



FCC RF Test Report

APPLICANT : Motorola Mobility LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
MODEL NAME : XT2241-2
FCC ID : IHDT56AF6
STANDARD : FCC Part 15 Subpart C §15.209
CLASSIFICATION : (DCD) Part 15 Low Power Transmitter Below 1705 kHz
TEST DATE(S) : Jun. 16, 2022 ~ Jun. 29, 2022

We, Sporton International Inc. (Kunshan), 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. (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**



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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 13.12 dB at 889.420 MHz
3.3	15.207	AC Conducted Emission	Pass	Under limit 7.21 dB at 0.150 MHz
3.4	15.203	Antenna Requirements	Pass	-

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	XT2241-2
FCC ID	IHDT56AF6
IMEI Code	Conducted: 355222700019475/355222700019483 Conduction: 355222700014153/355222700014161 Radiation: 355222700013494/355222700013502
HW Version	DVT2
SW Version	SSQ32.54
WPT Frequency Range	113 ~ 148kHz
WPT Type of Modulation	ASK
WPT Antenna Type	Coil Antenna
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 Modification of EUT

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



1.5 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 03CH02-KS TH01-KS	CN1257	314309

1.6 Test Software

Item	Site	Manufacture	Name	Version
1.	03CH02-KS	AUDIX	E3	6.2009-8-24a
2.	CO01-KS	AUDIX	E3	6.2009-8-24

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				
AC Adapter (US)	Brand Name	Motorola (AOHAI)	Model Name	MC-1251
AC Adapter (EU)	Brand Name	Motorola (AOHAI)	Model Name	MC-1252
AC Adapter (UK)	Brand Name	Motorola (AOHAI)	Model Name	MC-1253
AC Adapter (IN)	Brand Name	Motorola (AOHAI)	Model Name	MC-1254
AC Adapter (AU)	Brand Name	Motorola (AOHAI)	Model Name	MC-1255
AC Adapter (AR)	Brand Name	Motorola (AOHAI)	Model Name	MC-1256
AC Adapter (BR)	Brand Name	Motorola (AOHAI)	Model Name	MC-1257
AC Adapter (CHILE)	Brand Name	Motorola (AOHAI)	Model Name	MC-1259
Battery	Brand Name	Motorola(ATL)	Model Name	NF45
Earphone 1	Brand Name	Motorola (Lyand)	Model Name	MD211
Earphone 2	Brand Name	Motorola (LCHSE)	Model Name	MD211
USB Cable	Brand Name	Motorola(Saibao)	Model Name	SC18D58980
Wireless Charging dock	Marketing Name	Turbo Power 50W Wireless Charging Stand	Model Name	MW-02

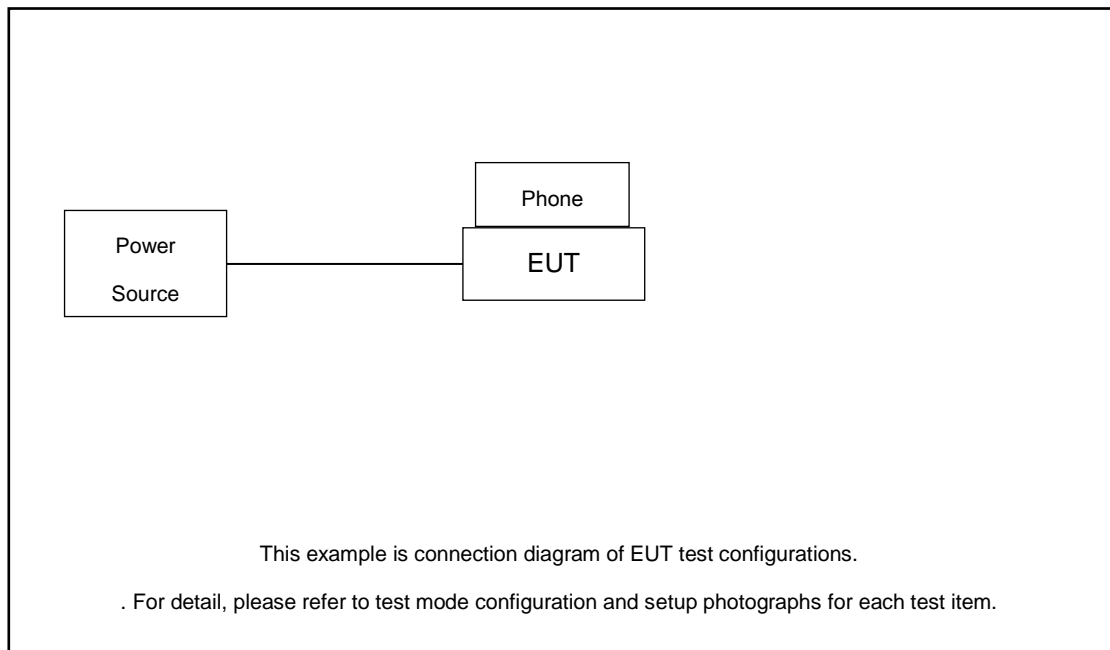
2 Test Configuration of Equipment Under Test

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
AC Conducted Emission	Mode 1 : Wireless Charging(Reverse charging for other phone)
RF Conducted / Radiated Emission	Mode 1 : Wireless Charging(Reverse charging for other phone) at Low Frequency Mode 2 : Wireless Charging(Reverse charging for other phone) at Mid Frequency Mode 3 : Wireless Charging(Reverse charging for other phone) at High Frequency
Remark: For RSE, only the worst case of mode 1 is reported.	

2.2 Connection Diagram of Test System



2.3 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Phone	Motorola	XT2241-2	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

