CERTIFICATE #3478.01

TEST REPORT

EUT Description	**WLAN and BT, 2x2 PCIe M.2 1216 SD adapter card, LTE Coexistence**
Brand Name	**Intel® Wireless-AC 9560**
Model Name	**9560D2WL**
FCC ID ISED ID	**PD99560D2L** **1000M-9560D2L**
Date of Test Start/End	**2018-02-19 / 2018-03-09**
Features	**802.11ac, Dual Band, 2x2 Wi-Fi + Bluetooth® 5** (see section 5)

Applicant	**Intel Mobile Communications**
Address	**100 Center Point Circle, Suite 200** **Columbia, South Carolina 29210** **USA**
Contact Person	**Steven Hackett**
Telephone/Fax/ Email	**steven.c.hackett@intel.com**

Reference Standards	**FCC CFR Title 47 Part 15 C** **RSS-247 issue 2, RSS-Gen issue 4** (see section 1)

Test Report identification	**180201-02.TR05**
Revision Control	**Rev. 00** **This test report revision replaces any previous test report revision** (see section 8)

The test results relate only to the samples tested.
The test report shall not be reproduced in full, without written approval of the laboratory.

Issued by

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Table of Contents

1. Standards, reference documents and applicable test methods

1. FCC 47 CFR part 15 - Subpart C – §15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.
2. FCC 47 CFR part 15 - Subpart C – §15.209 Radiated emission limits; general requirements.
3. ANSI C63.10-2013 - American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
4. DA 00-705 Released March 30, 2000 - Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems
5. RSS-247 Issue 2 - Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
6. RSS-Gen Issue 4 - General Requirements for Compliance of Radio Apparatus.

2. General conditions, competences and guarantees

- ✓ Intel Mobile Communications France SAS Wireless RF Lab (Intel WRF Lab) is an ISO/IEC 17025:2005 testing laboratory accredited by the American Association for Laboratory Accreditation (A2LA) with the certificate number 3478.01.
- ✓ Intel Mobile Communications France SAS Wireless RF Lab (Intel WRF Lab) is an Accredited Test Firm recognized by the FCC, with Designation Number FR0011.
- ✓ Intel Mobile Communications France SAS Wireless RF Lab (Intel WRF Lab) is a Registered Test Site listed by ISED, with ISED Assigned Code 1000Y.
- ✓ Intel WRF Lab only provides testing services and is committed to providing reliable, unbiased test results and interpretations.
- ✓ Intel WRF Lab is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.
- ✓ Intel WRF Lab has developed calibration and proficiency programs for its measurement equipment to ensure correlated and reliable results to its customers.
- ✓ This report is only referred to the item that has undergone the test.
- ✓ This report does not imply an approval of the product by the Certification Bodies or competent Authorities.

3. Environmental Conditions

- ✓ At the site where the measurements were performed the following limits were not exceeded during the tests:

Temperature	22 ºC ±3 ºC
Humidity	35 % ± 15 %

4. Test samples

Sample	Control #	Description	Model	Serial #	Date of receipt	Note
#01	180201-02.S01	Module	9560D2WL	WFM: 3413E87ED82B	2018-02-14	Used for conducted tests
	170524-02.S15	Extender Board	PCB00609_01	6092416-442	2017-05-30	
	170000-01.S01	Laptop	Latitude E5470	DPBLMC2	2017-03-28	
	170220-04.S04	Adapter 1216SD to M.2	JfP Adapter M2	N/A	2017-04-10	
#02	180201-02.S03	Module	9560D2WL	WFM:3413E87ED853	2018-02-14	Used for Emission spurious tests from 30 MHz to 1 GHz and AC power-line conducted emission tests
	170220-02.S03	Extender Board	PCB00609_01	6092416-446	2017-02-20	
	170000-01.S13	Laptop	Latitude E5470	FT6LMC2	2017-05-30	
	170727-02.S16	Adapter 1216SD to M.2	JfP Adapter M2	N/A	2017-07-27	
#03	180201-02.S04	Module	9560D2WL	WFM:3413E87ED803	2018-02-14	Used for Emission spurious tests from 1GHz to 26.5 GHz
	170220-02.S04	Extender Board	PCB00609_01	6092416-493	2017-02-20	
	170000-01.S16	Laptop	Latitude E5470	C2HTPF2	2017-06-13	
	170727-02.S13	Adapter 1216SD to M.2	JfP Adapter M2	N/A	2017-08-09	

5. EUT Features

Brand Name	Intel® Wireless-AC 9560
Model Name	9560D2WL
FCC ID	PD99560D2L
ISED ID	1000M-9560D2L
Software Version	11.1807.0-07027
Driver Version	99.0.28.6
Prototype / Production	Production
Supported Radios	802.11b/g/n 2.4GHz (2400.0 – 2483.5 MHz) 802.11a/n/ac 5.2GHz (5150.0 – 5350.0 MHz) 5.6GHz (5470.0 – 5725.0 MHz) 5.8GHz (5725.0 – 5850.0 MHz) Bluetooth 5 2.4GHz (2400.0 – 2483.5 MHz)
Antenna Information	CHAIN A: PIFA antenna. WiFi 2.4GHz & 5GHz and BT CHAIN B: PIFA antenna. WiFi 2.4GHz & 5GHz
Additional Information	

6. Remarks and comments

N/A

7. Test Verdicts summary

7.1. BT Basic Data Rate / Enhanced Data Rate

FCC part	RSS part	Test name	Verdict
15.247 (a) (1)	RSS-247 Clause 5.1 (a) and (b)	20dB Bandwidth and Carrier frequency separation	P
15.247 (a) (1) (iii)	RSS-247 Clause 5.1 (d)	Number of hopping channels	P
15.247 (a) (1) (iii)	RSS-247 Clause 5.1 (d)	Time of Occupancy (Dwell Time)	P
15.247 (b) (1)	RSS-247 Clause 5.4 (b)	Maximum Peak Output Power and antenna gain	P
15.247 (d)	RSS-247 Clause 5.5	Out-of-band Emissions (conducted)	P
15.247 (d) 15.209	RSS-247 Clause 5.5 RSS GEN Clause 8.9	Out-of-band Emissions (radiated)	P
15.207	RSS-GEN Clause 8.8	AC power-line conducted emission measurements	P

8. Document Revision History

Revision #	Date	Modified by	Revision Details
Rev.00	2018-03-08	F. Nsengiyumva Z.Ouachicha	First Issue

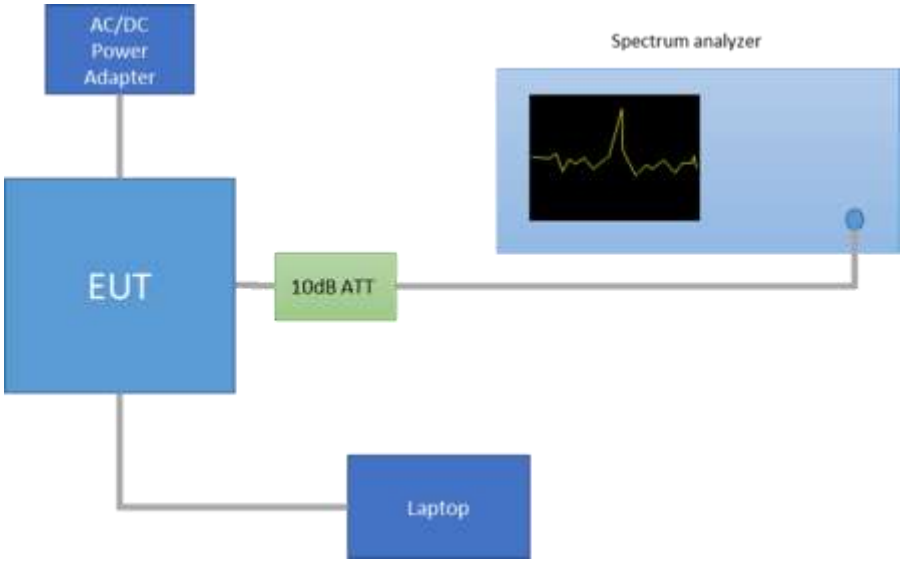
Annex A. Test & System Description

A.1 Measurement System

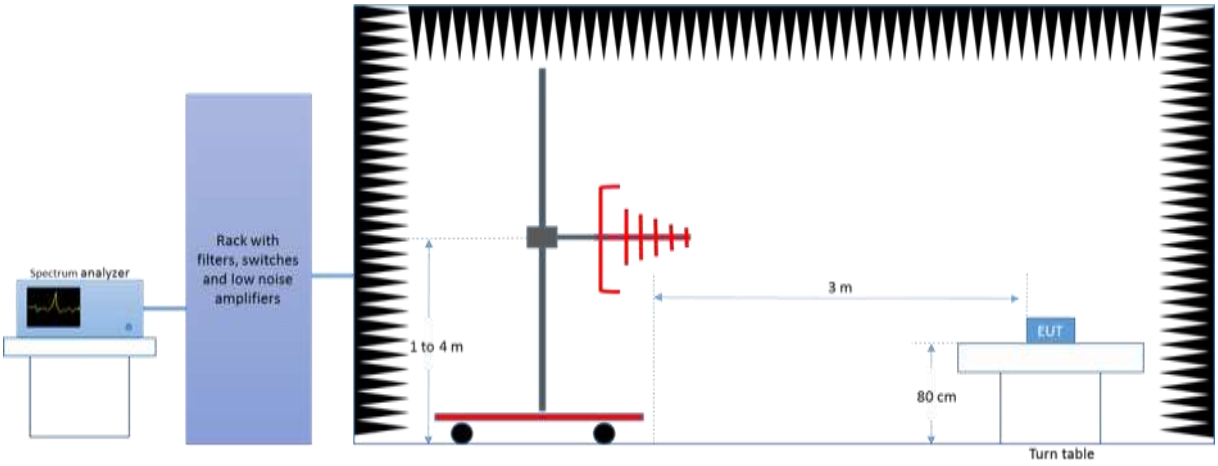
Measurements were performed using the following setups.

The DUT was installed in a test fixture and this test fixture is connected to a laptop computer and AC/DC power adapter. The laptop computer was used to configure the EUT to continuously transmit at a specified output power using all different modes and modulation schemes.

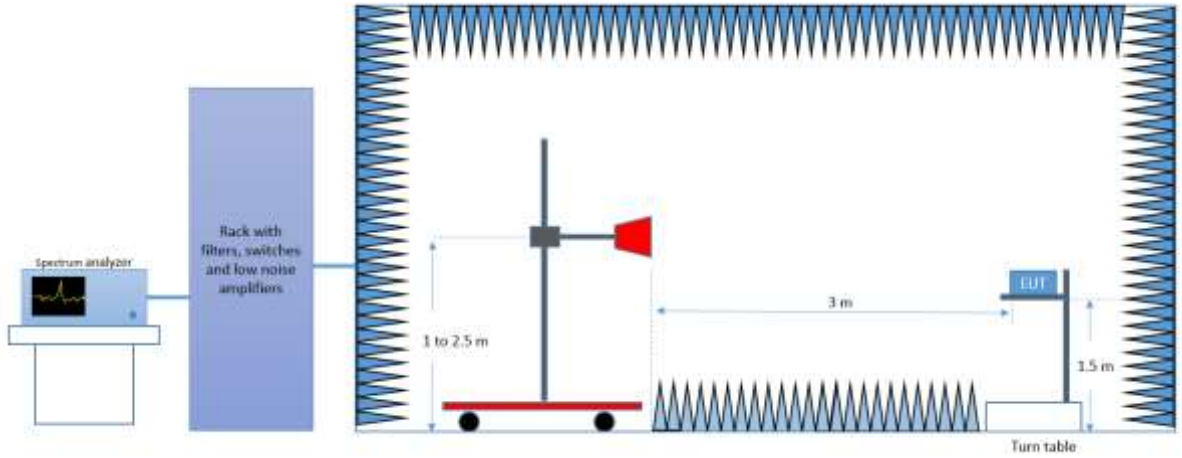
Conducted Setup



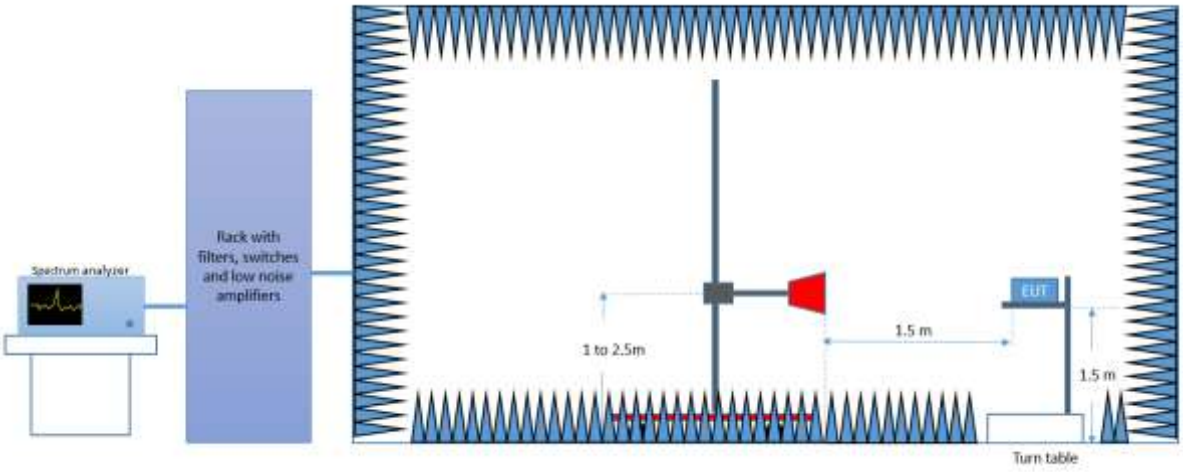
Radiated Setup 30 MHz- 1 GHz



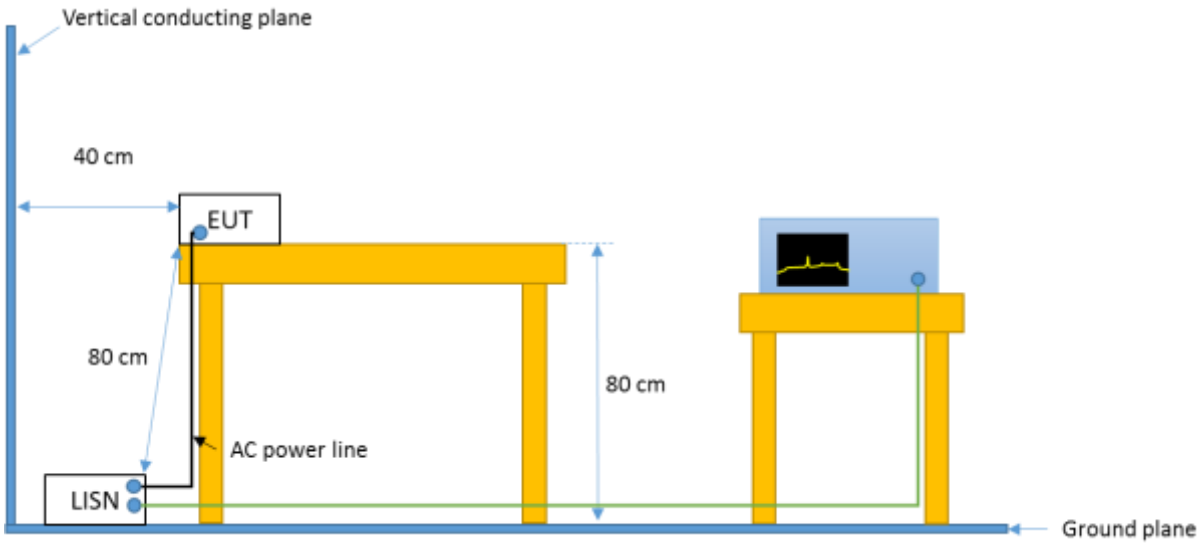
Radiated Setup 1 GHz – 18 GHz



Radiated Setup 18 GHz – 26.5 GHz



AC power-line conducted emission Setup 150 kHz – 30 MHz



A.2 Test Equipment List

Conducted Setup

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
0316	Spectrum analyzer	FSV30	103309	Rohde & Schwarz	2017-09-22	2019-09-22

