



TEST REPORT

Product Name : Bluetooth Car Kit

Model Number : CKBT

Brand Name : BILLIONTON

FCC ID : NLF-CKBT

Applicant : BILLIONTON SYSTEMS INC.

Address : No. 21, Sui-Lih Rd., Hsin-Chu, 300, Taiwan

Received Date : February 02, 2005

Tested Date : February 02 ~ March 03, 2005

Issued by

**Compliance Certification Services Inc.
Hsinchu Lab.**

Rm. 258, Bldg. 17, NO.195, Sec.4 Chung Hsing Rd.,
Chu Tung Chen, Hsinchu, Taiwan 310, R.O.C

TEL: (03) 591-8012

FAX: (03) 582-5720

Notes :

1. This report will be invalid if duplicated or photocopied in part.
2. This report refers only to the specimen(s) submitted to testing, and be invalid as separately used.
3. This report is invalid without examination stamp and signature of this institute.
4. The tested specimen(s) will be preserved for thirty days from the data issued.
5. The report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.





Test Report Certification

Product Name : Bluetooth Car Kit
Model Number : CKBT
Brand Name : BILLIONTON
FCC ID : NLF-CKBT
Applicant : BILLIONTON SYSTEMS INC.

Measurement Standard :

FCC 47 C.F.R. Part 15, Subpart B and Subpart C (2004),
ANSI C63.4 (2003)

Tested By : Stan Peng, Date March 04, 2005
(Stan Peng)

Approved By : C.F. Wu, Date March 04, 2005
(C.F. Wu, Manager) C C S



WE HEREBY CERTIFY THAT: The measurements shown in the attachment were made in accordance with the procedures indicated, and the energy emitted by the equipment was found to be within the limits applicable. We assume full responsibility for the accuracy and completeness of these measurements and vouch for the qualifications of all persons taking them.



TABLE OF CONTENTS

TITLE	PAGE NO.
1. GENERAL INFORMATION	5
1.1 Description of EUT & Power	5
1.2 Description of Peripherals	5
1.3 EUT & Peripherals Setup Diagram	6
1.4 EUT Operating Procedure	7
1.5 Description of Laboratory	7
1.6 Summary of Test Results	8
2. 20dB BANDWIDTH FOR HOPPING	9
2.1 Test Equipments	9
2.2 Test Setup	9
2.3 Limits of 20db Bandwidth Measurement	9
2.4 Test Procedure	9
2.5 Uncertainty of Conducted Emission	10
2.6 Test Results	10
2.7 Photo of 20db Bandwidth Measurement	11
3. MAXIMUM PEAK OUTPUT POWER	12
3.1 Test Equipments	12
3.2 Test Setup	12
3.3 Limits of Maximum Peak Output Power	12
3.4 Test Procedure	13
3.5 Uncertainty of Conducted Emission	13
3.6 Test Results	13
3.7 Photo of Maximum Peak Output Power	14
4. HOPPING CHANNEL SEPARATION	15
4.1 Test Equipments	15
4.2 Test Setup	15
4.3 Limits of Hopping Channel Separation	15
4.4 Test Procedure	16
4.5 Uncertainty of Conducted Emission	16
4.6 Test Results	16
4.7 Photo of Hopping Channel Separation	16
5. NUMBER OF HOPPING FREQUENCY USED	17
5.1 Test Equipments	17
5.2 Test Setup	17
5.3 Limits of Number of Hopping Frequency Used	17
5.4 Test Procedure	18
5.5 Uncertainty of Conducted Emission	18
5.6 Test Results	18
5.7 Photo of Number of Hopping Frequency Used	18



TABLE OF CONTENTS

TITLE	PAGE NO.
6. DWELL TIME ON EACH CHANNEL.....	19
6.1 Test Equipments.....	19
6.2 Test Setup.....	19
6.3 Limits of Dwell Time on Each Channel.....	19
6.4 Test Procedure.....	20
6.5 Uncertainty of Conducted Emission.....	20
6.6 Test Results	20
6.7 Photo of Dwell Time on Each Channel.....	21
7. POWER SPECTRAL DENSITY MEASUREMENT.....	22
7.1 Test Equipments.....	22
7.2 Test Setup.....	22
7.3 Limits of Power Spectral Density Measurement.....	22
7.4 Test Procedure.....	23
7.5 Uncertainty of Conducted Emission.....	23
7.6 Test Results	23
7.7 Photo of Power Spectral Density Measurement.....	24
8. BAND EDGE SPURIOUS EMISSIONS.....	25
8.1 Test Equipments.....	25
8.2 Test Setup.....	25
8.3 Limits of Band edge Measurements.....	25
8.4 Test Procedure.....	26
8.5 Uncertainty of Conducted Emission.....	26
8.6 Test Results	26
8.7 Photo of Band edge Measurement.....	27-29
9. OUT OF BAND SPURIOUS EMISSIONS -RADIATED MEASUREMENTS.....	30
9.1 Test Equipments.....	30
9.2 Test Setup.....	30
9.3 Radiation Limit	31
9.4 Test Procedures	32
9.5 Uncertainty of Radiated Emission.....	32
9.6 Radiated RF Noise Measurement.....	33-45
9.7 Photos of Open Site.....	46
10. CONDUDED EMISSION MEASUREMENT.....	47
10.1 Standard Applicable	47
11. ANTENNA REQUIREMENT	48
11.1 Standard Applicable	48
11.2 Antenna Connected Construction.....	48



1. GENERAL INFORMATION

1.1 Description of EUT & Power

Product Name	Bluetooth Car Kit
Model Number	CKBT
EUT Description	2.4GHz Class II Frequency Hopping Spread Spectrum Data Transceiver for Bluetooth Car Kit
Frequency Range	2402 MHz to 2480MHz
Channel Number	79
Channel Spacing	1MHz
Air Data Rate	723Kbps
Type of Modulation	Frequency Hopping Spread Spectrum
Frequency Selection	BY SOFTWARE
Transmitter Classification	portable device
Antenna Type	SMD Antenna, Antenna Gain : 4dBi.
Power Source	12VDC

1.2 Description of Peripherals

(1) Notebook PC

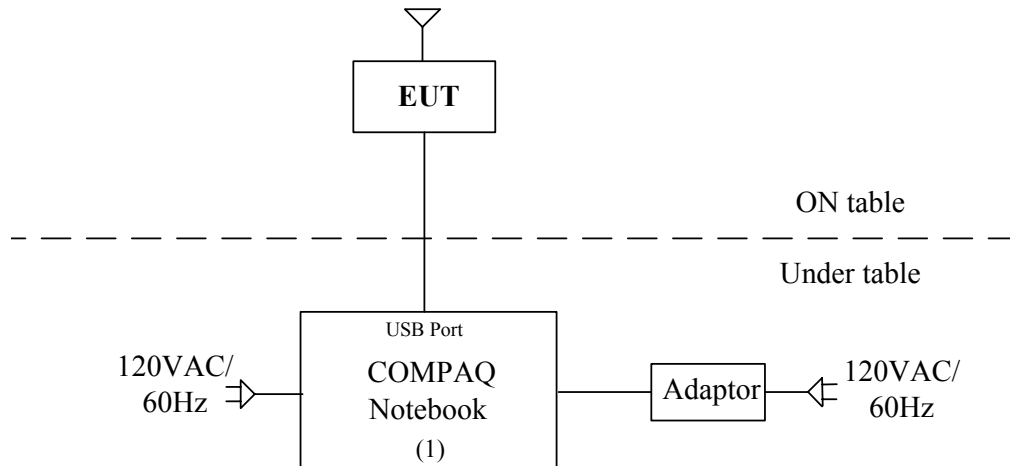
MANUFACTURER : COMPAQ CORP.
MODEL NUMBER : N800V
SERIAL NUMBER : 5Y33KSQZM0YV 1YR
INPUT POWER : 18.5VDC,65W,3.5A
OUTPUT POWER : -----

Adapter

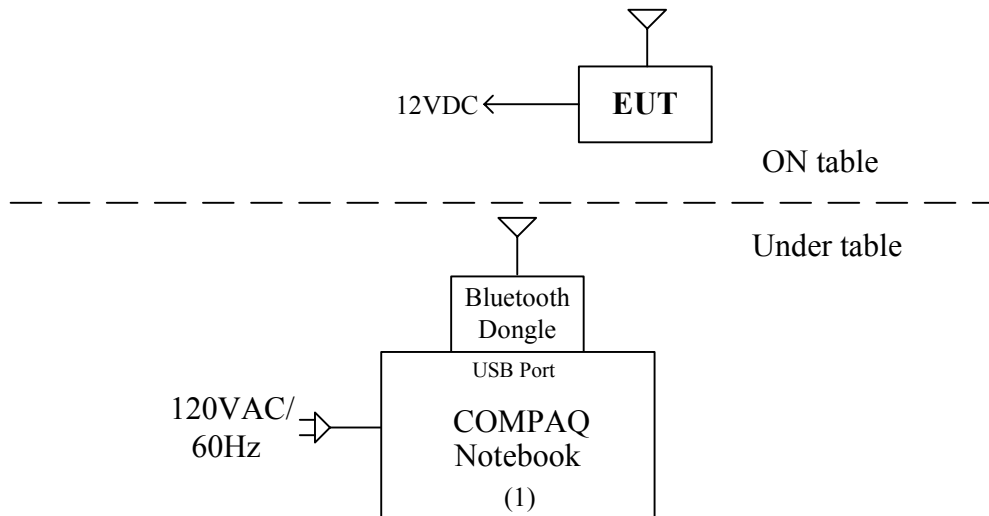
MANUFACTURER : COMPAQ CORP.
MODEL NUMBER : PPP009H
SERIAL NUMBER : 2Y18650504
INPUT POWER : 100-240VAC 50/60Hz,1.6A
OUTPUT POWER : 18.5VDC, 65W, 3.5A

1.3 EUT & Peripherals Setup Diagram

(1) Continue TX mode :



(2) User mode :



The indicated numbers (1)(2)....., please refer to item 1.2



1.4 EUT Operating Procedure

- (1) Turn on the power of all equipment.
- (2) Notebook runs a test program CSR Blue Suite (Bluetest) to set channel.
- (3) TX mode : select TXDATA1 to Execute.
Power (Ext, Int) : 255, 63
RX mode : select RXDATA1 to Execute.

1.5 Description of Laboratory

SITE DESCRIPTION

FCC Certificate NO. : 90585
BSMI Certificate NO. : SL2-IN-E-0002
NVLAP Lab Code : 200118-0
CNLA Certificate NO. : CNLA-ZL97018E
VCCI Certificate NO. : R-1189, C-1250
TÜV Rheinland Certificate NO. : 10008375

NAME OF SITE : Compliance Certification Services Inc. Hsinchu Lab.
SITE LOCATION : Rm.258, Bldg.17, NO.195 , Sec. 4, Chung Hsing Rd.,
Chu-Tung Chen. Hsin-Chu, Taiwan 310 R.O.C.



