FCC RADIO TEST REPORT

FCC ID	:	**B94-TNC162GPWC**
Equipment	:	**Notebook Computer**
Brand Name	:	**HP**
Model Name	:	**TPN-C162**
Applicant	:	**HP Inc.** **1501 Page Mill Road, Palo Alto CA, 94304, USA**
Standard	:	**FCC Part 15 Subpart C §15.225**

The product was received on May 05, 2023 and testing was performed from May 11, 2023 to Jun. 21, 2023. We, Sporton International Inc. EMC & Wireless Communications Laboratory, 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 from Sporton International Inc. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issue Date
FR321001-02	01	Initial issue of report	Jun. 28, 2023
FR321001-02	02	Revise Product Feature This report is an updated version, replacing the report issued on Jun. 28, 2023.	Jul. 03, 2023

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.207	AC Power Line Conducted Emissions	Pass	13.12 dB under the limit at 3.755 MHz
3.2	15.215(c)	20dB Spectrum Bandwidth	Pass	-
	2.1049	99% OBW Spectrum Bandwidth	Reporting only	-
3.3	15.225(e)	Frequency Stability	Pass	-
3.4	15.225(a)(b)(c)	Field Strength of Fundamental Emissions	Pass	Max level 19.71 dBμV/m at 13.560 MHz
3.5	15.225(d) 15.209	Radiated Spurious Emissions	Pass	6.89 dB under the limit at 40.800 MHz
3.6	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/manufacturer 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.

Reviewed by: Sheng Kuo

Report Producer: Clio Lo

1. General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
General Specs	Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n/ac/ax, Wi-Fi 5GHz 802.11a/n/ac/ax, Wi-Fi 6GHz 802.11ax, WLC and WPC.
Sample 1	multi-coil
Sample 2	single-coil
Integrated WLAN Module	Brand Name: Intel Model Name: AX211D2W
Integrated WPC Module	Brand Name: HP Model Name: L0NPS003-CS-H
Antenna Type	WLAN <Main>: PIFA Antenna <Aux.>: PIFA Antenna Bluetooth: PIFA Antenna WLC: Rod Antenna WPC: Rod Antenna

Remark: The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.

1.2 Modification of EUT

No modifications made to the EUT during the testing.

1.3 Testing Location

Test Site	Sporton International Inc. EMC & Wireless Communications Laboratory		
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978		
Test Site No.	Sporton Site No.		
	TH03-HY	CO05-HY	03CH07-HY
Test Engineer	Eric Wu	Calvin Wang	Ken Wu
Temperature (℃)	22.4~24.9	23~26	23.6~26.9
Relative Humidity (%)	42.2~51.7	45~55	52.6~60.4

Note: The test site complies with ANSI C63.4 2014 requirement.

FCC designation No.: TW1190

1.4 Applicable Standards

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

- FCC Part 15 Subpart C §15.225
- FCC KDB 414788 D01 Radiated Test Site v01r01
- ANSI C63.10-2013

Remark:

1. All the test items were validated and recorded in accordance with the standards without any modification during the testing.
2. The TAF code is not including all the FCC KDB listed without accreditation.

2. Test Configuration of Equipment Under Test

2.1 Descriptions of Test Mode

Investigation has been done on all the possible configurations.

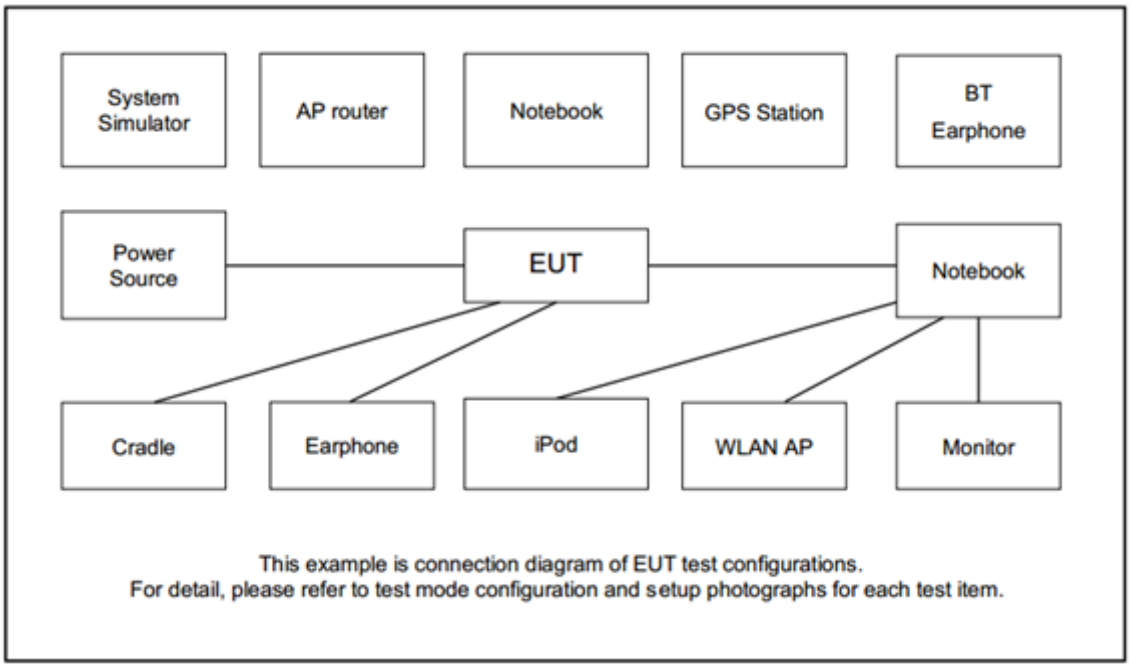
The following table is a list of the test modes shown in this test report.

Test Items	
AC Power Line Conducted Emissions	Field Strength of Fundamental Emissions
20dB Spectrum Bandwidth	Frequency Stability
Radiated Emissions 9kHz~30MHz	Radiated Emissions 30MHz~1GHz

The measured emission level of the EUT was maximized by rotating the EUT on a turntable, adjusting the orientation of the EUT and EUT antenna in three orthogonal axis (X: flat, Y: portrait, Z: landscape), and adjusting the measurement antenna orientation, following C63.10 exploratory test procedures and only the worst case emissions were reported in this report.

Test Cases	
AC Conducted Emission	Mode 1 : WPC Charging + AC Adapter for Sample 1

2.2 Connection Diagram of Test System



2.3 EUT Operation Test Setup

The Keyboard is charged via EUT.

3. Test Results

3.1 AC Power Line Conducted Emissions Measurement

3.1.1 Limit 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.

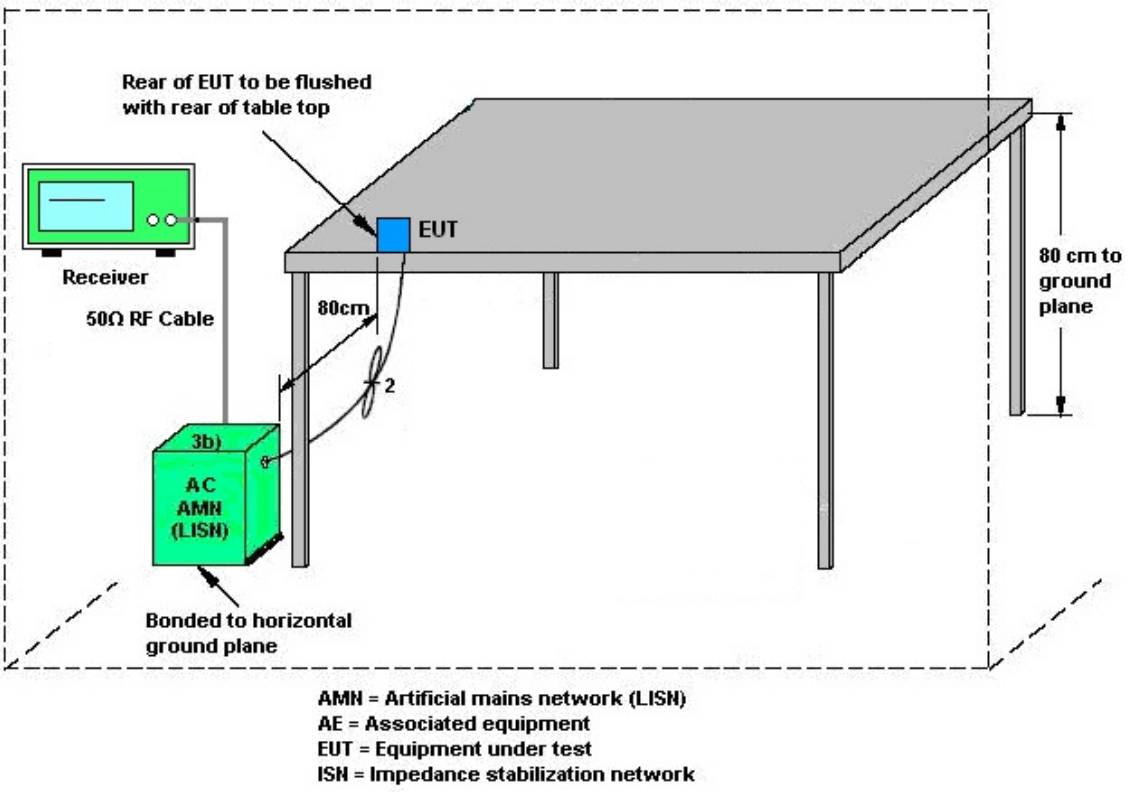
3.1.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.1.3 Test Procedures

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is 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 shall be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9 kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

3.1.4 Test setup



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

3.1.5 Test Result of AC Conducted Emission

Please refer to Appendix A.

