FCC TEST REPORT

FCC ID	: ZTJ-EM100T
Applicant	: Shenzhen Uniwisdom Technologies Co., Ltd.
Address	: Bldg.91-94 3rd Industrial Zone, Lisonglang, Gongming Town, Bao'an District, Shenzhen, P.R.China

Equipment Under Test (EUT) :

Product Name	: Wireless Personal In-Ear Monitor
Model No.	: EM-100 (Transmitter), PEM-1000 (Transmitter), IN EAR MONITOR(Transmitter)

Standards	: FCC CFR47 Part 74 Section 74.861:2010
Date of Test	: March 7 ~ March 17, 2012
Date of Issue	: March 19, 2012
Test Engineer	: Hunk yan / Engineer
Reviewed By	: Philo zhong / Manager

Test Result	**: PASS**

Prepared By:
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✧ The sample detailed above has been tested to the requirements of Council Directives ANSI C63.4:2003. The test results have been reviewed against the Directives above and found to meet their essential requirements.

2 Test Summary

Test Items	Test Requirement	Test Method	Result
AC Line Conducted Emissions	15.207	ANSI C63.4	PASS
RF Output Power	74.861(e)(1)(ii)	TIA/EIA-603-C-2004	PASS
Modulation Characteristics	2.1047(a)	TIA/EIA-603-C-2004	PASS
Occupied Bandwidth	2.1049(c)(1)	TIA/EIA-603-C-2004	PASS
Spurious Radiated Emissions	2.1053 & 74.861(e)(6)	TIA/EIA-603-C-2004	PASS
Spurious emissions at antenna terminals	2.1051	TIA/EIA-603-C-2004	PASS
Frequencies Stability	2.1055(a)(1)	TIA/EIA-603-C-2004	PASS

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4 General Information

4.1 Client Information

Applicant	: Shenzhen Uniwisdom Technologies Co., Ltd.
Address of Applicant	: Bldg.91-94 3rd Industrial Zone, Lisonglang, Gongming Town, Bao'an District, Shenzhen, P.R.China
Manufacturer	: Shenzhen Uniwisdom Technologies Co., Ltd.
Address of Manufacturer	: Bldg.91-94 3rd Industrial Zone, Lisonglang, Gongming Town, Bao'an District, Shenzhen, P.R.China

4.2 General Description of E.U.T.

Product Name	: Wireless Personal In-Ear Monitor
Model No.	: EM-100 (Transmitter), PEM-1000 (Transmitter), IN EAR MONITOR(Transmitter)
Differences describe	: All the models are exactly the same excepte different model names.
Operation Frequency	: 673.000MHz ~ 685.375MHz

4.3 Details of E.U.T.

Technical Data:	: DC 12V by Adapter Adapter input: 100 - 240VAC, 50/60Hz, 1.5A Adapter output: 12VDC, 1.0A

4.4 Description of Support Units

The EUT has been tested as an independent unit. The adapter input is 120VAC, 60Hz.

4.5 Standards Applicable for Testing

The customer requested FCC tests for a Wireless Personal In-Ear Monitor. The standards used were Part 15.207, Part 74H and Part 2.

4.6 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: IC7760A**

  Waltek Services(Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration 7760A, August 3, 2010.

- **FCC – Registration No.: 880581**

  Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, May 26, 2011.

4.7 Test Location

All the tests were performed at:
Waltek Services(Shenzhen) Co., Ltd. at 1/F, Fukangtai Building, West Baima Rd., Songgang Street, Baoan District, Shenzhen, China

5 Equipment Used during Test

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Uncertainty
EMC Analyzer	Agilent/ E7405A	MY45114943	W2008001	9k-26.5GHz	Aug. 2, 2011	Aug. 1, 2012	±1dB
Trilog Broadband Antenne	SCHWARZBECK MESS-ELEKTROM/ VULB9163	336	W2008002	30-3000 MHz	Aug. 2, 2011	Aug. 1, 2012	±1dB
Broad-band Horn Antenna	SCHWARZBECK MESS-ELEKTROM/ BBHA 9120D(1201)	667	W2008003	1-18GHz	Aug. 2, 2011	Aug. 1, 2012	f < 10 GHz : ±1dB 10GHz < f < 18 GHz : ±1.5dB
Broadband Preamplifier	SCHWARZBECK MESS-ELEKTROM/ BBV 9718	9718-148	W2008004	0.5-18GHz	Aug. 2, 2011	Aug. 1, 2012	±1.2dB
10m Coaxial Cable with N-male Connectors	SCHWARZBECK MESS-ELEKTROM/ AK 9515 H	-	-	-	Aug. 2, 2011	Aug. 1, 2012	-
10m 50 Ohm Coaxial Cable	SCHWARZBECK MESS-ELEKTROM/ AK 9513	-	-	-	Aug. 2, 2011	Aug. 1, 2012	-
Positioning Controller	C&C LAB/ CC-C-IF	-	-	-	N/A	N/A	-
Color Monitor	SUNSPO/ SP-14C	-	-	-	N/A	N/A	-
Test Receiver	ROHDE&SCHWARZ/ ESPI	101155	W2005001	9k-3GHz	Aug. 2, 2011	Aug. 1, 2012	±1dB
Two-Line V-Network	ROHDE&SCHWARZ/ ENV216	100115	W2005002	50Ω/50μH	Aug. 2, 2011	Aug. 1, 2012	±10%
RF Generator	TESEQ GmbH/ NSG4070	25781	W2008008	Fraq-range : 9K-1GHz RF voltage : -60 dBm-+10dBm	Aug. 2, 2011	Aug. 1, 2012	Power_freq distinguish 0.1Hz RFeletricity distinguish 0.1B
Attenuator 6dB	TESEQ GmbH/ ATN6050	25365	-	-	Aug. 2, 2011	Aug. 1, 2012	-
Audio Generator	INSTEK/ GAG-809	-	-	-	Aug. 2, 2011	Aug. 1, 2012	Freq: ± (3%+1Hz)
Active Loop Antenna	Beijing Dazhi / ZN30900A	-	-	9kHz-30MHz	Aug. 2, 2011	Aug. 1, 2012	±1dB

6 AC Line Conducted Emissions

Test Requirement:	FCC CFR 47 Part 15 Section 15.207
Test Method:	ANSI C63.4:2003
Test Result:	PASS
Frequency Range:	150kHz to 30MHz
Class:	Class B
Limit:	66-56 dBμV between 0.15MHz & 0.5MHz 56 dBμV between 0.5MHz & 5MHz 60 dBμV between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth) Quasi-Peak & Average if maximised peak within 6dB of Average Limit

6.1 E.U.T. Operation

Operating Environment:

Temperature: 25.5 °C

Humidity: 51 % RH

Atmospheric Pressure: 1012 mbar

EUT Operation:

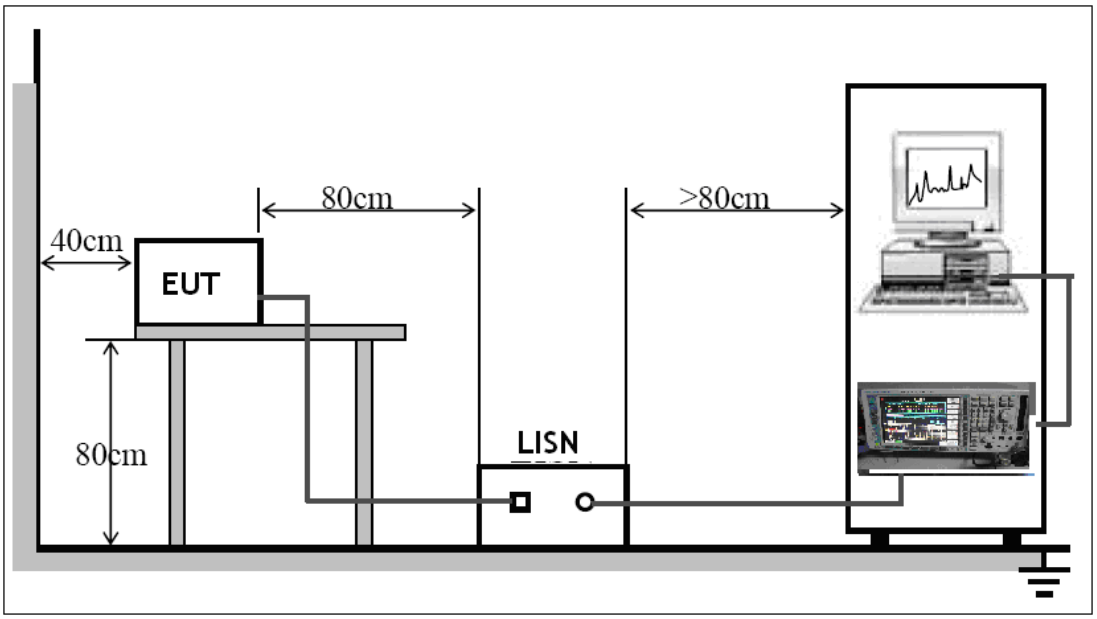
The EUT was tested in continuously transmitting mode. The pre-test was performed on low, middle and high channels, the worst data was the low channel's, so the data showing in the report is the low channel's.

The EUT was tested according to ANSI C63.4:2003. The frequency spectrum from 150kHz to 30MHz was investigated.

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

6.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15.207 limits.

