

TEST REPORT

Applicant	Shenzhen Qianfenyi Intelligent Technology Co., LTD.
Address	302, Floor 3 Chuangxingda Commercial Center Building, Bao'an District, Shenzhen, Guangdong, P.R. China

Manufacturer or Supplier	Shenzhen Qianfenyi Intelligent Technology Co., LTD.
Address	302, Floor 3 Chuangxingda Commercial Center Building, Bao'an District, Shenzhen, Guangdong, P.R. China
Product	HP Wireless Rechargeable MPP2.0 Tilt Sparkling Black Pen
Brand Name	HP
Model	TPA-M003P
Additional Model & Model Difference	N/A
Date of tests	Feb. 03, 2023 ~ Feb. 10, 2023

The submitted sample of the above equipment has been tested for according to the requirements of the following standards:

☒ **FCC Part 15, Subpart C**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Tested by Andrew Sha Project Engineer / EMC Department	Approved by Glyn He Supervisor/ EMC Department
	
Date: Feb. 16, 2023	

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Test Report No.: RF2301WDG0150

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF230WDG0150	Original release	Feb. 16, 2023

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart C			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
§15.203	Antenna Requirement	PASS	No antenna connector is used.
§15.207	AC Power Conducted Emission	N/A	EUT is powered by battery
§15.209	Radiated Emission	PASS	Meet the requirement of limit.
§15.215 (c)	20dB Bandwidth	PASS	Meet the requirement of limit.

2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Radiated emissions	9KHz ~ 30MHz	2.16dB
	30MHz ~ 1GMHz	3.82dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	HP Wireless Rechargeable MPP2.0 Tilt Sparkling Black Pen
MODEL NO.	TPA-M003P
ADDITIONAL MODELS	N/A
FCC ID	2AYOTTPA-M003P
POWER SUPPLY	DC 3.7V Supplied by Li-ion Battery
MODULATION TYPE	PWM
OPERATING FREQUENCY	18kHz~89kHz & 111-210kHz for penpoint TX
ANTENNA TYPE	Integrated antenna
CABLE SUPPLIED	N/A

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
3. Please refer to the EUT photo document (Reference No.: 2301WDG0150) for detailed product photo.

3.2 DESCRIPTION OF TEST MODES

The EUT was tested under the following modes the final worst mode was marked in boldface and recorded in this report.

TEST FREQUENCY	TEST MODE	TEST VOLTAGE
174.36KHz	TX transmitting	DC 3.7V from Battery

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C
ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

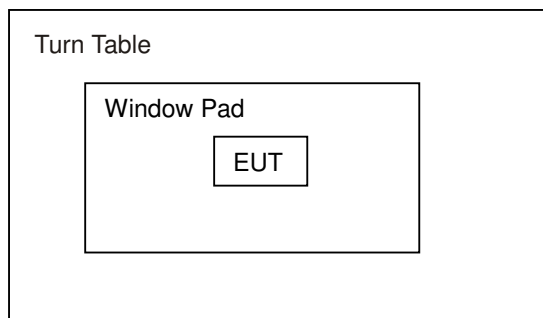
3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Windows Pad	Microsoft	1724	N/A	N/A

NO.	DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	N/A

3.5 CONFIGURATION OF SYSTEM UNDER TEST





4 EMISSION TEST

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

TEST STANDARD: FCC Part 15, Subpart C, Section 15.209

Emissions radiated outside of the specified bands, shall be according to the general radiated limits as following:

FREQUENCIES (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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.
4. The measured field strength was extrapolated to distance 30 meters, using the formula that the limit of field strength varies as the inverse distance square (40dB per decade of distance)



4.1.2 TEST INSTRUMENTS

FREQUENCY 9KHz-30MHz

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101564	Jan. 10, 24
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	1519B-045	Apr. 27, 23
Amplifier	Burgeon	BPA-530	100210	Mar. 09, 23
Coaxial RF Cable	/	/	/	Oct. 07, 23
Test Software	ADT	ADT_Radiated_V8.7.07	N/A	N/A

- NOTES:** 1. The test was performed in 10m Chamber.
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

FREQUENCY 30MHz-1GHz

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU40	100449	Jan. 10, 24
Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	01282	Aug. 21, 23
Pre-Amplifier	Burgeon	BPA-530	100220	Mar. 08, 23
3m Semi-anechoic Chamber	Burgeon	9m*6m*6m	NSEMC003	Oct. 15, 23
Coaxial RF Cable(3m Below 1G)	/	/	/	Aug. 29, 23
Test software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A

- NOTES:** 1. The test was performed in 966 Chamber
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
3. The FCC Site Registration No. is 749762.

