FCC TEST REPORT

UNDER
FCC Part 74 Subpart H,

PREPARED FOR：

Guangzhou Bai Yun New Century Electronic Factory.

Yong Tai Industrial Park, Bai Yun, Guangzhou, China

FCC ID: PDMWM-70
EUT: Wireless Microphone
Model: WM-7.0

June 23, 2003

Report Type: Original Report
Test Engineer: Peter Lin
Test Date: June 15, 2003
Review By:  Apollo Liu

PREPARED BY：

Shenzhen Academy of Metrology & Quality Inspection
Longzhu Road, Nanshan
FCC Registration Number: 97379

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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).	Measured Bandwidth	**PASS**	Complies.

2. Test Statement

2. 1 Test Statement

A. This statement explains the test condition of this project. The EUT was tested under the condition of each test item.

B. The data shown in this report reflects the worst – case data for the condition as the summary of test result.

C. EUT conditions.

Note: (1)The EUT is a Wireless Microphone and the microphone is worn by a performer and other participants in a program, filming, reporting. etc. Frequency Range: 736MHz~748.5MHz; Battery: DC 9V Battery.
(2)Regarding to the frequency band operation, 736MHz(CH Low), 744MHz(CH Mid), 748.5MHz(CH High) were selected to perform the test, then shown on this report. Type of Emission: 82KF3E.
(3) It is acknowledged by Guangzhou Bai Yun New Century Electronic Factory . that Selling Model No.: WM-7.0.

2. 2 Departure From Document Policies, Procedure or Specifications, The Statement

1. Did have Any departure from document policies & procedures or from specifications.
   Yes ___ , No □
   If yes , the description as below.

2. The report must not be used by the client to claim product endorsement by any agency the government.

3. This product is a test sample that was shown as the photos of this test report only.

4. The effect that the results relate only to the items tested.

3. EUT Modifications

No modification by Shenzhen Academy of Metrology & Quality Inspection.

4. Conducted Power Line Test

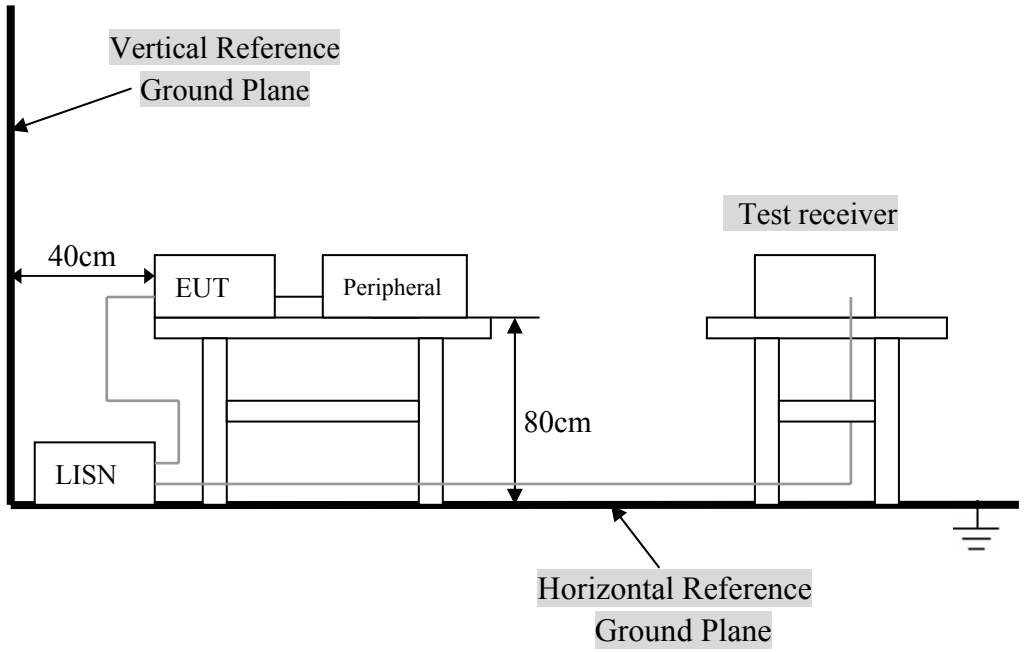
4. 1 Test Equipment

Please refer to Section 12 this report.

4. 2 Test Procedure

The EUT was tested according to ANSI C63.4 - 1992. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm / 50 uHenry as specified by section 5.1 of ANSI C63.4 - 1992. 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

The EUT was configured according to ANSI C63.4-1992. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A. EUT

DEVICE	MANUFACTURER	MODEL #	FCC ID
Wireless Microphone	Guangzhou Bai Yun New Century Electronic Factory	WM-7.0	PDMWM-70

