FCC TEST REPORT

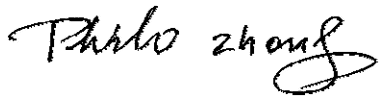
FCC ID : ZTJ-VH5
Applicant : Shenzhen Uniwisdom Technologies Co., Ltd.
Address : Bldg.91-94 3rd Industrial Zone, Lisonglang, Gongming Town, Bao'an District, Shenzhen, P.R.China

Equipment Under Test (EUT) :
Product Name : Wireless Microphone System
Model No. : VH-5; PV-1 V1 HH(Transmitter)

Standards : FCC CFR47 Part 74 Section 74.861:2009

Date of Test : August 15 ~ August 17, 2011
Date of Issue : August 18, 2011

Test Engineer : Hunk yan 

Reviewed By : Philo zhong 

Test Result	**: PASS**

Prepared By:
Waltek Services (Shenzhen) Co., Ltd.
1/F, Fukangtai Building, West Baima Rd., Songgang Street, Baoan District,
Shenzhen 518105, China

Tel :+86-755-27553488
Fax:+86-755-27553868

✧ 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
RF Output Power	74.861(e)(1)(i)	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
Frequencies Stability	2.1055(a)(1)	TIA/EIA-603-C-2004	PASS

3 Contents

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 Microphone System
Model No.	: VH-5; PV-1 V1 HH(Transmitter)
Differences describe	: Both models are exactly the same excepte different model names.
Operation Frequency	: 174.00MHz ~ 216.00MHz

4.3 Details of E.U.T.

Technical Data:	: Powered by 9.0V Battery

4.4 Description of Support Units

The EUT has been tested as an independent unit.

4.5 Standards Applicable for Testing

The customer requested FCC tests for a Wireless Microphone System. The standards used were FCC CFR47 Part 74 and FCC CFR 47 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, Aug.03, 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	Cert. No	Uncertainty
EMC Analyzer	Agilent/ E7405A	MY45114943	W2008001	9k-26.5GHz	Aug. 2, 2011	Aug. 1, 2012	Wws20081596	±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	Wws20080942	±1dB
EMI Receiver	Beijingkehuan	KH3931	-	9k-1GHz	Aug. 2, 2011	Aug. 1, 2012	-	-
Two-Line V-Network	ROHDE&SCHWARZ/ ENV216	100115	W2005002	50Ω/50μH	Aug. 2, 2011	Aug. 1, 2012	Wws20080941	±10%
Digital Power Analyzer	Em Test AG/Switzerland/ DPA 500	V0745103095	W2008012	Power：2000VA Vol-range：0-300V Freq_range：10-80Hz	Aug. 2, 2011	Aug. 1, 2012	Wwd20081185	Voltage distinguish:0.025% Power_freq distinguish:0.02Hz
Power Source	Em Test AG/Switzerland/ ACS 500	V0745103096	W2008013	Vol-range：0-300V Power_freq：10-80Hz				

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
Shihin Temperatur e Chamber	BM50-CB	-	-	-	Aug. 2, 2011	Aug. 1, 2012	-	-
Advantest Spectrum Analyzer	R3132	-	-	-	Aug. 2, 2011	Aug. 1, 2012	-	-
RF Generator	TESEQ GmbH/ NSG4070	25781	W2008008	Fraq-range：9K-1GHz RF voltage：-60 dBm-+10dBm	Aug. 2, 2011	Aug. 1, 2012	Wws200 81890	Power_freq distinguish0. 1Hz RFeletricity distinguish 0.1 B
CDN M-Type	TESEQ GmbH/ CDN M016	25112	W2008009	Voltage correct factor 9.5 dB	Aug. 2, 2011	Aug. 1, 2012	Wwc200 82396	150K-80MHz：±1dB 80-230MHz:-2-+3dB
EM-Clamp	TESEQ GmbH/ KEMZ 801	25453	W2008010	Freq_range：0.15-1000 MHz	Aug. 2, 2011	Aug. 1, 2012	Wwc200 82397	0.3-400 MHz：±4dB Other freq：±5dB
Attenuator 6dB	TESEQ GmbH/ ATN6050	25365	-	-	Aug. 2, 2011	Aug. 1, 2012	Wws200 81597	-
Spectrum Analyzer	HP 8566B	36874	-	-	Aug. 2, 2011	Aug. 1, 2012	Wws200 83213	-
All Modules Generator	SCHAFFNE R/6150	34579	W2008006	voltage:200V-4.4KV Pulse current：100A-2.2KA	Aug. 2, 2011	Aug. 1, 2012	Wwc200 82401	voltage: ±10% Pulse current：±10%
Capacitive Coupling Clamp	SCHAFFNE R/ CDN 8014	25311	-	-	Aug. 2, 2011	Aug. 1, 2012	Wwc200 82398	-
Signal and Data Line Coupling Network	SCHAFFNE R/ CDN 117	25627	W2008011	1.2/50μS	Aug. 2, 2011	Aug. 1, 2012	Wwc200 82399	-
Monople Antenna	-	-	-	-	Aug. 2, 2011	Aug. 1, 2012	-	-
Audio Generator	INSTEK/ GAG-809	-	-	-	Aug. 2, 2011	Aug. 1, 2012	WWS20 100845	Freq: ±(3%+1Hz)

6 RF Output Power

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

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

Limit: According to Part 74.861(e)(1)(i), the output power shall not exceed 50mW (16.99 dBm).

6.1 Test Equipment

Please refer to Section 5 of this report.

6.2 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.