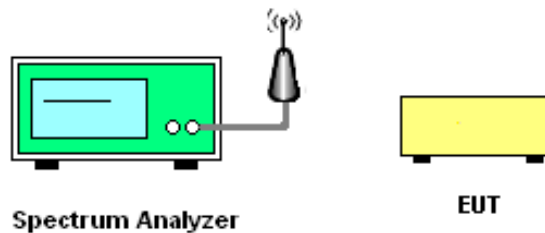
3.1.2 Measuring Instruments

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

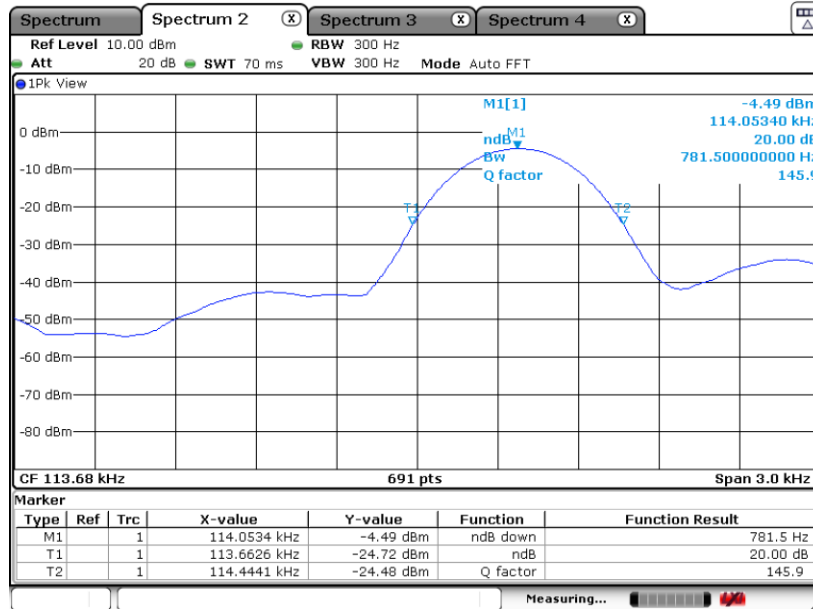




3.1.5 Test Result of 20dB and 99% Bandwidth

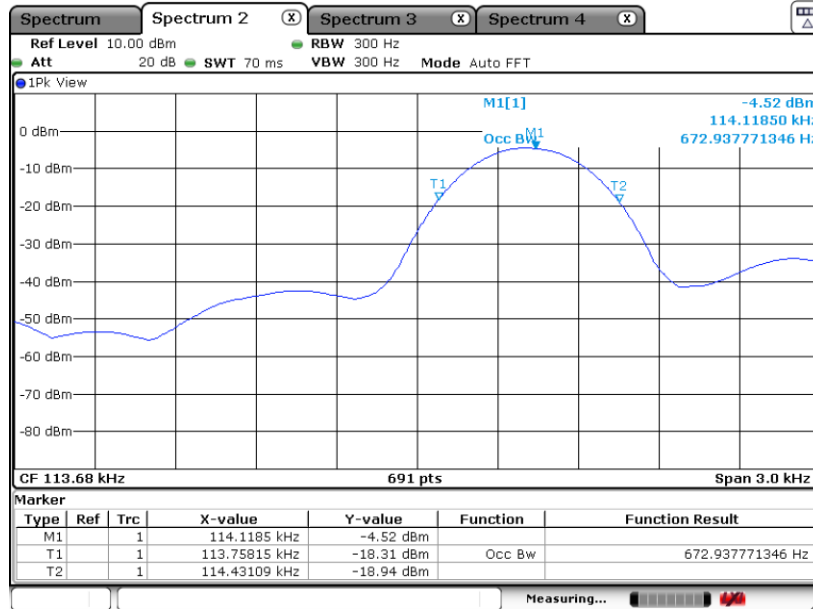
Mode 1 (Low Frequency)

20 dB Bandwidth Plot



Date: 16.JUN.2022 09:25:55

99% Occupied Bandwidth Plot

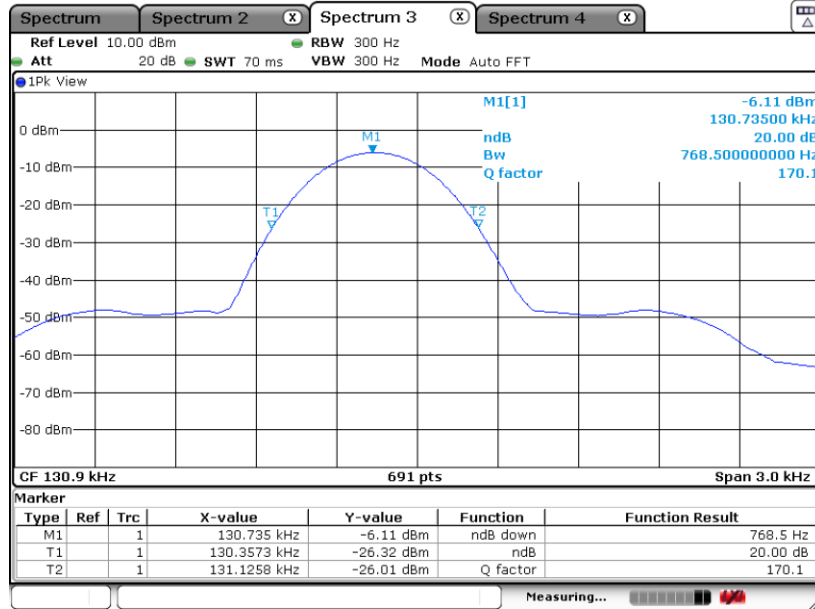


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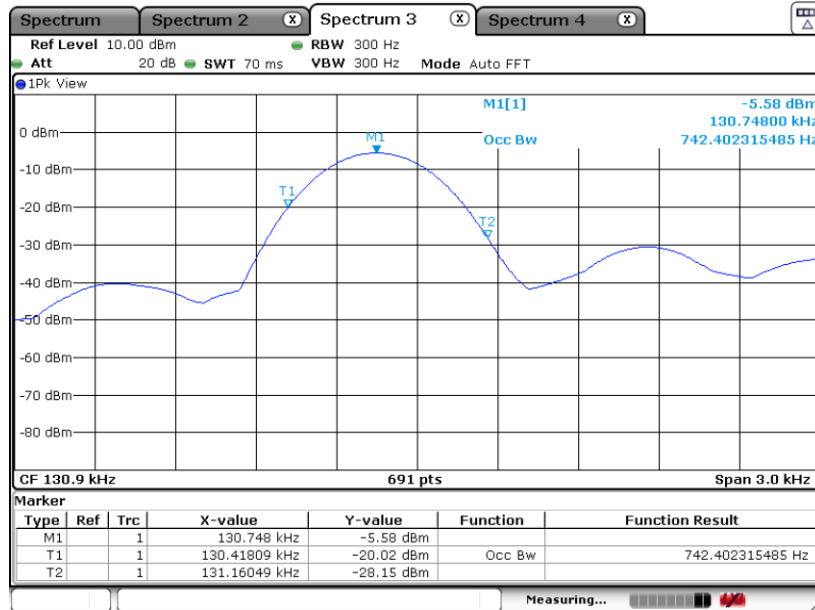
Mode 2 (Mid Frequency)

