

# **FCC PART 74 TEST REPORT**

*For*

**UHF Wireless Microphone -Transmitter**

**Model Number:**

**M2400, M1200, M2000, M4000,  
M4800, M8000, M95, M96, M326, M327**

**Brand Name: DIFAN**

**FCC ID: YE2M2400**

**Report No.: AGC01661001GZ01-2E5**

**Date of Issue: Apr.27, 2010**

*Prepared For*

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## VERIFICATION OF COMPLIANCE

Applicant:	ENPING DIFAN ELECTRONICS CO., LTD NO.7 & 8 OF DISTRICT A, ENPING FOREIGN AND PRIVATE CAPITAL INDUSTRIAL DISTRICT, ENPING, GUANGDONG, CHINA
Manufacturer:	ENPING DIFAN ELECTRONICS CO., LTD NO.7 & 8 OF DISTRICT A, ENPING FOREIGN AND PRIVATE CAPITAL INDUSTRIAL DISTRICT, ENPING, GUANGDONG, CHINA
Product Description:	UHF WIRELESS MICROPHONE-TRANSMITTER
Brand Name:	DIFAN
Model Number:	M2400, M1200, M2000, M4000, M4800, M8000, M95, M96, M326, M327
Model Difference:	THEY HAVE THE SAME PCB, BUT MODEL NAME IS DIFFERENCE, THE TEST IS BASE AT M2400
FCC ID:	YE2M2400
Report Number:	AGC01661001GZ01-2E5
Date of Test:	Apr.18, 2008~ Apr.27, 2010

### We hereby certify that:

The report for the equipment was prepared by Shenzhen Attestation Of Global Compliance Science & Technology Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in TIA/EIA 603; ANSI C 63.4:2009 and the sample tested as described in this report is in compliance with the FCC Rules Part 74 Subpart H. The test results of this report relate only to the tested sample identified in this report.

Checked By: Jekey Zhang  
Jekey Zhang Apr.27, 2010

Authorized By King Zhang  
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## 1. GENERAL INFORMATION

### 1.1 PRODUCT DESCRIPTION

The EUT is a Wireless Microphone designed as Low Power Auxiliary Stations for transmitting voice only. It is designed by way of utilizing the FM modulation achieves the system operating.

A major technical description of EUT is described as following:

Communication Type	Voice / Tone only
Modulation	FM
Emission Type	F3E
Emission Designator	121K4F3E (2M+2DK, M=12, D=48.72, K=1, Necessary Bandwidth = 121.44 KHz)
Emission Bandwidth	145.72 KHz
Peak Frequency Deviation	48.72KHz
Audio Frequency Deviation	12 KHz
Maximum Output Power	4.111 mW
Output Power Modification	Fixed can't be changed
Antenna Designation	Integral
Power Supply	DC 3V by battery
Operation Frequency Range and Channel	Frequency Range: 575-600MHz
	Channel: Top Channel:599.750MHz, Middle Channel: 587.500 MHz, Bottom Channel: 575.000MHz
Frequency Tolerance	0.000596%

## **1.2 RELATED SUBMITTAL(S) / GRANT (S)**

This submittal(s) (test report) is intended for FCC ID: **YE2M2400** filing to comply with the FCC Part 74, Subpart H Rules.

## **1.3 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

## **1.4 TEST FACILITY**

The test site used to collect the radiated data is located on the address of Shenzhen EMTEK Technology Co., Ltd. The test site is 3m anechoic chamber and calibrated to meet the FCC requirements in documents ANSI C63.4: 2009.

## **1.5 SPECIAL ACCESSORIE**

Not available for this EUT intended for grant.

## **1.6 EQUIPMENT MODIFICATIONS**

Not available for this EUT intended for grant.

## **1.7 DIFFERENCES BETWEEN MODELS**

Not available for this EUT intended for grant.

## 2. SYSTEM TEST CONFIGURATION

### 2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commission's requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### 2.2 EUT EXERCISE

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

### 2.3 GENERAL TECHNICAL REQUIREMENTS

- a) Section 74.861 (e) - 1: Maximum transmitter power less than 250mW
- b) Section 74.861 (e) - 3: Peak Frequency Deviation less than  $\pm 75$  KHz
- c) Section 74.861 (e) - 4: Frequency Tolerance less than 0.005%
- d) Section 74.861 (e) - 5: Emission Bandwidth shall less than 200 KHz
- e). Section 74.861 (e) - 6: Unwanted radiation

According to Section 74.861 (e) – 6, the mean power of emission shall be attenuated below the mean output power of the transmitter in accordance with the following schedule:

- 1). At least 25 dB on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth.
- 2). At least 35 dB on any frequency removed from the center of the authorized bandwidth by more than 100% up to and including 250% of the authorized bandwidth.
- 4). At least  $43 + 10 \log_{10}(T)$  dB on any frequency removed from the center of the authorized bandwidth by more than 250%

### 2.4 CONFIGURATION OF TESTED SYSTEM

Fig. 2-1 Configuration of Tested System



Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
1.	UHF Wireless Microphone	DIFAN	M2400	YE2M2400	N/A	EUT
--	--	--	--	--	--	--
--	--	--	--	--	--	--

### 3. SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§74.861 (e)-1	Carrier Power	Compliant
§74.861 (e)-3	Frequency Deviation	Compliant
§74.861 (e)-4	Frequency Tolerance	Compliant
§74.861 (e)-5	Operating Bandwidth	Compliant
§74.861 (e)-6	Unwanted Radiation	Compliant

### 4. DESCRIPTION OF TEST MODES

The EUT (Wireless Microphone) has been tested under normal operating condition. Three channels (the bottom channel, the middle channel and the top channel) have been chosen for testing. On each channel three axes have been evaluated for radiated emission.



## **5. MAXIMUM TRANSMITTER POWER**

### **5.1 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

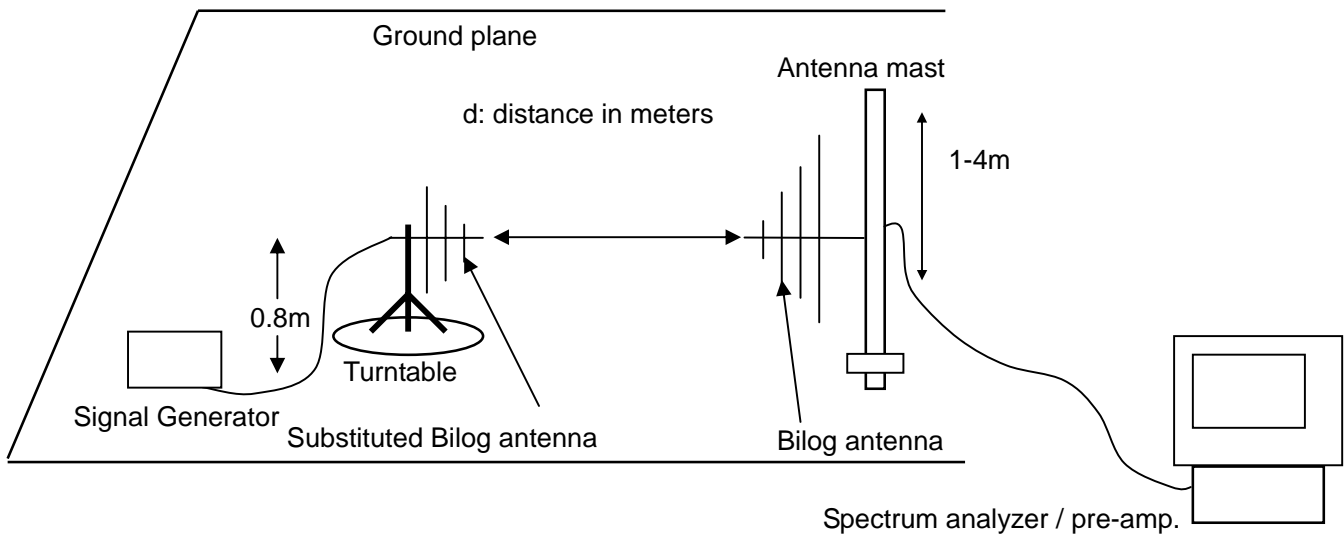
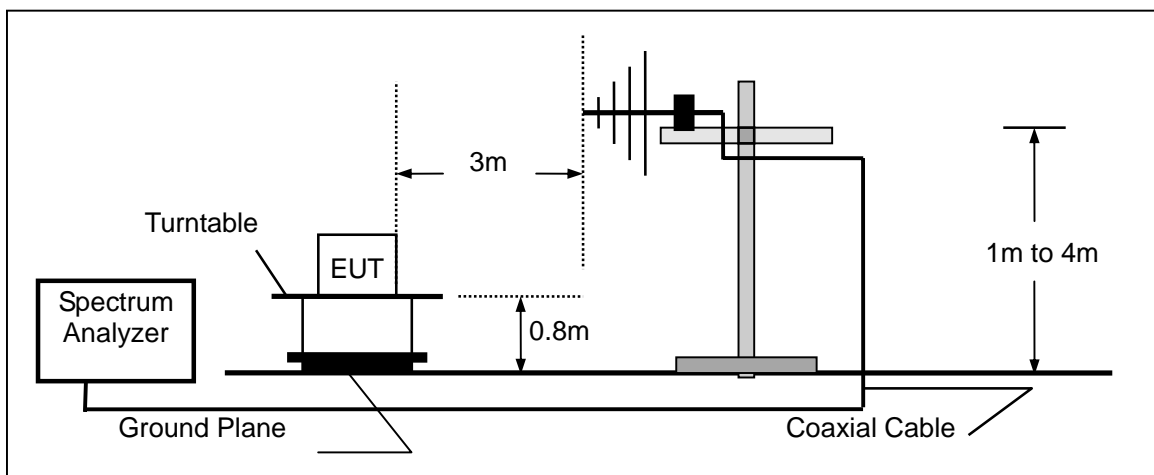
### **5.2 MEASUREMENT PROCEDURE**

- 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 then 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.

