Test Report of FCC Part 74 H for FCC Certificate

On Behalf of

MEDIACOM INTERNATIONAL (LLC)

Product description:	**WIRELESS MICROPHONE**
Model No.:	**RH-1112 CLMIC**
FCC ID:	**XWF-RH-1112**

Prepared for:	**MEDIACOM INTERNATIONAL (LLC)**
	P.O.BOX 52704 DUBAI U.A.E
Prepared by:	**Bontek Compliance Testing Laboratory Ltd.**
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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant:	**MEDIACOM INTERNATIONAL (LLC)**
Address of applicant:	P.O.BOX 52704 DUBAI U.A.E
Manufacturer:	**MEDIACOM INTERNATIONAL (LLC)**
Address of manufacturer:	P.O.BOX 52704 DUBAI U.A.E

General Description of E.U.T

Items	Description
EUT Description:	WIRELESS MICROPHONE
Trade Name:	N/A
Model No.:	RH-1112 CLMIC
FCC ID:	XWF-RH-1112
Rated Voltage	DC 3V from 2”AA” bettary.
Frequency Range	215.50MHz
Number of Channels	1
Frequency Tolerance:	±0.0016% (Limit: ±0.005%)
Communication Type:	Voice/Tone only
Modulation:	FM
Emission Type:	F3E
Emission Designator:	91K0F3E
Emission Bandwidth:	91 KHz (Limit: 200 KHz)
Necessary Bandwidth:	47.2KHz (2M+2DK, M=11, D=12.6, K=1)
Peak Frequency Deviation:	12.6 KHz (Limit<±75 KHz)
Audio Frequency Response:	11 KHz
Maximum Transmitter Power:	0.24 mW (Limit: 50 mW)
Output Power Modification:	Fixed can’t be change

** The test data gathered are from the production sample provided by the manufacturer.*

1.2 Test Standards

The following Declaration of Conformity report of EUT is prepared in accordance with

FCC Part 74,Subpart H Rules

The objective of the manufacturer is to demonstrate compliance with the described above standards.

1.3 Test Summary

Tests carried out under FCC Part 74,Subpart H:

Standard	Test Items	Application	Requirement	Result
Section 74.861 (e)	Disturbance Voltage at The Mains Terminals	N/A, without AC power supply	Refer to Section 15.207	Compliant
	Maximum Transmitter Power	√	less than 50mW	Compliant
	Peak Frequency Deviation	√	less than 75 KHz	Compliant
	Frequency Tolerance	√	less than 0.005%	Compliant
	Occupied Bandwidth	√	less than 200KHz	Compliant
	Unwanted Radiation	√	Refer to Section 74.861(e)-6	Compliant

√ Indicates that the test is applicable

1.4 Test Methodology

The radiated emission testing was performed according to the procedures of ANSI TIA/EIA 603 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057

The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

The maximum emission levels emanating from the device are compared to the FCC Part 74,Subpart H limits for radiation emissions and the measurement results contained in this test report show that EUT is to be technically compliant with FCC requirements.

All measurement required was performed at laboratory of Bontek Compliance Testing Laboratory Ltd at 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China

1.5 Test Facility

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

FCC – Registration No.: 338263

Bontek Compliance Testing Laboratory 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 338263, March 24, 2008.

