

FCC TEST REPORT

FCC ID : ZTJ-EM100R
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(RECEIVER), PEM-1000(RECEIVER),
IN EAR MONITOR(RECEIVER)

Standards : FCC CFR47 Part 15 Section 15.109:2010

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
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Prepared By:

Waltek Services (Shenzhen) Co., Ltd.

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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.

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Reference No.: WT12031424-S-S-F

2 Test Summary

Test Items	Test Requirement	Test Method	Result
Radiated Emission (9kHz to 5GHz)	FCC Part 15.109:2010	ANSI C63.4: 2003	PASS
Conducted Emission (150KHz to 30MHz)	FCC Part 15.107:2010	ANSI C63.4: 2003	N/A

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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(RECEIVER), PEM-1000(RECEIVER), IN EAR MONITOR(RECEIVER)
Differences describe : All of models have the same circuit and apparence, they only have different model number.
Operation Frequency : 673.000MHz ~ 685.375MHz

4.3 Details of E.U.T.

Technical Data: : DC 3.0V (2*1.5V "AA" Size Battery)

4.4 Description of Support Units

The EUT has been tested as an independent unit. All the test was performed in the condition of DC 3.0V input.

4.5 Standards Applicable for Testing

The customer requested FCC tests for a Wireless Personal In-Ear Monitor. The standards used were FCC Part 15.109:2010.

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

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6 Conducted Emission Data

Test Requirement: FCC Part 15.107

Test Method: ANSI C63.4:2003

Test Result: N/A

Remark: Due to the EUT is power by battery, this test is not applicable.

7 Radiation Emission Data

Test Requirement: FCC Part15.109
 Test Method: ANSI C63.4:2003
 Test Result: PASS
 Frequency Range: 9kHz to 5GHz
 Measurement Distance: 3m
 Class: Class B
 Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

Detector: Peak for pre-scan (120kHz resolution bandwidth)
 Quasi-Peak if maximised peak within 6dB of limit

7.1 E.U.T Operation:

Operating Environment:

Temperature: 25.5 °C
 Humidity: 51 % RH
 Atmospheric Pressure: 1012 mbar

E.U.T Operation:

The pre-test was performed in receive mode and standby mode, for each mode, the low, middle and high channel had been tested. The worst mode is the low channel's receive mode, so the report show that mode's data only.

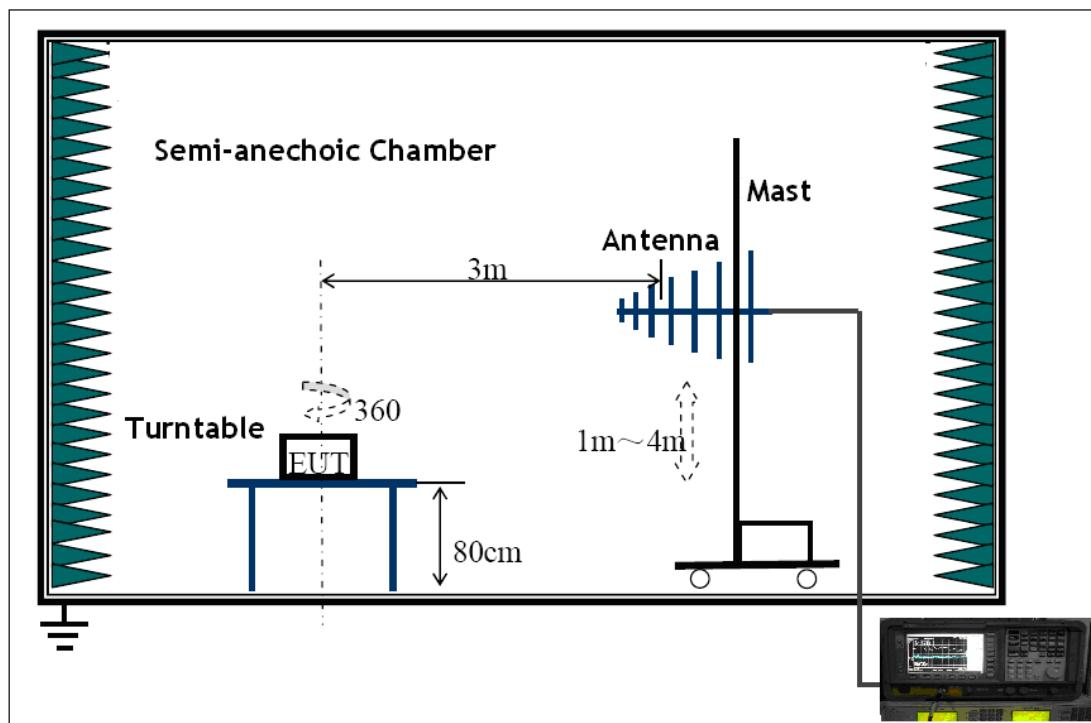
7.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Waltek EMC Lab is ± 5.03 dB.

