



FCC Test Report

APPLICANT : Motorola Mobility LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
MODEL NAME : XT2235-2
FCC ID : IHDT56AF2
STANDARD : 47 CFR Part 15 Subpart B
CLASSIFICATION : Certification
TEST DATE(S) : May 24, 2022 ~ May 25, 2022

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia



Sporton International Inc. (Kunshan)

**No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China**



TABLE OF CONTENTS

REVISION HISTORY	3
SUMMARY OF TEST RESULT	4
1. GENERAL DESCRIPTION	5
1.1. Applicant.....	5
1.2. Manufacturer	5
1.3. Product Feature of Equipment Under Test	5
1.4. Product Specification of Equipment Under Test	6
1.5. Modification of EUT	7
1.6. Specification of Accessory	7
1.7. Test Location.....	8
1.8. Test Software	8
1.9. Applicable Standards	8
2. TEST CONFIGURATION OF EQUIPMENT UNDER TEST	9
2.1. Test Mode	9
2.2. Connection Diagram of Test System	11
2.3. Support Unit used in test configuration and system.....	12
2.4. EUT Operation Test Setup.....	12
3. TEST RESULT	13
3.1. Test of AC Conducted Emission Measurement	13
3.2. Test of Radiated Emission Measurement	17
4. LIST OF MEASURING EQUIPMENT	22
5. UNCERTAINTY OF EVALUATION	23
APPENDIX A. SETUP PHOTOGRAPHS	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC232908-01	Rev. 01	Initial issue of report	May 27, 2022

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.107	AC Conducted Emission	< 15.107 limits	PASS	Under limit 13.36 dB at 9.603 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 4.56 dB at 39.7000 MHz

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.



1. General Description

1.1. Applicant

Motorola Mobility LLC

222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

1.2. Manufacturer

Motorola Mobility LLC

222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

1.3. Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2235-2
FCC ID	IHDT56AF2
EUT supports Radios application	GSM/WCDMA/LTE/NFC WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE GNSS FM
IMEI Code	Conduction: 355771340020178/355771340020186 for sample 1 355771340020558/355771340020566 for sample 2 Radiation: 355771340020095/355771340020103 for sample 1 355771340019857/355771340019865 for sample 2
HW Version	DVT2
SW Version	S2SN32.29
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. There are two samples, the differences could be referred to the XT2235-2_Operational Description of Product Equality Declaration which is exhibit separately. According to the difference, sample 1 perform full test and sample 2 verify the worst case.

1.4. Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx Frequency	GSM850: 824 MHz ~ 849 MHz GSM1900: 1850MHz ~ 1910MHz WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 5 : 824 MHz ~ 849 MHz LTE Band 7 : 2500 MHz ~ 2570 MHz LTE Band 38 : 2570 MHz ~ 2620 MHz LTE Band 41 : 2535 MHz ~ 2655 MHz 802.11b/g/n: 2400 MHz ~ 2483.5 MHz 802.11a/n/ac: 5150 MHz ~ 5250 MHz; 5250 MHz ~ 5350 MHz; 5470 MHz ~ 5725 MHz 5725 MHz ~ 5850 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz NFC : 13.56 MHz
Rx Frequency	GSM850: 869 MHz ~ 894 MHz GSM1900: 1930 MHz ~ 1990 MHz WCDMA Band II: 1930 MHz ~ 1990 MHz WCDMA Band V: 869 MHz ~ 894 MHz LTE Band 5 : 869 MHz ~ 894 MHz LTE Band 7 : 2620 MHz ~ 2690 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41 : 2535 MHz ~ 2655 MHz 802.11b/g/n: 2400 MHz ~ 2483.5 MHz 802.11a/n/ac: 5150 MHz ~ 5250 MHz; 5250 MHz ~ 5350 MHz; 5470 MHz ~ 5725 MHz 5725 MHz ~ 5850 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz NFC : 13.56 MHz GNSS : 1559 MHz ~ 1610 MHz FM : 88 MHz ~ 108 MHz
Antenna Type	WWAN : IFA Antenna WLAN : IFA Antenna Bluetooth : IFA Antenna GNSS: IFA Antenna NFC: Coil Antenna FM : External Earphone Antenna
Type of Modulation	GSM/GPRS: GMSK EDGE(MCS 0-4): GMSK / (MCS 5-9): 8PSK WCDMA : BPSK HSDPA/DC-HSDPA : QPSK HSUPA : QPSK HSPA+ : 16QAM (16QAM uplink is not supported) DC-HSDPA : 64QAM LTE: QPSK / 16QAM / 64QAM 802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)

	Bluetooth LE : GFSK Bluetooth (1Mbps) : GFSK Bluetooth (2Mbps) : $\pi/4$ -DQPSK Bluetooth (3Mbps) : 8-DPSK GNSS : BPSK NFC: ASK FM
--	--