1.6 Test Equipment List and Details

Items	Equipment	Manufacturer	Model No.	Serial No.	Last Cal	Calibration Period
1	EMI Test Receiver	R&S	ESCI	100687	2009/11	1 Year
2	EMI Test Receiver	R&S	ESPI7	100097	2009/11	1 Year
3	RF Communication Tester	HP	HP8920B	US35010135	2009/5	1 Year
4	Amplifier	HP	8447D	1937A02492	2009/11	1 Year
5	Signal Generator	IFR	2032	203002/105	2009/11	1 year
6	Audio Signal Generator	MEI LI	MAG-203D	200609175	2009/11	1 year
7	3 phase Artificial Mains（L.I.S.N）	SCHWARZBECK	NSLK 8128	8128247	2009/11	1 Year
8	TRILOG Broadband Test-Antenna	SCHWARZBECK	VULB9163	9163-324	2009/11	1 Year
9	Horn Antenna	SCHWARZBECK	BBHA9120A	D69250	2009/11	1 Year
10	Loop Antenna	DAZE	ZN30900A	8411	2009/11	1 Year
11	High Field Biconical Antenna	ELECTRO-METRICS	EM-6913	166	2009/11	1 Year
12	Log Periodic Antenna	ELECTRO-METRICS	EM-6950	811	2009/11	1 Year
13	Remote Active Vertical Antenna	ELECTRO-METRICS	EM-6892	304	2009/11	1 Year
14	Power Clamp	SCHWARZBECK	MDS-21	3812	2009/11	1 Year
15	Single Power Conductor Module	FCC	FCC-LISN-5-50-1-01-CISPR25	07102	2009/11	1 Year
16	Teo Line Single Phase Module	FCC	FCC-LISN-50-25-2-01	06061	2009/11	1 Year
17	Electrostatic Discharge Simulator	TESEQ	NSG437	125	2009/11	1 Year
18	EFT/Surge/ Dips Simulator	SCHAFFNER	MODULA6150	34572	2009/11	1 Year
19	Fast Transient Noise Simulator	Noiseken	FNS-105AX	31485	2009/11	1 Year
20	Capacitive Coupling Clamp	TESEQ	CDN8014	25096	2009/11	1 Year
21	Power Frequency Magnetic Field Generator	EVERFINE	EMS61000-8K	608002	2009/11	1 Year
22	Temperature & Humidity Chamber	WUHUAN	HTP205	20021115	2009/11	1 Year

2 - SYSTEM TEST CONFIGURATION

2.1 Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

2.2 EUT Exercise Software

The EUT exercising program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software offered by manufacture, can let the EUT being normal operation.

2.3 Equipment Modifications

The EUT tested was not modified by Bontek.

3- MAXIMUM TRANSMITTER POWER

3.1 Provisions Applicable

According to FCC Part 74 Section 74.861(e) – 1: The power of the measured unmodulated carrier power at the output of the transmitter power amplifier may not exceed 50mW

3.2 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). 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 measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for the gain of the substitution antenna if necessary.

