Ke Mei Ou Laboratory Co., Ltd.

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Ke Mei Ou Lab Corp.
FEDERAL COMMUNICATIONS COMMISSION
Registration Number: 125782
INDUSTRY CANADA
Registration Number: IC4986

FCC TEST REPORT

Under

FCC Part 74 Subpart H,

Prepared For:

Logitek Standard Electronics Cable Manufacturing Co., Ltd.

Science & Technology Zone, Jiangshan Town, Yinzhou District, Ningbo Zhejiang, China.

FCC ID: TPYTRM801
EUT: Wireless Microphone
Model: TRM 801

October 17, 2005

Report Type: Original Report
Test Engineer: Peter Lin
Test Date: October 10, 2005
Review By:  Apollo Liu / Manager

TABLE OF CONTENTS

1. General Information

1. 1 Notes

The test results of this report relate exclusively to the test item specified in 1.5. The KMO Lab does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the KMO Lab.

1. 2 Testing Laboratory

Ke Mei Ou Laboratory Co., Ltd.
7A, Jiaxiangge, Jiahuixincheng, No.3027, Shennan Rd., Futian, Shenzhen, Guangdong, P.R.China.
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Site on File with the Federal Communications Commission – United Sates
Registration Number: 125782
For 3 & 10 meter OATS

Site Listed with Industry Canada of Ottawa, Canada
Registration Number: IC4986
For 3 & 10 meter OATS

1. 3 Details of Applicant

Name : Logitek Standard Electronics Cable Manufacturing Co., Ltd.
Address : Science & Technology Zone, Jiangshan Town, Yinzhou District, Ningbo Zhejiang, China.
Contact : Yin Bangyan
Tel : + 86 574 87065582
Fax : + 86 57487065539

1. 4 Application Details

Date of Receipt of Application : August 24, 2005
Date of Receipt of Test Item : August 26, 2005
Date of Test : October 10~October 17, 2005

1. 5 Test Item

Manufacturer : See Applicant
Brand Name : Audio Master, Laner
Model No. : TRM 801
Description : Wireless Microphone

Additional Information

Frequency : 801.785MHz
Modulation Mode : FM
Nominal Deviation : ±30KHz
Audio Frequency Response : N/A
S/N Ratio : >90dB
T.H.D : <1%
Service Areas : N/A
Power : Transmitter DC9V; Receiver 12VDC/0.1A
Operating environment Temp. : N/A

1. 6 Test Standards

FCC Part 74 Subpart H

Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

2. Technical Test

2. 1 Summary of Test Results

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.207	Conducted Test	N/A	Owing to the DC operation of EUT, this test item is not performed.
FCC Part 74, Paragraph 74.861(e)(1)(i)	Output Power Measurement	PASS	Complies.
FCC Part 2, Paragraph 2.1047(a)	Modulation Characteristics	PASS	Complies.
FCC Part 2, Paragraph 2.1049 (c)(1)	Occupied Bandwidth of Emission	PASS	Complies.
FCC Part 2, Paragraph 2.1053 & FCC Part 74, Paragraph 74.861(e)(6)	Field Strength of Emission	PASS	Complies.
FCC Part 2, Paragraph 2.1055 (a)(1)(d)(2) & FCC Part 74, Paragraph 74.861(e)(4).	Frequency Stability	PASS	Complies.

Note: FCC Part2, Paragraph 2.1033(C)(8) The dc voltages applied to and dc currents into the several elements of the final radio frequency amplifying device for normal operation over the power range: 9VDC, Current 26mA.

3. EUT Modifications

No modification by Ke Mei Ou Laboratory Co., Ltd.

4. Conducted Power Line Test

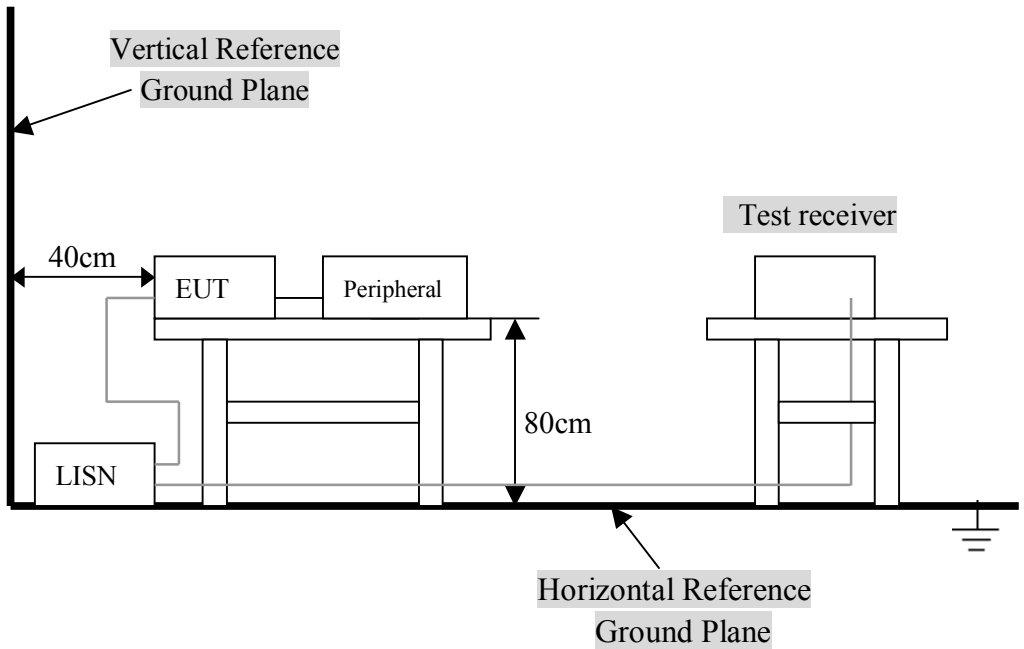
4. 1 Test Equipment

Please refer to Section 12 this report.

4. 2 Test Procedure

The EUT was tested according to ANSI C63.4 - 2003. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm / 50 u-Henry as specified by section 5.1 of ANSI C63.4 - 2003.cables and peripherals were moved to find the maximum emission levels for each frequency.

4. 3 Test Setup



For the actual test configuration, Please refer to the related items – Photos of Testing.

