FCC 47 CFR PART 74 SUBPART H

TEST REPORT

For

Applicant :	**Shenzhen JWL Electronics Co., Ltd.**
Address :	**C and D Block, XiRong Industrial Estate, Gushu, XiXiang Avenue, BaoAn District, Shenzhen, Guangdong, China**
Product Name :	**Wireless Microphone Transmitter**
Model Name :	**HT-16D**
Brand Name :	**GEMINI, JWL**
FCC ID :	**PVDHT-16D**
Report No. :	**MOST100419F1**
Date of Issue :	**May 18, 2010**

Issued by :	**Most Technology Service Co., Ltd.**
Address :	**No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China**
Tel :	**86-755-8617 0306**
Fax :	**86-755-8617 0310**

CONTENTS

1. TEST RESULT CERTIFICATION

Applicant Name:	Shenzhen JWL Electronics Co., Ltd.
Address:	C and D Block, XiRong Industrial Estate, Gushu, XiXiang Avenue, BaoAn District, Shenzhen, Guangdong, China
Manufacturer Name:	Shenzhen JWL Electronics Co., Ltd.
Address:	C and D Block, XiRong Industrial Estate, Gushu, XiXiang Avenue, BaoAn District, Shenzhen, Guangdong, China
Brand Name:	GEMINI, JWL
Equipment Under Test:	Wireless Microphone Transmitter
Model Number:	HT-16D
Series Model Difference description:	N/A
FCC ID：	PVDHT-16D
Test Standard	FCC 47 CFR Part 74 Subpart H
File Number:	MOST100419F1
Date of Test:	May 10, 2010 – May 18, 2010

We (MOST) hereby certify that:

The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI TIA 603:2004 and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC Rules Part 74 H.

The test results of this report relate only to the tested sample identified in this report.

Tested by (+ signature): Candy

Candy Zhang May 18, 2010

Review by (+ signature):

Sam Zhong May 18, 2010

MOST TECHNOLOGY SERVICE CO., LTD. APPROVED EMC & SAFETY

Approved by (+ signature):

Yvette Zhou May 18, 2010

2. Technical Information

Note: the following data is based on the information by the applicant.

2.1 EUT Description

Product	Wireless Microphone Transmitter
Brand Name	GEMINI
Model Number	HT-16D
Power Supply	DC 3 V by Battery
Frequency Range	682.35 MHz-697.10 MHz
Modulation Technique	FM
Antenna Gain	0 dBi
Antenna Type	Internal
Temperature Range	-10℃-60℃

Note:

1. *This submittal(s) (test report) is intended for FCC ID: PVDHT-16D filing to comply with the FCC Part 74, Subpart H Rules.*
2. *Please refer to Appendix B for the photographs of the EUT. For more details, please refer to the User's manual of the EUT.*

2.2 Objective

The tests documented in this report were performed in accordance with ANSI TIA 603:2004 and FCC CFR 47 Rules Part 74 Subpart H.

2.3 Test Standards and Results

The EUT has been tested according to FCC CFR 47:

- Part 2: Frequency Allocations and Radio Treaty Matters: General Rules and Regulations (10-1-05 Edition)
- Part 74: Experimental Radio, Auxiliary, Special Broadcast and other program distributional services

Test items and the results are as bellow:

№	Test Type	Para. Number	Limit	Result
1	RF Output Power (Radiated)	2.1046(a); 74.861 e(1)	250 mW	PASS
2	Modulation Deviation	2.1047(b); 74.861 e(2)	Refer to 74.861e(2)	PASS
3	Audio Frequency Response	2.1047(a)	Refer to 2.1047(a)	PASS
4	Occupied Bandwidth	2.1049(c)(1); 74.861 e(5)	< 200 KHz	PASS
5	Radiated Spurious Emission	2.1053; 74.861 e(6)	Refer to 74.861e(6)	PASS
6	Frequency Stability vs. Temperature	2.1055(b); 74.861 e(4)	Refer to 74.861e(4)	PASS
7	Frequency Stability vs. Voltage	2.1055(a)(1); 74.861 e(4)	Refer to 74.861e(4)	PASS

3. Details of Test

3.1 Identification of the Responsible Testing Laboratory

Company:	Most Technology Service Co., Ltd
Address:	No.5, Langshan 2nd Rd., North Hi-Tech Industrial park ,Nanshan, Shenzhen, Guangdong ,China

3.2 Identification of the Responsible Testing Location

Test Site:	Most Technology Service Co., Ltd
Address:	No.5, Langshan 2nd Rd., North Hi-Tech Industrial park ,Nanshan, Shenzhen, Guangdong ,China
Description:	There is one 3m semi-anechoic an area test sites and two line conducted labs for final test. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2003, ANSI TIA 603:2004 and CISPR 16 requirements. The **FCC** Registration Number is **490827.** The **CNAS** Registration Number is **CNAS L3573.**

3.3 List of Test Equipments

No.	Equipment	Manufacturer	Model No.	S/N	Calibration due date
1	Test Receiver	Rohde & Schwarz	ESCI	100492	2011/03/14
2	L.I.S.N.	Rohde & Schwarz	ENV216	100093	2011/03/14
3	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2011/03/14
4	Terminator	Hubersuhner	50Ω	No.1	2011/03/14
5	RF Cable	SchwarzBeck	N/A	No.1	2011/03/14
6	Bilog Antenna	Sunol	JB3	A121206	2011/03/14
7	Cable	Resenberger	N/A	NO.1	2011/03/14
8	DC Power Filter	DuoJi	DL2×30B	N/A	2011/03/14
9	Single Phase Power Line Filter	DuoJi	FNF 202B30	N/A	2011/03/14
10	3 Phase Power Line Filter	DuoJi	FNF 402B30	N/A	2011/03/14
11	Absorbing Clamp	Luthi	MDS21	3635	2011/03/14
12	Coaxial Switch	Anritsu Corp	MP59B	6200283933	2011/03/14
13	AC Power Source	Kikusui	AC40MA	LM003232	2011/03/14
14	Test Analyzer	Kikusui	KHA1000	LM003720	2011/03/14
15	Line Impendence Network	Kikusui	LIN40MA-PCR-L	LM002352	2011/03/14
16	ESD Tester	Kikusui	KES4021	LM003537	2011/03/14
17	EMCPRO System	EM Test	UCS-500-M4	V0648102026	2011/03/14
18	Signal Generator	IFR	2032	203002/100	2011/03/14
19	Amplifier	A&R	150W1000	301584	2011/03/14
20	CDN	FCC	FCC-801-M3-25	107	2011/03/14
21	EM Injection Clamp	FCC	F-203I-23mm	403	2011/03/14
22	Telecommunication Antenna	European Antennas	PSA 75301R/170	0304213	2011/03/14

NOTE: Equipments listed above have been calibrated and are in the period of validation.

3.4 Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 15-35ºC
- Humidity: 30-60%
- Atmospheric pressure: 86-106 k Pa

4. Test Methodology

4.1 General Test Procedures

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirement in Section 13.1.4.1 of ANSI TIA 603:2004. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

Not Applicable (Since the EUT is powered by battery)

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in ANSI TIA 603:2004.

4.2 Description of Test Modes

The EUT has been tested under engineering test mode condition and the EUT staying in continuous transmitting mode.

