

TEST REPORT



Applicant	Shenzhen Orderly Electronics Co., Ltd
Address	4F, Building7, Asian Industrial Park, Bantian Street, Longgang District, Shenzhen, China

Manufacturer or Supplier	Shenzhen Orderly Electronics Co., Ltd
Address	4F, Building7, Asian Industrial Park, Bantian Street, Longgang District, Shenzhen, China
Product	Bluetooth FM Transmitter
Brand Name	blackweb& CRAIG & MAGNAVOX
Model	BWB17AV004
Additional Model & Model Difference	CMA3336, MMA3336, see section 3.1
Date of tests	Jul. 13, 2018 ~ Jul. 27, 2018

The tests have been carried out according to the requirements of the following standard:

☒ **FCC Part 15, Subpart C, Section 15.239**

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

Tested by Robert Cheng Project Engineer / EMC Department	Approved by Glyn He Supervisor / EMC Department
	 Date: Jul. 31, 2018

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Test Report No.: RF180713N049-2

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF180713N049-2	Original release	Jul. 31, 2018

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.239)			
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
§15.203	Antenna Requirement	PASS	No antenna connector is used.
§15.207 (a)	Conducted Emission	N/A	Power by battery
§15.239(b) (c)	Radiated Emission	PASS	Meet the requirement of limit.
§15.215(c)	20dB Bandwidth Test	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	2.70dB
Radiated emissions	30MHz ~ 200MHz	2.90dB
	200MHz ~1000MHz	3.83dB

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	Bluetooth FM Transmitter
MODEL NO.	BWB17AV004
ADDITIONAL MODEL	CMA3336, MMA3336
FCC ID	2AD5YFMBT1736A
NOMINAL VOLTAGE	DC 12V or 24V from Battery
MODULATION TYPE	FM
OPERATING FREQUENCY	88.1MHz ~ 107.9MHz
NUMBER OF CHANNEL	198
ANTENNA TYPE	Wire Antenna, 0dBi Gain
I/O PORTS	Refer to user's manual
DATA 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.: 180713N049) for detailed product photo.
4. Additional model CMA3336, MMA3336 is identical in the electrical circuit design, layout, component used, internal wiring and outward appearance with the test model BWB17AV004 except the trade name and model no. for purpose marketing.

3.2 DESCRIPTION OF TEST MODES

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and packet type. The worst case was found when the EUT was positioned on X axis for radiated emission. The EUT was tested under the following mode.

EUT CONFIGURE MODE	APPLICABLE TO			DESCRIPTION
	RE<1G	PLC	BW	
A	√	-	√	Power by DC 12V from Battery
B	√			Power by DC 24V from Battery

Where **RE<1G**: Radiated Emission below 1GHz
BW: 20db bandwidth

PLC: Power Line Conducted Emission

NOTE: No need to concern of Conducted Emission due to the EUT is powered by battery.

Following Frequency(s) was (were) selected for the test as listed below.

TESTED CHANNEL	TESTED FREQUENCY	TEST MODES
Low	88.1 MHz	Transmitting
Middle	98.0 MHz	Transmitting
High	107.9 MHz	Transmitting

Note: The more detailed channel, please refer to the product specifications

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE	23deg. C, 53%RH	DC 12V from Battery	Xue Wang
BW	23deg. C, 53%RH	DC 12V from Battery	Xue Wang
PLC	-	-	-

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 (15.239)

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	TF Card	Kingston	SDC4/8GB	J4L8F-9P6T27-8X BD6	N/A

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

4. TEST TYPES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 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

According to §15.239(b), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission [Peak] [μV/m]	Field Strength of Fundamental Emission [Average] [μV/m]
88 – 108	2500 (68 dBμV/m)	250 (48 dBμV/m)