4. 4 Configuration of The EUT

Four frequencies are provide by EUT. The 4 frequencies of 710.4MHz, 734.6MHz, 802.525MHz, 805.9MHz were for test.
Note:

1) Below 1GHz, the frequency 710.4MHz, 734.6MHz, 802.525MHz, 805.9MHz were pre-tested in chamber. The frequency 710.4MHz, worst case one, was chosen for radiated emission test.
2) Above 1GHz, the frequency 710.4MHz, 734.6MHz, 802.525MHz, 805.9MHz were tested individually.

A. EUT

Device	Manufacturer	Model #	FCC ID
Wireless Microphone	Logitek Standard Electronics Cable Manufacturing Co., Ltd.	TRM801	TPYTRM801

B. Internal Devices

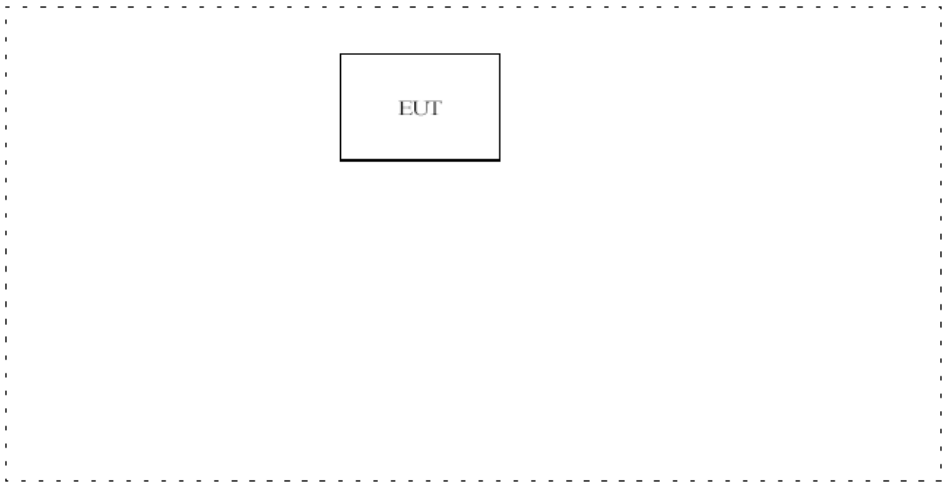
Device	Manufacturer	Model #	FCCID / DoC
N/A			

C. Peripherals

Device	Manufacturer	Model # Serial #	FCC ID/ DoC	Cable
N/A				

4. 5 EUT Operating Condition

Operating condition is according to ANSI C63.4 - 2003.
A. Setup the EUT and simulators as shown on follow.
B. Enable RF signal and confirm EUT active.
C. Modulate output capacity of EUT up to specification.



4. 6 Conducted Power Line Emission Limits

FCC Part 15 Paragraph 15.207 (dBuV)		
Frequency Range (MHz)	**Class A QP/AV**	**Class B QP/AV**
0.15 – 0.5	79/66	66-56/56-46
0.5 – 5.0	73/60	56/46
5.0 - 30	73/60	60/50

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

4. 7 Conducted Power Line Test Result

Owing to the DC operation of EUT, this test item is not performed.

5. Output Power Measurement

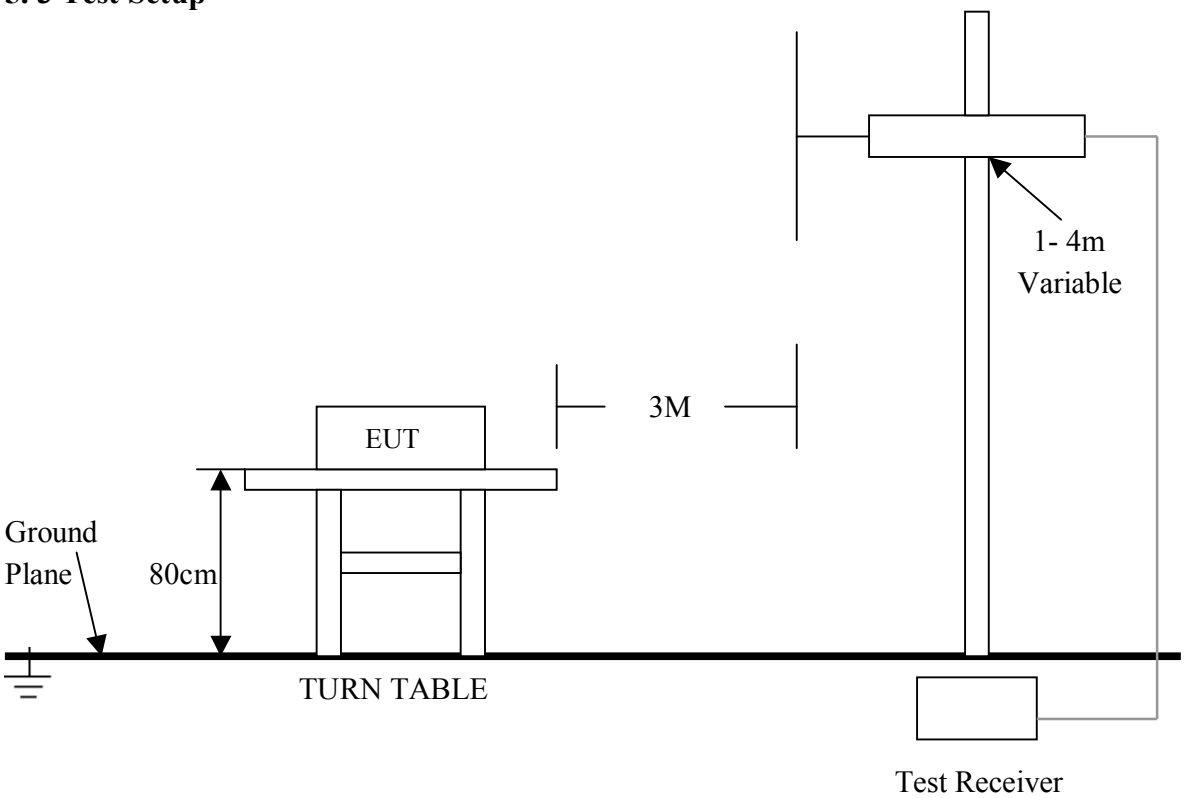
5. 1 Test Equipment

Please refer to Section 12 this report.

