

FCC TEST REPORT


Under
FCC 15 Subpart C, Paragraph 15.249

Prepared For :

LAYON International Electronic & Telecom Co., Ltd

No.328 Chigang Xi Road, Haizhu District, GuangZhou, China

FCC ID: TNBBK63
EUT: Bluetooth Car kit
Model: BK63

December 29, 2010
Issue Date:
Original Report
Report Type:
<i>Jacky Huang</i>
Test Engineer: Jacky Huang

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 : LAYON International Electronic & Telecom Co., Ltd
Address : No.328 Chigang Xi Road, Haizhu District, GuangZhou, China
Contact : Paulhe (Mr.)
Tel : +86-13808868087
Fax : +86-20-84214533

1.4 Application Details

Date of Receipt of Application : December 22, 2010
Date of Receipt of Test Item : December 24, 2010
Date of Test : December 27~December 28, 2010

1.5 Test Item

Manufacturer : Same As Applicant
Address : Same As Applicant
Trade Name : N/A
Model No.(Base) : BK63
Model No.(Extension) : BK63, BK60, BK61, BK62, BK64, BK65, BK66, BK67, BK68, BK69
Description : Bluetooth Car kit

Additional Information

Frequency : 2400-2483.5MHz
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

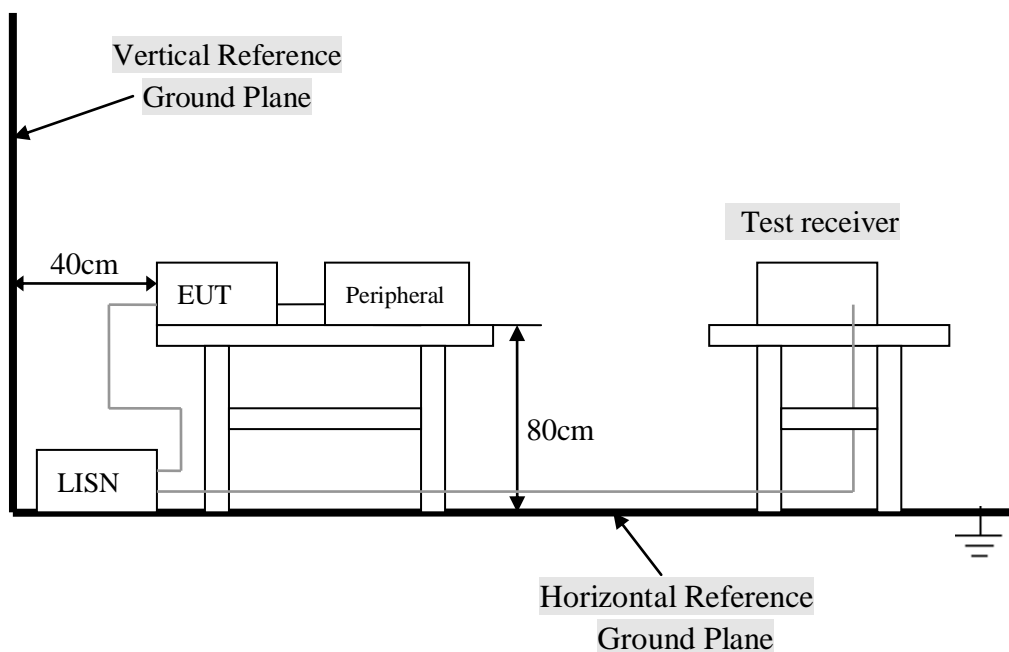
Please refer to Section 10 this report.

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
Bluetooth Car kit	Same As Applicant	BK63	TNBBK63

