APPLICATION FOR CERTIFICATION
On Behalf of
Amtran Technology Co., Ltd.
Bluetooth Embedded Module
Total Model No.: BCM92046MD_EMB
FCC ID: MDZSV422XVT-BT

Prepared for : Amtran Technology Co., Ltd.
17F, No.268, Lien Chen Rd., Chung Ho City,
Taipei County, Taiwan, 235 R.O.C.

Prepared by : AUDIX Technology Corporation
EMC Department
No. 53-11, Tin-Fu Tsun, Lin-Kou,
Taipei, Taiwan

Tel : (02) 2609-9301, 2609-2133
Fax: (02) 2609-9303

File Number	:	EM981525B
Report Number	:	EM-F980571
Date of Test	:	Aug. 03 ~ 05, 2009
Date of Report	:	Aug. 13, 2009

TABLE OF CONTENTS

Appendix (Radiated Test Data for frequency rang above 1GHz at Semi-Anechoic Chamber)

TEST REPORT CERTIFICATION

Applicant	:	Amtran Technology Co., Ltd.		
EUT Description	:	Bluetooth Embedded Module		
FCC ID	:	MDZSV422XVT-BT		
		(A) MODEL NO.	:	BCM92046MD_EMB
		(B) SERIAL NO.	:	N/A
		(C) POWER SUPPLY	:	DC 5V
		(D) TEST VOLTAGE	:	AC 120V, 60Hz (Via Notebook PC)

Measurement Procedure Used:

FCC RULES AND REGULATIONS PART 15 SUBPART C, July. 2008
AND ANSI C63.4/2003

(FCC CFR 47 Part 15C, §15.205, §15.207, §15.209 and §15.247)

The device described above was tested by AUDIX Technology Corporation to determine the maximum emission levels emanating from the device. The maximum emission levels were compared to the FCC Part 15 subpart C limits.

The measurement results are contained in this test report and AUDIX Technology Corporation is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the FCC official limits.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX Technology Corporation.

Date of Test : Aug. 03 ~ 05, 2009 Date of Report : Aug. 13, 2009

Producer : _____
(Nita Lee/Administrator)

Review: _____
(Ben Cheng/Manager)

Signatory: _____
(Leon Liu/Deputy General Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description	:	Bluetooth Embedded Module
Model Number	:	BCM92046MD_EMB
FCC ID	:	MDZSV422XVT-BT
Applicant	:	Amtran Technology Co., Ltd. 17F, No.268, Lien Chen Rd., Chung Ho City, Taipei County, Taiwan, 235 R.O.C.
Fundamental Range	:	2400MHz ~ 2483.5MHz
Channel Number	:	79
Radio Technology	:	FHSS Modulation
Antenna Gain	:	1.87dBi
Date of Receipt of Sample	:	Aug. 03 ~ 05, 2009
Date of Test	:	Jul. 23, 2009

1.2. Tested Supporting System Details

1.2.1. LCD TV

Model Number	:	VIZIO SV422XVT
Serial Number	:	N/A
BSMI ID	:	R31421
FCC ID	:	FCC By DoC
Manufacturer	:	VIZIO
Power Cord	:	Non-Shielded, Detachable, 1.8m (3 Pin)

1.2.2. NOTEBOOK PC

Model Number	:	PP2130
Serial Number	:	5Y32KSQZ40ME
BSMI ID	:	3912A556
FCC ID	:	FCC By DoC
Manufacturer	:	LG (Brand Compaq)
Power Adapter	:	COMPAQ, M/N PA-1650-02C DC Power Cord: Shielded, Undetachable, 1.8m Bonded a ferrite core AC Power Cord: Non-Shielded, Undetachable, 1.8m

1.3. Description of Test Facility

Name of Firm	:	**AUDIX Technology Corporation** **EMC Department** No. 53-11, Tin-Fu Tsun, Lin-Kou Hsiang, Taipei County, Taiwan, R.O.C.
Test Site	:	**Semi-Anechoic Chamber** No. 53-11, Tin-Fu Tsun, Lin-Kou Hsiang, Taipei Hsien, Taiwan May 14, 2009 Renewal on Federal Communication Commission Registration Number: 90993
NVLAP Lab. Code	:	200077-0

(NVLAP is a NATA accredited body under Mutual Recognition Agreement)

TAF Accreditation No	:	1724

1.4. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB)
Radiation Test (Distance: 3m)	30MHz~300MHz	±2.91dB
	300MHz~1000MHz	±2.94dB
	Above 1GHz	± 5.02dB

Remark **:** Uncertainty = $ku_c(y)$

Test Item	Uncertainty
20dB Bandwidth	± 0.2kHz
Carrier Frequency Separation	± 0.2kHz
Time Of Occupancy	± 0.03sec
Maximum peak Output power	± 0.52dBm
Emission Limitations	± 0.13dB
Band Edges	± 0.13dB

2. CONDUCTED EMISSION MEASUREMET

【The EUT only employs DC power for operation, no conductive emission limits are required according to FCC Part 15 Section §15.207】

3. RADIATED EMISSION MEASUREMENT

3.1. Test Equipment

The following test equipment was used during the radiated emission measurement:

3.1.1. For Frequency 30MHz~1000MHz (at Semi-Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	HP	8564EC	3946A00249	Oct. 24, 08'	Oct. 23, 09'
2.	Test Receiver	R & S	ESCS30	100265	Aug. 28, 08'	Aug. 27, 09'
3.	Amplifier	HP	8447D	2944A06305	Feb. 04, 09'	Feb. 03, 10'
4.	Log Periodic Antenna	Schwarzbeck	UHALP 9108-A	0810	Mar. 20, 09'	Mar. 19, 10'
5.	Biconical Antenna	CHASE	VBA6106A	1264	Mar. 20, 09'	Mar. 19, 10'

3.1.2. For Frequency Above 1GHz (at Semi-Anechoic Chamber)

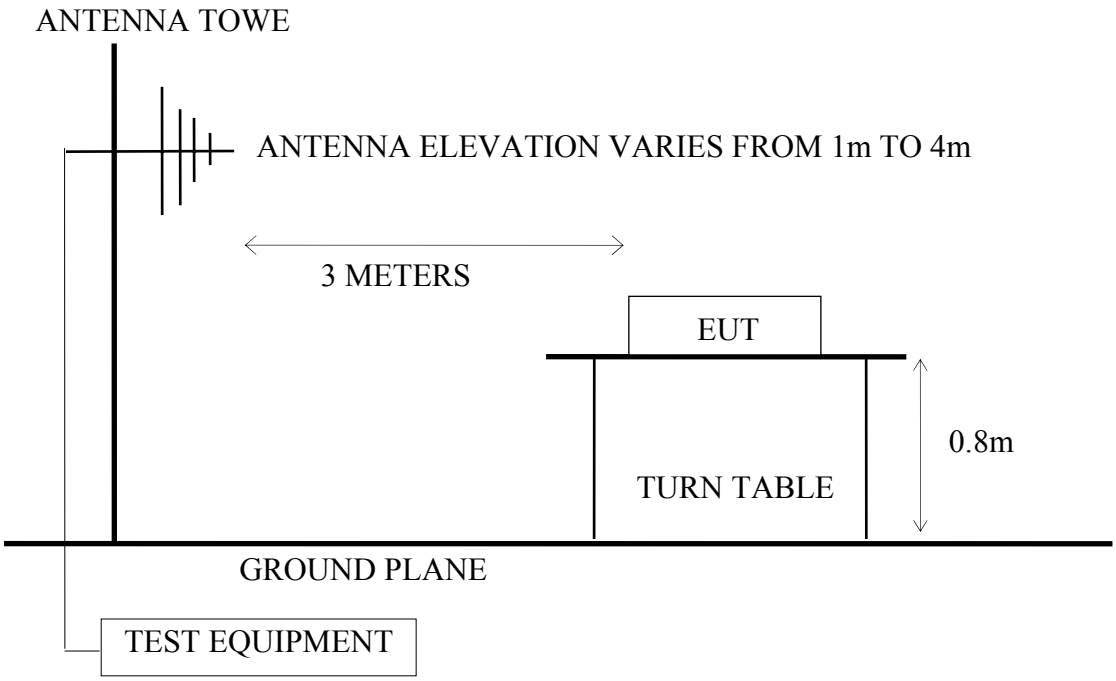
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	HP	8564EC	3946A00249	Oct. 24, 08'	Oct. 23, 09'
2.	Amplifier	HP	8449B	3008A01284	Jun. 17, 09'	Jun. 16, 10'
3.	Horn Antenna	EMCO	3115	9112-3775	May 15, 09'	May 14, 10'
4.	Horn Antenna	EMCO	3116	2653	Oct. 03, 08'	Oct. 02, 09'

3.2. Test Setup

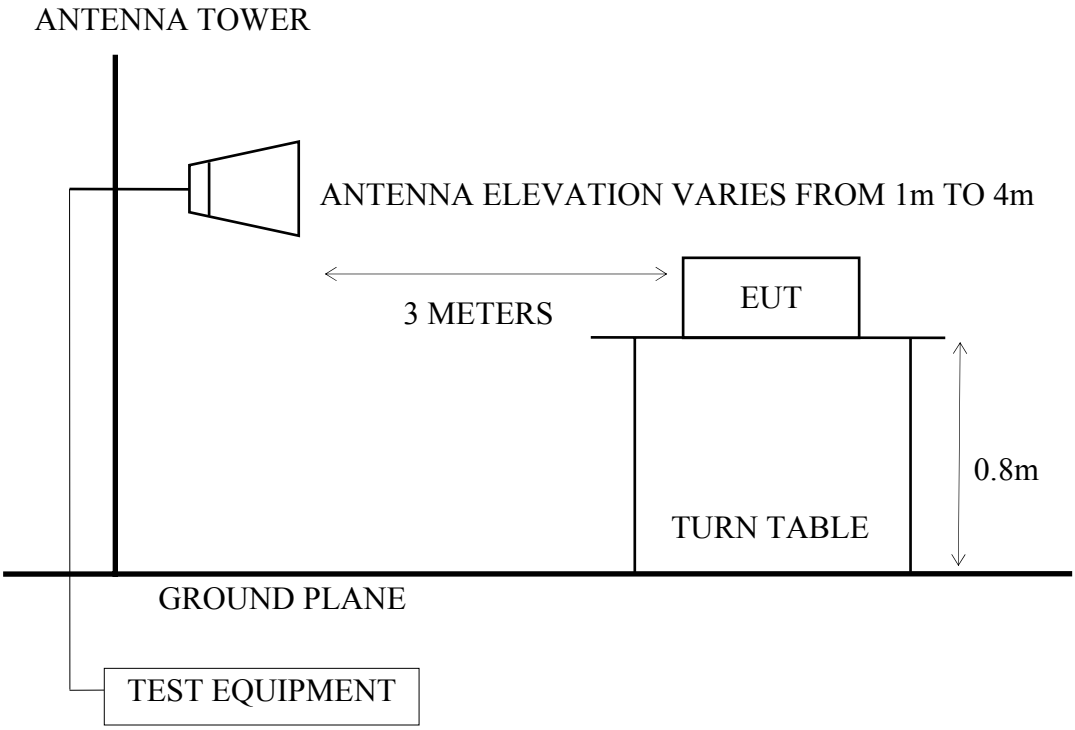
3.2.1. Block Diagram of connection between EUT and simulators

EUT: Bluetooth Embedded Module

3.2.2. Semi-Anechoic Chamber (3m) Setup Diagram for 30-1000MHz



3.2.3. Semi-Anechoic Chamber (3m) Setup Diagram for above 1GHz



3.3. Radiated Emission Limits (§15.209)

Frequency MHz	Distance Meters	Field Strengths Limits	
		μV/m	dBμV/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0
Above 1000	3	74.0 dBμV/m (Peak) 54.0 dBμV/m (Average)	

Remark： (1) Emission level (dBμV/m) = 20 log Emission level (μV/m)
(2) The tighter limit applies at the edge between two frequency bands.
(3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
(4) The limits in this table are based on CFR 47 Part 15.205(a)(b) and Part 15.209 (a).
(5) The over 1GHz limit, FCC limit is used based on CFR 47 Part 15.35 (b) and Part 15.205(b) & Part 15.209(e) and Part 15.207(c).

3.4. Operating Condition of EUT

3.4.1. Set up the EUT (Bluetooth Embedded Module) and simulator as shown on 3.2.1.

3.4.2. To turn on the power of all equipment.

3.4.3. The EUT was set to continuously transmit signals at 2402MHz, 2441MHz and 2480MHz during testing.

3.4.4. The EUT was set to continuously receive signals at 2441MHz during testing.

3.5. Test Procedure

The EUT and its simulators were placed on a turn table which was 0.8 meter above the ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. EUT was set to 3 meters away from the receiving antenna which was mounted on an antenna tower. The antenna moved up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna such as calibrated biconical and log-periodical antennas or horn antenna were used as a receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to FCC ANSI C63.4-2003 regulation.

The bandwidth of the R&S Test Receiver ESCS30 was set at 120kHz. (For 30MHz to 1000MHz)

The resolution bandwidth and video bandwidth of test spectrum analyzer is 1MHz for peak detection (PK) at frequency above 1GHz.

The resolution bandwidth of test spectrum analyzer is 1MHz and the video bandwidth is 3kHz for average detection (AV) at frequency above 1GHz.

The frequency range from 30MHz to 25GHz (Up to 10^{th} harmonics from fundamental frequency) was checked.

3.6. Radiated Emission Measurement Results

PASSED. All the emissions not reported below are too low against the official limits. [Note: Three types of modulation (GFSK and 8-DPSK and π/4-DQPSK) were evaluated but only the worst case (GFSK) was reported in this report.]

EUT：Bluetooth Embedded Module M/N：BCM92046MD_EMB

Test Date : Aug. 03, 2009 Temperature : 26 ℃ Humidity : 53 %

For Frequency Range 30MHz~1000MHz:

The EUT with following test modes was performed during this section testing and all the test results are listed in section 3.6.1.

Mode	Test Mode and Frequency		Reference Test Data No.	
			Horizontal	Vertical
1.	Transmitting	2402MHz (CH0)	# 10	# 9
2.		2441MHz (CH39)	# 9	# 10
3.		2480MHz (CH78)	# 10	# 9
4.	Receiving	2441MHz (CH39)	# 9	# 10

* Type of modulation: GFSK.
* All above final readings were measured with Quasi-Peak detector.

For Frequency above 1GHz:

The EUT with the following test modes was measured within semi-anechoic chamber. All the graphical results are attached in Appendix I.
Test Modes 5 & 9 (Frequency range: 1000-2680MHz) was measurement with Peak and Average detector are listed in section 3.6.2.

Mode	Test Mode and Frequency		Test Frequency Range
1.	Transmitting	2402MHz (CH0)	1000-2680MHz
2.			2680-5500MHz
3.			5500-18000MHz
4.			18000-25000MHz
***5.**	Transmitting	2441MHz (CH39)	**1000-2680MHz**
6.			2680-5500MHz
7.			5500-18000MHz
8.			18000-25000MHz
***9.**	Transmitting	2480MHz (CH78)	**1000-2680MHz**
10.			2680-5500MHz
11.			5500-18000MHz
12.			18000-25000MHz
13.	Receiving	2441MHz (CH39)	1000-2680MHz
14.			2680-5500MHz
15.			5500-18000MHz
16.			18000-25000MHz

* Above all final readings were measured with Peak detector and Average detector.
* Type of modulation: GFSK.

(**Test Modes 1~ 4 & 6 ~8 & 10 ~16** emissions level is too low to be measured, therefore, the reading values not reported.)

For Restricted Bands:

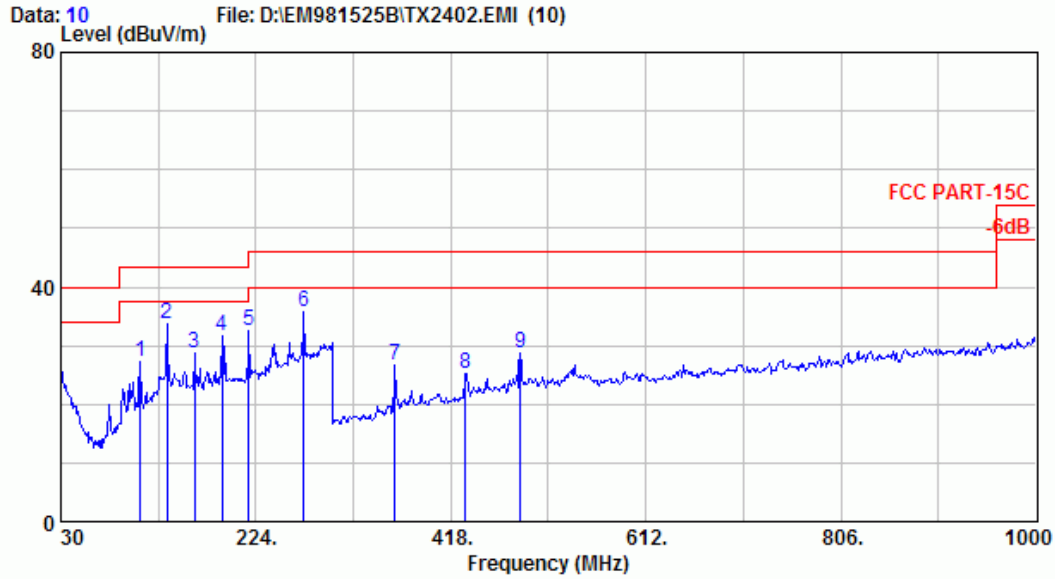
The EUT was tested in restricted bands and all the test results are listed in section 3.6.3. (The restricted bands defined in part 15.205(a))

Mode	Test Mode and Frequency		Reference Test Data No.	
			Horizontal	Vertical
1.	Transmitting	2402MHz (CH0)	# 1, # 4	# 2 , # 3
2.		2480MHz (CH78)	# 7, # 6	# 8, # 5

* Type of modulation: GFSK.

3.6.1. 30MHz~ 1000MHz Frequency Range Measurement Result

AUDIX TECHNOLOGY Corp. EMC Laboratory
No.53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei County, Taiwan R.O.C. Post Code:24443
Tel:+886-2-26092133 Fax:+886-2-26099303
Email:ttemc@ttemc.com.tw

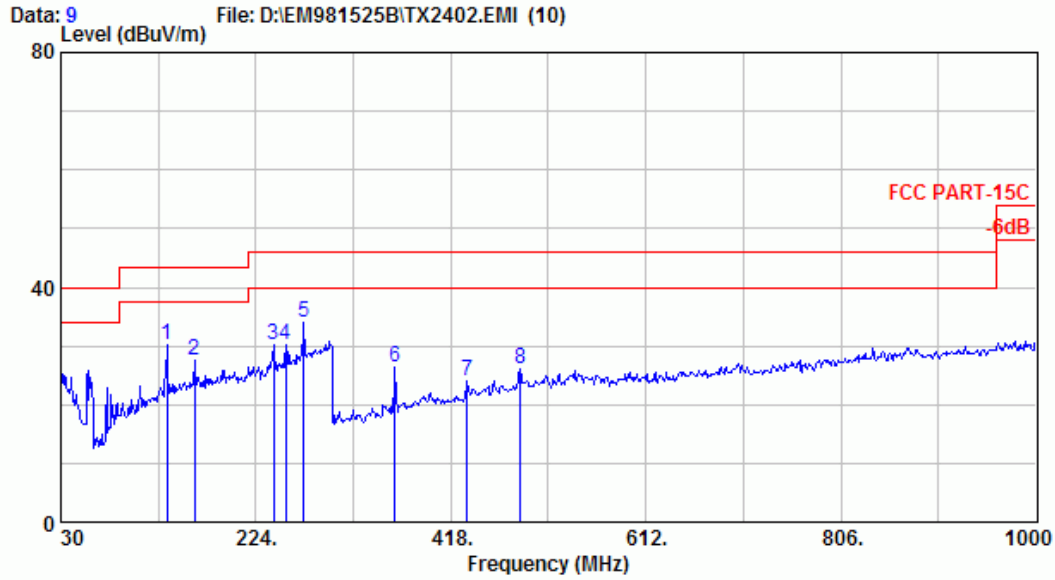


Site no. : site
Data no. : 10
Dis. / Ant. : 3m VBA6106A/UHALP9108A
Ant. pol. : HORIZONTAL
Limit : FCC PART-15C
Env. / Ins. : 8564EC 26*C/53%
Engineer : Jarwei Wang
EUT : Bluetooth Embedded Module
Power Rating : 120Vac/60Hz M/N:BCM92046MD_EMB
Test Mode : TX2402

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	109.540	18.13	2.20	7.05	27.38	43.50	16.12	
2	135.730	19.95	2.40	11.47	33.82	43.50	9.68	
3	162.890	20.87	2.70	5.20	28.78	43.50	14.72	
4	190.050	21.51	2.92	7.19	31.62	43.50	11.88	
5	217.210	21.90	3.20	7.54	32.64	46.00	13.36	
6	271.530	25.06	3.70	6.94	35.70	46.00	10.30	
7	362.710	16.38	4.50	5.69	26.57	46.00	19.43	
8	432.550	17.28	5.20	2.72	25.20	46.00	20.80	
9	486.870	18.67	6.20	3.96	28.83	46.00	17.17	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

AUDIX TECHNOLOGY Corp. EMC Laboratory
No.53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei
County, Taiwan R.O.C. Post Code:24443
Tel:+886-2-26092133 Fax:+886-2-26099303
Email:ttemc@ttemc.com.tw

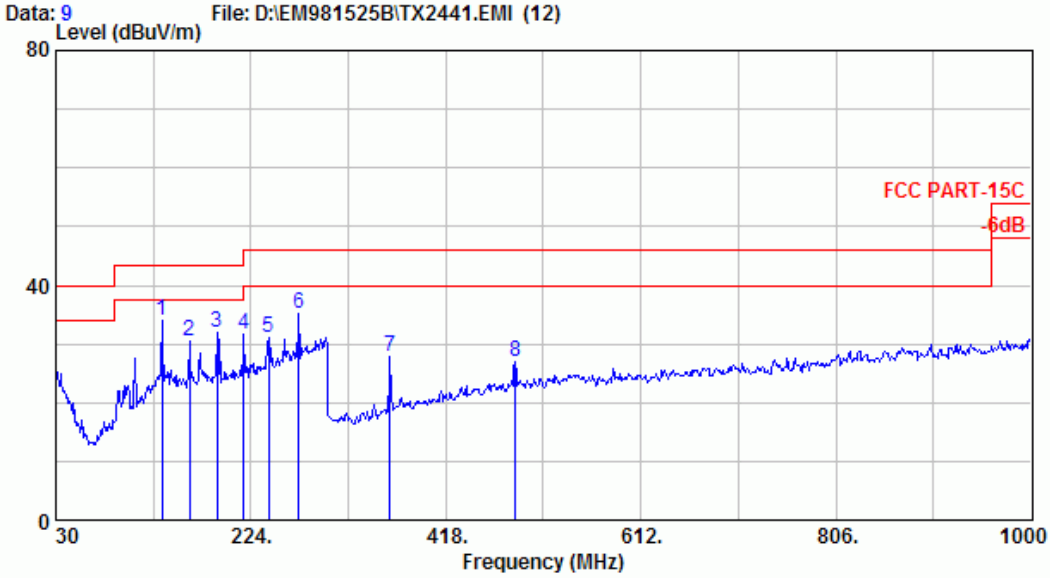


Site no. : site
Data no. : 9
Dis. / Ant. : 3m VBA6106A/UHALP9108A
Ant. pol. : VERTICAL
Limit : FCC PART-15C
Env. / Ins. : 8564EC 26*C/53%
Engineer : Jarwei Wang
EUT : Bluetooth Embedded Module
Power Rating : 120Vac/60Hz M/N:BCM92046MD_EMB
Test Mode : TX2402

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	135.730	19.95	2.40	7.90	30.25	43.50	13.25	
2	162.890	20.87	2.70	3.96	27.54	43.50	15.96	
3	241.460	23.16	3.40	3.49	30.05	46.00	15.95	
4	254.070	24.13	3.60	2.47	30.20	46.00	15.80	
5	271.530	25.06	3.70	5.34	34.10	46.00	11.90	
6	362.710	16.38	4.50	5.41	26.29	46.00	19.71	
7	434.490	17.36	5.24	1.45	24.04	46.00	21.96	
8	486.870	18.67	6.20	1.23	26.10	46.00	19.90	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

AUDIX TECHNOLOGY Corp. EMC Laboratory
No.53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei
County, Taiwan R.O.C. Post Code:24443
Tel:+886-2-26092133 Fax:+886-2-26099303
Email:ttemc@ttemc.com.tw

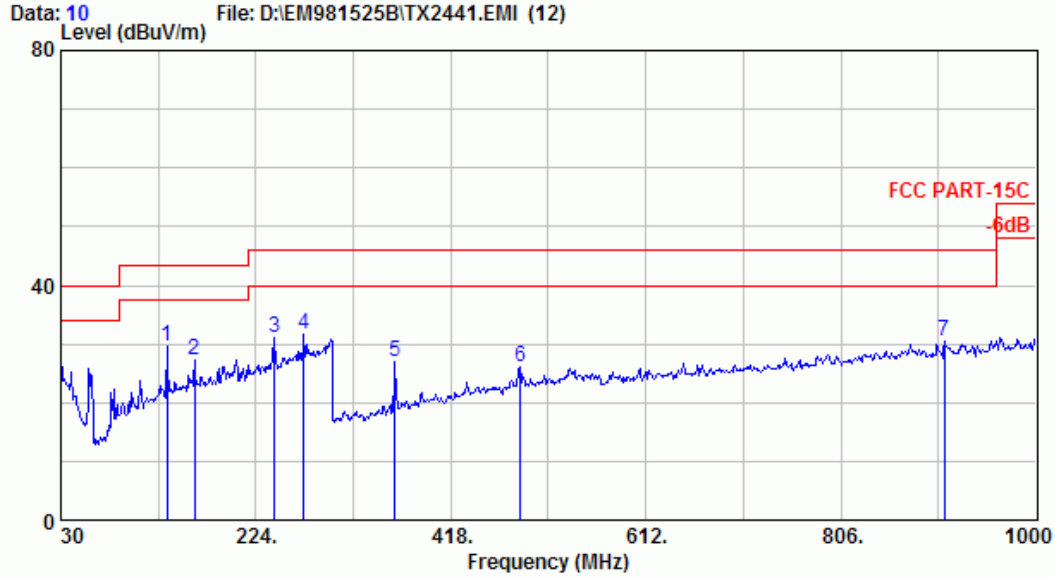


Site no. : site
Data no. : 9
Dis. / Ant. : 3m VBA6106A/UHALP9108A
Ant. pol. : HORIZONTAL
Limit : FCC PART-15C
Env. / Ins. : 8564EC 26*C/53%
Engineer : Jarwei Wang
EUT : Bluetooth Embedded Module
Power Rating : 120Vac/60Hz M/N:BCM92046MD_EMB
Test Mode : TX2441

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	135.730	19.95	2.40	11.63	33.98	43.50	9.52	
2	162.890	20.87	2.70	6.84	30.42	43.50	13.08	
3	190.050	21.51	2.92	7.65	32.08	43.50	11.42	
4	217.210	21.90	3.20	6.54	31.64	46.00	14.36	
5	241.460	23.16	3.40	4.57	31.13	46.00	14.87	
6	271.530	25.06	3.70	6.40	35.16	46.00	10.84	
7	362.710	16.38	4.50	7.03	27.91	46.00	18.09	
8	486.870	18.67	6.20	2.20	27.07	46.00	18.93	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

AUDIX TECHNOLOGY Corp. EMC Laboratory
No.53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei
County, Taiwan R.O.C. Post Code:24443
Tel:+886-2-26092133 Fax:+886-2-26099303
Email:ttemc@ttemc.com.tw

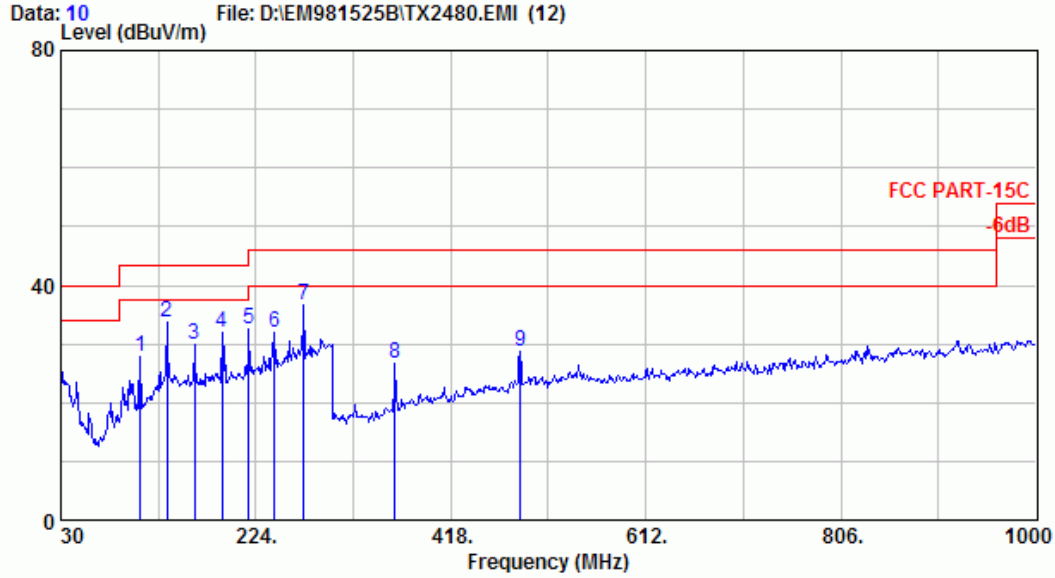


Site no. : site
Data no. : 10
Dis. / Ant. : 3m VBA6106A/UHALP9108A
Ant. pol. : VERTICAL
Limit : FCC PART-15C
Env. / Ins. : 8564EC 26*C/53%
Engineer : Jarwei Wang
EUT : Bluetooth Embedded Module
Power Rating : 120Vac/60Hz M/N:BCM92046MD_EMB
Test Mode : TX2441

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	135.730	19.95	2.40	7.19	29.54	43.50	13.96	
2	162.890	20.87	2.70	3.78	27.36	43.50	16.14	
3	242.430	23.23	3.40	4.39	31.03	46.00	14.97	
4	271.530	25.06	3.70	2.75	31.51	46.00	14.49	
5	362.710	16.38	4.50	6.13	27.01	46.00	18.99	
6	486.870	18.67	6.20	1.07	25.94	46.00	20.06	
7	908.820	25.01	7.40	-1.98	30.43	46.00	15.57	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

AUDIX TECHNOLOGY Corp. EMC Laboratory
No.53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei
County, Taiwan R.O.C. Post Code:24443
Tel:+886-2-26092133 Fax:+886-2-26099303
Email:ttemc@ttemc.com.tw