3.2 20dB and 99% OBW Spectrum Bandwidth Measurement

3.2.1 Limit

Intentional radiators must be designed to ensure that the 20 dB and 99% emission bandwidth in the specific band 13.553~13.567 MHz.

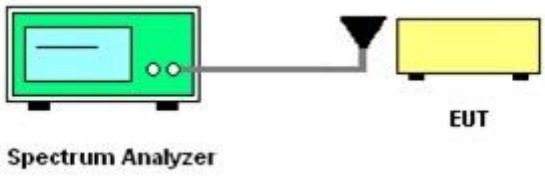
3.2.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.2.3 Test Procedures

1. The spectrum analyzer connected via a receive antenna placed near the EUT in peak Max Hold Mode.
2. The resolution bandwidth of 1 kHz and the video bandwidth of 3 kHz were used.
3. Measured the spectrum width with power higher than 20 dB below carrier.
4. Measured the 99% OBW.

3.2.4 Test Setup



3.2.5 Test Result of Near Field Test Items

Please refer to Appendix B.

3.3 Frequency Stability Measurement

3.3.1 Limit

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% (100ppm) of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed by using a new battery.

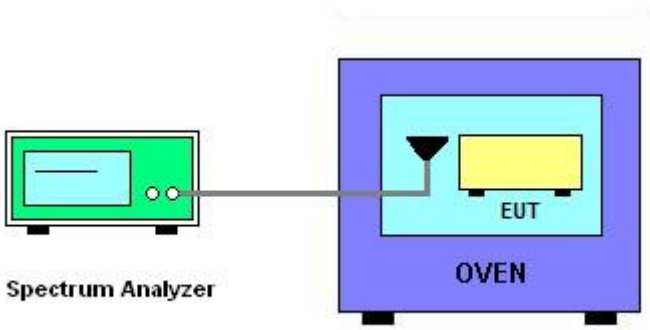
3.3.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.3.3 Test Procedures

1. The spectrum analyzer connected via a receive antenna placed near the EUT.
2. EUT has transmitted signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire emissions bandwidth.
4. Set RBW = 1 kHz, VBW = 3 kHz with peak detector and maxhold settings.
5. The fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 10^6 ppm and the limit is less than ±100ppm.
6. Extreme temperature rule is -20°C~50°C.

3.3.4 Test Setup



3.3.5 Test Result of Near Field Test Items

Please refer to Appendix B.

3.4 Field Strength of Fundamental Emissions and Mask Measurement

3.4.1 Limit

Rules and specifications	FCC CFR 47 Part 15 section 15.225			
Description	Compliance with the spectrum mask is tested with RBW set to 9kHz.			
Freq. of Emission (MHz)	Field Strength (μV/m) at 30m	Field Strength (dBμV/m) at 30m	Field Strength (dBμV/m) at 10m	Field Strength (dBμV/m) at 3m
1.705~13.110	30	29.5	48.58	69.5
13.110~13.410	106	40.5	59.58	80.5
13.410~13.553	334	50.5	69.58	90.5
13.553~13.567	15848	84.0	103.08	124.0
13.567~13.710	334	50.5	69.58	90.5
13.710~14.010	106	40.5	59.58	80.5
14.010~30.000	30	29.5	48.58	69.5

Remark:

1. The field strength test result is in 3m test distance, follow test rules the test data use distance extrapolation factor and reported in this report at 30m test result.
2. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)

3.4.2 Measuring Instruments

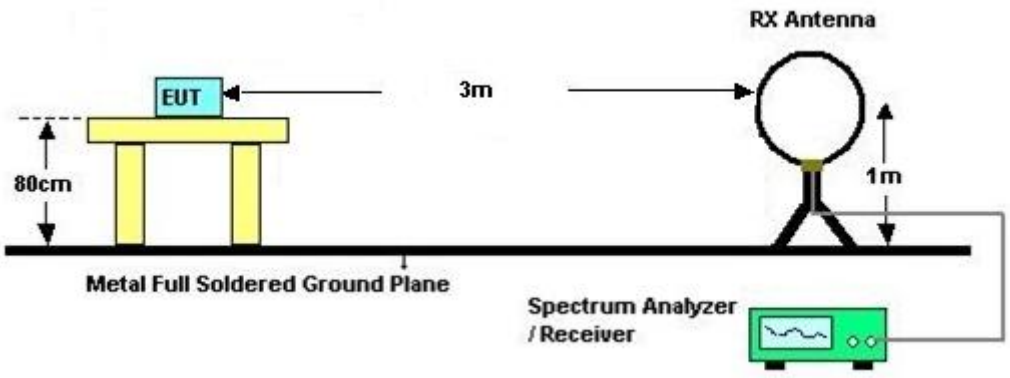
Please refer to the measuring equipment list in this test report.

3.4.3 Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT is placed on the top of the turntable 0.8 meter above ground. The phase center of the loop receiving antenna mounted antenna tower is placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable is rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the receiving antenna is fixed at one meter above ground to find the maximum emissions field strength.
4. For Fundamental emissions, use the receiver to measure QP reading.
5. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
6. Compliance with the spectrum mask is tested with RBW set to 9 kHz.
   Note: Emission level (dBμV/m) = 20 log Emission level (μV/m).

3.4.4 Test Setup

For radiated test below 30MHz



3.4.5 Test Result of Field Strength of Fundamental Emissions and Mask

Please refer to Appendix C.

3.5 Radiated Emissions Measurement

3.5.1 Limit

The field strength of any emissions which appear outside of 13.110 ~14.010MHz band shall not exceed the general radiated emissions limits.

Frequencies (MHz)	Field Strength (μV/m)	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

3.5.2 Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.5.3 Measuring Instrument Setting

The following table is the setting of receiver:

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

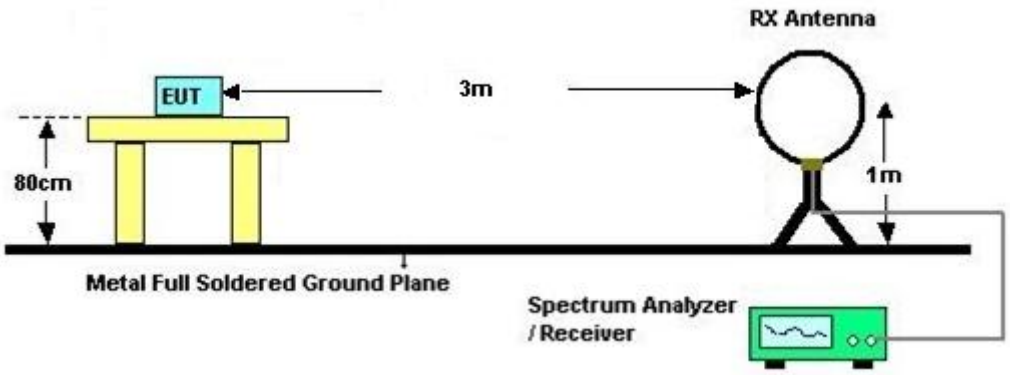
Note: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz and 110-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

3.5.4 Test Procedures

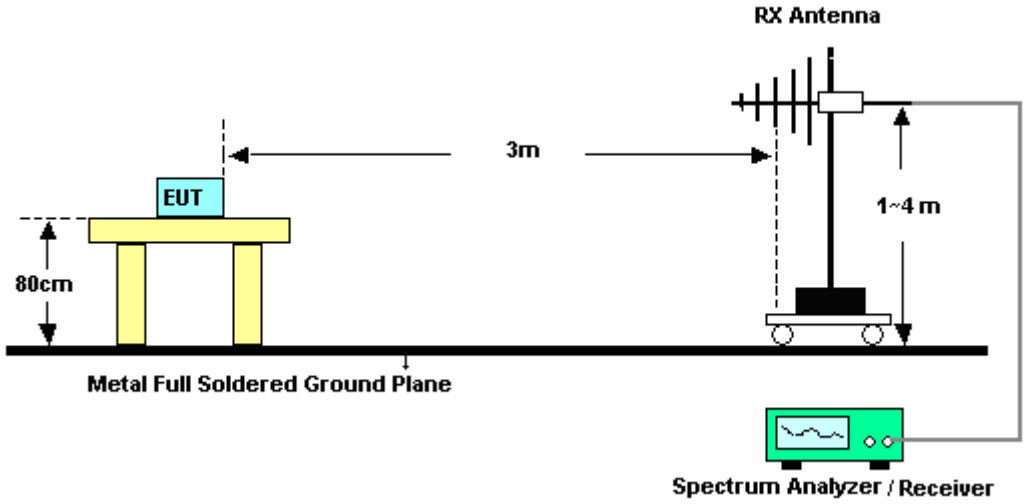
1. Configure the EUT according to ANSI C63.10. The EUT is placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower is placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable is rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna is varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower is scanned (from 1 M to 4 M) and then the turntable is rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
7. In case the emission is lower than 30 MHz, loop antenna has to be used for measurement and the recorded data shall be QP measured by receiver.
8. Radiated testing below 1 GHz is performed by adjusting the antenna tower from 1 m to 4 m and by rotating the turn table from 0 degree to 360 degrees to find the peak maximum hold reading. When there is no suspected emission found and the emission level is with at least 6 dB margin against QP limit line, the position is marked as “-“.

