Prüfbericht - Nr.: *Test Report No.:*	**16022613 001**	**Seite 1 von 28** *Page 1 of 28*
Auftraggeber: *Client:*	**Zhongshan K-mate General Elec. Co., Ltd. Fuwan Industrial Zone, Fuwan South Road, Sunwen East Road, East District, Zhongshan, Guangdong, P.R. China**	
Gegenstand der Prüfung: *Test item:*	**Hands-free Car Kit with Bluetooth Headset**	
Bezeichnung: *Identification:*	**BTC006**	**FCC ID:** *FCC ID* **WAD-BTC006**
Wareneingangs-Nr.: *Receipt No.:*	**173051624**	**Eingangsdatum:** *Date of receipt:* **Mar. 17, 2010**
Prüfort: *Testing location:*	**TÜV Rheinland (Guangdong) Ltd. EMC Laboratory** **Guangzhou Auto Market, Yuan Gang Section of Guangshan Road, Guangzhou 510650,** **P. R. China**	**Listed test laboratory according to FCC rules section 2.948 for measuring devices under Parts 15**
Prüfgrundlage: *Test specification:*	**ANSI C63.4: 2003** **FCC Part 15: July 10, 2008** **Subpart C section 15.209 and 15.247**	
Prüfergebnis: *Test Result:*	**Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).** *The test item passed the test specification(s).*	
Prüflaboratorium: *Testing Laboratory:*	**TÜV Rheinland (Guangdong) Ltd.**	

geprüft/ *tested by:* | **kontrolliert**/ *reviewed by:*

Datum / Date	Name/Stellung / Name/Position	Unterschrift / Signature	Datum / Date	Name/Stellung / Name/Position	Unterschrift / Signature
Jun. 11, 2010	Ken Kuang Project Engineer		Jun. 13. 2010	Rciky Liu Project Manager	

Sonstiges/ Other Aspects:

Abkürzungen:				*Abbreviations:*			
	P(ass)	=	*entspricht Prüfgrundlage*		*P(ass)*	=	*passed*
	F(ail)	=	*entspricht nicht Prüfgrundlage*		*F(ail)*	=	*failed*
	N/A	=	*nicht anwendbar*		*N/A*	=	*not applicable*
	N/T	=	*nicht getestet*		*N/T*	=	*not tested*

Test Summary

FCC Rules		Test items	Result
Paragraph	**Released Date**		
Part 15 Per Section 15.209(a)	**July 10, 2008**	**Radiated Spurious Emission**	**Pass**
Part 15 Per Section 15.203	**July 10, 2008**	**Antenna requirement**	**Pass**
Part 15 Per Section 15.247(b)(1)	**July 10, 2008**	**Maximum Peak Output power**	**Pass**
Part 15 Per Section 15.247(a)(1)	**July 10, 2008**	**20dB Bandwidth**	**Pass**
Part 15 Per Section 15.247(a)(1)	**July 10, 2008**	**Hopping Channel Carrier Frequency Separation**	**Pass**
Part 15 Per Section 15.247(a)(1)(iii)	**July 10, 2008**	**Number of Hopping Frequency Used**	**Pass**
Part 15 Per Section 15.247(a)(1)(iii)	**July 10, 2008**	**Time of Occupancy (Dwell Time)**	**Pass**
Part 15 Per Section 15.247(d)	**July 10, 2008**	**Out-Of-Band Emission measurement**	**Pass**

Contents

1 GENERAL REMARKS 5
1.1 COMPLEMENTARY MATERIALS 5
2 TEST SITES 5
2.1 TEST FACILITIES 5
2.2 LIST OF TEST AND MEASUREMENT INSTRUMENTS 6
2.3 TRACEABILITY 6
2.4 CALIBRATION 7
2.5 MEASUREMENT UNCERTAINTY 7
2.6 LOCATION OF ORIGINAL DATA 7
2.7 STATUS OF FACILITY USED FOR TESTING 7
3 GENERAL PRODUCT INFORMATION 8
3.1 PRODUCT FUNCTION AND INTENDED USE 8
3.2 RATINGS AND SYSTEM DETAILS 8
3.3 INDEPENDENT OPERATION MODES 9
3.4 SUBMITTED DOCUMENTS 9
4 TEST SET-UP AND OPERATION MODE 10
4.1 PRINCIPLE OF CONFIGURATION SELECTION 10
4.2 TEST OPERATION AND TEST SOFTWARE 10
4.3 SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT 10
4.4 COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE 10
4.5 TEST SET-UP 11
5 TEST RESULTS E M I S S I O N 13
5.1 RADIATED SPURIOUS EMISSION 13
5.2 ANTENNA REQUIREMENT 16
5.3 MAXIMUM PEAK OUTPUT POWER 17
5.4 20DB BANDWIDTH 18
5.5 HOPPING CHANNEL CARRIER FREQUENCY SEPARATION 19
5.6 NUMBER OF HOPPING FREQUENCY USED 21
5.7 TIME OF OCCUPANCY (DWELL TIME) 22
5.8 OUT-OF-BAND EMISSION 24
6 PHOTOGRAPHS OF THE TEST SET-UP 26

7 LIST OF TABLES 28

8 LIST OF PHOTOGRAPHS 28

1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix 1: Test result

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Guangdong) Ltd. EMC Laboratory

Guangzhou Auto Market, Yuan Gang Section of Guangshan Road
Guangzhou 510650

P. R. China

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Kind of Equipment	Type	Manufacturer	S/N	Calibrated until	Calibrated Interval
EMI Test Receiver	ESCI-3	Rohde & Schwarz	100216	2011-03-16	1 year
Spectrum Analyzer	FSP30	Rohde & Schwarz	100286	2011-03-16	1 year
Loop Antenna	HFH2-Z2	Rohde & Schwarz	100111	2011-03-16	1 year
Trilog-Broadband Antenna	VULB9168	SCHWARZBECK MESS-ELEKTRONIK	209	2011-08-21	2 year
Double-Ridged Waveguide Horn Antenna	HF906	Rohde & Schwarz	100385	2011-08-24	2 year
Pre-amplifier	AFS42-00101800-25-S-42	MITEQ	1101599	2011-03-16	2 year
Band Reject Filter	BRM50702	Micro-Tronics	023	2011-03-16	2 year
Standard Gain Horn Antenna	3160-09	EMCO	21642	N/A	N/A
Standard Gain Horn Antenna	3160-09	EMCO	21645	N/A	N/A
Pre-amplifier	AFS33-18002650-30-8P-44	MITEQ	1108282	2011-03-16	2 year
3m Anechoic Chamber	N/A	Albatross Project GmbH	N/A	2011-03-16	1 year
Spectrum Analyzer	E4404B	Agilent	MY414 40753	2011-03-16	1 year

2.3 Traceability

All measurement equipment calibrations are traceable to NIST or where calibration is performed outside the United States, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications.

2.5 Measurement Uncertainty

Uncertainty for conducted emissions measurements is ± 2.68dB.
Uncertainty for radiated emissions measurements is ± 4.94dB (30M-1GHz) and ± 4.88dB (> 1GHz)

The reported expanded uncertainty is based on a standard uncertainty multiply by a coverage factor k=2, providing a level of confidence of approximately 95%.

2.6 Location of original data

The original copies of test data taken during actual testing were attached at Appendix 1 of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Guangdong) file for certification follow-up purposes.

2.7 Status of facility used for testing

TÜV Rheinland (Guangdong) Ltd. EMC Laboratory; Guangzhou Auto Market, Yuan Gang Section of Guangshan Road, Guangzhou 510650, P. R. China is listed on the US Federal Communications Commission list of facilities approved to perform measurements, the register no. 833845.

3 General Product Information

Brief description of the test sample:

The EUT is a car kit with a detachable Bluetooth headset.

Bluetooth function is provided which enable this device to be connected with a Bluetooth HSP/HFP AG device. Bluetooth EDR function is not supported in the EUT.

For details, refer to technical document and the user manual.

3.1 Product Function and Intended Use

Refer to the Technical Documentation and user manual.

3.2 Ratings and System Details

Detachable Headset:

Frequency range	:	2402.0MHz – 2480.0MHz
Total Number of channels	:	79 channels
Channel Spacing	:	1MHz
Modulation Type	:	FHSS
Type of antenna	:	Bluetooth: Integral antenna
Power supply of Bluetooth headset	:	3.7V by the embedded battery (Li-ion 3.7V)
Ports	:	Connetion port to the carkit
Protection Class	:	III

Carkit:

Power supply		12V-24V DC by vehicle battery
Ports	:	12V-24V DC input port, USB DC 5V output port (no data flow function) Connection port to the headset.
Protection Class	:	III

Refer to the Technical Documentation for further information.

3.3 Independent Operation Modes

Bluetooth: RF Transmitting and receiving

For further information refer to User Manual

3.4 Submitted Documents

Block Diagram
Schematics
Operation Description
Components List
FCC label and location
User Manual
Internal Photos
External Photos
Application form

4 Test Set-up and Operation Mode

4.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Refer to test set-up in chapter 5.