3.3 Basic Test Setup Block Diagram

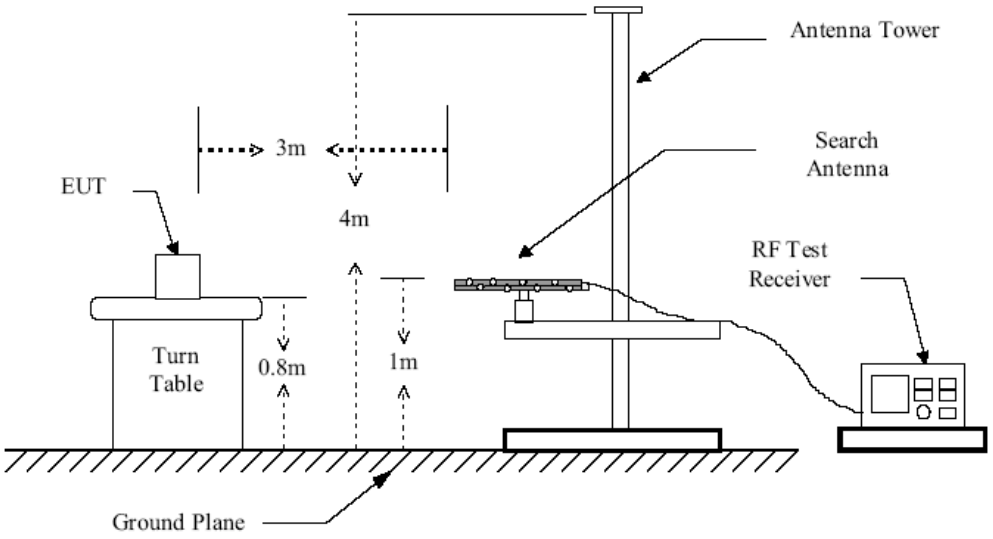


Figure 1 : Frequencies measured below 1 GHz configuration

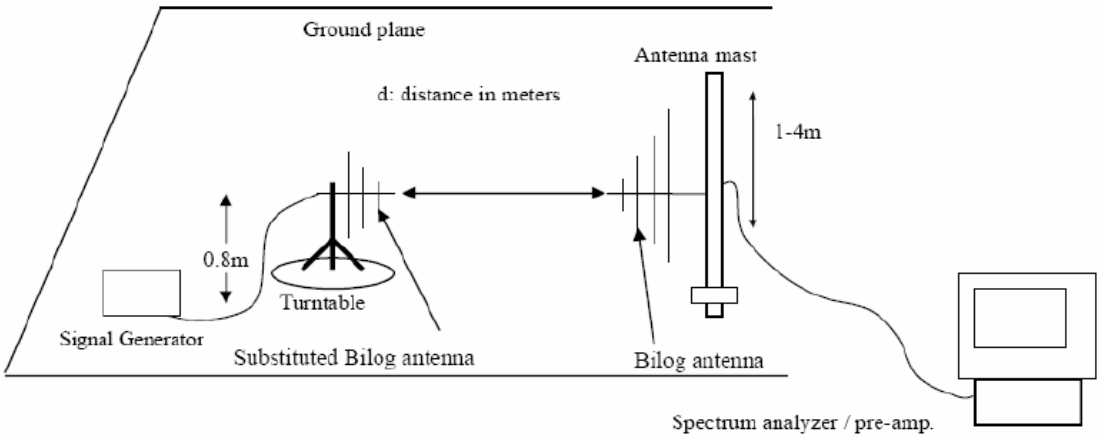


Figure 3: Substitution Method

3.4 Radiated Emissions Test Result

Temperature (℃) : 22~23	EUT: WIRELESS MICROPHONE
Humidity (%RH): 50~54	M/N: RH-1112 CLMIC
Barometric Pressure (mbar): 950~1000	Operation Condition: Continuous transmit

Test plots see following pages

Channel Frequency (MHz)	Effective Radiated Power		Limit (W)	Margin (W)
	(dBm)	(W)		
215.50	-6.2	0.00024	0.05	-0.0498

4- MODULATION CHARACTERISTICS

4.1 Provisions Applicable

a).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 5000Hz shall be measured.

b). According to CFR 47 section 74.861(e)-3, any form of modulation may be used. A maximum deviation of ± 75 KHz is permitted when frequency modulation is employed.

4.2 Test Procedure

4.2.1 Modulation Limit

1). Configure the EUT as shown in figure 1, adjust the audio input for 60% of rated system deviation at 1KHz using this level as a reference (0dB) and vary the input level from –20 to +20dB. Record the frequency deviation obtained as a function of the input level.

2). Repeat step 1 with input frequency changing to 300,1000,3000, and 14000Hz in sequence.

4.2.2 Audio Frequency Response

1). Configure the EUT as shown in figure 1.

2). Adjust the audio input for 20% of rated system deviation at 1 KHz using this level as a reference (0 dB).

3). Vary the Audio frequency from 100 Hz to 30 KHz and record the frequency deviation.

