

FCC TEST REPORT

FCC ID : V4CSF-30H

Applicant : **Bardl Professional Audio Co., Ltd.**
North Industrial District, Encheng Town, Enping City, Guangdong, China

Equipment Under Test (EUT) :

Product description : Handle Style Transmitter

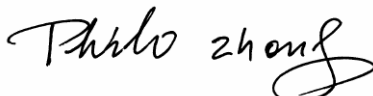
Brand : BARDL, RELACART

Model No. : SF-30H, OR-80H

Standards : FCC Part 74

Date of Test : June 26, 2008

Test Engineer : Nunu Deng

Reviewed By : 

PERPARED BY:

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14 FCC ID LABEL30

3 Test Summary

Test Item	Test Standard	Test Method	Test Result
Radiated Emission	FCC PART 74: 2004	Section 74.861 (e)(6)	PASS
Occupied Bandwidth	FCC PART 74: 2004	Section 74.861 (e)(5)	PASS
Maximum Output Power	FCC PART 74: 2004	Section 74.861 (e)(1)(i)	PASS
Frequency Stability Tolerance	FCC PART 74: 2004	Section 74.861 (e)(4)	PASS
Audio Low Pass Filter	FCC Part 2: 2004	FCC Part 2.1047(a).	PASS
Audio Frequency Response	FCC Part 2: 2004	FCC Part 2.1047(a).	PASS
Modulation Limiting	FCC Part 2: 2004 FCC PART 74: 2004	FCC Part 2.1047(b). Section 74.861 (e)(3)	PASS

4 General Information

4.1 Client Information

Applicant:	Bardl Professional Audio Co., Ltd.
Address of Applicant:	North Industrial District, Encheng Town, Enping City, Guangdong, China
Manufacturer:	Bardl Professional Audio Co., Ltd.
Address:	North Industrial District, Encheng Town, Enping City, Guangdong, China

4.2 General Description of E.U.T.

Product description:	Handle Style Transmitter
Model No.:	SF-30H, OR-80H

4.3 Details of E.U.T.

Power Supply:	DC 9V Battery
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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 Handle Style Transmitter. The radiated emission test was performed according to the procedures of ANSI TIA/ELA 603 and FCC CFR47 Part 74.861, 2.1046, 2.1047.

4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **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, June 24,2008.

4.7 Test Location

All Emissions tests were performed at:-

1/F, Fukangtai Building, West Baima Rd., Songgang Street, Baoan District, Shenzhen 518105,China.

5 Equipment Used during Test

Equipment	Brand Name	Model	Related standards	Cal.Intal Months	Last Cal. Date	Serial No
3m Anechoic chamber						
EMC Analyzer	Agilent	E7405A	ISO9001:2000	12	Jan-08	MY451149 43
Trilog Broadband Antenne 30-3000 MHz	SCHWARZB ECK MESS-ELEK TROM	VULB9163	EN/ISO/IEC 17025 DIN EN ISO9001	12	Jan-08	336
Broad-band Horn Antenna 1-18 GHz	SCHWARZB ECK MESS-ELEK TROM	BBHA 9120 D	EN/ISO/IEC 17025 DIN EN ISO9001	12	Jan-08	667
Broadband Preamplifier 0.5-18 GHz	SCHWARZB ECK MESS-ELEK TROM	BBV 9718	EN/ISO/IEC 17025 DIN EN ISO9001	12	Jan-08	9718-148
10m Coaxial Cable with N-male Connectors usable up to 18GHz,	SCHWARZB ECK MESS-ELEK TROM	AK 9515 H	EN/ISO/IEC 17025 DIN EN ISO9001	12	Jan-08	-
10m 50 Ohm Coaxial Cable with N-plug,individual length,usable up to 3(5)GHz, Connectors	SCHWARZB ECK MESS-ELEK TROM	AK 9513	EN/ISO/IEC 17025 DIN EN ISO9001	12	Jan-08	-
Positioning Controller	C&C LAB	CC-C-IF	ISO9001	12	Jan-08	MF7802108
Color Monitor	SUNSP0	SP-14C	ISO9001	12	Jan-08	-
EMI Shielded Room						
Test Receiver	ROHDE&SC HWARZ	ESPI	ISO9001	12	Jan-08	101155
Two-Line V-Network	ROHDE&SC HWARZ	ENV216	ISO9001 EN/ISO/IEC 17025	12	Jan-08	100115
Absorbing Clamp	ROHDE&SC	MDS-21	ISO9001	12	Jan-08	100205

	HWARZ		EN/ISO/IEC 17025			
10m 50 Ohm Coaxial Cable with N-plug,individual length,usable up to 3(5)GHz, Connectors	SCHWARZB ECK MESS-ELEK TROM	AK 9514	EN/ISO/IEC 17025 DIN EN ISO9001	12	Jan-08	-

6 Conducted Emission Test

According to the rule of section 15.207(c), owing to the DC operation of EUT, this test is not performed.

7 Maximum Power Output

7.1 Rules and Limits

2.1046(a), ANSI/TIA/EIA-603-2003, Paragraph 2.2.1

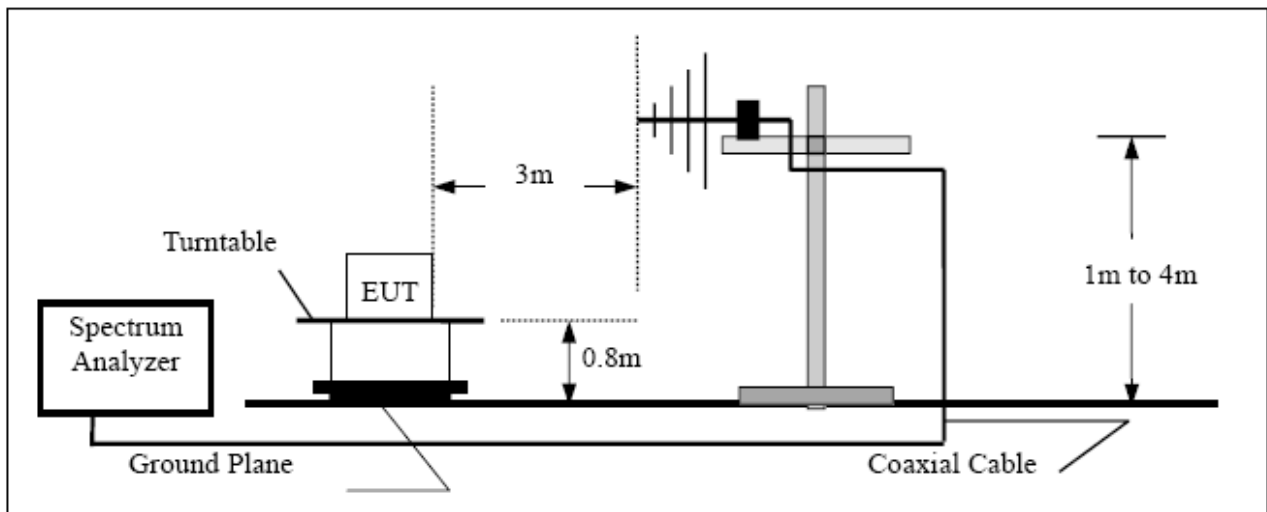
74.861(e)(1): the power of the measured un-modulated carrier power at output of the transmitter power amplifier (antenna input power) may not exceed the following:

1. 54-72, 76-88 and 174-216 MHz bands--50mW
2. 470-608 and 614-806MHz bands--250mW

7.2 Test Equipment

Please refer to Section 5 this report.

