



FCC Test Report

APPLICANT : Motorola Mobility LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
MODEL NAME : XT2201-4
FCC ID : IHDT56AB3
STANDARD : 47 CFR Part 15 Subpart B
CLASSIFICATION : Certification
TEST DATE(S) : Dec. 13, 2021 ~ Jan. 07, 2022

We, Sporton International (Shenzhen) Inc., 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.

This report contains data that were produced under subcontract by Sporton International (KunShan) Inc.

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

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People's Republic of China**



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC192317-02	Rev. 01	Initial issue of report	Jan. 05, 2022
FC192317-02	Rev. 02	Update Radiated Emission test data on page 20~21	Jan. 07, 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 3.54 dB at 1.129 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 4.17 dB at 296.750 MHz for Quasi-Peak

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	XT2201-4
FCC ID	IHDT56AB3
EUT supports Radios application	GSM/WCDMA/LTE/5G NR WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 2.4GHz 802.11ax HE20/HE40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80/VHT160 WLAN 5GHz 802.11ax HE20/HE40/HE80/HE160 WLAN 6GHz 802.11a/ax HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE GNSS/NFC/WPT
IMEI Code	Conduction: 357193870008358 Radiation: 357193870008242
HW Version	DVT2
SW Version	S1SH32.10
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

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 2 : 1850 MHz ~ 1910 MHz LTE Band 4 : 1710 MHz ~ 1755 MHz LTE Band 5 : 824 MHz ~ 849 MHz LTE Band 7 : 2500 MHz ~ 2570 MHz LTE Band 12 : 699 MHz ~ 716 MHz LTE Band 13 : 777 MHz ~ 787 MHz LTE Band 66 : 1710 MHz ~ 1780 MHz LTE Band 48 : 3550 MHz ~ 3700 MHz 5G NR n2 : 1850 MHz ~ 1910 MHz 5G NR n5 : 824 MHz ~ 849 MHz 5G NR n66 : 1710 MHz ~ 1780 MHz 5G NR n77: 3450 MHz ~ 3550 MHz; 3700 MHz ~ 3980 MHz 5G NR n78: 3450 MHz ~ 3550 MHz; 3700 MHz ~ 3800 MHz 5G NR n260: 37GHz ~ 40GHz 5G NR n261: 27.5GHz ~ 28.35GHz 802.11b/g/n: 2400 MHz ~ 2483.5 MHz 802.11a/n/ac/ax: 5150 MHz ~ 5250 MHz; 5250 MHz ~ 5350 MHz; 5470 MHz ~ 5725 MHz 5725 MHz ~ 5850 MHz 802.11a/ax: 5925 MHz ~ 7125 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz NFC : 13.56 MHz WPT: 110kHz~ 148kHz
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 2 : 1930 MHz ~ 1990 MHz LTE Band 4 : 2110 MHz ~ 2155 MHz LTE Band 5 : 869 MHz ~ 894 MHz LTE Band 7 : 2620 MHz ~ 2690 MHz LTE Band 12 : 729 MHz ~ 746 MHz LTE Band 13 : 746 MHz ~ 756 MHz LTE Band 66 : 2110 MHz~ 2200 MHz LTE Band 46 : 5150 MHz ~ 5925 MHz LTE Band 48 : 3550 MHz ~ 3700 MHz 5G NR n2 : 1930 MHz ~ 1990 MHz 5G NR n5 : 869 MHz ~ 894 MHz 5G NR n66 : 2110 MHz~ 2200 MHz 5G NR n77: 3450 MHz ~ 3550 MHz; 3700 MHz ~ 3980 MHz 5G NR n78: 3450 MHz ~ 3550 MHz; 3700 MHz ~ 3800 MHz 5G NR n260: 37GHz ~ 40GHz 5G NR n261: 27.5GHz ~ 28.35GHz 802.11b/g/n: 2400 MHz ~ 2483.5 MHz 802.11a/n/ac/ax: 5150 MHz ~ 5250 MHz;

	5250 MHz ~ 5350 MHz; 5470 MHz ~ 5725 MHz 5725 MHz ~ 5850 MHz 802.11a/ax: 5925 MHz ~ 7125 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz NFC : 13.56 MHz GNSS : 1559 MHz ~ 1610 MHz, 1164 MHz ~ 1215 MHz WPT: 110kHz~ 148kHz
Antenna Type	WWAN : PIFA Antenna WLAN 2.4GHz/Bluetooth Ant. 4 : IFA Antenna WLAN 2.4GHz/Bluetooth Ant. 6 : PIFA Antenna WLAN 5G/6G: PIFA Antenna GNSS 1559 MHz ~ 1610 MHz : IFA Antenna GNSS 1164 MHz ~ 1215 MHz : PIFA Antenna NFC: Loop Antenna WPT: Coil Antenna
Type of Modulation	GSM/GPRS: GMSK EDGE(MCS 0-4): GMSK / (MCS 5-9): 8PSK WCDMA : BPSK (Uplink) HSDPA/DC-HSDPA : QPSK HSUPA : QPSK HSPA+ : 16QAM (16QAM uplink is not supported) DC-HSDPA : 64QAM LTE: QPSK / 16QAM / 64QAM / 256QAM 5G NR: DFT-s-OFDM (PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM) CP-OFDM (QPSK / 16QAM / 64QAM / 256QAM) 802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM) 802.11ax : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM / 4096QAM) Bluetooth LE : GFSK Bluetooth (1Mbps) : GFSK Bluetooth (2Mbps) : $\pi/4$ -DQPSK Bluetooth (3Mbps) : 8-DPSK GNSS : BPSK NFC: ASK WPT: ASK