Radiated Setup-1

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
0133	Spectrum analyzer	FSV40	101358	Rohde & Schwarz	2016-04-15	2018-04-15
0137	Log antenna 30 MHz – 1 GHz	3142E	00156946	ETS Lindgren	2017-12-19	2019-12-19
0135	Semi Anechoic chamber	FACT 3	5720	ETS Lindgren	2016-04-28	2018-04-28
0530	Measurement Software	EMC32	100623	Rohde & Schwarz	N/A	N/A

N/A: Not Applicable

Radiated Setup-2

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
0420	Spectrum analyzer	FSV40	101556	Rohde & Schwarz	2016-04-14	2018-04-14
0138	Horn antenna 1 GHz – 6.4 GHz	3117	00152266	ETS Lindgren	2016-03-14	2018-03-14
0141	Double Ridged Horn Antenna 1 GHz – 18 GHz	3117	00157736	ETS Lindgren	2016-04-13	2018-04-13
0334	Double Ridged Horn Antenna 18 GHz – 40 GHz	3116C-PA	00196308	ETS Lindgren	2017-08-22	2019-08-22
0337	Full Anechoic chamber	RFD_FA_100	5996	ETS Lindgren	2016-04-28	2018-04-28
0329	Measurement Software	EMC32	100401	Rohde & Schwarz	N/A	N/A

N/A: Not Applicable

Radiated Setup - shared equipments

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
0617	Power Sensor 50MHz-18GHz	NRP-Z81	104386	Rohde & Schwarz	2017-05-24	2019-05-24
0618	Power Sensor 50MHz-18GHz	NRP-Z81	104382	Rohde & Schwarz	2017-05-24	2019-05-24

AC power-line conducted emission Setup

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
0027	Measurement software	EMC32	1300.7010.02	Rohde & Schwarz	NA	NA
0317	Spectrum Analyzer	FSV30	103308	Rohde & Schwarz	2017-08-05	2019-08-05
0532	LISN	ENV216	101321	Rohde & Schwarz	2016-09-13	2018-09-13
0607	LISN	ENV216	101342	Rohde & Schwarz	2017-09-06	2018-09-06
0538	Transformer	Monophase	TIMM3.15	Montelem	NA	NA
0095	Millivoltmeter	2000	4009301	KEITHLEY	2017-11-13	2019-11-13
0624	AC power source	61604	SM135546	CHROMA	NA	NA
0299	Multimeter	34401A	US36065790	HP	2017-11-14	2019-11-14

N/A: Not Applicable

A.3 Measurement Uncertainty Evaluation

The system uncertainty evaluation is shown in the below table:

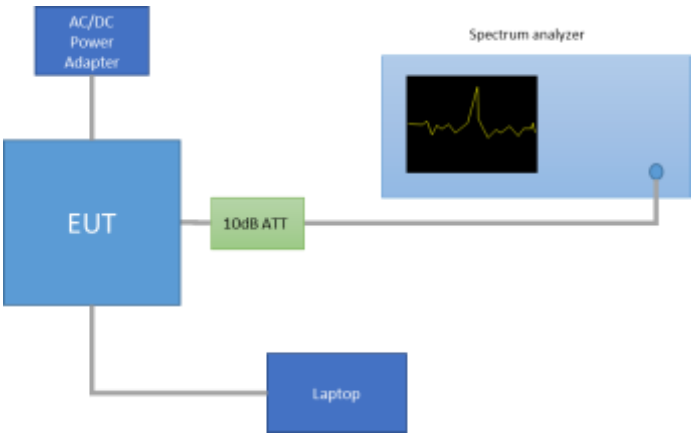
Measurement type	Uncertainty [±dB]
Conducted Power	±1.0
Conducted Spurious Emission	±2.9
Radiated tests <1GHz	±3.8
Radiated tests 1GHz - 40 GHz	±4.7
AC power-line conducted emission	±1.45

Annex B. Test Results

B.1 20dB Bandwidth and carrier frequency separation

Test limits

FCC part	RSS part	Limits
15.247 (a) (1)	RSS-247 Clause 5.1 (a) and (b)	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.



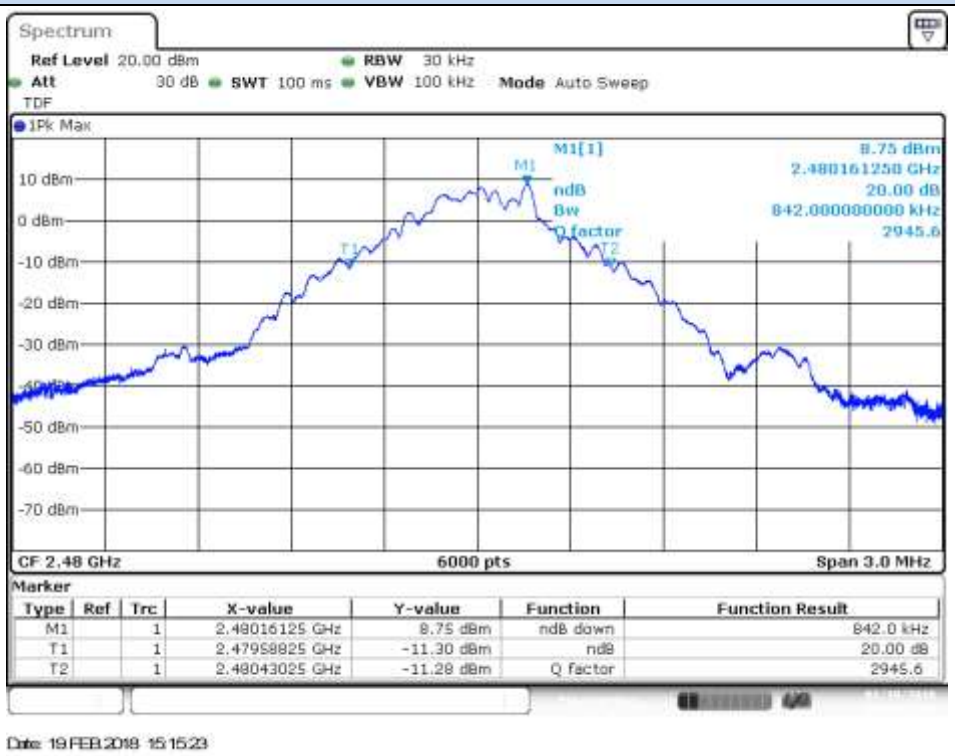
Results tables:

Mode	Packet Type	Channel Number	Frequency [MHz]	20dB BW [MHz]	Freq. Separation [kHz]
Basic Rate GFSK	DH5	0	2402	0.838	1000
		39	2441	0.839	
		78	2480	**0.842**	
EDR π/4-DQPSK	2DH5	0	2402	1.401	1000
		39	2441	**1.413**	
		78	2480	1.413	
EDR 8-DPSK	3DH5	0	2402	1.421	1000
		39	2441	1.422	
		78	2480	**1.428**	