1.5. Modification of EUT

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

1.6. Specification of Accessory

Specification of Accessory				
AC Adapter 1(US)	Brand Name	Motorola(Salcomp)	Model Name	MC-331
AC Adapter 1(EU)	Brand Name	Motorola(Salcomp)	Model Name	MC-332
AC Adapter 1(UK)	Brand Name	Motorola(Salcomp)	Model Name	MC-333
AC Adapter 1(IN)	Brand Name	Motorola(Salcomp)	Model Name	MC-334
AC Adapter 1(AU)	Brand Name	Motorola(Salcomp)	Model Name	MC-335
AC Adapter 1(AR)	Brand Name	Motorola(Salcomp)	Model Name	MC-336
AC Adapter 1(BR)	Brand Name	Motorola(Salcomp)	Model Name	MC-337
AC Adapter 1(CHILE)	Brand Name	Motorola(Salcomp)	Model Name	MC-339
AC Adapter 2(US)	Brand Name	Motorola(Chenyang)	Model Name	MC-331
AC Adapter 2(EU)	Brand Name	Motorola(Chenyang)	Model Name	MC-332
AC Adapter 2(AU)	Brand Name	Motorola(Chenyang)	Model Name	MC-333
AC Adapter 2(AR)	Brand Name	Motorola(Chenyang)	Model Name	MC-336
AC Adapter 2(BR)	Brand Name	Motorola(Chenyang)	Model Name	MC-337
AC Adapter 3(US)	Brand Name	Motorola(Acbel)	Model Name	MC-331
AC Adapter 3(EU)	Brand Name	Motorola(Acbel)	Model Name	MC-332
AC Adapter 3(UK)	Brand Name	Motorola(Acbel)	Model Name	MC-333
Battery 1	Brand Name	Motorola(ATL)	Model Name	NC50
Battery 2	Brand Name	Motorola(SCUD)	Model Name	NC50
Earphone 1	Brand Name	Motorola(NLD)	Model Name	NLD-EM313A-05SF
Earphone 2	Brand Name	Motorola(JUWEI)	Model Name	JWEP1205-L20H
USB Cable 1	Brand Name	Motorola(Saibao)	Model Name	SLQ-A201A
USB Cable 2	Brand Name	Motorola(Jieye)	Model Name	JY-C03-409

1.7. Test Location

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	CO01-KS 03CH08-KS	CN1257	314309

1.8. Test Software

Item	Site	Manufacturer	Name	Version
1.	03CH08-KS	AUDIX	E3	6.2009-8-24
2.	CO01-KS	AUDIX	E3	6.2009-8-24

1.9. Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 15 Subpart B
- ♦ ANSI C63.4-2014

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

2. Test Configuration of Equipment Under Test

2.1. Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (30MHz to the 5th harmonic of the highest frequency or to 40 GHz, whichever is lower).

Test Items	Function Type
AC Conducted Emission	Mode 1: GSM 850 Rx(Middle) Bluetooth Idle + WLAN (2.4G) Idle + Camera(Rear) + Earphone 1 + Battery 1 + USB Cable 1(Charging from Adapter1) + SIM 1 for Sample 1
	Mode 2: WCDMA 1900 Rx Bluetooth Idle + WLAN (5G) Idle + Camera(Front) + Earphone 1 + Battery 1 + USB Cable1(Charging from Adapter2) + SIM 2 for Sample 1
	Mode 3: WCDMA Band V Rx(Low) Bluetooth Idle + WLAN (2.4G) Idle + MPEG4(Run Color Bar) + Earphone 1 + Battery 1 + USB Cable 1(Charging from Adapter2) + SIM 1 for Sample 1
	Mode 4: LTE Band 41 Rx Bluetooth Idle + WLAN (5G) Idle + FM Rx(98) + Earphone 1 + Battery 1 + USB Cable 1(Data Link with Notebook) + SIM 2 for Sample 1 EUT (eMMC) USB Data Link to PC/NB
	Mode 5: LTE Band 5 Rx(High) Bluetooth Idle + WLAN (2.4G) Idle + GNSS Rx + Earphone 1 + Battery 1 + USB Cable1 (Data Link with Notebook) + SIM 1 for Sample 1 PC/NB USB Data Link to EUT (eMMC)
	Mode 6: LTE Band 5 Rx(Low) Bluetooth Idle + WLAN (5G) Idle + GNSS Rx + Earphone 1 + Battery 1 + USB Cable1 (Data Link with Notebook) + SIM 2 for Sample 1 EUT (SD) USB Data Link to PC/NB
	Mode 7: LTE Band 7 Rx Bluetooth Idle + WLAN (2.4G) Idle + GNSS Rx + Earphone 1 + Battery 1 + USB Cable1 (Data Link with Notebook) + SIM 1 for Sample 1 PC/NB USB Data Link to EUT (SD)
	Mode 8: WCDMA 1900 Rx Bluetooth Idle + WLAN (5G) Idle + Camera(Front) + Earphone 2 + Battery 1 + USB Cable 2(Charging from Adapter3) + SIM 2 for Sample 1
	Mode 9: LTE Band 5 Rx(High) Bluetooth Idle + WLAN (2.4G) Idle + GNSS Rx + Earphone 1 + Battery 1 + USB Cable2 (Data Link with Notebook) + SIM 1 for Sample 1 PC/NB USB Data Link to EUT (eMMC)
	Mode 10 : WCDMA 1900 Rx Bluetooth Idle + WLAN (5G) Idle + Camera(Front) + Earphone 2 + Battery 2 + USB Cable2(Charging from Adapter2) + SIM 2 for Sample 2
	Mode 11 : LTE Band 5 Rx(High) Bluetooth Idle + WLAN (2.4G) Idle + GNSS Rx + Earphone 1 + Battery 2 + USB Cable2 (Data Link with Notebook) + SIM 1 for Sample 2 PC/NB USB Data Link to EUT (eMMC)

