

**FCC 47 CFR PART 15 SUBPART C &
INDUSTRY CANADA RSS-247**

TEST REPORT

For

Zonar Connect

Model: 20081

Trade Name: ZONAR

Issued to

For FCC:

**Zonar Systems Inc
18200 Cascade Ave South Suite 200
Seattle Washington United States**

For IC

**ZONAR SYSTEMS
18200 Cascade Ave South Suite 200
SEATTLE WA USA**

Issued by

Compliance Certification Services Inc.

**No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)**

<http://www.ccsrf.com>

service@ccsrf.com

Issued Date: October 28, 2016



Note: This report shall not be reproduced except in full, without the written approval of Compliance Certification Services Inc. This document may be altered or revised by Compliance Certification Services Inc. personnel only, and shall be noted in the revision section of the document.

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	October 28, 2016	Initial Issue	ALL	Doris Chu

TABLE OF CONTENTS

1. TEST RESULT CERTIFICATION	4
2. EUT DESCRIPTION.....	5
3. TEST METHODOLOGY.....	6
3.1 EUT CONFIGURATION	6
3.2 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS	6
3.3 DESCRIPTION OF TEST MODES.....	7
4. INSTRUMENT CALIBRATION	8
4.1 MEASURING INSTRUMENT CALIBRATION	8
4.2 MEASUREMENT EQUIPMENT USED	8
4.3 MEASUREMENT UNCERTAINTY	9
5. FACILITIES AND ACCREDITATIONS	10
5.1 FACILITIES.....	10
5.2 EQUIPMENT.....	10
5.3 TABLE OF ACCREDITATIONS AND LISTINGS.....	11
6. SETUP OF EQUIPMENT UNDER TEST	12
6.1 SETUP CONFIGURATION OF EUT	12
6.2 SUPPORT EQUIPMENT.....	12
7. FCC PART 15.247 REQUIREMENTS & RSS 247 REQUIREMENTS	13
7.1 OCCUPIED BANDWIDTH(99%) AND 20 DB BANDWIDTH	13
7.2 PEAK POWER	18
7.3 AVERAGE POWER	19
7.4 BAND EDGES MEASUREMENT	20
7.5 CONDUCTED BAND EDGE AND CONDUCTED SPURIOUS EMISSION	30
7.6 FREQUENCY SEPARATION.....	39
7.7 NUMBER OF HOPPING FREQUENCY	45
7.8 TIME OF OCCUPANCY (DWEIL TIME)	47
7.9 RADIATED EMISSIONS	49
7.10 POWERLINE CONDUCTED EMISSIONS	61
APPENDIX I PHOTOGRAPHS OF TEST SETUP	64

1. TEST RESULT CERTIFICATION

Applicant: **For FCC**
Zonar Systems Inc
18200 Cascade Ave South Suite 200
Seattle Washington United States
For IC
ZONAR SYSTEMS
18200 Cascade Ave South Suite 200
SEATTLE WA USA

Manufacturer: First International Computer
8F, No.300, Yang Guang St., NeiHu, Taipei, Taiwan 114

Equipment Under Test: Zonar Connect

Model Number: 20081

Trade Name: ZONAR

Date of Test: July 29 ~ October 22, 2016


APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C Industry Canada RSS-247 Issue 1	No non-compliance noted

We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10: 2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements set forth in the above standards. The test results of this report relate only to the tested sample EUT identified in this report.

Approved by:

Tested by:



Sam Chuang
Manager
Compliance Certification Services Inc.

Dennis Li
Engineer
Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product	Zonar Connect
Model Number	20081
Trade Name	ZONAR
Received Date	April 15, 2016
Power Supply	VDC from Power Adapter DARFON / B112-51(SOY-0500250US) I/P: 100-240Vac, 0.4A, 50-60Hz O/P: 5Vdc, 2.5A
Frequency Range	2402 ~ 2480 MHz
Transmit Power	8.35 dBm
Modulation Technique	GFSK for 1Mbps; $\pi/4$ -DQPSK for 2Mbps; 8DPSK for 3Mbps
Number of Channels	79 Channels
Antenna Specification	Dipole Antenna / Gain: 2.1dBi

Remark:

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **SEJ-CONNECT** & ISED No. : **5266A-CONNECT** filing to comply with FCC Part 15C, Section 15.207, 15.209 and IC RSS-247 & RSS-GEN.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10: 2013 and FCC Part 15.205, Part 15.207, Part 15.209, Part 15.247, DA00-705., IC RSS-247, RSS-Gen.

3.1 EUT CONFIGURATION

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous normal application.

3.2 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

- (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	(²)
13.36 - 13.41	322 - 335.4		

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

- (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

3.3 DESCRIPTION OF TEST MODES

The EUT (model: 20081) had been tested under operating condition.

Software used to control the EUT for staying in continuous transmitting and receiving mode was programmed.

3.3.1 Worst mode of modulation

Worst Mode			
Bluetooth Mode	Data Rate	Maximum Peak Conducted Output Power (dBm)	Worst Mode
BR	1 Mbps	8.35	V
EDR	2 Mbps	7.08	
EDR	3 Mbps	7.13	

Remark: Emission for Unwanted test worst mode of BR-1Mbps

3.3.2 The worst mode of measurement

AC Conducted Emission	
Test Condition	AC Power line conducted emission for line and neutral
Voltage/Hz	120V/60Hz
Test Mode	Mode 1: Adapter Mode Mode 2: USB Charge Mode (Link NB)
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4

Remark: The worst mode was record in this test report.

Radiated Emission Measurement	
Test Condition	Band edge, Emission for Unwanted and Fundamental
Voltage/Hz	120V/60Hz
Test Mode	Mode 1: Adapter Mode Mode 2: USB Charge Mode (Link NB) Mode 3: Docking Mode
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4
Position	<input type="checkbox"/> Placed in fixed position. <input type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane) <input type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane) <input checked="" type="checkbox"/> Placed in fixed position at Z-Plane (H-Plane)

Remark: The worst mode was record in this test report.

4. INSTRUMENT CALIBRATION

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

4.2 MEASUREMENT EQUIPMENT USED

Equipment Used for Emissions Measurement

Remark: Each piece of equipment is scheduled for calibration once a year.

RF Conducted Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Power Meter	Anritsu	ML2495A	1012009	2016/7/4	2017/7/3
Power Meter	Anritsu	MA2411B	917072	2016/7/4	2017/7/3
Spectrum Analyzer	R&S	FSV 40	101073	2015/10/04	2016/10/03
Spectrum Analyzer	R&S	FSV 40	0229	2016/05/11	2017/05/10

Wugu 966 Chamber A					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum Analyzer	Agilent	E4446A	US42510252	2015/12/8	2016/12/7
Loop Ant	COM-POWER	AL-130	121051	2016/2/25	2017/2/24
Bilog Antenna	Sunol Sciences	JB3	A030105	2016/8/5	2017/8/4
Pre-Amplifier	EMEC	EM330	60609	2016/6/8	2017/6/7
Horn Antenna	ETC	MCTD 1209	DRH13M02003	2016/9/2	2017/9/1
Pre-Amplifier	MITEQ	AMF-6F-2604 00-40-8P	985646	2016/1/14	2017/1/13
Horn Antenna	EMCO	3116	26370	2016/1/15	2017/1/14
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Software	EZ-EMC (CCS-3A1RE)				

Conducted Emission Room # B					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
LISN	SCHWARZBECK	NSLK 8127	8127-541	2015/11/23	2016/11/22
Receiver	R&S	ESCI	101073	2015/9/9	2016/9/8
Software	CCS-3A1-CE				

Remark:

- Each piece of equipment is scheduled for calibration once a year and Precision Dipole is scheduled for calibration once three years.
- N.C.R. = No Calibration Request.

4.3 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Powerline Conducted Emission	+/- 1.2575
3M Semi Anechoic Chamber / 30M~200M	+/- 4.0138
3M Semi Anechoic Chamber / 200M~1000M	+/- 3.9483
3M Semi Anechoic Chamber / 1G~8G	+/- 2.5975
3M Semi Anechoic Chamber / 8G~18G	+/- 2.6112
3M Semi Anechoic Chamber / 18G~26G	+/- 2.7389
3M Semi Anechoic Chamber / 26G~40G	+/- 2.9683

Remark: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

5. FACILITIES AND ACCREDITATIONS

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

☐ No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.

Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)

Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

☐ No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841, TAIWAN, R.O.C.

Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10: 2013 and CISPR Publication 22.

5.2 EQUIPMENT



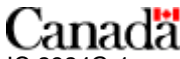
Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, ridged waveguide, horn and/or Loop. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.3 TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements	 FCC MRA: TW1039
Taiwan	TAF	LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-247, RSS-310 IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12.2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17 FCC OET Bulletin 65 + Supplement C, EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959 FCC Method -47 CFR Part 15 Subpart B IEC / EN 61000-3-2, IEC / EN 61000-3-3, IEC / EN 61000-4-2/3/4/5/6/8/11	
Canada	Industry Canada	3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform	 IC 2324G-1 IC 2324G-2

* No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.

6. SETUP OF EQUIPMENT UNDER TEST

6.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix I for the actual connections between EUT and support equipment.

6.2 SUPPORT EQUIPMENT

No	Equipment	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1	Zonar Connect Dock	ZONAR	20082	N/A	N/A	N/A	N/A
2	USB Dongle	Transcend	32 GB	N/A	N/A	N/A	N/A
3	Ear phone	Logitech	H150	N/A	N/A	N/A	N/A
4	SD Card	Kingston	4GB	N/A	N/A	N/A	N/A

Remark:

1. *All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
2. *Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*

7. FCC PART 15.247 REQUIREMENTS & RSS 247 REQUIREMENTS

7.1 OCCUPIED BANDWIDTH(99%) AND 20 DB BANDWIDTH

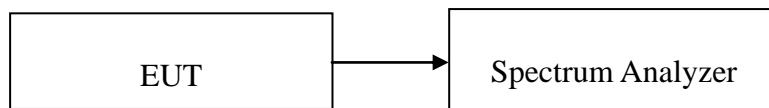
OCCUPIED BANDWIDTH(99%)

The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold.

20 DB BANDWIDTH

According to FCC §15.247(a)(1), the 20dB bandwidth is known as the 99% emission bandwidth, or 20dB bandwidth ($10 \cdot \log 1\% = 20\text{dB}$) taking the total RF output power.

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW=30 kHz, VBW = 100 kHz, ,Detector = Peak,
4. Set the spectrum analyzer as OBW(99%) function
5. Mark the peak frequency and 20dB (upper and lower) frequency.
6. Repeat until all the rest channels are investigated.

TEST RESULTS

For GFSK/DH5

Channel	Frequency (MHz)	99% Bandwidth (MHz)	20dB Bandwidth (MHz)
Low	2402	0.9204	1.0072
Mid	2441	0.9204	1.0116
High	2480	0.9204	1.0116

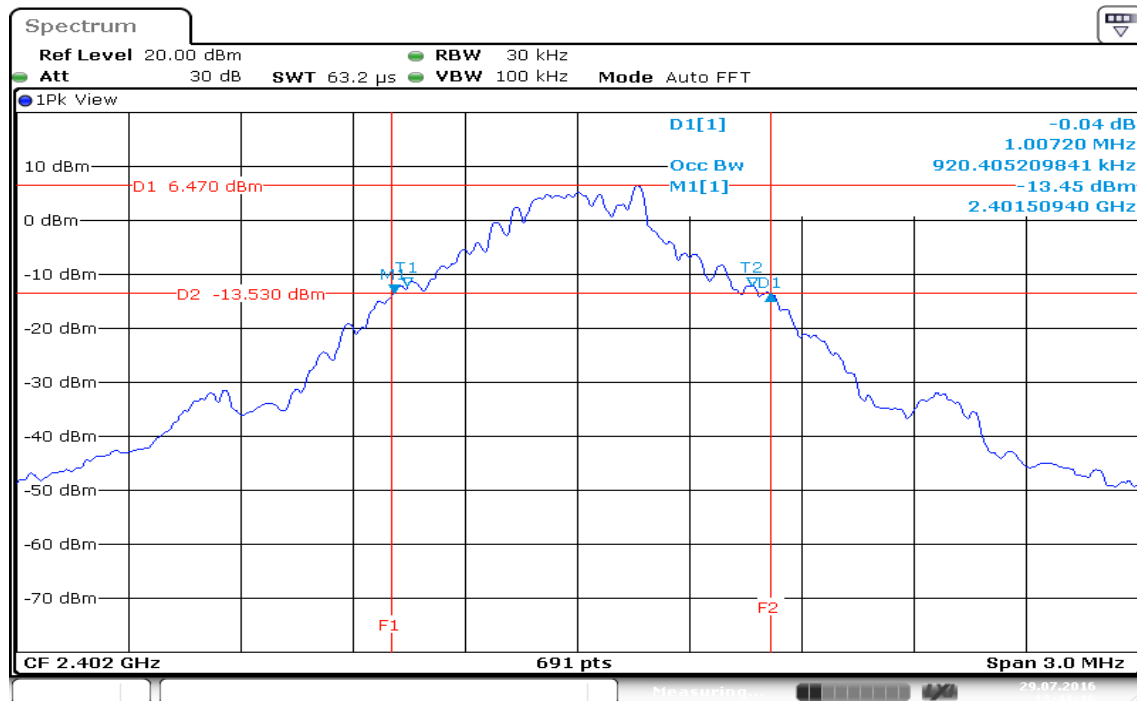
For 8DPSK/DH5

Channel	Frequency (MHz)	99% Bandwidth (MHz)	20dB Bandwidth (MHz)
Low	2402	1.2069	1.3198
Mid	2441	1.2069	1.3242
High	2480	1.2112	1.3242

