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FCC TEST REPORT


Under
FCC 15 Subpart C, Paragraph 15.249

Prepared For :

ELECOM CO., LTD

OSAKA-MIDOUSUJI BLDG. 1-1 Fushimi-machi 4-chome Chuoku, Osaka, Japan

FCC ID: YWOLBT-HS02
EUT: Bluetooth headset
Model: LBT-HS02

December 22, 2011
Issue Date:
Extension Report
Report Type:
<i>Joy Peng</i>
Test Engineer: Joy peng

Review By: Apollo Liu / Manager

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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

Site on File with the Federal Communications Commission – United States
Registration Number: 963441

Site Listed with Industry Canada of Ottawa, Canada
Registration Number: 7353A

1.3 Details of Applicant

Name : ELECOM CO., LTD
Address : OSAKA-MIDOUSUJI BLDG. 1-1 Fushimi-machi 4-chome Chuoku, Osaka, Japan
Contact : Takuya Nakamura
Tel : +81-6-6229-2723
Fax : +81-6-6229-1456

1.4 Application Details

Date of Receipt of Application : February 23, 2011
Date of Receipt of Test Item : March 3, 2011
Date of Test : March 7, 2011~December 22, 2011

1.5 Test Item

Manufacturer : LAYON International Electronic&Telecom Co., ltd
Address : No.328, ChiGang Xi Road HaiZhu District,Guangzhou, China
Trade Name : Elecom
Model No.(Base) : LBT-HS02
Model No.(Extension) : LBT-HS02BK, LBT-HS02SV
Description : Bluetooth headset

Additional Information

Frequency : 2402-2480MHz
Number of Channels : 79
Power Supply : DC 3.7V(by Battery)
Operation Distance : N/A
Resolution : N/A

1.6 Test Standards

FCC 15 Subpart C, Paragraph 15.249

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 15.203	Antenna Requirement	PASS	Complies
FCC Part 15, Paragraph 15.207	Conducted Test	PASS	Complies
FCC Part 15 Subpart C Paragraph 15.249(a) and 15.249(b) Limit	Field Strength of Fundamental	PASS	Complies
FCC Part 15, Paragraph 15.209	Radiated Test	PASS	Complies
FCC Part 15 Subpart C Paragraph 15.249(d) Limit	Measured Band Edges	PASS	Complies.

3. EUT Modifications

No modification by test lab.

4. Conducted Power Line Test

4.1 Test Equipment

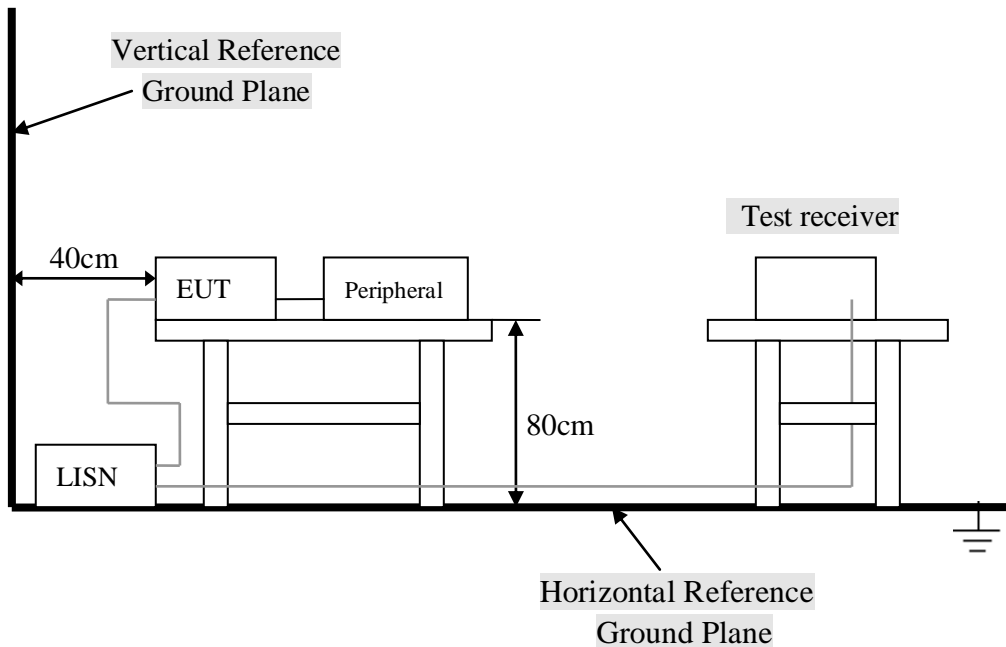
Please refer to Section 10 this report.

4.2 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 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.

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 C63.4:2003 on conducted measurement. Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

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 C63.4-2003. EUT was used DC3.7V. 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:

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

A. EUT

Device	Manufacturer	Model #	FCC ID
Bleetooth headset	LAYON International Electronic & Telecom Co., ltd	LBT-HS02	YWOLBT-HS02