6.3 Test result

Frequency (MHz)	RF Output Power (dBm)	Limit (dBm)	Result
178.1500	-3.20	16.99	PASS
198.8500	-3.44	16.99	PASS
214.5000	-9.21	16.99	PASS

7 Modulation Characteristics

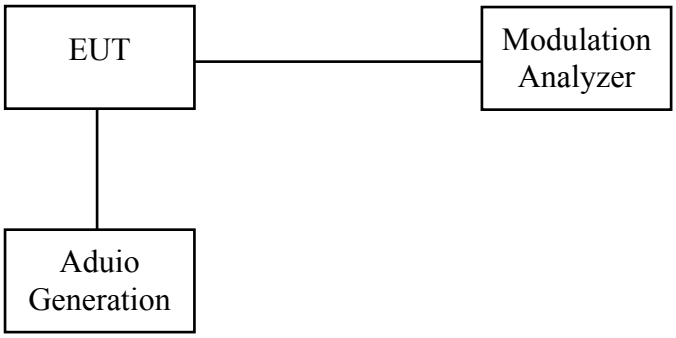
Test requirement:	FCC CFR47 Part 2 Section 2.1047(a)
Test method:	Based on TIA/EIA-603-C-2004
Requirement:	According to Part 2.1047(a), for Voice Modulated Communication Equipment, the frequency response of the audio modulating circuit over a range of 100Hz to 5000Hz shall be measured.

7.1 Test Equipment

Please refer to Section 5 in this report.

7.2 Test Procedure

(a) Test Configuration



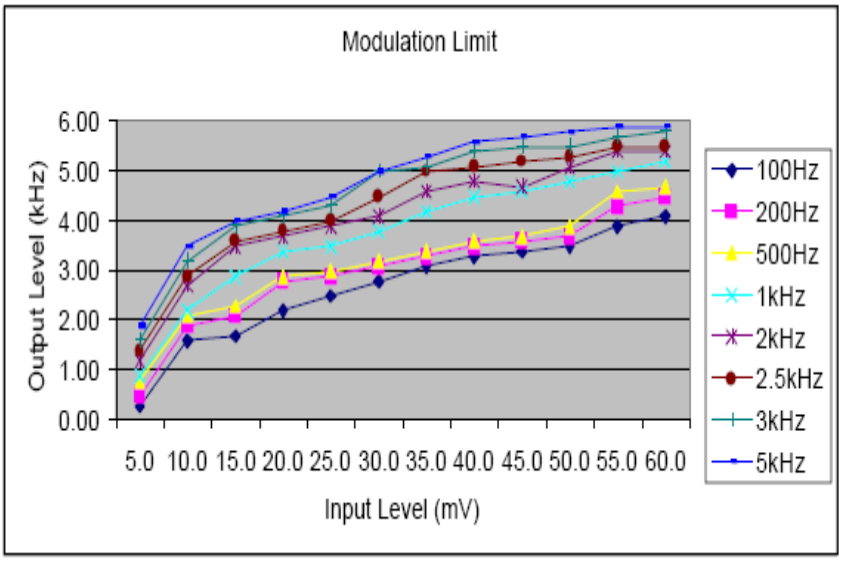
(b) Position the EUT as shown in above, adjust the audio input frequency to 100 Hz and the input level from 0V to maximum permitted input voltage with recording each carrier frequency deviation responding to respective input level.

(c) Repeat step (b) with changing the input frequency for 200, 500, 1000, 3000 and 5000 Hz in sequence.

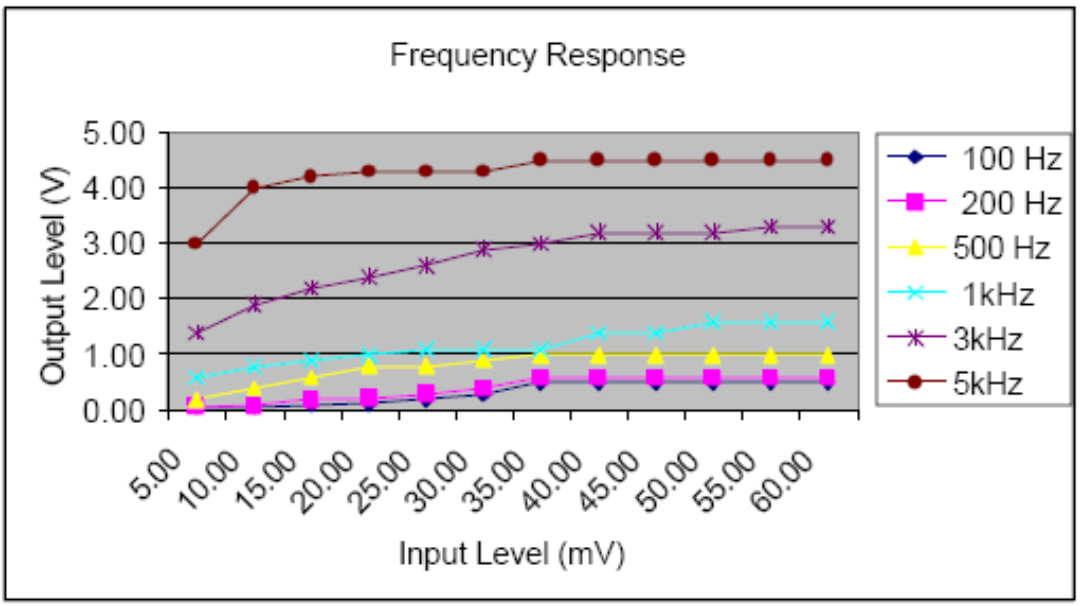
7.3 Test Result

The test data of modulation characteristic is showing as below:

Modulation Limit



Frequency Response



8 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.

8.1 Test Equipment

Please refer to Section 5 in this report.

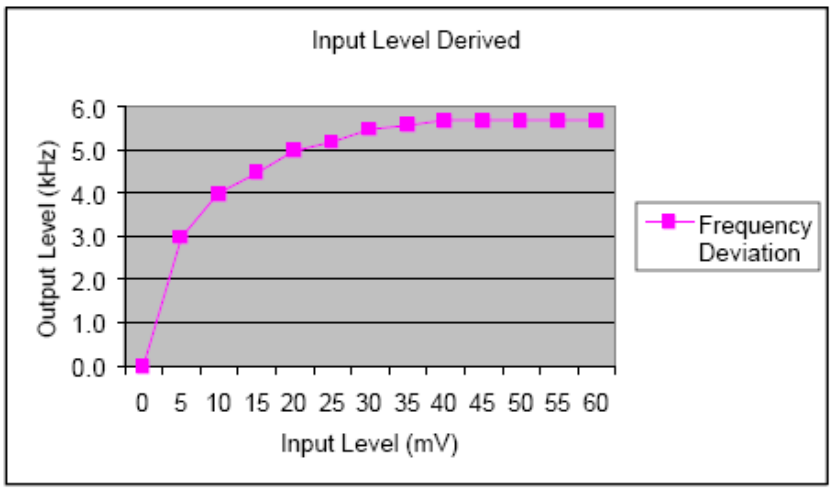
8.2 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Install new batteries in the EUT. Turn on the EUT and set it to any one convenient frequency within its operating range.

