



# FCC RADIO TEST REPORT

**FCC ID** : B94L0NPSG  
**Equipment** : Wireless Charging Module  
**Brand Name** : HP  
**Model Name** : G2022-L0NPS  
**Applicant** : HP Inc.  
1501 Page Mill Road, Palo Alto CA, 94304, USA  
**Standard** : FCC Part 15 Subpart C §15.209

The product was received on Aug. 05, 2022 and testing was performed from Aug. 09, 2022 to Aug. 19, 2022. 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 of 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	Issued Date
FR272109-01	01	Initial issue of report	Sep. 05, 2022
FR272109-01	02	Revise Product Feature of Equipment Under Test	Sep. 27, 2022

## Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
-	15.207	AC Power Line Conducted Emissions	Not Required	-
3.1	15.215(c)	20dB Spectrum Bandwidth	Reporting only	-
	2.1049	99% OBW Spectrum Bandwidth	Reporting only	-
3.2	15.209	Field Strength of Fundamental Emissions	Pass	Max level 17.03 dB $\mu$ V/m at 13.560 MHz
		Radiated Spurious Emissions	Pass	6.76 dB under the limit at 100.740MHz
3.3	15.203	Antenna Requirements	Pass	-

**Note:** Not required means after assessing, test items are not necessary to carry out.

<b>Declaration of Conformity:</b>
1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
2. The measurement uncertainty please refer to this report "Uncertainty of Evaluation".
<b>Comments and Explanations:</b>
The product specifications of the EUT presented in the report are declared by the manufacturer who shall take full responsibility for the authenticity.

**Reviewed by: Sheng Kuo**  
**Report Producer: Cindy Liu**



# 1. General Description

## 1.1 Product Feature of Equipment Under Test

WPT.

Product Feature	
Installed into the Host	Equipment Name: Convertible PC
	Brand Name: HP
	Model Name: G2022
	Marketing Name: HP Axis <sup>ONE</sup>
Antenna Type	Loop Antenna

**Remark:** The EUT's information above is declared by manufacturer. Please refer to Comments and Explanations 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.	<b>Sporton Site No.</b>	
	TH03-HY	03CH07-HY
Test Engineer	Cotty Hsu	Jesse Wang and Howard Huang
Temperature (°C)	22~24	21~24
Relative Humidity (%)	53~55	49~52

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

FCC Designation No.: TW1190



## **1.4 Applicable 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
- ♦ 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.
3. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

## 2. Test Configuration of Equipment Under Test

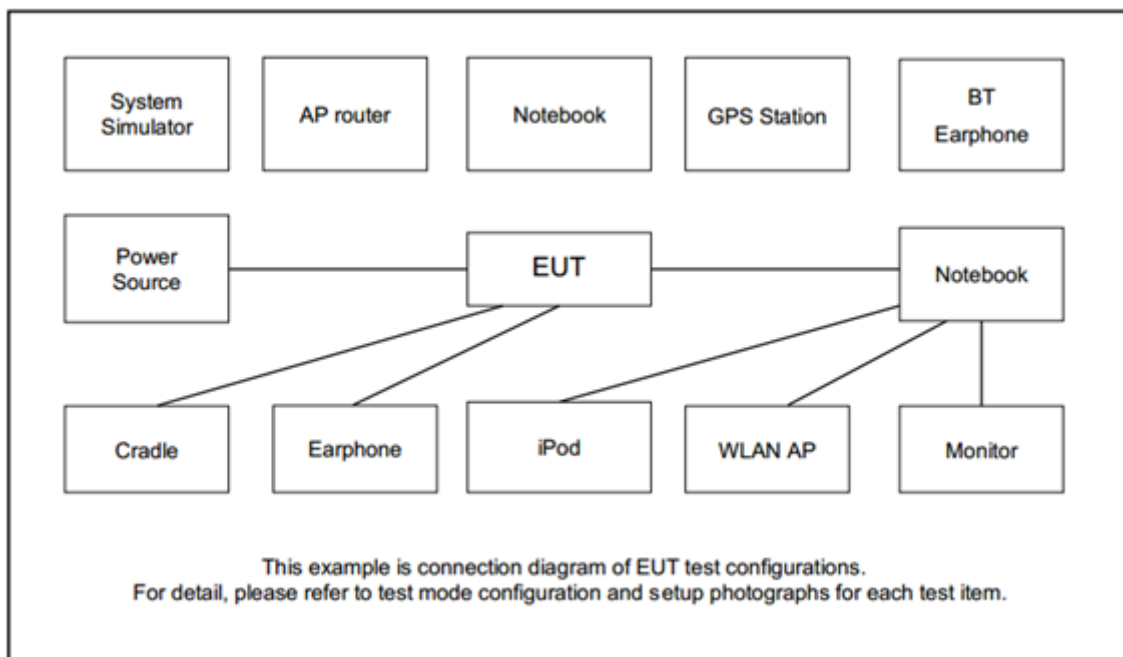
### 2.1 Descriptions of Test Mode

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	
Field Strength of Fundamental Emissions	20dB Spectrum Bandwidth
Radiated Emissions 9kHz~30MHz	Radiated Emissions 30MHz~1GHz