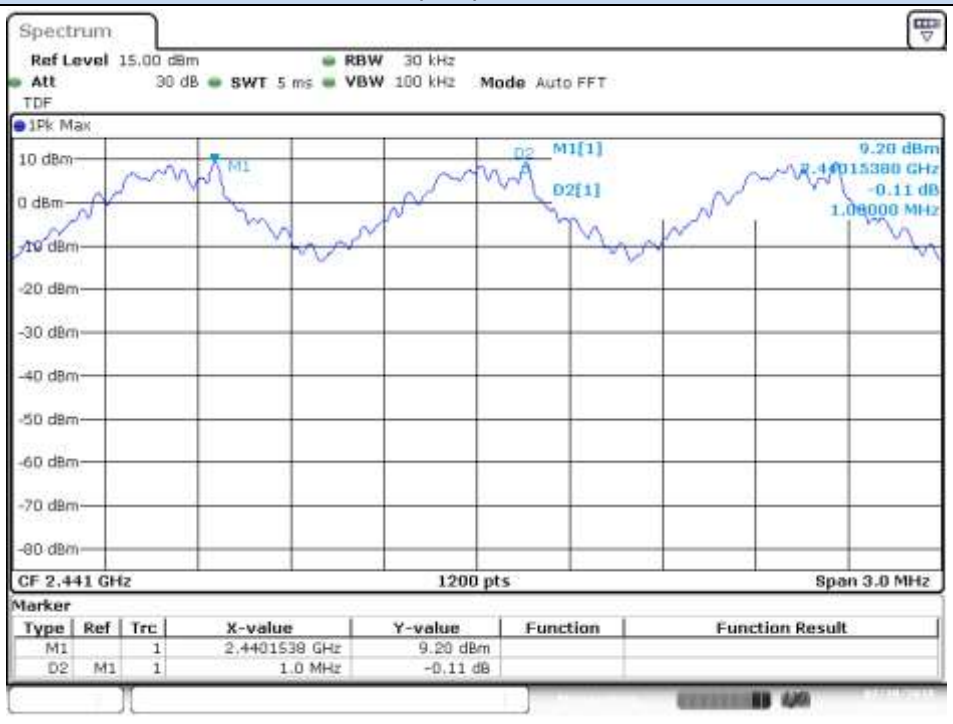
Results screenshot

Basic Rate - GFSK

20dB BW – CH78

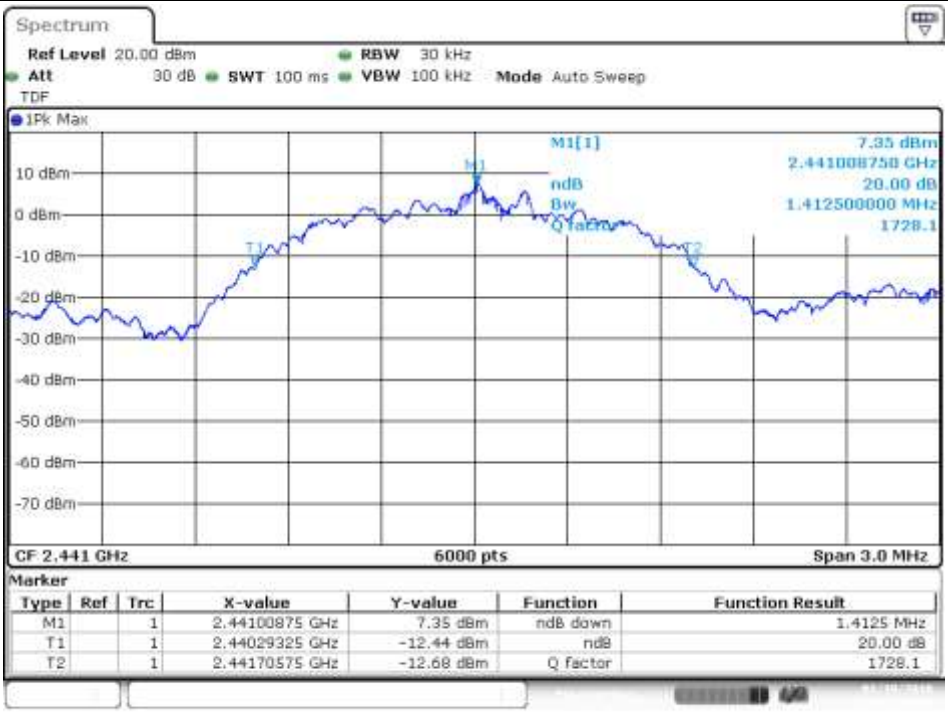


Freq. Separation

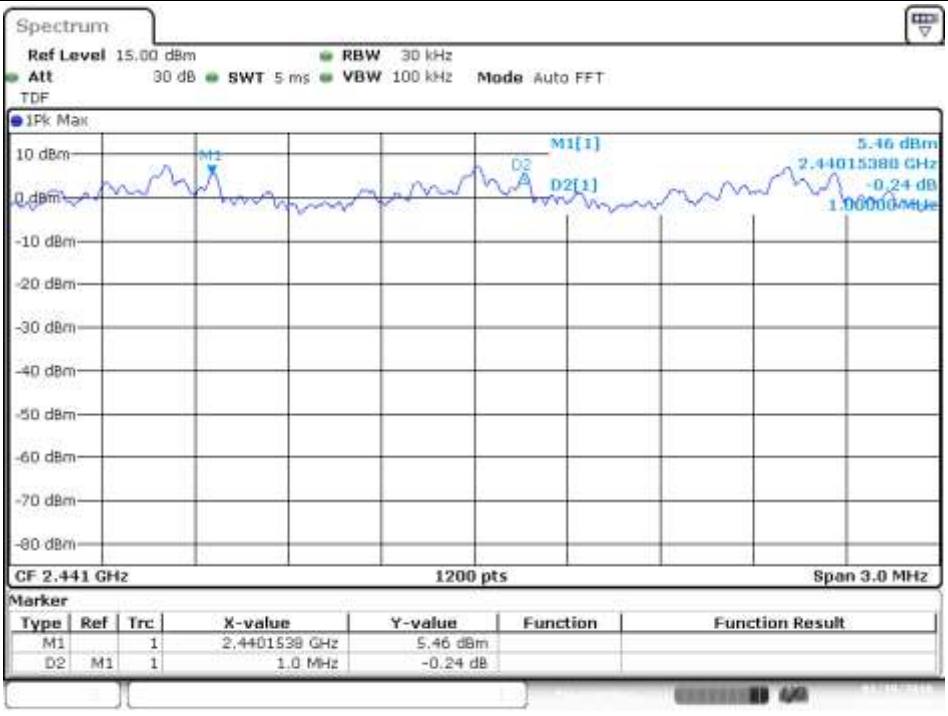


EDR – π/4-DQPSK

20dB BW – CH39

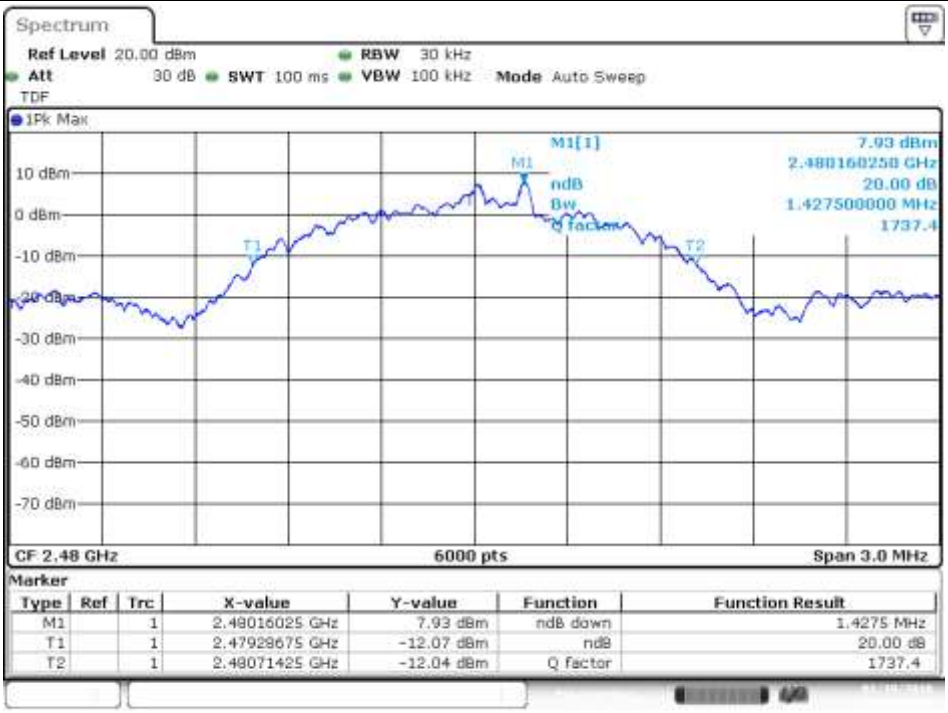


Freq. Separation

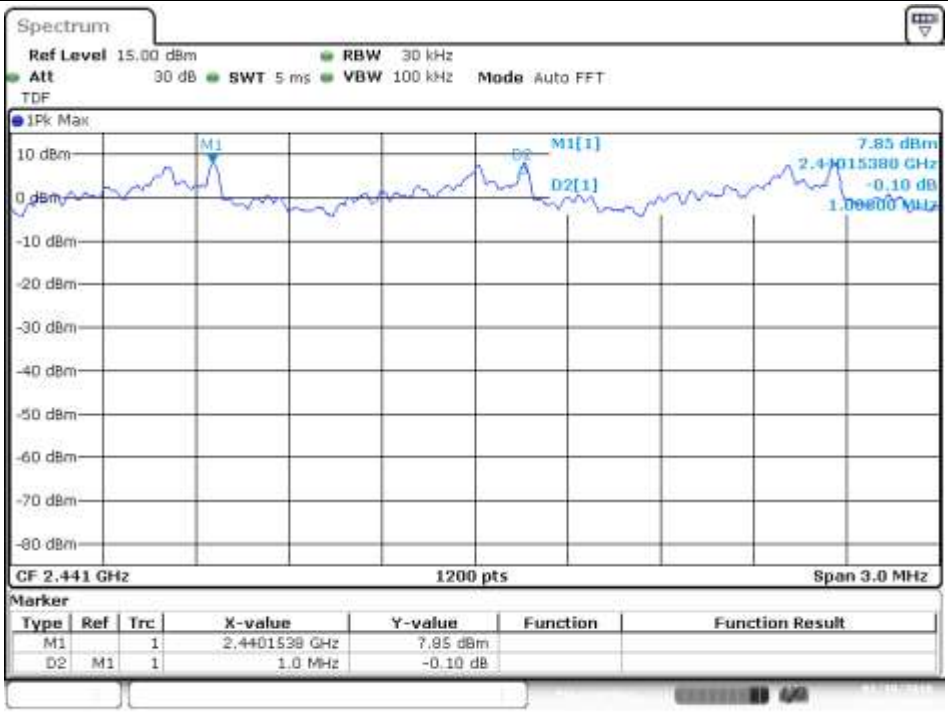


EDR – 8-DPSK

20dB BW – CH78



Freq. Separation



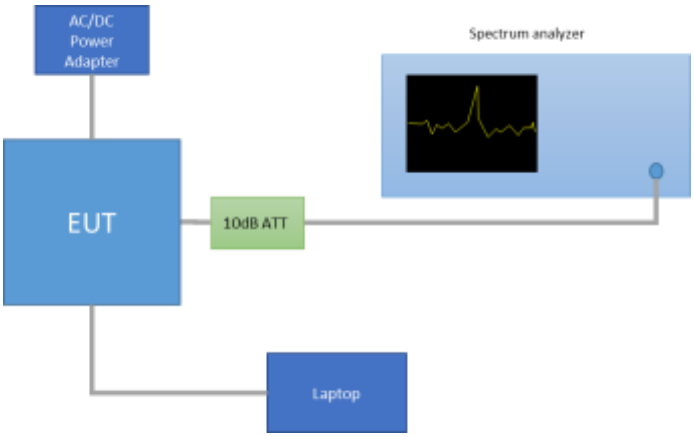
B.2 Number of hopping channels

Test limits

FCC part	RSS part	Limits
15.247 (a) (1) (iii)	RSS-247 Clause 5.1 (d)	Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

Test procedure

The setup below was used to measure the number of hopping channels. The antenna terminal of the EUT is connected to the spectrum through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.

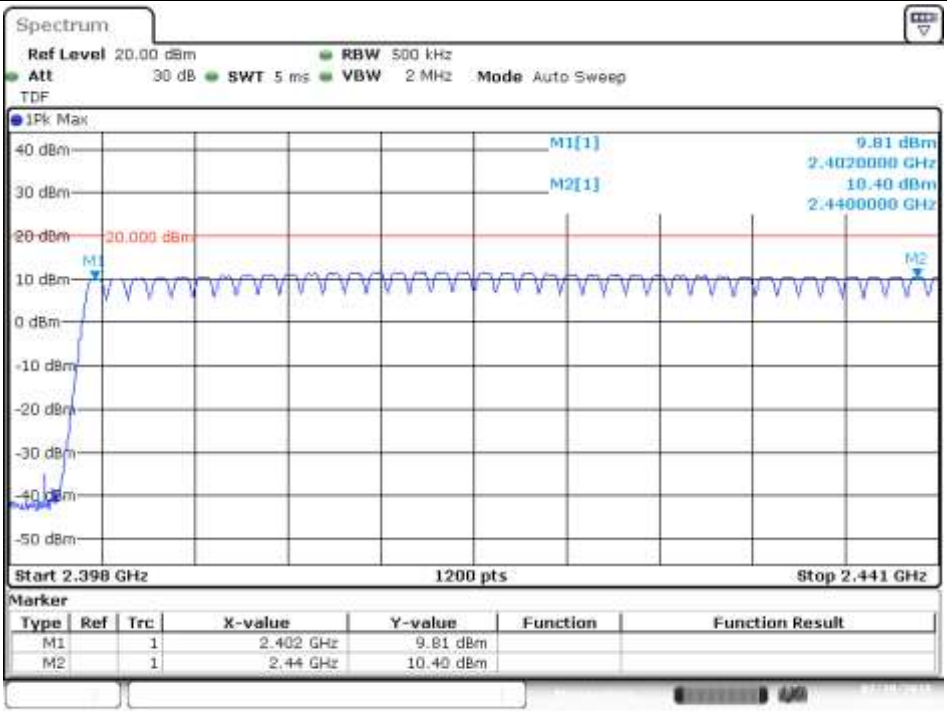


Results tables

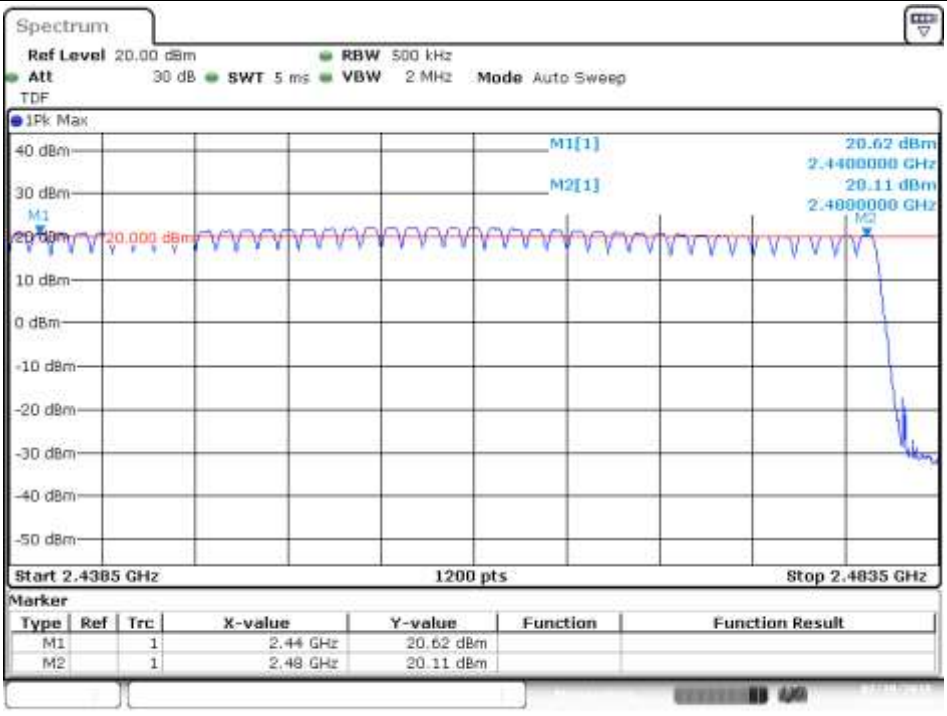
Mode	Packet Type	Number of hopping channels
Basic Rate GFSK	DH5	79
EDR π/4-DQPSK	2DH5	79
EDR 8-DPSK	3DH5	79

