



EMC Test Report

For

FMUSER INTERNATIONAL GROUP LIMITED

Test Standards:

ETSI EN 301 489-1 V2.2.3(2019-11)
ETSI EN 301 489-17 V3.2.4(2020-09)

Product Description:

FMUSER Smart Hotel

Tested Model:

Fmuser Magic Box

Brand Name:

FMUSER

Report No.:

EBSZ2511030066E02

Tested Date:

2025.11.06~2025.11.08

Issued Date:

2025.11.14

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	2025.11.14	Valid	Original Report

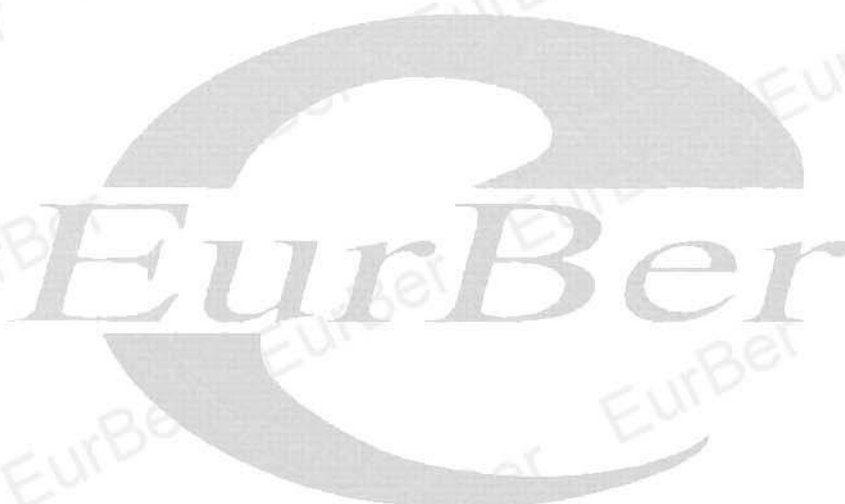


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SUMMARY OF TEST RESULT

CLAUSE (EN301489-1)	TEST ITEMS	TEST STANDARD	RESULT (PASS/FAIL)	REMARK
EMC Emission Measurements				
8.2	Radiated Emission	EN55032 :2015/A1:2020 Class B	PASS	Under limit 7.26 dB at 593.02 MHz for Peak
8.3 / 8.4 / 8.7	Conducted Emission	EN55032 :2015/A1:2020 Class B	PASS	Under limit 3.30 dB at 3.23 MHz for Quasi-Peak
8.5	Harmonic Current Emissions	EN 61000-3-2 :2019/A1:2021 Class B	Not Require	-
8.6	Voltage Fluctuations and Flicker	EN 61000-3-3 :2017/A11:2020	Not Require	-
EMC Immunity Tests				
9.2	RF Electromagnetic Field	EN IEC61000-4-3:2020	PASS	-
9.3	Electrostatic Discharge	EN 61000-4-2:2009	PASS	-
9.4	Fast Transients, Common Mode	EN 61000-4-4:2012	PASS	-
9.5	Radio frequency, Common Mode	EN 61000-4-6:2014	PASS	-
9.6	Transients and Surges in the vehicular environment	ISO 7637-2:2004	Not Required	-
9.7	Voltage Dips and Interruptions	EN IEC61000-4-11:2020	PASS	-
9.8	Surges	EN 61000-4-5:2014+A1:2017	PASS	-
Note: Not required means after assessing, test items are not necessary to carry out.				

1 General Information

1.1 Applicant

FMUSER INTERNATIONAL GROUP LIMITED
2301M, 23/F, No. 179 Tianhe North Road, Tianhe District, Guangzhou

1.2 Manufacturer

FMUSER INTERNATIONAL GROUP LIMITED
2301M, 23/F, No. 179 Tianhe North Road, Tianhe District, Guangzhou

1.3 General Description of EUT

Product	FMUSER Smart Hotel	
Model NO.	Fmuser Magic Box	
Additional no.	N/A	
Difference Description	N/A	
Nominal Voltage	Input;DC5V $\equiv$ 2A	
Extreme Temperature	0°C and 60°C	
Modulation Type	WLAN	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
	Bluetooth	N/A
Operating Frequency	WLAN	2.4G WiFi: 802.11b/g/n HT20/ax HE20/ax HT40: 2412-2472MHz
		802.11 n HT40/ax HE40: 2400-2484MH
Geo-location capability	Not Supported	
Antenna Type	N/A	
Antenna Gain	Internal Antenna, Maximum Gain is 0dBi	
HW Version	N/A	
SW Version	N/A	
Sample Received Date	2025-11-03	

NOTE:

1. The above EUT information is declared by manufacturer. The laboratory is not responsible for the information provided by the manufacturer. For more detailed feature description, please refer to the manufacturer's specifications or user's manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
3. According to the manufacturer's declaration that this product belongs to Class B equipment.

1.4 Support equipment List

Manufacturer	Description	Model	Serial Number	Certificate
Lenovo	Notebook	Xiaoxinchao5000	PF0QPQMH	DOC
Lenovo	Wired Keyboard	LXH-JME2209U	60937461	DOC
Logitech	Wired Mouse	M-U0026	1826HS0070D8	DOC

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of **ETSI EN301 489-1 V2.2.3 (2019-11)**, **ETSI EN 301 489 -17 V3.2.4(2020-09)**.

1.7 Address of the test laboratory

Guangdong Eurber Testing Co., Ltd.
Room 401/402, Building A, Tangxi Zhigu, No.21, Xijing Road, Gushu, Xixiang
Subdistrict, Bao'an District, Shenzhen, Guangdong, China
www.eurber.com/

2 Test Configuration of Equipment under Test

2.1 Details of EUT Test Modes

Details of Test line Items	
Radiated Emission (Refer to EN301 489-1 Section 8.2)	
Mode 1	: 2.4G WiFi: 802.11b/g/n <Fig.1>
Mode 2	:
Conducted Emission for AC mains input/output port (Refer to EN301 489-1 Section 8.4)	
Mode 1	: 2.4G WiFi: 802.11b/g/n <Fig.1>
Mode 2	:
Conducted Emission for telecommunication port (Refer to EN301 489-1 Section 8.7)	
Mode 1	: 2.4G WiFi: 802.11b/g/n <Fig.1>
Mode 2	:
Radio Frequency Electromagnetic Field (Refer to EN301 489-1 Section 9.2)	
Mode 1	: 2.4G WiFi: 802.11b/g/n <Fig.1>
Mode 2	:
Electrostatic Discharge (Refer to EN301 489-1 Section 9.3)	
Mode 1	: 2.4G WiFi: 802.11b/g/n <Fig.1> <Fig.1>
Mode 2	:
Mode 3	:
Fast Transient, Common Mode (Refer to EN301 489-1 Section 9.4)	
Voltage Dips and Interruptions (Refer to EN301 489-1 Section 9.7)	
Surges (Refer to EN301 489-1 Section 9.8)	
Mode 1	: 2.4G WiFi: 802.11b/g/n <Fig.1> <Fig.1>
Mode 2	:
Fast Transient, Common Mode for telecommunication port (Refer to EN301 489-1 Section 9.4)	
Surges for telecommunication port (Refer to EN301 489-1 Section 9.8)	
Mode 1	: 2.4G WiFi: 802.11b/g/n <Fig.1> <Fig.1>
Mode 2	:
Radio Frequency, Common Mode (Refer to EN301 489-1 Section 9.5)	
Mode 1	: 2.4G WiFi: 802.11b/g/n <Fig.1> <Fig.1>
Mode 2	:
Radio Frequency, Common Mode for telecommunication port (Refer to EN301 489-1 Section 9.5)	
Mode 1	: 2.4G WiFi: 802.11b/g/n <Fig.1> <Fig.1>
Mode 2	:

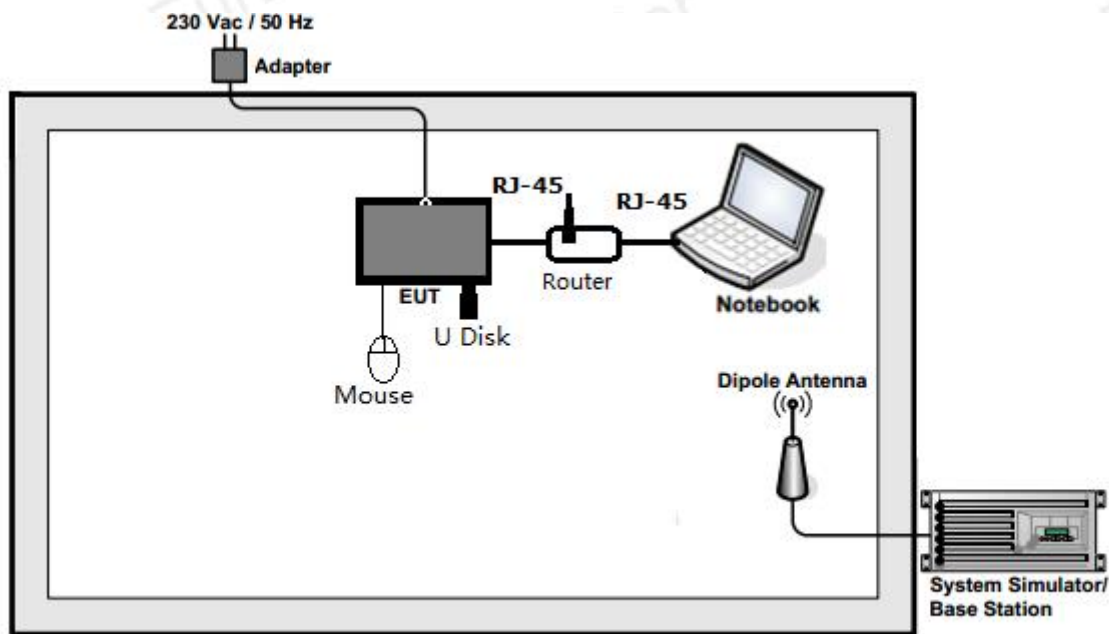
Worst mode of all test items listed in section 2.1

Test items	Worst mode
Radiated Emission	1
Conducted Emission for AC mains input/output port	1
Conducted Emission for telecommunication port	N/A
Radio Frequency Electromagnetic Field	1
Electrostatic Discharge	1
Fast Transient, Common Mode for AC power port	1
Fast Transient, Common Mode for telecommunication port	N/A