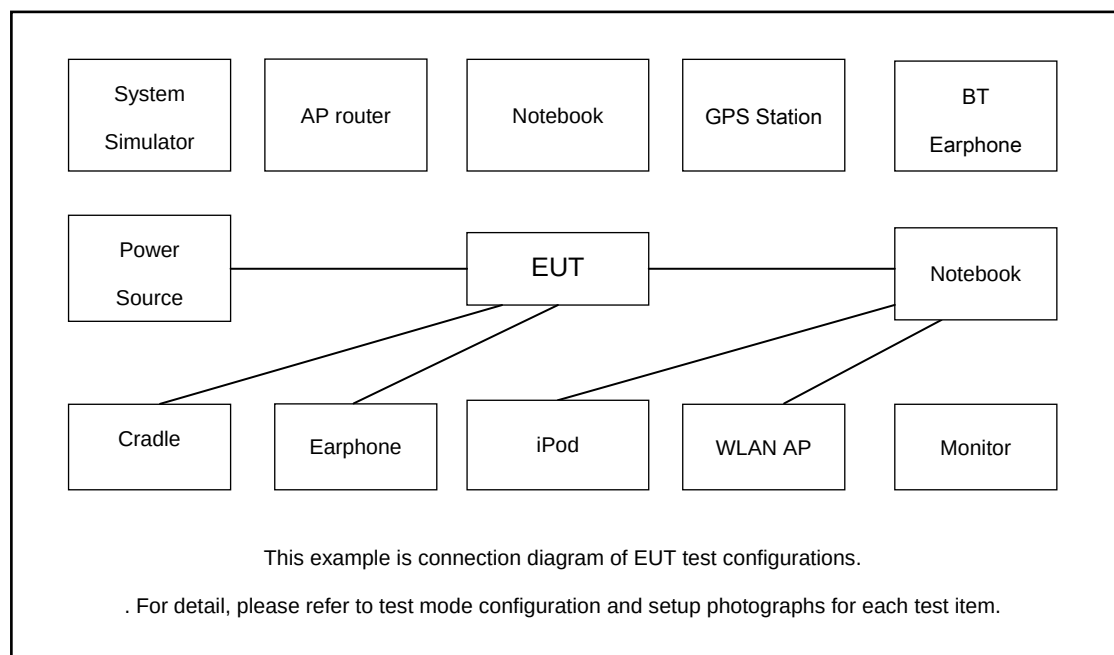


	Mode 12 : WCDMA 1900 Rx Bluetooth Idle + WLAN (5G) Idle + NFC On + Earphone 1 + Battery + USB Cable1(Charging from Adapter2) + SIM 2 for Sample 1
Radiated Emissions	Mode 1: GSM 850 Rx(Middle) Bluetooth Idle + WLAN (2.4G) Idle + Camera(Rear) + Earphone 1 + Battery 1 + USB Cable 1(Charging from Adapter1) + SIM 1 for Sample 1
	Mode 2: WCDMA 1900 Rx Bluetooth Idle + WLAN (5G) Idle + Camera(Front) + Earphone 1 + Battery 1 + USB Cable1(Charging from Adapter2) + SIM 2 for Sample 1
	Mode 3: WCDMA Band V Rx(Low) Bluetooth Idle + WLAN (2.4G) Idle + MPEG4(Run Color Bar) + Earphone 1 + Battery + USB Cable 1(Charging from Adapter2) + SIM 1 for Sample 1
	Mode 4: LTE Band 41 Rx Bluetooth Idle + WLAN (5G) Idle + FM Rx(98) + Earphone 1 + Battery 1 + USB Cable 1(Data Link with Notebook) + SIM 2 for Sample 1 EUT (eMMC) USB Data Link to PC/NB
	Mode 5: LTE Band 5 Rx(High) Bluetooth Idle + WLAN (2.4G) Idle + GNSS Rx + Earphone 1 + Battery 1 + USB Cable1 (Data Link with Notebook) + SIM 1 for Sample 1 PC/NB USB Data Link to EUT (eMMC)
	Mode 6: LTE Band 5 Rx(Low) Bluetooth Idle + WLAN (5G) Idle + GNSS Rx + Earphone 1 + Battery 1 + USB Cable1 (Data Link with Notebook) + SIM 2 for Sample 1 EUT (SD) USB Data Link to PC/NB
	Mode 7: LTE Band 7 Rx Bluetooth Idle + WLAN (2.4G) Idle + GNSS Rx + Earphone 1 + Battery 1 + USB Cable1 (Data Link with Notebook) + SIM 1 for Sample 1 PC/NB USB Data Link to EUT (SD)
	Mode 8: LTE Band 5 Rx(High) Bluetooth Idle + WLAN (2.4G) Idle + GNSS Rx + Earphone 2 + Battery 1 + USB Cable 2(Charging from Adapter3) + SIM 1 for Sample 1
	Mode 9: LTE Band 5 Rx(High) Bluetooth Idle + WLAN (2.4G) Idle + GNSS Rx + Earphone 1 + Battery 1 + USB Cable2 (Data Link with Notebook) + SIM 1 for Sample 1 PC/NB USB Data Link to EUT (eMMC)
	Mode 10 : LTE Band 5 Rx(High) Bluetooth Idle + WLAN (2.4G) Idle + Camera(Rear) + Earphone 1 + Battery 2 + USB Cable1 (Data Link with Notebook) + SIM 1 for Sample 2 PC/NB USB Data Link to EUT (eMMC)
	Mode 11 : LTE Band 5 Rx(High) Bluetooth Idle + WLAN (2.4G) Idle + GNSS Rx + Earphone 1 + Battery 2 + USB Cable1 (Data Link with Notebook) + SIM 1 for Sample 2 PC/NB USB Data Link to EUT (eMMC)
	Mode 12 : LTE Band 5 Rx(High) Bluetooth Idle + WLAN (2.4G) Idle + NFC On + Earphone 1 + Battery 1 + USB Cable1 (Data Link with Notebook) + SIM 1 for Sample 1 PC/NB USB Data Link to EUT (eMMC)