### 2.2 Connection Diagram of Test System



### 2.3 Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Wacom Pen	HP	ESP-241BW-01A-6	N/A	N/A	N/A

### 2.4 EUT Operation Test Setup

The Wireless Charging with Wacom Pen via wireless power transfer function.

### 3. Test Results

#### 3.1 20dB and 99% OBW Spectrum Bandwidth Measurement

##### 3.1.1 Limit

Reporting only

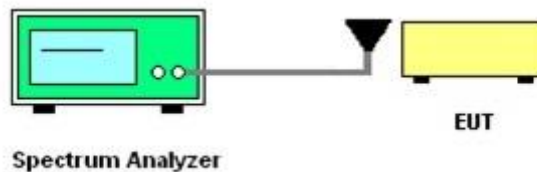
##### 3.1.2 Measuring Instruments

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

##### 3.1.3 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 300 Hz and the video bandwidth of 300 Hz were used.
3. Measured the spectrum width with power higher than 20dB below carrier.
4. Measured the 99% OBW.

##### 3.1.4 Test Setup



##### 3.1.5 Test Result of RF Near Field Test Items

Please refer to Appendix B.





### 3.2 Radiated Emissions Measurement

#### 3.2.1 Limit

The field strength of any emissions which appear band shall not exceed the general radiated emissions limits.

Frequencies (MHz)	Field Strength ( $\mu\text{V/m}$ )	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

#### 3.2.2 Measuring Instruments

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

#### 3.2.3 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.

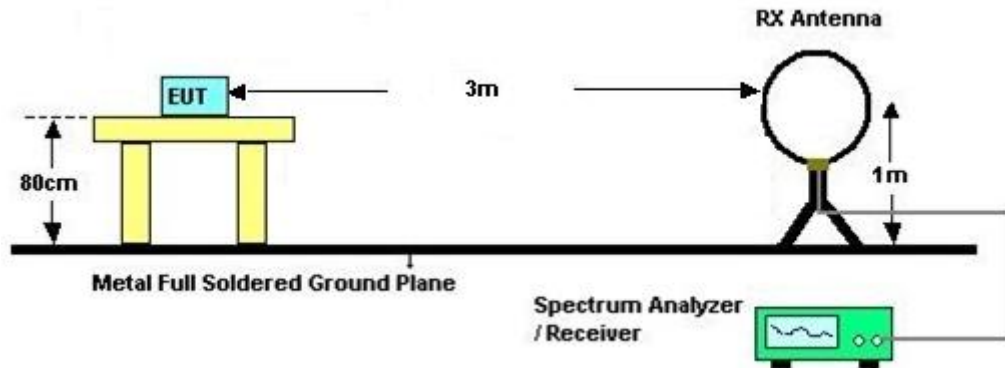


### **3.2.4 Test Procedures**

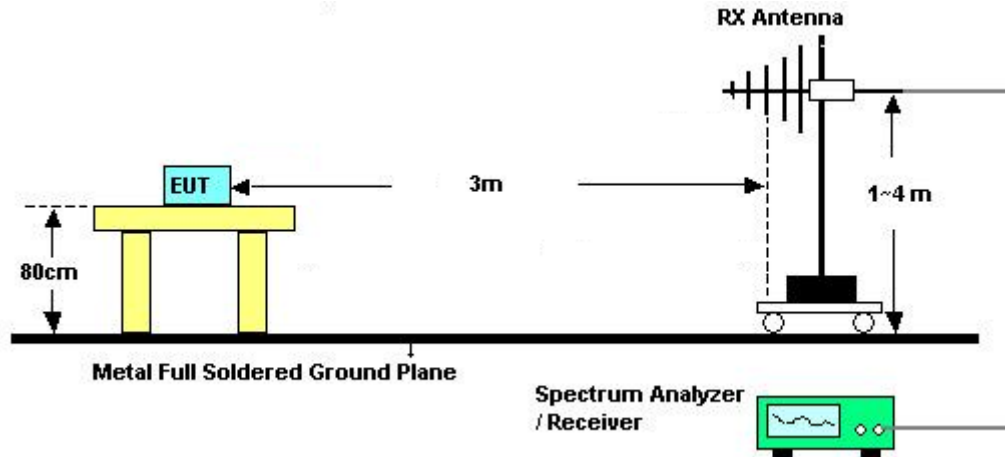
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was 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 was scan (from 1 M to 4 M) and then the turntable was 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 30MHz, loop antenna has to be used for measurement and the recorded data should 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 “-“.

