

FCC PART 15.249  
EMI MEASUREMENT AND TEST REPORT  
For  
**Kovol Electronics Co.,Ltd.**  
No.32, BaoHeRoad, NanZhou Street, GuangZhou, China

**FCC ID: U7MKV-803**

April 4,2007

This Report Concerns: Original Report	Equipment Type : Bluetooth Headset
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Report No.: F07040425A	
Receive EUT Date/Test Date: March 23,2007/ March 25-31,2007	
Reviewed By: Christina	<i>Christina</i>
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## 1. GENERAL INFORMATION

### 1.1. Report information

1.1.1. This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that BEST approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that BEST in any way guarantees the later performance of the product/equipment.

1.1.2. The sample/s mentioned in this report is/are supplied by Applicant, BEST therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.

Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through BEST, unless the applicant has authorized BEST in writing to do so.

Test Facility -

The open area test site used to collect the radiated data is located on the address of Shenzhen Academy of Metrology & Quality Inspection (FCC Registered Test Site Number: 97379) on Longzhu Road, Nanshan, Shenzhen, Guangdong, China.

The Open Area Test Site is constructed and calibrated to meet the FCC requirements.

### 1.2. Measurement Uncertainty

Available upon request.

## 2. PRODUCT DESCRIPTION

### 2.1. EUT Description

Description : **Bluetooth headset**

Applicant : **Kovol Electronics Co.,Ltd.**  
Building C, DaShan Industrial Park, Pingsha Village,  
XinShi Town, BaiYun District,  
GuangZhou

Model Number : KV-803,KV-801,KV-802,BH801i,BH802i,BH803i,  
CELLY-BH1,HD-610,HD-620,HD-630,Mini-01,UG-  
Mini,ALP-200,HS-890,NK-808,WEP-501,SE-288,  
BH-901,BH-710,HF-809,ALP-300,HD-710,CAT-007,  
EM600,NK-880,Micro-001,HD-100,PX07b,VS-100,V  
S-101,VS-102,VS-103,Pico,EM600C,BH02,Bini,Fini,  
Tini.

#### Additonal Information

Frequency : 2400MHz~2483.5MHz

Number of Channels : N/A

Power Supply : DC 4.5V by battey or by adapter

Maximum Range : N/A

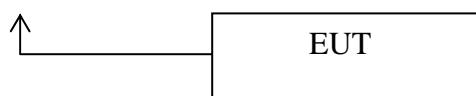
Transmitter : The transmitter has a built in antenna and solder on the PCB

Antenna Current : N/A

Consumption

### 2.2. Block Diagram of EUT Configuration

Power Supply



### 2.3. Support Equipment List

N/A

### 2.4. Test Conditions

Temperature: 23~25  
Relative Humidity: 55~63 %

### 3. FCC ID LABEL

**FCC ID: U7MKV-803**

**FCC ID Label Location on EUT**

**EUT Bottom View/FCC ID Label Location**



#### 4. TEST RESULTS SUMMARY

##### FCC 15 Subpart C,Paragraph 15.249:2004

Test Standards	Test Items	Test Results
FCC Part 15,Paragraph 15.203	Antenna Requirements	Pass
FCC Part 15,Paragraph 15.207	Conducted Test	Pass
FCC Part 15 Subpart C, Paragraph 15.249(a) and 15.249(b)	Field Strength of Fundamental	Pass
FCC Part 15,Paragraph 15.209	Radiated Test	Pass
FCC Part 15 Subpart C, Paragraph 15.249(d)	Measured Band Edges	Pass

Remark: "N/A" means "Not applicable."

#### Modifications

No modification was made.