7.3 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 specification used in this report was the FCC Part15.109 limits.



The EUT was placed on the test table in shielding room.

7.4 Spectrum Analyzer Setup

According to FCC Part15 Rules, the system was tested 9kHz to 5000MHz.

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	5000MHz
Sweep Speed.....	Auto
IF Bandwidth.....	120 KHz
Video Bandwidth.....	3MHz
Quasi-Peak Adapter Bandwidth	120 KHz
Quasi-Peak Adapter Mode	Normal
Resolution Bandwidth.....	1MHz

7.5 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. New battery were installed in the equipment under test for radiated emissions test. The radiation measurements are performed in X(normal uses) axis positioning. And all the modes was tested in the report.Only the worst case is shown in the report.
8. The EUT was pre-testrd in two mode:standby mode and receive mode.According to ANSI STANDARD C63.4-2003 12.1.1.2 OTHER TYPES OF RECEIVERS: In receive mode,a typical signal or an unmodulated CW signal at the operating frequency of the EUT shall be supplied to the EUT for all measurements. Such a signal may be supplied by either a signal generator and an antenna in close proximity to the EUT or directly conducted into the antenna terminals of the EUT. The signal level shall be sufficient to the local oscillator of the EUT.In this report, the antenna of the signal generator is under the turntable.

