Vojenský technický ústav, s.p.
odštěpný závod VTÚPV
Víta Nejedlého 691, 682 01 Vyškov, Czech Republic

CERTIFICATE
N° VTÚPV – 056 / 2025 / ZAHR

Applicant: **Shanghai Matis Electric Co., Ltd.**
上海麦豆电气有限公司
Room 320, No. 83, Huanhu West Third Road, Pudong, Shanghai, China

Product: **Smart Metering Breaker**

Tested Model: MT61GR
Derived Models: MT61GP

Manufacturer: **Shanghai Matis Electric**
Room 320, No. 83, Huanhu West Third Road, Pudong, Shanghai, China

Rating and principal characteristics: Power supply: 230/400 V AC;
Rated Current: 80 A max;
Frequency: 50 Hz

Test results are described in the Test Reports No.:
STE05232515S (tests made by STE Testing Laboratory Co., Ltd.)

The sample of tested product conforms with the requirements of the following standards harmonized with the LVD Directive No. 2014/35/EU

- EN 61010-1: 2010 + A1: 2019

This certificate is valid until: **25. 06. 2030**

After preparation of the necessary technical documentation as well as the conformity declaration, the required CE marking can be affixed on the product. Other relevant directives have to be observed.
The CE mark shall appear according to this sample:

CE

odštěpný závod VTÚPV
VTÚPV
VOJENSKÝ TECHNICKÝ ÚSTAV, s.p.

Vyškov 25. 06. 2025

Tel./Fax: +420 910 105 580
e-mail: milan.bezdek@vtusp.cz
http://www.vtusp.cz

Milan Bezděk
Certification Head

CERTIFICATE
of Conformity

Reference No. : **LCS190815025AS**

Applicant : **SHANGHAI MATIS ELECTRC CO.,LTD.**

Address : **BLOCK C, NO.888, HUANHU WEST 2ND ROAD, PUDONG, SHANGHAI, CHINA**

Trademark : **Matis matismart**

Product : **AIOT ENERGY METER WITH MCB**

Model(s) : **MT61GP, M61WF, MT61NB, MT61LR**

Parameters : **Single Phase, 1P+N, 230V,50/60Hz,**
6A,10A,16A,20A,25A,32A.40A.50A,63A,80A
Three Phase, 3P+N, 400V,50/60Hz,
6A,10A,16A,20A,25A,32A.40A.50A,63A,80,100A

The submitted products have been tested by us with the listed standards and found in compliance with the following European Directives:

The LVD Directive 2014/35/EU

EN 60898-1:2019

The tests were performed in normal operation mode. The test results apply only to the particular sample tested and to the specific tests carried out. This certificate applies specifically to the sample investigated in our test reference number only.

The CE markings as shown below can be affixed on the product after preparation of necessary technical documentation.

Other relevant Directives have to be observed.

CE

ate of issue: September 12, 2019

Center of Testing Service
Manager
APPROVED

Guangzhou LCS Compliance Testing Laboratory Ltd.
No 44-1, Qianfeng North Road, Shiqi town, Panyu District, Guangzhou City, China
Tel: (86)020-39166689 Fax: (86)020-39166619
Http://www.lcs-cert.com Email: webmaster@lcs-cert.com

扫码查询真伪
Scan,Query authenticity

CERTIFICATE
of Conformity

Reference No.	:	LCS190815026AS
Applicant	:	SHANGHAI MATIS ELECTRC CO.,LTD.
Address	:	BLOCK C, NO.888, HUANHU WEST 2ND ROAD, PUDONG, SHANGHAI, CHINA
Trademark	:	matis
Product	:	SMART PROTECTED POWER METER
Model(s)	:	MT61GP,MT641WF,MT61TR
Parameters	:	230V,50Hz,6A,10A,16A,20A,25A,32A,40A,50A,63A,80A,100A,125A(2P/single phase) 400V,50Hz,6A,10A,16A,20A,25A,32A,40A,50A,63A,80A,100A,125A(2P/single phase)

The submitted products have been tested by us with the listed standards and found in compliance with the following European Directives:

The LVD Directive 2014/35/EU

EN 61010-1:2010,AMD1:2019

The tests were performed in normal operation mode. The test results apply only to the particular sample tested and to the specific tests carried out. This certificate applies specifically to the sample investigated in our test reference number only.

The CE markings as shown below can be affixed on the product after preparation of necessary technical documentation.

Other relevant Directives have to be observed.

CE

Date of issue: September 12, 2019

Center of Testing Service
Manager
APPROVED

Shenzhen LCS Compliance Testing Laboratory Ltd.
1/F., Xingyuan Industrial Park, Tongda Road, Bao'an Avenue, Bao'an District,
Shenzhen, Guangdong, China
Tel: (86)755-82591330 Fax: (86)755-82591332
Http://www.lcs-cert.com Email: webmaster@lcs-cert.com

Appendix C for Photographs of The EUT



Fig. 1



Fig. 2

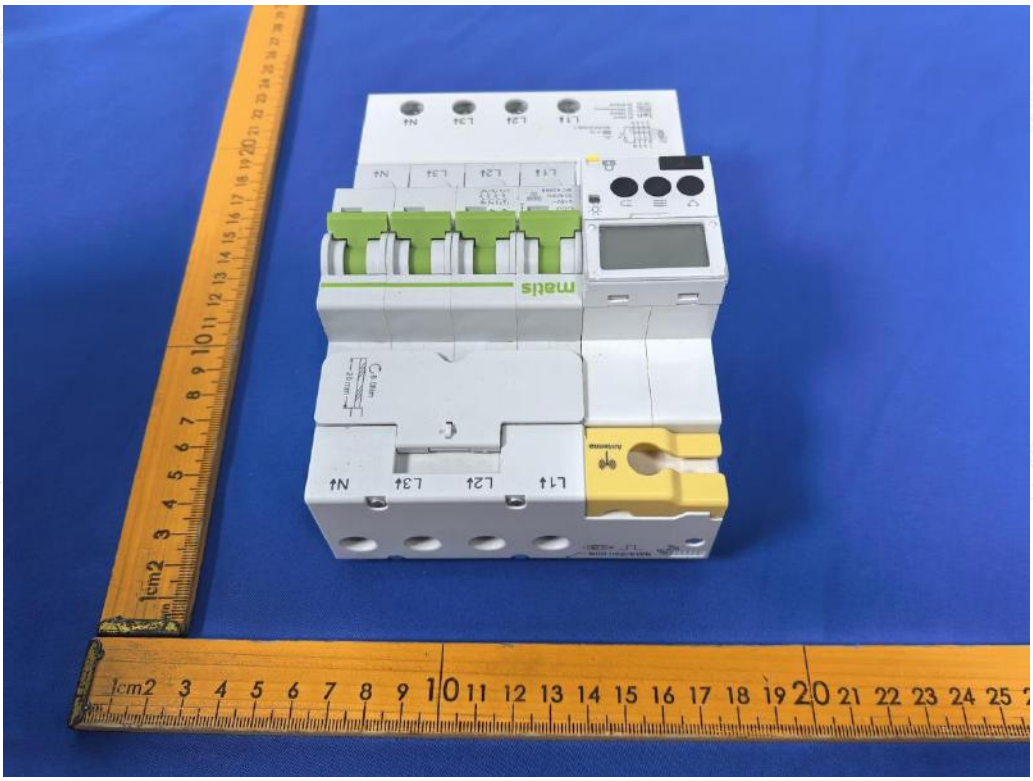

mats
N↓ L3↓ L2↓ L1↓
1cm2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

Fig. 3


mats
L1↓ L2↓ L3↓ N↓
1cm2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

Fig. 4


MT61GR-4G N/EUR/4P
1cm2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

Fig. 5


matis
1cm2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26

Fig. 6

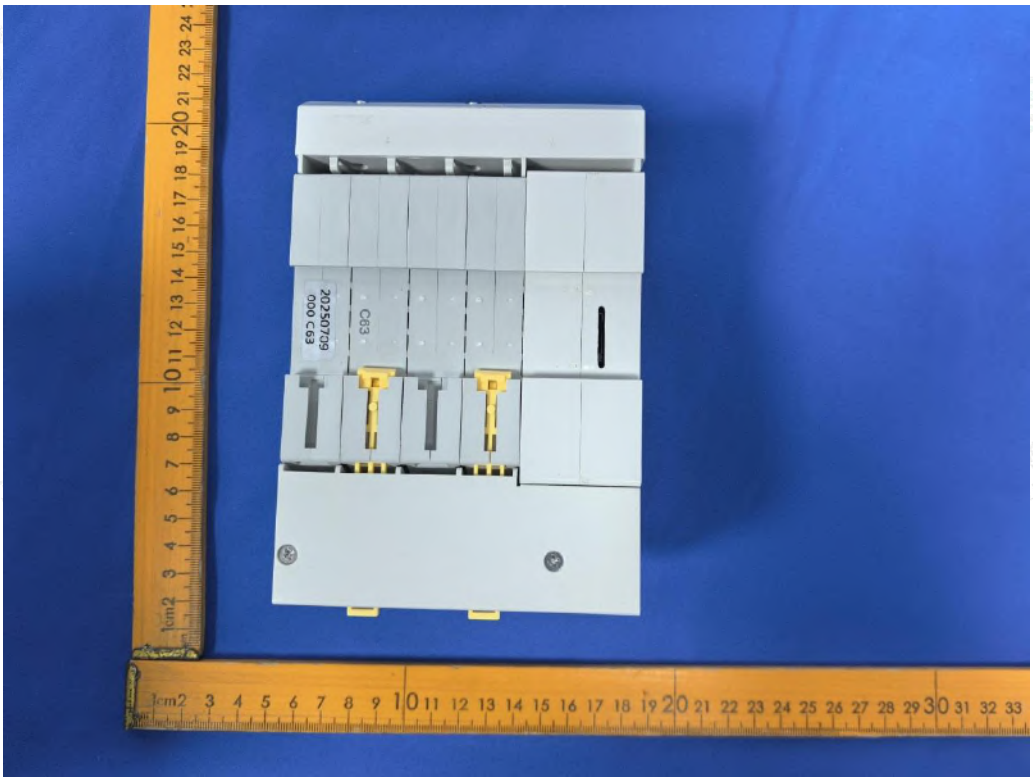


Fig. 7



Fig. 8

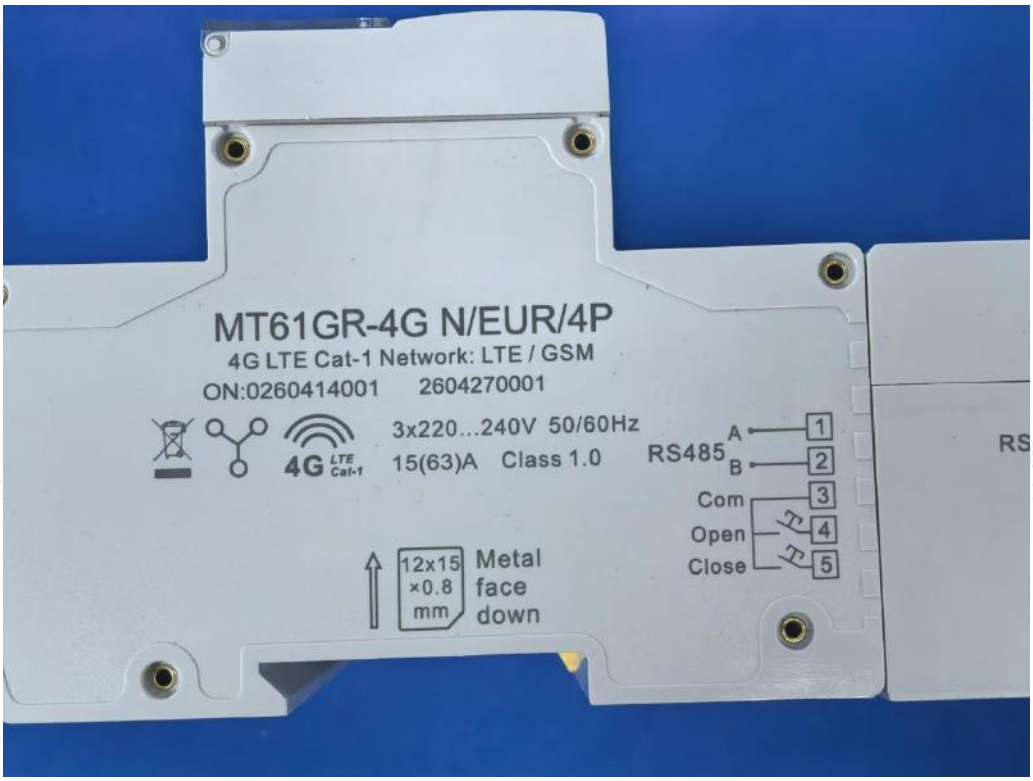

MT61GR-4G N/EUR/4P
4G LTE Cat-1 Network: LTE / GSM
ON:0260414001 2604270001
3x220...240V 50/60Hz
15(63)A Class 1.0
4G LTE Cat-1
RS485 A 1
B 2
Com 3
Open 4
Close 5
12x15 ×0.8 mm
Metal face down

Fig. 9

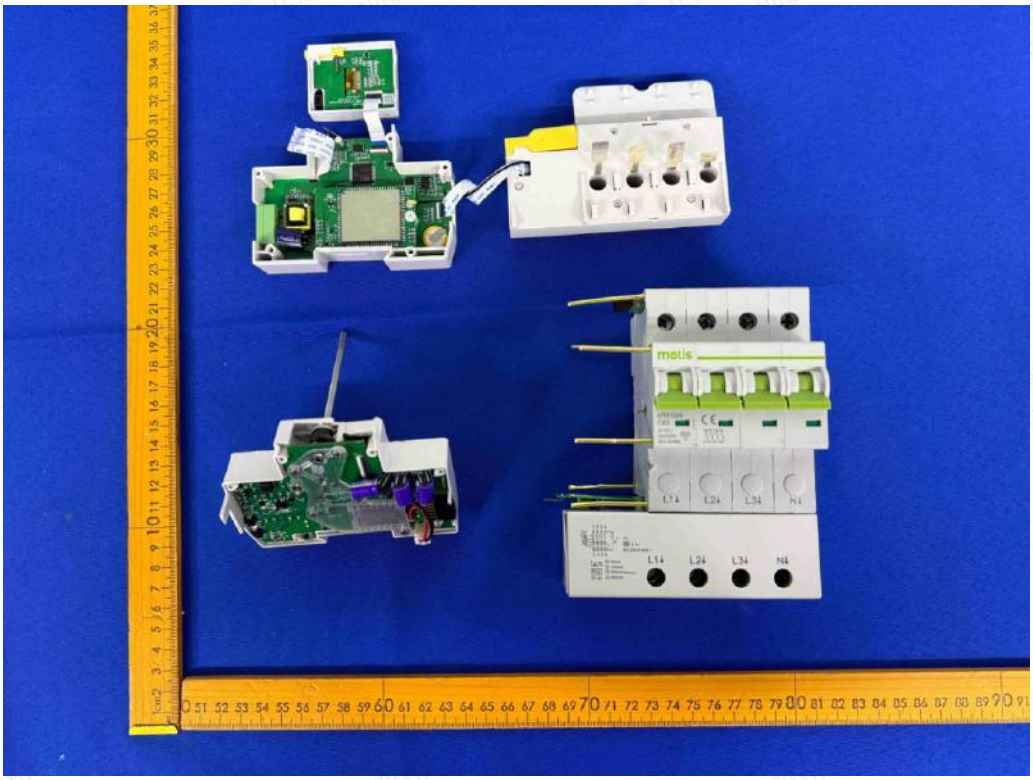


Fig. 10

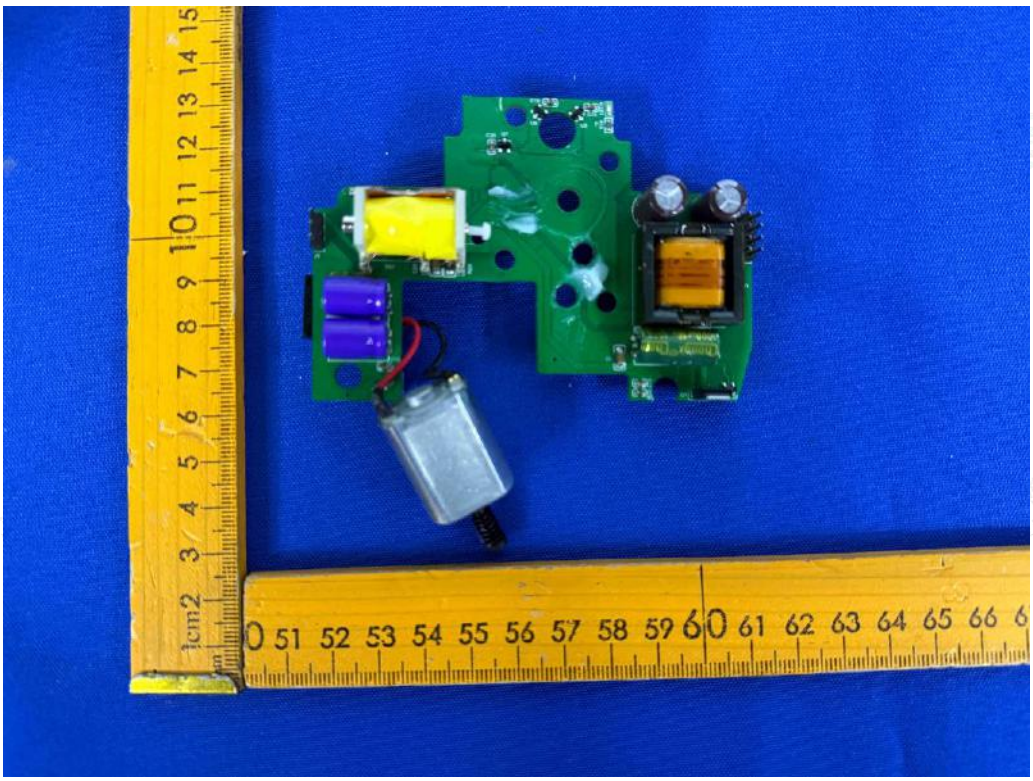


Fig. 11

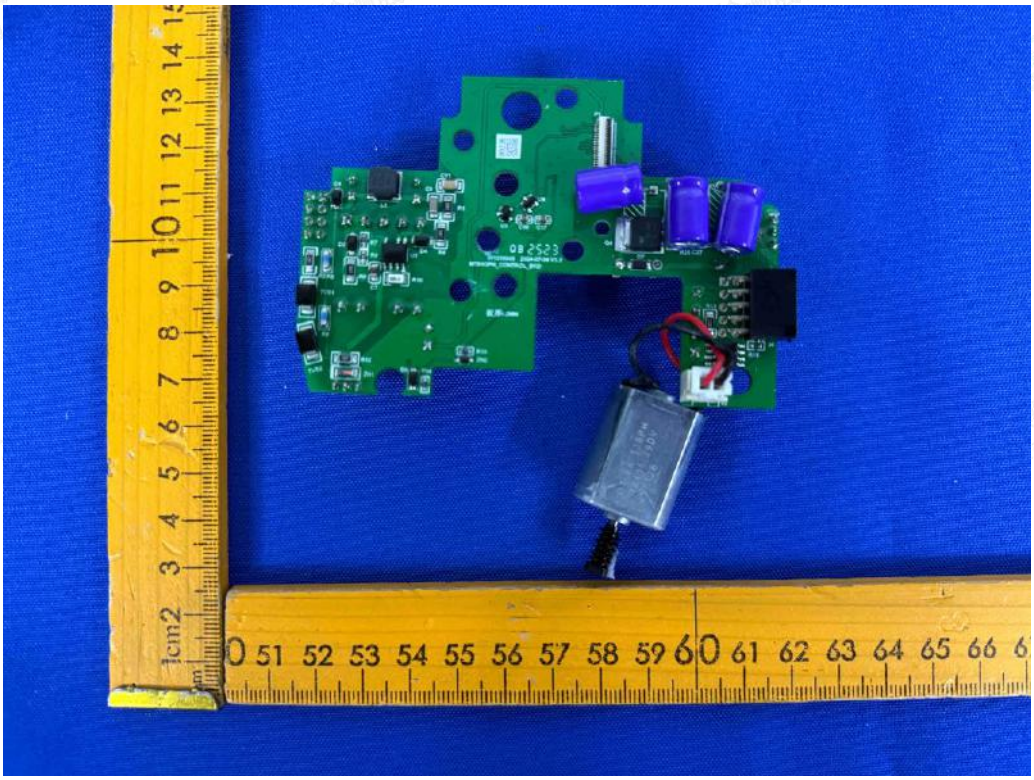


Fig. 12

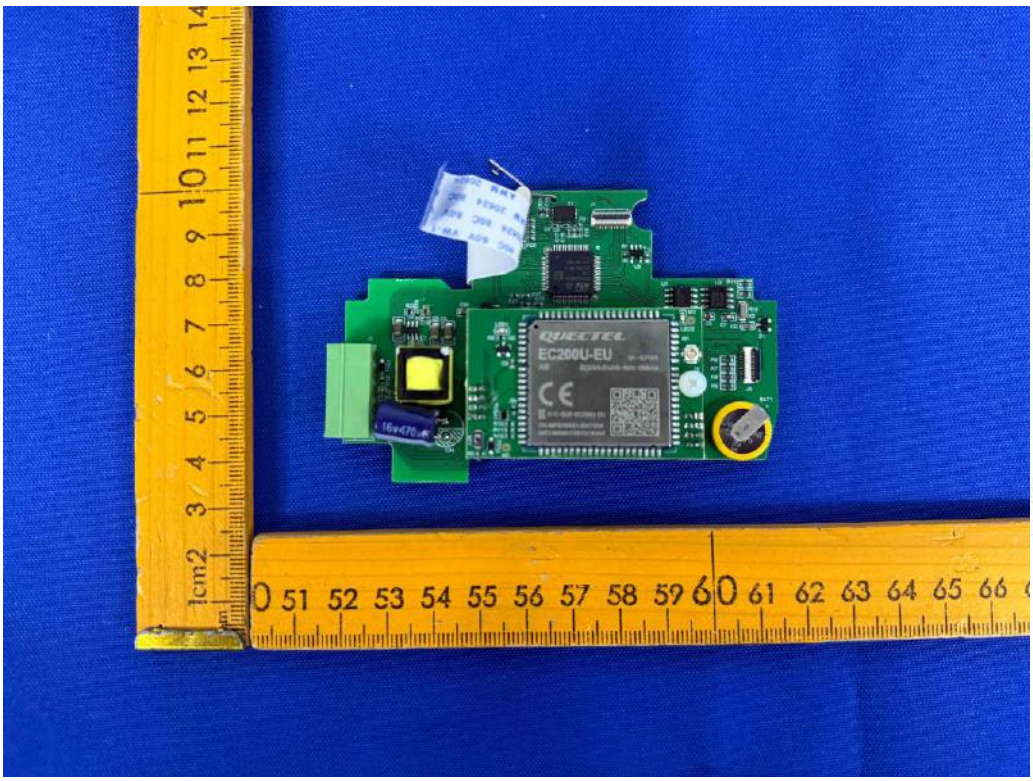


Fig. 13

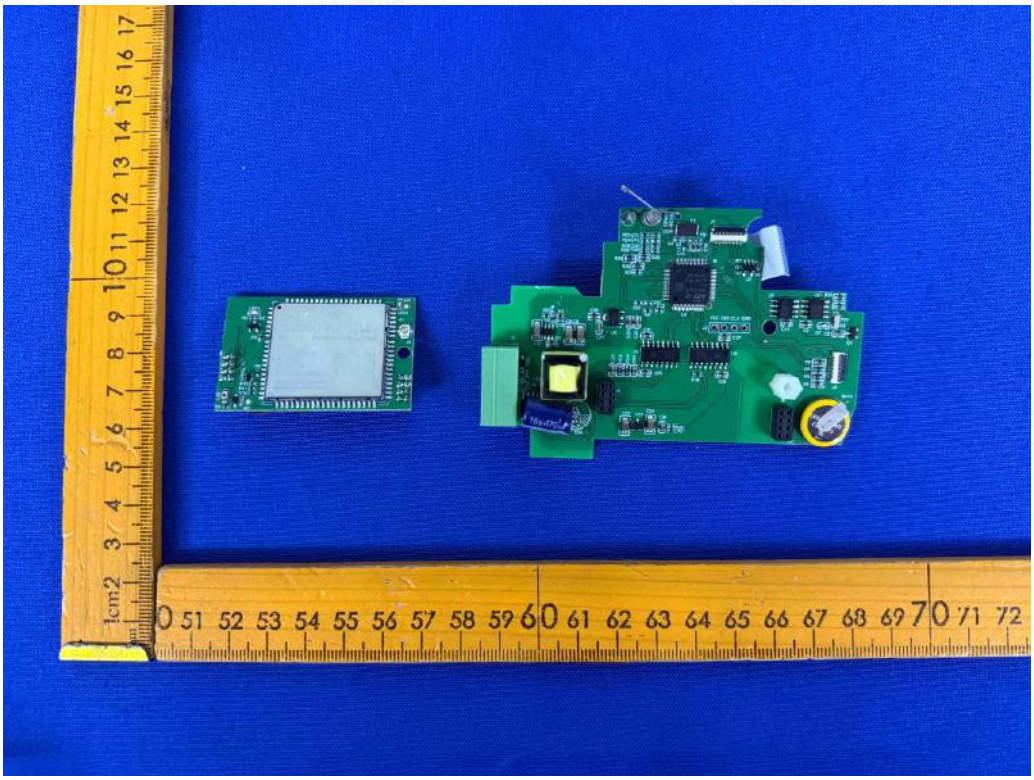


Fig. 14

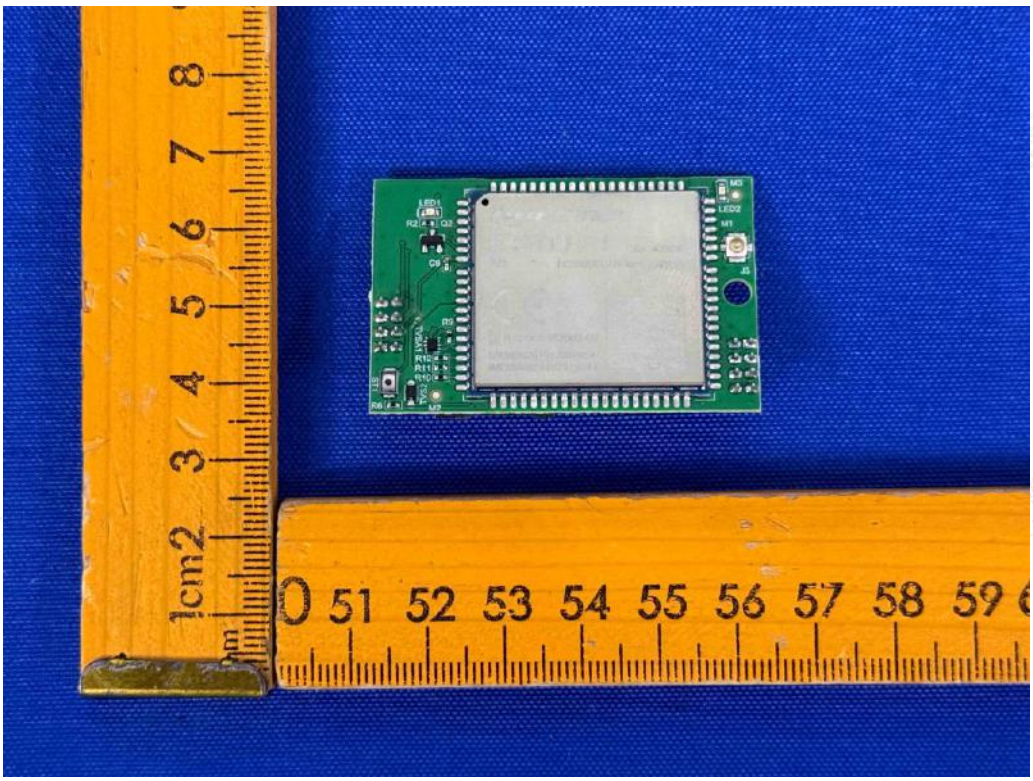


Fig. 15

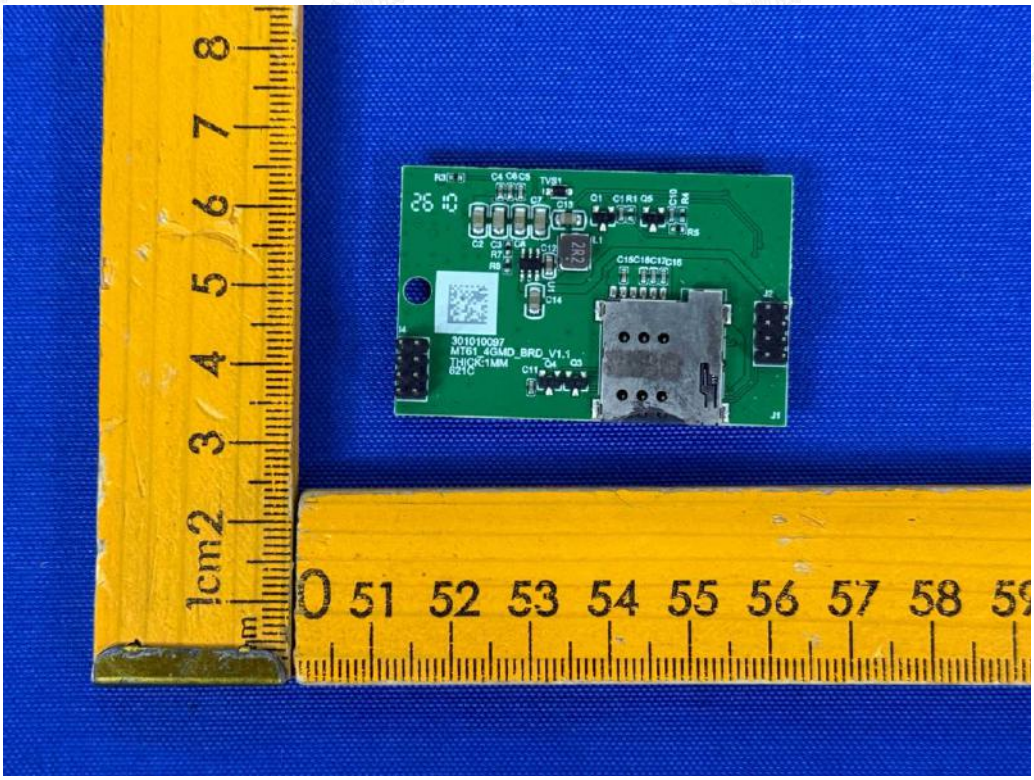


Fig. 16

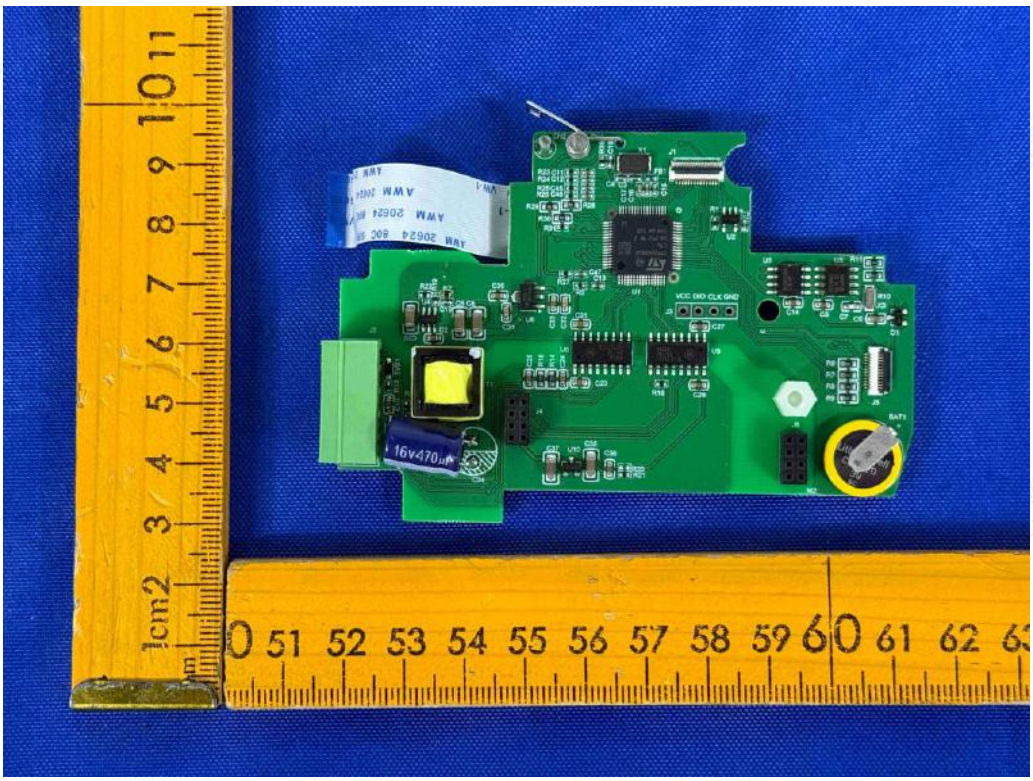

16v470μF
1cm2
0 51 52 53 54 55 56 57 58 59 60 61 62 63

Fig. 17

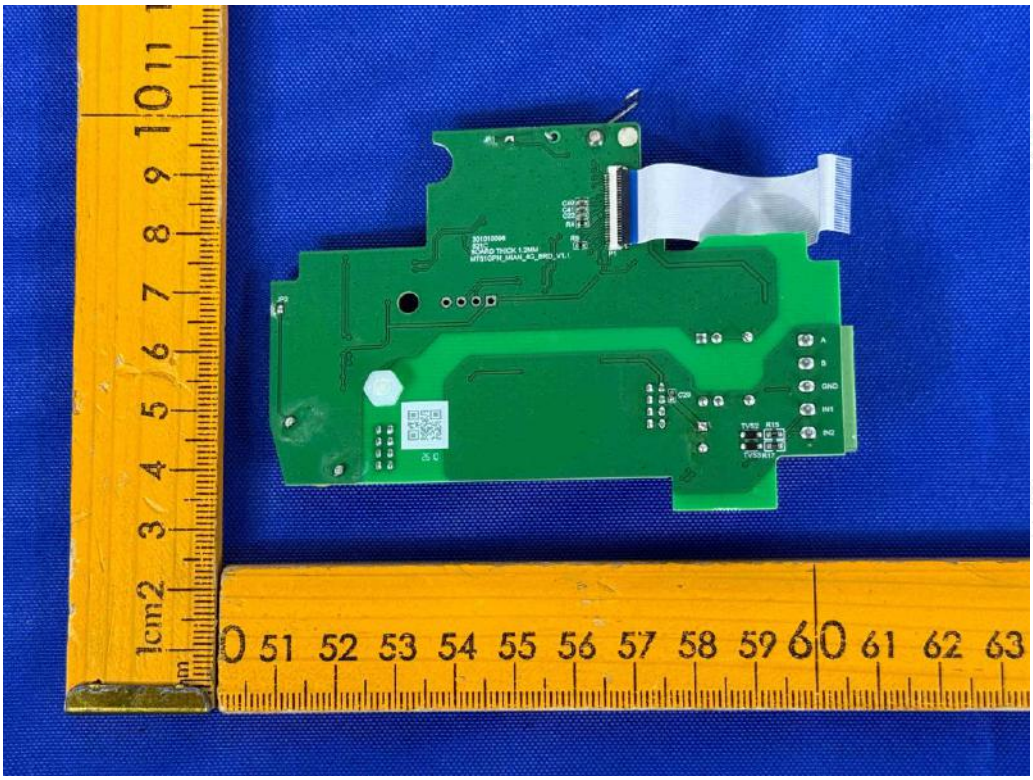

1cm2
0 51 52 53 54 55 56 57 58 59 60 61 62 63

Fig. 18

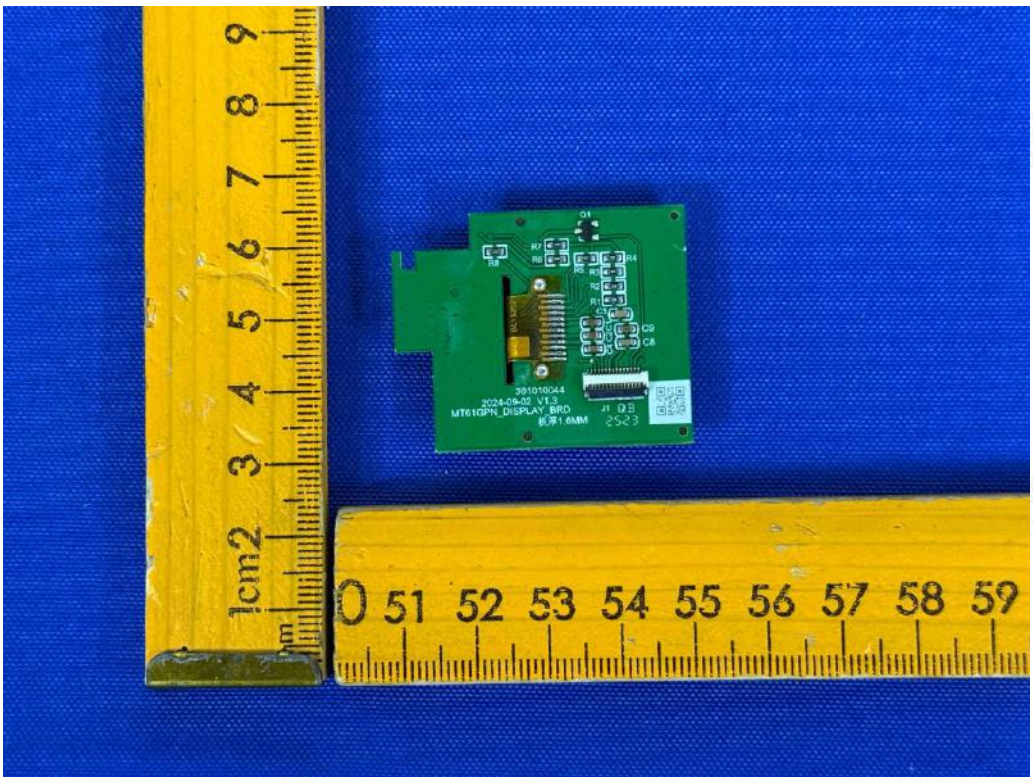


Fig. 19

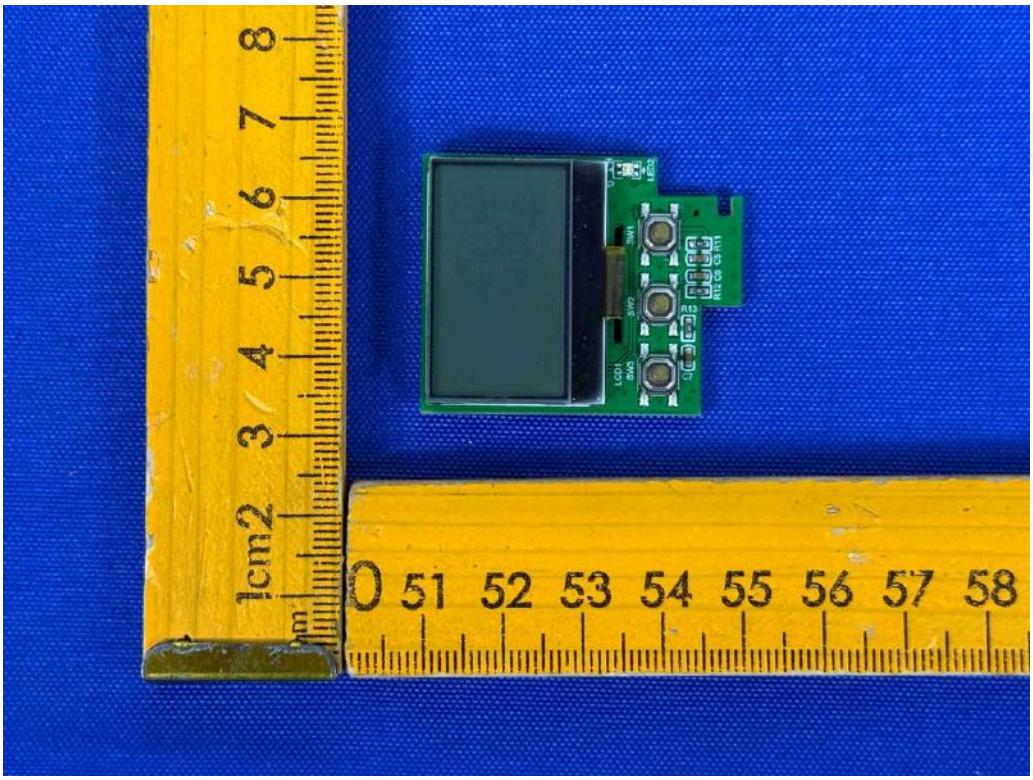


Fig. 20

Appendix D for Photographs of Test Setup_RF



Spurious Emission Below 1GHz



Spurious Emission Above 1GHz

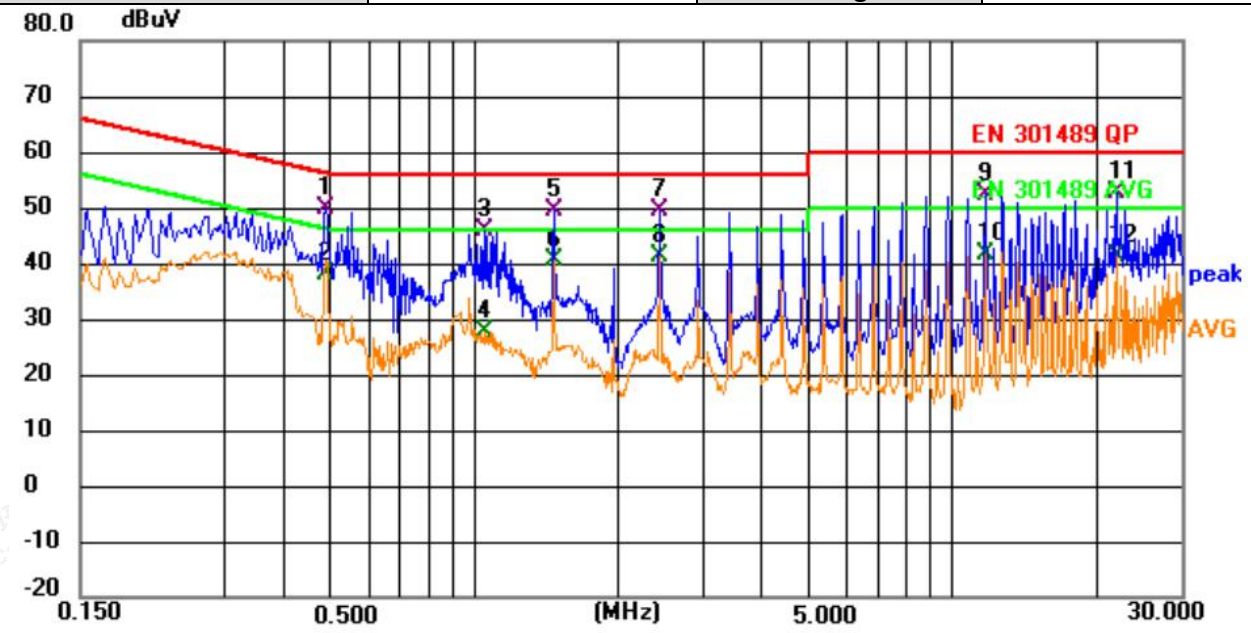
Appendix A for Emission and Immunity test results

Product Name: Smart Metering RCBO/MCB

Test Model: MT61GR

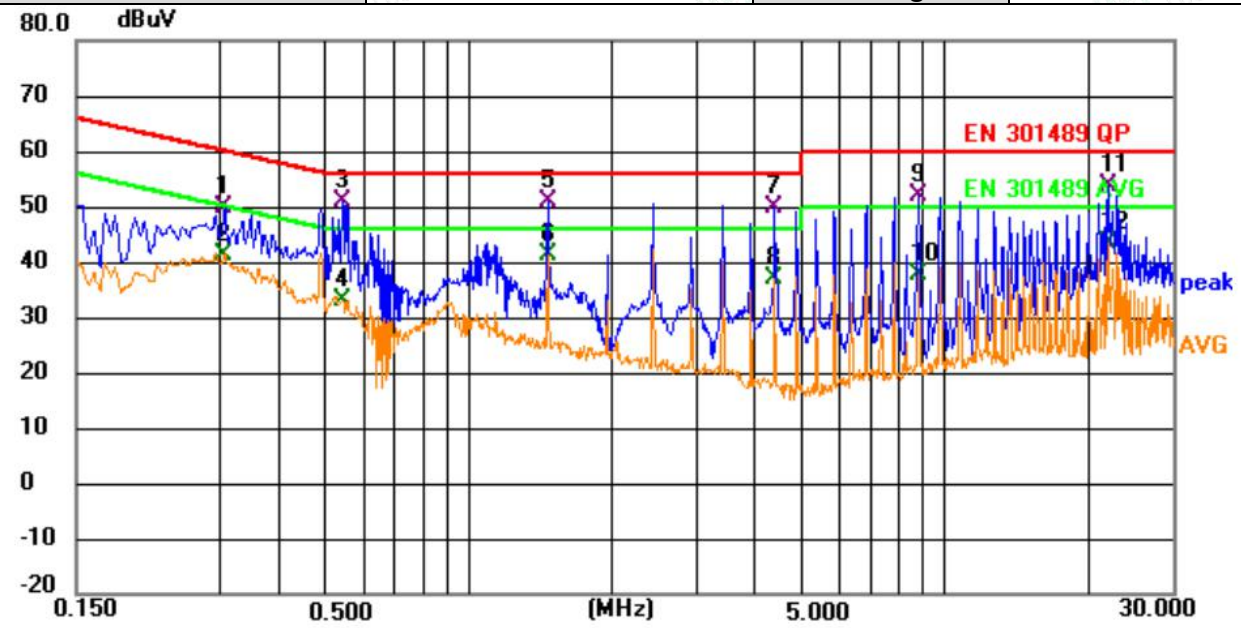
A.1 Line Conducted Emission

Test Model	MT61GR	**Test Mode**	TM1
Environmental Conditions	24.6℃, 56.8% RH	**Test Engineer**	Jerry Chu
Pol.	Line	**Test Voltage**	AC 230V/50Hz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.487	29.49	20.31	49.80	56.22	-6.42	QP	
2		0.487	17.58	20.31	37.89	46.22	-8.33	AVG	
3		1.054	26.22	19.62	45.84	56.00	-10.16	QP	
4		1.054	7.98	19.62	27.60	46.00	-18.40	AVG	
5		1.468	29.92	19.65	49.57	56.00	-6.43	QP	
6		1.468	20.83	19.65	40.48	46.00	-5.52	AVG	
7		2.445	29.90	19.71	49.61	56.00	-6.39	QP	
8	*	2.445	21.62	19.71	41.33	46.00	-4.67	AVG	
9		11.733	32.27	20.14	52.41	60.00	-7.59	QP	
10		11.733	21.41	20.14	41.55	50.00	-8.45	AVG	
11		22.006	33.20	19.54	52.74	60.00	-7.26	QP	
12		22.006	21.68	19.54	41.22	50.00	-8.78	AVG	

Test Model	MT61GR	Test Mode	TM1
Environmental Conditions	24.6℃, 56.8% RH	Test Engineer	Jerry Chu
Pol.	Neutral	Test Voltage	AC 230V/50Hz

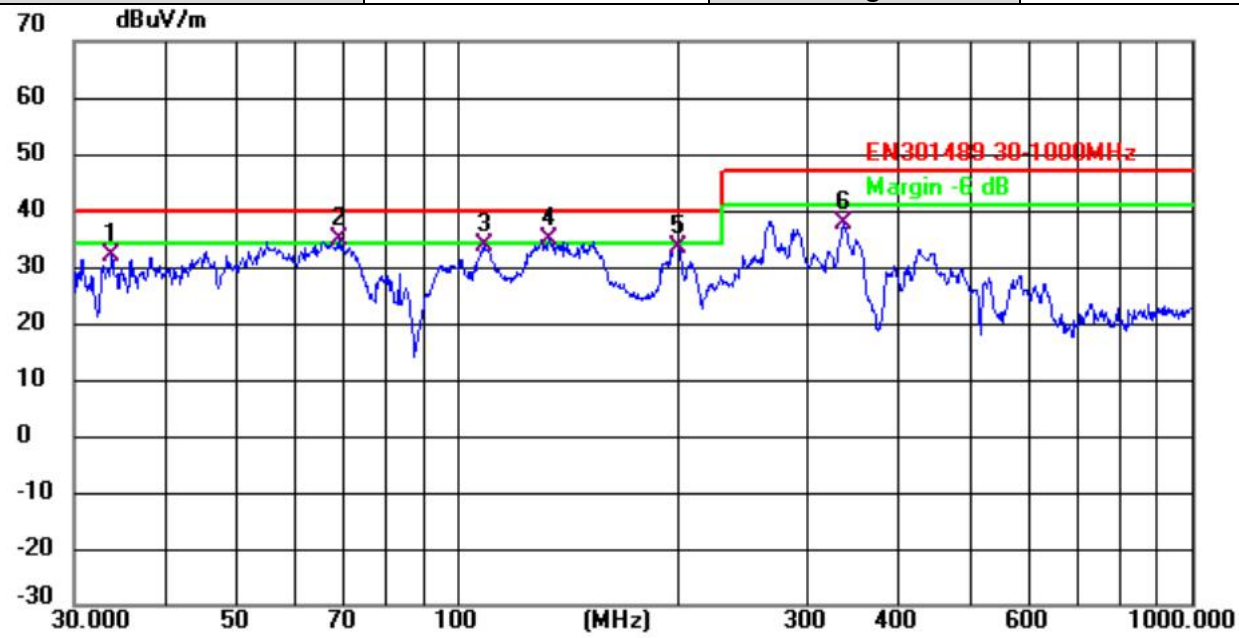


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.307	29.45	20.32	49.77	60.05	-10.28	QP	
2		0.307	20.98	20.32	41.30	50.05	-8.75	AVG	
3		0.541	30.79	20.20	50.99	56.00	-5.01	QP	
4		0.541	12.79	20.20	32.99	46.00	-13.01	AVG	
5		1.468	31.35	19.68	51.03	56.00	-4.97	QP	
6	*	1.468	21.66	19.68	41.34	46.00	-4.66	AVG	
7		4.398	30.00	19.78	49.78	56.00	-6.22	QP	
8		4.398	17.25	19.78	37.03	46.00	-8.97	AVG	
9		8.799	31.58	20.32	51.90	60.00	-8.10	QP	
10		8.799	17.27	20.32	37.59	50.00	-12.41	AVG	
11		22.002	34.26	19.49	53.75	60.00	-6.25	QP	
12		22.002	24.06	19.49	43.55	50.00	-6.45	AVG	

Note: For conducted emission and radiated emission test, a power supply of 230VAC and 120VAC was used for testing respectively, and only recorded the worst case of 230VAC.
Margin= Reading Level + Correct Factor – Limit
Correct Factor=Lisn Factor+Cable Factor

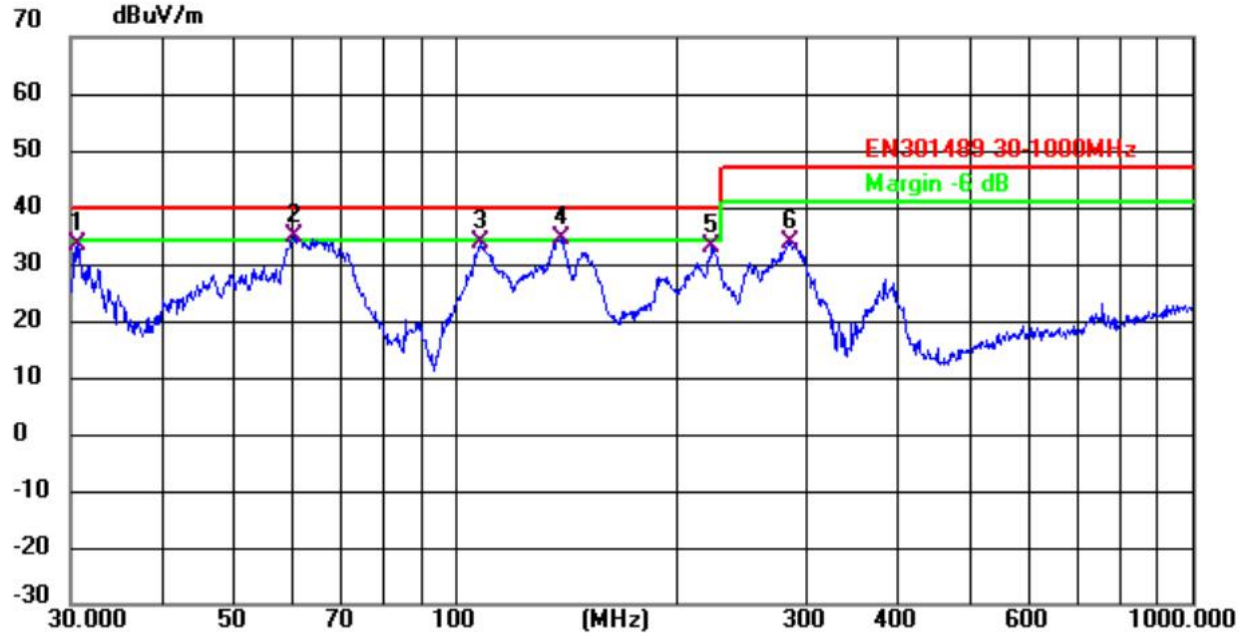
A.3 Radiated Disturbance

Test Model	MT61GR	Test Mode	TM1
Environmental Conditions	23.8℃, 52.1% RH	Test Engineer	Jerry Chu
Pol.	Vertical	Detector Function	Quasi-peak
Distance	3m	Test Voltage	AC 230V/50Hz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		33.7986	51.17	-19.15	32.02	40.00	-7.98	QP	
2	!	68.8721	55.52	-20.72	34.80	40.00	-5.20	QP	
3		109.0286	53.85	-20.25	33.60	40.00	-6.40	QP	
4	*	133.1510	56.86	-21.87	34.99	40.00	-5.01	QP	
5		199.9855	51.80	-18.39	33.41	40.00	-6.59	QP	
6		334.8588	52.66	-14.93	37.73	47.00	-9.27	QP	

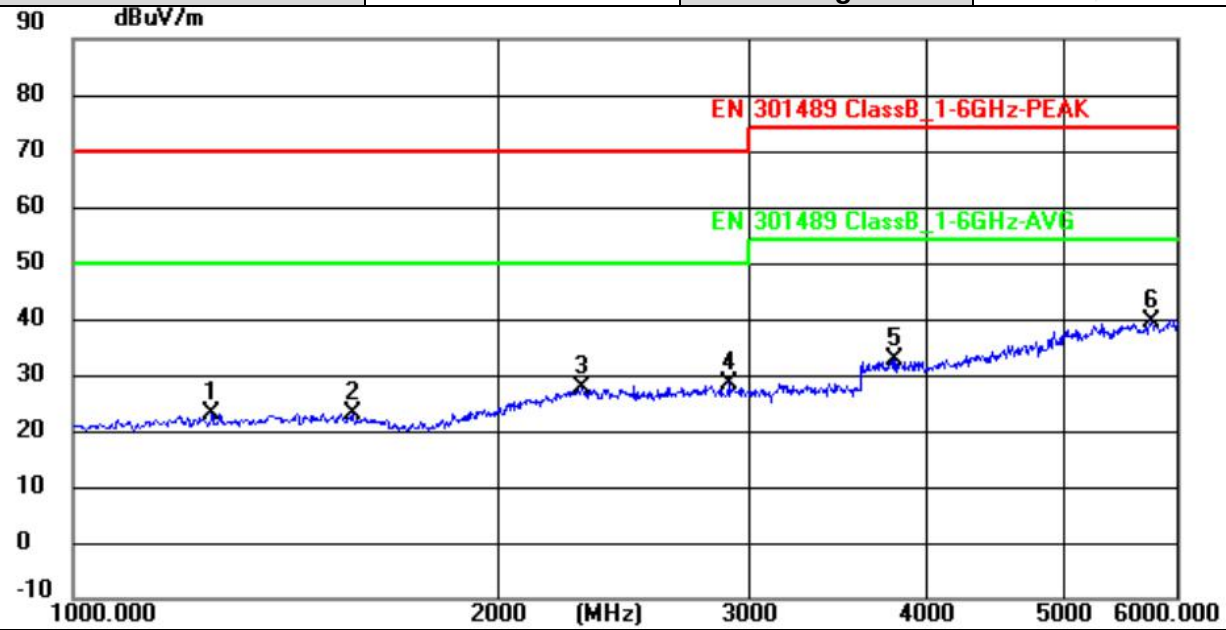
Test Model	MT61GR	Test Mode	TM1
Environmental Conditions	23.8℃, 52.1% RH	Test Engineer	Jerry Chu
Pol.	Horizontal	Detector Function	Quasi-peak
Distance	3m	Test Voltage	AC 230V/50Hz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		30.7454	53.07	-19.64	33.43	40.00	-6.57	QP	
2	*	60.2801	52.47	-17.79	34.68	40.00	-5.32	QP	
3		108.2666	52.48	-18.66	33.82	40.00	-6.18	QP	
4	!	138.8734	55.93	-21.56	34.37	40.00	-5.63	QP	
5		222.9502	51.81	-18.84	32.97	40.00	-7.03	QP	
6		284.9767	50.57	-16.81	33.76	47.00	-13.24	QP	

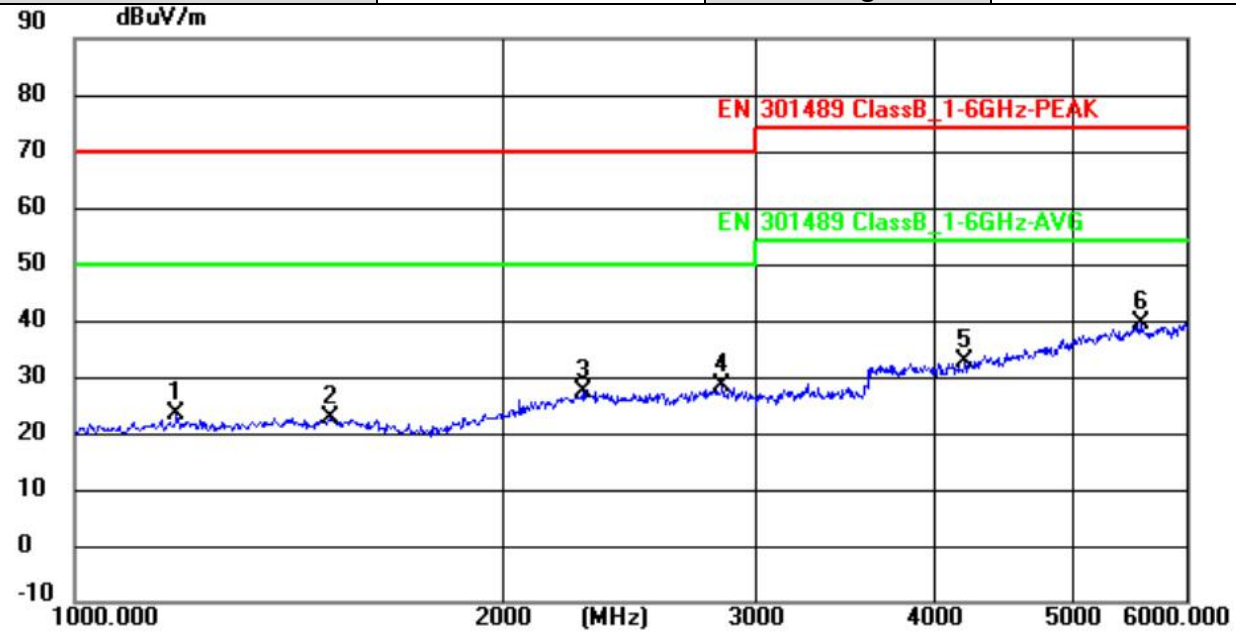
Note: Margin= Reading Level + Correct Factor – Limit
Correct Factor=Antenna Factor+Cable Factor – Pre-Amplifier Factor

Test Model	MT61GR	Test Mode	TM1(Above 1GHz)
Environmental Conditions	23.5℃, 52.1% RH	Test Engineer	Jerry Chu
Pol.	Vertical	Detector Function	Peak + AV
Distance	3m	Test Voltage	AC 230V/50Hz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		1255.0000	35.77	-12.68	23.09	70.00	-46.91	peak	
2		1575.0000	35.34	-12.17	23.17	70.00	-46.83	peak	
3		2290.0000	36.32	-8.67	27.65	70.00	-42.35	peak	
4		2900.0000	36.69	-8.41	28.28	70.00	-41.72	peak	
5		3800.0000	39.28	-6.55	32.73	74.00	-41.27	peak	
6	*	5770.0000	40.54	-0.96	39.58	74.00	-34.42	peak	

Test Model	MT61GR	Test Mode	TM1(Above 1GHz)
Environmental Conditions	23.5℃, 52.1% RH	Test Engineer	Jerry Chu
Pol.	Horizontal	Detector Function	Peak + AV
Distance	3m	Test Voltage	AC 230V/50Hz



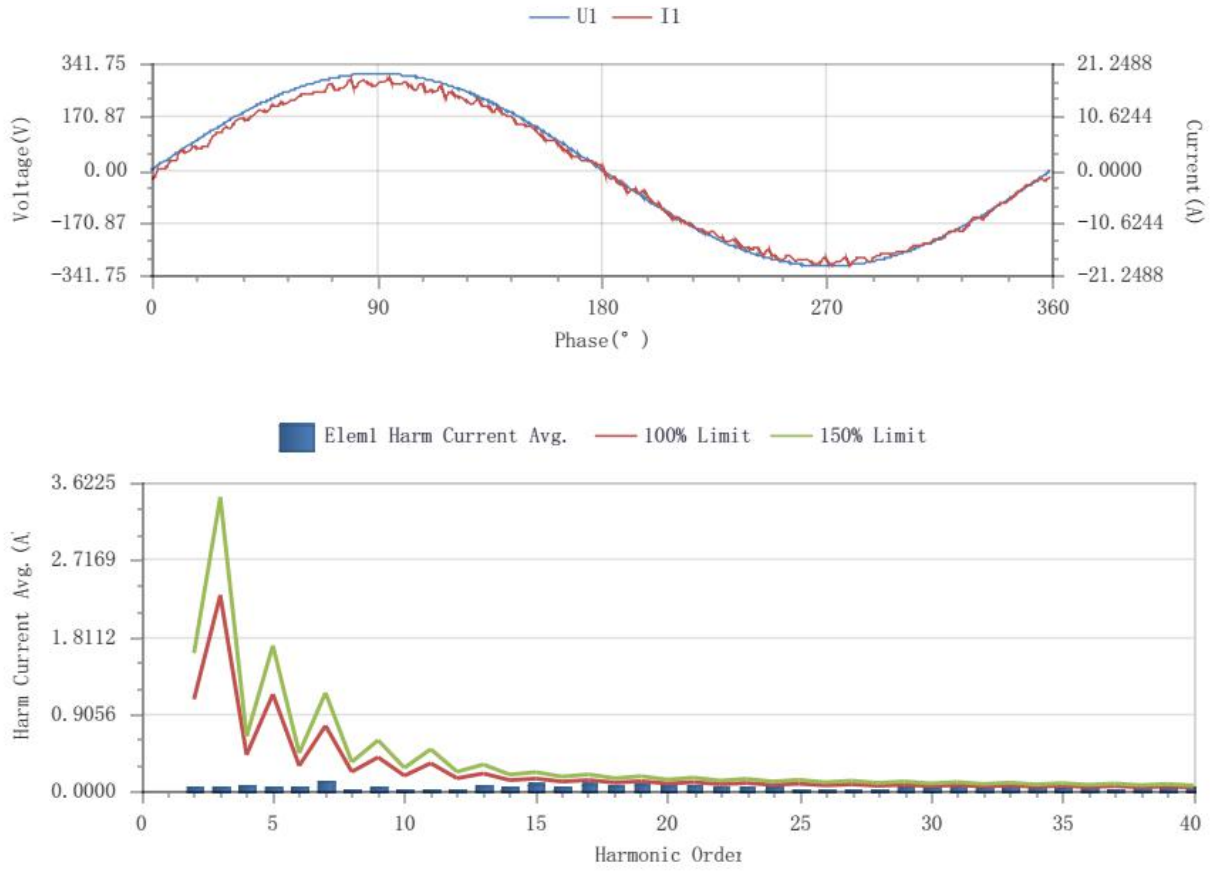
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		1180.0000	35.93	-12.54	23.39	70.00	-46.61	peak	
2		1510.0000	34.64	-12.12	22.52	70.00	-47.48	peak	
3		2275.0000	36.02	-8.80	27.22	70.00	-42.78	peak	
4		2845.0000	36.58	-8.14	28.44	70.00	-41.56	peak	
5		4205.0000	38.30	-5.78	32.52	74.00	-41.48	peak	
6	*	5580.0000	40.64	-1.31	39.33	74.00	-34.67	peak	

Note:
1. Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
2. Measurements above show only up to 6 maximum emissions noted.
3. Data of measurement within this frequency range shown " -- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. Factor = Antenna Factor + Cable Loss + Amplifier Factor
   Emission Level = Reading level + Factor
   Margin = Emission Level - Limit

A.4 Harmonic Current Emissions

Test Model	MT61GR	Test Mode	TM1
Test Engineer	Jerry Chu	Test Voltage	AC 230V/50Hz
Environmental Conditions	24.8℃, 55.7% RH		

Customer : Result : Pass



Customer : Result : Pass

Total Current Harmonic and Some Odd Harmonic Parameters

THC(A)	0.3432	THD(%)	2.71	POHC(A)	0.1476	POHC Limit(A)	0.2514

Maximum Value of Relevant Parameter During Test Period

Urms(V)	219.43	Freq(Hz)	49.999
Irms(A)	12.7072	Ipeak(A)	19.6352
I1(A)	12.6858	ICF	1.6075
P(W)	2784.6	λ	0.9982

Individual Harmonics and Limit Judgment

Order(n)	Harmonics Current Avg.(A)	100% Limit(A)	Limit Percent(%)	Harmonics Current Max.(A)	150% Limit(A)	Limit Percent(%)	Result
2	0.0442	1.0800	N/A	0.0518	1.6200	N/A	Pass
3	0.0385	2.3000	N/A	0.0414	3.4500	N/A	Pass
4	0.0634	0.4300	N/A	0.0680	0.6450	N/A	Pass
5	0.0361	1.1400	N/A	0.0394	1.7100	N/A	Pass
6	0.0391	0.3000	N/A	0.0424	0.4500	N/A	Pass
7	0.1228	0.7700	15.95	0.1252	1.1550	10.84	Pass
8	0.0252	0.2300	N/A	0.0280	0.3450	N/A	Pass
9	0.0495	0.4000	N/A	0.0515	0.6000	N/A	Pass
10	0.0142	0.1840	N/A	0.0160	0.2760	N/A	Pass
11	0.0222	0.3300	N/A	0.0244	0.4950	N/A	Pass
12	0.0245	0.1533	N/A	0.0266	0.2300	N/A	Pass
13	0.0676	0.2100	N/A	0.0701	0.3150	N/A	Pass
14	0.0435	0.1314	N/A	0.0466	0.1971	N/A	Pass
15	0.0941	0.1500	62.73	0.0967	0.2250	42.97	Pass
16	0.0581	0.1150	N/A	0.0612	0.1725	N/A	Pass
17	0.1022	0.1324	77.19	0.1048	0.1985	52.78	Pass
18	0.0643	0.1022	N/A	0.0678	0.1533	N/A	Pass
19	0.0892	0.1184	75.36	0.0925	0.1776	52.10	Pass
20	0.0669	0.0920	N/A	0.0738	0.1380	N/A	Pass
21	0.0666	0.1071	N/A	0.0732	0.1607	N/A	Pass
22	0.0493	0.0836	N/A	0.0539	0.1255	N/A	Pass
23	0.0384	0.0978	N/A	0.0418	0.1467	N/A	Pass
24	0.0357	0.0767	N/A	0.0402	0.1150	N/A	Pass
25	0.0253	0.0900	N/A	0.0288	0.1350	N/A	Pass
26	0.0281	0.0708	N/A	0.0317	0.1062	N/A	Pass
27	0.0276	0.0833	N/A	0.0316	0.1250	N/A	Pass
28	0.0342	0.0657	N/A	0.0384	0.0986	N/A	Pass
29	0.0396	0.0776	N/A	0.0448	0.1164	N/A	Pass
30	0.0445	0.0613	N/A	0.0502	0.0920	N/A	Pass
31	0.0691	0.0726	N/A	0.0786	0.1089	72.16	Pass
32	0.0532	0.0575	N/A	0.0709	0.0863	N/A	Pass
33	0.0608	0.0682	N/A	0.0681	0.1023	N/A	Pass
34	0.0460	0.0541	N/A	0.0597	0.0812	N/A	Pass
35	0.0423	0.0643	N/A	0.0461	0.0964	N/A	Pass
36	0.0355	0.0511	N/A	0.0427	0.0767	N/A	Pass
37	0.0334	0.0608	N/A	0.0372	0.0912	N/A	Pass
38	0.0377	0.0484	N/A	0.0421	0.0726	N/A	Pass
39	0.0387	0.0577	N/A	0.0438	0.0865	N/A	Pass
40	0.0506	0.0460	N/A	0.0565	0.0690	N/A	Pass

Customer : Result : Pass

Voltage Relevant Parameter During Test Period and Judgment

Item	Nominal Value	Measured Value	Error Value	Allowable Error Value	Result
Urms(V)	220.00	219.40	0.60	±2.0%	Pass
Frequency(Hz)	50.000	49.995	0.005	±0.5%	Pass

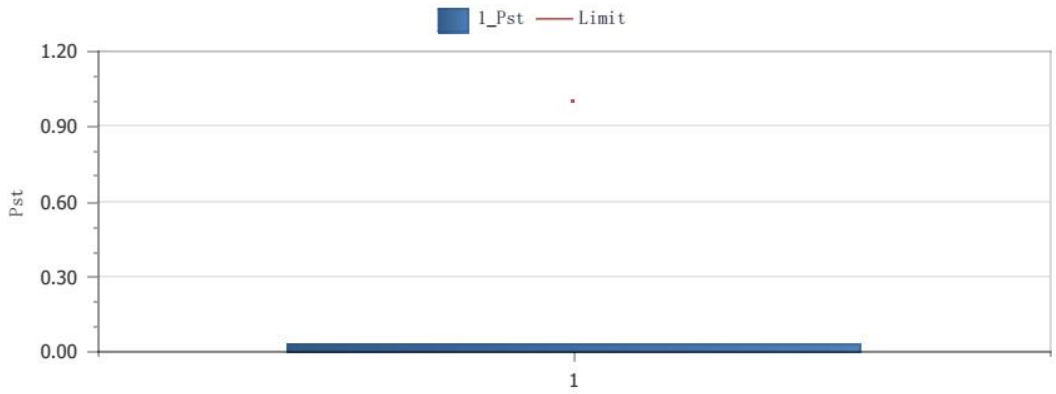
Individual Harmonics Voltage and Limit Judgment

Order(n)	U[k](V)	Uhdf(%)	Limit(%)	Result
1	219.417	100.007	---	Pass
2	0.035	0.016	0.200	Pass
3	0.031	0.014	0.900	Pass
4	0.016	0.007	0.200	Pass
5	0.019	0.009	0.400	Pass
6	0.012	0.005	0.200	Pass
7	0.021	0.009	0.300	Pass
8	0.008	0.004	0.200	Pass
9	0.022	0.010	0.200	Pass
10	0.009	0.004	0.200	Pass
11	0.009	0.004	0.100	Pass
12	0.012	0.005	0.100	Pass
13	0.012	0.005	0.100	Pass
14	0.013	0.006	0.100	Pass
15	0.016	0.007	0.100	Pass
16	0.015	0.007	0.100	Pass
17	0.023	0.010	0.100	Pass
18	0.016	0.007	0.100	Pass
19	0.013	0.006	0.100	Pass
20	0.018	0.008	0.100	Pass
21	0.010	0.004	0.100	Pass
22	0.013	0.006	0.100	Pass
23	0.017	0.008	0.100	Pass
24	0.010	0.004	0.100	Pass
25	0.025	0.011	0.100	Pass
26	0.011	0.005	0.100	Pass
27	0.032	0.014	0.100	Pass
28	0.016	0.007	0.100	Pass
29	0.035	0.016	0.100	Pass
30	0.020	0.009	0.100	Pass
31	0.041	0.019	0.100	Pass
32	0.021	0.010	0.100	Pass
33	0.037	0.017	0.100	Pass
34	0.020	0.009	0.100	Pass
35	0.031	0.014	0.100	Pass
36	0.016	0.007	0.100	Pass
37	0.027	0.012	0.100	Pass
38	0.018	0.008	0.100	Pass
39	0.028	0.013	0.100	Pass
40	0.025	0.011	0.100	Pass

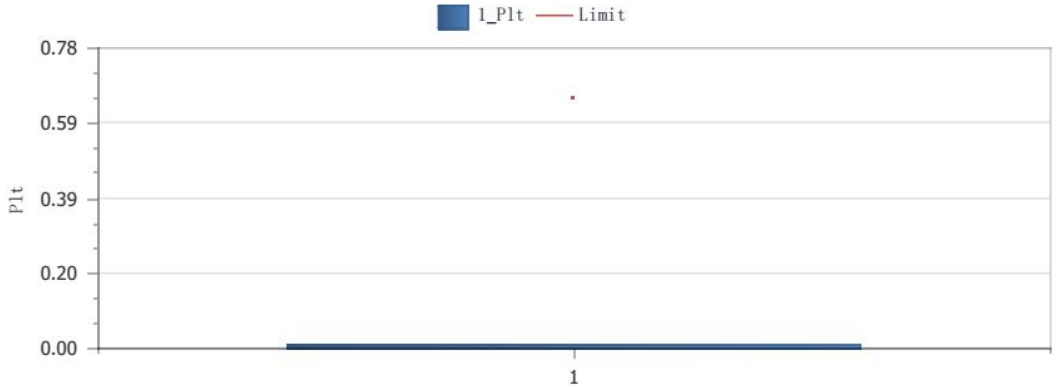
A.5 Voltage Fluctuation and Flicker

Test Model	MT61GR	Test Mode	TM1
Test Engineer	Jerry Chu	Test Voltage	AC 230V/50Hz
Environmental Conditions	24.8℃, 55.7% RH		

Pst and Limit



Plt and Limit



Relevant Parameter and Judgment During Test Period

Voltage at end of test	230.017V		
Voltage Fluctuation and Flicker	Test Value	Test Limit	Result
Tmax	0ms	500ms	Pass
dc	0.00%	3.30%	Pass
dmax	0.00%	4.00%	Pass
Pst	0.026	1.000	Pass
Plt	0.011	0.650	Pass

Eleml Test Parameters

Count	dc(%)	dmax(%)	Tmax(ms)	Pst	Plt
1	0.00	0.00	0.00	0.026	0.011

A.6 RF Electromagnetic Field (80 MHz - 6000 MHz)

Test Model	MT61GR	Test Engineer	Jerry Chu
Environmental Conditions	23.4℃, 52.4% RH	Test Voltage	AC 230V/50Hz

TM1-TM9 Test Result:

EUT Working Mode	Antenna Polarity	Frequency (MHz)	Fielded Strength (V/m)	Observation	Position	Conclusion
E-UTRA Band 1 Traffic	Vertical	80-6000	3	CT,CR	Front, Right, Left, Back, Top, Bottom	Pass
	Horizontal	80-6000	3	CT,CR	Front, Right, Left, Back, Top, Bottom	Pass
E-UTRA Band 1 Idle	Vertical	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass
E-UTRA Band 3 Traffic	Vertical	80-6000	3	CT,CR	Front, Right, Left, Back, Top, Bottom	Pass
	Horizontal	80-6000	3	CT,CR	Front, Right, Left, Back, Top, Bottom	Pass
E-UTRA Band 3 Idle	Vertical	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass
E-UTRA Band 7 Idle	Vertical	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass
E-UTRA Band 7 Idle	Vertical	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass
E-UTRA Band 8 Traffic	Vertical	80-6000	3	CT,CR	Front, Right, Left, Back, Top, Bottom	Pass
	Horizontal	80-6000	3	CT,CR	Front, Right, Left, Back, Top, Bottom	Pass
E-UTRA Band 8 Idle	Vertical	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass
E-UTRA Band 20 Traffic	Vertical	80-6000	3	CT,CR	Front, Right, Left, Back, Top, Bottom	Pass
	Horizontal	80-6000	3	CT,CR	Front, Right, Left, Back,	Pass

					Top, Bottom	
E-UTRA Band 20 Idle	Vertical	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass
E-UTRA Band 28 Traffic	Vertical	80-6000	3	CT,CR	Front, Right, Left, Back, Top, Bottom	Pass
	Horizontal	80-6000	3	CT,CR	Front, Right, Left, Back, Top, Bottom	Pass
E-UTRA Band 28 Idle	Vertical	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass
E-UTRA Band 38 Traffic	Vertical	80-6000	3	CT,CR	Front, Right, Left, Back, Top, Bottom	Pass
	Horizontal	80-6000	3	CT,CR	Front, Right, Left, Back, Top, Bottom	Pass
E-UTRA Band 38 Idle	Vertical	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass
E-UTRA Band 40 Traffic	Vertical	80-6000	3	CT,CR	Front, Right, Left, Back, Top, Bottom	Pass
	Horizontal	80-6000	3	CT,CR	Front, Right, Left, Back, Top, Bottom	Pass
E-UTRA Band 40 Idle	Vertical	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass
E-UTRA Band 41 Traffic	Vertical	80-6000	3	CT,CR	Front, Right, Left, Back, Top, Bottom	Pass
	Horizontal	80-6000	3	CT,CR	Front, Right, Left, Back, Top, Bottom	Pass
E-UTRA Band 41 Idle	Vertical	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass

TM10 Test Result:

EUT Working Mode	Antenna Polarity	Frequency (MHz)	Fielded Strength (V/m)	Observation	Position	Conclusion
Idle	Vertical	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass
	Horizontal	80-6000	3	See Note	Front, Right, Left, Back, Top, Bottom	Pass

Note: The EUT performance complied with performance criteria for CT&CR to MS Function and there is no any degradation of performance and function.
During the test, the Maximum Bit Error Ratio was less than 0.001
During the test, the Maximum Block Error Ratio was less than 0.01
For E-UTRA Band 1/3/7/8/20/28/38/40/41 (In the data transfer mode), the throughput is ≥ 95 % of the maximum throughput of the reference measurement channel as specified in annex C in TS 136 101 [13] with parameters specified in tables 7.3.1-1 and 7.3.1-2 in TS 136 101 [13] during the test sequence.
For equipment that supports a PER , the minimum performance level shall be PER less than or equal to 10%.

A.7 Electrostatic Discharge

Electrostatic Discharge Test Results			
Standard	☐ IEC 61000-4-2 ☑ EN 61000-4-2		
Applicant	SHANGHAI MATIS ELECTRIC CO.,LTD.		
EUT	Smart Metering RCBO/MCB	**Temperature**	24.2℃
M/N	MT61GR	**Humidity**	52.3％
Criterion	B	**Pressure**	1021mbar
Test Mode	TM1-TM10	**Test Engineer**	Jerry Chu

TEST RESULT OF TM1-TM9

Test Voltage	Coupling	Observation	Result (Pass/Fail)
±2KV, ±4kV	Contact Discharge	TT, TR	Pass
±2KV, ±4kV, ±8kV	Air Discharge	TT, TR	Pass
±2KV, ±4kV	Indirect Discharge HCP	TT, TR	Pass
±2KV, ±4kV	Indirect Discharge VCP	TT, TR	Pass

TEST RESULT OF TM10

Test Voltage	Coupling	Result (Pass/Fail)
±2KV, ±4kV	Contact Discharge	Pass
±2KV, ±4kV, ±8kV	Air Discharge	Pass
±2KV, ± 4kV	Indirect Discharge HCP	Pass
±2KV, ±4kV	Indirect Discharge VCP	Pass

Note: The EUT performance complied with performance criteria for TT&TR to MS Function and there is no any degradation of performance and function.