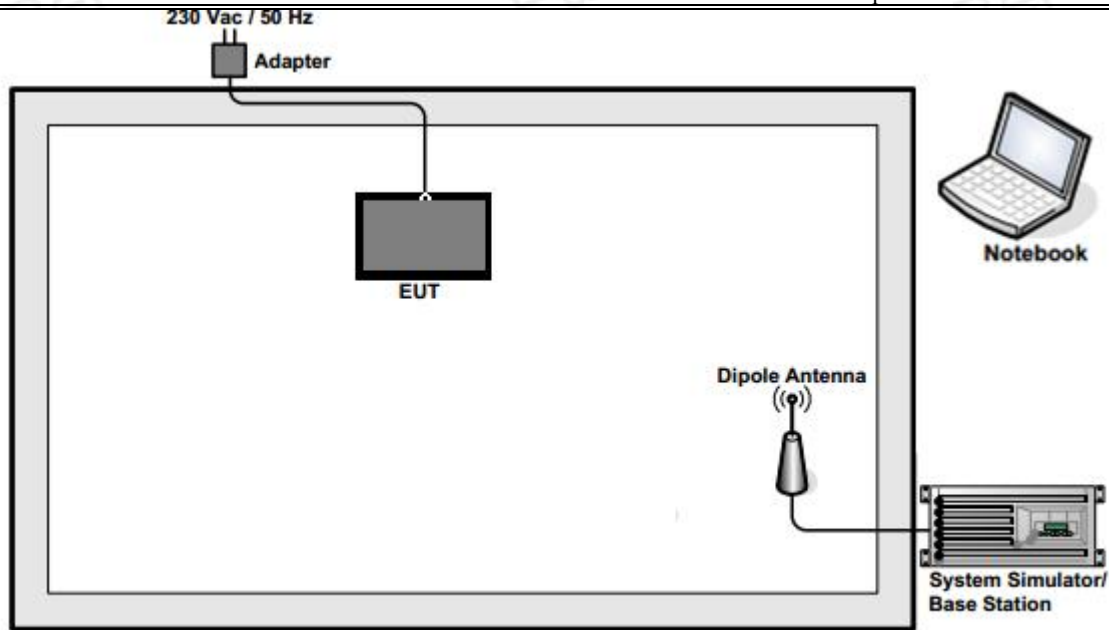
Radio Frequency, Common Mode for AC power port	1
Radio Frequency, Common Mode for telecommunication port	N/A
Surges for AC power port	1
Surges for telecommunication port	N/A

Remark: Only data of worst mode (if test item has) was reported in test result.

2.2 Connection of System Under Test



<Fig.1>



<Fig.2>

2.3 EUT Operation Test Setup

The EUT was set in below conditions during EMI and EMS testing

Read/Write and Storage of Data

1. Let EUT be connected with notebook.
2. Execute the program for files transferring between EUT and storage device.
3. Monitor the data transmission by checking whether there some error or abnormal action occurred.

WLAN

1. Enable WLAN function of the EUT.
2. The EUT links with supported units
3. Execute "PING IP" function under the "cmd" of Window system to transfer packet bi-directionally between the EUT and supported units.
4. Monitor the packet loss and WLAN radio performance.

3 Test Conditions of 301489 Series Standards

3.1 Special Conditions of Applied Standards for EUT

Below each section is special condition applied for each application of EUT.

3.1.1 Emission

EN301 489-17

No special conditions shall apply to UE in the scope of the present document.

3.1.2 Immunity

EN301 489-17

No special conditions are relevant for products covered in the present document.

3.2 RF Exclusion Band of Radio Equipment

As per section 4.3 of ETSI EN 301 489-1 V2.2.3 (2019-11)

As per section 4.3 of ETSI EN 301 489-17 V3.2.4 (2020-09)

4 Emission Measurements

4.1 Radiated Emission Test

4.1.1 Limits for Radiated Emission Test

<Class B limit>

Table A.2—Requirements for radiated emissions at frequencies up to 1GHz for Class B equipment

Table Clause	Frequency Range (MHz)	Measurement		Class B limits dB (μV/m)
		Distance (m)	Detector Type/ Bandwidth	OATS/SAC
A2.1	30 ~ 230	10	Quasi Peak / 120 kHz	30
	230 ~ 1000			37
A2.2	30 ~ 230	3		40
	230 ~ 1000			47

Table A.3—Requirements for radiated emissions at frequencies above 1GHz for Class B equipment

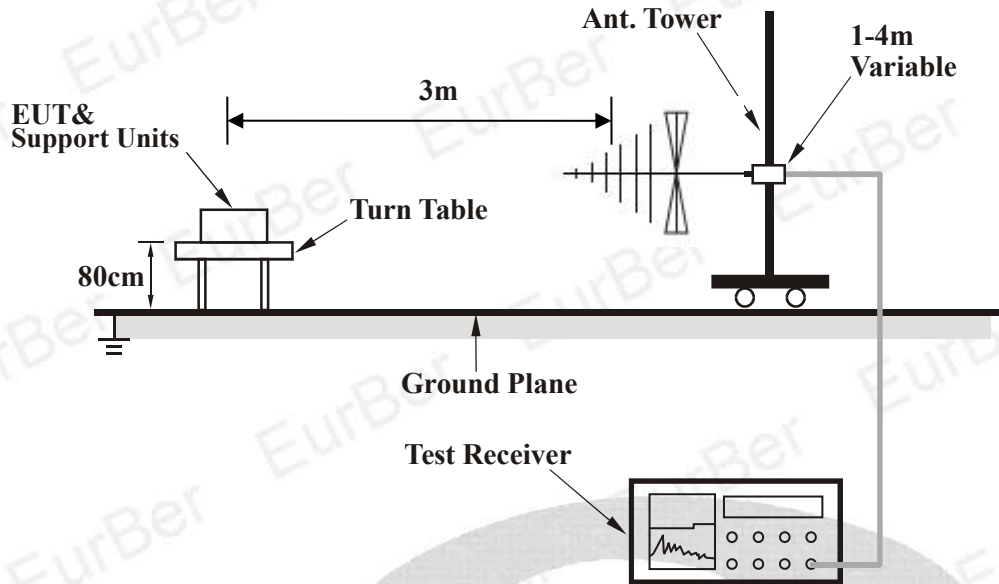
Table Clause	Frequency Range (MHz)	Measurement		Class B limits dB(μV/m)
		Distance (m)	Detector Type/ Bandwidth	FSOATS
A3.1	1000 ~ 3000	3	Average / 1 MHz	50
	3000 ~ 6000			54
A3.2	1000 ~ 3000		Peak / 1 MHz	70
	3000 ~ 6000			74

Conditional testing frequency:

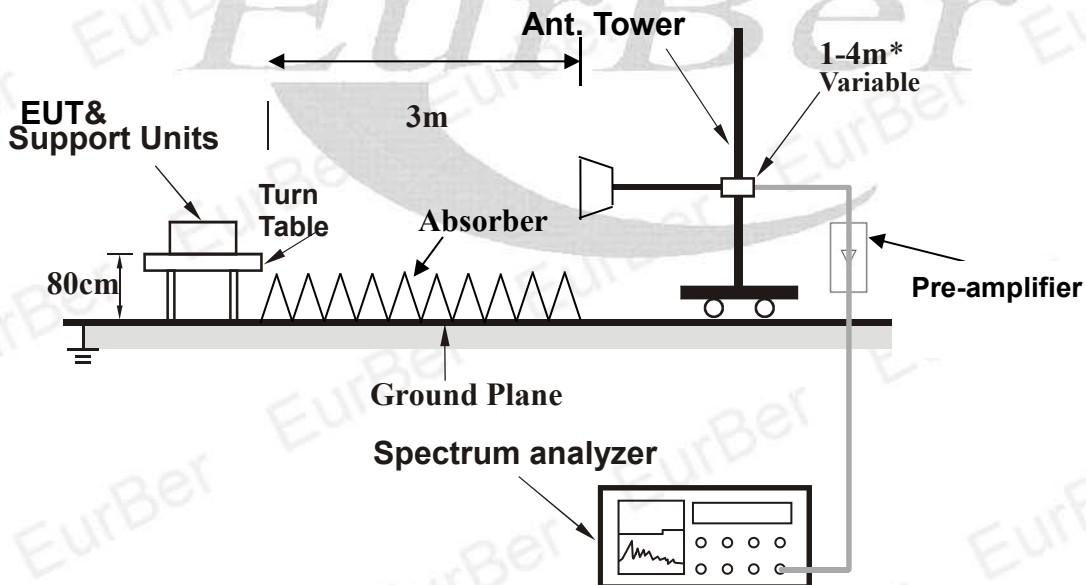
Highest measured frequency	Highest measured frequency
$F_x \leq 108 \text{ MHz}$	1 GHz
$108 \text{ MHz} \leq F_x \leq 500 \text{ MHz}$	2 GHz
$500 \text{ MHz} \leq F_x \leq 1 \text{ GHz}$	5 GHz
$F_x \geq 108 \text{ MHz}$	5 x F_x up to a maximum of 6 GHz
NOTE: For FM and TV broadcast receivers, F_x is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies.	