### 3.2.5 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



### 3.2.6 Test Result of Radiated Emissions Measurement

Please refer to Appendix C.

**Remark:**

1. 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.
2. According to C63.10 radiated test, the EUT pre-scanned horizontal, vertical, and ground-parallel three polarization's, the worst case is horizontal & vertical polarization, test data of two mode was reported.



### **3.3 Antenna Requirements**

#### **3.3.1 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.

#### **3.3.2 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	AC POWER	AFC-500W	F104070011	50Hz~60Hz	Sep. 14, 2021	Aug. 09, 2022	Sep. 13, 2022	RF Near Field (TH03-HY)
Hygrometer	TECPEL	DTM-303B	TP210073	N/A	Nov. 16, 2021	Aug. 09, 2022	Nov. 15, 2022	RF Near Field (TH03-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP30	101329	9kHz~30GHz	Sep. 30, 2021	Aug. 09, 2022	Sep. 29, 2022	RF Near Field (TH03-HY)
Temperature & Humidity Cabinet Chamber	ESPEC	LHU-113	1012005860	-20°C~85°C	Dec. 09, 2021	Aug. 09, 2022	Dec. 08, 2022	RF Near Field (TH03-HY)
Nearby field probe	LANGER EMV-TECHNIK	LF-U5	02-559	100 kHz up to 50 MHz	Apr. 04, 2022	Aug. 09, 2022	Apr. 03, 2023	RF Near Field (TH03-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N-06	35419 & 03	30MHz~1GHz	Apr. 24, 2022	Aug. 19, 2022	Apr. 23, 2023	Radiation (03CH07-HY)
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz~30 MHz	Mar. 18, 2022	Aug. 19, 2022	Mar. 17, 2023	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz~1GHz	Oct. 04, 2021	Aug. 19, 2022	Oct. 03, 2022	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY15682/4	30MHz to 18GHz	Feb. 23, 2022	Aug. 19, 2022	Feb. 22, 2023	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY24971/4	9kHz to 18GHz	Feb. 23, 2022	Aug. 19, 2022	Feb. 22, 2023	Radiation (03CH07-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY28655/4	9kHz to 18GHz	Feb. 23, 2022	Aug. 19, 2022	Feb. 22, 2023	Radiation (03CH07-HY)
Controller	EMEC	EM1000	N/A	Control Ant Mast	N/A	Aug. 19, 2022	N/A	Radiation (03CH07-HY)
Controller	MF	MF-7802	N/A	Control Turn table	N/A	Aug. 19, 2022	N/A	Radiation (03CH07-HY)
Antenna Mast	EMEC	AM-BS-4500E	N/A	Boresight mast 1M~4M	N/A	Aug. 19, 2022	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Aug. 19, 2022	N/A	Radiation (03CH07-HY)
Software	Audix	E3	N/A	N/A	N/A	Aug. 19, 2022	N/A	Radiation (03CH07-HY)
USB Data Logger	TECPEL	TR-32	HE17XB2495	N/A	Mar. 07, 2022	Aug. 19, 2022	Mar. 06, 2023	Radiation (03CH07-HY)
EMI Test Receiver	Agilent	N9038A(MXE)	MY53290053	20Hz~26.5GHz	May 27, 2022	Aug. 19, 2022	May 26, 2023	Radiation (03CH07-HY)



## 5. Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	3.7 dB
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### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ )	5.1 dB
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## Appendix A. Test Results of RF Near Field Test Items