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

4.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU40	100449	Mar. 21,18	Mar. 20,19
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV7	102331	Nov. 04,17	Nov. 03,18
Active Loop Antenna (9KHz -30MHz)	SCHWARZBECK	FMZB 1519B	1519B-045	May 31,18	May 30,19
Amplifier (9KHz -1GHz)	Burgeon	BPA-530	100210	Apr. 18,18	Apr. 18,19
Bilog Antenna (20MHz -2GHz)	Teseq	CBL 6111D	30643	Jul. 28, 18	Jul. 27, 19
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062558	Jun. 02,18	Jun. 01,19
Horn Antenna (18GHz -40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170242	May 05,18	May 04,19
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	Feb. 10,18	Feb. 09,19
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
Broadband Preamplifier (1GHz~18GHz)	SCHWARZBECK	BBV9718	305	Apr. 18,18	Apr. 18,19
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 08,17	Nov. 07,18
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	Aug. 10,17	Aug. 09,18

- NOTE:**
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 horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
 4. The FCC Site Registration No. is 749762

4.1.3 TEST PROCEDURES

- 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 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 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using new battery. The turntable was rotated to maximize the emission level.
- g. For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.

NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
3. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
4. Margin value = Emission level – Limit value.



BUREAU
VERITAS

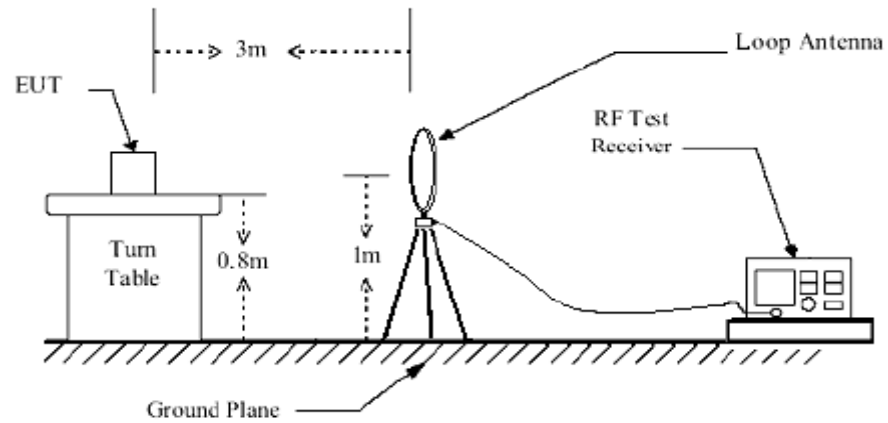
Test Report No.: RF180713N049-2

4.1.4 DEVIATION FROM TEST STANDARD

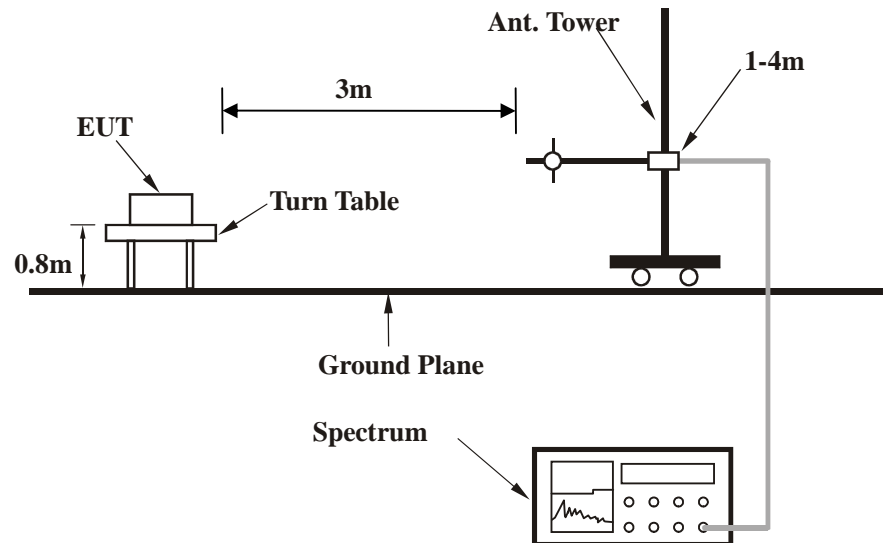
No deviation

4.1.5 TEST SETUP

Below 30MHz



Below 1GHz test setup



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



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4.1.6 EUT OPERATING CONDITIONS

- a. Placed the EUT on the testing table.
- b. Playing the music with TF Card
- c. Enable EUT under transmission condition continuously at specific channel frequency.