B. Internal Devices

Device	Manufacturer	Model #	FCC ID
N/A			

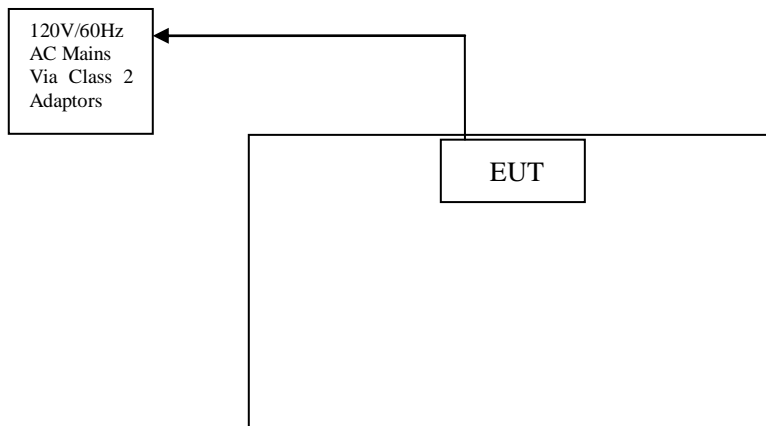
C. Peripherals

Device	Manufacturer	Model # Serial #	FCC ID/ DoC	Cable
Printer	HP	HP930C	DoC	1.5m unshielded power cord 1.2m unshielded data cable.
Modem	GVC	N/A	DoC	1.5m unshielded power cord 1.2m unshielded data cable.
Notebook	DELL	PP10L	DoC	1.5m unshielded power cord
PC	Dell	2400n	DoC	1.5m unshielded power cord

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.
- D. 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

The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All readings are quasi -peak values with a resolution bandwidth of 9 KHz.

- Temperature : 26 °C
- Humidity : 53 % RH
- Result : PASSED

FCC Part 15 Paragraph 15.207							
Frequency (MHz)	Emission (dBuV)		LINE/ NEUTRAL	Limit (dBuV)		Margin (dB)	
	QP	AV		QP	AV	QP	AV
0.158	52.16	46.51	Line	65.57	55.57	-13.41	-9.06
0.166	53.14	42.65	Neutral	65.16	55.16	-12.02	-12.51
0.202	49.74	41.06	Line	63.53	53.53	-13.79	-12.47
0.214	45.63	37.89	Neutral	63.05	53.05	-17.42	-15.16
0.274	39.05	30.44	Line	61.00	51.00	-21.95	-20.56
0.298	44.86	37.25	Neutral	60.30	50.30	-15.44	-13.05

Note: NF = No Significant Peak was Found.

Remarks :

- 1.Uncertainty in conducted emission measured is <+/- 2dB.
- 2.QP and AV are abbreviations of quasi-peak and average individually.
- 3.The emission levels of other frequencies were very low against the limit.
- 4.The Quasi-peak emission level also meets average limit and measurement with the average detector is unnecessary.
- 5.Margin Value= Emission Level – Limit Value.

Conducted Emission

EN55022

EUT: Bluetooth headset

M/N: LBT-HS02

Manufacturer: LAYON International Electronic&Telecom Co., ltd

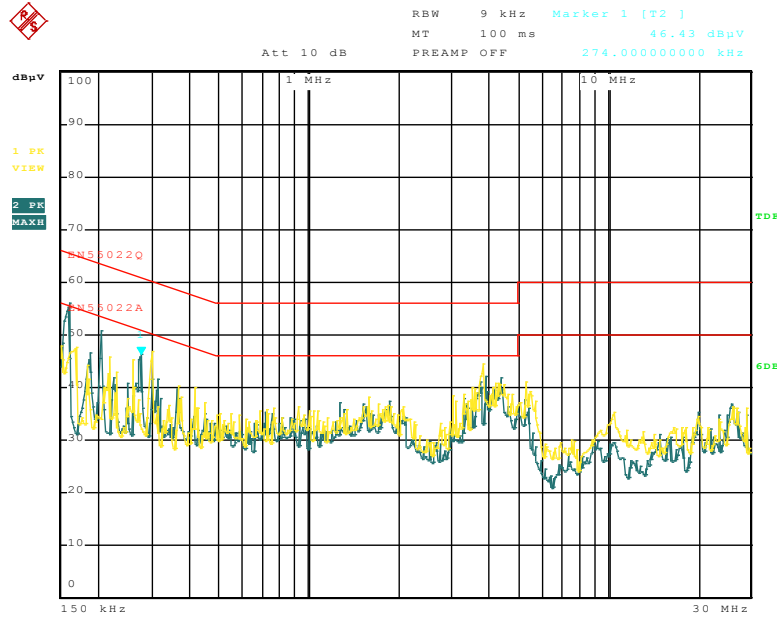
Operating Condition: Normal

Test Site: Ke Mei Ou Laboratory

Operator: Jacky

Test Specification: LINE&NEUTRAL

Comment:



Date: 7.MAR.2011 13:39:25

5. Radiated Emission Test

5.1 Test Equipment

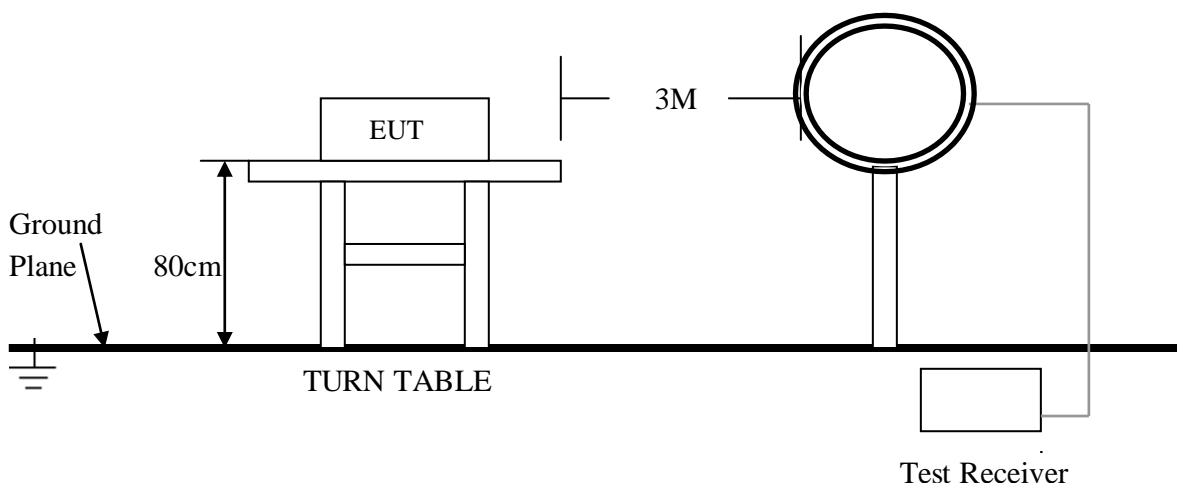
Please refer to Section 10 this report.