4.3 Basic Test Setup Block Diagram

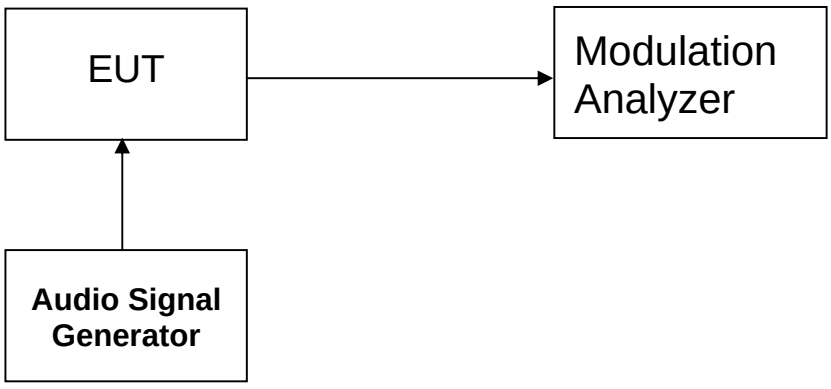


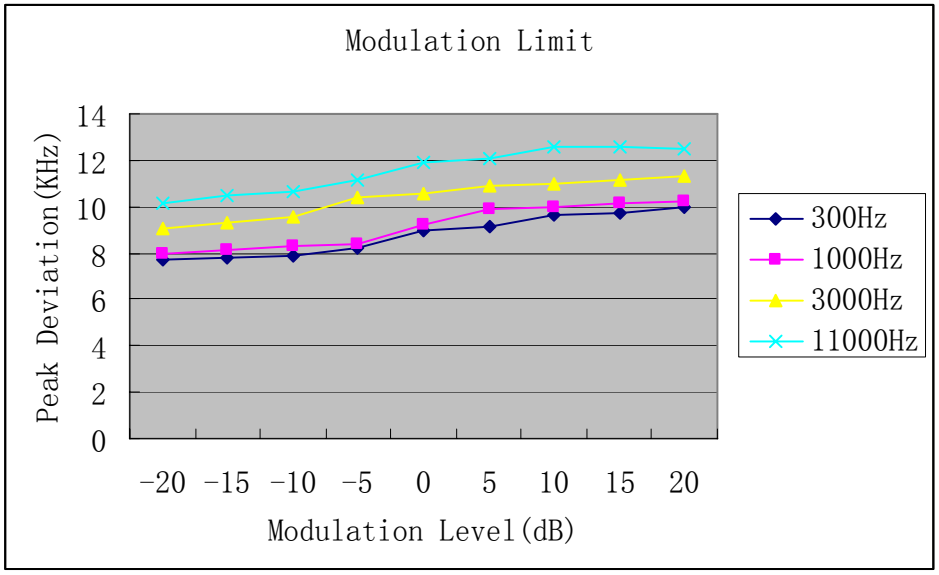
Figure 1: Modulation characteristic measurement configuration

4.4 Measurement Result

Temperature (℃) : 22~23	EUT: WIRELESS MICROPHONE
Humidity (%RH): 50~54	M/N: RH-1112 CLMIC
Barometric Pressure (mbar): 950~1000	Operation Condition: Continuous transmit

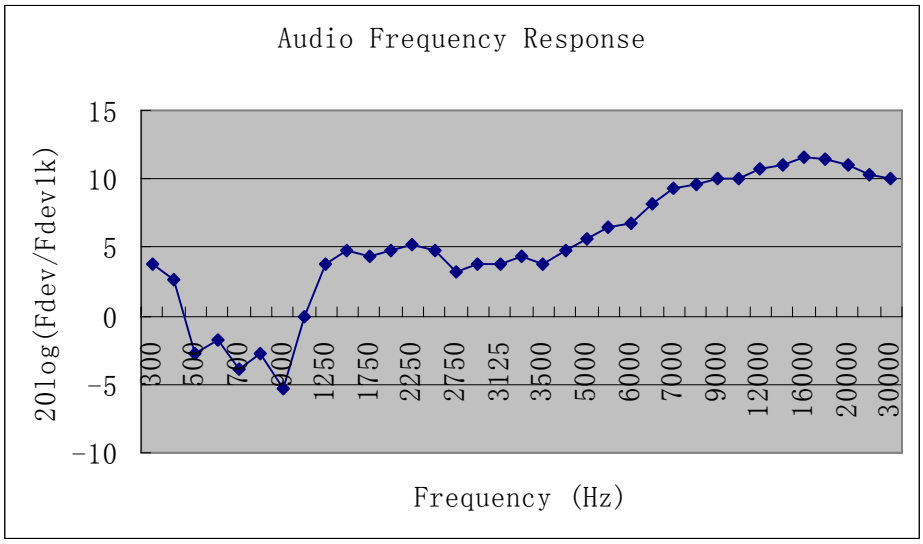
Test Result of Modulation Limit

Modulation Level (dB)	Peak Freq. Deviation At 300 Hz (KHz)	Peak Freq. Deviation At 1000 Hz (KHz)	Peak Freq. Deviation At 3000 Hz (KHz)	Peak Freq. Deviation At 11000 Hz (KHz)
-20	7.738	7.960	9.057	10.140
-15	7.765	8.119	9.279	10.518
-10	7.890	8.275	9.545	10.669
-5	8.247	8.343	10.380	11.147
0	8.971	9.247	10.560	11.875
+5	9.134	9.866	10.875	12.080
+10	9.644	9.978	11.002	12.600
+15	9.713	10.110	11.170	12.590
+20	9.940	10.214	11.331	12.473



Test Result of Audio Frequency Response

Frequency (Hz)	Deviation (KHz)	20Log(Fdev/Fdev at 1K)
300	1.7	3.78
400	1.5	2.69
500	0.8	-2.77
600	0.9	-1.74
700	0.7	-3.93
800	0.8	-2.77
900	0.6	-5.26
1000	1.1	0.00
1250	1.7	3.78
1500	1.9	4.75
1750	1.8	4.28
2000	1.9	4.75
2250	2	5.19
2500	1.9	4.75
2750	1.6	3.25
3000	1.7	3.78
3125	1.7	3.78
3250	1.8	4.28
3500	1.7	3.78
4000	1.9	4.75
5000	2.1	5.62
5500	2.3	6.41
6000	2.4	6.78
6500	2.8	8.12
7000	3.2	9.28
8000	3.3	9.54
9000	3.5	10.05
10000	3.5	10.05
12000	3.8	10.77
14000	3.9	10.99
16000	4.2	11.64
18000	4.1	11.42
20000	3.9	10.99
25000	3.6	10.30
30000	3.5	10.05