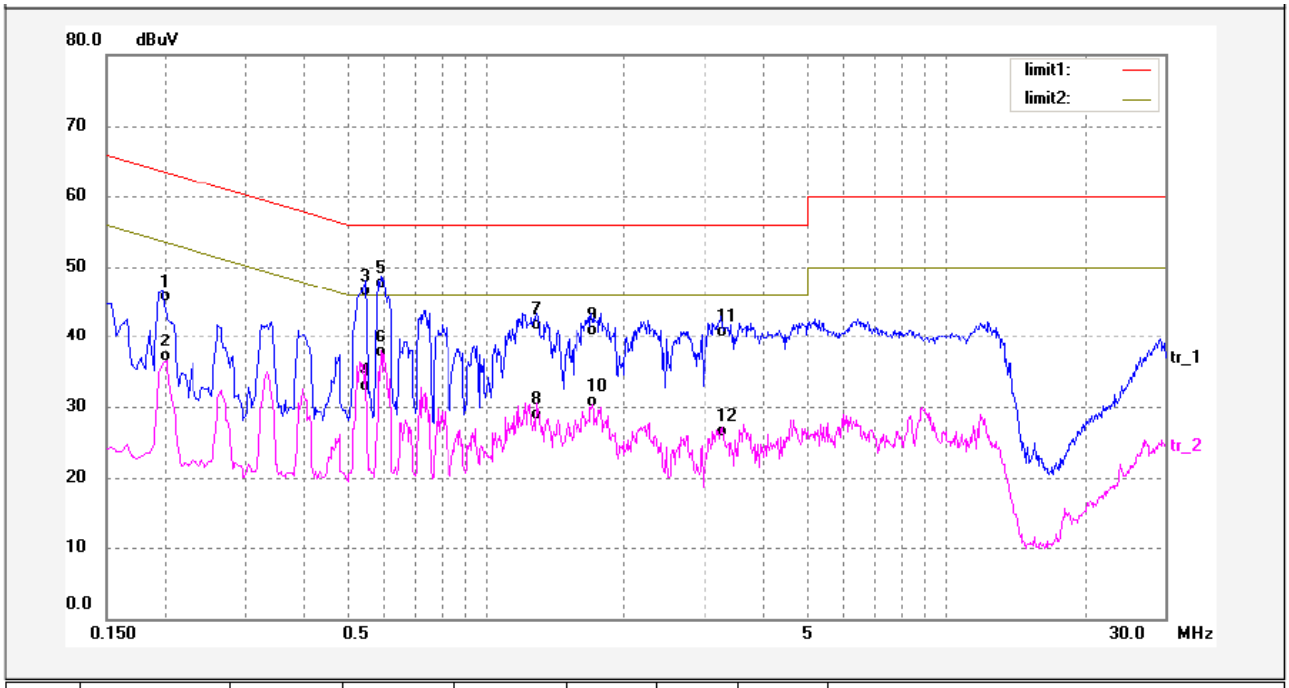


The EUT was placed on the test table in shielding room

6.3 Conducted Emission Test Result

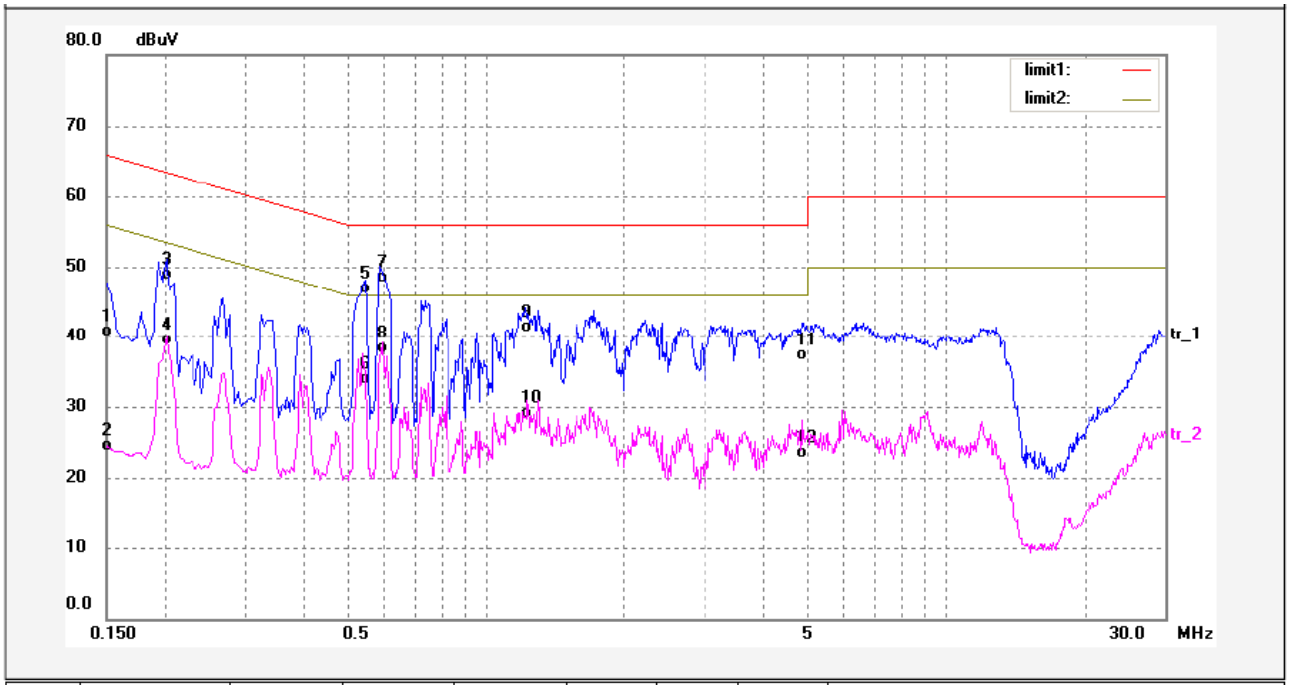
An initial pre-scan was performed on the live and neutral lines.

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1980	34.24	10.67	44.91	63.69	-18.78	QP	
2	0.1980	25.58	10.67	36.25	53.69	-17.44	AVG	
3	0.5500	34.20	11.50	45.70	56.00	-10.30	QP	
4	0.5500	20.57	11.50	32.07	46.00	-13.93	AVG	
5	0.5940	35.72	11.21	46.93	56.00	-9.07	QP	
6	0.5940	25.65	11.21	36.86	46.00	-9.14	AVG	
7	1.2900	28.72	12.19	40.91	56.00	-15.09	QP	
8	1.2900	15.82	12.19	28.01	46.00	-17.99	AVG	
9	1.7060	27.89	12.21	40.10	56.00	-15.90	QP	
10	1.7060	17.66	12.21	29.87	46.00	-16.13	AVG	
11	3.2740	27.36	12.51	39.87	56.00	-16.13	QP	
12	3.2740	13.25	12.51	25.76	46.00	-20.24	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1500	29.15	10.67	39.82	65.99	-26.17	QP	
2	0.1500	13.02	10.67	23.69	55.99	-32.30	AVG	
3	0.2020	37.40	10.67	48.07	63.52	-15.45	QP	
4	0.2020	28.07	10.67	38.74	53.52	-14.78	AVG	
5	0.5500	34.57	11.50	46.07	56.00	-9.93	QP	
6	0.5500	21.55	11.50	33.05	46.00	-12.95	AVG	
7	0.5899	36.51	11.24	47.75	56.00	-8.25	QP	
8	0.5899	26.18	11.24	37.42	46.00	-8.58	AVG	
9	1.2220	28.26	12.19	40.45	56.00	-15.55	QP	
10	1.2220	16.04	12.19	28.23	46.00	-17.77	AVG	
11	4.8500	24.51	11.91	36.42	56.00	-19.58	QP	
12	4.8500	10.83	11.91	22.74	46.00	-23.26	AVG	

6.4 Photograph – Conducted Emission Test Setup

7 RF Output Power

Test requirement: FCC CFR47 Part 74 Section 74.861(e)(1)(ii)

Test method: Based on TIA/EIA-603-C-2004

Limit: According to Part 74.861(e)(1)(ii), the output power shall not exceed 250mW (23.98 dBm).

7.1 Test Equipment

Please refer to Section 5 of this report.

7.2 Test Procedure

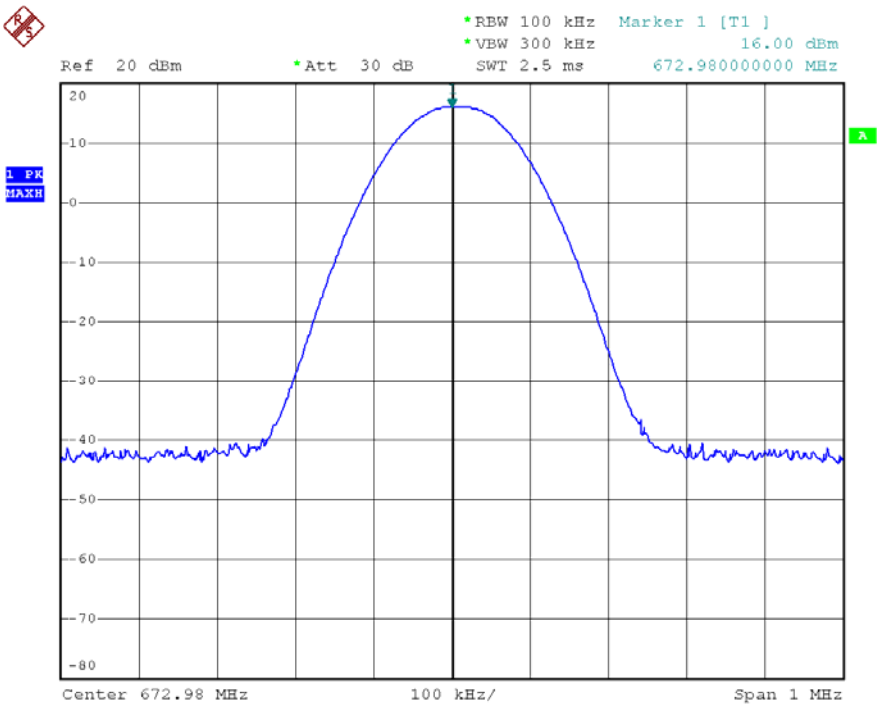
The maximum peak output power was measured with a spectrum analyzer connected to the antenna terminal (conducted measurement) while EUT was operating in normal situation. The test was performance in three frequency as low, middle and high.

7.3 Test result

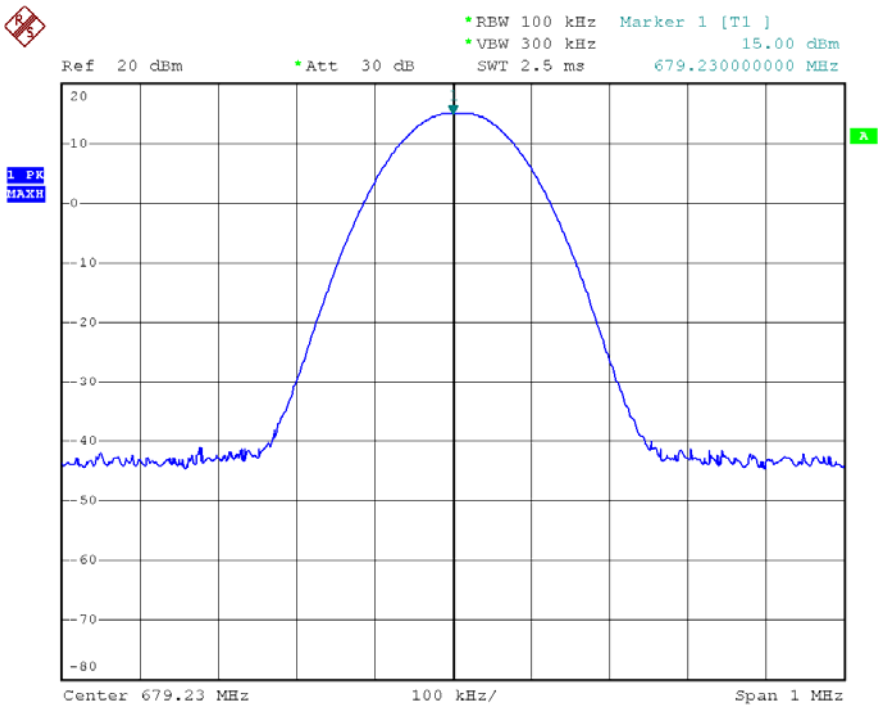
Frequency (MHz)	RF Output Power (dBm)	Limit (dBm)	Result
673.000	16.00	23.98	PASS
679.250	15.00	23.98	PASS
685.375	14.13	23.98	PASS

Please refer to following plot:

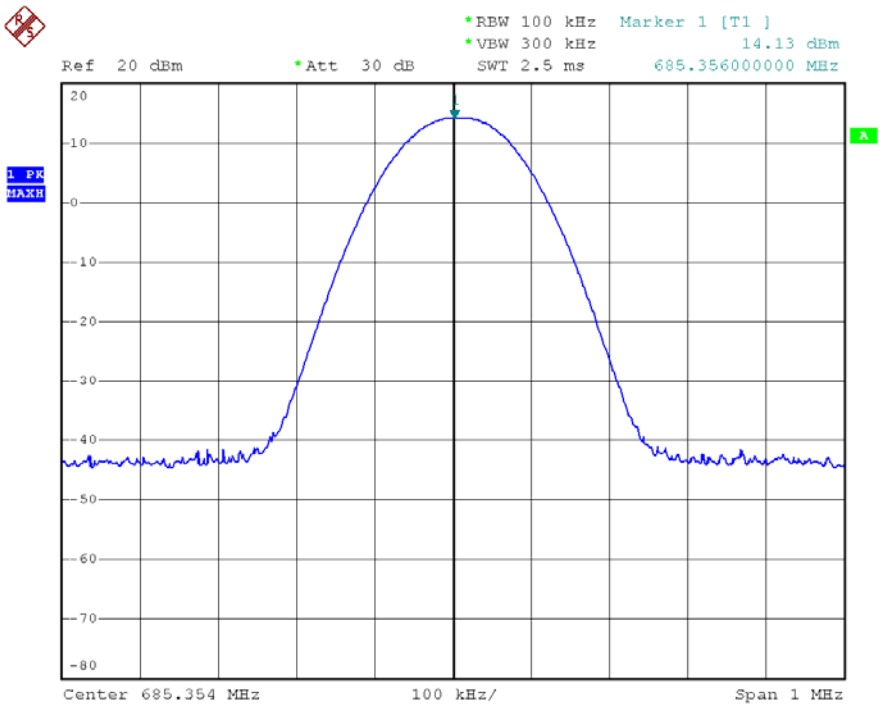
Low Frequency:



Middle Frequency:



High Frequency:



8 Modulation Characteristics

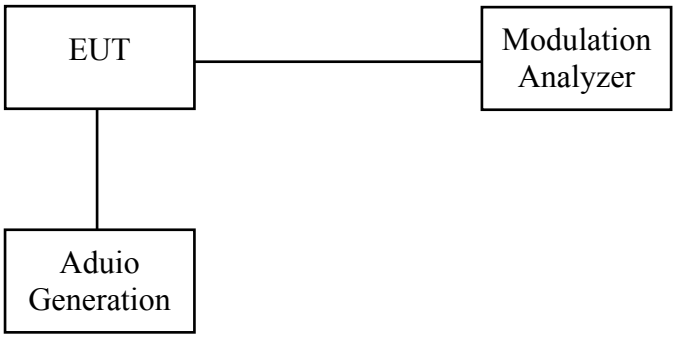
Test requirement:	FCC CFR47 Part 2 Section 2.1047(a)
Test method:	Based on TIA/EIA-603-C-2004
Requirement:	According to Part 2.1047(a), for Voice Modulated Communication Equipment, the frequency response of the audio modulating circuit over a range of 100Hz to 5000Hz shall be measured.

