

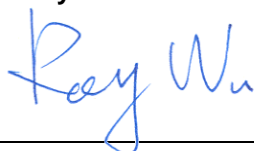
FCC/IC RF Test Report

APPLICANT : Atheros Communications, Inc.
EQUIPMENT : 802.11a/b/g/n WLAN + Bluetooth Combo module
BRAND NAME : Atheros
MODEL NAME : ARS42
FCC ID : PPD-ARS42
IC : 4104A-ARS42
STANDARD : FCC Part 15 Subpart C §15.247
IC RSS-210 Issue 8
CLASSIFICATION : Digital Spread Spectrum (DSS)

The WiFi + Bluetooth module was tested on extended card inserted to a host laptop PC. The product was received on Feb. 15, 2011 and completely tested on Mar. 28, 2011. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shows the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:



Roy Wu / Manager



SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



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SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(1)	A8.4(2)	Number of Channels	≥ 15Chs	Pass	-
3.2	15.247(a)(1)	A8.1(a)	20dB Bandwidth	NA	Pass	-
3.2	-	Gen 4.4.1	99% Bandwidth	-	Pass	-
3.3	15.247(a)(1)	A8.1(b)	Channel Separation	≥ 2/3 of 20dB BW	Pass	-
3.4	15.247(a)(1)	A8.1(d)	Dwell Time of Each Channel	≤ 0.4sec in 31.6sec period	Pass	-
3.5	15.247(b)(1)	A8.1(b)	Peak Output Power	≤ 125 mW	Pass	-
3.6	15.247(d)	A8.5	Spurious Emission	< 20 dBc	Pass	-
3.7	15.247(d)	A8.5	Frequency Band Edges	≤ 20dBc	Pass	-
3.8	15.247(d)	A8.5	Transmitter Radiated Emission	15.209(a) & 15.247(d)	Pass	Under limit 3.11 dB at 2483.5 MHz
3.9	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 18.2 dB at 0.19 MHz



1 General Description

1.1 Applicant

Atheros Communications, Inc.
1700 Technology Drive, San Jose, CA 95110, United States

1.2 Manufacturer

Atheros Communications, Inc.
1700 Technology Drive, San Jose, CA 95110, United States

1.3 Testing Site Facilities

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	CO05-HY	03CH07-HY	722060/4086B-1

1.4 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC Public Notice DA 00-705
- ♦ ANSI C63.4-2003
- ♦ IC RSS-210 Issue 8

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B (DoC), recorded in a separate test report.



1.5 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
2.	Notebook	DELL	Larirude E4300	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	LCD Monitor	Lenovo	6135-AB1	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m



2 Test Configuration of Equipment Under Test

2.1 General Information of EUT

Product Feature & Specification	
Equipment	802.11a/b/g/n WLAN + Bluetooth Combo module
Brand Name	Atheros
Model Name	ARS42
FCC ID	PPD-ARS42
IC	4104A-ARS42
Tx/Rx Frequency Range	2400 MHz ~ 2483.5 MHz
Channel Spacing	79
Carrier Frequency of Each Channel	2402+n*1 MHz; n=0~78 for Bluetooth 2.1+EDR 40 Channel(37 hopping + 3 advertising channel) for Bluetooth 4.0
Channel Spacing	1 MHz
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : π /4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
EUT Stage	Identical Prototype

Remark:

1. For other wireless features of this EUT, test report will be issued separately.
2. This test report recorded only product characteristics and test results of Digital Spread Spectrum (DSS).
3. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

2.2 Maximum Output Power

2.2.1 Peak Power

<Low Energy Bluetooth>

The device has the maximum peak power as below:

Channel	Frequency	Bluetooth RF Output Power	
		Data Rate / Modulation	
		GFSK	
		1Mbps	
Ch00	2402MHz	7.34 dBm	
Ch19	2440MHz	7.24 dBm	
Ch39	2480MHz	6.82 dBm	

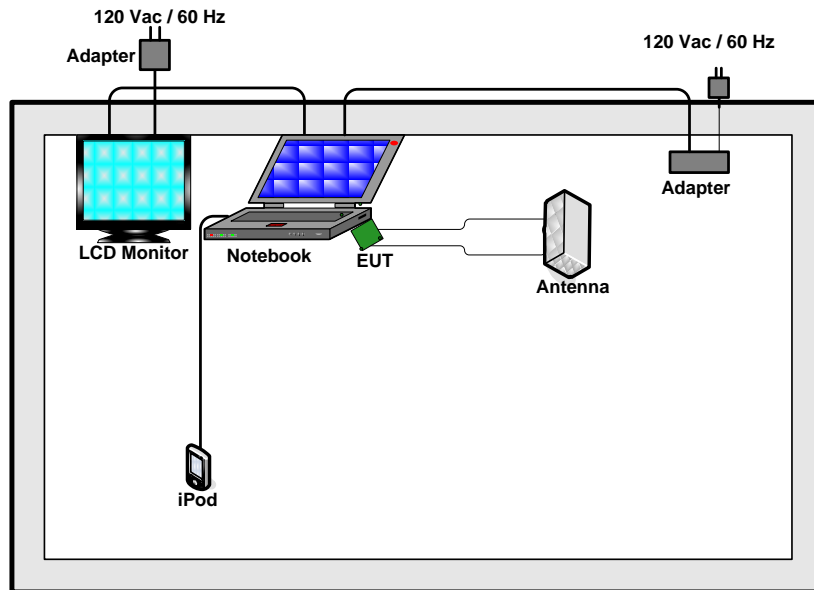
<Standard Bluetooth>

Channel	Frequency	Bluetooth RF Output Power		
		Data Rate / Modulation		
		GFSK	π /4-DQPSK	8-DPSK
		1Mbps	2Mbps	3Mbps
Ch00	2402MHz	8.45 dBm	10.58 dBm	11.10 dBm
Ch39	2441MHz	8.21 dBm	10.43 dBm	10.96 dBm
Ch78	2480MHz	7.82 dBm	10.06 dBm	10.59 dBm

2.3 Antenna Information

Brand / Model Name	Type	Frequency Range (MHz)	Antenna Gain (dBi)
Wistron Neweb Corporation / EBJ Aux.	PIFA	2400 ~ 2500	3.62

2.4 Connection Diagram of Test System



2.5 RF Utility

For Bluetooth function, the RF utility, "Art" was installed in EUT which was programmed in order to make the EUT into the engineering modes to contact with Bluetooth base station for transmitting and receiving signals continuously.

3 Test Result

3.1 Number of Channel Measurement

3.1.1 Limits of Number of Hopping Frequency

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

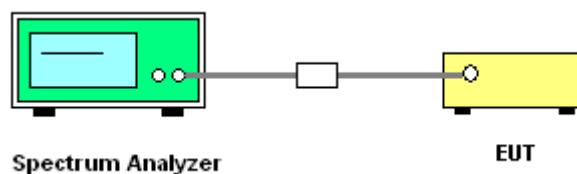
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedure

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The modulation types of EUT are irrelevant to number of hopping channels deviation.
4. The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:
Span = the frequency band of operation; $RBW \geq 1\%$ of the span; $VBW \geq RBW$; Sweep = auto;
Detector function = peak; Trace = max hold.
5. The number of hopping frequency used is defined as the device has the numbers of total channel.

3.1.4 Test Setup



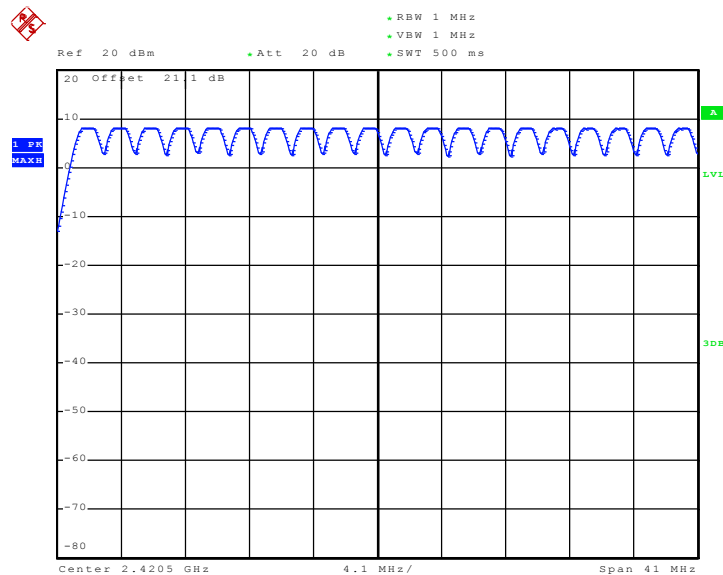
3.1.5 Test Result of Number of Hopping Frequency

<Low Energy Bluetooth>

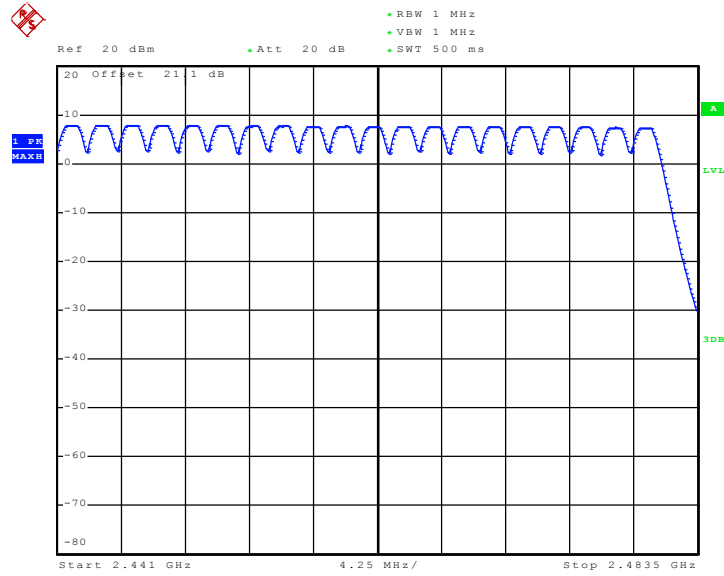
Test Mode :	Bluetooth LE 1Mbps 8-DPSK L/M/H channel	Temperature :	24~26°C
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Number of Hopping Channels (Channel)	Limits (Channel)	Pass/Fail
39	> 15	Pass

Number of Hopping Channel Plot on Channel 00 - 39



Date: 28.MAR.2011 12:41:46



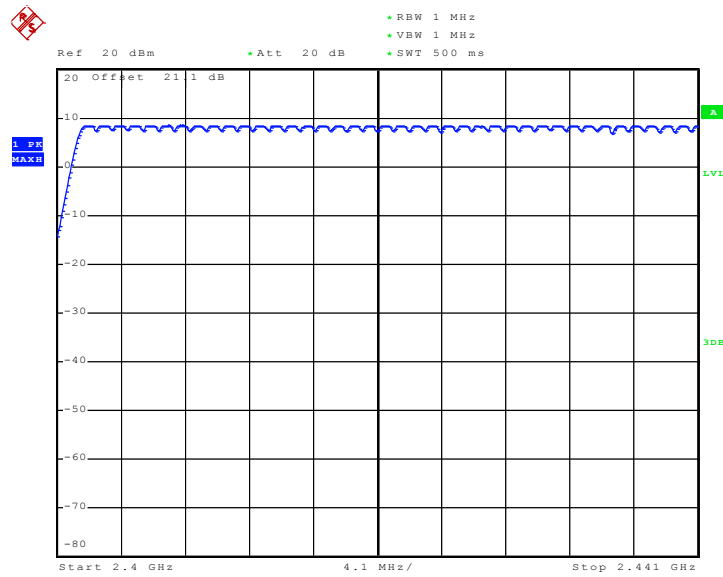
Date: 28.MAR.2011 12:45:45



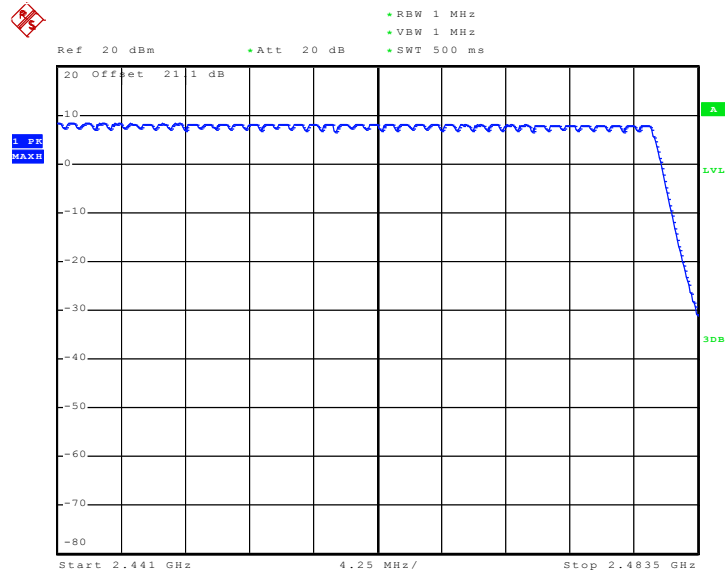
<Standard Bluetooth>

Test Mode :	Bluetooth 1Mbps 8-DPSK L/M/H channel	Temperature :	24~26°C
Test Engineer :	Cona Huang	Relative Humidity :	50~53%
Number of Hopping Channels (Channel)		Limits (Channel)	
79		> 15	
		Pass/Fail	
		Pass	

Number of Hopping Channel Plot on Channel 00 - 78



Date: 17.MAR.2011 14:35:00



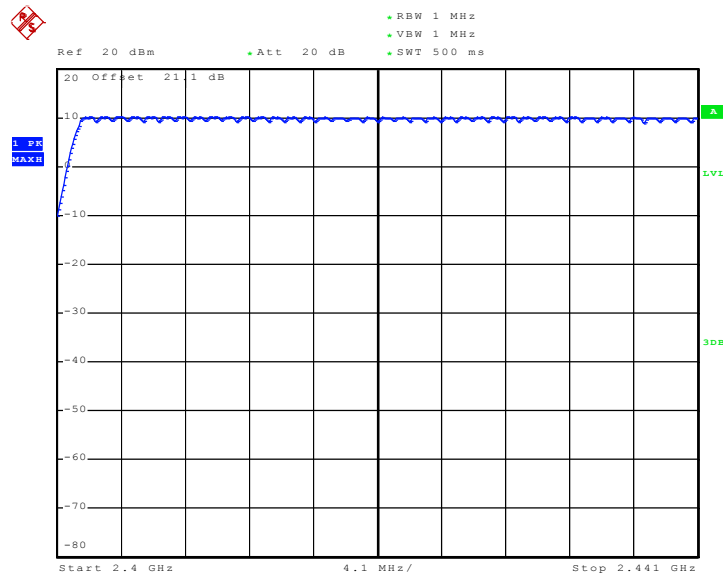
Date: 17.MAR.2011 14:37:50



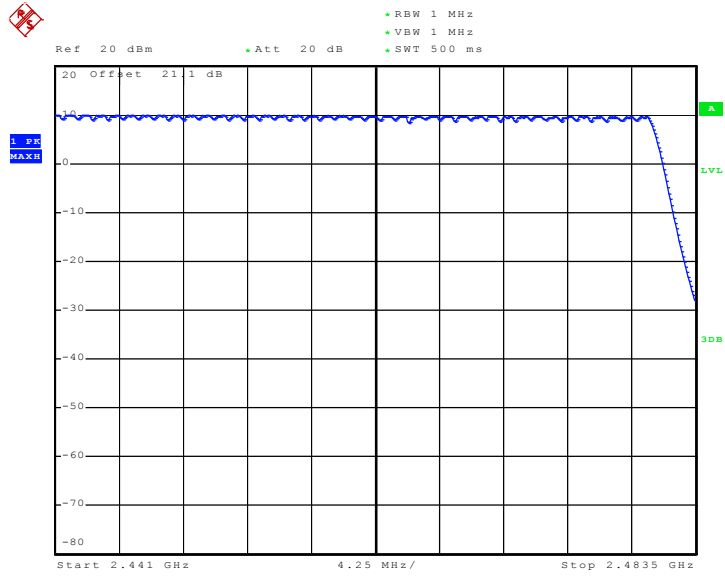
Test Mode :	Bluetooth EDR 2Mbps	Temperature :	24~26°C
	π /4-DQPSK L/M/H channel		
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Number of Hopping Channels (Channel)	Limits (Channel)	Pass/Fail
79	> 15	Pass

Number of Hopping Channel Plot on Channel 00 - 78



Date: 17.MAR.2011 14:42:58

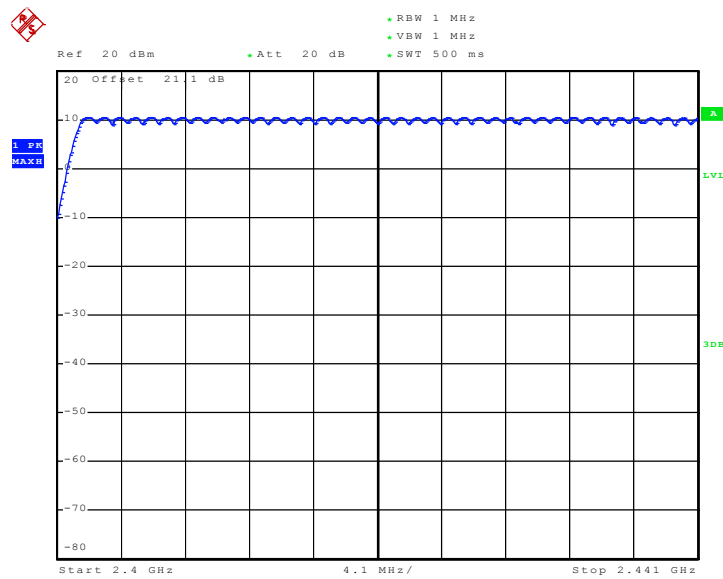


Date: 17.MAR.2011 14:46:15

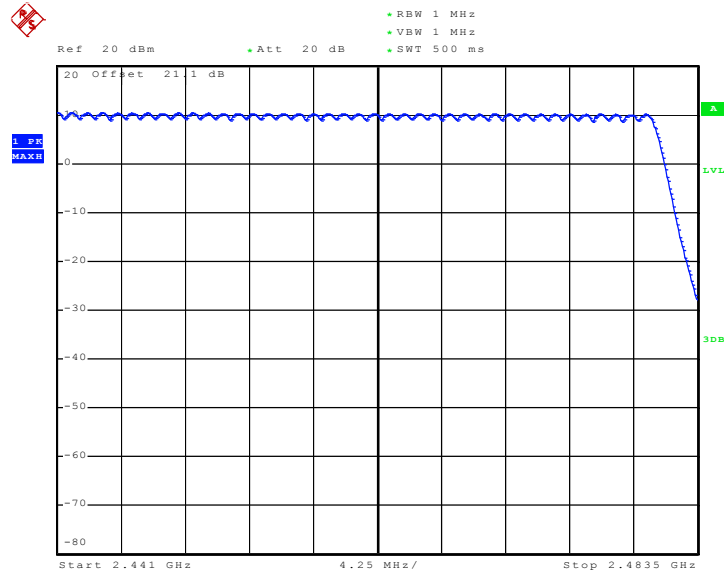


Test Mode :	Bluetooth EDR 3Mbps 8-DPSK L/M/H channel	Temperature :	24~26°C
Test Engineer :	Cona Huang	Relative Humidity :	50~53%
Number of Hopping Channels (Channel)		Limits (Channel)	
79		> 15	
		Pass	

Number of Hopping Channel Plot on Channel 00 - 78



Date: 17.MAR.2011 14:51:05



Date: 17.MAR.2011 14:55:40

3.2 20dB and 99% Bandwidth Measurement

3.2.1 Limit of 20dB Bandwidth

N/A

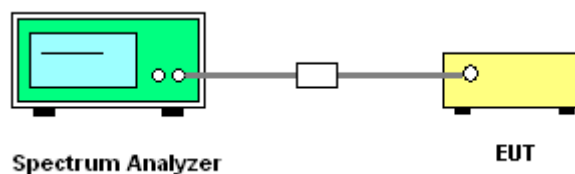
3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

3.2.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. Use the following spectrum analyzer settings:
Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel;
RBW \geq 1% of the 20 dB bandwidth; VBW \geq RBW; Sweep = auto; Detector function = peak;
Trace = max hold.
5. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

3.2.4 Test Setup



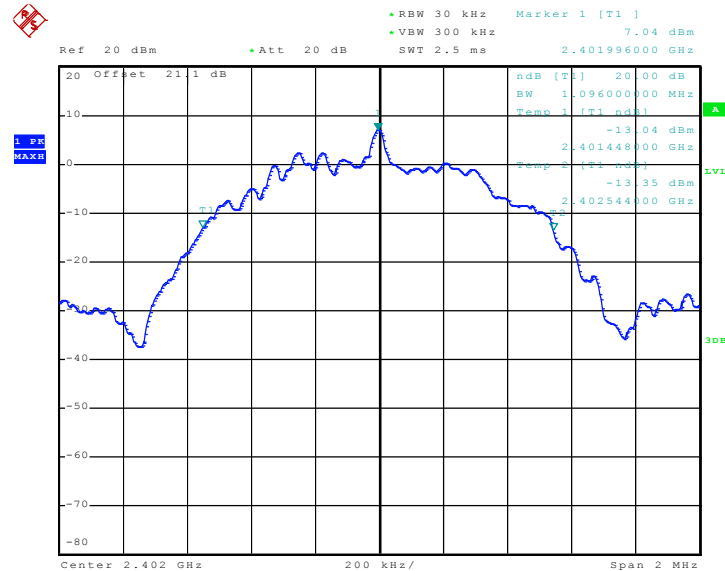
3.2.5 Test Result of 20dB Bandwidth

<Low Energy Bluetooth>

Test Mode :	Bluetooth LE 1Mbps GFSK L/M/H channel	Temperature :	24~26°C
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.096
19	2440	1.092
39	2480	1.092

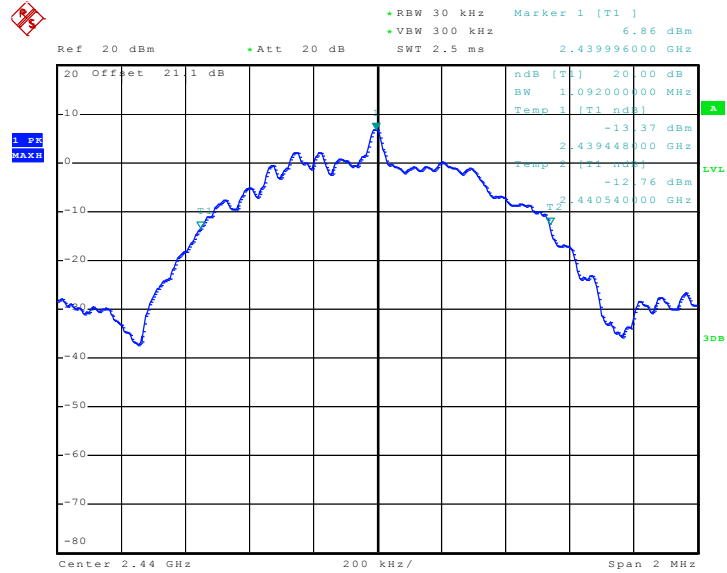
20 dB Bandwidth Plot on Channel 00



Date: 17.MAR.2011 20:21:28

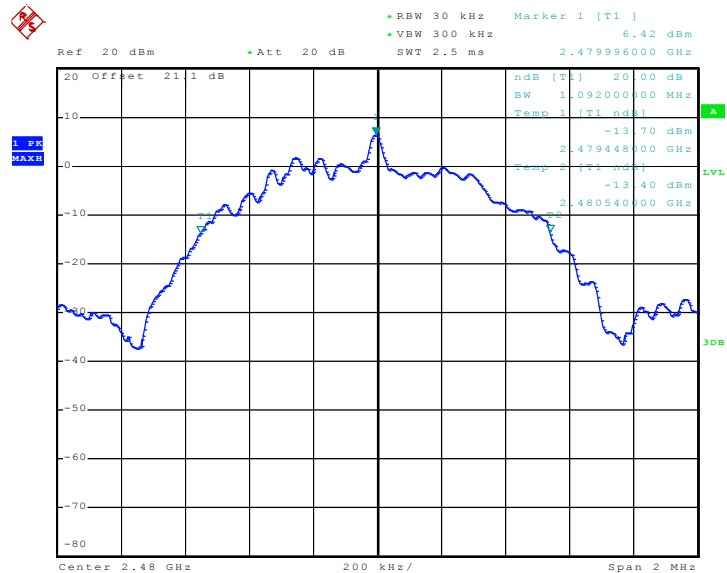


20 dB Bandwidth Plot on Channel 39



Date: 17.MAR.2011 20:30:32

20 dB Bandwidth Plot on Channel 78



Date: 17.MAR.2011 20:32:56

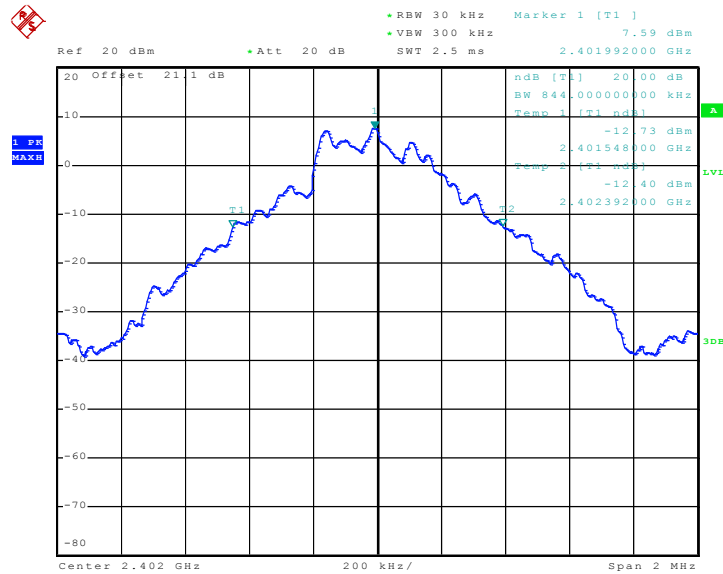


<Standard Bluetooth>

Test Mode :	Bluetooth 1Mbps GFSK L/M/H channel	Temperature :	24~26°C
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.844
39	2441	0.840
78	2480	0.844

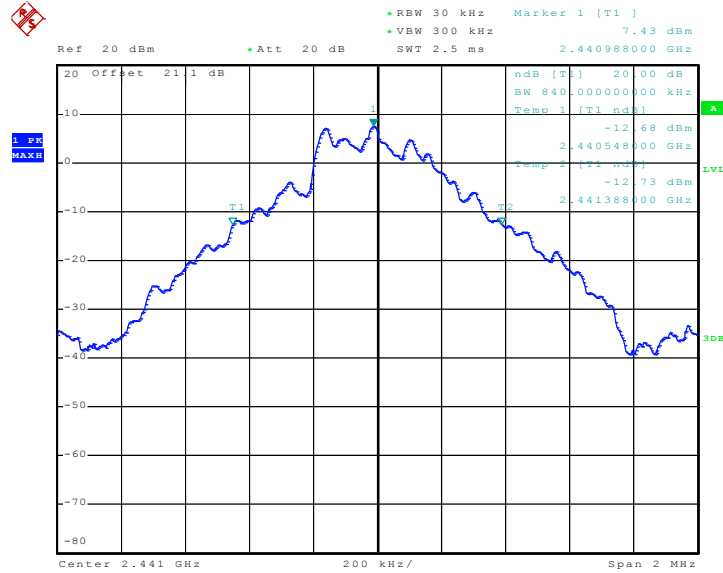
20 dB Bandwidth Plot on Channel 00



Date: 17.MAR.2011 15:26:59

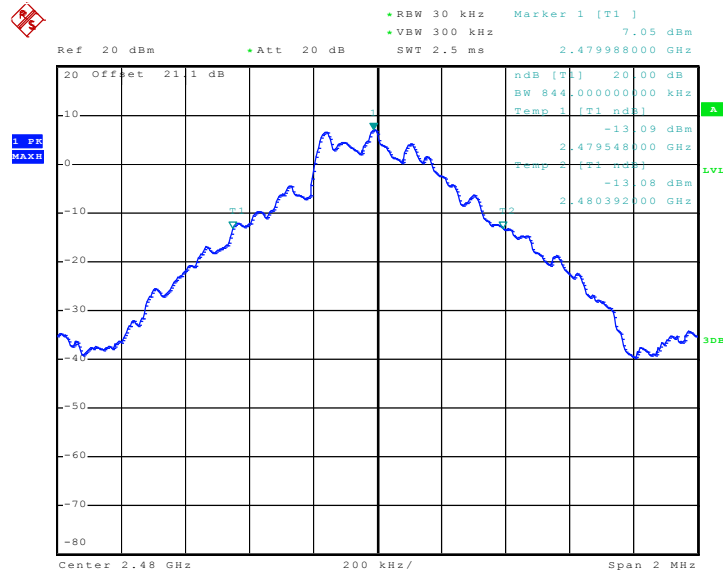


20 dB Bandwidth Plot on Channel 39



Date: 17.MAR.2011 15:27:26

20 dB Bandwidth Plot on Channel 78



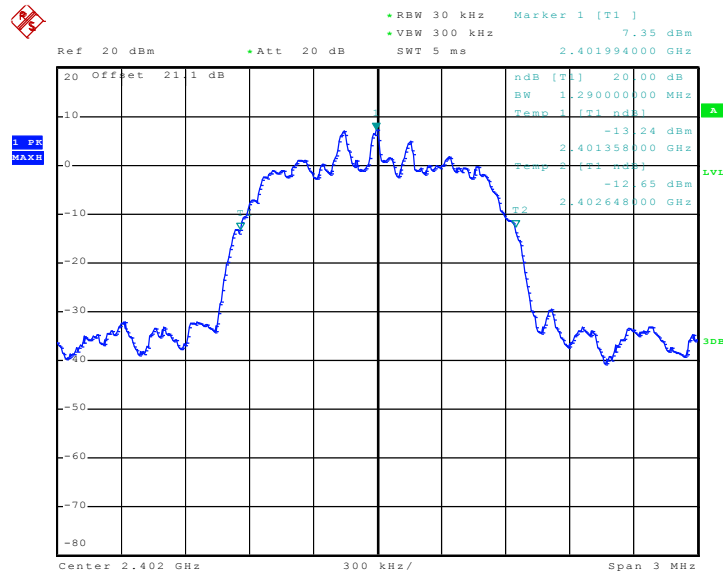
Date: 17.MAR.2011 15:26:09



Test Mode :	Bluetooth EDR 2Mbps π /4-DQPSK L/M/H channel	Temperature :	24~26°C
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.290
39	2441	1.284
78	2480	1.284

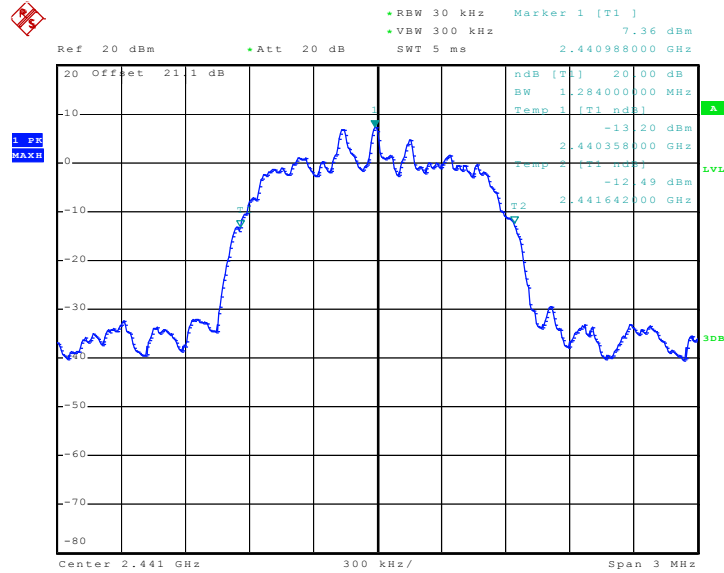
20 dB Bandwidth Plot on Channel 00



Date: 17.MAR.2011 15:29:01

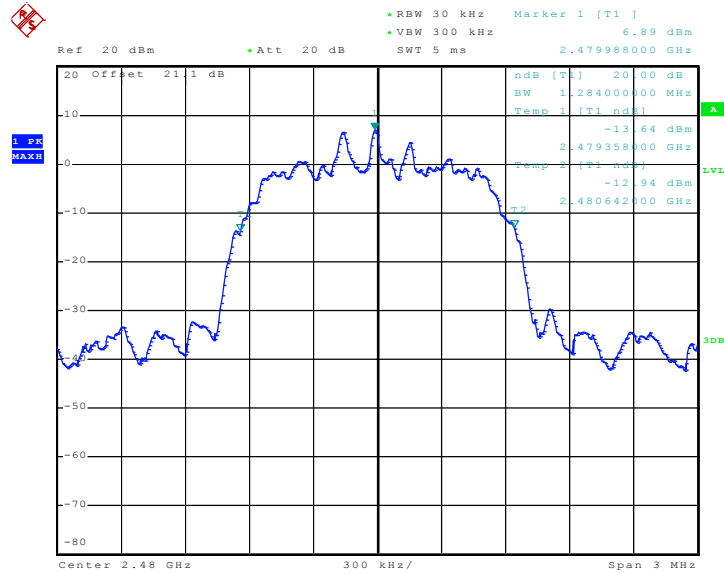


20 dB Bandwidth Plot on Channel 39



Date: 17.MAR.2011 15:28:36

20 dB Bandwidth Plot on Channel 78



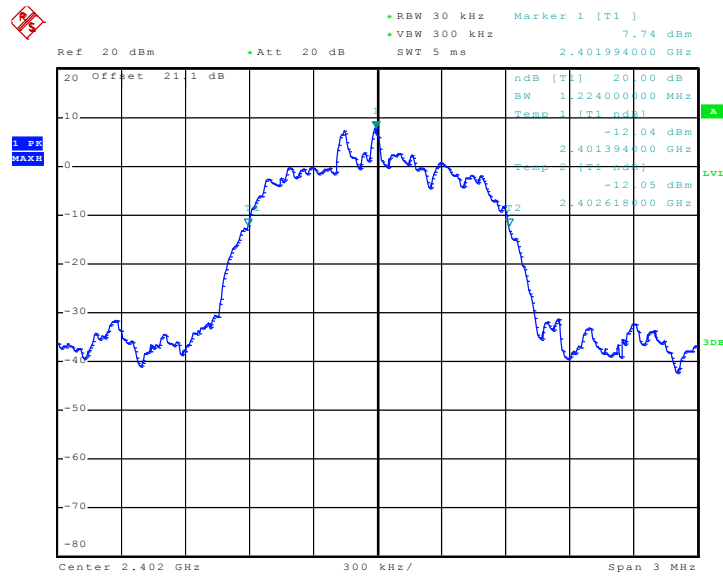
Date: 17.MAR.2011 15:29:25



Test Mode :	Bluetooth EDR 3Mbps 8-DPSK L/M/H channel	Temperature :	24~26°C
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	1.224
39	2441	1.224
78	2480	1.224