4.1.3 TEST PROCEDURE

< Below 30MHz >

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meters Semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

<30MHz~1GHz >

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

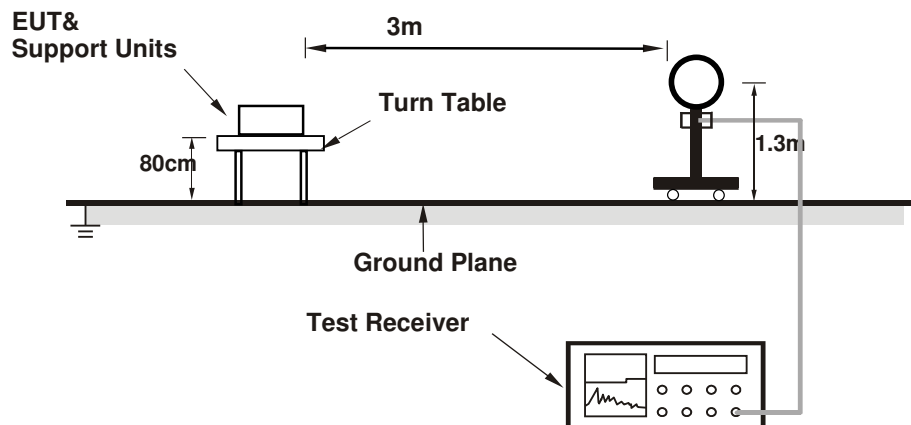
1. The resolution bandwidth of test receiver/spectrum analyzer is 200Hz for Quasi-peak detection (QP) at fundamental frequency 9K-150KHz;
2. The resolution bandwidth of test receiver/spectrum analyzer is 9KHz for Quasi-peak detection (QP) at fundamental frequency 150K-30MHz;
3. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at radiated spurious emission frequency 30MHz-1GHz.

4.1.4 DEVIATION FROM TEST STANDARD

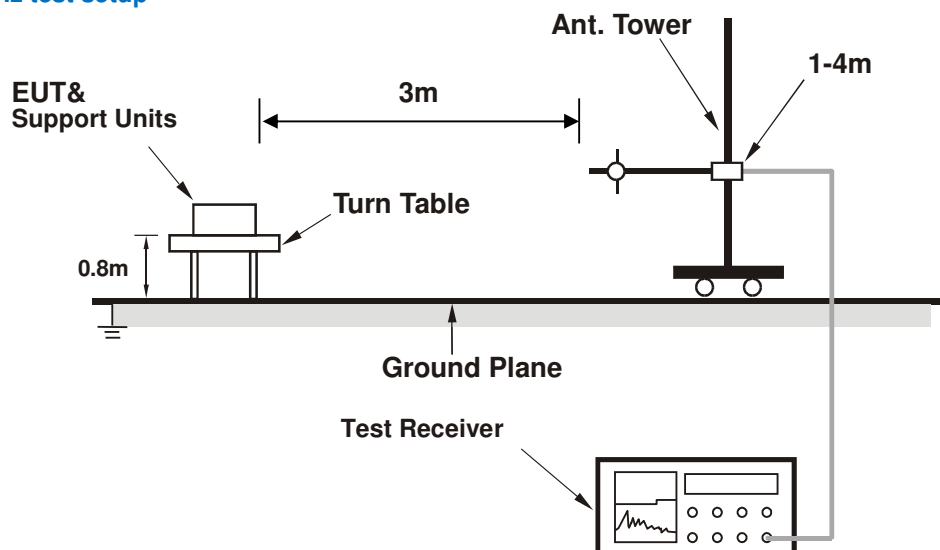
No deviation.