8.1 Test Equipment

Please refer to Section 5 in this report.

8.2 Test Procedure

(a) Test Configuration



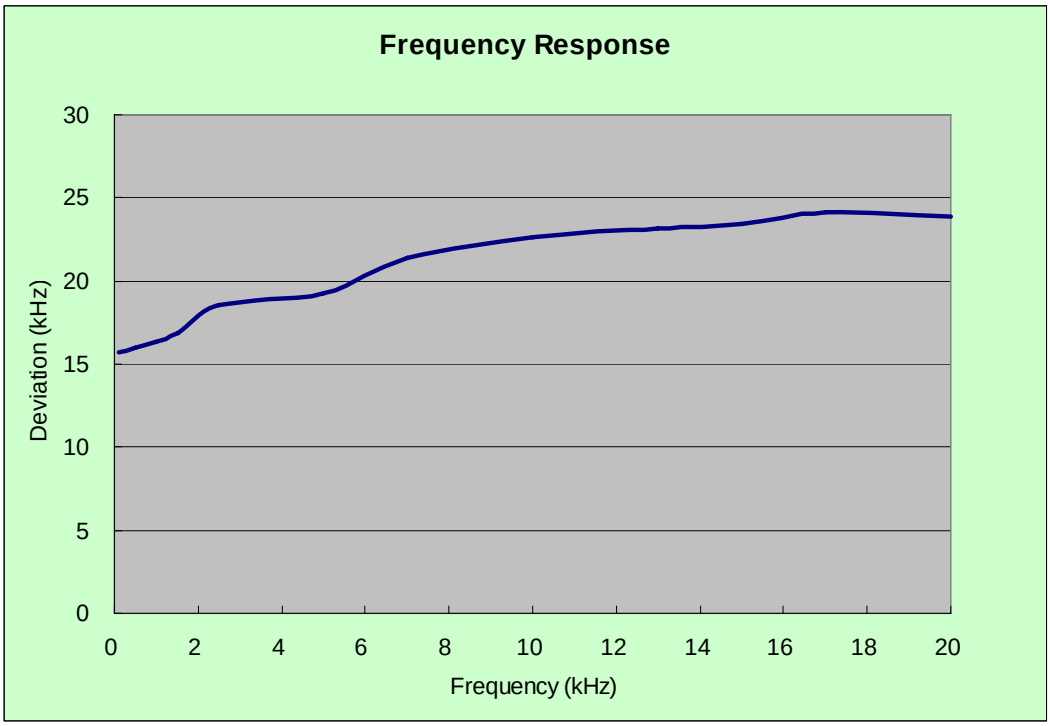
(b) Position the EUT as shown in above, adjust the audio input frequency to 100 Hz and the input level from 0V to maximum permitted input voltage with recording each carrier frequency deviation responding to respective input level.

(c) Repeat step (b) with changing the input frequency for 100, 500, 1000, 2500 and 5000 Hz in sequence.

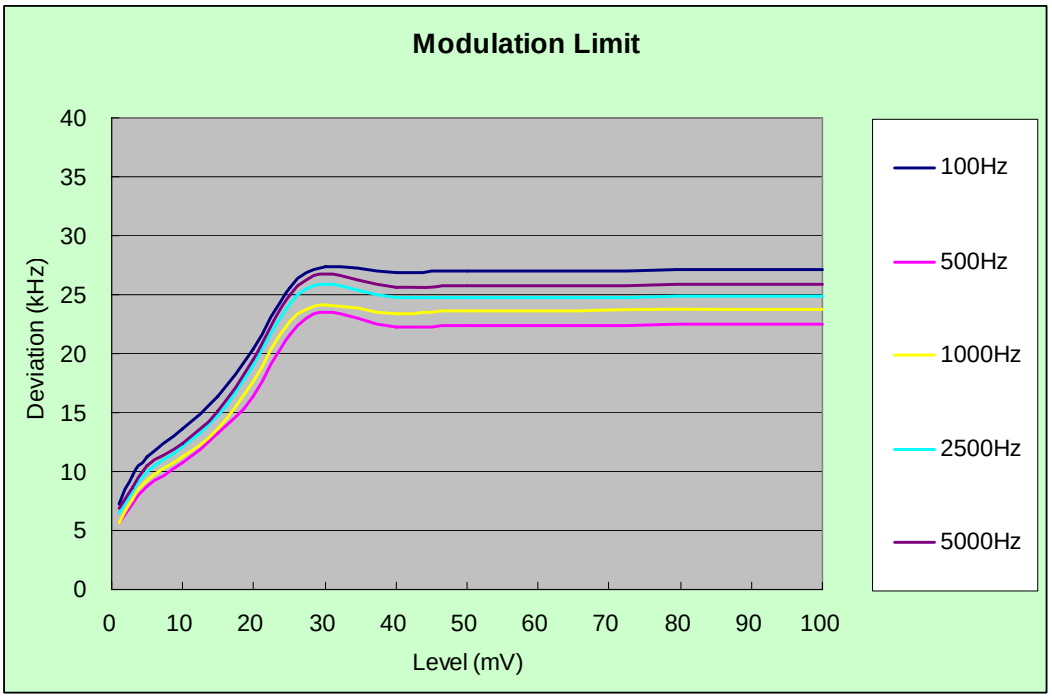
8.3 Test Result

The test data of modulation characteristic is showing as below:

Frequency Response



Modulation Limit



9 Occupied Bandwidth of Emission

Test requirement: FCC CFR47 Part 2 Section 2.1049(c)(1)

Test method: Based on TIA/EIA-603-C-2004

Limit: According to FCC 74.861 (e)(5), the frequency emission bandwidth shall not exceed 200 kHz.

9.1 Test Equipment

Please refer to Section 5 in this report.

9.2 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

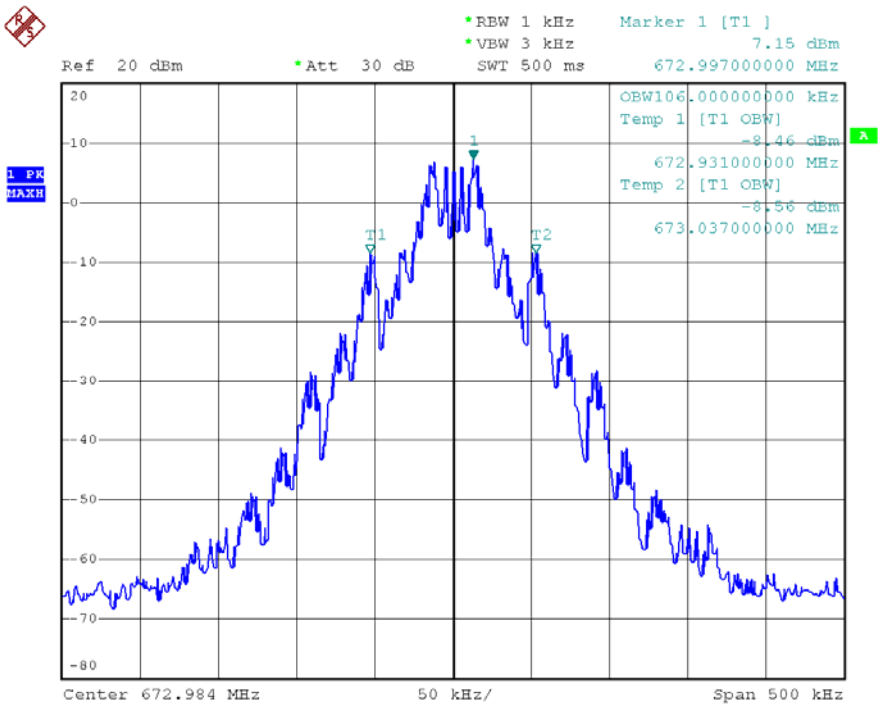
2. Turn on the EUT and set it to any one convenient frequency within its operating range.

9.3 Test Result

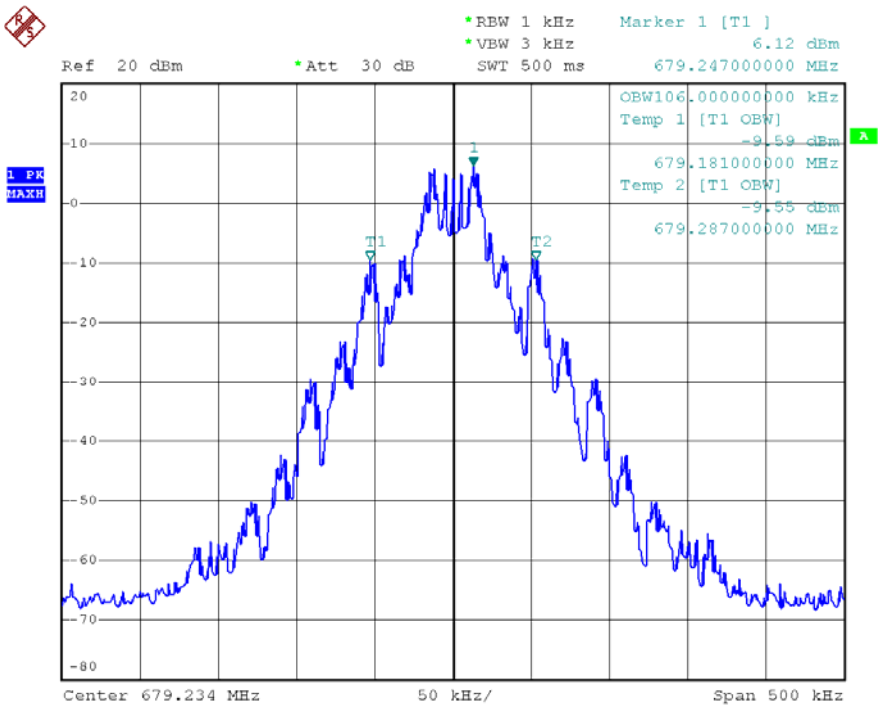
Channel	Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Result
CH1	673.000	106	200	PASS
CH51	679.250	106	200	PASS
CH100	685.375	106	200	PASS

Test Plot:

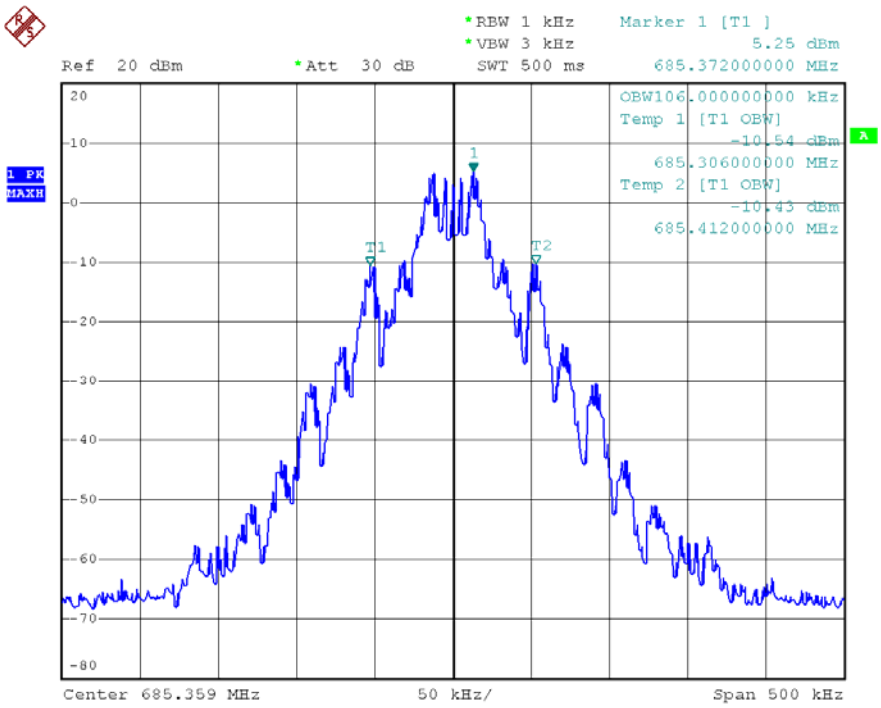
Low Frequency:CH1



Middle Frequency:CH51



High Frequency:CH100



Emission Designator:

The necessary (or occupied) bandwidth for FM (frequency modulation) devices is given by B = 2M + 2D, where M is the highest baseband frequency of the modulating signal and D is the peak frequency deviation. In this case, M = 15 kHz, D = 28.1 kHz, so B = 2*15kHz + 2* 28.1kHz = 86K2F3E

10 Spurious Emissions at Antenna Terminals

Test requirement:	FCC CFR47 Part 2 Section 2.1051
Test method:	Based on TIA/EIA-603-C-2004
Limit:	According to Part 2.1051, the radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in §2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.

10.1 Test Equipment

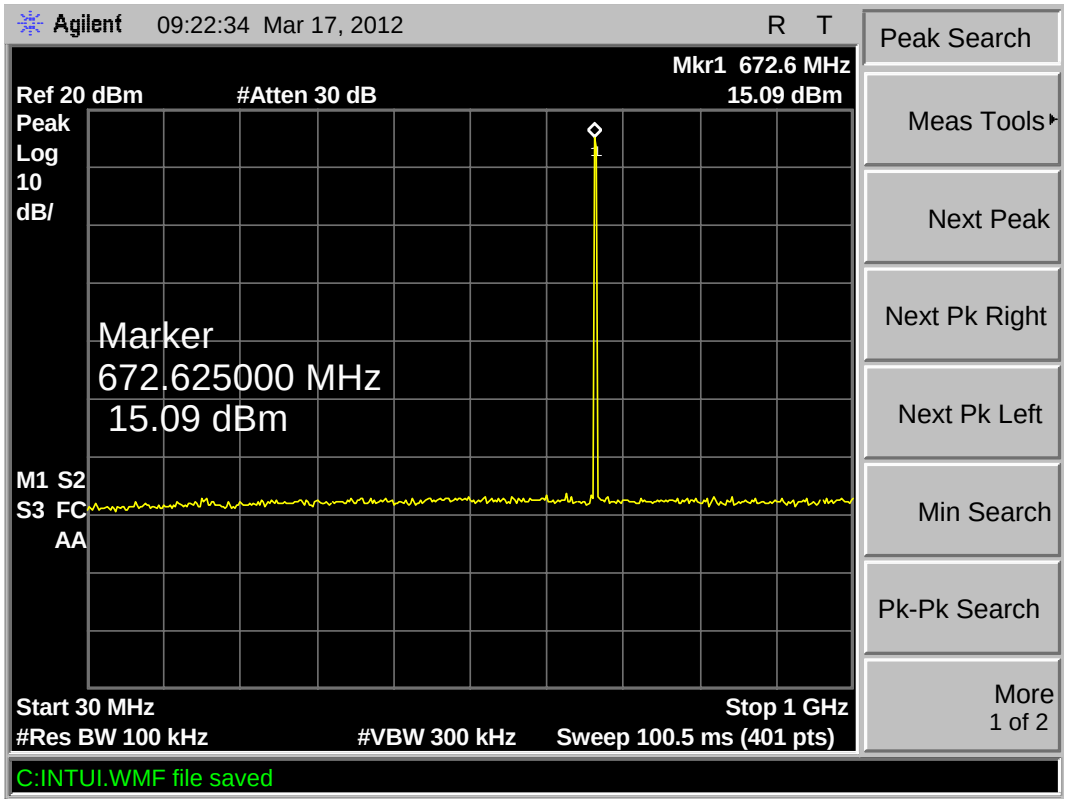
Please refer to Section 5 in this report.

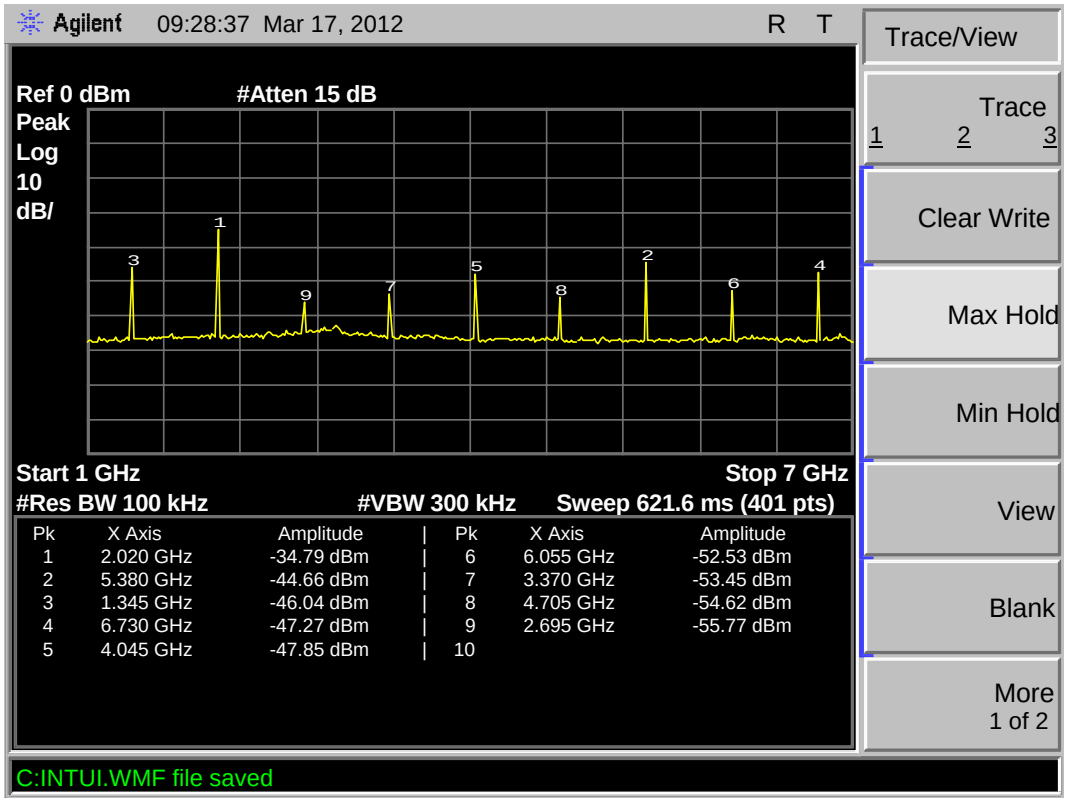
10.2 Test Procedure

1. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
2. Set the SA on Max-Hold Mode, and then keep the EUT in transmitting mode. Record all the signals from each channel until each one has been recorded.
3. Set the SA on View mode and then plot the result on SA screen.
4. Repeat above procedures until all frequencies measured were complete.