4.1.2 Test Setup

< Frequency Range below 1GHz >



< Frequency Range above 1GHz >



<Radiated Emissions Setup Configuration>

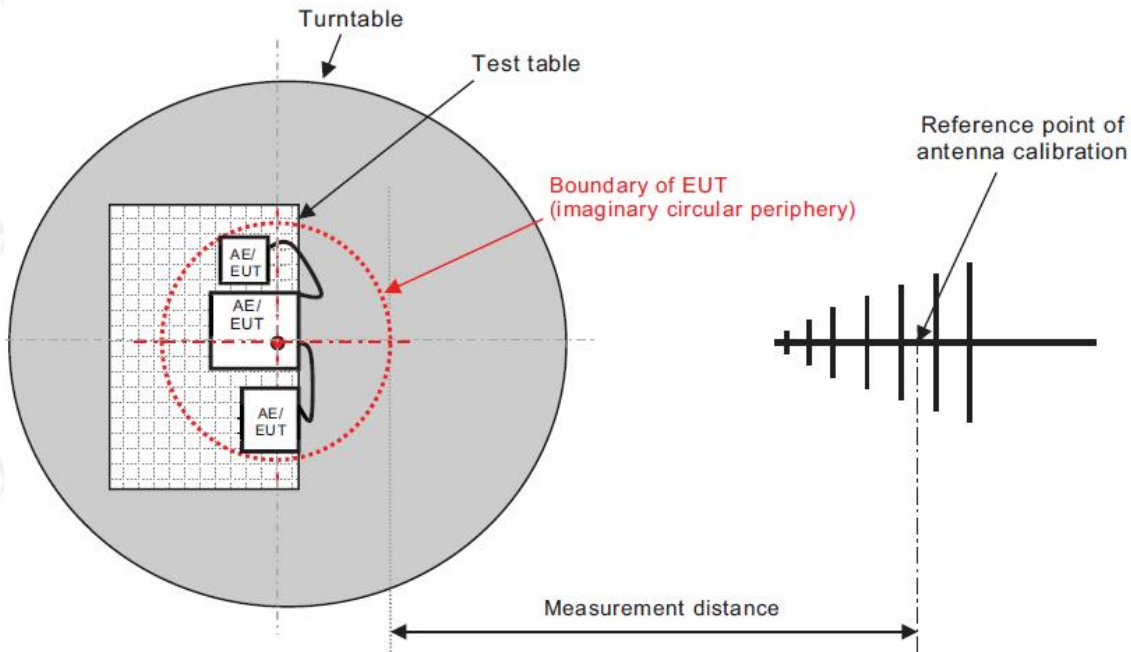


Figure C.1 – Measurement distance

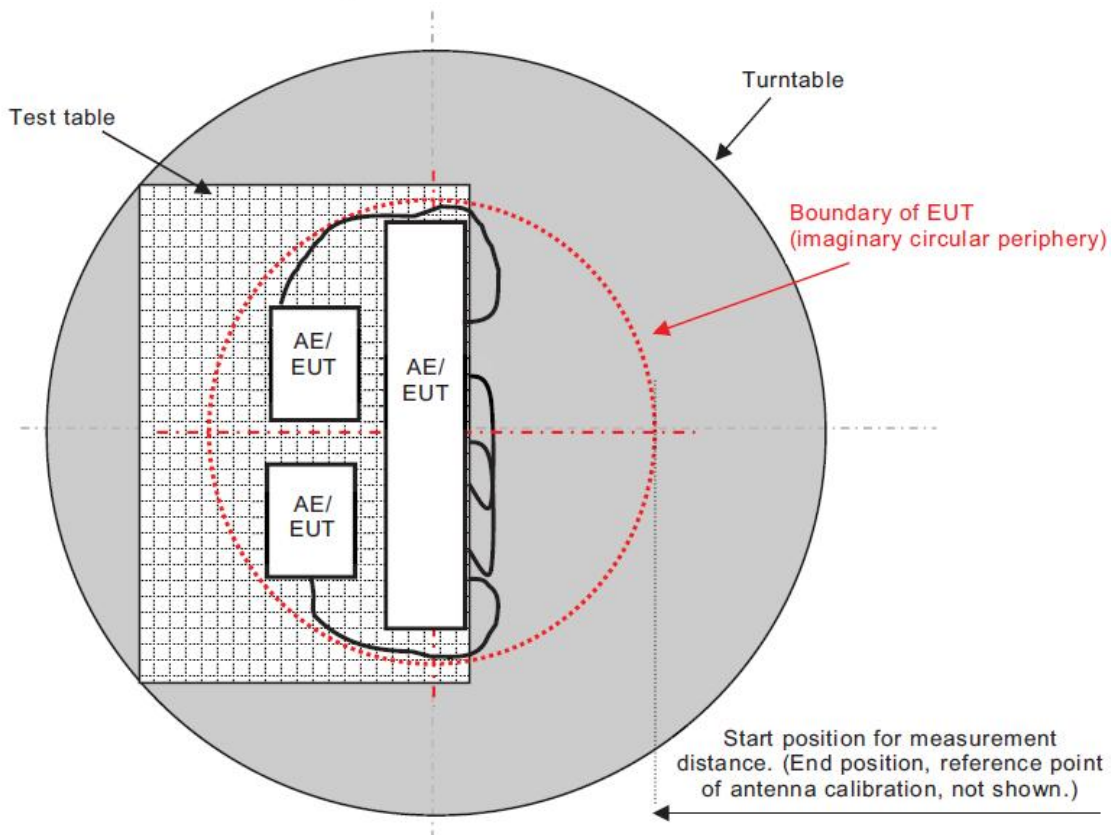


Figure C.2 – Boundary of EUT, Local AE and associated cabling

4.1.3 Test Procedures

Frequency range 30MHz~1GHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from 1 meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1GHz.

Frequency range above 1GHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna can be varied from 1 meter to 4 meters, the height of adjustment depends on the EUT height and the antenna 3dB beamwidth both, to detect the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test receiver/spectrum was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.

4.1.4 Test Result

Test Mode :	Mode1	Temperature :	23°C
Test Engineer :	May Li	Relative Humidity :	53%
Test Distance :	3m	Polarization :	Horizontal
Function Type :	WiFi: 802.11b/g/n <Fig.1>		
Remark :	NA		

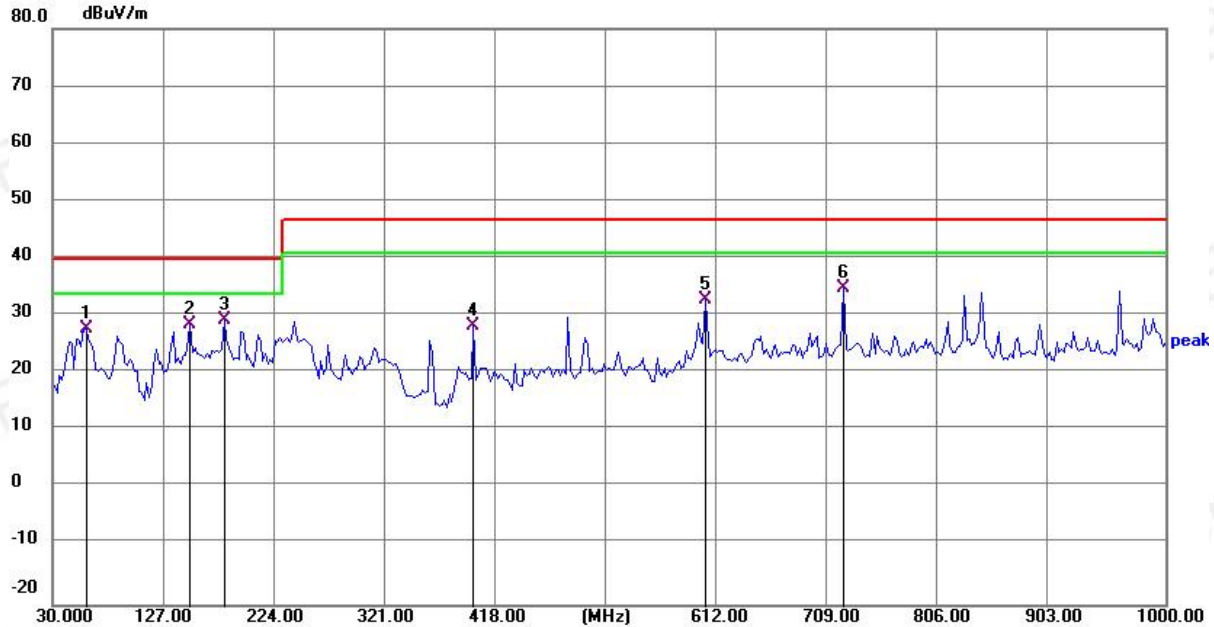
- Emission level (dBμV/m) = 20 log Emission level (μV/m)
- Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
- The test that passed at the minimum margin was marked by the frame in the following test record



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	164.9565	49.87	-19.58	30.29	40.00	9.71	QP
2	240.8694	58.26	-21.46	36.80	47.00	10.20	QP
3	396.9130	50.72	-18.15	32.57	47.00	14.43	QP
4	479.1521	46.86	-16.71	30.15	47.00	16.85	QP
5	630.9782	44.29	-14.17	30.12	47.00	16.88	QP
6	719.5434	48.08	-13.18	34.90	47.00	12.10	QP

Test Mode :	Mode 1	Temperature :	23°C
Test Engineer :	May Li	Relative Humidity :	53%
Test Distance :	3m	Polarization :	Vertical
Function Type :	WiFi: 802.11b/g/n <Fig.1>		
Remark :	NA		

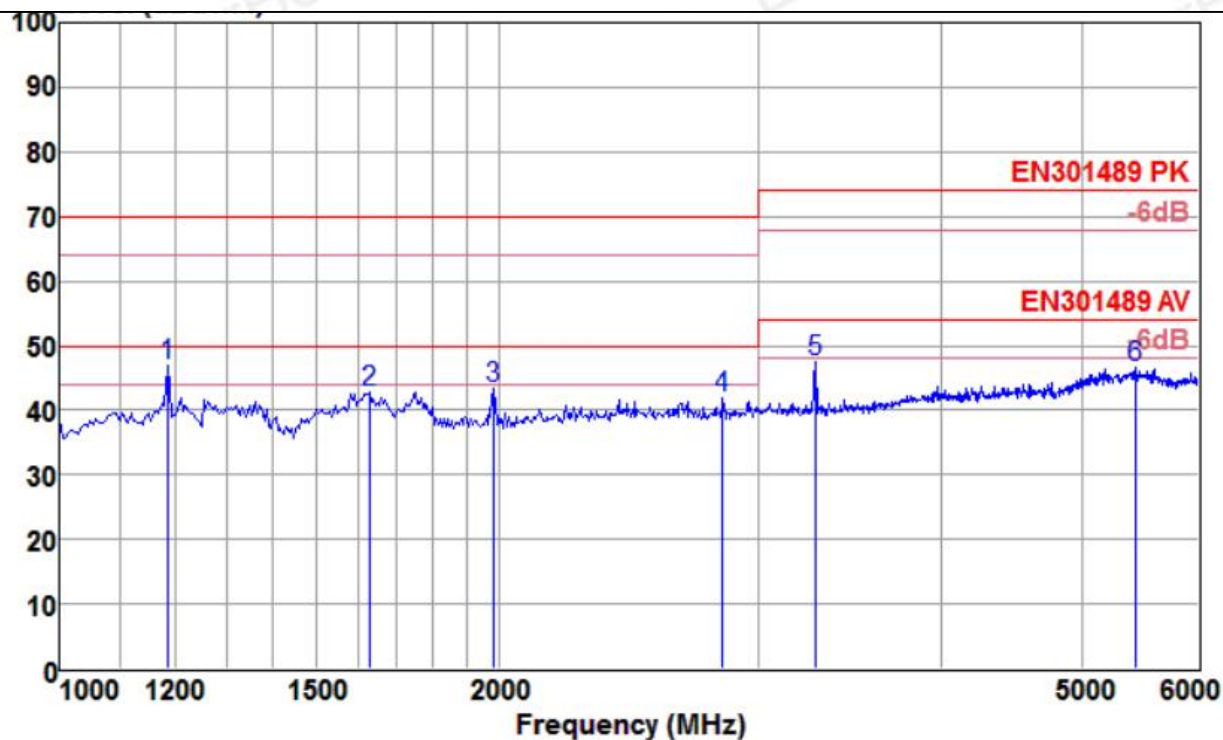
- Emission level (dBμV/m) = 20 log Emission level (μV/m)
- Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
- The test that passed at the minimum margin was marked by the frame in the following test record



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	59.5217	48.61	-20.50	28.11	40.00	11.89	QP
2	150.1956	47.78	-19.05	28.73	40.00	11.27	QP
3	179.7173	50.99	-21.57	29.42	40.00	10.58	QP
4	396.9130	46.56	-18.15	28.41	47.00	18.59	QP
5	599.3478	47.66	-14.71	32.95	47.00	14.05	QP
6	719.5434	48.25	-13.18	35.07	47.00	11.93	QP