B. Internal Devices

Device	Manufacturer	Model #	FCC ID
N/A			

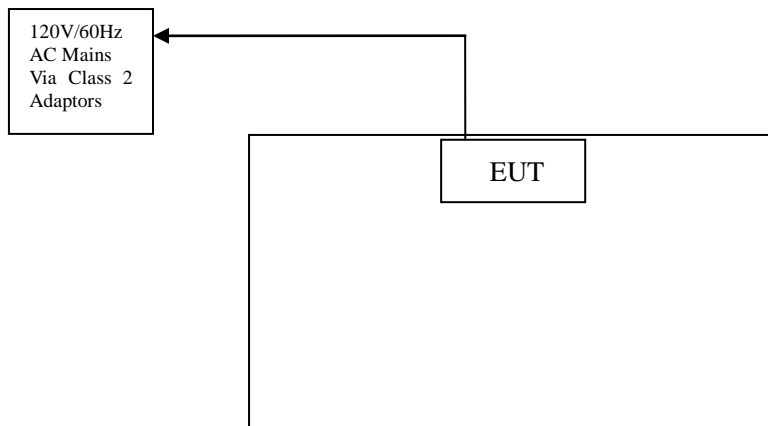
C. Peripherals

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
0.166	52.91	36.77	Line	65.16	55.16	-12.25	-18.39
0.154	52.75	41.04	Neutral	65.78	55.78	-13.03	-14.74
0.194	48.95	39.72	Line	63.86	53.86	-14.91	-14.14
0.198	47.94	39.85	Neutral	63.69	53.69	-15.75	-13.84
0.310	43.89	33.75	Line	59.97	49.97	-16.08	-16.22
0.274	45.26	35.76	Neutral	61.00	51.00	-15.74	-15.24

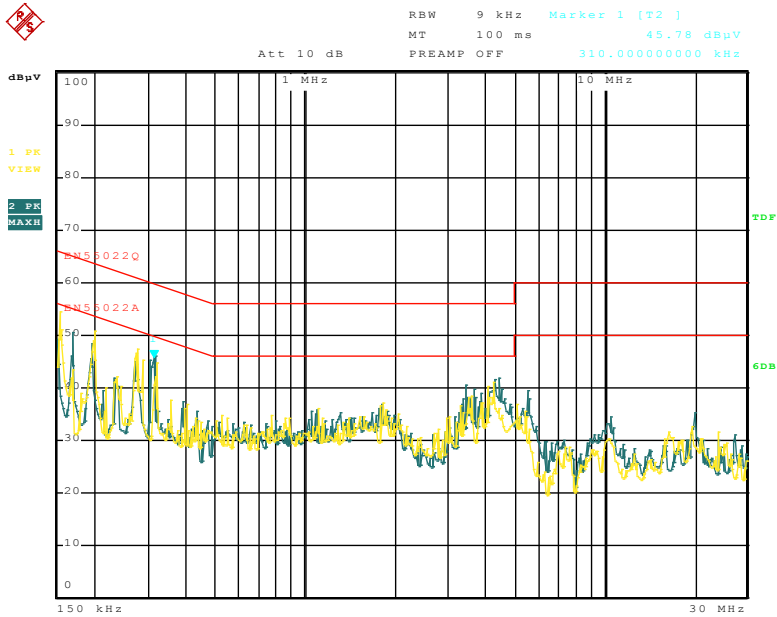
Note: NF = No Significant Peak was Found.

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 Car kit
M/N: BK63
Manufacturer: Same As Applicant
Operating Condition: Normal
Test Site:
Operator: Jacky
Test Specification: LINE&NEUTRAL
Comment:



Date: 28.DEC.2010 16:36:35

5. Radiated Emission Test

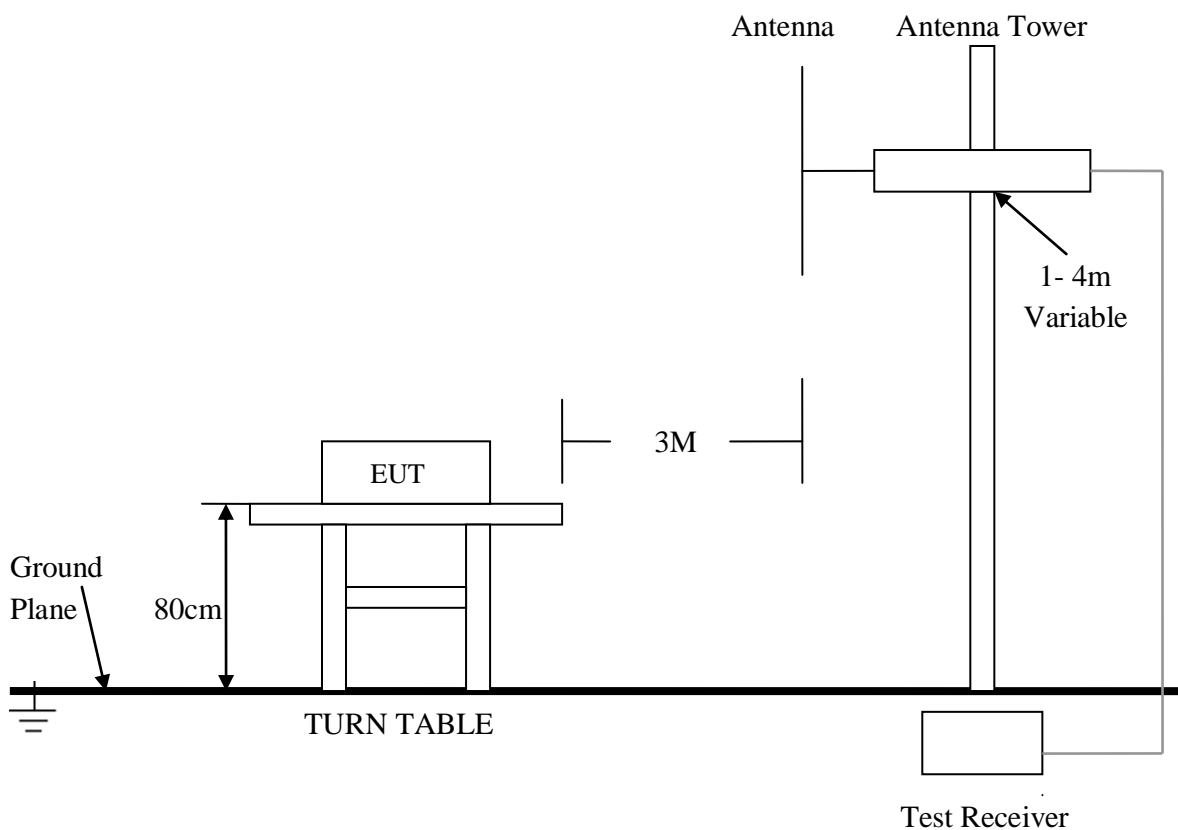
5.1 Test Equipment

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 30 MHz to 1 GHz was investigated. 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 antenna high is varied from 1 m to 4 m 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.

5.3 Radiated 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 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 (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 RF Voltage (uV)
 - (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.

5. 7 Radiated Emission Test Result

A. Fundamental Radiated Emission Data

Product : Bluetooth Car kit 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) Peak / Average		HORIZ /VERT	Limits (dBuV/m) Peak / Average		Margin (dB) Peak / Average	
2402.00	79.37	71.69	HORIZ	114.00	94.00	-34.63	-22.31
2402.00	71.57	60.36	VERT	114.00	94.00	-42.43	-33.64

CH Mid

Freq. (GHz)	Emission (dBuV/m) Peak / Average		HORIZ /VERT	Limits (dBuV/m) Peak / Average		Margin (dB) Peak / Average	
2441.00	78.65	70.14	HORIZ	114.00	94.00	-35.35	-23.86
2441.00	70.93	61.05	VERT	114.00	94.00	-43.07	-32.95

CH High

Freq. (GHz)	Emission (dBuV/m) Peak / Average		HORIZ /VERT	Limits (dBuV/m) Peak / Average		Margin (dB) Peak / Average	
2480.00	76.12	65.77	HORIZ	114.00	94.00	-37.88	-28.23
2480.00	70.04	60.32	VERT	114.00	94.00	-43.96	-33.68

- 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 Car kit 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	48.02	HORZ	74.0 / 54.0	-25.98
4804.00	46.55	VERT	74.0 / 54.0	-27.45
7206.00	48.06	HORZ	74.0 / 54.0	-25.94
7206.00	47.09	VERT	74.0 / 54.0	-26.91
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	48.12	HORZ	74.0 / 54.0	-25.88
4882.00	47.06	VERT	74.0 / 54.0	-26.94
7323.00	48.68	HORZ	74.0 / 54.0	-25.32
7323.00	47.23	VERT	74.0 / 54.0	-26.77
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	48.47	HORZ	74.0 / 54.0	-25.53
4960.00	47.65	VERT	74.0 / 54.0	-26.35
7440.00	48.17	HORZ	74.0 / 54.0	-25.83
7440.00	47.11	VERT	74.0 / 54.0	-26.89
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 Car kit	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		

Freq. (MHz)	Emission (dBuV/m) QP Detector	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
90.040	31.57	HORZ	43.5	-11.93
116.080	32.75	VERT	43.5	-10.75
176.080	33.84	HORZ	43.5	-9.66
182.140	32.95	VERT	43.5	-10.55
234.040	38.06	HORZ	46.0	-7.94
268.120	37.74	VERT	46.0	-8.26

- 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.