### 5.3 TEST SETUP BLOCK DAIGRAM

TEST SETUP OF SUBSTITUTION METHOD



#### 5.4 MEASUREMENT EQUIPMENT USED

EQUIPMENT TYPE	MFR	MODEL NO.	SERIAL NO.	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSEM30	849720/019	05/29/2009	05/29/2010
Amplifier	H.P.	8449B	3008A00277	05/29/2009	05/29/2010
Horn Antenna	Sunol Sciences	DRH-118	A052604	05/29/2009	05/29/2010
EMI Test Receiver	Rohde & Schwarz	ESCI	100028	05/29/2009	05/29/2010
Amplifier	H.P.	HP8447E	1937A01046	05/29/2009	05/29/2010

#### 5.5 TEST RESULT

**Test was performed on 575.000 MHz**

Freq. (MHz)	Antenna Polarity	Reading (dBm)	Total Factor (dB)	Corrected Power		Limit
				(dBm)	(mW)	(mW)
575.000	V	-22.12	32.47	5.72	3.733	250
575.000	H	-26.05	32.19	6.14	4.111	250

**Test was performed on 587.500 MHz**

Freq.	Antenna	Reading	Total Factor	Corrected Power		Limit
(MHz)	Polarity	(dBm)	(dB)	(dBm)	(mW)	(mW)
587.500	V	-29.15	34.56	5.41	3.475	250
587.500	H	-29.56	35.57	6.01	3.990	250

**Test was performed on 599.750 MHz**

Freq.	Antenna	Reading	Total Factor	Corrected Power		Limit
(MHz)	Polarity	(dBm)	(dB)	(dBm)	(mW)	(mW)
599.750	V	-27.74	33.37	5.63	3.656	250
599.750	H	-26.87	32.86	5.99	3.972	250

## 6. MODULATION CHARACTERISTICS

### 6.1 PROVISIONS APPLICABLE

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

### 6.2 MEASUREMENT METHOD

#### 6.2.1 MODULATION LIMIT

- Configure the EUT as shown in figure 6-1, 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  $+20$ dB. Record the frequency deviation obtained as a function of the input level.
- Repeat step 1 with input frequency changing to 300, 1000, 3000, and 12000 Hz in sequence.

#### 6.2.2 AUDIO FREQUENCY RESPONSE

- Configure the EUT as shown in figure 6-1.
- Adjust the audio input for 20% of rated system deviation at 1 KHz using this level as a reference (0 dB).
- Vary the Audio frequency from 100 Hz to 30 KHz and record the frequency deviation.
- Audio Frequency Response =  $20\log_{10}$  (Deviation of test frequency/Deviation of 1 KHz reference).

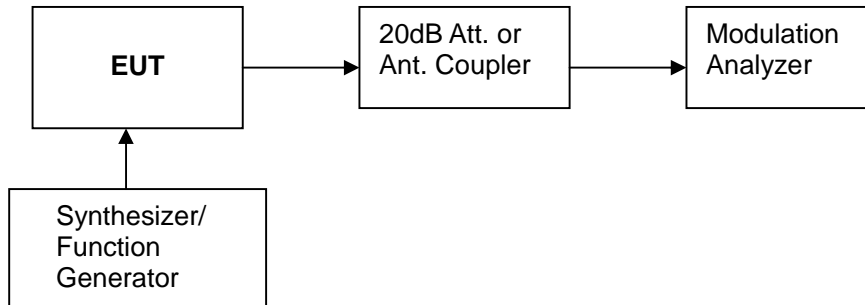


Figure 6-1: Modulation Characteristic Measurement Configuration

### 6.3 MEASUREMENT INSTRUMENTS

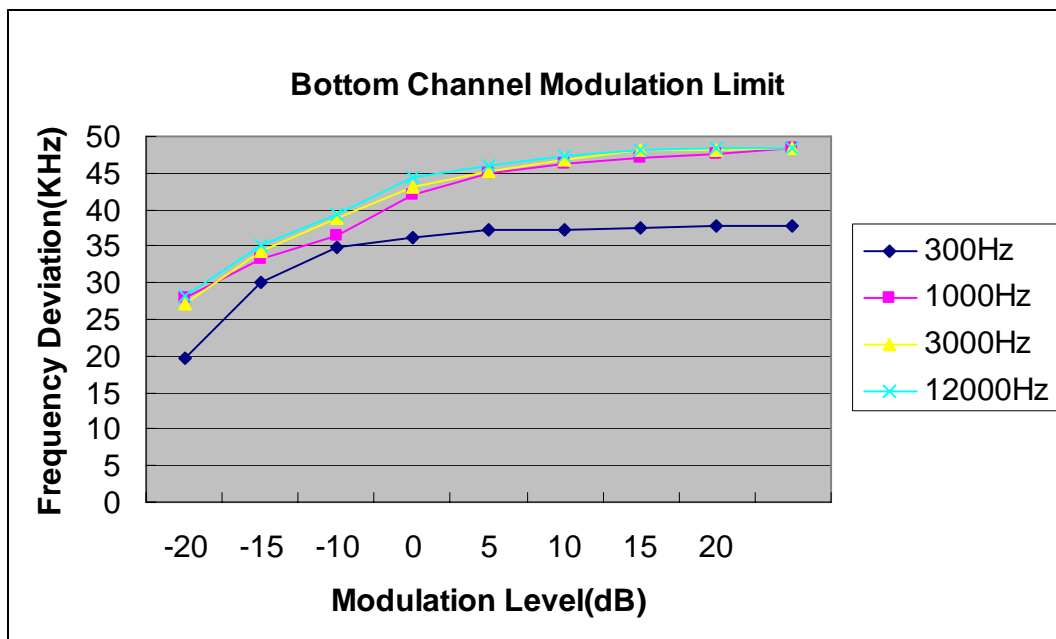
EQUIPMENT TYPE	MFR	MODEL NUMBER	LAST CAL.	CAL DUE.
Audio Signal Generator	HP	3325A	07/13/2009	07/12/2010
Modulation Analyzer	HP	8920B	07/13/2009	07/12/2010
Attenuator	MINI CIRCUITS	MCL BW-S20W2	07/13/2009	07/12/2010

## 6.4 TEST RESULT

### a). Modulation Limit:

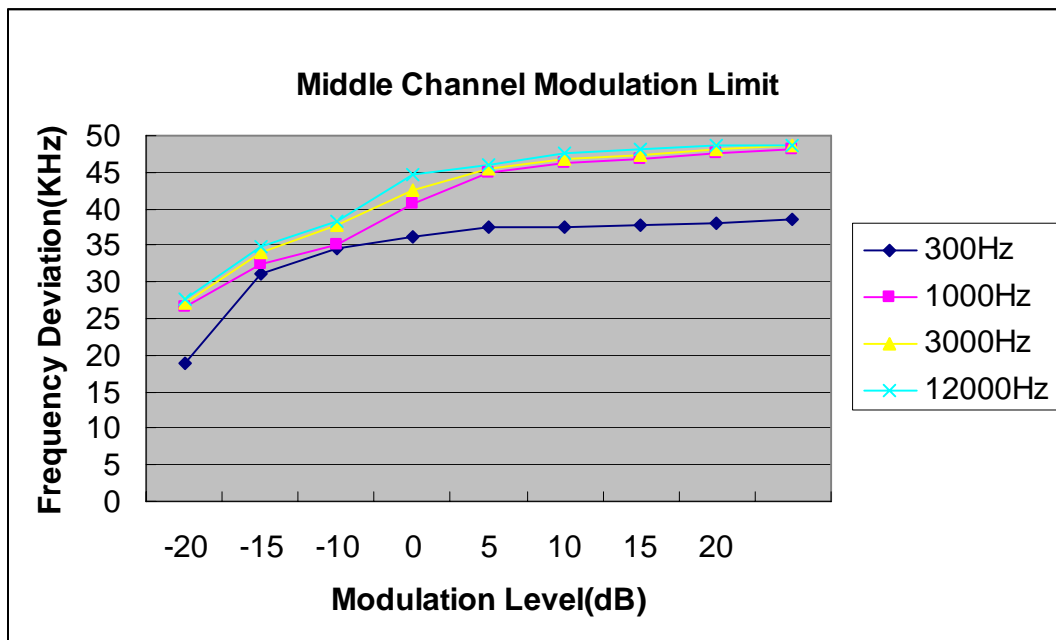
#### Test Result @ 575.0 MHz

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 12000 Hz (KHz)
-20	19.68	27.86	27.04	28.29
-15	30.12	33.14	34.28	35.13
-10	34.87	36.39	38.86	39.24
-5	36.04	41.89	43.16	44.54
0	37.12	44.97	45.17	46.09
+5	37.29	46.27	46.74	47.24
+10	37.44	46.98	48.09	48.15
+15	37.64	47.63	48.18	48.28
+20	37.89	48.29	48.42	48.51