5.2 Test Procedure

1. The EUT was tested according to ANSI C63.4 - 2003.
2. The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2003.
3. The frequency spectrum from 9 kHz to 25 GHz was investigated. All readings from 9 kHz to 150 kHz are quasi-peak values with a resolution bandwidth of 200 Hz. All readings from 150 kHz to 30 MHz are quasi-peak values with a resolution bandwidth of 9 KHz. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 KHz. All readings are above 1 GHz , peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters.
4. The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. The Receiving antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency. Emissions below 30MHz were measured with a loop antenna while emission above 30MHz were measured using a broadband E-field antenna.
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. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4 - 2003.

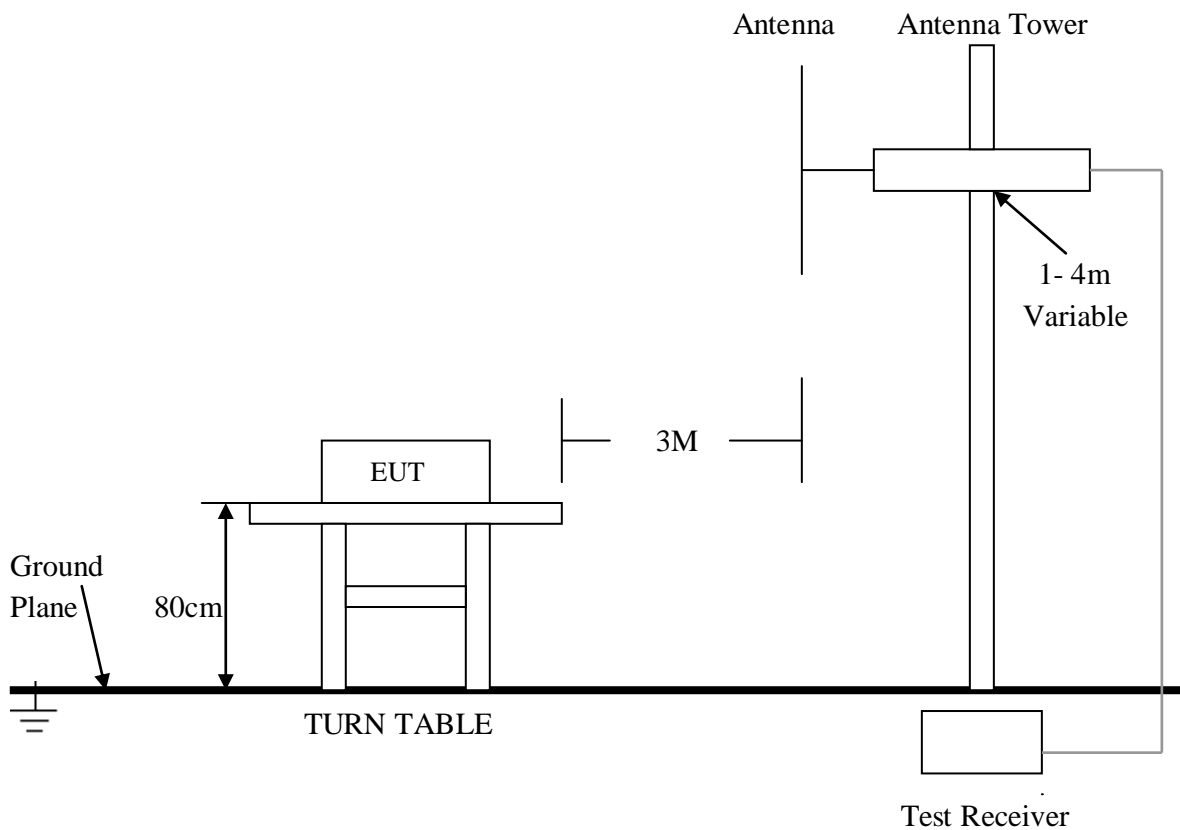
5.3 Radiated Test Setup

For Frequencies below 30 MHz



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

For Frequencies below 1 GHz



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 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

Fundamental Frequency (MHz)	Field Strength of Fundamental (3m)		Field 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 RF 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 is 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.

Frequency 9KHz~30MHz

Frequency (MHz)	Distance (m)	Field Strength (uV/m)
0.009~0.490	300	2400/F(kHz)
0.490~1.705	30	24000/F(kHz)
1.705~30	30	30

- Note:**
- (1) Limit(dBuV/m)=20log[24000/F(kHz)](The measurement distance at 30m)+40log(30/3)(The measurement distance at 3m)
 - (2) The tighter limit applies at the edge between two frequency bands.
 - (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.