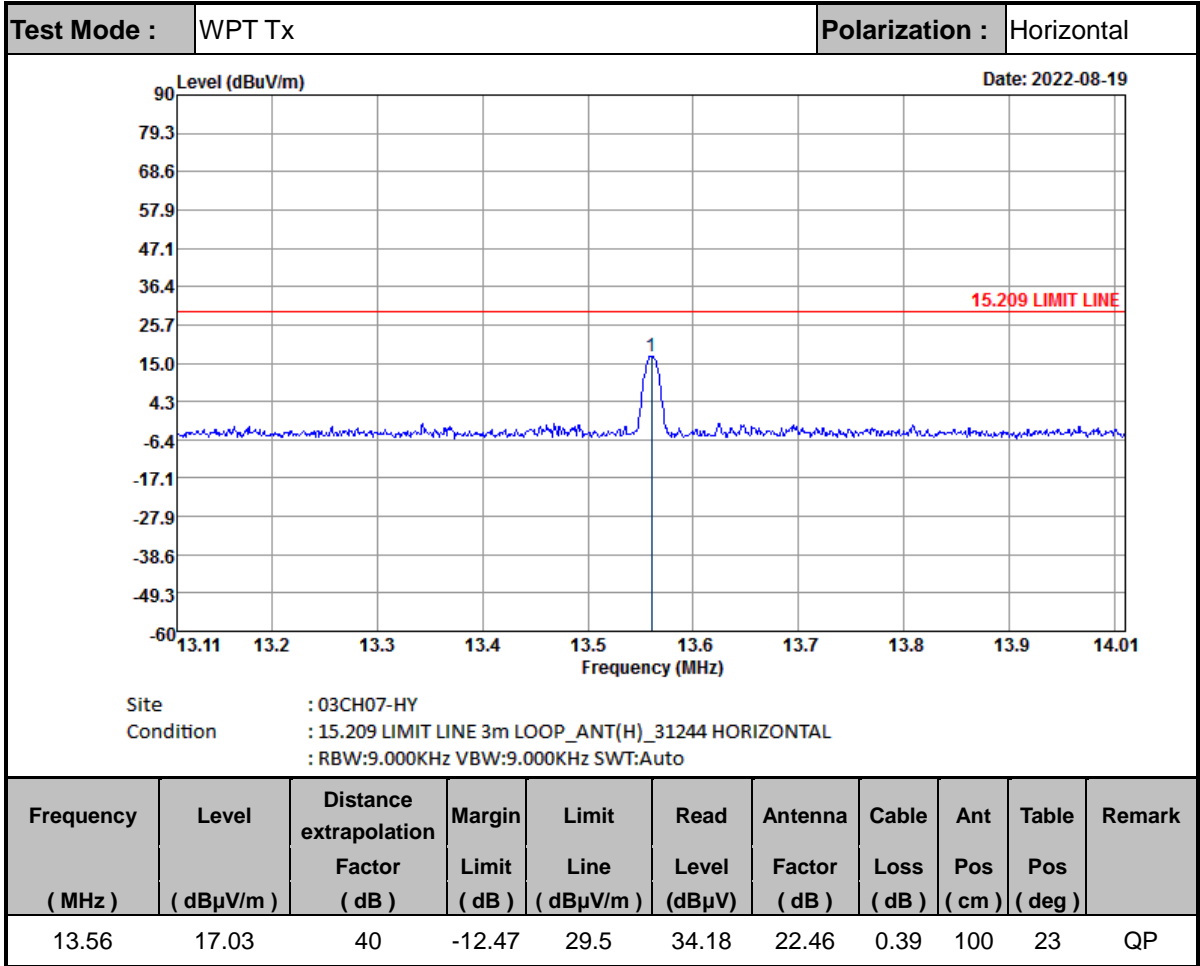
Test mode		WPT Charging with touch pen	
<b>20dB Bandwidth (kHz)</b>	2.64	<b>99% Occupied BW(kHz)</b>	2.24

