EN 55032:2015/A1:2020
EN 55035:2017/A11:2020

TEST REPORT

For

Bluetooth Low Energy and 802.15.4 wireless radio module

MODEL NUMBER: HM-MT2401, HM-MT2401B

REPORT NUMBER: E04A24020079E01001

ISSUE DATE: May 09, 2024

Prepared for

Shenzhen HOPE Microelectronics Co., Ltd

30th floor of 8th Building, C Zone Vanke Cloud City, Xili Sub-district, Nanshan, Shenzhen, Guangdong, China

Prepared by

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	May 09, 2024	Initial Issue	

Summary of Test Results

Emission			
Standard	**Test Item**	**Limit**	**Result**
EN IEC 61000-3-2:2019/A1:2021	Harmonic current emissions	Clause 6	N/A
EN 61000-3-3:2013/A1:2019	Voltage fluctuations and flicker	Clause 4	N/A
EN 55032:2015	Conducted emissions (AC mains power ports)	Clause 5	N/A
EN 55032:2015/A1:2020	Radiated emissions below 1GHz	Clause 5	Pass
	Radiated emissions above 1GHz	Clause 5	Pass

Immunity (EN 55035:2017/A11:2020)				
Basic Standard	**Test Item**	**Test Specification**	**Criteria**	**Result**
IEC 61000-4-2:2008	Electrostatic Discharge	Contact +/- 4 kV; Air +/- 2 kV;+/- 4 kV;+/- 8 kV	B	Pass
IEC 61000-4-3:2006 +A1:2007+A2:2010	Continuous RF electromagnetic field disturbances	3 V/m, 80 %; 1 kHz, AM 80 MHz-1000 MHz; 1800 MHz,2600 MHz,3500 MHz,5000 MHz	A	Pass
IEC 61000-4-4:2012	Electrical fast transients burst (AC mains power ports)	+/- 1.0 kV 5/50 ns, 5 kHz	B	N/A
IEC 61000-4-5:2014	Surges (AC mains power ports)	+/-2 kV (Common) +/-1 kV (Differential) 1.2/50 us	B	N/A
IEC 61000-4-6:2013	Continuous induced RF disturbances (AC mains power ports)	150 kHz-80 MHz 80 %, 1 kHz 0.15 MHz-10 MHz: 3 V 10 MHz-30 MHz: 3 V~1 V 30 MHz-80 MHz: 1 V	A	N/A
IEC 61000-4-11:2004	Voltage dips and interruptions (AC mains power ports)	Residual < 5 %: 0.5 cycle; Residual 70 %: 25 cycles; Residual < 5 %: 250 cycles;	B,C,C	N/A
IEC 61000-4-8:2009	Power frequency magnetic field	50 Hz, 1 A/m	A	N/A

*N/A: In this whole report not applicable.
*This test report is only published to and used by the applicant, and it is not for evidence purpose in China.
*The measurement result for the sample received is <Pass> according to < EN 55032:2015/A1:2020, EN 55035:2017/A11:2020> when <Accuracy Method> decision rule is applied.

CONTENTS

1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name:	Shenzhen HOPE Microelectronics Co., Ltd
Address:	30th floor of 8th Building, C Zone Vanke Cloud City, Xili Sub-district, Nanshan, Shenzhen, Guangdong, China

Manufacturer Information

Company Name:	Shenzhen HOPE Microelectronics Co., Ltd
Address:	30th floor of 8th Building, C Zone Vanke Cloud City, Xili Sub-district, Nanshan, Shenzhen, Guangdong, China

EUT Information

Product Description:	Bluetooth Low Energy and 802.15.4 wireless radio module
Model:	HM-MT2401
Series Model:	HM-MT2401B
Brand:	HOPERF
Sample Received Date:	Mar. 01, 2024
Sample Status:	Normal
Sample ID:	A24020079 001
Date of Tested:	Mar. 01, 2024 to May 09, 2024

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
EN 55032:2015/A1:2020	**Pass**
EN 55035:2017/A11:2020	**Pass**

Prepared By:

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Checked By:

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Alan He

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Approved By:

Shawn Wen

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2. TEST METHODOLOGY

All tests were performed in accordance with the standard EN 55032:2015/A1:2020, EN 55035:2017/A11:2020

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	**A2LA (Certificate No.: 6947.01)** Guangdong Global Testing Technology Co., Ltd. has been assessed and proved to be in compliance with A2LA. **FCC (FCC Designation No.: CN1343)** Guangdong Global Testing Technology Co., Ltd. has been recognized to perform compliance testing on equipment subject to Supplier's Declaration of Conformity (SDoC) and Certification rules **ISED (Company No.: 30714)** Guangdong Global Testing Technology Co., Ltd. has been registered and fully described in a report filed with ISED. The Company Number is 30714 and the test lab Conformity Assessment Body Identifier (CABID) is CN0148.

Note: All tests measurement facilities use to collect the measurement data are located at Room 101-105, 203-210, Building 1, No.2, Keji 8 Road, Songshan Lake Park, Dongguan city, Guangdong, People's Republic of China, 523808

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Measurement Frequency Range	K	U(dB)
Radiated emissions	30 MHz ~ 1 GHz	2	3.79
Radiated emissions	1 GHz ~ 18 GHz	2	5.62
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.			

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

EUT Name		Bluetooth Low Energy and 802.15.4 wireless radio module
Model		HM-MT2401
Series Model		HM-MT2401B
Model Difference		HM-MT2401/19.5dBm, HM-MT2401B/10dBm
Hardware Version		V1.0
Software Version		V1.0
Ratings		Input: DC 1.71V-3.8V
Power Supply	AC	N/A
	Battery	N/A

5.2. TEST MODE

Test Mode	Description
M01	Bluetooth Working: Connect to the PC
M02	802.15.4 Working: Connect to the PC

5.3. SUPPORT UNITS FOR SYSTEM TEST

The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	PC	Lenovo	T430	N/A	GTG Support
E-2	Serial Port Tool	N/A	USB TO TTL	N/A	GTG Support

The following cables were used to form a representative test configuration during the tests.

Item	Type of cable	Shielded Type	Ferrite Core	Length
C-1	Dupont cable	Unshielded	without ferrite	0.2 m

6. MEASURING EQUIPMENT AND SOFTWARE USED

Test Equipment of Radiated emissions below 1GHz					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Due Date**
Chamber	ETS	9*6*6	Q2146	2022/8/30	2025/8/29
Receiver	R&S	ESCI3	101409	2023/9/18	2024/9/17
Loop Antenna	ETS	6502	243668	2022/3/30	2025/3/30
Pre-Amplifier	HzEMC	HPA-9K0130	HYPA21001	2023/9/18	2024/9/17
Biconilog Antenna	Schwarzbeck	VULB 9168	1315	2022/10/10	2025/10/9
Biconilog Antenna	ETS	3142E	243646	2022/3/23	2025/3/22
EZ-EMC	Farad	Ver/FA-03A2 RE+	N/A	N/A	N/A

Test Equipment of Radiated emissions above 1GHz					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Due Date**
Spectrum Analyzer	R&S	FSV40	101413	2023/9/18	2024/9/17
Pre-Amplifier	HzEMC	HPA-1G1850	HYPA21003	2023/9/18	2024/9/17
Horn antenna	ETS	3117	246069	2022/3/11	2025/3/10
EZ-EMC	Farad	Ver/FA-03A2 RE+	N/A	N/A	N/A

Test Equipment of Electrostatic Discharge					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Due Date**
ESD Simulator	TESEQ	NSG437	336	2023/9/20	2024/9/19

Test Equipment of Continuous RF electromagnetic field disturbances					
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Last Cal.**	**Due Date**
Stacked Log-Per-Broadband Antenna	Schwarzbeck	STLP 9129	170	N/A	N/A
Power amplifier	MiCOTOP	MPA-80-1000-500	MPA2209336	2023/9/18	2024/9/17
Power amplifier	MiCOTOP	MPA-1000-6000-100	MPA2209337	2023/9/18	2024/9/17
EPM Series Power Meter	Keysight	N1914A	MY53240003	2023/9/18	2024/9/17
Average Power Sensor	Keysight	E9304A	MY41498925	2023/9/18	2024/9/17
Average Power Sensor	Keysight	E9304A	MY41497454	2023/9/18	2024/9/17
EXG Analog Signal Generator	Keysight	N5171B	MY61252624	2023/9/18	2024/9/17

Field Probe	Narda	EP 601	811ZX11137	2023/9/21	2024/9/20
Microphone kit	Magasig	MPA 663	220803075	2023/9/21	2024/9/20
FASLAB-RS	HzEMC	V2/7/2/3	N/A	N/A	N/A

7. EMISSION TEST

7.1. HARMONIC CURRENT EMISSIONS

LIMITS

EN 61000-3-2/IEC 61000-3-2						
Equipment Category	Harmonic Order n	Max. Permissible Harmonic Current A	Equipment Category	Harmonic Order n	Max. Permissible Harmonic Current A	mA/w
Class A	Odd Harmonics		Class D	Odd Harmonics only		
	3	2.30		3	2.30	3.4
	5	1.14		5	1.14	1.9
	7	0.77		7	0.77	1.0
	9	0.40		9	0.40	0.5
	11	0.33		11	0.33	0.35
	13	0.21		13	0.21	0.30
	15≤n≤39	0.15 x 15/n		15≤n≤39	0.15 x 15/n	3.85/n
	Even Harmonics					
	2	1.08				
	4	0.43				
	6	0.30				
	8≤n≤40	0.23 x 8/n				

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 Condition.

b. The classification of EUT is according to EN 61000-3-2. 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. Arc welding equipment which is not professional equipment.

Class C:

Lighting equipment.

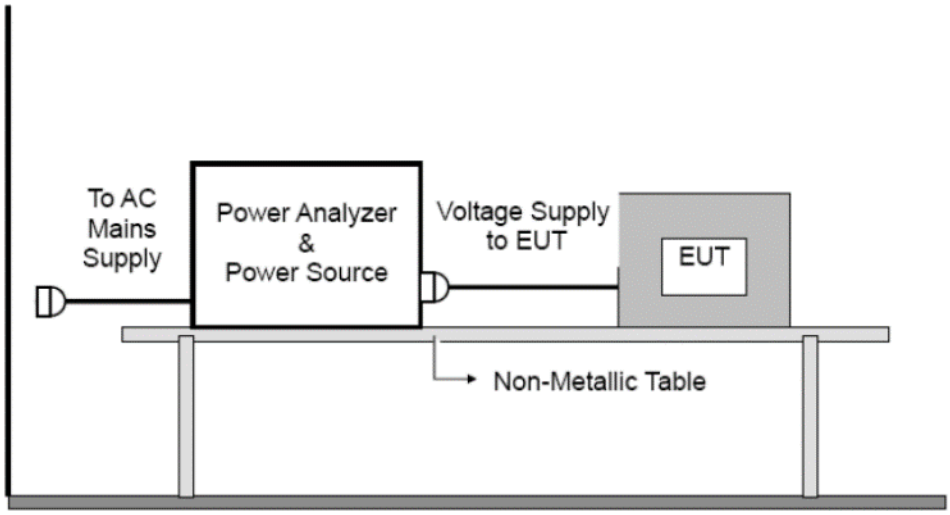
Class D:

Equipment having a specified power less than or equal to 600W 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.

TEST SETUP



TEST ENVIRONMENT

Temperature	℃	Relative Humidity	%
Atmosphere Pressure	kPa		

TEST MODE

Pre-test Mode:	/
Final Test Mode:	/

TEST RESULTS

N/A.

7.2. VOLTAGE FLUCTUATIONS AND FLICKER

LIMITS

Test items	Limits (EN 61000-3-3)	Descriptions
P_{st}	≤1.0, T_p=10 min	short-term flicker indicator
P_{lt}	≤0.65, T_p=2 h	long-term flicker indicator
d_c	≤3.3 %	relative steady-state voltage change
d_{max}	≤4 %(or 6 %Note(1), 7 % Note(2))	maximum relative voltage change:
$d_{(t)}$	≤3.3 %, more than 500 ms	relative voltage change characteristic

Note:

(1)6 % for equipment which is:

a. switched manually, or

b. switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.

(2)7 % for equipment which is

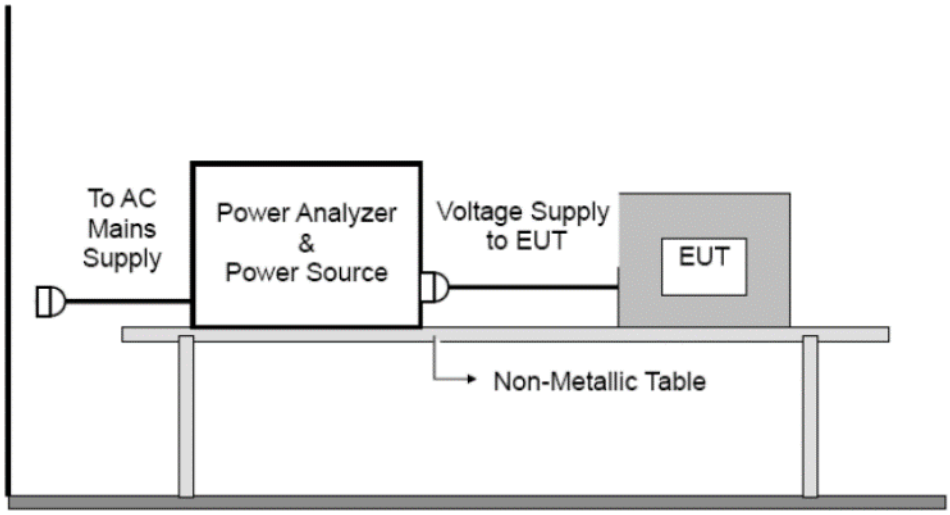
a. attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or

b. switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

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 most unfavorable sequence of voltage changes under normal Condition
b. During the flick measurement, the measure time shall include that part of whole operation changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.
c. Tests was performed according to the Test Condition/Assessment of Voltage Fluctuations specified in Clause 6.0/4.0 of IEC/EN 61000-3-3 depend on which standard adopted for compliance measurement.
d. All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter.

TEST SETUP



TEST ENVIRONMENT

Temperature	℃	Relative Humidity	%
Atmosphere Pressure	kPa		

TEST MODE

Pre-test Mode:	/
Final Test Mode:	/

TEST RESULTS

N/A.