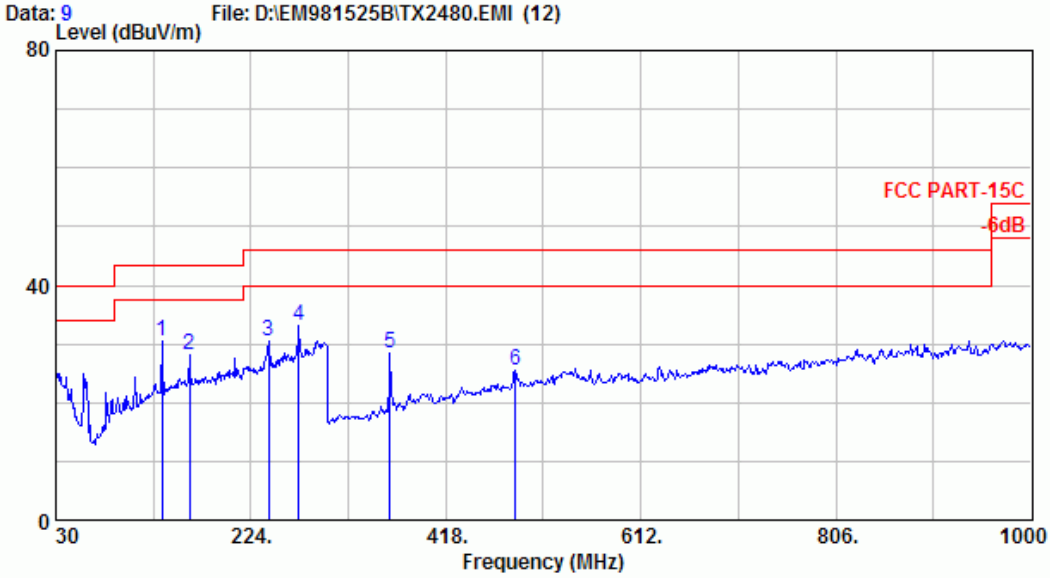


Site no. : site
Data no. : 10
Dis. / Ant. : 3m VBA6106A/UHALP9108A
Ant. pol. : HORIZONTAL
Limit : FCC PART-15C
Env. / Ins. : 8564EC 26*C/53%
Engineer : Jarwei Wang
EUT : Bluetooth Embedded Module
Power Rating : 120Vac/60Hz M/N:BCM92046MD_EMB
Test Mode : TX2480

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	109.540	18.13	2.20	7.47	27.80	43.50	15.70	
2	135.730	19.95	2.40	11.36	33.71	43.50	9.79	
3	162.890	20.87	2.70	6.17	29.75	43.50	13.75	
4	190.050	21.51	2.92	7.56	31.99	43.50	11.51	
5	217.210	21.90	3.20	7.42	32.52	46.00	13.48	
6	242.430	23.23	3.40	5.42	32.06	46.00	13.94	
7	271.530	25.06	3.70	7.76	36.52	46.00	9.48	
8	362.710	16.38	4.50	5.89	26.77	46.00	19.23	
9	486.870	18.67	6.20	3.78	28.65	46.00	17.35	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

AUDIX TECHNOLOGY Corp. EMC Laboratory
No.53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei
County, Taiwan R.O.C. Post Code:24443
Tel:+886-2-26092133 Fax:+886-2-26099303
Email:ttemc@ttemc.com.tw

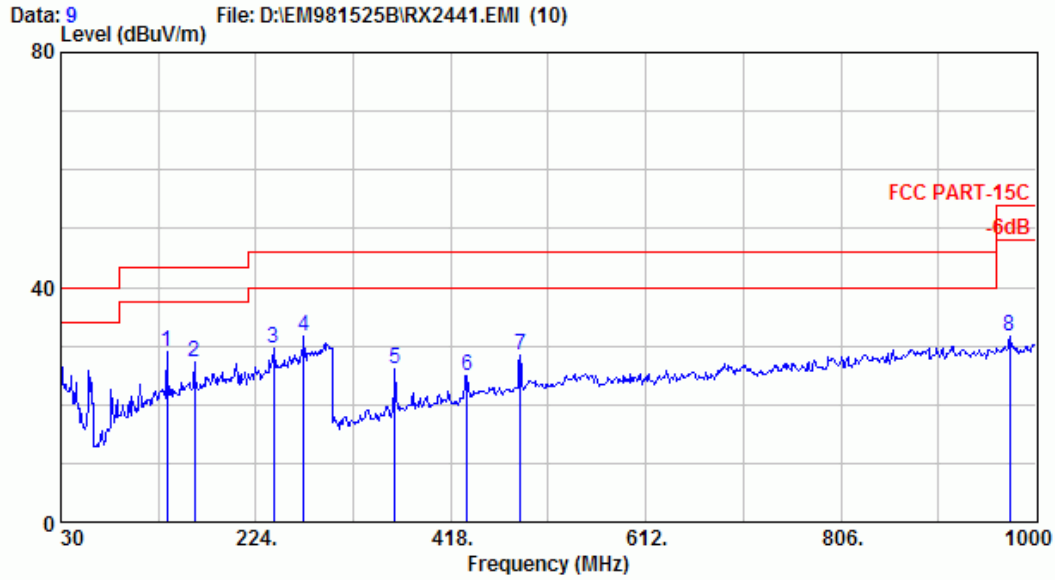


Site no. : site
Data no. : 9
Dis. / Ant. : 3m VBA6106A/UHALP9108A
Ant. pol. : VERTICAL
Limit : FCC PART-15C
Env. / Ins. : 8564EC 26*C/53%
Engineer : Jarwei Wang
EUT : Bluetooth Embedded Module
Power Rating : 120Vac/60Hz M/N:BCM92046MD_EMB
Test Mode : TX2480

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	135.730	19.95	2.40	7.99	30.34	43.50	13.16	
2	162.890	20.87	2.70	4.62	28.20	43.50	15.30	
3	241.460	23.16	3.40	3.79	30.35	46.00	15.65	
4	271.530	25.06	3.70	4.40	33.16	46.00	12.84	
5	362.710	16.38	4.50	7.65	28.53	46.00	17.47	
6	486.870	18.67	6.20	0.61	25.48	46.00	20.52	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

AUDIX TECHNOLOGY Corp. EMC Laboratory
No.53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei
County, Taiwan R.O.C. Post Code:24443
Tel:+886-2-26092133 Fax:+886-2-26099303
Email:ttemc@ttemc.com.tw

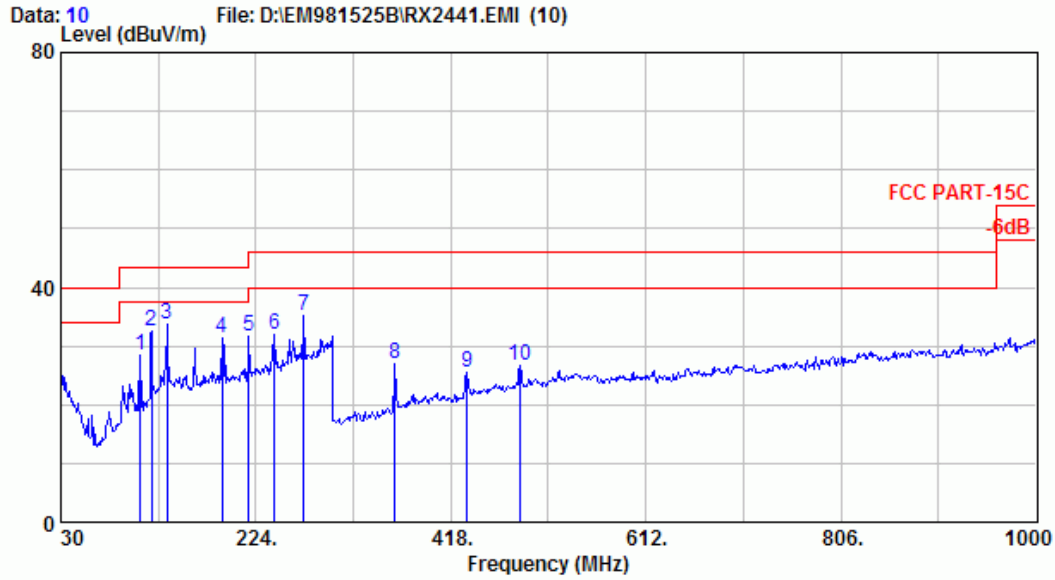


Site no. : site
Data no. : 9
Dis. / Ant. : 3m VBA6106A/UHALP9108A
Ant. pol. : HORIZONTAL
Limit : FCC PART-15C
Env. / Ins. : 8564EC 26*C/53%
Engineer : Jarwei Wang
EUT : Bluetooth Embedded Module
Power Rating : 120Vac/60Hz M/N:BCM92046MD_EMB
Test Mode : RX2441

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	135.730	19.95	2.40	6.52	28.87	43.50	14.63	
2	162.890	20.87	2.70	3.78	27.36	43.50	16.14	
3	241.460	23.16	3.40	3.08	29.64	46.00	16.36	
4	271.530	25.06	3.70	2.84	31.60	46.00	14.40	
5	362.710	16.38	4.50	5.13	26.01	46.00	19.99	
6	434.490	17.36	5.24	2.30	24.89	46.00	21.11	
7	486.870	18.67	6.20	3.57	28.44	46.00	17.56	
8	973.810	26.64	7.70	-2.76	31.59	54.00	22.41	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

AUDIX TECHNOLOGY Corp. EMC Laboratory
No.53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei
County, Taiwan R.O.C. Post Code:24443
Tel:+886-2-26092133 Fax:+886-2-26099303
Email:ttemc@ttemc.com.tw



Site no. : site
Dis. / Ant. : 3m VBA6106A/UHALP9108A
Limit : FCC PART-15C
Env. / Ins. : 8564EC 26*C/53%
EUT : Bluetooth Embedded Module
Power Rating : 120Vac/60Hz M/N:BCM92046MD_EMB
Test Mode : RX2441

Data no. : 10
Ant. pol. : VERTICAL
Engineer : Jarwei Wang

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	109.540	18.13	2.20	8.16	28.49	43.50	15.01	
2	120.210	19.08	2.30	11.01	32.39	43.50	11.11	
3	135.730	19.95	2.40	11.43	33.78	43.50	9.72	
4	190.050	21.51	2.92	6.83	31.26	43.50	12.24	
5	217.210	21.90	3.20	6.66	31.76	46.00	14.24	
6	242.430	23.23	3.40	5.21	31.85	46.00	14.15	
7	271.530	25.06	3.70	6.45	35.21	46.00	10.79	
8	362.710	16.38	4.50	5.94	26.82	46.00	19.18	
9	434.490	17.36	5.24	2.76	25.35	46.00	20.65	
10	486.870	18.67	6.20	1.92	26.79	46.00	19.21	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

3.6.2. Above 1GHz Frequency Range Measurement Results

Date of Test：	Aug. 03, 2009	Temperature：	26℃
EUT：	Bluetooth Embedded Module	Humidity：	53%
Test Mode：	Transmitting Mode, Frequency: 2441MHz (CH39)	Test Voltage：	DC 5V

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dBμV	Meter Reading Horizontal dBμV/m	Emission Level Horizontal dBμV/m	Limits dB	Margin
Peak	2409.520	28.63	6.36	7.16	42.15	74.00	31.85
Average	2409.520	28.63	6.36	2.38	37.37	54.00	16.63

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dBμV	Meter Reading Vertical dBμV/m	Emission Level Vertical dBμV/m	Limits dB	Margin
Peak	2406.160	28.63	6.36	10.90	45.89	74.00	28.11
Average	2406.160	28.63	6.36	4.59	39.58	54.00	14.42

Remark ： 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Measurement was up to 25GHz, but the emissions level were too low against the official limit and not report.

Date of Test：	Aug. 03, 2009	Temperature：	26℃
EUT：	Bluetooth Embedded Module	Humidity：	53%
Test Mode：	Transmitting Mode, Frequency: 2480MHz (CH78)	Test Voltage：	DC 5V

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dBμV	Meter Reading Horizontal dBμV/m	Emission Level Horizontal dBμV/m	Limits dB	Margin
Peak	2406.160	28.63	6.36	6.02	41.01	74.00	32.99
Average	2406.160	28.63	6.36	1.87	36.86	54.00	17.14

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dBμV	Meter Reading Vertical dBμV/m	Emission Level Vertical dBμV/m	Limits dB	Margin
Peak	2409.520	28.63	6.36	7.50	42.49	74.00	31.51
Average	2409.520	28.63	6.36	2.55	37.54	54.00	16.46

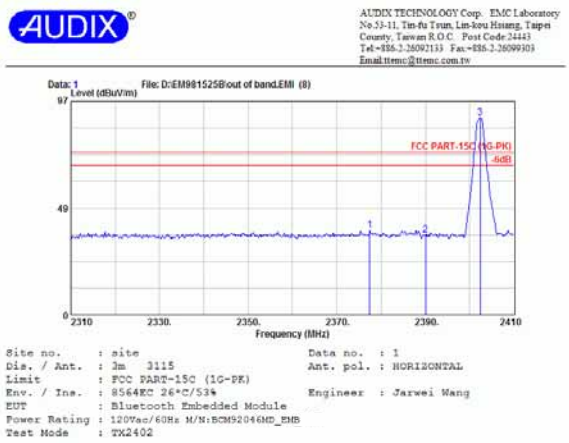
Remark ： 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Measurement was up to 25GHz, but the emissions level were too low against the official limit and not report.

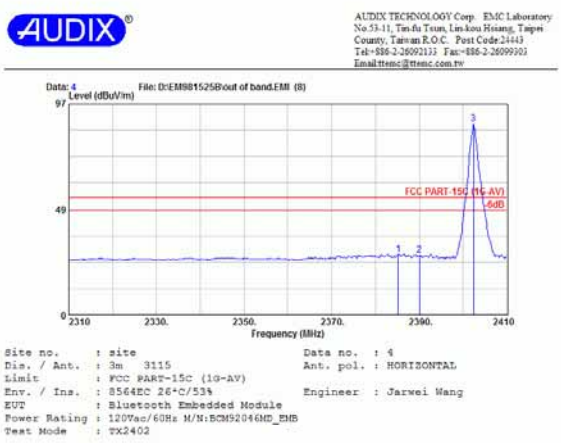
3.6.3. Restricted Bands Measurement Results

Date of Test：	Aug. 03, 2009	Temperature：	26℃
EUT：	Bluetooth Embedded Module	Humidity：	53%
Test Mode：	Transmitting Mode, Frequency: 2402MHz (CH0)	Test Voltage：	DC 5V

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dBμV	Meter Reading Horizontal dBμV/m	Emission Level Horizontal dBμV/m	Limits dB	Margin
Peak *	2377.400	28.58	6.32	3.52	38.42	74.00	35.58
Average *	2385.200	28.59	6.33	-7.06	27.86	54.00	26.14

Remark ： 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Low frequency section (spurious in the restricted band 2310-2390MHz).
3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.

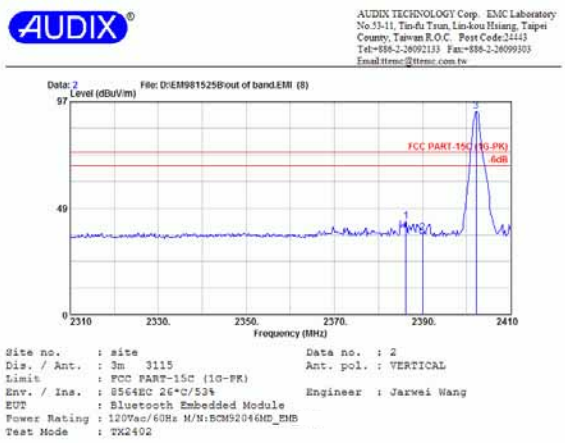


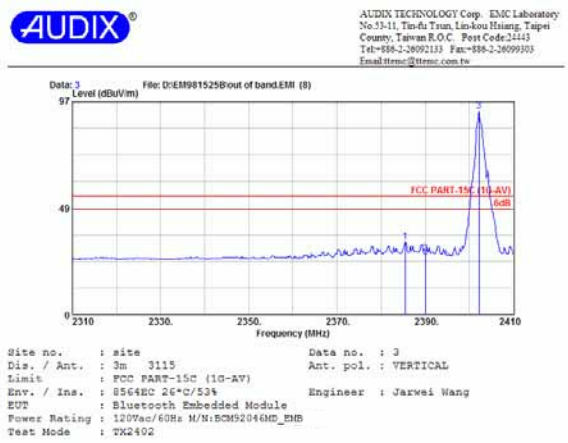


Date of Test：	Aug. 03, 2009	Temperature：	26℃
EUT：	Bluetooth Embedded Module	Humidity：	53%
Test Mode：	Transmitting Mode, Frequency: 2402MHz (CH0)	Test Voltage：	DC 5V

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dBμV	Meter Reading Vertical dBμV/m	Emission Level Vertical dBμV/m	Limits dB	Margin
Peak *	2386.200	28.59	6.33	7.76	42.68	74.00	31.32
Average *	2385.400	28.59	6.33	-1.90	33.02	54.00	20.98

Remark ： 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Low frequency section (spurious in the restricted band 2310-2390MHz).
3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.

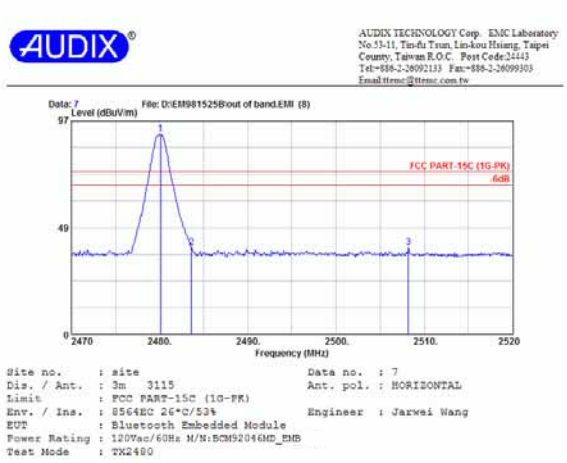


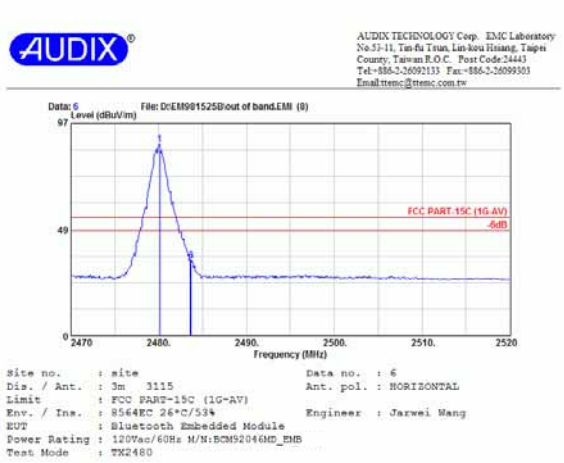


Date of Test：	Aug. 03, 2009	Temperature：	26℃
EUT：	Bluetooth Embedded Module	Humidity：	53%
Test Mode：	Transmitting Mode, Frequency: 2480MHz (CH78)	Test Voltage：	DC 5V

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dBμV	Meter Reading Horizontal dBμV/m	Emission Level Horizontal dBμV/m	Limits dB	Margin
Peak *	2483.600	28.77	6.45	4.05	39.27	74.00	34.73
Average *	2483.700	28.77	6.45	-1.24	33.98	54.00	20.02

Remark ： 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Low frequency section (spurious in the restricted band 2483.5-2500MHz).
3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.

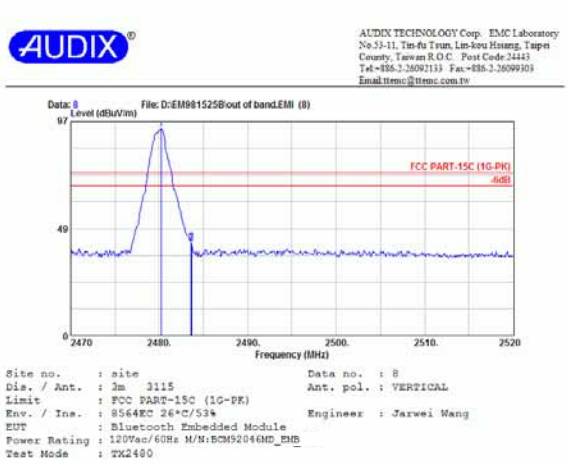


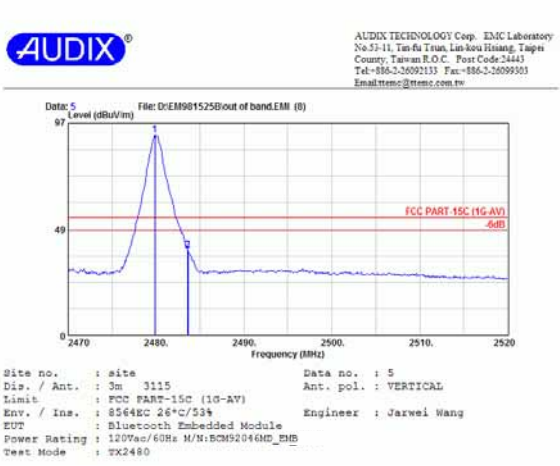


Date of Test：	Aug. 03, 2009	Temperature：	26℃
EUT：	Bluetooth Embedded Module	Humidity：	53%
Test Mode：	Transmitting Mode, Frequency: 2480MHz (CH78)	Test Voltage：	DC 5V

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dBμV	Meter Reading Vertical dBμV/m	Emission Level Vertical dBμV/m	Limits dB	Margin
Peak *	2483.600	28.77	6.45	6.91	42.13	74.00	31.87
Average *	2483.600	28.77	6.45	3.79	39.01	54.00	14.99

Remark ： 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Low frequency section (spurious in the restricted band 2483.5-2500MHz).
3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.





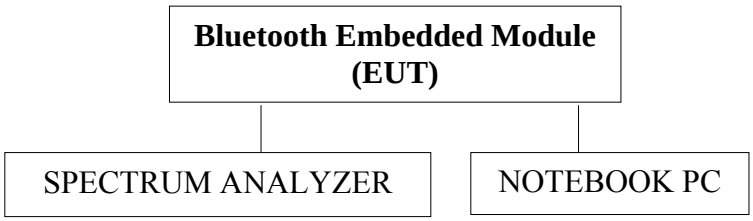
4. 20dB BANDWIDTH MEASUREMENT

4.1. Test Equipment

The following test equipment was used during the 20dB bandwidth measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9020A	MY48011382	Sep. 22, 08'	Sep. 21, 09'

4.2. Block Diagram of Test Setup



4.3. Specification Limits (§15.247(a)(1))

Alternatively, frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

4.4. Operating Condition of EUT

4.4.1. Set up the EUT and simulator as shown on 4.2.

4.4.2. To turn on the power of all equipment.

4.4.3. The EUT (Bluetooth Embedded Module) was on transmitting frequency function during the testing.

4.5. Test Procedure follow DA00-705

The transmitter output was connected to the spectrum analyzer. The RBW of the fundamental frequency was measure by spectrum analyzer 1% of the 20dB bandwidth and the setting equal to RBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

4.6. Test Results

PASSED. All the test results are attached in next pages.

[Note: Two types of modulation (GFSK and 8-DPSK) were reported in this report.]

EUT：Bluetooth Embedded Module M/N：BCM92046MD_EMB

Test Date : Aug. 03, 2009 Temperature : 26 ℃ Humidity : 53 %

4.6.1.Type of Modulation: GFSK

No.	Channel	Test Frequency	**20dB Bandwidth**	**2/3 (20dB Bandwidth)**
1.	0	2402MHz	**0.723MHz**	**0.482MHz**
2.	39	2441MHz	**0.720MHz**	**0.480MHz**
3.	78	2480MHz	**0.723MHz**	**0.482MHz**

The maximum two-thirds of the 20dB bandwidth shall be at maximum 0.482MHz.

4.6.2.Type of Modulation: 8-DPSK

No.	Channel	Test Frequency	**20dB Bandwidth**	**2/3 (20dB Bandwidth)**
1.	0	2402MHz	**1.251MHz**	**0.834MHz**
2.	39	2441MHz	**1.248MHz**	**0.832MHz**
3.	78	2480MHz	**1.254MHz**	**0.836MHz**

The maximum two-thirds of the 20dB bandwidth shall be at maximum 0.836MHz.

Figure 1: GFSK, Channel 0, Frequency: 2402MHz

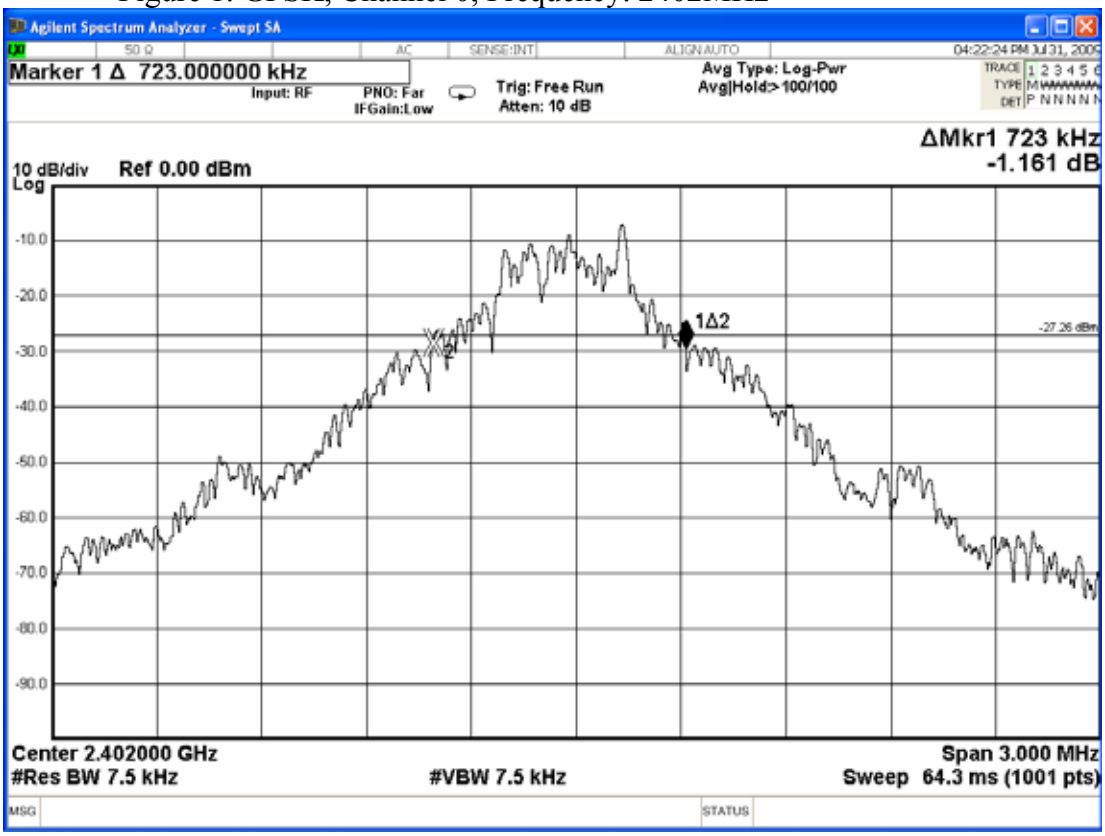


Figure 2: GFSK, Channel 39, Frequency: 2441MHz

Figure 3: GFSK, Channel 78, Frequency: 2480MHz

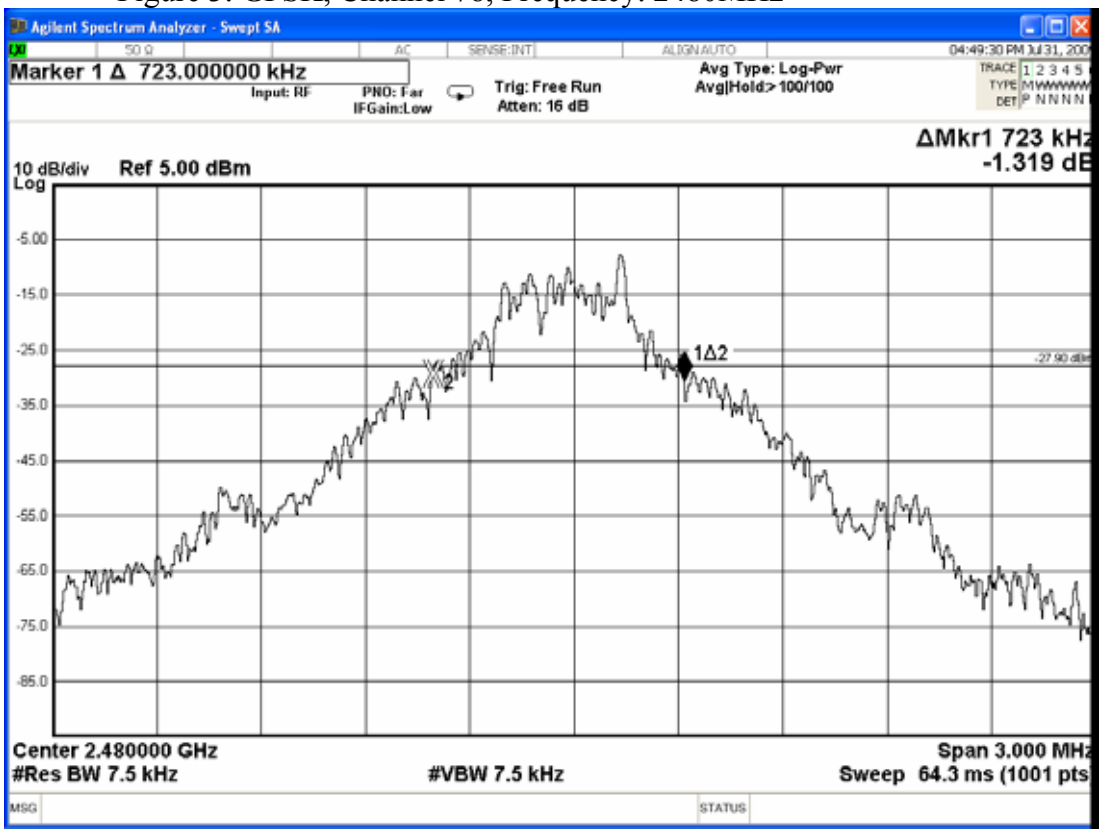


Figure 4: 8-DPSK, Channel 0, Frequency: 2402MHz

Figure 5: 8-DPSK, Channel 39, Frequency: 2441MHz

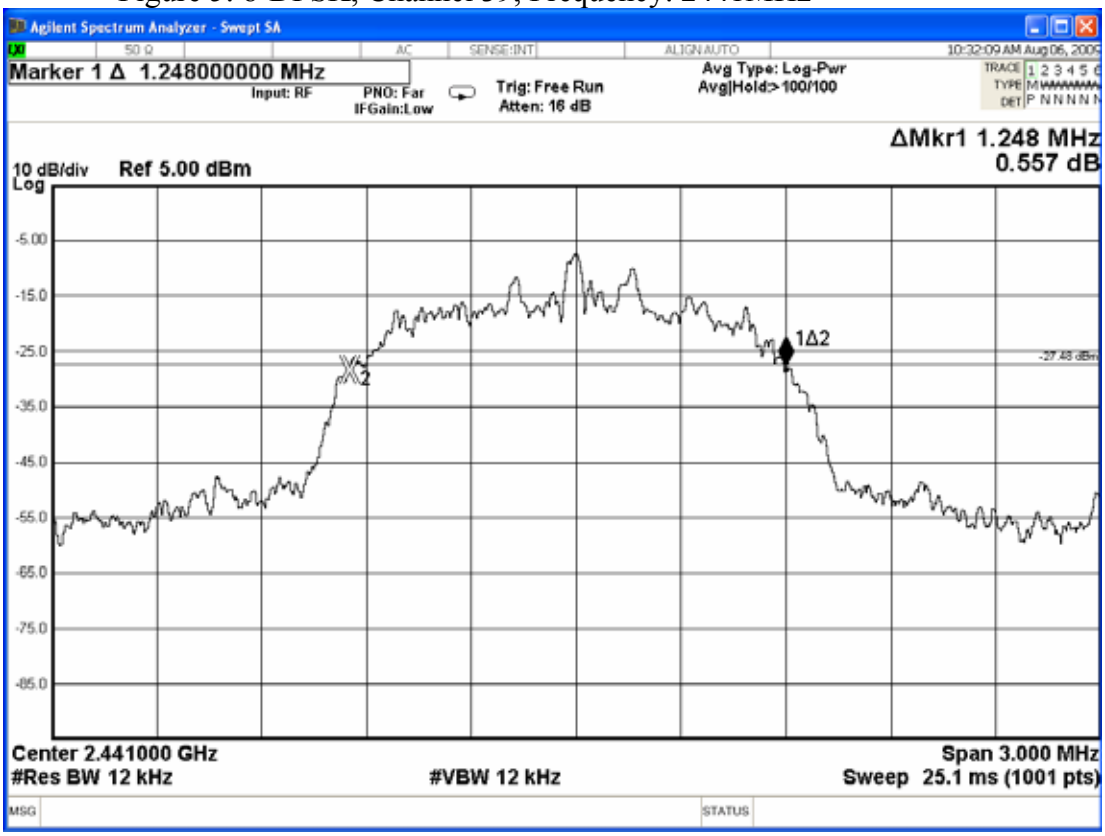
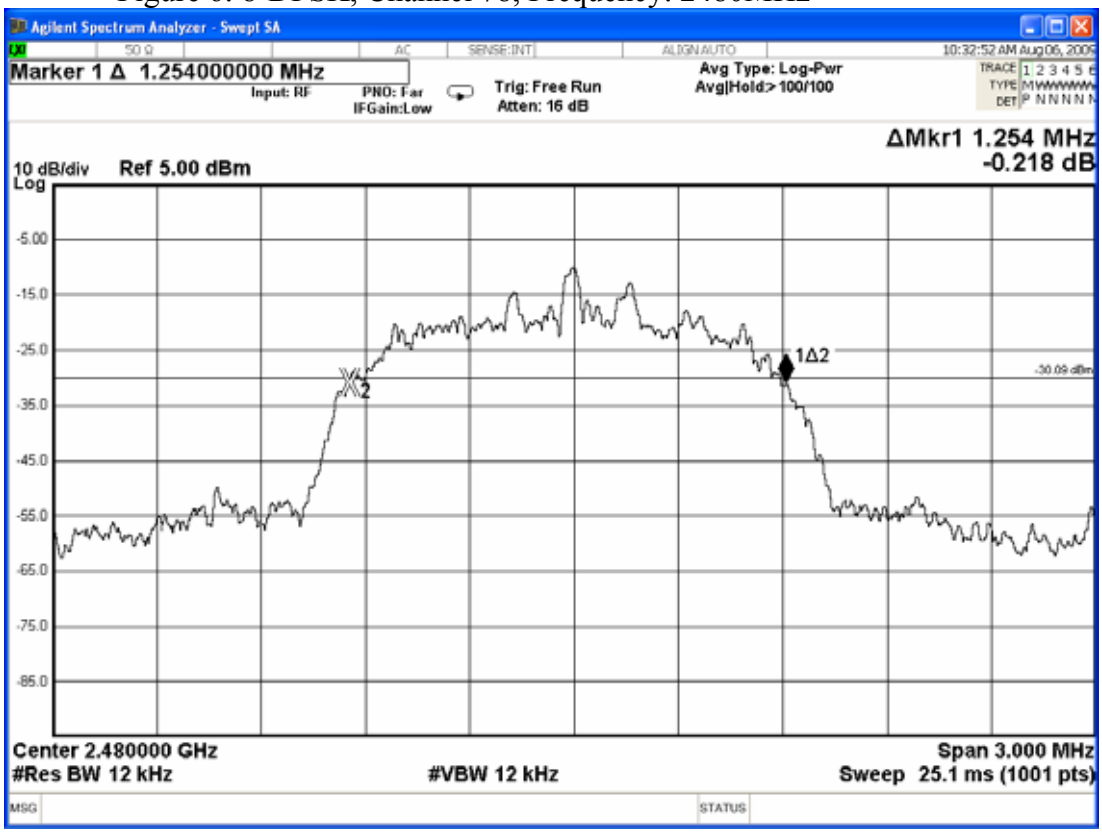


Figure 6: 8-DPSK, Channel 78, Frequency: 2480MHz



5. CARRIER FREQUENCY SEPARATION MEASUREMENT

5.1. Test Equipment

The following test equipment was used during the carrier frequency separation measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9020A	MY48011382	Sep. 22, 08'	Sep. 21, 09'

5.2. Block Diagram of Test Setup

The same as section.4.2.

