

# TEST REPORT



Applicant	ALLSTAR MARKETING GROUP
Address	2 SKYLINE DRIVE HAWTHORNE NY 10532

Manufacturer or Supplier	ShenZhen V-Start Development co.,LTD.
Address	Room 1401 Zhongxi ECO building, Baoan district, Shenzhen, Guangdong, China
Product	EASY TOUCH SPEAKER
Brand Name	N/A
Model	VS2201
Additional Model & Model Difference	EST01106, see items 3.1
Date of tests	Jan. 25, 2022 ~ Feb. 28, 2022

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 Lucas Chen Project Engineer / EMC Department	Approved by Glyn He Assistant Manager / EMC Department
	
	Date: Mar. 31, 2022

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Test Report No.: RF2201WDG0203

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF2201WDG0203	Original release	Mar. 31, 2022

## 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	PASS	Meet the requirement of limit.
§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
Conducted emissions	9kHz~30MHz	3.05dB
Radiated emissions	9KHz ~ 30MHz	2.16dB
	30MHz ~ 1GMHz	3.63dB

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

<b>PRODUCT</b>	EASY TOUCH SPEAKER
<b>MODEL NO.</b>	VS2201
<b>ADDITIONAL MODEL</b>	EST01106
<b>SAMPLE STATUS</b>	Engineering sample
<b>FCC ID</b>	2APZ3-EST01106
<b>POWER SUPPLY</b>	DC 5V from USB Host Unit or DC 3.7V from Li-ion Battery; Wireless Charging: 5W MAX. (see notes 4)
<b>MODULATION TYPE</b>	FSK
<b>OPERATING FREQUENCY</b>	111KHz ~ 205KHz
<b>ANTENNA TYPE</b>	Coil Antenna
<b>FIELD STRENGTH</b>	86.28dBuV/m (Measured Maximum)
<b>CABLE SUPPLIED</b>	USB-A to 2*Micro USB Cable: Unshielded, Detachable, 40cm

**NOTES:**

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.: 2201WDG0203-1) for detailed product photo.
4. The battery power supply supports only the Aux In and Induction Horn functions, but does not support the wireless charging function. The wireless charging function requires independent DC 5V power supply.
5. Additional model EST01106 is identical with test model VS2201 except the appearance, trade name and model number for marketing purpose.

### 3.2 DESCRIPTION OF TEST MODES

The EUT was tested under the following modes.

TEST FREQUENCY	TEST MODE	TEST VOLTAGE
127.468KHz	Standby	DC 5V from Adapter Input AC 120V/60Hz
126.100KHz	Wireless Charging	

### 3.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis, power supply voltage range and antenna ports  
The worst case was found when positioned on X axis for radiated emission. Following test modes were selected for the final test, and the final worst case is marked in boldface and recorded in the report:

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	RE<1G	PLC	20BW	
A	√	√	√	<b>Standby</b>
B	√	√	√	<b>Wireless Charging</b>

Where **RE<1G**: Radiated Emission below 1GHz  
**20BW**: 20dB Bandwidth

**PLC**: Power Line Conducted Emission

#### **RADIATED EMISSION TEST (BELOW 1GHZ):**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT configure mode	Operating Frequency Range(KHz)	Tested Frequency(KHz)	Modulation Type
A	111-205	127.468	FSK
B	111-205	126.100	FSK

#### **POWER LINE CONDUCTED EMISSION TEST:**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT configure mode	Operating Frequency Range(KHz)	Tested Frequency(KHz)	Modulation Type
A	111-205	127.468	FSK
B	111-205	126.100	FSK

#### **20DB BANDWIDTH TEST:**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT configure mode	Operating Frequency Range(KHz)	Tested Frequency(KHz)	Modulation Type
A	111-205	127.468	FSK
B	111-205	126.100	FSK

**TEST CONDITION:**

Applicable to	Environmental conditions	Input Power(Adapter)	Tested by
<b>RE&lt;1G</b>	22deg. C, 58% RH/ 22deg. C, 55% RH	DC 5V from Adapter Input AC 120V/60Hz	Jay/Panda
<b>PLC</b>	25deg. C, 55% RH	DC 5V from Adapter Input AC 120V/60Hz	Ming Bai
<b>20BW</b>	25deg. C, 54% RH	DC 5V from Adapter Input AC 120V/60Hz	Jeffrey

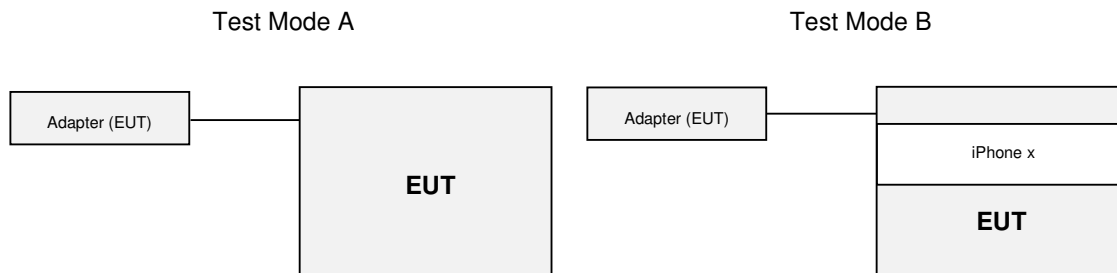
### 3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as a dependent 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	iPhone X	Apple	MQA52CH/A	N/A	N/A
2	Adapter	HUAWEI	N/A	N/A	N/A

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

### 3.5 CONFIGURATION OF SYSTEM UNDER TEST



### 3.6 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.





## 4 EMISSION TEST

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

- NOTES:**
- (1) The lower limit shall apply at the transition frequencies.
  - (2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
  - (3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

#### 4.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Mar. 07,22
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	Mar. 07,22
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	Mar. 07,22
Voltage probe	SCHWARZBECK	TK 9421	TK 9421-176	Aug. 05,22
Coaxial RF Cable	/	CE CABLE	C2310066DG	Jul. 27,22
Test software	ADT	ADT_Conc_V7.3.7	N/A	N/A

- NOTES:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
  2. The test was performed in shielding room 553.

#### 4.1.3 TEST PROCEDURE

The basic test procedure was in accordance with ANSI C63.4:2014 amended as per ANSI C63.4a:2017.

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20dB) were not recorded.

#### NOTES:

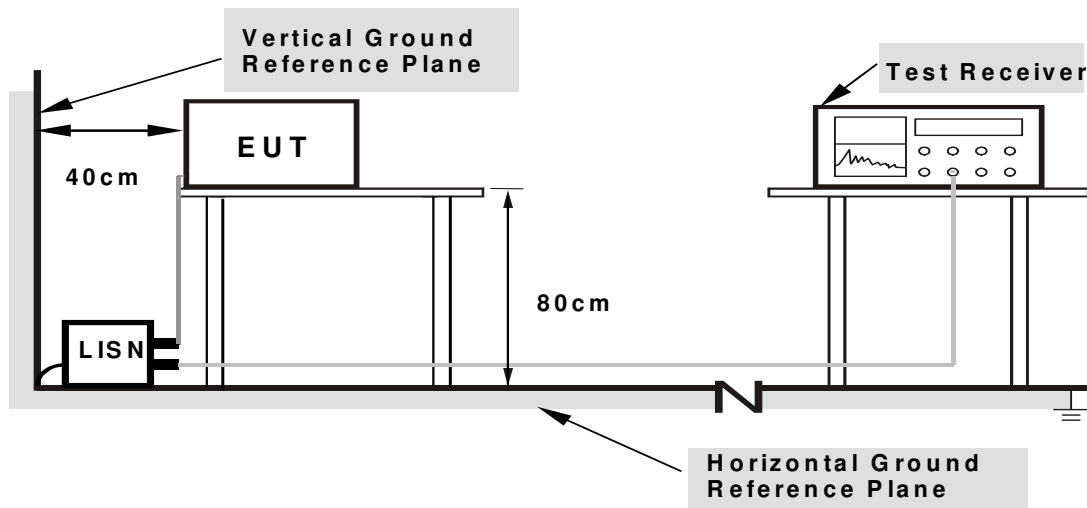
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation.