3.5.5 Test Setup

For radiated test below 30MHz



For radiated test above 30MHz



3.5.6 Test Result of Radiated Emissions Measurement

Please refer to Appendix C.

Remark: There is adequate comparison measurement 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.

3.6 Antenna Requirements

3.6.1 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.

3.6.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

4. List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	May 11, 2023	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Dec. 01, 2022	May 11, 2023	Nov. 30, 2023	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Nov. 17, 2022	May 11, 2023	Nov. 16, 2023	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Nov. 17, 2022	May 11, 2023	Nov. 16, 2023	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32	N/A	N/A	N/A	May 11, 2023	N/A	Conduction (CO05-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-F N	00691	N/A	Aug. 01, 2022	May 11, 2023	Jul. 31, 2023	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 29, 2022	May 11, 2023	Dec. 28, 2023	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100472	20Hz~26.5GHz	Feb. 13, 2023	May 13, 2023~ Jun. 21, 2023	Feb. 12, 2024	Radiation (03CH07-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N -06	35419 & 03	30MHz~1GHz	Apr. 23, 2023	May 13, 2023~ Jun. 21, 2023	Apr. 22, 2024	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Feb. 28, 2023	May 13, 2023~ Jun. 21, 2023	Feb. 27, 2024	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz~1GHz	Oct. 03, 2022	May 13, 2023~ Jun. 21, 2023	Oct. 02, 2023	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY15682/4	30MHz to 18GHz	Feb. 22, 2023	May 13, 2023~ Jun. 21, 2023	Feb. 21, 2024	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24971/4	9kHz to 18GHz	Feb. 22, 2023	May 13, 2023~ Jun. 21, 2023	Feb. 21, 2024	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4	9kHz to 18GHz	Feb. 22, 2023	May 13, 2023~ Jun. 21, 2023	Feb. 21, 2024	Radiation (03CH07-HY)
Controller	EMEC	EM1000	N/A	Control Ant Mast	N/A	May 13, 2023~ Jun. 21, 2023	N/A	Radiation (03CH07-HY)
Controller	MF	MF-7802	N/A	Control Turn table	N/A	May 13, 2023~ Jun. 21, 2023	N/A	Radiation (03CH07-HY)
Antenna Mast	EMEC	AM-BS-4500E	N/A	Boresight mast 1M~4M	N/A	May 13, 2023~ Jun. 21, 2023	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	May 13, 2023~ Jun. 21, 2023	N/A	Radiation (03CH07-HY)
Software	Audix	E3	N/A	N/A	N/A	May 13, 2023~ Jun. 21, 2023	N/A	Radiation (03CH07-HY)
USB Data Logger	TECPEL	TR-32	HE17XB2495	N/A	Mar. 14, 2023	May 13, 2023~ Jun. 21, 2023	Mar. 13, 2024	Radiation (03CH07-HY)
Hygrometer	TECPEL	DTM-303A	TP201996	N/A	Nov. 17, 2022	Jun. 19, 2023~ Jun. 21, 2023	Nov. 16, 2023	Near Field (TH03-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101329	9kHz~30GHz	Sep. 27, 2022	Jun. 19, 2023~ Jun. 21, 2023	Sep. 26, 2023	Near Field (TH03-HY)
Thermal Chamber	ESPEC	SH-641	92013720	-40℃ ~90℃	Sep. 07, 2022	Jun. 19, 2023~ Jun. 21, 2023	Sep. 06, 2023	Near Field (TH03-HY)
Programmable Power Supply	GW Instek	PSS-2005	EL890001	1V~20V 0.5A~4A	Sep. 29, 2022	Jun. 19, 2023~ Jun. 21, 2023	Sep 28, 2023	Near Field (TH03-HY)

5. Measurement Uncertainty

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.5 dB**

Uncertainty of Radiated Emission Measurement (9 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.8 dB**

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

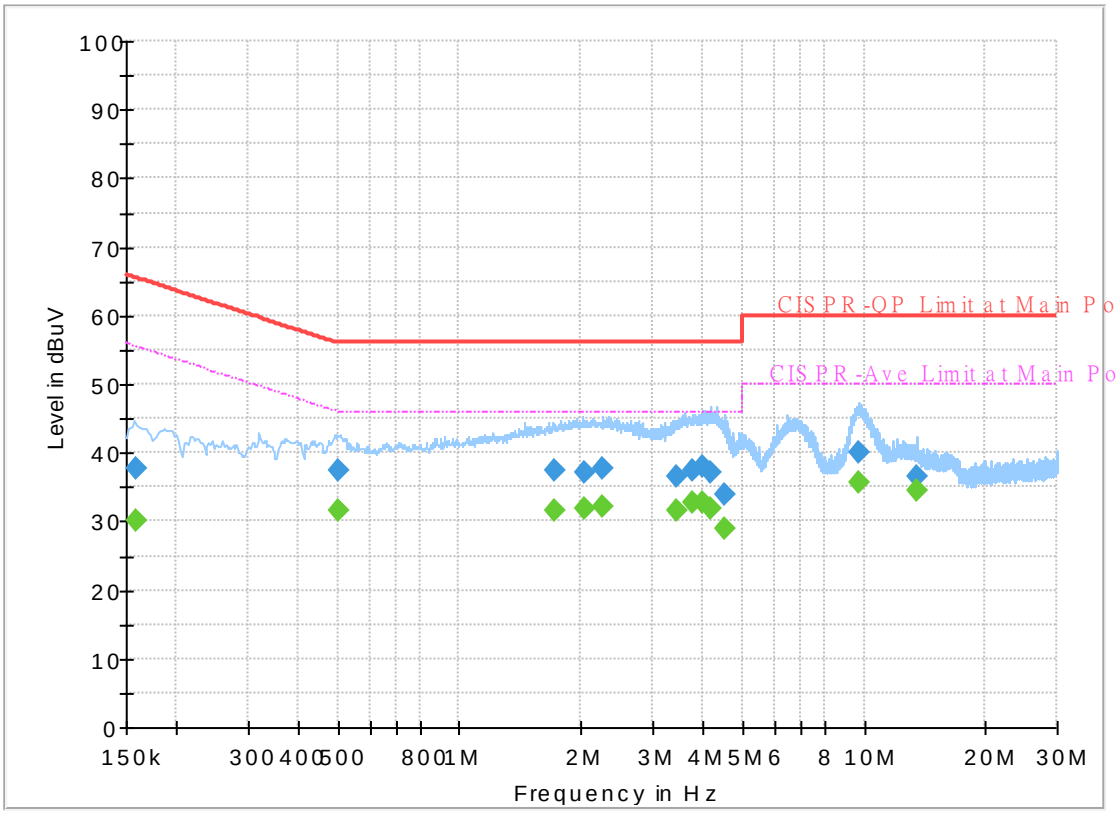
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**6.5 dB**