## 5. TEST EQUIPMENT USED

Equipment/Facilities	Manufacturer	Model #	Serial no.	Date of Cal.	Cal. Interval
Cable	Resenberger	N/A	NO.1	Mar 10 , 2007	1 Year
Cable	SCHWARZBECK	N/A	NO.2	Mar 10 , 2007	1 Year
Cable	SCHWARZBECK	N/A	NO.3	Mar 10 , 2007	1 Year
LISN	Rohde & Schwarz	ESH3-Z5	100305	Mar 10 , 2007	1 Year
50 Coaxial Switch	ANRITSU CORP	MP59B	6200283933	Mar 10, 2007	1 Year
EMI Test Receiver	Rohde & Schwarz	ESP13	100180	Oct.18,2006	1 Year
Spectrum Analyzer	Rohde & Schwarz	FSP40	100273	Sep.10,2007	1 Year
3m Semi-Anechoic Chamber	Albatross Projects	9mx6mx6m	N/A	Feb.20,2007	1 Year
Signal Generator	FLUKE	PM5418 + Y/C	LO747012	Feb.20,2007	1 Year
Signal Generator	FLUKE	PM5418TX	LO738007	Feb.20,2007	1 Year
Loop Antenna	SCHWARZBECK	FMZB1516	113	Jan.30,2007	1 Year
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	9161-4079	Sep.22,2006	1 Year
Broad-Band Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-564	Sep.22,2006	1 Year
Ultra Broadband Antenna	Rohde & Schwarz	HL-562	100110	June.15,2006	1 Year
AMN	Rohde & Schwarz	ESH3-Z5	100196	Oct.11,2006	1 Year
AMN	Rohde & Schwarz	ESH3-Z5	100197	Oct.11,2006	1 Year
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	N/A	N/A	N/A
Power Meter	Rohde & Schwarz	NRVD	100041	Feb.20,2007	1 Year
EMI Test Receiver	Rohde & Schwarz	ESCS30	100003	Feb.20,2007	1 Year
Coaxial Cable with N-connectors	SCHWARZBECK	AK9515H	95549	Sep.22,2006	1 Year
Radio Communication Test Set	Rohde & Schwarz	CMS 54	846621/024	Feb.20,2007	1 Year
Modulation Analyzer	Hewlett-Packard	8901B	2303A00362	Feb.20,2007	1 Year
Absorbing clamp	Rohde & Schwarz	MDS-21	N/A	Oct.29,2006	1 Year

## 6. CONDUCTED POWER LINE TEST

### 6.1. Test Equipment

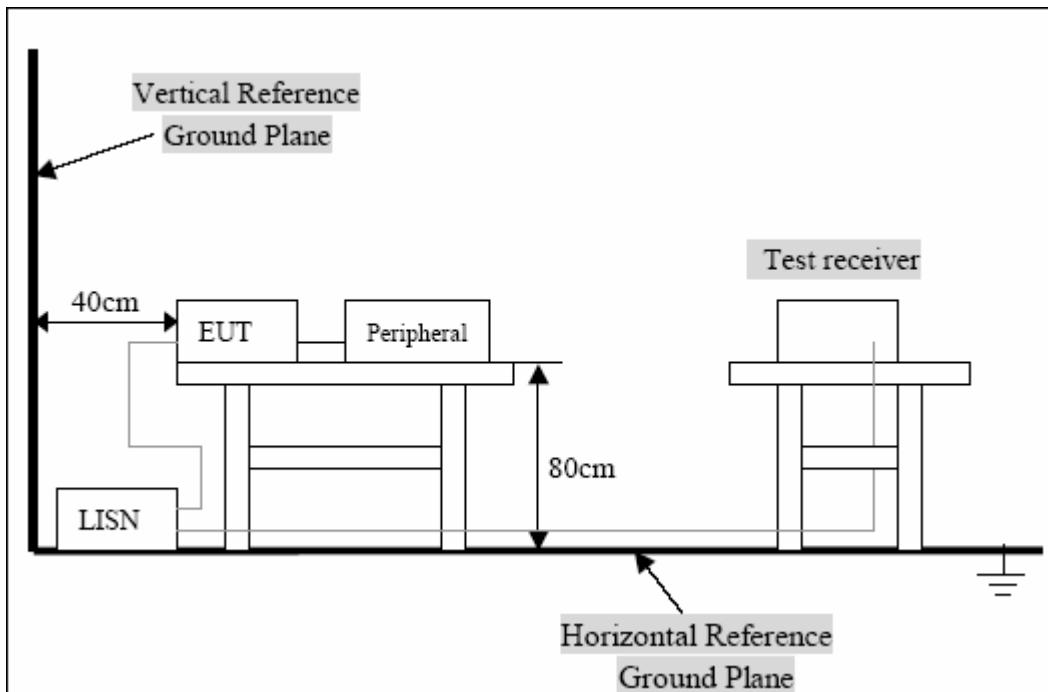
Please refer to section 4 this report.

### 6.2. 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 50ohm/50uh coupling inpedance for the measuring equipment.The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uh coupling inpedance with 50ohm termination.

Both sides of A.C. Line are check 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 ASIN C63.4:2003 on conducted measurement .Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9Khz.

### 6.3. Test Setup



For the actual test configuration,Please refer to the related items-Photos of testing

### 6.4. Configuring of the EUT

The EUT was configured according to ASIN C63.4:4-2003. EUT was used DC 3.7V (Power by Adapter). The operation frequency is from 2400MHZ—2483.5MHZ. Enable the signal transmitted from the external antenna from EUT to receiver. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

Note:

Below 1GHZ, the channel low, middle, high were pre-tested, The channel low, worst case one, was chosen for conducted and radiated emission test.

