



RED-EMC TEST REPORT

Client Name : ShenZhen EBELONG Technology Co., Ltd.

Address : 4th Floor, Building No.2, Hengmingzhu shajing Industrial Park,
Xiangxing Road, Bao'an District, ShenZhen GuangDong China.

Product Name : Wireless Controller

Test Model No. : ERC902

Report No. : CCTI-2022101904-2E

Issued Date : Nov. 17, 2022

Prepared By : Shenzhen CCTI Technology Co., Ltd.

Address : 7th Floor, Block A, Building E, Yongwei Industrial Park, No. 118,
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Guangdong, China

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TEST REPORT VERIFICATION

Applicant : ShenZhen EBELONG Technology Co., Ltd.
Address : 4th Floor, Building No.2, Hengmingzhu shajing Industrial Park, Xiangxing Road,
Bao'an District, ShenZhen GuangDong China.
Manufacturer : ShenZhen EBELONG Technology Co., Ltd.
Address : 4th Floor, Building No.2, Hengmingzhu shajing Industrial Park, Xiangxing Road,
Bao'an District, ShenZhen GuangDong China.
Product Name : Wireless Controller
Model No. : ERC902
Series No. : ERC903, ERC904, ERC905, ERC906
Trade Mark : N/A
Rating(s) : Input: AC184-264V; 50/60Hz; 3A
Load: 500W
Test Date : Oct. 20, 2022 to Nov. 17, 2022
Test Standard(s) : ETSI EN 301 489-1 V2.2.3 (2019-11)
ETSI EN 301 489-17 V3.2.4 (2020-09)
Test Result : PASS

This device described above has been tested by CCTI, and the test results show that the equipment under test (EUT) is in compliance with the 2014/53/EU RED Directive Art.3.1(b) requirements. The results shown in this test report refer only to the sample(s) tested unless other wise stated and the sample(s) are retained for 30 days only. The document is issued by CCTI, may be altered or revised by CCTI, personal only, and shall be noted in the revision of the document. this document cannot be reproduced except in full with our prior written permission.

Producer By :


(Betty Liang / Engineer)

Date : Nov. 17, 2022

Authorized Signer :


(Corey Mao / Manager)

Date : Nov. 17, 2022

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1. TEST SUMMARY

Test Procedures According To The Technical Standards:

ETSI EN 301 489-1 V2.2.3 (2019-11)

ETSI EN 301 489-17 V3.2.4 (2020-09)

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
EN 55032:2015+A11:2020	Conducted Emission	Class B	PASS	
	Radiated Emission	Class B	PASS	
EN IEC 61000-3-2:2019 +A1:2021	Harmonic Current Emission	Class A or D NOTE (2)	N/A	
EN 61000-3-3:2013 +A1:2019	Voltage Fluctuations & Flicker	—	PASS	
EMC Immunity				
Section EN 55035:2017+A11:2020	Test Item	Performance Criteria	Judgment	Remark
EN 61000-4-2:2009	Electrostatic Mode 1	B	PASS	
EN IEC 61000-4-3:2020	RF electromagnetic field	A	PASS	
EN 61000-4-4:2012	Fast transients	B	PASS	
EN 61000-4-5:2014+A1:2017	Surges	B	PASS	
EN 61000-4-6:2014+AC:2015	Injected Current	A	N/A	
EN 61000-4-8:2010	Power Frequency Magnetic Field	A	N/A	
EN 61000-3-3:2013+A1:2019+A2:2021	Volt. Interruptions Volt. Dips	B / C / C NOTE (3)	PASS	

NOTE:

- (1) "N/A"denotes test is not applicable in this Test Report
- (2) The power consumption of EUT is less than 75W and no Limits apply.
- (3) Voltage dip: 100% reduction – Performance Criteria B
Voltage dip: 30% reduction – Performance Criteria C
Voltage Interruption: 100% Interruption – Performance Criteria C
- (4) For client's request and manual description, the test will not be executed.

1.1 TEST FACILITY

Shenzhen CCTI Technology Co., Ltd.

7th Floor, Block A, Building E, Yongwei Industrial Park, No. 118, Yongfu Road, Qiaotou,
Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

A. Conducted Measurement :

Test Site	Method	Measurement Frequency Range	U, (dB)	NOTE
CCTI01	ANSI	150 KHz ~ 30MHz	3.2	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	U, (dB)	NOTE
CCTI01	ANSI	30MHz ~ 1000MHz	4.7	
		1GHz ~6000GHz	5.0	

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

EUT Name	: Wireless Controller
Model No.	: ERC902
Series No.	: ERC903, ERC904, ERC905, ERC906
Model Difference	: The product is different for model number.
Trademark	: N/A
Power supply	: Input: AC184-264V; 50/60Hz; 3A Load: 500W
Operation frequency	: 433.92MHz
Modulation	: FSK
Antenna Type	: Internal antenna
Intend use environment	: Residential, commercial and light industrial environment

Remark:

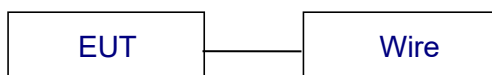
- (1) ERC902 was selected as the test model and the datas have been recorded in this report.
(2) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	TX Mode

DESCRIPTION OF TEST SETUP



2.3 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
E-1	Wireless Controller	N/A	ERC902	ERC903, ERC904, ERC905, ERC906	N/A

Item	Shielded Type	Ferrite Core	Length	Note
C1	N/A	N/A	2M	

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

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2.4 MEASUREMENT INSTRUMENTS

2.4.1 CONDUCTED EMISSION

No.	Equipment	Manufacturer	Type No.	Serial No.	Last Cal.	Next Cal.
1	LISN	R&S	ENV216	101313	Mar. 09, 2022	Mar. 08, 2023
2	LISN	EMCO	3816/2	00042990	Mar. 09, 2022	Mar. 08, 2023
3	50Ω Switch	ANRITSU CORP	MP59B	6200983704	Mar. 09, 2022	Mar. 08, 2023
4	Test Cable	N/A	C01	N/A	Mar. 09, 2022	Mar. 08, 2023
5	Test Cable	N/A	C02	N/A	Mar. 09, 2022	Mar. 08, 2023
6	Test Cable	N/A	C03	N/A	Mar. 09, 2022	Mar. 08, 2023
7	EMI Test Receiver	R&S	ESCI	101160	Mar. 09, 2022	Mar. 08, 2023
8	Passive Voltage Probe	ESH2-Z3	R&S	100196	Mar. 09, 2022	Mar. 08, 2023
9	Triple-Loop Antenna	EVERFINE	LIA-2	11020003	Mar. 09, 2022	Mar. 08, 2023
10	Absorbing Clamp	R&S	MDS-21	100423	Mar. 09, 2022	Mar. 08, 2023
11	Coupling/ Decoupling Network	FRANKONIA	A3011081	BC01-05	Mar. 09, 2022	Mar. 08, 2023

2.4.2 RADIATED TEST SITE

No.	Equipment	Manufacturer	Type No.	Serial No.	Last Cal.	Next Cal.
1	Bilog Antenna	TESEQ	CBL6111D	31216	Mar. 09, 2022	Mar. 08, 2023
2	Test Cable	N/A	R-01	N/A	Mar. 09, 2022	Mar. 08, 2023
3	Test Cable	N/A	R-02	N/A	Mar. 09, 2022	Mar. 08, 2023
4	EMI Test Receiver	R&S	ESCI-7	101318	Mar. 09, 2022	Mar. 08, 2023
5	Antenna Mast	EM	SC100_1	N/A	Mar. 09, 2022	Mar. 08, 2023
6	Turn Table	EM	SC100	060531	Mar. 09, 2022	Mar. 08, 2023
7	50Ω Switch	Anritsu Corp	MP59B	6200983705	Mar. 09, 2022	Mar. 08, 2023
8	Spectrum Analyzer	Aglient	E4407B	MY45108040	Mar. 09, 2022	Mar. 08, 2023
9	Horn Antenna	EM	EM-AH-10180	2011071402	Mar. 09, 2022	Mar. 08, 2023
10	Amplifier	EM	EM-30180	060538	Mar. 09, 2022	Mar. 08, 2023

2.4.3 HARMONICS AND FILCK

No.	Equipment	Manufacturer	Type No.	Serial No.	Last Cal.	Next Cal.
1	Harmonic & Flicker	EM TEST	DPA500	0303-04	Mar. 09, 2022	Mar. 08, 2023
2	AC Power Source	EM TEST	ACS500	0203-01	Mar. 09, 2022	Mar. 08, 2023

2.4.4 ESD

No.	Equipment	Manufacturer	Type No.	Serial No.	Last Cal.	Next Cal.
1	ESD TEST GENERATOR	EVERFINE	EMS61000-2 A-V200	11040001T	Mar. 09, 2022	Mar. 08, 2023

2.4.5 RS (SMQ)

No.	Equipment	Manufacturer	Type No.	Serial No.	Last Cal.	Next Cal.
1	Signal Generator	R&S	SMT 06	832080/007	Mar. 09, 2022	Mar. 08, 2023
2	Log-Bicon Antenna	Schwarzbeck	VULB9161	4022	Mar. 09, 2022	Mar. 08, 2023
3	Power Amplifier	AR	150W1000M1	320946	Mar. 09, 2022	Mar. 08, 2023
4	Microwave Horn Antenna	AR	AT4002A	321467	Mar. 09, 2022	Mar. 08, 2023
5	Power Amplifier	AR	25S1G4A	308598	Mar. 09, 2022	Mar. 08, 2023

2.4.6 SURGE, EFT/BURST, VOLTAGE INTERRUPTION/DIPS

No.	Equipment	Manufacturer	Type No.	Serial No.	Last Cal.	Next Cal.
1	Surge Generator	EVERFINE	EMS61000-5A	1101002	Mar. 09, 2022	Mar. 08, 2023
2	DIPS Generator	EVERFINE	EMS61000-1 1K	1011002	Mar. 09, 2022	Mar. 08, 2023
3	EFT/B Generator	EVERFINE	EMS61000-4 A-V2	1012005	Mar. 09, 2022	Mar. 08, 2023

2.4.7 INJECTION CURRENT

No.	Equipment	Manufacturer	Type No.	Serial No.	Last Cal.	Next Cal.
1	Signal Generator	IFR	2023A	202301/368	Mar. 09, 2022	Mar. 08, 2023
2	Power Amplifier	AR	75A250AM1	0320709	Mar. 09, 2022	Mar. 08, 2023
3	CDN	FCC	FCC-801-M2	06043	Mar. 09, 2022	Mar. 08, 2023
4	EM Clamp	FCC	F-203I-23MM	504	Mar. 09, 2022	Mar. 08, 2023

2.4.8 MF

No.	Equipment	Manufacturer	Type No.	Serial No.	Last Cal.	Next Cal.
1	Generator	EVERFINE	EMS61000-8K	1007001	Mar. 09, 2022	Mar. 08, 2023