Frequency Above 30MHz

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

5.7 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 °C
 Test Voltage : DC 3.7V(Power by battery) Humidity : 56%RH
 Test Result : **PASS**

CH Low

Freq. (GHz)	Emission (dBuV/m)		HORIZ /VERT	Limits (dBuV/m)		Margin (dB)	
	Peak	Average		Peak	Average	Peak	Average
2402.00	87.24	84.02	HORIZ	114.00	94.00	-26.76	-9.98
2402.00	81.83	79.68	VERT	114.00	94.00	-32.17	-14.32

CH Mid

Freq. (GHz)	Emission (dBuV/m)		HORIZ /VERT	Limits (dBuV/m)		Margin (dB)	
	Peak	Average		Peak	Average	Peak	Average
2441.00	86.54	83.45	HORIZ	114.00	94.00	-27.46	-10.55
2441.00	81.56	79.24	VERT	114.00	94.00	-32.44	-14.76

CH High

Freq. (GHz)	Emission (dBuV/m)		HORIZ /VERT	Limits (dBuV/m)		Margin (dB)	
	Peak	Average		Peak	Average	Peak	Average
2480.00	87.84	84.25	HORIZ	114.00	94.00	-26.16	-9.75
2480.00	82.37	77.38	VERT	114.00	94.00	-31.63	-16.62

- 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.
 - (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.

B. Harmonics Radiated Emission Data

Product : Bluetooth headset Test Mode : CH Low ~ CH High
 Test Item : Fundamental Radiated Emission Data Temperature : 25 °C
 Test Voltage : DC 3.7V(Power by battery) Humidity : 56%RH
 Test Result : **PASS**

CH Low

Freq. (MHz)	Emission (dBuV/m) Peak Detector	HORIZ /VERT	Limits (dBuV/m) Peak / Average	Margin (dB)
4804.00	48.55	HORZ	74.0 / 54.0	-25.45
4804.00	47.12	VERT	74.0 / 54.0	-26.88
7206.00	48.64	HORZ	74.0 / 54.0	-25.36
7206.00	47.32	VERT	74.0 / 54.0	-26.68
24020.00	-	HORZ	74.0 / 54.0	-
24020.00	-	VERT	74.0 / 54.0	-

CH Mid

Freq. (MHz)	Emission (dBuV/m) Peak Detector	HORIZ / VERT	Limits (dBuV/m) Peak / Average	Margin (dB)
4882.00	48.62	HORZ	74.0 / 54.0	-25.38
4882.00	47.37	VERT	74.0 / 54.0	-26.63
7323.00	48.19	HORZ	74.0 / 54.0	-25.81
7323.00	47.64	VERT	74.0 / 54.0	-26.36
24410.00	-	HORZ	74.0 / 54.0	-
24410.00	-	VERT	74.0 / 54.0	-

CH High

Freq. (MHz)	Emission (dBuV/m) Peak Detector	HORIZ / VERT	Limits (dBuV/m) Peak / Average	Margin (dB)
4960.00	48.67	HORZ	74.0 / 54.0	-25.33
4960.00	47.29	VERT	74.0 / 54.0	-26.71
7440.00	48.14	HORZ	74.0 / 54.0	-25.86
7440.00	47.56	VERT	74.0 / 54.0	-26.44
24800.00	-	HORZ	74.0 / 54.0	-
24800.00	-	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=30Hz; 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 High
Test Item	: Fundamental Radiated Emission Data	Temperature	: 25 °C
Test Voltage	: DC 3.7V(Power by battery)	Humidity	: 56%RH
Test Result	: PASS		

For Frequency Above 30MHz

Freq. (MHz)	Emission (dBuV/m) QP Detector	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
N/A	N/A	N/A	N/A	N/A

- Note:**
- (1) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
 - (2) "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
 - (3) Emission Level = Reading Level + Probe Factor + Cable Loss.

For Frequency Above 30MHz

Freq. (MHz)	Emission (dBuV/m) QP Detector	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
116.960	32.57	HORZ	43.5	-10.93
89.480	33.67	VERT	43.5	-9.83
249.360	30.78	HORZ	46.0	-15.22
207.960	34.15	VERT	43.5	-9.35
566.280	38.41	HORZ	46.0	-7.59
227.720	35.06	VERT	46.0	-10.94

- Note:**
- (1) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
 - (2) "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
 - (3) Emission Level = Reading Level + Probe Factor + Cable Loss.