8.3 Test Result

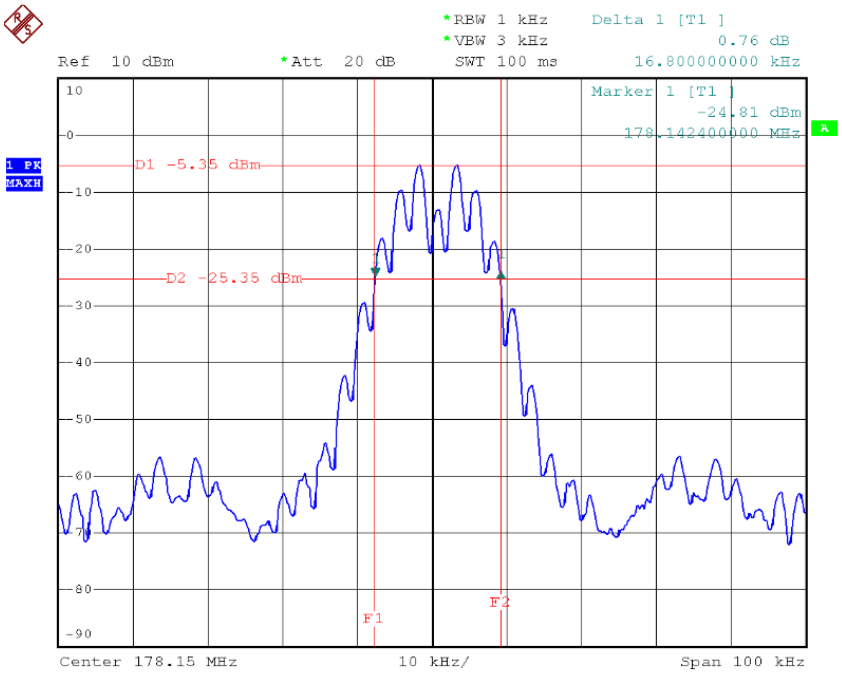
The necessary (or occupied) bandwidth for FM (frequency modulation) devices is given by B = 2M + 2D, where M is the highest baseband frequency of the modulating signal and D is the peak frequency deviation. In this case, M = 5 kHz, D = 16 kHz, so B = 2*5kHz + 2*16kHz = 42kHz < 200 kHz.

Please refer the following plots

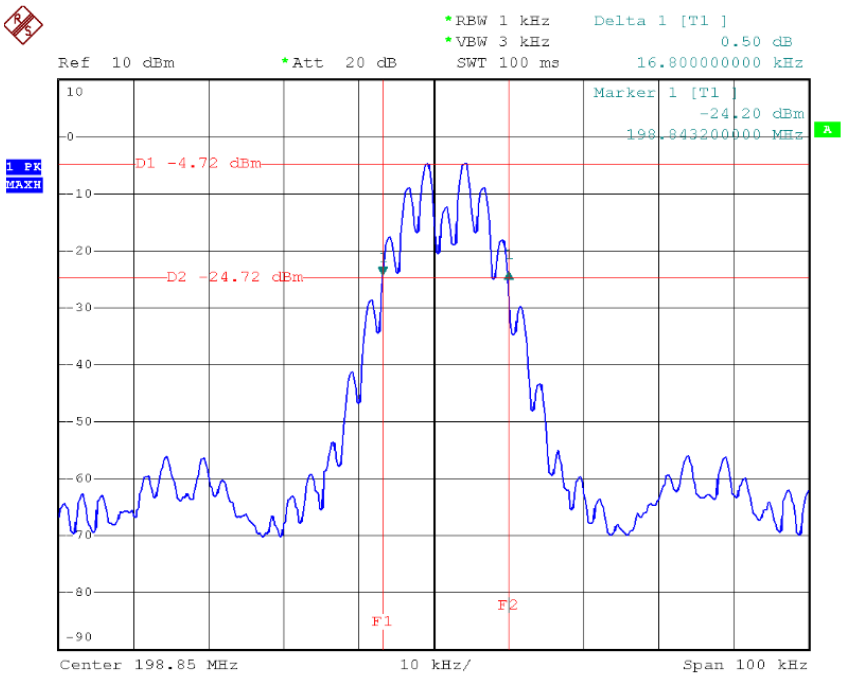


Modulated signal : 2.5kHz

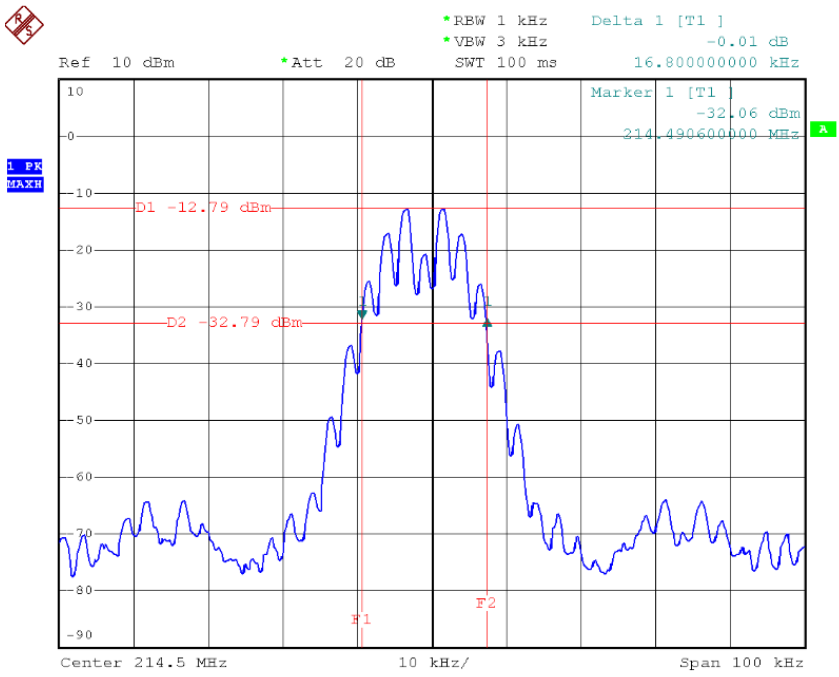
Low Channel



Middle Channel



High Channel



9 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.