Test Mode :	Mode 1	Temperature :	23°C
Test Engineer :	May Li	Relative Humidity :	53%
Test Distance :	3m	Polarization :	Horizontal
Function Type :	802.11b/g/n <Fig.1>		
Remark :	The main frequency has been filtered with a band stop filter		

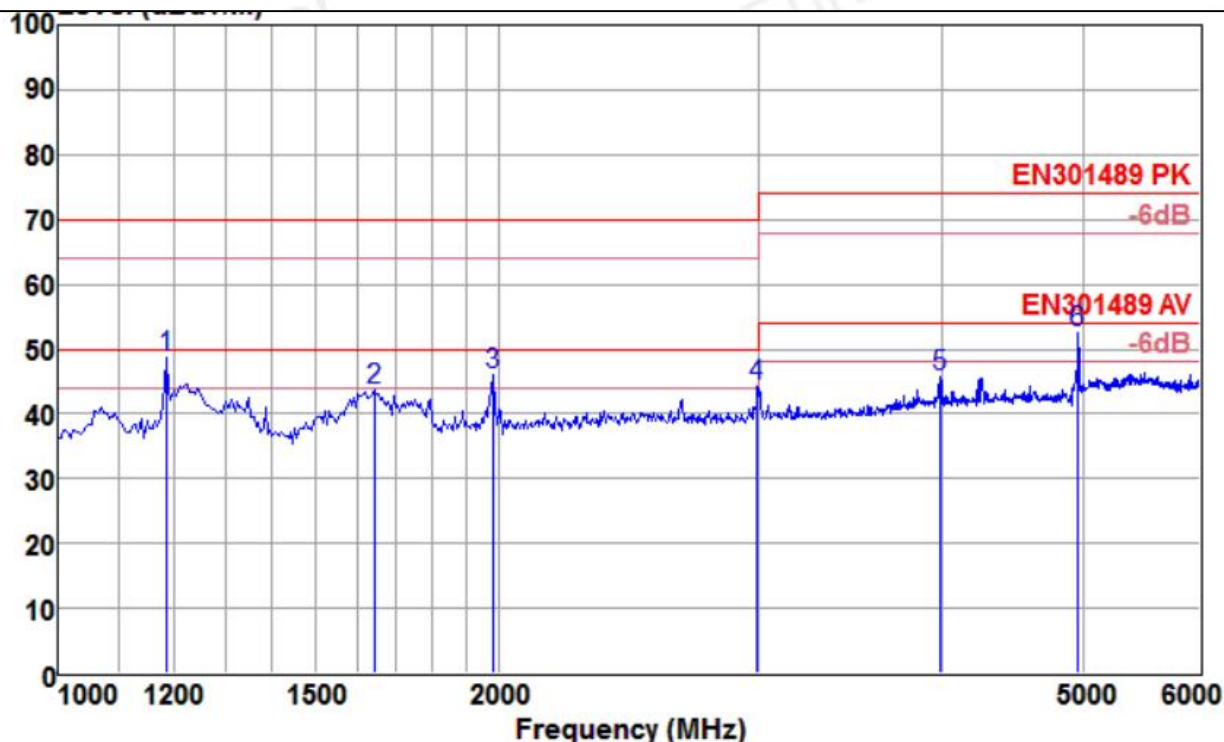
- Emission level (dBμV/m) = 20 log Emission level (μV/m)
- Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
- The test that passed at the minimum margin was marked by the frame in the following test record



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1185.000	80.26	24.27	2.84	60.47	46.90	70.00	-23.10	Peak
1630.000	74.25	25.37	3.30	60.16	42.76	70.00	-27.24	Peak
1980.000	73.06	26.63	3.57	59.91	43.35	70.00	-26.65	Peak
2840.000	68.35	28.07	4.50	59.06	41.86	70.00	-28.14	Peak
3285.000	73.07	28.37	5.06	59.01	47.49	74.00	-26.51	Peak
5440.000	64.83	31.55	8.93	58.81	46.50	74.00	-27.50	Peak

Test Mode :	Mode 1	Temperature :	23°C
Test Engineer :	May Li	Relative Humidity :	51%
Test Distance :	3m	Polarization :	Vertical
Function Type :	802.11b/g/n <Fig.1>		
Remark :	The main frequency has been filtered with a band stop filter		

- Emission level (dBμV/m) = 20 log Emission level (μV/m)
- Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
- The test that passed at the minimum margin was marked by the frame in the following test record



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
1185.000	81.96	24.27	2.84	60.47	48.60	70.00	-21.40	Peak
1645.000	75.12	25.42	3.29	60.15	43.68	70.00	-26.32	Peak
1980.000	75.85	26.63	3.57	59.91	46.14	70.00	-23.86	Peak
2995.000	70.14	28.20	4.95	58.91	44.38	70.00	-25.62	Peak
3995.000	68.94	29.79	6.21	59.30	45.64	74.00	-28.36	Peak
4955.000	72.86	31.14	7.58	58.92	52.66	74.00	-21.34	Peak

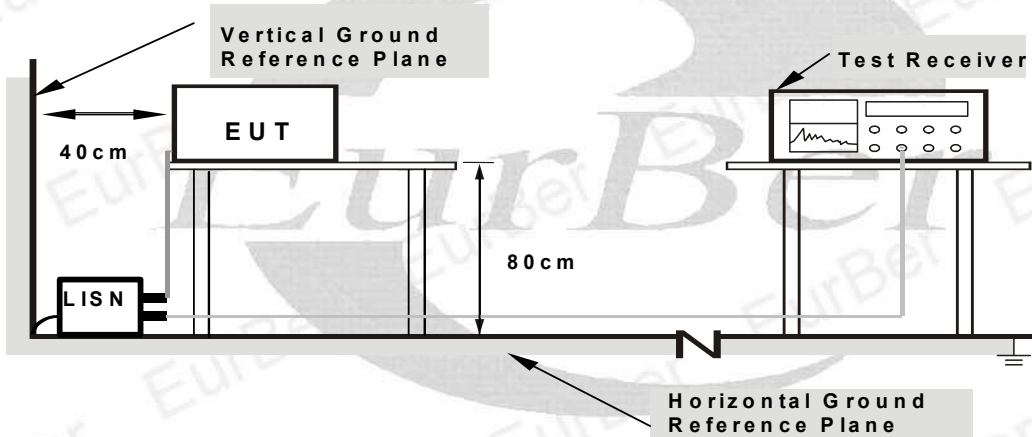
4.2 Conducted Emission Test

4.2.1 Limits for Conducted Emissions

Applicable to AC mains power ports			
Frequency Range (MHz)	Coupling Device	Detector Type / Bandwidth	Class B limits dB(μ V)
0.15~0.5	AMN	Quasi Peak / 9 kHz	66~56
0.5~5			56
5~30			60
0.15~0.5	AMN	Average / 9 kHz	56~46
0.5~5			46
5~30			50

The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz.

4.2.2 Test Setup



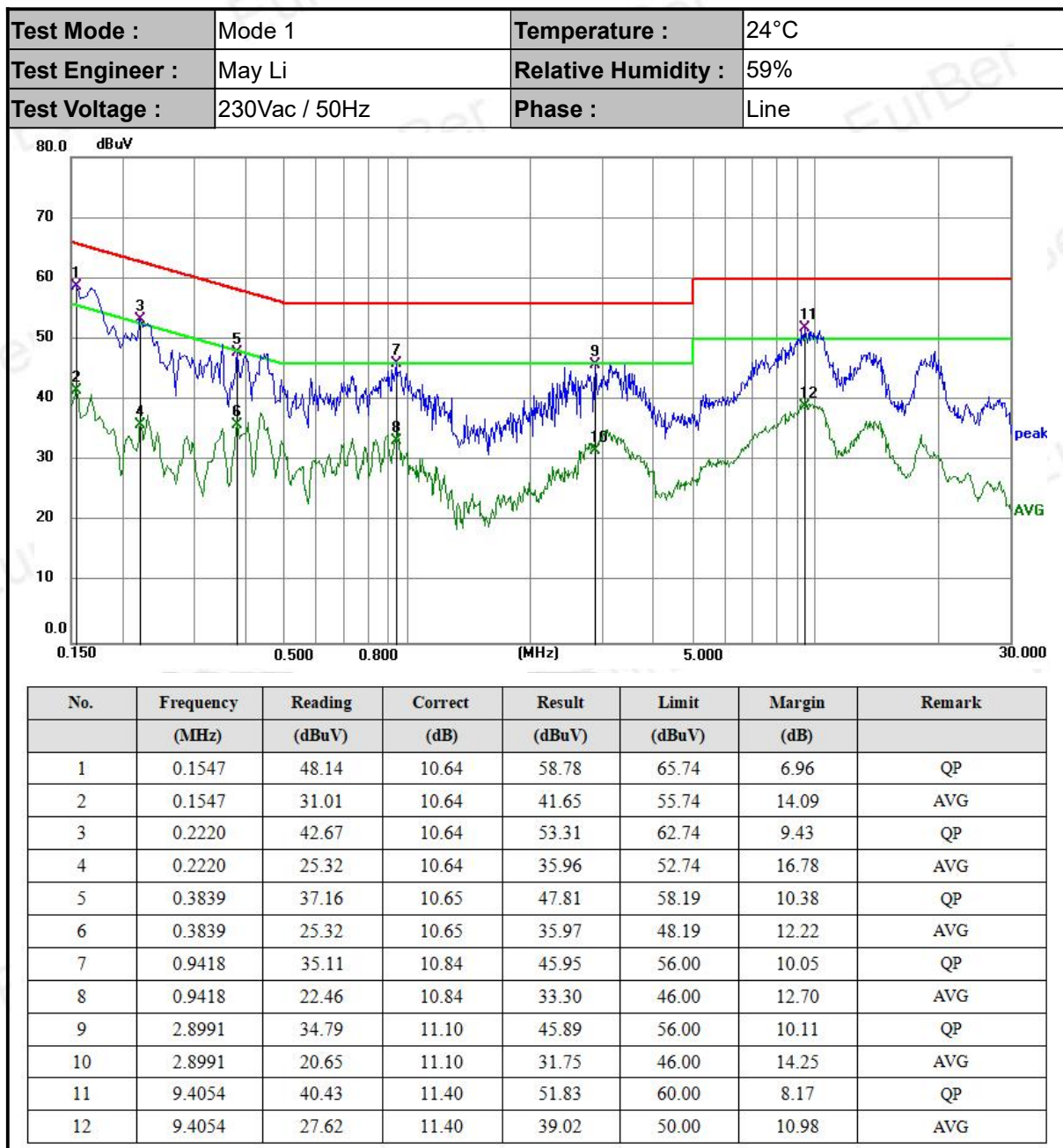
Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