Above 1GHZ, the channel low ,middle, high were tested individually.

**A.EUT**

Device	Manufacturer	Model #	FCC ID
Bluetooth Headset	Koval Electronics Co.,Ltd.	KV-803	U7MKV-803

**B.Internal Devices**

Device	Manufacturer	Model #	FCC ID
N/A			

**C.Peripherals**

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

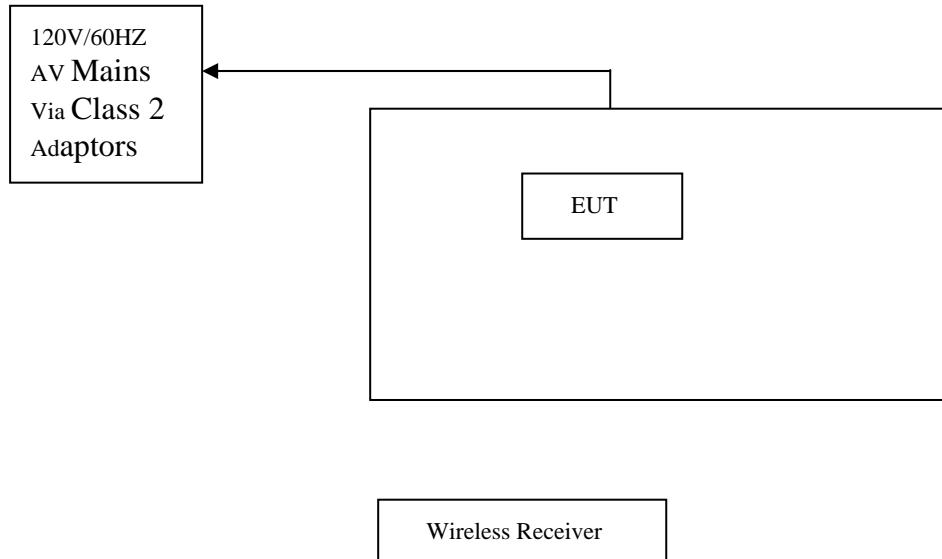
## 6.5. EUT Operating Condition

Operating condition is according to ANSI C63.4-2003.

Setup the EUT and simulators as shown on follow.

Enable RF signal and confirm EUT active.

Modulate output capacity of EUT up to specification.



## 6.6. 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	65-56/56-46
0.5-5.0	73/60	56-46
5.0-3.0	73/60	60-50

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

## 6.7. Conducted Power Line Test Result

Refer to APPENDIX I Test Curves

## 7. RADIATED EMISSION TEST

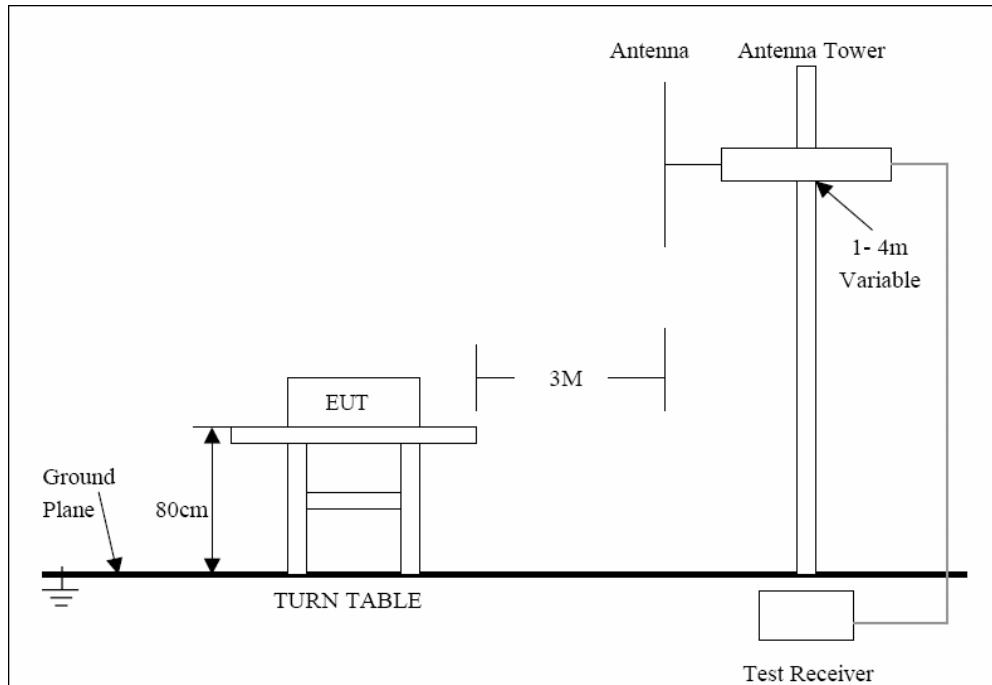
### 7.1. Test Equipment

Please refer to section 4 this report.