7.3 Test Procedure



1. Measurement was made on anechoic chamber. The EUT system was placed on non-conductive turntable which is 0.8 meters height, top surface 1.0*1.5 meter. The EUT was placed in three direction of the space in order to obtain maximum emission.
2. Connect the equipment as illustrated. Place the transmitter to be tested on the turntable in the standard test site.
3. Raise and lower the test antenna from 1m to 4m with the transmitter facing the antenna and record the highest received signal.
4. Replace the transmitter under test with a half-wave vertically polarized antenna. The centre of the antenna should be at the same location as the transmitter under test. Connect the antenna to a signal generator with a known output and record value.

7.4 Result Calculation

Result calculation is as following:

Result=SG Reading + Cable Loss + Antenna Gain Corrected

Antenna Gain Corrected: is used for antenna other than dipole to convert radiated power to ERP.

$$\text{mW} = \log^{-1}[\text{Result}(\text{dBm})/10]$$

7.5 Measurement Result

Frequency(MHz)	Antenna Polarity	Spectrum Reading (dBm)	E.R.P. (mW)	Limit (w)
684.7	V	5.5	3.54	0.25
684.7	H	5.3	3.39	

8 Modulation Characteristics

8.1 Rules and Limits

2.1047(a), ANSI/TIA/EIA-603-1992, Paragraph 2.2.6.

Voice modulated communication equipment, the frequency response of the audio modulating circuit over a range of 100Hz to 5000Hz shall be measured. For equipment required to have an audio low-pass filter, the frequency response of the filter or of all circuitry installed between the modulation limiter and the modulated stage shall be measured.

2.1047(b), ANSI/TIA/EIA-603-1992, Paragraph 2.2.3

Equipment which employs modulation limiting

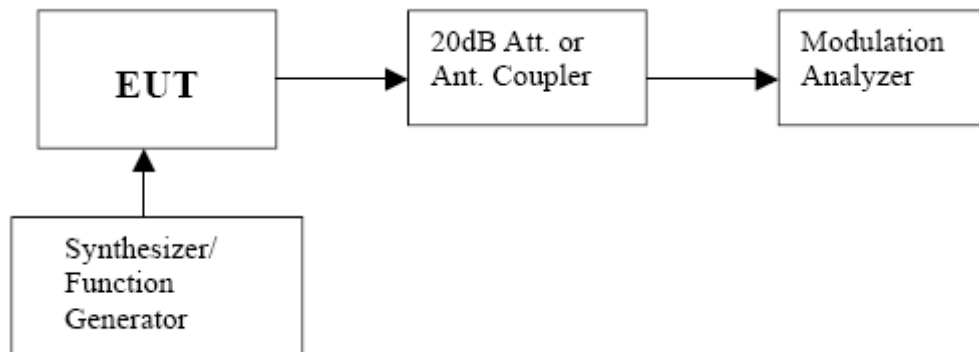
74.861(e)(3), ANSI/TIA/EIA-603-1992

Any form of modulation may be used. A maximum deviation of $\pm 75\text{kHz}$ is permitted when frequency modulation is employed.

8.2 Test Equipment

Please refer to Section 5 this report.

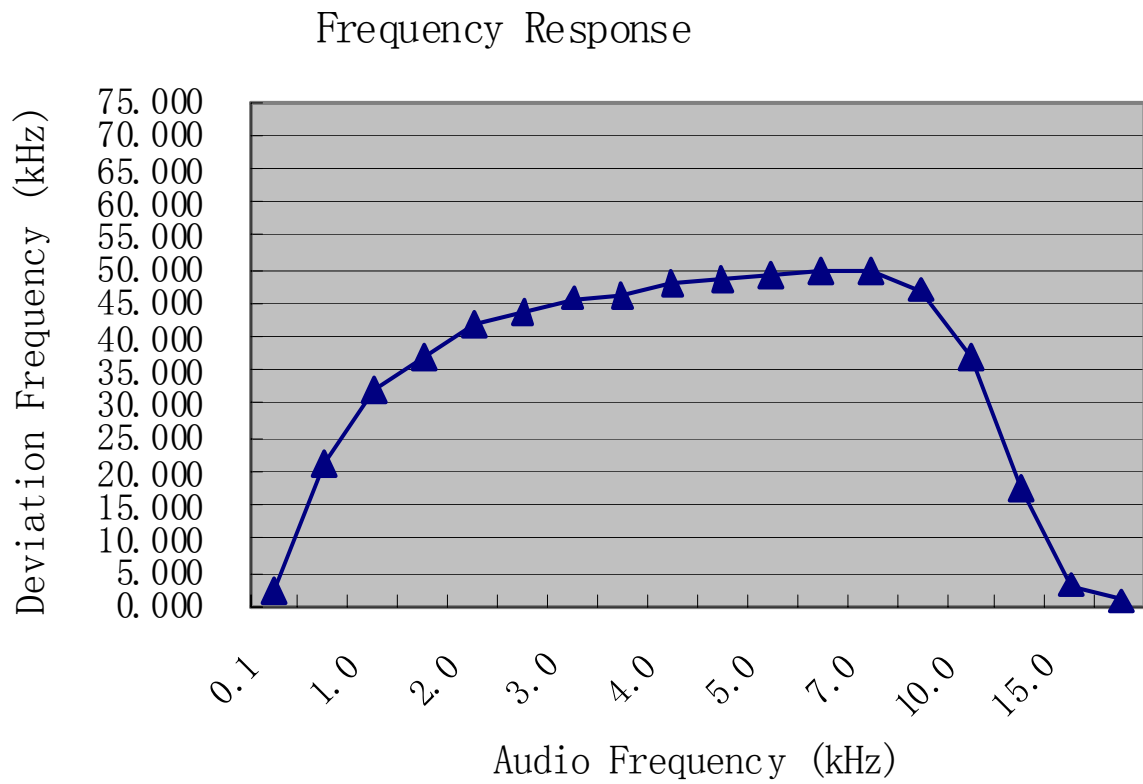
8.3 Frequency Response of Audio Modulation Circuit and Low Pass Filter Measurement Condition & Setup



2.1047(a)

1. The EUT and test equipment were set up as shown on the above graph.
2. Adjust the audio input for 20% of rated system deviation at 1KHz using this level as a reference (0dB) .
3. Vary the audio frequency from 100Hz to 15000Hz