#### 4.1.5 TEST SETUP



**Note:** 1.Support units were connected to second LISN.  
2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.

#### 4.1.6 EUT OPERATING CONDITIONS

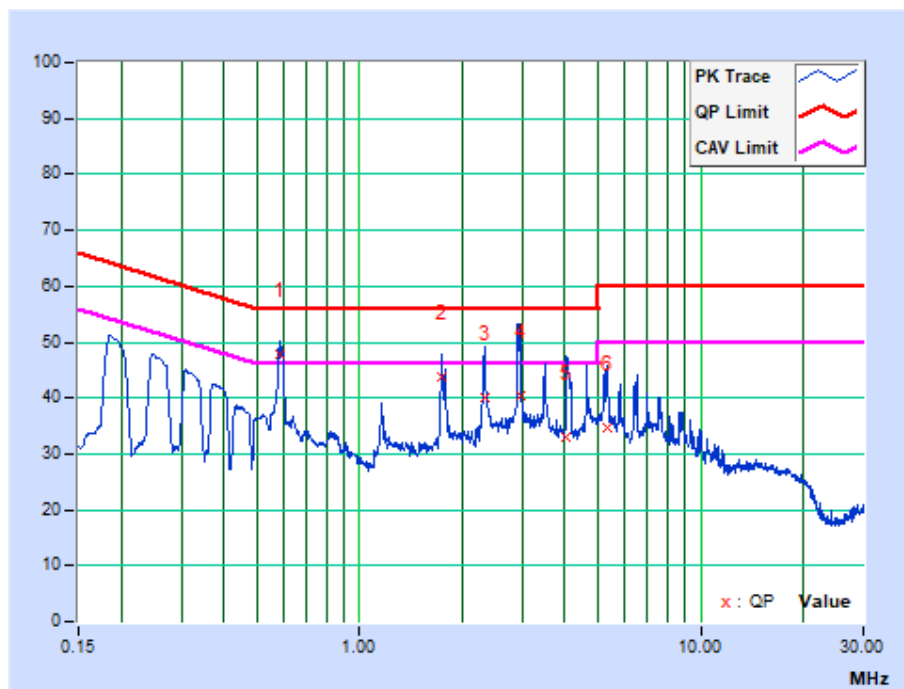
- a. Turned on the power of all equipment.
- b. EUT was operated according to the type description in manufacturer's specifications or the User's Manual.

#### 4.1.7 TEST RESULTS

<b>TEST MODE</b>	Wireless Charging	<b>6DB BANDWIDTH</b>	9 kHz
<b>TEST VOLTAGE</b>	DC 5V from Adapter Input AC 120V 60Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 55% RH	<b>TESTED BY</b>	Ming Bai

No.	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.58220	9.79	37.89	32.50	47.68	42.29	56.00	46.00	-8.32	-3.71
2	1.74525	9.83	33.93	27.21	43.76	37.04	56.00	46.00	-12.24	-8.96
3	2.33467	9.84	30.18	20.37	40.02	30.21	56.00	46.00	-15.98	-15.79
4	2.95312	9.85	30.72	16.90	40.57	26.75	56.00	46.00	-15.43	-19.25
5	4.04700	9.86	23.18	10.76	33.04	20.62	56.00	46.00	-22.96	-25.38
6	5.32097	9.89	24.74	13.72	34.63	23.61	60.00	50.00	-25.37	-26.39

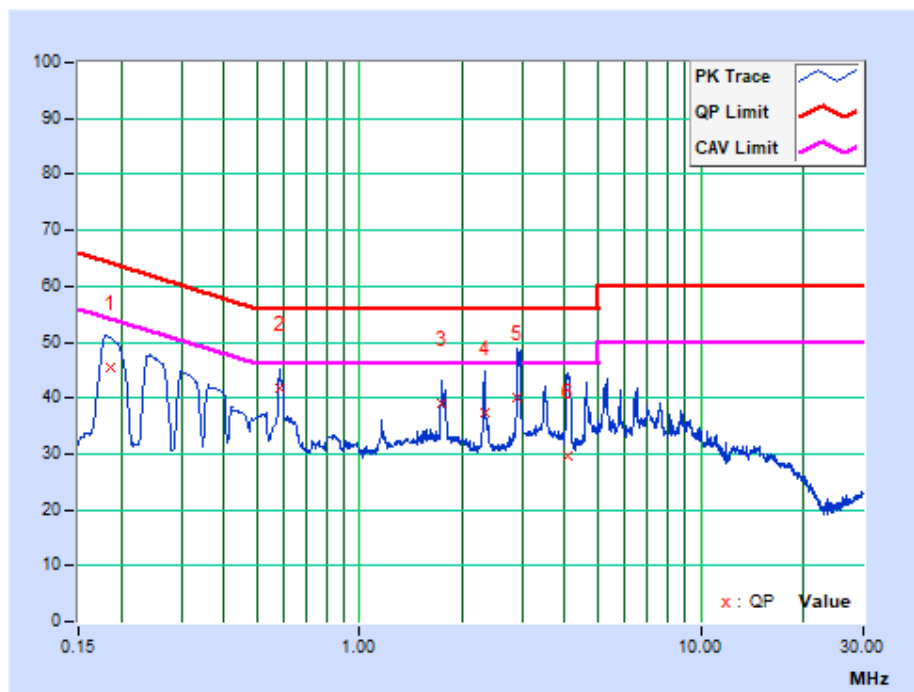
**REMARK:** The emission levels of other frequencies were very low against the limit.



<b>TEST MODE</b>	Wireless Charging	<b>6DB BANDWIDTH</b>	9 kHz
<b>TEST VOLTAGE</b>	DC 5V from Adapter Input AC 120V 60Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 55% RH	<b>TESTED BY</b>	Ming Bai

No.	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.18510	9.77	35.78	16.78	45.55	26.55	64.25	54.25	-18.71	-27.71
2	0.58200	9.78	31.97	29.33	41.75	39.11	56.00	46.00	-14.25	-6.89
3	1.74619	9.82	29.26	25.56	39.08	35.38	56.00	46.00	-16.92	-10.62
4	2.33250	9.82	27.59	17.51	37.41	27.33	56.00	46.00	-18.59	-18.67
5	2.91075	9.82	30.18	23.89	40.00	33.71	56.00	46.00	-16.00	-12.29
6	4.10100	9.85	19.64	12.01	29.49	21.86	56.00	46.00	-26.51	-24.14

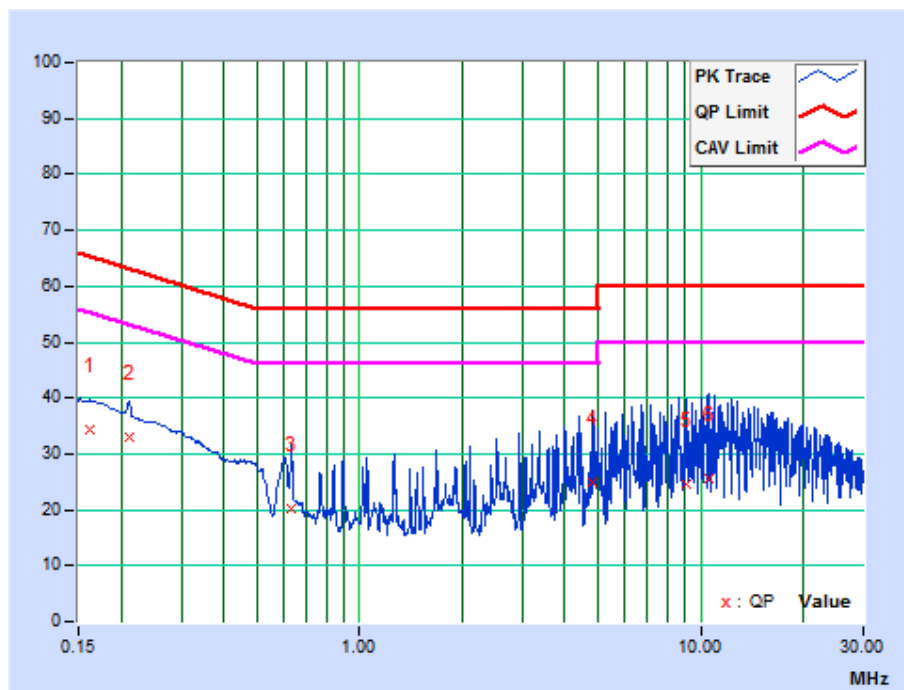
**REMARK:** The emission levels of other frequencies were very low against the limit.