7.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Class B Limit}$$

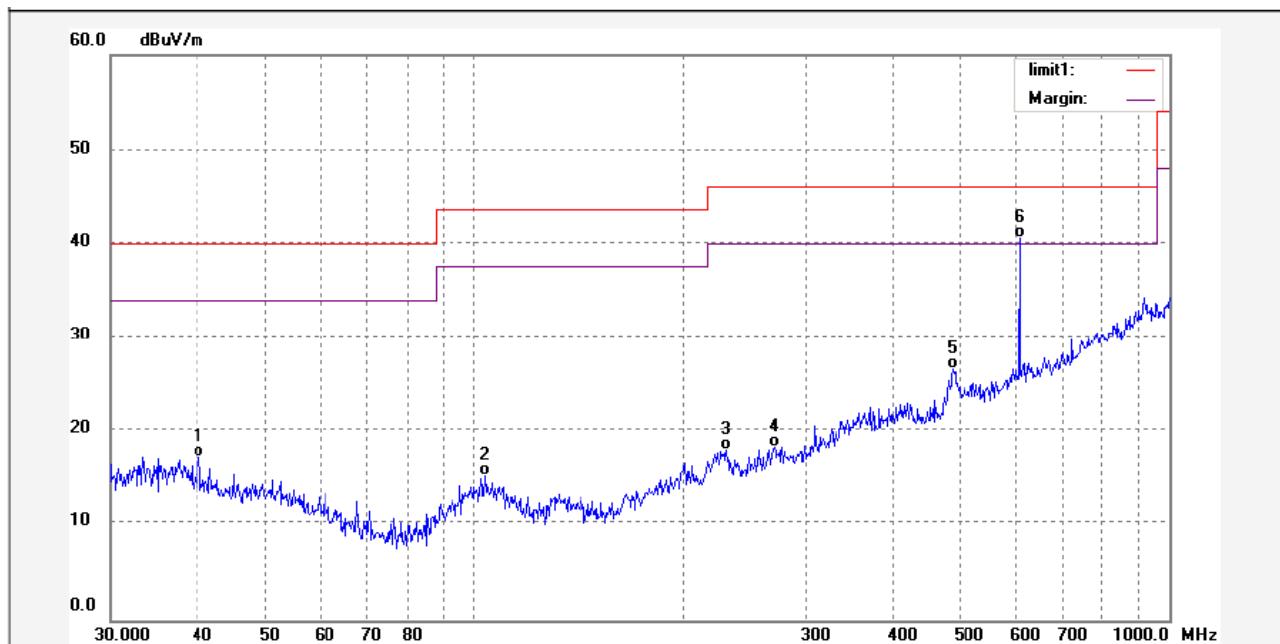
7.7 Summary of Test Results

According to the data in this section, the EUT complied with the FCC Part15.109 standards.

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

Investigated Frequency Range: 30MHz ~ 1000MHz

Antenna polarization: Vertical



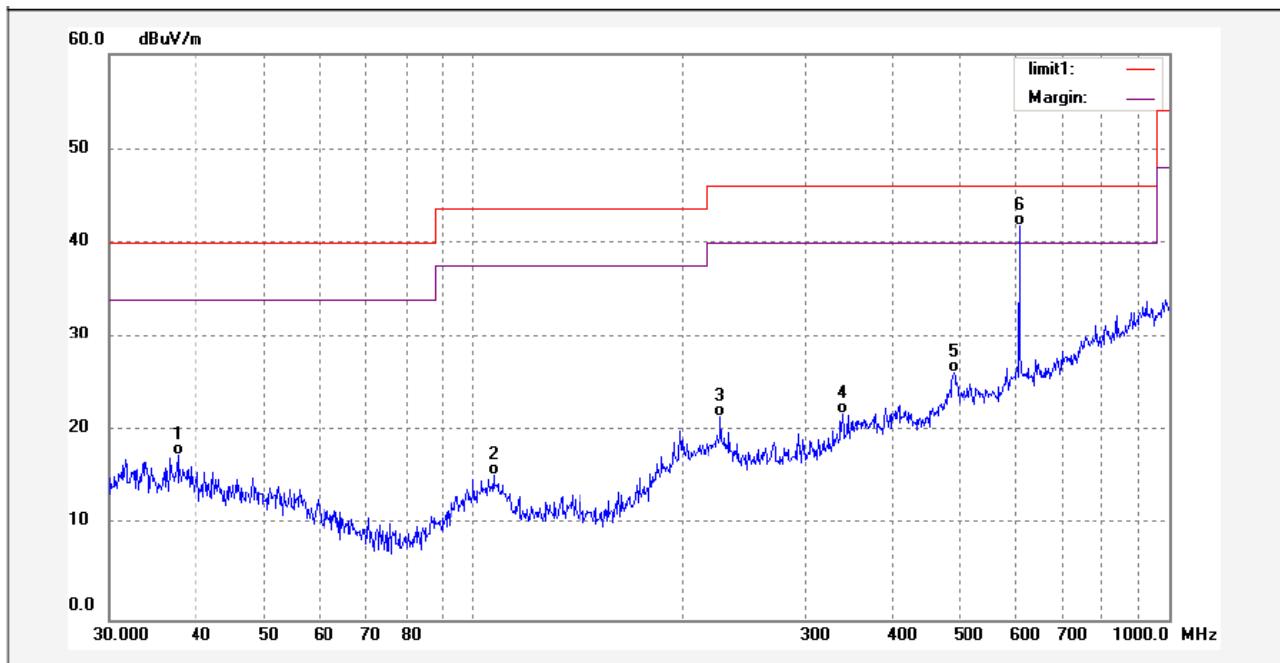
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	40.1581	1.36	16.00	17.36	40.00	-22.64	QP	
2	103.6990	1.12	14.19	15.31	43.50	-28.19	QP	
3	231.0399	2.03	16.12	18.15	46.00	-27.85	QP	
4	270.6162	1.64	16.78	18.42	46.00	-27.58	QP	
5	488.3263	1.40	25.25	26.65	46.00	-19.35	QP	
6	609.3177	14.63	26.02	40.65	46.00	-5.35	QP	