6. Band Edge

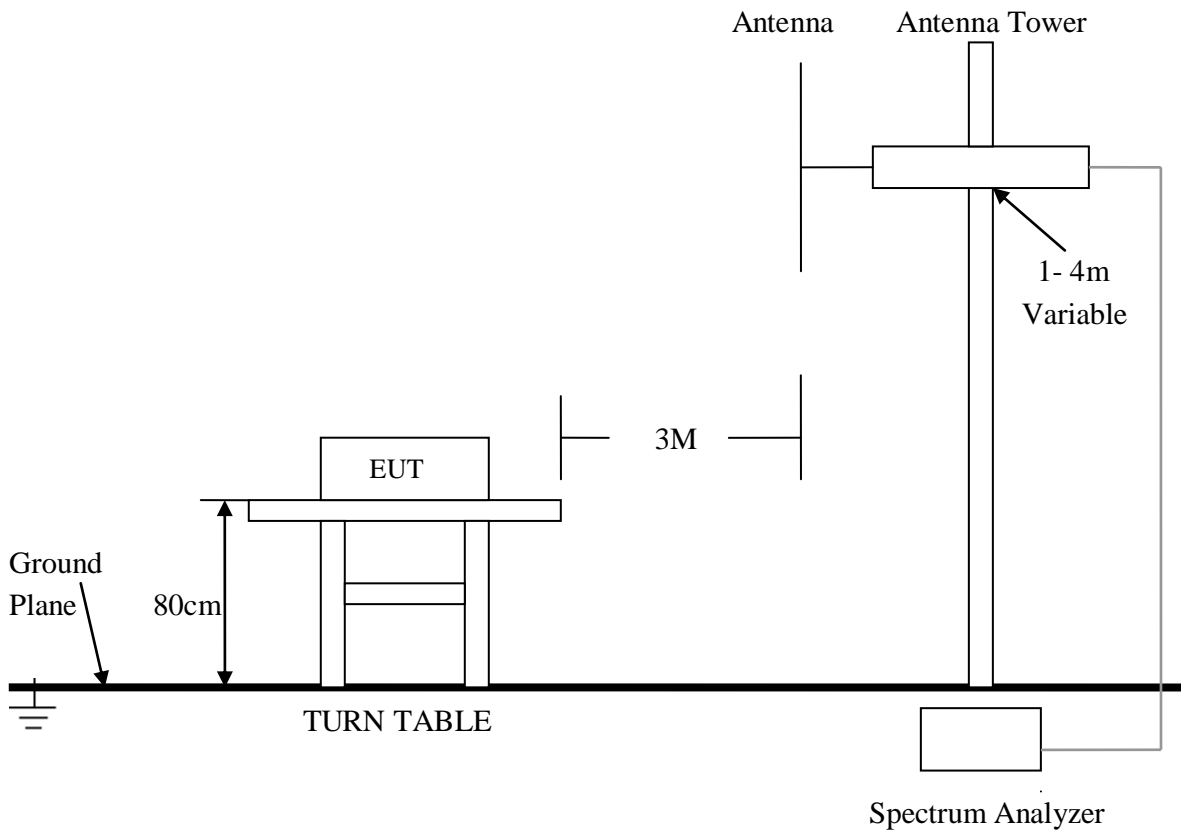
6.1 Test Equipment

Please refer to Section 10 this report.

6.2 Test Procedure

1. The EUT was tested according to ANSI C63.4 - 2003.
2. The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2003.
3. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4 - 2003.

6.3 Radiated Test Setup



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

6.4 Configuration of The EUT

Same as section 4.4 of this report

6.5 EUT Operating Condition

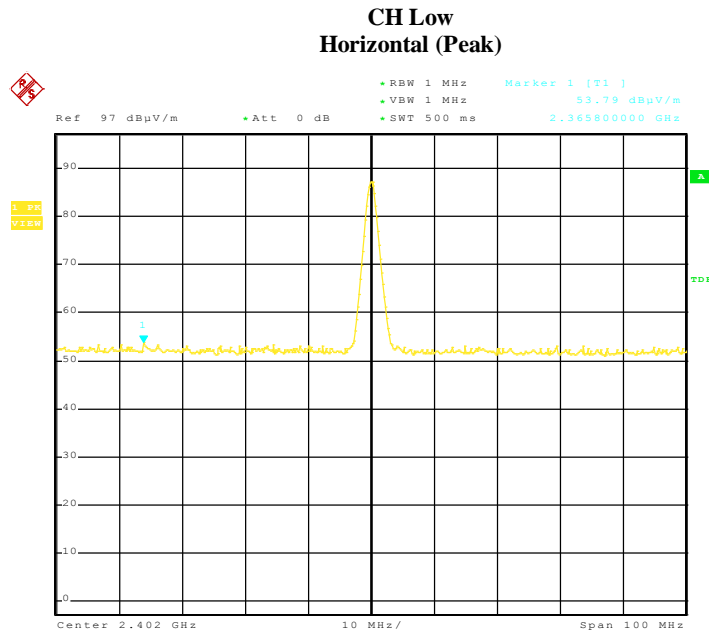
Same as section 4.5 of this report.

6.6 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 highest level of 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)).

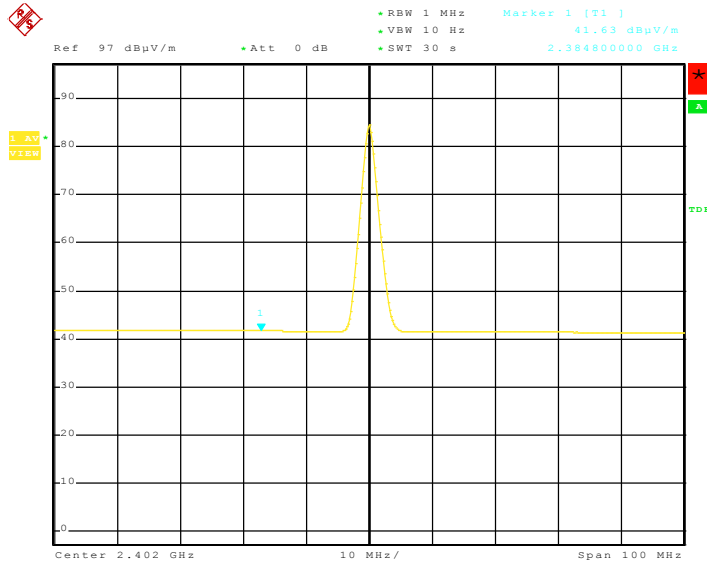
6.7 Band Edge Test Result

Product	: Bluetooth headset	Test Mode	: CH Low ~ CH High
Test Item	: Fundamental Radiated Emission Data	Temperature	: 25 °C
Test Voltage	: DC 3.7V (Power by battery)	Humidity	: 56%RH
Test Result	: PASS		



