



Test Report

Product Name : FM Transmitter
Model No. : CM782AGA, CM782AGB
FCC ID : JVPCM782

Applicant : BenQ Corporation
Address : 157 Shan-Ying Road, Gueishan, Taoyuan 333,
Taiwan, R.O.C.

Date of Receipt : Jun. 02, 2004
Date of Test : Jun. 07, 2004
Report No. : 046L048FI
Reference No. : NL-NR488

The Test Results relate only to the samples tested.
The test report shall not be reproduced except in full without the written approval of Quietek Corporation.
This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Test Report Certification

Test Date : Jun. 07, 2004

Report No. : 046L048FI



Accredited by NIST (NVLAP)

NVLAP Lab Code: 200533-0

Product Name : FM Transmitter

Applicant : BenQ Corporation

Address : 157 Shan-Ying Road, Gueishan, Taoyuan 333, Taiwan, R.O.C.

Manufacturer : Inventec Multimedia & Telecom Corporation

Model No. : CM782AGA, CM782AGB

FCC ID. : JVPCM782

Rated Voltage : DC 5V (Power by Adapter)

Trade Name : BenQ

Measurement Standard : FCC CFR Title 47 Part 15 Subpart C: 2003

Measurement Procedure : ANSI C63.4: 2001

Test Result : Complied



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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	: FM Transmitter
Trade Name	: BenQ
Model No.	: CM782AGA, CM782AGB
Frequency Range	: 88.1~107.9MHz
Channel Number	: 199
Type of Modulation	: FSK
Antenna Type	: Soldered on PCB
Operator Selection of Operating Frequency	: Manual Switch
Cable	: Non-Shielded, 0.6m
Earphone	: 1 Set, Non-Shielded, 0.7m
USB Cable	: Shielded, 1.2m
Power Adapter	: MFR: BenQ M/N: IU03-51050-032A

Frequency of each Channel

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 1:	88.1 MHz	Channel 2:	88.2 MHz	Channel 3:	88.3 MHz	Channel 4:	88.4 MHz
Channel 5:	88.5 MHz	Channel 6:	88.6 MHz	Channel 7:	88.7 MHz	Channel 8:	88.8 MHz
Channel 9:	88.9 MHz	Channel 10:	89.0 MHz	Channel 11:	89.1 MHz	Channel 12:	89.2 MHz
Channel 13:	89.3 MHz	Channel 14:	89.4 MHz	Channel 15:	89.5 MHz	Channel 16:	89.6 MHz
Channel 17:	89.7 MHz	Channel 18:	89.8 MHz	Channel 19:	89.9 MHz	Channel 20:	90.0 MHz
Channel 21:	90.1 MHz	Channel 22:	90.2 MHz	Channel 23:	90.3 MHz	Channel 24:	90.4 MHz
Channel 25:	90.5 MHz	Channel 26:	90.6 MHz	Channel 27:	90.7 MHz	Channel 28:	90.8 MHz
Channel 29:	90.9 MHz	Channel 30:	91.0 MHz	Channel 31:	91.1 MHz	Channel 32:	91.2 MHz
Channel 33:	91.3 MHz	Channel 34:	91.4 MHz	Channel 35:	91.5 MHz	Channel 36:	91.6 MHz
Channel 37:	91.7 MHz	Channel 38:	91.8 MHz	Channel 39:	91.9 MHz	Channel 40:	92.0 MHz
Channel 41:	92.1 MHz	Channel 42:	92.2 MHz	Channel 43:	92.3 MHz	Channel 44:	92.4 MHz
Channel 45:	92.5 MHz	Channel 46:	92.6 MHz	Channel 47:	92.7 MHz	Channel 48:	92.8 MHz
Channel 49:	92.9 MHz	Channel 50:	93.0 MHz	Channel 51:	93.1 MHz	Channel 52:	93.2 MHz
Channel 53:	93.3 MHz	Channel 54:	93.4 MHz	Channel 55:	93.5 MHz	Channel 56:	93.6 MHz
Channel 57:	93.7 MHz	Channel 58:	93.8 MHz	Channel 59:	93.9 MHz	Channel 60:	94.0 MHz
Channel 61:	94.1 MHz	Channel 62:	94.2 MHz	Channel 63:	94.3 MHz	Channel 64:	94.4 MHz
Channel 65:	94.5 MHz	Channel 66:	94.6 MHz	Channel 67:	94.7 MHz	Channel 68:	94.8 MHz
Channel 69:	94.9 MHz	Channel 70:	95.0 MHz	Channel 71:	95.1 MHz	Channel 72:	95.2 MHz
Channel 73:	95.3 MHz	Channel 74:	95.4 MHz	Channel 75:	95.5 MHz	Channel 76:	95.6 MHz
Channel 77:	95.7 MHz	Channel 78:	95.8 MHz	Channel 79:	95.9 MHz	Channel 80:	96.0 MHz
Channel 81:	96.1 MHz	Channel 82:	96.2 MHz	Channel 83:	96.3 MHz	Channel 84:	96.4 MHz
Channel 85:	96.5 MHz	Channel 86:	96.6 MHz	Channel 87:	96.7 MHz	Channel 88:	96.8 MHz
Channel 89:	96.9 MHz	Channel 90:	97.0 MHz	Channel 91:	97.1 MHz	Channel 92:	97.2 MHz
Channel 93:	97.3 MHz	Channel 94:	97.4 MHz	Channel 95:	97.5 MHz	Channel 96:	97.6 MHz
Channel 97:	97.7 MHz	Channel 98:	97.8 MHz	Channel 99:	97.9 MHz	Channel 100:	98.0 MHz

Channel 101: 98.1 MHz Channel 102: 98.2 MHz Channel 103: 98.3 MHz Channel 104: 98.4 MHz
 Channel 105: 98.5 MHz Channel 106: 98.6 MHz Channel 107: 98.7 MHz Channel 108: 98.8 MHz
 Channel 109: 98.9 MHz Channel 110: 99.0 MHz Channel 111: 99.1 MHz Channel 112: 99.2 MHz
 Channel 113: 99.3 MHz Channel 114: 99.4 MHz Channel 115: 99.5 MHz Channel 116: 99.6 MHz
 Channel 117: 99.7 MHz Channel 118: 99.8 MHz Channel 119: 99.9 MHz Channel 120: 100.0 MHz
 Channel 121: 100.1 MHz Channel 122: 100.2 MHz Channel 123: 100.3 MHz Channel 124: 100.4 MHz
 Channel 125: 100.5 MHz Channel 126: 100.6 MHz Channel 127: 100.7 MHz Channel 128: 100.8 MHz
 Channel 129: 100.9 MHz Channel 130: 101.0 MHz Channel 131: 101.1 MHz Channel 132: 101.2 MHz
 Channel 133: 101.3 MHz Channel 134: 101.4 MHz Channel 135: 101.5 MHz Channel 136: 101.6 MHz
 Channel 137: 101.7 MHz Channel 138: 101.8 MHz Channel 139: 101.9 MHz Channel 140: 102.0 MHz
 Channel 141: 102.1 MHz Channel 142: 102.2 MHz Channel 143: 102.3 MHz Channel 144: 102.4 MHz
 Channel 145: 102.5 MHz Channel 146: 102.6 MHz Channel 147: 102.7 MHz Channel 148: 102.8 MHz
 Channel 149: 102.9 MHz Channel 150: 103.0 MHz Channel 151: 103.1 MHz Channel 152: 103.2 MHz
 Channel 153: 103.3 MHz Channel 154: 103.4 MHz Channel 155: 103.5 MHz Channel 156: 103.6 MHz
 Channel 157: 103.7 MHz Channel 158: 103.8 MHz Channel 159: 103.9 MHz Channel 160: 104.0 MHz
 Channel 161: 104.1 MHz Channel 162: 104.2 MHz Channel 163: 104.3 MHz Channel 164: 104.4 MHz
 Channel 165: 104.5 MHz Channel 166: 104.6 MHz Channel 167: 104.7 MHz Channel 168: 104.8 MHz
 Channel 169: 104.9 MHz Channel 170: 105.0 MHz Channel 171: 105.1 MHz Channel 172: 105.2 MHz
 Channel 173: 105.3 MHz Channel 174: 105.4 MHz Channel 175: 105.5 MHz Channel 176: 105.6 MHz
 Channel 177: 105.7 MHz Channel 178: 105.8 MHz Channel 179: 105.9 MHz Channel 180: 106.0 MHz
 Channel 181: 106.1 MHz Channel 182: 106.2 MHz Channel 183: 106.3 MHz Channel 184: 106.4 MHz
 Channel 185: 106.5 MHz Channel 186: 106.6 MHz Channel 187: 106.7 MHz Channel 188: 106.8 MHz
 Channel 189: 106.9 MHz Channel 190: 107.0 MHz Channel 191: 107.1 MHz Channel 192: 107.2 MHz
 Channel 193: 107.3 MHz Channel 194: 107.4 MHz Channel 195: 107.5 MHz Channel 196: 107.6 MHz
 Channel 197: 107.7 MHz Channel 198: 107.8 MHz Channel 199: 107.9 MHz

Note:

1. This device is an 88-108MHz FM Transmitter included a 88-108MHz transmitting function.
2. The variation of model number is for different color. The circuit of each model is identical.