B. Internal Devices

DEVICE	MANUFACTURER	MODEL #	FCCID / DoC
N/A			

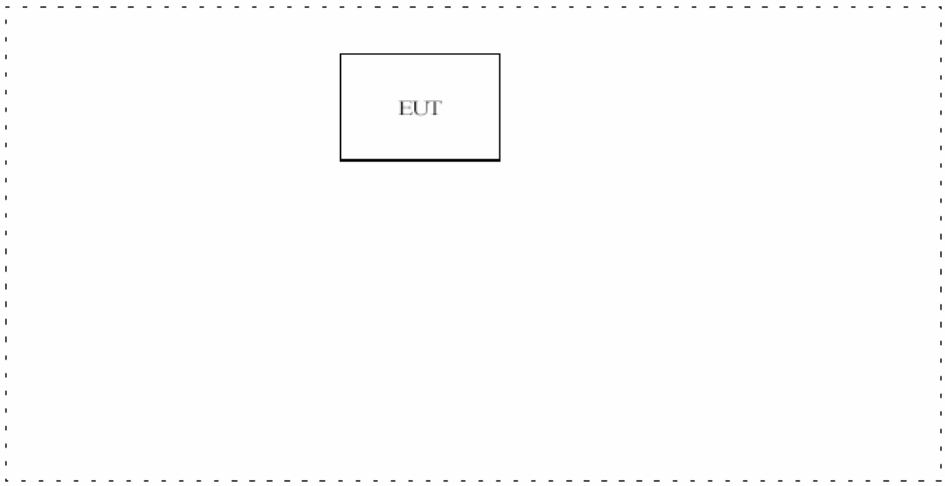
C. Peripherals

DEVICE	MANUFAC-TURER	MODEL # SERIAL #	FCC ID/ DoC	CABLE
N/A				

4. 5 EUT Operating Condition

Operating condition is according to ANSI C63.4 - 1992.

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

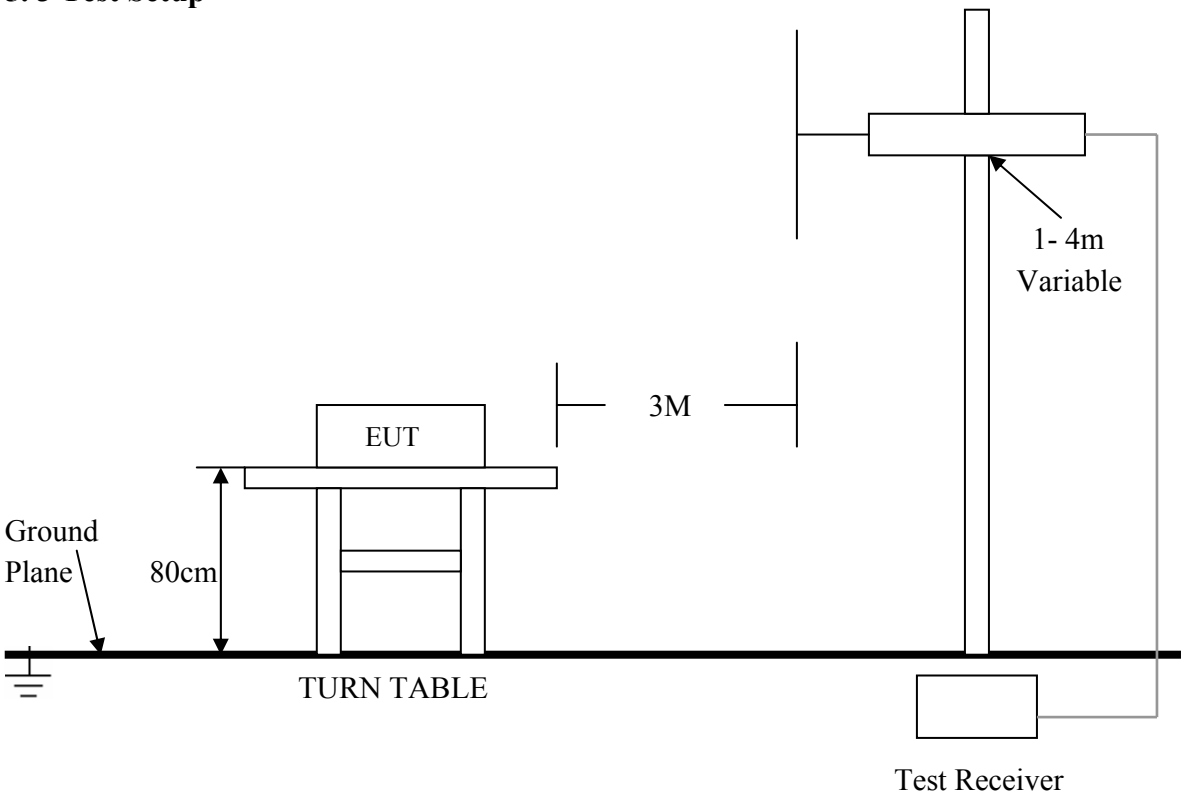
5. 1 Test Equipment

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

A. Channel Low (ERP)

Product : Wireless Microphone
Test Item : Output Power Measurement
Test Voltage : DC 9V (Power by Battery)
Test Mode : 736 MHz Channel Low
Temperature : 25 ℃
Humidity : 56%RH
Test Result : PASS

Frequency. (MHz)	Result (dBm)	Output Power (mW)	Limit (mW)
736.000	2.68	1.85	50.0

B. Channel Mid (ERP)

Product : Wireless Microphone
Test Item : Output Power Measurement
Test Voltage : DC 9V (Power by Battery)
Test Mode : 744MHz Channel Mid
Temperature : 25 ℃
Humidity : 56%RH
Test Result : PASS

Frequency. (MHz)	Result (dBm)	Output Power (mW)	Limit (mW)
744.000	2.65	1.84	50.0

C. Channel High (ERP)

Product : Wireless Microphone
Test Item : Output Power Measurement
Test Voltage : DC 9V (Power by Battery)
Test Mode : 748.5MHz Channel High
Temperature : 25 ℃
Humidity : 56%RH
Test Result : PASS

Frequency. (MHz)	Result (dBm)	Output Power (mW)	Limit (mW)
748.500	2.66	1.84	50.0

Note: For measured frequency below 1GHz, a tuned dipole antenna is used.