8.4 Measurement Result

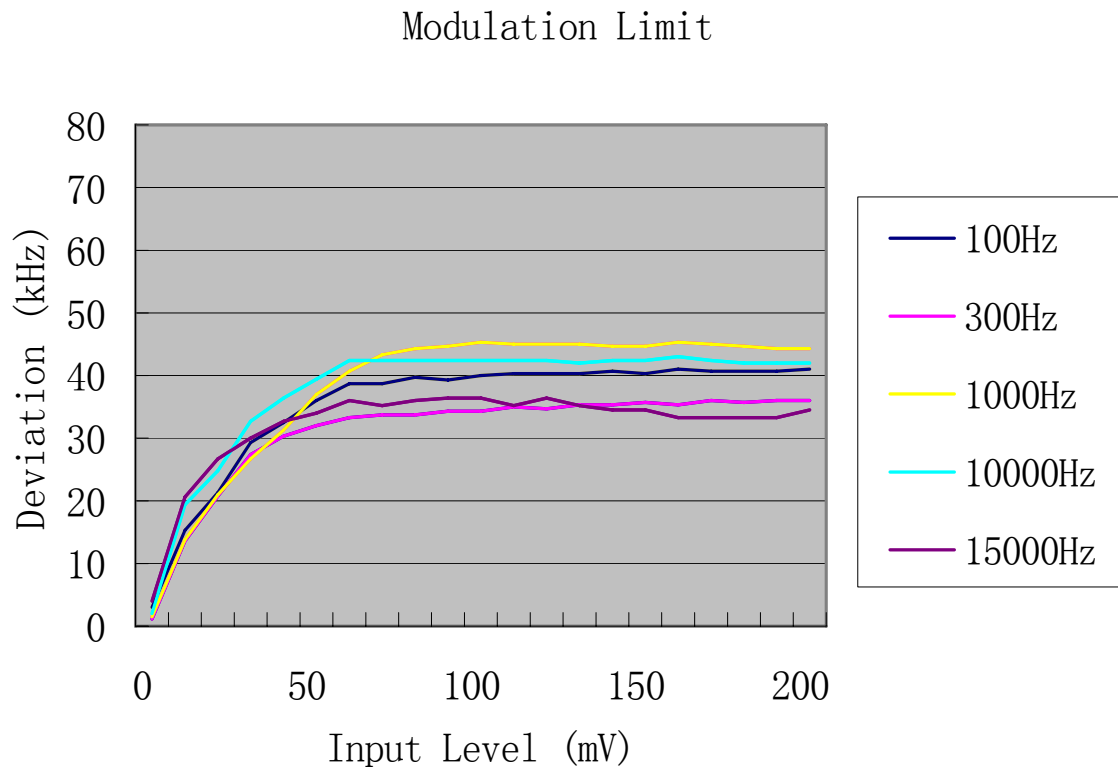


8.5 Modulation Limiting Measurement Condition & Setup

2.1047(b)

1. The Plus/Function generator was connected to the microphone of EUT, via an artificial mouth simulator.
2. Adjust the audio input frequency from 100Hz to 15000 Hz and the input level from 0V to maximum permitted input voltage with recording each carrier frequency deviation responding to respective input level.
3. Repeat step 2 with changing the input frequency for 100, 300, 1000, 10000 and 15000 Hz in sequence.

8.6 Measurement Result



9 Occupied Bandwidth

9.1 Rules and Limits

2.1049(c)(1): ANSI/TIA/EIA-603-1992, Paragraph 2.2.11

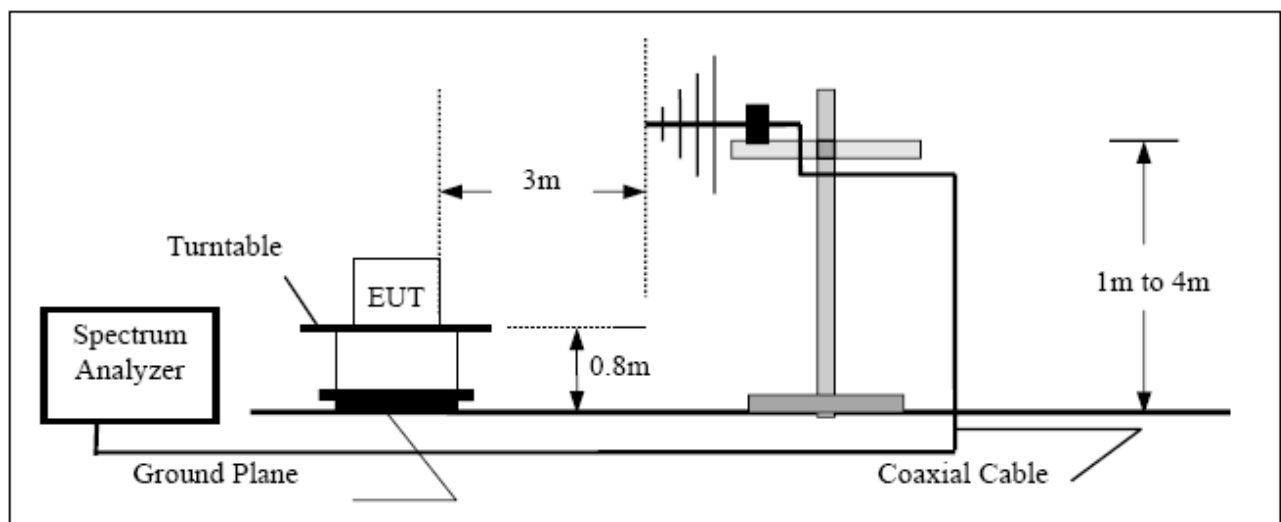
74.861(e)(3): Any form of modulation may be used. A maximum deviation of $\pm 75\text{kHz}$ is permitted when frequency modulation is employed.

74.861(e)(5): The operation bandwidth shall not exceed 200kHz.

9.2 Test Equipment

Please refer to Section 5 this report.

9.3 Test Procedure



1. Connect the EUT as above graph.
2. Plot the unmodulated chart shows on spectrum.
3. Set the output of the signal generator to 300Hz, 1kHz, 1.5kHz, 2.5kHz. Increase the amplitude of the signal, while monitoring the modulation meter. Until modulation is maximum measure the bandwidth under 26dB compared to the unmodulated fundamental carrier peak level of the modulated signal displayed on the spectrum analyzer.

9.4 Measurement Result

The occupied bandwidth's plot is presented on following pager, which illustrates compliance with the rules.