**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.

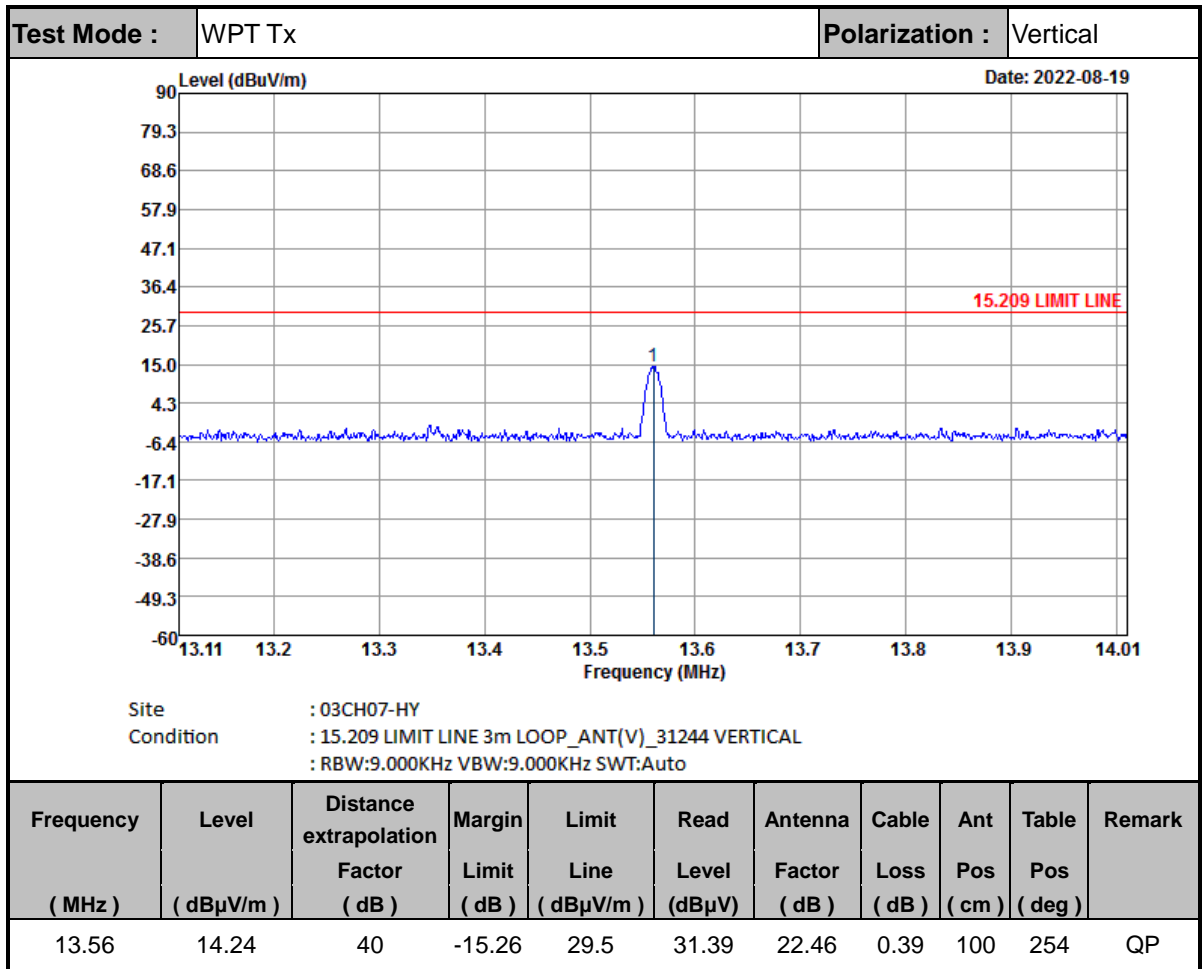


## Appendix B. Test Results of Radiated Test Items

### B1. Test Result of Field Strength of Fundamental Emissions





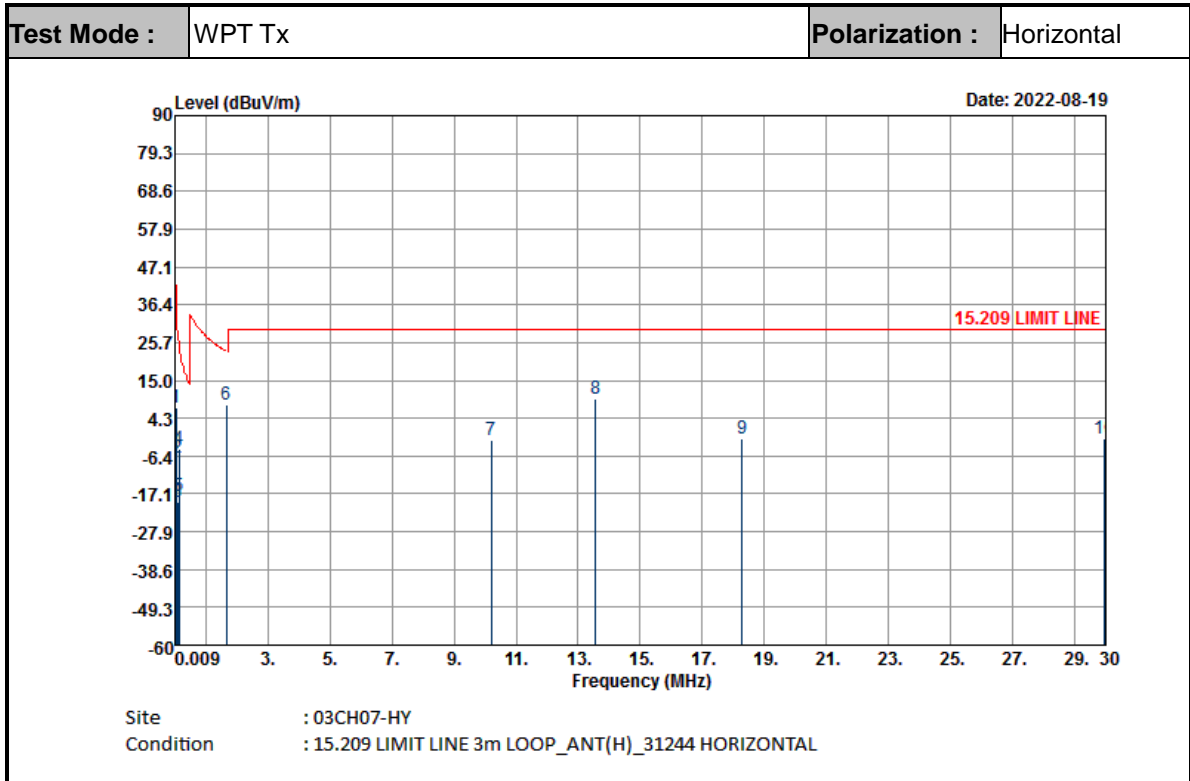


**Note:**

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



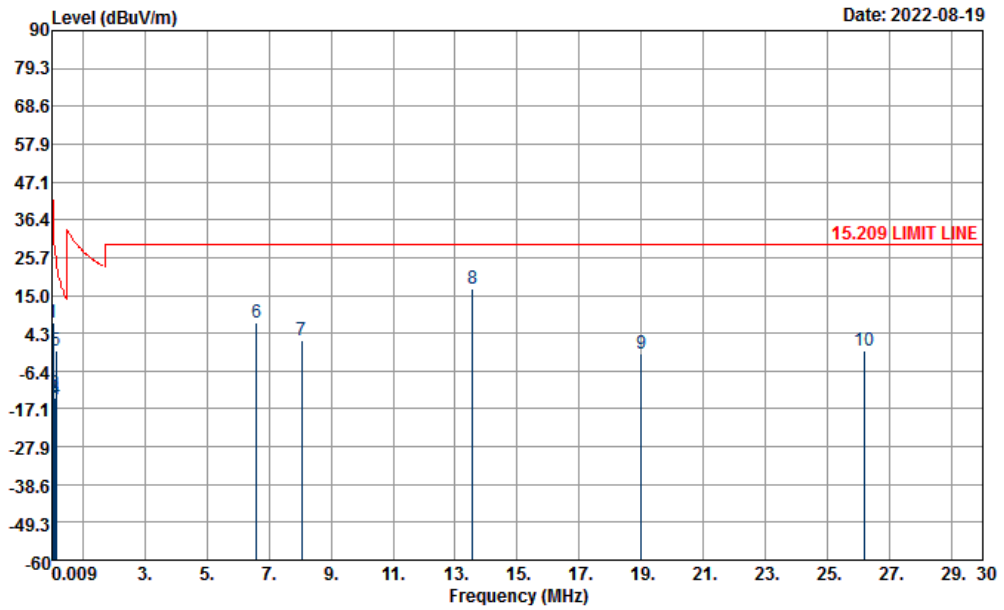
**B2. Results of Radiated Spurious Emissions (9 kHz~30MHz)**



Frequency ( MHz )	Level ( dBμV/m )	Distance extrapolation Factor ( dB )	Margin Limit ( dB )	Limit Line ( dBμV/m )	Read Level (dBμV)	Antenna Factor ( dB )	Cable Loss ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
0.05011	7.36	80	-26.25	33.61	66.54	20.8	0.02	-	-	Average
0.06	-6.85	80	-38.89	32.04	52.55	20.58	0.02	-	-	Average
0.0902	-19.26	80	-47.76	28.5	40.8	19.92	0.02	-	-	QP
0.15	-4.48	80	-28.56	24.08	55.66	19.83	0.03	-	-	Average
0.15	-17.84	80	-41.92	24.08	42.3	19.83	0.03	-	-	Average
1.677	8.25	40	-14.87	23.12	28.04	20.06	0.15	-	-	QP
10.192	-1.83	40	-31.33	29.5	15.72	22.12	0.33	-	-	QP
13.56	9.7	40	-19.8	29.5	26.85	22.46	0.39	-	-	QP
18.286	-1.41	40	-30.91	29.5	15.17	22.93	0.49	-	-	QP
29.955	-1.7	40	-31.2	29.5	14.03	23.3	0.97	-	-	QP



<b>Test Mode :</b>	WPT Tx	<b>Polarization :</b>	Vertical
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Site : 03CH07-HY  
 Condition : 15.209 LIMIT LINE 3m LOOP\_ANT(V)\_31244 VERTICAL