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Antenna polarization: Horizontal



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	37.5648	0.86	16.61	17.47	40.00	-22.53	QP	
2	107.0306	1.25	14.05	15.30	43.50	-28.20	QP	
3	227.0164	5.22	16.29	21.51	46.00	-24.49	QP	
4	340.0473	1.55	20.23	21.78	46.00	-24.22	QP	
5	490.0451	0.48	25.75	26.23	46.00	-19.77	QP	
6	609.3177	15.74	26.02	41.76	46.00	-4.24	QP	

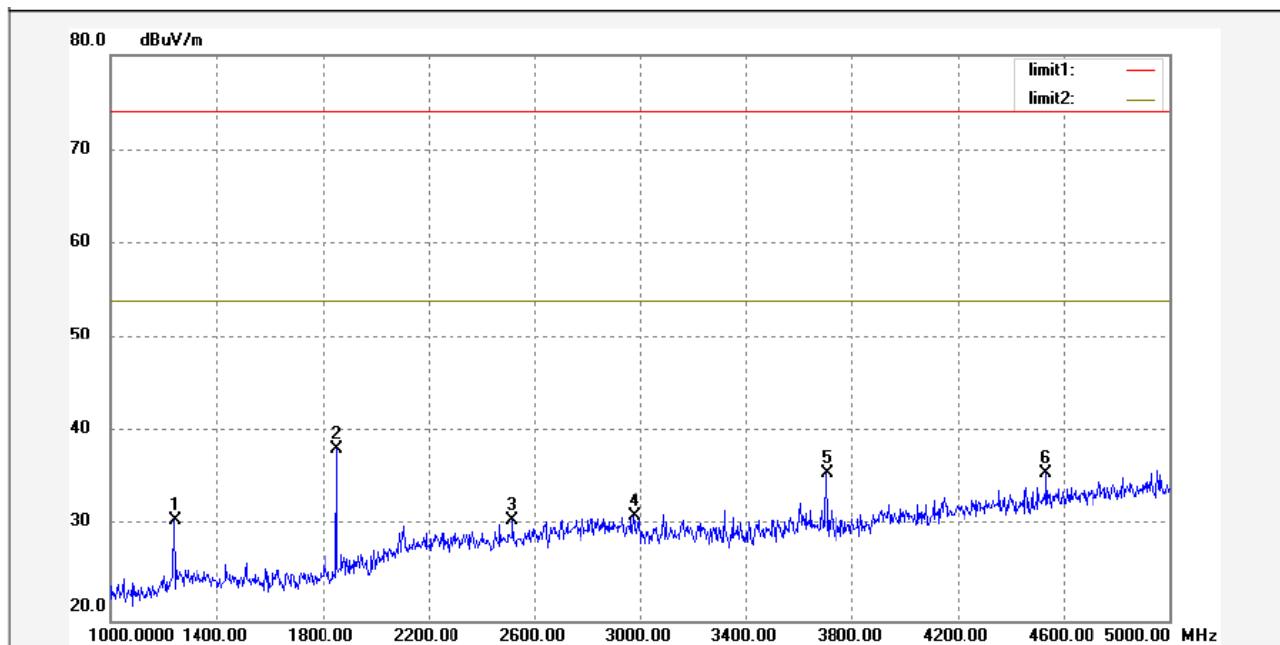
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Investigated Frequency Range: 1GHz ~ 5GHz