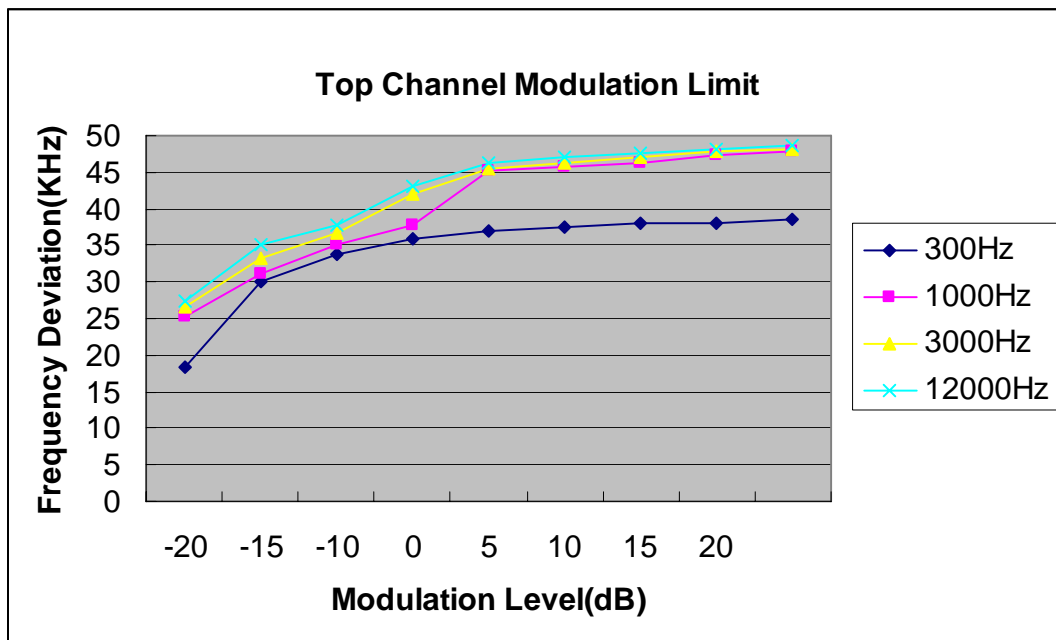
**Test Result @ 587.5 MHz**

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 12000 Hz (KHz)
-20	18.98	26.69	27.26	27.79
-15	31.02	32.46	34.11	34.88
-10	34.69	35.11	37.68	38.17
-5	36.24	40.77	42.49	44.79
0	37.47	45.05	45.46	46.11
+5	37.59	46.18	46.89	47.49
+10	37.88	46.77	47.38	48.04
+15	38.13	47.53	48.09	48.55
+20	38.49	48.18	48.58	48.72



**Test Result @ 599.75 MHz**

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 12000 Hz (KHz)
-20	18.43	25.39	26.59	27.33
-15	30.12	31.19	33.18	35.12
-10	33.65	35.02	36.71	37.77
-5	35.89	37.82	41.94	43.09
0	36.98	45.12	45.59	46.23
+5	37.39	45.87	46.29	47.11
+10	37.95	46.38	47.05	47.69
+15	38.09	47.27	47.83	48.12
+20	38.51	47.75	48.24	48.69



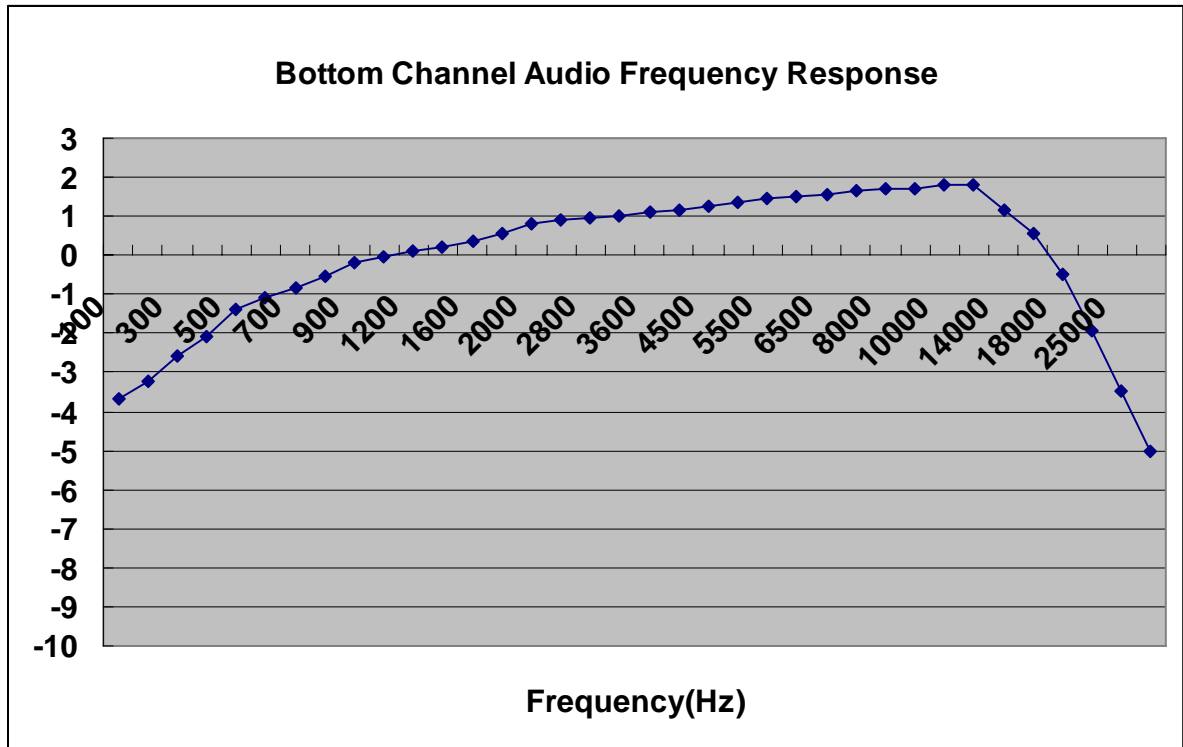


b). Audio Frequency Response:

**Test Result @ 575.00 MHz**

Frequency (Hz)	Deviation (KHz)
100	9.89
200	10.43
300	11.26
400	11.89
500	12.87
600	13.36
700	13.76
800	14.18
900	14.78
1000	15.06
1200	15.27
1400	15.49
1600	15.78
1800	16.14
2000	16.58
2400	16.74
2800	16.83
3200	16.94
3600	17.14
4000	17.26
4500	17.43
5000	17.65
5500	17.88
6000	17.95
6500	18.09
7000	18.23
8000	18.36
9000	18.42
10000	18.56
12000	18.63
14000	17.26
16000	16.14
18000	14.27
20000	12.09
25000	10.13
30000	8.47