4.3 Special Accessories and Auxiliary Equipment

The products have been tested together with the following device:

Device	Manufacture	Model	Serial no./ Version
Laptop notebook	IBM R40e	2684	99-CYY55
Bluetooth test Software	Alltek	Alltek Bluetooth production tool	1.5.1.0

4.4 Countermeasures to achieve EMC Compliance

The test sample, which has been tested, contained the noise suppression parts as described in the technical document. No additional measures were employed to achieve compliance.

4.5 Test set-up

Diagram 1 of Configuration for Testing Radiated Emission below 1 GHz

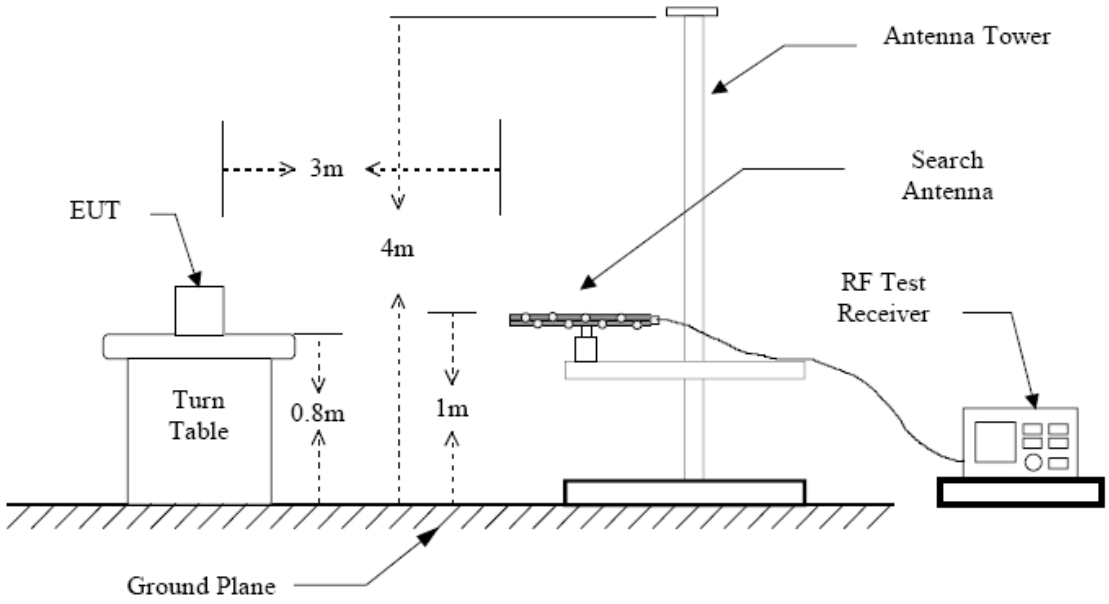


Diagram 2 of Configuration for Testing Radiated Emission above 1 GHz

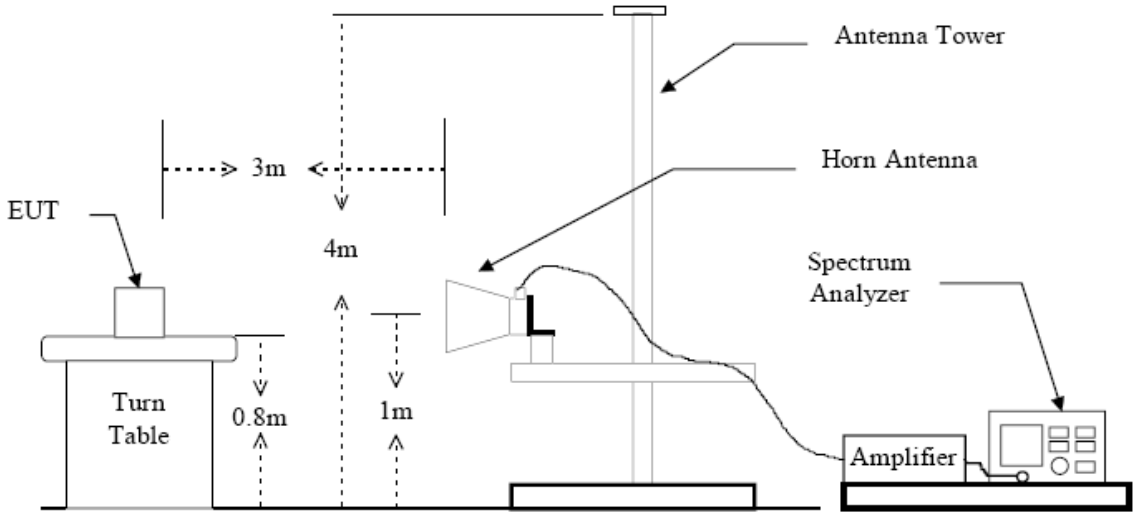
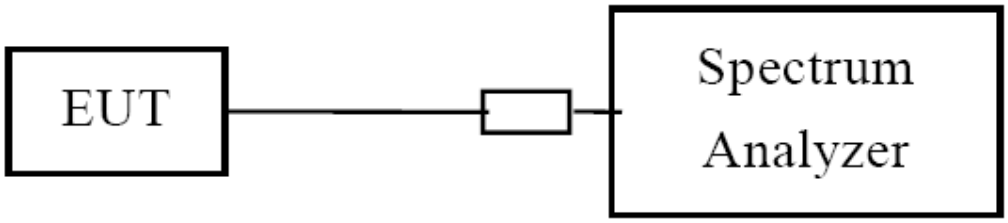


Diagram 3 of Configuration for Testing other test items



5 Test Results E M I S S I O N

5.1 Radiated Spurious Emission

RESULT: **Pass**

Date of testing	:	2010-5-19
Test specification	:	FCC Part 15 Per Section 15.209(a)
Limits	:	FCC Part 15 Per Section 15.209(a)
Test procedure	:	Procedure specified in ANSI C63.4
Deviations from Standard Test procedures	:	None
Kind of test site	:	3m Semi-anechoic chamber
Operation mode	:	Bluetooth RF transmitting at fix channel with max power (High, Low, Mid)
Power supply	:	DC 3.7V
Temperature	:	23°C
Humidity	:	50%

Test procedure:

1. The EUT was placed on the top of a rotatable table 0.8 meters above the ground with 3-orthogonal direction and be kept close enough to the receiving antenna. The table was rotated 360 degrees to determine the suspected emission frequency and the position of the worst radiation case with both horizontal and vertical antenna polarization.

2. The EUT was then set 3 meters away from the receiving antenna, which was mounted on a variable-height antenna tower.

3. For each suspected emission frequency recorded in step 1, the EUT was arranged to its worst case and:
for tests below 30MHz the loop antenna is positioned with its plane vertical and the center of it is 1m above the ground. During the tests it is rotated about its vertical axis for maximum response at each azimuth about the EUT;
for tests above 30MHz 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 read the maximum emission.

Table 2: Radiated Emission (Bluetooth: Transmitting at channel low)

Frequency	QP	AV	PK	Polarity	Limit		
					QP	AV	PK
[MHz]	[dBµV/m]			(H/V)	[dBµV/m]		
240.0	31.4	N/A	N/A	H	46.0	N/A	N/A
515.4	35.6	N/A	N/A	H	46.0	N/A	N/A
1335.5	N/A	36.0	48.9	H	N/A	54.0	74.0
4804.0	N/A	35.6	43.7	H	N/A	54.0	74.0
7206.0	N/A	49.5	54.5	H	N/A	54.0	74.0
9608.0	N/A	46.6	53.7	H	N/A	54.0	74.0
166.5	31.5	N/A	N/A	V	43.5	N/A	N/A
233.2	32.2	N/A	N/A	V	46.0	N/A	N/A
1335.5	N/A	38.9	45.9	V	N/A	54.0	74.0
1782.0	N/A	38.4	42.8	V	N/A	54.0	74.0
7206.0	N/A	50.1	55.1	V	N/A	54.0	74.0
9608.0	N/A	46.6	53.6	V	N/A	54.0	74.0
*)---							

Table 3: Radiated Emission (Bluetooth: Transmitting at channel mid)

Frequency	QP	AV	PK	Polarity	Limit		
					QP	AV	PK
[MHz]	[dBµV/m]			(H/V)	[dBµV/m]		
240.0	31.7	N/A	N/A	H	46.0	N/A	N/A
515.4	35.2	N/A	N/A	H	46.0	N/A	N/A
1335.5	N/A	35.8	45.7	H	N/A	54.0	74.0
4882.0	N/A	37.4	44.9	H	N/A	54.0	74.0
7323.0	N/A	49.4	54.3	H	N/A	54.0	74.0
9764.0	N/A	38.9	50.2	H	N/A	54.0	74.0
171.8	29.2	N/A	N/A	V	43.5	N/A	N/A
233.2	31.4	N/A	N/A	V	46.0	N/A	N/A
1335.5	N/A	36.7	47.0	V	N/A	54.0	74.0
4882.0	N/A	35.2	44.3	V	N/A	54.0	74.0
7323.0	N/A	50.8	55.4	V	N/A	54.0	74.0
9764.0	N/A	40.7	51.4	V	N/A	54.0	74.0
*)---							