Remark:

1. The worst case of AC is mode 2; only the test data of this mode is reported.
2. The worst case of RE is mode 12; only the test data of this mode is reported.
3. Data Link with Notebook means data application transferred mode between EUT and Notebook.
4. Pre-scanned Low/Middle/High channel, the worst channel was recorded in this report.

2.2.Connection Diagram of Test System



The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application

2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Base Station	Anritsu	MT8821C	N/A	N/A	Unshielded,1.8m
2.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
3.	Signal Generator	R&S	SMBV100A	N/A	N/A	Unshielded,1.8m
4.	WLAN AP	D-link	DIR-655	KA21R655B1	N/A	Unshielded,1.8m
5.	WLAN AP	TP-Link	TL-WDR5600	N/A	N/A	Unshielded,1.8m
6.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A
7.	Bluetooth Earphone	Xiaomi	LYEJ02LM	N/A	N/A	N/A
8.	Notebook	Lenovo	G480	QDS-BRCM1050I	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
9.	Notebook	Lenovo	G410	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
10.	SD Card	Kingston	8GB	N/A	N/A	N/A
11.	Hard Disk	Lenovo	F310	DoC	Shielded, 1.2m	N/A
12.	NFC Card	N/A	N/A	N/A	N/A	N/A

2.4. EUT Operation Test Setup

The EUT was in GSM or WCDMA or LTE idle mode during the testing. The EUT was synchronized to the BCCH, and is in continuous receiving mode by setting system simulator's paging reorganization.

At the same time, the EUT was attached to the Bluetooth earphone or WLAN AP, and the following programs installed in the EUT were programmed during the test.

1. Data application is transferred between notebook and EUT via USB cable.
2. Turn on camera to capture images.
3. Turn on MPEG4 function.
4. Turn on FM function to make the EUT receive continuous signals from FM station.
5. Turn on GNSS function to make the EUT receive continuous signals from GNSS station.
6. Turn on NFC function

3. Test Result

3.1. Test of AC Conducted Emission Measurement

3.1.1 Limits of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

<Class B Limit>

Frequency of emission (MHz)	Conducted limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

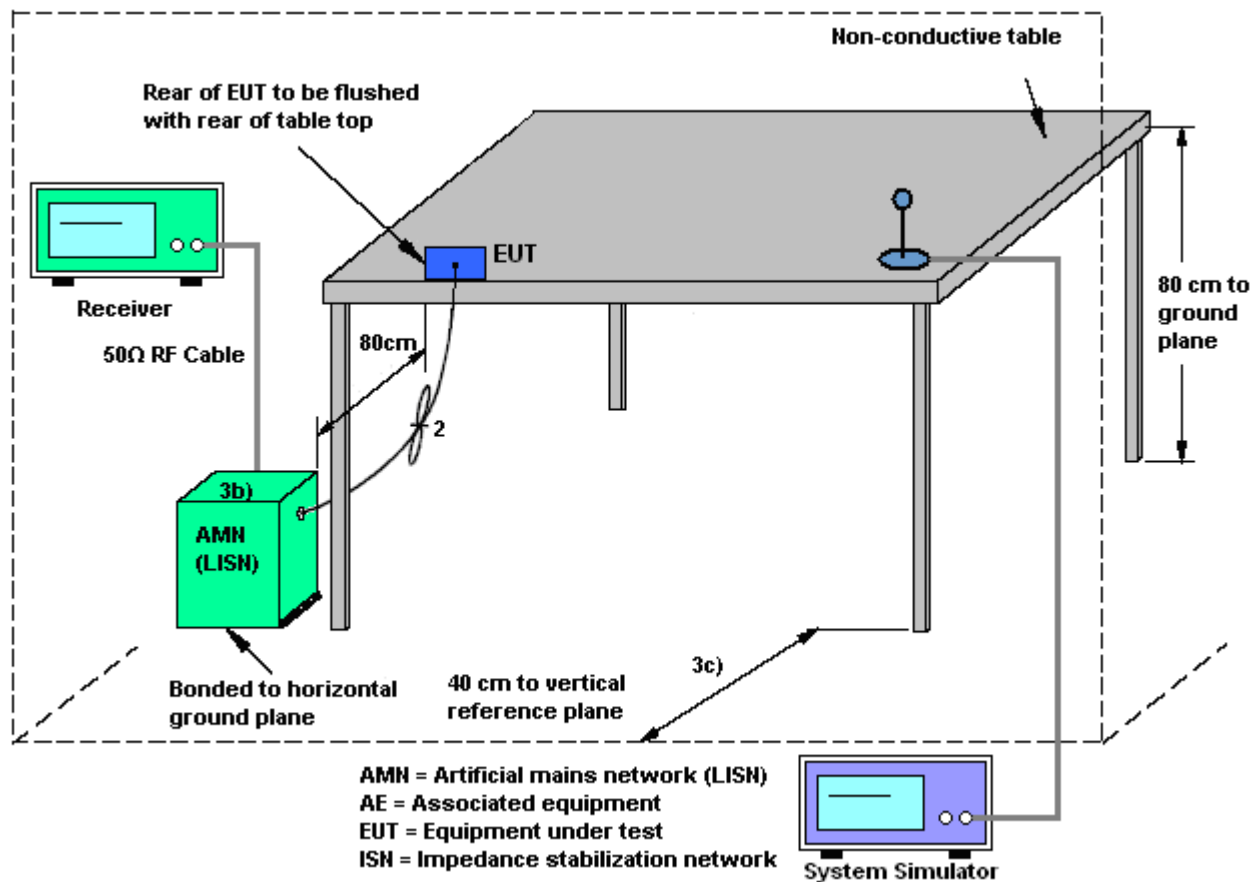
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedure

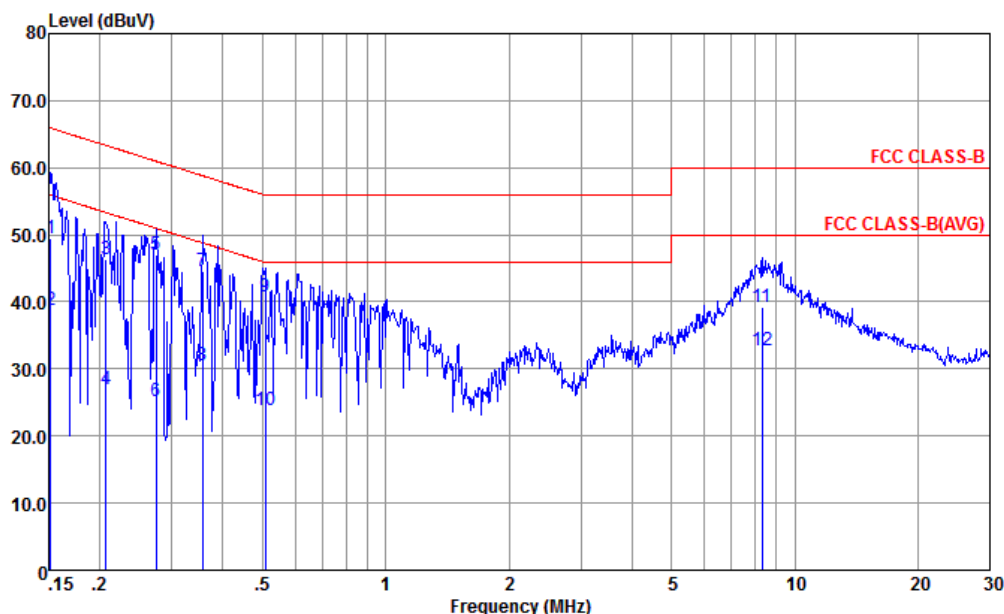
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

3.1.4 Test Setup



3.1.5 Test Result of AC Conducted Emission

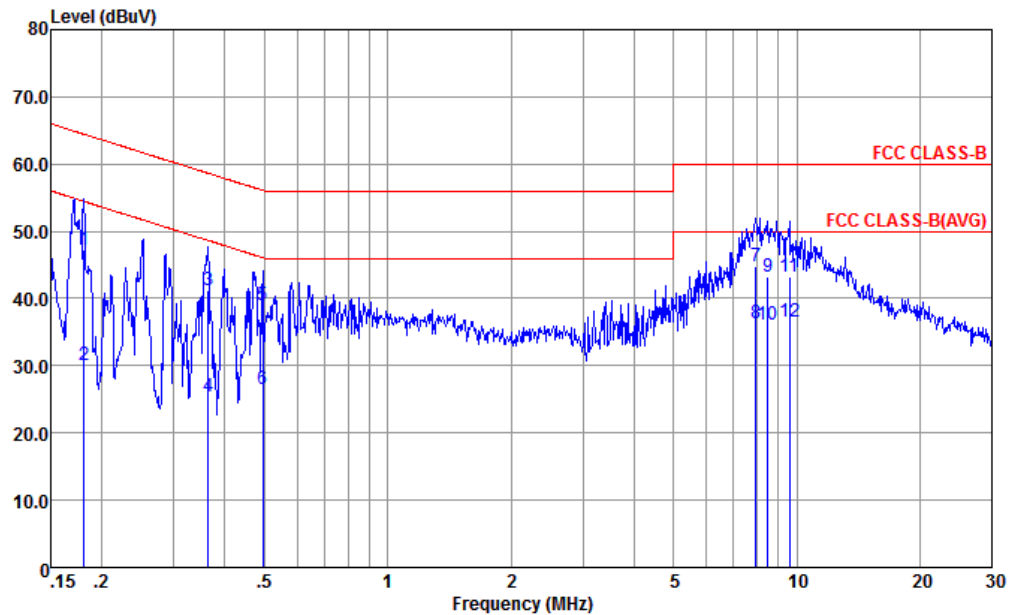
Test Engineer :	Amos Zhang	Temperature :	25.3~26.2°C
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition : FCC CLASS-B LISN-060105-L LINE