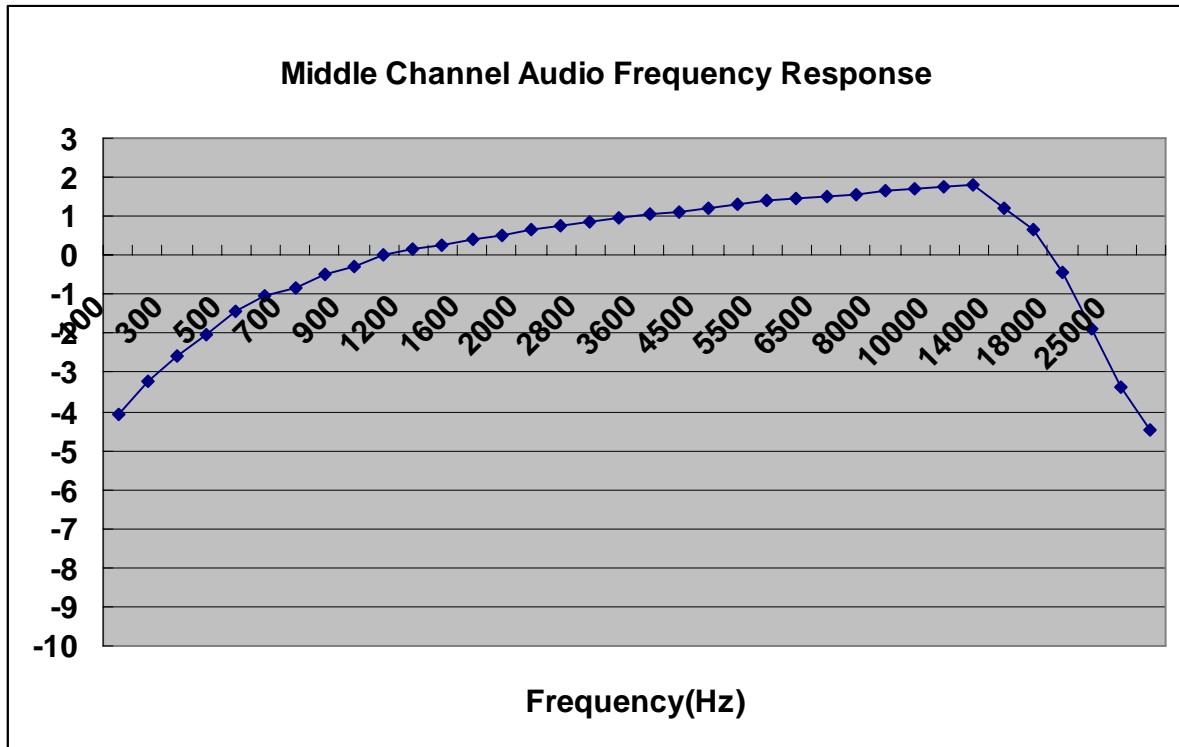
**Audio Frequency Response @575.0MHz**



**Test Result @ 587.5 MHz**

Frequency (Hz)	Deviation (KHz)
100	9.44
200	10.38
300	11.19
400	11.92
500	12.79
600	13.42
700	13.68
800	14.25
900	14.64
1000	15.09
1200	15.33
1400	15.52
1600	15.83
1800	15.96
2000	16.25
2400	16.47
2800	16.64
3200	16.81
3600	17.03
4000	17.16
4500	17.37
5000	17.54
5500	17.71
6000	17.86
6500	17.97
7000	18.08
8000	18.21
9000	18.33
10000	18.42
12000	18.53
14000	17.33
16000	16.27
18000	14.31
20000	12.13
25000	10.26
30000	9.01

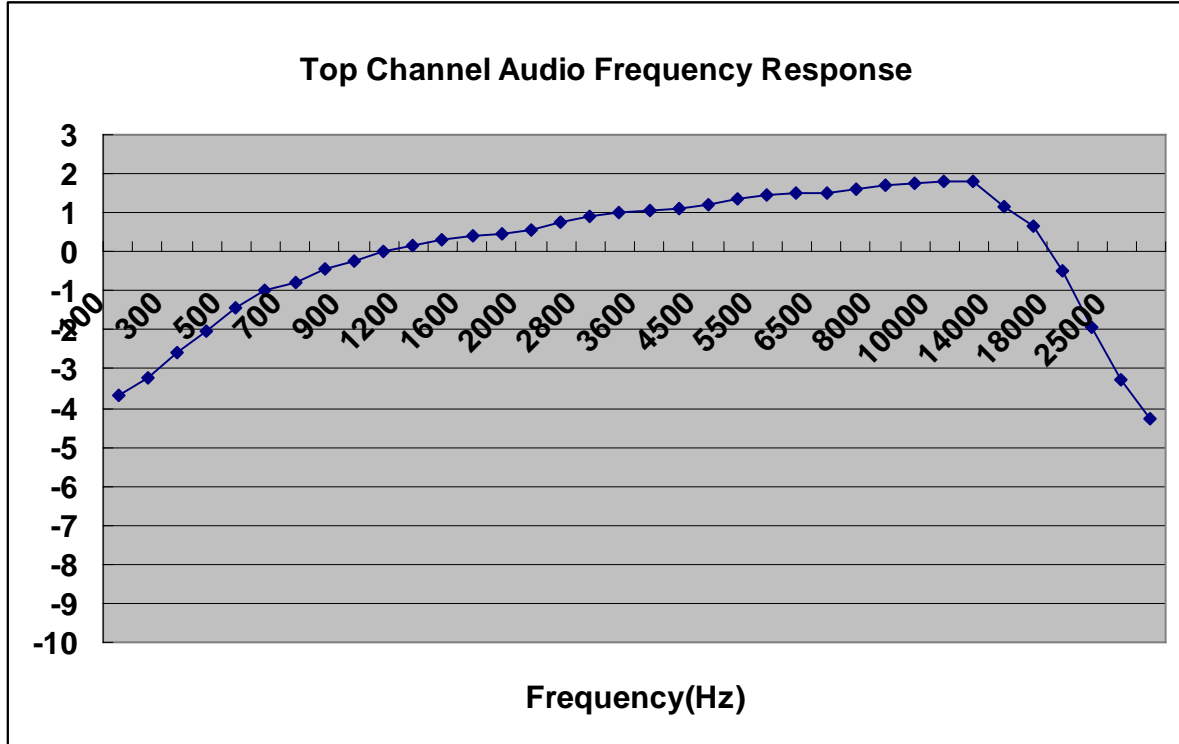
**Audio Frequency Response @587.5MHz**



**Test Result @ 599.75 MHz**

Frequency (Hz)	Deviation (KHz)
100	9.93
200	10.42
300	11.23
400	11.97
500	12.83
600	13.47
700	13.79
800	14.36
900	14.72
1000	15.12
1200	15.36
1400	15.64
1600	15.87
1800	15.98
2000	16.15
2400	16.53
2800	16.79
3200	16.94
3600	17.08
4000	17.19
4500	17.42
5000	17.63
5500	17.85
6000	17.94
6500	18.02
7000	18.16
8000	18.35
9000	18.47
10000	18.59
12000	18.64
14000	17.29
16000	16.32
18000	14.27
20000	12.09
25000	10.36
30000	9.25

**Audio Frequency Response@599.75MHz**



## **7. FREQUENCY TOLERANCE**

### **7.1 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%.

### **7.2 MEASUREMENT PROCEDURE**

#### **7.2.1 FREQUENCY STABILITY VERSUS ENVIRONMENTAL TEMPERATURE**

- 1) Setup the configuration per figure 7-1 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.

#### **7.2.2 FREQUENCY STABILITY VERSUS INPUT VOLTAGE**

- 1) Setup the configuration per figure 7-1 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 1 KHz 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.

### 7.3 TEST SETUP BLOCK DIAGRAM

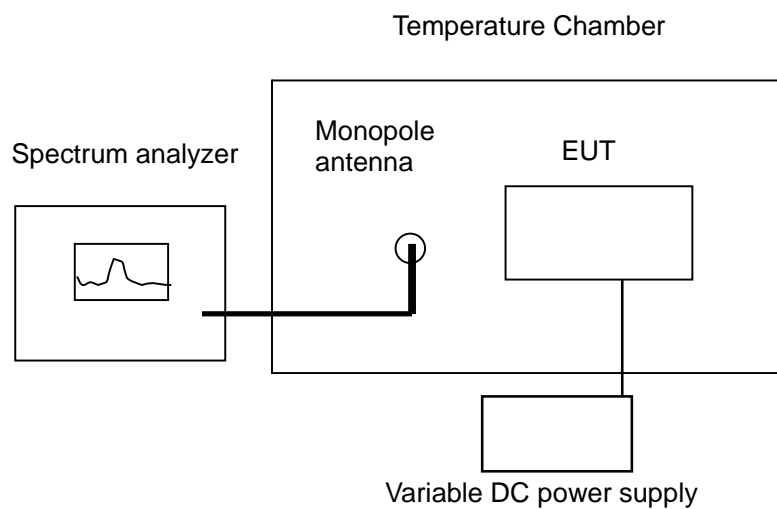


Figure 7-1

### 7.4 TEST EQUIPMENT USED

EQUIPMENT TYPE	MFR	MODEL NO.	SERIAL NO.	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCS30	100307	07/13/2009	07/12/2010
Temperature Chamber	SHIHIN	BM50-CB	908	07/13/2009	07/12/2010
DC Power Supply	LONGWEI	WYK-605	N/A	07/13/2009	07/12/2010

### 7.5 TEST RESULT



a) Frequency stability versus input voltage (battery operation end point voltage is 3 V)

Wireless Microphone	Reference Frequency (MHz)	Frequency Measured at End Point Voltage	Frequency Error (%)	Limit (%)
Bottom channel	575.0	574.998326	-0.000296	0.005
Middle Channel	587.5	587.496496	-0.000596	0.005
Top channel	599.75	599.749258	-0.000123	0.005

b) Frequency stability versus ambient temperature

**Test Result @ Bottom Channel**

Reference Frequency: 174.2MHz			Limit: $\pm 0.005\%$	
Environment Temperature ( )	Power Supply	Frequency deviation measured with time Elapsed (30 minutes)		
		(MHz)	%	
50	DC 3V	574.996593	-0.000592	
40	DC 3V	574.996641	-0.000584	
30	DC 3V	574.996696	-0.000574	
20	DC 3V	574.996938	-0.000532	
10	DC 3V	574.997739	-0.000393	
0	DC 3V	574.997464	-0.000441	
-10	DC 3V	574.998552	-0.000251	
-20	DC 3V	574.998639	-0.000237	
-30	DC 3V	574.998827	-0.000204	

**Test Result @ Middle Channel**

Reference Frequency: 587.5 MHz			Limit: $\pm 0.005\%$
Environment Temperature ( )	Power Supply	Frequency deviation measured with time Elapsed(30 minutes)	
		(MHz)	%
50	DC 3V	587.496821	-0.000541
40	DC 3V	587.496838	-0.000538
30	DC 3V	587.497106	-0.000492
20	DC 3V	587.497439	-0.000435
10	DC 3V	587.497748	-0.000383
0	DC 3V	587.497655	-0.000399
-10	DC 3V	587.498193	-0.000307
-20	DC 3V	587.498378	-0.000276
-30	DC 3V	587.498429	-0.000267