Note: GNSS = Galileo + GLONASS + GPS+ SBAS

1.5. Modification of EUT

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

1.6. Test Location

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

Test Firm	Sporton International (Kunshan) Inc.		
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	CN1257	314309

Sporton International (Shenzhen) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Test Firm	Sporton International (Shenzhen) Inc.		
Test Site Location	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City Guangdong Province China 518103 TEL: +86-755-33202398		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	03CH05-SZ	CN1256	421272

1.7. Test Software

Item	Site	Manufacturer	Name	Version
1.	CO01-KS	AUDIX	E3	6.2009-8-24
2.	03CH05-SZ	AUDIX	E3	6.2009-8-24

1.8. 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.

1.9. Specification of Accessory

Specification of Accessory				
AC Adapter 1(US)	Brand Name	Motorola(Salom)	Model Name	MC-301
AC Adapter 2(US)	Brand Name	Motorola(Acbel)	Model Name	MC-301
Battery	Brand Name	Motorola(ATL)	Model Name	NA50
Earphone	Brand Name	Motorola(Lyand)	Model Name	MD211(SH38D20195)
USB Cable 1	Brand Name	Motorola(Saibao)	Model Name	SC18D13215
USB Cable 2	Brand Name	Motorola(Cabletech)	Model Name	SC18D13216
USB Cable 3	Brand Name	Motorola(Luxshare)	Model Name	SC18D13217
Type C to HDMI Cable /USBC Cable	Brand Name	Motorola(Linxee)	Model Name	SC18D02146
Stylus	Brand Name	Motorola smart stylus	Model Name	XT2201-S
Smart Folio	Brand Name	Motorola(Techson)	Model Name	SS68D36907,SS68D36906
Wireless Dongle	Brand Name	Motorola	Model Name	MD-02
HDMI Cable	Brand Name	Motorola	Model Name	HC-01
USB Cable(Type A/C)	Brand Name	Motorola	Model Name	SC18C24367

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.

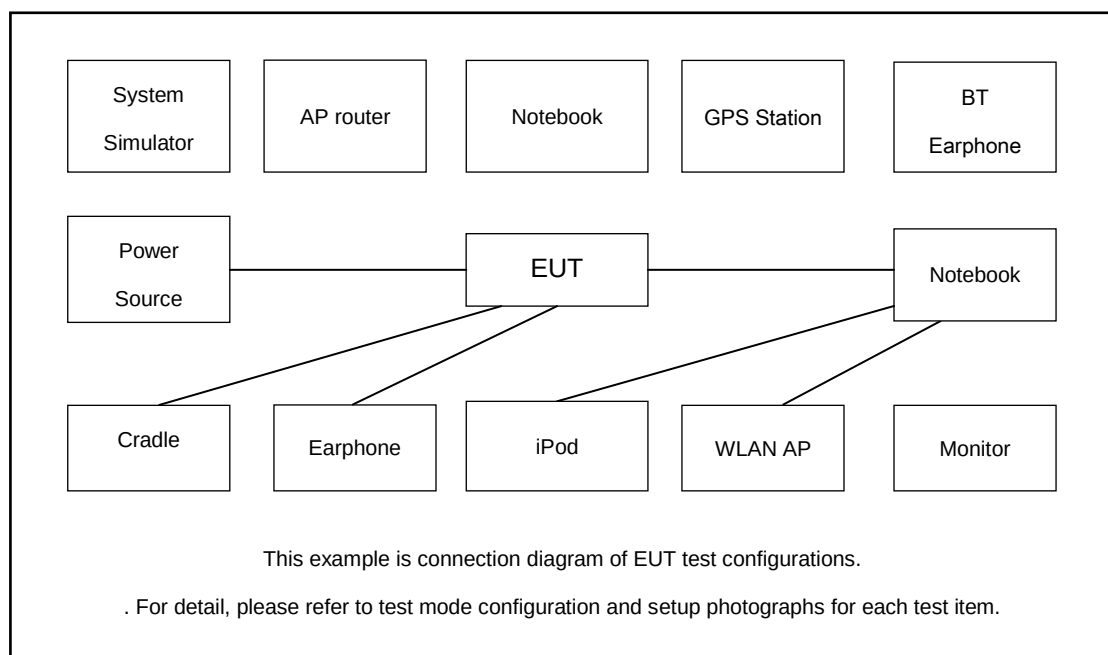
Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (30MHz to the 5th harmonic of the highest frequency or to 40 GHz, whichever is lower).