5.3. Specification Limits (§15.247(a)(1))

Alternatively, frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output no greater than 125mW.

5.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

5.5. Test Procedure follow DA00-705

The transmitter output was connected to the spectrum analyzer. The channel separation was measure by spectrum analyzer with RBW equal to 1% of the span. The video bandwidth not to be smaller than resolution bandwidth, the peak was mark on adjacent bandwidth, the between of peak is carrier frequency separation.

5.6. Test Results

PASSED. All the test results are attached in next pages.

[Note: Two types of modulation (GFSK and 8-DPSK) were reported in this report.]

EUT：Bluetooth Embedded Module M/N：BCM92046MD_EMB

Test Date : Aug. 03, 2009 Temperature : 26 ℃ Humidity : 53 %

5.6.1. Type of Modulation: GFSK

1. 2402MHz adjacent channel of carrier frequency separation: 1.002MHz。
2. 2441MHz adjacent channel of right carrier frequency separation: 1.002MHz。
3. 2441MHz adjacent channel of left carrier frequency separation: 1.002MHz。
4. 2480MHz adjacent channel of carrier frequency separation: 1.002MHz。

[Above values have met the requirement as specified in section 4.3: 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.]

5.6.2. Type of Modulation: 8-DPSK

1. 2402MHz adjacent channel of carrier frequency separation: 1.002MHz。
2. 2441MHz adjacent channel of right carrier frequency separation: 1.002MHz。
3. 2441MHz adjacent channel of left carrier frequency separation: 1.002MHz。
4. 2480MHz adjacent channel of carrier frequency separation: 1.002MHz。

[Above values have met the requirement as specified in section 4.3: 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.]

Figure 1: 2402MHz adjacent channel of carrier frequency separation (GFSK)

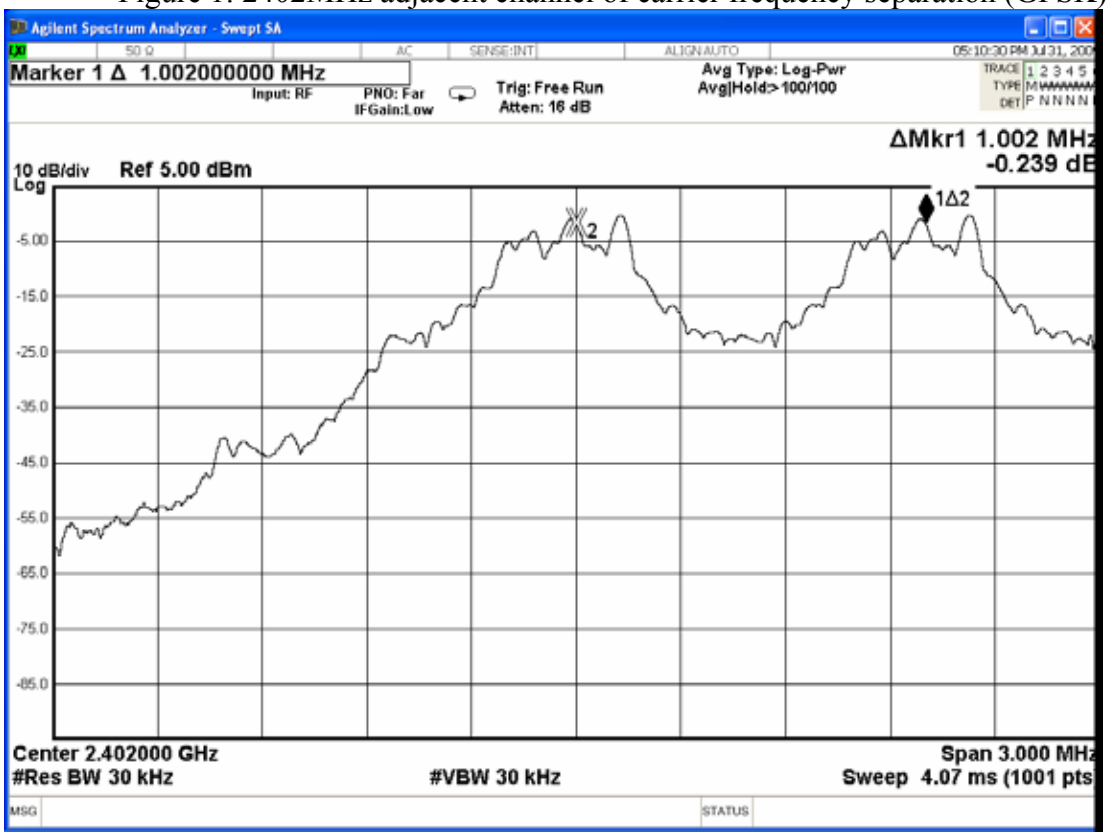


Figure 2: 2441MHz adjacent channel of right carrier frequency separation (GFSK)

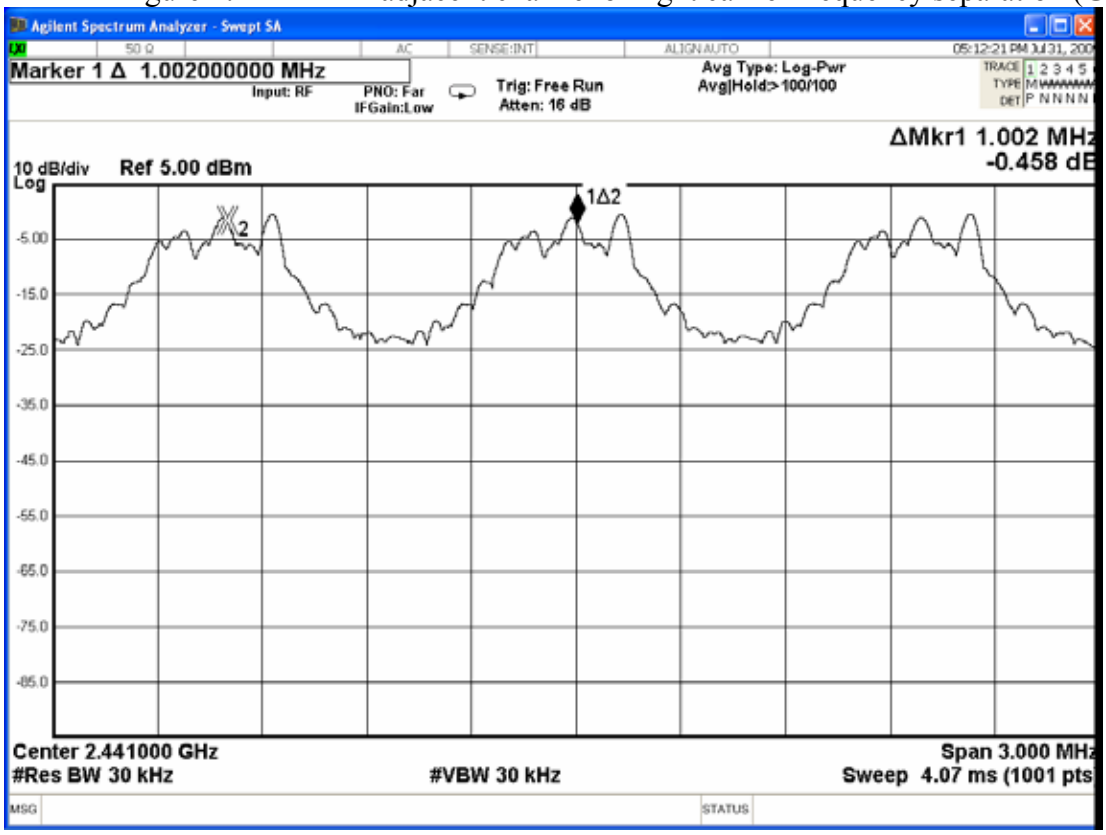


Figure 3: 2441MHz adjacent channel of left carrier frequency separation (GFSK)

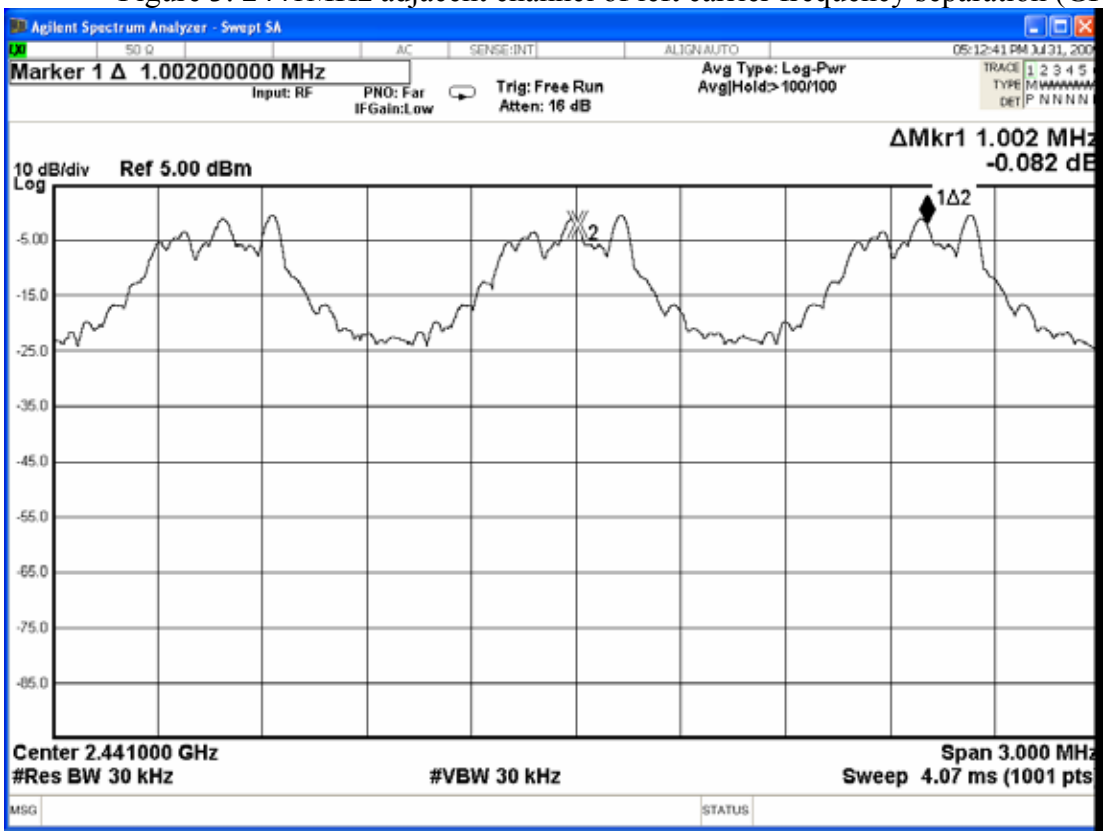


Figure 4: 2480MHz adjacent channel of carrier frequency separation (GFSK)

Figure 5: 2402MHz adjacent channel of carrier frequency separation (8-DPSK)

Figure 6: 2441MHz adjacent channel of right carrier frequency separation (8-DPSK)

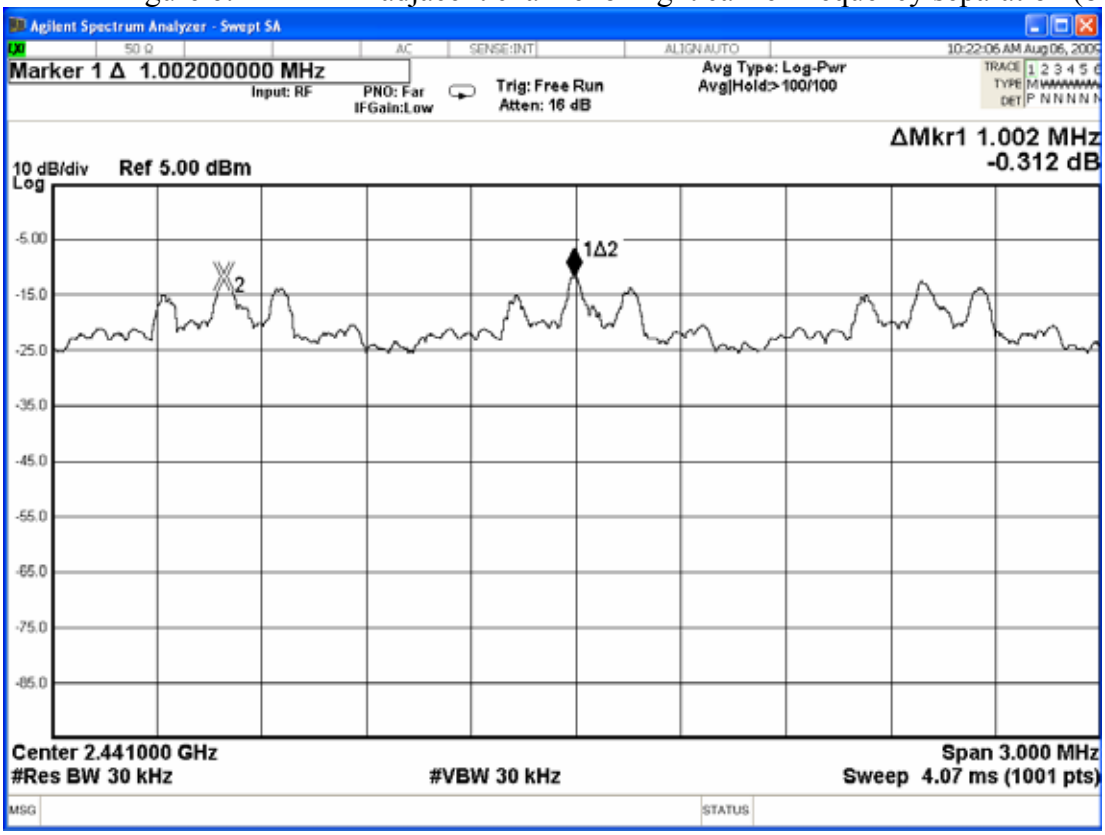


Figure 7: 2441MHz adjacent channel of left carrier frequency separation (8-DPSK)

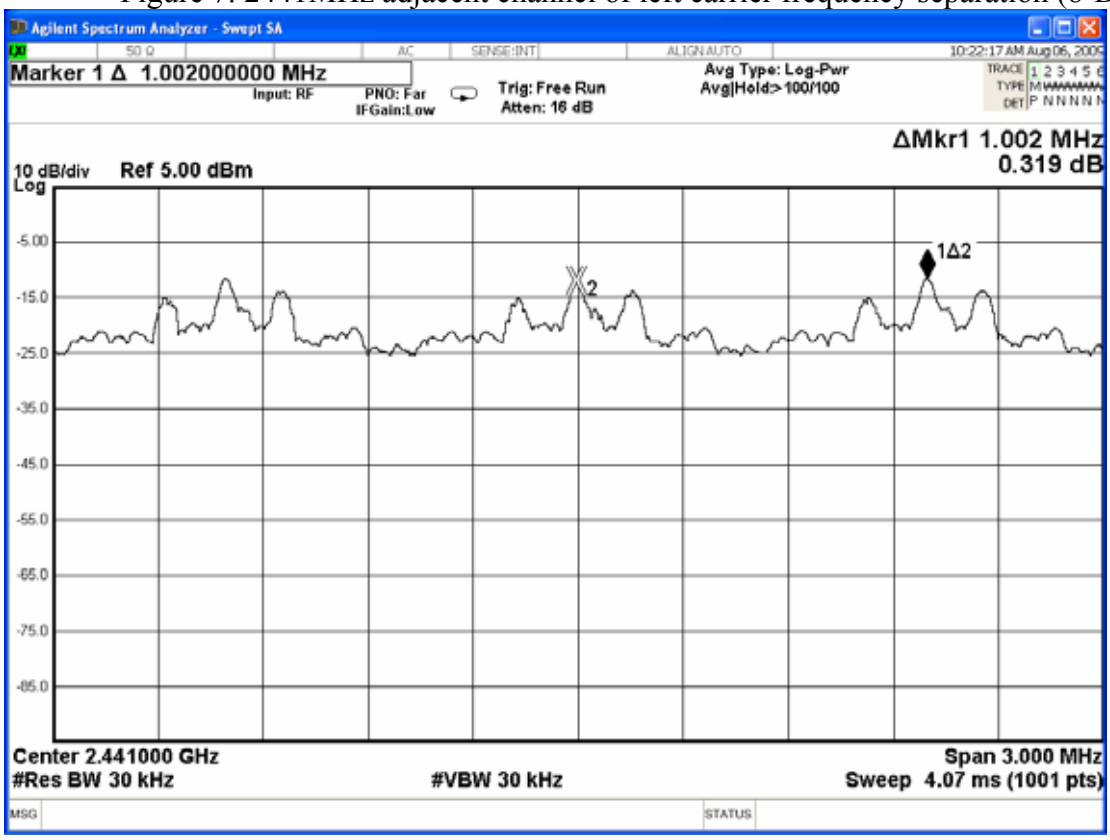
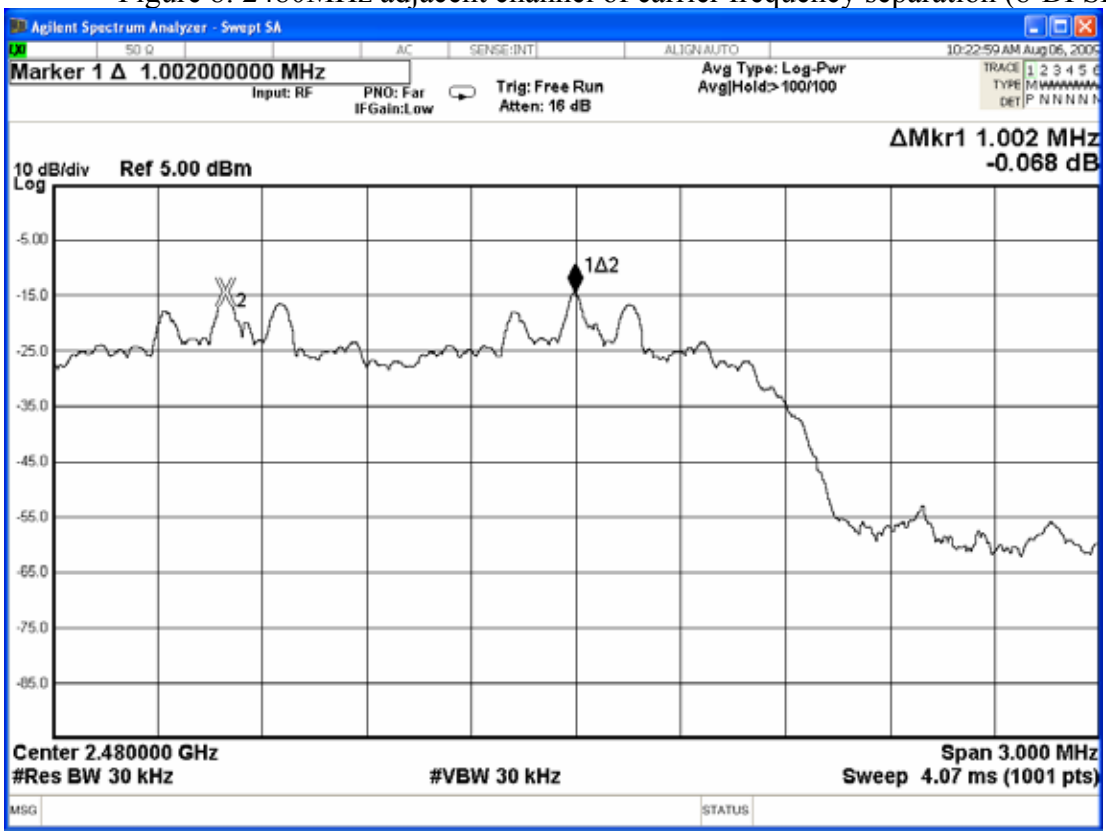


Figure 8: 2480MHz adjacent channel of carrier frequency separation (8-DPSK)



6. TIME OF OCCUPANCY MEASUREMENT

6.1. Test Equipment

The following test equipment was used during the time of occupancy measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9020A	MY48011382	Sep. 22, 08'	Sep. 21, 09'

6.2. Block Diagram of Test Setup

The same as section.4.2.

6.3. Specification Limits (§15.247(a)(1)(iii))

Frequency hopping systems in the 2400-2483.5MHz shall use at least 15 non-overlapping channels. 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 number of hopping channels employed.

6.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

6.5. Test Procedure follow DA00-705

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer with 1MHz RBW and 1MHz VBW. VBW≥RBW ; Span=zero span.
Centered on a hopping channel sweep=as necessary to capture the entire dwell time per hopping channel ; Detector function=peak ; Trace=Max hold

6.6. Test Results

PASSED. All the test results are attached in next page.
[Note: Two types of modulation (GFSK and 8-DPSK) were reported in this report.]

EUT：Bluetooth Embedded Module M/N：BCM92046MD_EMB

Test Date : Aug. 05, 2009 Temperature : 27 ℃ Humidity : 61 %

6.6.1. Type of Modulation：GFSK, Test Frequency：2402MHz

Duty cycle: 79channels*0.4 seconds = 31.6 seconds

DH1 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH1 packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 800 hops per second with 79 channels. So you have each channel 10.13 time per second and so for 31.6 seconds you have 320 time of appearance.

Each Tx-time per appearance is 391.7us.

10.13 time*31.6 seconds* 0.3917ms = 125.386ms (<400ms)

B. For each 5 seconds of 50 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

50 channels*31.6 seconds/5* 0.3917ms = 126.252ms (<400ms)

DH3 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH3 packet need 3 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 400 hops per second with 79 channels. So you have each channel 5.1 time per second and so for 31.6 seconds you have 161 time of appearance.

Each Tx-time per appearance is 1650us.

5.1 time*31.6 seconds* 1.650ms = 265.914ms (<400ms)

B. For each 5 seconds of 25 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

25 channels*31.6 seconds/5* 1.650ms = 260.7ms (<400ms)

DH5 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH5 packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 266.7 hops per second with 79 channels. So you have each channel 3.37 time per second and so for 31.6 seconds you have 106 time of appearance.

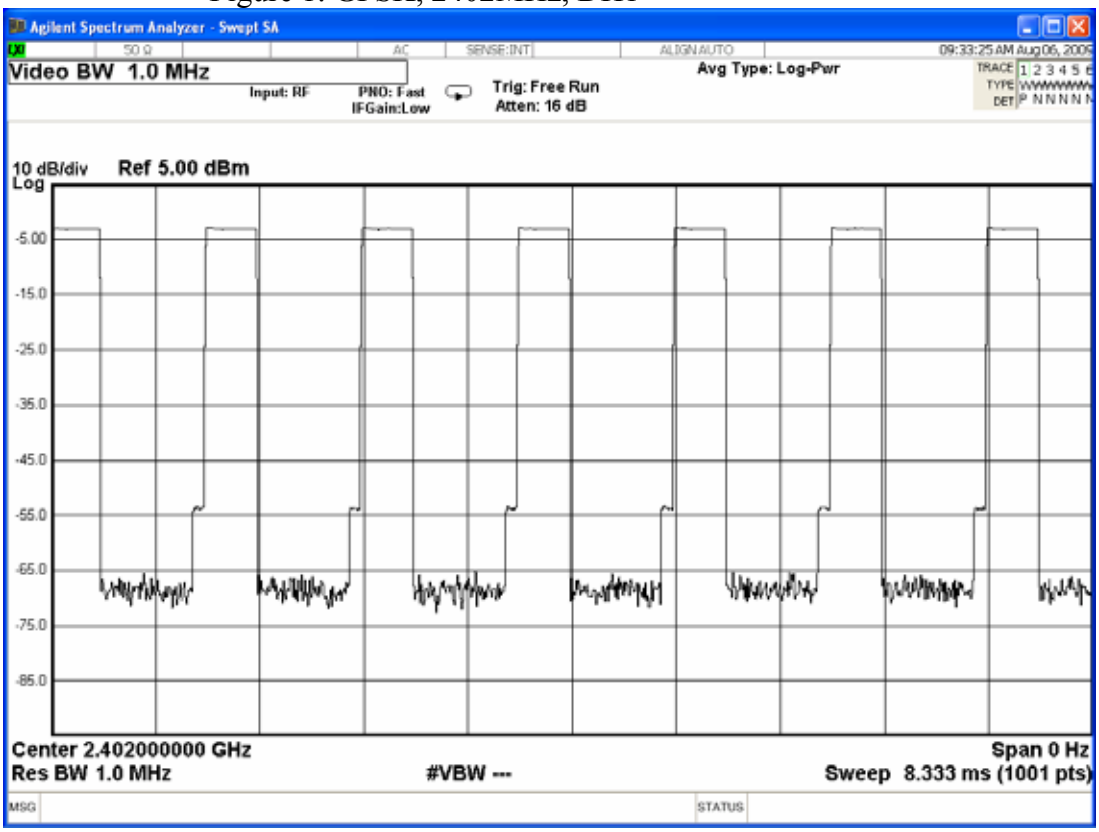
Each Tx-time per appearance is 2883us.