5. 2 Test Procedure

1. Setup the configuration as section 5.3 this report test setup for frequencies measured below and above 1GHz respectively. adjusting the input voltage to produce the maximum power as measured.
2. Adjust the analyzer for each frequency measured in chapter 6 on a 1MHz frequency span and 1MHz resolution bandwidth.
3. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on test receiver, then change the orientation of EUT on test table over a range from 0 degree to 360 degree, and record the highest value indicated on test receiver as reference value.
4. Repeat step 3 until all frequencies need to be measured were complete.
5. Repeat step 4 with search antenna in vertical polarized orientations.
6. Replace the EUT with a tuned dipole antenna (horn antenna for above 1GHz) relative to each frequency in horizontally polarized orientation and as the same polarized orientation with search antenna. Connect the tuned dipole antenna to a standard signal generator(SG) via a low loss cable. Power on the SG and tune the right frequency in measuring as well as set SG at a appreciated output level. Rise and lower the search antenna to get the highest value on test receiver, and then hold this position. Adjust the SG output to get a identical value derived from step 3 on test receiver. Record this value for result calculated.
7. Repeat step 6 until all frequencies need to be measured were complete.
8. Repeat step 7 with both dipole antenna (horn antenna for above 1 GHz) and search antenna in vertical polarized orientations.

5. 3 Test Setup



For the actual test configuration , please refer to the related items – Photos of Testing.

5. 4 Configuration of The EUT
Same as section 4 . 4 of this report

5. 5 EUT Operating Condition
Same as section 4 . 5 of this report.

5. 6 Rules and Specification Limits
According to § 74.861(e)(1)(i), the output power shall not exceed 50 milliwatts.

5. 7 Output Power Test Result

801.785MHz (ERP)

Product	: Wireless Microphone	Test Mode	: 801.785MHz
Test Item	: Output Power Measurement	Temperature	: 25 ℃
Test Voltage	: DC 9V	Humidity	: 56%RH
Test Result	: **PASS**		

Frequency. (MHz)	Result (dBm)	Output Power (mW)	Limit (mW)
801.785	-4.14	0.39	50.0

5. 8 Result Calculation

Result calculation is as following:
Result = SG Reading + Cable Loss + Antenna Gain Corrected
Antenna Gain Corrected: is used for antenna other than dipole to convert radiated power to ERP.

$$mW = \log^{-1}\left[\frac{Result(dBm)}{10}\right]$$

6. Modulation Characteristics

6. 1 Test Equipment

Please refer to Section 12 this report.

6. 2 Test Procedure

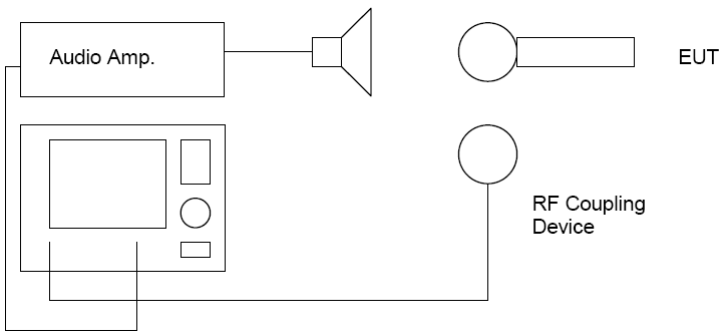
A. Audio Frequency Response

1) The audio signal was coupled to the microphone via a calibrated loudspeaker.
2) The audio signal was adjusted for 20% nominal modulation at 1 kHz. This was taken as 0 dB reference.
3) With input level held constant, the audio signal was varied from 100Hz to 30kHz.
4) The response was measured and recorded with a CMS54 Radiocommunication Tester.

B. Modulation Limit

1) The audio signal was coupled to the microphone via a calibrated loudspeaker.
2) The modulation response was measured for 100Hz to 15kHz including the frequency with maximum response found during "Audio Frequency Response Test".
3) The input level was varied from 30% modulation to 20 dB higher than the saturation point. The resulting deviation was measured with a CMS54 Radiocommunication Tester.
4) Measurements were performed for positive and negative deviation.