Test Items	Function Type
AC Conducted Emission	Mode 1: GSM 850 Rx(Middle)+Bluetooth Idle+WLAN (2.4G) Idle+USB Cable1 (Charging from Adapter 1)+Camera(Rear)+Battery
	Mode 2: WCDMA 1900 Rx+Bluetooth Idle+WLAN (5G) Idle+USB Cable 2(Charging from Adapter2)+Camera(Front)+Battery + Smart Folio With Stylus
	Mode 3: LTE Band 13 Rx(High)+Bluetooth Idle+WLAN (WIFI 6E) Idle+USB Cable3(Charging from Adapter1) +NFC On+Battery
	Mode 4: LTE Band 12 Rx(Middle)+Bluetooth Idle+WLAN (2.4G) Idle+USB Cable3 (EUT Charging from Adapter1)+MPEG4(Run Color Bar)+Battery
	Mode 5: LTE Band 5 Rx(Low)+Bluetooth Idle+WLAN (5G) Idle+USB Cable1 (Charging from Wireless charger)+Adapter1 Connect to Wireless charger+GNSS Rx+Earphone +Battery
	Mode 6: LTE Band 46 Rx+Bluetooth Idle+WLAN (WIFI 6E) Idle+USB Cable3 (Charging from Adapter1)+(EUT Charge the other phones)+Battery
	Mode 7: 5G N5 Rx(Middle)+Bluetooth Idle+WLAN (2.4G) Idle+USB Cable1 (Data Link with Notebook)+ GNSS Rx+Battery
	Mode 8: 5G N77 Rx+Bluetooth Idle+WLAN (5G) Idle+USB Cable 2(Data Link with Notebook)+ GNSS Rx+Battery
	Mode 9: 5G N78 Rx Idle+Bluetooth Idle+WLAN (WIFI 6E) Idle+USB Cable 3(Data Link with Notebook)+ GNSS Rx+Battery
	Mode 10 :LTE Band 5 Rx(Low)+Bluetooth Idle+WLAN (2.4G) Idle+USB Cable3(Charging from Adapter1)+Type C to HDMI Cable /USBC Cable With phone and monitor+Battery
	Mode 11 : LTE Band 46 Rx+Bluetooth Idle+WLAN (WIFI 5G) Idle+Wireless Dongle+ Standard HDMI Cable+ USB Cable(Type A/C)+Adaptor



Radiated Emissions	Mode 1: GSM 850 Rx(Middle)+Bluetooth Idle+WLAN (2.4G) Idle+USB Cable1 (Charging from Adapter 1)+Camera(Rear)+Battery
	Mode 2: WCDMA 1900 Rx+Bluetooth Idle+WLAN (5G) Idle+USB Cable 2(Charging from Adapter2)+Camera(Front)+Battery + Smart Folio With Stylus
	Mode 3: LTE Band 13 Rx(High)+Bluetooth Idle+WLAN (WIFI 6E) Idle+USB Cable3(Charging from Adapter1) +NFC On+Battery
	Mode 4: LTE Band 12 Rx(Middle)+Bluetooth Idle+WLAN (2.4G) Idle+USB Cable 3 (Charging from Adapter1)+MPEG4(Run Color Bar)+Battery
	Mode 5: LTE Band 5 Rx(Low)+Bluetooth Idle+WLAN (5G) Idle+USB Cable1 (Charging from Wireless charger)+Adapter1 Connect to Wireless charger+GNSS Rx+Earphone +Battery
	Mode 6: LTE Band 46 Rx+Bluetooth Idle+WLAN (WIFI 6E) Idle+USB Cable3 (EUT Charging from Adapter1)+(EUT Charge the other phones)+Battery
	Mode 7: 5G N5 Rx(Middle)+Bluetooth Idle+WLAN (2.4G) Idle+USB Cable1 (Data Link with Notebook)+ GNSS Rx+Battery
	Mode 8: 5G N77 Rx+Bluetooth Idle+WLAN (5G) Idle+USB Cable 2(Data Link with Notebook)+ GNSS Rx+Battery
	Mode 9: 5G N78 Rx Idle+Bluetooth Idle+WLAN (WIFI 6E) Idle+USB Cable 3(Data Link with Notebook)+ GNSS Rx+Battery
	Mode 10 : LTE Band 46 Rx+Bluetooth Idle+WLAN (2.4G) Idle+USB Cable 2(Charging from Adapter2)+MPEG4(Run Color Bar)+ Type C to HDMI Cable /USBC Cable With phone and monitor+Smart Folio With Stylus+ Battery
	Mode 11 : WCDMA 1900 Rx+Bluetooth Idle+WLAN (WIFI 5G) Idle+Wireless Dongle+ Standard HDMI Cable+ USB Cable(Type A/C)+Adaptor
Remark: 1. The worst case of AC is mode 5; only the test data of this mode is reported. 2. The worst case of RE is mode 10; only the test data of this mode is reported. 3. Data Link with Notebook means data application transferred mode between EUT and Notebook. 4. After pre-scanned the L/M/H channel for all frequency band which operate within the frequency range of 30MHz ~ 960MHz, only the worst channel for them between 30MHz ~ 960MHz test data of this mode was reported.	