7.3. CONDUCTED EMISSIONS (AC MAINS POWER PORTS)

LIMITS

(a.) Limits of conducted emissions from the AC mains power ports of Class A equipment

Frequency range MHz	Coupling device	Detector type / bandwidth	Class A voltage limits dB(uV)
0.15 to 0.5	AMN	Quasi Peak / 9 kHz	79
0.5 to 30			73
0.15 to 0.5	AMN	Average / 9 kHz	66
0.5 to 30			60

(b.) Limits of conducted emissions from the AC mains power ports of Class B equipment

Frequency range MHz	Coupling device	Detector type / bandwidth	Class B voltage limits dB(uV)
0.15 to 0.5	AMN	Quasi Peak / 9 kHz	66 to 56
0.5 to 5			56
5 to 30			60
0.15 to 0.5	AMN	Average / 9 kHz	56 to 46
0.5 to 5			46
5 to 30			50

(c.) Limits of asymmetric mode conducted emissions of Class A equipment

Frequency range MHz	Coupling device	Detector type / bandwidth	Class A voltage limits dB(uV)	Class A current limits dB(uA)
0.15 -0.5	AAN	Quasi Peak / 9 kHz	97 to 87	n/a
0.5 -30			87	n/a
0.15 -0.5	AAN	Average / 9 kHz	84 to 74	n/a
0.5 -30			74	n/a
0.15 -0.5	Current Probe	Quasi Peak / 9 kHz	N/A	53 to 43
0.5 -30			N/A	43
0.15 -0.5	Current Probe	Average / 9 kHz	N/A	40 to 30
0.5 -30			N/A	30

(d.) Limits of asymmetric mode conducted emissions of Class B equipment

Frequency range MHz	Coupling device	Detector type / bandwidth	Class B voltage limits dB(uV)	Class B current limits dB(uA)
0.15 -0.5	AAN	Quasi Peak / 9 kHz	84 to 74	n/a
0.5 -30			74	n/a
0.15 -0.5	AAN	Average / 9 kHz	74 to 64	n/a
0.5 -30			64	n/a
0.15 -0.5	Current Probe	Quasi Peak / 9 kHz	n/a	40 to 30
0.5 -30			n/a	30
0.15 -0.5	Current Probe	Average / 9 kHz	n/a	30 to 20
0.5 -30			n/a	20

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

TEST PROCEDURE

a. The EUT was placed on the top of a rotating table 0.8 meters above the horizontal ground plane and 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.

b. 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.

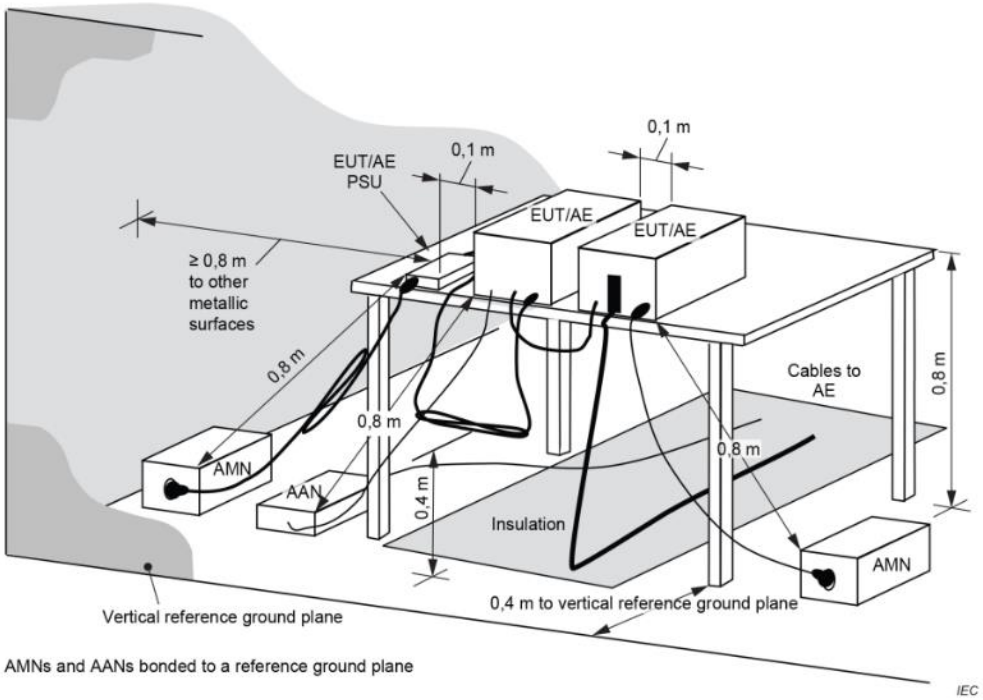
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

d. Cables of hand-operated devices, such as keyboards and mice, shall be placed as for normal used.

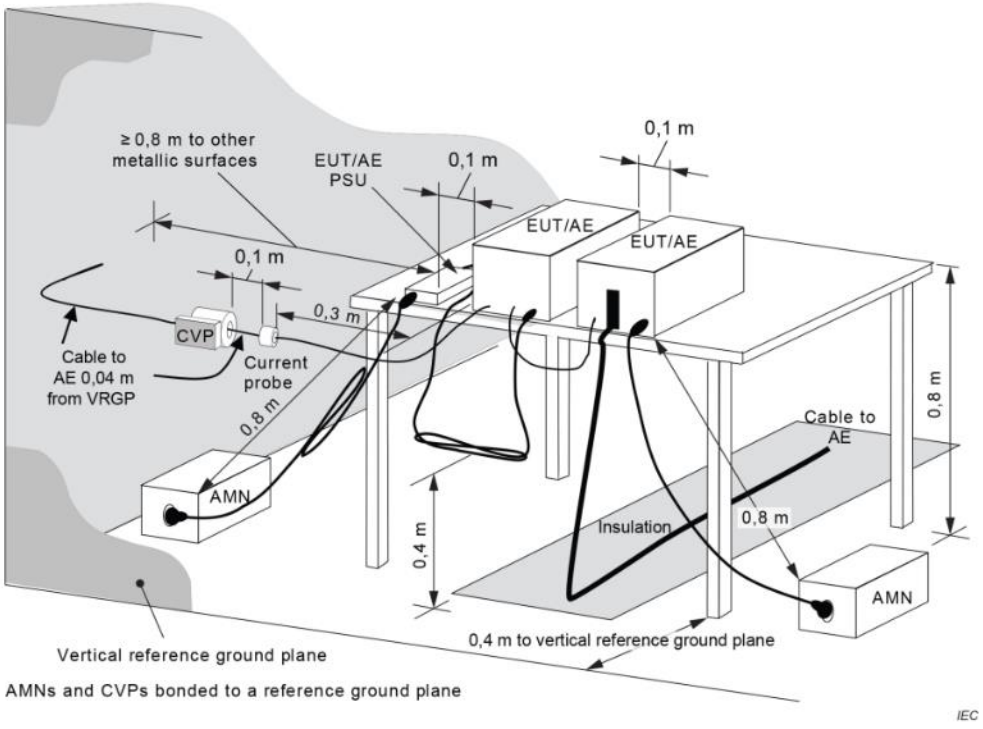
e. LISN at least 80 cm from nearest part of EUT chassis.

f. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.

TEST SETUP



AMNs and AANs bonded to a reference ground plane



AMNs and CVPs bonded to a reference ground plane

TEST ENVIRONMENT

Temperature	℃	Relative Humidity	%
Atmosphere Pressure	kPa		

TEST MODE

Pre-test Mode:	/

Final Test Mode:	/

TEST RESULTS

N/A.

7.4. RADIATED EMISSIONS BELOW 1GHZ

LIMITS

(a). **Limits up to 1 GHz**

FREQUENCY (MHz)	Class A		Class B	
	At 10 m	At 3 m	At 10 m	At 3 m
	dBμV/m	dBμV/m	dBμV/m	dBμV/m
30 – 230	40	50	30	40
230 – 1000	47	57	37	47

Note:

(1) The tighter limit applies at the band edges.

(2) Emission level (dBμV/m)=20log Emission level (uV/m).

(3) If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz. If the highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz. If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less.

TEST PROCEDURE

Below 1 GHz and above 30 MHz

The setting of the spectrum analyzer

RBW	120 kHz
VBW	300 kHz
Sweep	Auto
Detector	Peak and QP
Trace	Max hold

1. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp was used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

2. The EUT was placed on a turntable with 80 cm above ground.

3. 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.

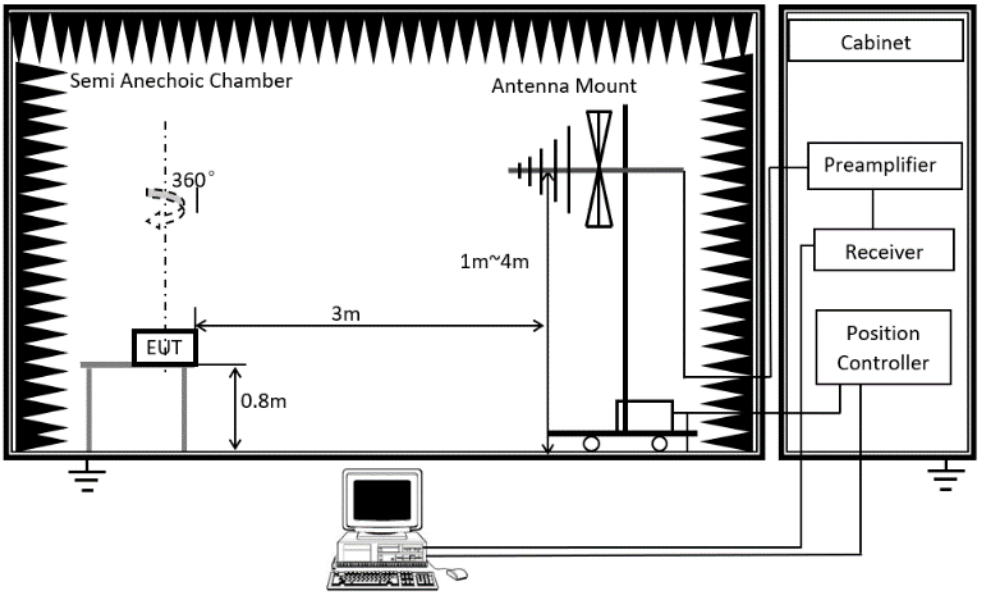
4. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

5. Cables of hand-operated devices, such as keyboards and mice, shall be placed as for normal used.

6. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

7. For measurement below 1 GHz, the initial step in collecting Radiated 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.

TEST SETUP



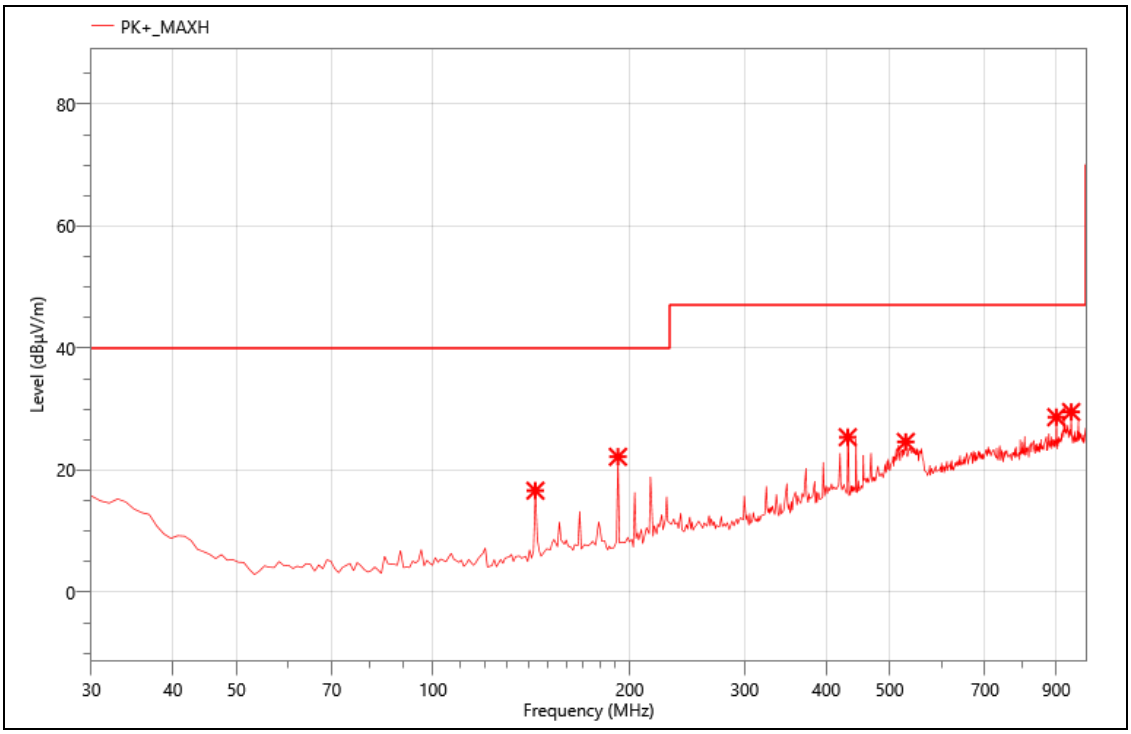
TEST ENVIRONMENT

Temperature	24.3℃	Relative Humidity	54%
Atmosphere Pressure	101kPa		

TEST MODE

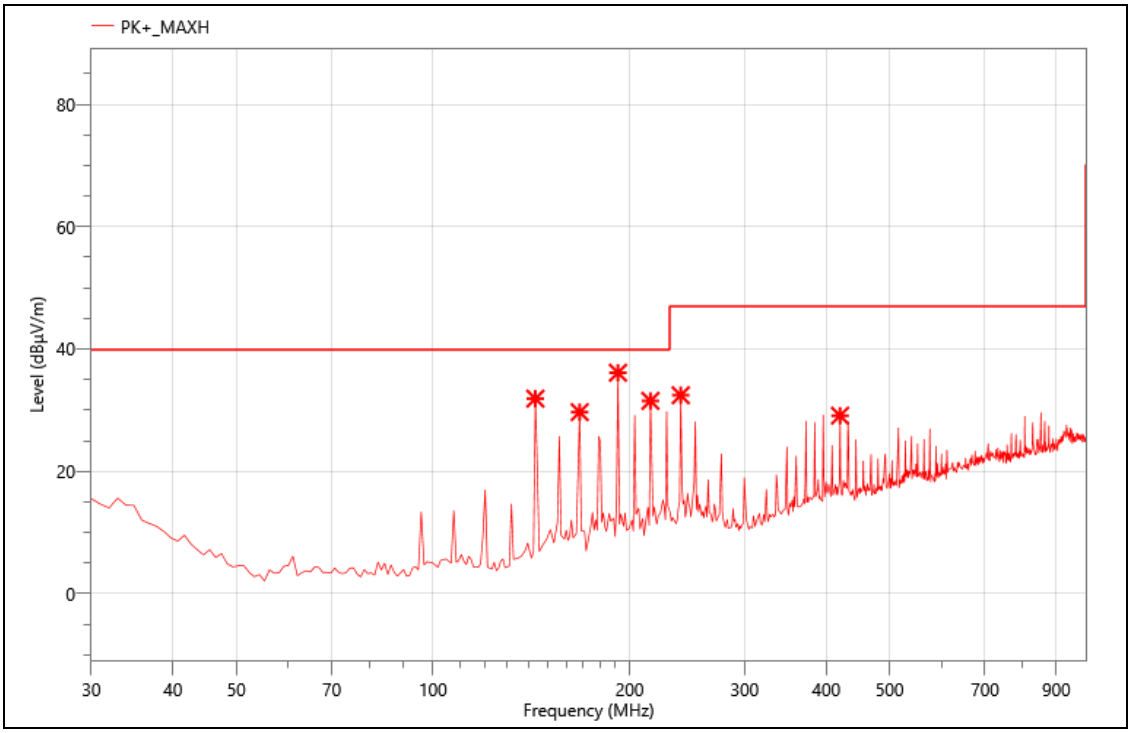
Pre-test Mode:	M01 ~ M02
Final Test Mode:	M01, M02