3.37 time*31.6 seconds* 2.883ms = 307.016ms (<400ms)

B. For each 5 seconds of 17 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

17 channels*31.6 seconds/5* 2.883ms = 309.749ms (<400ms)

Figure 1: GFSK, 2402MHz, DH1



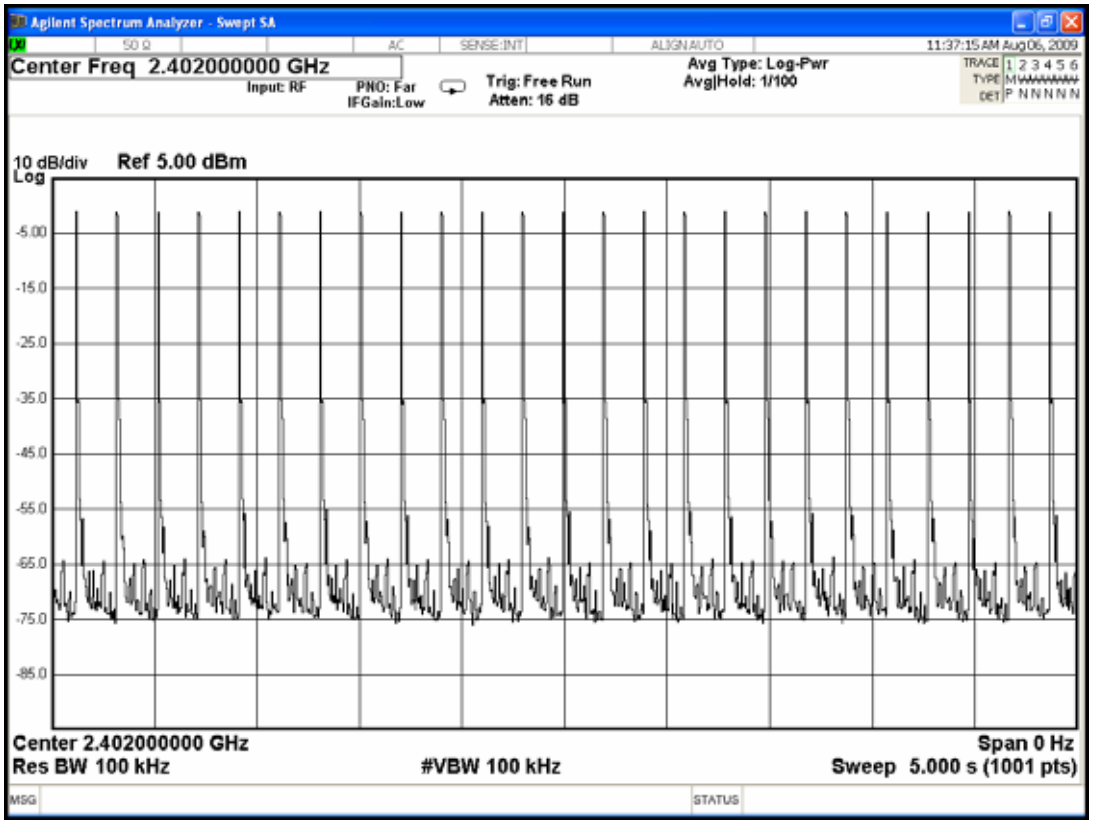
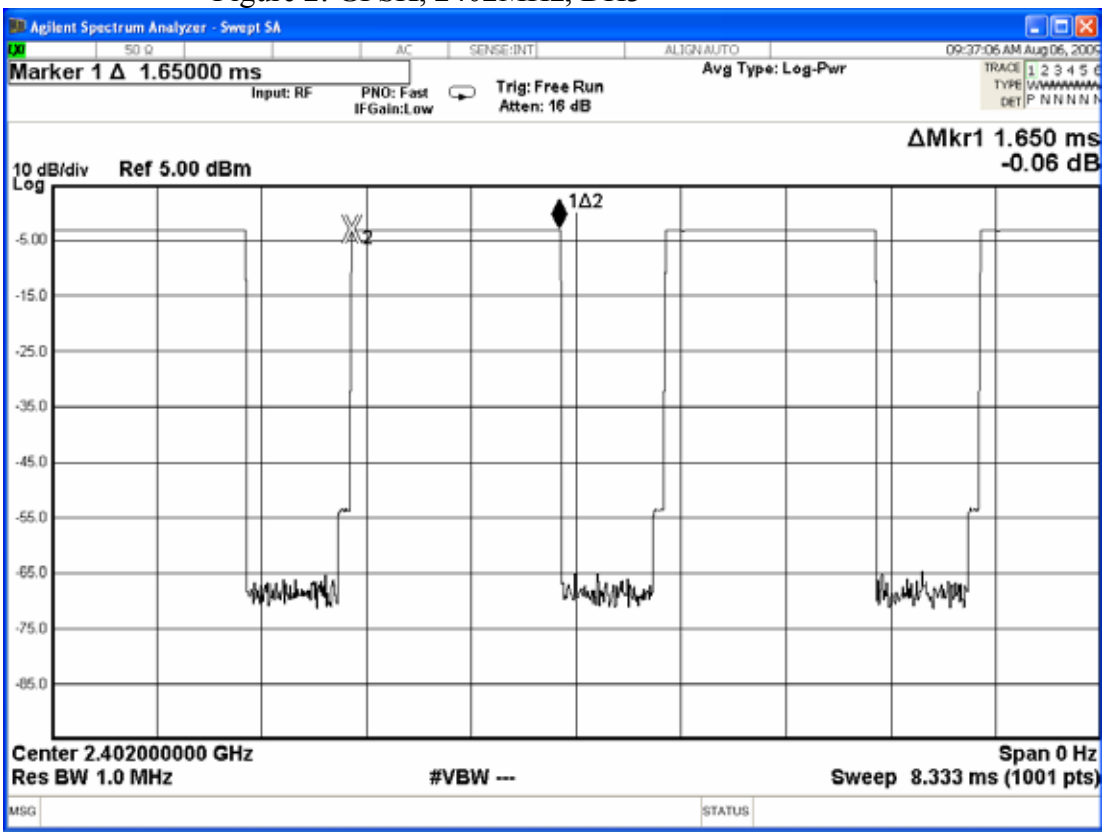


Figure 2: GFSK, 2402MHz, DH3



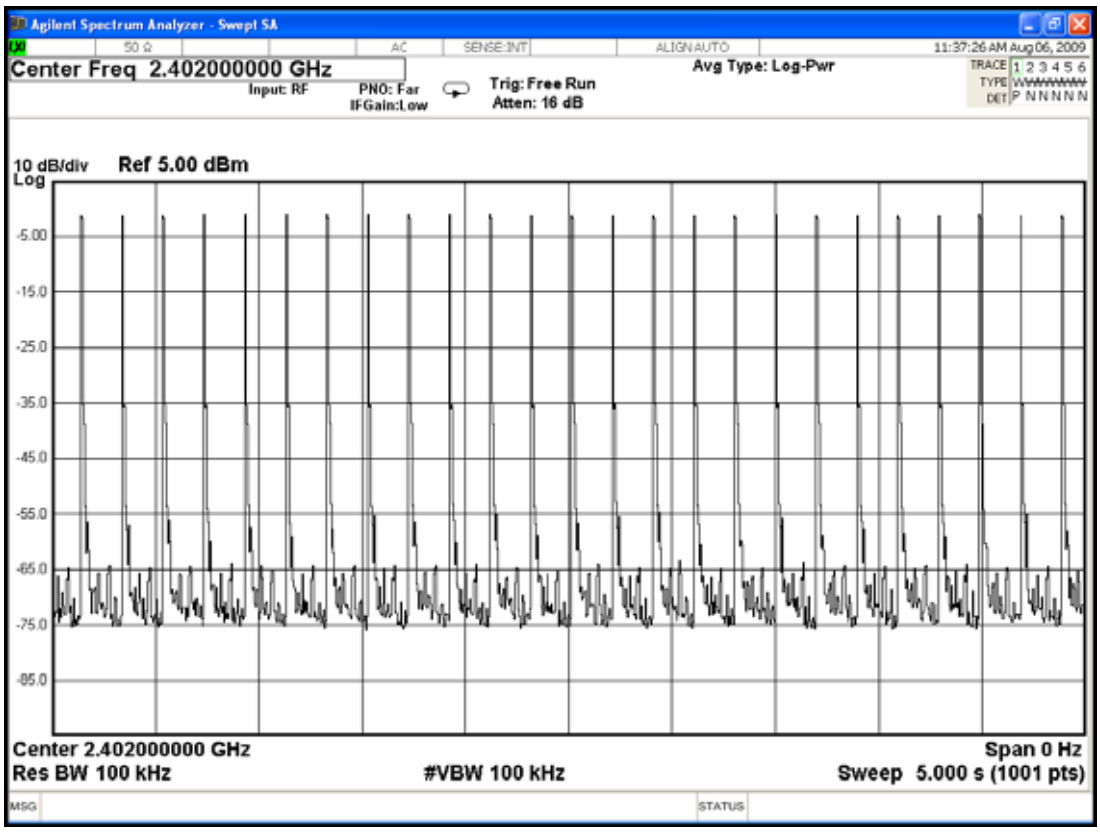
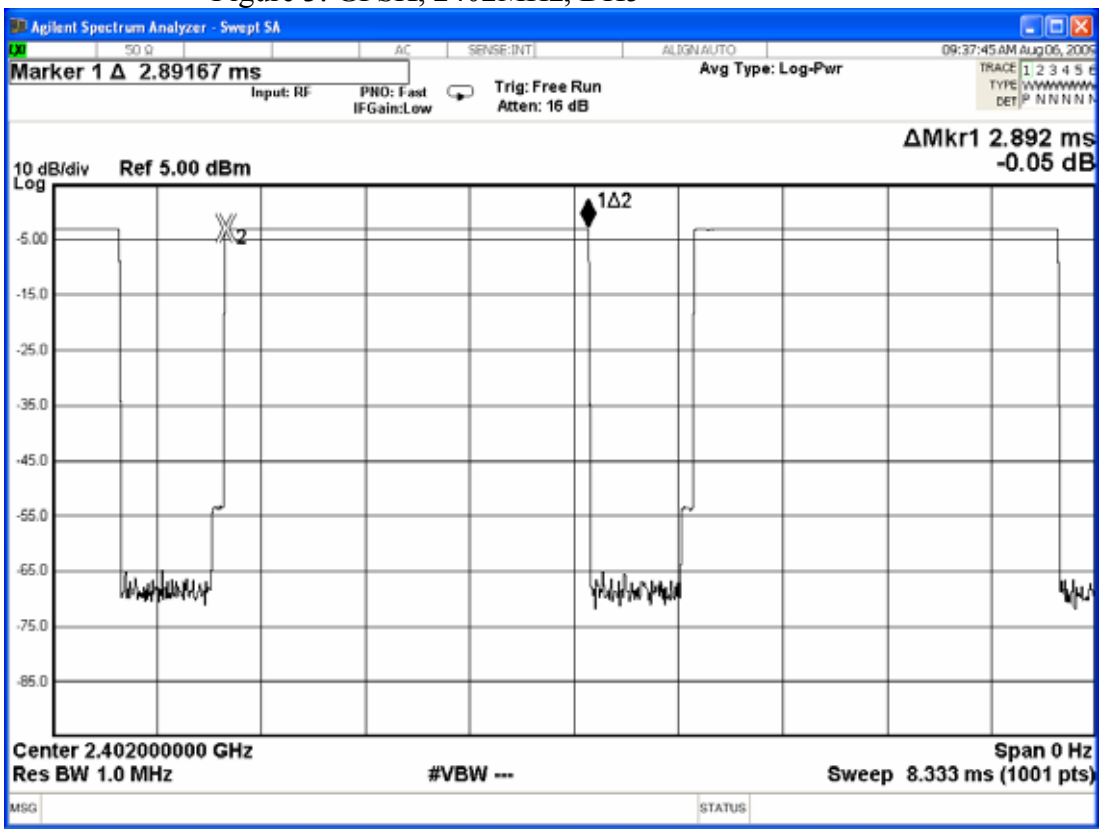
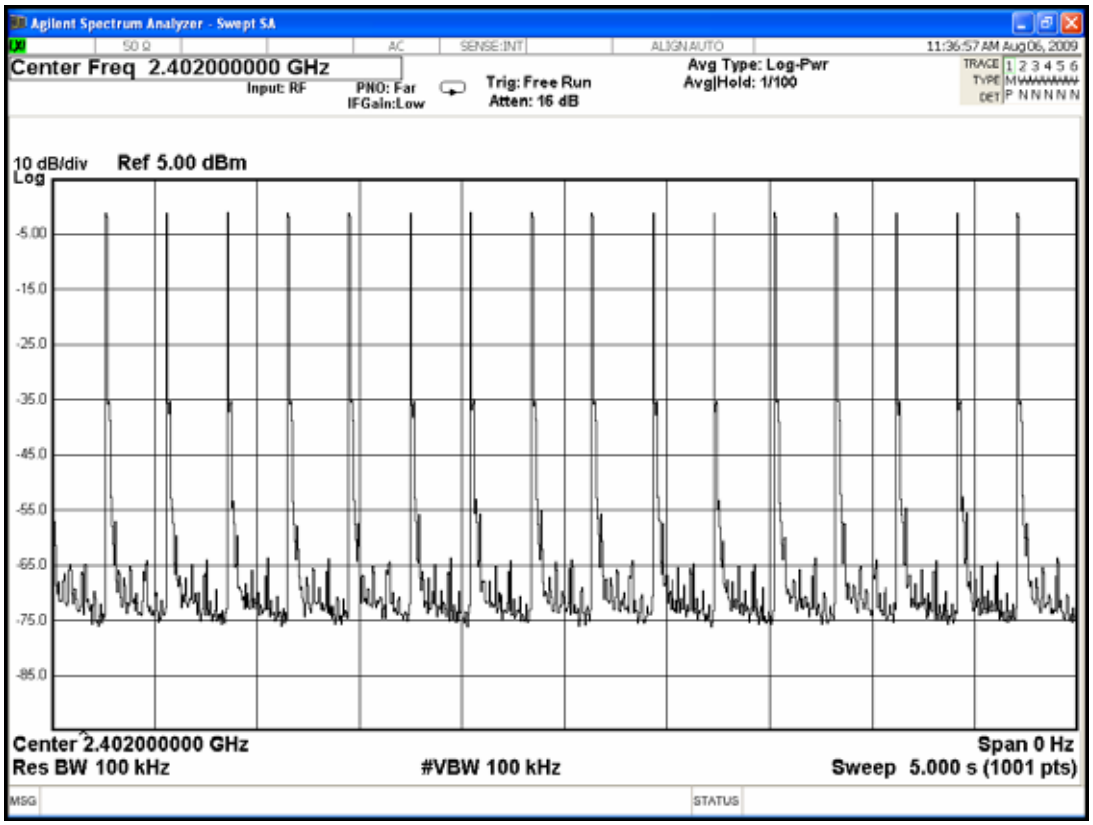


Figure 3: GFSK, 2402MHz, DH5





6.6.2. Type of Modulation：GFSK, Test Frequency：2441MHz

Duty cycle: 79channels*0.4 seconds = 31.6 seconds

DH1 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH1 packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 800 hops per second with 79 channels. So you have each channel 10.13 time per second and so for 31.6 seconds you have 320 time of appearance.

Each Tx-time per appearance is 391.7us.

10.13 time*31.6 seconds* 0.3917ms = 125.386ms (<400ms)

B. For each 5 seconds of 50 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

50 channels*31.6 seconds/5* 0.3917ms = 126.252ms (<400ms)

DH3 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH3 packet need 3 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 400 hops per second with 79 channels. So you have each channel 5.1 time per second and so for 31.6 seconds you have 161 time of appearance.

Each Tx-time per appearance is 1650us.

5.1 time*31.6 seconds* 1.650ms = 265.914ms (<400ms)

B. For each 5 seconds of 25 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

25 channels*31.6 seconds/5* 1.650ms = 260.7ms (<400ms)

DH5 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH5 packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 266.7 hops per second with 79 channels. So you have each channel 3.37 time per second and so for 31.6 seconds you have 106 time of appearance.

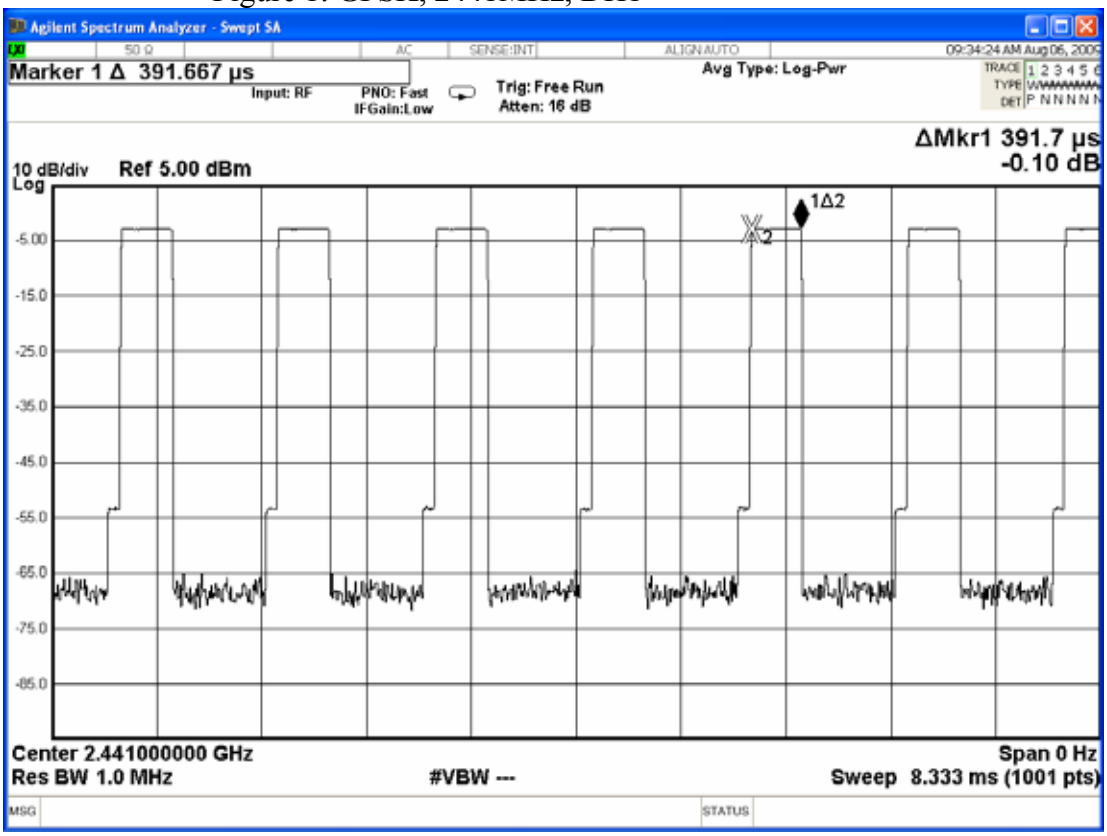
Each Tx-time per appearance is 2883us.

3.37 time*31.6 seconds* 2.883ms = 307.016ms (<400ms)

B. For each 5 seconds of 17 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

17 channels*31.6 seconds/5* 2.883ms = 309.749ms (<400ms)

Figure 1: GFSK, 2441MHz, DH1



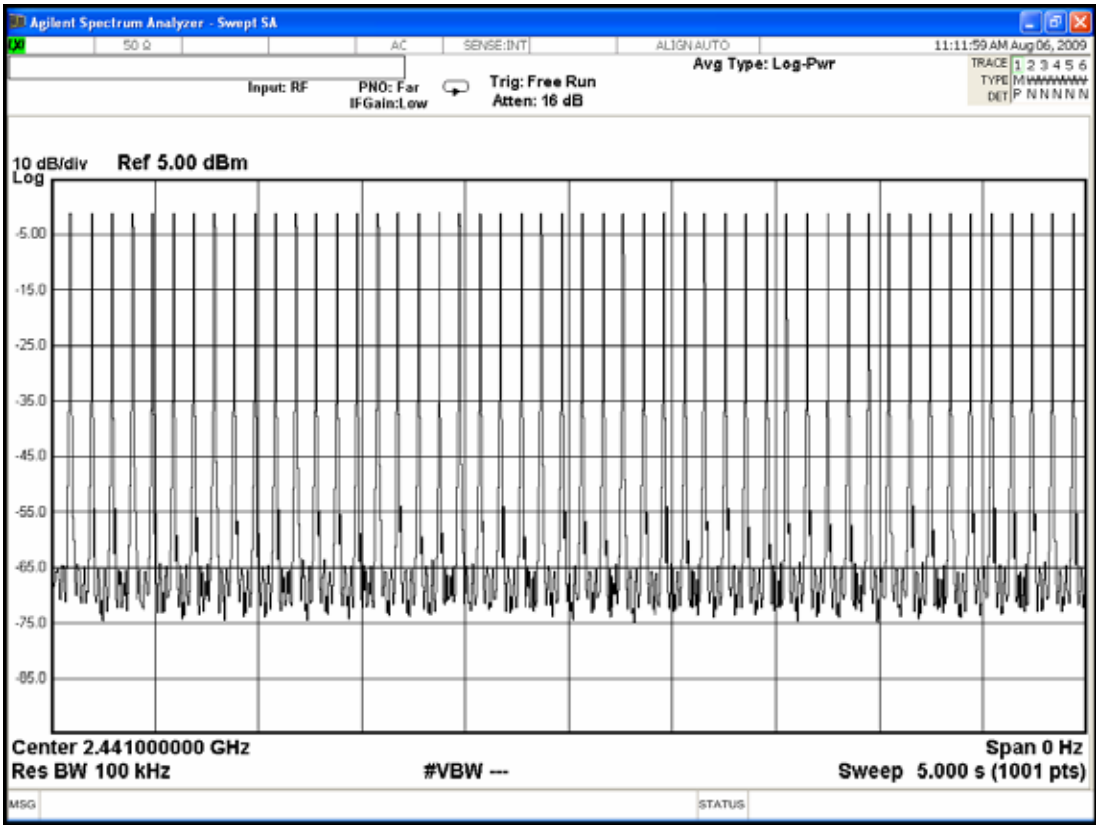
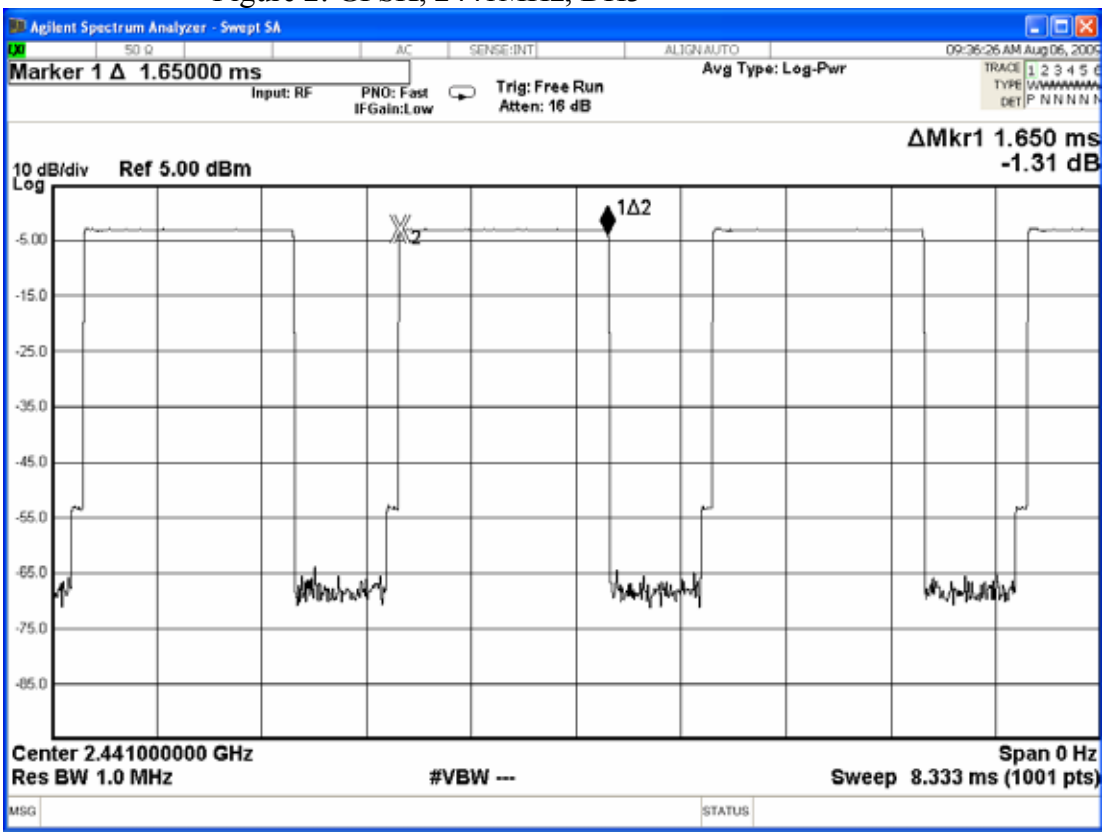


Figure 2: GFSK, 2441MHz, DH3



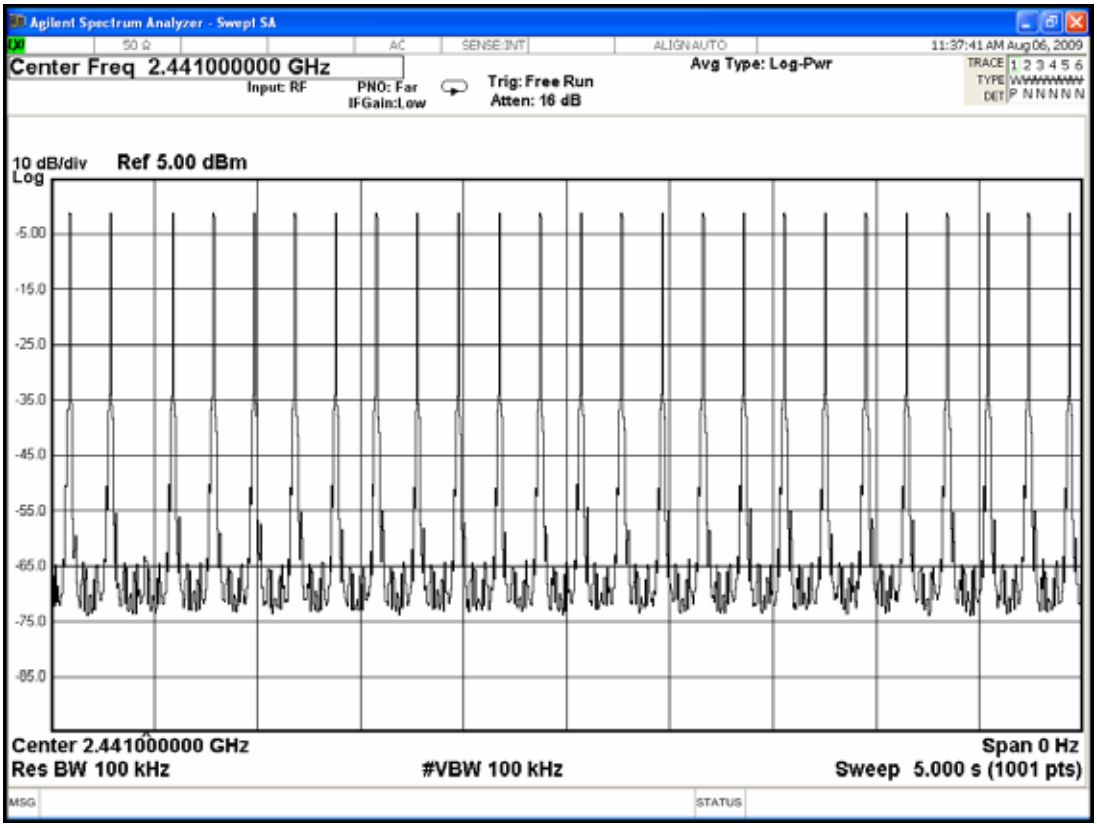
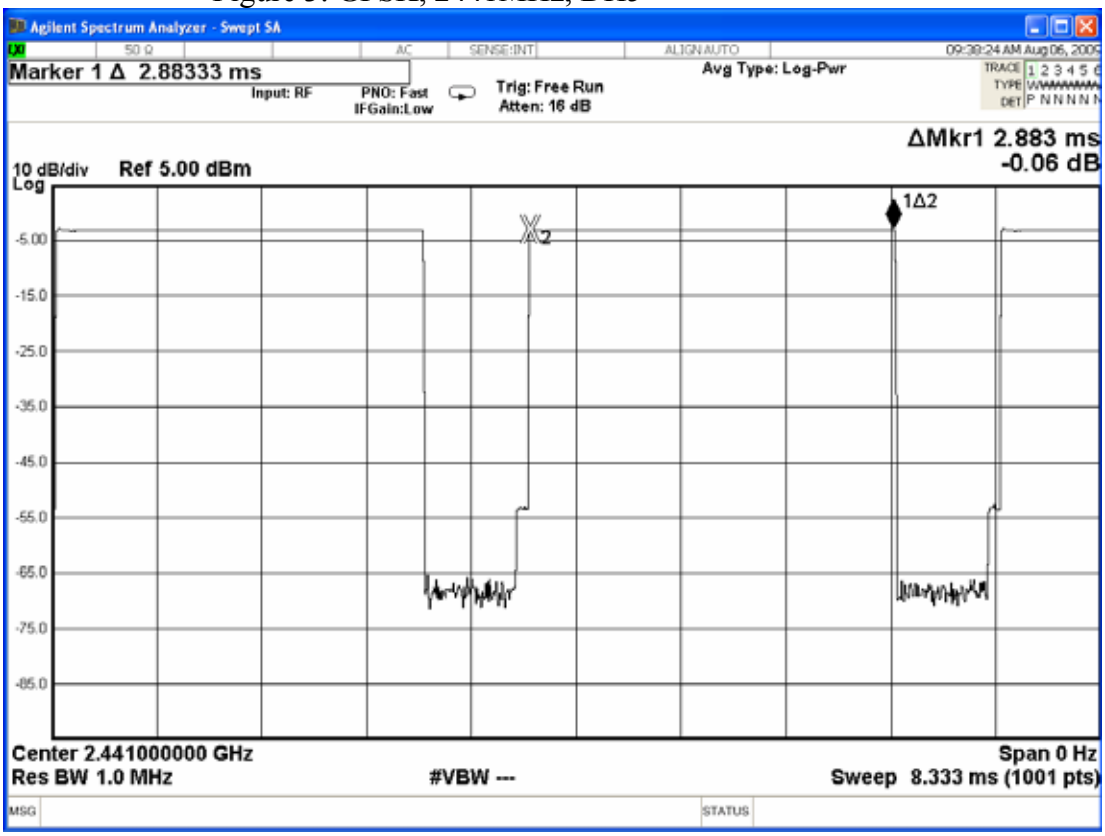
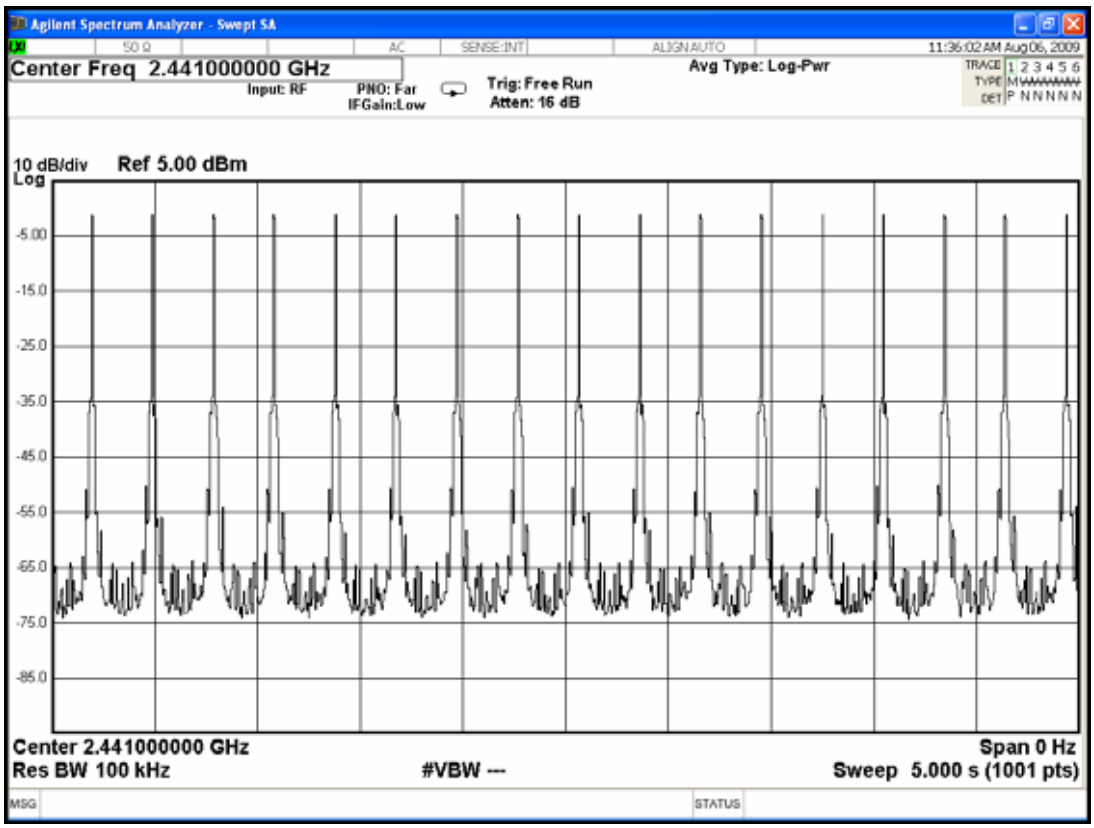


Figure 3: GFSK, 2441MHz, DH5





6.6.3. Type of Modulation：GFSK, Test Frequency：2480MHz

Duty cycle: 79channels*0.4 seconds = 31.6 seconds

DH1 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH1 packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 800 hops per second with 79 channels. So you have each channel 10.13 time per second and so for 31.6 seconds you have 320 time of appearance.

Each Tx-time per appearance is 391.7us.