1.6 Summary of Test Results

The EUT has been tested according to the following specifications : (1 ~ 79 Channel)

APPLIED STANDARD : FCC 47 C.F.R. Part 15, Subpart B and Subpart C			
Standard Section	Test Item and Limit	Result	REMARK
15.107 15.207	AC Power Conducted Emission Limit: Sec1.5.107	PASS	Meet the requirement of limit
15.109 15.205 15.209	Transmitter Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit
15.247(a)(1)	Transmitter 20dB Bandwidth	N/A	Meet the requirement of limit
15.247(b)(1)	Maximum Peak Output Power Limit: max. 125mW	PASS	Meet the requirement of limit
15.247(a)(1)	Carrier Frequency Separation Limit: 2/3 of the 20dB bandwidth	PASS	Meet the requirement of limit
15.247(a)(1)(iii)	Number of Hopping Frequency Limit: at least 15 channels	PASS	Meet the requirement of limit
15.247(a)(1)(iii)	Time of Occupancy (dwell time) Limit: 0.4sec within 31.6sec	PASS	Meet the requirement of limit
15.247(d)	Band Edge Compliance	PASS	Meet the requirement of limit
15.247(d)	Out of Band Measurements	PASS	Meet the requirement of limit
15.247(f)	Power Spectral Density	PASS	Meet the requirement of limit



2. 20dB BANDWIDTH FOR HOPPING

Test Requirement: 15.247(a)(1)

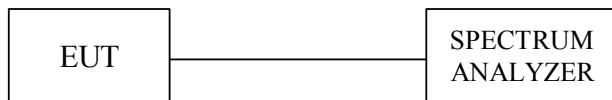
2.1 Test Equipments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Calibration Period
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	September 06, 2004	1 Year

NOTE :

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2.2 Test Setup



2.3 Limits of 20db Bandwidth Measurement

Limit: N/A

2.4 Test Procedure

The 20dB bandwidth was measured with a spectrum analyzer connected to RF antenna connector(conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency. The analyzer center frequency was set to the EUT carrier frequency, using the analyzer. Display Line and Marker Delta functions, the 20dB band width of the emission was determined.



2.5 Uncertainty of Conducted Emission

The uncertainty of conducted emission is $\pm 10\text{KHz}$.

2.6 Test Results

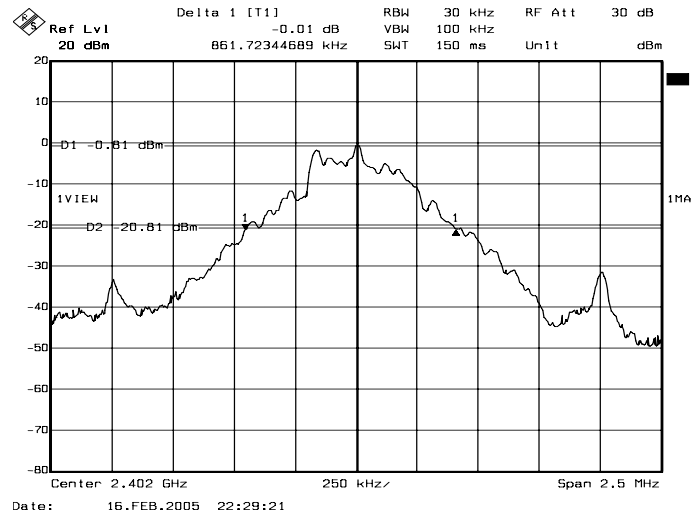
Refer to attached spectrum analyzer data chart.

Company	BILLIONTON SYSTEMS INC.	Test Date	2005/02/16
Product Name	Bluetooth Car Kit	Test By	Stan Peng
Model Name	CKBT	TEMP & Humidity	21.2°C, 74%

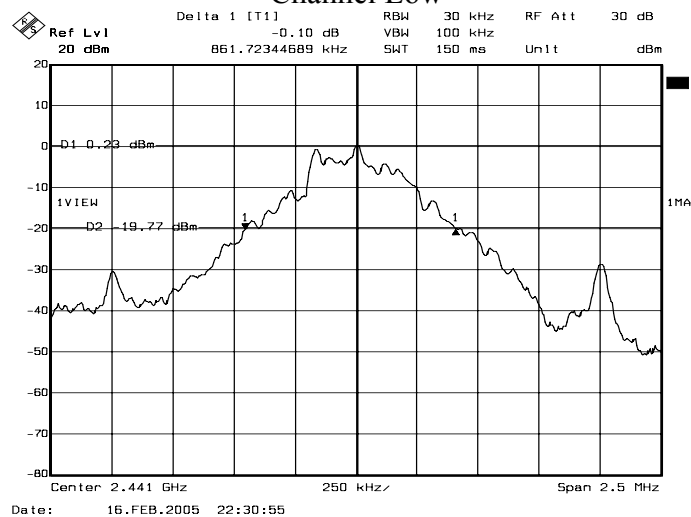
Channel	Channel Frequency (MHz)	20dB Bandwidth (MHz)	PASS / FAIL
01(Low)	2402	0.861	N/A
40(Mid)	2441	0.861	N/A
79(High)	2480	0.861	N/A



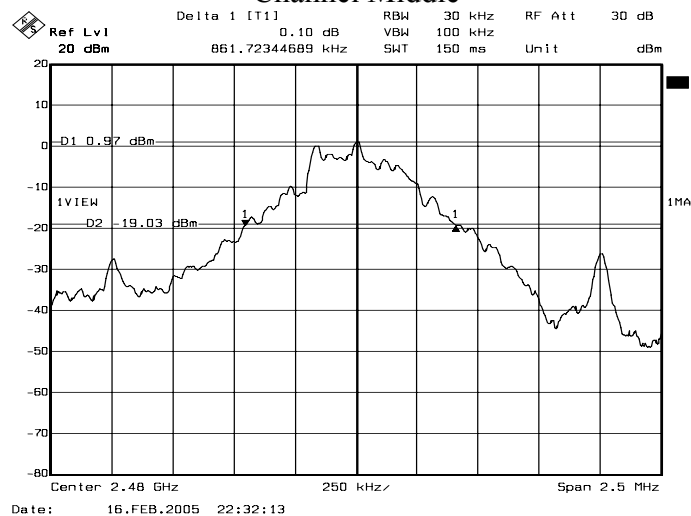
2.7 Photo of 20db Bandwidth Measurement



Channel Low



Channel Middle



Channel High



3. MAXIMUM PEAK OUTPUT POWER

Test Requirement: 15.247(b)(1)

3.1 Test Equipments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Calibration Period
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	September 06, 2004	1 Year

NOTE :

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

3.2 Test Setup



3.3 Limits of Maximum Peak Output Power

The Maximum Peak Output Power Measurement is 125mW for frequency hopping systems operating in 2400~2483.5 MHz employing at least 15 hopping channels.



3.4 Test Procedure

The RF power output was measured with a Power meter connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency, A spectrum analyzer was used to record the shape of the transmit signal see 4.7 for the measurement set up.

3.5 Uncertainty of Conducted Emission

The uncertainty of conducted emission is $\pm 1.82\text{dB}$.

3.6 Test Results

Company	BILLIONTON SYSTEMS INC.	Test Date	2005/02/16
Product Name	Bluetooth Car Kit	Test By	Stan Peng
Model Name	CKBT	TEMP & Humidity	18.3°C , 68%

Cable loss = 0.5dB

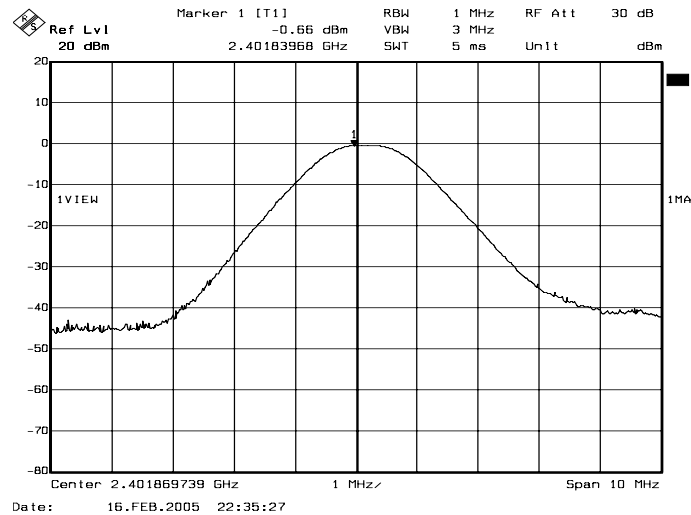
Channel	Channel Frequency (MHz)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass / Fail
01(Low)	2402	-0.16	20.97	PASS
40(Mid)	2441	0.88	20.97	PASS
79(High)	2480	1.65	20.97	PASS

Note :

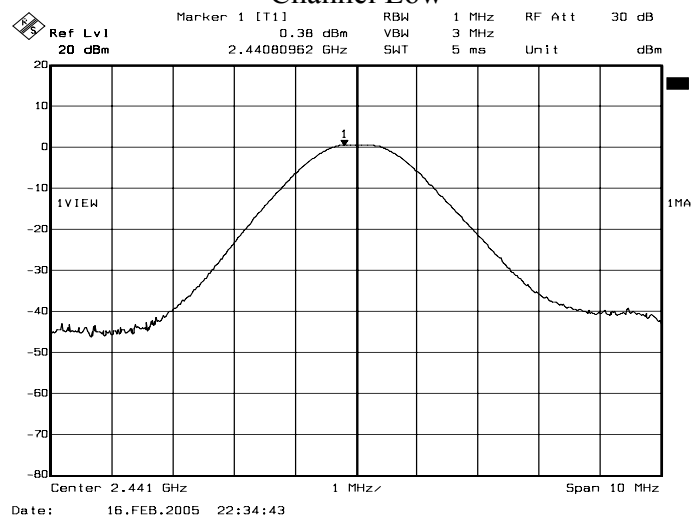
1. At final test to get the worst-case emission at 1Mbps.
2. The result basic equation calculation as follow :
Peak Power Output = Peak Power Reading + Cable loss



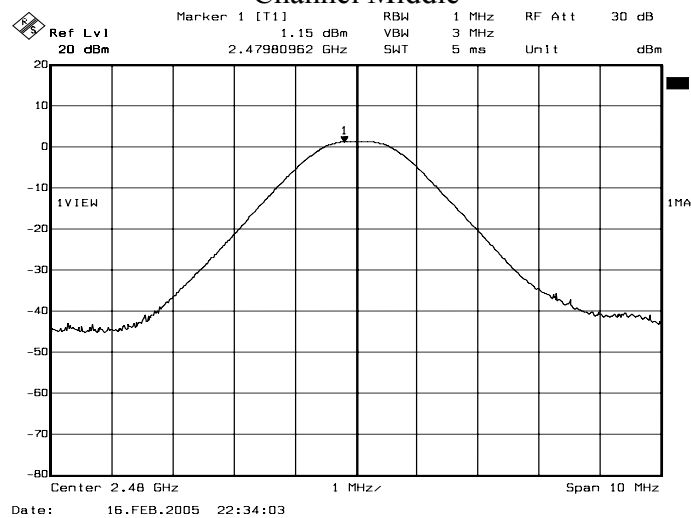
3.7 Photo of Maximum Peak Output Power



Channel Low



Channel Middle



Channel High



4. HOPPING CHANNEL SEPARATION

Test Requirement: 15.247(a)(1)

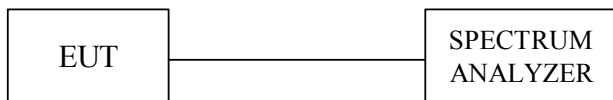
4.1 Test Equipments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Calibration Period
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	September 06, 2004	1 Year

NOTE :

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.2 Test Setup



4.3 Limits of Hopping Channel Separation

According to 15.247(a) (1), frequency hopping system operating in 2400-2483.5MHz band may have hopping channel carrier frequencies that are separated by 25kHz or two-third of 20dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125mW.