Audio Frequency Response
20log(Fdev/Fdev1k)
15
10
5
0
-5
-10
300
500
700
900
1250
1750
2250
2750
3125
3500
5000
6000
7000
9000
12000
16000
20000
30000
Frequency (Hz)

5- FREQUENCY TOLERANCE

5.1 Provisions Applicable

a). According to FCC Part 2 Section 2.1055(a)(1), the frequency stability shall be measured with variation of ambient temperature from –30℃ to +50℃ centigrade.

b). According to FCC Part 2 Section 2.1055(d)(2), for hand carried battery powered equipment, the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point, which is specified by the manufacture.

c). According to FCC Part 74 Section 74.861(e)-4, the frequency tolerance must be maintained within 0.005%.

5.2 Test Procedure

5.2.1 Frequency stability versus environmental temperature

1). Setup the configuration per figure 1 for frequencies measurement inside an environment chamber, Install new battery in the EUT.

2). Turn on EUT and set SA center frequency to the EUT radiated frequency. Set SA Resolution Bandwidth to 1KHz and Video Resolution Bandwidth to 1KHz and Frequency Span to 50KHz. Record this frequency as reference frequency.

3). Set the temperature of chamber to 50℃. 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 10℃ decreased per stage until the lowest temperature -30℃ is measured, record all measured frequencies on each temperature step.

5.2.2 Frequency stability versus input voltage

1). Setup the configuration per figure 1 for frequencies measured at temperature if it is within 15 ℃ to 25℃. Otherwise, an environment chamber set for a temperature of 20℃ shall be used. Install new battery in the EUT.

2). Set SA center frequency to the EUT radiated frequency. Set SA Resolution Bandwidth to 1KHz and Video Resolution Bandwidth to 1KHz. Record this frequency as reference frequency.

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

5.3 Basic Test Setup Block Diagram

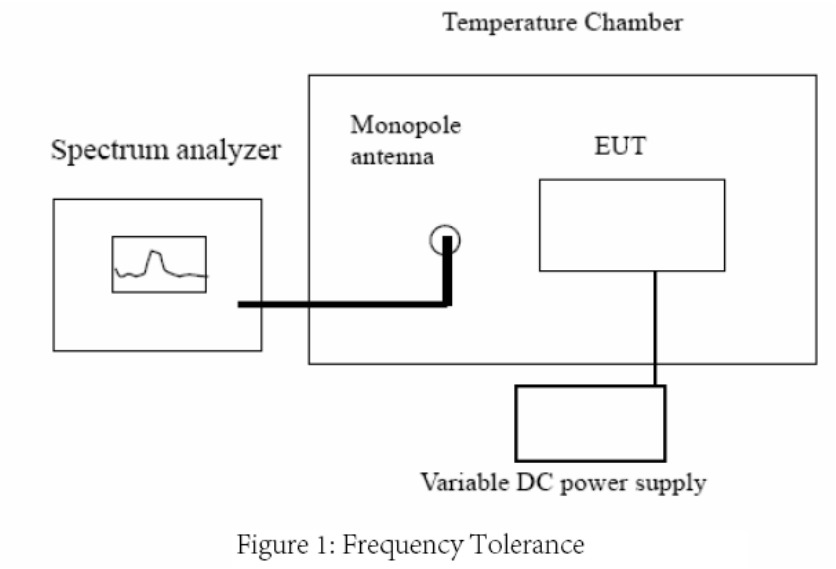


Figure 1: Frequency Tolerance

5.4 Measurement Result

Temperature (℃) : 22~23	EUT: WIRELESS MICROPHONE
Humidity (%RH): 50~54	M/N: RH-1112 CLMIC
Barometric Pressure (mbar): 950~1000	Operation Condition: Continuous transmit

Test result of frequency stability versus environmental temperature

Reference Frequency: 215.496 MHz		Limit: ±0.005%	
Environment Temperature (℃)	Power Supply	Frequency deviation measured with time Elapse (30 minutes)	
		(MHz)	%
50	New Battery	215.49833	0.0011
40	New Battery	215.49878	0.0013
30	New Battery	215.49600	0
20	New Battery	215.49904	0.0014
10	New Battery	215.49890	0.0013
0	New Battery	215.49907	0.0014
-10	New Battery	215.49930	0.0015
-20	New Battery	215.49939	0.0016
-30	New Battery	215.49935	0.0016

6- OCCUPIED BANDWIDTH

6.1 Provisions Applicable

According to FCC Part 74 Section 74.861(e)-5: The operation bandwidth shall not exceed 200 KHz

6.2 Test Procedure

1). The EUT was placed on a turn table 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 =200 KHz.