4.1.5 TEST SETUP

Below 30MHz test setup



Below 1GHz test setup



Note: For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT OPERATING CONDITIONS

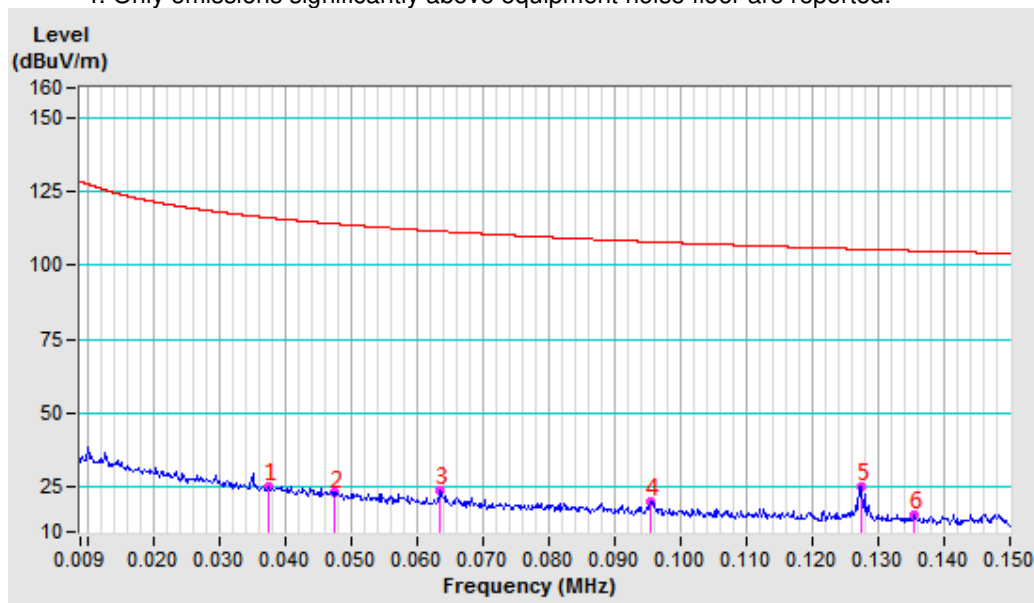
- Turn on the power supply of the EUT.
- EUT was operated according to the type description in manufacturer's specifications or the User's Manual.

4.1.7 TEST RESULTS

TEST MODE	Penpoint TX	FREQUENCY RANGE	9 -150KHz
TEST VOLTAGE	DC 3.7V Supplied by Battery	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 200Hz
ENVIRONMENTAL CONDITIONS	21deg. C, 54% RH	TESTED BY: Alex	

ANTENNA POLARITY & TEST DISTANCE: PARALLEL AT 3M								
No	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	0.0375	-11.65	36.79	25.14	116.12	-90.98	100	43
2	0.0476	-11.78	34.87	23.09	114.05	-90.96	100	25
3	0.0636	-11.82	35.73	23.91	111.53	-87.62	100	63
4	0.0955	-11.67	32.15	20.48	108.00	-87.52	100	85
5	0.1274	-11.68	37.23	25.55	105.50	-79.95	100	96
6	0.1355	-11.70	27.53	15.83	104.96	-89.13	100	44

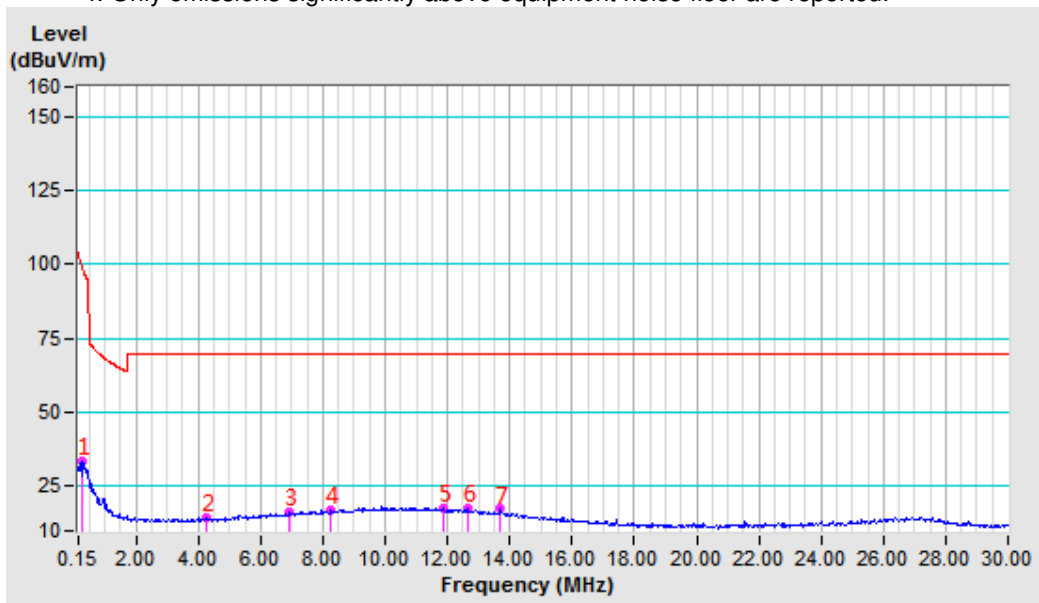
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 0.009-0.15MHz.
 4. Only emissions significantly above equipment noise floor are reported.