Test Plot

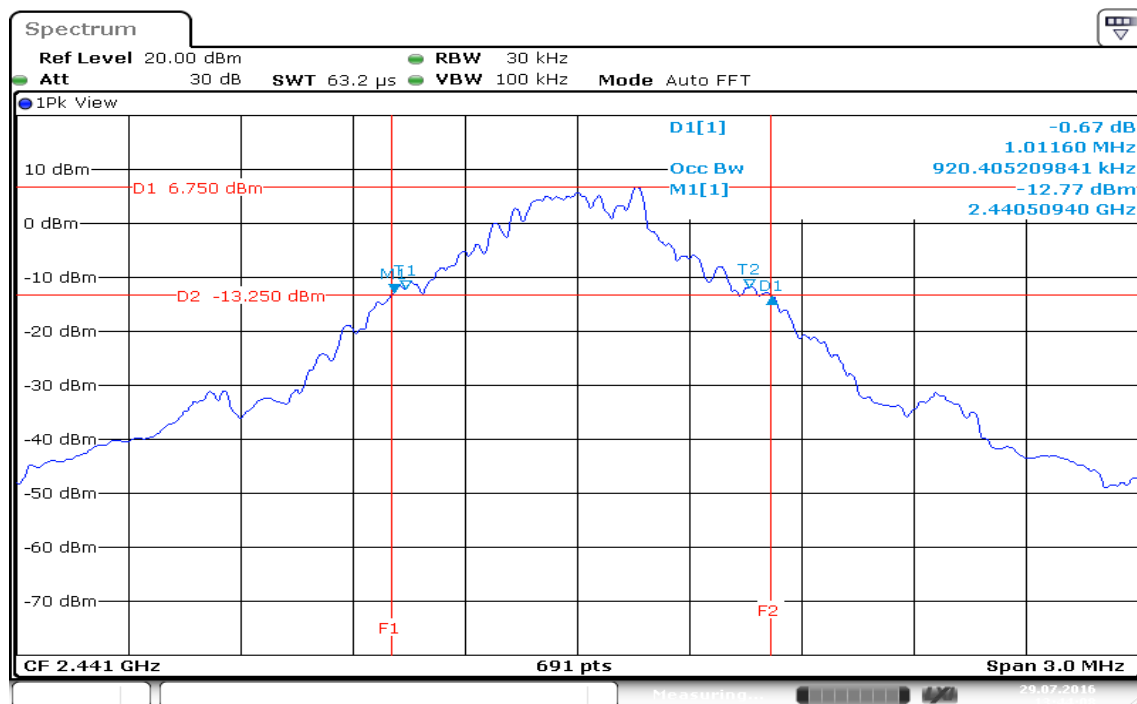
For GFSK / DH5

CH Low



Date: 29 JUL 2016 13:41:16

CH Mid

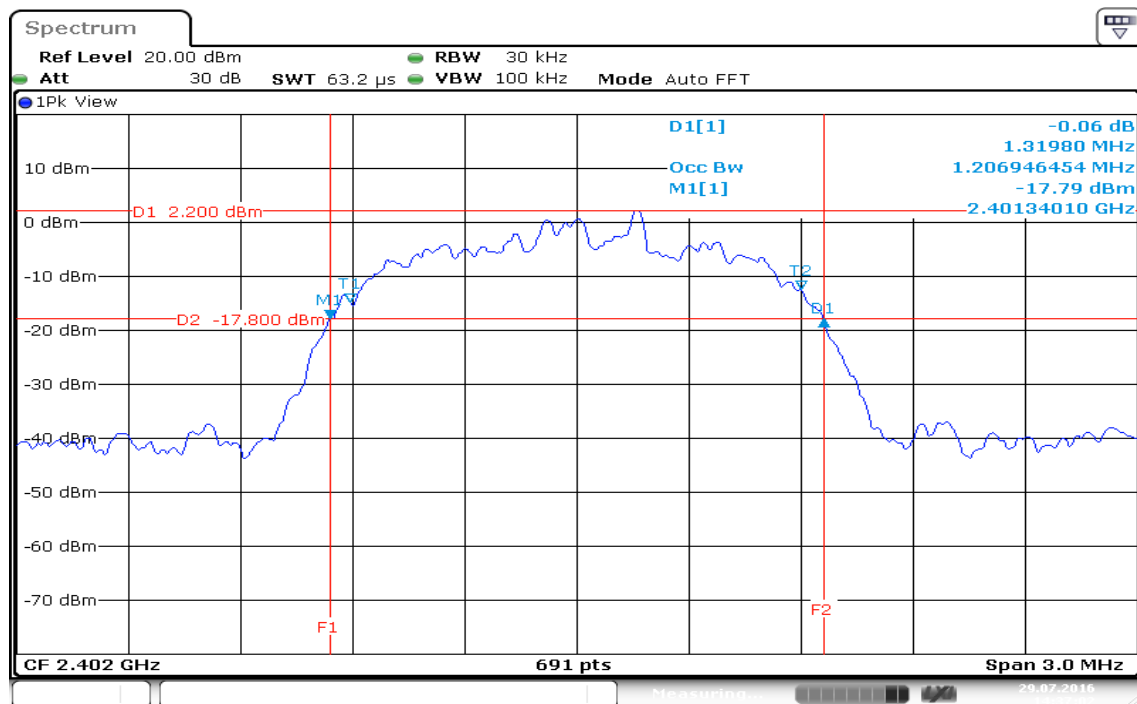


Date: 29 JUL 2016 13:44:09

Date: 29 JUL 2016 13:46:34

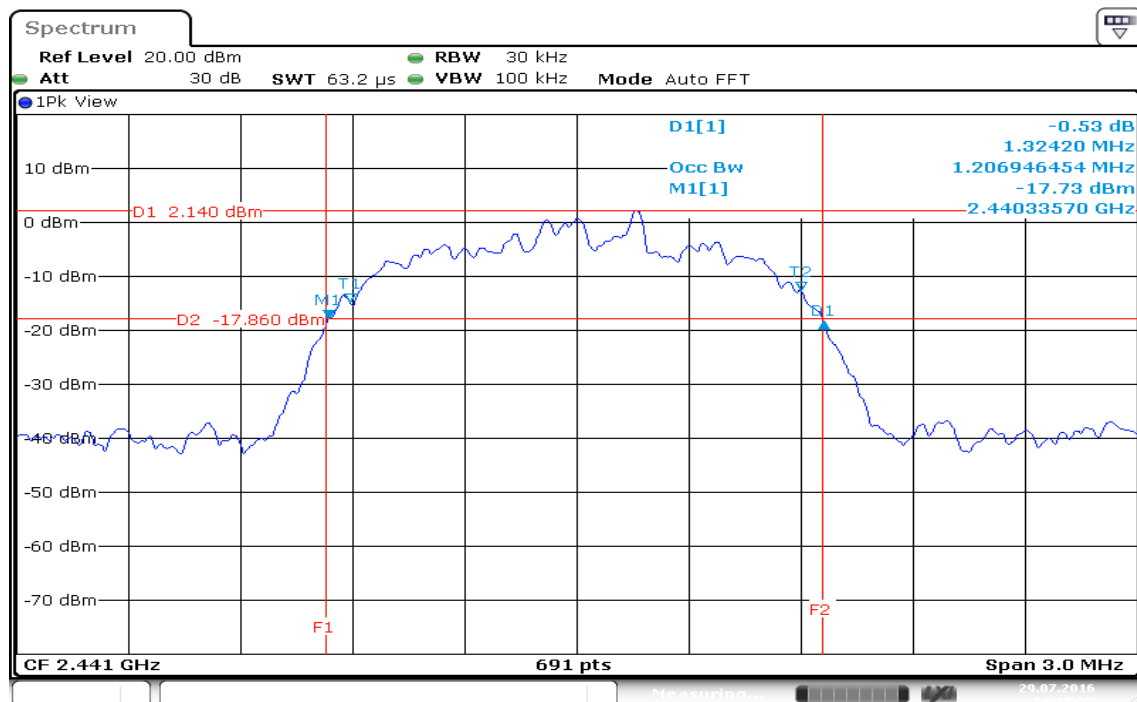
For 8DPSK / DH5

CH Low



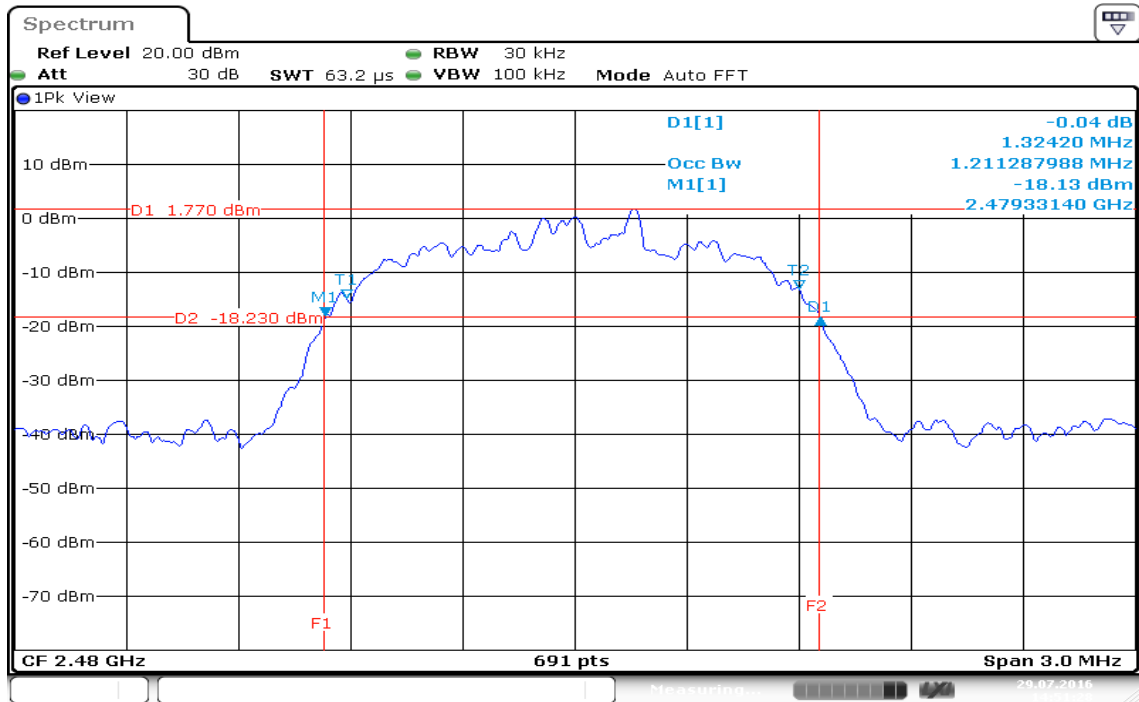
Date: 29 JUL 2016 14:37:02

CH Mid



Date: 29 JUL 2016 14:48:55

CH High



Date: 29 JUL 2016 14:51:28

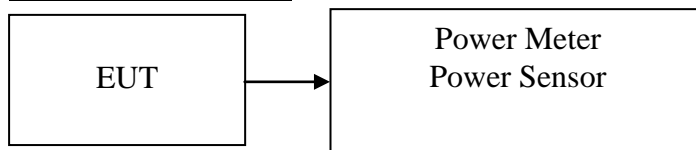
7.2 PEAK POWER

LIMIT

The maximum peak output power of the intentional radiator shall not exceed the following:

According to Part 15.247(b)(1) For frequency hopping systems operating in the 2400-2483.5MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850MHz band: 1 watts. For all other frequency hopping systems in the 2400-2483.5MHz band: 0.125 watts.

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the Power Meter. The Power Meter is set to the peak power detection.

TEST RESULTS

No non-compliance noted.

For GFSK / DH5

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2402	7.62	0.0058	1	PASS
Mid	2441	8.16	0.0065		PASS
High	2480	*8.35	0.0068		PASS

For 8DPSK / DH5

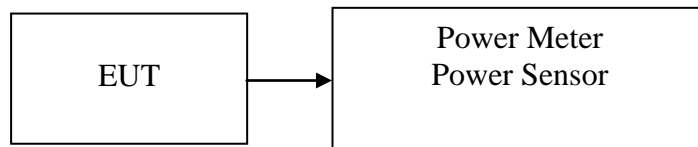
Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2402	6.13	0.0041	1	PASS
Mid	2441	6.86	0.0049		PASS
High	2480	7.13	0.0052		PASS

7.3 AVERAGE POWER

LIMIT

For reporting purpose.

Test Configuration



TEST PROCEDURE

The transmitter output is connected to the Power Meter. The Power Meter is set to the average power detection.

TEST RESULTS

No non-compliance noted.

Test Data

For GFSK / DH5

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2402	7.27	0.0053
Mid	2441	7.67	0.0058
High	2480	7.65	0.0058

For 8DPSK / DH5

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2402	3.81	0.0024
Mid	2441	4.66	0.0029
High	2480	5.50	0.0035

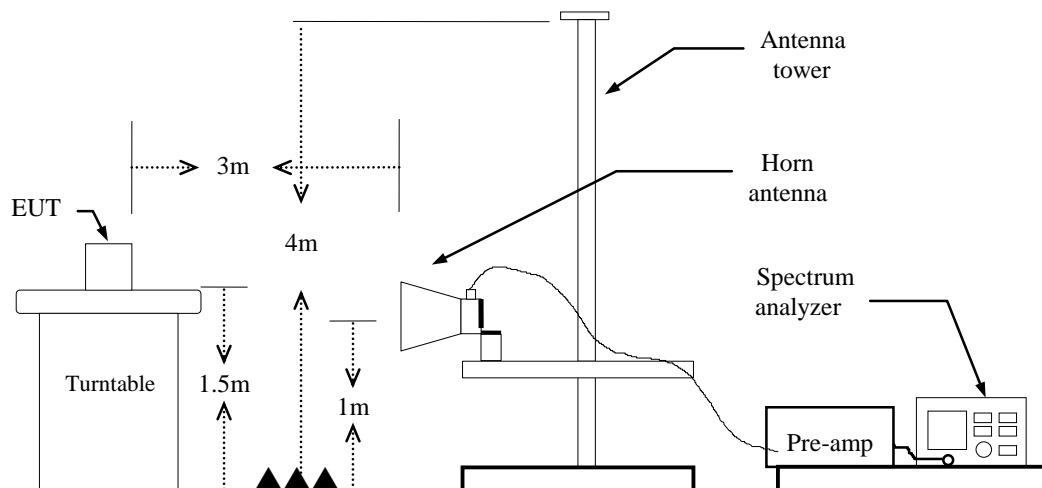
7.4 BAND EDGES MEASUREMENT

LIMIT

According to §15.247(d) & RSS-247, in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

Test Configuration

For Radiated

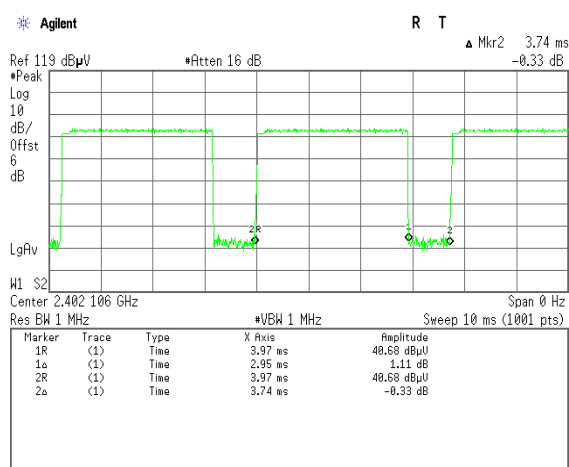


TEST PROCEDURE

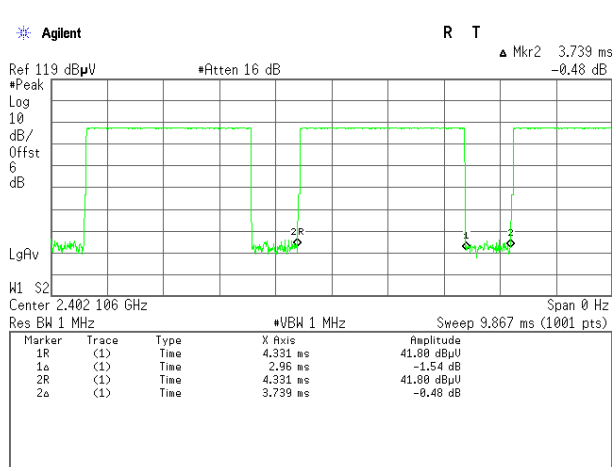
For Radiated

1. The EUT is placed on a turntable, which is 1.5m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - (a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO
 - (b) AVERAGE: RBW=1MHz,
if duty cycle $\geq 98\%$, VBW=10Hz.
if duty cycle $< 98\%$ VBW=1/T.
BT = 78%, VBW= 360Hz
EDR = 79%, VBW= 360Hz
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.
6. Result = Spectrum Reading + cable loss(spectrum to Amp) - Amp Gain + Cable loss(Amp to receive Ant)+ Receive Ant

Duty Cycle



BR-1M DUTY



EDR-3M DUTY

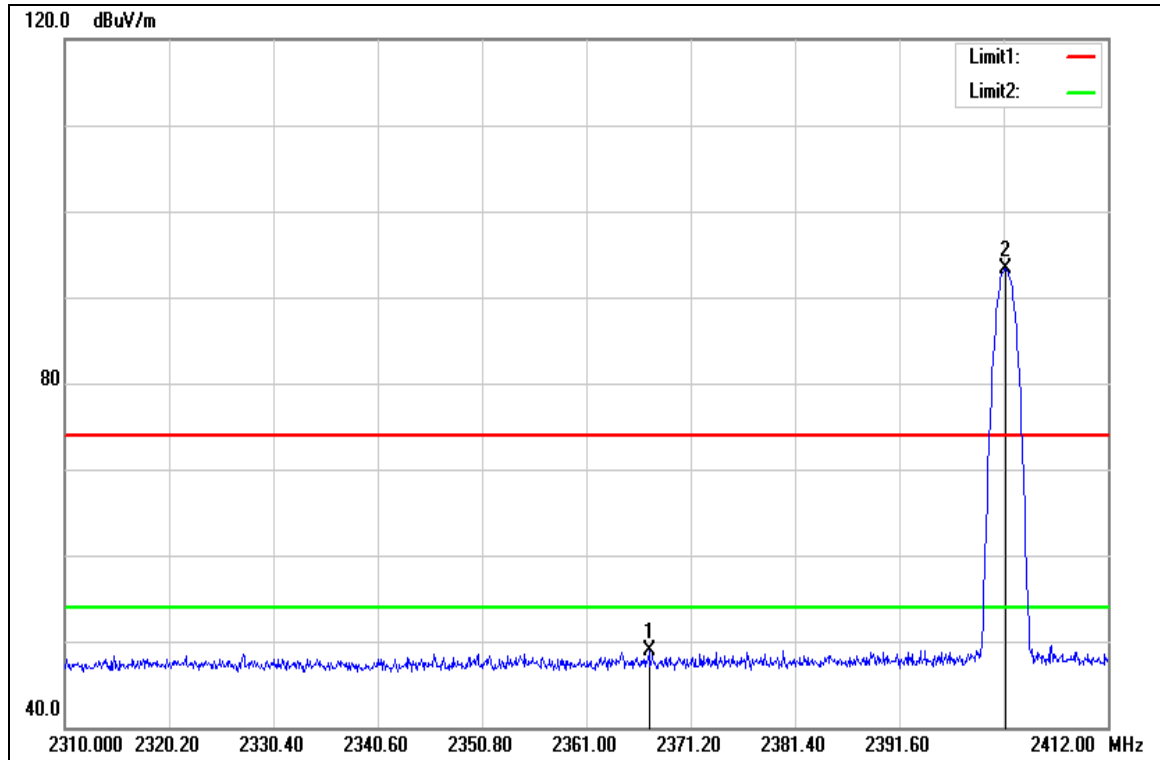
TEST RESULTS

Refer to attach spectrum analyzer data chart.

For GFSK / DH5

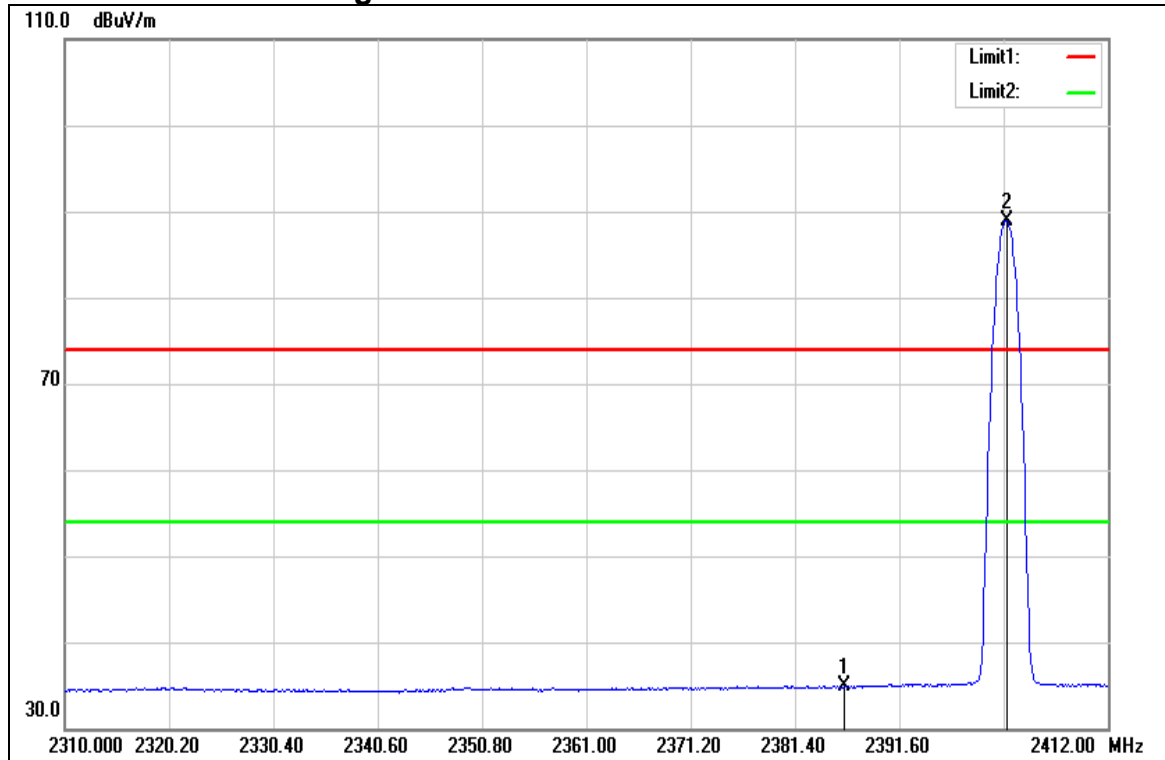
Band Edges (CH Low)

Detector mode: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2367.120	51.68	-2.70	48.98	74.00	-25.02	peak
2	2402.004	95.77	-2.41	93.36	-	-	peak

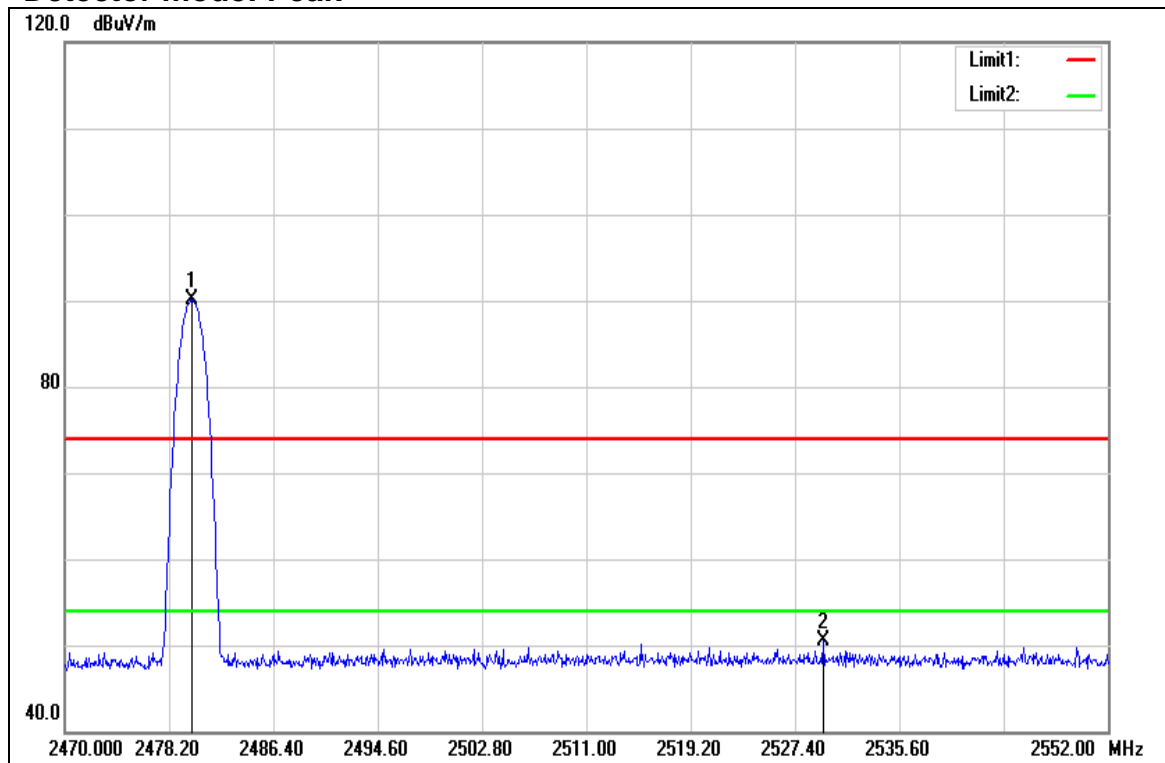
Detector mode: Average



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2386.194	37.51	-2.52	34.99	54.00	-19.01	AVG
2	2402.106	91.33	-2.41	88.92	-	-	AVG