10.13 time*31.6 seconds* 0.3917ms = 125.386ms (<400ms)

B. For each 5 seconds of 50 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

50 channels*31.6 seconds/5* 0.3917ms = 126.252ms (<400ms)

DH3 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH3 packet need 3 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 400 hops per second with 79 channels. So you have each channel 5.1 time per second and so for 31.6 seconds you have 161 time of appearance.

Each Tx-time per appearance is 1650us.

5.1 time*31.6 seconds* 1.650ms = 265.914ms (<400ms)

B. For each 5 seconds of 25 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

25 channels*31.6 seconds/5* 1.650ms = 260.7ms (<400ms)

DH5 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH5 packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 266.7 hops per second with 79 channels. So you have each channel 3.37 time per second and so for 31.6 seconds you have 106 time of appearance.

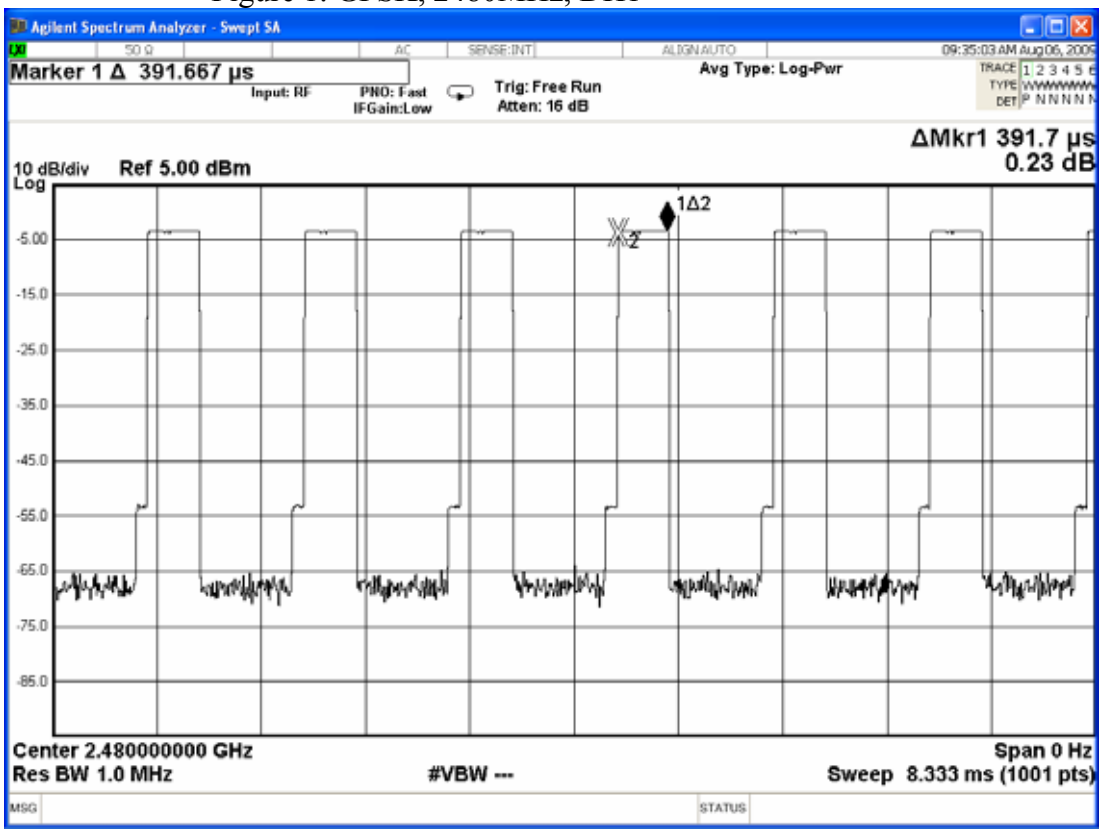
Each Tx-time per appearance is 2883us.

3.37 time*31.6 seconds* 2.883ms = 307.016ms (<400ms)

B. For each 5 seconds of 17 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

17 channels*31.6 seconds/5* 2.883ms = 309.749ms (<400ms)

Figure 1: GFSK, 2480MHz, DH1



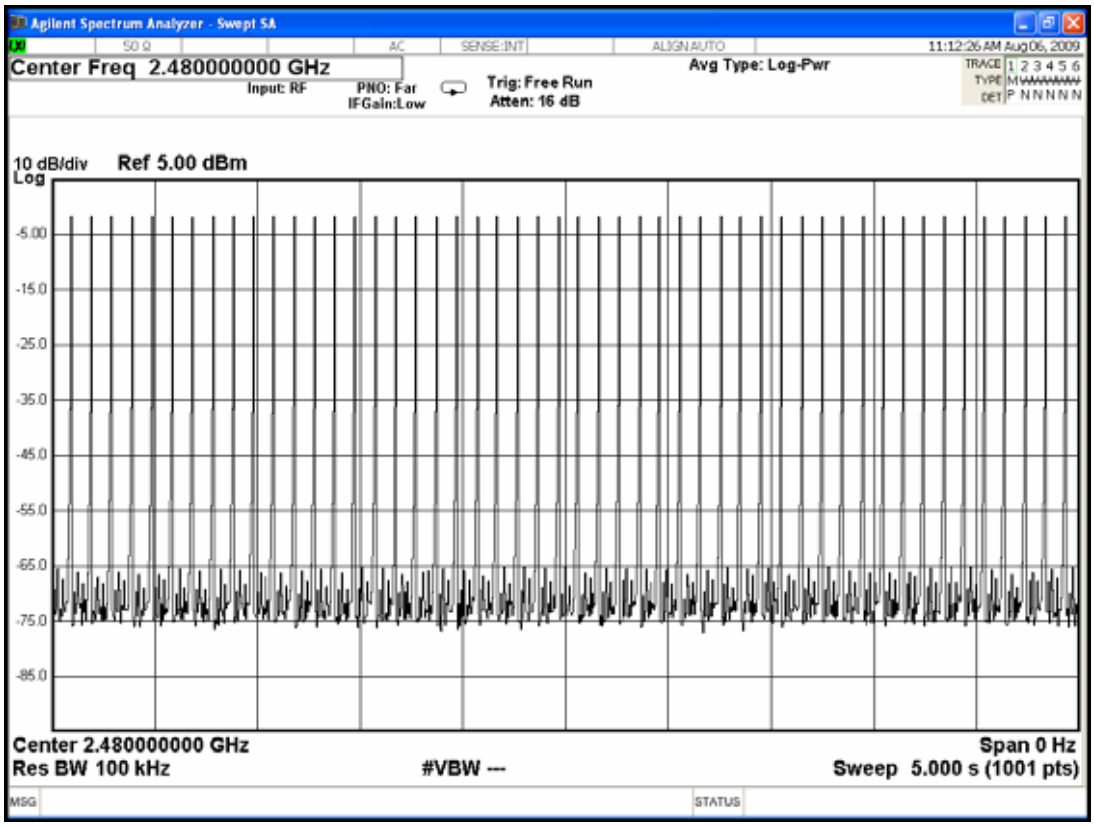
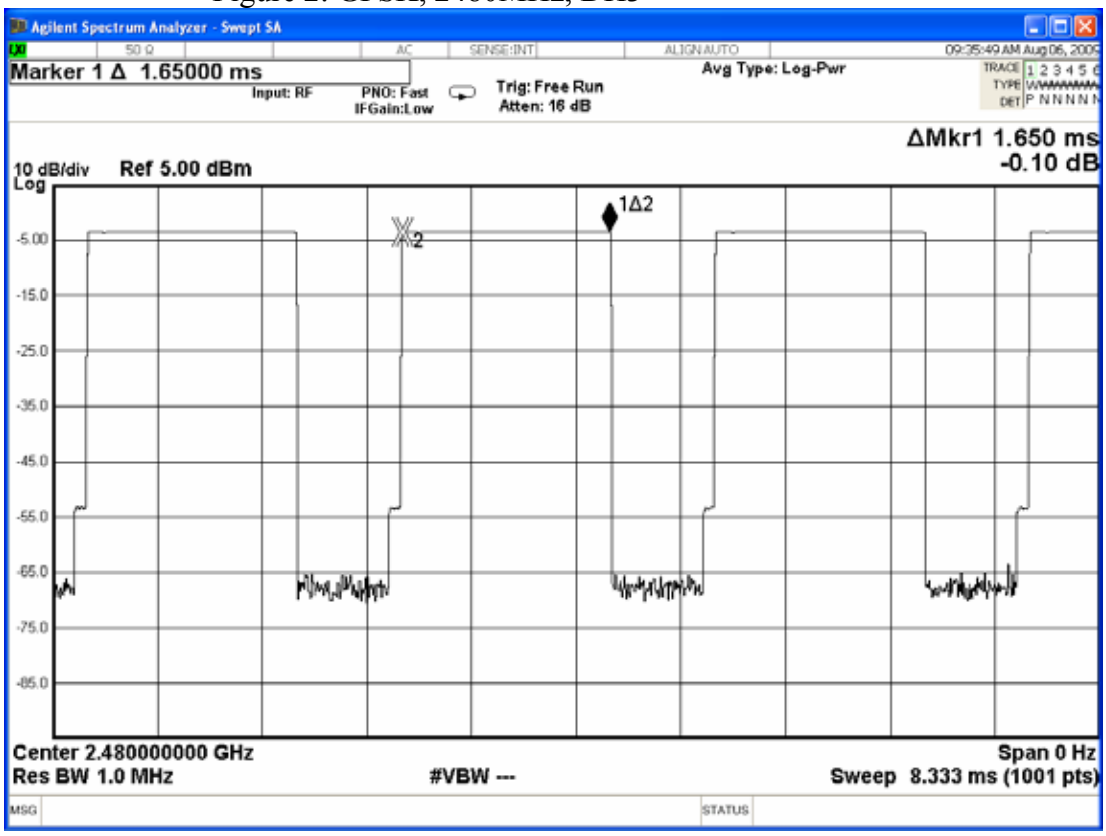


Figure 2: GFSK, 2480MHz, DH3



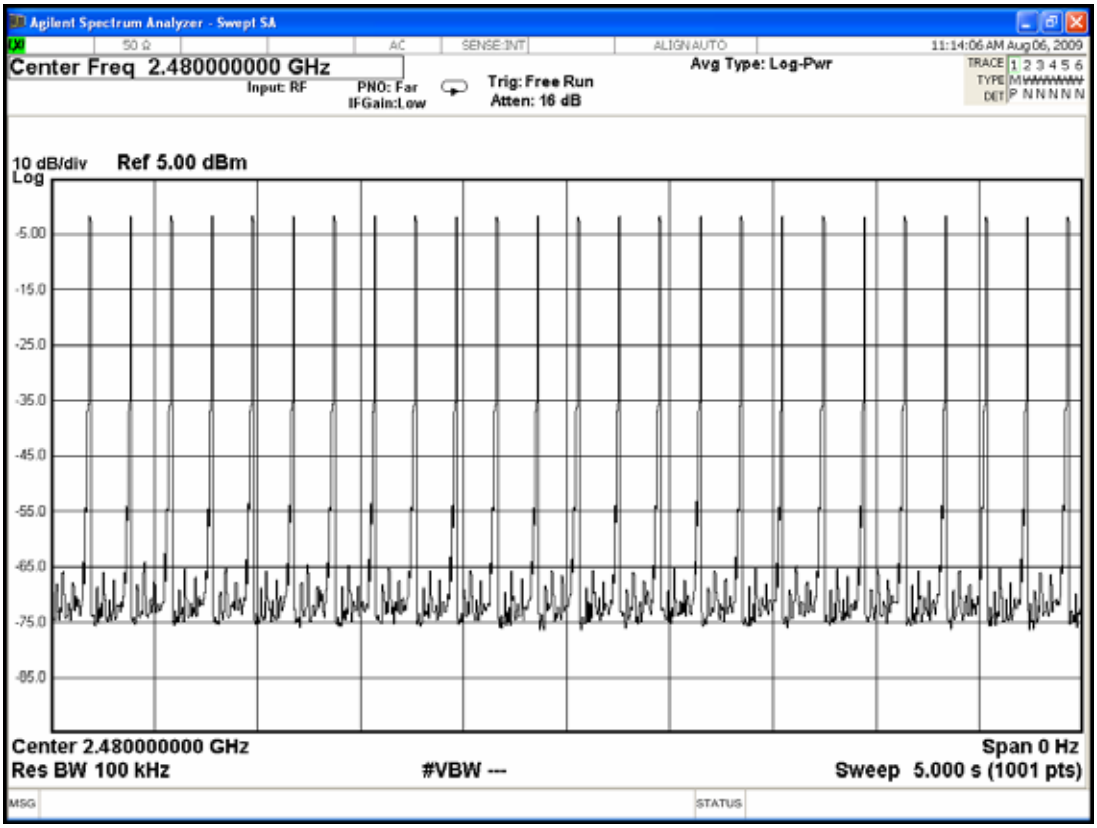
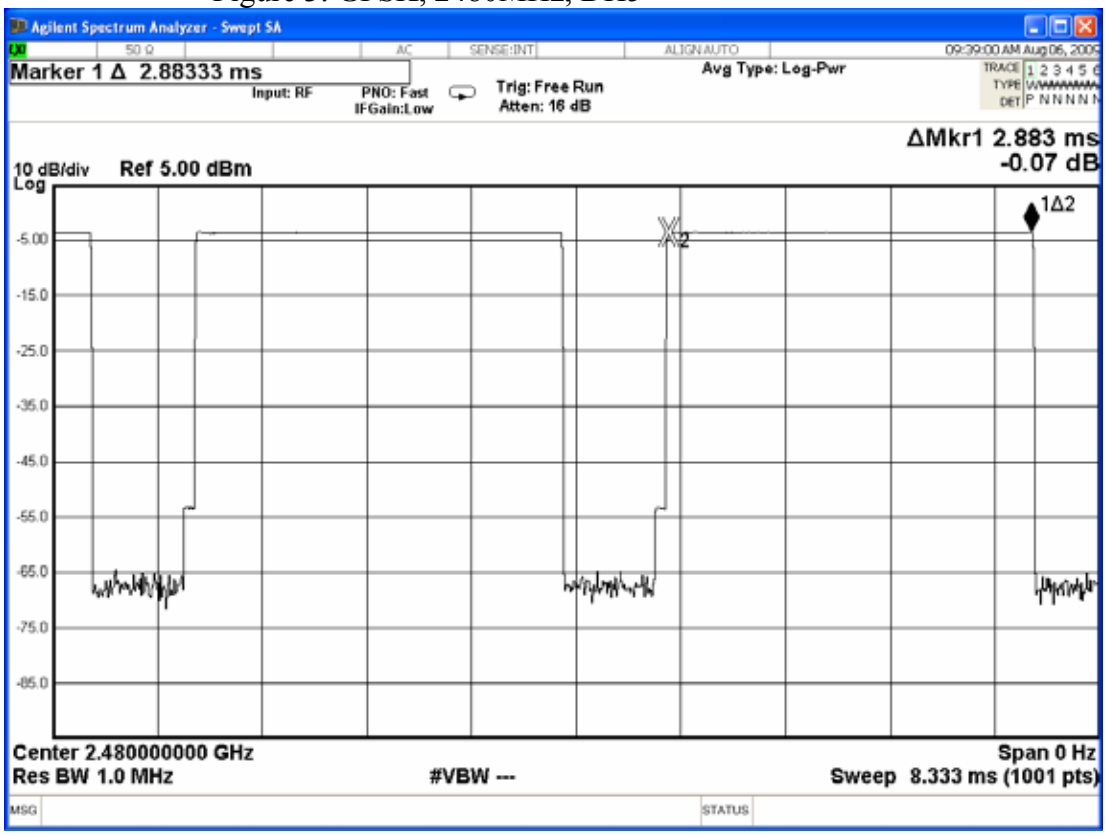
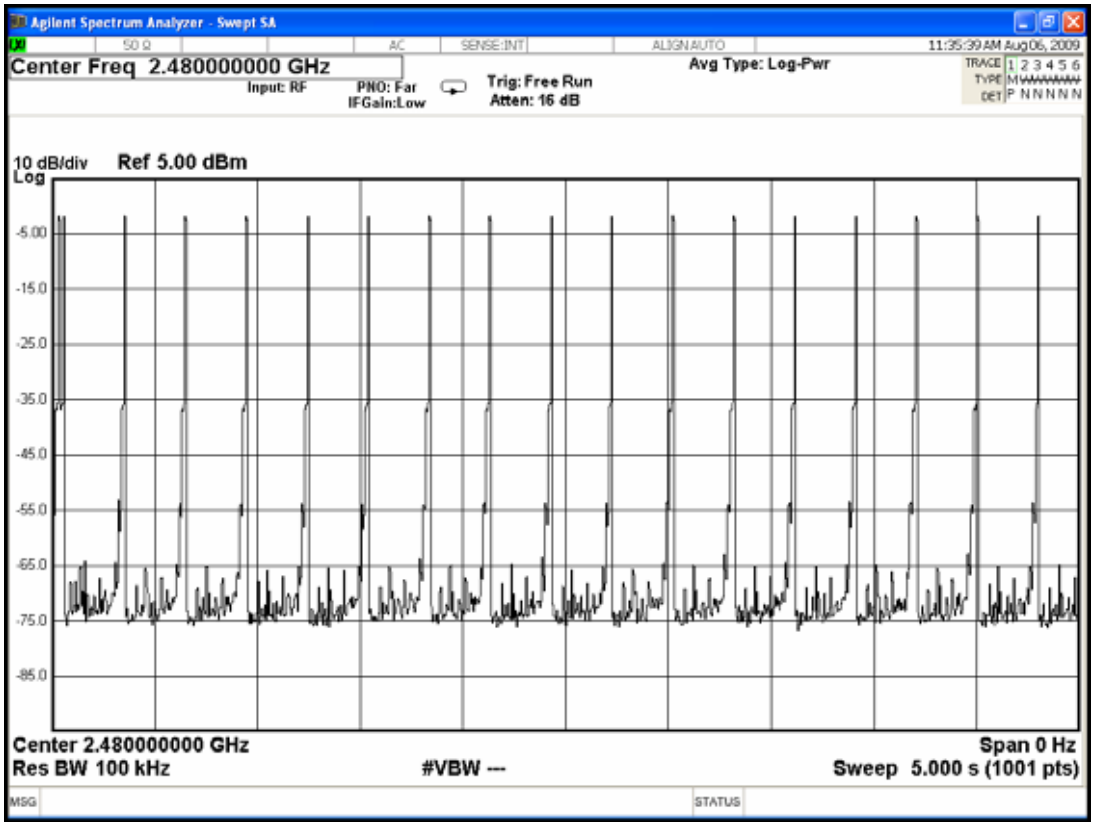


Figure 3: GFSK, 2480MHz, DH5





6.6.4. Type of Modulation：8-DPSK, Test Frequency：2402MHz

Duty cycle: 79channels*0.4 seconds = 31.6 seconds

DH1 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH1 packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 800 hops per second with 79 channels. So you have each channel 10.13 time per second and so for 31.6 seconds you have 320 time of appearance.

Each Tx-time per appearance is 391.7us.

10.13 time*31.6 seconds* 0.3917ms = 125.386ms (<400ms)

B. For each 5 seconds of 50 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

50 channels*31.6 seconds/5* 0.3917ms = 126.252ms (<400ms)

DH3 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH3 packet need 3 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 400 hops per second with 79 channels. So you have each channel 5.1 time per second and so for 31.6 seconds you have 161 time of appearance.

Each Tx-time per appearance is 1625us.

5.1 time*31.6 seconds* 1.625ms = 261.885ms (<400ms)

B. For each 5 seconds of 25 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

25 channels*31.6 seconds/5* 1.625ms = 256.750ms (<400ms)

DH5 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH5 packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 266.7 hops per second with 79 channels. So you have each channel 3.37 time per second and so for 31.6 seconds you have 106 time of appearance.

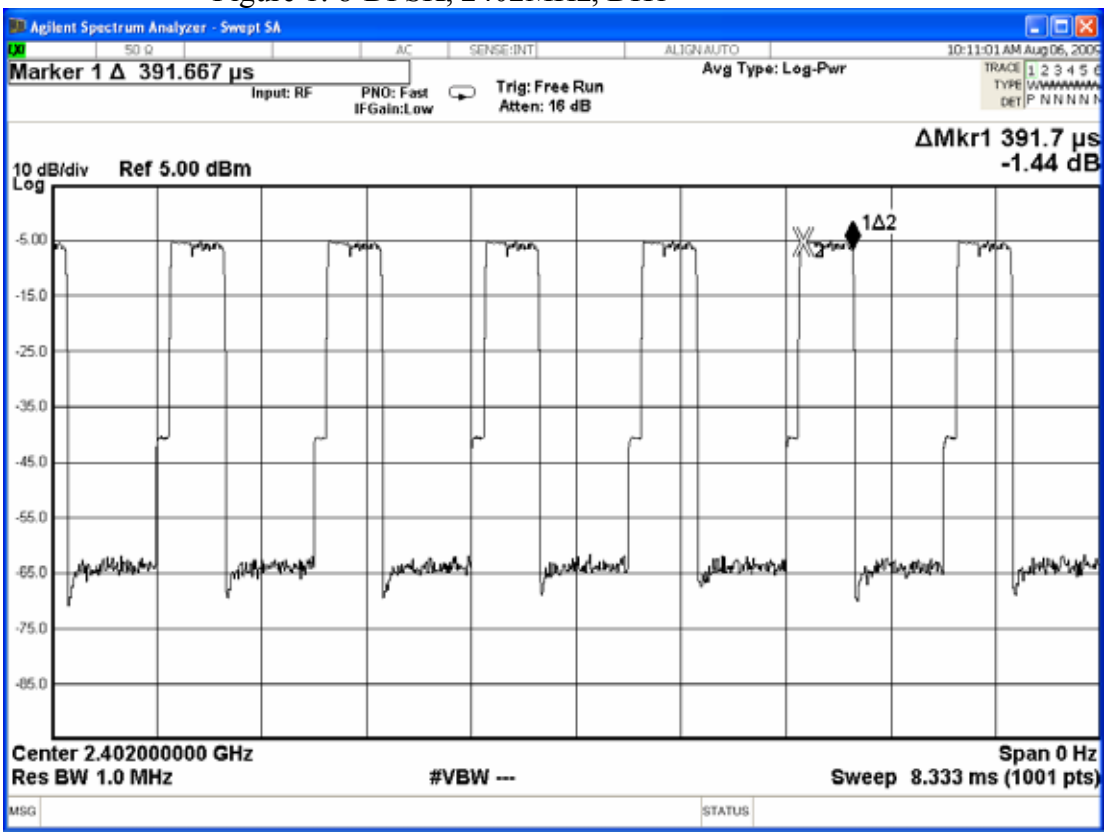
Each Tx-time per appearance is 2900us.

3.37 time*31.6 seconds* 2.900ms = 308.826ms (<400ms)

B. For each 5 seconds of 17 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

17 channels*31.6 seconds/5* 2.900ms = 311.576ms (<400ms)

Figure 1: 8-DPSK, 2402MHz, DH1



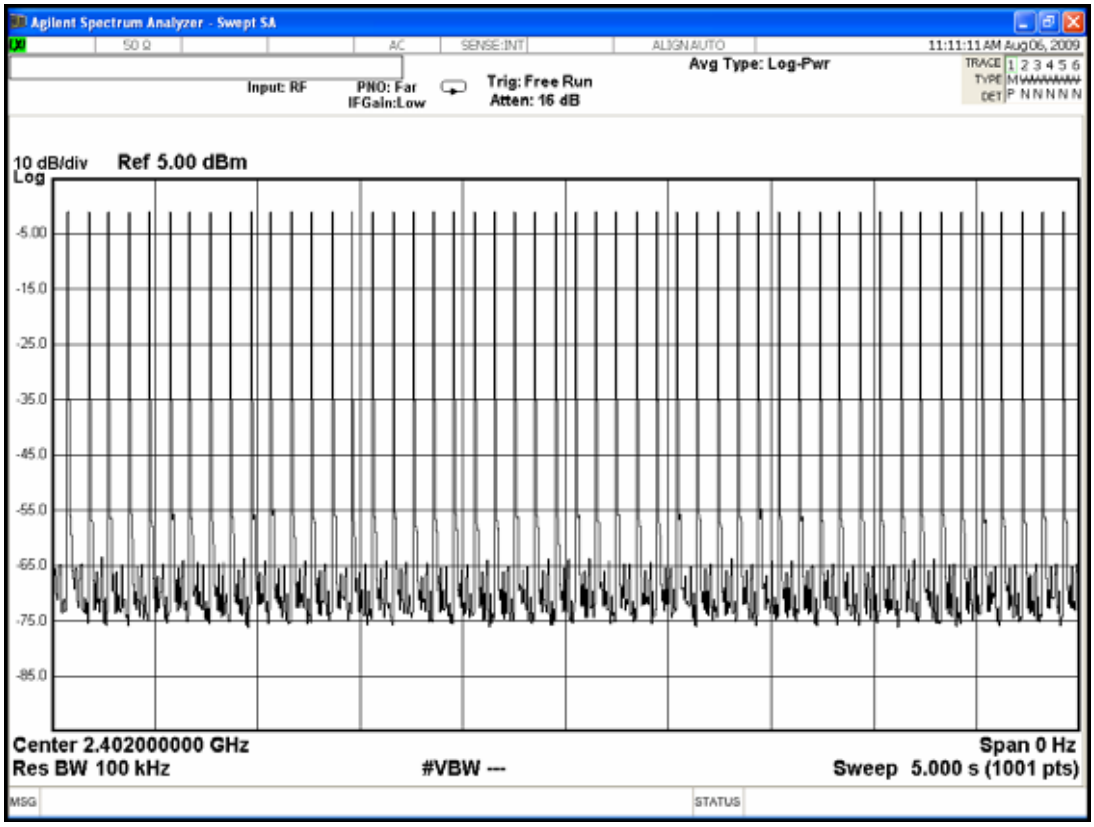
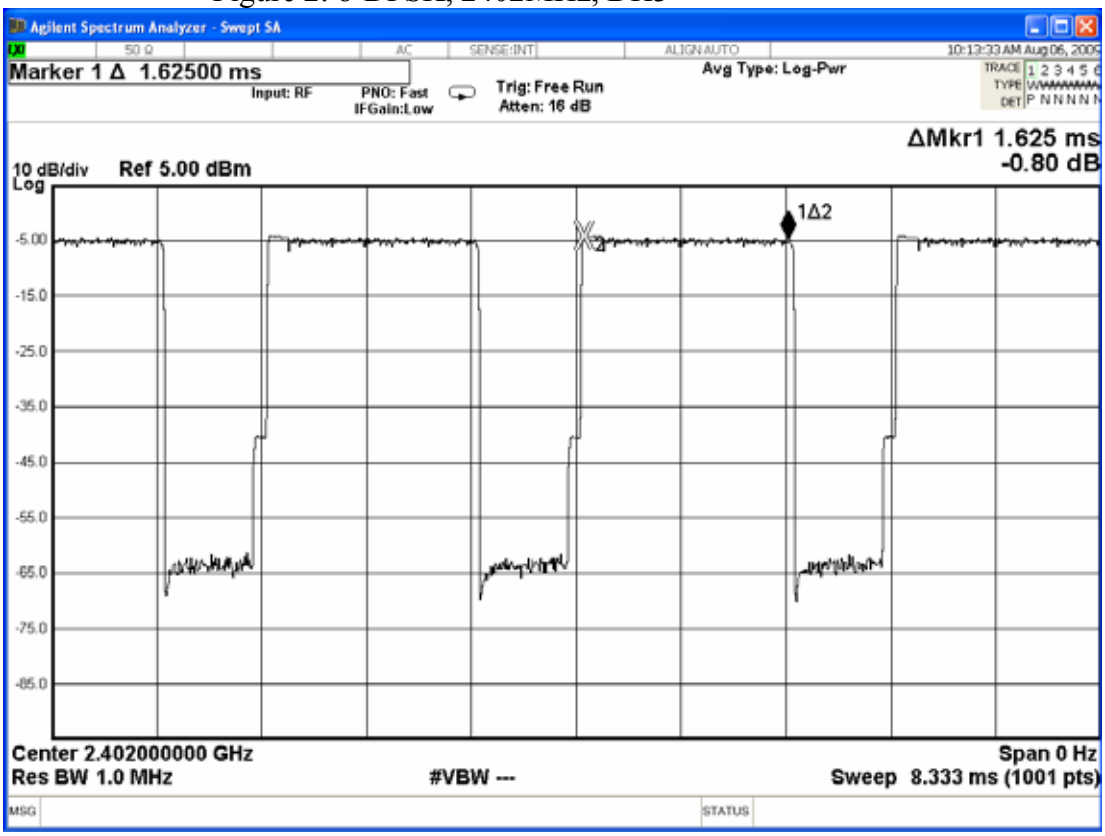