TEST RESULTS



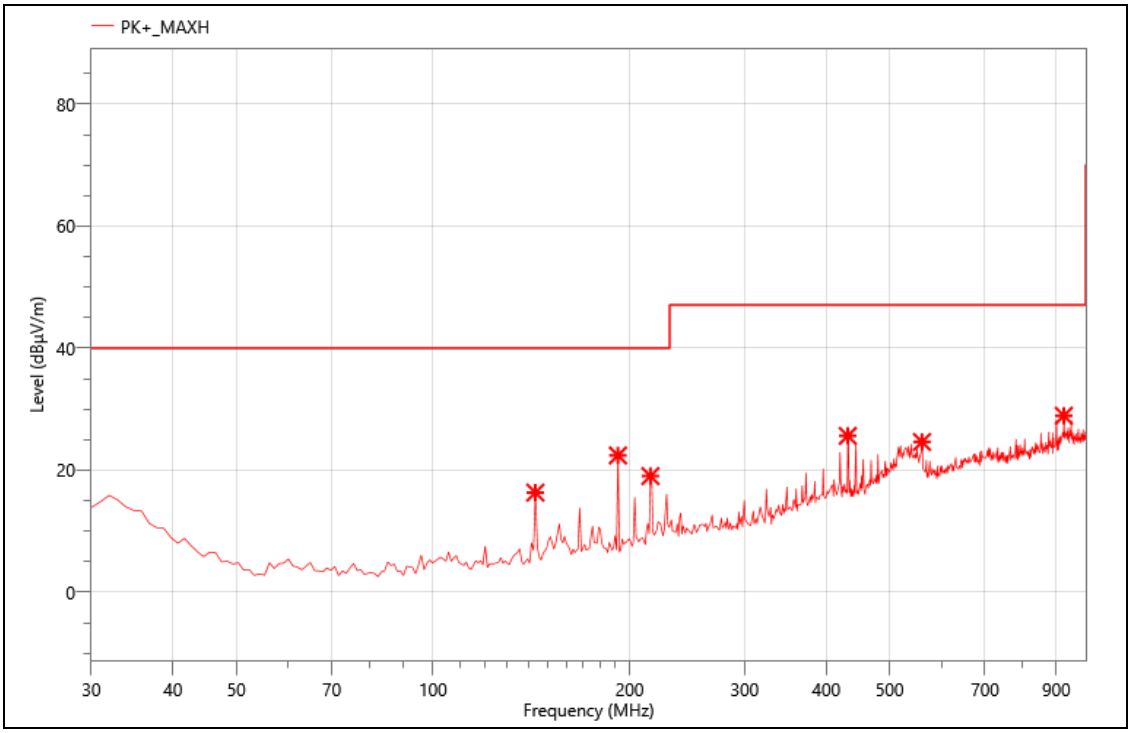
Antenna: Vertical	Mode: M01

No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.
1	143.490	40.16	-23.52	16.64	40.00	23.36	PK+	V
2	191.990	44.77	-22.57	22.20	40.00	17.80	PK+	V
3	431.580	39.57	-14.16	25.41	47.00	21.59	PK+	V
4	529.550	35.44	-10.79	24.65	47.00	22.35	PK+	V
5	900.090	33.79	-5.1	28.69	47.00	18.31	PK+	V
6	948.590	32.97	-3.42	29.55	47.00	17.45	PK+	V



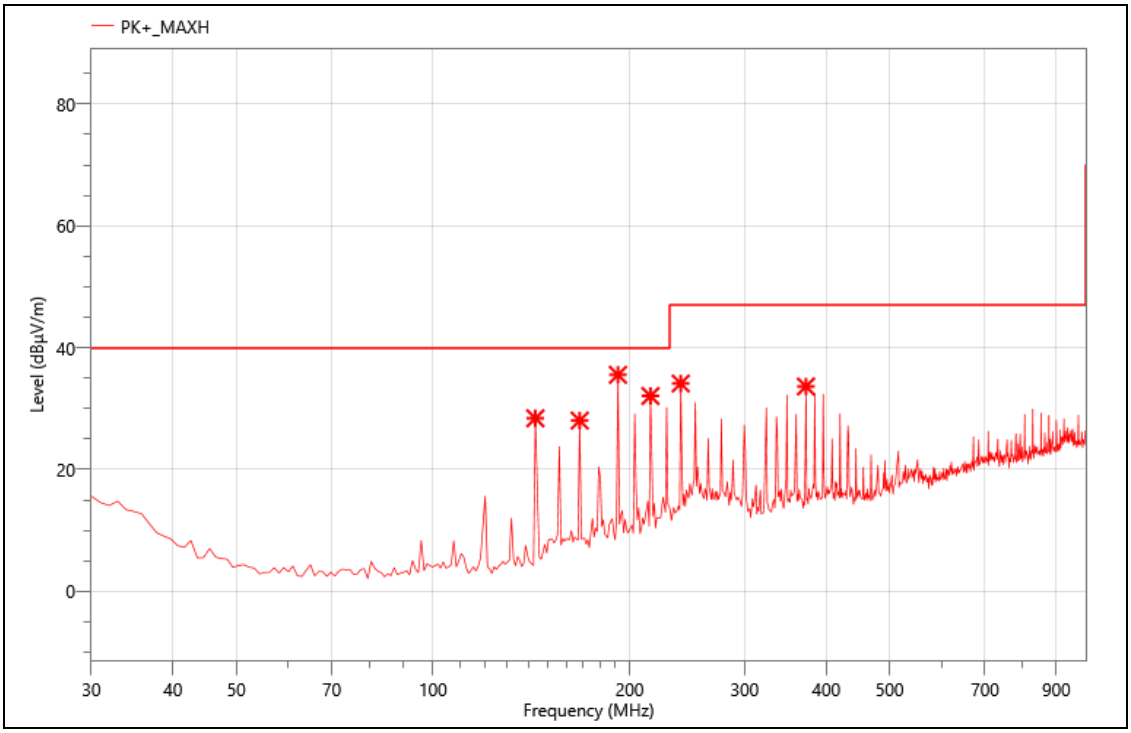
Antenna: Horizontal	Mode: M01

No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.
1	143.490	55.42	-23.52	31.90	40.00	8.10	PK+	H
2	167.740	52.39	-22.7	29.69	40.00	10.31	PK+	H
3	191.990	58.70	-22.57	36.13	40.00	3.87	PK+	H
4	215.270	52.53	-21	31.53	40.00	8.47	PK+	H
5	239.520	52.11	-19.66	32.45	47.00	14.55	PK+	H
6	419.940	43.00	-13.89	29.11	47.00	17.89	PK+	H



Antenna: Vertical	Mode: M02

No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.
1	143.490	39.85	-23.52	16.33	40.00	23.67	PK+	V
2	191.990	44.99	-22.57	22.42	40.00	17.58	PK+	V
3	215.270	40.04	-21	19.04	40.00	20.96	PK+	V
4	431.580	39.79	-14.16	25.63	47.00	21.37	PK+	V
5	560.590	34.99	-10.36	24.63	47.00	22.37	PK+	V
6	924.340	32.21	-3.27	28.94	47.00	18.06	PK+	V



Antenna: Horizontal	Mode: M02

No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.
1	143.490	51.93	-23.52	28.41	40.00	11.59	PK+	H
2	167.740	50.73	-22.7	28.03	40.00	11.97	PK+	H
3	191.990	58.11	-22.57	35.54	40.00	4.46	PK+	H
4	215.270	53.07	-21	32.07	40.00	7.93	PK+	H
5	239.520	53.78	-19.66	34.12	47.00	12.88	PK+	H
6	372.410	48.89	-15.26	33.63	47.00	13.37	PK+	H

Note: 1. Result = Reading +Correct (Amplifier Factor + Cable Loss + Antenna Factor)
2. Margin = Result - Limit

7.5. RADIATED EMISSIONS ABOVE 1GHZ

LIMITS

(a). **Limits above 1 GHz**

FREQUENCY (MHz)	Class A (at 3 m) dBμV/m		Class B (at 3 m) dBμV/m	
	Peak	Avg	Peak	Avg
1000-6000	80	60	74	54

Note:

(1) The tighter limit applies at the band edges.

(2) Emission level (dBμV/m)=20log Emission level (uV/m).

(3) If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz. If the highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz. If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less.

TEST PROCEDURE

Above 1 GHz

The setting of the spectrum analyzer

RBW	1 MHz
VBW	3 MHz
Sweep	Auto
Detector	Peak: Peak AVG: RMS
Trace	Max hold

a. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

b. The EUT was placed on a turntable with 80 cm above ground.

c. 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.

d. 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.

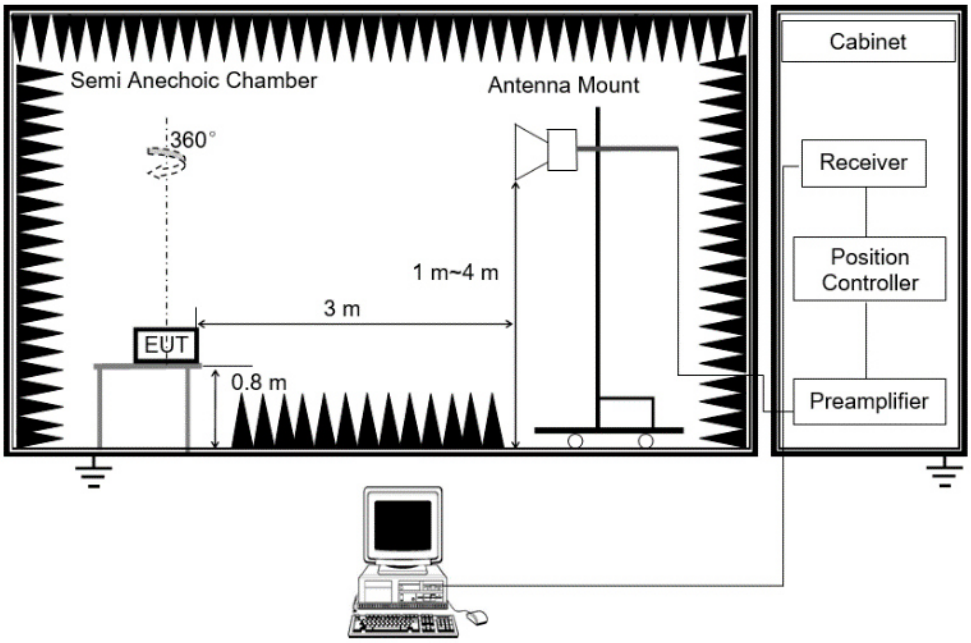
e. Cables of hand-operated devices, such as keyboards and mice, shall be placed as for normal used.

f. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

g. For measurement above 1 GHz, the peak emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the peak limit. If peak result complies with average limit, average result is deemed to comply with average limit.

h. The average emission measurement will be measured by the RMS detector and must comply with the average limit.

TEST SETUP



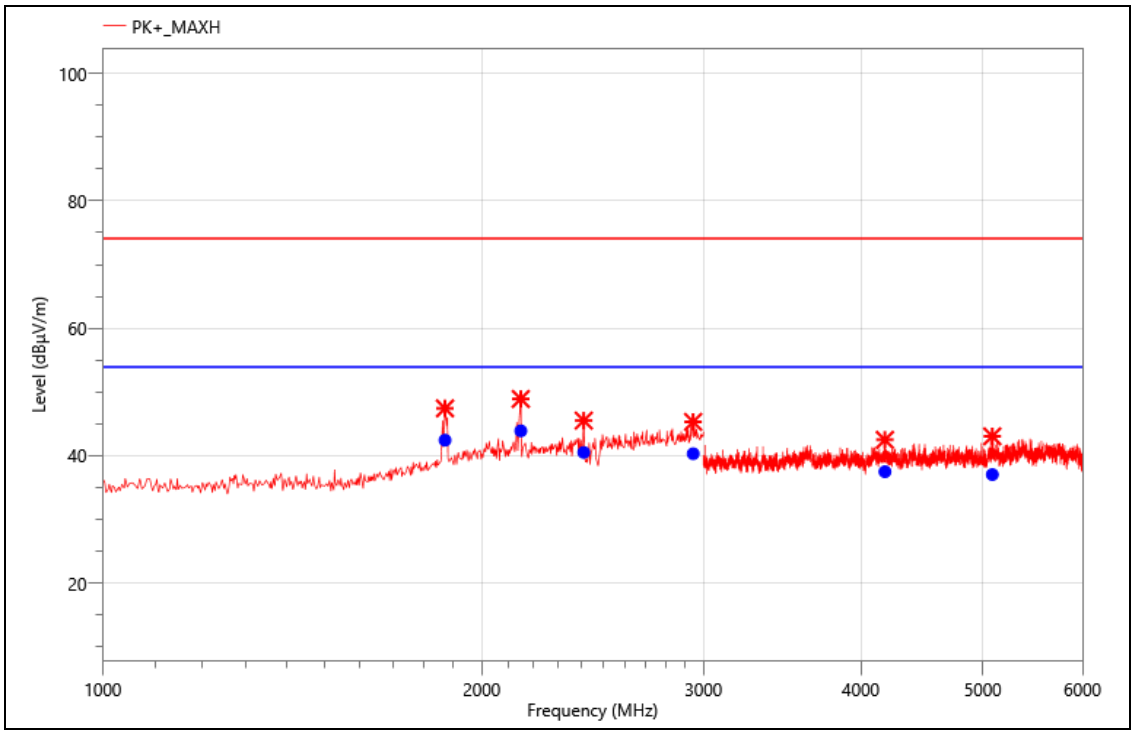
TEST ENVIRONMENT

Temperature	24.3℃	Relative Humidity	54%
Atmosphere Pressure	101kPa		

TEST MODE

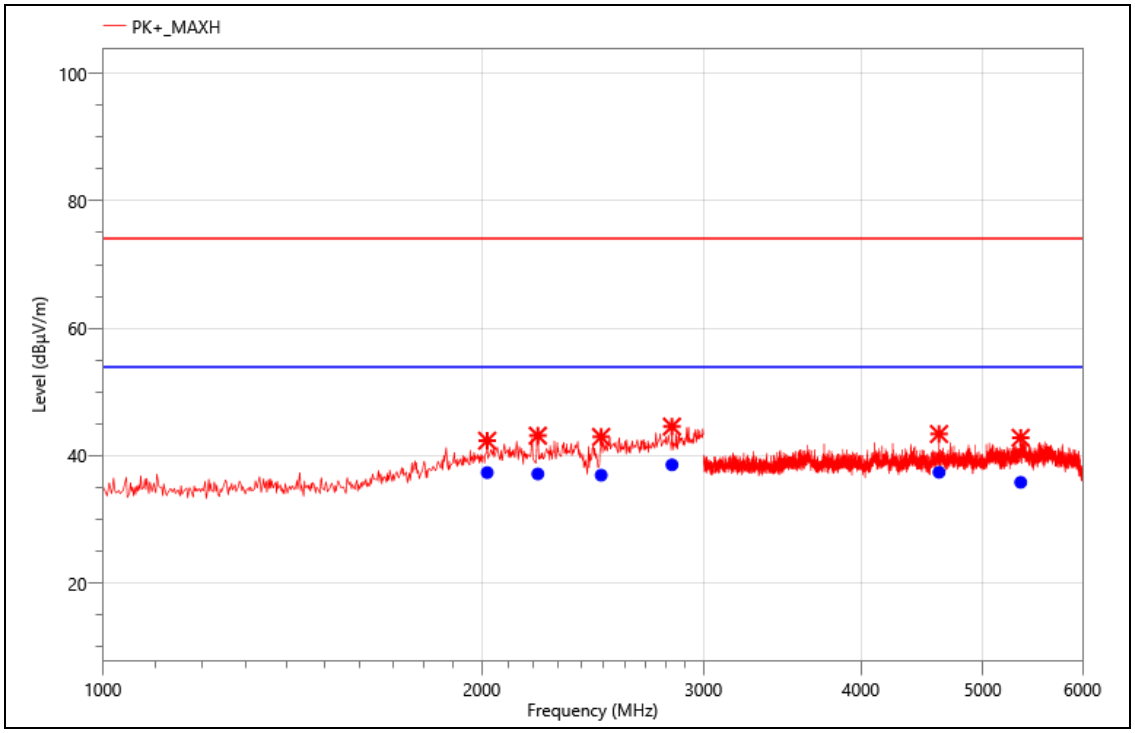
Pre-test Mode:	M01 ~ M02
Final Test Mode:	M01, M02