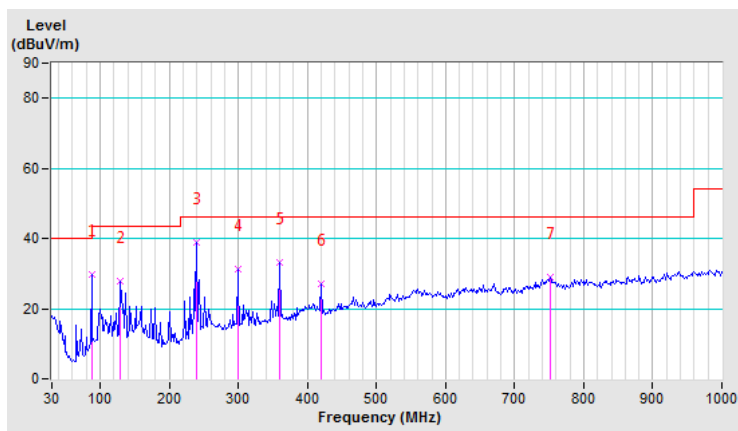
4.1.7 TEST RESULTS

Transmitting(88.1MHz)

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	88.10	49.67	-19.85	29.82 PK	68.00	-38.18	2.00 H	30
1	88.10	49.67	-19.85	29.82 AV	48.00	-18.18	2.00 H	30
2	129.49	45.00	-17.30	27.70 QP	43.50	-15.80	2.00 H	220
3	239.86	55.20	-16.33	38.87 QP	46.00	-7.13	2.00 H	220
4	298.93	44.65	-13.40	31.25 QP	46.00	-14.75	2.00 H	100
5	359.55	43.52	-10.48	33.04 QP	46.00	-12.96	2.00 H	90
6	420.18	36.42	-9.48	26.94 QP	46.00	-19.06	2.00 H	85
7	751.28	30.07	-1.17	28.90 QP	46.00	-17.10	2.00 H	270

REMARKS:

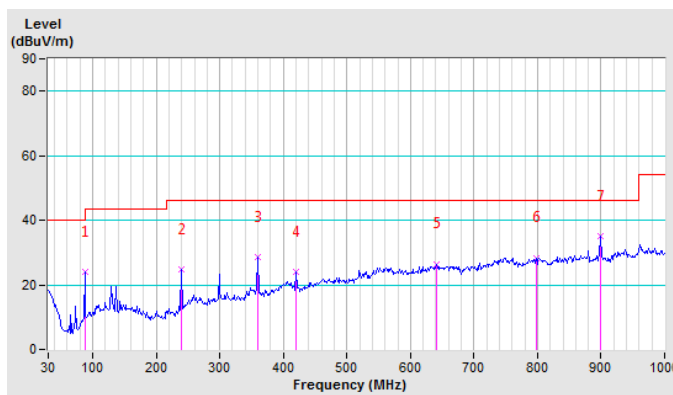
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. The Duty cycle=100%



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	88.10	43.79	-19.85	23.94 PK	68.00	-44.06	1.00 V	125
	88.10	43.79	-19.85	23.94 AV	48.00	-24.06	1.00 V	125
2	239.86	41.26	-16.33	24.93 QP	46.00	-21.07	1.00 V	125
3	359.55	38.99	-10.48	28.51 QP	46.00	-17.49	1.00 V	40
4	420.18	33.51	-9.48	24.03 QP	46.00	-21.97	1.00 V	85
5	640.91	29.57	-3.07	26.50 QP	46.00	-19.50	1.00 V	150
6	797.92	29.34	-0.95	28.39 QP	46.00	-17.61	1.00 V	88
7	898.96	34.91	0.20	35.11 QP	46.00	-10.89	1.00 V	150