Antenna polarization: Vertical



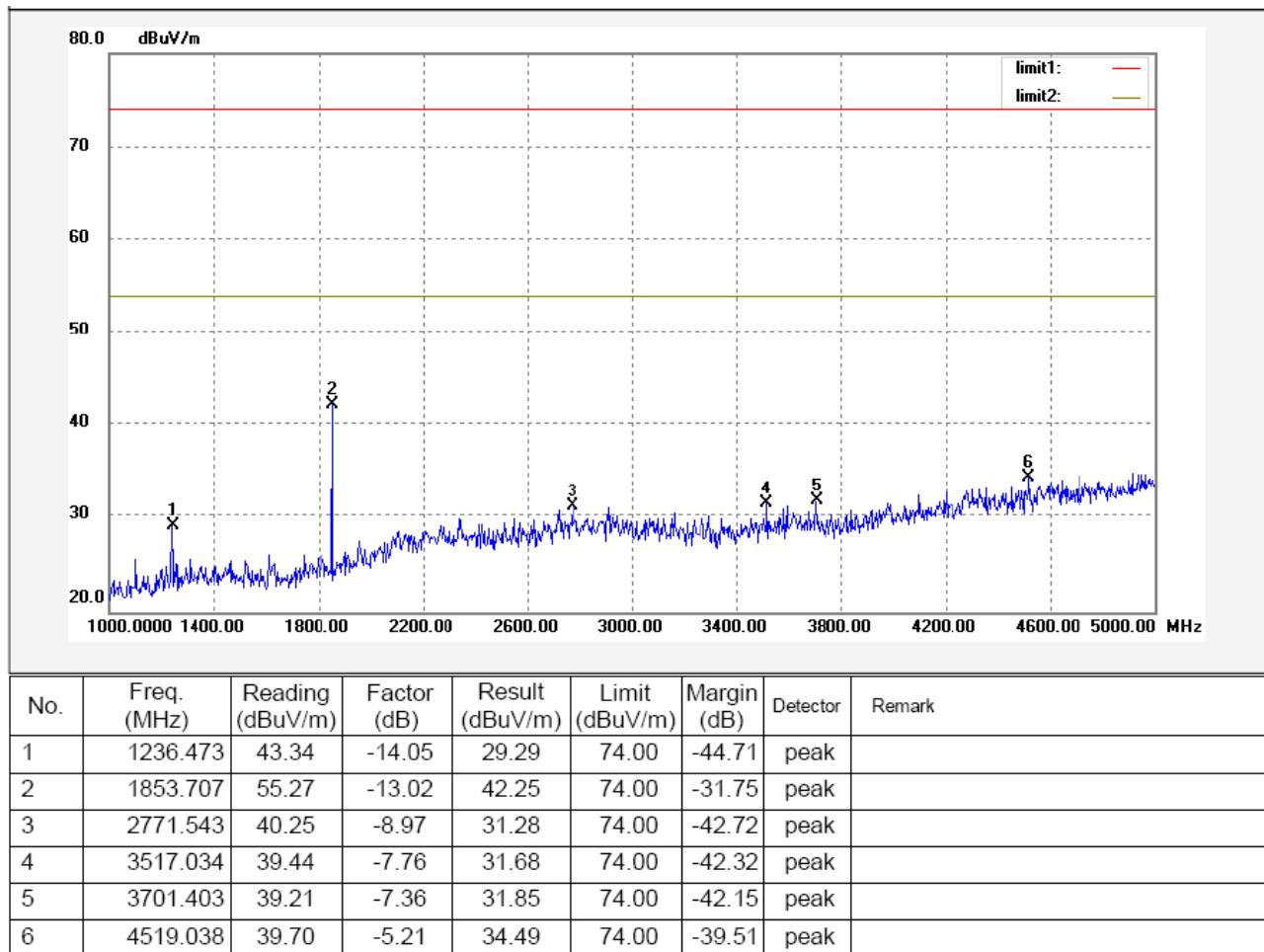
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	1236.473	44.59	-14.05	30.54	74.00	-43.46	peak	
2	1853.707	51.31	-13.02	38.29	74.00	-35.71	peak	
3	2519.038	40.42	-9.91	30.51	74.00	-43.49	peak	
4	2975.952	39.69	-8.70	30.99	74.00	-43.01	peak	
5	3701.403	43.05	-7.36	35.69	74.00	-38.31	peak	
6	4535.070	40.90	-5.15	35.75	74.00	-38.25	peak	

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Antenna polarization: Horizontal