4). Set SPA Max hold. Mark peak, -26dB.

6.3 Basic Test Setup Block Diagram

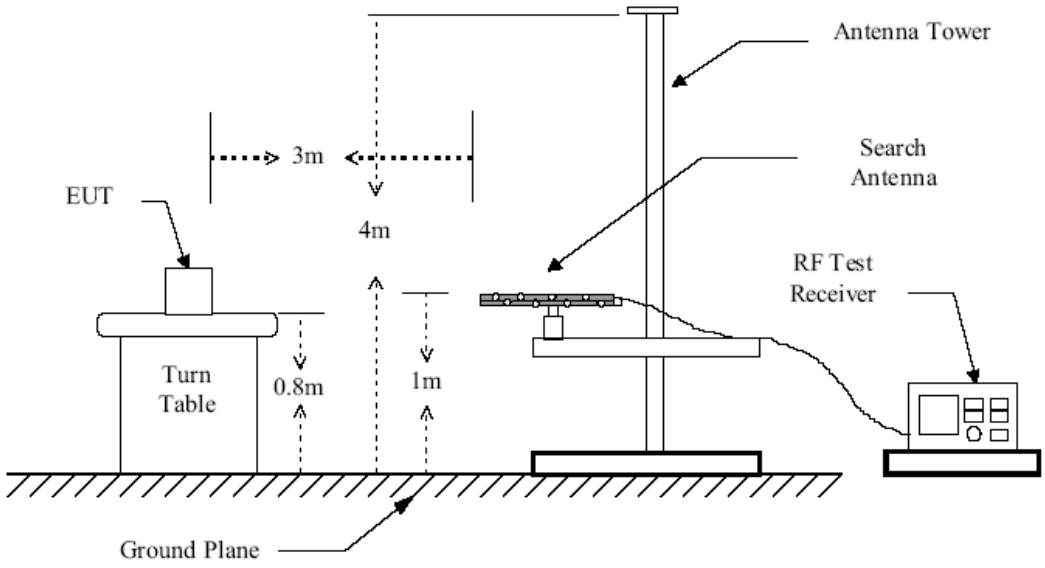


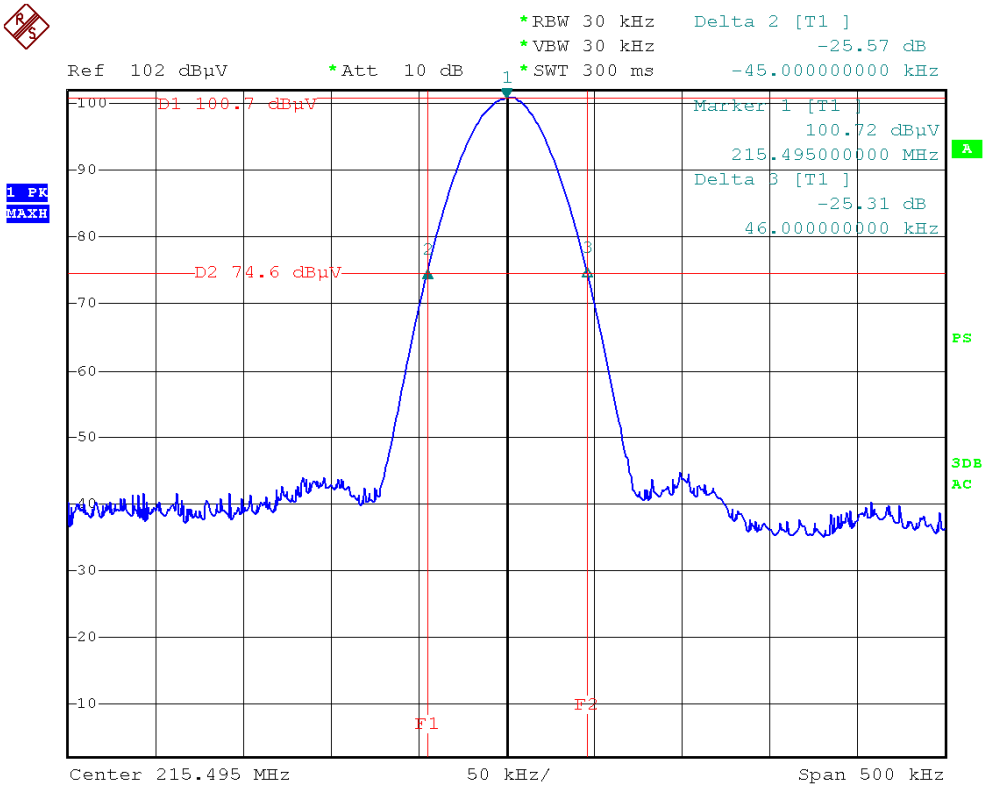
Figure 1 : Frequencies measured below 1 GHz configuration