A.8 Electrical Fast Transient Immunity

Electrical Fast Transient/Burst Test Results			
Standard	☐ IEC 61000-4-4 ☑ EN 61000-4-4		
Applicant	SHANGHAI MATIS ELECTRIC CO.,LTD.		
EUT	Smart Metering RCBO/MCB	**Temperature**	23.2℃
M/N	MT61GR	**Humidity**	54.1％
Test Mode	TM1-TM10	**Criterion**	B
Test Engineer	Jerry Chu		

TEST RESULT OF TM1-TM9				
Line	**Test Voltage**	**Polarity**	**Observation**	**Result (Pass/Fail)**
L	1KV	+/-	TT, TR	Pass
N	1KV	+/-	TT, TR	Pass
L-N	1KV	+/-	TT, TR	Pass

TEST RESULT OF TM10			
Line	**Test Voltage**	**Polarity**	**Result (Pass/Fail)**
L	1KV	+/-	Pass
N	1KV	+/-	Pass
L-N	1KV	+/-	Pass

A.9 RF Common Mode

Injected Currents Susceptibility Test Results			
Standard	☐ IEC 61000-4-6 ☑ EN 61000-4-6		
Applicant	SHANGHAI MATIS ELECTRIC CO.,LTD.		
EUT	Smart Metering RCBO/MCB	**Temperature**	22.3℃
M/N	MT61GR	**Humidity**	53.5%
Test Mode	TM1-TM10	**Criterion**	A
Test Engineer	Jerry Chu		

TEST RESULT OF TM1-TM9				
Frequency Range (MHz)	**Strength (Unmodulated)**	**Injected Position**	**Observation**	**Result (Pass/Fail)**
0.15 ~ 80	3V	AC Mains	CT, CR	Pass

TEST RESULT OF TM10			
Frequency Range (MHz)	**Strength (Unmodulated)**	**Injected Position**	**Result (Pass/Fail)**
0.15 ~ 80	3V	AC Mains	Pass

Remark:
1. Modulation Signal:1kHz 80% AM

Note: The EUT performance complied with performance criteria for CT&CR to MS Function and there is no any degradation of performance and function.
During the test, the Maximum Bit Error Ratio was less than 0.001
During the test, the Maximum Block Error Ratio was less than 0.01
For E-UTRA Band 1/3/7/8/20/28/38/40/41 (In the data transfer mode), the throughput is ≥ 95 % of the maximum throughput of the reference measurement channel as specified in annex C in TS 136 101 [13] with parameters specified in tables 7.3.1-1 and 7.3.1-2 in TS 136 101 [13] during the test sequence.
For equipment that supports a PER , the minimum performance level shall be PER less than or equal to 10%.

A.10 Surges, Line to Line and Line to Ground

Surge Immunity Test Result			
Standard	☐ IEC 61000-4-5 ☑ EN 61000-4-5		
Applicant	SHANGHAI MATIS ELECTRIC CO.,LTD.		
EUT	Smart Metering RCBO/MCB	**Temperature**	23.4℃
M/N	MT61GR	**Humidity**	52.0%
Test Mode	TM1-TM10	**Criterion**	B
Test Engineer	Jerry Chu		

TEST RESULT OF TM1-TM9

Location	Polarity	Phase Angle	Number of Pulse	Pulse Voltage (KV)	Observation	Result (Pass/Fail)
L-N	+	0^o, 90^o, 180^o, 270^o	5	1.0	TT, TR	Pass
	-	0^o, 90^o, 180^o, 270^o	5	1.0	TT, TR	Pass

TEST RESULT OF TM10

Location	Polarity	Phase Angle	Number of Pulse	Pulse Voltage (KV)	Result (Pass/Fail)
L-N	+	0^o, 90^o, 180^o, 270^o	5	1.0	Pass
	-	0^o, 90^o, 180^o, 270^o	5	1.0	Pass

Note: Verification shall be performed on the generators and coupling/decoupling network prior to the test.

A.11 Voltage Dips/Interruptions Immunity Test

Voltage Dips And Interruptions Test Results			
Standard	☐ IEC 61000-4-11 ☑ EN 61000-4-11		
Applicant	SHANGHAI MATIS ELECTRIC CO.,LTD.		
EUT	Smart Metering RCBO/MCB	**Temperature**	22.3℃
M/N	MT61GR	**Humidity**	53.4％
Test Mode	TM1-TM10	**Criterion**	B&C
Test Engineer	Jerry Chu		

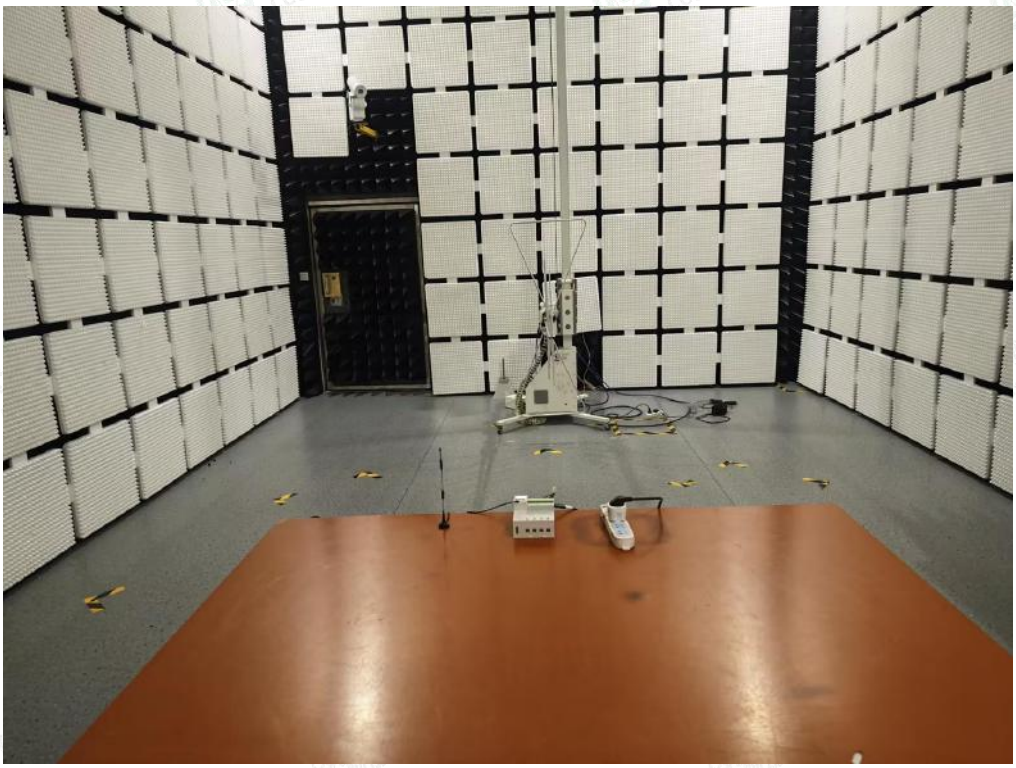
TEST RESULT OF TM1-TM9				
Test Level % U_T	**Voltage Dips & Short Interruptions % U_T**	**Duration (in periods)**	**Observation**	**Result (Pass/Fail)**
0	100	0.5P	TT, TR	Pass
70	30	25P	TT, TR	Pass
0	100	250P	TT, TR	Pass

TEST RESULT OF TM10			
Test Level % U_T	**Voltage Dips & Short Interruptions % U_T**	**Duration (in periods)**	**Result (Pass/Fail)**
0	100	0.5P	Pass
70	30	25P	Pass
0	100	250P	Pass

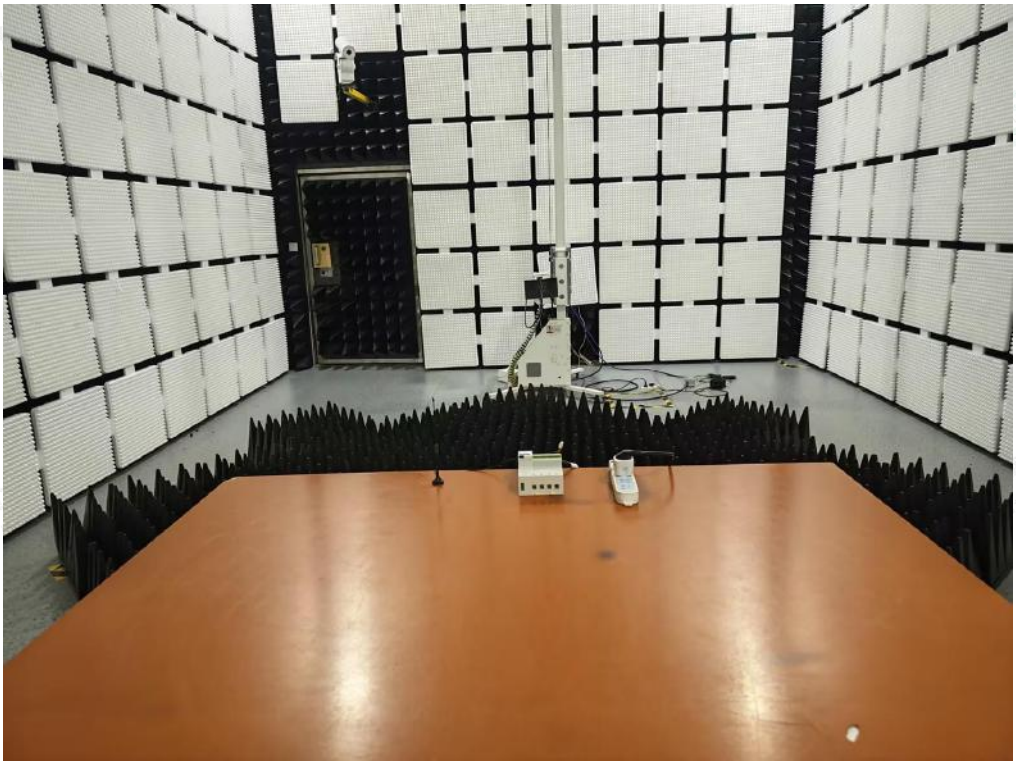
Appendix B for Photographs of Test Setup_EMC



Power Line Conducted Emission



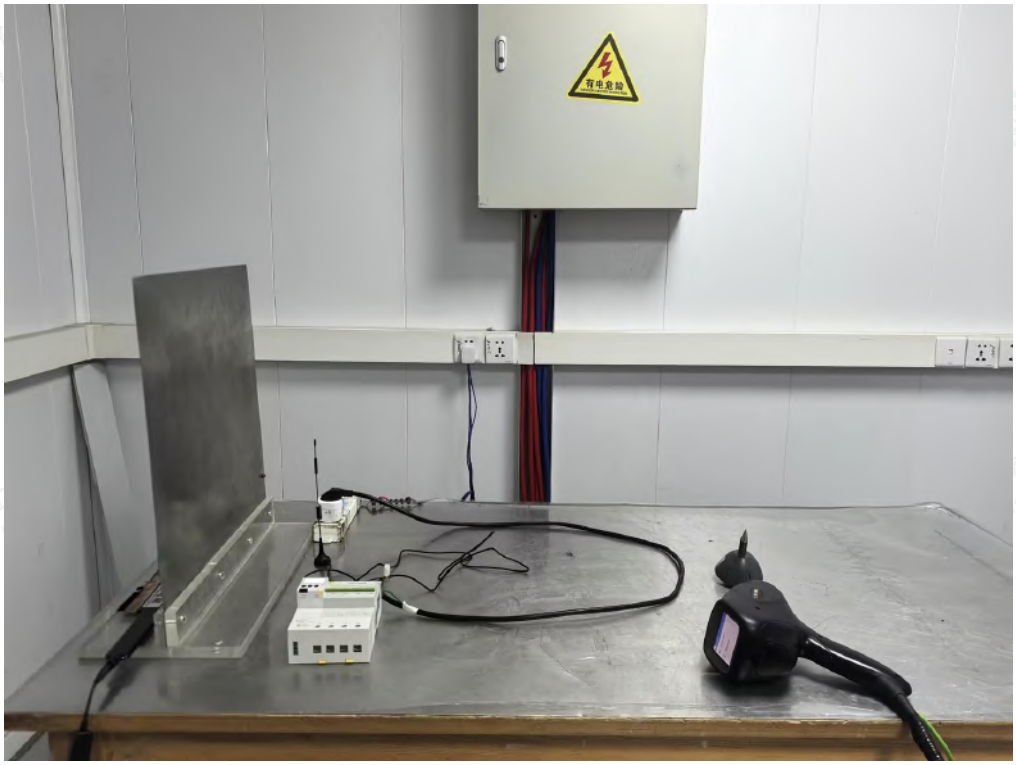
Radiated Emission Below 1 GHz



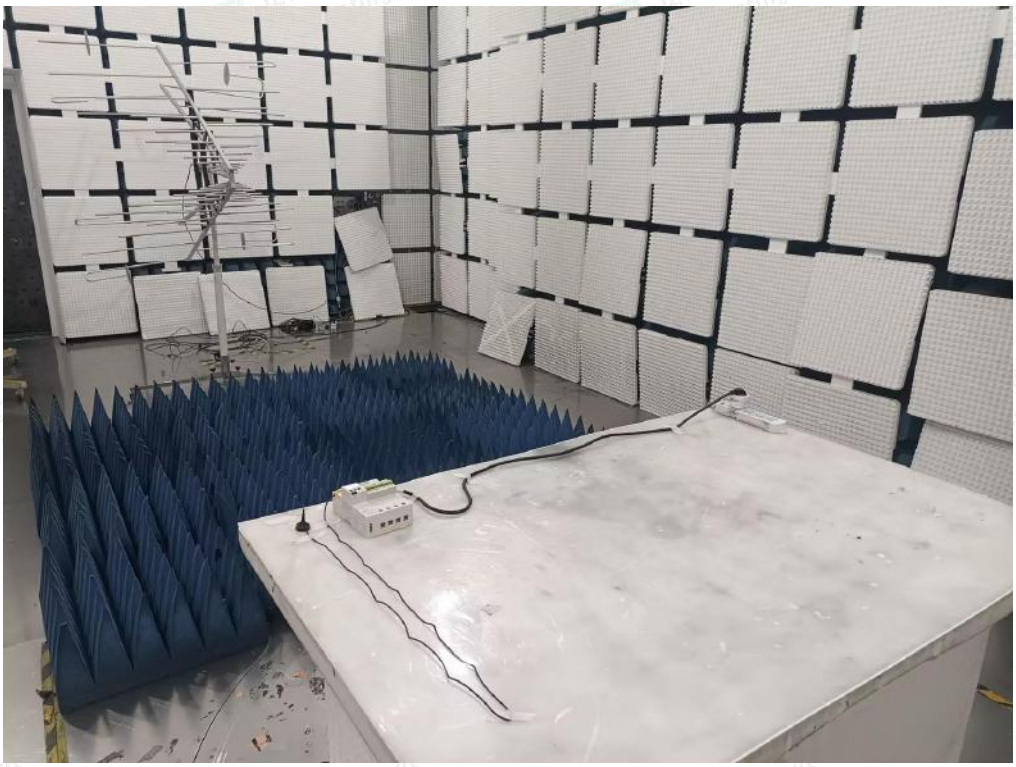
Radiated Emission Above 1 GHz



Voltage Fluctuations and Flicker



Electrostatic Discharge



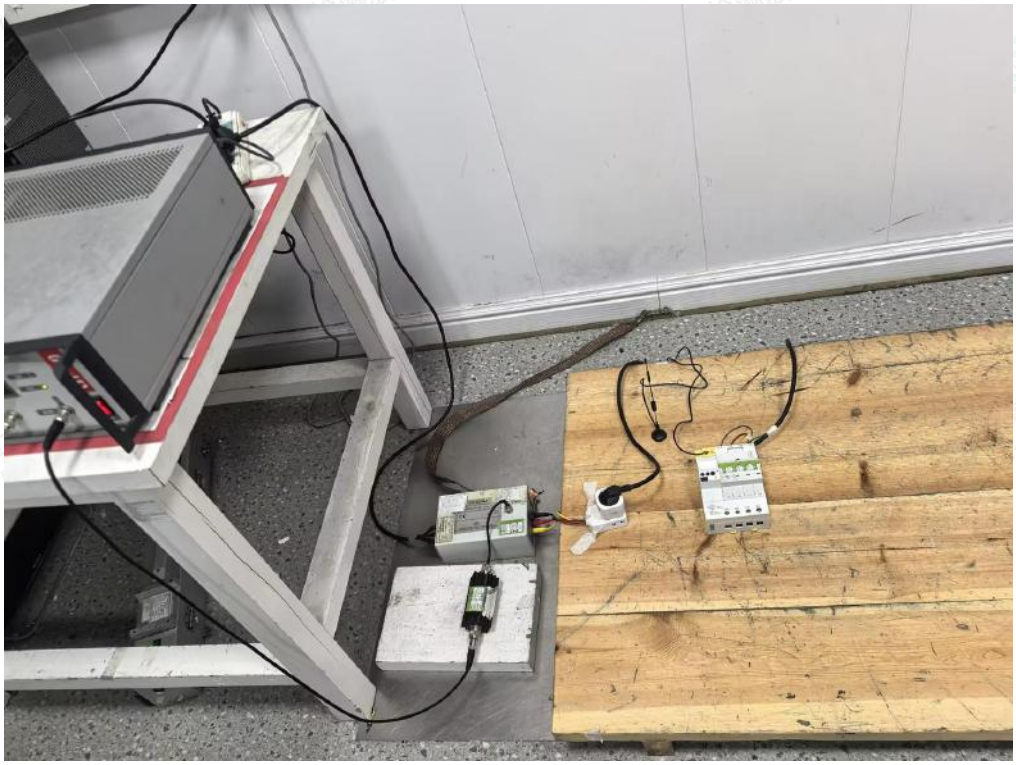
RF Electromagnetic Field (80MHz to 1000MHz)



RF Electromagnetic Field (1000MHz to 6000MHz)



Fast Transients Common Mode



RF Common Mode (0.15 MHz to 80MHz)



Surges



Voltage Dips and Interruptions

EMC TEST REPORT

For

SHANGHAI MATIS ELECTRIC CO.,LTD.

Smart Metering RCBO/MCB

Test Model: MT61GR

Additional Model No.: Please Refer to Page 6

Prepared for	:	SHANGHAI MATIS ELECTRIC CO.,LTD.
Address	:	Room318-320, No.83, West Huanghu Road, Pudong, Shanghai, China 201306
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
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Fax	:	(+86)755-82591332
Web	:	www.LCS-cert.com
Mail	:	webmaster@LCS-cert.com
Date of receipt of test sample	:	August 19, 2026
Number of tested samples	:	2
Sample No.	:	A260817067-1, A260817067-2
Serial number	:	Prototype
Date of Test	:	August 19, 2026 ~ September 20, 2026
Date of Report	:	September 21, 2026

Shenzhen LCS Compliance Testing Laboratory Ltd.
Add: Room 101/201, Building A, and Room 101/301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com
Scan code to check authenticity

EMC TEST REPORT ETSI EN 301 489-1 V2.2.3 (2019-11) & ETSI EN 301 489-52 V1.3.1 (2024-11)		
Report Reference No.	:	**LCSA08176105EA**
Date Of Issue	:	September 21, 2026
Testing Laboratory Name	:	**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address	:	Room 101/201, Building A, and Room 101/301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Testing Location/ Procedure.....	:	Full application of Harmonised standards■ Partial application of Harmonised standards□ Other standard testing method□
Applicant's Name	:	**SHANGHAI MATIS ELECTRIC CO.,LTD.**
Address	:	Room318-320, No.83, West Huanghu Road, Pudong, Shanghai, China 201306
Test Specification		
Standard.....	:	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-52 V1.3.1 (2024-11)
TRF Originator	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF	:	Dated 2017-06
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Test Item Description.	:	**Smart Metering RCBO/MCB**
Trade Mark.....	:	Matis/Matismart
Test Model	:	MT61GR
Ratings.....	:	Please Refer to Page 6
Result	:	**Pass**

Compiled by:	Supervised by:	Approved by:
Jack Liu/ Administrator	Kevin Huang/ RF Manager	Gavin Liang/ Manager

Shenzhen LCS Compliance Testing Laboratory Ltd.
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EMC -- TEST REPORT

Test Report No. : LCSA08176105EA	September 21, 2026 Date of issue

Test Model.....	: MT61GR
EUT.....	: Smart Metering RCBO/MCB
Applicant.....	**: SHANGHAI MATIS ELECTRIC CO.,LTD.**
Address.....	: Room318-320, No.83, West Huanghu Road, Pudong, Shanghai, China 201306
Telephone.....	: /
Fax.....	: /
Manufacturer.....	**: SHANGHAI MATIS ELECTRIC CO.,LTD.**
Address.....	: Room318-320, No.83, West Huanghu Road, Pudong, Shanghai, China 201306
Telephone.....	: /
Fax.....	: /
Factory.....	**: SHANGHAI MATIS ELECTRIC CO.,LTD.**
Address.....	: Room318-320, No.83, West Huanghu Road, Pudong, Shanghai, China 201306
Telephone.....	: /
Fax.....	: /

Test Result	**Pass**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Shenzhen LCS Compliance Testing Laboratory Ltd.
Add: Room 101/201, Building A, and Room 101/301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China
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Revision History

Report Version	Issue Date	Revision Content	Revised By
000	September 21, 2026	Initial Issue	---

Shenzhen LCS Compliance Testing Laboratory Ltd.
Add: Room 101/201, Building A, and Room 101/301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China
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1. GENERAL INFORMATION

1.1. Product Description for Equipment Under Test (EUT)

EUT	: Smart Metering RCBO/MCB
Test Model	: MT61GR
Additional Model No.	: MT61GP
Model Declaration	: PCB board, structure and internal of these model(s) are the same, So no additional models were tested
Ratings	: Ue: 230/240VAC(2P); 400/415VAC(4P) 50/60Hz; In: 6/10/16/20/25/32/40/50/63A/80A/100A/125A (B/C/D-type); Icn=Ics=6,0kA IΔn= 30, 100, 300mA,500mA; Type -A & -AC; With time delay: type S Energy Accuracy: class 1
Hardware Version	: 1.0
Software Version	: 1.0
LTE	:
Support Band	: ☒E-UTRA Band 1(EU-Band) ☒E-UTRA Band 3(EU-Band) ☒E-UTRA Band 5(Non EU-Band) ☒E-UTRA Band 7(EU-Band) ☒E-UTRA Band 8(EU-Band) ☒E-UTRA Band 20(EU-Band) ☒E-UTRA Band 28(EU-Band) ☒E-UTRA Band 38(EU-Band) ☒E-UTRA Band 40(EU-Band) ☒E-UTRA Band 41(EU-Band)
LTE Release Version	: R8
FDD Band	: Uplink: E-UTRA Band 1: 1920MHz~1980MHz E-UTRA Band 3: 1710MHz~1785MHz E-UTRA Band 7: 2500MHz~2570MHz E-UTRA Band 8: 880MHz~915MHz E-UTRA Band 20: 832MHz~862MHz E-UTRA Band 28: 703MHz~748MHz Downlink: E-UTRA Band 1: 2110MHz~2170MHz E-UTRA Band 3: 1805MHz~1880MHz E-UTRA Band 7: 2620MHz~2690MHz E-UTRA Band 8: 925MHz~960MHz E-UTRA Band 20: 791MHz~821MHz E-UTRA Band 28: 758MHz~803MHz
TDD Band	: E-UTRA Band 38: 2570MHz~2620MHz E-UTRA Band 40: 2300MHz~2400MHz E-UTRA Band 41: 2496-2690MHz
Type Of Modulation	: QPSK/16QAM
Antenna Description	: External Antenna -0.93dBi (max.) For E-UTRA Band 1 -0.22dBi (max.) For E-UTRA Band 3 -3.29dBi (max.) For E-UTRA Band 7 -1.41dBi (max.) For E-UTRA Band 8 -1.15dBi (max.) For E-UTRA Band 20

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-4.31dBi (max.) For E-UTRA Band 28
-1.92dBi (max.) For E-UTRA Band 38
-1.73dBi (max.) For E-UTRA Band 40
0.31dBi (max.) For E-UTRA Band 41

Power Class : Class 3

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1.2. Objective

ETSI EN 301 489-1	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility
ETSI EN 301 489-52	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 52: Specific conditions for Cellular Communication User Equipment (UE) radio and ancillary equipment; Harmonised Standard for ElectroMagnetic Compatibility

The objective is to determine compliance with ETSI EN 301 489-1 V2.2.3 (2019-11), ETSI EN 301 489-52 V1.3.1 (2024-11).

1.3. Related Submittal(s)/Grant(s)

No Related Submittals.

1.4. Test Methodology

All measurements contained in this report were conducted with ETSI EN 301 489-1 V2.2.3 (2019-11), ETSI EN 301 489-52 V1.3.1 (2024-11).

1.5. Description of Test Facility

NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier is CN0071.

CNAS Registration Number is L4595.

1.6. Support Equipment List

Manufacturer	Description	Model	Serial Number	Certificate
---	---	---	---	---

1.7. External I/O

I/O Port Description	Quantity	Cable
---	---	---

1.8. Measurement Uncertainty

Item	MU	Remark
Uncertainty for Power point Conducted Emissions Test	2.42dB	
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.54dB	Polarize: V
	4.1dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	2.08dB	Polarize: H
	2.56dB	Polarize: V
Uncertainty for radio frequency	0.01ppm	
Uncertainty for conducted RF Power	0.65dB	
Uncertainty for temperature	0.2℃	
Uncertainty for humidity	1%	
Uncertainty for DC and low frequency voltages	0.06%	

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1.9. Description of Test Modes

There was 10 test Modes. TM1 to TM10 were shown below:		
TM1	:	Operate in For E-UTRA Band 1 mode
TM2	:	Operate in For E-UTRA Band 3 mode
TM3	:	Operate in For E-UTRA Band 7 mode
TM4	:	Operate in For E-UTRA Band 8 mode
TM5	:	Operate in For E-UTRA Band 20 mode
TM6	:	Operate in For E-UTRA Band 28 mode
TM7	:	Operate in For E-UTRA Band 38 mode
TM8	:	Operate in For E-UTRA Band 40 mode
TM9	:	Operate in For E-UTRA Band 41 mode
TM10	:	Idle mode
Note:All test modes were tested, but we only recorded the worst case in this report.		

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2. SUMMARY OF TEST RESULTS

Rule	Description of Test Items	Result
§7.1	Reference to clause 8.4 of ETSI EN 301 489-1 Conducted Emission (AC mains input/output port)	Compliant
§7.1	Reference to clause 8.3 of ETSI EN 301 489-1 Conducted Emission (DC power input/output port)	N/A*
§7.1	Reference to clause 8.7 of ETSI EN 301 489-1 Conducted Emission (Wired network port)	N/A*
§7.1	Reference to clause 8.2 of ETSI EN 301 489-1 Radiated Emission (Enclosure of ancillary equipment)	Compliant
§7.1	Reference to clause 8.5 of ETSI EN 301 489-1 Harmonic current emissions (AC mains input port)	Compliant
§7.1	Reference to clause 8.6 of ETSI EN 301 489-1 Voltage fluctuations and flicker (AC mains input port)	Compliant
§7.2	Reference to clause 9.3 of ETSI EN 301 489-1 Electrostatic discharge (Enclosure port) (EN 61000-4-2)	Compliant
§7.2	Reference to clause 9.2 of ETSI EN 301 489-1 RF electromagnetic field (80MHz to 6000MHz) (Enclosure port) (EN 61000-4-3)	Compliant
§7.2	Reference to clause 9.4 of ETSI EN 301 489-1 Fast transients common mode (signal, wired network and control ports, DC and AC power ports) (EN 61000-4-4)	Compliant
§7.2	Reference to clause 9.8 of ETSI EN 301 489-1 Surges, line to line and line to ground (AC mains power input ports, wired network ports) (EN 61000-4-5)	Compliant
§7.2	Reference to clause 9.5 of ETSI EN 301 489-1 RF common mode 0.15MHz to 80MHz (signal, wired network and control ports, DC and AC power ports) (EN 61000-4-6)	Compliant
§7.2	Reference to clause 9.6 of ETSI EN 301 489-1 Transients and surges in the vehicular environment (ISO 7637-2)	N/A*
§7.2	Reference to clause 9.7 of ETSI EN 301 489-1 Voltage dips and interruptions (AC mains power input ports) (EN 61000-4-11)	Compliant

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3. TEST RESULTS

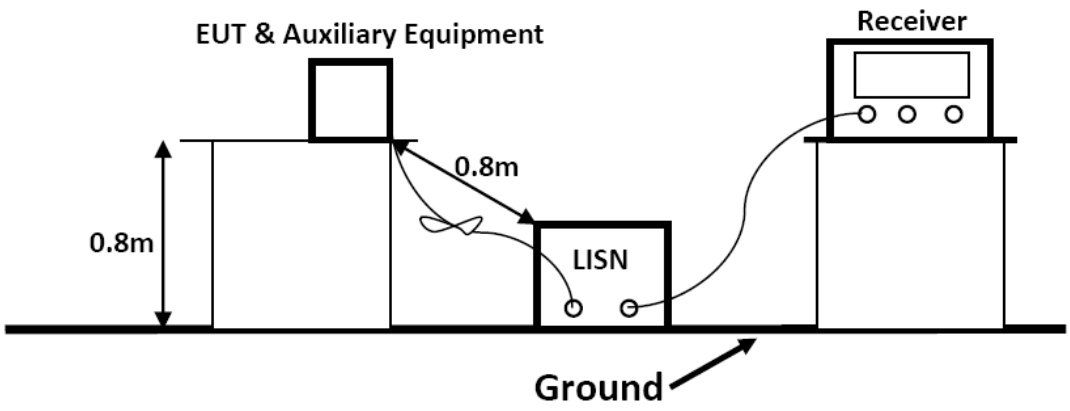
3.1. Line Conducted Emission

3.1.1 Conducted Emission Limit

Relevant Standard(s): ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 55032:2015/A11:2020 Class B

Limits for Line Conducted Emission		
Frequency (MHz)	Limit (dBμV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50 ~ 5.00	56.0	46.0
5.00 ~ 30.00	60.0	50.0
NOTE1-The lower limit shall apply at the transition frequencies. NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.		

3.1.2 Test Configuration



The setup of EUT is according with per ETSI EN 301 489-1 measurement procedure. The specification used was with the ETSI EN 301 489-1 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.
The spacing between the peripherals was 10 cm.

The EUT received charging power from the charger which received power through a LISN supplying power of AC 230V/50Hz.

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3.1.3 EMI Test Receiver Setup

During the conducted emission test, the EMI test receiver was set with the following configurations:

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	150KHz ~ 30MHz
(IF)RBW	9kHz

All data was recorded in the Quasi-peak and average detection mode.

3.1.4 Test Procedure

Power on the EUT, the EUT begins to work. Make sure the EUT operates normally during the test.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

3.1.5 Test Results

PASS

Please refer to Appendix A.1 for Emission and Immunity test results.

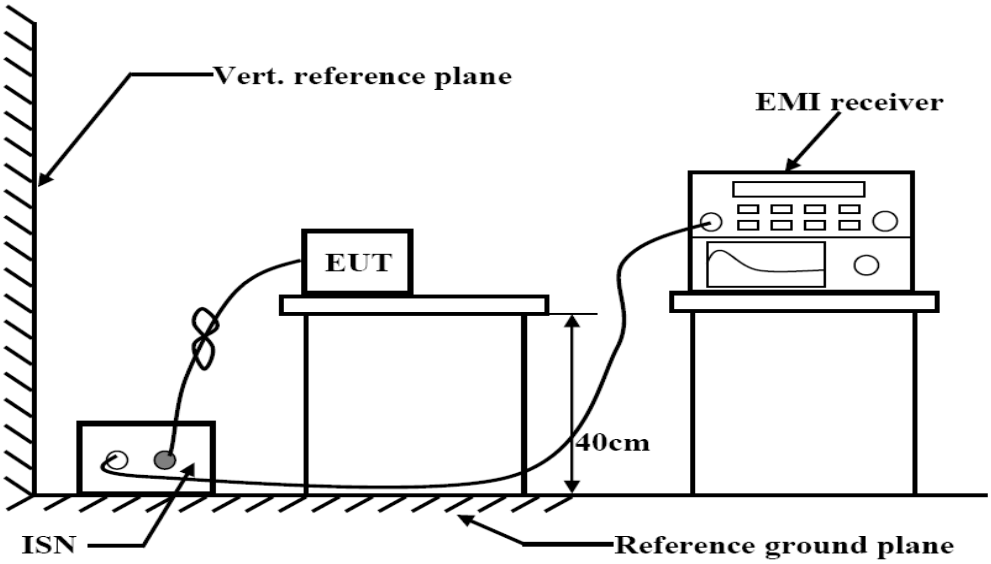
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3.2. Conducted Emission (Wired Network Port)

3.2.1 Conducted Emission Limit(Wired Network Port)

Limits for asymmetric mode conducted emissions				
Frequency (MHz)	Class B voltage limits (dBμV)		Class B current limits (dBμA)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ~ 0.50	84.0~74.0	74.0~64.0	40.0~30.0	30.0~20.0
0.50 ~ 30.00	74.0	64.0	30.0	20.0
NOTE 1-The limits decrease linearly with the logarithm of the frequency in the range 0,15 MHz to 0,5 MHz. NOTE 2-The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150Ω to the telecommunication port under test (conversion factor is 20 log10 150 / l = 44 dB).				

3.2.2 Test Configuration



3.2.3 EMI Test Receiver Setup

During the conducted emission test, the EMI test receiver was set with the following configurations:

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	150KHz ~ 30MHz
(IF)RBW	9kHz

All data was recorded in the Quasi-peak and average detection mode.

3.2.4 Test Procedure

Please refer to ETSI EN 301 489-1 Clause 8.7.2 and EN 55032 Clause 6 for the measurement methods.

3.2.5 Test Results

Not applicable.

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3.3. Radiated Disturbance

3.3.1 Radiated Emission Limit

Relevant Standard(s): ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 55032:2015/A11:2020 Class B

Limits for Radiated Disturbance Below 1GHz			
Frequency (MHz)	Facility	Distance (Meters)	Field Strengths Limit (dBμV/m)
30 ~ 230	SAC	3	40
230 ~ 1000	SAC	3	47
***Note: (1) The smaller limit shall apply at the combination point between two frequency bands. (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.			

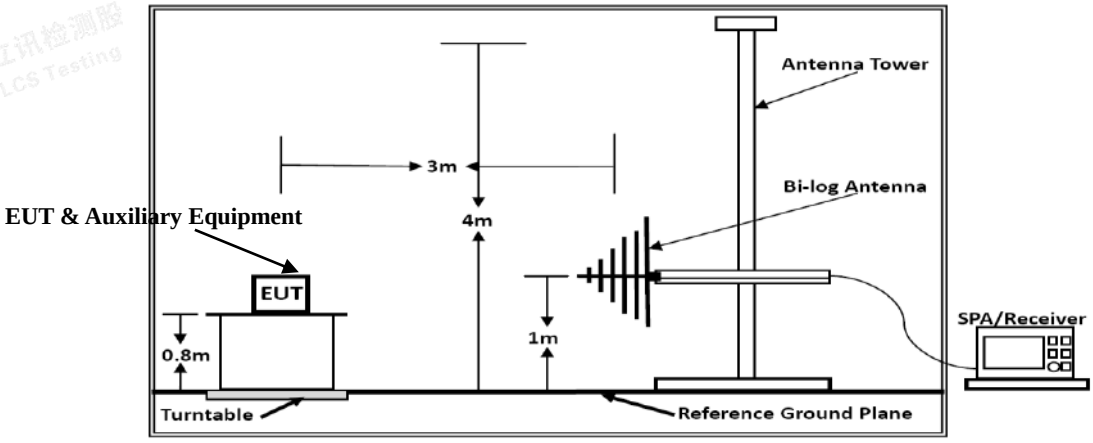
Limits for Radiated Disturbance Above 1GHz			
Frequency (MHz)	Distance (Meters)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)
1000 ~ 3000	3	70	50
3000 ~ 6000	3	74	54
***Note: The lower limit applies at the transition frequency.			

Limits for Radiated Disturbance Below 1GHz (For FM Receivers)			
Frequency (MHz)	Distance (Meters)	Class B Limit (dBμV/m)	
		Fundamental	Harmonics
30 ~ 230	3	60	52
230 ~ 300	3		52
300 ~ 1000	3		56
***Note: These relaxed limits apply only to emissions at the fundamental and harmonic frequencies of the LO. Signals at all other frequencies shall be compliant with the limits given in above Table.			

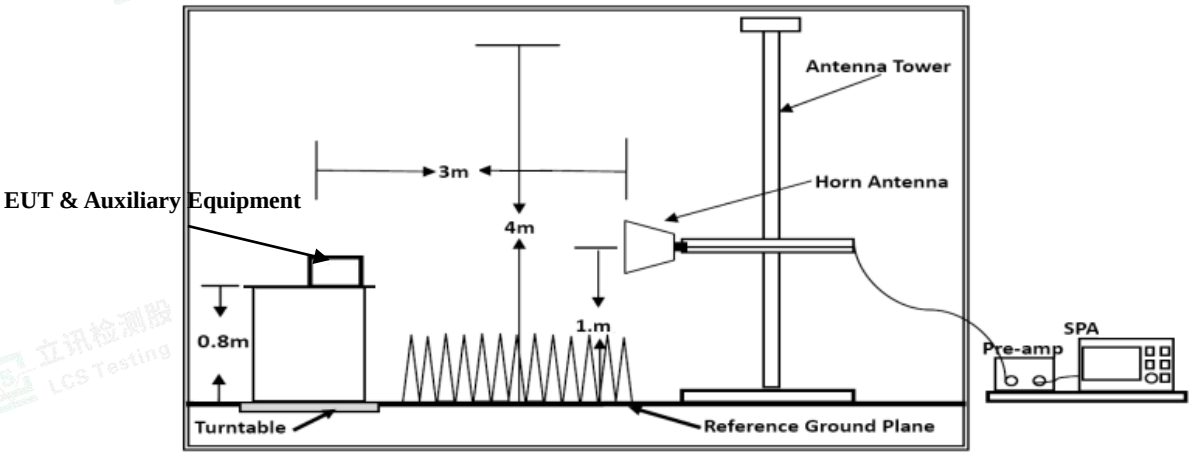
Limits for Radiated Disturbance Above 1GHz (For FM Receivers)			
Frequency (MHz)	Distance (Meters)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)
1000 ~ 3000	3	70	50
3000 ~ 6000	3	74	54
***Note: The lower limit applies at the transition frequency.			

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3.3.2 Test Configuration



Below 1GHz



Above 1GHz

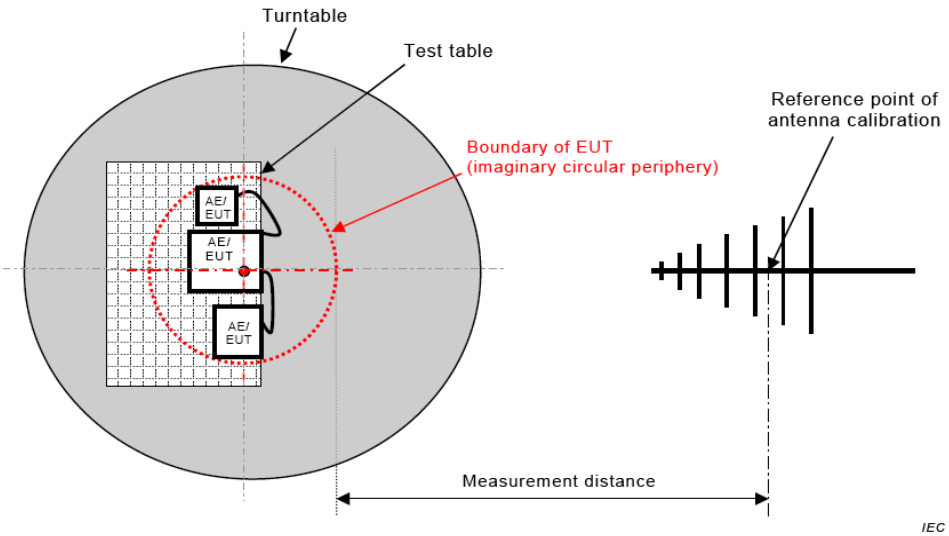


Figure C.1 – Measurement distance

Test Setup for FM Receiver

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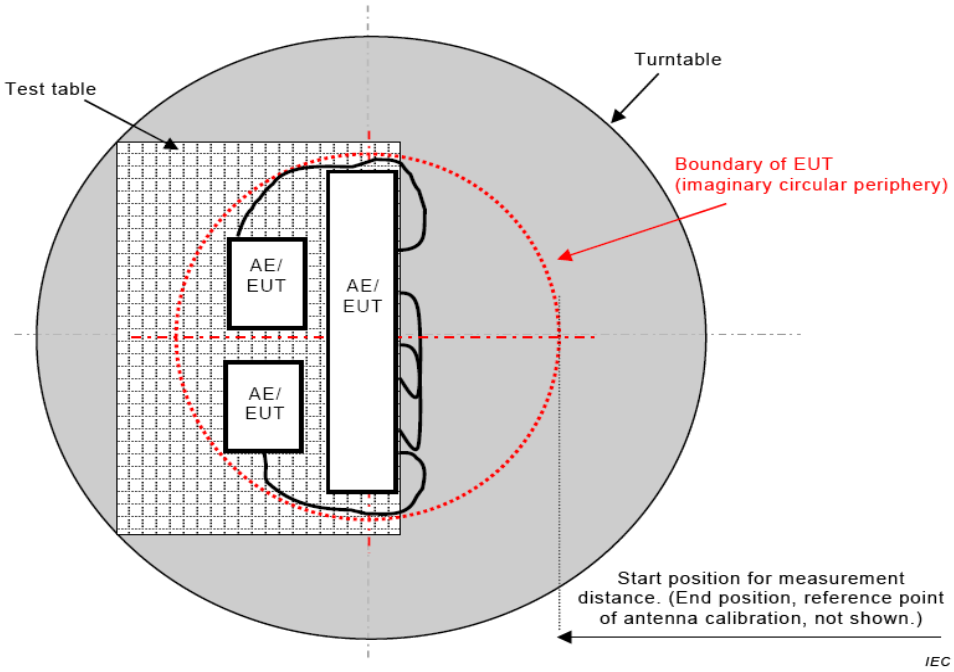


Figure C.2 – Boundary of EUT, Local AE and associated cabling

Test Setup for FM Receiver

3.3.3 Test Procedure

The test method shall be in accordance with CENELEC EN 55032 [1], annex A.3.

3.3.4 Test Results

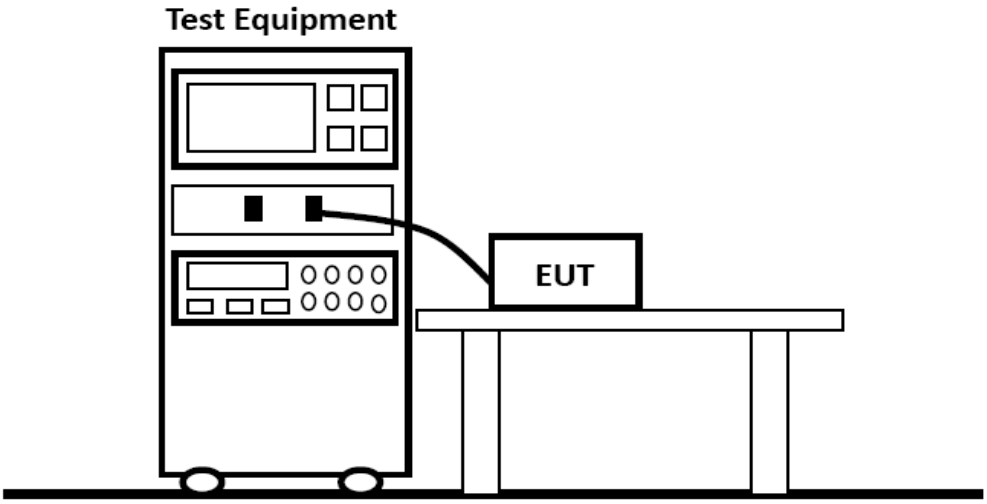
PASS

Please refer to Appendix A.3 for Emission and Immunity test results.

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3.4. Harmonic Current Emissions

3.4.1 Test Configuration



3.4.2 Test Standard

According to ETSI EN 301 489-1 V2.2.3 (2019-11) & EN 61000-3-2:2014

3.4.3 Test Results

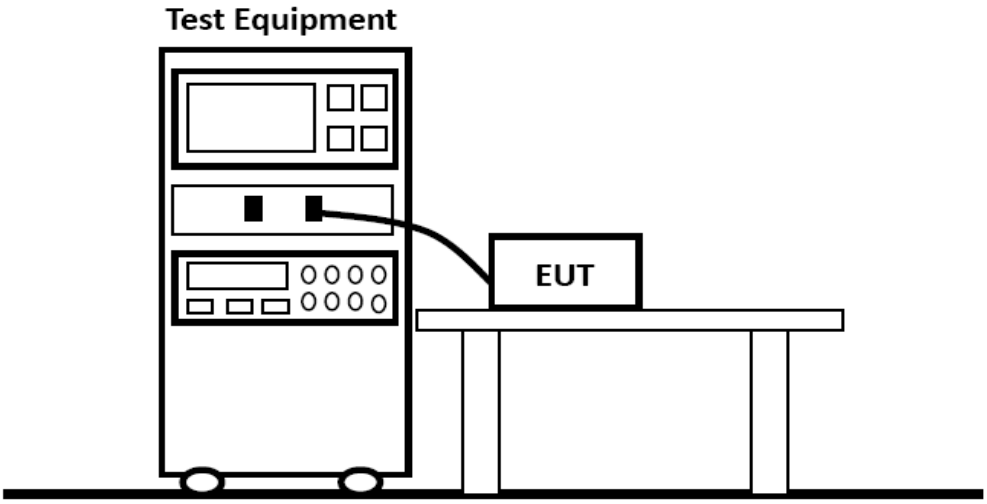
PASS

Please refer to Appendix A.4 for Emission and Immunity test results.

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3.5. Voltage Fluctuation and Flicker

3.5.1 Test Configuration



3.5.2 Test Standard

According to ETSI EN 301 489-1 V2.2.3 (2019-11) & EN 61000-3-3:2013

3.5.3 Test Results

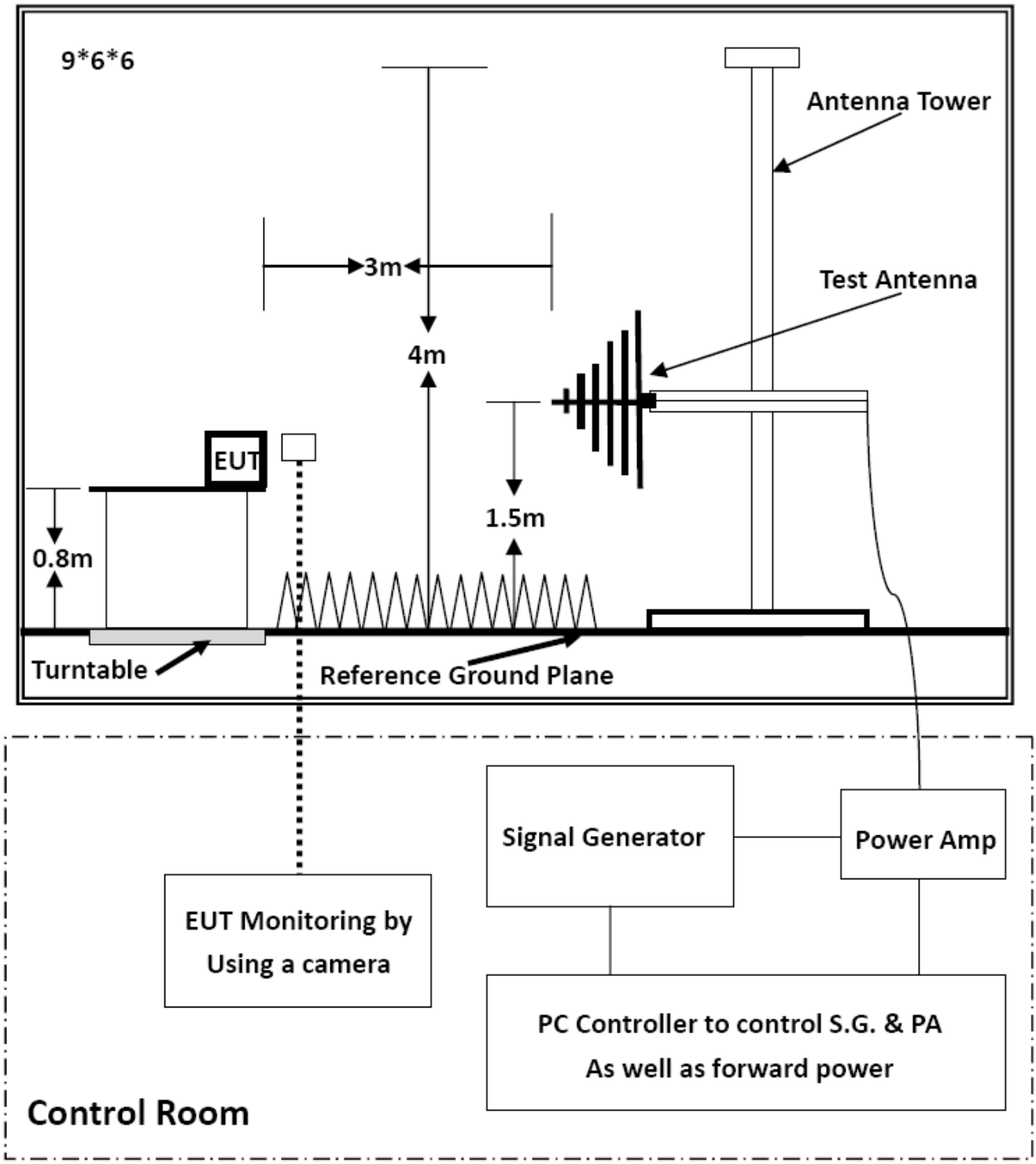
PASS

Please refer to Appendix A.5 for Emission and Immunity test results.

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3.6. RF Electromagnetic Field (80 MHz - 6000 MHz)

3.6.1 Test Configuration



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3.6.2 Test Standard

ETSI EN 301 489-1, ETSI EN 301 489-52 (EN 61000-4-3: 2006+A2: 2010)

Test level 2 at 3V/m.

3.6.3 Severity Level

Level	Field Strength (V/m)
1	1
2	3
3	10
X	Special
Performance Criterion: **A**	

3.6.4 Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. EUT is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor EUT screen. All the scanning conditions are as follows:

Condition of Test	Remark
Fielded Strength	3 V/m (Severity Level 2)
Radiated Signal	Unmodulated
Scanning Frequency	80-6000MHz
Dwell time of radiated	0.0015 decade/s
Waiting Time	3 Sec.

3.6.5 Test Results

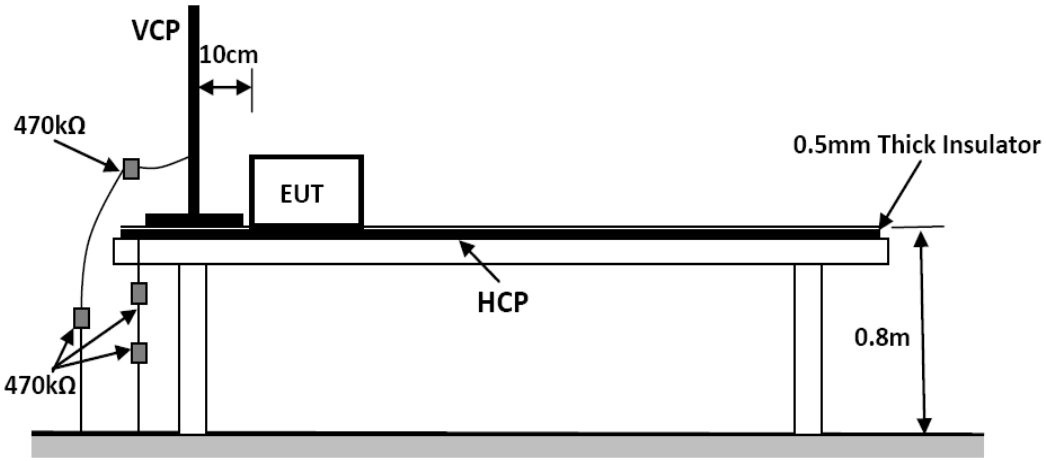
PASS

Please refer to Appendix A.6 for Emission and Immunity test results.

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3.7. Electrostatic Discharge

3.7.1 Test Configuration



EN 61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.5 by 1.0-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by 0.5-millimeter thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

3.7.2 Test Procedure

ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 61000-4-2: 2009
Test level 3 for Air Discharge at ±8 kV
Test level 2 for Contact Discharge at ±4 kV

3.7.2.1 Air Discharge

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

3.7.2.2 Contact Discharge

All the procedure shall be same as Section 3.7.2.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

3.7.2.3 Indirect Discharge For Horizontal Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

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3.7.2.4 Indirect Discharge For Vertical Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

3.7.3 Test Results

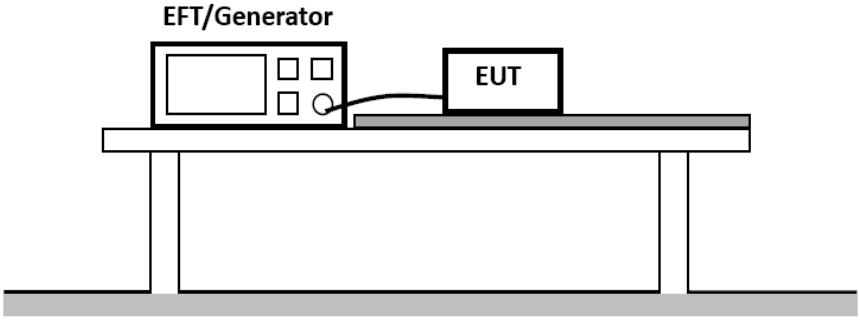
PASS

Please refer to Appendix A.7 for Emission and Immunity test results.

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3.8. Electrical Fast Transient Immunity

3.8.1 Test Configuration



3.8.2 Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11)/ EN61000-4-4: 2012
Test level 2 at 1 kV

Test Level		
Open Circuit Output Test Voltage ±10 %		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1	0.5 kV	0.25 kV
2	1 kV	0.5 kV
3	2 kV	1 kV
4	4 kV	2 kV
X	Special	Special
Performance Criterion: B		

3.8.3 Test Procedure

The EUT is put on the table, which is 0.8 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

3.8.3.1 For input and output AC power ports:
The EUT is connected to the power mains by using a coupling device, which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minutes.

3.8.3.2 For signal lines and control lines ports: No I/O ports. It's unnecessary to test.

3.8.3.3 For DC output line ports: It's unnecessary to test.

3.8.4 Test Results

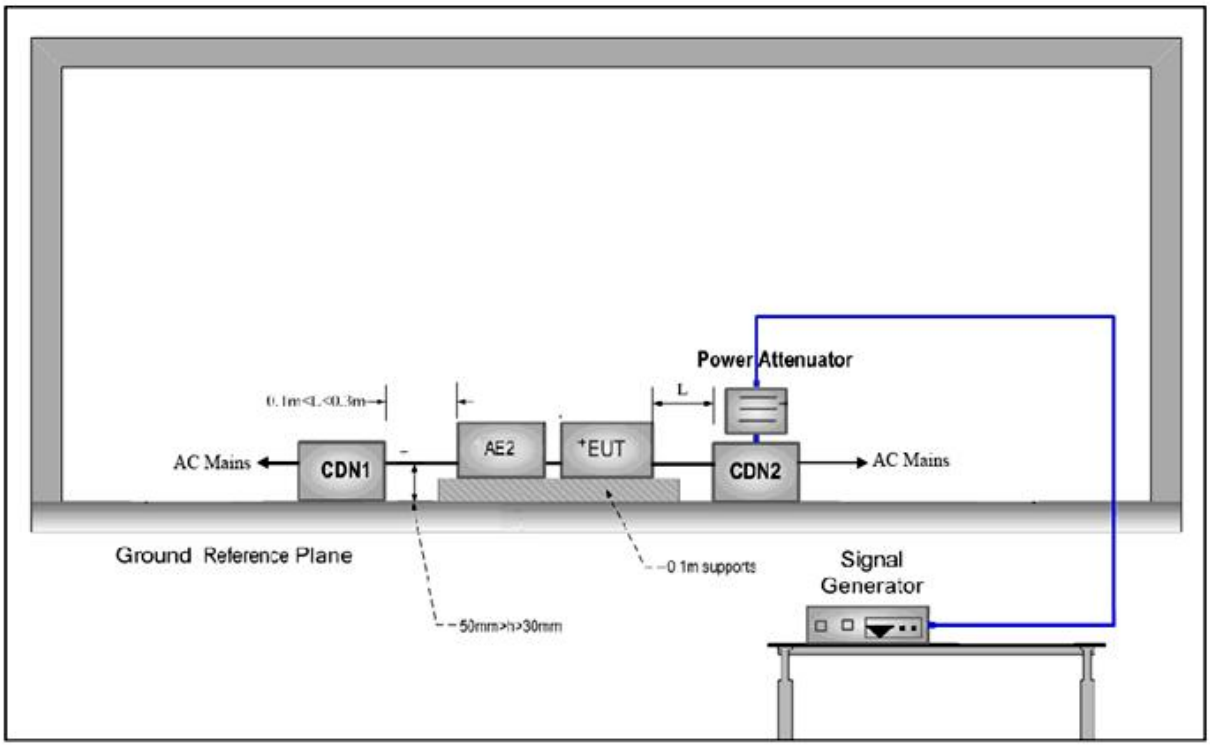
PASS

Please refer to Appendix A.8 for Emission and Immunity test results.

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3.9. RF Common Mode

3.9.1 Test Configuration



3.9.2 Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11)/ EN 61000-4-6: 2014
Test level: 3V (r.m.s.) for 0.15MHz ~ 10MHz; 3V (r.m.s.) to 1V (r.m.s.) for 10MHz ~ 30MHz; 1V (r.m.s.) for 30MHz ~ 80MHz
Modulation type: AM
Modulation depth: 80%
Modulation signal: 1 kHz

Test Level	
Level	Voltage Level (r.m.s..) (V)
1	1
2	3
3	10
X	Special
Performance Criterion: A	

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3.9.3 Test Procedure

3.9.3.1 Let the EUT work in test mode and test it.

3.9.3.2 The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50mm (where possible).

3.9.3.3 The disturbance signal described below is injected to EUT through CDN.

3.9.3.4 The EUT operates within its operational mode(s) under intended climatic conditions after power on.

3.9.3.5 The frequency range is swept from 150kHz to 10MHz using 3V signal level, 10MHz to 30MHz using 3V to 1V signal level, 30MHz to 80MHz using 1V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.

3.9.3.6 The rate of sweep shall not exceed 1.5*10-3 decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

3.9.3.7 Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

3.9.4 Test Results

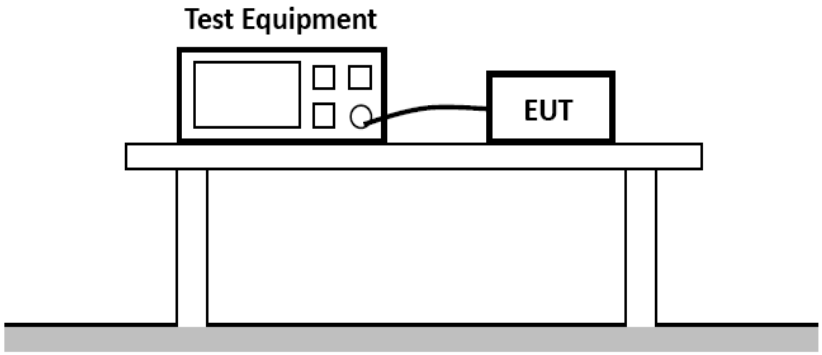
PASS

Please refer to Appendix A.9 for Emission and Immunity test results.

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3.10. Surges, Line to Line and Line to Ground

3.10.1 Test Configuration



3.10.2 Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 61000-4-5: 2014+A1:2017
L-N: Test level 2 at 1 kV
L-PE, N-PE Test Level 3 at 2kV

Test Level		
Open Circuit Output Test Voltage ±10 %		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1	0.5 kV	0.25 kV
2	1 kV	0.5 kV
3	2 kV	1 kV
4	4 kV	2 kV
X	Special	Special
Performance Criterion: B		

3.10.3 Test Procedure

Note:Vertification shall be performed on the generators and coupling/decoupling network prior to the test.This performance check can usually be limited to the existence of the surge pilse and its voltage and /or current

3.10.3.1 For line to line coupling mode, provide a 0.5 kV 1.2/50us voltage surge (at open-circuit condition).

3.10.3.2 At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.

3.10.3.3 Different phase angles are done individually.

3.10.3.4 Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

3.10.4 Test Results

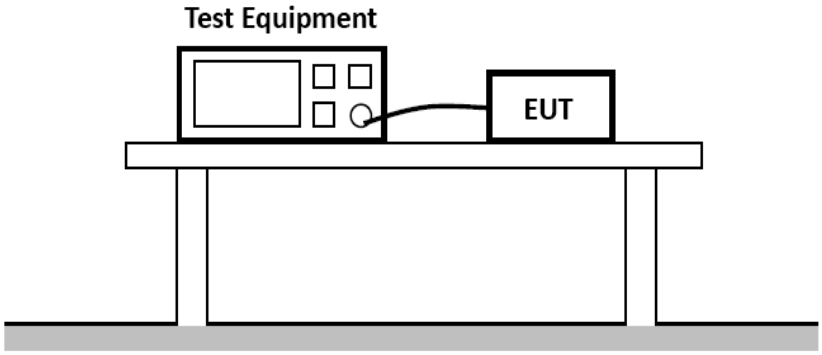
PASS

Please refer to Appendix A.10 for Emission and Immunity test results.

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3.11. Voltage Dips/Interruptions Immunity Test

3.11.1 Test Configuration



3.11.2 Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11)/ EN 61000-4-11: 2004+A1:2017
Test levels and Performance Criterion

Test Level		
Voltage Reduction $\%U_T$	Voltage Dips $\%U_T$	Duration (in Period)
100	0	0.5
100	0	1
30	70	5
Voltage Reduction $\%U_T$	Voltage Dips $\%U_T$	Duration (in Period)
100	0	250
Performance Criterion: B&C		

3.11.3 Test Procedure

3.11.3.1 The interruption is introduced at selected phase angles with specified duration.

3.11.3.2 Record any degradation of performance.

3.11.4 Test Results

PASS

Please refer to Appendix A.11 for Emission and Immunity test results.

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4. GENERAL PERFORMANCE CRITERIA FOR IMMUNITY TEST

4.1. Performance criteria for Continuous phenomena applied to Transmitter (CT)

For equipment of type II or type III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence. Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

4.2. Performance criteria for Transient phenomena applied to Transmitter (TT)

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence. Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

4.3. Performance criteria for Continuous phenomena applied to Receiver (CR)

For equipment of type II or III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

4.4. Performance criteria for Transient phenomena applied to Receiver (TR)

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

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Performance criteria for ETSI EN 301 489-52 V1.3.1 (2024-11)

1) Performance criteria for Continuous phenomena applied to Transmitters (CT)

With a link established, during the test, the uplink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check).

NOTE: When there is a high-level background noise present, the filter bandwidth may be reduced down to a minimum of 40 Hz.

In idle mode, the transmitter shall not operate unintentionally.

At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or critical stored data, and the communication link shall have been maintained.

2) Performance criteria for Continuous phenomena applied to Receivers (CR)

During the test, the RXQUAL of the downlink shall not exceed the value of three, measured during each individual exposure in the test sequence.

In the case of narrow band responses, the procedure in clause 4.4.1 shall be followed.

During the test, the downlink speech output level shall be at least 35 dB less than the previously recorded reference levels, when measured through an audio band pass filter of width 200 Hz, centred on 1 kHz (audio breakthrough check).

NOTE: When there is a high-level background noise present, the filter bandwidth may be reduced down to a minimum of 40 Hz.

At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or critical stored data, and the communication link shall have been maintained.

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5. LIST OF MEASURING EQUIPMENT

LINE CONDUCTED EMISSION

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Software	Farad	EZ-EMC	Ver. EMC-CON 3A1.1+	N/A	N/A
2	EMI Test Receiver	R&S	ESR3	102312	2025-12-22	2026-12-21
3	Artificial Mains	R&S	ENV216	101479	2026-04-21	2027-04-20
4	Pulse Limiter	R&S	ESH3-Z2	102750	2026-04-21	2027-04-20
5	Impedance Stabilization Network	TESEQ	ISN T800	45130	2025-09-27	2026-09-26
6	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	166586	2025-09-27	2026-09-26

RADIATED DISTURBANCE

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Software	Farad	EZ-EMC	Ver. EMC-CON 3A1.1+	N/A	N/A
2	3m Semi Anechoic Chamber	MRDIANZI	966	MR009	2025-08-16	2028-08-15
3	Positioning Controller	Max-Full	MF7802BS	MF780208586	N/A	N/A
4	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2024-08-03	2027-08-02
5	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2024-07-13	2027-07-12
6	EMI Test Receiver	R&S	ESPI	101940	2026-04-21	2027-04-20
7	Low-frequency amplifier	SchwarzBECK	BBV9745	00253	2025-09-27	2026-09-26
8	High-frequency amplifier	JS Denki Pte	PA0118-43	JSPA21009	2025-09-27	2026-09-26
9	MXA Signal Analyzer	Agilent	N9020A	MY50510140	2025-09-27	2026-09-26
10	RS SPECTRUM ANALYZER	R&S	FSP40	100503	2026-04-21	2027-04-20
11	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	166586	2025-09-27	2026-09-26

VOLTAGE FLUCTUATION AND FLICKER/HARMONIC CURRENT EMISSIONS

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	HARMONICS&FLICKER MEASUREMENT SYSTEM	EVERFINE	HFM-3000	P630850CD1411116	2025-12-22	2026-12-21
2	HARMONICS&FLICKER TESTING POWER SOURCE	EVERFINE	HFS-4000	P624486CD1411124	2025-12-22	2026-12-21
3	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	166586	2025-09-27	2026-09-26

RF ELECTROMAGNETIC FIELD

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	RS Test Software	Tonscend	/	/	N/A	N/A
2	3m Semi Anechoic Chamber	MRDIANZI	966	MR009	2025-08-16	2028-08-15
3	MXG Vector Signal Generator	Agilent	N5182A	MY50144567(6G)	2025-12-05	2026-12-04
4	RF POWER AMPLIFIER	OPHIR	5225R	1052	2026-05-06	2027-05-05
5	RF POWER AMPLIFIER	YEAH TECH	YEAH TECH	25090001	2025-09-27	2026-09-26
6	Stacked Broadband Log Periodic Antenna	SCHWARZBECK	STLP 9128	9128ES-145	N/A	N/A
7	Stacked Mikrowellen Log.-Per Antenna	SCHWARZBECK	STLP 9149	9149-484	N/A	N/A
8	RS Electric field probe	narda	EP601	611WX80208	2025-10-31	2026-10-30
9	Sound Level meter	BK Precision	735	7350087310010020	2026-05-21	2027-05-20
10	Audio Analyzer	R&S	UPV	1146.2003K02-101721-UW	2025-09-27	2026-09-26

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Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
11	Mouse Simulation	Bruel & Kjaer	4227	A0304216	2026-05-21	2027-05-20
12	Ear Simulation and supply	Bruel & Kjaer	2669.4182.5935	A0305284	2026-05-21	2027-05-20
13	Acoustical Calibrators	Bruel & Kjaer	4231	A0304215	2026-05-21	2027-05-20
14	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	166586	2025-09-27	2026-09-26

ELECTROSTATIC DISCHARGE

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	ESD Simulator	emtest/AMETEK	esd NX30.1	111969	2026-05-19	2027-05-18
2	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	166586	2025-09-27	2026-09-26

ELECTRICAL FAST TRANSIENT IMMUNITY

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Immunity Simulative Generator	EM TEST	UCS500-M	0101-34	2026-05-06	2027-05-05
2	Capacitive coupling clamp	3CTEST	EFTC	EC0441098	2026-05-06	2027-05-05
3	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	166586	2025-09-27	2026-09-26

RF COMMON MODE

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Simulator	FRANKONIA	CIT-10/75	A126A1195	2026-05-06	2027-05-05
2	CDN	FRANKONIA	CDN-M2+M3	A2210177	2026-05-06	2027-05-05
3	6dB Attenuator	FRANKONIA	DAM25W	1172040	2026-05-06	2027-05-05
4	Electromagnetic coupling injection clamp	ZHINAN	ZN23203	14017	2026-05-06	2027-05-05
5	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	166586	2025-09-27	2026-09-26

SURGES, LINE TO LINE AND LINE TO GROUND

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Immunity Simulative Generator	EM TEST	UCS500-M	0101-34	2026-05-06	2027-05-05
2	Communication wave lightning generator	HTEC	HTSG 70	181701	2025-10-11	2026-10-10
3	Symmetrical data line coupling network	HTEC	HCN 8	182701	2025-10-11	2026-10-10
4	Data line decoupling network	HTEC	HDEC 8	182702	2025-10-11	2026-10-10
5	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	166586	2025-09-27	2026-09-26

VOLTAGE DIPS/INTERRUPTIONS IMMUNITY TEST

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Three phase power supply fault simulator	HTEC	HPFS 2003P	234711	2026-01-06	2027-01-05
2	Programmable AC fault power supply	HTEC	HV3P200T	234710	2026-01-06	2027-01-05
3	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	166586	2025-09-27	2026-09-26

Note: N/A means no calibration requirement

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6. PHOTOGRAPHS OF TEST SETUP

Please refer to separated files Appendix B for Photographs of Test Setup_EMC

7. PHOTOGRAPHS OF THE EUT

Please refer to separated files Appendix C for Photographs of The EUT.

----------THE END OF REPORT----------

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RADIO TEST REPORT

For

SHANGHAI MATIS ELECTRIC CO.,LTD.

Smart Metering RCBO/MCB

Test Model: MT61GR

Additional Model No.: Please Refer to Page 6

Prepared for	:	SHANGHAI MATIS ELECTRIC CO.,LTD.
Address	:	Room318-320, No.83, West Huanghu Road, Pudong, Shanghai, China 201306
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	:	Room 101/201, Building A, and Room 101/301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Tel	:	(+86)755-82591330
Fax	:	(+86)755-82591332
Web	:	www.LCS-cert.com
Mail	:	webmaster@LCS-cert.com
Date of receipt of test sample	:	August 19, 2026
Number of tested samples	:	2
Sample No.	:	A260817067-1, A260817067-2
Serial number	:	Prototype
Date of Test	:	August 19, 2026 ~ September 20, 2026
Date of Report	:	September 21, 2026

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Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com
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RADIO TEST REPORT ETSI EN 301 908-1 V15.2.1 (2023-01) & ETSI EN 301 908-13 V13.3.1 (2024-10)		
Report Reference No.	**:**	**LCSA08176105EB**
Date of Issue	:	September 21, 2026
Testing Laboratory Name	**:**	**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address	:	Room 101/201, Building A, and Room 101/301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Testing Location/ Procedure...	:	Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □
Applicant's Name	**:**	SHANGHAI MATIS ELECTRIC CO.,LTD.
Address	:	Room318-320, No.83, West Huanghu Road, Pudong, Shanghai, China 201306
Test Specification		
Standard.....	:	ETSI EN 301 908-1 V15.2.1 (2023-01) ETSI EN 301 908-13 V13.3.1 (2024-10)
TRF Originator.....	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF.....	:	Dated 2017-06
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Test Item Description.	**:**	**Smart Metering RCBO/MCB**
Trade Mark	:	Matis/Matismart
Test Model.....	:	MT61GR
Ratings	:	Please Refer to Page 6
Result	**:**	**Pass**

Compiled by:	Supervised by:	Approved by:
Jack Liu	Kevin Huang	Gavin Liang
Jack Liu/ Administrator	Kevin Huang/ RF Manager	Gavin Liang/ Manager

Shenzhen LCS Compliance Testing Laboratory Ltd.
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RADIO -- TEST REPORT

Test Report No. : LCSA08176105EB	September 21, 2026 Date of issue

Test Model.....	: MT61GR
EUT.....	: Smart Metering RCBO/MCB
Applicant.....	**: SHANGHAI MATIS ELECTRIC CO.,LTD.**
Address.....	: Room318-320, No.83, West Huanghu Road, Pudong, Shanghai, China 201306
Telephone.....	: /
Fax.....	: /
Manufacturer.....	**: SHANGHAI MATIS ELECTRIC CO.,LTD.**
Address.....	: Room318-320, No.83, West Huanghu Road, Pudong, Shanghai, China 201306
Telephone.....	: /
Fax.....	: /
Factory.....	**: SHANGHAI MATIS ELECTRIC CO.,LTD.**
Address.....	: Room318-320, No.83, West Huanghu Road, Pudong, Shanghai, China 201306
Telephone.....	: /
Fax.....	: /

Test Result	Pass

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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Revision History

Report Version	Issue Date	Revision Content	Revised By
000	September 21, 2026	Initial Issue	---

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1. GENERAL INFORMATION

1.1. Product Description for Equipment Under Test (EUT)

EUT	: Smart Metering RCBO/MCB
Test Model	: MT61GR
Additional Model No.	: MT61GP
Model Declaration	: PCB board, structure and internal of these model(s) are the same, So no additional models were tested
Ratings	: Ue: 230/240VAC(2P); 400/415VAC(4P) 50/60Hz; In: 6/10/16/20/25/32/40/50/63A/80A/100A/125A (B/C/D-type); Icn=Ics=6,0kA IΔn= 30, 100, 300mA,500mA; Type -A & -AC; With time delay: type S Energy Accuracy: class 1
Hardware Version	: 1.0
Software Version	: 1.0
LTE	:
Support Band	: ☒E-UTRA Band 1(EU-Band) ☒E-UTRA Band 3(EU-Band) ☒E-UTRA Band 5(Non EU-Band) ☒E-UTRA Band 7(EU-Band) ☒E-UTRA Band 8(EU-Band) ☒E-UTRA Band 20(EU-Band) ☒E-UTRA Band 28(EU-Band) ☒E-UTRA Band 38(EU-Band) ☒E-UTRA Band 40(EU-Band) ☒E-UTRA Band 41(EU-Band)
LTE Release Version	: R8
FDD Band	: Uplink: E-UTRA Band 1: 1920MHz~1980MHz E-UTRA Band 3: 1710MHz~1785MHz E-UTRA Band 7: 2500MHz~2570MHz E-UTRA Band 8: 880MHz~915MHz E-UTRA Band 20: 832MHz~862MHz E-UTRA Band 28: 703MHz~748MHz Downlink: E-UTRA Band 1: 2110MHz~2170MHz E-UTRA Band 3: 1805MHz~1880MHz E-UTRA Band 7: 2620MHz~2690MHz E-UTRA Band 8: 925MHz~960MHz E-UTRA Band 20: 791MHz~821MHz E-UTRA Band 28: 758MHz~803MHz
TDD Band	: E-UTRA Band 38: 2570MHz~2620MHz E-UTRA Band 40: 2300MHz~2400MHz E-UTRA Band 41: 2496-2690MHz
Type Of Modulation	: QPSK/16QAM
Antenna Description	: External Antenna -0.93dBi (max.) For E-UTRA Band 1 -0.22dBi (max.) For E-UTRA Band 3

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-3.29dBi (max.) For E-UTRA Band 7
-1.41dBi (max.) For E-UTRA Band 8
-1.15dBi (max.) For E-UTRA Band 20
-4.31dBi (max.) For E-UTRA Band 28
-1.92dBi (max.) For E-UTRA Band 38
-1.73dBi (max.) For E-UTRA Band 40
0.31dBi (max.) For E-UTRA Band 41

Power Class : Class 3

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1.2. Support Equipment List

Manufacturer	Description	Model	Serial Number	Certificate
---	---	---	---	---

1.3. External I/O

I/O Port Description	Quantity	Cable
---	---	---

1.4. Objective

Standard Referenced	Standard Title	Standard Version
ETSI EN 301 908-1	IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 1: Introduction and common requirements; Release 15	V15.2.1 (2023-01)
ETSI EN 301 908-13	IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 13: Evolved Universal Terrestrial Radio Access (E-UTRA) User Equipment (UE)	V13.3.1 (2024-10)
ETSI TS 136 521-1	LTE; Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) conformance specification; Radio transmission and reception; Part 1: Conformance testing (3GPP TS 36.521-1 version 17.7.0 Release 17)	V17.7.0 (2023-07)

The objective is to determine compliance with ETSI EN 301 908-1 V15.2.1 (2023-01) & ETSI EN 301 908-13 V13.3.1 (2024-10).

1.5. Test Conditions

Conditions	Temperature	Voltage
Normal	21-25℃	AC 230V
Low extreme Temperature/Low extreme Voltage (TL/VL);	0℃	AC 207V
Low extreme Temperature/High extreme Voltage (TL/VH);	0℃	AC 240V
High extreme Temperature/Low extreme Voltage (TH/VL);	45℃	AC 207V
High extreme Temperature/High extreme Voltage (TH/VH).	45℃	AC 240V
Note1: For all conditions, the humidity range is: 40-75%, the pressure range is 86-106kPa. The High Voltage AC 240V and Low Voltage AC 207V was declared by manufacturer		

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1.6. Description Of Test Mode

The following operating modes were applied for the related test items. For radiated measurement, the test was performed with EUT in X, Y, Z position and the worse case was found when EUT in Y position. All test modes were tested, only the result of the worst case was recorded in the report.

Band	Bandwidth (MHz)						Modulation		RB #			Test Channel		
	1.4	3	5	10	15	20	QPSK	16QAM	1	Part	Full	L	M	H
1	N/A	N/A	Y	/	/	Y	Y	Y	Y	Y	Y	Y	Y	Y
3	Y	/	Y	/	/	Y	Y	Y	Y	Y	Y	Y	Y	Y
7	N/A	N/A	Y	/	/	Y	Y	Y	Y	Y	Y	Y	Y	Y
8	Y	/	Y	Y	N/A	N/A	Y	Y	Y	Y	Y	Y	Y	Y
20	N/A	N/A	Y	/	/	Y	Y	Y	Y	Y	Y	Y	Y	Y
28	N/A	Y	Y	/	/	Y	Y	Y	Y	Y	Y	Y	Y	Y
38	N/A	N/A	Y	/	/	Y	Y	Y	Y	Y	Y	Y	Y	Y
40	N/A	N/A	Y	/	/	Y	Y	Y	Y	Y	Y	Y	Y	Y
41	N/A	N/A	Y	/	/	Y	Y	Y	Y	Y	Y	Y	Y	Y

Note:
1)The mark "**Y**" means that this configuration is chosen for testing.
2)The mark "**/**" means that this bandwidth is supported but is not chosen for testing.
3)The mark "**N/A**" means that this bandwidth is not supported.

1.7. Measurement Uncertainty (95% confidence levels, k=2)

Test Item		Uncertainty
Radio Frequency	:	0.9×10^{-4}
Total RF Power, Conducted	:	1.0 dB
RF Power Density, Conducted	:	1.8 dB
Spurious Emissions, Conducted	:	1.8 dB
All Emissions, Radiated	:	3.1 dB
Temperature	:	0.5℃
Humidity	:	1 %
DC And Low Frequency Voltages	:	1 %

1.8. Description of Test Facility

NVLAP Accreditation Code is 600167-0.
FCC Designation Number is CN5024.
CAB identifier is CN0071.
CNAS Registration Number is L4595.

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2. SYSTEM TEST CONFIGURATION

2.1. Justification

N/A

2.2. EUT Exercise Software

N/A

2.3. Special Accessories

The special accessories were supplied by Shenzhen LCS Compliance Testing Laboratory Ltd.

2.4. Block Diagram/Schematics

Please refer to the related document.

2.5. Equipment Modifications

Shenzhen LCS Compliance Testing Laboratory Ltd. has not done any modification on the EUT.

2.6. Test Setup

Please refer to the test setup photo.