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.

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

6. Modulation Characteristics

6. 1 Test Equipment

Please refer to Section 12 this report.

6. 2 Test Procedure

A. Frequency response of audio circuits

1) Position the EUT as Section 6.3 this report.

2) Vary the modulating frequency from 100 Hz to 5000 Hz with varying the input voltage from 0V to maximum permitted input voltage, and observe the change in output.

B. Modulation Limit

1) Position the EUT as shown in follow. Adjust the audio input frequency to 100 Hz and the input level from 0V to maximum permitted input voltage with recording each carrier frequency deviation responding to response input level.

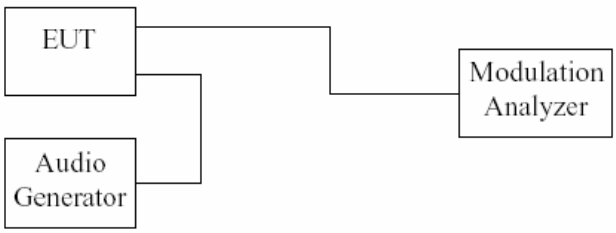
2) Repeat step 1) with changing the input frequency for 200, 500, 1000, 3000, and 5000 Hz in sequence.

C. Frequency response of all circuits

1) Position the EUT as shown in follow.

2) Vary the modulating frequency from 100 Hz to 15000 Hz with constant input voltage and observe the change in output.