4.4 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in test setup without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
3. Because of the property of test software and hardware, the TX signal can not be modulated while test.
4. By using the MaxHold function record the separation of adjacent channels.
5. Measure the frequency difference of these two adjacent channels by spectrum analyzer MARK function. And then plot the result on spectrum analyzer screen.

Repeat above procedures until all frequencies measured were complete.

4.5 Uncertainty of Conducted Emission

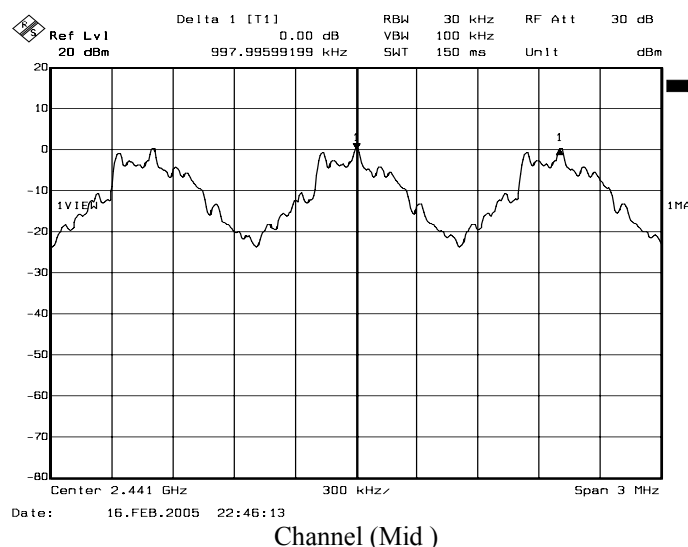
The uncertainty of conducted emission is $\pm 10\text{KHz}$.

4.6 Test Results

Refer to section 3, 20dB bandwidth measurement, the measured channel separation should be greater than two-third of 20dB bandwidth or Minimum bandwidth.

Channel	Adjacent Hopping Channel Separation (kHz)	Two –third of 20dB bandwidth (kHz)	Minimum Bandwidth	Result
2441MHz (Mid)	997.99 kHz	574.48 kHz	25 kHz	PASS

4.7 Photo of Hopping Channel Separation





5. NUMBER OF HOPPING FREQUENCY USED

Test Requirement: 15.247(a)(1)(iii)

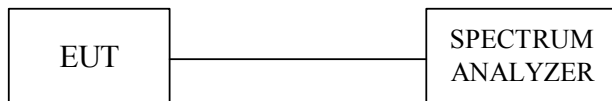
5.1 Test Equipments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Calibration Period
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	June 17, 2004	1 Year

NOTE :

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.2 Test Setup



5.3 Limits of Number of Hopping Frequency Used

According to 15.247(a)(1)(iii), for frequency hopping system operating in the 2400-2483.5MHz bands shall use at least 15 hopping frequencies.



5.4 Test Procedure

1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in test setup without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set the spectrum analyzer on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
4. Set the spectrum analyzer on View mode and then plot the result on spectrum analyzer screen.
5. Repeat above procedures until all frequencies measured were complete.

5.5 Uncertainty of Conducted Emission

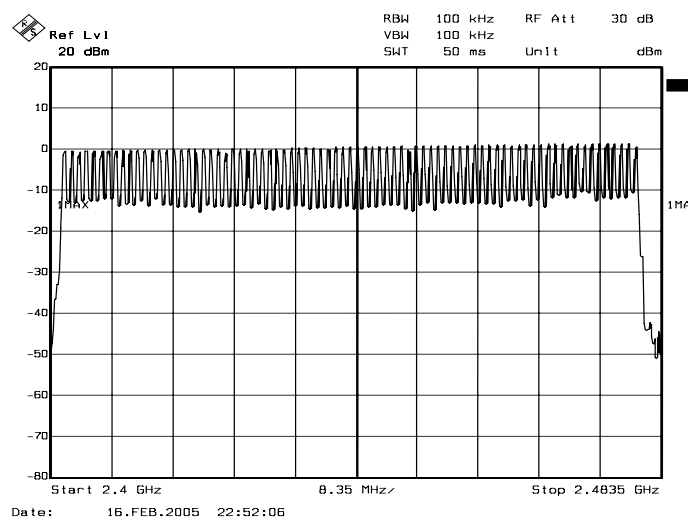
The uncertainty is not applicable.

5.6 Test Results

Refer to the attached plot.

There are 79 hopping frequencies in a hopping sequence.

5.7 Photo of Number of Hopping Frequency Used





6. DWELL TIME ON EACH CHANNEL

Test Requirement: 15.247(a)(1)(iii)

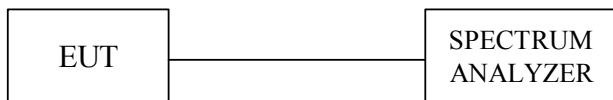
6.1 Test Equipments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Calibration Period
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	June 17, 2004	1 Year

NOTE :

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

6.2 Test Setup



6.3 Limits of Dwell Time on Each Channel

According to 15.247(a)(1)(iii), for frequency hopping system operating in the 2400-2483.5MHz band, the average time of occupancy on any frequency shall not be greater than **0.4** second within a 31.6 second period.



6.4 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in test setup without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of spectrum analyzer on any frequency be measured and set spectrum analyzer to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
5. Repeat above procedures until all frequencies measured were complete.
6. The Bluetooth Car Kit has 3 type of payload, DH1, DH3 and DH5. The hopping rate differ with different payloads. The longer the payload is, the slower the hopping rate is.

6.5 Uncertainty of Conducted Emission

The uncertainty of time is $\pm 5.25\text{ms}$.

6.6 Test Results

Time of occupancy on the TX channel in 31.6sec = time domain slot length $\times$ hop rate $\div$ number of hop per channel $\times 31.6$

Refer to the attached graph.

The hopping rates of Bluetooth devices change with different types of payload. The longer the payload is, the slower the hopping rate. The hopping rate scenario is defined in Bluetooth core specification.

Transmitting Frequency	Packet type	Dwell time (ms)	Time of occupancy on the TX channel in 31.6sec (ms)	Limit for Time of occupancy on the TX channel in 31.6sec (ms)	Results
2441MHz	DH1	0.420	134.40	400	PASS
2441MHz	DH3	1.653	264.48	400	PASS
2441MHz	DH5	2.254	240.42	400	PASS

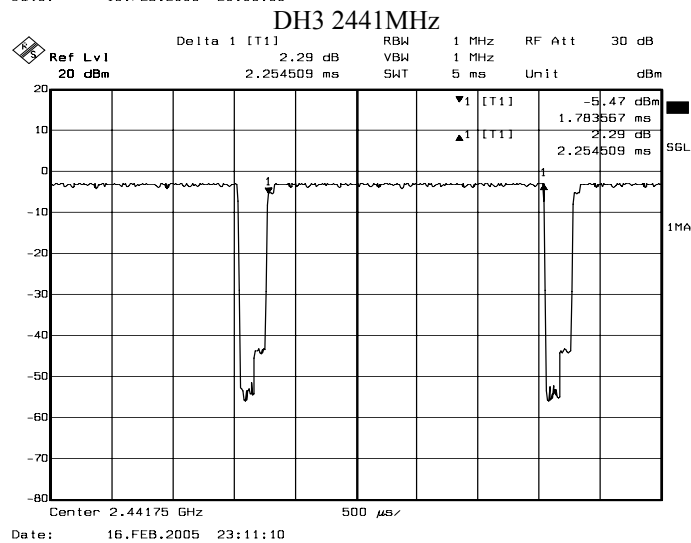
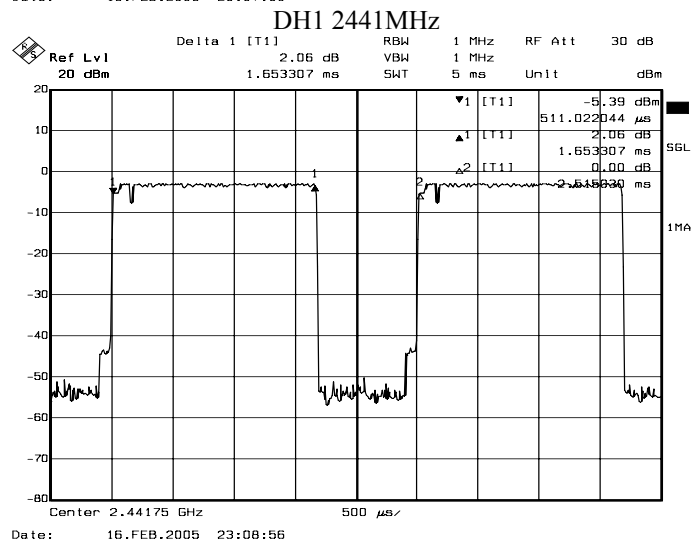
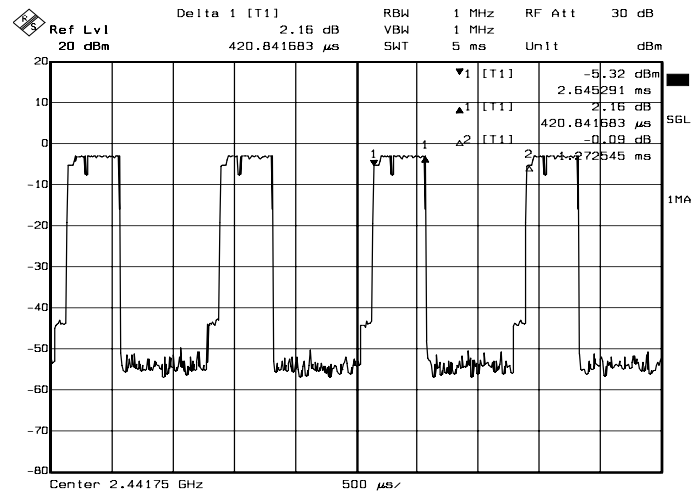
$$\text{DH1 Dwell time} = 0.420 \text{ ms} \times (1600 \div 2) \div 79 \times 31.6 = 134.40 \text{ (ms)}$$

$$\text{DH3 Dwell time} = 1.653 \text{ ms} \times (1600 \div 4) \div 79 \times 31.6 = 264.48 \text{ (ms)}$$

$$\text{DH5 Dwell time} = 2.254 \text{ ms} \times (1600 \div 6) \div 79 \times 31.6 = 240.42 \text{ (ms)}$$