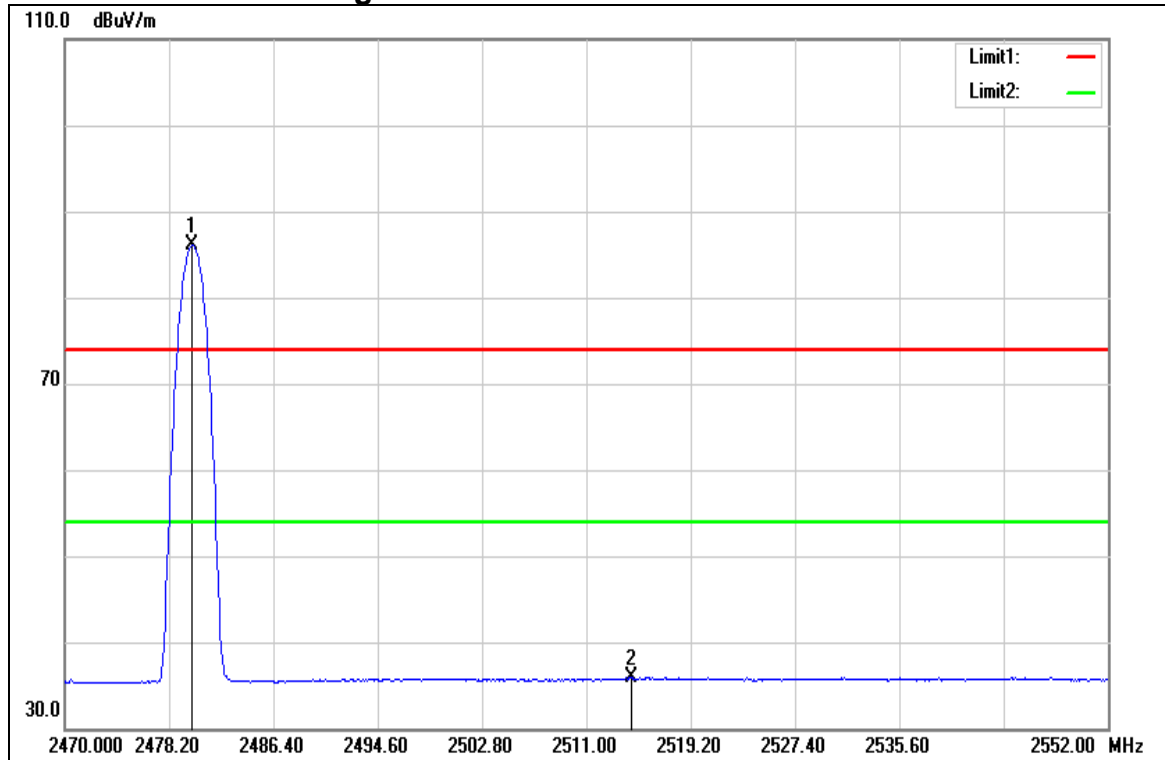
Band Edges (CH High)

Detector mode: Peak

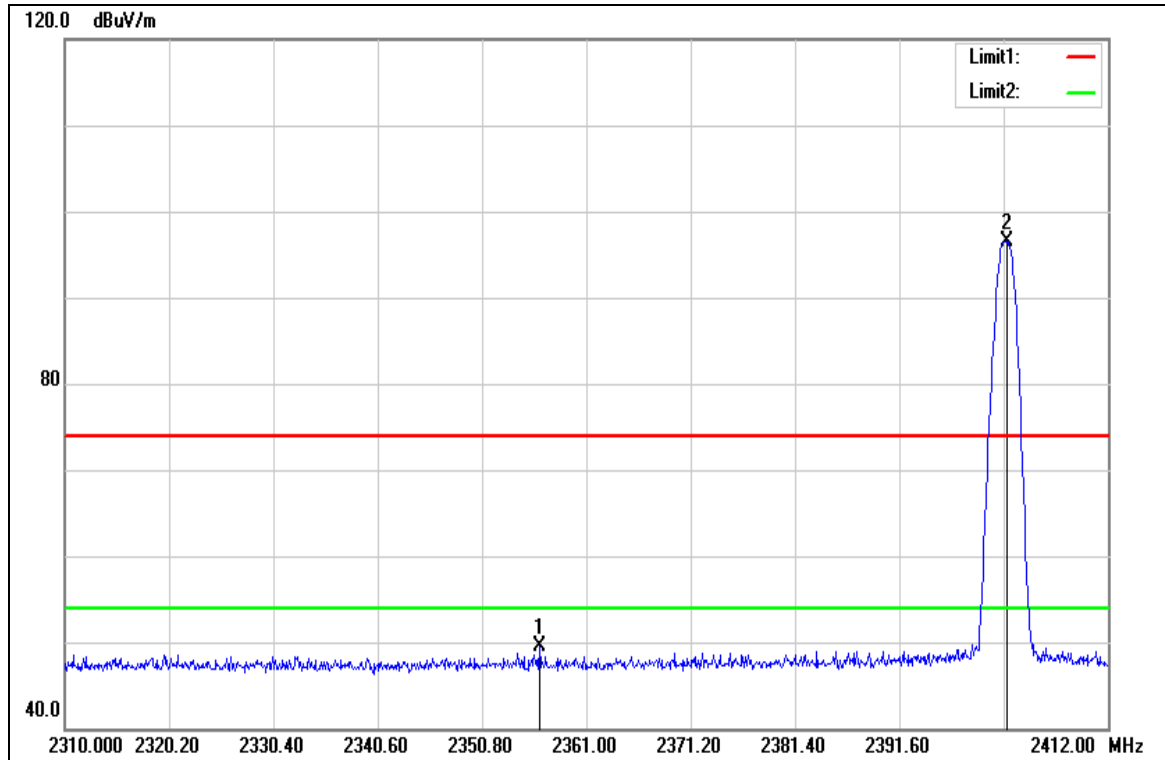


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.004	92.14	-2.03	90.11	-	-	peak
2	2529.614	52.30	-1.78	50.52	74.00	-23.48	peak

Detector mode: Average

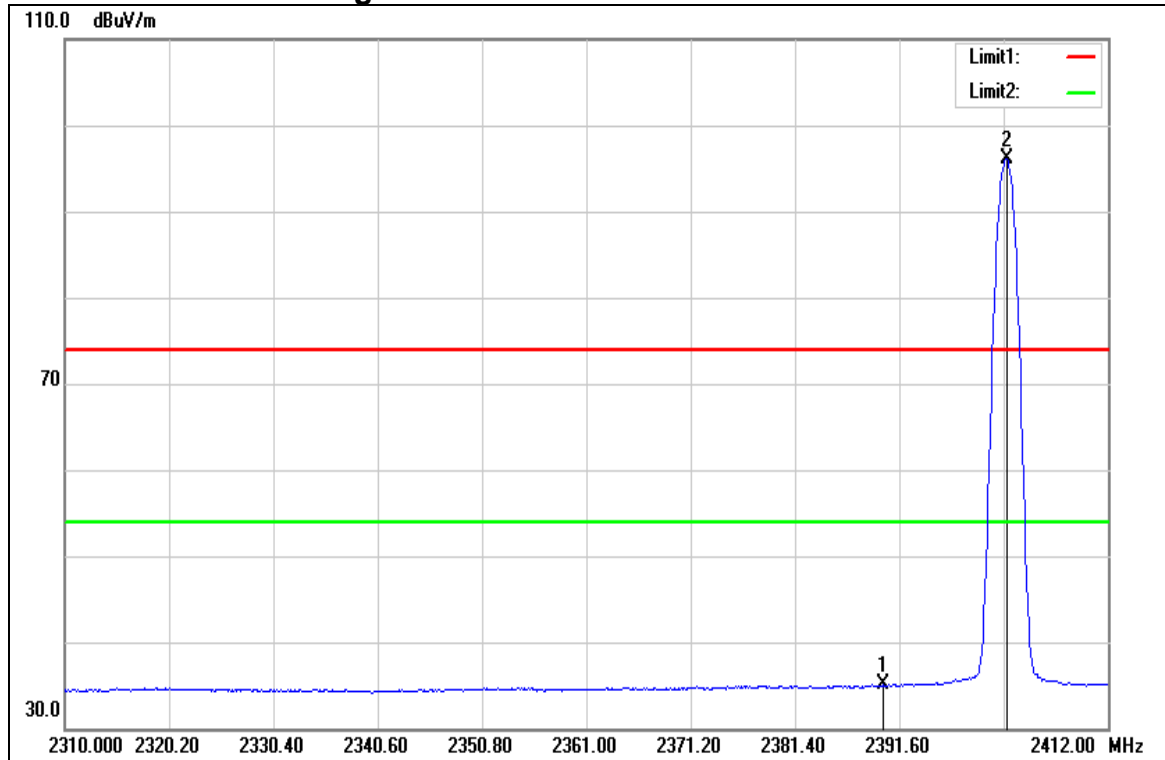


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.004	88.08	-2.03	86.05	-	-	AVG
2	2514.526	37.73	-1.82	35.91	54.00	-18.09	AVG

For 8DPSK**Band Edges (CH Low)****Detector mode: Peak**

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2356.410	52.30	-2.81	49.49	74.00	-24.51	peak
2	2402.106	98.87	-2.41	96.46	-	-	peak

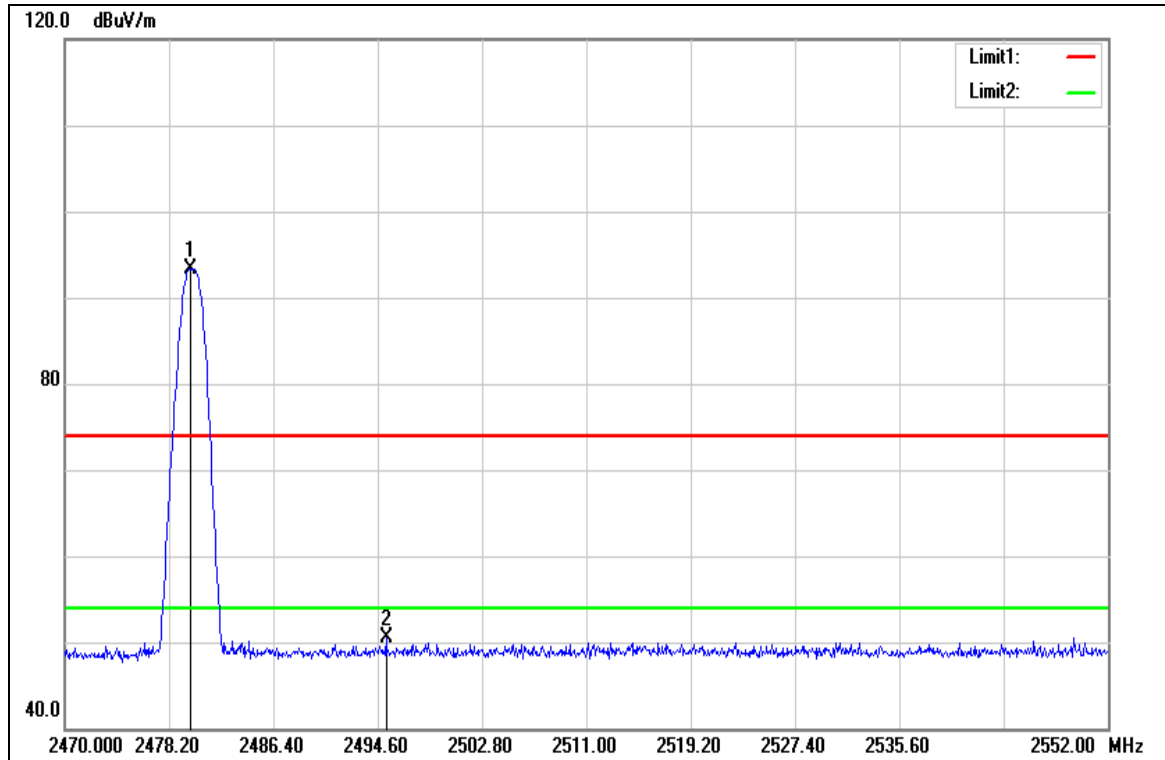
Detector mode: Average



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2389.968	37.55	-2.49	35.06	54.00	-18.94	AVG
2	2402.106	98.45	-2.41	96.04	-	-	AVG

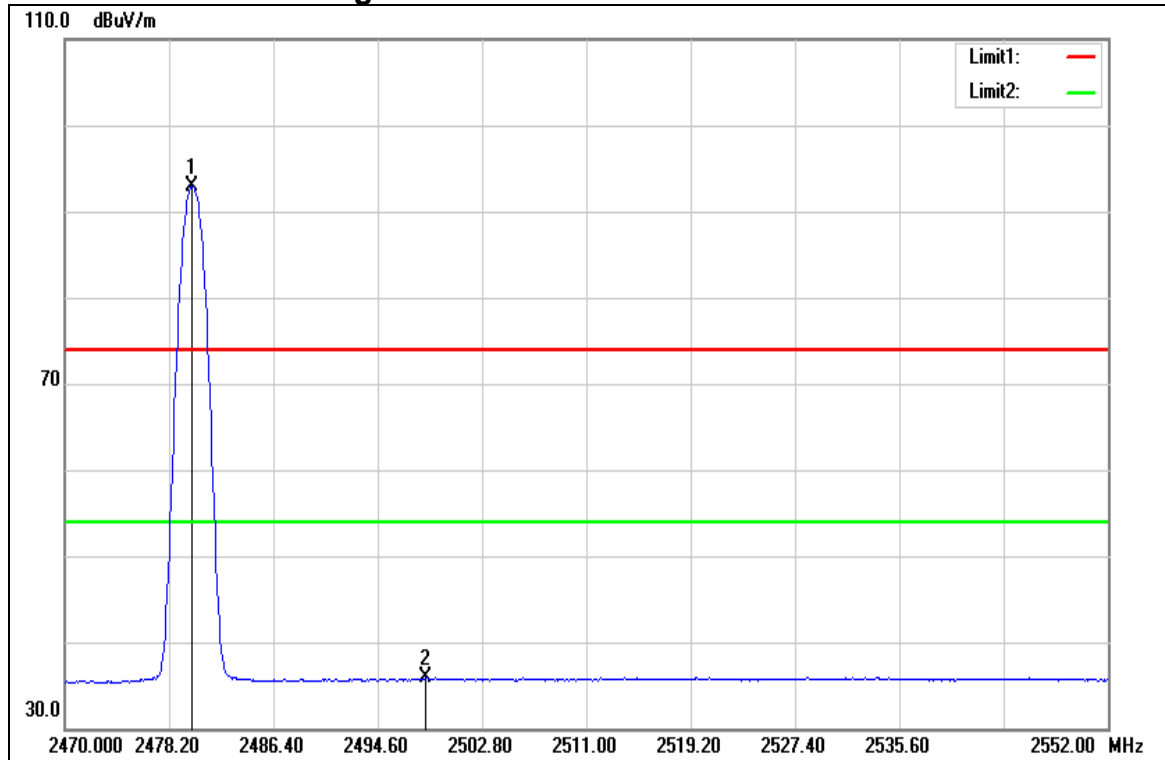
Band Edges (CH High)

Detector mode: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2479.840	95.37	-2.03	93.34	-	-	peak
2	2495.256	52.36	-1.89	50.47	74.00	-23.53	peak

Detector mode: Average



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2480.004	94.99	-2.03	92.96	-	-	AVG
2	2498.372	37.80	-1.87	35.93	54.00	-18.07	AVG

7.5 CONDUCTED BAND EDGE AND SPURIOUS EMISSION

In any 100 kHz bandwidth outside the authorized frequency band,

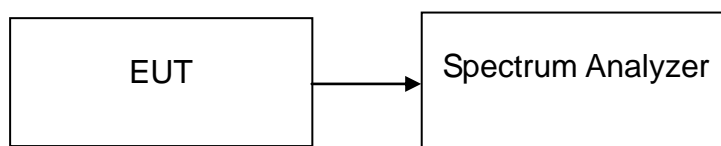
Non-restricted bands shall be attenuated at least 20 dB/30 dB relative to the maximum PSD level in 100 kHz by RF conducted or a radiated measurement which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

TEST PROCEDURE

According to 15.247(d), ANSI C63.10:2013 clause 7.8.6 and clause 7.8.8.

1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.
2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.
3. In any 100 kHz bandwidth outside the authorized frequency band, shall be attenuated at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when conducted power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Test Configuration



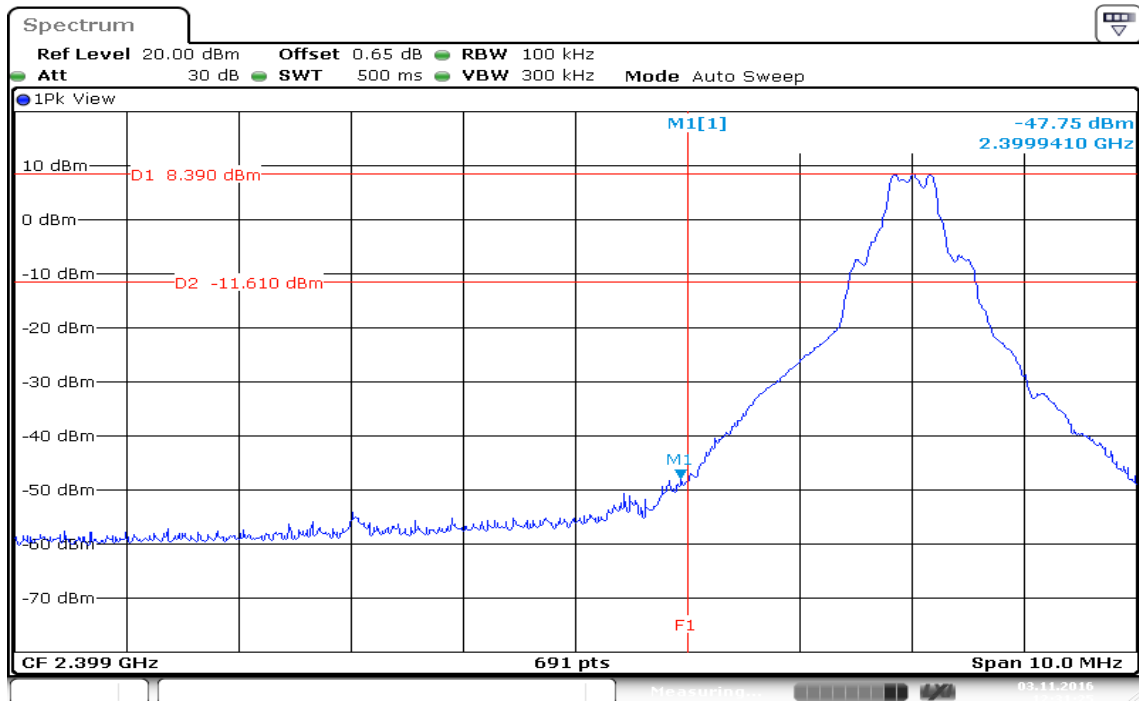
TEST RESULTS

Refer to attach spectrum analyzer data chart.