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.	LTE Base Station	Anritus	MT8821C	N/A	N/A	Unshielded,1.8m
2.	Base Station	Anritsu	MT8820C	Fcc DoC	N/A	Shielded, 1.5m
3.	Base Station	Anritsu	MT8000A	N/A	N/A	Unshielded,1.8m
4.	GPS Station	ADIVIE	MP9000	N/A	N/A	N/A
5.	Vector Signal Generator	R&S	SMBV100A	258305	N/A	N/A
6.	5GNR Base Station	Anritus	MT8000A	N/A	N/A	Unshielded,1.8m
7.	WLAN AP	D-link	DIR-655	KA21R655B1	N/A	Unshielded,1.8m
8.	WLAN AP	ASUSTek	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded,2.7m with Core
9.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A
10.	Bluetooth Earphone	Samsung	EO-MG900	CCAH14LP1680T5	N/A	N/A
11.	Notebook	Lenovo	V130-15IKB005	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m

12.	Notebook	DELL	Inspiron 15-7570	Fcc DoC	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
13.	Hard Disk	Lenovo	F310	DoC	Shielded, 1.2m	N/A
14.	Monitor	Lenovo	Thinkvision	N/A	N/A	Unshielded,1.8m
15.	Monitor	Dell	IN1940MWB	Fcc DoC	N/A	N/A
16.	Wireless Charger	HUAWEI	CP61	N/A	N/A	N/A
17.	iPod	Apple	MC525 ZP/A	Fcc DoC	Shielded, 1.0m	N/A
18.	NFC Card	N/A	N/A	N/A	N/A	N/A
19.	Earphone	Motorola	MD211	N/A	Unshielded,1.2m	N/A
20.	Phone	N/A	N/A	N/A	N/A	N/A

2.4. EUT Operation Test Setup

The EUT was in WWAN 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 GNSS function to make the EUT receive continuous signals from GNSS station.
5. Turn on NFC function
6. Turn on WPT 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.

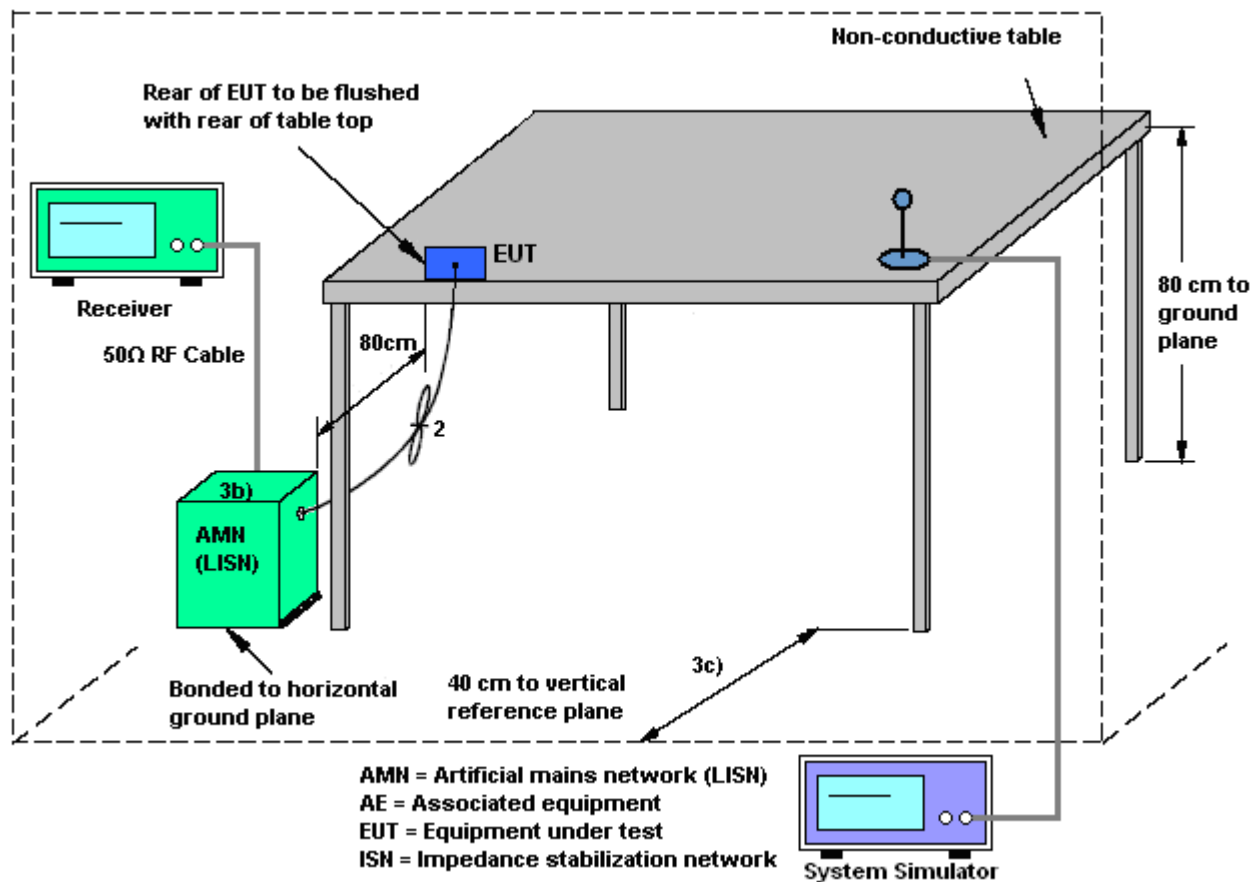
3.1.2 Measuring Instruments

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.