<b>TEST MODE</b>	Standby	<b>6DB BANDWIDTH</b>	9 kHz
<b>TEST VOLTAGE</b>	DC 5V from Adapter Input AC 120V 60Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 55% RH	<b>TESTED BY</b>	Ming Bai

No.	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16125	10.13	24.20	1.70	34.33	11.83	65.40	55.40	-31.07	-43.57
2	0.21011	10.11	22.99	3.52	33.10	13.63	63.20	53.20	-30.10	-39.57
3	0.63150	10.03	10.01	-3.01	20.04	7.02	56.00	46.00	-35.96	-38.98
4	4.83450	10.15	14.78	-0.33	24.93	9.82	56.00	46.00	-31.07	-36.18
5	9.04200	10.16	14.57	-0.69	24.73	9.47	60.00	50.00	-35.27	-40.53
6	10.51800	10.21	15.23	-1.46	25.44	8.75	60.00	50.00	-34.56	-41.25

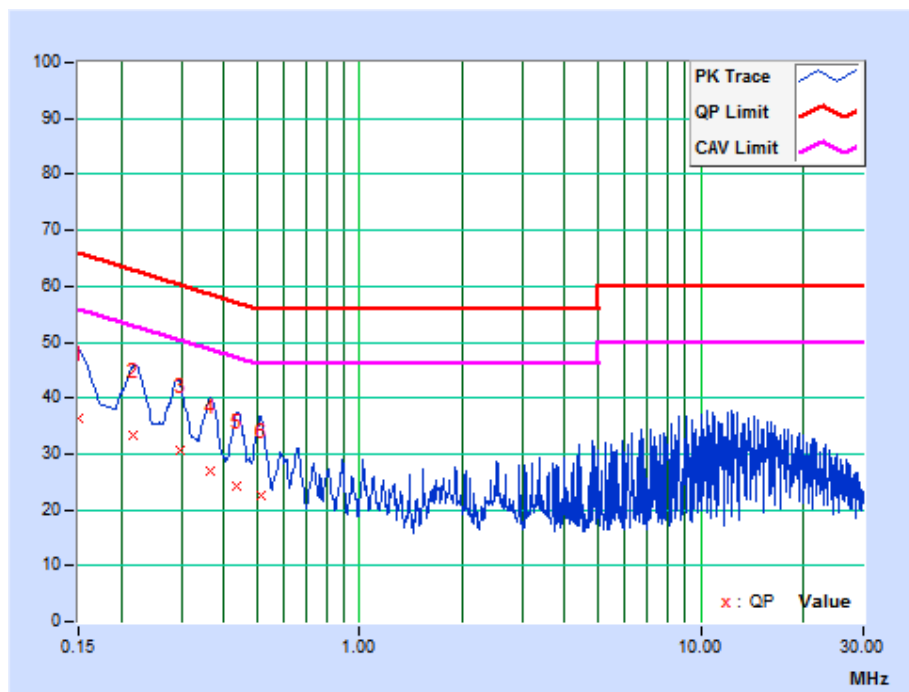
**REMARK:** The emission levels of other frequencies were very low against the limit.



<b>TEST MODE</b>	Standby	<b>6DB BANDWIDTH</b>	9 kHz
<b>TEST VOLTAGE</b>	DC 5V from Adapter Input AC 120V 60Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 55% RH	<b>TESTED BY</b>	Ming Bai

No.	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.00	26.47	3.88	36.47	13.88	66.00	56.00	-29.53	-42.12
2	0.21630	10.00	23.17	1.47	33.17	11.47	62.96	52.96	-29.79	-41.49
3	0.29625	9.99	20.52	-0.15	30.51	9.84	60.35	50.35	-29.84	-40.51
4	0.36292	10.00	16.92	-1.11	26.92	8.89	58.66	48.66	-31.75	-39.78
5	0.43545	10.00	14.19	-3.36	24.19	6.64	57.15	47.15	-32.95	-40.50
6	0.51155	10.00	12.72	-0.59	22.72	9.41	56.00	46.00	-33.28	-36.59

**REMARK:** The emission levels of other frequencies were very low against the limit.



## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 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

**NOTES:**

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)



**4.2.2 TEST INSTRUMENTS****FREQUENCY 9KHz-30MHz**

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101564	Mar. 07,22
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	1519B-045	May 29,22
Amplifier	Burgeon	BPA-530	100210	Mar. 13,22
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.  
 3. The FCC Site Registration No. is 749762.

**FREQUENCY 30MHz-1GHz**

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU40	100449	Mar. 07,22
Bilog Antenna	Teseq	CBL 6111D	30643	May 29,22
Amplifier	Burgeon	BPA-530	100220	Mar. 13,22
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	May 22,22
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.

### 4.2.3 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.

#### NOTES:

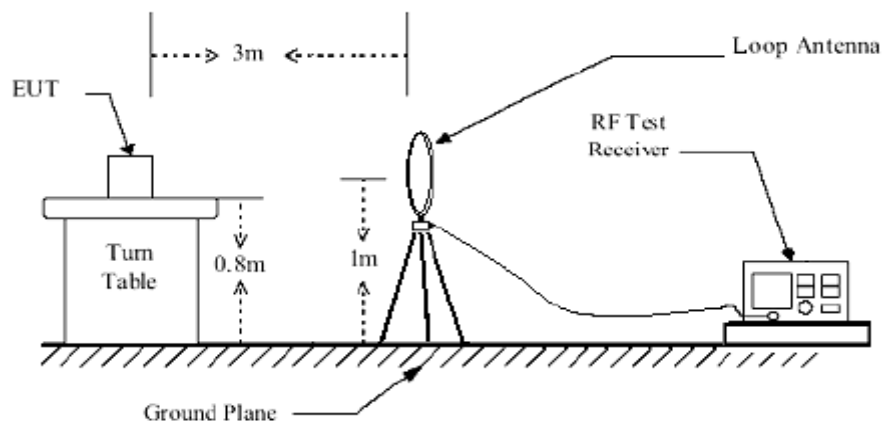
1. The resolution bandwidth of test receiver/spectrum analyzer is 200Hz for Quasi-peak detection (QP) at fundamental frequency 9K-150KHz;
2. The resolution bandwidth of test receiver/spectrum analyzer is 9KHz for Quasi-peak detection (QP) at fundamental frequency 150K-30MHz;
3. The resolution bandwidth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

### 4.2.4 DEVIATION FROM TEST STANDARD

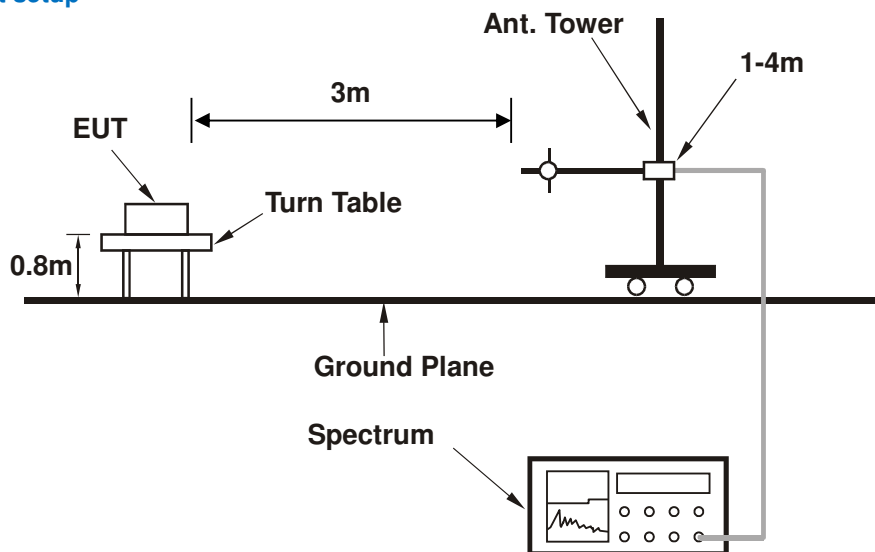
No deviation.

## 4.2.5 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).

## 4.2.6 EUT OPERATING CONDITIONS

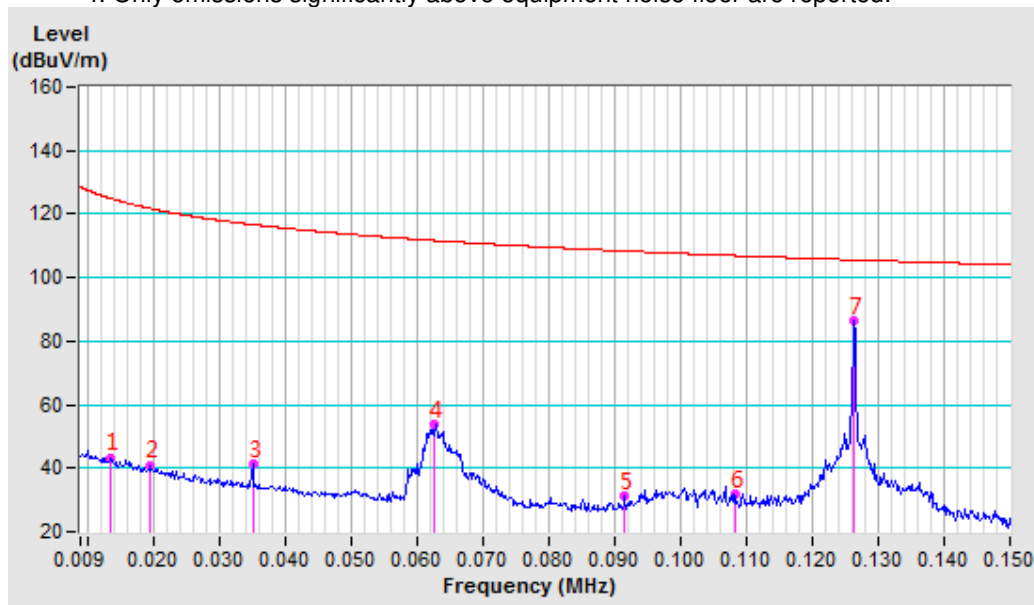
- Turn on the power supply of the EUT.
- EUT was operated according to the type description in manufacturer's specifications or the User's Manual.