6. 3 Test Setup

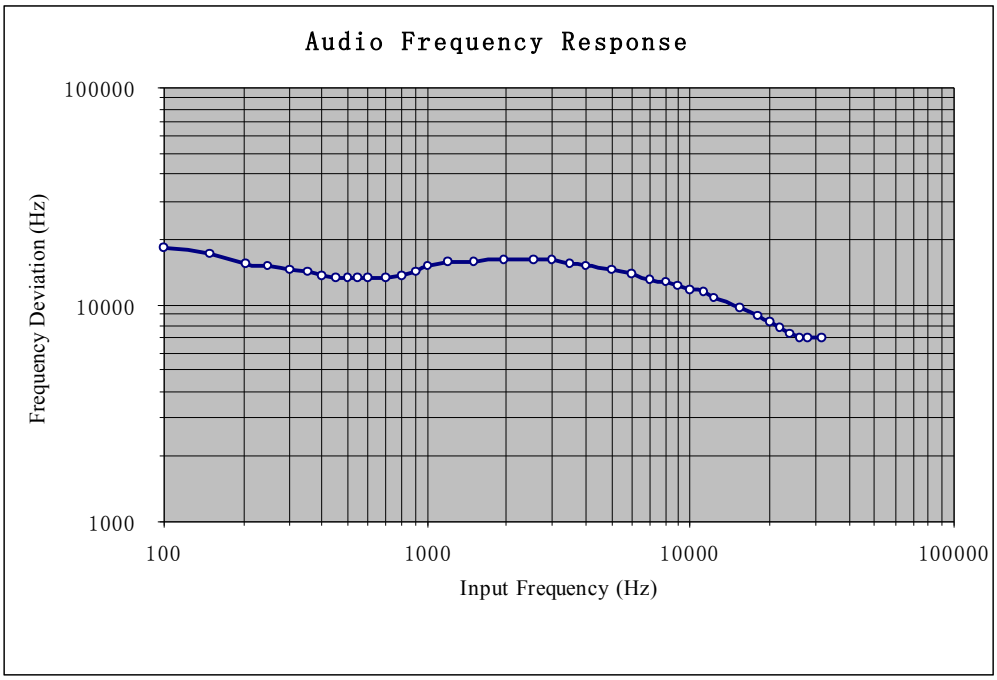


6.4 Rules and Specification Limits

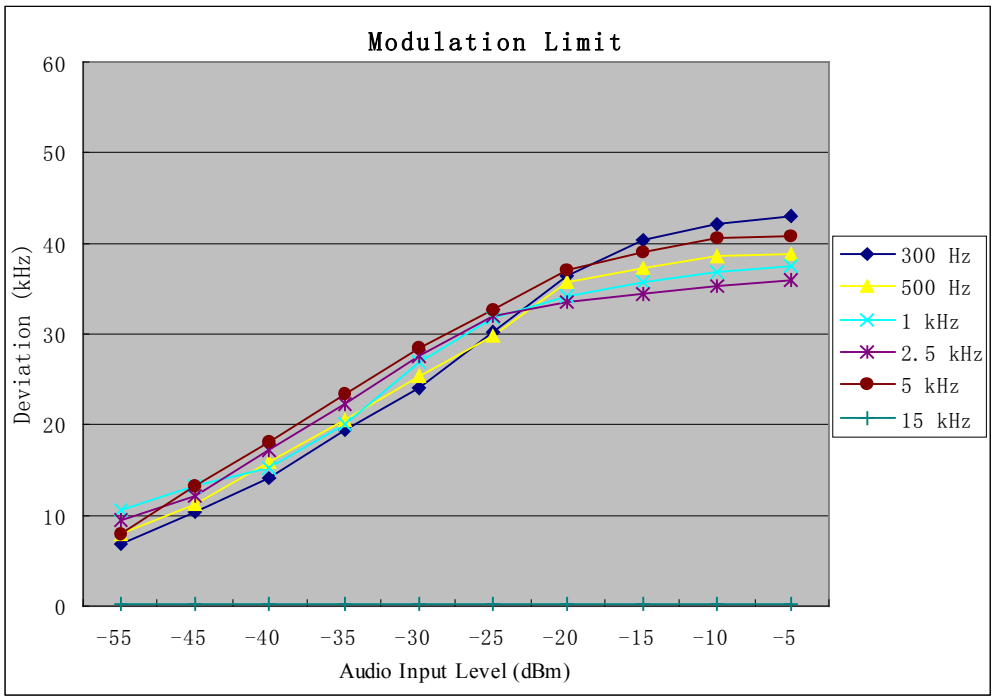
According to § 2.1047 (a), for Voice Modulated Communication Equipment, the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be measured.

6. 5 Test Result

A. Audio Frequency Response



B. Modulation Limit



7. Occupied Bandwidth of Emission

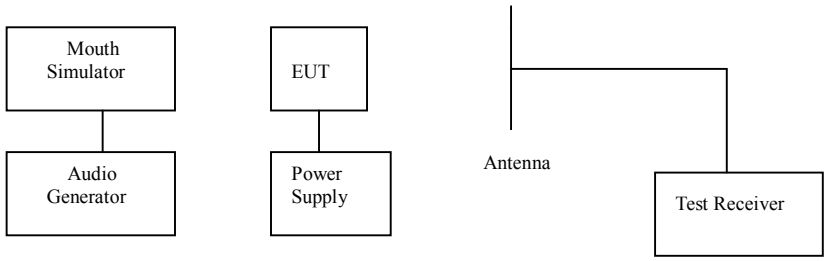
7. 1 Test Equipment

Please refer to Section 12 this report.

7. 2 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Set the output of the signal generator to 15KHz. Increase the amplitude of the signal, while monitoring the modulation meter. Until modulation is maximum measure the bandwidth under 26dB compared to the unmodulated fundamental carrier peak level of the modulated signal displayed on the test receiver

7. 3 Test Setup



7. 4 Rules and Specification Limits

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

According to § 74.861 (e)(3), Any form of modulation may be used. A maximum deviation of ±75 KHz is permitted when frequency modulation is employed.

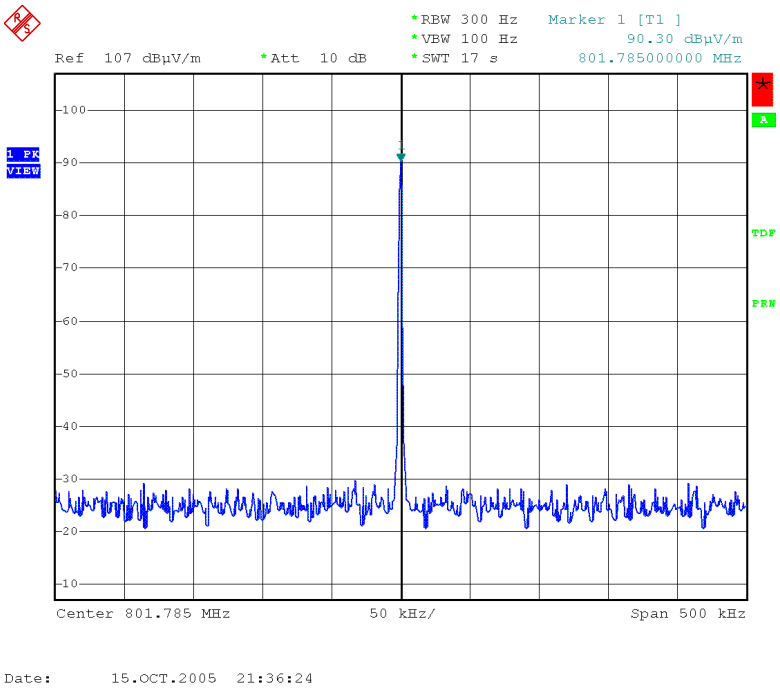
According to § 74.861 (e)(5), The operation bandwidth shall not exceed 200KHz.