TEST MODE	Penpoint TX	FREQUENCY RANGE	150KHz-30MHz
TEST VOLTAGE	DC 3.7V Supplied by Battery	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 200Hz
ENVIRONMENTAL CONDITIONS	21deg. C, 54% RH	TESTED BY:	Alex

ANTENNA POLARITY & TEST DISTANCE: PARALLEL AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	0.2560	-11.73	45.07	33.34	99.44	-66.10	100	240
2	4.2561	-11.71	26.37	14.66	69.54	-54.88	100	232
3	6.8979	-11.65	27.93	16.28	69.54	-53.26	100	288
4	8.2517	-11.58	28.81	17.23	69.54	-52.31	100	100
5	11.8503	-11.55	29.37	17.82	69.54	-51.72	100	318
6	12.6369	-11.55	29.16	17.61	69.54	-51.93	100	79
7	13.7071	-11.55	28.93	17.38	69.54	-52.16	100	210

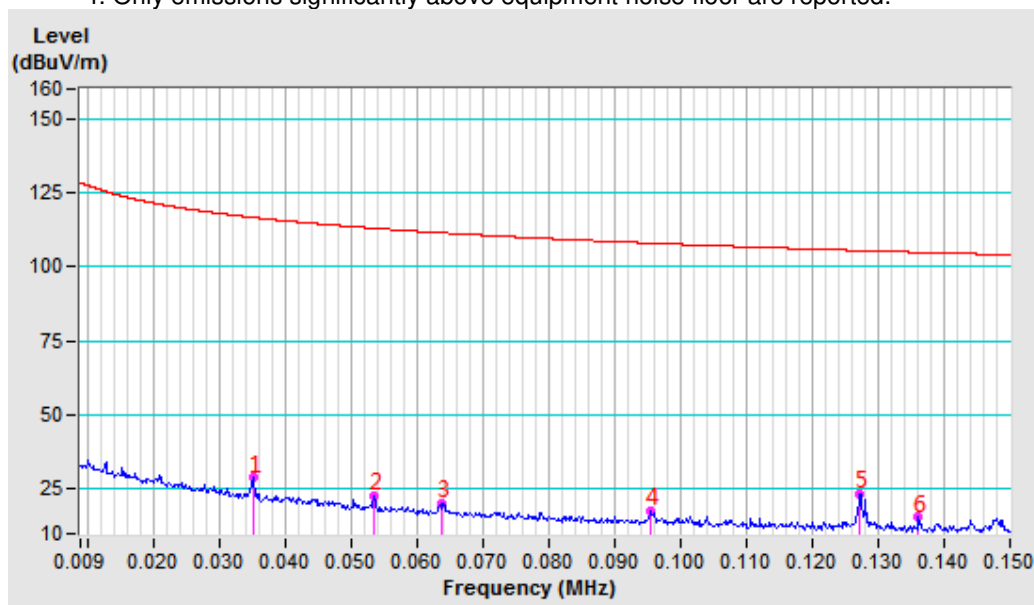
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 0.15-30MHz.
 4. Only emissions significantly above equipment noise floor are reported.



TEST MODE	Penpoint TX	FREQUENCY RANGE	9 -150KHz
TEST VOLTAGE	DC 3.7V Supplied by Battery	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 200Hz
ENVIRONMENTAL CONDITIONS	21deg. C, 54% RH	TESTED BY: Alex	

ANTENNA POLARITY & TEST DISTANCE: PERPENDICULAR AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	0.0352	-11.62	40.45	28.83	116.67	-87.84	100	34
2	0.0535	-11.81	34.31	22.50	113.04	-90.54	100	55
3	0.0637	-11.82	31.98	20.16	111.52	-91.36	100	79
4	0.0956	-11.67	29.53	17.86	107.99	-90.13	100	25
5	0.1273	-11.68	34.81	23.13	105.51	-82.38	100	43
6	0.1361	-11.70	27.14	15.44	104.92	-89.48	100	33