**Test Result @ Top Channel**

Reference Frequency: 215.8 MHz			Limit: $\pm 0.005\%$
Environment Temperature ( )	Power Supply	Frequency deviation measured with time Elapsed (30 minutes)	
		(MHz)	%
50	DC 3V	599.749283	-0.000120
40	DC 3V	599.749937	-0.000011
30	DC 3V	599.748392	-0.000268
20	DC 3V	599.748816	-0.000197
10	DC 3V	599.748842	-0.000086
0	DC 3V	599.749485	-0.000068
-10	DC 3V	599.749593	-0.000061
-20	DC 3V	599.749638	-0.000063
-30	DC 3V	599.749722	-0.000051

## 8. EMISSION BANDWIDTH

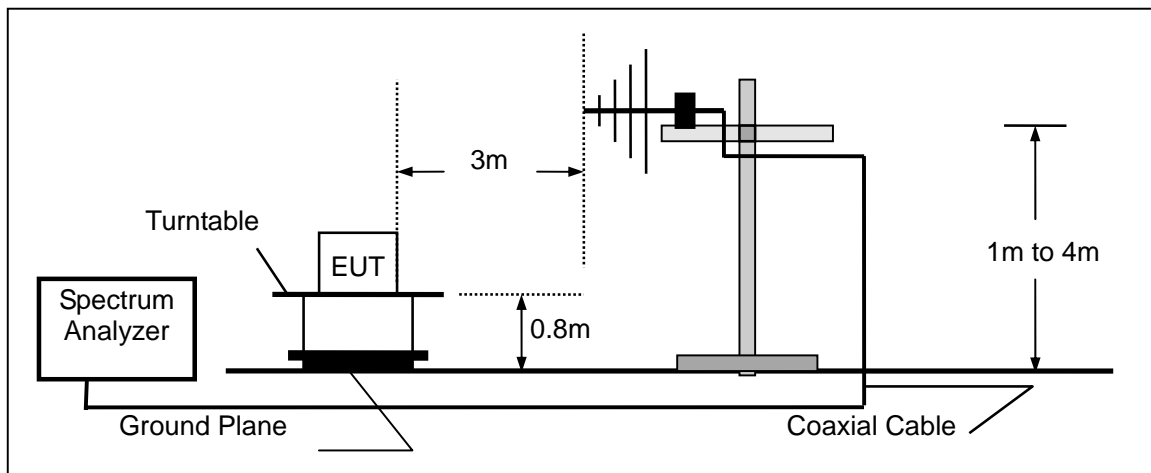
### 8.1 PROVISIONS APPLICABLE

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

### 8.2 MEASUREMENT 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=1 KHz, VBW=1 KHz, Span =200 KHz.
- 4). Set SPA Max hold. Mark peak, -26dB.

### 8.3 TEST SETUP BLOCK DIAGRAM



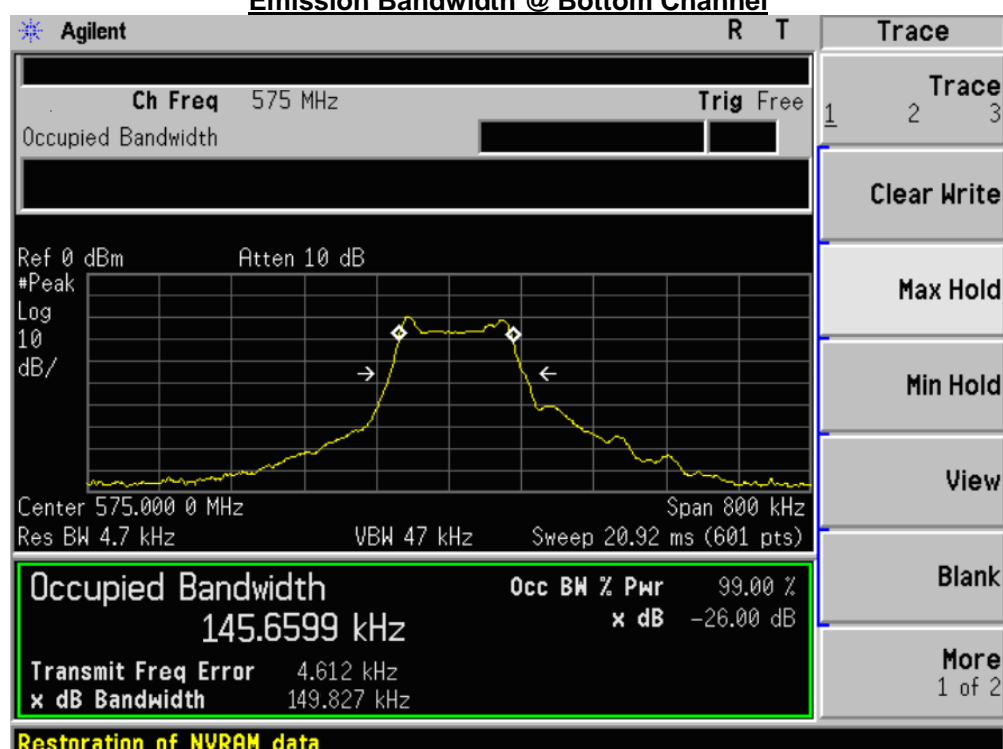
### 8.4 MEASUREMENT EQUIPMENT USED

EQUIPMENT TYPE	MFR	MODEL NO.	SERIAL NO.	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCS30	100307	07/13/2009	07/12/2010
Pre-Amplifier	HP	8447D	2944A07999	07/13/2009	07/12/2010
Bi-Log Antenna	EMCO	3142	9910-1436	07/13/2009	07/12/2010
Bi-Log Antenna	SCHAFFNER	CBL6143	5082	07/13/2009	07/12/2010

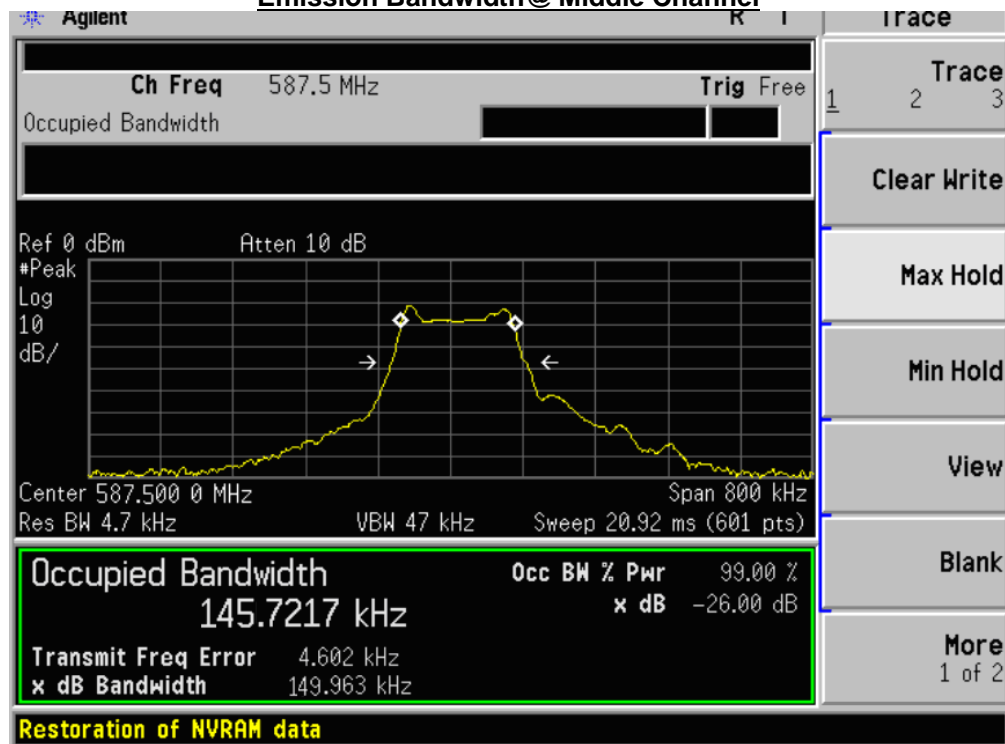
### 8.5 TEST RESULT

26 dB Test Result			
Operation Channel	Test Data	Limit	Result
Bottom Channel	149.827 KHz	200 KHz	Pass
Middle Channel	149.963 KHz	200 KHz	Pass
Top Channel	149.312 KHz	200 KHz	Pass