Appendix A. Test Results of Conducted Emission Test

EUT Information

Report NO :	321001-02
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Line

Full Spectrum



Final_Result

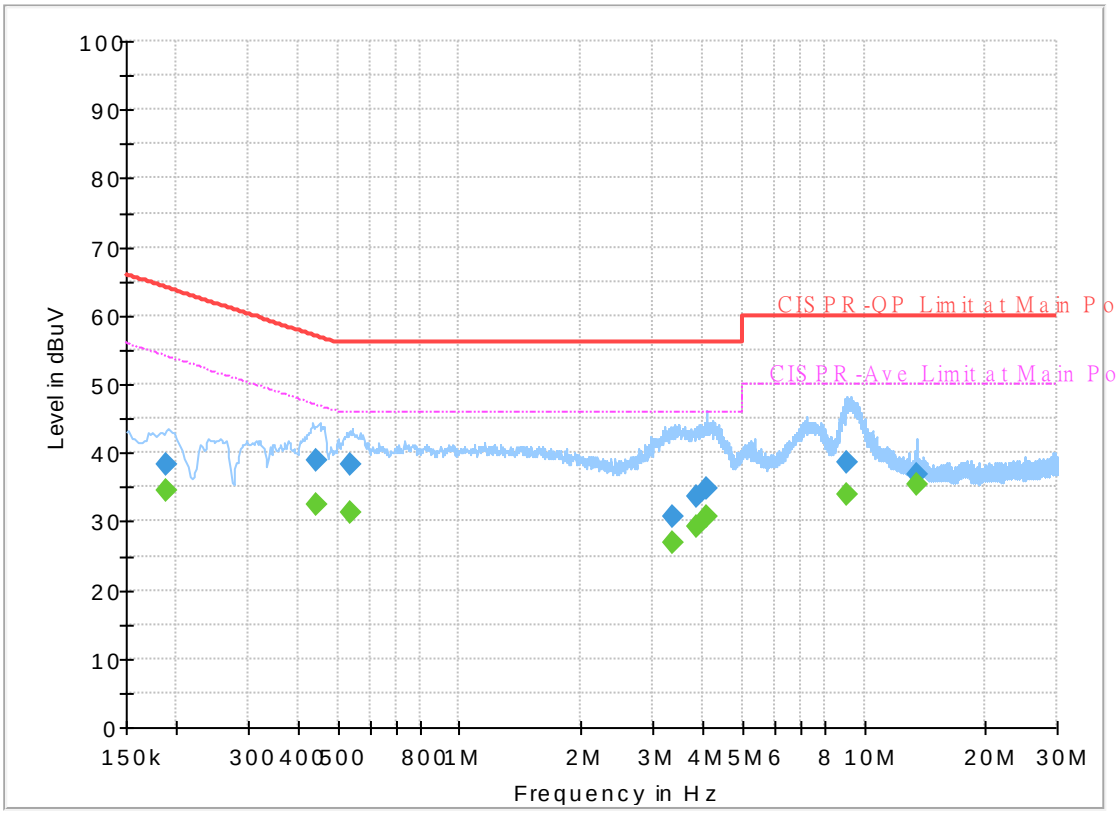
Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.159000	---	30.23	55.52	25.29	L1	OFF	19.9
0.159000	37.62	---	65.52	27.90	L1	OFF	19.9
0.501000	---	31.71	46.00	14.29	L1	OFF	19.9
0.501000	37.32	---	56.00	18.68	L1	OFF	19.9
1.716000	---	31.65	46.00	14.35	L1	OFF	19.9
1.716000	37.57	---	56.00	18.43	L1	OFF	19.9
2.028750	---	31.88	46.00	14.12	L1	OFF	19.9
2.028750	37.26	---	56.00	18.74	L1	OFF	19.9
2.265000	---	32.19	46.00	13.81	L1	OFF	19.9
2.265000	37.62	---	56.00	18.38	L1	OFF	19.9
3.432750	---	31.65	46.00	14.35	L1	OFF	20.0
3.432750	36.58	---	56.00	19.42	L1	OFF	20.0
3.754500	---	32.88	46.00	13.12	L1	OFF	20.0
3.754500	37.41	---	56.00	18.59	L1	OFF	20.0
4.006500	---	32.73	46.00	13.27	L1	OFF	20.0
4.006500	37.91	---	56.00	18.09	L1	OFF	20.0
4.197750	---	31.92	46.00	14.08	L1	OFF	20.0
4.197750	37.18	---	56.00	18.82	L1	OFF	20.0
4.510500	---	28.97	46.00	17.03	L1	OFF	20.0
4.510500	33.83	---	56.00	22.17	L1	OFF	20.0
9.744000	---	35.69	50.00	14.31	L1	OFF	20.2

9.744000	**40.12**	**---**	**60.00**	**19.88**	**L1**	**OFF**	**20.2**
13.560000	**---**	**34.52**	**50.00**	**15.48**	**L1**	**OFF**	**20.4**
13.560000	**36.54**	**---**	**60.00**	**23.46**	**L1**	**OFF**	**20.4**

EUT Information

Report NO :	321001-02
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Neutral

Full Spectrum



Final_Result

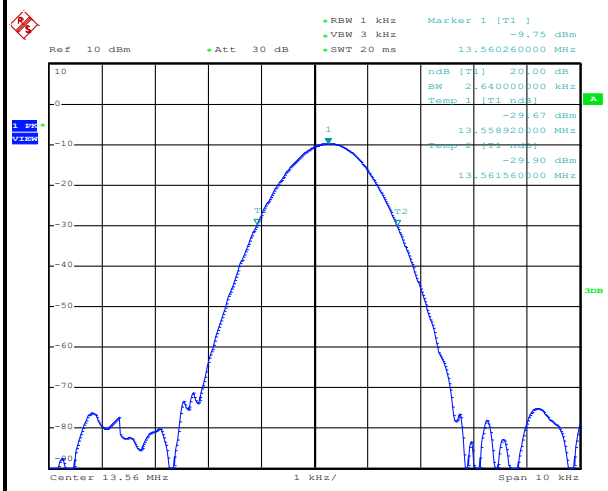
Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.188250	---	34.63	54.11	19.48	N	OFF	19.9
0.188250	38.17	---	64.11	25.94	N	OFF	19.9
0.442500	---	32.56	47.02	14.46	N	OFF	19.9
0.442500	38.79	---	57.02	18.23	N	OFF	19.9
0.539250	---	31.28	46.00	14.72	N	OFF	19.9
0.539250	38.35	---	56.00	17.65	N	OFF	19.9
3.383250	---	26.99	46.00	19.01	N	OFF	20.0
3.383250	30.73	---	56.00	25.27	N	OFF	20.0
3.842250	---	29.33	46.00	16.67	N	OFF	20.0
3.842250	33.57	---	56.00	22.43	N	OFF	20.0
4.096500	---	30.61	46.00	15.39	N	OFF	20.0
4.096500	34.83	---	56.00	21.17	N	OFF	20.0
9.107250	---	33.79	50.00	16.21	N	OFF	20.2
9.107250	38.57	---	60.00	21.43	N	OFF	20.2
13.560000	---	35.48	50.00	14.52	N	OFF	20.4
13.560000	36.72	---	60.00	23.28	N	OFF	20.4

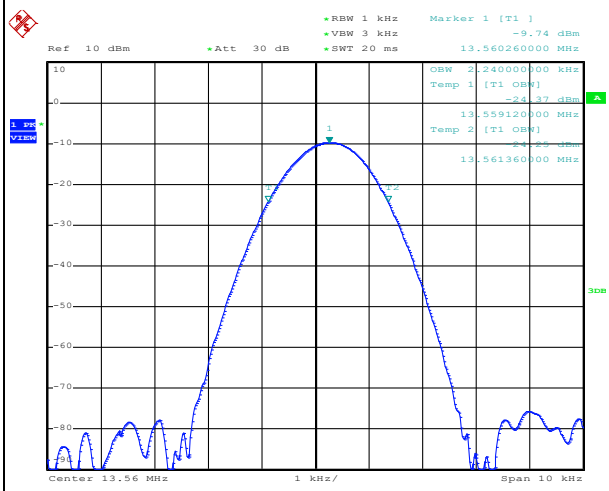
Appendix B. Test Results of Near Field Test Items

B1. Test Result of 20dB Spectrum Bandwidth

<Sample 1>

Test mode	WPC Tx	Test Frequency (MHz)	13.56



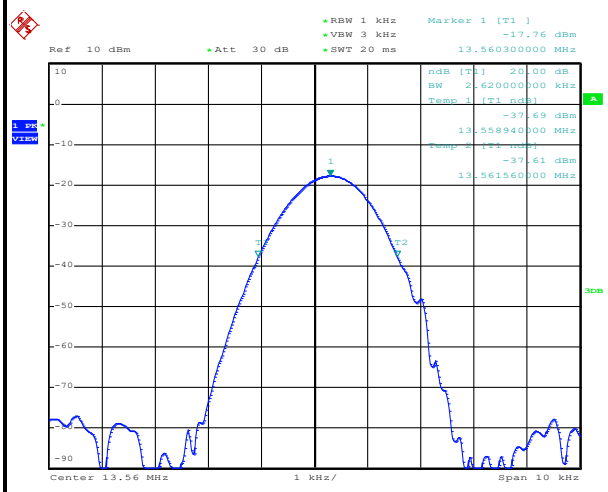


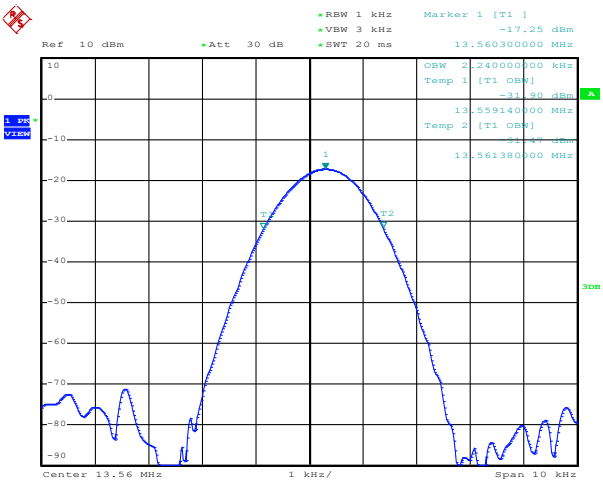
20dB Bandwidth (kHz)	2.640	99% OccupiedBW(kHz)	2.240
Frequency range (MHz)	**f_L > 13.553**	13.55892	**Test Result**
	f_H < 13.567	13.56156	**Complies**

Remark: Because the measured signal is CW adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

<Sample 2>

Test mode	WPC Tx	Test Frequency (MHz)	13.56





20dB Bandwidth (kHz)	2.640	99% OccupiedBW(kHz)	2.240
Frequency range (MHz)	**f_L > 13.553**	13.55894	**Test Result**
	f_H < 13.567	13.56156	**Complies**

Remark: Because the measured signal is CW adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

B2. Test Result of Frequency Stability

<Sample 1>

Voltage vs. Frequency Stability		Temperature vs. Frequency Stability		
Voltage (Vdc)	**Measurement Frequency (MHz)**	**Temperature (℃)**	**Time**	**Measurement Frequency (MHz)**
11.5	13.560240	**-10**	**0**	13.560340
9	13.560240		**2**	13.560320
13.2	13.560240		**5**	13.560330
			10	13.560330
		0	**0**	13.560300
			2	13.560300
			5	13.560300
			10	13.560320
		10	**0**	13.560300
			2	13.560300
			5	13.560300
			10	13.560300
		20	**0**	13.560280
			2	13.560280
			5	13.560280
			10	13.560280
		30	**0**	13.560240
			2	13.560240
			5	13.560240
			10	13.560240
		40	**0**	13.560210
			2	13.560200
			5	13.560200
			10	13.560200
		50	**0**	13.560160
			2	13.560180
			5	13.560170
			10	13.560170
Max.Deviation (MHz)	0.000240	**Max.Deviation (MHz)**		0.000160
Max.Deviation (ppm)	17.6991	**Max.Deviation (ppm)**		11.7994
Limit	**FS < ±100 ppm**	**Limit**		**FS < ±100 ppm**
Test Result	**PASS**	**Test Result**		**PASS**