## 4.2.7 TEST RESULTS

<b>TEST MODE</b>	Standby	<b>FREQUENCY RANGE</b>	9KHz-0.15MHz
<b>TEST VOLTAGE</b>	DC 5V from Adapter Input AC 120V 60Hz	<b>DETECTOR FUNCTION &amp; RESOLUTION BANDWIDTH</b>	QP&AV, 200Hz
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 58% RH	<b>TESTED BY:</b> Jay	

ANTENNA POLARITY & TEST DISTANCE: PARALLEL AT 10M								
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	0.01350 AV	-10.05	53.29	43.24	125.00	-81.76	100	27
2	0.01970 AV	-10.34	51.15	40.81	121.71	-80.90	100	24
3	0.03520 AV	-10.83	51.97	41.14	116.67	-75.53	100	77
4	0.06280 AV	-10.88	64.45	53.57	111.64	-58.07	100	2
5	0.09160 QP	-10.82	41.93	31.11	108.36	-77.25	100	38
6	0.10820 QP	-10.82	42.49	31.67	106.92	-75.25	100	1
7	0.12640 AV	-10.85	97.13	86.28	105.57	-19.29	100	38

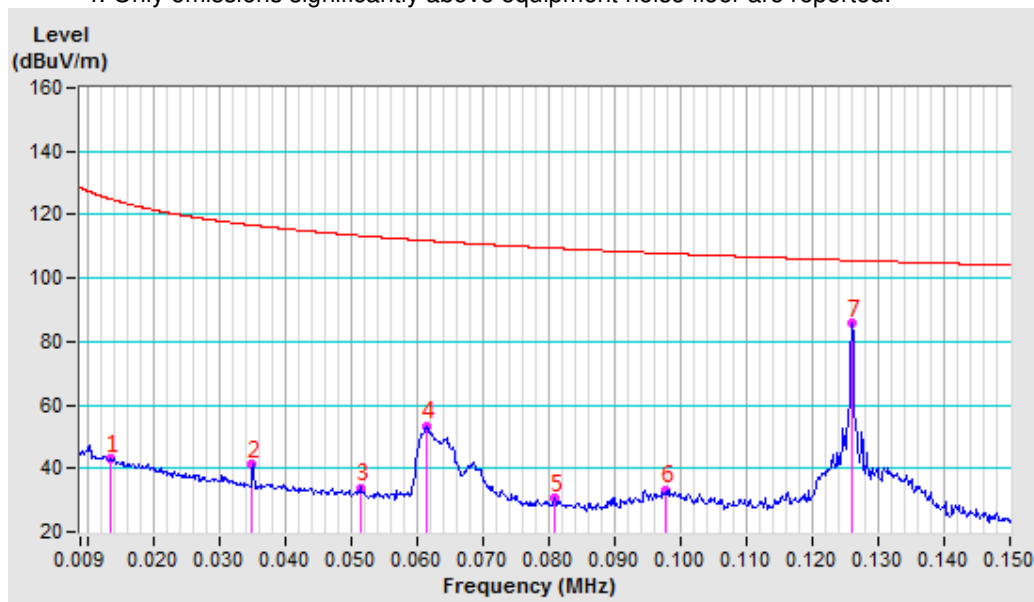
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
  2. Negative sign (-) in the margin column signify levels below the limit.
  3. Frequency range scanned: 0.009-0.15MHz.
  4.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



<b>TEST MODE</b>	Standby	<b>FREQUENCY RANGE</b>	9KHz-0.15MHz
<b>TEST VOLTAGE</b>	DC 5V from Adapter Input AC 120V 60Hz	<b>DETECTOR FUNCTION &amp; RESOLUTION BANDWIDTH</b>	QP&AV, 200Hz
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 58% RH	<b>TESTED BY:</b> Jay	

<b>ANTENNA POLARITY &amp; TEST DISTANCE: PERPENDICULAR AT 10M</b>								
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	0.01360 AV	-10.05	53.18	43.13	124.93	-81.80	100	42
2	0.03510 AV	-10.83	51.91	41.08	116.70	-75.62	100	41
3	0.05140 AV	-10.86	44.80	33.94	113.38	-79.44	100	44
4	0.06160 AV	-10.89	64.26	53.37	111.81	-58.44	100	45
5	0.08090 QP	-10.84	41.33	30.49	109.44	-78.95	100	17
6	0.09790 QP	-10.81	44.02	33.21	107.79	-74.58	100	45
7	0.12600 AV	-10.85	96.60	85.75	105.59	-19.84	100	25

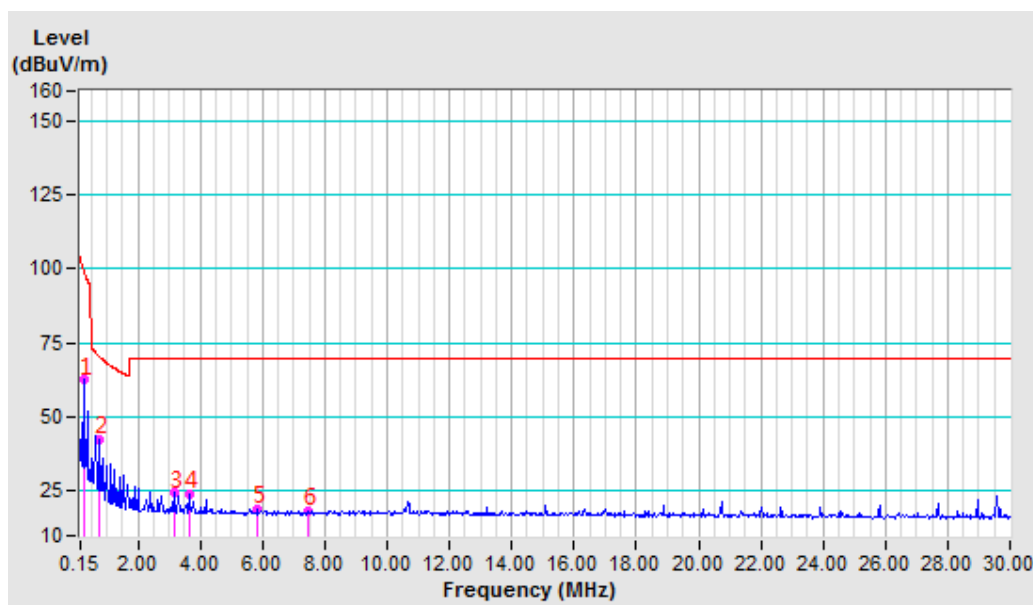
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
  2. Negative sign (-) in the margin column signify levels below the limit.
  3. Frequency range scanned: 0.009-0.15MHz.
  4.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



<b>TEST MODE</b>	Standby	<b>FREQUENCY RANGE</b>	150KHz-30MHz
<b>TEST VOLTAGE</b>	DC 5V from Adapter Input AC 120V 60Hz	<b>DETECTOR FUNCTION &amp; RESOLUTION BANDWIDTH</b>	QP&AV, 9KHz
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 58% RH	<b>TESTED BY:</b> Jay	

<b>ANTENNA POLARITY &amp; TEST DISTANCE: PARALLEL AT 10M</b>								
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	0.25150 AV	-10.92	73.44	62.52	99.59	-37.07	100	19
2	0.75750 QP	-11.03	53.49	42.46	70.37	-27.91	100	19
3	3.15900 QP	-11.23	35.55	24.32	69.54	-45.22	100	19
4	3.66350 QP	-11.24	35.12	23.88	69.54	-45.66	100	26
5	5.85160 QP	-11.31	30.13	18.82	69.54	-50.72	100	360
6	7.44120 QP	-11.23	29.38	18.15	69.54	-51.39	100	37

