

APPLICATION FOR CERTIFICATION

On Behalf of

LG Electronics Inc.

Bluetooth Adapter Card

Models No.: MB8811C1

FCC ID: BEJ9QK-DMMB8811C1

IC: 2703H-DMMB8811C1

Brand: LG

Prepared for : LG Electronics Inc.
222, LG-ro, Jinwi-myeon, Pyeongtaek-si,
Gyeonggi-do, 451-713, Korea

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TABLE OF CONTENTS

Description	Page
TEST REPORT CERTIFICATION	4
1. DESCRIPTION OF REVISION HISTORY	5
2. GENERAL INFORMATION	6
2.1. Description of Device (EUT)	6
2.2. Antenna Information	6
2.3. Tested Supporting System Details	7
2.4. Description of Test Facility	7
2.5. Measurement Uncertainty	8
3. POWERLINE CONDUCTED EMISSION MEASUREMENT	9
3.1. Test Equipment	9
3.2. Block Diagram of Test Setup	9
3.3. Power line Conducted Emission Limit (§15.207, RSS-Gen §7.2.2/Table 2)	9
3.4. Operating Condition of EUT	10
3.5. Test Procedure	10
3.6. Power line Conducted Emission Measurement Results	10
4. RADIATED EMISSION MEASUREMENT	13
4.1. Test Equipment	13
4.2. Block Diagram of Test Setup	13
4.3. Radiated Emission Limits (§15.209, RSS-210 §2.7/Table 2)	15
4.4. Operating Condition of EUT	15
4.5. Test Procedure	16
4.6. Radiated Emission Measurement Results	17
5. 20dB BANDWIDTH MEASUREMENT	29
5.1. Test Equipment	29
5.2. Block Diagram of Test Setup	29
5.3. Specification Limits [§15.247(a)(1), RSS-210 §A8.2 (a)]	29
5.4. Operating Condition of EUT	29
5.5. Test Procedure	29
5.6. Test Results	30
6. CARRIER FREQUENCY SEPARATION MEASUREMENT	34
6.1. Test Equipment	34
6.2. Block Diagram of Test Setup	34
6.3. Specification Limits [§15.247(a)(1), RSS-210 §A8.2 (b)]	34
6.4. Operating Condition of EUT	34
6.5. Test Procedure	34
6.6. Test Results	35
7. TIME OF OCCUPANCY MEASUREMENT	40
7.1. Test Equipment	40
7.2. Block Diagram of Test Setup	40
7.3. Specification Limits [§15.247(a)(1)(iii), RSS-210 §A8.2 (d)]	40
7.4. Operating Condition of EUT	40
7.5. Test Procedure	40
7.6. Test Results	41
8. NUMBER OF HOPPING CHANNELS MEASUREMENT	65
8.1. Test Equipment	65
8.2. Block Diagram of Test Setup	65
8.3. Specification Limits [§15.247(a)(1)(iii), RSS-210 §A8.2 (d)]	65

8.4. Operating Condition of EUT	65
8.5. Test Procedure	65
8.6. Test Results.....	66
9. MAXIMUM PEAK OUTPUT POWER MEASUREMENT	68
9.1. Test Equipment.....	68
9.2. Block Diagram of Test Setup.....	68
9.3. Specification Limits [§15.247(b)-(1), RSS-210 §A8.4 (2)].....	68
9.4. Operating Condition of EUT	68
9.5. Test Procedure	68
9.6. Test Results.....	69
10. EMISSION LIMITATIONS MEASUREMENT.....	70
10.1. Test Equipment.....	70
10.2. Block Diagram of Test Setup	70
10.3. Specification Limits [§15.247(c), RSS-210 §A8.5]	70
10.4. Operating Condition of EUT	70
10.5. Test Procedure	70
10.6. Test Results	71
11. BAND EDGES MEASUREMENT.....	84
11.1. Test Equipment.....	84
11.2. Block Diagram of Test Setup	84
11.3. Specification Limits [§15.247(c), RSS-210 §A8.5]	84
11.4. Operating Condition of EUT	84
11.5. Test Procedure	84
11.6. Test Results	84
12. DEVIATION TO TEST SPECIFICATIONS	88
13. PHOTOGRAPHS	89
13.1. Photos of Conducted Disturbance Measurement.....	89
13.2. Photos of Radiated Emission Measurement at Semi-Anechoic Chamber.....	90
13.3. Photo of Section RF Conducted Measurement	91
13.4. Photo of Maximum Peak Output Power Measurement.....	91

TEST REPORT CERTIFICATION

Applicant : LG Electronics Inc.
Manufacturer : LG Electronics Inc.
EUT Description : Bluetooth Adapter Card
FCC ID : BEJ9QK-DMMB8811C1
IC : 2703H-DMMB8811C1
(A) Model No. : MB8811C1
(B) Serial No. : N/A
(C) Brand : LG
(D) Power Supply : DC 3.3V
(E) Test Voltage : DC 3.3V (Transferred via JIG Board)

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C, Oct 2013
(FCC CFR 47 Part 15C, §15.205, §15.207, §15.209 and §15.247)
ANSI C63.4/2003
FCC Public Notice DA 00-705, Mar. 2000

Industry Canada Rules and Regulations RSS-Gen (Issue 3), December 2010 and
RSS-210 (Issue 8), December 2010

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 and Canada RSS-Gen, RSS-210 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 Part 15 and Industry Canada RSS-Gen, RSS-210 standards.

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 : 2014. 11. 04 ~ 07 Date of Report : 2014. 11. 07

Producer : Annie Yu
(Annie Yu/Administrator)

Signatory : Ben Cheng
(Ben Cheng/Manager)

1. DESCRIPTION OF REVISION HISTORY

Edition No.	Date of Revision	Revision Summary	Report Number
0	2014. 11. 07	Original Report.	EM-F140695

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

Product	Bluetooth Adapter Card
Model Number	MB8811C1
Serial Number	N/A
Brand Name	LG
Applicant	LG Electronics Inc. 222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, 451-713, Korea
Manufacturer	LG Electronics Inc. 222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, 451-713, Korea
FCC ID	BEJ9QK-DMMB8811C1
IC	2703H-DMMB8811C1
Fundamental Range	2402MHz ~ 2480MHz
Frequency Channel	BT: 79 channels BLE: 40 channels
Radio Technology	BT: FHSS (GFSK, $\pi/4$ DQPSK, 8-DPSK) BLE: DSSS (Low Energy)
Data Transfer Rate	1/2/3Mbps
Date of Receipt of Sample	2014. 10. 30
Date of Test	2014. 11. 04 ~ 07

2.2. Antenna Information

Manufacture	Antenna Type	Peak Gain
MCS LOGIC CO.,LTD	PCB Antenna	1.396dBi

2.3. Tested Supporting System Details

2.3.1. Support Peripheral Unit

No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Notebook PC (For Conduction Test)	ASUS	U5F	6CN0AG047651	By DoC
2.	Notebook PC	acer	MS2362	N/A	PPD-AAR5B22
3.	JIG Board	N/A	N/A	N/S	N/A

2.3.2. Cable Lists

No.	Signal Cable Description Of The Above Support Units
1.	Adapter: DELTA, M/N SADP-65KB B, Cord: Non-Shielded, Detachable, 1.8m Power Cord: Non-Shielded, Undetachable, 1.8m
2.	Adapter: Chicony, M/N CPA09-A065N1, Cord: Non-Shielded, Detachable, 1.8m Power Cord: Shielded, Undetachable, 1.8m
3.	USB Cable: Non-Shielded, Detachable, 0.55m Bus Cable: Non-Shielded, Detachable, 0.20m

2.4. Description of Test Facility

Name of Firm : **AUDIX Technology Corporation**
EMC Department
 No. 53-11, Dingfu, Linkou Dist.,
 New Taipei City 244, Taiwan, R.O.C.

Test Location & Facility (C8/Semi-AC) : **No. 8 Shielded Room**
 No. 53-11, Dingfu, Linkou Dist.,
 New Taipei City 244, Taiwan, R.O.C.

Semi-Anechoic Chamber
 No. 53-11, Dingfu, Linkou Dist.,
 New Taipei City 244, Taiwan, R.O.C.
 May 11, 2012 Renewal on
 Federal Communication Commission
 Registration Number: 90993

NVLAP Lab. Code : 200077-0

TAF Accreditation No : 1724

2.5. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Conduction Test	150kHz~30MHz	$\pm 3.43\text{dB}$
Radiation Test (Distance: 3m)	30MHz~300MHz	$\pm 2.91\text{dB}$
	300MHz~1000MHz	$\pm 2.94\text{dB}$
	Above 1GHz	$\pm 5.02\text{dB}$

Remark : Uncertainty = $k_{uc}(y)$

Test Item	Uncertainty
20dB Bandwidth	$\pm 0.2\text{kHz}$
Carrier Frequency Separation	$\pm 0.2\text{kHz}$
Time Of Occupancy	$\pm 0.03\text{sec}$
Maximum peak Output power	$\pm 0.52\text{dBm}$
Emission Limitations	$\pm 0.13\text{dB}$
Band Edges	$\pm 0.13\text{dB}$

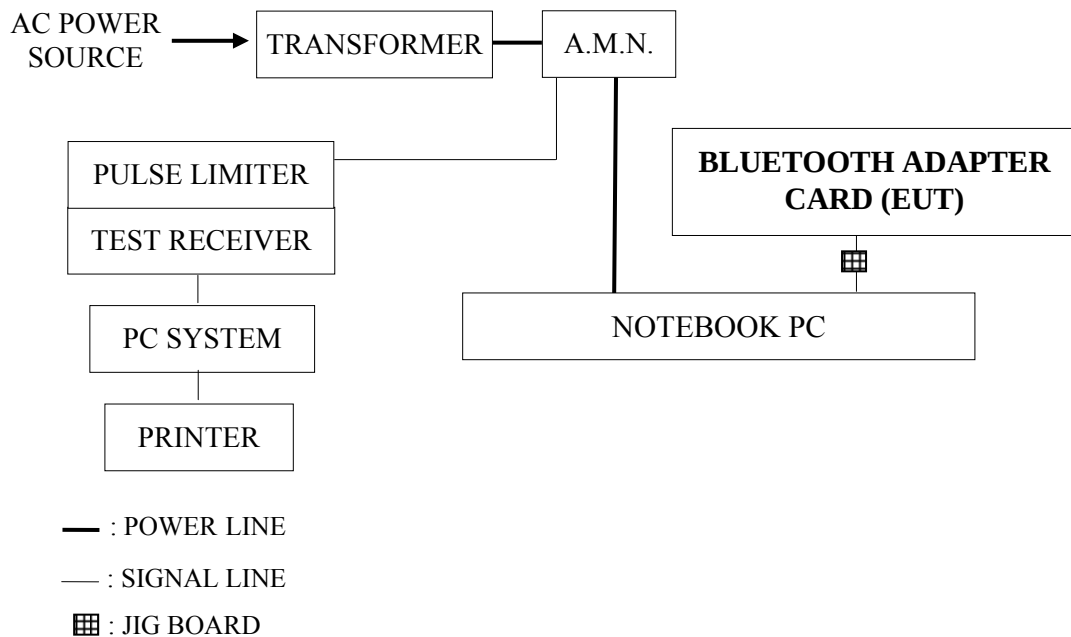
3. POWERLINE CONDUCTED EMISSION MEASUREMENT

3.1. Test Equipment

The following test equipment was used during the power line conducted emission measurement: (No. 8 Shielded Room)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Test Receiver	R&S	ESR3	101774	2014. 02. 19	1 Year
2	A.M.N.	R&S	ESH2-Z5	100366	2014. 03. 21	1 Year
3	L.I.S.N.	Kyoritsu	KNW-407	8-855-9	2013. 12. 26	1 Year
4	Pulse Limiter	R&S	ESH3-Z2	100354	2014. 01. 18	1 Year

3.2. Block Diagram of Test Setup



3.3. Power line Conducted Emission Limit (§15.207, RSS-Gen §7.2.2/Table 2)

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 dB μ V	56 ~ 46 dB μ V
500kHz ~ 5MHz	56 dB μ V	46 dB μ V
5MHz ~ 30MHz	60 dB μ V	50 dB μ V

Remark1.: If the average limit is met when using a Quasi-Peak detector, the EUT shall be deemed to meet both limits and measurement with the average detector is unnecessary.

2.: The lower limit applies at the band edges.

3.4. Operating Condition of EUT

3.4.1. Setup the EUT as shown on 3.2.

3.4.2. The Notebook PC was running test software “CSR” to set EUT on transmitting and receiving during all testing.

3.5. Test Procedure

The EUT was linked to notebook PC was placed on the table which was above the ground by 80cm and notebook PC's adapter's power cord connected to the AC mains through an Artificial Mains Network (A.M.N.). This provided a 50 ohm coupling impedance for the measuring equipment. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions simulators of the interface cables should be manipulated according to FCC ANSI C63.4-2003 , RSS-Gen and RSS-210 during conducted measurement.

The bandwidth of the R & S Test Receiver ESR3 was set at 9 kHz.

The frequency range from 150 KHz to 30MHz was checked.

All the final readings from Test Receiver were measured with the Quasi-Peak detector and Average detector. (Remark: If the Average limit is met when using a Quasi-Peak detector, the Average detector is unnecessary)

3.6. Power line Conducted Emission Measurement Results

PASSED. All emissions not reported below are too low against the prescribed limits.

EUT was performed during this section testing and all the test results are attached in next pages.

EUT : Bluetooth Adapter Card M/N : MB8811C1

Test Date : 2014. 11. 07 Temperature : 25°C Humidity : 45%

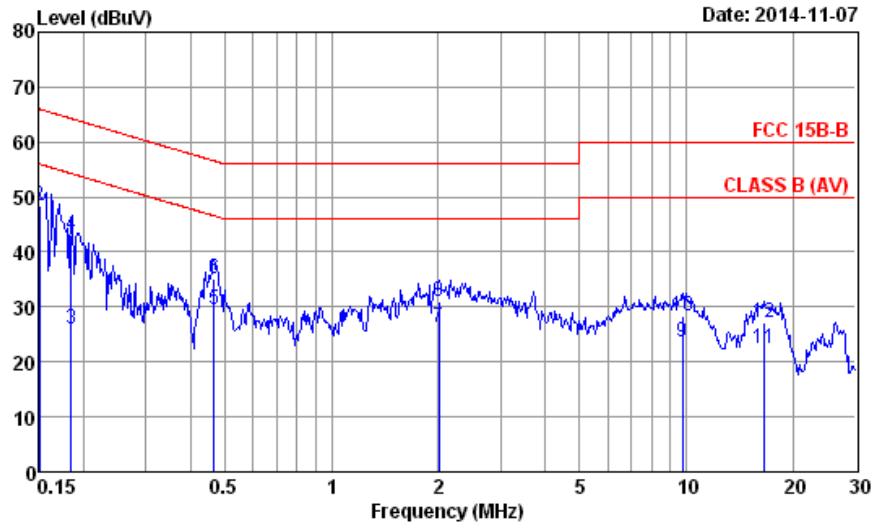
The details are as follows :

Mode	Reference Test Data	
	Neutral	Line
1.	# 2	# 1



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Email: emc@audixtech.com

Data: 2 File: D:\test data\REPORT\2014\1M1410XXX\1M1410236-C-D(RF).EM6 (2)



Site no. : No.8 Shielded Room Data no. : 2
Condition : ESH2-Z5 366 Phase : NEUTRAL
Limit : FCC 15B-B
Env. / Ins. : 25°C / 45% ESR3 (1774) Engineer : Hank
EUT : MB8811C1
Power Rating : 120Vac/60Hz
Test Mode : Operating

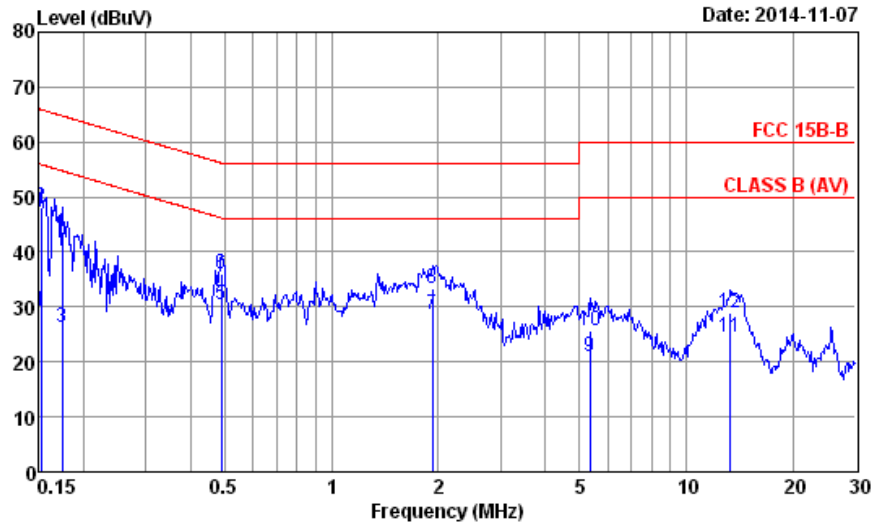
	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.150	0.21	0.02	9.85	24.45	34.53	55.99	21.46	Average
2	0.150	0.21	0.02	9.85	38.46	48.54	65.99	17.45	QP
3	0.184	0.21	0.03	9.85	15.91	26.00	54.28	28.28	Average
4	0.184	0.21	0.03	9.85	32.91	43.00	64.28	21.28	QP
5	0.466	0.23	0.03	9.85	19.47	29.58	46.58	17.00	Average
6	0.466	0.23	0.03	9.85	24.90	35.01	56.58	21.57	QP
7	2.012	0.25	0.06	9.84	16.24	26.39	46.00	19.61	Average
8	2.012	0.25	0.06	9.84	20.92	31.07	56.00	24.93	QP
9	9.757	0.46	0.14	9.89	13.13	23.62	50.00	26.38	Average
10	9.757	0.46	0.14	9.89	17.90	28.39	60.00	31.61	QP
11	16.486	0.71	0.18	9.92	11.70	22.51	50.00	27.49	Average
12	16.486	0.71	0.18	9.92	16.37	27.18	60.00	32.82	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
2. If the average limit is met when using a quasi-peak detector,
the EUT shall be deemed to meet both limits and measurement
with average detector is unnecessary.



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Data: 1 File: D:\test data\REPORT\2014\C1M1410XXX\C1M1410236-C-D(RF).EM6 (2)



Site no. : No.8 Shielded Room Data no. : 1
Condition : ESH2-Z5 366 Phase : LINE
Limit : FCC 15B-B
Env. / Ins. : 25°C / 45% ESR3 (1774) Engineer : Hank
EUT : MB8811C1
Power Rating : 120Vac/60Hz
Test Mode : Operating

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.152	0.18	0.02	9.85	19.23	29.28	55.91	26.63	Average
2	0.152	0.18	0.02	9.85	38.05	48.10	65.91	17.81	QP
3	0.174	0.18	0.03	9.85	16.36	26.42	54.77	28.35	Average
4	0.174	0.18	0.03	9.85	33.68	43.74	64.77	21.03	QP
5	0.489	0.20	0.03	9.85	20.29	30.37	46.19	15.82	Average
6	0.489	0.20	0.03	9.85	26.03	36.11	56.19	20.08	QP
7	1.928	0.24	0.06	9.84	18.56	28.70	46.00	17.30	Average
8	1.928	0.24	0.06	9.84	23.12	33.26	56.00	22.74	QP
9	5.333	0.33	0.10	9.86	10.57	20.86	50.00	29.14	Average
10	5.333	0.33	0.10	9.86	15.51	25.80	60.00	34.20	QP
11	13.267	0.53	0.16	9.90	13.90	24.49	50.00	25.51	Average
12	13.267	0.53	0.16	9.90	18.24	28.83	60.00	31.17	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
2. If the average limit is met when using a quasi-peak detector,
the EUT shall be deemed to meet both limits and measurement
with average detector is unnecessary.

4. RADIATED EMISSION MEASUREMENT

4.1. Test Equipment

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

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

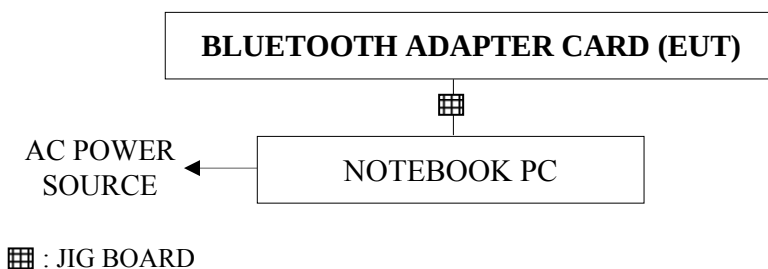
Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9010A-503	MY52220119	2014. 06. 25	1 Year
2	Test Receiver	R & S	ESCS30	100338	2014. 06. 24	1 Year
3	Amplifier	HP	8447D	2944A06305	2014. 02. 19	1 Year
4	Bilog Antenna	TESEQ	CBL6112D	33821	2014. 08. 02	1 Year

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

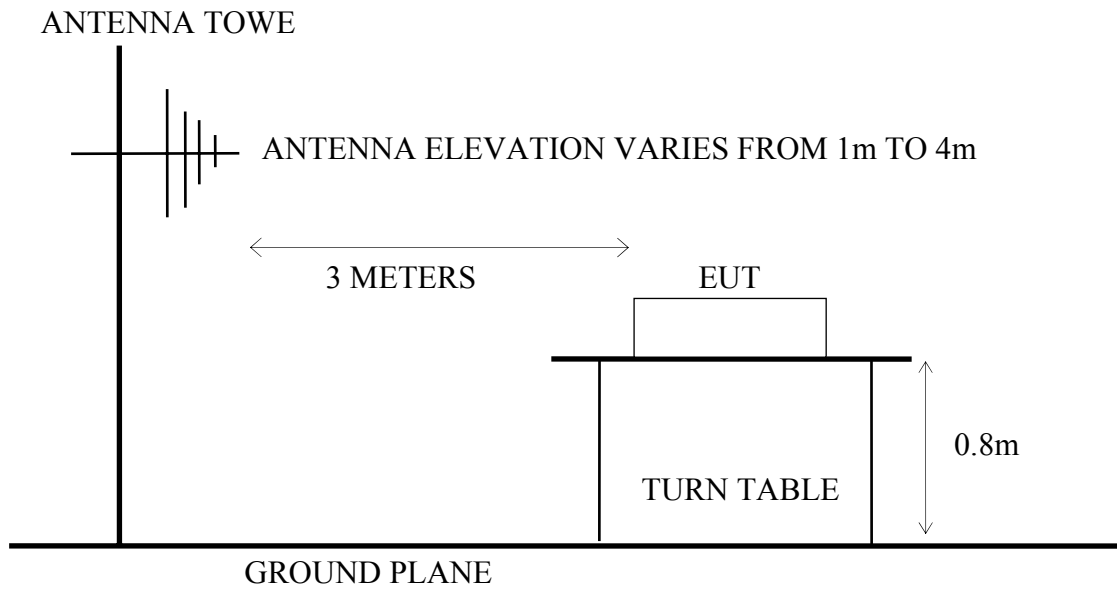
Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A-544	US51350140	2014. 06. 25	1 Year
2	Test Receiver	R & S	ESCS30	100338	2014. 06. 24	1 Year
3	Amplifier	Agilent	8449B	3008A02676	2014. 02. 21	1 Year
4	2.4GHz Notch Filter	K&L	7NSL10-2441 .5E130.5-00	1	2014. 06. 12	1 Year
5	3G High Pass Filter	Microwave Circuits	H3G018G1	484796	2014. 06. 12	1 Year
6	Horn Antenna	EMCO	3115	9609-4927	2014. 06. 17	1 Year
7	Horn Antenna	EMCO	3116	2653	2014. 10. 10	1 Year

4.2. Block Diagram of Test Setup

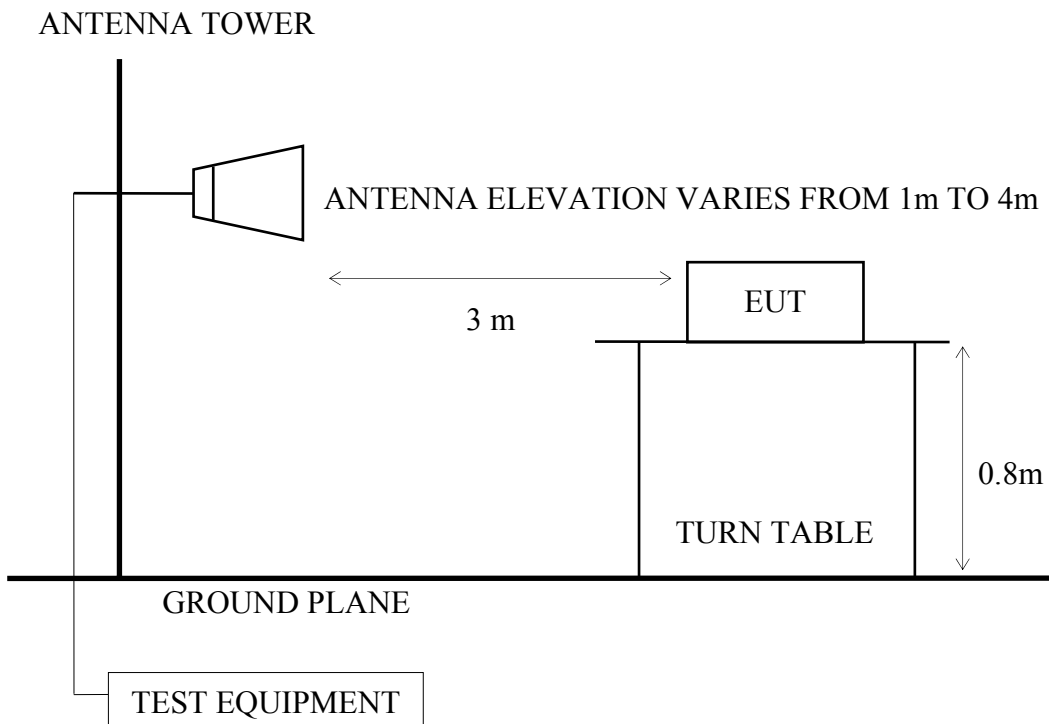
4.2.1. Block Diagram of connection between EUT and simulators



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



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



4.3. Radiated Emission Limits (§15.209, RSS-210 §2.7/Table 2)

Frequency MHz	Distance Meters	Field Strengths Limits	
		$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
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 $\text{dB}\mu\text{V/m}$ (Peak) 54.0 $\text{dB}\mu\text{V/m}$ (Average)	

- Remark :
- (1) Emission level ($\text{dB}\mu\text{V/m}$) = $20 \log$ Emission level ($\mu\text{V/m}$)
 - (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).

4.4. Operating Condition of EUT

- 4.4.1. Set up the EUT as shown on 4.2.1.
- 4.4.2. The Notebook PC was running test software “CSR” to set EUT on transmitting and receiving during all testing.
- 4.4.3. The EUT set to continuously transmit signals at 2402MHz, 2441MHz and 2480MHz during testing.

4.5. 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 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 bi-conical and log-periodical antenna 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, RSS-Gen and RSS-210 regulation, and the measurement guideline was according to FCC Public Notice DA 00-705.

The bandwidth of the R&S Test Receiver was set at 120 KHz. (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 10Hz for average detection (AV) at frequency above 1GHz.

The frequency range from 30MHz to 25GHz (Up to 10th harmonics from fundamental frequency) was checked. 30MHz to 1000MHz was measured with Quasi-Peak detector. Pursuant to ANSI 63.4: 4.2, peak detector is an alternate option for frequency from 30MHz to 1000MHz.

Above 1GHz was measured with peak and average detector. For frequency from 1GHz to 40GHz, we checked it in 1 meter distance and with a shorter cable 2 meter instead of original's. There is no signal exist.

Pursuant to ANSI C63.4 8.3.1.2, when peak value complies with the average limit, we didn't perform measurement in average detector.

4.6. Radiated Emission Measurement Results

PASSED. (All the emissions not reported below are too low against the prescribed limits.)

EUT : Bluetooth Adapter Card

M/N : MB8811C1

Test Date : 2014. 11. 07 Temperature : 22°C Humidity : 51%

For Frequency Range 30MHz-1000MHz:

The EUT emitted the fundamental frequency with data code at the stand, side and lying conditions.

[Note: Three types of modulation (8-DPSK, π /4DQPSK, GFSK) were evaluated but only the worst case (GFSK) was reported in this report.]

The EUT select **worst position “lying”** and with following test modes was performed during this section testing and all the test results are listed in section 4.6.1.

No.	Test Mode and Frequency		Reference Test Data No.	
			Horizontal	Vertical
1.	Transmitting	2402MHz (CH0)	# 2	# 1
2.		2441MHz (CH39)	# 4	# 3
3.		2480MHz (CH78)	# 6	# 5

* Type of modulation: GFSK.

* All above final readings were measured with Quasi-Peak detector.

For Frequency Range above 1GHz:

The emissions (up to 25GHz) not reported are too low to be measured.

For Restricted Bands:

[Note: Three types of modulation (8-DPSK, π /4DQPSK, GFSK) were evaluated but the two case (GFSK & 8-DPSK) were reported in this report.]

The EUT with following test modes was performed during this section testing and all the test results are listed in section 4.6.2. (The restricted bands defined in part 15.205(a))

No.	Type of modulation	Test Mode and Frequency		Reference Test Data No.	
				Horizontal	Vertical
1.	8-DPSK	Transmitting	2402MHz (CH0)	# 6	# 5
2.			2480MHz (CH78)	# 8	# 7
3.	GFSK	Transmitting	2402MHz (CH0)	# 4	# 3
4.			2480MHz (CH78)	# 2	# 1

4.6.1. Frequency Range 30MHz-1000MHz Measurement Result

Transmit, Frequency: 2402MHz (GFSK)

Site no. : Audix NO.1 Chamber
 Dis. / Ant. : 3m CBL6112D 33821
 Limit : 30M-1G
 Env. / Ins. : 22°C / 51% N9010A
 EUT : MB8811C1
 Power Rating : DC 3.3V
 Test Mode : Tx 2402MHz(GFSK)

Data no. : 2
 Ant. pol. : HORIZONTAL
 Engineer : Johnny_Hsueh

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1	167.74	9.58	3.74	24.10	37.42	43.50	6.08	Peak
2	327.79	13.87	4.96	24.19	43.02	46.00	2.98	Peak
3	455.83	16.38	6.12	14.91	37.41	46.00	8.59	Peak

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

Site no. : Audix NO.1 Chamber
 Dis. / Ant. : 3m CBL6112D 33821
 Limit : 30M-1G
 Env. / Ins. : 22°C / 51% N9010A
 EUT : MB8811C1
 Power Rating : DC 3.3V
 Test Mode : Tx 2402MHz(GFSK)

Data no. : 1
 Ant. pol. : VERTICAL
 Engineer : Johnny_Hsueh

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1	44.55	10.98	2.57	21.10	34.65	40.00	5.35	Peak
2	335.55	14.08	5.05	16.98	36.11	46.00	9.89	Peak
3	419.94	15.87	5.83	17.18	38.88	46.00	7.12	Peak

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

Transmit, Frequency: 2441MHz (GFSK)

Site no. : Audix NO.1 Chamber
 Dis. / Ant. : 3m CBL6112D 33821
 Limit : 30M-1G
 Env. / Ins. : 22°C / 51% N9010A
 EUT : MB8811C1
 Power Rating : DC 3.3V
 Test Mode : Tx 2441MHz(GFSK)

Data no. : 4
 Ant. pol. : HORIZONTAL
 Engineer : Johnny_Hsueh

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1	227.88	11.08	4.18	22.53	37.79	46.00	8.21	Peak
2	321.97	13.72	4.90	21.15	39.77	46.00	6.23	Peak
3	576.11	18.03	6.49	5.86	30.38	46.00	15.62	Peak

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

Site no. : Audix NO.1 Chamber
 Dis. / Ant. : 3m CBL6112D 33821
 Limit : 30M-1G
 Env. / Ins. : 22°C / 51% N9010A
 EUT : MB8811C1
 Power Rating : DC 3.3V
 Test Mode : Tx 2441MHz(GFSK)

Data no. : 3
 Ant. pol. : VERTICAL
 Engineer : Johnny_Hsueh

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1	191.99	9.21	3.92	22.19	35.32	43.50	8.18	Peak
2	335.55	14.08	5.05	17.72	36.85	46.00	9.15	Peak
3	419.94	15.87	5.83	16.32	38.02	46.00	7.98	Peak

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

Transmit, Frequency: 2480MHz (GFSK)

Site no. : Audix NO.1 Chamber
 Dis. / Ant. : 3m CBL6112D 33821
 Limit : 30M-1G
 Env. / Ins. : 22°C / 51% N9010A
 EUT : MB8811C1
 Power Rating : DC 3.3V
 Test Mode : Tx 2480MHz(GFSK)

Data no. : 6
 Ant. pol. : HORIZONTAL
 Engineer : Johnny_Hsueh

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1	263.77	12.61	4.43	22.58	39.62	46.00	6.38	Peak
2	419.94	15.87	5.83	20.79	42.49	46.00	3.51	Peak
3	815.70	20.12	7.23	10.13	37.48	46.00	8.52	Peak

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

Site no. : Audix NO.1 Chamber
 Dis. / Ant. : 3m CBL6112D 33821
 Limit : 30M-1G
 Env. / Ins. : 22°C / 51% N9010A
 EUT : MB8811C1
 Power Rating : DC 3.3V
 Test Mode : Tx 2480MHz(GFSK)

Data no. : 5
 Ant. pol. : VERTICAL
 Engineer : Johnny_Hsueh

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1	203.63	9.51	4.01	21.64	35.16	43.50	8.34	Peak
2	335.55	14.08	5.05	17.54	36.67	46.00	9.33	Peak
3	419.94	15.87	5.83	16.38	38.08	46.00	7.92	Peak

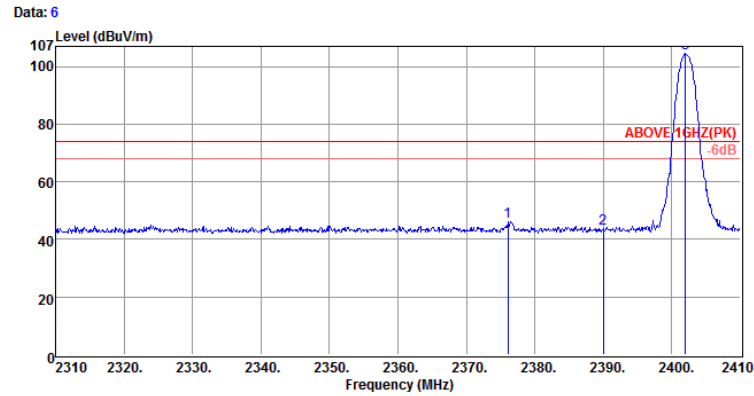
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading
 2. The emission levels that are 20dB below the official limit are not reported.

4.6.2. Restricted Bands Measurement Results

Date of Test : 2014. 11. 07 Temperature : 22°C

EUT : Bluetooth Adapter Card Humidity : 51%

Test Mode : Transmit, Channel: 0, Frequency: 2402MHz, 8-DPSK



Site no. : Audix NO.1 Chamber Data no. : 6
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL
 Limit : ABOVE 1GHz(PK)
 Env. / Ins. : 22°C / 51% N9010A Engineer : Johnny_Hsueh
 EUT : MB8811C1
 Power Rating : DC 3.3V
 Test Mode : Tx 2402MHz(8PDSK)

	Freq. (MHz)	Ant. Cable Factor (dB/m)	Loss (dB)	Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1	2376.10	28.18	5.22	12.70	46.10	74.00	27.90	Peak
2	2390.00	28.20	5.24	10.31	43.75	74.00	30.25	Peak
3	2402.00	28.21	5.26	71.00	104.47	74.00	-30.47	Peak

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

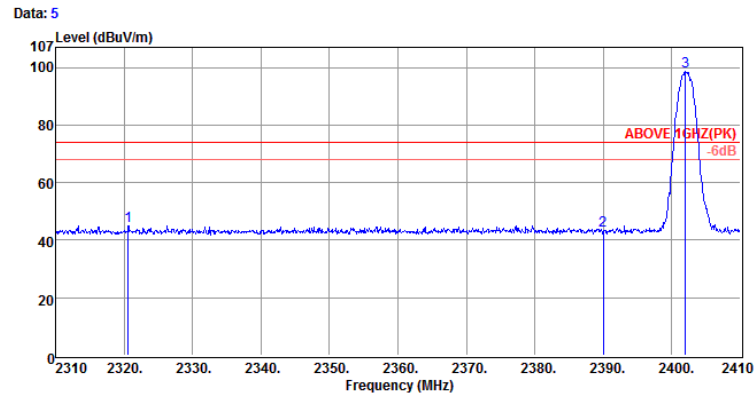
Emission Frequency	Peak Value	Duty Cycle Correction Factor	Average Value Horizontal	Limit	Margin
(MHz)	(dB/m)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
2376.10	46.10	-30.767	15.333	54.00	38.667
2390.00	43.75	-30.767	12.983	54.00	41.017

Remarks: 1. Duty Cycle Correction Factor=20log (dwell time/100ms)=
 20log (2.895ms/100ms) = -30.767
 2. Dwell time was presented in section 7.
 3. Average value=Peak value+ Duty Cycle Correction Factor
 4. Low frequency section (spurious in the restricted band
 2310-2420MHz).