Table 4: Radiated Emission (Bluetooth: Transmitting at channel high)

Frequency	QP	AV	PK	Polarity	Limit		
					QP	AV	PK
[MHz]	[dBµV/m]			(H/V)	[dBµV/m]		
486.8	35.2	N/A	N/A	H	46.0	N/A	N/A
515.4	33.7	N/A	N/A	H	46.0	N/A	N/A
1335.5	N/A	32.9	42.6	H	N/A	54.0	74.0
1559.0	N/A	33.2	42.1	H	N/A	54.0	74.0
3839.0	N/A	27.3	40.4	H	N/A	54.0	74.0
7440.0	N/A	50.9	55.6	H	N/A	54.0	74.0
166.5	34.5	N/A	N/A	V	43.5	N/A	N/A
233.2	35.0	N/A	N/A	V	46.0	N/A	N/A
1335.5	N/A	36.4	47.9	V	N/A	54.0	74.0
1782.0	N/A	39.3	43.4	V	N/A	54.0	74.0
3119.0	N/A	37.6	45.4	V	N/A	54.0	74.0
4960.0	N/A	37.5	45.5	V	N/A	54.0	74.0
7440.0	N/A	49.1	53.9	V	N/A	54.0	74.0
*)---							

*) Note:
The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz at frequency below 1GHz.

The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz at frequency above 1GHz.

Measurement is made from 9kHz to 25 GHz. Disturbances other than those mentioned above are small or not detectable.

5.2 Antenna requirement

RESULT: **Pass**

Date of testing	:	---
Test specification	:	FCC Part 15 Per Section 15.203 FCC Part 15 Per Section 15.247(b)

For intentional device, according to 15.203, and 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 15.247(b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by amount in dB than the directional gain of the antenna exceeds of 6dBi.

As the BT antenna is permanently printed on RF Board, there is no consideration of replacement.

And the max gain of the antenna is 2dBi.

5.3 Maximum Peak Output Power

RESULT: **Pass**

Date of testing	:	2010-5-21
Test specification	:	FCC Part 15 Per Section 15.247(b)(1)
Limits	:	FCC Part 15 Per Section 15.247(b)(1) For frequency hopping systems operating in the band 2400-2483.5 MHz employing at least 75 hopping channels, the maximum peak conducted output power shall not exceed 1 W; for all other frequency hopping systems in the band, the maximum peak conducted output power shall not exceed 0.125 W.
Deviations from Standard Test procedures	:	None
Test procedure	:	Procedure specified in ANSI C63.4
Kind of test site	:	Shielded room
Operation mode	:	Bluetooth continuously transmitting on the measured channel.
Power supply	:	DC 3.7V
Temperature	:	22°C
Humidity	:	52%

Table 5: Peak Conducted Power

Channel	Frequency (MHz)	Power Reading(dBm)	Cable Loss (dB)	Output Power		Limit (mW) *
				(dBm)	(mW)	
Low	2402.2	3.85	0.40	4.25	2.66	1000
Mid	2440.8	3.80	0.40	4.20	2.63	1000
High	2479.8	3.77	0.40	4.17	2.61	1000
*Note: Refer to the test result of "Number of Hopping Channel Used" for the non-overlap channel number.						

5.4 20dB Bandwidth

RESULT: **Pass**

Date of testing	:	2010-5-21
Test specification	:	FCC Part 15 Per Section 15.247(a)(1)
Limits	:	FCC Part 15 Per Section 15.247(b)(1) Frequency hopping systems operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 0.125W.
Deviations from Standard Test procedures	:	None
Test procedure	:	Procedure specified in ANSI C63.4
Operation mode	:	Bluetooth continuously transmitting on the measured channel.
Kind of test site	:	Shielded room
Power supply	:	DC 3.7V
Temperature	:	22°C
Humidity	:	52%

Test procedure:

1. Connect the antenna port of the EUT to the spectrum analyzer by a low lost cable.
2. Set the EUT to proper test mode with relative test software and hardware.
3. Spectrum analyzer setting: Centered Frequency= measured channel, RBW=10kHz, VBW=30kHz.
4. Mark the peak power frequency point and the -20dB upper and lower frequency points.
5. Read the frequency delta value between the -20dB upper and lower frequency points.
6. Repeat step 2 to 5 until all the channels required are finished.

Table 6: 20dB Bandwidth

Channel	Frequency (GHz)	Test Result (kHz)
Low	2402.0	888
Mid	2441.0	888
High	2480.0	920

Please refer to Appendix 1 for measurement data.

5.5 Hopping Channel Carrier Frequency Separation

RESULT: **Pass**

Date of testing	:	2010-6-1
Test specification	:	FCC Part 15 Per Section 15.247(a)(1)
Limits	:	FCC Part 15 Per Section 15.247(a)(1) Frequency hopping systems operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 0.125W.
Deviations from Standard Test procedures	:	None
Test procedure	:	Procedure specified in ANSI C63.4
Kind of test site	:	Shielded room
Operation mode	:	Bluetooth transmitting with hopping at the full channel set
Power supply	:	DC 3.7V
Temperature	:	22°C
Humidity	:	55%

Test procedure:

1. Connect the antenna port of the EUT to the spectrum analyzer by a low lost cable.
2. Set the EUT to proper test mode with relative test software and hardware.
3. Spectrum analyzer setting: Centered Frequency = measured channel, RBW = 100 kHz, VBW = 100 kHz, Frequency Span = wide enough to cover the adjacent channel.
4. Mark the peak power frequency point of the measured channel and its adjacent channel(s)
5. Read the frequency delta value between the measured channel and its adjacent channel(s)
6. Repeat step 3 to 5 until all the channels measured are finished.

Table 7: Hopping Channel Carrier Frequency Separation

Channel	**Adjacent Hopping channel separation (kHz)**	**Limit**
Low	978	At least 25kHz or tow-thirds of the 20dB bandwidth of the hopping channel, whichever is greater. Note: refer to table 6 for the value of 20dB bandwidth
Mid	1000	
High	1020	

Please refer to Appendix 1 for measurement data.

5.6 Number of Hopping Frequency Used

RESULT: **Pass**

Date of testing	:	2010-6-1
Test specification	:	FCC Part 15 Per Section 15.247(a)(1)(iii)
Limits	:	FCC Part 15 Per Section 15.247(a)(1)(iii) Frequency hopping system in the 2400-2483.5 MHz band shall use at least 15 non-overlapping channels
Deviations from Standard Test procedures	:	None
Test procedure	:	Procedure specified in ANSI C63.4
Kind of test site	:	Shielded room
Operation mode	:	Bluetooth transmitting with hopping at the full channel set
Power supply	:	DC 3.7V
Temperature	:	22°C
Humidity	:	55%

Test procedure:

1. Connect the antenna port of the EUT to the spectrum analyzer by a low lost cable.
2. Set the EUT to proper test mode with relative test software and hardware.
3. Spectrum analyzer setting: RBW = 100 kHz, VBW≥RBW, Frequency Span = wide enough to cover the channels to be plotted.
4. Set the spectrum analyzer to Max-hold mode and plot the result(s) with record of all hopping channel.

Table 8: Number of hopping frequency

Number of hopping frequency:	79
Limit:	At least 15 non-overlapping channels

Please refer to Appendix 1 for measurement data.

5.7 Time of Occupancy (Dwell Time)

RESULT: **Pass**

Date of testing	:	Jun. 1, 2010
Test specification	:	FCC Part 15 Per Section 15.247(a)(1)(iii)
Limits	:	FCC Part 15 Per Section 15.247(a)(1)(iii) For frequency hopping system operating in the 2400-2483.5MHz band, the average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.
Deviations from Standard Test procedures	:	None
Test Procedure	:	Procedure specified in ANSI C63.4
Kind of test site	:	Shielded room
Operation mode	:	Bluetooth transmitting with hopping at the full channel set (DH5 mode)
Power supply	:	DC 3.7V
Temperature	:	22°C
Humidity	:	55%

Test procedure:

1. Connect the antenna port of the EUT to the spectrum analyzer by a low lost cable.
2. Set the EUT to proper test mode with relative test software and hardware.
3. Spectrum analyzer setting: Centered Frequency = measured channel, RBW = 1MHz, VBW≥RBW, Frequency Span = 0 Hz.
4. Set sweep time properly to capture the entire dwell time per hopping channel.
5. Set detector type to Peak and trace mode to Max Hold and make the measurement.
6. Repeat step 3-5 until all channels measured were complete.