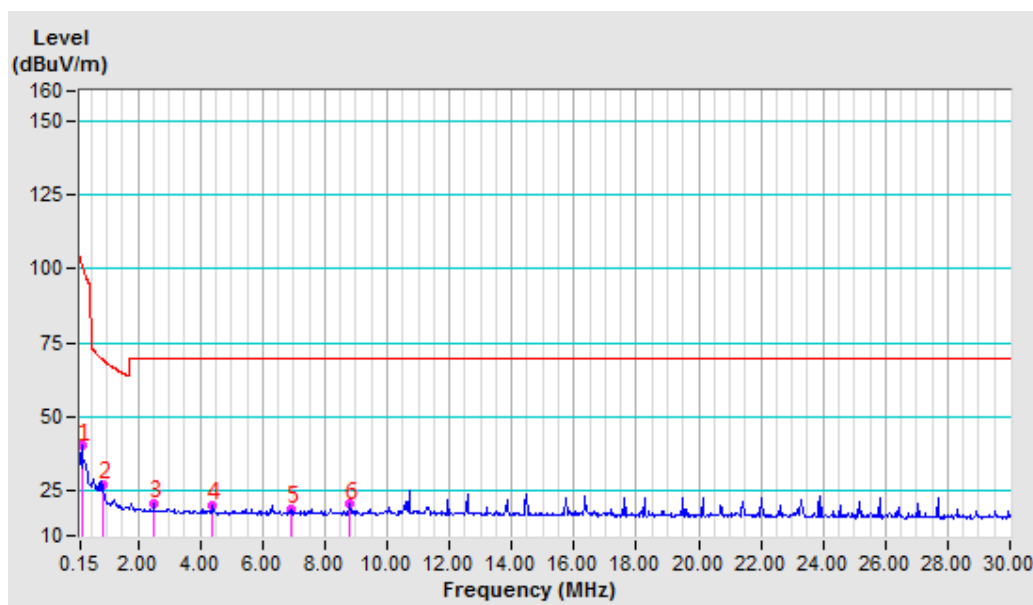
**REMARKS:** 1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.  
2. Negative sign (-) in the margin column signify levels below the limit.  
3. Frequency range scanned: 0.15-30MHz.  
4. Only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



<b>TEST MODE</b>	Standby	<b>FREQUENCY RANGE</b>	150KHz-30MHz
<b>TEST VOLTAGE</b>	DC 5V from Adapter Input AC 120V 60Hz	<b>DETECTOR FUNCTION &amp; RESOLUTION BANDWIDTH</b>	QP&AV, 9KHz
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 58% RH	<b>TESTED BY:</b> Jay	

<b>ANTENNA POLARITY &amp; TEST DISTANCE: PERPENDICULAR AT 10M</b>								
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	0.19630 AV	-10.88	51.09	40.21	101.75	-61.54	100	169
2	0.88730 QP	-11.08	38.33	27.25	69.12	-41.87	100	270
3	2.51720 QP	-11.20	32.19	20.99	69.54	-48.55	100	103
4	4.40530 QP	-11.27	31.61	20.34	69.54	-49.20	100	95
5	6.92180 QP	-11.25	30.34	19.09	69.54	-50.45	100	29
6	8.80990 QP	-11.20	31.76	20.56	69.54	-48.98	100	54

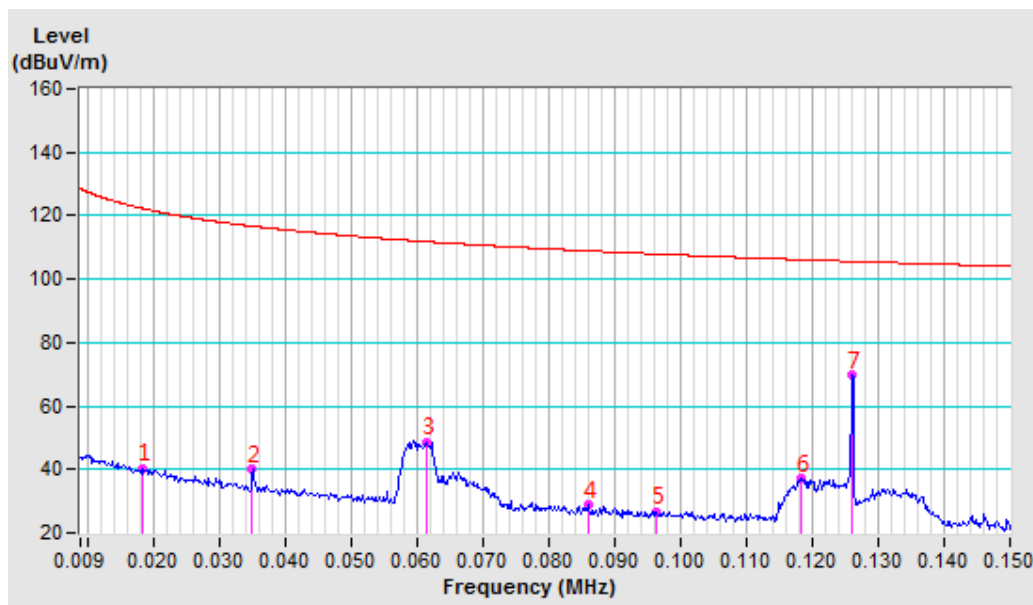
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
  2. Negative sign (-) in the margin column signify levels below the limit.
  3. Frequency range scanned: 0.15-30MHz
  4. Only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



<b>TEST MODE</b>	Wireless Charging	<b>FREQUENCY RANGE</b>	9KHz-0.15MHz
<b>TEST VOLTAGE</b>	DC 5V from Adapter Input AC 120V 60Hz	<b>DETECTOR FUNCTION &amp; RESOLUTION BANDWIDTH</b>	QP&AV, 200Hz
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 58% RH	<b>TESTED BY:</b> Jay	

<b>ANTENNA POLARITY &amp; TEST DISTANCE: PARALLEL AT 10M</b>								
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	0.01850 AV	-10.28	50.56	40.28	122.26	-81.98	100	27
2	0.03510 AV	-10.83	50.79	39.96	116.70	-76.74	100	7
3	0.06140 AV	-10.89	59.53	48.64	111.84	-63.20	100	44
4	0.08610 AV	-10.83	39.58	28.75	108.90	-80.15	100	17
5	0.09620 AV	-10.81	37.62	26.81	107.94	-81.13	100	38
6	0.11840 QP	-10.83	48.03	37.20	106.14	-68.94	100	27
7	0.12610 AV	-10.85	80.52	69.67	105.59	-35.92	100	22

- 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.

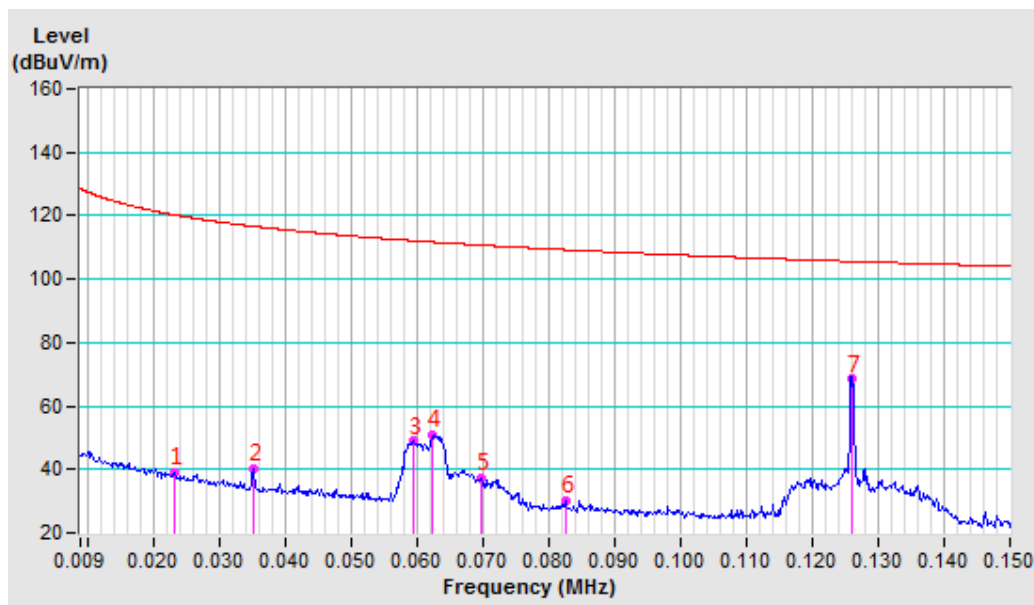




<b>TEST MODE</b>	Wireless Charging	<b>FREQUENCY RANGE</b>	9KHz-0.15MHz
<b>TEST VOLTAGE</b>	DC 5V from Adapter Input AC 120V 60Hz	<b>DETECTOR FUNCTION &amp; RESOLUTION BANDWIDTH</b>	QP&AV, 200Hz
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 58% RH	<b>TESTED BY:</b> Jay	