6. 3 Test Setup

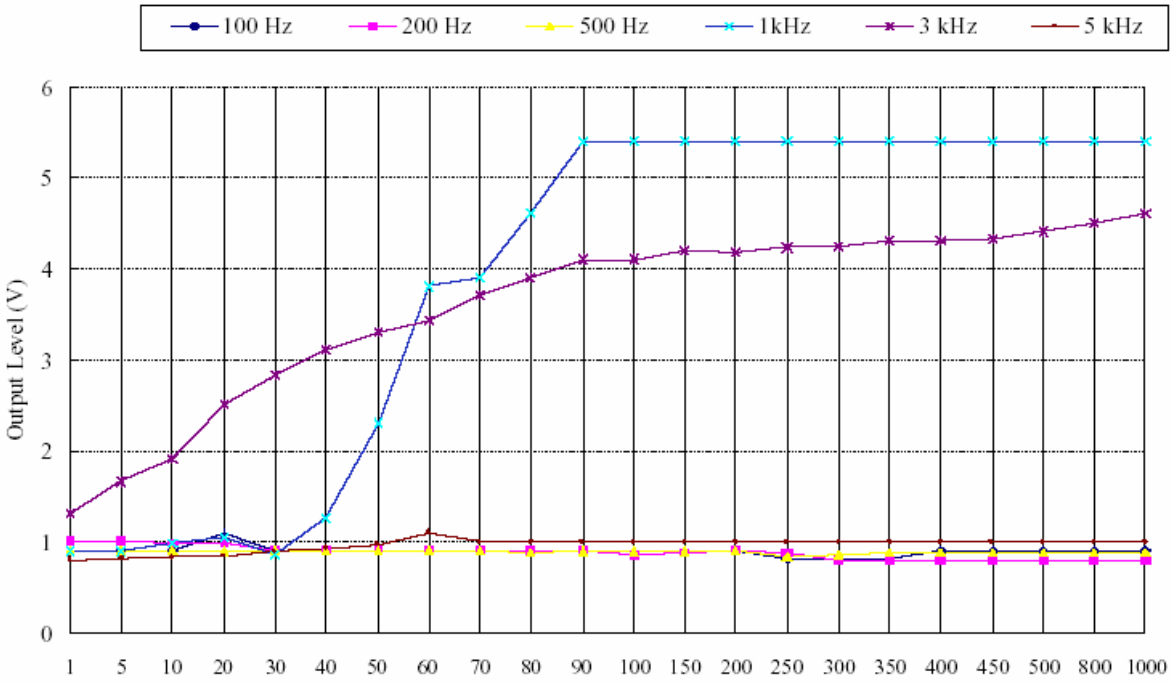


6.4 Rules and Specification Limits

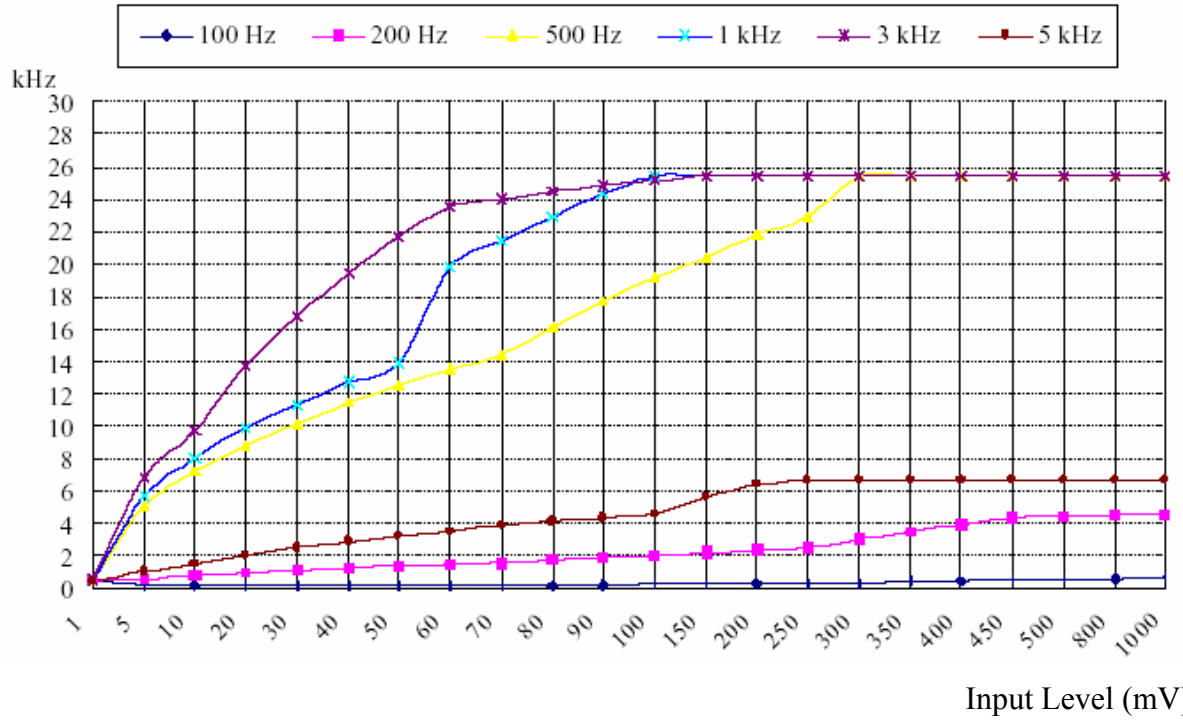
According to § 2.1047 (a), for Voice Modulated Communication Equipment, the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be measured.

6. 5 Test Result

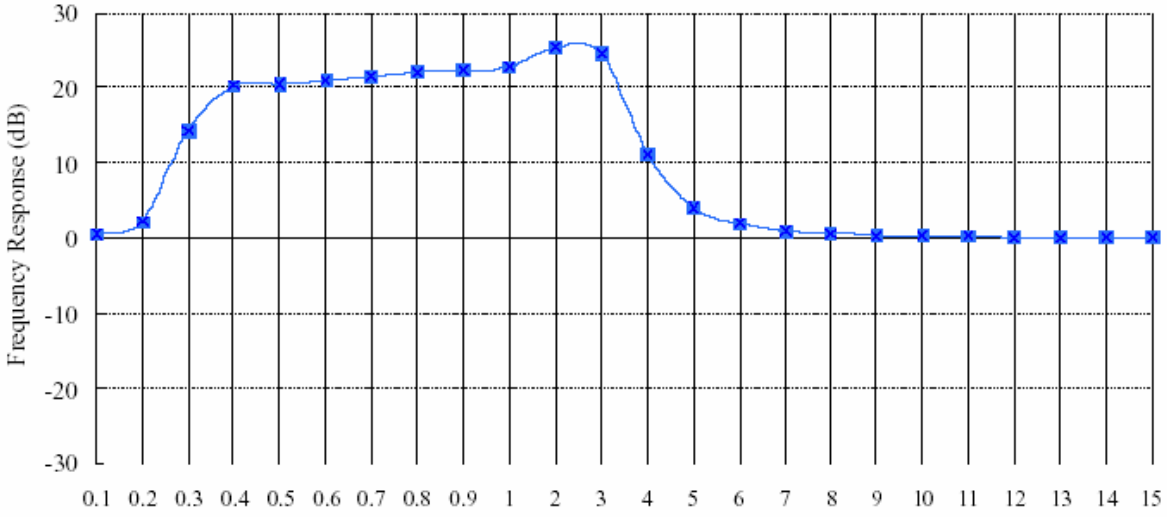
A. Frequency response of audio circuits



B. Modulation Limit



C. Frequency response of all circuits



7. Occupied Bandwidth of Emission

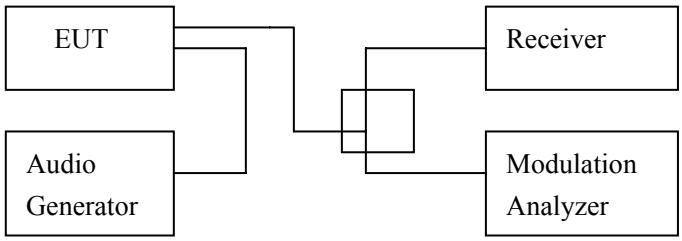
7. 1 Test Equipment

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 § 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