Table 9: Dwell Time (DH5 mode)

channel	Frequency (GHz)	Dwell time of one signal Burst (ms)	Total Dwell Time (ms)	Limit (ms)
Low	2.402	3.175	(3.175 x **106.81**) = 339.12	400
Mid	2.441	3.175	(3.175 x **106.81**) = 339.12	400
High	2.480	3.200	(3.200 x **106.81**) = 341.79	400

Note :

Period = 0.4 (seconds) x 79 (channels) = 31.6 seconds

For Bluetooth system, there are 1600 timeslots in one second. The DH5 mode operates on a 5-slot transmission and 1-slot receiving basis. Thus there are 1600/ (5+1) = 266.7 transmission per second. In one period for each particular channel there are (266.7/79) x 31.6 = 106.81 times of transmission.

Dwell Time in one period(ms) = Dwell time of one-slot transmission(ms) multiplexes **106.81**

Please refer to Appendix 1 for measurement data.

5.8 Out-of-Band Emission

RESULT: **Pass**

Date of testing	:	2010-5-21
Test specification	:	FCC Part 15 Per Section 15.247(d)
Limits	:	FCC Part 15 Per Section 15.247(d)
		In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB 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.
		In addition: FCC Part 15 - radiated emission 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).
Deviations from Standard Test procedures	:	None
Test Procedure	:	Procedure specified in ANSI C63.4
Kind of test site	:	Shielded room
Operation mode	:	Bluetooth transmitting at the highest and lowest channel (band edge)
Power supply	:	DC 3.7V
Temperature	:	22°C
Humidity	:	55%

Test procedure:

1. Connect the antenna port of the EUT to the spectrum analyzer by a low lost cable.
2. Set the EUT to proper test mode with relative test software and hardware.
3. Spectrum analyzer setting: RBW = 100 kHz, VBW≥RBW.
4. Set proper frequency span respectively for out-of-band emission measurement of the band edge and the whole range (up to 10 times of the carrier frequency.)
5. Set the trace mode to Max Hold and mark the peak reading of any spurious emission recorded.

Table 10: Out-Of-Band Emission measurement (conducted)

Emission (Carrier operating at Channel low, mid and high)	**Attenuation**	**Limit (dB)**
30MHz to 25GHz	All emission in this 100kHz bandwidth are attenuated more than 20dB from the carrier	△≥20

Note: Refer to Appendix 1 for measurement data.

Table 11: Band Edges Emission in the Restricted Bands by Marker Delta Method

Frequency [MHz]	**dBc** [dB]	**PK** [dBμV/m]	**AV** [dBμV/m]	**Polarity** (H/V)	**PK limit** [dBμV/m]	**AV limit** [dBμV/m]
2483.5	62.06	30.10	---	V	74	54

NOTE:

1. The Peak carrier field strength of the highest channel is 92.16dBuV/m.
   The above field strength levels were measured in vertical polarity which is the worst case.

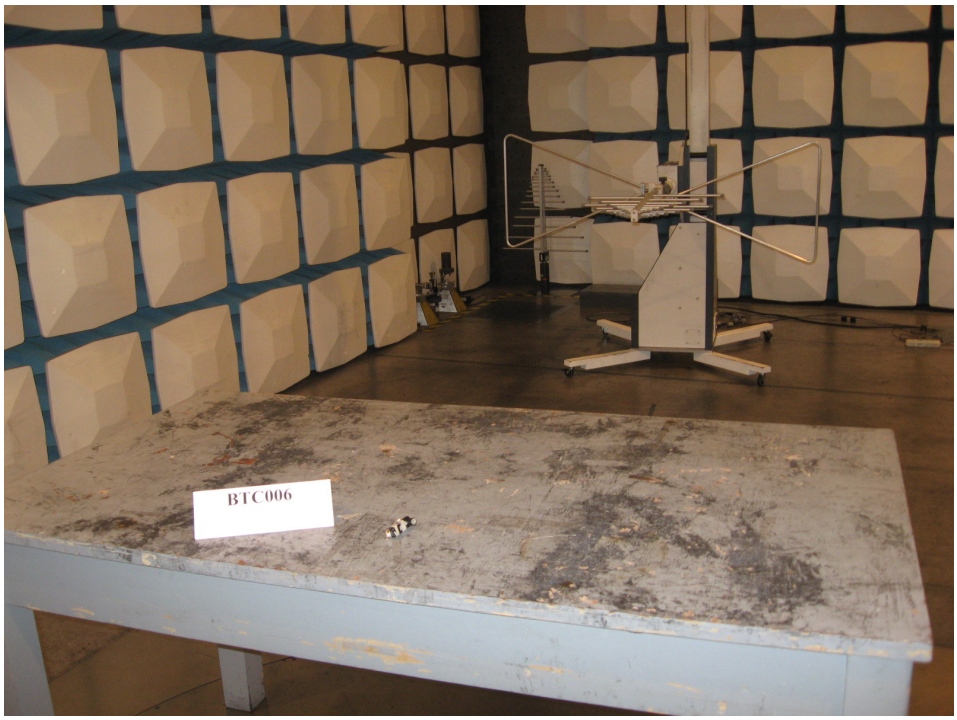
2. The dBc value between the carrier maximum power and band edge emission power of the frequency listed in the table is calculated from the test record showed in Appendix 1.

3. Peak value of the high/low band edge emission listed in the table is calculated by the below formula: PK value of band edge emission = Peak carrier field strength – dBc value in item2

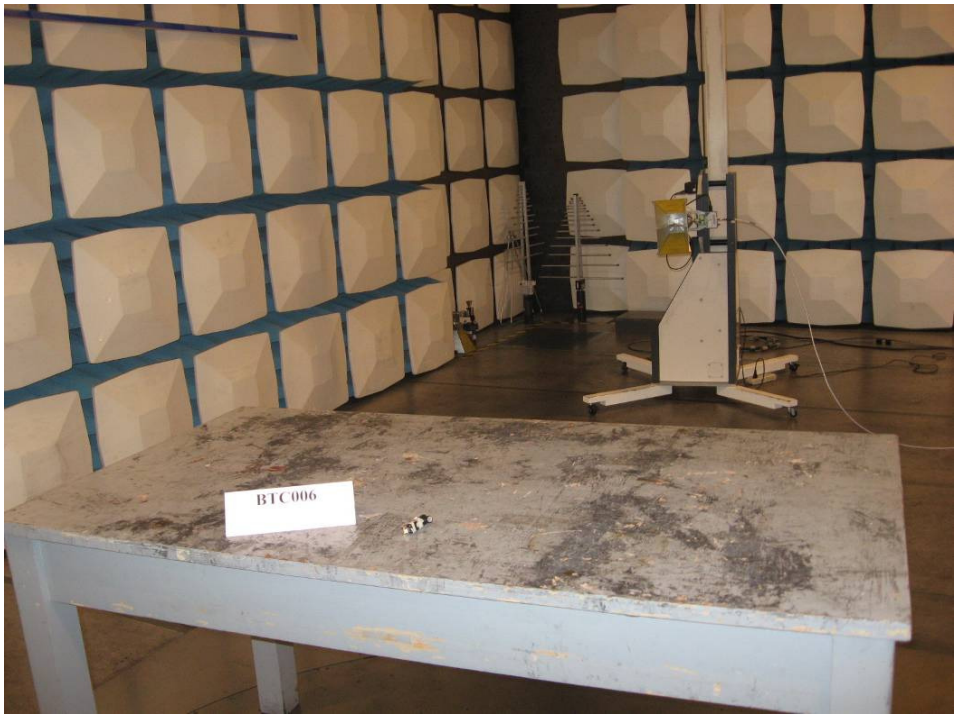
*Note: Please refer to Appendix 1 for measurement data. Disturbances other than those mentioned above are small or not detectable. Please refer to the Appendix 1 for the noise floor of the band edge emission.