20 dB Bandwidth Plot



Date: 16.JUN.2022 09:28:28

99% Occupied Bandwidth Plot

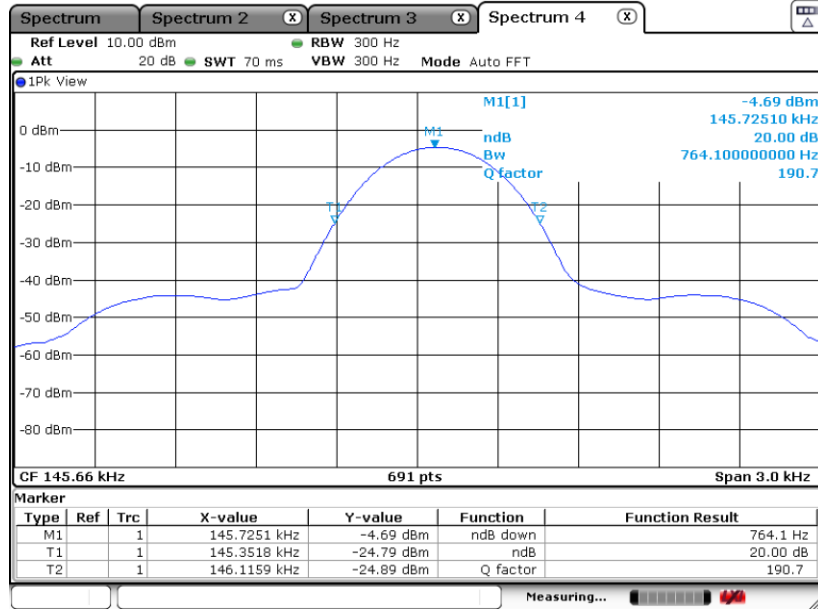


Date: 16.JUN.2022 09:29:03



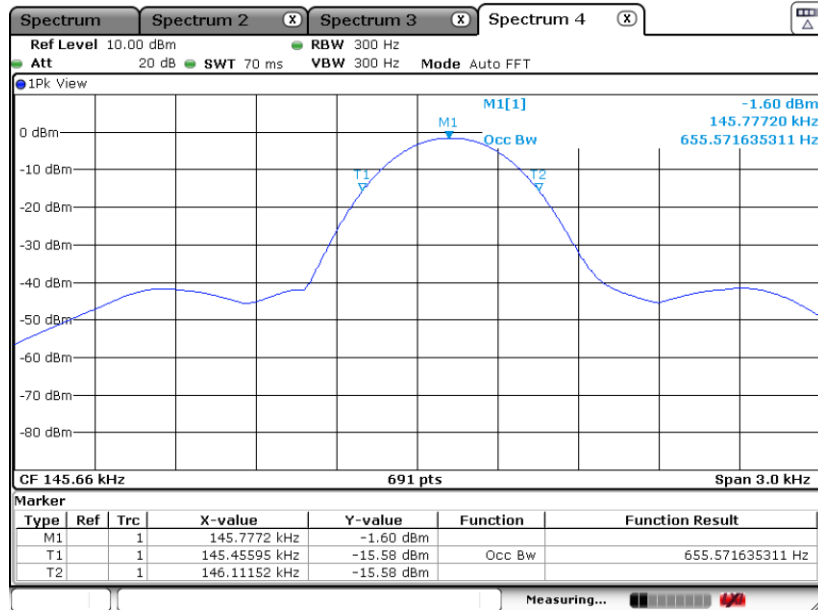
Mode 3 (High Frequency)

20 dB Bandwidth Plot



Date: 16.JUN.2022 09:34:37

99% Occupied Bandwidth Plot



Date: 16.JUN.2022 09:37:45



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 (specific distance / test distance) (dB);
3. specific line (dBµV/m) = 20 log Emission level (µV/m)
4. Limit line = specific limits (dBµV/m) + distance extrapolation factor.

3.2.2 Measuring Instruments

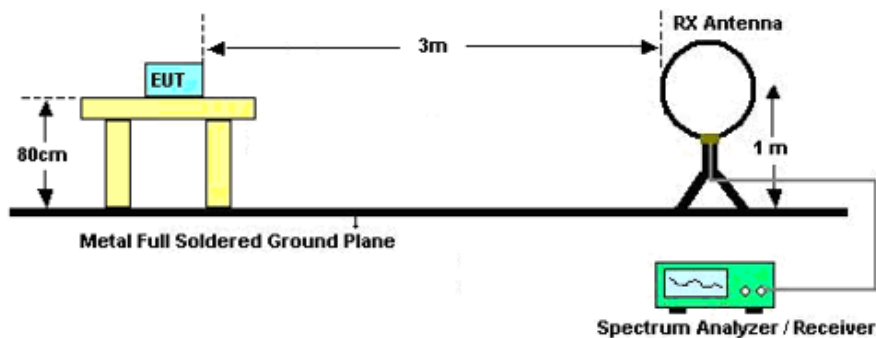
See list of measuring equipment of this test report.

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.