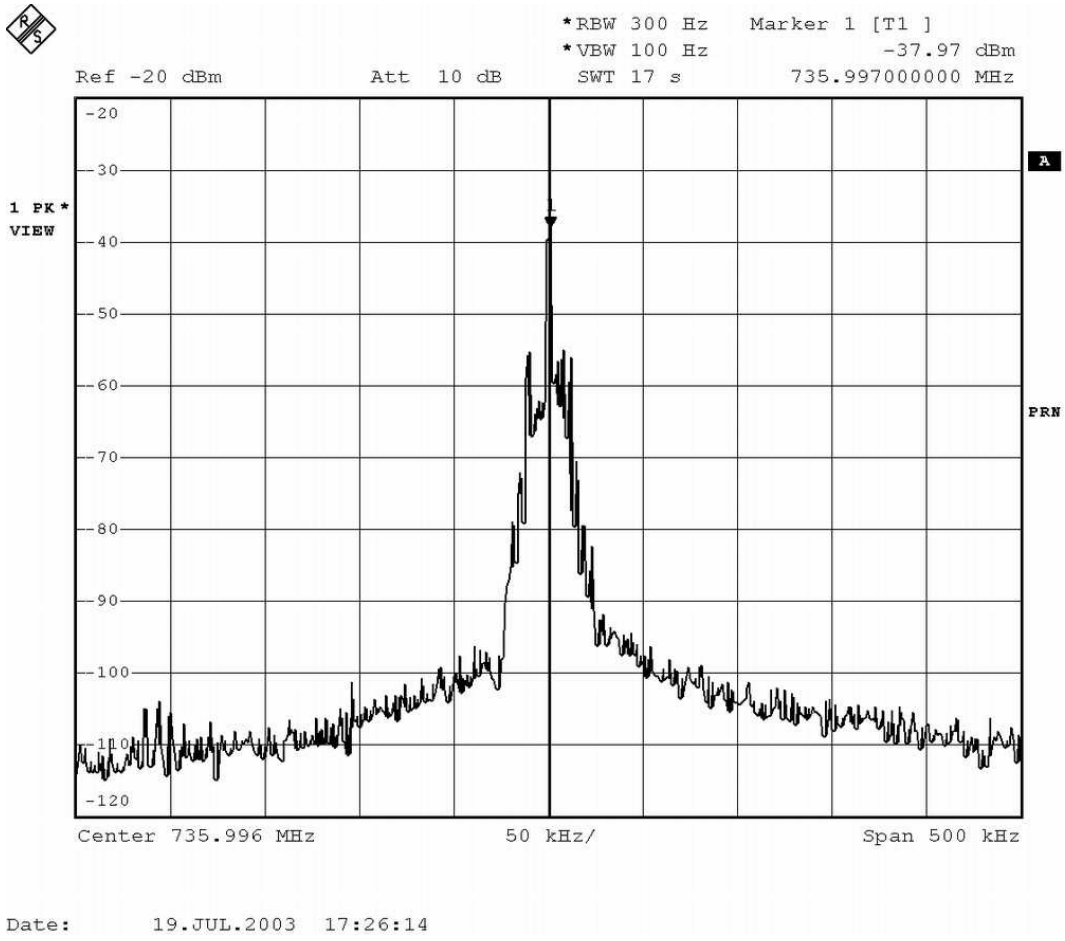
D = Peak Frequency Deviation = 26.0KHz

K = 1

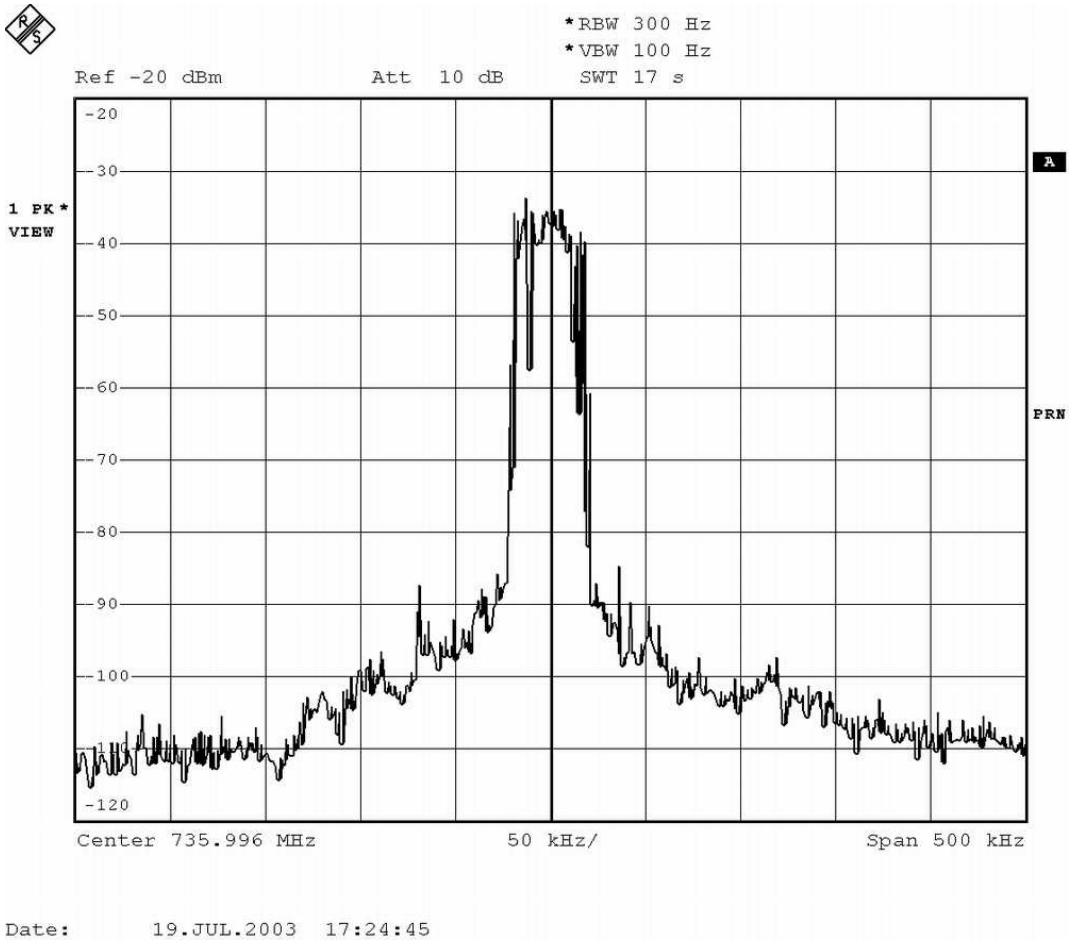
Bn = 82KHz

Product	: Wireless Microphone
Test Item	: Occupied Bandwidth Test
Test Mode	: 736 MHz Channel Low
Temperature	: 25 ℃
Humidity	: 56%RH

Unmodulation



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

A. Channel Low

Product	: Wireless Microphone	Test Mode	: Channel Low
Test Item	: Field Strength of Emission	Temperature	: 25 ℃
Test Voltage	: DC 9V (Power by Battery)	Humidity	: 56%RH
Test Result	: PASS		

Unmodulated carrier output power is 2.68 dBm, or 1.85 mW(ERP). The limit of spurious or harmonics is calculated as following:

10.42 –[43+10log(carrier output power in W)], or –13dBm

Frequency. (MHz)	Result (dBm) Hori. / Vert.	Limit (mW)	Margin (dB) Hori. / Vert.
2944.0	-79.4 / -80.1	-13.0	-66.4 / -67.1
3680.1	-84.5 / -82.3	-13.0	-71.5 / -69.3
4415.994	-83.6 / -81.7	-13.0	-70.6 / -68.7
5151.998	-80.3 / -81.2	-13.0	-67.3 / -69.2
6624.3	-72.9 / -73.6	-13.0	-59.9 / -60.6
7360.0	-74.8 / -73.1	-13.0	-61.8 / -60.1

Note: (1) For measured frequency below 1GHz, a tuned dipole antenna is used.
(2) 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.
(3) Spurious or harmonics above 1 GHz is too low to be detected or attenuated more than 60dB from limit value.

B. Channel Mid

Product	: Wireless Microphone	Test Mode	: Channel Mid
Test Item	: Field Strength of Emission	Temperature	: 25 ℃
Test Voltage	: DC 9V (Power by Battery)	Humidity	: 56%RH
Test Result	: PASS		

Unmodulated carrier output power is 2.65 dBm, or 1.84 mW(ERP). The limit of spurious or harmonics is calculated as following:

10.42 –[43+10log(carrier output power in W)], or –13dBm

Frequency. (MHz)	Result (dBm) Hori. / Vert.	Limit (mW)	Margin (dB) Hori. / Vert.
2976.0	-84.2 / -85.1	-13.0	50.0
3720.1	-83.0 / -83.6	-13.0	
5208.0	-81.3 / -82.6	-13.0	
5951.996	-76.2 / - 77.5	-13.0	
6695.994	-74.1 / -73.4	-13.0	
7440.0	-77.0 / -78.5	-13.0	

Note: (4) For measured frequency below 1GHz, a tuned dipole antenna is used.
(5) 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.
(6) Spurious or harmonics above 1 GHz is too low to be detected or attenuated more than 60dB from limit value.

C. Channel High

Product	: Wireless Microphone	Test Mode	: Channel High
Test Item	: Field Strength of Emission	Temperature	: 25 ℃
Test Voltage	: DC 9V (Power by Battery)	Humidity	: 56%RH
Test Result	: PASS		

Unmodulated carrier output power is 2.66 dBm, or 1.84 mW(ERP). The limit of spurious or harmonics is calculated as following:

10.42 –[43+10log(carrier output power in W)], or –13dBm

Frequency. (MHz)	Result (dBm) Hori. / Vert.	Limit (mW)	Margin (dB) Hori. / Vert.
2994.0	-82.3 / -81.5	-13.0	-69.3 / -68.5
3742.499	-84.0 / -83.7	-13.0	-71.0 / -70.7
5239.498	-81.6 / -81.2	-13.0	-68.6 / -68.2
5987.996	-75.7 / -75.6	-13.0	-62.7 / -62.6
6736.499	-73.3 / -73.1	-13.0	-60.3 / -60.1
7485.0	-76.1 / -75.9	-13.0	-63.1 / -62.9

Note: (7) For measured frequency below 1GHz, a tuned dipole antenna is used.

(8) 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.

(9) Spurious or harmonics above 1 GHz is too low to be detected or attenuated more than 60dB from limit value.