6. Band Edge

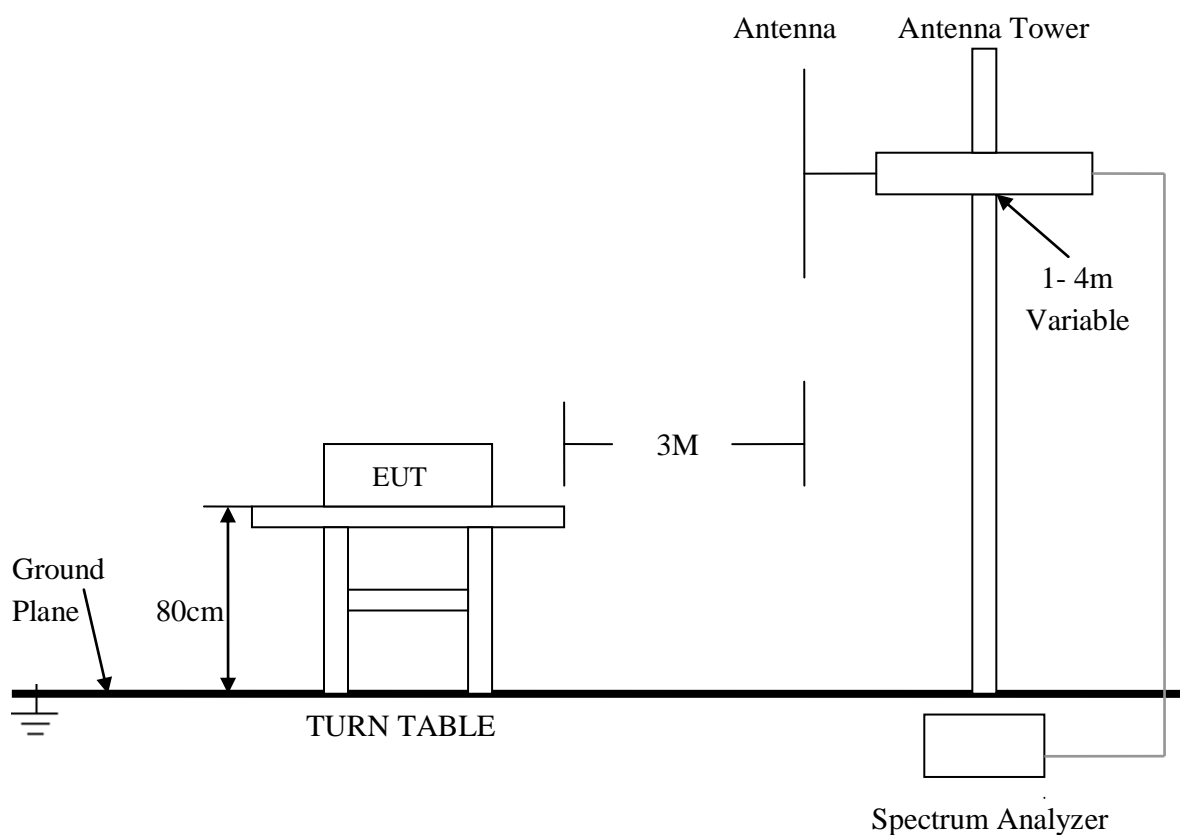
6.1 Test Equipment

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.