Calculation of Necessary bandwidth

$$B_n = 2M + 2DK$$

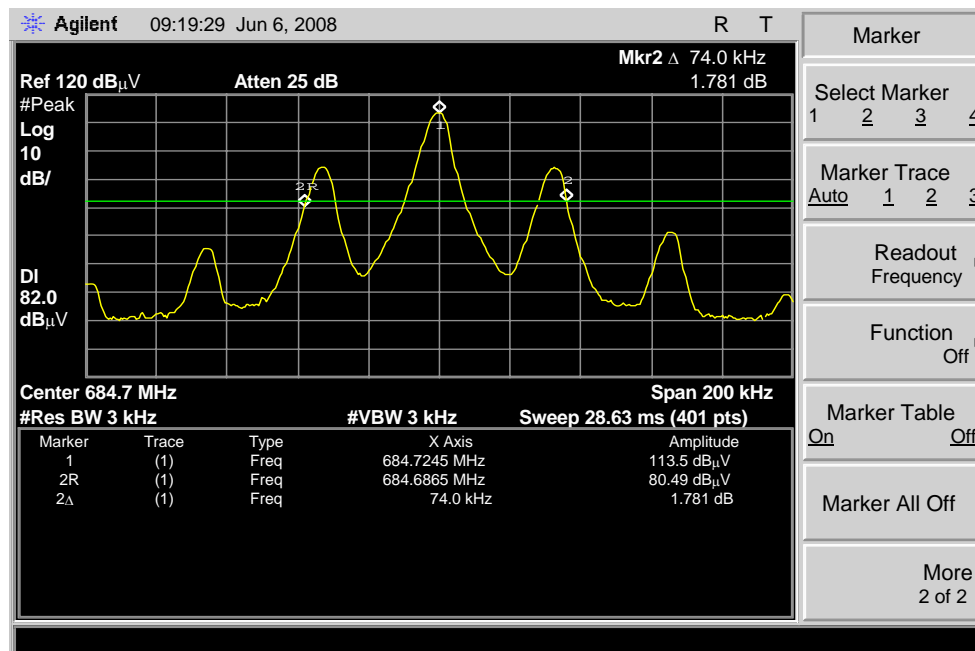
M=Max modulation Frequency=15KHz

D=Peak Frequency Deviation=44KHz

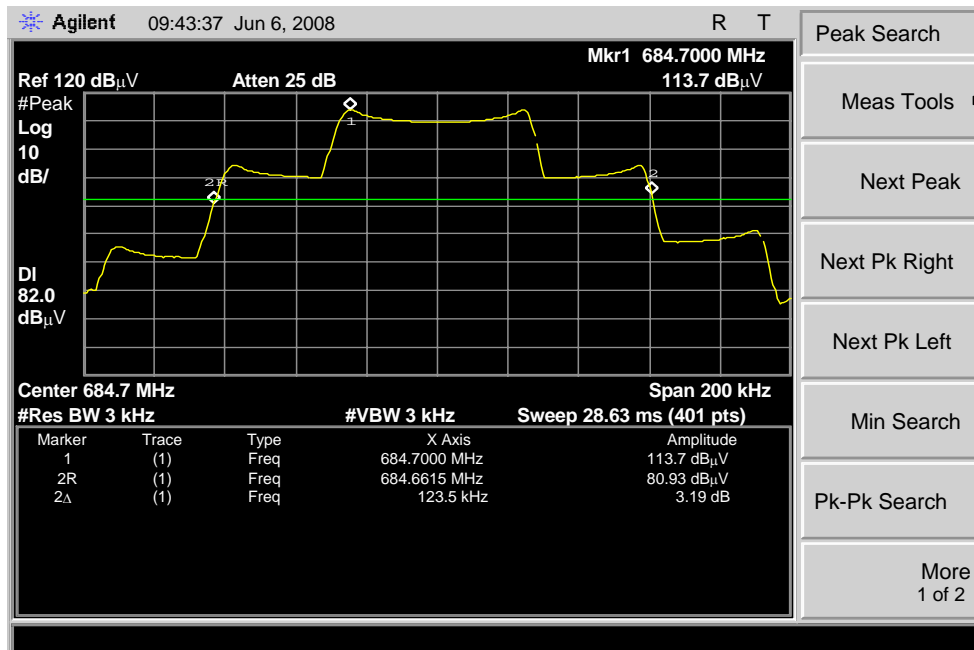
K=1

$$B_n = 118 \text{ KHz}$$

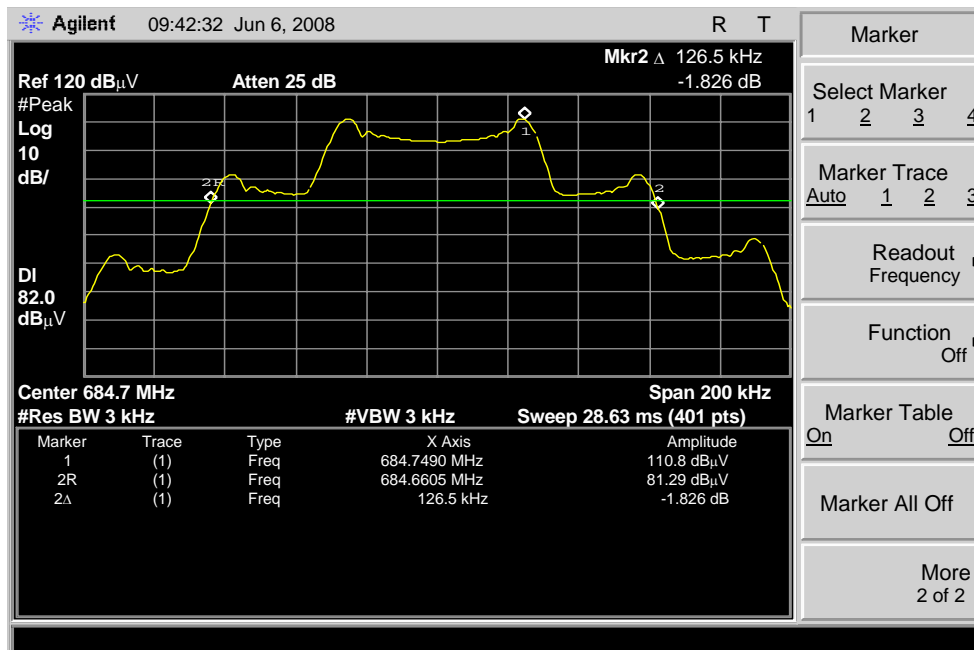
Unmodulation



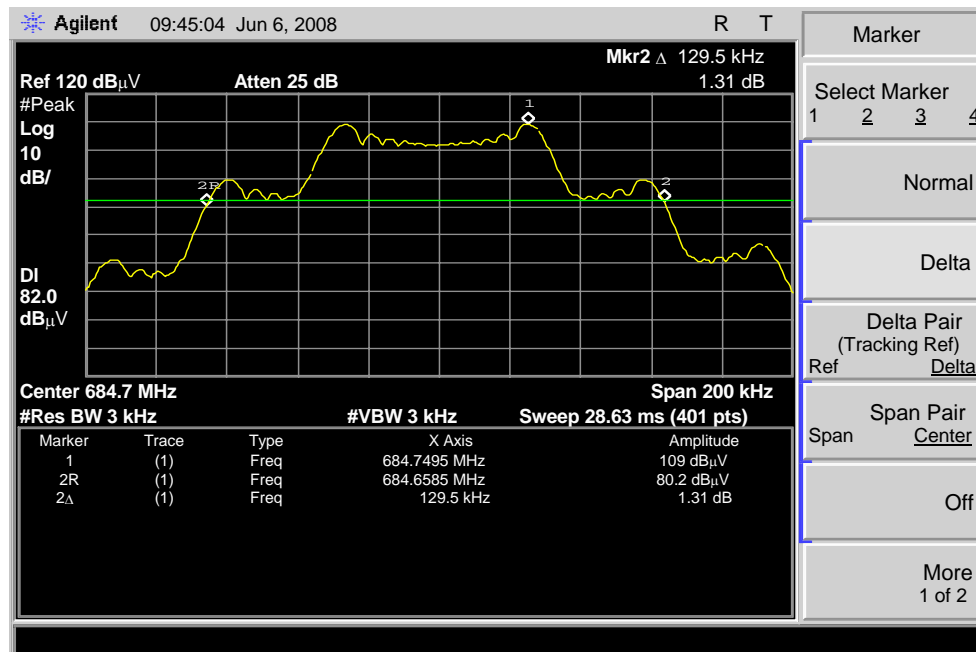
300Hz



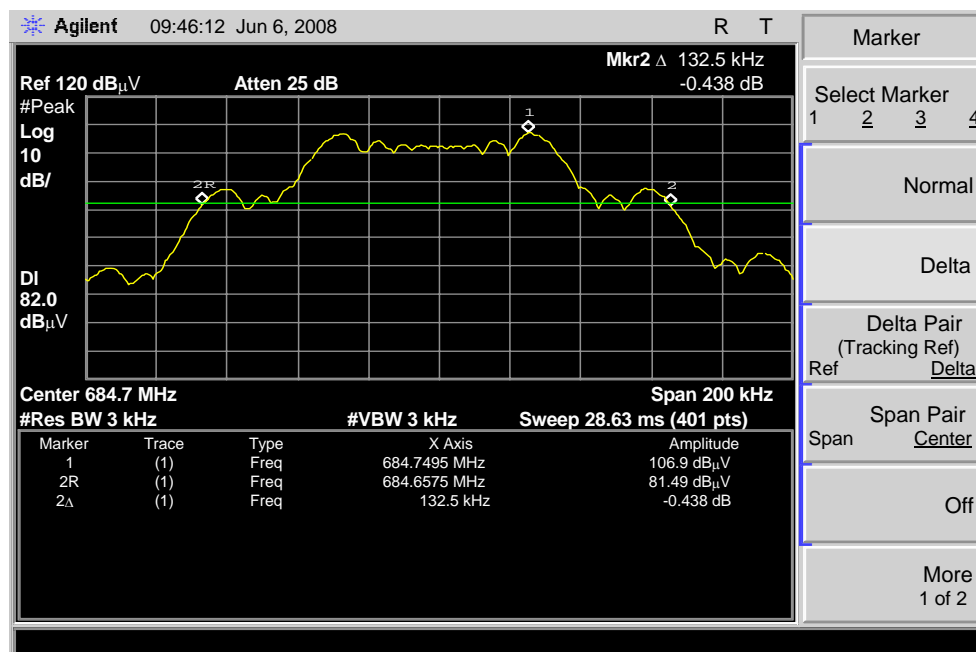
1k modulation



1.5k modulation



2.5k modulation



10 Field Strength of Spurious Radiation

10.1 Rules and Limits

2.1053(a): ANSI-603-1992, Paragraph 2.2.12

Measurement shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuit, power leads, or intermediate circuit elements under normal conditions of installation and operation.

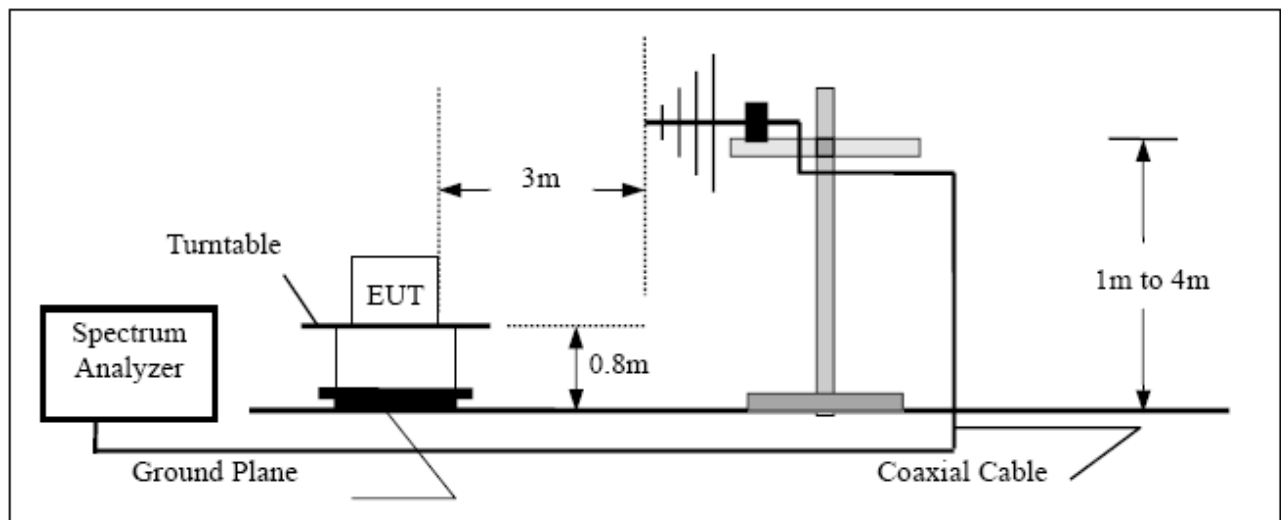
74.861(e)(6)(iii): Spurious and harmonics must be at least $43 + 10\log(\text{output power})$ below the carrier peak

2.1057: in all measurements set forth, the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency

10.2 Test Equipment

Please refer to Section 5 this report.

10.3 Test Procedure



1. Connected the equipment as above graph.
2. 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.
4. 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.

5. 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.
6. The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.
7. The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