7. 5 Occupied Bandwidth Test Result

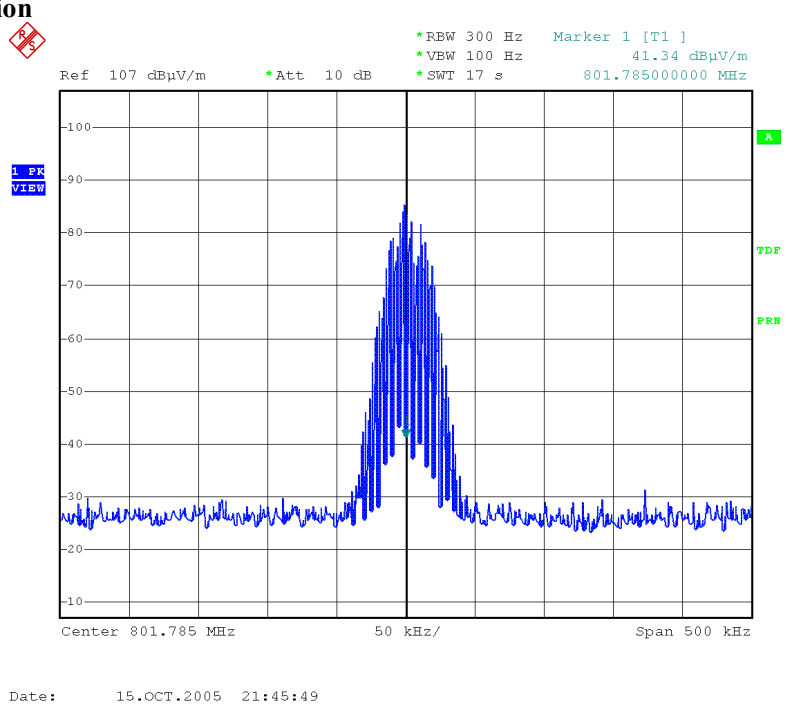
The occupied bandwidth's plot is presented on following pager, which illustrates compliance with the rules.
Calculation of Necessary Bandwidth (Bn)
Bn = 2M +2DK
M = Max. Modulation Frequency = 15.0 KHz
D = Peak Frequency Deviation = 43KHz
K = 1
Bn = 116KHz

Product	: Wireless Microphone	Test Mode	: 801.785MHz
Test Item	: Output Power Measurement	Temperature	: 25 ℃
Test Voltage	: DC 9V	Humidity	: 56%RH
Test Result	: **PASS**		

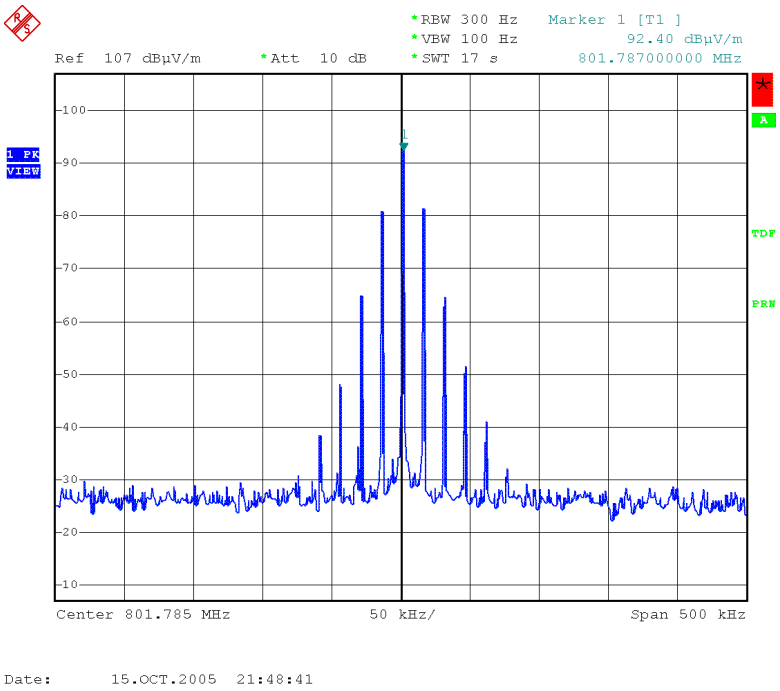
Unmodulated



2.5 kHz Modulation



15KHz modulation



8. Field Strength of Emission

8. 1 Test Equipment

Please refer to Section 12 this report.

8. 2 Test Procedure

1. Setup the configuration in Section 5.3 this report for frequencies measured below and above 1GHz respectively, adjusting the input voltage to produce the maximum power as measured in Section 5 this report.
2. Adjust the test receiver for each frequency measured on a 1MHz frequency span and 1MHz resolution bandwidth.
3. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on test receiver. Then change the orientation of EUT on test table over a range from 0 degree to 360 degree, and record the highest value indicated on test receiver as reference value.
4. Repeat step 3 until all frequencies need to be measured were complete.
5. Repeat step 4 with search antenna in vertical polarized orientations.
6. Replace the EUT with a tuned dipole antenna (horn antenna for above 1GHz) relative to each frequency in horizontally polarized orientation and as the same polarized orientation with search antenna. Connect the tuned dipole antenna to a standard signal generator (SG) via a low loss cable. Power on the SG and tune right frequency in measuring as well as set SG at a appreciated output level. Rise and lower the search antenna to get the highest value on test receiver, and then hold this position. Adjust the SG output to get a identical value derived from step 3 on test receiver. Record this value for result calculated.
7. Repeat step 6 until all frequency need to be measured were complete.
8. Repeat step 7 with both dipole antenna (horn antenna for above 1GHz) and search antenna in vertical polarized orientations.

8. 3 Rules and Specification Limits

According to § 2.1053(a): ANSI/ TIA/ EIA-603-1992, Paragraph 2.2.12,

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

According to § 74.861 (e)(6)(iii):

Spurious and harmonics must be at least 43 + 10log(Output Power) below the carrier peak.

According to § 2.1057:

In all measurements set forth, the test receiver should be investigated from the lowest radio frequency generated in the equipment up to at least the 10^{th} harmonic of the carrier frequency.

8. 4 Test Result

Product	: Wireless Microphone	Test Mode	: 801.785MHz
Test Item	: Field Strength of Emission	Temperature	: 25 ℃
Test Voltage	: DC 9V	Humidity	: 56%RH
Test Result	: **PASS**		

Unmodulated carrier output power is -4.14 dBm, or 0.39mW(ERP). The limit of spurious or harmonics is calculated as following:

-4.14 –[43+10log(carrier output power in W)], or –13dBm

801.785MHz

Frequency (MHz)	Result (dBm) Hori.	Result (dBm) Vert.	Limit (dBm)	Margin (dB) Hori.	Margin (dB) Vert.
35.680	-65.12	-64.66	-13	-52.12	-51.66
40.880	-64.64	-54.88	-13	-51.64	-41.88
400.880	-56.34	-52.86	-13	-43.34	-39.86
1603.570	-59.64	-58.57	-13	-46.64	-45.57
2405.355	-56.63	-55.54	-13	-43.63	-42.54
3207.140	-58.57	-56.44	-13	-45.57	-43.44

Note: a. For measured frequency below 1GHz, a tuned dipole antenna is used.
b. Result calculation is as following:
Result = SG Reading + Cable Loss + Antenna Gain Corrected.
Antenna Gain Corrected: is used for antenna other than dipole to convert radiated power to ERP.
c. Spurious or harmonics above 1 GHz is too low to be detected or attenuated more than 60dB from limit value.