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

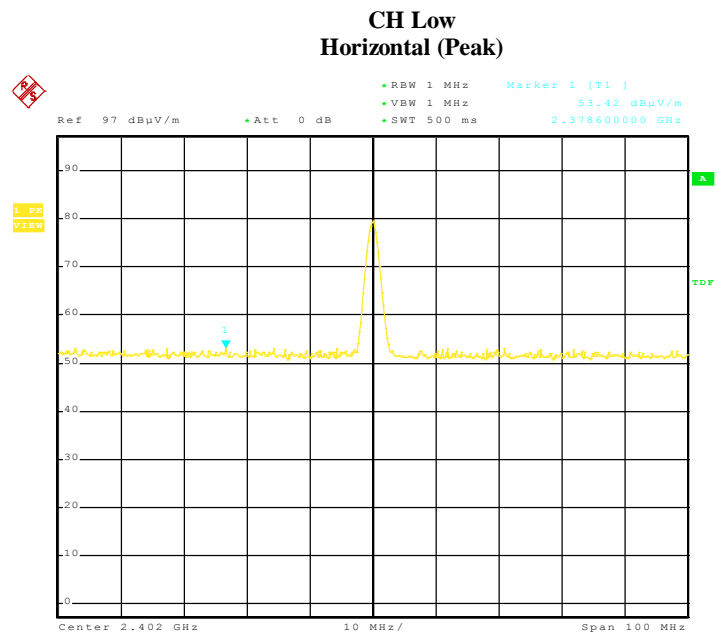
Same as section 4 . 5 of this report.

6. 6 Band Edge FCC 15.249(d) Limit

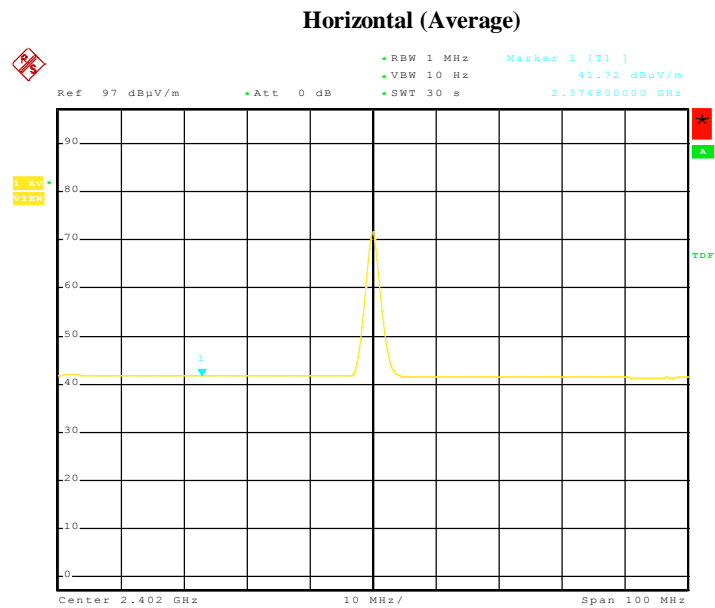
In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 50dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired 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

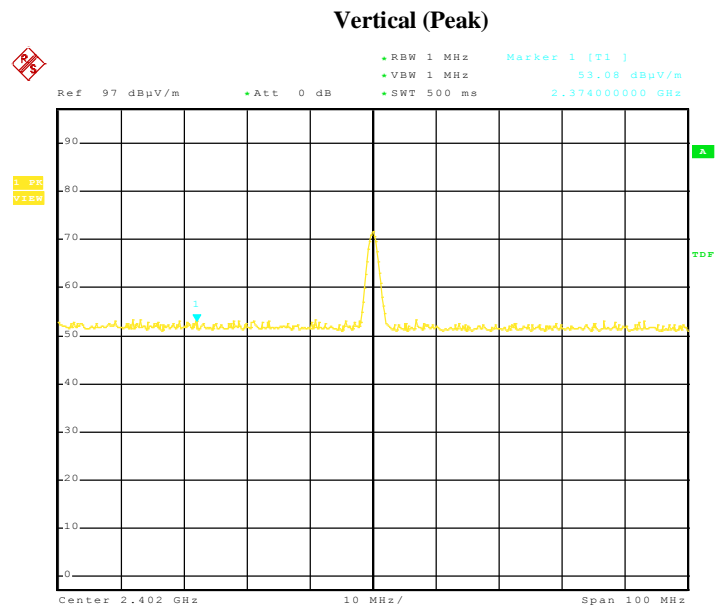
Product	: Bluetooth Car kit	Test Mode	: CH Low ~ CH High
Test Item	: Fundamental Radiated Emission Data	Temperature	: 25 °C
Test Voltage	: DC 3.7V (Power by battery)	Humidity	: 56%RH
Test Result	: PASS		