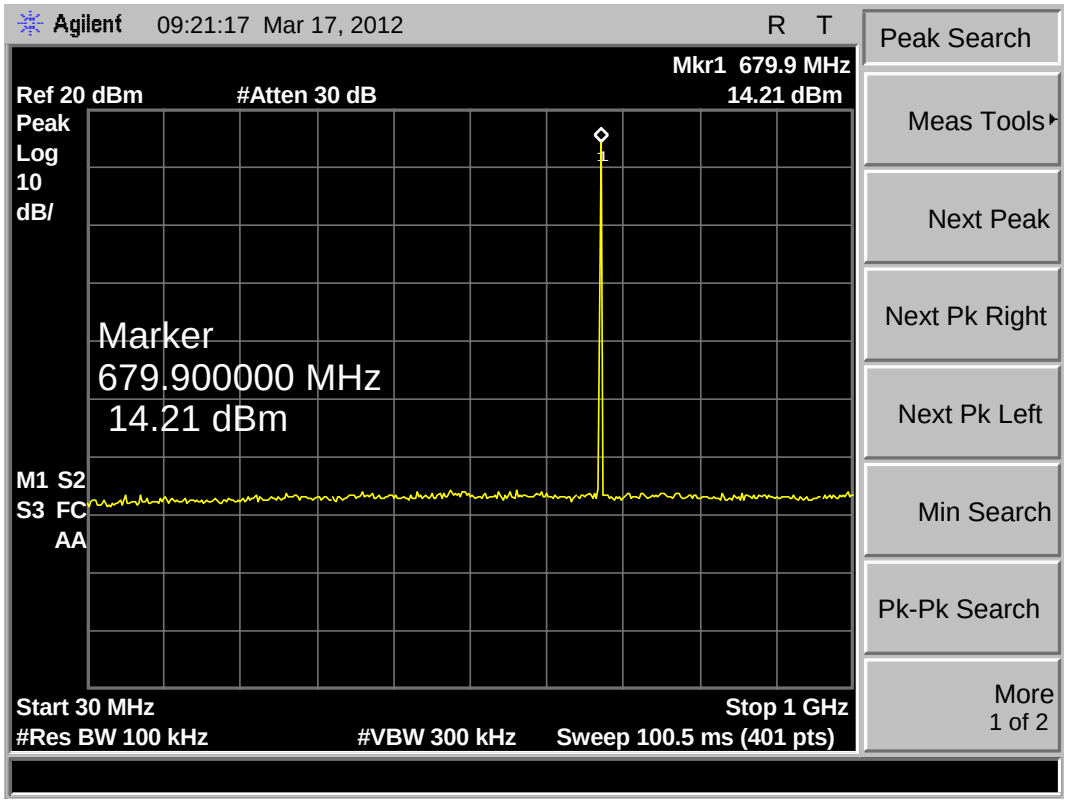
10.3 Test Data

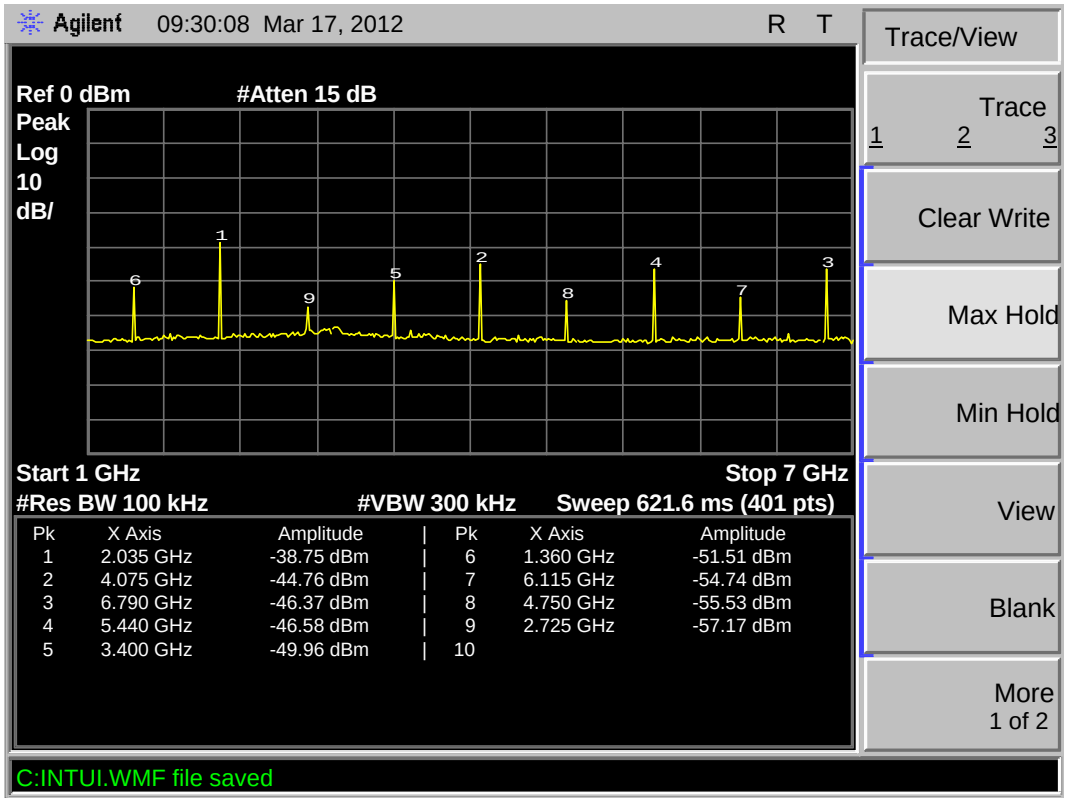
Low Frequency:



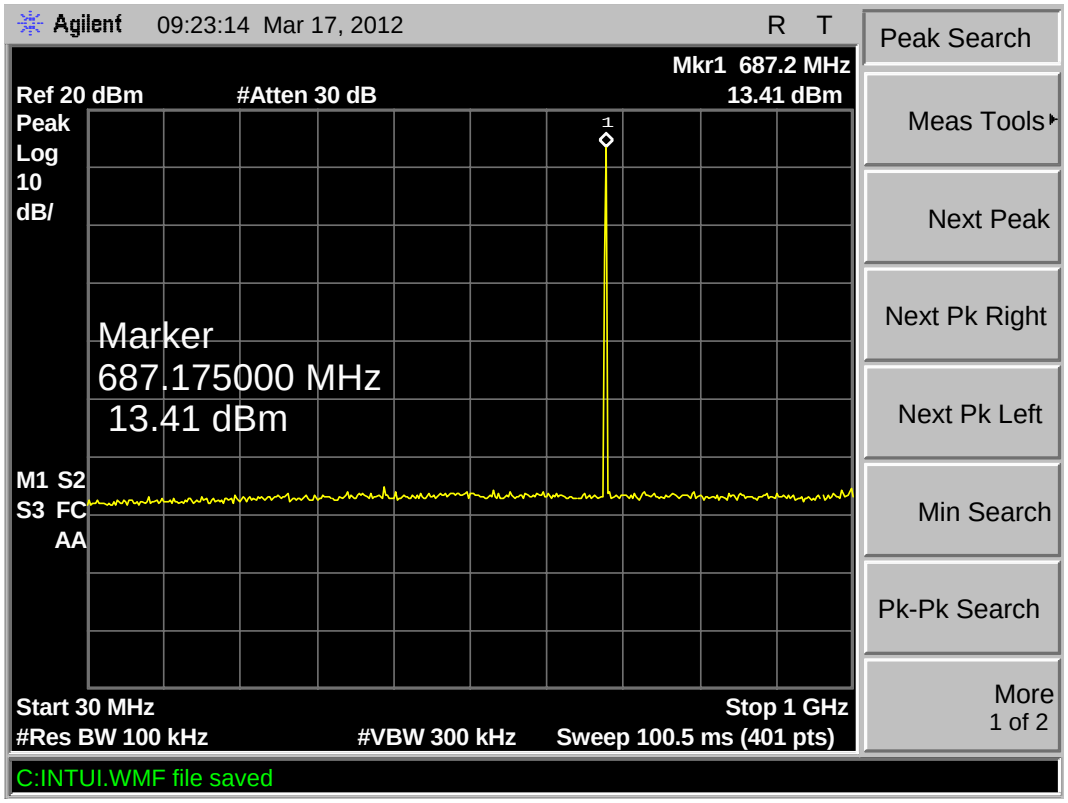


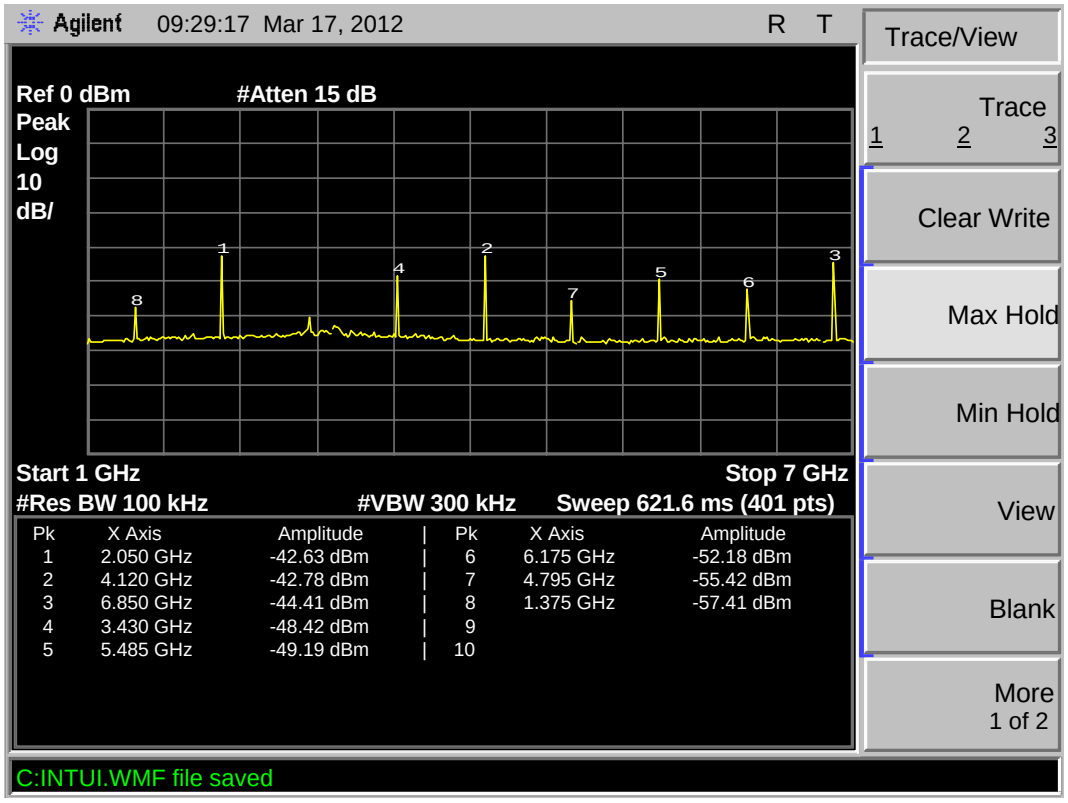
Middle Frequency:





High Frequency:





11 Spurious Radiated Emission

Test requirement:	FCC CFR47 Part 2 Section 2.1053
Test method:	Based on TIA/EIA-603-C-2004
Limit:	According to Part 74.861 (e)(6), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule: (i) on any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB. (ii) on any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB. (iii) on any frequency removed from the operating frequency by more than 250 percent up to and the authorized bandwidth shall be attenuated below the un-modulated carrier by at least 43 + 10 Log (output power in watts)dB.

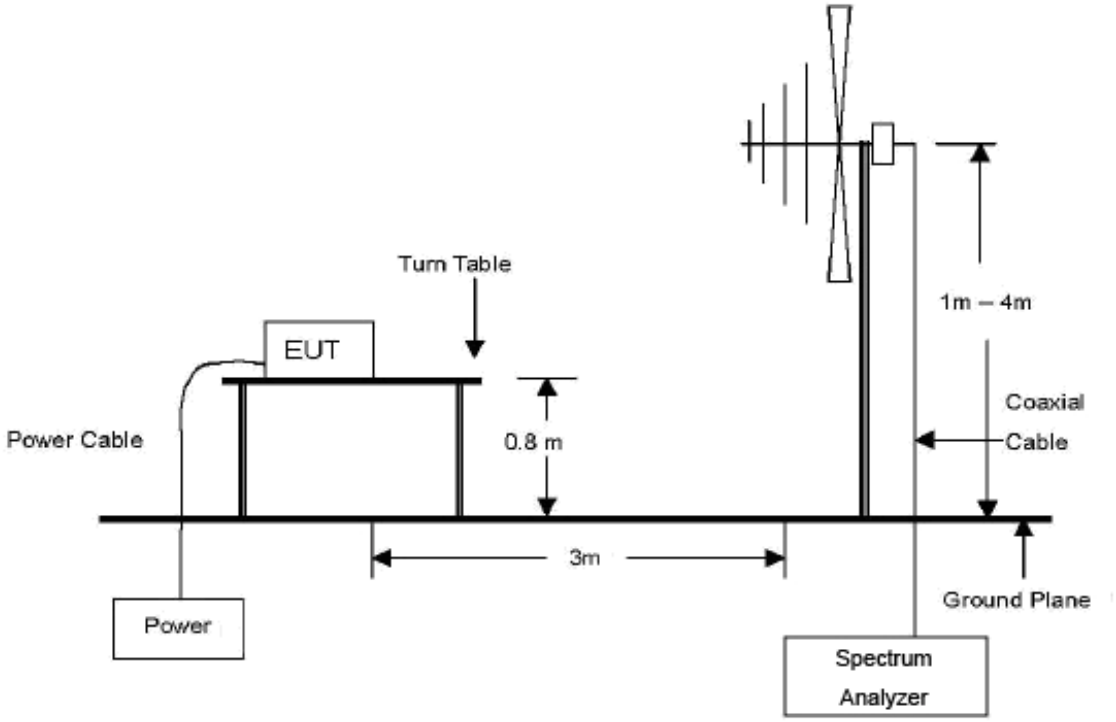
11.1 Test Equipment

Please refer to Section 5 in this report.

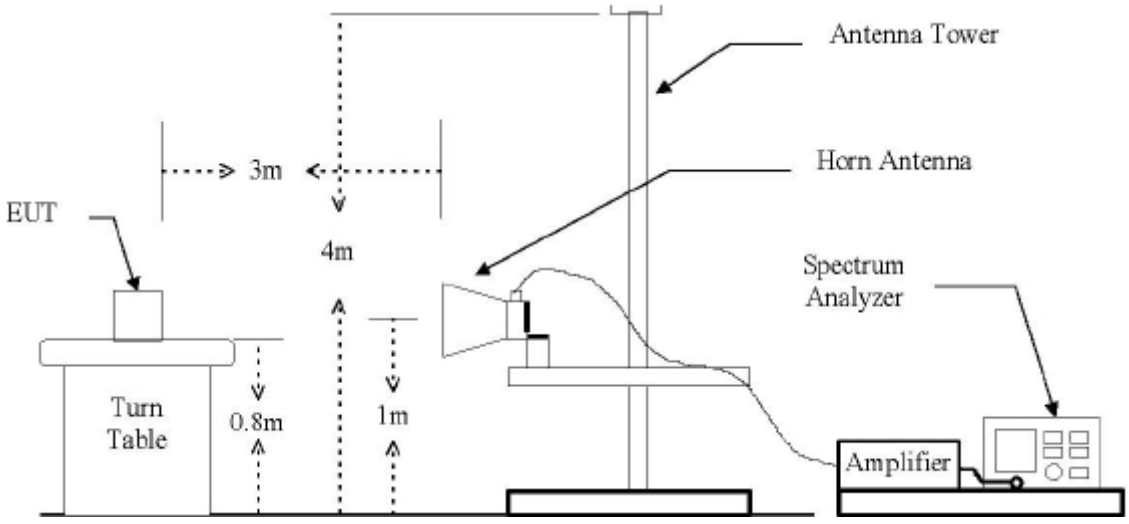
11.2 EUT Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4:2003.