6 Photographs of the Test Set-Up

Photograph 1: Set-up for Radiation Measurement below 1GHz



Photograph 2: Set-up for Radiation Measurement above 1GHz



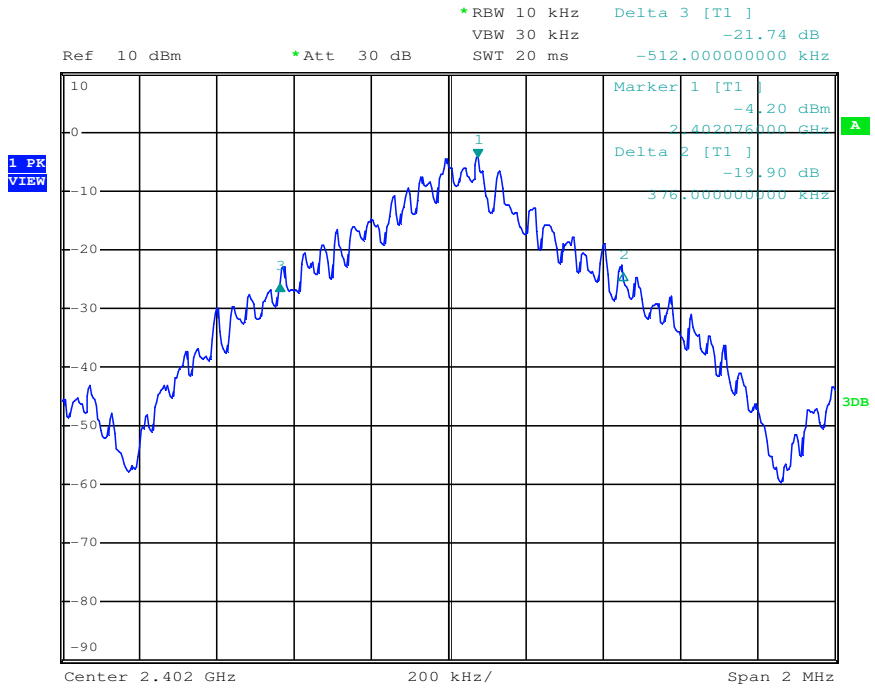
7 List of Tables

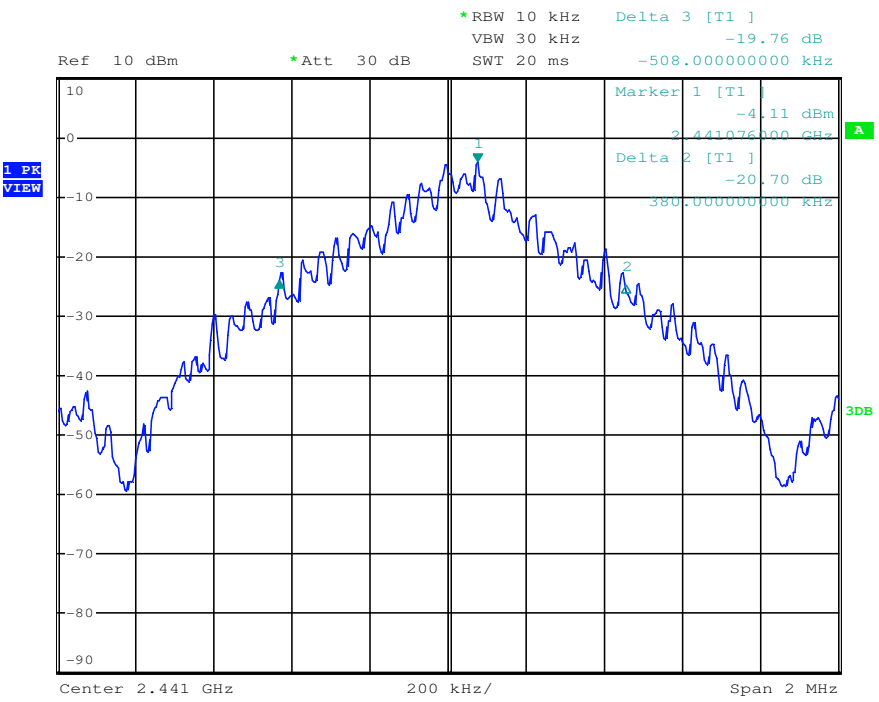
Table 1: List of Test and Measurement Equipment 6
Table 2: Radiated Emission (Bluetooth: Transmitting at channel low) 14
Table 3: Radiated Emission (Bluetooth: Transmitting at channel mid) 14
Table 4: Radiated Emission (Bluetooth: Transmitting at channel high) 15
Table 5: Peak Conducted Power 17
Table 6: 20dB Bandwidth 18
Table 7: Hopping Channel Carrier Frequency Separation 20
Table 8: Number of hopping frequency 21
Table 9: Dwell Time (DH5 mode) 23
Table 10: Out-Of-Band Emission measurement (conducted) 25
Table 11: Band Edges Emission in the Restricted Bands by Marker Delta Method 25

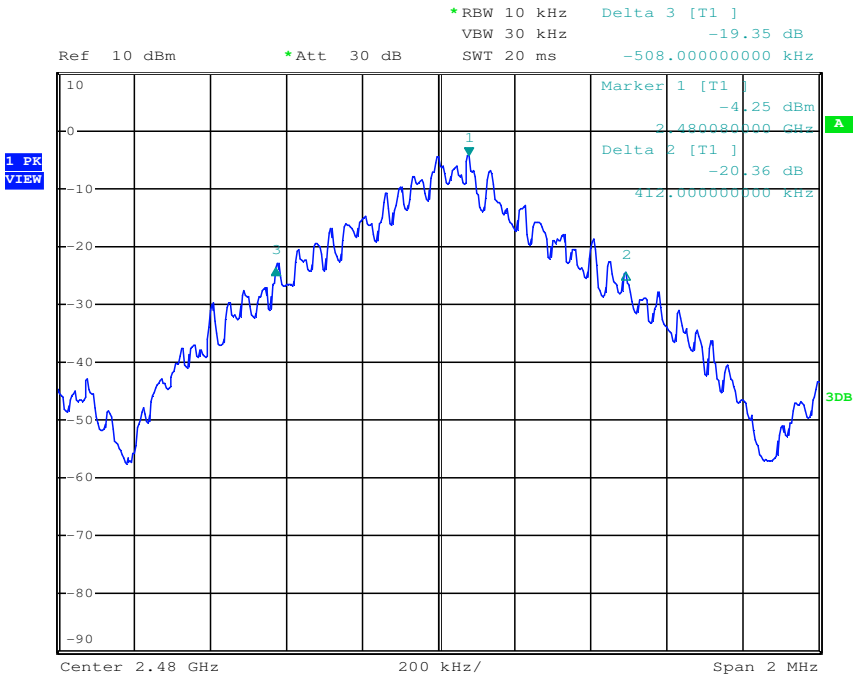
8 List of Photographs

Photograph 1: Set-up for Radiation Measurement below 1GHz 26
Photograph 2: Set-up for Radiation Measurement above 1GHz 27