5. FCC Part 74 Requirements

5.1 RF Output Power (Radiated)

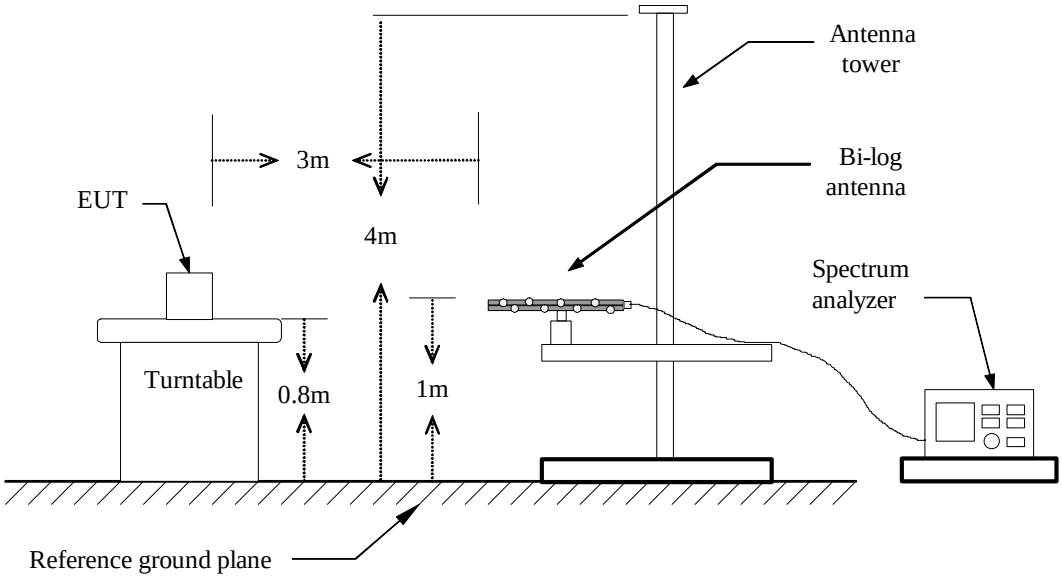
LIMIT

According to CFR 47 section 74.861 e (1), the power of the measured unmodulated carrier power at the output of the transmitter power amplifier (antenna input power) may not exceed the following:

(1) 54-72, 76-88, and 174-216 MHz bands: 50 mW;

(2) 470-608 and 614-806 MHz bands: 250 mW

TEST CONFIGURATION



TEST PROCEDURE

1. On a test site, the EUT shall be placed on a turntable and in the position closest to the normal use as declared by the user.

2. The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the transmitter.

3. 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.

4. 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.

5. The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.

6. The transmitter shall than be rotated through 360°in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

7. The test antenna shall be raised and lowered again through the specified range of height until the measuring receiver detects a maximum signal level.

8. The maximum signal level detected by the measuring receiver shall be noted.

9. The measurement shall be repeated with the test antenna set to horizontal polarization.

10. Replace the antenna with a proper Antenna (substitution antenna).

11. 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.

12. The substitution antenna shall be connected to a calibrated signal generator.

13. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.

14. The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.

15. 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.

16. 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.

17. The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

TEST RESULTS

Peak Output Power

Frequency (MHz)	Antenna (H/V)	SG output power (dBm)	Antenna Gain (dB)	Cable Loss (dB)	Peak Output Power (dBm)	Peak Output Power (mW)	Limits (mW)
682.35	H	-41.43	1.53	6.14	-36.82	0.0002	250
682.35	V	-31.17	1.53	6.14	-26.56	0.0022	250
690.10	H	-39.78	1.35	6.30	-34.83	0.0003	250
690.10	V	-27.20	1.35	6.30	-22.25	0.0059	250
697.10	H	-38.83	1.05	6.39	-33.49	0.0004	250
697.10	V	-25.99	1.05	6.39	**-20.65**	**0.0861**	250

Note:

Peak Output Power (dBm) = SG output power (dBm) – Cable losses (dB) + Antenna gain (dB)

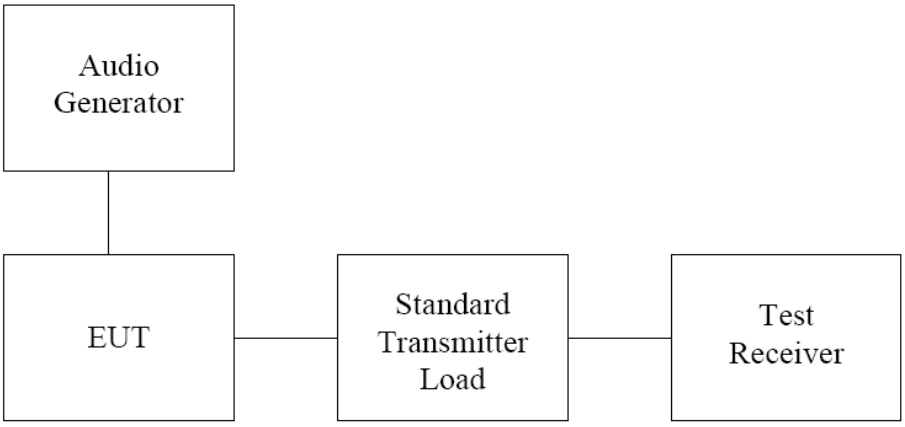
5.2 Modulation Deviation

LIMIT

According to CFR 47 section 2.1047 a, for Voice modulation communication equipment, the frequency response of the audio modulation circuit over a range of 100 to 5000 Hz shall be measured.

According to CFR 47 section 74.861 e (1), any form of modulation may be used. A maximum deviation of ±75 KHz is permitted when frequency modulation is employed.

TEST CONFIGURATION



TEST PROCEDURE

Modulation limits is the transmitter circuit's ability to limit the transmitter form producing deviations in excess of rated system deviation.

The audio signal generator is connected to the audio input of the EUT with its full rating.

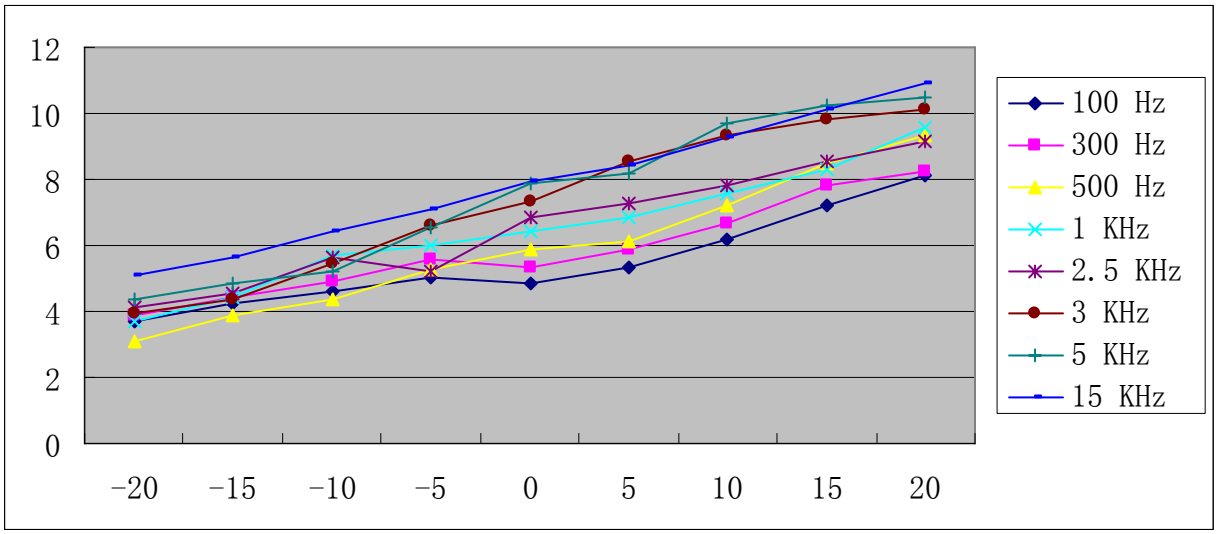
The modulation response is measured at certain modulation frequencies, related to 1000 Hz reference signal.