Test Data

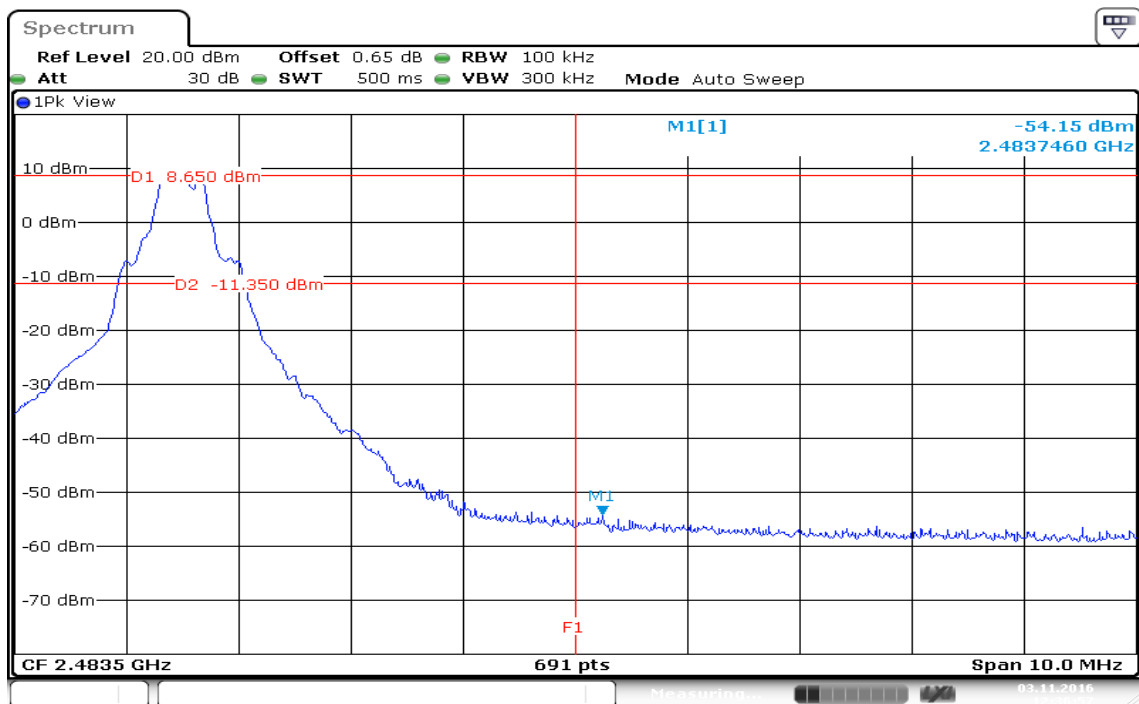
For GFSK/DH5

Low CH_Conducted Band edge



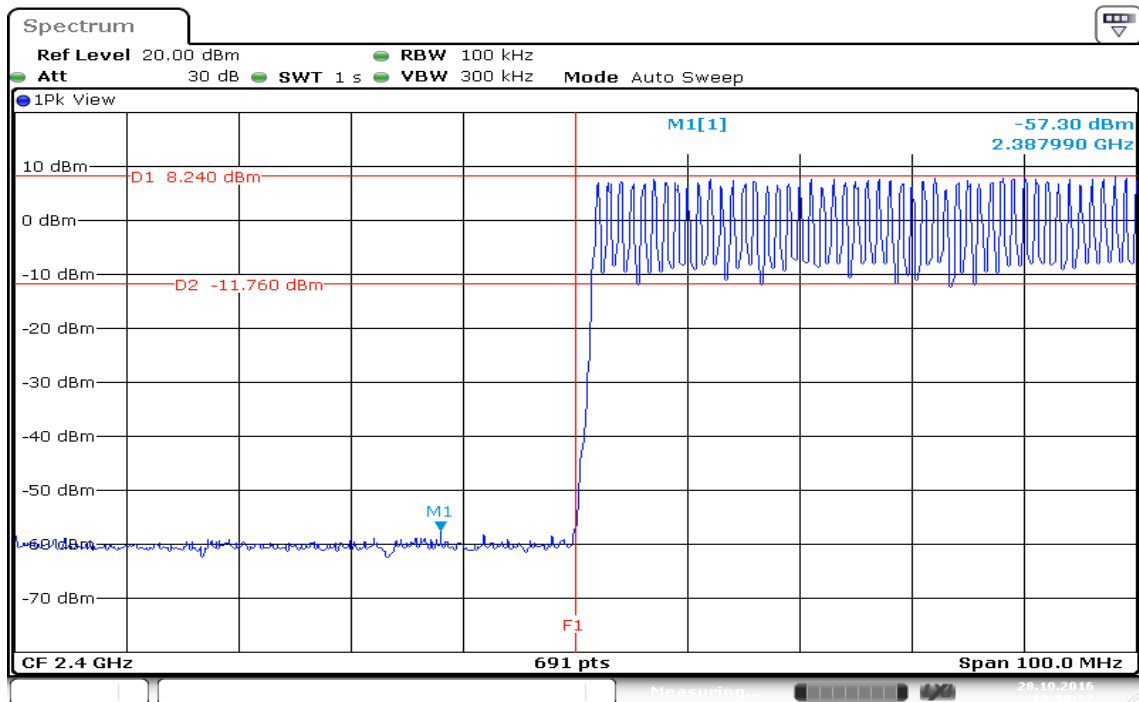
Date: 3 NOV 2016 12:31:26

High CH_Conducted Band edge



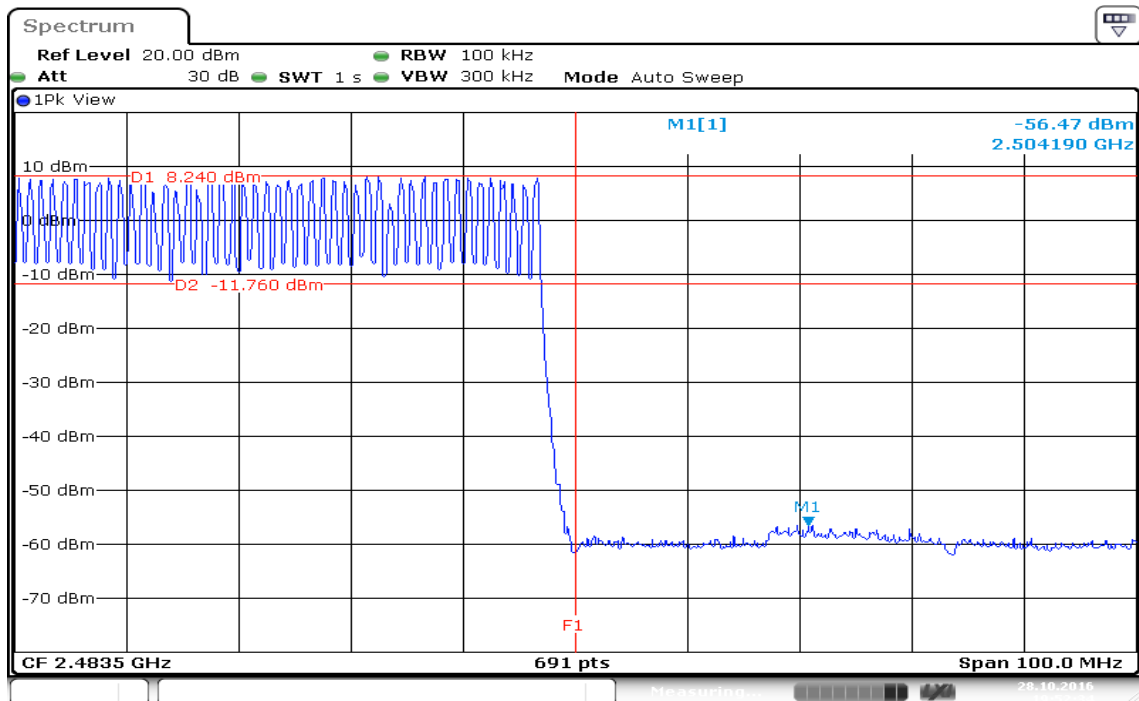
Date: 3 NOV 2016 12:36:57

Hopping Low CH_Conducted Band edge



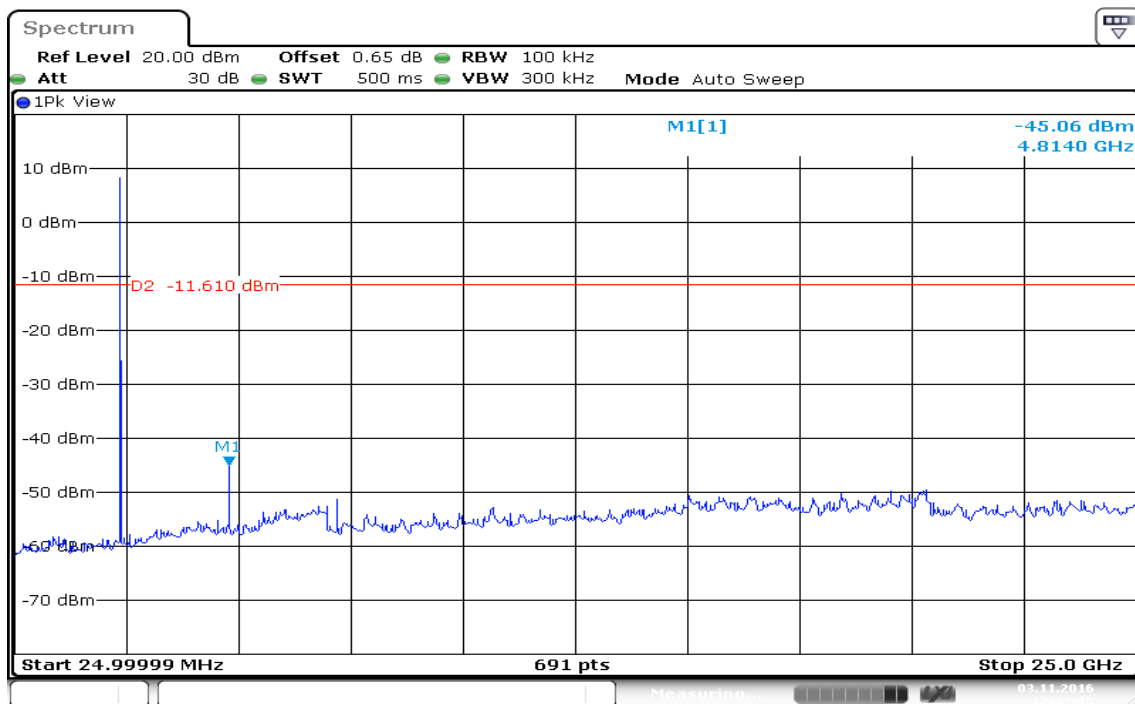
Date: 28 OCT 2016 19:50:28

Hopping High CH_Conducted Band edge



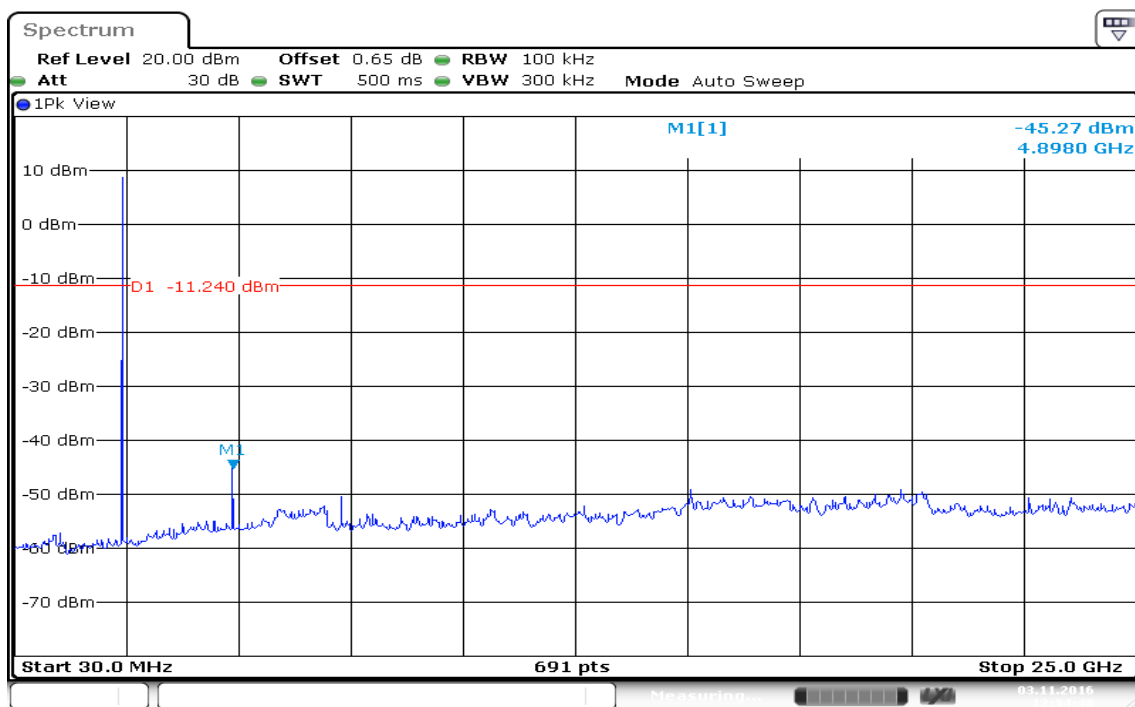
Date: 28 OCT 2016 19:52:35

Low CH_ Conducted spurious emission



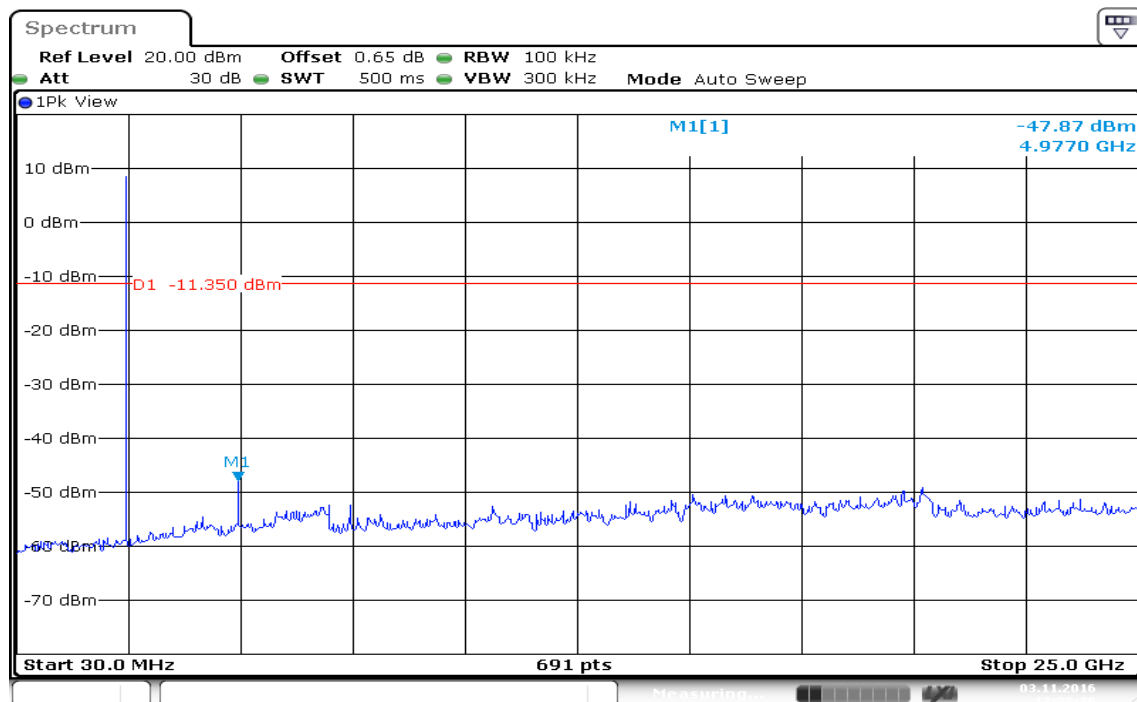
Date: 3 NOV 2016 12:32:15

Mid CH_ Conducted spurious emission



Date: 3 NOV 2016 12:34:48

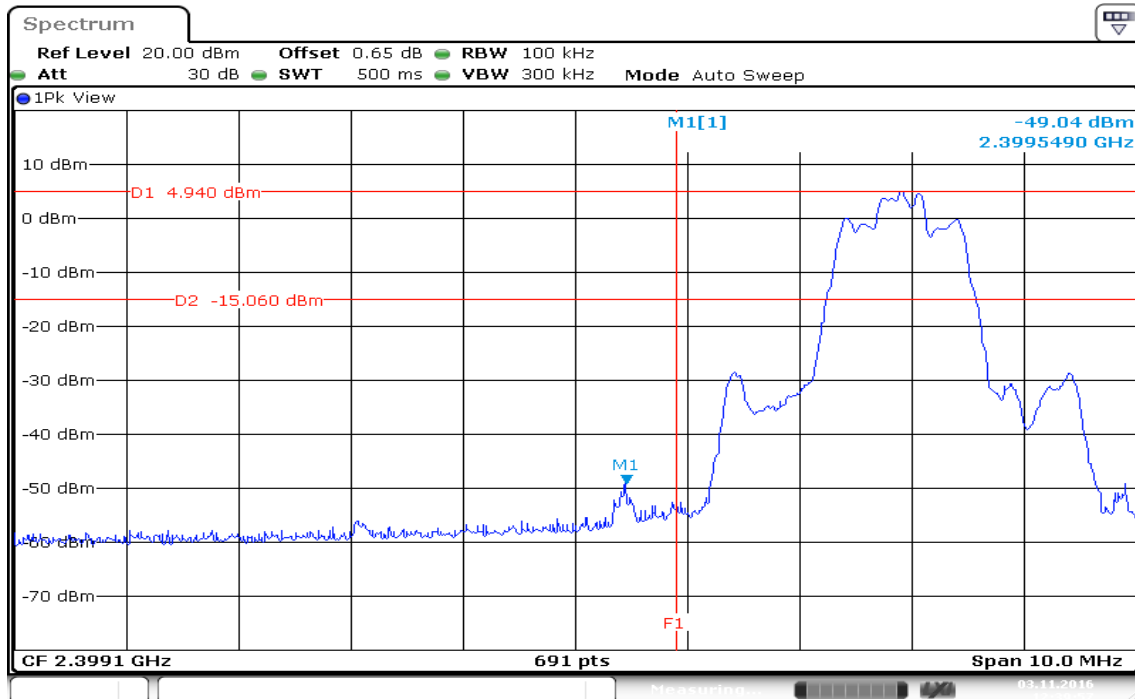
High CH_ Conducted spurious emission



Date: 3 NOV 2016 12:38:26

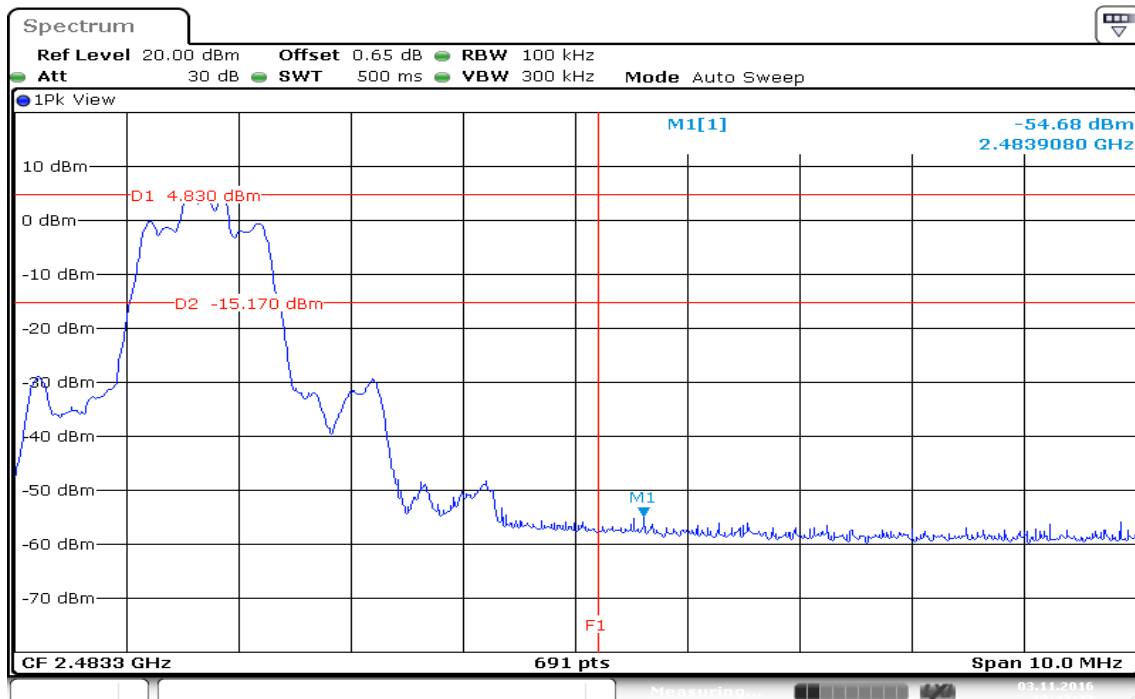
For 8DPSK/DH5

Low CH_Conducted Band edge



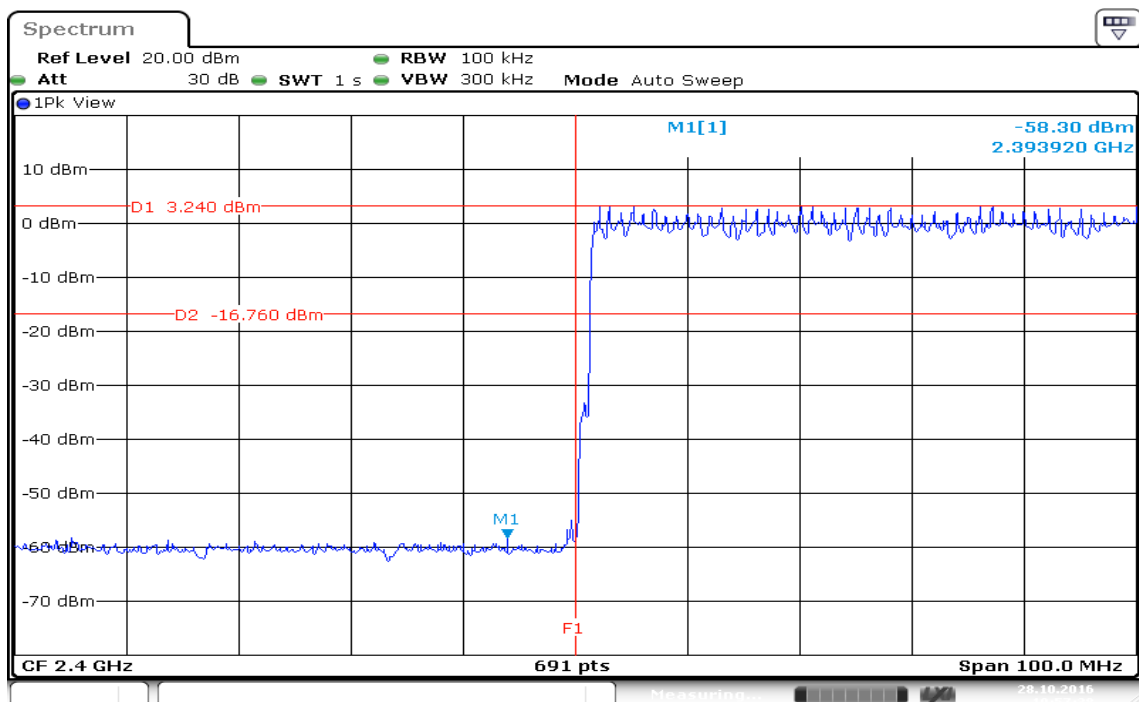
Date: 3 NOV 2016 12:39:58

High CH_Conducted Band edge



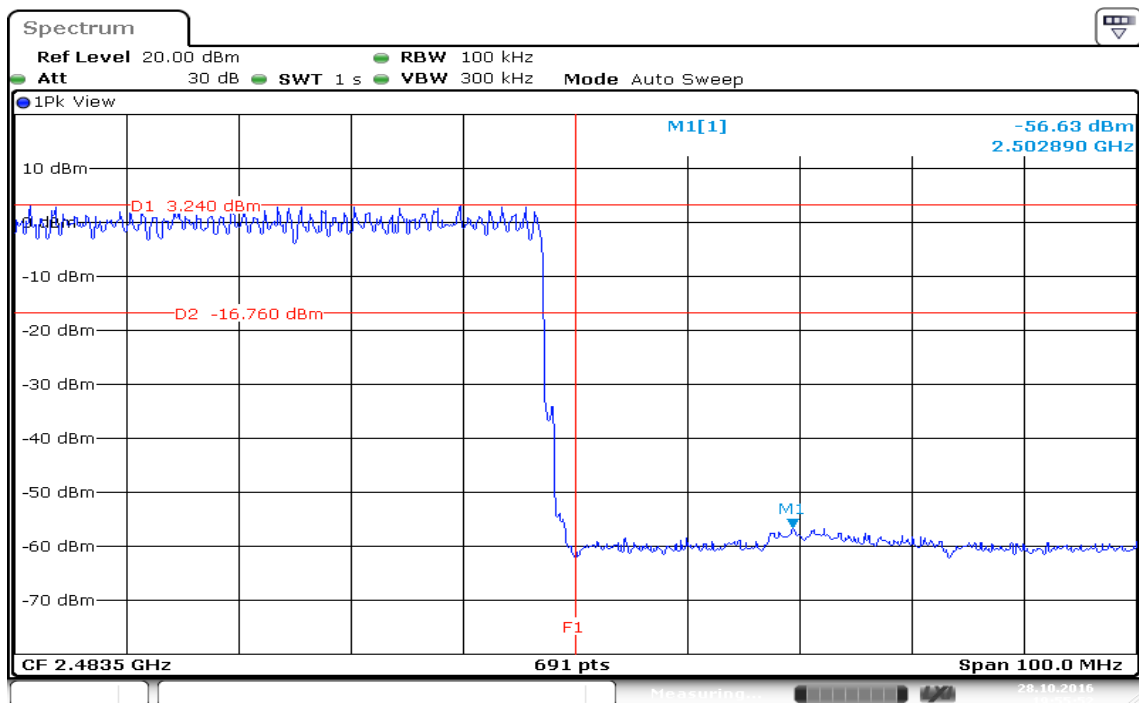
Date: 3 NOV 2016 12:43:38

Hopping Low CH_Conducted Band edge



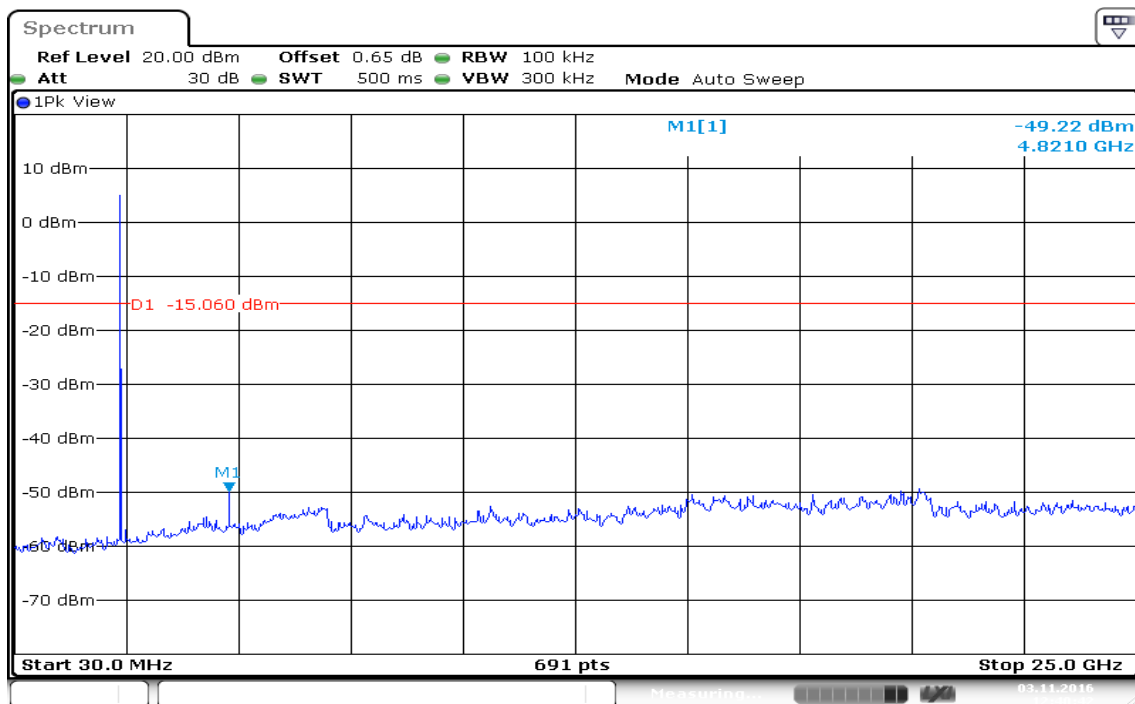
Date: 28 OCT 2016 19:57:39

Hopping High CH_Conducted Band edge



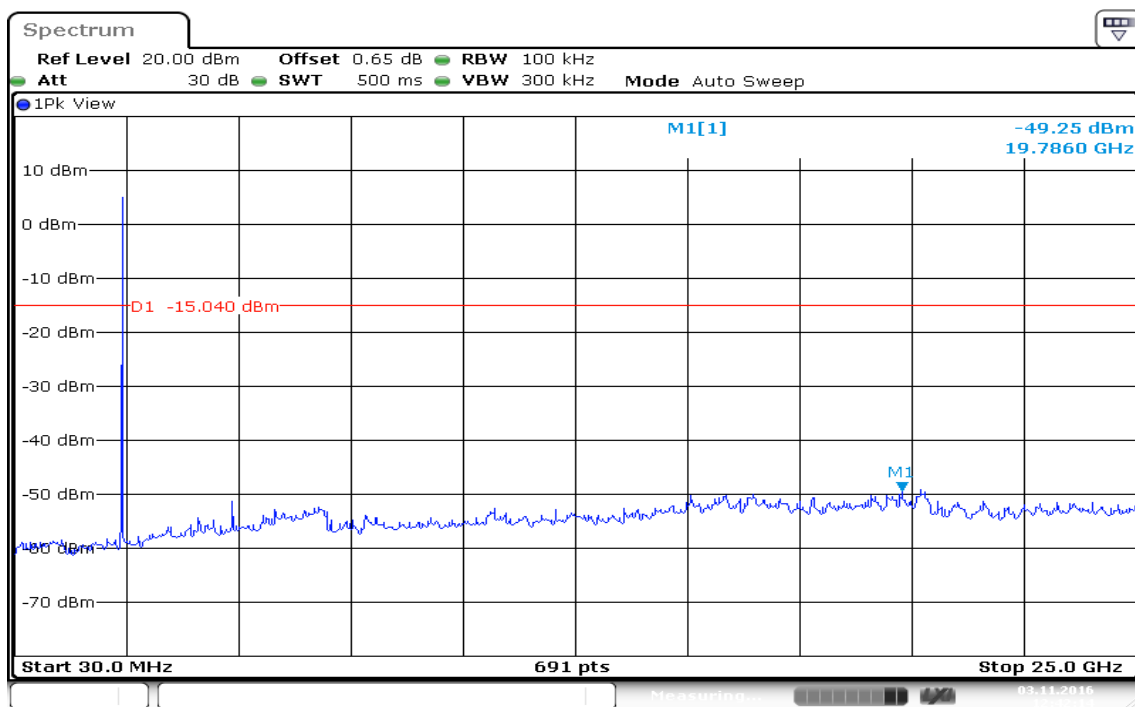
Date: 28 OCT 2016 19:55:53

Low CH_ Conducted spurious emission



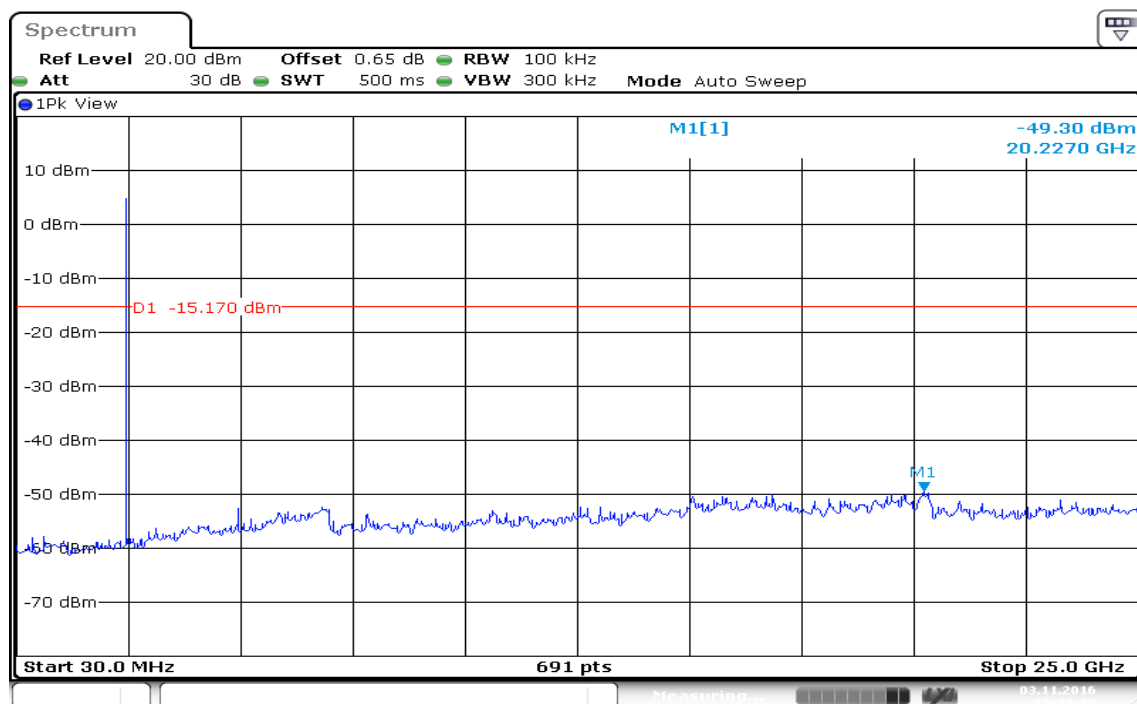
Date: 3 NOV 2016 12:40:42

Mid CH_ Conducted spurious emission