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note:

- (1)The tighter limit applies at the band edges.
(2)The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

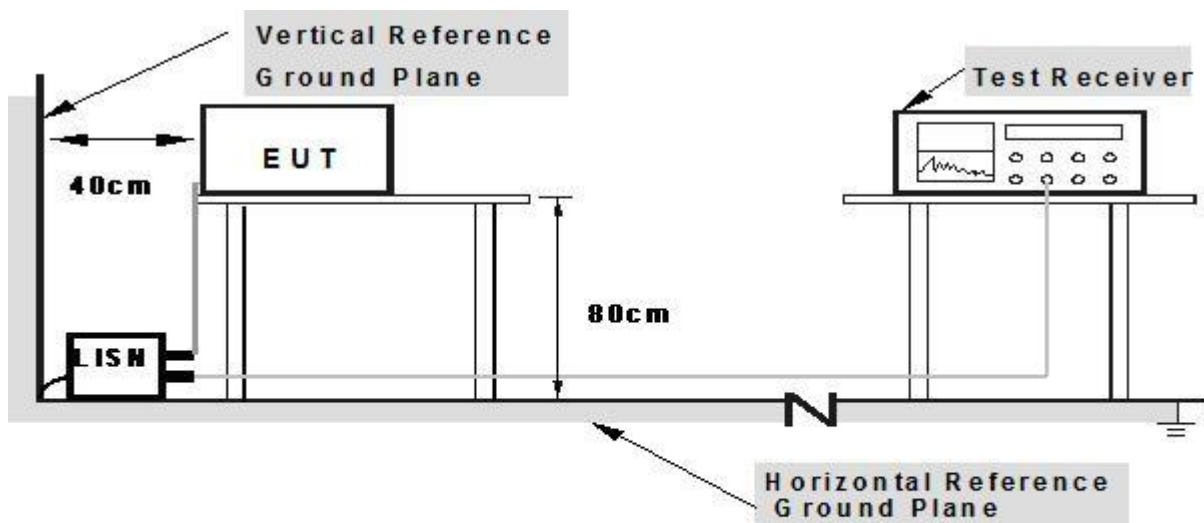
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

- The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 TEST SETUP



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

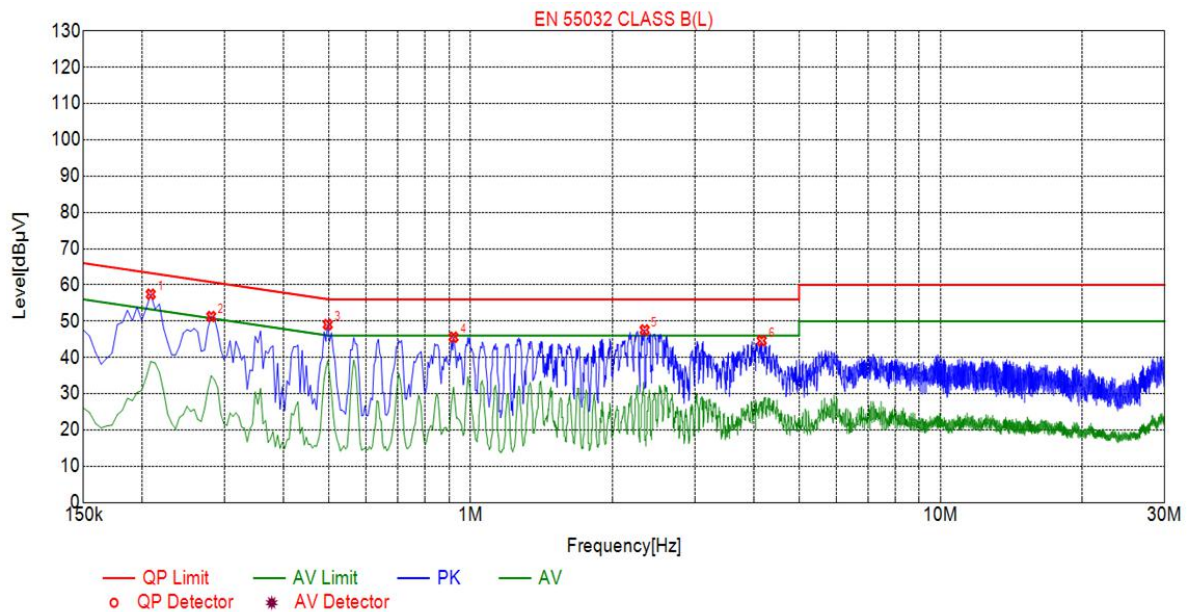
3.1.4 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.2** Unless otherwise a special operating condition is specified in the follows during the testing.

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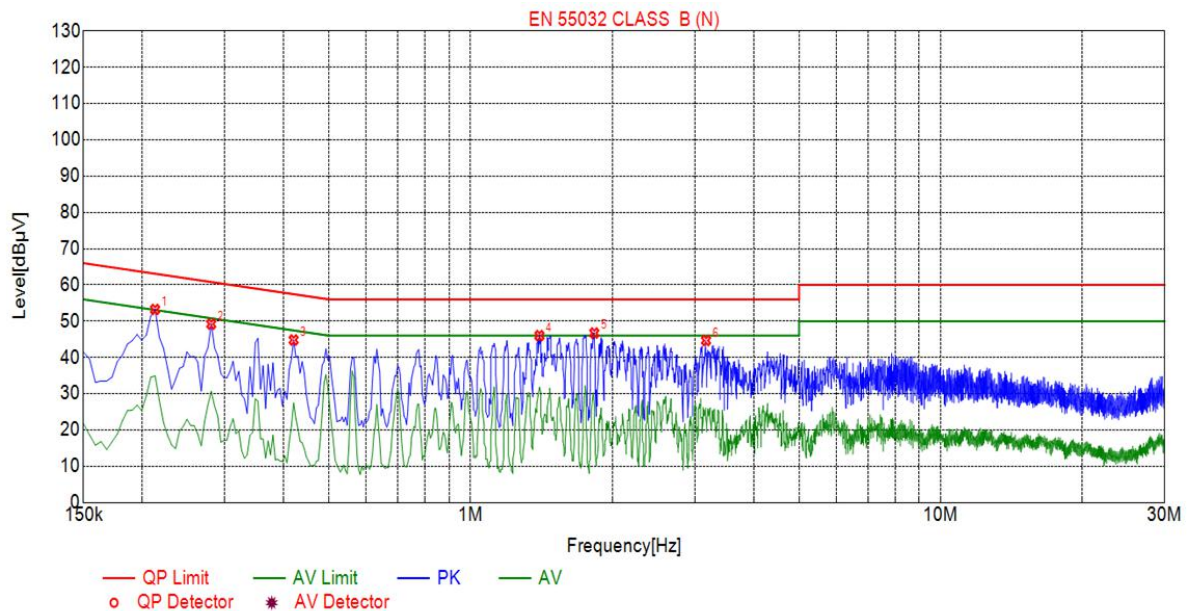
3.1.5 TEST RESULTS

EUT:	Wireless Controller	Model Name. :	ERC902
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	Line
Test Voltage :	AC 230V/50Hz	Test Mode:	Working



Suspected List								
NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.2085	57.43	20.04	63.26	5.83	37.39	PK	L
2	0.2805	51.29	20.04	60.80	9.51	31.25	PK	L
3	0.4965	49.07	20.04	56.06	6.99	29.03	PK	L
4	0.9195	45.58	20.06	56.00	10.42	25.52	PK	L
5	2.3460	47.57	20.18	56.00	8.43	27.39	PK	L
6	4.1640	44.61	20.25	56.00	11.39	24.36	PK	L

EUT:	Wireless Controller	Model Name. :	ERC902
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	Neutral
Test Voltage :	AC 230V/50Hz	Test Mode:	Working



Suspected List								
NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.2130	53.24	20.05	63.09	9.85	33.19	PK	N
2	0.2805	49.21	20.04	60.80	11.59	29.17	PK	N
3	0.4200	44.82	20.04	57.45	12.63	24.78	PK	N
4	1.4010	46.03	20.11	56.00	9.97	25.92	PK	N
5	1.8330	46.73	20.14	56.00	9.27	26.59	PK	N
6	3.1695	44.68	20.23	56.00	11.32	24.45	PK	N

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT (Below 1000MHz)

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	dBuV/m	dBuV/m
30 – 230	40	30
230 – 1000	47	37

3.2.2 LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class A (at 10m) dBuV/m		Class B (at 10m) dBuV/m	
	Peak	Avg	Peak	Avg
1000 – 3000	76	56	70	50
3000 – 6000	80	60	74	54

Notes:

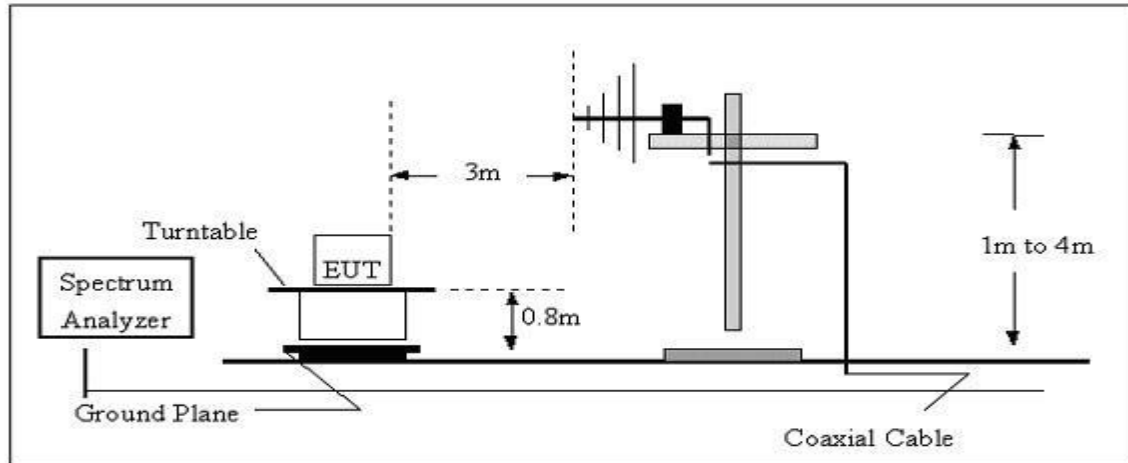
- (1) The limit for radiated test was performed according to as following: CISPR 22/ FCC PART 15B /ICES-003.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