9.1 Test Equipment

Please refer to Section 5 in this report.

9.2 Test Configuration

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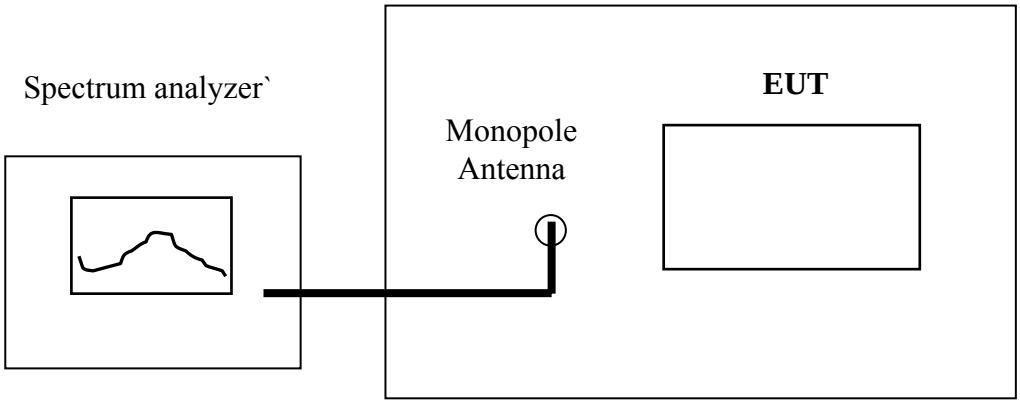


Figure 1

9.3 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. For battery operated only device, supply the EUT primary voltage at the battery operating end point which is specified by the manufactured and record the frequency.

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.

9.4 Test Result

a) Frequency stability versus input voltage (battery operation end point voltage is 8.1V)

Reference Frequency (MHz)	Environment Temperature (ºC)	Frequency Measured at end point voltage	Frequency Tolerance (%)
178.1500	20	178.1479	-0.0012
198.8500	20	198.8532	0.0016
214.5000	20	214.4968	-0.0015

b) Frequency stability versus environmental temperature

Reference Frequency: 178.1500MHz, Limit: 0.005%			
Environment Temperature(ºC)	Power Supply	Frequency Deviation measured with time Elapse(30 minutes)	
		MHz	%
50	New Battery	178.1524	0.0013
40	New Battery	178.1527	0.0015
30	New Battery	178.1518	0.0010
20	New Battery	178.1509	0.0005
10	New Battery	178.1515	0.0008
0	New Battery	178.1485	0.0008
-10	New Battery	178.1519	0.0011
-20	New Battery	178.1473	0.0015
-30	New Battery	178.1522	0.0012

Reference Frequency: 198.8500MHz, Limit: 0.005%			
Environment Temperature(ºC)	Power Supply	Frequency Deviation measured with time Elapse(30 minutes)	
		MHz	%
50	New Battery	198.8532	0.0016
40	New Battery	198.8536	0.0018
30	New Battery	198.8527	0.0014
20	New Battery	198.8518	0.0009
10	New Battery	198.8521	0.0011
0	New Battery	198.8482	0.0009
-10	New Battery	198.8478	0.0011
-20	New Battery	198.8514	0.0007
-30	New Battery	198.8510	0.0005

Reference Frequency: 214.5000MHz, Limit: 0.005%			
Environment Temperature(ºC)	**Power Supply**	**Frequency Deviation measured with time Elapse(30 minutes)**	
		MHz	**%**
50	New Battery	214.5039	0.0018
40	New Battery	214.5036	0.0017
30	New Battery	214.5028	0.0013
20	New Battery	214.5010	0.0005
10	New Battery	214.5016	0.0007
0	New Battery	214.5034	0.0016
-10	New Battery	214.5037	0.0017
-20	New Battery	214.5041	0.0019
-30	New Battery	214.5027	0.0013

Test Result: The frequency tolerance rating is 0.0019% < 0.005%. Passed.

10 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.