8. The test antenna shall be raised and lowered again through the specified range of height until the measuring receiver detects a maximum signal level.
9. The maximum signal level detected by the measuring receiver shall be noted.
10. The measurement shall be repeated with the test antenna set to horizontal polarization.
11. Replace the antenna with a proper antenna (substitution antenna).
12. 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.
13. The substitution antenna shall be connected to a calibrated signal generator.
14. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
15. The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
16. 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.
17. 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.
18. The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

10.4 Measurement Result

Unmodulated carrier output power is -17.19dBm, or 0.019mW(ERP). The limit of spurious or harmonics is calculated as following:

$-17.19-[43+10\log(\text{carrier output power in W})]$, or -13dBm

Horizontal

Frquency (MHz)	Reading Amplitude (dBm)	Limit (dBm)	Margin (dBm)
128.87	-78.13	-13	-65.13
632.66	-77.24	-13	-64.24
1638.19	-68.12	-13	-56.12
2316.56	-75.68	-13	-62.68
4281.74	-79.55	-13	-66.55

Vertical

Frquency (MHz)	Reading Amplitude (dBm)	Limit (dBm)	Margin (dBm)
201.49	-81.23	-13	-68.23
426.61	-78.58	-13	-65.58
906.67	-75.22	-13	-62.22
1578.64	-76.65	-13	-63.65
2262.72	-79.38	-13	-66.38