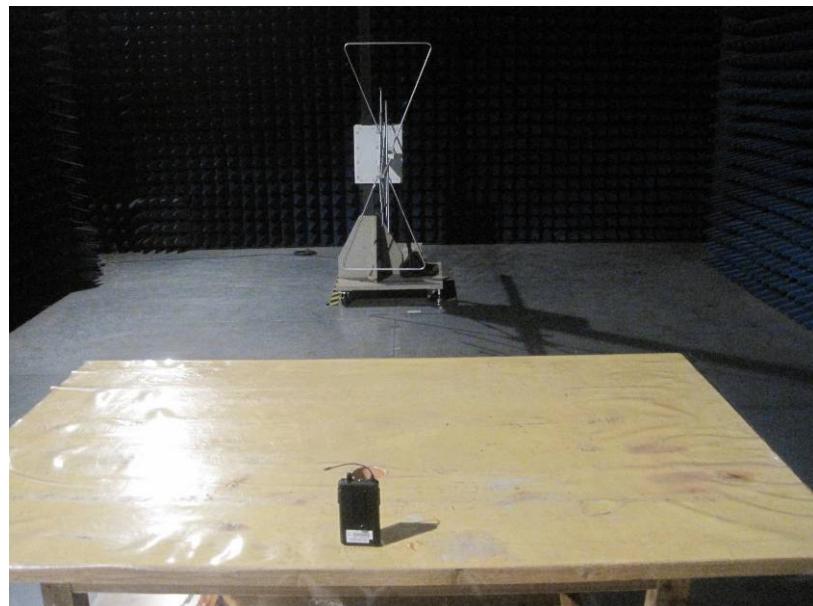
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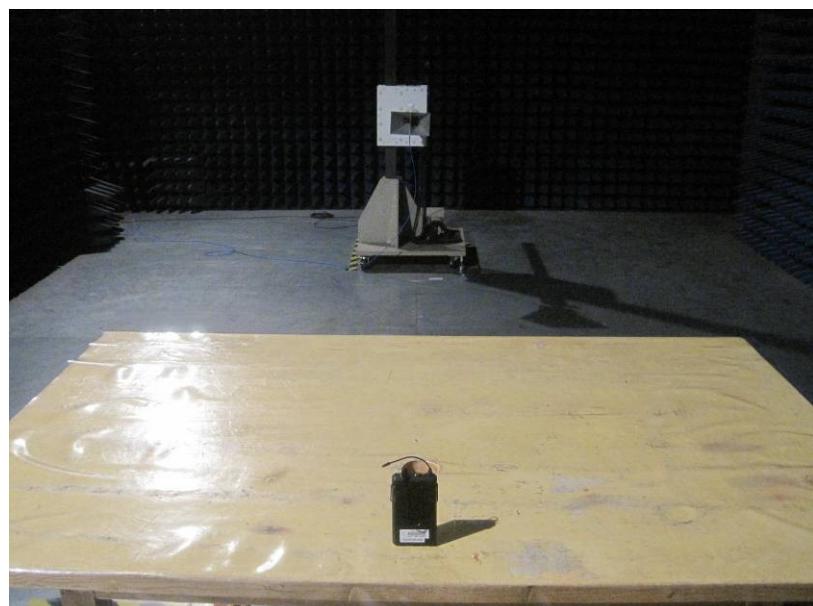
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7.8 Photograph – Radiation Emission Test Setup

Below 1GHz



Above 1GHz



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8 Photographs - Constructional Details