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.152	49.40	-16.51	65.91	38.90	0.02	10.48	QP
2	0.152	38.80	-17.11	55.91	28.30	0.02	10.48	Average
3	0.207	46.30	-17.02	63.32	35.90	0.04	10.36	QP
4	0.207	27.00	-26.32	53.32	16.60	0.04	10.36	Average
5 *	0.274	46.98	-14.00	60.98	36.60	0.06	10.32	QP
6	0.274	25.28	-25.70	50.98	14.90	0.06	10.32	Average
7	0.356	44.56	-14.27	58.83	34.20	0.08	10.28	QP
8	0.356	30.56	-18.27	48.83	20.20	0.08	10.28	Average
9	0.507	40.84	-15.16	56.00	30.50	0.10	10.24	QP
10	0.507	23.84	-22.16	46.00	13.50	0.10	10.24	Average
11	8.323	39.33	-20.67	60.00	28.81	0.20	10.32	QP
12	8.323	32.73	-17.27	50.00	22.21	0.20	10.32	Average

Test Engineer :	Amos Zhang	Temperature :	25.3~26.2°C
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition : FCC CLASS-B LISN-060105-L NEUTRAL

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.181	47.20	-17.26	64.46	36.80	0.00	10.40	QP
2	0.181	30.00	-24.46	54.46	19.60	0.00	10.40	Average
3	0.363	41.18	-17.47	58.65	30.90	0.00	10.28	QP
4	0.363	25.38	-23.27	48.65	15.10	0.00	10.28	Average
5	0.494	39.04	-17.06	56.10	28.80	0.00	10.24	QP
6	0.494	26.54	-19.56	46.10	16.30	0.00	10.24	Average
7	7.935	44.82	-15.18	60.00	34.50	0.00	10.32	QP
8	7.935	36.42	-13.58	50.00	26.10	0.00	10.32	Average
9	8.501	43.22	-16.78	60.00	32.90	0.00	10.32	QP
10	8.501	36.12	-13.88	50.00	25.80	0.00	10.32	Average
11	9.603	43.14	-16.86	60.00	32.80	0.00	10.34	QP
12 *	9.603	36.64	-13.36	50.00	26.30	0.00	10.34	Average

Note:

1. Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
2. Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)

3.2. Test of Radiated Emission Measurement

3.2.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

<Class B Limit>

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.2.2. Measuring Instruments

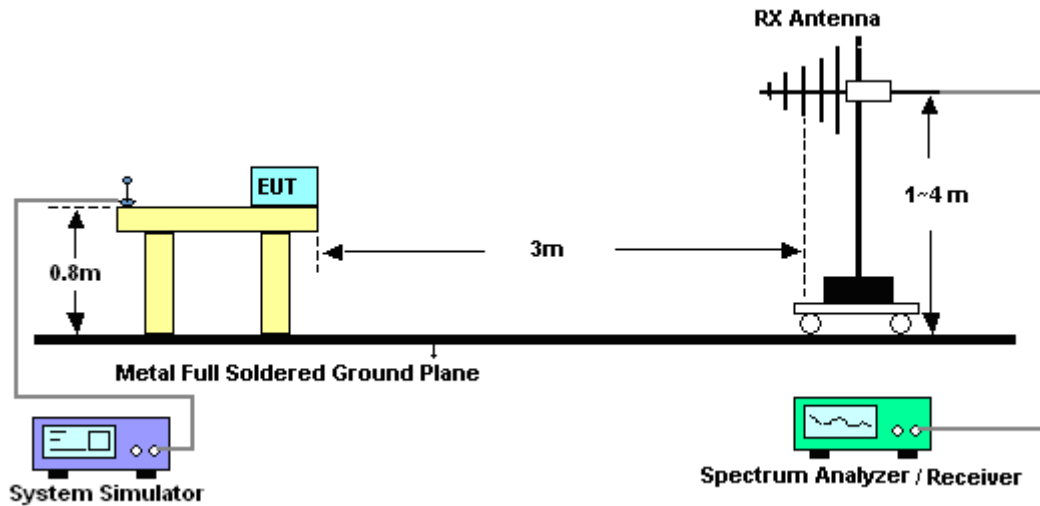
The measuring equipment is listed in the section 4 of this test report.

3.2.3. Test Procedures

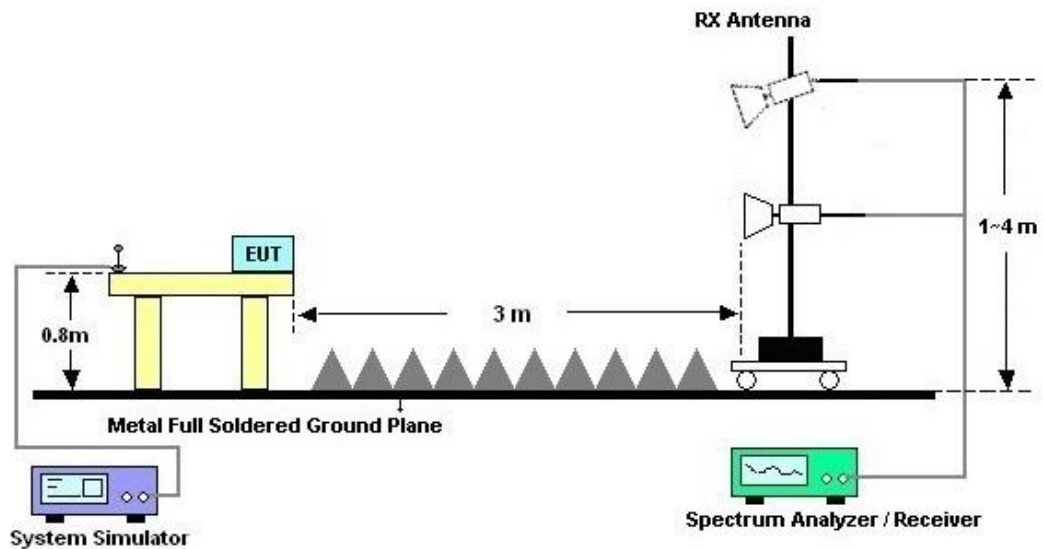
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, 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.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
8. Emission level (dBμV/m) = 20 log Emission level (μV/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
10. Exploratory radiated emissions testing of handheld and/or body-worn devices shall include rotation of the EUT through three orthogonal axes (X/Y/Z Plane) to determine the orientation (attitude) that maximizes the emissions.