REMARKS:

1. Emission level (dBUV/m) = Raw Value (dBUV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. The Duty cycle=100%

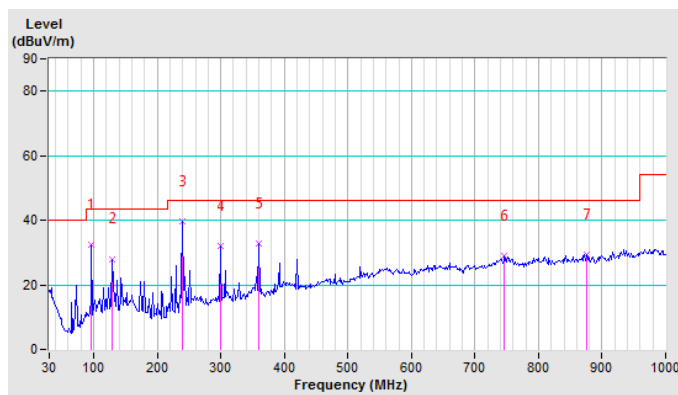


Transmitting(98MHz)

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	98.00	51.26	-18.91	32.35 PK	68.00	-35.65	1.00 H	187
	98.00	51.26	-18.91	32.35 AV	48.00	-15.65	1.00 H	187
2	129.49	45.29	-17.30	27.99 QP	43.50	-15.51	1.00 H	187
3	239.86	55.88	-16.33	39.55 QP	46.00	-6.45	1.00 H	30
4	298.93	45.28	-13.40	31.88 QP	46.00	-14.12	1.00 H	180
5	359.55	43.18	-10.48	32.70 QP	46.00	-13.30	1.00 H	30
6	746.62	30.18	-1.09	29.09 QP	46.00	-16.91	1.00 H	80
7	875.64	29.81	-0.44	29.37 QP	46.00	-16.63	1.00 H	0

REMARKS:

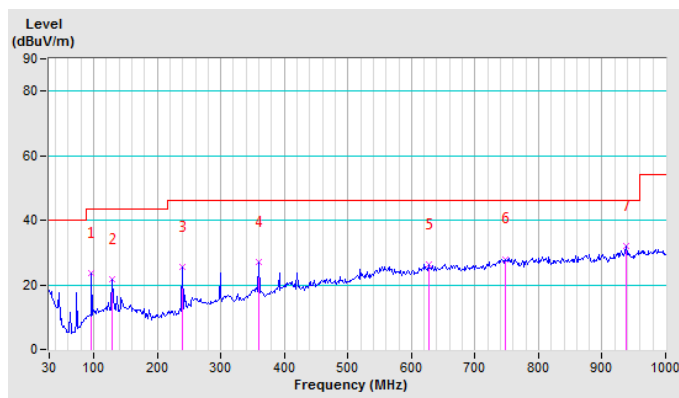
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. The Duty cycle=100%



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	98.00	42.63	-18.91	23.72 PK	68.00	-44.28	2.00 V	0
	98.00	42.63	-18.91	23.72 AV	48.00	-24.28	2.00 V	0
2	129.49	39.00	-17.30	21.70 QP	43.50	-21.80	2.00 V	88
3	239.86	41.82	-16.33	25.49 QP	46.00	-20.51	2.00 V	88
4	359.55	37.54	-10.48	27.06 QP	46.00	-18.94	2.00 V	250
5	626.92	29.57	-3.12	26.45 QP	46.00	-19.55	2.00 V	160
6	748.17	29.15	-1.12	28.03 QP	46.00	-17.97	2.00 V	86
7	937.82	30.95	1.05	32.00 QP	46.00	-14.00	2.00 V	110