TEST RESULTS



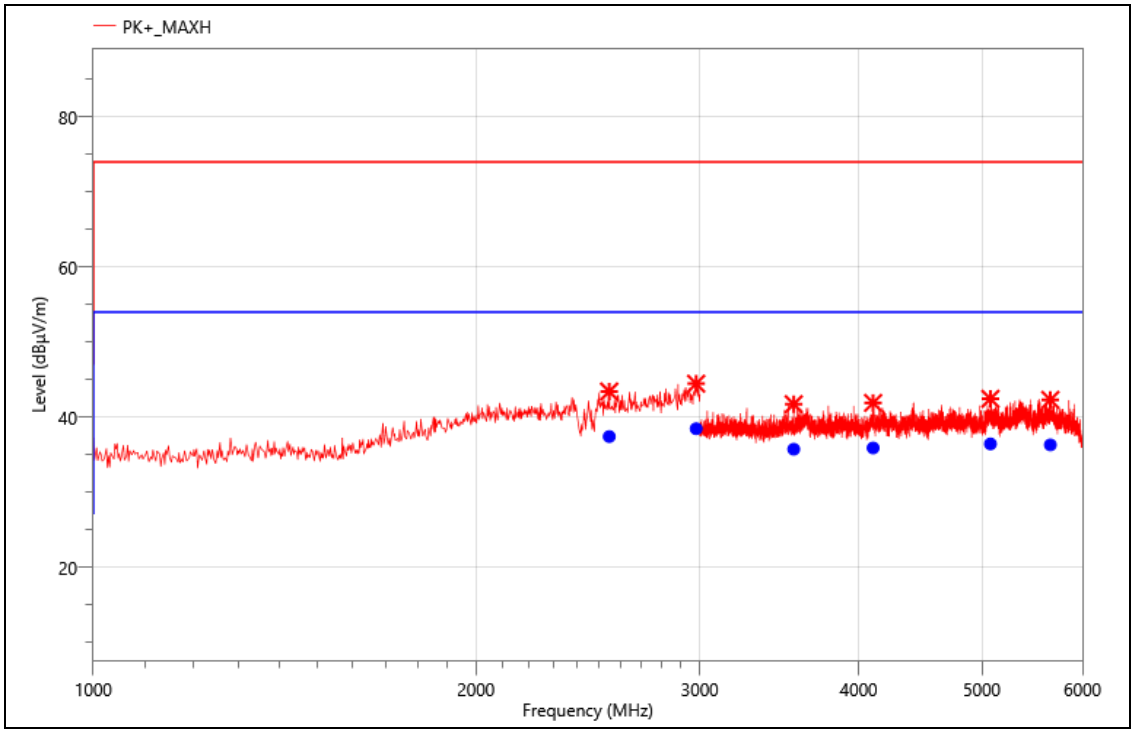
Antenna: Horizontal	Mode: M01

No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.
1	1870.000	57.83	-10.37	47.46	74.00	26.54	PK+	V
2	2148.000	57.98	-9.05	48.93	74.00	25.07	PK+	V
3	2410.000	54.06	-8.52	45.54	74.00	28.46	PK+	V
4	2944.000	52.80	-7.46	45.34	74.00	28.66	PK+	V
5	4180.500	54.87	-12.35	42.52	74.00	31.48	PK+	V
6	5087.700	53.47	-10.4	43.07	74.00	30.93	PK+	V
7	1870.000	52.83	-10.37	42.46	54.00	11.54	AVG	V
8	2148.000	52.98	-9.05	43.93	54.00	10.07	AVG	V
9	2410.000	49.06	-8.52	40.54	54.00	13.46	AVG	V
10	2944.000	47.80	-7.46	40.34	54.00	13.66	AVG	V
11	4180.500	49.87	-12.35	37.52	54.00	16.48	AVG	V
12	5087.700	47.47	-10.4	37.07	54.00	16.93	AVG	V



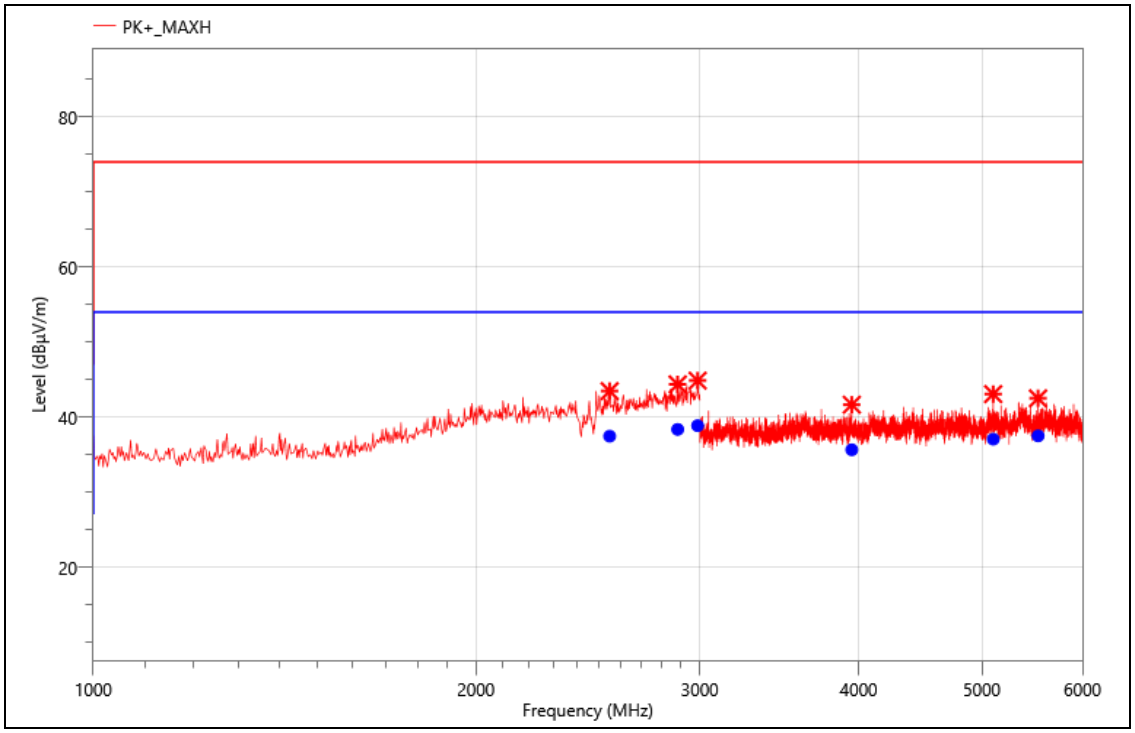
Antenna: Vertical	Mode: M01

No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.
1	2020.000	51.40	-9.02	42.38	74.00	31.62	PK+	H
2	2216.000	52.40	-9.23	43.17	74.00	30.83	PK+	H
3	2488.000	51.39	-8.42	42.97	74.00	31.03	PK+	H
4	2832.000	52.33	-7.73	44.60	74.00	29.40	PK+	H
5	4615.500	54.98	-11.55	43.43	74.00	30.57	PK+	H
6	5358.600	52.40	-9.55	42.85	74.00	31.15	PK+	H
7	2020.000	46.40	-9.02	37.38	54.00	16.62	AVG	H
8	2216.000	46.40	-9.23	37.17	54.00	16.83	AVG	H
9	2488.000	45.39	-8.42	36.97	54.00	17.03	AVG	H
10	2832.000	46.33	-7.73	38.60	54.00	15.40	AVG	H
11	4615.500	48.98	-11.55	37.43	54.00	16.57	AVG	H
12	5358.600	45.40	-9.55	35.85	54.00	18.15	AVG	H



Antenna: Vertical	Mode: M02

No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.
1	2546.000	51.70	-8.27	43.43	74.00	30.57	PK+	H
2	2980.000	51.46	-6.99	44.47	74.00	29.53	PK+	H
3	3556.200	55.76	-14.02	41.74	74.00	32.26	PK+	H
4	4106.100	54.41	-12.5	41.91	74.00	32.09	PK+	H
5	5078.100	52.86	-10.41	42.45	74.00	31.55	PK+	H
6	5660.400	51.46	-9.14	42.32	74.00	31.68	PK+	H
7	2546.000	45.70	-8.27	37.43	54.00	16.57	AVG	H
8	2980.000	45.46	-6.99	38.47	54.00	15.53	AVG	H
9	3556.200	49.76	-14.02	35.74	54.00	18.26	AVG	H
10	4106.100	48.41	-12.5	35.91	54.00	18.09	AVG	H
11	5078.100	46.86	-10.41	36.45	54.00	17.55	AVG	H
12	5660.400	45.46	-9.14	36.32	54.00	17.68	AVG	H



Antenna: Horizontal	Mode: M02

No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Pol.
1	2548.000	51.70	-8.22	43.48	74.00	30.52	PK+	V
2	2882.000	52.66	-8.28	44.38	74.00	29.62	PK+	V
3	2988.000	51.85	-6.97	44.88	74.00	29.12	PK+	V
4	3950.400	54.90	-13.23	41.67	74.00	32.33	PK+	V
5	5104.200	53.50	-10.42	43.08	74.00	30.92	PK+	V
6	5536.200	52.06	-9.54	42.52	74.00	31.48	PK+	V
7	2548.000	45.70	-8.22	37.48	54.00	16.52	AVG	V
8	2882.000	46.66	-8.28	38.38	54.00	15.62	AVG	V
9	2988.000	45.85	-6.97	38.88	54.00	15.12	AVG	V
10	3950.400	48.90	-13.23	35.67	54.00	18.33	AVG	V
11	5104.200	47.50	-10.42	37.08	54.00	16.92	AVG	V
12	5536.200	47.06	-9.54	37.52	54.00	16.48	AVG	V

Note: 1. Result = Reading +Correct (Amplifier Factor + Cable Loss + Antenna Factor)
2. Margin = Result - Limit

8. IMMUNITY TEST

8.1. PERFORMANCE CRITERIA

EN 55035:2017/A11:2020

GENERAL PERFORMANCE CRITERIA

According to EN 55035 standard, the general performance criteria as following:

Criteria A	The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Criteria B	During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test. After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Criteria C	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

PERFORMANCE CRITERIA FOR BROADCAST RECEPTION FUNCTION

The broadcast reception function shall comply with the general performance criteria given in Clause 8 and any relevant annex with the deviations defined in Table A.2.

Table A.2 – Modified test levels for performance criterion A for the broadcast reception function

Performance criteria	Test type table clause	Group 1	Group 2
Criterion A	1.2 1.3	The disturbance level is reduced to 1 V/m for in-band frequencies.	No test requirements apply
	2.1 3.1 4.1	The disturbance level is reduced to 1 V for in-band frequencies.	

In-band is defined as the entire tuneable operating range of the selected broadcast reception function.
The tuned channel ±0,5 MHz (lower edge frequency – 0,5 MHz up to the upper edge frequency + 0,5 MHz of the tuned channel) is excluded from testing.
Note: In some countries, there is a requirement to test the tuned channels. Refer to the relevant regional requirements for guidance.

