



# FCC RF Test Report

APPLICANT : Motorola Mobility LLC  
EQUIPMENT : Mobile Cellular Phone  
BRAND NAME : Motorola  
MODEL NAME : XT2451-1, XT2451-2  
FCC ID : IHDT56AP9  
STANDARD : FCC Part 15 Subpart C §15.209  
CLASSIFICATION : (DCD) Part 15 Low Power Transmitter Below 1705 kHz  
TEST DATE(S) : Mar. 15, 2024 ~ Apr. 03, 2024

We, Sporton International Inc. (Shenzhen), would like to declare that the tested sample has been evaluated in accordance with the test procedures 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. (Shenzhen), the test report shall not be reproduced except in full.

Jason Jia

Approved by: Jason Jia



**Sporton International Inc. (ShenZhen)**

**1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055**

**People's Republic of China**



## Table of Contents

<b>History of this test report.....</b>	<b>3</b>
<b>Summary of Test Result.....</b>	<b>4</b>
<b>1 General Description .....</b>	<b>5</b>
1.1 Applicant.....	5
1.2 Manufacturer .....	5
1.3 Product Feature of Equipment Under Test .....	5
1.4 Modification of EUT .....	5
1.5 Test Location .....	6
1.6 Test Software .....	6
1.7 Applied Standards .....	6
1.8 Specification of Accessory .....	7
<b>2 Test Configuration of Equipment Under Test .....</b>	<b>8</b>
2.1 Test Mode .....	8
2.2 Connection Diagram of Test System .....	8
2.3 Support Unit used in test configuration and system .....	9
<b>3 Test Result .....</b>	<b>10</b>
3.1 20dB and 99% Occupied Bandwidth Measurement .....	10
3.2 Radiated Emission Measurement .....	12
3.3 AC Conducted Emission Measurement .....	20
3.4 Antenna Requirements.....	24
<b>4 List of Measuring Equipment.....</b>	<b>25</b>
<b>5 Measurement Uncertainty .....</b>	<b>26</b>
<b>Appendix A. Setup Photographs</b>	



## History of this test report

Report No.	Version	Description	Issued Date
FR420703E	01	Initial issue of report	Apr. 12, 2024

## Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	2.1049	20dB Bandwidth	Reporting Only	-
3.1	2.1049	99% Occupied Bandwidth	Reporting Only	-
3.2	15.209	Radiated Emission	Pass	Under limit 17.71 dB at 801.15 MHz
3.3	15.207	AC Conducted Emission	Pass	Under limit 10.69 dB at 0.60 MHz
3.4	15.203	Antenna Requirements	Pass	-

**Conformity Assessment Condition:**

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section "Measurement Uncertainty"

**Disclaimer:**

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.



# 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	XT2451-1, XT2451-2
FCC ID	IHDT56AP9
IMEI Code	Conducted: 350431590015296&350431590015304 Conduction: 350431590015254/350431590015262 Radiation: 350431590015254/350431590015262
HW Version	DVT2
SW Version	U3UX34.16
WPT Frequency Range	115kHz ~ 145kHz
WPT Type of Modulation	ASK
WPT Antenna Type	Loop Antenna
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. The two model names are only for market segment, no other difference.

## 1.4 Modification of EUT

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

## 1.5 Test Location

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

<b>Test Firm</b>	Sporton International Inc. (ShenZhen)		
<b>Test Site Location</b>	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
<b>Test Site No.</b>	<b>Sporton Site No.</b>	<b>FCC Designation No.</b>	<b>FCC Test Firm Registration No.</b>
	CO01-SZ TH01-SZ	CN1256	421272

<b>Test Firm</b>	Sporton International Inc. (ShenZhen)		
<b>Test Site Location</b>	101, 1st Floor, Block B, Building 1, No. 2, Tengfeng 4th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen City, Guangdong Province 518103 People's Republic of China TEL: +86-755-86066985		
<b>Test Site No.</b>	<b>Sporton Site No.</b>	<b>FCC Designation No.</b>	<b>FCC Test Firm Registration No.</b>
	03CH05-SZ	CN1256	421272

## 1.6 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH05-SZ	AUDIX	E3	6.2009-8-24
2.	CO01-SZ	AUDIX	E3	6.120613b

## 1.7 Applied Standards

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

- ♦ FCC Part 15 Subpart C §15.209, §15.207
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01.
- ♦ ANSI C63.10-2013

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



## 1.8 Specification of Accessory

Specification of Accessory				
Battery 1	Brand Name	Motorola(ATL)	Model Name	QR10
Battery 2	Brand Name	Motorola(ATL)	Model Name	QR30
USB Cable 1	Brand Name	Motorola(SAIBAO)	Model Name	SC18D86731
USB Cable 2	Brand Name	Motorola(Luxshare)	Model Name	SC18E08103