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. The Duty cycle=100%

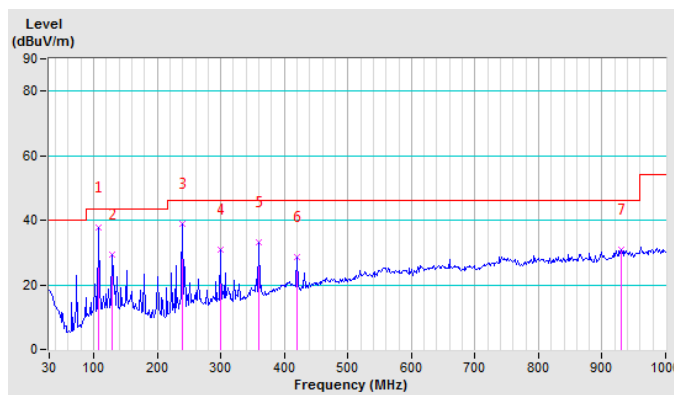


Transmitting(107.9MHz)

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	107.9	55.85	-18.05	37.80 PK	68.00	-30.20	3.00 H	60
	107.9	55.85	-18.05	37.80 AV	48.00	-10.20	3.00 H	60
2	129.49	46.53	-17.30	29.23 QP	43.50	-14.27	3.00 H	250
3	239.86	55.31	-16.33	38.98 QP	46.00	-7.02	3.00 H	250
4	298.93	44.24	-13.40	30.84 QP	46.00	-15.16	3.00 H	40
5	359.55	43.62	-10.48	33.14 QP	46.00	-12.86	3.00 H	90
6	420.18	38.17	-9.48	28.69 QP	46.00	-17.31	3.00 H	30
7	930.05	29.98	1.03	31.01 QP	46.00	-14.99	3.00 H	55

REMARKS:

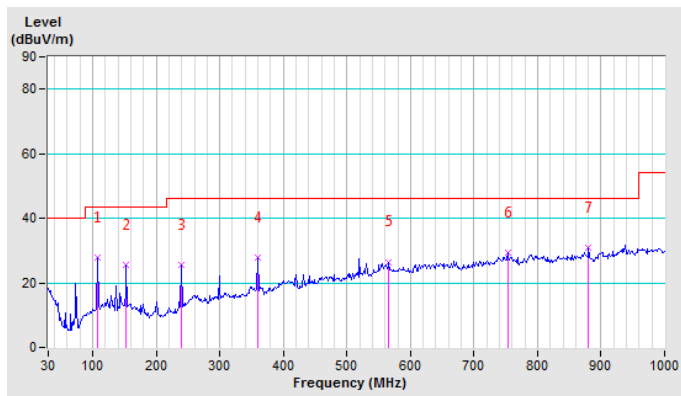
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. The Duty cycle=100%



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	107.9	45.81	-18.05	27.76 PK	68.00	-40.24	1.00 V	60
	107.9	45.81	-18.05	27.76 AV	48.00	-20.24	1.00 V	60
2	152.80	41.93	-16.26	25.67 QP	43.50	-17.83	1.00 V	90
3	239.86	41.80	-16.33	25.47 QP	46.00	-20.53	1.00 V	90
4	359.55	38.29	-10.48	27.81 QP	46.00	-18.19	1.00 V	300
5	566.30	30.59	-4.11	26.48 QP	46.00	-19.52	1.00 V	240
6	752.84	30.49	-1.18	29.31 QP	46.00	-16.69	1.00 V	30
7	880.30	31.54	-0.69	30.85 QP	46.00	-15.15	1.00 V	160

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. The Duty cycle=100%



4.2 20dB BANDWIDTH MEASUREMENT

4.2.1 LIMITS OF 20dB BANDWIDTH MEASUREMENT

According to FCC 15.215(c), must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