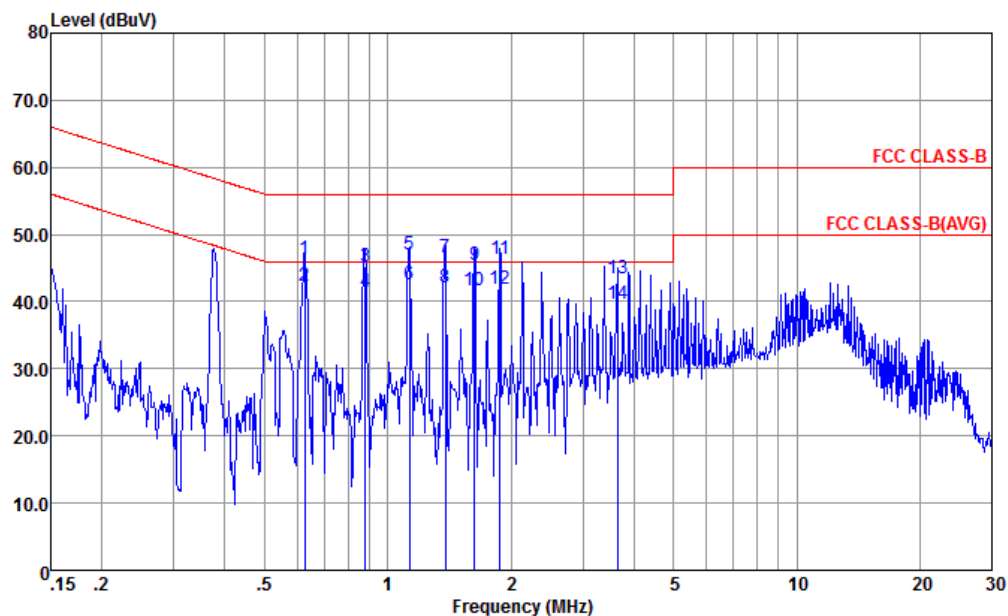
3.1.4 Test Setup





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.		

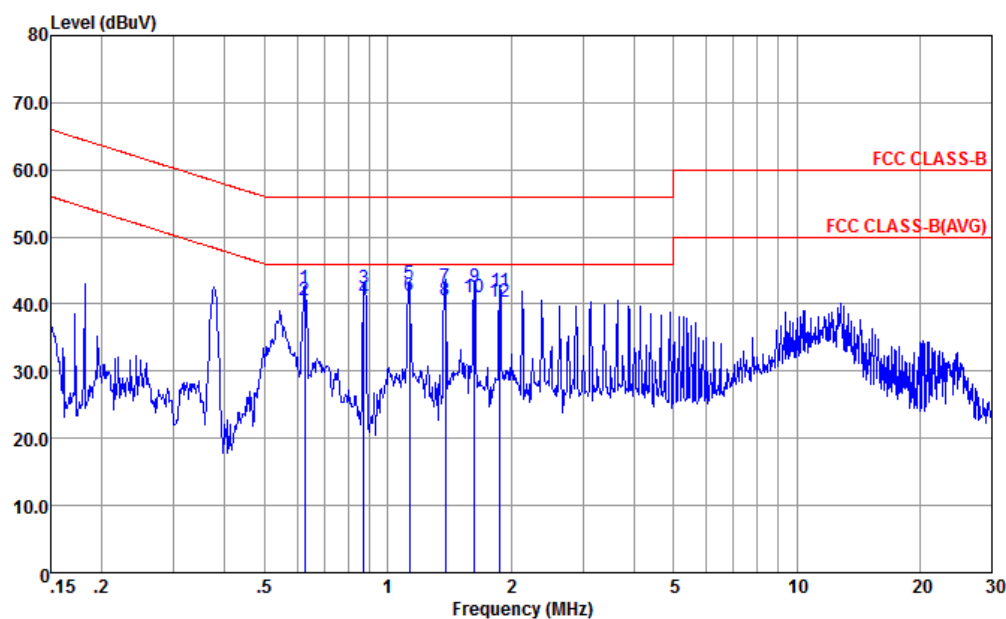


Site : CO01-KS
Condition : FCC CLASS-B LISN-060105-L LINE

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.627	46.44	-9.56	56.00	36.09	0.11	10.24	QP
2	0.627	42.24	-3.76	46.00	31.89	0.11	10.24	Average
3	0.880	45.26	-10.74	56.00	34.90	0.12	10.24	QP
4	0.880	41.46	-4.54	46.00	31.10	0.12	10.24	Average
5	1.129	46.96	-9.04	56.00	36.60	0.13	10.23	QP
6 *	1.129	42.46	-3.54	46.00	32.10	0.13	10.23	Average
7	1.381	46.57	-9.43	56.00	36.21	0.13	10.23	QP
8	1.381	42.17	-3.83	46.00	31.81	0.13	10.23	Average
9	1.628	45.47	-10.53	56.00	35.10	0.14	10.23	QP
10	1.628	41.67	-4.33	46.00	31.30	0.14	10.23	Average
11	1.878	46.27	-9.73	56.00	35.90	0.14	10.23	QP
12	1.878	41.97	-4.03	46.00	31.60	0.14	10.23	Average
13	3.642	43.51	-12.49	56.00	33.10	0.16	10.25	QP
14	3.642	39.71	-6.29	46.00	29.30	0.16	10.25	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-N NEUTRAL