Tests are performed for positive and negative modulation.

TEST RESULTS

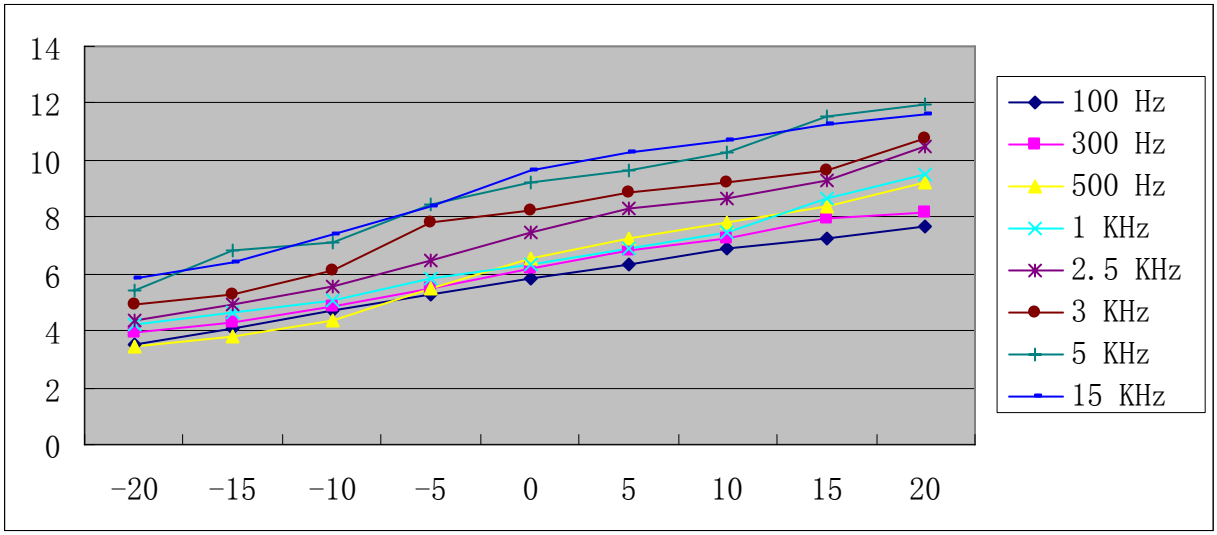
The Low Channel (682.35 MHz)

Modulation Level (dB)	Peak Frequency Deviation							
	100 Hz (KHz)	300 Hz (KHz)	500 Hz (KHz)	1 KHz (KHz)	2.5 KHz (KHz)	3 KHz (KHz)	5 KHz (KHz)	15 KHz (KHz)
-20	3.68	3.85	3.12	3.68	4.15	3.91	4.35	5.11
-15	4.25	4.42	3.90	4.45	4.53	4.38	4.83	5.63
-10	4.61	4.92	4.38	5.72	5.65	5.46	5.21	6.43
-5	5.06	5.58	5.25	6.01	5.24	6.61	6.52	7.08
0	4.82	5.32	5.88	6.42	6.86	7.34	7.85	7.91
+5	5.35	5.86	6.15	6.83	7.29	8.56	8.20	8.45
+10	6.19	6.69	7.24	7.60	7.84	9.31	9.67	9.26
+15	7.23	7.81	8.51	8.33	8.56	9.82	10.23	10.15
+20	8.12	8.23	9.36	9.58	9.13	10.15	10.46	**10.91**



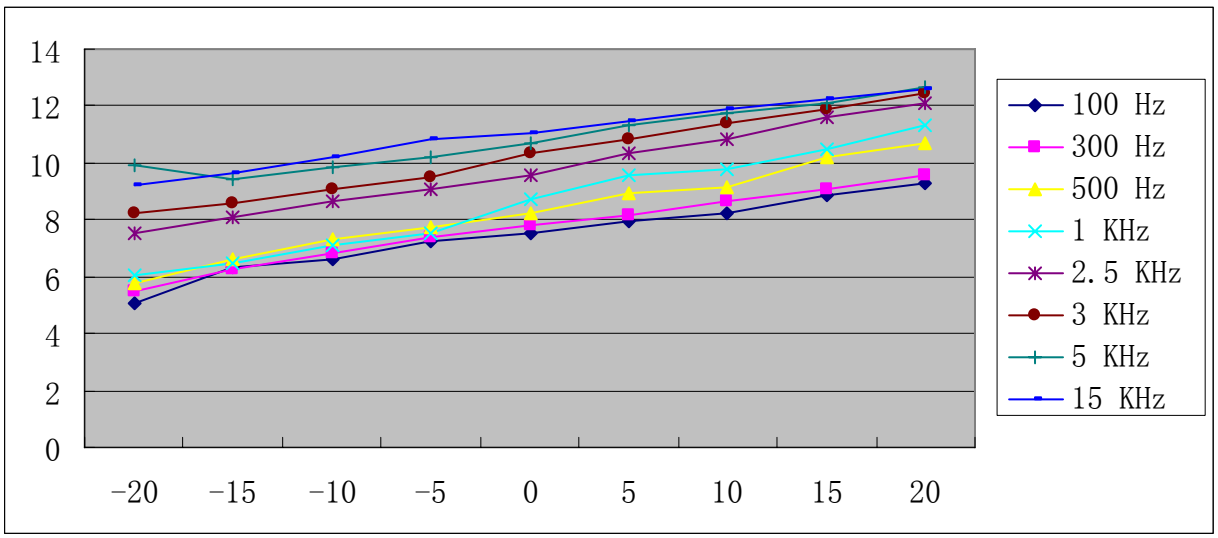
The Middle Channel (690.10 MHz)

Modulation Level (dB)	Peak Frequency Deviation							
	100 Hz (KHz)	300 Hz (KHz)	500 Hz (KHz)	1 KHz (KHz)	2.5 KHz (KHz)	3 KHz (KHz)	5 KHz (KHz)	15 KHz (KHz)
-20	3.51	3.95	3.42	4.21	4.35	4.90	5.43	5.85
-15	4.09	4.32	3.81	4.63	4.89	5.28	6.82	6.38
-10	4.72	4.83	4.35	5.05	5.53	6.15	7.08	7.40
-5	5.26	5.52	5.48	5.82	6.49	7.80	8.41	8.35
0	5.85	6.16	6.56	6.34	7.45	8.22	9.23	9.65
+5	6.34	6.85	7.23	6.92	8.28	8.89	9.67	10.24
+10	6.89	7.22	7.84	7.46	8.64	9.20	10.28	10.66
+15	7.22	7.93	8.35	8.65	9.29	9.64	11.52	11.24
+20	7.64	8.15	9.23	9.48	10.51	10.75	**11.95**	11.63



The High Channel (697.10 MHz)