### 7.2. Test Procedure

1. The EUT was tested according C63.4-2003. The radiated test was performed at FCC Registration laboratory .
2. The EUT, peripherals were put on the turntable which table size od 1m×1.5m,table high 0.8m. All set up is according tl ANSI C63.4-2003.
3. The frequency spectrum from 30MHZ to 1 GHZ was investigated. All readings from 30MHZ to 1 GHZ are quasi-peak values with a resolution bandwidth of 120 KHZ. All readings are above 1GHZ ,prak values with a resolution bandwidth of 1 MHZ. Measurements were made at 3 merers.
4. The antenna high is varied from 1m to 4m high to find the maximum emission for each frequency.
5. Maximizing procedure was performed on the six(6)highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 Db of specification limit), and are distinguished with a “QP” in the data table.
6. The antenna polarization: Vertical polarization and Horizontal polarization.

### 7.3. Radiated Test Setup



For the accrual test configuration,pleas refer to the related items-photos of Testing.

### 7.4. Configuration of the EUT

Same as section 5.4 of this report

## 7.5. EUT Operating Condition

Same as section 5.5 of this report.

## 7.6. Radiated Emission Limit

All emission from a digital device,including any network of conductors and apparatus connected thereto,shall not exceed the level of field strength specified below :

A . FCC Part 15 Subpart C Paragraph 15.249(a) Limit

Frequency (MHZ)	Distance (m)	Field Strength (dBuV/m)
30-88	3	40.0
88-*216	3	43.5
216-960	3	46.0
ABOVE 960	3	54.0

Note: (1) RF Voltage (DbUv)=20 log Voltage(Uv)

(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.

(3) The emission limit in this paragraph os based on measurement instrumentation employing an average detector.Measurement using instrumentation with a peak detector function,corresponding to 20dB above the maximum permitted average limit.

B.Frequencies in restricted band are complied to limit on Paragraph 15.209.

Fundamental Frequency (MHZ)	Field as strength of Fundamental(3m)			Field as strength of Harmonics(3m)		
	Mv/m	dBuV/M		Uv/m	DBuV/M	
902~928	50	94(Average)	114(Peak)	500	54(Average)	74(Peak)
2400~2483.5	50	94(Average)	114(Peak)	500	54(Average)	74(Peak)

Note: (1) RF Voltage (DbUv)=20 log Voltage(Uv)

(2) In the Above Table,the tighter limit applies at the band edges.

(3) Distaqnce refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

## 7.7. Radiated Emission Test Result

### A. Fundamental Radiated Emission Data

Product:	Bluetooth Headset	Test mode:	CH Low ~ CH High
Test Item:	Fundamental Radiated Emission Data	Temperature:	25
Test Voltage:	DC4.5V(Power By Battery)	Humidity:	56%RH
Test Result:	PASS		

#### CH Low

Freq. (GHz)	Emission(dBuV/m) Peak Detector	HORIZ/ VERT	Limits(dBuV/m) Peak/ACERAGE	Margin (Db)
2400.00	90.68	HORIZ	114/94	-23.22
2400.00	89.52	VERT	114/94	-24.48

#### CH Middle

Freq. (GHz)	Emission(dBuV/m) Peak Detector	HORIZ/ VERT	Limits(dBuV/m) Peak/ACERAGE	Margin (Db)
2441.0	85.83	HORIZ	114/94	-28.17
2411.0	88.84	VERT	114/94	-25.16

#### CH High

Freq. (GHz)	Emission(dBuV/m) Peak Detector	HORIZ/ VERT	Limits(dBuV/m) Peak/ACERAGE	Margin (Db)
2483.5	86.67	HORIZ	114/94	-27.33
2483.5	88.78	VERT	114/94	-25.22

Note:

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

### B. Harmonics Radiated Emission Data

Product:	Bluetooth Headset	Test mode:	CH Low ~ CH High
Test Item:	Fundamental Radiated Emission Data	Temperature:	25
Test Voltage:	DC4.5V(Power By Battery)	Humidity:	56%RH
Test Result:	PASS		

#### CH Low

Freq. (GHz)	Emission(dBuV/m) Peak Detector	HORIZ/ VERT	Limits(dBuV/m) Peak/ACERAGE	Margin (Db)
4800	-	HORIZ	74.0/54.0	-
4800	-	VERT	74.0/54.0	-
7200.		HORIZ	74.0/54.0	-
7200.	-	VERT	74.0/54.0	-