## 2 Test Configuration of Equipment Under Test

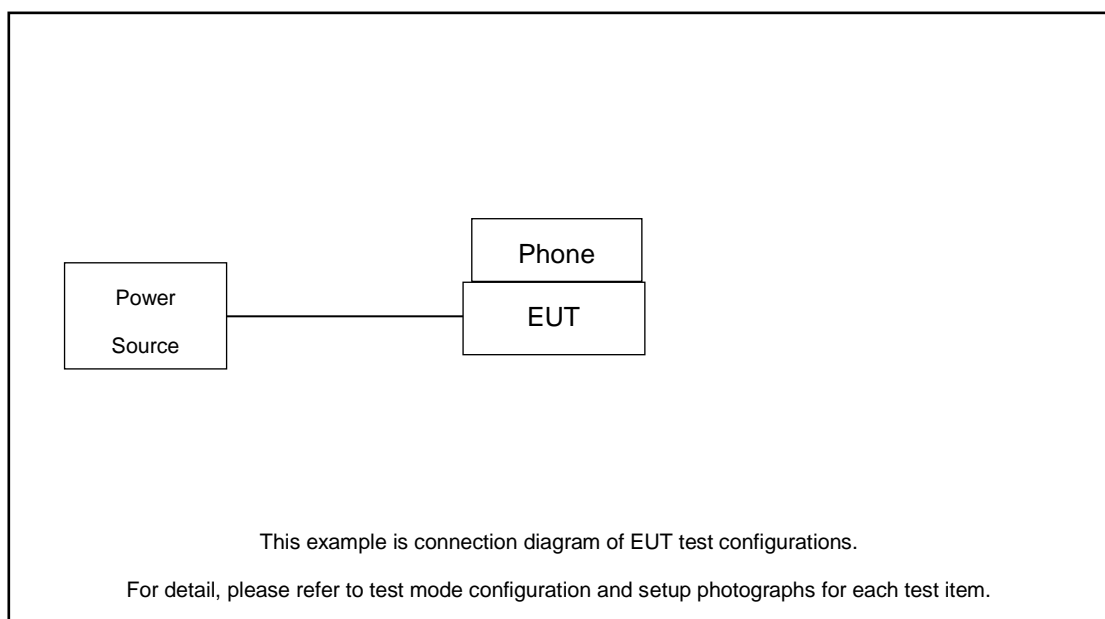
### 2.1 Test Mode

- a. The EUT has been associated with peripherals 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 (9 kHz to the 1000 MHz).
- b. AC power line Conducted Emission was tested under maximum output power.

Test Items	Function Type
<b>AC Conducted Emission</b>	Mode 1 : Wireless Charging (Reverse charge the other phone) + USB Cable 1 (Charging from Adapter)
<b>RF Conducted / Radiated Emission</b>	Mode 1 : Wireless Charging (Reverse charge the other phone)

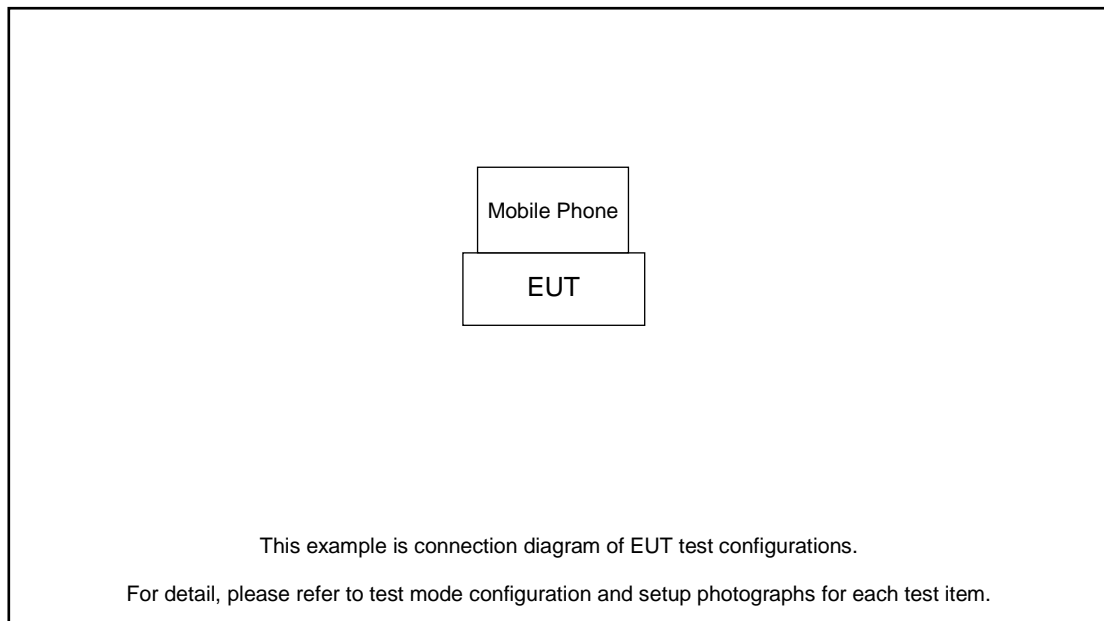
### 2.2 Connection Diagram of Test System

For Conducted Emission:





For Radiated Emission:



## 2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Mobile Phone	Moto	N/A	N/A	N/A	N/A
2.	AC Adapter	Moto	N/A	N/A	N/A	N/A

### 3 Test Result

#### 3.1 20dB and 99% Occupied Bandwidth Measurement

##### 3.1.1 Limit of 20dB and 99% Occupied Bandwidth

Reporting only, 99% OBW shall not located within 15.205 restricted bands.

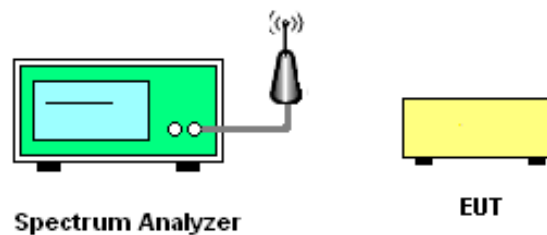
##### 3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

##### 3.1.3 Test Procedures

1. The 20dB bandwidth is measured with a spectrum analyzer connected via a receiver antenna placed near the EUT while wirelessly charging a charging board.
2. Use the following spectrum analyzer settings for 99 % Bandwidth measurement.
3. Measure and record the results in the test report.