Figure 2: 8-DPSK, 2402MHz, DH3



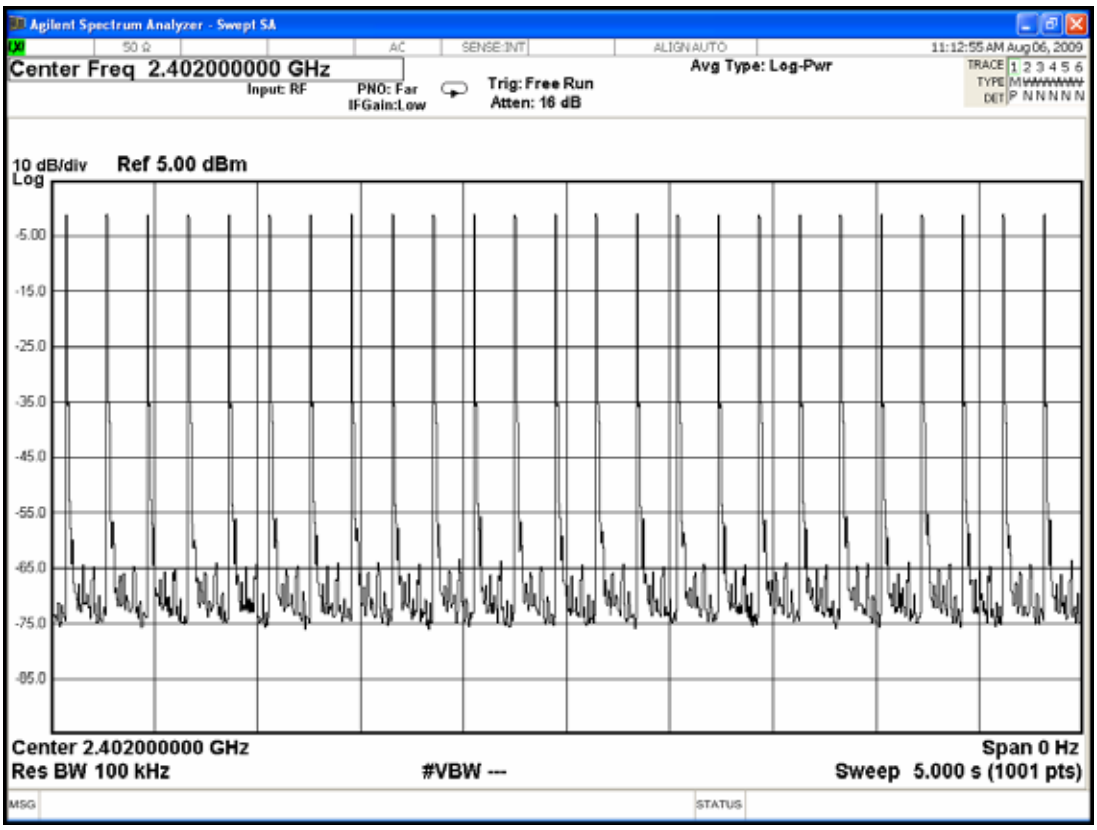
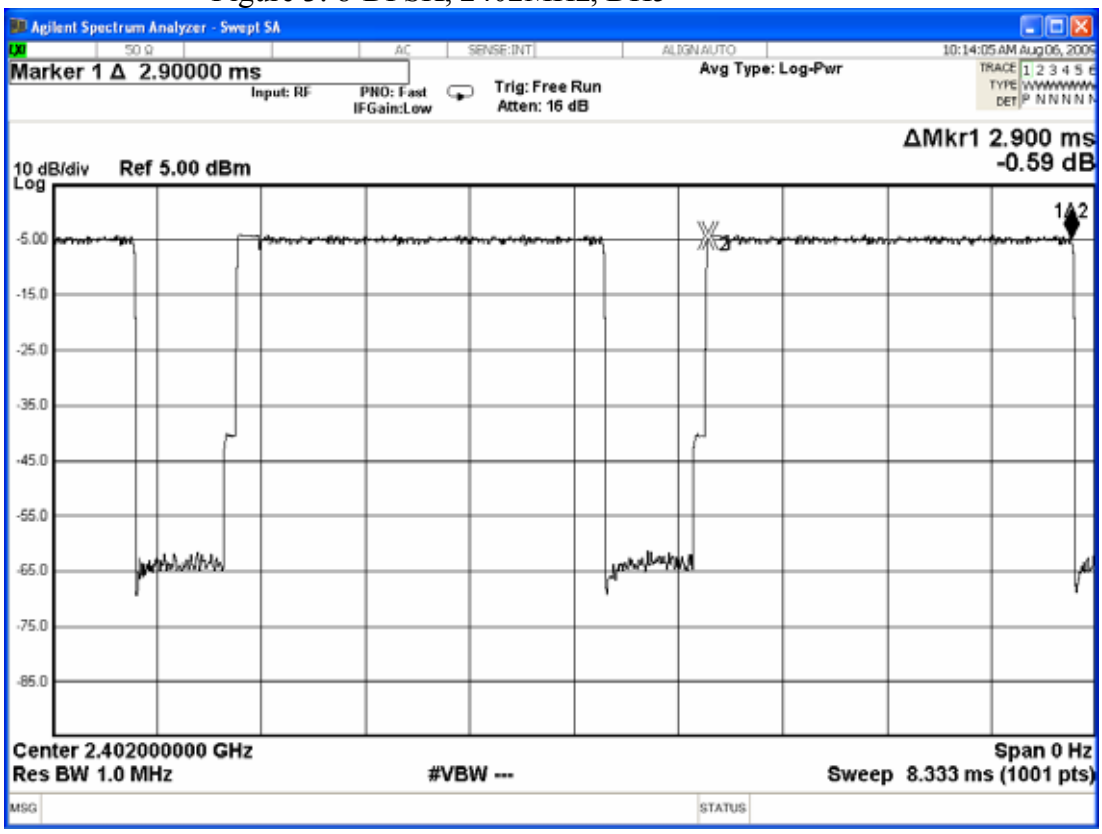
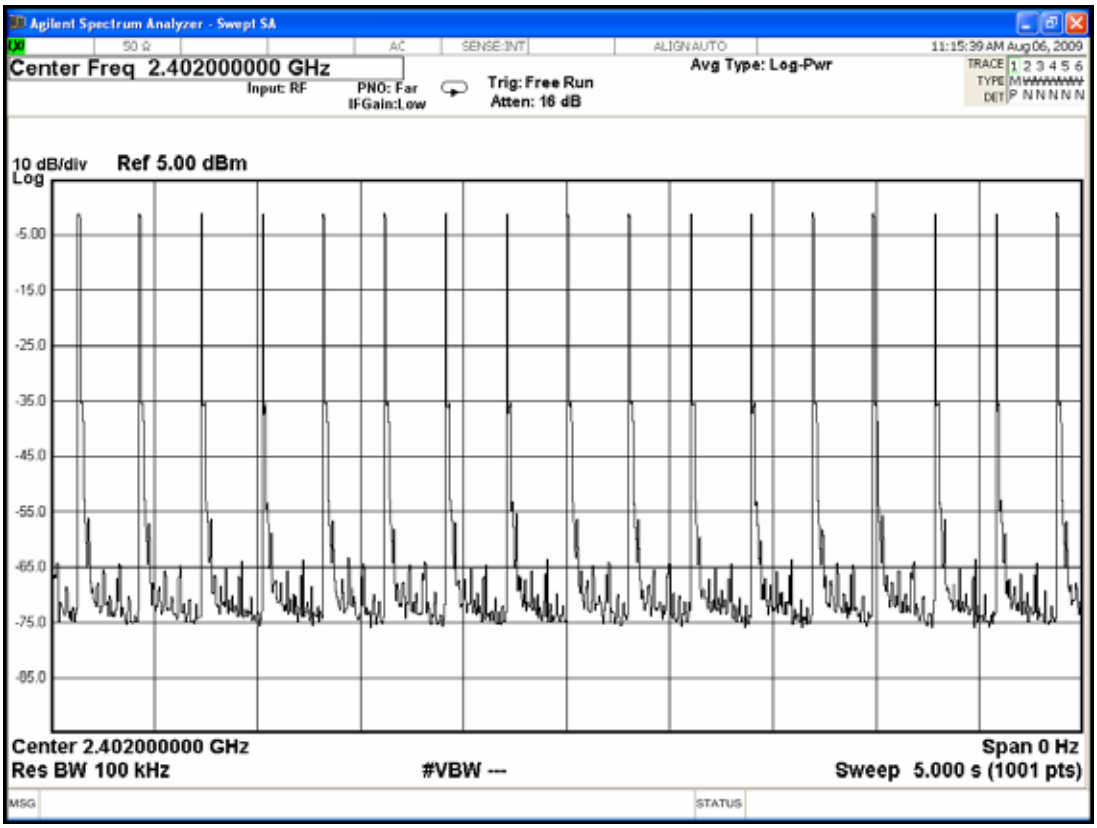


Figure 3: 8-DPSK, 2402MHz, DH5





6.6.5. Type of Modulation：8-DPSK, Test Frequency：2441MHz

Duty cycle: 79channels*0.4 seconds = 31.6 seconds

DH1 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH1 packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 800 hops per second with 79 channels. So you have each channel 10.13 time per second and so for 31.6 seconds you have 320 time of appearance.

Each Tx-time per appearance is 391.7us.

10.13 time*31.6 seconds* 0.3917ms = 125.386ms (<400ms)

B. For each 5 seconds of 50 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

50 channels*31.6 seconds/5* 0.3917ms = 126.252ms (<400ms)

DH3 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH3 packet need 3 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 400 hops per second with 79 channels. So you have each channel 5.1 time per second and so for 31.6 seconds you have 161 time of appearance.

Each Tx-time per appearance is 1625us.

5.1 time*31.6 seconds* 1.625ms = 261.885ms (<400ms)

B. For each 5 seconds of 25 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

25 channels*31.6 seconds/5* 1.625ms = 256.750ms (<400ms)

DH5 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH5 packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 266.7 hops per second with 79 channels. So you have each channel 3.37 time per second and so for 31.6 seconds you have 106 time of appearance.

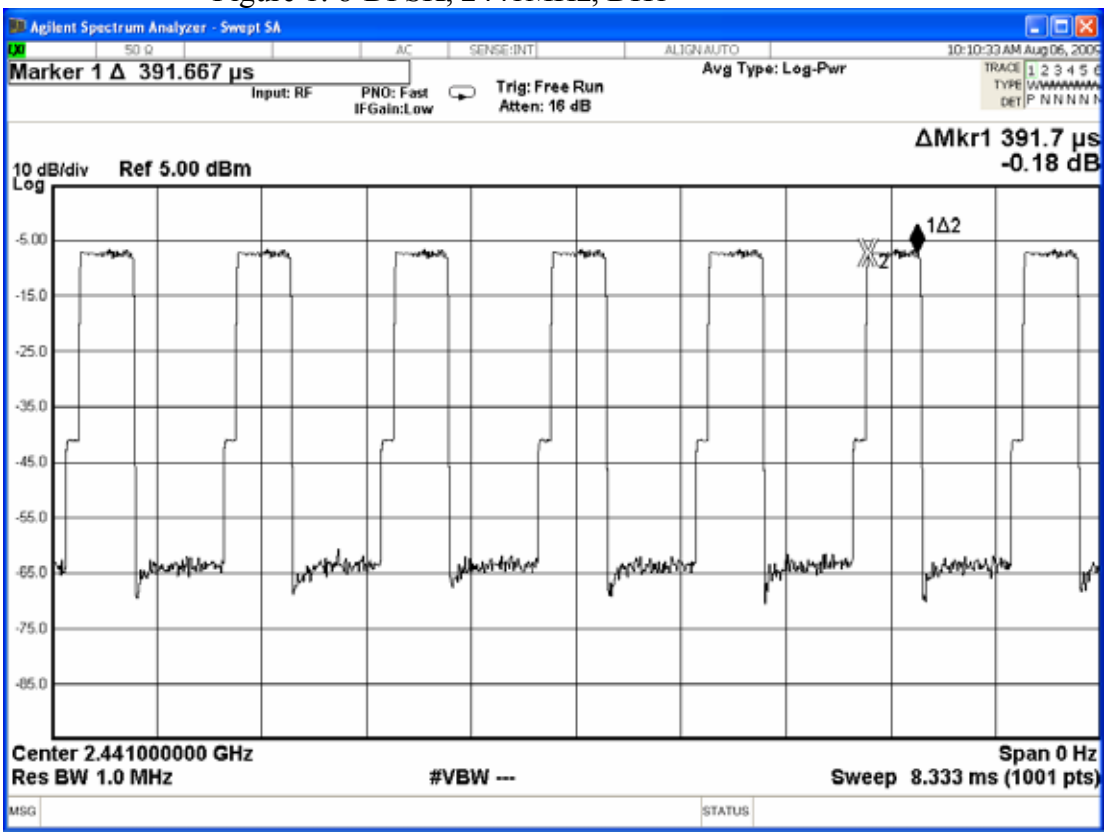
Each Tx-time per appearance is 2900us.

3.37 time*31.6 seconds* 2.900ms = 308.826ms (<400ms)

B. For each 5 seconds of 17 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

17 channels*31.6 seconds/5* 2.900ms = 311.576ms (<400ms)

Figure 1: 8-DPSK, 2441MHz, DH1



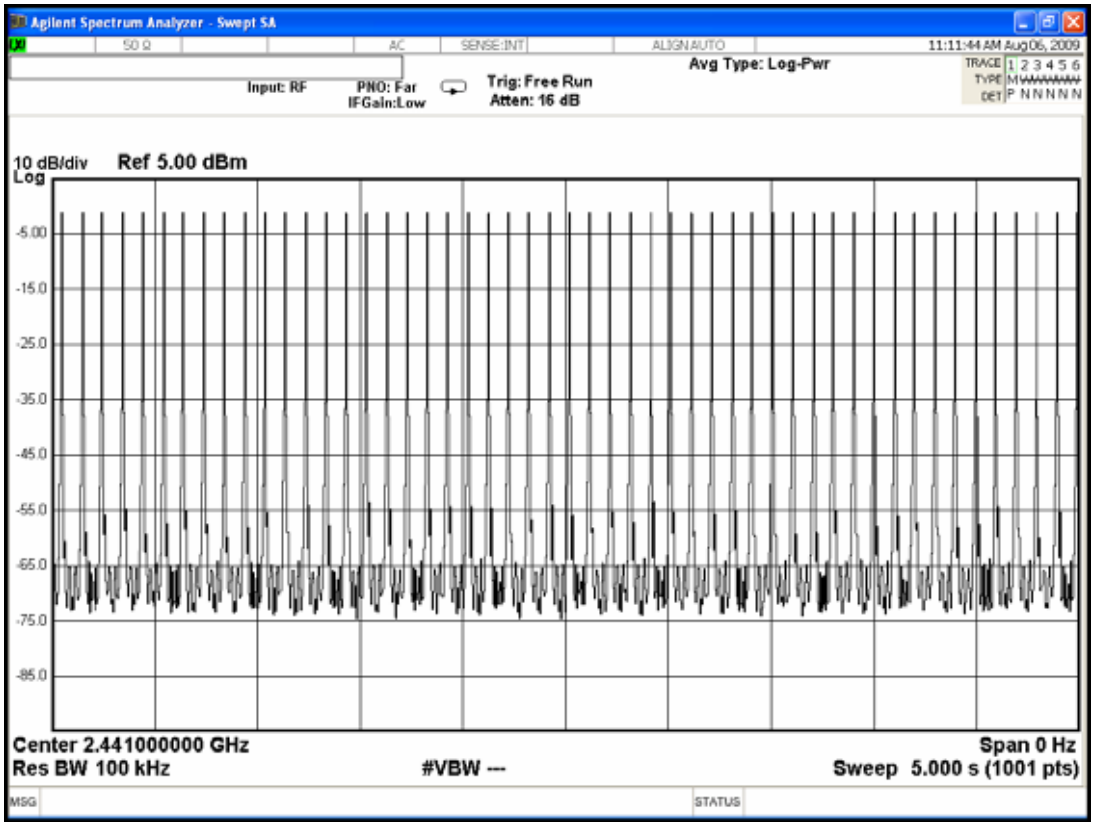
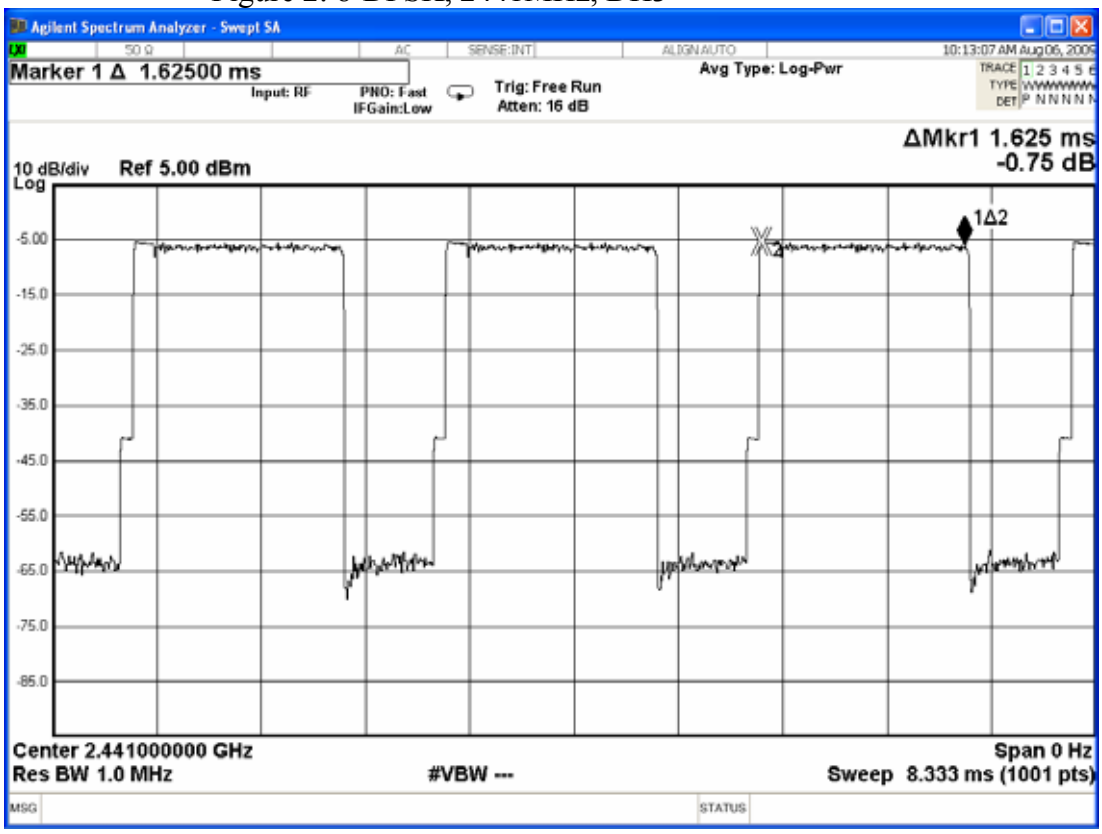


Figure 2: 8-DPSK, 2441MHz, DH3



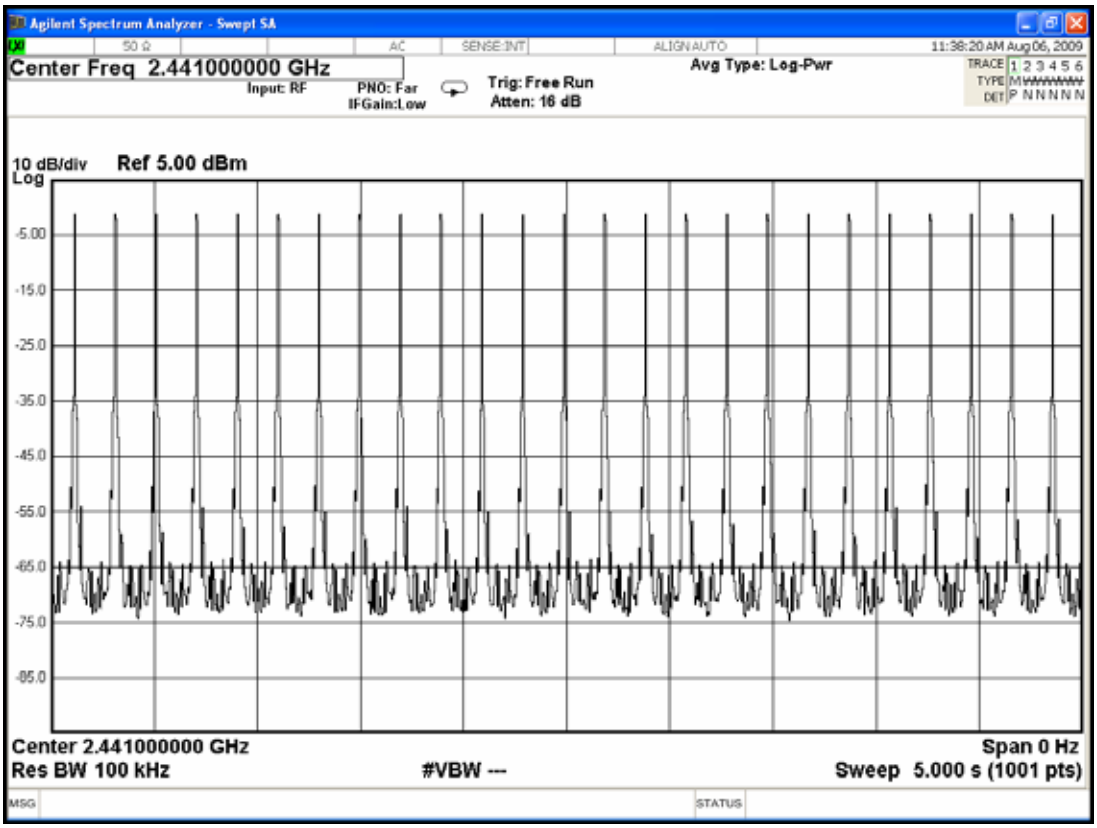
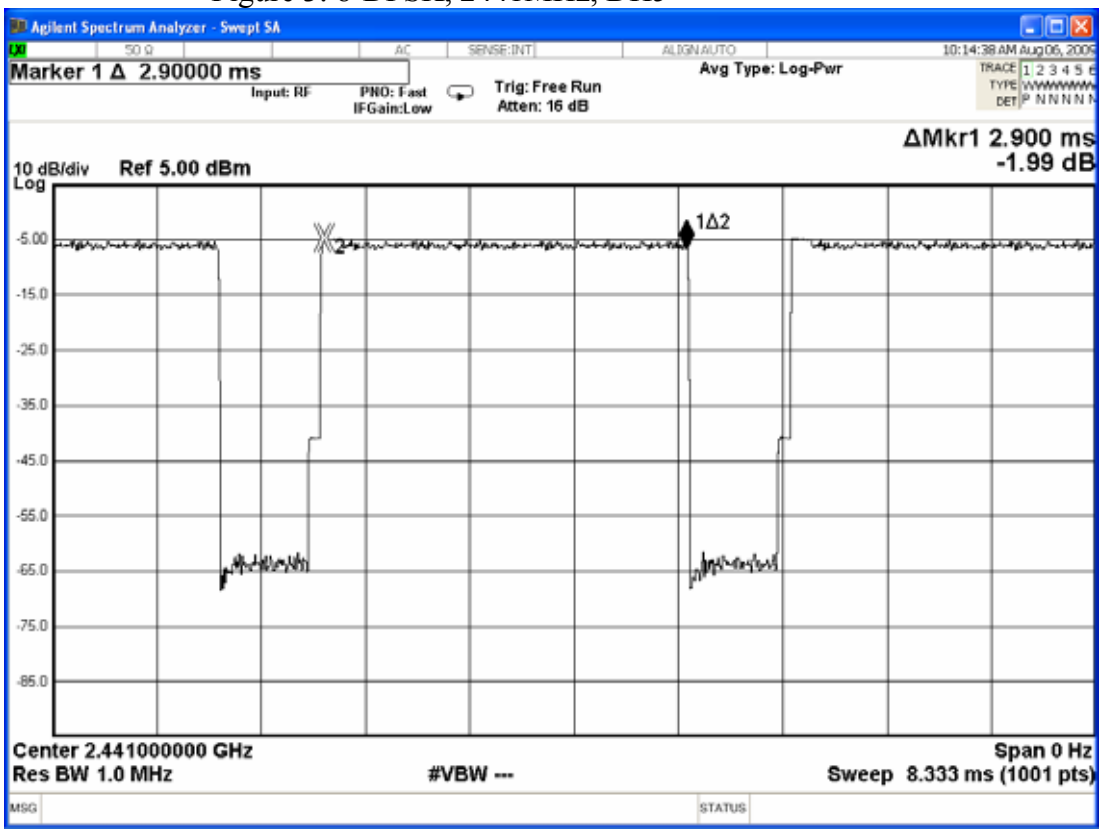
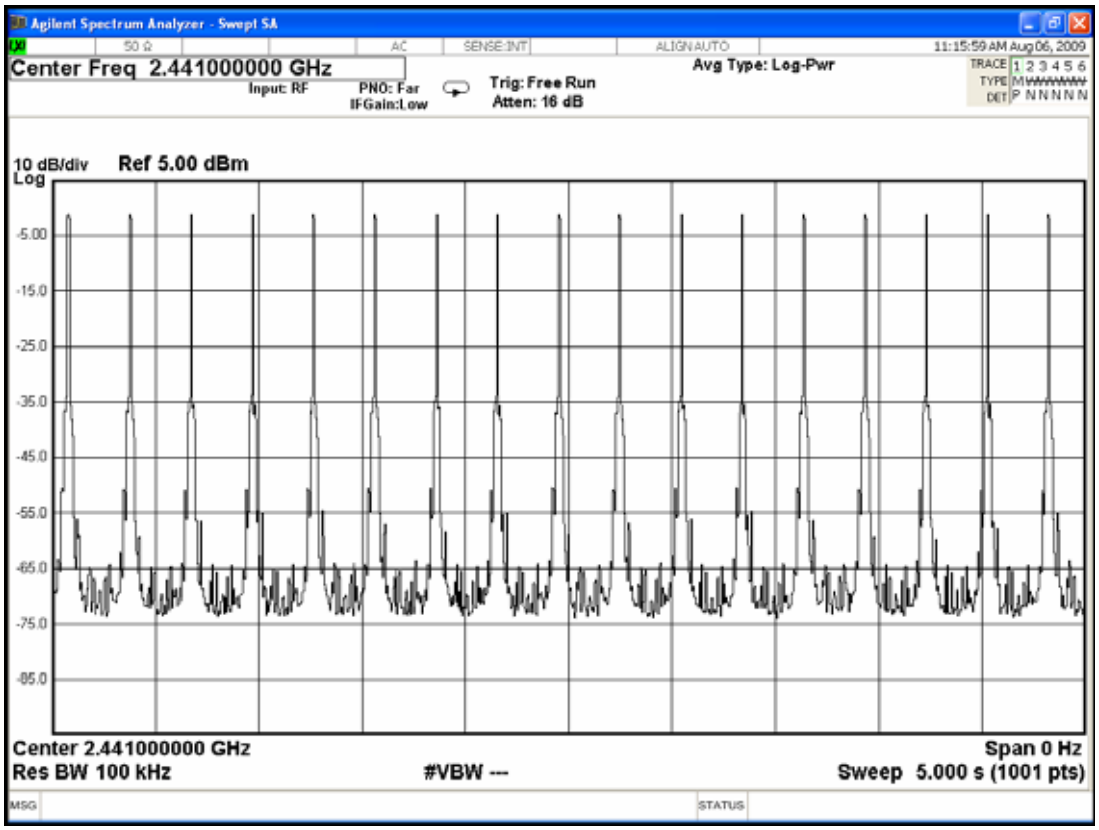


Figure 3: 8-DPSK, 2441MHz, DH5





6.6.6. Type of Modulation：8-DPSK, Test Frequency：2480MHz

Duty cycle: 79channels*0.4 seconds = 31.6 seconds

DH1 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH1 packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 800 hops per second with 79 channels. So you have each channel 10.13 time per second and so for 31.6 seconds you have 320 time of appearance.

Each Tx-time per appearance is 391.7us.

10.13 time*31.6 seconds* 0.3917ms = 125.386ms (<400ms)

B. For each 5 seconds of 50 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

50 channels*31.6 seconds/5* 0.3917ms = 126.252ms (<400ms)

DH3 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH3 packet need 3 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 400 hops per second with 79 channels. So you have each channel 5.1 time per second and so for 31.6 seconds you have 161 time of appearance.

Each Tx-time per appearance is 1625us.

5.1 time*31.6 seconds* 1.625ms = 261.885ms (<400ms)

B. For each 5 seconds of 25 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

25 channels*31.6 seconds/5* 1.625ms = 256.750ms (<400ms)

DH5 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH5 packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 266.7 hops per second with 79 channels. So you have each channel 3.37 time per second and so for 31.6 seconds you have 106 time of appearance.

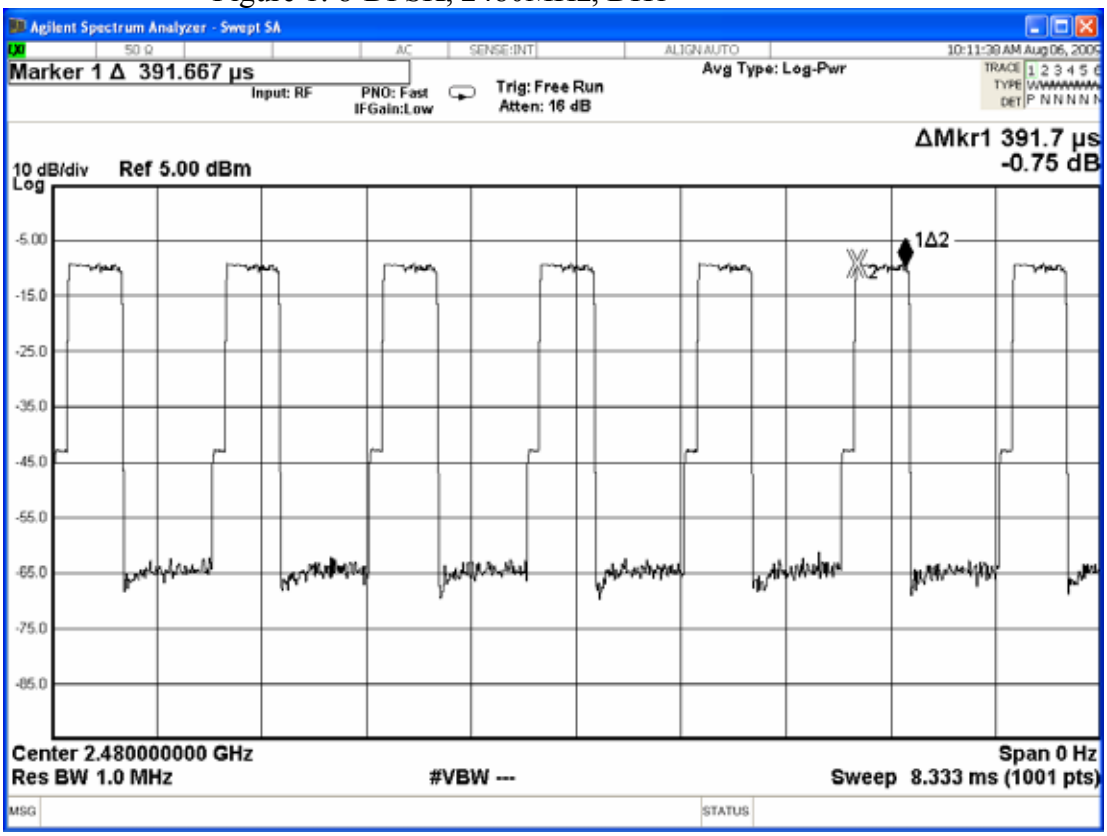
Each Tx-time per appearance is 2900us.