## CH Midde

Freq. (GHz)	Emission(dBuV/m) Peak Detector	HORIZ/ VERT	Limits(dBuV/m) Peak/ACERAGE	Margin (Db)
4882.0	-	HORIZ	74.0/54.0	-
4882.0	-	VERT	74.0/54.0	-
7323.0		HORIZ	74.0/54.0	-
7323.0	-	VERT	74.0/54.0	-

## CH High

Freq. (GHz)	Emission(dBuV/m) Peak Detector	HORIZ/ VERT	Limits(dBuV/m) Peak/ACERAGE	Margin (Db)
4967.0	-	HORIZ	74.0/54.0	-
4967.0	-	VERT	74.0/54.0	-
7450.5		HORIZ	74.0/54.0	-
7450.5	-	VERT	74.0/54.0	-

Note:

- (1) All Reading Levels below 1GHz are Quasi-Peak, above are peak and average value.
- (2) Emission Level=Reading Level + Probe Factor + Cable loss.
- (3) Receiver setting(peak Detector):RBW=1MHz;VBW=1MHz;Span=100MHz.
- (4) Receiver setting(AVG Detector):RBW=1MHz;VBW=30MHz;Span=20MHz.
- (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.

## C. General Radiated Emission Data

Product:	Bluetooth Headset	Test mode:	CH Low ~ CH High
Test Item:	Fundamental Radiated Emission Data	Temperature:	25
Test Voltage:	DC4.5V(Power By Battery)	Humidity:	56%RH
Test Result:	PASS		

## CH Low

Freq. (GHz)	Emission(dBuV/m) Peak Detector	HORIZ/ VERT	Limits(dBuV/m) Peak/ACERAGE	Margin (Db)
4882.0	-	HORIZ	40	-
4882.0	-	VERT		-
7323.0		HORIZ		-
7323.0	-	VERT		-
		HORIZ		
		VERT		

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.

## 8. BAND EDGE

### 8.1. Test Equipment

Please refer to Section 4 this report.

### 8.2. Test Procedure

1. The EUT was tested according C63.4-2003. The radiated test was performed at FCC Registration laboratory .
2. The transmitter output was connected to the spectrum analyzer via a low loss cable. Set both RBW and VBW of spectrum analyzer to 100 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