The model number were shown in the table as following:

Model Number	Color
CM782AGA	White
CM782AGB	Black

3. Regards to the frequency band operation, the lowest 、 middle and highest frequency of channel were selected to perform the test, then shown on this report.
4. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.239.
5. Quietek had verified the construction and function in typical operation, and then shown in this test report. Mode 1: Transmit

1.2. Operation Description

The EUT is FM Transmitter. The operation frequency is from 88.1MHz to 107.9MHz with FSK modulation. 199 manually selectable channels were built in the EUT. The signal will be transmitted through 88.1M-107.9MHz FSK RF signal from the soldered on PCB antenna from EUT to receiver. DC 5V shall be provided for EUT operation.

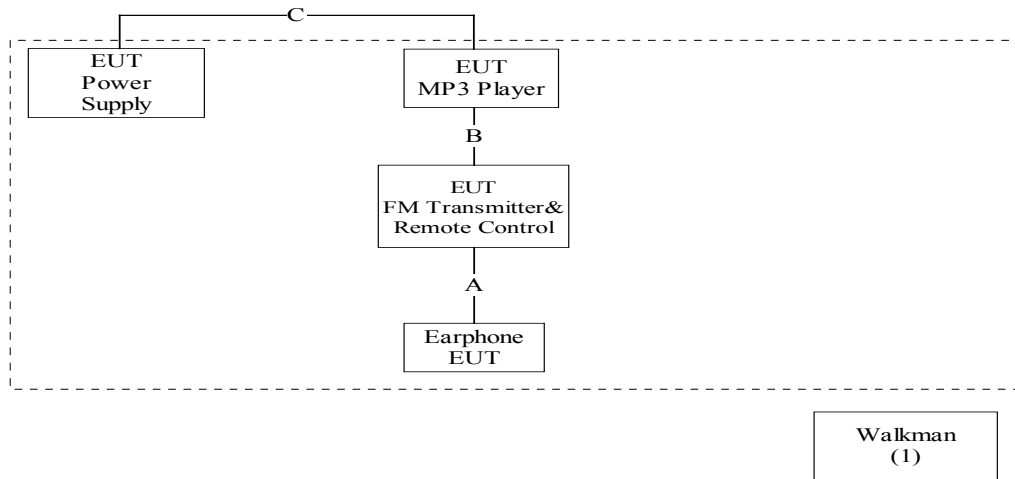
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	Power Cord
(1)	Walkman	AIWA	HS-TA164	N/A	N/A

	Signal Cable Type	Signal cable Description
A.	Earphone Cable	Non-shielded, 0.7m
B.	FM Transmitter & Remote Control Cable	Shielded, 0.6m
C.	USB Cable	Shielded, 1.2m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

- 1.4.1 Setup the EUT and display as shown on 1.4.
- 1.4.2 Turn on the power of all equipment.
- 1.4.3 The EUT will transmit the signal.
- 1.4.4 Repeat the above procedure 1.4.2 to 1.4.3

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

Site Description: June 22, 2001 File on
 Federal Communications Commission
 FCC Engineering Laboratory
 7435 Oakland Mills Road
 Columbia, MD 21046
 Reference 31040/SIT1300F2



0914
ILAC MRA

July 03, 2001 Accreditation on NVLAP
 NVLAP Lab Code: 200533-0



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2. Conducted Emission

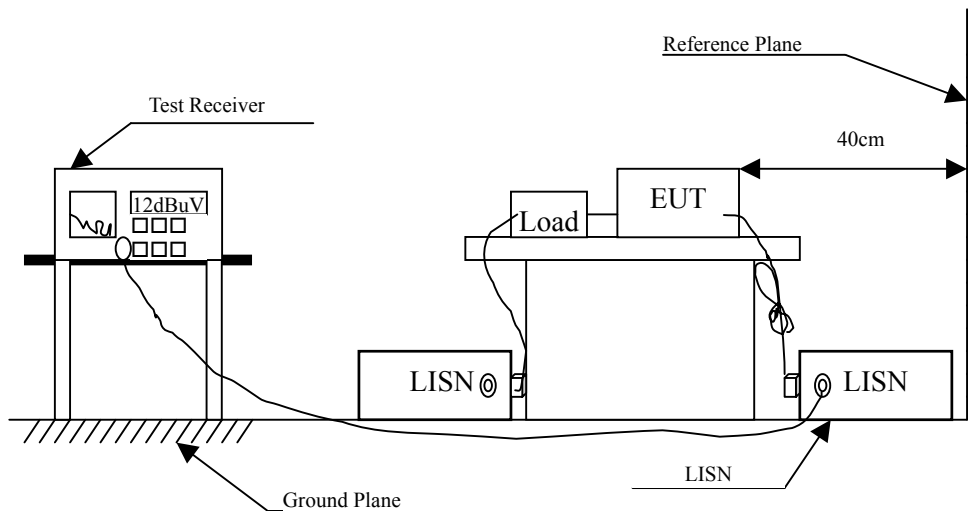
2.1. Test Equipment

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2004	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2004	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2004	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2004	
5	No.1 Shielded Room			N/A	

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2001 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Uncertainty

The measurement uncertainty is defined as ± 2.02 dB

2.6. Test Result of Conducted Emission

Product : FM Transmitter
 Test Item : Conducted Emission
 Power Line : Line 1
 Test Mode : Mode 1: Transmit (88.1 MHz)

Frequency MHz	Cable Loss dB	Probe Factor dB	Reading Level dBuV	Emission Level dBuV	Limits dBuV
Quasi-Peak					
0.177	0.60	0.10	44.34	45.04	64.61
0.240	0.60	0.10	40.12	40.82	62.10
0.298	0.60	0.10	40.28	40.98	60.29
0.529	0.60	0.10	39.30	40.00	56.00
* 0.712	0.60	0.10	42.02	42.72	56.00
26.009	0.86	0.55	25.26	26.66	60.00
Average					
0.177	0.60	0.10	37.60	38.30	54.61
0.240	0.60	0.10	35.00	35.70	52.10
0.298	0.60	0.10	35.70	36.40	50.29
0.529	0.60	0.10	29.00	29.70	46.00
* 0.712	0.60	0.10	34.20	34.90	46.00
26.009	0.86	0.55	17.50	18.90	50.00

Note:

1. All Reading Levels are Quasi-Peak and Average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable Loss.

Product : FM Transmitter
 Test Item : Conducted Emission
 Power Line : Line 2
 Test Mode : Mode 1: Transmit (88.1 MHz)

Frequency MHz	Cable Loss dB	Probe Factor dB	Reading Level dBuV	Emission Level dBuV	Limits dBuV
Quasi-Peak					
0.181	0.60	0.10	47.26	47.96	64.43
0.248	0.60	0.10	47.86	48.56	61.84
0.373	0.60	0.10	42.50	43.20	58.44
0.502	0.60	0.10	35.06	35.76	56.00
* 0.548	0.60	0.10	43.10	43.80	56.00
1.791	0.60	0.13	35.42	36.15	56.00
Average					
0.181	0.60	0.10	34.60	35.30	54.43
* 0.248	0.60	0.10	35.00	35.70	51.84
0.373	0.60	0.10	24.80	25.50	48.44
0.502	0.60	0.10	17.60	18.30	46.00
0.548	0.60	0.10	26.40	27.10	46.00
1.791	0.60	0.13	18.50	19.23	46.00

Note:

1. All Reading Levels are Quasi-Peak and Average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable Loss.

Product : FM Transmitter
 Test Item : Conducted Emission
 Power Line : Line 1
 Test Mode : Mode 1: Transmit (98.1 MHz)

Frequency MHz	Cable Loss dB	Probe Factor dB	Reading Level dBuV	Emission Level dBuV	Limits dBuV
Quasi-Peak					
* 0.189	0.60	0.10	48.84	49.54	64.08
0.244	0.60	0.10	46.02	46.72	61.97
0.369	0.60	0.10	36.52	37.22	58.53
0.494	0.60	0.10	40.72	41.42	56.10
0.798	0.60	0.10	35.02	35.72	56.00
1.107	0.60	0.10	35.16	35.86	56.00
Average					
* 0.189	0.60	0.10	48.80	49.50	54.08
0.244	0.60	0.10	28.30	29.00	51.97
0.369	0.60	0.10	22.50	23.20	48.53
0.494	0.60	0.10	22.30	23.00	46.10
0.798	0.60	0.10	18.70	19.40	46.00
1.107	0.60	0.10	17.90	18.60	46.00

Note:

1. All Reading Levels are Quasi-Peak and Average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable Loss.

Product : FM Transmitter
 Test Item : Conducted Emission
 Power Line : Line 2
 Test Mode : Mode 1: Transmit (98.1 MHz)