Number of hopping channels

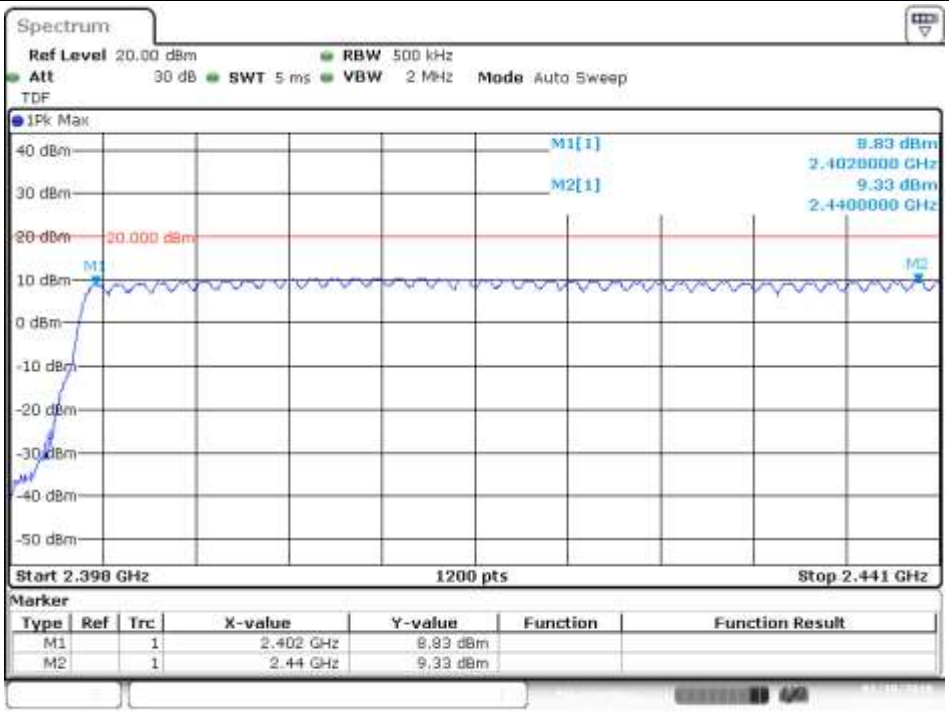
Basic Rate – GFSK



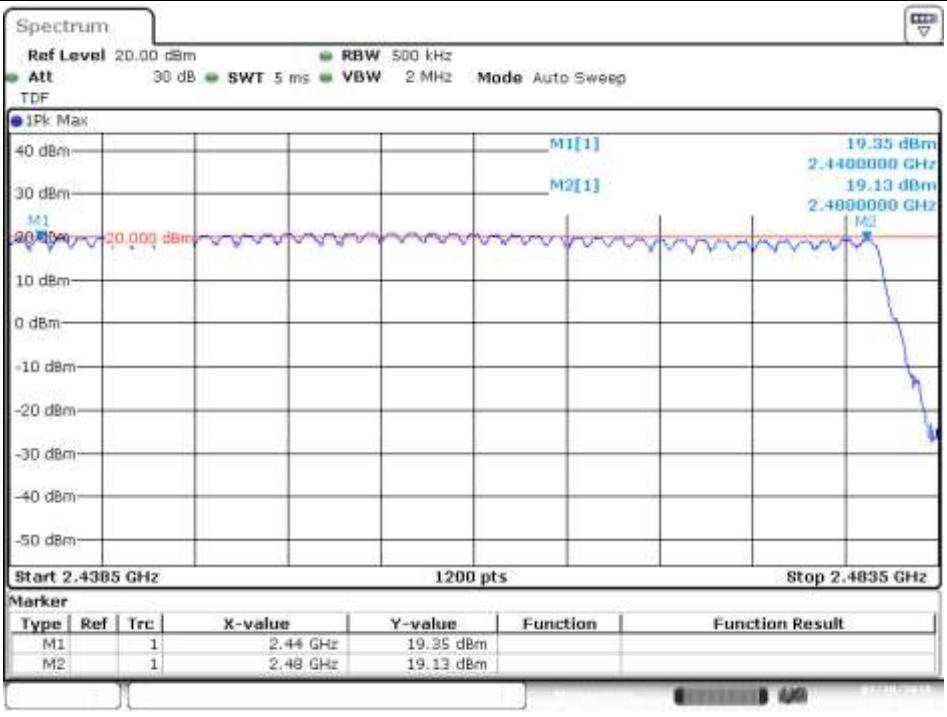
Basic Rate – GFSK



EDR – π/4-DPSK

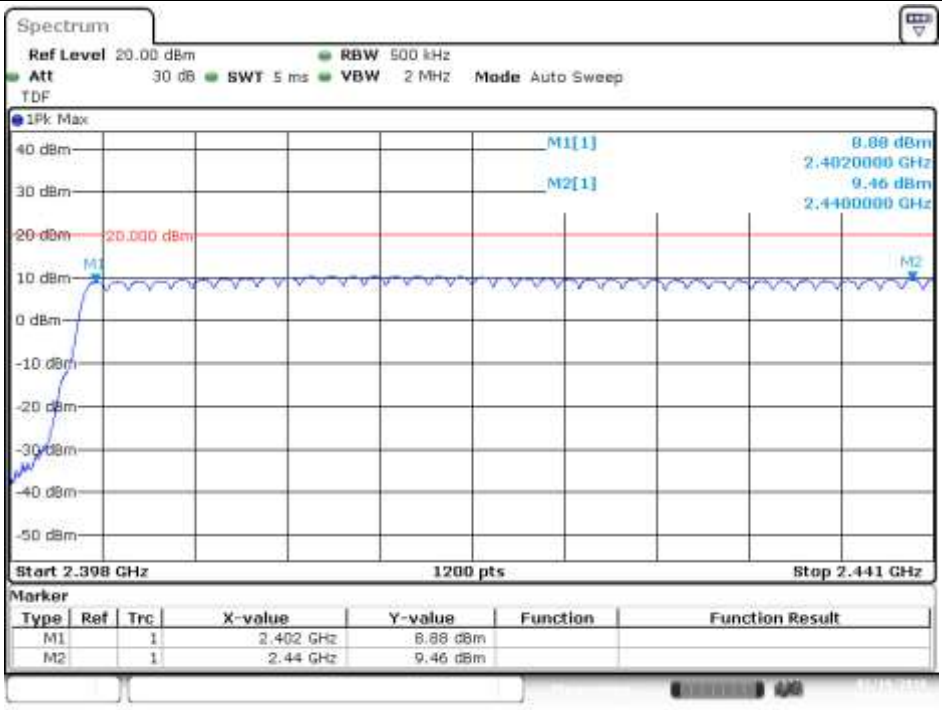


EDR – π/4-DPSK

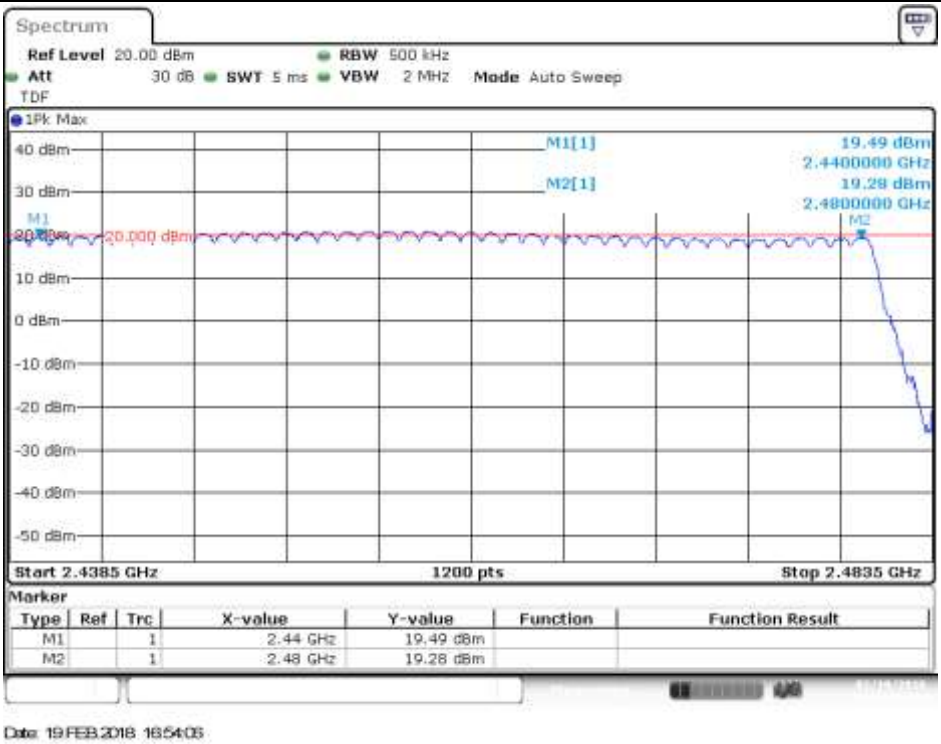


3

EDR – 8-DPSK



EDR – 8-DPSK

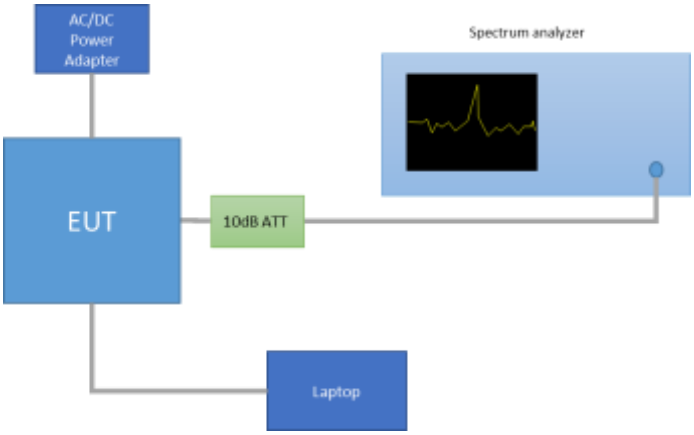


B.3 Time of Occupancy (Dwell Time)

FCC part	RSS part	Limits
15.247 (a) (1) (iii)	RSS-247 Clause 5.1 (d)	The average time of occupancy (Dwell Time) 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.

Test procedure

The setup below was used to measure the dwell time. The antenna terminal of the EUT is connected to the spectrum through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.



In the worst case, the system makes 1600 hops per second with 79 channels, providing a 1 timeslot length of 625µs.

A DH1 packet, with independence of the modulation, needs 1 time slot for transmitting and 1 time slot for receiving. Then, the system makes in the worst case 1600/2 = 800 hops per second with 79 channels. So each channel appears 800/79 = 10.13 times per second and, for a period of 0.4 x 79 = 31.6 seconds, each channel appears 10.13 x 31.6 = 320.11 times.

A DH3 packet, with independence of the modulation, needs 3 time slots for transmitting and 1 time slot for receiving. Then, the system makes in the worst case 1600/4 = 400 hops per second with 79 channels. So each channel appears 400/79 = 5.1 times per second and, for a period of 0.4 x 79 = 31.6 seconds, each channel appears 5.1 x 31.6 = 161.16 times.

A DH5 packet, with independence of the modulation, needs 5 time slots for transmitting and 1 time slot for receiving. Then, the system makes in the worst case 1600/6 = 266.67 hops per second with 79 channels. So each channel appears 166.67/79 = 3.37 times per second and, for a period of 0.4 x 79 = 31.6 seconds, each channel appears 3.37 x 31.6 = 106.49 times.

Thus, the total time of occupancy is obtained by multiplying the calculated maximum number of appearances per packet type and the measured Tx-time, as shown in the results screenshots.

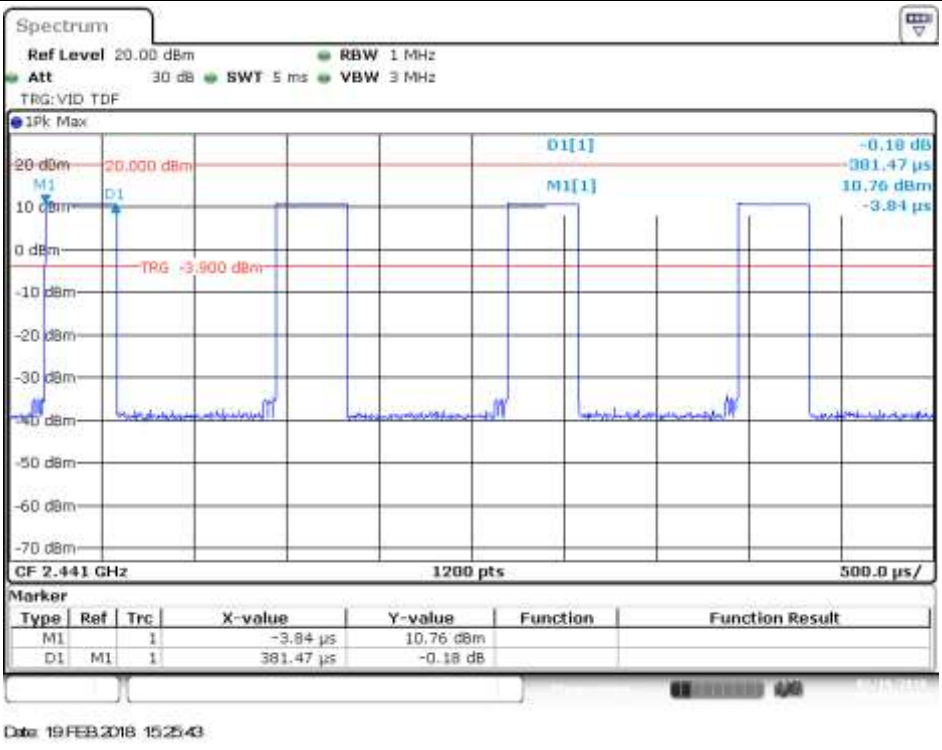
Results tables

Mode	Packet Type	Times of appearance	Tx-time [ms]	Dwell Time [ms]
Basic Rate GFSK	DH1	320.11	0.381	122.112
	DH3	161.16	1.638	264.007
	DH5	106.49	2.877	306.414
EDR π/4-DQPSK	2-DH1	320.11	0.392	125.416
	2-DH3	161.16	1.644	264.999
	2-DH5	106.49	2.890	307.747
EDR 8-DPSK	3-DH1	320.11	0.385	123.322
	3-DH3	161.16	1.635	263.576
	3-DH5	106.49	2.886	307.302

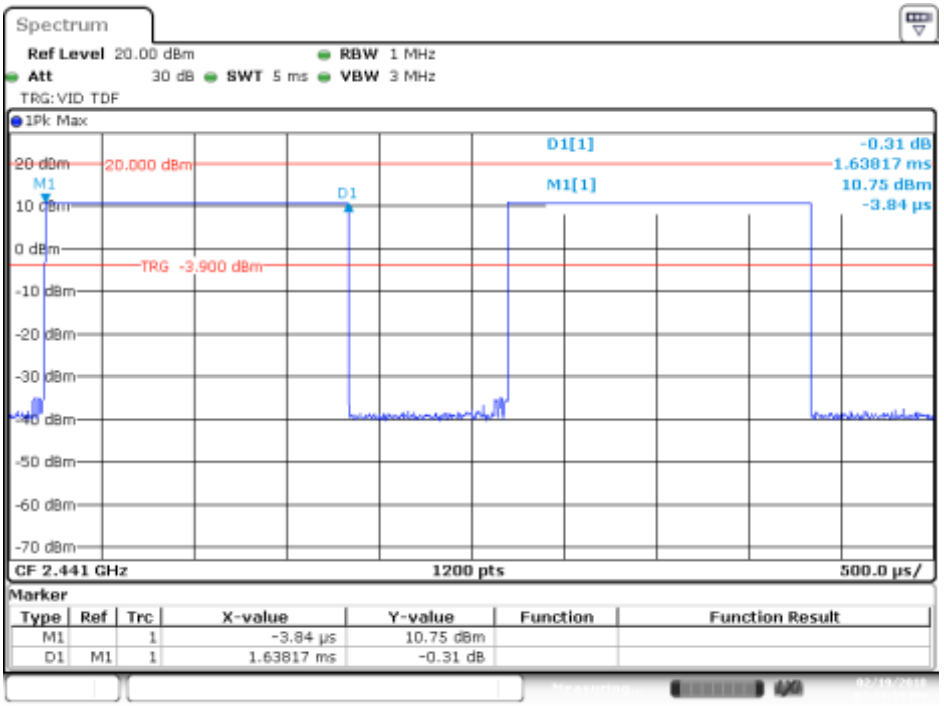
Results Screenshot:

BDR – GFSK

DH1 Tx-Time

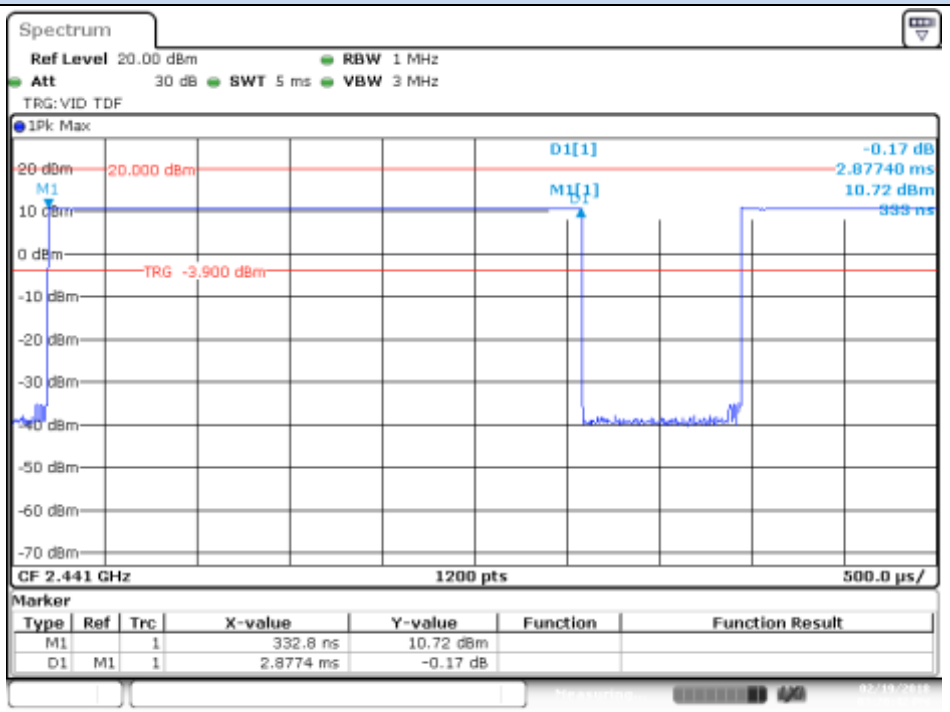


DH3 Tx-Time



Date: 19.FEB.2018 15:24:20

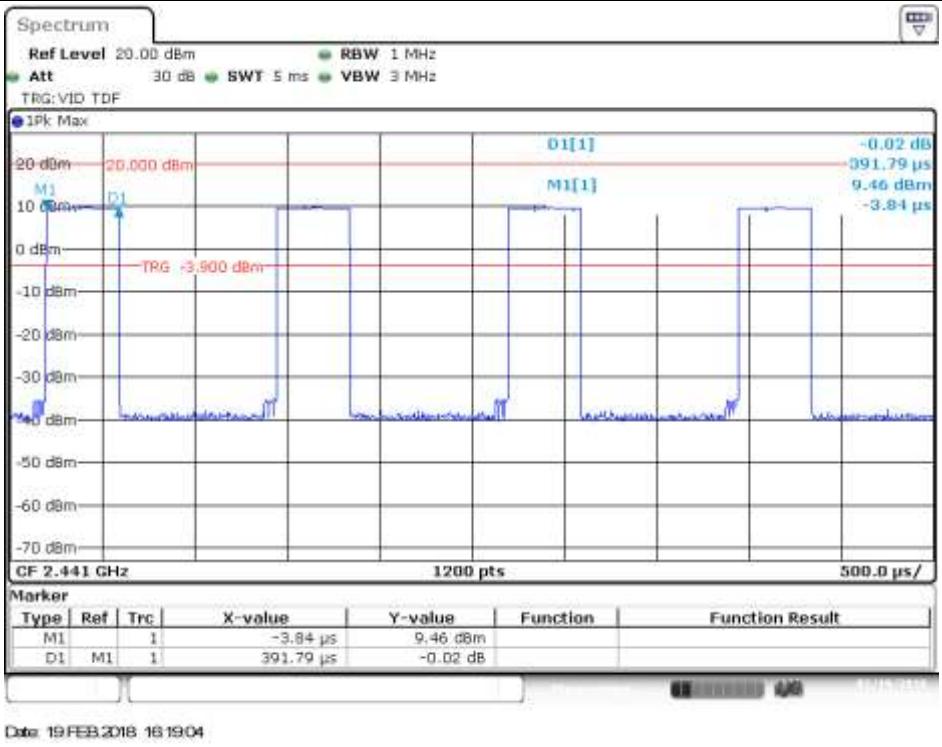
DH5 Tx-Time



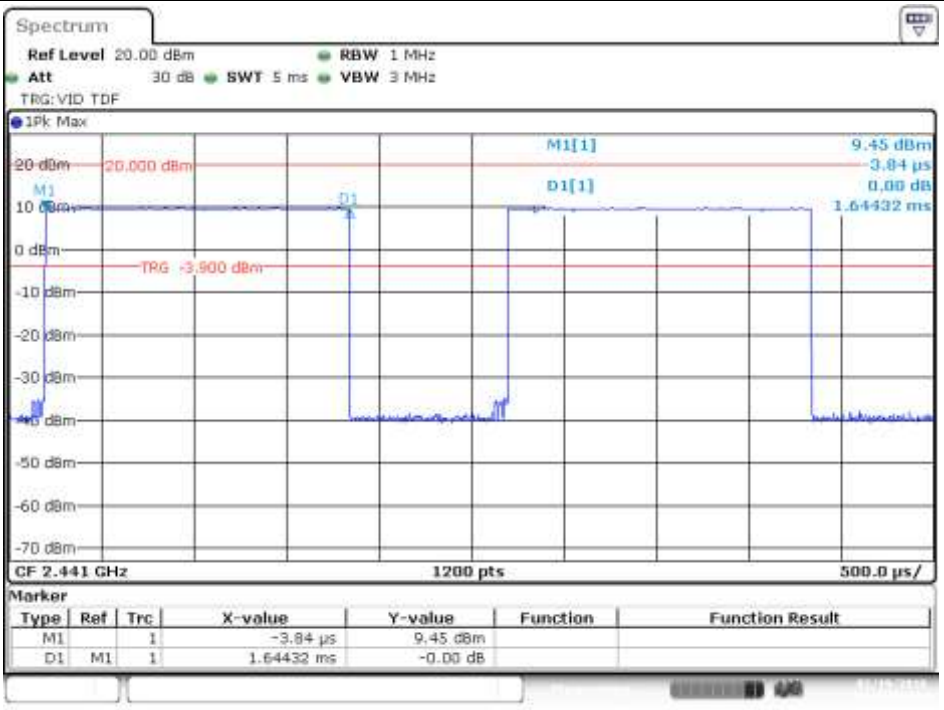
Date: 19.FEB.2018 15:20:43

EDR – π/4-DQPSK

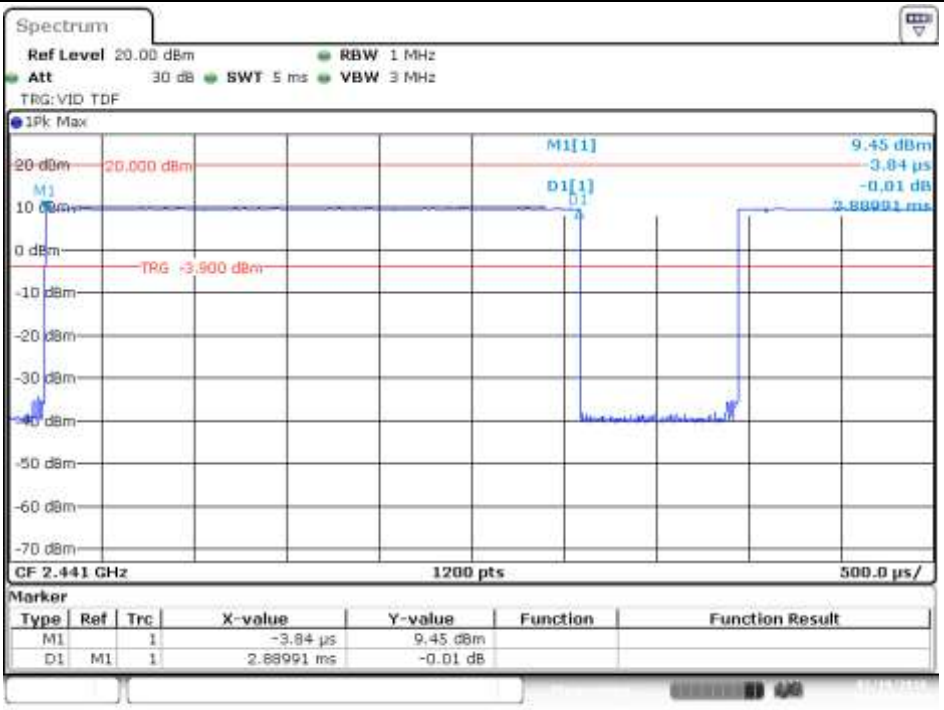
2-DH1 Tx-Time



2-DH3 Tx-Time

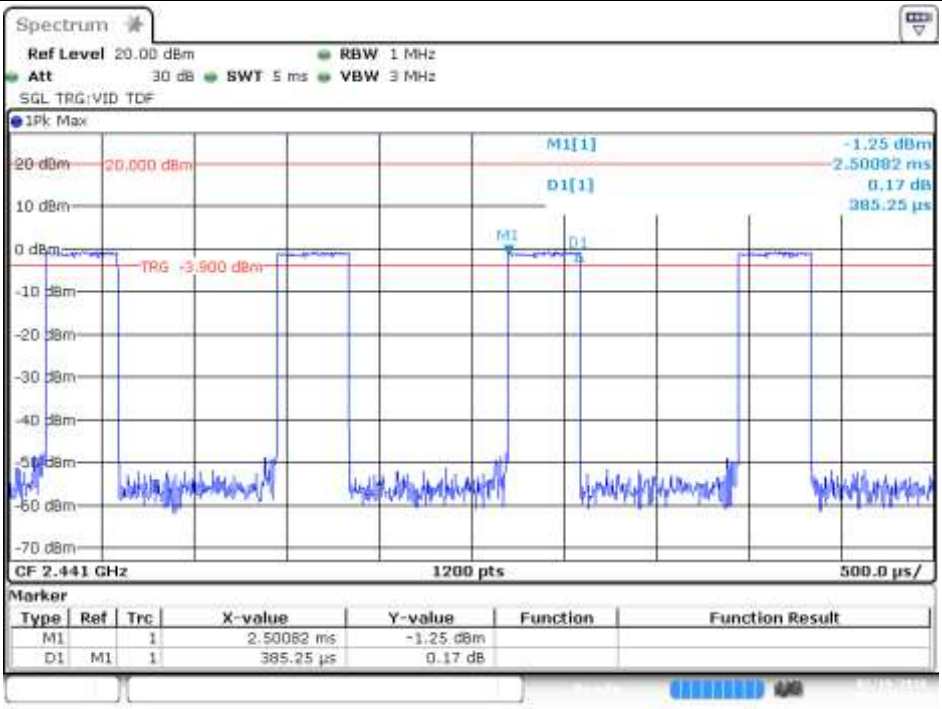


2-DH5 Tx-Time



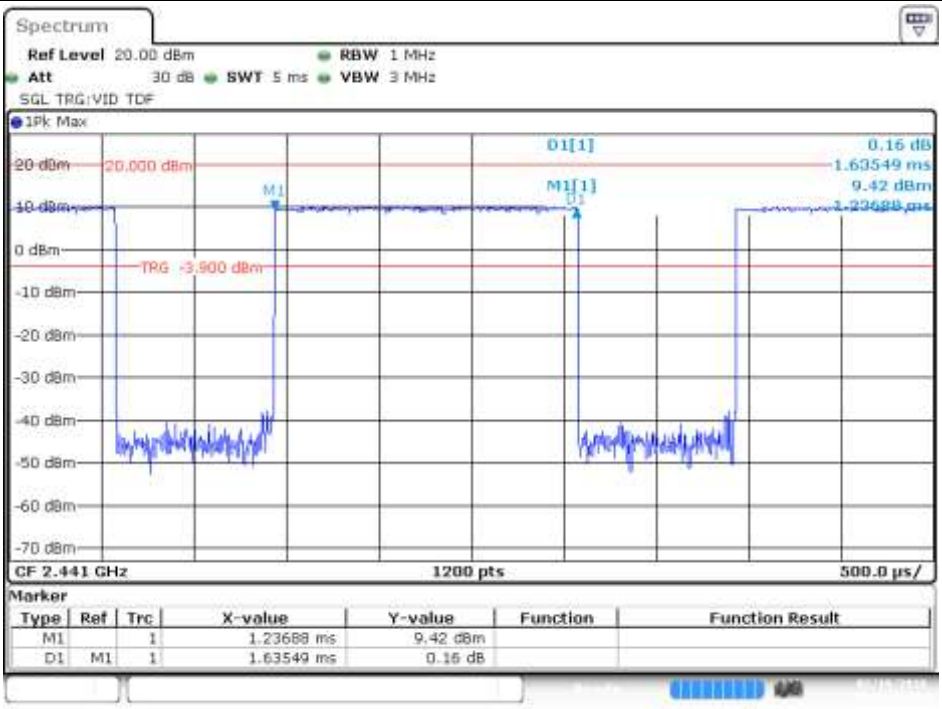
EDR – 8-DPSK

3-DH1 Tx-Time



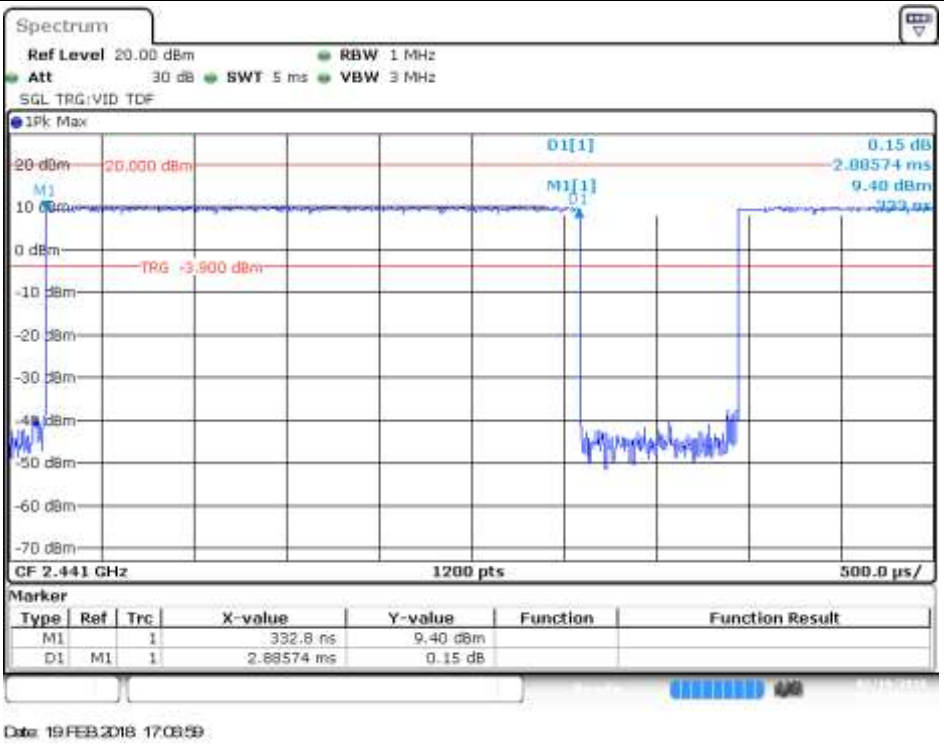
Date: 19.FEB.2018 17:09:51

3-DH3 Tx-Time



Date: 19.FEB.2018 17:08:41

3-DH5 Tx-Time



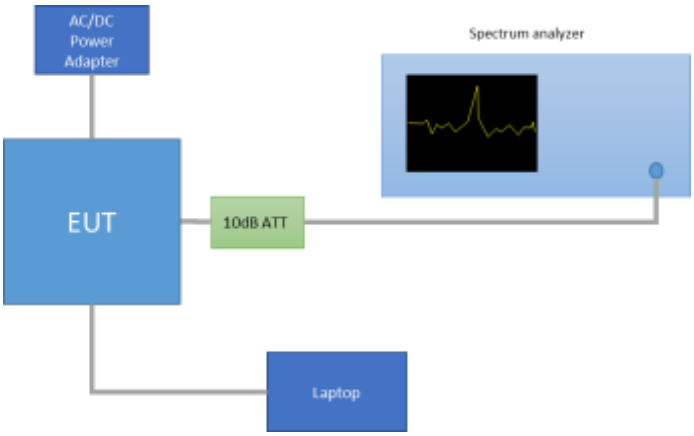
B.4 Maximum Peak Output Power antenna gain

Test Limits

FCC part	RSS part	Limits
15.247 (b) (1)	RSS-247 Clause 5.4 (b)	(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following: (1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. (…) (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi.

Test procedure

The setup below was used to measure the maximum peak output power. The antenna terminal of the EUT is connected to the spectrum through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.



The declared maximum antenna gain is 3.24dBi.

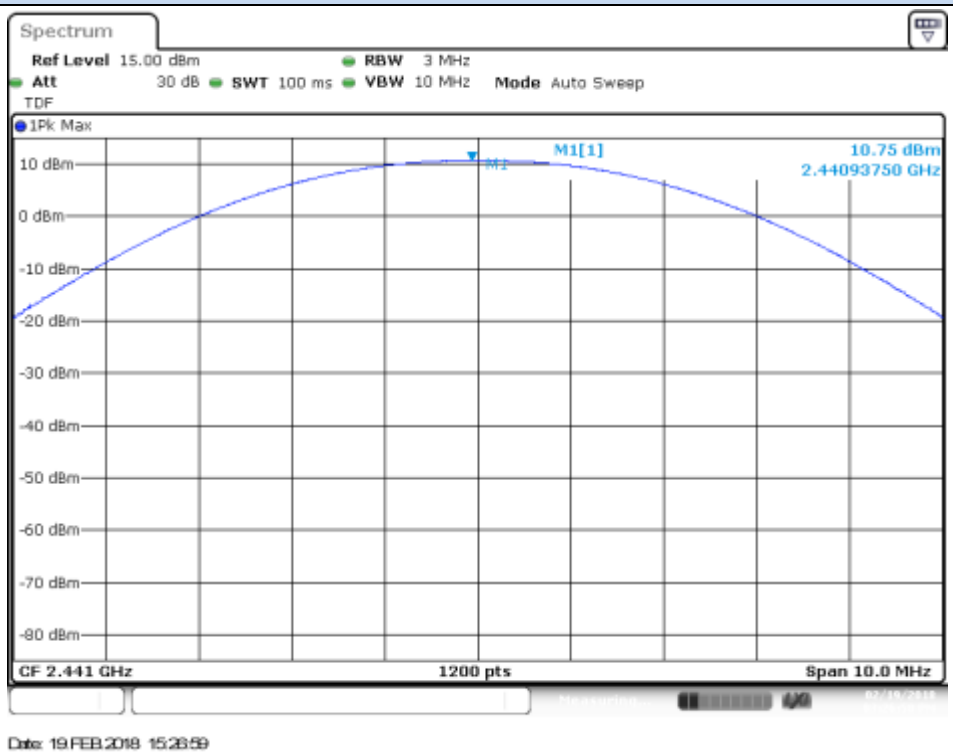
Results tables

Mode	Packet Type	Channel Number	Frequency [MHz]	Peak Power [dBm]	Peak Power [mW]	Peak Power EIRP [dBm]	Peak Power EIRP [mW]