<b>ANTENNA POLARITY &amp; TEST DISTANCE: PERPENDICULAR AT 10M</b>								
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	0.02320 AV	-10.49	49.65	39.16	120.29	-81.13	100	75
2	0.03520 AV	-10.83	51.20	40.37	116.67	-76.30	100	33
3	0.05960 AV	-10.89	59.81	48.92	112.10	-63.18	100	2
4	0.06250 AV	-10.88	61.89	51.01	111.69	-60.68	100	7
5	0.06990 AV	-10.87	48.27	37.40	110.71	-73.31	100	22
6	0.08260 QP	-10.83	41.13	30.30	109.26	-78.96	100	3
7	0.12590 AV	-10.85	79.32	68.47	105.60	-37.13	100	3

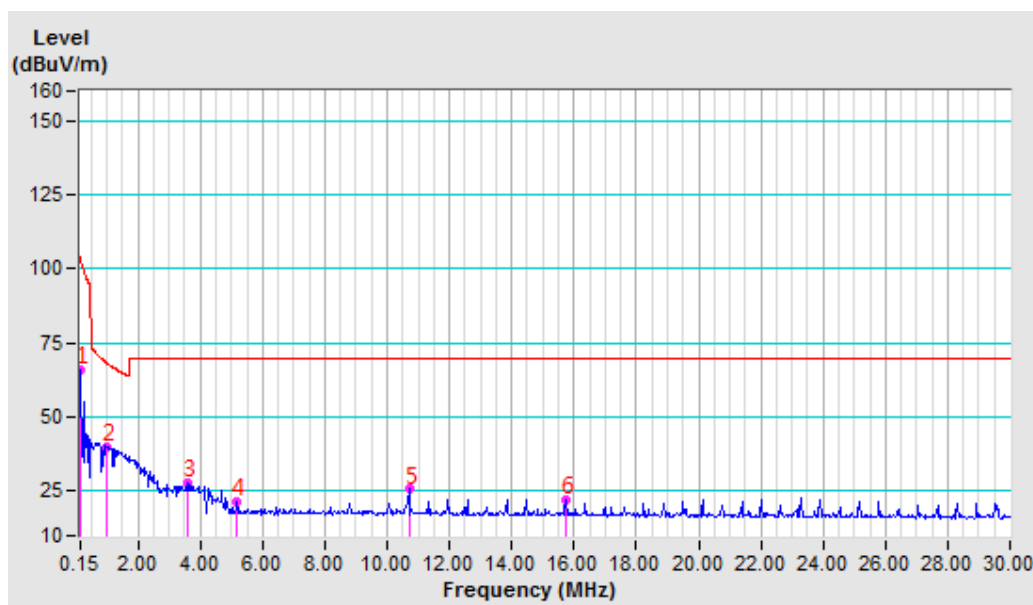
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
  2. Negative sign (-) in the margin column signify levels below the limit.
  3. Frequency range scanned: 0.009-0.15MHz
  4. Only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



<b>TEST MODE</b>	Wireless Charging	<b>FREQUENCY RANGE</b>	150KHz-30MHz
<b>TEST VOLTAGE</b>	DC 5V from Adapter Input AC 120V 60Hz	<b>DETECTOR FUNCTION &amp; RESOLUTION BANDWIDTH</b>	QP&AV, 9KHz
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 58% RH	<b>TESTED BY:</b> Jay	

<b>ANTENNA POLARITY &amp; TEST DISTANCE: PARALLEL AT 10M</b>								
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	0.15600 AV	-10.89	77.07	66.18	103.74	-37.56	100	62
2	1.01570 QP	-11.16	51.34	40.18	68.05	-27.87	100	208
3	3.62170 QP	-11.24	39.05	27.81	69.54	-41.73	100	207
4	5.17400 QP	-11.31	32.88	21.57	69.54	-47.97	100	200
5	10.69500 QP	-11.16	36.79	25.63	69.54	-43.91	100	70
6	15.73100 QP	-11.09	33.16	22.07	69.54	-47.47	100	57

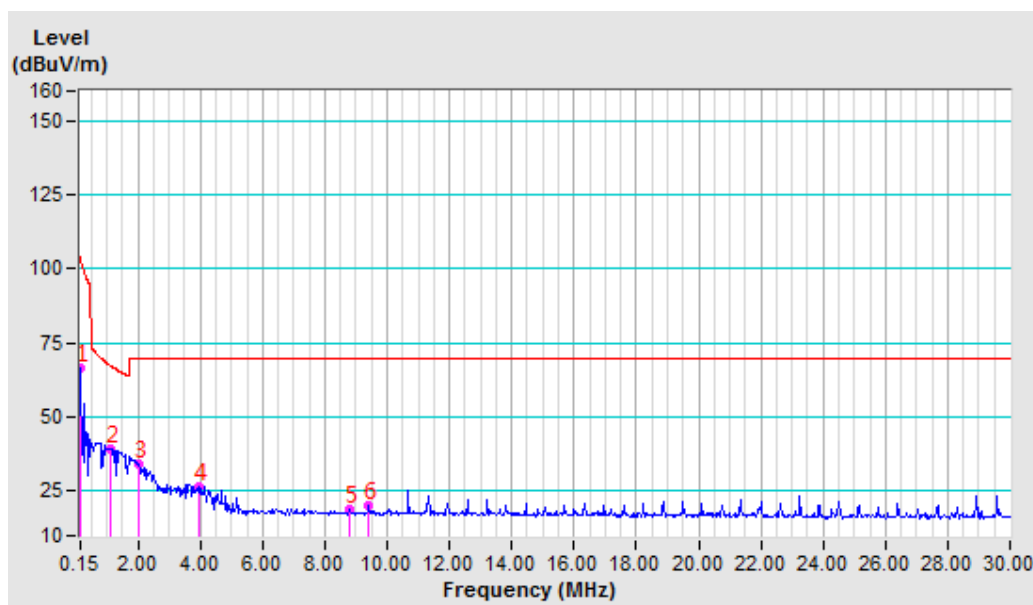
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
  2. Negative sign (-) in the margin column signify levels below the limit.
  3. Frequency range scanned: 0.15-30MHz
  4. Only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



<b>TEST MODE</b>	Wireless Charging	<b>FREQUENCY RANGE</b>	150KHz-30MHz
<b>TEST VOLTAGE</b>	DC 5V from Adapter Input AC 120V 60Hz	<b>DETECTOR FUNCTION &amp; RESOLUTION BANDWIDTH</b>	QP&AV, 9KHz
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 58% RH	<b>TESTED BY:</b> Jay	

<b>ANTENNA POLARITY &amp; TEST DISTANCE: PERPENDICULAR AT 10M</b>								
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	0.15600 AV	-10.89	77.23	66.34	103.74	-37.40	100	72
2	1.12470 QP	-11.16	50.67	39.51	67.25	-27.74	100	217
3	2.01870 QP	-11.20	45.44	34.24	69.54	-35.30	100	197
4	3.93520 QP	-11.24	37.75	26.51	69.54	-43.03	100	188
5	8.79350 QP	-11.20	30.03	18.83	69.54	-50.71	100	71
6	9.42490 QP	-11.21	31.27	20.06	69.54	-49.48	100	39

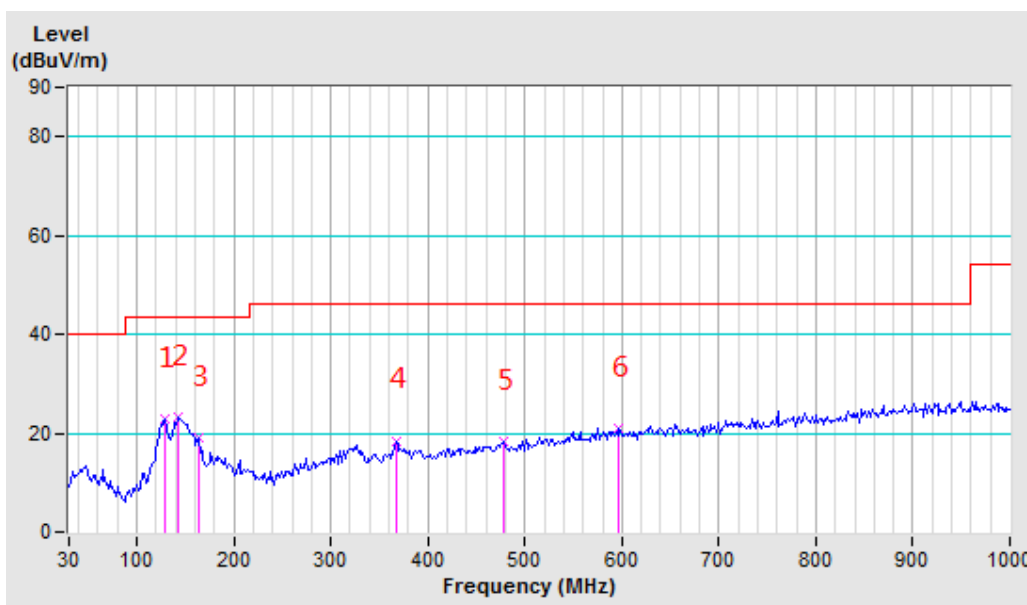
**REMARKS:** 1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.  
2. Negative sign (-) in the margin column signify levels below the limit.  
3. Frequency range scanned: 0.15-30MHz  
4. Only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