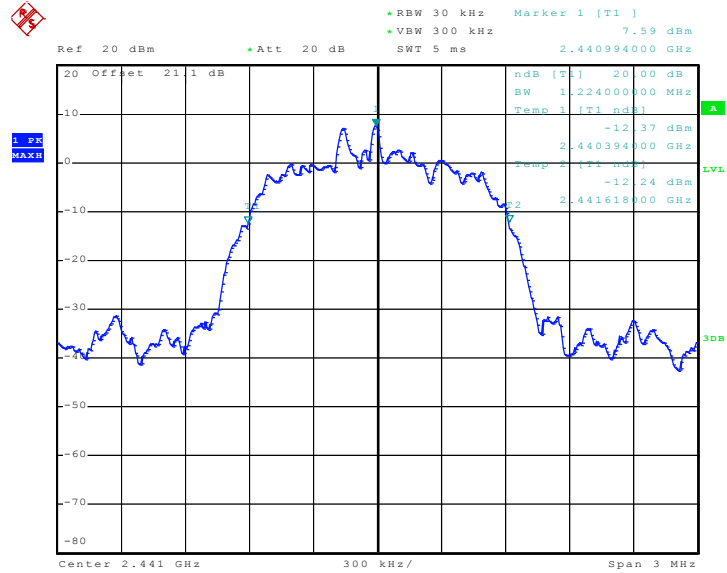
20 dB Bandwidth Plot on Channel 00



Date: 17.MAR.2011 14:56:59

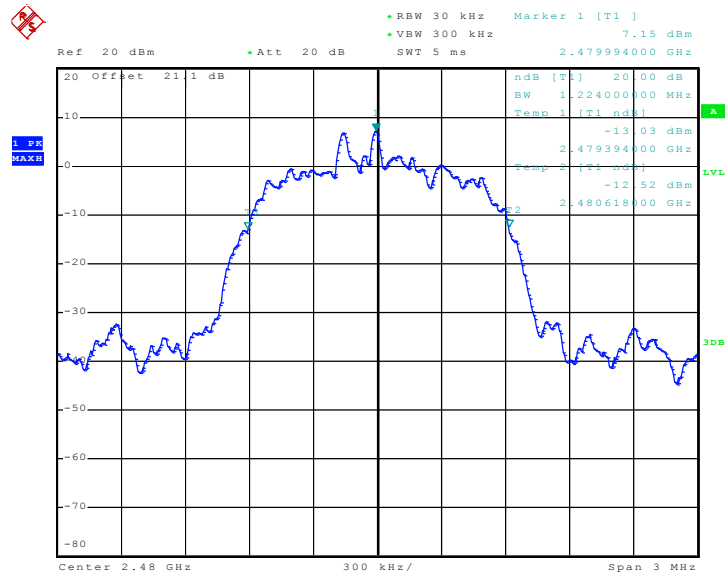


20 dB Bandwidth Plot on Channel 39



Date: 17.MAR.2011 14:57:36

20 dB Bandwidth Plot on Channel 78



Date: 17.MAR.2011 14:58:05

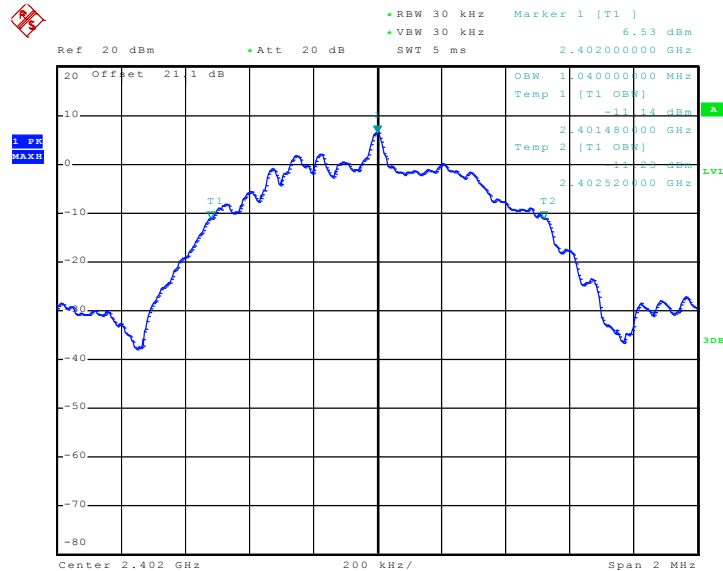
3.2.6 Test Result of 99% Occupied Bandwidth

<Low Energy Bluetooth >

Test Mode :	Bluetooth LE 1Mbps GFSK L/M/H channel	Temperature :	24~26°C
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	1.040
19	2440	1.040
39	2480	1.040

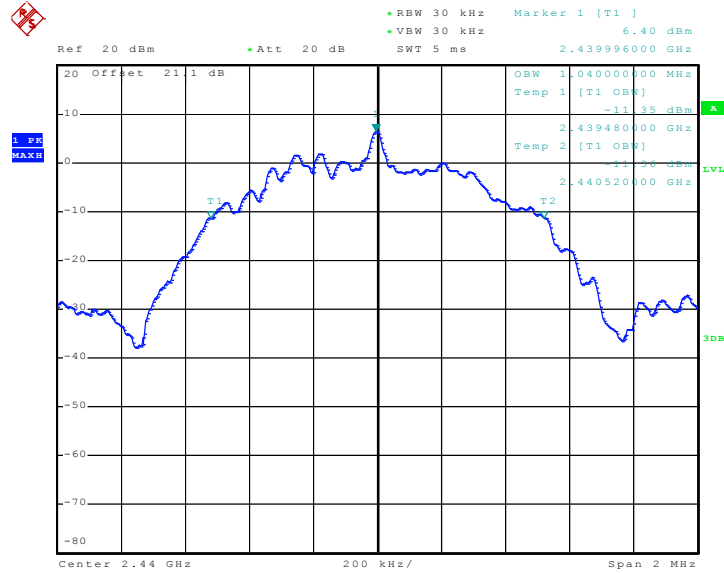
99% Bandwidth Plot on Channel 00



Date: 17.MAR.2011 20:22:26

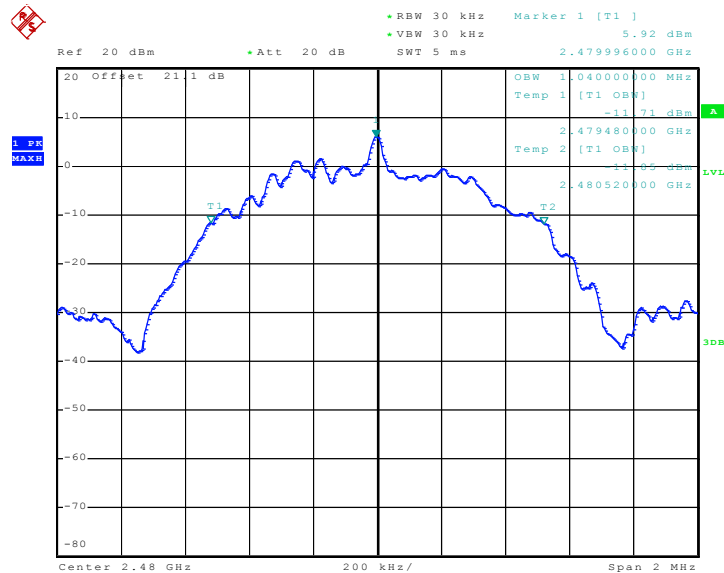


99% Occupied Bandwidth Plot on Channel 19



Date: 17.MAR.2011 20:31:21

99% Occupied Bandwidth Plot on Channel 39



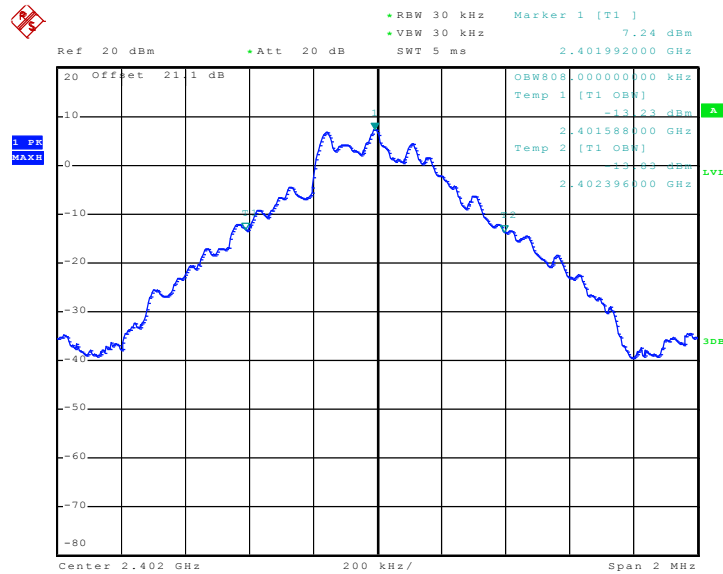
Date: 17.MAR.2011 20:33:40

<Standard Bluetooth>

Test Mode :	Bluetooth 1Mbps GFSK L/M/H channel	Temperature :	24~26°C
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	0.808
39	2441	0.808
78	2480	0.808

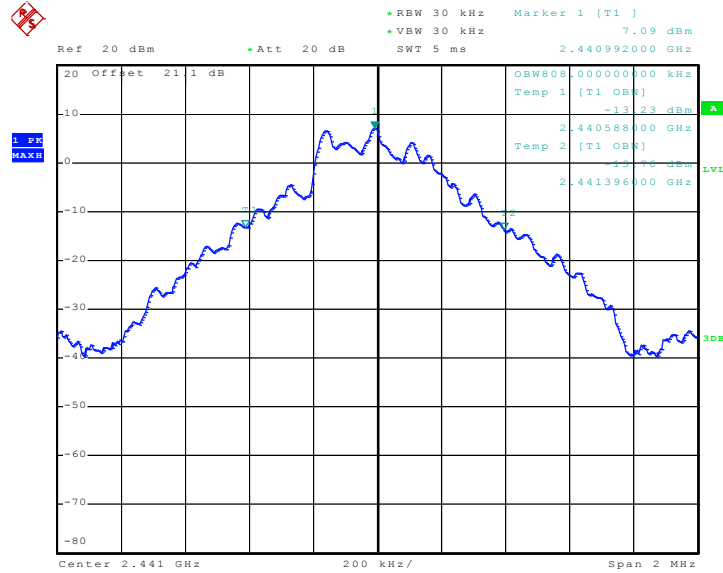
99% Bandwidth Plot on Channel 00



Date: 17.MAR.2011 15:14:48

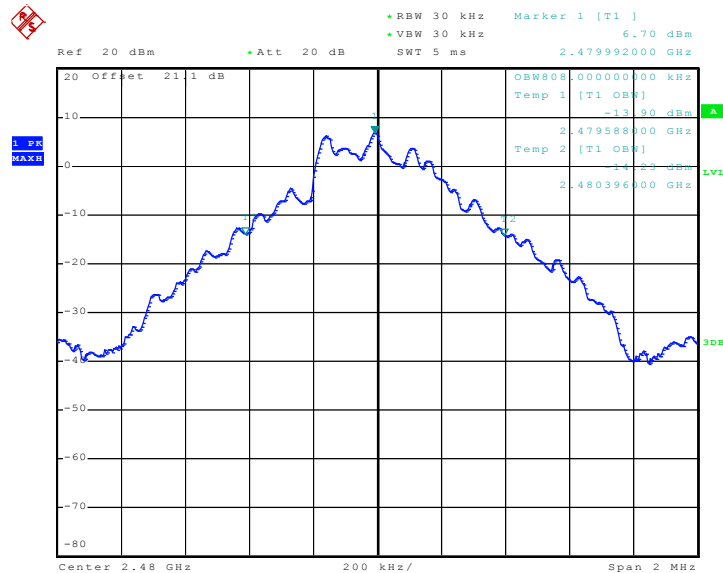


99% Occupied Bandwidth Plot on Channel 39



Date: 17.MAR.2011 15:15:16

99% Occupied Bandwidth Plot on Channel 78



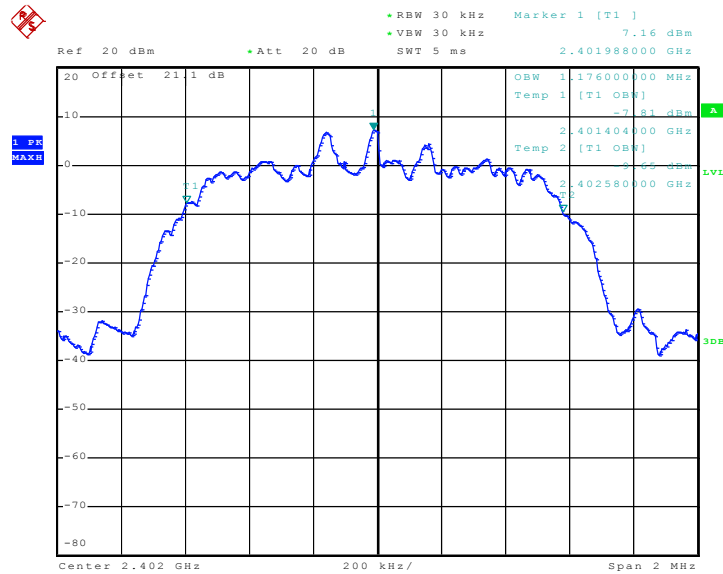
Date: 17.MAR.2011 15:14:24



Test Mode :	Bluetooth EDR 2Mbps	Temperature :	24~26°C
	π /4-DQPSK		
	L/M/H channel		
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	1.176
39	2441	1.176
78	2480	1.172

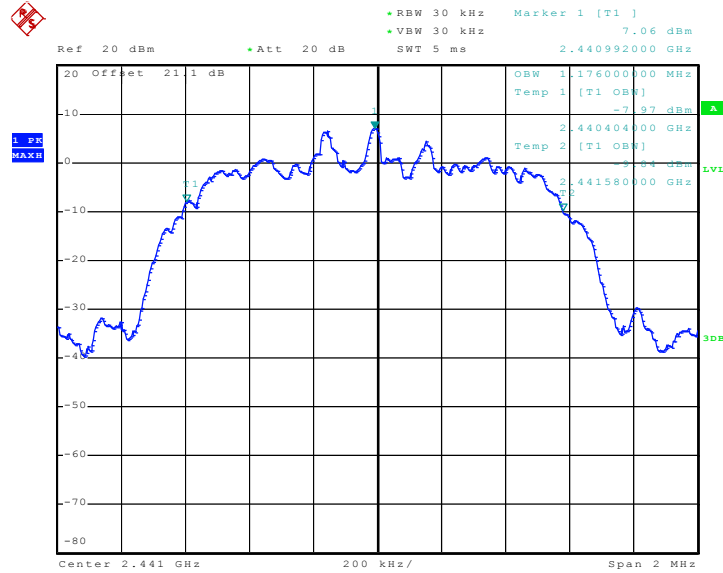
99% Bandwidth Plot on Channel 00



Date: 17.MAR.2011 15:05:16

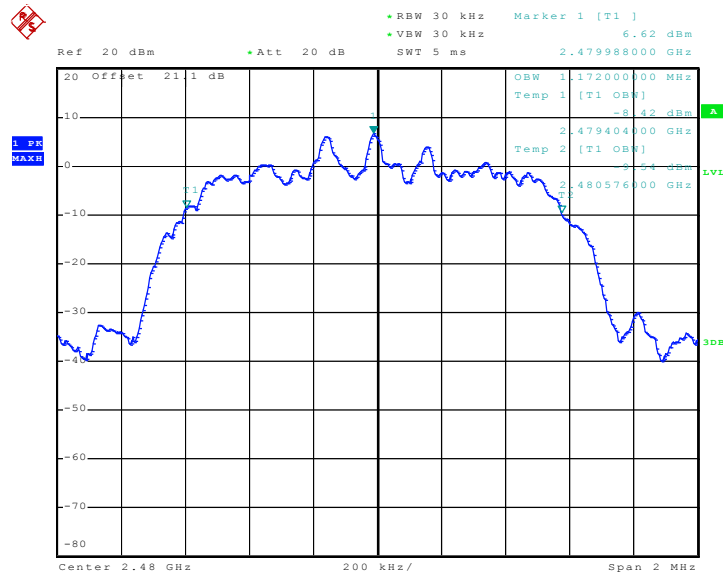


99% Occupied Bandwidth Plot on Channel 39



Date: 17.MAR.2011 15:05:47

99% Occupied Bandwidth Plot on Channel 78



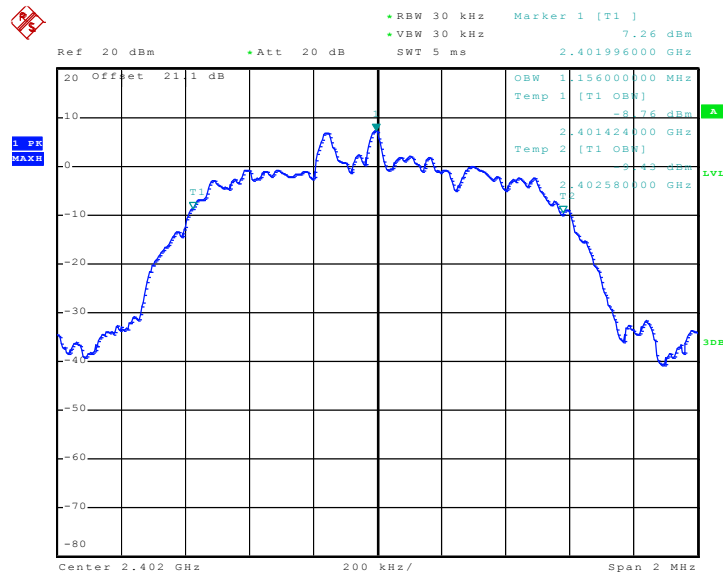
Date: 17.MAR.2011 15:06:13



Test Mode :	Bluetooth EDR 3Mbps 8-DPSK L/M/H channel	Temperature :	24~26°C
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)
00	2402	1.156
39	2441	1.156
78	2480	1.160

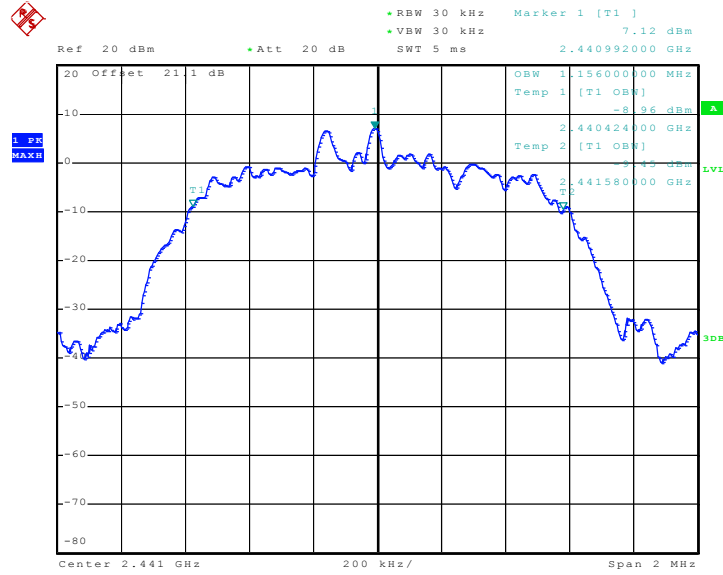
99% Bandwidth Plot on Channel 00



Date: 17.MAR.2011 15:12:41

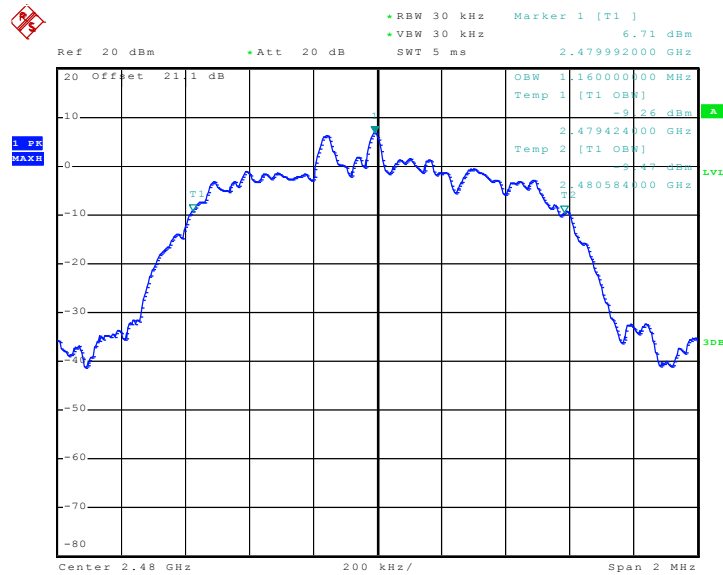


99% Occupied Bandwidth Plot on Channel 39



Date: 17.MAR.2011 15:13:07

99% Occupied Bandwidth Plot on Channel 78



Date: 17.MAR.2011 15:13:34

3.3 Hopping Channel Separation Measurement

3.3.1 Limit of Hopping Channel Separation

Frequency hopping systems operating in the 2400-2483.5 MHz band 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.

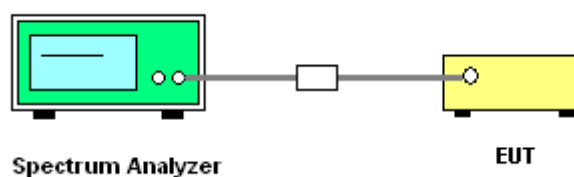
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. Please refer FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. Use the following spectrum analyzer settings:
Span = wide enough to capture the peaks of two adjacent channels; $RBW \geq 1\%$ of the span;
 $VBW \geq RBW$; Sweep = auto; Detector function = peak; Trace = max hold.
5. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

3.3.4 Test Setup





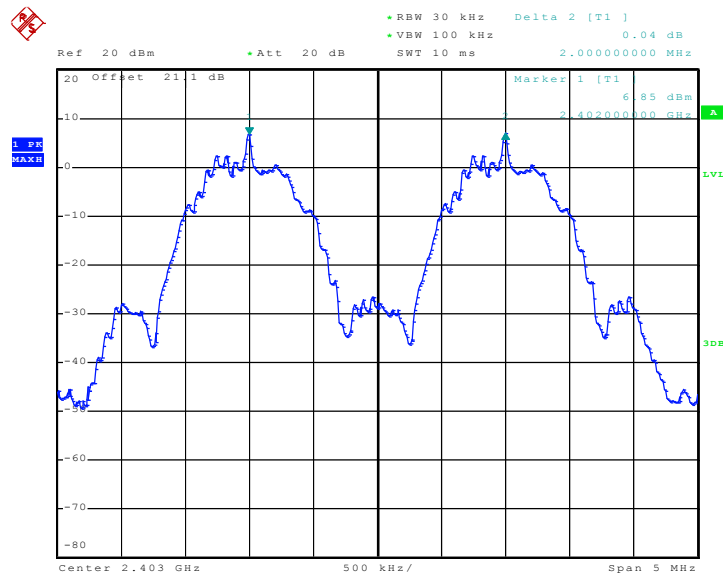
3.3.5 Test Result of Hopping Channel Separation

<Low Energy Bluetooth>

Test Mode :	Bluetooth LE 1Mbps GFSK L/M/H channel	Temperature :	24~26°C
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	2.000	0.025	Pass
19	2440	2.000	0.025	Pass
39	2480	2.000	0.025	Pass

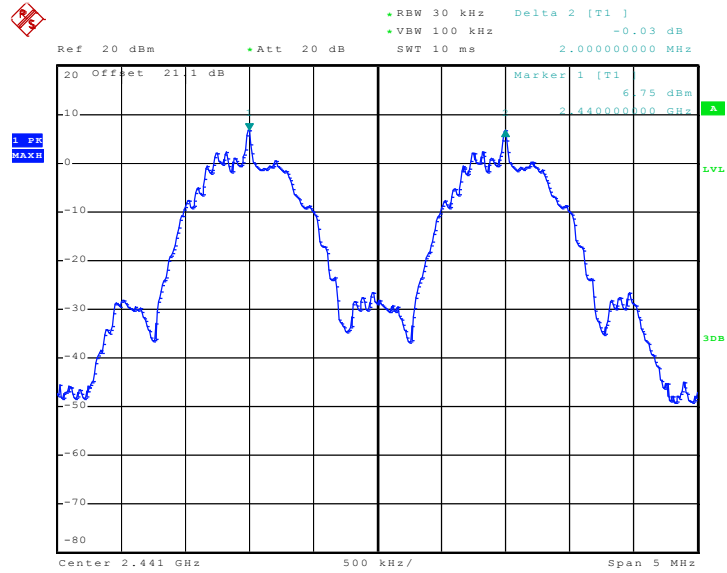
Channel Separation Plot on Channel 00 - 01



Date: 17.MAR.2011 20:15:13

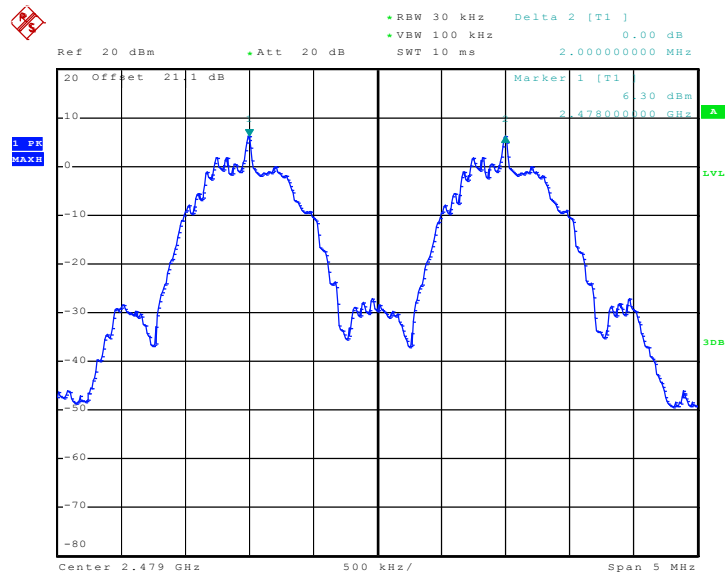


Channel Separation Plot on Channel 19-20



Date: 17.MAR.2011 20:16:31

Channel Separation Plot on Channel 38 - 39



Date: 17.MAR.2011 20:18:37

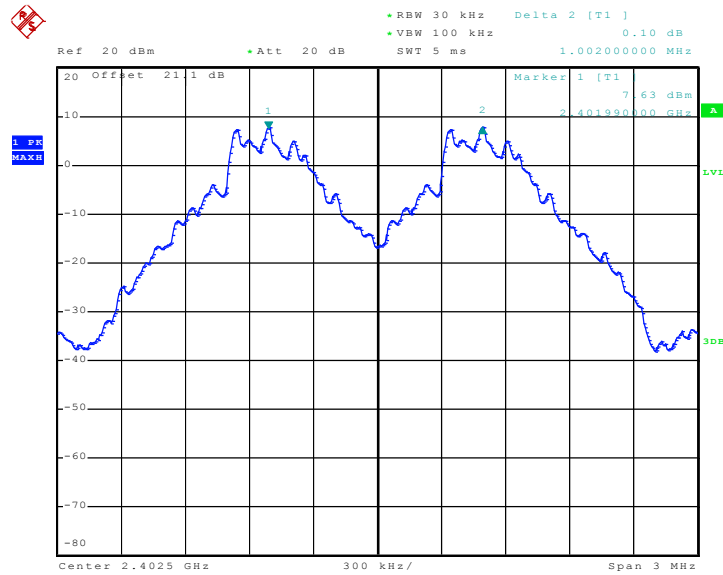


<Standard Bluetooth>

Test Mode :	Bluetooth 1Mbps GFSK L/M/H channel	Temperature :	24~26°C
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.025	Pass
39	2441	1.002	0.025	Pass
78	2480	1.002	0.025	Pass

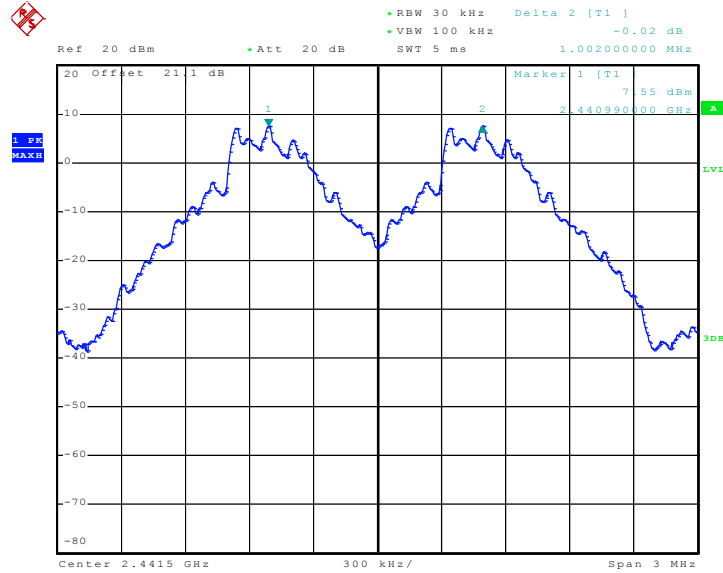
Channel Separation Plot on Channel 00 - 01



Date: 17.MAR.2011 11:59:37

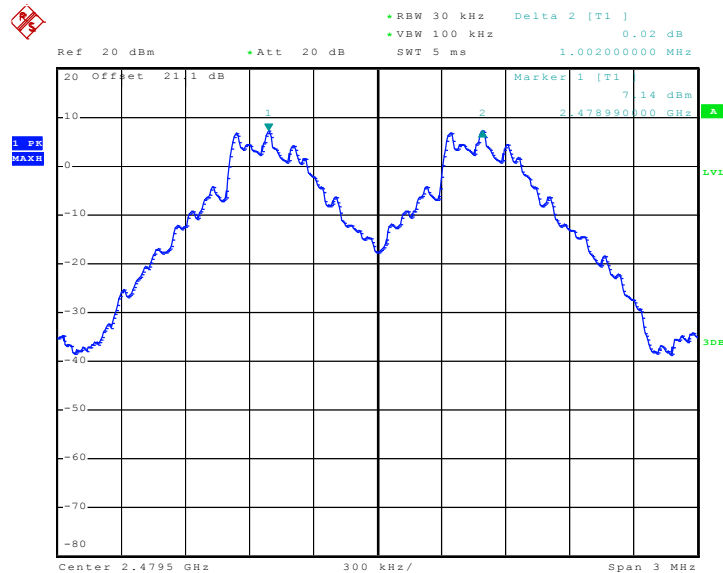


Channel Separation Plot on Channel 39 - 40



Date: 17.MAR.2011 12:00:52

Channel Separation Plot on Channel 77 - 78



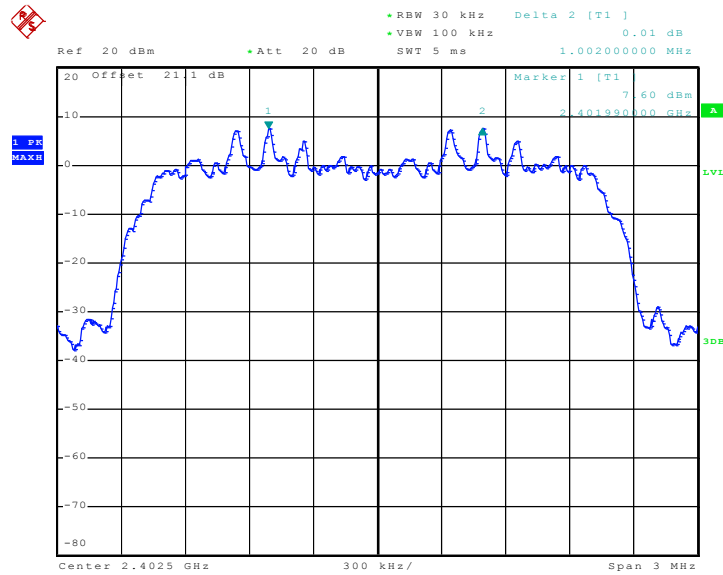
Date: 17.MAR.2011 12:03:51



Test Mode :	Bluetooth EDR 2Mbps	Temperature :	24~26°C
	π /4-DQPSK L/M/H channel		
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.025	Pass
39	2441	1.002	0.025	Pass
78	2480	1.002	0.025	Pass

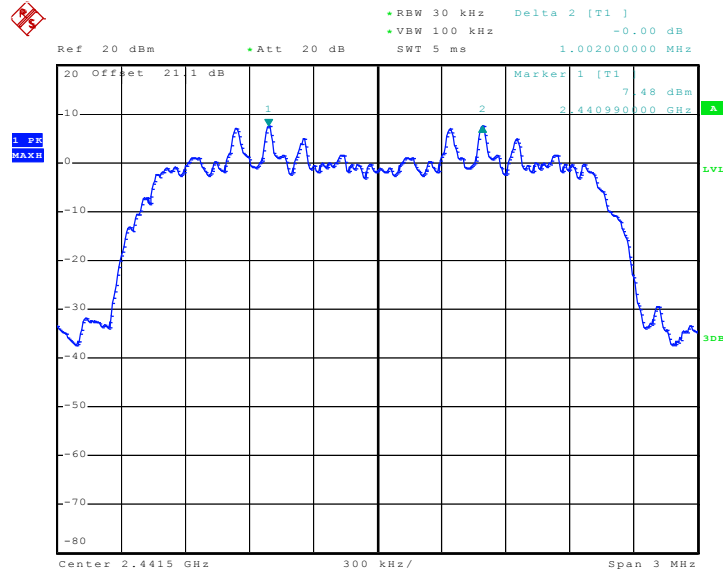
Channel Separation Plot on Channel 00 - 01