6.7 Photo of Dwell Time on Each Channel



DH5 2441MHz



7. POWER SPECTRAL DENSITY MEASUREMENT

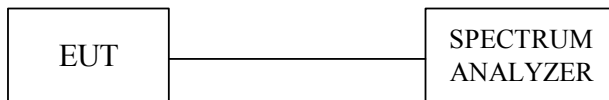
7.1 Test Equipments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Calibration Period
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	September 06, 2004	1 Year

Note :

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

7.2 Test Setup



7.3 Limits of Power Spectral Density Measurement

The Maximum Power Spectral Density Measurement is 8dBm/3KHz.



7.4 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3KHz RBW and 30KHz VBW, set sweep time=span / 3KHz.

The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span / 3KHz for a full response of the mixer in the spectrum analyzer.

7.5 Uncertainty of Conducted Emission

The uncertainty of conducted emission is $\pm 1.82\text{dB}$.

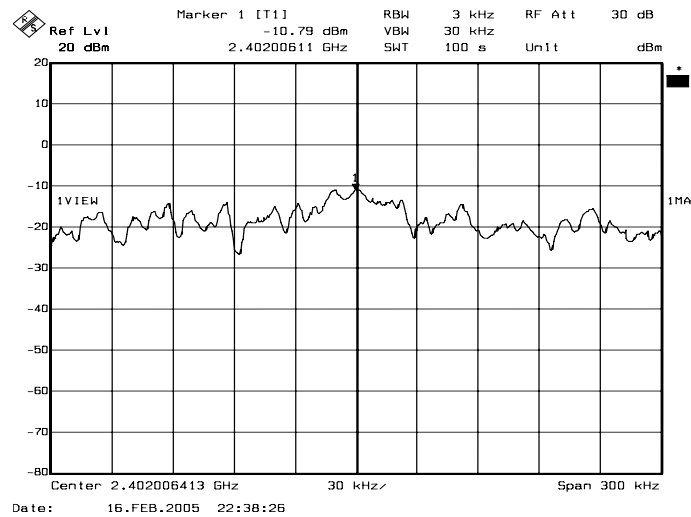
7.6 Test Results

Company	BILLIONTON SYSTEMS INC.	Test Date	2005/02/16
Product Name	Bluetooth Car Kit	Test By	Stan Peng
Model Name	CKBT	TEMP & Humidity	18.3°C, 68%

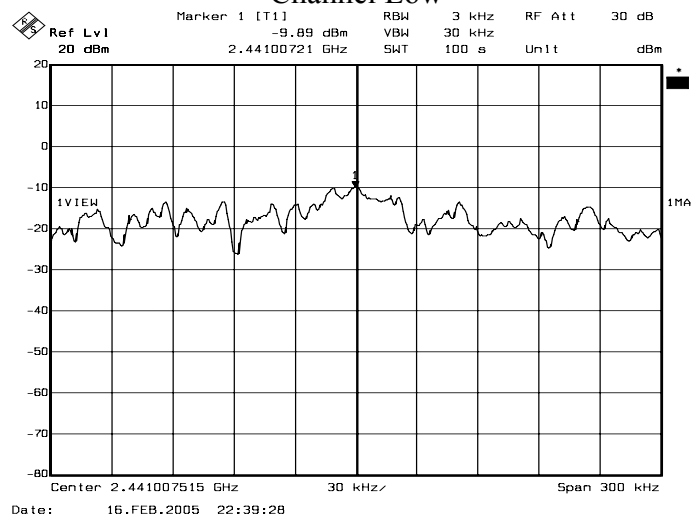
Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Maxmum Limit (dBm)	Pass / Fail
01(Low)	2402	-10.79	8	PASS
40(Mid)	2441	-9.89	8	PASS
79(High)	2480	-9.25	8	PASS



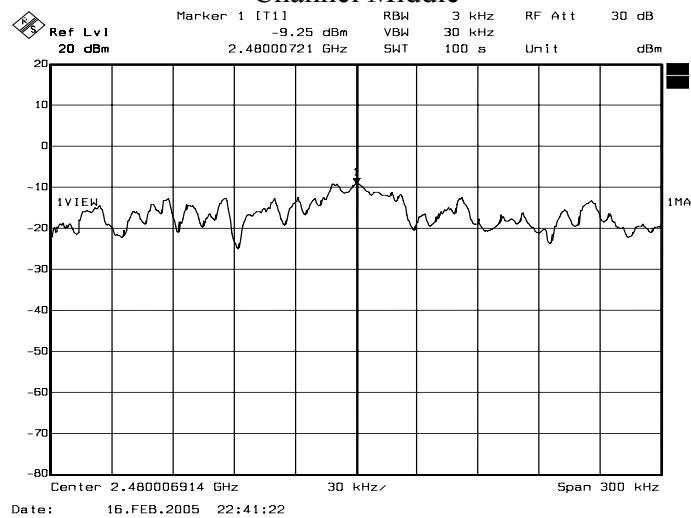
7.7 Photo of Power Spectral Density Measurement



Channel Low



Channel Middle



Channel High



8. BAND EDGE SPURIOUS EMISSIONS

Test Requirement: 15.247(d)

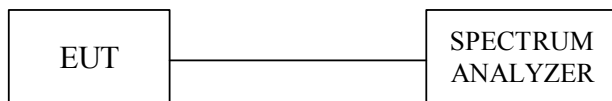
8.1 Test Equipments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Calibration Period
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	September 06, 2004	1 Year

Note :

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

8.2 Test Setup



8.3 Limits of Band edge Measurements

The emission not fallen in restricted bands should be 20dB below the highest emission level of operating band (in 100KHz Resolution Bandwidth).

For the emissions fallen in the restricted bands listed in section 15.205, the maximum permitted average field strength should meet the requirement listed in section 15.209.



8.4 Test Procedure

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.4 with respect to maximizing the emission by rotating the EUT , measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW and VBM to 1MHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength.

The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW and VBW to 100kHz, to measure the conducted peak band edge.

8.5 Uncertainty of Conducted Emission

The uncertainty of Frequency : $\pm 100\text{kHz}$.

The uncertainty of Amplitude : $\pm 2\text{dB}$.

8.6 Test Results

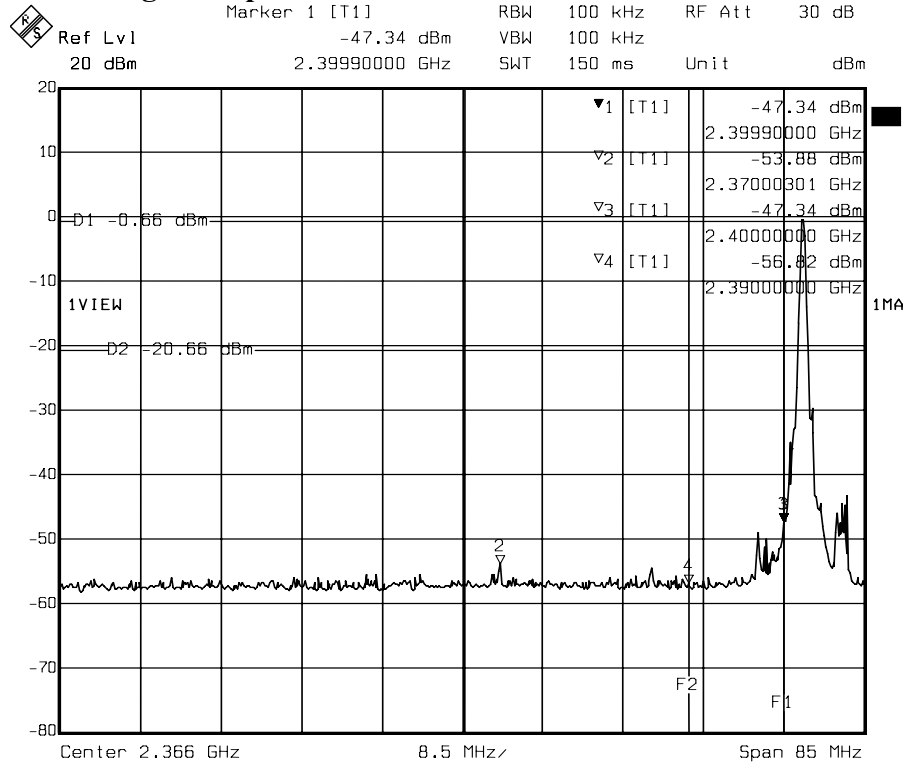
Band edge Frequency (MHz)		Measured radiated band edge field strength (dBuV/m)		Radiated band edge field strength limit (dBuV/m)		Test result
		Horizontal	Vertical	Horizontal	Vertical	
2399.90	PK	61.78	58.18	79.40	76.94	PASS
	AVG	41.18	37.98	79.04	76.72	
2483.50	PK	52.53	50.43	74.00	74.00	PASS
	AVG	35.33	33.83	54.00	54.00	

Note : Radiated band edge field strength is measured according to measurement procedure ANSI C63.4-2003.