3.2.3 TEST PROCEDURE

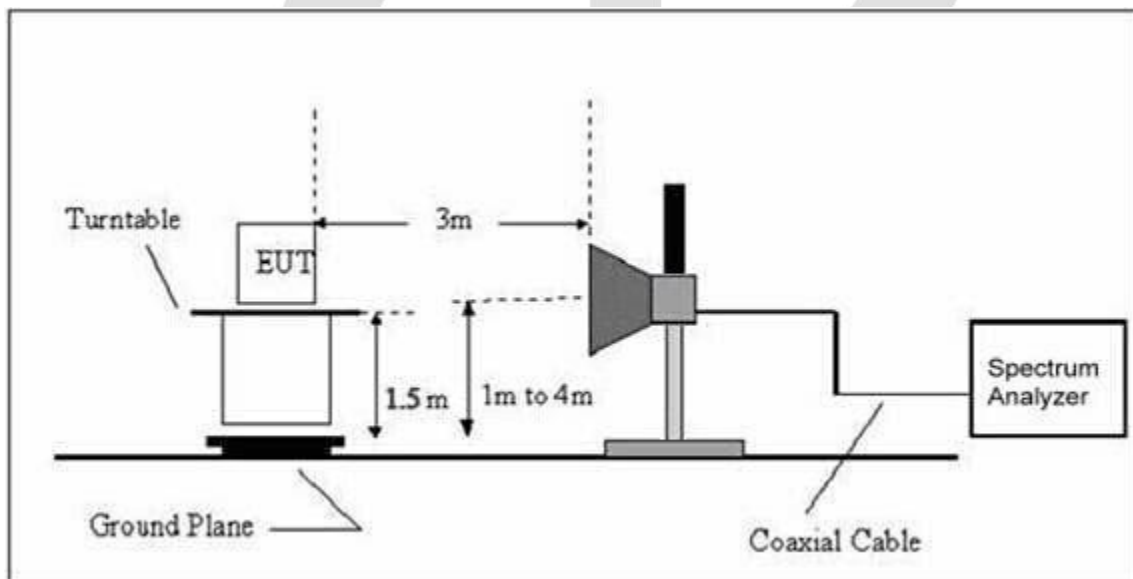
- a. The measuring distance of at 10 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item – EUT Test Photos.

3.2.4 TEST SETUP

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1GHz

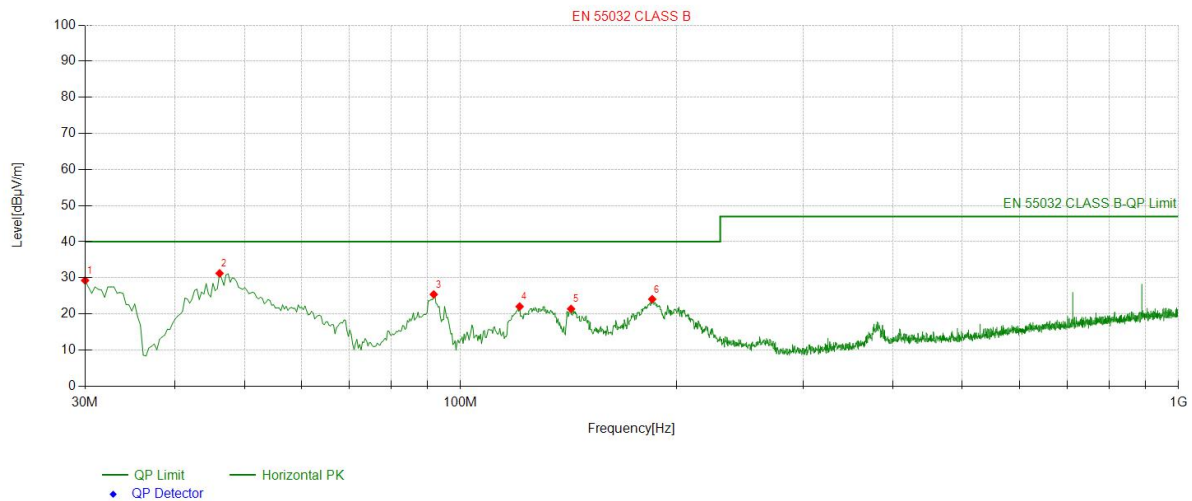


3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.2** Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 TEST RESULTS (30-1000MHz)

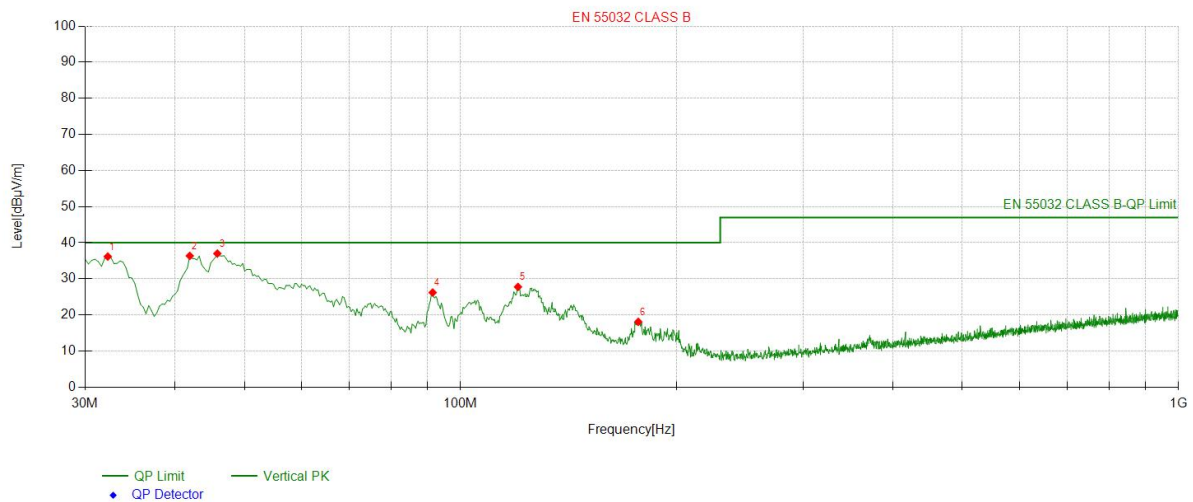
EUT:	Wireless Controller	Model Name :	ERC902
Temperature:	24 °C	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Horizontal
Test Voltage :	AC 230V/50Hz	Test Mode:	Working



Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	30	-17.35	46.62	29.27	40.00	10.73	100	351	Horizontal
2	46.1721	-16.77	48.01	31.24	40.00	8.76	100	351	Horizontal
3	91.7773	-20.62	46.02	25.40	40.00	14.60	100	351	Horizontal
4	120.887	-17.89	39.93	22.04	40.00	17.96	100	184	Horizontal
5	142.5575	-16.66	38.05	21.39	40.00	18.61	100	192	Horizontal
6	184.9283	-18.86	42.94	24.08	40.00	15.92	100	308	Horizontal

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EUT:	Wireless Controller	Model Name :	ERC902
Temperature:	24 °C	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Vertical
Test Voltage :	AC 230V/50Hz	Test Mode:	Working



Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	32.2641	-17.25	53.41	36.16	40.00	3.84	100	91	Vertical
2	41.9673	-16.55	52.91	36.36	40.00	3.64	100	272	Vertical
3	45.8486	-16.77	53.77	37.00	40.00	3.00	100	281	Vertical
4	91.4538	-20.65	46.86	26.21	40.00	13.79	100	290	Vertical
5	120.2401	-17.93	45.69	27.76	40.00	12.24	100	181	Vertical
6	176.8423	-18.01	36.09	18.08	40.00	21.92	100	89	Vertical

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3.2.1 LIMITS OF HARMONICS CURRENT

IEC 555-2					
Table - I			Table - II		
Equipment Category	Harmonic Order n	Max. Permissible Harmonic Current (in Amperes)	Equipment Category	Harmonic Order n	Max. Permissible Harmonic Current (in Amperes)
Non Portable Tools or TV Receivers	Odd Harmonics		TV Receivers	Odd Harmonics	
	3	2.30		3	0.80
	5	1.14		5	0.60
	7	0.77		7	0.45
	9	0.40		9	0.30
	11	0.33		11	0.17
	13	0.21		13	0.12
	15≤n≤39	0.15 · 15/n		15≤n≤39	0.10 · 15/n
	Even Harmonics			Even Harmonics	
	2	1.08		2	0.30
4	0.43	4	0.15		
8	0.30				
8≤n≤40	0.23 · 8/n		DC	0.05	

EN 61000-3-2/IEC 61000-3-2					
Equipment Category	Max. Permissible Harmonic Current (in Amperes)	Equipment Category	Harmonic Order n	Max. Permissible Harmonic Current (in A) (mA/w)	
Class A	Same as Limits Specified in 4-2.1, Table - I, but only odd harmonics required	Class D	3	2.30	3.4
			5	1.14	1.9
			7	0.77	1.0
			9	0.40	0.5
			11	0.33	0.35
			13≤n≤39	see Table I	3.85/n
			only odd harmonics required		

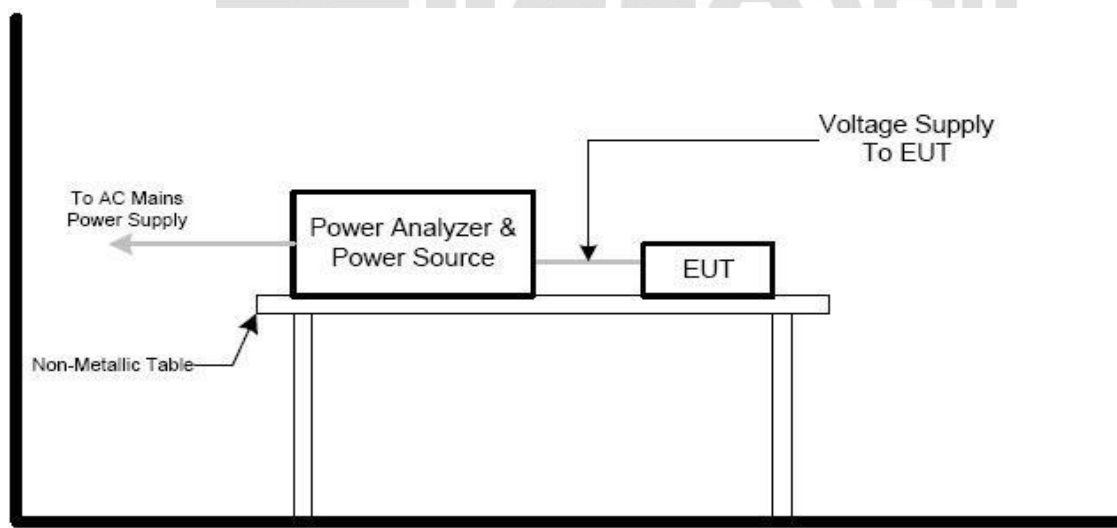
3.2.1.1 TEST PROCEDURE

- a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions.
- b. The classification of EUT is according to section 5 of EN IEC 61000-3-2:2019+A1:2021. The EUT is classified as follows:
Class A: Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.
Class B: Portable tools. Portable tools.; Arc welding equipment which is not professional equipment.
Class C: Lighting equipment.
Class D: Equipment having a specified power less than or equal to 600 W of the following types: Personal computers and personal computer monitors and television receivers.
- c. The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.
- d. For the actual test configuration, please refer to the related item – EUT Test Photos.