Date: 17.MAR.2011 12:06:16

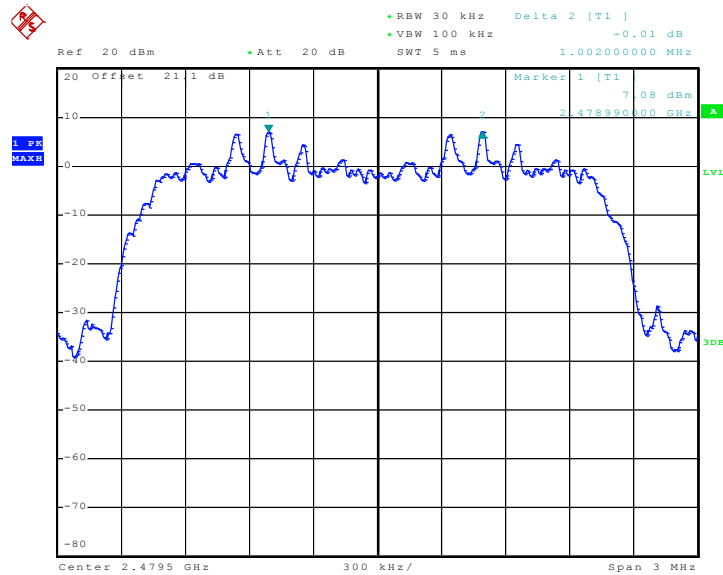


Channel Separation Plot on Channel 39 - 40



Date: 17.MAR.2011 12:07:09

Channel Separation Plot on Channel 77 - 78



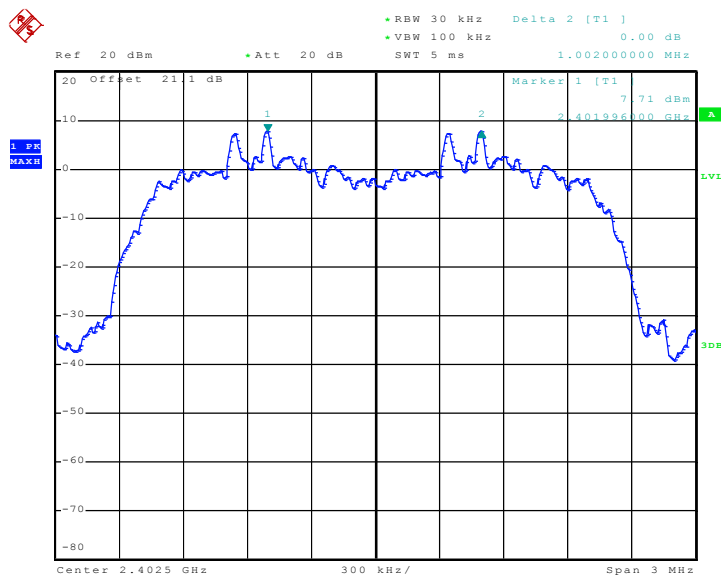
Date: 17.MAR.2011 12:08:06



Test Mode :	Bluetooth EDR 3Mbps 8-DPSK L/M/H channel	Temperature :	24~26°C
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	Frequency Separation (MHz)	(2/3 of 20dB BW) Limits (MHz)	Pass/Fail
00	2402	1.002	0.025	Pass
39	2441	1.002	0.025	Pass
78	2480	1.002	0.025	Pass

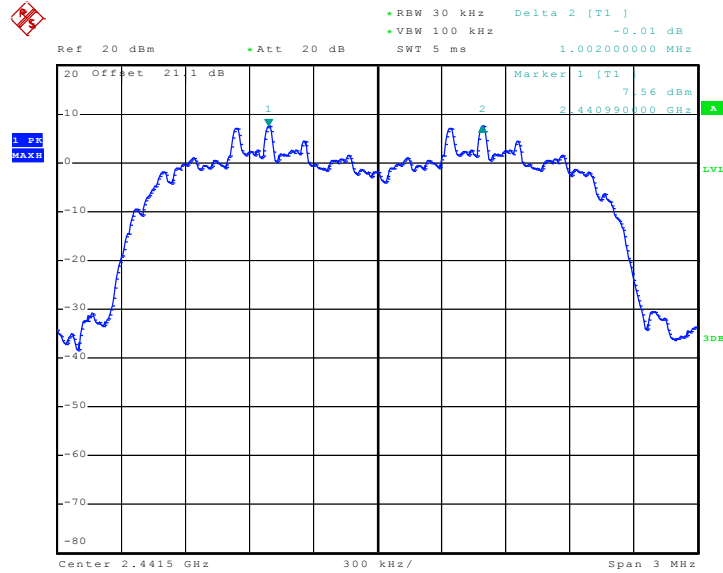
Channel Separation Plot on Channel 00 - 01



Date: 17.MAR.2011 12:09:21

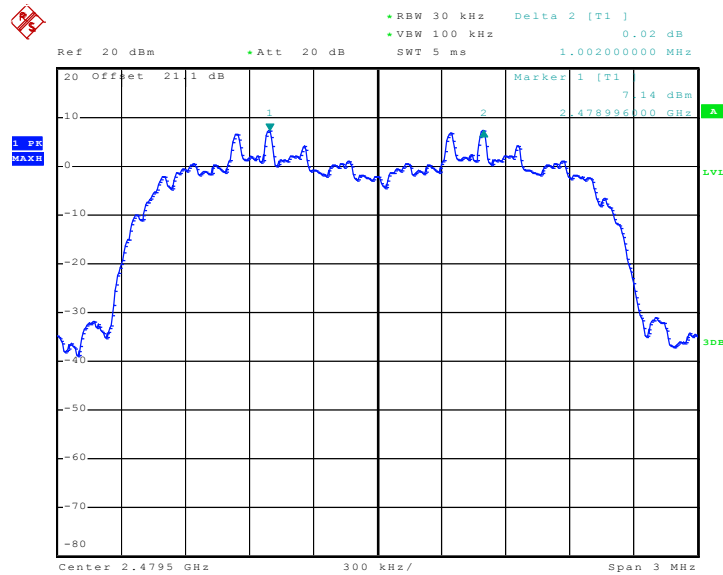


Channel Separation Plot on Channel 39 - 40



Date: 17.MAR.2011 14:02:40

Channel Separation Plot on Channel 77 - 78



Date: 17.MAR.2011 14:05:14

3.4 Dwell Time Measurement

3.4.1 Limit of Dwell Time

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.

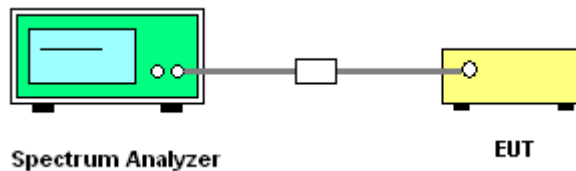
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The EUT should be transmitting at its maximum data rate as the worst cases.
4. The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:
Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW \geq RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold.
5. Use the marker-delta function to calculate the dwell time.

3.4.4 Test Setup



3.4.5 Test Result of Dwell Time

<Low Energy Bluetooth>

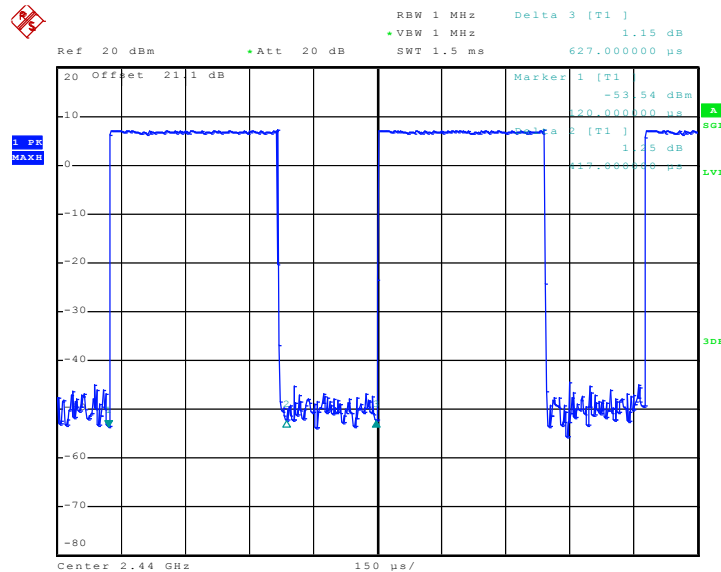
Test Mode :	Bluetooth LE 1Mbps GFSK M channel	Temperature :	24~26°C
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (msec)	Limits (msec)	Pass/Fail
DH	0.32	417.00	4.22	400	Pass

Remark:

1. Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time
2. 79 channels come from the Hopping Channel number.
3. Average Hopping Channel = hops/sweep time
4. t: Package Transfer Time(us)

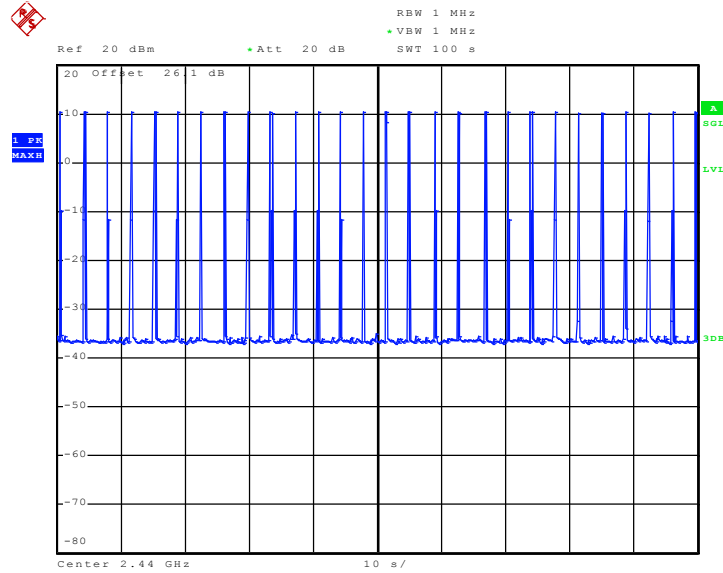
DH Dwell Time (One Pulse) Plot on Channel 19



Date: 17.MAR.2011 20:04:06



DH Dwell Time (Count Pulses) Plot on Channel 19



Date: 23.MAR.2011 14:52:37



<Standard Bluetooth>

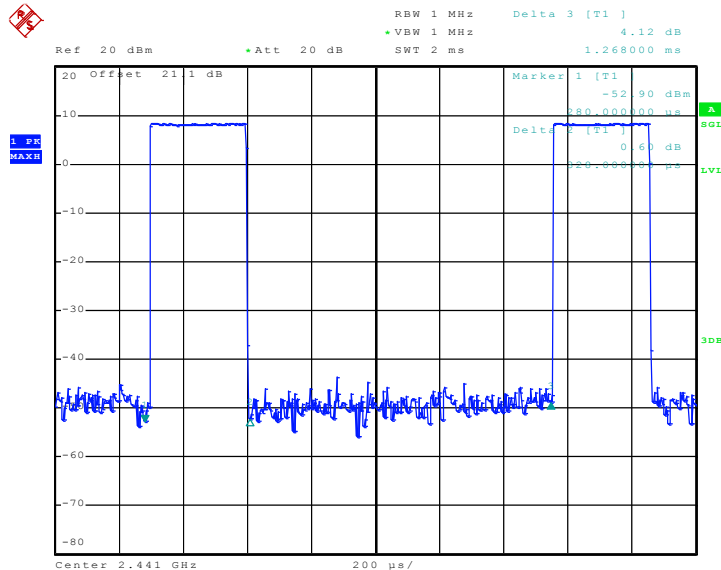
Test Mode :	Bluetooth 1Mbps GFSK M channel	Temperature :	24~26°C
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
DH1	7.90	328.00	0.08	0.4	Pass
DH3	4.40	1708.00	0.24	0.4	Pass
DH5	3.20	3008.00	0.30	0.4	Pass

Remark:

1. Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time
2. 79 channels come from the Hopping Channel number.
3. Average Hopping Channel = hops/sweep time
4. t: Package Transfer Time(us)

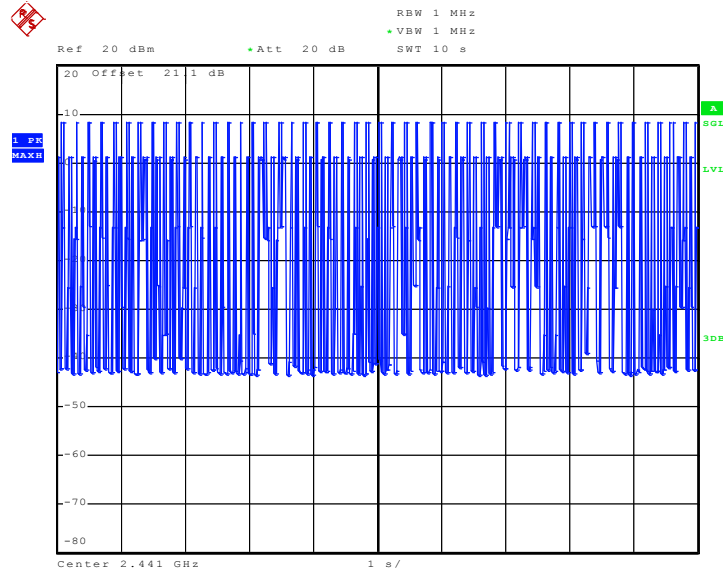
DH1 Dwell Time (One Pulse) Plot on Channel 39



Date: 17.MAR.2011 11:50:37

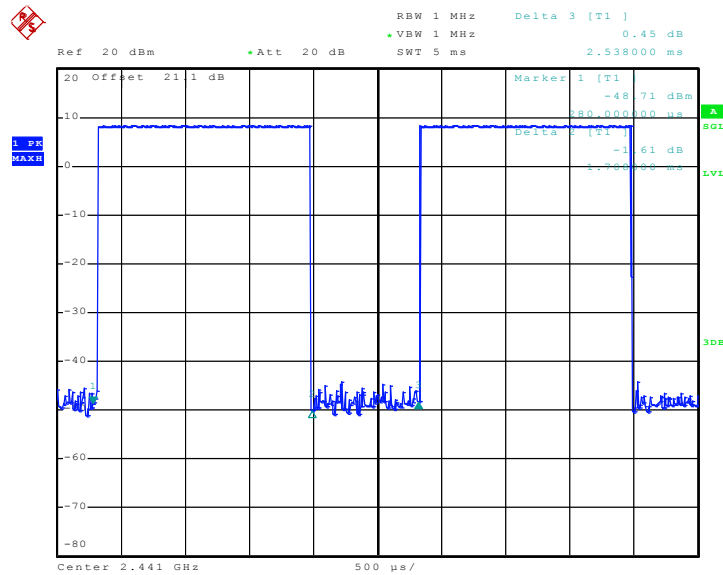


DH1 Dwell Time (Count Pulses) Plot on Channel 39



Date: 17.MAR.2011 14:10:55

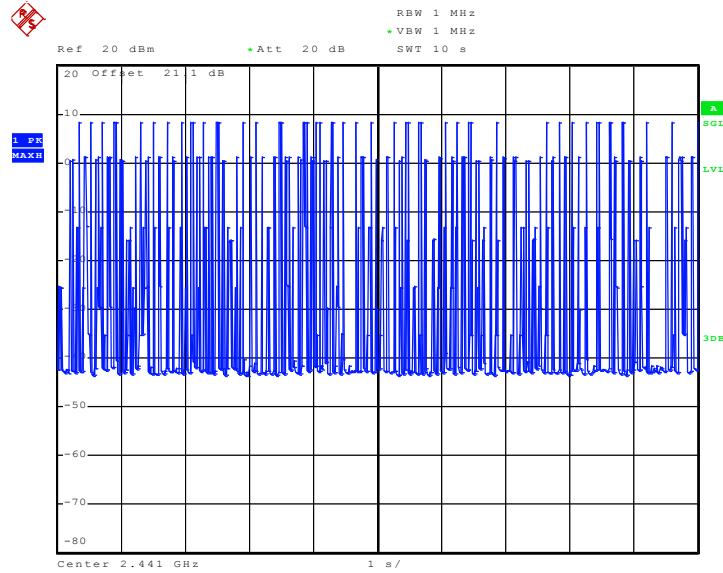
DH3 Dwell Time (One Pulse) Plot on Channel 39



Date: 17.MAR.2011 11:51:24

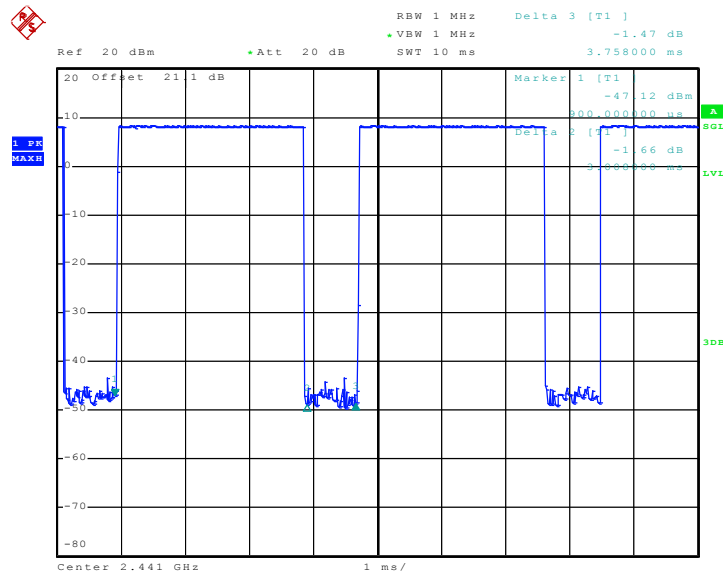


DH3 Dwell Time (Count Pulses) Plot on Channel 39



Date: 17.MAR.2011 14:11:27

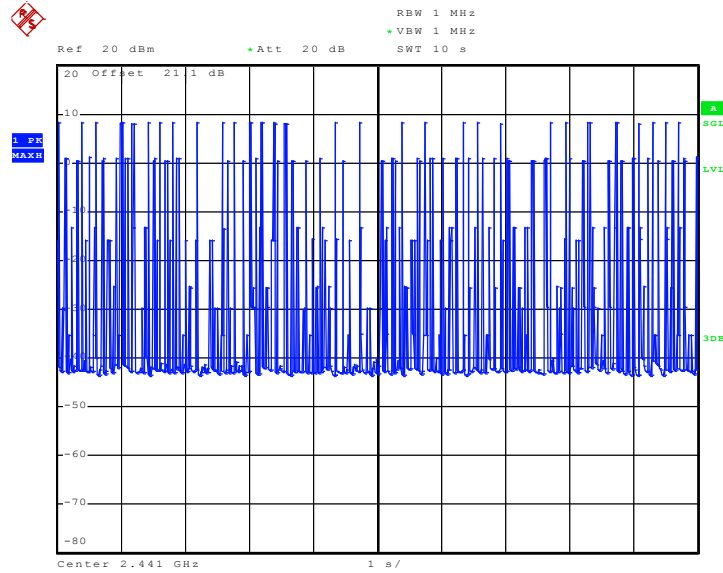
DH5 Dwell Time (One Pulse) Plot on Channel 39



Date: 17.MAR.2011 11:51:54



DH5 Dwell Time (Count Pulses) Plot on Channel 39



Date: 17.MAR.2011 14:11:57



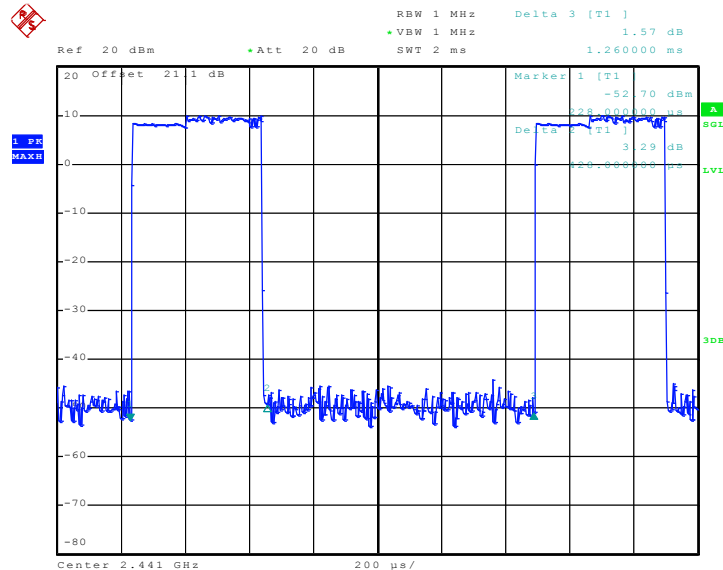
Test Mode :	Bluetooth EDR 2Mbps π/4-DQPSK M channel	Temperature :	24~26°C
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
2DH1	7.70	428.00	0.10	0.4	Pass
2DH3	4.80	1696.00	0.26	0.4	Pass
2DH5	3.30	3036.00	0.32	0.4	Pass

Remark:

1. Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time
2. 79 channels come from the Hopping Channel number.
3. Average Hopping Channel = hops/sweep time
4. t: Package Transfer Time(us)

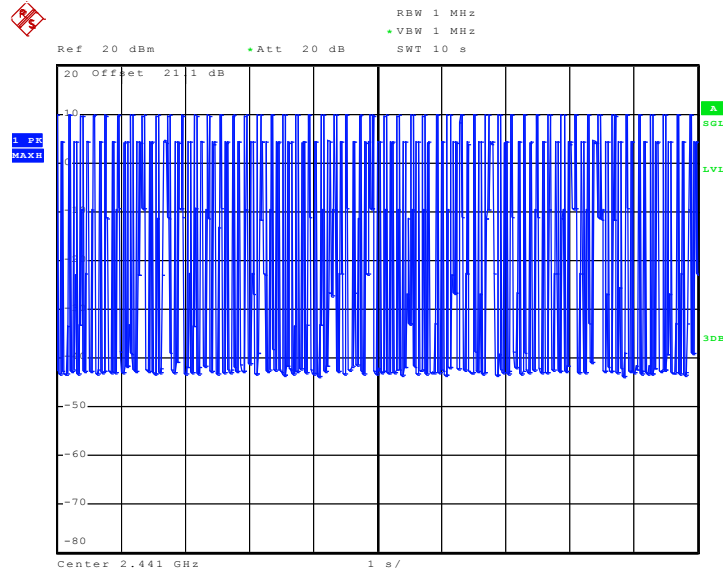
2DH1 Dwell Time (One Pulse) Plot on Channel 39



Date: 17.MAR.2011 11:52:54

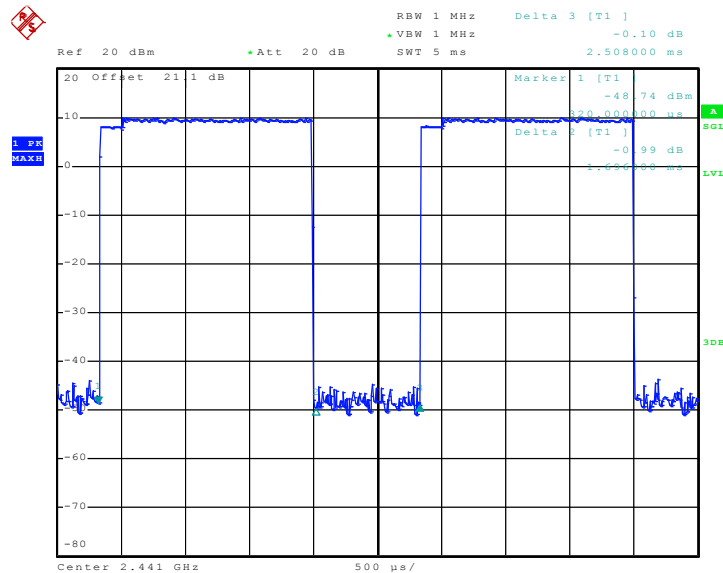


2DH1 Dwell Time (Count Pulses) Plot on Channel 39



Date: 17.MAR.2011 14:12:54

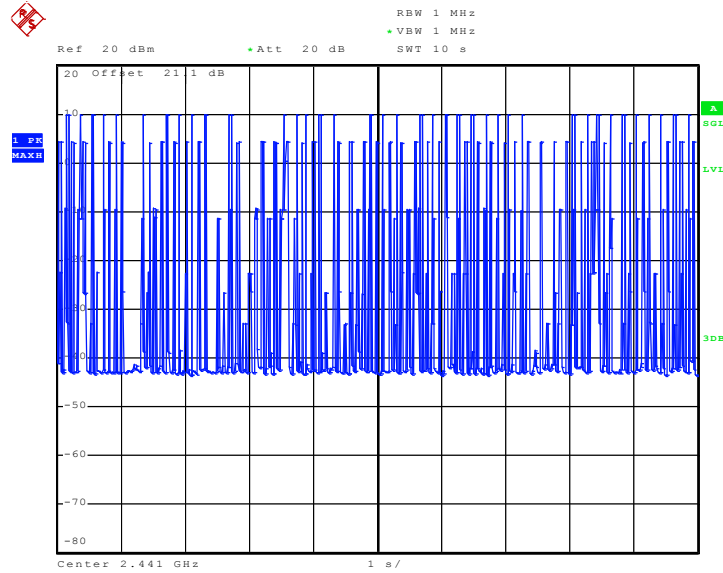
2DH3 Dwell Time (One Pulse) Plot on Channel 39



Date: 17.MAR.2011 11:53:33

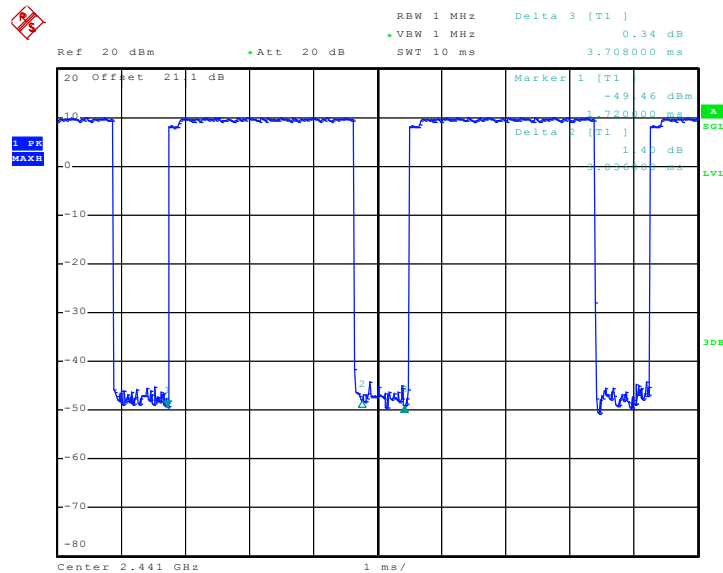


2DH3 Dwell Time (Count Pulses) Plot on Channel 39



Date: 17.MAR.2011 14:13:17

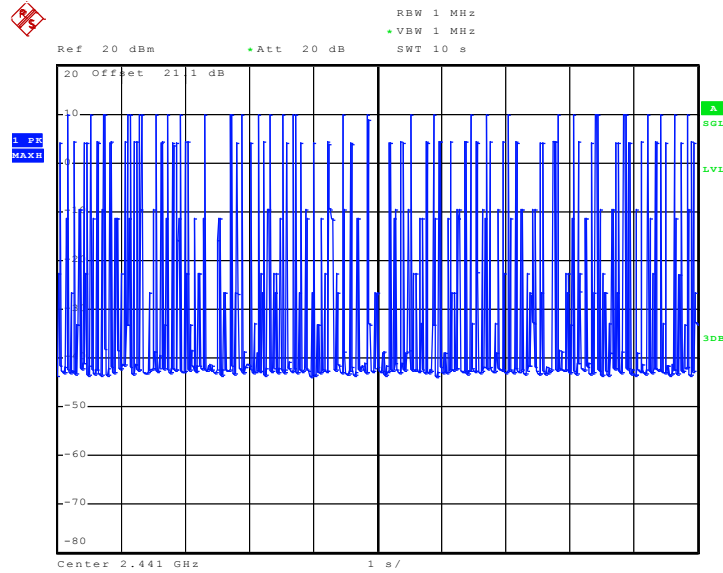
2DH5 Dwell Time (One Pulse) Plot on Channel 39



Date: 17.MAR.2011 11:54:17



2DH5 Dwell Time (Count Pulses) Plot on Channel 39



Date: 17.MAR.2011 14:13:45



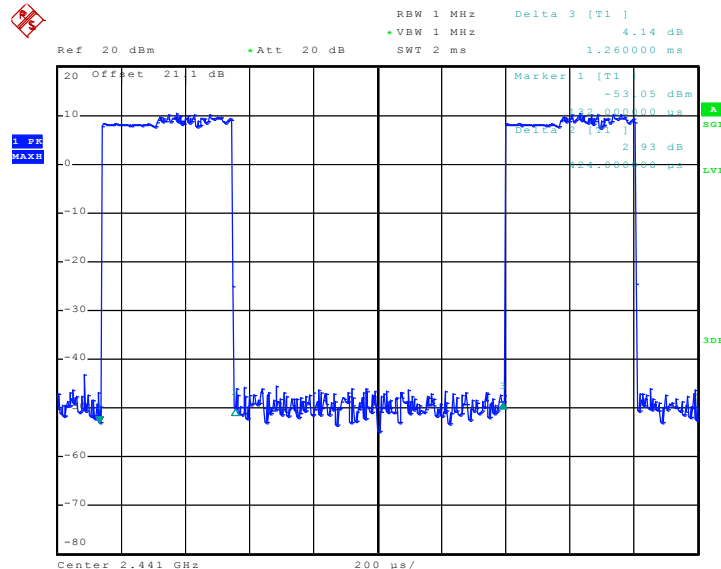
Test Mode :	Bluetooth EDR 3Mbps 8-DPSK M channel	Temperature :	24~26°C
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Package Mode	Average Hopping Channel	Package Transfer Time (usec)	Dwell Time (sec)	Limits (sec)	Pass/Fail
3DH1	7.50	424.00	0.10	0.4	Pass
3DH3	4.80	1714.00	0.26	0.4	Pass
3DH5	3.20	2974.00	0.30	0.4	Pass

Remark:

1. Dwell Time=79(channels) x 0.4(s) x average hopping channel x package transfer time
2. 79 channels come from the Hopping Channel number.
3. Average Hopping Channel = hops/sweep time
4. t: Package Transfer Time(us)

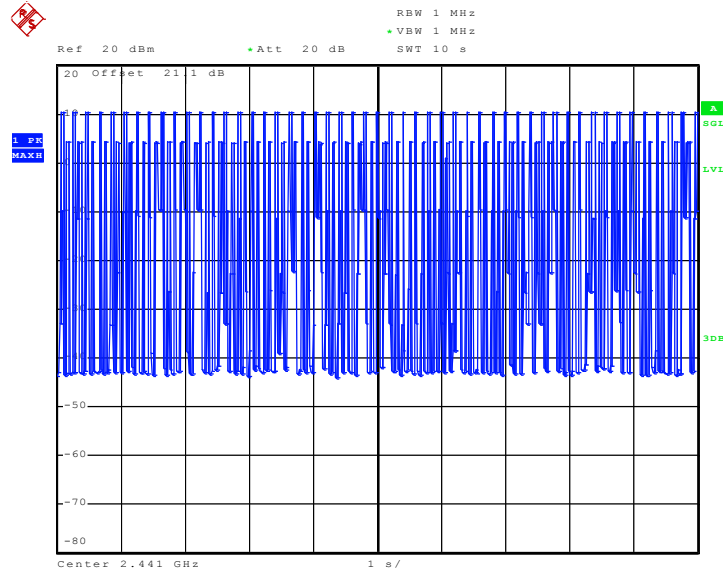
3DH1 Dwell Time (One Pulse) Plot on Channel 39



Date: 17.MAR.2011 11:55:29

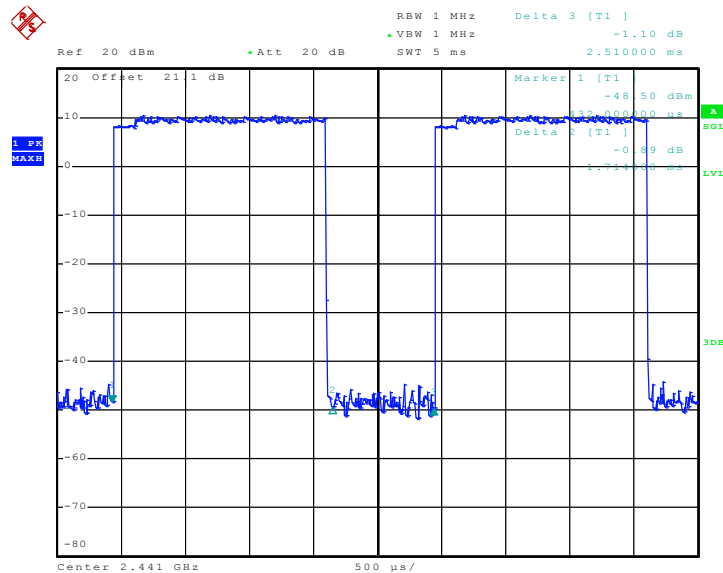


3DH1 Dwell Time (One Pulse) Plot on Channel 39



Date: 17.MAR.2011 14:14:10

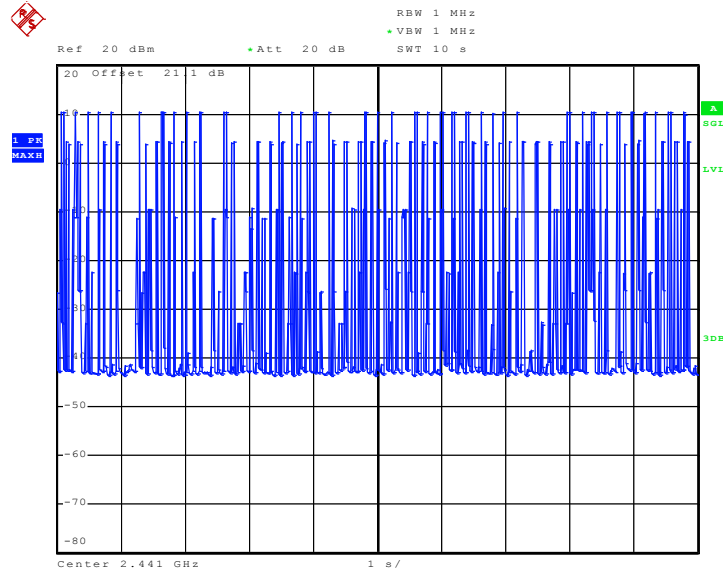
3DH3 Dwell Time (Count Pulses) Plot on Channel 39



Date: 17.MAR.2011 11:56:05

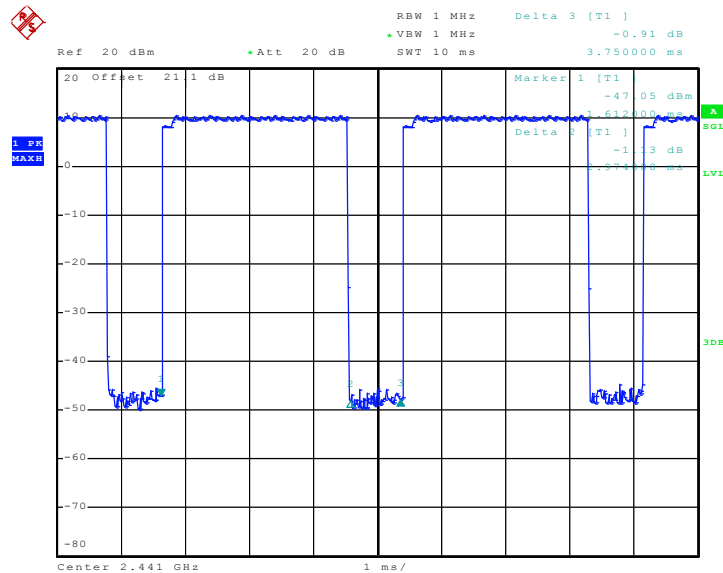


3DH3 Dwell Time (Count Pulses) Plot on Channel 39



Date: 17.MAR.2011 14:14:40

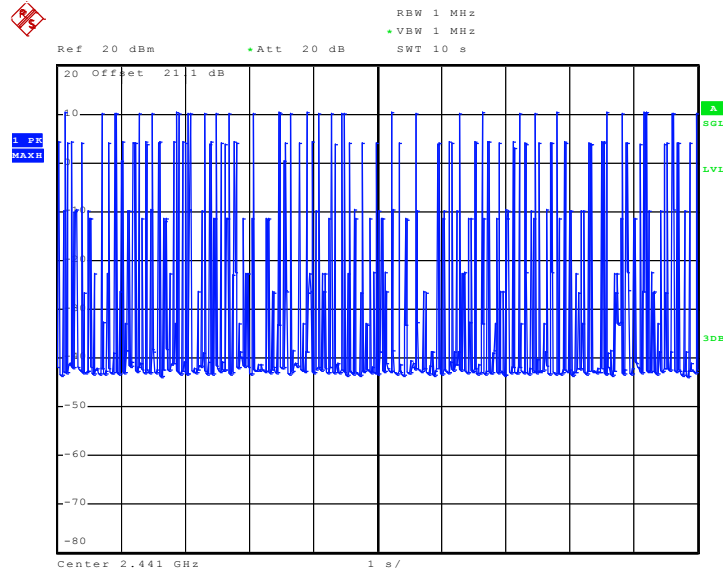
3DH5 Dwell Time (Count Pulses) Plot on Channel 39



Date: 17.MAR.2011 11:56:37



3DH5 Dwell Time (Count Pulses) Plot on Channel 39



Date: 17.MAR.2011 14:15:31

3.5 Peak Output Power Measurement

3.5.1 Limit of Peak Output Power

Frequency hopping systems operating in the 2400-2483.5 MHz band 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 125 mW (20.97dBm).