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3. SUMMARY OF TEST RESULTS

Test Engineer	:	Jerry Chu
Temperature/ Humidity:	:	24.1℃/ 52.2%

Reference Clause No. (ETSI EN 301 908-13)	Description of Test Items	Result					
		E-UTRA Band					
		Band 1	Band 3	Band 7	Band 8	Band 20	Band 28
4.2.2	Transmitter Maximum Output Power						
	Normal	Pass	Pass	Pass	Pass	Pass	Pass
	TL/VL	Pass	Pass	Pass	Pass	Pass	Pass
	TL/VH	Pass	Pass	Pass	Pass	Pass	Pass
	TH/VL	Pass	Pass	Pass	Pass	Pass	Pass
	TH/VH	Pass	Pass	Pass	Pass	Pass	Pass
4.2.5	Transmitter Minimum Output Power						
	Normal	Pass	Pass	Pass	Pass	Pass	Pass
	TL/VL	Pass	Pass	Pass	Pass	Pass	Pass
	TL/VH	Pass	Pass	Pass	Pass	Pass	Pass
	TH/VL	Pass	Pass	Pass	Pass	Pass	Pass
	TH/VH	Pass	Pass	Pass	Pass	Pass	Pass
4.2.3	Transmitter Spectrum Emission Mask						
	Normal	Pass	Pass	Pass	Pass	Pass	Pass
4.2.11	Transmitter Adjacent Channel Leakage Power Ratio						
	Normal	Pass	Pass	Pass	Pass	Pass	Pass
	TL/VL	Pass	Pass	Pass	Pass	Pass	Pass
	TL/VH	Pass	Pass	Pass	Pass	Pass	Pass
	TH/VL	Pass	Pass	Pass	Pass	Pass	Pass
	TH/VH	Pass	Pass	Pass	Pass	Pass	Pass
4.2.4	Transmitter Spurious Emissions						
	Normal	Pass	Pass	Pass	Pass	Pass	Pass
4.2.10	Receiver Spurious Emissions						
	Normal	Pass	Pass	Pass	Pass	Pass	Pass
4.2.6	Receiver Adjacent Channel Selectivity (ACS)						
	Normal	Pass	Pass	Pass	Pass	Pass	Pass
4.2.7	Receiver Blocking Characteristics						
	Normal	Pass	Pass	Pass	Pass	Pass	Pass
4.2.8	Receiver Spurious Response						
	Normal	Pass	Pass	Pass	Pass	Pass	Pass
4.2.9	Receiver Intermodulation Characteristics						
	Normal	Pass	Pass	Pass	Pass	Pass	Pass

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4.2.12	Receiver Reference Sensitivity Level						
	Normal	Pass	Pass	Pass	Pass	Pass	Pass
	TL/VL	Pass	Pass	Pass	Pass	Pass	Pass
	TL/VH	Pass	Pass	Pass	Pass	Pass	Pass
	TH/VL	Pass	Pass	Pass	Pass	Pass	Pass
	TH/VH	Pass	Pass	Pass	Pass	Pass	Pass

Reference Clause No. (ETSI EN 301 908-1)	Description of Test Items	Result					
		E-UTRA Band					
		Band 1	Band 3	Band 7	Band 8	Band 20	Band 28
4.2.2	Radiated emissions (UE)						
	Normal	Pass	Pass	Pass	Pass	Pass	Pass
4.2.4	Control and monitoring functions (UE)						
	Normal	Pass	Pass	Pass	Pass	Pass	Pass

Reference Clause No. (ETSI EN 301 908-13)	Description of Test Items	Result		
		E-UTRA Band		
		Band 38	Band 40	Band 41
4.2.2	Transmitter Maximum Output Power			
	Normal	Pass	Pass	Pass
	TL/VL	Pass	Pass	Pass
	TL/VH	Pass	Pass	Pass
	TH/VL	Pass	Pass	Pass
	TH/VH	Pass	Pass	Pass
4.2.5	Transmitter Minimum Output Power			
	Normal	Pass	Pass	Pass
	TL/VL	Pass	Pass	Pass
	TL/VH	Pass	Pass	Pass
	TH/VL	Pass	Pass	Pass
	TH/VH	Pass	Pass	Pass
4.2.3	Transmitter Spectrum Emission Mask			
	Normal	Pass	Pass	Pass
4.2.11	Transmitter Adjacent Channel Leakage Power Ratio			
	Normal	Pass	Pass	Pass
	TL/VL	Pass	Pass	Pass
	TL/VH	Pass	Pass	Pass
	TH/VL	Pass	Pass	Pass
	TH/VH	Pass	Pass	Pass
4.2.4	Transmitter Spurious Emissions			
	Normal	Pass	Pass	Pass

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4.2.10	Receiver Spurious Emissions			
	Normal	Pass	Pass	Pass
4.2.6	Receiver Adjacent Channel Selectivity (ACS)			
	Normal	Pass	Pass	Pass
4.2.7	Receiver Blocking Characteristics			
	Normal	Pass	Pass	Pass
4.2.8	Receiver Spurious Response			
	Normal	Pass	Pass	Pass
4.2.9	Receiver Intermodulation Characteristics			
	Normal	Pass	Pass	Pass
4.2.12	Receiver Reference Sensitivity Level			
	Normal	Pass	Pass	Pass
	TL/VL	Pass	Pass	Pass
	TL/VH	Pass	Pass	Pass
	TH/VL	Pass	Pass	Pass
	TH/VH	Pass	Pass	Pass
4.2.2	Radiated emissions (UE)			
	Normal	Pass	Pass	Pass
4.2.4	Control and monitoring functions (UE)			
	Normal	Pass	Pass	Pass

Reference Clause No. (ETSI EN 301 908-1)	**Description of Test Items**	**Result**		
		E-UTRA Band		
		Band 38	**Band 40**	**Band 41**
4.2.2	Radiated emissions (UE)			
	Normal	Pass	Pass	Pass
4.2.4	Control and monitoring functions (UE)			
	Normal	Pass	Pass	Pass

***Note:
Result: Describes test result of Test Case.
Pass: Test Case passed on specified conformance test platform.
Normal(TN/VN): Normal temperature – 25℃; Normal voltage. – AC 230V
TH: High extreme Temperature – +45℃
VH: High extreme Voltage – AC 240V
TL: Low extreme Temperature – 0℃
VL: Low extreme Voltage – AC 207V
N/A: Not applicable.
—: Not test.

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4. LIST OF MEASURING EQUIPMENT

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	LTE Test Software	Tonscend	JS1120-1	N/A	N/A	N/A
2	RF Control Unit	Tonscend	JS0806-1	158060009	2025-11-07	2026-11-06
3	MXA Signal Analyzer	Agilent	N9020A	MY23311067	2026-04-21	2027-04-20
4	DC Power Supply	Agilent	E3642A	N/A	2025-09-27	2026-09-26
5	MXG Vector Signal Generator	Agilent	N5182A	MY47071151	2026-04-21	2027-04-20
6	PSG Analog Signal Generator	Agilent	E8257D	MY46410184	2025-12-05	2026-12-04
7	Temperature & Humidity Chamber	Baro	/	/	2026-05-06	2027-05-05
8	EMI Test Software	Farad	EZ-EMC	Ver. EMC-CON 3A1.1+	N/A	N/A
9	3m Semi Anechoic Chamber	MRDIANZI	966	MR009	2025-08-16	2028-08-15
10	Positioning Controller	Max-Full	MF7802BS	MF780208586	N/A	N/A
11	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	00005	2024-07-13	2027-07-12
12	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2024-08-03	2027-08-02
13	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2024-07-13	2027-07-12
14	Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	791	2024-07-13	2027-07-12
15	Broadband Preamplifier	SCHWARZBECK	BBV9719	9719-025	2024-07-30	2027-07-29
16	EMI Test Receiver	R&S	ESR3	101181	2026-05-06	2027-05-05
17	RS SPECTRUM ANALYZER	R&S	FSP40	100503	2026-04-21	2027-04-20
18	Low-frequency amplifier	SchwarzZBECK	BBV9745	00253	2025-09-27	2026-09-26
19	High-frequency amplifier	JS Denki Pte	PA0118-43	JSPA21009	2025-09-27	2026-09-26
20	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	166586	2025-09-27	2026-09-26
21	RF Filter	Micro-Tronics	BRC50718	017	2025-09-27	2026-09-26
22	RF Filter	Micro-Tronics	BRC50719	011	2025-09-28	2026-09-27
23	RF Filter	Micro-Tronics	BRC50720	011	2025-09-27	2026-09-26
24	RF Filter	Micro-Tronics	BRC50721	013	2025-09-27	2026-09-26
25	RF Filter	Micro-Tronics	BRM50702	S/N-195	2026-04-21	2027-04-20
26	6dB Attenuator	/	100W/6dB	1172040	2026-04-21	2027-04-20
27	3dB Attenuator	/	2N-3dB	/	2025-09-28	2026-09-27

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5. PHOTOGRAPHS OF TEST SETUP

Please refer to separated files Appendix D for Photographs of Test Setup_RF.

6. PHOTOGRAPHS OF THE EUT

Please refer to separated files Appendix C for Photographs of The EUT.

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Annex A

Transmitter maximum output power

The Conducted Power Measurement Result for LTE Band					
Test Result for LTE Band 1					
Channel Bandwidth	Channel	RB Allocation		Average Power (dBm, QPSK)	Limit (dBm)
		RB Size	RB Offset		
5MHz	Low Range	1	1RB#0	23.20	20.3~25.7
			8RB#0	23.26	20.3~25.7
	Mid Range	1	1RB#0	23.28	20.3~25.7
			8RB#0	23.15	20.3~25.7
	High Range	1	1RB#24	23.54	20.3~25.7
			8RB#17	23.39	20.3~25.7
20MHz	Low Range	1	1RB#0	23.16	20.3~25.7
			18RB#0	23.25	20.3~25.7
	Mid Range	1	1RB#0	23.19	20.3~25.7
			18RB#0	23.45	20.3~25.7
	High Range	1	1RB#99	23.36	20.3~25.7
			18RB#82	23.38	20.3~25.7

The Conducted Power Measurement Result for LTE Band					
Test Result for LTE Band 3					
Channel Bandwidth	Channel	RB Allocation		Average Power (dBm, QPSK)	Limit (dBm)
		RB Size	RB Offset		
1.4MHz	Low Range	1	1RB#0	23.77	20.3~25.7
	Mid Range	1	1RB#0	23.74	20.3~25.7
	High Range	1	1RB#0	23.72	20.3~25.7
			5RB#0	23.69	20.3~25.7
5MHz	Low Range	1	1RB#0	23.75	20.3~25.7
			1RB#24	23.62	20.3~25.7
	Mid Range	1	1RB#0	23.49	20.3~25.7
			1RB#24	23.48	20.3~25.7
	High Range	1	1RB#0	23.45	20.3~25.7
			1RB#24	22.95	20.3~25.7
			8RB#0	23.03	20.3~25.7
20MHz	Low Range	1	1RB#0	23.62	20.3~25.7
			1RB#99	23.11	20.3~25.7
	Mid Range	1	1RB#0	23.29	20.3~25.7
			1RB#99	23.18	20.3~25.7
	High Range	1	1RB#0	23.33	20.3~25.7
			1RB#99	22.98	20.3~25.7
			18RB#0	22.97	20.3~25.7

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The Conducted Power Measurement Result for LTE Band

Test Result for LTE Band 7

Channel Bandwidth	Channel	RB Allocation		Average Power (dBm, QPSK)	Limit (dBm)
		RB Size	RB Offset		
5MHz	Low Range	1	1RB#0	23.79	20.3~25.7
			1RB#24	23.84	20.3~25.7
	Mid Range	1	1RB#0	23.88	20.3~25.7
			1RB#24	23.82	20.3~25.7
	High Range	1	1RB#0	23.96	20.3~25.7
			1RB#24	23.74	20.3~25.7
			8RB#0	23.74	20.3~25.7
20MHz	Low Range	1	1RB#0	23.71	20.3~25.7
			1RB#99	23.67	20.3~25.7
	Mid Range	1	1RB#0	23.78	20.3~25.7
			1RB#99	23.75	20.3~25.7
	High Range	1	1RB#0	23.75	20.3~25.7
			1RB#99	23.60	20.3~25.7
			18RB#0	23.45	20.3~25.7

The Conducted Power Measurement Result for LTE Band

Test Result for LTE Band 8

Channel Bandwidth	Channel	RB Allocation		Average Power (dBm, QPSK)	Limit (dBm)
		RB Size	RB Offset		
1.4MHz	Low Range	1	1RB#0	24.30	20.3~25.7
	Mid Range	1	1RB#0	24.25	20.3~25.7
	High Range	1	1RB#0	24.29	20.3~25.7
			5RB#0	24.00	20.3~25.7
5MHz	Low Range	1	1RB#0	24.32	20.3~25.7
			1RB#24	24.26	20.3~25.7
	Mid Range	1	1RB#0	24.28	20.3~25.7
			1RB#24	24.17	20.3~25.7
	High Range	1	1RB#0	24.28	20.3~25.7
			1RB#24	24.06	20.3~25.7
			8RB#0	23.99	20.3~25.7
10MHz	Low Range	1	1RB#0	24.10	20.3~25.7
			1RB#49	24.04	20.3~25.7
	Mid Range	1	1RB#0	23.98	20.3~25.7
			1RB#49	23.94	20.3~25.7
	High Range	1	1RB#0	24.06	20.3~25.7
			1RB#49	23.90	20.3~25.7
			12RB#0	23.72	20.3~25.7

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The Conducted Power Measurement Result for LTE Band

Test Result for LTE Band 20

Channel Bandwidth	Channel	RB Allocation		Average Power (dBm, QPSK)	Limit (dBm)
		RB Size	RB Offset		
5MHz	Low Range	1	1RB#0	23.80	20.3~25.0
			1RB#24	23.79	20.3~25.0
	Mid Range	1	1RB#0	23.67	20.3~25.0
			1RB#24	23.60	20.3~25.0
	High Range	1	1RB#0	23.76	20.3~25.0
			1RB#24	23.52	20.3~25.0
			8RB#0	23.62	20.3~25.0
20MHz	Low Range	1	1RB#0	23.65	20.3~25.0
			1RB#99	23.86	20.3~25.0
	Mid Range	1	1RB#0	23.71	20.3~25.0
			1RB#99	23.49	20.3~25.0
	High Range	1	1RB#0	23.81	20.3~25.0
			1RB#99	23.51	20.3~25.0
			18RB#0	23.26	20.3~25.0

The Conducted Power Measurement Result for LTE Band

Test Result for LTE Band 28

Channel Bandwidth	Channel	RB Allocation		Average Power (dBm, QPSK)	Limit (dBm)
		RB Size	RB Offset		
3MHz	Low Range	1	1RB#0	24.52	19.8~25.0
			4RB#0	24.57	19.8~25.0
	Mid Range	1	1RB#0	24.58	19.8~25.0
			4RB#0	24.53	19.8~25.0
	High Range	1	1RB#14	24.60	19.8~25.0
			4RB#11	24.66	19.8~25.0
5MHz	Low Range	1	1RB#0	24.50	19.8~25.0
			8RB#0	24.59	19.8~25.0
	Mid Range	1	1RB#0	24.53	19.8~25.0
			8RB#0	24.45	19.8~25.0
	High Range	1	1RB#24	24.56	19.8~25.0
			8RB#17	24.64	19.8~25.0
20MHz	Low Range	1	1RB#0	24.44	19.8~25.0
			18RB#0	24.51	19.8~25.0
	Mid Range	1	1RB#0	24.26	19.8~25.0
			18RB#0	24.50	19.8~25.0
	High Range	1	1RB#99	24.50	19.8~25.0
			18RB#82	24.43	19.8~25.0

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The Conducted Power Measurement Result for LTE Band

Test Result for LTE Band 38

Channel Bandwidth	Channel	RB Allocation		Average Power (dBm, QPSK)	Limit (dBm)
		RB Size	RB Offset		
5MHz	Low Range	1	1RB#0	23.66	20.3~25.7
			8RB#0	23.75	20.3~25.7
	Mid Range	1	1RB#0	24.07	20.3~25.7
			8RB#0	24.07	20.3~25.7
	High Range	1	1RB#24	23.82	20.3~25.7
			8RB#17	23.87	20.3~25.7
20MHz	Low Range	1	1RB#0	23.69	20.3~25.7
			18RB#0	23.75	20.3~25.7
	Mid Range	1	1RB#0	23.98	20.3~25.7
			18RB#0	23.99	20.3~25.7
	High Range	1	1RB#99	23.61	20.3~25.7
			18RB#82	23.71	20.3~25.7

The Conducted Power Measurement Result for LTE Band

Test Result for LTE Band 40

Channel Bandwidth	Channel	RB Allocation		Average Power (dBm, QPSK)	Limit (dBm)
		RB Size	RB Offset		
5MHz	Low Range	1	1RB#0	22.42	20.3~25.0
			8RB#0	22.58	20.3~25.0
	Mid Range	1	1RB#0	22.14	20.3~25.0
			8RB#0	22.25	20.3~25.0
	High Range	1	1RB#24	22.23	20.3~25.0
			8RB#17	22.34	20.3~25.0
20MHz	Low Range	1	1RB#0	22.42	20.3~25.0
			18RB#0	22.70	20.3~25.0
	Mid Range	1	1RB#0	22.57	20.3~25.0
			18RB#0	22.56	20.3~25.0
	High Range	1	1RB#99	22.30	20.3~25.0
			18RB#82	22.58	20.3~25.0

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The Conducted Power Measurement Result for LTE Band

Test Result for LTE Band 41

Channel Bandwidth	Channel	RB Allocation		Average Power (dBm, QPSK)	Limit (dBm)
		RB Size	RB Offset		
5MHz	Low Range	1	1RB#0	23.44	20.3~25.7
			1RB#24	23.49	20.3~25.7
	Mid Range	1	1RB#0	24.07	20.3~25.7
			1RB#24	23.99	20.3~25.7
	High Range	1	1RB#0	24.11	20.3~25.7
			1RB#24	23.52	20.3~25.7
			12RB#0	23.41	20.3~25.7
20MHz	Low Range	1	1RB#0	23.47	20.3~25.7
			1RB#99	23.50	20.3~25.7
	Mid Range	1	1RB#0	23.91	20.3~25.7
			1RB#99	23.77	20.3~25.7
	High Range	1	1RB#0	23.97	20.3~25.7
			1RB#99	23.60	20.3~25.7
			50RB#0	23.28	20.3~25.7

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Annex of Radiated spurious emission

Radiated spurious emissions - MS allocated a channel(Worst Case)

LTE Band 1(5MHz, RB allocation=25): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
59.96	Horizontal	-74.48	-36.00	Pass
824.15	H	-80.37	-36.00	
3900.32	H	-63.62	-30.00	
5853.58	H	-59.01	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
57.92	Vertical	-78.12	-36.00	Pass
730.03	V	-71.58	-36.00	
3903.05	V	-70.33	-30.00	
5853.46	V	-53.95	-30.00	

LTE Band 1(5MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
54.68	Horizontal	-77.85	-36.00	Pass
948.15	H	-70.67	-36.00	
3903.91	H	-60.41	-30.00	
5851.25	H	-59.36	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
58.74	Vertical	-76.65	-36.00	Pass
733.38	V	-77.09	-36.00	
3902.39	V	-69.77	-30.00	
5855.76	V	-52.69	-30.00	

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LTE Band 1(20MHz, RB allocation=100): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
51.82	Horizontal	-73.32	-36.00	Pass
761.73	H	-72.74	-36.00	
3905.02	H	-69.68	-30.00	
5855.81	H	-53.64	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
51.94	Vertical	-75.12	-36.00	Pass
989.17	V	-73.17	-36.00	
3903.84	V	-65.64	-30.00	
5853.80	V	-52.14	-30.00	

LTE Band 1(20MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
55.80	Horizontal	-72.89	-36.00	Pass
926.09	H	-72.54	-36.00	
3904.17	H	-63.24	-30.00	
5851.07	H	-58.70	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
58.04	Vertical	-70.08	-36.00	Pass
703.19	V	-73.33	-36.00	
3901.23	V	-68.08	-30.00	
5851.14	V	-56.51	-30.00	

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LTE Band 3(1.4MHz, RB allocation=6): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
57.81	Horizontal	-78.21	-36.00	Pass
922.75	H	-78.05	-36.00	
3503.78	H	-62.80	-30.00	
5252.67	H	-56.42	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
55.74	Vertical	-78.30	-36.00	Pass
761.25	V	-76.97	-36.00	
3505.47	V	-67.98	-30.00	
5253.36	V	-53.30	-30.00	

LTE Band 3(1.4MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
57.60	Horizontal	-71.28	-36.00	Pass
879.65	H	-71.15	-36.00	
3502.85	H	-63.85	-30.00	
5250.36	H	-57.71	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
50.45	Vertical	-70.80	-36.00	Pass
890.72	V	-80.65	-36.00	
3504.70	V	-60.17	-30.00	
5251.36	V	-54.19	-30.00	

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LTE Band 3(5MHz, RB allocation=25): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
50.44	Horizontal	-70.94	-36.00	Pass
895.67	H	-72.48	-36.00	
3505.18	H	-63.23	-30.00	
5250.83	H	-51.87	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
55.25	Vertical	-76.41	-36.00	Pass
852.55	V	-77.61	-36.00	
3502.33	V	-60.45	-30.00	
5252.42	V	-60.67	-30.00	

LTE Band 3(5MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
59.05	Horizontal	-73.52	-36.00	Pass
909.02	H	-72.92	-36.00	
3503.93	H	-70.27	-30.00	
5252.84	H	-50.14	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
58.08	Vertical	-76.96	-36.00	Pass
996.78	V	-77.13	-36.00	
3500.25	V	-70.92	-30.00	
5251.09	V	-50.90	-30.00	

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LTE Band 3(20MHz, RB allocation=100): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
52.67	Horizontal	-80.87	-36.00	Pass
919.75	H	-77.50	-36.00	
3503.56	H	-62.72	-30.00	
5255.36	H	-51.19	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
55.29	Vertical	-74.03	-36.00	Pass
982.20	V	-73.93	-36.00	
3503.60	V	-68.76	-30.00	
5253.86	V	-53.53	-30.00	

LTE Band 3(20MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
60.66	Horizontal	-70.14	-36.00	Pass
912.72	H	-73.20	-36.00	
3503.30	H	-67.33	-30.00	
5254.41	H	-51.98	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
52.04	Vertical	-79.77	-36.00	Pass
719.42	V	-78.35	-36.00	
3501.71	V	-63.38	-30.00	
5250.78	V	-54.60	-30.00	

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LTE Band 7(5MHz, RB allocation=25): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
52.65	Horizontal	-78.32	-36.00	Pass
990.88	H	-76.65	-36.00	
5073.01	H	-63.25	-30.00	
7686.74	H	-52.91	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
58.45	Vertical	-74.17	-36.00	Pass
793.77	V	-72.69	-36.00	
5073.00	V	-68.42	-30.00	
7688.18	V	-50.55	-30.00	

LTE Band 7(5MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
51.73	Horizontal	-72.96	-36.00	Pass
853.89	H	-70.54	-36.00	
5072.45	H	-67.70	-30.00	
7686.64	H	-60.57	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
50.76	Vertical	-76.82	-36.00	Pass
735.14	V	-73.70	-36.00	
5075.09	V	-69.85	-30.00	
7686.70	V	-53.57	-30.00	

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LTE Band 7(20MHz, RB allocation=100): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
59.91	Horizontal	-72.01	-36.00	Pass
719.04	H	-73.33	-36.00	
5073.68	H	-65.65	-30.00	
7686.61	H	-51.68	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
55.58	Vertical	-78.20	-36.00	Pass
943.79	V	-75.60	-36.00	
5074.21	V	-64.28	-30.00	
7690.23	V	-51.95	-30.00	

LTE Band 7(20MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
53.63	Horizontal	-75.75	-36.00	Pass
926.30	H	-77.52	-36.00	
5075.72	H	-64.05	-30.00	
7687.24	H	-58.37	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
60.79	Vertical	-71.09	-36.00	Pass
778.10	V	-78.08	-36.00	
5070.45	V	-68.84	-30.00	
7688.67	V	-52.27	-30.00	

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LTE Band 8(1.4MHz, RB allocation=6): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
59.94	Horizontal	-80.32	-36.00	Pass
820.68	H	-70.14	-36.00	
1790.71	H	-66.22	-30.00	
2692.41	H	-59.10	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
51.29	Vertical	-74.77	-36.00	Pass
769.86	V	-70.08	-36.00	
1795.21	V	-65.19	-30.00	
2692.15	V	-50.90	-30.00	

LTE Band 8(1.4MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
51.94	Horizontal	-80.85	-36.00	Pass
726.10	H	-79.55	-36.00	
1797.19	H	-61.83	-30.00	
2695.74	H	-56.73	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
51.27	Vertical	-79.77	-36.00	Pass
808.60	V	-74.91	-36.00	
1796.72	V	-60.62	-30.00	
2694.67	V	-50.08	-30.00	

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LTE Band 8(5MHz, RB allocation=25): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
59.31	Horizontal	-70.14	-36.00	Pass
737.99	H	-78.90	-36.00	
1790.03	H	-63.83	-30.00	
2694.35	H	-59.38	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
54.87	Vertical	-74.13	-36.00	Pass
955.48	V	-76.96	-36.00	
1799.96	V	-65.96	-30.00	
2691.78	V	-53.21	-30.00	

LTE Band 8(5MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
53.81	Horizontal	-71.01	-36.00	Pass
814.28	H	-72.04	-36.00	
1792.63	H	-70.70	-30.00	
2690.30	H	-51.18	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
52.67	Vertical	-70.65	-36.00	Pass
785.32	V	-75.37	-36.00	
1797.05	V	-65.99	-30.00	
2694.26	V	-53.61	-30.00	

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LTE Band 8(10MHz, RB allocation=50): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
51.77	Horizontal	-78.62	-36.00	Pass
832.32	H	-75.31	-36.00	
1791.18	H	-63.13	-30.00	
2693.19	H	-54.20	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
57.35	Vertical	-75.78	-36.00	Pass
814.46	V	-75.91	-36.00	
1790.46	V	-68.53	-30.00	
2694.07	V	-54.54	-30.00	

LTE Band 8(10MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
51.88	Horizontal	-78.44	-36.00	Pass
873.17	H	-75.51	-36.00	
1791.29	H	-66.76	-30.00	
2694.28	H	-59.85	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
54.72	Vertical	-79.98	-36.00	Pass
852.99	V	-70.30	-36.00	
1793.71	V	-66.60	-30.00	
2695.63	V	-57.77	-30.00	

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LTE Band 20(5MHz, RB allocation=25): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
53.06	Horizontal	-73.86	-36.00	Pass
993.61	H	-72.61	-36.00	
1695.20	H	-67.41	-30.00	
2544.97	H	-50.57	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
53.30	Vertical	-76.81	-36.00	Pass
995.78	V	-78.88	-36.00	
1693.36	V	-62.81	-30.00	
2543.30	V	-55.20	-30.00	

LTE Band 20(5MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
53.49	Horizontal	-76.95	-36.00	Pass
751.18	H	-76.02	-36.00	
1694.96	H	-60.18	-30.00	
2545.86	H	-56.23	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
50.34	Vertical	-76.02	-36.00	Pass
950.49	V	-70.93	-36.00	
1699.89	V	-61.13	-30.00	
2541.83	V	-57.10	-30.00	

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LTE Band 20(20MHz, RB allocation=100): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
59.12	Horizontal	-79.98	-36.00	Pass
943.82	H	-70.89	-36.00	
1694.94	H	-63.10	-30.00	
2544.79	H	-56.02	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
59.01	Vertical	-75.48	-36.00	Pass
743.15	V	-74.53	-36.00	
1697.98	V	-62.89	-30.00	
2544.42	V	-57.08	-30.00	

LTE Band 20(20MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
59.89	Horizontal	-78.16	-36.00	Pass
874.78	H	-70.09	-36.00	
1698.01	H	-64.11	-30.00	
2541.93	H	-51.55	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
58.73	Vertical	-77.58	-36.00	Pass
906.24	V	-72.89	-36.00	
1690.67	V	-60.65	-30.00	
2544.60	V	-52.95	-30.00	

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LTE Band 28(3MHz, RB allocation=15): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
52.99	Horizontal	-77.90	-36.00	Pass
985.61	H	-80.88	-36.00	
1447.50	H	-62.73	-30.00	
2175.36	H	-59.67	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
50.03	Vertical	-77.90	-36.00	Pass
711.65	V	-77.91	-36.00	
1451.99	V	-65.64	-30.00	
2179.55	V	-60.04	-30.00	

LTE Band 28(3MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
52.32	Horizontal	-78.54	-36.00	Pass
744.64	H	-72.51	-36.00	
1448.54	H	-64.84	-30.00	
2174.26	H	-56.45	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
58.22	Vertical	-76.82	-36.00	Pass
725.50	V	-71.56	-36.00	
1454.39	V	-63.58	-30.00	
2178.84	V	-53.57	-30.00	

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LTE Band 28(5MHz, RB allocation=25): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
54.53	Horizontal	-77.84	-36.00	Pass
791.95	H	-74.78	-36.00	
1452.95	H	-64.27	-30.00	
2175.23	H	-51.24	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
58.84	Vertical	-73.00	-36.00	Pass
707.60	V	-78.89	-36.00	
1451.26	V	-66.58	-30.00	
2172.75	V	-60.44	-30.00	

LTE Band 28(5MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
53.94	Horizontal	-70.96	-36.00	Pass
974.83	H	-78.70	-36.00	
1448.55	H	-66.20	-30.00	
2171.63	H	-54.76	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
55.10	Vertical	-80.81	-36.00	Pass
845.85	V	-76.85	-36.00	
1450.67	V	-69.56	-30.00	
2180.53	V	-57.38	-30.00	

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LTE Band 28(20MHz, RB allocation=100): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
58.98	Horizontal	-74.49	-36.00	Pass
922.78	H	-74.47	-36.00	
1450.63	H	-67.50	-30.00	
2177.46	H	-55.33	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
57.76	Vertical	-70.58	-36.00	Pass
797.66	V	-70.39	-36.00	
1453.07	V	-65.74	-30.00	
2172.48	V	-54.04	-30.00	

LTE Band 28(20MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
58.09	Horizontal	-75.77	-36.00	Pass
875.90	H	-76.48	-36.00	
1449.52	H	-66.41	-30.00	
2178.39	H	-60.17	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
52.66	Vertical	-73.91	-36.00	Pass
838.03	V	-80.37	-36.00	
1451.38	V	-63.79	-30.00	
2171.33	V	-58.05	-30.00	

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LTE Band 38(5MHz, RB allocation=25): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
58.39	Horizontal	-80.61	-36.00	Pass
956.50	H	-79.61	-36.00	
5193.14	H	-64.85	-30.00	
7795.27	H	-52.82	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
58.77	Vertical	-79.88	-36.00	Pass
884.67	V	-72.02	-36.00	
5190.43	V	-66.95	-30.00	
7793.39	V	-52.35	-30.00	

LTE Band 38(5MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
59.44	Horizontal	-78.04	-36.00	Pass
738.55	H	-78.67	-36.00	
5191.46	H	-69.94	-30.00	
7793.68	H	-59.42	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
57.06	Vertical	-75.64	-36.00	Pass
1000.06	V	-71.62	-36.00	
5194.88	V	-63.77	-30.00	
7792.01	V	-60.57	-30.00	

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LTE Band 38(20MHz, RB allocation=100): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
51.34	Horizontal	-73.07	-36.00	Pass
757.65	H	-75.29	-36.00	
5191.40	H	-65.38	-30.00	
7794.46	H	-52.82	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
55.39	Vertical	-71.06	-36.00	Pass
831.59	V	-72.35	-36.00	
5194.45	V	-68.30	-30.00	
7792.97	V	-59.67	-30.00	

LTE Band 38(20MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
56.41	Horizontal	-79.58	-36.00	Pass
821.40	H	-79.50	-36.00	
5192.34	H	-61.87	-30.00	
7790.72	H	-58.85	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
57.69	Vertical	-72.13	-36.00	Pass
755.45	V	-79.04	-36.00	
5190.12	V	-61.49	-30.00	
7794.56	V	-59.30	-30.00	

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LTE Band 40(5MHz, RB allocation=25): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
55.69	Horizontal	-78.13	-36.00	Pass
734.17	H	-70.87	-36.00	
4705.49	H	-66.14	-30.00	
7050.12	H	-55.10	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
56.47	Vertical	-78.25	-36.00	Pass
702.66	V	-73.87	-36.00	
4703.69	V	-70.86	-30.00	
7052.81	V	-59.71	-30.00	

LTE Band 40(5MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
56.88	Horizontal	-70.11	-36.00	Pass
869.61	H	-78.62	-36.00	
4706.59	H	-62.20	-30.00	
7057.73	H	-58.00	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
55.21	Vertical	-75.48	-36.00	Pass
922.27	V	-79.93	-36.00	
4705.99	V	-61.72	-30.00	
7058.51	V	-54.05	-30.00	

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LTE Band 40(20MHz, RB allocation=100): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
53.08	Horizontal	-74.24	-36.00	Pass
895.63	H	-72.22	-36.00	
4703.28	H	-62.72	-30.00	
7052.76	H	-51.69	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
55.76	Vertical	-77.80	-36.00	Pass
855.37	V	-78.12	-36.00	
4705.41	V	-70.44	-30.00	
7051.59	V	-59.93	-30.00	

LTE Band 40(20MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
55.31	Horizontal	-76.14	-36.00	Pass
897.31	H	-76.50	-36.00	
4704.57	H	-64.97	-30.00	
7056.44	H	-58.18	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
52.84	Vertical	-74.00	-36.00	Pass
749.28	V	-76.71	-36.00	
4708.88	V	-61.55	-30.00	
7055.40	V	-52.99	-30.00	

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LTE Band 41(5MHz, RB allocation=25): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
55.85	Horizontal	-76.64	-36.00	Pass
949.21	H	-80.70	-36.00	
4800.08	H	-70.90	-30.00	
7255.99	H	-57.03	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
52.80	Vertical	-71.72	-36.00	Pass
824.61	V	-75.24	-36.00	
4801.10	V	-66.95	-30.00	
7253.85	V	-60.71	-30.00	

LTE Band 41(5MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
50.65	Horizontal	-78.50	-36.00	Pass
964.00	H	-72.29	-36.00	
4806.19	H	-64.07	-30.00	
7256.19	H	-59.24	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
50.83	Vertical	-79.14	-36.00	Pass
948.46	V	-71.90	-36.00	
4804.89	V	-61.83	-30.00	
7258.24	V	-57.40	-30.00	

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LTE Band 41(20MHz, RB allocation=100): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
51.78	Horizontal	-74.14	-36.00	Pass
971.27	H	-77.86	-36.00	
4802.63	H	-68.29	-30.00	
7251.21	H	-54.91	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
58.49	Vertical	-80.23	-36.00	Pass
720.51	V	-78.62	-36.00	
4804.85	V	-69.77	-30.00	
7250.18	V	-57.59	-30.00	

LTE Band 41(20MHz, RB allocation=1): Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
58.98	Horizontal	-71.74	-36.00	Pass
747.75	H	-72.73	-36.00	
4806.95	H	-66.79	-30.00	
7254.02	H	-53.20	-30.00	
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
57.47	Vertical	-74.40	-36.00	Pass
962.32	V	-79.38	-36.00	
4808.37	V	-67.01	-30.00	
7258.33	V	-50.88	-30.00	

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Radiated spurious emissions-MS in idle mode (Worst Case)

LTE Band 1: Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
54.38	Horizontal	-74.17	-57.00	Pass
708.54	H	-77.92	-57.00	
1791.06	H	-61.11	-47.00	
2706.75	H	-59.70	-47.00	
3615.04	H	-57.27	-47.00	
LTE Band 1: Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
50.48	Vertical	-78.53	-57.00	Pass
878.29	V	-72.06	-57.00	
1793.23	V	-69.43	-47.00	
2700.27	V	-60.49	-47.00	
3613.49	V	-52.36	-47.00	

LTE Band 8: Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
52.22	Horizontal	-80.13	-57.00	Pass
908.95	H	-71.23	-57.00	
1699.93	H	-65.65	-47.00	
2670.38	H	-50.33	-47.00	
3240.93	H	-55.51	-47.00	
LTE Band 8: Middle Channel, Normal condition				
Frequency (MHz)	Radiated Spurious Emission		Limit (dBm)	Test Result
	Polarization	Level(dBm)		
56.09	Vertical	-70.41	-57.00	Pass
865.52	V	-76.00	-57.00	
1691.61	V	-62.91	-47.00	
2678.02	V	-58.83	-47.00	
3250.48	V	-57.15	-47.00	

Note:The report only recorded the worst result.

----------THE END OF REPORT----------

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HEALTH TEST REPORT

For

SHANGHAI MATIS ELECTRIC CO.,LTD.

Smart Metering RCBO/MCB

Test Model: MT61GR

Additional Model No.: Please Refer to Page 5

Prepared for	:	SHANGHAI MATIS ELECTRIC CO.,LTD.
Address	:	Room318-320, No.83, West Huanghu Road, Pudong, Shanghai, China 201306
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	:	Room 101/201, Building A, and Room 101/301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China
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Web	:	www.LCS-cert.com
Mail	:	webmaster@LCS-cert.com
Date of receipt of test sample	:	August 19, 2026
Number of tested samples	:	2
Sample No.	:	A260817067-1, A260817067-2
Serial number	:	Prototype
Date of Test	:	August 19, 2026 ~ September 20, 2026
Date of Report	:	September 21, 2026

Shenzhen LCS Compliance Testing Laboratory Ltd.
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HEALTHTEST REPORT

EN IEC 62311:2020

Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz)

Report Reference No.....	**:**	**LCSA08176105EC**
Date of Issue	:	September 21, 2026
Testing Laboratory Name	**:**	**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address	:	Room 101/201, Building A, and Room 101/301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Testing Location/Procedure	:	Full application of Harmonised standards ■ Partial application of Harmonised standards□ Other standard testing method□
Applicant's Name	**:**	**SHANGHAI MATIS ELECTRIC CO.,LTD.**
Address	:	Room318-320, No.83, West Huanghu Road, Pudong, Shanghai, China 201306
Test Specification		
Standard.....	:	EN IEC 62311:2020
TRF Originator.....	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF	:	Dated 2011-03

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Test Item Description.....	**:**	**Smart Metering RCBO/MCB**
Trade Mark	:	Matis/Matismart
Test Model	:	MT61GR
Ratings	:	Please Refer to Page 5
Result.....	**:**	**Pass**

Compiled by:	Reviewed by:	Approved by:
Jack Liu	Kevin Huang	Gavin Liang
Jack Liu/ Administrator	Kevin Huang/ RF Manager	Gavin Liang/ Manager

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HEALTH--TEST REPORT

Test Report No. : LCSA08176105EC	September 21, 2026 Date of issue

Test Model.....	:	MT61GR
EUT.....	:	Smart Metering RCBO/MCB
Applicant.....	**:**	**SHANGHAI MATIS ELECTRIC CO.,LTD.**
Address.....	:	Room318-320, No.83, West Huanghu Road, Pudong, Shanghai, China 201306
Telephone.....	:	/
Fax.....	:	/
Manufacturer.....	**:**	**SHANGHAI MATIS ELECTRIC CO.,LTD.**
Address.....	:	Room318-320, No.83, West Huanghu Road, Pudong, Shanghai, China 201306
Telephone.....	:	/
Fax.....	:	/
Factory.....	**:**	**SHANGHAI MATIS ELECTRIC CO.,LTD.**
Address.....	:	Room318-320, No.83, West Huanghu Road, Pudong, Shanghai, China 201306
Telephone.....	:	/
Fax.....	:	/

Test Result	**Pass**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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Revision History

Report Version	Issue Date	Revision Content	Revised By
000	September 21, 2026	Initial Issue	---

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1. GENERAL INFORMATION

1.1. Product Description for Equipment Under Test (EUT)

EUT	: Smart Metering RCBO/MCB
Test Model	: MT61GR
Additional Model No.	: MT61GP
Model Declaration	: PCB board, structure and internal of these model(s) are the same, So no additional models were tested
Ratings	: Ue: 230/240VAC(2P); 400/415VAC(4P) 50/60Hz; In: 6/10/16/20/25/32/40/50/63A/80A/100A/125A (B/C/D-type); Icn=Ics=6,0kA IΔn= 30, 100, 300mA,500mA; Type -A & -AC; With time delay: type S Energy Accuracy: class 1
Hardware Version	: 1.0
Software Version	: 1.0
LTE	:
Support Band	: ☒E-UTRA Band 1(EU-Band) ☒E-UTRA Band 3(EU-Band) ☒E-UTRA Band 5(Non EU-Band) ☒E-UTRA Band 7(EU-Band) ☒E-UTRA Band 8(EU-Band) ☒E-UTRA Band 20(EU-Band) ☒E-UTRA Band 28(EU-Band) ☒E-UTRA Band 38(EU-Band) ☒E-UTRA Band 40(EU-Band) ☒E-UTRA Band 41(EU-Band)
LTE Release Version	: R8
FDD Band	: Uplink: E-UTRA Band 1: 1920MHz~1980MHz E-UTRA Band 3: 1710MHz~1785MHz E-UTRA Band 7: 2500MHz~2570MHz E-UTRA Band 8: 880MHz~915MHz E-UTRA Band 20: 832MHz~862MHz E-UTRA Band 28: 703MHz~748MHz Downlink: E-UTRA Band 1: 2110MHz~2170MHz E-UTRA Band 3: 1805MHz~1880MHz E-UTRA Band 7: 2620MHz~2690MHz E-UTRA Band 8: 925MHz~960MHz E-UTRA Band 20: 791MHz~821MHz E-UTRA Band 28: 758MHz~803MHz
TDD Band	: E-UTRA Band 38: 2570MHz~2620MHz E-UTRA Band 40: 2300MHz~2400MHz E-UTRA Band 41: 2496-2690MHz
Type Of Modulation	: QPSK/16QAM
Antenna Description	: External Antenna -0.93dBi (max.) For E-UTRA Band 1 -0.22dBi (max.) For E-UTRA Band 3 -3.29dBi (max.) For E-UTRA Band 7

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-1.41dBi (max.) For E-UTRA Band 8
-1.15dBi (max.) For E-UTRA Band 20
-4.31dBi (max.) For E-UTRA Band 28
-1.92dBi (max.) For E-UTRA Band 38
-1.73dBi (max.) For E-UTRA Band 40
0.31dBi (max.) For E-UTRA Band 41

Power Class : Class 3

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1.2. Objective

According to its specifications, the EUT must comply with the requirements of the following standards:
EN IEC 62311:2020–Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz)

1.3. Test Methodology

All measurements contained in this report were conducted with EN IEC 62311:2020.

1.4. Facilities

All measurement facilities used to collect the measurement data are located at Room 101/201, Building A, and Room 101/301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 32.

1.5. Support Equipment List

Manufacturer	Description	Model	Serial Number	Certificate
---	---	---	---	---

1.6. External I/O

I/O Port Description	Quantity	Cable
---	---	---

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1.7. Equipment

Radiated emissions are measured with one or more of the following types of linearly polarizedantennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrumanalyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.Conducted emissions are measured with Line Impedance Stabilization Networks and EMI TestReceivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for makingmeasurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference MeasuringApparatus and Measurement Methods.”

1.8. Laboratory Accreditations And Listings

Site Description

EMC Lab. : NVLAP Accreditation Code is 600167-0.
FCC Designation Number is CN5024.
CAB identifier is CN0071.
CNAS Registration Number is L4595.

Name of Firm : Shenzhen LCS Compliance Testing Laboratory Ltd.

Site Location : Room 101/201, Building A, and Room 101/301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Subdistrict, Bao’an District, Shenzhen, Guangdong, China

1.9. Measurement Uncertainty(95% confidence levels, k=2)

Test Item		Uncertainty
Radio Frequency	:	0.9×10^{-4}
Total RF Power, Conducted	:	1.0 dB
RF Power Density, Conducted	:	1.8 dB
Spurious Emissions, Conducted	:	1.8 dB
All Emissions, Radiated	:	3.1 dB
Temperature	:	0.5℃
Humidity	:	1 %
DC And Low Frequency Voltages	:	1 %

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2.HUMAN EXPOSURE TO THE ELECTROMAGNETIC FIELDS

2.1 Basic Restrictions Reference levels

Council Recommendation 1999/519/EC Annex II

Basic restrictions for electric, magnetic and electromagnetic fields (0Hz to 300GHz)

Frequency range	Magnetic flux density (mT)	Current density (Ma/m2) (rms)	Whole body average SAR (W/kg)	Localised SAR (head and trunk) (W/kg)	Localised SAR (limbs) (W/kg)	Power density (W/m2)
0Hz	40	-	-	-	-	-
>0-1Hz	-	8	-	-	-	-
1-4Hz	-	8/f	-	-	-	-
4-1000Hz	-	2	-	-	-	-
1000Hz-100kHz	-	f/500	-	-	-	-
100kHz-10MHz	-	f/500	0.08	2	4	-
10MHz-10GHz	-	-	0.08	2	4	-
10-300GHz	-	-	-	-	-	10

Note:

1. f is the frequency in Hz.

2. The basic restriction on the current density is intended to protect against acute exposure effects on central nervous system tissues in the head and trunk of the body and includes a safety factor. The basic restrictions for ELF fields are based on established adverse effects on the central nervous system. Such acute effects are essentially instantaneous and there is no scientific justification to modify the basic restrictions for exposure of short duration. However, since the basic restriction refers to adverse effects on the central nervous system, this basic restriction may permit higher current densities in body tissues other than the central nervous system under the same exposure conditions.

3. Because of electrical inhomogeneity of the body, current densities should be averaged over a cross section of 1cm2 perpendicular to the current direction.

4. For frequencies up to 100 kHz, peak current density values can be obtained by multiplying the rms value by √2(=1.414). For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated as=1/(2tp)

5. For frequencies up to 100kHz and for pulsed magnetic fields, the maximum current density associated with the pulses can be calculated from the rise/fall times and the maximum rate of change of magnetic flux density. The induced current density can then be compared with the appropriate basic restriction.

6. All SAR values are to be averaged over any six-minute period.

7. Localised SAR averaging mass is any 10g of contiguous tissue; the maximum SAR so obtained should be the value used for the estimation of exposure. These 10g of tissue are intended to be a mass of contiguous tissue with nearly homogeneous electrical properties. In specifying a contiguous mass of tissue, it is recognised that this concept can be used in computational dosimetry but may present difficulties for direct physical measurements. A simple geometry such as cubic tissue mass can be used provided that the calculated dosimetric quantities have conservation values relative to the exposure guidelines.

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8. For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated as=1/(2tp). Additionally, for pulsed exposures, in the frequency range 0,3 to 10GHz and for localised exposure of the head, in order to limit and avoid auditory effects caused by thermoelastic expansion, an additional basic restriction is recommended. This is that SA should not exceed 2mJ kg-1 averaged over 10g of tissue.

Council Recommendation 1999/519/EC Annex III

Basic restrictions for electric, magnetic and electromagnetic fields (0Hz to 300GHz)

Frequency range	Magnetic flux density (mT)	Current density (Ma/m2) (rms)	Whole body average SAR (W/kg)	Localised SAR (head and trunk) (W/kg)	Localised SAR (limbs) (W/kg)	Power density (W/m2)
0Hz	40	-	-	-	-	-
>0-1Hz	-	8	-	-	-	-
1-4Hz	-	8/f	-	-	-	-
4-1000Hz	-	2	-	-	-	-
1000Hz-100kHz	-	f/500	-	-	-	-
100kHz-10MHz	-	f/500	0.08	2	4	-
10MHz-10GHz	-	-	0.08	2	4	-
10-300GHz	-	-	-	-	-	10

Note:

1. f is the frequency in Hz.
2. The basic restriction on the current density is intended to protect against acute exposure effects on central nervous system tissues in the head and trunk of the body and includes a safety factor. The basic restrictions for ELF fields are based on established adverse effects on the central nervous system. Such acute effects are essentially instantaneous and there is no scientific justification to modify the basic restrictions for exposure of short duration. However, since the basic restriction refers to adverse effects on the central nervous system, this basic restriction may permit higher current densities in body tissues other than the central nervous system under the same exposure conditions.
3. Because of electrical inhomogeneity of the body, current densities should be averaged over a cross section of 1cm2 perpendicular to the current direction.
4. For frequencies up to 100 kHz, peak current density values can be obtained by multiplying the rms value by √2(=1.414). For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated as=1/(2tp)
5. For frequencies up to 100kHz and for pulsed magnetic fields, the maximum current density associated with the pulses can be calculated from the rise/fall times and the maximum rate of change of magnetic flux density. The induced current density can then be compared with the appropriate basic restriction.
6. All SAR values are to be averaged over any six-minute period.
7. Localised SAR averaging mass is any 10g of contiguous tissue; the maximum SAR so obtained should be the value used for the estimation of exposure. These 10g of tissue are intended to be a mass of contiguous tissue with nearly homogeneous electrical properties. In specifying a contiguous mass of tissue, it is recognised that this concept can be used in computational dosimetry but may present difficulties for direct physical measurements. A simple geometry such as cubic tissue mass can be used provided that the calculated dosimetric quantities have conservation values relative to the exposure guidelines.

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8. For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated as=1/(2tp). Additionally, for pulsed exposures, in the frequency range 0,3 to 10GHz and for localised exposure of the head, in order to limit and avoid auditory effects caused by thermoelastic expansion, an additional basic restriction is recommended. This is that SA should not exceed 2mJ kg-1 averaged over 10g of tissue.

2.2 Reference Levels

Council Recommendation 1999/519/EC Annex II

Basic restrictions for electric, magnetic and electromagnetic fields (0Hz to 300GHz)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density Seq (W/m2)
0-1Hz	-	$3,2\times10^{4}$	4×10^{4}	-
1-8Hz	1000	$3,2\times10^{4}/f^{2}$	$4\times10^{4}/f^{2}$	-
8-25Hz	1000	4000/f	5000/f	-
0.025Hz-0,8kHz	250/f	4/f	5/f6,25	-
0,8-3kHz	250/f	5	6,25	-
3-150kHz	87	5	6,25	-
0,15-1MHz	87	0.73/f	0,92/f	-
1-10MHz	$87/f^{1/2}$	0.73/f	0,92/f	-
10-400MHz	28	0.073	0,092	2
400-2000MHz	$1,375\ f^{1/2}$	$0,0037\ f^{1/2}$	$0,0046\ f^{1/2}$	f/200
2-300GHz	61	0,16	0,20	10

Note:

1. f is the frequency in Hz.
2. The basic restriction on the current density is intended to protect against acute exposure effects on central nervous system tissues in the head and trunk of the body and includes a safety factor. The basic restrictions for ELF fields are based on established adverse effects on the central nervous system. Such acute effects are essentially instantaneous and there is no scientific justification to modify the basic restrictions for exposure of short duration. However, since the basic restriction refers to adverse effects on the central nervous system, this basic restriction may permit higher current densities in body tissues other than the central nervous system under the same exposure conditions.
3. Because of electrical inhomogeneity of the body, current densities should be averaged over a cross section of 1cm2 perpendicular to the current direction.
4. For frequencies up to 100 kHz, peak current density values can be obtained by multiplying the rms value by √2(=1.414). For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated as=1/(2tp)
5. For frequencies up to 100kHz and for pulsed magnetic fields, the maximum current density associated with the pulses can be calculated from the rise/fall times and the maximum rate of change of magnetic flux density. The induced current density can then be compared with the appropriate basic restriction.
6. All SAR values are to be averaged over any six-minute period.
7. Localised SAR averaging mass is any 10g of contiguous tissue; the maximum SAR so obtained should be the value used for the estimation of exposure. These 10g of tissue are intended to be a mass of contiguous tissue with nearly homogeneous electrical properties. In specifying a contiguous mass of tissue, it is recognised that this concept can be used in

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computational dosimetry but may present difficulties for direct physical measurements. A simple geometry such as cubic tissue mass can be used provided that the calculated dosimetric quantities have conservation values relative to the exposure guidelines.

8. For pulses of duration tp the equivalent frequency to apply in the basic restrictions should be calculated as=1/(2tp). Additionally, for pulsed exposures, in the frequency range 0,3 to 10GHz and for localised exposure of the head, in order to limit and avoid auditory effects caused by thermoelastic expansion, an additional basic restriction is recommended. This is that SA should not exceed 2mJ kg-1 averaged over 10g of tissue.

Classification of the assessment methods
The antenna of the product, under normal use condition is at least 20cm away from the body of the user. Warning statement on the user for keeping 20cm separation distance and the prohibition of operating to a person has been printed on the user manual. So, this product under normal use is located on electromagnetic far field between the human body.
Far Field Calculation Formula
$E = \frac{\sqrt{30 \times G \times TP}}{D}$ *Where* *G: numerical gain of transmitting antenna;* *TP: Transmitted power in watt;* *D: distance from the transmitting antenna in meter.*

Council Recommendation 1999/519/EC Annex III

Reference levels for electric, magnetic and electromagnetic fields (0Hz to 300GHz)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density Seq (W/m2)
0-1Hz	-	$3,2\times10^4$	4×10^4	-
1-8Hz	1000	$3,2\times10^4/f^2$	$4\times10^4/f^2$	-
8-25Hz	1000	4000/f	5000/f	-
0.025Hz-0,8kHz	250/f	4/f	5/f6,25	-
0,8-3kHz	250/f	5	6,25	-
3-150kHz	87	5	6,25	-
0,15-1MHz	87	0.73/f	0,92/f	-
1-10MHz	$87/f^{1/2}$	0.73/f	0,92/f	-
10-400MHz	28	0.073	0,092	2
400-2000MHz	$1,375\ f^{1/2}$	$0,0037\ f^{1/2}$	$0,0046f^{1/2}$	f/200
2-300GHz	61	0,16	0,20	10

Note:

1. As indicated in the frequency range column.
2. For frequencies between 100kHz and 10GHz, Seq, E2, H2 and B2 are to be averaged over any six-minute period.
3. For frequencies exceeding 10GHz, Seq, E2, H2 and B2 are to be averaged over any 68/.1.05-minute period (.in GHz).
4. No E-field value is provided for frequencies <1Hz, which are effectively static electric fields. For most people the annoying perception of surface electric charges will not occur at field strengths less than 20kV/m. Spark discharges causing stress or annoyance should be avoided.

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3. RF EXPOSURE EVALUATION

3.1. Test Results

According to the radio test report (LCSA08176105EB):

Mode	Max RF Output Power (e.i.r.p.) (dBm)	Minimum Distance in Meter (m)	E-field Strength (V/m)	E-field Strength Limit (V/m)	Result
LTE Band 1	23.54	0.2	13.02	61.03	Pass
LTE Band 3	23.77	0.2	13.37	57.48	Pass
LTE Band 7	23.96	0.2	13.66	61.00	Pass
LTE Band 8	24.32	0.2	14.24	41.19	Pass
LTE Band 20	23.86	0.2	13.51	39.90	Pass
LTE Band 28	24.66	0.2	14.81	37.10	Pass
LTE Band 38	24.07	0.2	13.84	61.00	Pass
LTE Band 40	22.70	0.2	11.82	61.00	Pass
LTE Band 41	24.11	0.2	13.90	61.00	Pass

Note:

1. Only record worst case data.

2. All other emissions are too low to read.

This proves that the unit complies with the EN IEC 62311 for RF exposure requirement.

----------THE END OFREPORT----------

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LVD TEST REPORT

Report No.:	**STE05232515S**
Product:	Smart Metering Breaker
Model No.:	MT61GR, MT61GP
Prepared for:	**SHANGHAI MATIS ELECTRIC CO., LTD.**
Address:	Room 320, No. 83, Huanhu West Third Road, Pudong, Shanghai, China
Prepared by:	**Shenzhen STE Testing Laboratory Co., Ltd.**
Lab Location:	3/F, Building 9, Hongde Factory, No. 63 Yuchang Road, Niuhu Community, Guanlan Street, Longhua District, Shenzhen, China
Tel. :	+86-755-2373 0717
Fax. :	+86-755-2373 0717
Website:	http://www.stecert.com

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TEST REPORT
EN 61010-1
Safety requirements for electrical equipment for measurement, control, and laboratory use
Part 1: General requirements

Report Number.....:	STE05232515S
Tested by (name + signature).....:	Plum Xiao / Test engineer
Approved by (name + signature).....:	Allen Huang / Project manager
Date of issue.....:	June 03, 2025
Total number of pages.....:	45
Testing Laboratory .....:	**Shenzhen STE Testing Laboratory Co., Ltd.**
Address .....:	3/F, Building 9, Hongde Factory, No. 63 Yuchang Road, Niuhu Community, Guanlan Street, Longhua District, Shenzhen, China
Applicant's name.....:	**SHANGHAI MATIS ELECTRIC CO., LTD.**
Address.....:	Room 320, No. 83, Huanhu West Third Road, Pudong, Shanghai, China
Manufacturer's name.....:	**SHANGHAI MATIS ELECTRIC CO., LTD.**
Address.....:	Room 320, No. 83, Huanhu West Third Road, Pudong, Shanghai, China
Test specification:	
Standard.....:	EN 61010-1: 2010+ A1: 2019
Test procedure.....:	Type test
Non-standard test method.....:	N/A
Test Report Form No.....:	IEC61010_1P
Test Report Form(s) Originator.....:	VDE Prüf- und Zertifizierungsinstitut GmbH
Master TRF.....:	Dated: 2021-04-12

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Test item description.....:	Smart Metering Breaker
Model/Type reference.....:	MT61GR, MT61GP
Trade Mark.....:	matis
Ratings.....:	Input: 230V~ / 400V 3~, 50Hz, Max. 80A

Summary of testing:

Testing location:

Shenzhen STE Testing Laboratory Co., Ltd.

3/F, Building 9, Hongde Factory, No. 63 Yuchang Road, Niuhu Community, Guanlan Street, Longhua District, Shenzhen, China

Tests performed (name of test and test clause):

- EN 61010-1: 2010+ A1: 2019

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

matis

Smart Metering Breaker

Model: MT61GR

Input: 230V~ / 400V 3~, 50Hz, Max. 80A



SHANGHAI MATIS ELECTRIC CO., LTD.

Room 320, No. 83, Huanhu West Third Road, Pudong, Shanghai, China

Importer: xxxx

Address: xxxx

Made in China

Remarks:

1. Height of CE mark is 5mm or more, height of WEEE symbol is 7mm or more, height of other marks is 5mm or more, height of letters and numerals is 2mm or more.

TEST ITEM PARTICULARS:	
Type of item ..... :	~~Measurement~~ / Control / ~~Laboratory~~
Description of equipment function..... :	Circuit on-off control
Connection to MAINS supply..... :	~~Permanent~~ / ~~Detachable cord set~~ / Terminals ~~Non detachable cord set~~ / ~~None~~ / ~~Battery operated~~
Overvoltage category..... :	II / ~~III~~ / ~~IV~~
POLLUTION DEGREE..... :	IIIb
Means of protection..... :	Class I
Environmental conditions..... :	Normal / ~~Extended (Specify):~~
For use in wet locations..... :	~~Yes~~ / No
Equipment mobility..... :	~~Portable~~ / ~~Hand-held~~ / ~~Floor standing~~ / ~~Fixed~~ / Built-in
Operating conditions..... :	Continuous / ~~Short-time~~ / ~~Intermittent~~
Marked degree of protection to IEC 60529..... :	IPX0

Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A (or N)
- test object does meet the requirement..... :	P (Pass)
- test object does not meet the requirement..... :	F (Fail)

Testing..... :	
Date of receipt of test item..... :	December 23, 2024
Date(s) of performance of tests..... :	December 23, 2024 to June 03, 2025

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(see Enclosure #)" refers to additional information appended to the report.
"(see appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided..... :	☐ **Yes** ☒ **Not applicable**

General product information

1, The product is a circuit breaker.

EN 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
1	**Scope and object**		**P**
1.3	Verification	Type tests	P
1.4	Environmental conditions	See below	P
1.4.1	Normal environmental conditions		P
a)	indoor use		P
b)	altitude up to 2 000 m		P
c)	temperature 5 ℃ to 40℃		P
d)	maximum relative humidity		--
e)	mains supply voltage fluctuations	±10 % of the nominal voltage	P
f)	transient overvoltages	Overvoltage category II	P
g)	temporary overvoltages occurring on the mains supply		P
h)	Applicable pollution degree of the intended environment	Pollution degree 2	--
1.4.2	Extended environmental conditions		N
a)	outdoor use		N
b)	altitude above 2 000 m		N
c)	temperature below 5 ℃or above 40℃		N
d)	maximum relative humidity		--
e)	mains supply voltage fluctuations	Exceeding ±10 % of the nominal voltage	N
f)	Wet Location		N
g)	transient overvoltages	Overvoltage category II	P
4	**Tests**		**--**
4.1	General	Type tests	P
4.2	Sequence of tests	inspected after each test	P
4.3	Reference test conditions	15-20℃, 75-106kPa	P
4.4	**Testing in SINGLE FAULT CONDITION**	**(see Form A.1)**	**P**
4.4.1	General		P
4.4.2	Application of fault conditions		--
4.4.2.1	Fault conditions shall include those specified in 4.4.2.2 to 4.4.2.14	(see Form A.1)	--
	After each application of a fault condition, the equipment or part shall pass the applicable tests of 4.4.4.	See below	P

EN 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.4.2.2	Protective impedance		N
4.4.2.3	Protective conductor	(see Form A.1 & Form A.6)	P
4.4.2.4	Equipment or parts for short-term or intermittent operations	Continuous operation	N
4.4.2.5	Motors		P
	– stopped while fully energized	See appened table	P
	– prevented from starting	See appened table	P
	– one phase interrupted (multi-phase)		N
4.4.2.6	Capacitors		N
4.4.2.7	Mains transformers		P
4.4.2.7.1	Short circuit	(See Form A.1)	P
4.4.2.7.2	Overload	(See Form A.1)	P
4.4.2.8	Outputs	No hazards	P
4.4.2.9	Equipment for more than one supply		N
4.4.2.10	Cooling		P
a)	air-holes with filters shall be closed;	See appended table	P
b)	forced cooling by motor-driven fans shall be stopped		N
c)	cooling by circulation of water or other coolant shall be stopped		N
d)	loss of cooling liquid shall be simulated		N
4.4.2.11	Heating devices	No such heating devices	N
a)	Overridden timers for limit the heating period		N
b)	Overridden temperature controllers		N
4.4.2.12	Insulation between circuits and parts		P
4.4.2.13	Interlocks	No such interlocks	N
4.4.2.14	Voltage selectors		N
4.4.3	Duration of tests		--
4.4.3.1	The equipment shall be operated unit further change as a result of the applied fault is unlikely	Comply with requirement	P
4.4.3.2	A device interrupted or limited the current shall limit the temperature of parts easily touched		N
4.4.3.3	Fuse opened and not operate within approximately 1 s, and the current through the fuse shall be measured		N
4.4.4	Conformity after application of fault conditions		--

EN 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.4.4.1	Protection against electric shock is checked after the application of single fault as follows:		P
	a), no accessible conductive parts become hazardous live	Not become hazardous live parts	P
	b), performing a voltage test on double insulation or reinforced insulation	See clause 6.8	P
	c), measuring the temperature of transformer winding		P
4.4.4.2	Temperature of outer surface of enclosure and of parts that can be touched is checked	See appended table	P
4.4.4.3	Protection against the spread of fire is checked	See appended table	P
4.4.4.4	Protection against other hazard is checked	See clause 7 and 8 and 11 to 16	P
5	**MARKING AND DOCUMENTATION**		--
5.1	**Marking**		--
5.1.1	General	See below	P
	Required equipment markings are:		--
	visible:	See page 3	P
	From the exterior; or	See page 3	P
	After removing a cover; or	No removing cover	N
	Opening a door	No opening door	N
	After removal from a rack or panel		N
	Not put on parts which can be removed by an OPERATOR	No such parts	N
	Letter symbols (IEC 60027) used		P
	Graphic symbols (IEC 61010-1: Table 1) used		P
	Graphic symbols shall be explained in the documentation	See user manual or specification	P
5.1.2	Identification		--
	a) Manufacturer’s or supplier’s name or trademark	See label	P
	b) Model number, name or other means	See label	P
	Manufacturing location identified	Only one manufacturing location.	N
5.1.3	Mains supply		--
	Equipment is marked as follows:	See below	P
a)	Nature of supply:		--

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Clause	Requirement + Test	Result - Remark	Verdict
	1) a.c. RATED mains frequency or range of frequencies ……..…..:	50Hz	P
	2) d.c. with symbol 1		P
b)	RATED supply voltage(s) or range.....:	230V~ / 400V 3~	P
c)	Max. RATED power (W or VA)or input current.....:	Max. 80A	P
c)	The measured value not more than 110 %	(see appended table)	P
	If more than one voltage range:	See page 4	P
	Separate values marked; or		P
	Values differ by less than 20 %		P
d)	OPERATOR-set for different RATED supply voltages:		N
	Indicates the equipment set voltage		N
	PORTABLE EQUIPMENT indication is visible from the exterior		N
	Changing the setting changes the indication		N
e)	Accessory mains socket-outlets accepting standard mains plugs are marked:	No such accessory	N
	With the voltage if it is different from the mains supply voltage..... :		N
	For use only with specific equipment		N
	If not marked for specific equipment it is marked with:		N
	The maximum rated current or power; or		N
	Symbol 14 with full details in the documentation		N
5.1.4	Fuses		--
	OPERATOR replaceable fuse marking (see also 5.4.5).....:		N
5.1.5	Terminals, connections and operating devices	Comply with the standard	P
5.1.5.1	General		--
	Where necessary for safety, indication of purpose of terminals, connectors, controls and indicators marked	Comply with the standard	P
	If insufficient space, symbol 14 used		P
5.1.5.2	Terminals	See below	P
	Mains supply terminals identified		P
	Other terminal marking:		P
a)	functional earth terminals (symbol 5 used)		N
b)	protective conductor terminals:		--

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Clause	Requirement + Test	Result - Remark	Verdict
	Symbol 6 is placed close to or on the terminal; or		N
	Part of appliance inlet		N
c)	Terminals of control circuits which are permitted by 6.6.3 to be connected to accessible conductive parts, with symbol 7 of table 1 unless connection is self-evident;		N
d)	Hazardous live terminals supplied from the interior	Comply with the standard	P
	Symbol 14 used; or	⚠ See page 3	P
	RATINGS marked	See page 3	P
	Standard mains socket outlet; or		N
5.1.6	Switches and circuit breakers		P
	If disconnecting device, on or off position marked		P
	Symbols 9 and 10 of Table 1		P
	A lamp alone is not considered to be a satisfactory marking		N
	For a push-button switch		N
5.1.7	Equipment protected by double insulation or reinforced insulation		P
	Protected throughout (symbol 11 used)		N
	Only partially protected (symbol 11 not used)		P
5.1.8	Field-wiring terminal boxes		N
	If terminal or enclosure exceeds 60 °C:		N
	Cable temperature rating marked		N
	Marking visible or beside terminal		N
5.2	**Warning markings**		--
	Visible when ready for normal use		P
	Are near or on applicable parts		P
a)	Symbols shall be at least 2.75 mm high. Text shall be at least 1.5 mm high and contrast in colour with the background		P
b)	Symbols or text moulded, stamped or engraved in a material shall be at least 2.0 mm high. If not contrasting in colour, they shall have a depth or raised height of at least 0.5 mm		P
	If necessary marked with symbol 14		P
	Statement to isolate or disconnect		P
5.3	**Durability of markings**	See appended table	P

EN 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
	The required markings remain clear and legible in normal use		P
5.4	**Documentation**		--
5.4.1	General		P
	Equipment is accompanied by documentation which includes:		P
a)	Intended use	See user manual	P
b)	Technical specification	See user manual	P
c)	name and address of the manufacturer or supplier from whom technical assistance	See user manual	P
d)	Information specified in 5.4.2 to 5.4.5	See user manual	P
e)	information about how to mitigate RISKS	See user manual	P
f)	indicate that only accessories which meet the manufacturer's specifications shall be used	See user manual	P
g)	provide guidance on how to determine that the equipment is functioning correctly	See user manual	P
h)	instructions for lifting and carrying	See user manual	P
	Warning statements and a clear explanation of warning symbols	See user manual	P
	include a statement that it must be consulted in all cases where symbol 14 of Table 1 is marked	See user manual	P
	Documentation may be provided on printed or electronic media		P
5.4.2	Equipment ratings		--
	Documentation includes:		P
a)	Supply voltage or voltage range	See page 3	P
	Frequency or frequency range	Ditto	P
	Power or current rating	Ditto	P
b)	Description of all input and output connections	See user manual	P
c)	Rating of insulation of external circuits		P
d)	Statement of the range of environmental conditions		P
e)	Degree of protection (IEC 60529)	IPX0	N
5.4.3	Equipment installation	See user manual	P
	Documentation includes instructions for:		--
a)	Assembly, location and mounting	See user manual	P
b)	Protective earthing		N
c)	Connections to supply	See user manual	P

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Clause	Requirement + Test	Result - Remark	Verdict
d)	Permanently connected equipment:		P
	1) Supply wiring requirements		P
	2) If external switch or circuit-breaker, requirements and location recommendation		P
e)	Ventilation requirements	See user manual	P
f)	Special services (e. g. air, cooling liquid)		N
g)	Maximum sound power level		N
h)	Instructions about sound pressure		N
5.4.4	Equipment operation		--
	Instructions for use include:		P
a)	Identification of operating controls and modes		P
b)	Positioning for disconnection		P
c)	Interconnection		P
d)	Specification of intermittent operation limits		N
e)	Explanation of symbols used		P
f)	Replacement of consumable materials		N
g)	Cleaning and decontamination		P
h)	Listing of any poisonous or injurious gases and quantities		N
i)	Risk-reduction procedures relating to flammable liquids		N
j)	methods of reducing the RISKS of burns from surfaces permitted to exceed the temperature limits of 10.1		P
	A statement about protection impairment if used in a manner not specified by the manufacturer		P
5.4.5	Equipment maintenance and service		--
	Instructions include:		P
	Sufficient preventive maintenance and inspection information		P
	Replacement of supply cords		P
	Specific battery type		P
	Any manufacturer specified parts		P
	Rating and characteristics of fuses	See following table	P
	Provided for service personnel:		--
	a) product-specific risks that may affect the service personnel		P

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Clause	Requirement + Test	Result - Remark	Verdict
	b) protective measures for these risks		P
	c) verification of the safe state of the equipment after repair		P
5.4.6	Integration into systems or effects resulting from special conditions	--	
	Aspects resulting from integration into systems or effects resulting from special ambient or application conditions shall be described in the documentation		P

6	**PROTECTION AGAINST ELECTRIC SHOCK**	**(see appended table)**	**--**
6.1	**General**		**P**
6.1.1	Requirements		P
	Accessible parts not hazadous live in normal condition and single fault condition		P
	Conformity is checked by the determination of 6.2 and 6.3 followed by the tests of 6.4 to 6.11	See below	P
6.1.2	Exceptions		--
	it is not feasible for operating reasons to prevent the following parts being both accessible and hazardous live		P
	a) parts of lamps and lamp sockets after lamp removal		N
	b) parts intended to be replaced by an OPERATOR		P
	hazardous live during the replacement or other operator action, but only if they are accessible only by means of a tool and have a warning marking		P
	Capacitance test	(see appended tables)	P
	Parts not hazardous live 10 s after interruption of supply		P
6.2	**Determination of accessible parts**		**P**
6.2.1	General	(see appended table A.6)	P
6.2.2	Examination	10N with test finger	P
6.2.2	Openings above parts that are hazardous live		P
6.2.3	Openings for pre-set controls	No such controls	N
6.3	**Limit values for accessible parts**		**--**
6.3.1	Levels in normal condition	(see appended table)	N
6.3.2	Levels in single fault condition	(see appended table)	N
6.4	**Primary means of protection**		**P**

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Clause	Requirement + Test	Result - Remark	Verdict
6.4.1	General		P
	Accessible parts shall be prevented from becoming hazardous live by following:		P
6.4.2	Enclosures and protective barriers		P
	- meet the rigidity requirements of 8.1		P
	- for provide protection by basic insulation		N
	- provide protection by limiting access, clearances and creepage distances between accessible parts and hazardous live parts shall meet the requirements of 6.7		P
6.4.3	Basic insulation		P
	meet the requirements of 6.7		P
6.4.4	Impedance		N
	impedance used as a primary means of protection		--
	- a) limit the current or voltage to not more than the applicable level of 6.3.2		N
	- b) be rated for the maximum working voltage and for the amount of power that it will dissipate		N
	- c) meet the requirements of 6.7		N
6.5	**Additional means of protection in case of single fault conditions**		**P**
6.5.1	General		--
6.5.2	Protective bonding		N
6.5.2.1	General		--
	Accessible conductive parts:		--
	Bonded to the protective conductor terminal; or		N
	Separated by screen or barrier bonded to protective conductor terminal from parts which are hazardous live		N
6.5.2.2	Integrity of protective bonding		N
a)	Protective bonding consists of directly connected structural parts or discrete conductors or both; and withstands thermal and dynamic stresses		N
b)	Soldered connections:		N
	Independently secured		N
	Not used for other purposes		N
c)	Screw connections are secured		N
d)	Protective bonding not interrupted		N

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Clause	Requirement + Test	Result - Remark	Verdict
e)	Any moveable connection specifically designed, and meets 6.5.2.4		N
f)	No external metal braid of cables used		N
g)	If mains supply passes through:		--
	Means provided for passing protective conductor;		N
	Impedance meets 6.5.1.3.		N
h)	Protective conductors bare or insulated, if insulated, green/yellow		N
	Exceptions:		--
	1) earthing braids;		N
	2) internal protective conductors etc.;		N
	Green/yellow not used for other purposes		N
	terminal suitable, and meets 6.5.2.3		N
6.5.2.3	Protective conductor terminal		N
a)	Contact surfaces are metal		N
b)	Appliance inlet used		N
c)	For rewireable cords and permanently connected equipment, protective conductor terminal is close to mains supply terminals		N
d)	If no mains supply is required, any protective conductor terminal:		--
	Is near terminals of circuit for which protective earthing is necessary		N
	External if other terminals external		N
e)	Equivalent current-carrying capacity to mains supply terminals	(see appended table)	N
f)	If plug-in, makes first and breaks last		N
g)	If also used for other bonding purposes, protective conductor:		--
	Applied first;		N
	Secured independently;		N
	Unlikely to be removed by servicing; or		N
	Warning marking requires replacement of protective conductor		N
h)	Protective conductor of measuring circuit:		--
	1) Current rating;		N
	2) protective bonding:		N
	Not interrupted; or		N

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Clause	Requirement + Test	Result - Remark	Verdict
	Indirect bonding used (see 6.5.1.5)		N
i)	Functional earth terminals allow independent connection		N
j)	If a binding screw:		--
	Suitable size for bond wire		N
	Not smaller than M 4 (No. 6)		N
	At least 3 turns of screw engaged		N
k)	Contact pressure not capable of reduction by deformation of materials		N
	Passes tightening torque test	(see appended table)	N
6.5.2.4	Impedance of protective bonding of plug-connected equipment	(see appended table)	N
6.5.2.5	Impedance of protective bonding of permanently connected equipment	(see appended table)	N
6.5.2.6	Transformer protective bonding screen	(see appended table)	N
6.5.3	double insulation and reinforced insulation (see 6.7)	See 6.7	P
6.5.4	Protective impedance	(see appended table)	--
a)	single component used, that safety and reliability for protection against electric shock is assured		N
	- rated for twice the maximum working voltage		N
	- if a resistor, rated for twice the power dissipation for the maximum working voltage		N
b)	A combination of components used	No use such component	N
	Components, wires and connections are rated as required sw		N
6.5.5	Automatic disconnection of the supply		--
	If used, it meets :		P
a)	be rated to disconnect the load within the time specified in figure 2		P
b)	be rated for the maximum rated load conditions of the equipment		P
6.5.6	Current- or voltage-limiting device		--
	If used, it meets :		N
a)	be rated to limit the current or voltage to the levels not exceeding the values of 6.3.2		N
b)	shall be rated for the maximum working voltage and, if applicable, for the maximum operational current		P

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Clause	Requirement + Test	Result - Remark	Verdict
c)	clearance and creepage distance between the terminations of the current or voltage limiting device meet requirements of 6.7 for supplementary insulation		N
6.6	**Connections to external circuits**		--
6.6.1	General		--
	Connections do not cause accessible parts of the following to become hazardous live in normal condition or single fault condition:		N
	Separation of circuits provided; or		N
	Short circuit of separation does not cause a Hazard		N
	Instructions or markings include:		P
	a) rated conditions for terminal		N
	b) Required rating of external circuit insulation		N
6.6.2	terminals for external circuits		--
	terminals which receive a charge from an internal capacitor are not hazardous live	(see appended table)	N
6.6.3	Circuits with terminals which are hazardous live		--
	These circuits are:		--
	Not connected to accessible conductive parts; or		N
	Connected to accessible conductive parts, but are not mains circuits and have one terminal contact at earth potential		N
	No accessible conductive parts are hazardous live		N
6.6.4	Accessible terminals for stranded conductors		N
	No risk of accidental contact because:		--
	Located or shielded		N
	Self-evident or marked whether connected to accessible conductive parts		N
	Accessible terminals will not work loose		N
6.7	**Insulation requirements**		--
6.7.1	The nature of insulation		--
6.7.1.1	General		--
	requirements for insulation depend on:		--
	- the required level of insulation	Reinforce insulation	P
	- the maximum TRANSIENT OVERVOLTAGE	OVERVOLTAGE CATEGORY II	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- the maximum WORKING VOLTAGE	400V~	P
	- he POLLUTION DEGREE of the micro-environment	POLLUTION DEGREE 2	P
	- the maximum TEMPORARY OVERVOLTAGE		P
6.7.1.2	Clearances		--
	Multiplication factor	1 (rated operating altitude ≤ 2000m)	P
6.7.1.3	Creepage distances		--
	Material group IIIb	100 ≤ CTI < 175	P
6.7.1.4	Solid insulation		--
6.7.1.5	Requirements for insulation according to type of circuit	see 6.7.2, 6.7.3, K1, K2, K3	--
6.7.2	Insulation for MAINS CIRCUITS of OVERVOLTAGE CATEGORY II with a nominal supply voltage up to 300 V		P
6.7.2.1	**CLEARANCES and CREEPAGE DISTANCES**	**(See appended table)**	**P**
6.7.2.2	**Solid insulation**	**See below**	**P**
6.7.2.2.1	General		--
6.7.2.2.2	Moulded and potted parts	enclosure	P
6.7.2.2.3	Inner insulating layers of printed wiring boards		N
	For REINFORCED INSULATION (RI):		--
	a) the thickness of the insulation is at least 0,4 mm		N
	b) two separate layers, each of which is BASIC INSULATION (BI);		N
	c) two separate, and the combination of layers is REINFORCED INSULATION (RI)		N
6.7.2.2.4	Thin-film insulation	RI for transformer	P
	a) the thickness of the insulation is at least 0,4 mm	>1mm	P
	b) two separate layers, each of which is BASIC INSULATION (BI);		P
	c) two separate, and the combination of layers is REINFORCED INSULATION (RI)	Electric strength: 3000V~, 1min	P
6.7.3	Insulation for secondary circuits derived from MAINS CIRCUITS of OVERVOLTAGE CATEGORY II up to 300 V		--
6.7.3.1	General		--
6.7.3.2	Clearances		P
6.7.3.3	Creepage distances		P
6.7.3.4	**Solid insulation**		**P**

EN 61010-1			
Clause	Requirement + Test	Result - Remark	Verdict
6.7.3.4.1	General		P
6.7.3.4.2	Moulded and potted parts		P
6.7.3.4.3	Inner insulating layers of printed wiring boards		P
6.7.3.4.4	Thin-film insulation		N
6.8	**Procedure for voltage tests**	**(See appended table)**	**P**
6.8.1	General		--
6.8.2	Humidity preconditioning	40℃, 94%RH, 48h	--
6.8.3	Test procedures	(See appended table)	--
6.8.3.1	The a.c. voltage test		--
6.8.3.2	The 1 min d.c. voltage test		--
6.8.3.3	The impulse voltage withstand test		--
6.9	**Constructional requirements for protection against electric shock**		**--**
6.9.1	General		--
	If a failure could cause a hazard:		N
a)	Security of wiring connections		P
b)	Screws securing removable covers	No such covers	N
c)	Accidental loosening		P
6.9.2	Insulating materials		P
a)	Easily damaged materials not used		P
b)	Non-impregnated hydroscopic materials not used		P
6.9.3	Colour coding		P
	Green-and-yellow insulation shall not be used except for:		--
	a) protective earth conductors;		P
	b) PROTECTIVE BONDING conductors;		N
	c) potential equalization conductors for safety purposes;		N
	d) functional earth conductors.		N
6.10	Connection to mains supply source and connections between parts of equipment		--
6.10.1	Mains supply cords		--
	rated for maximum equipment current (see 5.1.3c)		N
	Cable complies with IEC 60227 or IEC 60245		N
	Heat-resistant if likely to contact hot parts		N
	Temperature rating (cord and inlet)		N