Basic Rate GFSK	DH5	0	2402	10.09	10.21	13.33	21.53
		39	2441	**10.75**	11.89	13.99	25.06
		78	2480	10.24	10.57	13.48	22.28
EDR π/4-DQPSK	2DH5	0	2402	9.47	8.85	12.71	18.66
		39	2441	**10.20**	10.47	13.44	22.08
		78	2480	9.81	9.57	13.05	20.18
EDR 8-DPSK	3DH5	0	2402	9.50	8.91	12.74	18.79
		39	2441	**10.23**	10.54	13.47	22.23
		78	2480	9.83	9.62	13.07	20.28

Results Screenshot

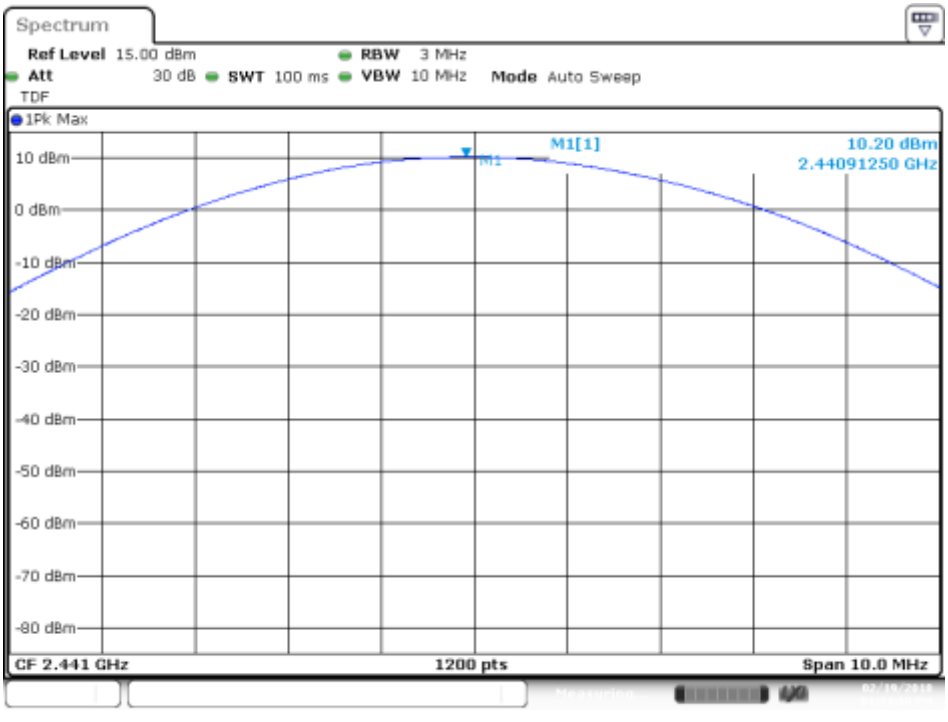
Basic Rate - GFSK

Peak Power – CH39



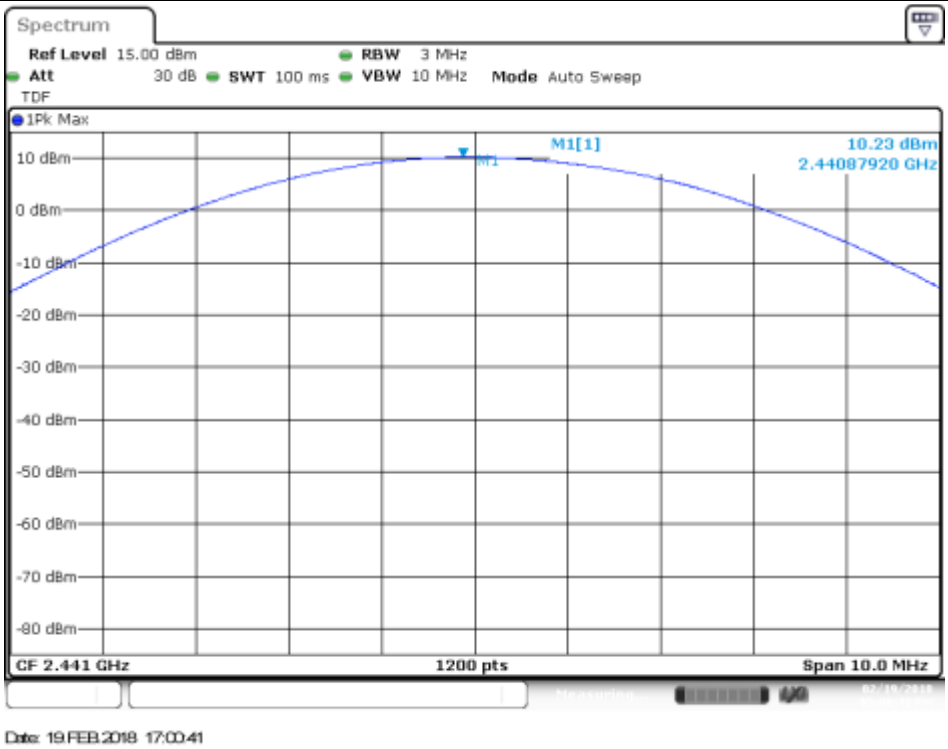
EDR – π/4-DQPSK

Peak Power – CH39



EDR – 8-DPSK

Peak Power – CH39



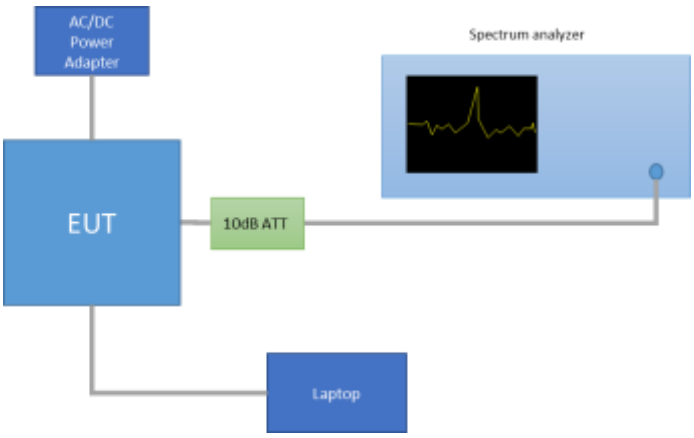
B.5 Out-of-band emission (conducted)

Test limits

FCC part	RSS part	Limits
15.247 (d)	RSS-247 Clause 5.5	In any 100 kHz 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 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.

Test procedure

The setup below was used to measure the out-of-band emissions (conducted). The antenna terminal of the EUT is connected to the spectrum through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.

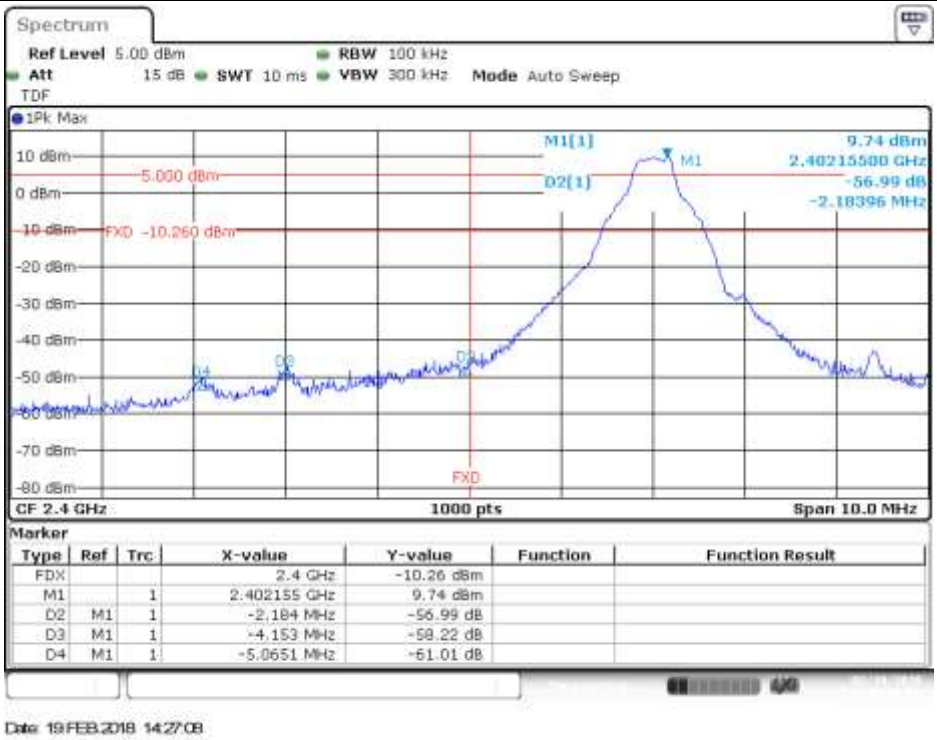


Note: these PSD_{Peak} values are shown just as a reference for the compliance of the Out-of-band Measurements. Thus the RBW used for these measurements was 100 kHz.