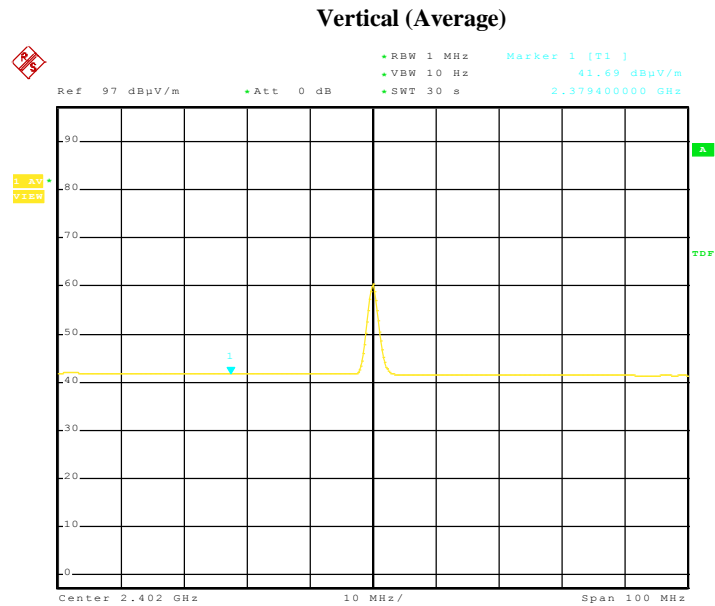
Date: 28.DEC.2010 15:42:34



Date: 28.DEC.2010 15:30:51

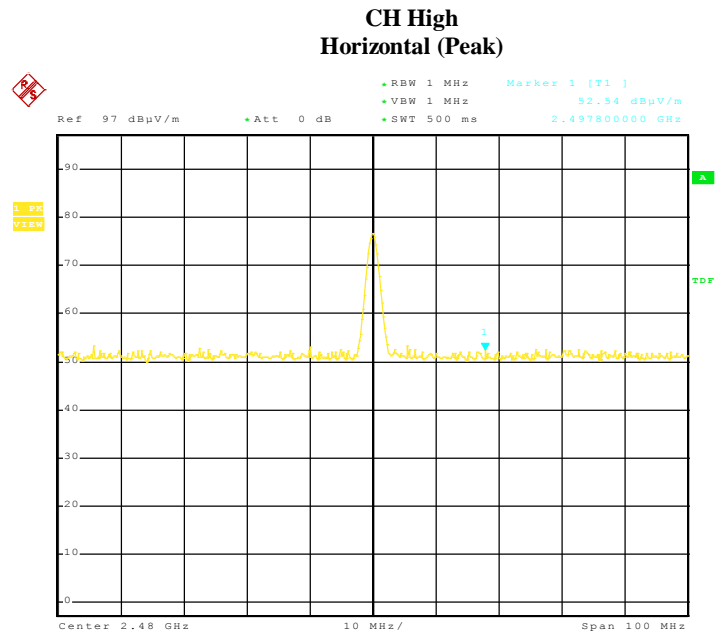


Date: 28.DEC.2010 15:35:47



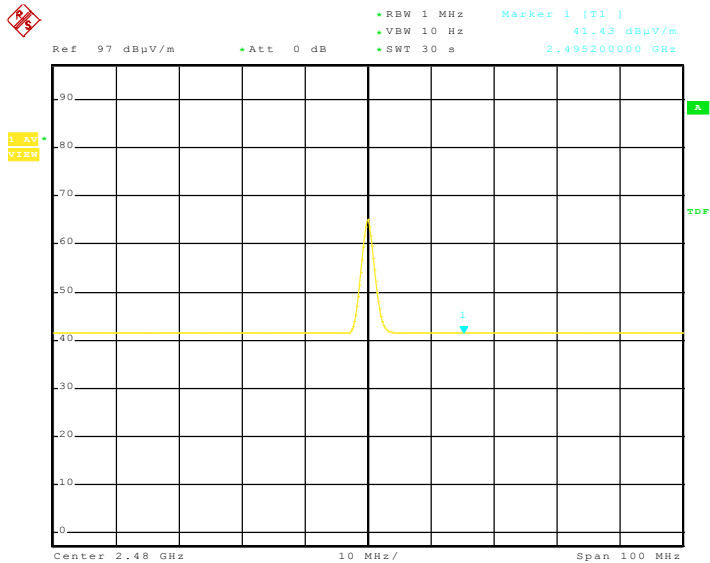
Date: 28.DEC.2010 15:38:46

- 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.