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.627	42.25	-13.75	56.00	31.90	0.11	10.24	QP
2	0.627	40.55	-5.45	46.00	30.20	0.11	10.24	Average
3	0.876	42.25	-13.75	56.00	31.89	0.12	10.24	QP
4	0.876	40.85	-5.15	46.00	30.49	0.12	10.24	Average
5	1.129	42.96	-13.04	56.00	32.61	0.12	10.23	QP
6 *	1.129	41.16	-4.84	46.00	30.81	0.12	10.23	Average
7	1.381	42.46	-13.54	56.00	32.10	0.13	10.23	QP
8	1.381	40.66	-5.34	46.00	30.30	0.13	10.23	Average
9	1.628	42.66	-13.34	56.00	32.30	0.13	10.23	QP
10	1.628	40.96	-5.04	46.00	30.60	0.13	10.23	Average
11	1.878	41.97	-14.03	56.00	31.60	0.14	10.23	QP
12	1.878	40.27	-5.73	46.00	29.90	0.14	10.23	Average

Note:

- Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
- 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.

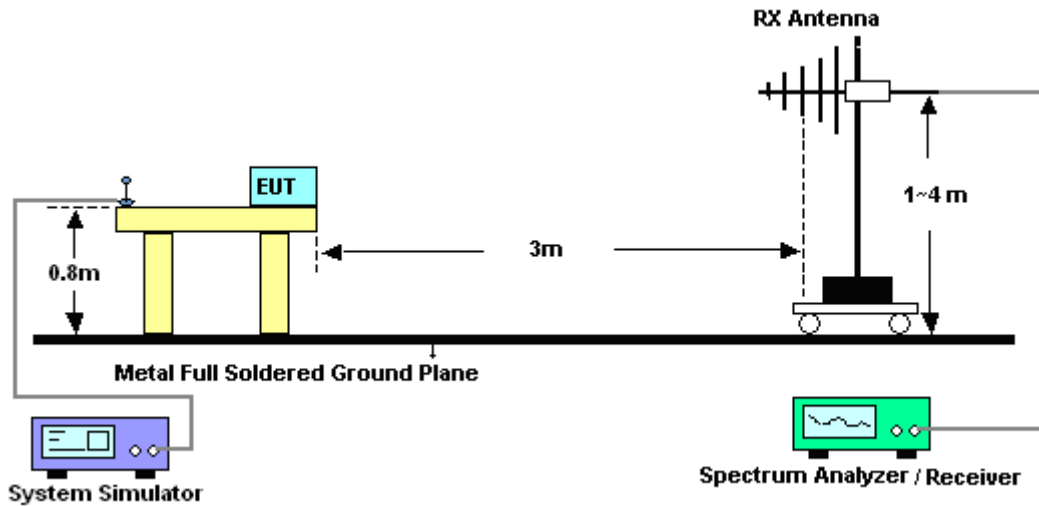
3.2.3. Test Procedures

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

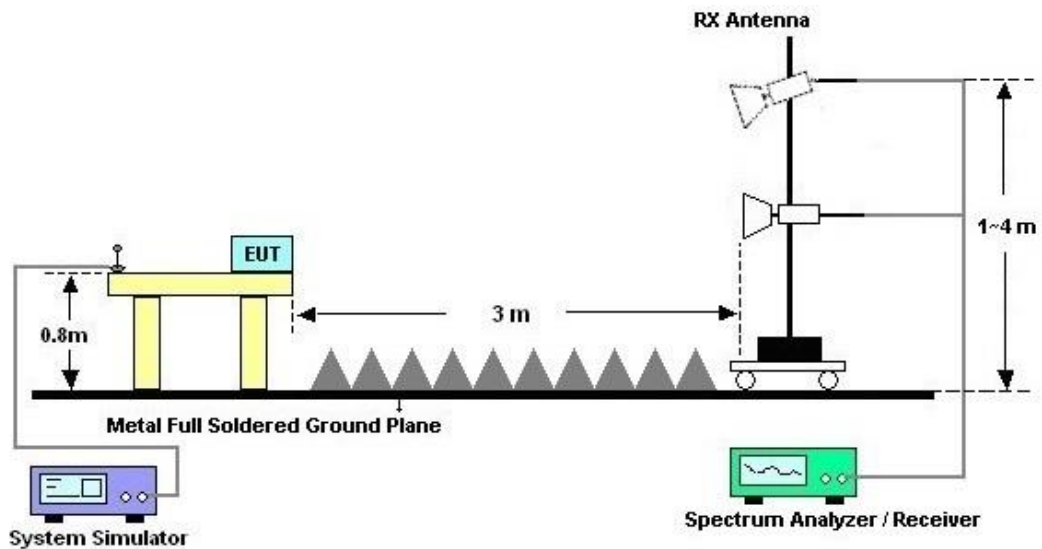
10. Exploratory radiated emissions testing of handheld and/or body-worn devices shall include rotation of the EUT through three orthogonal axes (X/Y/Z Plane) to determine the orientation (attitude) that maximizes the emissions.