9. Frequency Stability Measurement

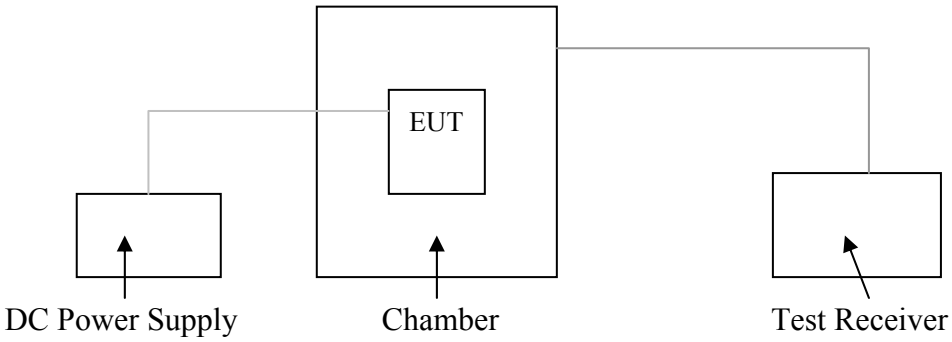
9. 1 Test Equipment

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: The frequency tolerance of the transmitter shall be 0.005 percent.

9. 5 Test Result

Frequency stability versus environment temperature

Reference Frequency: 744.0000 MHz		Limit: 0.005%					
Environment Temperature (℃)	Power Supplied (9Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	New Batt.	744.0123	0.00165	743.9921	-0.00106	744.0137	0.00184
	New Batt.	744.0131	0.00176	743.9926	-0.00099	743.9837	-0.00219
	New Batt.	743.9922	-0.00105	744.0205	0.00276	743.9786	-0.00288
40	New Batt.	743.9931	-0.00093	743.9892	-0.00145	744.0062	0.00083
	New Batt.	743.9967	-0.00044	743.9963	-0.00050	744.0126	0.00169
	New Batt.	744.0016	0.00022	744.0123	0.00165	743.9918	-0.00110
30	New Batt.	743.9976	-0.00032	744.0016	0.00022	743.9793	-0.00278
	New Batt.	744.0028	0.00038	743.9943	-0.00077	744.0127	0.00171
	New Batt.	744.0136	0.00183	744.0036	0.00048	743.9842	-0.00212
20	New Batt.	744.0129	0.00173	743.9871	-0.00173	744.0123	0.00165
	New Batt.	744.0161	0.00216	743.9905	-0.00128	743.9796	-0.00274
	New Batt.	744.0206	0.00277	743.9916	-0.00113	743.9979	-0.00028
10	New Batt.	744.0169	0.00227	744.0087	0.00117	744.0024	0.00032
	New Batt.	743.9962	-0.00051	743.9961	-0.00052	744.0025	0.00034
	New Batt.	743.9783	-0.00292	744.0028	0.00038	743.9781	-0.00294
0	New Batt.	743.9756	-0.00328	743.9862	-0.00185	743.9873	-0.00171
	New Batt.	744.0118	0.00159	743.9831	-0.00227	744.0166	0.00223
	New Batt.	743.9878	-0.00164	743.9967	-0.00044	744.0019	0.00026
-10	New Batt.	743.9936	-0.00086	743.9976	-0.00032	743.9865	-0.00181
	New Batt.	744.0174	0.00234	744.0062	0.00083	743.9856	-0.00194
	New Batt.	743.9891	-0.00147	743.9788	-0.00285	743.9847	-0.00206
-20	New Batt.	743.9932	-0.00091	744.0022	0.00030	744.0112	0.00151
	New Batt.	743.9787	-0.00286	743.9868	-0.00177	743.9869	-0.00176
	New Batt.	743.9869	-0.00176	743.9891	-0.00147	744.0135	0.00181

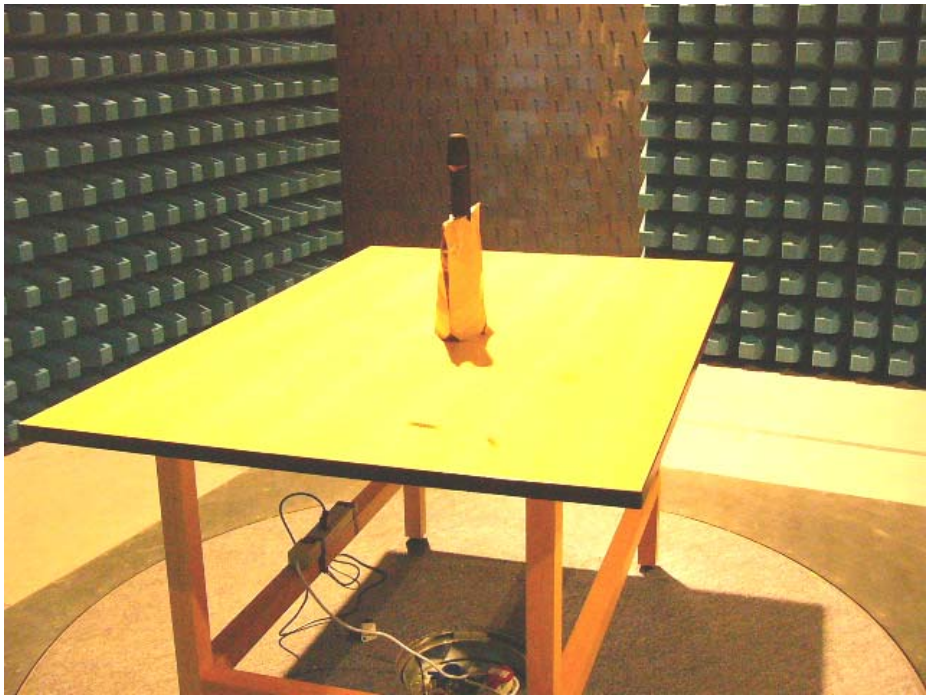
B2. Frequency stability versus end-point supplied voltage (7Vdc)