Date of Test : 2014. 11. 07 Temperature : 22°C

EUT : Bluetooth Adapter Card Humidity : 51%

Test Mode : Transmit, Channel: 0, Frequency: 2402MHz, 8-DPSK



Site no. : Audix NO.1 Chamber Data no. : 5
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL
 Limit : ABOVE 1GHz(PK)
 Env. / Ins. : 22°C / 51% N9010A Engineer : Johnny_Hsueh
 EUT : MB8811C1
 Power Rating : DC 3.3V
 Test Mode : Tx 2402MHz(8PDSK)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1	2320.60	28.13	5.14	11.75	45.02	74.00	28.98	Peak
2	2390.00	28.20	5.24	9.87	43.31	74.00	30.69	Peak
3	2402.00	28.21	5.26	65.19	98.66	74.00	-24.66	Peak

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

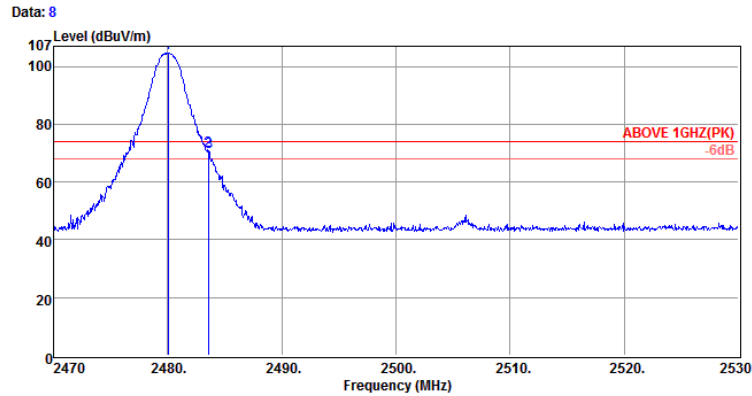
Emission Frequency	Peak Value	Duty Cycle Correction Factor	Average Value Vertical	Limit	Margin
(MHz)	(dB/m)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
2320.6	45.02	-30.767	14.253	54.00	39.747
2390	43.31	-30.767	12.543	54.00	41.457

Remarks: 1. Duty Cycle Correction Factor=20log (dwell time/100ms)=
 20log (2.895ms/100ms) = -30.767
 2. Dwell time was presented in section 7.
 3. Average value=Peak value+ Duty Cycle Correction Factor
 4. Low frequency section (spurious in the restricted band 2310-2420MHz).

Date of Test : 2014. 11. 04 Temperature : 22°C

EUT : Bluetooth Adapter Card Humidity : 51%

Test Mode : Transmit, Channel: 78, Frequency: 2480MHz, 8-DPSK



Site no. : Audix NO.1 Chamber Data no. : 8
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL
 Limit : ABOVE 1GHZ(PK)
 Env. / Ins. : 22°C / 51% N9010A Engineer : Johnny_Hsueh
 EUT : MB8811C1
 Power Rating : DC 3.3V
 Test Mode : Tx 2480MHz(8PDSK)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	2480.02	28.28	5.36	70.91	104.55	74.00	-30.55	Peak
2	2483.56	28.29	5.37	37.09	70.75	74.00	3.25	Peak
3	2483.62	28.29	5.37	36.88	70.54	74.00	3.46	Peak

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

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value Horizontal (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2483.50	70.44	-30.767	39.673	54.00	14.327
2483.62	70.54	-30.767	39.773	54.00	14.227

Remarks: 1. Duty Cycle Correction Factor=20log (dwell time/100ms)=
 20log (2.895ms/100ms) = -30.767

2. Dwell time was presented in section 7.

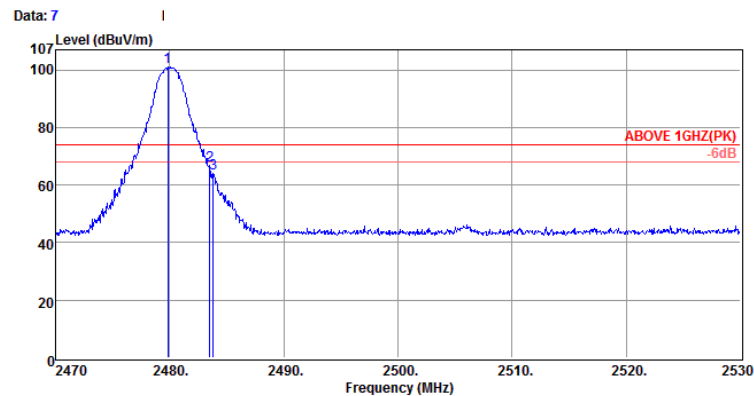
3. Average value=Peak value+ Duty Cycle Correction Factor

4. Low frequency section (spurious in the restricted band 2470-2530MHz).

Date of Test : 2014. 11. 04 Temperature : 22°C

EUT : Bluetooth Adapter Card Humidity : 51%

Test Mode : Transmit, Channel: 78, Frequency: 2480MHz, 8-DPSK



Site no. : Audix NO.1 Chamber Data no. : 7
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL
 Limit : ABOVE 1GHZ(PK)
 Env. / Ins. : 22°C / 51% N9010A Engineer : Johnny_Hsueh
 EUT : MB8811C1
 Power Rating : DC 3.3V
 Test Mode : Tx 2480MHz(8DPSK)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB μV)	Emission Level (dB μV/m)	Limits (dB μV/m)	Margin (dB)	Remark
1	2479.84	28.28	5.36	67.34	100.98	74.00	-26.98	Peak
2	2483.50	28.29	5.37	33.22	66.88	74.00	7.12	Peak
3	2483.80	28.29	5.37	30.42	64.08	74.00	9.92	Peak

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

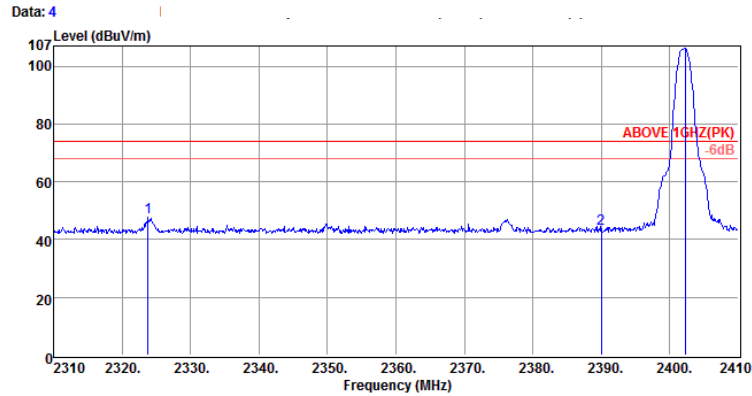
Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value Vertical (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2483.50	66.88	-30.767	36.113	54.00	17.887
2483.80	64.08	-30.767	33.313	54.00	20.687

Remarks: 1. Duty Cycle Correction Factor=20log (dwell time/100ms)=
 20log (2.895ms/100ms) = -30.767
 2. Dwell time was presented in section 7.
 3. Average value=Peak value+ Duty Cycle Correction Factor
 4. Low frequency section (spurious in the restricted band 2470-2530MHz).

Date of Test : 2014. 11. 04 Temperature : 22°C

EUT : Bluetooth Adapter Card Humidity : 51%

Test Mode : Transmit, Channel: 0, Frequency: 2402MHz, GFSK



Site no. : Audix NO.1 Chamber Data no. : 4
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL
 Limit : ABOVE 1GHZ(PK)
 Env. / Ins. : 22°C / 51% N9010A Engineer : Johnny_Hsueh
 EUT : MB8811C1
 Power Rating : DC 3.3V
 Test Mode : Tx 2402MHz(GFSK)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1	2323.80	28.14	5.14	14.29	47.57	74.00	26.43	Peak
2	2390.00	28.20	5.24	10.37	43.81	74.00	30.19	Peak
3	2402.20	28.21	5.26	72.63	106.10	74.00	-32.10	Peak

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

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value Horizontal (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
2323.80	47.57	-30.812	16.758	54.00	37.242
2390.00	43.81	-30.812	12.998	54.00	41.002

Remarks: 1. Duty Cycle Correction Factor=20log (dwell time/100ms)=
 20log (2.88ms/100ms) = -30.812

2. Dwell time was presented in section 7.

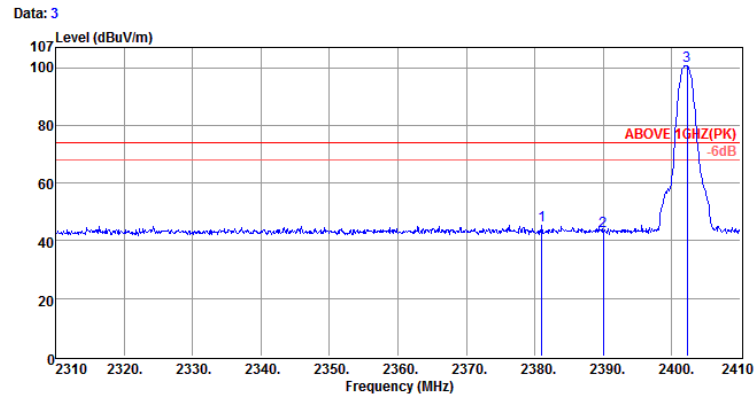
3. Average value=Peak value+ Duty Cycle Correction Factor

4. Low frequency section (spurious in the restricted band 2310-2410MHz).

Date of Test : 2014. 11. 04 Temperature : 22°C

EUT : Bluetooth Adapter Card Humidity : 51%

Test Mode : Transmit, Channel: 0, Frequency: 2402MHz, GFSK



Site no. : Audix NO.1 Chamber Data no. : 3
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL
 Limit : ABOVE 1GHZ(PK)
 Env. / Ins. : 22°C / 51% N9010A Engineer : Johnny_Hsueh
 EUT : MB8811C1
 Power Rating : DC 3.3V
 Test Mode : Tx 2402MHz(GFSK)

	Freq. (MHz)	Ant. Cable Factor (dB/m)	Loss (dB)	Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1	2381.00	28.19	5.23	11.94	45.36	74.00	28.64	Peak
2	2390.00	28.20	5.24	9.72	43.16	74.00	30.84	Peak
3	2402.20	28.21	5.26	67.10	100.57	74.00	-26.57	Peak

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

Emission Frequency	Peak Value	Duty Cycle Correction Factor	Average Value Vertical	Limit	Margin
(MHz)	(dB/m)	(dB)	(dB μ V/m)	(dB μ V/m)	(dB)
2381.00	45.36	-30.812	14.548	54.00	39.452
2390.00	43.16	-30.812	12.348	54.00	41.652

Remarks: 1. Duty Cycle Correction Factor=20log (dwell time/100ms)=
 20log (2.88ms/100ms) = -30.812

2. Dwell time was presented in section 7.

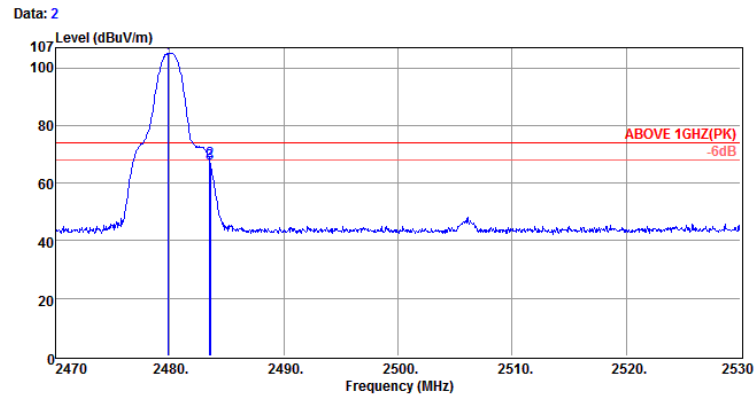
3. Average value=Peak value+ Duty Cycle Correction Factor

4. Low frequency section (spurious in the restricted band
 2310-2410MHz).

Date of Test : 2014. 11. 04 Temperature : 22°C

EUT : Bluetooth Adapter Card Humidity : 51%

Test Mode : Transmit, Channel: 78, Frequency: 2480MHz, GFSK



Site no. : Audix NO.1 Chamber Data no. : 2
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL
 Limit : ABOVE 1GHZ(PK)
 Env. / Ins. : 22°C / 51% N9010A Engineer : Johnny_Hsueh
 EUT : MB8811C1
 Power Rating : DC 3.3V
 Test Mode : Tx 2480MHz(GFSK)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1	2479.84	28.28	5.36	71.35	104.99	74.00	-30.99	Peak
2	2483.50	28.29	5.37	34.02	67.68	74.00	6.32	Peak
3	2483.56	28.29	5.37	33.04	66.70	74.00	7.30	Peak

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

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value Horizontal (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
2483.50	67.68	-30.812	36.868	54.00	17.132
2483.56	66.70	-30.812	35.888	54.00	18.112

Remarks: 1. Duty Cycle Correction Factor=20log (dwell time/100ms)=
 20log (2.88ms/100ms) = -30.812

2. Dwell time was presented in section 7.

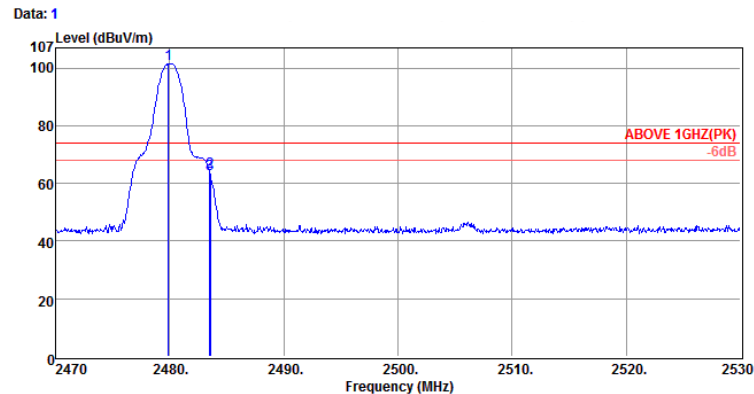
3. Average value=Peak value+ Duty Cycle Correction Factor

4. Low frequency section (spurious in the restricted band 2470-2530MHz).

Date of Test : 2014. 11. 04 Temperature : 22°C

EUT : Bluetooth Adapter Card Humidity : 51%

Test Mode : Transmit, Channel: 78, Frequency: 2480MHz, GFSK



Site no. : Audix NO.1 Chamber Data no. : 1
 Dis. / Ant. : 3m 3115(4927) Ant. pol. : VERTICAL
 Limit : ABOVE 1GHZ(PK)
 Env. / Ins. : 22°C / 51% N9010A Engineer : Johnny_Hsueh
 EUT : MB8811C1
 Power Rating : DC 3.3V
 Test Mode : Tx 2480MHz(GFSK)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dB μV)	Emission Level (dB μV/m)	Limits (dB μV/m)	Margin (dB)	Remark
1	2479.90	28.28	5.36	67.70	101.34	74.00	-27.34	Peak
2	2483.50	28.29	5.37	30.21	63.87	74.00	10.13	Peak
3	2483.56	28.29	5.37	29.48	63.14	74.00	10.86	Peak

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

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value Vertical (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2483.50	53.87	-30.812	23.058	54.00	30.942
2483.56	63.14	-30.812	32.328	54.00	21.672

Remarks: 1. Duty Cycle Correction Factor=20log (dwell time/100ms)=
 20log (2.88ms/100ms) = -30.812
 2. Dwell time was presented in section 7.
 3. Average value=Peak value+ Duty Cycle Correction Factor
 4. Low frequency section (spurious in the restricted band 2470-2530MHz).

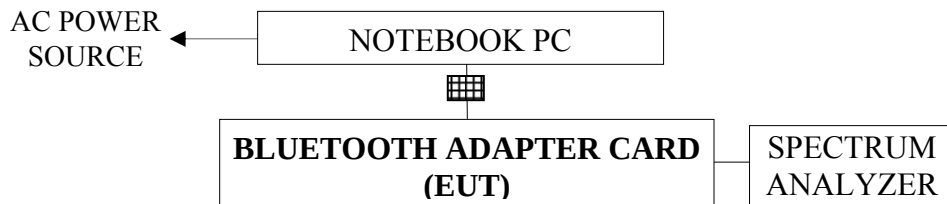
5. 20dB BANDWIDTH MEASUREMENT

5.1. Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	R&S	FSV30	101181	2014. 03. 04	1 Year

5.2. Block Diagram of Test Setup



 : JIG BOARD

5.3. Specification Limits [§15.247(a)(1), RSS-210 §A8.2 (a)]

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.

5.4. Operating Condition of EUT

5.4.1. Set up the EUT as shown on 5.2.

5.4.2. The Notebook PC was running test software “CSR” to set EUT on transmitting and receiving during all testing.

5.5. Test Procedure

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 and VBW is equal to RBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

The measurement guideline was according to FCC Public Notice DA 00-705.

5.6. Test Results

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

[Note: Three types of modulation (8-DPSK, π /4DQPSK, GFSK) were evaluated but only two types of modulation (8-DPSK and GFSK) were reported in this report.]

EUT: Bluetooth Adapter Card

M/N: MB8811C1

Test Date: 2014. 11. 04 Temperature: 25°C Humidity: 55%

5.6.1. Type of Modulation: 8-DPSK

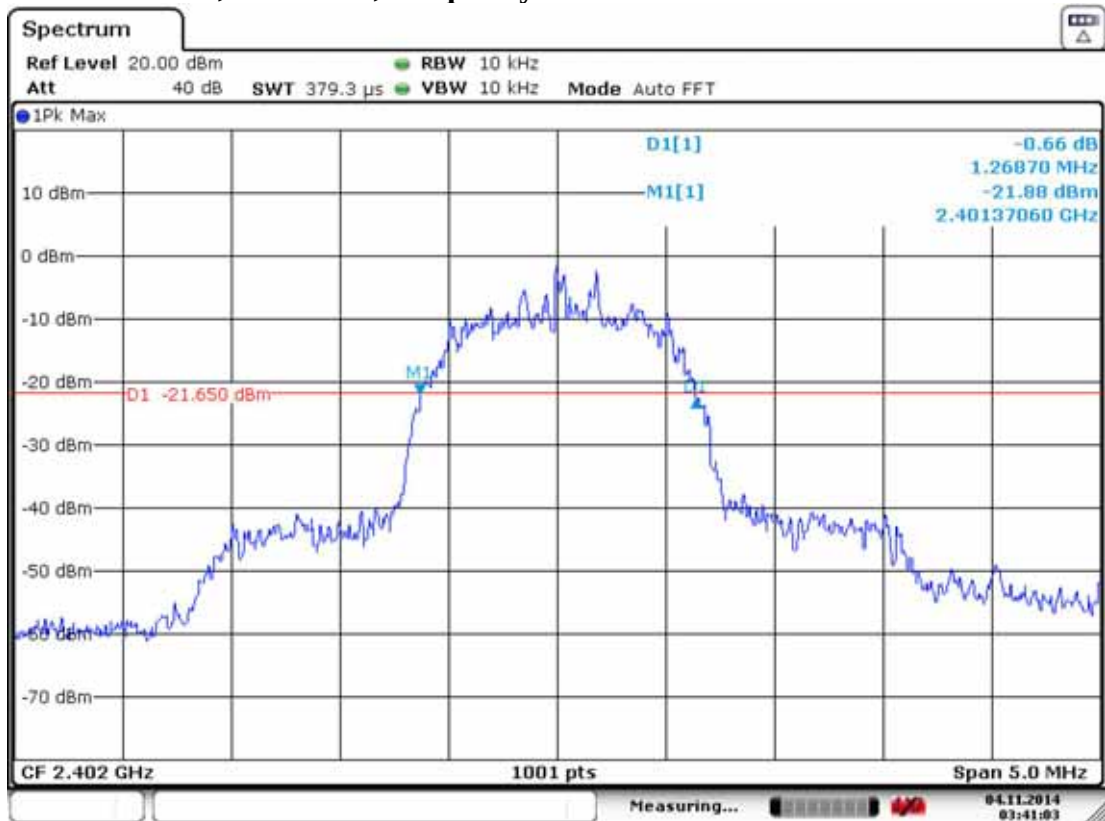
No.	Channel	Test Frequency	20dB Bandwidth	2/3 (20dB Bandwidth)
1.	0	2402MHz	1.26870MHz	0.8458MHz
2.	39	2441MHz	1.26870MHz	0.8458MHz
3.	78	2480MHz	1.28870MHz	0.8591MHz

The maximum two-thirds of the 20dB bandwidth shall be at maximum 0.8591MHz.

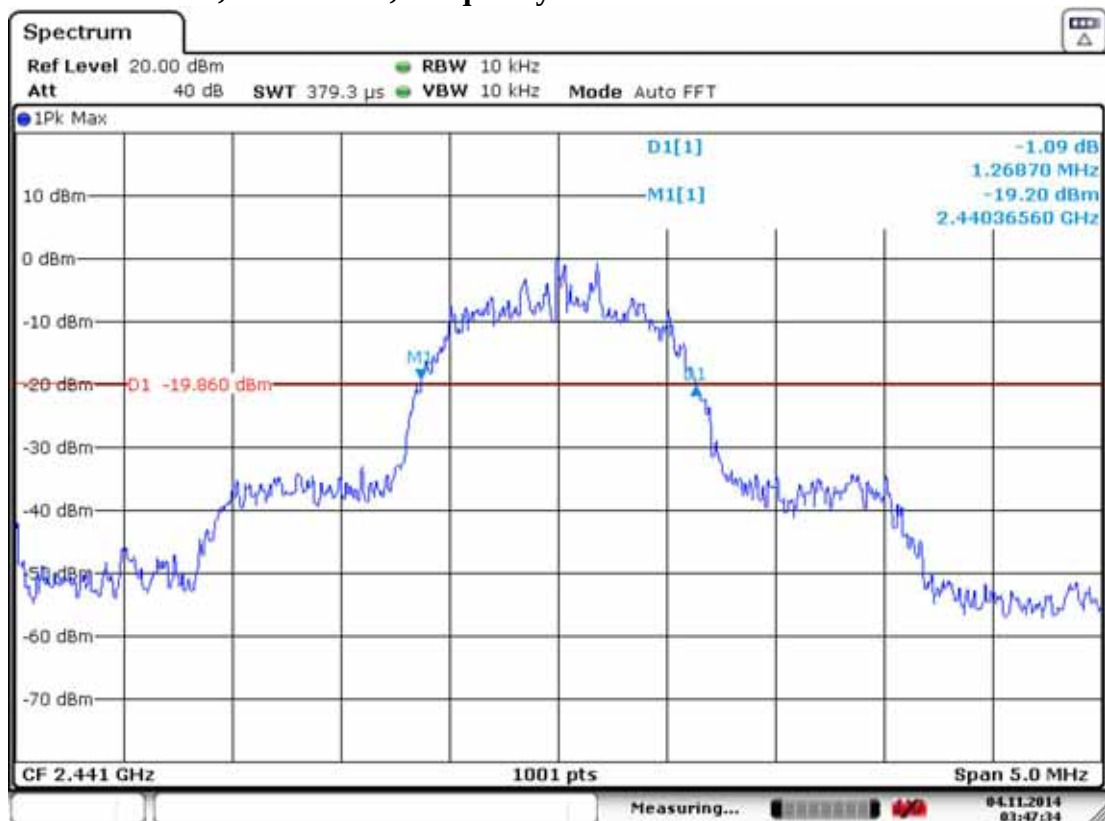
5.6.2. Type of Modulation: GFSK

No.	Channel	Test Frequency	20dB Bandwidth	2/3 (20dB Bandwidth)
1.	0	2402MHz	923.10kHz	615.4kHz
2.	39	2441MHz	923.10kHz	615.4kHz
3.	78	2480MHz	923.10kHz	615.4kHz

The maximum two-thirds of the 20dB bandwidth shall be at maximum 615.4kHz.

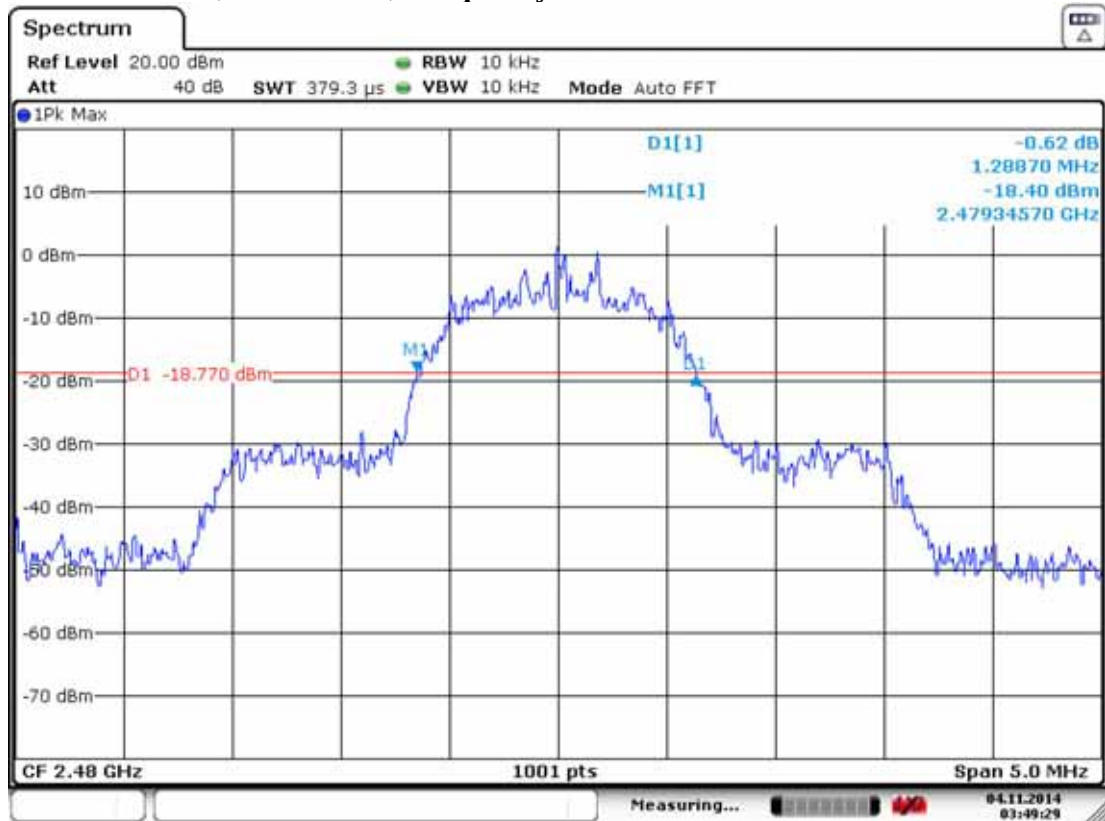
8-DPSK, Channel 0, Frequency: 2402MHz

Date: 4.NOV.2014 03:41:03

8-DPSK, Channel 39, Frequency: 2441MHz

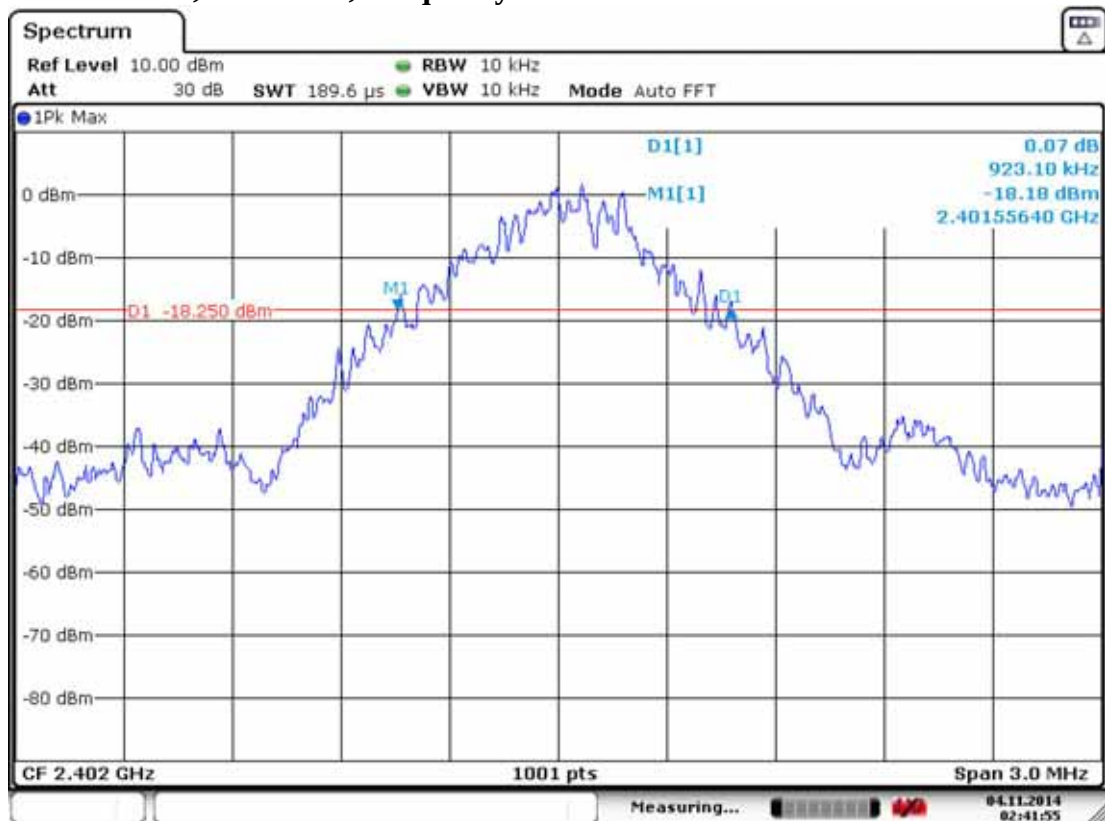
Date: 4.NOV.2014 03:47:34

8-DPSK, Channel 78, Frequency: 2480MHz



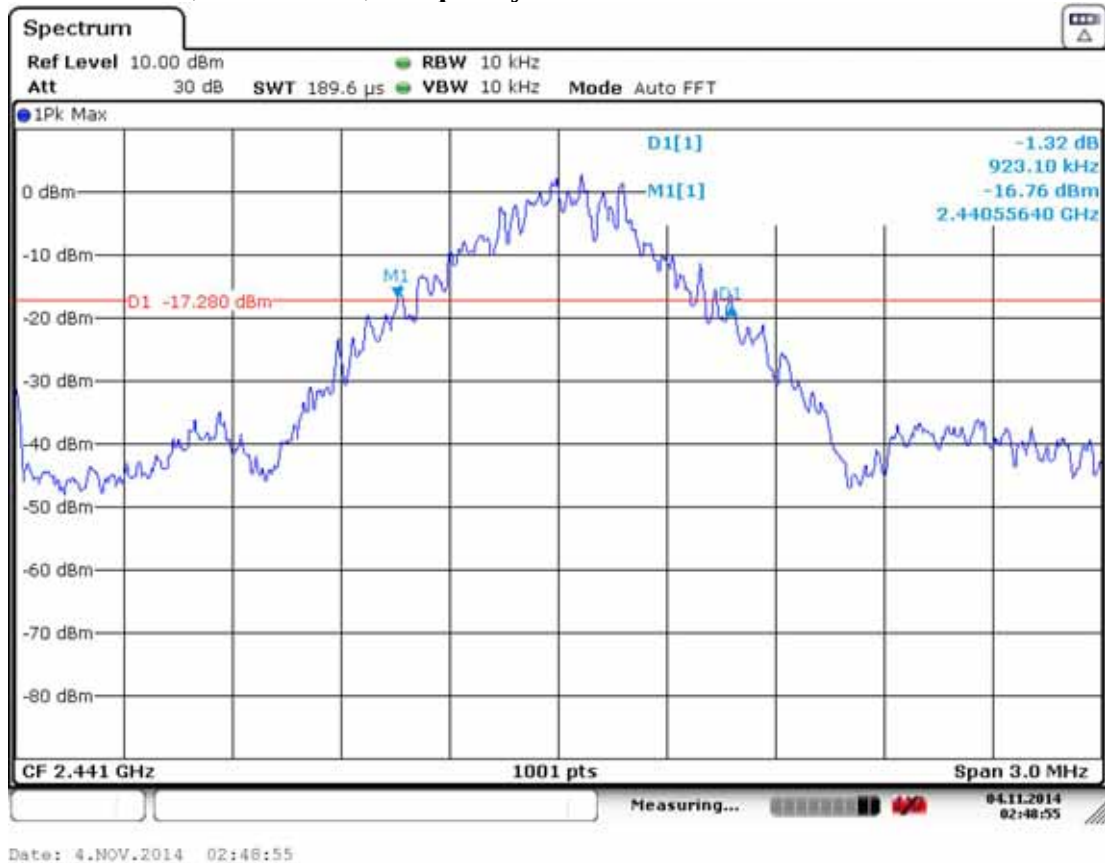
Date: 4.NOV.2014 03:49:29

GFSK, Channel 0, Frequency: 2402MHz

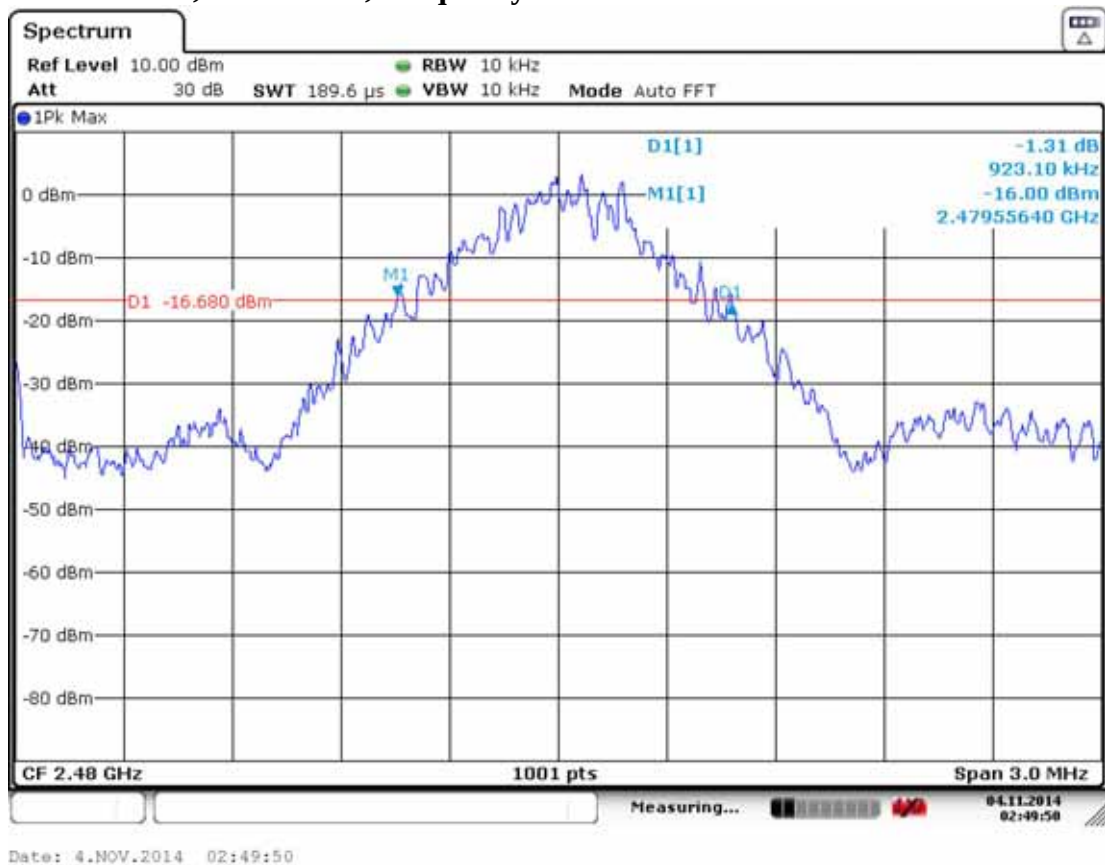


Date: 4.NOV.2014 02:41:55

GFSK, Channel 39, Frequency: 2441MHz



GFSK, Channel 78, Frequency: 2480MHz



6. CARRIER FREQUENCY SEPARATION

MEASUREMENT

6.1. Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	R&S	FSV30	101181	2014. 03. 04	1 Year

6.2. Block Diagram of Test Setup

The same as section 5.2.