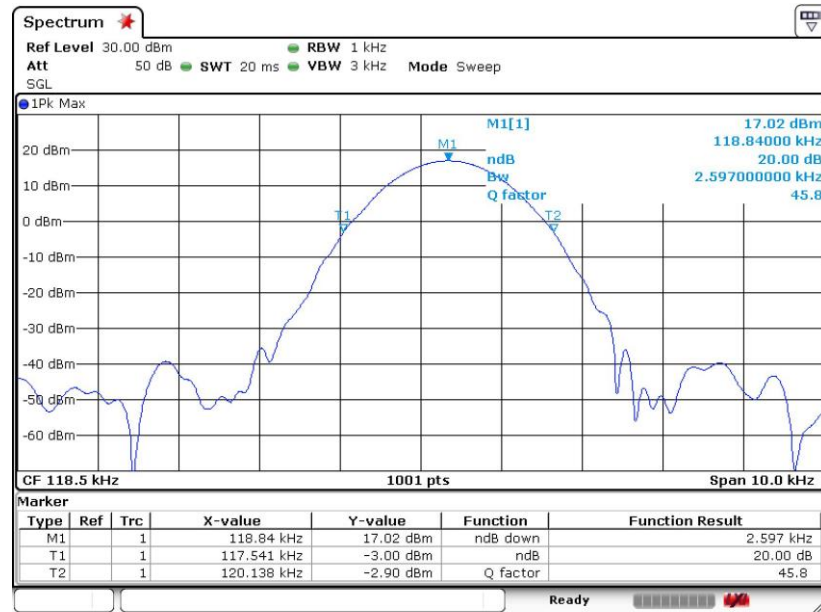
##### 3.1.4 Test Setup





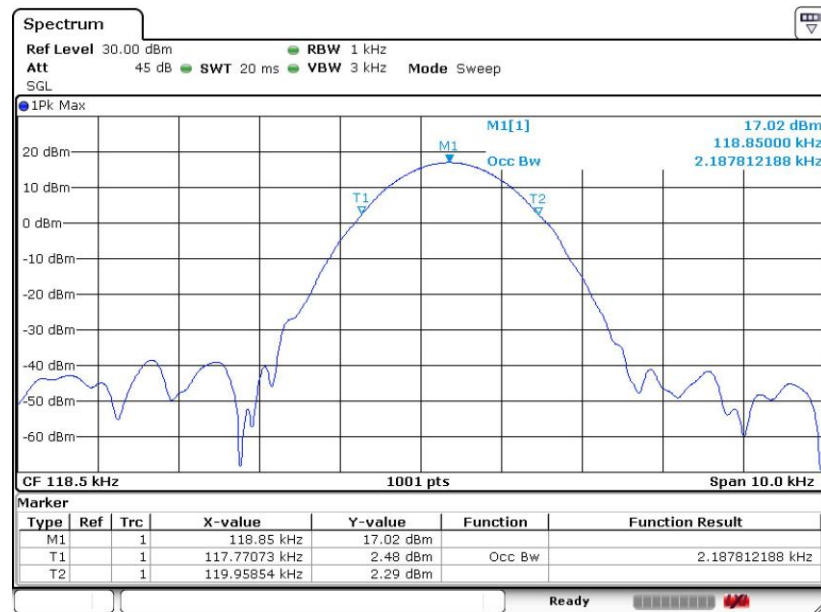
## 3.1.5 Test Result of 20dB and 99% Bandwidth

## 20 dB Bandwidth Plot



Date: 15.MAR.2024 09:13:31

## 99% Occupied Bandwidth Plot



Date: 15.MAR.2024 09:13:07

## 3.2 Radiated Emission Measurement

### 3.2.1 Limit of Radiated Emission

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

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

Receiver Parameter	Setting
Frequency Range: 9kHz~150kHz	RBW 200Hz for QP
Frequency Range: 150kHz~30MHz	RBW 9kHz for QP
Frequency Range: 30MHz~1000MHz	RBW 120kHz for Peak

**Note:** The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

For radiated emissions from 9kHz to 1GHz test distance is 3m

For 9kHz ~ 30MHz

1. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
2. Distance extrapolation factor =  $40 \log (\text{specific distance} / \text{test distance})$  (dB);
3. specific line (dB $\mu$ V/m) =  $20 \log$  Emission level ( $\mu$ V/m)
4. Limit line = specific limits (dB $\mu$ V/m) + distance extrapolation factor.

### 3.2.2 Measuring Instruments

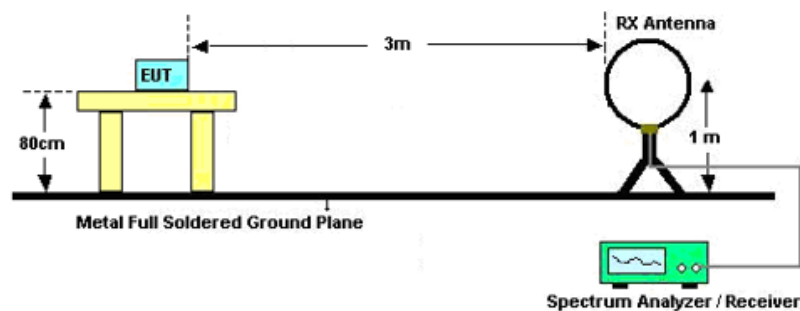
See list of measuring equipment of this test report.

### 3.2.3 Measuring Instrument Setting

Follow the guidelines in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.

### 3.2.4 Test Setup of Radiated Emission

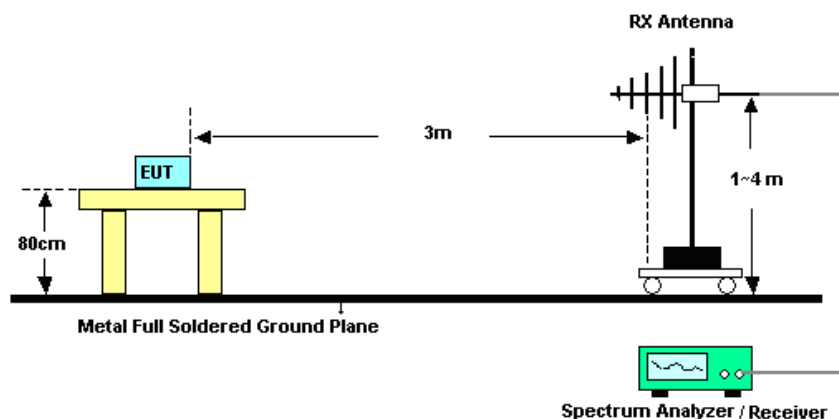
**For radiated emissions below 30MHz**



**Note:**

1. There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.
2. Tested for radiated below 30 MHz using a loop antenna in accordance with C63.10, the antenna was positioned in three antenna orientations: horizontal, vertical, and ground-parallel three polarization's, the worst case is horizontal & vertical polarization, test data of two mode was reported.