PERFORMANCE CRITERIA FOR PRINT FUNCTION

Criterion A	Refer to chapter B.3.1 of EN 55035:2017/A11:2020
Criterion B	Refer to chapter B.3.2 of EN 55035:2017/A11:2020
Criterion C	Refer to chapter B.3.3 of EN 55035:2017/A11:2020

PERFORMANCE CRITERIA FOR SCAN FUNCTION

Criterion A	Refer to chapter C.3.1 of EN 55035:2017/A11:2020
Criterion B	Refer to chapter C.3.2 of EN 55035:2017/A11:2020
Criterion C	Refer to chapter C.3.3 of EN 55035:2017/A11:2020

PERFORMANCE CRITERIA FOR DISPLAY AND DISPLAY OUTPUT FUNCTION

Criterion A	Refer to chapter D.3.1 and D.3.2 of EN 55035:2017/A11:2020
Criterion B	Refer to chapter D.3.3 of EN 55035:2017/A11:2020
Criterion C	Refer to chapter D.3.4 of EN 55035:2017/A11:2020

PERFORMANCE CRITERIA FOR MUSICAL TONE GENERATING FUNCTION

Criterion A	Refer to chapter E.3.2 of EN 55035:2017/A11:2020
Criterion B	Refer to chapter E.3.3 of EN 55035:2017/A11:2020
Criterion C	Refer to chapter E.3.4 of EN 55035:2017/A11:2020

PERFORMANCE CRITERIA FOR NETWORKING FUNCTION

General requirements for network functions	
Criterion A	Refer to chapter F.3.3.1 of EN 55035:2017/A11:2020
Criterion B	Refer to chapter F.3.3.2 of EN 55035:2017/A11:2020
Criterion C	Refer to chapter F.3.3.3 of EN 55035:2017/A11:2020

Requirements for CPE containing xDSL ports	
Criterion A	Refer to chapter F.4.2 of EN 55035:2017/A11:2020
Criterion B	Refer to chapter F.4.3 of EN 55035:2017/A11:2020
Criterion C	Refer to chapter F.4.4 of EN 55035:2017/A11:2020

PERFORMANCE CRITERIA FOR AUDIO OUTPUT FUNCTION

Criterion A	Refer to chapter G.7.1 of EN 55035:2017/A11:2020
Criterion B	Refer to chapter G.7.2 of EN 55035:2017/A11:2020
Criterion C	Refer to chapter G.7.3 of EN 55035:2017/A11:2020

PERFORMANCE CRITERIA FOR TELEPHONY FUNCTION

Criterion A	Refer to chapter H.4 Table H.1 of EN 55035:2017/A11:2020
Criterion B	Refer to chapter H.4 Table H.1 of EN 55035:2017/A11:2020
Criterion C	Refer to chapter H.4 Table H.1 of EN 55035:2017/A11:2020

8.2. ELECTROSTATIC DISCHARGE

TEST SPECIFICATION

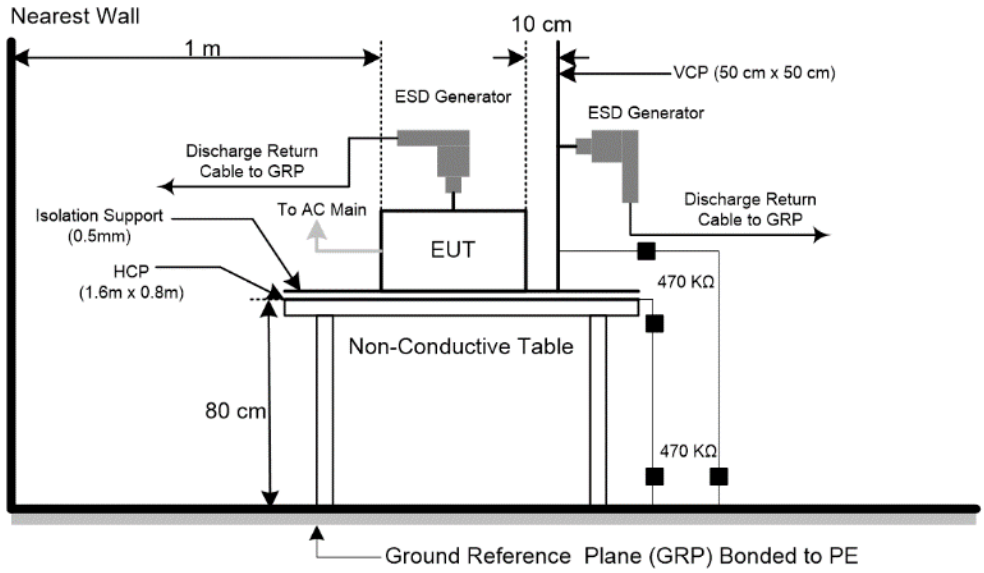
Standard:	EN 55035:2017/A11:2020 IEC 61000-4-2:2008
Criterion Required:	Performance criteria B
Discharge Impedance:	330(1±10 %) Ω / 150(1±10 %) pF
Polarity:	Positive & Negative
Number of Discharge:	Minimum 10 times at each test point
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum
Test Level:	Air Discharge: 2 kV, 4 kV, 8 kV (Direct); Contact Discharge: 4 kV (Direct/Indirect)

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.
   Vertical Coupling Plane (VCP):
   The coupling plane, of dimensions 0.5 m x 0.5 m, is placed parallel to, and positioned at a distance 0.1 m from, the EUT, with the Discharge 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 0.1 m from the EUT, with the Discharge 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. The test shall be performed with single discharges. On each pre-selected point at least 10 single discharges (in the most sensitive polarity) shall be applied.
d. For air discharge testing, the test shall be applied at all test levels 2 kV, 4 kV and 8 kV.
e. For the actual test configuration, please refer to the related Item: EUT Test Photos.

TEST SETUP



TEST ENVIRONMENT

Temperature	23.6℃	Relative Humidity	52%
Atmosphere Pressure	101kPa	Test Voltage	

TEST MODE

Test Mode:	M01, M02

TEST RESULTS

Mode	Level(kV)	Polarity	Test Point	Criteria	Result	Judgement
Air Discharge	2,4,8	+	All Slot	B	A	Pass
Air Discharge	2,4,8	-	All Slot	B	A	Pass
Contact Discharge	4	+	All Metal	B	A	Pass
Contact Discharge	4	-	All Metal	B	A	Pass
Horizontal Coupling	4	+	Front,rear,left,right	B	A	Pass
Horizontal Coupling	4	-	Front,rear,left,right	B	A	Pass
Vertical Coupling	4	+	Front,rear,left,right	B	A	Pass
Vertical Coupling	4	-	Front,rear,left,right	B	A	Pass
Air Discharge	15	+	All Slot	/	/	/
Air Discharge	15	-	All Slot	/	/	/
Contact Discharge	8	+	All Metal	/	/	/
Contact Discharge	8	-	All Metal	/	/	/

Observation:
A: No observable change.
Conclusion: The EUT met the requirements of the standard

8.3. CONTINUOUS RF ELECTROMAGNETIC FIELD DISTURBANCES

TEST SPECIFICATION

Standard:	EN 55035:2017/A11:2020 IEC 61000-4-3:2006 +A1:2007+A2:2010
Criterion Required:	Performance criteria A
Spot test:	1 800 MHz, 2 600 MHz, 3 500 MHz, 5 000 MHz
Test Level:	Level 2: 3 V/m (measured unmodulated)
Modulation:	The test signal shall be amplitude modulated to a depth of 80 % by a sinusoidal audio signal of 1 000 Hz.
Frequency Step:	1 % of fundamental
Dwell time:	1 seconds
Antenna Polarization:	Horizontal and vertical

TEST PROCEDURE

The test procedure was in accordance with IEC 61000-4-3.

a. The testing was performed in a fully anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.

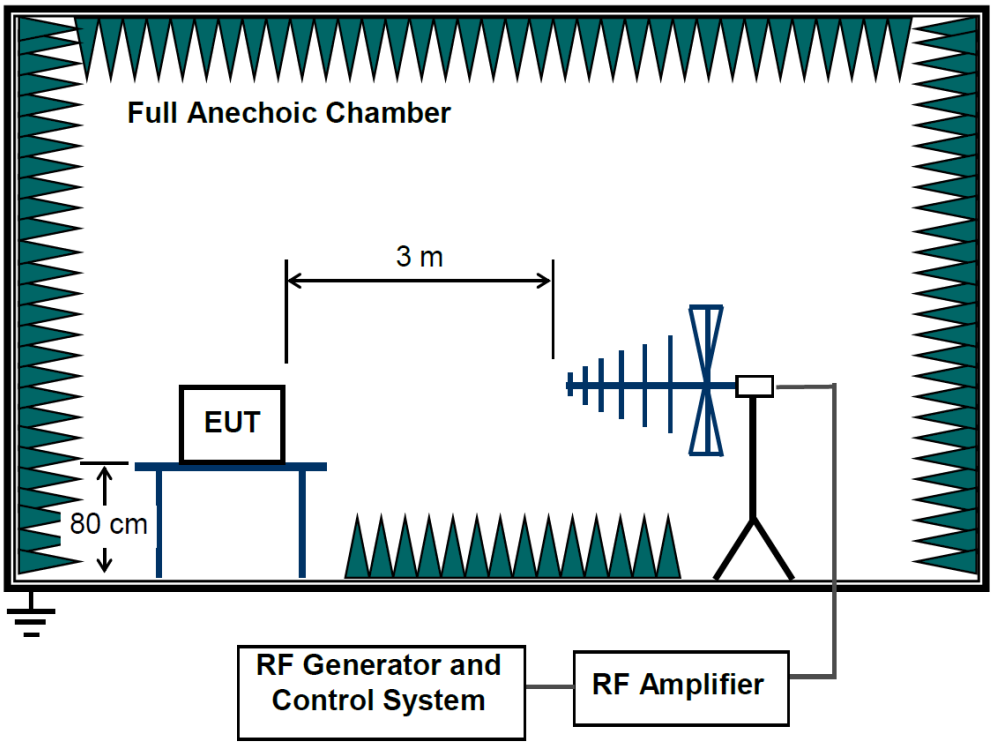
b. The disturbance test signal shall be 80 % amplitude modulated by a sine wave, preferably having a frequency of 1 kHz. A frequency other than 1 kHz may be used where permitted within EN 55035 (for example Clause G.3).

c. 1 % step size is preferred, the frequency range can be swept incrementally with a step size not exceeding 4 % of the previous frequency with a test level of twice the value of the specified test level.

d. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to be able to respond. However, the dwell time should not exceed 5 s at each of the frequencies during the scan.

e. The test was performed with the EUT exposed to both vertically and horizontally polarized fields.

TEST SETUP



TEST ENVIRONMENT

Temperature	24.2℃	Relative Humidity	52%
Atmosphere Pressure	101kPa	Test Voltage	

TEST MODE

Test Mode:	M01, M02

TEST RESULTS

Freq.Range (MHz)	Position (Face)	Polarity (H or V)	Field Strength (V/m) (unmodulated,r.m.s)	Criterion	Result	Judgment
80-1000; 1800; 2600; 3500; 5000;	0°	H&V	3 V/m	A	A	Pass
80-1000; 1800; 2600; 3500; 5000;	90°	H&V	3 V/m	A	A	Pass
80-1000; 1800; 2600; 3500; 5000;	180°	H&V	3 V/m	A	A	Pass
80-1000; 1800; 2600; 3500; 5000;	270°	H&V	3 V/m	A	A	Pass
Observation: A: No observable change. **Conclusion:** The EUT met the requirements of the standard						

8.4. ELECTRICAL FAST TRANSIENTS BURST (AC MAINS POWER PORTS)

TEST SPECIFICATION

Standard:	EN 55035:2017/A11:2020 IEC 61000-4-4:2012
Criterion Required:	Performance criteria B
Polarity:	Positive & Negative
Test Level and Repetition Frequency:	The test level for shall be 0.5kV,1 kV open circuit voltage at a repetition rate of 5 kHz as given EN 61000-4-4.
Impulse Wave shape:	5/50 Tr/Th ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	1 Minute

TEST PROCEDURE

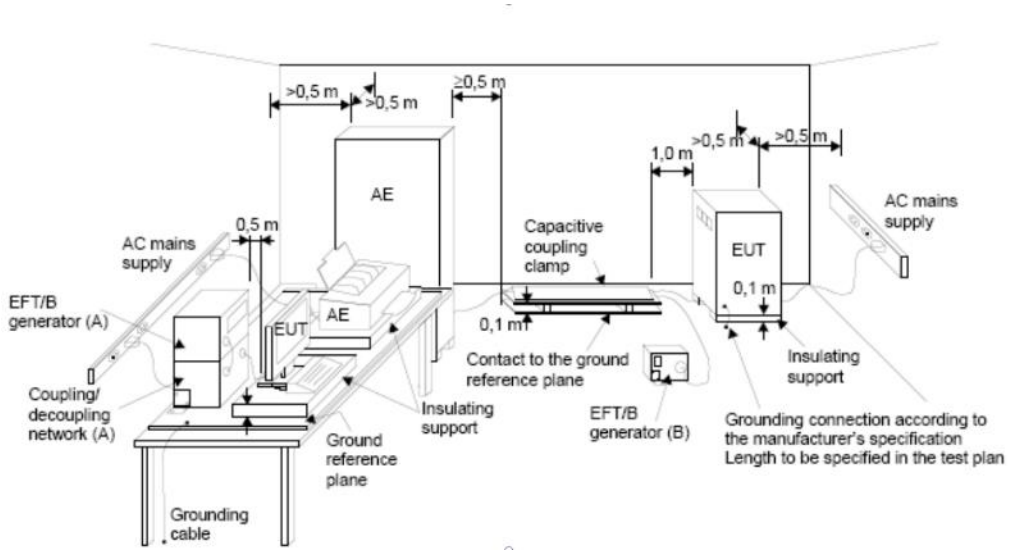
a. Both positive and negative polarity discharges were applied.

b. The duration time of each test sequential was 1 minute.

c. The transient/burst waveform was in accordance with IEC 61000-4-4, 5/50ns.

d. Multi conductor cables shall be tested as a single cable. Cables shall not be split or divided into groups of conductors for this test.

TEST SETUP



TEST ENVIRONMENT

Temperature	℃	Relative Humidity	%
Atmosphere Pressure	102kPa	Test Voltage	

TEST MODE

Test Mode:	/

TEST RESULTS

N/A.

8.5. SURGES (AC MAINS POWER PORTS)

TEST SPECIFICATION

Standard:	EN 55035:2017/A11:2020 IEC 61000-4-5:2014
Criterion Required:	Performance criteria B
Wave Shape:	Tr/Th 1.2/50 us or 10/700 us
Test Level:	1 kV (Line to Line for AC mains power ports) 2 kV (Line to Ground for AC mains power ports) 1 kV (Lines to Ground for Analogue/Digital data ports) 0.5 kV (shield to ground for coaxial/shielded cable on Analogue/Digital data ports) 0.5 kV (each individual line to reference ground for DC network power ports)
Polarity:	Positive & Negative
Interval:	60s between each surge
No. of Surges:	Five positive pulses at 90° phase Five negative pulses at 270° phase

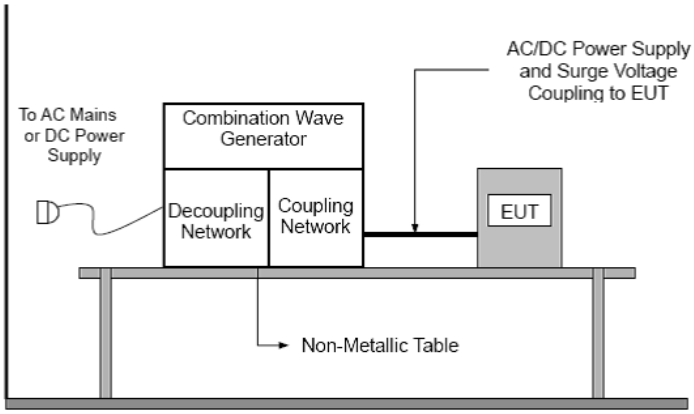
TEST PROCEDURE

a. The EUT and the auxiliary equipment were placed on a table of 0.8m heights above a metal ground reference plane. The size of ground plane is greater than 1m×1m and project beyond the EUT by at least 0.1m on all sides. The ground plane is connected to the protective earth. The length of power cord between the coupling device and the EUT was less than 2 meters (provided by the manufacturer).

b. The EUT was connected to the power mains through a coupling device that directly couples the surge interference signal. The surge noise was applied synchronized to the voltage phase at the zero crossing and the peak value of the AC voltage wave (positive and negative).

c. The surges were applied line to line and line(s) to earth. When testing line to earth the test voltage was applied successively between each of the lines and earth. Steps up to the test level specified increased the test voltage. All lower levels including the selected test level were tested. The polarity of each surge level included positive and negative test pulses.

TEST SETUP



TEST ENVIRONMENT

Temperature	℃	Relative Humidity	%
Atmosphere Pressure	kPa	Test Voltage	

TEST MODE

Test Mode:	/

TEST RESULTS

N/A.