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Clause	Requirement + Test	Result - Remark	Verdict
	Green/yellow used only for connection to protective conductor terminals		N
	Detachable cords with IEC 60320 mains connectors:		--
	Conform to IEC 60799; or		N
	Have the current rating of the mains connector		N
6.10.2	Fitting of non-detachable mains supply cords		N
6.10.2.1	Cord entry		N
	protected against abrasion and sharp bends at the point where the cord enters the equipment		--
a)	an inlet or bushing with a smoothly rounded opening		N
b)	a reliably fixed flexible cord guard made of insulating material protruding		N
	Non-detachable cord protection:		N
6.10.2.2	Cord anchorages:		N
a)	Cord is not clamped by direct pressure from a screw		N
b)	Knots are not used		N
c)	Cannot push the cord into the equipment to cause a hazard		N
d)	No failure of cord insulation in anchorage with metal parts		N
e)	not loosen the cord anchorage without the use of a TOOL		N
f)	be designed so that cord replacement does not cause a HAZARD, and it shall be clear how the relief from strain is provided		N
	compression bushing:		N
	1) Clamps all types and sizes of mains cords; and		N
	2) Is suitable:		N
	For connection to terminals provided; or		N
	It is designed for screened mains cord		N
6.10.3	Plugs and connectors		--
	Mains supply plugs, connectors etc., conform with relevant specifications		P
	If equipment supplied at voltages below 6.3.2.a) or from a sole source:		P
	Plugs of supply cords do not fit mains sockets above rated supply voltage		N

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Clause	Requirement + Test	Result - Remark	Verdict
	Mains-type plugs used only for connection to mains supply		N
	Plug pins which receive a charge from an internal capacitor		N
	Accessory mains socket outlets:		N
	a) Marking if accepts a standard mains plug (see 5.1.3e)		N
	b) Input has a protective earth conductor if outlet has earth terminal contact		N
6.11	**Disconnection from supply source**		**--**
6.11.1	General	See below	P
	Disconnects all current carrying conductors		P
6.11.2	Exceptions		--
a)	Equipment supplied by low energy source; or		N
b)	Equipment connected to impedance protected supply; or		N
c)	Equipment constitutes an impedance protected load		N
6.11.3	Requirements according to type of equipment		--
6.11.3.1	Permanently connected equipment and multi-phase equipment		P
	Employs switch or circuit-breaker		P
	If switch or circuit-breaker is not part of the equipment, documentation specifies:		P
a)	Switch or circuit-breaker to be included in building installation		P
b)	Location		P
c)	Marking		P
6.11.3.2	Single-phase cord-connected equipment		P
	Equipment is provided with:		--
a)	Switch or circuit-breaker; or		P
b)	Appliance coupler (disconnectable without tool); or		P
c)	Separable plug (without locking device)		P
6.11.4	Disconnecting devices		--
6.11.4.1	General		--
	Electrically close to the supply		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Power-consuming components shall not be electrically located between the supply source and the disconnecting device		P
6.11.4.2	Switches and circuit-breakers		P
	When used as disconnection device:		--
	Meets IEC 60947-1 and IEC 60947-3		P
	Marked to indicate function		P
	Not incorporated in mains cord		P
	Does not interrupt protective earth conductor		P
6.11.4.3	Appliance couplers and plugs		--
	Where an appliance coupler or separable plug is used as the disconnecting device		N
	Readily identifiable and easily reached by the operator		N
	Single-phase portable equipment cord length ≤ 3 m		N
	Protective earth conductor connected first and disconnected last		N
7	**PROTECTION AGAINST MECHANICAL HAZARDS**		**--**
7.1	General	See below	--
	Conformity is checked by 7.2 to 7.7		P
7.2	**Sharp edges**		**--**
	All easily-touched parts of the equipment shall be smooth and rounded		P
	easily-touched parts of the equipment shall not cause an injury in SINGLE FAULT CONDITION		P
7.3	**Moving parts**		**N**
7.3.1	General		--
7.3.2	Exceptions		--
a)	For obviously intended to operate on parts or materials external to the equipment, shall be designed to minimize inadvertent touching of these moving parts		N
b)	If operator access permitted:		--
	1) Access requires tool		N
	2) Statement about training		N
	3) Warning markings or symbol 14		N

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Clause	Requirement + Test	Result - Remark	Verdict
7.3.3	RISK assessment for mechanical HAZARDS to body parts		--
	RISKS shall be reduced to a tolerable level by at least the applicable minimum protective measure of Table 12		N
7.3.4	Limitation of force and pressure		N
	The maximum tolerable continuous contact pressure is 50 N/cm^2, with a maximum force of 150 N.		N
	The maximum tolerable temporary force for body contact areas of at least 3 cm^2 is 250 N for a maximum duration of 0,75 s		N
7.3.5	Gap limitations between moving parts		N
7.3.5.1	Gap limitations between moving parts – Access normally allowed		N
7.3.5.2	Gap limitations between moving parts – Access normally prevented		N
7.4	**Stability**	Fixed or built-in equipment	N
	For each castor and support foot:		--
	- RATED to support a load of at least 4 times its normal load		N
	- tested according to d) and e)		N
	Conformity tests:		--
a)	10° tilt test		N
b)	multi-directional force test		N
c)	downward force test		N
d)	castor or support foot that supports the greatest load (M) is loaded with 4 times that load (4M)		N
e)	The castor or support foot that supports the greatest load is removed from the equipment and the equipment is placed on a flat surface		N
7.5	**Provisions for lifting and carrying**		**--**
7.5.1	General		--
	Equipment or parts having a mass of 18 kg or more	No Handles or grips	N
7.5.2	Handles and grips		N
	Handles or grips withstand four times weight		N
7.5.3	Lifting devices and supporting parts		--
	four times the maximum load		N
7.6	**Wall mounting**		**N**

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Clause	Requirement + Test	Result - Remark	Verdict
	Mounting brackets withstand four times weight		N
7.7	**Expelled parts**		**--**
	Equipment contains or limits the energy		P
	Protection not removable without the aid of a tool		P
8	**Mechanical resistance to shock and impact**		**--**
8.1	General		--
	After the tests of 8.2 to 8.3		P
	hazardous live parts not accessible		P
	Voltage tests of 6.8	(see appended table)	P
i)	no leaks of corrosive or harmful substances		P
ii)	enclosure shows no cracks (hazard)		P
iii)	clearances not less than their permitted values	(see appended table)	P
iv)	insulation of internal wiring remains undamaged		P
v)	barriers not damaged or loosened		P
vi)	No moving parts exposed, except permitted by 7.3		P
vii)	No damage which could cause spread of fire		P
8.2	**Enclosure rigidity tests**		**--**
8.2.1	Static test		--
	a force of 30 N applied by the hemispherical end of a hard rod of 12 mm diameter.	See 8.1	P
8.2.2	Impact test		--
	impact by a smooth steel sphere with a mass 500 g ± 25 g and with a diameter of approximately 50 mm	See 8.1	P
8.3	**Drop test**		**--**
8.3.1	Equipment other than hand-held equipment and direct plug-in equipment		N
8.3.2	Hand-held equipment and direct plug-in equipment		N
9	**Protection against the spread of fire**		**P**
9.1	**General**		**--**
	Conformity for each source of hazard or area of the equipment is checked by one of the following:	(See appended table)	--
a)	Fault test of 4.4; or	(See appended table)	P
b)	Application of 9.2 (eliminating or reducing the sources of ignition); or		P

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Clause	Requirement + Test	Result - Remark	Verdict
c)	Application of 9.3 (containment of fire within the equipment)		P
9.2	**Eliminating or reducing the sources of ignition within the equipment**	**See below**	**--**
a)	1) Limited-energy circuit (see 9.4); or		N
	2) Insulation meets the requirements for basic insulation; or	(see appended table)	P
	Bridging the insulation does not cause ignition	(see appended table)	P
b)	Any ignition hazard related to flammable liquids (see 9.5)	No flammable liquid	N
c)	No ignition occurs when tested in single fault condition	(see appended table)	N
9.3	**Containment of the fire within the equipment, should it occur**		**--**
9.3.1	General		--
a)	Energizing of the equipment is controlled by an operator held switch		P
b)	Enclosure is conform with constructional requirements of 9.3.2; and		P
	Requirements of 9.5 are met		P
9.3.2	Constructional requirements		P
a)	Connectors and insulating material have flammability classification FV2 or better	(see appended table)	P
b)	Insulated wires and cables shall retard flame propagation. Meet: IEC 60332	(see appended table)	P
c)	The enclosure is constructed as follows :	The equipment has bottom openings	--
	1) Bottom and sides constructed with:		P
	i) No openings; or		N
	ii) be made of metal with perforations as specified in Table 16; or		P
	iii) Metal screen with a mesh		N
	iv) openings with baffles according to Figure 12		P
	2) Material of enclosure and any baffle or flame barrier is made of:		--
	Metal (except magnesium); or		P
	Non metallic materials have flammability classification FV1 or better		N
	3) enclosure and any baffle or flame barrier have adequate rigidity		P

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Clause	Requirement + Test	Result - Remark	Verdict
9.4	**Limited-energy circuit**		**--**
a)	Potential not more than 30 r.m.s. and 42.4 V peak, or 60 V dc		N
b)	Current limited by one of following means:		N
	1) Inherently or by impedance; or		N
	2) Overcurrent protective device; or		N
	3) A regulating network limits also in single fault condition		N
c)	Is separated by at least basic insulation		N
	If overcurrent protective device used:		N
	Fuse or a non adjustable electromechanical device		N
9.5	**Requirements for equipment containing or using flammable liquids**	**No such liquids.**	**N**
	Flammable liquids contained in or specified for use with equipment do not cause spread of fire		N
	Risk is reduced to a tolerable level :	(see appended table)	N
a)	The temperature of surface or parts in contact with flammable liquids is 25 °C below fire point		N
b)	The quantity of liquid is limited		N
c)	Flames are contained within the equipment		N
	Detailed instructions for risk-reduction provided		N
9.6	**Overcurrent protection**		**--**
9.6.1	General		--
	Devices not in the protective conductor	Current fuse	P
	Fuses or single-pole circuit-breakers not fitted in neutral (multi-phase)		P
9.6.2	permanently connected equipment	Not such equipment	N
	Overcurrent device:		N
	Fitted within the equipment; or		N
	Specified in manufacturer's instructions		N
9.6.3	Other equipment		--
	Protection within the equipment		P

10	**Equipment temperature limits and resistance to heat**		**-**
10.1	**Surface temperature limits for protection against burns**		**P**
	Easily touched surfaces within the limits	(see appended table)	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Heated surfaces necessary for functional reasons exceeding specified values:		N
	Are recognizable as such by appearance or function; or		P
	Are marked with symbol 13	No use this mark	N
	Guards are not removable without tool		P
10.2	**Temperatures of windings**	**(see appended table)**	**P**
	Limits not exceeded in:		P
	normal condition		P
	single fault condition		P
10.3	**Other temperature measurements**	**(see appended table)**	**P**
	Following measurements conducted if applicable:		--
a)	Value of 60 °C of field-wiring terminal box not exceeded		N
b)	Surface of flammable liquids and parts in contact with this liquids		N
c)	Surface of non-metallic enclosures		P
d)	Parts made of insulating material supporting parts connected to mains supply		P
e)	Terminals carrying a current more than 0.5 A		P
10.4	**Conduct of temperature test**	**(see appended table)**	**P**
10.4.1	General		--
10.4.2	Temperature measurement of heating equipment		N
10.4.3	Equipment intended for installation in a cabinet or a wall		N
10.5	**Resistance to heat**		**P**
10.5.1	Integrity of clearance and creepage distances	(See appended table)	P
10.5.2	Non-metallic enclosures	(See appended table)	P
	After treatment:		--
	No hazardous live parts accessible;		P
	Tests of 8.1 and 8.2	(See appended table)	P
	In case of doubt, tests of 6.8 (without humidity preconditioning)	(See appended table)	N
10.5.3	Insulating material		--
a)	Parts supporting parts connected to mains supply		P
b)	Terminals carrying a current more than 0.5 A		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Examination of material data; or		P
	in case of doubt:		N
	1) Ball pressure test; or	See appended table	P
	2) Vicat softening test of ISO 306		N
11	**Protection against hazards from fluids**	**No fluids**	**N**
11.1	General		N
11.2	Cleaning	(See appended table)	N
11.3	Spillage	(See appended table)	N
11.4	Overflow	(See appended table)	N
11.5	Battery electrolyte		N
	Battery electrolyte leakage presents no hazard		N
11.6	Specially protected equipment		N
11.7	**Fluid pressure and leakage**		**--**
11.7.1	Maximum pressure		N
	Maximum pressure of any part does not exceed Prated		N
11.7.2	Leakage and rupture at high pressure	(See appended table)	N
	Test to IEC 60335 (refrigeration only)		N
11.7.3	Leakage from low-pressure parts	(See appended table)	N
11.7.4	Overpressure safety device		--
	Does not operate in normal use		N
	Meets ISO 4126-1; and		N
	It is conform with:		N
a)	Connected as close as possible to parts intended to be protected		N
b)	Easy access for inspection, maintenance and repair		N
c)	Adjustment only with tool		N
d)	No discharge towards person		N
e)	No hazard from deposit of discharged material		N
f)	Adequate discharge capacity		N
	No shut-off valve between overpressure safety device and protected parts		N

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Clause	Requirement + Test	Result - Remark	Verdict
12	**Protection against radiation, including laser sources, and against sonic and ultrasonic pressure**		**--**
12.1	General		N
	Equipment provides protection		N
12.2	**Equipment producing ionizing radiation**		**N**
12.2.1	Ionizing radiation	No ionizing radiation	N
	a) Meet the requirements of 12.2.1.2. or be tested, classified, and marked according to IEC 60405	(See appended table)	N
	b) uses or generates radiation but only emits stray radiation, it shall meet the requirements of 12.2.1.3		N
12.2.1.2	Equipment intended to emit radiation		N
	Equipment which contains radioactive substances or that generates x-rays		N
	If the effective dose rate at any easily reached point 50 mm from the outer surface exceeds 5 μSv/h:		N
	a) with symbol 17 of Table 1;		N
	b) for equipment containing one or more radioactive substances, with the abbreviations of the radionuclides		N
	c) either with the maximum dose rate value at 1 m, or with a dose rate value between 1 μSv/h and 5 μSv/h at the appropriate distance in m		N
	Measuring maximum radiation		N
	Equipment containing X-ray sources is set to produce the maximum possible level of radiation		N
12.2.1.3	Equipment not intended to emit radiation		N
	The effective dose rate of unintended stray radiation at any easily reached point 100 mm shall not exceed 1 μSv/h		N
12.2.2	Accelerated electrons		N
	which electrons are accelerated by voltages exceeding 5 kV cannot be opened without the use of a tool		N
12.3	**Ultra-violet (UV) radiation**	(Conformity test under consideration)	**N**
	No unintentional and hazardous escape of UV radiation		N
12.4	**Micro-wave radiation**		**N**
	Power density does not exceed 10 W/m^2:		

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Clause	Requirement + Test	Result - Remark	Verdict
12.5	**Sonic and ultrasonic pressure**		**N**
12.5.1	Sound level	(See appended table)	N
12.5.2	Ultrasonic pressure	(See appended table)	N
12.6	**Laser sources (IEC 60825-1)**		**N**
13	**Protection against liberated gases, explosion and implosion**		**--**
13.1	**Poisonous and injurious gases**	Not such gases	**N**
	Attached data/test reports demonstrate conformity		N
13.2	**Explosion and implosion**		**N**
13.2.1	Components		N
	Components liable to explode:		N
	Pressure release device provided; or		N
	Apparatus incorporates operator protection (see also 7.6)		N
	Pressure release device:		N
	Discharge without danger		N
	Cannot be obstructed		N
13.2.2	Batteries and battery charging	No inside batteries	N
	If explosion or fire hazard could occur:		N
	Protection incorporated in the equipment; or		N
	Instructions specify batteries with built-in protection		N
	In case of wrong type of battery used:		N
	No hazard; or		N
	Warning by marking and within instructions		N
	Equipment with means to charge rechargeable batteries:		N
	Warning against the charging of non-rechargeable batteries; and		N
	Type of rechargeable battery indicated; or		N
	Symbol 14 used		N
	Battery compartment design	(See appended table)	N
	Single component failure		N
	Polarity reversal test		N
13.2.3	Implosion of cathode ray tubes	No such tubes	N
	If maximum face dimensions > 160 mm:		N

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Clause	Requirement + Test	Result - Remark	Verdict
	Intrinsically protected and correctly mounted; or		N
	enclosure provides protection:		N
	If non-intrinsically protected:		N
	Screen not removable without tool		N
	If glass screen, not in contact with surface of tube		N

14	**Components and subassemblies**		**P**
14.1	General	See below	P
	Where safety is involved, components meet relevant requirements	(see appended table)	P
14.2	**Motors**		**N**
14.2.1	Motor temperatures		--
	Does not present a hazard when stopped or prevented form starting; or		N
	Protected by over-temperature or thermal protection device conform with 14.3		N
14.2.2	Series excitation motors		N
	Connected direct to device, if over-speeding causes a hazard		N
14.3	**Over-temperature protection devices**		**N**
	Devices operating in a single fault condition		--
a)	Reliable function is ensured		N
b)	Rated to interrupt maximum current and voltage		N
c)	Does not operate in normal use		N
	For self-resetting over-temperature protection device		--
	1) self-resetting over-temperature protection devices are caused to operate 200 times;		N
	2) non-self-resetting over-temperature protection devices, except thermal fuses, are reset after each operation and thus caused to operate 10 times;		N
	3) non-resetting over-temperature protection devices are caused to operate once.		N
14.4	**Fuse holders**		**--**
	No access to hazardous live parts		N
14.5	**Mains voltage selecting devices**		**N**

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Clause	Requirement + Test	Result - Remark	Verdict
	constructed so that a change from one voltage or one type of supply to another cannot occur accidentally		N
	5.1.3 d) for marking requirements		N
14.6	**Mains transformers tested outside equipment**		**N**
	short-circuit and overload tests in 4.4.2.7	(see Forms A.1)	N
14.7	**Printed circuit boards**	**See appended table**	**P**
	Data shows conformity with FV-1 of IEC 60707 or better; or	V-0	P
	Test shows conformity with FV-1 of IEC 60707 or better; or	See appended table	N
	Thin film flexible PCB with limited-energy circuit used		N
14.8	**Circuits or components used as transient overvoltage limiting devices**		**P**
	After test, no sign of overload or degradation		P

15	**Protection by interlocks**		**N**
15.1	General	Not interlocks	N
	Interlocks are designed to remove a hazard before operator exposed		N
15.2	Prevention of reactivation		N
15.3	Reliability		N
	Single fault unlikely to occur; or		N
	Cannot cause a hazard		N

16	**Hazards resulting from application**		**--**
16.1	**reasonably foreseeable misuse**		**P**
	No HAZARDS shall arise if adjustments, knobs, or other software-based or hardware-based controls are set in a way not intended, and not described in the instructions		P
	Other possible cases of REASONABLY FORESEEABLE MISUSE that are not addressed by specific requirements in this standard shall be addressed by RISK assessment (see Clause 17)		N
16.2	**Ergonomic aspects**		**--**
	For below which give rise to a HAZARD, a RISK assessment shall be documented:	No rise to hazard	--

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Clause	Requirement + Test	Result - Remark	Verdict
	a) limitation of body dimensions;		N
	b) displays and indicators;		N
	c) accessibility and conventions of controls;		N
	d) Arrangements of TERMINALS.		N
17	**RISK assessment**		**--**
	equipment shows that HAZARDS not fully addressed in Clauses 6 to 16		N
	a) risk analysis		N
	b) risk evaluation		N
	c) risk reduction		N
	risks remaining after a risk assessment shall be identified in the instructions for the responsible body.		N
	adequate information about how to mitigate these risks shall be given		N
	1) eliminate or reduce RISKS as far as possible		N
	2) take the necessary protective measures in relation to RISKS that cannot be eliminated		N
	3) inform users of the residual RISKS due to any shortcomings of the protective measures adopted		N

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Clause	Requirement + Test	Result - Remark	Verdict
ANNEX F	**ROUTINE TESTS**		--
	Manufacturer ´s declaration		P
ANNEX H	**QUALIFICATION OF CONFORMAL COATINGS FOR PROTECTION AGAINST POLLUTION**		--
H.1	**General**		N
	Conformal coatings meet the requirements of Clause H.2 and H.3.		N
H.2	**Technical properties**		N
	Technical properties of conformal coatings are suitable for the intended application. In particular:		—
	a) Manufacturer indicate that it is a coating for PWBs;		N
	b) RATED operating temperature include the temperature range of the indicated application;		N
	c) CTI, insulation resistance and dielectric strength are suitable for the intended application;		N
	d) Coating have adequate UV resistance, if it is exposed to sunlight;		N
	e) Flammability RATING of the coating is at least the required flammability RATING of the applied PWB.		N
H.3	**Qualification of coatings**	(see Form A.42)	N
	Coating complies with the conformity requirements.		N
ANNEX K	**INSULATION REQUIREMENTS NOT COVERED BY CLAUSE 6.7**	(see Forms A.15 and A.18)	N

Appendix tables

4.4	TABLE: Testing in single FAULT CONDITION – Results	Form A.1	P
	Ambient temperature (°C)	22.5℃	--
	Ambient temperature (°C)	22.3℃	--
	Test voltage	240V~, 50Hz	--

Test subclause	Fault No.	Fault	Test time	Comments	Verdict
4.4.2.6.1	U1 (pin 1-3)	s-c	5mins	Unit shut down, no damage, no hazards. No function	P

NOTE:

1, Record dielectric strength test on Form A.14 and temperature tests on Form A.20.

2, Record in the comments column for each test whether carried out during or after SINGLE FAULT CONDITION.

3, s-c=short circuit, o-c=open circuit, o-l=overload

5.1.3	TABLE: mains supply			P
	Marked rating.....:	230V~ / 400V 3~, 50/60Hz		--
	Phase.....:	Single-phase		--
	Frequency .....:	50Hz,		--
	Power / Current .....:	Max. 80A		--
Test No.	U (V) / F (Hz)	I (A)	I rated (A)	Condition / status
1	230V~/50Hz	76.1	80	Max. Load
3	400V~/50Hz	73.2	80	Max. Load
Remark: the measured value not exceed the marked value by more than 10%				

Appendix tables

5.3	TABLE: Durability of markings	Form A.4	P

Marking method (see NOTE)	Agent
1)	A Water
2)	B ☐ Isopropyl alcohol/ ☒ Petroleum spirit
3)	C (specify agent)
4)	D (specify agent)
5)	E (specify agent)

NOTE – Where applicable include print method, label material, ink or paint type, fixing method, adhesive and surface to which marking is fixed.

Marking location	Marking method (see above)
Identification (5.1.2)	1), 2)
Mains supply (5.1.3)	1), 2)
Fuses (5.1.4)	1), 2)
Terminals and operating devices (5.1.5.1)	1), 2)
Measuring circuit terminals (5.1.5.2)	1), 2)
Switches and circuit breakers (5.1.6)	1), 2)
Double/reinforced equipment (5.1.7)	Not such equipment
Field wiring Terminal boxes (5.1.8)	Not such equipment
Warning marking (5.2)	1), 2)
Battery charging (13.2.2)	No battery

Method	Test agent	Remains legible	Label loose	Curled edges	Comments
		Verdict	Verdict	Verdict	
1), 2)	A, B	Remains legible	No loose	No curled	All markings accordance with 5.1.2 to 5.2 test in this method, and pass the test

Appendix tables

6.2	TABLE: List of accessible parts		Form A.6	P
6.1.2	Exceptions	See below		--
6.2	Determination of accessible parts	See below		--

Item	Description	Determination method (NOTE 5)	Exception under 6.1.2 (NOTE 4)
1	Front Enclosure	Rigid test finger and Test pin 3 mm diameter	No hazard voltage

NOTE 1 – Test fingers and pins are to be applied without force unless a force is specified (see 6.2.1)
NOTE 2 – Special consideration should be given to inadequate insulation and high voltage parts (see 6.2)
NOTE 3 – Parts are considered to be ACCESSIBLE if they could be touched in the absence of any covering which is not considered to provide suitable insulation (see note to paragraph 1 of 6.4).
NOTE 4 – Capacitor test may be required (see Form A.7).
NOTE 5 – The determination methods are: visual; rigid test finger; jointed test finger; pin 3 mm diameter; pin 4 mm diameter.

Supplementary information:
There are no any hazardous parts accessible after installation.

6.3.1	TABLE: Levels in NORMAL CONDITION					N
Open-circuit voltage measurement on secondary output terminal:						
Open-circuit voltage measured between:	Condition	max. Voltage		Comments		
		V peak	V d.c. / V a.c.			
--	--	--	--	--		
--		--	--	--		
Touch current measured between:	Condition	Accessible current (mA)	Accessible current limit(mA)	Charged capacitance (μC/mJ)	Charged capacitance (μC/mJ)	
--	--	--	--	--	--	
--		--	--	--	--	

Note: the Accessible current was measured according to 6.3.1 b) with the test circuit of figure A.1 connected between the specified points.
Input: 110% of rated supply voltage

Appendix tables

6.3.2	TABLE: Levels in SINGLE FAULT CONDITION		Form A.6	N
Open-circuit voltage measurement on secondary output terminal:				
Open-circuit voltage measured between:	Condition	max. Voltage		Comments
		V peak	V d.c. / V a.c.	
--	Single fault condition	--	--	Limit: --.

Touch current measured between:	Condition	Accessible current (mA)	Accessible current limit(mA)	Charged capacitance (µC/mJ)	Charged capacitance (µC/mJ)
--	Single fault condition	--	--	--	
--		--	--	--	

Note: the Accessible current was measured according to 6.3.1 b) with the test circuit of figure A.1 connected between the specified points.

Input: 110% of rated supply voltage

6.5.2.1	TABLE: Cross-sectional area of bonding conductors	N
Conductor location	Cross-sectional area	Verdict
--	--	--

6.5.2.3	TABLE: Tighting torque test		N
Conductor location	Size of Screw	Tighting torque (Nm)	Verdict
--	--	--	--

6.5.2.4	TABLE: Impedance of of plug-connected equipment			N
ACCESSIBLE part under test	Test current A	Voltage attained after 1 min V	Calculated resistance (maximum allowed 0,1 Ω) Ω	Verdict
--	--	--	--	--
Supplementary information:				

6.5.2.5	TABLE: Impedance of protective bonding of permanently connected equipment		N
ACCESSIBLE part under test	Test current A	Voltage attained after 1 min (maximum 10 V) V	Verdict
Supplementary information: Not permanently connector equipment			

Appendix tables

6.5.2.6	TABLE: Transformer protective bonding screen		N
ACCESSIBLE part under test	Test current A	Voltage attained after 1 min (maximum 10 V) V	Verdict
Supplementary information: Not permanently connector equipment			

6.5.3	TABLE: protective impedance	N
A high INTEGRITY single component		
Component	Location	Comments
A combination of components		
Component	Location	Comments
A combination of BASIC INSULATION and a current or voltage limiting device		
Component	Location	Comments
Supplementary information:		

6.7.1	TABLE: protection against electric shock					P
clearance cl and creepage distance dcr at/of:	Up (V)	U r.m.s. (V)	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)
Enclosure to live parts	465	400	4.0	6.5	6.0	6.5

6.8	TABLE: Procedure for voltage tests (Dielectric strength tests)	P
4.4.4.1 b)	Conformity after application of fault conditions[1]	P
6.5.3	Supplementary insulation and reinforced insulation	N
6.6.1	Connections to external circuits	N
6.7.3.2	CLEARANCE	N
6.7.3.4	Solid insulation	P
6.10.2.2	Fitting of non-detachable MAINS SUPPLY cords[1]	N
8	Mechanical resistance to shock and impact	P
9.1 a) 2)	Eliminating or reducing the sources of ignition within the equipment	N
9.3 c)	Limited-energy circuit	P
11.2	Cleaning[1]	N
11.3	Spillage[1]	N
11.4	Overflow[1]	N

Appendix tables

11.6	Specially protected equipment[1]					N
[1] Record the fault, test or treatment applied before the dielectric strength test						
	Test site altitude.....:		< 2000m			--
	Test voltage correction factor (see Table 10).... :		1.0			--
Location or references from Forms A.2 and A.5	Clause or sub-clause	Humidity Yes/No	Working voltage V	Test voltage r.m.s./peak/d.c V	Comments	Verdict
Live part to accessible parts with foil	--	Yes	400	3000Vrms a.c.	No flashover or break down	P
Supplementary information:						

6.10.2.2	**TABLE: Cord anchorage**					**N**
Location	Mass kg	Pull N	Verdict	Torque Nm	Verdict	Comment
Supplementary information:Not fitting of non-detachable mains supply cords						

8	**TABLE: mechanical resistance to shock and impact**	**P**
Test part	Test condition	Test result
Enclosure	Static test: 30N, hard rod of Φ12mm,	No hazard
Enclosure	Impact test: 500g±25g, 50mm	No hazard

9.3	**TABLE: flammability of materials (IEC 60695-11-10)**		**N**
	Material tested .....:	Certificated materials	--
	Generic name .....:		--
	Material manufacturer .....:		--
	Type designation .....:		--
	Colour .....:		--
	Conditioning details .....:		--
	Thickness (mm) .....:	1 -	--
	Duration of flaming after first application (s) .....:	1 -	--
	Duration of flaming plus glowing after second application (s) .....:	1 -	--
	Specimen burns to holding clamp (Yes/No) .....:	1 -	--
	Cotton ignited (Yes/No) .....:	1 -	--
Supplementary information: PCB and plastic enclosure have through UL authentication. And the flammability classification are V-0.			

Appendix tables

9.4	TABLE: Limited-energy circuit					N
circuit / location	Open circuit voltage (V)	Maximum current (A)	Maximum available power (VA)	Overload protection (VA)	Limited current (Yes/No)	Comments
Supplementary information:						

10	TABLE: temperature tests		P
	Voltage (V) ..... :	440V~	--
	Frequency (Hz) ..... :	50Hz	--
	Duration (h, min) ..... :	4 h	--
	Ambient temperature Ta (°C) ..... :	See below	--

Part / location	Measured temperature Tm (°C)	Corrected maximum temperature(°C)	Maximum allowed temperature (°C)	Result	Comments
Enclosure	43.6	61	85	P	--
PCB under U1	54.9	72.3	85	P	--
Inside wire	38.7	56.1	105	P	--
Ambient	22.6	40	--	--	--
Supplementary information:					

10.5	TABLE: ball-pressure tests for thermoplastics		P
	Limited impression diameter (mm)	≤2 mm	--

Part	Test temperature (°C)	Impression diameter (mm)
Enclosure	125°C	1.2
PCB	125°C	0.8

11	TABLE: protection against hazards from fluids							N
location	cleaning	spillage	overflow	equipment plus liquid	working voltage (V)	test voltage (V)	result	comments

11.7.2	TABLE: leakage and rupture at high pressure					N
Part	Maximum permissible working pressure (pa)	Factor	Test pressure (pa)	Leakage test	Burst test	Comments

Appendix tables

11.7.3	TABLE: leakage from low-pressure parts		N
Part	Test pressure (Pa)	Result	Comments

12.2.1	TABLE: ionizing radiation		N
location	radiation (Sv/h)	result	comments

12.5.1	TABLE: sound level measurements	N
location	value (dBA)	calculated maximum sound pressure level

12.5.2	TABLE: ultrasonic pressure measurements		N
location	value (dB)	frequency (kHz)	result

13.2.2	TABLE: batteries tests		N
	Battery load and charging circuit diagram .....:	No battery used	--
	Battery type .....:		--
	Battery manufacturer .....:		--
	Battery model .....:		--
	Battery catalogue No. .....:		--
	Battery ratings .....:		--
	Reverse polarity installment test		--
Component	Result, open circuit	Result, short circuit	

Appendix tables

14.1	**TABLE: components**	**P**

Object/part No.	Manufacturer/ trademark	Type/ model	Technical data	Standard	Mark(s) of conformity[1])
Enclosure	Zhejiang Chimei Chemical Co., Ltd.	ABS	V-0	UL 94	UL
Enameled copper wire	JIANGSU DARTONG M&E CO.,LTD	Q (ZY/XY) BP-2/200	Class E, 120℃	UL1446	UL E237377
Inside plastic parts	Interchangeable	Interchangeable	V-0	UL 94	UL
PCB	Various	Various	V-1 or better, 130°C	UL746A, UL94	UL
Internal wire	Various	1015	26-18AWG, 105°C	UL758 EN61010-1	Tested with appliance & UL
[1]) an asterisk indicates a mark which assures the agreed level of surveillance					

Appendix tables

14.2.1	**TABLE: motor temperatures measurements**		**N**
	Voltage (V).....:		--
	Frequency (Hz) .....:		--
	Duration (h, min).....:		--
	Ambient temperature Ta (℃).....:		--

Motor No. and location	Insulation class	Measured temperature Tm (℃)	corrected maximum temperature Tm- Ta+ 40 (℃)	maximum allowed temperature (℃)	result

14.3	**TABLE: overtemperature protection devices**			**N**
component	type	result	comments	
Note: Type: self-resetting SR, non-self-resetting NSR, non-resetting NR				

14.6	**TABLE: Short circuit (for Mains transformer)**	**Form A.39**	**N**
	Mains transformers tested outside equipment	Approved switch power supply	--
4.4.2.7.2	Short circuit		--
	Type .....:		--
	Manufacturer .....:		--
	Test in equipment		N
	Test on bench		N
	Temperature protection class of the lowest RATED winding (class or maximum RATED temperature) .:		--
	Winding identification .....:		--
	Type of protector for winding .....:		--
	Elapsed time .....:		--
	Winding temperature, primary (°C) .....:		**N**
	Winding temperature, secondary (°C) .....:		**N**
	Tissue paper / cheesecloth OK ?		**N**
	Voltage test, primary to secondary (V) .....:		**N**
	Voltage test, primary to core (V) .....:		--

Appendix tables

14.6	**TABLE: Overload tests (for Mains transformer)**	**Form A.40**	**N**
	Mains transformers tested outside equipment	Approved switch power supply	
	Type ..... :		--
	Manufacturer ..... :		--
	Test in equipment		N
	Test on bench		N
	Temperature protection class of the lowest RATED winding (class or maximum RATED temperature) .:		--
	Winding identification ..... :		--
	Type of protector for winding ..... :		--
	Elapsed time ..... :		--
	Winding temperature, primary (°C) ..... :		**N**
	Winding temperature, secondary (°C) ..... :		**N**
	Tissue paper / cheesecloth OK ?		**N**
	Voltage test, primary to secondary (V) ..... :		**N**
	Voltage test, primary to core (V) ..... :		--

Product Photos

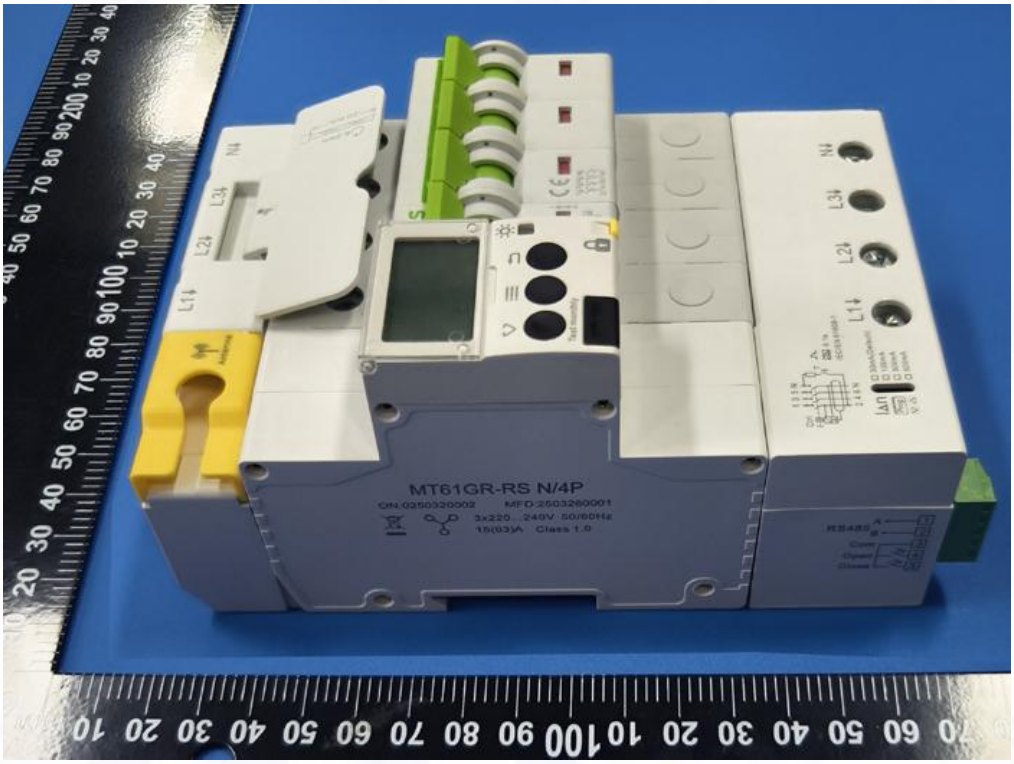


Fig. 1

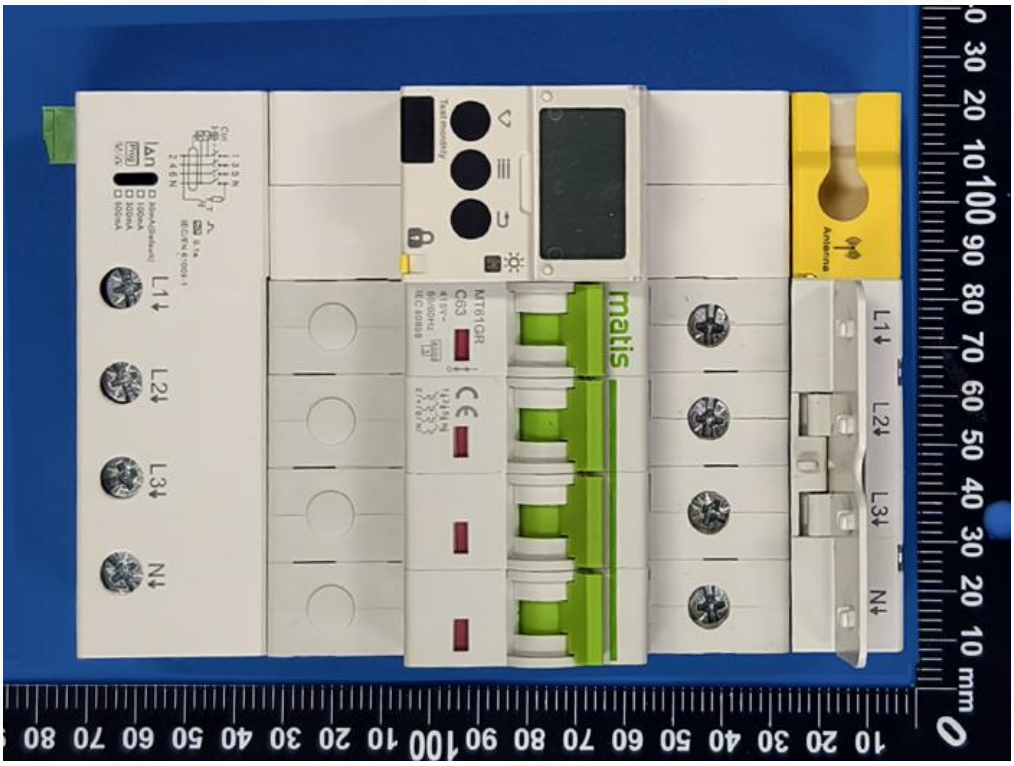


Fig. 2

---------- END OF REPORT ----------

TEST REPORT
IEC 60898-1
Circuit-breakers for over current protection for household and similar installations
Part 1 - Circuit-breakers for a.c. operation

Report Number. .....:	LCS190815025AS
Date of issue .....:	September 12, 2019
Total number of pages	57
Applicant's name.....:	SHANGHAI MATIS ELECTRC CO.,LTD.
Address .....:	BLOCK C, NO.888, HUANHU WEST 2ND ROAD, PUDONG, SHANGHAI, CHINA
Test specification:	
Standard .....:	IEC 60898-1:2015 ED2
Test procedure .....:	Type test
Non-standard test method.....:	N/A
Test Report Form No.....:	IEC60898_1
Test Report Form(s) Originator.....:	DEKRA Certification B.V.
Master TRF.....:	Dated 2015-09

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This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

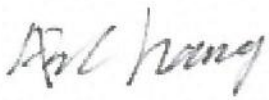
General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

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Test item description	AIOT ENERGY METER WITH MCB
Trade Mark	matis, matismart
Manufacturer	SHANGHAI MATIS ELECTRC CO.,LTD. BLOCK C, NO.888, HUANHU WEST 2ND ROAD, PUDONG, SHANGHAI, CHINA
Model/Type reference	MT61GP, M61WF, MT61NB, MT61LR
Ratings	Single Phase, 1P+N, 230V,50/60Hz, 6A,10A,16A,20A,25A,32A.40A.50A,63A,80A Three Phase, 3P+N, 400V,50/60Hz, 6A,10A,16A,20A,25A,32A.40A.50A,63A,80,100A

Testing procedure and testing location:

☒ **Testing Laboratory:**	Shenzhen LCS Compliance Testing Laboratory Ltd.	
Testing location/ address	101, 601, Xingyuan Industrial Park, Gushu Community, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China	
Tested by	Aic Huang / Test Engineer	
Checked by	Albert Lai / Project Engineer	
Approved by	Hart Qiu / Technical Director	

List of Attachments (including a total number of pages in each attachment):

Attachment No.1: Component assembly (1 pages)

Attachment No.2: Photo documentation (4 pages)

Summary of testing:

Tests performed (name of test and test clause): The submitted samples were found to comply with the requirements of: IEC 60898-1:2015 ED2 EN 60898-1:2019	**Testing location:** Shenzhen LCS Compliance Testing Laboratory Ltd. 101, 601, Xingyuan Industrial Park, Gushu Community, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China

Summary of compliance with National Differences (List of countries addressed):

--

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Copy of marking plate

The artwork below may be only a draft.

matis, matismart
AIOT ENERGY METER WITH MCB
Model: MT61GP
400V,50Hz,6A,10A,16A,20A,25A,32A.40A.50A,63A ,80A,100A,125A(4P/three phase)



SHANGHAI MATIS ELECTRC CO.,LTD.
MADE IN CHINA

Shenzhen LCS Compliance Testing Laboratory Ltd.
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Classification of installation and use.....:	--
Supply Connection.....:	--
.....:	
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	August 15, 2019
Date (s) of performance of tests.....:	From August 15, 2019- September 12, 2019

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

"*" This symbol refers to not within the scope of CNAS recognition.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☐ **Yes** ☒ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies).....:	SHANGHAI MATIS ELECTRC CO.,LTD. 4TH FLOOR, BLOCK 7A, SHAHU SCIENCE PARK, NO.183, LANE TINGLAN, WUZHONG, SUZHOU, JIANGSHU, CHINA

General product information:

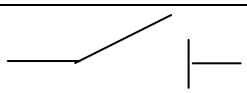
1.This product is suitable for internal use

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Test item particulars.....	
Type of circuit-breaker ..... :	
Number of poles ..... :	☐ 1-P ☐ 1-P+N ☒ 2-P ☐ 3-P ☐ 3-P+N ☒ 4-P
Protection against external influences ..... :	☐enclosed ☒ unenclosed
Method of mounting ..... :	☐surface ☒ flush ☐ panel board
Method of connection ..... :	☒.not associated with the mechanical mounting ☐ associated with the mechanical mounting
Type of terminal ..... :	☐ screw [a) b)] ☒ pillar [a) b)] ☐ cage [a) b)] ☐ lug ☐ screw less[a)] ☐ flat quick connect [a)] ☐ plug-in ☐ screw-in [a)] copper conductors [b)] aluminium conductors
Instantaneous tripping current ..... :	☒ B ☒ C ☒ D
I^2t characteristic .....:	
Value of rated operational voltage (Ue) ..... :	☐ 120 V ☒ 230 V ☐ 240 V ☐ 120/240 V ☐ 230/400 V ☒ 400 V ☐ 240/415 V ☐ 415 V
Value of rated current (In) ..... :	6, 10, 16, 20, 25, 32, 40, 50, 63, 80, 100 A
Value of rated frequency ..... :	☒ 50 Hz ☒ 60 Hz
Ambient air temperature (°C) ..... :	☒ 30℃ ☐ 40℃ ☐ Other _____℃
Rated short-circuit capacity (Icn) ..... :	☐ 1,5 kA ☐ 3 kA ☐ 4,5 kA ☒ 6 kA ☐ 10 kA ☐ 15 kA ☐ 20 kA ☐ 25 kA
Rated impulse withstand voltage (Uimp)	☒ 2,5 kV ☐ 4 kV ☐ declared ___kV

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	TESTS „A“ 1 SAMPLE	A_1	
6	**MARKING AND OTHER INFORMATION**		
	Circuit-breaker marked with:		--
	a) Manufacturer’s name or trade mark.....:	matis / matismart	P
	b) Type designation, catalogue number or other serial number.....:	MT61GP, M61WF, MT61NB, MT61LR	P
	c) Rated voltage (V).....:	230/400 VAC	P
	d) Rated current without symbol "A", preceded by the symbol of instantaneous tripping.....:	6,10,16,20,25,32,40,50,63A, 80,100	P
	e) Rated frequency (Hz) .....:	50/60 Hz	P
	f) Rated short circuit capacity (A) .....:	6000 A	P
	g) Wiring diagram		P
	h) Ambient air temperature, if different from 30℃		P
	i) Degree of protection, if different from IP20	IP20	P
	j) For D-type circuit-breakers: the maximum instantaneous tripping current, if higher than 20 In see table 2)		P
	k) Rated impulse withstand voltage Uimp if it is 2,5 kV	4kV	P
	l) Making and breaking capacity on an individual protected pole of multipole circuit-breakers (Icn1), if different from Icn	6000A	P
	Marking d) shall be readily visible when the CB is installed		P
	If, for small devices, the available space is insufficient, markings a), b), c), e), f), h), j) and l) may be put on the side or on the back of the CB		P
	Marking g) may be on the inside of any cover which has to be removed in order to connect the supply wires but shall not be on a label loosely attached to the CB		P
	Any other information not marked shall be given in the manufacturer’s documentation		P
	The suitability for isolation, which is provided by all circuit-breakers of this standard, may be indicated by the symbol on the device		P
	I^2t characteristic (documentation)		P
	Symbols on supply and load terminal		P
	Terminal for neutral conductor N		P

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Earth terminal if any (IEC 60417-5019)		N/A
	On - off position shall be clearly indicated - 0 I -		P
	For push-button CB the off push-button shall either be red or be marked with the symbol 0´		P
	Red not used for other push-button		P
	For CB with multiple current ratings, the maximum value is marked, the adjusted value indicated without ambiguity		P
	Marking shall be indelible and easily legible (not on removable parts), 15 s with water, 15 s with hexane (see cl. 9.3)		N/A
8.	**REQUIREMENTS FOR CONSTRUCTION AND OPERATION**		
8.1.1	**General**		
	Circuit-breakers shall be so designed and constructed that, in normal use, their performance is reliable and without danger to the user or surroundings		P
8.1.2	**Mechanism**		
	The moving contact shall be mechanically coupled so that all poles make and break together, whether operated manually or automatically, even if an overload occurs on one pole only		P
	The switched neutral shall close before and open after the protected pole (s)		P
	Neutral pole having adequate making and breaking capacity and CB with independent manual operation: all poles operate together including neutral pole		P
	CB shall have a trip free mechanism		P
	It shall be possible to switch the CB on and off by hand		P
	No intermediate position of the contacts		P
	Position of contacts shall be indicated		P
	Indication visible from the outside		P
	If the indication is on the actuating means, it shall, when released, automatically take up or stay in the position corresponding to that of the moving contacts; operating means shall have two different rest positions, except that, for automatic operation, a third distinct rest position may be provided		P

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict
	If a separate mechanical indicator is used to indicate the position of the main contacts, colour red shall be used for the on position and green for the off position.		N/A
	The action of the mechanism shall not be influenced by the position of enclosures		P
	If the cover is used as a guiding means for push-button, it shall not be possible to remove this button from the outside		P
	Operating means securely fixed, not possible to remove them without a tool		P
	For the up-down operating means the contacts shall be closed by the up movement.		P
8.1.3	**Clearances and creepage distances**		
	The minimum required clearances and creepage distances are based on the CB being designed for operating in an environment with pollution degree 2		P
	Compliance for item 1 in Table 4 is checked by measurement and by the test of 9.7.5.4.1 and 9.7.5.4.2. The test is carried out with samples not submitted to the humidity treatment described in 9.7.1.		P
	The clearances of items 2 and 4 (except accessible surface after installation) may be reduced provided that the measured clearances are not shorter than the minimum allowed in IEC 60664-1 for homogenous field conditions.		N/A
	In this case, after the humidity treatment in 9.7.1, compliance for item 2 and 4 and arrangements of 9.7.2 items b), c), d) and e) is checked:		P
	-Tests according to 9.7.2 to 9.7.4 as applicable		P
	-Test according to 9.7.5.2 with test voltages acc. Table 13 with test arrangements of 9.7.2 items b), c), d), e)		P
	If measurement does not show any reduced clearance, test 9.7.5.2 is not applied		P
	Compliance for item 3, checked by measurement		P
	The insulating materials are classified into Material Groups on the basis of their comparative tracking index (CTI) acc. to IEC 60664-1		P
	Clearances [mm] U_{imp}		--

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Clause	Requirement + Test	Result - Remark	Verdict
	4 kV (see table 4) 2,5 kV (see table 4)	4kV	P
	Minimum clearances (see table 4)		N/A
		minimum clearances [mm]	--
	1.between live parts (of the main circuits) which are separated when the CB is in off position ..... :		P
	2.between live parts of different polarity..... :		P
	3.between circuits supplied from different sources, one of which being PELV or SELV..... :		N/A
	4. between live parts and		P
	- accessible surfaces of operating means..... :		P
	- screws or other means for fixing covers ..... :		P
	- surface on which the base is mounted..... :		P
	- screws or other means for fixing the circuit breaker ..... :		P
	- metal covers or boxes..... :		P
	- other accessible metal parts ..... :		P
	- metal frames supporting the base (flush-type) . :		P
	Minimum creepage distances (see table 4)		P
	Material group	☐ III_b ☐ III_a ☐ II ☐ I	--
		minimum creepage distances [mm]	--
	1.between live parts (of the main circuits) which are separated when the CB is in off position ..... :		P
	2.between live parts of different polarity..... :		N/A
	3.between circuits supplied from different sources, one of which being PELV or SELV..... :		N/A
	4. between live parts and		P
	- accessible surfaces of operating means..... :		P
	- screws or other means for fixing covers ..... :		P
	- surface on which the base is mounted..... :		P
	- screws or other means for fixing the circuit breaker ..... :		P
	- metal covers or boxes..... :		P
	- other accessible metal parts ..... :		P
	- metal frames supporting the base (flush-type) . :		P

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Clause	Requirement + Test	Result - Remark	Verdict
8.1.4	**Screws, current-carrying parts and connections**		
8.1.4.1	Connections, withstand mechanical stresses occurring in normal use		P
	Screws for mounting of the CB not of the thread-cutting type		P
	Test according to cl. 9.4:		P
	- 10 times (screw Ø / torque Nm)	Ø___mm___Nm (see table 11) Ø___mm___Nm	N/A
	- 5 times (screw Ø / torque Nm)	Ø_4.8__mm_2.0__Nm (see table 11) Ø___mm___Nm	P
	Plug in connections tested by plugging in and pulling out five times		N/A
	After test connections have not become loose nor electrical function impaired		P
8.1.4.2	Screws with a thread of insulating material ensured correct introduction		N/A
8.1.4.3	Electrical connection: contact pressure not transmitted through insulating material, unless there is sufficient resilience in the metallic parts		P
8.1.4.4	Current-carrying parts including parts intended for protective conductors, if any, shall be made of a metal having, under the conditions occurring in the equipment, mechanical strength, electrical conductivity and resistance to corrosion adequate for their intended use. Examples below:		N/A
	- copper		N/A
	- alloy 58% copper for worked cold parts		P
	- alloy 50% copper for other parts		N/A
	- other metal		N/A
	In case of using ferrous alloys or suitably coated ferrous alloys, compliance to resistance to corrosion is checked by a test of resistance to rusting (see 9.16).		P
	The requirements of this subclause do not apply to contacts, magnetic circuits, heater elements, bimetals, shunts, parts of electronic devices or to screws, nuts, washers, clamping plates, similar parts of terminals and parts of the test circuit		P

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Clause	Requirement + Test	Result - Remark	Verdict
8.1.5	**Terminals for external conductors**		--
	Compliance is checked by inspection and by the tests as relevant for the type of connection:		--
	by tests of clause 9.5 for screw-type terminals		P
	by specific tests for plug-in or bolt-on CBs included in the standard		N/A
	by the tests of Annexes J, K		N/A
8.1.5.1	Terminals ensure the necessary contact pressure		P
9.5	Torque test:		
	- torque (Nm); diameter (mm).....:	2.0Nm, Ø4.8 mm	--
	- torque (Nm); diameter (mm).....:	25.0	--
	- torque (Nm); diameter (mm).....:		--
	- max. cross-sectional area (mm²) .....:		--
9.5.2	Pull test:		N/A
	Terminal shall be suitable for all types of conductors: rigid (solid or stranded) and flexible, unless otherwise specified by the manufacturer.		--
	Min. cross-section solid / stranded / flexible (mm²) .....:	Solid: 1,0 mm² Stranded: 1,5 mm 2 Flexible: 1,0 mm	--
	Max. cross-section solid / stranded / flexible (mm²) .....:	Solid: 16,0 mm² Stranded: 25,0 mm 2 Flexible: 16,0 mm	--
	Torque $^2/_3$ (Nm) .....:	1.33 Nm	--
	Pull for 1 min solid / stranded / flexible (N).....:	50N for 1,0 mm² 50N for 1,5 mm 2 90N for 16,0 mm² 100N for 25,0 mm²	P
	During the test no noticeable move of conductor		P
9.5.3	Torque test:		
	- torque $^2/_3$ (Nm).....:	1.33Nm	--
	- min. cross-sectional area (mm²) .....:	Solid: 1,0 mm² Stranded: 1,5 mm²	--
	- max. cross-sectional area (mm²) .....:	Solid: 16,0 mm² Stranded: 25,0 mm 2	--
	The conductor shows no damage		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Terminals have not worked loose and no damage		P
9.5.4	Terminals fitted with the largest cross-section area specified in Table 5, for stranded copper conductor.		P
	Max. cross-section stranded (mm^2) .....:	Stranded: 25,0 mm^2	--
	Torque $^2/_3$ (Nm) .....:	1,33Nm	--
	After the test no strand of conductor escaped outside		P
8.1.5.2	Terminals allow the connection of conductors of the following cross-sectional areas: (table 5)		P
	Rated current (A) / sections — Range of nominal cross to be clamped* (mm^2): Rigid (solid or stranded) conductors / Flexible conductors ≤ 13: 1 to 2,5 / 1 to 2,5 > 13 ≤ 16: 1 to 4 / 1 to 4 > 16 ≤ 25: 1,5 to 6 / 1,5 to 6 > 25 ≤ 32: 2,5 to 10 / 2,5 to 6 > 32 ≤ 50: 4 to 16 / 4 to 10 > 50 ≤ 80: 10 to 25 / 10 to 16 > 80 ≤ 100: 16 to 35 / 16 to 25 > 100 ≤ 125: 24 to 50 / 25 to 35	Solid conductors: 1,0mm 2 to 16,0mm 2 Stranded conductors: 1,5mm 2 to 25,0mm 2 flexible conductors: 1,0mm 2 to 16,0mm 2	P
	*It is required that, for current ratings up to and including 50 A, terminals be designed to clamp solid conductors as well as rigid stranded conductors. Nevertheless, it is permitted that terminals for conductors having cross-sections from 1 mm^2 up to 6 mm^2 be designed to clamp solid conductors only.		N/A
	- or terminals for external untreated aluminium conductors and with aluminium screw-type terminals for use with copper or with aluminium conductors according to Annex L.		N/A
8.1.5.3	Means for clamping the conductors in the terminals not serve to fix any other component (See test sub-clause 9.5)		P
8.1.5.4	Terminals for $I_N \leq 32$ A allow the connection of conductors without special preparation		P
8.1.5.5	Terminals shall have adequate mechanical strength; ISO thread or equivalent (See tests of sub-clause 9.4 and 9.5.2)		P

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Clause	Requirement + Test	Result - Remark	Verdict
8.1.5.6	Clamping of conductor without damage to the conductor (See test of sub-clause 9.5.3)		P
8.1.5.7	Clamping of conductor between metal surfaces (See tests of sub-clause 9.4 and 9.5.2)		P
8.1.5.8	Conductor shall not slip-out when the clamping screw or nuts are tightened (See test of sub-clause 9.5.4)		P
8.1.5.9	Terminals shall be properly fixed. No work loose when the clamping screws or nuts are tightened or loosened (See test of sub-clause 9.4)		P
8.1.5.10	Clamping screws or nuts of terminals for protective conductors adequately secured against accidental loosening		N/A
8.1.5.11	Pillar terminals shall allow full insertion and reliable clamping of the conductor		P
8.1.5.12	Screws and nuts of terminals for external conductors shall be in engagement with a metal thread, and the screws shall not be of tapping screw type		P
8.1.6	**Non-interchangeability**		
	For circuit-breakers intended to be mounted on bases forming a unit therewith (plug-in or screw-in type) it shall not be possible, without the aid of a tool, to replace a circuit-breaker when mounted as for normal use by another of the same make having a higher rated current, compliance is checked by inspection		N/A
8.1.7	**Mechanical mounting of plug-in circuit-breakers**		
8.1.7.1	The mechanical mounting of plug-in circuit-breakers, the holding in position of which does not depend solely on their plug-in connection(s), shall be reliable and have adequate stability		N/A
8.1.7.2	Plug-in type circuit-breakers, the holding in position of which does not depend solely on their plug-in connection(s) Compliance of the mechanical mounting is checked by the relevant test 9.13		N/A
8.1.7.3	Plug-in type circuit-breakers, the holding in position of which does depend solely on their plug-in connection(s) Compliance of the mechanical mounting is checked by the relevant test 9.13		N/A
8.2	**Protection against electric shock**		
	Live parts not accessible in normal use		P

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Clause	Requirement + Test	Result - Remark	Verdict
	For CB, other than plug-in type, external parts, other than screws and other means for fixing covers, which are accessible shall be of insulating material		P
	Unless the live parts are within an internal enclosure of insulating material: Lining - reliable fixed, - adequate thickness and - mechanical strength		N/A
	Inlet openings for cables shall be in insulating material or be provided with bushings or similar devices in insulating material Such device - shall be reliable fixed - shall have adequate mechanical strength		N/A
	For plug-in CB, external parts, other than screws and other means for fixing covers, which are accessible shall be in insulating material		N/A
	Metallic operating means insulated from live parts		N/A
	Metal parts of the mechanism not accessible and insulated from accessible metal parts, metal frames (for flush-type), screws or other means for fixing the base		P
	Replacement of plug-in CB possible without touching live parts		N/A
	Lacquer or enamel not considered		N/A
8.1.3	**Creepage distances [mm] (see table 4)**		
	Internal parts only	See above	--
9.6	**Test of protection against electric shock**		
	This verification is applicable to those parts of circuit breakers which are exposed to the operator when mounted as for normal use		P
	Use of test finger so designed that each jointed can be turned through an angle of 90°with respect to the finger		P
	Circuit-breaker with enclosures of thermoplastic material are additional tested at 35 ℃ for 1 min with a force of 75 N		N/A
8.10	**Resistance to heat**		
	CB sufficiently resistant to heat		P
9.14	**Test of resistance to heat**		

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Clause	Requirement + Test	Result - Remark	Verdict
9.14.1	Test:		
	- without removable covers ..... 1 h (100 ± 2) ℃		P
	- removable covers..... 1 h (70 ± 2) ℃		N/A
	After the test no access to live parts, marking still legible		P
9.14.2	Ball pressure test for external parts of insulating material (parts retaining current-carrying parts and parts of the protective circuit in position) T = 125℃ Ø of impression ≤ 2 mm	Impression: 1.2 mm (Enclosure)	P
9.14.3	Ball pressure test for external parts of insulating material (parts not retaining current-carrying parts and parts of the protective circuit in position T = (70 ± 2)℃ or T = ___ ℃ = (40 ± 2)℃ + max. temperature rise of sub-clause 9.8 Ø of impression ≤ 2 mm	Impression: 1.0 mm (Handle)	P
8.12	**Resistance to rusting**		
	Ferrous parts adequately protected against rusting		P
9.16	**Test of resistance to rusting:**		
	- 10 min immersed in a cold chemical degreaser such as methyl-chloroform or refined petrol		P
	- 10 min immersed in a 10% solution of chloride in water at 20℃		--
	- 10 min at 95% humidity at 20℃		--
	- 10 min at 100℃		--
	No sign of rust		--

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Clause	Requirement + Test	Result - Remark	Verdict

	TESTS „A_2“ 3 samples	A_{2-1} A_{2-2} A_{2-3}	
8.11	**Resistance to abnormal heat and to fire**		
	External parts of insulating material shall not ignite or spread fire under fault or overload conditions		P
9.15	**Resistance to abnormal heat and to fire**		
	Test performed on a complete CB		P
	external parts retaining current-carrying parts and parts of the protective circuit in position ..... (960 ± 15)℃		P
	all other external parts ..... (650 ± 10)℃		P
	No visible flames, no sustained glowing, or		N/A
	flames and glowing extinguish within 30 s after removal .....:	2.8s	P
	No ignition of tissue paper or scorching of the pinewood board		P

	TESTS „B“ 3 samples	B_1 B_2 B_3	
8.3	**Dielectric properties and isolating capability**		
8.3.1	CB shall have adequate dielectric properties and shall ensure isolation:		P
8.3.2	Dielectric strength at power frequency		P
	Compliance is checked by the tests 9.7.1, 9.7.2 and 9.7.3 on circuit-breaker in new condition		P
8.3.3	Isolating capability		
	Circuit-breakers shall be suitable for isolation. Compliance is checked by the verification of compliance with the minimum clearances and creepage distances of item 1 of table 4 and by tests of 9.7.5.1 and 9.7.5.3.		P
8.3.4	Dielectric strength at rated impulse withstand voltage (Uimp)		
	Circuit-breakers shall adequately withstand impulse voltages. Compliance is checked by the tests of 9.7.5.2.		P
9.7	**Test of dielectric properties and isolating capability**		
9.7.5.4	Verification of resistance of the insulation of open contact and basic insulation against an impulse voltage in normal conditions		

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Clause	Requirement + Test	Result - Remark	Verdict
	These tests are not preceded by the humidity treatment described in 9.7.1.		P
	The test is carried out on an CB fixed on a metal support		P
	The impulses are given by a generator producing positive and negative impulses having a front time of 1,2μs, and a time to half-value of 50μs		P
	The shape of the impulses is adjusted with the CB under test connected to the impulse generator.		P
	rated impulse withstand voltage [kV]:	kV	--
	sea level of test laboratory [m]:	m	--
	test voltage (acc. Table 15) [kV]:	kV	--
9.7.5.4.2	CB in open position (contacts in open position)		
	The impulses are applied between:		--
	the line terminals connected together and the load terminals connected together		P
9.7.5.4.3	CB in closed position		
	A first series of tests is made applying the impulse voltage between the phase pole(s) and the neutral pole (or path) connected together and the metal support connected to the terminal(s) intended for the protective conductor(s), if any		P
	A second series of tests is made applying the impulse voltage between the phase pole(s), connected together, and the neutral pole (or path) of the CB		N/A
	Five positive impulses and five negative impulses are applied, the interval between consecutive impulses being at least 1 s for impulses of the same polarity and being at least 10 s for impulses of the opposite polarity.		P
	no disruptive discharges during the test		P
9.7.1	Resistance to humidity		
9.7.1.1	Preparation of the circuit-breaker for test		
	Inlet openings, if any, are left open; if knock-outs are provided, one of them is opened.		P
9.7.1.2	Test conditions		

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Clause	Requirement + Test	Result - Remark	Verdict
	The humidity treatment is carried out in humidity cabinet 91% to 95% and the temperature of the air between 20 ℃ and 30 ℃	Rf = 93 % T = 25 ℃	P
9.7.1.3	Test procedure.		
	The sample is kept in the cabinet for 48 h.		P
9.7.1.4	Conditions of the circuit breaker after the tests.		
	The sample show no damage within the meaning of this standard and shall withstand the tests of 9.7.2 and 9.7.3, 9.7.4 and 9.7.5.2		P
9.7.2	Insulation resistance of the main circuit		
9.7.2	After an interval between 30 min and 60 min flowing this treatment, the insulation resistance is measured 5 s after application of a d.c. voltage of approximately 500 V, consecutively as follows:	[MΩ] [MΩ] [MΩ]	P
	a) In off-position, between the terminals which are electrically connected together when the circuit-breaker is in the closed position ≥ 2 MΩ	>500 >500 >500	P
	b) in off-position, between each pole in turn and the others connected together ≥ 2 MΩ	>500 >500 >500	P
	c) in on-position, between all poles connected together and the frame ≥ 5 MΩ	>500 >500 >500	P
	d) between metal parts of mechanism and the frame ≥ 5 MΩ		N/A
	e) between the frame and metal foil in contact with the inner surface of the internal enclosure or lining of insulating material ≥ 5 MΩ		N/A
9.7.3	Dielectric strength of the main circuit		
	After the circuit-breakers have passed the tests of 9.7.2 the test voltage specified is applied for 1 min between the parts indicated in 9.7.2		P
	a) 2000 V		P
	b) 2000 V		P
	c) 2000 V		P
	d) 2000 V		N/A
	e) 2500 V		N/A
	No flashover or breakdown		P
9.7.4	Insulation resistance and dielectric strength of the auxiliary circuits		
	Insulation resistance of auxiliary circuits measured with 500 V DC after 1 min:		

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Clause	Requirement + Test	Result - Remark	Verdict
	1) between all auxiliary circuits and the frame (MΩ) ≥ 2 MΩ		N/A
	2) between each part of the auxiliary circuits which might be isolated from the other parts and the whole of the other parts connected together (MΩ) ≥ 2 MΩ		N/A
	Dielectric strength of auxiliary circuits measured with an AC voltage at rated frequency for 1 min:		--
	Rated voltage of auxiliary circuits (a.c. or d.c.) — Test voltage (V) ≤ 30 — 600 > 30 ≤ 50 — 1000 > 50 ≤ 110 — 1500 > 110 ≤ 250 — 2000 > 250 ≤ 500 — 2500	V	--
	1) between all auxiliary circuits and the frame		N/A
	2) between each part of the auxiliary circuits which might be isolated from the other parts and the whole of the other parts connected together		N/A
	No flashover or perforation		N/A
9.7.5.2	Verification of clearances with the impulse withstand voltage		
	If the measurement of clearances of items 2 and 4 in Table 4 shows a reduction of the required length, this test applies.		P
	The test is carried out on an CB fixed on a metal support and being in the closed position		P
	The impulses are given by a generator producing positive and negative impulses having a front time of 1,2μs, and a time to half-value of 50μs		N/A
	The shape of the impulses is adjusted with the CB under test connected to the impulse generator.		N/A
	test performed with:		--
	-surge impedance of the test apparatus ≤500Ω and surge protective devices disconnected before testing or		P
	-hybrid generator with an surge impedance of 2 Ω and surge protective devices not disconnected before testing		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	rated impulse withstand voltage [kV]:	kV	--
	see level of test laboratory [m]:	m	--
	test voltage (acc. Table 14) [kV]:	kV	--
	A first series of tests is made applying the impulse voltage between the phase pole(s) and the neutral pole (or path) connected together and the metal support connected to the terminal(s) intended for the protective conductor(s), if any		P
	A second series of tests is made applying the impulse voltage between the phase pole(s), connected together, and the neutral pole (or path) of the CB		N/A
	A third series of tests is made applying the impulse voltage between (and not tested during the two first sequences described here above):		--
	b) between each pole and the others connected together		P
	c) between all poles connected together and the frame		P
	d) between metal parts of the mechanism and the frame		P
	e) between the frame and a metal foil in contact with the inner surface of the lining of insulating material		P
	Five positive impulses and five negative impulses are applied, the interval between consecutive impulses being at least 1 s for impulses of the same polarity and being at least 10 s for impulses of the opposite polarity.		N/A
	no disruptive discharges during the test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

8.4	**Temperature rise**				
	Temperature rise does not exceed the limiting values stated in table 6:	sect. __16.0_ mm²			--
9.8.2	Test current: I_N= (reach the steady-state value) Four-pole CB's: ☐ 1) Three poles loaded 2) One pole and neutral pole loaded ☑ 1) Four-poles loaded	I_N = _63_A			--
	Ambient air temperature.....:	Tamb= __21__℃			--
	Parts .....Temperature rise [K]	[K]	[K]	[K]	--
	L1	51	54	53	P
	L2	53	53	57	
	L3	50	54	56	
	L4(N)	49	51	53	
	L3				
	N				
	Terminals for external connections .....60 K				P
	External parts liable to be touched during manual operation of the circuit-breaker, including operating means of insulating material and metallic means for coupling of insulating operating means of several poles .....40 K	25	21	22	P
	External metallic parts of operating means...25 K				P
	Other external parts, including that face of the circuit-breaker is in direct contact with the mounting surface.....60 K	45	51	52	P
9.8.5	Measurement of power losses	B_1	B_2	B_3	P
	Power loss do not exceed the values stated in table 8				P
	Test current: I_N = __63_ A (reach the steady state value)		63A		P
	Loaded one pole after the other				P
	Max. power loss : ___13___ W	W	W	W	P
	L1	4.6	4.8	4.6	P

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Clause	Requirement + Test	Result - Remark			Verdict
	L2	5.3	4.6	4.8	
	L3 L4(N) L3 N	46 4.7	5.0 4.5	5.7 5.7	N/A
8.5	**Uninterrupted duty**				
	Circuit-breakers operate reliable even after long service				P
9.9	**28 day test**				
	28 cycles - 21 h with current - 3 h without current Cross-sectional area. ____ mm²	I_N = _63_A 16.0mm²			P
	During the test no tripping during the last period, temperature rise shall be measured				P
	Ambient air temperature.....:	23 ℃			P
	Parts .....Temperature rise [K]	[K]	[K]	[K]	P
	Terminals for external connections				P
	The temperature rise does not exceed the value measured during the temperature rise test (sub-clause 9.8) by more than 15 K				P
	Test current 1,45 I_N =__91.4__A				P
	- Tripping within	[s]	[s]	[s]	P
	- 1h (≤ 63 A)	4.5	3.5	3.6	P
	- 2h (> 63 A)				P

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	TESTS „C“ 3 +3 samples				
8.7	**Test „C_1“ Mechanical and electrical endurance**	**C_{1-1}**	**C_{1-2}**	**C_{1-3}**	
	Circuit-breaker shall be capable to perform an adequate number of cycles with rated current				P
9.11.1	General test conditions				--
	Test: Test Voltage _____V (rated voltage) Test Current _____A (rated current) Power factor _____(0,85-0,9) Par. resistor _____ (Ω) Cross sect. area ____mm²	418V 63,2A 0,85 16,0mm²			--
9.11.2	Test procedure				
	The circuit-breaker is submitted to 4000 operating cycles with rated current.	4000 cycles			P
	- $I_N \leq 32$ A: 2 s on - 13 s off				N/A
	- $I_N > 32$ A: 2 s on - 28 s off	IN = 63 A			P
	During the test the circuit-breaker shall be operated as in normal use.				P
9.11.3	Conditions of the circuit breaker after the tests.				
	Following the test 9.11.2 the sample shall not show:				--
	- undue wear				P
	- discrepancy between the position of the moving contacts and corresponding position of the Indicating device				P
	- damage to the enclosure permitting access to live parts by test finger (see 9.6)				P
	- loosening of electrical or mechanical connections				P
	- seepage of sealing compound				N/A
	Moreover test current .....2,55 I_N_____A	161A			--
	Opening time not less 1 s or more than	[s]	[s]	[s]	--
	- 60 s (≤ 32 A)				N/A
	- 120 s (> 32 A)	19	27	13	P
	Dielectric strength reduced to 1500 V				P

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Clause	Requirement + Test	Result - Remark	Verdict

9.12.11.2	**Test at reduced short-circuit currents**				
9.12.11.2.1	Test on all circuit-breakers				--
9.12.11.2.1	Test at reduced short-circuit currents: Fig. 3				--
	Test current:	Obtained			--
	- 500 A or 10 In	I test= ___656__A			--
	Test voltage 1,05 Un	Un = ___440____V			--
	Power factor 0,93-0,98	__0.95___			--
9.12.9.2	Test in free air copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	"a" = ___35_ mm			P
9.12.9.3	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value	__960_A			P
	Sequence: 6 x "O" and 3 x "CO"	[kA^2s]	[kA^2s]	[kA^2s]	--
	Max. $I^2t \leq$ _____kA^2s	37.0	65.0	111	P
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				--
9.12.12	Verification of the circuit-breaker after short-circuit tests				--
9.12.12.1	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				P
	a) leakage current across open contacts, according to 9.7.5.3, each pole is supplied at a voltage 1,1 times Un.= _____ V. The circuit – breaker is in the open position	**C_{1-1}** [mA]	**C_{1-2}** [mA]	**C_{1-3}** [mA]	--
	The leakage current shall not exceed 2 mA L1	3.50	4.10	3.10	P
	L2	3.70	3.20	4.30	P
	L3	4.30	4.10	3.10	P
	L4(N)	3.10	4.10	2.40	P

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Electric strength test:		--
	Test voltage 1500 V (see 9.7.2)		--
	a)		P
	b)		P
	c)		P
	d)		--
	e) 2000 V		N/A

9.12.11.2.2	**Test „C_2“ Short-circuit test on circuit-breakers for use in IT systems**				
	Test current:				--
	- 500 A or 1,2 times the upper limit of the standard range of instantaneous tripping (see table 2) whichever is the higher, but < 2500 A. When tripping exceed 20 In the current adjusted at 1,2 times the upper limit even when higher 2500 A	I test= __1,55x10 3__A			--
	Test voltage 1,05 Un	Un = ___456__V			--
	Power factor 0,93-0,98	__0.95___			--
9.12.9.2	Test in free air copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	"a" = __35__ mm			P
9.12.9.3	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value	___1,78X10 3__A			P
	Sequence: "O" + "CO" on each protected pole	[kA^2s]	[kA^2s]	[kA^2s]	--
	Shifted point 30 °on the other protected pole	**C_{2-1}**	**C_{2-2}**	**C_{2-3}**	--
	Max. I^2t ≤ _____kA^2s L1	67.0	65.1	66.5	P
	L2	67.0	65.1	66.5	
	L3	___	___	___	
	L4 (N)	___	___	___	
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				--

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IEC 60898-1					
Clause	Requirement + Test	Result - Remark			Verdict
9.12.12.1	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				--
	a) leakage current across open contacts, according to 9.7.5.3, each pole is supplied at a voltage 1,1 times Un.= _____ V. The circuit – breaker is in the open position	**C_{2-1}** [mA]	**C_{2-2}** [mA]	**C_{2-3}** [mA]	--
	The leakage current shall not exceed 2 mA L1	3.5	3.4	3.7	P
	L2	3.6	3.6	3.5	P
	L3	3.1	3.2	3.3	P
	L4(N)	2.9	3.3	3.0	P
	Electric strength test:				--
	Test voltage 1500 V (see 9.7.2)				--
	a)				P
	b)				P
	c)				P
	d)				N/A
	e) 2000 V				N/A

	TESTS „D“ 3 samples		
8.6	**Automatic operation**		--
8.6.1	Standard time-current zone		--
	Tripping characteristic of CB ensures adequate protection of the circuit, without premature operation.		P
9.10	**Tests „D_0“**	**D_{O-1}** **D_{O-2}** **D_{O-3}**	
	I_N (A)	63 A	--
	Sect. (mm²)	16 mm²	--
	Instantaneous tripping current	☐ B ☐ C ☑ D	--
9.10.2	Test of time-current characteristic		--
9.10.2.1	Test current 1,13 I_N (A) starting from cold for:	71.2 A	--
	- 1 h ($I_N \leq 63$ A)		P
	- 2 h ($I_N > 63$ A)		N/A
	No tripping		P
	Then steadily increased within 5 s to 1,45 I_N (A)		N/A
	- Tripping within	[min] [min] [mini]	--
	- 1h (≤ 63 A)	0.5 0.6 0.8	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- 2h (> 63 A)		N/A
9.10.2.2	Test current 2,55 I_N (A) starting from cold for:	161 A	--
	opening time not less than 1 s or more than	[s] [s] [s]	--
	- 60 s (≤ 32 A)		N/A
	- 120 s (> 32 A)	29 24 28	P
9.10.3	Test of instantaneous tripping and of correct opening of the contacts		P
9.10.3.1	General test conditions		P
	For the lower values of the test current the test is made once, at any convenient voltage.		P
	For the upper values of the test current the test is made at rated voltage Un(phase to neutral) with a power factor between 0,95 and 1.		N/A
	The sequence of operation is : O-CO-CO-CO Interval time: > 3 min		N/A
	The tripping time of the O operation is measured		N/A
	After each operation the indicating means shall show the open position of the contacts		P
9.10.3.2	☐ For circuit-breakers of the B – Type		
	Test current 3I_N (A), starting from cold	A	N/A
	Opening time:	[s] [s] [s]	--
	≥ 0,1 s		N/A
	Test current 5 I_N (A), starting from cold	A	N/A
	Tripping less than 0,1 s		N/A
9.10.3.3	☐ For circuit-breakers of the C – Type		
	Test current 5I_N (A), starting from cold	315 A	--
	Opening time:	[s] [s] [s]	--
	≥ 0,1 s	1.3 1.6 1.5	P
	Test current 10 I_N (A), starting from cold	630 A	--
--	Tripping less than 0,1 s	0.05 0.07 0.7	P
9.10.3.4	☐ For circuit-breakers of the D – Type		
	Test current 10I_N (A), starting from cold	630 A	--
	Opening time:	[s] [s] [s]	--
	≥ 0,1 s	1.2 1.3 1.2	P
	Test current 20 I_N (A) or to the maximum instantaneous tripping current(see cl. 6, item j), starting from cold	1260 A	--

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Clause	Requirement + Test	Result - Remark	Verdict
	Tripping less than 0,1 s	0.07 0.06 0.9	P
9.10.4	Test of effect of single pole loading on the tripping characteristic of multi-pole circuit-breakers:		--
	Test current 1,1 It (A), (two pole) starting from cold	_____A	--
	Tripping within	[min] [min] [min]	--
	- 1h (≤ 63 A)		N/A
	- 2h (> 63 A)		N/A
	Test current 1,2 It (A), (three pole or four pole) starting from cold	___110A__A	--
	Tripping within	[min] [min] [min]	--
	- 1h (≤ 63 A)	3.5 2.5 2.8	P
	- 2h (> 63 A)		N/A
9.10.5	Test of effect of ambient temperature on the tripping characteristics		--
	a) Ambient temperature of (35 ± 2) K below the ambient air reference temperature	T =_____5____℃	--
	Test current 1,13 I_N (A)	___71.2__A	--
	- Passed for 1h	>1h	P
	- Passed for 2h		N/A
	Current is then steadily increased to 1,9 I_N (A) within 5s	___120__A	--
	Tripping within	[min] [min] [mini]	--
	- 1h (≤ 63 A)	0.9 0.8 0.8	P
	- 2h (> 63 A)		N/A
	b) Ambient temperature of (10 ± 2) K above the ambient air reference temperature	T = +40℃	--
	Test current I_N (A)	___63___A	--
	No tripping within		--
	- 1h (≤ 63 A)	>1h	P
	- 2h (> 63 A)		N/A