3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz



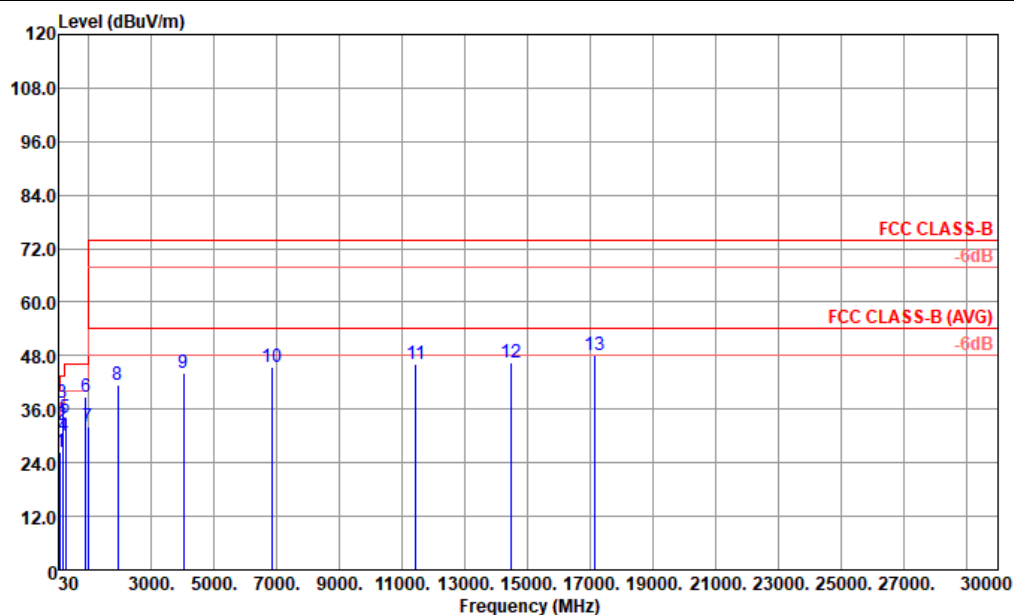
For radiated emissions above 1GHz





3.2.5. Test Result of Radiated Emission

Test Engineer :	Amos Zhao	Temperature :	21~22°C
		Relative Humidity :	41~42%
Test Distance :	3m	Polarization :	Horizontal
Remark :	#6 is system simulator signal which can be ignored.		