Date: 3 NOV 2016 12:42:14

High CH_ Conducted spurious emission



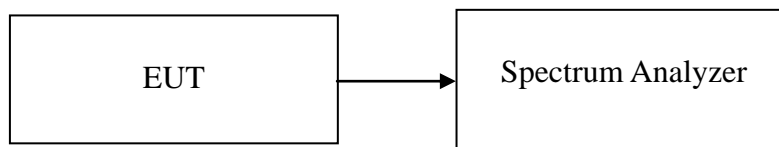
Date: 3 NOV 2016 12:44:16

7.6 FREQUENCY SEPARATION

LIMIT

According to §15.247(a)(1) & RSS-247, Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = middle of hopping channel.
4. Set the spectrum analyzer as RBW = 100kHz, VBW = 300kHz, Sweep = auto.
5. Max hold, mark 3 peaks of hopping channel and record the 3 peaks frequency.

TEST RESULTS

No non-compliance noted

Test Data

For GFSK

Channel	Channel Separation (MHz)	two-thirds of the 20 dB bandwidth (MHz)	Channel Separation Limit	Result
Low	1.0029	0.671	> two-thirds of the 20 dB bandwidth	Pass
Mid	1.0029	0.674	> two-thirds of the 20 dB bandwidth	Pass
High	1.0029	0.674	> two-thirds of the 20 dB bandwidth	Pass

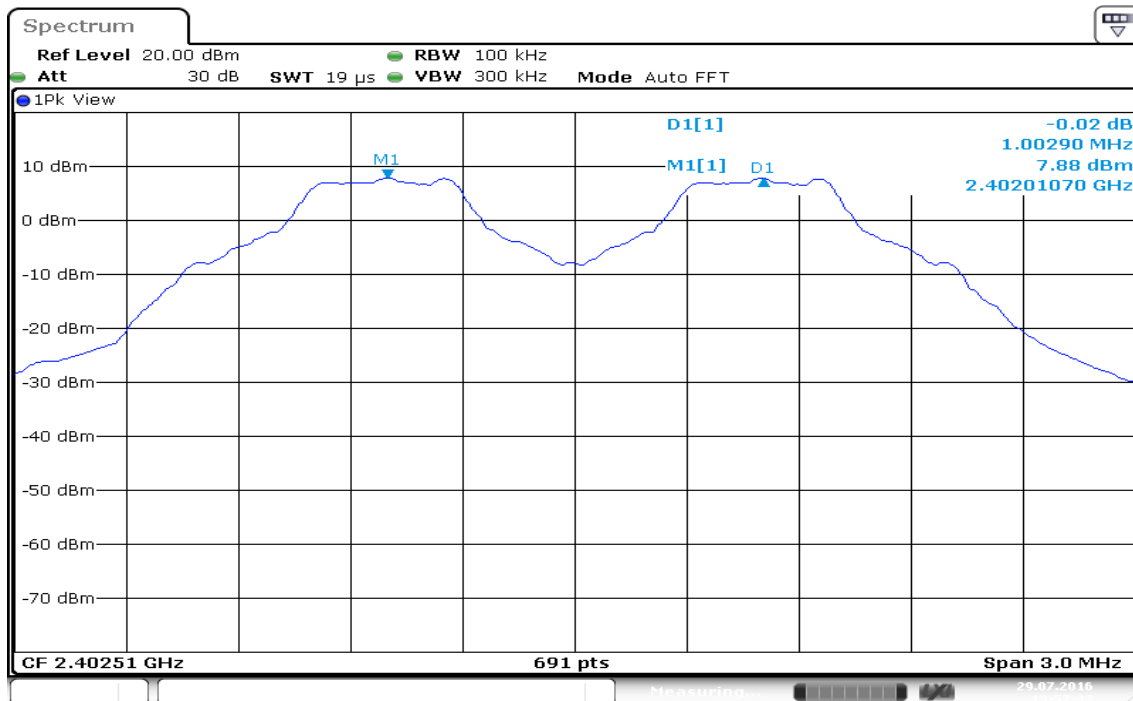
For 8DPSK

Channel	Channel Separation (MHz)	two-thirds of the 20 dB bandwidth (MHz)	Channel Separation Limit	Result
Low	1.0029	0.880	> two-thirds of the 20 dB bandwidth	Pass
Mid	1.0029	0.883	> two-thirds of the 20 dB bandwidth	Pass
High	1.0029	0.883	> two-thirds of the 20 dB bandwidth	Pass

Test Plot

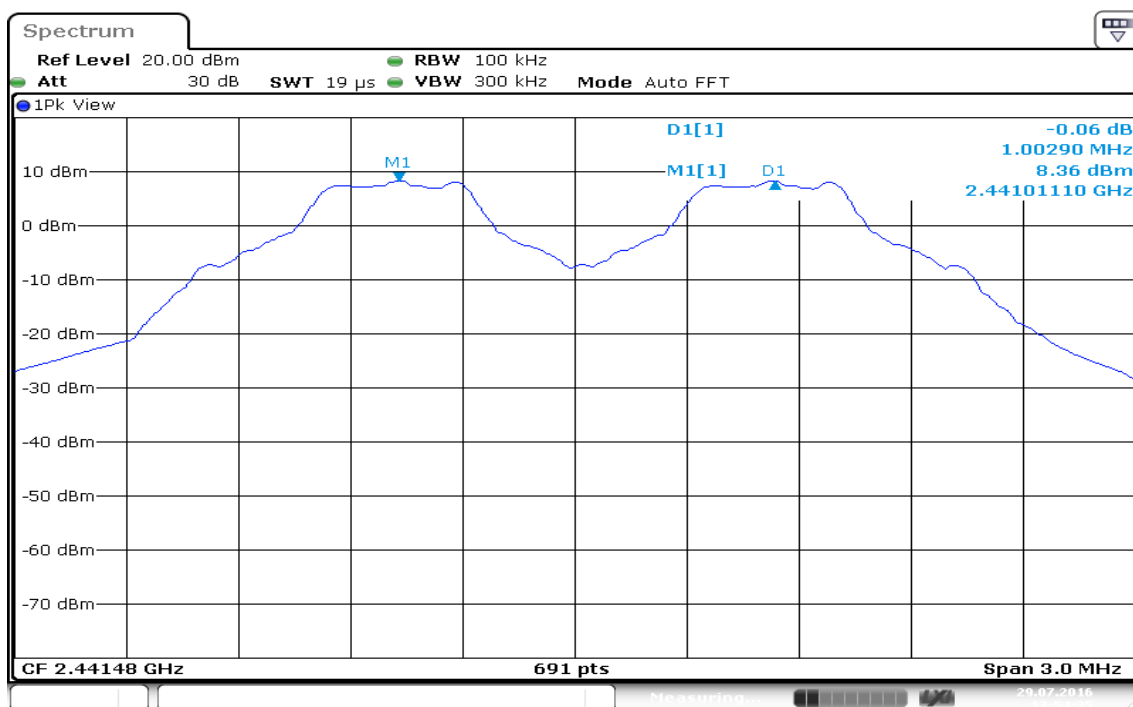
For GFSK / DH5

Measurement of Channel Separation / (CH Low)

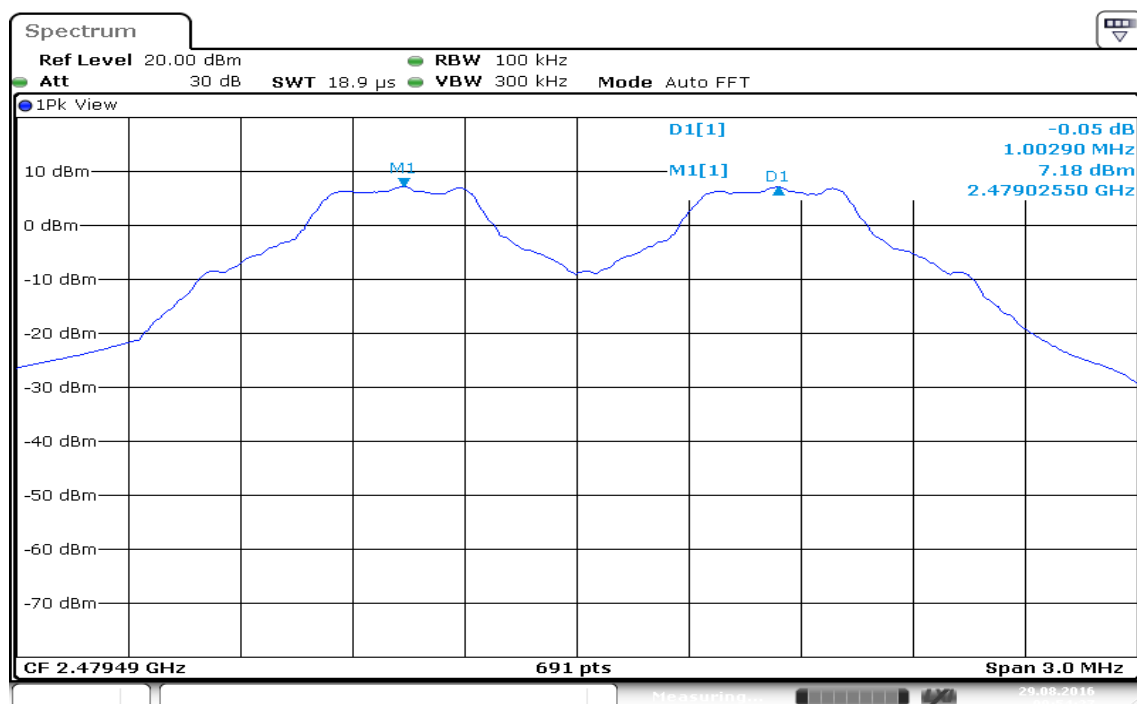


Date: 29 JUL 2016 13:57:33

Measurement of Channel Separation / (CH Mid)