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	Tests „D_1“	**D_{1-1} D_{1-2} D_{1-3}**	
8.9	**Resistance to mechanical shock and impact**		
	CB shall have adequate mechanical behaviour so as to withstand the stresses imposed during installation and use		P
9.13.1	Mechanical shock		--
	- 50 falls on two sides of vertical board C		P
	- Vertical board turned 90°		P
	- 50 falls on two sides of vertical board C		N/A
	During the test the circuit-breakers shall not open		N/A
9.13.2	Mechanical impact		--
9.13.2.2	All types:		--
	- Impact test: 10 blows-height 10 cm, no damage		P
9.13.2.3	Screw-in types:		--
	- Torque 2,5 Nm for 1 min, no damage		P
9.13.2.4	CB intended to be mounted on a rail		--
	- downward vertical 50 N for 1 min		P
	- upward vertical 50 N for 1 min, no damage		P
9.13.2.5	Plug-in types		--
	The circuit-breaker are mounted in their normal position, complete with plug-in base but without cables and any cover plate		N/A
	A force of 20 N applied for 1min to the circuit-breaker (see fig 16).		N/A
	During this test the circuit-breaker part shall not become loose from the base and shall not show damage impairing further use.		N/A
9.12.11.3	**Test at 1500 A:**		--
	Prospective current of 1500 A - power factor 0,93 to 0,98		--
	Prospective current obtained (A)	1,55x10 3 A	--
	Power factor	0.95	--
	Test voltage 1,05 Un	Utest = 456V	--
	Test circuit: figure	Figure 3	--
	T (min)	3 min	--

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IEC 60898-1					
Clause	Requirement + Test	Result - Remark			Verdict
9.12.9.2	Test in free air copper wire F': ☐ 0,12 mm / ☑ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☑ 1,5 Ohm	"a" = __35__ mm			P
9.12.9.3	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	Sequence	6-O, 3-CO			--
	I_{Peak} (A) max. value	2,8x10 3 A			--
	$I^2t \leq$ _____ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	--
	Max. $I^2t \leq$ _____kA^2s L1 L2 L3 L4(N)	_11.0__ __26.0_ 15.0_ ____	_10.0_ _23.0 _30.0 ___	8.00__ 13.0_ 31.0_ ___	P
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				--
9.12.12.1	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				--
	a) leakage current across open contacts, according to 9.7.5.3, each pole is supplied at a voltage 1,1 times Un.= _____ V. The circuit – breaker is in the open position	**D_{1-1}** [mA]	**D_{1-2}** [mA]	**D_{1-3}** [mA]	--
	The leakage current shall not exceed 2 mA L1	3.50	4.60	4.30	P
	L2	3.90	3.50	4.20	P
	L3	3.30	4.80	4.60	P
	L4(N)	3.80	4.50	3.80	P
	Electric strength test:				--
	Test voltage 1500 V (see 9.7.2)				--
	a)				--
	b)				--
	c)				--
	d)				--
	e) 2000 V				P

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IEC 60898-1					
Clause	Requirement + Test	Result - Remark			Verdict
	Test current 0.85x non-tripping current (1,13 I_N)	60.5 A			--
	- Passed for 1h	>1h			P
	- Passed for 2h				N/A
	Current is then steadily increased to 1,1 x tripping current (1,45 I_N) within 5s	100.5 A			--
		D_{1-1} [min]	**D_{1-2}** [min]	**D_{1-3}** [min]	--
	Tripping within ☐ 1 hour / ☐ 2 hour	0.5	0.7	0.4	P

	TESTS „E_1“ 3 + 4 samples				
9.12.11.4.2	**Test E_1: Test at service short-circuit capacity**	**E_{1-1}**	**E_{1-2}**	**E_{1-3}**	--
	Service short-circuit capacity (Ics) .....:	7,50×10 3 A			--
	Test circuit: figure .....:	Figure 3			--
	Test voltage 1,05 Un	436V			--
	Prospective current .....:	7,50×10 3 A			--
	Prospective current obtained .....:	7,60x10 3 A			--
	Power factor .....:	0,45~0,50			--
	Power factor obtained .....:	0,47			--
	Sequence .....:	O-O-CO			--
	T (min) .....:	3min			--
9.12.9.2	Test in free air copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	"a" = 45 mm			P
9.12.9.3	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimensions of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value .....:	6,17x10 3 A			--
	$I^2t \leq$ _____ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	--
	Max. $I^2t \leq$ _____kA^2s L1 L2 L3 L4(N)	64.0 58.0 52.0 _____	69.0 49.0 73.0 ___	101 153 50.0 ___	P
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P

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IEC 60898-1					
Clause	Requirement + Test	Result - Remark			Verdict
	- Polyethylene foil shows no holes				P
	After the test:				--
9.12.12.1	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				P
	a) leakage current across open contacts, according to 9.7.5.3, each pole is supplied at a voltage 1,1 times Un.= _____ V. The circuit – breaker is in the open position	**E_{1-1}** [mA]	**E_{1-2}** [mA]	**E_{1-3}** [mA]	--
	The leakage current shall not exceed 2 mA L1	3.70	3.20	4.10	P
	L2	3.10	3.00	3.80	P
	L3	3.50	3.10	4.20	P
	L4(N)	3.60	2.60	3.10	P
	Electric strength test:				--
	Test voltage 1500 V (see 9.7.2)				--
	a)				P
	b)				P
	c)				P
	d)				N/A
	e) 2000 V				N/A
	Test current 0.85x non-tripping current (1,13 I_N)	___60.5___A			--
	- Passed for 1h	>1H			P
	- Passed for 2h				N/A
	Current is then steadily increased to 1,1 x tripping current (1,45 I_N) within 5s	___100.5__A			--
		E_{1-1} [min]	**E_{1-2}** [min]	**E_{1-3}** [min]	--
	Tripping within ☑ 1 hour / ☐ 2 hour	2.1	0.4	1.6	P

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

9.12.11.4.2	**Test „E_1"(Test at service short-circuit capacity) three phase tests for single circuit-breakers**	**E_{1-4}**	**E_{1-5}**	**E_{1-6}**	**P**
	Service short-circuit capacity (Ics) .....:	7,50x10 3 A			--
	Test circuit: figure .....:	Figure 3			--
	Test voltage 1,05 Un	436V			--
	Prospective current .....:	7,50x10 3 A			--
	Prospective current obtained.....:	7,60x10 3 A			--
	Power factor .....:	0,45~0,50			--
	Power factor obtained .....:	0,47			--
	Sequence .....:	O-O-CO			--
	T (min) .....:	3min			--
9.12.9.2	Test in free air copper wire F': ☐ 0,12 mm / ☑ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☑ 1,5 Ohm	"a" = __45_ mm			P
9.12.9.3	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimensions of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value .....:	__530___A			--
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				--
9.12.12.1	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				--
	a) leakage current across open contacts, according to 9.7.5.3, each pole is supplied at a voltage 1,1 times Un.= _____ V. The circuit – breaker is in the open position	**E_{1-4}** [mA]	**E_{1-5}** [mA]	**E_{1-6}** [mA]	--
	The leakage current shall not exceed 2 mA L1	2.80	3.20	2.90	P
	L2	2.90	3.40	3.10	P
	L3	3.70	3.00	3.10	P
	L4(N)	2.90	2.80	3.90	P
	Electric strength test:				--

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IEC 60898-1					
Clause	Requirement + Test	Result - Remark			Verdict
	Test voltage 1500 V (see 9.7.2)				--
	a)				P
	b)				P
	c)				P
	d)				--
	e) 2000 V				--
	Test current 0.85x non-tripping current (1,13 I_N)	__0.96__A			P
	- Passed for 1h	>1H			P
	- Passed for 2h				N/A
	Current is then steadily increased to 1,1 x tripping current (1,45 I_N) within 5s	__1.60__A			N/A
		E_{1-4} [min]	**E_{1-5}** [min]	**E_{1-6}** [min]	--
	Tripping within ☐ 1 hour / ☐ 2 hour	12.3	5.6	8.3	P

	TESTS „E_2“ 3 + 4 samples				
9.12.11.4.3	**Test: E2 (Test at rated short-circuit capacity)**	**E_{2-1}**	**E_{2-2}**	**E_{2-3}**	**P**
	Rated short-circuit capacity (Icn)..... :	10kA			--
	Test circuit: figure ..... :	Figure 3			--
	Test voltage 1,05 Un	437V			--
	Prospective current ..... :	6kA			--
	Prospective current obtained ..... :	1,03x10 4 A			--
	Power factor ..... :	0,45~0,50			--
	Power factor obtained ..... :	0,48			--
	Sequence ..... :	O-CO			--
	T (min) ..... :	3min			--
9.12.9.2	Test in free air copper wire F': ☐ 0,12 mm / ☑ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☑ 1,5 Ohm	"a" = _45_ mm			P
9.12.9.3	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimensions of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value ..... :	5,73X10 3 A			--
	I^2t ≤ __70__ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	--

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IEC 60898-1					
Clause	Requirement + Test	Result - Remark			Verdict
	Max. I²t ≤ _____kA²s L1	30.0	54.0	10.0	P
	L2	40.0	34.0	50.0	
	L3	60.0	9.00	23.0	
	L4(N)	_____	___	___	
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				--
9.12.12.2	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				--
	a) leakage current across open contacts, according to 9.7.5.3, each pole is supplied at a voltage 1,1 times Un.= _____ V. The circuit – breaker is in the open position	**E_{2-1}** [mA]	**E_{2-2}** [mA]	**E_{2-3}** [mA]	--
	The leakage current shall not exceed 2 mA L1	5.30	5.50	6.30	P
	L2	5.60	5.50	5.70	P
	L3	5.50	5.70	5.90	P
	L4(N)	5.50	5.60	5.80	P
	Electric strength test:				--
	Test voltage 900 V (see 9.7.3)				--
	a)				P
	b)				P
	c)				P
	d)				N/A
	e)				N/A
	Test current 2,8 I_N	176 A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s				N/A
	- 120 s	42	27	30	P

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

9.12.11.4.3	**Test „E_2"(Test at rated short-circuit capacity) three phase tests for single circuit-breakers**	**E_{2-4}**	**E_{2-5}**	**E_{2-6}**	**E_{2-7}**	**P**
	Rated short-circuit capacity (Icn)..... :	6kA				--
	Test circuit: figure ..... :	Figure 3				--
	Test voltage 1,05 Un	437 V				--
	Prospective current ..... :	6kA				--
	Prospective current obtained ..... :	1,03x10 4 A				--
	Power factor ..... :	0,45~0,50				--
	Power factor obtained ..... :	0,48				--
	Sequence ..... :	O-CO				--
	T (min) ..... :	3min				--
9.12.9.2	Test in free air copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	"a" = __45__ mm				--
9.12.9.3	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimensions of enclosure: _____x_____x_____mm				--
	I_{Peak} (A) max. value..... :	510 A				--
	- No permanent arcing					P
	- No flash-over between poles or between poles and frame					P
	- No blowing of the fuses F and F′					P
	- Polyethylene foil shows no holes					P
	After the test:					P
9.12.12.2	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.					--
	a) leakage current across open contacts, according to 9.7.5.3, each pole is supplied at a voltage 1,1 times Un.= _____ V. The circuit – breaker is in the open position	**E_{2-4}** [mA]	**E_{2-5}** [mA]	**E_{2-6}** [mA]	**E_{2-7}** [mA]	--
	The leakage current shall not exceed 2 mA L1					--
	L2					--
	L3					--
	L4(N)					---
	Electric strength test:					--
	Test voltage 900 V (see 9.7.3)					--

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IEC 60898-1						
Clause	Requirement + Test	Result - Remark				Verdict
	a)					---
	b)					--
	c)					--
	d)					--
	e)					--
	Test current 2,8 I_N	_____A				--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	[s]	--
	- 60 s					--
	- 120 s					--

	TESTS „E_3“ 3 samples				
9.12.11.4.4	**Test: E_3 (Test at making and breaking capacity on an individual pole (Icn1)**	**E_{3-1}**	**E_{3-2}**	**E_{3-3}**	
	Icn1.....:	_____A			--
	Test circuit: figure .....:	_____			--
	Test voltage 1,05 Un	_____V			--
	Prospective current .....:	_____A			--
	Prospective current obtained .....:	_____A			--
	Power factor .....:	_____			--
	Power factor obtained .....:	_____			--
	Sequence .....:	_____			--
	T (min).....:	_____min			--
9.12.9.2	Test in free air copper wire F': ☒ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	“a” = _____ mm			--
9.12.9.3	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimensions of enclosure: _____x_____x_____mm			--
	I_{Peak} (A) max. value.....:	_____A			--
	$I^2t \leq$ _____ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	--
	Max. $I^2t \leq$ _____kA^2s L1 L2 L3 L4	____ ____ ____ ____	____ ____ ____ ____	____ ____ ____ ____	--
	- No permanent arcing				--

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IEC 60898-1					
Clause	Requirement + Test	Result - Remark			Verdict
	- No flash-over between poles or between poles and frame				N/A
	- No blowing of the fuses F and F′				N/A
	- Polyethylene foil shows no holes				N/A
	After the test:				--
9.12.12.2	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				
	a) leakage current across open contacts, according to 9.7.5.3, each pole is supplied at a voltage 1,1 times Un.= _____ V. The circuit – breaker is in the open position	**E_{3-1}** [mA]	**E_{3-2}** [mA]	**E_{3-3}** [mA]	--
	The leakage current shall not exceed 2 mA L1				--
	L2				--
	L3				--
	L4				--
	Electric strength test:				--
	Test voltage 900 V (see 9.7.3)				--
	a)				--
	b)				--
	c)				-
	d)				--
	e)				--
	Test current 2,8 I_N	_____A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s				--
	- 120 s				--

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	Annex E		
	Special requirements for auxiliary circuits for safety extra-low voltage		N/A
8.1.3	**Clearances and creepage distances**		
	Additional note to table 4 NOTE 4 live parts in auxiliary circuits intended to be connected to safety extra low voltages shall be separated from circuits with higher voltages in accordance with the requirements of 411.1.3.3 of IEC 60364-4-41		--
	Compliance is checked by inspection		--
9.7.4	**Dielectric strength of the auxiliary circuits**		
	Note: A test for circuits intended for connection to safety extra-low voltage is under consideration		N/A

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	Annex J		
	Particular requirements for circuit-breakers with screw less type terminals for external copper conductors (In not exceeding 20 A, cross-sectional area up to 4 mm^2		N/A
J.6	**Marking**		
	Universal terminals		--
	- no marking		N/A
	Non-universal		--
	- declared for rigid-solid conductors	marked with: “sol”	N/A
	- declared for rigid(solid and stranded) .....:	marked with: “r”	N/A
	- declared for flexible conductors .....:	Marked with: “f”	N/A
	The markings should appear on the circuit-breaker or, if available space is not sufficient, on smallest package unit or in technical information .....:		N/A
	Indication of length of insulation to be removed on the circuit-breaker.....:	_____mm	N/A
J.7	**Standard conditions for operation in service**		
	Clause 7 applies		N/A
J.8	**Constructional requirements**		
	Clause 8 applies with the follow modifications:		N/A
	In clause 8.1.5 only –5.1, -5.2. –5.3, - 5.6 and - 5.7 apply		N/A
	Compliance is checked by inspection and by the tests of J.9.1 and J.9.2		N/A
J.8.1	**Connection or disconnection of conductors**		
	The connection or disconnection shall be made by:		N/A
	A general purpose tool or by a convenient device integral with the terminal or		N/A
	for rigid conductors by simple insertion		N/A
	For disconnection an operation other than a pull shall be necessary (push-wire terminals)		N/A
	Universal terminals shall accept rigid (solid or stranded and flexible unprepared conductors		N/A
	Non-universal terminals shall accept conductors declared by the manufacturer		N/A

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Compliance is checked by inspection and by the tests of J.9.1 and J.9.2		N/A
J.8.2	**Dimensions of connectable conductors**		
	The dimensions of connectable conductors are given in table J.1		N/A
	The ability to connect these conductors shall be checked by inspection and by the tests of J.9.1 and J.9.2		N/A
J.8.3	**Connectable cross-sectional areas**		
	The nominal cross-sections to be clamped are given in table J.2		N/A
	Compliance is checked by inspection and by the tests of J.9.1 and J.9.2		N/A
J.8.4	**Insertion and connection of conductors**		
	The insertion and disconnection of the conductors shall be made in accordance with the manufacturer's instructions		N/A
J.8.5	**Design and construction of terminals**		
	Terminals shall be designed and constructed that:		N/A
	- each conductor is clamped individually		N/A
	- connection or disconnection connectors connected or disconnected separate or same		N/A
	- inadequate insertion of the conductor is avoided		N/A
	Compliance is checked by inspection and by the tests of J.9.1 and J.9.2		N/A
J.8.6	**The terminals shall be resistant to ageing**		
	Compliance is checked by the tests of J.9.3		N/A
J.9	**Tests**		
	Clause 9 applies, by replacing 9.4 and 9.5 by the follow		N/A
J.9.1	**Test of reliability of screw less terminals**		
J.9.1.1	**Reliability of screw less system**		
	5 times connection and disconnection		N/A
	3 rigid conductors min. cross-section max. cross-section	_____mm^2 _____mm^2	N/A
	3 flexible conductors min. cross-section max. cross-section	_____mm^2 _____mm^2	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	After tests, the terminal shall not be damage in such a way as to impair its further use		N/A
J.9.1.2	**Test of reliability of connection**		
	3 terminals of poles of new sample are fitted with new copper conductors according table J.2		N/A
	rigid conductors min. cross-section max. cross-section	_____mm^2 _____mm^2	N/A
	flexible conductors min. cross-section max. cross-section	_____mm^2 _____mm^2	N/A
	Each conductor is either pushed as far as possible into the terminal or shall be inserted so that adequate connection is obvious		N/A
	After tests, no wire of the conductor shall have escaped outside the terminals		N/A
J.9.2	**Tests of reliability of terminals for external conductors: Mechanical strength**		
	Three terminals of new samples are fitted with new conductors of the type and of the minimum and maximum cross sectional area according table J.2.		N/A
	Each conductor is subjected to a pull force of value shown in table J.3. for 1 min		N/A
	Terminal screw torque : $^2/_3$ of table 11	_____ Nm	N/A
	rigid conductors min. cross-section max. cross-section	_____ mm^2 / _____N _____ mm^2 / _____N	N/A
	flexible conductors min. cross-section max. cross-section	_____ mm^2 / _____N _____ mm^2 / _____N	N/A
	During the test the conductor shall not slip out of the terminal		N/A
J.9.3	**Cycling test**		
	The test is carried out with new copper conductors having a cross sectional area according table 10	_____ mm^2	N/A
	The test is carried out on new samples(a sample is one pole, the number of which is defined below, according the type of terminal		N/A
	- universal terminals for rigid (solid and stranded) and flexible conductors	3 + 3 samples	N/A
	- non-universal terminals for solid conductors only	3 samples	N/A

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IEC 60898-1					
Clause	Requirement + Test	Result - Remark			Verdict
	-- non- universal terminals for rigid (solid and stranded) conductors	3 + 3 samples			N/A
	- non-universal terminals for flexible conductors only	3 samples			N/A
	The conductors are connected in series as in normal use to each of the three samples as defined on fig. J.1.				N/A
	The sample is provided with a hole or equivalent in order to measure the voltage drop on the terminal				N/A
	The test arrangement is placed in a heating cabinet which is initially on 20℃				N/A
	Except the cooling period the test current (rated current) is applied to the circuit	I test _____ A			N/A
	The samples shall be subjected to 192 temperature cycles, each cycle having a duration of $^{+}/_{-}$ 1 hour				N/A
	Description of the temperature cycle: In 20 min raised to 40℃, maintained for 10 min, then cool down in 20 min to 30 ℃, maintained for 10 min. For measurement of the voltage drop it is allowed to cool down to 20 ℃				N/A
	The maximum voltage drop, measured on each terminal, at the end of the 192nd cycle, with Inom. shall not exceed the smaller of the two following values - either 22,5 mV - or 1,5 times the value measured after the 24 cycle	Uv max. _____ mV			N/A
	Sample after 24 cycles: rigid conductors (mV) flexible conductors (mV)	J_1 _____ _____	J_2 _____ _____	J_3 _____ _____	N/A
	Sample after 192 cycles: rigid conductors (mV) flexible conductors (mV)	J_1 _____ _____	J_2 _____ _____	J_3 _____ _____	N/A
	After this test the samples shall show no changes evidently impairing further use, such as cracks, deformations or like				P

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	Annex K		
	Particular requirements for circuit-breakers with flat quick-connect terminations		--
K.6	**Marking**		
	The whole of clause 6 applies		P
	Addition after the lettered item k		--
	The following information regarding the female connector according to IEC 61210 and the type of conductor to be used shall be given in the manufacturer's instructions		N/A
	a) manufacturers name or trade mark		--
	b) type reference		P
	c) information on cross-sections of conductors and colour code of insulating female connectors (see table K.1)		P
	d) the use of only silver or tin-plated copper alloys		N/A
K.7	**Standard conditions for operation in service**		
	Clause 7 applies		P
K.8	**Constructional requirements**		
	Clause 8 applies with the follow modifications:		P
	replacement of 8.1.3 by:		N/A
K.8.1	**Clearances and creepage distances (see annex B)**		
	Subclause 8.1.3 applies, the female connectors being fitted to the male tabs of the circuit-breaker		P
	Replacement of 8.1.5 by:		P
K.8.2	**Terminals for external conductors**		
K.8.2.1	Male tabs and female connectors shall be of a metal having mechanical strength, electrical conductivity and resistance to corrosion adequate for their intended use		N/A
K.8.2.2	The nominal width of male tab is 6,3 mm and the thickness 0,8 mm, applicable to rated currents up to and including 16 A NOTE 1:The use for rated currents up to and including 20 A is accepted in BE, FR, IT, PT, ES and US		N/A
	The dimensions of the male tab shall comply with those specified in table K.3 and in figures K.2, K3, K4, K5, where the dimensions A, B, C, D, E, F, J, M, N and Q are mandatory		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The dimensions of the female connector which may be fitted-on are given in figure K.6 and in table K.4		P
	Compliance is checked by inspection and by measurement	See table on page _____	P
K.8.2.3	**Male tabs shall be securely retained**		
	Compliance is checked by the mechanical overload test of K.9.1		P
K.9	**Tests**		
	Clause 9 applies, with follow modifications:		N/A
	Replacement of 9.5 by:		N/A
K.9.1	**Mechanical overload-force**		
	10 terminals of circuit-breakers, mounted as normal use are subjected to a axial push force and successively the axial pull force specified in table K2 applied to male tab once	push force 96 N pull force 88 N	P
	No damage which could impair further use shall occur to the tab or to the circuit-breaker in which the tab is integrated		N/A
	Addition to 9.8.3:		N/A
	Fine –wire thermocouples shall be placed in such a way as not to influence the contact or the connection area. An example of placement is shown in fig K.1		N/A

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

		Dimensions of tabs according Table K.3		Measured in mm	Verdict
		Minimum	Maximum		
A	Dimple	0,7	1,0	_____	P
	Hole	0,5	1,0	_____	P
B	Dimple	7,8 min		_____	P
	Hole	7,8 min		_____	P
C	Dimple	0,77	0,84	_____	P
	Hole	0,77	0,84	_____	P
D	Dimple	6,20	6,40	_____	P
	Hole	6,20	6,40	_____	P
E	Dimple	3,6	4,1	_____	P
	Hole	4,3	4,7	_____	P
F	Dimple	1,6	2,0	_____	P
	Hole	1,6	2,0	_____	P
J	Dimple	8°	12°	_____	P
	Hole	8°	12°	_____	P
M	Dimple	2,2	2,5	_____	P
	Hole	---	---	---	---
N	Dimple	1,8	2,0	_____	P
	Hole	---	---	---	---
P	Dimple	0,7	1,8	_____	P
	Hole	0,7	1,8	_____	P
Q	Dimple	8,9 min	---	_____	P
	Hole	8,9 min	---	_____	P
B3			7,8 max	_____	P
L2			3,5 max	_____	P

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	Annex L		
	Specific requirements for circuit-breakers with screw-type terminals for external untreated aluminium conductors and with aluminium screw-type terminals for use with copper or with aluminium conductors		P
L.6	**Marking**		
	In addition to clause 6 the following apply:		P
	Terminal marking according table L.1, on the circuit breaker, near the terminals		--
	Conductor types accepted: Copper only Aluminium only Aluminium and copper	 ☐ None ☐ "Al" ☐ "Al/Cu"	P
	Other information concerning the number of conductors, screw torque (if different from table 11) and cross-section shall be indicated on the circuit-breaker	_____ Nm _____ mm^2	P
L.7	**Standard conditions for operation in service**		
	Clause 7 applies		N/A
L.8	**Constructional requirements**		
	Clause 8 applies with the following exceptions:		N/A
8.1.5.2	is completed by:		
	For connection of aluminium conductors, circuit-breakers shall be provided with screw-type terminals allowing the connection of conductors having nominal cross-sections as shown in table L.2		P
	Terminals for the connection of aluminium conductors and terminals of aluminium for the connection of copper or aluminium conductors shall have mechanical strength adequate to withstand the tests of 9.4, with the test conductors tightened with the torque indicated in table 11, or with the torque specified by the manufacturer, which shall never be lower than that specified in table 11.		N/A
	Compliance is checked by inspection, by measurement and by fitting in turn one conductor of the smallest and one of the largest cross-section areas as specified		N/A
8.1.5.4	Terminals shall allow the conductors to be connected without special preparation		P

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Compliance is checked by inspection and by the tests of L.9		P
L.9	**Tests**		
	Clause 9 applies with the following modifications/additions:		P
	For the tests which are influenced by the material of the terminal and the type of conductor that can be connected, the test conditions of table L.3 are applied		P
	Additionally the test of L.9.2 is carried out on terminals separated from the circuit-breaker		N/A
L.9.2	**Current cycling test**		
	This test is carried out on separate terminals		P
	The general arrangement of the samples shall be as shown in figure L.1		N/A
	90 % of torque stated by the manufacturer or selected in table 11 used for the specimens	torque:_____Nm	P
	The test is carried out with conductors according to table L.5. The length of the test conductor from the point of entry to the screw-type terminal specimens to the equalizer shall be as in table L.6	cross-section:_____mm^2 minimum conductor length:_____mm	P
	Cross section of equalizer not greater than that given in table L.7	max. crosssection_____mm^2	P
L.9.2.5	Test method and acceptance criteria		
	Test loop subjected to 500 cycles of 1h current-on and 1h current-off, starting at an a.c. current value of 1,12 times the test current value determined in table L.8	test current:_____A	P
	Near the end of each current-on period of the first 24 cycles, the current shall subsequently be adjusted to raise the temperature of the reference conductor to 75℃		N/A
	At the end of the 25^{th} cycle the test current shall be adjusted the last time and the stable temperature shall be recorded as the first measurement. No further adjustment of test current for the remainder of the test		N/A
	Temperatures recorded for at least one cycle of each working day, and after approximately 25, 50, 75, 100, 125, 175, 225, 350, 425 and 500 cycles		N/A
	For each screw-type terminal		P
	- the temperature rise shall not exceed 110 K		P

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IEC 60898-1				
Clause	Requirement + Test	Result - Remark		Verdict
	- the stability factor Sf shall not exceed ±10 ℃			P
	ambient air temperature: _____℃	max. temperature rise [K]	max. stability factor Sf [℃]	P
	Terminal 1			P
	Terminal 2			P
	Terminal 3			P
	Terminal 4			P
	Terminal 5			P
	Terminal 6			P
	Terminal 7			P
	Terminal 8			P

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: Heating Test		
	Test voltage (V) ..... :		—
	Ambient (^{o}C) .....:		—

Thermocouple Locations	max. temperature measured, (K)	max. temperature limit, (K)

Supplementary information:

	TABLE: Dielectric Strength	

Test voltage applied between:	Test potential applied (V)	Breakdown / flashover (Yes/No)

Supplementary information:

	TABLE: insulation resistance measurements	

Insulation resistance R between:	R (MΩ)	Required R (MΩ)
Between mains poles (primary fuse disconnected)		
Between parts separated by basic or supplementary insulation		
Between parts separated by double or reinforced insulation		

Supplementary information:

	TABLE: Impact Resistance		

Impacts per surface	Surface tested	Impact energy (Nm)	Comments

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:			

	TABLE: Clearance And Creepage Distance Measurements					
clearance cl and creepage distance dcr at/of:	**Up (V)**	**U r.m.s. (V)**	**Required cl (mm)**	**cl (mm)**	**required dcr (mm)**	**dcr (mm)**
Supplementary information:						

	TABLE: Ball Pressure Test of Thermoplastics		
Allowed impression diameter (mm) ..... :			—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)
Supplementary information:			

	TABLE: Needle- flame test (NFT)				
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Supplementary information: **NFT not relevant (or applicable) for Parts of material classified as V-0 or V-1** **NFT not relevant (or applicable) for Base material of PCBs classified as V-0 or if relevant VTM-0**					

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: Resistance to heat and fire - Glow wire tests	

Object/ Part No./ Material	Manufacturer / trademark	Glow wire test (GWT); (℃)						Verdict
		550	650		750		850	
			te	ti	te	ti		

Object/ Part No./ Material	Manufacturer / trademark	Glow-wire flammability index (GWFI), ℃				GW ignition temp. (GWIT), ℃		Verdict
		550	650	750	850	675	775	

The test specimen passed the glow wire test (GWT) with no ignition [($t_e - t_i$) ≤ 2s] (Yes/No):	
If no, then surrounding parts passed the needle-flame test of annex E (Yes/No)..... :	
The test specimen passed the test by virtue of most of the flaming material being withdrawn with the glow-wire (Yes/No)? ..... :	
Ignition of the specified layer placed underneath the test specimen (Yes/No)..... :	
Supplementary information: 550 ℃ GWT not relevant (or applicable) to parts of material classified at least HB40 or if relevant HBF The GWIT pre-selection option, the 850 ℃ GWFI pre -selection option, and the 850 ℃ GWT are not relevant (or applicable) for attended appliances.	

	TABLE: Threaded Part Torque Test	

Threaded part identification	Diameter of thread (mm)	Column number (I, II, or III)	Applied torque (Nm)
Supplementary information:			

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Attachment No. 1

APPENDED TABLE Critical components					
Object / part no.	Manufacturer / trademark	Type / model	Technical data	Standard	Mark(s) of Conformity
Plastic material	Suzhou Banleantone International Logistics CO,.Ltd	PA66	PA66	IEC/EN60998-2-1,IEC/EN60998-1	Test with appliance
Terminal block material	Foshan Huaru Copper Industry Co., Ltd	COPPER	COPPER	IEC/EN60998-2-1,IEC/EN60998-1	Test with appliance

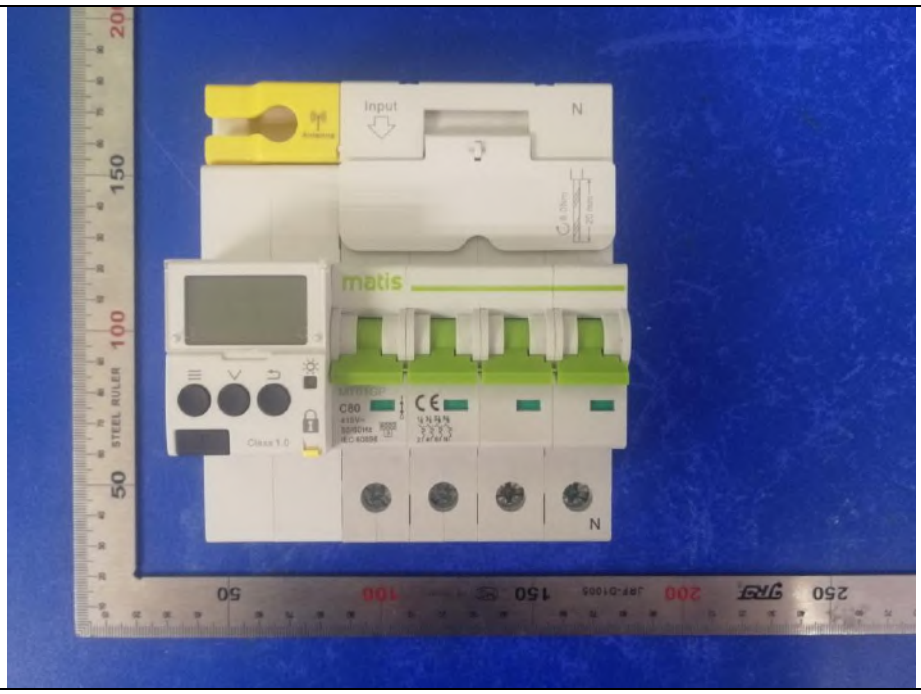
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Attachment No. 2: photo documentation

Details of: External View



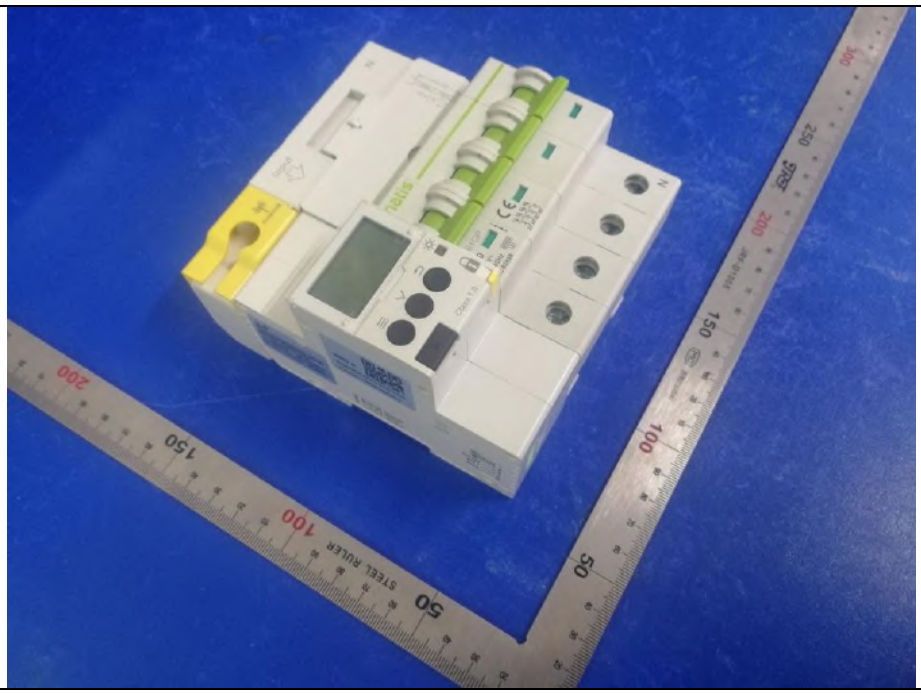
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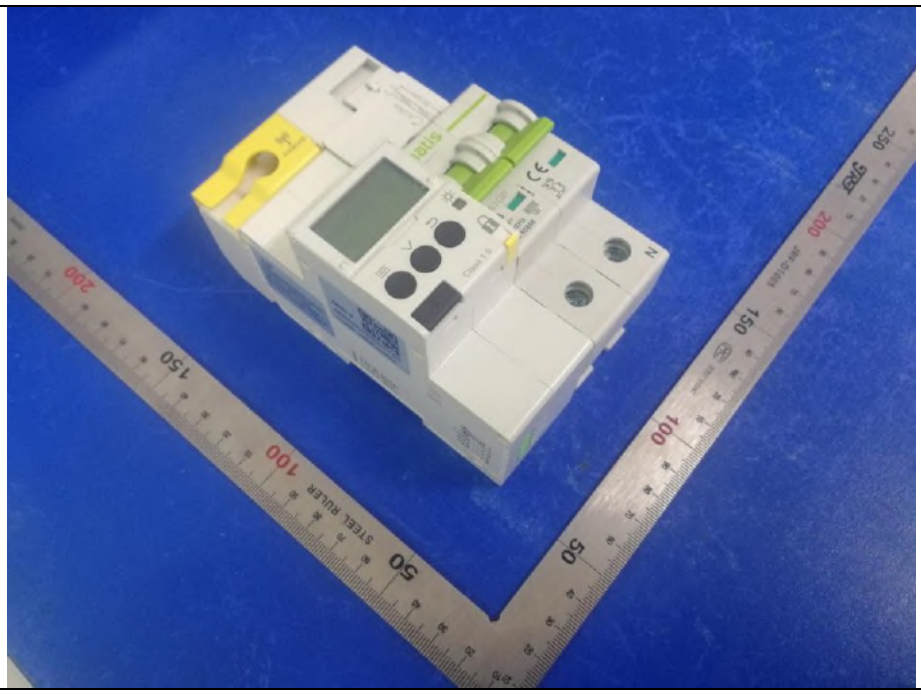
Details of: External View



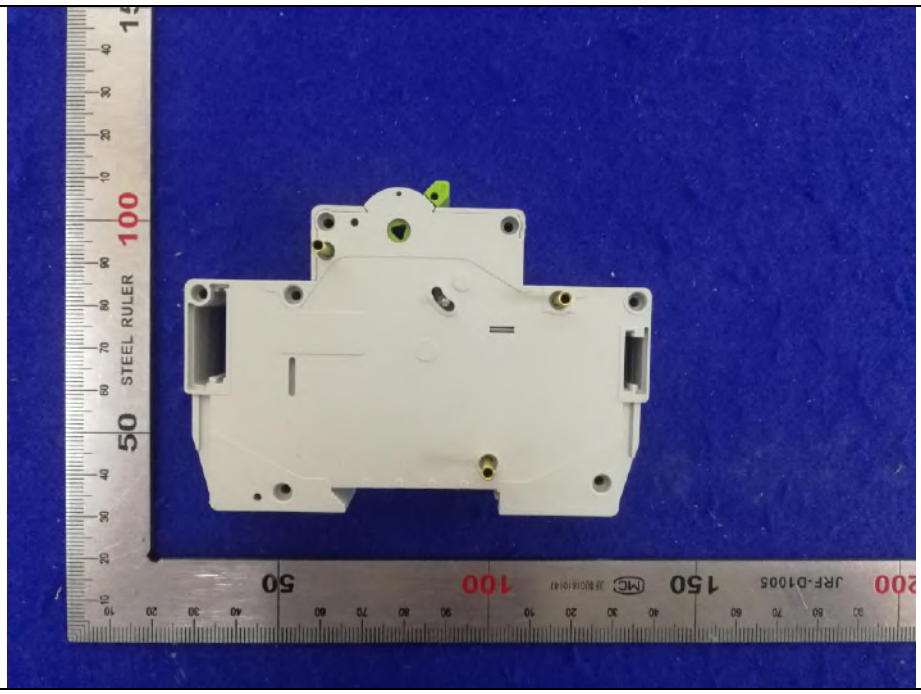
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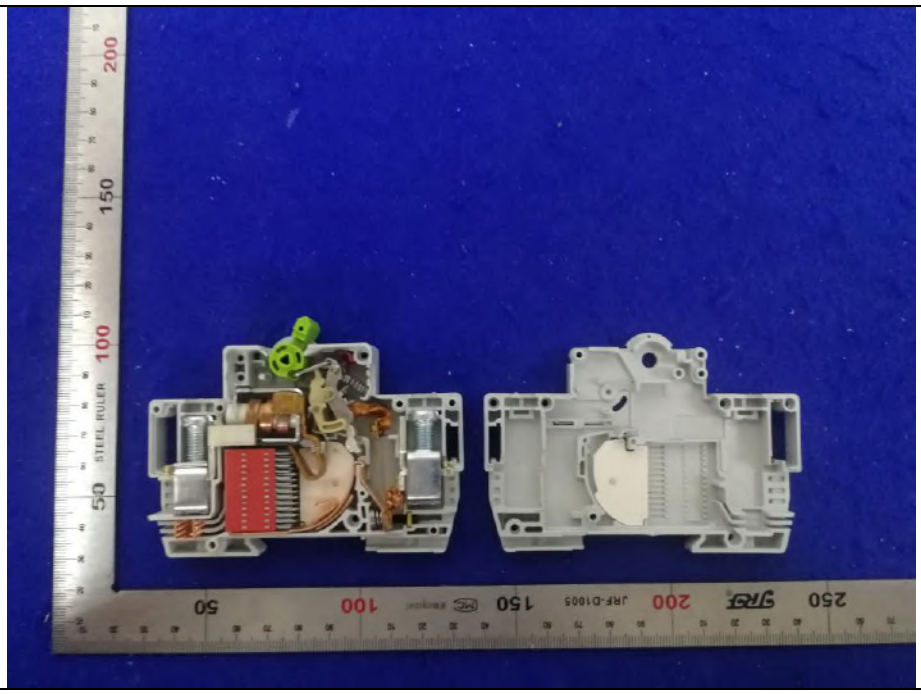
Details of: External View



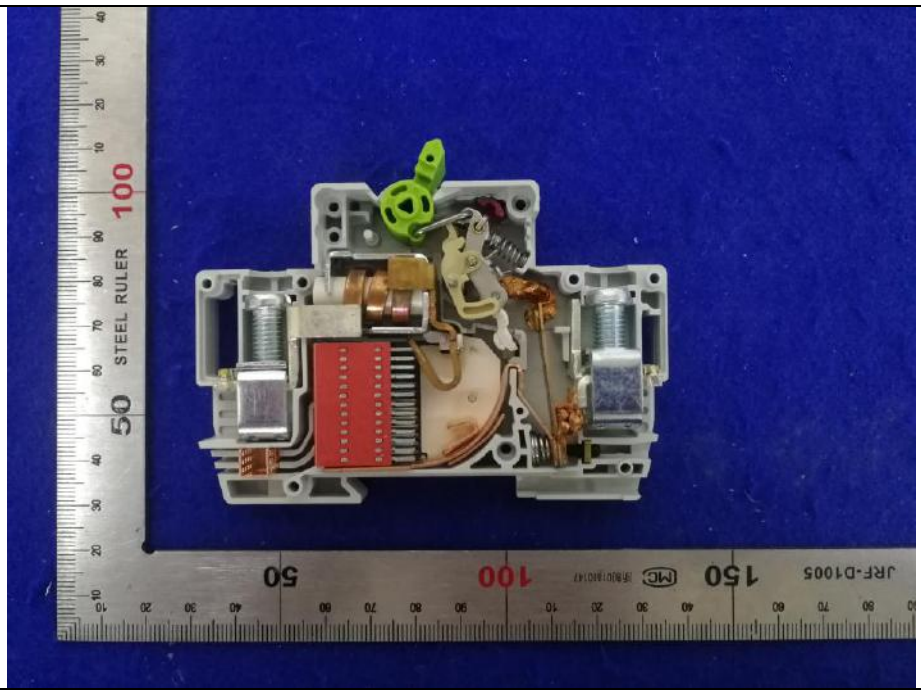
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Attachment No. 2: photo documentation

Details of: Internal view



Details of: Internal view



----------End of test report----------

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TEST REPORT
IEC 60898-1
Circuit-breakers for over current protection for household and similar installations
Part 1 - Circuit-breakers for a.c. operation

Report Number. .....:	LCS190815025AS
Date of issue .....:	September 12, 2019
Total number of pages	57
Applicant's name.....:	SHANGHAI MATIS ELECTRC CO.,LTD.
Address .....:	BLOCK C, NO.888, HUANHU WEST 2ND ROAD, PUDONG, SHANGHAI, CHINA
Test specification:	
Standard .....:	IEC 60898-1:2015 ED2
Test procedure .....:	Type test
Non-standard test method.....:	N/A
Test Report Form No.....:	IEC60898_1
Test Report Form(s) Originator.....:	DEKRA Certification B.V.
Master TRF.....:	Dated 2015-09

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This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

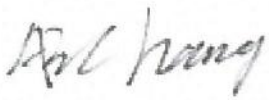
General disclaimer:

The test results presented in this report relate only to the object tested.
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Test item description	AIOT ENERGY METER WITH MCB
Trade Mark	matis, matismart
Manufacturer	SHANGHAI MATIS ELECTRC CO.,LTD. BLOCK C, NO.888, HUANHU WEST 2ND ROAD, PUDONG, SHANGHAI, CHINA
Model/Type reference	MT61GP, M61WF, MT61NB, MT61LR
Ratings	Single Phase, 1P+N, 230V,50/60Hz, 6A,10A,16A,20A,25A,32A.40A.50A,63A,80A Three Phase, 3P+N, 400V,50/60Hz, 6A,10A,16A,20A,25A,32A.40A.50A,63A,80,100A

Testing procedure and testing location:

☒ **Testing Laboratory:**	Shenzhen LCS Compliance Testing Laboratory Ltd.	
Testing location/ address	101, 601, Xingyuan Industrial Park, Gushu Community, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China	
Tested by	Aic Huang / Test Engineer	
Checked by	Albert Lai / Project Engineer	
Approved by	Hart Qiu / Technical Director	

List of Attachments (including a total number of pages in each attachment):

Attachment No.1: Component assembly (1 pages)

Attachment No.2: Photo documentation (4 pages)

Summary of testing:

Tests performed (name of test and test clause): The submitted samples were found to comply with the requirements of: IEC 60898-1:2015 ED2 EN 60898-1:2019	**Testing location:** Shenzhen LCS Compliance Testing Laboratory Ltd. 101, 601, Xingyuan Industrial Park, Gushu Community, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China

Summary of compliance with National Differences (List of countries addressed):

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Copy of marking plate

The artwork below may be only a draft.

matis, matismart
AIOT ENERGY METER WITH MCB
Model: MT61GP
400V,50Hz,6A,10A,16A,20A,25A,32A.40A.50A,63A ,80A,100A,125A(4P/three phase)



SHANGHAI MATIS ELECTRC CO.,LTD.
MADE IN CHINA

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Classification of installation and use.....:	--
Supply Connection.....:	--
.....:	
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	August 15, 2019
Date (s) of performance of tests.....:	From August 15, 2019- September 12, 2019

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

"*" This symbol refers to not within the scope of CNAS recognition.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☐ **Yes** ☒ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies).....:	SHANGHAI MATIS ELECTRC CO.,LTD. 4TH FLOOR, BLOCK 7A, SHAHU SCIENCE PARK, NO.183, LANE TINGLAN, WUZHONG, SUZHOU, JIANGSHU, CHINA

General product information:

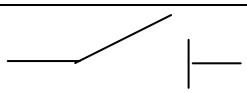
1.This product is suitable for internal use

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Test item particulars.....	
Type of circuit-breaker ..... :	
Number of poles ..... :	☐ 1-P ☐ 1-P+N ☒ 2-P ☐ 3-P ☐ 3-P+N ☒ 4-P
Protection against external influences ..... :	☐enclosed ☒ unenclosed
Method of mounting ..... :	☐surface ☒ flush ☐ panel board
Method of connection ..... :	☒.not associated with the mechanical mounting ☐ associated with the mechanical mounting
Type of terminal ..... :	☐ screw [a) b)] ☒ pillar [a) b)] ☐ cage [a) b)] ☐ lug ☐ screw less[a)] ☐ flat quick connect [a)] ☐ plug-in ☐ screw-in [a)] copper conductors [b)] aluminium conductors
Instantaneous tripping current ..... :	☒ B ☒ C ☒ D
I^2t characteristic .....:	
Value of rated operational voltage (Ue) ..... :	☐ 120 V ☒ 230 V ☐ 240 V ☐ 120/240 V ☐ 230/400 V ☒ 400 V ☐ 240/415 V ☐ 415 V
Value of rated current (In) ..... :	6, 10, 16, 20, 25, 32, 40, 50, 63, 80, 100 A
Value of rated frequency ..... :	☒ 50 Hz ☒ 60 Hz
Ambient air temperature (°C) ..... :	☒ 30℃ ☐ 40℃ ☐ Other _____℃
Rated short-circuit capacity (Icn) ..... :	☐ 1,5 kA ☐ 3 kA ☐ 4,5 kA ☒ 6 kA ☐ 10 kA ☐ 15 kA ☐ 20 kA ☐ 25 kA
Rated impulse withstand voltage (Uimp)	☒ 2,5 kV ☐ 4 kV ☐ declared ___kV

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	TESTS „A“ 1 SAMPLE	A_1	
6	**MARKING AND OTHER INFORMATION**		
	Circuit-breaker marked with:		--
	a) Manufacturer’s name or trade mark.....:	matis / matismart	P
	b) Type designation, catalogue number or other serial number.....:	MT61GP, M61WF, MT61NB, MT61LR	P
	c) Rated voltage (V).....:	230/400 VAC	P
	d) Rated current without symbol "A", preceded by the symbol of instantaneous tripping.....:	6,10,16,20,25,32,40,50,63A, 80,100	P
	e) Rated frequency (Hz) .....:	50/60 Hz	P
	f) Rated short circuit capacity (A) .....:	6000 A	P
	g) Wiring diagram		P
	h) Ambient air temperature, if different from 30℃		P
	i) Degree of protection, if different from IP20	IP20	P
	j) For D-type circuit-breakers: the maximum instantaneous tripping current, if higher than 20 In see table 2)		P
	k) Rated impulse withstand voltage Uimp if it is 2,5 kV	4kV	P
	l) Making and breaking capacity on an individual protected pole of multipole circuit-breakers (Icn1), if different from Icn	6000A	P
	Marking d) shall be readily visible when the CB is installed		P
	If, for small devices, the available space is insufficient, markings a), b), c), e), f), h), j) and l) may be put on the side or on the back of the CB		P
	Marking g) may be on the inside of any cover which has to be removed in order to connect the supply wires but shall not be on a label loosely attached to the CB		P
	Any other information not marked shall be given in the manufacturer’s documentation		P
	The suitability for isolation, which is provided by all circuit-breakers of this standard, may be indicated by the symbol on the device		P
	I^2t characteristic (documentation)		P
	Symbols on supply and load terminal		P
	Terminal for neutral conductor N		P

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Earth terminal if any (IEC 60417-5019)		N/A
	On - off position shall be clearly indicated - 0 I -		P
	For push-button CB the off push-button shall either be red or be marked with the symbol 0´		P
	Red not used for other push-button		P
	For CB with multiple current ratings, the maximum value is marked, the adjusted value indicated without ambiguity		P
	Marking shall be indelible and easily legible (not on removable parts), 15 s with water, 15 s with hexane (see cl. 9.3)		N/A
8.	**REQUIREMENTS FOR CONSTRUCTION AND OPERATION**		
8.1.1	**General**		
	Circuit-breakers shall be so designed and constructed that, in normal use, their performance is reliable and without danger to the user or surroundings		P
8.1.2	**Mechanism**		
	The moving contact shall be mechanically coupled so that all poles make and break together, whether operated manually or automatically, even if an overload occurs on one pole only		P
	The switched neutral shall close before and open after the protected pole (s)		P
	Neutral pole having adequate making and breaking capacity and CB with independent manual operation: all poles operate together including neutral pole		P
	CB shall have a trip free mechanism		P
	It shall be possible to switch the CB on and off by hand		P
	No intermediate position of the contacts		P
	Position of contacts shall be indicated		P
	Indication visible from the outside		P
	If the indication is on the actuating means, it shall, when released, automatically take up or stay in the position corresponding to that of the moving contacts; operating means shall have two different rest positions, except that, for automatic operation, a third distinct rest position may be provided		P

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Clause	Requirement + Test	Result - Remark	Verdict
	If a separate mechanical indicator is used to indicate the position of the main contacts, colour red shall be used for the on position and green for the off position.		N/A
	The action of the mechanism shall not be influenced by the position of enclosures		P
	If the cover is used as a guiding means for push-button, it shall not be possible to remove this button from the outside		P
	Operating means securely fixed, not possible to remove them without a tool		P
	For the up-down operating means the contacts shall be closed by the up movement.		P
8.1.3	**Clearances and creepage distances**		
	The minimum required clearances and creepage distances are based on the CB being designed for operating in an environment with pollution degree 2		P
	Compliance for item 1 in Table 4 is checked by measurement and by the test of 9.7.5.4.1 and 9.7.5.4.2. The test is carried out with samples not submitted to the humidity treatment described in 9.7.1.		P
	The clearances of items 2 and 4 (except accessible surface after installation) may be reduced provided that the measured clearances are not shorter than the minimum allowed in IEC 60664-1 for homogenous field conditions.		N/A
	In this case, after the humidity treatment in 9.7.1, compliance for item 2 and 4 and arrangements of 9.7.2 items b), c), d) and e) is checked:		P
	-Tests according to 9.7.2 to 9.7.4 as applicable		P
	-Test according to 9.7.5.2 with test voltages acc. Table 13 with test arrangements of 9.7.2 items b), c), d), e)		P
	If measurement does not show any reduced clearance, test 9.7.5.2 is not applied		P
	Compliance for item 3, checked by measurement		P
	The insulating materials are classified into Material Groups on the basis of their comparative tracking index (CTI) acc. to IEC 60664-1		P
	Clearances [mm] U_{imp}		--

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Clause	Requirement + Test	Result - Remark	Verdict
	4 kV (see table 4) 2,5 kV (see table 4)	4kV	P
	Minimum clearances (see table 4)		N/A
		minimum clearances [mm]	--
	1.between live parts (of the main circuits) which are separated when the CB is in off position ..... :		P
	2.between live parts of different polarity..... :		P
	3.between circuits supplied from different sources, one of which being PELV or SELV..... :		N/A
	4. between live parts and		P
	- accessible surfaces of operating means..... :		P
	- screws or other means for fixing covers ..... :		P
	- surface on which the base is mounted..... :		P
	- screws or other means for fixing the circuit breaker ..... :		P
	- metal covers or boxes..... :		P
	- other accessible metal parts ..... :		P
	- metal frames supporting the base (flush-type) . :		P
	Minimum creepage distances (see table 4)		P
	Material group	☐ III_b ☐ III_a ☐ II ☐ I	--
		minimum creepage distances [mm]	--
	1.between live parts (of the main circuits) which are separated when the CB is in off position ..... :		P
	2.between live parts of different polarity..... :		N/A
	3.between circuits supplied from different sources, one of which being PELV or SELV..... :		N/A
	4. between live parts and		P
	- accessible surfaces of operating means..... :		P
	- screws or other means for fixing covers ..... :		P
	- surface on which the base is mounted..... :		P
	- screws or other means for fixing the circuit breaker ..... :		P
	- metal covers or boxes..... :		P
	- other accessible metal parts ..... :		P
	- metal frames supporting the base (flush-type) . :		P

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Clause	Requirement + Test	Result - Remark	Verdict
8.1.4	**Screws, current-carrying parts and connections**		
8.1.4.1	Connections, withstand mechanical stresses occurring in normal use		P
	Screws for mounting of the CB not of the thread-cutting type		P
	Test according to cl. 9.4:		P
	- 10 times (screw Ø / torque Nm)	Ø___mm___Nm (see table 11) Ø___mm___Nm	N/A
	- 5 times (screw Ø / torque Nm)	Ø_4.8__mm_2.0__Nm (see table 11) Ø___mm___Nm	P
	Plug in connections tested by plugging in and pulling out five times		N/A
	After test connections have not become loose nor electrical function impaired		P
8.1.4.2	Screws with a thread of insulating material ensured correct introduction		N/A
8.1.4.3	Electrical connection: contact pressure not transmitted through insulating material, unless there is sufficient resilience in the metallic parts		P
8.1.4.4	Current-carrying parts including parts intended for protective conductors, if any, shall be made of a metal having, under the conditions occurring in the equipment, mechanical strength, electrical conductivity and resistance to corrosion adequate for their intended use. Examples below:		N/A
	- copper		N/A
	- alloy 58% copper for worked cold parts		P
	- alloy 50% copper for other parts		N/A
	- other metal		N/A
	In case of using ferrous alloys or suitably coated ferrous alloys, compliance to resistance to corrosion is checked by a test of resistance to rusting (see 9.16).		P
	The requirements of this subclause do not apply to contacts, magnetic circuits, heater elements, bimetals, shunts, parts of electronic devices or to screws, nuts, washers, clamping plates, similar parts of terminals and parts of the test circuit		P

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Clause	Requirement + Test	Result - Remark	Verdict
8.1.5	**Terminals for external conductors**		--
	Compliance is checked by inspection and by the tests as relevant for the type of connection:		--
	by tests of clause 9.5 for screw-type terminals		P
	by specific tests for plug-in or bolt-on CBs included in the standard		N/A
	by the tests of Annexes J, K		N/A
8.1.5.1	Terminals ensure the necessary contact pressure		P
9.5	Torque test:		
	- torque (Nm); diameter (mm).....:	2.0Nm, Ø4.8 mm	--
	- torque (Nm); diameter (mm).....:	25.0	--
	- torque (Nm); diameter (mm).....:		--
	- max. cross-sectional area (mm²) .....:		--
9.5.2	Pull test:		N/A
	Terminal shall be suitable for all types of conductors: rigid (solid or stranded) and flexible, unless otherwise specified by the manufacturer.		--
	Min. cross-section solid / stranded / flexible (mm²) .....:	Solid: 1,0 mm² Stranded: 1,5 mm 2 Flexible: 1,0 mm	--
	Max. cross-section solid / stranded / flexible (mm²) .....:	Solid: 16,0 mm² Stranded: 25,0 mm 2 Flexible: 16,0 mm	--
	Torque $^2/_3$ (Nm) .....:	1.33 Nm	--
	Pull for 1 min solid / stranded / flexible (N).....:	50N for 1,0 mm² 50N for 1,5 mm 2 90N for 16,0 mm² 100N for 25,0 mm²	P
	During the test no noticeable move of conductor		P
9.5.3	Torque test:		
	- torque $^2/_3$ (Nm).....:	1.33Nm	--
	- min. cross-sectional area (mm²) .....:	Solid: 1,0 mm² Stranded: 1,5 mm²	--
	- max. cross-sectional area (mm²) .....:	Solid: 16,0 mm² Stranded: 25,0 mm 2	--
	The conductor shows no damage		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Terminals have not worked loose and no damage		P
9.5.4	Terminals fitted with the largest cross-section area specified in Table 5, for stranded copper conductor.		P
	Max. cross-section stranded (mm^2) .....:	Stranded: 25,0 mm^2	--
	Torque $^2/_3$ (Nm) .....:	1,33Nm	--
	After the test no strand of conductor escaped outside		P
8.1.5.2	Terminals allow the connection of conductors of the following cross-sectional areas: (table 5)		P
	Rated current (A) / sections — Range of nominal cross to be clamped* (mm^2): Rigid (solid or stranded) conductors / Flexible conductors ≤ 13: 1 to 2,5 / 1 to 2,5 > 13 ≤ 16: 1 to 4 / 1 to 4 > 16 ≤ 25: 1,5 to 6 / 1,5 to 6 > 25 ≤ 32: 2,5 to 10 / 2,5 to 6 > 32 ≤ 50: 4 to 16 / 4 to 10 > 50 ≤ 80: 10 to 25 / 10 to 16 > 80 ≤ 100: 16 to 35 / 16 to 25 > 100 ≤ 125: 24 to 50 / 25 to 35	Solid conductors: 1,0mm 2 to 16,0mm 2 Stranded conductors: 1,5mm 2 to 25,0mm 2 flexible conductors: 1,0mm 2 to 16,0mm 2	P
	*It is required that, for current ratings up to and including 50 A, terminals be designed to clamp solid conductors as well as rigid stranded conductors. Nevertheless, it is permitted that terminals for conductors having cross-sections from 1 mm^2 up to 6 mm^2 be designed to clamp solid conductors only.		N/A
	- or terminals for external untreated aluminium conductors and with aluminium screw-type terminals for use with copper or with aluminium conductors according to Annex L.		N/A
8.1.5.3	Means for clamping the conductors in the terminals not serve to fix any other component (See test sub-clause 9.5)		P
8.1.5.4	Terminals for $I_N \leq 32$ A allow the connection of conductors without special preparation		P
8.1.5.5	Terminals shall have adequate mechanical strength; ISO thread or equivalent (See tests of sub-clause 9.4 and 9.5.2)		P

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Clause	Requirement + Test	Result - Remark	Verdict
8.1.5.6	Clamping of conductor without damage to the conductor (See test of sub-clause 9.5.3)		P
8.1.5.7	Clamping of conductor between metal surfaces (See tests of sub-clause 9.4 and 9.5.2)		P
8.1.5.8	Conductor shall not slip-out when the clamping screw or nuts are tightened (See test of sub-clause 9.5.4)		P
8.1.5.9	Terminals shall be properly fixed. No work loose when the clamping screws or nuts are tightened or loosened (See test of sub-clause 9.4)		P
8.1.5.10	Clamping screws or nuts of terminals for protective conductors adequately secured against accidental loosening		N/A
8.1.5.11	Pillar terminals shall allow full insertion and reliable clamping of the conductor		P
8.1.5.12	Screws and nuts of terminals for external conductors shall be in engagement with a metal thread, and the screws shall not be of tapping screw type		P
8.1.6	**Non-interchangeability**		
	For circuit-breakers intended to be mounted on bases forming a unit therewith (plug-in or screw-in type) it shall not be possible, without the aid of a tool, to replace a circuit-breaker when mounted as for normal use by another of the same make having a higher rated current, compliance is checked by inspection		N/A
8.1.7	**Mechanical mounting of plug-in circuit-breakers**		
8.1.7.1	The mechanical mounting of plug-in circuit-breakers, the holding in position of which does not depend solely on their plug-in connection(s), shall be reliable and have adequate stability		N/A
8.1.7.2	Plug-in type circuit-breakers, the holding in position of which does not depend solely on their plug-in connection(s) Compliance of the mechanical mounting is checked by the relevant test 9.13		N/A
8.1.7.3	Plug-in type circuit-breakers, the holding in position of which does depend solely on their plug-in connection(s) Compliance of the mechanical mounting is checked by the relevant test 9.13		N/A
8.2	**Protection against electric shock**		
	Live parts not accessible in normal use		P

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Clause	Requirement + Test	Result - Remark	Verdict
	For CB, other than plug-in type, external parts, other than screws and other means for fixing covers, which are accessible shall be of insulating material		P
	Unless the live parts are within an internal enclosure of insulating material: Lining - reliable fixed, - adequate thickness and - mechanical strength		N/A
	Inlet openings for cables shall be in insulating material or be provided with bushings or similar devices in insulating material Such device - shall be reliable fixed - shall have adequate mechanical strength		N/A
	For plug-in CB, external parts, other than screws and other means for fixing covers, which are accessible shall be in insulating material		N/A
	Metallic operating means insulated from live parts		N/A
	Metal parts of the mechanism not accessible and insulated from accessible metal parts, metal frames (for flush-type), screws or other means for fixing the base		P
	Replacement of plug-in CB possible without touching live parts		N/A
	Lacquer or enamel not considered		N/A
8.1.3	**Creepage distances [mm] (see table 4)**		
	Internal parts only	See above	--
9.6	**Test of protection against electric shock**		
	This verification is applicable to those parts of circuit breakers which are exposed to the operator when mounted as for normal use		P
	Use of test finger so designed that each jointed can be turned through an angle of 90°with respect to the finger		P
	Circuit-breaker with enclosures of thermoplastic material are additional tested at 35 ℃ for 1 min with a force of 75 N		N/A
8.10	**Resistance to heat**		
	CB sufficiently resistant to heat		P
9.14	**Test of resistance to heat**		

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Clause	Requirement + Test	Result - Remark	Verdict
9.14.1	Test:		
	- without removable covers ..... 1 h (100 ± 2) ℃		P
	- removable covers..... 1 h (70 ± 2) ℃		N/A
	After the test no access to live parts, marking still legible		P
9.14.2	Ball pressure test for external parts of insulating material (parts retaining current-carrying parts and parts of the protective circuit in position) T = 125℃ Ø of impression ≤ 2 mm	Impression: 1.2 mm (Enclosure)	P
9.14.3	Ball pressure test for external parts of insulating material (parts not retaining current-carrying parts and parts of the protective circuit in position T = (70 ± 2)℃ or T = ___ ℃ = (40 ± 2)℃ + max. temperature rise of sub-clause 9.8 Ø of impression ≤ 2 mm	Impression: 1.0 mm (Handle)	P
8.12	**Resistance to rusting**		
	Ferrous parts adequately protected against rusting		P
9.16	**Test of resistance to rusting:**		
	- 10 min immersed in a cold chemical degreaser such as methyl-chloroform or refined petrol		P
	- 10 min immersed in a 10% solution of chloride in water at 20℃		--
	- 10 min at 95% humidity at 20℃		--
	- 10 min at 100℃		--
	No sign of rust		--

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	TESTS „A_2“ 3 samples	A_{2-1} A_{2-2} A_{2-3}	
8.11	**Resistance to abnormal heat and to fire**		
	External parts of insulating material shall not ignite or spread fire under fault or overload conditions		P
9.15	**Resistance to abnormal heat and to fire**		
	Test performed on a complete CB		P
	external parts retaining current-carrying parts and parts of the protective circuit in position ..... (960 ± 15)℃		P
	all other external parts ..... (650 ± 10)℃		P
	No visible flames, no sustained glowing, or		N/A
	flames and glowing extinguish within 30 s after removal .....:	2.8s	P
	No ignition of tissue paper or scorching of the pinewood board		P

	TESTS „B“ 3 samples	B_1 B_2 B_3	
8.3	**Dielectric properties and isolating capability**		
8.3.1	CB shall have adequate dielectric properties and shall ensure isolation:		P
8.3.2	Dielectric strength at power frequency		P
	Compliance is checked by the tests 9.7.1, 9.7.2 and 9.7.3 on circuit-breaker in new condition		P
8.3.3	Isolating capability		
	Circuit-breakers shall be suitable for isolation. Compliance is checked by the verification of compliance with the minimum clearances and creepage distances of item 1 of table 4 and by tests of 9.7.5.1 and 9.7.5.3.		P
8.3.4	Dielectric strength at rated impulse withstand voltage (Uimp)		
	Circuit-breakers shall adequately withstand impulse voltages. Compliance is checked by the tests of 9.7.5.2.		P
9.7	**Test of dielectric properties and isolating capability**		
9.7.5.4	Verification of resistance of the insulation of open contact and basic insulation against an impulse voltage in normal conditions		

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Clause	Requirement + Test	Result - Remark	Verdict
	These tests are not preceded by the humidity treatment described in 9.7.1.		P
	The test is carried out on an CB fixed on a metal support		P
	The impulses are given by a generator producing positive and negative impulses having a front time of 1,2μs, and a time to half-value of 50μs		P
	The shape of the impulses is adjusted with the CB under test connected to the impulse generator.		P
	rated impulse withstand voltage [kV]:	kV	--
	sea level of test laboratory [m]:	m	--
	test voltage (acc. Table 15) [kV]:	kV	--
9.7.5.4.2	CB in open position (contacts in open position)		
	The impulses are applied between:		--
	the line terminals connected together and the load terminals connected together		P
9.7.5.4.3	CB in closed position		
	A first series of tests is made applying the impulse voltage between the phase pole(s) and the neutral pole (or path) connected together and the metal support connected to the terminal(s) intended for the protective conductor(s), if any		P
	A second series of tests is made applying the impulse voltage between the phase pole(s), connected together, and the neutral pole (or path) of the CB		N/A
	Five positive impulses and five negative impulses are applied, the interval between consecutive impulses being at least 1 s for impulses of the same polarity and being at least 10 s for impulses of the opposite polarity.		P
	no disruptive discharges during the test		P
9.7.1	Resistance to humidity		
9.7.1.1	Preparation of the circuit-breaker for test		
	Inlet openings, if any, are left open; if knock-outs are provided, one of them is opened.		P
9.7.1.2	Test conditions		

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Clause	Requirement + Test	Result - Remark	Verdict
	The humidity treatment is carried out in humidity cabinet 91% to 95% and the temperature of the air between 20 ℃ and 30 ℃	Rf = 93 % T = 25 ℃	P
9.7.1.3	Test procedure.		
	The sample is kept in the cabinet for 48 h.		P
9.7.1.4	Conditions of the circuit breaker after the tests.		
	The sample show no damage within the meaning of this standard and shall withstand the tests of 9.7.2 and 9.7.3, 9.7.4 and 9.7.5.2		P
9.7.2	Insulation resistance of the main circuit		
9.7.2	After an interval between 30 min and 60 min flowing this treatment, the insulation resistance is measured 5 s after application of a d.c. voltage of approximately 500 V, consecutively as follows:	[MΩ] [MΩ] [MΩ]	P
	a) In off-position, between the terminals which are electrically connected together when the circuit-breaker is in the closed position ≥ 2 MΩ	>500 >500 >500	P
	b) in off-position, between each pole in turn and the others connected together ≥ 2 MΩ	>500 >500 >500	P
	c) in on-position, between all poles connected together and the frame ≥ 5 MΩ	>500 >500 >500	P
	d) between metal parts of mechanism and the frame ≥ 5 MΩ		N/A
	e) between the frame and metal foil in contact with the inner surface of the internal enclosure or lining of insulating material ≥ 5 MΩ		N/A
9.7.3	Dielectric strength of the main circuit		
	After the circuit-breakers have passed the tests of 9.7.2 the test voltage specified is applied for 1 min between the parts indicated in 9.7.2		P
	a) 2000 V		P
	b) 2000 V		P
	c) 2000 V		P
	d) 2000 V		N/A
	e) 2500 V		N/A
	No flashover or breakdown		P
9.7.4	Insulation resistance and dielectric strength of the auxiliary circuits		
	Insulation resistance of auxiliary circuits measured with 500 V DC after 1 min:		

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Clause	Requirement + Test	Result - Remark	Verdict
	1) between all auxiliary circuits and the frame (MΩ) ≥ 2 MΩ		N/A
	2) between each part of the auxiliary circuits which might be isolated from the other parts and the whole of the other parts connected together (MΩ) ≥ 2 MΩ		N/A
	Dielectric strength of auxiliary circuits measured with an AC voltage at rated frequency for 1 min:		--
	Rated voltage of auxiliary circuits (a.c. or d.c.) — Test voltage (V) ≤ 30 — 600 > 30 ≤ 50 — 1000 > 50 ≤ 110 — 1500 > 110 ≤ 250 — 2000 > 250 ≤ 500 — 2500	V	--
	1) between all auxiliary circuits and the frame		N/A
	2) between each part of the auxiliary circuits which might be isolated from the other parts and the whole of the other parts connected together		N/A
	No flashover or perforation		N/A
9.7.5.2	Verification of clearances with the impulse withstand voltage		
	If the measurement of clearances of items 2 and 4 in Table 4 shows a reduction of the required length, this test applies.		P
	The test is carried out on an CB fixed on a metal support and being in the closed position		P
	The impulses are given by a generator producing positive and negative impulses having a front time of 1,2μs, and a time to half-value of 50μs		N/A
	The shape of the impulses is adjusted with the CB under test connected to the impulse generator.		N/A
	test performed with:		--
	-surge impedance of the test apparatus ≤500Ω and surge protective devices disconnected before testing or		P
	-hybrid generator with an surge impedance of 2 Ω and surge protective devices not disconnected before testing		N/A

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict
	rated impulse withstand voltage [kV]:	kV	--
	see level of test laboratory [m]:	m	--
	test voltage (acc. Table 14) [kV]:	kV	--
	A first series of tests is made applying the impulse voltage between the phase pole(s) and the neutral pole (or path) connected together and the metal support connected to the terminal(s) intended for the protective conductor(s), if any		P
	A second series of tests is made applying the impulse voltage between the phase pole(s), connected together, and the neutral pole (or path) of the CB		N/A
	A third series of tests is made applying the impulse voltage between (and not tested during the two first sequences described here above):		--
	b) between each pole and the others connected together		P
	c) between all poles connected together and the frame		P
	d) between metal parts of the mechanism and the frame		P
	e) between the frame and a metal foil in contact with the inner surface of the lining of insulating material		P
	Five positive impulses and five negative impulses are applied, the interval between consecutive impulses being at least 1 s for impulses of the same polarity and being at least 10 s for impulses of the opposite polarity.		N/A
	no disruptive discharges during the test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

8.4	**Temperature rise**				
	Temperature rise does not exceed the limiting values stated in table 6:	sect. __16.0_ mm²			--
9.8.2	Test current: I_N= (reach the steady-state value) Four-pole CB's: ☐ 1) Three poles loaded 2) One pole and neutral pole loaded ☑ 1) Four-poles loaded	I_N = _63_A			--
	Ambient air temperature.....:	Tamb= __21__℃			--
	Parts .....Temperature rise [K]	[K]	[K]	[K]	--
	L1	51	54	53	P
	L2	53	53	57	
	L3	50	54	56	
	L4(N)	49	51	53	
	L3				
	N				
	Terminals for external connections .....60 K				P
	External parts liable to be touched during manual operation of the circuit-breaker, including operating means of insulating material and metallic means for coupling of insulating operating means of several poles .....40 K	25	21	22	P
	External metallic parts of operating means...25 K				P
	Other external parts, including that face of the circuit-breaker is in direct contact with the mounting surface.....60 K	45	51	52	P
9.8.5	Measurement of power losses	B_1	B_2	B_3	P
	Power loss do not exceed the values stated in table 8				P
	Test current: I_N = __63_ A (reach the steady state value)		63A		P
	Loaded one pole after the other				P
	Max. power loss : ___13___ W	W	W	W	P
	L1	4.6	4.8	4.6	P

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IEC 60898-1					
Clause	Requirement + Test	Result - Remark			Verdict
	L2	5.3	4.6	4.8	
	L3 L4(N) L3 N	46 4.7	5.0 4.5	5.7 5.7	N/A
8.5	**Uninterrupted duty**				
	Circuit-breakers operate reliable even after long service				P
9.9	**28 day test**				
	28 cycles - 21 h with current - 3 h without current Cross-sectional area. ____ mm²	I_N = _63_A 16.0mm²			P
	During the test no tripping during the last period, temperature rise shall be measured				P
	Ambient air temperature.....:	23 ℃			P
	Parts .....Temperature rise [K]	[K]	[K]	[K]	P
	Terminals for external connections				P
	The temperature rise does not exceed the value measured during the temperature rise test (sub-clause 9.8) by more than 15 K				P
	Test current 1,45 I_N =__91.4__A				P
	- Tripping within	[s]	[s]	[s]	P
	- 1h (≤ 63 A)	4.5	3.5	3.6	P
	- 2h (> 63 A)				P

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	TESTS „C“ 3 +3 samples				
8.7	**Test „C_1“ Mechanical and electrical endurance**	**C_{1-1}**	**C_{1-2}**	**C_{1-3}**	
	Circuit-breaker shall be capable to perform an adequate number of cycles with rated current				P
9.11.1	General test conditions				--
	Test: Test Voltage _____V (rated voltage) Test Current _____A (rated current) Power factor _____(0,85-0,9) Par. resistor _____ (Ω) Cross sect. area ____mm²	418V 63,2A 0,85 16,0mm²			--
9.11.2	Test procedure				
	The circuit-breaker is submitted to 4000 operating cycles with rated current.	4000 cycles			P
	- $I_N \leq 32$ A: 2 s on - 13 s off				N/A
	- $I_N > 32$ A: 2 s on - 28 s off	IN = 63 A			P
	During the test the circuit-breaker shall be operated as in normal use.				P
9.11.3	Conditions of the circuit breaker after the tests.				
	Following the test 9.11.2 the sample shall not show:				--
	- undue wear				P
	- discrepancy between the position of the moving contacts and corresponding position of the Indicating device				P
	- damage to the enclosure permitting access to live parts by test finger (see 9.6)				P
	- loosening of electrical or mechanical connections				P
	- seepage of sealing compound				N/A
	Moreover test current .....2,55 I_N_____A	161A			--
	Opening time not less 1 s or more than	[s]	[s]	[s]	--
	- 60 s (≤ 32 A)				N/A
	- 120 s (> 32 A)	19	27	13	P
	Dielectric strength reduced to 1500 V				P

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

9.12.11.2	**Test at reduced short-circuit currents**				
9.12.11.2.1	Test on all circuit-breakers				--
9.12.11.2.1	Test at reduced short-circuit currents: Fig. 3				--
	Test current:	Obtained			--
	- 500 A or 10 In	I test= ___656__A			--
	Test voltage 1,05 Un	Un = ___440____V			--
	Power factor 0,93-0,98	__0.95___			--
9.12.9.2	Test in free air copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	"a" = ___35_ mm			P
9.12.9.3	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value	__960_A			P
	Sequence: 6 x "O" and 3 x "CO"	[kA^2s]	[kA^2s]	[kA^2s]	--
	Max. $I^2t \leq$ _____kA^2s	37.0	65.0	111	P
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				--
9.12.12	Verification of the circuit-breaker after short-circuit tests				--
9.12.12.1	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				P
	a) leakage current across open contacts, according to 9.7.5.3, each pole is supplied at a voltage 1,1 times Un.= _____ V. The circuit – breaker is in the open position	**C_{1-1}** [mA]	**C_{1-2}** [mA]	**C_{1-3}** [mA]	--
	The leakage current shall not exceed 2 mA L1	3.50	4.10	3.10	P
	L2	3.70	3.20	4.30	P
	L3	4.30	4.10	3.10	P
	L4(N)	3.10	4.10	2.40	P

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Electric strength test:		--
	Test voltage 1500 V (see 9.7.2)		--
	a)		P
	b)		P
	c)		P
	d)		--
	e) 2000 V		N/A

9.12.11.2.2	**Test „C_2“ Short-circuit test on circuit-breakers for use in IT systems**				
	Test current:				--
	- 500 A or 1,2 times the upper limit of the standard range of instantaneous tripping (see table 2) whichever is the higher, but < 2500 A. When tripping exceed 20 In the current adjusted at 1,2 times the upper limit even when higher 2500 A	I test= __1,55x10 3__A			--
	Test voltage 1,05 Un	Un = ___456__V			--
	Power factor 0,93-0,98	__0.95___			--
9.12.9.2	Test in free air copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	"a" = __35__ mm			P
9.12.9.3	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value	___1,78X10 3__A			P
	Sequence: "O" + "CO" on each protected pole	[kA^2s]	[kA^2s]	[kA^2s]	--
	Shifted point 30 °on the other protected pole	**C_{2-1}**	**C_{2-2}**	**C_{2-3}**	--
	Max. I^2t ≤ _____kA^2s L1	67.0	65.1	66.5	P
	L2	67.0	65.1	66.5	
	L3	___	___	___	
	L4 (N)	___	___	___	
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				--

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Clause	Requirement + Test	Result - Remark			Verdict
9.12.12.1	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				--
	a) leakage current across open contacts, according to 9.7.5.3, each pole is supplied at a voltage 1,1 times Un.= _____ V. The circuit – breaker is in the open position	**C_{2-1}** [mA]	**C_{2-2}** [mA]	**C_{2-3}** [mA]	--
	The leakage current shall not exceed 2 mA L1	3.5	3.4	3.7	P
	L2	3.6	3.6	3.5	P
	L3	3.1	3.2	3.3	P
	L4(N)	2.9	3.3	3.0	P
	Electric strength test:				--
	Test voltage 1500 V (see 9.7.2)				--
	a)				P
	b)				P
	c)				P
	d)				N/A
	e) 2000 V				N/A