<b>TEST MODE</b>	Standby	<b>FREQUENCY RANGE</b>	30MHz -1GHz
<b>TEST VOLTAGE</b>	DC 5V from Adapter Input AC 120V 60Hz	<b>DETECTOR FUNCTION &amp; RESOLUTION BANDWIDTH</b>	Quasi-Peak, 120KHz
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 55% RH	<b>TESTED BY:</b> Panda	

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3M</b>								
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	129.49	-17.84	40.74	22.90	43.50	-20.60	200	148
2	143.48	-17.05	40.29	23.24	43.50	-20.26	100	161
3	163.69	-16.72	35.83	19.11	43.50	-24.39	200	116
4	367.32	-13.89	32.36	18.47	46.00	-27.53	100	105
5	477.69	-11.08	29.50	18.42	46.00	-27.58	200	92
6	595.83	-7.98	29.04	21.06	46.00	-24.94	100	82

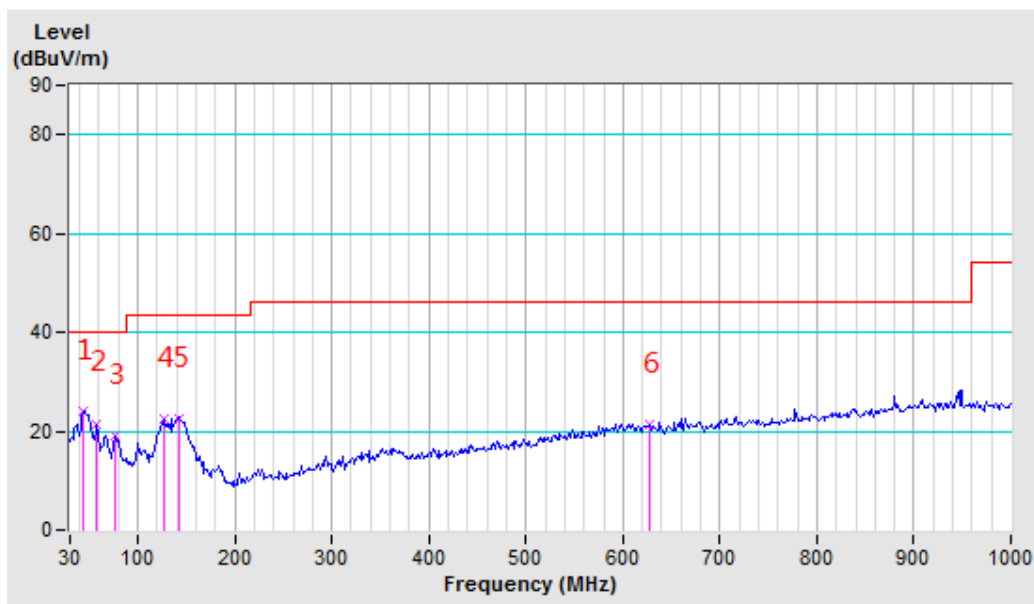
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
  2. Negative sign (-) in the margin column signify levels below the limit.
  3. Frequency range scanned: 30MHz to 1000MHz.
 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



<b>TEST MODE</b>	Standby	<b>FREQUENCY RANGE</b>	30MHz -1GHz
<b>TEST VOLTAGE</b>	DC 5V from Adapter Input AC 120V 60Hz	<b>DETECTOR FUNCTION &amp; RESOLUTION BANDWIDTH</b>	Quasi-Peak, 120KHz
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 55% RH	<b>TESTED BY:</b>	Panda

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3M</b>								
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	43.99	-16.87	41.04	24.17	40.00	-15.83	100	323
2	57.98	-18.06	39.57	21.51	40.00	-18.49	100	351
3	76.63	-20.95	39.90	18.95	40.00	-21.05	100	54
4	127.93	-17.93	40.26	22.33	43.50	-21.17	100	309
5	141.92	-17.12	39.71	22.59	43.50	-20.91	100	298
6	626.92	-7.58	28.91	21.33	46.00	-24.67	100	306

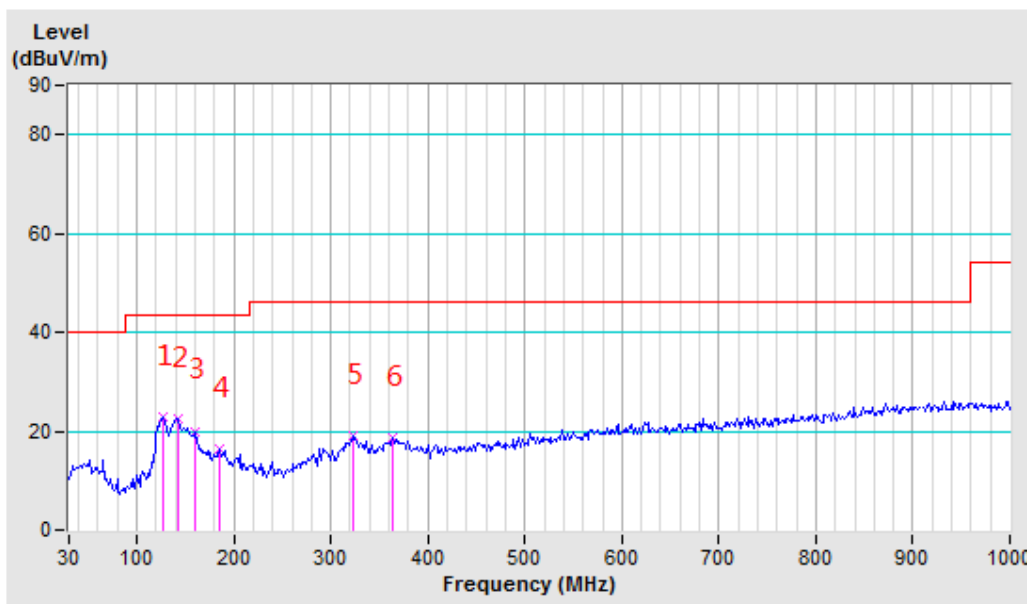
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
  2. Negative sign (-) in the margin column signify levels below the limit.
  3. Frequency range scanned: 30MHz to 1000MHz.
 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



<b>TEST MODE</b>	Wireless Charging	<b>FREQUENCY RANGE</b>	30MHz -1GHz
<b>TEST VOLTAGE</b>	DC 5V from Adapter Input AC 120V 60Hz	<b>DETECTOR FUNCTION &amp; RESOLUTION BANDWIDTH</b>	Quasi-Peak, 120KHz
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 55% RH	<b>TESTED BY:</b>	Panda

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3M</b>								
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	127.93	-17.93	40.92	22.99	43.50	-20.51	200	197
2	141.92	-17.12	39.60	22.48	43.50	-21.02	100	211
3	160.58	-16.44	36.43	19.99	43.50	-23.51	100	222
4	185.45	-18.58	34.84	16.26	43.50	-27.24	100	245
5	322.24	-15.04	34.22	19.18	46.00	-26.82	200	233
6	364.21	-13.97	32.59	18.62	46.00	-27.38	100	256