8.6. CONTINUOUS INDUCED RF DISTURBANCES (AC MAINS POWER PORTS)

TEST SPECIFICATION

Standard:	EN 55035:2017/A11:2020 IEC 61000-4-6:2013
Criterion Required:	Performance criteria A
Test Level:	0.15 MHz to 10 MHz: 3 V (r.m.s) 10 MHz to 30 MHz: 3 to 1 V (r.m.s) 30 MHz to 80 MHz: 1 V (r.m.s)
Modulation:	80%, 1kHz Amplitude Modulation
Step Size:	1% increment
Dwell Time:	1s

TEST PROCEDURE

a. The EUT shall be tested within its intended operating and climatic conditions.

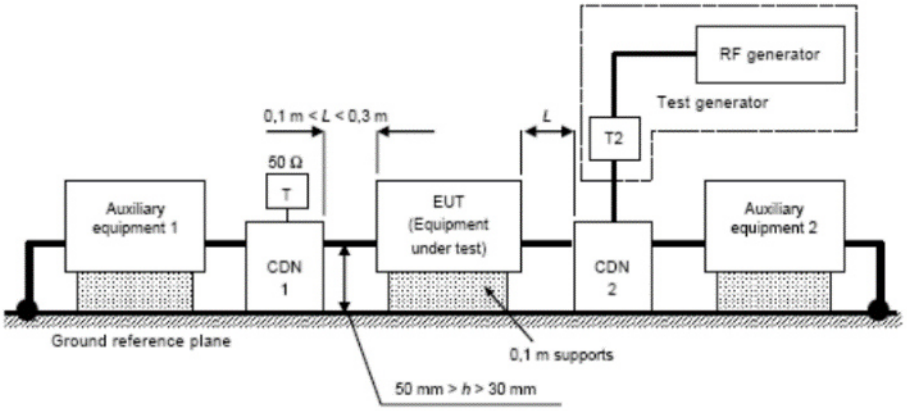
b. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50-ohm load resistor.

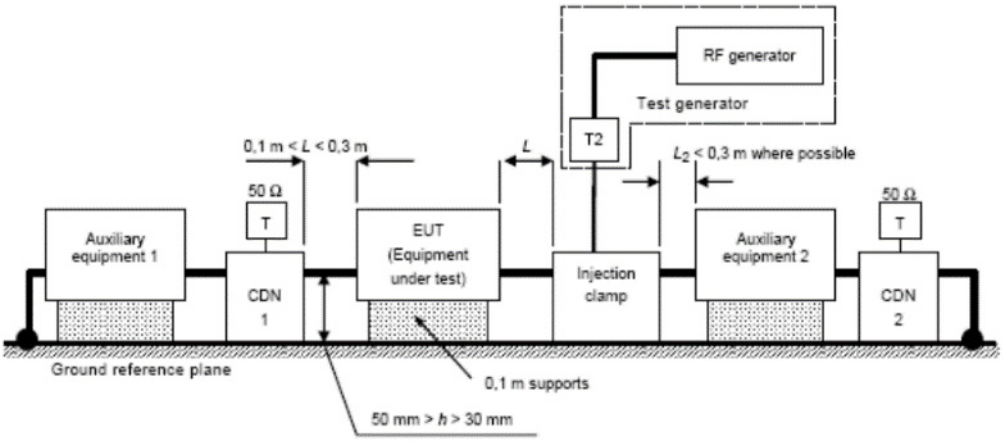
c. The frequency range is swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. The sweep rate shall not exceed 1.5×10^{-3} decades/s. The step size shall not exceed 1 % of the start and thereafter 1 % of the preceding frequency value where the frequency is swept incrementally.

d. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequencies and harmonics or frequencies of dominant interest, shall be analyzed separately.

e. Attempts should be made to fully exercise the EUT during test, and to fully interrogate all exercise modes selected for susceptibility.

TEST SETUP





TEST ENVIRONMENT

Temperature	℃	Relative Humidity	%
Atmosphere Pressure	101kPa	Test Voltage	

TEST MODE

Test Mode:	/

TEST RESULTS

N/A.

8.7. VOLTAGE DIPS AND INTERRUPTIONS (AC MAINS POWER PORTS)

TEST SPECIFICATION

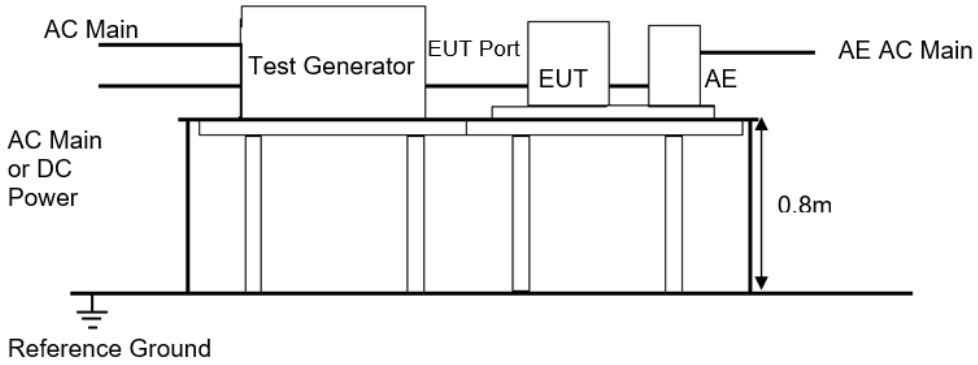
Standard:	EN 55035:2017/A11:2020 IEC 61000-4-11:2004
Criterion Required:	Voltage dips: performance criteria B or C; Interruptions: performance criteria C
Test Port:	AC mains power port
Test Level:	>95 % reduction: 0.5 period >30 % reduction: 25 period for 50Hz/ 30 period for 60Hz >95 % reduction: 250 period for 50Hz/ 300 period for 60Hz
No. of Dips / Interruptions:	3 per Level
Interval between Event:	Minimum 10 seconds
Phase Angle:	0°

TEST PROCEDURE

a. The power cord was used as supplied by the manufacturer. The EUT was connected to the line output of the Voltage Dips and Interruption Generator.

b. Voltage reductions occur at 0 degree crossover point of the voltage waveform. The performance of the EUT was checked after the voltage dip or interruption.

TEST SETUP



TEST ENVIRONMENT

Temperature	℃	Relative Humidity	%
Atmosphere Pressure	kPa	Test Voltage	

TEST MODE

Test Mode:	/

TEST RESULTS

N/A.

8.8. POWER FREQUENCY MAGNETIC FIELD

TEST SPECIFICATION

Standard:	EN 55035:2017/A11:2020 IEC 61000-4-8:2009
Criterion Required:	Performance criteria A
Frequency:	50/60 Hz
Test Level:	Level 2: 1 A/m (rms)
Observation Time:	1 minute
Inductance Coil:	Rectangular type, 1 mx1 m

TEST PROCEDURE

a. The equipment cabinets which can be earthed shall be connected to the safety earth directly on the GRP or via the earth terminal to PE.

b. The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.

c. The cables supplied or recommended by the equipment manufacturer shall be used. In absence of any recommendation, unshielded cables shall be adopted, of a type appropriate for the signals involved. All cables shall be exposed to the magnetic field for 1 m of their length.

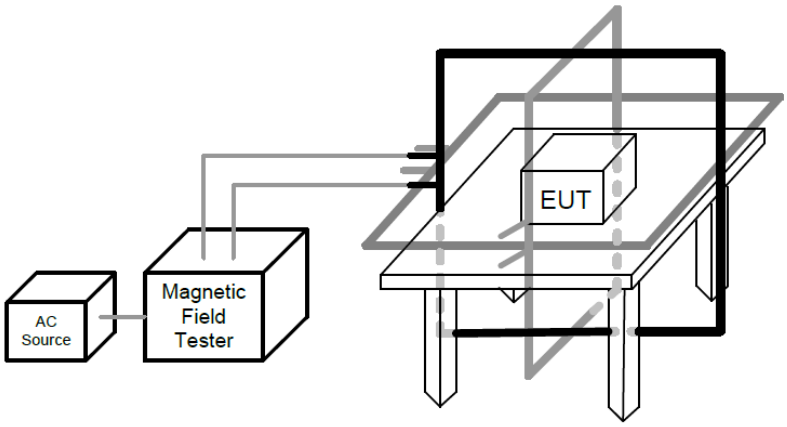
d. The back filters, if any, shall be inserted in the circuits at 1 m cable length from the EUT and connected to the ground plane.

e. The communication lines (data lines) shall be connected to the EUT by the cables given in the technical specification or standard for this application.

TABLE-TOP EQUIPMENT:
The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

FLOOR-STANDING EQUIPMENT:
The equipment shall be subjected to the test magnetic field by using induction coils of suitable dimensions. The test shall be repeated by moving and shifting the induction coils, in order to test the whole volume of the EUT for each orthogonal direction. The test shall be repeated with the coil shifted to different positions along the side of the EUT, in steps corresponding to 50% of the shortest side of the coil. The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

TEST SETUP



TEST ENVIRONMENT

Temperature	℃	Relative Humidity	%
Atmosphere Pressure	101kPa	Test Voltage	

TEST MODE

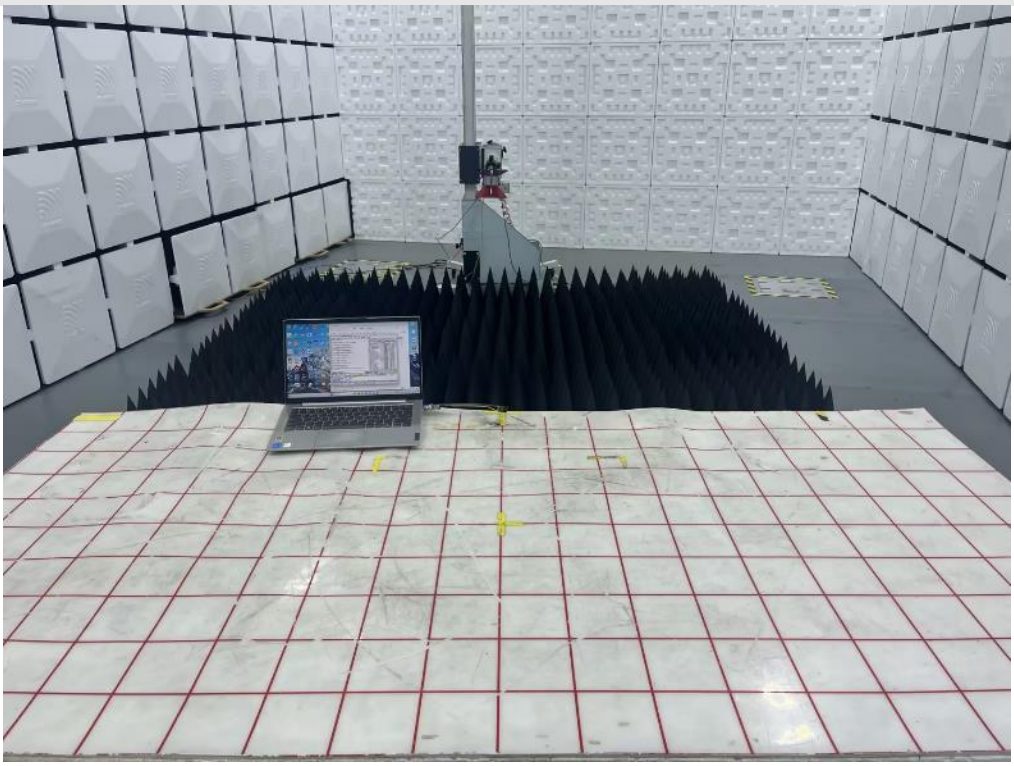
Test Mode:	N/A

TEST RESULTS

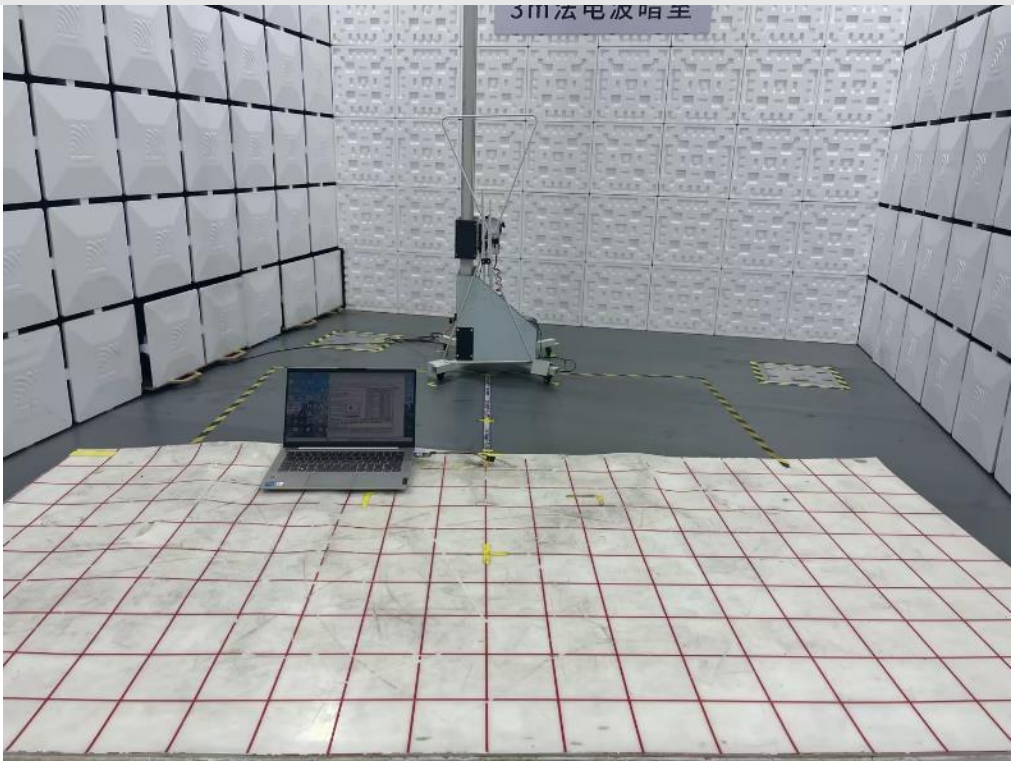
N/A.