6.3. Specification Limits [§15.247(a)(1), RSS-210 §A8.2 (b)]

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.

6.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 5.4.

6.5. Test Procedure

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.

The measurement guideline was according to FCC Public Notice DA 00-705.

6.6. Test Results

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

[Note: Three types of modulation (8-DPSK, π /4DQPSK, GFSK) were evaluated but only two types of modulation (8-DPSK and GFSK) were reported in this report.]

EUT: Bluetooth Adapter Card

M/N: MB8811C1

Test Date: 2014. 11. 04 Temperature: 25°C Humidity: 55%

6.6.1. Type of Modulation: 8-DPSK

1. 2402MHz adjacent channel of carrier frequency separation:
0.998MHz_o
2. 2441MHz adjacent channel of right carrier frequency separation:
1.0040MHz_o
3. 2441MHz adjacent channel of left carrier frequency separation:
0.998MHz_o
4. 2480MHz adjacent channel of carrier frequency separation:
1.0010MHz_o

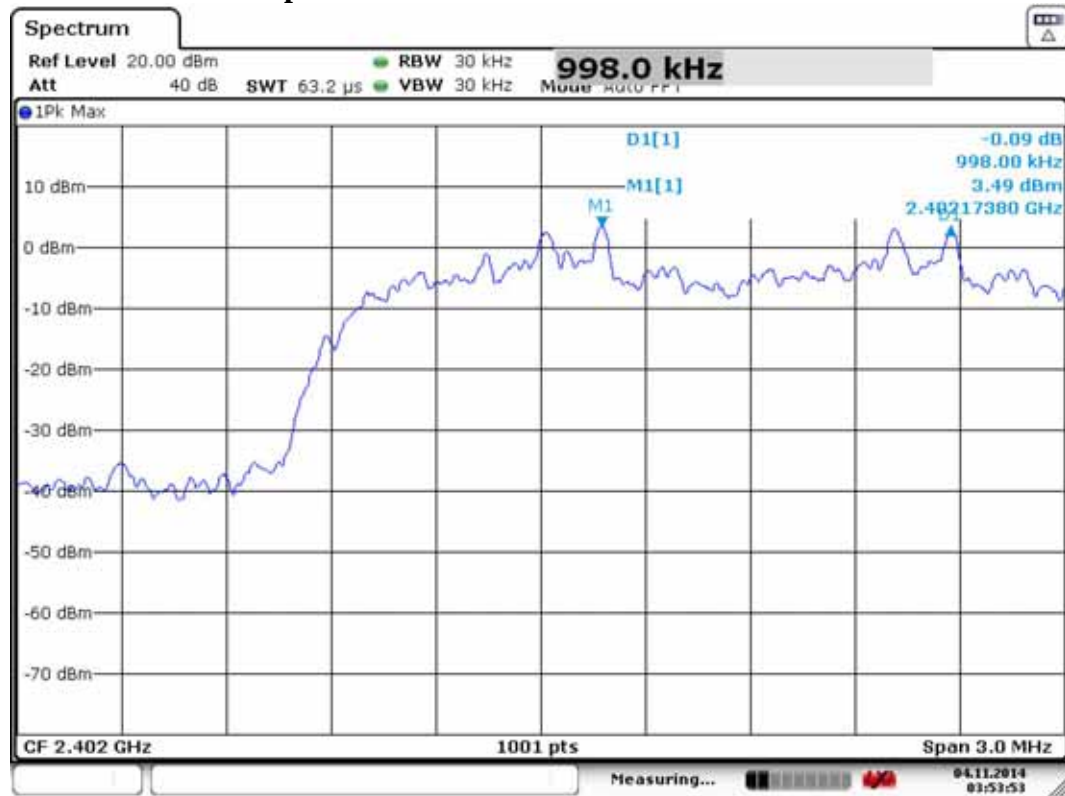
[Above values have met the requirement as specified in section 4.3: frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.]

6.6.2. Type of Modulation: GFSK

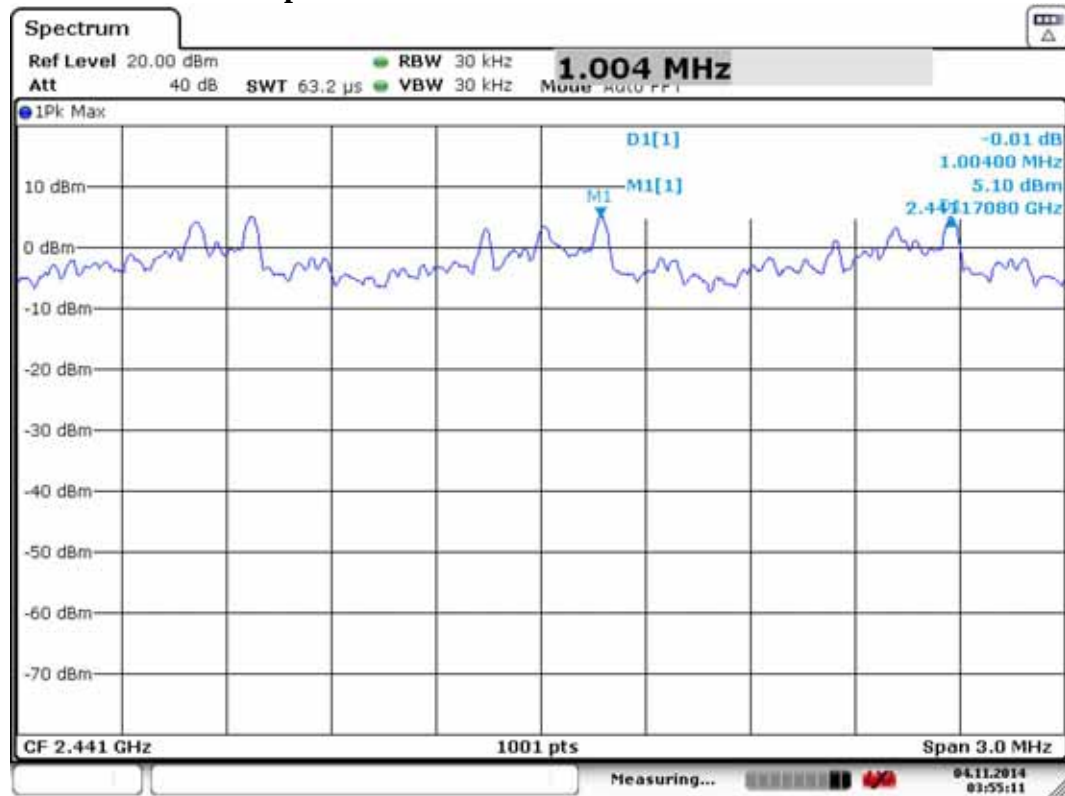
1. 2402MHz adjacent channel of carrier frequency separation:
0.980MHz_o
2. 2441MHz adjacent channel of right carrier frequency separation:
1.10890MHz_o
3. 2441MHz adjacent channel of left carrier frequency separation:
0.89310MHz_o
4. 2480MHz adjacent channel of carrier frequency separation:
1.16280MHz_o

[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.]

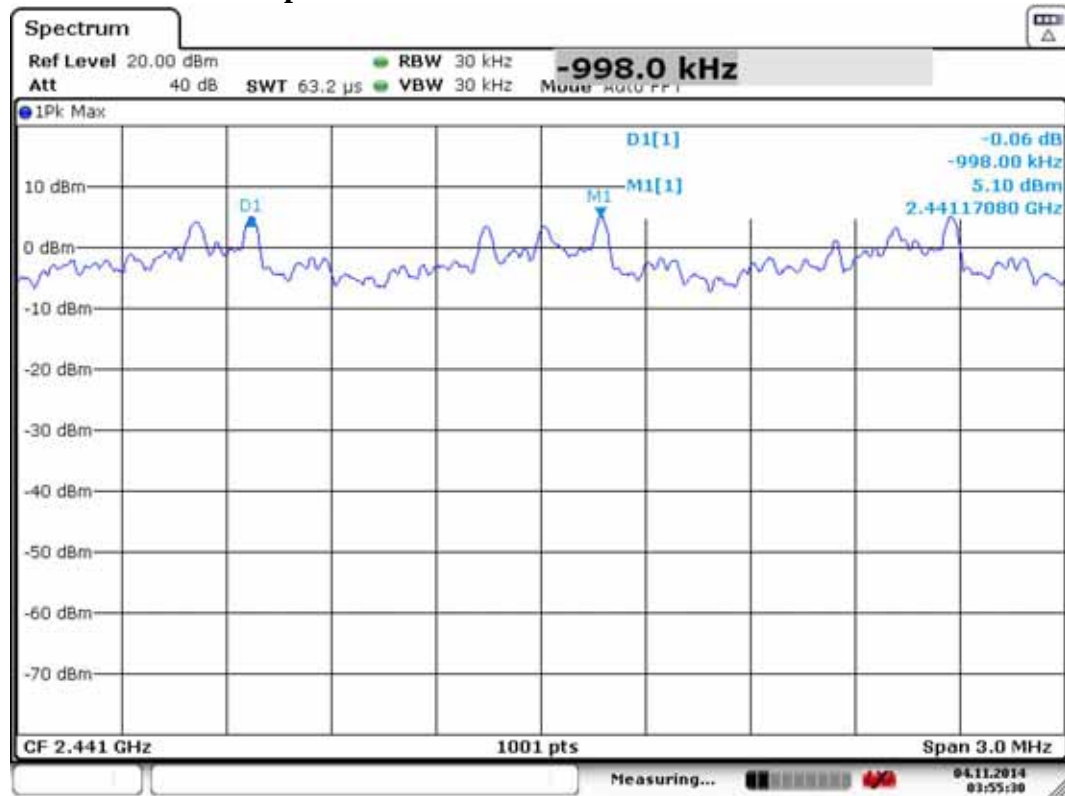
Test Mode: 8-DPSK, 2402MHz adjacent channel of carrier frequency separation



Test Mode: 8-DPSK, 2441MHz adjacent channel of right carrier frequency separation

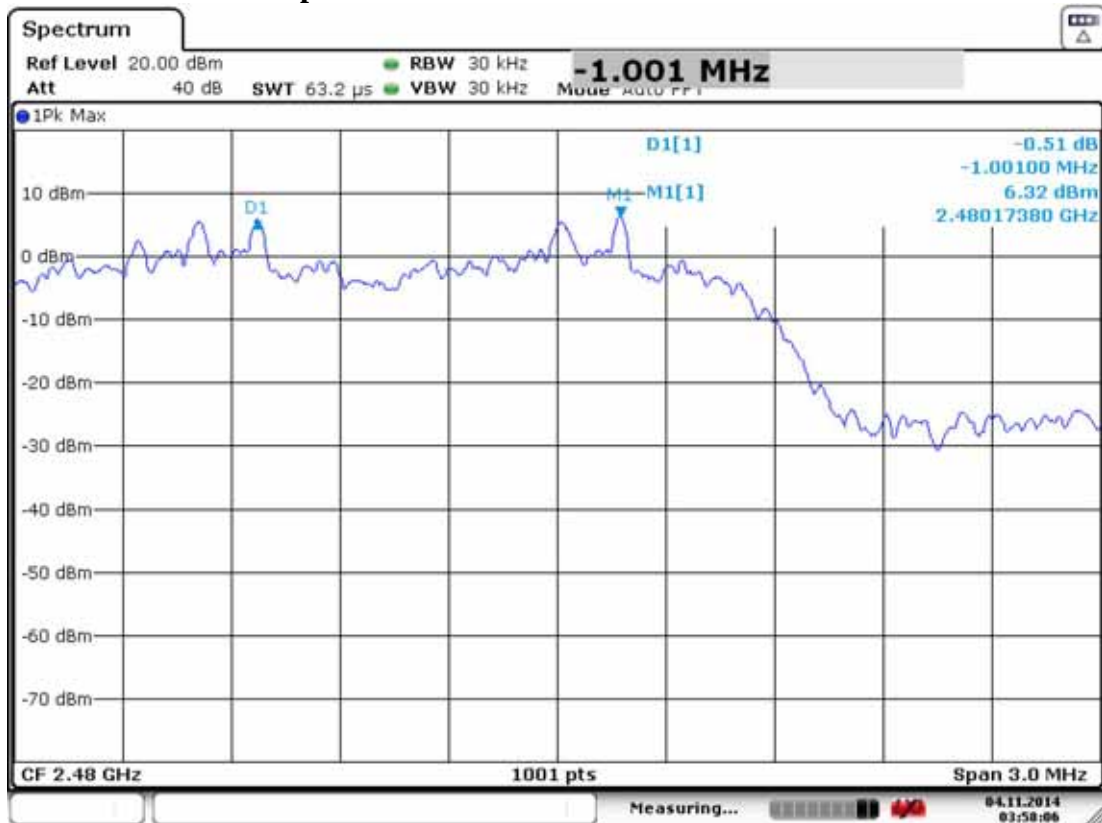


Test Mode: 8-DPSK, 2441MHz adjacent channel of left carrier frequency separation



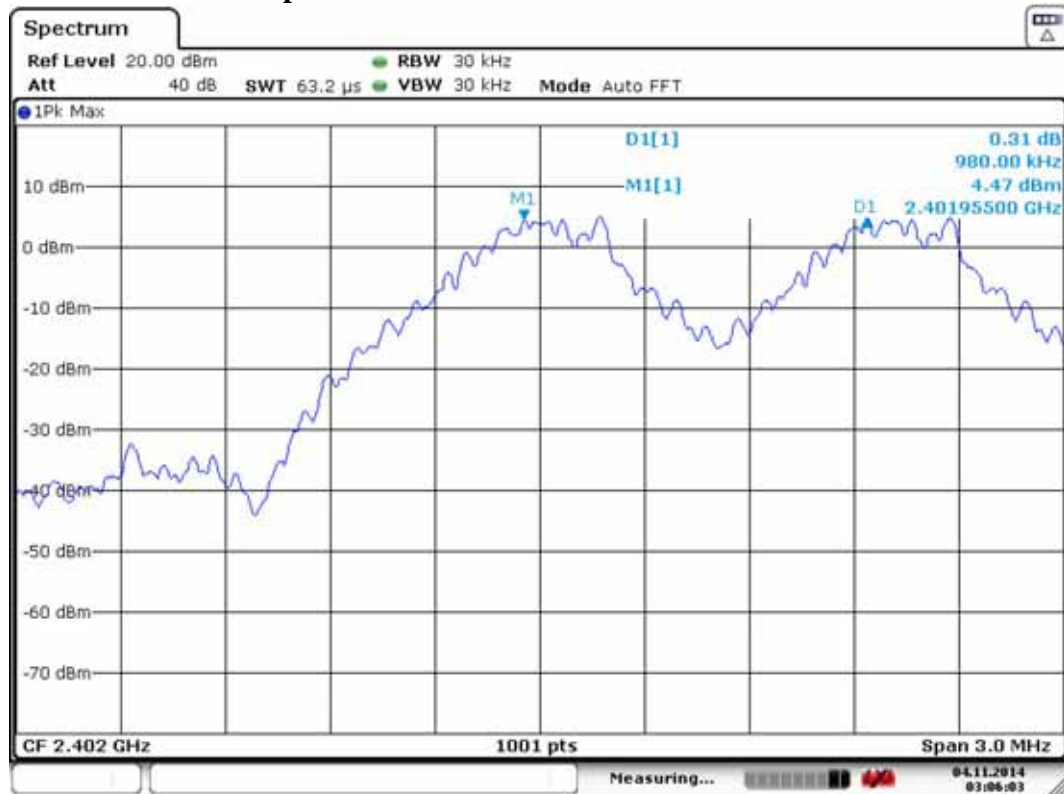
Date: 4.NOV.2014 03:55:30

Test Mode: 8-DPSK, 2480MHz adjacent channel of carrier frequency separation



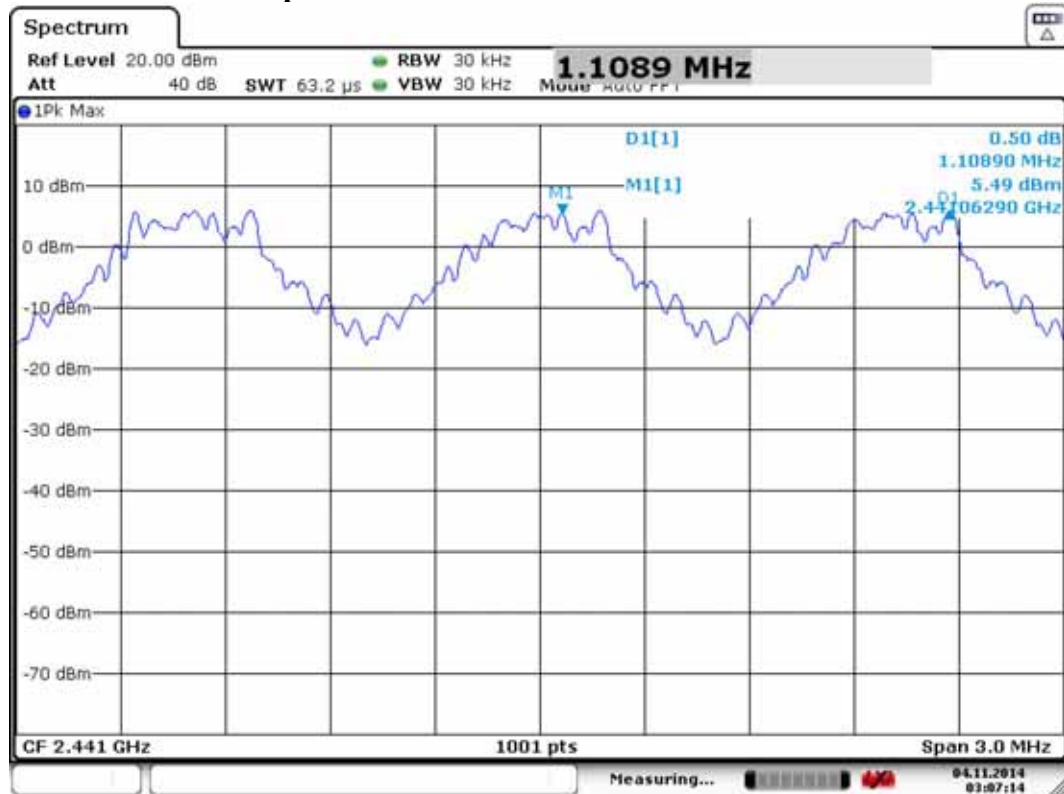
Date: 4.NOV.2014 03:58:06

Test Mode: GFSK, 2402MHz adjacent channel of carrier frequency separation



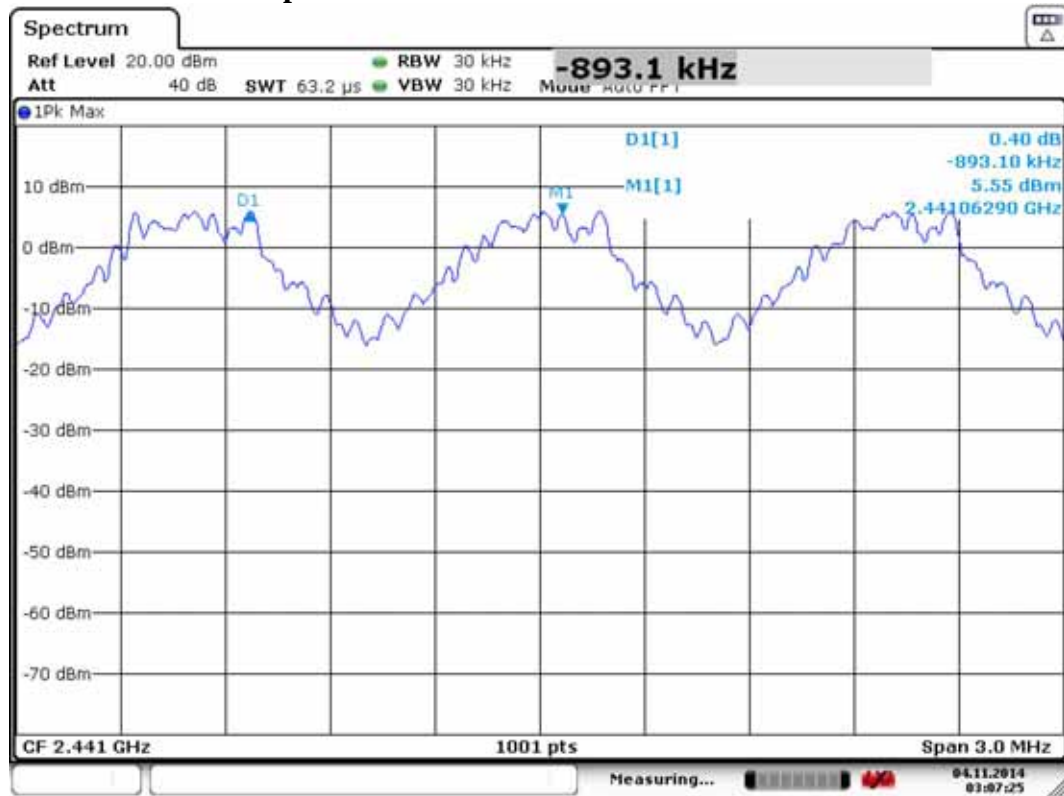
Date: 4.NOV.2014 03:06:03

Test Mode: GFSK, 2441MHz adjacent channel of right carrier frequency separation



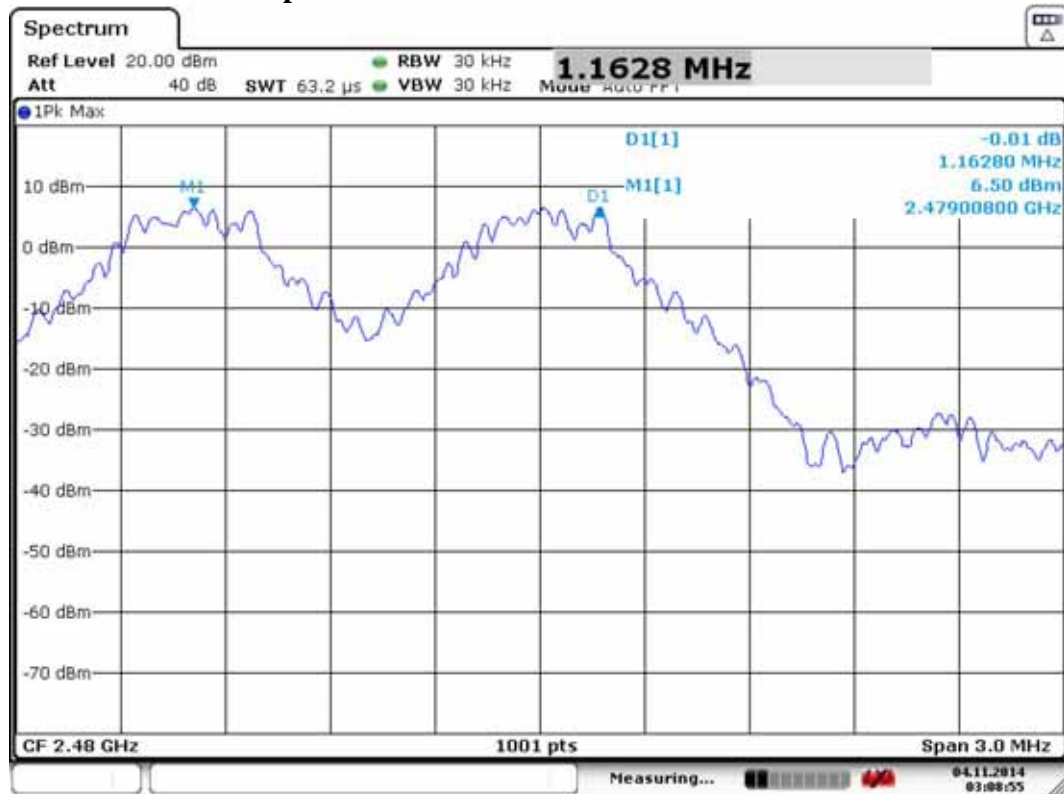
Date: 4.NOV.2014 03:07:14

Test Mode: GFSK, 2441MHz adjacent channel of left carrier frequency separation



Date: 4.NOV.2014 03:07:25

Test Mode: GFSK, 2480MHz adjacent channel of carrier frequency separation



Date: 4.NOV.2014 03:08:55

7. TIME OF OCCUPANCY MEASUREMENT

7.1. Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	R&S	FSV30	101181	2014. 03. 04	1 Year

7.2. Block Diagram of Test Setup

The same as section 5.2.

7.3. Specification Limits [§15.247(a)(1)(iii), RSS-210 §A8.2 (d)]

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.

7.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 5.4.

7.5. Test Procedure

The EUT was connected to the notebook. The bandwidth of the fundamental frequency was measure by spectrum analyzer with 1MHz RBW and 1MHz VBW. $VBW \geq RBW$; Span=zero span.

Centred on a hopping channel sweep=as necessary to capture the entire dwell time per hopping channel ; Detector function=peak ; Trace=Max hold

The measurement guideline was according to FCC Public Notice DA 00-705.

7.6. Test Results

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

[Note: Three types of modulation (8-DPSK, π /4DQPSK, GFSK) were evaluated but only two types of modulation (8-DPSK and GFSK) were reported in this report.]

EUT: Bluetooth Adapter Card

M/N: MB8811C1

Test Date: 2014. 11. 04 Temperature: 25°C Humidity: 55%

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

Observation Period: 79channels*0.4 seconds = 31.6 seconds

3DH1 : For each 5 seconds of 51 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$51 \text{ channels} * 31.6 \text{ seconds} \div 5s * 0.390ms = 125.7048ms$
(<400ms)

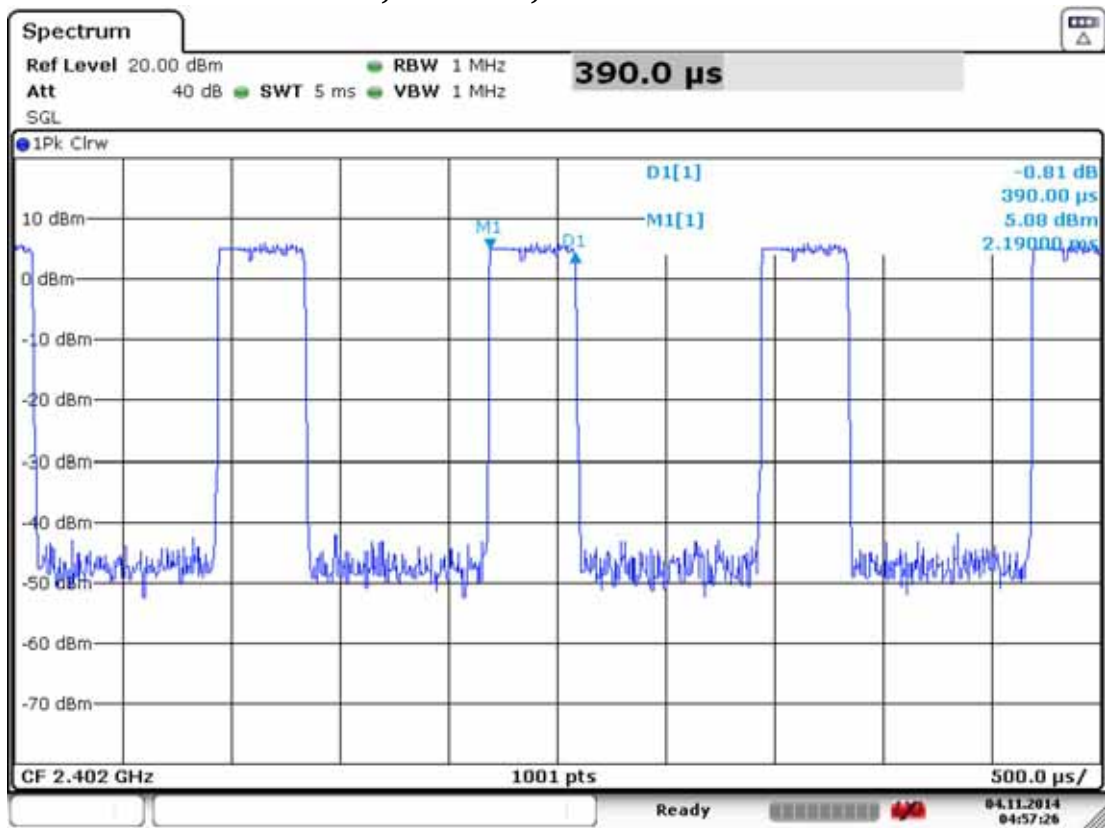
3DH3 : For each 5 seconds of 12 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$12 \text{ channels} * 31.6 \text{ seconds} \div 5s * 1.645ms = 124.7568ms$
(<400ms)

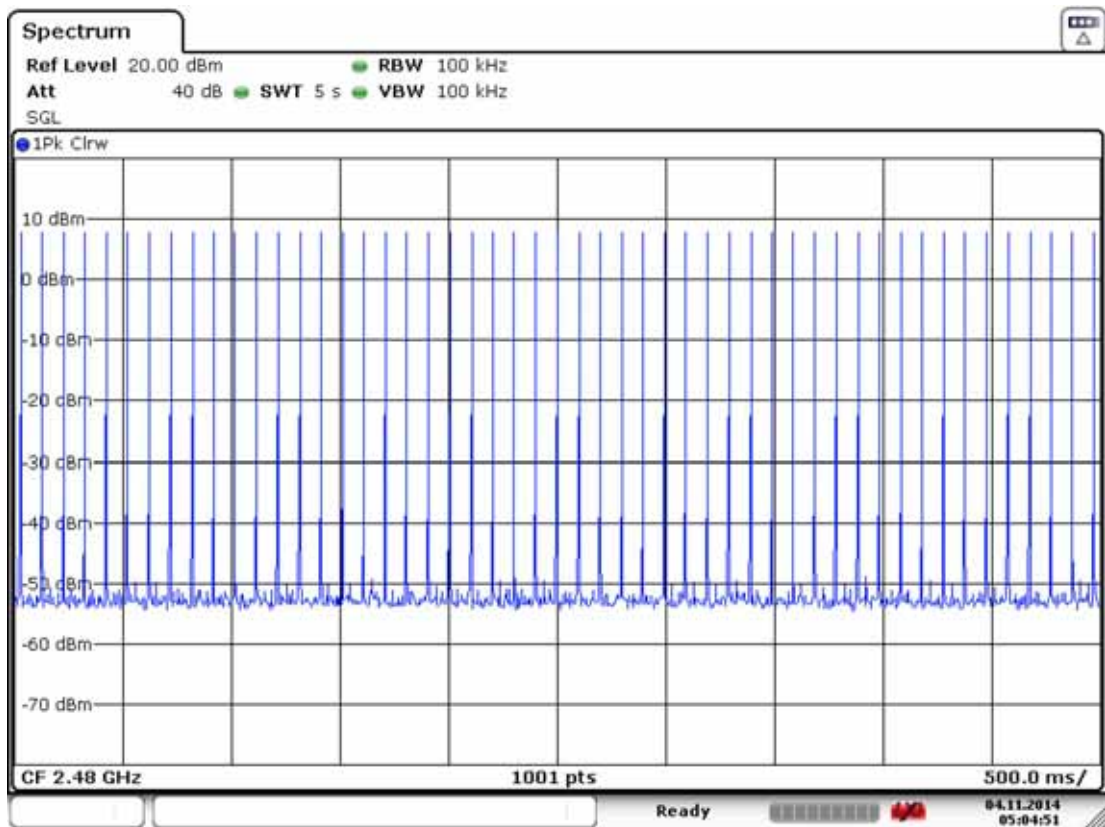
3DH5 : For each 5 seconds of 5 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$5 \text{ channels} * 31.6 \text{ seconds} \div 5s * 2.895ms = 91.482ms$ (<400ms)

Test Mode: 8-DPSK, 2402MHz, 3DH1

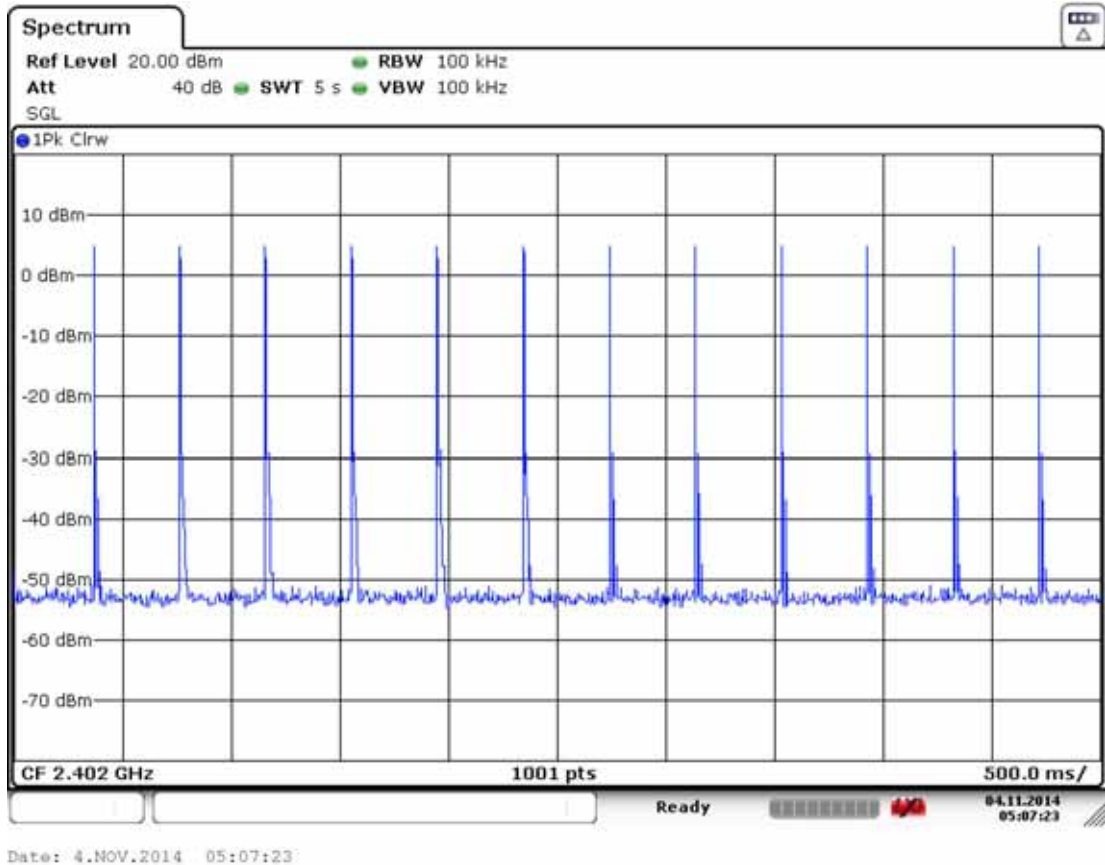
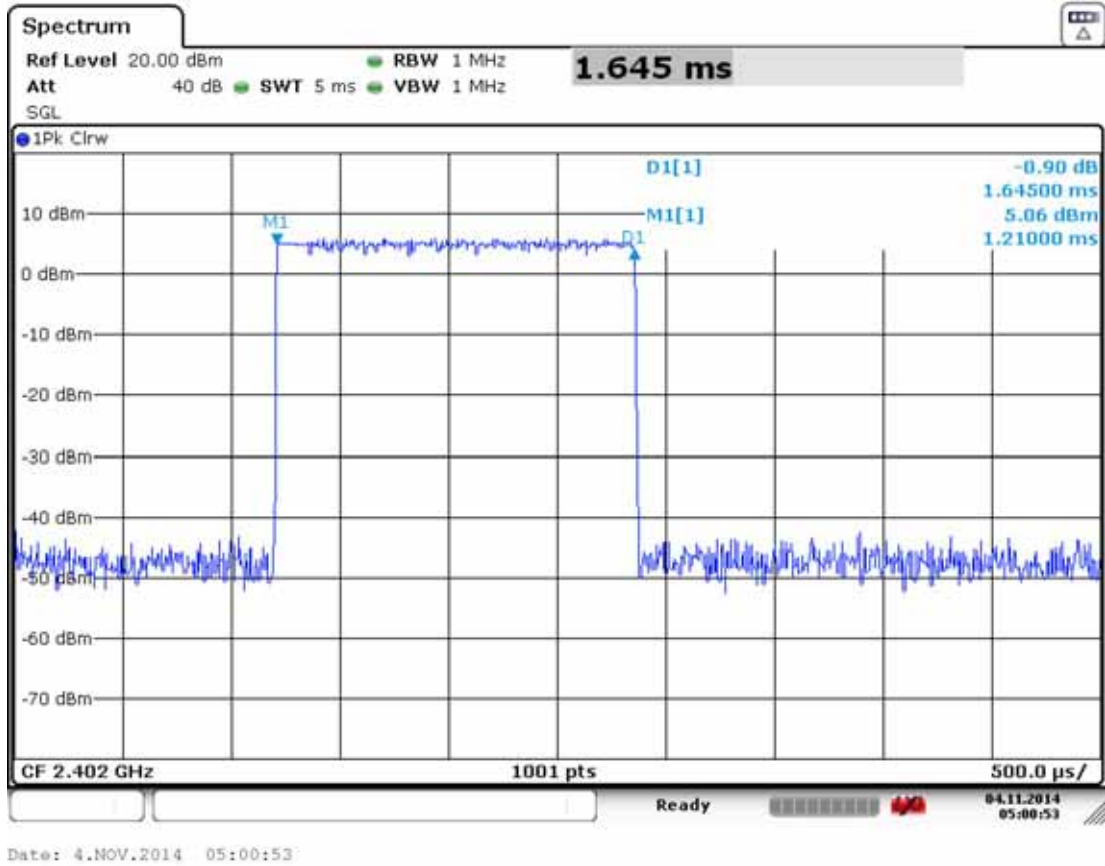