Frequency MHz	Cable Loss dB	Probe Factor dB	Reading Level dBuV	Emission Level dBuV	Limits dBuV
Quasi-Peak					
* 0.185	0.60	0.10	51.62	52.32	64.25
0.244	0.60	0.10	46.58	47.28	61.97
0.306	0.60	0.10	43.76	44.46	60.07
0.509	0.60	0.10	38.58	39.28	56.00
0.560	0.60	0.10	41.88	42.58	56.00
0.861	0.60	0.10	36.40	37.10	56.00
Average					
0.185	0.60	0.10	30.30	31.00	54.25
0.244	0.60	0.10	26.10	26.80	51.97
0.306	0.60	0.10	25.60	26.30	50.07
0.509	0.60	0.10	19.00	19.70	46.00
* 0.560	0.60	0.10	23.10	23.80	46.00
0.861	0.60	0.10	19.10	19.80	46.00

Note:

1. All Reading Levels are Quasi-Peak and Average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable Loss.

Product : FM Transmitter
 Test Item : Conducted Emission
 Power Line : Line 1
 Test Mode : Mode 1: Transmit (107.9 MHz)

Frequency MHz	Cable Loss dB	Probe Factor dB	Reading Level dBuV	Emission Level dBuV	Limits dBuV
Quasi-Peak					
0.181	0.60	0.10	46.50	47.20	64.43
0.240	0.60	0.10	36.44	37.14	62.10
0.302	0.60	0.10	35.22	35.92	60.18
0.365	0.60	0.10	35.04	35.74	58.62
* 0.498	0.60	0.10	38.78	39.48	56.04
0.740	0.60	0.10	35.34	36.04	56.00
Average					
0.181	0.60	0.10	27.70	28.40	54.43
0.240	0.60	0.10	19.10	19.80	52.10
0.302	0.60	0.10	20.10	20.80	50.18
0.365	0.60	0.10	21.10	21.80	48.62
* 0.498	0.60	0.10	23.30	24.00	46.04
0.740	0.60	0.10	19.80	20.50	46.00

Note:

1. All Reading Levels are Quasi-Peak and Average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable Loss.

Product : FM Transmitter
 Test Item : Conducted Emission
 Power Line : Line 2
 Test Mode : Mode 1: Transmit (107.9 MHz)

Frequency MHz	Cable Loss dB	Probe Factor dB	Reading Level dBuV	Emission Level dBuV	Limits dBuV
Quasi-Peak					
0.185	0.60	0.10	49.18	49.88	64.25
0.252	0.60	0.10	41.44	42.14	61.71
0.373	0.60	0.10	40.74	41.44	58.44
* 0.525	0.60	0.10	42.86	43.56	56.00
0.615	0.60	0.10	40.68	41.38	56.00
1.470	0.60	0.12	29.92	30.64	56.00
Average					
0.185	0.60	0.10	30.00	30.70	54.25
0.252	0.60	0.10	23.40	24.10	51.71
0.373	0.60	0.10	26.00	26.70	48.44
0.525	0.60	0.10	23.10	23.80	46.00
* 0.615	0.60	0.10	23.70	24.40	46.00
1.470	0.60	0.12	15.70	16.42	46.00

Note:

1. All Reading Levels are Quasi-Peak and Average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable Loss.

3. Radiated Emission

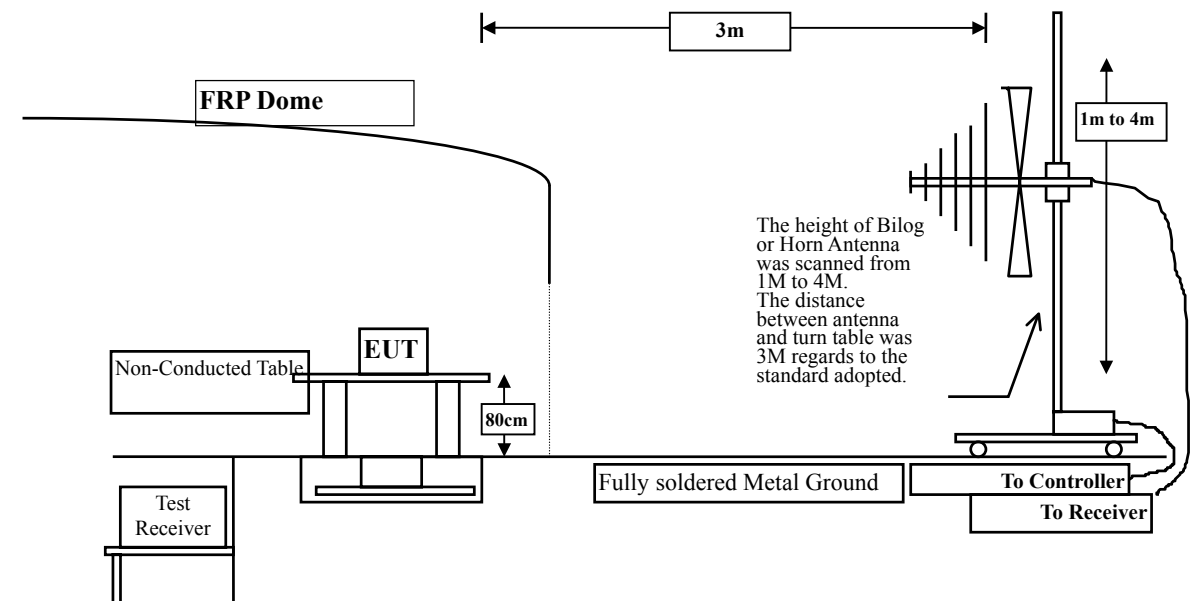
3.1. Test Equipment

The following test equipment are used during the radiated emission test:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
<input type="checkbox"/> Site # 1	Test Receiver	R & S	ESVS 10 / 834468/003	May, 2004
	Spectrum Analyzer	Advantest	R3162/ 00803480	May, 2004
	Pre-Amplifier	Advantest	BB525C/ 3307A01812	May, 2004
	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	Sep., 2003
<input type="checkbox"/> Site # 2	Test Receiver	R & S	ESCS 30 / 836858 / 022	May, 2004
	Spectrum Analyzer	Advantest	R3162 / 100803466	May, 2004
	Pre-Amplifier	Advantest	BB525C/3307A01814	May, 2004
	Bilog Antenna	SCHAFFNER	CBL6112B / 2705	May, 2004
	Horn Antenna	ETS	3115 / 0005-6160	Sep., 2003
	Pre-Amplifier	QTK	QTK-AMP-01/ 0001	May, 2004
<input checked="" type="checkbox"/> Site # 3	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2004
	Spectrum Analyzer	Advantest	R3162 / 100803480	May, 2004
	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2004
	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2004
	Horn Antenna	ETS	3115 / 0005-6160	Jul., 2003
	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	Jul., 2003

- Note: 1. All equipments that need to calibrate are with calibration period of 1 year.
 2. Mark "X" test instruments are used to measure the final test results.

3.2. Test Setup



3.3. Limits

➤ **Fundamental and Harmonics Emission Limits**

FCC Part 15 Subpart C Paragraph 15.239 Limits	
Frequency MHz	Field Strength of Fundamental (uV/m @3m)
200	250

- Remarks :
1. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)
 2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

➤ **General Radiated Emission Limits**

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart B Paragraph 15.209 Limits		
Frequency MHz	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

- Remarks :
1. RF Voltage (dBuV/m) = 20 log RF Voltage (uV/m)
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2001 on radiated measurement.

Radiated emissions were investigated over the frequency range from 30MHz to 1GHz using a receiver bandwidth of 120kHz. Radiated was performed at an antenna to EUT distance of 3 meters.

The frequency range from 30MHz to 10th harmonics is checked.