Mode	**Packet Type**	**CH**	**Frequency [MHz]**	**PSD Peak [dBm]**
Basic Rate - GFSK	DH5	0	2402	9.74
		39	2441	10.50
		78	2480	10.05
EDR – π/4-DQPSK	2DH5	0	2402	8.32
		39	2441	9.24
		78	2480	9.17
EDR – 8-DPSK	3DH5	0	2402	8.31
		39	2441	9.21
		78	2480	9.14

Basic Rate - GFSK

BE Low Freq Section – CH0

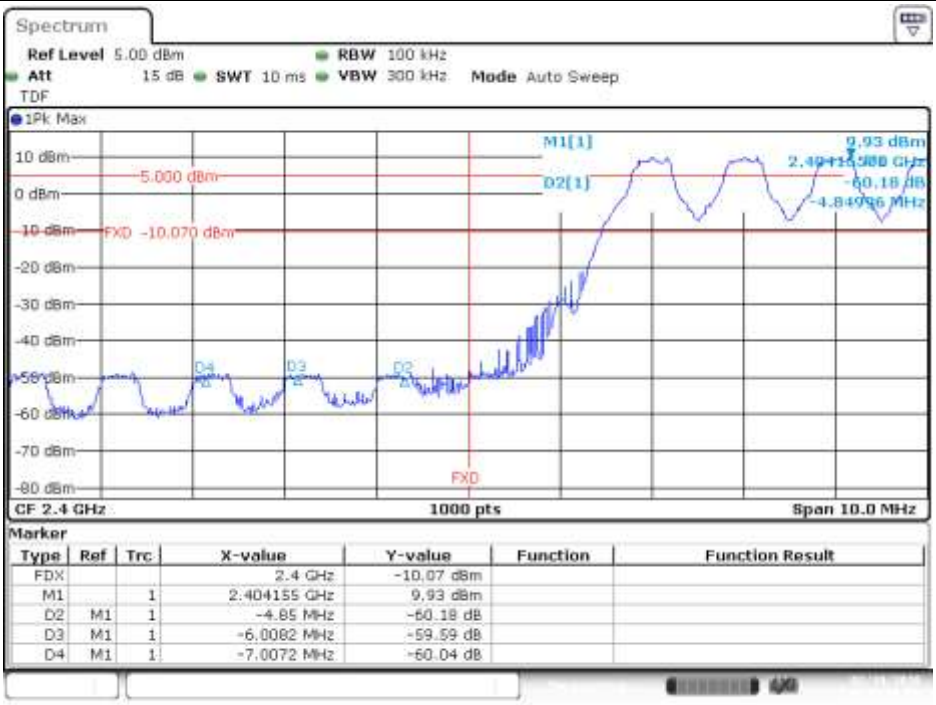


Date: 19.FEB.2018 14:27:08

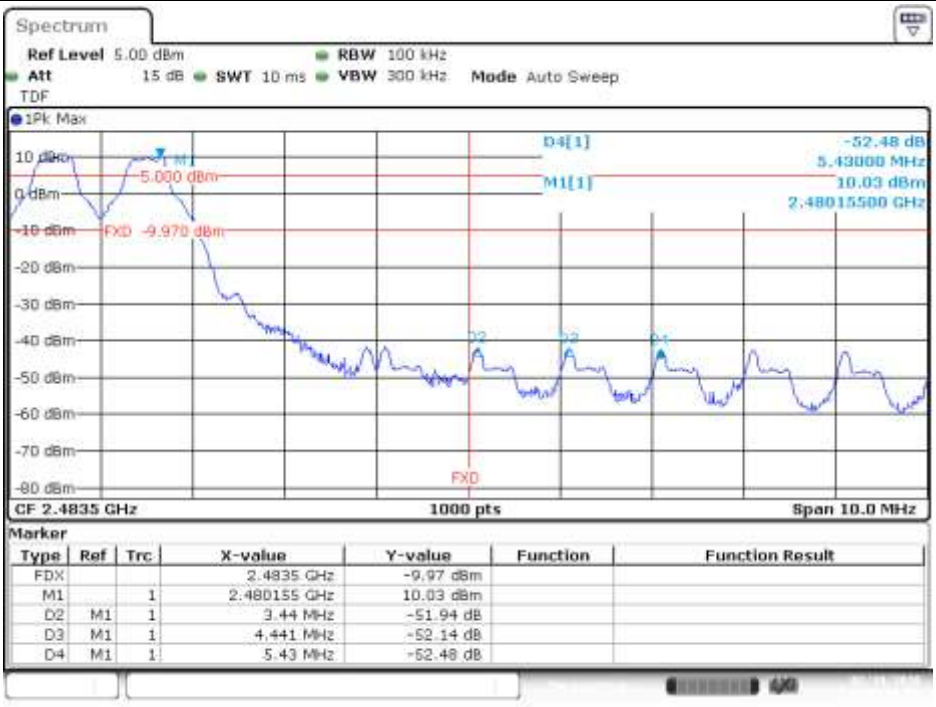
BE High Freq Section – CH78

Date: 19.FEB.2018 15:07:17

BE Low Freq Section – Hopping

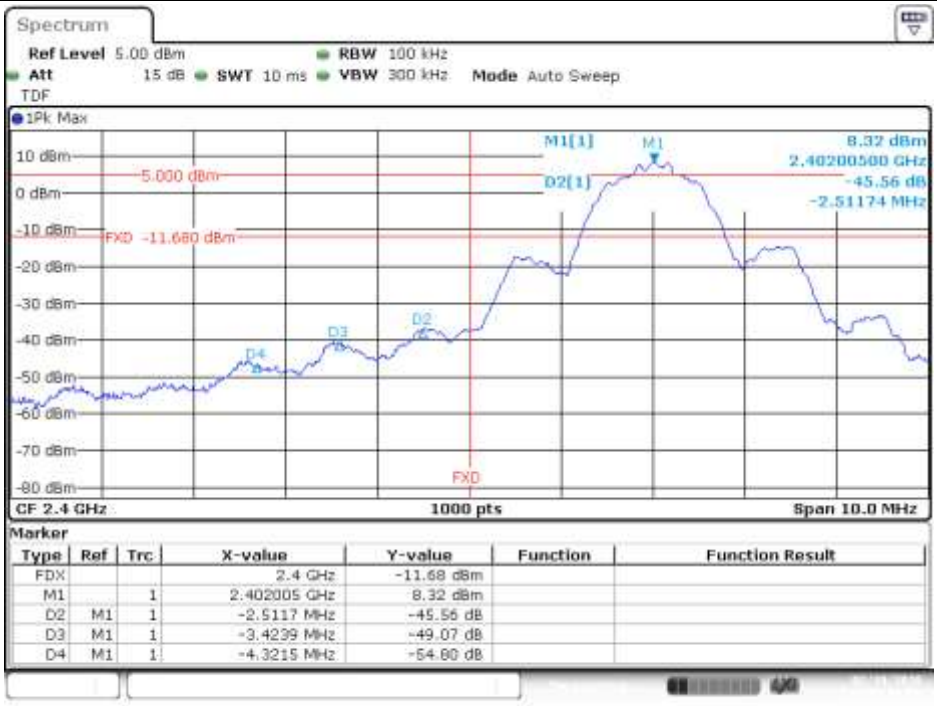


BE High Freq Section – Hopping



EDR – π/4-DQPSK

BE Low Freq Section – CH0

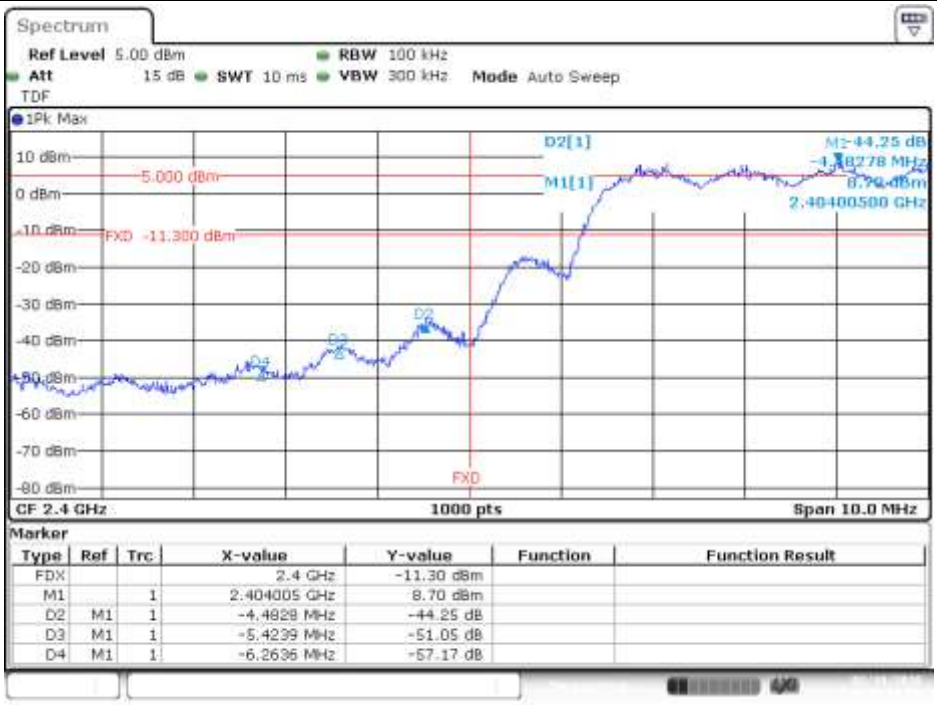


Date: 19.FEB.2018 16:08:45

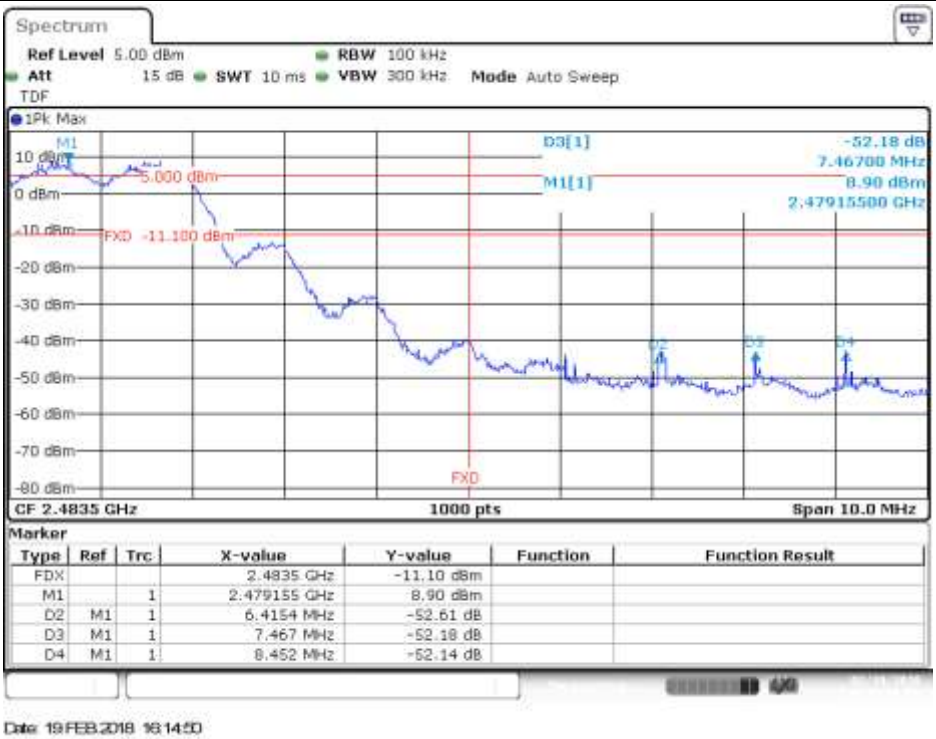
BE High Freq Section – CH78

Date: 19.FEB.2018 16:09:57

BE Low Freq Section – Hopping

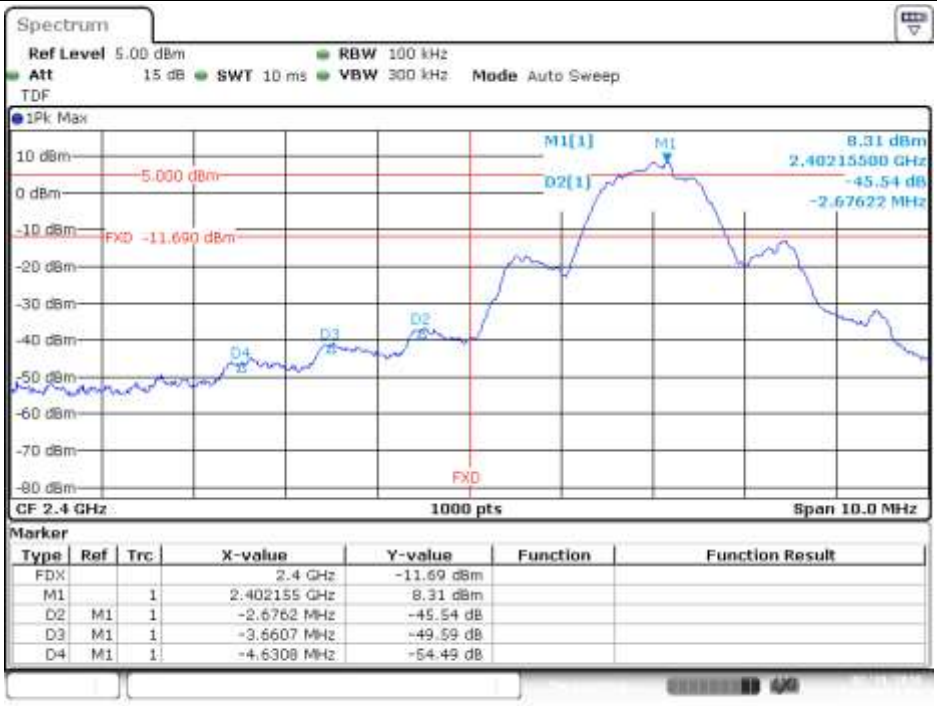


BE High Freq Section – Hopping

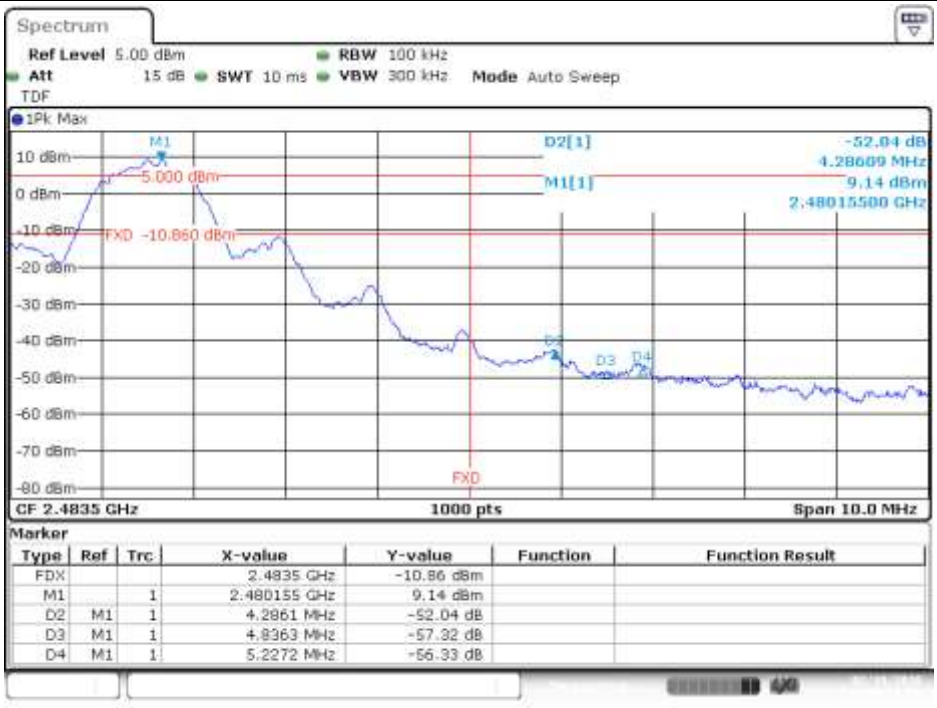


EDR – 8-DPSK

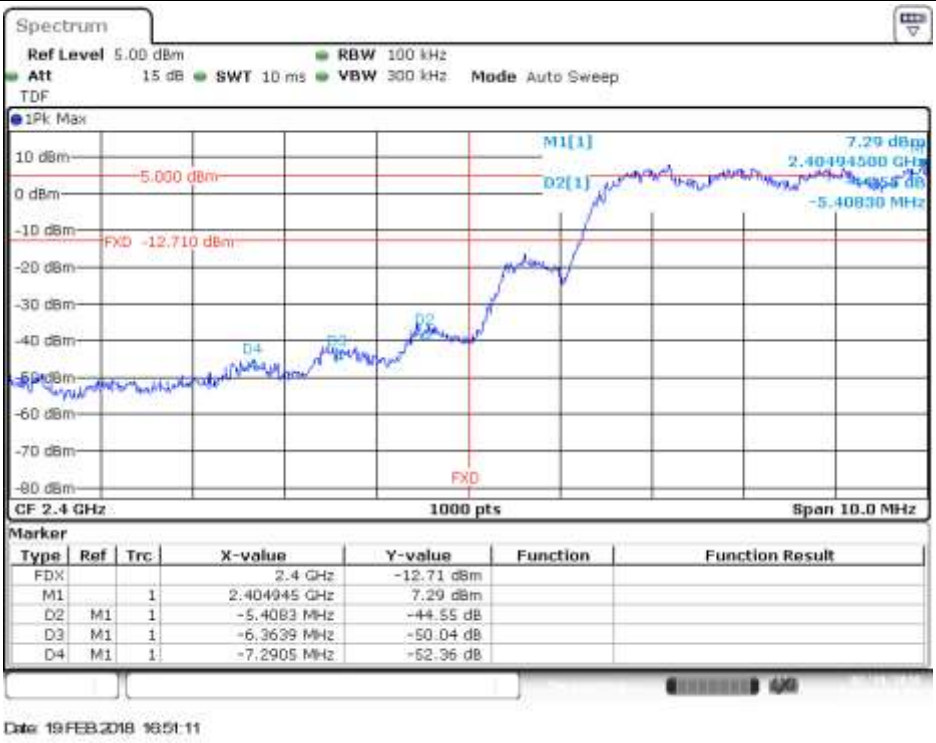
BE Low Freq Section – CH0