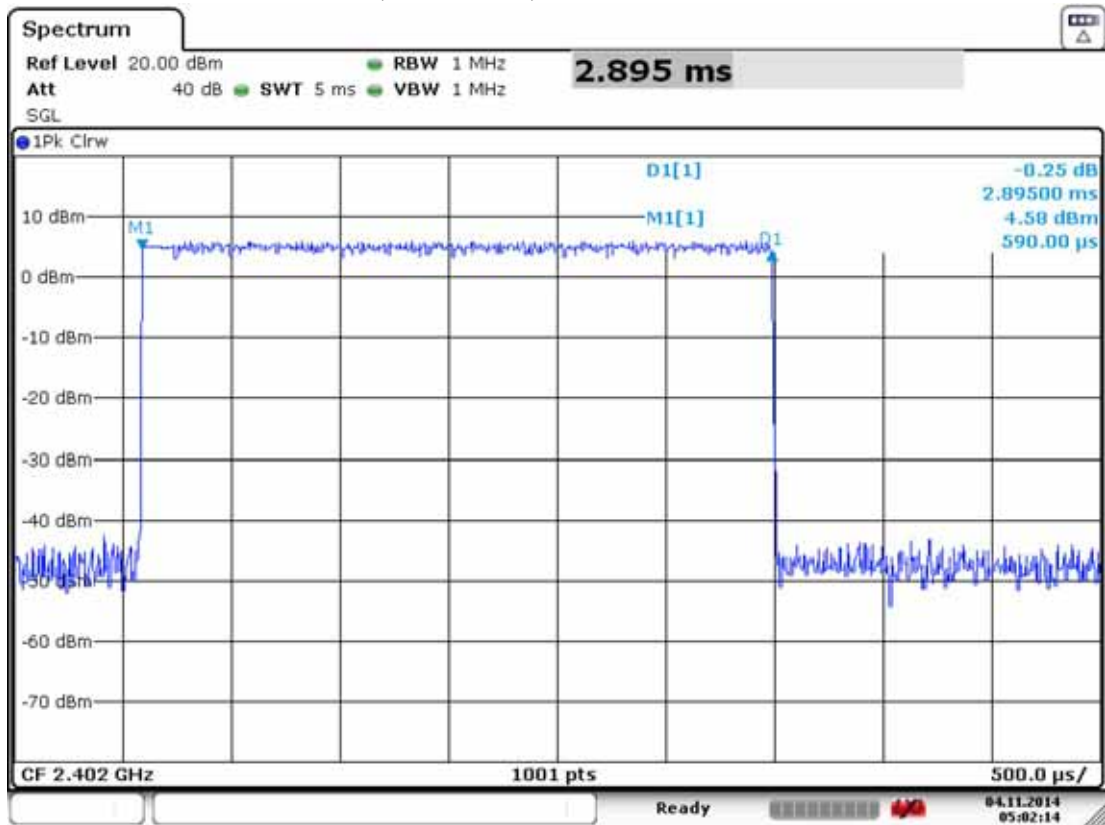
Date: 4.NOV.2014 04:57:26



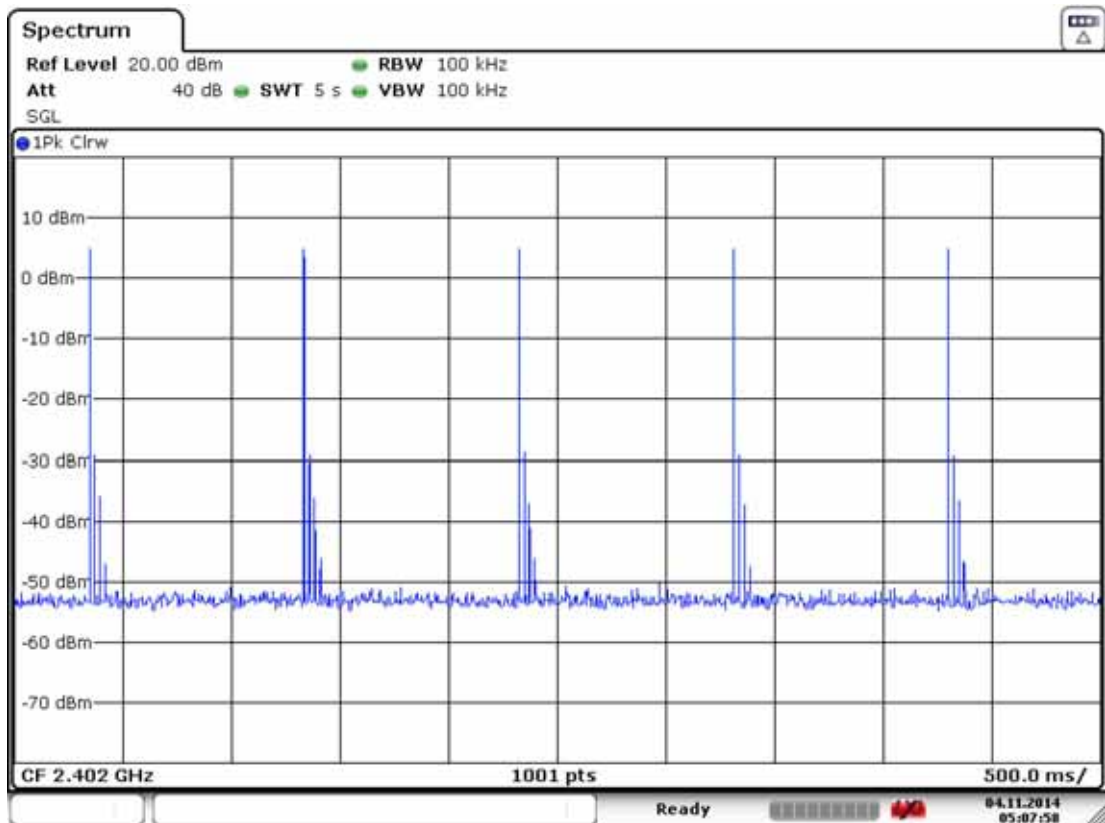
Date: 4.NOV.2014 05:04:51

Test Mode: 8-DPSK, 2404MHz, 3DH3



Test Mode: 8-DPSK, 2402MHz, 3DH5

Date: 4.NOV.2014 05:02:14



Date: 4.NOV.2014 05:07:58

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

Observation Period:: 79channels*0.4 seconds = 31.6 seconds

3DH1 : For each 5 seconds of 51 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$$51 \text{ channels} * 31.6 \text{ seconds} \div 5s * 0.390ms = 125.70480ms$$

(<400ms)

3DH3 : For each 5 seconds of 13 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

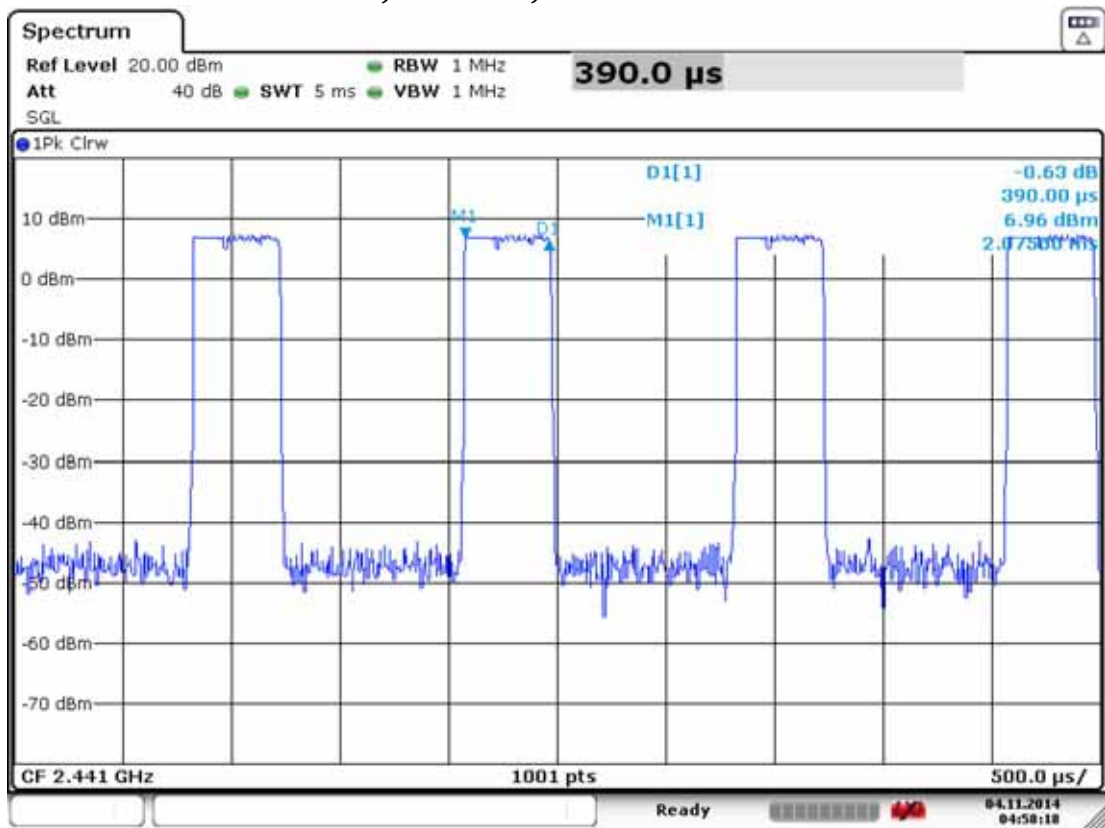
$$13 \text{ channels} * 31.6 \text{ seconds} \div 5s * 1.645ms = 135.1532ms$$

(<400ms)

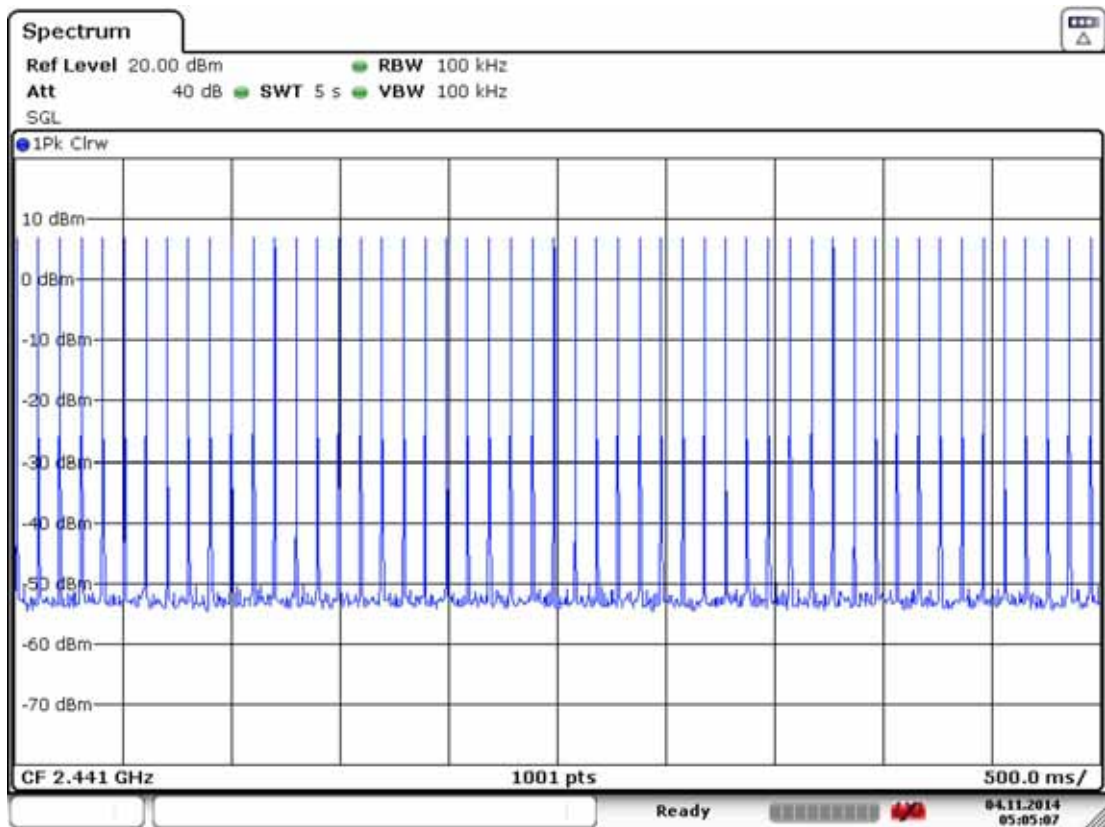
3DH5 : For each 5 seconds of 5 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$$5 \text{ channels} * 31.6 \text{ seconds} \div 5s * 2.895ms = 91.482ms (<400ms)$$

Test Mode: 8-DPSK, 2441MHz, 3DH1

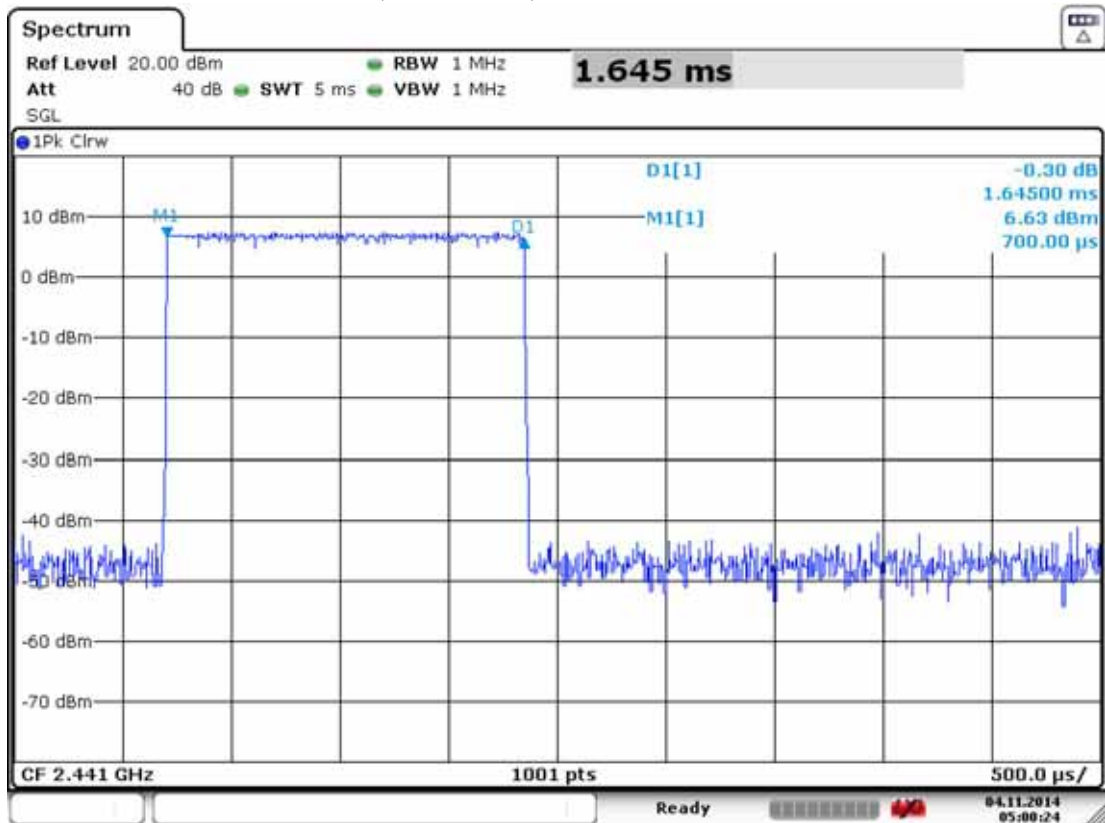


Date: 4.NOV.2014 04:58:18

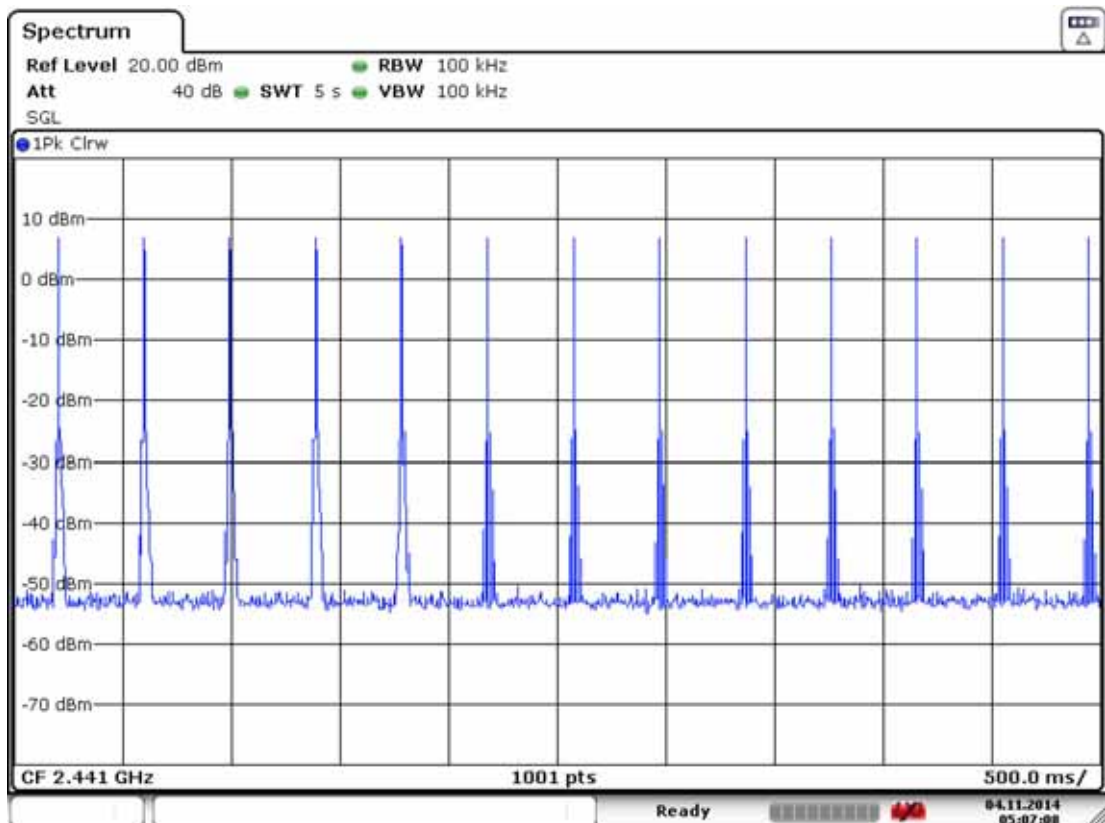


Date: 4.NOV.2014 05:05:07

Test Mode: 8-DPSK, 2441MHz, 3DH3

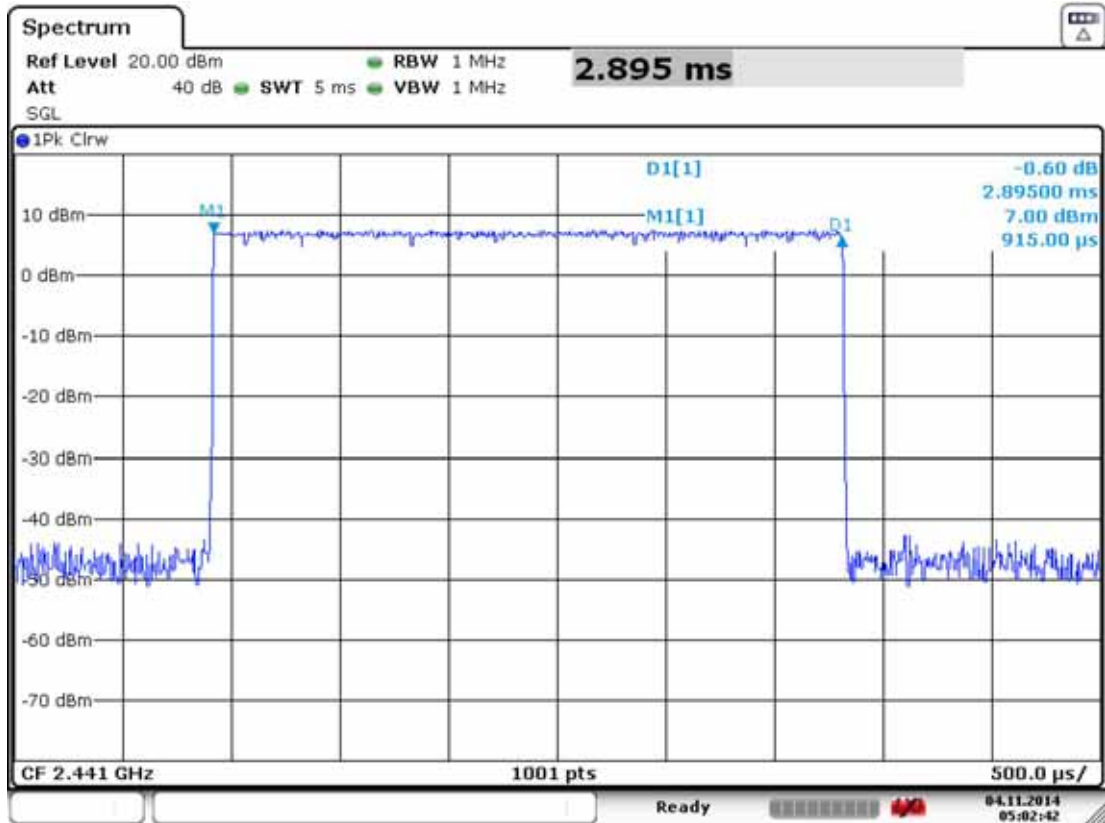


Date: 4.NOV.2014 05:00:24

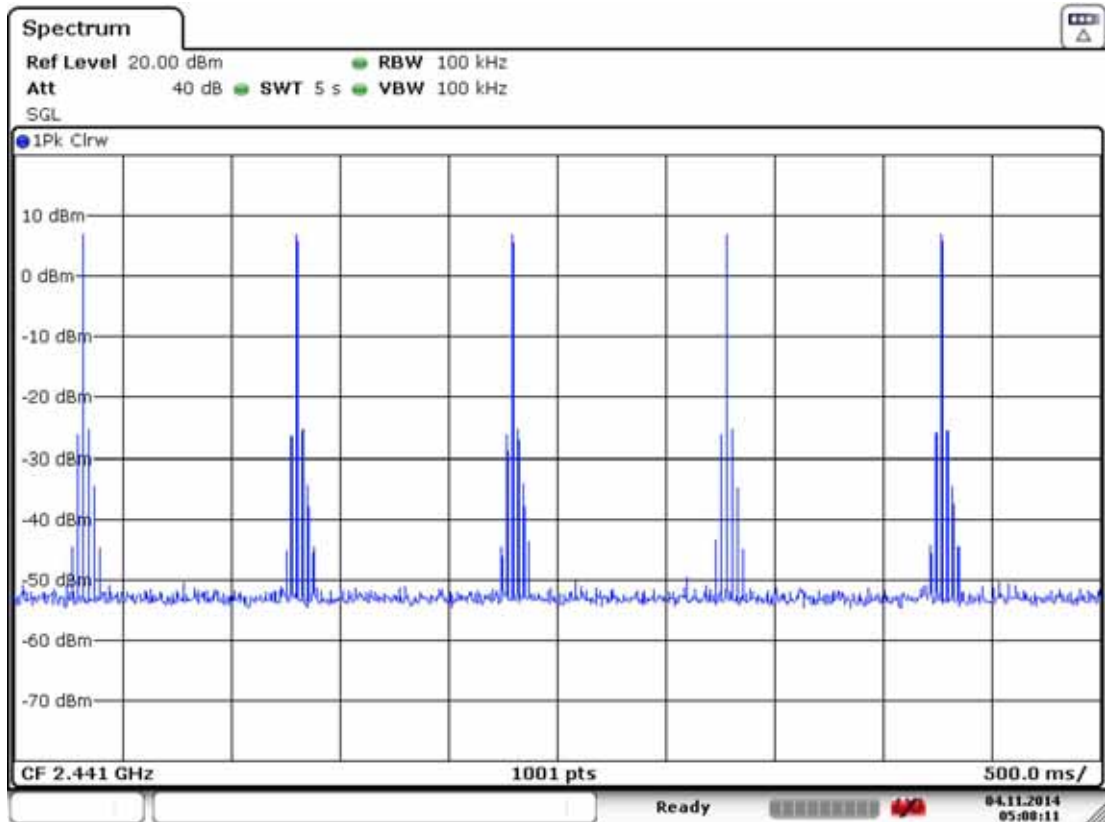


Date: 4.NOV.2014 05:07:08

Test Mode: 8-DPSK, 2441MHz, 3DH5



Date: 4.NOV.2014 05:02:42



Date: 4.NOV.2014 05:08:11

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

Observation Period:: 79channels*0.4 seconds = 31.6 seconds

3DH1 : For each 5 seconds of 50 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$$50 \text{ channels} * 31.6 \text{ seconds} \div 5s * 0.390ms = 123.2400ms$$

(<400ms)

3DH3 : For each 5 seconds of 13 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

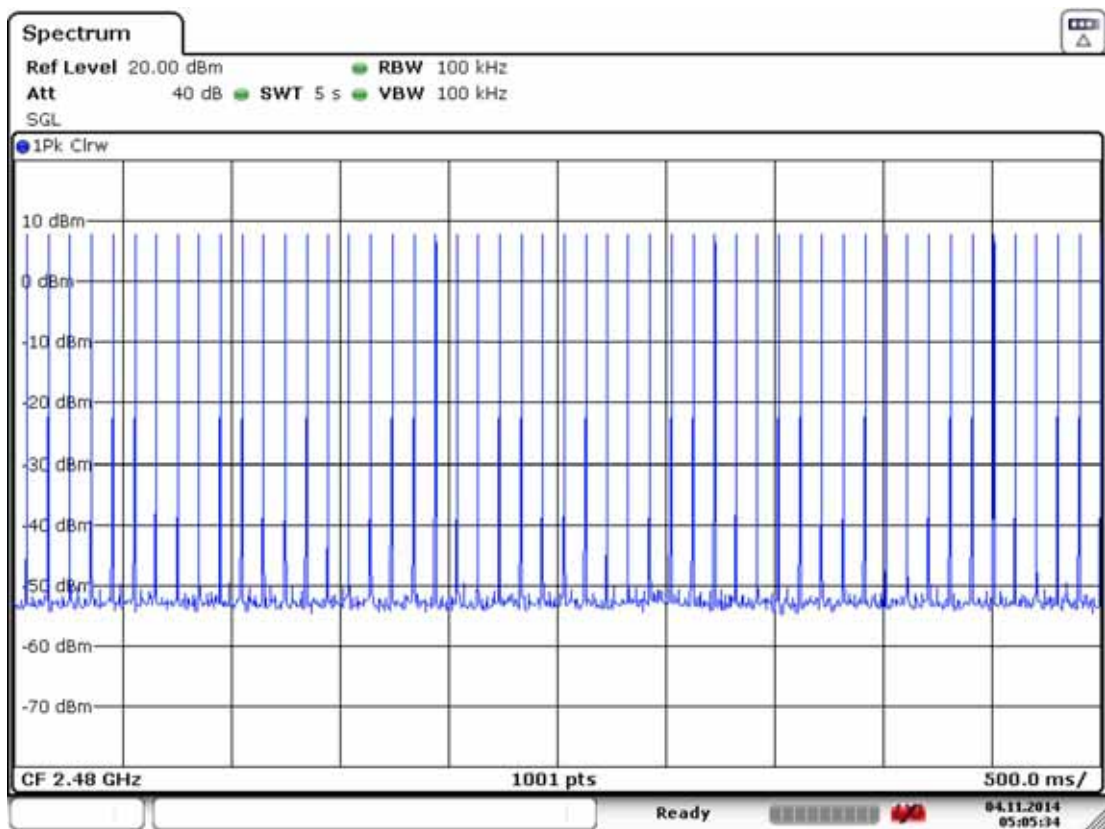
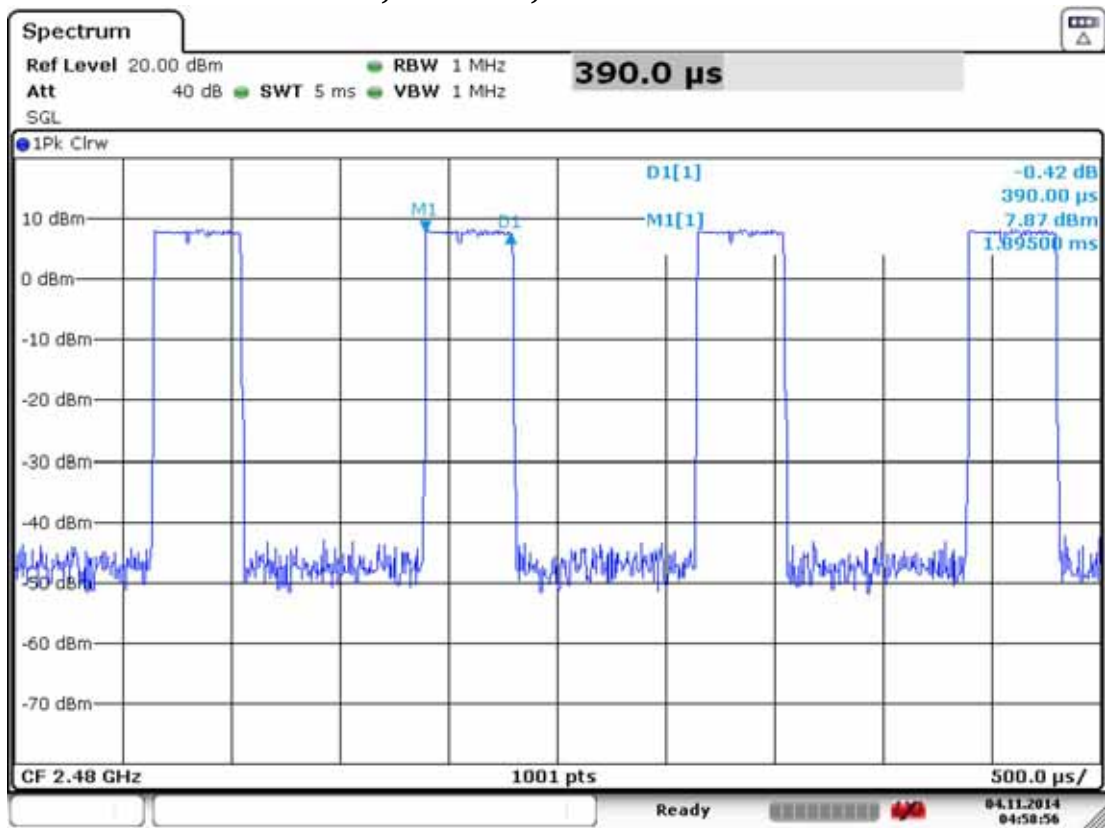
$$13 \text{ channels} * 31.6 \text{ seconds} \div 5s * 1.645ms = 135.1532ms$$

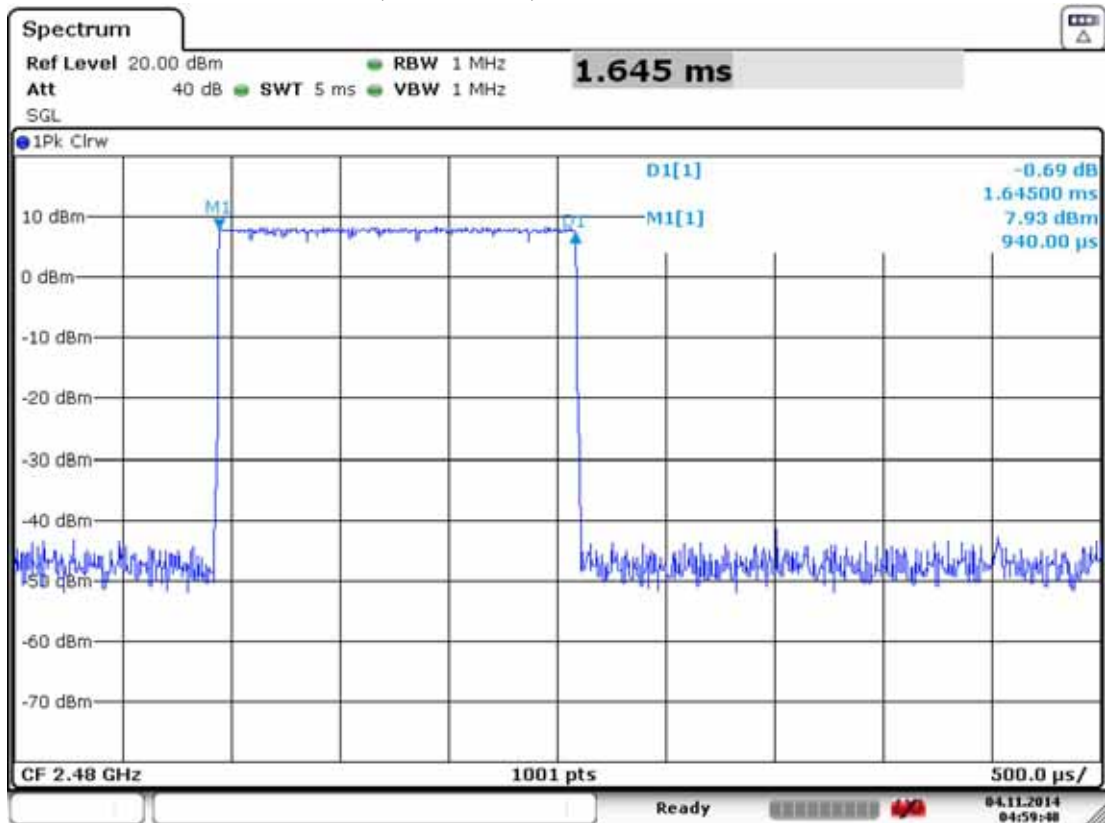
(<400ms)