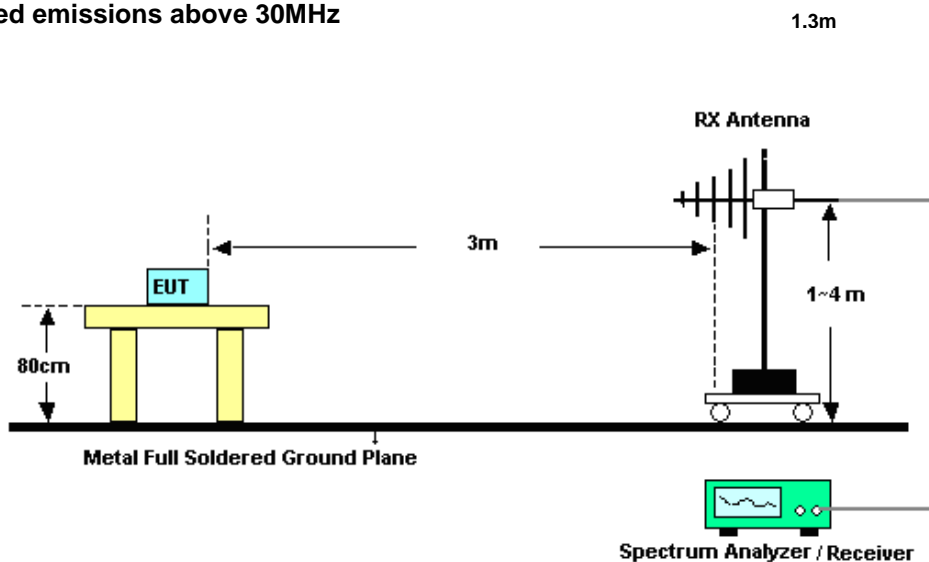
3.2.4 Test Setup of Radiated Emission

For radiated emissions below 30MHz



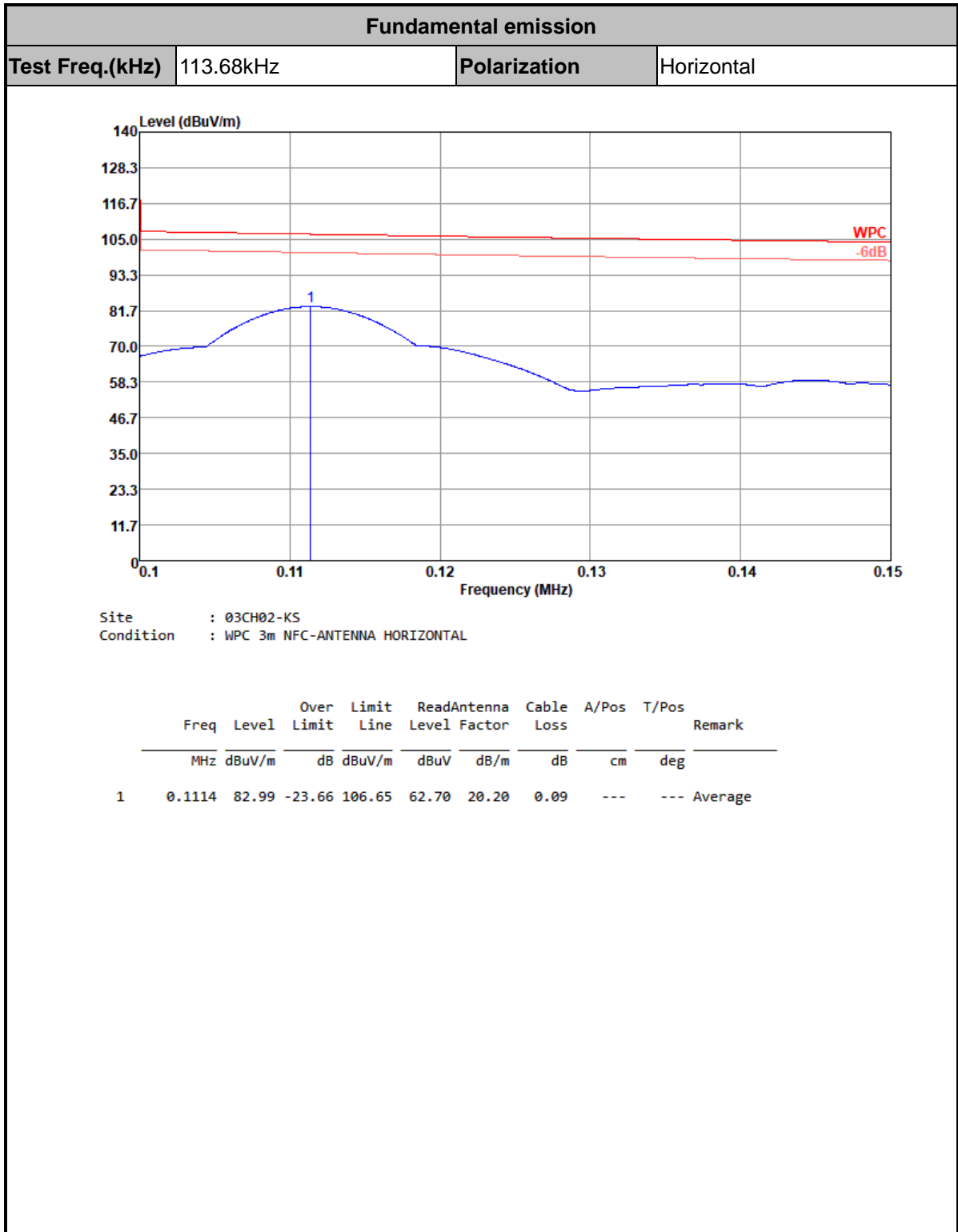
Note: There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