Modulation Level (dB)	Peak Frequency Deviation							
	100 Hz (KHz)	300 Hz (KHz)	500 Hz (KHz)	1 KHz (KHz)	2.5 KHz (KHz)	3 KHz (KHz)	5 KHz (KHz)	15 KHz (KHz)
-20	5.08	5.51	5.80	6.06	7.52	8.22	9.93	9.24
-15	6.32	6.25	6.62	6.44	8.12	8.61	9.42	9.66
-10	6.64	6.79	7.32	7.13	8.65	9.05	9.85	10.19
-5	7.25	7.41	7.76	7.54	9.05	9.51	10.20	10.82
0	7.56	7.84	8.23	8.75	9.54	10.32	10.66	11.05
+5	7.92	8.13	8.92	9.57	10.33	10.84	11.31	11.46
+10	8.23	8.62	9.14	9.78	10.85	11.39	11.72	11.90
+15	8.84	9.08	10.22	10.46	11.59	11.88	12.11	12.25
+20	9.31	9.58	10.68	11.34	12.12	12.45	**12.69**	12.60



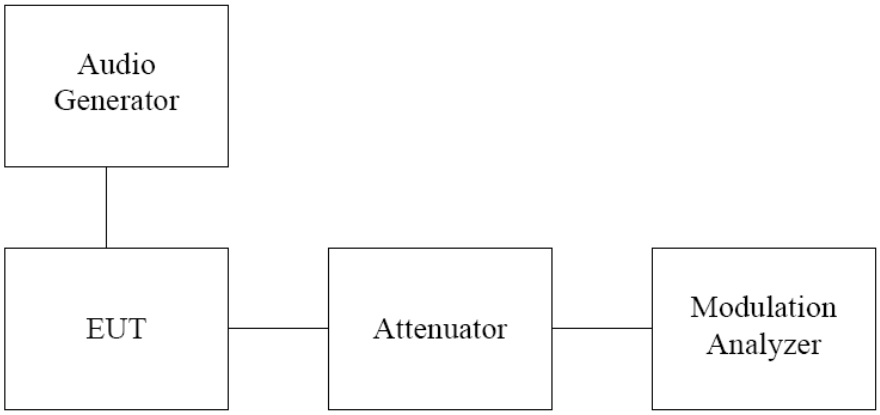
5.3 Audio Frequency Response

LIMIT

According to CFR 47 section 2.1047 a, for Voice modulation communication equipment, the frequency response of the audio modulation circuit over a range of 100 to 5000 Hz shall be measured.

According to CFR 47 section 74.861 e (1), any form of modulation may be used. A maximum deviation of ±75 KHz is permitted when frequency modulation is employed.

TEST CONFIGURATION



TEST PROCEDURE

1. The audio frequency response is the degree of the closeness to which the frequency deviation of the transmitter follows prescribed characteristics.

2. The frequency response of the audio modulation part is measured over a frequency range of 100Hz to 5000 Hz.

3. For 1000 Hz tone reference signal the audio generator level is adjusted to get 20% of the rated system deviation.

4. The deviations obtained over the frequency range from 100 HZ to 5000 Hz are recorded and compared with the reference deviation as follows:

Audio Frequency Response= 20 log (DEV freq/ Dev ref)

TEST RESULTS

Low Channel (682.35 MHz)

Frequency (Hz)	Deviation (KHz)
100	5.32
200	5.86
300	6.21
400	6.79
500	7.45
600	7.82
700	8.38
800	9.13
900	9.55
1000	10.42
1200	10.96
1400	**11.40**
1600	11.12
1800	10.75
2000	10.33
2400	9.65
2800	9.14
3200	8.82
3600	8.20
4000	7.54
4500	7.09
5000	6.43

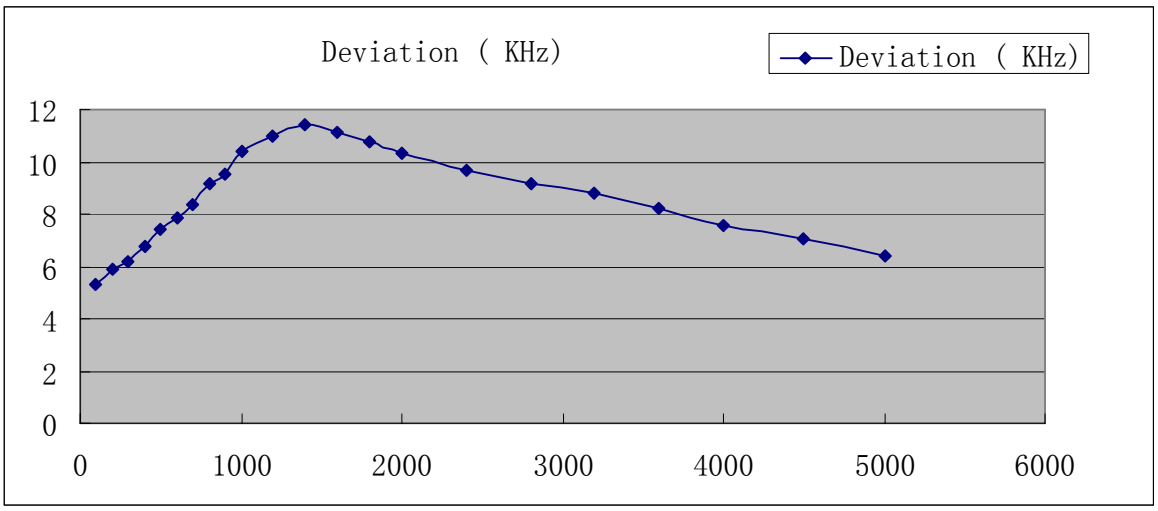
Middle Channel (690.10 MHz)

Frequency (Hz)	Deviation (KHz)
100	6.24
200	6.61
300	6.98
400	7.39
500	7.83
600	8.65
700	9.42
800	10.25
900	10.74
1000	11.11
1200	11.60
1400	**12.56**
1600	12.04
1800	11.82
2000	11.35
2400	10.46
2800	9.61
3200	8.82
3600	8.22
4000	7.68
4500	7.35
5000	6.55

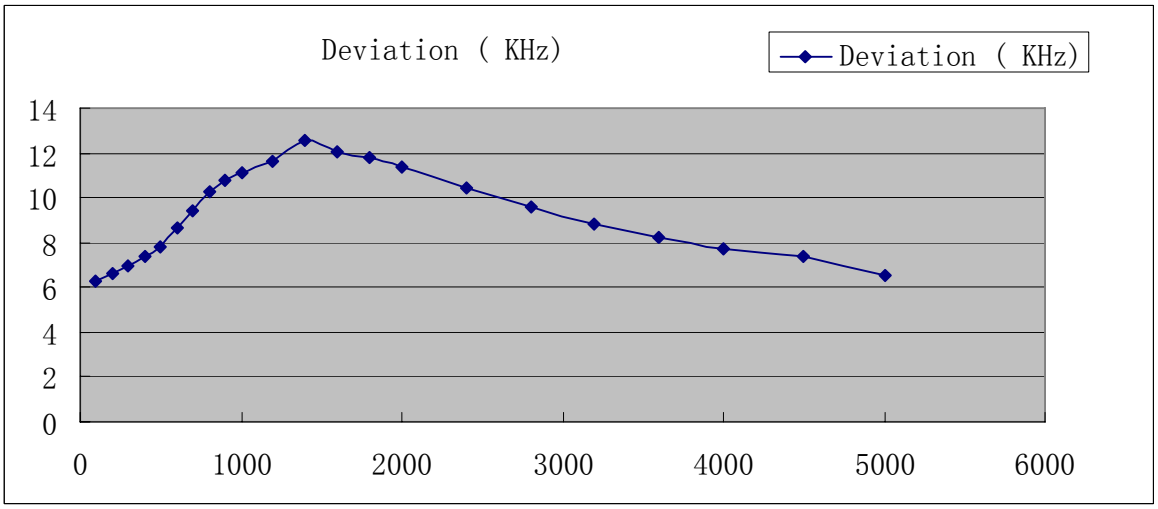
The High Channel (697.10 MHz)