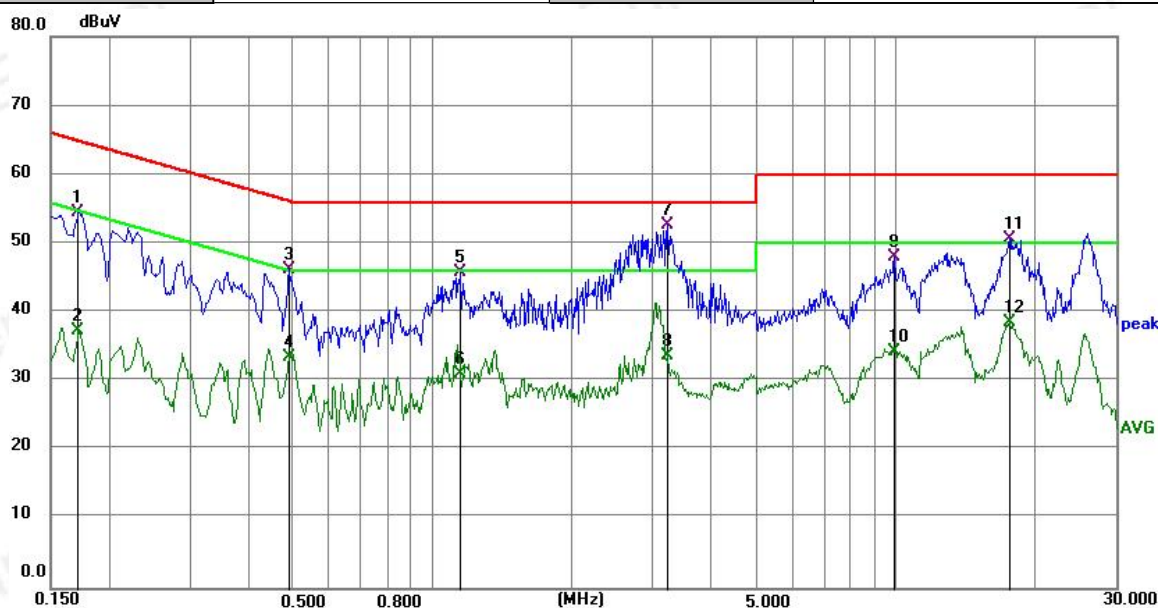
4.2.3 Test Procedure

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels under Limit - 20dB was not recorded.

4.2.4 Test Results



Test Mode :	Mode 1	Temperature :	22.5°C
Test Engineer :	May Li	Relative Humidity :	55.5%
Test Voltage :	230Vac / 50Hz	Phase :	Neutral



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1723	44.04	10.54	54.58	64.85	10.27	QP
2	0.1723	26.87	10.54	37.41	54.85	17.44	AVG
3	0.4919	35.55	10.65	46.20	56.14	9.94	QP
4	0.4919	22.87	10.65	33.52	46.14	12.62	AVG
5	1.1577	35.14	10.78	45.92	56.00	10.08	QP
6	1.1577	20.40	10.78	31.18	46.00	14.82	AVG
7	3.2366	41.83	10.87	52.70	56.00	3.30	QP
8	3.2366	22.84	10.87	33.71	46.00	12.29	AVG
9	9.9905	36.79	11.33	48.12	60.00	11.88	QP
10	9.9905	23.09	11.33	34.42	50.00	15.58	AVG
11	17.6756	39.17	11.59	50.76	60.00	9.24	QP
12	17.6756	26.90	11.59	38.49	50.00	11.51	AVG

5 Immunity Tests

5.1 Requirements of Limit and EUT Performance Criteria for all Immunity Test Items

Test limit including test level, test frequency range, pulse type, test duration...etc. requirements.

This section is intended to integrate requirements of limit, and required performance criteria for all immunity test Items.

In subsection 5.1.1, includes two parts:

- a. Subsection 5.1.1.1 : Support ports list of EUT, accessory, and cable record, where EUT intended to use in. These information will be used for decide test items and test limit
 - i. Supported ports list of EUT: Because test limit are based on supported ports of EUT, this is necessary information.
 - ii. Accessory : include adapter type and remark EUT has battery or not.
 - iii. Cable record : includes cable type, cable length, indoor/outdoor. These parameters will decide tests shall be carrying out or not.
- b. Subsection 5.1.1.2 : tables of immunity test level specified in EN301489 series standards and immunity test level specified by manufacturer.

If immunity test level specified by manufacturer are higher/stronger than level specified in EN301489 series standards, they will be also record in this table. Therefore anyone could distinguish requirements specified by standard or manufacturer from these tables.

In subsection 5.1.2, required performance criteria of EUT per EN301489 series standards.

Integrated required performance criteria of EN301489 series standards, they are used for all immunity test of this report.

5.1.1 Test Limit

5.1.1.1 Information of supported ports of EUT, accessory, cable record where EUT intended to use in.

1. Supported ports of EUT are listed as below (symbol ☒ means supported port):

☒	Enclosure Port
☒	Input AC power port
☐	Input DC power port
☐	Telecommunication port

2. Accessory (symbol ☒ means have used with EUT during test)

☒	☒ AC Adapter ☐ DC Adapter ☐ Car charger ☐ PoE adapter	Pins : ☒ 2pins ☐ 3pins Cable Length : ☐ >3m ☒ <3m
☐	Battery	

As per above information, corresponded test limit (including test level, test frequency range, pulse type, test duration...etc. requirements) specified in below table 1~4 have been selected to carry out test in this report.

5.1.1.2 Tables of Immunity Test Level Specified in EN301489 series standards and Immunity Test Level Specified by Manufacturer

When immunity test level specified by manufacturer are higher (stronger) than level specified in EN301489 series standards, they will be also record in this table. But if manufacturer doesn't specify immunity test level, "N/A" is filling in table and test level of all immunity test items are following requirements of EN301489 series standards.

Table 1 - Enclosure Port

Test item	Immunity test level specified in EN301489-1	Immunity test level specified by manufacturer
Electrostatic discharge (ESD)	± 2 kV, ± 4 kV contact	N/A
	± 2 kV, ± 4 kV, ± 8 kV air	N/A
Radio frequency electromagnetic field (RS)	3 V/m	N/A
	Frequency range : 80 MHz – 6 GHz	N/A
	Modulation: 80 % AM at 1 kHz	N/A

Table 2 – Input AC Power Port

Test Item	Immunity test level specified in EN301489-1	Immunity Test level specified by manufacturer
Fast transients, common mode (EFT)	± 1 kV 5 kHz repetition frequency	N/A
Surges Line-to-line	$\pm 0,5$ kV, ± 1 kV	N/A
Surges Line-to-ground	$\pm 0,5$ kV, ± 1 kV, ± 2 kV	N/A
Radio frequency, common mode (CS)	3 Vrms	N/A
	Frequency range: 0,15 MHz – 80 MHz	N/A
	Modulation: 80 % AM at 1 kHz	N/A
Voltage dips	0 % residual; 0,5 cycle , 50Hz Phase At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°	N/A
	0 % residual; 1 cycle , 50Hz Phase At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°	
	70 % residual; 25 cycles , 50Hz Phase At 0°, 45°, 90°, 135°, 180°, 225°, 270° and 315°	
Voltage interruptions	0 % residual; 250cycle , 50Hz	N/A

Table 3 – Input DC Power Port (not necessary performed on EUT of this report)

Test Item	Immunity test level specified in EN301489-1	Immunity Test level specified by manufacturer
Fast transients, common mode (EFT)	± 0.5 kV 5 kHz repetition frequency When cable length >3m	N/A
Radio frequency, common mode (CS)	3 Vrms When cable length >3m	N/A
	Frequency range: 0,15 MHz – 80 MHz	N/A
	Modulation: 80 % AM at 1 kHz	N/A
Transients and surges in the vehicular environment	As specified in ISO 7637-2 : Pulse type : 1, 2a, 2b, 3a, 3b, 4 Level : III	N/A

Table 4 –Telecommunication Port (not necessary performed on EUT of this report)

Test Item	Immunity test level specified in EN301489-1	Immunity Test level specified by manufacturer
Fast transients, common mode (EFT)	± 0.5 kV 5 kHz repetition frequency When cable length >3m	N/A
Surges Line-to-ground	± 0.5 kV for indoor cable When cable length >10m	N/A
	± 1 kV for outdoor cable	N/A
Radio frequency, common mode (CS)	3 Vrms When cable length >3m	N/A
	Frequency range: 0,15 MHz – 80 MHz	N/A
	Modulation: 80 % AM at 1 kHz	N/A

5.1.1 Required Performance Criteria of EUT per EN301489 series standards

General performance requirements table of 301489-1

Criteria	Performance criteria
Continuous phenomena	During the test, the equipment shall: • continue to operate as intended; • not unintentionally transmit; • not unintentionally change its operating state; • not unintentionally change critical stored data.

Transient phenomena	For all ports and transient phenomena with the exception described below, the following applies: • The application of the transient phenomena shall not result in a change of the mode of operation (e.g. unintended transmission) or the loss of critical stored data. • After application of the transient phenomena, the equipment shall operate as intended. For surges applied to symmetrically operated wired network ports intended to be connected directly to outdoor lines the following criteria applies: • For products with only one symmetrical port intended for connection to outdoor lines, loss of function is allowed, provided the function is self-recoverable, or can be otherwise restored. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost. • For products with more than one symmetrical port intended for connection to outdoor lines, loss of function on the port under test is allowed, provided the function is self-recoverable. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.
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*Performance requirements table of 301489-17

CLAUSE 6.2 of EN301489-17		
Criteria	During test	After test
A	Shall operate as intended. (See note). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance. Shall be no loss of function. Shall be no loss of critical stored data.
B	May be loss of function.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no loss of critical stored data.
C	May be loss of function.	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no loss of critical stored data.
NOTE : Operate as intended during the test allows a level of degradation in accordance with clause 6.2.2. • performance criteria A for immunity tests with phenomena of a continuous nature; • performance criteria B for immunity tests with phenomena of a transient nature; • performance criteria C for immunity tests with power interruptions exceeding a certain time. Minimum performance level : For equipment that supports a PER or FER, the minimum performance level shall be a PER or FER less than or equal to 10 %. For equipment that does not support a PER or a FER, the minimum performance level		

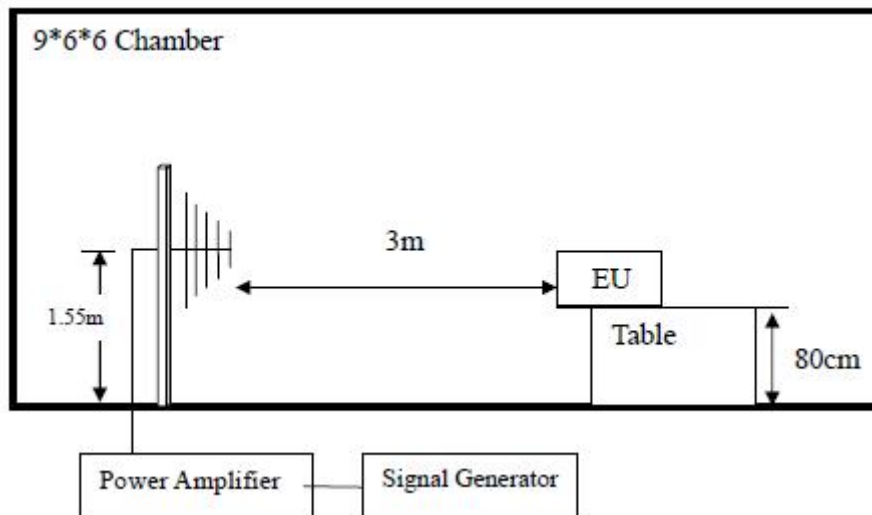
shall be no loss of the wireless transmission function needed for the intended use of the equipment.