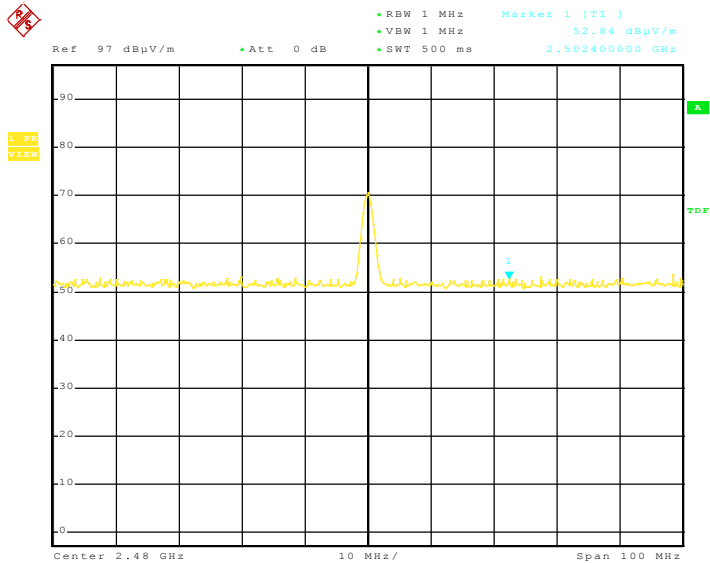
Date: 28.DEC.2010 15:22:53

Horizontal (Average)

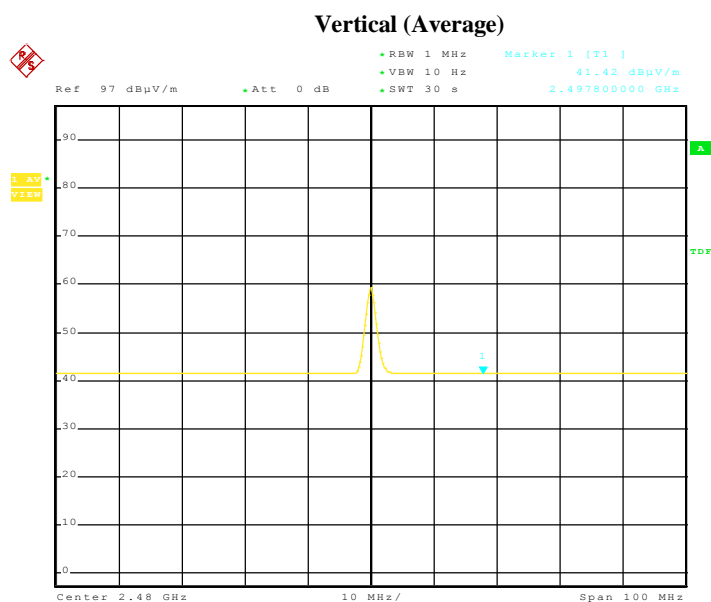


Date: 28.DEC.2010 15:25:43

Vertical (Peak)