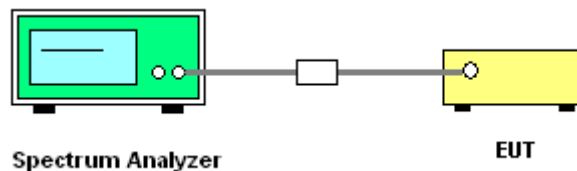
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The testing follows FCC Public Notice DA 00-705 Measurement Guidelines.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.

3.5.4 Test Setup





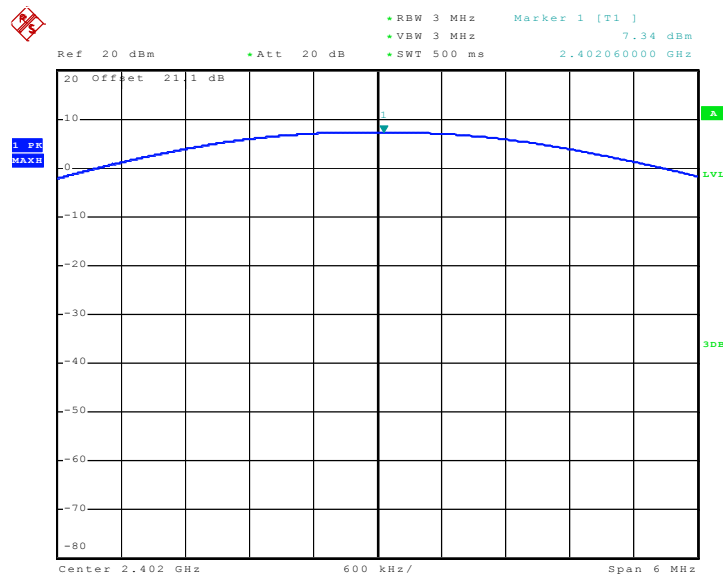
3.5.5 Test Result of Peak Output Power

<Low Energy Bluetooth>

Test Mode :	Bluetooth LE 1Mbps GFSK L/M/H channel	Temperature :	24~26°C
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	7.34	20.97	Pass
19	2440	7.24	20.97	Pass
39	2480	6.82	20.97	Pass

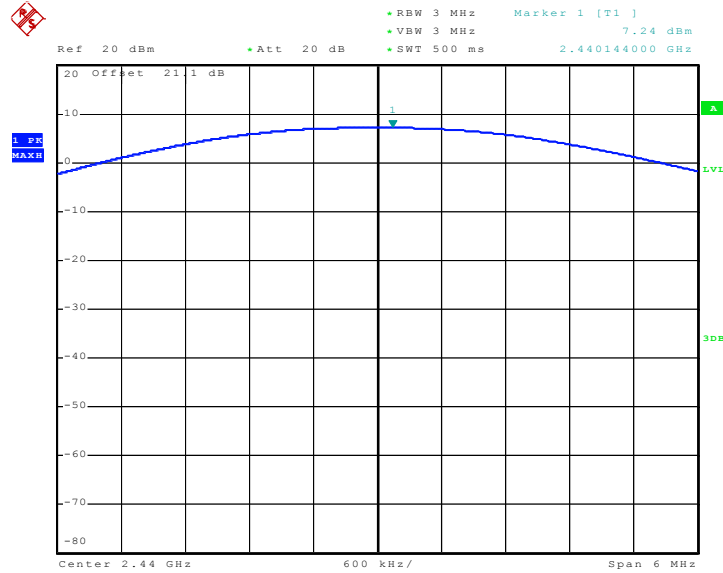
Peak Output Power Plot on Channel 00



Date: 11.MAR.2011 14:01:27

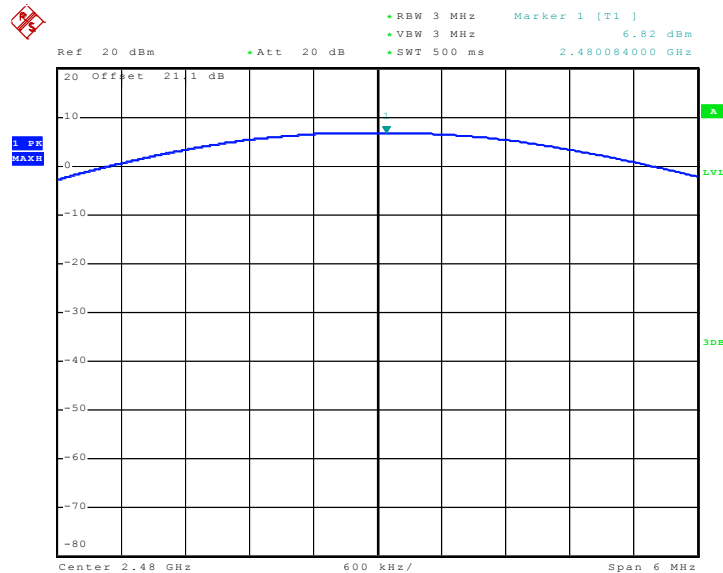


Peak Output Power Plot on Channel 39



Date: 11.MAR.2011 14:02:19

Peak Output Power Plot on Channel 78



Date: 11.MAR.2011 14:03:00

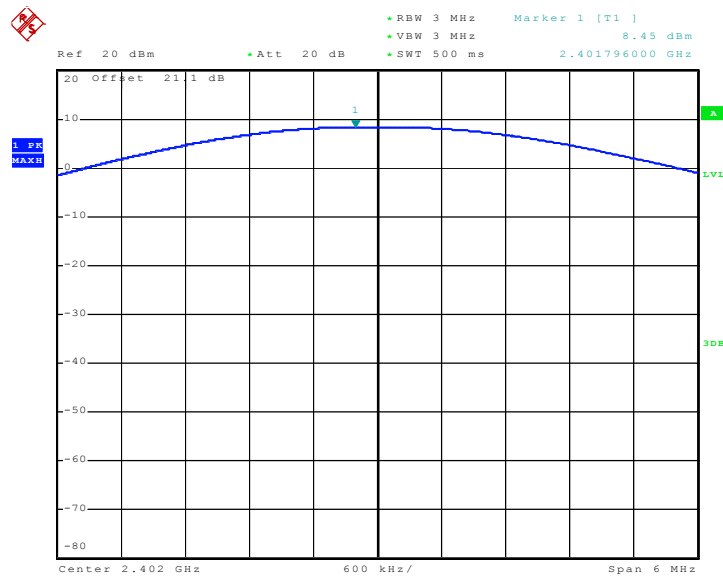


<Standard Bluetooth >

Test Mode :	Bluetooth 1Mbps GFSK L/M/H channel	Temperature :	24~26°C
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	RF Power (dBm)		
		GFSK	Max. Limits (dBm)	Pass/Fail
		1 Mbps		
00	2402	8.45	20.97	Pass
39	2441	8.21	20.97	Pass
78	2480	7.82	20.97	Pass

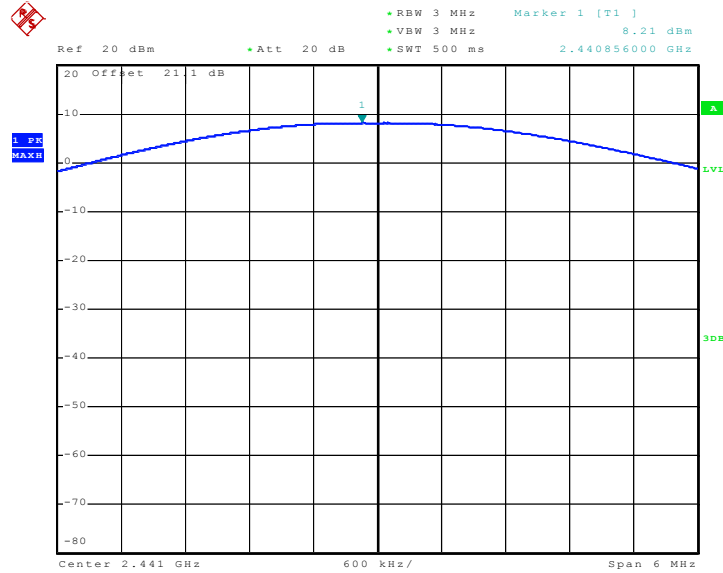
Peak Output Power Plot on Channel 00



Date: 11.MAR.2011 13:48:15

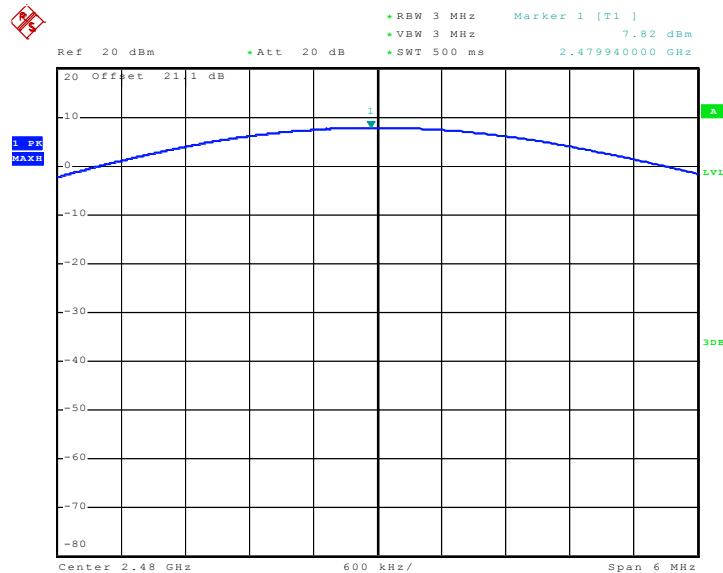


Peak Output Power Plot on Channel 39



Date: 11.MAR.2011 13:51:31

Peak Output Power Plot on Channel 78



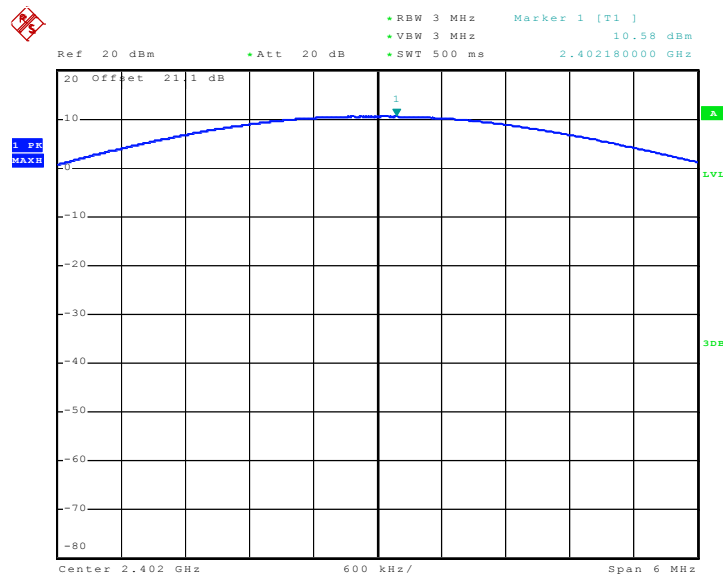
Date: 11.MAR.2011 13:55:41



Test Mode :	Bluetooth EDR 2Mbps	Temperature :	24~26°C
	π /4-DQPSK L/M/H channel		
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	RF Power (dBm)		
		π /4-DQPSK	Max. Limits (dBm)	Pass/Fail
		2 Mbps		
00	2402	10.58	20.97	Pass
39	2441	10.43	20.97	Pass
78	2480	10.06	20.97	Pass

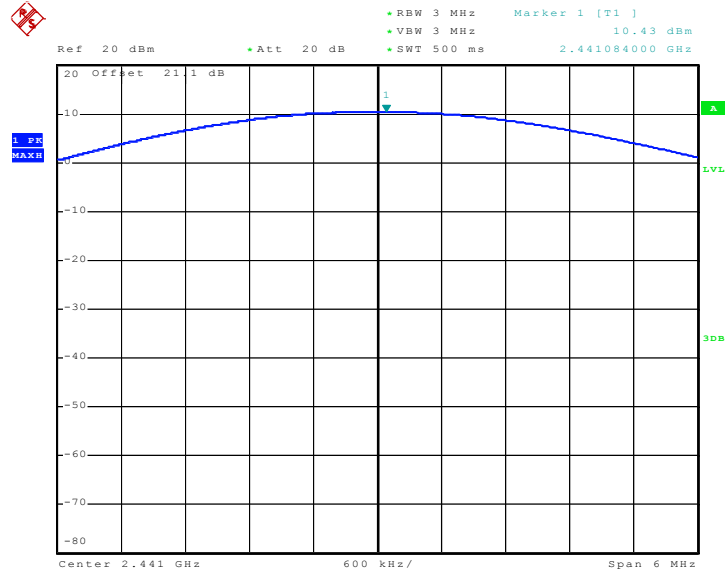
Peak Output Power Plot on Channel 00



Date: 11.MAR.2011 13:49:45

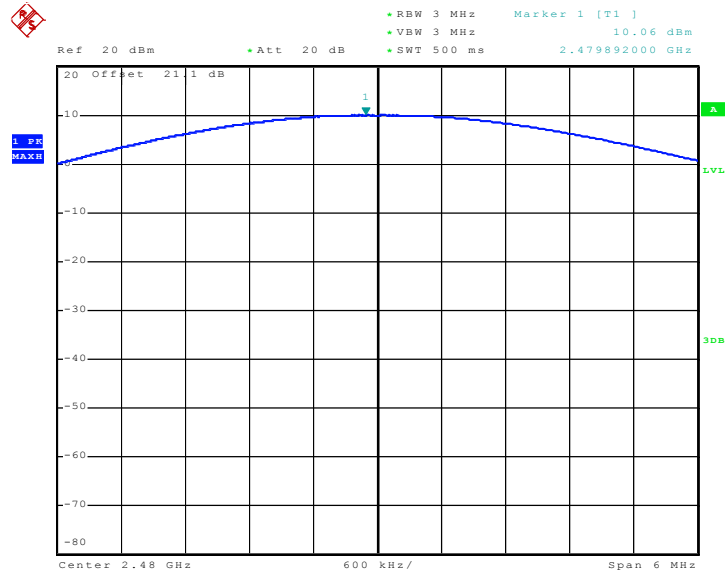


Peak Output Power Plot on Channel 39



Date: 11.MAR.2011 13:52:57

Peak Output Power Plot on Channel 78



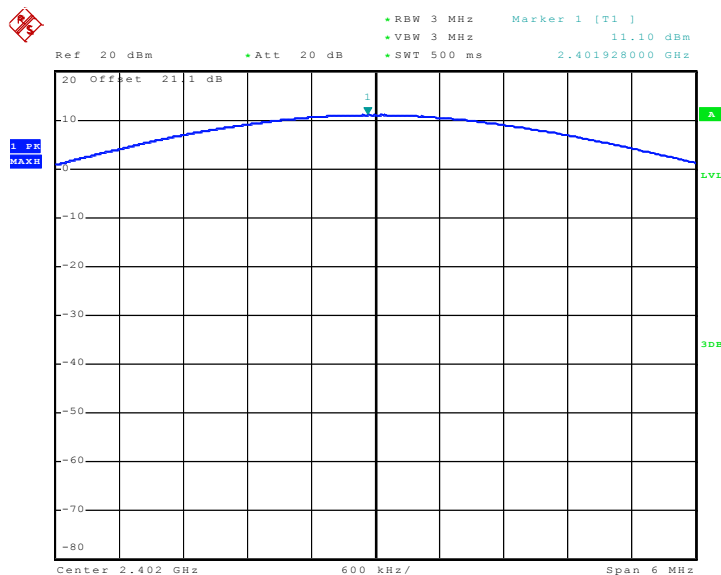
Date: 11.MAR.2011 13:57:09



Test Mode :	Bluetooth EDR 3Mbps 8-DPSK L/M/H channel	Temperature :	24~26°C
Test Engineer :	Cona Huang	Relative Humidity :	50~53%

Channel	Frequency (MHz)	RF Power (dBm)		
		8-DPSK	Max. Limits (dBm)	Pass/Fail
		3 Mbps		
00	2402	11.10	20.97	Pass
39	2441	10.96	20.97	Pass
78	2480	10.59	20.97	Pass

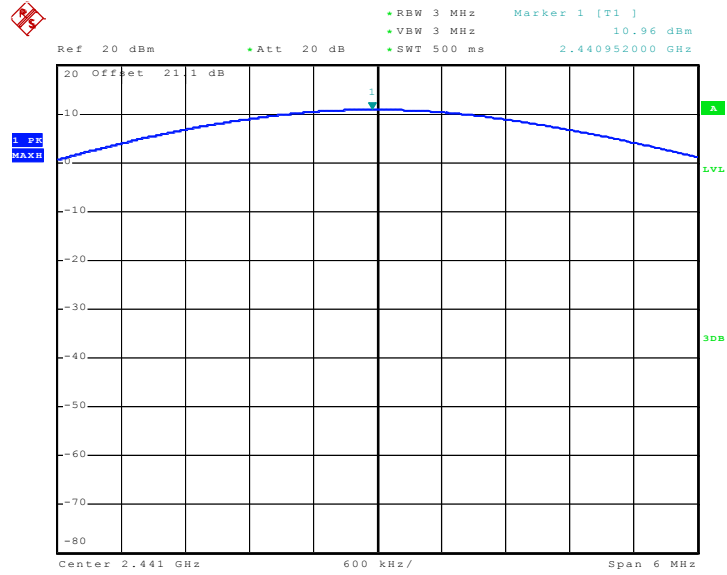
Peak Output Power Plot on Channel 00



Date: 11.MAR.2011 13:50:07

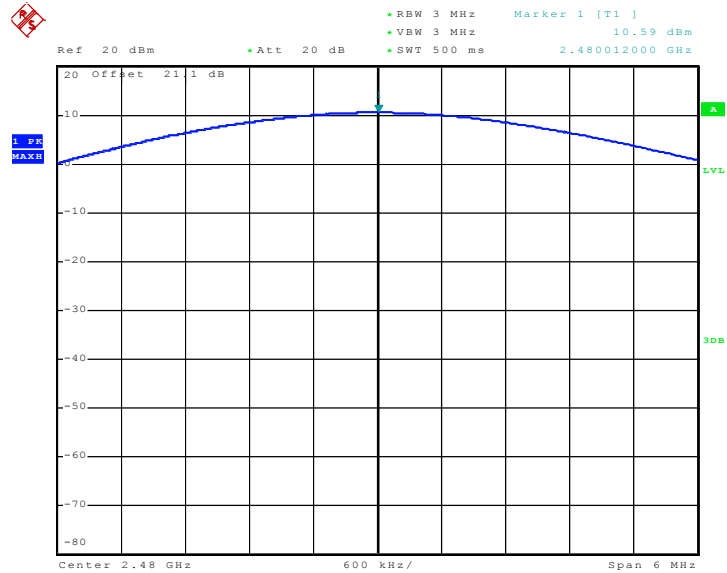


Peak Output Power Plot on Channel 39



Date: 11.MAR.2011 13:53:18

Peak Output Power Plot on Channel 78



Date: 11.MAR.2011 13:57:28

3.6 Spurious Emission Measurement

3.6.1 Limit of Spurious Emission Measurement

All harmonics/spurious must be at least 20 dB down from the highest emission level within the authorized band.

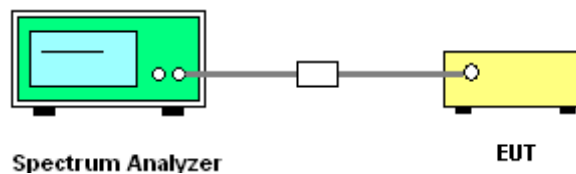
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedure

1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set RBW = 100 kHz, VBW = 300kHz, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

3.6.4 Test Setup

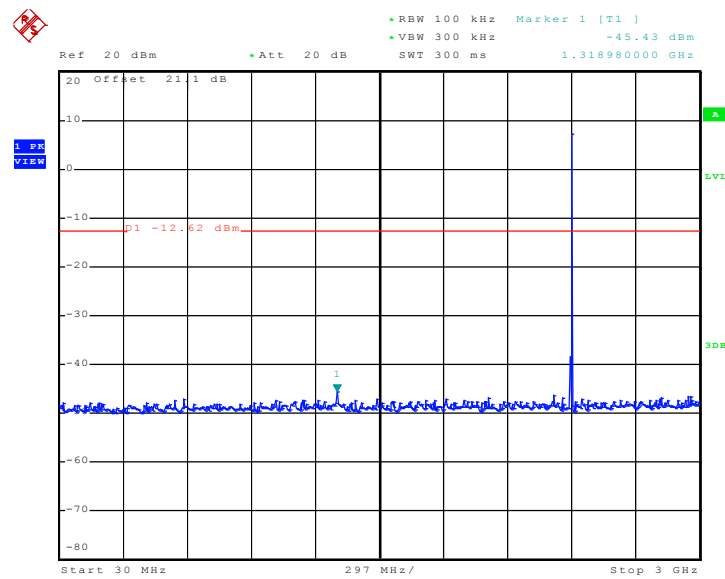


3.6.5 Test Result

<Low Energy Bluetooth>

Test Mode :	Bluetooth LE 1Mbps GFSK L channel	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~53%
		Test Engineer :	Cona Huang

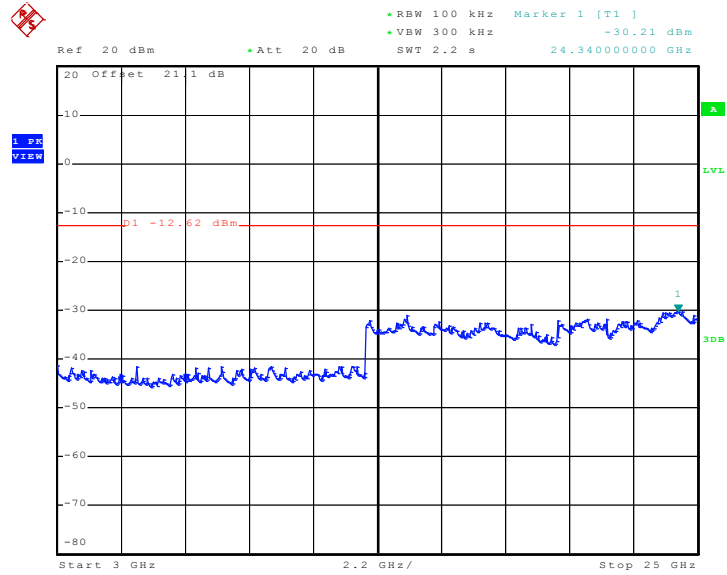
Conducted Spurious Emission Plot on Bluetooth LE 1Mbps
GFSK Channel 00



Date: 17.MAR.2011 20:23:17



Conducted Spurious Emission Plot on Bluetooth LE 1Mbps
GFSK Channel 00

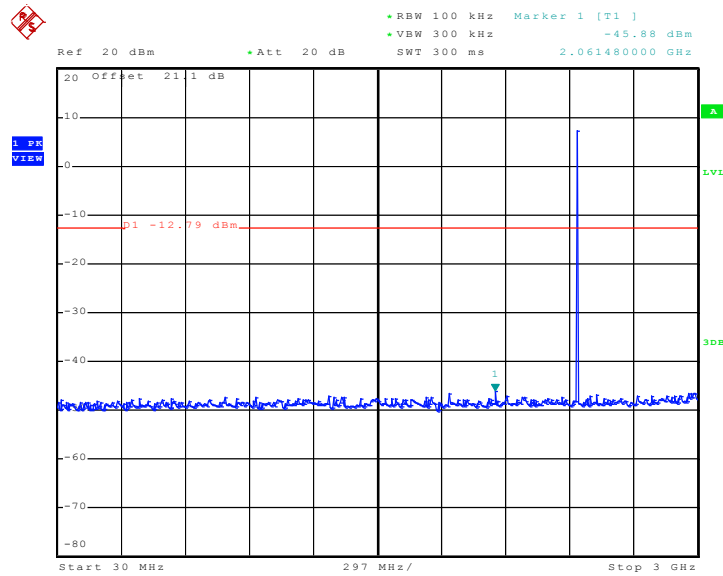


Date: 17.MAR.2011 20:23:40



Test Mode :	Bluetooth LE 1Mbps GFSK M channel	Temperature :	24~26°C
Test Channel :	19	Relative Humidity :	50~53%
		Test Engineer :	Cona Huang

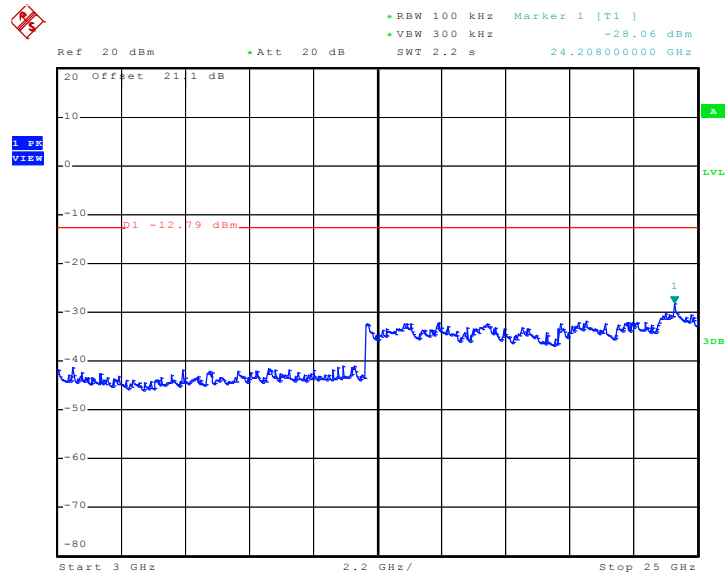
Conducted Spurious Emission Plot on Bluetooth LE 1Mbps
GFSK Channel 19



Date: 17.MAR.2011 20:31:51



Conducted Spurious Emission Plot on Bluetooth LE 1Mbps
GFSK Channel 19

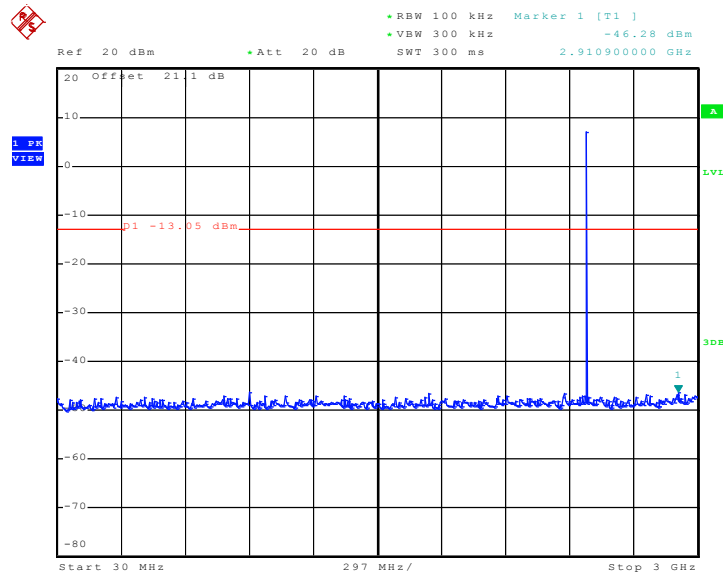


Date: 17.MAR.2011 20:32:13



Test Mode :	Bluetooth LE 1Mbps GFSK H channel	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	50~53%
		Test Engineer :	Cona Huang

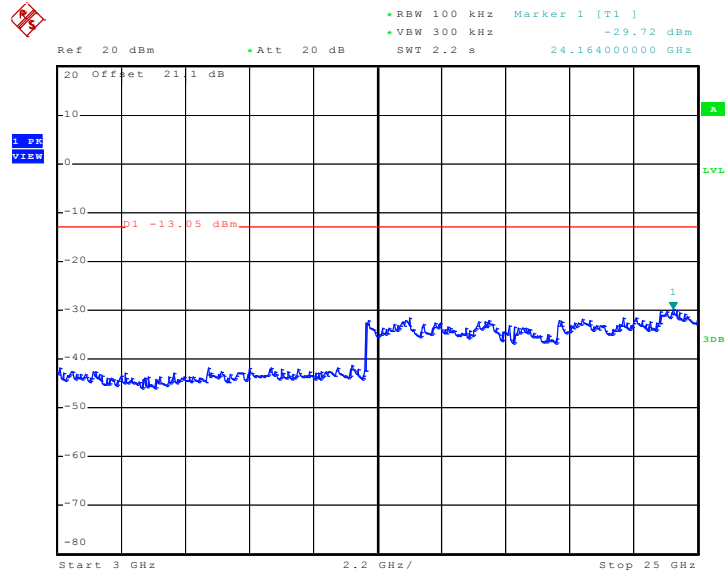
Conducted Spurious Emission Plot on Bluetooth LE 1Mbps
GFSK Channel 39



Date: 17.MAR.2011 20:34:14



Conducted Spurious Emission Plot on Bluetooth LE 1Mbps
GFSK Channel 39



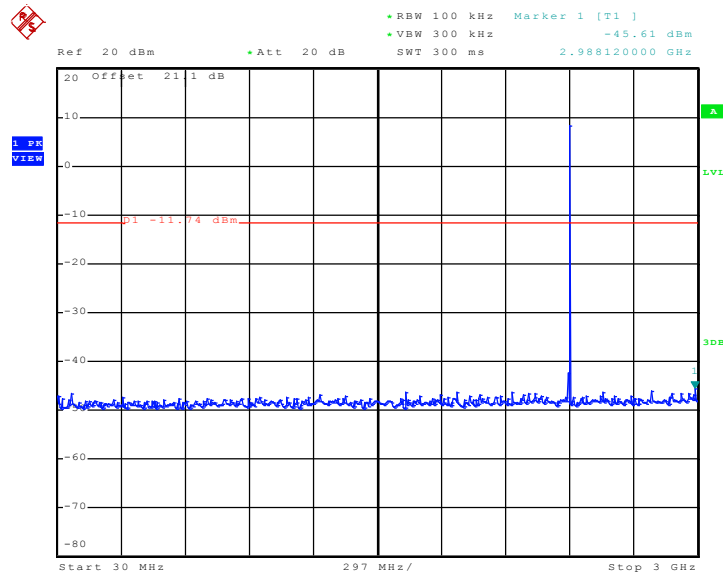
Date: 17.MAR.2011 20:34:37



<Standard Bluetooth>

Test Mode :	Bluetooth 1Mbps GFSK L channel	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~53%
		Test Engineer :	Cona Huang