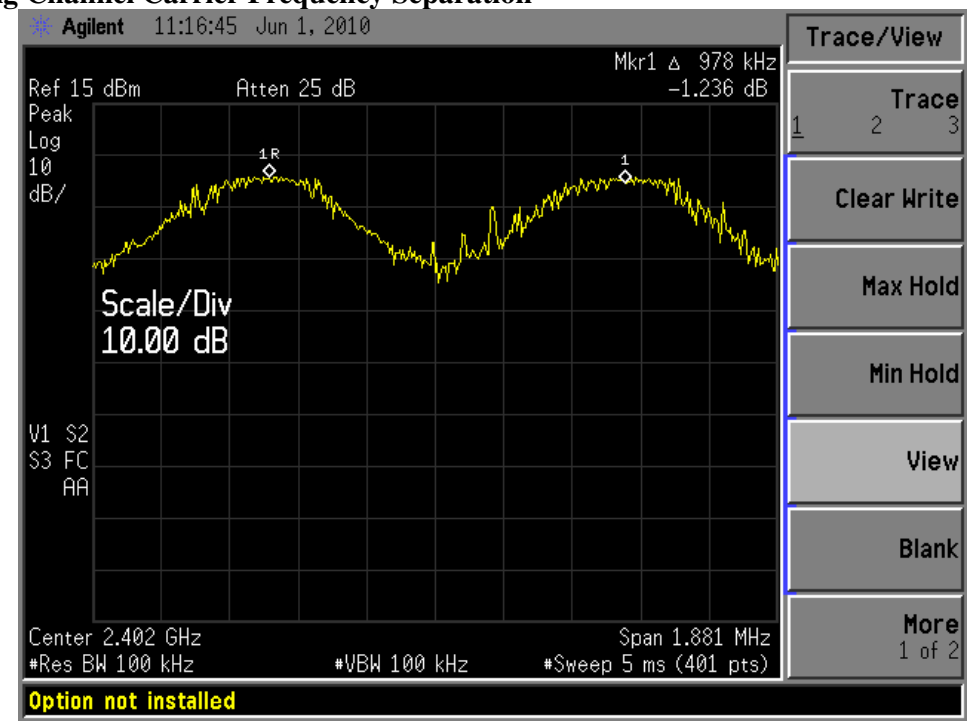
20dB Bandwidth

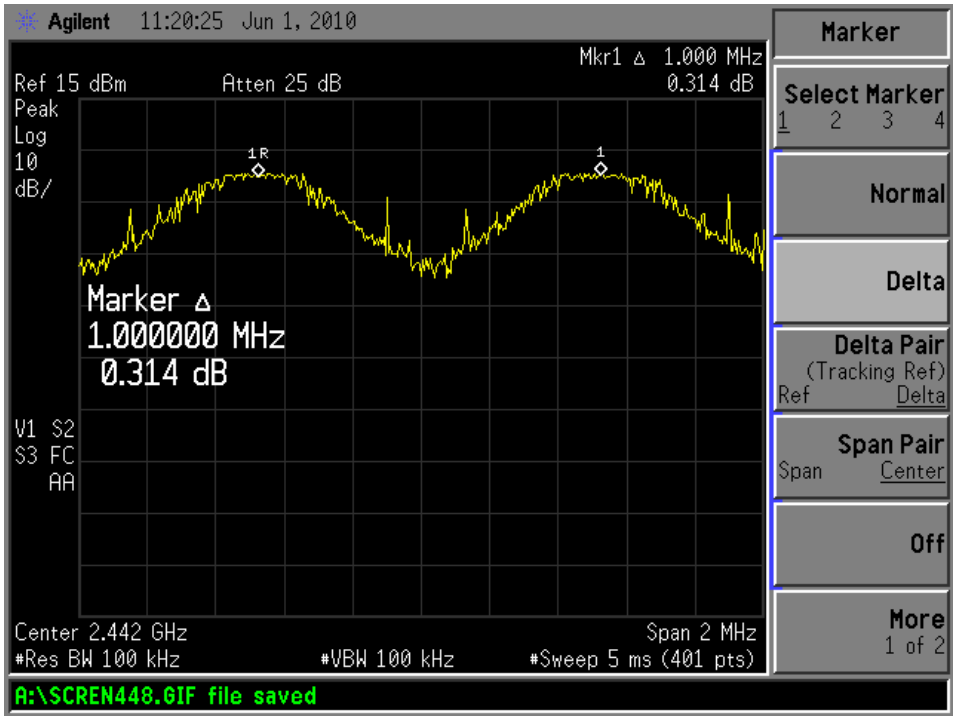


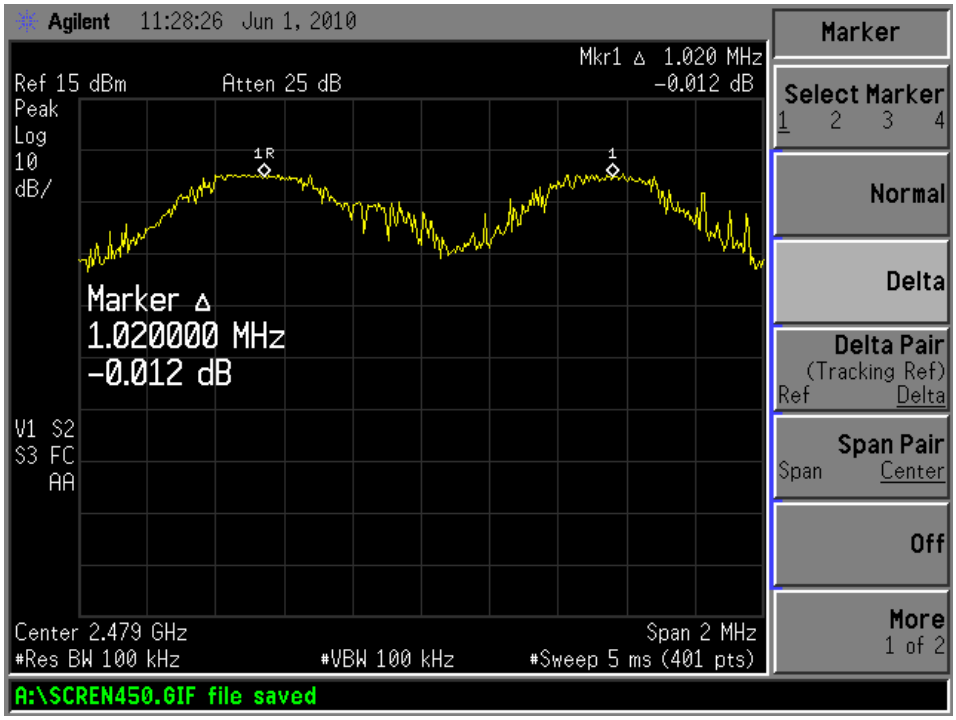



*RBW 10 kHz
VBW 30 kHz
SWT 20 ms
Delta 3 [T1]
-19.35 dB
-508.000000000 kHz
Ref 10 dBm
*Att 30 dB
Marker 1 [T1]
-4.25 dBm
2.480080000 GHz
Delta 2 [T1]
-20.36 dB
412.000000000 kHz
1 PK
VIEW
A
3DB
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.48 GHz
200 kHz/
Span 2 MHz

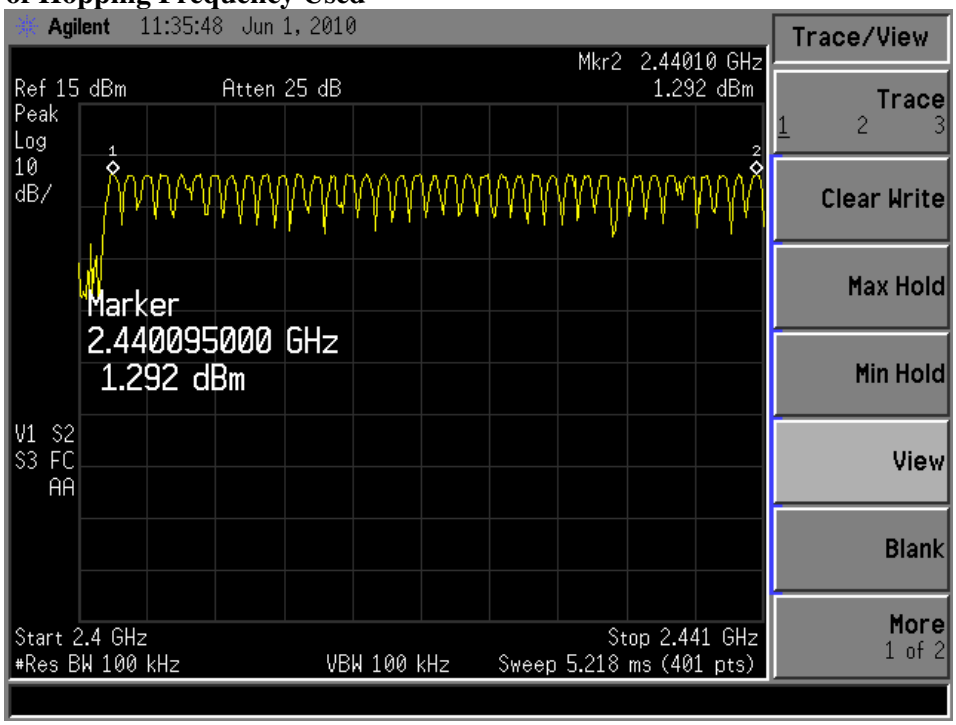
Hopping Channel Carrier Frequency Separation