3DH5 : For each 5 seconds of 5 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

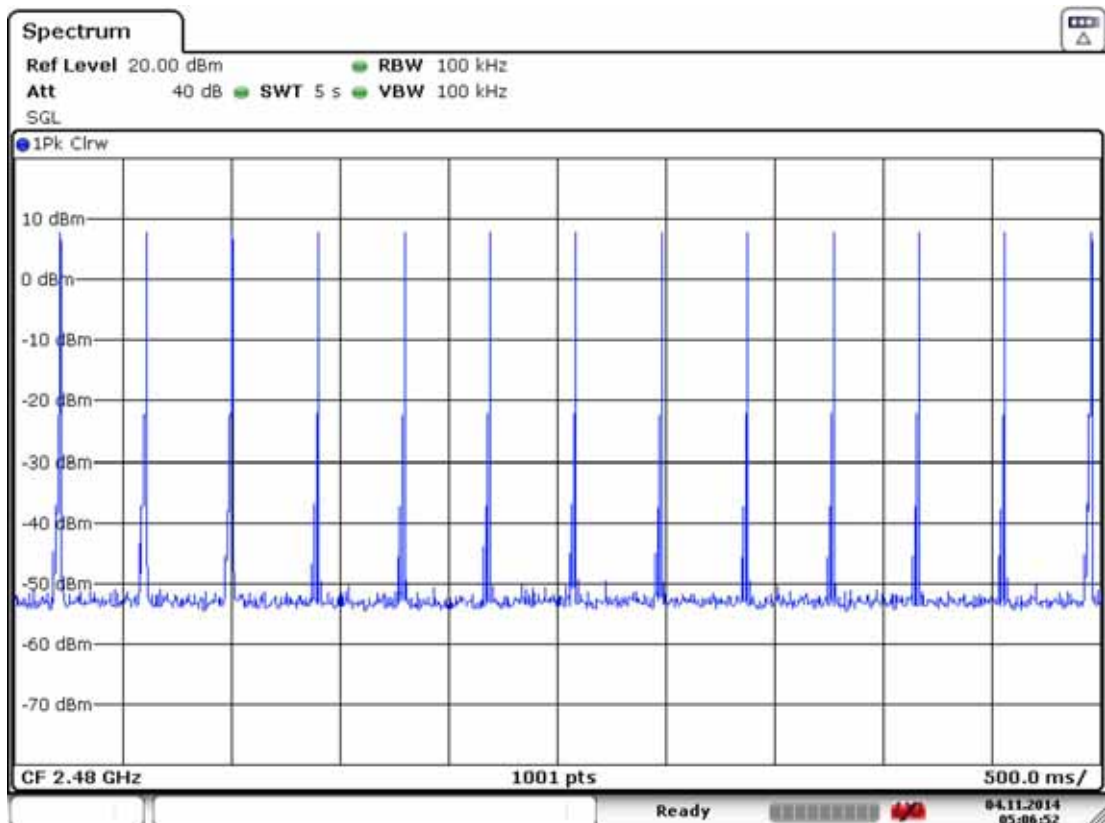
$$5 \text{ channels} * 31.6 \text{ seconds} \div 5s * 2.895ms = 91.482ms (<400ms)$$

Test Mode: 8-DPSK, 2480MHz, 3DH1



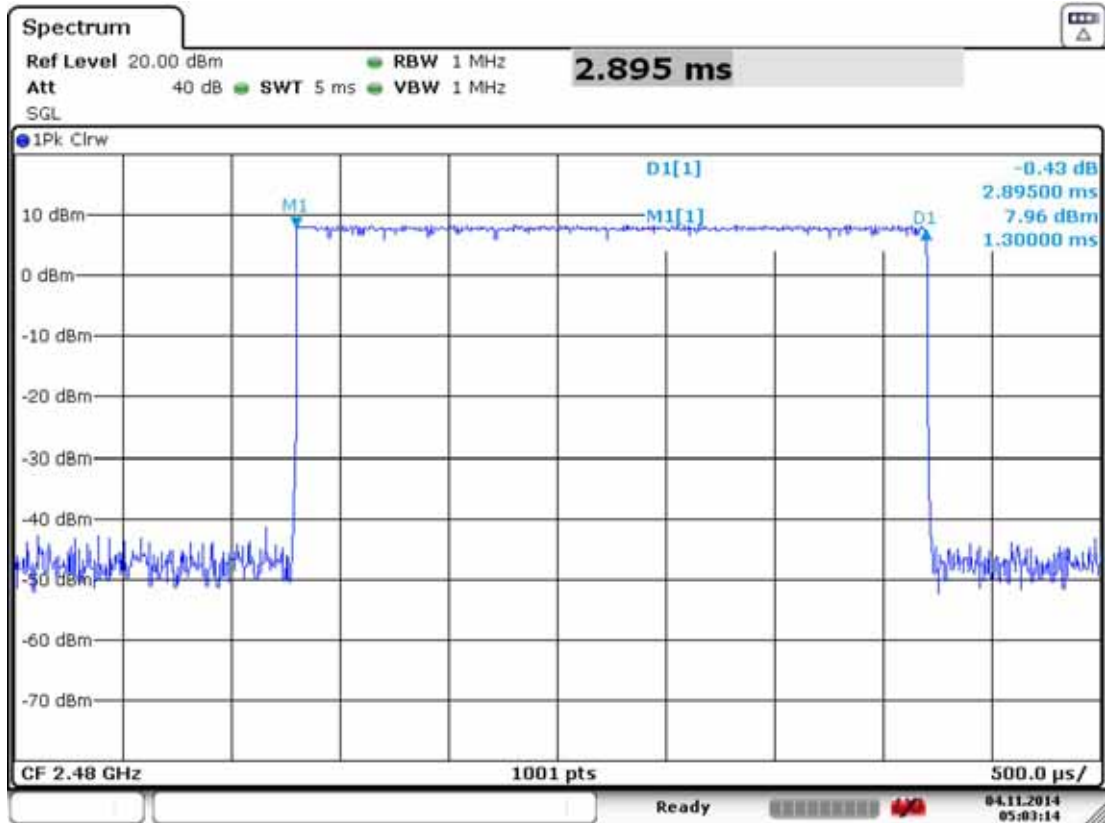
Test Mode: 8-DPSK, 2480MHz, 3DH3

Date: 4.NOV.2014 04:59:48

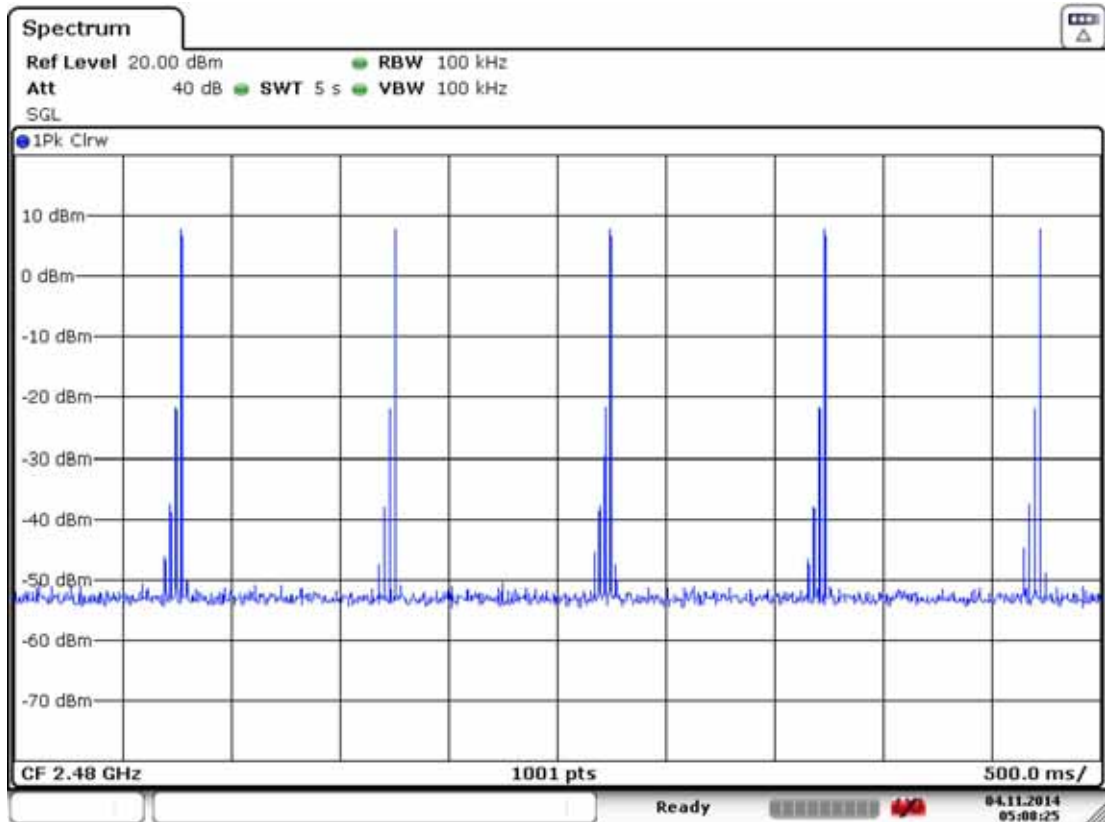


Date: 4.NOV.2014 05:06:52

Test Mode: 8-DPSK, 2480MHz, 3DH5



Date: 4.NOV.2014 05:03:14



Date: 4.NOV.2014 05:08:25

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

Observation Period: 79channels*0.4 seconds = 31.6 seconds

DH1 : For each 5 seconds of 51 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$$51 \text{ channels} * 31.6 \text{ seconds} \div 5s * 0.380ms = 122.4816ms$$

(<400ms)

DH3 : For each 5 seconds of 17 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

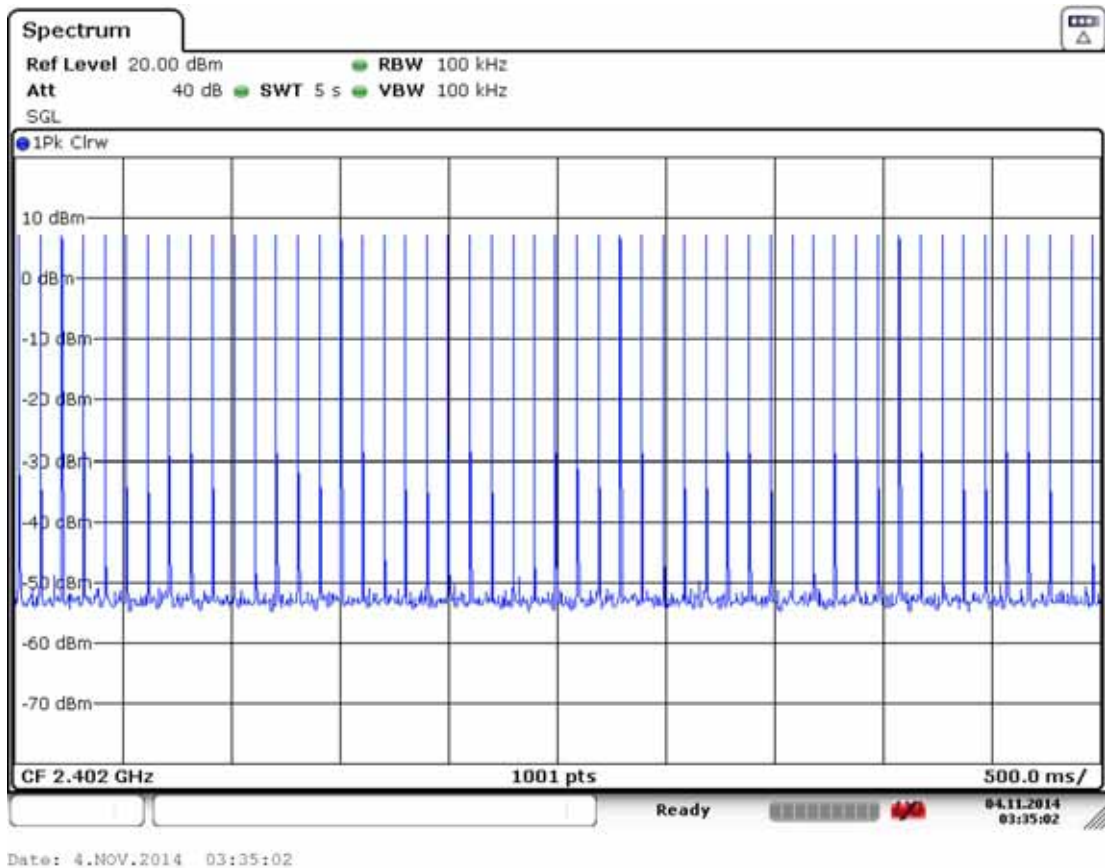
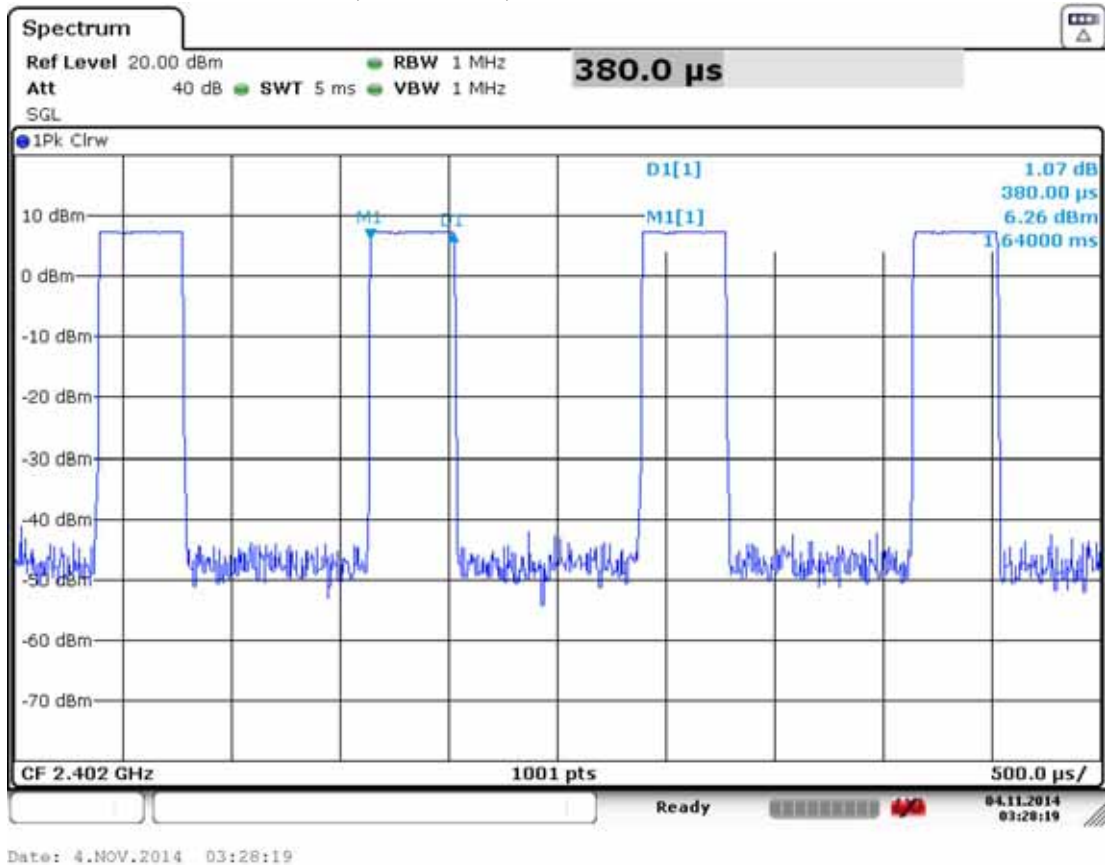
$$17 \text{ channels} * 31.6 \text{ seconds} \div 5s * 1.625ms = 174.5900ms$$

(<400ms)

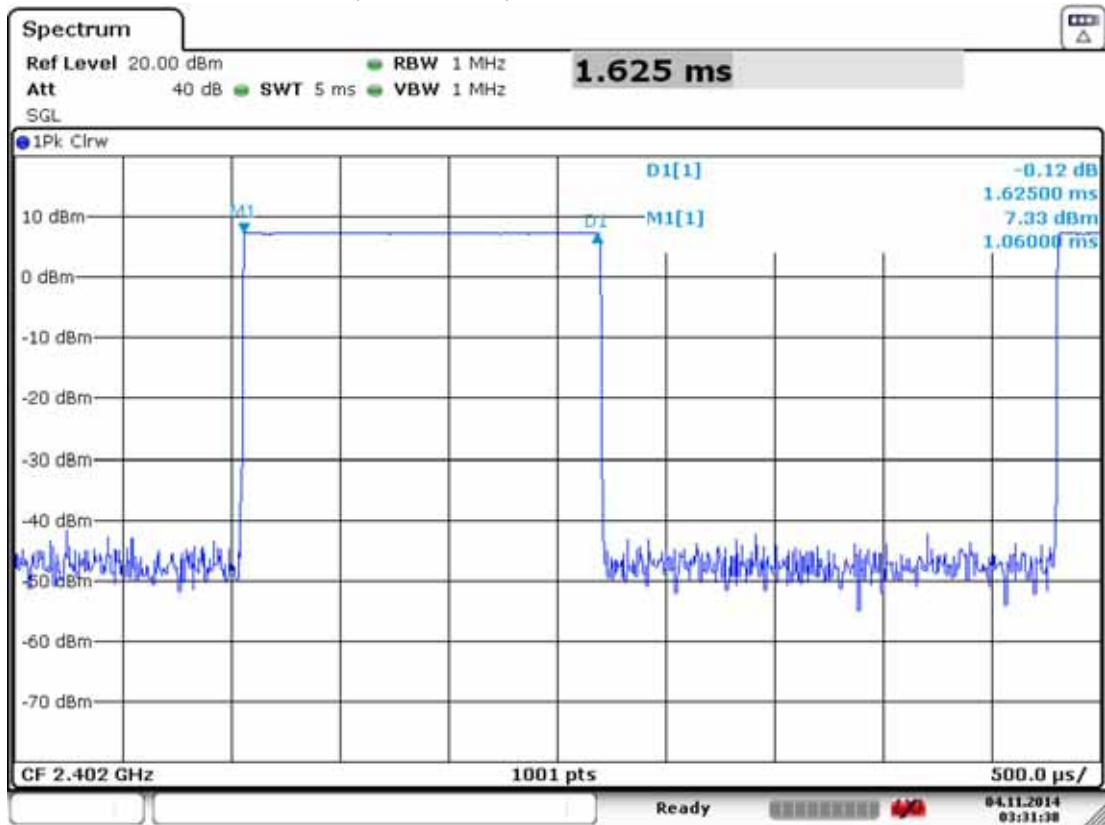
DH5 : For each 5 seconds of 10 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$$10 \text{ channels} * 31.6 \text{ seconds} \div 5s * 2.880ms = 182.0160ms (<400ms)$$

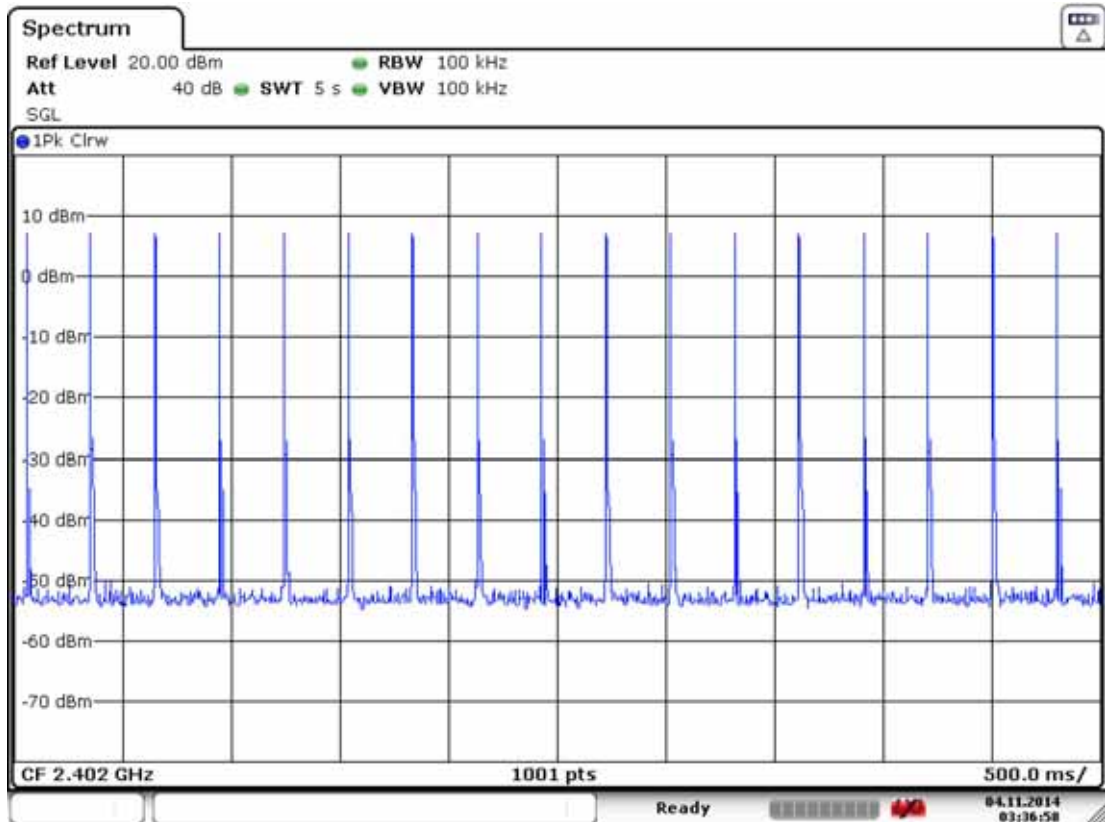
Test Mode: GFSK, 2402MHz, DH1



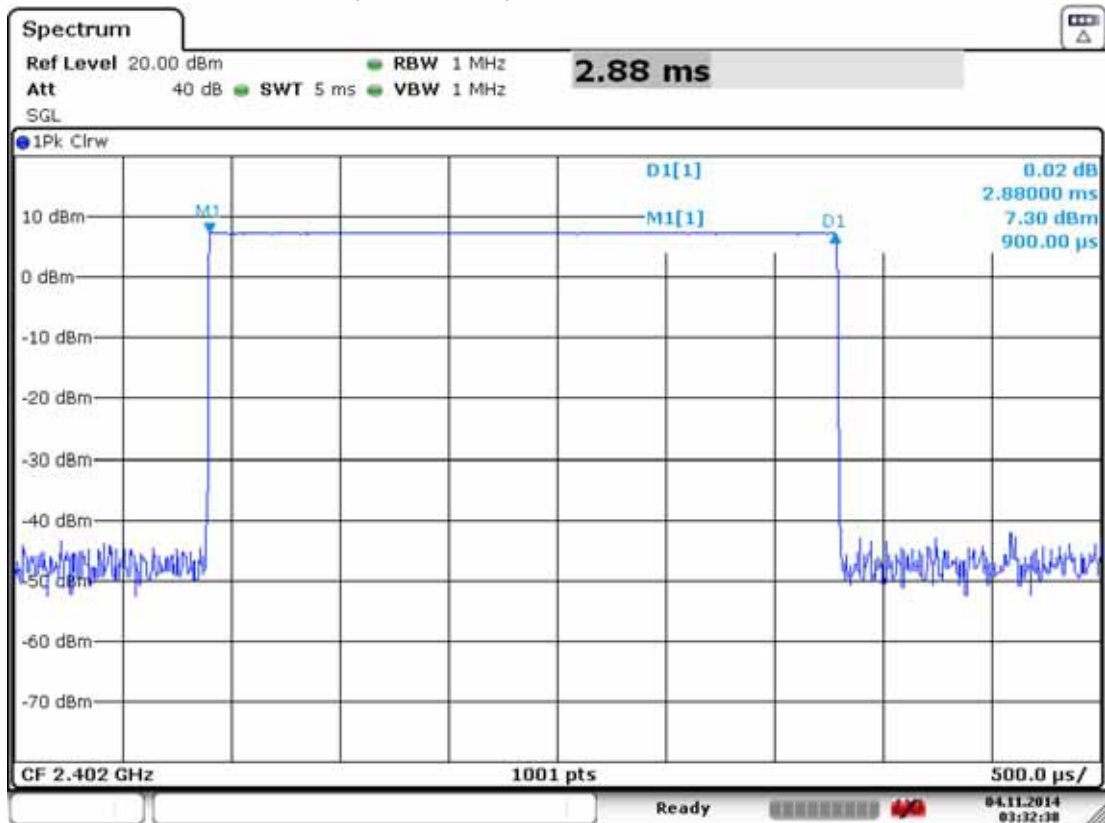
Test Mode: GFSK, 2402MHz, DH3



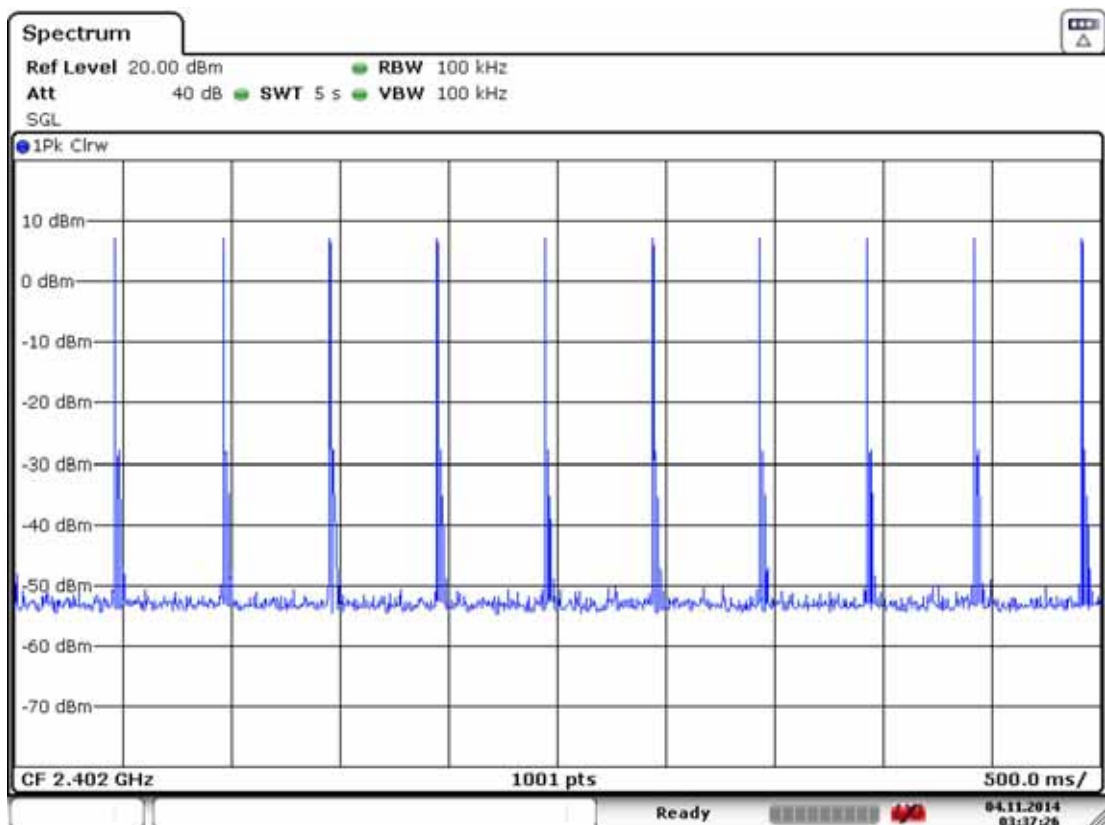
Date: 4.NOV.2014 03:31:38



Date: 4.NOV.2014 03:36:58

Test Mode: GFSK, 2402MHz, DH5

Date: 4.NOV.2014 03:32:38



Date: 4.NOV.2014 03:37:26

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

Observation Period:: 79channels*0.4 seconds = 31.6 seconds

DH1 : For each 5 seconds of 51 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$$51 \text{ channels} * 31.6 \text{ seconds} \div 5s * 0.380ms = 122.4816ms$$

(<400ms)

DH3 : For each 5 seconds of 17 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

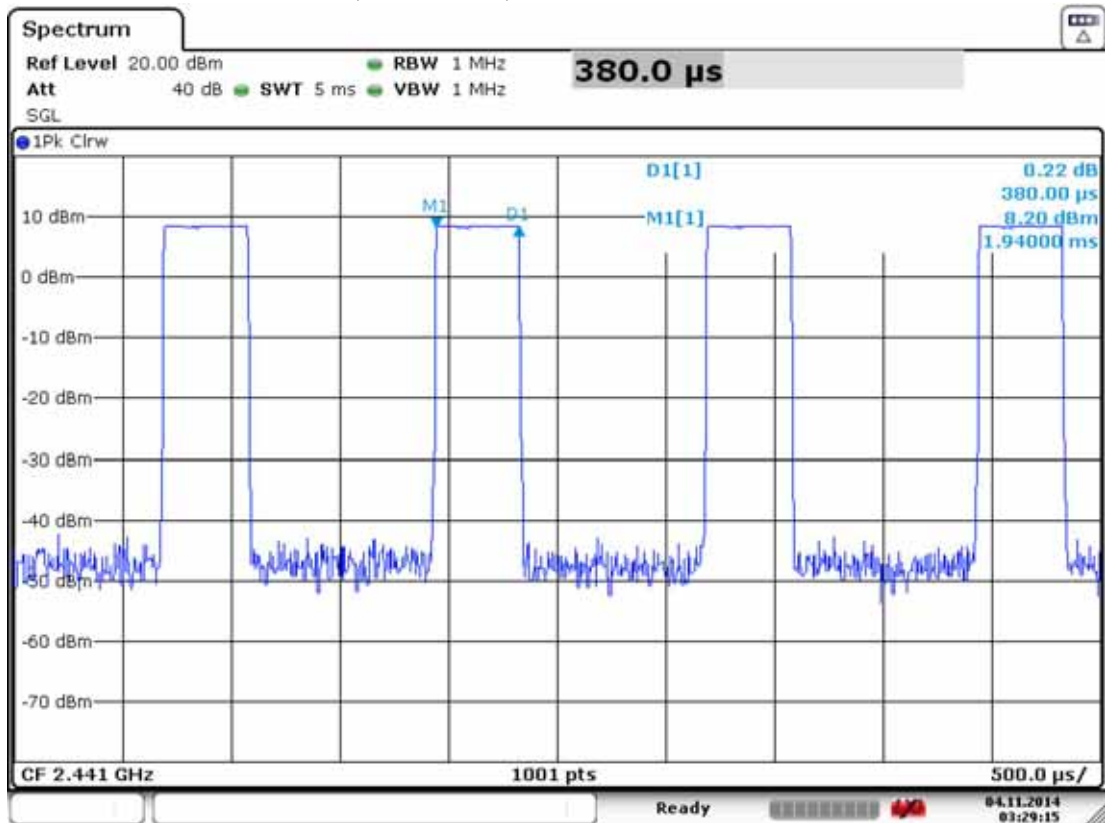
$$17 \text{ channels} * 31.6 \text{ seconds} \div 5s * 1.635ms = 175.6644ms$$

(<400ms)

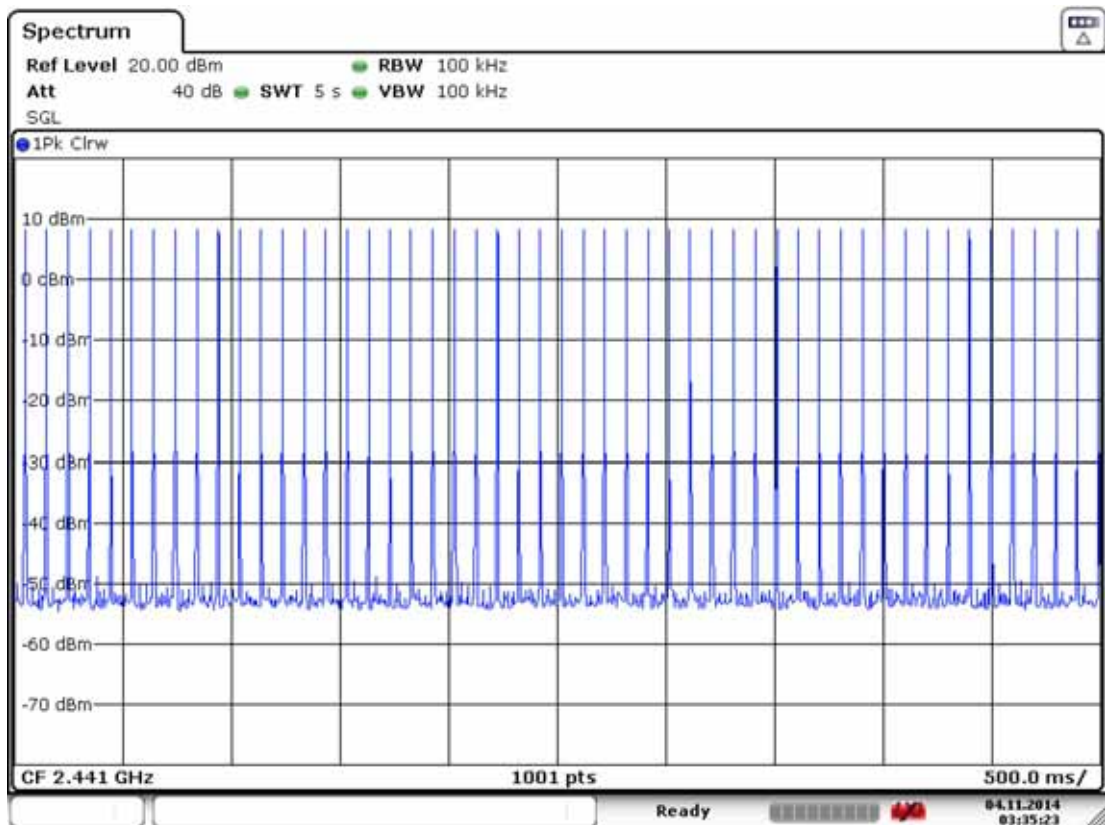
DH5 : For each 5 seconds of 10 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$$10 \text{ channels} * 31.6 \text{ seconds} \div 5s * 2.880ms = 182.0160ms (<400ms)$$