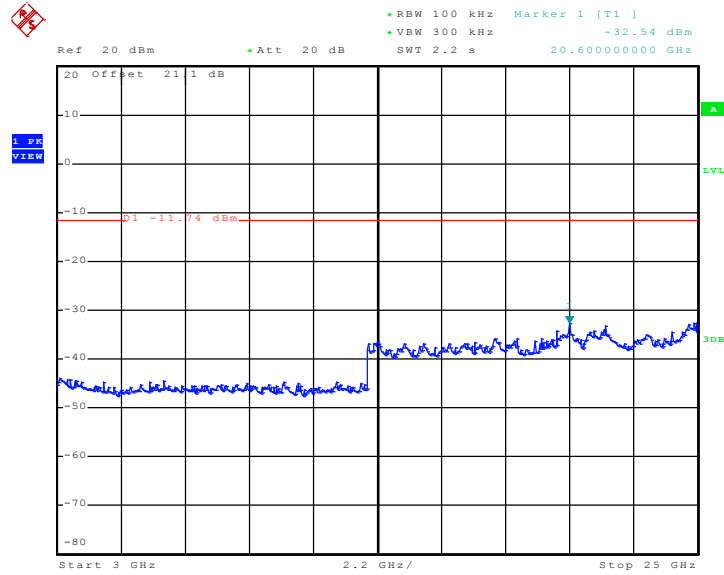
Conducted Spurious Emission Plot on Bluetooth 1Mbps
GFSK Channel 00



Date: 22.MAR.2011 13:30:01



Conducted Spurious Emission Plot on Bluetooth 1Mbps
GFSK Channel 00

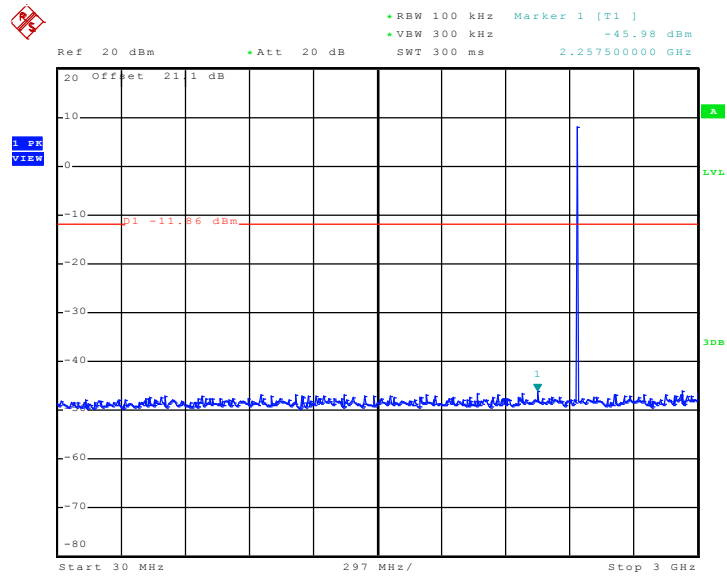


Date: 22.MAR.2011 13:30:23



Test Mode :	Bluetooth 1Mbps GFSK M channel	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	50~53%
		Test Engineer :	Cona Huang

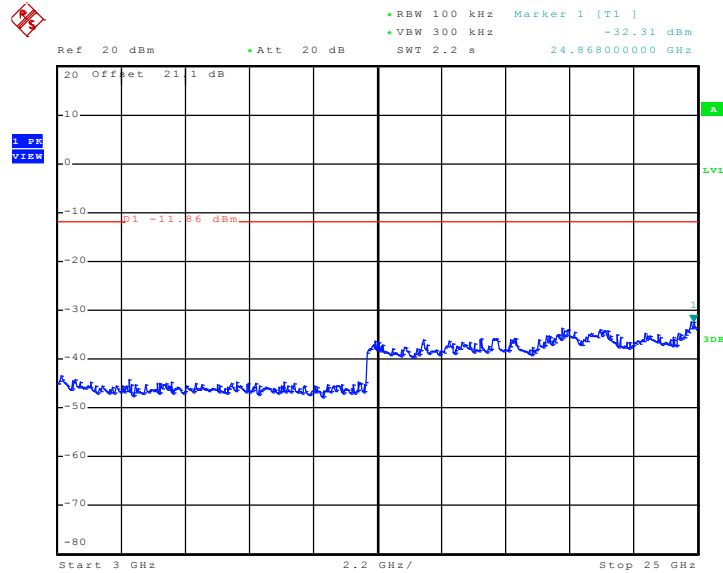
Conducted Spurious Emission Plot on Bluetooth 1Mbps
GFSK Channel 39



Date: 22.MAR.2011 13:31:10



Conducted Spurious Emission Plot on Bluetooth 1Mbps
GFSK Channel 39

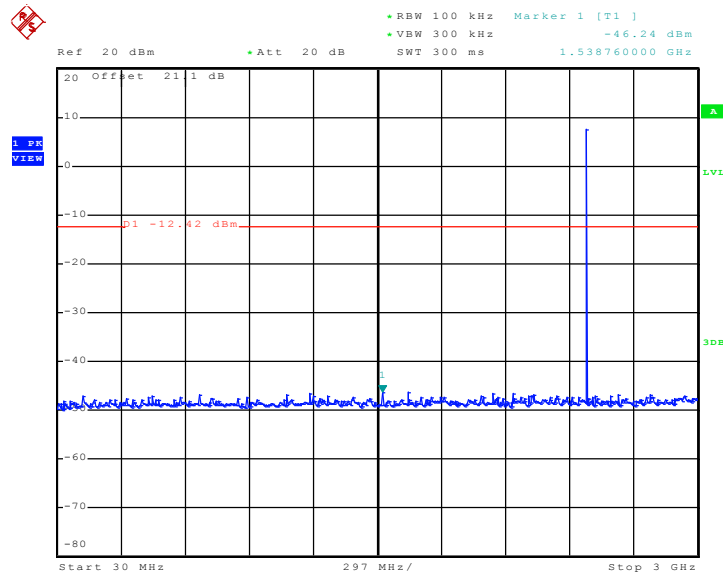


Date: 22.MAR.2011 13:31:32



Test Mode :	Bluetooth 1Mbps GFSK H channel	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	50~53%
		Test Engineer :	Cona Huang

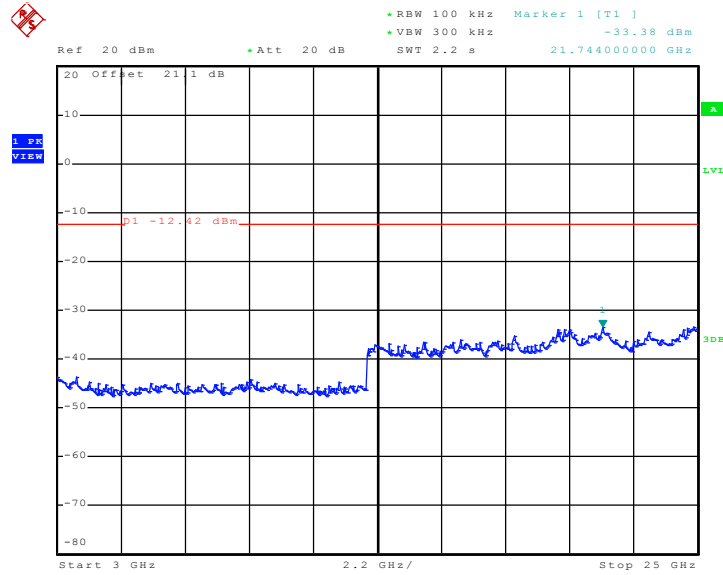
Conducted Spurious Emission Plot on Bluetooth 1Mbps
GFSK Channel 78



Date: 22.MAR.2011 13:32:12



Conducted Spurious Emission Plot on Bluetooth 1Mbps
GFSK Channel 78

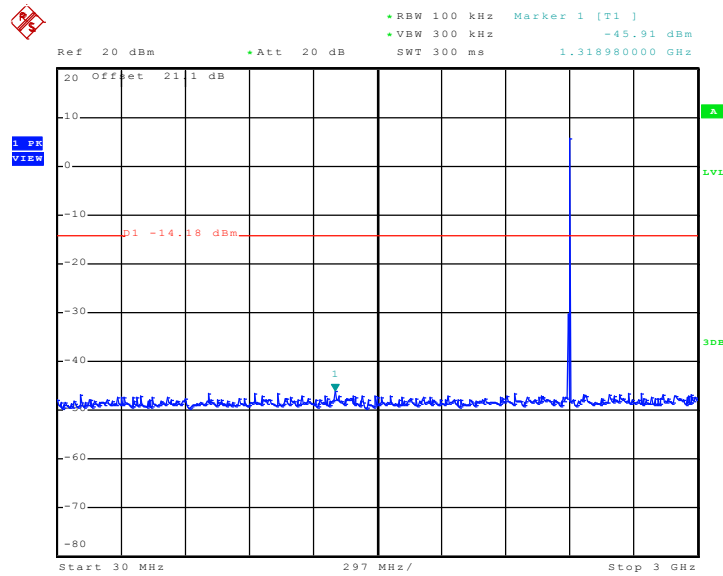


Date: 22.MAR.2011 13:32:34



Test Mode :	Bluetooth EDR 2Mbps π /4-DQPSK L channel	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~53%
		Test Engineer :	Cona Huang

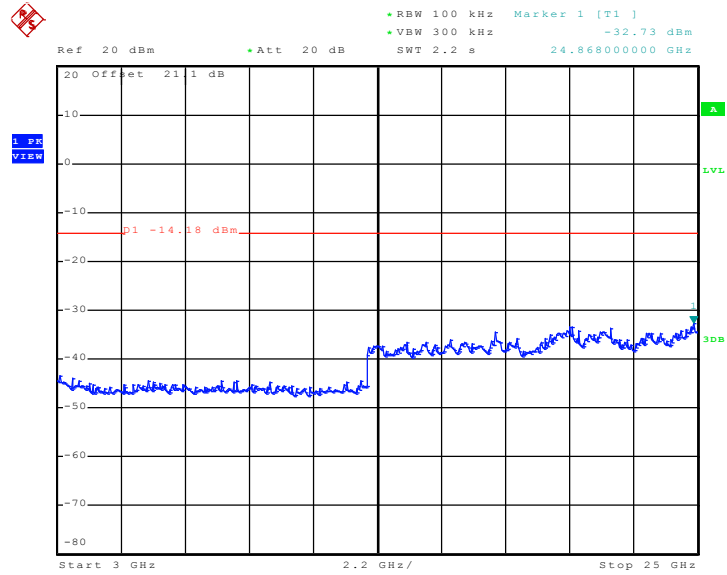
Conducted Spurious Emission Plot on Bluetooth EDR 2Mbps
 π /4-DQPSK Channel 00



Date: 22.MAR.2011 13:36:01



Conducted Spurious Emission Plot on Bluetooth EDR 2Mbps
 $\pi/4$ -DQPSK Channel 00

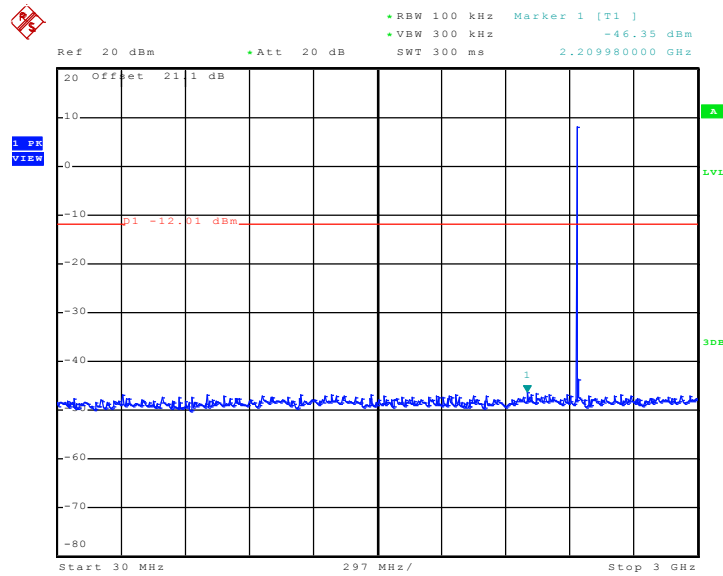


Date: 22.MAR.2011 13:36:23



Test Mode :	Bluetooth EDR 2Mbps π /4-DQPSK channel	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	50~53%
		Test Engineer :	Cona Huang

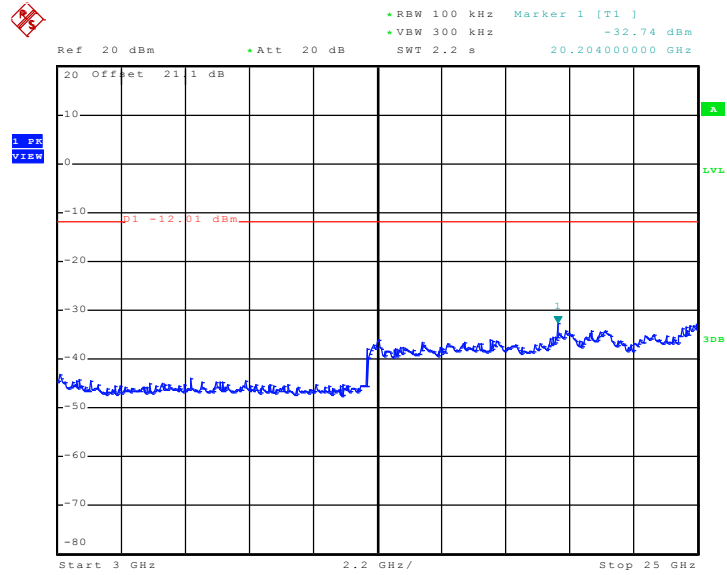
Conducted Spurious Emission Plot on Bluetooth EDR 2Mbps
 π /4-DQPSK Channel 39



Date: 22.MAR.2011 13:35:06



Conducted Spurious Emission Plot on Bluetooth EDR 2Mbps
 $\pi/4$ -DQPSK Channel 39

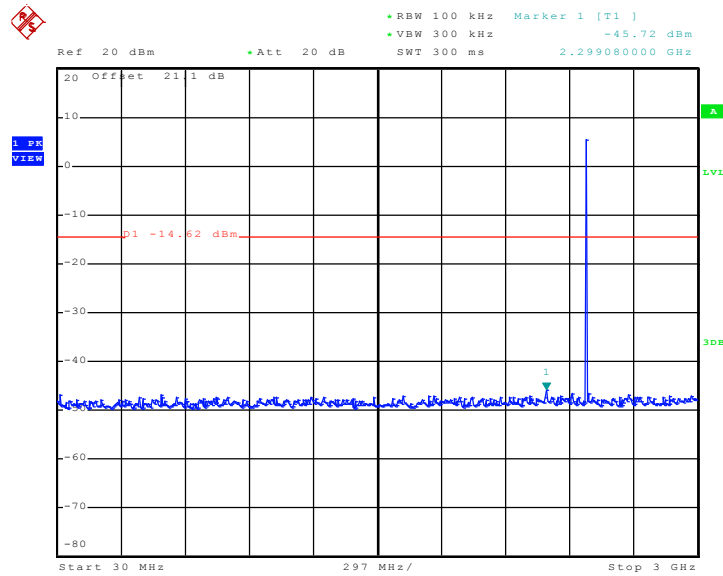


Date: 22.MAR.2011 13:35:28



Test Mode :	Bluetooth EDR 2Mbps π /4-DQPSK H channel	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	50~53%
		Test Engineer :	Cona Huang

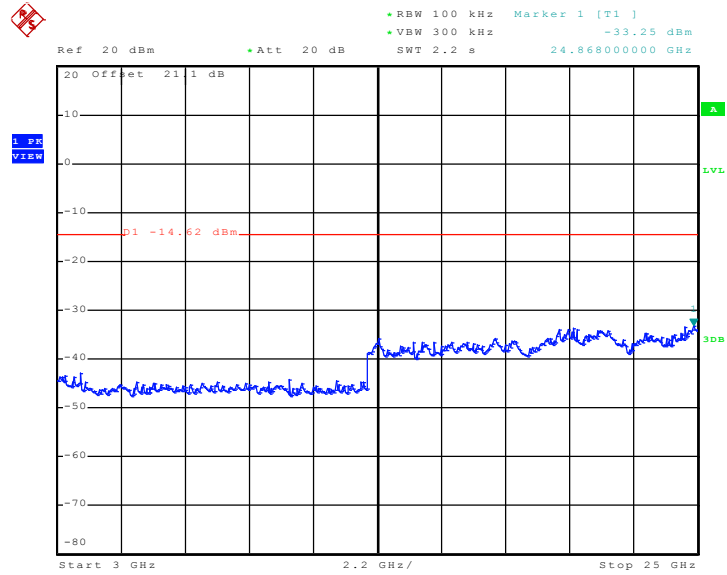
Conducted Spurious Emission Plot on Bluetooth EDR 2Mbps
 π /4-DQPSK Channel 78



Date: 22.MAR.2011 13:34:08



Conducted Spurious Emission Plot on Bluetooth EDR 2Mbps
 $\pi/4$ -DQPSK Channel 78

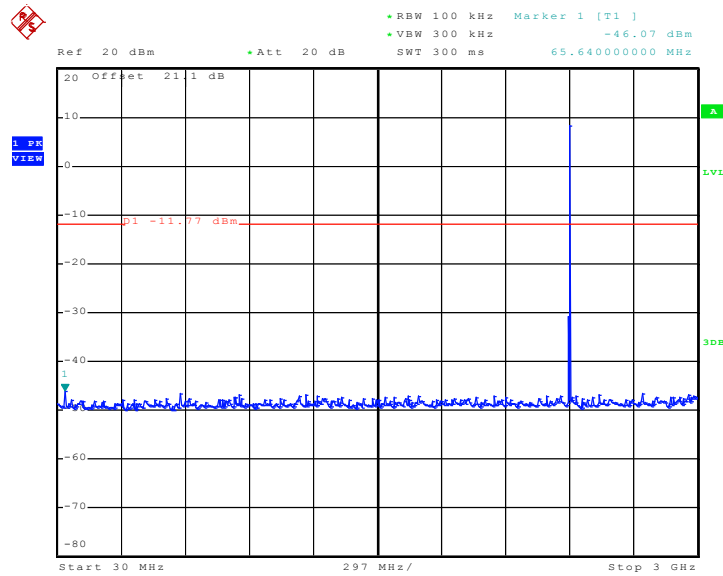


Date: 22.MAR.2011 13:34:30



Test Mode :	Bluetooth EDR 3Mbps 8-DPSK L channel	Temperature :	24~26°C
Test Channel :	00	Relative Humidity :	50~53%
		Test Engineer :	Cona Huang

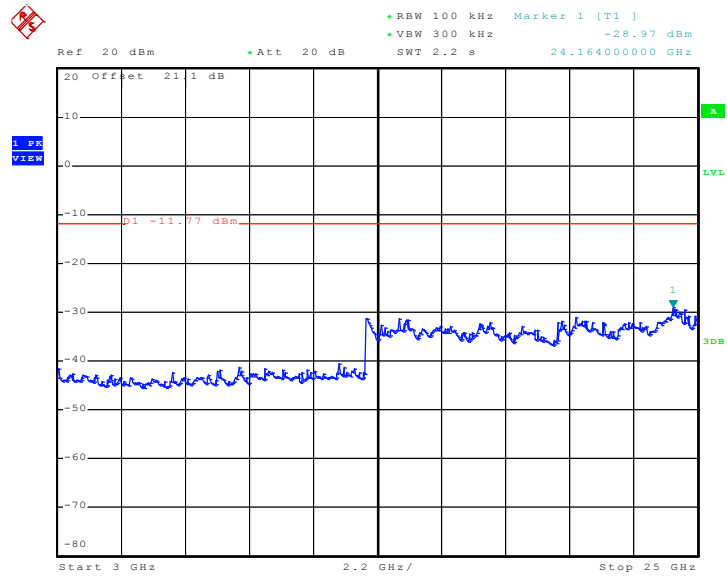
Conducted Spurious Emission Plot on Bluetooth EDR 3Mbps
8-DPSK Channel 00



Date: 17.MAR.2011 15:18:49



Conducted Spurious Emission Plot on Bluetooth EDR 3Mbps
8-DPSK Channel 00

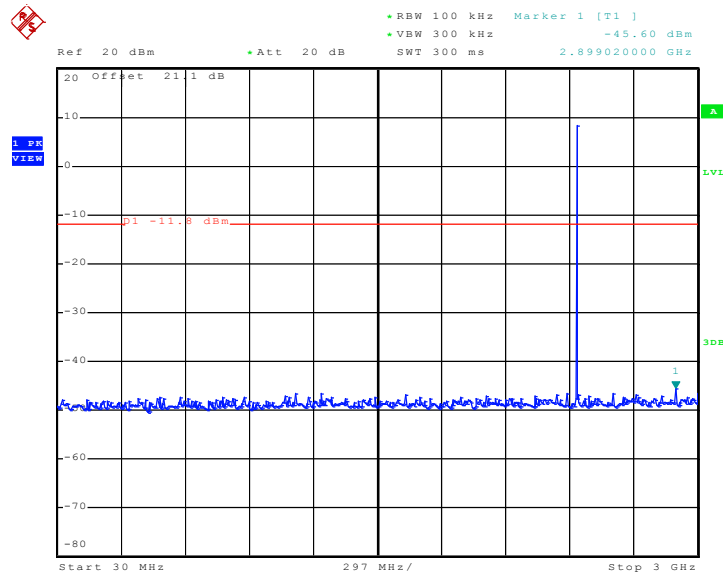


Date: 17.MAR.2011 15:19:12



Test Mode :	Bluetooth EDR 3Mbps 8-DPSK M channel	Temperature :	24~26°C
Test Channel :	39	Relative Humidity :	50~53%
		Test Engineer :	Cona Huang

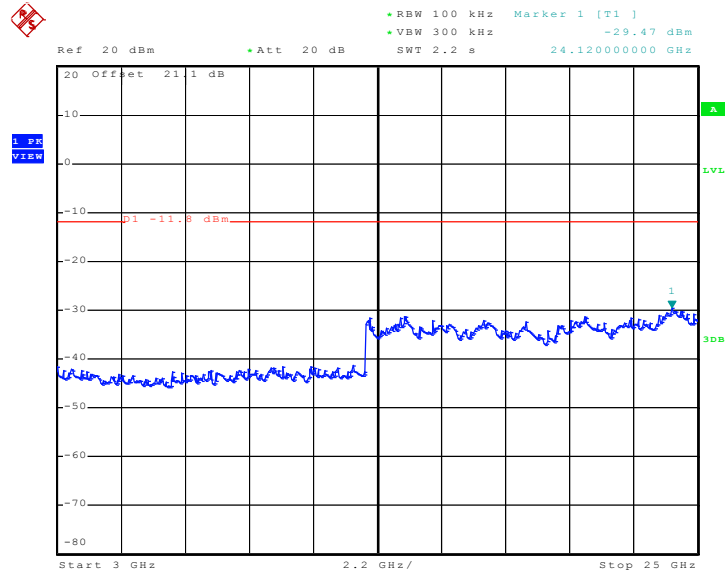
Conducted Spurious Emission Plot on Bluetooth EDR 3Mbps
8-DPSK Channel 39



Date: 17.MAR.2011 15:20:05



Conducted Spurious Emission Plot on Bluetooth EDR 3Mbps
8-DPSK Channel 39

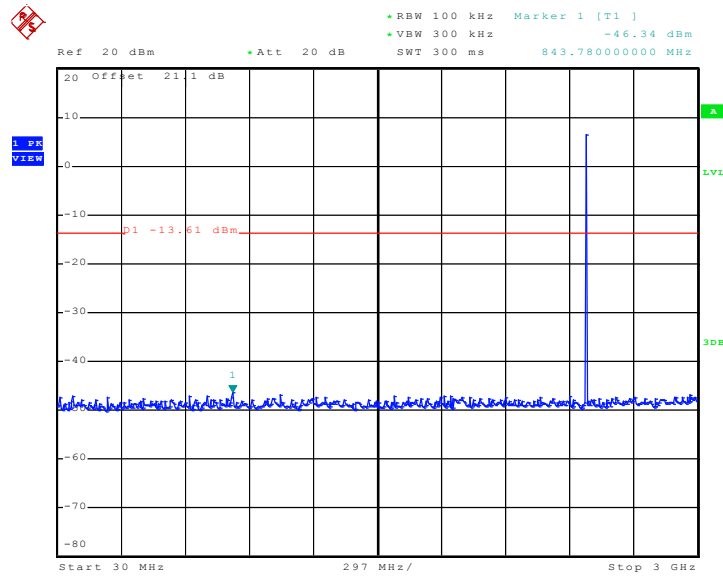


Date: 17.MAR.2011 15:20:28



Test Mode :	Bluetooth EDR 3Mbps 8-DPSK H channel	Temperature :	24~26°C
Test Channel :	78	Relative Humidity :	50~53%
		Test Engineer :	Cona Huang

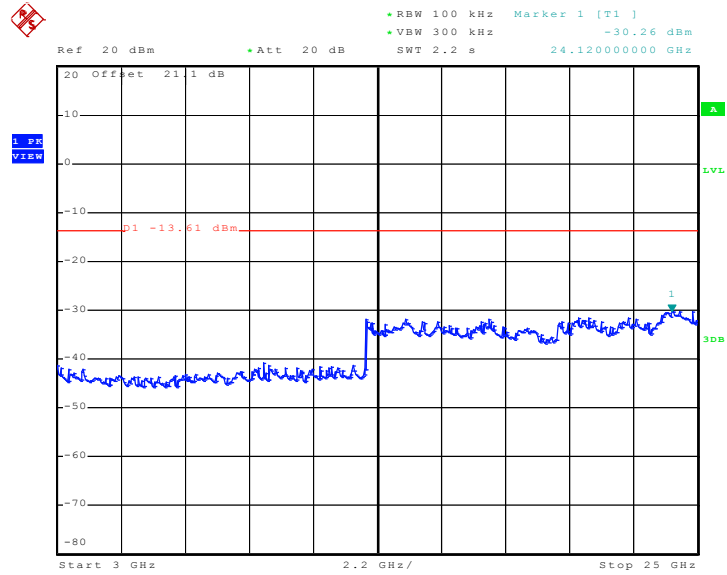
Conducted Spurious Emission Plot on Bluetooth EDR 3Mbps
8-DPSK Channel 78



Date: 17.MAR.2011 15:21:11



Conducted Spurious Emission Plot on Bluetooth EDR 3Mbps
8-DPSK Channel 78



Date: 17.MAR.2011 15:21:34



3.7 Band Edges Measurement

3.7.1 Limit of Band Edges

In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.

3.7.2 Measuring Instruments

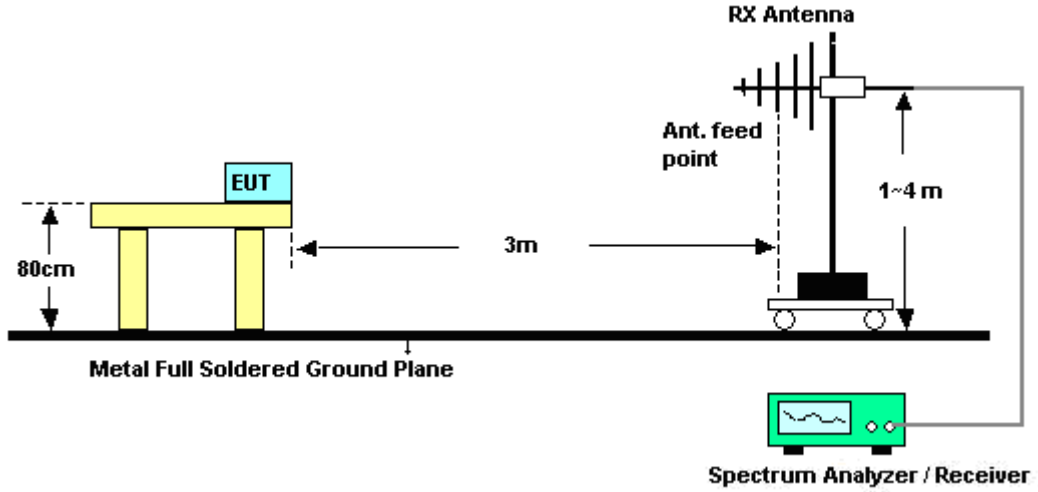
See list of measuring instruments of this test report.

3.7.3 Test Procedures

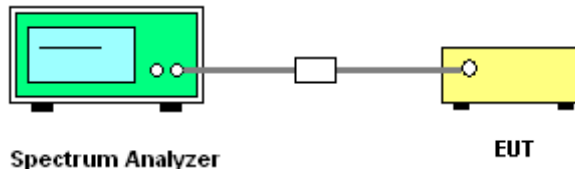
1. The testing follows the guidelines in ANSI C63.4-2003 and FCC Public Notice DA 00-705 Measurement Guidelines.
2. RF antenna conducted test: Set RBW = 300kHz, Video bandwidth (VBW) \geq RBW. Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 300k Hz RBW. Note: If the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 dB.
3. Radiated emission test: Applies to band edge emissions that fall in the restricted bands listed in FCC Section 15.205. The maximum permitted average field strength is listed in FCC Section 15.209. A pre-amp is necessary for this measurement. For measurements above 1 GHz, set RBW = 1MHz, VBW = 1MHz, Sweep = Auto for Peak detector; RBW = 1MHz, VBW = 10 Hz, Sweep=Auto for Average detector. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation. See FCC Section 15.35(b) and (c).
4. In case the emission is fail due to the used RBW / VBW is too wide, marker-delta method of FCC Public Notice DA 00-705 will be followed.