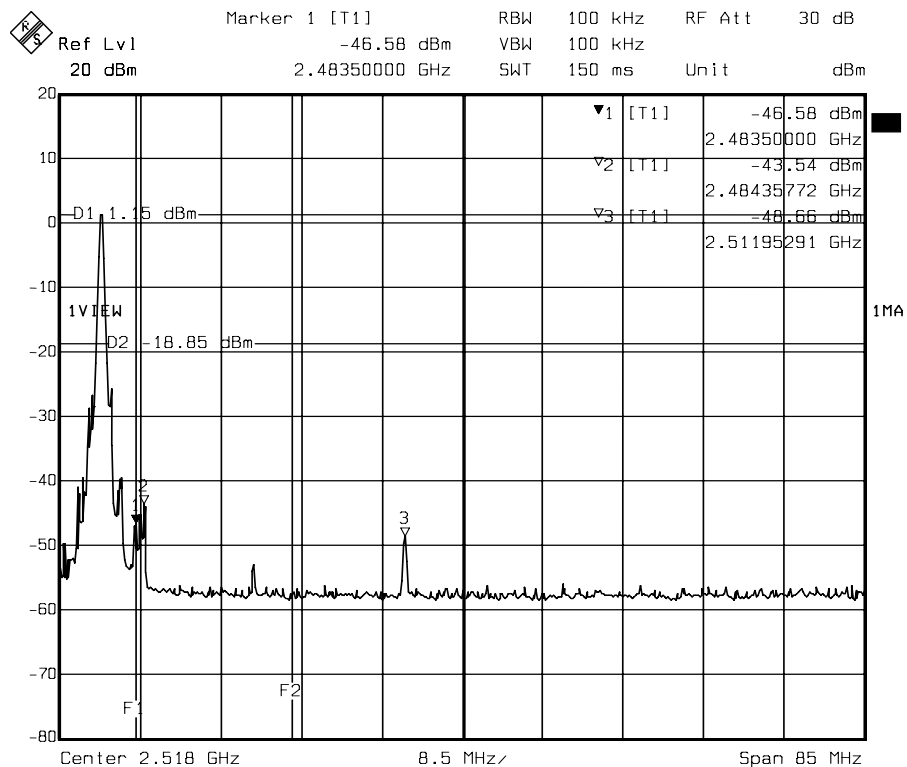
8.7 Photo of Band edge Measurement

Band edge Compliance of RF Conducted Emissions



Date: 16.FEB.2005 23:22:11

FRONT

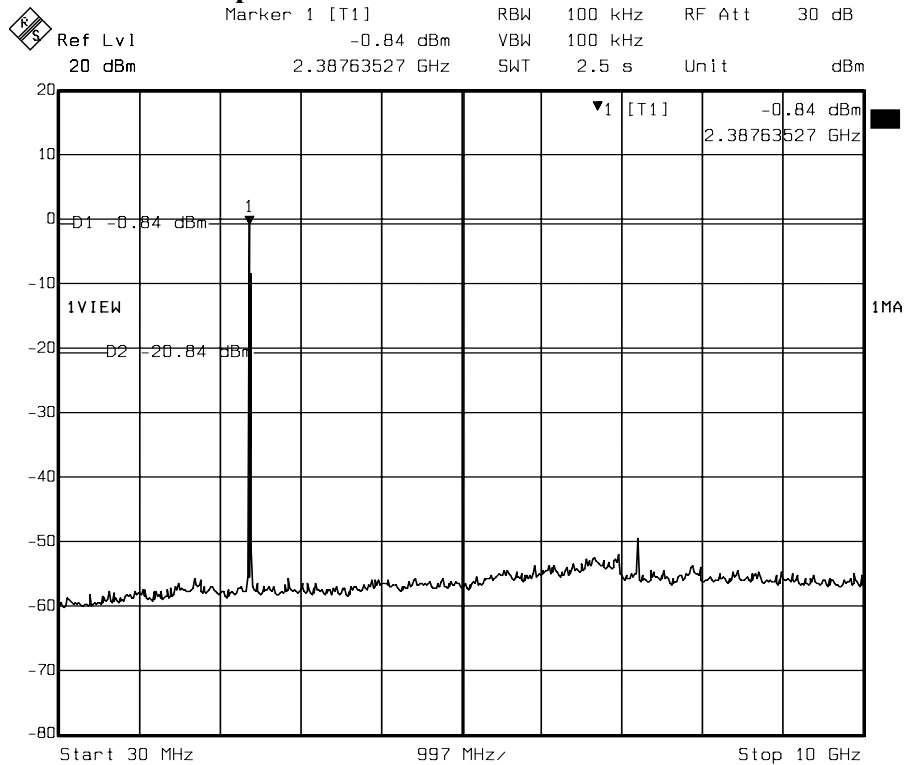


Date: 16.FEB.2005 23:27:33

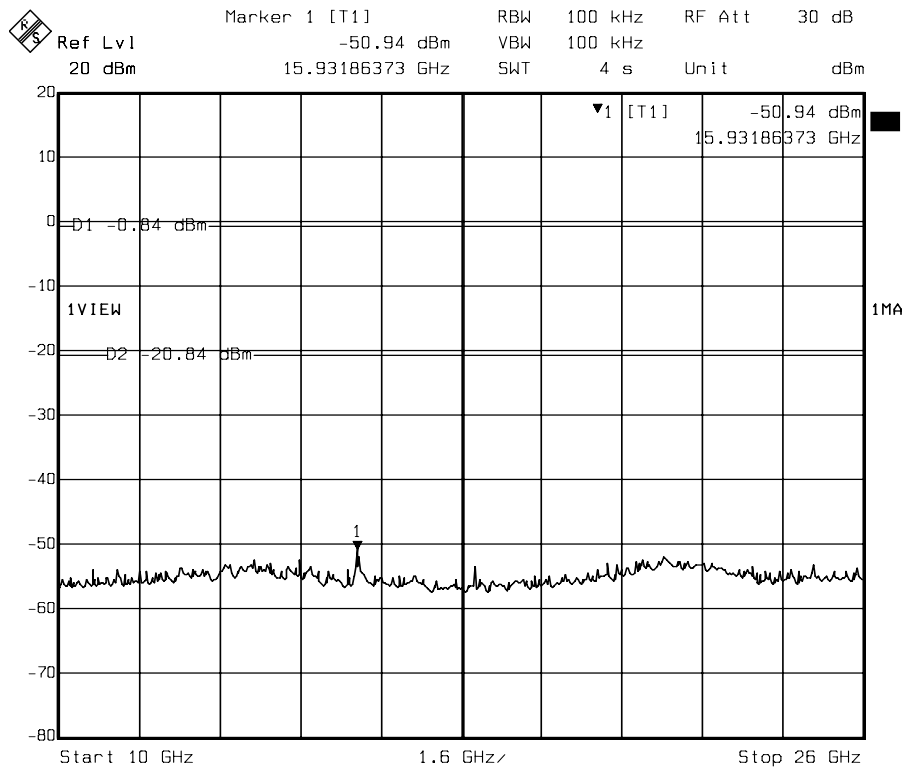
REAR



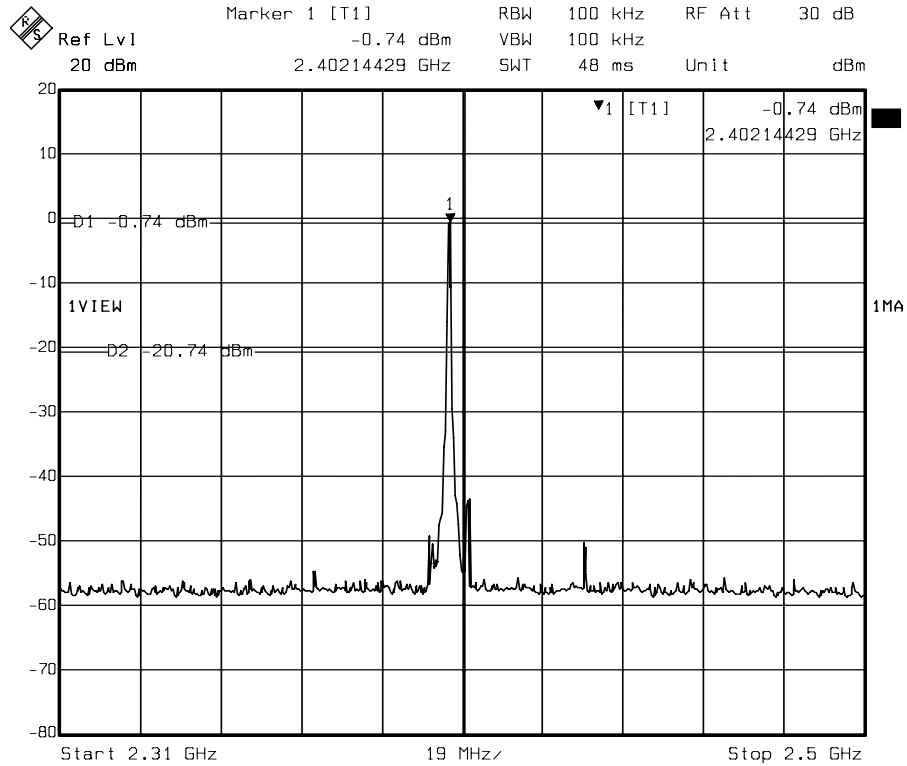
Out-of-band Spurious Emissions-conducted measurement



Date: 16.FEB.2005 23:31:39



Date: 16.FEB.2005 23:33:23



Date: 16.FEB.2005 23:35:57



9. OUT OF BAND SPURIOUS EMISSIONS -RADIATED MEASUREMENTS

Test Requirement: 15.247(d)

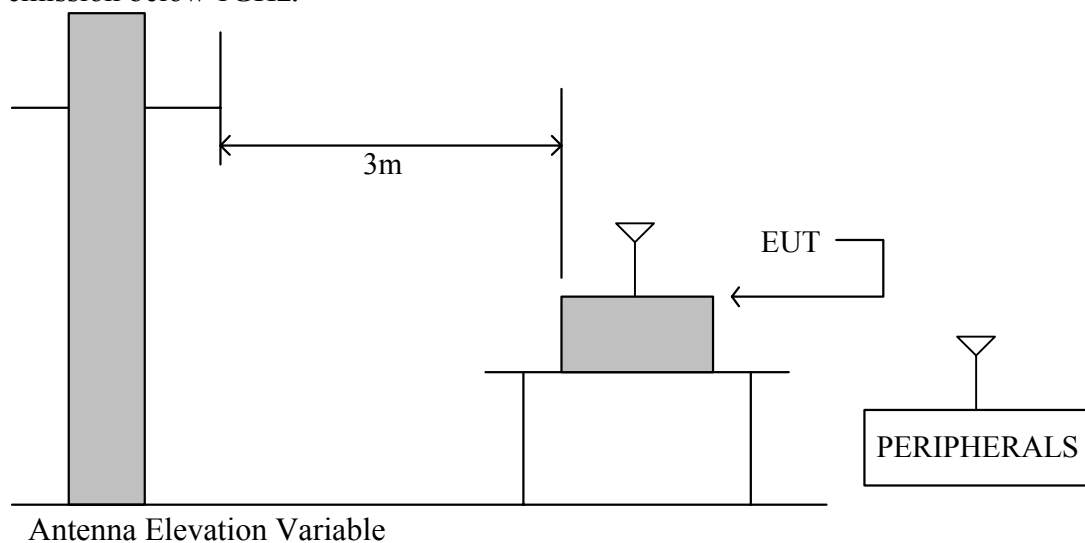
9.1 Test Equipments

The following test equipments are utilized in making the measurements contained in this report.