<Sample 2>

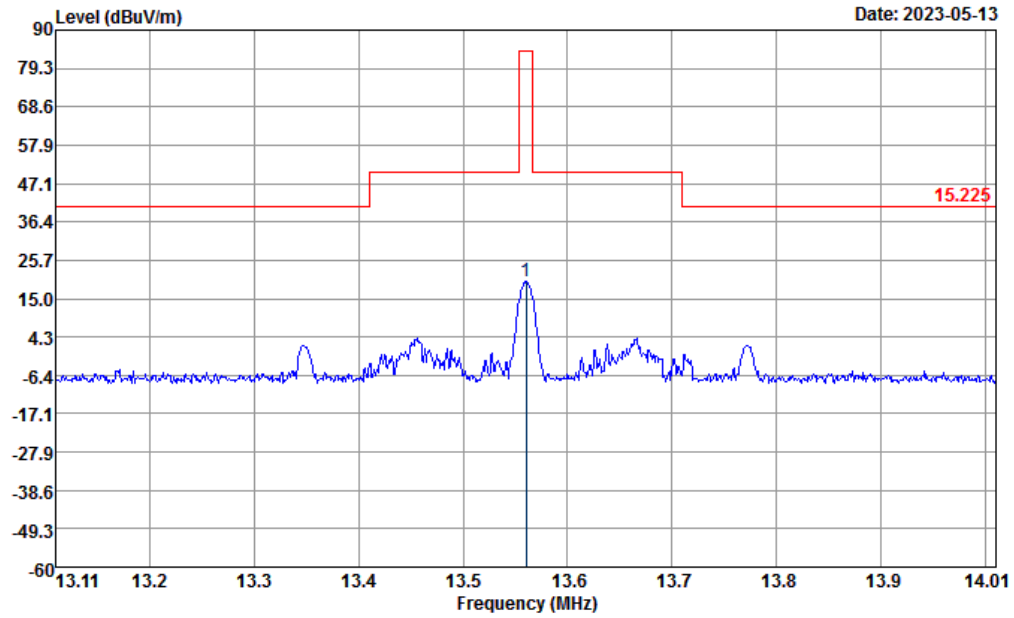
Voltage vs. Frequency Stability		Temperature vs. Frequency Stability		
Voltage (Vdc)	**Measurement Frequency (MHz)**	**Temperature (℃)**	**Time**	**Measurement Frequency (MHz)**
11.5	13.560250	**-10**	**0**	13.560260
9	13.560260		**2**	13.560280
13.2	13.560260		**5**	13.560280
			10	13.560280
		0	**0**	13.560270
			2	13.560280
			5	13.560280
			10	13.560280
		10	**0**	13.560280
			2	13.560280
			5	13.560280
			10	13.560280
		20	**0**	13.560290
			2	13.560280
			5	13.560280
			10	13.560280
		30	**0**	13.560260
			2	13.560260
			5	13.560260
			10	13.560260
		40	**0**	13.560250
			2	13.560280
			5	13.560260
			10	13.560240
		50	**0**	13.560250
			2	13.560260
			5	13.560260
			10	13.560260
Max.Deviation (MHz)	0.000260	**Max.Deviation (MHz)**		0.000290
Max.Deviation (ppm)	19.1740	**Max.Deviation (ppm)**		21.3864
Limit	**FS < ±100 ppm**	**Limit**		**FS < ±100 ppm**
Test Result	**PASS**	**Test Result**		**PASS**

Appendix C. Test Results of Radiated Test Items

C1. Test Result of Field Strength of Fundamental Emissions

<Sample 1>

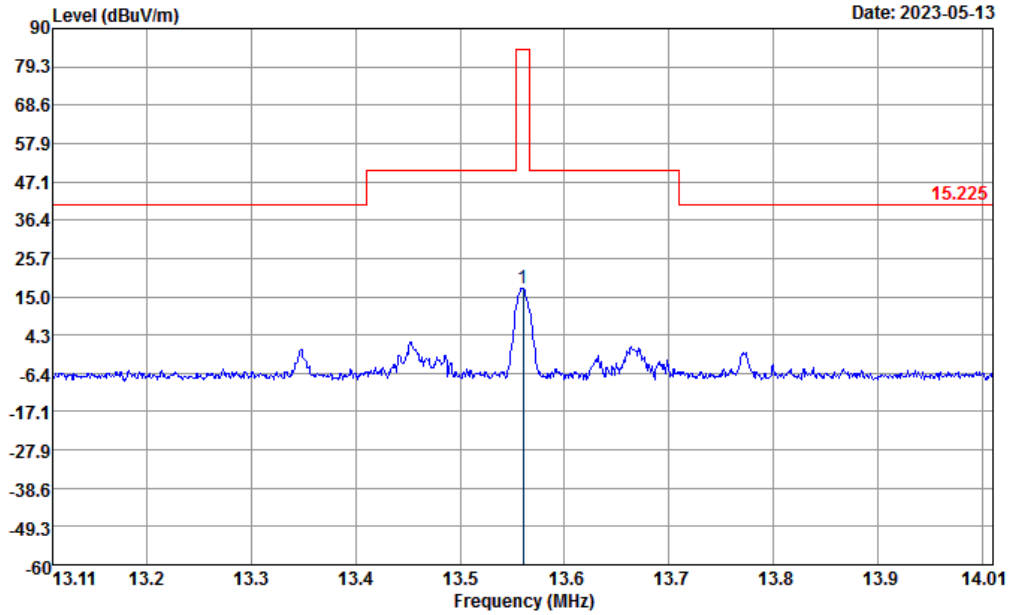
Test Mode :	WPC Tx	Test Frequency (MHz)	13.56



Site : 03CH07-HY
Condition : 15.225 3m LOOP_ANT(H)_100315 HORIZONTAL
: RBW:9.000KHz VBW:9.000KHz SWT:Auto

Frequency (MHz)	Level (dBµV/m)	Distance extrapolation Factor (dB)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
13.56	19.71	40	-64.29	84	40.56	18.64	0.51	100	98	QP

Test Mode :	WPC Tx	Test Frequency (MHz)	13.56



Site : 03CH07-HY
Condition : 15.225 3m LOOP_ANT(V)_100315 VERTICAL
: RBW:9.000KHz VBW:9.000KHz SWT:Auto

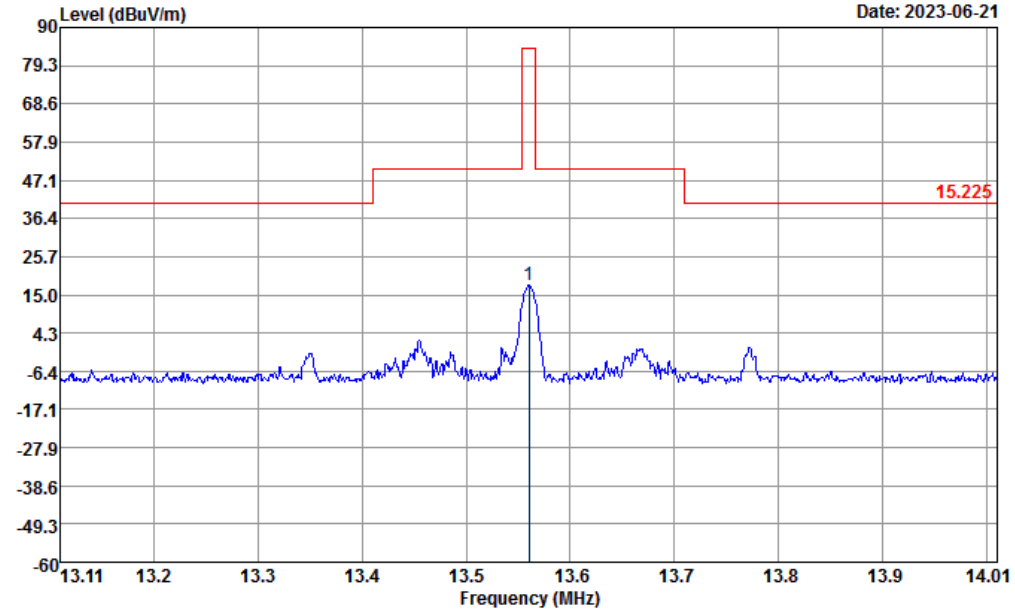
Frequency (MHz)	Level (dBµV/m)	Distance extrapolation Factor (dB)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
13.56	17.3	40	-66.7	84	38.15	18.64	0.51	100	185	QP

Note :

1. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
2. Level = Antenna Factor + Cable Loss + Read Level - Distance extrapolation factor.