### 8.3. Configuration of The EUT

Same as section 5.4 of this report

### 8.4. EUT Operating Condition

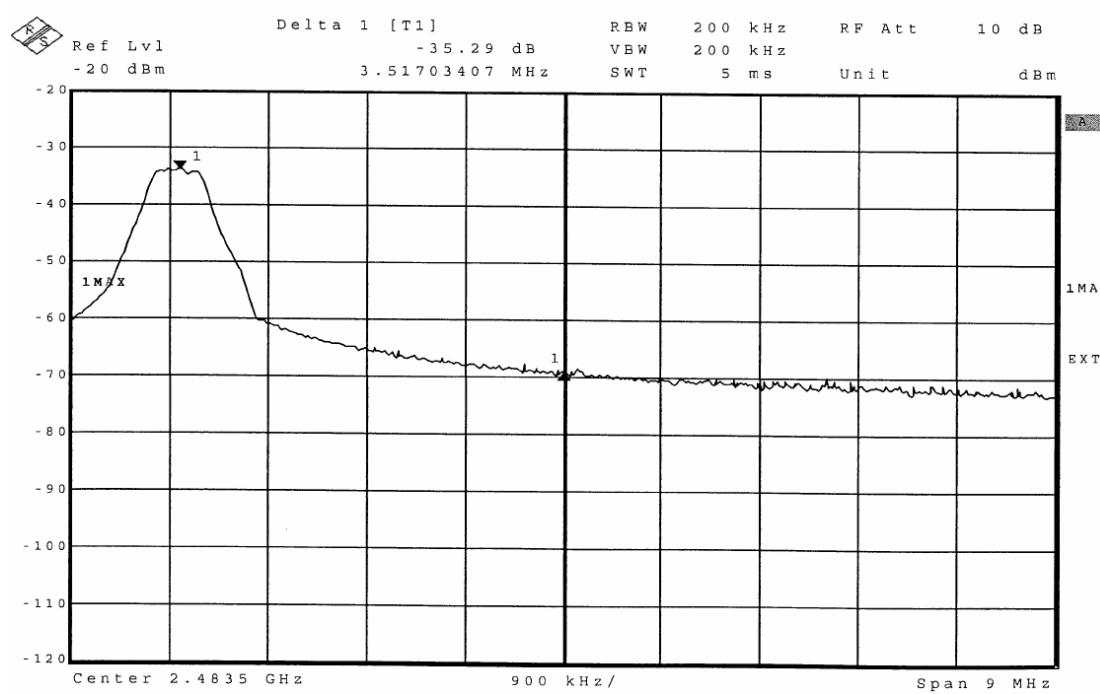
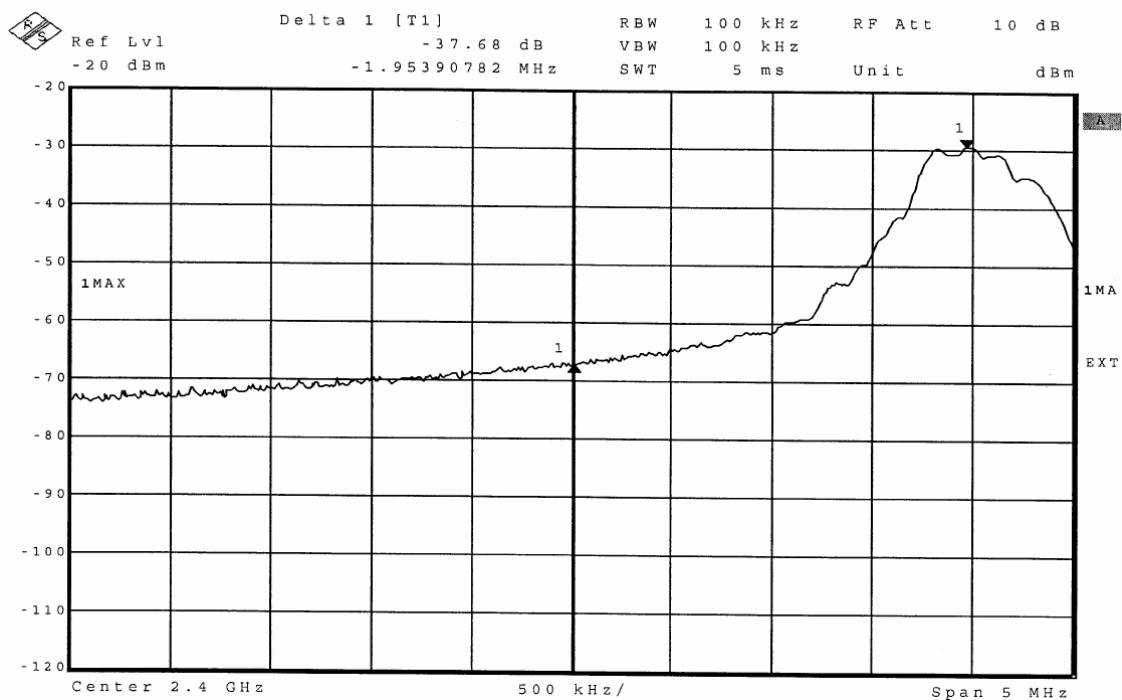
Same as section 5.5 of this report

### 8.5. Band Edge FCC 15.249(d) Limit

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 50dB below that in the 100kHz bandwidth within the band that contains the desired power, based on either an RF conducted or a radiated measurement. 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)).

### 8.6. Band Edge Test Result

Product:	Bluetooth Headset	Test mode:	CH Low,CH High
Test Item:	Fundamental Radiated Emission Data	Temperature:	25
Test Voltage:	DC4.5V(Power By Battery)	Humidity:	56%RH
Test Result:	PASS		