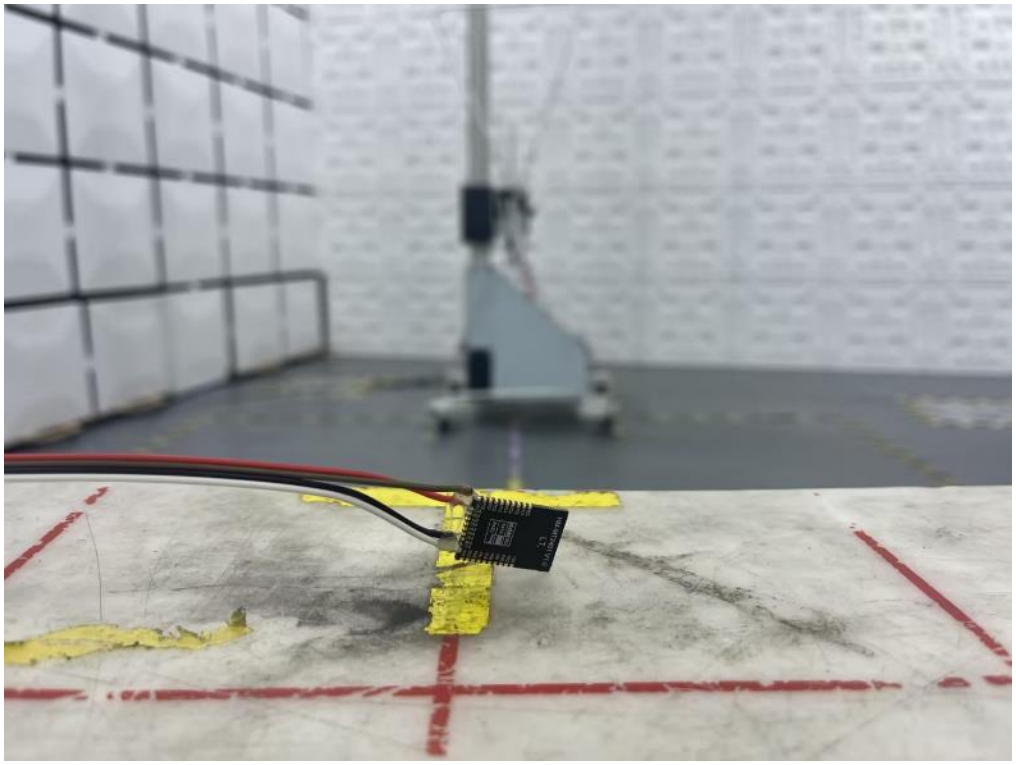
APPENDIX: PHOTOGRAPHS OF TEST CONFIGURATION

Radiated emissions above 1GHz

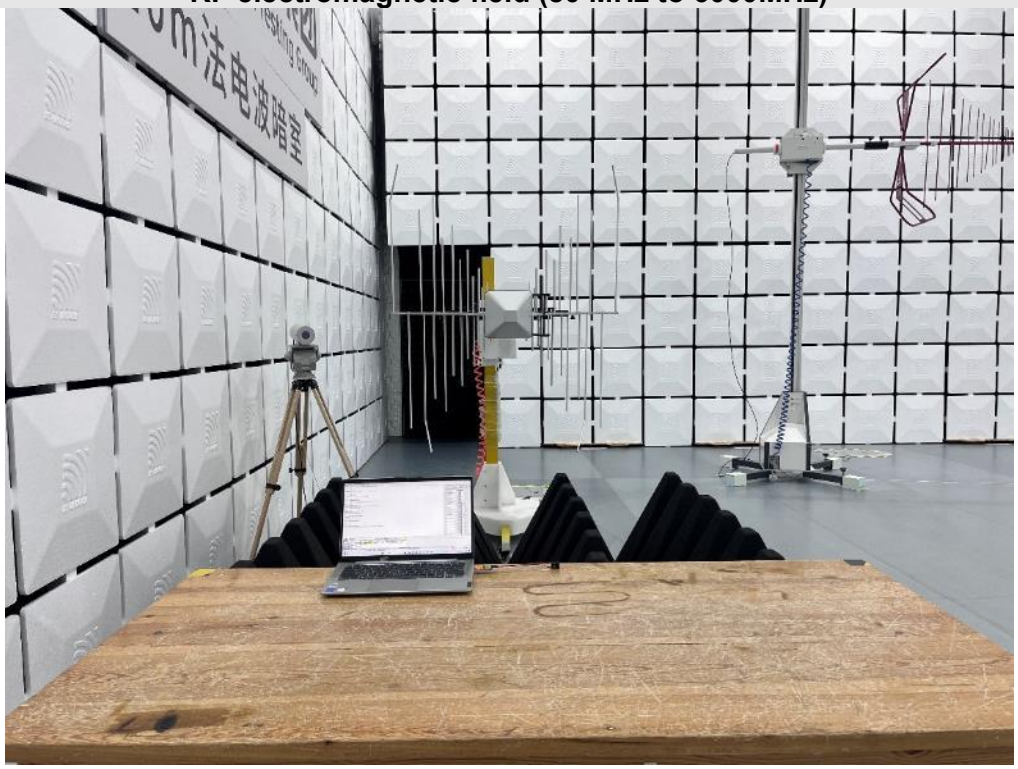


Radiated emissions below 1GHz

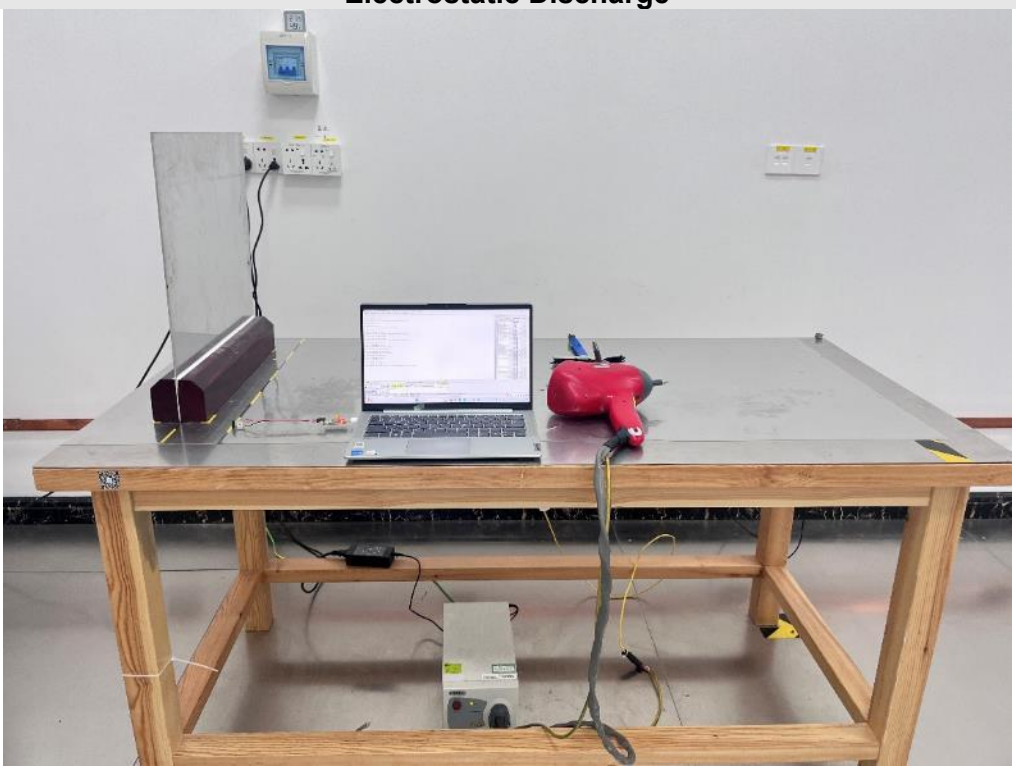




RF electromagnetic field (80 MHz to 6000MHz)