Reference Frequency: 736.0000 MHz		Limit: 0.005%					
Environment Temperature (℃)	Power Supplied (Vdc)	Frequency measured with time elapsed					
		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
25	End-Point	743.9866	-0.00180	743.9892	-0.00145	744.0136	0.00183

10. Photos of Testing

10. 1 EUT Test Photographs

Radiated emission test view

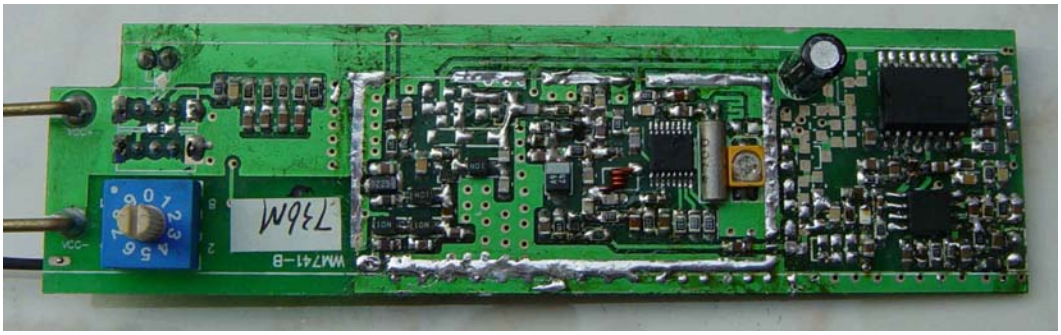


10. 2 EUT Detailed Photographs

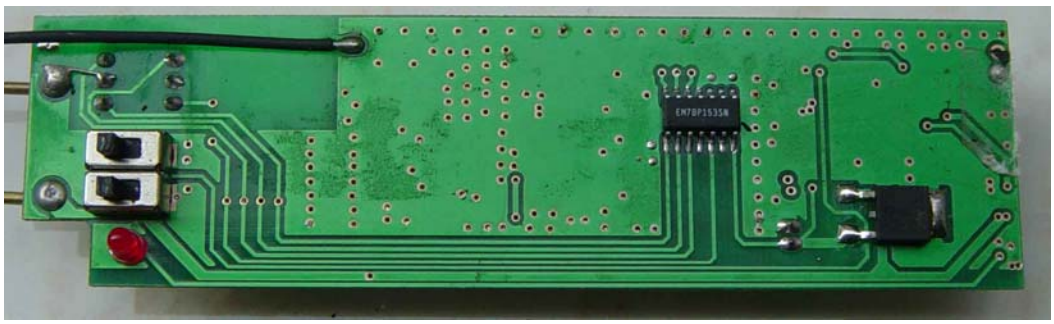
(1) EUT view

(2) EUT inside whole view

(3) Main board component side



(4) Main board solder side



11. FCC ID Label

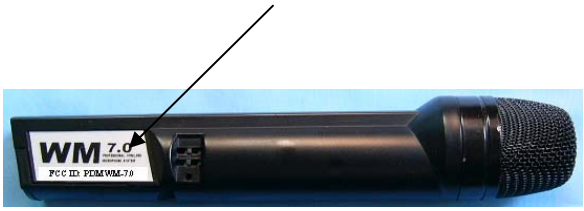
FCC ID: PDMWM-70

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

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 Mark 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
EMI Test Receiver	Rohde & Schwarz	ESCS30	100003	Feb 27, 2003	Feb 27, 2004
AMN	Rohde & Schwarz	ESH3-Z5	100002	Feb 01, 2003	Feb 01, 2004
LISN	Kyoritsu	KNW-407	8-1441-8	Feb 23, 2003	Feb 23, 2004
EMI Test Receiver	Rohde & Schwarz	ESI26	838786/013	Feb 01, 2003	Feb 01, 2004
Bilog Antenna	Chase	CBL6112B	2591	Feb 01, 2003	Feb 01, 2004
Horn Antenna	Rohde & Schwarz	HF906	100014	Feb 01, 2003	Feb 01, 2004
Radio Communication Test Set	IFR	2955B	100015	Feb 01, 2003	Feb 01, 2004
Multifunction Synthesizer	Hewlett-Packard	8904A	100016	Feb 01, 2003	Feb 01, 2004
3m Semi-Anechoic Chamber	Albatross Projects	9mX6mX6m	N/A	Feb 01, 2003	Feb 01, 2004
Temperature Chamber	TABAI	PSL-4GTW	N/A	Feb 06,2003	Feb 06, 2004