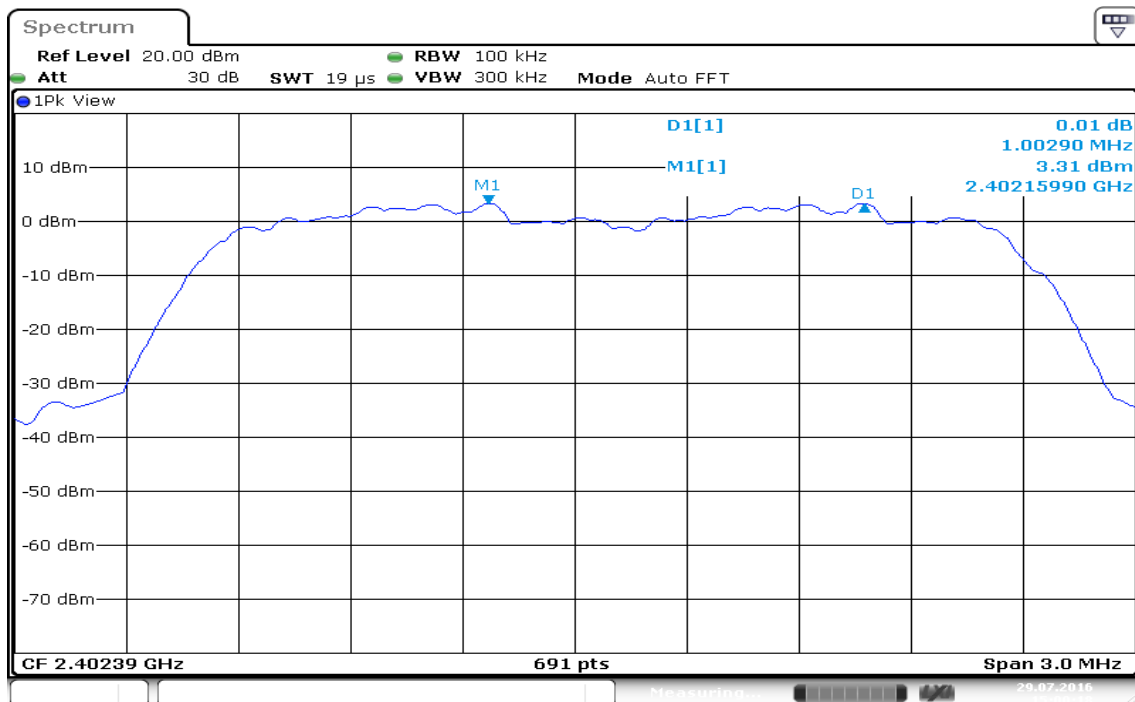


Date: 29 JUL 2016 13:54:24

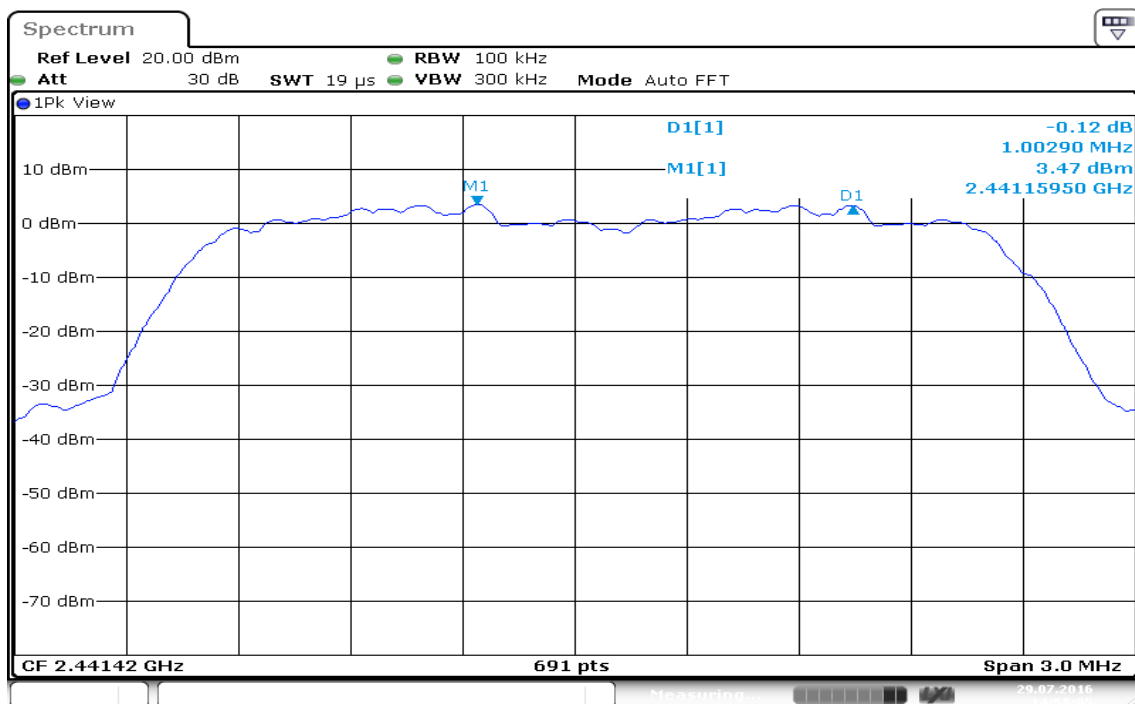
Measurement of Channel Separation / (CH High)

Date: 29.AUG.2016 09:54:27

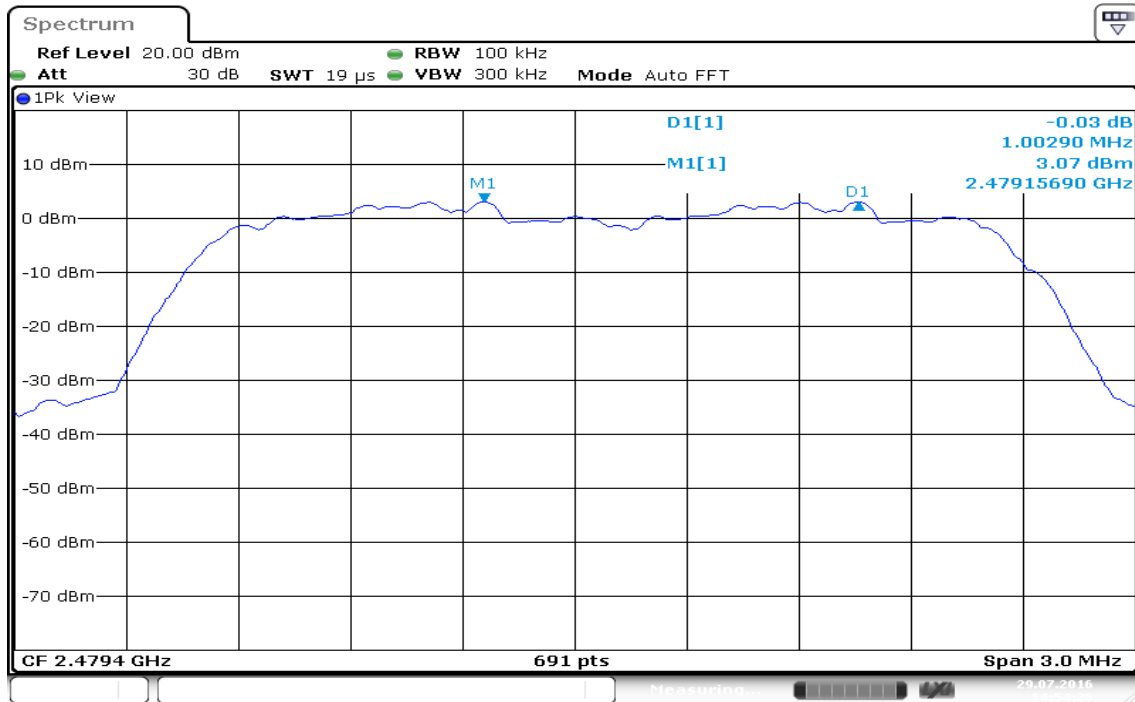
For 8DPSK / DH5

Measurement of Channel Separation / (CH Low)

Date: 29 JUL 2016 15:00:18

Measurement of Channel Separation / (CH Mid)

Date: 29 JUL 2016 14:58:05

Measurement of Channel Separation / (CH High)

Date: 29 JUL 2016 14:54:27

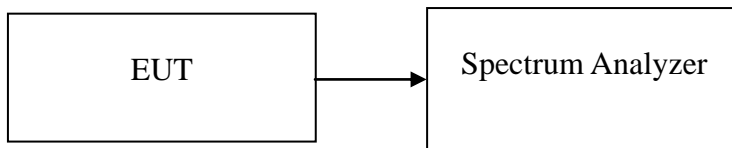
7.7 NUMBER OF HOPPING FREQUENCY

LIMIT

According to §15.247(a)(1)(ii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands shall use at least 75 hopping frequencies.

According to §15.247(a)(1)(iii) & RSS-247, Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands shall use at least 15 hopping frequencies.

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. RBW < 30% or channel spacing or 20 dB bandwidth, whichever is smaller.
4. Set spectrum analyzer Start Freq. = 2400 MHz, Stop Freq. = 2483.5 MHz, RBW = 100KHz, VBW = 300KHz
5. Max hold, view and count how many channel in the band.

TEST RESULTS

No non-compliance noted

Test Data

Number of Hopping				
Mode	Frequency (MHz)	Hopping Channel Number	Hopping Channel Number Limits	Result
BR-1Mbps	2402-2480	79	15	Pass
EDR-3Mbps	2402-2480	79	15	

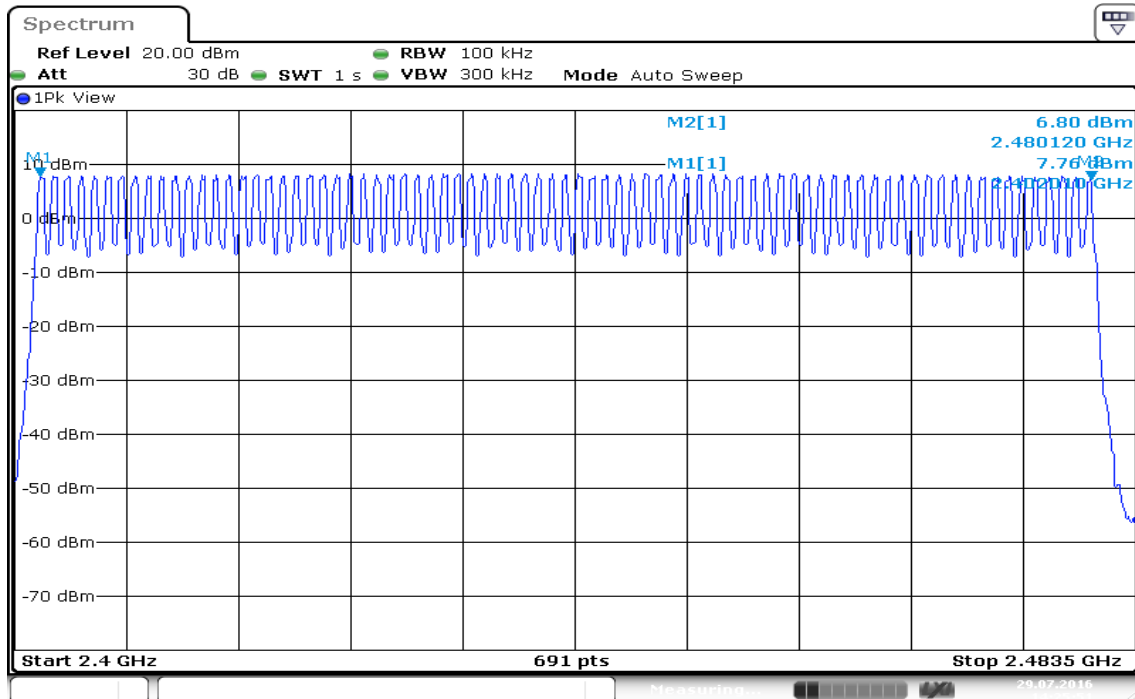
REMARK:

The frequency spectrum was broken up in to two sub-range to clearly show all of the hopping frequencies. In the AFH mode, this device operation was using 20 channels, so the requirement for minimum number of hopping channels is satisfied.

Test Plot

For GFSK

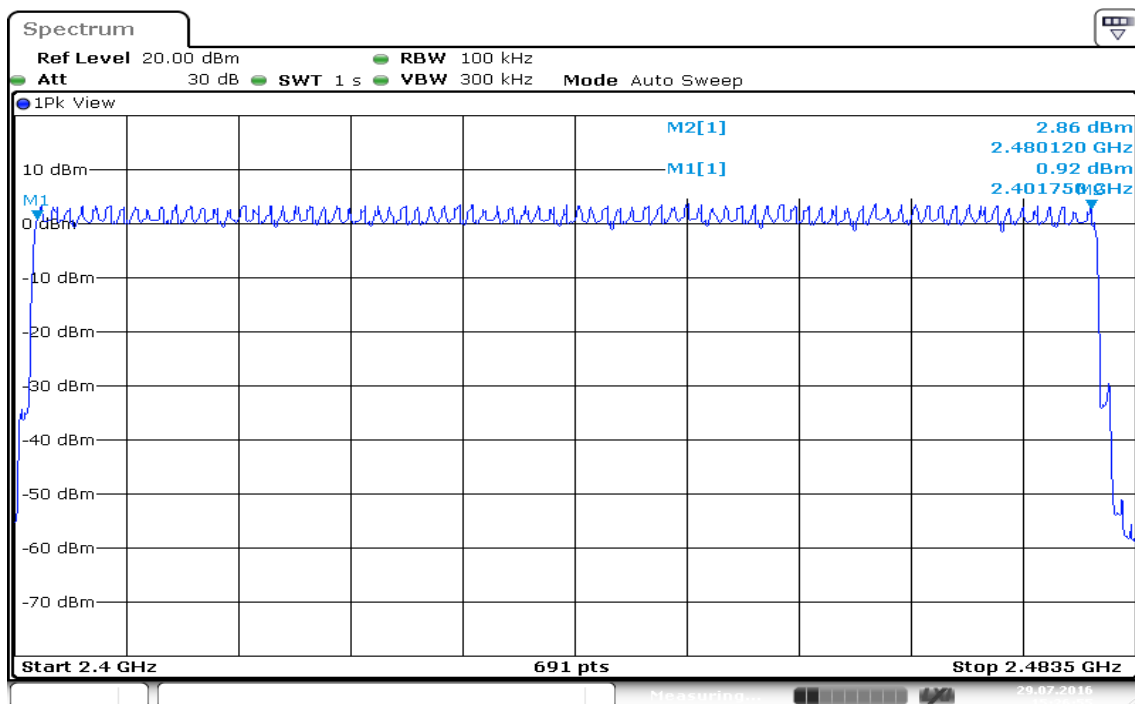
Channel Number



Date: 29 JUL 2016 14:25:51

For 8DPSK

Channel Number



Date: 29 JUL 2016 15:26:56

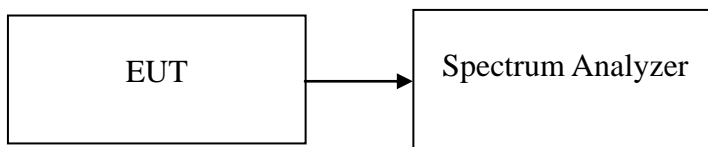
7.8 TIME OF OCCUPANCY (DWEELL TIME)

LIMIT

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

According to RSS-247, the average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Transmissions on particular hopping frequencies may be avoided or suppressed provided that a minimum of 15 hopping channels are used.

Test Configuration



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=1MHz, Sweep = 1 ms.
5. Repeat above procedures until all frequency measured were complete.

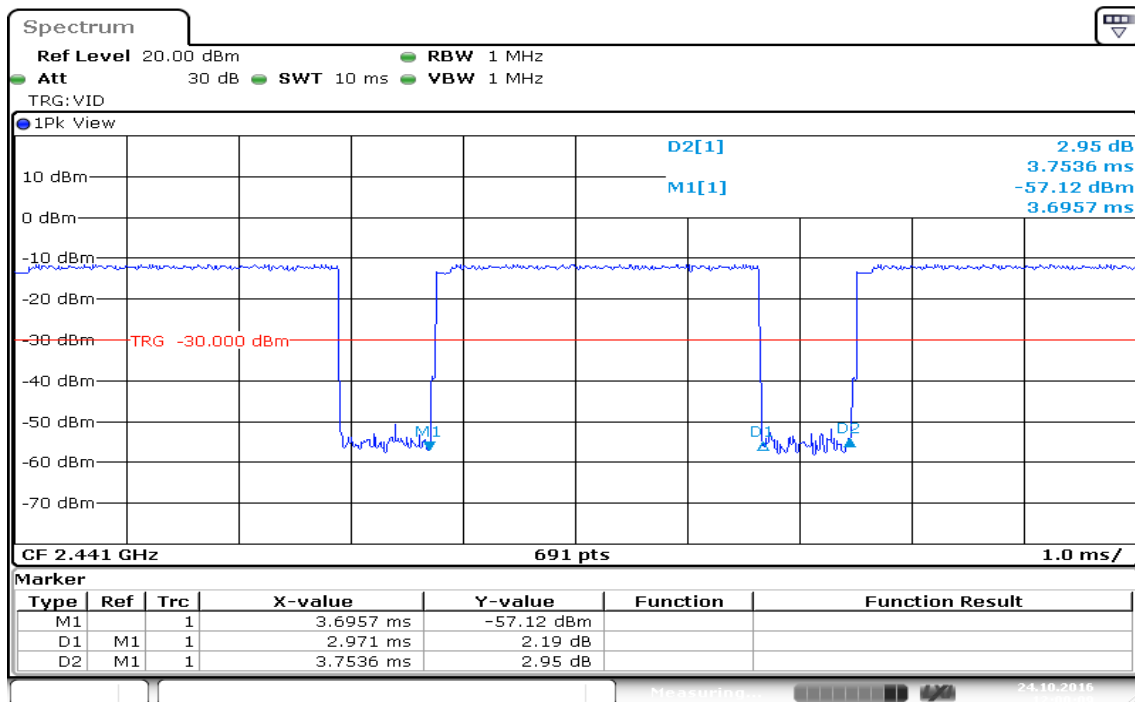
TEST RESULTS

No non-compliance noted

Test Data

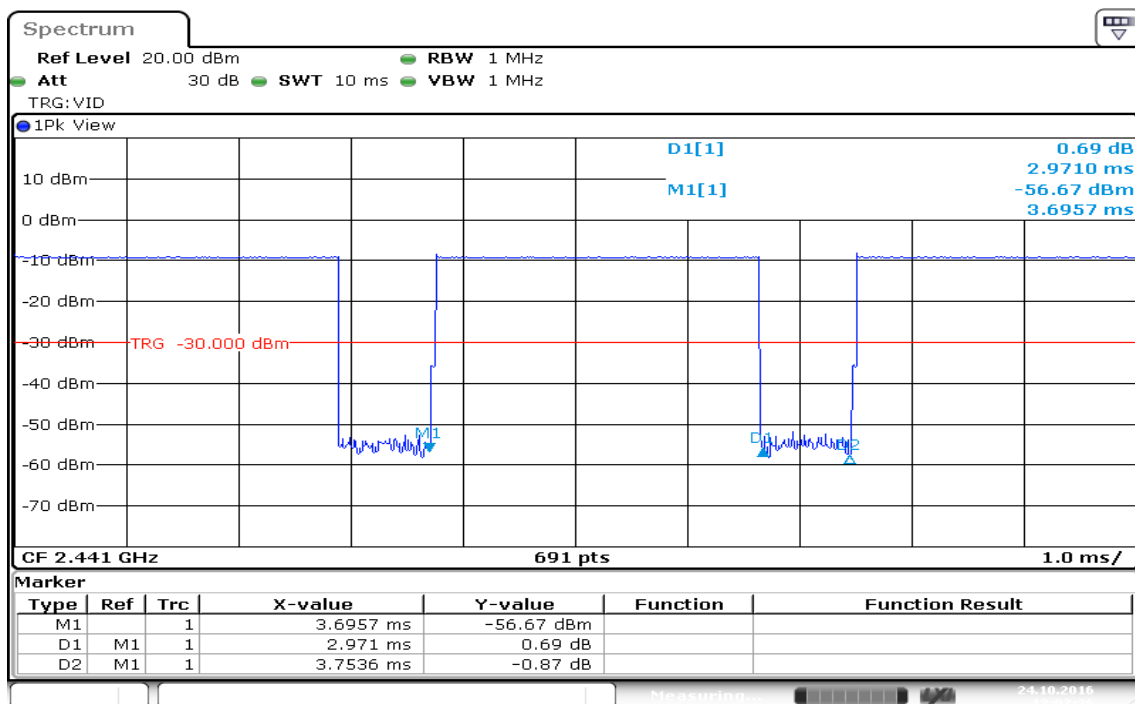
Time of Occupancy (Dwell Time)							
Mode	Frequency (MHz)	Pulse Time Per Hopping (ms)	Minimum Number of Hopping Freq.	Number of pulse in	Dwell Time IN	Dwell Time Limits (s)	Result
				(0.4 * N sec)	(0.4 * N sec)		
BR-1Mbps	2441	2.971	79	106.67	0.3169	0.4	Pass
EDR-3Mbps	2441	2.971	79	106.67	0.3169	0.4	
AFH: DH5	2441	2.971	20	53.33	0.1585	0.4	
Non-AFH: DH5 Packet permit maximum $1600/ 79 / 6 = 3.37$ hops per second in each channel (5 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times $3.37 * 0.4 * 79 = 106.6$							
AFH: DH5 Packet permit maximum $800/ 20 / 6 = 6.666$ hops per second in each channel (5 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times $6.666*0.4*20 = 53.33$							

BR-1Mbps



Date: 24 OCT 2016 12:00:09

EDR-3Mbps



Date: 24 OCT 2016 12:02:26

7.9 RADIATED EMISSIONS

LIMIT

All spurious emissions shall comply with the limits of §15.209(a) and RSS-Gen Table 2 & Table 4.