3.5. Uncertainty

The measurement uncertainty is defined as ± 3.8 dB above 1GHz as ± 3.9 dB

3.6. Test Result of Radiated Emission

Product : FM Transmitter
 Test Item : Fundamental Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit

Horizontal

Freq.	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
MHz	Loss	Factor		Level	Level		
	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Peak Detector:

88.1MHz							
88.100	1.17	9.46	0.00	38.28	48.91	19.04	67.95
98.1MHz							
98.100	1.23	10.98	0.00	33.62	45.83	22.12	67.95
107.1MHz							
107.900	1.27	12.09	0.00	28.44	41.80	26.15	67.95

Average Detector:

88.1MHz							
88.100	1.17	9.46	0.00	19.70	30.33	17.62	47.95
98.1MHz							
98.100	1.23	10.98	0.00	18.60	30.81	17.14	47.95
107.1MHz							
107.900	1.27	12.09	0.00	17.70	31.06	16.89	47.95

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : FM Transmitter
 Test Item : Fundamental Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit

Vertical

Freq.	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
MHz	Loss	Factor	dB	Level	Level	dB	dBuV/m
	dB	dB/m		dBuV	dBuV/m		

Peak Detector:

88.1MHz

88.100	1.17	7.94	0.00	22.50	31.62	36.33	67.95
--------	------	------	------	-------	-------	-------	-------

98.1MHz

98.100	1.23	9.48	0.00	32.40	43.11	24.84	67.95
--------	------	------	------	-------	-------	-------	-------

107.1MHz

107.900	1.27	10.47	0.00	26.80	38.54	29.41	67.95
---------	------	-------	------	-------	-------	-------	-------

Average Detector:

88.1MHz

88.100	1.17	7.94	0.00	14.90	24.02	23.93	47.95
--------	------	------	------	-------	-------	-------	-------

98.1MHz

98.100	1.23	9.48	0.00	17.60	28.31	19.64	47.95
--------	------	------	------	-------	-------	-------	-------

107.1MHz

107.900	1.27	10.47	0.00	13.60	25.34	22.61	47.95
---------	------	-------	------	-------	-------	-------	-------

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.
3. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : FM Transmitter
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (88.1 MHz)

Freq. MHz	Cable Loss dB	Probe Factor dB/m	PreAMP dB	Reading Level dBuV	Emission Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal:							
176.200	1.63	8.43	0.00	8.34	18.39	25.11	43.50
245.800	1.98	11.26	0.00	23.78	37.03	8.97	46.00
* 247.350	2.00	11.31	0.00	24.42	37.73	8.27	46.00
352.400	2.54	13.30	0.00	5.74	21.58	24.42	46.00
440.500	2.99	15.61	0.00	5.32	23.92	22.08	46.00
528.600	3.44	16.57	0.00	5.38	25.39	20.61	46.00
616.700	3.89	18.75	0.00	4.94	27.59	18.41	46.00
704.800	4.34	18.22	0.00	4.84	27.40	18.60	46.00
792.900	4.81	19.65	0.00	4.58	29.04	16.96	46.00
881.000	5.26	19.49	0.00	4.50	29.25	16.75	46.00
Vertical:							
176.200	1.63	8.35	0.00	9.78	19.75	23.75	43.50
245.800	1.98	11.31	0.00	18.34	31.64	14.36	46.00
* 247.350	2.00	11.51	0.00	18.94	32.45	13.55	46.00
264.300	2.08	12.94	0.00	8.00	23.02	22.98	46.00
352.400	2.54	13.75	0.00	8.06	24.35	21.65	46.00
440.500	2.99	16.97	0.00	5.40	25.36	20.64	46.00
528.600	3.44	16.93	0.00	5.22	25.59	20.41	46.00
616.700	3.89	19.34	0.00	4.92	28.15	17.85	46.00
704.800	4.34	18.42	0.00	5.04	27.80	18.20	46.00
792.900	4.81	19.59	0.00	4.60	29.00	17.00	46.00
881.000	5.26	20.08	0.00	4.56	29.89	16.11	46.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable Loss.

Product : FM Transmitter
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (98.1 MHz)

Freq. MHz	Cable Loss dB	Probe Factor dB/m	PreAMP dB	Reading Level dBuV	Emission Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal:							
196.200	1.73	8.20	0.00	7.36	17.29	26.21	43.50
245.800	1.98	11.26	0.00	24.02	37.27	8.73	46.00
* 247.350	2.00	11.31	0.00	24.40	37.71	8.29	46.00
294.300	2.24	12.21	0.00	5.78	20.23	25.77	46.00
392.400	2.74	14.24	0.00	5.44	22.41	23.59	46.00
490.500	3.24	16.25	0.00	5.32	24.81	21.19	46.00
588.600	3.75	17.83	0.00	5.12	26.70	19.30	46.00
686.700	4.26	18.60	0.00	4.94	27.80	18.20	46.00
784.800	4.77	18.97	0.00	4.62	28.36	17.64	46.00
882.900	5.26	19.49	0.00	4.40	29.15	16.85	46.00
981.000	5.79	20.56	0.00	4.50	30.85	23.15	54.00
Vertical:							
196.200	1.73	8.14	0.00	8.92	18.79	24.71	43.50
245.800	1.98	11.31	0.00	19.38	32.68	13.32	46.00
* 247.350	2.00	11.51	0.00	19.68	33.19	12.81	46.00
294.300	2.24	12.22	0.00	6.02	20.47	25.53	46.00
392.400	2.74	15.57	0.00	5.34	23.65	22.35	46.00
490.500	3.24	16.25	0.00	5.26	24.75	21.25	46.00
588.600	3.75	19.61	0.00	5.10	28.45	17.55	46.00
686.700	4.26	17.90	0.00	4.96	27.12	18.88	46.00
784.800	4.77	19.62	0.00	4.48	28.87	17.13	46.00
882.900	5.26	20.08	0.00	4.34	29.67	16.33	46.00
981.000	5.79	19.96	0.00	4.54	30.29	23.71	54.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable Loss.

Product : FM Transmitter
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (107.9 MHz)

Freq. MHz	Cable Loss dB	Probe Factor dB/m	PreAMP dB	Reading Level dBuV	Emission Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal:							
215.800	1.82	8.21	0.00	11.00	21.03	22.47	43.50
247.350	2.00	11.31	0.00	24.04	37.35	8.65	46.00
* 250.400	2.01	11.81	0.00	25.26	39.08	6.92	46.00
323.700	2.38	12.22	0.00	6.18	20.78	25.22	46.00
431.600	2.94	15.81	0.00	5.70	24.45	21.55	46.00
539.500	3.49	17.47	0.00	5.10	26.06	19.94	46.00
647.400	4.05	18.73	0.00	4.88	27.66	18.34	46.00
755.300	4.61	18.92	0.00	4.46	27.99	18.01	46.00
863.200	5.16	19.72	0.00	4.36	29.25	16.75	46.00
971.100	5.73	20.49	0.00	4.28	30.50	23.50	54.00
Vertical:							
215.800	1.82	9.33	0.00	12.50	23.66	19.84	43.50
247.350	2.00	11.51	0.00	18.72	32.23	13.77	46.00
* 250.400	2.01	11.86	0.00	20.30	34.17	11.83	46.00
323.700	2.38	12.66	0.00	8.66	23.70	22.30	46.00
431.600	2.94	17.33	0.00	5.18	25.45	20.55	46.00
539.500	3.49	17.95	0.00	5.22	26.66	19.34	46.00
647.400	4.05	17.97	0.00	4.98	27.01	18.99	46.00
755.300	4.61	20.57	0.00	4.62	29.80	16.20	46.00
863.200	5.16	19.47	0.00	4.44	29.08	16.92	46.00
971.100	5.73	19.98	0.00	4.44	30.16	23.84	54.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable Loss.

Product : FM Transmitter
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (107.9 MHz)

Freq.	Cable	Probe	PreAMP	Reading	Emission	Margin	Limit
MHz	Loss	Factor		Level	Level		
	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal

Peak Detector:

1079.000	2.09	24.34	35.79	45.15	35.79	38.21	74.00
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Vertical

Peak Detector:

1079.000	2.09	24.34	35.79	44.24	34.88	39.12	74.00
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Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector): RBW: 1MHz; VBW: 1MHz; Span: 100MHz ◦
3. Receiver setting (AVG Detector): RBW: 1MHz; VBW: 30Hz; Span: 20MHz ◦
4. Emission Level = Reading Level + Probe Factor + Cable Loss – PreAMP.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

4. Occupied Bandwidth

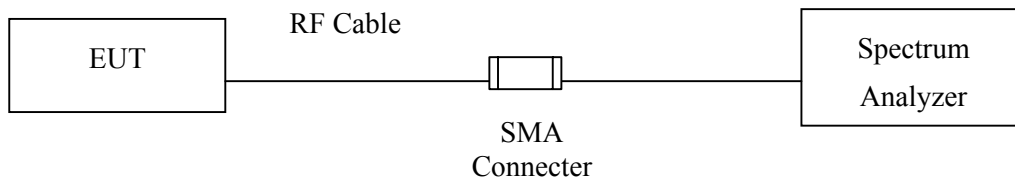
4.1. Test Equipment

The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum Analyzer	Advantest	R3272 / 72421194	May, 2004

Note: 1. All equipment upon which need to calibrated are with calibration period of 1 year.
 2. Mark "X" test instruments are used to measure the final test results.

4.2. Test Setup



4.3. Limits

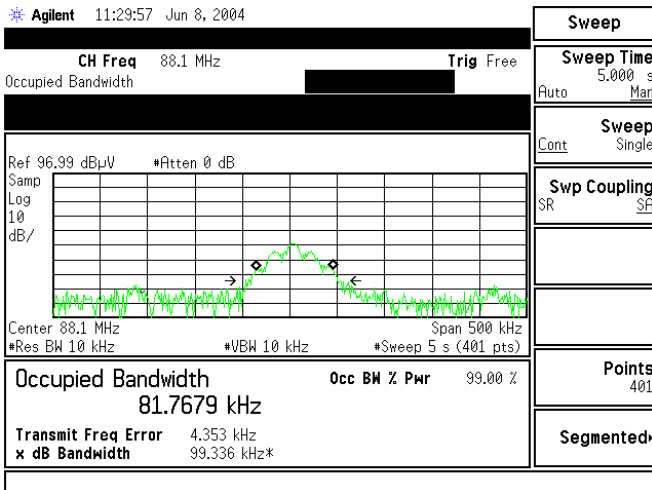
Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency.