## **9. ANTENNA REQUIREMENT**

### **9.1. Antenna Requirement**

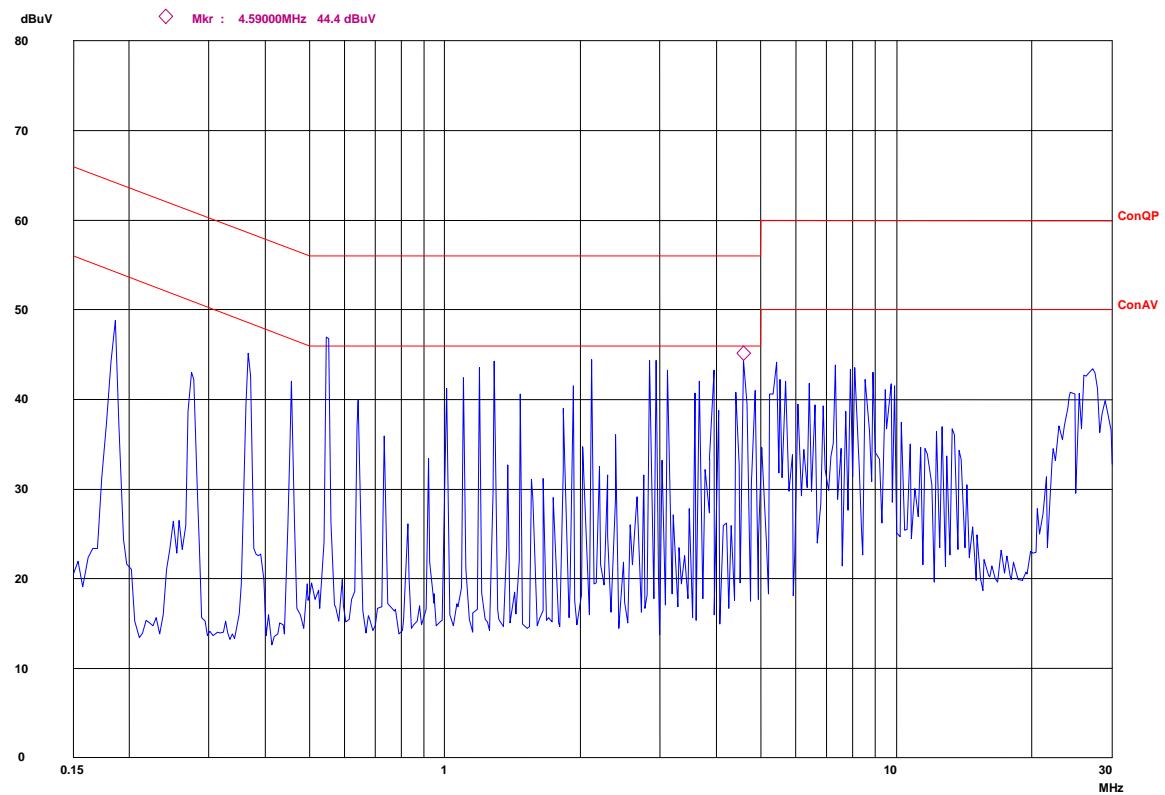
According to Section 15.203 ,an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

The transmitter has a built in antenna and solder on the PCB ,this is permanently attached antenna and meets the requirements of section.