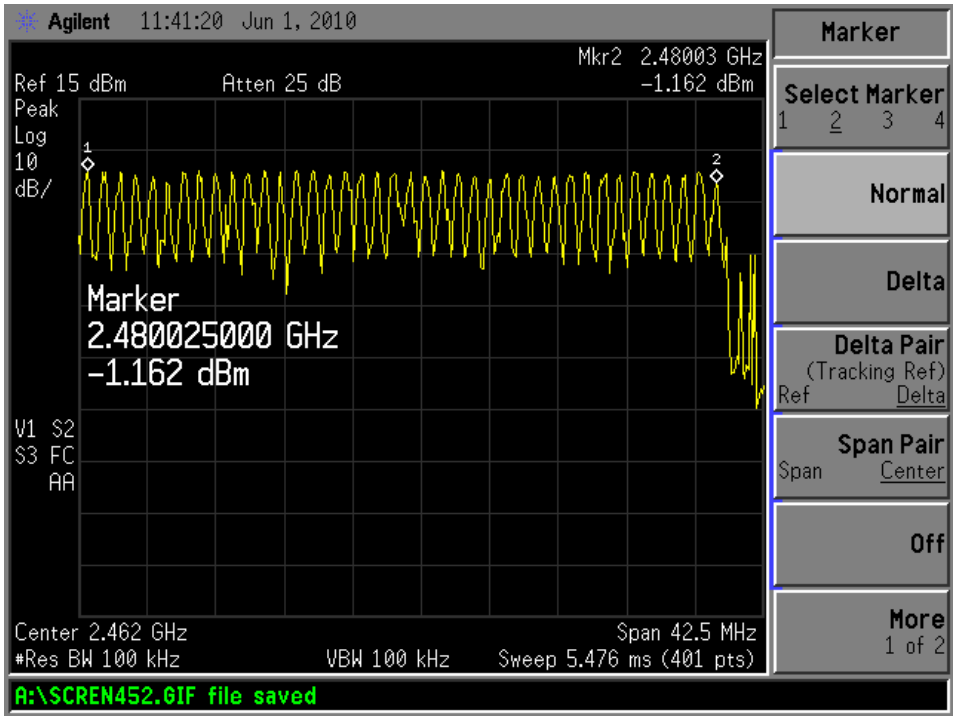




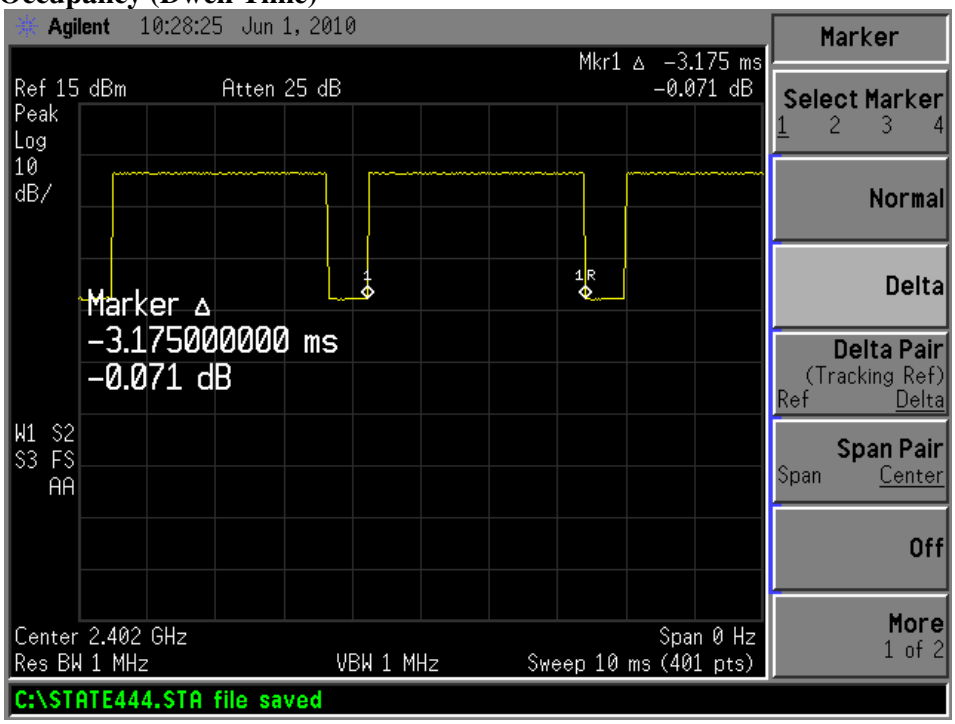

Agilent 11:28:26 Jun 1, 2010
Mkr1 Δ 1.020 MHz
-0.012 dB
Ref 15 dBm
Atten 25 dB
Peak
Log
10
dB/
1R
1
Marker Δ
1.020000 MHz
-0.012 dB
V1 S2
S3 FC
AA
Center 2.479 GHz
#Res BW 100 kHz
#VBW 100 kHz
Span 2 MHz
#Sweep 5 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2
A:\SCREN450.GIF file saved

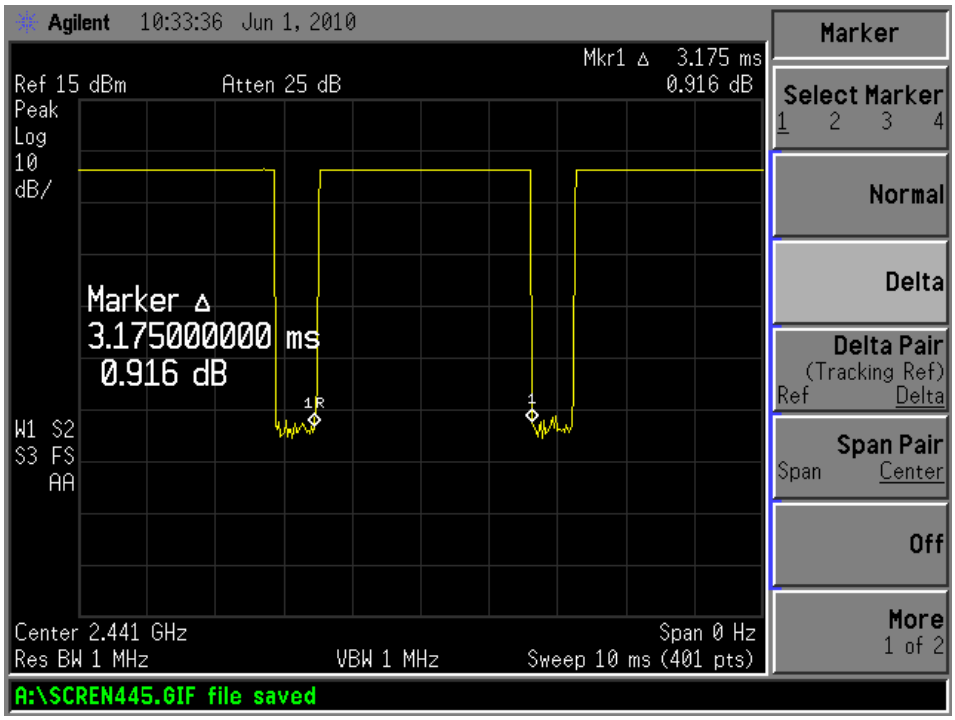
Number of Hopping Frequency Used

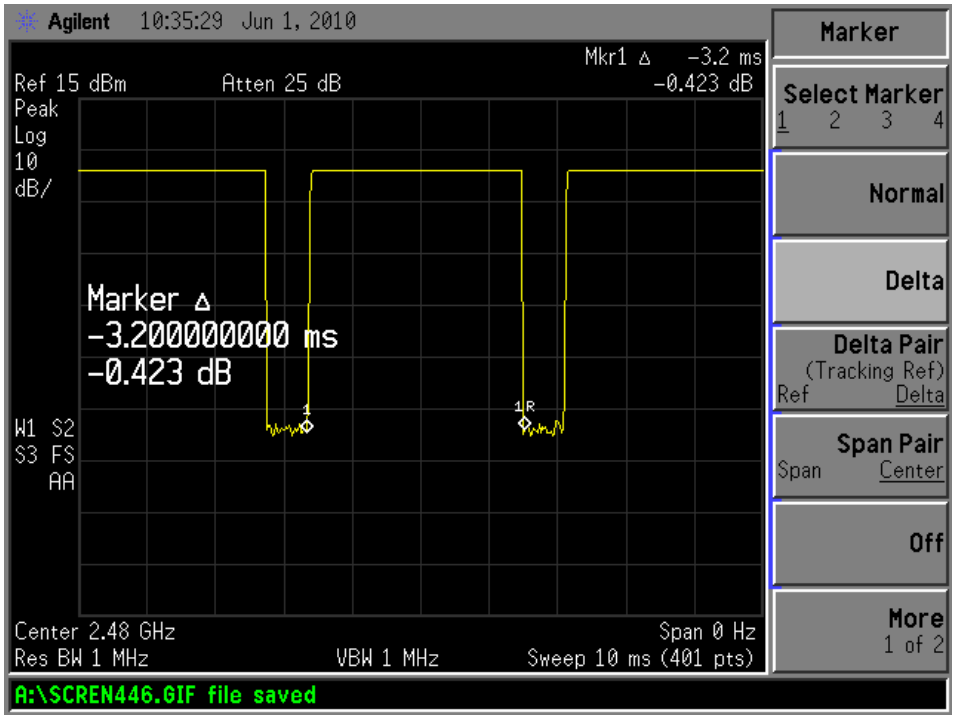




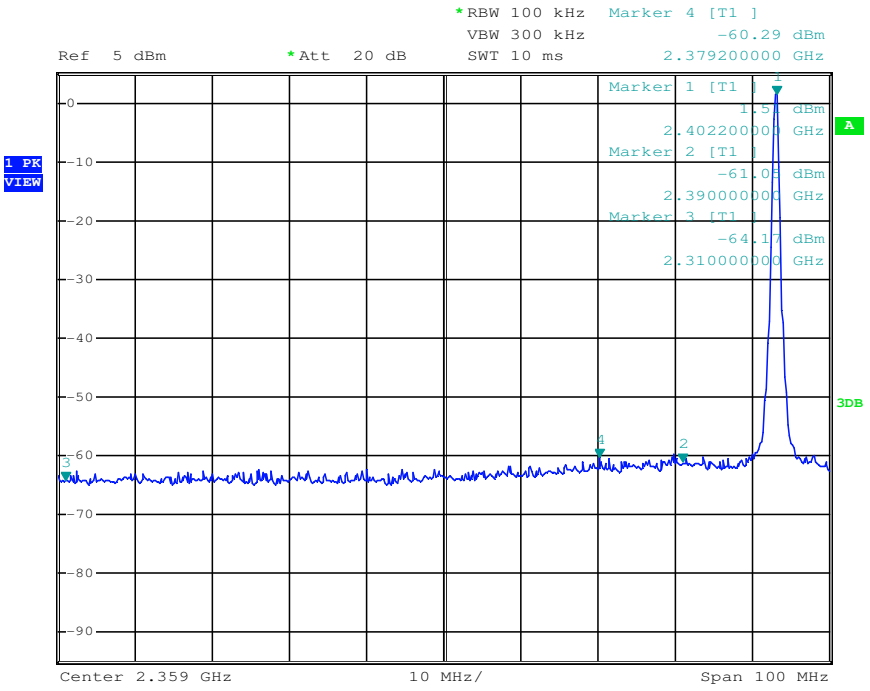
Time of Occupancy (Dwell Time)