	TESTS „D“ 3 samples		
8.6	**Automatic operation**		--
8.6.1	Standard time-current zone		--
	Tripping characteristic of CB ensures adequate protection of the circuit, without premature operation.		P
9.10	**Tests „D_0“**	**D_{O-1}** **D_{O-2}** **D_{O-3}**	
	I_N (A)	63 A	--
	Sect. (mm²)	16 mm²	--
	Instantaneous tripping current	☐ B ☐ C ☑ D	--
9.10.2	Test of time-current characteristic		--
9.10.2.1	Test current 1,13 I_N (A) starting from cold for:	71.2 A	--
	- 1 h ($I_N \leq 63$ A)		P
	- 2 h ($I_N > 63$ A)		N/A
	No tripping		P
	Then steadily increased within 5 s to 1,45 I_N (A)		N/A
	- Tripping within	[min] [min] [mini]	--
	- 1h (≤ 63 A)	0.5 0.6 0.8	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- 2h (> 63 A)		N/A
9.10.2.2	Test current 2,55 I_N (A) starting from cold for:	161 A	--
	opening time not less than 1 s or more than	[s] [s] [s]	--
	- 60 s (≤ 32 A)		N/A
	- 120 s (> 32 A)	29 24 28	P
9.10.3	Test of instantaneous tripping and of correct opening of the contacts		P
9.10.3.1	General test conditions		P
	For the lower values of the test current the test is made once, at any convenient voltage.		P
	For the upper values of the test current the test is made at rated voltage Un(phase to neutral) with a power factor between 0,95 and 1.		N/A
	The sequence of operation is : O-CO-CO-CO Interval time: > 3 min		N/A
	The tripping time of the O operation is measured		N/A
	After each operation the indicating means shall show the open position of the contacts		P
9.10.3.2	☐ For circuit-breakers of the B – Type		
	Test current 3I_N (A), starting from cold	A	N/A
	Opening time:	[s] [s] [s]	--
	≥ 0,1 s		N/A
	Test current 5 I_N (A), starting from cold	A	N/A
	Tripping less than 0,1 s		N/A
9.10.3.3	☐ For circuit-breakers of the C – Type		
	Test current 5I_N (A), starting from cold	315 A	--
	Opening time:	[s] [s] [s]	--
	≥ 0,1 s	1.3 1.6 1.5	P
	Test current 10 I_N (A), starting from cold	630 A	--
--	Tripping less than 0,1 s	0.05 0.07 0.7	P
9.10.3.4	☐ For circuit-breakers of the D – Type		
	Test current 10I_N (A), starting from cold	630 A	--
	Opening time:	[s] [s] [s]	--
	≥ 0,1 s	1.2 1.3 1.2	P
	Test current 20 I_N (A) or to the maximum instantaneous tripping current(see cl. 6, item j), starting from cold	1260 A	--

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Clause	Requirement + Test	Result - Remark	Verdict
	Tripping less than 0,1 s	0.07 0.06 0.9	P
9.10.4	Test of effect of single pole loading on the tripping characteristic of multi-pole circuit-breakers:		--
	Test current 1,1 It (A), (two pole) starting from cold	_____A	--
	Tripping within	[min] [min] [min]	--
	- 1h (≤ 63 A)		N/A
	- 2h (> 63 A)		N/A
	Test current 1,2 It (A), (three pole or four pole) starting from cold	___110A__A	--
	Tripping within	[min] [min] [min]	--
	- 1h (≤ 63 A)	3.5 2.5 2.8	P
	- 2h (> 63 A)		N/A
9.10.5	Test of effect of ambient temperature on the tripping characteristics		--
	a) Ambient temperature of (35 ± 2) K below the ambient air reference temperature	T =_____5____℃	--
	Test current 1,13 I_N (A)	___71.2__A	--
	- Passed for 1h	>1h	P
	- Passed for 2h		N/A
	Current is then steadily increased to 1,9 I_N (A) within 5s	___120__A	--
	Tripping within	[min] [min] [mini]	--
	- 1h (≤ 63 A)	0.9 0.8 0.8	P
	- 2h (> 63 A)		N/A
	b) Ambient temperature of (10 ± 2) K above the ambient air reference temperature	T = +40℃	--
	Test current I_N (A)	___63___A	--
	No tripping within		--
	- 1h (≤ 63 A)	>1h	P
	- 2h (> 63 A)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	Tests „D_1“	**D_{1-1} D_{1-2} D_{1-3}**	
8.9	**Resistance to mechanical shock and impact**		
	CB shall have adequate mechanical behaviour so as to withstand the stresses imposed during installation and use		P
9.13.1	Mechanical shock		--
	- 50 falls on two sides of vertical board C		P
	- Vertical board turned 90°		P
	- 50 falls on two sides of vertical board C		N/A
	During the test the circuit-breakers shall not open		N/A
9.13.2	Mechanical impact		--
9.13.2.2	All types:		--
	- Impact test: 10 blows-height 10 cm, no damage		P
9.13.2.3	Screw-in types:		--
	- Torque 2,5 Nm for 1 min, no damage		P
9.13.2.4	CB intended to be mounted on a rail		--
	- downward vertical 50 N for 1 min		P
	- upward vertical 50 N for 1 min, no damage		P
9.13.2.5	Plug-in types		--
	The circuit-breaker are mounted in their normal position, complete with plug-in base but without cables and any cover plate		N/A
	A force of 20 N applied for 1min to the circuit-breaker (see fig 16).		N/A
	During this test the circuit-breaker part shall not become loose from the base and shall not show damage impairing further use.		N/A
9.12.11.3	**Test at 1500 A:**		--
	Prospective current of 1500 A - power factor 0,93 to 0,98		--
	Prospective current obtained (A)	1,55x10 3 A	--
	Power factor	0.95	--
	Test voltage 1,05 Un	Utest = 456V	--
	Test circuit: figure	Figure 3	--
	T (min)	3 min	--

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IEC 60898-1					
Clause	Requirement + Test	Result - Remark			Verdict
9.12.9.2	Test in free air copper wire F': ☐ 0,12 mm / ☑ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☑ 1,5 Ohm	"a" = __35__ mm			P
9.12.9.3	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimension of enclosure: _____x_____x_____mm			N/A
	Sequence	6-O, 3-CO			--
	I_{Peak} (A) max. value	2,8x10 3 A			--
	$I^2t \leq$ _____ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	--
	Max. $I^2t \leq$ _____kA^2s L1 L2 L3 L4(N)	_11.0__ __26.0_ 15.0_ ____	_10.0_ _23.0 _30.0 ___	8.00__ 13.0_ 31.0_ ___	P
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				--
9.12.12.1	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				--
	a) leakage current across open contacts, according to 9.7.5.3, each pole is supplied at a voltage 1,1 times Un.= _____ V. The circuit – breaker is in the open position	**D_{1-1}** [mA]	**D_{1-2}** [mA]	**D_{1-3}** [mA]	--
	The leakage current shall not exceed 2 mA L1	3.50	4.60	4.30	P
	L2	3.90	3.50	4.20	P
	L3	3.30	4.80	4.60	P
	L4(N)	3.80	4.50	3.80	P
	Electric strength test:				--
	Test voltage 1500 V (see 9.7.2)				--
	a)				--
	b)				--
	c)				--
	d)				--
	e) 2000 V				P

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Clause	Requirement + Test	Result - Remark			Verdict
	Test current 0.85x non-tripping current (1,13 I_N)	60.5 A			--
	- Passed for 1h	>1h			P
	- Passed for 2h				N/A
	Current is then steadily increased to 1,1 x tripping current (1,45 I_N) within 5s	100.5 A			--
		D_{1-1} [min]	**D_{1-2}** [min]	**D_{1-3}** [min]	--
	Tripping within ☐ 1 hour / ☐ 2 hour	0.5	0.7	0.4	P

	TESTS „E_1“ 3 + 4 samples				
9.12.11.4.2	**Test E_1: Test at service short-circuit capacity**	**E_{1-1}**	**E_{1-2}**	**E_{1-3}**	--
	Service short-circuit capacity (Ics) .....:	7,50×10 3 A			--
	Test circuit: figure .....:	Figure 3			--
	Test voltage 1,05 Un	436V			--
	Prospective current .....:	7,50×10 3 A			--
	Prospective current obtained .....:	7,60x10 3 A			--
	Power factor .....:	0,45~0,50			--
	Power factor obtained .....:	0,47			--
	Sequence .....:	O-O-CO			--
	T (min) .....:	3min			--
9.12.9.2	Test in free air copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	"a" = 45 mm			P
9.12.9.3	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimensions of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value .....:	6,17x10 3 A			--
	$I^2t \leq$ _____ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	--
	Max. $I^2t \leq$ _____kA^2s L1 L2 L3 L4(N)	64.0 58.0 52.0 _____	69.0 49.0 73.0 ___	101 153 50.0 ___	P
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P

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Clause	Requirement + Test	Result - Remark			Verdict
	- Polyethylene foil shows no holes				P
	After the test:				--
9.12.12.1	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				P
	a) leakage current across open contacts, according to 9.7.5.3, each pole is supplied at a voltage 1,1 times Un.= _____ V. The circuit – breaker is in the open position	**E_{1-1}** [mA]	**E_{1-2}** [mA]	**E_{1-3}** [mA]	--
	The leakage current shall not exceed 2 mA L1	3.70	3.20	4.10	P
	L2	3.10	3.00	3.80	P
	L3	3.50	3.10	4.20	P
	L4(N)	3.60	2.60	3.10	P
	Electric strength test:				--
	Test voltage 1500 V (see 9.7.2)				--
	a)				P
	b)				P
	c)				P
	d)				N/A
	e) 2000 V				N/A
	Test current 0.85x non-tripping current (1,13 I_N)	___60.5___A			--
	- Passed for 1h	>1H			P
	- Passed for 2h				N/A
	Current is then steadily increased to 1,1 x tripping current (1,45 I_N) within 5s	___100.5__A			--
		E_{1-1} [min]	**E_{1-2}** [min]	**E_{1-3}** [min]	--
	Tripping within ☑ 1 hour / ☐ 2 hour	2.1	0.4	1.6	P

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

9.12.11.4.2	**Test „E_1"(Test at service short-circuit capacity) three phase tests for single circuit-breakers**	**E_{1-4}**	**E_{1-5}**	**E_{1-6}**	**P**
	Service short-circuit capacity (Ics) .....:	7,50x10 3 A			--
	Test circuit: figure .....:	Figure 3			--
	Test voltage 1,05 Un	436V			--
	Prospective current .....:	7,50x10 3 A			--
	Prospective current obtained.....:	7,60x10 3 A			--
	Power factor .....:	0,45~0,50			--
	Power factor obtained .....:	0,47			--
	Sequence .....:	O-O-CO			--
	T (min) .....:	3min			--
9.12.9.2	Test in free air copper wire F': ☐ 0,12 mm / ☑ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☑ 1,5 Ohm	"a" = __45_ mm			P
9.12.9.3	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimensions of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value .....:	__530___A			--
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				--
9.12.12.1	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				--
	a) leakage current across open contacts, according to 9.7.5.3, each pole is supplied at a voltage 1,1 times Un.= _____ V. The circuit – breaker is in the open position	**E_{1-4}** [mA]	**E_{1-5}** [mA]	**E_{1-6}** [mA]	--
	The leakage current shall not exceed 2 mA L1	2.80	3.20	2.90	P
	L2	2.90	3.40	3.10	P
	L3	3.70	3.00	3.10	P
	L4(N)	2.90	2.80	3.90	P
	Electric strength test:				--

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IEC 60898-1					
Clause	Requirement + Test	Result - Remark			Verdict
	Test voltage 1500 V (see 9.7.2)				--
	a)				P
	b)				P
	c)				P
	d)				--
	e) 2000 V				--
	Test current 0.85x non-tripping current (1,13 I_N)	__0.96__A			P
	- Passed for 1h	>1H			P
	- Passed for 2h				N/A
	Current is then steadily increased to 1,1 x tripping current (1,45 I_N) within 5s	__1.60__A			N/A
		E_{1-4} [min]	**E_{1-5}** [min]	**E_{1-6}** [min]	--
	Tripping within ☐ 1 hour / ☐ 2 hour	12.3	5.6	8.3	P

	TESTS „E_2“ 3 + 4 samples				
9.12.11.4.3	**Test: E2 (Test at rated short-circuit capacity)**	**E_{2-1}**	**E_{2-2}**	**E_{2-3}**	**P**
	Rated short-circuit capacity (Icn)..... :	10kA			--
	Test circuit: figure ..... :	Figure 3			--
	Test voltage 1,05 Un	437V			--
	Prospective current ..... :	6kA			--
	Prospective current obtained ..... :	1,03x10 4 A			--
	Power factor ..... :	0,45~0,50			--
	Power factor obtained ..... :	0,48			--
	Sequence ..... :	O-CO			--
	T (min) ..... :	3min			--
9.12.9.2	Test in free air copper wire F': ☐ 0,12 mm / ☑ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☑ 1,5 Ohm	"a" = _45_ mm			P
9.12.9.3	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimensions of enclosure: _____x_____x_____mm			N/A
	I_{Peak} (A) max. value ..... :	5,73X10 3 A			--
	I^2t ≤ __70__ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	--

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IEC 60898-1					
Clause	Requirement + Test	Result - Remark			Verdict
	Max. I²t ≤ _____kA²s L1	30.0	54.0	10.0	P
	L2	40.0	34.0	50.0	
	L3	60.0	9.00	23.0	
	L4(N)	_____	___	___	
	- No permanent arcing				P
	- No flash-over between poles or between poles and frame				P
	- No blowing of the fuses F and F′				P
	- Polyethylene foil shows no holes				P
	After the test:				--
9.12.12.2	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				--
	a) leakage current across open contacts, according to 9.7.5.3, each pole is supplied at a voltage 1,1 times Un.= _____ V. The circuit – breaker is in the open position	**E_{2-1}** [mA]	**E_{2-2}** [mA]	**E_{2-3}** [mA]	--
	The leakage current shall not exceed 2 mA L1	5.30	5.50	6.30	P
	L2	5.60	5.50	5.70	P
	L3	5.50	5.70	5.90	P
	L4(N)	5.50	5.60	5.80	P
	Electric strength test:				--
	Test voltage 900 V (see 9.7.3)				--
	a)				P
	b)				P
	c)				P
	d)				N/A
	e)				N/A
	Test current 2,8 I_N	176 A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s				N/A
	- 120 s	42	27	30	P

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

9.12.11.4.3	**Test „E_2"(Test at rated short-circuit capacity) three phase tests for single circuit-breakers**	**E_{2-4}**	**E_{2-5}**	**E_{2-6}**	**E_{2-7}**	**P**
	Rated short-circuit capacity (Icn)..... :	6kA				--
	Test circuit: figure ..... :	Figure 3				--
	Test voltage 1,05 Un	437 V				--
	Prospective current ..... :	6kA				--
	Prospective current obtained ..... :	1,03x10 4 A				--
	Power factor ..... :	0,45~0,50				--
	Power factor obtained ..... :	0,48				--
	Sequence ..... :	O-CO				--
	T (min) ..... :	3min				--
9.12.9.2	Test in free air copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	"a" = __45__ mm				--
9.12.9.3	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimensions of enclosure: _____x_____x_____mm				--
	I_{Peak} (A) max. value..... :	510 A				--
	- No permanent arcing					P
	- No flash-over between poles or between poles and frame					P
	- No blowing of the fuses F and F′					P
	- Polyethylene foil shows no holes					P
	After the test:					P
9.12.12.2	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.					--
	a) leakage current across open contacts, according to 9.7.5.3, each pole is supplied at a voltage 1,1 times Un.= _____ V. The circuit – breaker is in the open position	**E_{2-4}** [mA]	**E_{2-5}** [mA]	**E_{2-6}** [mA]	**E_{2-7}** [mA]	--
	The leakage current shall not exceed 2 mA L1					--
	L2					--
	L3					--
	L4(N)					---
	Electric strength test:					--
	Test voltage 900 V (see 9.7.3)					--

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IEC 60898-1						
Clause	Requirement + Test	Result - Remark				Verdict
	a)					---
	b)					--
	c)					--
	d)					--
	e)					--
	Test current 2,8 I_N	_____A				--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	[s]	--
	- 60 s					--
	- 120 s					--

	TESTS „E_3“ 3 samples				
9.12.11.4.4	**Test: E_3 (Test at making and breaking capacity on an individual pole (Icn1)**	**E_{3-1}**	**E_{3-2}**	**E_{3-3}**	
	Icn1.....:	_____A			--
	Test circuit: figure .....:	_____			--
	Test voltage 1,05 Un	_____V			--
	Prospective current .....:	_____A			--
	Prospective current obtained .....:	_____A			--
	Power factor .....:	_____			--
	Power factor obtained .....:	_____			--
	Sequence .....:	_____			--
	T (min).....:	_____min			--
9.12.9.2	Test in free air copper wire F': ☒ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☒ 1,5 Ohm	“a” = _____ mm			--
9.12.9.3	Test in enclosures copper wire F': ☐ 0,12 mm / ☐ 0,16 mm resistor R' : ☐ 0,75 Ohm / ☐ 1,5 Ohm	dimensions of enclosure: _____x_____x_____mm			--
	I_{Peak} (A) max. value.....:	_____A			--
	$I^2t \leq$ _____ kA^2s	[kA^2s]	[kA^2s]	[kA^2s]	--
	Max. $I^2t \leq$ _____kA^2s L1 L2 L3 L4	____ ____ ____ ____	____ ____ ____ ____	____ ____ ____ ____	--
	- No permanent arcing				--

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IEC 60898-1					
Clause	Requirement + Test	Result - Remark			Verdict
	- No flash-over between poles or between poles and frame				N/A
	- No blowing of the fuses F and F′				N/A
	- Polyethylene foil shows no holes				N/A
	After the test:				--
9.12.12.2	The circuit-breakers shall show no damage impairing their further use and shall maintenance, withstand the following tests.				
	a) leakage current across open contacts, according to 9.7.5.3, each pole is supplied at a voltage 1,1 times Un.= _____ V. The circuit – breaker is in the open position	**E_{3-1}** [mA]	**E_{3-2}** [mA]	**E_{3-3}** [mA]	--
	The leakage current shall not exceed 2 mA L1				--
	L2				--
	L3				--
	L4				--
	Electric strength test:				--
	Test voltage 900 V (see 9.7.3)				--
	a)				--
	b)				--
	c)				-
	d)				--
	e)				--
	Test current 2,8 I_N	_____A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s				--
	- 120 s				--

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Clause	Requirement + Test	Result - Remark	Verdict

	Annex E		
	Special requirements for auxiliary circuits for safety extra-low voltage		N/A
8.1.3	**Clearances and creepage distances**		
	Additional note to table 4 NOTE 4 live parts in auxiliary circuits intended to be connected to safety extra low voltages shall be separated from circuits with higher voltages in accordance with the requirements of 411.1.3.3 of IEC 60364-4-41		--
	Compliance is checked by inspection		--
9.7.4	**Dielectric strength of the auxiliary circuits**		
	Note: A test for circuits intended for connection to safety extra-low voltage is under consideration		N/A

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	Annex J		
	Particular requirements for circuit-breakers with screw less type terminals for external copper conductors (In not exceeding 20 A, cross-sectional area up to 4 mm^2		N/A
J.6	**Marking**		
	Universal terminals		--
	- no marking		N/A
	Non-universal		--
	- declared for rigid-solid conductors	marked with: “sol”	N/A
	- declared for rigid(solid and stranded) .....:	marked with: “r”	N/A
	- declared for flexible conductors .....:	Marked with: “f”	N/A
	The markings should appear on the circuit-breaker or, if available space is not sufficient, on smallest package unit or in technical information .....:		N/A
	Indication of length of insulation to be removed on the circuit-breaker.....:	_____mm	N/A
J.7	**Standard conditions for operation in service**		
	Clause 7 applies		N/A
J.8	**Constructional requirements**		
	Clause 8 applies with the follow modifications:		N/A
	In clause 8.1.5 only –5.1, -5.2. –5.3, - 5.6 and - 5.7 apply		N/A
	Compliance is checked by inspection and by the tests of J.9.1 and J.9.2		N/A
J.8.1	**Connection or disconnection of conductors**		
	The connection or disconnection shall be made by:		N/A
	A general purpose tool or by a convenient device integral with the terminal or		N/A
	for rigid conductors by simple insertion		N/A
	For disconnection an operation other than a pull shall be necessary (push-wire terminals)		N/A
	Universal terminals shall accept rigid (solid or stranded and flexible unprepared conductors		N/A
	Non-universal terminals shall accept conductors declared by the manufacturer		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Compliance is checked by inspection and by the tests of J.9.1 and J.9.2		N/A
J.8.2	**Dimensions of connectable conductors**		
	The dimensions of connectable conductors are given in table J.1		N/A
	The ability to connect these conductors shall be checked by inspection and by the tests of J.9.1 and J.9.2		N/A
J.8.3	**Connectable cross-sectional areas**		
	The nominal cross-sections to be clamped are given in table J.2		N/A
	Compliance is checked by inspection and by the tests of J.9.1 and J.9.2		N/A
J.8.4	**Insertion and connection of conductors**		
	The insertion and disconnection of the conductors shall be made in accordance with the manufacturer's instructions		N/A
J.8.5	**Design and construction of terminals**		
	Terminals shall be designed and constructed that:		N/A
	- each conductor is clamped individually		N/A
	- connection or disconnection connectors connected or disconnected separate or same		N/A
	- inadequate insertion of the conductor is avoided		N/A
	Compliance is checked by inspection and by the tests of J.9.1 and J.9.2		N/A
J.8.6	**The terminals shall be resistant to ageing**		
	Compliance is checked by the tests of J.9.3		N/A
J.9	**Tests**		
	Clause 9 applies, by replacing 9.4 and 9.5 by the follow		N/A
J.9.1	**Test of reliability of screw less terminals**		
J.9.1.1	**Reliability of screw less system**		
	5 times connection and disconnection		N/A
	3 rigid conductors min. cross-section max. cross-section	_____mm^2 _____mm^2	N/A
	3 flexible conductors min. cross-section max. cross-section	_____mm^2 _____mm^2	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	After tests, the terminal shall not be damage in such a way as to impair its further use		N/A
J.9.1.2	**Test of reliability of connection**		
	3 terminals of poles of new sample are fitted with new copper conductors according table J.2		N/A
	rigid conductors min. cross-section max. cross-section	_____mm^2 _____mm^2	N/A
	flexible conductors min. cross-section max. cross-section	_____mm^2 _____mm^2	N/A
	Each conductor is either pushed as far as possible into the terminal or shall be inserted so that adequate connection is obvious		N/A
	After tests, no wire of the conductor shall have escaped outside the terminals		N/A
J.9.2	**Tests of reliability of terminals for external conductors: Mechanical strength**		
	Three terminals of new samples are fitted with new conductors of the type and of the minimum and maximum cross sectional area according table J.2.		N/A
	Each conductor is subjected to a pull force of value shown in table J.3. for 1 min		N/A
	Terminal screw torque : $^2/_3$ of table 11	_____ Nm	N/A
	rigid conductors min. cross-section max. cross-section	_____ mm^2 / _____N _____ mm^2 / _____N	N/A
	flexible conductors min. cross-section max. cross-section	_____ mm^2 / _____N _____ mm^2 / _____N	N/A
	During the test the conductor shall not slip out of the terminal		N/A
J.9.3	**Cycling test**		
	The test is carried out with new copper conductors having a cross sectional area according table 10	_____ mm^2	N/A
	The test is carried out on new samples(a sample is one pole, the number of which is defined below, according the type of terminal		N/A
	- universal terminals for rigid (solid and stranded) and flexible conductors	3 + 3 samples	N/A
	- non-universal terminals for solid conductors only	3 samples	N/A

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IEC 60898-1					
Clause	Requirement + Test	Result - Remark			Verdict
	-- non- universal terminals for rigid (solid and stranded) conductors	3 + 3 samples			N/A
	- non-universal terminals for flexible conductors only	3 samples			N/A
	The conductors are connected in series as in normal use to each of the three samples as defined on fig. J.1.				N/A
	The sample is provided with a hole or equivalent in order to measure the voltage drop on the terminal				N/A
	The test arrangement is placed in a heating cabinet which is initially on 20℃				N/A
	Except the cooling period the test current (rated current) is applied to the circuit	I test _____ A			N/A
	The samples shall be subjected to 192 temperature cycles, each cycle having a duration of $^{+}/_{-}$ 1 hour				N/A
	Description of the temperature cycle: In 20 min raised to 40℃, maintained for 10 min, then cool down in 20 min to 30 ℃, maintained for 10 min. For measurement of the voltage drop it is allowed to cool down to 20 ℃				N/A
	The maximum voltage drop, measured on each terminal, at the end of the 192nd cycle, with Inom. shall not exceed the smaller of the two following values - either 22,5 mV - or 1,5 times the value measured after the 24 cycle	Uv max. _____ mV			N/A
	Sample after 24 cycles: rigid conductors (mV) flexible conductors (mV)	J_1 _____ _____	J_2 _____ _____	J_3 _____ _____	N/A
	Sample after 192 cycles: rigid conductors (mV) flexible conductors (mV)	J_1 _____ _____	J_2 _____ _____	J_3 _____ _____	N/A
	After this test the samples shall show no changes evidently impairing further use, such as cracks, deformations or like				P

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	Annex K		
	Particular requirements for circuit-breakers with flat quick-connect terminations		--
K.6	**Marking**		
	The whole of clause 6 applies		P
	Addition after the lettered item k		--
	The following information regarding the female connector according to IEC 61210 and the type of conductor to be used shall be given in the manufacturer's instructions		N/A
	a) manufacturers name or trade mark		--
	b) type reference		P
	c) information on cross-sections of conductors and colour code of insulating female connectors (see table K.1)		P
	d) the use of only silver or tin-plated copper alloys		N/A
K.7	**Standard conditions for operation in service**		
	Clause 7 applies		P
K.8	**Constructional requirements**		
	Clause 8 applies with the follow modifications:		P
	replacement of 8.1.3 by:		N/A
K.8.1	**Clearances and creepage distances (see annex B)**		
	Subclause 8.1.3 applies, the female connectors being fitted to the male tabs of the circuit-breaker		P
	Replacement of 8.1.5 by:		P
K.8.2	**Terminals for external conductors**		
K.8.2.1	Male tabs and female connectors shall be of a metal having mechanical strength, electrical conductivity and resistance to corrosion adequate for their intended use		N/A
K.8.2.2	The nominal width of male tab is 6,3 mm and the thickness 0,8 mm, applicable to rated currents up to and including 16 A NOTE 1:The use for rated currents up to and including 20 A is accepted in BE, FR, IT, PT, ES and US		N/A
	The dimensions of the male tab shall comply with those specified in table K.3 and in figures K.2, K3, K4, K5, where the dimensions A, B, C, D, E, F, J, M, N and Q are mandatory		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The dimensions of the female connector which may be fitted-on are given in figure K.6 and in table K.4		P
	Compliance is checked by inspection and by measurement	See table on page _____	P
K.8.2.3	**Male tabs shall be securely retained**		
	Compliance is checked by the mechanical overload test of K.9.1		P
K.9	**Tests**		
	Clause 9 applies, with follow modifications:		N/A
	Replacement of 9.5 by:		N/A
K.9.1	**Mechanical overload-force**		
	10 terminals of circuit-breakers, mounted as normal use are subjected to a axial push force and successively the axial pull force specified in table K2 applied to male tab once	push force 96 N pull force 88 N	P
	No damage which could impair further use shall occur to the tab or to the circuit-breaker in which the tab is integrated		N/A
	Addition to 9.8.3:		N/A
	Fine –wire thermocouples shall be placed in such a way as not to influence the contact or the connection area. An example of placement is shown in fig K.1		N/A

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

		Dimensions of tabs according Table K.3		Measured in mm	Verdict
		Minimum	Maximum		
A	Dimple	0,7	1,0	_____	P
	Hole	0,5	1,0	_____	P
B	Dimple	7,8 min		_____	P
	Hole	7,8 min		_____	P
C	Dimple	0,77	0,84	_____	P
	Hole	0,77	0,84	_____	P
D	Dimple	6,20	6,40	_____	P
	Hole	6,20	6,40	_____	P
E	Dimple	3,6	4,1	_____	P
	Hole	4,3	4,7	_____	P
F	Dimple	1,6	2,0	_____	P
	Hole	1,6	2,0	_____	P
J	Dimple	8°	12°	_____	P
	Hole	8°	12°	_____	P
M	Dimple	2,2	2,5	_____	P
	Hole	---	---	---	---
N	Dimple	1,8	2,0	_____	P
	Hole	---	---	---	---
P	Dimple	0,7	1,8	_____	P
	Hole	0,7	1,8	_____	P
Q	Dimple	8,9 min	---	_____	P
	Hole	8,9 min	---	_____	P
B3			7,8 max	_____	P
L2			3,5 max	_____	P

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	Annex L		
	Specific requirements for circuit-breakers with screw-type terminals for external untreated aluminium conductors and with aluminium screw-type terminals for use with copper or with aluminium conductors		P
L.6	**Marking**		
	In addition to clause 6 the following apply:		P
	Terminal marking according table L.1, on the circuit breaker, near the terminals		--
	Conductor types accepted: Copper only Aluminium only Aluminium and copper	 ☐ None ☐ "Al" ☐ "Al/Cu"	P
	Other information concerning the number of conductors, screw torque (if different from table 11) and cross-section shall be indicated on the circuit-breaker	_____ Nm _____ mm^2	P
L.7	**Standard conditions for operation in service**		
	Clause 7 applies		N/A
L.8	**Constructional requirements**		
	Clause 8 applies with the following exceptions:		N/A
8.1.5.2	is completed by:		
	For connection of aluminium conductors, circuit-breakers shall be provided with screw-type terminals allowing the connection of conductors having nominal cross-sections as shown in table L.2		P
	Terminals for the connection of aluminium conductors and terminals of aluminium for the connection of copper or aluminium conductors shall have mechanical strength adequate to withstand the tests of 9.4, with the test conductors tightened with the torque indicated in table 11, or with the torque specified by the manufacturer, which shall never be lower than that specified in table 11.		N/A
	Compliance is checked by inspection, by measurement and by fitting in turn one conductor of the smallest and one of the largest cross-section areas as specified		N/A
8.1.5.4	Terminals shall allow the conductors to be connected without special preparation		P

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Compliance is checked by inspection and by the tests of L.9		P
L.9	**Tests**		
	Clause 9 applies with the following modifications/additions:		P
	For the tests which are influenced by the material of the terminal and the type of conductor that can be connected, the test conditions of table L.3 are applied		P
	Additionally the test of L.9.2 is carried out on terminals separated from the circuit-breaker		N/A
L.9.2	**Current cycling test**		
	This test is carried out on separate terminals		P
	The general arrangement of the samples shall be as shown in figure L.1		N/A
	90 % of torque stated by the manufacturer or selected in table 11 used for the specimens	torque:_____Nm	P
	The test is carried out with conductors according to table L.5. The length of the test conductor from the point of entry to the screw-type terminal specimens to the equalizer shall be as in table L.6	cross-section:_____mm^2 minimum conductor length:_____mm	P
	Cross section of equalizer not greater than that given in table L.7	max. crosssection_____mm^2	P
L.9.2.5	Test method and acceptance criteria		
	Test loop subjected to 500 cycles of 1h current-on and 1h current-off, starting at an a.c. current value of 1,12 times the test current value determined in table L.8	test current:_____A	P
	Near the end of each current-on period of the first 24 cycles, the current shall subsequently be adjusted to raise the temperature of the reference conductor to 75℃		N/A
	At the end of the 25^{th} cycle the test current shall be adjusted the last time and the stable temperature shall be recorded as the first measurement. No further adjustment of test current for the remainder of the test		N/A
	Temperatures recorded for at least one cycle of each working day, and after approximately 25, 50, 75, 100, 125, 175, 225, 350, 425 and 500 cycles		N/A
	For each screw-type terminal		P
	- the temperature rise shall not exceed 110 K		P

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IEC 60898-1				
Clause	Requirement + Test	Result - Remark		Verdict
	- the stability factor Sf shall not exceed ±10 ℃			P
	ambient air temperature: _____℃	max. temperature rise [K]	max. stability factor Sf [℃]	P
	Terminal 1			P
	Terminal 2			P
	Terminal 3			P
	Terminal 4			P
	Terminal 5			P
	Terminal 6			P
	Terminal 7			P
	Terminal 8			P

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: Heating Test		
	Test voltage (V) ..... :		—
	Ambient (^{o}C) .....:		—

Thermocouple Locations	max. temperature measured, (K)	max. temperature limit, (K)

Supplementary information:

	TABLE: Dielectric Strength	

Test voltage applied between:	Test potential applied (V)	Breakdown / flashover (Yes/No)

Supplementary information:

	TABLE: insulation resistance measurements	

Insulation resistance R between:	R (MΩ)	Required R (MΩ)
Between mains poles (primary fuse disconnected)		
Between parts separated by basic or supplementary insulation		
Between parts separated by double or reinforced insulation		

Supplementary information:

	TABLE: Impact Resistance		

Impacts per surface	Surface tested	Impact energy (Nm)	Comments

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:			

	TABLE: Clearance And Creepage Distance Measurements					
clearance cl and creepage distance dcr at/of:	**Up (V)**	**U r.m.s. (V)**	**Required cl (mm)**	**cl (mm)**	**required dcr (mm)**	**dcr (mm)**
Supplementary information:						

	TABLE: Ball Pressure Test of Thermoplastics		
Allowed impression diameter (mm) ..... :			—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)
Supplementary information:			

	TABLE: Needle- flame test (NFT)				
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Supplementary information: **NFT not relevant (or applicable) for Parts of material classified as V-0 or V-1** **NFT not relevant (or applicable) for Base material of PCBs classified as V-0 or if relevant VTM-0**					

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IEC 60898-1			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: Resistance to heat and fire - Glow wire tests	

Object/ Part No./ Material	Manufacturer / trademark	Glow wire test (GWT); (℃)						Verdict
		550	650		750		850	
			te	ti	te	ti		

Object/ Part No./ Material	Manufacturer / trademark	Glow-wire flammability index (GWFI), ℃				GW ignition temp. (GWIT), ℃		Verdict
		550	650	750	850	675	775	

The test specimen passed the glow wire test (GWT) with no ignition [($t_e - t_i$) ≤ 2s] (Yes/No):	
If no, then surrounding parts passed the needle-flame test of annex E (Yes/No)..... :	
The test specimen passed the test by virtue of most of the flaming material being withdrawn with the glow-wire (Yes/No)? ..... :	
Ignition of the specified layer placed underneath the test specimen (Yes/No)..... :	
Supplementary information: 550 ℃ GWT not relevant (or applicable) to parts of material classified at least HB40 or if relevant HBF The GWIT pre-selection option, the 850 ℃ GWFI pre -selection option, and the 850 ℃ GWT are not relevant (or applicable) for attended appliances.	

	TABLE: Threaded Part Torque Test	

Threaded part identification	Diameter of thread (mm)	Column number (I, II, or III)	Applied torque (Nm)
Supplementary information:			

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Attachment No. 1

APPENDED TABLE Critical components					
Object / part no.	Manufacturer / trademark	Type / model	Technical data	Standard	Mark(s) of Conformity
Plastic material	Suzhou Banleantone International Logistics CO,.Ltd	PA66	PA66	IEC/EN60998-2-1,IEC/EN60998-1	Test with appliance
Terminal block material	Foshan Huaru Copper Industry Co., Ltd	COPPER	COPPER	IEC/EN60998-2-1,IEC/EN60998-1	Test with appliance

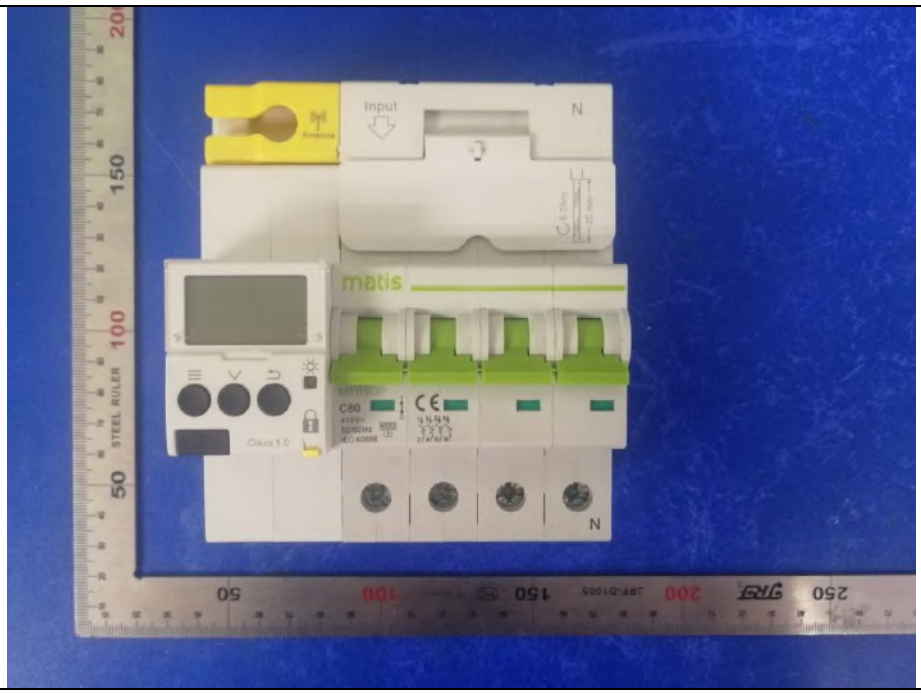
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Attachment No. 2: photo documentation

Details of: External View



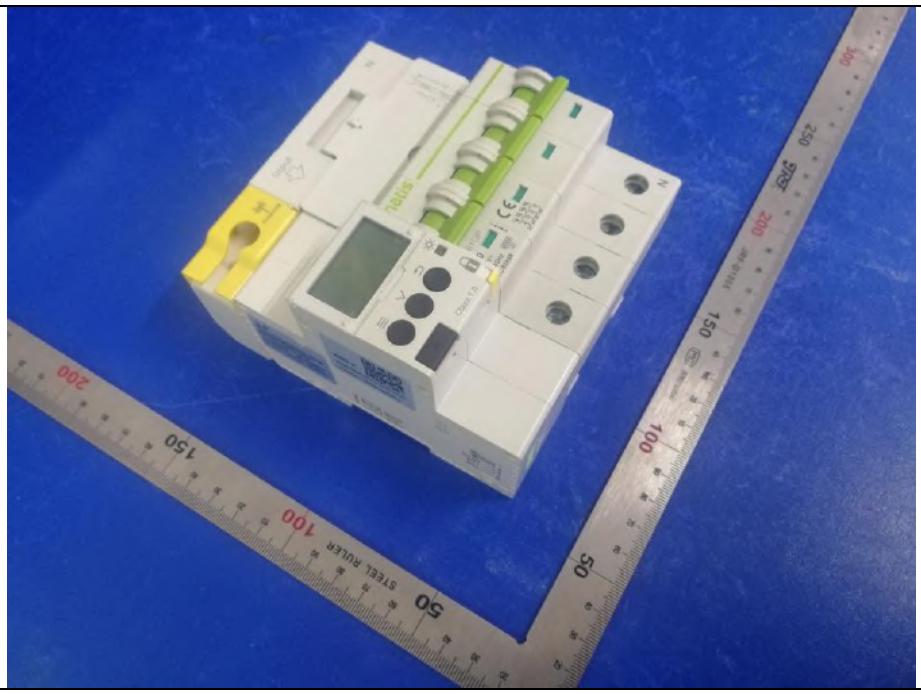
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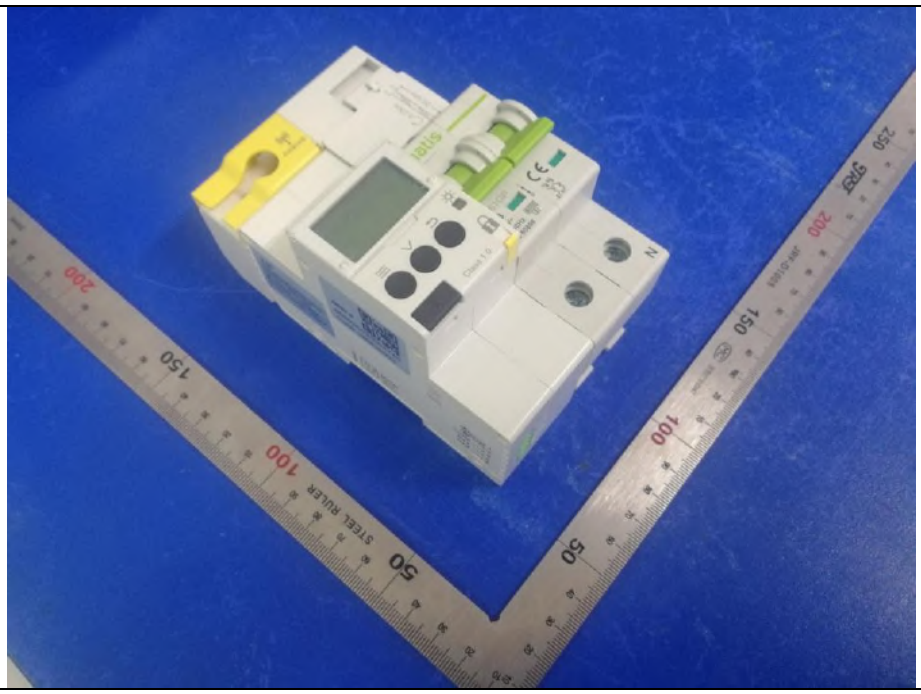
Details of: External View



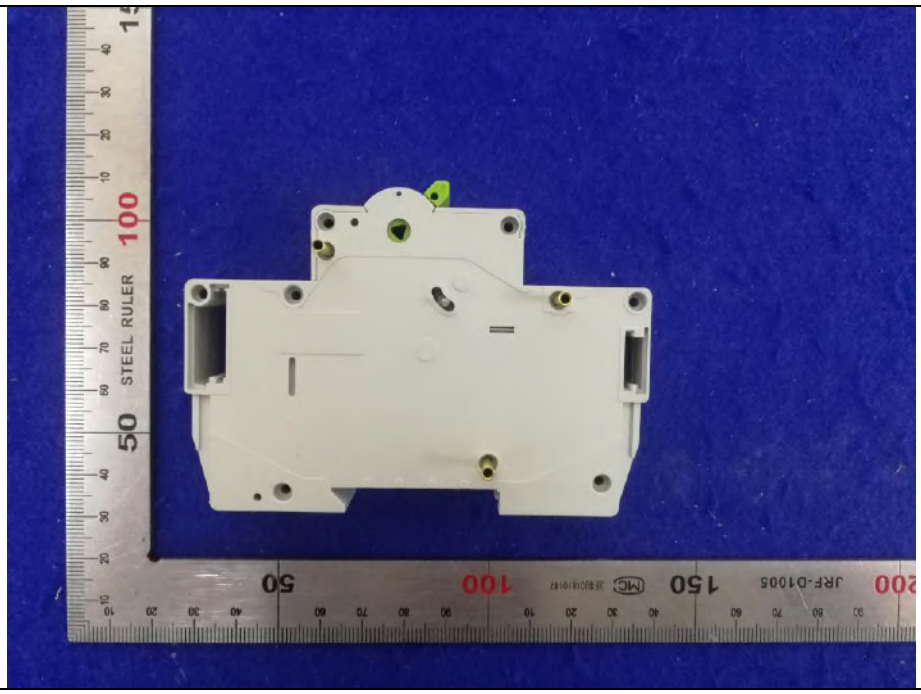
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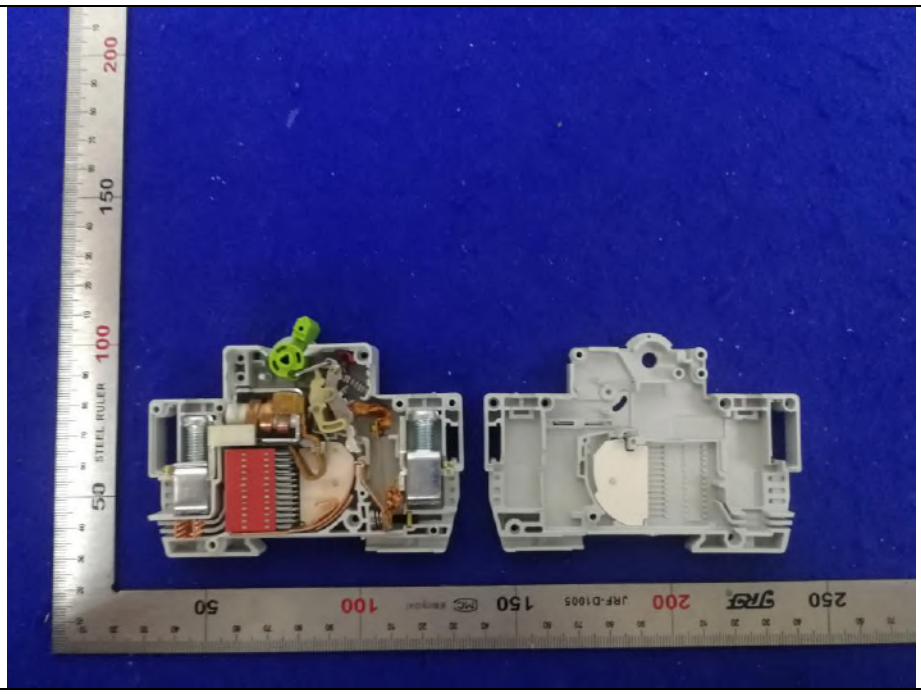
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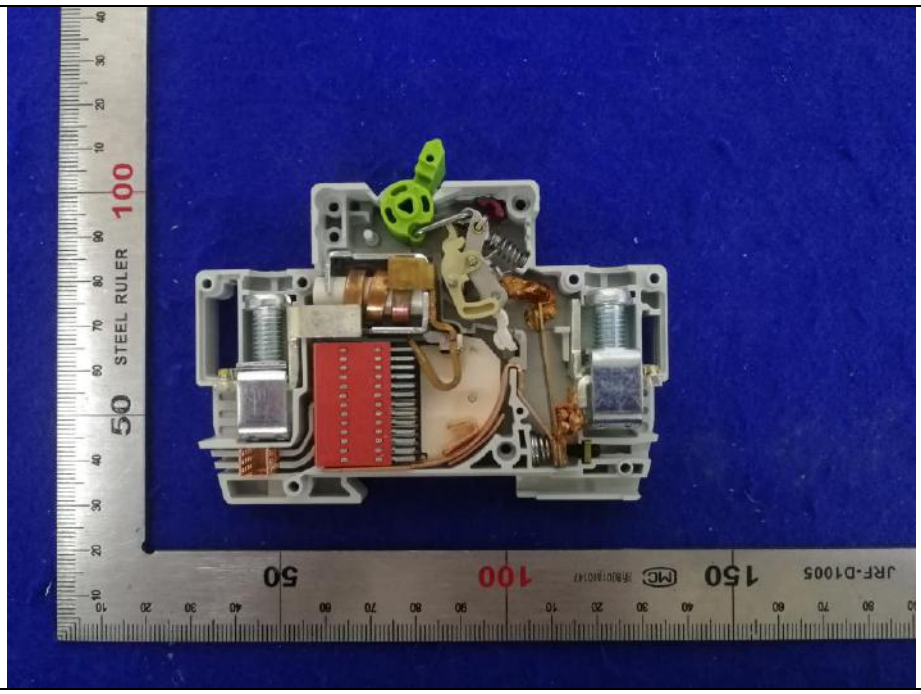
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Attachment No. 2: photo documentation

Details of: Internal view



Details of: Internal view



----------End of test report----------

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Report No.: B19X70228

170009013402

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检测
TESTING
CNAS L0570

TEST REPORT

EUT Name: Smart IoT Power Meter with Breaker

Model Name: MT61GP,1P+N.230V.0~80A

Applicant: Shanghai Matis Electric Co,Ltd.

Manufacturer: Shanghai Matis Electric Co., Ltd.

Test Type: Commissioned Test

China Telecommunication Technology Labs.

PRECAUTIONS

1. **The Inspection Report without "the special inspection seal" or "the official seal of inspection institution" is invalid.**
2. **The printed Inspection Report should be stamped by "the Paging Seal".**
3. **The duplications of the Inspection Report without "the special inspection seal" or "the official seal of inspection institution" are invalid.**
4. **The Inspection Report without the signature of "Approver", "Reviewer" and "Inspector" is invalid.**
5. **The Inspection Report is invalid if there is any alter.**
6. **The Inspection Report is only responsible for the provided sample and test items. The information of the sample (e.g. *Deliverer, Origin, Manufacture*, etc.) is provided by the client and the lab is not responsible for its authenticity.**
7. **For benefits of the client, if there are any questions, please contact us in 15 days since the Inspection Report is delivered.**
8. **Any partial copy of the Inspection Report without written approval of the lab is forbidden.**
9. **The sample will be preserved for 60 days. The overdue sample will be disposed by the lab**
10. **The CTTL management system includes the following 9 inspection centers:**

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    National Quality Supervision and Inspection Center of Internet of Things Communication Products,

    Quality Supervision and Inspection Center of Graphic Communication Equipment of Information Industry,

    Beijing Mobile Communication Equipment Quality Supervision and Inspection Center of Information Industry,

    Beijing Telephone Exchange Equipment Quality Supervision and Inspection Center of Information Industry,

    Post and Telecommunication Industry Product Quality Supervision and Inspection Center of Information Industry,

    Communication and Electromagnetic Compatibility Quality Supervision and Inspection Center of Information Industry,

    Quality Supervision and Inspection Center for Communication Equipment Anti-Seismic Performance of Information Industry,

    Communication Software Evaluation Center of Information Industry.

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E-MAIL: ptpic@163.com

China Telecommunication Technology Labs.

TEST REPORT

EUT Name	Smart IoT Power Meter with Breaker	**Model Name**	MT61GP,1P+N.230V.0~80A
Applicant	Shanghai Matis Electric Co,Ltd.	**Test Type**	Commissioned Test
Manufacturer	Shanghai Matis Electric Co,Ltd.	**Date of Receiving Samples**	January 18, 2019
Test Location	China Telecommunication Technology Labs.	**Deliverer**	Zhang Jian Wei
Sample Quantity	2pcs	**Check Item**	30
Initial Sample	The initial samples state are in good condition and meet related requirements.		
Test Standard	GB/T 17626.2-2006《Electromagnetic compatibility Test and measurement technology Electrostatic discharge immunity test》 GB 4208-2008 《Case Protection Grade（IP grade）》 GB/T 9254-2008 《Radio disturbance limits and methods of measurement for information technology equipment》 GB/T 2423.1-2008 《Environmental testing of electric and electronic products Test A: Basic information of low temperature Part 2: Test method》 GB/T 2423.2-2008 《Environmental testing of electric and electronic products Test B: Basic information of high temperature Part 2: Test method》 GB/T 2423.4-2008 《Environmental testing of electric and electronic products - Part 2: Test methods Test Db alternating heat and humidity (12hrs + 12hrs cycle)》		
Test Conclusion	MT61GP,1P+N.230V.0~80A (Smart IoT Power Meter with Breaker) were tested, with al performances and technical results as below: MT61GP reached all technical data and passed all 30 tests, and met all terms requested in standards of: GB/T 17626.2-2006《Electromagnetic compatibility Test and measurement technology Electrostatic discharge immunity test》, GB 4208-2008 《Case Protection Grade（IP grade）》, GB/T 9254-2008 《Radio disturbance limits and methods of measurement for information technology equipment》and requirements specified in the《Enterprise Standard Q/Matis 0001S-2018》. (Seal for the test report) Issue Date：February 18, 2019		
Remark	The test results in this report are in accordance with GB/T 17215.211-2006 "General requirements for AC electrical measurement equipment, test and test conditions Part 11: Measurement equipment", DL/T 614-2007 "Multi-function electric energy meter" and "Enterprise standard Q/" Matis 0001S-2018" requirements.		

Approver: **Reviewer:** **Inspector:**

TEST RESULTS

No.	Test item		Unit	Requirement	Test Result	Conclusion
1	Outlook and Structure		--	All device buttons are flexible in operation, clear display, normal brightness and backlight. After network connected, the indicator is clear and no flashing. The outer case should not have cracks or pitting. The trademark, model and technical parameters of the device should be accurate.	Meet requirements	**Pass**
2	Case Safety	Electric shock protection	--	The device structure should make sure its live lines are not easily accessible after being installed and wired. The case protection grade should comply with the IP2X specified in GB 4208.	Meet requirements	**Pass**
3		Case fire hazard	--	Terminal block: 960 °C ± 10 ° C; Case: 650 ° C ± 10 ° C; Operation time: 30s ± 1s. The glow wire can touch any random place of the device. The terminal block and case should be safe to prevent flame spread or catch fire due to thermal overload of live line.	Meet requirements	**Pass**
4	Insulation Features	Insulation resistance	--	Applied voltage of 500 VDC to the test point for 5s, the insulation resistance is no less than 5 MΩ. After the constant humidity and heat test, the insulation resistance is no less than 2 MΩ.	Normal：＞10MΩ Constant humidity and heat：＞10MΩ	**Pass**
5		Voltage withstand test	--	Applied voltage of 2000V/50Hz to the test point for 1 min, the device has no flash or break down. The leakage current trip value of the test device is set to 100 mA.	No flash or break down Meet requirements	**Pass**
6	Temperature Rise		--	The temperature rise of each component should not exceed the specified limit and no damage on device function or safety. Connection terminal block 60K Accessible external components when manually operates device, including the operating parts of insulation material and the metal parts of pole connecting: 40K The external metal part of operating parts: 25K Other external components, including the surface of the device , in direct touch with the mounting face: 60K	Terminal connection：26K plastic external parts：33K Meet requirements	**Pass**

TEST RESULTS

No.	Test item		Unit	Requirement	Test Result	Conclusion
7	Technical Requirements on Operation Function and Power Supply		--	The device should operate correctly at any supply voltage between 0.85 and 1.1 times the rated voltage (Un), ie: 1, can do remote close and open 2, the host computer can read the measurement data of device. 3, the LCD display can read device parameters and measurement data	Meet requirements	**Pass**
8	Mechanical and electrical life		--	The device can withstand the specified operation life: each operation cycle includes once open and close, and unloaded operations (mechanical life) is 2000 times.	Meet requirements	**Pass**
9	Environmental Adaptability	Low temperature test	--	The test is carried out in accordance with GB/T 2423.1 under the following conditions: —The meter is not in working state; —Temperature: -25 °C ± 3 °C, indoor energy meter; —Test period: 16hrs, energy meter used indoor; After the test, the error should be less than 2%.	Error change: -0.14% Meet requirements	**Pass**
10		High temperature test	--	The test is carried out in accordance with GB/T 2423.1 under the following conditions: —The meter is not in working state; —Temperature: +70 °C ± 2 °C; —Test period: 72hrs; After the test, the error should be less than 2%.	Error change: +0.06% Meet requirements	**Pass**
11		Humidity and heat test	--	The test is carried out in accordance with GB/T 2423.4 under the following conditions: —Voltage line and auxiliary lines connected with reference voltage; —The current line has no current; —Alternating mode: 1; —Max. temperature: +40°C±2°C, indoor meter; — No treatmentS to remove surface moisture; —Test time: 6 cycles. At test, there should be no signs of corrosion that may affect the functional characteristics of the meter. The error should be less than 2%.	Error change: +0.10% Meet requirements	**Pass**
12	Automatic Reclosing Feature		--	If it has no earth leakage detection function after disconnection, the device will automatically reclose once after 20s-60s when disconnected. If failed to reclose, it will try reclosing again after 15 minutes. If failed twice, the device will try the third time after another 15 minutes. If failed in third time, the device will stop auto reclosing. If the device owns leakage detection function after disconnection, the requirements are as follows: 1. If failed 3 times in 1 min, the device can't do auto reclose again. 2, Detection voltage: <24V Successful closing means that the closing state can be kept for 5 seconds without trip after reclosed.	Meet requirements	**Pass**

TEST RESULTS

No.	Test item		Unit	Requirement	Test Result	Conclusion
13	Over/under Voltage and Action Time		--	Overvoltage value is AC 280±5V, and recover value AC 275±5V. Undervoltage value is AC 175±5V and recover value is AC 180±5V, the device output should be disconnected and protection time less than 60s.	Protection time:58s Meet requirements	**Pass**
14	Over Current and Action Time		--	Input current higher than AC100±2A, the load output should be disconnected and time less than 300ms.	Protection time: 30ms Meet requirements	**Pass**
15	Overload and Action Time		--	Input power higher than 22±1kW, the load output should be disconnected and time less than 300ms.	Protection time: 30ms Meet requirements	**Pass**
16	Communication Mode	RS485	--	It can read online status of the device, measure data, real time data and realize the remote opening and closing through upper computer software.	Meet requirements	**Pass**
17		GSM		It can read online status of the device, measure data, real time data and realize remote opening and closing through the “Device Management Platform” on web..	Meet requirements	**Pass**
18		WCDMA		It can read online status of the device, measure data, real time data and realize remote opening and closing through the “Device Management Platform” on web..	Meet requirements	**Pass**

TEST RESULTS

No.	Test item	Unit	Requirement	Test Result	Conclusion
19	Voltage Error	--	AC 175V--280V， Error< 0.5%	**+0.15%**	**Pass**
20	Current, Power, Energy Error / Balance load	--	2% to 5% Imax: cosφ=1, 5% to 100% Imax: cosφ = 0.5L, 0.8C, Error< 0.5%.	**Error** / **Total** A / -0.04% P / +0.05% KWH / +0.08%	**Pass**
21	Start	--	Under start current（0.004Ib）, the meter should start to work and record continuously	Ib=15A、20A Meet requirements	**Pass**
22	Potential Start	--	While voltage of 115% Un and no current, the test output of the device should not have more than one pulse. The shortest test time t is shown in the formula below. $\Delta t \leq \frac{600 \times 10^6}{k \cdot m \cdot U_n \cdot I_{max}}$ K, single phase is 1, three phase is 3, m is pulse constant: 400, Un is voltage 230V, and Imax is 80.	Meet requirements	**Pass**
23	Power Consumption	--	Voltage line apparent power consumption：≤10VA	2VA Meet requirements	**Pass**
24		--	Voltage line active power consumption：≤2W	1W Meet requirements	**Pass**
25		--	Current line apparent power consumption：≤4VA	2VA	**Pass**

TEST RESULTS

No.	Test item	Unit	Requirement	Test Result	Conclusion
26	Device Performance under Electric Surge	--	The device should be sufficiently resistant to ground surge currents flowing through the capacitive load and through devices flashover. The time-delay type device should have sufficient resistance to tripping current to the ground surge current flowing through the flashover. Apply 1.2/50 us (8/20 us) combined wave and 2kV between the power line (L-N), and no malfunction should occur. The power line (L-N) is applied with a 1.2/50 us, 4kV surge voltage, and the sample works normally without damage. The power cable L flows through 8/20 us and 20kA lightning current to N. When the surge protector installed, the sample works normally without damaged.	Meet requirements	**Pass**
27	Electrostatic Discharge Disturbance Test	--	The test shall be carried out in accordance with GB/T 17626.2 under the following conditions: —It is used as desktop device test; —The device is working: • The voltage line and the auxiliary line are connected to the reference voltage; • The current line has no current (open circuit); —Contact discharge; —Test voltage, 8kV; —Number of discharges: 10 (with the most sensitive polarity); —If the discharge cannot be connected due to the absence of exposed metal parts, the air is discharged at a test voltage of 15 kV. The electrostatic discharge should not cause the meter to produce a change greater than x units and the test output should not produce a signal amount greater than the equivalent x unit of measure. $x = 10^{-6} m U_n I_{max}$ In the test, a temparory decrease or loss of function or performance is allowed.	Meet requirements	**Pass**

TEST RESULTS

No.	Test item	Unit	Requirement	Test Result	Conclusion
28	Fast Transient Impulse Burst Test	--	The test shall be carried out in accordance with GB/T 17626.4 under the following conditions: —It is used as desktop device test; —The device is working: • The voltage line and the auxiliary line are connected to the reference voltage; • The basic current Ib (corresponding rated current In) and cosφ (corresponding sinφ) are specified according to the corresponding standards; —Cable length between the coupler and the EUT: ⩽ 1m; —The test voltage shall be applied in the form of a common mode (line to ground): • voltage line; • Current line, is isolated from the voltage line during normal use; • Auxiliary lines, are isolated from voltage lines during normal use; —Test voltage on current and voltage lines: 4kV; —Test voltage on auxiliary lines with reference voltage exceeding 40V: 2kV; —Test time: 60s for each polarity; In the test, a temporary decrease or loss of function or performance is allowed, and the error should be less than 2%.	Error change：-0.15% Meet requirements	**Pass**
29	Conducted Disturbance Immunity Test of RF Field Induction	--	The test shall be carried out in accordance with GB/T 17626.6 under the following conditions: —It is used as desktop device test; —The device is working: • The voltage line and the auxiliary line are connected to the reference voltage; • The basic current Ib (corresponding rated current In) and cosφ (corresponding sinφ) are specified according to the corresponding standards; —Frequency range: 150kHz ~ 80MHz, —Voltage level: 10V. The condition of the equipment should not be disturbed during the test and the error should be less than 1%.	Error change：-0.18% Meet requirements	**Pass**
30	Radio Interference Restrain	--	The test shall be carried out in accordance with GB 9254 under the following conditions. As a bench-top device, the voltage line shall be connected to each connector. An unshielded cable of length 1 m shall be used. The device is in working condition: the electric circuit and the auxiliary line are connected. Specific voltage; current between 0.1Ib (In) and 0.2 Ib (In) (extracted by linear load and connected by 1m long unshielded cable). The test results shall comply with the requirements of GB 9254 Class B equipment.	Meet requirements	**Pass**

Test Sample Pictures



MT61GP,1P+N.230V.0~80A

Smart IoT Power Meter with Breaker

Test Equipments, Enviroment and Others

Index	Instrument	Model	Code	Note
1	Test finger	BND-A/B/C/D	BND20140728-01\BND20140526	——
2	Glow wire tester	GW-3020	614G0001	——
3	Digital high resistance meter	1865+	E5-14322590	——
4	AC voltage withstand tester	7473	1430115	——
5	Recorder	MV2048	S5N906006	——
6	Constant temperature and humidity testing machine	GTH-150-60-CP-SD	MAA0803-001	——
7	Digital power meter	WT310E	C3TB09014E	——
8	Multi-function surge generator	SG5020G	EC5661601	——
9	Combined immunity tester	CCS600	ES0801654	——
10	Electrostatic discharge test system	EDS 20H	ES0101306	——
11	Signal generator	SMR27	100003	——
12	Antenna (bilateral speaker)	HF906	100038	——
13	Network Analyzer	E8362B	MY43021471	——
14	Electromagnetic wave chamber	8500	/	——

Description of test:

None

Address of Test	China Telecommunication Technology Labs.	
Date of Test	January 21st,2019 to January 31th,2019	
Condition of Test	Temperature：(18～22)℃	Humidity：(45～55)%RH

Report No.: B19X70222

170009013402

中国认可
国际互认
检测
TESTING
CNAS L0570

TEST REPORT

EUT Name: Smart IoT Power Meter with Breaker

Model Name: MT61GP,3P+N,400V,0~100A

Applicant: Shanghai Matis Electric Co,Ltd.

Manufacturer: Shanghai Matis Electric Co,Ltd.

Test Type: Commissioned Test

China Telecommunication Technology Labs.

CHINA TELECOMMUNICATION TECHNOLOGY LABS 中国泰尔实验室 TTL 检验检测专用章 (15)

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E-MAIL: ptpic@163.com

China Telecommunication Technology Labs.

TEST REPORT

EUT Name	Smart IoT Power Meter with Breaker	**Model Name**	MT61GP,3P+N,400V,0~100A
Applicant	Shanghai Matis Electric Co,Ltd.	**Test Type**	Commissioned Test
Manufacturer	Shanghai Matis Electric Co,Ltd.	**Date of Receiving Samples**	January 18, 2019
Test Location	China Telecommunication Technology Labs.	**Deliverer**	Zhang Jian Wei
Sample Quantity	2pcs	**Check Item**	32
Initial Sample	The initial samples state are in good condition and meet related requirements.		
Test Standard	GB/T 17626.2-2006《Electromagnetic compatibility Test and measurement technology Electrostatic discharge immunity test》 GB 4208-2008 《Case Protection Grade（IP grade）》 GB/T 9254-2008 《Radio disturbance limits and methods of measurement for information technology equipment》 GB/T 2423.1-2008 《Environmental testing of electric and electronic products Test A: Basic information of low temperature Part 2: Test method》 GB/T 2423.2-2008 《Environmental testing of electric and electronic products Test B: Basic information of high temperature Part 2: Test method》 GB/T 2423.4-2008 《Environmental testing of electric and electronic products - Part 2: Test methods Test Db alternating heat and humidity (12hrs + 12hrs cycle)》		
Test Conclusion	MT61GP,3P+N,400V,0~100A (Smart IoT Power Meter with Breaker) were tested, with al performances and technical results as below: MT61GP reached all technical data and passed all 32 tests, and met all terms requested in standards of: GB/T 17626.2-2006《Electromagnetic compatibility Test and measurement technology Electrostatic discharge immunity test》, GB 4208-2008 《Case Protection Grade（IP grade）》, GB/T 9254-2008 《Radio disturbance limits and methods of measurement for information technology equipment》and requirements specified in the《Enterprise Standard Q/Matis 0001S-2018》. (Seal for the test report) Issue Date：February 18, 2019		
Remark	The test results in this report are in accordance with GB/T 17215.211-2006 "General requirements for AC electrical measurement equipment, test and test conditions Part 11: Measurement equipment", DL/T 614-2007 "Multi-function electric energy meter" and "Enterprise standard Q/" Matis 0001S-2018" requirements.		

Approver: **Reviewer:** **Inspector:**

TEST RESULTS

No.	Test item		Unit	Requirement	Test Result	Conclusion
1	Outlook and Structure		--	All device buttons are flexible in operation, clear display, normal brightness and backlight. After network connected, the indicator is clear and no flashing. The outer case should not have cracks or pitting. The trademark, model and technical parameters of the device should be accurate.	Meet requirements	**Pass**
2	Case Safety	Electric shock protection	--	The device structure should make sure its live lines are not easily accessible after being installed and wired. The case protection grade should comply with the IP2X specified in GB 4208.	Meet requirements	**Pass**
3		Case fire hazard	--	Terminal block: 960 °C ± 10 ° C; Case: 650 ° C ± 10 ° C; Operation time: 30s ± 1s. The glow wire can touch any random place of the device. The terminal block and case should be safe to prevent flame spread or catch fire due to thermal overload of live line.	Meet requirements	**Pass**
4	Insulation Features	Insulation resistance	--	Applied voltage of 500 VDC to the test point for 5s, the insulation resistance is no less than 5 MΩ. After the constant humidity and heat test, the insulation resistance is no less than 2 MΩ.	Normal：＞10MΩ Constant humidity and heat：＞10MΩ	**Pass**
5		Voltage withstand test	--	Applied voltage of 2000V/50Hz to the test point for 1 min, the device has no flash or break down. The leakage current trip value of the test device is set to 100 mA.	No flash or break down Meet requirements	**Pass**
6	Temperature Rise		--	The temperature rise of each component should not exceed the specified limit and no damage on device function or safety. Connection terminal block 60K Accessible external components when manually operates device, including the operating parts of insulation material and the metal parts of pole connecting: 40K The external metal part of operating parts: 25K Other external components, including the surface of the device , in direct touch with the mounting face: 60K	Terminal connection：26K plastic external parts：35K Meet requirements	**Pass**

TEST RESULTS

No.	Test item		Unit	Requirement	Test Result	Conclusion
7	Technical Requirements on Operation Function and Power Supply		--	The device should operate correctly at any supply voltage between 0.85 and 1.1 times the rated voltage (Un), ie: 1, can do remote close and open 2, the host computer can read the measurement data of device. 3, the LCD display can read device parameters and measurement data	Meet requirements	**Pass**
8	Mechanical and electrical life		--	The device can withstand the specified operation life: each operation cycle includes once open and close, and unloaded operations (mechanical life) is 2000 times.	Meet requirements	**Pass**
9	Environmental Adaptability	Low temperature test	--	The test is carried out in accordance with GB/T 2423.1 under the following conditions: —The meter is not in working state; —Temperature: -25 °C ± 3 °C, indoor energy meter; —Test period: 16hrs, energy meter used indoor; After the test, the error should be less than 2%.	Error change: -0.04% Meet requirements	**Pass**
10		High temperature test	--	The test is carried out in accordance with GB/T 2423.1 under the following conditions: —The meter is not in working state; —Temperature: +70 °C ± 2 °C; —Test period: 72hrs; After the test, the error should be less than 2%.	Error change: +0.08% Meet requirements	**Pass**
11		Humidity and heat test	--	The test is carried out in accordance with GB/T 2423.4 under the following conditions: —Voltage line and auxiliary lines connected with reference voltage; —The current line has no current; —Alternating mode: 1; —Max. temperature: +40°C±2°C, indoor meter; — No treatmentS to remove surface moisture; —Test time: 6 cycles. At test, there should be no signs of corrosion that may affect the functional characteristics of the meter. The error should be less than 2%.	Error change: +0.12% Meet requirements	**Pass**
12	Automatic Reclosing Feature		--	If it has no earth leakage detection function after disconnection, the device will automatically reclose once after 20s-60s when disconnected. If failed to reclose, it will try reclosing again after 15 minutes. If failed twice, the device will try the third time after another 15 minutes. If failed in third time, the device will stop auto reclosing. If the device owns leakage detection function after disconnection, the requirements are as follows: 1. If failed 3 times in 1 min, the device can't do auto reclose again. 2, Detection voltage: <24V Successful closing means that the closing state can be kept for 5 seconds without trip after reclosed.	Meet requirements	**Pass**

TEST RESULTS

No.	Test item		Unit	Requirement	Test Result	Conclusion
13	Over/under Voltage and Action Time		--	Overvoltage value is AC 280±5V, and recover value AC 275±5V. Undervoltage value is AC 175±5V and recover value is AC 180±5V, the device output should be disconnected and protection time less than 60s.	Protection time:57s Meet requirements	**Pass**
14	Over Current and Action Time		--	Input current higher than AC100±2A, the load output should be disconnected and time less than 300ms.	Protection time: 30ms Meet requirements	**Pass**
15	Overload and Action Time		--	Input power higher than 22±1kW, the load output should be disconnected and time less than 300ms.	Protection time: 30ms Meet requirements	**Pass**
16	Phase Loss and Action Time			The device owns phase loss protection, and action time les than 60s.	Protection time: 57s Meet requirements	**Pass**
17	Phase Imbalance and Action Time			The judgement value is 2%, and time less than 60s.	Protection time: 57s Meet requirements	**Pass**
18	Communication Mode	RS485	--	It can read online status of the device, measure data, real time data and realize the remote opening and closing through upper computer software.	Meet requirements	**Pass**
19		GSM		It can read online status of the device, measure data, real time data and realize remote opening and closing through the “Device Management Platform” on web..	Meet requirements	**Pass**
20		WCDMA		It can read online status of the device, measure data, real time data and realize remote opening and closing through the “Device Management Platform” on web..	Meet requirements	**Pass**

TEST RESULTS

No.	Test item		Unit	Requirement	Test Result				Conclusion
21	Voltage Error		--	AC 175V--280V， Error< 0.5%	**Error**	**A**	**B**	**C**	**Pass**
					V	+0.24%	+0.22%	+0.15%	
22	Current, Power, Energy Error	Balance load	--	2% to 5% Imax: cosφ=1, 5% to 100% Imax: cosφ = 0.5L, 0.8C, Error< 0.5%.	**Error**	**Total**			**Pass**
					A	-0.27%			
					P	-0.12%			
					KWH	-0.08%			
		Imbalance load		5% to 100% Imax: cosφ = 1 Error< 0.5%.	**Error**	**A**	**B**	**C**	**Pass**
					A	+0.05%	+0.12%	+0.14%	
					P	+0.12%	+0.20%	+0.08%	
					KWH	+0.06%	+0.13%	+0.15%	
				10% to 100% Imax: cosφ = 0.5L Error< 0.5%.	**Error**	**A**	**B**	**C**	
					A	+0.12%	+0.22%	+0.10%	
					P	+0.14%	+0.25%	+0.11%	
					KWH	+0.15%	+0.27%	+0.15%	
23	Start		--	Under start current（0.004Ib）, the meter should start to work and record continuously	Meet requirements				**Pass**
24	Potential Start		--	While voltage of 115% Un and no current, the test output of the device should not have more than one pulse. The shortest test time t is shown in the formula below. $\Delta t \leq \frac{600 \times 10^6}{k \cdot m \cdot U_n \cdot I_{max}}$ K, single phase is 1, three phase is 3, m is pulse constant: 400, Un is voltage 230V, and Imax is 80.	Meet requirements				**Pass**
25	Power Consumption		--	Voltage line apparent power consumption：≤10VA	4VA Meet requirements				**Pass**
26			--	Voltage line active power consumption：≤2W	1W Meet requirements				**Pass**
27			--	Current line apparent power consumption：≤4VA	3VA				**Pass**

TEST RESULTS

No.	Test item	Unit	Requirement	Test Result	Conclusion
28	Device Performance under Electric Surge	--	The device should be sufficiently resistant to ground surge currents flowing through the capacitive load and through devices flashover. The time-delay type device should have sufficient resistance to tripping current to the ground surge current flowing through the flashover. Apply 1.2/50 us (8/20 us) combined wave and 2kV between the power line (L-N), and no malfunction should occur. The power line (L-N) is applied with a 1.2/50 us, 4kV surge voltage, and the sample works normally without damage. The power cable L flows through 8/20 us and 20kA lightning current to N. When the surge protector installed, the sample works normally without damaged.	Meet requirements	**Pass**
29	Electrostatic Discharge Disturbance Test	--	The test shall be carried out in accordance with GB/T 17626.2 under the following conditions: —It is used as desktop device test; —The device is working: • The voltage line and the auxiliary line are connected to the reference voltage; • The current line has no current (open circuit); —Contact discharge; —Test voltage, 8kV; —Number of discharges: 10 (with the most sensitive polarity); —If the discharge cannot be connected due to the absence of exposed metal parts, the air is discharged at a test voltage of 15 kV. The electrostatic discharge should not cause the meter to produce a change greater than x units and the test output should not produce a signal amount greater than the equivalent x unit of measure. $x = 10^{-6} m U_n I_{max}$ In the test, a temparory decrease or loss of function or performance is allowed.	Meet requirements	**Pass**

TEST RESULTS

No.	Test item	Unit	Requirement	Test Result	Conclusion
30	Fast Transient Impulse Burst Test	--	The test shall be carried out in accordance with GB/T 17626.4 under the following conditions: —It is used as desktop device test; —The device is working: • The voltage line and the auxiliary line are connected to the reference voltage; • The basic current Ib (corresponding rated current In) and cosφ (corresponding sinφ) are specified according to the corresponding standards; —Cable length between the coupler and the EUT: ⩽ 1m; —The test voltage shall be applied in the form of a common mode (line to ground): • voltage line; • Current line, is isolated from the voltage line during normal use; • Auxiliary lines, are isolated from voltage lines during normal use; —Test voltage on current and voltage lines: 4kV; —Test voltage on auxiliary lines with reference voltage exceeding 40V: 2kV; —Test time: 60s for each polarity; In the test, a temporary decrease or loss of function or performance is allowed, and the error should be less than 2%.	Error change：+0.10% Meet requirements	**Pass**
31	Conducted Disturbance Immunity Test of RF Field Induction	--	The test shall be carried out in accordance with GB/T 17626.6 under the following conditions: —It is used as desktop device test; —The device is working: • The voltage line and the auxiliary line are connected to the reference voltage; • The basic current Ib (corresponding rated current In) and cosφ (corresponding sinφ) are specified according to the corresponding standards; —Frequency range: 150kHz ~ 80MHz, —Voltage level: 10V. The condition of the equipment should not be disturbed during the test and the error should be less than 1%.	Error change：+0.08% Meet requirements	**Pass**
32	Radio Interference Restrain	--	The test shall be carried out in accordance with GB 9254 under the following conditions. As a bench-top device, the voltage line shall be connected to each connector. An unshielded cable of length 1 m shall be used. The device is in working condition: the electric circuit and the auxiliary line are connected. Specific voltage; current between 0.1Ib (In) and 0.2 Ib (In) (extracted by linear load and connected by 1m long unshielded cable). The test results shall comply with the requirements of GB 9254 Class B equipment.	Meet requirements	**Pass**

Test Sample Pictures



MT61GP, Three Phase, 3P+N, AC400V, 0~100A

Smart IoT Power Meter with Breaker

Test Equipments, Enviroment and Others

Index	Instrument	Model	Code	Note
1	Test finger	BND-A/B/C/D	BND20140728-01\BND20140526	——
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6	Constant temperature and humidity testing machine	GTH-150-60-CP-SD	MAA0803-001	——
7	Digital power meter	WT310E	C3TB09014E	——
8	Multi-function surge generator	SG5020G	EC5661601	——
9	Combined immunity tester	CCS600	ES0801654	——
10	Electrostatic discharge test system	EDS 20H	ES0101306	——
11	Signal generator	SMR27	100003	——
12	Antenna (bilateral speaker)	HF906	100038	——
13	Network Analyzer	E8362B	MY43021471	——
14	Electromagnetic wave chamber	8500	/	——

Description of test:

None

Address of Test	China Telecommunication Technology Labs.	
Date of Test	January 21st,2019 to January 31th,2019	
Condition of Test	Temperature：(18～22)℃	Humidity：(45～55)%RH

Report No.	LCS190815026AS
Total pages	24 pages

Test Report

NAME OF SAMPLE	:	AIOT ENERGY METER WITH MCB
MODEL	:	MT61GP, MT641WF, MT61LR
INSPECTION CLASSIFICATION	:	Commission test
APPLICANT	:	SHANGHAI MATIS ELECTRC CO., LTD.
MANUFACTURER	:	SHANGHAI MATIS ELECTRC CO., LTD.

Shenzhen LCS Compliance Testing Laboratory Ltd.

Test Report

Name of sample	AIOT ENERGY METER WITH MCB	Trademark	matis, matismart
Model	MT61GP, MT641WF, MT61LR	Meter Constant	400 imp/kWh
Specifications	Three Phase, 3P+N, 415V, 50/60Hz, 80A, LCD register type		
Applicant	SHANGHAI MATIS ELECTRC CO., LTD.		
Address	BLOCK C, NO.888, HUANHU WEST 2ND ROAD, PUDONG, SHANGHAI, CHINA		
Manufacture	SHANGHAI MATIS ELECTRC CO., LTD.		
Address	BLOCK C, NO.888, HUANHU WEST 2ND ROAD, PUDONG, SHANGHAI, CHINA		
Test Lab.	Shenzhen LCS Compliance Testing Laboratory Ltd.		
Address of test Lab.	101, 201 Building A and 301 Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Baoan District, Shenzhen, Guangdong, China		
Date of delivering	2019-10-08	Quantity of sample	3 pcs
Date of test	2019-10-08 to 2019-12-09	Ambient Temperature	15-35°C; 45-75%RH
Test procedure	Type test	Installation	Direct Connection
Test standard	IEC 62053-21: 2003 Electricity metering equipment(a.c.) Particular requirements -Part21: Static meters for active energy(classes1 and 2) IEC 62052-11: 2003 Electricity metering equipment(a.c.)-General requirements, tests and test conditions -Part11: Metering equipment		
Test result	Measured data see report attached.		
Metering accuracy	Class 1.0		

Tested by: Aic Huang Test engineer	Signature:	Aic Huang	2019-12-09
Checked by: Albert Lai Project engineer	Signature:	Albert Lai	2019-12-09
Approved by: Hart Qiu Technical Director	Signature:	Hart Qiu	2019-12-09

General remarks:

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"(See appended table)" refers to a table appended to the report.

Possible test case verdicts:

- test case does not apply to the test object..... : N/A
- test object does meet the requirement..... : P (Pass)
- test object does not meet the requirement..... : F (Fail)

Copy of marking plate:

N/A

General product information:

1. The samples for each group of testing were selected randomly from the samples provided by the manufacturer.
2. All models can use for Single Phase power supply, 1P+N. All models are identical except for the model name.
3. All test were conducted on the model MT61GP, Three Phase power supply.