9. Frequency Stability Measurement

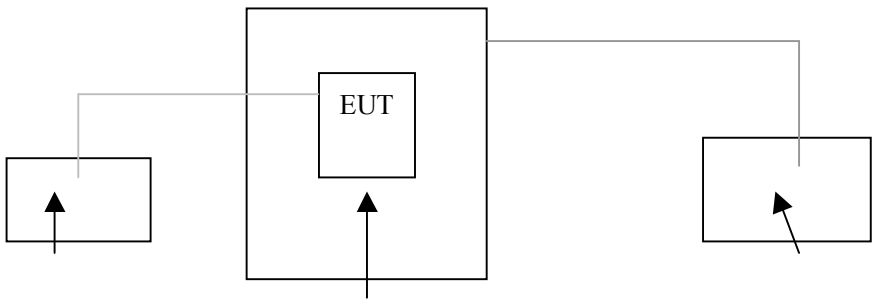
9. 1 Test Equipment

Please refer to Section 12 this report.

9. 2 Test Procedure

1. Place the EUT in the chamber, powered in its normal operation.
2. Set the temperature of the chamber –30 degree Centigrade. Allow the equipment to stabilize at that temperature.
3. Measurement the carrier frequency using preamplifier and frequency counter.
4. Repeated procedures 1 to 3 from –20 to 50 degree Centigrade at internals of 10 degree.

9. 3 Test Setup



9. 4 Rules and Specification Limits

According to § 2.1055 (a)(1), The frequency stability shall be measured with variation of ambient temperature from -30℃ to + 50℃ centigrade, and according to § 2.1055 (d)(2), the frequency stability shall be measured with reducing primary supply voltage to the battery operating end point which is specified by the manufacturer.

According to § 74.861(e)(4): The frequency tolerance of the transmitter shall be 0.005 percent.

9. 5 Test Result

Frequency stability versus environment temperature
Wireless Microphone Transmitter: DC9V

Environment Temperature (℃)	Power Supplied (Vdc)	Frequency Measured (MHz)	Frequency Tolerance (ppm)	Nominal Frequency	Limit (ppm)
50	New Batt.	801.7610	-29.9332	801.785	50
40	New Batt.	801.7690	-19.9555	801.785	50
30	New Batt.	801.7750	-12.4722	801.785	50
20	New Batt.	801.7810	-4.9889	801.785	50
10	New Batt.	801.7910	7.4833	801.785	50
0	New Batt.	801.7968	14.7172	801.785	50
-10	New Batt.	801.8020	21.2027	801.785	50
-20	New Batt.	801.8127	34.5479	801.785	50
-30	New Batt.	801.8136	35.6704	801.785	50

Frequency stability versus end-point supplied voltage (DC7V)

Environment Temperature (℃)	Power Supplied (Vdc)	Frequency Measured (MHz)	Frequency Tolerance (ppm)	Nominal Frequency	Limit (ppm)
25	End-Point	801.789	4.9889	801.785	50