<Sample 2>

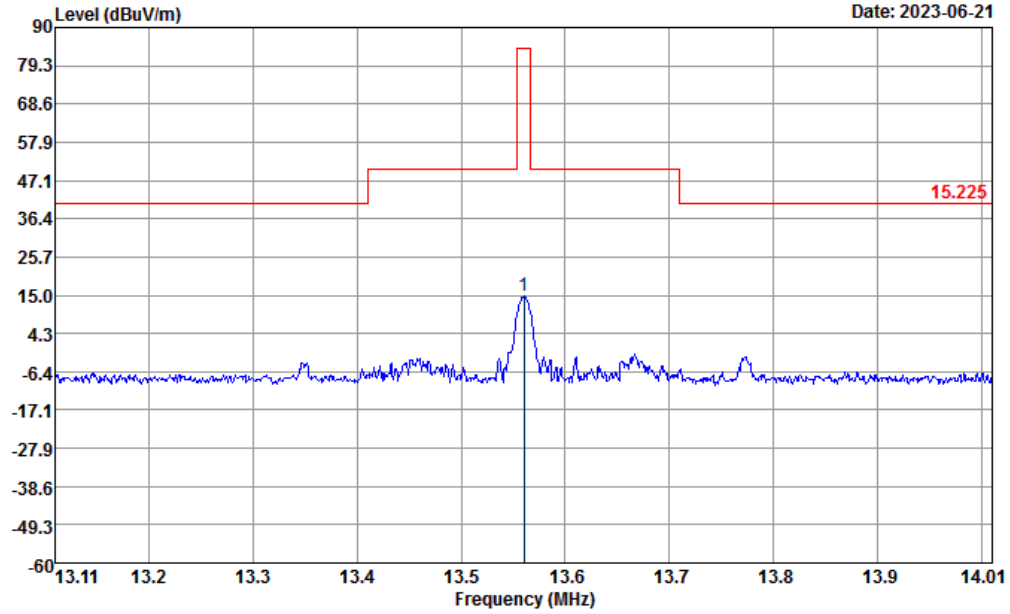
Test Mode :	WPC Tx	Test Frequency (MHz)	13.56



Site : 03CH07-HY
Condition : 15.225 3m LOOP_ANT(H)_100315 HORIZONTAL
: RBW:9.000KHz VBW:9.000KHz SWT:Auto

Frequency (MHz)	Level (dBµV/m)	Distance extrapolation Factor (dB)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
13.56	17.66	40	-66.34	84	38.51	18.64	0.51	100	110	QP

Test Mode :	WPC Tx	Test Frequency (MHz)	13.56



Site : 03CH07-HY
Condition : 15.225 3m LOOP_ANT(V)_100315 VERTICAL
: RBW:9.000KHz VBW:9.000KHz SWT:Auto

Frequency (MHz)	Level (dBµV/m)	Distance extrapolation Factor (dB)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
13.56	14.6	40	-69.4	84	35.45	18.64	0.51	100	178	QP

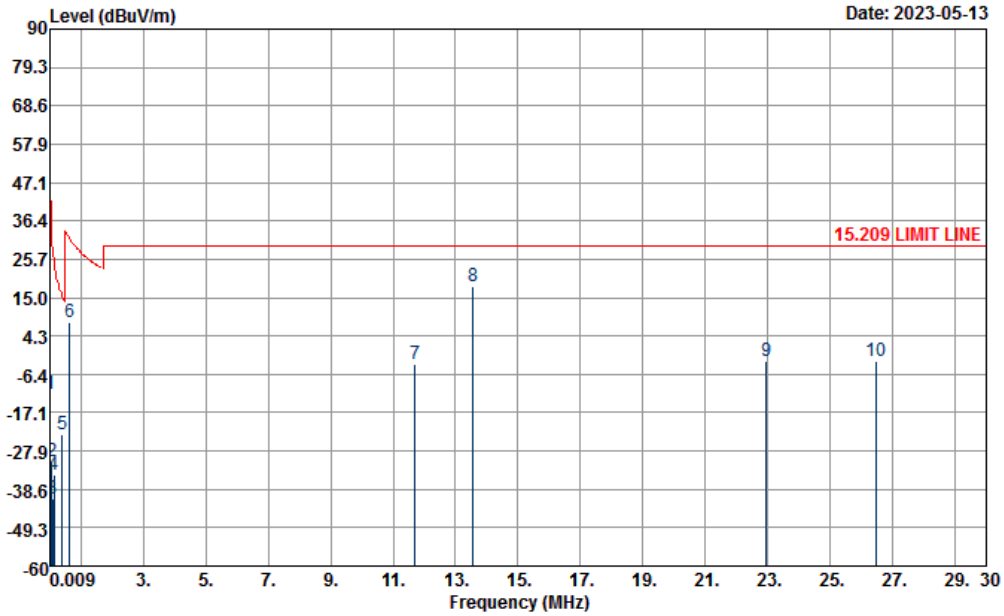
Note :

1. Distance extrapolation factor = 40 log (specific distance / test distance) (dB)
2. Level = Antenna Factor + Cable Loss + Read Level - Distance extrapolation factor.

C2. Results of Radiated Spurious Emissions (9 kHz~30MHz)

<Sample 1>

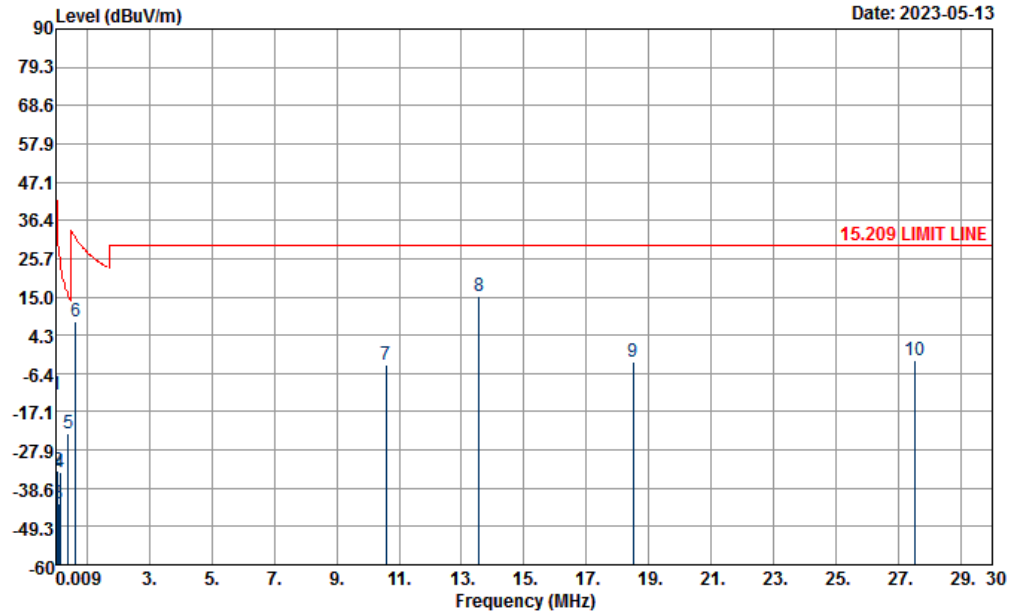
Test Mode :	WPC Tx	Polarization :	Horizontal



Site : 03CH07-HY
Condition : 15.209 LIMIT LINE 3m LOOP_ANT(H)_100315 HORIZONTAL

Frequency (MHz)	Level (dBµV/m)	Distance extrapolation Factor (dB)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
0.0192	-12.13	80	-54.07	41.94	48.36	19	0.51	-	-	Average
0.06051	-30.85	80	-62.82	31.97	29.94	18.7	0.51	-	-	Average
0.10006	-41.04	80	-68.64	27.6	19.84	18.61	0.51	-	-	QP
0.15	-34.37	80	-58.45	24.08	26.55	18.57	0.51	-	-	Average
0.39956	-23.41	80	-38.98	15.57	37.58	18.5	0.51	-	-	Average
0.6402	8.06	40	-23.42	31.48	29.07	18.48	0.51	-	-	QP
11.704	-3.67	40	-33.17	29.5	17.26	18.56	0.51	-	-	QP
13.56	18.12	40	-11.38	29.5	38.97	18.64	0.51	-	-	QP
22.966	-2.94	40	-32.44	29.5	16.19	19.51	1.36	-	-	QP
26.455	-2.84	40	-32.34	29.5	16.03	19.77	1.36	-	-	QP