Item	Requirement - Test	Result - Remark	Verdict
1	Test of limits of errors due to variation of the current	See table 1	P
2	Test of starting condition	See table 2	P
3	Test of no-load conditions	See table 3	P
4	Test of meter constant	See table 4	P
5	AC voltage tests	See table 5	P
6	Impulse voltage test	See table 6	P
7	Test of ambient temperature influence	See table 7	P
8	Test of influence of self-heating	See table 8	P
9	Test of influence of voltage variation	See table 9	P
10	Test of influence of frequency variation	See table 10	P
11	Test of magnetic induction of external origin (0. 5mT)	See table 11	P
12	Test of the influence of harmonies	See table 12	P
13	Test of influence of short time over currents	See table 13	P
14	Spring hammer test	See table 14	P
15	Test of resistance to heat and fire	See table 15	P
16	Test of power consumption	See table 16	P
17	Test of influence of heating	See table 17	P
18	Test of continuous magnetic induction of external origin	See table 18	P
19	Marking and elements test	See table 19	P
20	Test of supply voltage operating range	See table 20	P
21	Test of initial start-up	See table 21	P
22	Test of solar radiation	See table 22	P
23	Damp heat cyclic test	See table 23	P
24	Vibration test	See table 24	P
25	Shock test	See table 25	P
26	Dry heat test	See table 26	P
27	Cold test	See table 27	P
28	Test of immunity to electromagnetic HF fields	See table 28	P

Item	Requirement - Test	Result - Remark	Verdict
29	Fast transient burst test	See table 29	P
30	Tests of the effect of voltage dips and short interruptions	See table 30	P
31	Radio interference measurement	See table 31	P
32	Surge immunity test	See table 32	P
33	Test of immunity to conducted disturbances, induced radio-frequency fields	See table 33	P

Table 1. Test of limits of errors due to variation of the current

1. Requirement: IEC62053-21:2003 IEC62052-11:2003

2. Test method: When the meter is under the reference conditions, the percentage errors shall not exceed the limits.

3. Test equipment: Meter calibration device

4. Test result: Reference voltage 415V Current 80A Reference frequency 50Hz

Current	Power factor (cosφ)	Percentage error limits (%)	Test result (%)		
			1#	2#	3#
0.05I_b	1.0	±1.5	0.3	0.2	0.2
0.1 I_b	1.0	±1.0	0.3	0.4	0.4
0.5 I_b	1.0	±1.0	0.0	0.1	0.2
I_b	1.0	±1.0	0.4	0.5	0.6
0.5 I_{max}	1.0	±1.0	0.0	0.0	0.1
I_{max}	1.0	±1.0	0.4	0.3	0.3
0.1 I_b	0.5L	±1.5	0.2	0.3	0.2
0.2 I_b	0.5L	±1.0	0.1	0.3	0.1
0.5 I_b	0.5L	±1.0	0.2	0.2	0.2
I_b	0.5L	±1.0	0.3	0.4	0.2
0.5 I_{max}	0.5L	±1.0	0.2	0.3	0.2
I_{max}	0.5L	±1.0	0.0	-0.1	-0.1
0.1 I_b	0.8C	±1.5	-0.3	-0.3	-0.2
0.2 I_b	0.8C	±1.0	-0.3	-0.2	-0.3
0.5 I_b	0.8C	±1.0	-0.4	-0.4	-0.3
I_b	0.8C	±1.0	0.0	0.0	-0.1
I_{max}	0.8C	±1.0	-0.2	-0.3	-0.3
Test conclusion			**Pass**		

Table 2. Test of starting condition

1. Requirement: IEC62053-21:2003 IEC62052-11:2003

2. Test method: The meter shall start and continue to register 0.004Ibband 0.005Ib

3. Test equipment: Meter calibration device

4. Test result: Reference voltage 415V Current 80A Reference frequency 50Hz.

Power factor (cosφ)	Current	Test result		
		1#	2#	3#
1.0	0.004I_b	Pass	Pass	Pass
Test conclusion		**Pass**		

Table 3. Test of no-load conditions

1. Requirement: IEC62053-21:2003 IEC62052-11:2003

2. Test method: The current circuit shall be open circuit and a voltage of 115% of the reference voltage shall be applied to the voltage circuits.

3. Test equipment: Meter calibration device

4. Test result: Reference voltage 415V Reference frequency 50Hz

Voltage	Test result		
	1#	2#	3#
115% of the reference voltage	Pass	Pass	Pass
Test conclusion	**Pass**		

Table 4. Test of meter constant

1. Requirement: IEC62053-21:2003 IEC62052-11:2003

2. Test method: It shall be verified that the relation between the test output and the indication on the display complies with the marking on the name-plate.

3. Test equipment: Meter calibration device

4. Test result: Reference voltage 415V Current 80A Reference frequency 50Hz

Power factor (cosφ)	Test result（imp/k Wh）		
	1#	2#	3#
1.0	1000	1000	1000
Test conclusion	**Pass**		

Table 5. AC voltage tests

1. Requirement: IEC62053-21:2003IEC62052-11:2003

2. Test method: The test voltage shall be substantially sinusoidal, having a frequency between 45Hzand 65Hz, and applied for 1 min. During this test no flashover, disruptive discharge or puncture shall occur.

3. Test equipment: Tester 860A

4. Test result:

Test Voltage r.m.s	Test Result		
	1#	2#	3#
4kV	Pass	Pass	Pass
Test conclusion	**Pass**		

Table 6. Impulse voltage test

1. Requirement: IEC62053-21:2003IEC62052-11:2003

2. Test method: The impulse voltage is applied ten times with one polarity and then repeated with the other polarity. The minimum time between the impulses shall be3s.

3. Test equipment: Tester XTS-11A

4. Test result:

Impulse Voltage	Test Result		
	1#	2#	3#
Impulse waveform 1.2/50 μ s,6kV	Pass	Pass	Pass
Cosφ=1.0, I_b error(%)	0.1	0.2	0.1
Test conclusion	**Pass**		

Table 7. Test of ambient temperature influence

1. Requirement: IEC62053-21:2003 IEC62052-11:2003

2. Test method: The determination of the mean temperature coefficient for a given temperature shall be made over a temperature range 10K above and 10 K below that temperature, but in no case shall the temperature be outside the specified operating temperature range.

3. Test equipment: High and low temperature test chambers and Meter calibration device

4. Test result: Reference voltage 415V Current 80A Reference frequency 50Hz

Current	Power factor（cosφ）	Temperature	Limits of mean temperature coefficient（%/K）	Test result（%/K）		
				1#	2#	3#
0.1I_b	1.0	-10℃~10℃	0.05	0.008	0.020	0.006
I_b	1.0		0.05	0.006	0.015	0.019
I_{max}	1.0		0.05	-0.005	0.004	-0.016
0.2 I_b	0.5L		0.07	0.000	0.010	-0.011
I_b	0.5L		0.07	-0.005	-0.003	0.008
I_{max}	0.5L		0.07	-0.003	0.006	0.011
0.1 I_b	1.0	10℃~30℃	0.05	0.005	0.000	0.007
I_b	1.0		0.05	0.007	-0.007	0.003
I_{max}	1.0		0.05	-0.009	-0.008	-0.017
0.2 I_b	0.5L		0.07	0.007	0.012	-0.007
I_b	0.5L		0.07	-0.001	0.012	-0.012
I_{max}	0.5L		0.07	-0.008	-0.005	0.003
0.1 I_b	1.0	30℃~45℃	0.05	0.003	-0.003	-0.009
I_b	1.0		0.05	0.006	-0.009	-0.003
I_{max}	1.0		0.05	0.012	0.021	0.025
0.2 I_b	0.5L		0.07	-0.005	-0.015	0.008
I_b	0.5L		0.07	-0.004	-0.012	-0.001
I_{max}	0.5L		0.07	0.014	0.011	0.016
Test conclusion				**Pass**		

Table 8. Test of influence of self-heating

1. Requirement: IEC62053-21:2003 IEC62052-11:2003

2. Test Method: After the voltage circuits have been energized at reference voltage for at least 2h for class 1, without any current in the current circuits, the maximum current shall be applied to the current circuits, the meter error shall be measured at unity power factor immediately after the current is applied.

3. Test Equipment: Meter calibration device

4. Test Result: Reference voltage 415V Current 80A Reference frequency 50Hz

Current	Power factor (cosφ)	Limits of variation (%)	Test result (%)		
			1#	2#	3#
I_{max}	1.0	0.7	0.04	0.04	0.03
I_{max}	0.5L	1.0	0.02	0.03	0.03
Test conclusion			**Pass**		

Table 9. Test of influence of voltage variation

1. Requirement: IEC62053-21:2003IEC62052-11:2003

2. Test method: Test the variation in percentage errors when voltage variation at ±10%.

3. Test equipment: Meter calibration device

4. Test result: Reference voltage 415V Current 80A Reference frequency 50Hz

Current	Power factor (cosφ)	Voltage (V)	Limits of variation (%)	Test result (%)		
				1#	2#	3#
0.05I_b	1.0	198	0.7	0.00	-0.02	0.00
I_b	1.0	198	0.7	0.02	0.04	0.02
I_{max}	1.0	198	0.7	0.04	0.05	0.05
0.1 I_b	0.5L	198	1.0	0.04	0.03	0.04
I_b	0.5L	198	1.0	-0.01	-0.02	0.01
I_{max}	0.5L	198	1.0	0.03	0.04	0.03
0.05 I_b	1.0	242	0.7	0.03	0.04	0.03
I_b	1.0	242	0.7	0.03	0.04	0.03
I_{max}	1.0	242	0.7	0.03	0.04	0.04
0.1 I_b	0.5L	242	1.0	0.03	0.02	0.05
I_b	0.5L	242	1.0	-0.01	-0.02	-0.01
I_{max}	0.5L	242	1.0	0.00	0.00	0.01
Test conclusion				**Pass**		

Table 10. Test of influence of frequency variation

1. Requirement: IEC62053-21:2003IEC62052-11:2003

2. Test method: Test the variation in percentage errors when frequency variation at +2%.

3. Test equipment: Meter calibration device

4. Test result: Reference voltage 415V Current 80A Reference frequency 50Hz

Current	Power factor （cosφ）	frequency (Hz)	Limits of variation （%）	Test result（%）		
				1#	2#	3#
0.05I_b	1.0	49	0.5	0.03	0.02	0.03
I_b	1.0	49	0.5	0.04	0.05	0.04
I_{max}	1.0	49	0.5	0.02	0.03	0.03
0.1 I_b	0.5L	49	0.7	0.04	0.03	0.04
I_b	0.5L	49	0.7	0.01	0.02	0.01
I_{max}	0.5L	49	0.7	0.03	0.02	0.02
0.05 I_b	1.0	51	0.5	0.05	0.06	0.06
I_b	1.0	51	0.5	0.02	0.03	0.01
I_{max}	1.0	51	0.5	0.03	0.03	0.03
0.1 I_b	0.5L	51	0.7	0.02	0.02	0.02
I_b	0.5L	51	0.7	0.06	0.05	0.06
I_{max}	0.5L	51	0.7	0.08	0.08	0.08
Test conclusion				**Pass**		

Table 11. Test of magnetic induction of external origin (0.5 mT)

1. Requirement: IEC62053-21:2003 IEC62052-11:2003

2. Test method: A magnetic induction of external origin of 0.5 mT produced by a current of the same frequency as that of the voltage applied to the meter and under the most unfavorable conditions of phase and direction shall not cause a variation in the percentage error of the meter exceeding limits of variation.

3. Test equipment: Meter calibration device External magnetic field test bench

4. Test result: Reference voltage 415V Current 80A Reference frequency 50Hz

Current	Power factor （cosφ）	Direction of magnetic		Limits of variation （%）	Test result（%）		
					1#	2#	3#
I_b	1.0	Upright	Same phase	2.0	0.05	0.05	0.06
			60°	2.0	0.07	0.07	0.07
		Parallel	Same phase	2.0	0.06	0.06	0.05
			60°	2.0	0.07	0.07	0.07
Test conclusion					**Pass**		

Table 12. Test of the influence of harmonies

1. Requirement: IEC62053-21:2003 IEC62052-11:2003
2. Test method: Test the variation in percentage errors at power with harmonic
3. Test equipment: Meter calibration device
4. Test result: Reference voltage 415V Current 80A Reference frequency 50Hz

Influence quantity	Current	Power factor（cosφ）	Limits of variation（%）	Test result（%）		
				1#	2#	3#
Harmonic components in the current and voltage circuits	0.5 I_{max}	1.0	0.8	0.09	0.09	0.09
Sub-harmonics in the A.C. Current circuits	0.5 I_b	1.0	3.0	-0.05	-0.05	-0.05
odd-harmonics in the A.C. Current circuits	0.5 I_b	1.0	3.0	0.08	0.09	0.08
DC and even harmonics in the Current circuits	$\frac{I_{max}}{\sqrt{2}}$	1.0	3.0	0.01	0.00	0.01
Test conclusion				**Pass**		

Table 13. Test of influence of short time over currents

1. Requirement: IEC62053-21:2003 IEC62052-11:2003
2. Test method: After the application of the short-time over current, the meter shall perform correctly when back to its initial working.
3. Test equipment: Pulse current test bench and Meter calibration device
4. Test result: Reference voltage 415V Current 80A Reference frequency 50Hz

Current	Power factor（cosφ）	Limits of variation（%）	Test result（%）		
			1#	2#	3#
I_b	1.0	1.5	0.12	0.12	0.13
Test conclusion			**Pass**		

Table 14. Spring hammer test

1. Requirement: IEC62053-21:2003 IEC62052-11:2003
2. Test method: The meter shall be mounted in its normal working position and the spring hammer shall act on the outer surfaces of the meter cover(including windows) and on the terminal cover with a kinetic energy of0.2JH0.02J.
3. Test equipment: Impact test bench
4. Test result:

Test part	Test requirement	Test result		
		1#	2#	3#
Outside surface	No damage	Pass	Pass	Pass
Terminal cover	No damage	Pass	Pass	Pass
Test conclusion		**Pass**		

Table 15. Test of resistance to heat and fire

1. Requirement: IEC62053-21:2003 IEC62052-11:2003
2. Test method: The contact with the glow wire may occur at any random location . If the terminal block is integral with the meter base, it is sufficient to carry out the test only on the terminal block.
3. Test equipment: Hot wire test device
4. Test result:

Location	Temperature （℃）	Requirement	Test result		
			1#	2#	3#
Terminal block	960	No bum	Pass	Pass	Pass
Terminal Cover	650	No bum	Pass	Pass	Pass
Case	650	No bum	Pass	Pass	Pass
Test conclusion			**Pass**		

Table 16. Test of power consumption

1. Requirement: IEC62053-21:2003 IEC62052-11:2003
2. Test method: The power consumption in the voltage and current circuit at reference values of the influence quantities
3. Test equipment: Low power factor wattmeter and DMM
4. Test result: Reference voltage 415V Current 80A Reference frequency 50Hz

Test item	Specified range of power consumption（active）	Test result（%）		
		1#	2#	3#
Voltage circuit	2W	0.93W	0.93W	0.93W
	10VA	1.45VA	1.45VA	1.45VA
Current circuit	4VA	0.13VA	0.13VA	0.13VA
Test conclusion		**Pass**		

Table 17. Test of influence of heating

1. Requirement: IEC62053-21:2003 IEC62052-11:2003

2. Test method: With each current circuit of the meter carrying maximum current and with each voltage circuit carrying 1.15times the reference voltage, the temperature rise of the external surface shall not exceed 25K, with an ambient temperature of 40℃.

3. Test equipment: Digital thermometer

4. Test result: Voltage 253V Current 80A Reference frequency 50Hz Temperature 40℃

Test temperature arise part	Limits of temperature rise （K）	Test result		
		1#	2#	3#
Outside surface of cover	25	8.3	8.5	8.2
Test conclusion		**Pass**		

Table 18. Test of continuous magnetic induction of external origin

1. Requirement: IEC62053-21:2003 IEC62052-11:2003

2. Test method: Put 1000At magnetic field to touchable part of the meter surface.

3. Test equipment: DC steady current source and Meter calibration device

4. Test result: Reference voltage 415V Current 80A Reference frequency 50Hz

Current	Location	Power factor （cosφ）	Limits of variation（%）	Test result（%）		
				1#	2#	3#
I_b	Front	1.0	2.0	0.15	0.15	0.15
I_b	Up	1.0	2.0	0.14	0.14	0.13
I_b	Left	1.0	2.0	0.13	0.12	0.14
I_b	Right	1.0	2.0	0.11	0.10	0.11
Test conclusion				**Pass**		

Table 19. Marking and elements test

1.Requirement:IEC62053-21:2003 IEC62052-11:2003

2.Test method: Checked by inspection

3.Test equipment: Checked by inspection

4.Test result:

Test item	Test Result		
	1#	2#	3#
Case	Pass	Pass	Pass
Name-plates and marking	Pass	Pass	Pass
Terminal and Line connecting diagram	Pass	Pass	Pass
Clearance and creep age distances	Pass	Pass	Pass
Seal	Pass	Pass	Pass
Test conclusion	**Pass**		

Table 20. Test of supply voltage operating range

1. Requirement: IEC62053-21:2003 IEC62052-11:2003
2. Test method: IEC62053-21:2003 IEC62052-11:2003
3. Test equipment: Meter calibration device
4. Test result: Reference voltage 415V Current 80A Reference frequency 50Hz

Supply voltage operating range	Test Result		
	1#	2#	3#
Operating range(0.9~1.1)U_b Limit operating range0~1.15 U_b	Pass	Pass	Pass
Test conclusion	**Pass**		

Table 21. Test of initial start-up

1. Requirement: IEC62053-21:2003 IEC62052-11:2003
2. Test method: IEC62053-21:2003 IEC62052-11:2003
3. Test equipment: Meter calibration device
4. Test result: Reference voltage 415V Reference frequency 50Hz

Test item	Test Result		
	1#	2#	3#
Initial start-up	Pass	Pass	Pass
Test conclusion	**Pass**		

Table 22. Test of solar radiation

1. Requirement: IEC62053-21:2003 IEC62052-11:2003
2. Test method: IEC62053-21:2003 IEC62052-11:2003
3. Test equipment: Xenon climate test chamber
4. Test result:

Test condition	Requirement	Test result		
		1#	2#	3#
8h irradiation and 16h darkness 3 cycles Humidity：95% Temperature：55℃	The appearance and, in particular,the legibility of markings shall not be altered.The function of meter shall not be impaired.	Pass	Pass	Pass
Test conclusion		**Pass**		

Table 23. Damp heat cyclic test

1. Requirement: IEC62053-21:2003 IEC62052-11:2003

2. Test method: After damp heat cyclic test, the meter shall show no damage or change of the information and shall operate correctly.

3. Test equipment: Damp heat cyclic test chambers and Meter calibration device

4. Test result: Reference voltage 415V Current 80A Reference frequency 50Hz

Current	Power factor (cosφ)	Percentage error limits (%)	Test result (%)		
			1#	2#	3#
0.05I_b	1.0	±1.5	0.2	0.2	0.3
0.1 I_b	1.0	±1.0	0.4	0.4	0.3
0.5 I_b	1.0	±1.0	0.2	0.3	0.1
I_b	1.0	±1.0	0.1	0.1	-0.1
0.5 I_{max}	1.0	±1.0	0.1	0.1	0.2
I_{max}	1.0	±1.0	0.1	0.0	0.1
0.1 I_b	0.5L	±1.5	0.4	0.5	0.3
0.2 I_b	0.5L	±1.0	0.0	0.0	0.0
0.5 I_b	0.5L	±1.0	0.1	0.0	0.1
I_b	0.5L	±1.0	0.3	0.3	0.4
0.5 I_{max}	0.5L	±1.0	0.0	-0.1	-0.1
I_{max}	0.5L	±1.0	-0.2	-0.1	-0.1
0.1 I_b	0.8C	±1.5	0.1	0.0	0.1
0.2 I_b	0.8C	±1.0	-0.3	-0.4	-0.4
0.5 I_b	0.8C	±1.0	-0.3	-0.4	-0.2
I_b	0.8C	±1.0	-0.2	-0.3	-0.2
I_{max}	0.8C	±1.0	-0.1	-0.2	-0.1
Test conclusion			**Pass**		

Table 24. Vibration test

1. Requirement: IEC62053-21:2003 IEC62052-11:2003

2. Test method: The meter shall show no damage or change of the information and shall operate correctly in accordance with the requirements of this standard after the test.

3. Test equipment: Vibration test bench and Meter calibration device

4. Test result: Reference voltage 415V Current 80A Reference frequency 50Hz

Current	Power factor (cosφ)	Percentage error limits (%)	Test result (%)		
			1#	2#	3#
0.05I_b	1.0	±1.5	0.2	0.1	0.2
0.1 I_b	1.0	±1.0	0.3	0.2	0.2
0.5 I_b	1.0	±1.0	0.3	0.4	0.2
I_b	1.0	±1.0	0.1	0.0	0.1
0.5 I_{max}	1.0	±1.0	0.3	0.2	0.3
I_{max}	1.0	±1.0	0.2	0.3	0.1
0.1 I_b	0.5L	±1.5	0.0	0.0	-0.1
0.2 I_b	0.5L	±1.0	0.2	0.4	0.2
0.5 I_b	0.5L	±1.0	0.1	0.2	0.2
I_b	0.5L	±1.0	0.0	-0.1	-0.1
0.5 I_{max}	0.5L	±1.0	0.1	0.2	0.1
I_{max}	0.5L	±1.0	-0.2	-0.1	-0.3
0.1 I_b	0.8C	±1.5	-0.1	0.0	-0.1
0.2 I_b	0.8C	±1.0	-0.1	-0.2	-0.1
0.5 I_b	0.8C	±1.0	0.1	0.0	0.0
I_b	0.8C	±1.0	0.0	-0.1	-0.1
I_{max}	0.8C	±1.0	-0.1	0.0	-0.1
Test conclusion			**Pass**		

Table 25. Shock test

1. Requirement: IEC62053-21:2003 IEC62052-11:2003

2. Test method: The meter shall show no damage or change of the information and shall operate corectly in accordance with the requirements of this standard after the test.

3. Test equipment: Shock test bench and Meter calibration device

4. Test result: Reference voltage 415V Current 80A Reference frequency 50Hz

Current	Power factor (cosφ)	Percentage error limits (%)	Test result (%)		
			1#	2#	3#
0.05I_b	1.0	±1.5	0.4	0.4	0.5
0.1 I_b	1.0	±1.0	0.4	0.5	0.4
0.5 I_b	1.0	±1.0	0.0	0.1	0.0
I_b	1.0	±1.0	0.4	0.5	0.5
0.5 I_{max}	1.0	±1.0	0.0	0.0	0.0
I_{max}	1.0	±1.0	0.2	0.2	0.3
0.1 I_b	0.5L	±1.5	0.2	0.3	0.1
0.2 I_b	0.5L	±1.0	0.2	0.3	0.2
0.5 I_b	0.5L	±1.0	0.0	0.0	-0.1
I_b	0.5L	±1.0	-0.1	0.0	-0.2
0.5 I_{max}	0.5L	±1.0	0.0	0.1	-0.1
I_{max}	0.5L	±1.0	0.0	0.0	0.1
0.1 I_b	0.8C	±1.5	0.1	0.1	0.2
0.2 I_b	0.8C	±1.0	0.1	0.1	0.0
0.5 I_b	0.8C	±1.0	-0.2	-0.3	-0.3
I_b	0.8C	±1.0	-0.3	-0.2	-0.4
I_{max}	0.8C	±1.0	0.1	0.0	0.2
Test conclusion			**Pass**		

Table 26. Dry heat test

1. Requirement: IEC62053-21:2003IEC62052-11:2003

2. Test method: After dry heat test, the meter shall show no damage or change of the information and shall operate correctly.

3. Test equipment: High and low temperature test chambers and Meter calibration device

4. Test result: Reference voltage 415V Current 80A Reference frequency 50Hz

Current	Power factor (cosφ)	Percentage error limits (%)	Test result (%)		
			1#	2#	3#
0.05I_b	1.0	±1.5	0.3	0.4	0.2
0.1 I_b	1.0	±1.0	0.2	0.1	0.2
0.5 I_b	1.0	±1.0	0.4	0.3	0.4
I_b	1.0	±1.0	0.4	0.5	0.5
0.5 I_{max}	1.0	±1.0	-0.1	0.1	-0.2
I_{max}	1.0	±1.0	0.3	0.2	0.4
0.1 I_b	0.5L	±1.5	0.4	0.4	0.5
0.2 I_b	0.5L	±1.0	0.3	0.4	0.4
0.5 I_b	0.5L	±1.0	0.0	-0.1	0.1
I_b	0.5L	±1.0	-0.1	-0.1	-0.1
0.5 I_{max}	0.5L	±1.0	0.0	0.1	0.1
I_{max}	0.5L	±1.0	0.1	0.0	0.2
0.1 I_b	0.8C	±1.5	-0.2	-0.2	-0.2
0.2 I_b	0.8C	±1.0	-0.2	-0.3	-0.3
0.5 I_b	0.8C	±1.0	0.1	0.2	0.0
I_b	0.8C	±1.0	0.1	0.2	0.1
I_{max}	0.8C	±1.0	-0.2	-0.3	-0.2
Test conclusion			**Pass**		

Table 27. Cold test

1. Requirement: IEC62053-21:2003 IEC62052-11:2003

2. Test method: After cold test, the meter shall show no damage or change of the information and shall operate correctly.

3. Test equipment: High and low temperature test chambers and Meter calibration device

4. Test result: Reference voltage 415V Current 80A Reference frequency 50Hz.

Current	Power factor （cosφ）	Percentage error limits（%）	Test result（%）		
			1#	2#	3#
0.05I_b	1.0	±1.5	0.2	0.3	0.4
0.1 I_b	1.0	±1.0	0.2	0.3	0.1
0.5 I_b	1.0	±1.0	0.1	0.2	0.2
I_b	1.0	±1.0	0.2	0.3	0.3
0.5 I_{max}	1.0	±1.0	-0.1	-0.2	0.1
I_{max}	1.0	±1.0	0.1	0.0	0.0
0.1 I_b	0.5L	±1.5	0.4	0.5	0.3
0.2 I_b	0.5L	±1.0	0.3	0.3	0.2
0.5 I_b	0.5L	±1.0	0.4	0.3	0.3
I_b	0.5L	±1.0	0.2	0.2	0.4
0.5 I_{max}	0.5L	±1.0	0.2	0.2	0.1
I_{max}	0.5L	±1.0	0.2	0.2	0.2
0.1 I_b	0.8C	±1.5	0.1	0.0	0.0
0.2 I_b	0.8C	±1.0	-0.2	-0.2	-0.1
0.5 I_b	0.8C	±1.0	0.2	0.3	0.3
I_b	0.8C	±1.0	0.1	0.1	0.1
I_{max}	0.8C	±1.0	-0.2	-0.3	-0.1
Test conclusion			**Pass**		

Table 28. Test of immunity to electromagnetic HF fields

1. Requirement: IEC62053-21:2003 IEC62052-11:2003

2. Test method:1) Without any current in the current circuits, test the change in the register. With basic current lb and power factor equal to 1.

2) At sensitive frequencies or frequencies of dominant interest, test the variation of error.

3. Test equipment Signal generator and Power amplifier and Power amplifier

4. Test result: Power factor1.0 Reference voltage 415V Current 80A Reference frequency 50Hz

Test field strength	Frequency (MHz)	Limits of variation (%)	Test result (%)		
			1#	2#	3#
10V/m	80	2.0	-0.1	-0.1	0.0
	100		0.1	0.0	0.1
	120		0.1	0.1	0.0
	200		0.1	0.2	0.2
	200		0.0	-0.1	0.1
	400		0.1	0.2	0.0
	500		0.0	0.1	0.1
	600		0.0	0.0	0.0
	700		0.1	0.2	0.1
	800		-0.1	0.0	0.0
	900		0.0	0.0	-0.1
	1000		0.1	0.1	0.0
	1100		0.0	0.1	-0.1
	1200		0.0	0.1	-0.1
	1300		0.0	0.0	-0.1
	1400		0.2	0.3	0.4
	1500		0.2	0.2	0.2
	1600		0.3	0.2	0.4
	1700		0.1	0.2	0.2
	1800		0.2	0.3	0.2
	1900		0.3	0.2	0.2
	2000		0.2	0.1	0.2
Test conclusion			**Pass**		

Reference voltage 415V Reference frequency 50Hz.

Frequency band and field strength	Limits of charge in the register	Test result		
		1#	2#	3#
80~2000MHz 30V/m	≤0.00704kWh	Pass	Pass	Pass
	No output			
Test conclusion		**Pass**		

Table 29. Fast transient burst test

1. Requirement: IEC62053-21:2003 IEC62052-11:2003
2. Test method: IEC62053-21:2003 IEC62052-11:2003
3. Test equipment: Burst generator
4. Test result: Reference voltage 415V Reference frequency 50Hz

Test voltage	Test content	Test result		
		1#	2#	3#
4kV	Pulse Output	Pass	Pass	Pass
Register function	≤0.0704kWh	Pass	Pass	Pass
Test conclusion		**Pass**		

Table 30. Tests of the effect of voltage dips and short interruptions

1. Requirement: IEC62053-21:2003 IEC62052-11:2003
2. Test method: IEC62053-21:2003 IEC62052-11:2003
3. Test equipment: Cycle drop device and Meter calibration device
4. Test result: Reference voltage 415V Reference frequency 50Hz

Interrupt voltage and time	Test content	Limits of change in the register	Test result（%）		
			1#	2#	3#
∆U=100% 1s/50ms	Register Function	≤0.00704kWh	Pass	Pass	Pass
	Output pulse	No output	Pass	Pass	Pass
∆U=100% 20ms	Register Function	≤0.00704kWh	Pass	Pass	Pass
	Output pulse	No output	Pass	Pass	Pass
∆U=50% 1min	Register Function	≤0.00704kWh	Pass	Pass	Pass
	Output pulse	No output	Pass	Pass	Pass
I_b	Error(%)		0.1	0.1	0.2
Test conclusion			**Pass**		

Table 31. Radio interference measurement

1. Requirement: IEC62053-21:2003 IEC62052-11:2003

2. Test method: IEC62053-21:2003 IEC62052-11:2003

3. Test equipment: Electromagnetic disturbance test receiver and Three-phase power supply network of artificial

4. Test result: a. Limit value of conducted disturbances: Power factor 1.0 Reference voltage 415V Curent0.5A

Frequency (MHz)	Limits dB(μV)		Test result		
	Peak value	Average value	1#	2#	3#
0.15~0.50	66~56	56~46	≤22	≤22	≤22
0.50~5	56	46	≤26	≤26	≤26
5~30	50	50	≤21	≤21	≤21
Test conclusion			**Pass**		

b. Limit value of radiation disturbances: Power factor 1.0 Reference voltage 415V Curent0.5A

Frequency (MHz)	Peak value dB(μV/m)	Test result		
		1#	2#	3#
30~230	40	≤21	≤21	≤21
230~1000	47	≤24	≤24	≤24
Test conclusion		**Pass**		

Table 32. Surge immunity test

1. Requirement: IEC62053-21:2003IEC62052-11:2003

2. Test method: After application of the surge immunity, test the change in the register.

3. Test equipment: Surge generator

4. Test result: Reference frequency 50Hz Reference voltage 415V

Test content	Limits of charge in the register	Test result		
		1#	2#	3#
Register function	≤0.0704kWh	Pass	Pass	Pass
Pulse Output	No output	Pass	Pass	Pass
Test conclusion		**Pass**		

Table 33. Test of immunity to conducted disturbances, induced radio-frequency fields

1. Requirement: IEC62053-21:2003 IEC62052-11:2003
2. Test method: IEC62053-21:2003 IEC62052-11:2003
3. Test equipment: Conducted disturbances test system
4. Test result: Power factor 1.0 Reference voltage 415V Current 80A Reference frequency 50Hz

Test field strength	Frequency (MHz)	Limits of variation (%)	Test result (%)		
			1#	2#	3#
10V/m	0.15	2.0	0.0	-0.1	-0.1
	0.5		0.2	0.1	0.1
	5.0		0.2	0.3	0.1
	10.0		0.4	0.3	0.5
	20.0		0.1	0.2	0.1
	50.0		-0.1	0.0	0.0
	80.0		0.1	0.0	0.0
Test conclusion			**Pass**		

Reference voltage 415V Reference frequency 50Hz

Test content	Limits of charge in the register	Test result		
		1#	2#	3#
Frequency range:150kHz~80MHz	≤0.0704kWh	Pass	Pass	Pass
	No output	Pass	Pass	Pass
Test conclusion		**Pass**		

Attachment No.1 Photo Documentation

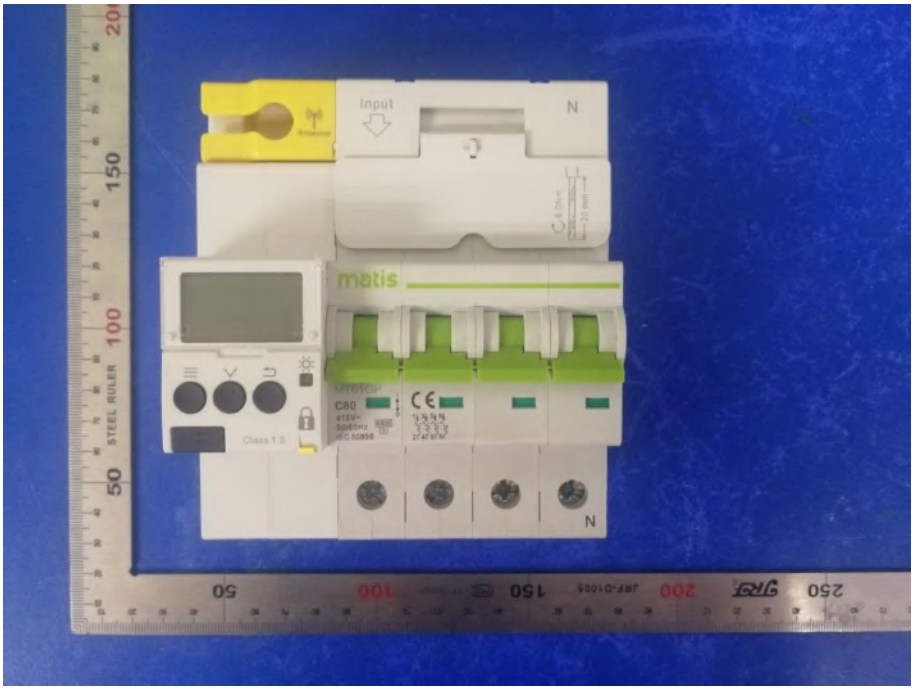


Figure 1 External View

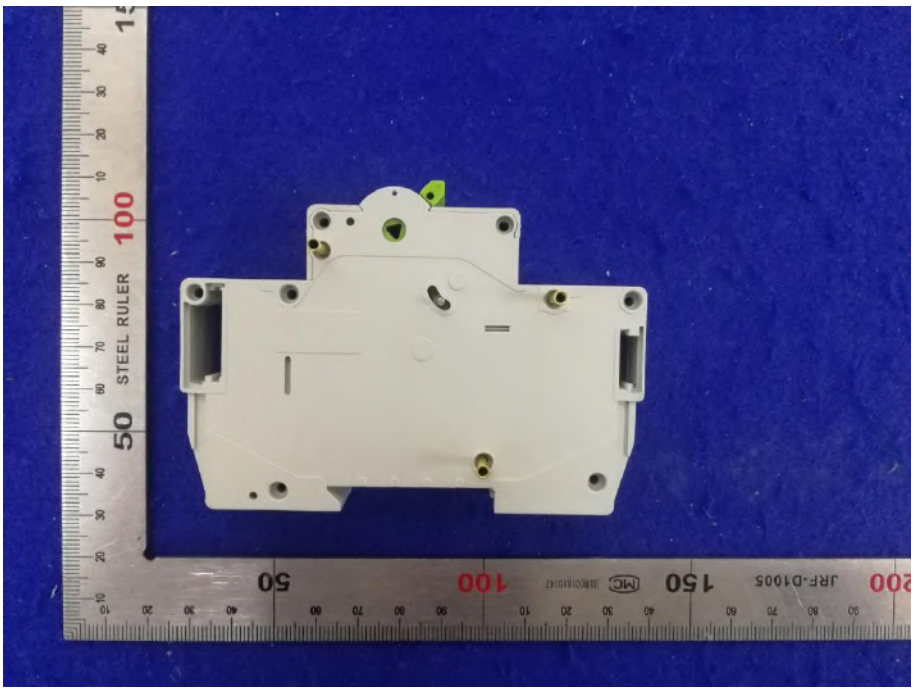


Figure 2 External View

Attachment No.1 Photo Documentation

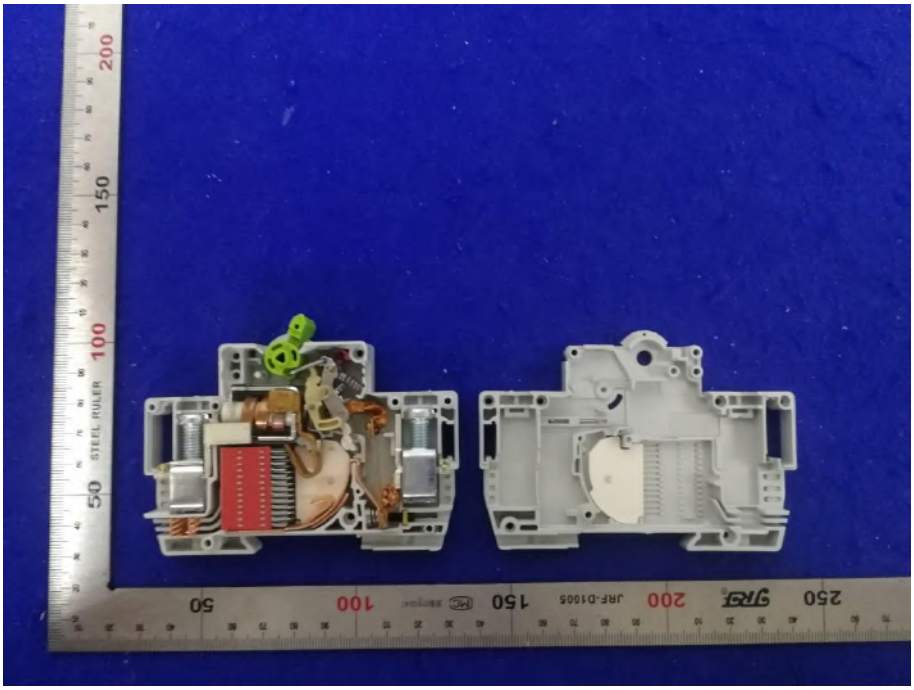


Figure 3 Internal View

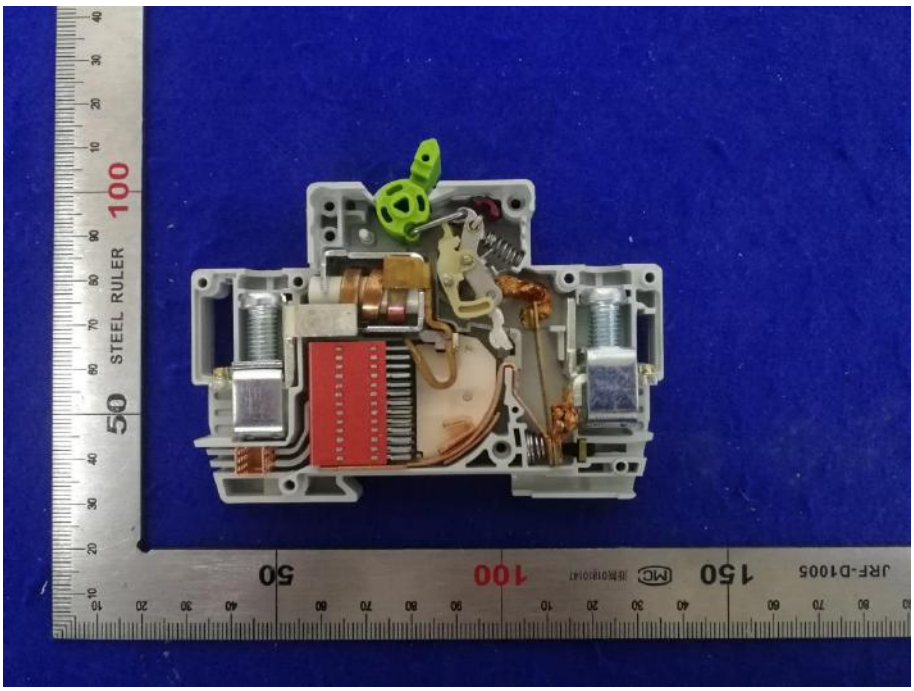


Figure 4 Internal View

--- END OF TEST REPORT ---

China Compulsory products certification

TEST REPORT

☐new application ☐alteration ☐supervision ☐recheck ☑ others: Use certificated result

Application No.: A2018CCC0307-2813677

Name of Product: Miniature circuit breaker

Model/Type: MM61-125

Testing laboratory: ZhongJian Quality Test & Certification Research Institute Co.,Ltd.

Name of Product: Miniature circuit breaker Model/Type: MM61-125 Sample quantity: 4 pcs Sample from: Send sample Date of receipt of test item: 2018.02.04 Date of issue: 2018.03.17	**Applicant**: SHANGHAI MATIS ELECTRIC CO.,LTD **Address of Applicant**: Room318-320, No.83,Huanhu West Road 3,Pudong,Shanghai **Producer(manufacturer)**: SHANGHAI MATIS ELECTRIC CO.,LTD **Address of producer(manufacturer)**: Room318-320,No.83,Huanhu West Road 3,Pudong,Shanghai Zhejiang, P.R . **Factory**: ZHEJIANG DELING TECHNOLOGY CO.,LTD **Address of Factory**: 1/F,4/F,5/F,2nd Producing Building, Helong Anti-explosion Electric Co.,Ltd., No.477 Jingqi Road, Yueqing Center Industrial Zone, Yueqing, Zhejiang Province, P.R.China

Test Conclusion: The project meets the certificated result.

This application certification unit covered by the product specifications and relevant case description:

MM61-125; Ue: AC230V/400V(1P), AC400V(2P, 3P, 4P); Ui: 500V; Uimp: 4kV; In:100A,125A; Icn=Ics=6000A: Instantaneous trip type: B, C, D: Number of poles:1P,2P,3P,4P(All extremely are protected)

Approved by: Lou Yunsheng

Signature: Louyunsheng

Date of issue: 2018.03.17

Remark:

The report constituent

Report Content	have or not	Pages	Report No.
Cover	√	1	HJ2018-726
Home page	√	1	HJ2018-726
The report constituent	√	1	HJ2018-726
The safety type test report	√	9	HJ2018-726
Electromagnetic compatibility type test report			
Back cover	√	1	

This report consists of a row √ all content in the table.

Judge: P Test results meet the requirements.
F Test results do not conform to the requirements.
N Requirement does not apply to the product, or don't do the test.

The safety type test report

Application No.: A2017CCC0307-2650875

Name of Product: Miniature circuit breaker

Model/Type: MM61-125

Sample quantity: 4 pcs

Sample product serial number: /

Date of receipt of test item: 2018.02.04

Sample from: Send sample

Notice of sampling No.: /

Applicant:
SHANGHAI MATIS ELECTRIC CO.,LTD
Address of Applicant:
Room318-320, No.83,Huanhu West Road 3,Pudong,Shanghai
Producer(manufacturer):
SHANGHAI MATIS ELECTRIC CO.,LTD
Address of producer(manufacturer):
Room318-320,No.83,Huanhu West Road 3,Pudong,Shanghai Zhejiang, P.R .
Factory:
ZHEJIANG DELING TECHNOLOGY CO.,LTD
Address of Factory:
1/F,4/F,5/F,2nd Producing Building, Helong Anti-explosion Electric Co.,Ltd., No.477 Jingqi Road, Yueqing Center Industrial Zone, Yueqing, Zhejiang Province, P.R.China

Test according to the standard : IEC 60898-1:2015-03 Electrical accessories – Circuit-breakers for overcurrent protection for household and similar installations – Part 1: Circuit-breakers for a.c. operation

Test Conclusion:The project meets the certificated result.

This application certification unit covered by the product specifications and relevant case description:
MM61-125; Ue: AC230V/400V(1P), AC400V(2P, 3P, 4P); Ui: 500V; Uimp: 4kV; In:100A,125A; Icn=Ics=6000A: Instantaneous trip type: B, C, D: Number of poles:1P,2P,3P,4P(All extremely are protected)
Deliver samples by this unit for the verification, the sample is in accordance with the certified (2017010307026547)product.

Tested by:	Xu Liang	Signature:		Date: 2018.03.17
Checked by:	Sun Ronglin	Signature:		Date: 2018.03.17
Approved by:	Lou Yunsheng	Signature:		Date: 2018.03.17

Testing Laboratory: ZhongJian Quality Test & Certification Research Institute Co.,Ltd.

Remark:

Using the model certification has been awarded the certificate results	The information of the original certified result	The difference between the original certified result
Applicant	ZHEJIANG DELING TECHNOLOGY CO.,LTD	SHANGHAI MATIS ELECTRIC CO.,LTD
Address of Applicant	1/F,4/F,5/F,2nd Producing Building, Helong Anti-explosion Electric Co.,Ltd., No.477 Jingqi Road, Yueqing Center Industrial Zone, Yueqing, Zhejiang Province, P.R.China	Room318-320, No.83,Huanhu West Road 3,Pudong,Shanghai
Model/Type	CBRB7-125	MM61-125
The original certificate No.	2017010307026547	
Certificate of testing institutions	Zhejiang province quality testing academy of sciences(Zhejiang Fangyuan electrical equipment inspection Co., Ltd.)(C-06801-1C161739)	

Declaration：This test report reference number for the ‘C-06801-1C161739’ report, except change the applicant name, address, model, the product structure and technical parameters are the same with the original certified result.
Sample No.: #1：1P D100；#2：2P D125；#3：3P D125；#4：4P D125

Sample description and explanation

1.Product's composition and construction characteristics (brief description of the construction):
Including main parts of the product, means of operation, installation and wiring,and etc.,
and also the following information:
Main parts of the product: Plastic enclosure,Contact terminal ,Instantaneous release, Bimetallic element, Arc suppressing transformer etc.;
means of operation: manual operation;
installation: Standard rail installation;
wiring: Screw crimping.

1). Product model and Current shell frame level: MM61-125; 125A

2). Drawings offered and their serial numbers:

General assembly drawing: MM61-125; 2DL.253.034.1~4, 2DL.259.034.1~4

Electromagnetic trip block diagrams: 5DL.636.032.1~2(B); 5DL.636.033.1~2(C); 5DL.636.034.1~2(D)

3). Contact Material Name/Serial number: Fixed contact: AgC(5), Moving contact: AgNi(20)

4). Moving contact dimension: 5.0mm×4.0mm×1.4(R)mm

5). Fixed contact dimension: 6.0mm×4.0mm×1.0mm

6). Contact parameter: Contact gap: ≥5.5mm ,Terminal pressure: ≥6N ,Over travel: ≥1.2mm

7). Descriptions and specifications of materials of soft connection:

TSR soft copper brush copper stranded wire: 100A: 6.0mm^2; 125A: 8.0mm^2

8). Thermal element Name/Serial number: See table 1

9). Descriptions and specifications of resistance wire material: /

10). Skeleton tripping device Name/Serial number: Fire-retardant reinforced nylon PA66

11). The trip coil wire specifications and number of turns:

100A/125A: specification 2×7.5copper plateT2, Number of turns: 1 turn

12). Core material Name/Serial number: cold-drawn round steel Q235

13). Tripping device and latched device description & specification of materials:

Latched device/ Fire-retardant reinforced nylon PA46;

Tripping device / Spring steel wire 1Cr18Ni9

14). Descriptions and specifications of spring material: Spring steel wire 1Cr18Ni9

15). Terminal and the suitable type of screw thread diameter: M6

16). The shell Material Name/Serial number: Fire-retardant reinforced nylon PA66

Sample description and explanation

2. Main technical Parameter:

1). Rated voltage (Ue): AC230/400V(1P), AC400V(2P、3P、4P)

2). Rated insulation voltage (Ui): 500V

3). Rated impulse withstand voltage(Uimp): 4kV

4). Rated current(In): 100A, 125A

5). Rated short-time making capacity(Icn): 6000A

6). Running short circuit capacity(Ics): 6000A

7). Number of poles:1P,2P,3P,4P(All extremely are protected)

8). The instantaneous tripping types: B,C,D

9). The benchmark environment temperature: 30℃

10). Raster distance:(mm): 60mm

11). Material group: IIIa

Table 1

rated current	Zhejiang tiansheng shuangjin technology co. Ltd.		Wenzhou yada bimetal components co. Ltd.		Wenzhou tongda bimetal co. Ltd.	
	Serical number of Material	Material thickness	Serical number of Material	Material thickness	Serical number of Material	Material thickness
100A	TB180/05	1.0	YDTBRS	1.0	FPA721-5	1.0
125A	TB180/05	1.2	YDTBRS	1.2	FPA721-5	1.2

Sample description and explanation

3. Description of product series and explanation of model/ type:

3.1 Among the model types within this application:

a. With the same basic design

☑Y □N_____

b. Each pole of the external physical size is the same

☑ Y □N _____

c. Except inside current-carrying fitting different cross-sectional area, internal current carrying parts material, coating and the same size

☑ Y □N _____

d. Terminal blocks with similar structure

☑ Y □N _____

e. Contact size, material, structure and connect the same way

☑ Y □N _____

f. Manual operator (materials and physical properties) is the same

☑ Y □N_____

g. Mold material and insulation material is the same

☑ Y □N _____

h. Arc extinguishing device arcing way, material and structure is the same

☑ Y □N_____

i. In addition to the size and material of the current trip device, the basic structure of the overcurrent tripping device is the same

☑ Y □N _____

j. In addition to the instantaneous tripping device working coil number of turns and different cross-sectional area, the instantaneous tripping device at the same basic structure

☑ Y □N_____

k. The voltage rating for the same type of power distribution circuit

☑ Y □N_____

l. Multipole circuit breaker is composed of single circuit breaker, or the same as the single-pole breaker of components assembled, besides extremely with the external partition between each pole of the same size shape

☑Y □N _____

3.2 Series description(Description for different type and different current):

MM61-125 series miniature circuit breaker case frame size curren is 125A, instantaneous trip characteristics are type B, type C, type D, The rated current is divided into 100A and 125A in two specifications. The circuit breakers with different rated current are only of different thermal element brand and soft connection sectional area, and the other structures are completely the same. The circuit breaker with different number of poles has the same structure except the external connection between poles and multi-pole connection handle. According to the number of poles, it is divided into 1P, 2P, 3P and 4P. Instantaneous trip type: B type, C type, D type.

3.3 Explanation of model/ type:

M	M	61	-	125
(1)	(2)	(3)		(4)

(1) Enterprise code
(2) Miniature circuit breaker
(3) Design sequence
(4) Frame size current(A)

Sample description and explanation

4. Description of special structure (if necessary):
/
5. Situation of certification:
The original certificate No.: 2017010307026547;

Sample description and explanation

6. Safety components/parts list:

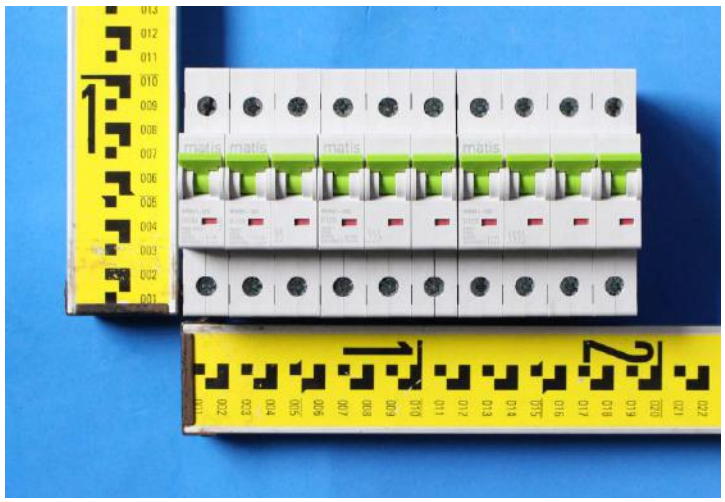
Item No.	Name of components/parts	Description of Parts/Material	Type/Model Serial number	Supplier(Factory)
1	shell (engine base, cover, hand shank)	engine base, cover, hand shank / Fire-retardant reinforced nylon	PA66	Zhejiang Jieda Electric Appliance Co.,Ltd.; Zhejiang fengyuan electric parts co. Ltd.; Wenzhou chengcheng electric co. Ltd;
2	Latched device, Tripping device	Latched device / fire-retardant reinforced nylon	AgCdO15	
		Tripping device / stainless steel wire	T2Y2	Wenzhou Youxin Electric Co.,Ltd. Zhejiang Baofeng Mechanical&Electrical Co.,Ltd. Zhejiang Deling Technology.Co.,Ltd
3	Moving contact, Fixed contace	Moving contact / AgNi(20)	AgNi(20)	Shanghai people electric appliance factory; Zhongxi Group Co.,Ltd.; Fuda Alloy Materials Co.,Ltd.;
		Fixed contace / AgC(5)	AgC(5)	
4	contactor spring	Spring steel wire	1Cr18Ni9	Yueqing Dongfeng Spring Manufacturing Co.,Ltd. Wenzhou Heli Spring Manufacturing Co.,Ltd. Yueqing Xinli Hardware Spring Factory Yueqing Qingzhuo Spring Complete Set Factory
5	magnetic release	iron core / cold-drawn round steel	Q235	Yueqing yiwan hardware products co. Ltd.; Yueqing Jijia Electric Appliances; Component Factory;
		spring /Spring steel wire	1Cr18Ni9	Yueqing Dongfeng Spring Manufacturing Co.,Ltd. Wenzhou Heli Spring Manufacturing Co.,Ltd. Yueqing Xinli Hardware Spring Factory Yueqing Qingzhuo Spring Complete Set Factory
6	arc-control device	arc chute /cold-drawn round steel	Q235	Zhejiang Baofeng Mechanical&Electrical Co.,Ltd. Wenzhou Youxin Electric Co.,Ltd. Yueqing Wanxing Automation Equipment Co.,Ltd. Yueqing qiligang harvest punch parts factory
		flash barrier / cold-drawn round steel	number one	
7	bimetallic element	Thermostartic Bimetal steel strip	See table 1	Wenzhou yada bimetal components co. Ltd.; Wenzhou tongda bimetal co. Ltd.; Zhejiang Tiansheng Shuangjin Technology Co.,Ltd.

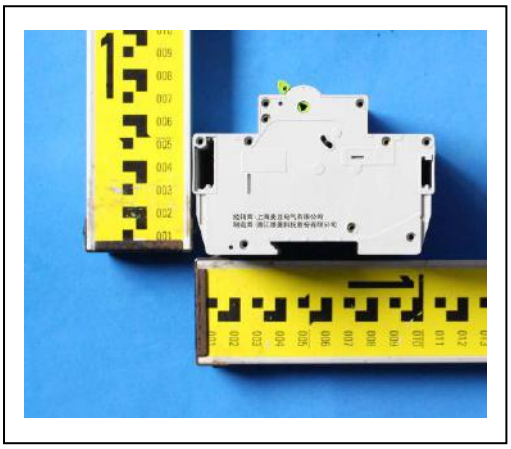
Note1: for the above listed safety parts, if there are more than one supplier/factory, then the supplier/factory which provides the safety parts for samples for the type test should be put in the first place.

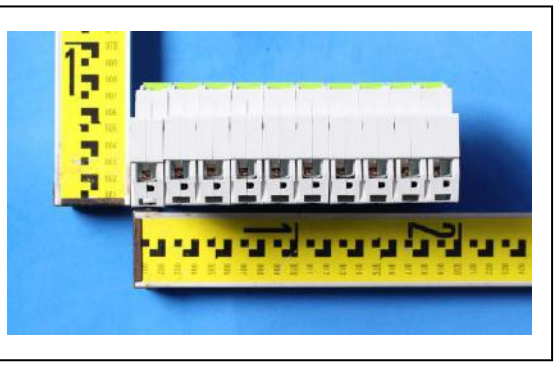
Note 2: We declare that for the above listed safety parts, if there are more than one supplier/factory, then there should be no difference in terms of performance between the safety part used in the samples for type tests and other safety parts provided by the other suppliers/factories above listed.

Product pictures

7. Product profile photo (Including external, internal structure and nameplate):





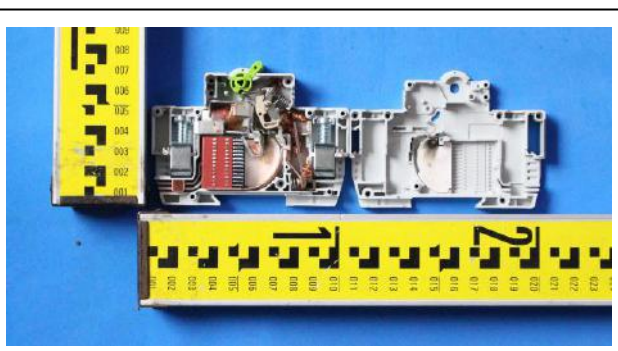


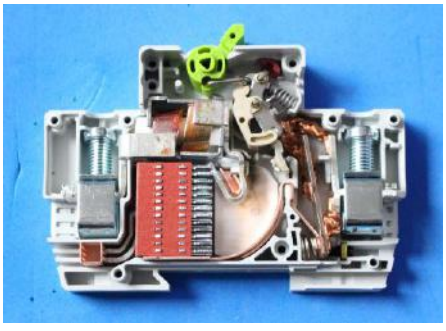






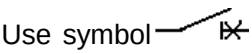






Inspection items summary table

Item No.	Inspection items	According to the standard terms and conditions	Inspection result
A/01	Marking and other product information	6	P
2	General	8.1.1	See C-06801-1C161739
3	Mechanism	8.1.2	
4	Non-interchangeability	8.1.6	
5	Test of indelibility of marking	9.3	P
6	Test of reliability of screws, current-carrying parts and connections	9.4	See C-06801-1C161739
7	Tests of reliability of screw-type terminals for external copper conductors	9.5	
8	Test of protection against electric shock	9.6	
9	Test of resistance of heat	9.14	
10	Resistance to abnormal heat and to fire (glow-wire test)	9.15	
11	Test of resistance to rusting	9.16	
B/12	Test of dielectric properties and isolating capability	9.7	See C-06801-1C161739
13	Test of temperature-rise and measurement of power loss	9.8	
14	28-day test	9.9	
C_1 /15	Test of mechanical and electrical endurance	9.11	See C-06801-1C161739
16	Test on all circuit-breakers	9.12.11.2.1	See C-06801-1C161739
17	Verification of the circuit-breaker after short-circuit tests	9.12.12	
C_2/18	Short-circuit test on circuit-breakers rated 230V or 230/400V for verifying their suitability for use in IT systems	9.12.11.2.2	See C-06801-1C161739
19	Verification of the circuit-breaker after short-circuit tests	9.12.12	
D /20	Test of tripping characteristic	9.10	See C-06801-1C161739
21	Mechanical stresses	9.13	
22	Test at 1500A	9.12.11.3	
23	Verification of the circuit-breaker after short-circuit tests	9.12.12	
D_0/24	Test of tripping characteristic	9.10	See C-06801-1C161739
E_1/25	Test at service short-circuit capacity(Ics)	9.12.11.4.2	See C-06801-1C161739
26	Verifications after the tests at reduced short-circuit currents	9.12.12.1	
	blank below		

Clause	Requirement + Test	Result - Remark #1	Verdict
	Program A (2P D63)		
6	Marking and other product information		P
	Manufacturer's name or trade mark:	ZHEJIANG DELING TECHNOLOGY CO.,LTD	
	Type designation, catalogue number or serial number:	MM61-125	
	Rated voltage:	230/400V~	
	Rated current:	D100	
	Rated frequency:	50Hz	
	Rated short-circuit capacity:	6000A	
	Wiring diagram:	meet the requirement	
	Open and closed position:	closed 'O OFF' open 'I ON'	
	Use symbol  indicate its suitable for isolation	meet the requirement	
	Neutral pole with the letter 'N'	/	
	The inlet and outlet	meet the requirement	
	Reference calibration temperature, if different from 30℃	30℃	
	Degree of protection (only if different from IP20)	IP20	
	The D type circuit breaker: maximum instantaneous tripping current (if more than 20 in)	20In	
	Rated impulse withstand voltage Uimp (if it's 2.5kV)	4kV	
	Terminals intended for the protective conductor, if any, shall be indicated by the symbol	/	
	Marking shall be indelible and easily legible, and shall not be placed on screws, washers or other removable parts.	meet the requirement	
9.3	Test of indelibility of marking The test is made by rubbing the marking by hand for 15s with a piece of cotton soaked with water and again. After the test, the marking shall be easily legible. It shall not be easily possible to remove labels and they shall show no curling.	meet the requirement	P

STATEMENT

This report test results is valid for the test sample only;

This report shall not be part of the copy without permission;

If there is any objection to this report, please submit it within 15 days from the date of receipt of the report.

Detection unit: ZhongJian Quality Test & Certification Research Institute Co.,Ltd

Address: No.352 Banshan Road, HangZhou Postcode: 310022

Tel: 0571-88296682 Fax: 0571-88296681

E-MAIL: HDJC001@163.COM

EU TYPE EXAMINATION CERTIFICATE

Radio Equipment Directive 2014/53/EU

Certificate Number	NB2906.2025.000552
Project Number	SH-CERT250909015
Product Model Number(s)	EC200U-EU
Brand/Trade Name	Quectel
Product Type	LTE Cat 1 bis Module
Manufacturer	Quectel Wireless Solutions Co., Ltd.
Address	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233

Essential Requirements	Results
Article 3.1(a) - Health	Conforms
Article 3.1(a) - Safety	Conforms
Article 3.1(b) - EMC	Conforms
Article 3.2 - Radio Spectrum	Conforms

Technical Documentation: SH-CERT250909015-01

Based upon an examination of the Technical Documentation and supporting evidence, the above listed equipment was found to conform with those essential requirements of the Radio Equipment Directive 2014/53/EU as noted above.

This certificate is issued for only the equipment mentioned above and is subject to the conditions and restrictions listed in the Annex. This type examination certification is issued under Module B of the Radio Equipment Directive 2014/53/EU, applying the Notified Body Identification Number adjacent to the CE Marking is NOT permitted. No changes/modifications to the equipment which would require a re-assessment are allowed - any such change will invalidate this type examination certificate.

This certificate is valid for 5 years from the date of issue unless changes/modifications have been made to the applied standard(s) or assessed type of equipment.

NB2906

Authorized By:

Eddy Zong
Certifier

Certificate Issue Date
September 19, 2025

This certificate is issued by the company under its General Conditions for Certification Services accessible at https://www.sgs.com/en/terms-and-conditions. Attention is drawn to the limitations of liability defined therein and in the Test Report here above mentioned which findings are reflected in this Certificate. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Notified Body : NB2906

Consumer and Retail, a division of SGS North America Inc.
620 Old Peachtree Road, Ste. 100, Suwanee, GA 30024, USA
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EU TYPE EXAMINATION CERTIFICATE

Radio Equipment Directive 2014/53/EU

ANNEX

ESSENTIAL REQUIREMENTS

ESSENTIAL REQUIREMENTS	APPLIED STANDARD(S)
Article 3.1(a) - Health	EN IEC 62311:2020
Article 3.1(a) - Safety	EN IEC 62368-1:2024+A11:2024
Article 3.1(b) - EMC	EN 301 489-1 V2.2.3, EN 301 489-17 V3.3.1, EN 301 489-52 V1.3.1
Article 3.2 - Spectrum	EN 300 328 V2.2.2, EN 301 511 V12.5.1 EN 301 908-1 V15.2.1, EN 301 908-13 V13.3.1 ETSI TS 136 521-1 V17.7.0

PRODUCT TECHNICAL DETAILS

HW Version:	R1.1
SW Version:	EC200UEUDCR06A04M08

EQUIPMENT DETAIL

Radio	Frequency Range (MHz)	Antenna Type	Modulation	Transmit Power
WLAN	2412 - 2472	External Antenna	DSSS	NA(Receiver only)
GSM900	1920 - 1980	External Antenna	GMSK	35dBm
GSM1800	1710 - 1785	External Antenna	GMSK	32dBm
LTE Band1	1920-1980	External Antenna	QPSK, 16QAM	25dBm
LTE Band3	1710 - 1785	External Antenna	QPSK, 16QAM	25dBm
LTE Band5	824 - 849	External Antenna	QPSK, 16QAM	25dBm
LTE Band7	2500 - 2570	External Antenna	QPSK, 16QAM	25dBm
LTE Band8	880 - 915	External Antenna	QPSK, 16QAM	25dBm
LTE Band20	832 - 862	External Antenna	QPSK, 16QAM	25dBm
LTE Band28	703 - 748	External Antenna	QPSK, 16QAM	25dBm
LTE Band38	2570 - 2620	External Antenna	QPSK, 16QAM	25dBm
LTE Band40	2300 - 2400	External Antenna	QPSK, 16QAM	25dBm
LTE Band41	2496 - 2690	External Antenna	QPSK, 16QAM	25dBm

CONDITIONS/RESTRICTIONS

The following conditions and restrictions apply:

1) LTE band 28 is restricted to operation in frequency range703MHz-736MHz for the transmitter and 758MHz-791 MHz for the receiver.
2) LTE band 41 is restricted to operate between 2500MHz-2690MHz.
3) The device supports operation in frequency bands which are not available for use in member states of the European Union and EFTA countries and which have not been included in this conformity assessment. The conformity assessment of this radio equipment is limited to those frequency bands of operation which are available for use in one or more Member States of the European Union and EFTA countries.
4) This type examination certificate is based on the earlier issued type examination certificate no. E1177-244676 dated on October 31, 2024, and enable LTE Cat 1 bis function through software upgrade.

This certificate is issued by the company under its General Conditions for Certification Services accessible at https://www.sgs.com/en/terms-and-conditions. Attention is drawn to the limitations of liability defined therein and in the Test Report here above mentioned which findings are reflected in this Certificate. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Notified Body : NB2906

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EU TYPE EXAMINATION CERTIFICATE

Radio Equipment Directive 2014/53/EU

Certificate Number	NB2906.2024.000143-01
Project Number	SH-CERT240402339
Product Model Number(s)	EC200U-EU
Brand/Trade Name	Quectel
Product Type	LTE Cat 1 bis Module
Manufacturer	Quectel Wireless Solutions Co., Ltd.
Address	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233

Essential Requirements	Results
Article 3.1(a) - Health	Conforms
Article 3.1(a) - Safety	Conforms
Article 3.1(b) - EMC	Conforms
Article 3.2 - Radio Spectrum	Conforms

Technical Documentation: SH-CERT240402339-02

Based upon an examination of the Technical Documentation and supporting evidence, the above listed equipment was found to conform with those essential requirements of the Radio Equipment Directive 2014/53/EU as noted above.

This certificate is issued for only the equipment mentioned above and is subject to the conditions and restrictions listed in the Annex. This type examination certification is issued under Module B of the Radio Equipment Directive 2014/53/EU, applying the Notified Body Identification Number adjacent to the CE Marking is NOT permitted. No changes/modifications to the equipment which would require a re-assessment are allowed - any such change will invalidate this type examination certificate.

This certificate is valid for 5 years from the date of issue unless changes/modifications have been made to the applied standard(s) or assessed type of equipment.

NB2906

Authorized By:

Eddy Zong
Certifier

Certificate Issue Date
September 19, 2025

This certificate is issued by the company under its General Conditions for Certification Services accessible at https://www.sgs.com/en/terms-and-conditions. Attention is drawn to the limitations of liability defined therein and in the Test Report here above mentioned which findings are reflected in this Certificate. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Notified Body : NB2906

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EU TYPE EXAMINATION CERTIFICATE

Radio Equipment Directive 2014/53/EU

ANNEX

ESSENTIAL REQUIREMENTS — APPLIED STANDARD(S)

Article 3.1(a) - Health	EN IEC 62311:2020
Article 3.1(a) - Safety	EN IEC 62368-1:2024+A11:2024
Article 3.1(b) - EMC	EN 55032:2015+A11:2020+A1:2020, EN 55035:2017+A11:2020 EN 301 489-1 V2.2.3, EN 301 489-17 V3.3.1 EN 301 489-19 V2.2.1, EN 301 489-52 V1.3.1
Article 3.2 - Spectrum	EN 300 328 V2.2.2, EN 303 413 V1.2.1 EN 301 908-1 V15.2.1, EN 301 908-13 V13.3.1, EN 301 511 V12.5.1

PRODUCT TECHNICAL DETAILS

HW Version:	R1.0
SW Version:	EC200UEUAAR03A20M08

EQUIPMENT DETAIL

Radio	Frequency Range (MHz)	Antenna Type	Modulation	Transmit Power
GNSS	1559-1610	External Antenna	BPSK	N/A(Receiver)
WLAN	2412-2472	External Antenna	DSSS	N/A(Receiver)
BT	2402-2480	External Antenna	GFSK, π/4DQPSK, 8DPSK	6.16dBm
BLE	2402-2480	External Antenna	GFSK	4.94dBm
GSM 900	880-915	External Antenna	GMSK	35dBm
GSM 1800	1710-1785	External Antenna	GMSK	32dBm
LTE Band 1	1920-1980	External Antenna	QPSK, 16QAM	25dBm
LTE Band 3	1710-1785	External Antenna	QPSK, 16QAM	25dBm
LTE Band 5	824-849	External Antenna	QPSK, 16QAM	25dBm
LTE Band 7	2500-2570	External Antenna	QPSK, 16QAM	25dBm
LTE Band 8	880-915	External Antenna	QPSK, 16QAM	25dBm
LTE Band 20	832-862	External Antenna	QPSK, 16QAM	25dBm
LTE Band 28	703-748	External Antenna	QPSK, 16QAM	25dBm
LTE Band 38	2570-2620	External Antenna	QPSK, 16QAM	25dBm
LTE Band 40	2300-2400	External Antenna	QPSK, 16QAM	25dBm
LTE Band 41	2496-2690	External Antenna	QPSK, 16QAM	25dBm

CONDITIONS/RESTRICTIONS

The following conditions and restrictions apply:

1) LTE band 28 is restricted to operation in frequency range703MHz-736MHz for the transmitter and 758MHz-791 MHz for the receiver.
2) LTE band 41 is restricted to operate between 2500MHz-2690MHz.
3) The device supports operation in frequency bands which are not available for use in member states of the European Union and EFTA countries and which have not been included in this conformity assessment. The conformity assessment of this radio equipment is limited to those frequency bands of operation which are available for use in one or more Member States of the European Union and EFTA countries.
4) This type examination certificate is based on the earlier issued type examination certificate no. NB2906.2024.000143 dated on April 15, 2024, and enable LTE Cat 1 bis function through software upgrade.

This certificate is issued by the company under its General Conditions for Certification Services accessible at https://www.sgs.com/en/terms-and-conditions. Attention is drawn to the limitations of liability defined therein and in the Test Report here above mentioned which findings are reflected in this Certificate. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Notified Body : NB2906

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EU TYPE EXAMINATION CERTIFICATE

Radio Equipment Directive 2014/53/EU

Certificate Number	NB2906.2024.000149-01
Project Number	SH-CERT240402364
Product Model Number(s)	EC200U-EU
Brand/Trade Name	Quectel
Product Type	LTE Cat 1 bis Module
Manufacturer	Quectel Wireless Solutions Co., Ltd.
Address	Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233

Essential Requirements	Results
Article 3.1(a) - Health	Conforms
Article 3.1(a) - Safety	Conforms
Article 3.1(b) - EMC	Conforms
Article 3.2 - Radio Spectrum	Conforms

Technical Documentation: SH-CERT240402364-02

Based upon an examination of the Technical Documentation and supporting evidence, the above listed equipment was found to conform with those essential requirements of the Radio Equipment Directive 2014/53/EU as noted above.

This certificate is issued for only the equipment mentioned above and is subject to the conditions and restrictions listed in the Annex. This type examination certification is issued under Module B of the Radio Equipment Directive 2014/53/EU, applying the Notified Body Identification Number adjacent to the CE Marking is NOT permitted. No changes/modifications to the equipment which would require a re-assessment are allowed - any such change will invalidate this type examination certificate.

This certificate is valid for 5 years from the date of issue unless changes/modifications have been made to the applied standard(s) or assessed type of equipment.

NB2906

Authorized By:

Eddy Zong
Certifier

Certificate Issue Date
September 19, 2025

Notified Body : NB2906

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EU TYPE EXAMINATION CERTIFICATE

Radio Equipment Directive 2014/53/EU

ANNEX

ESSENTIAL REQUIREMENTS

ESSENTIAL REQUIREMENTS	APPLIED STANDARD(S)
Article 3.1(a) - Health	EN IEC 62311:2020
Article 3.1(a) - Safety	EN IEC 62368-1:2024+A11:2024
Article 3.1(b) - EMC	EN 55032:2015+A11:2020+A1:2020, EN 55035:2017+A11:2020 EN 301 489-1 V2.2.3, EN 301 489-17 V3.3.1, EN 301 489-52 V1.3.1
Article 3.2 - Spectrum	EN 300 328 V2.2.2, EN 301 511 V12.5.1 EN 301 908-1 V15.2.1, EN 301 908-13 V13.3.1

PRODUCT TECHNICAL DETAILS

HW Version:	R1.0
SW Version:	EC200UEUAAR03A20M08

EQUIPMENT DETAIL

Radio	Frequency Range (MHz)	Antenna Type	Modulation	Transmit Power
WLAN	2412-2472	External Antenna	DSSS	N/A(Receiver)
BT	2402-2480	External Antenna	GFSK, π/4DQPSK, 8DPSK	6.16dBm
BLE	2402-2480	External Antenna	GFSK	4.94dBm
GSM 900	880-915	External Antenna	GMSK	35dBm
GSM 1800	1710-1785	External Antenna	GMSK	32dBm
LTE Band 1	1920-1980	External Antenna	QPSK, 16QAM	25dBm
LTE Band 3	1710-1785	External Antenna	QPSK, 16QAM	25dBm
LTE Band 5	824-849	External Antenna	QPSK, 16QAM	25dBm
LTE Band 7	2500-2570	External Antenna	QPSK, 16QAM	25dBm
LTE Band 8	880-915	External Antenna	QPSK, 16QAM	25dBm
LTE Band 20	832-862	External Antenna	QPSK, 16QAM	25dBm
LTE Band 28	703-748	External Antenna	QPSK, 16QAM	25dBm
LTE Band 38	2570-2620	External Antenna	QPSK, 16QAM	25dBm
LTE Band 40	2300-2400	External Antenna	QPSK, 16QAM	25dBm
LTE Band 41	2496-2690	External Antenna	QPSK, 16QAM	25dBm

CONDITIONS/RESTRICTIONS

The following conditions and restrictions apply:

1) LTE band 28 is restricted to operation in frequency range703MHz-736MHz for the transmitter and 758MHz-791 MHz for the receiver.
2) LTE band 41 is restricted to operate between 2500MHz-2690MHz.
3) The device supports operation in frequency bands which are not available for use in member states of the European Union and EFTA countries and which have not been included in this conformity assessment. The conformity assessment of this radio equipment is limited to those frequency bands of operation which are available for use in one or more Member States of the European Union and EFTA countries.
4) This type examination certificate is based on the earlier issued type examination certificate no. NB2906.2024.000149 dated on April 15, 2024, and enable LTE Cat 1 bis function through software upgrade.

This certificate is issued by the company under its General Conditions for Certification Services accessible at https://www.sgs.com/en/terms-and-conditions. Attention is drawn to the limitations of liability defined therein and in the Test Report here above mentioned which findings are reflected in this Certificate. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Notified Body : NB2906

Consumer and Retail Services, a division of SGS North America Inc.
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CERTIFICATE RED-3640
Issue no. 2

CE 0598

EU TYPE EXAMINATION CERTIFICATE
RADIO EQUIPMENT DIRECTIVE 2014/53/EU

Product	LTE Cat 1 bis Module
Model	EG915U-EC
Series models	EC200U-EU; EC600U-CE; EC600U-EU; EC600U-EC
Trademark	Quectel
Certificate holder / Manufacturer	Quectel Wireless Solutions Co., Ltd. Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China
Other information	-
Compliance with the requirements on the basis of type examination	Product fulfils the requirements of the standard(s) listed on page 2 and the essential requirements set out in Article 3.3d (Cyber security) of the Radio Equipment Directive 2014/53/EU.
Validity	This certificate is valid until 2030-10-23 unless the standard in question has been amended or superseded.
Date of issue	2025-10-23
	SGS Fimko Oy
Signature	Eddy Zong Certifier

SGS Fimko Oy is a Notified Body (0598) according to the RE Directive 2014/53/EU.

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Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Certificate issued by

SGS Fimko Oy
Takomotie 8
FI-00380 Helsinki, Finland
t. +358 9 696 361 www.sgs.com
Business ID 0634247-4 Member of the SGS Group (SGS SA)

Applied standards

Article	Standard
3.3d	EN 18031-1:2024

Test reports

Testing Laboratory	Report Number	Date
SGS-CSTC	SHCS250400018002	2025-10-15

Technical information

Model	Hardware Version	Software Version	Cybersecurity Version
EG915U-EC	R1.1	EG915UECABR03A08M08	LTEVLLOTW5100 REDDAVN001
EC200U-EU	R1.0	EC200UEUAAR03A20M08	
	R1.1	EC200UEUDCR06A05M08	
EC600U-CE	R1.0	EC600UCEABR03A05M08	
	R2.0		
EC600U-EU	R1.0	EC600UEUABR03A05M08	
EC600U-EC	R1.0	EC600UECACR03A06M08	

Other technical details which are not relevant for the Cyber security features are listed in the type examination certificates:

Model	TEC No.	Issued date	Issued by
EC200U-EU	NB2906.2025.000552	2025-09-19	SGS North America Inc.
EC200U-EU	NB2906.2024.000143-01	2025-09-19	SGS North America Inc.
EC200U-EU	NB2906.2024.000149-01	2025-09-19	SGS North America Inc.
EC600U-CE	4228-09-2025-250571	2025-09-27	Eurofins Electrical and Electronic Testing NA, Inc.
EC600U-CE	4225-09-2025-250568	2025-09-29	Eurofins Electrical and Electronic Testing NA, Inc.
EC600U-EC	NB2906.2025.000274-01	2025-09-16	SGS North America Inc.
EC600U-EU	NB2906.2025.000549	2025-09-16	SGS North America Inc.
EG915U-EC	E1177-255734	2025-07-23	TIMCO Engineering, Inc.

Additional information

This type examination certificate is based on the inspection of the technical documentation ref. no. TF_ SH-CERT250705478-02 provided by the manufacturer.

This certificate is valid only for the models mentioned in this certificate.

This type examination certificate is based on the earlier issued type examination certificate no. RED-3640 Issue 1 dated on 7 July 2025 due to product name.

The manufacturer must inform SGS Fimko if any technical or electrical changes made to the product covered by this certificate, as unauthorised modifications would invalidate this certificate.

FINAS
Finnish Accreditation Service
S003 (EN ISO/IEC 17065)

This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Certificate issued by

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Business ID 0634247-4 Member of the SGS Group (SGS SA)

CERTIFICATE RED-3640
Issue no. 1

CE 0598

EU TYPE EXAMINATION CERTIFICATE
RADIO EQUIPMENT DIRECTIVE 2014/53/EU

Product	LTE Cat 1 Module
Model	EG915U-EC
Series models	EC200U-EU; EC600U-CE; EC600U-EU; EC600U-EC
Trademark	Quectel
Certificate holder / Manufacturer	Quectel Wireless Solutions Co., Ltd. Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China
Other information	-
Compliance with the requirements on the basis of type examination	Product fulfils the requirements of the standard(s) listed on page 2 and the essential requirements set out in Article 3.3d (Cyber security) of the Radio Equipment Directive 2014/53/EU.
Validity	This certificate is valid until 2030-07-07 unless the standard in question has been amended or superseded. The delegated regulation (EU) 2022/30 amended by 2023/2444 is applicable from 2025-08-01 on. Regarding articles 3.3d this certificate will come into effect on 2025-08-01.
Date of issue	2025-07-07
	SGS Fimko Oy
Signature	Eddy Zong Certifier

SGS Fimko Oy is a Notified Body (0598) according to the RE Directive 2014/53/EU.

This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

Certificate issued by

SGS Fimko Oy
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FI-00380 Helsinki, Finland
t. +358 9 696 361 www.sgs.com
Business ID 0634247-4 Member of the SGS Group (SGS SA)

Applied standards

Article	Standard
3.3d	EN 18031-1:2024

Test reports

Testing Laboratory	Report Number	Date
SGS-CSTC	SHCS250400018001	2025-06-06

Technical information

Model	Hardware version	Software version	Cybersecurity version
EG915U-EC	R1.1	EG915UECABR03A08M08	LTEVLLOTW5100R EDDAVN001
EC200U-EU	R1.0	EC200UEUAAR03A20M08	
	R1.1	EC200UEUDCR06A05M08	
EC600U-CE	R1.0	EC600UCEABR03A05M08	
	R2.0		
EC600U-EU	R1.0	EC600UEUABR03A05M08	
EC600U-EC	R1.0	EC600UECACR03A06M08	

Other technical details which are not relevant for the Cyber security features are listed in the type examination certificates:

Model	TEC No.	Issued date	Issued by
EC200U-EU	E1177-244676	2024-10-31	TIMCO Engineering, Inc.
EC200U-EU	NB2906.2024.000149	2024-04-15	SGS North America Inc.
	NB2906.2024.000143	2024-04-15	
EC600U-CE	SN23C0177	2023-10-31	Sporton International (USA) Inc.
	SN23C0100	2023-06-20	
EC600U-EC	NB2906.2025.000274	2025-06-09	SGS North America Inc.
EC200U-EU	E1177-233002	2023-05-04	TIMCO Engineering, Inc.
EG915U-EC	E1177-255439	2025-05-14	

Additional information

This type examination certificate is based on the inspection of the technical documentation ref. no. TF_ SH-CERT250705478-01 provided by the manufacturer.