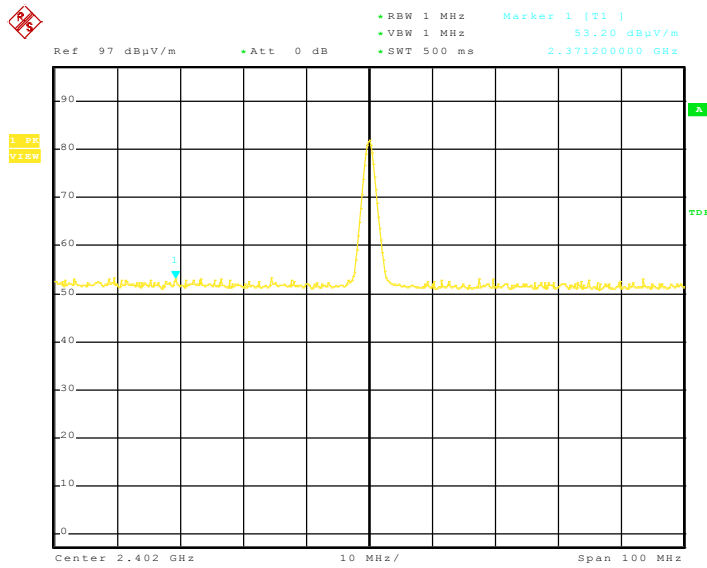
Date: 7.MAR.2011 11:18:32

Horizontal (Average)



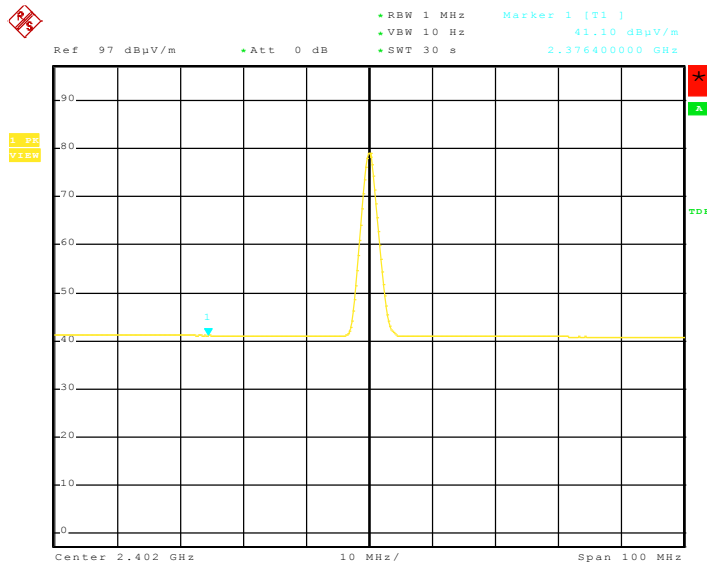
Date: 7.MAR.2011 11:23:27

Vertical (Peak)



Date: 7.MAR.2011 11:35:10

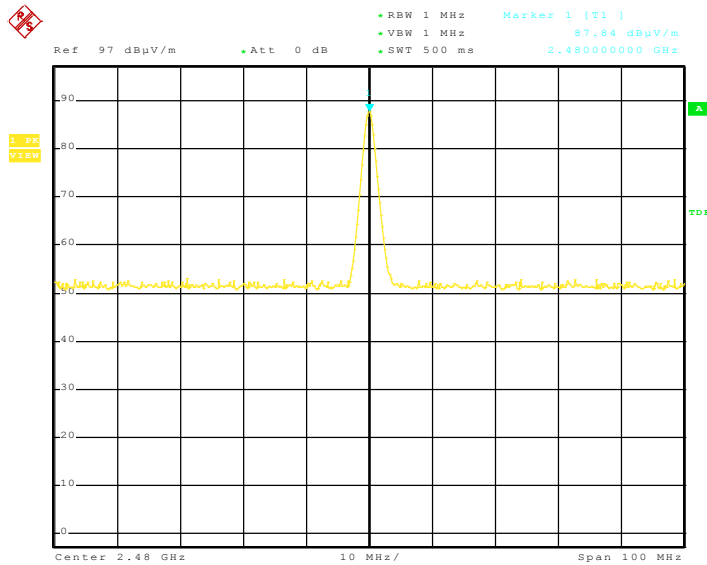
Vertical (Average)



Date: 7.MAR.2011 13:50:36

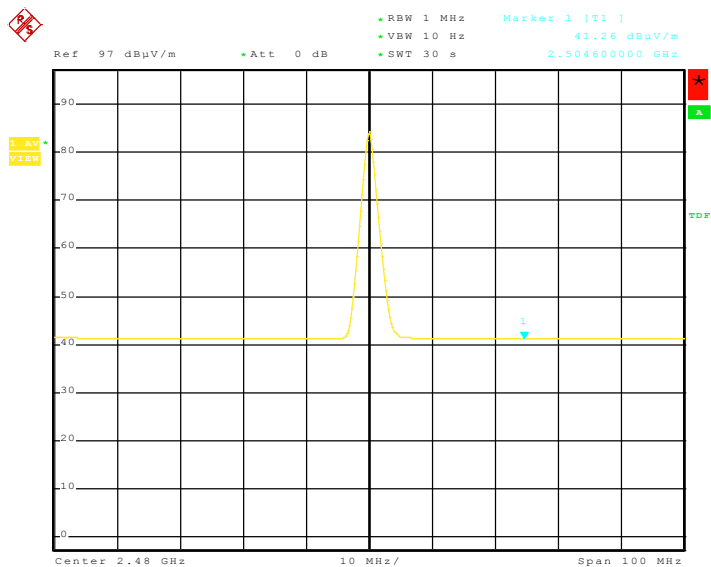
- Note:**
- (1) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.
 - (2) The average measurement was not performed when the peak measured data under the limit of average detection.