CLAUSE 6.3 to 6.4 of EN301489-17

Criteria	Performance criteria
Continuous phenomena	The performance criteria A shall apply. Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur during the test. Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur during the test.
Transient phenomena	The performance criteria B shall apply, except for voltage dips greater than or equal to 100 ms and voltage interruptions of 5 000 ms duration, for which performance criteria C shall apply. Where the EUT is a transmitter in standby mode, unintentional transmission shall not occur as a result of the application of the test. Where the EUT is a transceiver in receive mode, unintentional transmission shall not occur as a result of the application of the test.

5.2 Radio frequency electromagnetic field (RS) Test

5.2.1 Test Setup



5.2.2 Test Instrument Setting

Frequency Step Size	1% increment
Modulation	80% AM (1kHz)
Dwell Time	3 seconds
Tested Antenna Height	1.55m

5.2.3 Test Procedures

The antenna is placed 3m away from the equipment. The required field strength is pre-calibrated and complies with the uniform field area requirement lay down in the IEC/EN 61000-4-3.

5.2.4 Test Result

Test Standard	EN 61000-4-3:2006+A1:2008+A2:2010
Product Standard	EN 301 489-1, EN 301 489-17
Test Frequency Range	80 MHz ~ 6 GHz
Test Level	3 V/m
Polarity	Horizontal and Vertical
Azimuth	0°, 90°, 180°, 270°
Required Performance Criteria	A
Performance Criteria of EUT	A
Ambient Temperature	22° C
Relative Humidity	55%RH
Test Date	2025.11.07
Test Engineer	May Li
Test Result	PASS

<Data>

Test Mode :	Mode 1/Mode2
Function Type :	BT BR(1Mbps): GFSK BT EDR(2Mbps): $\pi/4$ -DQPSK BT EDR(3Mbps): 8DPSK BT (BLE) GFSKWiFi: 802.11b/g/n
Azimuth	0°
Polarity	Horizontal
Frequency Range	80 MHz ~ 1 GHz
PER	0%

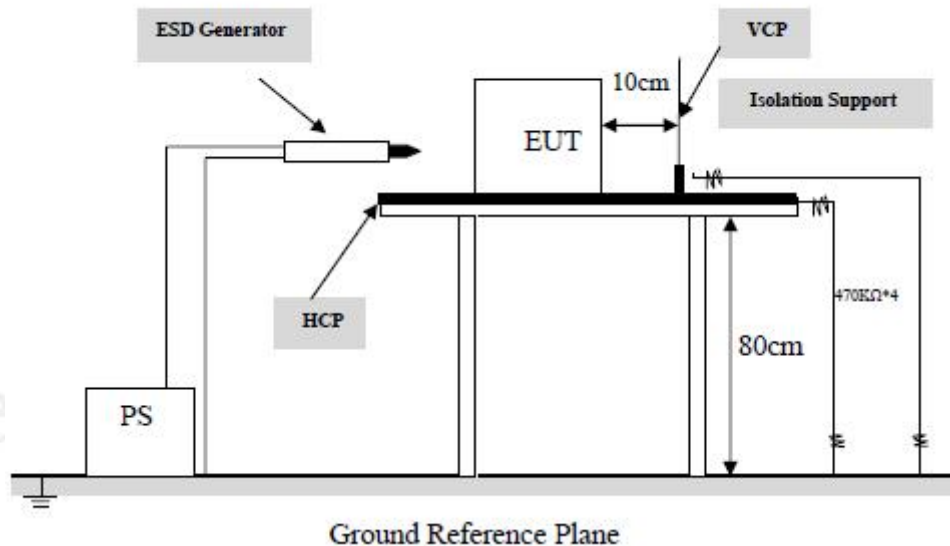
Test Mode :	Mode 1/Mode2
Function Type :	BT BR(1Mbps): GFSKBT EDR(2Mbps): $\pi/4$ -DQPSK BT EDR(3Mbps): 8DPSK BT (BLE) GFSKWiFi: 802.11b/g/n
Azimuth	0°
Polarity	Horizontal
Frequency Range	1 GHz ~ 6 GHz
PER	0%

Test Mode :	Mode 1/Mode2
Function Type :	BT BR(1Mbps): GFSKBT EDR(2Mbps): $\pi/4$ -DQPSK BT EDR(3Mbps): 8DPSK BT (BLE) GFSKWiFi: 802.11b/g/n
Azimuth	180°
Polarity	Vertical
Frequency Range	80 MHz ~ 1 GHz
PER	0%

Test Mode :	Mode 1/Mode2
Function Type :	BT BR(1Mbps): GFSKBT EDR(2Mbps): $\pi/4$ -DQPSK BT EDR(3Mbps): 8DPSK BT (BLE) GFSKWiFi: 802.11b/g/n
Azimuth	180°
Polarity	Vertical
Frequency Range	1 GHz ~ 6 GHz
PER	0%

5.3 Electrostatic Discharge (ESD) Test (Refer to EN301 489-1 Section 9.3)

5.3.1 Test Setup



A distance of 1m minimum was provided between the EUT and the wall or any other metallic structure. In cases where this length exceeds the length necessary to apply the discharges to the selected points, the excess length shall, where possible, be placed non-inductively off the ground reference plane and shall not be less than 0.2m to other conductive parts in the test setup.

The coupling plane is placed parallel to, and positioned at a distance of 0,1 m from the EUT.

5.3.2 Test Instrument Setting

Tested number of air discharge is at least 10 discharges (in the most sensitive polarity). For contact discharge, tested number is at least 10 discharges.

For the time interval between successive single discharges an initial value of 1 s is recommended.

Sweeping of the EUT with a grounded carbon fibre brush with bleeder resistors (for example, $2 \times 470 \text{ k}\Omega$) in the grounding cable.

Ensure parameters of current waveform of an ESD generator is within specifications before test.

5.3.3 Test Procedure

EUT and auxiliary instrument necessary to perform DIRECT and INDIRECT application of discharges to the EUT, in the following manner:

· CONTACT DISCHARGE to the conductive surfaces and to the coupling plane;

· AIR DISCHARGE at insulating surfaces.

a. Contact Discharges to the conductive surfaces and to coupling planes

In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

In the case of painted surface covering a conducting substrate, the following procedure shall be adopted :

- If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate.

- Coating declared as insulating by the manufacturer shall only be submitted to the air discharge.

- The contact discharge test shall not be applied to such surfaces.

b. Air Discharge to apertures and insulation surfaces:

In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT.

After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.

c. Ensure that the applied charge on the EUT has been dis-charged before next ESD pulse

5.3.4 Test Result

Test Standard	EN 61000-4-2:2009
Product Standard	EN 301 489-1, EN 301 489-17
EUT operated voltage during test	230 Vac, 50Hz
Tested Level	$\pm 2 / \pm 4 / \pm 8$ kV for air discharge $\pm 2 / \pm 4$ kV for contact discharge
Required Performance Criteria	B
Performance Criteria of EUT	B
Ambient Temperature	22° C
Relative Humidity	58%RH
Atmospheric Pressure	100.7kPa
Test Date	2025.11.07
Test Engineer	May Li
Test Result	PASS

5.3.5 Photos for Identification of ESD Test Points

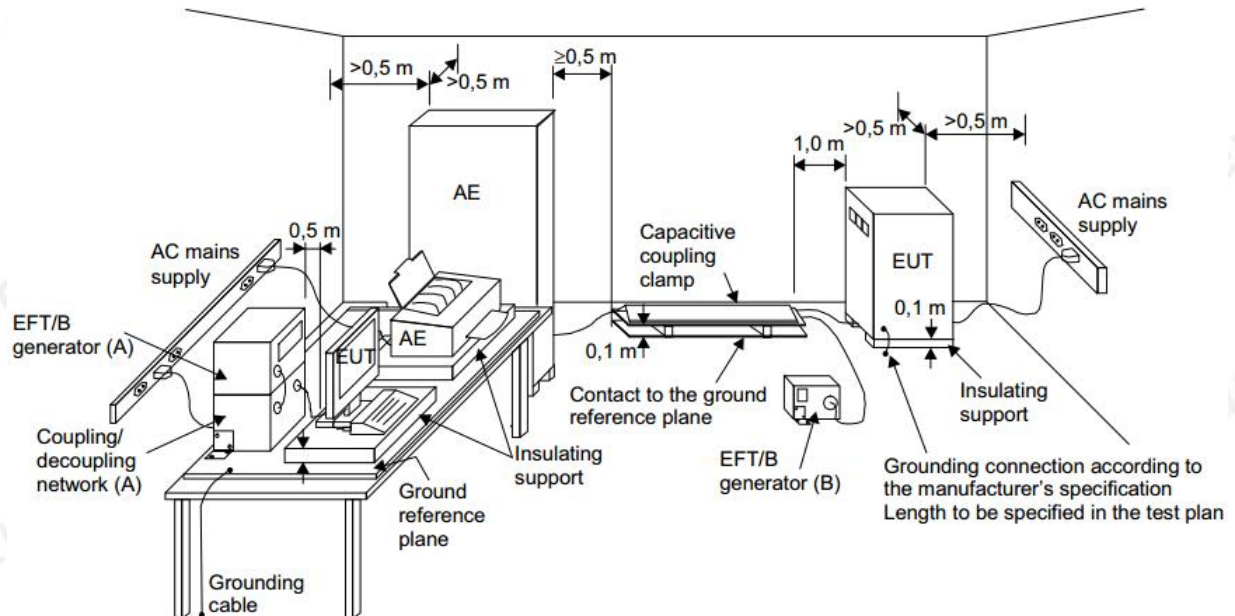
Remark: 1. Air discharge refers to the product gap, the camera audio output, the housing, the indicator light, and the contact discharge refers to the discharge of the charging port on the photo

<EUT>



5.4 Fast Transients, Common Mode (EFT/BURST) Test

5.4.1 Test Setup



The EUT was placed on a ground reference plane and was insulated from it by an insulating support about 0.1m thick. If the EUT is table-top equipment, it was located approximately 0.8m above the GRP. The GRP was a metallic sheet (copper or aluminum) of 0.25 mm, minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness.