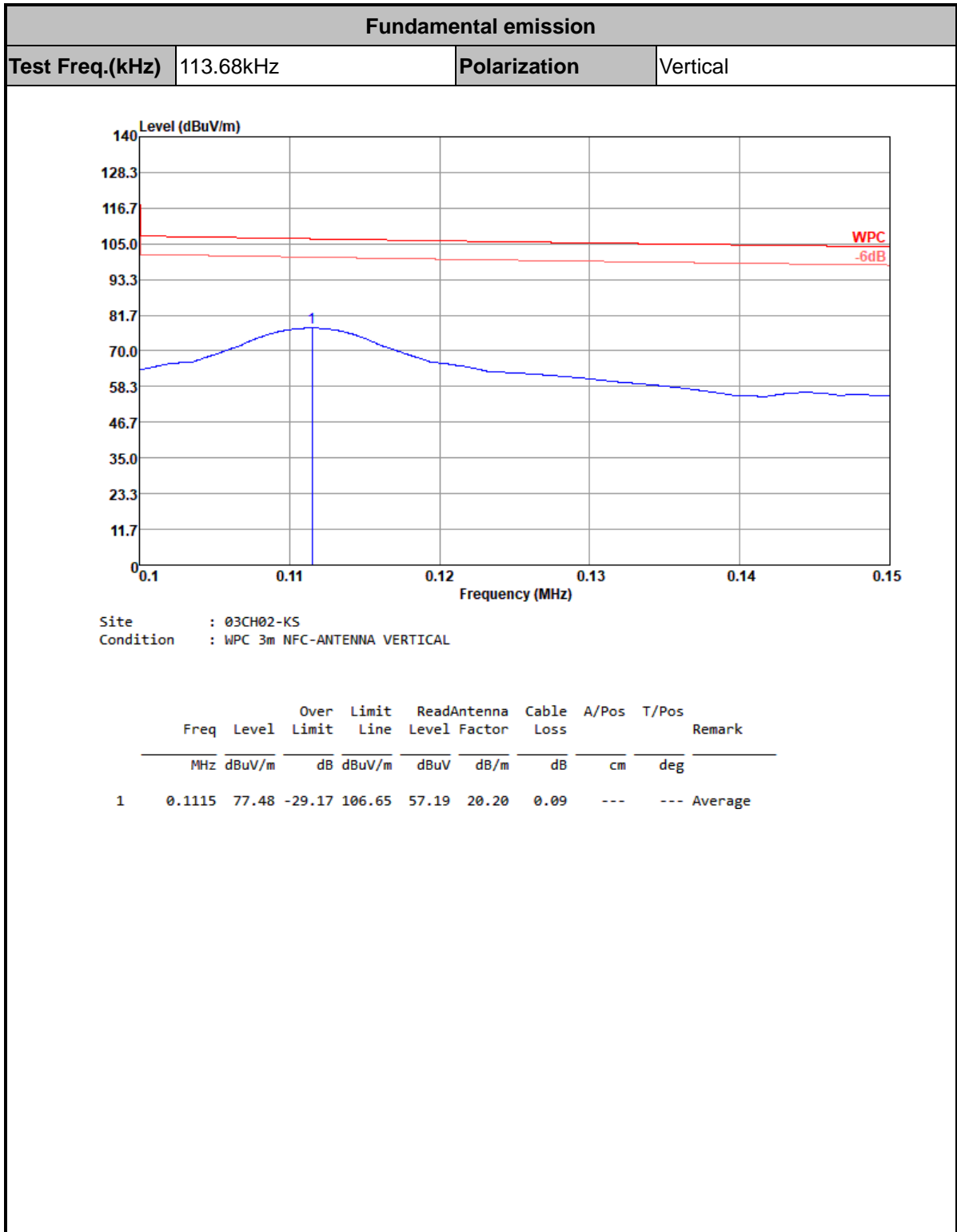
For radiated emissions above 30MHz

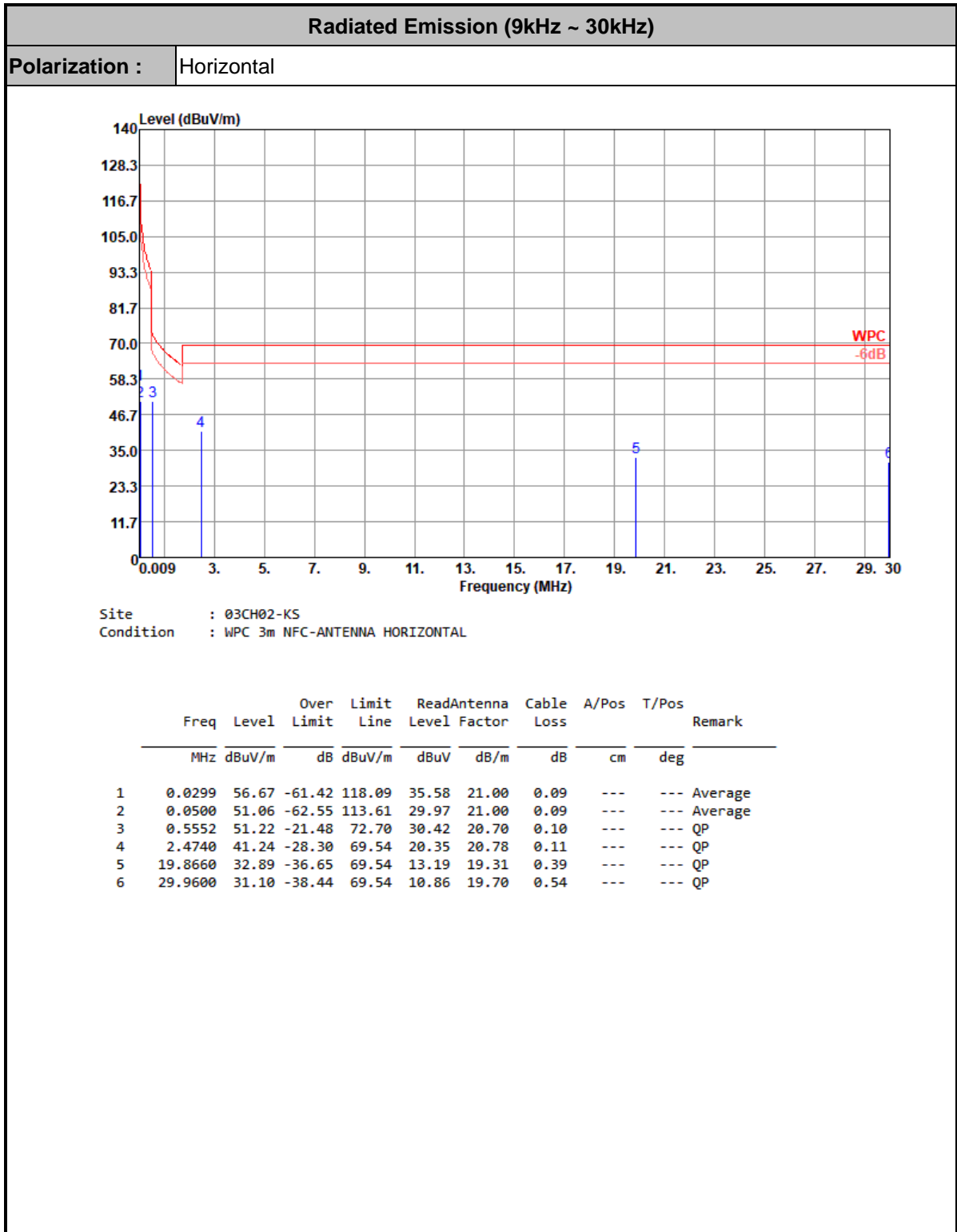


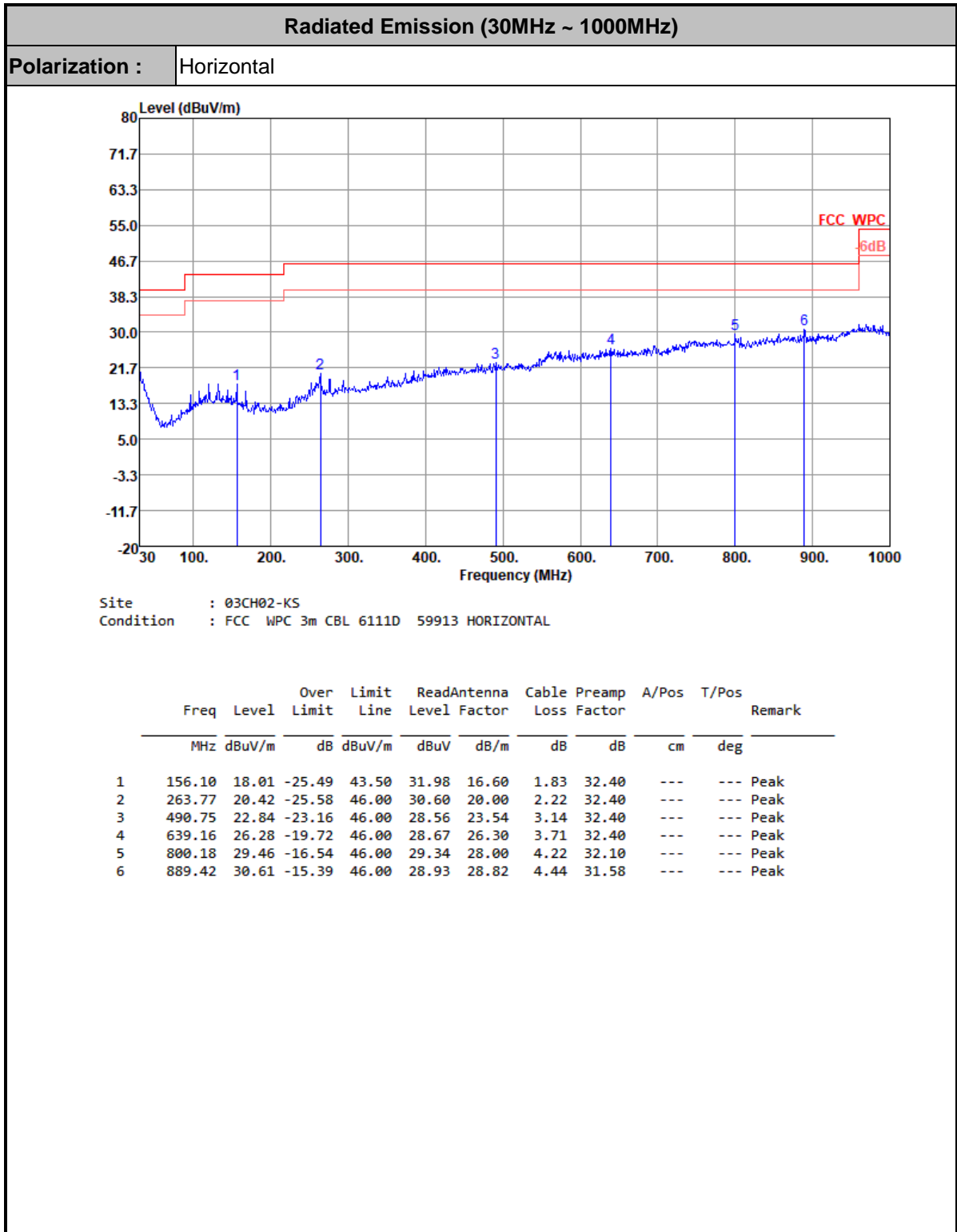


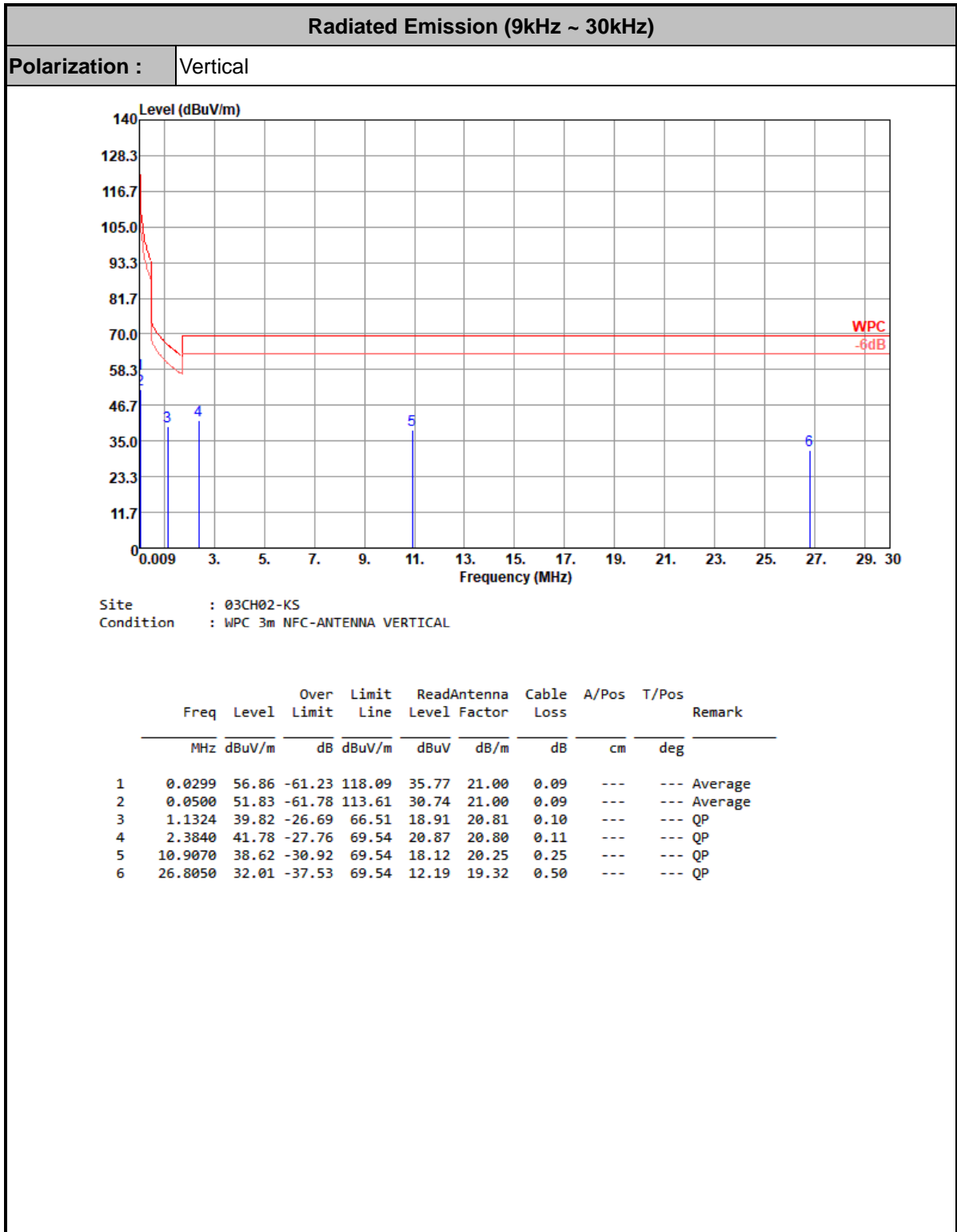
3.2.5 Test Result of Radiated Emission

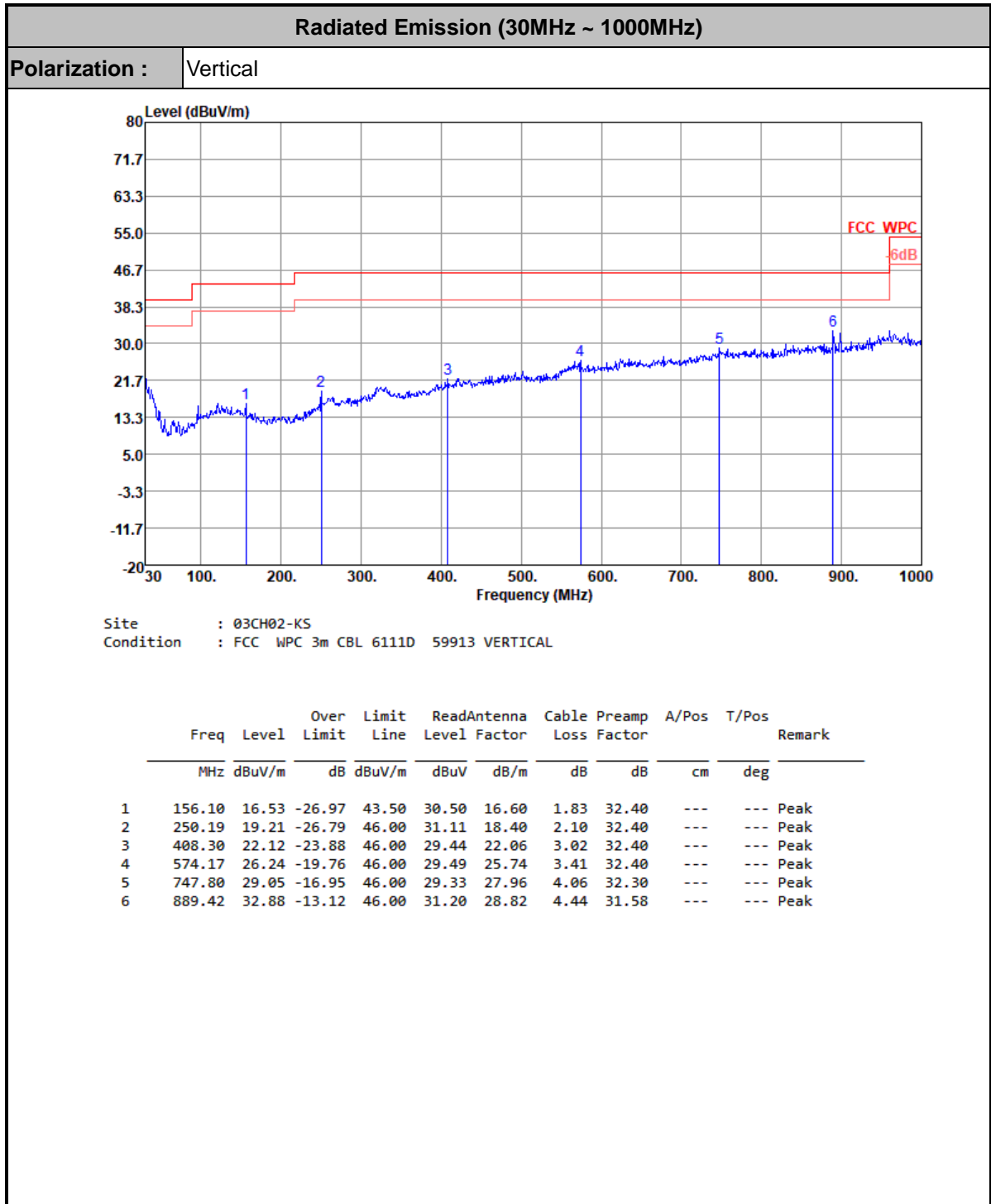