The diagram below shows the test setup that is utilized to make the measurements for emission below 1GHz.



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



11.3 Spectrum Analyzer Setup

According to FCC Part15 Rules, the system was tested 9kHz to 7000MHz.

9kHz ~ 30MHz

Start Frequency	9kHz
Stop Frequency	30MHz
Sweep Speed	Auto
IF Bandwidth	10KHz
Video Bandwidth	10KHz
Resolution Bandwidth	10KHz

30MHz ~ 1GHz

Start Frequency	30 MHz
Stop Frequency	1000MHz
Sweep Speed	Auto
IF Bandwidth	120 KHz
Video Bandwidth	100KHz
Quasi-Peak Adapter Bandwidth	120 KHz
Quasi-Peak Adapter Mode	Normal
Resolution Bandwidth	100KHz

Above 1GHz

Start Frequency	1000 MHz
Stop Frequency	7000MHz
Sweep Speed	Auto
IF Bandwidth	120 KHz
Video Bandwidth	3MHz
Quasi-Peak Adapter Bandwidth	120 KHz
Quasi-Peak Adapter Mode	Normal
Resolution Bandwidth	1MHz

11.4 Test Procedure

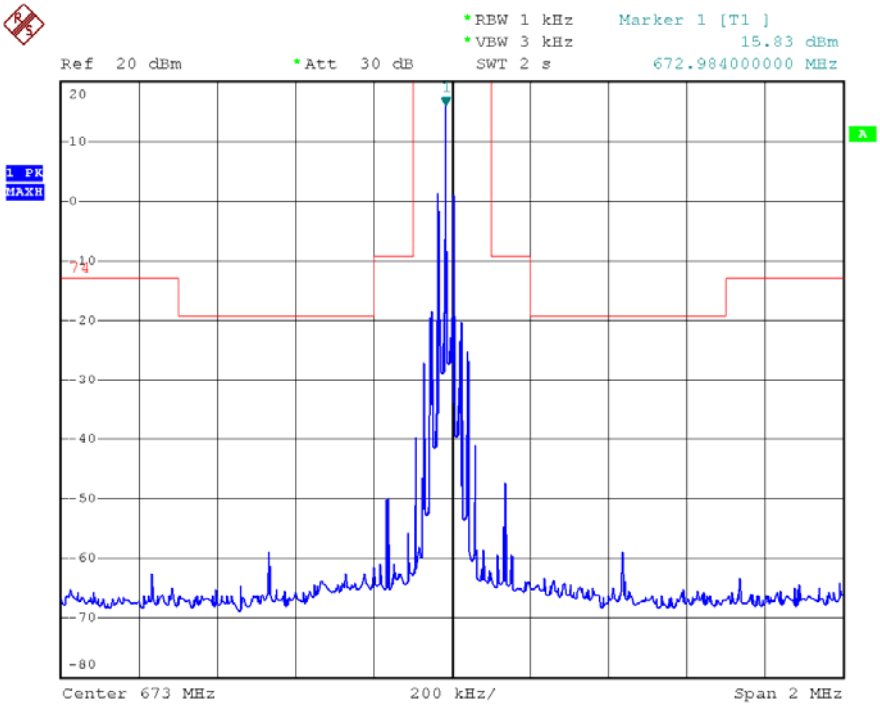
1. Place the transmitter to be tested on the turntable in the standard test site. The transmitter is Transmitting into a non-radiating load, which is placed on the turntable.
2. The output of the antenna was connected to the measuring receiver and a peak detector was used for the measurement as indicated on the report.
3. The transmitter was switched on; if possible, without the modulation and the measurement receiver shall be tuned to the frequency of the transmitter under test.
4. The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.
5. The transmitter shall than be rotated through 360^{o} in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
6. The test antenna shall be raised and lowered again through the specified range of height until the measuring receiver detects a maximum signal level.
7. The maximum signal level detected by the measuring receiver shall be noted.
8. The measurement shall be repeated with the test antenna set to horizontal polarization.
9. Replace the antenna with a proper antenna (substitution antenna).
10. The substitution antenna shall be oriented for vertical polarization and, if necessary, the length of the substitution antenna shall be adjusted to correspond to the frequency of transmitting.
11. The substitution antenna shall be connected to a calibrated signal generator.
12. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
13. The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
14. The input signal to substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuation setting of the measuring receiver.
15. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
16. The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.
17. The radiation emission was tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.
18. The EUT was under working mode during the final qualification test and the configuration was used to represent the worst case results.

11.5 Test Result

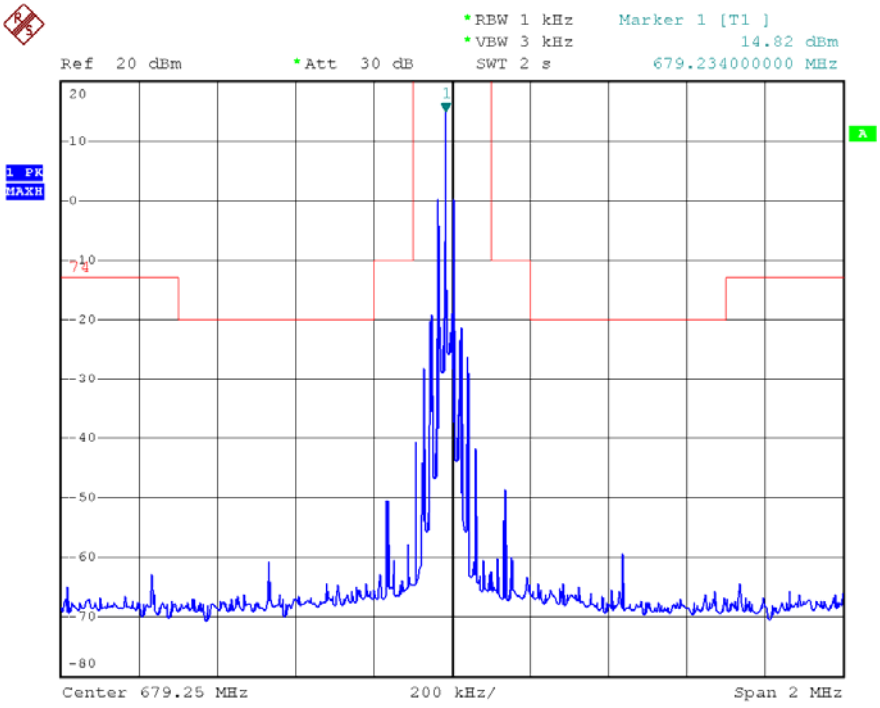
Remark:Because the emissions below 30MHz are more than 20dB below the limit, the data is not show in the report.

Emission Mask:

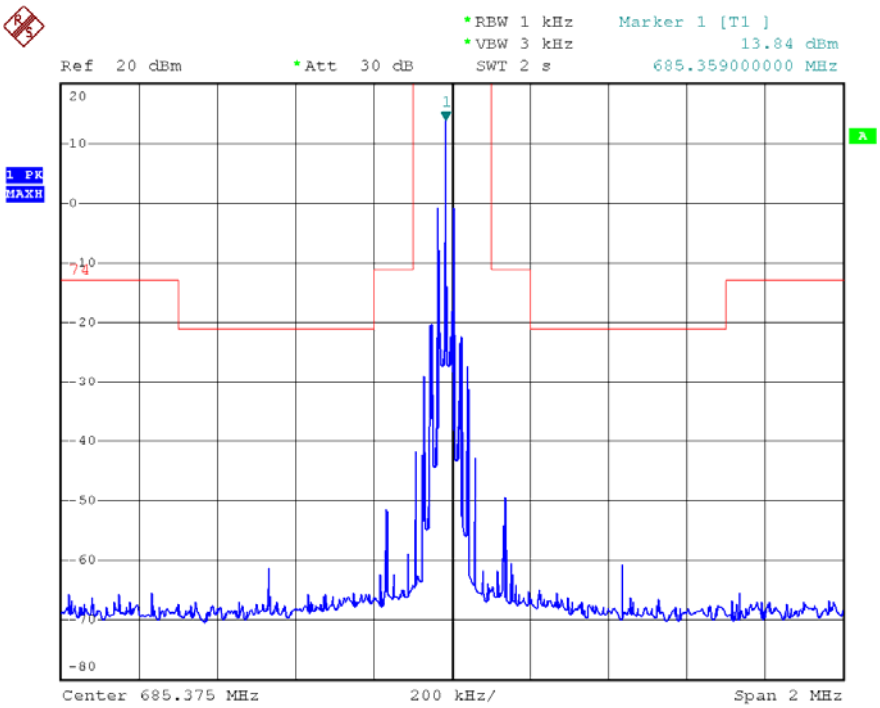
Low Frequency:



Middle Frequency:



High Frequency:



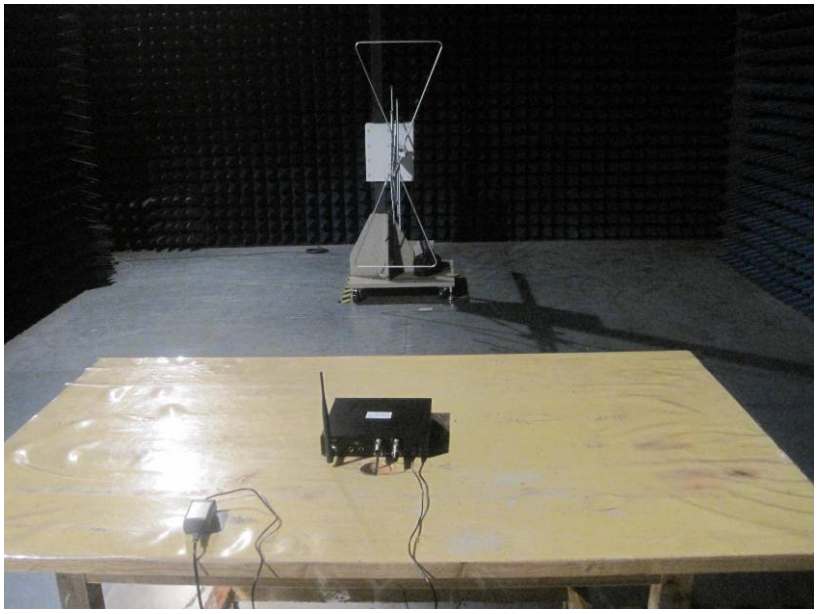
Radiated Spurious Emissions:

Frequency (MHz)	Detector	Ant. Pol	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
Low Channel: 673.000MHz							
1346.000	Peak	V	-34.44	-13.00	-21.44	1.2	40
2019.000	Peak	V	-24.57	-13.00	-11.57	1.9	25
2692.000	Peak	V	-30.68	-13.00	-17.68	1.9	210
3365.000	Peak	V	-44.33	-13.00	-31.33	1.5	160
4038.000	Peak	V	-38.61	-13.00	-25.61	1.8	180
4711.000	Peak	V	-48.06	-13.00	-35.06	1.8	150
5384.000	Peak	V	-47.61	-13.00	-34.61	1.3	160
6057.000	Peak	V	-70.23	-13.00	-57.23	2.2	190
6730.000	Peak	V	-47.30	-13.00	-34.30	1.5	140
1346.000	Peak	H	-62.49	-13.00	-49.49	2.2	30
2019.000	Peak	H	-63.81	-13.00	-50.81	1.4	280
2692.000	Peak	H	-68.81	-13.00	-55.81	1.9	130
3365.000	Peak	H	-74.37	-13.00	-61.37	2.4	140
4038.000	Peak	H	-65.33	-13.00	-52.33	1.3	250
4711.000	Peak	H	-67.21	-13.00	-54.21	1.5	80
5384.000	Peak	H	-68.53	-13.00	-55.53	1.9	40
6057.000	Peak	H	-70.85	-13.00	-57.85	1.9	330
6730.000	Peak	H	-63.43	-13.00	-50.43	2.0	90
Middle Channel: 679.250MHz							
1358.500	Peak	V	-27.79	-13.00	-14.79	1.4	70
2037.750	Peak	V	-24.88	-13.00	-11.88	1.2	100
2717.000	Peak	V	-22.58	-13.00	-9.58	1.2	60
3396.250	Peak	V	-37.81	-13.00	-24.81	1.6	60
4075.500	Peak	V	-32.52	-13.00	-19.52	1.2	280
4754.750	Peak	V	-37.83	-13.00	-24.83	1.3	150
5434.000	Peak	V	-38.66	-13.00	-25.66	1.3	20
6113.250	Peak	V	-40.84	-13.00	-27.84	1.3	0
6792.500	Peak	V	-33.33	-13.00	-20.33	1.4	85
1358.500	Peak	H	-57.97	-13.00	-44.97	2.1	300
2037.750	Peak	H	-67.05	-13.00	-54.05	1.4	120

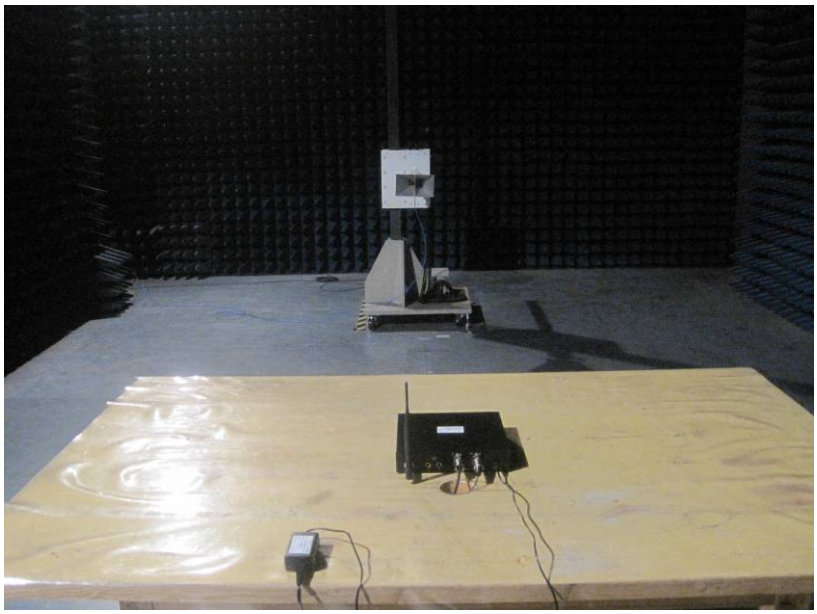
2717.000	Peak	H	-72.57	-13.00	-59.57	1.9	100
3396.250	Peak	H	-71.28	-13.00	-58.28	1.8	180
4075.500	Peak	H	-68.10	-13.00	-55.10	1.8	120
4754.750	Peak	H	-71.62	-13.00	-58.62	2.1	40
5434.000	Peak	H	-72.64	-13.00	-59.64	1.7	70
6113.250	Peak	H	-71.83	-13.00	-58.83	1.5	150
6792.500	Peak	H	-72.18	-13.00	-59.18	2.5	250
High Channel: 685.375MHz							
1370.750	Peak	V	-26.95	-13.00	-13.95	1.2	230
2056.125	Peak	V	-24.28	-13.00	-11.28	1.2	270
2741.500	Peak	V	-24.39	-13.00	-11.39	1.1	290
3426.875	Peak	V	-26.09	-13.00	-13.09	1.4	160
4112.250	Peak	V	-31.17	-13.00	-18.17	1.5	20
4797.625	Peak	V	-31.86	-13.00	-18.86	1.8	110
5483.000	Peak	V	-46.66	-13.00	-33.66	1.6	40
6168.375	Peak	V	-38.34	-13.00	-25.34	1.6	60
6853.750	Peak	V	-33.92	-13.00	-20.92	1.1	200
1370.750	Peak	H	-57.60	-13.00	-44.60	2.0	240
2056.125	Peak	H	-65.49	-13.00	-52.49	1.9	170
2741.500	Peak	H	-72.93	-13.00	-59.93	1.9	150
3426.875	Peak	H	-69.64	-13.00	-56.64	1.9	80
4112.250	Peak	H	-68.73	-13.00	-55.73	1.7	110
4797.625	Peak	H	-68.60	-13.00	-55.60	2.5	160
5483.000	Peak	H	-72.36	-13.00	-59.36	2.1	180
6168.375	Peak	H	-72.85	-13.00	-59.85	1.8	290
6853.750	Peak	H	-71.94	-13.00	-58.94	2.0	70

11.6 Photograph – Radiated Emission Setup

Below 1GHz



Above 1GHz



12 Frequency Stability

Test requirement: FCC CFR47 Part 2 Section 2.1055(a)(a)

Test method: Based on TIA/EIA-603-C-2004

Limit: According to FCC 74.86(e)(4), the frequency tolerance of the transmitter shall be 0.005 percent.

12.1 Test Equipment

Please refer to Section 5 in this report.

12.2 Test Configuration

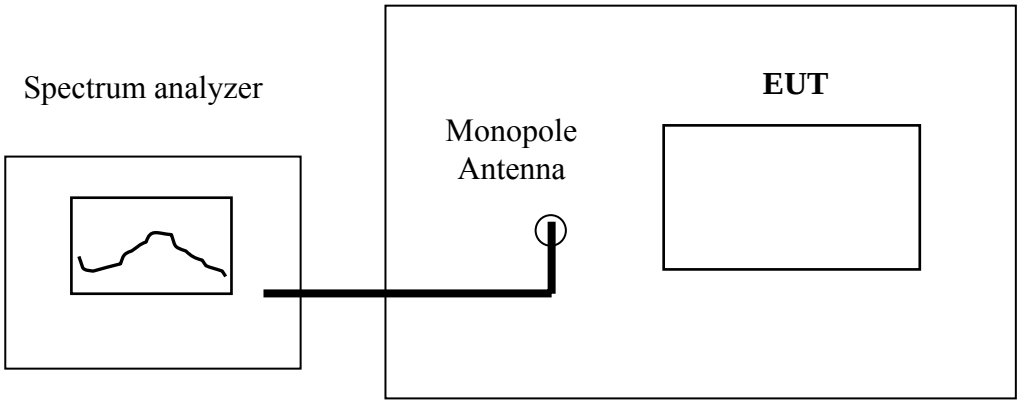


Figure 1

12.3 Test Procedure

A) Frequency stability versus input voltage

1. Setup the configuration per figure 1 for frequencies measured at an environmental chamber whose temperature is set to 20 ºC. Install new batteries in the EUT.

2. Set SA center frequency to the EUT operation frequency. Then set SA RBW to 30 kHz, VBW to 100kHz and frequency span to 500 kHz. Record this frequency to be a reference.

3. Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

B) Frequency stability versus environmental temperature

1. Setup the configuration per figure 1 for frequencies measured at an environmental chamber, Install new batteries in the EUT.

2. Turn on EUT and set SA center frequency to the EUT operation frequency, then set SA RBW to 30kHz, VBW to 100kHz and frequency span to 500 kHz. Record this frequency to be a reference.

3. Set the temperature of chamber to 50ºC. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the chamber, turn the EUT on and measure the EUT operating frequency.

4. Repeat step 2 with a 10ºC decreased per stage until the lowest temperature -30ºC is measured, record all measurement frequencies.

12.4 Test Result

a) Frequency stability versus input voltage

Power Supply	Reference Frequency (MHz)	Environment Temperature (ºC)	Frequency Measured	Frequency Tolerance (%)
102VAC, 60Hz	673.000	20	672.995	0.0007
	679.250	20	679.245	0.0007
	685.375	20	685.368	0.0010
138VAC, 60Hz	673.000	20	672.992	0.0012
	679.250	20	679.247	0.0004
	685.375	20	685.371	0.0006

b) Frequency stability versus environmental temperature

Reference Frequency: 673.000MHz, Limit: 0.005%			
Environment Temperature(ºC)	Power Supply	Frequency Deviation measured with time Elapse(30 minutes)	
		MHz	%
50	120VAC, 60Hz	673.024	0.0036
40	120VAC, 60Hz	673.018	0.0027
30	120VAC, 60Hz	673.020	0.0030
20	120VAC, 60Hz	672.984	0.0024
10	120VAC, 60Hz	672.988	0.0018
0	120VAC, 60Hz	672.979	0.0031
-10	120VAC, 60Hz	672.981	0.0028
-20	120VAC, 60Hz	673.015	0.0022
-30	120VAC, 60Hz	672.994	0.0009

Reference Frequency: 679.250MHz, Limit: 0.005%			
Environment Temperature(ºC)	Power Supply	Frequency Deviation measured with time Elapse(30 minutes)	
		MHz	%
50	120VAC, 60Hz	679.258	0.0012
40	120VAC, 60Hz	679.261	0.0016
30	120VAC, 60Hz	679.243	0.0010
20	120VAC, 60Hz	679.237	0.0019
10	120VAC, 60Hz	679.232	0.0026
0	120VAC, 60Hz	679.254	0.0006
-10	120VAC, 60Hz	679.235	0.0022
-20	120VAC, 60Hz	679.229	0.0031
-30	120VAC, 60Hz	679.236	0.0021

Reference Frequency: 685.375MHz, Limit: 0.005%			
Environment Temperature(ºC)	Power Supply	Frequency Deviation measured with time Elapse(30 minutes)	
		MHz	%
50	120VAC, 60Hz	685.381	0.0009
40	120VAC, 60Hz	685.381	0.0009
30	120VAC, 60Hz	685.368	0.0010
20	120VAC, 60Hz	685.360	0.0022
10	120VAC, 60Hz	685.371	0.0006
0	120VAC, 60Hz	685.357	0.0026
-10	120VAC, 60Hz	685.364	0.0016
-20	120VAC, 60Hz	685.368	0.0010
-30	120VAC, 60Hz	685.359	0.0023

Test Result: The max frequency tolerance rating is 0.0036% < 0.005%. Passed.