5.4.2 Test Instrument Setting

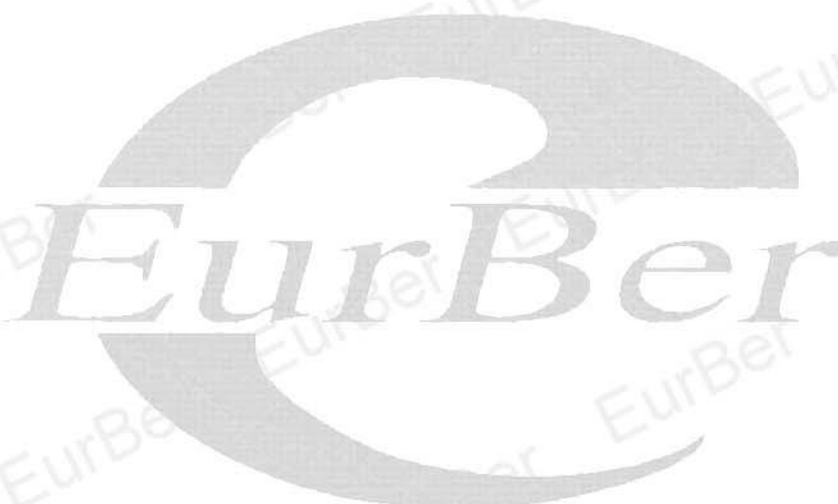
Pulse repetition rate	Burst duration/ Burst period	Duration of test per port
5kHz	15 ms / 300 ms	1 minute

5.4.3 Test Procedure

- a. Both positive and negative polarity discharges were applied.
 - b. The distance between any coupling devices and the EUT should be $(0.5 - 0/+0.1)$ m for table-top equipment testing, and (1.0 ± 0.1) m for floor standing equipment.
 - c. The duration time of each test sequential was 1 minute.
 - d. Testing on signal input/output parts port is followed below requirements:
 - i. The coupling clamp is composed of a clamp unit for cable length more than 3 m, and it was placed on the GRP.
 - ii. Telecommunication port whose maximum cable length is less than 3 m in length are excluded
- Electrical Fast Transients / BURST test

5.4.4 Test Result

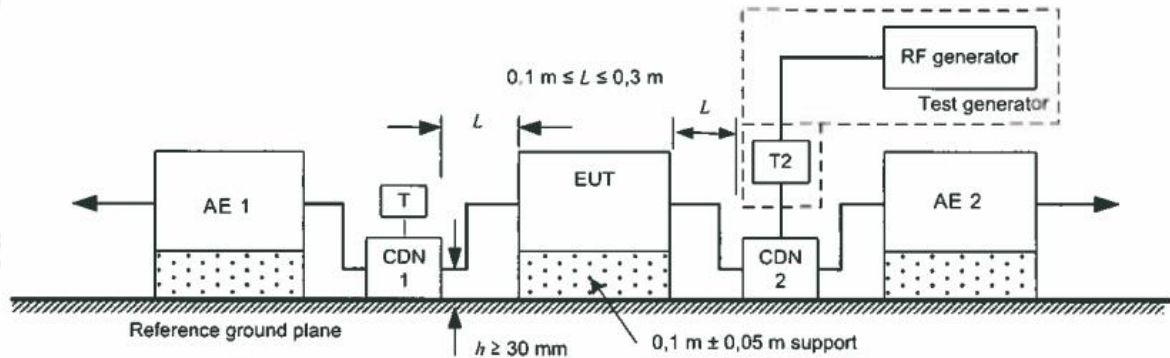
Test Standard	EN 61000-4-4:2012
Product Standard	EN 301 489-1, EN 301 489-17
EUT operated voltage during test	230 Vac, 50Hz
Test Level	on AC Power Port : ± 1 kV
Required Performance Criteria	B
EUT Performance	B
Ambient Temperature	24° C
Relative Humidity	55%RH
Test Date	2025.11.08
Test Engineer	May Li
Test Result	PASS



5.5 Radio frequency, Common mode (CS) Test

5.5.2 Test Setup

<CDN>



5.5.3 Test Instrument Setting

Frequency Step Size	1% increment
Modulation	80% AM (1kHz)
Dwell Time	3 seconds

5.5.4 Test Procedures

- The EUT shall be tested within its intended operating and climatic conditions.
- An artificial hand was placed on the hand-held accessory and connected to the ground reference plane.
- One of the CDNs not used for injection was terminated with 50Ω, providing only one return path. All other CDNs were coupled as decoupling networks.
- The frequency range is swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. Where the frequency is swept incrementally, the step size shall not exceed 1% of the preceding frequency value.
- The dwell time of the amplitude modulated carrier at each frequency shall not be less than the time necessary for the EUT to be exercised and to respond, but shall in no case be less than 0.5 s. The sensitive frequencies (e.g. clock frequencies) shall be analyzed separately.
- Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.

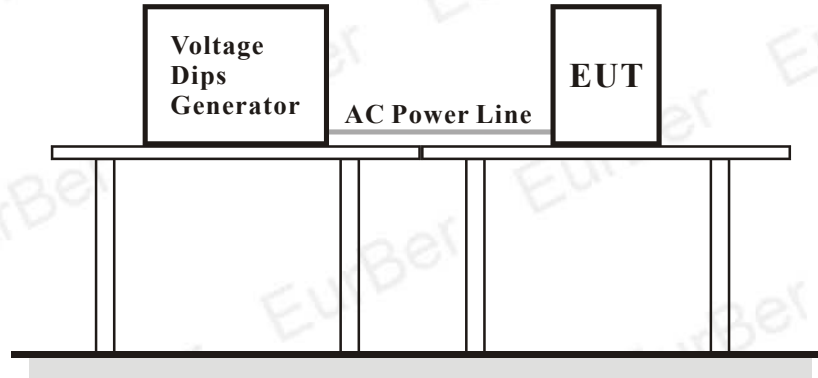
5.5.5 Test Result

Test Standard	EN 61000-4-6:2014
Product Standard	EN 301 489-1, EN 301 489-17
EUT operated voltage during test	230 Vac, 50Hz
Test Frequency Range	0.15 MHz ~ 80 MHz
Test Level	3 V rms
Test Method	CDN for Power port
Required Performance Criteria	A
Performance Criteria of EUT	A
Ambient Temperature	23° C
Relative Humidity	53%RH
Test Date	2025.11.08
Test Engineer	May Li
Test Result	PASS



5.6 Voltage Dips and Interruptions

5.6.2 Test Setup



5.6.3 Test Instrument Setting

Test of interval	10 sec
Waveform Rise (and Fall) Time	1 ~ 5 μ s.
Duration	Sequence of 3 dips/interrupts.

5.6.4 Test Procedures

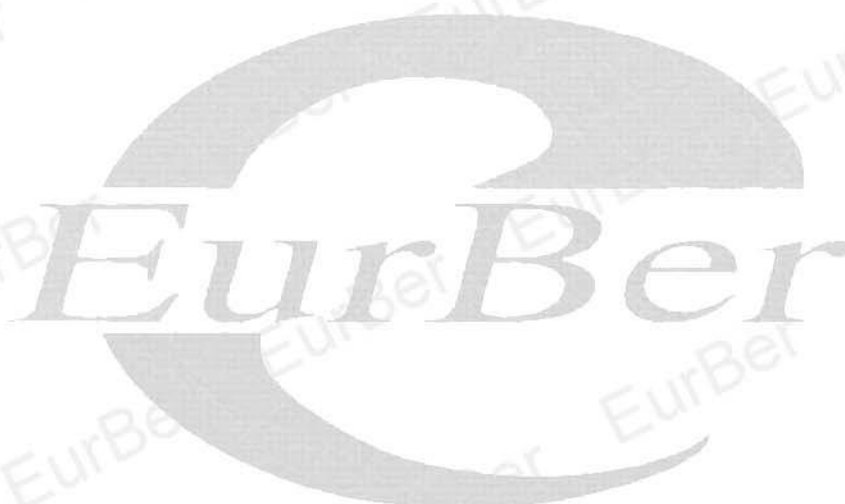
The EUT was tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the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

5.6.5 Test Result

Test Standard	EN 61000-4-11:2020
Product Standard	EN 301 489-1, EN 301 489-17
EUT input voltage	230 Vac, 50Hz
Requirements among Phase, Residual and Duration	As following table
Required Performance Criteria	B for voltage dips less than 100ms C for voltage dips greater than or equal to 100 ms and voltage interruptions of 5 000 ms duration
Performance Criteria of EUT	B for voltage dips less than 100ms C for voltage dips greater than or equal to 100 ms and voltage interruptions of 5 000 ms duration
Ambient Temperature	23° C
Relative Humidity	53%RH
Test Date	2025.11.08
Test Engineer	May Li

Test Result**PASS**

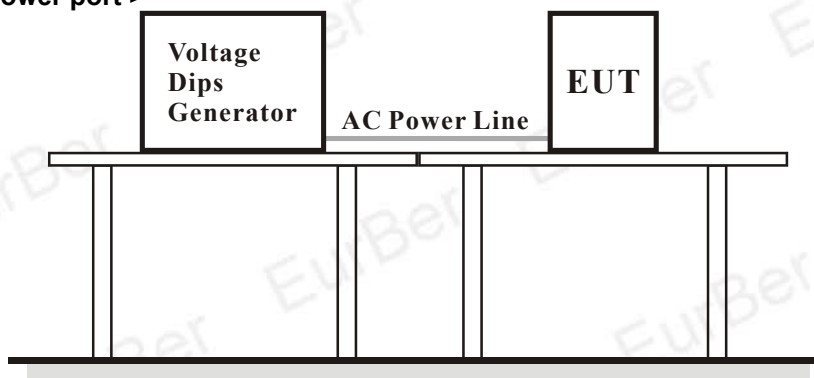
Test	Phase Angle	Residual (%)	Duration (ms)
Voltage Dips	0 °, 45 °, 90 °, 135 °, 180 °, 225 °, 270 °, 315 °	0%	10
		0%	20
		70%	500
Voltage Interruption	0 °	0%	5000



5.7 Surges Test

5.7.1 Test Setup

<Testing for power port >



5.7.2 Test Instrument Setting

Surge wave form (Tr/Th)	1,2/50 μ s, for power port (if EUT supported)
Number of impulses	For d.c. power ports and interconnection lines five positive and five negative surge impulses
	For a.c. power ports five positive and five negative impulses each at 0°, 90°, 180° and 270°
Time between successive impulses	1 minute

5.7.3 Test Procedure

a. **For EUT power supply:**

The surge is 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 was shorter than 2 meters in length.

b. **For test applied to unshielded unsymmetrically operated interconnection lines of EUT:**

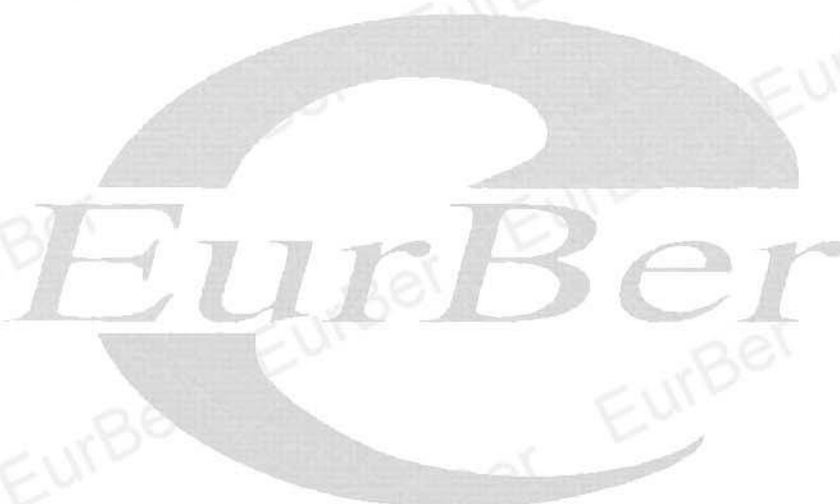
The surge was applied to the lines via the capacitive coupling. The coupling / decoupling networks didn't influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

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

The surge was applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor was not specified. The interconnection line between the EUT and the coupling/decoupling networks was shorter than 2 meters in length.