10. Photos of Testing

10. 1 EUT Test Photographs

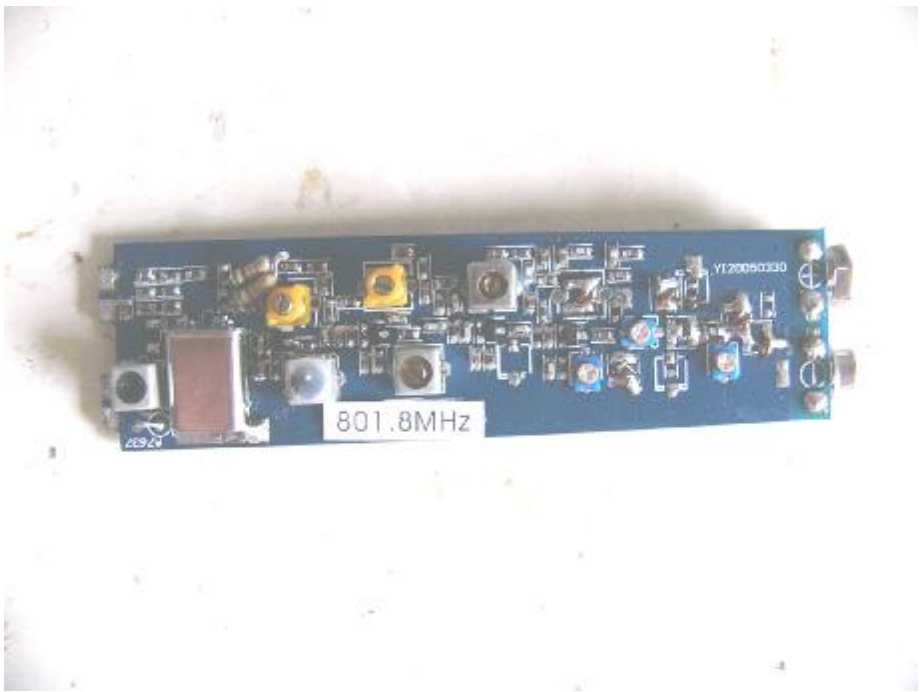
Radiated emission test view

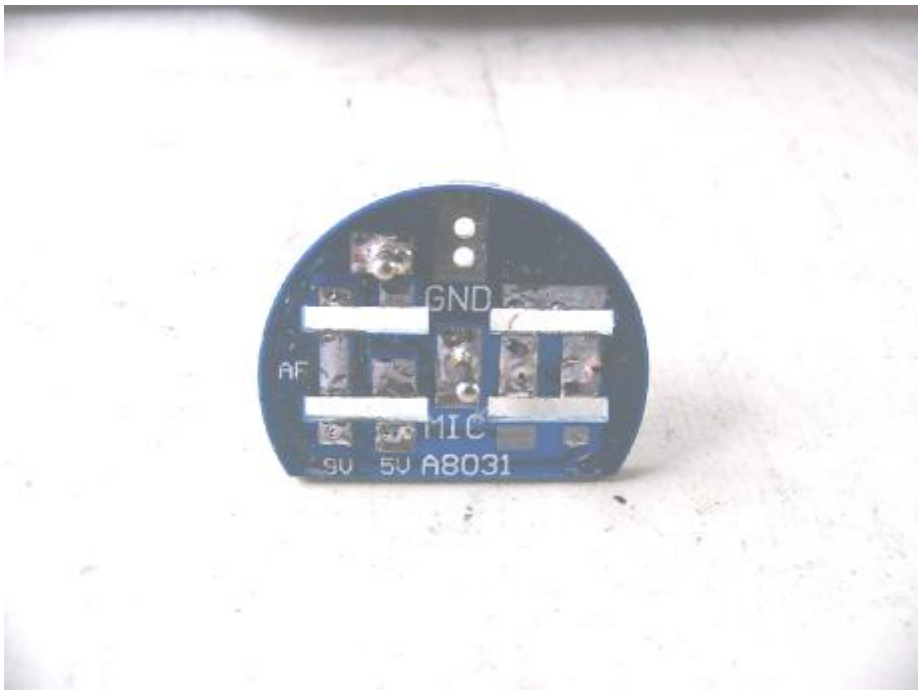
10. 2 EUT Detailed Photographs

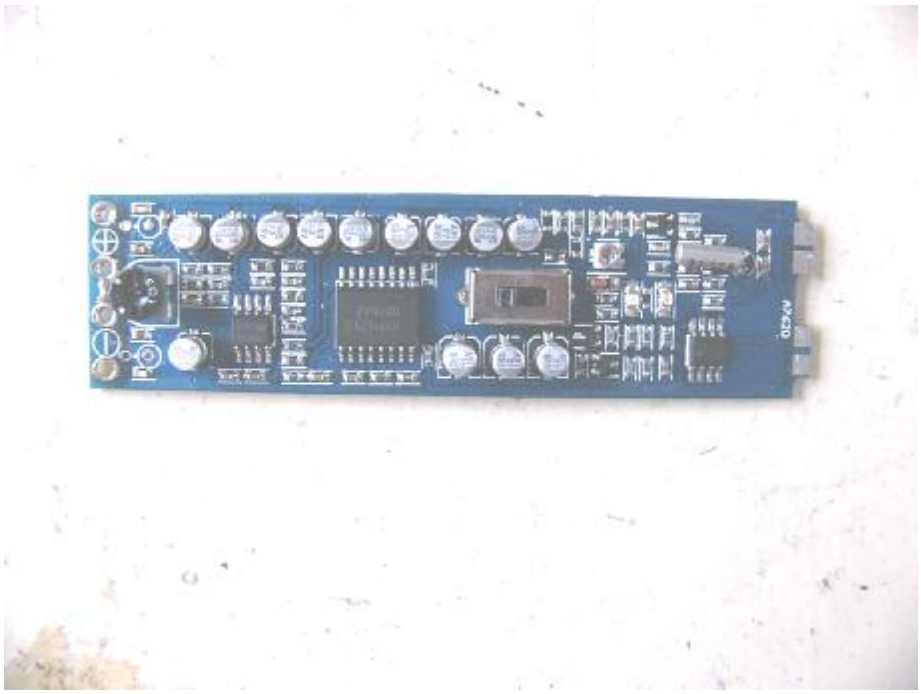
Tx EUT view

Tx EUT inside whole view

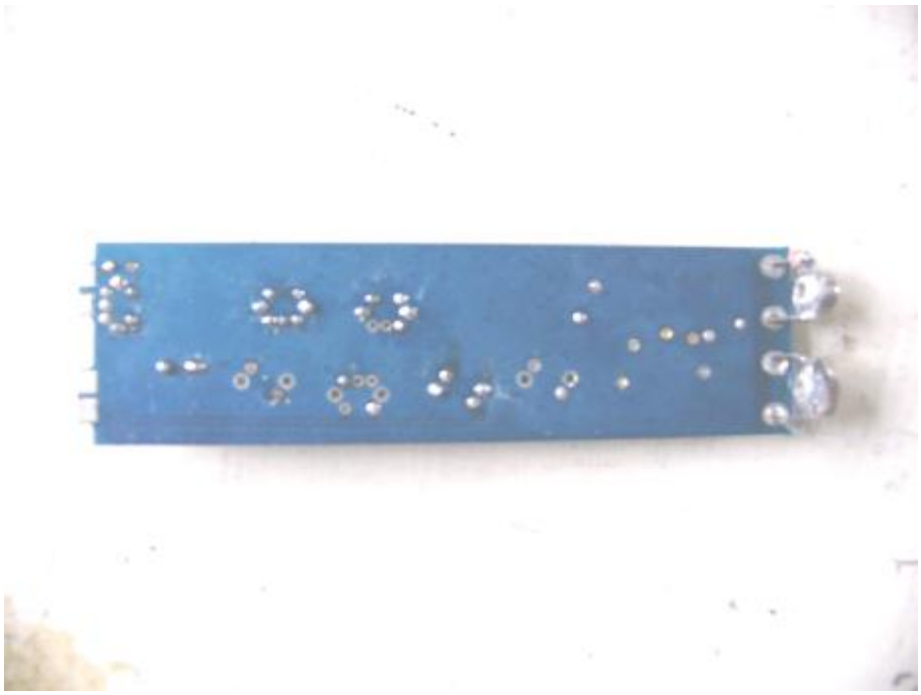
Tx Main board component side

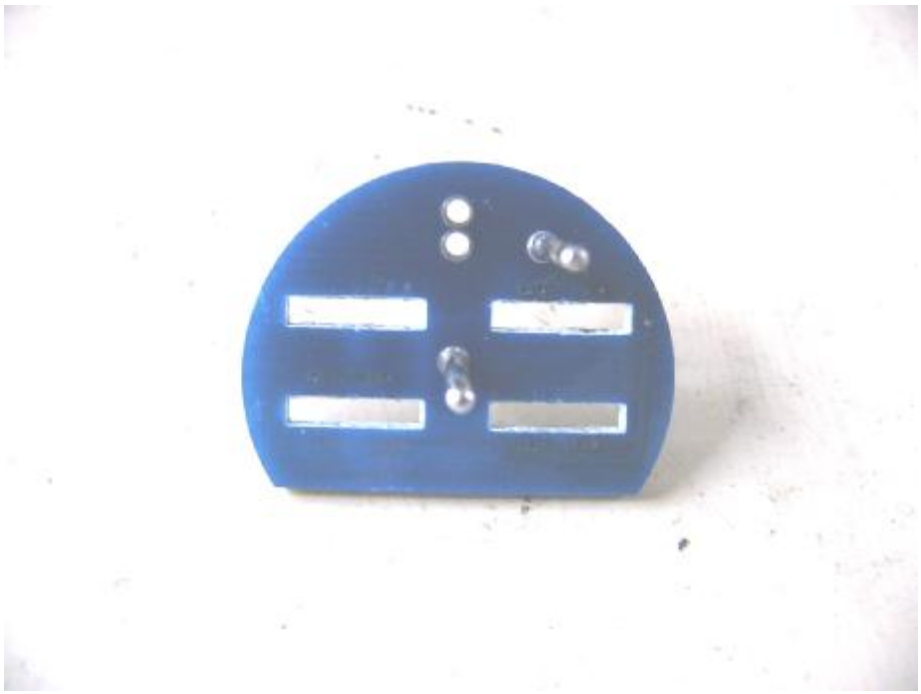


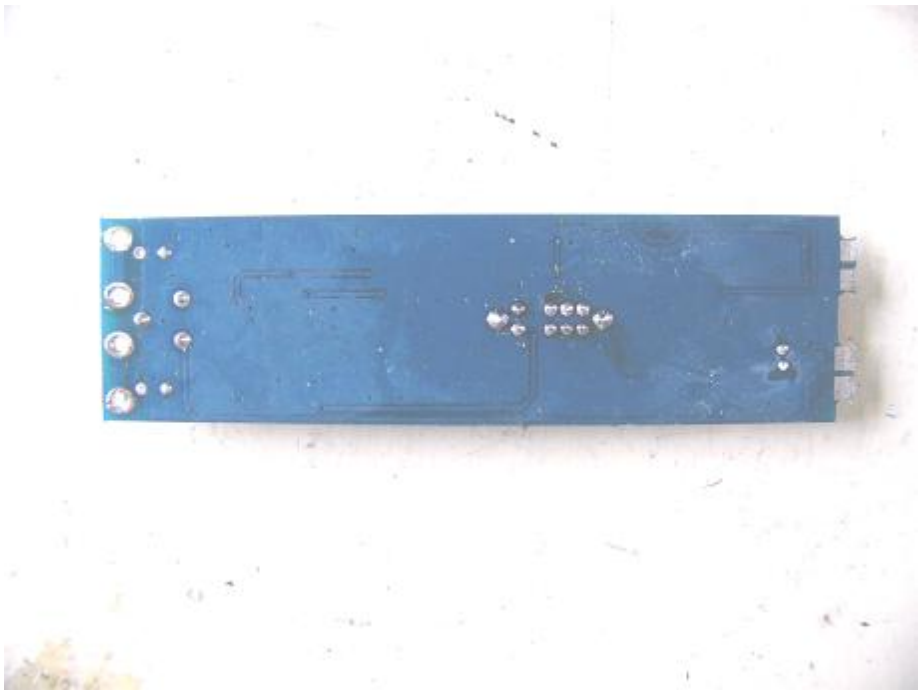

GND
AF
MIC
9V 5V A8031



Tx Main board solder side







11. FCC ID Label

FCC ID: TPYTRM801

This device complies with Part 74 of the FCC Rules.

The Label must not be a stick-on paper label. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT

EUT Bottom View/Proposed FCC ID Location

12. Test Equipment

The following test equipments were used during the radiated & conducted emission test:

Equipment/ Facilities	Manufacturer	Model #	Serial No.	Date of Cal.	Due Date
Turntable	KMO	KSZ001T	200306	NCR	NCR
Antenna Tower	KMO	KSZ002AT	200307	NCR	NCR
OATS	KMO	KSZSITE001	N/A	July 06, 2005	July 06, 2006
EMI Test Receiver	Rohde & Schwarz	ESPI3	100180	Oct.18, 2004	Oct.18, 2005
Signal Generator	Rohde & Schwarz	SMT03	100059	Feb.01, 2005	Feb.01, 2006
Signal Generator	FLUKE	PM5418+Y/C	LO747012	Feb 01, 2005	Feb 01, 2006
Signal Generator	FLUKE	PM5418TX	LO738007	Feb 01, 2005	Feb 01, 2006