3.2.1.2 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.2** Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.1.3 TEST SETUP

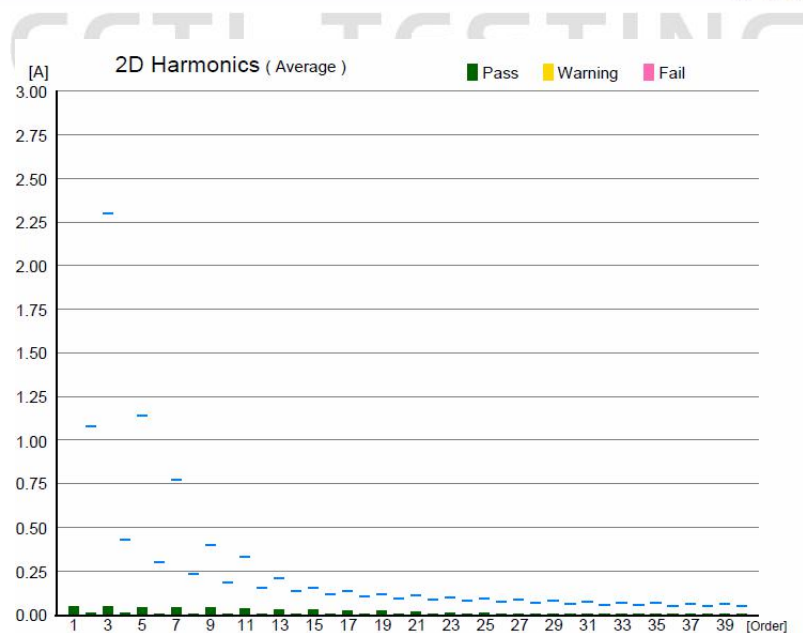


3.2.2 TEST RESULTS

EUT:	Wireless Controller	Model Name:	ERC902
Temperature:	24 °C	Relative Humidity:	45%
Pressure:	1010 hPa	Test Power:	AC 230V/50Hz
Test Mode:	Working		

Order	Limit1(A rms)	Limit2(A rms)	Ave(A rms)	Max(A rms)	Limit Over(s)	Judge
1	-----	-----	0.0469	0.0471	0.0	N/A
2	1.0800	2.1600	0.0061	0.0061	0.0	N/A
3	2.3000	4.6000	0.0434	0.0436	0.0	N/A
4	0.4300	0.8600	0.0058	0.0059	0.0	N/A
5	1.1400	2.2800	0.0418	0.0420	0.0	N/A
6	0.3000	0.6000	0.0054	0.0055	0.0	N/A
7	0.7700	1.5400	0.0396	0.0397	0.0	N/A
8	0.2300	0.4600	0.0049	0.0050	0.0	N/A
9	0.4000	0.8000	0.0368	0.0369	0.0	N/A
10	0.1840	0.3680	0.0043	0.0043	0.0	N/A
11	0.3300	0.6600	0.0335	0.0336	0.0	N/A
12	0.1533	0.3066	0.0036	0.0037	0.0	N/A
13	0.2100	0.4200	0.0298	0.0300	0.0	N/A
14	0.1314	0.2628	0.0029	0.0029	0.0	N/A
15	0.1500	0.3000	0.0259	0.0261	0.0	N/A
16	0.1150	0.2300	0.0022	0.0022	0.0	N/A
17	0.1324	0.2648	0.0218	0.0220	0.0	N/A
18	0.1022	0.2044	0.0015	0.0016	0.0	N/A
19	0.1184	0.2368	0.0178	0.0180	0.0	N/A
20	0.0920	0.1840	0.0010	0.0011	0.0	N/A
21	0.1071	0.2142	0.0139	0.0142	0.0	N/A
22	0.0836	0.1672	0.0008	0.0008	0.0	N/A
23	0.0978	0.1956	0.0103	0.0105	0.0	N/A
24	0.0767	0.1534	0.0009	0.0009	0.0	N/A
25	0.0900	0.1800	0.0070	0.0072	0.0	N/A
26	0.0708	0.1416	0.0011	0.0011	0.0	N/A
27	0.0833	0.1666	0.0041	0.0044	0.0	N/A
28	0.0657	0.1314	0.0012	0.0012	0.0	N/A
29	0.0776	0.1552	0.0018	0.0020	0.0	N/A
30	0.0613	0.1226	0.0013	0.0013	0.0	N/A
31	0.0726	0.1452	0.0008	0.0009	0.0	N/A
32	0.0575	0.1150	0.0012	0.0013	0.0	N/A
33	0.0682	0.1364	0.0019	0.0020	0.0	N/A
34	0.0541	0.1082	0.0011	0.0012	0.0	N/A
35	0.0643	0.1286	0.0028	0.0029	0.0	N/A
36	0.0511	0.1022	0.0010	0.0010	0.0	N/A
37	0.0608	0.1216	0.0033	0.0034	0.0	N/A
38	0.0484	0.0968	0.0007	0.0008	0.0	N/A
39	0.0577	0.1154	0.0035	0.0035	0.0	N/A
40	0.0460	0.0920	0.0005	0.0006	0.0	N/A

N/A : Not Apply



3.2.2.1 VOLTAGE FLUCTUATION AND FLICKERS

3.2.3 LIMITS OF VOLTAGE FLUCTUATION AND FLICKERS

Tests	Limits		Descriptions
	IEC555-3	IEC/EN 61000-3-3	
Pst	≤ 1.0 , $T_p = 10$ min.	≤ 1.0 , $T_p = 10$ min.	Short Term Flicker Indicator
Plt	N/A	≤ 0.65 , $T_p = 2$ hr.	Long Term Flicker Indicator
dc	$\leq 3\%$	$\leq 3.3\%$	Relative Steady-State V-Chang
dmax	$\leq 4\%$	$\leq 4\%$	Maximum Relative V-change
d (t)	N/A	$\leq 3.3\%$ for > 500 ms	Relative V-change characteristic

3.2.3.1 TEST PROCEDURE

a. Harmonic Current Test:

Test was performed according to the procedures specified in Clause 5.0 of IEC555-2 and/or Sub-clause 6.2 of IEC/EN 61000-3-2 depend on which standard adopted for compliance measurement.

b. Fluctuation and Flickers Test:

Tests was performed according to the Test Conditions/Assessment of Voltage Fluctuations specified in Clause 5.0/6.0 of IEC555-3 and/or Clause 6.0/4.0 of IEC/EN 61000-3-3 depend on which standard adopted for compliance measurement.

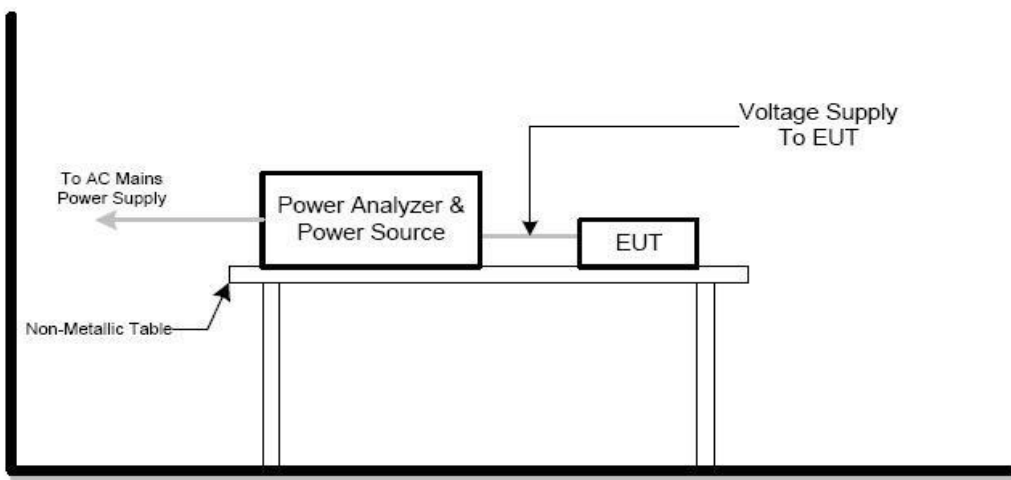
c. All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter.

d. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.2.3.2 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of **2.2** Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.3.3 TEST SETUP



3.2.4 TEST RESULTS

EUT:	Wireless Controller	Model Name:	ERC902
Temperature:	25 °C	Relative Humidity:	45%
Pressure:	1010 hPa	Test Power:	AC 230V/50Hz
Test Mode:	Mode 1		

Test Parameter	Measurement Value	limit	Remarks
P_{st}	0.064	1.0	Pass
P_{it}	2.770	3.3	Pass
$T_{dt(s)}$	0.000	0.5	Pass
$d_{max}(\%)$	0.03%	4%	Pass
$d_c(\%)$	0.02%	3.3%	Pass

4. EMC IMMUNITY TEST

4.1 GENERAL PERFORMANCE CRITERIA

4.1.1 PERFORMANCE CRITERIA

According To **EN 301489-17** standard, The General Performance Criteria As Following:

Criteria	During the test	After the test
A	Shall operate as intended May show degradation of performance (see note 1) Shall be no loss of function Shall be no unintentional transmissions	Shall operate as intended Shall be no degradation of performance (see note 2) Shall be no loss of function Shall be no loss of stored data or user programmable functions
B	May show loss of function (one or more) May show degradation of performance (see note 1) No unintentional transmissions	Functions shall be self-recoverable Shall operate as intended after recovering Shall be no degradation of performance (see note 2) Shall be no loss of stored data or user programmable functions
C	May be loss of function (one or more)	Functions shall be recoverable by the operator Shall operate as intended after recovering Shall be no degradation of performance (see note 2)
<p>NOTE 1: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.</p> <p>NOTE 2: no degradation of performance after the test is understood as any degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.</p>		

PERFORMANCE FOR TT

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply. Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

PERFORMANCE FOR TR

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5 000 ms duration for which performance criteria C shall apply. Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test.

In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

PERFORMANCE FOR CT

The performance criteria A shall apply. Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an Acknowledgement (ACK) or Not Acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

PERFORMANCE FOR CR

The performance criteria A shall apply. Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

4.2 GENERAL PERFORMANCE CRITERIA TEST SETUP

The EUT tested system was configured as the statements of **2.2** Unless otherwise a special operating condition is specified in the follows during the testing.

4.3 ESD TESTING

4.3.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-2
Mode 1 Impedance:	330 ohm / 150 pF
Required Performance	B
Mode 1 Voltage:	Air Mode 1:2kV/4kV/8kV (Direct) Contact Mode 1:2kV/4kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Mode 1:	Air Mode 1: min. 20 times at each test point Contact Mode 1: min. 200 times in total
Mode 1 Mode:	Mode 1
Mode 1 Period:	1 second minimum

4.3.2 TEST PROCEDURE

The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

- a. Contact discharge was applied to conductive surfaces and coupling planes of the EUT.