3.37 time*31.6 seconds* 2.900ms = 308.826ms (<400ms)

B. For each 5 seconds of 17 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

17 channels*31.6 seconds/5* 2.900ms = 311.576ms (<400ms)

Figure 1: 8-DPSK, 2480MHz, DH1



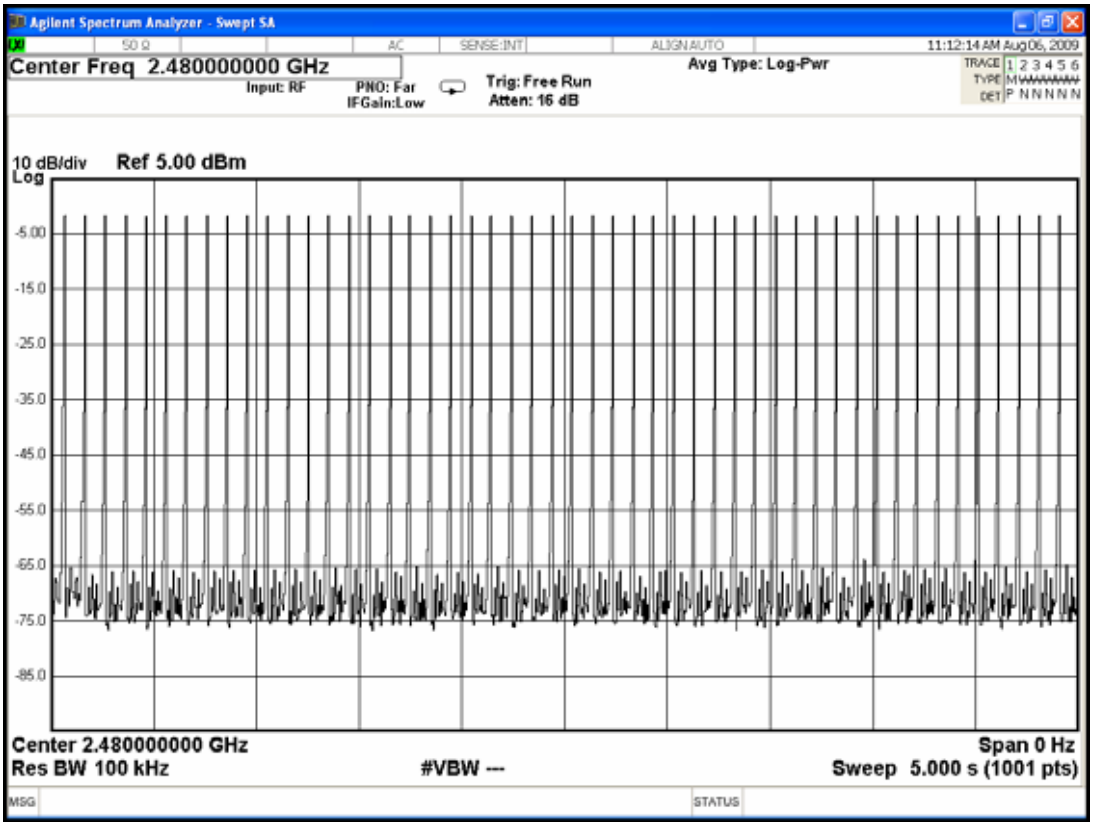
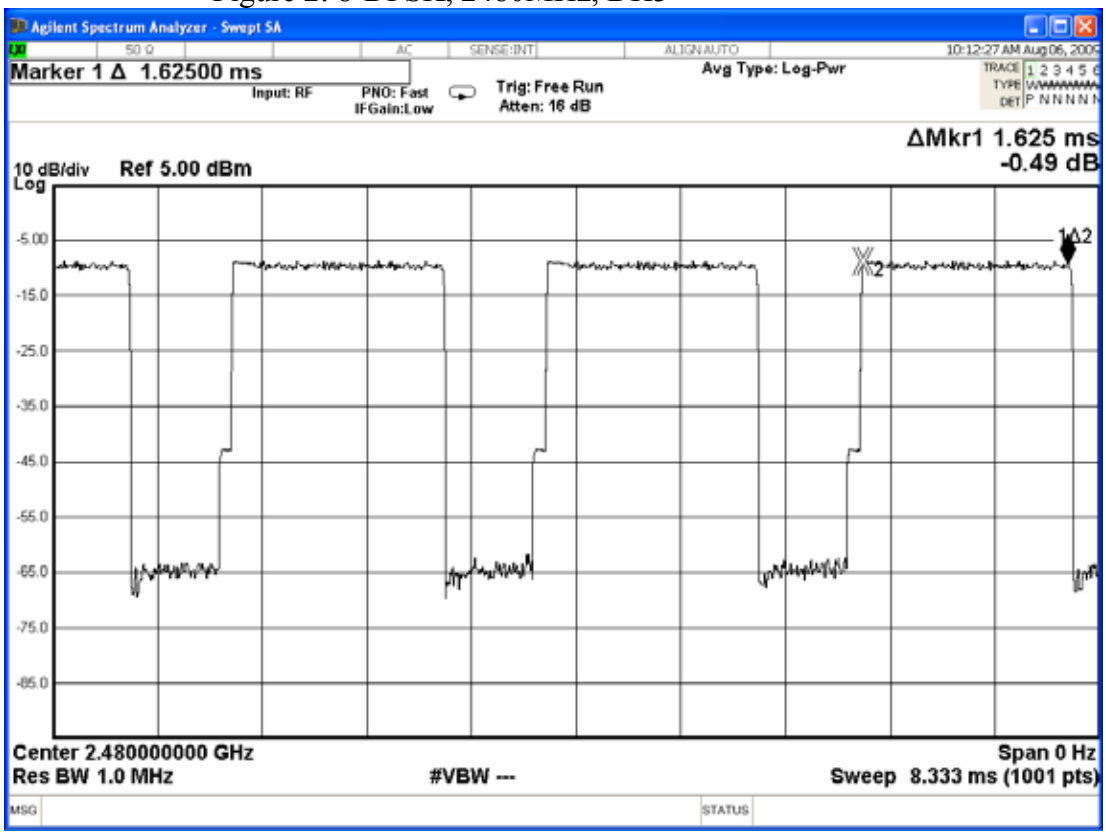


Figure 2: 8-DPSK, 2480MHz, DH3



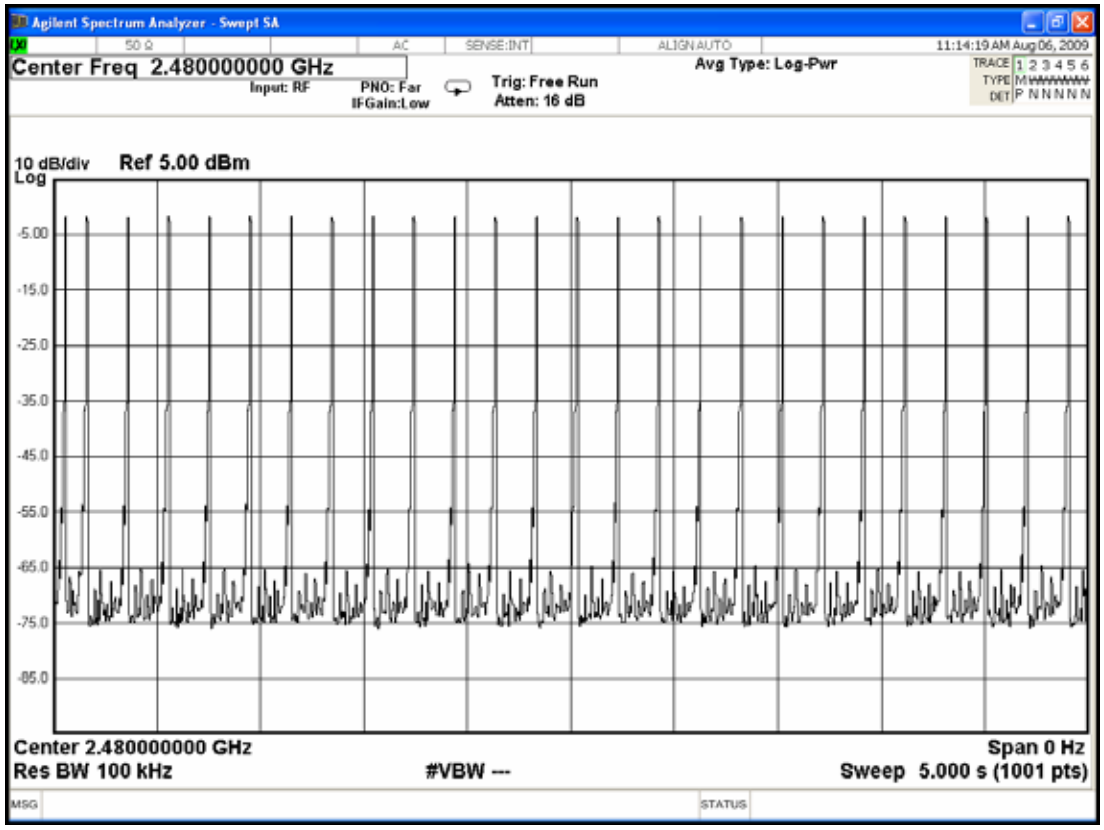
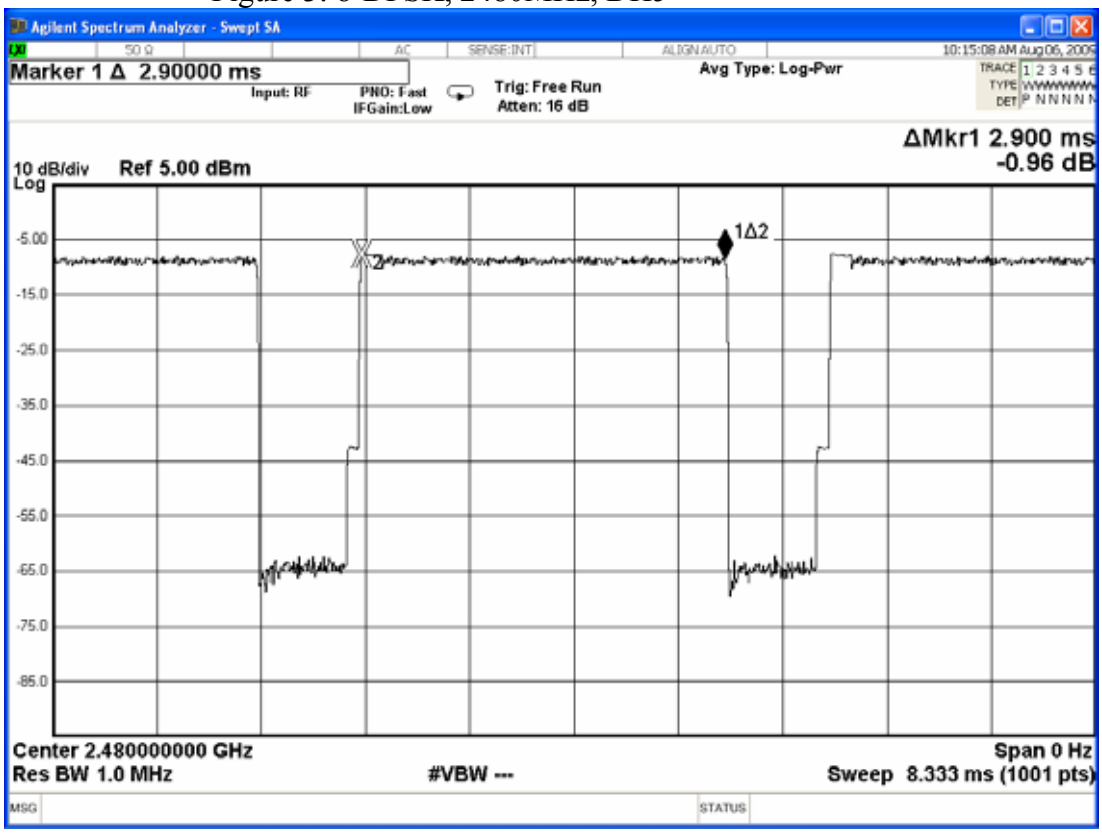
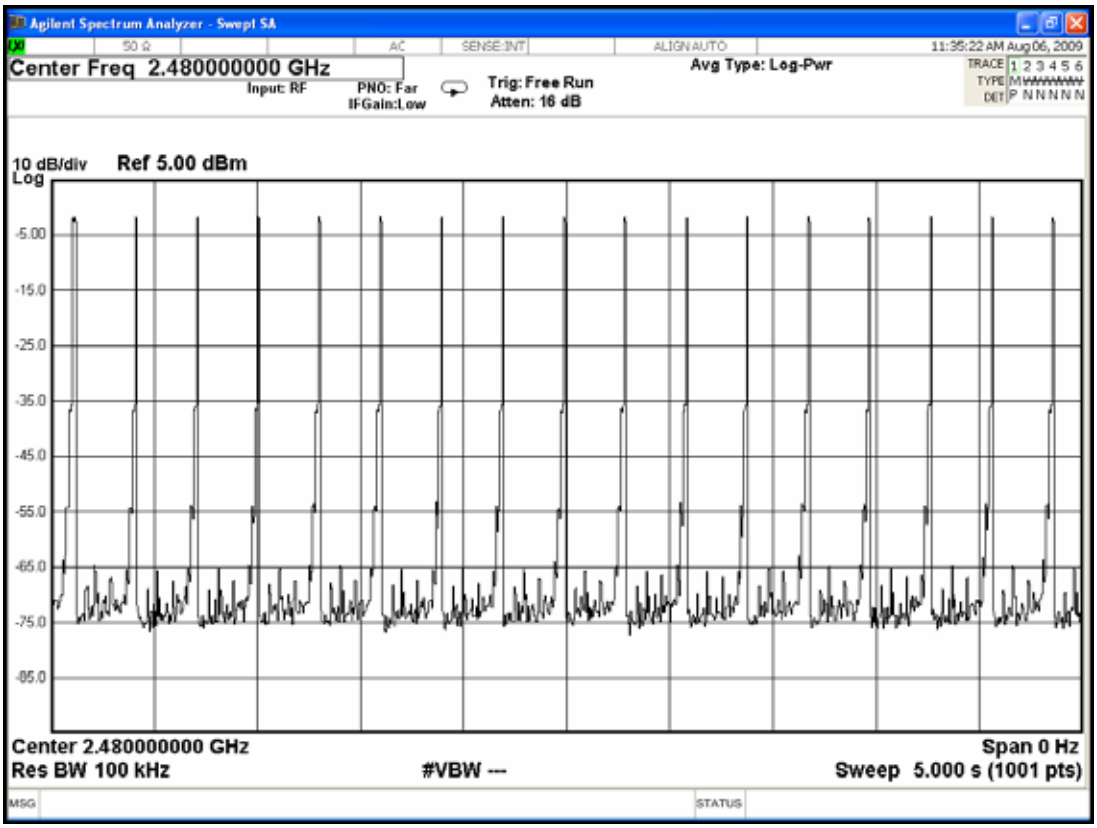


Figure 3: 8-DPSK, 2480MHz, DH5





7. NUMBER OF HOPPING CHANNELS MEASUREMENT

7.1. Test Equipment

The following test equipment was used during the number of hopping channels measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9020A	MY48011382	Sep. 22, 08'	Sep. 21, 09'

7.2. Block Diagram of Test Setup

The same as section.4.2.

7.3. Specification Limits (§15.247(a)(1)(iii))

Frequency hopping systems which use fewer than 20 hopping frequencies may employ intelligent hopping techniques to avoid interference to other transmissions. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 non-overlapping channels.

7.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

7.5. Test Procedure follow DA00-705

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer with 100kHz RBW and 100kHz VBW. Sweep=Auto ; Detector function=peak ; Trace=Max hold

7.6. Test Results

PASSED. All the test results are attached in next page.

[Note: Two types of modulation (GFSK and 8-DPSK) were reported in this report.]

EUT：Bluetooth Embedded Module M/N：BCM92046MD_EMB

Test Date : Aug. 03, 2009 Temperature : 26 ℃ Humidity : 53 %

7.6.1. Type of Modulation: GFSK

The number hopping channel is 79.

7.6.2. Type of Modulation: 8-DPSK

The number hopping channel is 79.

Figure 1: Type of Modulation: GFSK

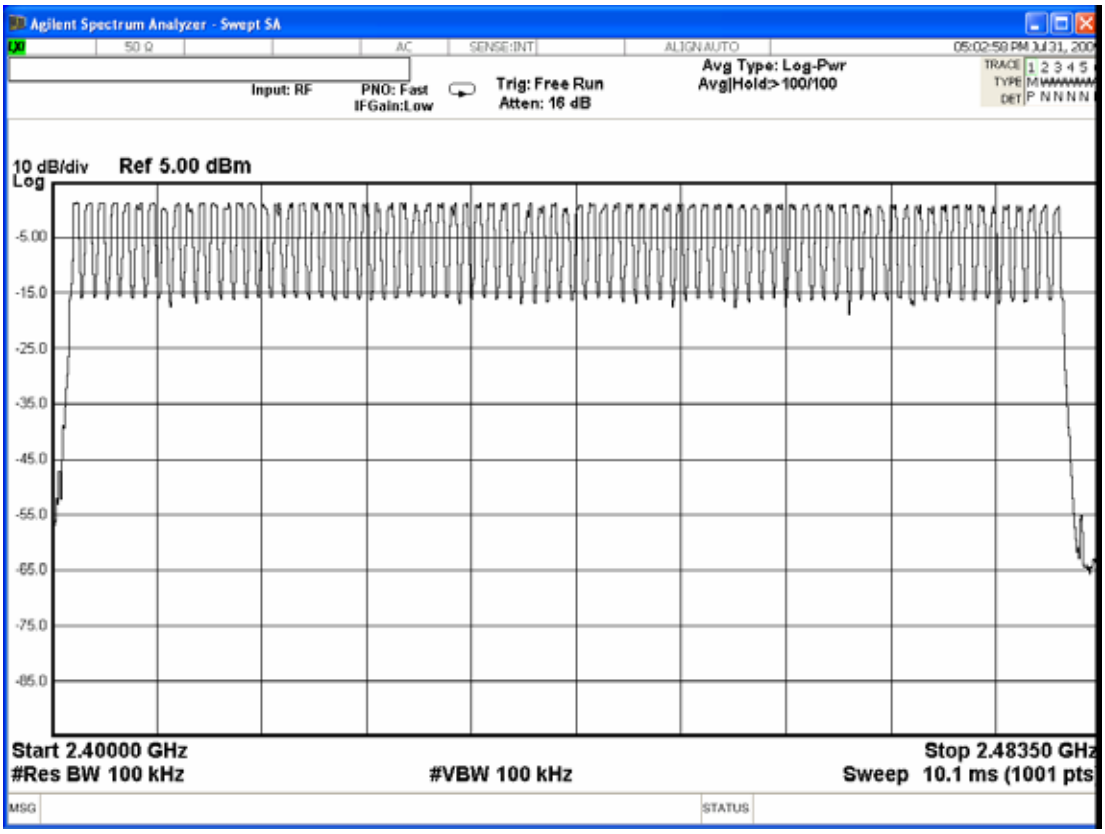
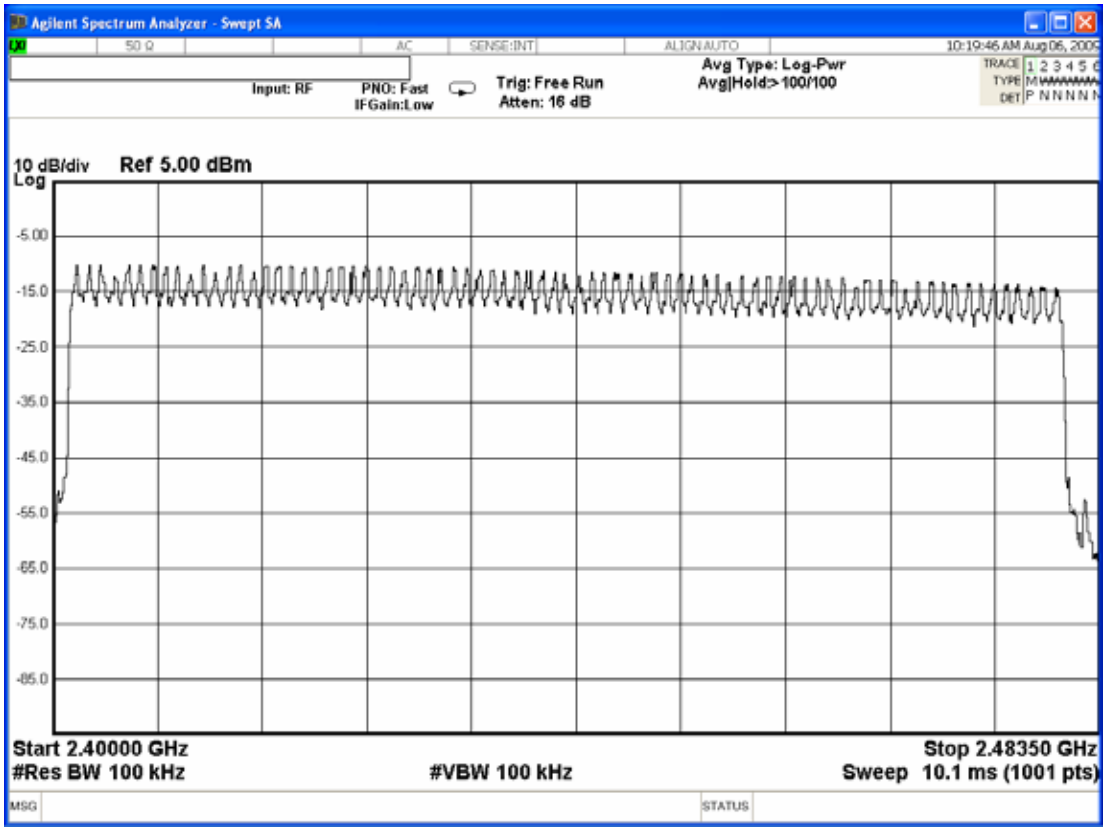


Figure 2: Type of Modulation: 8-DPSK



8. MAXIMUM PEAK OUTPUT POWER MEASUREMENT

8.1. Test Equipment

The following test equipment was used during the maximum peak output power measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9020A	MY48011382	Sep. 22, 08’	Sep. 21, 09’

8.2. Block Diagram of Test Setup

The same as section.4.2.

8.3. Specification Limits (§15.247(b)-(1))

The Limits of maximum Peak Output Power for frequency hopping systems in 2400-2483.5MHz is: 0.125Watt. (21dBm)

8.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in 4.4 except the test set up replaced by section 8.2.

8.5. Test Procedure follow DA00-705

The transmitter output was connected to the spectrum analyzer.
Span can encompass the waveform
RBW=VBW=1MHz
Sweep=Auto

8.6. Test Results

PASSED. All the test results are attached in next pages.

[Note: Two types of modulation (GFSK and 8-DPSK) were reported in this report.]

EUT：Bluetooth Embedded Module M/N：BCM92046MD_EMB

Test Date : Aug. 03, 2009 Temperature : 26 ℃ Humidity : 53 %

8.6.1.Type of Modulation: GFSK

No.	Channel	Test Frequency	**Peak Output Power**	Limit
1.	0	2402MHz	**1.278dBm**	21dBm
2.	39	2441MHz	**1.201dBm**	21dBm
3.	78	2480MHz	**0.828dBm**	21dBm

8.6.2.Type of Modulation: 8-DPSK

No.	Channel	Test Frequency	**Peak Output Power**	Limit
1.	0	2402MHz	**-1.451dBm**	21dBm
2.	39	2441MHz	**-2.359dBm**	21dBm
3.	78	2480MHz	**-4.973dBm**	21dBm