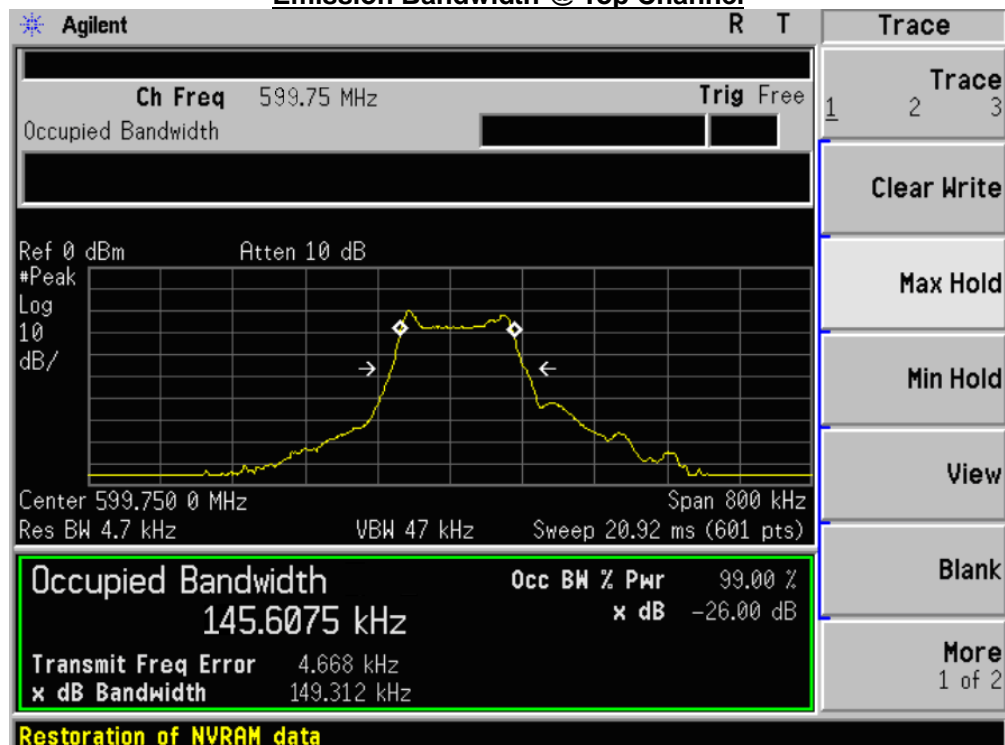
### Emission Bandwidth @ Bottom Channel



### Emission Bandwidth@ Middle Channel



### Emission Bandwidth @ Top Channel



## **9. UNWANTED RADIATION**

### **9.1 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:

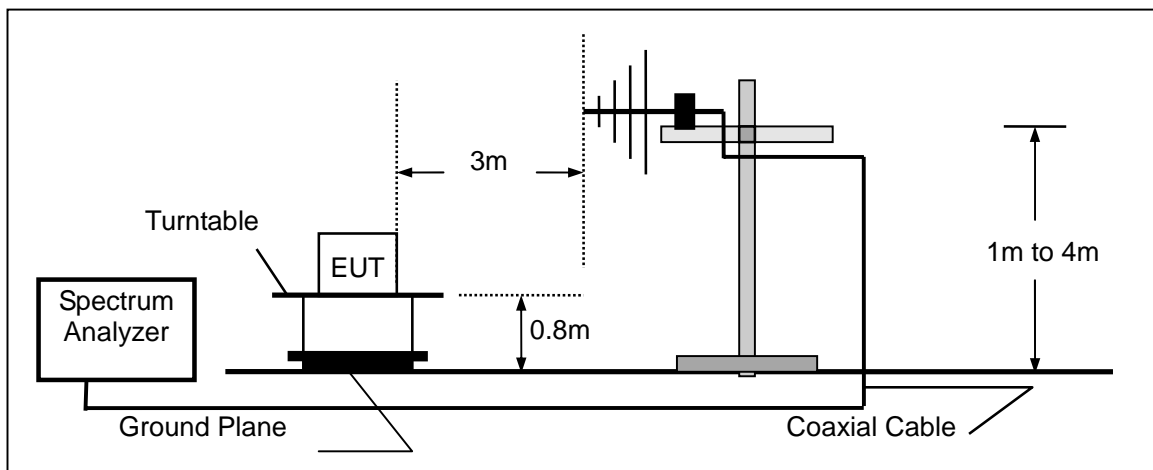
- 1). On any frequency removed from the operating frequency by more than 50 percent up to and including 100 percent of the authorized bandwidth: at least 25 dB;
- 2). On any frequency removed from the operating frequency by more than 100 percent up to and including 250 percent of the authorized bandwidth: at least 35 dB;
- 3). On any frequency removed from the operating frequency by more than 250 percent of the authorized bandwidth: at least  $43 + 10 \log_{10} (TP)$  dB

### **9.2 MEASUREMENT 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 then 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.

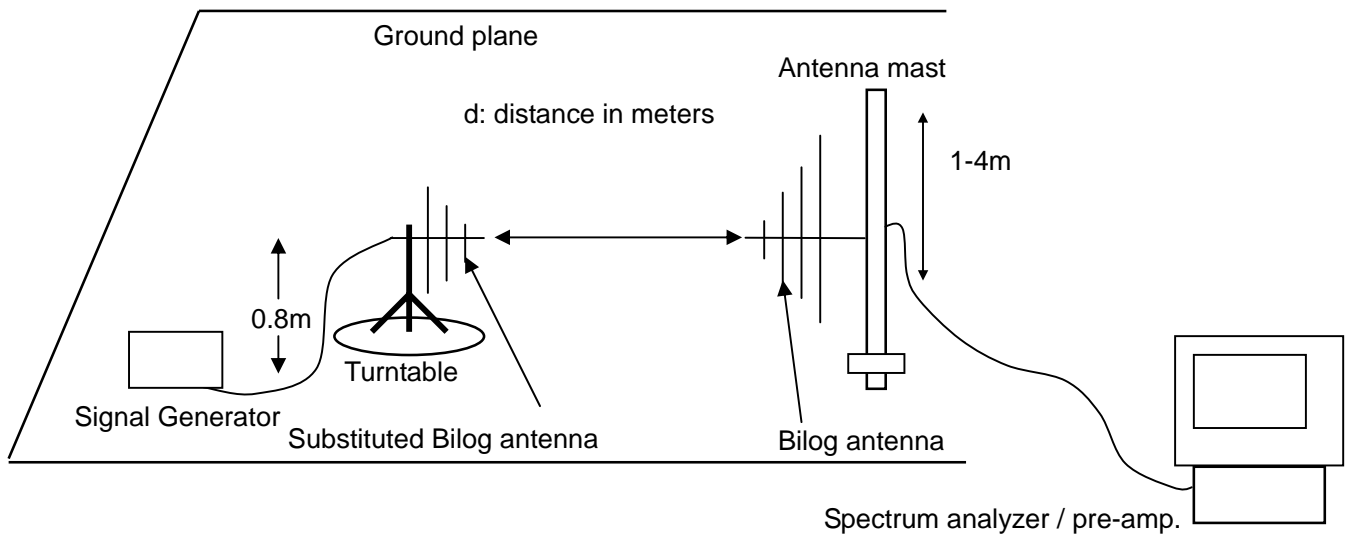
- 14). The test antenna shall be raised and lowered through the specified range of the height to ensure that the maximum signal is received.
- 15). The input signal to substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level 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.

### 9.3 TEST SETUP BLOCK DIAGRAM

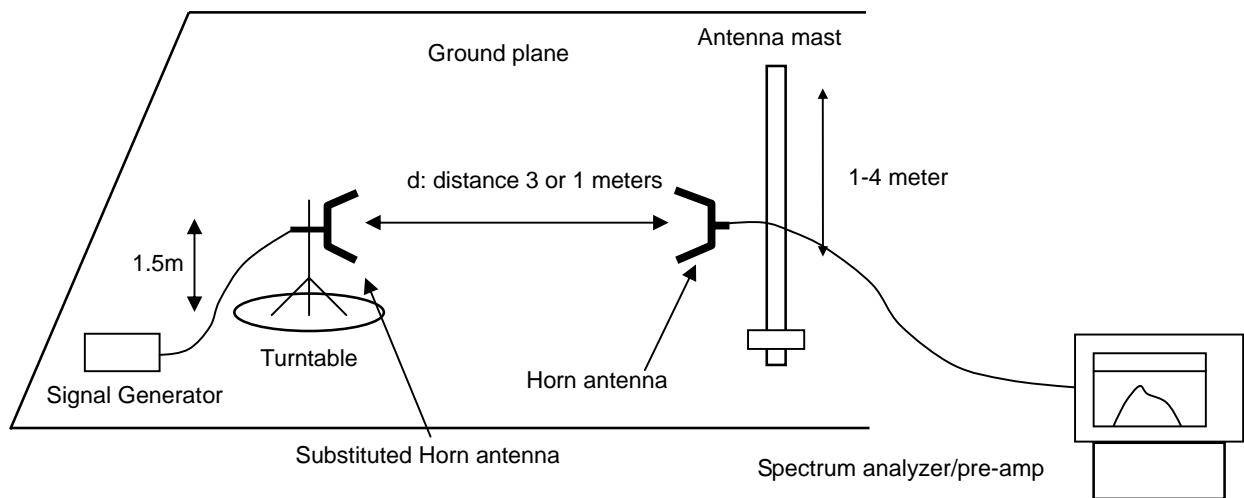


**Substitution Method:**

**Radiation below 1GHz**



**Radiation above 1GHz**





#### 9.4 MEASUREMENT EQUIPMENT USED

EQUIPMENT TYPE	MFR	MODEL NO.	SERIAL NO.	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCS30	100307	07/13/2009	07/12/2010
Pre-Amplifier	HP	8447D	2944A07999	07/13/2009	07/12/2010
Bi-Log Antenna	EMCO	3142	9910-1436	07/13/2009	07/12/2010
Bi-Log Antenna	SCHAFFNER	CBL6143	5082	07/13/2009	07/12/2010

#### 9.5 TEST RESULTS

Calculation: Limit (dBm) = EL-43-10log10 (TP)

Notes: EL is the emission level of the Output Power expressed in dBm, in this application, the EL is 6.14 dBm.