4.4. Test Result of Occupied Bandwidth

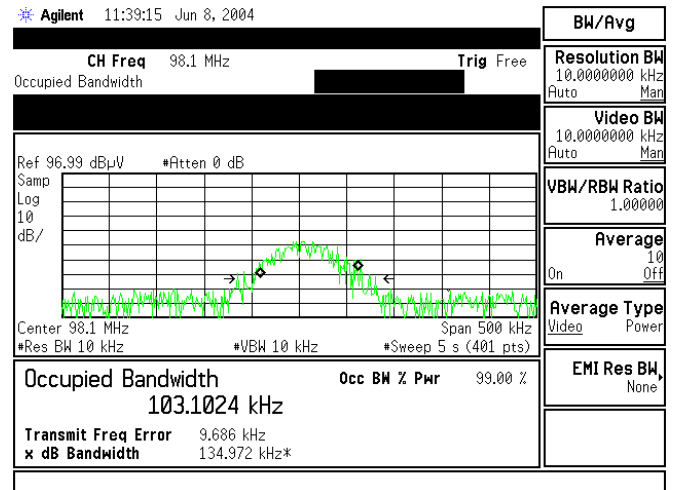
Product : FM Transmitter
 Test Item : Occupied Bandwidth
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1	88.1	81.7679	200	Pass
101	98.1	103.1024	200	Pass
199	107.9	104.0756	200	Pass

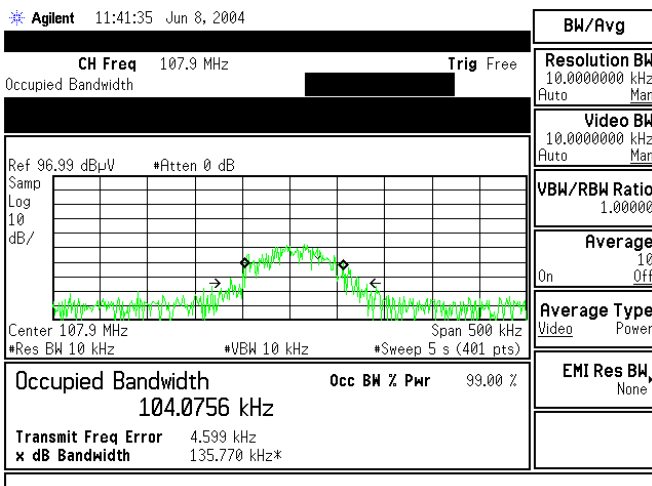
Channel 1:



Channel 101



Channel 199:



5. Band Edge

5.1. Test Equipment

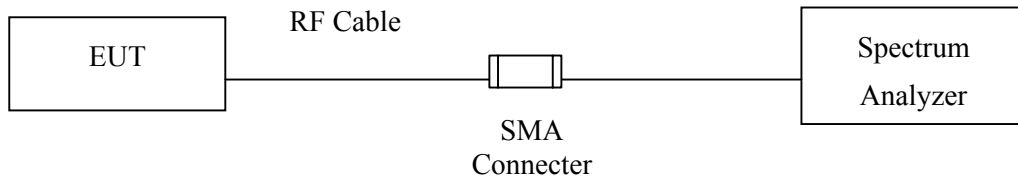
The following test equipments are used during the band edge tests:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Spectrum Analyzer	Advantest	R3272 / 72421194	May, 2004
X Test Receiver	R & S	ESCS 30 / 825442/14	May, 2004
X Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2004
X Pre-Amplifier	HP	8447D/3307A01812	May, 2004
X Bilog Antenna	Chase	CBL6112B / 12452	Sep., 2003
X Horn Antenna	EM	EM6917 / 103325	May, 2004

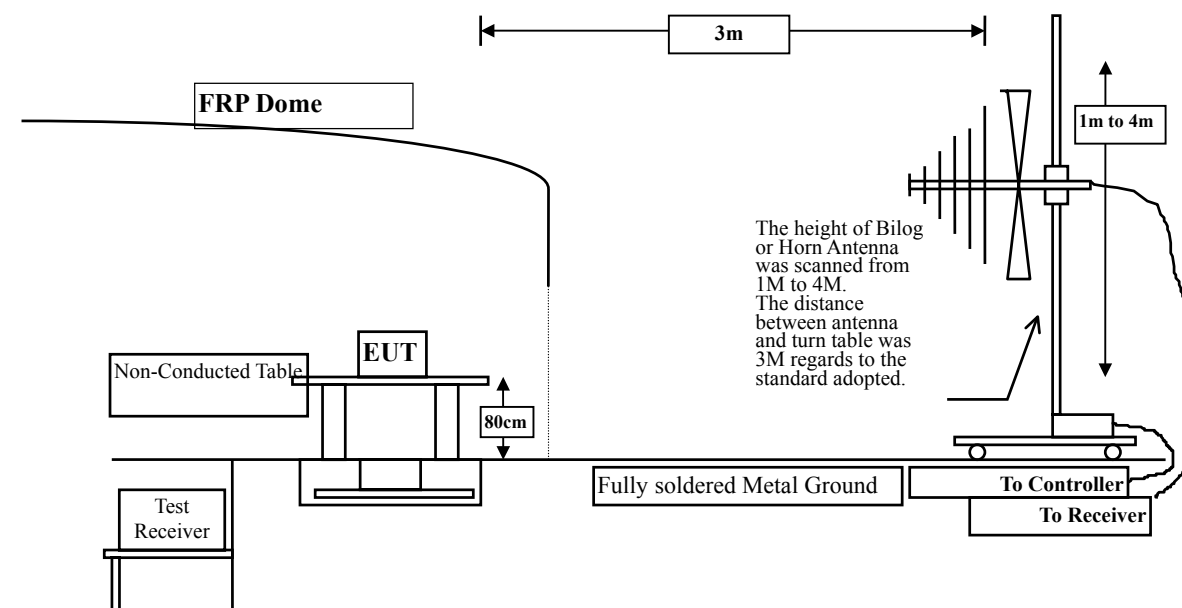
- Note: 1. All equipments that need to calibrate are with calibration period of 1 year.
 2. Mark "X" test instruments are used to measure the final test results.

5.2. Test Setup

RF Conducted Measurement:



RF Radiated Measurement:



5.3. Limits

The 200 kHz band shall lie wholly within the frequency range of 88–108 MHz. The field strength of any emissions appearing outside of this band shall not exceed the general radiated emission limits shown in Section 15.209. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

5.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2001 on radiated measurement.

The bandwidth below 30MHz setting on the field strength meter (R&S Test Receiver ESCS 30)is 9 kHz, 30MHz to 1GHz is 120 kHz and above 1GHz are 1 MHz.

5.5. Uncertainty

The measurement uncertainty is defined as ± 1 MHz

5.6. Test Result of Band Edge

Product : FM Transmitter
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (88.1 MHz)

RF Radiated Measurement: (Quasi-Peak Detector)

Channel No.	Frequency (MHz)	Reading Level (dBuV)	Probe Factor (dB/m)	Cable Loss (dB)	PreAMP (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Result
Horizontal	80.8	32.05	7.99	1.13	27.84	13.33	40.00	Pass
Vertical	80.8	31.56	7.63	1.13	27.84	12.49	40.00	Pass

Figure 88.1 MHz: (Horizontal)

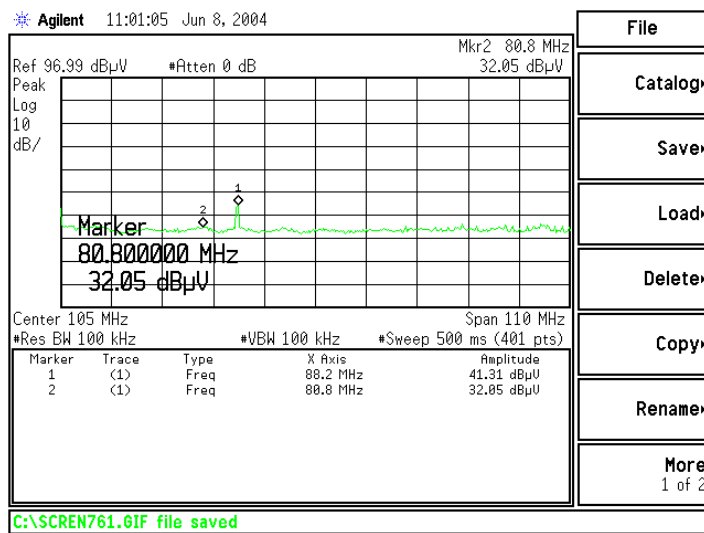
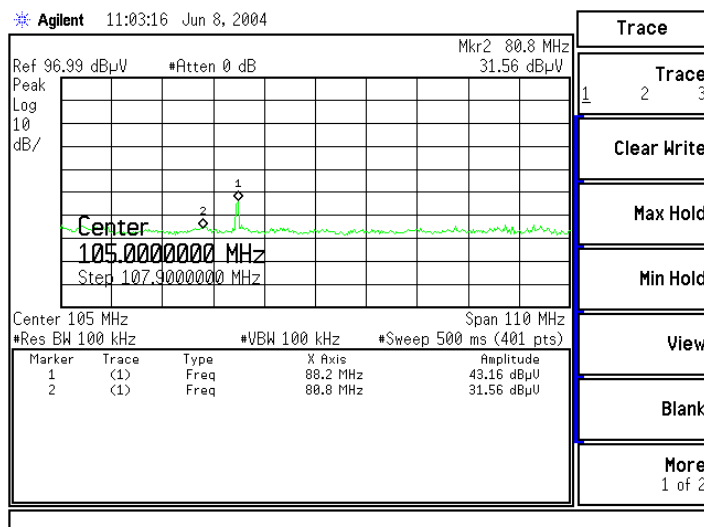