Note:

- 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)



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 (dBµV)	
	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.

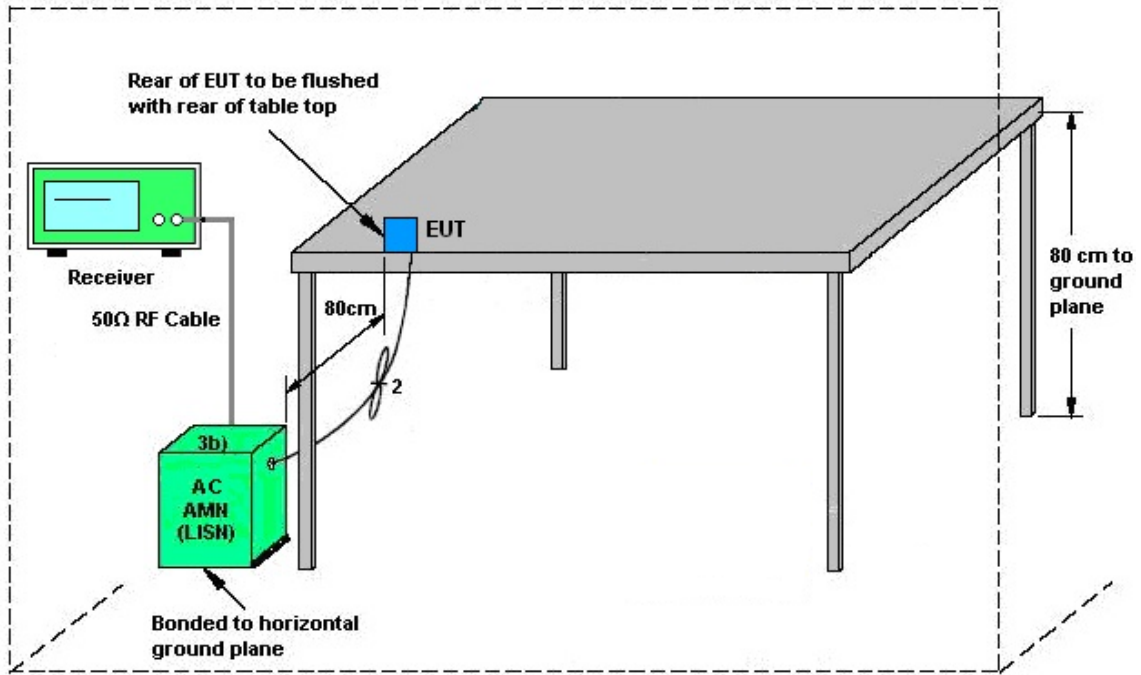
3.3.2 Measuring Instruments