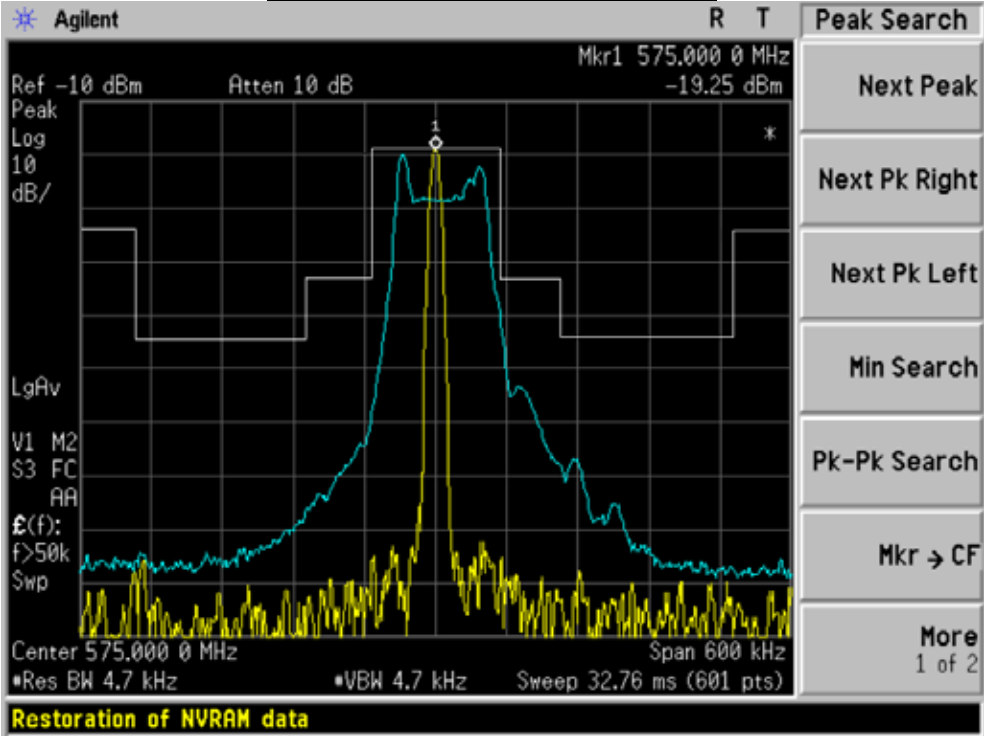
Limit (dBm) = 6.14 - 43 - 10log 10 (0.00411) = -13

##### Top Channel, Middle Channel & Bottom Channel

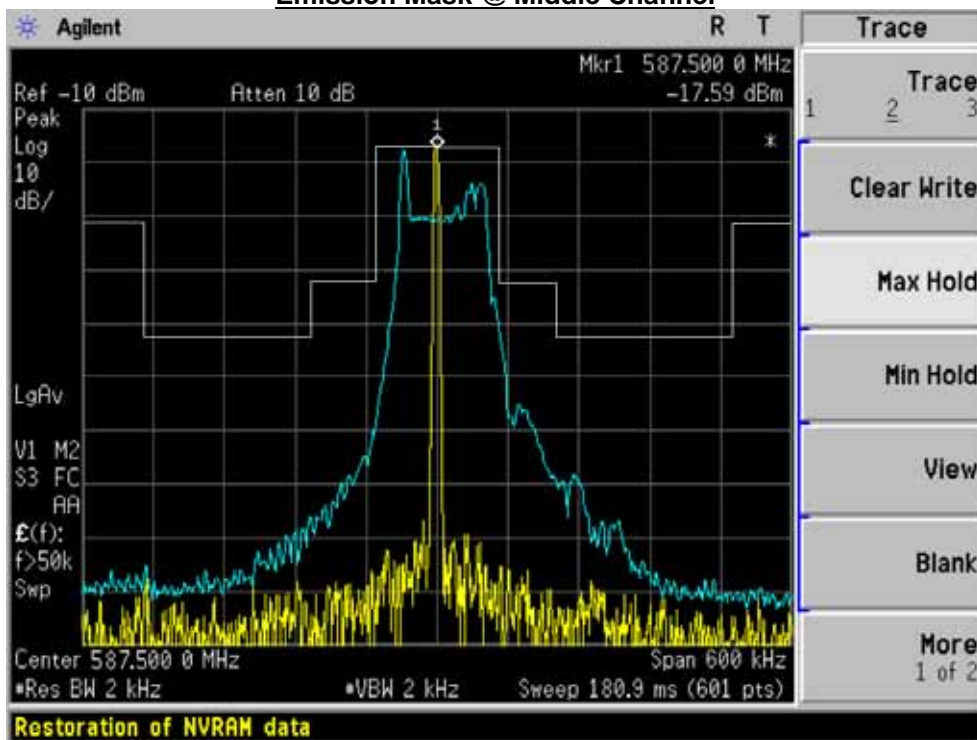
Frequency (MHz)	Reading Level (dBm)	Antenna Polarization	S.G. (dBm) (dBm)	Cabel Loss (dB)	Ant.Gain (dB)	Emission Level (dBm)	Limit (dBm)	Margin (dB)
1150.00	-66.93	H	-45.87	1.47	13.37	-33.97	-13	-20.97
1150.00	-61.54	V	-40.12	1.47	13.37	-28.22	-13	-15.22
1175.00	-68.46	H	-46.29	1.52	13.42	-34.39	-13	-21.39
1175.00	-62.17	V	-41.09	1.52	13.42	-29.19	-13	-16.19
1199.50	-68.55	H	-47.89	1.58	13.67	-35.80	-13	-22.80
1199.50	-62.39	V	-42.94	1.58	13.67	-30.85	-13	-17.85
1725.00	-82.34	H	-63.47	1.61	13.83	-51.25	-13	-38.25
1725.00	-79.37	V	-61.83	1.61	13.83	-49.61	-13	-36.61
1762.50	-83.26	H	-64.74	1.64	13.87	-52.51	-13	-39.51
1762.50	-80.14	V	-62.05	1.64	13.87	-49.82	-13	-36.82
1799.25	-83.43	H	-64.98	1.69	13.95	-52.72	-13	-39.72
1799.25	-80.25	V	-62.27	1.69	13.95	-50.01	-13	-37.01
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Notes: -- means the output power of all the spurious frequency is at least 20dB down to the limit.