Figure 88.1 MHz: (Vertical)



Product : FM Transmitter
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (107.9 MHz)

RF Radiated Measurement: (Quasi-Peak Detector)

Channel No.	Frequency (MHz)	Reading Level (dBuV)	Probe Factor (dB/m)	Cable Loss (dB)	PreAMP (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Result
Horizontal	136.6	33.51	11.2	1.42	27.84	18.28	43.50	Pass
Vertical	150.7	32.13	9.13	1.49	27.80	14.95	43.50	Pass

Figure 107.9 MHz: (Horizontal)

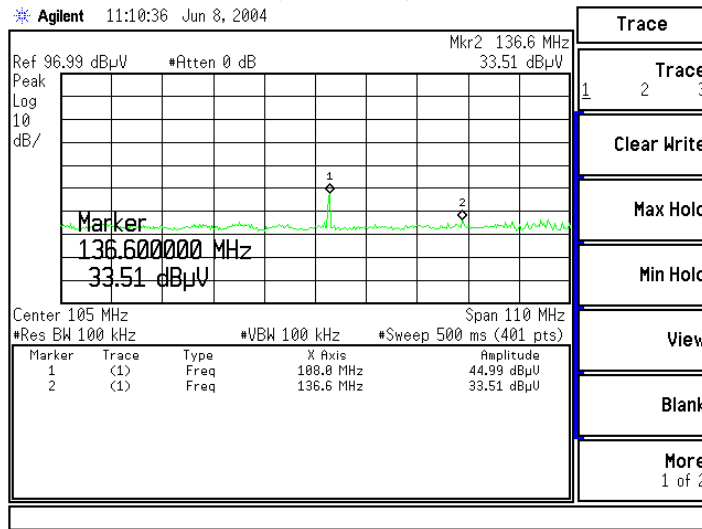
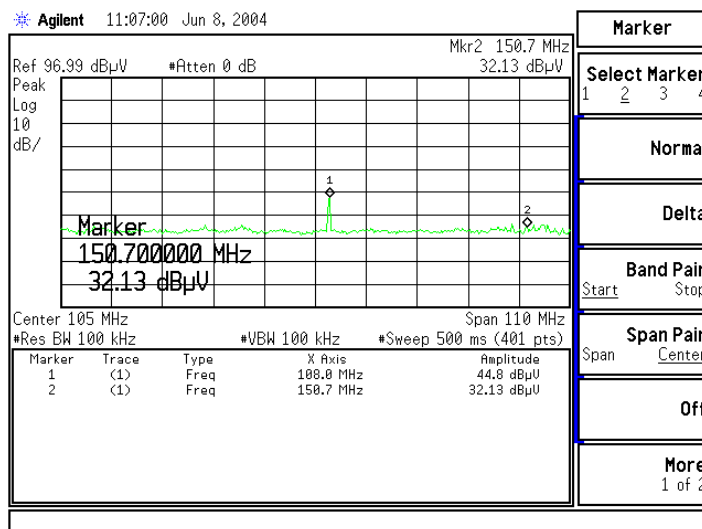


Figure 107.9 MHz: (Vertical)



6. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1 : EUT Test Photographs

Attachment 1: EUT Test Setup Photographs

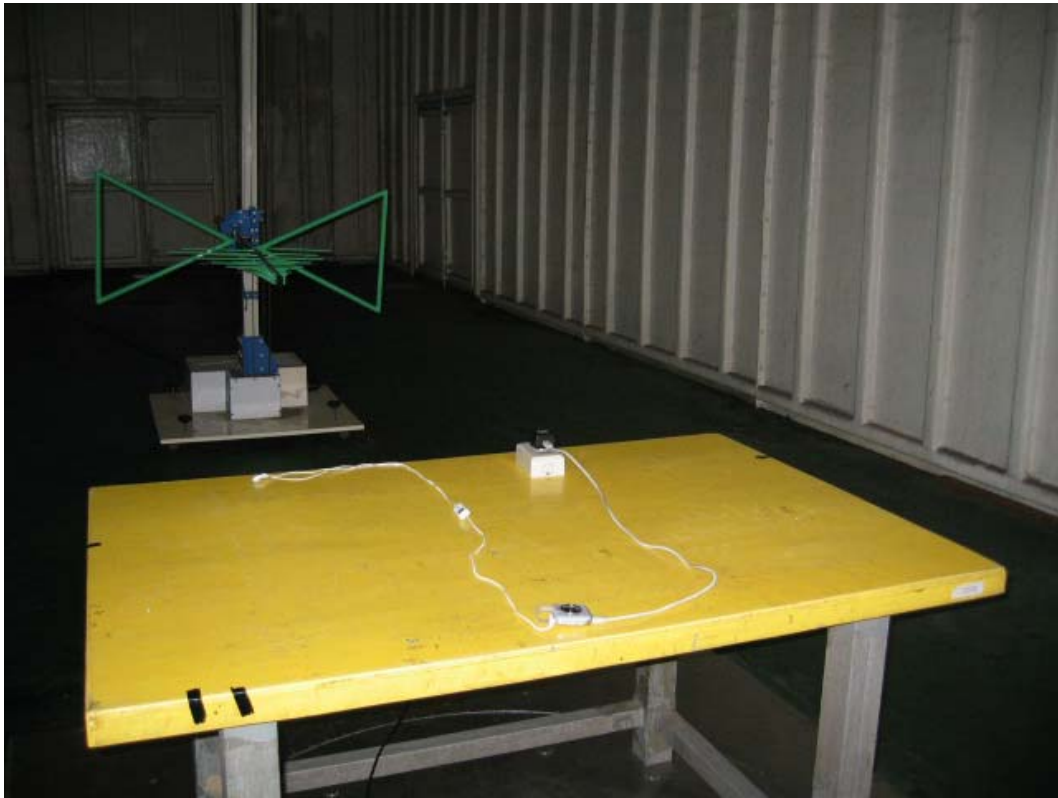
Front View of Conducted Test



Back View of Conducted Test



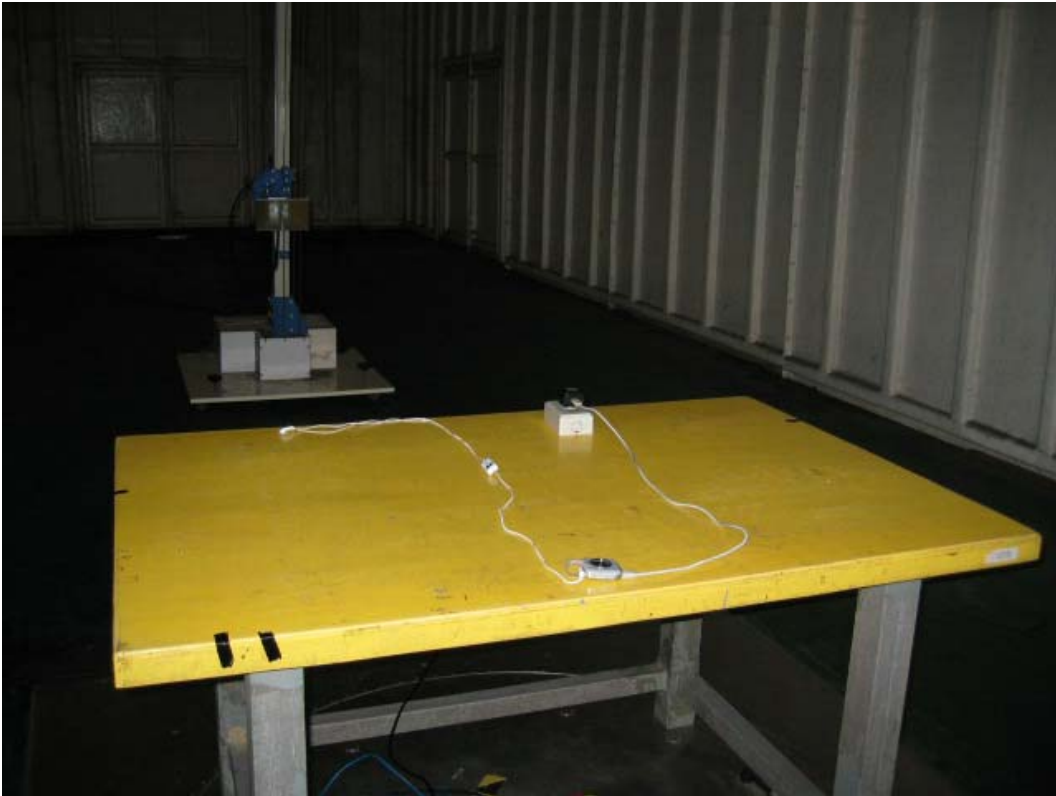
Front View of Radiated Test



Back View of Radiated Test



Front View of Radiated Test (Horn)