Test Mode: GFSK, 2441MHz, DH1



Date: 4.NOV.2014 03:29:15



Date: 4.NOV.2014 03:35:23

Spectrum

Ref Level 20.00 dBm RBW 100 kHz
 Att 40 dB SWT 5 s VBW 100 kHz
 SGL

1Pk Clrw

10 dBm
 0 dBm
 -10 dBm
 -20 dBm
 -30 dBm
 -40 dBm
 -50 dBm
 -60 dBm
 -70 dBm

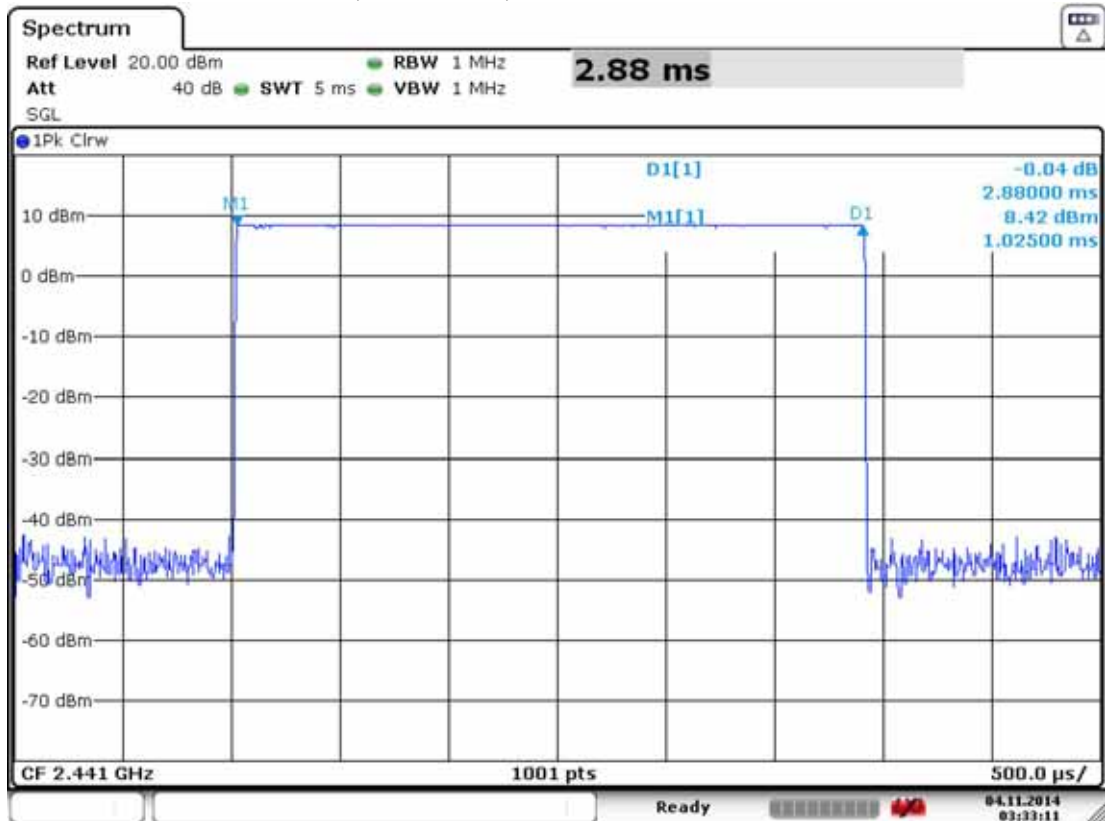
CF 2.441 GHz 1001 pts 500.0 ms/

Ready

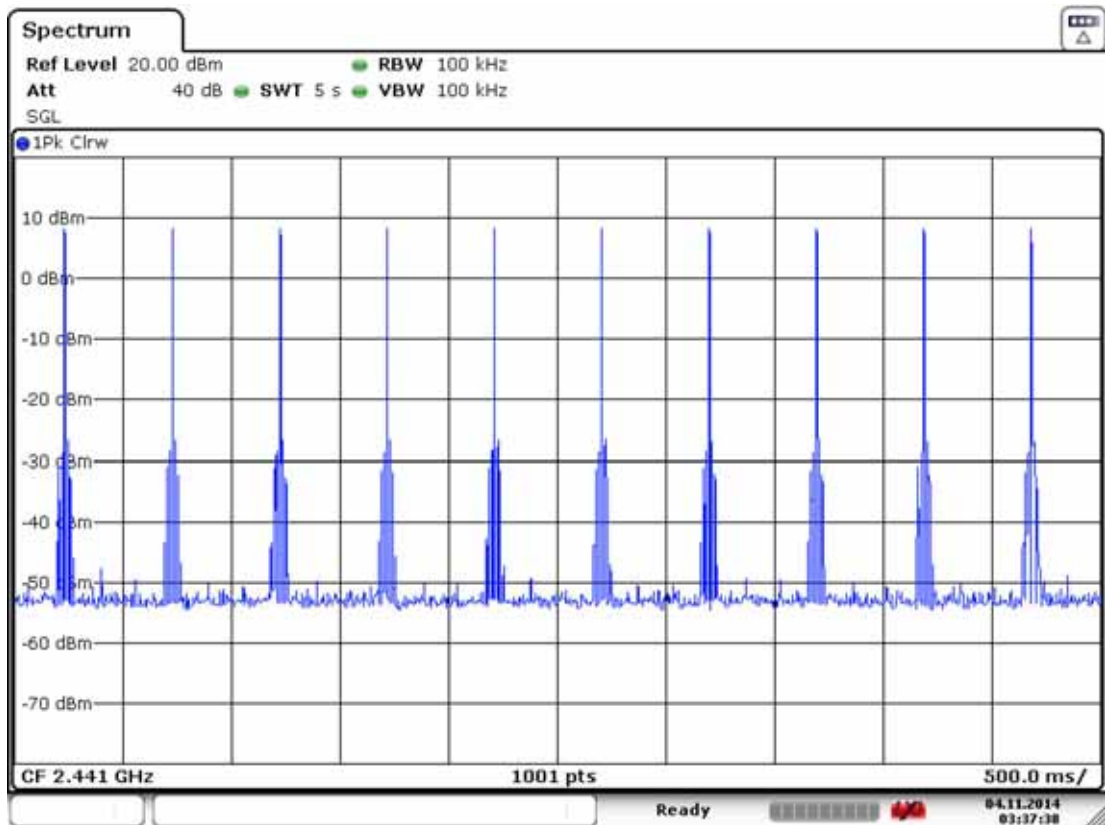
04.11.2014 03:36:41

AUDIX Technology Corporation Report No. EM-F140695

Test Mode: GFSK, 2441MHz, DH5



Date: 4.NOV.2014 03:33:11



Date: 4.NOV.2014 03:37:38

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

Observation Period:: 79channels*0.4 seconds = 31.6 seconds

DH1 : For each 5 seconds of 50 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$$50 \text{ channels} * 31.6 \text{ seconds} \div 5s * 0.380ms = 120.0800ms$$

(<400ms)

DH3 : For each 5 seconds of 17 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

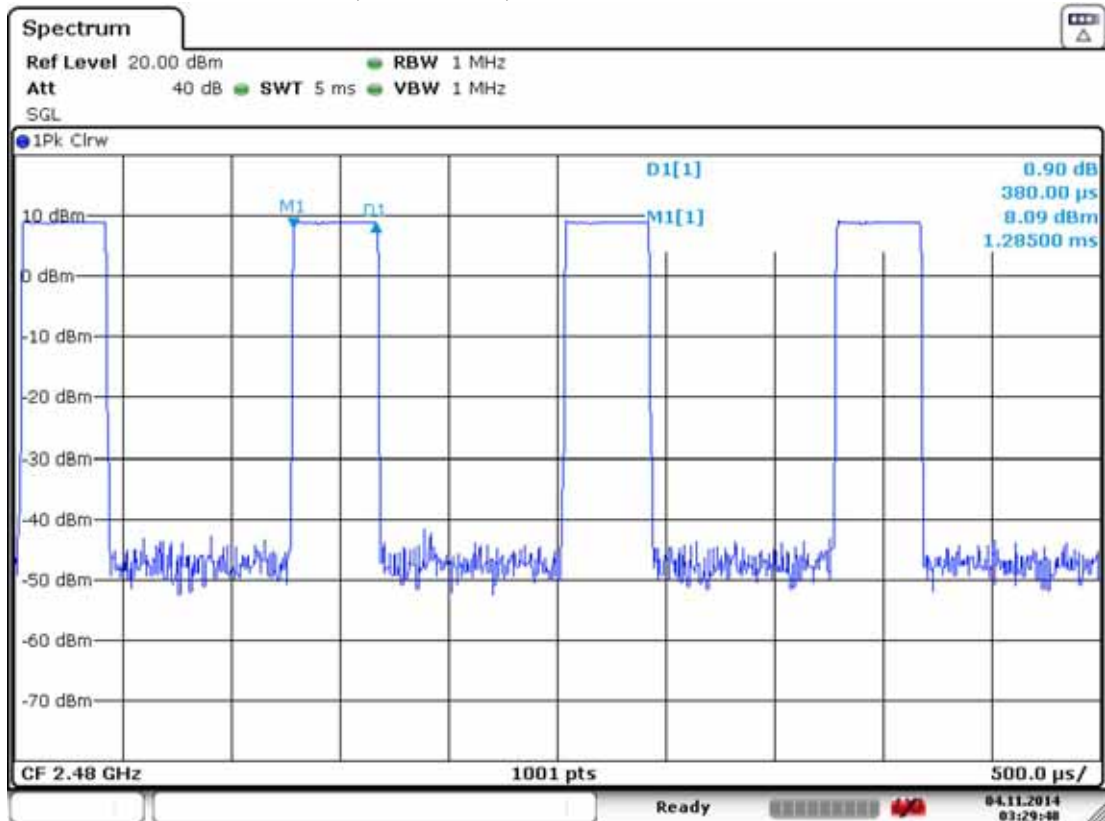
$$17 \text{ channels} * 31.6 \text{ seconds} \div 5s * 1.635ms = 175.6644ms$$

(<400ms)

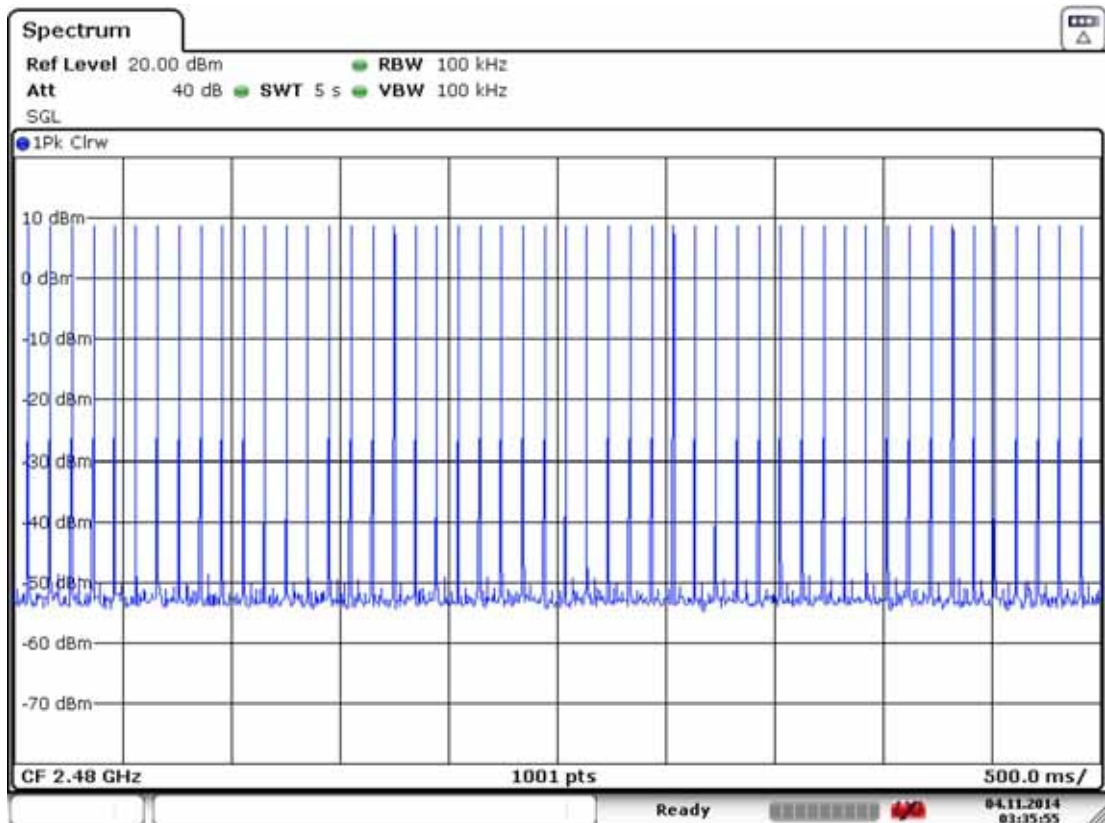
DH5 : For each 5 seconds of 10 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$$10 \text{ channels} * 31.6 \text{ seconds} \div 5s * 2.885ms = 182.3320ms (<400ms)$$

Test Mode: GFSK, 2480MHz, DH1

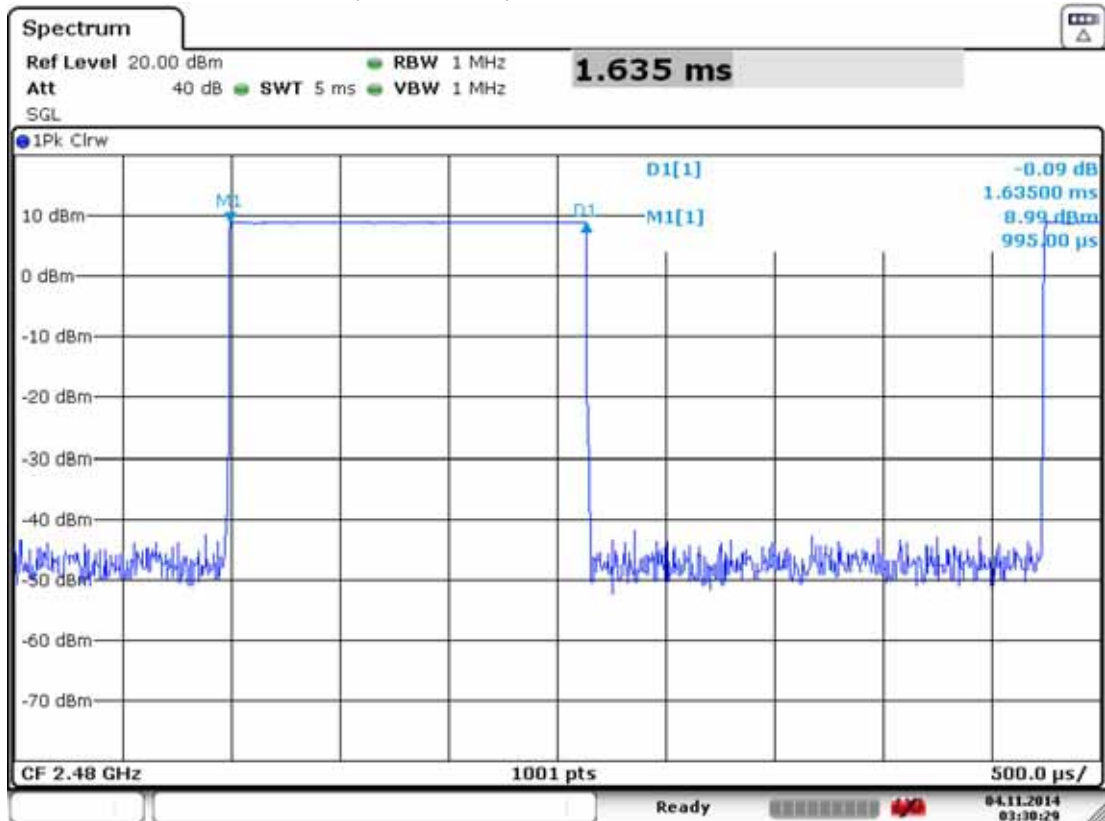


Date: 4.NOV.2014 03:29:48

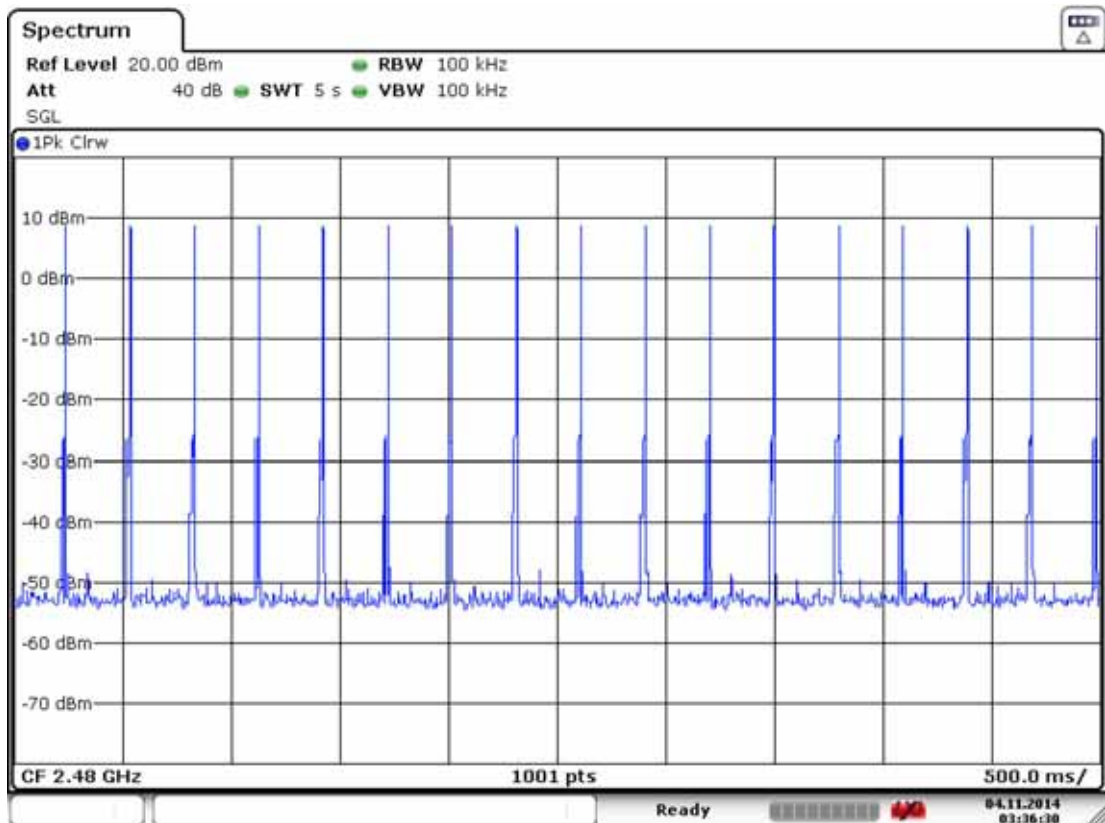


Date: 4.NOV.2014 03:35:55

Test Mode: GFSK, 2480MHz, DH3

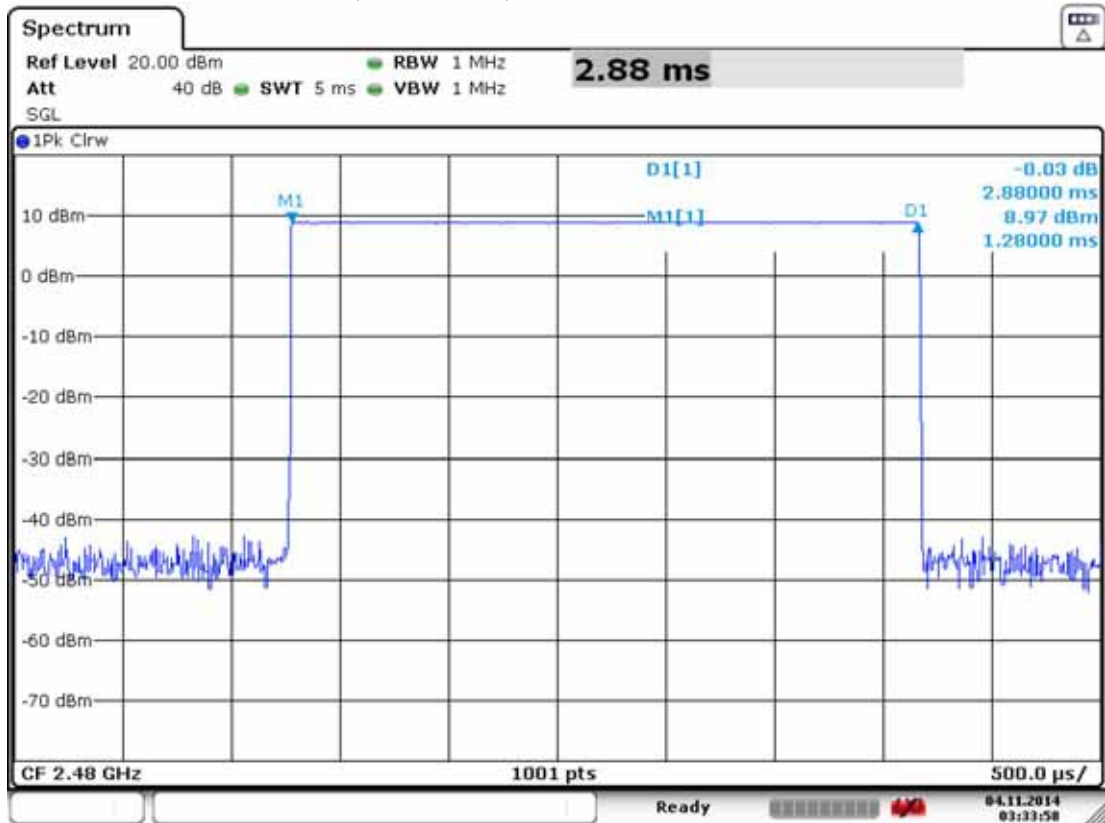


Date: 4.NOV.2014 03:30:29

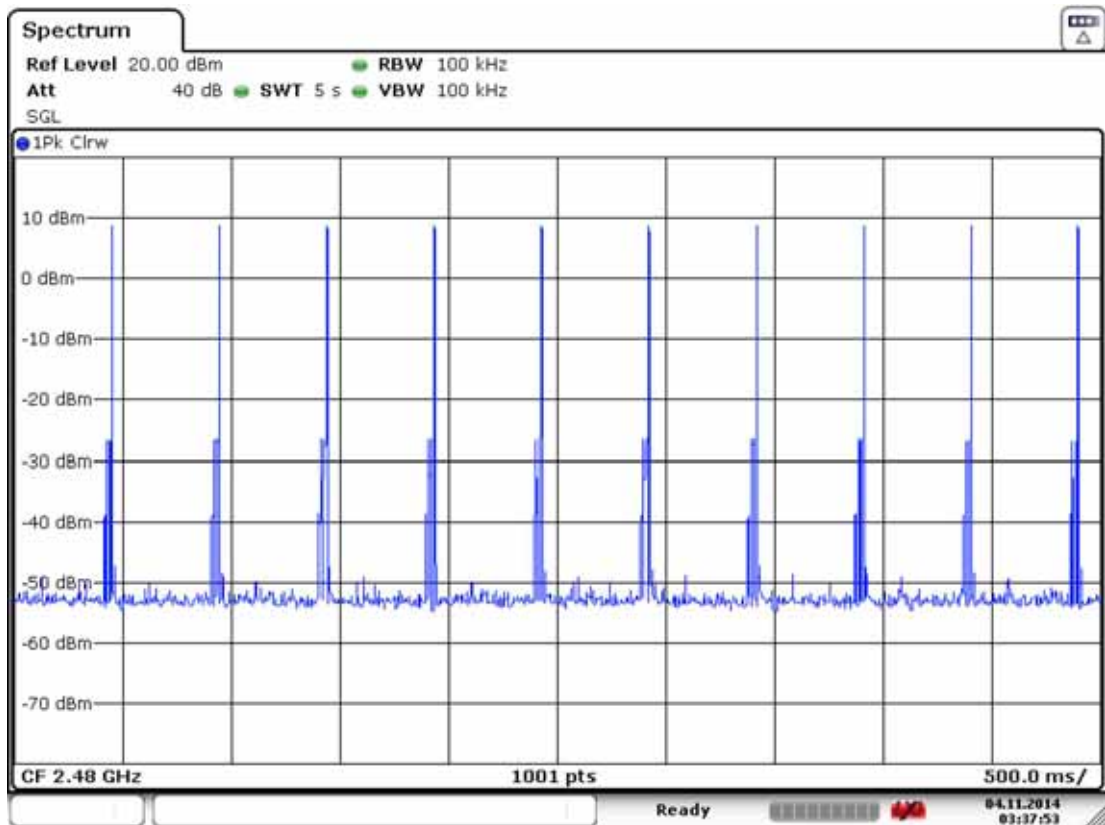


Date: 4.NOV.2014 03:36:30

Test Mode: GFSK, 2480MHz, DH5



Date: 4.NOV.2014 03:33:58



Date: 4.NOV.2014 03:37:53

8. NUMBER OF HOPPING CHANNELS MEASUREMENT

8.1. Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	R&S	FSV30	101181	2014. 03. 04	1 Year

8.2. Block Diagram of Test Setup

The same as section 5.2.

8.3. Specification Limits [§15.247(a)(1)(iii), RSS-210 §A8.2 (d)]

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.

8.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 5.4.

8.5. Test Procedure

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

The measurement guideline was according to FCC Public Notice DA 00-705.

8.6. Test Results

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

[Note: Three types of modulation (8-DPSK, π /4DQPSK, GFSK) were evaluated but only two types of modulation (8-DPSK and GFSK) were reported in this report.]

EUT: Bluetooth Adapter Card

M/N: MB8811C1

Test Date: 2014. 11. 04 Temperature: 25°C Humidity: 50%

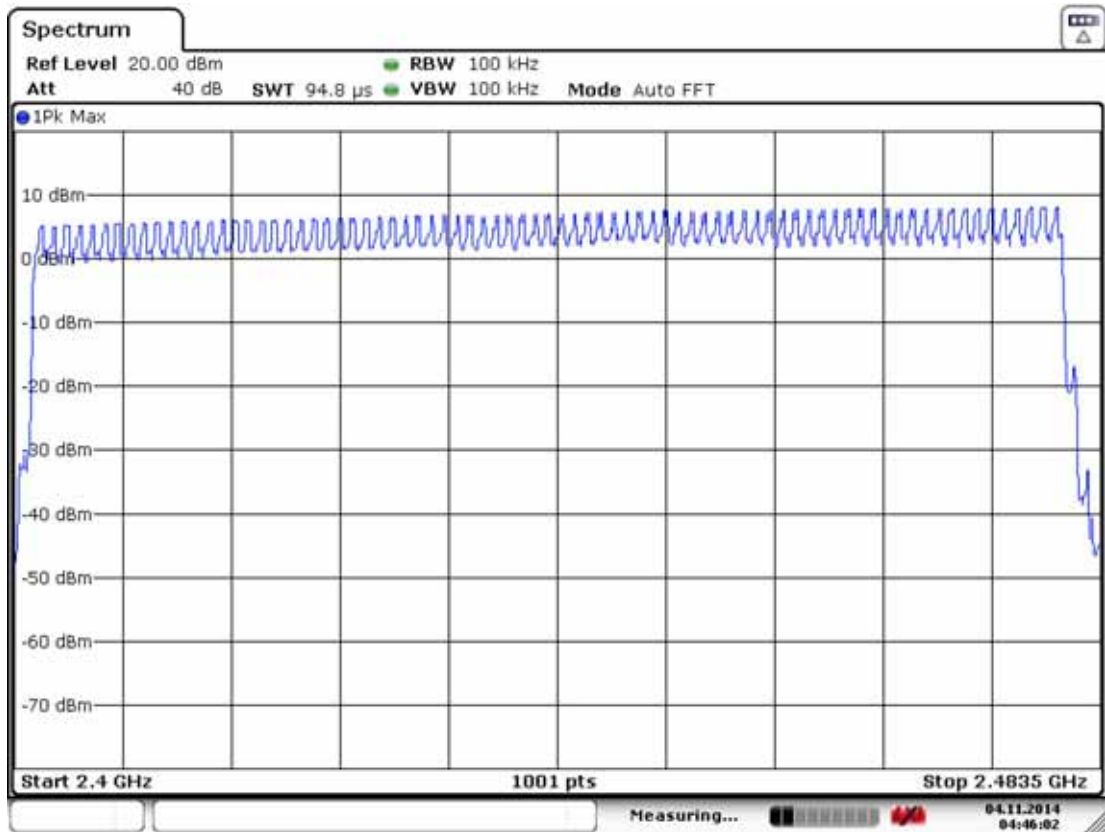
8.6.1. Type of Modulation: 8-DPSK

The number hopping channel is 79.

8.6.2. Type of Modulation: GFSK

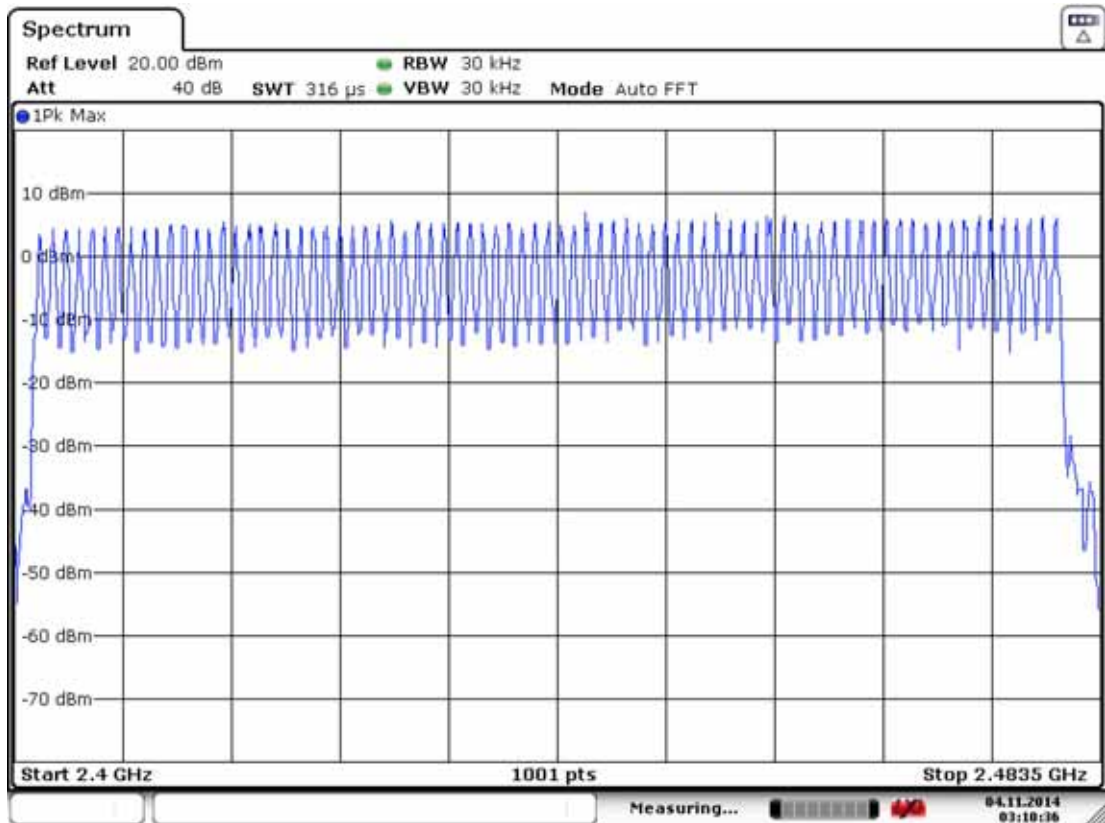
The number hopping channel is 79.

Test Mode: 8-DPSK



Date: 4.NOV.2014 04:46:02

Test Mode: GFSK



Date: 4.NOV.2014 03:10:36

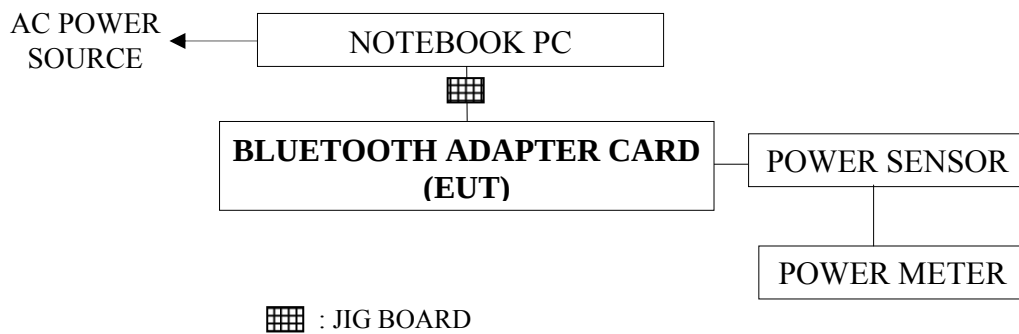
9. MAXIMUM PEAK OUTPUT POWER MEASUREMENT

9.1. Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Power Meter	Anritsu	ML2495A	1145008	2014. 10. 17	1 Year
	Power Sensor	Anritsu	MA2411B	1126096	2014. 10. 17	1 Year

9.2. Block Diagram of Test Setup



9.3. Specification Limits [§15.247(b)-(1), RSS-210 §A8.4 (2)]

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

9.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in 5.4.

9.5. Test Procedure

The transmitter output was connected to the power sensor and record the reading of power meter.

The measurement guideline was according to FCC Public Notice DA 00-705.

9.6. Test Results

PASSED. All the test results are listed below

[Note: Three types of modulation (8-DPSK, π /4DQPSK, GFSK) were evaluated but only two types of modulation (8-DPSK and GFSK) were reported in this report.]

EUT: Bluetooth Adapter Card

M/N: MB8811C1

Test Date: 2014. 11. 04 Temperature: 25°C Humidity: 55%

9.6.1. Type of Modulation: 8-DPSK

No.	Channel	Test Frequency	Peak Output Power	Limit
1.	0	2402MHz	7.00dBm	21dBm
2.	39	2441MHz	7.48dBm	21dBm
3.	78	2480MHz	7.55dBm	21dBm

9.6.2. Type of Modulation: GFSK

No.	Channel	Test Frequency	Peak Output Power	Limit
1.	0	2402MHz	8.16dBm	21dBm
2.	39	2441MHz	8.57dBm	21dBm
3.	78	2480MHz	8.68dBm	21dBm

10.EMISSION LIMITATIONS MEASUREMENT

10.1.Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	R&S	FSV30	101181	2014. 03. 04	1 Year

10.2.Block Diagram of Test Setup

The same as section 5.2.

10.3.Specification Limits [§15.247(c), RSS-210 §A8.5]

10.3.1. 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)

10.3.2. The reference level for determining limit of emission limitations is according to the value measured indicated in plots at section 9.6.

10.4.Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 5.4.

10.5.Test Procedure

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

The measurement guideline was according to FCC Public Notice DA 00-705.

10.6. Test Results

PASSED. The testing data was attached in the next pages.

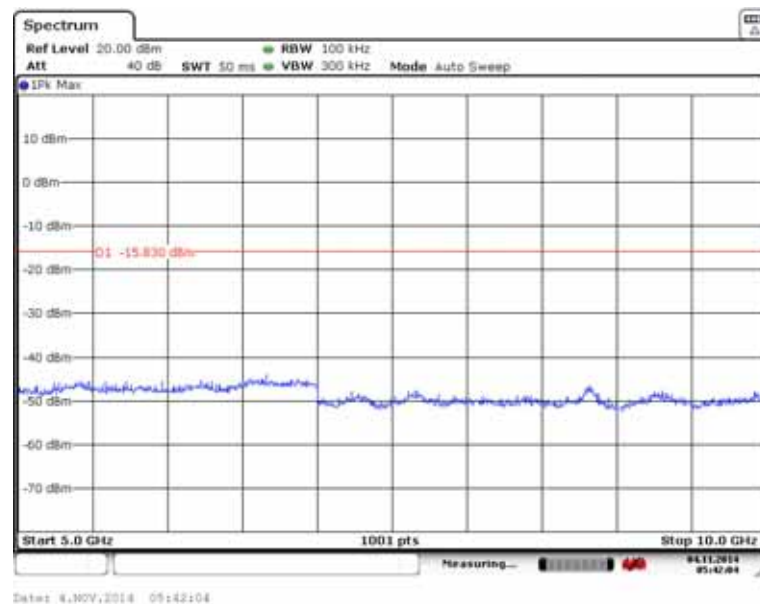
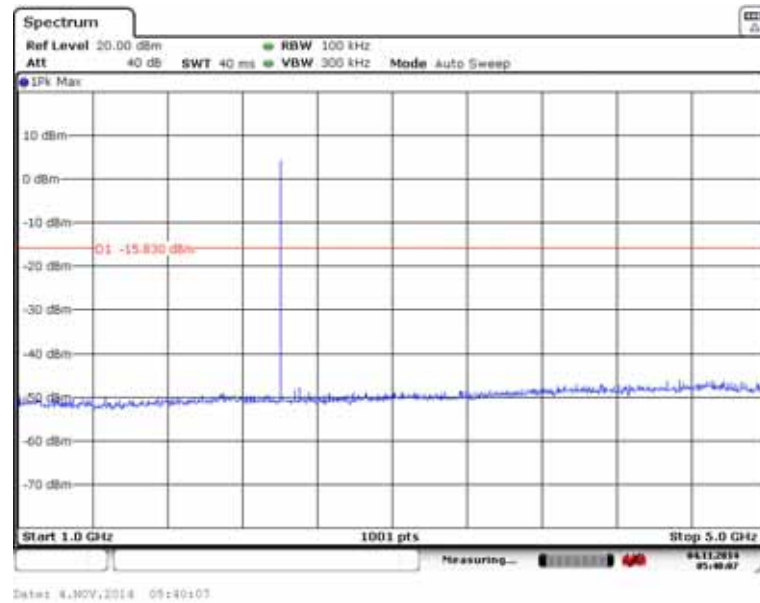
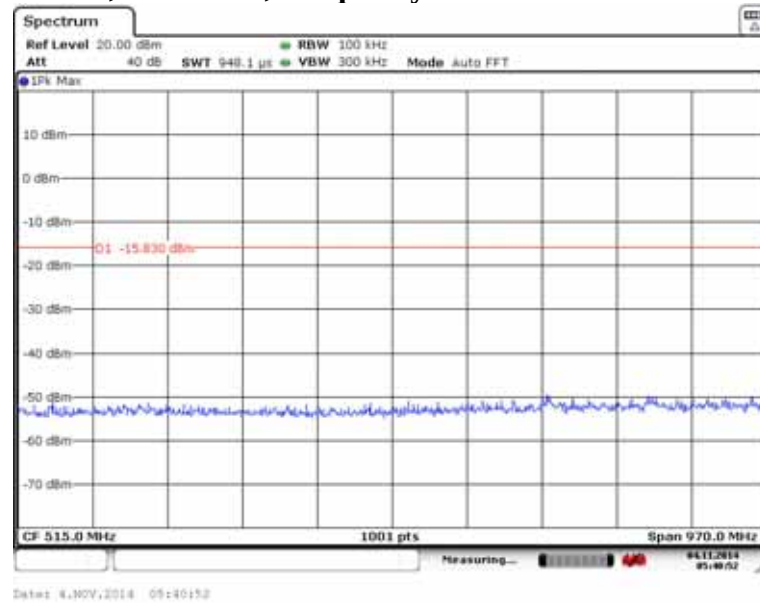
[Note: Three types of modulation (8-DPSK, π /4DQPSK, GFSK) were evaluated but only two types of modulation (8-DPSK and GFSK) were reported in this report.]