This certificate is valid only for the models mentioned in this certificate.

The manufacturer must inform SGS Fimko if any technical or electrical changes made to the product covered by this certificate, as unauthorised modifications would invalidate this certificate.

FINAS
Finnish Accreditation Service
S003 (EN ISO/IEC 17065)

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Certificate issued by

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هيئة الاتصالات والفضاء والتقنية
Communications, Space & Technology Commission

شهادة مطابقة
Conformity Certificate

Certificate No: TA 2023-1911 **رقم الشهادة :**

Applicant Information			**معلومات مقدم الطلب**
Applicant:	Global Teleaccess		**اسم الجهة :**
Certificate Details			**بيانات الشهادة**
Issue Date:	22/08/2023	1445/02/06	**تاريخ الاصدار :**
Validity Period:	22/08/2025	1447/02/28	**تاريخ الانتهاء :**
Device Details			**بيانات الجهاز**
Product Name:	LTE Module		**اسم المنتج :**
Product Model:	EC200U-EU		**موديل المنتج :**
Manufacturer:	Quectel Wireless Solutions Co., Ltd.		**المصنع :**
Additional Details			**معلومات اضافية**
Operating Frequency : Maximum Output Power allowed (EIRP) :	2402-2480 MHz:6.16 dBm , 1559-1610 MHz:0 dBm 800 MHz:35 dBm , 1700 MHz:32 dBm 1900 MHz:25 dBm , 1700 MHz:25 dBm 2500 MHz:25 dBm , 700 MHz:25 dBm 2300 MHz:25 dBm , 2402-2480 MHz:4.94 dBm 2412-2472 MHz:0 dBm , 800 MHz:25 dBm		**الترددات المستخدمة : وطاقة الخرج القصوى المسموحة**
Device comply with CITC technical Specification No.:	GEN001 , GEN003 , RI117 , RI120		**الجهاز مطابق لمواصفات الهيئة رقم :**
Additional Requirement			**متطلبات اضافية**

يمكن التحقق من صحة وصلاحية هذه الشهادة من خلال زيارة الرابط ادناه فى الموقع الإلكترونى لهيئة الاتصالات وتقنية المعلومات

http://ers.citc.gov.sa

او عن طريق مسح الرمز التالى :

بنـاءً على نظام الاتصـالات الصـادر بالمرسوم الملكي ذي الرقم (م/12) والتاريخ 1422/03/12هـ ولائحته التنفيذية, وبموجب تنظيم هيئة الاتصالات وتقنية المعلومات بقـــرار مجلس الوزراء رقم (74) والتاريخ 1422/03/05هـ, فقد أصدرت الهيئة هذه الوثيقة بخصوص مطابقة الجهاز المشار إليه أعلاه. علماً بأن هذه الوثيقة لا تعتبر موافقة على فسح الأجهزة المشار إليها أعلاه أو الترخيـــص باستخدامها, بل هي شهادة مطابقة للمواصفات الفنية المعمول بها بالهيئة. كما أن هذه الشهادة قد صدرت عن الهيئة بناءً على المعلومات المتاحة لها والتي وفرتها الجهة المستوردةأو المصنعة وقت صدور هذه الشهادة, ولا يجوز استخدام أو حيازة الأجهزة أو المتاجرة بها بصورة تخالف أحكام وأنظمة هيئة الاتصالات وتقنية المعلومات و الأنظمة الأخرى ذات العلاقة المعمول بها في المملكة, وتتحمل الجهة المستوردة أو المصنعة وحدها المسئولية عن أية أضرار أو خسائر أو إصابات قد تنشأ عن حيازة أو استخدام هذه الأجهزة أو المتاجرة بها. وفي حال كون الأجهزة مصنعة خارج المملكة فإنه يجب التقدم إلى الهيئة من قبل المستورد بطلب لفسح الأجهزة قبل/وقت وصولهـا إلى أحد المنافذ الجمركية

91FA-91C4-69D8-EF09

방송통신기자재등의 적합인증서

Certificate of Broadcasting and Communication Equipments

상호 또는 성명 Trade Name or Applicant	**Quectel Wireless Solutions Co., Ltd**
기자재명칭 Equipment Name	**LTE 이동통신용 무선설비의 기기(기타)**
기본모델명 Basic Model Number	**EC200U-EU**
기기부호/추가 기기부호 Equipment code /Additional Equipment code	**LTE9 / LARN8**
파생모델명 Series Model Number	
인증번호 Certification No.	**R-C-QUT-EC200U-EU**
제조자/제조국가 Manufacturer/Country of Origin	**Quectel Wireless Solutions Co., Ltd/중국**
인증연월일 Date of Certification	**2022-07-29**
기타 Others	

위 기자재는「전파법」제58조의2 제2항에 따라 인증되었음을 증명합니다.

It is verified that foregoing equipment has been certificated under the Clause 2, Article 58-2 of Radio Waves Act.

2024년(Year) 11월(Month) 22일(Day)

국립전파연구원장

Director General of National Radio Research Agency

※ 인증 받은 방송통신기자재는 반드시 **"적합성평가표시"** 를 부착하여 유통하여야 합니다.
위반시 과태료 처분 및 인증이 취소될 수 있습니다.

E186-2AC1-54C2-2221

변경신고 처리결과 통보서

전자민원신청번호		202417210000373319	접수일자	2024-11-21
대상기기	상호 또는 성명	Quectel Wireless Solutions Co., Ltd	적합성평가 분야	적합인증
	기자재 명칭	LTE 이동통신용 무선설비의 기기(기타)	기본모델명	EC200U-EU
	적합성평가 번호	R-C-QUT-EC200U-EU	적합성평가 연 월 일	2024-11-21

변경 사항	변경 전	변경 후
기술기준	1. Type A LTE B1, B3, B5, B7, B8 +Bluetooth 2.4 GHz +Wifi Scan(수신 기능만) +GNSS(수신 기능만) 2. Type B LTE B1, B3, B5, B7, B8 +Bluetooth 2.4 GHz +Wifi Scan(수신 기능만) 3. Type C LTE B1, B3, B5, B7, B8	* 소프트웨어를 사용하여 각Type 별 지원 Band와 무선 기능을 선택적으로 사용하는 기술기준 변경 건. 1. Type A LTE B1, B3, B5, B7, B8 / Bluetooth 2.4 GHz / Wifi Scan(수신 기능만) / GNSS(수신 기능만) 의 선택적 사용 2. Type B LTE B1, B3, B5, B7, B8 / Bluetooth 2.4 GHz / Wifi Scan(수신 기능만)의 선택적 사용 3. Type C LTE B1, B3, B5, B7, B8의 선택적 사용 * 각 Type 별 사용하는 Band, 무선 기능 및 형식기호는 변경신고서를 참고해주시기 바랍니다.

「방송통신기자재등의 적합성평가에 관한 고시」 제16조에 따른 적합성평가 사항의 변경신고 건에 대하여 위와 같이 변경처리 되었음을 알려드립니다.

2024년(Year) 11월(Month) 21일(Date)

국립전파연구원장 국립전파연구원장인

D4A3-22E3-2516-0D5B

변경신고 처리결과 통보서

전자민원신청번호		20241721000374385	접수일자	2024-11-22
대상기기	상호 또는 성명	Quectel Wireless Solutions Co., Ltd	적합성평가 분야	적합인증
	기자재 명칭	LTE 이동통신용 무선설비의 기기(기타)	기본모델명	EC200U-EU
	적합성평가 번호	R-C-QUT-EC200U-EU	적합성평가 연 월 일	2024-11-22

변경 사항	변경 전	변경 후
기술기준	1. Type A LTE B1, B3, B5, B7, B8 / Bluetooth 2.4 GHz / Wifi Scan(수신 기능만) / GNSS(수신 기능만) 의 선택적 사용 2. Type B LTE B1, B3, B5, B7, B8 / Bluetooth 2.4 GHz / Wifi Scan(수신 기능만)의 선택적 사용 3. Type C LTE B1, B3, B5, B7, B8의 선택적 사용	* 소프트웨어를 사용하여 각Type 별 지원 Band와 무선 기능을 선택적으로 사용하는 기술기준 변경 건. 1. Type A LTE B1, B3, B5, B7, B8 / Bluetooth 2.4 GHz / Wifi Scan(수신 기능만)의 선택적 사용 (GNSS(수신 기능만)는 모두 적용) 2. Type B LTE B1, B3, B5, B7, B8 / Bluetooth 2.4 GHz / Wifi Scan(수신 기능만)의 선택적 사용 3. Type C LTE B1, B3, B5, B7, B8의 선택적 사용 * 각 Type 별 사용하는 Band, 무선 기능 및 형식기호는 변경신고서를 참고해주시기 바랍니다.

「방송통신기자재등의 적합성평가에 관한 고시」 제16조에 따른 적합성평가 사항의 변경신고 건에 대하여 위와 같이 변경처리 되었음을 알려드립니다.

2024년(Year) 11월(Month) 22일(Date)

국립전파연구원장 국립전파연구원장인

8EAD-4C73-69A8-496E

변경신고 처리결과 통보서

전자민원신청번호		20231721000027414 6	접수일자	2023-09-06
대상기기	상호 또는 성명	Quectel Wireless Solutions Co., Ltd	적합성평가 분야	적합인증
	기자재 명칭	LTE 이동통신용 무선설비의 기기(기타)	기본모델명	EC200U-EU
	적합성평가 번호	R-C-QUT-EC200U-EU	적합성평가 연 월 일	2023-09-06

변경 사항	변경 전	변경 후
기술기준	1. 무선 기능 1) LTE B1, B3, B5, B7, B8 지원 2) Bluetooth 2.4 GHz 지원 3) 형식기호: LTE9-824/849T,869/894R0.251G7WD7W+904.3/915T,949.3/960R0.282G7WD7W+1715/1785T,1810/1880R0.224G7WD7W+1920/1980T,2110/2170R0.282G7WD7W+2500/2550T,2620/2670R0.251G7WD7W+LARN8-2402/2480TR	* 하드웨어 및 소프트웨어 변경을 통해 무선 기능 추가/차단하여 무선 기능을 선택적으로 사용하는 기술기준 변경 건 (형식기호 변경 포함) 1. Type A (하드웨어 및 소프트웨어 변경) 1) LTE B1, B3, B5, B7, B8 지원 2) Bluetooth 2.4 GHz 지원 3) Wifi Scan(수신 기능만 추가) 지원 - 소프트웨어 변경 4) GNSS(수신 기능만 추가) 지원 - 하드웨어 변경 5) 형식기호: LTE9-824/849T,869/894R0.251G7WD7W+904.3/915T,949.3/960R0.282G7WD7W+1715/1785T,1810/1880R0.224G7WD7W+1920/1980T,2110/2170R0.282G7WD7W+2500/2550T,2620/2670R0.251G7WD7W+LARN8-2402/2480TR+LARN8-2412/2472R 2. Type B (소프트웨어 변경) 1) LTE B1, B3, B5, B7, B8 지원 2) Bluetooth 2.4 GHz 지원 3) Wifi Scan(수신 기능만 추가) 지원 - 소프트웨어 변경 4) 형식기호: LTE9-824/849T,869/894R0.251G7WD7W+904.3/915T,949.3/960R0.282G7WD7W+1715/1785T,1810/1880R0.224G7WD7W+1920/1980T,2110/2170R0.282G7WD7W+2500/2550T,2620/2670R0.251G7WD7W+LARN8-2402/2480TR+LARN8-2412/2472R 3. Type C (하드웨어 및 소프트웨어 변경) 1) LTE B1, B3, B5, B7, B8 지원 2) 형식기호: LTE9-824/849T,869/894R0.251G7WD7W+904.3/915T,949.3/960R0.282G7WD7W+1715/1785T,1810/1880R0.224G7WD7W+1920/1980T,2110/2170R0.282G7WD7W+2500/2550T,2620/2670R0.251G7WD7W *상세 내용은 별첨 참고 바랍니다.
형식기호(기술기준)	LTE9-824/849T,869/894R0.251G7WD7W+904.3/915T,949.3/960R0.282G7WD7W+1715/1785T,1810/1880R0.224G7WD7W+1920/1980T,2110/2170R0.282G7WD7W+2500/2550T,2620/2670R0.251G7WD7W+LARN8-2402/2480TR	LTE9-824/849T,869/894R0.251G7WD7W+904.3/915T,949.3/960R0.282G7WD7W+1715/1785T,1810/1880R0.224G7WD7W+1920/1980T,2110/2170R0.282G7WD7W+2500/2550T,2620/2670R0.251G7WD7W+LARN8-2402/2480TR+LARN8-2412/2472R

「방송통신기자재등의 적합성평가에 관한 고시」 제16조에 따른 적합성평가 사항의 변경신고 건에 대하여 위와 같이 변경처리 되었음을 알려드립니다.

2023년(Year) 09월(Month) 06일(Date)

국립전파연구원장

국립전파연구원장인

방송통신기자재등의 적합인증서

Certificate of Broadcasting and Communication Equipments

상호 또는 성명 Trade Name or Applicant	Quectel Wireless Solutions Co., Ltd
기자재명칭 Equipment Name	LTE 이동통신용 무선설비의 기기(기타)
기본모델명 Basic Model Number	EC200U-EU
기기부호/추가 기기부호 Equipment code /Additional Equipment code	LTE9 / LARN8
파생모델명 Series Model Number	
인증번호 Certification No.	R-C-QUT-EC200U-EU
제조자/제조국가 Manufacturer/Country of Origin	Quectel Wireless Solutions Co., Ltd/중국
인증연월일 Date of Certification	2022-07-29
기타 Others	

위 기자재는「전파법」제58조의2 제2항에 따라 인증되었음을 증명합니다.

It is verified that foregoing equipment has been certificated under the Clause 2, Article 58-2 of Radio Waves Act.

2023년(Year) 09월(Month) 06일(Day)

국립전파연구원장 국립전파연구원장인

Director General of National Radio Research Agency

※ 인증 받은 방송통신기자재는 반드시 **"적합성평가표시"** 를 부착하여 유통하여야 합니다.
위반시 과태료 처분 및 인증이 취소될 수 있습니다.

91FA-91C4-69D8-EF09

방송통신기자재등의 적합인증서

Certificate of Broadcasting and Communication Equipments

상호 또는 성명 *Trade Name or Applicant*	**Quectel Wireless Solutions Co., Ltd**
기자재명칭 *Equipment Name*	**LTE 이동통신용 무선설비의 기기(기타)**
기본모델명 *Basic Model Number*	**EC200U-EU**
기기부호/추가 기기부호 *Equipment code /Additional Equipment code*	**LTE9 / LARN8**
파생모델명 *Series Model Number*	
인증번호 *Certification No.*	**R-C-QUT-EC200U-EU**
제조자/제조국가 *Manufacturer /Country of Origin*	**Quectel Wireless Solutions Co., Ltd / 중국**
인증연월일 *Date of Certification*	**2022-07-29**
기타 *Others*	

위 기자재는「전파법」제58조의2 제2항에 따라 인증되었음을 증명합니다.

It is verified that foregoing equipment has been certificated under the Clause 2, Article 58-2 of Radio Waves Act.

2022년(Year) 07월(Month) 29일(Day)

국립전파연구원장 국립전파연구원장인

Director General of National Radio Research Agency

※ 인증 받은 방송통신기자재는 반드시 **"적합성평가표시"** 를 부착하여 유통하여야 합니다.
위반시 과태료 처분 및 인증이 취소될 수 있습니다.

Nancy Zhu(朱雅楠)

Subject:[검증결과] Quectel LTE모듈 EC200U-EU(MR1회) 기능검증 결과서(2차)(최종) 송부

Quectel LTE모듈 EC200U-EU(MR1회) 기능검증 결과서(2차)(최종) 송부합니다.

자세한 사항은 **"KT Device 고객지원 사이트 > 검증 > QAT/기능검증 > 제조사 단말 모델 검색"** 하여 확인해 주시기 바랍니다.

❑ 검증 정보

○ 검증기간

최초 검증 시작일	검증 시작일	검증 종료일	검증기간
2023-11-13	2023-12-06	2023-12-06	18

○ 검증장소

내부	필드
IoT 사업협력센터	-

○ 검증대상

구분	모델명	제조/개발사	버전 (빌드날짜 포함)	펌웨어 사이즈
모뎀/모듈	EC200U-EU	Quectel	EC200UEUAAR03A03M08_KR	44.5MB

❑ MR 사유

○ IMS 추가

○ 발신정지시 Attach Request 재시도 횟수를 3회로 수정

○ 미개통 USIM/발신정지 USIM 삽입시에도 AT CMD로 EMM cause 확인 가능하도록 수정

○ SMS over IMS 403/406 응답 수신 시 동작 수정

○ CM Tool 수정

❑ 검증 결과 : 조건부 출시

○ **QAT 결과 : MR2차 적합 (2023-12-20)**

○ **기능검증 결과 : MR1회 2차 조건부 출시**

○ **KC 인증 : 인증 완료 (2022-07-29)**

차수	시작일 종료일	총 항목	OK	NOK	COK	NT (미검증)	NA (검증제외)	결과
1차	2023-11-13 2023-11-13	65	56	5	1	0	3	**부적합**
2차	2023-12-06 2023-12-06	66	62	0	1	0	3	**조건부출시**

○ NA 사유

- SMS 수신함 미구현으로 SMS Full 및 삭제 항목 NA
- LTE Band 1 ↔ LTE Band 3&8 전환 항목 NA

○ 항목 증감 사유

- Attach Type은 "combined EPS/IMSI attach"로 설정 확인 항목 추가

❑ 조건부 출시 항목

등급	No.	내용
M+	**COK 1**	DM 연결된 상태 에서 모듈 리셋 시 DM 재 연결 필요 - UART로 DM을 구성 필요

❑ FOTA 검증 결과

차수	검증구분	합계	성공	실패	실패율	비고
2차	모듈 FOTA	10	10	0	0%	○ Normal 상황에서 100% 성공 확인

❑ **보안 검증 결과**

점검 항목 수	적합	개선필요	N/A	내용
13	10	-	3	**적합**

❑ **검증 이슈 사항**

이슈 사항
ㅇ 검증 이슈 사항 - Packet Log 확인 시 (AT+QDBGCFG="PCAP",3), (at+qdbgcfg="tracecfg",0,2)명령어 입력 필요 - 원격 APN 변경 시 리셋 후 변경된 APN 망 접속 시도 - default APN 활성화 및 profile 확인 시 별도의 AT CMD 필요 (at+qcfg="dftpdn") - IMS 추가로 발신정지 시 Attach Request 재시도 횟수 확인불가 - 모듈 버전 명 EC200UEUAAR03A03M08_KT → EC200UEUAAR03A03M08_KR로 변경(제조사 정책 : 통신사 구분 없이 펌웨어 관리하기위해 변경됨) - 모듈 Factory Reset 을 통한 Default Audio 설정값 확인 시 음성 미지원으로 확인됨 - LTE VOLTE스팩에 맞게 구현 완료 되었으나, 망에서 118 콜에 대한 REJECT 현상 발생 ㅇ 디버깅 이슈 사항 - KDM 연동 불가로 인해 제조사 자체 분석 툴(ArmTracer / QuectelDM_v1.0.8)로 검증 진행 - 정상 동작 중 음영지역 진입 시 디버그 스크린 내 Band 및 SRV 정보가 상이하게 표시됨(Debug Screen 정보 Band : 5, SRV : SRV) ㅇ 모듈 FOTA 시 데이터 미사용(AT+QNETDEVCTL=0) 설정 상태에서 진행 필요 - 단말 제조사 안내 필요 o 제조사 FOTA 및 APN 변경 기능 지원 1. KT FOTA 적용이 우선, 불가피한 제조사 FOTA 적용 시 KT 검증 완료된 FW에 대해 KT사업팀과 사전 협의 후 현장적용 필요 2. KT와 협의되지 않은 F/W 적용으로 발생하는 모든 문제의 후속처리는 제조사 비용으로 처리 3. 제조사에서 APN 변경 시 KT와 사전 협의 후 현장적용 필요

Nancy Zhu(朱雅楠)

Subject:[검증결과] Quectel LTE모듈 EC200U-EU 기능검증 결과서(2차)(최종) 송부

Quectel LTE모듈 EC200U-EU 기능검증 결과서(2차)(최종) 송부합니다.

자세한 사항은 **"KT Device 고객지원 사이트 > 검증 > QAT/기능검증 > 제조사 단말 모델 검색"** 하여 확인해 주시기 바랍니다.

❑ 검증 정보

○ 검증기간

최초 검증 시작일	검증 시작일	검증 종료일	검증기간
2023-06-23	2023-06-23	2023-07-17	17

○ 검증장소

내부	필드
IoT 사업협력센터	-

○ 검증대상

구분	모델명	제조/개발사	버전 (빌드날짜 포함)	펌웨어 사이즈
모뎀/모듈	EC200U-EU	Quectel	EC200UEUAAR03A02M08_KR	44.8MB

❑ 검증 결과 : 조건부 출시

○ **QAT 결과 : 2차 적합 (2023-08-30)**

○ **기능검증 결과 : 2차 조건부 출시**

○ **KC 인증 : 인증 완료 (2022-07-29)**

○ **확인서(웨이버) : 인증 완료 (2022-08-24)**

차수	시작일 종료일	총 항목	OK	NOK	COK	NT (미검증)	NA (검증제외)	결과
1차	2023-06-23 2023-06-26	55	44	8	0	0	3	**부적합**
2차	2023-07-17 2023-07-17	55	47	0	5	0	3	**조건부출시**

○ NA 사유

- SMS 수신함 미구현으로 SMS Full 및 삭제 항목 NA
- LTE Band 1 ↔ LTE Band 3&8 전환 항목 NA

❑ 조건부 출시 항목

등급	No.	내용
M+	**COK 1**	발신정지 시 Attach request를 5회씩 시도함 - Attach request를 3회 시도하고 T3402 Timer가 시작하도록 수정 필요 - 이슈사항은 5회 재시도를 통해 운용, 이슈 발생 시 제조사에서 책임지고 대응
M+	**COK 2 ~ 3**	패킷 메시지 Enable/Disable 시 모듈 Reset 1회 필요 - 상용화 후 디버깅 이슈 발생 시 제조사에서 적극적으로 대응
M+	**COK 4**	DM 연결된 상태 에서 모듈 리셋 시 DM 재연결 필요 - UART로 DM을 구성 필요
M-	**COK 5**	CM Tool 내 디버그 스크린에서 발신정지, 미개통 USIM 삽입 시 EMM cause 확인되지 않음 AT 커멘드로 Cause값 확인 불가 - 9월 말까지 개선 후 MR검증 진행 예정

❑ FOTA 검증 결과

차수	검증구분	합계	성공	실패	실패율	비고
2차	모듈 FOTA	10	10	0	0%	

❑보안 검증 결과

점검 항목 수	적합	개선필요	N/A	내용
13	10	-	3	**적합**

❑검증 이슈 사항

이슈 사항
ㅇ 검증 이슈 사항 - Packet Log 확인 시 (AT+QDBGCFG="PCAP",3), (at+qdbgcfg="tracecfg",0,2)명령어 입력 필요 - AT CMD로 잘못된 커멘드 입력시 응답값으로 ERROR 약5~10회 발생 후 리셋 동작 - AT CMD로 상태값 변경 시 간헐적으로 AT+CFUN=4로 바꿔야 커멘드 가 동작하는 경우가 발생함 - IMS 미구현(9월 말까지 개발 후 MR검증 진행 예정) ㅇ 디버깅 이슈 사항 - KDM 연동 불가로 인해 제조사 자체 분석 툴(ArmTracer)로 검증 진행 - 실시간 Data Packet 통신 확인 불가하며, PCAP 로그 수집 후 추후 확인 가능 ㅇ 모듈 FOTA 시 AT+QNETDEVCTL=0 설정 상태에서 진행 필요 o 제조사 FOTA 및 APN 변경 기능 지원 1. KT FOTA 적용이 우선, 불가피한 제조사 FOTA 적용 시 KT 검증 완료된 FW에 대해 KT사업팀과 사전 협의 후 현장적용 필요 2. KT와 협의되지 않은 F/W 적용으로 발생하는 모든 문제의 후속처리는 제조사 비용으로 처리 3. 제조사에서 APN 변경 시 KT와 사전 협의 후 현장적용 필요

ที่ สทช ๒๔๐๗/๑๒๒๗๔

สำนักงาน กสทช.
๘๗ พหลโยธิน ซอย ๘
แขวงสามเสนใน เขตพญาไท
กรุงเทพฯ ๑๐๔๐๐

๗ มีนาคม ๒๕๖๕

เรื่อง การตรวจสอบและรับรองมาตรฐานเครื่องโทรคมนาคมและอุปกรณ์ ตราอักษร QUECTEL รุ่น EC200U-EU

เรียน กรรมการผู้จัดการ บริษัท อีเลคทรอนิคส์ ซอร์ช จำกัด

อ้างถึง ๑. แบบคำขอรับบริการรับรองเครื่องโทรคมนาคมและอุปกรณ์ ลงวันที่ ๓ มีนาคม ๒๕๖๕
๒. ประกาศคณะกรรมการกิจการกระจายเสียง กิจการโทรทัศน์ และกิจการโทรคมนาคมแห่งชาติ เรื่อง การตรวจสอบและรับรองมาตรฐานของเครื่องโทรคมนาคมและอุปกรณ์ ประกาศ ณ วันที่ ๒ กรกฎาคม ๒๕๕๙
๓. ประกาศคณะกรรมการกิจการโทรคมนาคมแห่งชาติ เรื่อง หลักเกณฑ์และมาตรการกำกับดูแลความปลอดภัยต่อสุขภาพของมนุษย์จากการใช้เครื่องวิทยุคมนาคม ประกาศ ณ วันที่ ๒๙ มีนาคม ๒๕๕๐

สิ่งที่ส่งมาด้วย ใบรับรองเครื่องโทรคมนาคมและอุปกรณ์ จำนวน ๑ ฉบับ

ตามหนังสือที่อ้างถึง ๑ ท่านได้ยื่นขอรับบริการรับรองเครื่องโทรคมนาคมและอุปกรณ์ (แบบ วท.๐๓) ตราอักษร QUECTEL รุ่น EC200U-EU ต่อสำนักงานคณะกรรมการกิจการกระจายเสียง กิจการโทรทัศน์ และกิจการโทรคมนาคมแห่งชาติ (สำนักงาน กสทช.) ความละเอียดแจ้งแล้ว นั้น

สำนักงาน กสทช. ขอเรียนดังนี้

๑. เครื่องวิทยุคมนาคมตราอักษร แบบรุ่น ดังกล่าว ผ่านการรับรองมาตรฐานจากสำนักงาน กสทช. รายละเอียดปรากฏตามใบรับรองเครื่องโทรคมนาคมและอุปกรณ์ตามสิ่งที่ส่งมาด้วย ทั้งนี้ การผลิตหรือนำเครื่องวิทยุคมนาคมเข้ามาจำหน่ายภายในประเทศ ผู้ประกอบการมีหน้าที่และความรับผิดชอบ ตามหมวด ๖ ของประกาศที่อ้างถึง ๒ และต้องแสดงความสอดคล้องตามมาตรฐานความปลอดภัย ตามหมวด ๒ หมวด ๓ หรือหมวด ๔ (แล้วแต่กรณีตามประเภทของเครื่องวิทยุคมนาคม) ของประกาศที่อ้างถึง ๓

๒. สำนักงาน กสทช. ยังไม่ได้รับแจ้งยืนยันรายงานผลการทดสอบของเครื่องวิทยุคมนาคมดังกล่าว ดังนั้น หากในภายหลังปรากฏว่ารายงานผลการทดสอบที่ท่านจัดส่งมานั้น ไม่สอดคล้องตามที่สำนักงาน กสทช. ได้รับแจ้งจากหน่วยตรวจสอบของต่างประเทศที่เกี่ยวข้องโดยตรง สำนักงาน กสทช. จะพิจารณาดำเนินการเสนอ ให้เพิกถอนผลการตรวจสอบและรับรองมาตรฐานเครื่องโทรคมนาคมและอุปกรณ์ดังกล่าวต่อไป

จึงเรียนมาเพื่อโปรดทราบและถือปฏิบัติต่อไป

ขอแสดงความนับถือ

(นายชุติเดช บุญโกสุมภ์)
ผู้อำนวยการสำนักเทคโนโลยีและมาตรฐานโทรคมนาคม
ปฏิบัติการแทน เลขาธิการ กสทช.

สำนักเทคโนโลยีและมาตรฐานโทรคมนาคม
โทร. ๐-๒๖๗๐-๘๘๘๘ ต่อ ๗๖๗๗
โทรสาร ๐-๒๒๗๙-๒๒๗๓
ไปรษณีย์อิเล็กทรอนิกส์ standard@nbtc.go.th

สำนักงานคณะกรรมการกิจการกระจายเสียง กิจการโทรทัศน์ และกิจการโทรคมนาคมแห่งชาติ

The Office of National Broadcasting and Telecommunications Commission

ใบรับรองเครื่องโทรคมนาคมและอุปกรณ์

(Approval Certificate for Telecommunication Equipment)

ที่ (No.) : B38133-22

ใบรับรองนี้แสดงว่าเครื่องโทรคมนาคมและอุปกรณ์ดังรายละเอียดต่อไปนี้ได้ผ่านการตรวจสอบและรับรองมาตรฐานแล้ว โดยมีเงื่อนไขปรากฏตามเอกสารแนบจำนวน 2 ฉบับ

This is to certify that the telecommunication equipment appeared hereunder has been approved with condition(s) specified in 2 Annex(es)

ตราอักษร (Brand Name)	: QUECTEL
แบบ/รุ่น (Type/Model)	: EC200U-EU
ชนิด (Type of equipment)	: MODULE
ประเภทเครื่องโทรคมนาคมและอุปกรณ์ (Product Description)	: Cellular Mobile (GSM/LTE Module)
ย่านความถี่วิทยุ (Frequency Range)	: Tx: See Annex(es) Rx: See Annex(es)
กำลังส่ง (Output Power)	: See Annex(es)
ผู้ผลิต (Manufacturer) และบริษัทในเครือประเทศอื่นๆ	: Quectel Wireless Solutions Co., Ltd., P.R. China
ผู้ยื่นขอตรวจสอบและรับรอง (Applicant)	: บริษัท อีเลคทรอนิคส์ ซอร์ซ จำกัด

ลงวันที่ 3 มีนาคม 2565
(Date of Issue)

ลงชื่อ (Signature) .....
(นายชุติเดช บุญโกสุมภ์)
ผู้อำนวยการสำนักเทคโนโลยีและมาตรฐานโทรคมนาคม
พนักงานเจ้าหน้าที่

เลขที่ 87 ซอยพหลโยธิน 8 ถนนพหลโยธิน แขวงสามเสนใน เขตพญาไท กรุงเทพมหานคร 10400 โทร + 66 2271 0151-60 ต่อ 321 โทรสาร +66 2279 2273
No.87 Soi Phaholyothin8, Phaholyothin Rd., Samsennai, Phayathai, Bangkok Thailand 10400 Tel + 66 2271 0151-60 Ext. 321 Fax +66 2279 2273

เอกสารแนบ (Annex) 1

ที่ (No.) : B38133-22

ข้อกำหนดการรับรองเครื่องโทรคมนาคมและอุปกรณ์

1. เครื่องวิทยุคมนาคมดังกล่าว ได้รับยกเว้นไม่ต้องได้รับใบอนุญาตให้มี ใช้ นำเข้า นำออก หรือค้า ซึ่งเครื่องวิทยุคมนาคม และตั้งสถานีวิทยุคมนาคม แล้วแต่กรณี ตามประกาศคณะกรรมการกิจการกระจายเสียง กิจการโทรทัศน์ และกิจการโทรคมนาคมแห่งชาติ เรื่อง เครื่องวิทยุคมนาคมและสถานีวิทยุคมนาคมที่ได้รับการยกเว้นไม่ต้องได้รับใบอนุญาต ตามพระราชบัญญัติวิทยุคมนาคม พ.ศ. 2498 ข้อ 5 (1) ข้อ 6 ข้อ 7 และข้อ 13 (3) โดยอนุญาตให้ใช้งานในลักษณะหรือกิจการที่กำหนดไว้ในประกาศดังกล่าว
2. ผู้ใด ทำ มี ใช้ นำเข้า นำออก หรือค้า ซึ่งเครื่องวิทยุคมนาคม หรือตั้งสถานีวิทยุคมนาคมตราอักษรและรุ่นดังกล่าว จะต้องปฏิบัติตามพระราชบัญญัติวิทยุคมนาคม พ.ศ. 2498 และกฎกระทรวง ระเบียบ ประกาศ และเงื่อนไขการอนุญาต ที่ออกตามพระราชบัญญัติดังกล่าวอย่างเคร่งครัด
3. ผู้ใด ทำ มี ใช้ นำเข้า นำออก หรือค้า ซึ่งเครื่องวิทยุคมนาคม หรือตั้งสถานีวิทยุคมนาคม ที่มีตราอักษรและรุ่นดังกล่าว โดยมีลักษณะทางเทคนิคไม่สอดคล้องกับใบรับรองเครื่องโทรคมนาคมและอุปกรณ์นี้ หรือไม่เป็นไปตามประกาศคณะกรรมการกิจการกระจายเสียง กิจการโทรทัศน์ และกิจการโทรคมนาคมแห่งชาติ เรื่อง เครื่องวิทยุคมนาคมและสถานีวิทยุคมนาคมที่ได้รับการยกเว้นไม่ต้องได้รับใบอนุญาต ตามพระราชบัญญัติวิทยุคมนาคม พ.ศ. 2498 จะต้องได้รับอนุญาตจากคณะกรรมการกิจการกระจายเสียง กิจการโทรทัศน์ และกิจการโทรคมนาคมแห่งชาติ มิฉะนั้น จะมีความผิดตามพระราชบัญญัติวิทยุคมนาคม พ.ศ. 2498
4. หากสำนักงานคณะกรรมการกิจการกระจายเสียง กิจการโทรทัศน์และกิจการโทรคมนาคมแห่งชาติ ตรวจสอบในภายหลังพบว่า มีการแก้ไขดัดแปลงลักษณะทางเทคนิคของเครื่องวิทยุคมนาคม หรือเอกสาร ก่อนส่งตรวจสอบและรับรองมาตรฐาน หรือมีการปิดบัง ซ่อนเร้นข้อมูลความจริง เพื่อให้สำคัญผิดว่า เครื่องวิทยุคมนาคมนั้นมีลักษณะทางเทคนิคของผู้ผลิตถูกต้องตามกฎระเบียบ และประกาศที่ออกตามพระราชบัญญัติวิทยุคมนาคม พ.ศ. 2498 และพระราชบัญญัติการประกอบกิจการโทรคมนาคม พ.ศ. 2544 เพื่อประโยชน์ในการขอใบรับรองเครื่องโทรคมนาคมและอุปกรณ์ สำนักงานคณะกรรมการกิจการกระจายเสียง กิจการโทรทัศน์และกิจการโทรคมนาคมแห่งชาติ จะเสนอให้คณะกรรมการกิจการกระจายเสียง กิจการโทรทัศน์ และกิจการโทรคมนาคมแห่งชาติ เพิกถอนใบรับรองนั้น

เอกสารแนบ (Annex) 2 (1)

ที่ (No.) : B38133-22

รายละเอียดการรับรองเครื่องโทรคมนาคมและอุปกรณ์

1. สำนักงานคณะกรรมการกิจการกระจายเสียง กิจการโทรทัศน์และกิจการโทรคมนาคมแห่งชาติ ใช้เอกสารดังต่อไปนี้ ประกอบการรับรองเครื่องโทรคมนาคมและอุปกรณ์ ตราอักษร QUECTEL รุ่น EC200U-EU
   1.1 สำเนารายงานผลการทดสอบของ SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch P.R. China
   (/) GSM Test (900/1800 MHz) : หมายเลข SHR/2021/3000504 ลงวันที่ 26 พฤษภาคม 2564 และ หมายเลข SHR/2021/3000511 ลงวันที่ 31 พฤษภาคม 2564
   (/) LTE Test (Band 1/3/8/28/40) : หมายเลข SHR/2021/3000505 ลงวันที่ 26 พฤษภาคม 2564 และหมายเลข SHR/2021/3000512 ลงวันที่ 31 พฤษภาคม 2564
   (/) LTE Test (Band 1/3/5/8/28/40/41) : หมายเลข SHR/2021/C000902 ลงวันที่ 13 มกราคม 2565
   (/) LTE Test (Band 5) : หมายเลข : SHR/2021/3000502 ลงวันที่ 6 พฤษภาคม 2564
   (/) Bluetooth Test : หมายเลข SHR/2021/3000506 และหมายเลข SHR/2021/3000507 ลงวันที่ 26 พฤษภาคม 2564 และหมายเลข SHR/2021/3000513 และหมายเลข SHR/2021/3000514 ลงวันที่ 31 พฤษภาคม 2564
   (/) WLAN Test (2.4 GHz) : หมายเลข SHR/2021/3000508 ลงวันที่ 26 พฤษภาคม 2564 และหมายเลข SHR/2021/3000515 ลงวันที่ 31 พฤษภาคม 2564
   (/) MPE Test : หมายเลข SHR/2021/3000503 ลงวันที่ 31 พฤษภาคม 2564 และหมายเลข SHR/2021/3000510 ลงวันที่ 30 มิถุนายน 2564 และหมายเลข SHR/2021/C000907 ลงวันที่ 13 มกราคม 2565
   (/) Safety Test (Module) : หมายเลข SZES210600423101 และหมายเลข SZES210600423201 ลงวันที่ 29 มิถุนายน 2564
   1.2 สำเนาหนังสือรับรองของ Quectel wireless solutions Co., Ltd., P.R.China รับรองว่า module รุ่น EC200U-EU รองรับ WiFi 2.4 GHz ภาครับ (Rx) เท่านั้น
   1.3 แค็ตตาล็อก (Catalogue) และข้อกำหนดทางวิชาการ (Technical Specifications)
2. เครื่องวิทยุคมนาคมตราอักษรและรุ่นดังกล่าว มีลักษณะทางเทคนิคผ่านเกณฑ์ที่กำหนดตามประกาศ กทช. และ กสทช. ดังต่อไปนี้
   2.1 เรื่อง มาตรฐานทางเทคนิคของเครื่องโทรคมนาคมและอุปกรณ์ สำหรับเครื่องวิทยุคมนาคมลูกข่ายในกิจการเคลื่อนที่ทางบก ระบบโทรศัพท์เคลื่อนที่แบบรังผึ้ง (Cellular) ซึ่งใช้เทคโนโลยี GSM ลงวันที่ 28 มีนาคม พ.ศ. 2560 (กสทช. มท. 1004-2560)
   2.2 เรื่อง มาตรฐานทางเทคนิคของเครื่องโทรคมนาคมและอุปกรณ์ สำหรับเครื่องวิทยุคมนาคมลูกข่าย กิจการโทรคมนาคมเคลื่อนที่สากล International Mobile Telecommunications (IMT) ซึ่งใช้เทคโนโลยี Evolution Universal Terrestrial Radio Access (E-UTRA) ลงวันที่ 28 มีนาคม พ.ศ. 2560 (กสทช. มท. 1027-2560)
   2.3 เรื่อง มาตรฐานความปลอดภัยต่อสุขภาพของมนุษย์จากการใช้เครื่องวิทยุคมนาคม ลงวันที่ 29 มีนาคม พ.ศ. 2550 (กทช. มท. 5001-2550)

เอกสารแนบ (Annex) 2 (2)

ที่ (No.) : B38133-22

3. รายละเอียดเครื่องวิทยุคมนาคม

3.1 รายละเอียดย่านความถี่วิทยุคมนาคมที่ได้รับการรับรองมาตรฐานทางเทคนิคของเครื่องวิทยุคมนาคม

เทคโนโลยี	Tx. (MHz)	Rx. (MHz)	กำลังส่งสูงสุด (วัตต์)
GSM 900	880-915	925-960	2
GSM 1800	1710-1785	1805-1880	1
LTE Band 1	1920-1980	2110-2170	0.20
LTE Band 3	1710-1785	1805-1880	0.20
LTE Band 5	824-849	869-894	0.20
LTE Band 8	880-915	925-960	0.20
LTE Band 28	703-748	758-803	0.20
LTE Band 40	2300-2400	2300-2400	0.20
LTE Band 41	2496-2690	2496-2690	0.20
Bluetooth	2400-2500	2400-2500	100 mW (e.i.r.p.)
WLAN 2.4 GHz	-	2400-2500	-

3.2 รายละเอียดย่านความถี่วิทยุคมนาคมที่ไม่ได้รับการรับรองมาตรฐานทางเทคนิคของเครื่องวิทยุคมนาคม

เทคโนโลยี	Tx. (MHz)	Rx. (MHz)	กำลังส่งสูงสุด (วัตต์)
GSM 850	824-849	869-894	2
GSM 1900	1850-1910	1930-1990	1
LTE Band 7	1920-1980	2110-2170	0.20
LTE Band 20	832-862	791-821	0.20
LTE Band 38	2570-2620	2570-2620	0.20
GPS	N/A	1575.42 MHz	-
GLONASS	N/A	1598.0625-1605.375	-
Galileo	N/A	1575.42 MHz	-
BDS	N/A	1561.098 MHz	-

3.3 เครื่องวิทยุคมนาคมตราอักษรและรุ่นดังกล่าว มีค่าความแรงสนามไฟฟ้า (Electric Field Strength) ของคลื่นแม่เหล็กไฟฟ้าสูงสุด 21.75 V/m @20 cm สำหรับเทคโนโลยี LTE Band 41

Declaration of Conformity

We, **Quectel Wireless Solutions Co., Ltd.**, being the manufacturer, hereby declare that this product (Product name: **LTE Cat 1 bis Module**; Tradename: **QUECTEL**, Model: **EC200U-EU** complies with the following:

☒ IMEI Security:
The product has a device identifier. The IMEI codes are unique to each unit. The IMEI of each unit is factory set and cannot be altered by the user. It complies with the relevant IMEI integrity related requirements of current ETSI TS 122 016 and ETSI TS 133 501.

☐ Core Protocol Specifications for UTRA (UMTS):
The product complies with the applicable mandatory requirements of the following ETSI Core Specifications:
- ETSI TS 123 122
- ETSI TS 124 008
- ETSI TS 125 304
- ETSI TS 125 321
- ETIS TS 125 331

☒ Core Protocol Specifications for E-UTRA (LTE):
The product complies with the applicable mandatory requirements of the following ETSI Core Specifications:
- ETSI TS 136 321
- ETSI TS 136 322
- ETSI TS 136 323
- ETSI TS 136 331

☐ RED Carrier Aggregation combinations for E-UTRA (LTE):
The product complies with the requirements of the following ETSI Specifications:
- ETSI TS 136 521-1

☐ Other Carrier Aggregation combinations for E-UTRA (LTE):
The product complies with the requirements of the following ETSI Specifications:
- ETSI TS 136 101

☐ Core Protocol Specifications for 5G NR technologies (5G NR):
The product complies with the applicable mandatory requirements of the following ETSI Core Specifications:
- ETSI TS 138 321
- ETSI TS 138 322
- ETSI TS 138 323
- ETSI TS 138 331

☐ 5G NR FR1 standalone (5G NR):
The product complies with the requirements of the following ETSI Core Specifications:
☐ ETSI 138 101-1(Single Carrier); ☐ ETSI 138 101-1(Carrier Aggregation); ☐ ETSI 138 101-1(Supplemental Uplink);

☐ 5G NR FR2 standalone (5G NR):
The product complies with the requirements of the following ETSI Core Specifications:
☐ ETSI 138 101-2(Single Carrier); ☐ ETSI 138 101-2(Carrier Aggregation);

☒ FDD Band 5 (850MHz):
The product supports FDD Band 5 (850MHz) and complies with the requirements of FCC Part 22 Rules for RF compatibility, network integrity and interoperability with the STS.

Should you have any questions or comments regarding this Declaration, please do not hesitate to contact me.

Signature:

Company Name: Quectel Wireless Solutions Co., Ltd.
Signatory Name &Title: Jean Hu & Certification Manager
Date: September 23, 2025

Supplier's declaration of conformity

Australian Government | acma Australian Communications and Media Authority

As required by the following Notices:

- *Radiocommunications (Compliance Labelling - Devices) Notice 2014* made under section 182 of the *Radiocommunications Act 1992*;
- *Radiocommunications Labelling (Electromagnetic Compatibility) Notice 2017* made under section 182 of the *Radiocommunications Act 1992*
- *Radiocommunications (Compliance Labelling – Electromagnetic Radiation) Notice 2014* made under section 182 of the *Radiocommunications Act 1992* and
- *Telecommunications (Labelling Notice for Customer Equipment and Customer Cabling) Instrument 2015* made under section 407 of the *Telecommunications Act 1997*.

Instructions for completion

- ***Do not return this form to the ACMA***. This completed form must be retained by the supplier as part of the documentation required for the compliance records and must be made available for inspection by the ACMA when requested.

Supplier's details (manufacturer, importer or authorised agent)

Company Name (OR INDIVIDUAL)

QUECTEL WIRELESS SOLUTIONS AUSTRALIA PTY LTD
TRADING AS

ACN/ARBN

652 889 588

OR

New Zealand IRDN

Street Address (AUSTRALIAN or NEW ZEALAND)

3 Stirling Crescent, Glen Waverley, Victoria,
Australia
POSTCODE **3150**
Phone: **0450646886**

Product details and date of manufacture

Product description – brand name, type, current model, lot, batch or serial number (if available), software/firmware version (if applicable)

Product name: LTE Cat 1 bis Module
Brand name: QUECTEL
Model : EC200U-EU
Date of manufacture or importation of the original/modified item

Compliance – applicable standards and other supporting documents

Evidence of compliance with applicable standards may be demonstrated by test reports, endorsed/accredited test reports, certification/competent body statements.

Having had regard to these documents, I am satisfied the above mentioned product complies with the requirements of the relevant ACMA Standards made under the *Radiocommunications Act 1992* and the *Telecommunications Act 1997.*

List the details of the documents the above statement was made, including the standard title, number and, if applicable, number of the test report/endorsed test report or certification/competent body statement

AS/CA S042.1:2025, AS/CA S042.4:2025, AS/NZS 4268:2017 + A1:2021 **Report NO. : SZCR250800340401, SZCR250800340402, SZCR250800340403, SZCR250800340404, SZCR250800340408, SZCR250800340409, SZCR250800340410, SZCR250800340411**
AS/NZS CISPR 32: 2015 + A1:2020 **Report NO. : SZCR250800340407**
AS&NZS 2772.2: 2016 Amd 1: 2018 /ARPANSA Standard RPS S-1: 2021 **Report NO. : SZCR250800340412**
AS/NZS 62368.1:2022 **Report NO. : SZES250800620701**

Declaration

I hereby declare that:

1. I am authorised to make this declaration on behalf of the Company mentioned above,
2. the contents of this form are true and correct, and
3. the product mentioned above complies with the applicable above mentioned standards and all products supplied under this declaration will be identical to the product identified above.

***Note*:** Under section 137.1 of the *Criminal Code Act 1995*, it is an offence to knowingly provide false or misleading information to a Commonwealth entity.

Penalty: 12 months imprisonment

SIGNATURE OF SUPPLIER OR AGENT 	POSITION IN ORGANISATION **Director**
PRINT NAME **Helen Mao**	DATE **September 23, 2025**

The *Privacy Act 1988* (Cth) (the Privacy Act) imposes obligations on the ACMA in relation to the collection, security, quality, access, use and disclosure of personal information. These obligations are detailed in the Australian Privacy Principles.

The ACMA may only collect personal information if it is reasonably necessary for, or directly related to, one or more of the ACMA's functions or activities.

The purpose of collecting the personal information in this form is to ensure the supplier is identified in the 'Declaration of conformity'. If this Declaration of Conformity is not completed and the requested information is not provided, a compliance label cannot be applied.

Further information on the Privacy Act and the ACMA's Privacy Policy is available at www.acma.gov.au/privacypolicy. The Privacy Policy contains details about how you may access personal information about you that is held by the ACMA, and seek the correction of such information. It also explains how you may complain about a breach of the Privacy Act and how we will deal with such a complaint.

Should you have any questions in this regard, please contact the ACMA's privacy contact officer on telephone on 1800 226 667 or by email at privacy@acma.gov.au.

Declaration of Conformity

We, **Quectel Wireless Solutions Co., Ltd.,**being the manufacturer, hereby declare that this product (Product name: **LTE Module**; Tradename: **QUECTEL**, Model: **EC200U-EU** complies with the following:

☒ IMEI Security:
The product has a device identifier. The IMEI codes are unique to each unit. The IMEI of each unit is factory set and cannot be altered by the user. It complies with the relevant IMEI integrity related requirements of current ETSI TS 122 016 and ETSI TS 133 501.

☐ Core Protocol Specifications for UTRA (UMTS):
The product complies with the applicable mandatory requirements of the following ETSI Core Specifications:
- ETSI TS 123 122
- ETSI TS 124 008
- ETSI TS 125 304
- ETSI TS 125 321
- ETIS TS 125 331

☒ Core Protocol Specifications for E-UTRA (LTE):
The product complies with the applicable mandatory requirements of the following ETSI Core Specifications:
- ETSI TS 136 321
- ETSI TS 136 322
- ETSI TS 136 323
- ETSI TS 136 331

☐ RED Carrier Aggregation combinations for E-UTRA (LTE):
The product complies with the requirements of the following ETSI Specifications:
- ETSI TS 136 521-1

☐ Other Carrier Aggregation combinations for E-UTRA (LTE):
The product complies with the requirements of the following ETSI Specifications:
- ETSI TS 136 101

☐ Core Protocol Specifications for 5G NR technologies (5G NR):
The product complies with the applicable mandatory requirements of the following ETSI Core Specifications:
- ETSI TS 138 321
- ETSI TS 138 322
- ETSI TS 138 323
- ETSI TS 138 331

☐ 5G NR FR1 standalone (5G NR):
The product complies with the requirements of the following ETSI Core Specifications:
☐ ETSI 138 101-1(Single Carrier); ☐ ETSI 138 101-1(Carrier Aggregation); ☐ ETSI 138 101-1(Supplemental Uplink);

☐ 5G NR FR2 standalone (5G NR):
The product complies with the requirements of the following ETSI Core Specifications:
☐ ETSI 138 101-2(Single Carrier); ☐ ETSI 138 101-2(Carrier Aggregation);

☒ FDD Band 5 (850MHz):
The product supports FDD Band 5 (850MHz) and complies with the requirements of FCC Part 22 Rules for RF compatibility, network integrity and interoperability with the STS.

Should you have any questions or comments regarding this Declaration, please do not hesitate to contact me.

Signature:

Company Name: Quectel Wireless Solutions Co., Ltd.
Signatory Name &Title: Jean Hu & Certification Manager
Date: October 30, 2024

Supplier's declaration of conformity

This is the Australian Communications and Media Authority (ACMA) approved form for a declaration of conformity under the following legislative instruments:

- Radiocommunications Equipment (General) Rules 2021
- Radiocommunications Labelling (Electromagnetic Compatibility) Notice 2017.

This is a sample form for a declaration of conformity under the Telecommunications (Labelling Notice for Customer Equipment and Customer Cabling) Instrument 2015.

Instructions for completion

Do not return this form to the ACMA. This completed form must be retained by the supplier as part of the documentation required for the compliance records. However, it must be made available for inspection by the ACMA when requested.

Supplier's details (manufacturer, importer or authorised agent)

Company name (or individual)

QUECTEL WIRELESS SOLUTIONS AUSTRALIA PTY LTD
Trading as

ACN/ARBN

652 889 588

or

New Zealand IRDN

Street address (Australia or New Zealand)

3 Stirling Crescent, Glen Waverley, Victoria, Australia
POSTCODE **3150**
Phone: **0450646886**

Product details and date of manufacture

Product description – brand name, type, current model, lot, batch or serial number (if available), software/firmware version (if applicable)

Product name：LTE Module
Brand name: Quectel
Model: EC200U-EU
Date of manufacture or importation of the original/modified item

Compliance – applicable standards and other supporting documents

Evidence of compliance with applicable standards may be demonstrated by test reports, endorsed/accredited test reports, certification/competent body statements.

Having had regard to these documents, I am satisfied the above-mentioned product complies with the requirements of the relevant ACMA standards made under the *Radiocommunications Act 1992* and/or the *Telecommunications Act 1997.*

List these documents including details of the standard title, number and, if applicable, number of the test report/endorsed test report or certification/competent body statement.

AS/NZS 4268:2017,AS/CA S042.1:2022,AS/CA S042.4:2022 **Report NO. : PD20240123-R2B, PD20240123-R2A, PD20240123-R1A, PD20240123-R1B, PD20240123-R1C**
AS/NZS CISPR 32: 2015+A1:2020 **Report NO. : PD20240123-E2A**
AS&NZS 2772.2: 2016 Amd 1:2018 **Report NO. : PD20240123-R2C**
AS/NZS 62368.1:2022 **Report NO. : PD20240123-L2A**

Declaration

I hereby declare that:

1. I am authorised to make this declaration on behalf of the Company mentioned above
2. the contents of this form are true and correct
3. the product mentioned above complies with the applicable above mentioned standards and all products supplied under this declaration will be identical to the product identified above
4. I understand that giving false or misleading information is a serious offence.

***Note*:** It is an offence to knowingly provide false or misleading information to a Commonwealth entity or a person who is exercising powers, performing functions under, or in connection with, a law of the Commonwealth. It is an offence to knowingly provide false or misleading information or documents in compliance or purported compliance with a law of the Commonwealth. (See sections 137.1 and 137.2 of the *Criminal Code Act 1995*.)

Penalty: 12 months imprisonment

SIGNATURE OF SUPPLIER OR AGENT 	POSITION IN ORGANISATION **Director**
PRINT NAME **Helen Mao**	DATE **October 30, 2024**

The *Privacy Act 1988* (Cth) (the Privacy Act) imposes obligations on the ACMA in relation to the collection, security, quality, access, use and disclosure of personal information. These obligations are detailed in the Australian Privacy Principles.

The ACMA may only collect personal information if it is reasonably necessary for, or directly related to, one or more of the ACMA's functions or activities.

The purpose of collecting the personal information in this form is to ensure the supplier is identified in the 'declaration of conformity'. If this declaration of conformity is not completed and the requested information is not provided, a compliance label cannot be applied.

Further information on the Privacy Act and the ACMA's privacy policy is available at www.acma.gov.au/privacypolicy. The privacy policy contains details about how you may access personal information about you that is held by the ACMA, and seek the correction of such information. It also explains how you may complain about a breach of the Privacy Act and how we will deal with such a complaint.

Should you have any questions in this regard, please contact the ACMA's privacy contact officer on telephone on 1800 226 667 or by email at privacy@acma.gov.au.

Declaration of Conformity

We, **Quectel Wireless Solutions Co., Ltd.**, being the manufacturer, hereby declare that this product (Product name: **LTE Cat 1 bis Module**; Tradename: **QUECTEL**, Model: **EC200U-EU** complies with the following:

☒ IMEI Security:
The product has a device identifier. The IMEI codes are unique to each unit. The IMEI of each unit is factory set and cannot be altered by the user. It complies with the relevant IMEI integrity related requirements of current ETSI TS 122 016 and ETSI TS 133 501.

☐ Core Protocol Specifications for UTRA (UMTS):
The product complies with the applicable mandatory requirements of the following ETSI Core Specifications:
- ETSI TS 123 122
- ETSI TS 124 008
- ETSI TS 125 304
- ETSI TS 125 321
- ETIS TS 125 331

☒ Core Protocol Specifications for E-UTRA (LTE):
The product complies with the applicable mandatory requirements of the following ETSI Core Specifications:
- ETSI TS 136 321
- ETSI TS 136 322
- ETSI TS 136 323
- ETSI TS 136 331

☐ RED Carrier Aggregation combinations for E-UTRA (LTE):
The product complies with the requirements of the following ETSI Specifications:
- ETSI TS 136 521-1

☐ Other Carrier Aggregation combinations for E-UTRA (LTE):
The product complies with the requirements of the following ETSI Specifications:
- ETSI TS 136 101

☐ Core Protocol Specifications for 5G NR technologies (5G NR):
The product complies with the applicable mandatory requirements of the following ETSI Core Specifications:
- ETSI TS 138 321
- ETSI TS 138 322
- ETSI TS 138 323
- ETSI TS 138 331

☐ 5G NR FR1 standalone (5G NR):
The product complies with the requirements of the following ETSI Core Specifications:
☐ ETSI 138 101-1(Single Carrier); ☐ ETSI 138 101-1(Carrier Aggregation); ☐ ETSI 138 101-1(Supplemental Uplink);

☐ 5G NR FR2 standalone (5G NR):
The product complies with the requirements of the following ETSI Core Specifications:
☐ ETSI 138 101-2(Single Carrier); ☐ ETSI 138 101-2(Carrier Aggregation);

☒ FDD Band 5 (850MHz):
The product supports FDD Band 5 (850MHz) and complies with the requirements of FCC Part 22 Rules for RF compatibility, network integrity and interoperability with the STS.

Should you have any questions or comments regarding this Declaration, please do not hesitate to contact me.

Signature:

Company Name: Quectel Wireless Solutions Co., Ltd.
Signatory Name &Title: Jean Hu & Certification Manager
Date: September 23, 2025

Supplier's declaration of conformity

Australian Government | acma Australian Communications and Media Authority

As required by the following Notices:

- *Radiocommunications (Compliance Labelling - Devices) Notice 2014* made under section 182 of the *Radiocommunications Act 1992*;
- *Radiocommunications Labelling (Electromagnetic Compatibility) Notice 2017* made under section 182 of the *Radiocommunications Act 1992*
- *Radiocommunications (Compliance Labelling – Electromagnetic Radiation) Notice 2014* made under section 182 of the *Radiocommunications Act 1992* and
- *Telecommunications (Labelling Notice for Customer Equipment and Customer Cabling) Instrument 2015* made under section 407 of the *Telecommunications Act 1997*.

Instructions for completion

- ***Do not return this form to the ACMA***. This completed form must be retained by the supplier as part of the documentation required for the compliance records and must be made available for inspection by the ACMA when requested.

Supplier's details (manufacturer, importer or authorised agent)

Company Name (OR INDIVIDUAL)

QUECTEL WIRELESS SOLUTIONS AUSTRALIA PTY LTD
TRADING AS

ACN/ARBN

652 889 588

OR

New Zealand IRDN

Street Address (AUSTRALIAN or NEW ZEALAND)

3 Stirling Crescent, Glen Waverley, Victoria,
Australia
POSTCODE **3150**
Phone: **0450646886**

Product details and date of manufacture

Product description – brand name, type, current model, lot, batch or serial number (if available), software/firmware version (if applicable)

Product name: LTE Cat 1 bis Module
Brand name: QUECTEL
Model : EC200U-EU
Date of manufacture or importation of the original/modified item

Compliance – applicable standards and other supporting documents

Evidence of compliance with applicable standards may be demonstrated by test reports, endorsed/accredited test reports, certification/competent body statements.

Having had regard to these documents, I am satisfied the above mentioned product complies with the requirements of the relevant ACMA Standards made under the *Radiocommunications Act 1992* and the *Telecommunications Act 1997.*

List the details of the documents the above statement was made, including the standard title, number and, if applicable, number of the test report/endorsed test report or certification/competent body statement

AS/CA S042.1:2025, AS/CA S042.4:2025, AS/NZS 4268:2017 + A1:2021 **Report NO. : SZCR250800340601, SZCR250800340602, SZCR250800340603, SZCR250800340604, SZCR250800340605, SZCR250800340606, SZCR250800340608, SZCR250800340610, SZCR250800340611, SZCR250800340612**
AS/NZS CISPR 32: 2015 + A1:2020 **Report NO. : SZCR250800340613**
AS&NZS 2772.2: 2016 Amd 1: 2018 /ARPANSA Standard RPS S-1: 2021 **Report NO. : SZCR250800340609**
AS/NZS 62368.1:2022 **Report NO. : SZES250800620502**

Declaration

I hereby declare that:

1. I am authorised to make this declaration on behalf of the Company mentioned above,
2. the contents of this form are true and correct, and
3. the product mentioned above complies with the applicable above mentioned standards and all products supplied under this declaration will be identical to the product identified above.

***Note*:** Under section 137.1 of the *Criminal Code Act 1995*, it is an offence to knowingly provide false or misleading information to a Commonwealth entity.

Penalty: 12 months imprisonment

SIGNATURE OF SUPPLIER OR AGENT 	POSITION IN ORGANISATION **Director**
PRINT NAME **Helen Mao**	DATE **September 23, 2025**

The *Privacy Act 1988* (Cth) (the Privacy Act) imposes obligations on the ACMA in relation to the collection, security, quality, access, use and disclosure of personal information. These obligations are detailed in the Australian Privacy Principles.

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Should you have any questions in this regard, please contact the ACMA's privacy contact officer on telephone on 1800 226 667 or by email at privacy@acma.gov.au.

Declaration of Conformity

We, **Quectel Wireless Solutions Co., Ltd.**, being the manufacturer, hereby declare that this product (Product name: **LTE Cat 1 bis Module**; Tradename: **QUECTEL**, Model: **EC200U-EU** complies with the following:

☒ IMEI Security:
The product has a device identifier. The IMEI codes are unique to each unit. The IMEI of each unit is factory set and cannot be altered by the user. It complies with the relevant IMEI integrity related requirements of current ETSI TS 122 016 and ETSI TS 133 501.

☐ Core Protocol Specifications for UTRA (UMTS):
The product complies with the applicable mandatory requirements of the following ETSI Core Specifications:
- ETSI TS 123 122
- ETSI TS 124 008
- ETSI TS 125 304
- ETSI TS 125 321
- ETIS TS 125 331

☒ Core Protocol Specifications for E-UTRA (LTE):
The product complies with the applicable mandatory requirements of the following ETSI Core Specifications:
- ETSI TS 136 321
- ETSI TS 136 322
- ETSI TS 136 323
- ETSI TS 136 331

☐ RED Carrier Aggregation combinations for E-UTRA (LTE):
The product complies with the requirements of the following ETSI Specifications:
- ETSI TS 136 521-1

☐ Other Carrier Aggregation combinations for E-UTRA (LTE):
The product complies with the requirements of the following ETSI Specifications:
- ETSI TS 136 101

☐ Core Protocol Specifications for 5G NR technologies (5G NR):
The product complies with the applicable mandatory requirements of the following ETSI Core Specifications:
- ETSI TS 138 321
- ETSI TS 138 322
- ETSI TS 138 323
- ETSI TS 138 331

☐ 5G NR FR1 standalone (5G NR):
The product complies with the requirements of the following ETSI Core Specifications:
☐ ETSI 138 101-1(Single Carrier); ☐ ETSI 138 101-1(Carrier Aggregation); ☐ ETSI 138 101-1(Supplemental Uplink);

☐ 5G NR FR2 standalone (5G NR):
The product complies with the requirements of the following ETSI Core Specifications:
☐ ETSI 138 101-2(Single Carrier); ☐ ETSI 138 101-2(Carrier Aggregation);

☒ FDD Band 5 (850MHz):
The product supports FDD Band 5 (850MHz) and complies with the requirements of FCC Part 22 Rules for RF compatibility, network integrity and interoperability with the STS.

Should you have any questions or comments regarding this Declaration, please do not hesitate to contact me.

Signature:

Company Name: Quectel Wireless Solutions Co., Ltd.
Signatory Name &Title: Jean Hu & Certification Manager
Date: September 23, 2025

Supplier's declaration of conformity

Australian Government | acma Australian Communications and Media Authority

As required by the following Notices:

- *Radiocommunications (Compliance Labelling - Devices) Notice 2014* made under section 182 of the *Radiocommunications Act 1992*;
- *Radiocommunications Labelling (Electromagnetic Compatibility) Notice 2017* made under section 182 of the *Radiocommunications Act 1992*
- *Radiocommunications (Compliance Labelling – Electromagnetic Radiation) Notice 2014* made under section 182 of the *Radiocommunications Act 1992* and
- *Telecommunications (Labelling Notice for Customer Equipment and Customer Cabling) Instrument 2015* made under section 407 of the *Telecommunications Act 1997*.

Instructions for completion

- ***Do not return this form to the ACMA***. This completed form must be retained by the supplier as part of the documentation required for the compliance records and must be made available for inspection by the ACMA when requested.

Supplier's details (manufacturer, importer or authorised agent)

Company Name (OR INDIVIDUAL)

QUECTEL WIRELESS SOLUTIONS AUSTRALIA PTY LTD
TRADING AS

ACN/ARBN

652 889 588

OR

New Zealand IRDN

Street Address (AUSTRALIAN or NEW ZEALAND)

3 Stirling Crescent, Glen Waverley, Victoria,
Australia
POSTCODE **3150**
Phone: **0450646886**

Product details and date of manufacture

Product description – brand name, type, current model, lot, batch or serial number (if available), software/firmware version (if applicable)

Product name: LTE Cat 1 bis Module
Brand name: QUECTEL
Model : EC200U-EU
Date of manufacture or importation of the original/modified item

Compliance – applicable standards and other supporting documents

Evidence of compliance with applicable standards may be demonstrated by test reports, endorsed/accredited test reports, certification/competent body statements.

Having had regard to these documents, I am satisfied the above mentioned product complies with the requirements of the relevant ACMA Standards made under the *Radiocommunications Act 1992* and the *Telecommunications Act 1997.*

List the details of the documents the above statement was made, including the standard title, number and, if applicable, number of the test report/endorsed test report or certification/competent body statement

AS/CA S042.1:2025, AS/CA S042.4:2025, AS/NZS 4268:2017 + A1:2021 **Report NO. : SZCR250800340301, SZCR250800340302, SZCR250800340303, SZCR250800340304, SZCR250800340305, SZCR250800340307, SZCR250800340309, SZCR250800340310, SZCR250800340311**
AS/NZS CISPR 32: 2015 + A1:2020 **Report NO. : SZCR250800340312**
AS&NZS 2772.2: 2016 Amd 1: 2018 /ARPANSA Standard RPS S-1: 2021 **Report NO. : SZCR250800340308**
AS/NZS 62368.1:2022 **Report NO. : SZES250800620602**

Declaration

I hereby declare that:

1. I am authorised to make this declaration on behalf of the Company mentioned above,
2. the contents of this form are true and correct, and
3. the product mentioned above complies with the applicable above mentioned standards and all products supplied under this declaration will be identical to the product identified above.

***Note*:** Under section 137.1 of the *Criminal Code Act 1995*, it is an offence to knowingly provide false or misleading information to a Commonwealth entity.

Penalty: 12 months imprisonment

SIGNATURE OF SUPPLIER OR AGENT 	POSITION IN ORGANISATION **Director**
PRINT NAME **Helen Mao**	DATE **September 23, 2025**

The *Privacy Act 1988* (Cth) (the Privacy Act) imposes obligations on the ACMA in relation to the collection, security, quality, access, use and disclosure of personal information. These obligations are detailed in the Australian Privacy Principles.

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Should you have any questions in this regard, please contact the ACMA's privacy contact officer on telephone on 1800 226 667 or by email at privacy@acma.gov.au.

Declaration of Conformity

We, **Quectel Wireless Solutions Co., Ltd.**, being the manufacturer, hereby declare that this product (Product name: **LTE Module**; Tradename: **Quectel**, Model: **EC200U-EU**) complies with the following:

☒ IMEI Security:
The product has a device identifier. The IMEI codes are unique to each unit. The IMEI of each unit is factory set and cannot be altered by the user. It complies with the relevant IMEI integrity related requirements of current ETSI TS 122 016.

☐ Core Protocol Specifications for UTRA (UMTS):
The product complies with the applicable mandatory requirements of the following ETSI Core Specifications:
- ETSI TS 123 122
- ETSI TS 124 008
- ETSI TS 125 304
- ETSI TS 125 321
- ETIS TS 125 331

☒ Core Protocol Specifications for E-UTRA (LTE):
The product complies with the applicable mandatory requirements of the following ETSI Core Specifications:
- ETSI TS 136 321
- ETSI TS 136 322
- ETSI TS 136 323
- ETSI TS 136 331

☐ RED Carrier Aggregation combinations for E-UTRA (LTE):
The product complies with the requirements of the following ETSI Specifications:
- ETSI TS 136 521-1

☐ Other Carrier Aggregation combinations for E-UTRA (LTE):
The product complies with the requirements of the following ETSI Specifications:
- ETSI TS 136 101

☐ Core Protocol Specifications for 5G NR technologies (5G NR):
The product complies with the applicable mandatory requirements of the following ETSI Core Specifications:
- ETSI TS 138 321
- ETSI TS 138 322
- ETSI TS 138 323
- ETSI TS 138 331

☐ 5G NR FR1 standalone (5G NR):
The product complies with the requirements of the following ETSI Core Specifications:
☐ ETSI 138 101-1(Single Carrier); ☐ ETSI 138 101-1(Carrier Aggregation); ☐ ETSI 138 101-1(Supplemental Uplink);

☐ 5G NR FR2 standalone (5G NR):
The product complies with the requirements of the following ETSI Core Specifications:
☐ ETSI 138 101-2(Single Carrier); ☐ ETSI 138 101-2(Carrier Aggregation);

☒ FDD Band 5 (850MHz):
The product supports FDD Band 5 (850MHz) and complies with the requirements of FCC Part 22 Rules for RF compatibility, network integrity and interoperability with the STS.

Should you have any questions or comments regarding this Declaration, please do not hesitate to contact me.

Signature with company stamp:

Company Name: Quectel Wireless Solutions Co., Ltd.
Signatory Name &Title: Jean Hu & Certification Manager
Date: April 16, 2024

Supplier's declaration of conformity

Australian Government | acma Australian Communications and Media Authority

As required by the following Notices:

- *Radiocommunications (Compliance Labelling - Devices) Notice 2014* made under section 182 of the *Radiocommunications Act 1992*;
- *Radiocommunications Labelling (Electromagnetic Compatibility) Notice 2017* made under section 182 of the *Radiocommunications Act 1992*
- *Radiocommunications (Compliance Labelling – Electromagnetic Radiation) Notice 2014* made under section 182 of the *Radiocommunications Act 1992* and
- *Telecommunications (Labelling Notice for Customer Equipment and Customer Cabling) Instrument 2015* made under section 407 of the *Telecommunications Act 1997*.

Instructions for completion

- ***Do not return this form to the ACMA***. This completed form must be retained by the supplier as part of the documentation required for the compliance records and must be made available for inspection by the ACMA when requested.

Supplier's details (manufacturer, importer or authorised agent)

Company Name (OR INDIVIDUAL)

QUECTEL WIRELESS SOLUTIONS AUSTRALIA PTY LTD
TRADING AS

ACN/ARBN

652 889 588

OR

New Zealand IRDN

Street Address (AUSTRALIAN or NEW ZEALAND)

3 Stirling Crescent, Glen Waverley, Victoria,
Australia
POSTCODE **3150**
Phone: **0450646886**

Product details and date of manufacture

Product description – brand name, type, current model, lot, batch or serial number (if available), software/firmware version (if applicable)

Product name: LTE Cat 1 Module
Brand name: Quectel
Model : EC200U-EU
Date of manufacture or importation of the original/modified item

Compliance – applicable standards and other supporting documents

Evidence of compliance with applicable standards may be demonstrated by test reports, endorsed/accredited test reports, certification/competent body statements.

Having had regard to these documents, I am satisfied the above mentioned product complies with the requirements of the relevant ACMA Standards made under the *Radiocommunications Act 1992* and the *Telecommunications Act 1997.*

List the details of the documents the above statement was made, including the standard title, number and, if applicable, number of the test report/endorsed test report or certification/competent body statement

AS/CA S042.1: 2022, AS/CA S042.4: 2022, AS/NZS 4268: 2017 **Report NO. : SZCR240300085702，SZCR240300085703，SZCR240300085704，SZCR240300085705，SZCR240300085708，SZCR240300085710**
AS/NZS CISPR 32: 2015 + A1:2020 **Report NO. : SZCR240300085713**
AS/NZS 2772.2: 2016/ARPANSA Standard RPS S-1: 2021 **Report NO. : SZCR240300085709**
AS/NZS 62368.1:2022 **Report NO. : SZES240300172401**

Declaration

I hereby declare that:

1. I am authorised to make this declaration on behalf of the Company mentioned above,
2. the contents of this form are true and correct, and
3. the product mentioned above complies with the applicable above mentioned standards and all products supplied under this declaration will be identical to the product identified above.

***Note*:** Under section 137.1 of the *Criminal Code Act 1995*, it is an offence to knowingly provide false or misleading information to a Commonwealth entity.

Penalty: 12 months imprisonment

SIGNATURE OF SUPPLIER OR AGENT 	POSITION IN ORGANISATION **Director**
PRINT NAME **Helen Mao**	DATE **April 16, 2024**

The *Privacy Act 1988* (Cth) (the Privacy Act) imposes obligations on the ACMA in relation to the collection, security, quality, access, use and disclosure of personal information. These obligations are detailed in the Australian Privacy Principles.

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Should you have any questions in this regard, please contact the ACMA's privacy contact officer on telephone on 1800 226 667 or by email at privacy@acma.gov.au.

Declaration of Conformity

We, **Quectel Wireless Solutions Co., Ltd.**, being the manufacturer, hereby declare that this product (Product name: **LTE Module**; Tradename: **Quectel**, Model: **EC200U-EU**) complies with the following:

☒ IMEI Security:
The product has a device identifier. The IMEI codes are unique to each unit. The IMEI of each unit is factory set and cannot be altered by the user. It complies with the relevant IMEI integrity related requirements of current ETSI TS 122 016.

☐ Core Protocol Specifications for UTRA (UMTS):
The product complies with the applicable mandatory requirements of the following ETSI Core Specifications:
- ETSI TS 123 122
- ETSI TS 124 008
- ETSI TS 125 304
- ETSI TS 125 321
- ETIS TS 125 331

☒ Core Protocol Specifications for E-UTRA (LTE):
The product complies with the applicable mandatory requirements of the following ETSI Core Specifications:
- ETSI TS 136 321
- ETSI TS 136 322
- ETSI TS 136 323
- ETSI TS 136 331

☐ RED Carrier Aggregation combinations for E-UTRA (LTE):
The product complies with the requirements of the following ETSI Specifications:
- ETSI TS 136 521-1

☐ Other Carrier Aggregation combinations for E-UTRA (LTE):
The product complies with the requirements of the following ETSI Specifications:
- ETSI TS 136 101

☐ Core Protocol Specifications for 5G NR technologies (5G NR):
The product complies with the applicable mandatory requirements of the following ETSI Core Specifications:
- ETSI TS 138 321
- ETSI TS 138 322
- ETSI TS 138 323
- ETSI TS 138 331

☐ 5G NR FR1 standalone (5G NR):
The product complies with the requirements of the following ETSI Core Specifications:
☐ ETSI 138 101-1(Single Carrier); ☐ ETSI 138 101-1(Carrier Aggregation); ☐ ETSI 138 101-1(Supplemental Uplink);

☐ 5G NR FR2 standalone (5G NR):
The product complies with the requirements of the following ETSI Core Specifications:
☐ ETSI 138 101-2(Single Carrier); ☐ ETSI 138 101-2(Carrier Aggregation);

☒ FDD Band 5 (850MHz):
The product supports FDD Band 5 (850MHz) and complies with the requirements of FCC Part 22 Rules for RF compatibility, network integrity and interoperability with the STS.

Should you have any questions or comments regarding this Declaration, please do not hesitate to contact me.

Signature with company stamp:

Company Name: Quectel Wireless Solutions Co., Ltd.
Signatory Name &Title: Jean Hu & Certification Manager
Date: April 16, 2024

Supplier's declaration of conformity

Australian Government | acma Australian Communications and Media Authority

As required by the following Notices:

- *Radiocommunications (Compliance Labelling - Devices) Notice 2014* made under section 182 of the *Radiocommunications Act 1992*;
- *Radiocommunications Labelling (Electromagnetic Compatibility) Notice 2017* made under section 182 of the *Radiocommunications Act 1992*
- *Radiocommunications (Compliance Labelling – Electromagnetic Radiation) Notice 2014* made under section 182 of the *Radiocommunications Act 1992* and
- *Telecommunications (Labelling Notice for Customer Equipment and Customer Cabling) Instrument 2015* made under section 407 of the *Telecommunications Act 1997*.

Instructions for completion

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Supplier's details (manufacturer, importer or authorised agent)

Company Name (OR INDIVIDUAL)

QUECTEL WIRELESS SOLUTIONS AUSTRALIA PTY LTD
TRADING AS

ACN/ARBN

652 889 588

OR

New Zealand IRDN

Street Address (AUSTRALIAN or NEW ZEALAND)

3 Stirling Crescent, Glen Waverley, Victoria,
Australia
POSTCODE **3150**
Phone: **0450646886**

Product details and date of manufacture

Product description – brand name, type, current model, lot, batch or serial number (if available), software/firmware version (if applicable)

Product name: LTE Cat 1 Module
Brand name: Quectel
Model : EC200U-EU
Date of manufacture or importation of the original/modified item

Compliance – applicable standards and other supporting documents

Evidence of compliance with applicable standards may be demonstrated by test reports, endorsed/accredited test reports, certification/competent body statements.

Having had regard to these documents, I am satisfied the above mentioned product complies with the requirements of the relevant ACMA Standards made under the *Radiocommunications Act 1992* and the *Telecommunications Act 1997.*

List the details of the documents the above statement was made, including the standard title, number and, if applicable, number of the test report/endorsed test report or certification/competent body statement

AS/CA S042.1: 2022, AS/CA S042.4: 2022, AS/NZS 4268: 2017 **Report NO. : SZCR240300085807, SZCR240300085802, SZCR240300085803，SZCR240300085804，SZCR240300085805，SZCR240300085809**
AS/NZS CISPR 32: 2015 + A1:2020 **Report NO. : SZCR240300085812**
AS/NZS 2772.2: 2016/ARPANSA Standard RPS S-1: 2021 **Report NO. : SZCR240300085808**
AS/NZS 62368.1:2022 **Report NO. : SZES240300172501**

Declaration

I hereby declare that:

1. I am authorised to make this declaration on behalf of the Company mentioned above,
2. the contents of this form are true and correct, and
3. the product mentioned above complies with the applicable above mentioned standards and all products supplied under this declaration will be identical to the product identified above.

***Note*:** Under section 137.1 of the *Criminal Code Act 1995*, it is an offence to knowingly provide false or misleading information to a Commonwealth entity.

Penalty: 12 months imprisonment

SIGNATURE OF SUPPLIER OR AGENT 	POSITION IN ORGANISATION **Director**
PRINT NAME **Helen Mao**	DATE **April 16, 2024**

The *Privacy Act 1988* (Cth) (the Privacy Act) imposes obligations on the ACMA in relation to the collection, security, quality, access, use and disclosure of personal information. These obligations are detailed in the Australian Privacy Principles.

The ACMA may only collect personal information if it is reasonably necessary for, or directly related to, one or more of the ACMA's functions or activities.

The purpose of collecting the personal information in this form is to ensure the supplier is identified in the 'Declaration of conformity'. If this Declaration of Conformity is not completed and the requested information is not provided, a compliance label cannot be applied.

Further information on the Privacy Act and the ACMA's Privacy Policy is available at www.acma.gov.au/privacypolicy. The Privacy Policy contains details about how you may access personal information about you that is held by the ACMA, and seek the correction of such information. It also explains how you may complain about a breach of the Privacy Act and how we will deal with such a complaint.

Should you have any questions in this regard, please contact the ACMA's privacy contact officer on telephone on 1800 226 667 or by email at privacy@acma.gov.au.