11 Frequency Stability Tolerance

11.1 Rules and Limits

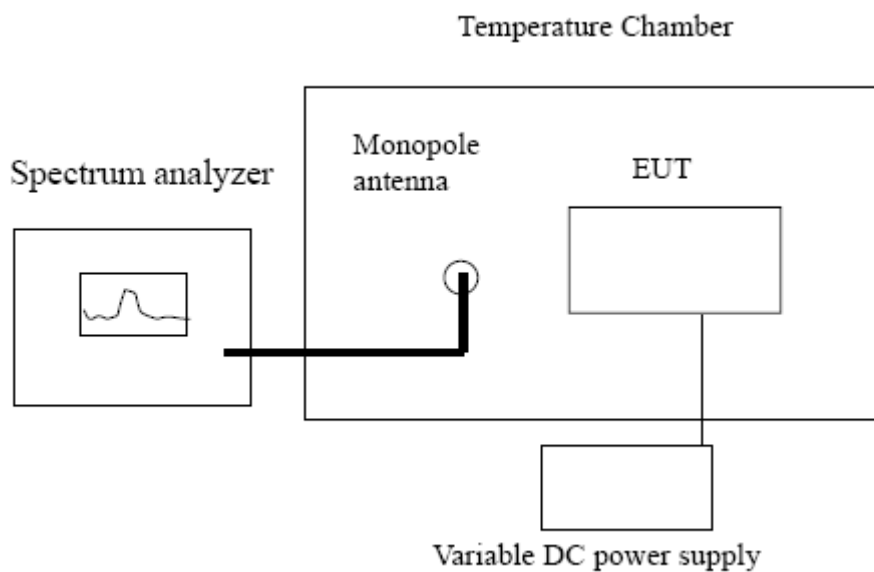
2.1055, ANSI/TIA/EIA-603-1992, Paragraph 2.2.2.

74.861(e)(4): the frequency tolerance of the transmitter shall be 0.005 percent

11.2 Test Equipment

Please refer to Section 5 this report.

11.3 Temperature Variation Test Procedure



1. Place the EUT in the chamber, powered in its normal operation.
2. Set the temperature of the chamber -30 degree centigrade. Allow the equipment to stabilize at that temperature.
3. Measured the carrier frequency using preamplifier and frequency counter.
4. Repeated procedures 1 to 3 from -30 to 50 degree centigrade at internals of 10 degree.

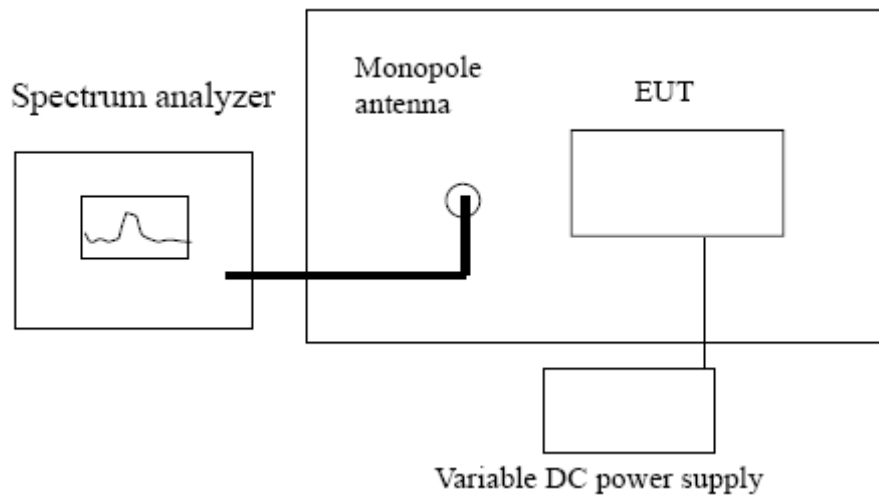
11.4 Measurement Result

A plot and table is presented which illustrate compliance with the rule where the center frequency is 684.7MHz

Temperature Variation Table

Temperature(Centigrade)	Frequency(MHz)	Tolerance(MHz)
-30	684.771733	684.708487 to 684.791512
-20	684.774242	
-10	684.763599	
0	684.763244	
10	684.751769	
20	684.754573	
30	684.755933	
40	684.741577	
50	684.732749	

11.5 Voltage Variation Test Procedure



1. Attached the power line of the power supply to the battery position of the EUT.
2. Tuned the output power level to battery end point, 85%, 100%, 115% of the normal operation power of EUT.
3. Recorded the frequency with a frequency counter.

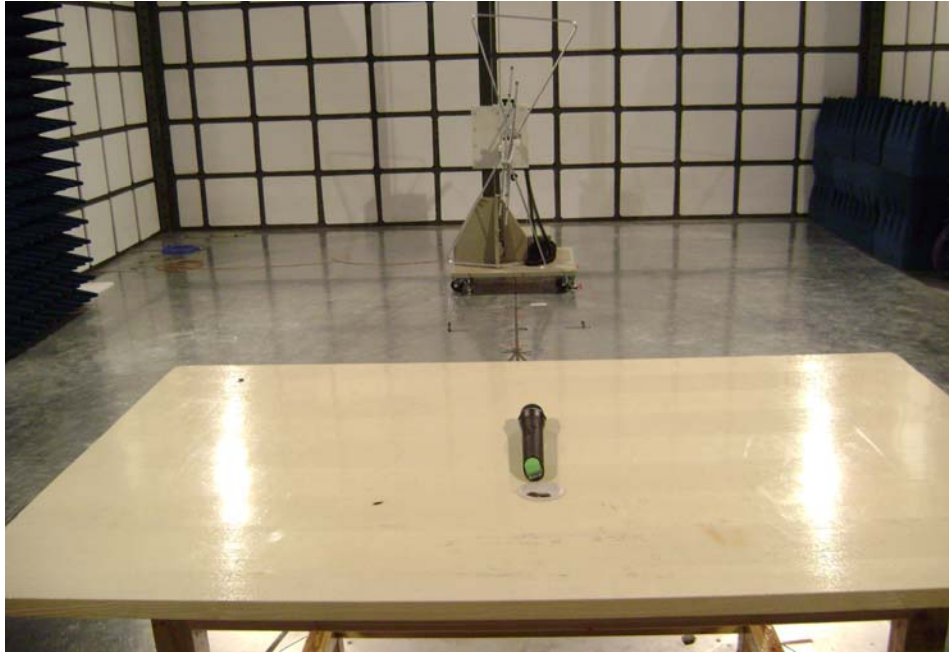
11.6 Measurement Result

Frequency Stability of Voltage Variation Measurement Table

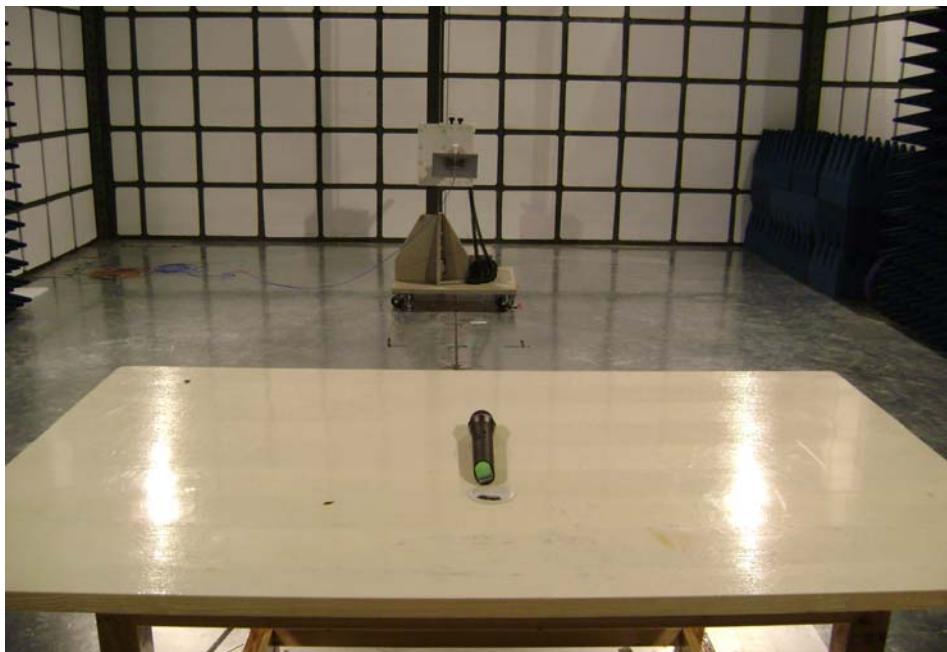
Supply Voltage (Volt)	Frequency (MHz)	Tolerance (MHz)
7.65(85%)	684.753726	684.708487 to 684.791512
9(100%)	684.754254	
10.35(115%)	684.753336	