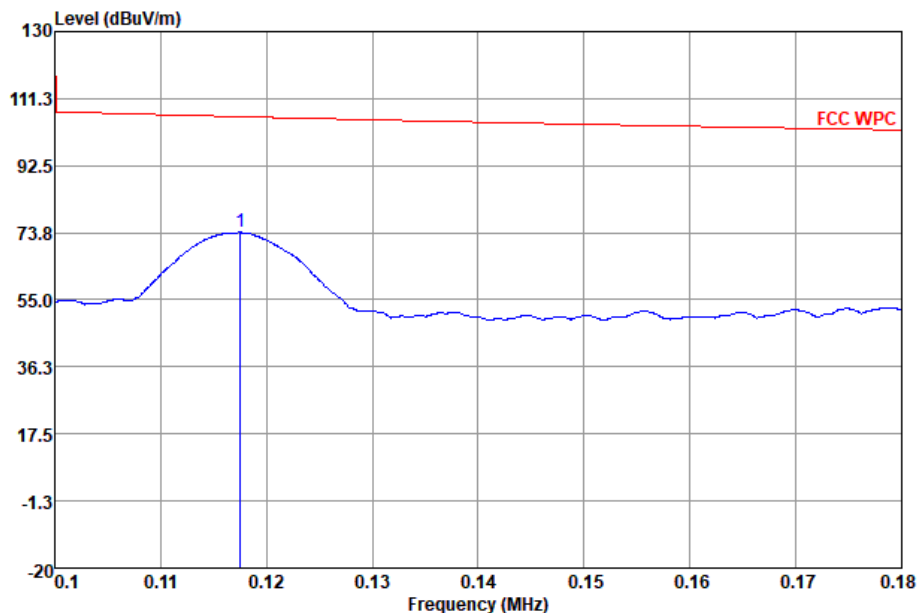
**For radiated emissions above 30MHz**





## 3.2.5 Test Result of Fundamental Emission

Test Engineer :	TaoZhang	Temperature :	22~25°C
Polarization :	Horizontal	Relative Humidity :	48~52%

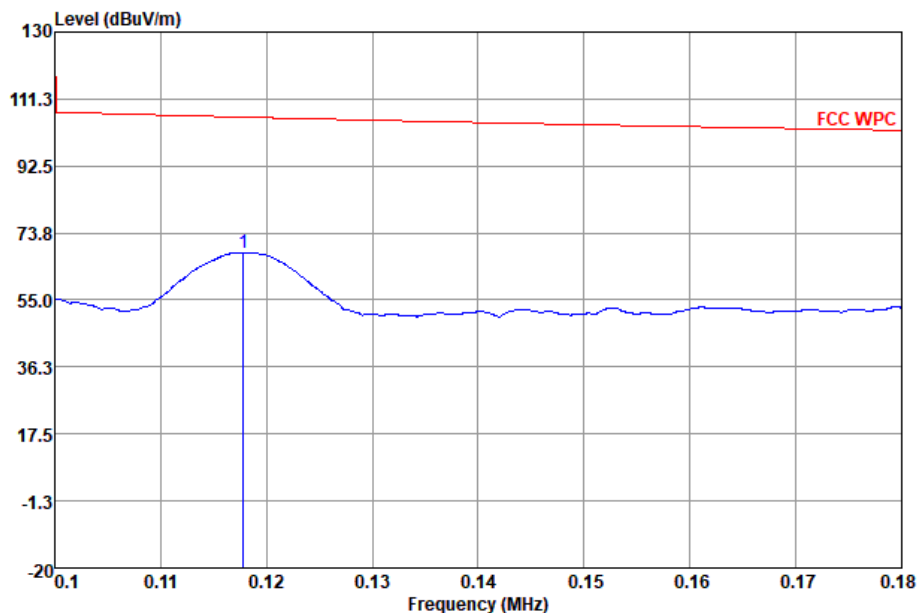


Site : 03CH05-SZ  
Condition : FCC WPC 3m LOOP ANTENNA - 3164 HORIZONTAL

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg	
1	0.12	73.84	-32.36	106.20	53.40	20.40	0.04	---	---	Average



Test Engineer :	TaoZhang	Temperature :	22~25°C
Polarization :	Vertical	Relative Humidity :	48~52%