Test Mode :	WPC Tx	Polarization :	Vertical



Site : 03CH07-HY
Condition : 15.209 LIMIT LINE 3m LOOP_ANT(V)_100315 VERTICAL

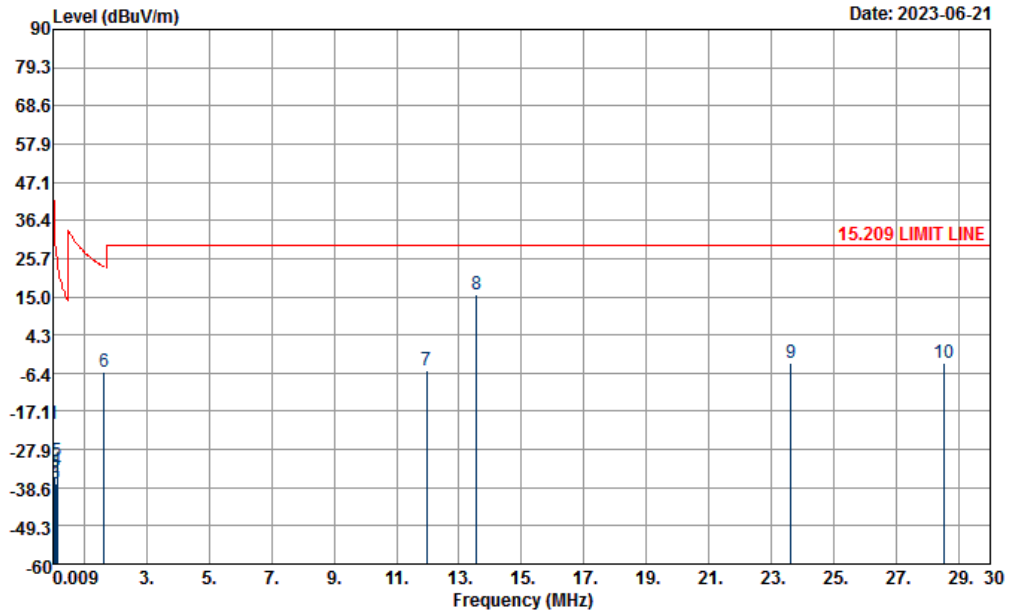
Frequency (MHz)	Level (dBµV/m)	Distance extrapolation Factor (dB)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
0.0192	-12.16	80	-54.1	41.94	48.33	19	0.51	-	-	Average
0.0603	-33.75	80	-65.75	32	27.04	18.7	0.51	-	-	Average
0.09218	-42.92	80	-71.23	28.31	17.94	18.63	0.51	-	-	QP
0.15	-34.29	80	-58.37	24.08	26.63	18.57	0.51	-	-	Average
0.39854	-23.25	80	-38.84	15.59	37.74	18.5	0.51	-	-	Average
0.63269	8.02	40	-23.56	31.58	29.03	18.48	0.51	-	-	QP
10.584	-3.97	40	-33.47	29.5	16.98	18.54	0.51	-	-	QP
13.56	15.06	40	-14.44	29.5	35.91	18.64	0.51	-	-	QP
18.502	-2.99	40	-32.49	29.5	17.52	18.98	0.51	-	-	QP
27.505	-2.6	40	-32.1	29.5	16.27	19.77	1.36	-	-	QP

Note :

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. Level = Antenna Factor + Cable Loss + Read Level - Distance extrapolation factor.
4. 13.56 MHz is fundamental signal which can be ignored

<Sample 2>

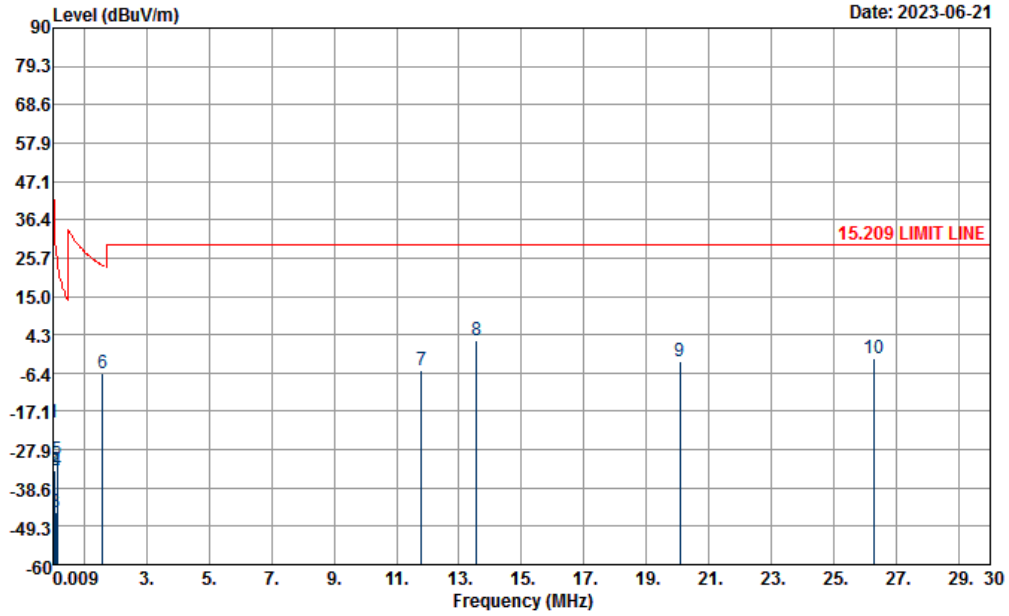
Test Mode :	WPC Tx	Polarization :	Horizontal



Site : 03CH07-HY
Condition : 15.209 LIMIT LINE 3m LOOP_ANT(H)_100315 HORIZONTAL

Frequency (MHz)	Level (dBµV/m)	Distance extrapolation Factor (dB)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
0.01915	-20.54	80	-62.5	41.96	39.94	19.01	0.51	-	-	Average
0.06825	-35.84	80	-66.76	30.92	24.97	18.68	0.51	-	-	Average
0.09166	-37.29	80	-65.65	28.36	23.57	18.63	0.51	-	-	QP
0.15	-33.73	80	-57.81	24.08	27.19	18.57	0.51	-	-	Average
0.15204	-31.33	80	-55.3	23.97	29.59	18.57	0.51	-	-	Average
1.647	-5.93	40	-29.2	23.27	15.1	18.46	0.51	-	-	QP
11.968	-5.82	40	-35.32	29.5	15.1	18.57	0.51	-	-	QP
13.56	15.51	40	-13.99	29.5	36.36	18.64	0.51	-	-	QP
23.632	-3.79	40	-33.29	29.5	15.28	19.57	1.36	-	-	QP
28.545	-3.71	40	-33.21	29.5	15.2	19.73	1.36	-	-	QP

Test Mode :	WPC Tx	Polarization :	Vertical



Site : 03CH07-HY
Condition : 15.209 LIMIT LINE 3m LOOP_ANT(V)_100315 VERTICAL

Frequency (MHz)	Level (dBµV/m)	Distance extrapolation Factor (dB)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
0.01925	-20.13	80	-62.05	41.92	40.36	19	0.51	-	-	Average
0.06	-33.49	80	-65.53	32.04	27.3	18.7	0.51	-	-	Average
0.09226	-45.25	80	-73.55	28.3	15.61	18.63	0.51	-	-	QP
0.15	-33.72	80	-57.8	24.08	27.2	18.57	0.51	-	-	Average
0.15102	-30.8	80	-54.82	24.02	30.12	18.57	0.51	-	-	Average
1.594	-6.52	40	-30.07	23.55	14.51	18.46	0.51	-	-	QP
11.792	-5.89	40	-35.39	29.5	15.03	18.57	0.51	-	-	QP
13.56	2.79	40	-26.71	29.5	23.64	18.64	0.51	-	-	QP
20.068	-3.21	40	-32.71	29.5	16.27	19.16	1.36	-	-	QP
26.28	-2.24	40	-31.74	29.5	16.63	19.77	1.36	-	-	QP

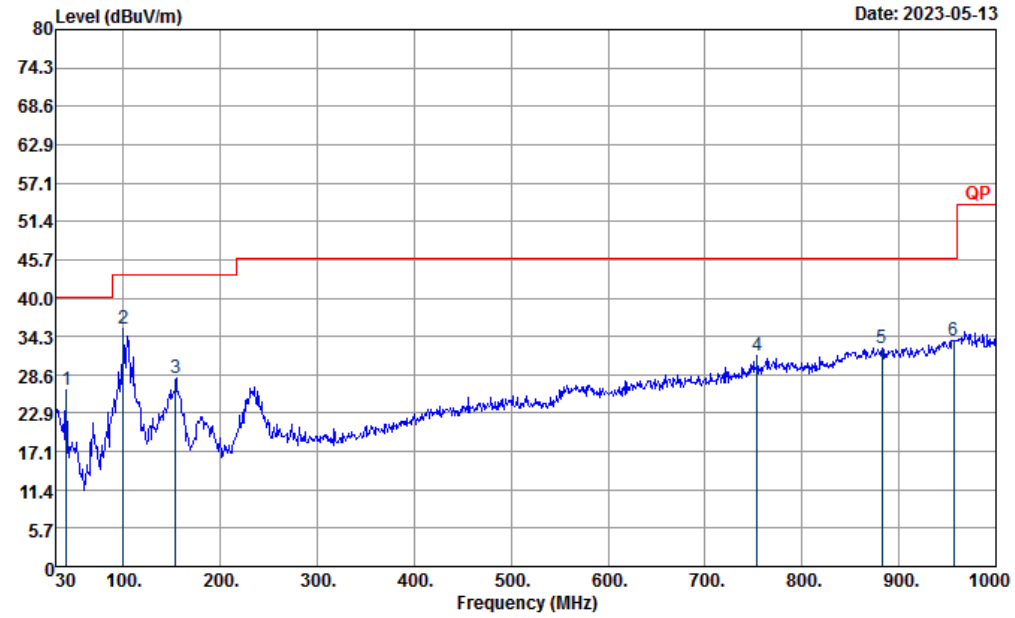
Note :

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. Level = Antenna Factor + Cable Loss + Read Level - Distance extrapolation factor.
4. 13.56 MHz is fundamental signal which can be ignored

C3. Results of Radiated Spurious Emissions (30MHz~1GHz)