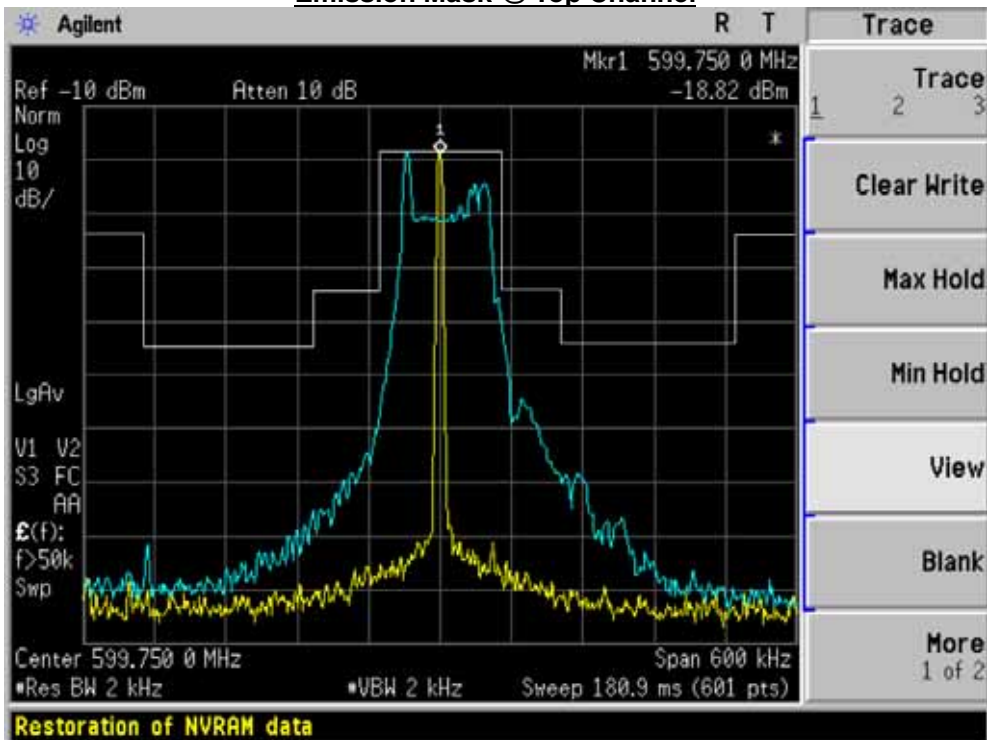
Emission Mask @ Bottom Channel



### Emission Mask @ Middle Channel



### Emission Mask @ Top Channel



## **APPENDIX**

### **PHOTOGRAPHS OF TEST SETUP**

### RADIATED EMISSION TEST SETUP



## **APPENDIX**

### **EXTERNAL PHOTOGRAPHS OF EUT**

VIEW OF MICROPHONE

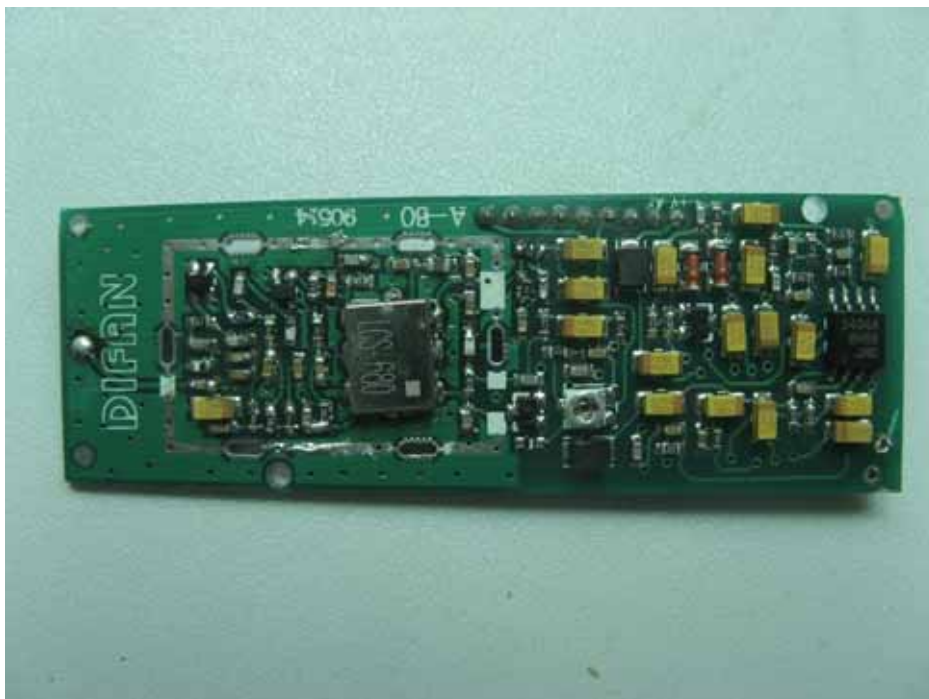


## **APPENDIX**

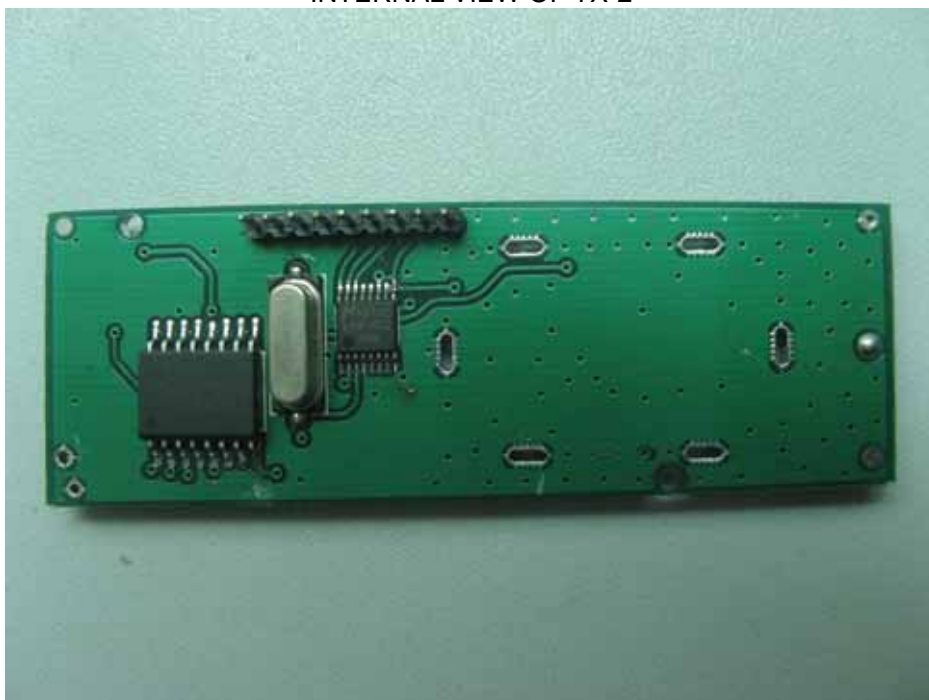
### **EXTERNAL PHOTOGRAPHS OF EUT**



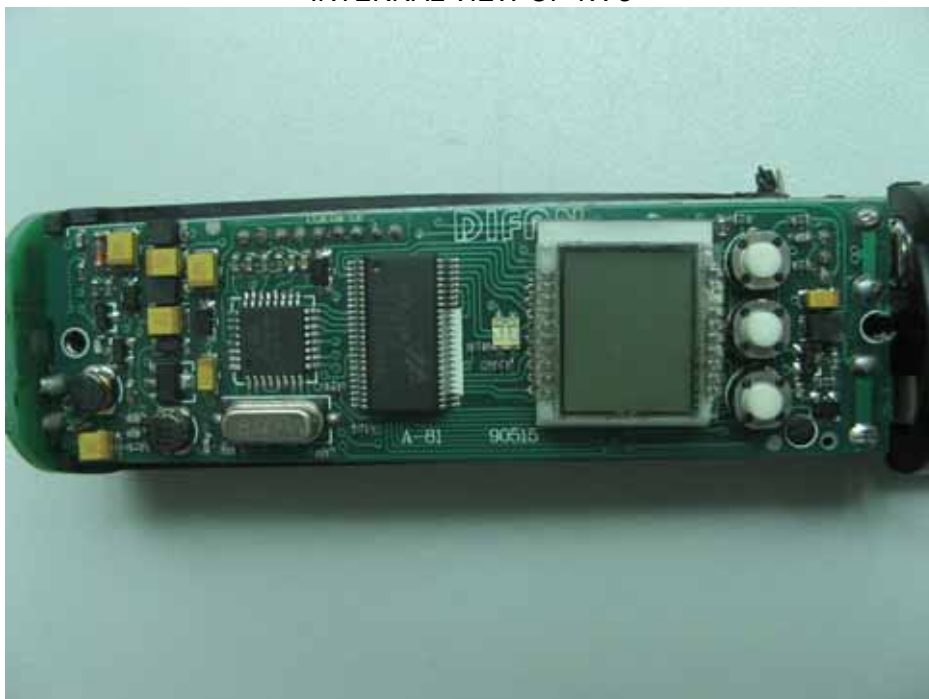
INTERNAL VIEW OF TX-1



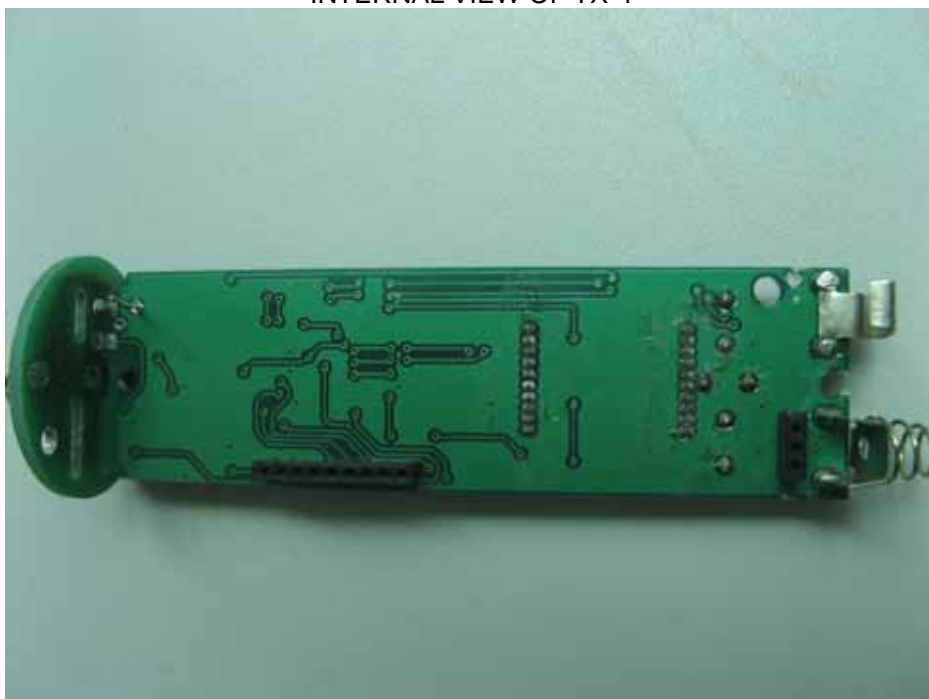
INTERNAL VIEW OF TX-2



INTERNAL VIEW OF TX-3



INTERNAL VIEW OF TX-4



---END OF REPORT---