4.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Power Sensor	Keysight	U2021XA	MY55060016	May 19,18	May 18,19
Power Sensor	Keysight	U2021XA	MY55060018	May 19,18	May 18,19
Power Meter	Anritsu	ML2495A	1139001	Apr. 13,18	Apr. 13,19
Power Sensor	Anritsu	MA2411B	1531155	Apr. 13,18	Apr. 13,19
Digital Multimeter	FLUKE	15B	A1220010DG	Oct. 21, 17	Oct.20, 18
Humid & Temp Programmable Tester	Haida	HD-2257	110807201	Sep.05,17	Sep. 04,18
Oscilloscope	Agilent	DSO9254A	MY51260160	Nov. 08,17	Nov. 07,18
Signal Analyzer	Rohde & Schwarz	FSV7	102331	Nov. 04,17	Nov. 03,18
Signal Generator	Agilent	N5183A	MY50140980	Jan. 02,18	Jan. 01,19
Agile Signal Generator	Agilent	8645A	Agilent	Sep.01, 17	Aug.31, 18
Spectrum Analyzer	Keysight	N9020A	MY55400499	Mar. 21,18	Mar. 20,19
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY56200288	Jan. 02,18	Jan. 01,19
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	Aug.10, 17	Aug.09, 18
Attenuator	MINI	BW-S10W2+	S130129FGE2	N/A	N/A
DC Source	Keysight	E3642A	MY56146098	N/A	N/A

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.

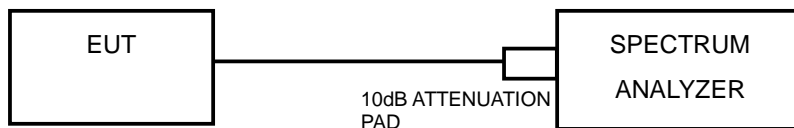
4.2.3 TEST PROCEDURE

- 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 and connect it to measurement instrument. 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



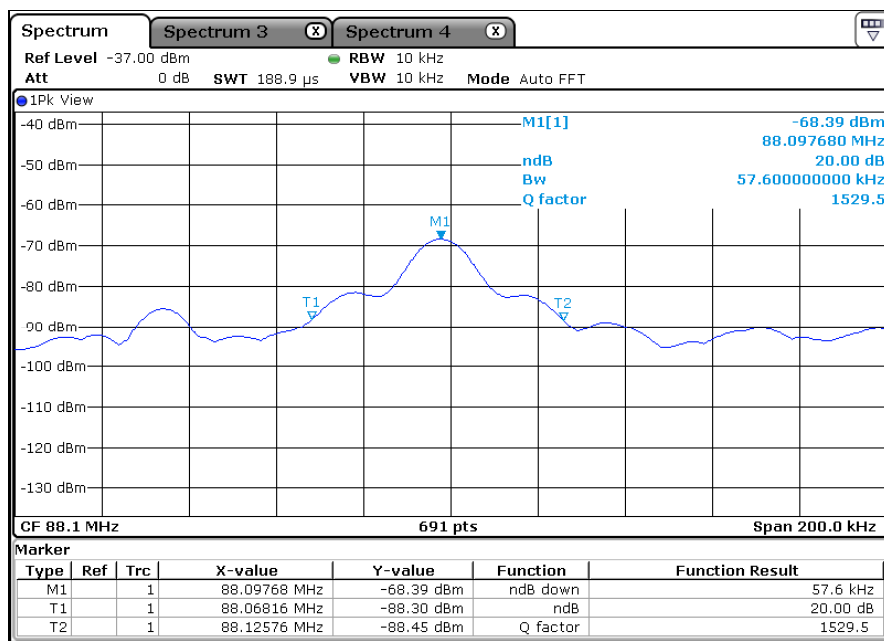
4.2.6 EUT OPERATING CONDITIONS

- a. Turned on the power of all equipment.
- b. Playing the music with TF Card
- c. Enable EUT under transmission condition continuously at specific channel frequency.