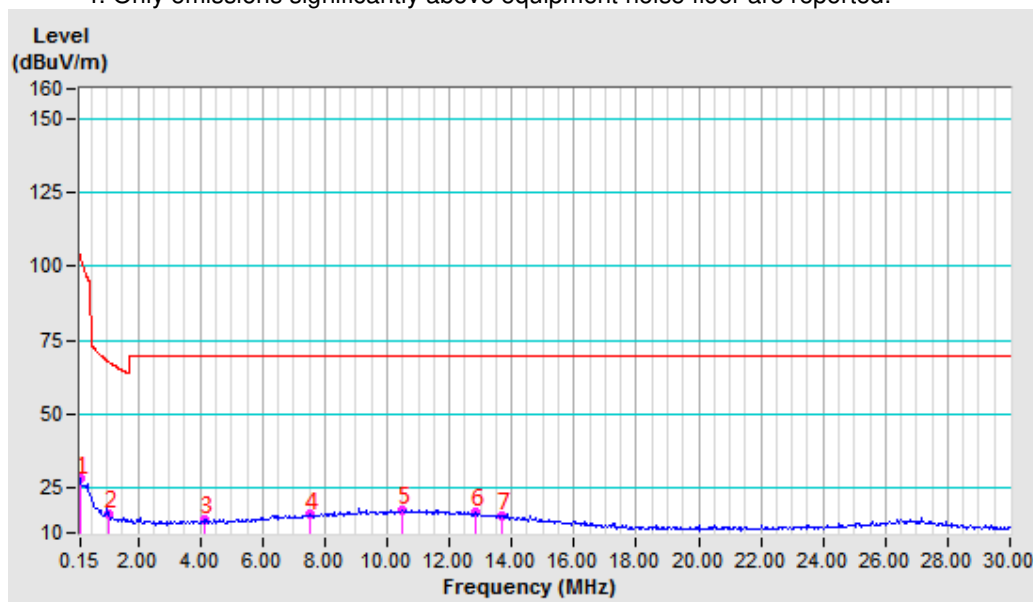
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 0.009-0.15MHz.
 4. Only emissions significantly above equipment noise floor are reported.



TEST MODE	Penpoint TX	FREQUENCY RANGE	150KHz-30MHz
TEST VOLTAGE	DC 3.7V Supplied by Battery	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 200Hz
ENVIRONMENTAL CONDITIONS	21deg. C, 54% RH	TESTED BY: Summer	

ANTENNA POLARITY & TEST DISTANCE: PERPENDICULAR AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	0.1515	-11.72	39.84	28.12	103.99	-75.87	100	92
2	1.0769	-11.70	27.83	16.13	67.59	-51.46	100	132
3	4.1128	-11.72	26.08	14.36	69.54	-55.18	100	26
4	7.5054	-11.61	27.70	16.09	69.54	-53.45	100	53
5	10.5025	-11.56	29.19	17.63	69.54	-51.91	100	85
6	12.8488	-11.55	28.47	16.92	69.54	-52.62	100	76
7	13.6712	-11.55	27.21	15.66	69.54	-53.88	100	4

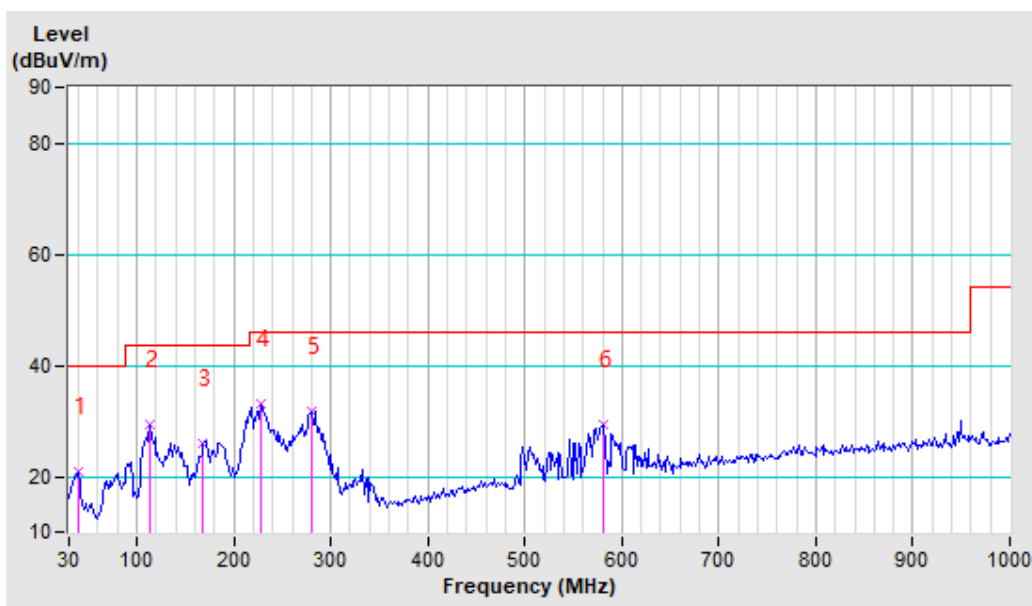
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 0.15-30MHz
 4. Only emissions significantly above equipment noise floor are reported.