During the test, it was performed with single discharges. For the single discharge time between successive single discharges was at least 1 second. The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane. The remaining three test points shall each receive at least 50 direct contact discharges.

If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

Vertical Coupling Plane (VCP):

The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from, the EUT, with the Mode 1 Electrode touching the coupling plane.

The four faces of the EUT will be performed with electrostatic discharge. Horizontal Coupling Plane (HCP):

The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Mode 1 Electrode touching the coupling plane.

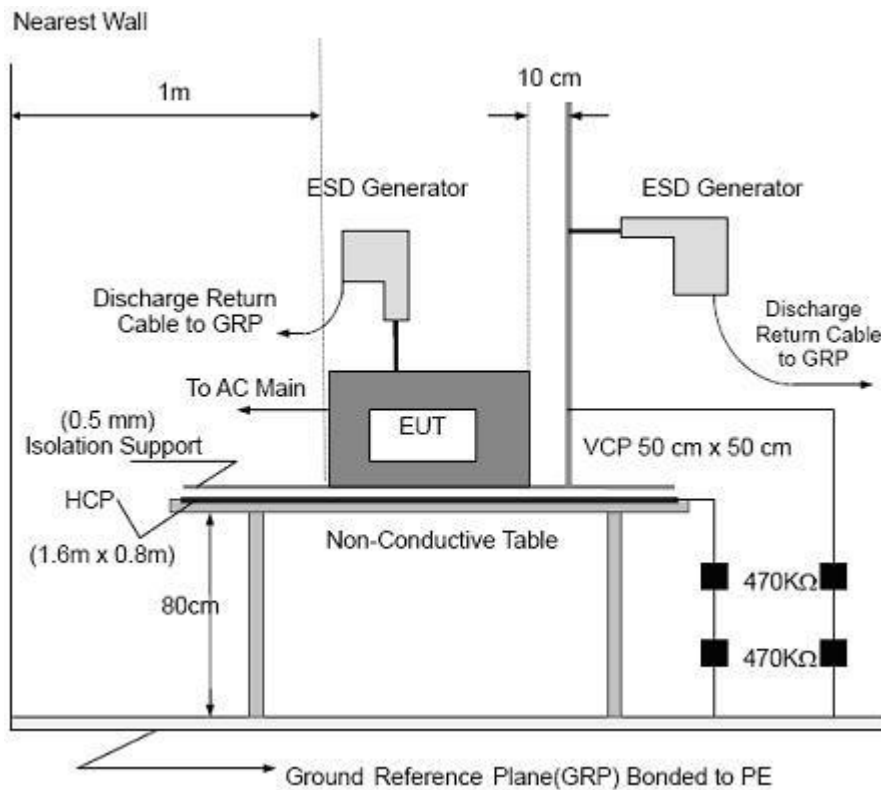
The four faces of the EUT will be performed with electrostatic discharge.

- b. Air discharges at insulation surfaces of the EUT.

It was at least ten single discharges with positive and negative at the same selected point.

- c. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.3.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940k total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC /EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC/EN 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

4.3.4 TEST RESULTS

EUT:	Wireless Controller	Model Name :	ERC902
Temperature:	25 °C	Relative Humidity:	45%
Pressure:	1010 hPa	Test Power:	AC 230V/50Hz
Test Mode:	Mode 1		

Mode	Air Mode 1								Contact Mode 1								Obser vation	Criterion	Result
Test level (kV)	4		8		10		15		2		4		6		8				
Test Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-			
HCP									A	A	A	A					TT,TR	B	PASS
VCP									A	A	A	A							PASS
plastic part	A	A	A	A															PASS
button	A	A	A	A															PASS
port									A	A	A	A							PASS
slot	A	A	A	A															PASS

Note:

- (1) P/N denotes the Positive/Negative polarity of the output voltage.
- (2) Test condition:
 Direct / Indirect (HCP/VCP) discharges: Minimum 50 times (Positive/Negative) at each point.
 Air discharges: Minimum 10 times (Positive/Negative) at each point.
- (3) N/A - denotes test is not applicable in this test report
- (4) There was not any unintentional transmission in standby mode

4.4 RS TESTING

4.4.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-3
Required Performance	A
Frequency Range:	80 MHz - 1000 MHz , 1400MHz-2700MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Dwell Time:	at least 3 seconds
Test site:	SMQ RS test room

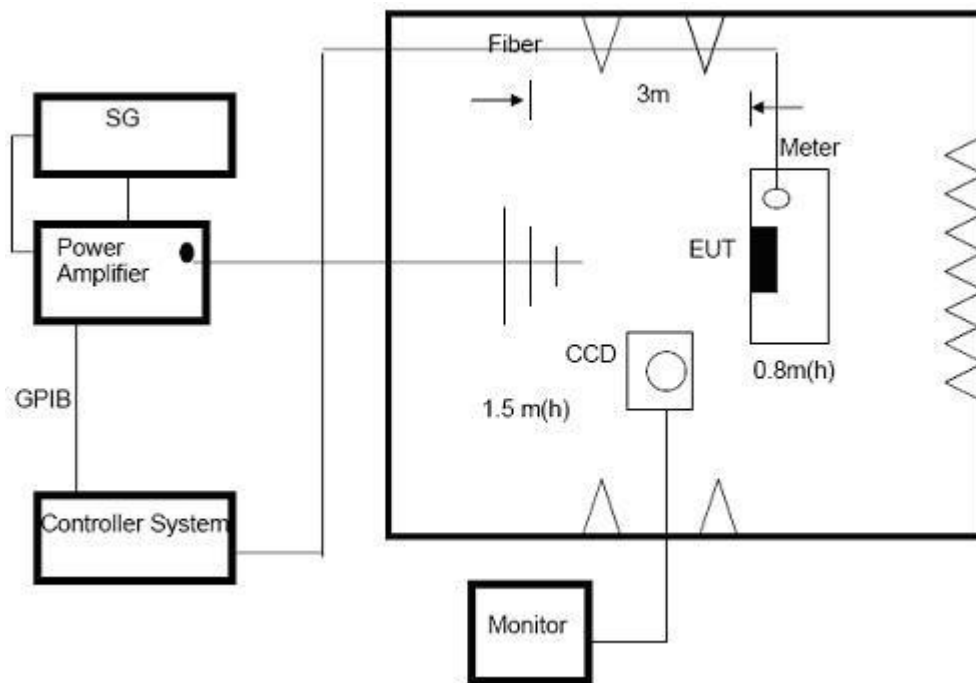
4.4.2 TEST PROCEDURE

The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber.

The testing distance from antenna to the EUT was 3 meters. The other condition as following manner:

- The field strength level was 3V/m.
- The frequency range is swept from 80 MHz to 1000 MHz, & 1400MHz - 2700MHz with the signal 80%amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- Sweep Frequency 900 MHz, with the Duty Cycle:1/8 and Modulation: Pulse 217 Hz (if applicable)
- The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.
- For the actual test configuration, please refer to the related Item – EUT Test Photos.

4.4.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

4.4.4 TEST RESULTS

EUT:	Wireless Controller	Model Name :	ERC902
Temperature:	25 °C	Relative Humidity:	45%
Pressure:	1010 hPa	Test Power:	AC 230V/50Hz
Test Mode:	Mode 1		

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Observation	Perform. Criteria	Results	Judgment
80~1000 1400-2700	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	CT,CR	A	A	PASS
			Rear				
			Left				
			Right				

Note:

- (1) P/N denotes the Positive/Negative polarity of the output voltage.
- (2) N/A - denotes test is not applicable in this test report.
- (3) There was no change operated with initial operating during the test.
- (4) There was not any unintentional transmission in standby mode

4.5 EFT/BURST TESTING

4.5.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-4
Required Performance	B
Test Voltage:	Power Line:1 kV Signal/Control Line:0.5 KV
Polarity:	Positive & Negative
Impulse Frequency:	5 kHz
Impulse Wave shape :	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	Not less than 1 min.

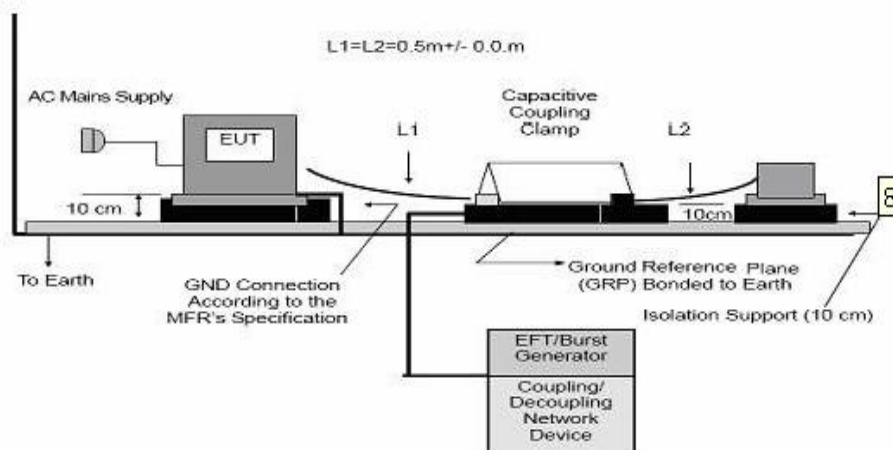
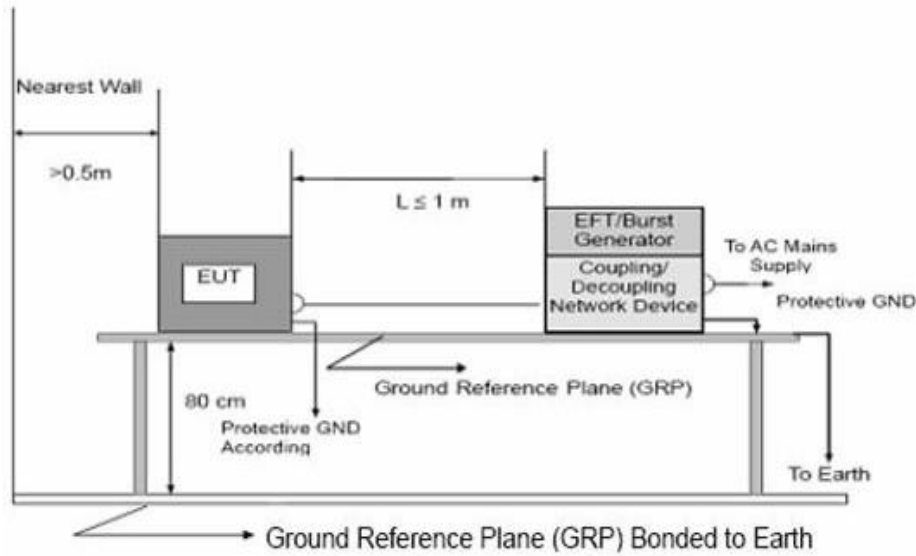
4.5.2 TEST PROCEDURE

The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m*1m min. and 0.65mm thick min.