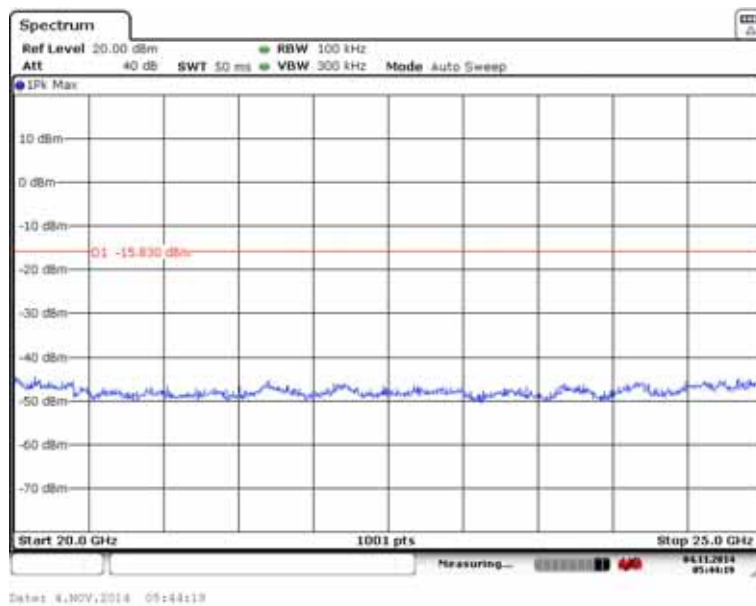
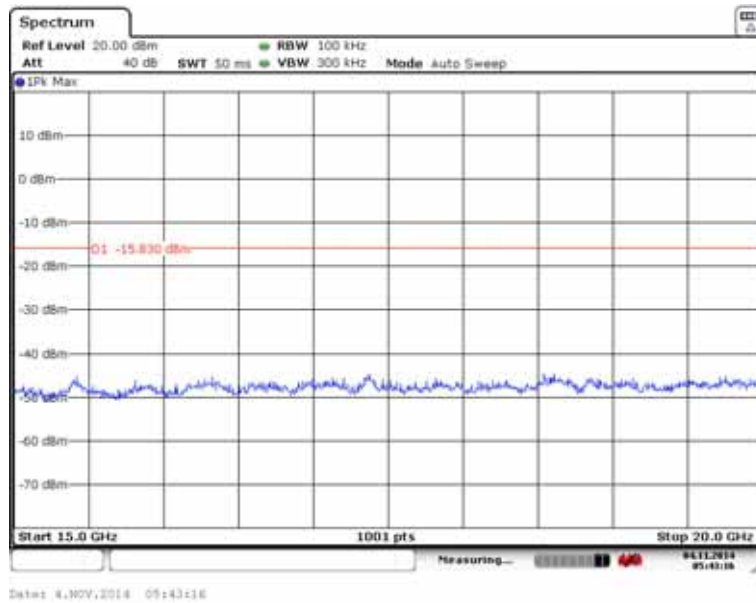
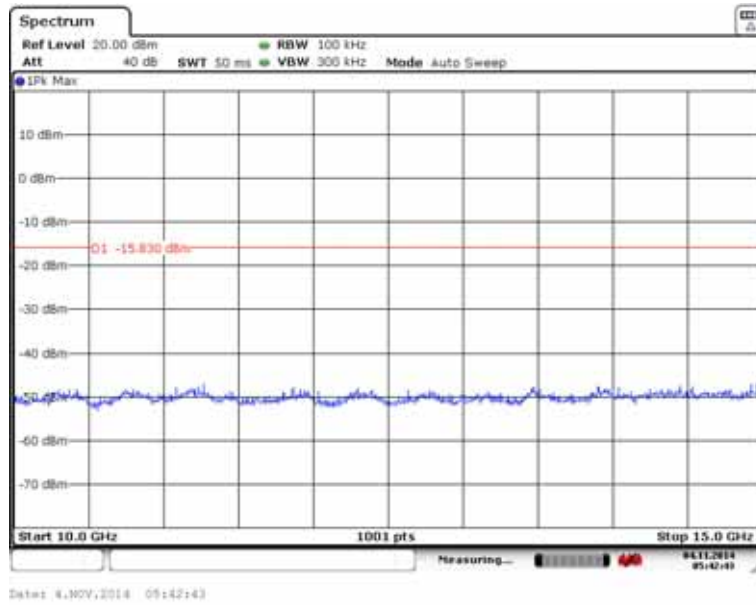
EUT: Bluetooth Adapter Card

M/N: MB8811C1

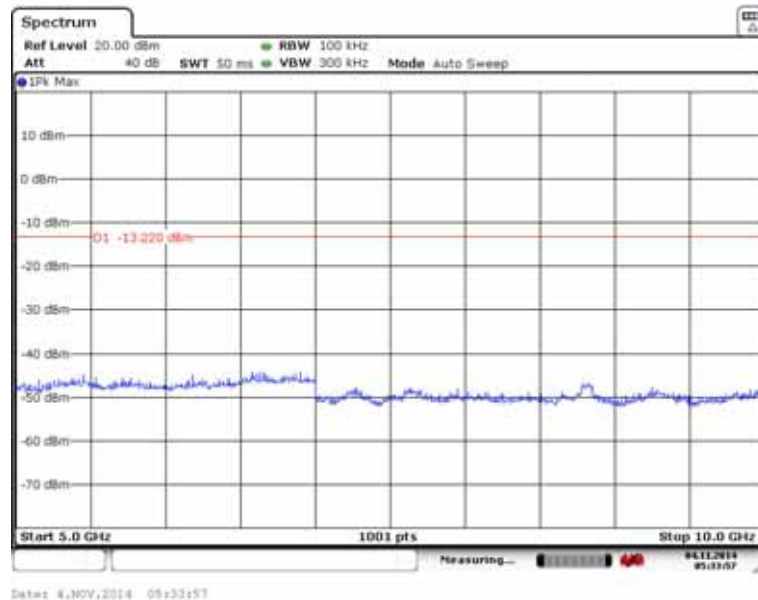
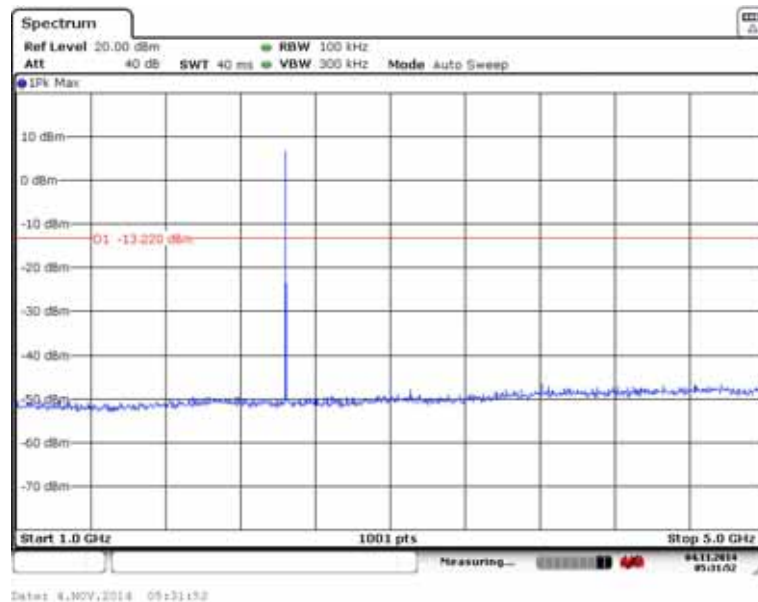
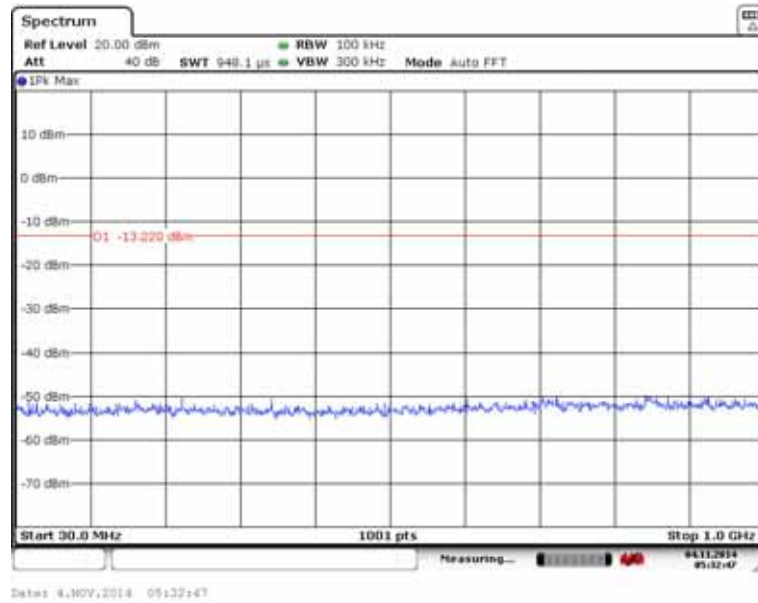
Test Date: 2014. 11. 04 Temperature: 25°C Humidity: 55%

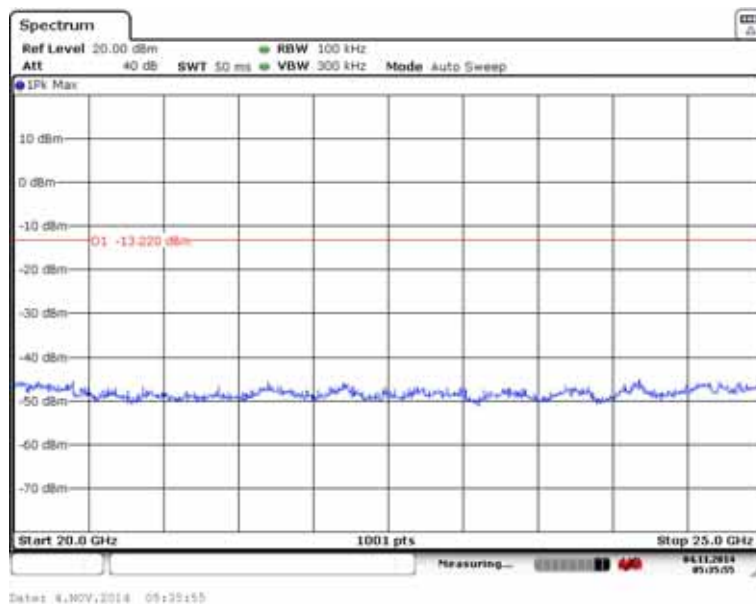
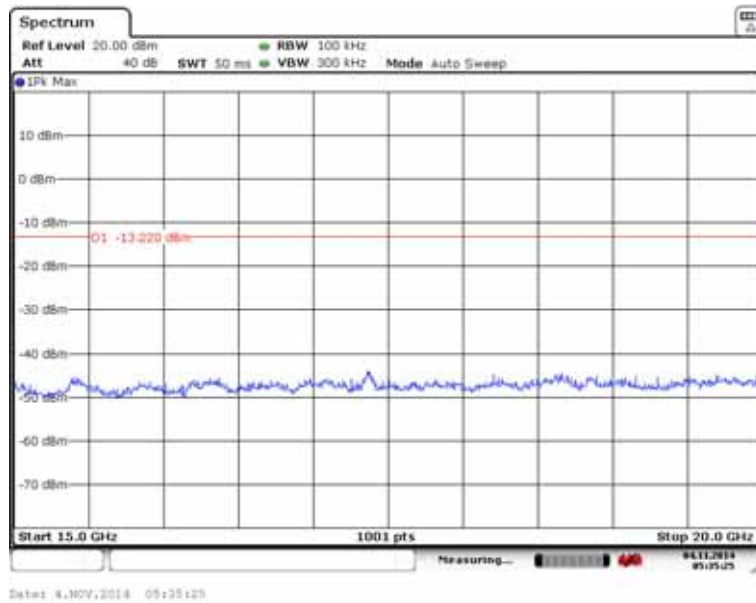
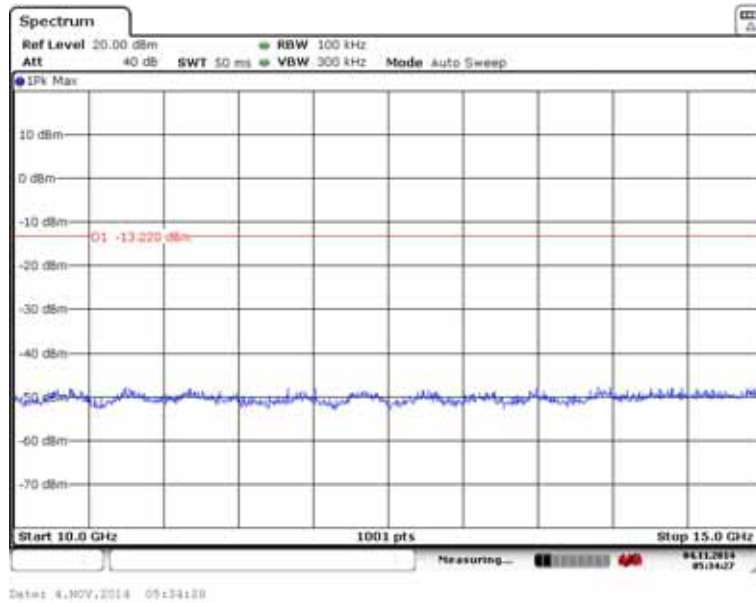
8-DPSK, Channel 0, Frequency: 2402MHz



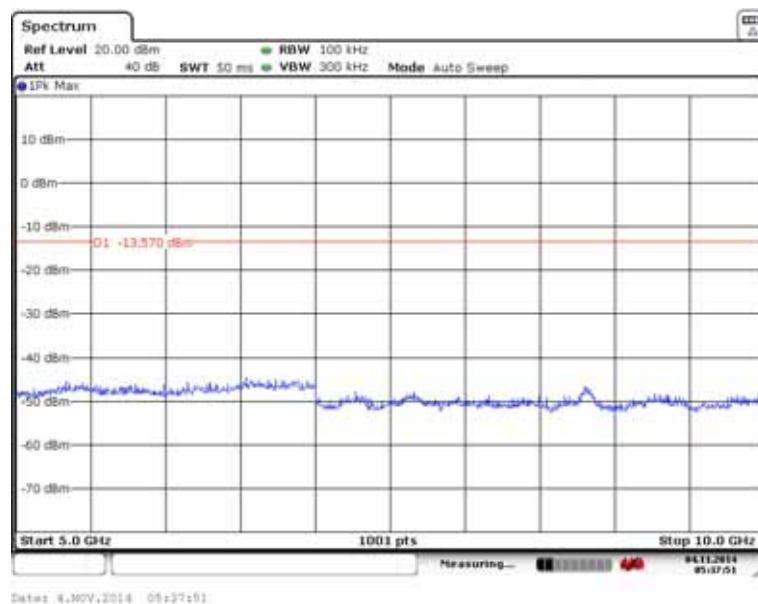
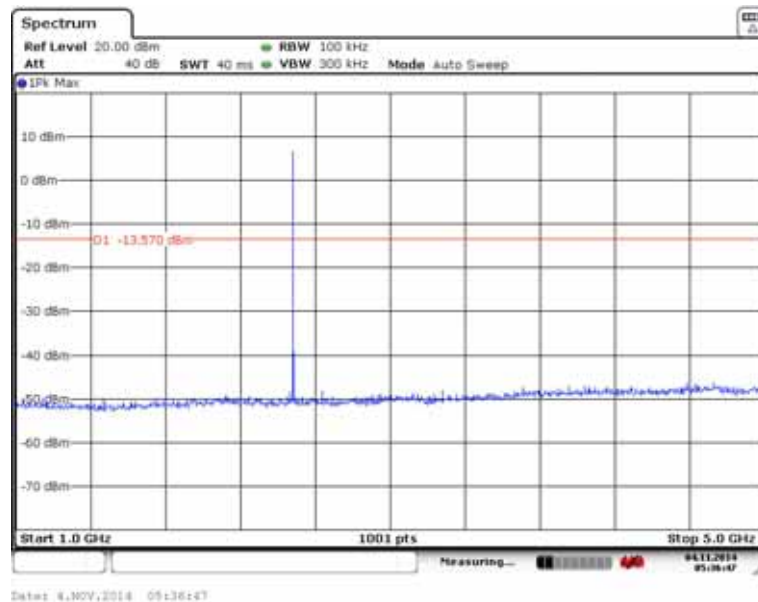
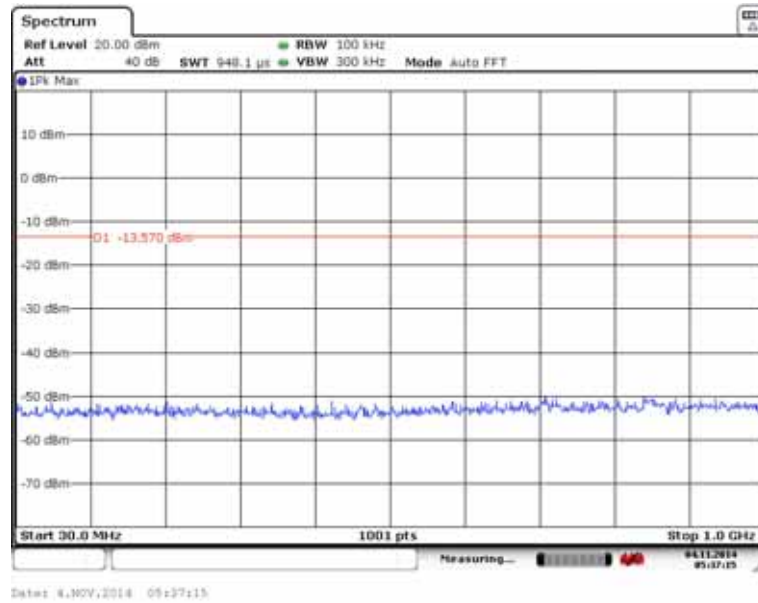


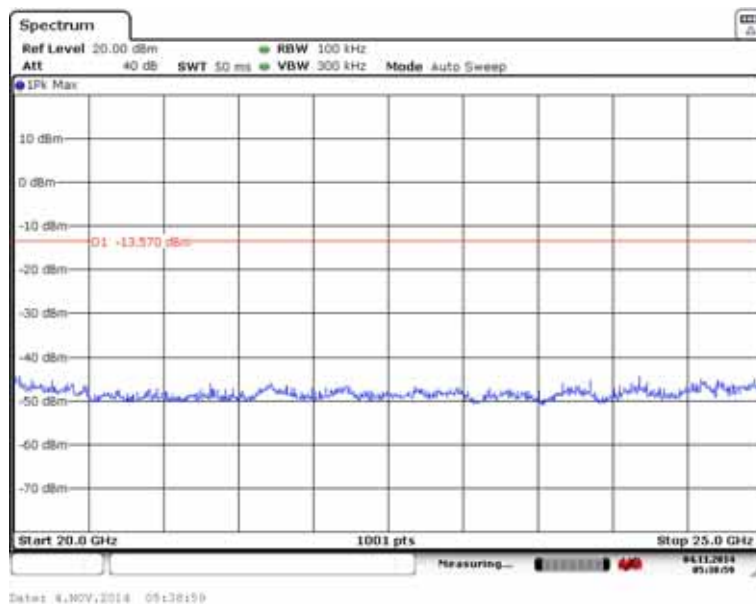
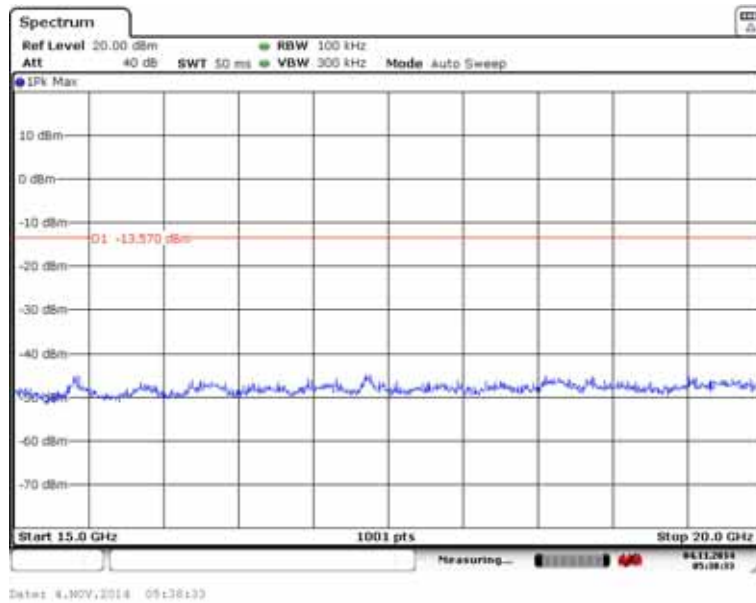
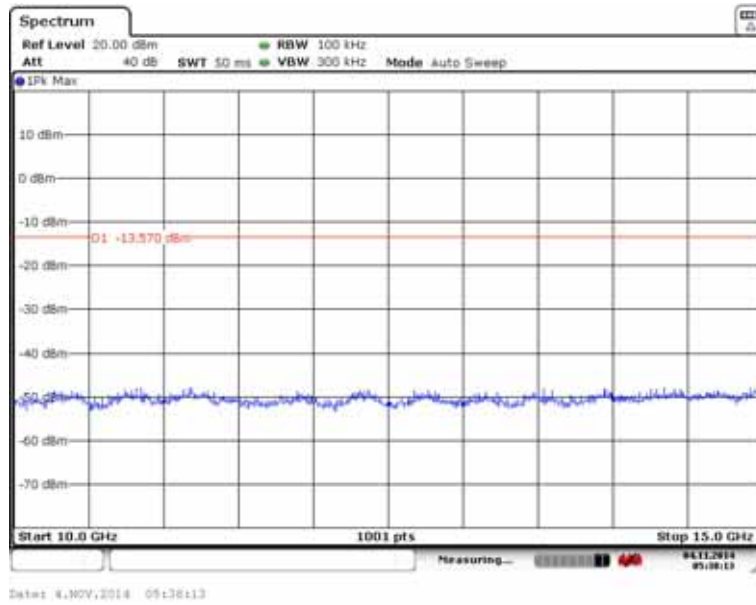
8-DPSK, Channel 39, Frequency: 2441MHz



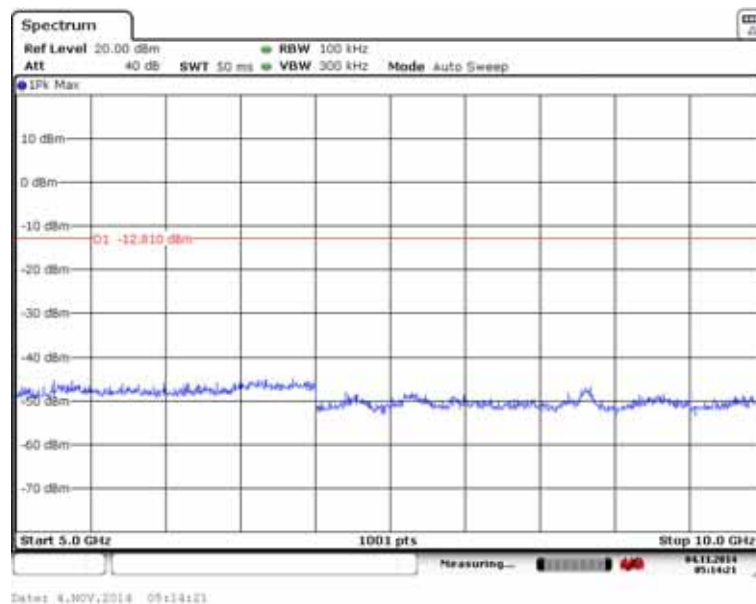
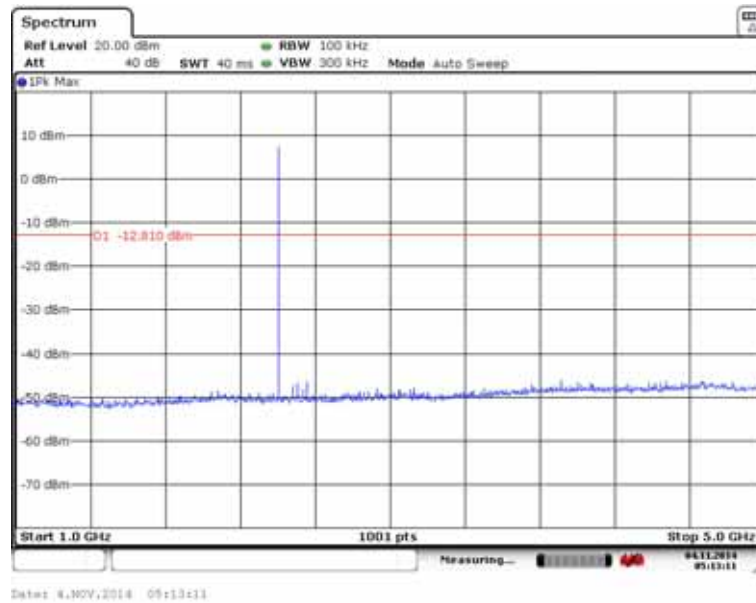
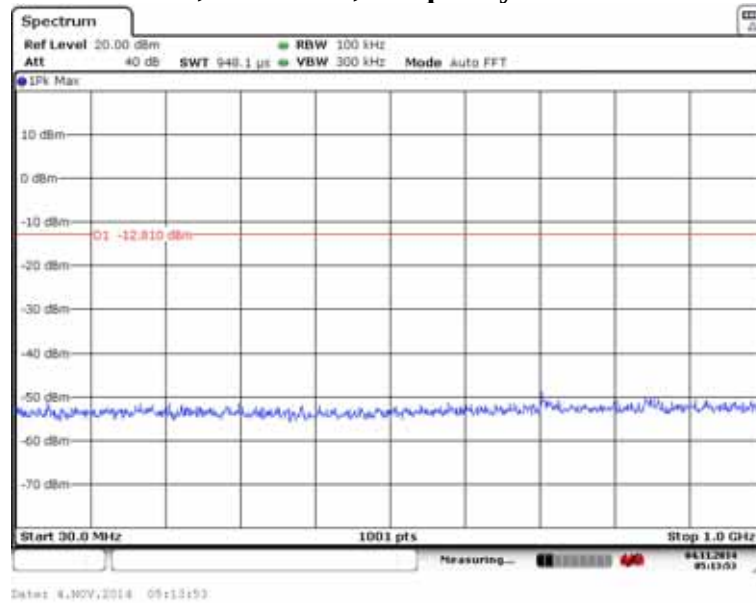


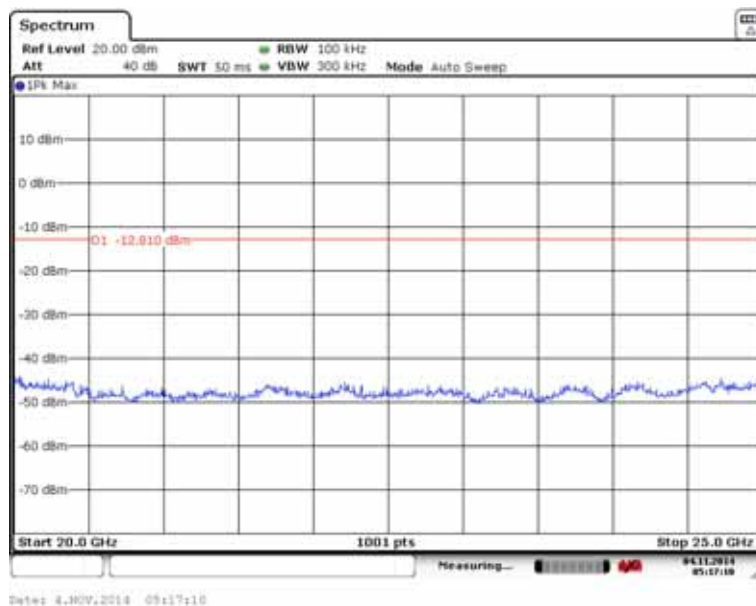
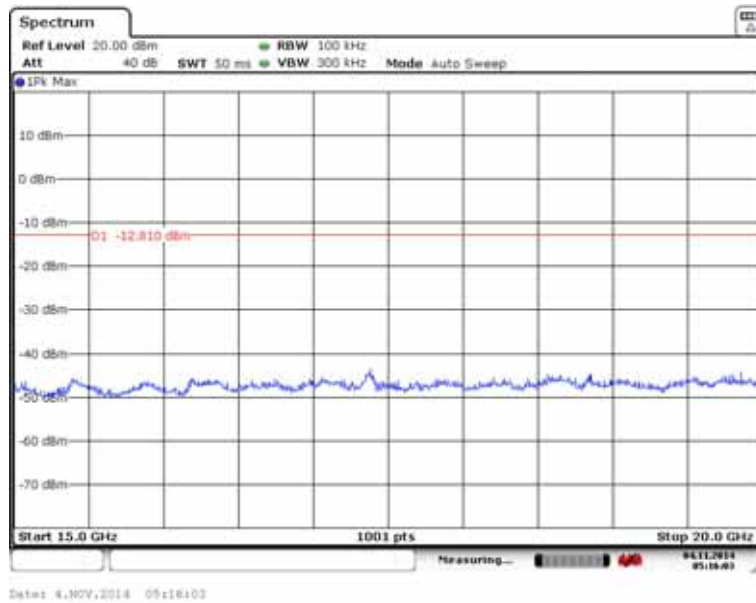
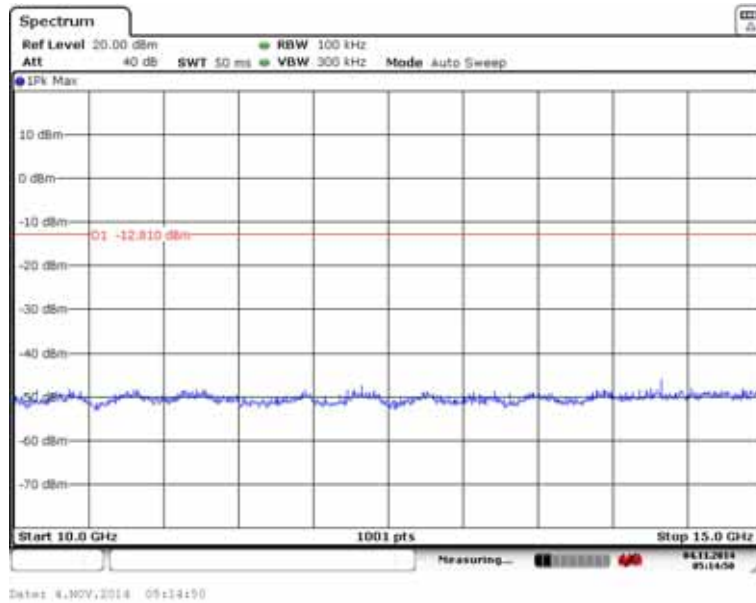
8-DPSK, Channel 78, Frequency: 2480MHz



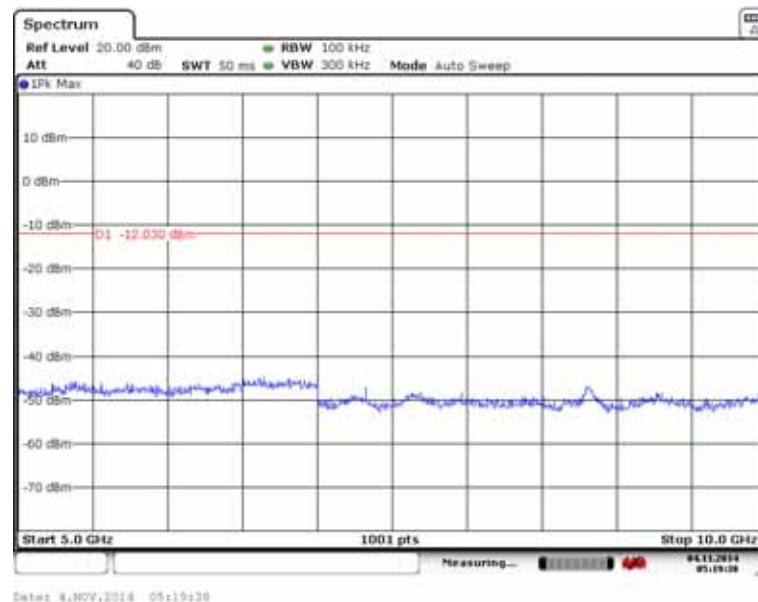
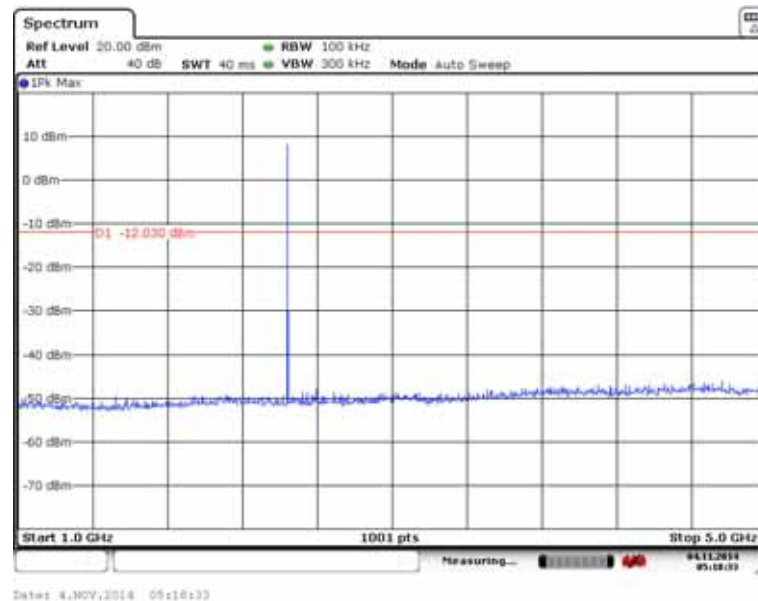
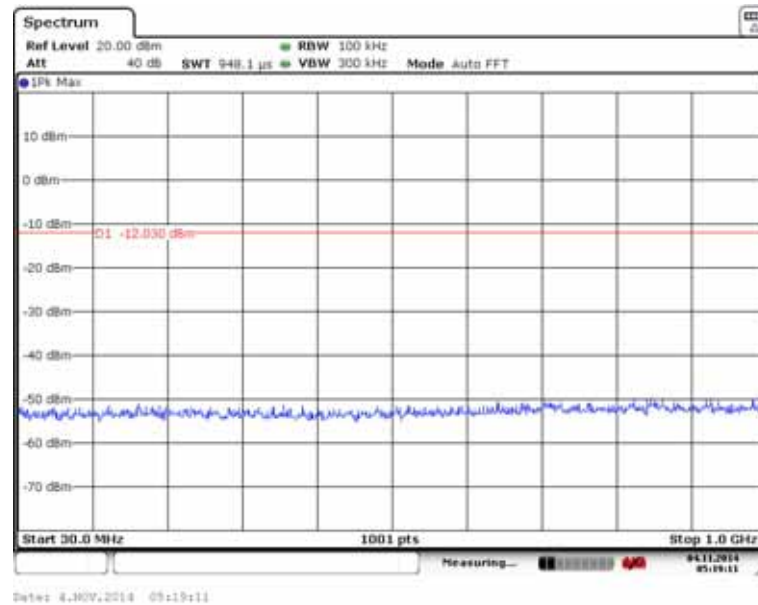