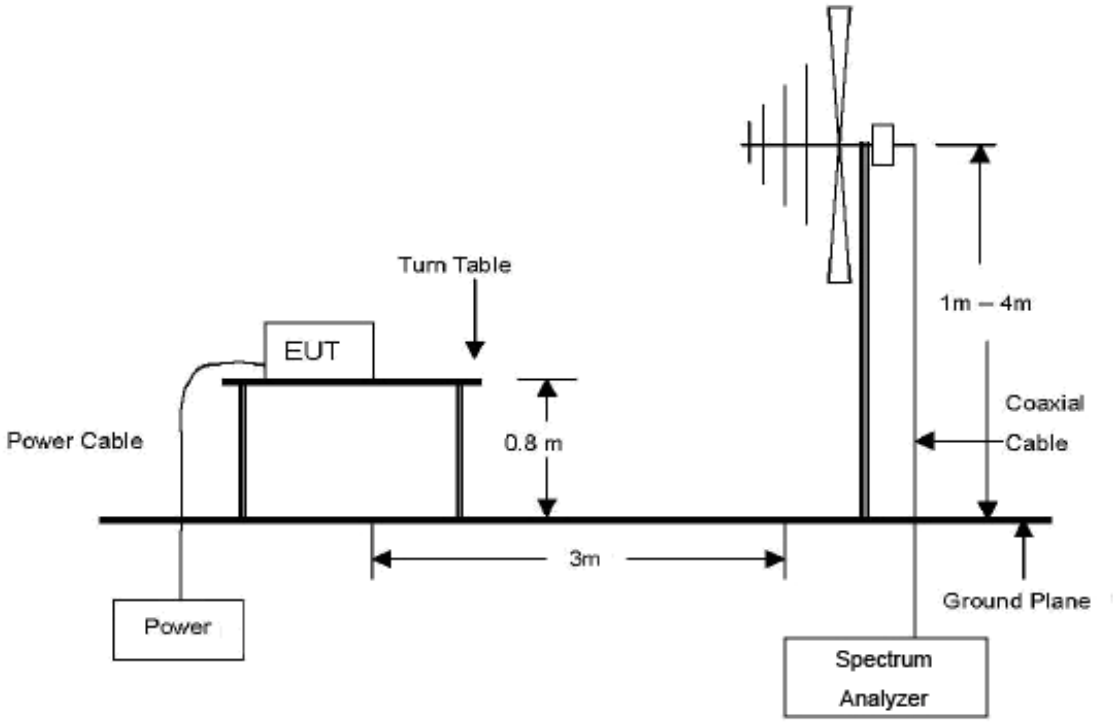
10.1 Test Equipment

Please refer to Section 5 in this report.

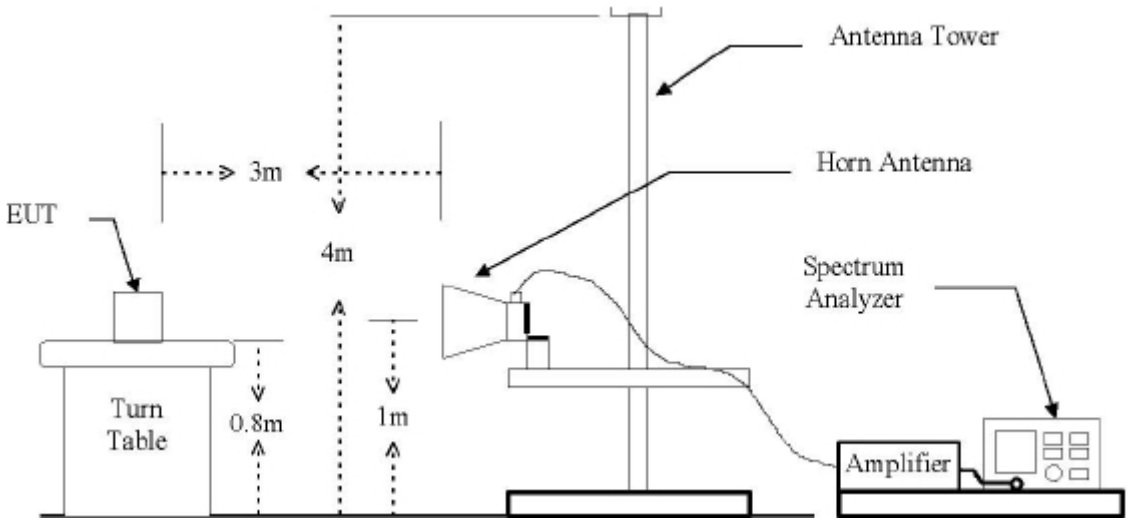
10.2 EUT Setup

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.



10.3 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. The RF cable to this load should be of minimum length.
2. The output of the antenna shall be connected to the measuring receiver and either a peak or quasi-peak detector was used for the measurement as indicated on the report. The detector selection is based on how close the emission level was approaching the limit.
3. The transmitter shall be 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. New battery were installed in the equipment under test for radiated emissions test,the transmitter shall than be rotated through 360o 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. This is a handhold device, The radiation emission should be 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.

10.4 Test Result

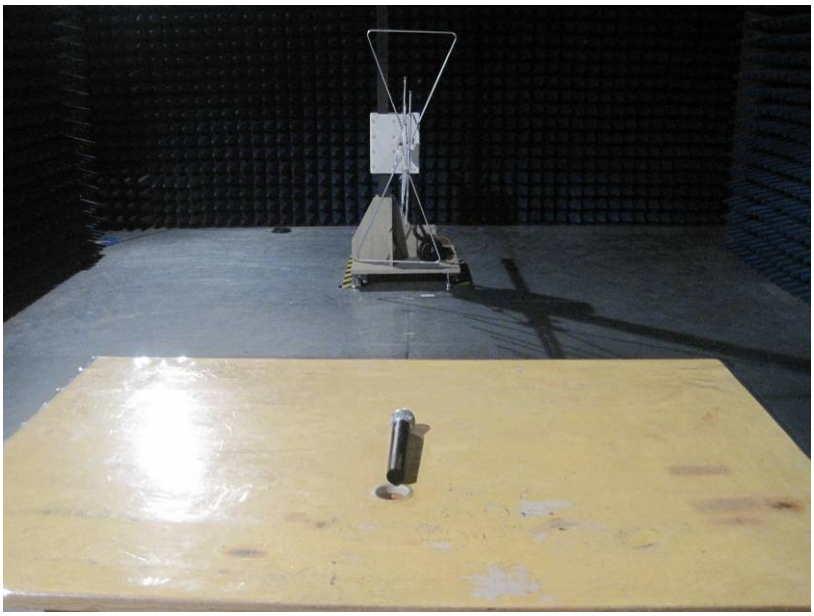
Frequency (MHz)	Detector	Ant. Pol	Emission Level (dBm)	Limit (dBm)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
Low Channel: 178.15MHz							
178.15	Peak	V	-5.27	(Fund.)		1.3	260
356.30	Peak	V	-33.54	-13.00	-20.54	1.5	140
534.45	Peak	V	-37.18	-13.00	-24.18	1.0	160
712.60	Peak	V	-34.23	-13.00	-21.23	1.2	200
890.75	Peak	V	-42.15	-13.00	-29.15	1.4	320
1068.90	Peak	V	-46.52	-13.00	-33.52	1.7	40
1247.05	Peak	V	-38.14	-13.00	-25.14	1.6	80
1425.20	Peak	V	-44.04	-13.00	-31.04	1.1	210
1603.35	Peak	V	-47.18	-13.00	-34.18	1.0	130
1781.50	Peak	V	-39.27	-13.00	-26.27	1.5	150
178.15	Peak	H	-9.41	(Fund.)		1.8	180
356.30	Peak	H	-47.87	-13.00	-34.87	2.3	260
534.45	Peak	H	-50.36	-13.00	-37.36	2.1	310
712.60	AVG	H	-46.33	-13.00	-33.33	2.4	170
890.75	AVG	H	-51.74	-13.00	-38.74	1.9	80
1068.90	AVG	H	-49.19	-13.00	-36.19	2.0	90
1247.05	AVG	H	-47.34	-13.00	-34.34	2.1	60
1425.20	AVG	H	-46.05	-13.00	-33.05	1.6	110
1603.35	AVG	H	-47.21	-13.00	-34.21	2.2	70
1781.50	AVG	H	-54.14	-13.00	-41.14	1.8	60