Frequency (Hz)	Deviation (KHz)
100	5.85
200	6.14
300	6.69
400	7.45
500	7.83
600	8.32
700	8.90
800	9.56
900	10.01
1000	10.61
1200	11.23
1400	11.75
1600	**12.49**
1800	12.10
2000	11.83
2400	11.12
2800	10.66
3200	9.42
3600	8.85
4000	8.23
4500	7.50
5000	6.88

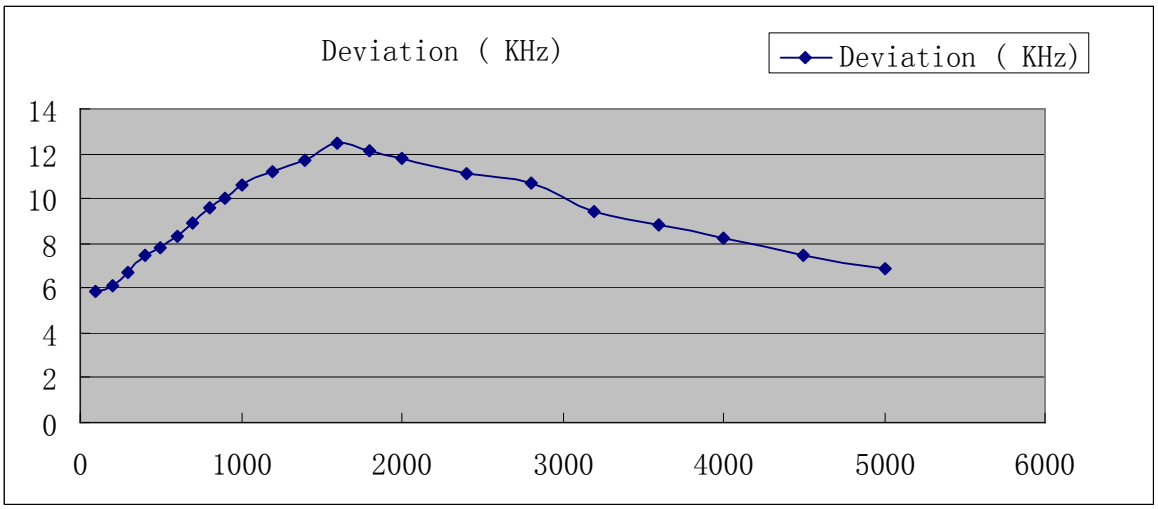
The Low Channel (682.35 MHz)



The Middle Channel (690.10 MHz)



The High Channel (697.10 MHz)



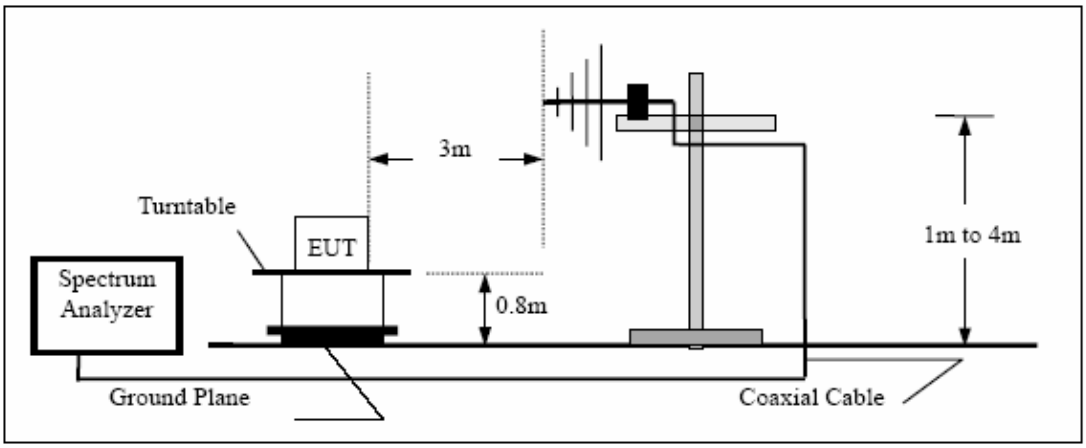
5.4 Occupied Bandwidth

LIMIT

According to CFR 47 section 74.861 e (5), the operating bandwidth shall no exceed 200 KHz.

Near the carrier an emission mask is defined by the standard.

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. Set EUT as normal operation.
3. Set SPA center frequency=fundamental frequency, RBW, VBW=1 KHz, Span=50 KHz.
4. Set SPA max. Hold. Mark peak, -26dB.

TEST RESULTS

1000 Hz Modulation

Frequency	Occupied Bandwidth	Limit
682.35 MHz	7.8 KHz	200 KHz
690.10 MHz	6.5 KHz	200 KHz
697.10 MHz	5.3 KHz	200 KHz

2500 Hz Modulation

Frequency	Occupied Bandwidth	Limit
682.35 MHz	9.1 KHz	200 KHz
690.10 MHz	8.4 KHz	200 KHz
697.10 MHz	7.9 KHz	200 KHz

5.5 Radiated Spurious Emission

LIMIT

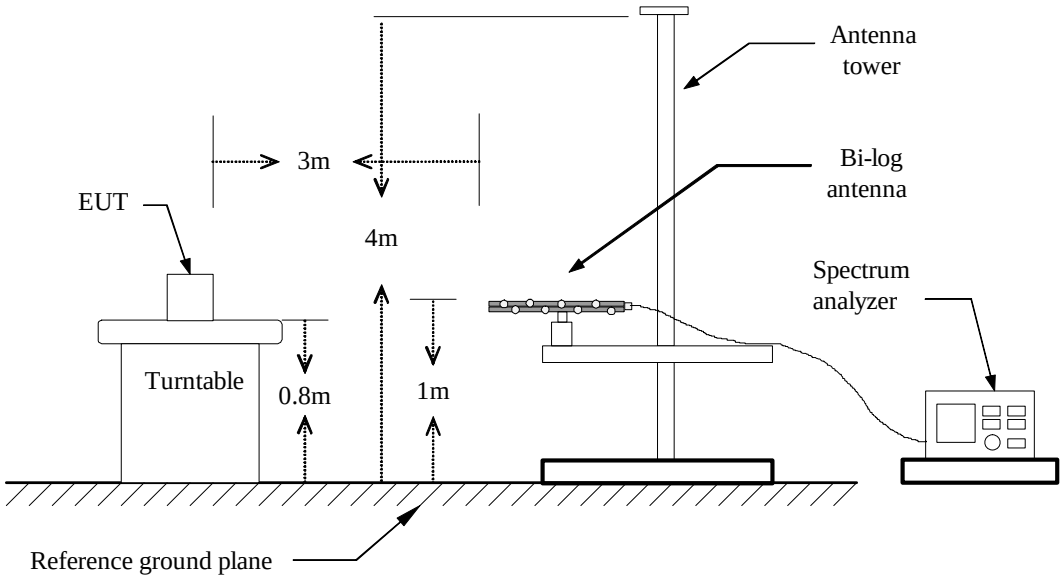
According to CFR 47 section 74.861 e (6), the mean power of emissions shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

(1) 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;

(2) 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;

(3) On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least 43+10log $_{10}$ *(mean output power in watts) dB;

TEST CONFIGURATION



TEST PROCEDURE

1. On a test site, the EUT shall be placed on a turntable and in the position closest to the normal use as declared by the user.