TEST MODE	Penpoint TX	FREQUENCY RANGE	30-1000MHz
TEST VOLTAGE	DC 3.7V Supplied by Battery	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	23deg. C, 55% RH	TESTED BY: Alex	

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	39.330	-17.59	38.55	20.96	40.00	-19.04	150	0
2	113.940	-18.97	48.21	29.24	43.50	-14.26	150	0
3	168.350	-16.11	42.14	26.03	43.50	-17.47	150	0
4	227.420	-17.21	50.38	33.17	46.00	-12.83	150	359
5	280.270	-15.14	46.85	31.71	46.00	-14.29	150	341
6	580.290	-7.33	36.66	29.33	46.00	-16.67	150	322

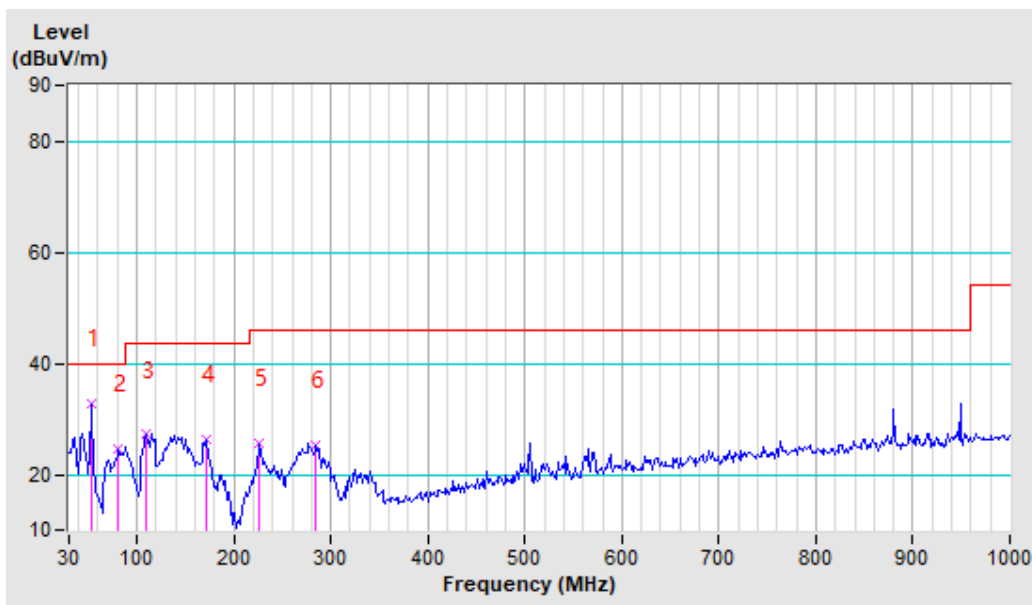
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 30MHz to 1000MHz.
 4. Only emissions significantly above equipment noise floor are reported.



TEST MODE	Penpoint TX	FREQUENCY RANGE	30-1000MHz
TEST VOLTAGE	DC 3.7V Supplied by Battery	DETECTOR FUNCTION & RESOLUTION BANDWIDTH	Quasi-Peak, 120kHz
ENVIRONMENTAL CONDITIONS	21deg. C, 67% RH	TESTED BY: Alex	

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	53.320	-16.52	49.32	32.80	40.00	-7.20	150	123
2	81.300	-21.40	45.98	24.58	40.00	-15.42	150	225
3	109.280	-19.33	46.50	27.17	43.50	-16.33	150	115
4	171.460	-16.37	42.76	26.39	43.50	-17.11	150	204
5	225.870	-17.28	42.94	25.66	46.00	-20.34	150	116
6	284.940	-14.97	40.34	25.37	46.00	-20.63	150	163

- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
 2. Negative sign (-) in the margin column signify levels below the limit.
 3. Frequency range scanned: 30MHz to 1000MHz.
 4. Only emissions significantly above equipment noise floor are reported.