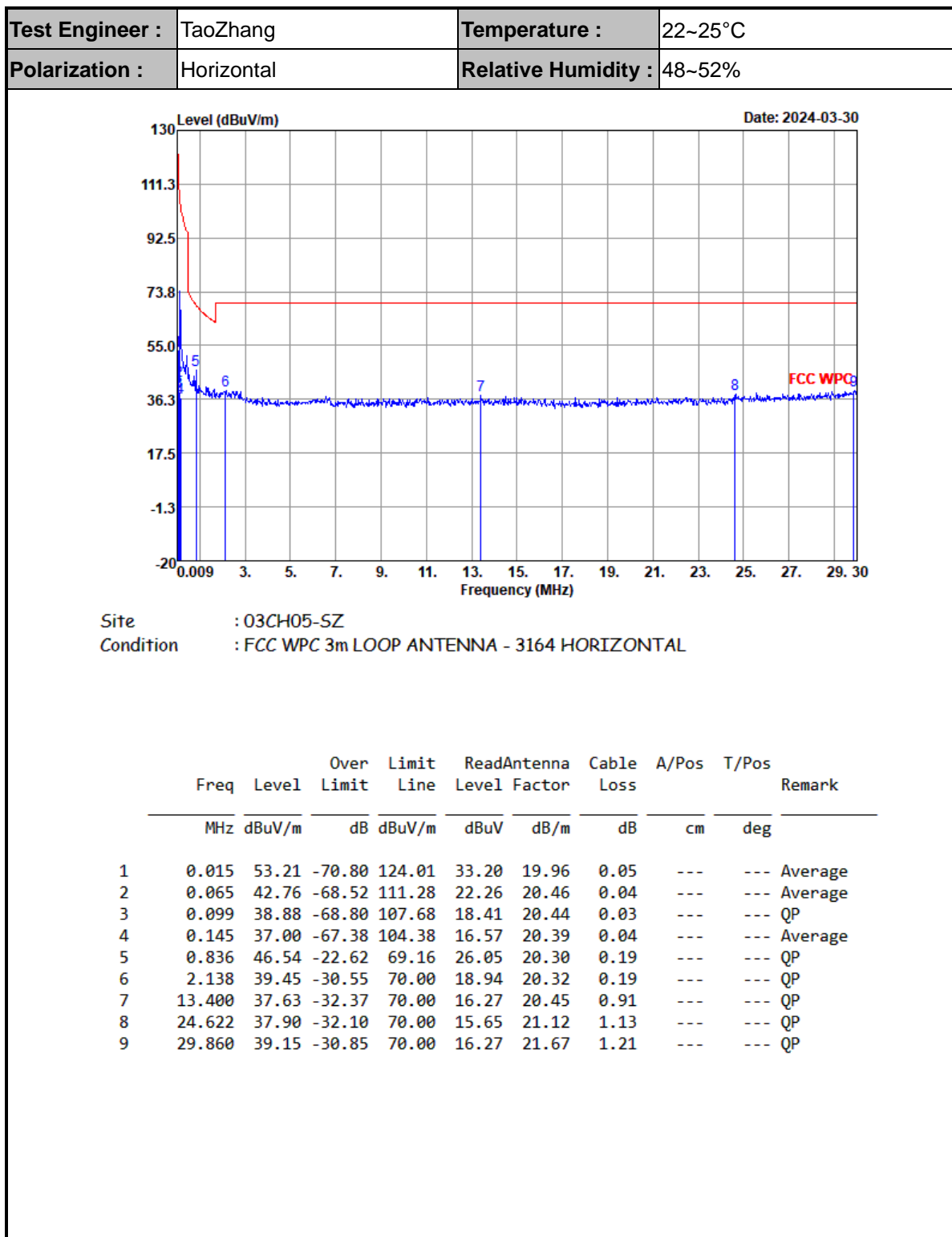
Site : 03CH05-SZ

Condition : FCC WPC 3m LOOP ANTENNA - 3164 VERTICAL

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg	
1	0.12	68.33	-37.85	106.18	47.89	20.40	0.04	---	---	Average



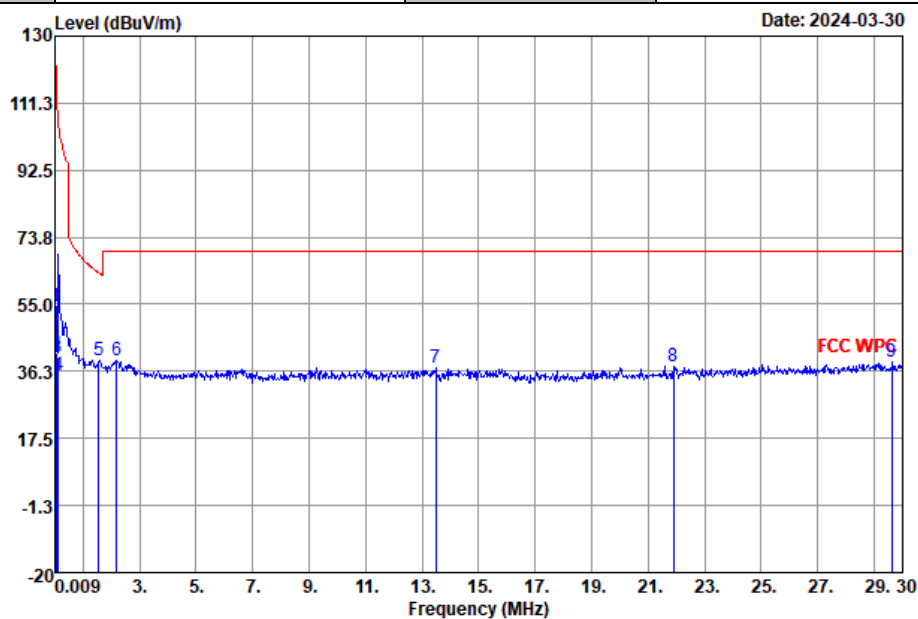
## 3.2.6 Test Result of Radiated Emission (9kHz ~ 30MHz)







Test Engineer :	TaoZhang	Temperature :	22~25°C
Polarization :	Vertical	Relative Humidity :	48~52%