3.7.4 Test Setup

<Radiated Band Edges>



<Conducted Band Edges>





3.7.5 Test Result of Radiated Band Edges

<Low Energy Bluetooth>

Test Mode :	Bluetooth LE 1Mbps GFSK L channel	Temperature :	20~22°C
Test Channel :	00	Relative Humidity :	40~42%
		Test Engineer :	Cona Huang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2374.79	46.18	-27.82	74	44.11	31.68	4.47	34.08	108	141	Peak
2374.79	33.51	-20.49	54	31.44	31.68	4.47	34.08	108	141	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2387.33	49.07	-24.93	74	46.98	31.7	4.47	34.08	123	262	Peak
2387.33	34.97	-19.03	54	32.88	31.7	4.47	34.08	123	262	Average

Test Mode :	Bluetooth LE 1Mbps GFSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
		Test Engineer :	Cona Huang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	68.07	-5.93	74	65.78	31.78	4.59	34.08	127	136	Peak
2483.5	50.11	-3.89	54	47.82	31.78	4.59	34.08	127	136	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	68.99	-5.01	74	66.7	31.78	4.59	34.08	123	263	Peak
2483.5	50.8	-3.2	54	48.51	31.78	4.59	34.08	123	263	Average



<Standard Bluetooth>

Test Mode :	Bluetooth 1Mbps GFSK L channel	Temperature :	20~22°C
Test Channel :	00	Relative Humidity :	40~42%
		Test Engineer :	Cona Huang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2384.67	47.74	-26.26	74	45.67	31.68	4.47	34.08	105	31	Peak
2384.67	35.34	-18.66	54	33.27	31.68	4.47	34.08	105	31	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.09	49.24	-24.76	74	47.15	31.7	4.47	34.08	129	262	Peak
2388.09	37.15	-16.85	54	35.06	31.7	4.47	34.08	129	262	Average

Test Mode :	Bluetooth 1Mbps GFSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
		Test Engineer :	Cona Huang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	68.84	-5.16	74	66.55	31.78	4.59	34.08	127	138	Peak
2483.5	27.27	-26.73	54	24.98	31.78	4.59	34.08	127	138	Average

Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	86.49	59.22	27.27	54	-26.73	Pass
Hopping Mode	86.49	60.27	26.22	54	-27.78	Pass

Note : Average result = Maximum field strength – Delta result



ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	69.25	-4.75	74	66.96	31.78	4.59	34.08	124	267	Peak
2483.5	27.92	-26.08	54	25.63	31.78	4.59	34.08	124	267	Average

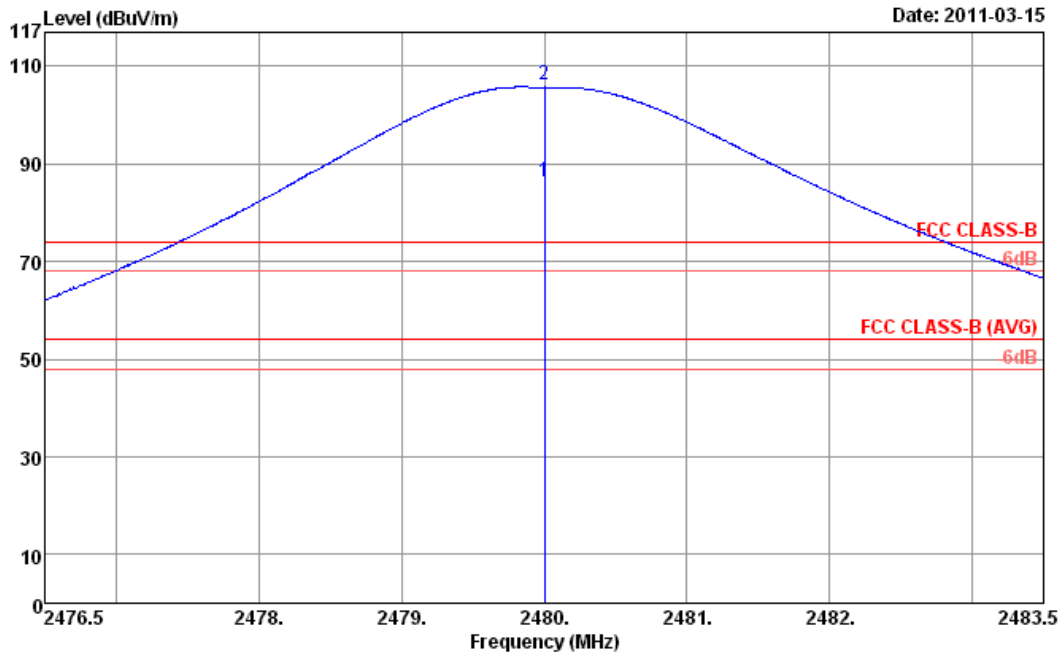
Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	88.84	60.92	27.92	54	-26.08	Pass
Hopping Mode	88.84	62.52	26.32	54	-27.68	Pass

Note : Average result = Maximum field strength – Delta result



Test Mode :	Bluetooth 1Mbps GFSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal



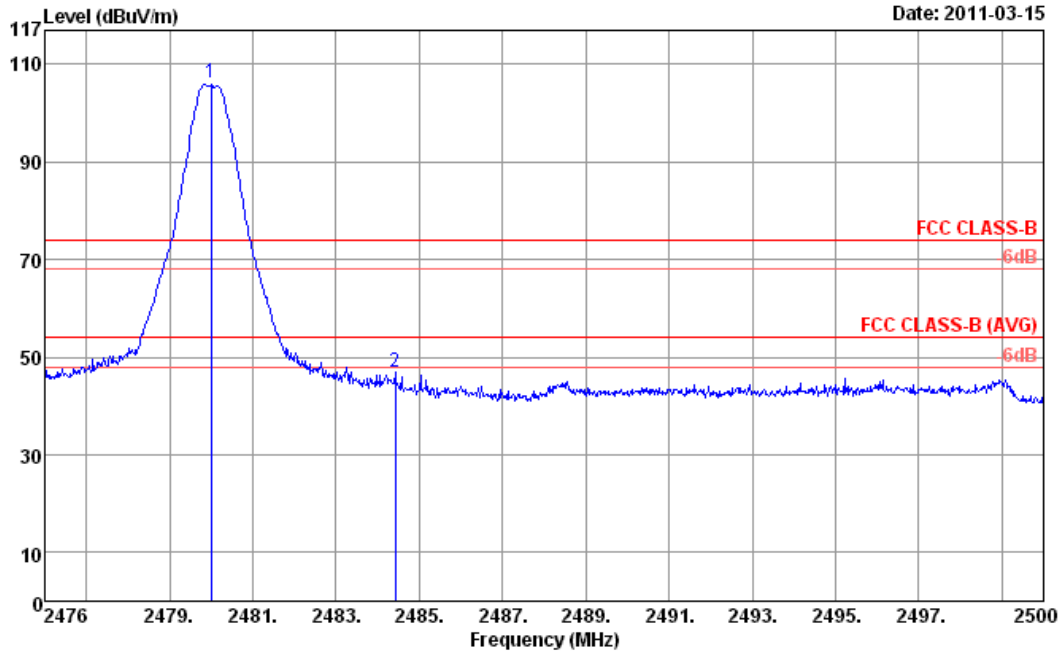
Site : 03CH07-HY
 Condition : FCC CLASS-B HF_ANT_100824 HORIZONTAL
 Project : FR 121516
 Mode : Mode 6

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X	2480.00	86.49	32.49	54.00	84.20	31.78	4.59	34.08	127	138	Average
2 X	2480.00	106.15	32.15	74.00	103.86	31.78	4.59	34.08	127	138	Peak

* Maximum field strength of the fundamental emission



Test Mode :	Bluetooth 1Mbps GFSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal



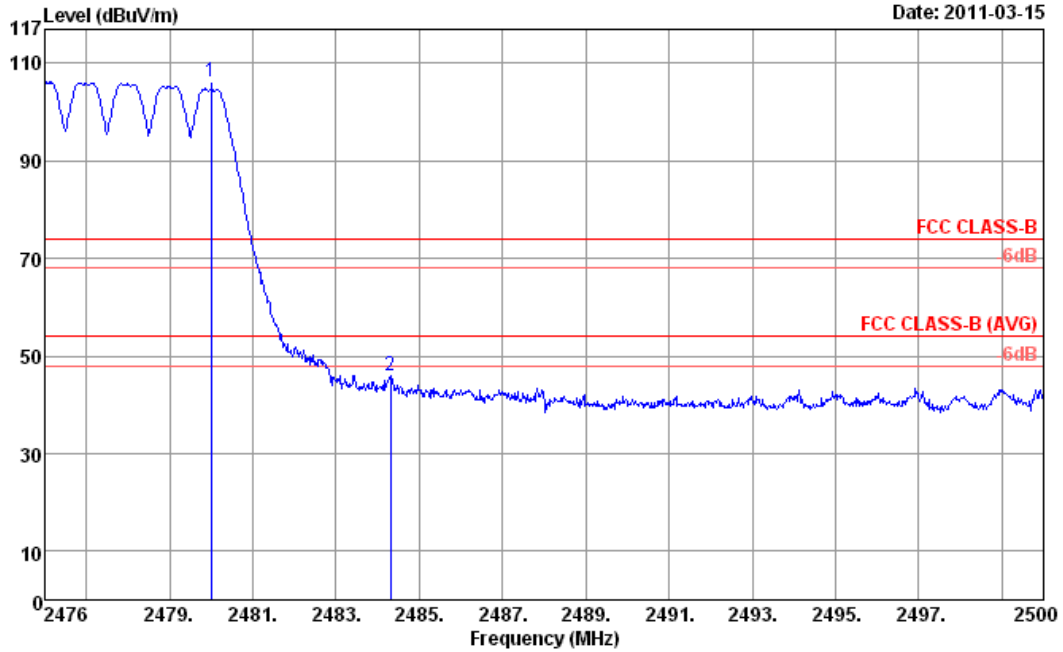
Site : 03CH07-HY
 Condition : FCC CLASS-B HF_ANT_100824 HORIZONTAL
 Project : FR 121516
 Mode : Mode 6

	Over	Limit	Read	Antenna	Cable	Preamp	A/Pos	T/Pos	Remark
Freq	Level	Limit	Line	Level	Factor	Loss	Factor		
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 X 2480.00	106.11	32.11	74.00	103.82	31.78	4.59	34.08	127	138 Peak
2 2484.42	46.89	-27.11	74.00	44.60	31.78	4.59	34.08	127	138 Peak

* Marker-Delta Method (RBW/VBW=100KHz): 59.22 dB , single carrier Mode



Test Mode :	Bluetooth 1Mbps GFSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal



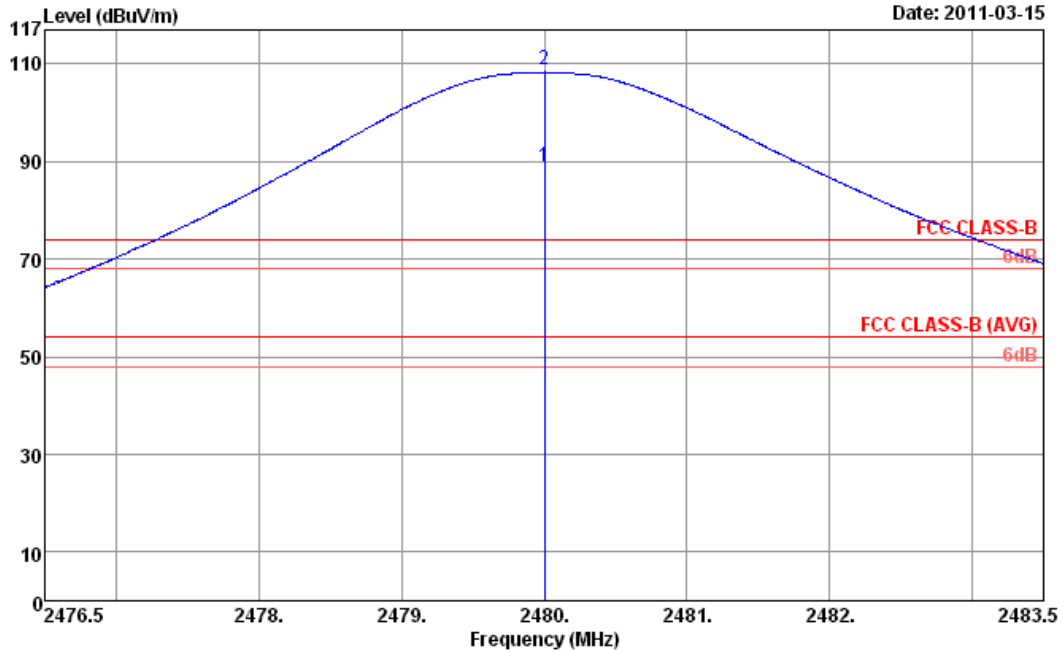
Site : 03CH07-HY
 Condition : FCC CLASS-B HF_ANT_100824 HORIZONTAL
 Project : FR 121516
 Mode : Mode 6

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X	2480.00	106.16	32.16	74.00	103.87	31.78	4.59	34.08	127	138	Peak
2	2484.30	45.89	-28.11	74.00	43.60	31.78	4.59	34.08	127	138	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 60.27 dB , Hopping Mode



Test Mode :	Bluetooth 1Mbps GFSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical



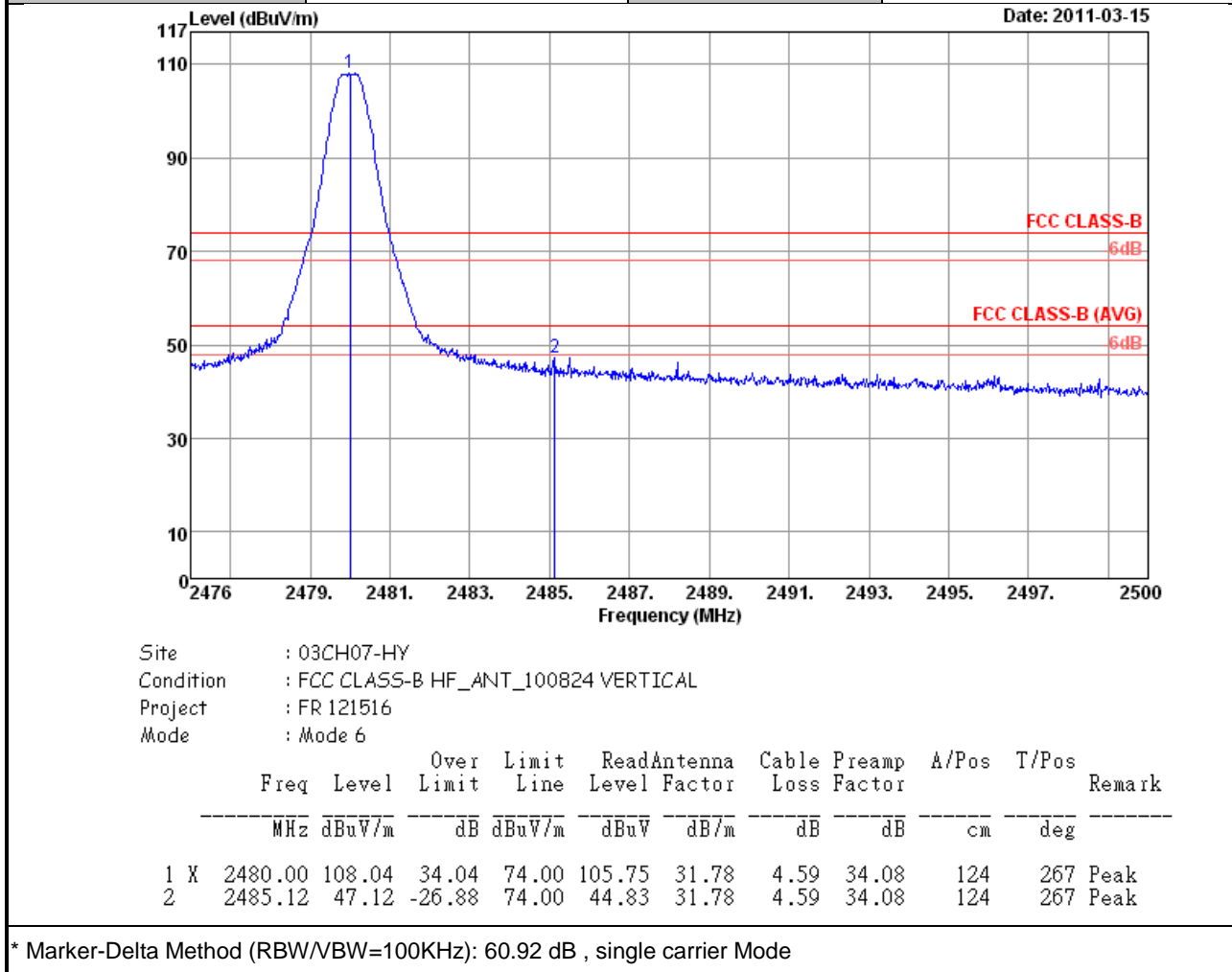
Site : 03CH07-HY
 Condition : FCC CLASS-B HF_ANT_100824 VERTICAL
 Project : FR 121516
 Mode : Mode 6

	Freq	Level	Over Limit	Limit Line	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 X	2480.00	88.84	34.84	54.00	86.55	31.78	4.59	34.08	124	267 Average
2 X	2480.00	108.71	34.71	74.00	106.42	31.78	4.59	34.08	124	267 Peak

* Maximum field strength of the fundamental emission

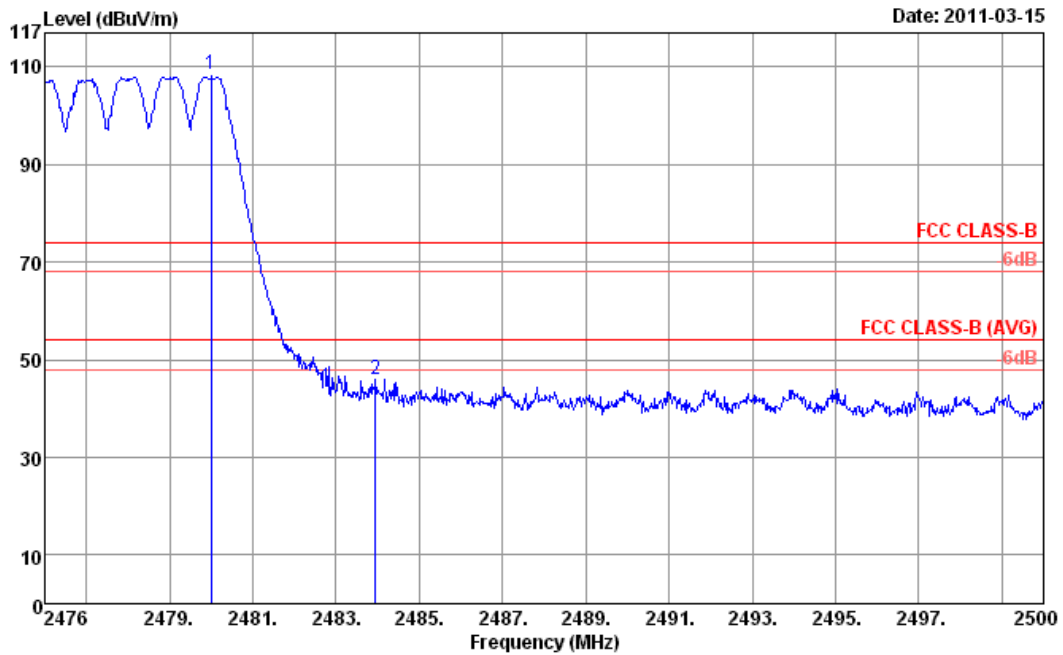


Test Mode :	Bluetooth 1Mbps GFSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical





Test Mode :	Bluetooth 1Mbps GFSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical



Site : 03CH07-HY
 Condition : FCC CLASS-B HF_ANT_100824 VERTICAL
 Project : FR 121516
 Mode : Mode 6

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X	2480.00	108.56	34.56	74.00	106.27	31.78	4.59	34.08	124	267	Peak
2	2483.94	46.04	-27.96	74.00	43.75	31.78	4.59	34.08	124	267	Peak

* Marker-Delta Method (RBW/BW=100KHz): 62.52 dB , Hopping Mode



Test Mode :	Bluetooth EDR 2Mbps π /4-DQPSK L channel	Temperature :	20~22°C
Test Channel :	00	Relative Humidity :	40~42%
		Test Engineer :	Cona Huang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.8	48.61	-25.39	74	46.49	31.7	4.5	34.08	105	31	Peak
2389.8	34.97	-19.03	54	32.85	31.7	4.5	34.08	105	31	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.61	49.68	-24.32	74	47.59	31.7	4.47	34.08	129	262	Peak
2389.61	36.56	-17.44	54	34.47	31.7	4.47	34.08	129	262	Average

Test Mode :	Bluetooth EDR 2Mbps π /4-DQPSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
		Test Engineer :	Cona Huang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	69.56	-4.44	74	67.27	31.78	4.59	34.08	127	138	Peak
2483.5	29.22	-24.78	54	26.93	31.78	4.59	34.08	127	138	Average

Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	86.74	57.52	29.22	54	-24.78	Pass
Hopping Mode	86.74	60.06	26.68	54	-27.32	Pass

Note : Average result = Maximum field strength – Delta result



ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	70.89	-3.11	74	68.6	31.78	4.59	34.08	124	267	Peak
2483.5	29.45	-24.55	54	27.16	31.78	4.59	34.08	124	267	Average

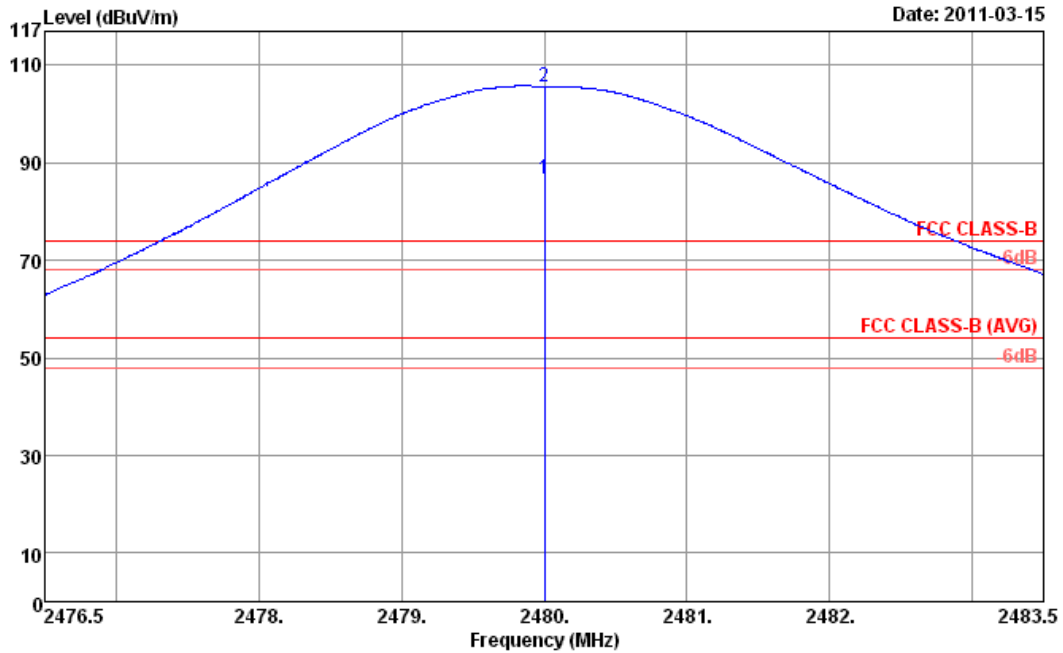
Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	88.96	59.51	29.45	54	-24.55	Pass
Hopping Mode	88.96	59.92	29.04	54	-24.96	Pass

Note : Average result = Maximum field strength – Delta result



Test Mode :	Bluetooth EDR 2Mbps π /4-DQPSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal



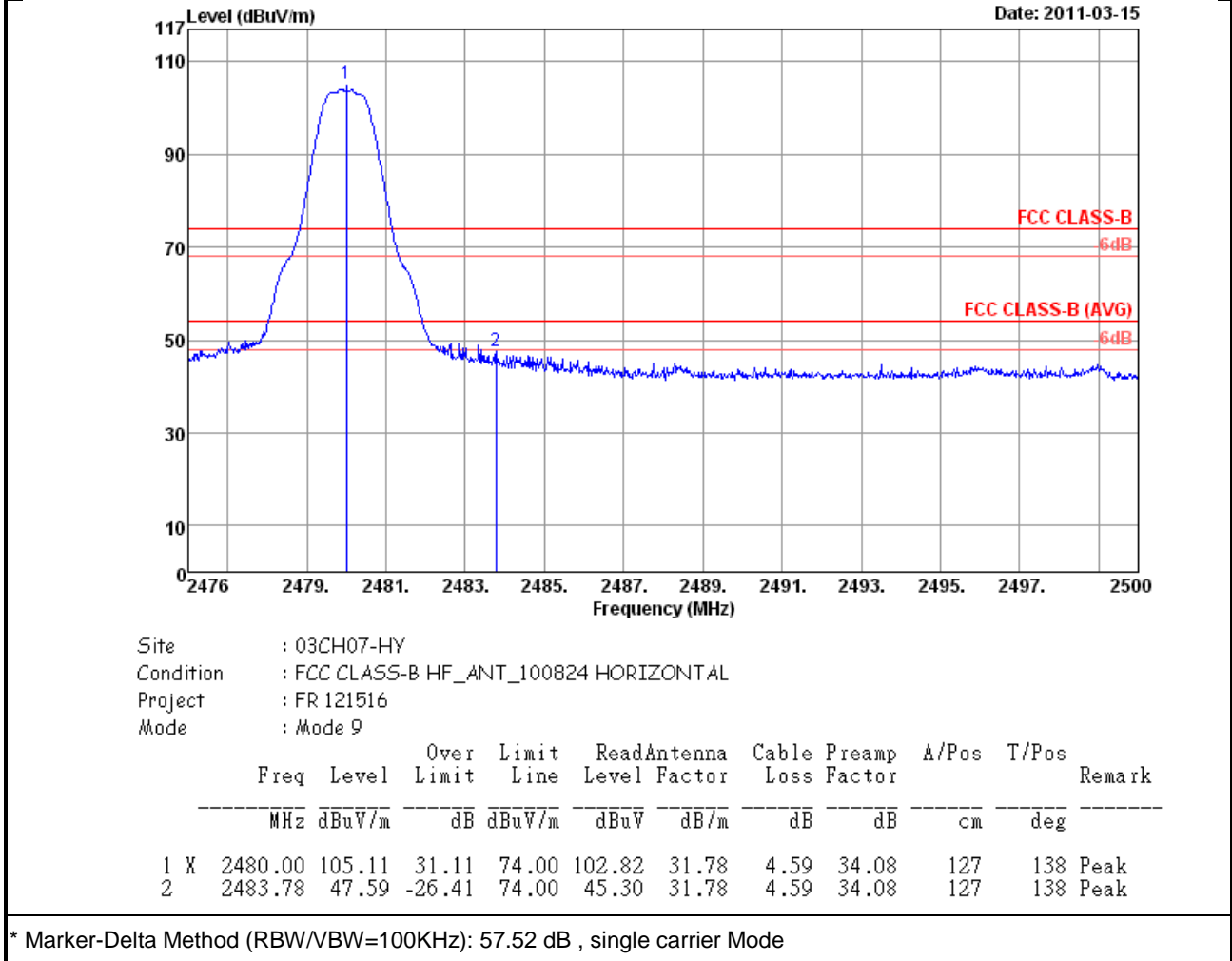
Site : 03CH07-HY
 Condition : FCC CLASS-B HF_ANT_100824 HORIZONTAL
 Project : FR 121516
 Mode : Mode 9

	Over	Limit	Read	Antenna	Cable	Preamp	A/Pos	T/Pos	Remark	
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
Freq	Level	Limit	Level	Factor	Loss	Factor	cm	deg		
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X 2480.00	86.74	32.74	54.00	84.45	31.78	4.59	34.08	127	138	Average
2 X 2480.00	105.67	31.67	74.00	103.38	31.78	4.59	34.08	127	138	Peak

* Maximum field strength of the fundamental emission

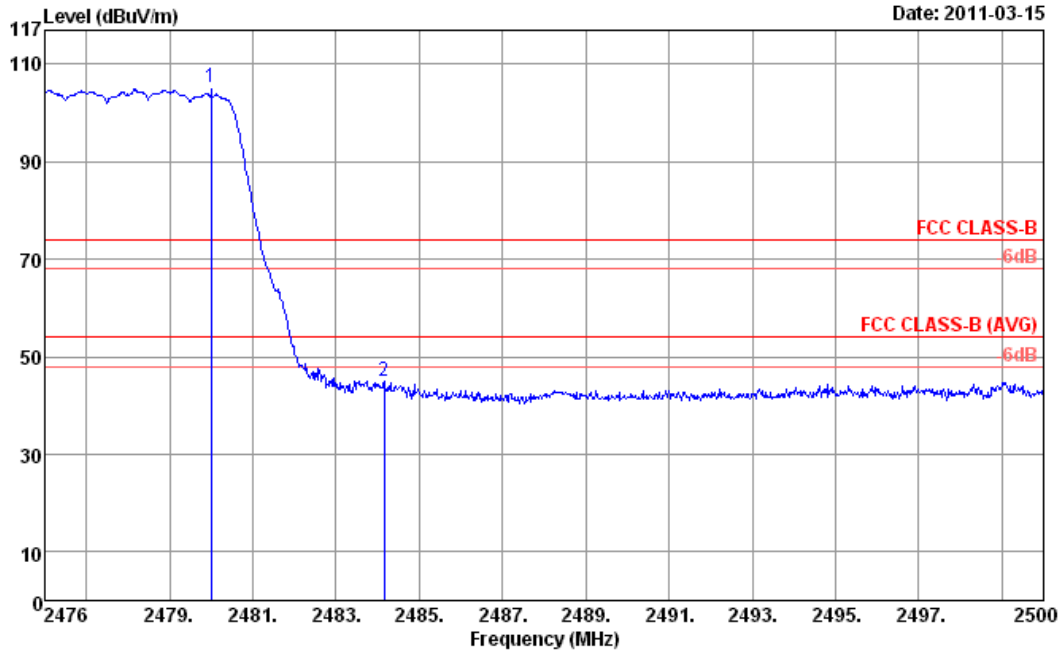


Test Mode :	Bluetooth EDR 2Mbps π /4-DQPSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal





Test Mode :	Bluetooth EDR 2Mbps π /4-DQPSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal



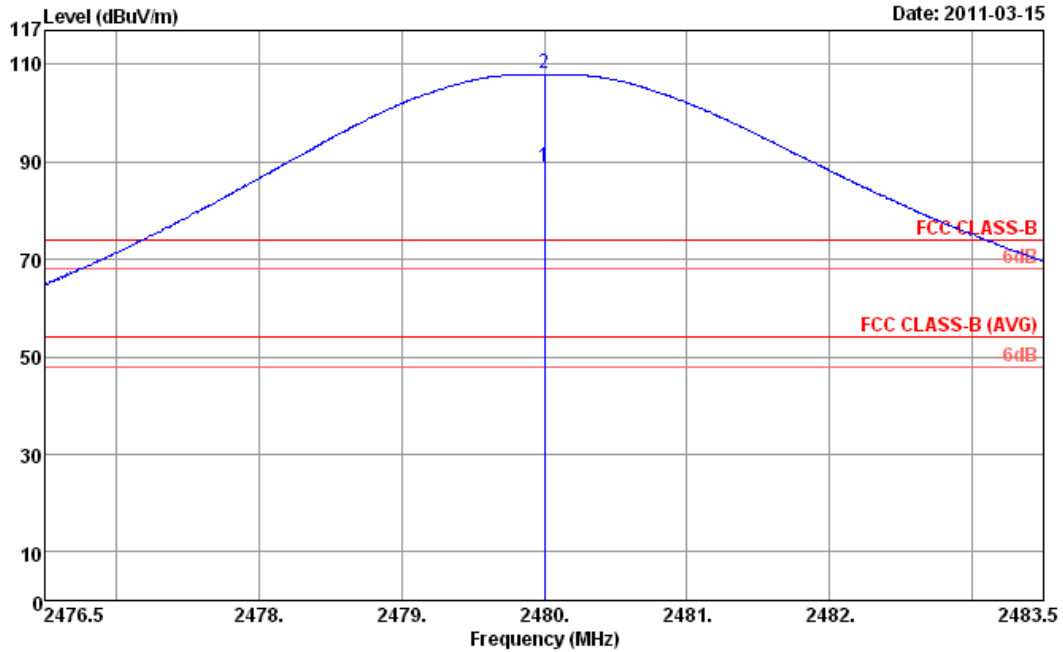
Site : 03CH07-HY
 Condition : FCC CLASS-B HF_ANT_100824 HORIZONTAL
 Project : FR 121516
 Mode : Mode 9

	Freq	Level	Over Limit	Limit Line	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 X	2480.00	105.13	31.13	74.00	102.84	31.78	4.59	34.08	127	138 Peak
2	2484.16	45.07	-28.93	74.00	42.78	31.78	4.59	34.08	127	138 Peak

* Marker-Delta Method (RBW/VBW=100KHz): 60.06 dB , Hopping Mode



Test Mode :	Bluetooth EDR 2Mbps π /4-DQPSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical



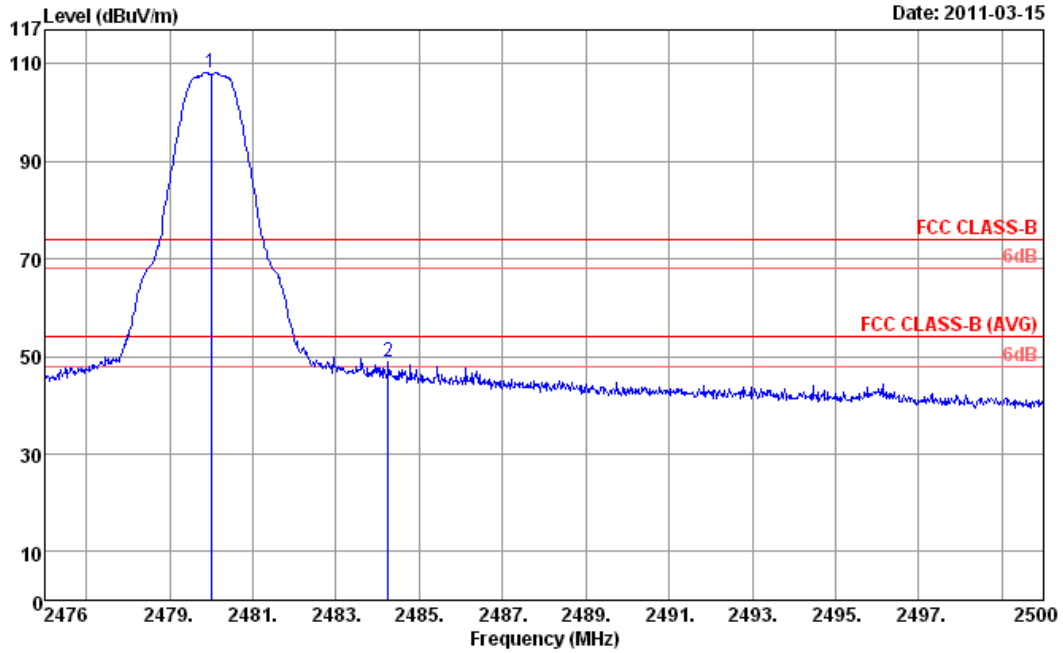
Site : 03CH07-HY
 Condition : FCC CLASS-B HF_ANT_100824 VERTICAL
 Project : FR 121516
 Mode : Mode 9

	Over	Limit	Read	Antenna	Cable	Preamp	A/Pos	T/Pos	Remark
Freq	Level	Limit	Level	Factor	Loss	Factor	cm	deg	
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB			
1 X 2480.00	88.96	34.96	54.00	86.67	31.78	4.59	34.08	124	267 Average
2 X 2480.00	108.33	34.33	74.00	106.04	31.78	4.59	34.08	124	267 Peak

* Maximum field strength of the fundamental emission



Test Mode :	Bluetooth EDR 2Mbps π /4-DQPSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical



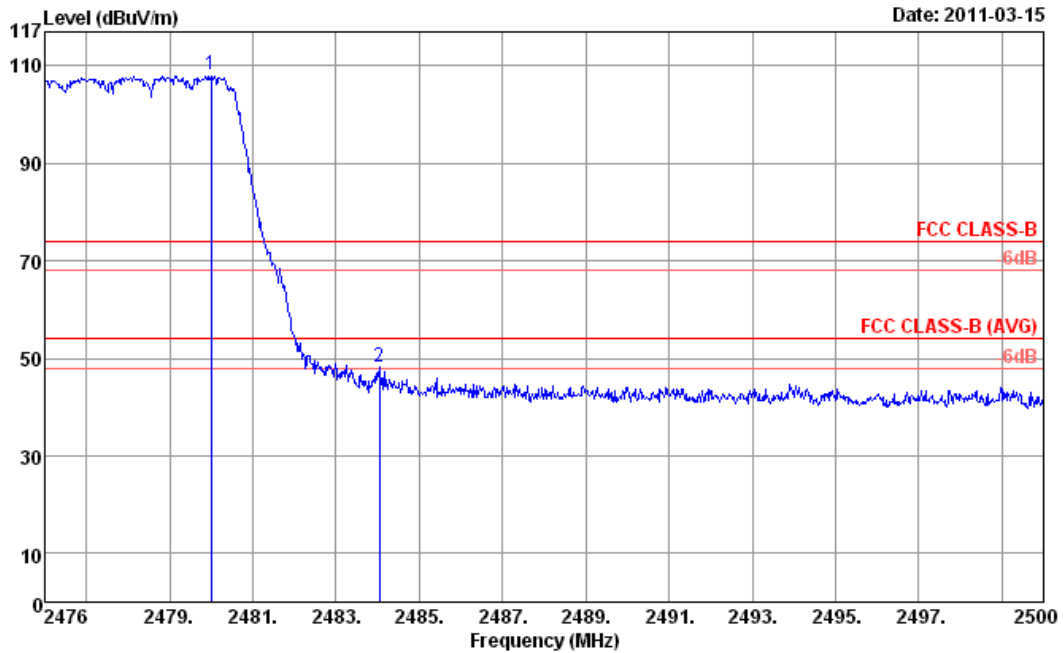
Site : 03CH07-HY
 Condition : FCC CLASS-B HF_ANT_100824 VERTICAL
 Project : FR 121516
 Mode : Mode 9