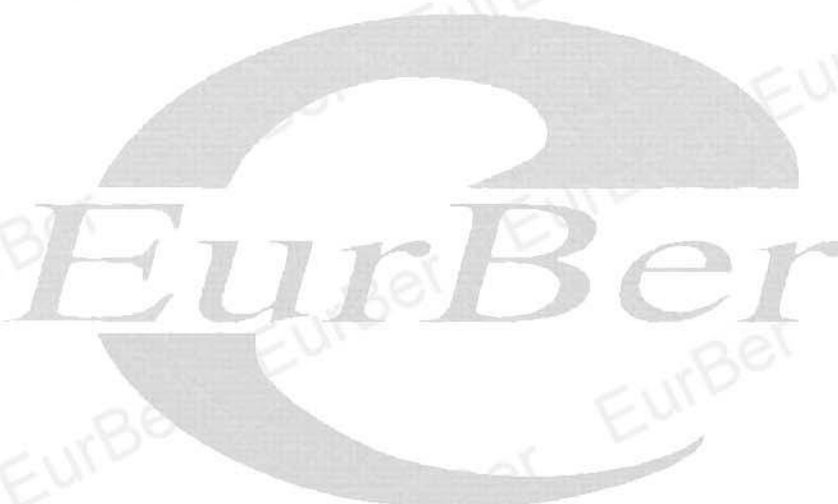
5.7.4 Test Result

Test Standard	EN 61000-4-5:2014+A1:2017
Product Standard	EN 301 489-1, EN 301 489-17
EUT operated voltage during test	230 Vac, 50Hz
Test Level	on AC Power Port ± 0.5 kV, ± 1 kV,
Required Performance Criteria	B
Performance Criteria of EUT	B
Ambient Temperature	23° C
Relative Humidity	53%RH
Test Date	2025.11.08
Test Engineer	May Li
Test Result	PASS



6 Measurement Uncertainty

Measurement uncertainty		
Parameter	Frequency	Measurement uncertainty
Conducted Emission at mains port	9kHz~150KHz	2.31dB
Conducted Emission at mains port	150kHz~30MHz	2.89dB
Conducted Emission at telecommunication port	150kHz~30MHz	4.55dB
Disturbance Power	30MHz~300MHz	3.90dB
Radiated Emission	30MHz-1000MHz	5.28dB
	1GHz-6GHz	5.12dB

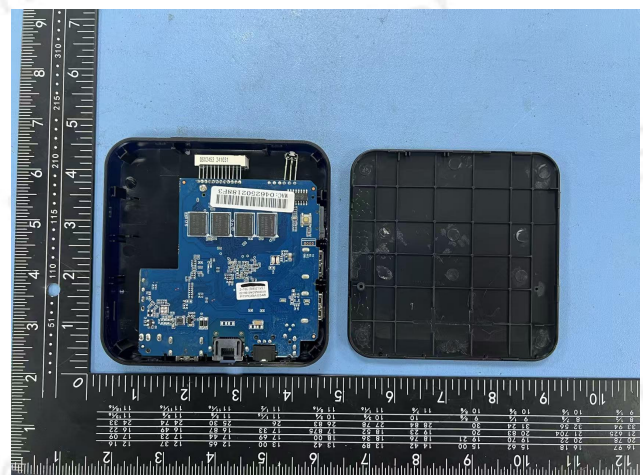
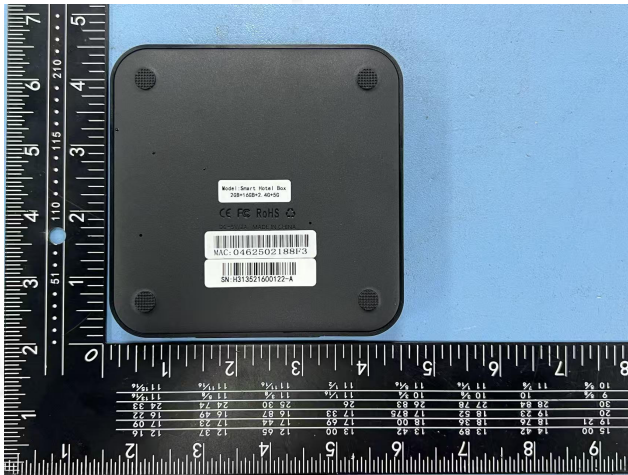


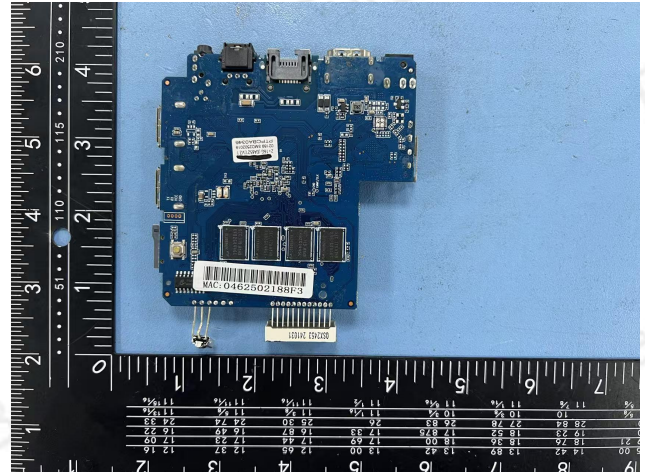
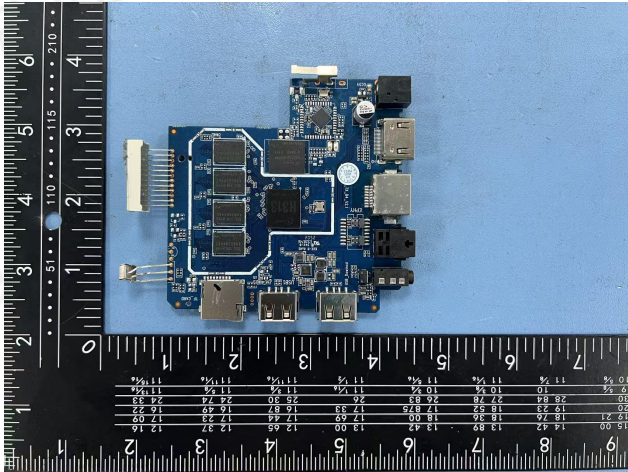
7 List of Measuring Equipment

Test Equipment for Conducted Emission					
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
LISN	R&S	ENV216	102125	2024/12/18	2025/12/17
LISN	R&S	ENV432	101327	2024/12/18	2025/12/17
ISN	Schwarzbeck	NTFM 8158	0127	2024/12/18	2025/12/17
EMI Test Receiver	R&S	ESR3	102143	2024/12/18	2025/12/17
EMI Test Software	Audix	E3	N/A	N/A	N/A
Test Equipment for Radiated Emission					
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
EMI Test Receiver	R&S	ESR3	102144	2024/12/18	2025/12/17
Spectrum Analyzer	R&S	FSV 30	103728	2024/12/18	2025/12/17
Amplifier	Sonoma	310	363917	2024/12/18	2025/12/17
Amplifier	Schwarzbeck	BBV 9718	327	2024/12/18	2025/12/17
Broadband Antenna	Schwarzbeck	VULB9168	9168-757	2024/12/18	2026/09/16
Horn Antenna	Schwarzbeck	BBHA 9120 D	1677	2023/02/12	2026/02/11
EMI Test Software	Audix	E3	N/A	N/A	N/A
Test Equipment for ESD					
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
ESD Generator	Teseq	NSG 437	1121	2024/12/18	2025/12/17
Test Equipment for EFT/SURGE/DIPS					
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Surge Generator	Teseq	NSG 3060-MF	4040	2024/12/18	2025/12/17
Surges Generator extension box	Teseq	NSG 3060-TS-EXT-EPO	3005	2024/12/18	2025/12/17
CDN	Teseq	CDN 3061-S16	3003	2024/12/18	2025/12/17
EFT/DIPS Generator	Teseq	NSG 3040-MF	6033	2024/12/18	2025/12/17
Transformer	Teseq	INA6501	1002	2024/12/18	2025/12/17
Test Equipment for CS					
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
CS Generator	Teseq	NSG 4070B-80	45341	2024/12/18	2025/12/17
6dB Attenuator	Teseq	ATN 6075	32154	2024/12/18	2025/12/17
Current injection pliers	3ctest	BCIP-400	BCIP22091891	2023/02/28	2025/12/17
CDN	Teseq	CDN M016	45065	2024/12/18	2025/12/17
CDN	Teseq	CDN T800	42821	2024/12/18	2025/12/17
Test Equipment for RS					
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Signal generator	R&S	SMB100A	113825	2023/12/18	2025/12/17
Power Meter	R&S	NRP2	105581	2023/12/18	2025/12/17
Power Sensor	R&S	NRP-Z91	103778	2023/12/18	2025/12/17
Power Sensor	R&S	NRP-Z91	103779	2023/12/18	2025/12/17
Power Amplifier	R&S	BBA150	102377	2023/12/18	2025/12/17
Power Amplifier	R&S	BBA150	102376	2023/12/18	2025/12/17
Power Amplifier	MIAO	MAPA2G6G100	20240102001	2024/12/18	2025/12/17
Antenna	R&S	HL046E	100230	N/A	N/A
Antenna	Schwarzbeck	STLP 9149	9149-459	N/A	N/A
RS Test Software	Fala	EZ-RS	N/A	N/A	N/A
Test Equipment for ALL					
Description	Manufacturer	Model	Serial Number	Cal Date	Due Date
Communication Tester	R&S	CMW270	101231	2024/12/18	2025/12/17
Communication Tester	R&S	CMW500	164998	2024/12/18	2025/12/17

N/A: No Calibration Required

Appendix A. Photographs of EUT





-----End of the report-----

EurBer