Middle Channel: 198.85MHz							
198.85	Peak	V	-6.24	(Fund.)		1.2	130
397.70	Peak	V	-34.31	-13.00	-21.31	1.0	110
596.55	Peak	V	-38.74	-13.00	-25.74	1.3	150
795.40	Peak	V	-31.45	-13.00	-18.45	1.7	310
994.25	Peak	V	-36.11	-13.00	-23.11	1.6	20
1193.10	Peak	V	-40.15	-13.00	-27.15	1.0	270
1391.95	Peak	V	-42.30	-13.00	-29.30	1.5	180
1590.80	Peak	V	-39.46	-13.00	-26.46	1.2	300
1789.65	Peak	V	-48.12	-13.00	-35.12	1.4	170
1988.50	Peak	V	-46.52	-13.00	-33.52	1.6	205
198.85	Peak	H	-13.41	(Fund.)		1.8	90
397.70	Peak	H	-41.02	-13.00	-28.02	2.1	100
596.55	Peak	H	-44.36	-13.00	-31.36	2.0	60
795.40	AVG	H	-37.12	-13.00	-24.12	1.9	80
994.25	AVG	H	-39.26	-13.00	-26.26	2.3	240
1193.10	AVG	H	-45.33	-13.00	-32.33	2.2	340
1391.95	AVG	H	-42.85	-13.00	-29.85	2.3	50
1590.80	AVG	H	-49.12	-13.00	-36.12	1.9	80
1789.65	AVG	H	-50.30	-13.00	-37.30	2.0	70
1988.50	AVG	H	-55.03	-13.00	-42.03	1.8	40
High Channel: 214.50MHz							
214.50	Peak	V	-14.44	(Fund.)		1.3	240
429.00	Peak	V	-39.14	-13.00	-26.14	1.5	120
643.50	Peak	V	-37.26	-13.00	-24.26	1.0	130
858.00	Peak	V	-40.12	-13.00	-27.12	1.7	260
1072.50	Peak	V	-42.40	-13.00	-29.40	1.6	340
1287.00	Peak	V	-35.22	-13.00	-22.22	1.2	330
1501.50	Peak	V	-47.15	-13.00	-34.15	1.0	250
1716.00	Peak	V	-39.87	-13.00	-26.87	1.0	280
1930.50	Peak	V	-41.47	-13.00	-28.47	1.8	110
2145.00	Peak	V	-48.03	-13.00	-35.03	1.4	100

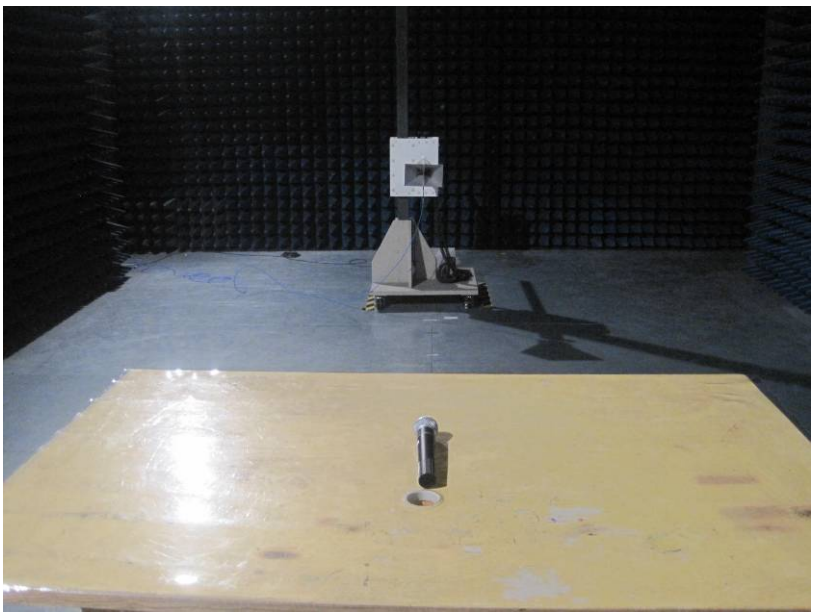
214.50	Peak	H	-19.44	(Fund.)		1.8	350
429.00	Peak	H	-39.14	-13.00	-26.14	2.1	330
643.50	Peak	H	-45.50	-13.00	-32.50	1.9	160
858.00	AVG	H	-47.38	-13.00	-34.38	1.6	170
1072.50	AVG	H	-40.25	-13.00	-27.25	2.0	280
1287.00	AVG	H	-37.71	-13.00	-24.71	2.4	300
1501.50	AVG	H	-49.90	-13.00	-36.90	1.8	270
1716.00	AVG	H	-44.52	-13.00	-31.52	2.0	230
1930.50	AVG	H	-46.28	-13.00	-33.28	2.7	150
2145.00	AVG	H	-40.36	-13.00	-27.36	2.5	130