3.2.4. Test Setup of Radiated Emission

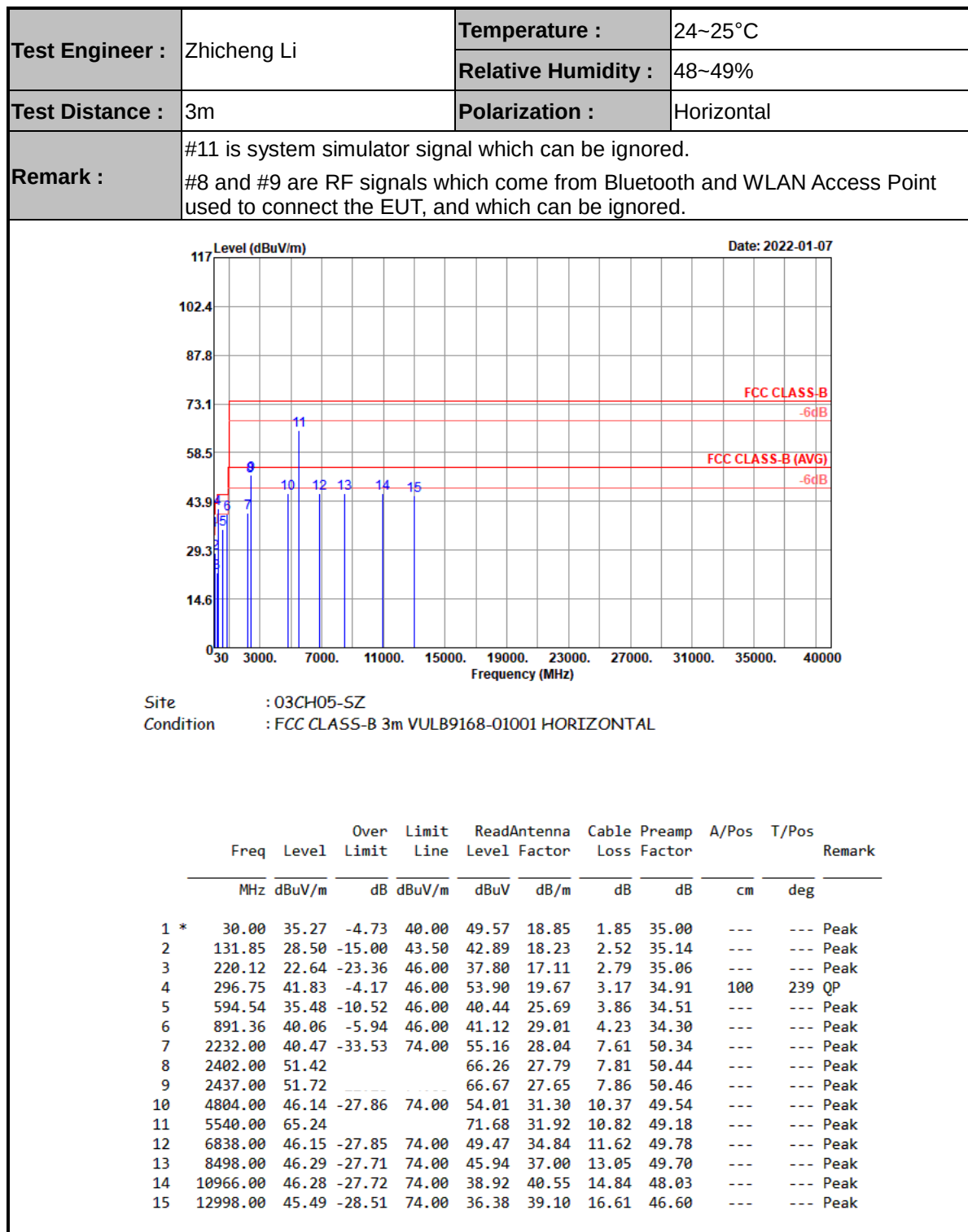
For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz

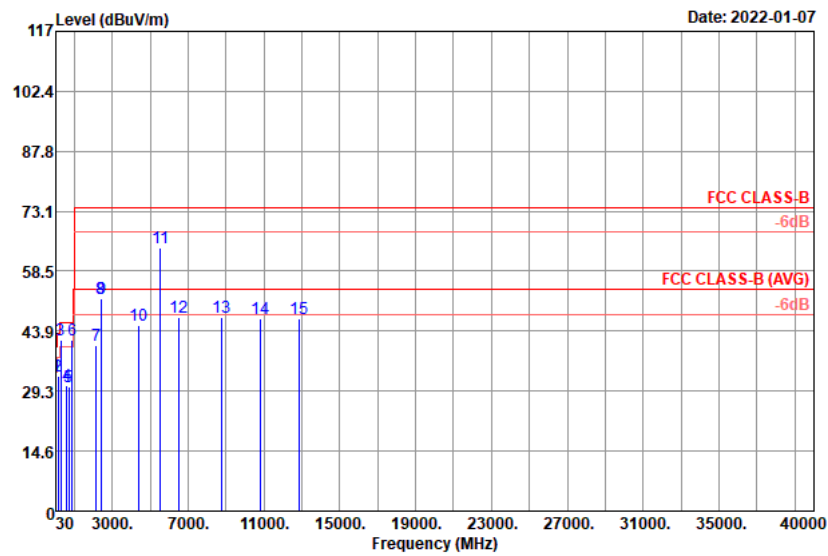


3.2.5. Test Result of Radiated Emission





Test Engineer :	Zhicheng Li	Temperature :	24~25°C
		Relative Humidity :	48~49%
Test Distance :	3m	Polarization :	Vertical
Remark :	#11 is system simulator signal which can be ignored. #8 and #9 are RF signals which come from Bluetooth and WLAN Access Point used to connect the EUT, and which can be ignored.		