6.4 Measurement Result

Temperature (℃) : 22~23	EUT: WIRELESS MICROPHONE
Humidity (%RH): 50~54	M/N: RH-1112 CLMIC
Barometric Pressure (mbar): 950~1000	Operation Condition: Continuous transmit

Test plots see following pages

Channel	Measured occupied bandwidth (KHz)	Limit (KHz)
215.495MHz	91	200



7- UNWANTED RADIATION

7.1 Provisions Applicable

According to 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 form the operating frequency by more than 250 percent of the authorized bandwidth: at least 43 + 10 log (TP) dB

7.2 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). 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 measure of the effective radiated power is the larger of the two levels recorded, at the input to the substitution antenna, corrected for the gain of the substitution antenna if necessary.

7.3 Basic Test Setup Block Diagram

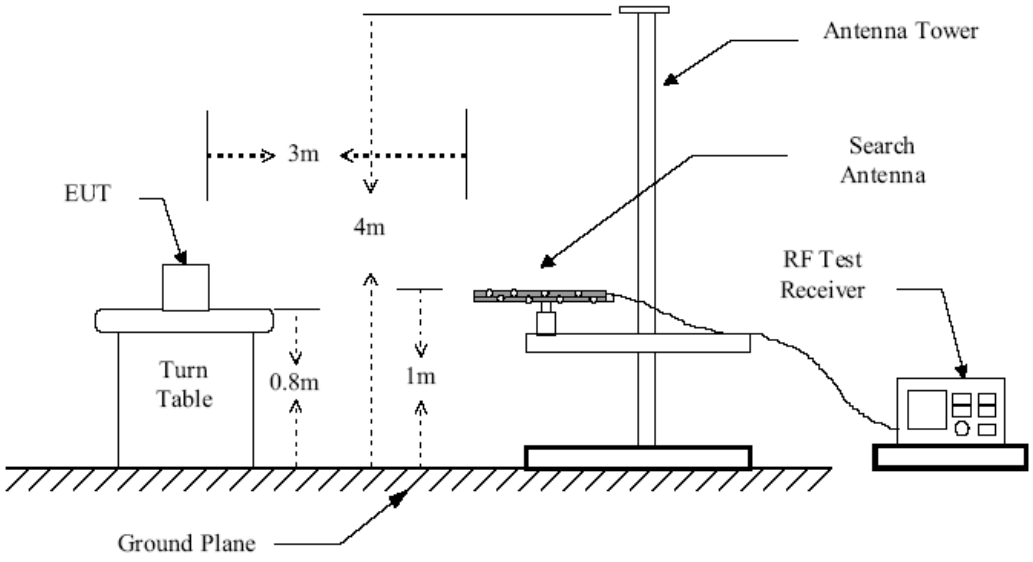