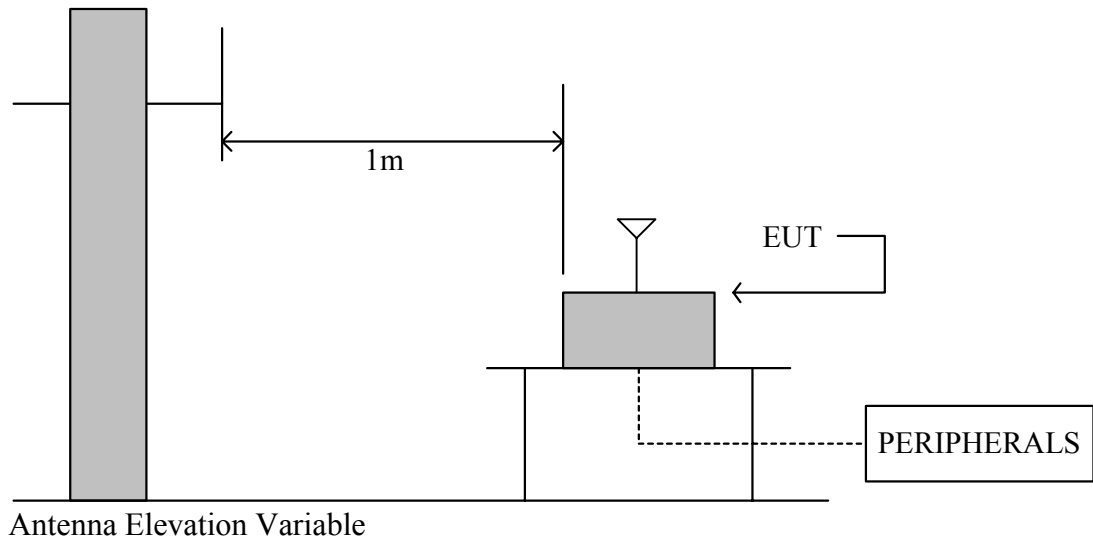
Manufacturer or Type	Model No	Serial No	Date of Calibration	Calibration Period	Remark
CHASE BI-LOG ANTENNA	CBL6112B	2421	June 15, 2004	1 Year	FINAL
R/S SPECTRUM ANALYZER	FSEK30	835253/002	September 06, 2004	1 Year	FINAL
OPEN SITE	-----	No.2	May 07, 2004	1 Year	FINAL
N TYPE COAXIAL CABLE	CHA9525	4	June 03, 2004	1 Year	FINAL
Horn Antenna	AH-118	10089	April 09, 2004	1 Year	FINAL
HP Pre-amplifier	8449B	3008A01471	November 24, 2004	1 Year	FINAL
HP High pass filter	84300/80038	002	CAL. ON USE	1 Year	FINAL
Horn Antenna	AH-840	3077	February 25, 2004	1 Year	FINAL

9.2 Test Setup

The diagram below shows the test setup that is utilized to make the measurements for emission below 1GHz.



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



9.3 Radiation Limit

For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values :

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/M)	Radiated (μV/M)
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.



9.4 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. During performing radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. During performing radiated emission above 1GHz, the EUT was set 1 meters away from the interference-receiving antenna.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE :

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

9.5 Uncertainty of Radiated Emission

The uncertainty of radiated emission is ± 3.2 dB.



9.6 Radiated RF Noise Measurement

The frequency spectrum from 30 MHz to 1000 MHz was investigated. All emissions not reported are much lower than the prescribed limits.

All readings are quasi-peak values.

Company	BILLIONTON SYSTEMS INC.	Test Date	2005/02/14
Product Name	Bluetooth Car Kit	Test By	Stan Peng
Model Name	CKBT	TEMP & Humidity	22.4°C, 60%

Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading at 3m(dBμV)		Limits (dBμV/m)	Emission Level at 3m(dBμV/m)	
			Horizontal	Vertical		Horizontal	Vertical
30.00	21.39	0.90	*	*	40.00	*	*
150.00	12.09	2.30	10.70	9.50	43.50	25.09	23.89
193.93	10.33	2.74	15.90	7.10	43.50	28.97	20.17
255.24	13.13	3.24	7.90	1.30	46.00	24.27	17.67
289.96	13.42	3.52	1.40	0.50	46.00	18.34	17.44
502.39	18.35	4.91	0.90	0.60	46.00	24.16	23.86
703.74	19.47	5.92	7.40	2.30	46.00	32.79	27.69
800.18	20.53	6.40	0.60	0.40	46.00	27.53	27.33
935.98	21.23	6.74	1.10	0.80	46.00	29.08	28.78
1000.00	21.58	7.00	*	*	54.00	*	*

REMARKS :

1. * Undetectable
2. Emission level (dBμV/m) = Antenna Factor (dB/m) + Cable loss (dB) + Meter Reading (dBμV).
3. The EUT can be operated in transmitting, stand-by and receiving mode. After preliminary scan, EUT in transmitting mode has highest emission. The EUT was set in transmitting mode at final test to get the worst case test results.
4. According to technical experience, all spurious emission at channel 1, 40 and 79 are almost the same below 1GHz, so the spurious emission test result of the channel 1 was chosen as representative in final test.



The frequency spectrum above 1 GHz for Receiver was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	BILLIONTON SYSTEMS INC.	Test Date	2005/02/17
Product Name	Bluetooth Car Kit	Test By	Stan Peng
Model Name	CKBT	TEMP & Humidity	17.6°C, 72%

CH01 (2402 MHz) RX (Low)				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
1200.29	51.01	26.18	2.58	36.32	9.50	0.00	33.96	74	-40.04	P	1.0
1200.29	43.67	26.18	2.58	36.32	9.50	0.00	26.62	54	-27.38	A	1.0
2399.99	51.16	31.80	3.58	35.30	9.50	0.00	41.74	74	-32.26	P	1.0
2399.99	46.31	31.80	3.58	35.30	9.50	0.00	36.89	54	-17.11	A	1.0
4800.52	41.88	34.28	5.08	35.14	9.50	0.00	36.60	74	-37.40	P	1.0
4800.52	31.59	34.28	5.08	35.14	9.50	0.00	26.31	54	-27.69	A	1.0
7201.91	43.30	39.82	6.72	35.66	9.50	0.00	44.68	74	-29.32	P	1.0
7201.91	31.86	39.82	6.72	35.66	9.50	0.00	33.24	54	-20.76	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :
Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.



The frequency spectrum above 1 GHz for Receiver was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	BILLIONTON SYSTEMS INC.	Test Date	2005/02/17
Product Name	Bluetooth Car Kit	Test By	Stan Peng
Model Name	CKBT	TEMP & Humidity	17.6°C, 72%

CH01 (2402 MHz) RX (Low)				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
1200.22	48.09	26.18	2.58	36.32	9.50	0.00	31.04	74	-42.96	P	1.0
1200.22	35.43	26.18	2.58	36.32	9.50	0.00	18.38	54	-35.62	A	1.0
2399.99	48.44	31.80	3.58	35.30	9.50	0.00	39.02	74	-34.98	P	1.0
2399.99	42.85	31.80	3.58	35.30	9.50	0.00	33.43	54	-20.57	A	1.0
4800.85	43.61	34.29	5.08	35.14	9.50	0.00	38.33	74	-35.67	P	1.0
4800.85	31.40	34.29	5.08	35.14	9.50	0.00	26.12	54	-27.88	A	1.0
7201.49	43.30	39.82	6.72	35.66	9.50	0.00	44.68	74	-29.32	P	1.0
7201.49	32.27	39.82	6.72	35.66	9.50	0.00	33.65	54	-20.35	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :
Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.



The frequency spectrum above 1 GHz for Receiver was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	BILLIONTON SYSTEMS INC.	Test Date	2005/02/17
Product Name	Bluetooth Car Kit	Test By	Stan Peng
Model Name	CKBT	TEMP & Humidity	17.6°C, 72%

CH40 (2441 MHz) RX (Mid)				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
1219.78	50.01	26.31	2.60	36.27	9.50	0.00	33.15	74	-40.85	P	1.0
1219.78	41.33	26.31	2.60	36.27	9.50	0.00	24.47	54	-29.53	A	1.0
4875.32	42.87	34.78	5.10	35.20	9.50	0.00	38.05	74	-35.95	P	1.0
4875.32	31.32	34.78	5.10	35.20	9.50	0.00	26.50	54	-27.50	A	1.0
7318.10	43.70	39.77	6.80	35.64	9.50	0.00	45.13	74	-28.87	P	1.0
7318.10	32.22	39.77	6.80	35.64	9.50	0.00	33.65	54	-20.35	A	1.0
9757.94	45.09	38.52	8.33	36.61	9.50	0.00	45.83	74	-28.17	P	1.0
9757.94	33.23	38.52	8.33	36.61	9.50	0.00	33.97	54	-20.03	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :
$$\text{Level} = \text{Reading} + \text{AF} + \text{Cable} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.



The frequency spectrum above 1 GHz for Receiver was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	BILLIONTON SYSTEMS INC.	Test Date	2005/02/17
Product Name	Bluetooth Car Kit	Test By	Stan Peng
Model Name	CKBT	TEMP & Humidity	17.6°C, 72%

CH40 (2441 MHz) RX (Mid)				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
1219.75	45.15	26.31	2.60	36.27	9.50	0.00	28.29	74	-45.71	P	1.0
1219.75	36.52	26.31	2.60	36.27	9.50	0.00	19.66	54	-34.34	A	1.0
4878.99	42.37	34.80	5.10	35.20	9.50	0.00	37.57	74	-36.43	P	1.0
4878.99	32.01	34.80	5.10	35.20	9.50	0.00	27.21	54	-26.79	A	1.0
7318.03	43.49	39.77	6.80	35.64	9.50	0.00	44.92	74	-29.08	P	1.0
7318.03	32.06	39.77	6.80	35.64	9.50	0.00	33.49	54	-20.51	A	1.0
9758.25	44.42	38.52	8.33	36.61	9.50	0.00	45.16	74	-28.84	P	1.0
9758.25	32.73	38.52	8.33	36.61	9.50	0.00	33.47	54	-20.53	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :
Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.