	Freq	Level	Over Limit	Limit Line	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 X	2480.00	108.29	34.29	74.00	106.00	31.78	4.59	34.08	124	267 Peak
2	2484.26	48.78	-25.22	74.00	46.49	31.78	4.59	34.08	124	267 Peak

* Marker-Delta Method (RBW/VBW=100KHz): 59.51 dB , single carrier Mode



Test Mode :	Bluetooth EDR 2Mbps π /4-DQPSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical



Site : 03CH07-HY
 Condition : FCC CLASS-B HF_ANT_100824 VERTICAL
 Project : FR 121516
 Mode : Mode 9

	Freq	Level	Over Limit	Limit Line	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 X	2480.00	108.22	34.22	74.00	105.93	31.78	4.59	34.08	124	267 Peak
2	2484.04	48.30	-25.70	74.00	46.01	31.78	4.59	34.08	124	267 Peak

* Marker-Delta Method (RBW/BW=100KHz): 59.92 dB , Hopping Mode



Test Mode :	Bluetooth EDR 3Mbps 8-DPSK L channel	Temperature :	20~22°C
Test Channel :	00	Relative Humidity :	40~42%
		Test Engineer :	Cona Huang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.47	48.18	-25.82	74	46.09	31.7	4.47	34.08	105	31	Peak
2388.47	34.96	-19.04	54	32.87	31.7	4.47	34.08	105	31	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.28	49.42	-24.58	74	47.33	31.7	4.47	34.08	129	262	Peak
2388.28	36.61	-17.39	54	34.52	31.7	4.47	34.08	129	262	Average

Test Mode :	Bluetooth EDR 3Mbps 8-DPSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
		Test Engineer :	Cona Huang

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	70.82	-3.18	74	68.53	31.78	4.59	34.08	127	138	Peak
2483.5	26.68	-27.32	54	24.39	31.78	4.59	34.08	127	138	Average

Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBµV/m)	Delta Result (dB)	Average Result (dBµV/m)	Average Limit (dBµV/m)	Margin (dB)	Result
Single Carrier Mode	86.03	59.35	26.68	54	-27.32	Pass
Hopping Mode	86.03	59.52	26.51	54	-27.49	Pass

Note : Average result = Maximum field strength – Delta result



ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	70.2	-3.8	74	67.91	31.78	4.59	34.08	124	267	Peak
2483.5	27.85	-26.15	54	25.56	31.78	4.59	34.08	124	267	Average

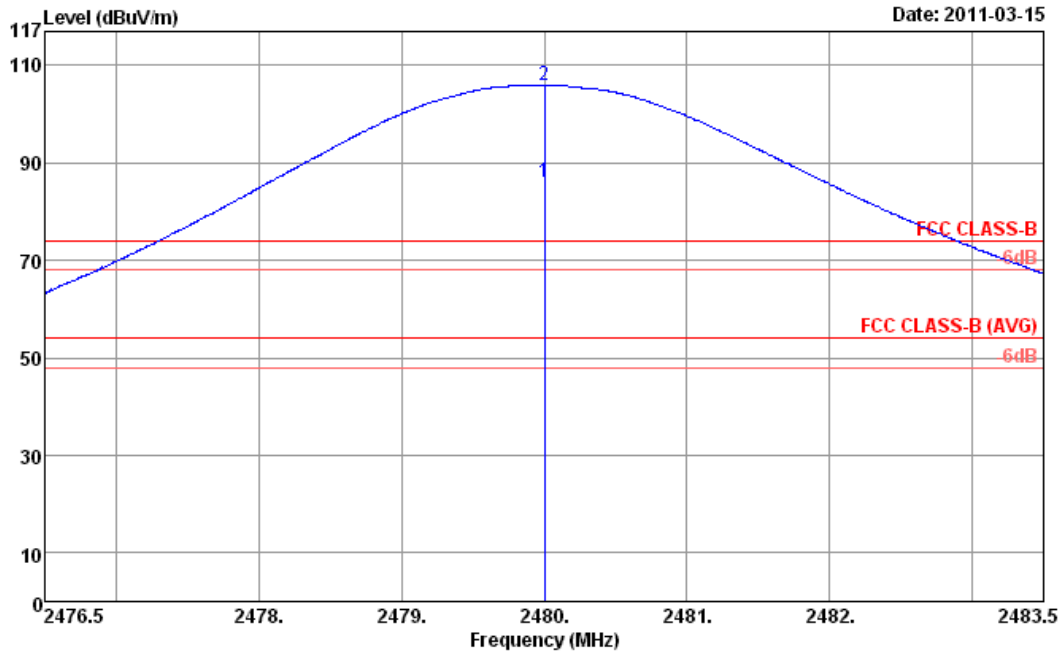
Summary results of marker-delta method:

Test mode	Maximum field strength of the fundamental emission (dBμV/m)	Delta Result (dB)	Average Result (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Result
Single Carrier Mode	87.84	59.99	27.85	54	-26.15	Pass
Hopping Mode	87.84	61.59	26.25	54	-27.75	Pass

Note : Average result = Maximum field strength – Delta result



Test Mode :	Bluetooth EDR 3Mbps 8-DPSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal



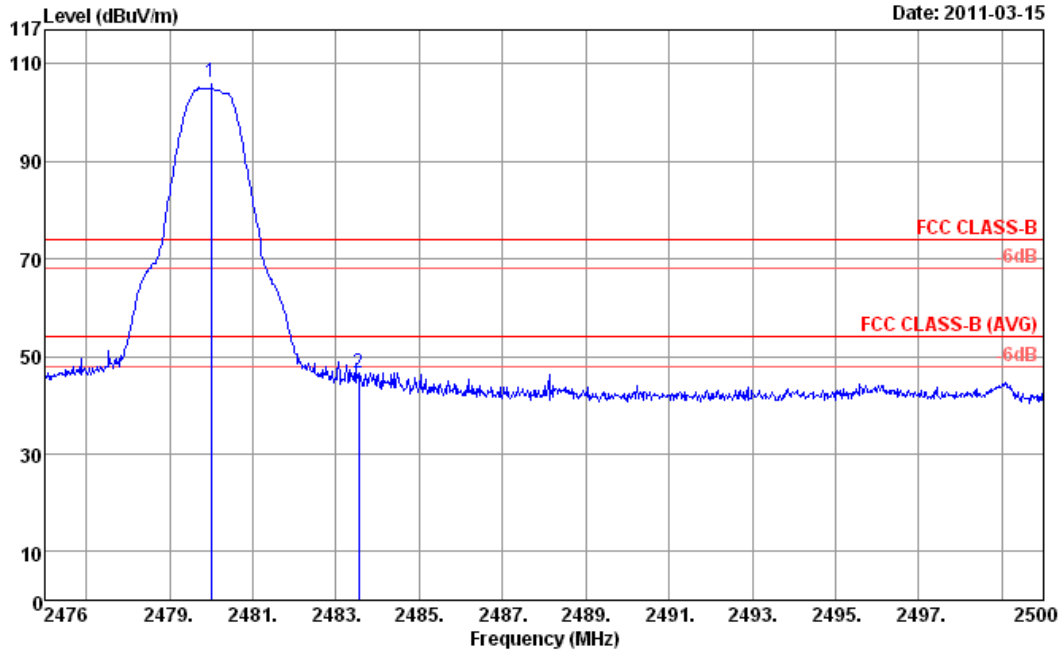
Site : 03CH07-HY
 Condition : FCC CLASS-B HF_ANT_100824 HORIZONTAL
 Project : FR 121516
 Mode : Mode 12

	Freq	Level	Over Limit	Limit Line	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 X	2480.00	86.03	32.03	54.00	83.74	31.78	4.59	34.08	127	138 Average
2 X	2480.00	106.00	32.00	74.00	103.71	31.78	4.59	34.08	127	138 Peak

* Maximum field strength of the fundamental emission



Test Mode :	Bluetooth EDR 3Mbps 8-DPSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal



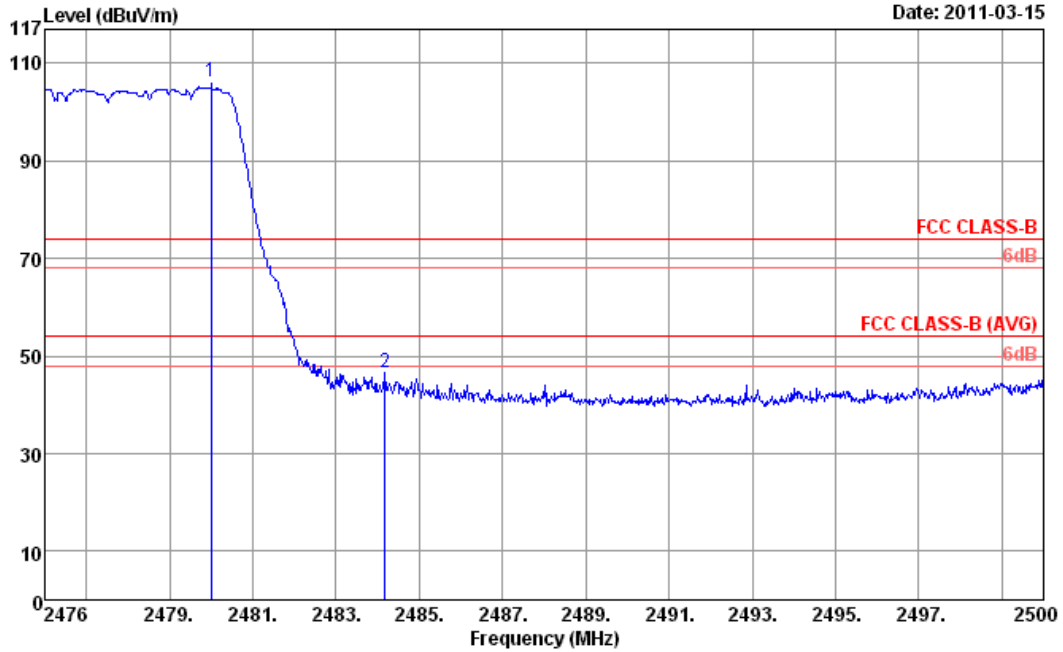
Site : 03CH07-HY
 Condition : FCC CLASS-B HF_ANT_100824 HORIZONTAL
 Project : FR 121516
 Mode : Mode 12

	Over	Limit	Read	Antenna	Cable	Preamp	A/Pos	T/Pos	
Freq	Limit	Line	Level	Factor	Loss	Factor			Remark
MHz	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X 2480.00	32.11	74.00	103.82	31.78	4.59	34.08	127	138	Peak
2 2483.54	-27.24	74.00	44.47	31.78	4.59	34.08	127	138	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 59.35 dB , single carrier Mode



Test Mode :	Bluetooth EDR 3Mbps 8-DPSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal



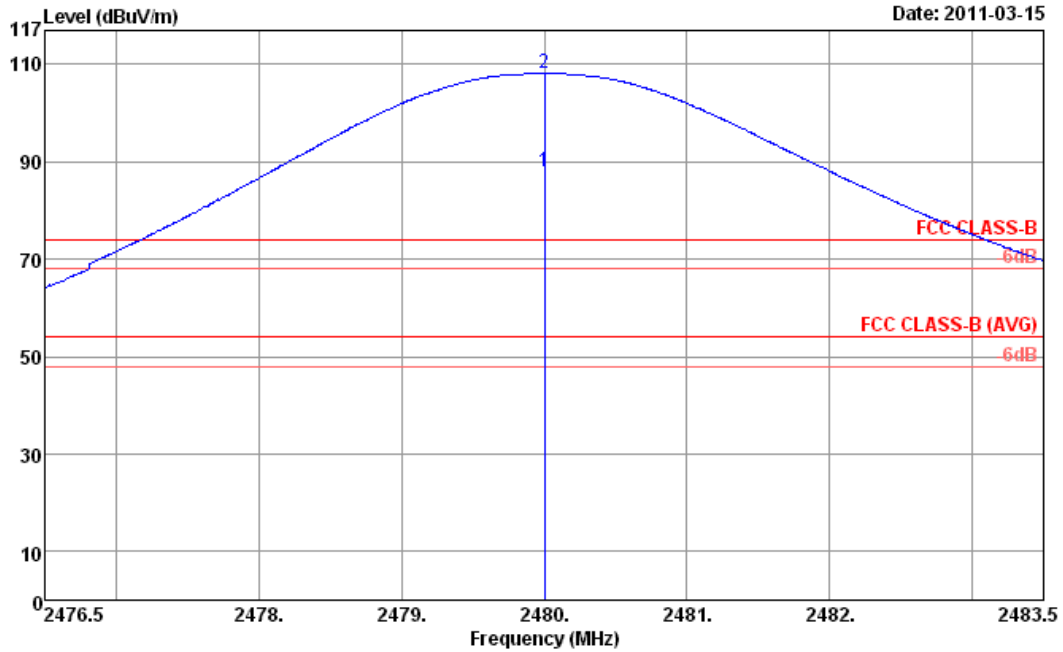
Site : 03CH07-HY
 Condition : FCC CLASS-B HF_ANT_100824 HORIZONTAL
 Project : FR 121516
 Mode : Mode 12

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X	2480.00	106.12	32.12	74.00	103.83	31.78	4.59	34.08	127	138	Peak
2	2484.18	46.60	-27.40	74.00	44.31	31.78	4.59	34.08	127	138	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 59.52 dB , Hopping Mode



Test Mode :	Bluetooth EDR 3Mbps 8-DPSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical



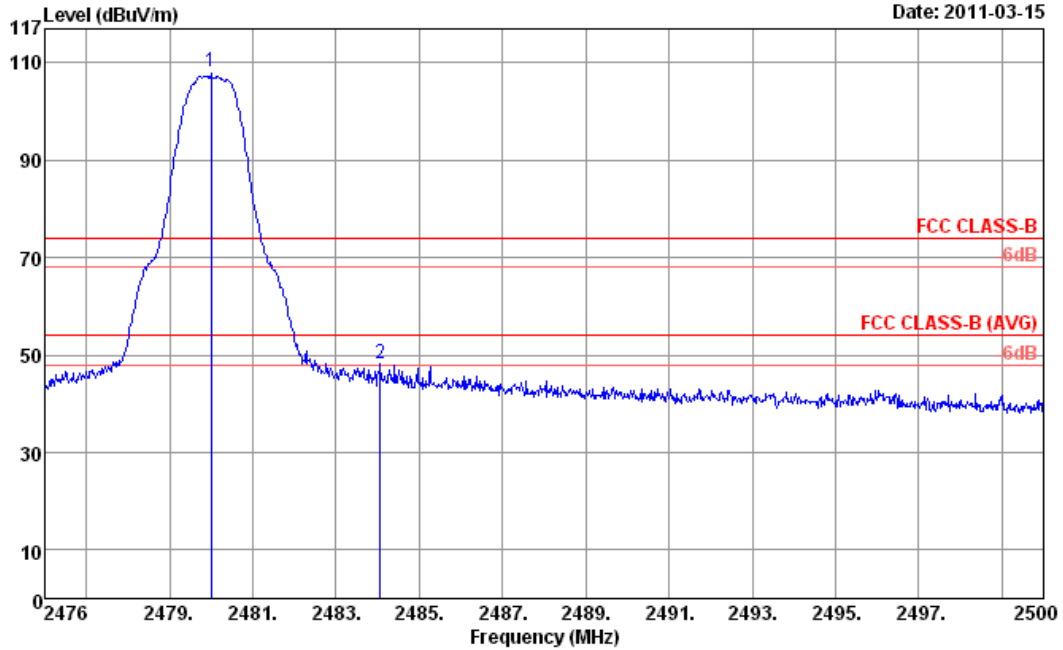
Site : 03CH07-HY
 Condition : FCC CLASS-B HF_ANT_100824 VERTICAL
 Project : FR 121516
 Mode : Mode 12

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X	2480.00	87.84	33.84	54.00	85.55	31.78	4.59	34.08	124	267	Average
2 X	2480.00	108.26	34.26	74.00	105.97	31.78	4.59	34.08	124	267	Peak

* Maximum field strength of the fundamental emission



Test Mode :	Bluetooth EDR 3Mbps 8-DPSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical



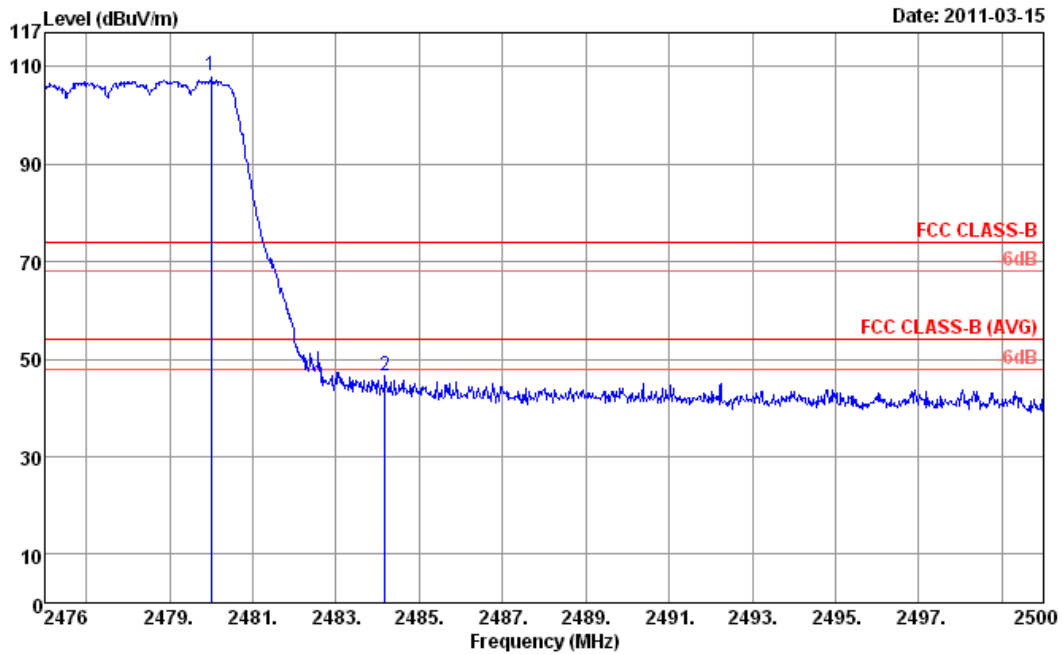
Site : 03CH07-HY
 Condition : FCC CLASS-B HF_ANT_100824 VERTICAL
 Project : FR 121516
 Mode : Mode 12

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 X	2480.00	108.24	34.24	74.00	105.95	31.78	4.59	34.08	124	267	Peak
2	2484.06	48.25	-25.75	74.00	45.96	31.78	4.59	34.08	124	267	Peak

* Marker-Delta Method (RBW/VBW=100KHz): 59.99 dB , single carrier Mode



Test Mode :	Bluetooth EDR 3Mbps 8-DPSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical



Site : 03CH07-HY
 Condition : FCC CLASS-B HF_ANT_100824 VERTICAL
 Project : FR 121516
 Mode : Mode 12

	Freq	Level	Over Limit	Limit Line	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1 X	2480.00	108.11	34.11	74.00	105.82	31.78	4.59	34.08	124	267 Peak
2	2484.18	46.52	-27.48	74.00	44.23	31.78	4.59	34.08	124	267 Peak

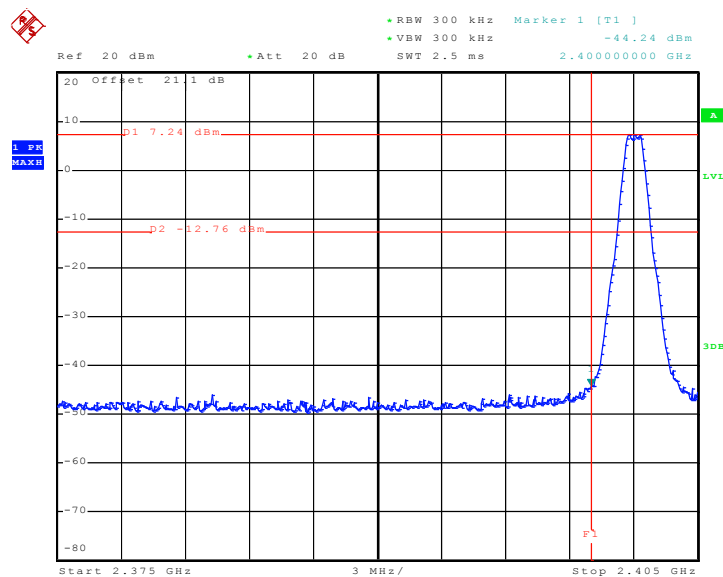
* Marker-Delta Method (RBW/BW=100KHz): 61.59 dB , Hopping Mode

3.7.10 Test Result of Conducted Band Edges

<Low Energy Bluetooth>

Test Mode :	Bluetooth LE 1Mbps GFSK L/H channel	Temperature :	24~26°C
Test Channel :	00 and 39	Relative Humidity :	50~53%
		Test Engineer :	Cona Huang

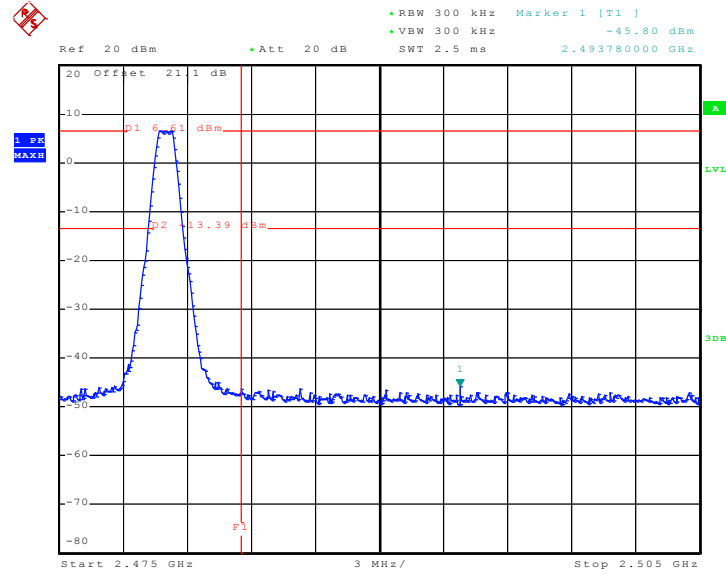
Low Band Edge Plot on Channel 01



Date: 17.MAR.2011 20:21:53



High Band Edge Plot on Channel 39



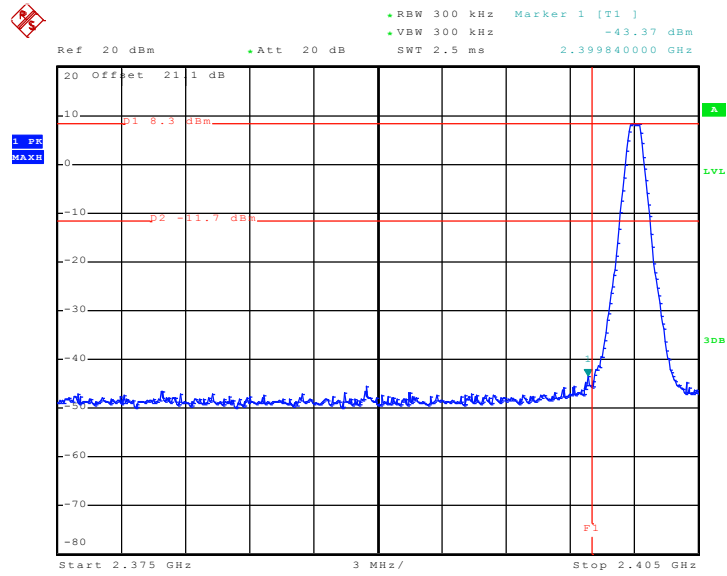
Date: 17.MAR.2011 20:35:07



<Standard Bluetooth>

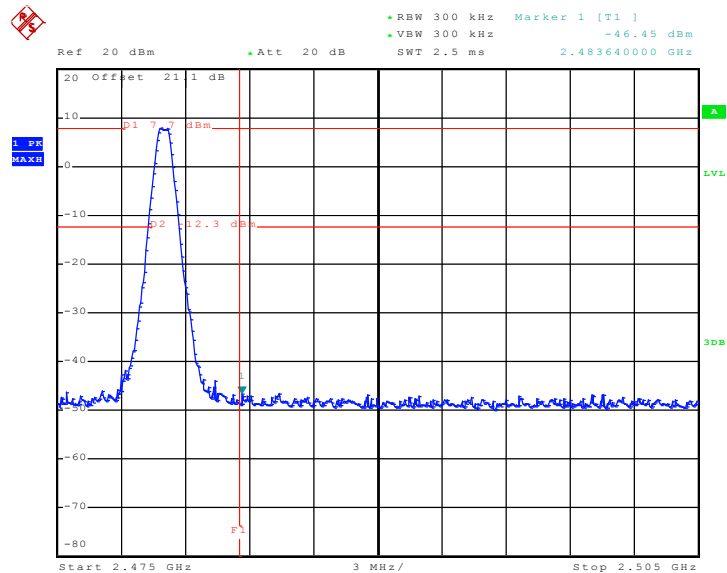
Test Mode :	Bluetooth 1Mbps GFSK L/H channel	Temperature :	24~26°C
Test Channel :	00 and 78	Relative Humidity :	50~53%
		Test Engineer :	Cona Huang

Low Band Edge Plot on Channel 01



Date: 17.MAR.2011 15:02:35

High Band Edge Plot on Channel 78

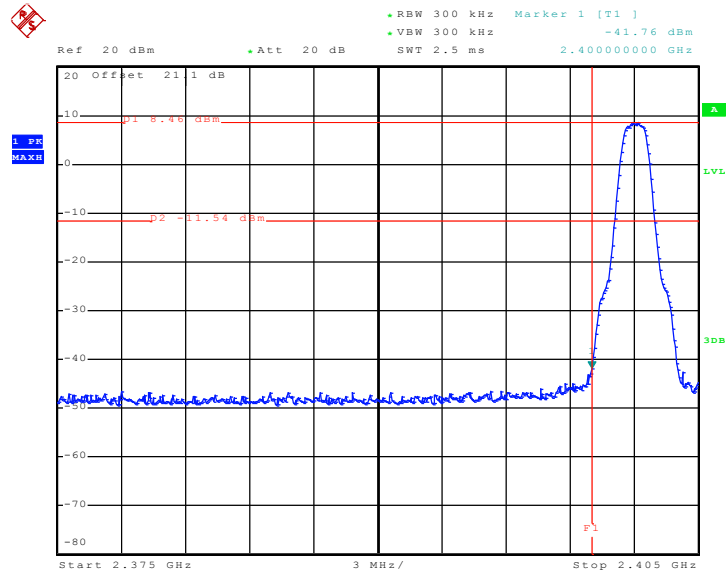


Date: 17.MAR.2011 15:01:54



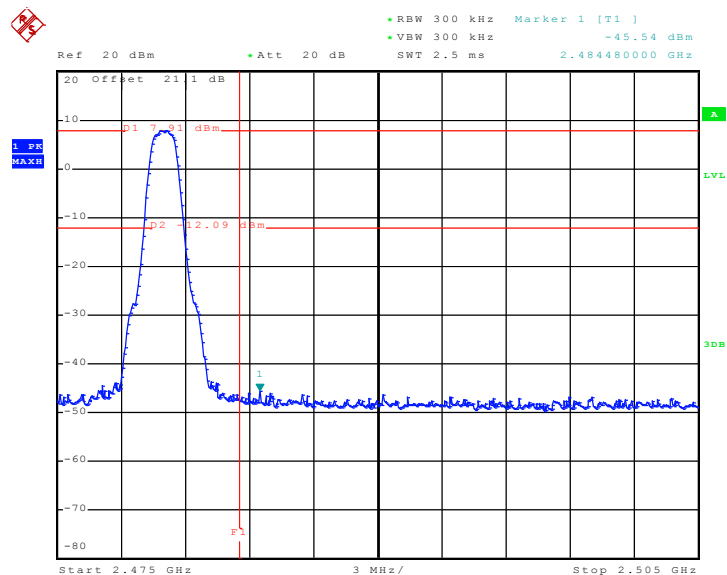
Test Mode :	Bluetooth EDR 2Mbps π /4-DQPSK L/H channel	Temperature :	24~26°C
Test Channel :	00 and 78	Relative Humidity :	50~53%
		Test Engineer :	Cona Huang

Low Band Edge Plot on Channel 01



Date: 17.MAR.2011 15:03:33

High Band Edge Plot on Channel 78

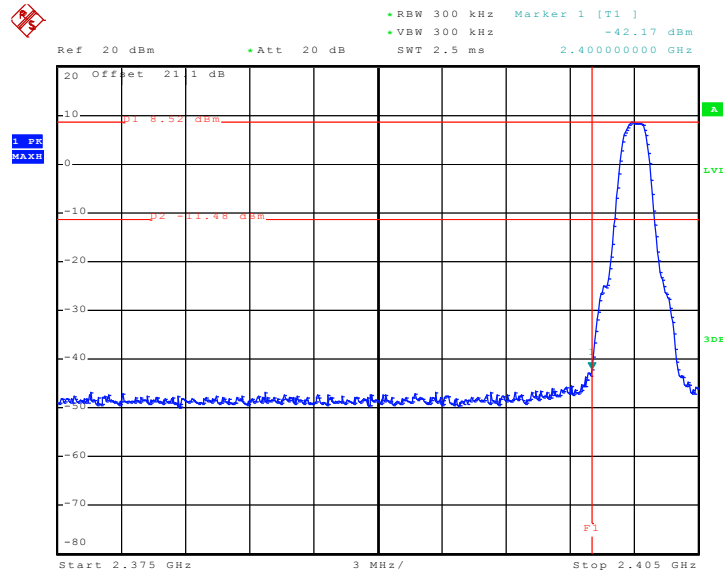


Date: 17.MAR.2011 15:04:22



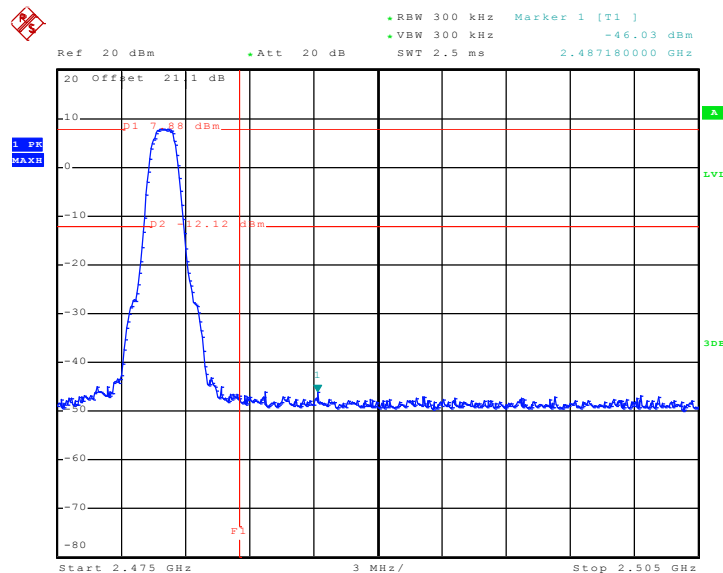
Test Mode :	Bluetooth EDR 3Mbps 8-DPSK L/H channel	Temperature :	24~26°C
Test Channel :	00 and 78	Relative Humidity :	50~53%
		Test Engineer :	Cona Huang

Low Band Edge Plot on Channel 01



Date: 17.MAR.2011 14:59:32

High Band Edge Plot on Channel 78



Date: 17.MAR.2011 15:01:00

3.8 Radiated Emission Measurement

3.8.1 Limit of Radiated Emission

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

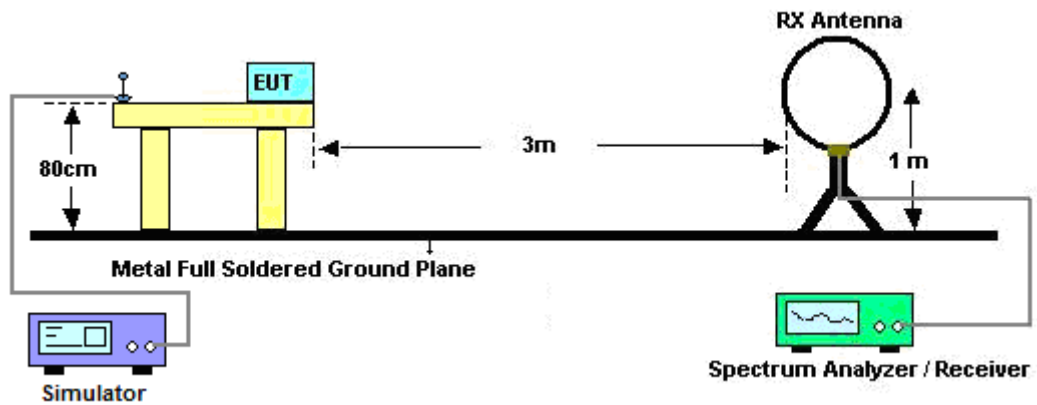
3.8.3 Test Procedures

1. The testing follows the guidelines in FCC Public Notice DA 00-705 Measurement Guidelines.
2. Use the following spectrum analyzer settings:
 - (1) If $f < 1$ GHz,
Span = wide enough to fully capture the emission being measured; RBW = 100 kHz; VBW = 300kHz; Sweep = auto; Detector function = peak; Trace = max hold.
 - (2) If $f \geq 1$ GHz
Span = wide enough to fully capture the emission being measured; RBW = 1 MHz, VBW = 1MHz for Peak mode, RBW = 1 MHz, VBW = 10Hz for Average mode; Sweep = auto; Detector function = peak; Trace = max hold.
 - (3) Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.
Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB)