2. The test antenna shall be oriented initially for vertical polarization located 3m from the EUT to correspond to the transmitter.

3. 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.

4. 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.

5. The test antenna shall be raised and lowered through the specified range of height until the measuring receiver detects a maximum signal level.

6. The transmitter shall than be rotated through 360°in the horizontal plane, until the maximum signal level is detected by the measuring receiver.

7. The test antenna shall be raised and lowered again through the specified range of height until the measuring receiver detects a maximum signal level.

8. The maximum signal level detected by the measuring receiver shall be noted.

9. The measurement shall be repeated with the test antenna set to horizontal polarization.

10. Replace the antenna with a proper Antenna (substitution antenna).

11. 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.

12. The substitution antenna shall be connected to a calibrated signal generator.

13. If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.

14. The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.

15. 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.

16. 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.

17. The measurement shall be repeated with the test antenna and the substitution antenna oriented for horizontal polarization.

TEST RESULTS

Low Channel (682.35 MHz)

Frequency (MHz)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
110.51	H	-53.94	0.46	-2.02	-56.42	-13	-43.42
280.09	H	-69.09	0.81	5.32	-64.58	-13	-51.58
Other <1000	H				--	-13	>20
1362.50	H	-55.34	1.45	7.89	-48.90	-13	-35.90
2050.00	H	-55.16	1.34	10.35	-46.15	-13	-33.15
Other>1000	H				--	-13	>20
110.51	V	-49.88	0.46	-2.02	-52.36	-13	-39.36
280.09	V	-64.33	0.81	5.32	-59.82	-13	-46.82
Other <1000	V				--	-13	>20
1362.50	V	-42.68	1.45	7.89	-36.24	-13	-23.24
2050.00	V	-38.44	1.34	10.35	-29.43	-13	-16.43
Other>1000	V				--	-13	>20

Middle Channel (690.10 MHz)

Frequency (MHz)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
120.31	H	-51.69	0.51	-2.02	-54.22	-13	-41.22
280.51	H	-64.00	0.81	5.33	-59.48	-13	-46.48
Other <1000	H				--	-13	>20
1387.50	H	-54.71	1.51	8.03	-48.19	-13	-35.19
2075.00	H	-55.52	1.38	10.39	-46.51	-13	-33.51
Other>1000	H				--	-13	>20
116.25	V	-47.11	0.51	-2.02	-49.64	-13	-36.64
286.13	V	-47.98	0.81	5.33	-43.46	-13	-30.46
Other <1000	V				--	-13	>20
1387.50	V	-38.77	1.51	8.03	-32.25	-13	-19.25
2075.00	V	-35.79	1.38	10.39	-26.78	-13	-13.78
Other>1000	V				--	-13	>20

High Channel (697.10 MHz)

Frequency (MHz)	Antenna Polarization	S.G. (dBm)	Cable loss (dB)	Ant.Gain (dB)	Emission level (dBm)	Limit (dBm)	Margin (dB)
125.15	H	-52.46	0.52	-2.38	-55.36	-13	-42.36
285.32	H	-61.11	0.82	5.35	-56.58	-13	-43.58
Other <1000	H				--	-13	>20
1400.05	H	-52.14	1.51	8.03	-45.62	-13	-32.62
2087.50	H	-56.87	1.40	10.46	-47.81	-13	-34.81
Other>1000	H				--	-13	>20
120.32	V	-47.91	0.52	-2.38	-50.81	-13	-37.81
288.56	V	-52.75	0.82	5.35	-48.22	-13	-35.22
Other <1000	V				--	-13	>20
1400.05	V	-39.47	1.51	8.03	-32.95	-13	-19.95
2087.50	V	-37.52	1.40	10.46	-28.46	-13	-15.46
Other>1000	V				--	-13	>20

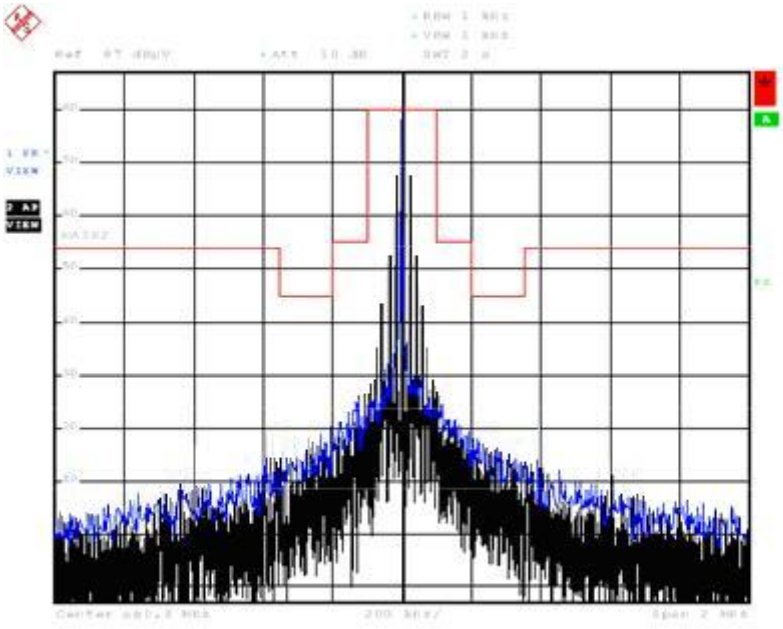
Notes:

(1) ERP= S.G Level-Cable Loss+Antenna Gain

(2) Data of measurement within this frequency range shown "-- " in the table above means the reading of emissions are attenuated more than 10dB below the permissible limits or the field strength is too small to be measured.

Maximum Transmitter Power (P)	-20.65 dBm
Require attenuation	$43+10\log_{10}$ (0.0000086)= 7.65 dB
Emission Limits	P-[$43+10\log_{10}$ (0.0000086)]= -13 dBm

Emission Mask:



The High Channel (690.10 MHz)

5.6 Frequency Stability vs. Temperature

LIMIT

According to CFR 47 section 74.861 e (4), the frequency tolerance of the transmitter shall be 0.005 percent.

TEST PROCEDURE

The EUT was connected to an external DC power supply and the RF output was connected to a frequency counter via feed through attenuators. The EUT was placed inside the temperature chamber. The DC leads and the RF output cable, exited the chamber through an opening made for that purpose.

After the temperature stabilized the frequency output was recorded form the counter.