CH High Horizontal (Peak)



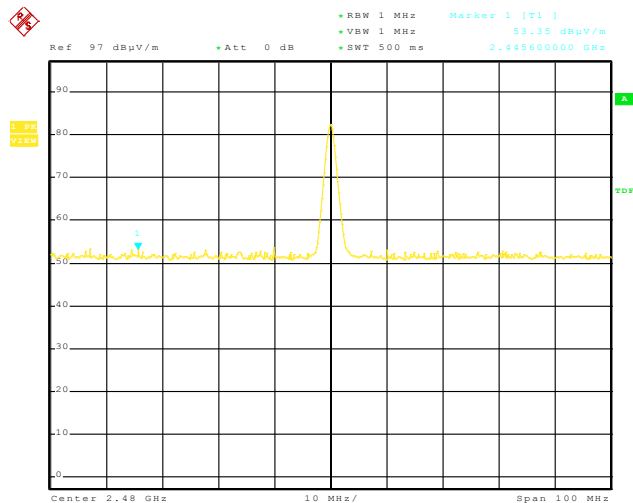
Date: 7.MAR.2011 11:53:21

Horizontal (Average)

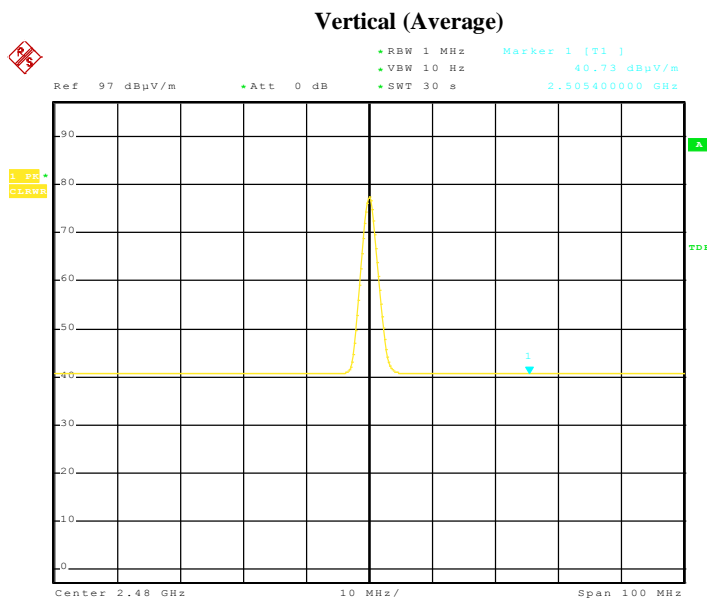


Date: 7.MAR.2011 11:55:57

Vertical (Peak)



Date: 7.MAR.2011 11:48:28



Date: 7.MAR.2011 11:50:51

- Note:**
- (1) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.
 - (2) The average measurement was not performed when the peak measured data under the limit of average detection.

7. 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 EUT no antenna connector for printed antenna. Therefore the EUT complies with Section 15.203 of the FCC rules.