8.1 EUT – Appearance View



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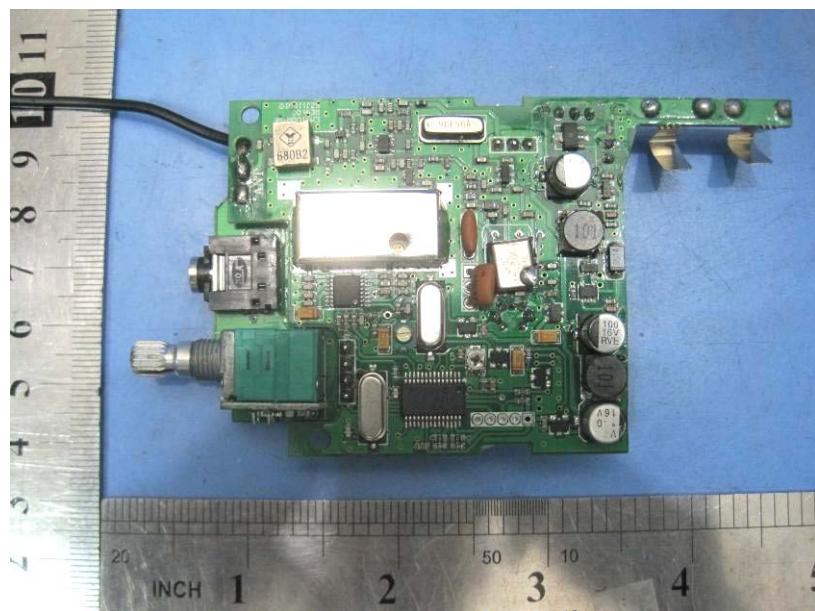
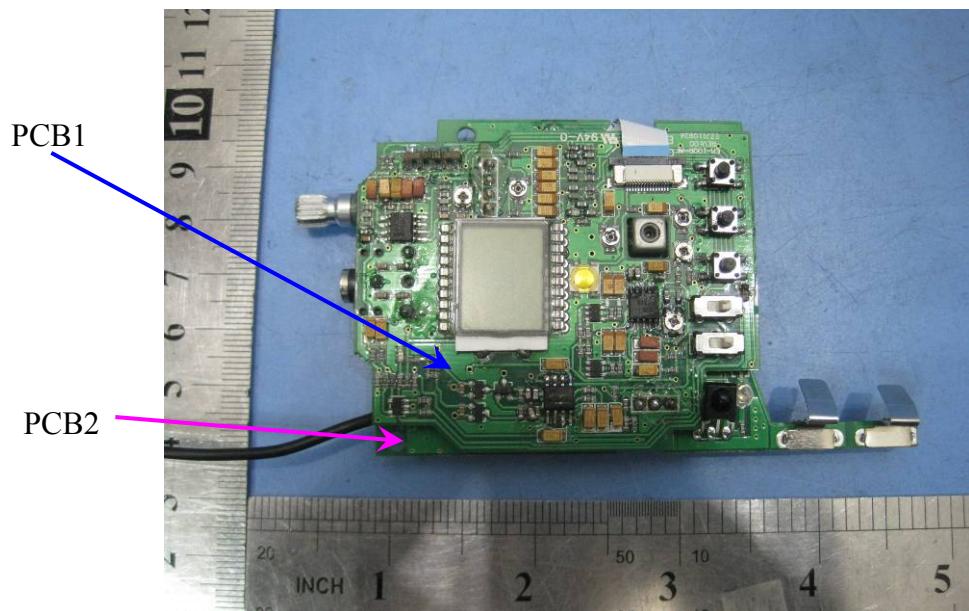
8.2 EUT – Open View