4.2 20DB BANDWIDTH MEASUREMENT

4.2.1 LIMITS OF 20dB BANDWIDTH MEASUREMENT

The field strength of any emissions appearing between the band edges and out of band shall be attenuated at least 20 dB below the level of the unmodulated carrier or to the general limits in Section 15.209.

4.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
Humid & Temp Programmable Tester	Haida	HD-225T	110807201	Nov. 02, 23
Oscilloscope	Agilent	DSO9254A	MY51260160	Jul. 27, 23
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Jan. 11, 24
Signal Generator	Agilent	N5183A	MY50140980	Jul. 20, 23

NOTE:

1. The test was performed in RF Oven room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

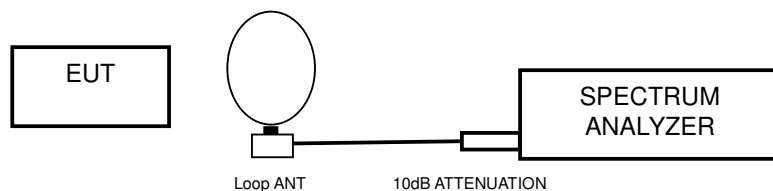
4.2.3 TEST PROCEDURE

- a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT, then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- c. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
- d. Repeat above procedures until all frequencies measured were complete.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



4.2.6 EUT OPERATING CONDITION

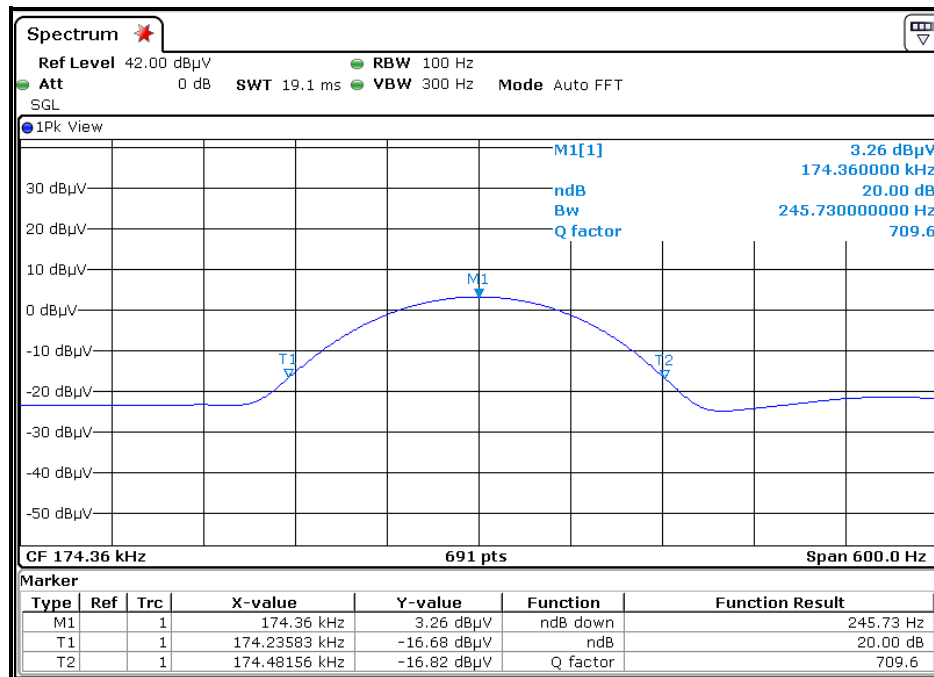
- a. Turn on the EUT.
- b. The EUT tested in charging mode and standby mode respectively.

4.2.7 TEST RESULTS

TEST MODE	CHANNEL FREQUENCY (KHz)	20dB BANDWIDTH (Hz)
Penpoint Transmitting	174.36	245.7

Lower & Upper Test Frequency Point (MHz)	Test Frequency (KHz)	P/F
Lower	174.2358	PASS
Upper	174.4816	PASS

Test Data:





Test Report No.: RF2301WDG0150

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



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6 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications were made to the EUT by the lab during the test.

---END---