## **APPENDIX I TEST CURVES**

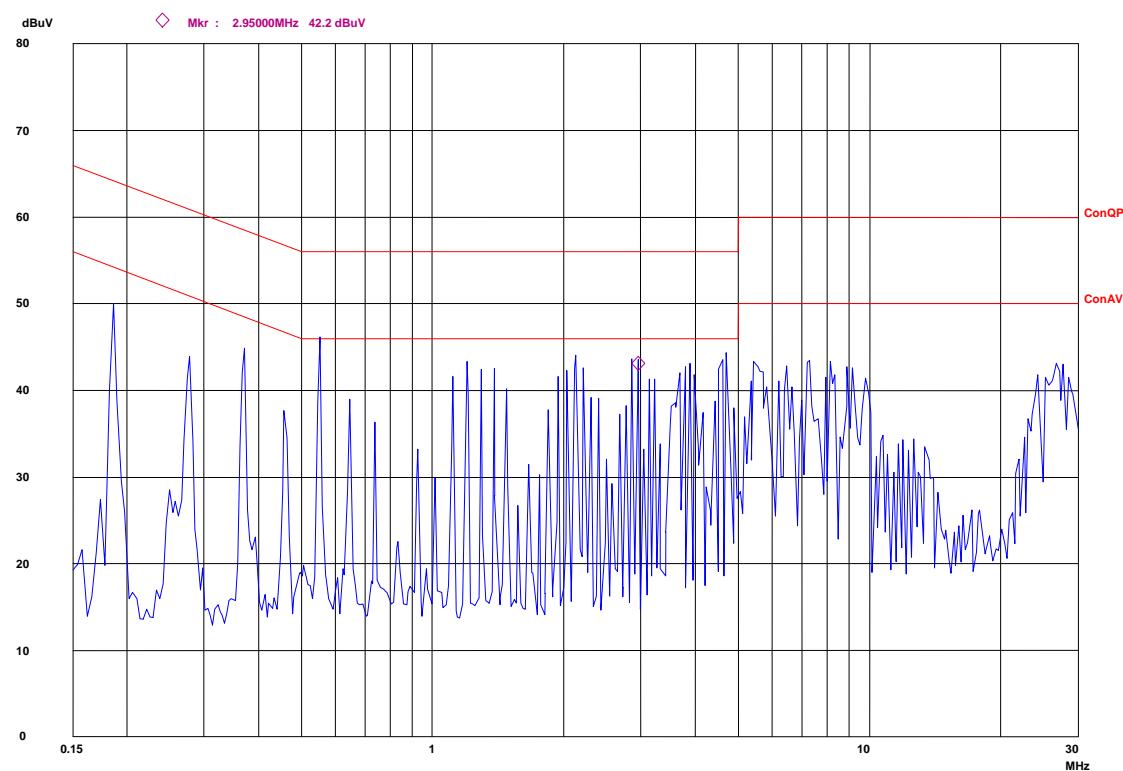
**Conducted Disturbance**

EUT: M/N:  
Op Cond: ON  
Test Spec: L  
Comment: AC 230V/50Hz



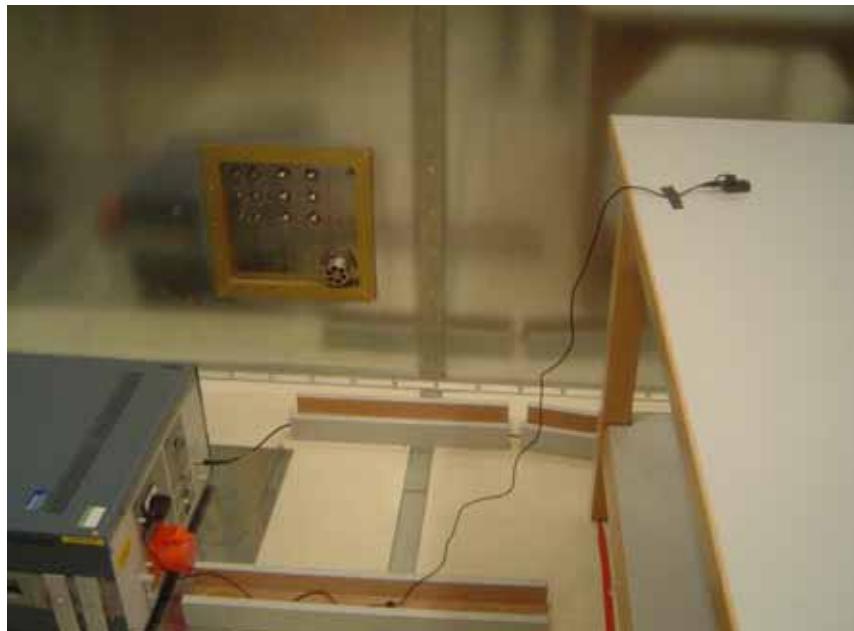
**Conducted Disturbance**

EUT: M/N:  
Op Cond: ON  
Test Spec: N  
Comment: AC 230V/50Hz

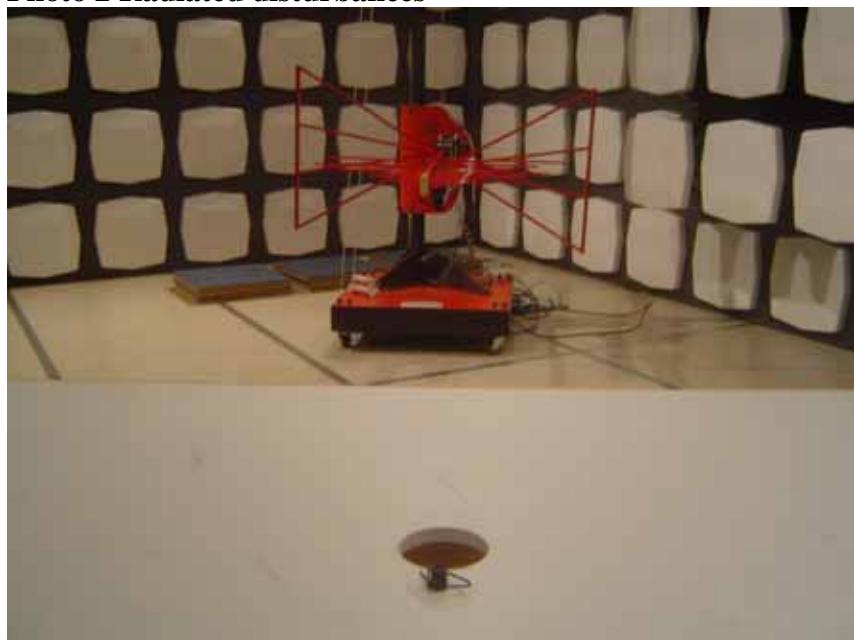


## **APPENDIX II TEST PICTURE**

**Photo 1 Conducted Disturbance Test**



**Photo 2 Radiated disturbances**



**Photo 3 Charger of EUT**



**Photo 4 General Appearance of the EUT**



**Photo 5 General Appearance of the EUT**



**Photo 6 Inside of EUT**



**Photo 7 Inside of EUT**