Figure 1: GFSK, Channel 0, Frequency: 2402MHz

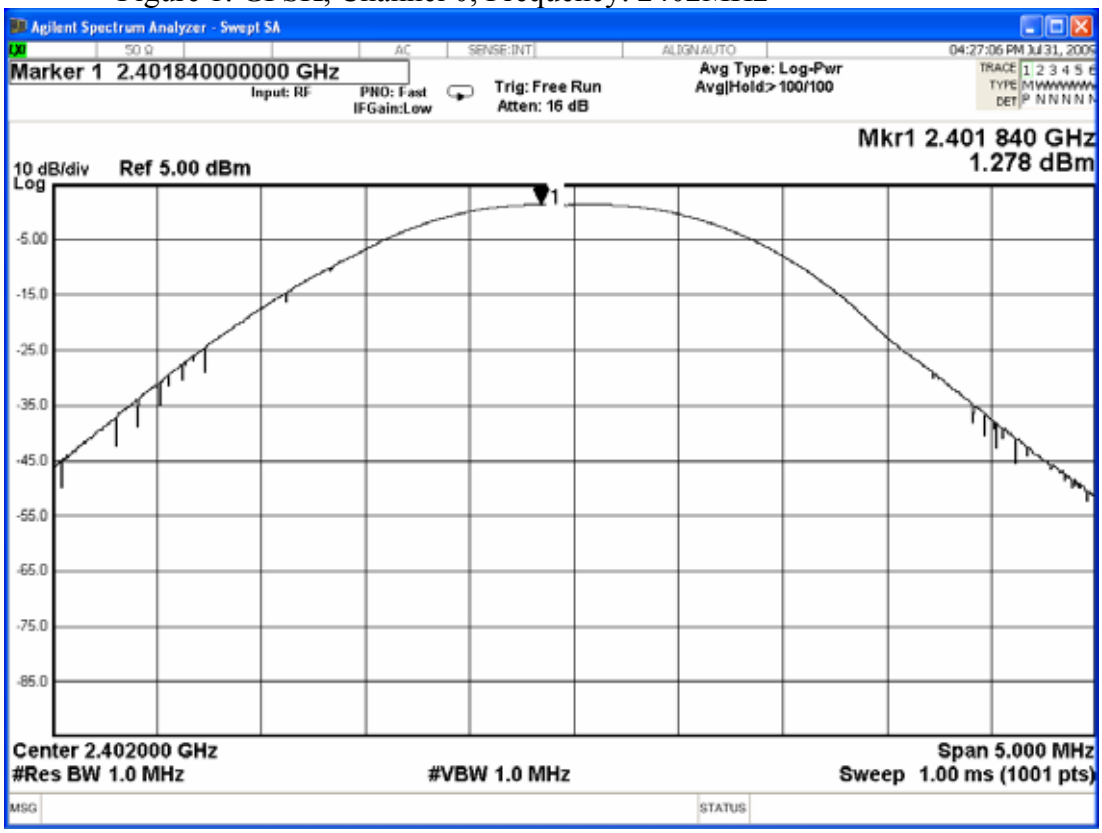


Figure 2: GFSK, Channel 39, Frequency: 2441MHz

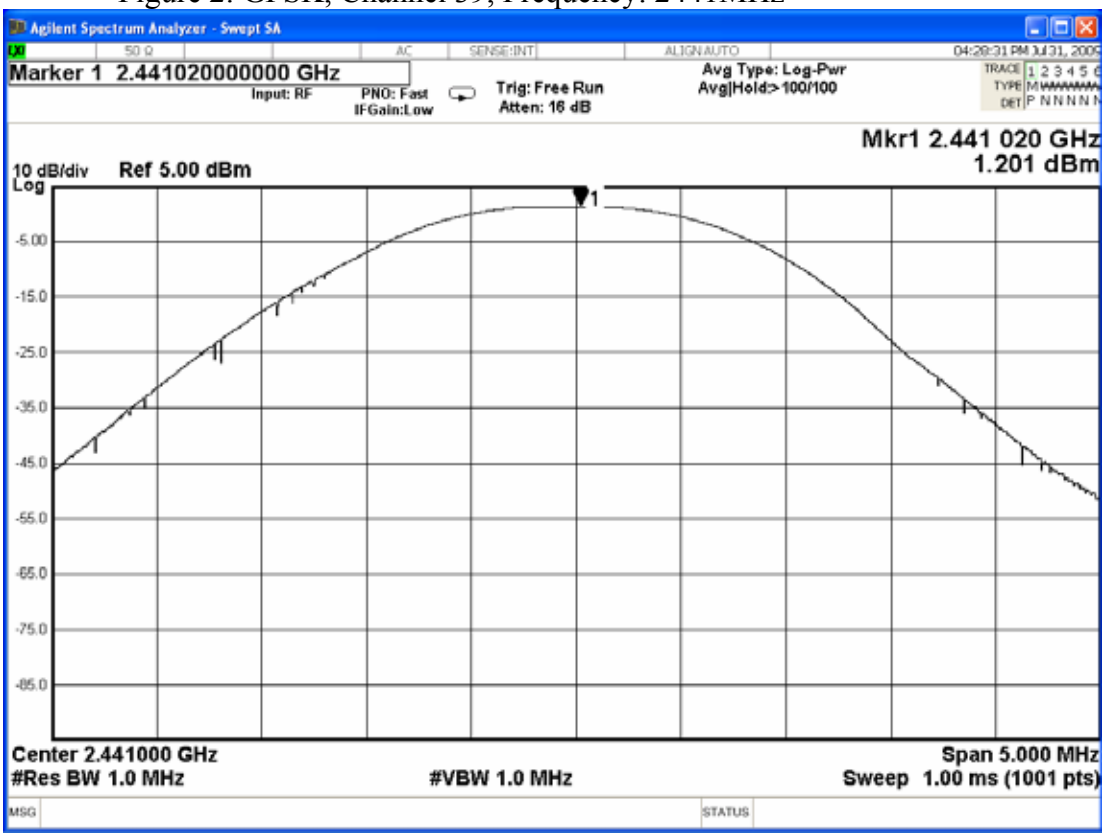


Figure 3: GFSK, Channel 78, Frequency: 2480MHz

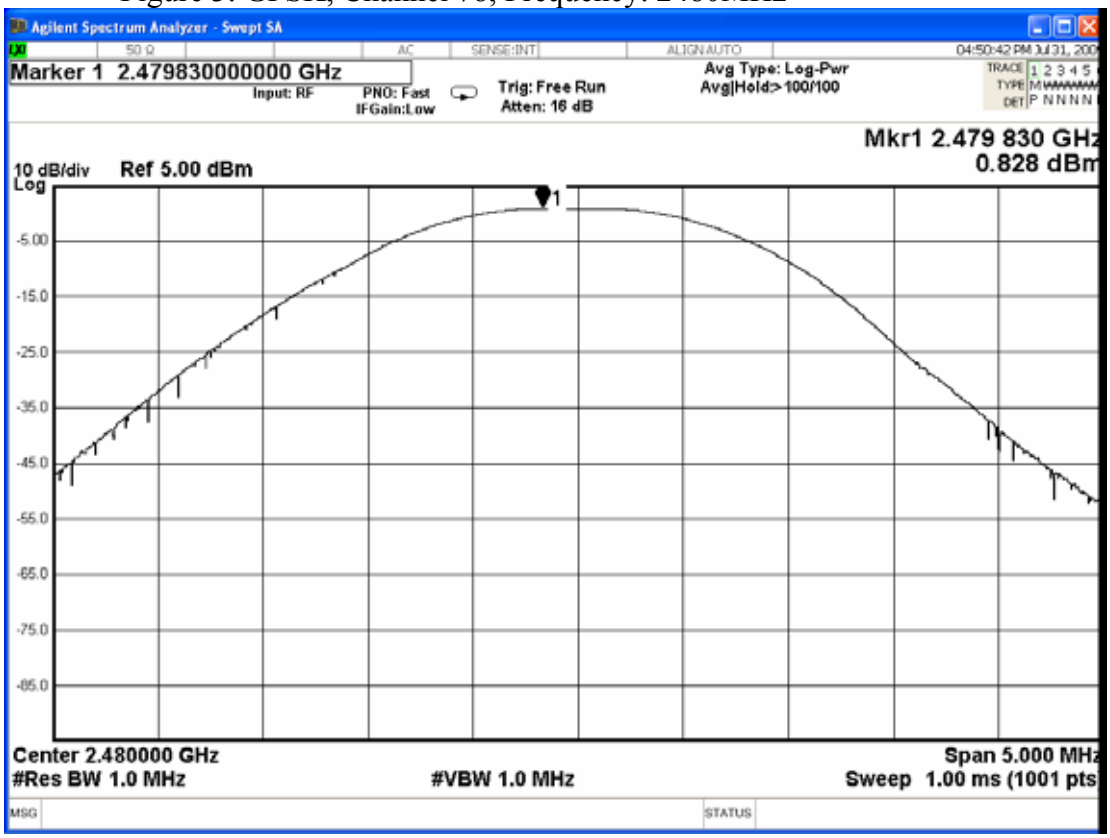


Figure 4: 8-DPSK, Channel 0, Frequency: 2402MHz

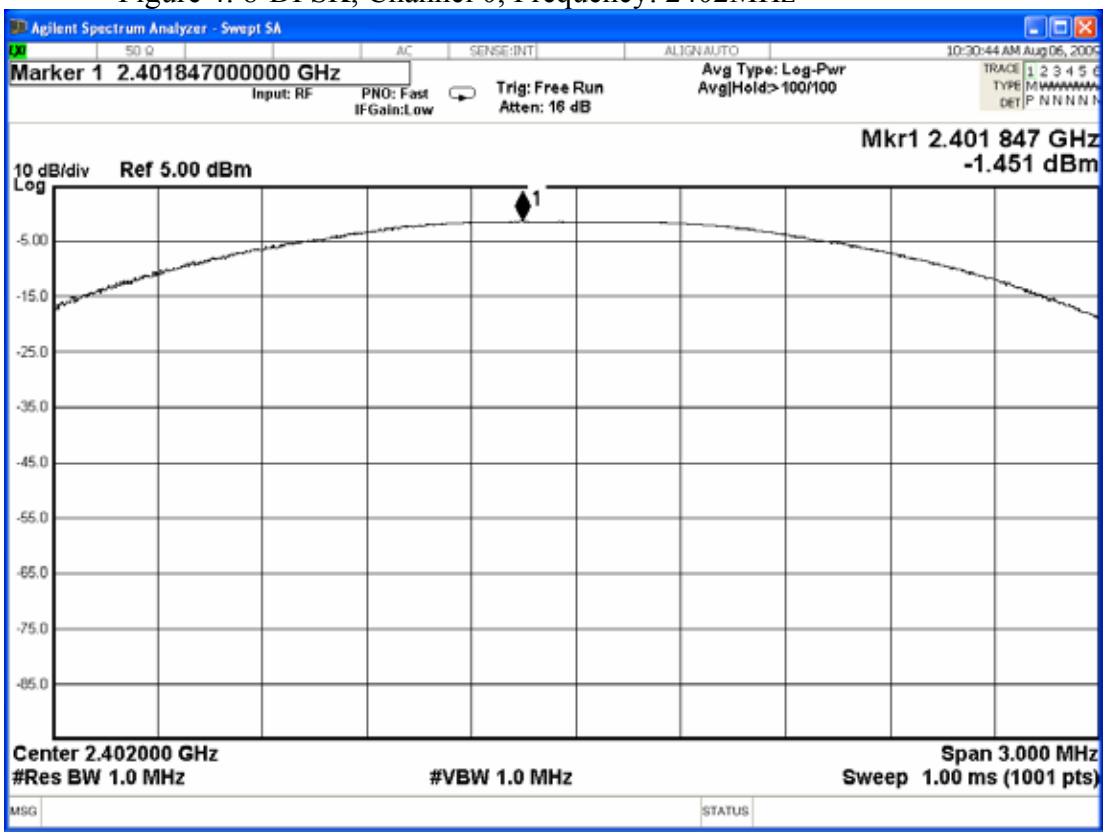


Figure 5: 8-DPSK, Channel 39, Frequency: 2441MHz

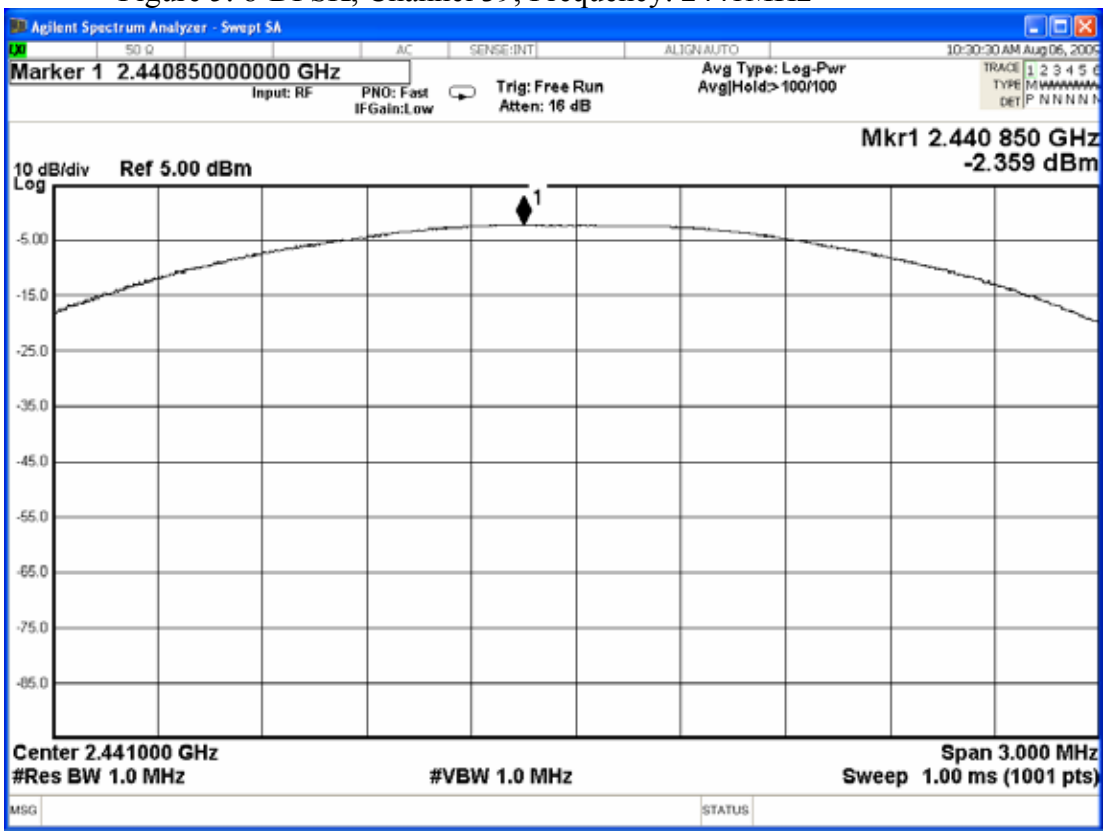
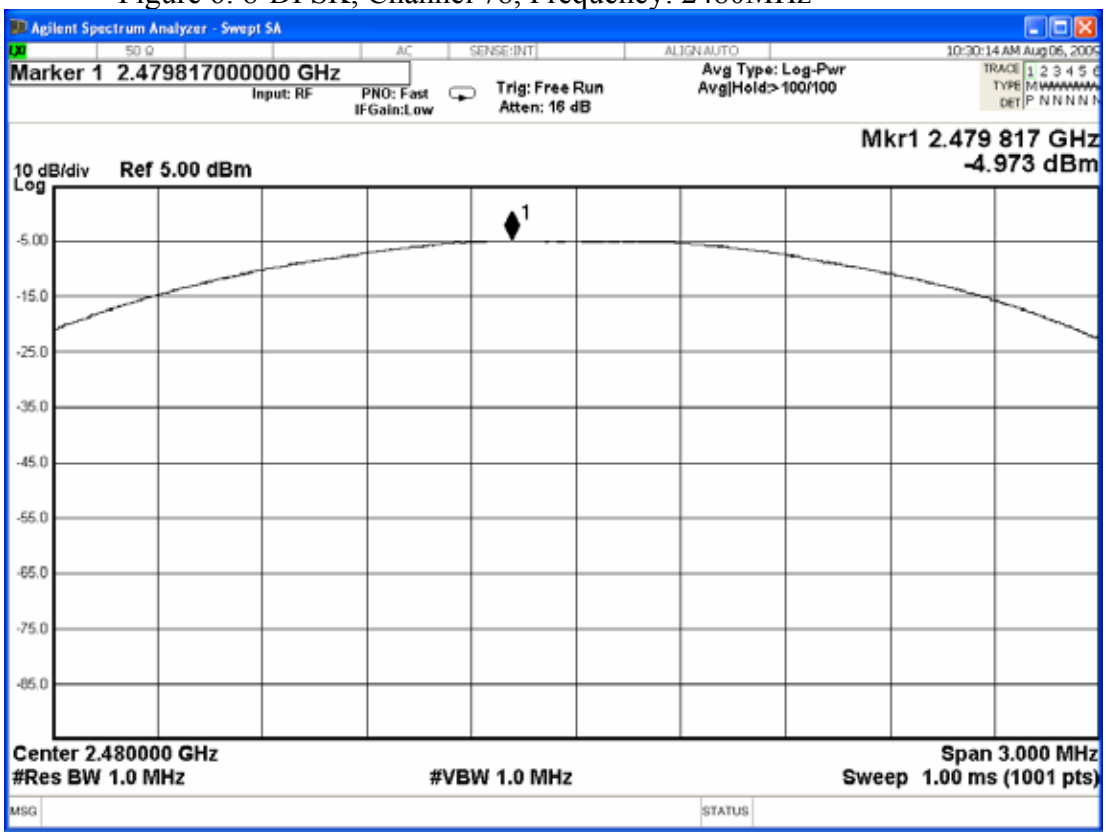


Figure 6: 8-DPSK, Channel 78, Frequency: 2480MHz



9. EMISSION LIMITATIONS MEASUREMENT

9.1. Test Equipment

The following test equipment was used during the emission limitations measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9020A	MY48011382	Sep. 22, 08'	Sep. 21, 09'

9.2. Block Diagram of Test Setup

The same as section.4.2.

9.3. Specification Limits (§15.247(c))

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (See Section 15.205(c)).(※ This test result attaching to §3.6.3)

9.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

9.5. Test Procedure follow DA00-705

The transmitter output was connected to the spectrum analyzer. Set both RBW and VBW of spectrum analyzer to 100kHz with frequency range from 30MHz to 25GHz.

9.6. Test Results

PASSED. All the test results are attached in next pages.

[Note: Two types of modulation (GFSK and 8-DPSK) were reported in this report.]

EUT：Bluetooth Embedded Module M/N：BCM92046MD_EMB

Test Date : Aug. 03, 2009 Temperature : 26 ℃ Humidity : 53 %

9.6.1. Type of Modulation: GFSK

1. 2402MHz: During 30MHz~25GHz bandwidth. In the 1.603GHz, the –55.982dBm is max value that is lower than 20dB of primary channel.
2. 2441MHz: During 30MHz~25GHz bandwidth. In the 1.603GHz, the –56.139dBm is max value that is lower than 20dB of primary channel.
3. 2480MHz: During 30MHz~25GHz bandwidth. In the 1.603GHz, the –55.636dBm is max value that is lower than 20dB of primary channel.

Note: The peak above the limit line is the carrier frequency.

9.6.2. Type of Modulation: 8-DPSK

1. 2402MHz: During 30MHz~25GHz bandwidth. In the 1.603GHz, the –53.600dBm is max value that is lower than 20dB of primary channel.
2. 2441MHz: During 30MHz~25GHz bandwidth. In the 1.628GHz, the –52.174dBm is max value that is lower than 20dB of primary channel.
3. 2480MHz: During 30MHz~25GHz bandwidth. In the 1.653GHz, the –51.432dBm is max value that is lower than 20dB of primary channel.

Note: The peak above the limit line is the carrier frequency.

Figure 1: GFSK, Channel 0, Frequency: 2402MHz

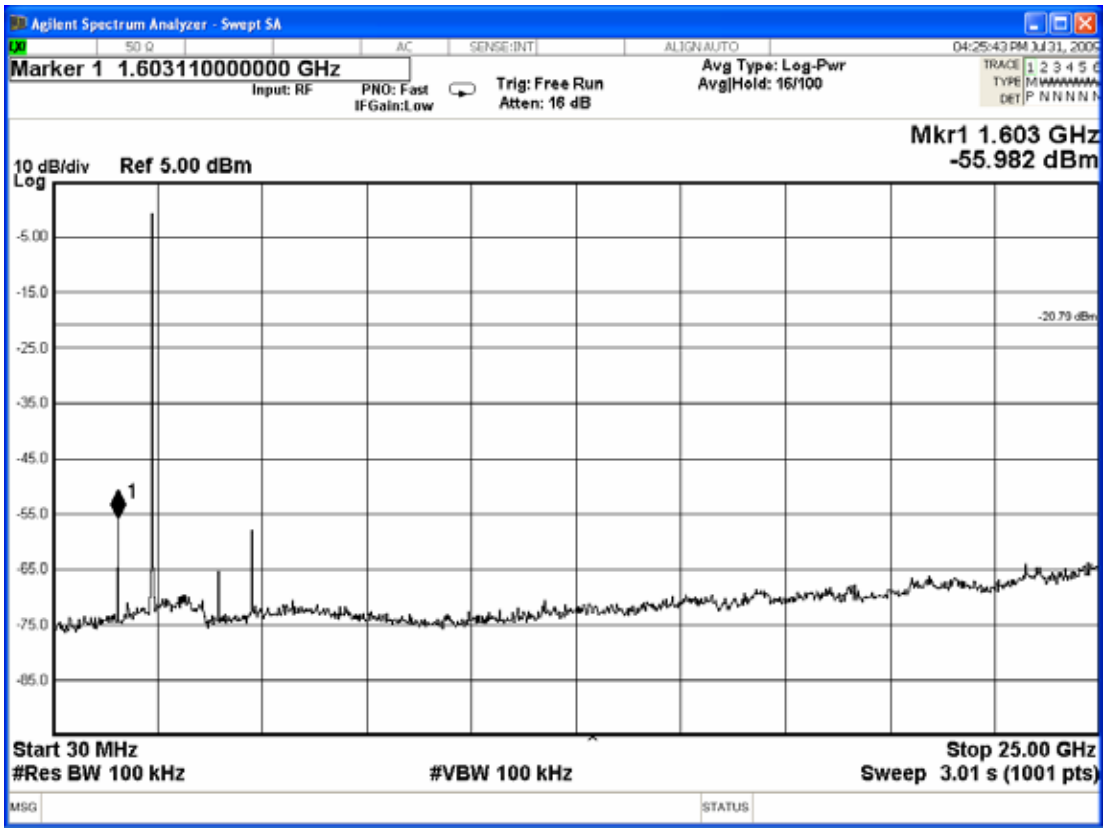


Figure 2: GFSK, Channel 39, Frequency: 2441MHz

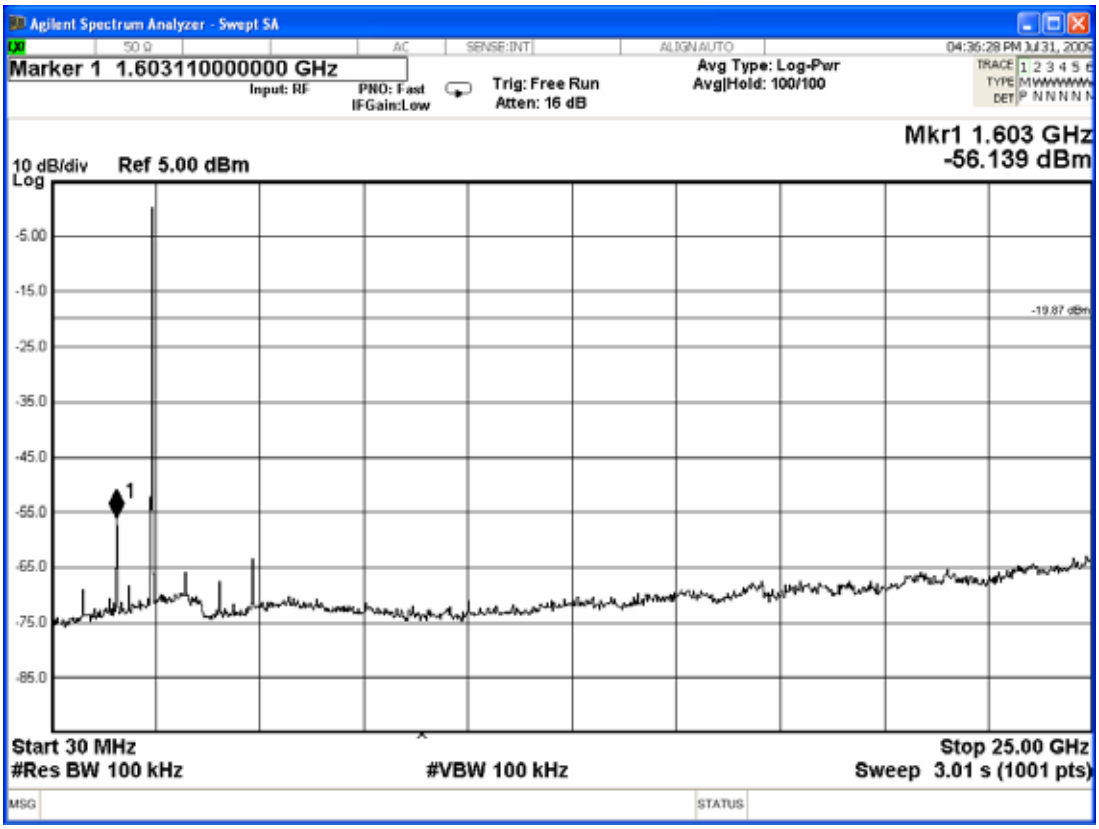
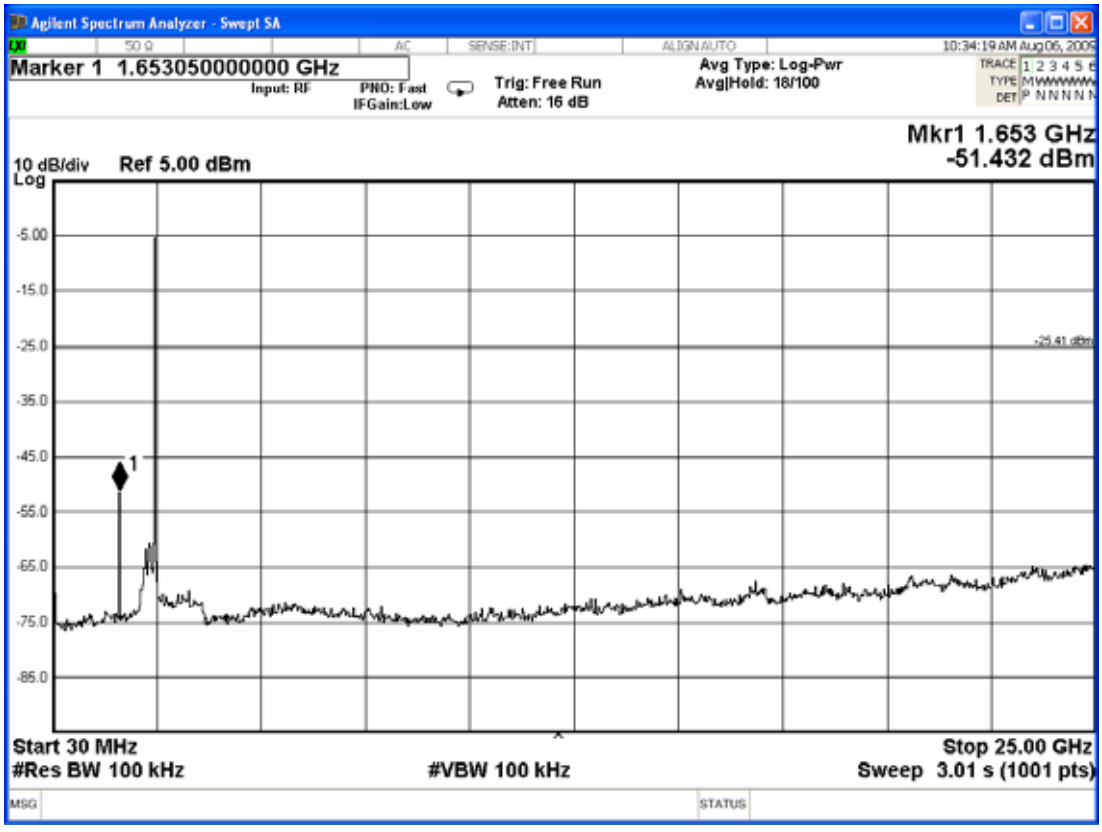


Figure 3: GFSK, Channel 78, Frequency: 2480MHz

Figure 4: 8-DPSK, Channel 0, Frequency: 2402MHz

Figure 5: 8-DPSK, Channel 39, Frequency: 2441MHz

Figure 6: 8-DPSK, Channel 78, Frequency: 2480MHz



10. BAND EDGES MEASUREMENT

10.1. Test Equipment

The following test equipment was used during the band edges measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9020A	MY48011382	Sep. 22, 08'	Sep. 21, 09'

10.2. Block Diagram of Test Setup

The same as section.4.2.

10.3. Specification Limits (§15.247(c))

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (See Section 15.205(c)). (※ This test result attaching to §3.6.3)

10.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

10.5. Test Procedure follow DA00-705

The transmitter output was connected to the spectrum analyzer. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 100kHz bandwidth from band edge.

10.6. Test Results

PASSED. All the test results are attached in next pages.

[Note: Two types of modulation (GFSK and 8-DPSK) were reported in this report.]

EUT：Bluetooth Embedded Module M/N：BCM92046MD_EMB

Test Date : Aug. 03, 2009 Temperature : 26 ℃ Humidity : 53 %

10.6.1. Type of Modulation: GFSK

1. Upper Band edge: The highest emission level is – 63.474dBm on 2.39990GHz。
2. Below Band edge : The highest emission level is – 66.897dBm on 2.48360GHz。

10.6.2. Type of Modulation: 8-DPSK

1. Upper Band edge: The highest emission level is – 51.455dBm on 2.39990GHz。
2. Below Band edge : The highest emission level is – 58.818dBm on 2.48360GHz。

Figure 1: Upper Band edge (GFSK)

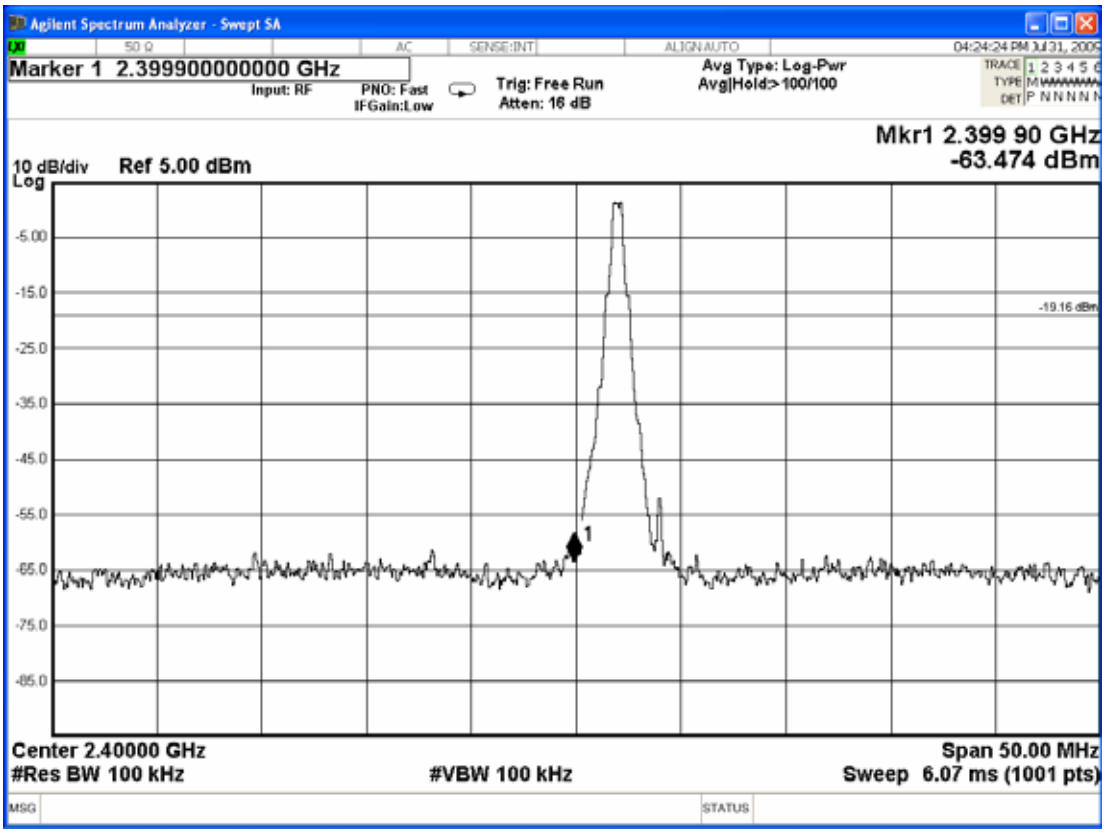


Figure 2: Below Band edge (GFSK)

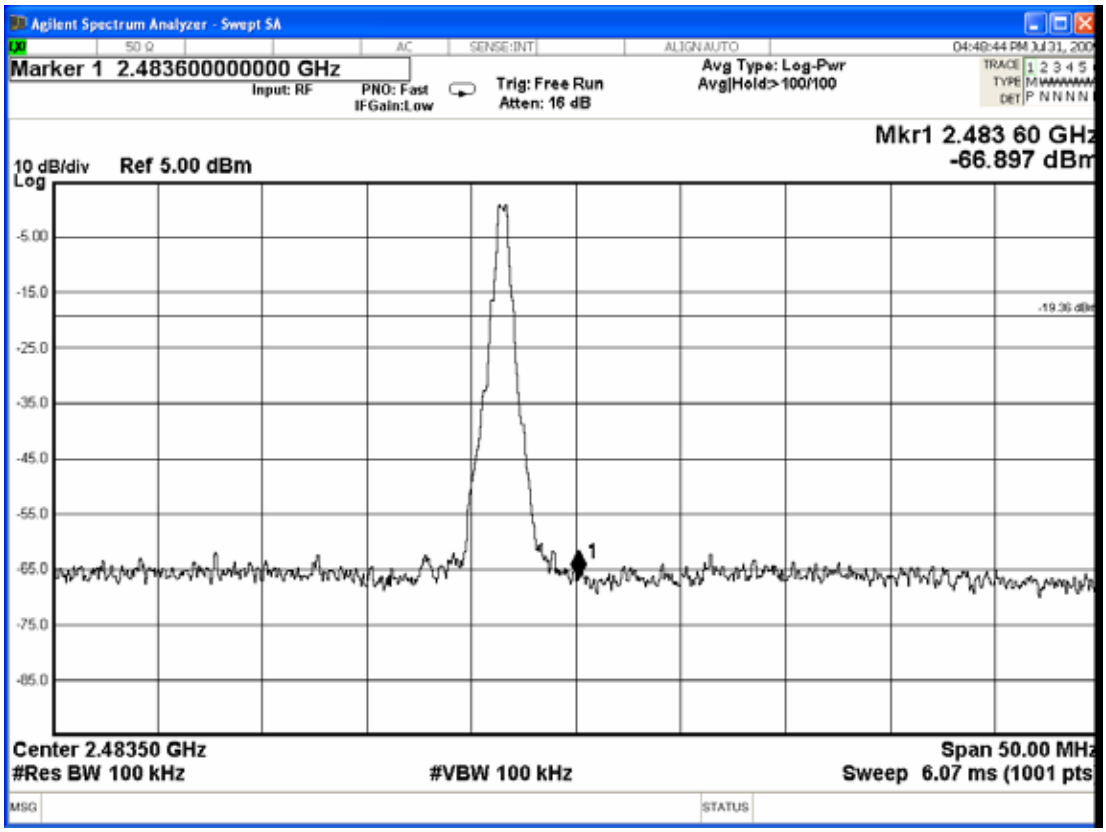


Figure 1: Upper Band edge (8-DPSK)

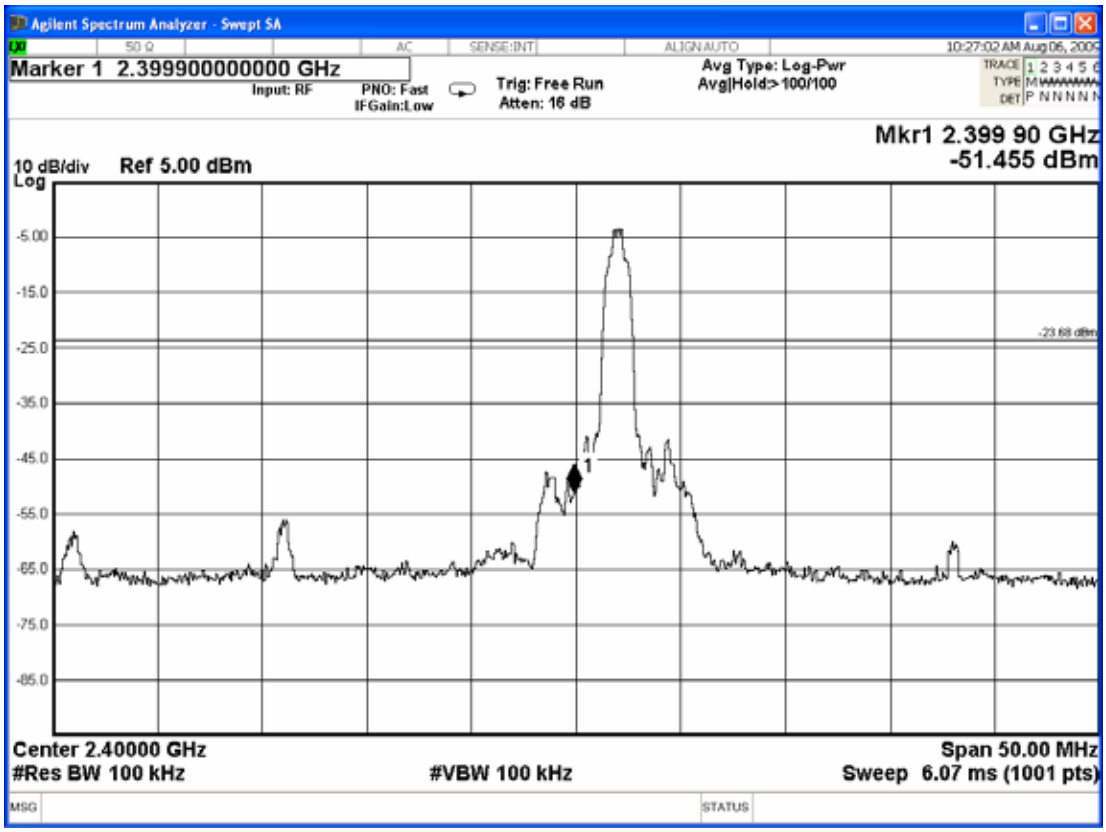
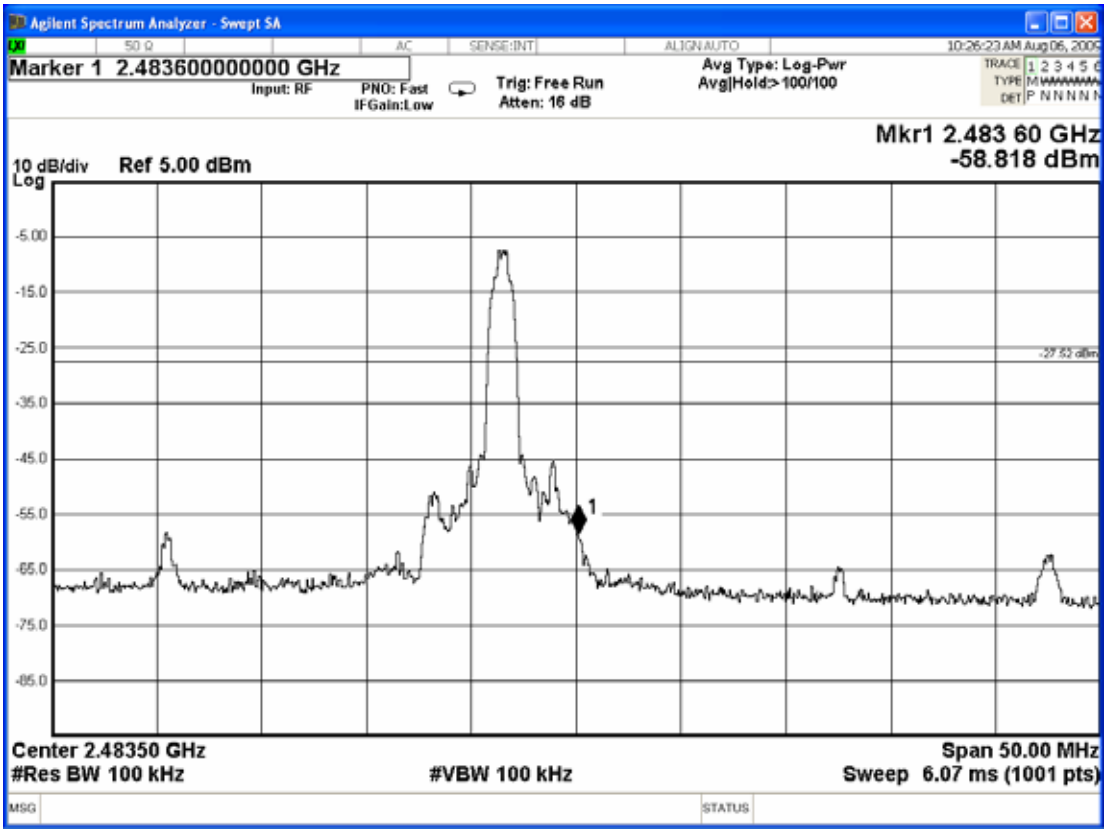


Figure 2: Below Band edge (8-DPSK)



11. DEVIATION TO TEST SPECIFICATIONS

【NONE】