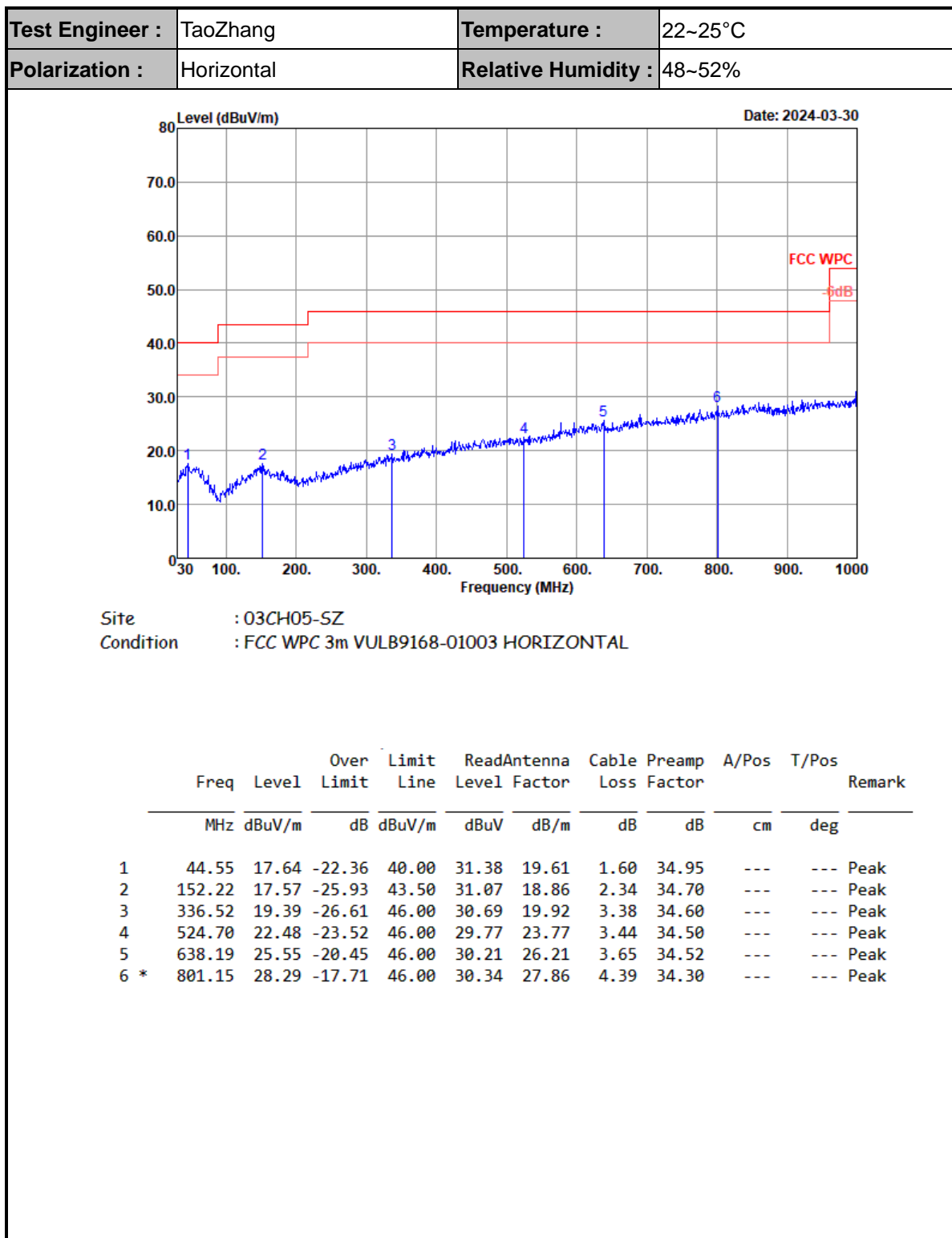


Site : 03CH05-SZ  
Condition : FCC WPC 3m LOOP ANTENNA - 3164 VERTICAL

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	cm	deg
1	0.010	54.53	-73.42	127.95	34.52	19.96	0.05	---	Average
2	0.060	41.51	-70.52	112.03	21.01	20.46	0.04	---	Average
3	0.098	40.03	-67.72	107.75	19.56	20.44	0.03	---	QP
4	0.121	35.29	-70.64	105.93	14.85	20.40	0.04	---	Average
5	1.567	39.17	-24.53	63.70	18.64	20.32	0.21	---	QP
6	2.198	39.23	-30.77	70.00	18.73	20.31	0.19	---	QP
7	13.472	37.35	-32.65	70.00	15.99	20.45	0.91	---	QP
8	21.886	37.70	-32.30	70.00	15.77	20.85	1.08	---	QP
9	29.615	38.97	-31.03	70.00	16.12	21.65	1.20	---	QP

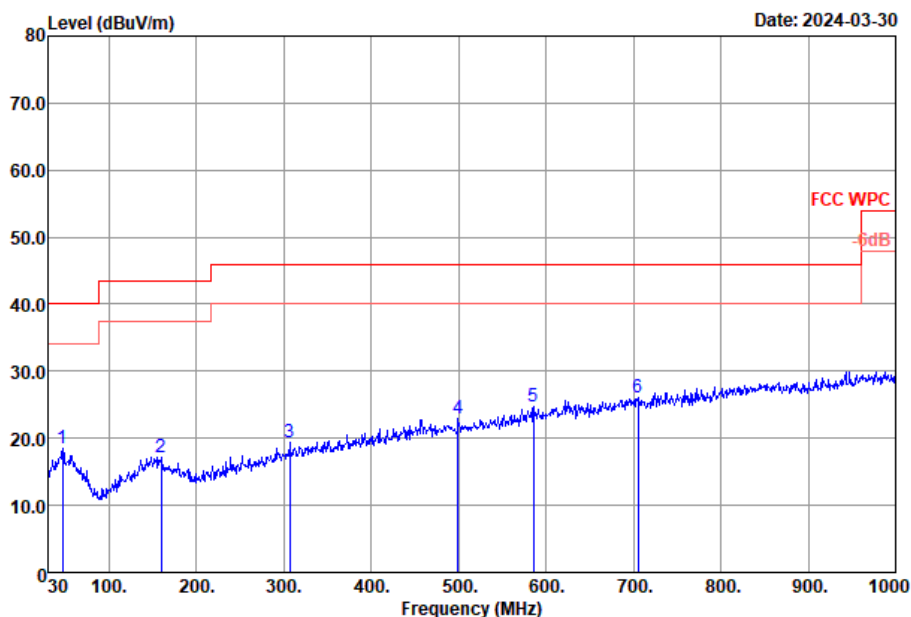


## 3.2.7 Test Result of Radiated Emission (30MHz ~ 1000MHz)





Test Engineer :	TaoZhang	Temperature :	22~25°C
Polarization :	Vertical	Relative Humidity :	48~52%



Site : 03CH05-SZ  
Condition : FCC WPC 3m VULB9168-01003 VERTICAL

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Cable Preamp	A/Pos	T/Pos		
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	46.49	18.44	-21.56	40.00	32.17	19.62	1.61	34.96	---	---
2	159.98	17.20	-26.30	43.50	31.13	18.39	2.38	34.70	---	---
3	306.45	19.35	-26.65	46.00	31.44	19.27	3.24	34.60	---	---
4	499.48	22.97	-23.03	46.00	30.74	23.35	3.38	34.50	---	---
5	585.81	24.67	-21.33	46.00	30.14	25.54	3.56	34.57	---	---
6 *	705.12	26.11	-19.89	46.00	29.62	27.15	3.74	34.40	---	---
										Peak
										Peak
										Peak
										Peak
										Peak
										Peak

### 3.3 AC Conducted Emission Measurement

#### 3.3.1 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.

Frequency of Emission (MHz)	Conducted Limit (dB $\mu$ V)	
	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.