Date: 28.DEC.2010 14:57:26



Date: 28.DEC.2010 14:59:21

- 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



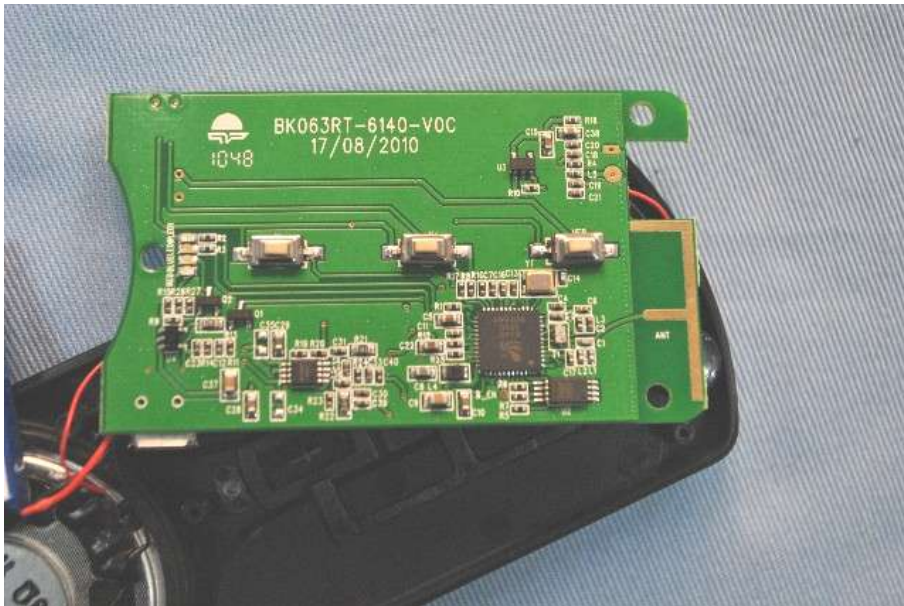
EUT bottom view



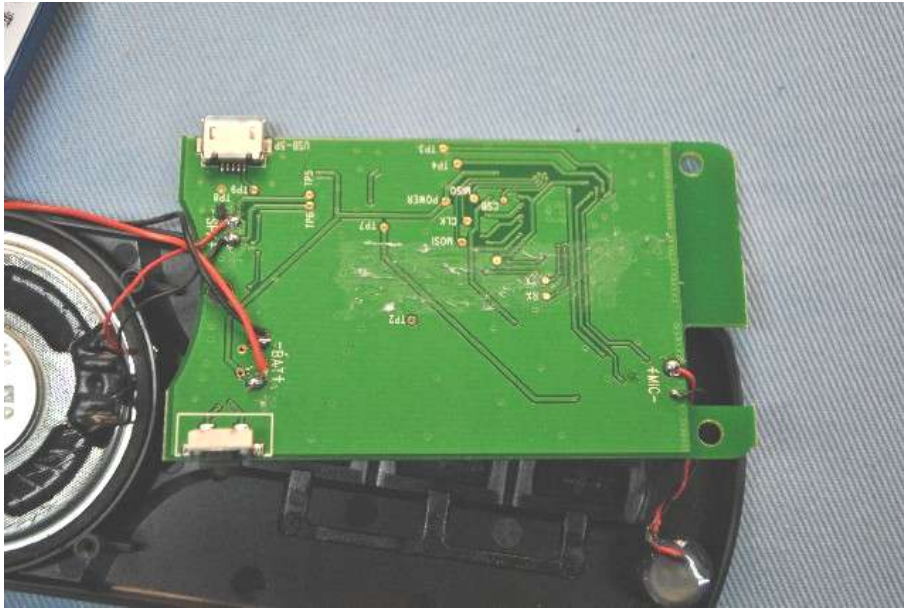
EUT inside whole view



Main & RF board component side



Main & RF board solder side



9. FCC ID Label

FCC ID: TNBBK63

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	Oct. 9, 2011
Bilog Antenna	SCHAFFNER	CBL6111C	2775	June 12, 2011
Pre-Amplifier	HP	8449B	3008B00965	June 12, 2011
Horn Antenna	EMCO	3115	9602-4659	June 12, 2011
Horn Antenna	Rohde & Schwarz	AT4560	SB3435/03	May 4, 2011
EMI Test Receiver	Rohde & Schwarz	ESPI7	100013	July 09, 2011
Spectrum Analyzer	Rohde & Schwarz	FSP40	100273	Sep.18, 2011
Signal Generator	FLUKE	PM5418+Y/C	LO747012	Feb.10, 2011
Loop Antenna	SCHWARZBECK	FMZB1516	113	Jan. 30, 2011
Loop Antenna	Rohde & Schwarz	HFH2-Z2	872096/16	Jan. 30, 2011
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	9161-4079	Sep.18, 2011
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	9161-4080	Sep.18, 2011
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-564	Sep.18, 2011
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-565	Sep.18, 2011
AMN	Rohde & Schwarz	ESH3-Z5	100196	Oct. 23, 2011
AMN	Rohde & Schwarz	ESH3-Z5	100197	Oct. 23, 2011
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	9604	Nov.29, 2011
KMO Shielded Room	KMO	KMO-001	N/A	N/A
Coaxial Cable with N-Connectors	SCHWARZBECK	AK9515H	95549	Sep.18, 2011
Radio Communication Test Set	Rohde & Schwarz	CMS 54	846621/024	Feb.10, 2011
Modulation Analyzer	Hewlett-Packard	8901B	2303A00362	Feb.10, 2011
SOHO Telephone Switching System	IKE	2000-108C	N/A	Feb.10, 2011
Temperature Chamber	TABAI	PSL-4GTW	N/A	Feb.10, 2011