Back View of Radiated Test (Horn)



Attachment 2 : EUT Detailed Photographs

Attachment 2 : EUT Detailed Photographs

(1) EUT Photo



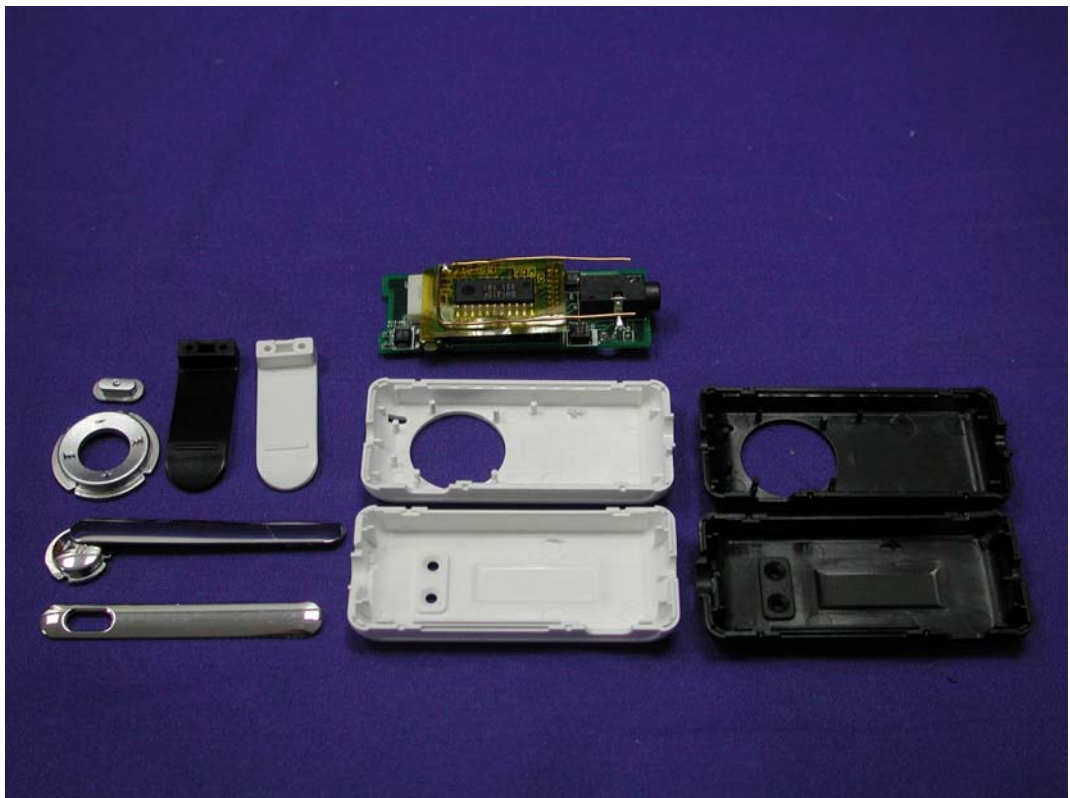
(2) EUT Photo



(3) EUT Photo



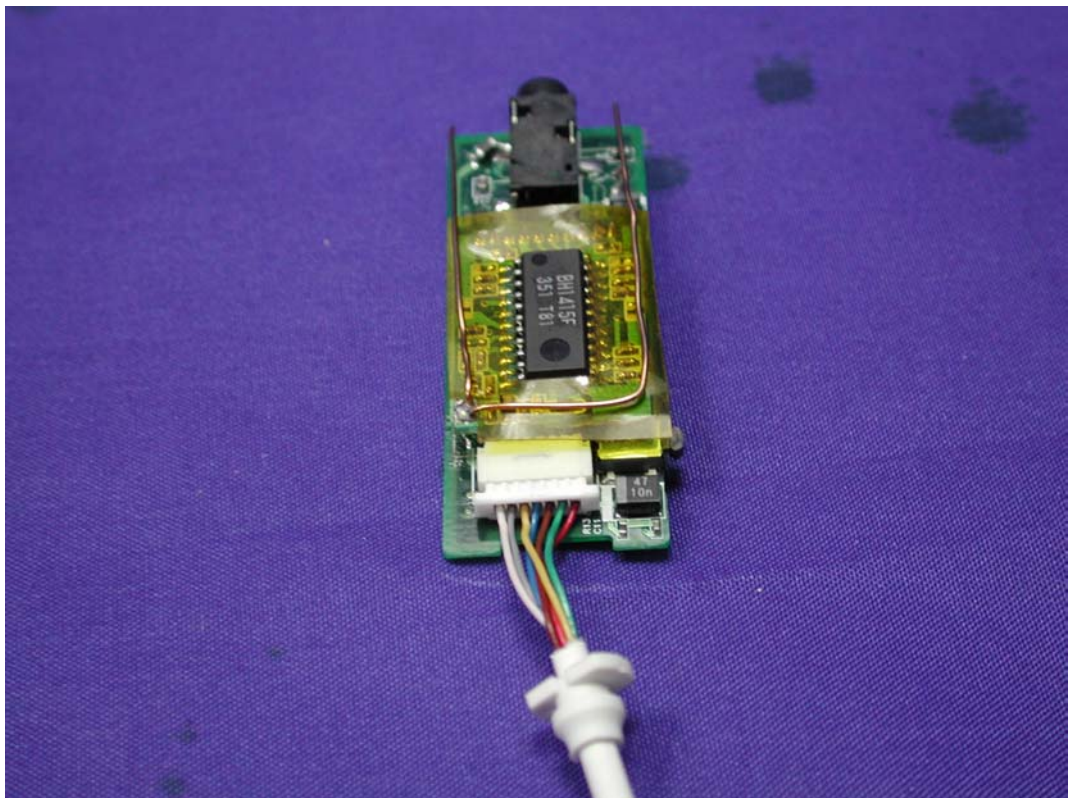
(4) EUT Photo



(5) EUT Photo