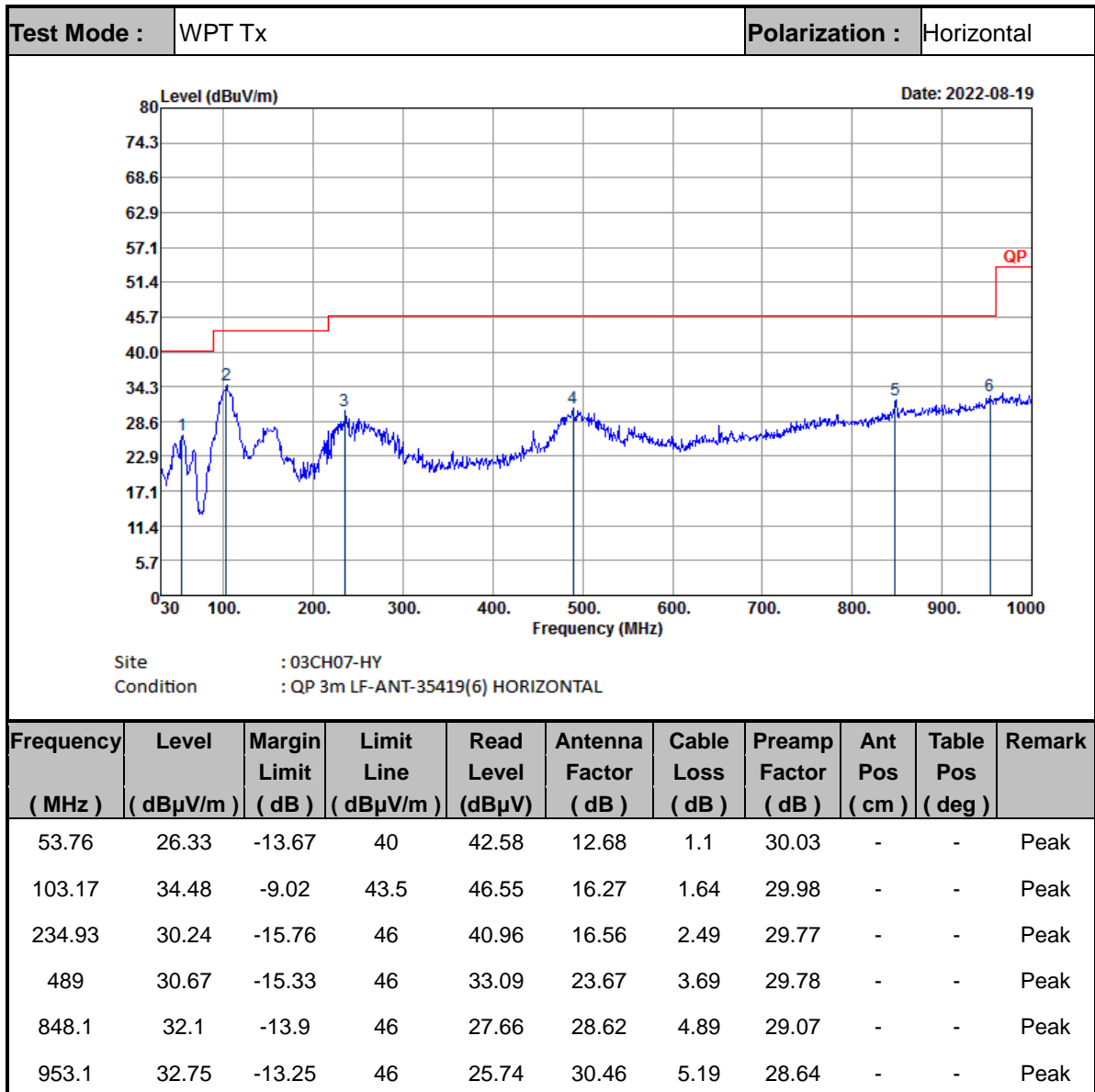
Frequency ( MHz )	Level ( dBuV/m )	Distance extrapolation Factor ( dB )	Margin Limit ( dB )	Limit Line ( dBuV/m )	Read Level (dBuV)	Antenna Factor ( dB )	Cable Loss ( dB )	Ant Pos ( cm )	Table Pos ( deg )	Remark
0.05011	7.34	80	-26.27	33.61	66.52	20.8	0.02	-	-	Average
0.06	-12.82	80	-44.86	32.04	46.58	20.58	0.02	-	-	Average
0.0902	-14.24	80	-42.74	28.5	45.82	19.92	0.02	-	-	QP
0.15	-14.26	80	-38.34	24.08	45.88	19.83	0.03	-	-	Average
0.15034	-0.8	80	-24.86	24.06	59.34	19.83	0.03	-	-	Average
6.611	7.46	40	-22.04	29.5	26.3	20.88	0.28	-	-	QP
8.048	2.39	40	-27.11	29.5	20.69	21.4	0.3	-	-	QP
13.56	17.03	40	-12.47	29.5	34.18	22.46	0.39	-	-	QP
18.997	-1.47	40	-30.97	29.5	15.02	23	0.51	-	-	QP
26.18	-0.77	40	-30.27	29.5	15.32	23.22	0.69	-	-	QP