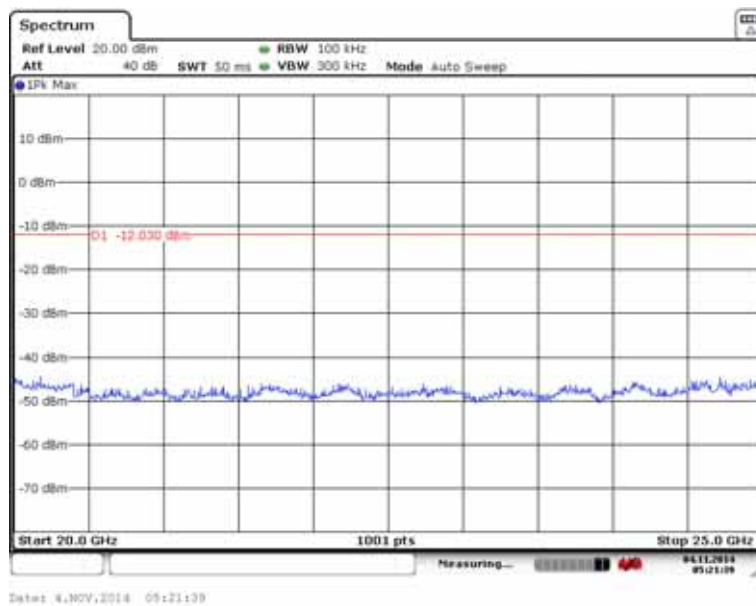
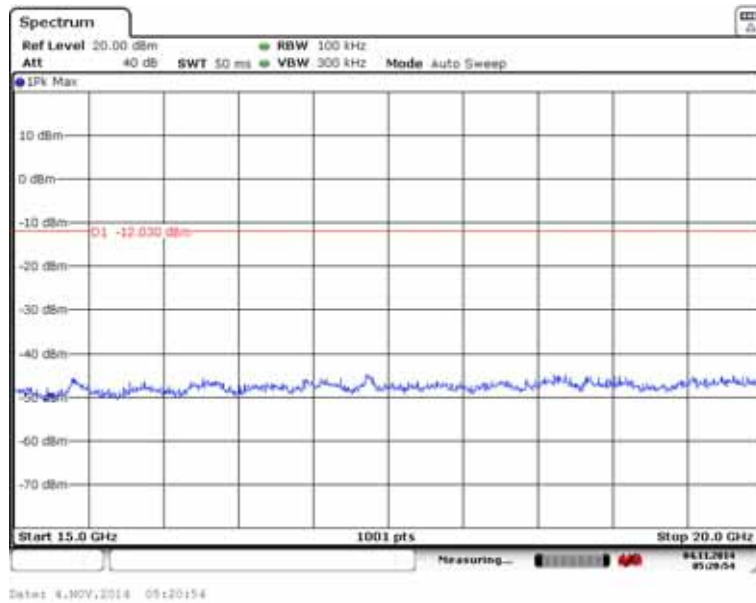
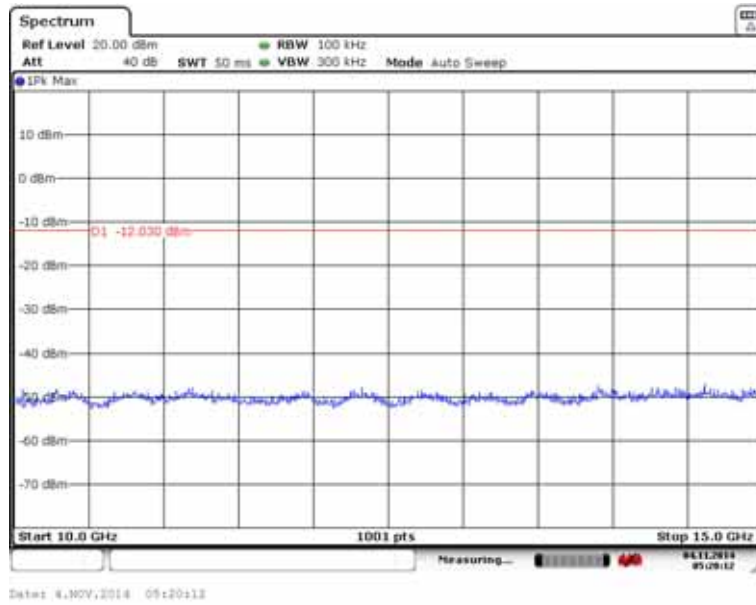
GFSK, Channel 0, Frequency: 2402MHz



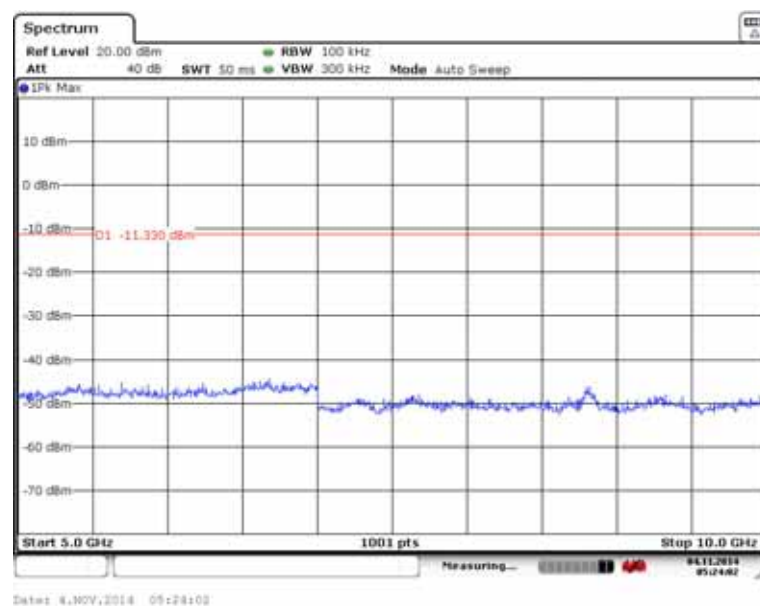
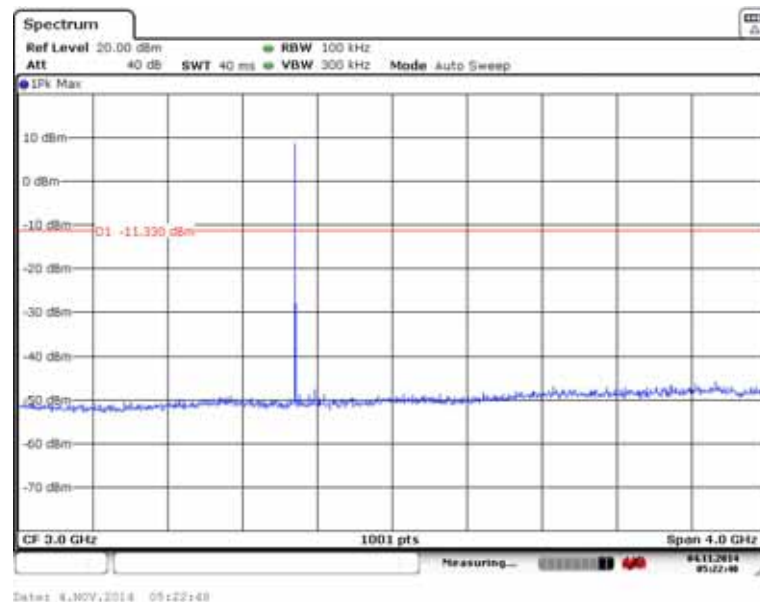
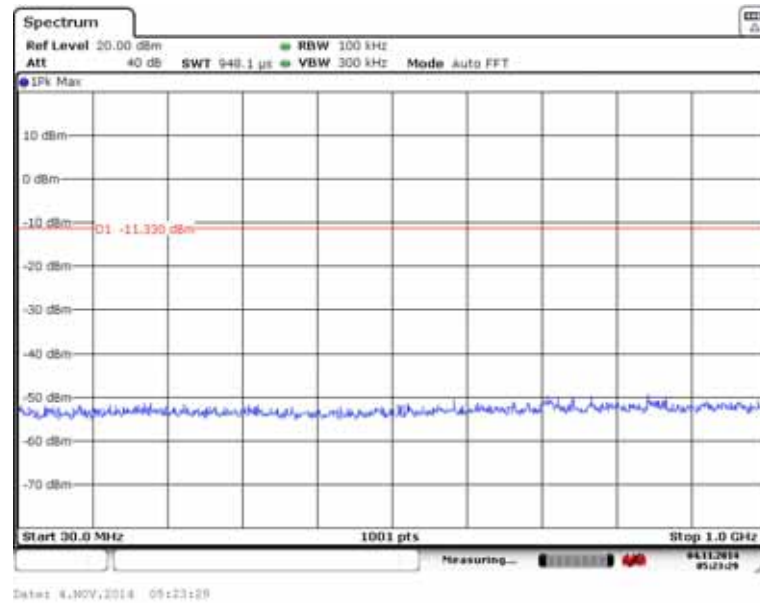


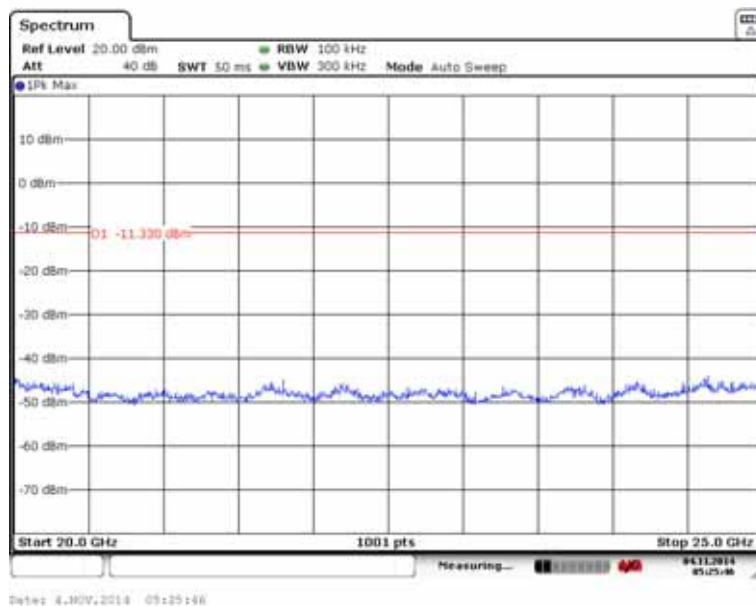
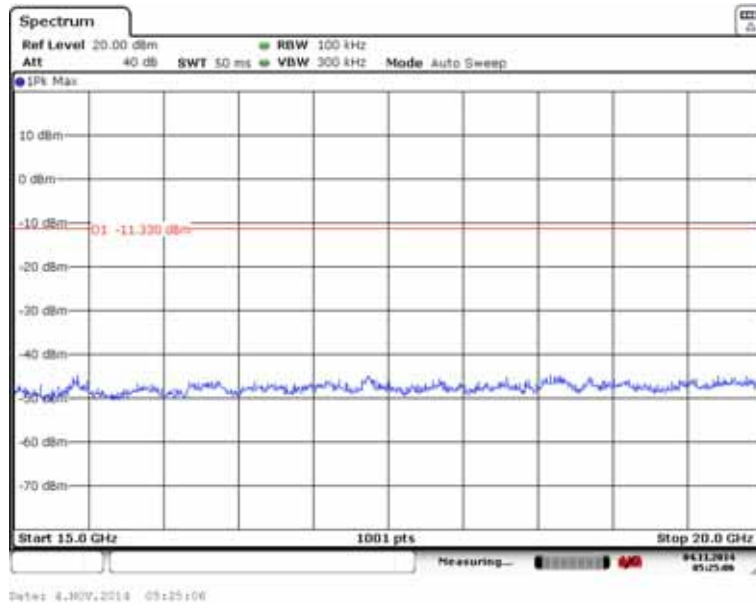
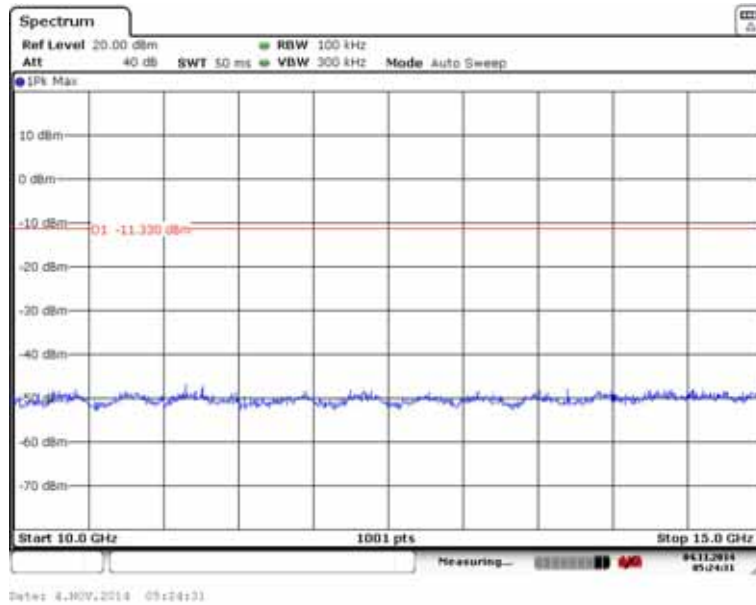
GFSK, Channel 39, Frequency: 2441MHz





GFSK, Channel 78, Frequency: 2480MHz





11.BAND EDGES MEASUREMENT

11.1.Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	R&S	FSV30	101181	2014. 03. 04	1 Year

11.2.Block Diagram of Test Setup

The same as section 5.2.

11.3.Specification Limits [§15.247(c), RSS-210 §A8.5]

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)

11.4.Operating Condition of EUT

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

11.5.Test Procedure

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.

The measurement guideline was according to FCC Public Notice DA 00-705.

11.6.Test Results

PASSED. The testing data was attached in the next pages.

[Note: Three types of modulation (8-DPSK, π /4DQPSK, GFSK) were evaluated but only two types of modulation (8-DPSK and GFSK) were reported in this report.]

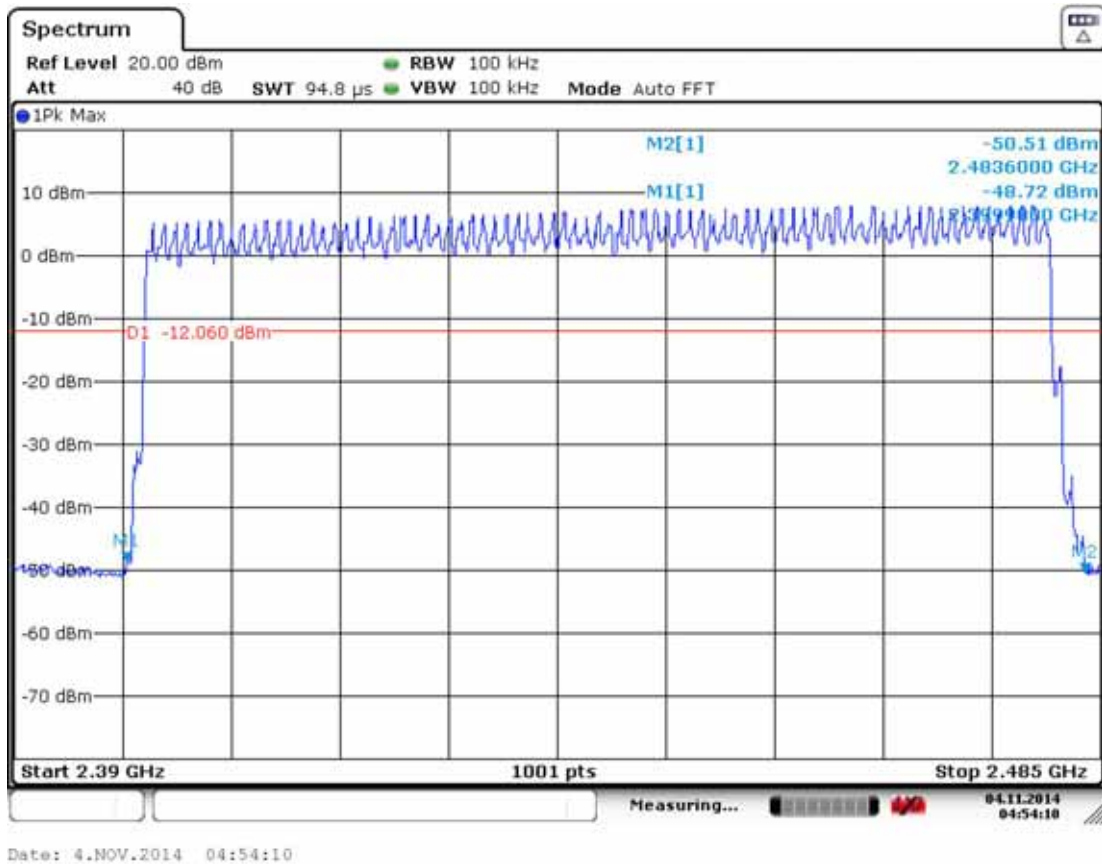
EUT: Bluetooth Adapter Card

M/N: MB8811C1

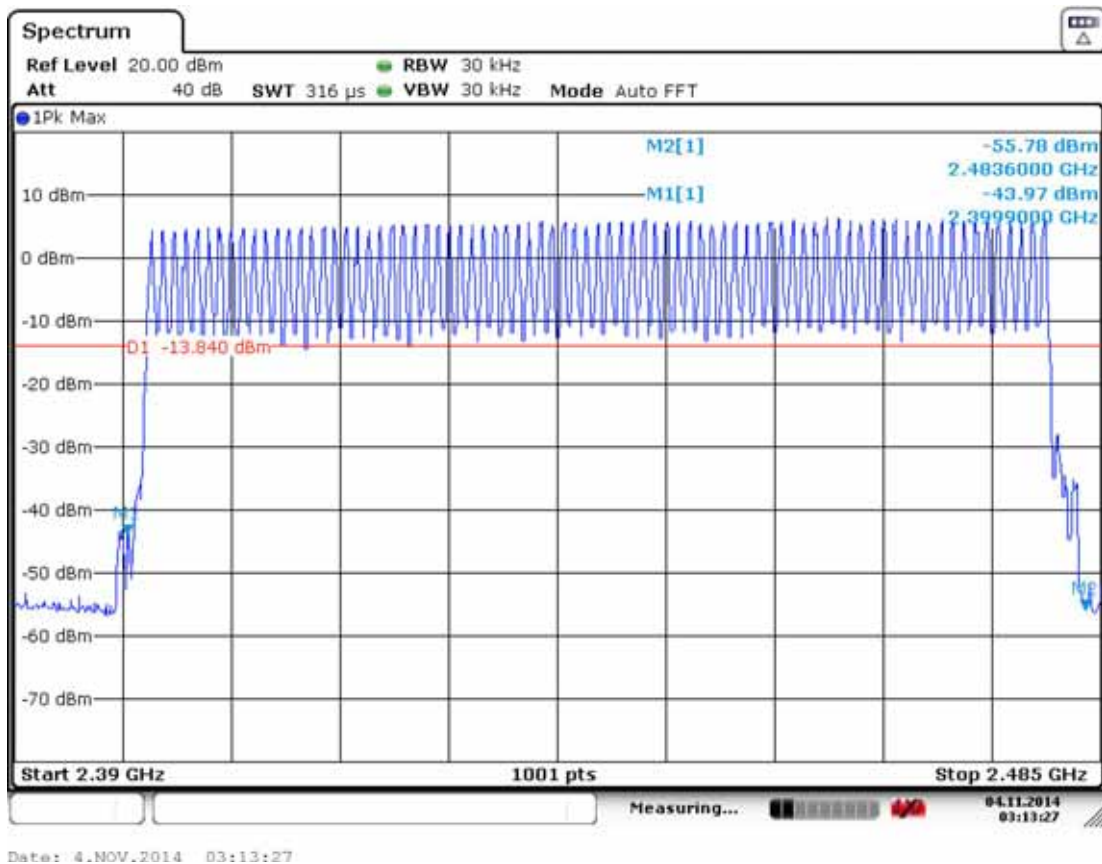
Test Date: 2014. 11. 04 Temperature: 25°C Humidity: 55%

11.6.1. Hopping Mode

Test Mode: 8-DPSK

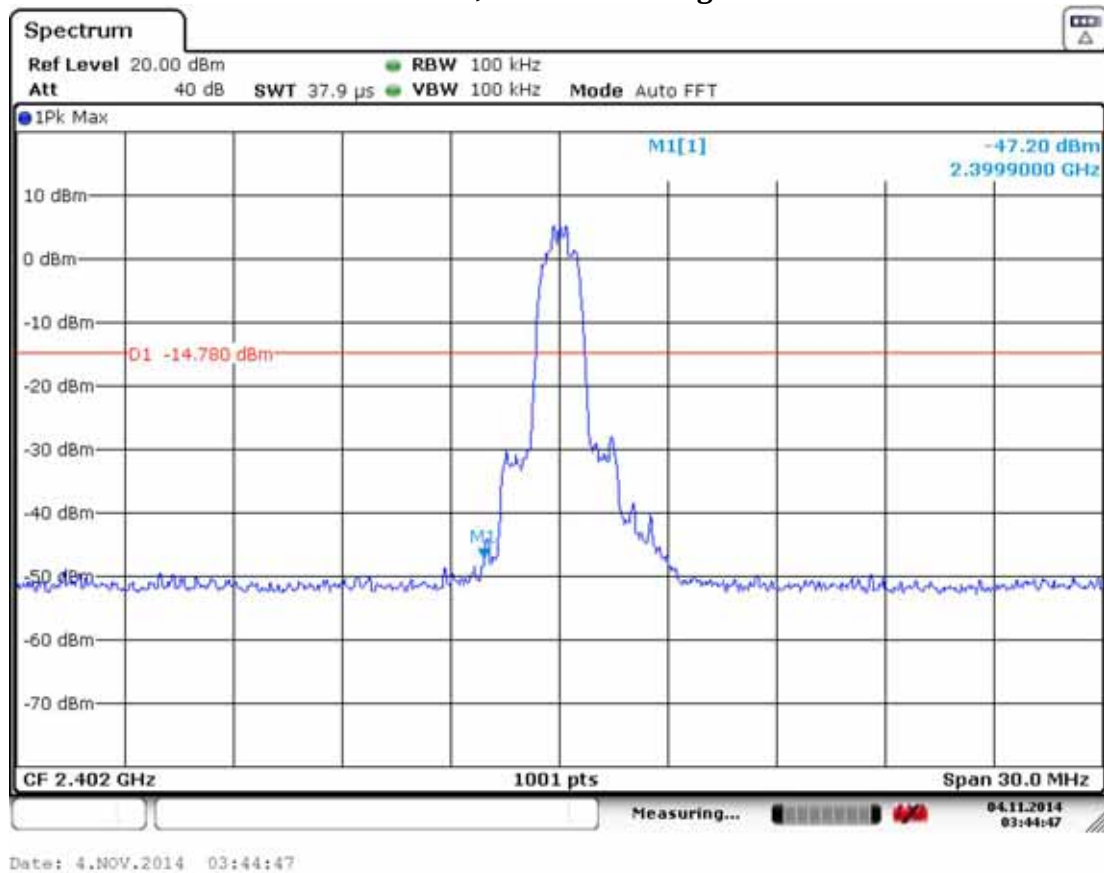


Test Mode: GFSK

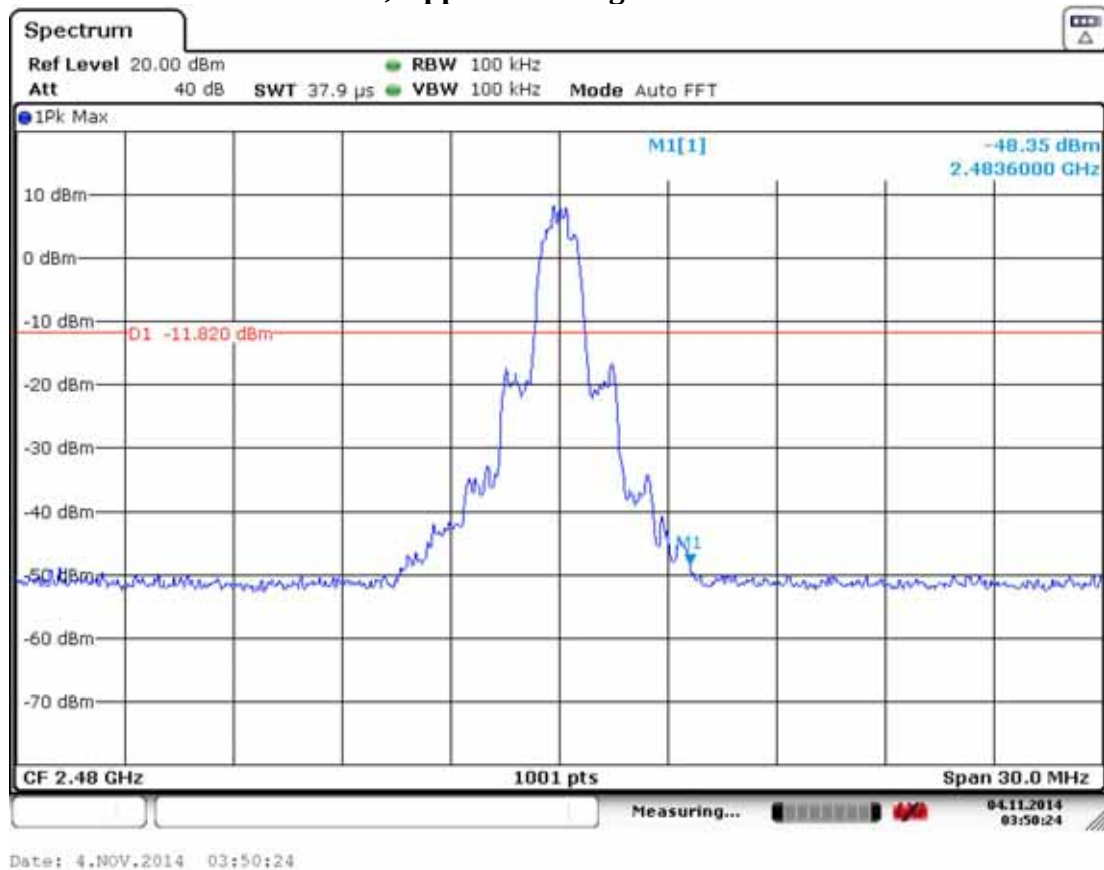


11.6.2. Band Edge

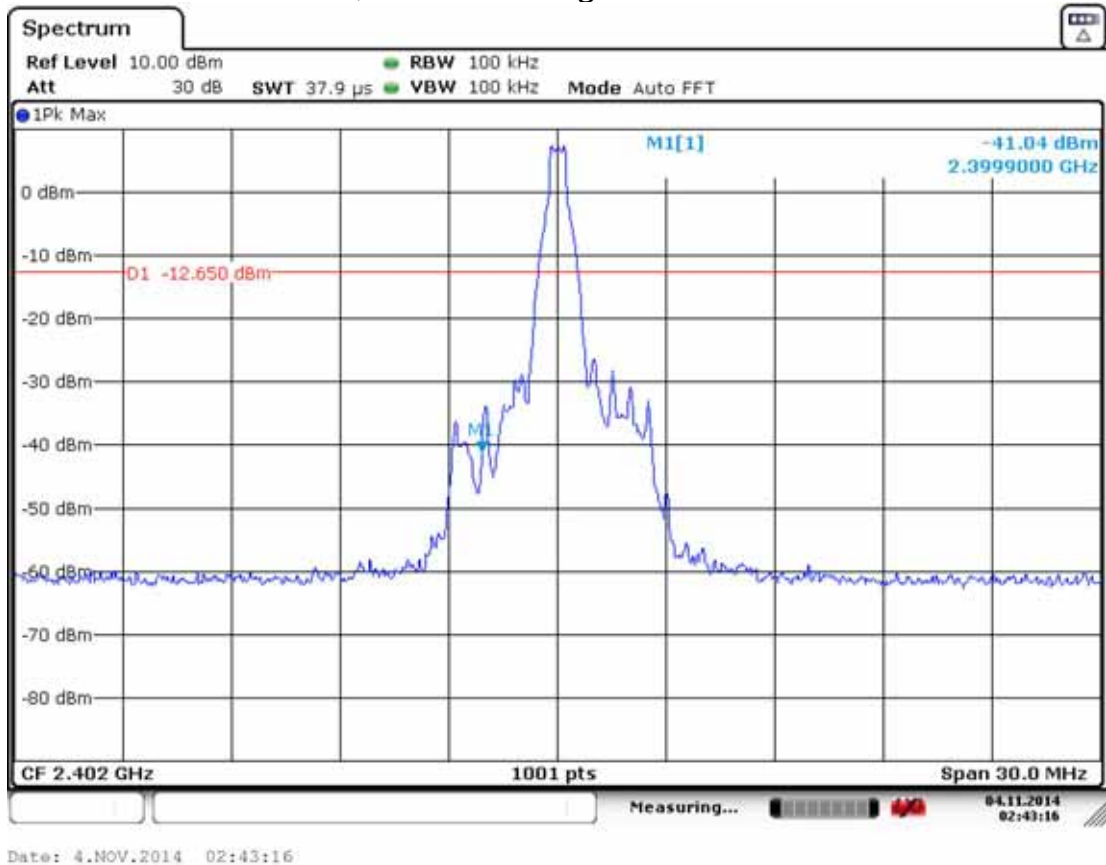
Test Mode: 8-DPSK, Below Band edge



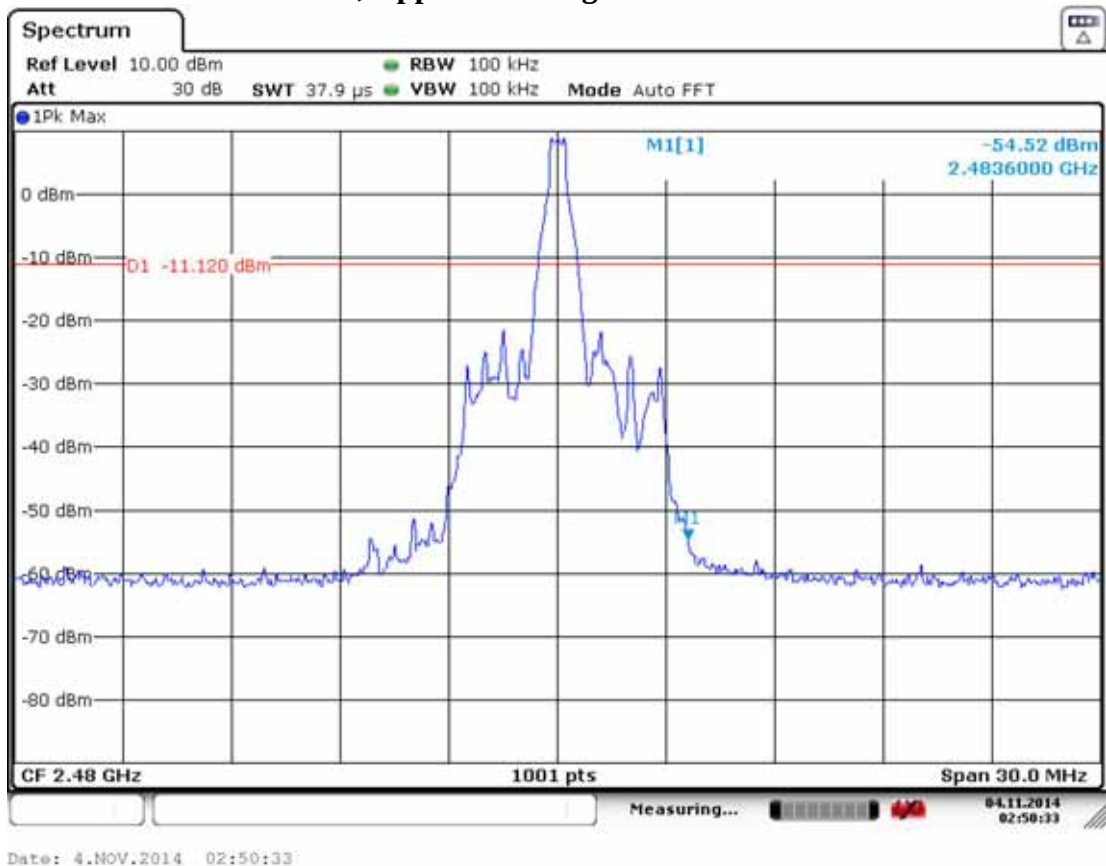
Test Mode: 8-DPSK, Upper Band edge



Test Mode: GFSK, Below Band edge



Test Mode: GFSK, Upper Band edge



12.DEVIATION TO TEST SPECIFICATIONS

【NONE】

13. PHOTOGRAPHS

13.1. Photos of Conducted Disturbance Measurement



FRONT VIEW OF CONDUCTED MEASUREMENT



BACK VIEW OF CONDUCTED MEASUREMENT

13.2.Photos of Radiated Emission Measurement at Semi-Anechoic Chamber

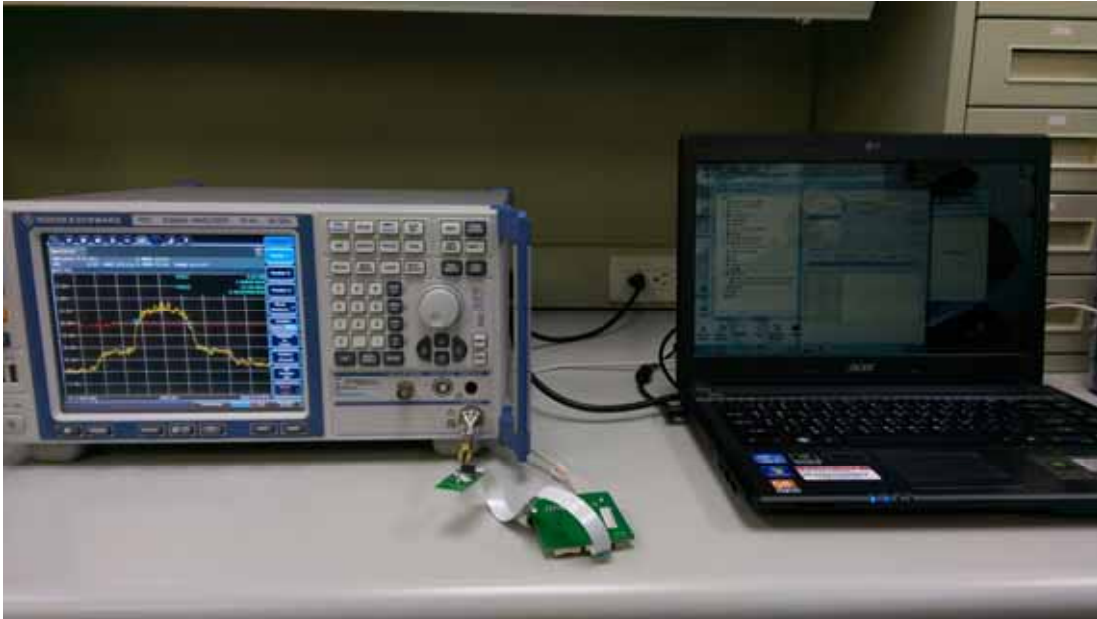
13.2.1. Frequency Range 30MHz-1GHz



13.2.2. Frequency Range Above 1GHz



13.3.Photo of Section RF Conducted Measurement



13.4.Photo of Maximum Peak Output Power Measurement