RESULTS

The Low Channel (682.35 MHz)

Temperature (℃)	Frequency Error (K Hz)	Frequency Error (%)	Limit (%)
-30	-8.320	-0.00122	±0.005
-20	-7.590	-0.00111	±0.005
-10	-5.420	-0.00079	±0.005
0	-3.560	-0.00052	±0.005
10	-2.150	-0.00032	±0.005
20	-3.690	-0.00054	±0.005
30	-4.425	-0.00065	±0.005
40	-5.615	-0.00082	±0.005
50	-6.280	-0.00092	±0.005

The Middle Channel (690.10 MHz)

Temperature (℃)	Frequency Error (KHz)	Frequency Error (%)	Limit (%)
-30	-7.580	-0.00110	±0.005
-20	-6.490	-0.00094	±0.005
-10	-5.620	-0.00081	±0.005
0	-4.880	-0.00071	±0.005
10	-3.065	-0.00044	±0.005
20	-1.290	-0.00019	±0.005
30	-2.450	-0.00036	±0.005
40	-3.780	-0.00055	±0.005
50	-4.620	-0.00067	±0.005

The High Channel (697.10 MHz)

Temperature (℃)	Frequency Error (KHz)	Frequency Error (%)	Limit (%)
-30	-7.890	-0.00113	±0.005
-20	-6.420	-0.00092	±0.005
-10	-5.590	-0.00080	±0.005
0	-4.875	-0.00070	±0.005
10	-3.658	-0.00052	±0.005
20	-2.425	-0.00035	±0.005
30	-3.510	-0.00050	±0.005
40	-4.280	-0.00061	±0.005
50	-5.330	-0.00077	±0.005

5.7 Frequency Stability vs. Voltage

LIMIT

According to CFR 47 section 74.861 e (4), the frequency tolerance of the transmitter shall be 0.005 percent.

TEST PROCEDURE

An external variable DC power supply was connected to the battery terminals of the equipment under test.

For hand carried, battery powered equipment primary supply voltage was reduced to the battery operating end point as specified by the manufacturer. The output frequency was recorded for each battery voltage.

RESULTS

The Low Channel (682.35 MHz)

Voltage (V)	Frequency Error (Hz)	Frequency Error (%)	Limit (%)
3.0	1135	0.00017	±0.005
2.5	1450	0.00021	±0.005
2.0	1685	0.00025	±0.005
1.8	1790	0.00026	±0.005
--			

The Middle Channel (690.10 MHz)

Voltage (V)	Frequency Error (Hz)	Frequency Error (%)	Limit (%)
3.0	1285	0.00019	±0.005
2.5	1392	0.00020	±0.005
2.0	1556	0.00023	±0.005
1.8	1650	0.00024	±0.005
--			

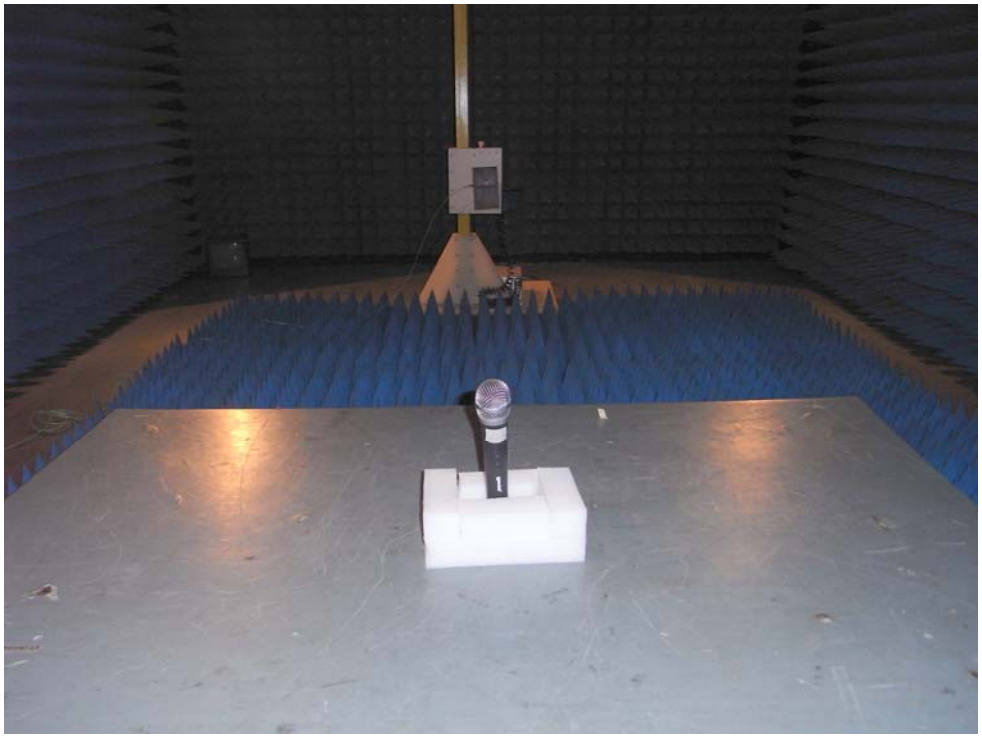
The High Channel (697.10 MHz)

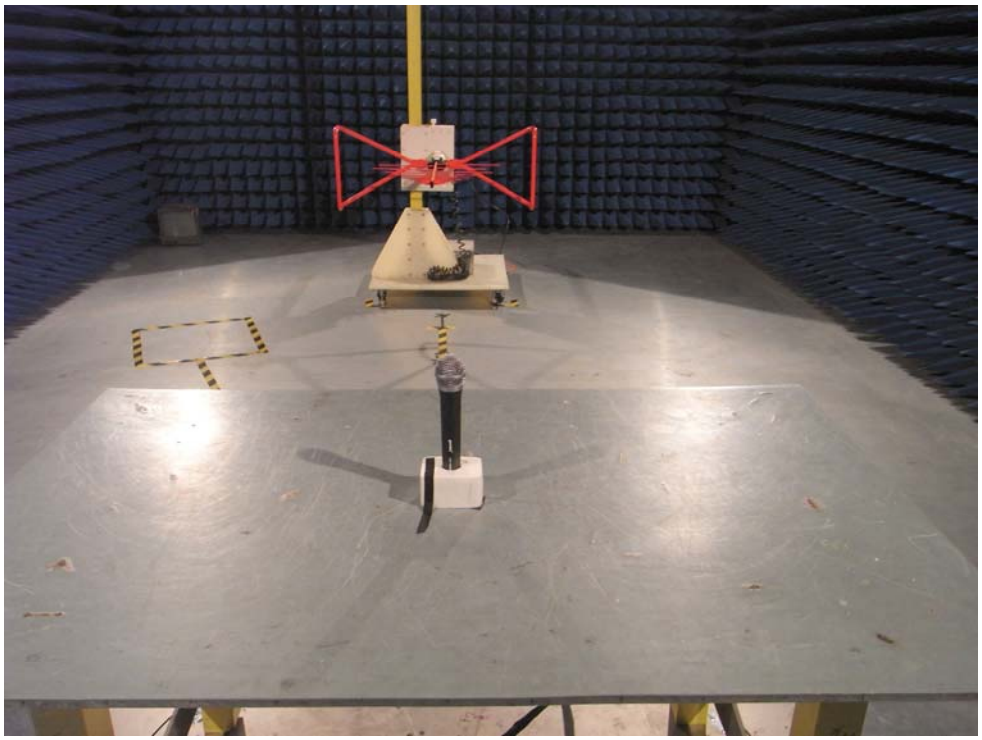
Voltage (V)	Frequency Error (Hz)	Frequency Error (%)	Limit (%)
3.0	1320	0.00019	±0.005
2.5	1465	0.00021	±0.005
2.0	1582	0.00023	±0.005
1.8	1715	0.00025	±0.005
--			