The other condition as following manner:

- The length of power cord between the coupling device and the EUT should not exceed 1 meter.
- Both positive and negative polarity discharges were applied.
- The duration time of each test sequential was 1 minute.
- For the actual test configuration, please refer to the related Item – EUT Test Photos.

4.5.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table (0.8m high) standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-4 and its cables, were isolated from the Ground Reference Plane by an insulating support that is 0.1-meter thick. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system.

4.5.4 TEST RESULTS

EUT:	Wireless Controller	Model Name :	ERC902
Temperature:	25 °C	Relative Humidity:	45%
Pressure:	1010 hPa	Test Power :	AC 230V/50Hz
Test Mode:	Working		

Coupling Line		Test level (KV)								Observation	Criterion	Result
		0.5		1		2		4				
		+	-	+	-	+	-	+	-			
AC Line	L	A	A	A	A					TT,TR	B	PASS
	N	A	A	A	A							PASS
	PE											
	L+N	A	A	A	A							PASS
	L+PE											
	N+PE											
	L+N+PE											
DC Line												
Signal Line												

Note:

- (1) P/N denotes the Positive/Negative polarity of the output voltage.
- (2) N/A - denotes test is not applicable in this test report.
- (3) There was not any unintentional transmission in standby mode.

4.6 SURGE TESTING

4.6.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-5
Required Performance:	B
Wave-Shape:	Combination Wave 1.2/50 us Open Circuit Voltage 8 /20 us Short Circuit Current
Test Voltage:	Power Line:0.5 kV, 1 kV, 2 kV
Surge Input/Output:	L1-L2, L1-PE, L2-PE
Generator Source:	2 ohm between networks
Impedance:	12 ohm between network and ground
Polarity:	Positive/Negative
Phase Angle:	0 /90/180/270
Pulse Repetition Rate:	1 time / min. (maximum)
Number of Tests:	5 positive and 5 negative at selected points

4.6.2 TEST PROCEDURE

a. For EUT power supply:

The surge is to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks shall be 2meters in length (or shorter).

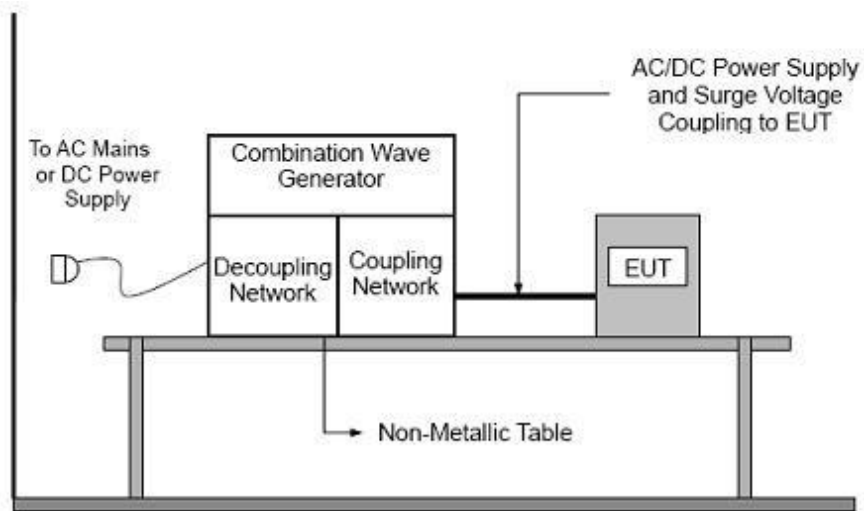
b. For test applied to unshielded asymmetrical operated interconnection lines of EUT: The surge is applied to the lines via the capacitive coupling. The coupling /decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

c. For test applied to unshielded symmetrically operated interconnection /telecommunication lines of EUT:

The surge is applied to the lines via gas arrester coupling. Test levels below the ignition point of the coupling arrester cannot be specified. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

d. For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.6.3 TEST SETUP



中鉴检测
CCTI TESTING

4.6.4 TEST RESULTS

EUT:	Wireless Controller	Model Name :	ERC902
Temperature:	25 °C	Relative Humidity:	45%
Pressure:	1010 hPa	Test Power :	AC 230V/50Hz
Test Mode:	Working		

Coupling Line			Test level (KV)								Observation	Criterion	Result
			0.5		1		2		4				
			+	-	+	-	+	-	+	-			
AC Line	L-N	0°	A	A	B	B					TT,TR	B	PASS
		90°	A	A	B	B							
		180°	A	A	B	B							
		270°	A	A	B	B							
	L-PE	0°											
		90°											
		180°											
		270°											
	N-PE	0°											
		90°											
		180°											
		270°											
DC Line													
Signal Line													

Note:

- (1) Polarity and Numbers of Impulses:5 Pst / NgT at each tested mode
- (2) N/A - denotes test is not applicable in this Test Report
- (3) There was not any unintentional transmission in standby mode.

4.7 INJECTION CURRENT TESTING

4.7.1 TEST SPECIFICATION

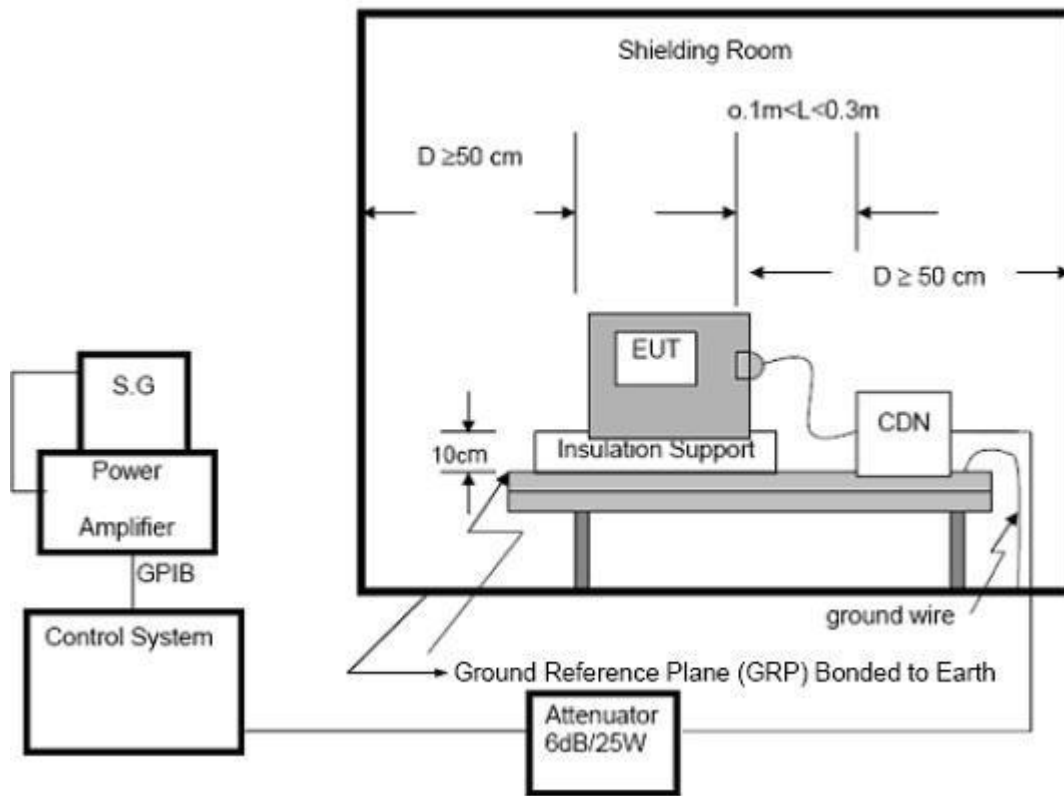
Basic Standard:	IEC/EN 61000-4-6
Required Performance	A
Frequency Range:	0.15 MHz - 80 MHz
Field Strength:	3 Vr.m.s.
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Dwell Time:	at least 3 seconds

4.7.2 TEST PROCEDURE

The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m*1m min. and 0.65mm thick min.

- The other condition as following manner:
- The field strength level was 3V.
- The frequency range is swept from 150 KHz to 80 MHz, with the signal 80%amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- For the actual test configuration, please refer to the related Item – EUT Test Photos.

4.7.3 TEST SETUP



For the actual test configuration, please refer to the related Item –EUT Test Photos.

NOTE:

FLOOR-STANDING EQUIPMENT

The equipment to be tested is placed on an insulating support of 0.1 meters height above a ground reference plane. All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters and 0.3 meters from the projected geometry of the EUT on the ground reference plane.

4.7.4 TEST RESULTS

EUT:	Wireless Controller	Model Name :	ERC902
Temperature:	25 °C	Relative Humidity:	45%
Pressure:	1010 hPa	Test Power :	AC 230V/50Hz
Test Mode:	Working		

Test Ports (Mode)	Freq. Range (MHz)	Field Strength Azimuth	Observation	Perform. Criteria	Results	Judgment
Input/ Output AC. Power Port	0.18-80	3 V/m (rms) AM Modulated 1000Hz, 80%	CT,CR	A	A	PASS
Input/ Output DC. Power Port	0.18-80		N/A	N/A	N/A	N/A
Signal Line	0.18-80		N/A	N/A	N/A	N/A

Note:“A” stand for, during test, operate as intended no loss of function, no degradation of performance, no unintentional transmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

4.8 VOLTAGE INTERRUPTION/DIPS TESTING

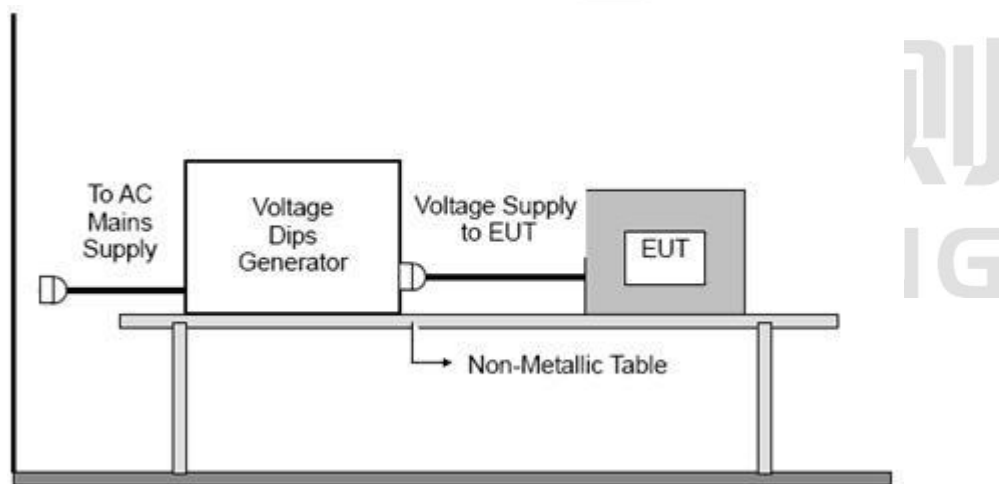
4.8.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-11
Required Performance	100% reduction, 0.5 Cycle 100% reduction, 1.0 Cycle 30% reduction, 25 Cycles
Voltage Interruptions:	100% reduction, 250 Cycles
Test Duration Time:	Minimum three test events in sequence
Interval between Event:	Minimum ten seconds
Phase Angle:	0°/45°/90°/135°/180°/225°/270°/315°/360°
Test Cycle:	3 times