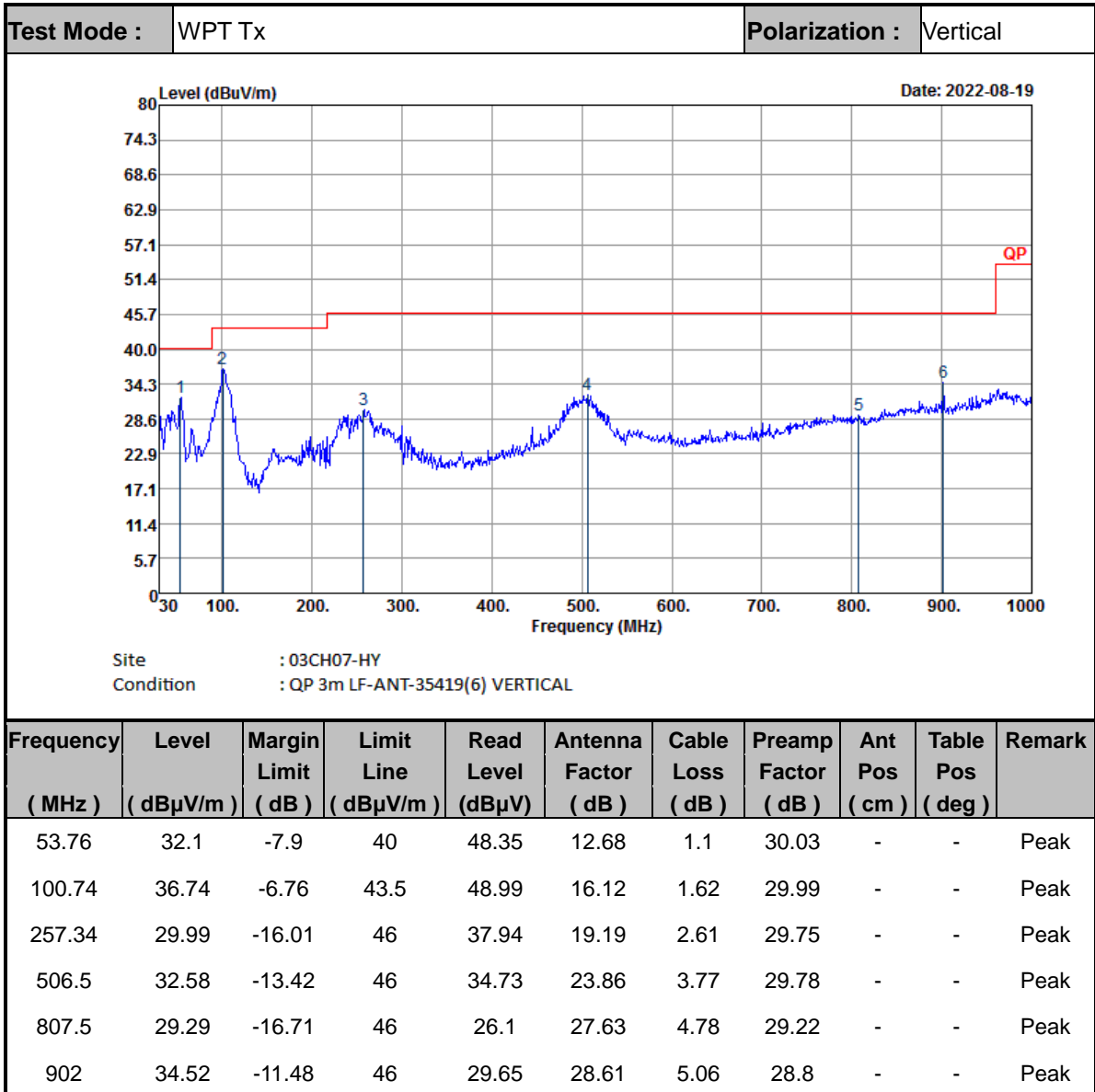
**Note:**

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= Read Level + Antenna Factor + Cable loss + distance extrapolation factor.



**B3. Results of Radiated Spurious Emissions (30MHz~1GHz)**





**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 and emission level has at least 6dB margin against limit or emission is noise floor only.