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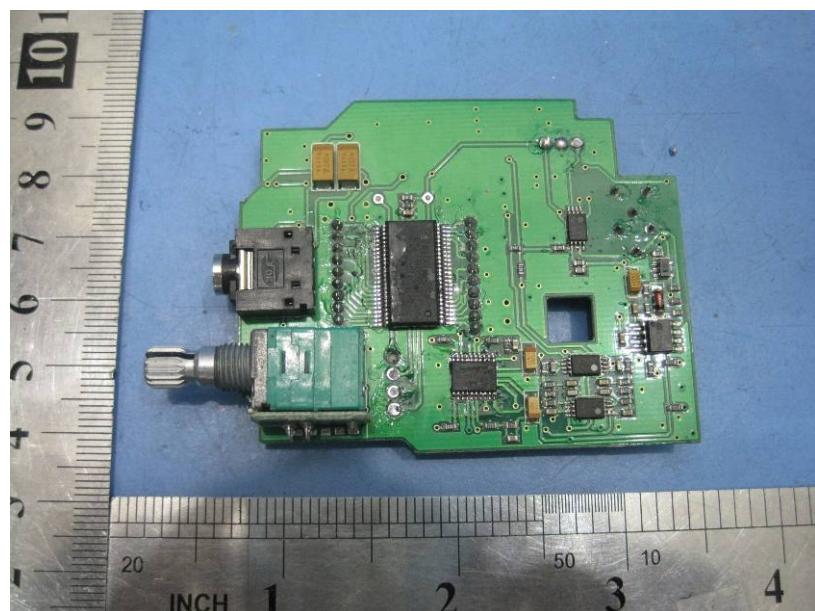
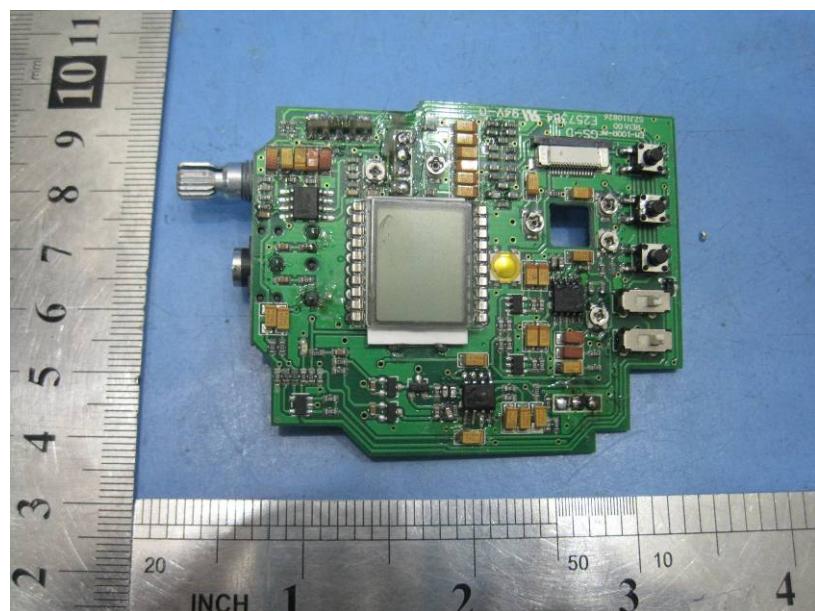


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8.3 EUT – PCB1 View

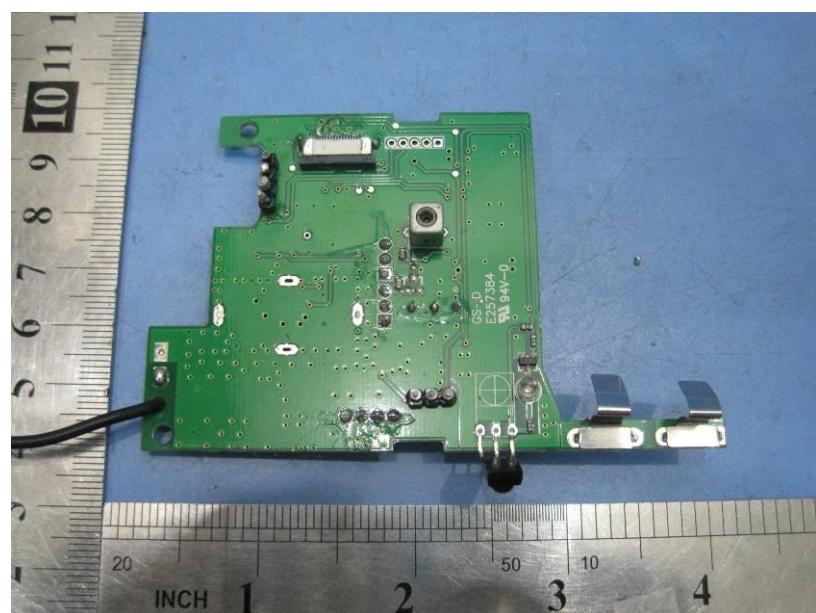


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8.4 EUT – PCB2 View



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9 FCC Label

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:(1)this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation

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 Bottom View/proposed FCC Label Location



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