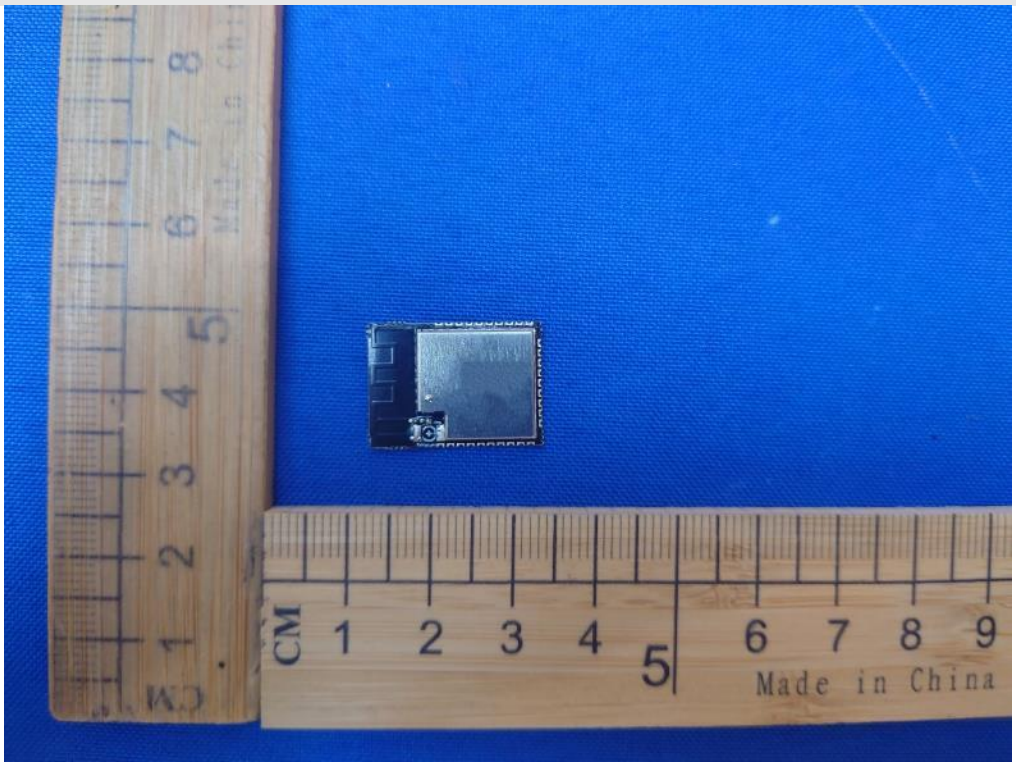


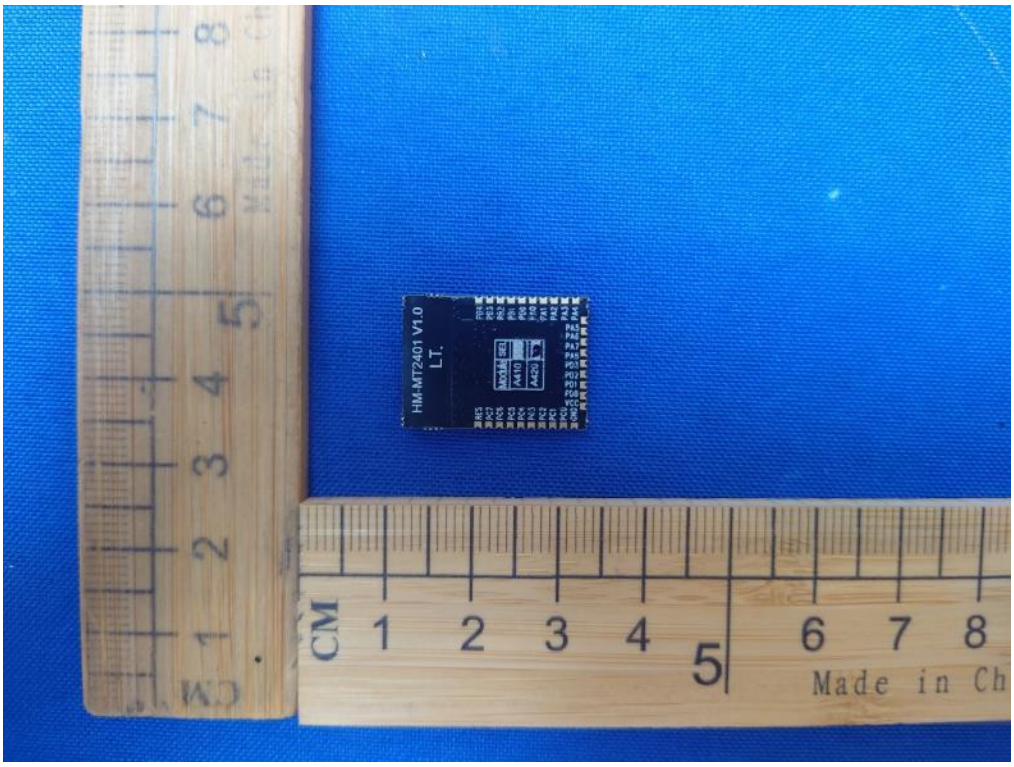
Electrostatic Discharge

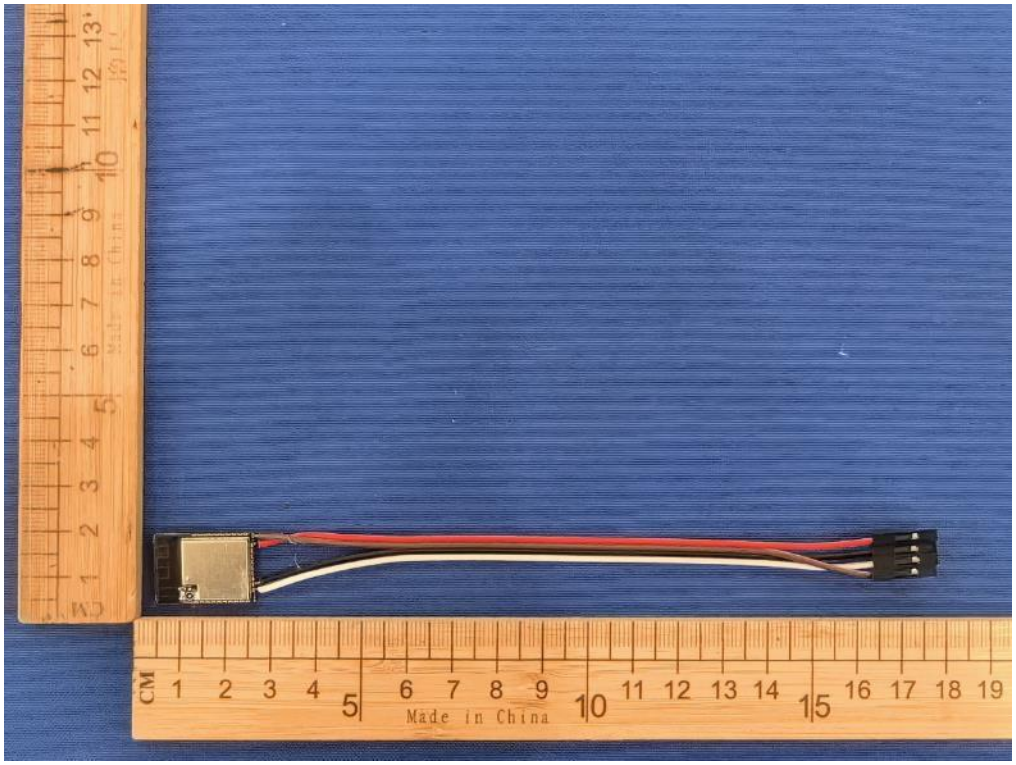


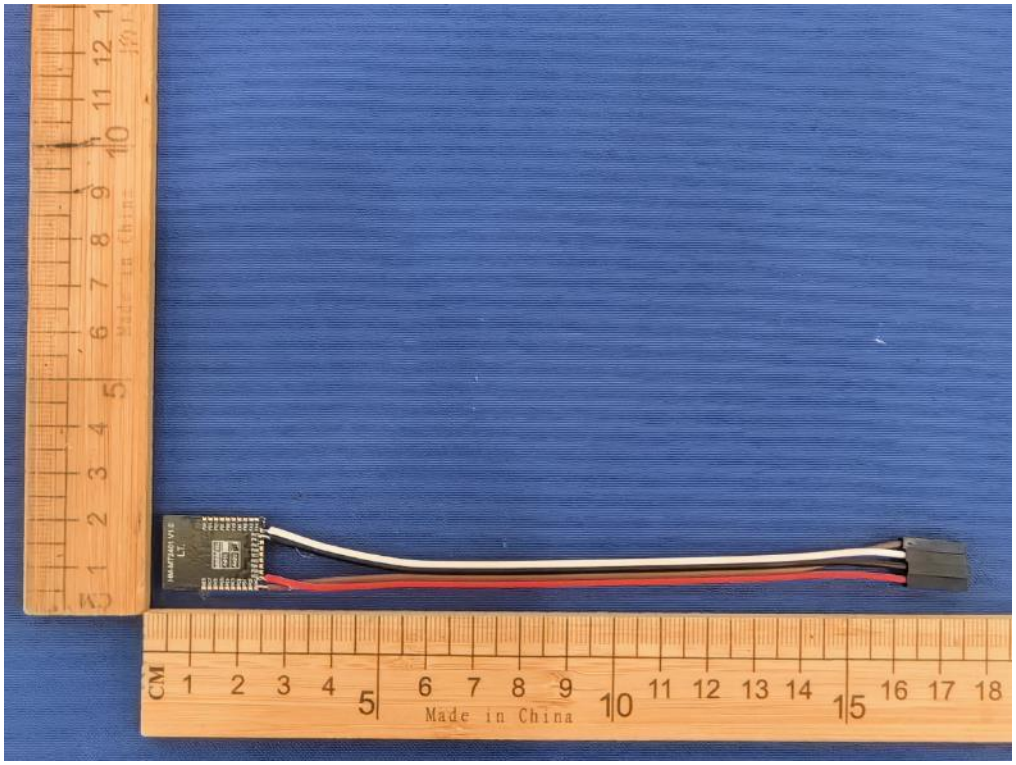
APPENDIX: PHOTOGRAPHS OF THE EUT

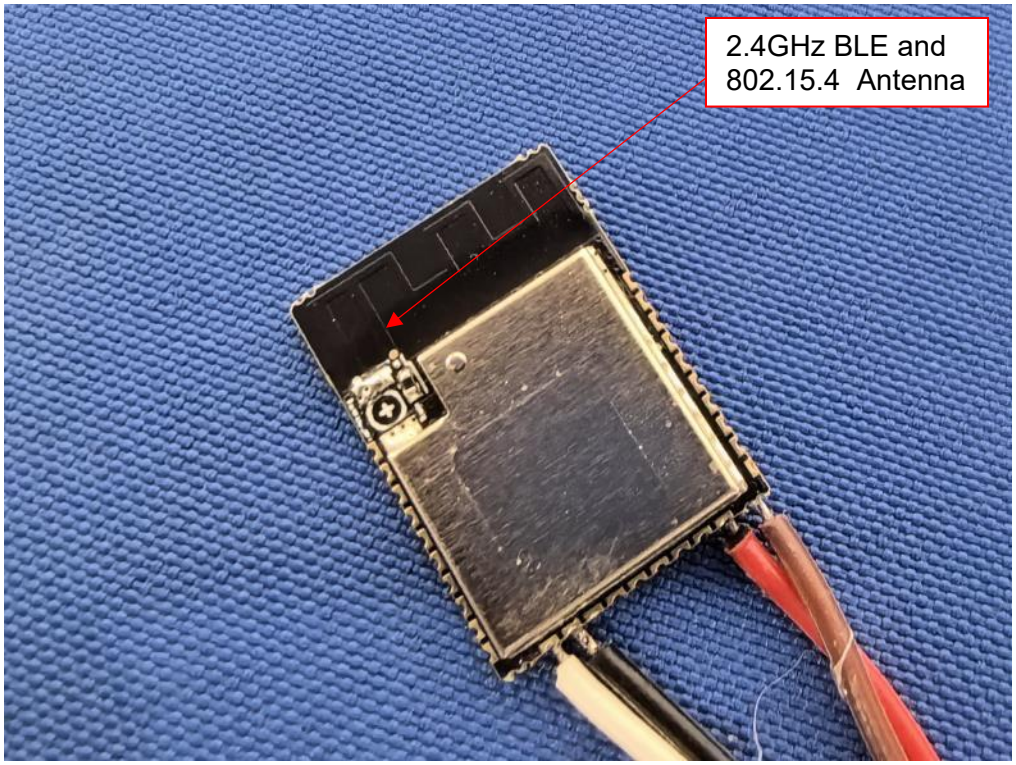
External

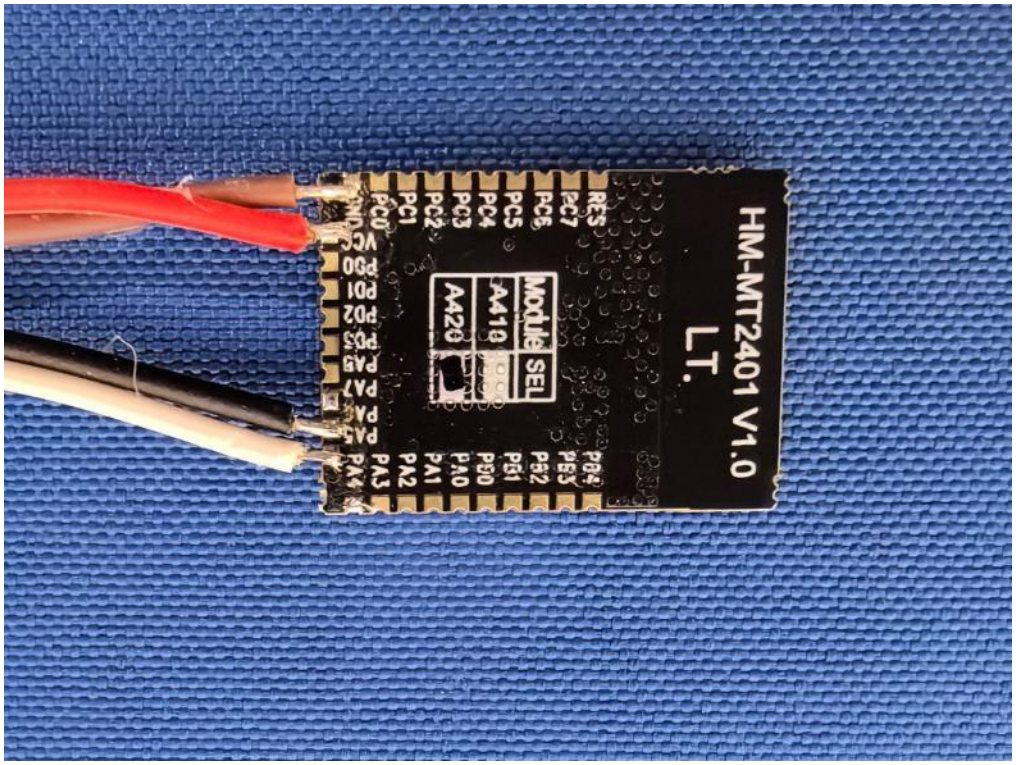




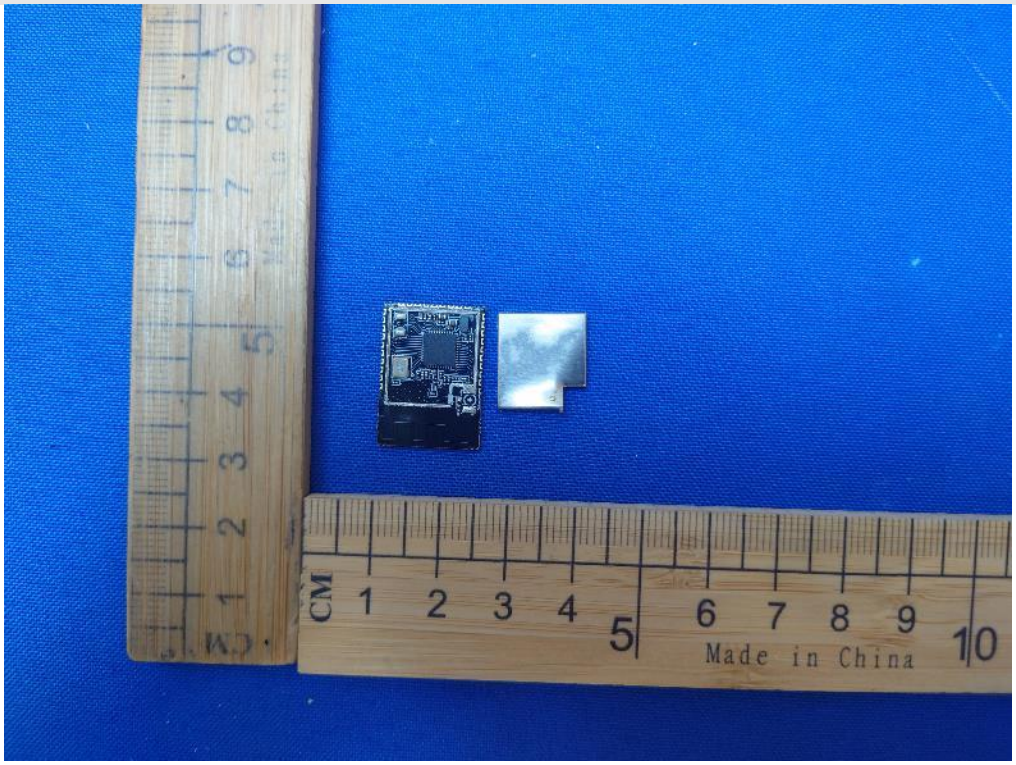

CM 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
Made in China

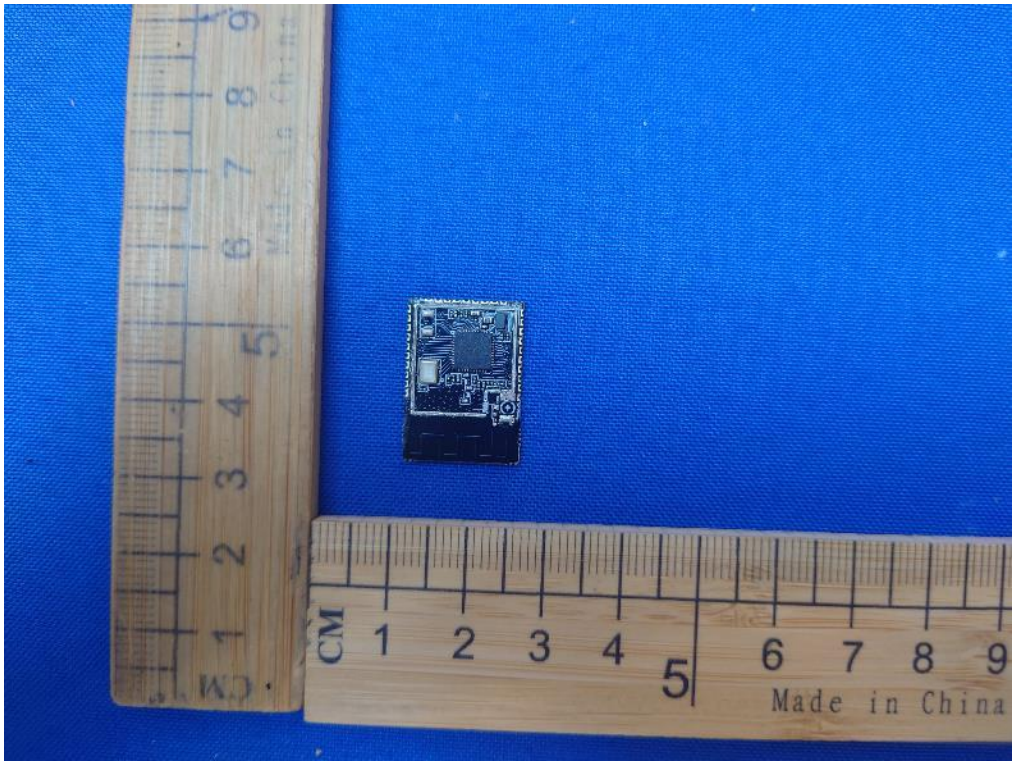

CM 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Made in China

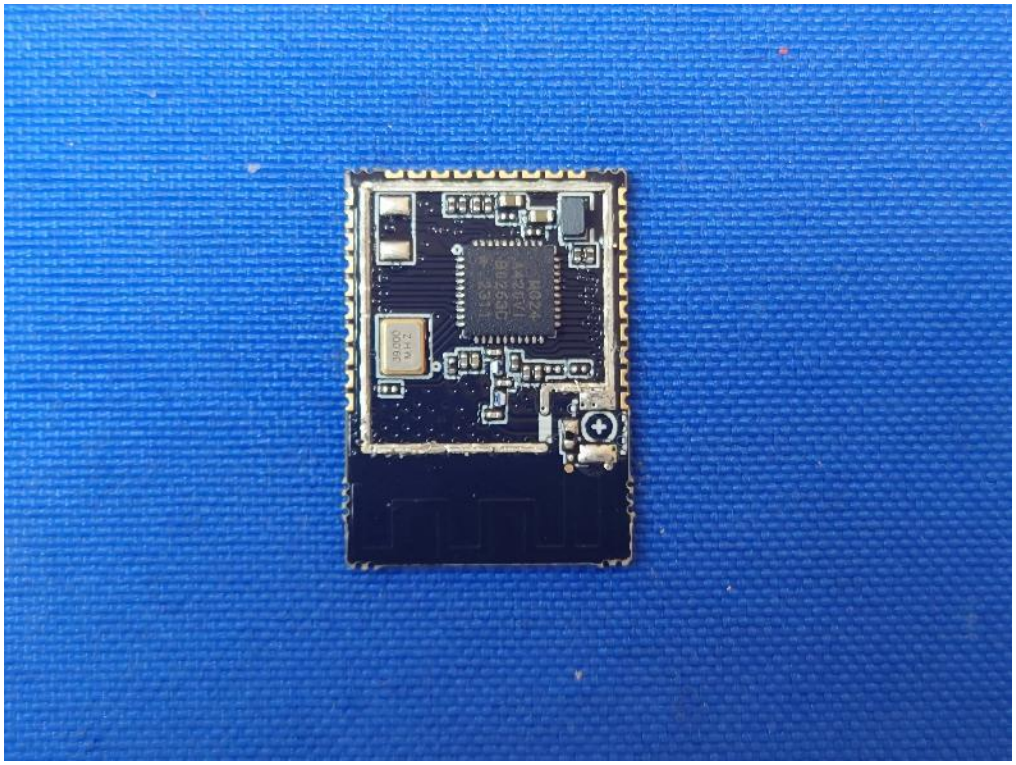

2.4GHz BLE and
802.15.4 Antenna


HM-MT2401 V1.0
LT.
Module SEL
A419
A420

Internal







END OF REPORT