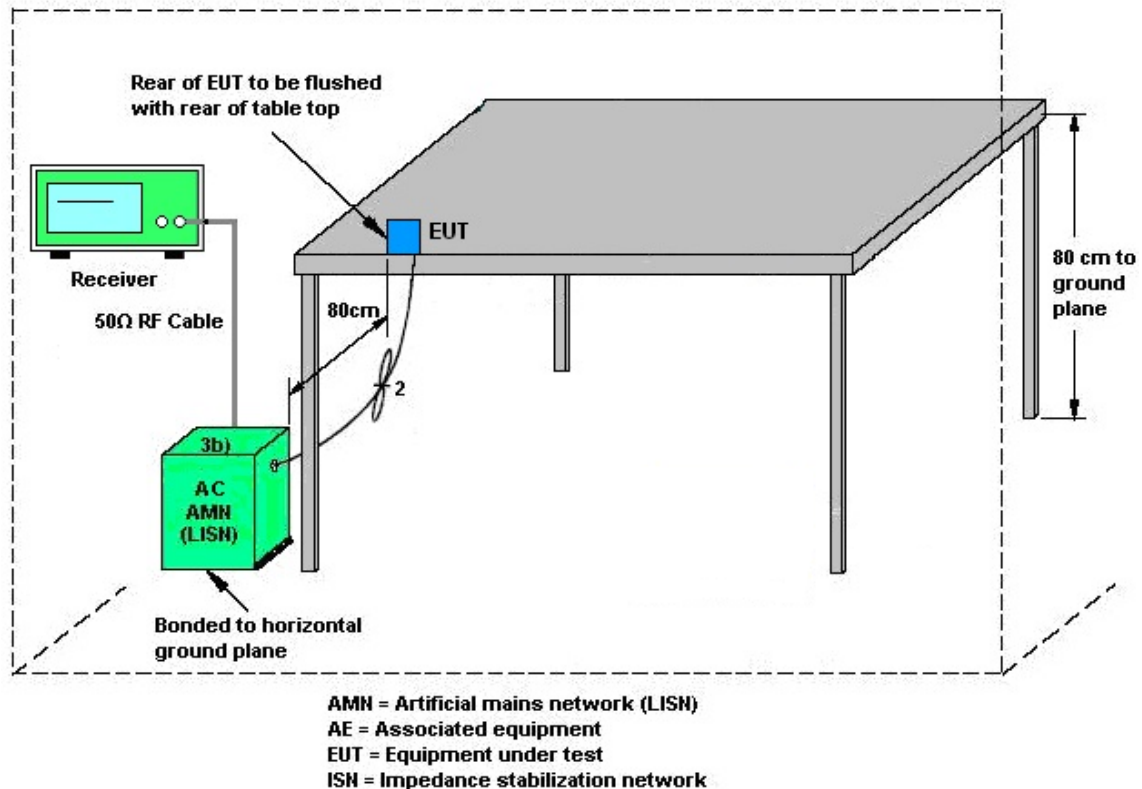
#### 3.3.2 Measuring Instruments

See list of measuring equipment of this test report.

#### 3.3.3 Test Procedure

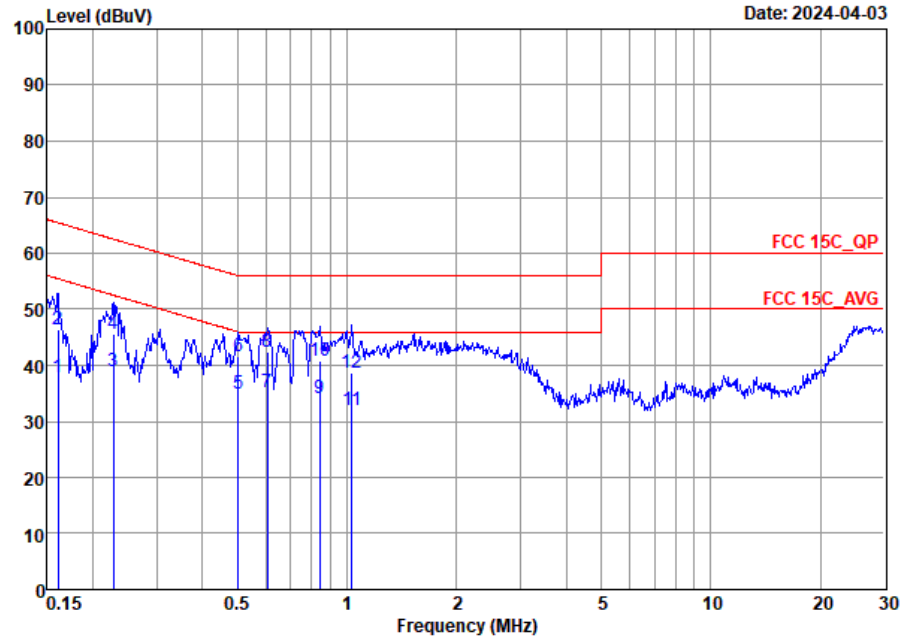
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
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.

### 3.3.4 Test Setup



### 3.3.5 Test Result of AC Conducted Emission

Test Engineer :	FangMing Liang	Temperature :	22~24°C
		Relative Humidity :	44~50%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		