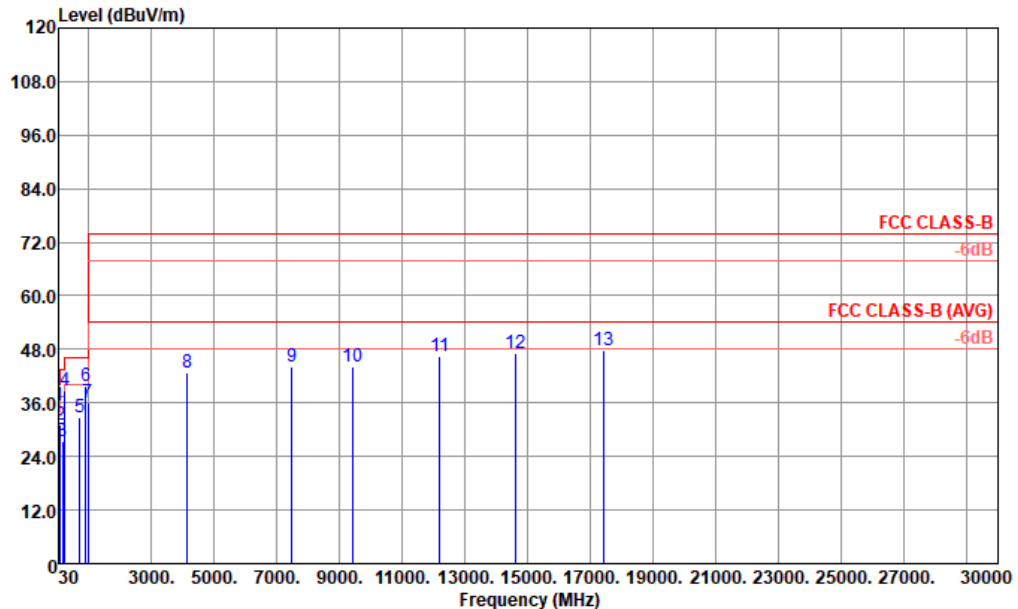


Site : 03CH08-KS
Condition : FCC CLASS-B 3m CBL 61110 59915 HORIZONTAL

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	cm	deg
			dB	dBuV/m	dBuV	dB/m	dB	dB		
1	89.17	26.25	-17.25	43.50	43.19	14.46	1.50	32.90	---	Peak
2	157.07	32.35	-11.15	43.50	46.57	16.70	1.99	32.91	---	Peak
3	167.74	37.39	-6.11	43.50	52.04	16.22	2.06	32.93	---	Peak
4	191.99	30.02	-13.48	43.50	45.63	15.15	2.22	32.98	---	Peak
5	263.77	34.14	-11.86	46.00	45.85	18.69	2.61	33.01	---	Peak
6	890.39	38.68			37.37	29.00	4.76	32.45	---	Peak
7	960.23	32.07	-21.93	54.00	28.35	30.54	4.93	31.75	---	Peak
8	1935.00	41.40	-32.60	74.00	38.91	28.74	7.04	33.29	---	Peak
9	4009.00	43.98	-30.02	74.00	31.64	32.53	11.54	31.73	---	Peak
10	6848.00	45.30	-28.70	74.00	28.59	35.35	13.57	32.21	---	Peak
11	11438.00	46.29	-27.71	74.00	24.43	37.72	17.72	33.58	---	Peak
12	14447.00	46.33	-27.67	74.00	20.72	39.08	20.09	33.56	---	Peak
13	17116.00	48.01	-25.99	74.00	18.40	41.21	22.06	33.66	---	Peak



Test Engineer :	Amos Zhao	Temperature :	21~22°C
		Relative Humidity :	41~42%
Test Distance :	3m	Polarization :	Vertical
Remark :	#6 is system simulator signal which can be ignored.		



Site : 03CH08-KS
Condition : FCC CLASS-B 3m CBL 61110 59915 VERTICAL

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	cm	deg	
			dB	dBuV/m	dBuV	dB/m	dB	dB		
1	39.70	35.44	-4.56	40.00	47.83	19.50	1.02	32.91	100	152 Peak
2	96.93	31.10	-12.40	43.50	47.07	15.38	1.57	32.92	---	Peak
3	159.98	27.39	-16.11	43.50	41.73	16.57	2.01	32.92	---	Peak
4	239.52	38.68	-7.32	46.00	51.48	17.72	2.49	33.01	---	Peak
5	719.67	32.81	-13.19	46.00	34.79	27.03	4.28	33.29	---	Peak
6	889.42	39.64			38.35	29.00	4.75	32.46	---	Peak
7	960.23	36.21	-17.79	54.00	32.49	30.54	4.93	31.75	---	Peak
8	4145.00	42.85	-31.15	74.00	29.66	32.63	12.15	31.59	---	Peak
9	7477.00	43.97	-30.03	74.00	26.81	35.42	14.37	32.63	---	Peak
10	9415.00	44.20	-29.80	74.00	25.15	36.17	16.19	33.31	---	Peak
11	12203.00	46.46	-27.54	74.00	23.29	38.51	18.31	33.65	---	Peak
12	14600.00	47.01	-26.99	74.00	21.20	39.18	20.18	33.55	---	Peak
13	17439.00	47.86	-26.14	74.00	18.33	40.90	22.31	33.68	---	Peak

Note:

- Level(dBuV/m) = Read Level(dBuV) + Antenna Factor(dB/m) + Cable Loss(dB) - Preamp Factor(dB)
- Over Limit(dB) = Level(dBuV/m) - Limit Line(dBuV/m)



4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 21, 2022	May 24, 2022	Apr. 20, 2023	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 14, 2021	May 24, 2022	Oct. 13, 2022	Conduction (CO01-KS)
AC LISN	R&S	ENV216	100334	9kHz~30MHz	Oct. 14, 2021	May 24, 2022	Oct. 13, 2022	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 14, 2021	May 24, 2022	Oct. 13, 2022	Conduction (CO01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max 30dBm	Oct. 16, 2021	May 25, 2022	Oct. 15, 2022	Radiation (03CH08-KS)
EXA Spectrum Analyzer	Keysight	N9010B	MY57471084	10Hz~44G,MAX 30dB	Jul. 12, 2021	May 25, 2022	Jul. 11, 2022	Radiation (03CH08-KS)
Bilog Ante1ma	TESEQ& VGT	CBL 61110	59915	30MHz~1GHz	Sep. 02, 2021	May 25, 2022	Sep. 01, 2022	Radiation (03CH08-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75959	1GHz~18GHz	Dec. 24, 2021	May 25, 2022	Dec. 23, 2022	Radiation (03CH08-KS)
SHF-EHF Horn	Com-power	AH-840	101070	18GHz~40GHz	Jan. 05, 2022	May 25, 2022	Jan. 04, 2023	Radiation (03CH08-KS)
Amplifier	MITEQ	EM18G40GGA	060728	18~40GHz	Jan. 05, 2022	May 25, 2022	Jan. 04, 2023	Radiation (03CH08-KS)
Amplifier	SONOMA	310N	413741	9KHz~1GHz	Jan. 13, 2022	May 25, 2022	Jan. 12, 2023	Radiation (03CH08-KS)
Amplifier	Keysight	83017A	MY53270389	500MHz~26.5G Hz	Jan. 05, 2022	May 25, 2022	Jan. 04, 2023	Radiation (03CH08-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	May 25, 2022	NCR	Radiation (03CH08-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	May 25, 2022	NCR	Radiation (03CH08-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	May 25, 2022	NCR	Radiation (03CH08-KS)

NCR: No Calibration Required

5. Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.9dB
---	-------

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
---	-------

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
---	-------

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
---	-------