The frequency spectrum above 1 GHz for Receiver was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	BILLIONTON SYSTEMS INC.	Test Date	2005/02/17
Product Name	Bluetooth Car Kit	Test By	Stan Peng
Model Name	CKBT	TEMP & Humidity	17.6°C, 72%

CH79 (2480 MHz) RX (High)				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
1239.29	51.43	26.43	2.62	36.23	9.50	0.00	34.76	74	-39.24	P	1.0
1239.29	43.40	26.43	2.62	36.23	9.50	0.00	26.73	54	-27.27	A	1.0
2478.55	50.30	31.72	3.61	35.30	9.50	0.00	40.83	74	-33.17	P	1.0
2478.55	46.35	31.72	3.61	35.30	9.50	0.00	36.88	54	-17.12	A	1.0
4958.25	41.98	35.32	5.13	35.27	9.50	0.00	37.66	74	-36.34	P	1.0
4958.25	31.73	35.32	5.13	35.27	9.50	0.00	27.41	54	-26.59	A	1.0
7423.84	42.82	39.73	6.87	35.62	9.50	0.00	44.30	74	-29.70	P	1.0
7423.84	31.67	39.73	6.87	35.62	9.50	0.00	33.15	54	-20.85	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :
Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.



The frequency spectrum above 1 GHz for Receiver was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	BILLIONTON SYSTEMS INC.	Test Date	2005/02/17
Product Name	Bluetooth Car Kit	Test By	Stan Peng
Model Name	CKBT	TEMP & Humidity	17.6°C, 72%

CH79 (2480 MHz) RX (High)				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
1239.13	46.30	26.43	2.62	36.23	9.50	0.00	29.63	74	-44.37	P	1.0
1239.13	36.22	26.43	2.62	36.23	9.50	0.00	19.55	54	-34.45	A	1.0
2478.37	49.96	31.72	3.61	35.30	9.50	0.00	40.49	74	-33.51	P	1.0
2478.37	45.00	31.72	3.61	35.30	9.50	0.00	35.53	54	-18.47	A	1.0
4957.02	43.56	35.32	5.13	35.27	9.50	0.00	39.24	74	-34.76	P	1.0
4957.02	31.80	35.32	5.13	35.27	9.50	0.00	27.48	54	-26.52	A	1.0
7434.05	43.44	39.73	6.88	35.61	9.50	0.00	44.93	74	-29.07	P	1.0
7434.05	31.96	39.73	6.88	35.61	9.50	0.00	33.45	54	-20.55	A	1.0

1. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain.
2. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
3. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
4. The result basic equation calculation as follow :
$$\text{Level} = \text{Reading} + \text{AF} + \text{Cable} - \text{Preamp} + \text{Filter} - \text{Dist}, \text{Margin} = \text{Level} - \text{Limit}$$
5. The test limit is 3M limit.
6. The frequency was searched to 18GHz.
7. The other emission levels were very low against the limit.



The frequency spectrum above 1 GHz for Transmitter was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	BILLIONTON SYSTEMS INC.	Test Date	2005/02/17
Product Name	Bluetooth Car Kit	Test By	Stan Peng
Model Name	CKBT	TEMP & Humidity	17.6°C, 72%

CH01 (2402 MHz) TX (Low)				Measurement Distance at 1m					Horizontal polarity		
Freq.	Reading	AF	Cable	Pre-amp	Dist	Filter	Level	Limit	Margin	Mark	Height
(MHz)	(dBμV)	(dBμV)	(dB)	(dB)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)	(Meter)
* 2370.20	53.26	31.83	3.56	35.30	9.50	0.00	43.85	74.00	-30.15	P	1.00
* 2370.20	49.31	31.83	3.56	35.30	9.50	0.00	39.90	54.00	-14.10	A	1.00
* 2389.90	15.90	31.81	3.57	0.00	9.50	0.00	41.78	74.00	-32.22	P	1.00
* 2389.90	1.30	31.81	3.57	0.00	9.50	0.00	27.18	54.00	-26.82	A	1.00
2399.90	35.90	31.80	3.58	0.00	9.50	0.00	61.78	79.40	-17.63	P	1.00
2399.90	15.30	31.80	3.58	0.00	9.50	0.00	41.18	79.04	-37.87	A	1.00
2402.16	73.53	31.80	3.58	0.00	9.50	0.00	99.40	Fundamental Frequency		P	1.00
2402.16	73.17	31.80	3.58	0.00	9.50	0.00	99.04			A	1.00
* 4803.74	49.79	34.30	5.08	35.14	9.50	2.09	46.61	74.00	-27.39	P	1.00
* 4803.74	43.85	34.30	5.08	35.14	9.50	2.09	40.67	54.00	-13.33	A	1.00
7205.98	46.25	39.82	6.72	35.66	9.50	2.00	49.63	79.40	-29.78	P	1.00
7205.98	38.01	39.82	6.72	35.66	9.50	2.00	41.39	79.04	-37.66	A	1.00
9608.01	47.32	38.54	8.28	36.37	9.50	0.64	48.90	79.40	-30.50	P	1.00
9608.01	38.24	38.54	8.28	36.37	9.50	0.64	39.82	79.04	-39.22	A	1.00
* 12010.80	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14412.96	-----	-----	-----	-----	9.50	0.60	-----	-----	-----	-----	1.00
16815.12	-----	-----	-----	-----	9.50	0.39	-----	-----	-----	-----	1.00
* 19217.28	-----	-----	-----	-----	9.50	1.86	-----	-----	-----	-----	1.00
21619.44	-----	-----	-----	-----	9.50	0.85	-----	-----	-----	-----	1.00
24021.60	-----	-----	-----	-----	9.50	3.07	-----	-----	-----	-----	1.00

Note :

1. The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter : High Pass Filter Insertion Loss (3.5GHz)
3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
4. Remark “*” means that Restricted band.
5. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
6. The result basic equation calculation is as follow:
Level=Reading+AF+Closs-Preamp+Filter-Dist,Margin=Level-Limit
7. The other emission levels were very low against the limit
8. The test limit distance is 3M limit.



The frequency spectrum above 1 GHz for Transmitter was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	BILLIONTON SYSTEMS INC.	Test Date	2005/02/17
Product Name	Bluetooth Car Kit	Test By	Stan Peng
Model Name	CKBT	TEMP & Humidity	17.6°C, 72%

CH01 (2402 MHz) TX (Low)				Measurement Distance at 1m					Vertical polarity		
Freq.	Reading	AF	Cable	Pre-amp	Dist	Filter	Level	Limit	Margin	Mark	Height
(MHz)	(dBμV)	(dBμV)	(dB)	(dB)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)	(Meter)
* 2370.24	52.86	31.83	3.56	35.30	9.50	0.00	43.45	74.00	-30.55	P	1.00
* 2370.24	48.59	31.83	3.56	35.30	9.50	0.00	39.18	54.00	-14.82	A	1.00
* 2389.90	13.40	31.81	3.57	0.00	9.50	0.00	39.28	74.00	-34.72	P	1.00
* 2389.90	0.90	31.81	3.57	0.00	9.50	0.00	26.78	54.00	-27.22	A	1.00
2399.90	32.30	31.80	3.58	0.00	9.50	0.00	58.18	76.94	-18.77	P	1.00
2399.90	12.10	31.80	3.58	0.00	9.50	0.00	37.98	76.72	-38.75	A	1.00
2402.17	71.07	31.80	3.58	0.00	9.50	0.00	96.94	Fundamental Frequency		P	1.00
2402.17	70.85	31.80	3.58	0.00	9.50	0.00	96.72			A	1.00
* 4803.97	45.59	34.31	5.08	35.14	9.50	2.08	42.41	74.00	-31.59	P	1.00
* 4803.97	36.49	34.31	5.08	35.14	9.50	2.08	33.31	54.00	-20.69	A	1.00
7205.61	46.92	39.82	6.72	35.66	9.50	2.00	50.30	76.94	-26.65	P	1.00
7205.61	38.20	39.82	6.72	35.66	9.50	2.00	41.58	76.72	-35.15	A	1.00
9607.99	46.12	38.54	8.28	36.37	9.50	0.64	47.70	76.94	-29.24	P	1.00
9607.99	35.03	38.54	8.28	36.37	9.50	0.64	36.61	76.72	-40.11	A	1.00
* 12010.85	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14413.02	-----	-----	-----	-----	9.50	0.60	-----	-----	-----	-----	1.00
16815.19	-----	-----	-----	-----	9.50	0.39	-----	-----	-----	-----	1.00
* 19217.36	-----	-----	-----	-----	9.50	1.86	-----	-----	-----	-----	1.00
21619.53	-----	-----	-----	-----	9.50	0.85	-----	-----	-----	-----	1.00
24021.70	-----	-----	-----	-----	9.50	3.07	-----	-----	-----	-----	1.00

Note :

1. The measurement was searched to 10th harmonic, Remark "---" means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter : High Pass Filter Insertion Loss (3.5GHz)
3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
4. Remark "*" means that Restricted band.
5. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
6. The result basic equation calculation is as follow:
Level=Reading+AF+Closs-Preamp+Filter-Dist,Margin=Level-Limit
7. The other emission levels were very low against the limit
8. The test limit distance is 3M limit.



The frequency spectrum above 1 GHz for Transmitter was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	BILLIONTON SYSTEMS INC.	Test Date	2005/02/17
Product Name	Bluetooth Car Kit	Test By	Stan Peng
Model Name	CKBT	TEMP & Humidity	17.6°C, 72%

CH40 (2441 MHz) TX (Mid)				Measurement Distance at 1m				Horizontal polarity			
Freq.	Reading	AF	Cable	Pre-amp	Dist	Filter	Level	Limit	Margin	Mark	Height
(MHz)	(dBμV)	(dBμV)	(dB)	(dB)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)	(Meter)
2441.05	73.32	31.76	3.59	0.00	9.50	0.00	99.17	Fundamental Frequency		P	1.00
2441.05	72.85	31.76	3.59	0.00	9.50	0.00	98.70			A	1.00
2473.11	47.15	31.73	3.61	35.30	9.50	0.00	37.69	79.17	-41.49	P	1.00
2473.11	41.03	31.73	3.61	35.30	9.50	0.00	31.57	78.70	-47.14	A	1.00
* 4882.24	51.43	34.82	5.10	35.21	9.50	1.77	48.42	74.00	-25.58	P	1.00
* 4882.24	46.71	34.82	5.10	35.21	9.50	1.77	43.70	54.00	-10.30	A	1.00
* 7322.48	49.78	39.77	6.80	35.64	9.50	2.00	53.21	74.00	-20.79	P	1.00
* 7322.48	42.53	39.77	6.80	35.64	9.50	2.00	45.96	54.00	-8.04	A	1.00
9764.00	46.78	38.52	8.34	36.62	9.50	0.54	48.06	79.17	-31.12	P	1.00
9764.00	34.12	38.52	8.34	36.62	9.50	0.54	35.40	78.70	-43.31	A	1.00
* 12205.25	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14646.30	-----	-----	-----	-----	9.50	0.58	-----	-----	-----	-----	1.00
17087.35	-----	-----	-----	-----	9.50	0.53	-----	-----	-----	-----	1.00
* 19528.40	-----	-----	-----	-----	9.50	2.23	-----	-----	-----	-----	1.00
21969.45	-----	-----	-----	-----	9.50	0.71	-----	-----	-----	-----	1.00

Note :

1. The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter : High Pass Filter Insertion Loss (3.5GHz)
3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
4. Remark “*” means that Restricted band.
5. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
6. The result basic equation calculation is as follow:
Level=Reading+AF+Closs-Preamp+Filter-Dist,Margin=Level-Limit
7. The other emission levels were very low against the limit
8. The test limit distance is 3M limit.