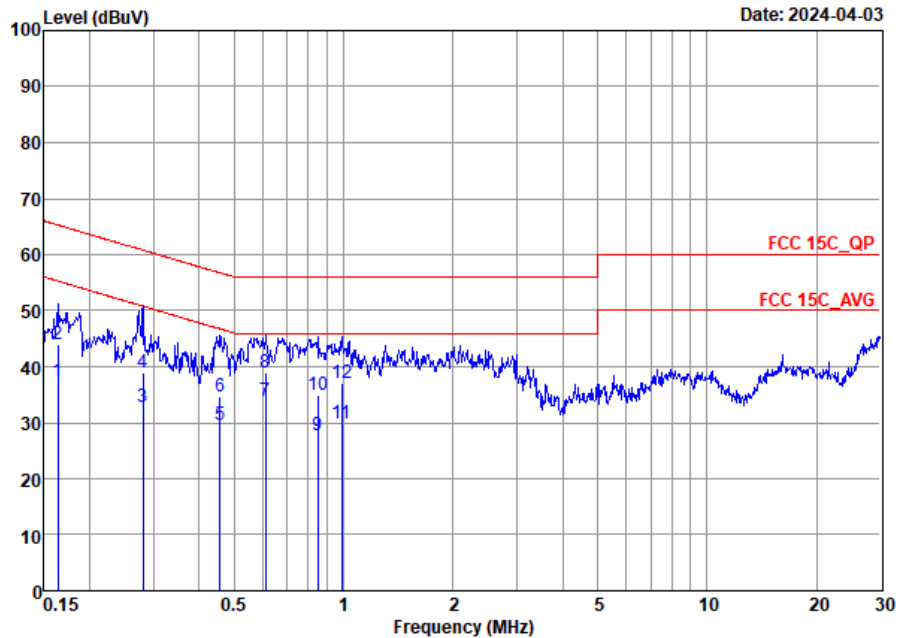


Site : CO01-SZ  
Condition: FCC 15C\_QP AC LISN 100063\_L LINE

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.16	37.94	-17.49	55.43	17.50	10.30	10.14	Average
2	0.16	46.44	-18.99	65.43	26.00	10.30	10.14	QP
3	0.23	39.03	-13.49	52.52	18.60	10.28	10.15	Average
4	0.23	45.73	-16.79	62.52	25.30	10.28	10.15	QP
5	0.50	35.02	-10.98	46.00	14.60	10.26	10.16	Average
6	0.50	41.52	-14.48	56.00	21.10	10.26	10.16	QP
7 *	0.60	35.31	-10.69	46.00	15.00	10.15	10.16	Average
8	0.60	42.31	-13.69	56.00	22.00	10.15	10.16	QP
9	0.84	34.07	-11.93	46.00	13.60	10.31	10.16	Average
10	0.84	40.87	-15.13	56.00	20.40	10.31	10.16	QP
11	1.03	32.10	-13.90	46.00	11.71	10.23	10.16	Average
12	1.03	38.70	-17.30	56.00	18.31	10.23	10.16	QP



<b>Test Engineer :</b>	FangMing Liang	<b>Temperature :</b>	22~24°C
		<b>Relative Humidity :</b>	44~50%
<b>Test Voltage :</b>	120Vac / 60Hz	<b>Phase :</b>	Neutral
<b>Remark :</b>	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ  
Condition: FCC 15C\_QP AC LISN 100063\_N NEUTRAL

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.16	37.32	-17.98	55.30	16.80	10.38	10.14	Average
2	0.16	43.92	-21.38	65.30	23.40	10.38	10.14	QP
3	0.28	32.81	-18.00	50.81	12.30	10.36	10.15	Average
4	0.28	39.01	-21.80	60.81	18.50	10.36	10.15	QP
5	0.46	29.60	-17.16	46.76	9.39	10.05	10.16	Average
6	0.46	34.70	-22.06	56.76	14.49	10.05	10.16	QP
7 *	0.61	33.83	-12.17	46.00	13.50	10.17	10.16	Average
8	0.61	38.93	-17.07	56.00	18.60	10.17	10.16	QP
9	0.85	27.77	-18.23	46.00	7.30	10.31	10.16	Average
10	0.85	34.97	-21.03	56.00	14.50	10.31	10.16	QP
11	0.99	29.80	-16.20	46.00	9.40	10.24	10.16	Average
12	0.99	37.20	-18.80	56.00	16.80	10.24	10.16	QP

Note:

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



### **3.4 Antenna Requirements**

#### **3.4.1 Standard Applicable**

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited.

The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

#### **3.4.2 Antenna Anti-Replacement Construction**

An embedded-in antenna design is used.





## 4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver	R&S	ESR7	102261	9kHz~7GHz	Apr. 04, 2023	Mar. 30, 2024	Apr. 03, 2024	Radiation (03CH05-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010B	MY59071191	10Hz~44GHz	Apr. 04, 2023	Mar. 30, 2024	Apr. 03, 2024	Radiation (03CH05-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jul. 28, 2022	Mar. 30, 2024	Jul. 27, 2024	Radiation (03CH05-SZ)
Log-periodic Antenna	SCHWARZBECK	VULB 9168	01001	20MHz~1.5GHz	Jul. 08, 2023	Mar. 30, 2024	Jul. 07, 2024	Radiation (03CH05-SZ)
Amplifier	EM Electronics	EM330	060756	0.01Hz ~3000MHz	Apr. 04, 2023	Mar. 30, 2024	Apr. 03, 2024	Radiation (03CH05-SZ)
AC Power Source	APC	AFV-S-600	F119050013	N/A	Oct. 18, 2023	Mar. 30, 2024	Oct. 17, 2024	Radiation (03CH05-SZ)
Turn Table	EMEC	T-200-S-1	060925-T	0~360 degree	NCR	Mar. 30, 2024	NCR	Radiation (03CH05-SZ)
Antenna Mast	EMEC	MBS-400-1	060927	1 m~4 m	NCR	Mar. 30, 2024	NCR	Radiation (03CH05-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Jul. 06, 2023	Apr. 03, 2024	Jul. 05, 2024	Conduction (CO01-SZ)
AC LISN	R&S	ENV216	100063	9kHz~30MHz	Aug. 21, 2023	Apr. 03, 2024	Aug. 20, 2024	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Oct. 16, 2023	Apr. 03, 2024	Oct. 15, 2024	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	6160200008 91	100Vac~250Vac	Jul. 07, 2023	Apr. 03, 2024	Jul. 06, 2024	Conduction (CO01-SZ)
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 06, 2023	Mar. 15, 2024	Apr. 05, 2024	Conducted (TH01-SZ)
Thermo meter	Anymetre	JR593	#7	- 10°C ~ 50°C 10%RH~99%RH	Apr. 08, 2023	Mar. 15, 2024	Apr. 07, 2024	Conducted (TH01-SZ)

NCR: No Calibration Required



## 5 Measurement Uncertainty

### Uncertainty of Conducted Measurement

Test Item	Uncertainty
Occupied Channel Bandwidth	$\pm 0.012$ MHz

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2U_c(y)$ )	2.5dB
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### Uncertainty of Radiated Emission Measurement (9 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2U_c(y)$ )	2.5dB
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2U_c(y)$ )	4.2dB
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