Site : 03CH05-SZ
Condition : FCC CLASS-B 3m VULB9168-01001 VERTICAL

	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	34.85	33.00	-7.00	40.00	46.87	19.14	1.99	35.00	---	Peak
2	139.61	32.94	-10.56	43.50	46.48	19.05	2.53	35.12	---	Peak
3	296.75	41.69	-4.31	46.00	53.76	19.67	3.17	34.91	100	132 QP
4	596.48	30.52	-15.48	46.00	35.44	25.72	3.87	34.51	---	Peak
5	726.46	30.23	-15.77	46.00	33.45	27.28	3.95	34.45	---	Peak
6 *	891.36	41.87	-4.13	46.00	42.93	29.01	4.23	34.30	---	Peak
7	2146.00	40.41	-33.59	74.00	55.45	27.74	7.51	50.29	---	Peak
8	2402.00	51.83			66.67	27.79	7.81	50.44	---	Peak
9	2437.00	51.91			66.86	27.65	7.86	50.46	---	Peak
10	4400.00	45.46	-28.54	74.00	54.52	30.60	9.94	49.60	---	Peak
11	5540.00	64.18			70.62	31.92	10.82	49.18	---	Peak
12	6544.00	47.19	-26.81	74.00	50.67	34.20	11.33	49.01	---	Peak
13	8786.00	47.21	-26.79	74.00	46.45	37.40	12.95	49.59	---	Peak
14	10820.00	46.85	-27.15	74.00	40.59	40.35	14.05	48.14	---	Peak
15	12827.00	46.77	-27.23	74.00	38.78	38.89	15.84	46.74	---	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, 2021	Dec. 14, 2021	Apr. 20, 2022	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 17, 2021	Dec. 14, 2021	Oct. 16, 2022	Conduction (CO01-KS)
AC LISN	R&S	ENV216	100334	9kHz~30MHz	Oct. 17, 2021	Dec. 14, 2021	Oct. 16, 2022	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 17, 2021	Dec. 14, 2021	Oct. 16, 2022	Conduction (CO01-KS)
EMI Test Receiver	R&S	ESR7	102261	9kHz~7GHz	May 21, 2021	Dec. 13, 2021~Jan. 07, 2022	May 20, 2022	Radiation (03CH05-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010B	MY59071191	10Hz~44GHz	Apr. 07, 2021	Dec. 13, 2021~Jan. 07, 2022	Apr. 06, 2022	Radiation (03CH05-SZ)
Log-periodic Antenna	SCHWARZBECK	VULB 9168	01001	20MHz~1.5GHz	Mar. 25, 2021	Dec. 13, 2021~Jan. 07, 2022	Mar. 24, 2022	Radiation (03CH05-SZ)
Amplifier	EM Electronics	EM330	060756	0.01Hz~3000MHz	Apr. 07, 2021	Dec. 13, 2021~Jan. 07, 2022	Apr. 06, 2022	Radiation (03CH05-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-2206	1GHz~18GHz	Apr. 11, 2021	Dec. 13, 2021~Jan. 07, 2022	Apr. 10, 2022	Radiation (03CH05-SZ)
HF Amplifier	EM Electronics	EM01G18GA	060781	1GHz~18GHz	Apr. 07, 2021	Dec. 13, 2021~Jan. 07, 2022	Apr. 06, 2022	Radiation (03CH05-SZ)
HF Amplifier	EM Electronics	EM18G40G	060778	18GHz~40GHz	Apr. 07, 2021	Dec. 13, 2021~Jan. 07, 2022	Apr. 06, 2022	Radiation (03CH05-SZ)
Horn Antenna	SCHWARZBECK	BBHA9170	00983	15GHz~40GHz	Apr. 11, 2021	Dec. 13, 2021~Jan. 07, 2022	Apr. 10, 2022	Radiation (03CH05-SZ)
AC Power Source	APC	AFV-S-600	F119050013	N/A	NCR	Dec. 13, 2021~Jan. 07, 2022	NCR	Radiation (03CH05-SZ)
Turn Table	EMEC	T-200-S-1	060925-T	0~360 degree	NCR	Dec. 13, 2021~Jan. 07, 2022	NCR	Radiation (03CH05-SZ)
Antenna Mast	EMEC	MBS-400-1	060927	1 m~4 m	NCR	Dec. 13, 2021~Jan. 07, 2022	NCR	Radiation (03CH05-SZ)

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% ($U = 2Uc(y)$)	2.94dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.2dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.1dB
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