RSS-Gen Table 2 & Table 4: General Field Strength Limits for Transmitters and Receivers at Frequencies Above 30 MHz ^(Note)

Frequency (MHz)	Field Strength microvolts/m at 3 metres (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

Note: *Measurements for compliance with limits in the above table may be performed at distances other than 3 metres, in accordance with Section 6.5.

Transmitting devices are not permitted in Table 1 bands or, unless stated otherwise, in TV bands (54-72 MHz, 76-88 MHz, 174-216 MHz, 470-608 MHz and 614-806 MHz).

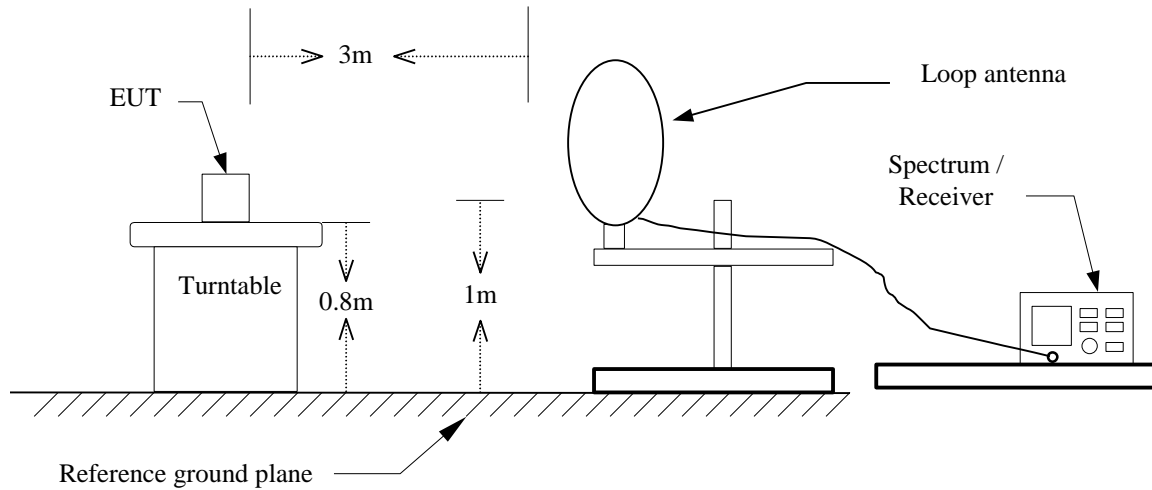
RSS-Gen Table 5: General Field Strength Limits for Transmitters at Frequencies Below 30 MHz (Transmit)

Frequency	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/377F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	24,000/377F (F in kHz)	30
1.705-30 MHz	30	N/A	30

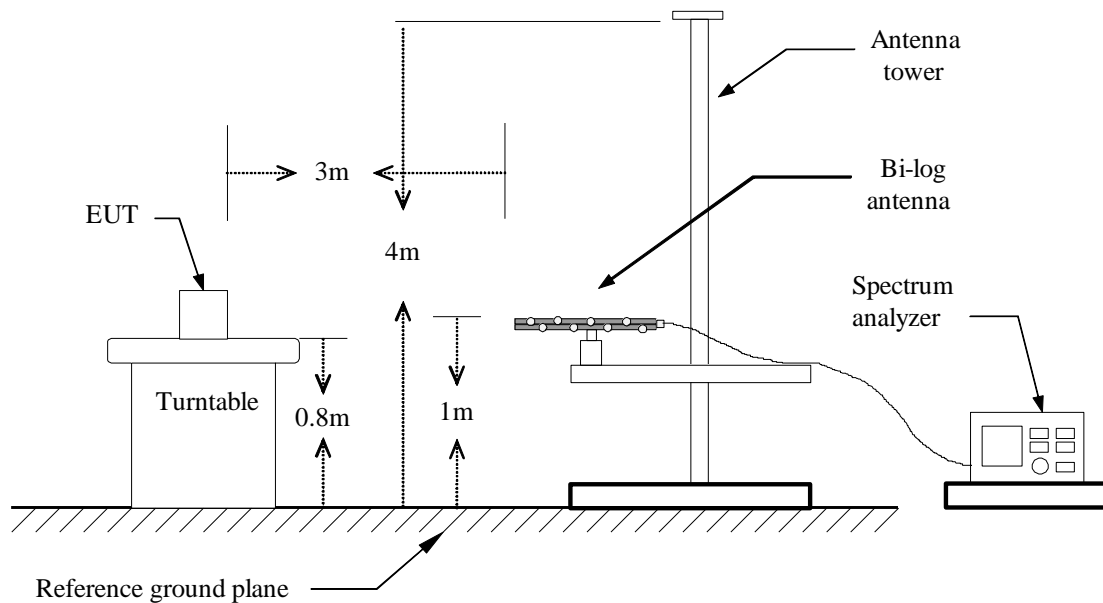
Note: The emission limits for the bands 9-90 kHz and 110-490 kHz are based on measurements employing an average detector.

Test Configuration

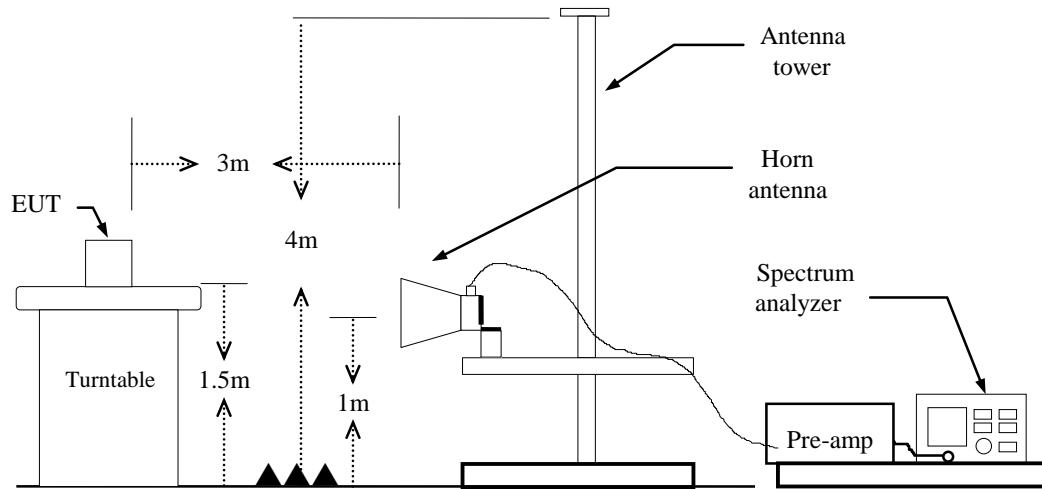
9kHz ~ 30MHz



30MHz ~ 1GHz



Above 1 GHz



TEST PROCEDURE

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m high and below 1 GHz is 0.8m high above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

Below 1GHz:

RBW=100kHz / VBW=300kHz / Sweep=AUTO

Above 1GHz:

(a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO

(b) AVERAGE: RBW=1MHz,
if duty cycle $\geq 98\%$, VBW=10Hz.
if duty cycle $< 98\%$ VBW=1/T.

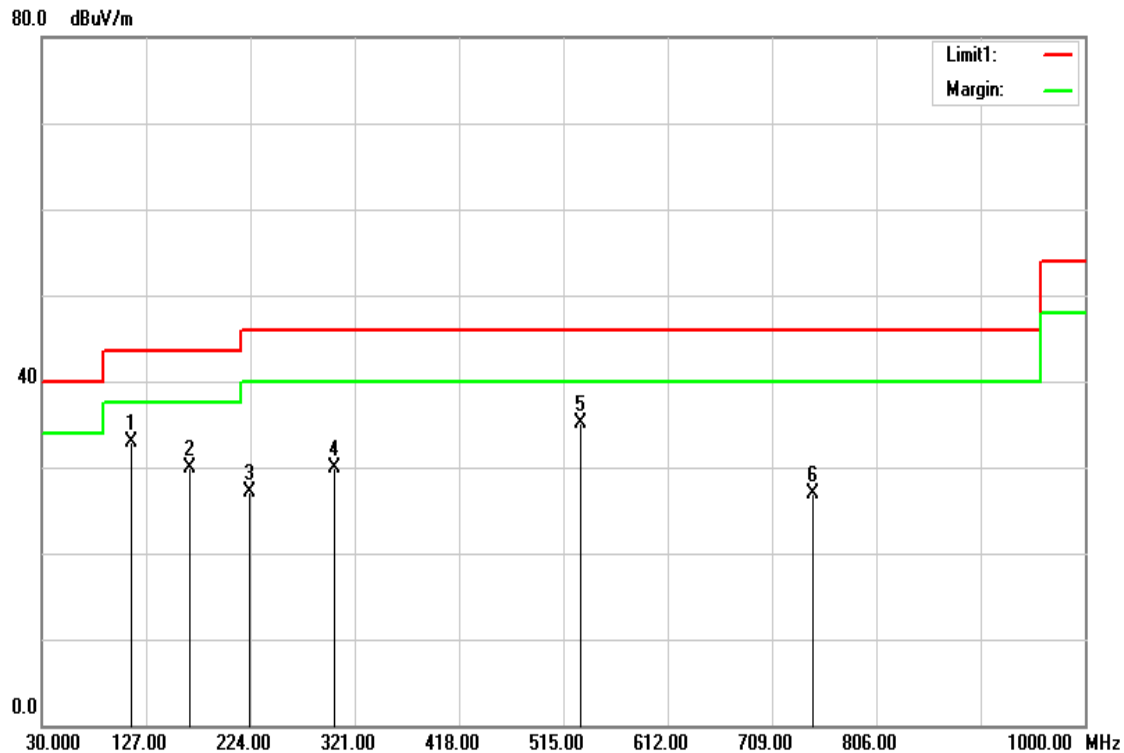
About Test

BT: = 78%, VBW= 360Hz

EDR = 79%, VBW= 360Hz

7. Repeat above procedures until the measurements for all frequencies are complete.
8. Result = Spectrum Reading + cable loss(spectrum to Amp) - Amp Gain + Cable loss(Amp to receive Ant)+ Receive Ant
9. Transmitter Radiated Unwanted Emissions: For test mode BR and EDR were pretest. The worst case was BR-1Mbps in this test report.

Note: We checked every harmonics frequencies from Fundamental frequencies with reduced VBW, and we mark a point to prove pass or not if we find any emission. For this case, there are no emissions hidden in the noise floor.

TEST RESULTS**Below 1GHz****Operation Mode:** Normal Link**Test Date:** October 21, 2016**Temperature:** 27°C**Tested by:** Dennis Li**Humidity:** 53% RH**Polarity:** Ver.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
113.4200	49.52	-16.66	32.86	43.50	-10.64	peak	V
167.7400	46.70	-16.74	29.96	43.50	-13.54	peak	V
223.0300	43.94	-16.89	27.05	46.00	-18.95	peak	V
301.6000	44.02	-14.20	29.82	46.00	-16.18	peak	V
530.5200	43.93	-8.78	35.15	46.00	-10.85	peak	V
746.8300	31.83	-4.99	26.84	46.00	-19.16	peak	V

Remark:

1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).

Operation Mode: Normal Link

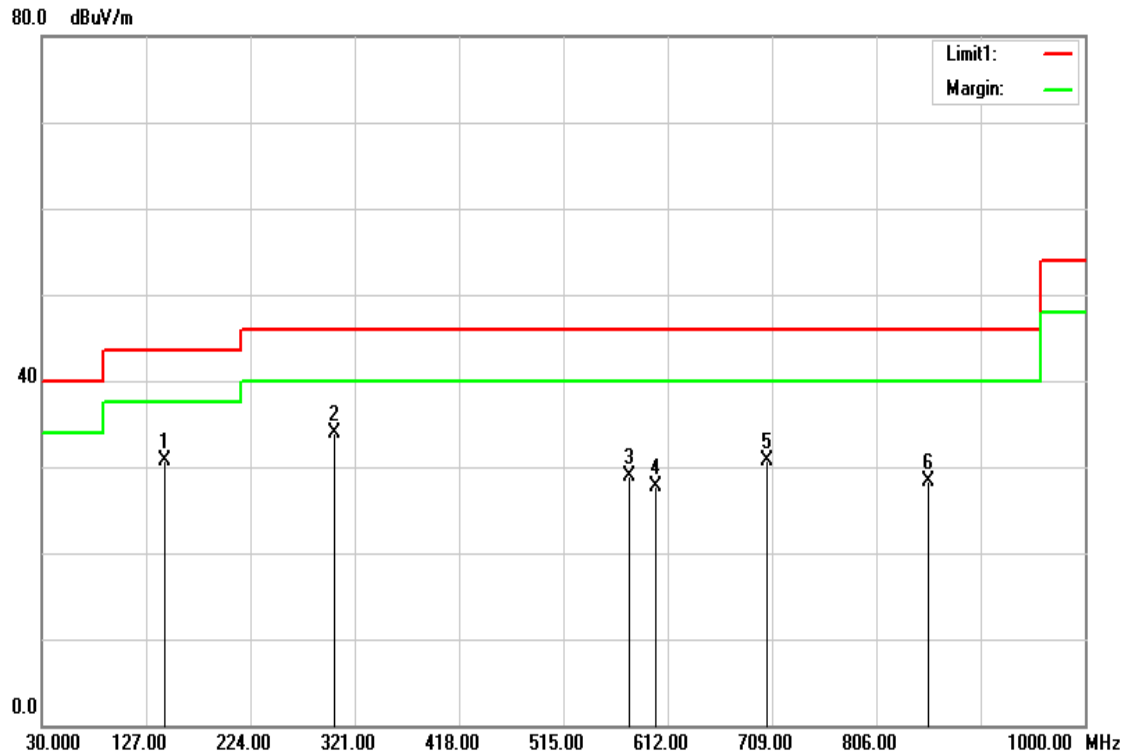
Test Date: October 21, 2016

Temperature: 27°C

Tested by: Dennis Li

Humidity: 53% RH

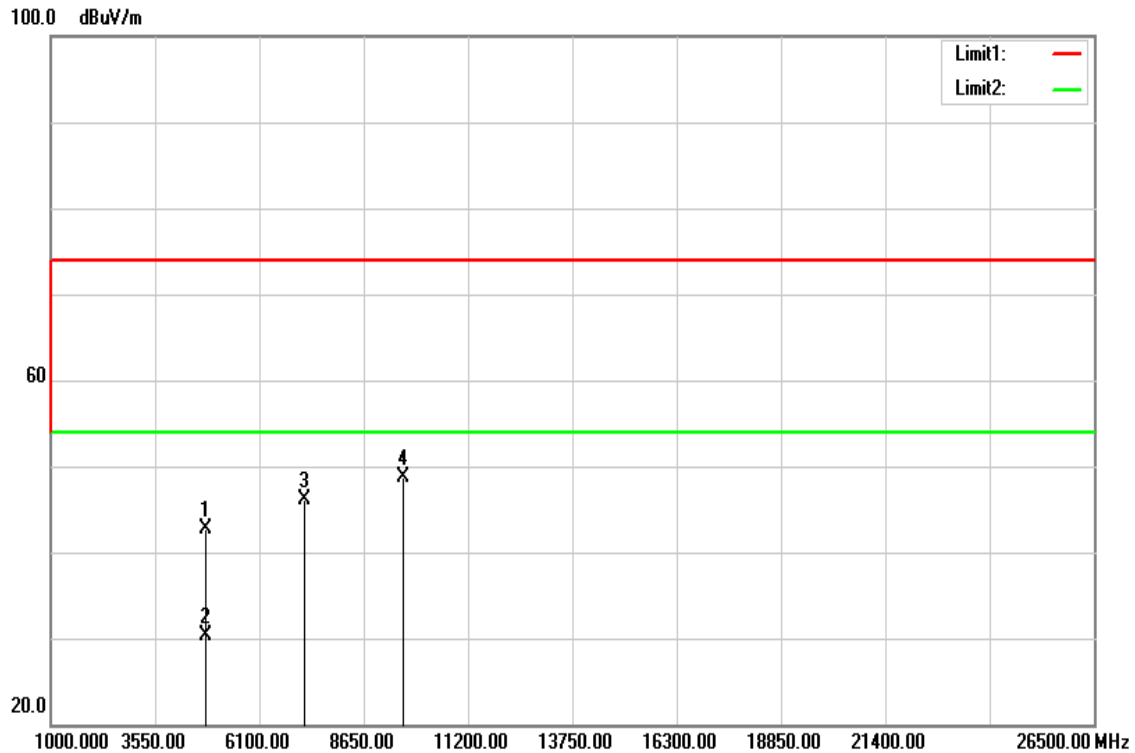
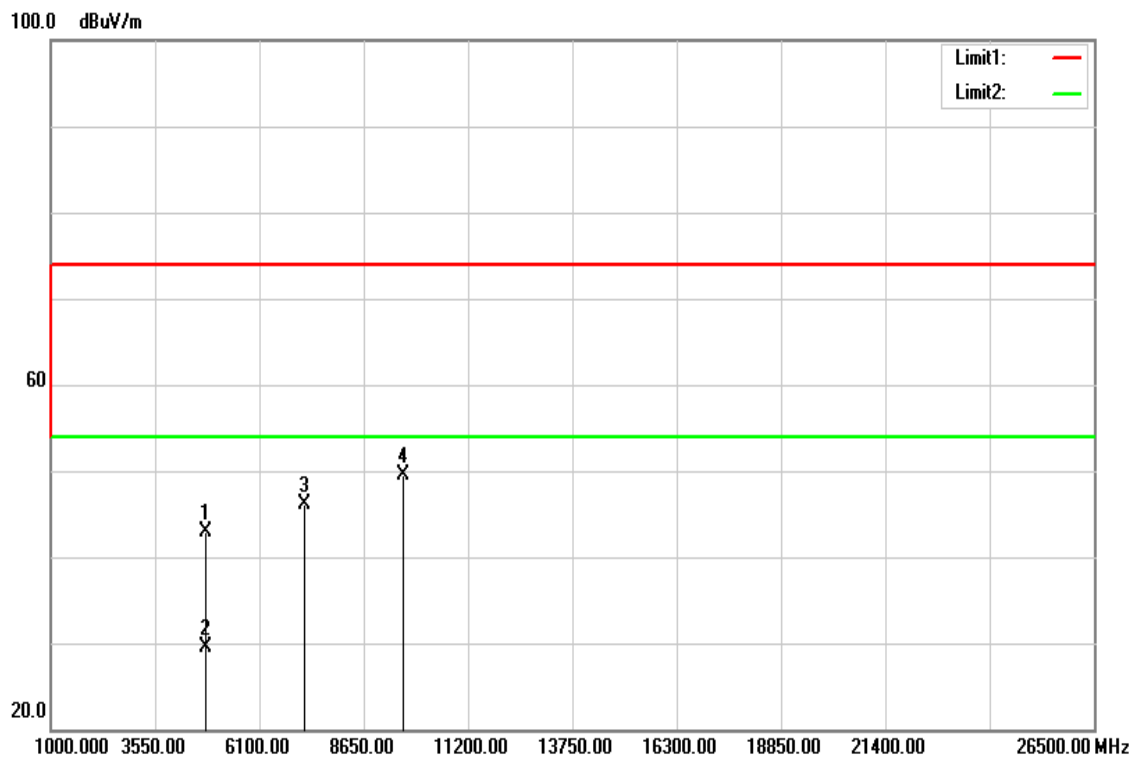
Polarity: Hor.



Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
144.4600	46.70	-15.91	30.79	43.50	-12.71	peak	H
301.6000	48.08	-14.20	33.88	46.00	-12.12	peak	H
576.1100	37.03	-8.11	28.92	46.00	-17.08	peak	H
600.3600	35.49	-7.75	27.74	46.00	-18.26	peak	H
704.1500	36.67	-5.97	30.70	46.00	-15.30	peak	H
854.5000	31.97	-3.73	28.24	46.00	-17.76	peak	H

Remark:

1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.
3. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
4. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
5. Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).

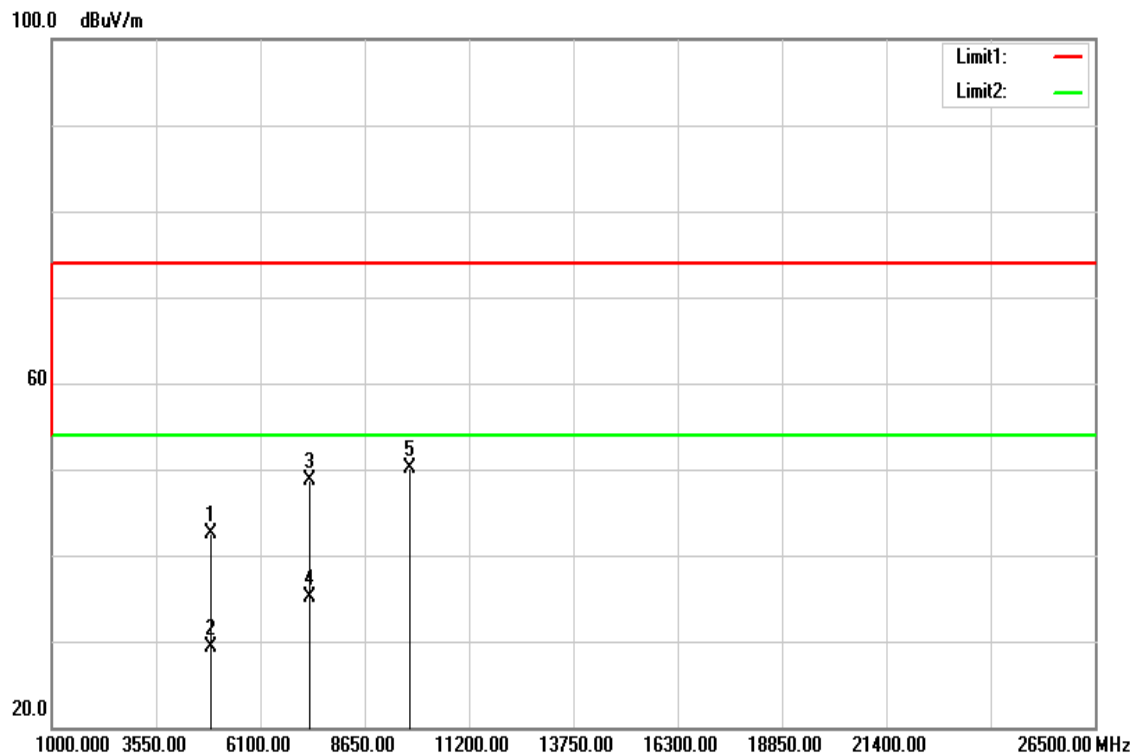
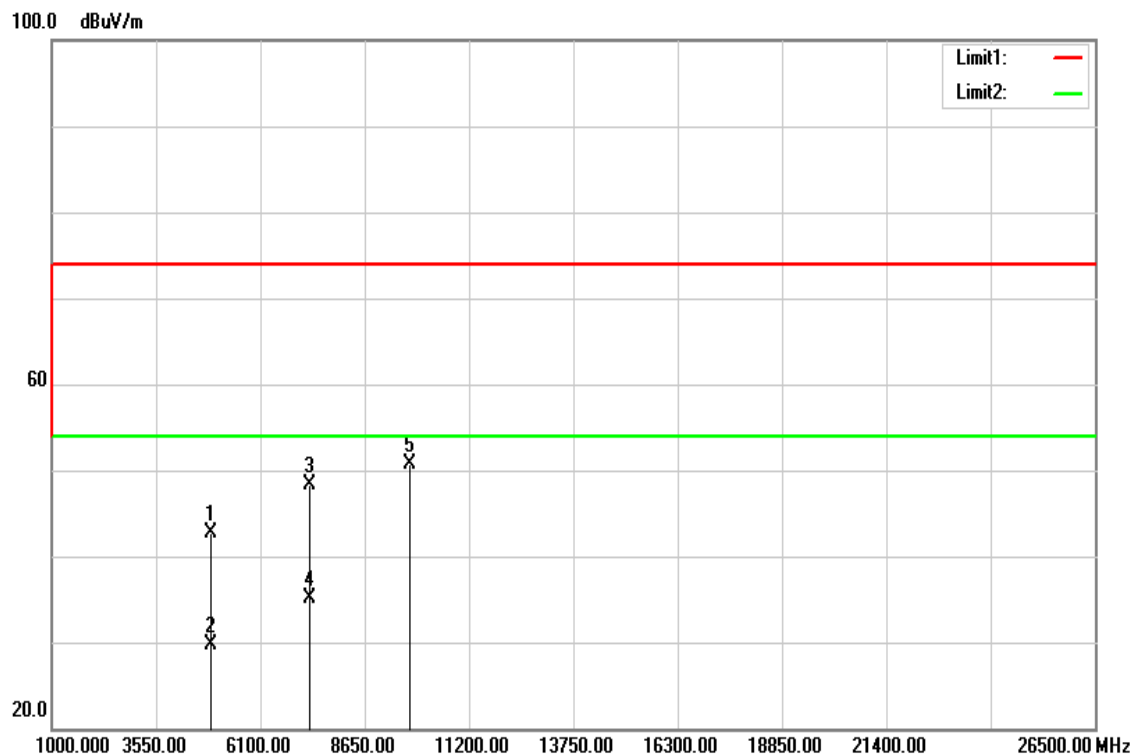
Above 1 GHz**TX /DH5 / CH Low****Polarity: Vertical****Polarity: Horizontal**

Above 1 GHz**Operation Mode:** TX / DH5 / CH Low**Test Date:** October 22, 2016**Temperature:** 27°C**Tested by:** Dennis Li**Humidity:** 53 % RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
4804.000	37.70	5.04	42.74	74.00	-31.26	peak	V
4804.000	25.22	5.04	30.26	54.00	-23.74	AVG	V
7206.000	33.52	12.62	46.14	74.00	-27.86	peak	V
9608.000	31.18	17.60	48.78	74.00	-25.22	peak	V
N/A							
4804.000	37.90	5.04	42.94	74.00	-31.06	peak	H
4804.000	24.52	5.04	29.56	54.00	-24.44	AVG	H
7206.000	33.49	12.62	46.11	74.00	-27.89	peak	H
9608.000	31.88	17.60	49.48	74.00	-24.52	peak	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

TX / DH5 / CH Mid**Polarity: Vertical****Polarity: Horizontal**

Operation Mode: TX / DH5 / CH Mid

Test Date: October 22, 2016

Temperature: 26°C

Tested by: Dennis Li

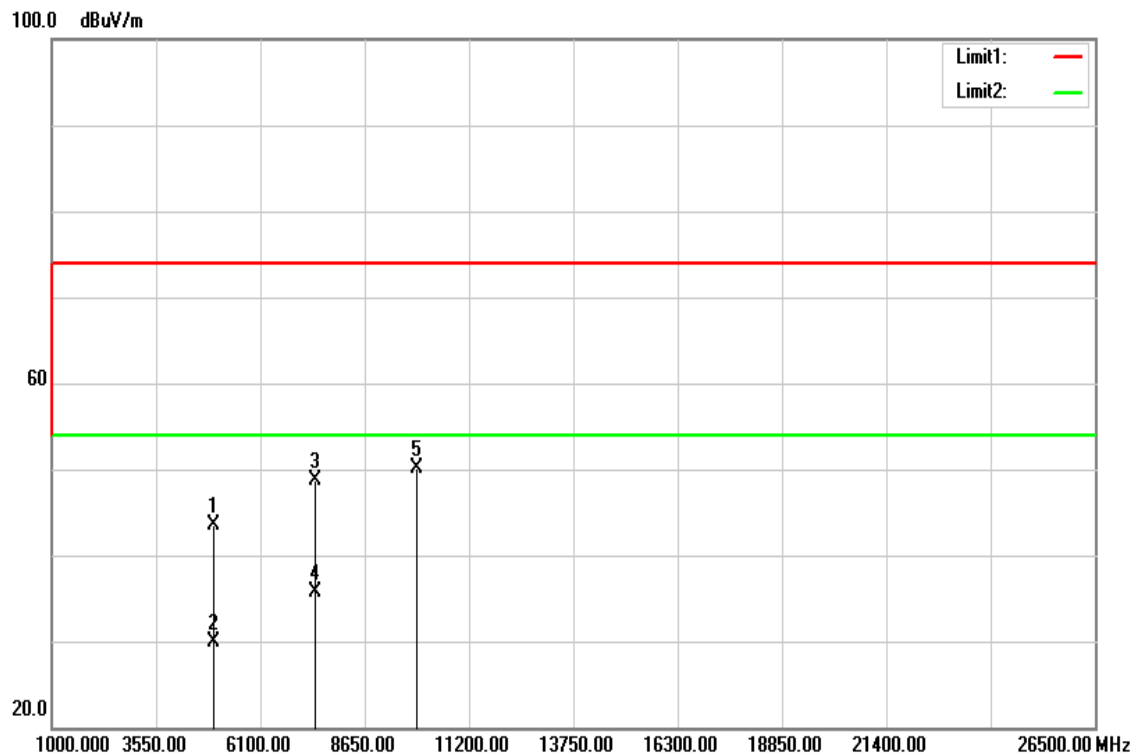
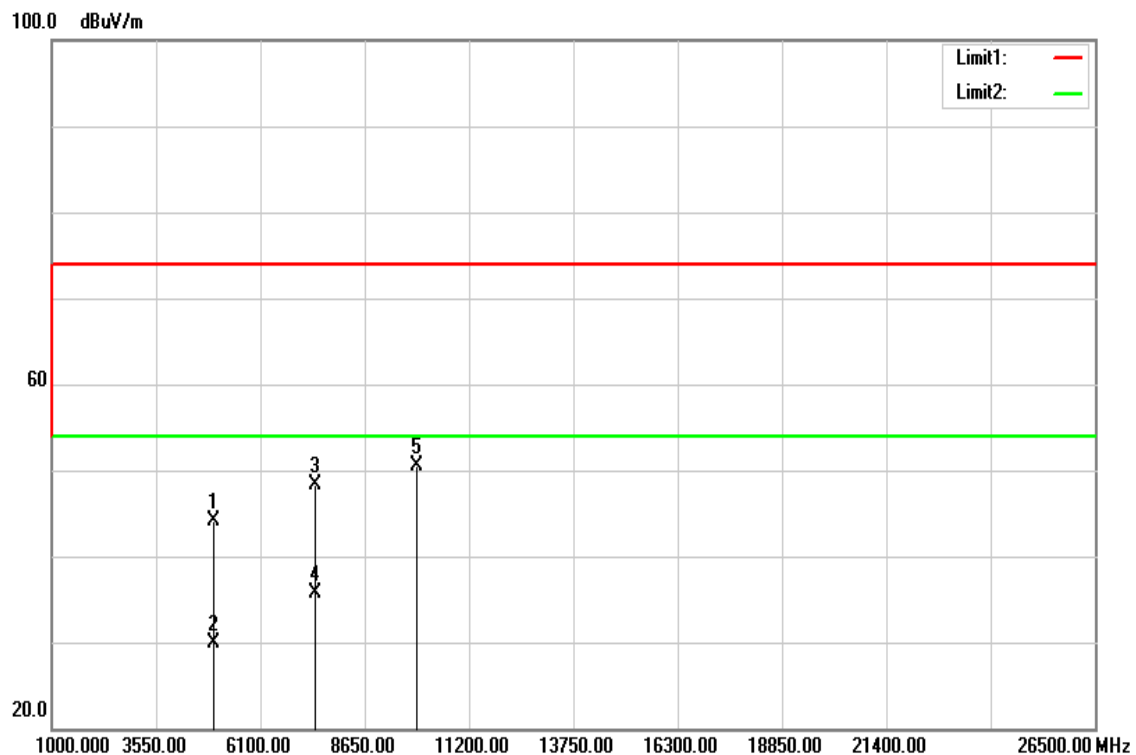
Humidity: 50 % RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
4880.000	37.27	5.25	42.52	74.00	-31.48	peak	V
4880.000	24.13	5.25	29.38	54.00	-24.62	AVG	V
7320.000	35.82	12.97	48.79	74.00	-25.21	peak	V
7320.000	22.04	12.97	35.01	54.00	-18.99	AVG	V
9760.000	32.49	17.60	50.09	74.00	-23.91	peak	V
N/A							
4880.000	37.50	5.25	42.75	74.00	-31.25	peak	H
4880.000	24.40	5.25	29.65	54.00	-24.35	AVG	H
7320.000	35.37	12.97	48.34	74.00	-25.66	peak	H
7320.000	22.13	12.97	35.10	54.00	-18.90	AVG	H
9760.000	33.16	17.60	50.76	74.00	-23.24	peak	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. $\text{Margin (dB)} = \text{Remark result (dBuV/m)} - \text{Average limit (dBuV/m)}$.

TX / DH5 / CH High**Polarity: Vertical****Polarity: Horizontal**

Operation Mode: TX / DH5 / CH High

Test Date: October 22, 2016

Temperature: 26°C

Tested by: Dennis Li

Humidity: 50 % RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant.Pol. (H/V)
4960.000	38.04	5.46	43.50	74.00	-30.50	peak	V
4960.000	24.49	5.46	29.95	54.00	-24.05	AVG	V
7440.000	35.46	13.33	48.79	74.00	-25.21	peak	V
7440.000	22.43	13.33	35.76	54.00	-18.24	AVG	V
9920.000	32.50	17.60	50.10	74.00	-23.90	peak	V
N/A							
4960.000	38.55	5.46	44.01	74.00	-29.99	peak	H
4960.000	24.45	5.46	29.91	54.00	-24.09	AVG	H
7440.000	35.00	13.33	48.33	74.00	-25.67	peak	H
7440.000	22.39	13.33	35.72	54.00	-18.28	AVG	H
9920.000	32.96	17.60	50.56	74.00	-23.44	peak	H
N/A							

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. $\text{Margin (dB)} = \text{Remark result (dBuV/m)} - \text{Average limit (dBuV/m)}$.

7.10 POWERLINE CONDUCTED EMISSIONS

LIMIT

According to §15.207(a) & RSS-Gen §8.8, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

* Decreases with the logarithm of the frequency.

Test Configuration

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Test Data

Operation Mode: Normal Link **Test Date:** October 20, 2016
Temperature: 24°C **Tested by:** Dennis Li
Humidity: 56% RH

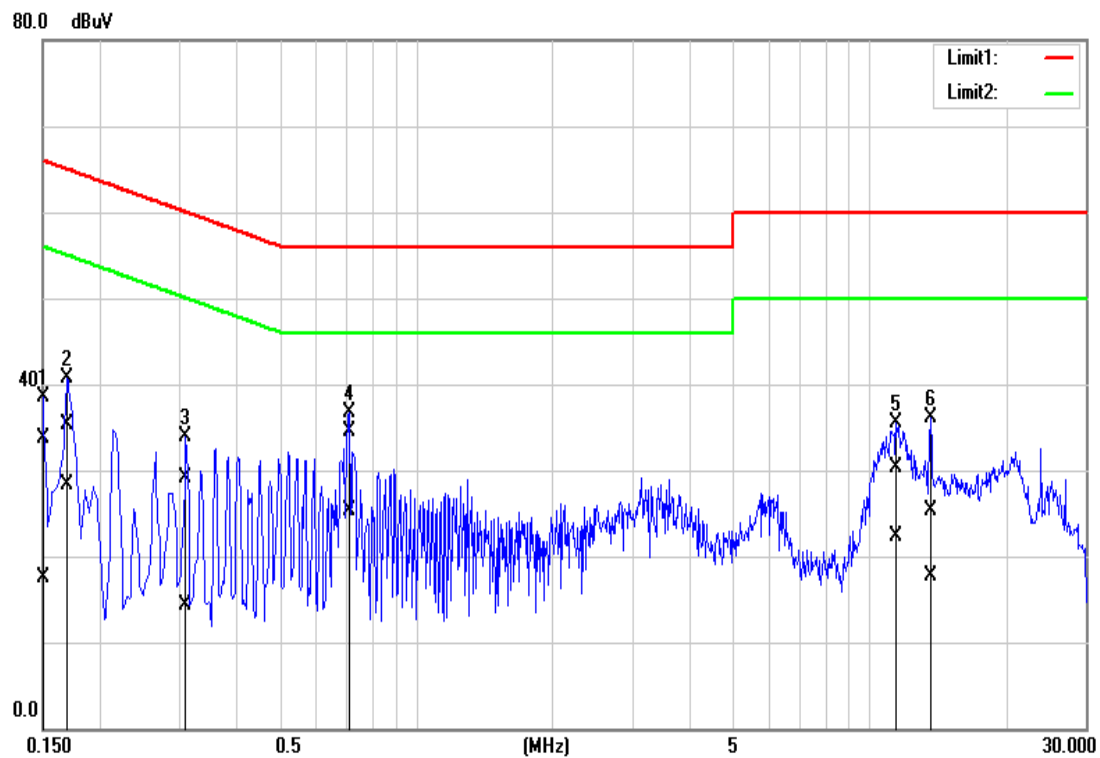
Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB/m)	QP Result (dBuV/m)	AV Result (dBuV/m)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.1500	23.93	7.87	9.71	33.64	17.58	65.99	56.00	-32.35	-38.42	L1
0.1700	25.50	18.66	9.71	35.21	28.37	64.96	54.96	-29.75	-26.59	L1
0.3100	19.45	4.55	9.70	29.15	14.25	59.97	49.97	-30.82	-35.72	L1
0.7140	24.80	15.66	9.71	34.51	25.37	56.00	46.00	-21.49	-20.63	L1
11.4420	20.50	12.51	9.80	30.30	22.31	60.00	50.00	-29.70	-27.69	L1
13.6420	15.39	7.86	9.82	25.21	17.68	60.00	50.00	-34.79	-32.32	L1
0.1620	24.04	19.49	9.78	33.82	29.27	65.36	55.36	-31.54	-26.09	L2
0.7140	28.60	16.13	9.76	38.36	25.89	56.00	46.00	-17.64	-20.11	L2
1.6300	18.51	8.71	9.77	28.28	18.48	56.00	46.00	-27.72	-27.52	L2
2.5100	18.76	8.87	9.79	28.55	18.66	56.00	46.00	-27.45	-27.34	L2
10.8300	20.55	8.39	10.04	30.59	18.43	60.00	50.00	-29.41	-31.57	L2
20.8460	18.29	7.67	10.28	28.57	17.95	60.00	50.00	-31.43	-32.05	L2

Remark:

1. Measuring frequencies from 0.15 MHz to 30MHz.
2. The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.
3. The IF bandwidth of SPA between 0.15MHz to 30MHz was 10kHz; the IF bandwidth of Test Receiver between 0.15MHz to 30MHz was 9kHz;
4. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)

Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)