4.8.2 TEST PROCEDURE

The EUT shall be tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10 s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

4.8.3 TEST SETUP



For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.8.4 TEST RESULTS

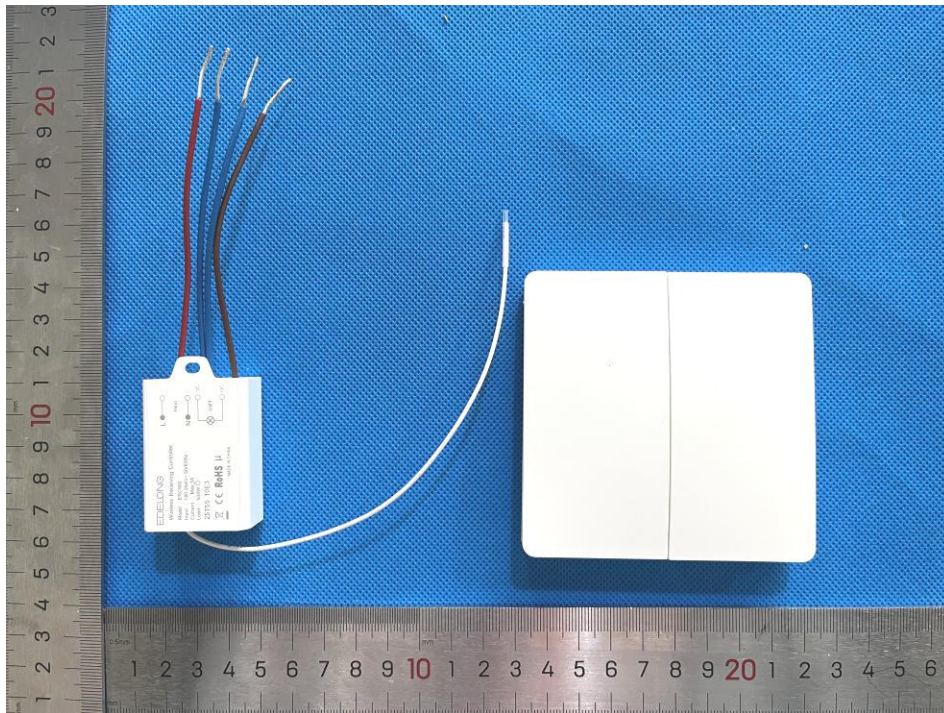
EUT:	Wireless Controller	Model Name :	ERC902
Temperature:	25 °C	Relative Humidity:	45%
Pressure:	1010 hPa	Test Power:	AC 230V/50Hz
Test Mode:	Working		

Voltage Reduction	Duration (ms)	Observation	Perform. Criteria	Results	Judgment
Voltage dip 0%	10	TT, TR	B	A	PASS
Voltage dip 0%	20	TT, TR	B	A	PASS
Voltage dip 70%	500	TT, TR	B	A	PASS
Voltage interruptions	5000	TT, TR	C	B	PASS

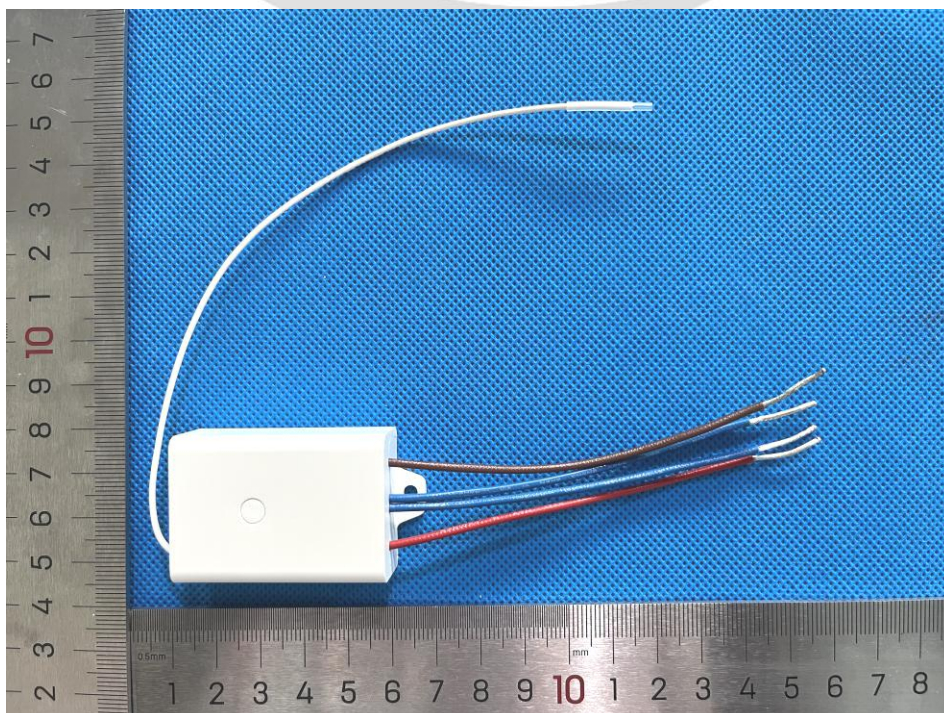
Note:

(1) There was not any unintentional transmission in standby mode.