12 Photographs of Testing

12.1 Radiation Emission Test View For 30MHz-1000MHz



12.2 Radiation Emission Test View For 1GHz-10GHz



13 Photographs - Constructional Details

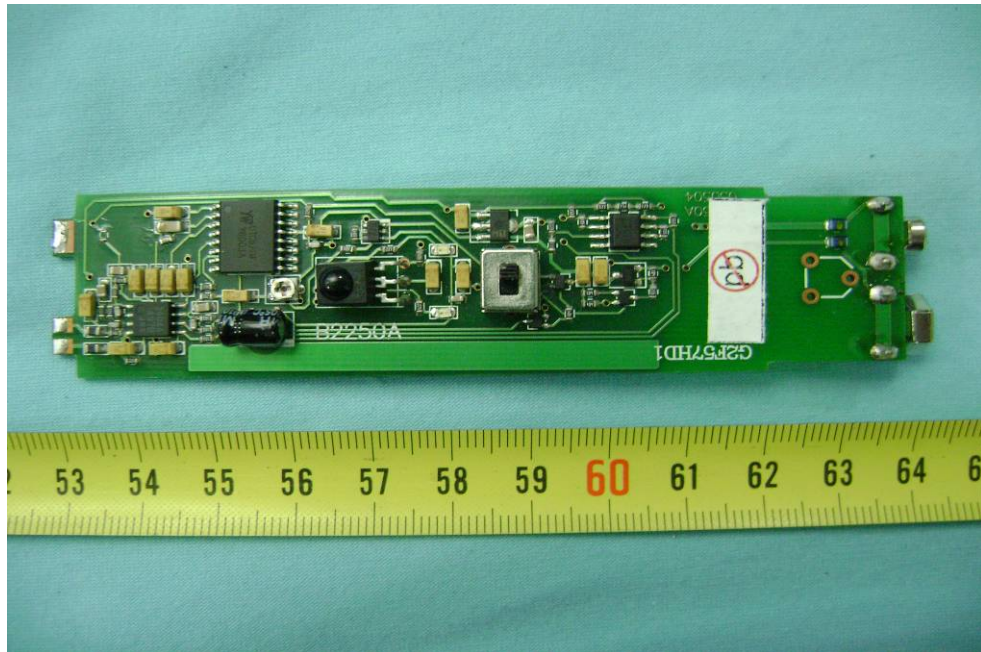
13.1 EUT - Front View



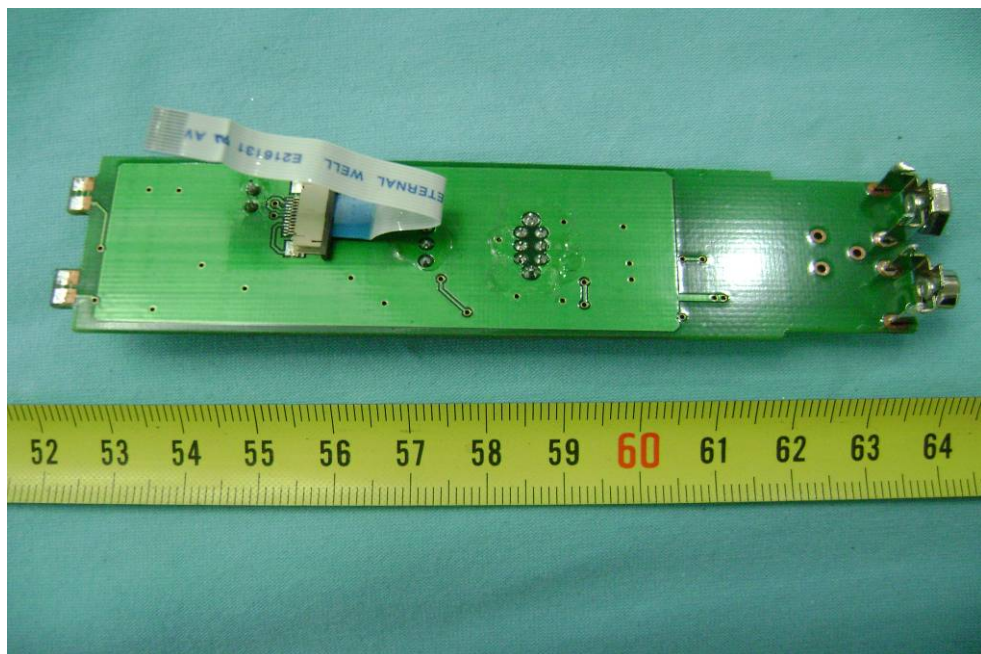
13.2 EUT - Back View



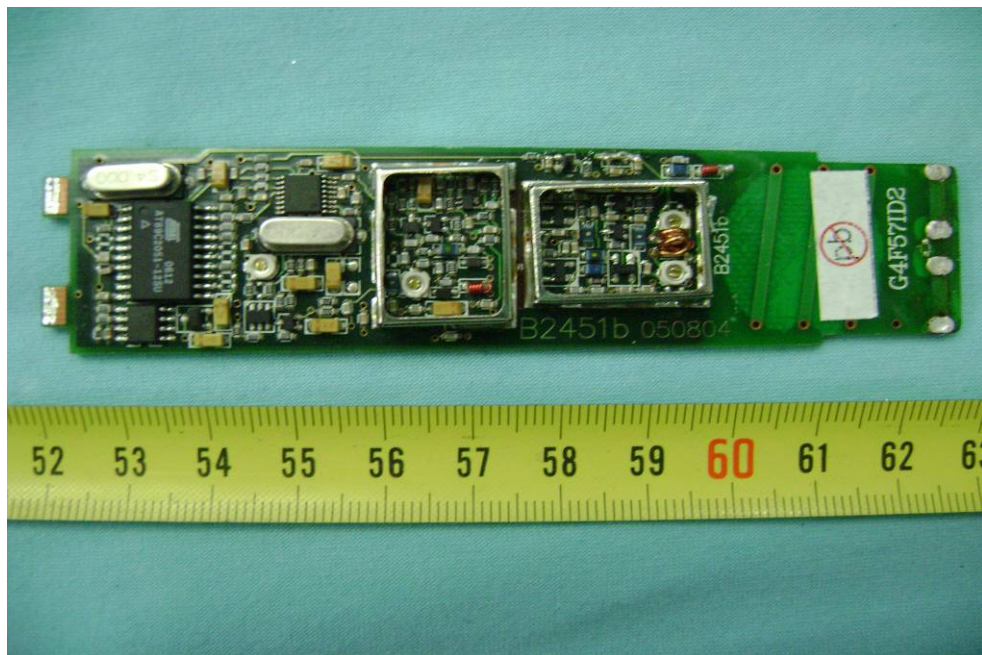
13.3 PCB1 - Front View