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

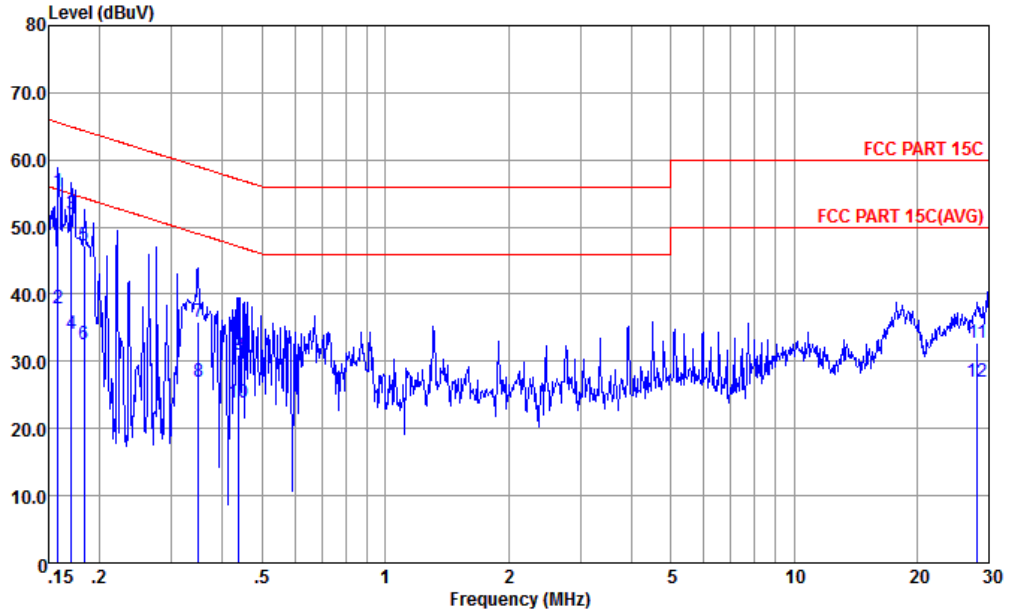


AMN = Artificial mains network (LISN)
 AE = Associated equipment
 EUT = Equipment under test
 ISN = Impedance stabilization network



3.3.5 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.		