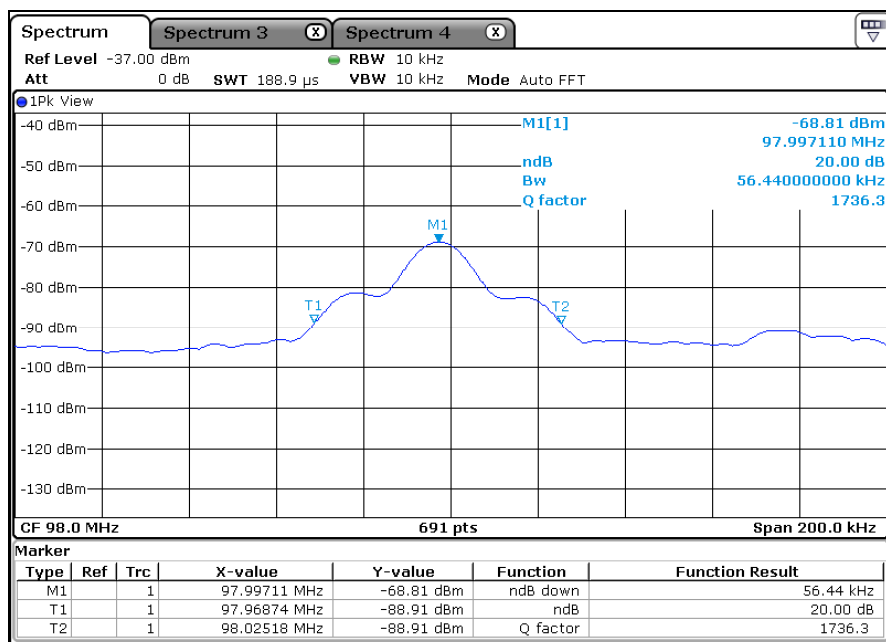
4.2.7 TEST RESULTS

TEST CHANNEL	CHANNEL FREQUENCY (MHz)	20dB BANDWIDTH (KHz)
Low	88.1	57.60
Middle	98.0	56.44
High	107.9	63.68

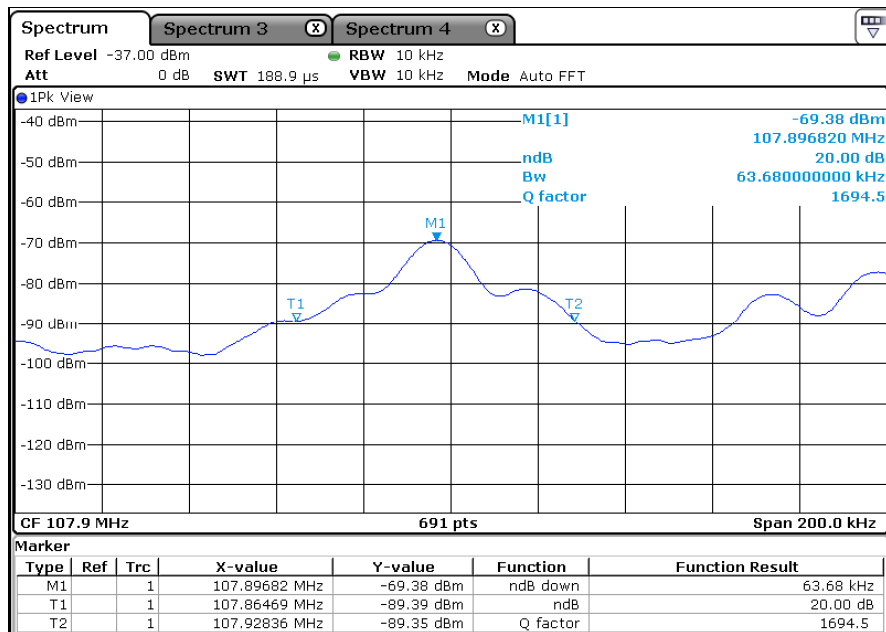
Test Data: 88.1MHz



Test Data: 98.0MHz



Test Data: 107.9MHz





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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 are made to the EUT by the lab during the test.

---END---