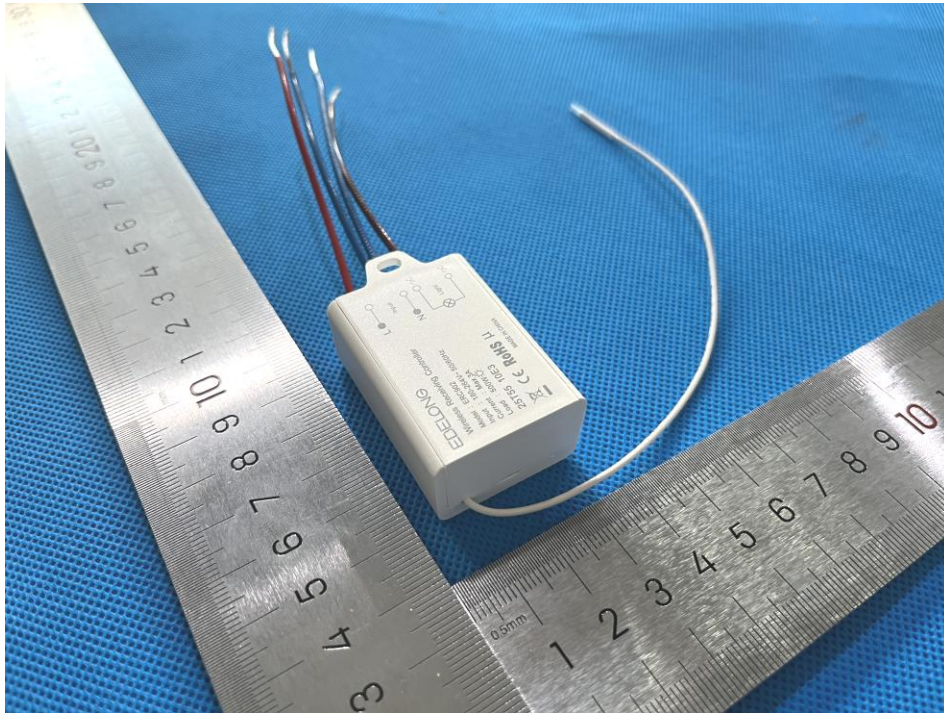
APPENDIX I -- EUT PHOTOGRAPHS



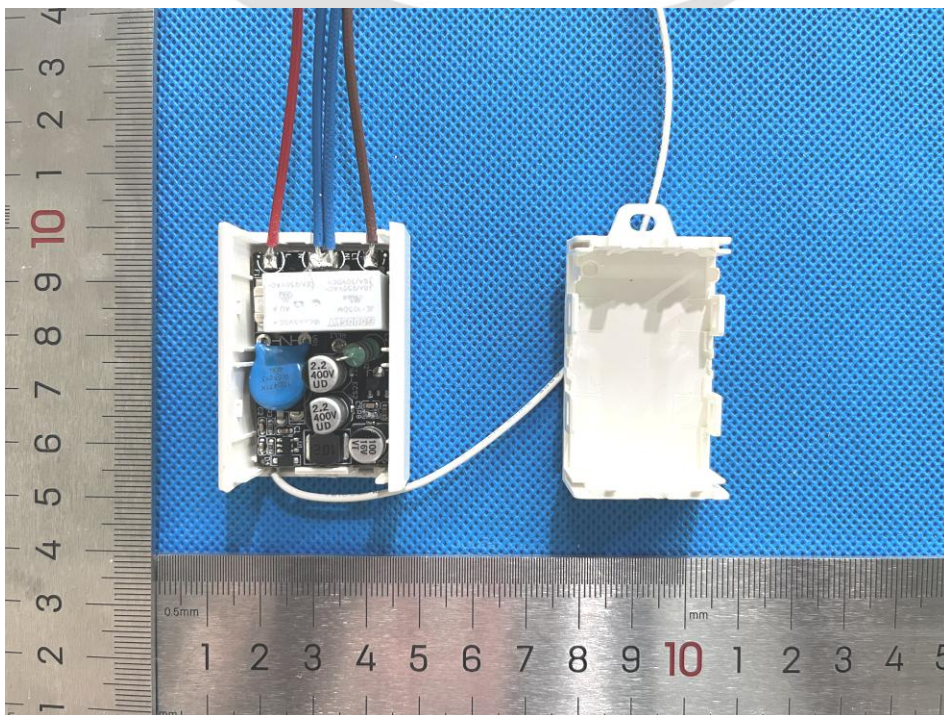
EUT Photo 1



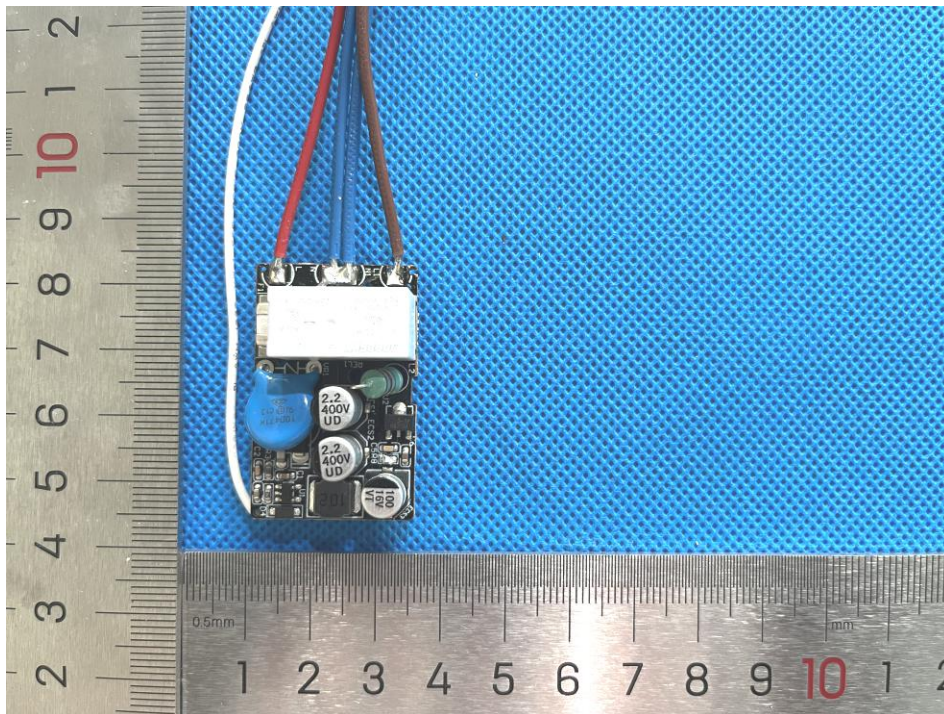
EUT Photo 2



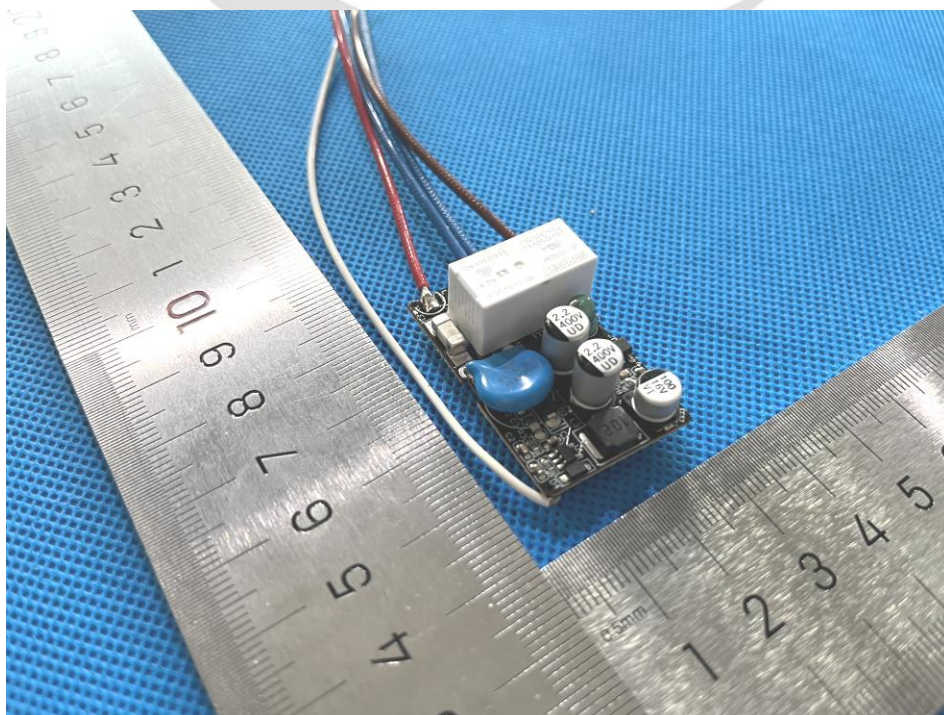
EUT Photo 3



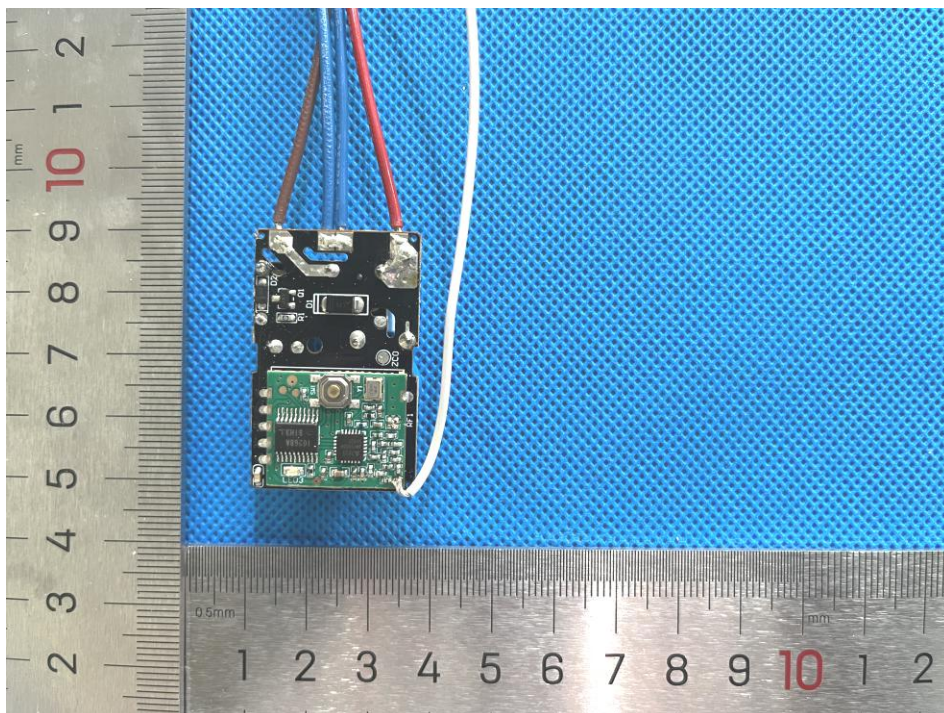
EUT Photo 4



EUT Photo 5



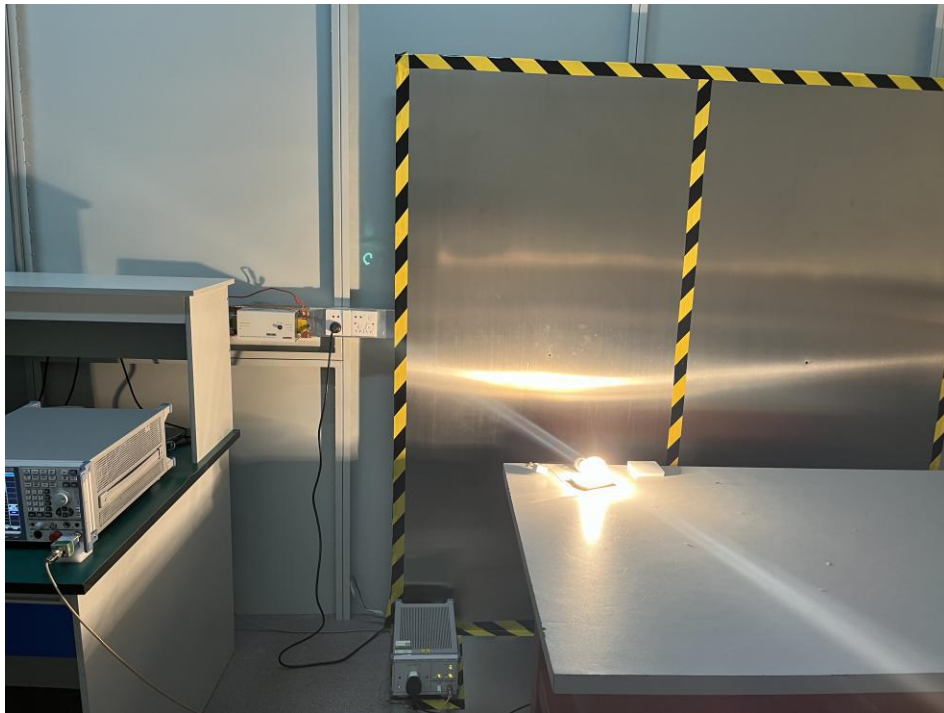
EUT Photo 6



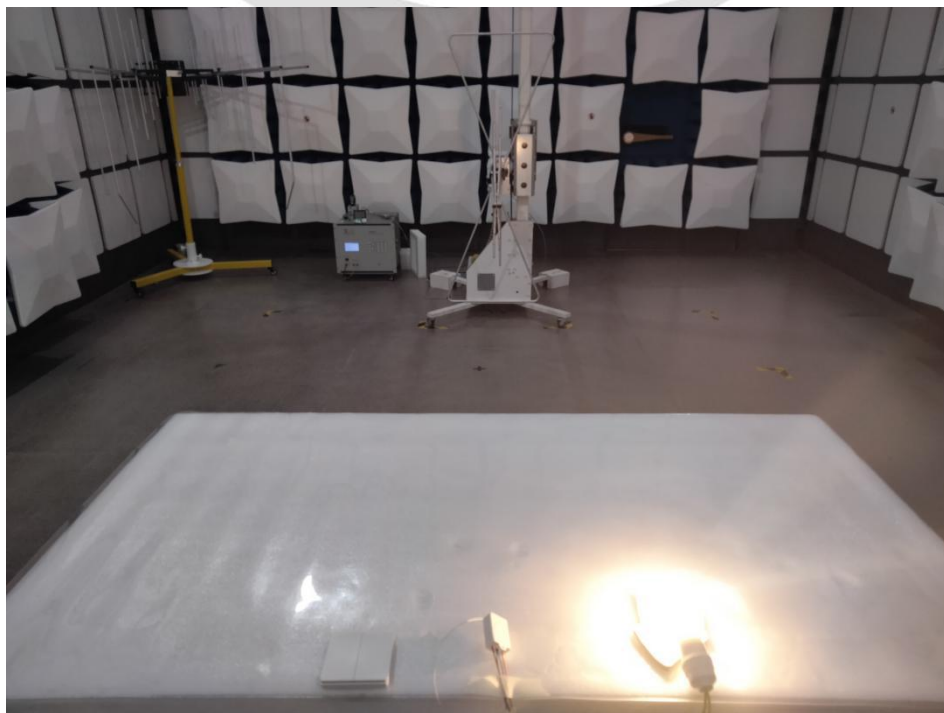
EUT Photo 7

中鉴检测
CCTI TESTING

APPENDIX II -- EUT TEST PHOTOGRAPHS



Test Photo CE



Test Photo RE

***** END OF REPORT *****