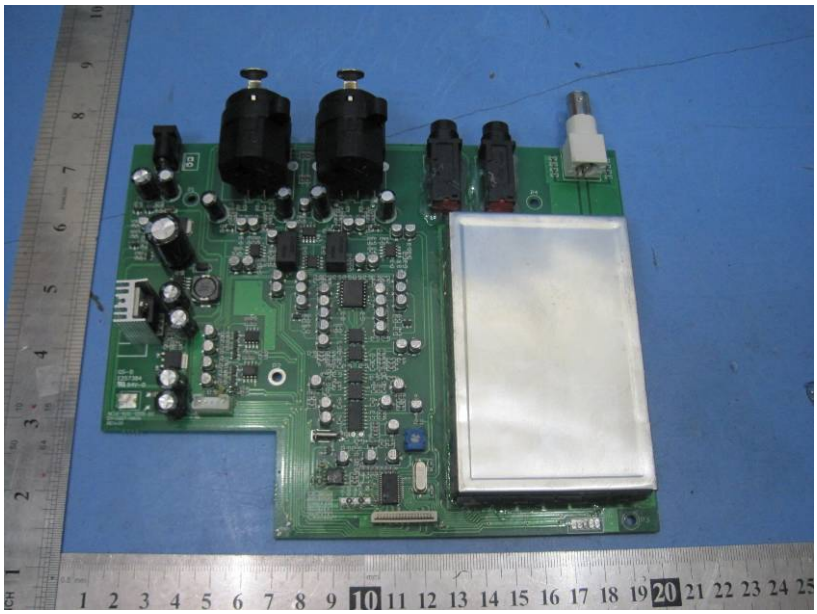
13 Photographs - Constructional Details

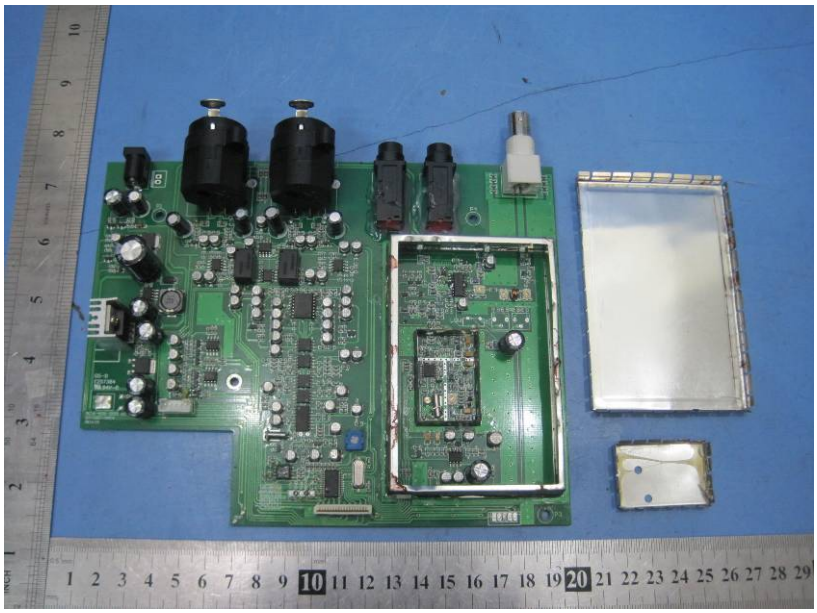
13.1 Product View

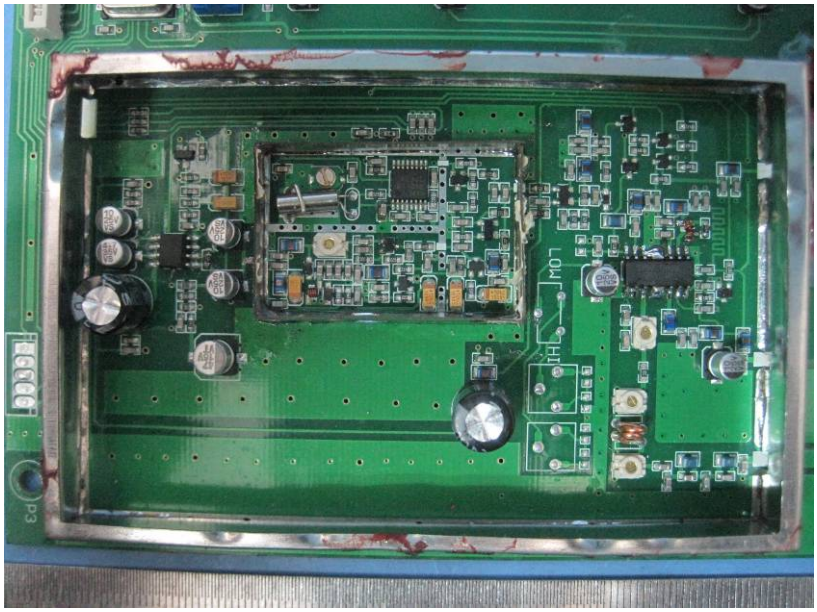
13.2 EUT – Appearance View

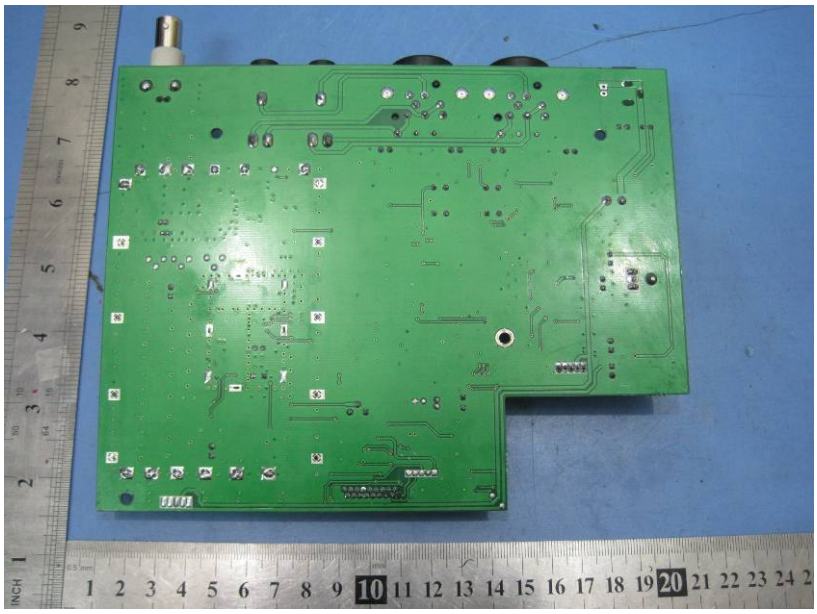
13.3 EUT – Open View

13.4 PCB1 - View

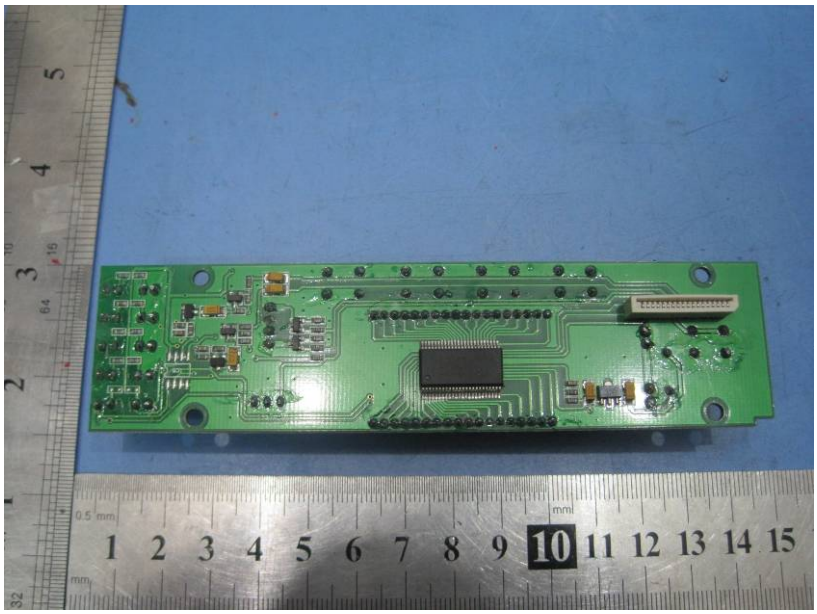


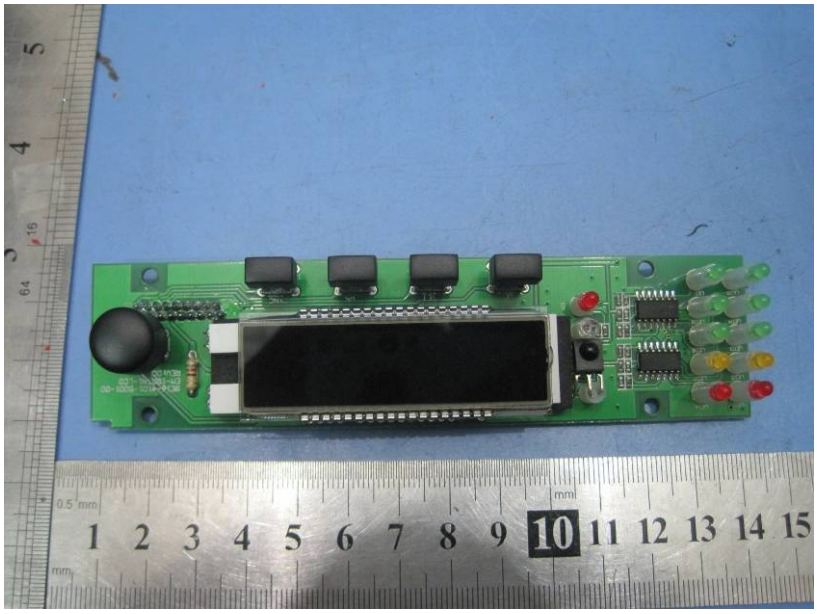




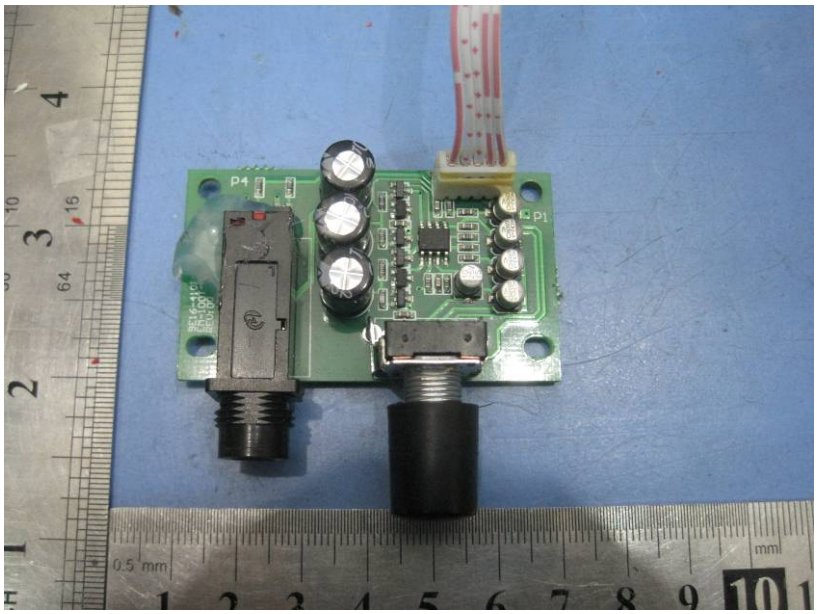


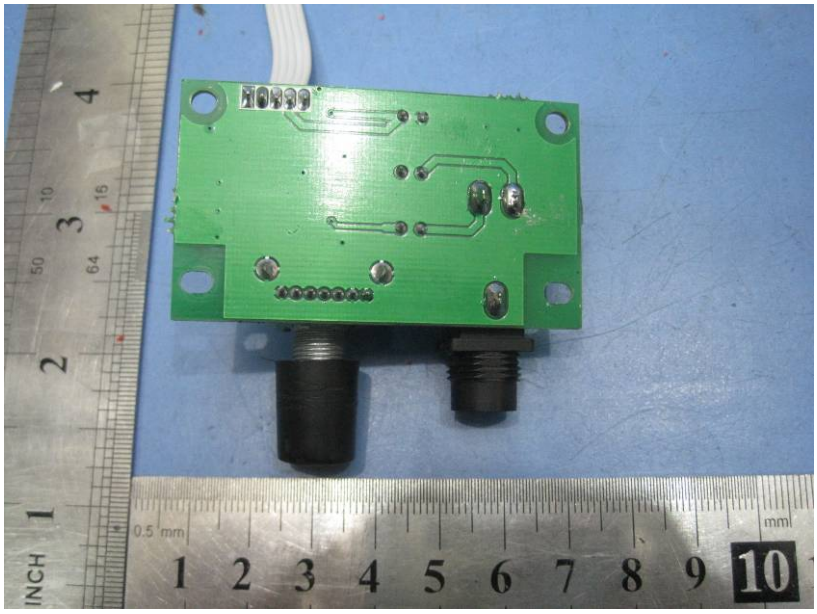
13.5 PCB2 – View





13.6 PCB3 – View





14 FCC Label

The Label must not be a stick-on paper. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT

EUT Top View/proposed FCC Label Location