10.5 Photograph – Radiated Emission Setup

Below 1GHz



Above 1GHz



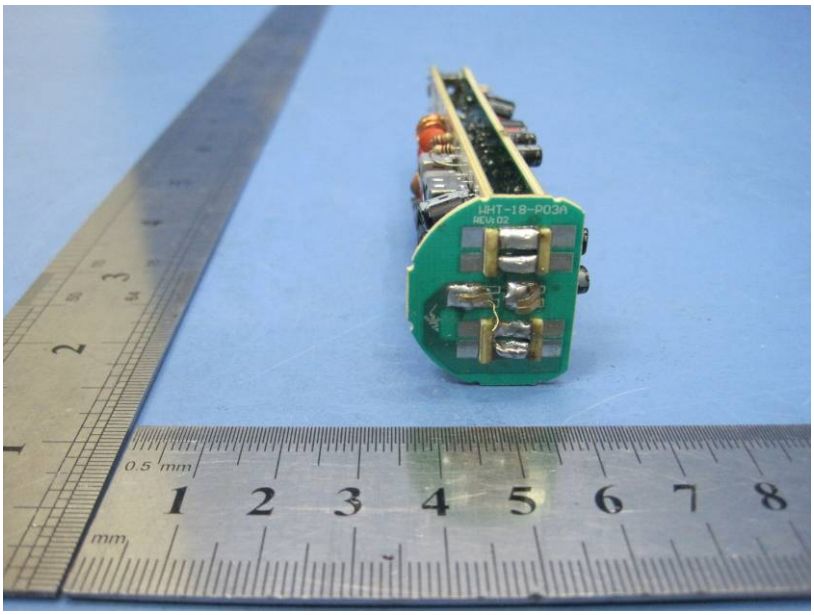
11 Photographs - Constructional Details

11.1 EUT – Front View

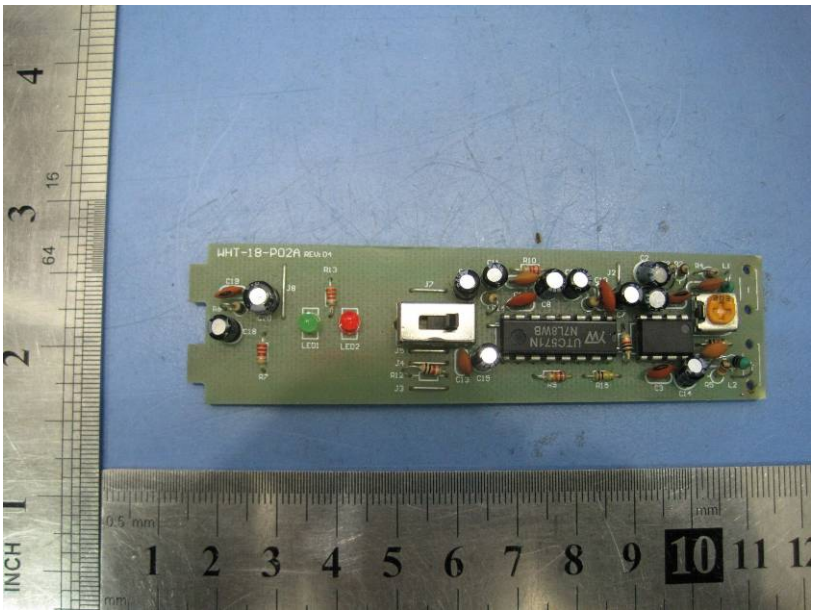
11.2 EUT – Back View

11.3 EUT – Open View1

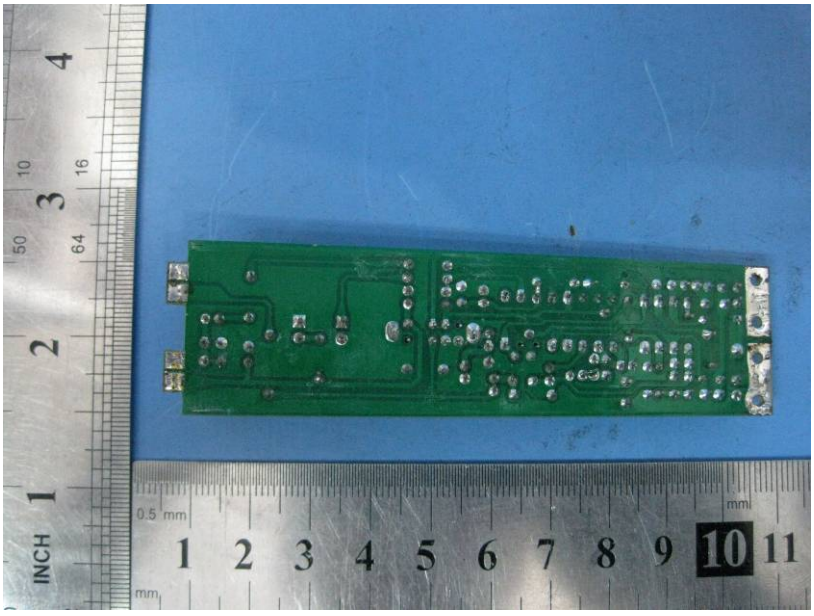
11.4 EUT – Open View2



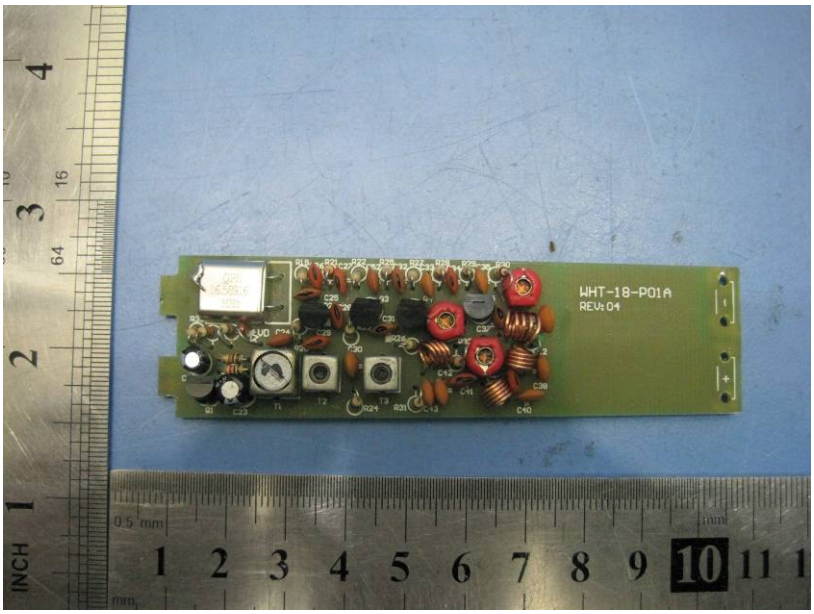