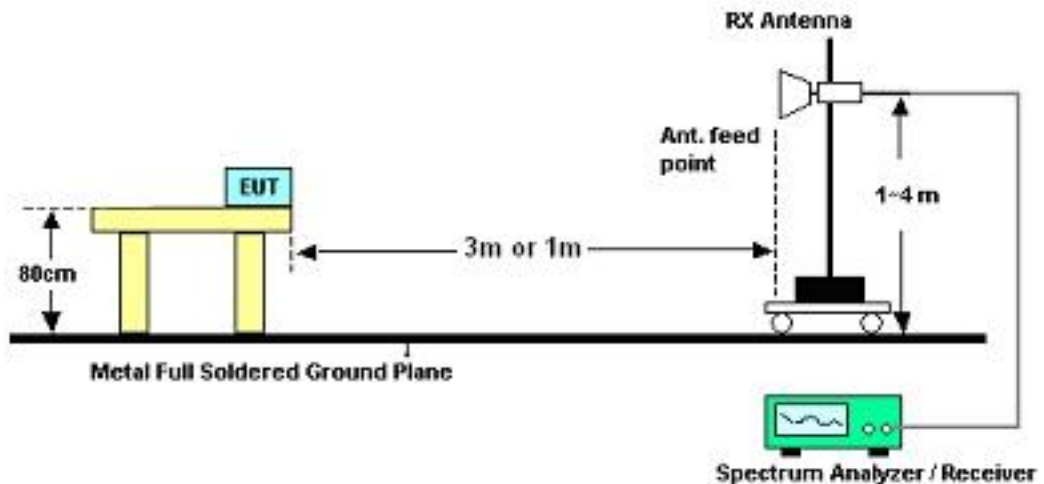
3. Follow the guidelines in ANSI C63.4-2003 with respect to maximizing the emission by rotating the EUT, measuring the emission for three EUT orthogonal planes, and adjusting the measurement antenna height and polarization. A pre-amp and a high pass filter are used for this test in order to get the good signal level.
4. Measured average value for the peak value is greater than 54 dBuV/m

3.8.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz





3.8.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)

Test Engineer :	Cona Huang	Temperature :	20~22°C	
		Relative Humidity :	40~42%	
Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log(\text{specific distance} / \text{test distance})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

3.8.6 Test Result of Radiated Emission (30MHz ~ 1GHz)

<Low Energy Bluetooth>

Test Mode :	Bluetooth LE 1Mbps GFSK L channel	Temperature :	20~22°C
Test Channel :	00	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
143.13	39.65	-3.85	43.5	59.48	10.54	1.14	31.51	102	156	Peak
160.14	37.85	-5.65	43.5	58.58	9.63	1.14	31.5	-	-	Peak
191.46	37.18	-6.32	43.5	59.1	8.33	1.23	31.48	-	-	Peak
390.3	41.16	-4.84	46	56.09	14.51	1.77	31.21	-	-	Peak
437.2	41.3	-4.7	46	54.96	15.63	1.87	31.16	-	-	Peak
456.1	40.74	-5.26	46	53.91	16.05	1.92	31.14	-	-	Peak

Test Mode :	Bluetooth LE 1Mbps GFSK L channel	Temperature :	20~22°C
Test Channel :	00	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
40.8	34.04	-5.96	40	52.3	12.68	0.58	31.52	-	-	Peak
129.9	33.84	-9.66	43.5	53.42	10.87	1.07	31.52	-	-	Peak
233.31	34.88	-11.12	46	54.52	10.52	1.34	31.5	-	-	Peak
409.2	39.58	-6.42	46	53.95	14.98	1.82	31.17	-	-	Peak
423.9	42.23	-3.77	46	56.21	15.32	1.87	31.17	100	177	Peak
440	41.49	-4.51	46	55.08	15.7	1.87	31.16	-	-	Peak



<Standard Bluetooth>

Test Mode :	Bluetooth 1Mbps GFSK L channel	Temperature :	20~22°C
Test Channel :	00	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
133.14	35.94	-7.56	43.5	55.57	10.82	1.07	31.52	-	-	Peak
143.4	40.43	-3.07	43.5	60.26	10.54	1.14	31.51	100	159	Peak
167.97	39.2	-4.3	43.5	60.39	9.12	1.23	31.54	-	-	Peak
390.3	41.98	-4.02	46	56.91	14.51	1.77	31.21	-	-	Peak
409.9	39.74	-6.26	46	54.08	15.01	1.82	31.17	-	-	Peak
442.1	42.32	-3.68	46	55.81	15.74	1.92	31.15	-	-	Peak

Test Mode :	Bluetooth 1Mbps GFSK L channel	Temperature :	20~22°C
Test Channel :	00	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
40.8	33.69	-6.31	40	51.95	12.68	0.58	31.52	-	-	Peak
81.57	36.55	-3.45	40	60.46	6.8	0.84	31.55	100	113	Peak
135.84	34.28	-9.22	43.5	53.95	10.77	1.07	31.51	-	-	Peak
407.8	40.37	-5.63	46	54.79	14.94	1.82	31.18	-	-	Peak
441.4	41.26	-4.74	46	54.83	15.72	1.87	31.16	-	-	Peak
531	39.42	-6.58	46	50.75	17.57	2.1	31	-	-	Peak

3.8.7 Test Result of Radiated Emission (30 MHz ~ 10th Harmonic)

<Low Energy Bluetooth>

Test Mode :	Bluetooth LE 1Mbps GFSK L channel	Temperature :	20~22°C
Test Channel :	00	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	2402 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2374.79	33.51	-20.49	54	31.44	31.68	4.47	34.08	108	141	Average
2374.79	46.18	-27.82	74	44.11	31.68	4.47	34.08	108	141	Peak
2402	76.86	-	-	74.74	31.7	4.5	34.08	108	141	Average
2402	104.35	-	-	102.23	31.7	4.5	34.08	108	141	Peak
2494	34.51	-19.49	54	32.17	31.8	4.62	34.08	108	141	Average
2494	46.19	-27.81	74	43.85	31.8	4.62	34.08	108	141	Peak



Test Mode :	Bluetooth LE 1Mbps GFSK L channel	Temperature :	20~22°C
Test Channel :	00	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	2402 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2387.33	34.97	-19.03	54	32.88	31.7	4.47	34.08	123	262	Average
2387.33	49.07	-24.93	74	46.98	31.7	4.47	34.08	123	262	Peak
2402	78.07	-	-	75.95	31.7	4.5	34.08	123	262	Average
2402	106.34	-	-	104.22	31.7	4.5	34.08	123	262	Peak
2498	34.46	-19.54	54	32.12	31.8	4.62	34.08	123	262	Average
2498	46.25	-27.75	74	43.91	31.8	4.62	34.08	123	262	Peak



Test Mode :	Bluetooth LE 1Mbps GFSK M channel	Temperature :	20~22°C
Test Channel :	19	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	2440 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388	34.95	-19.05	54	32.86	31.7	4.47	34.08	102	135	Average
2388	46.54	-27.46	74	44.45	31.7	4.47	34.08	102	135	Peak
2440	76.82	-	-	74.59	31.75	4.56	34.08	102	135	Average
2440	104.25	-	-	102.02	31.75	4.56	34.08	102	135	Peak
2492	34.69	-19.31	54	32.35	31.8	4.62	34.08	102	135	Average
2492	47.94	-26.06	74	45.6	31.8	4.62	34.08	102	135	Peak



Test Mode :	Bluetooth LE 1Mbps GFSK M channel	Temperature :	20~22°C
Test Channel :	19	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	2440 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2336	37.27	-16.73	54	35.31	31.64	4.41	34.09	125	272	Average
2336	48.8	-25.2	74	46.84	31.64	4.41	34.09	125	272	Peak
2440	77.99	23.99	54	109.52	0	4.56	36.09	125	272	Average
2440	106.01	32.01	74	137.54	0	4.56	36.09	125	272	Peak
2494	33.18	-20.82	54	30.84	31.8	4.62	34.08	125	272	Average
2494	45.9	-28.1	74	43.56	31.8	4.62	34.08	125	272	Peak



Test Mode :	Bluetooth LE 1Mbps GFSK H channel	Temperature :	20~22°C
Test Channel :	39	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	2480 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2376	38.32	-15.68	54	36.25	31.68	4.47	34.08	127	136	Average
2376	49.02	-24.98	74	46.95	31.68	4.47	34.08	127	136	Peak
2480	77.02	-	-	74.73	31.78	4.59	34.08	127	136	Average
2480	104.35	-	-	102.06	31.78	4.59	34.08	127	136	Peak
2483.5	50.11	-3.89	54	47.82	31.78	4.59	34.08	127	136	Average
2483.5	68.07	-5.93	74	65.78	31.78	4.59	34.08	127	136	Peak



Test Mode :	Bluetooth LE 1Mbps GFSK H channel	Temperature :	20~22°C
Test Channel :	39	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	2480 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2384	37.95	-16.05	54	35.88	31.68	4.47	34.08	123	263	Average
2384	48.43	-25.57	74	46.36	31.68	4.47	34.08	123	263	Peak
2480	77.67	-	-	75.38	31.78	4.59	34.08	123	263	Average
2480	105.3	-	-	103.01	31.78	4.59	34.08	123	263	Peak
2483.5	50.8	-3.2	54	48.51	31.78	4.59	34.08	123	263	Average
2483.5	68.99	-5.01	74	66.7	31.78	4.59	34.08	123	263	Peak



<Standard Bluetooth>

Test Mode :	Bluetooth 1Mbps GFSK L channel	Temperature :	20~22°C
Test Channel :	00	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	2402 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2384.67	35.34	-18.66	54	33.27	31.68	4.47	34.08	105	31	Average
2384.67	47.74	-26.26	74	45.67	31.68	4.47	34.08	105	31	Peak
2402	88.85	-	-	86.73	31.7	4.5	34.08	105	31	Average
2402	105.77	-	-	103.65	31.7	4.5	34.08	105	31	Peak
2498	37.12	-16.88	54	34.78	31.8	4.62	34.08	105	31	Average
2498	48.43	-25.57	74	46.09	31.8	4.62	34.08	105	31	Peak
4804	36.85	-17.15	54	55.16	33.76	6.42	58.49	105	52	Average
4804	44.37	-29.63	74	62.68	33.76	6.42	58.49	105	52	Peak



Test Mode :	Bluetooth 1Mbps GFSK L channel	Temperature :	20~22°C
Test Channel :	00	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	2402 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.09	37.15	-16.85	54	35.06	31.7	4.47	34.08	129	262	Average
2388.09	49.24	-24.76	74	47.15	31.7	4.47	34.08	129	262	Peak
2402	89.78	-	-	87.66	31.7	4.5	34.08	129	262	Average
2402	107.11	-	-	104.99	31.7	4.5	34.08	129	262	Peak
2498	33.67	-20.33	54	31.33	31.8	4.62	34.08	129	262	Average
2498	45.13	-28.87	74	42.79	31.8	4.62	34.08	129	262	Peak
4804	38.54	-15.46	54	56.85	33.76	6.42	58.49	102	77	Average
4804	45.65	-28.35	74	63.96	33.76	6.42	58.49	102	77	Peak



Test Mode :	Bluetooth 1Mbps GFSK M channel	Temperature :	20~22°C
Test Channel :	39	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	2441 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2364	36.71	-17.29	54	34.69	31.66	4.44	34.08	103	138	Average
2364	47.16	-26.84	74	45.14	31.66	4.44	34.08	103	138	Peak
2441	88.45	-	-	86.22	31.75	4.56	34.08	103	138	Average
2441	105.19	-	-	102.96	31.75	4.56	34.08	103	138	Peak
2494	36.14	-17.86	54	33.8	31.8	4.62	34.08	103	138	Average
2494	48.04	-25.96	74	45.7	31.8	4.62	34.08	103	138	Peak



Test Mode :	Bluetooth 1Mbps GFSK M channel	Temperature :	20~22°C
Test Channel :	39	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	2441 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2364	39.71	-14.29	54	37.69	31.66	4.44	34.08	125	278	Average
2364	49.18	-24.82	74	47.16	31.66	4.44	34.08	125	278	Peak
2441	89.93	-	-	87.7	31.75	4.56	34.08	125	278	Average
2441	106.73	-	-	104.5	31.75	4.56	34.08	125	278	Peak
2484	34.19	-19.81	54	31.9	31.78	4.59	34.08	125	278	Average
2484	44.99	-29.01	74	42.7	31.78	4.59	34.08	125	278	Peak



Test Mode :	Bluetooth 1Mbps GFSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	2480 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2376	41.03	-12.97	54	38.96	31.68	4.47	34.08	127	138	Average
2376	49.46	-24.54	74	47.39	31.68	4.47	34.08	127	138	Peak
2480	87.38	-	-	85.09	31.78	4.59	34.08	127	138	Average
2480	104.19	-	-	101.9	31.78	4.59	34.08	127	138	Peak
2483.5	27.27	-26.73	54	24.98	31.78	4.59	34.08	127	138	Average
2483.5	68.84	-5.16	74	66.55	31.78	4.59	34.08	127	138	Peak



Test Mode :	Bluetooth 1Mbps GFSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	2480 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2376	41.17	-12.83	54	39.1	31.68	4.47	34.08	124	267	Average
2376	49.82	-24.18	74	47.75	31.68	4.47	34.08	124	267	Peak
2480	89.53	-	-	87.24	31.78	4.59	34.08	124	267	Average
2480	106.43	-	-	104.14	31.78	4.59	34.08	124	267	Peak
2483.5	27.92	-26.08	54	25.63	31.78	4.59	34.08	124	267	Average
2483.5	69.25	-4.75	74	66.96	31.78	4.59	34.08	124	267	Peak
4960	34.52	-19.48	54	52.35	33.79	6.57	58.19	100	59	Average
4960	43.01	-30.99	74	60.84	33.79	6.57	58.19	100	59	Peak



Test Mode :	Bluetooth EDR 2Mbps π /4-DQPSK L channel	Temperature :	20~22°C
Test Channel :	00	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	2402 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.8	34.97	-19.03	54	32.85	31.7	4.5	34.08	105	31	Average
2389.8	48.61	-25.39	74	46.49	31.7	4.5	34.08	105	31	Peak
2402	88.26	-	-	86.14	31.7	4.5	34.08	105	31	Average
2402	107.28	-	-	105.16	31.7	4.5	34.08	105	31	Peak
2500	36.99	-17.01	54	34.65	31.8	4.62	34.08	105	31	Average
2500	48.56	-25.44	74	46.22	31.8	4.62	34.08	105	31	Peak
4804	39.63	-14.37	54	57.94	33.76	6.42	58.49	100	167	Average
4804	46.08	-27.92	74	64.39	33.76	6.42	58.49	100	167	Peak



Test Mode :	Bluetooth EDR 2Mbps π /4-DQPSK L channel	Temperature :	20~22°C
Test Channel :	00	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	2402 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.61	36.56	-17.44	54	34.47	31.7	4.47	34.08	129	262	Average
2389.61	49.68	-24.32	74	47.59	31.7	4.47	34.08	129	262	Peak
2402	89.28	-	-	87.16	31.7	4.5	34.08	129	262	Average
2402	108.52	-	-	106.4	31.7	4.5	34.08	129	262	Peak
2498	33.9	-20.1	54	31.56	31.8	4.62	34.08	129	262	Average
2498	45.38	-28.62	74	43.04	31.8	4.62	34.08	129	262	Peak
4804	41.33	-12.67	54	59.64	33.76	6.42	58.49	102	331	Average
4804	48.73	-25.27	74	67.04	33.76	6.42	58.49	102	331	Peak



Test Mode :	Bluetooth EDR 2Mbps π /4-DQPSK M channel	Temperature :	20~22°C
Test Channel :	39	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	2441 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	36.23	-17.77	54	34.11	31.7	4.5	34.08	103	138	Average
2390	46.84	-27.16	74	44.72	31.7	4.5	34.08	103	138	Peak
2441	87.98	-	-	85.75	31.75	4.56	34.08	103	138	Average
2441	107.08	-	-	104.85	31.75	4.56	34.08	103	138	Peak
2494	36.1	-17.9	54	33.76	31.8	4.62	34.08	103	138	Average
2494	47.48	-26.52	74	45.14	31.8	4.62	34.08	103	138	Peak



Test Mode :	Bluetooth EDR 2Mbps π /4-DQPSK M channel	Temperature :	20~22°C
Test Channel :	39	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	2441 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2336	38.88	-15.12	54	36.92	31.64	4.41	34.09	125	278	Average
2336	48.82	-25.18	74	46.86	31.64	4.41	34.09	125	278	Peak
2441	88.83	-	-	86.6	31.75	4.56	34.08	125	278	Average
2441	108.36	-	-	106.13	31.75	4.56	34.08	125	278	Peak
2490	33.91	-20.09	54	31.57	31.8	4.62	34.08	125	278	Average
2490	46.01	-27.99	74	43.67	31.8	4.62	34.08	125	278	Peak



Test Mode :	Bluetooth EDR 2Mbps π /4-DQPSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	2480 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2376	40.26	-13.74	54	38.19	31.68	4.47	34.08	127	138	Average
2376	49.57	-24.43	74	47.5	31.68	4.47	34.08	127	138	Peak
2480	86.74	-	-	84.45	31.78	4.59	34.08	127	138	Average
2480	105.96	-	-	103.67	31.78	4.59	34.08	127	138	Peak
2483.5	29.22	-24.78	54	26.93	31.78	4.59	34.08	127	138	Average
2483.5	69.56	-4.44	74	67.27	31.78	4.59	34.08	127	138	Peak



Test Mode :	Bluetooth EDR 2Mbps π /4-DQPSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	2480 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2376	40.39	-13.61	54	38.32	31.68	4.47	34.08	124	267	Average
2376	49.74	-24.26	74	47.67	31.68	4.47	34.08	124	267	Peak
2480	88.96	-	-	86.67	31.78	4.59	34.08	124	267	Average
2480	108.37	-	-	106.08	31.78	4.59	34.08	124	267	Peak
2483.5	29.45	-24.55	54	27.16	31.78	4.59	34.08	124	267	Average
2483.5	70.89	-3.11	74	68.6	31.78	4.59	34.08	124	267	Peak
4960	35.67	-18.33	54	53.5	33.79	6.57	58.19	105	222	Average
4960	42.41	-31.59	74	60.24	33.79	6.57	58.19	105	222	Peak



Test Mode :	Bluetooth EDR 3Mbps 8-DPSK L channel	Temperature :	20~22°C
Test Channel :	00	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	2402 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.47	34.96	-19.04	54	32.87	31.7	4.47	34.08	105	31	Average
2388.47	48.18	-25.82	74	46.09	31.7	4.47	34.08	105	31	Peak
2402	88.01	-	-	85.89	31.7	4.5	34.08	105	31	Average
2402	107.2	-	-	105.08	31.7	4.5	34.08	105	31	Peak
2498	37.14	-16.86	54	34.8	31.8	4.62	34.08	105	31	Average
2498	47.9	-26.1	74	45.56	31.8	4.62	34.08	105	31	Peak
4804	42.39	-11.61	54	60.7	33.76	6.42	58.49	104	117	Average
4804	46.76	-27.24	74	65.07	33.76	6.42	58.49	104	117	Peak



Test Mode :	Bluetooth EDR 3Mbps 8-DPSK L channel	Temperature :	20~22°C
Test Channel :	00	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	2402 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.28	36.61	-17.39	54	34.52	31.7	4.47	34.08	129	262	Average
2388.28	49.42	-24.58	74	47.33	31.7	4.47	34.08	129	262	Peak
2402	89.03	-	-	86.91	31.7	4.5	34.08	129	262	Average
2402	108.72	-	-	106.6	31.7	4.5	34.08	129	262	Peak
2498	34.02	-19.98	54	31.68	31.8	4.62	34.08	129	262	Average
2498	46.46	-27.54	74	44.12	31.8	4.62	34.08	129	262	Peak
4804	43.21	-10.79	54	61.52	33.76	6.42	58.49	105	225	Average
4804	48.09	-25.91	74	66.4	33.76	6.42	58.49	105	225	Peak



Test Mode :	Bluetooth EDR 3Mbps 8-DPSK M channel	Temperature :	20~22°C
Test Channel :	39	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	2441 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390	36.19	-17.81	54	34.07	31.7	4.5	34.08	103	138	Average
2390	46.61	-27.39	74	44.49	31.7	4.5	34.08	103	138	Peak
2441	87.88	-	-	85.65	31.75	4.56	34.08	103	138	Average
2441	107.28	-	-	105.05	31.75	4.56	34.08	103	138	Peak
2500	35.7	-18.3	54	33.36	31.8	4.62	34.08	103	138	Average
2500	47.17	-26.83	74	44.83	31.8	4.62	34.08	103	138	Peak



Test Mode :	Bluetooth EDR 3Mbps 8-DPSK M channel	Temperature :	20~22°C
Test Channel :	39	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	2441 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2364	38.93	-15.07	54	36.91	31.66	4.44	34.08	125	278	Average
2364	48.84	-25.16	74	46.82	31.66	4.44	34.08	125	278	Peak
2441	89.04	-	-	86.81	31.75	4.56	34.08	125	278	Average
2441	108.72	-	-	106.49	31.75	4.56	34.08	125	278	Peak
2494	33.95	-20.05	54	31.61	31.8	4.62	34.08	125	278	Average
2494	45.51	-28.49	74	43.17	31.8	4.62	34.08	125	278	Peak



Test Mode :	Bluetooth EDR 3Mbps 8-DPSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Horizontal
Remark :	2480 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2376	40.23	-13.77	54	38.16	31.68	4.47	34.08	127	138	Average
2376	49.32	-24.68	74	47.25	31.68	4.47	34.08	127	138	Peak
2480	86.03	-	-	83.74	31.78	4.59	34.08	127	138	Average
2480	106.31	-	-	104.02	31.78	4.59	34.08	127	138	Peak
2483.5	26.68	-27.32	54	24.39	31.78	4.59	34.08	127	138	Average
2483.5	70.82	-3.18	74	68.53	31.78	4.59	34.08	127	138	Peak



Test Mode :	Bluetooth EDR 3Mbps 8-DPSK H channel	Temperature :	20~22°C
Test Channel :	78	Relative Humidity :	40~42%
Test Engineer :	Cona Huang	Polarization :	Vertical
Remark :	2480 MHz is Fundamental Signals which can be ignored.		

Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2376	40.31	-13.69	54	38.24	31.68	4.47	34.08	124	267	Average
2376	49.37	-24.63	74	47.3	31.68	4.47	34.08	124	267	Peak
2480	87.84	-	-	85.55	31.78	4.59	34.08	124	267	Average
2480	108.53	-	-	106.24	31.78	4.59	34.08	124	267	Peak
2483.5	27.85	-26.15	54	25.56	31.78	4.59	34.08	124	267	Average
2483.5	70.2	-3.8	74	67.91	31.78	4.59	34.08	124	267	Peak

3.9 AC Conducted Emission Measurement

3.9.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

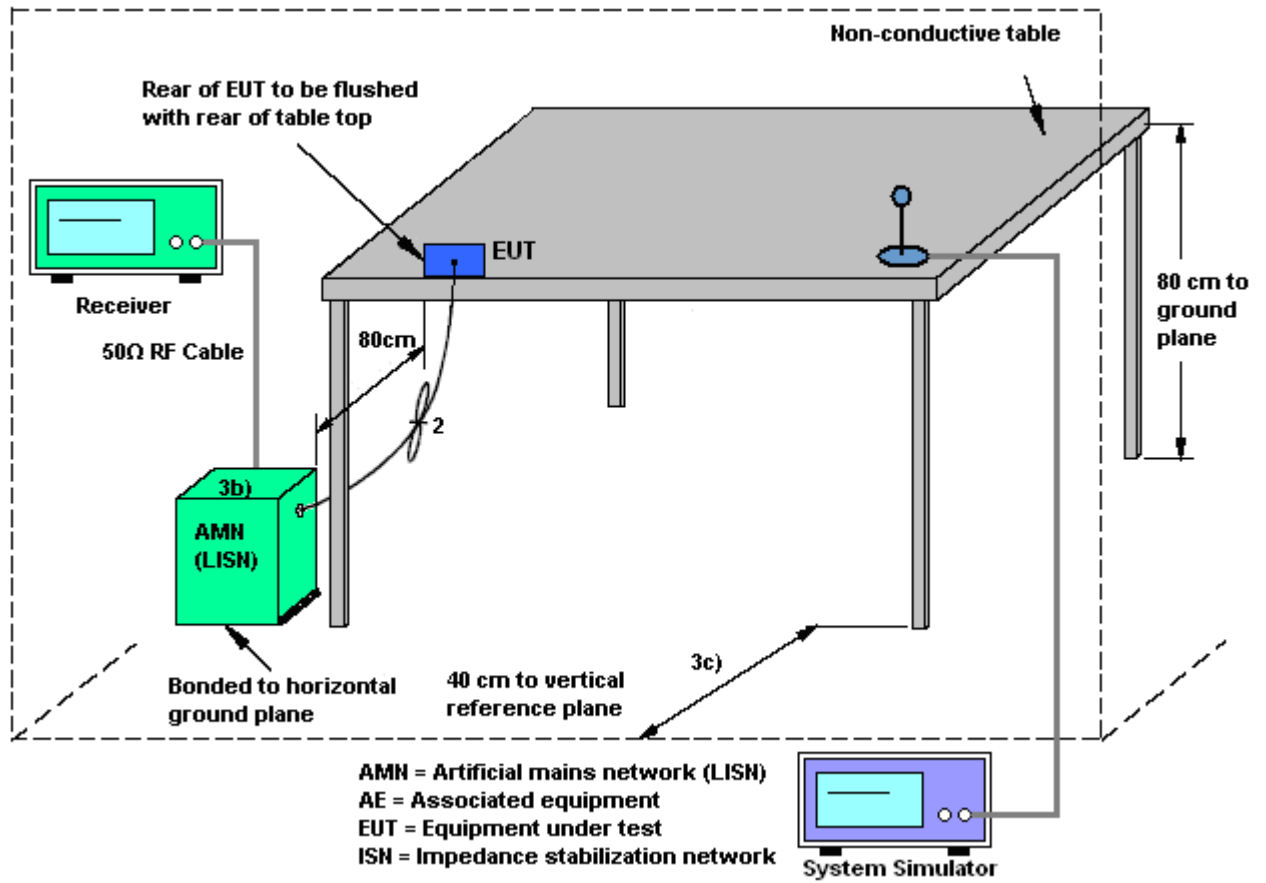
3.9.2 Measuring Instruments

See list of measuring instruments of this test report.

3.9.3 Test Procedures

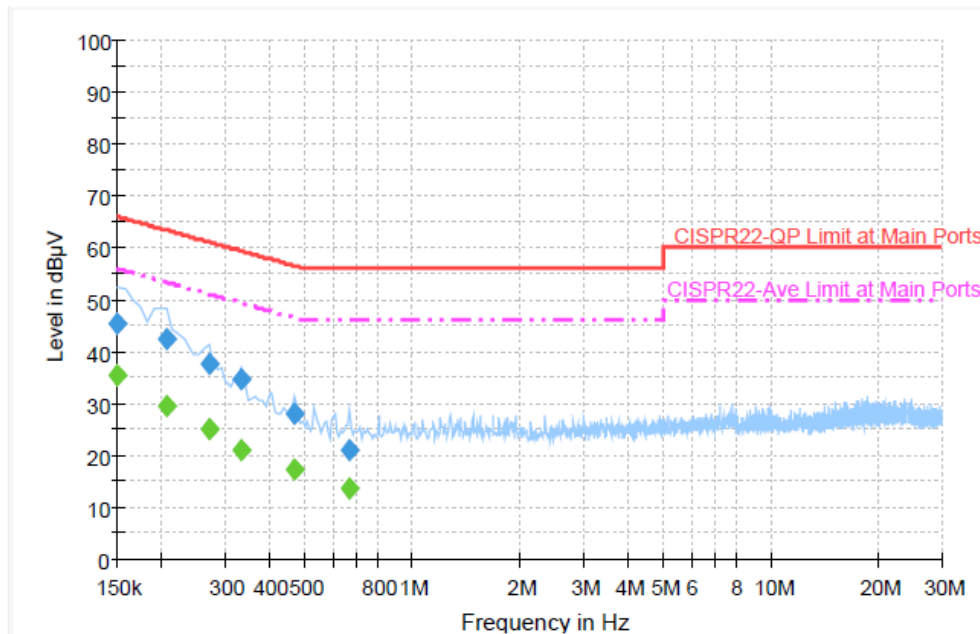
1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.9.4 Test Setup



3.9.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Cona Huang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN Tx + Bluetooth Tx		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



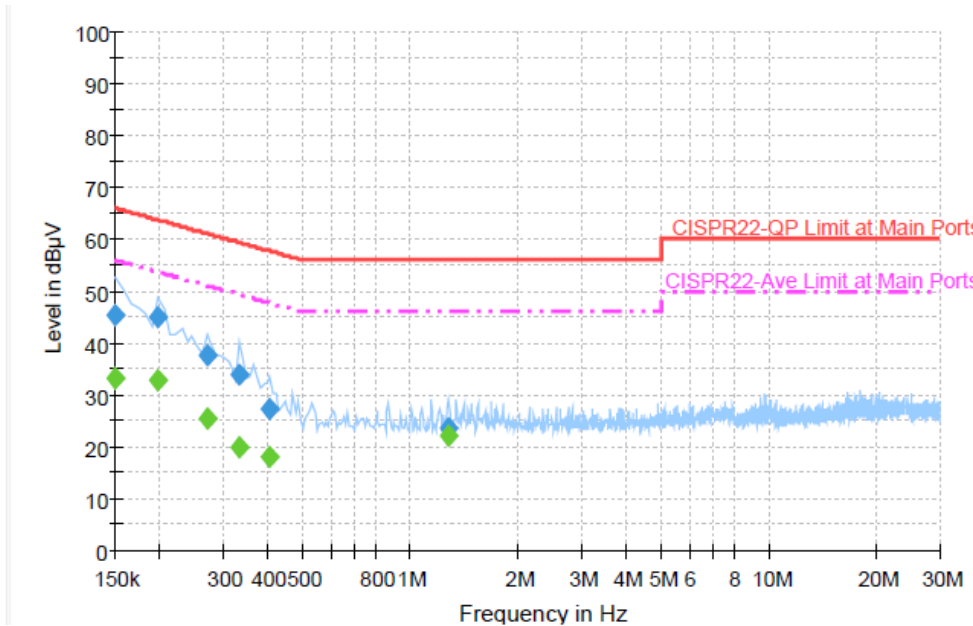
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	45.3	Off	L1	19.4	20.7	66.0
0.206000	42.3	Off	L1	19.3	21.1	63.4
0.270000	37.8	Off	L1	19.3	23.3	61.1
0.334000	34.5	Off	L1	19.3	24.9	59.4
0.470000	28.2	Off	L1	19.4	28.3	56.5
0.670000	21.0	Off	L1	19.4	35.0	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	35.5	Off	L1	19.4	20.5	56.0
0.206000	29.5	Off	L1	19.3	23.9	53.4
0.270000	25.2	Off	L1	19.3	25.9	51.1
0.334000	21.1	Off	L1	19.3	28.3	49.4
0.470000	17.2	Off	L1	19.4	29.3	46.5
0.670000	13.7	Off	L1	19.4	32.3	46.0

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Cona Huang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN Tx + Bluetooth Tx		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	45.3	Off	N	19.4	20.7	66.0
0.198000	45.0	Off	N	19.3	18.7	63.7
0.270000	37.7	Off	N	19.3	23.4	61.1
0.334000	33.8	Off	N	19.3	25.6	59.4
0.406000	27.5	Off	N	19.4	30.2	57.7
1.278000	23.8	Off	N	19.5	32.2	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	33.0	Off	N	19.4	23.0	56.0
0.198000	32.7	Off	N	19.3	21.0	53.7
0.270000	25.6	Off	N	19.3	25.5	51.1
0.334000	20.0	Off	N	19.3	29.4	49.4
0.406000	18.0	Off	N	19.4	29.7	47.7
1.278000	22.1	Off	N	19.5	23.9	46.0



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
System Simulator	R&S	CMU200	117995	N/A	Jun. 08, 2009	Jun. 07, 2011	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 11, 2010	Jun. 10, 2011	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 13, 2010	Sep. 12, 2011	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 14, 2010	Sep. 13, 2011	Conducted (TH02-HY)
Power Meter	Agilent	E4416A	GB41292344	N/A	Feb. 18, 2011	Feb. 17, 2012	Conducted (TH02-HY)
Power Sensor	Agilent	E9327A	US40441548	N/A	Feb. 18, 2011	Feb. 17, 2012	Conducted (TH02-HY)
Thermal Chamber	Ten Billion	TTH-D35P	TBN-930701	N/A	Jul. 30,2010	Jul. 29, 2011	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz – 2.75GHz	Aug. 16, 2010	Aug. 15, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz – 30MHz	Dec. 03, 2010	Dec. 02, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz – 30MHz	Dec. 01, 2010	Nov. 30, 2011	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
ISN	Teseq GmbH	ISN T400A	25696	N/A	Jun. 19, 2010	Jun. 18, 2011	Conduction (CO05-HY)
ISN	Teseq GmbH	ISN T800	27134	N/A	Jun. 19, 2010	Jun. 18, 2011	Conduction (CO05-HY)
DC- LISN	R&S	ESH3-26	1000485	0.1MHz~200MHz	Jun. 17, 2010	Jun. 16, 2011	Conduction (CO05-HY)
DC- LISN	R&S	ESH3-26	1000484	0.1MHz~200MHz	Jun. 17, 2010	Jun. 16, 2011	Conduction (CO05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 31, 2010	Oct. 30, 2011	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP	101067	9KHz ~ 30GHz	Dec. 03, 2010	Dec. 02, 2011	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 19, 2010	Aug. 18, 2011	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Dec. 06, 2010	Dec. 05, 2011	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32dB.GAIN	Mar. 29, 2010	Mar. 28, 2011	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH07-HY)

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.10	Normal (k=2)	0.05
Cable Loss	0.10	Normal (k=2)	0.05
AMN Insertion Loss	2.50	Rectangular	0.63
Receiver Specification	1.50	Rectangular	0.43
Site Imperfection	1.39	Rectangular	0.80
Mismatch	+0.34 / -0.35	U-Shape	0.24
Combined Standard Uncertainty $U_c(y)$	1.13		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.26		

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
Combined Standard Uncertainty $U_c(y)$	1.27		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.54		



Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Contribution	Uncertainty of X_i		$u(X_i)$	C_i	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	±0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	±1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	±0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site Imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\text{Log}(1-\Gamma_1*\Gamma_2)$	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty $U_c(y)$	2.36				
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.72				



Appendix A. Photographs of EUT

Please refer to Sporton report number EP121516 as below.