Biconical Antenna	Rohde & Schwarz	HK116	EMC0502	Dec. 14,2004	Dec. 14,2005
Bilog Antenna	Chase	CBL6111C	2576	Feb.01, 2005	Feb.01, 2006
Ultra Broadband Antenna	Rohde & Schwarz	HL 562	100110	June.05, 2005	June.05, 2006
AMN	Rohde & Schwarz	ESH3-Z5	100196	Oct. 23,2004	Oct. 23, 2005
AMN	Rohde & Schwarz	ESH3-Z5	100197	Oct. 23,2004	Oct. 23, 2005
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	N/A	N/A	N/A
Absorbing Clamp	Rohde & Schwarz	MDS-21	N/A	Oct. 29,2004	Oct. 29,2005
KMO Shielded Room	KMO	KMO-001	N/A	N/A	N/A
EMI Test Receiver	Rohde & Schwarz	ESCS30	100003	Feb. 27, 2005	Feb.27, 2006
AMN	Rohde & Schwarz	ESH3-Z5	100002	Feb. 01, 2005	Feb.01, 2006
LISN	Kyoritsu	KNW-407	8-1441-8	Feb. 23, 2005	Feb.23, 2006
EMI Test Receiver	Rohde & Schwarz	ESI26	838786/013	Feb. 01, 2005	Feb.01, 2006
Bilog Antenna	Chase	CBL6112B	2591	Feb. 01, 2005	Feb.01, 2006
Horn Antenna	Rohde & Schwarz	HF906	100014	Feb. 01, 2005	Feb.01, 2006
Power Meter	Rohde & Schwarz	NRVD	100041	Feb. 01, 2005	Feb.01, 2006
Radio Communication Test Set	Rohde & Schwarz	CMS 54	846621/024	Feb 01, 2005	Feb 01, 2006
Modulation Analyzer	Hewlett-Packard	8901B	2303A00362	Feb 01, 2005	Feb 01, 2006
SOHO Telephone Switching System	IKE	2000-108C	N/A	Feb 26, 2005	Feb 26, 2006
Temperature Chamber	TABAI	PSL-4GTW	N/A	Feb 06,2005	Feb 06, 2006
3m Semi-Anechoic Chamber	Albatross Projects	9mX6mX6m	N/A	Feb. 01, 2005	Feb.01, 2006