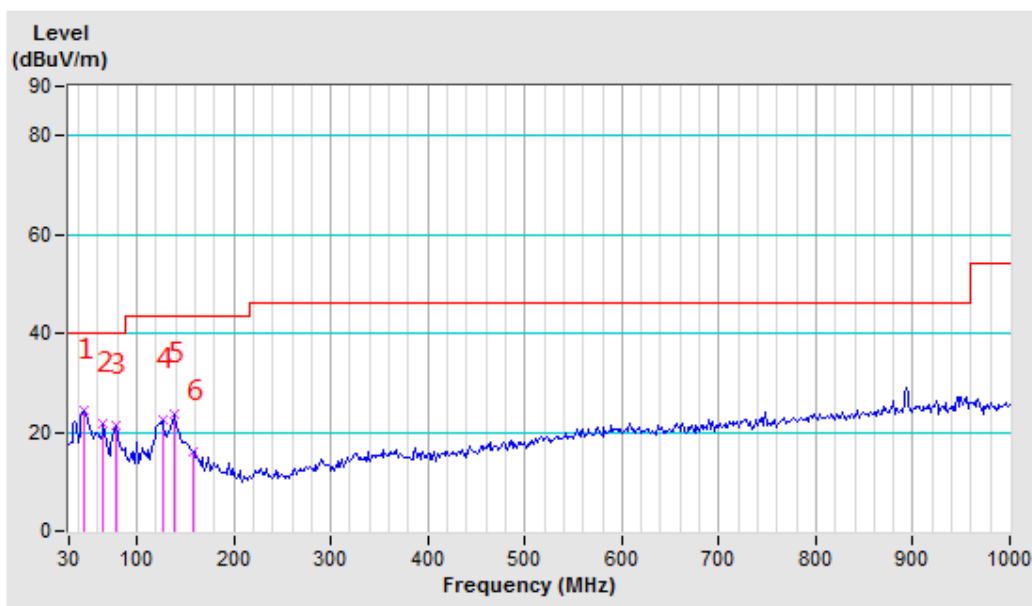
- REMARKS:**
1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
  2. Negative sign (-) in the margin column signify levels below the limit.
  3. Frequency range scanned: 30MHz to 1000MHz.
 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



<b>TEST MODE</b>	Wireless Charging	<b>FREQUENCY RANGE</b>	30MHz -1GHz
<b>TEST VOLTAGE</b>	DC 5V from Adapter Input AC 120V 60Hz	<b>DETECTOR FUNCTION &amp; RESOLUTION BANDWIDTH</b>	Quasi-Peak, 120KHz
<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 55% RH	<b>TESTED BY:</b> Panda	

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	45.54	-16.97	41.22	24.25	40.00	-15.75	100	42
2	65.75	-18.72	40.28	21.56	40.00	-18.44	100	13
3	78.19	-21.37	42.78	21.41	40.00	-18.59	100	24
4	126.38	-18.03	40.56	22.53	43.50	-20.97	100	54
5	138.81	-17.27	41.06	23.79	43.50	-19.71	100	72
6	157.47	-16.49	32.64	16.15	43.50	-27.35	100	49

- 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.



### 4.3. 20dB BANDWIDTH MEASUREMENT

#### 4.3.1 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.

#### 4.3.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Mar. 17,22
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	1519B-045	May 29,22
Attenuator	MINI	BW-S10W2+	S130129FGE2	N/A

#### NOTES:

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, GREGT/CHINA and NIM/CHINA.

#### 4.3.3 TEST PROCEDURE

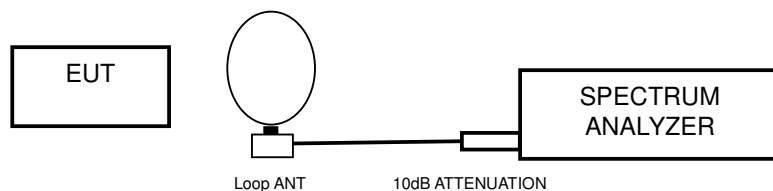
- a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT, then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest 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.

#### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation.



#### 4.3.5 TEST SETUP



#### 4.3.6 EUT OPERATING CONDITION

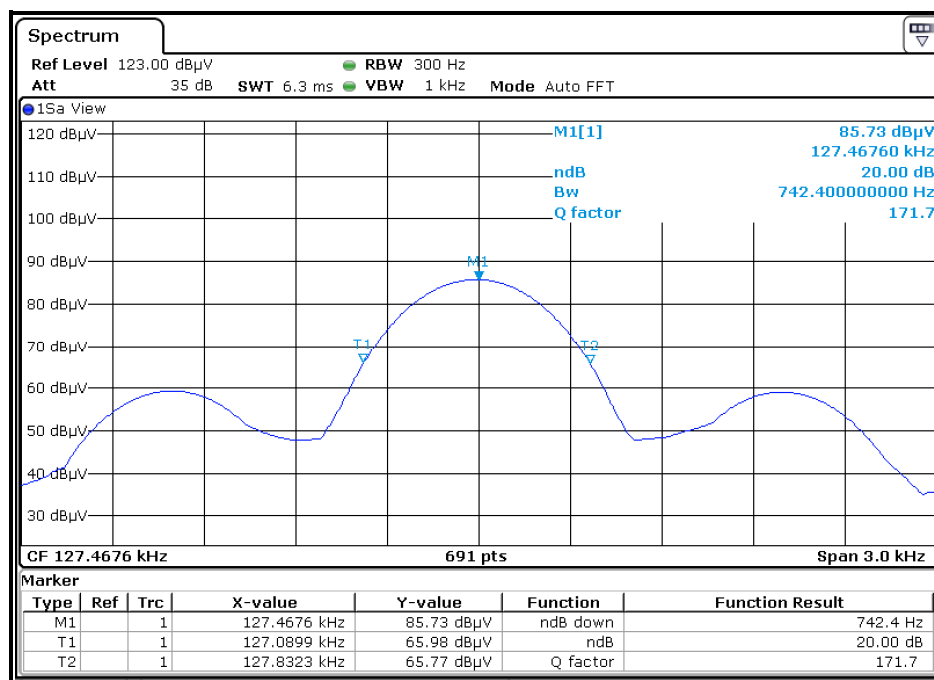
- a. Turn on the EUT.
- b. The EUT tested in charging mode and standby mode respectively.

### 4.3.7 TEST RESULTS

TEST MODE	CHANNEL FREQUENCY (KHz)	20dB BANDWIDTH (Hz)
Standby	127.468	742.4

Lower & Upper Test Frequency Point (MHz)	Test Frequency (KHz)	P/F
Lower	127.0899	PASS
Upper	127.8323	PASS

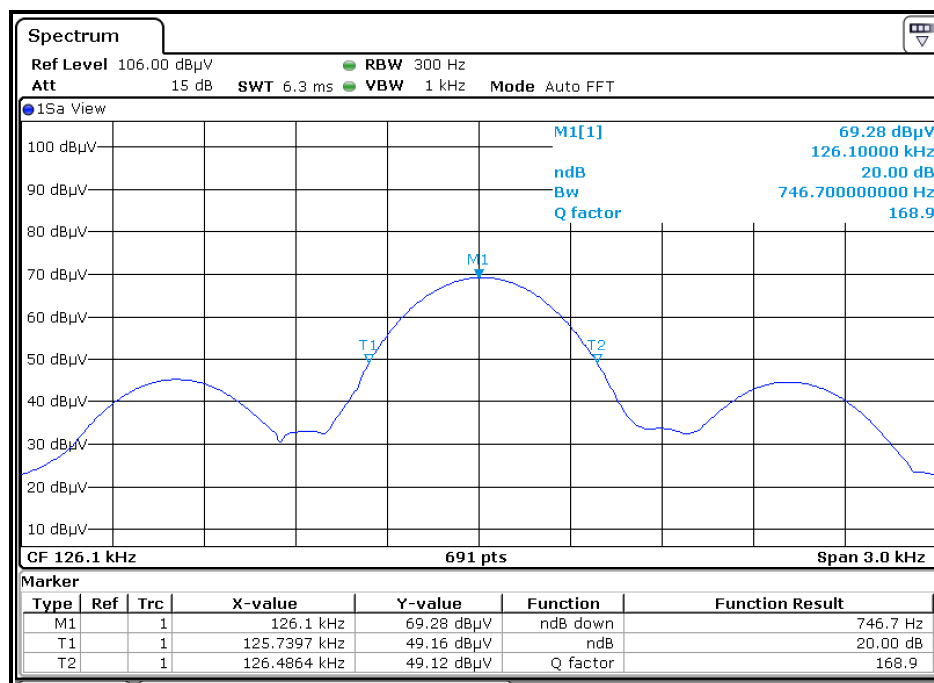
#### Test Data:



TEST MODE	CHANNEL FREQUENCY (KHz)	20dB BANDWIDTH (kHz)
Wireless charging	126.100	746.7

Lower & Upper Test Frequency Point (MHz)	Test Frequency (KHz)	P/F
Lower	125.7397	PASS
Upper	126.4864	PASS

Test Data:





Test Report No.: RF2201WDG0203

## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

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



Test Report No.: RF2201WDG0203

## 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---