11.5 PCB 1 – Front View



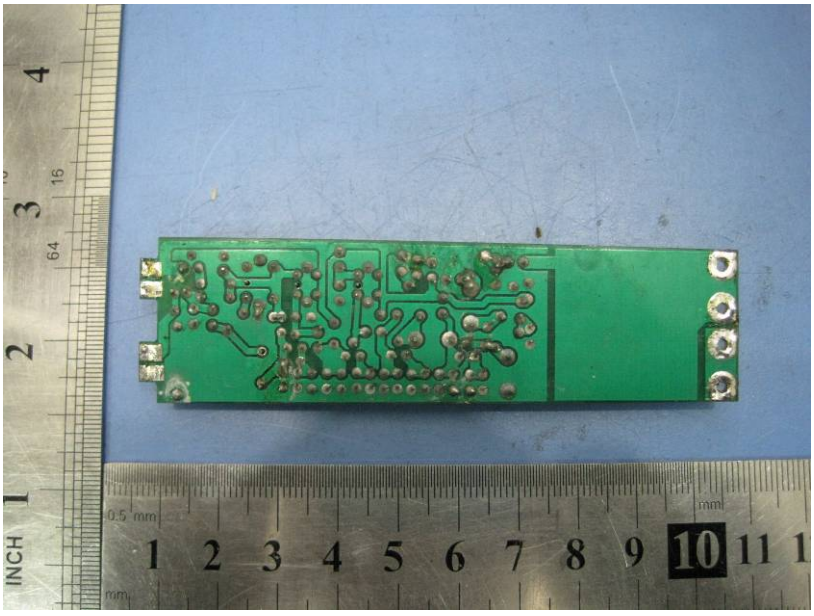
11.6 PCB 1 – Back View



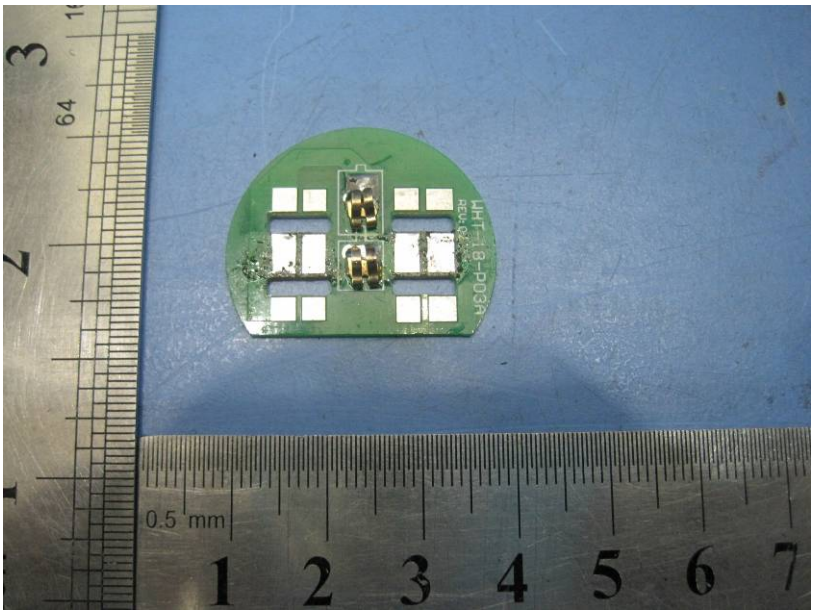
11.7 PCB 2 – Front View



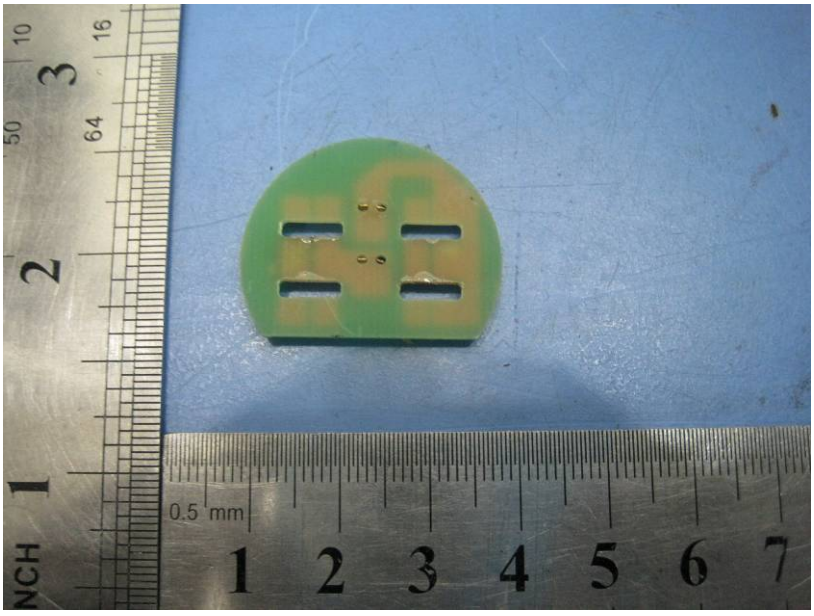
11.8 PCB 2 – Back View



11.9 PCB 3 – Front View



11.10 PCB 3 – Back View



12 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.