Annex A

Photographs of the Test Setup

Radio Emission Setup Photo





Annex B

Photographs of the EUT

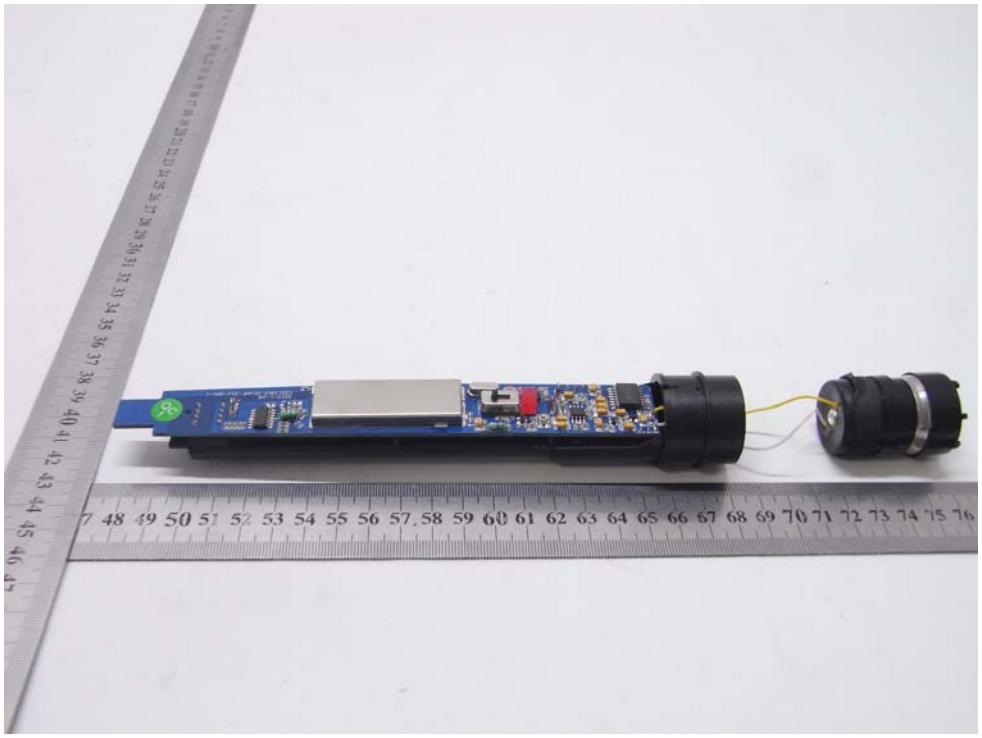
FRONT VIEW OF SAMPLE

BACK VIEW OF SAMPLE

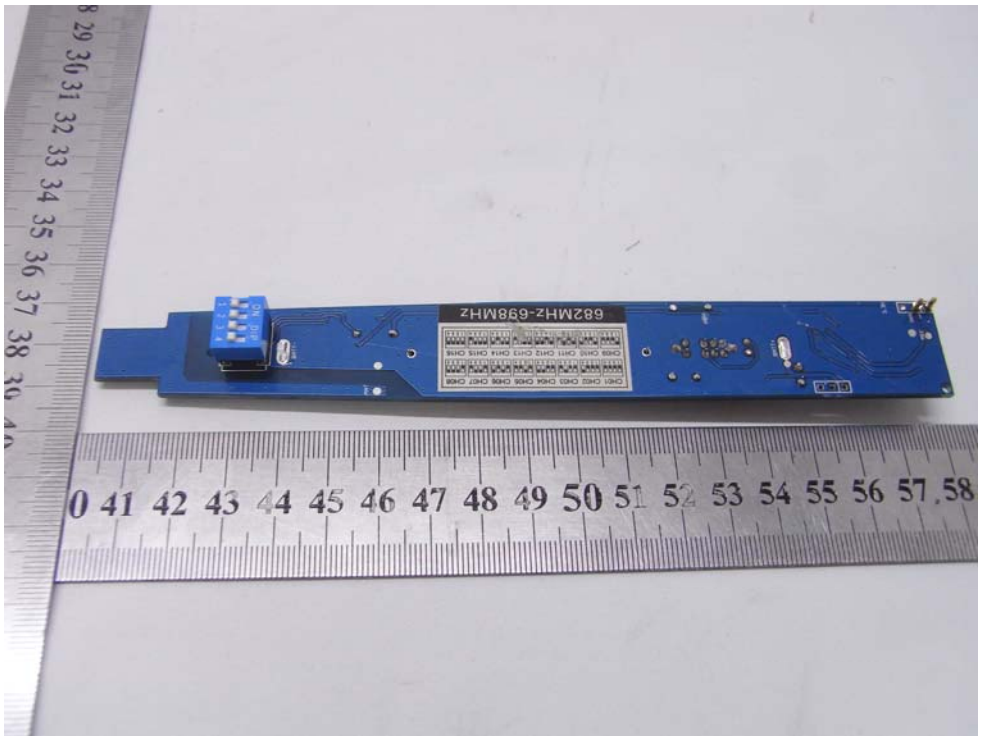
TOP VIEW OF SAMPLE

BOTTOM VIEW OF SAMPLE

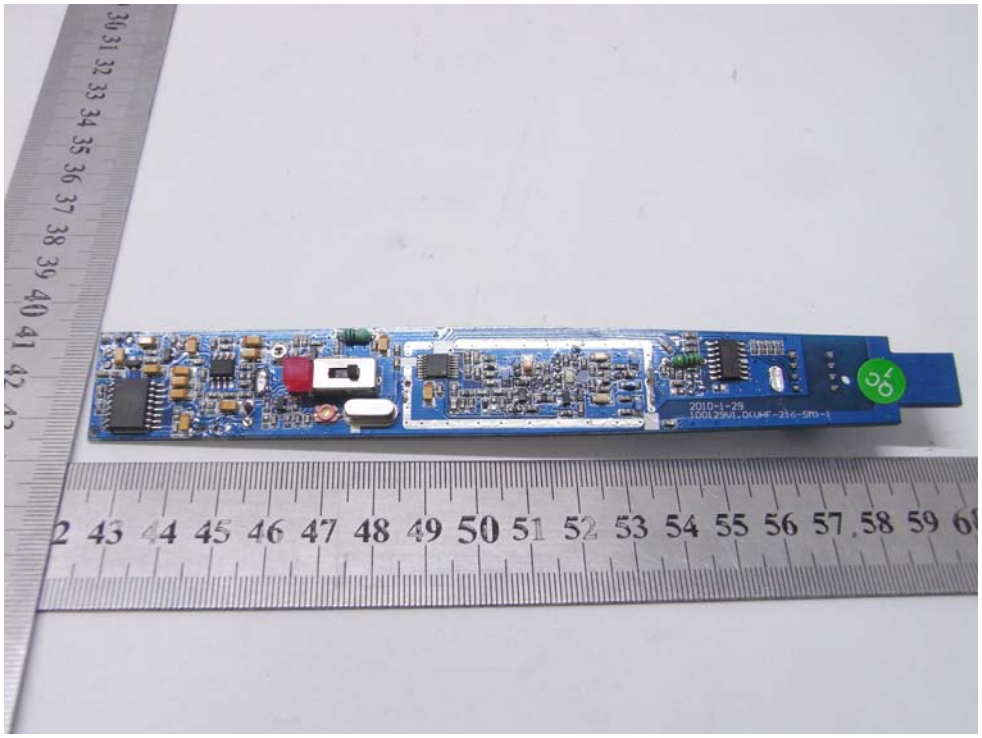
INTERNAL PHOTO OF SAMPLE – 1



INTERNAL PHOTO OF SAMPLE - 2



INTERNAL PHOTO OF SAMPLE - 3



*** End of the Reports***