Figure 1 : Frequencies measured below 1 GHz configuration

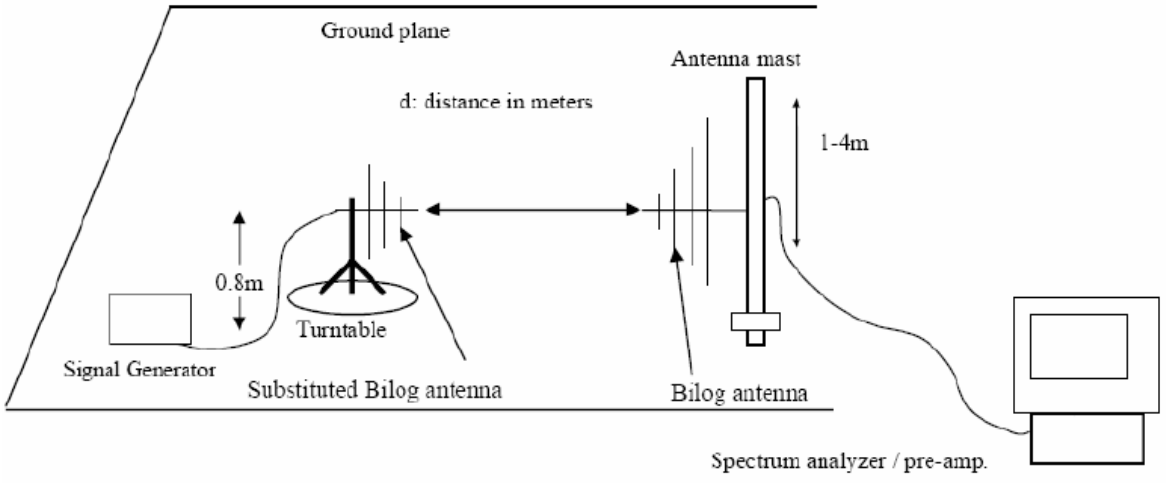
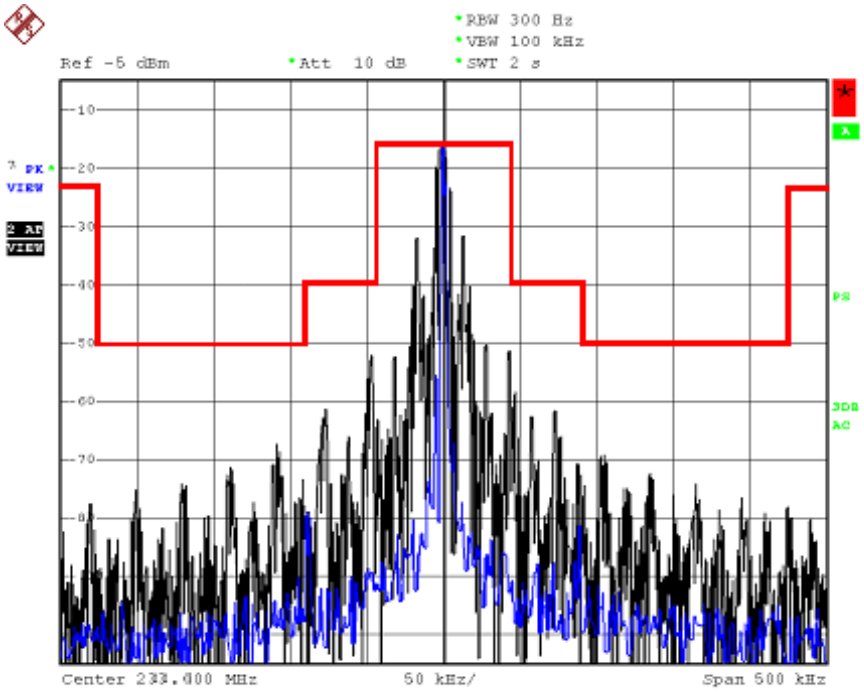


Figure 3: Substitution Method

7.4 measurement result

Temperature (℃) : 22~23	EUT: WIRELESS MICROPHONE
Humidity (%RH): 50~54	M/N: RH-1112 CLMIC
Barometric Pressure (mbar): 950~1000	Operation Condition: Continuous transmit

Test Result of Emission Mask



Test Result of Tx spurious Emissions

Frequency (MHz)	Effective Radiated Power (dBm)	Limit (dB)	Margin (dB)
53.2800	-48.94	6.80	-55.74
107.6000	-46.30	6.80	-53.1
196.8400	-20.33	6.80	-27.13
233.7000	-36.70	6.80	-43.5
431.0000	-26.45	6.80	33.25
646.5000	-31.49	6.80	38.29
862.0000	-33.28	6.80	40.08
891.3600	-35.05	6.80	41.85
951.5000	-32.27	6.80	39.07
1077.5000	-35.70	6.80	42.50
1293.0000	-36.68	6.80	43.48
1508.5000	-38.39	6.80	45.19
1724.0000	-39.90	6.80	46.70
1939.5000	-38.21	6.80	45.01
2155.0000	-39.26	6.80	46.06