8. Photos of Testing

8.1 EUT Test Photographs

Conducted emission test view



Radiated emission test view



8. 2 EUT Detailed Photographs

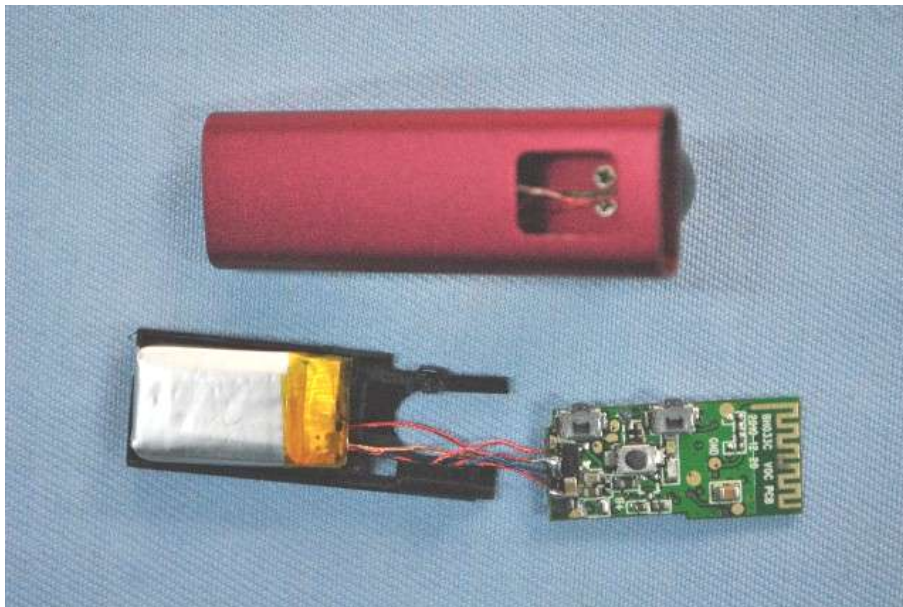
EUT top view



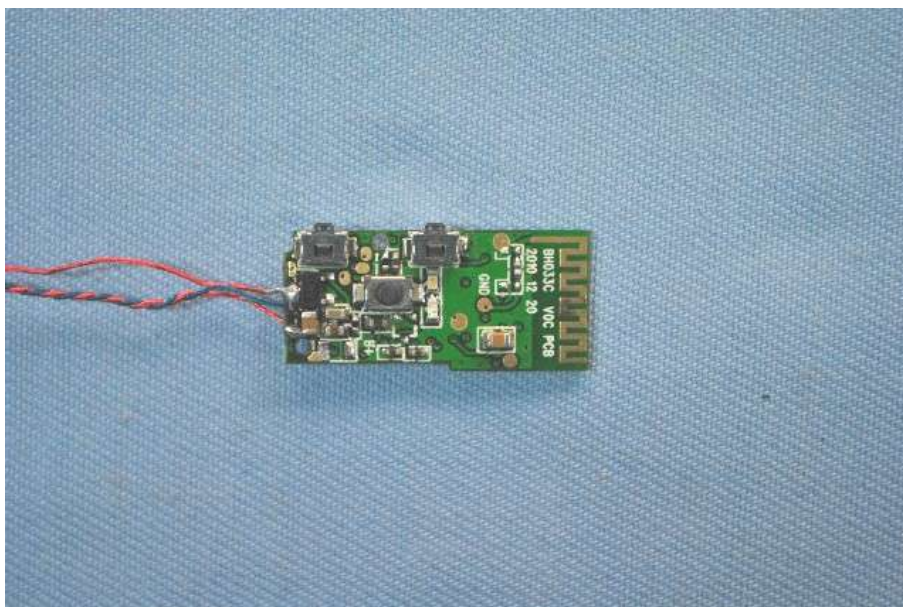
EUT bottom view



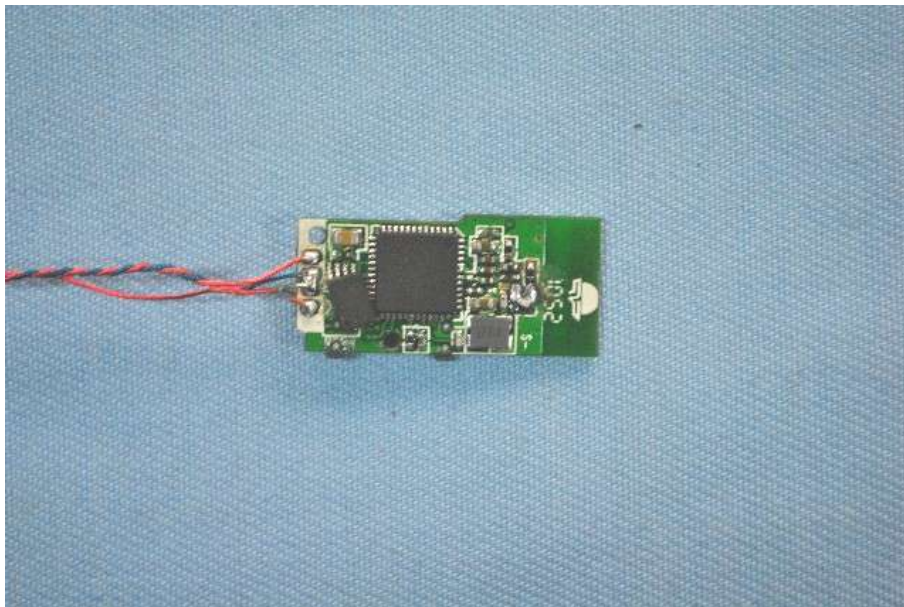
EUT inside whole view



Main & RF board component side



Main & RF board solder side



9. FCC ID Label

FCC ID: YWO LBT-HS02

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 ID Label Location



10. Test Equipment

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

Equipment/ Facilities	Manufacturer	Model #	Serial No.	Due Date
Turntable	SinTek	N/A	N/A	NCR
Antenna Tower	SinTek	N/A	N/A	NCR
OATS	SinTek	N/A	N/A	Sep.28, 2013
Bilog Antenna	SCHAFFNER	CBL6111C	2775	June 12, 2012
Pre-Amplifier	HP	8449B	3008B00965	June 12, 2012
Horn Antenna	EMCO	3115	9602-4659	June 12, 2012
Horn Antenna	Rohde & Schwarz	AT4560	SB3435/03	May 4, 2012
EMI Test Receiver	Rohde & Schwarz	ESPI7	100013	June 01, 2012
Spectrum Analyzer	Rohde & Schwarz	FSP40	100273	May 27, 2012
Signal Generator	FLUKE	PM5418+Y/C	LO747012	May 27, 2012
Loop Antenna	Rohde & Schwarz	HFH2-Z2	872096/16	Jan. 30, 2012
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	9161-4079	Sep.18, 2012
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	9161-4080	Sep.18, 2012
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-564	Sep.18, 2012
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-565	Sep.18, 2012
AMN	Rohde & Schwarz	ESH3-Z5	100197	May 27, 2012
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	9604	Nov.29, 2012
ISN	SCHWARZBECK	NTFM 8158 CAT3	CAT 3 8158-0010	Nov.19, 2012
ISN	SCHWARZBECK	NTFM 8158 CAT5	CAT 5 8158-0009	Nov.19, 2012
ISN	SCHWARZBECK	NTFM 8158 CAT6	CAT 6 8158-0012	Nov.19, 2012
KMO Shielded Room	KMO	KMO-001	N/A	N/A
Coaxial Cable with N-Connectors	SCHWARZBECK	AK9515H	95549	Sep.18, 2012
SOHO Telephone Switching System	IKE	2000-108C	N/A	NCR
3m Anechoic Chamber	Sintek	KMO-3AC	KMO-3AC-1	May 29, 2012
Temperature Chamber	TABAI	PSL-4GTW	N/A	Feb.10, 2012