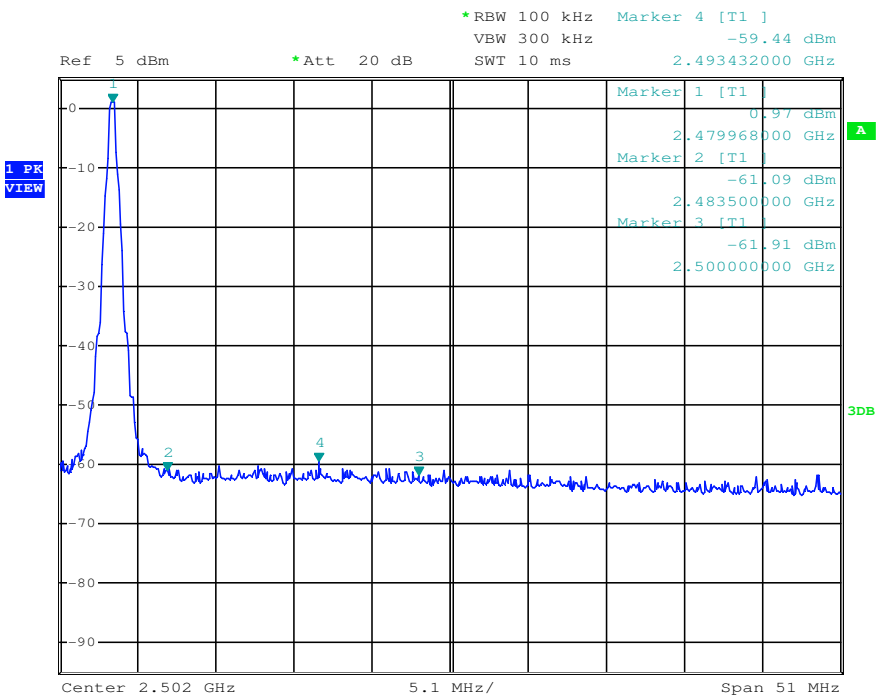




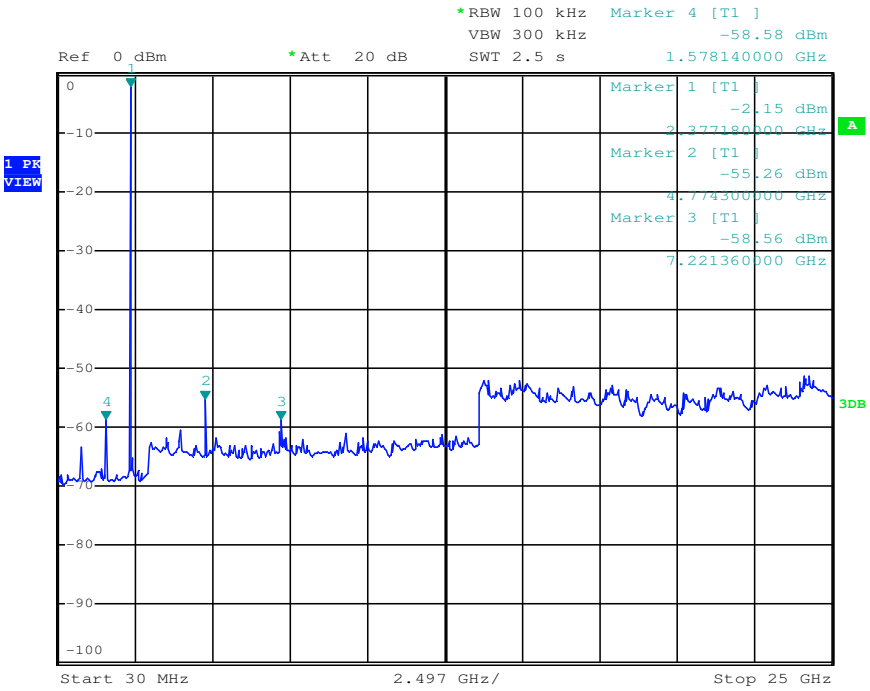

Agilent 10:35:29 Jun 1, 2010
Mkr1 Δ -3.2 ms
Ref 15 dBm
Atten 25 dB
-0.423 dB
Peak
Log
10
dB/
Marker Δ
-3.200000000 ms
-0.423 dB
W1 S2
S3 FS
AA
Center 2.48 GHz
Res BW 1 MHz
VBW 1 MHz
Span 0 Hz
Sweep 10 ms (401 pts)
A:\SCREN446.GIF file saved
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

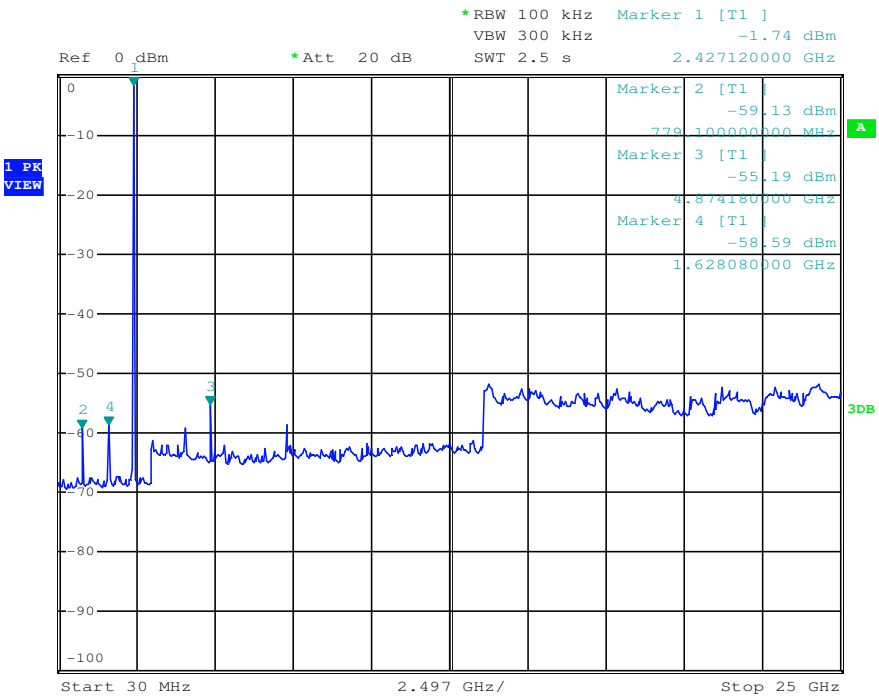
Band Edge Emission

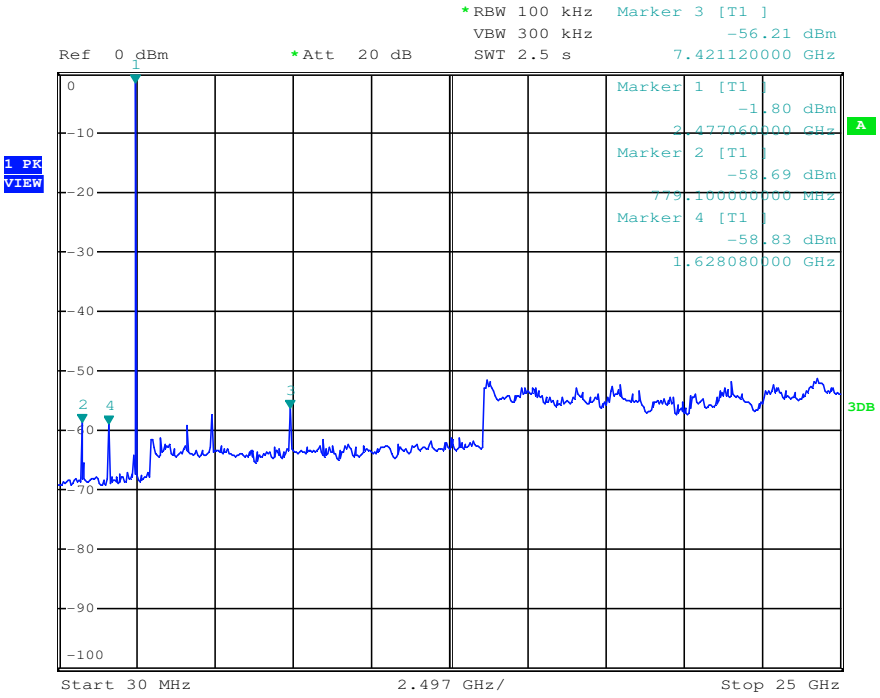




Out-Of-Band Emission






*RBW 100 kHz
VBW 300 kHz
SWT 2.5 s
Marker 3 [T1]
-56.21 dBm
7.421120000 GHz
Ref 0 dBm
*Att 20 dB
Marker 1 [T1]
-1.80 dBm
2.477060000 GHz
Marker 2 [T1]
-58.69 dBm
779.100000000 MHz
Marker 4 [T1]
-58.83 dBm
1.628080000 GHz
1 PK VIEW
A
3DB
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
Start 30 MHz
2.497 GHz/
Stop 25 GHz