The frequency spectrum above 1 GHz for Transmitter was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	BILLIONTON SYSTEMS INC.	Test Date	2005/02/17
Product Name	Bluetooth Car Kit	Test By	Stan Peng
Model Name	CKBT	TEMP & Humidity	17.6°C, 72%

CH40 (2441 MHz) TX (Mid)				Measurement Distance at 1m				Vertical polarity			
Freq.	Reading	AF	Cable	Pre-amp	Dist	Filter	Level	Limit	Margin	Mark	Height
(MHz)	(dBμV)	(dBμV)	(dB)	(dB)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)	(Meter)
2441.03	70.06	31.76	3.59	0.00	9.50	0.00	95.91	Fundamental Frequency		P	1.00
2441.03	69.68	31.76	3.59	0.00	9.50	0.00	95.53			A	1.00
2473.12	50.06	31.73	3.61	35.30	9.50	0.00	40.60	75.91	-35.32	P	1.00
2473.12	45.24	31.73	3.61	35.30	9.50	0.00	35.78	75.53	-39.76	A	1.00
* 4881.85	47.02	34.82	5.10	35.21	9.50	1.77	44.01	74.00	-29.99	P	1.00
* 4881.85	38.62	34.82	5.10	35.21	9.50	1.77	35.61	54.00	-18.39	A	1.00
* 7323.25	47.33	39.77	6.80	35.64	9.50	2.00	50.77	74.00	-23.23	P	1.00
* 7323.25	39.01	39.77	6.80	35.64	9.50	2.00	42.45	54.00	-11.55	A	1.00
9764.00	46.52	38.52	8.34	36.62	9.50	0.54	47.80	75.91	-28.12	P	1.00
9764.00	35.02	38.52	8.34	36.62	9.50	0.54	36.30	75.53	-39.24	A	1.00
* 12205.15	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14646.18	-----	-----	-----	-----	9.50	0.58	-----	-----	-----	-----	1.00
17087.21	-----	-----	-----	-----	9.50	0.53	-----	-----	-----	-----	1.00
* 19528.24	-----	-----	-----	-----	9.50	2.23	-----	-----	-----	-----	1.00
21969.27	-----	-----	-----	-----	9.50	0.71	-----	-----	-----	-----	1.00
24410.30	-----	-----	-----	-----	9.50	2.44	-----	-----	-----	-----	1.00

Note :

1. The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter : High Pass Filter Insertion Loss (3.5GHz)
3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
4. Remark “*” means that Restricted band.
5. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
6. The result basic equation calculation is as follow:
Level=Reading+AF+Closs-Preamp+Filter-Dist,Margin=Level-Limit
7. The other emission levels were very low against the limit
8. The test limit distance is 3M limit.



The frequency spectrum above 1 GHz for Transmitter was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	BILLIONTON SYSTEMS INC.	Test Date	2005/02/17
Product Name	Bluetooth Car Kit	Test By	Stan Peng
Model Name	CKBT	TEMP & Humidity	17.6°C, 72%

CH79 (2480 MHz) TX (High)				Measurement Distance at 1m				Horizontal polarity			
Freq.	Reading	AF	Cable	Pre-amp	Dist	Filter	Level	Limit	Margin	Mark	Height
(MHz)	(dBμV)	(dBμV)	(dB)	(dB)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)	(Meter)
2479.90	71.98	31.72	3.61	0.00	9.50	0.00	97.81	Fundamental Frequency		P	1.00
2479.90	71.29	31.72	3.61	0.00	9.50	0.00	97.12			A	1.00
* 2483.50	26.70	31.72	3.61	0.00	9.50	0.00	52.53	74.00	-21.47	P	1.00
* 2483.50	9.50	31.72	3.61	0.00	9.50	0.00	35.33	54.00	-18.67	A	1.00
* 2484.47	27.10	31.72	3.61	0.00	9.50	0.00	52.93	74.00	-21.07	P	1.00
* 2484.47	10.50	31.72	3.61	0.00	9.50	0.00	36.33	54.00	-17.67	A	1.00
2511.73	57.18	31.70	3.63	35.31	9.50	0.00	47.69	77.81	-30.12	P	1.00
2511.73	54.54	31.70	3.63	35.31	9.50	0.00	45.05	77.12	-32.07	A	1.00
* 4960.06	53.16	35.34	5.13	35.27	9.50	1.46	50.32	74.00	-23.68	P	1.00
* 4960.06	49.08	35.34	5.13	35.27	9.50	1.46	46.24	54.00	-7.76	A	1.00
* 7439.50	49.90	39.72	6.88	35.61	9.50	2.00	53.39	74.00	-20.61	P	1.00
* 7439.50	43.46	39.72	6.88	35.61	9.50	2.00	46.95	54.00	-7.05	A	1.00
9919.17	46.61	38.51	8.39	36.87	9.50	0.45	47.59	77.81	-30.22	P	1.00
9919.17	34.55	38.51	8.39	36.87	9.50	0.45	35.53	77.12	-41.59	A	1.00
* 12399.50	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14879.40	-----	-----	-----	-----	9.50	0.40	-----	-----	-----	-----	1.00
17359.30	-----	-----	-----	-----	9.50	0.64	-----	-----	-----	-----	1.00
* 19839.20	-----	-----	-----	-----	9.50	2.54	-----	-----	-----	-----	1.00
* 22319.10	-----	-----	-----	-----	9.50	0.70	-----	-----	-----	-----	1.00
24799.00	-----	-----	-----	-----	9.50	1.88	-----	-----	-----	-----	1.00

Note :

1. The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter : High Pass Filter Insertion Loss (3.5GHz)
3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
4. Remark “*” means that Restricted band.
5. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
6. The result basic equation calculation is as follow:
Level=Reading+AF+Closs-Preamp+Filter-Dist,Margin=Level-Limit
7. The other emission levels were very low against the limit
8. The test limit distance is 3M limit.



The frequency spectrum above 1 GHz for Transmitter was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	BILLIONTON SYSTEMS INC.	Test Date	2005/02/17
Product Name	Bluetooth Car Kit	Test By	Stan Peng
Model Name	CKBT	TEMP & Humidity	17.6°C, 72%

CH79 (2480 MHz) TX (High)				Measurement Distance at 1m				Vertical polarity			
Freq.	Reading	AF	Cable	Pre-amp	Dist	Filter	Level	Limit	Margin	Mark	Height
(MHz)	(dBμV)	(dBμV)	(dB)	(dB)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)	(Meter)
2479.88	68.69	31.72	3.61	0.00	9.50	0.00	94.52	Fundamental Frequency		P	1.00
2479.88	68.35	31.72	3.61	0.00	9.50	0.00	94.18			A	1.00
* 2483.50	24.60	31.72	3.61	0.00	9.50	0.00	50.43	74.00	-23.57	P	1.00
* 2483.50	8.00	31.72	3.61	0.00	9.50	0.00	33.83	54.00	-20.17	A	1.00
* 2484.57	25.00	31.72	3.61	0.00	9.50	0.00	50.83	74.00	-23.17	P	1.00
* 2484.57	8.70	31.72	3.61	0.00	9.50	0.00	34.53	54.00	-19.47	A	1.00
2512.01	54.67	31.70	3.63	35.31	9.50	0.00	45.18	74.52	-29.34	P	1.00
2512.01	51.68	31.70	3.63	35.31	9.50	0.00	42.19	74.18	-31.99	A	1.00
* 4960.08	46.95	35.34	5.13	35.27	9.50	1.46	44.11	74.00	-29.89	P	1.00
* 4960.08	39.45	35.34	5.13	35.27	9.50	1.46	36.61	54.00	-17.39	A	1.00
* 7440.14	47.52	39.72	6.88	35.61	9.50	2.00	51.01	74.00	-22.99	P	1.00
* 7440.14	39.05	39.72	6.88	35.61	9.50	2.00	42.54	54.00	-11.46	A	1.00
9919.98	46.52	38.51	8.39	36.87	9.50	0.45	47.50	74.52	-27.03	P	1.00
9919.98	34.46	38.51	8.39	36.87	9.50	0.45	35.44	74.18	-38.75	A	1.00
* 12399.40	-----	-----	-----	-----	9.50	0.80	-----	-----	-----	-----	1.00
14879.28	-----	-----	-----	-----	9.50	0.40	-----	-----	-----	-----	1.00
17359.16	-----	-----	-----	-----	9.50	0.64	-----	-----	-----	-----	1.00
* 19839.04	-----	-----	-----	-----	9.50	2.54	-----	-----	-----	-----	1.00
* 22318.92	-----	-----	-----	-----	9.50	0.70	-----	-----	-----	-----	1.00
24798.80	-----	-----	-----	-----	9.50	1.88	-----	-----	-----	-----	1.00

Note :

1. The measurement was searched to 10th harmonic, Remark “---” means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter : High Pass Filter Insertion Loss (3.5GHz)
3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
4. Remark “*” means that Restricted band.
5. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
6. The result basic equation calculation is as follow:
Level=Reading+AF+Closs-Preamp+Filter-Dist,Margin=Level-Limit
7. The other emission levels were very low against the limit
8. The test limit distance is 3M limit.



9.7 Photos of Open Site





10. CONDUDED EMISSION MEASUREMENT

10.1 Standard Applicable

This EUT is excused from investigation of conducted emission for it is powered by cell phone only. According to § 15.207 (C), measurement to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.



11. ANTENNA REQUIREMENT

11.1 Standard Applicable

For intentional device, according to FCC 47 CFR 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.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

11.2 Antenna Connected Construction

The antenna used in this product is SMD antenna. The maximum Gain of this antenna is only 4dBi.