<Sample 1>

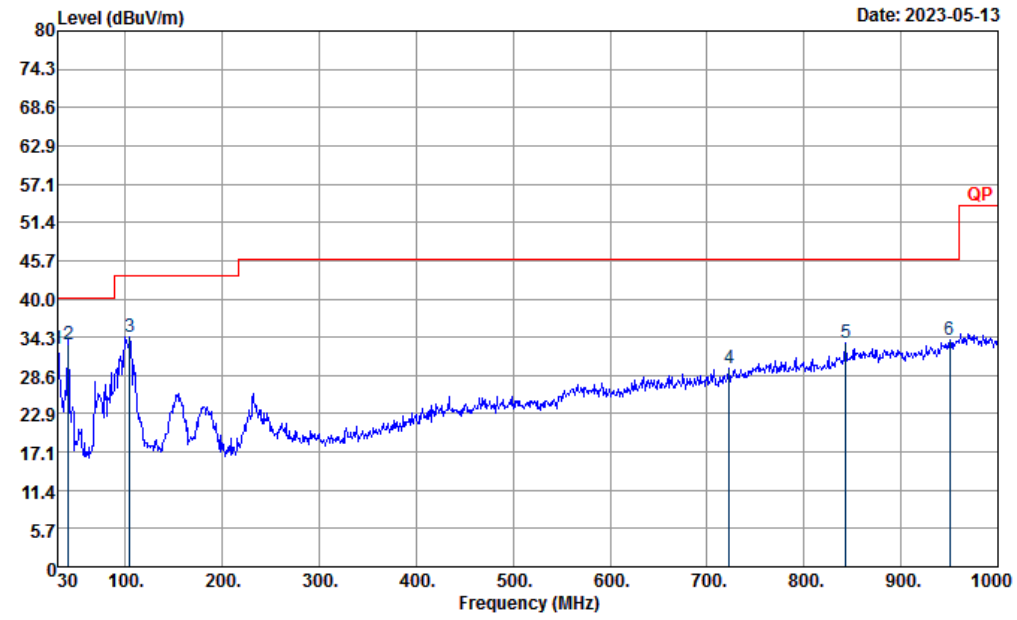
Test Mode :	WPC Tx	Polarization :	Horizontal



Site : 03CH07-HY
Condition : QP 3m LF-ANT-35419(6)_H HORIZONTAL

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
40.8	26.28	-13.72	40	35.76	19.11	1.36	29.95	-	-	Peak
99.93	35.5	-8	43.5	48	15.99	1.52	30.01	-	-	Peak
153.66	27.98	-15.52	43.5	38.92	16.85	2.18	29.97	-	-	Peak
753.6	31.44	-14.56	46	28.79	27.83	4.56	29.74	-	-	Peak
882.4	32.47	-13.53	46	27.75	28.81	5.03	29.12	-	-	Peak
956.6	33.74	-12.26	46	26.94	30.46	5.14	28.8	-	-	Peak

Test Mode :	WPC Tx	Polarization :	Vertical



Site : 03CH07-HY
Condition : QP 3m LF-ANT-35419(6)_H VERTICAL

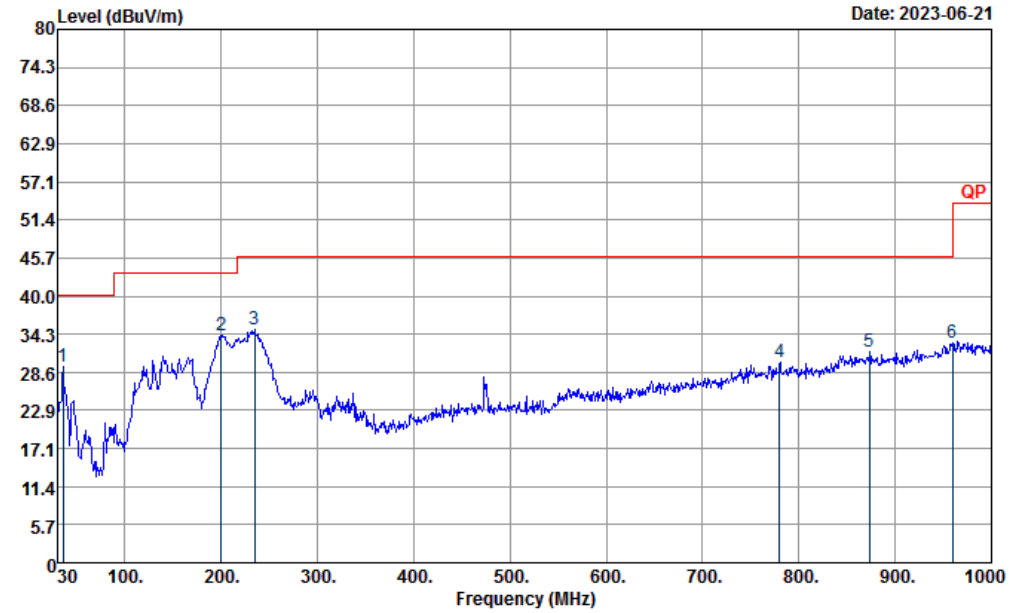
Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	32.52	-7.48	40	37.13	24.11	1.36	30.08	-	-	Peak
40.8	33.11	-6.89	40	42.59	19.11	1.36	29.95	-	-	Peak
104.25	34.4	-9.1	43.5	45.98	16.48	1.94	30	-	-	Peak
722.8	29.56	-16.44	46	28.02	26.74	4.48	29.68	-	-	Peak
843.2	33.34	-12.66	46	29.14	28.67	4.86	29.33	-	-	Peak
950.3	33.92	-12.08	46	27.35	30.26	5.14	28.83	-	-	Peak

Note:

1. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
2. Emission level (dBµV/m) = 20 log Emission level (µV/m).
3. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor= Level.
4. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.

<Sample 2>

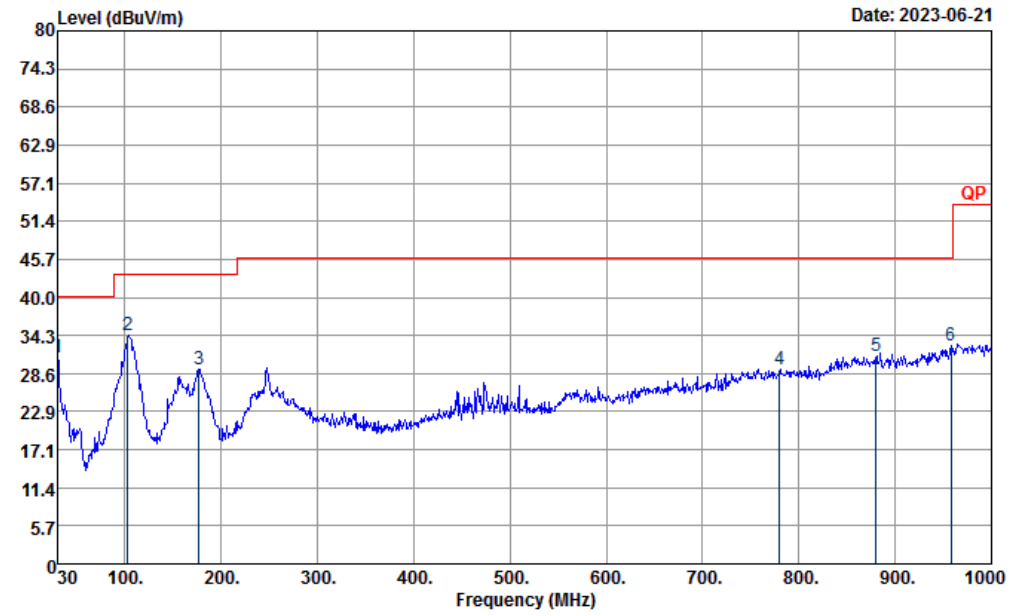
Test Mode :	WPC Tx	Polarization :	Horizontal



Site : 03CH07-HY
Condition : QP 3m LF-ANT-35419(6)_H HORIZONTAL

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
35.4	29.46	-10.54	40	36.29	21.8	1.36	29.99	-	-	Peak
199.83	34.2	-9.3	43.5	46.98	14.99	2.28	30.05	-	-	Peak
234.39	35.08	-10.92	46	45.85	16.64	2.54	29.95	-	-	Peak
780.2	30.06	-15.94	46	27.13	27.83	4.74	29.64	-	-	Peak
873.3	31.55	-14.45	46	26.71	28.97	5.03	29.16	-	-	Peak
959.4	32.95	-13.05	46	25.91	30.68	5.14	28.78	-	-	Peak

Test Mode :	WPC Tx	Polarization :	Vertical



Site : 03CH07-HY
Condition : QP 3m LF-ANT-35419(6)_H VERTICAL

Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	30.92	-9.08	40	35.53	24.11	1.36	30.08	-	-	Peak
103.17	34.25	-9.25	43.5	45.88	16.43	1.94	30	-	-	Peak
177.15	29.26	-14.24	43.5	41.92	15.16	2.18	30	-	-	Peak
780.2	29.18	-16.82	46	26.25	27.83	4.74	29.64	-	-	Peak
880.3	31.12	-14.88	46	26.36	28.86	5.03	29.13	-	-	Peak
958	32.87	-13.13	46	25.95	30.57	5.14	28.79	-	-	Peak

Note:

1. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
2. Emission level (dBµV/m) = 20 log Emission level (µV/m).
3. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor= Level.
4. The emission position marked as "-" means no suspected emission found with sufficient margin against limit line or noise floor only.