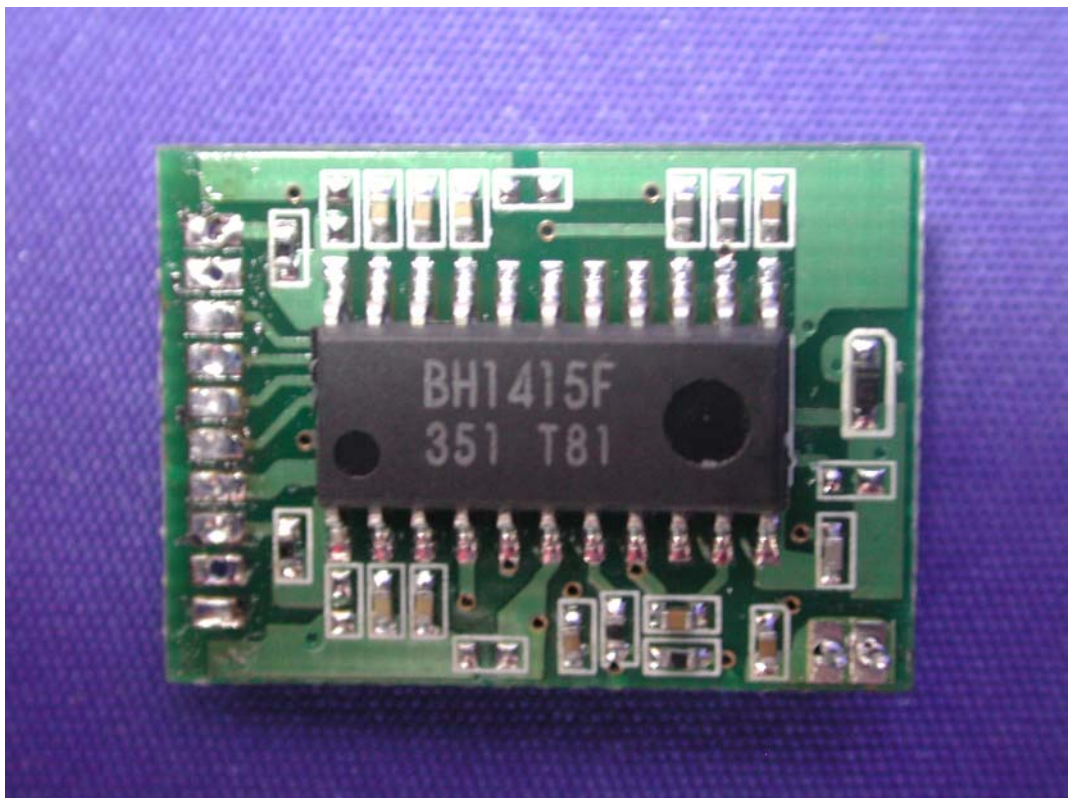
(6) EUT Photo



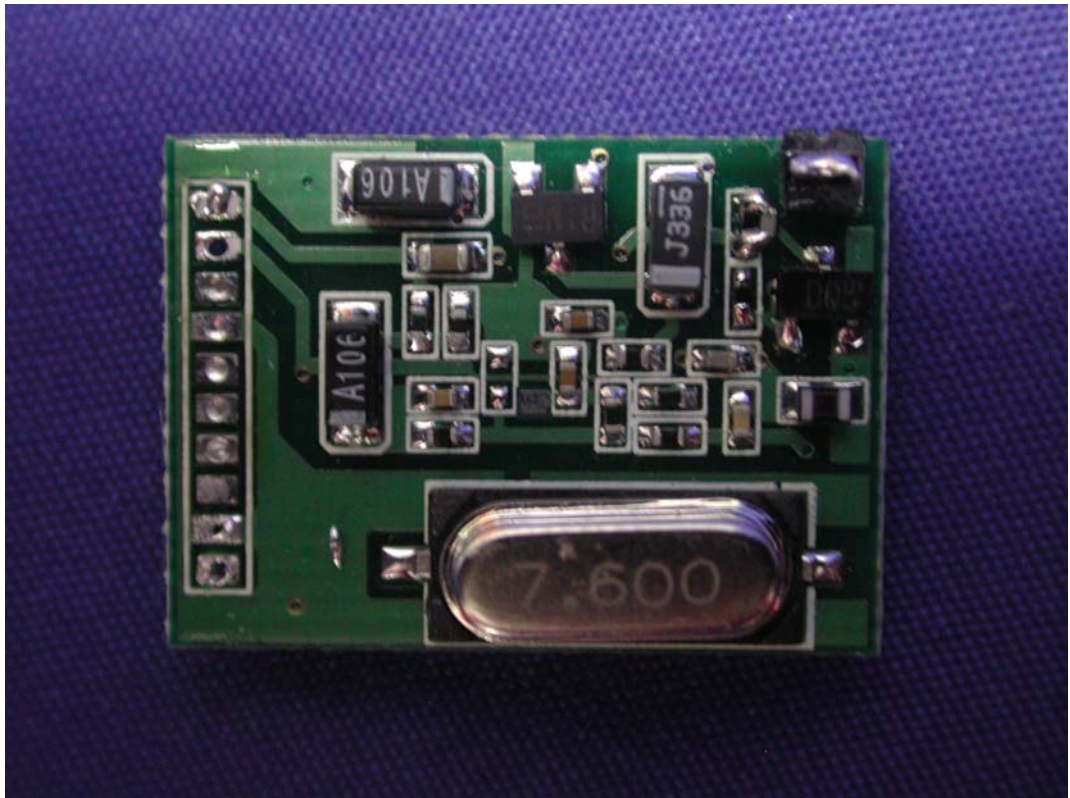
(7) EUT Photo



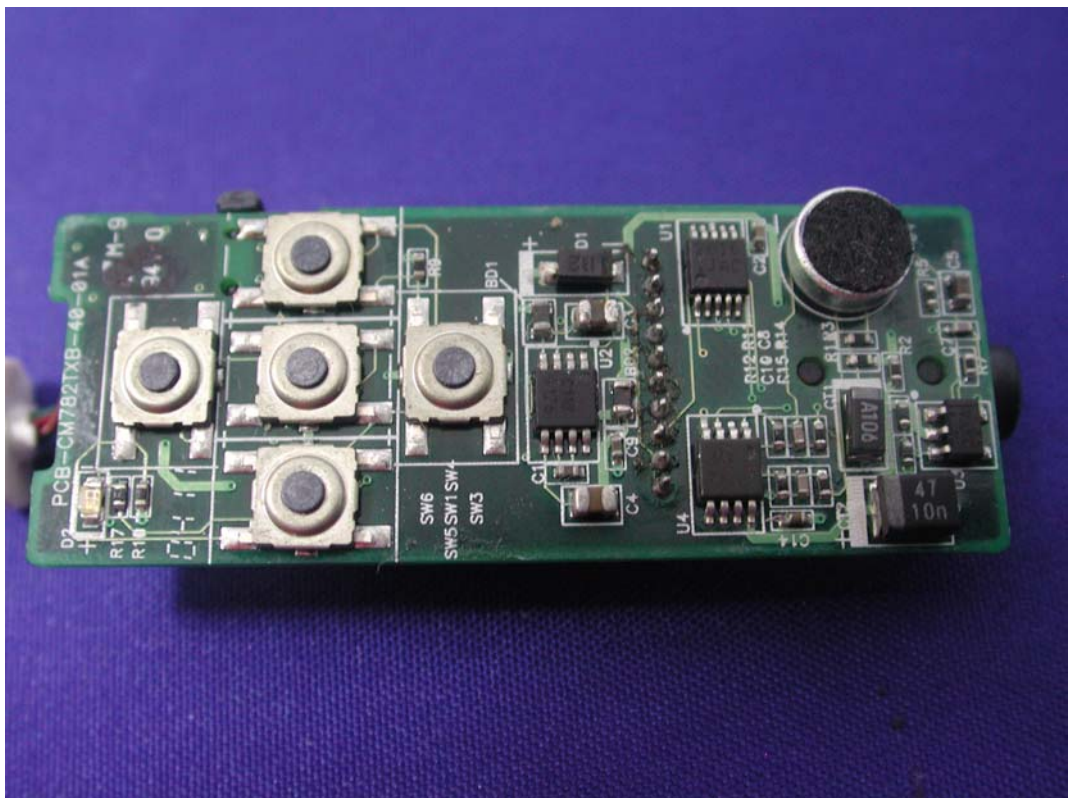
(8) EUT Photo



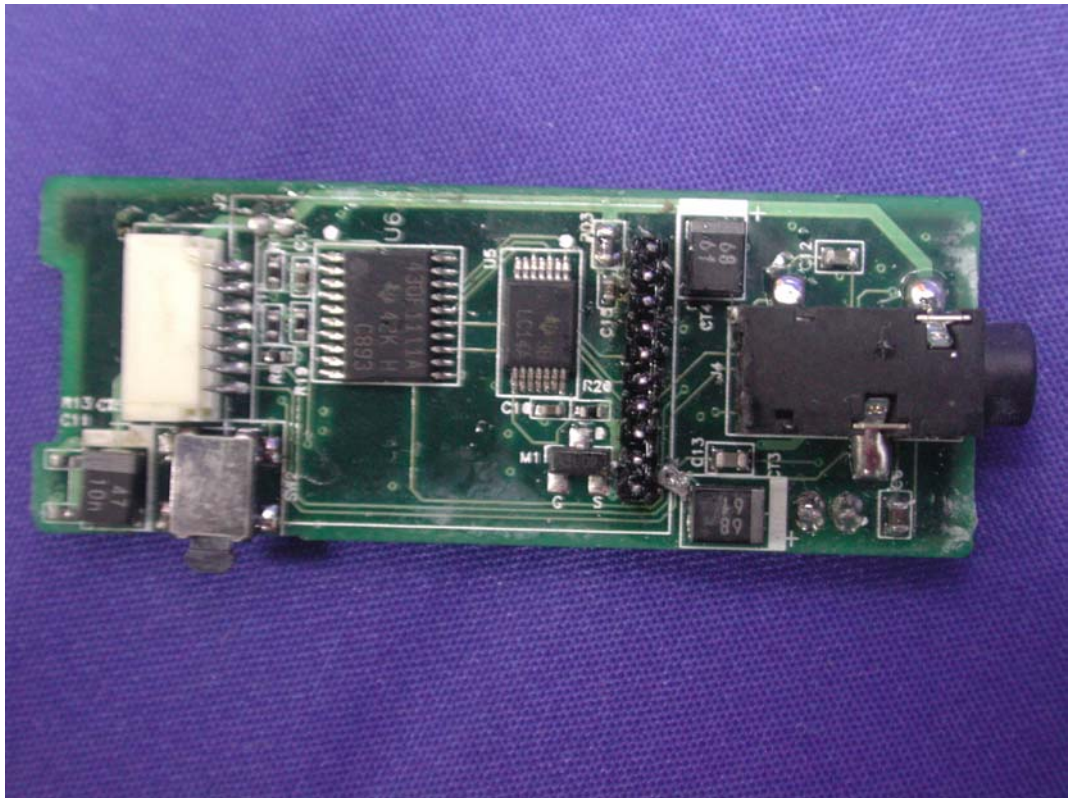
(9) EUT Photo



(10) EUT Photo



(11) EUT Photo



(12) EUT Photo



(13) EUT Photo