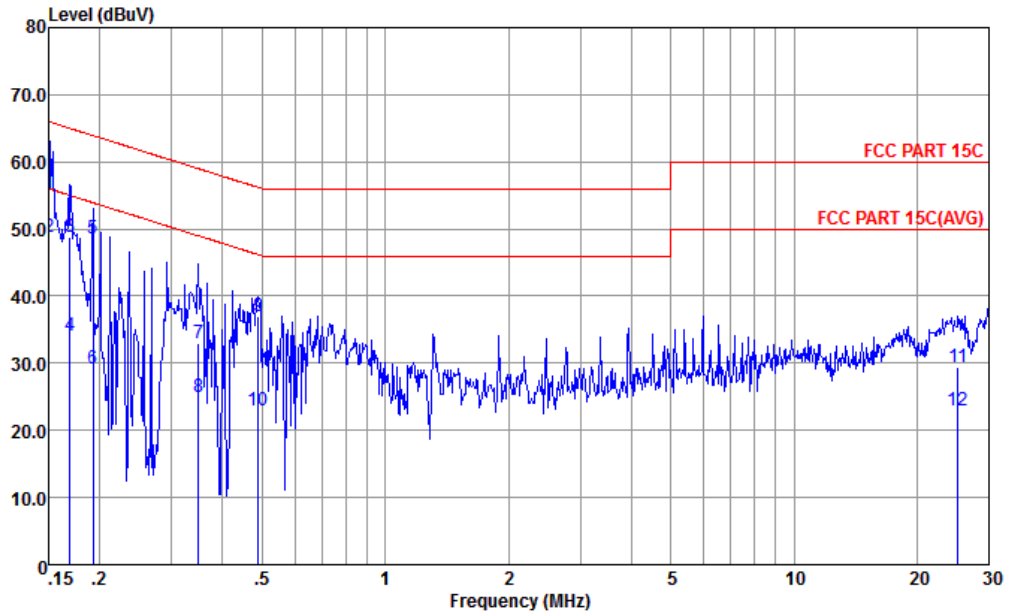


Site : CO01-KS
 Condition : FCC PART 15C LISN-060105-L LINE

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 *	0.158	55.28	-10.28	65.56	44.80	0.02	10.46	QP
2	0.158	37.98	-17.58	55.56	27.50	0.02	10.46	Average
3	0.170	51.96	-12.98	64.94	41.50	0.03	10.43	QP
4	0.170	34.06	-20.88	54.94	23.60	0.03	10.43	Average
5	0.183	47.23	-17.10	64.33	36.80	0.03	10.40	QP
6	0.183	32.63	-21.70	54.33	22.20	0.03	10.40	Average
7	0.348	35.96	-23.04	59.00	25.59	0.08	10.29	QP
8	0.348	26.96	-22.04	49.00	16.59	0.08	10.29	Average
9	0.437	30.95	-26.16	57.11	20.61	0.09	10.25	QP
10	0.437	23.85	-23.26	47.11	13.51	0.09	10.25	Average
11	28.152	32.85	-27.15	60.00	21.50	0.75	10.60	QP
12	28.152	26.95	-23.05	50.00	15.60	0.75	10.60	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 PART 15C LISN-060105-N NEUTRAL

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.150	55.19	-10.81	66.00	44.60	0.11	10.48	QP
2 *	0.150	48.79	-7.21	56.00	38.20	0.11	10.48	Average
3	0.169	48.74	-16.25	64.99	38.20	0.11	10.43	QP
4	0.169	34.14	-20.85	54.99	23.60	0.11	10.43	Average
5	0.192	48.58	-15.35	63.93	38.10	0.10	10.38	QP
6	0.192	29.28	-24.65	53.93	18.80	0.10	10.38	Average
7	0.348	32.89	-26.11	59.00	22.50	0.10	10.29	QP
8	0.348	24.99	-24.01	49.00	14.60	0.10	10.29	Average
9	0.489	36.95	-19.24	56.19	26.60	0.11	10.24	QP
10	0.489	22.85	-23.34	46.19	12.50	0.11	10.24	Average
11	25.188	29.36	-30.64	60.00	18.10	0.69	10.57	QP
12	25.188	22.86	-27.14	50.00	11.60	0.69	10.57	Average

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
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Oct. 14, 2021	Jun. 16, 2022	Oct. 13, 2022	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz;Max x 30dBm	Oct. 16, 2021	Jun. 29, 2022	Oct. 15, 2022	Radiation (03CH02-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55370528	10Hz~44G,MAX 30dB	Oct. 16, 2021	Jun. 29, 2022	Oct. 15, 2022	Radiation (03CH02-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 30, 2021	Jun. 29, 2022	Oct. 29, 2022	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6111D	44483	30MHz~1GHz	Dec. 22, 2021	Jun. 29, 2022	Dec. 21, 2022	Radiation (03CH02-KS)
Amplifier	SONOMA	310N	187289	9KHz~1GHz	Jan. 05, 2022	Jun. 29, 2022	Jan. 04, 2023	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	616010002473	N/A	NCR	Jun. 29, 2022	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Jun. 29, 2022	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Jun. 29, 2022	NCR	Radiation (03CH02-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	May 24, 2022	Jun. 22, 2022	May 23, 2023	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060103	9kHz~30MHz	Oct. 14, 2021	Jun. 22, 2022	Oct. 13, 2022	Conduction (CO01-KS)
AC LISN	R&S	ENV216	100334	9kHz~30MHz	May 24, 2022	Jun. 22, 2022	May 23, 2023	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 14, 2021	Jun. 22, 2022	Oct. 13, 2022	Conduction (CO01-KS)

NCR: No Calibration Required



5 Uncertainty of Evaluation

Uncertainty of Conducted Measurement

Test Item	Uncertainty
Occupied Channel Bandwidth	0.03%

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 (9 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.9dB
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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))	5.0dB
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----- THE END -----