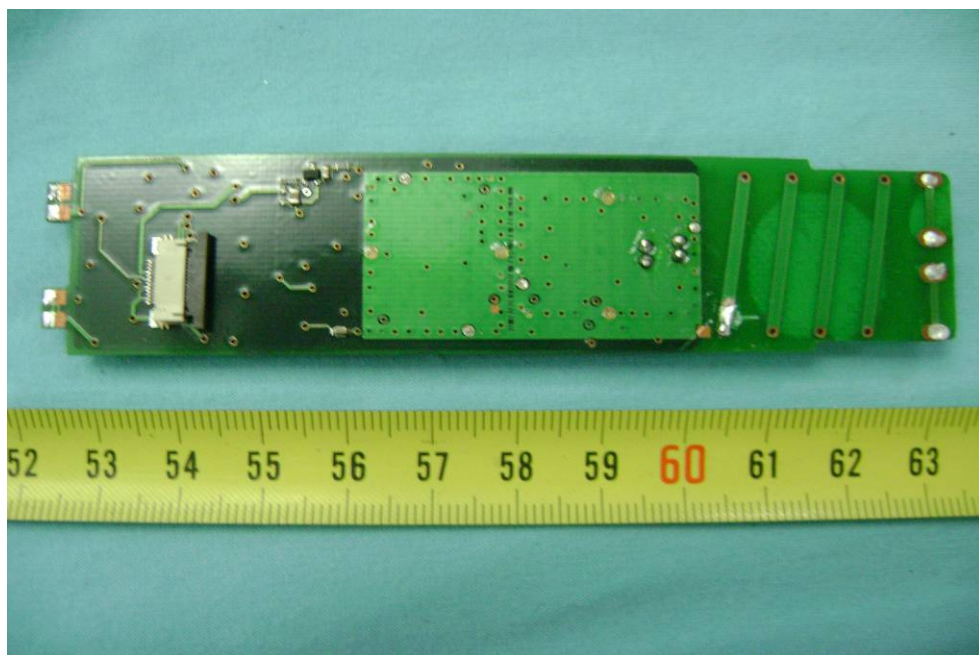
13.4 PCB1 - Back View



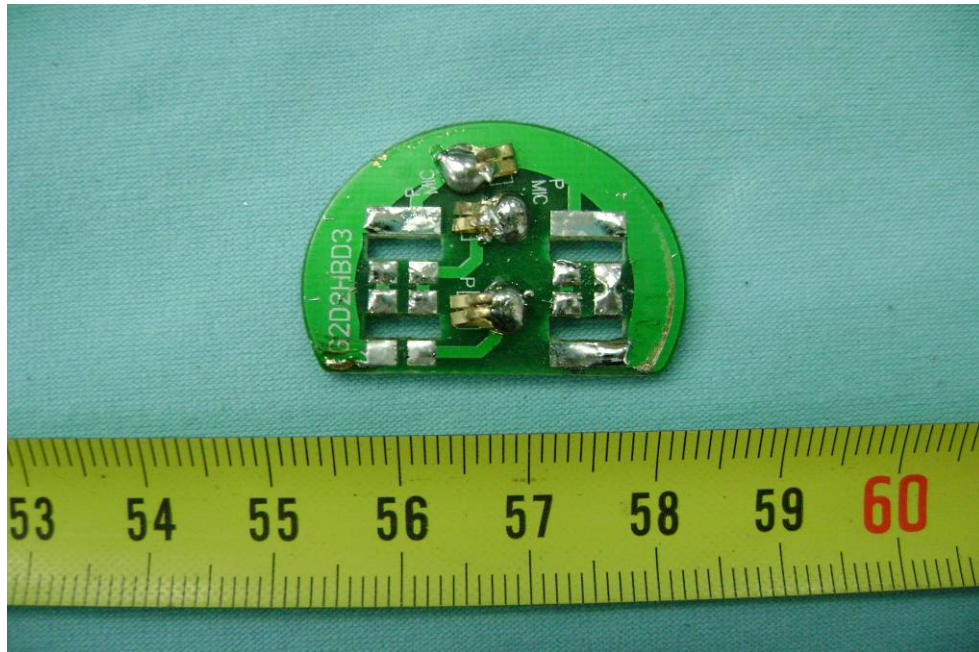
13.5 PCB2 -Front View



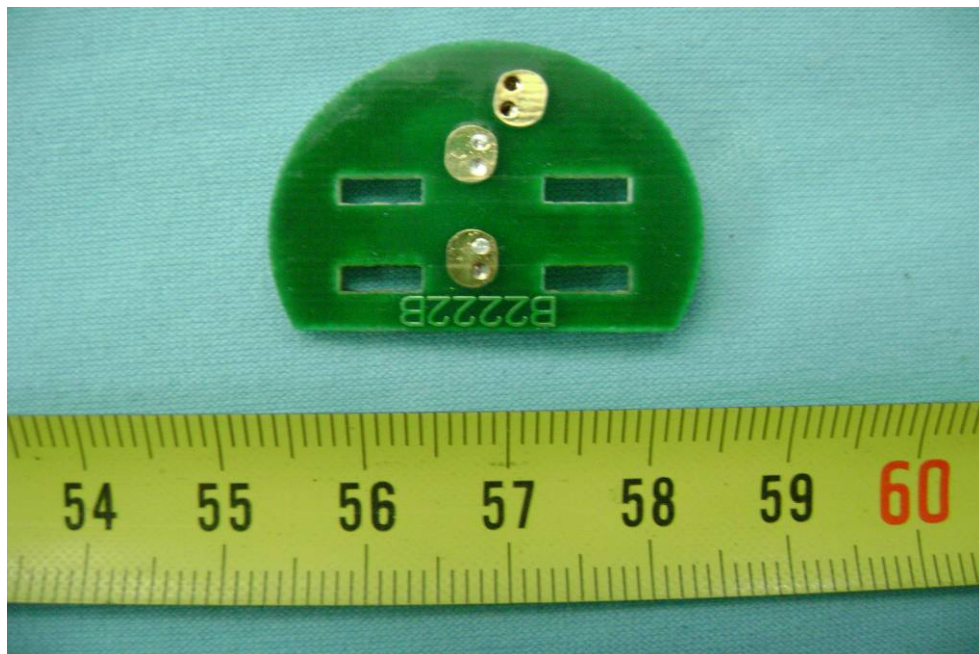
13.6 PCB2 - Back View



13.7 PCB3 - Front View



13.8 PCB3 - Back View



14 FCC ID 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 Bottom View/proposed FCC Mark Location