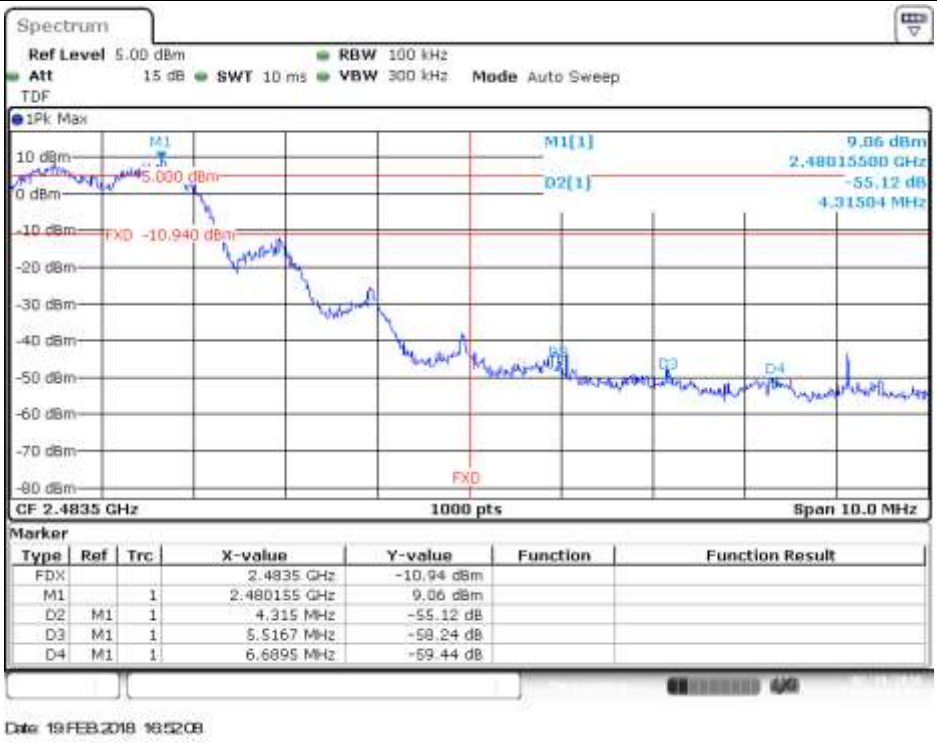
BE High Freq Section – CH78



BE Low Freq Section – Hopping



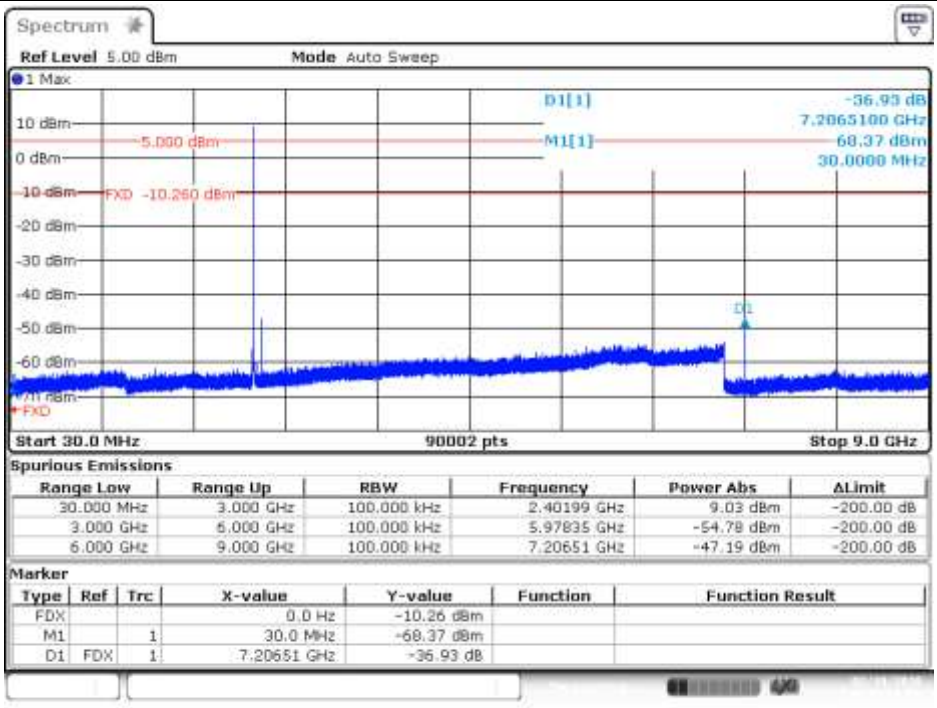
BE High Freq Section – Hopping



Conducted Spurious results Screenshot

Basic Rate - GFSK

Cond Spur – CH0 (30MHz - 9GHz)



Spurious Emissions

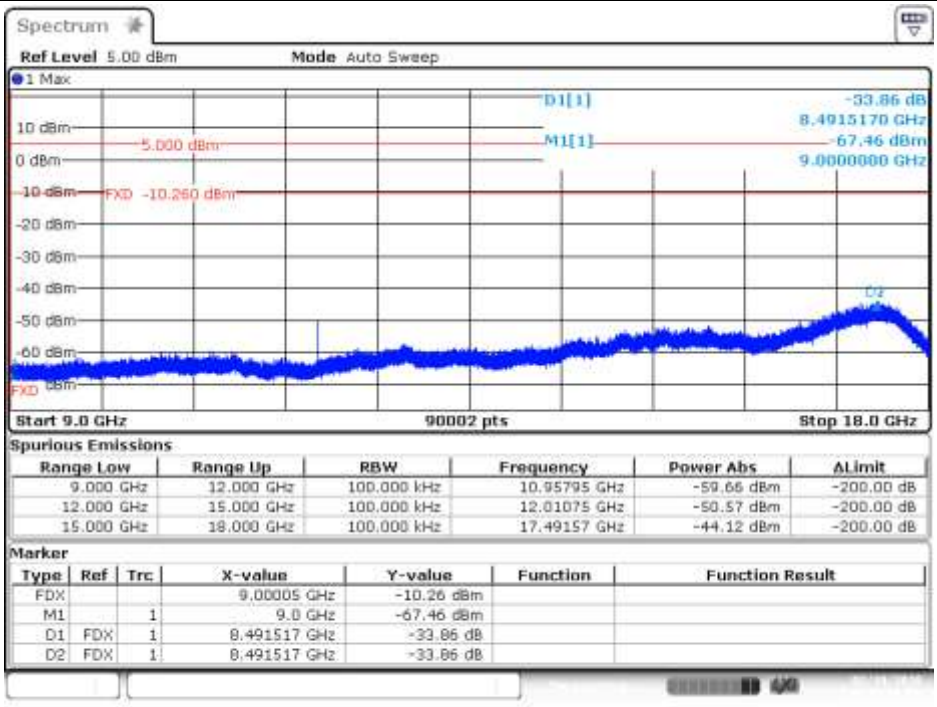
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	3.000 GHz	100.000 kHz	2.40199 GHz	9.03 dBm	-200.00 dB
3.000 GHz	6.000 GHz	100.000 kHz	5.97835 GHz	-54.78 dBm	-200.00 dB
6.000 GHz	9.000 GHz	100.000 kHz	7.20651 GHz	-47.19 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			0.0 Hz	-10.26 dBm		
M1		1	30.0 MHz	-68.37 dBm		
D1	FDX	1	7.20651 GHz	-36.93 dB		

Date: 19.FEB.2018 15:33:33

Cond Spur – CH0 (9GHz - 18GHz)



Spurious Emissions

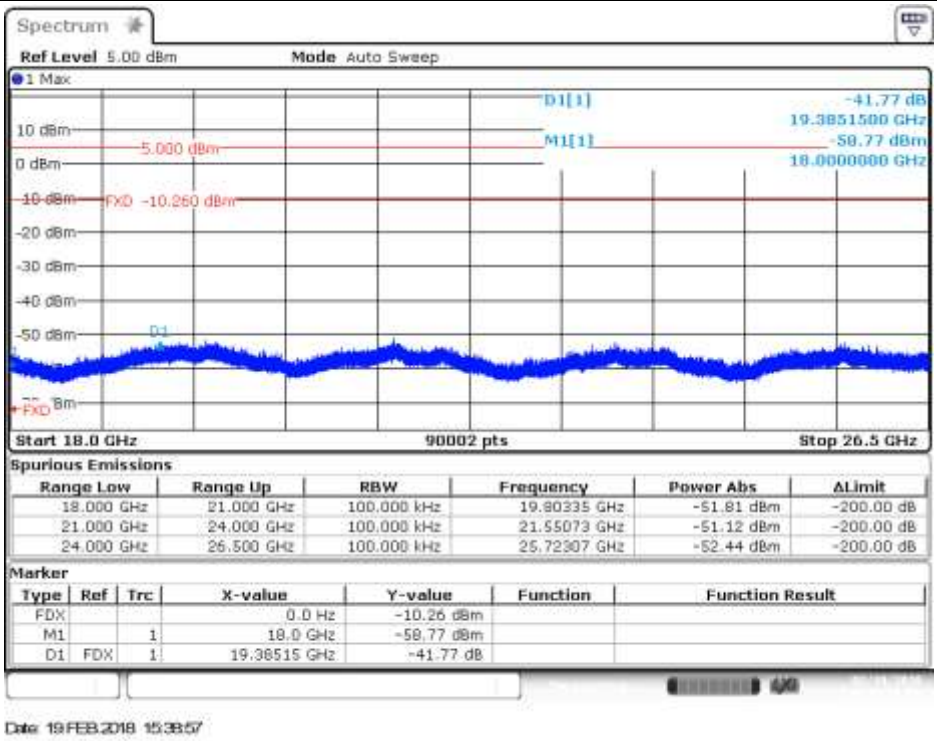
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 GHz	12.000 GHz	100.000 kHz	10.95795 GHz	-59.66 dBm	-200.00 dB
12.000 GHz	15.000 GHz	100.000 kHz	12.01075 GHz	-50.57 dBm	-200.00 dB
15.000 GHz	18.000 GHz	100.000 kHz	17.49157 GHz	-44.12 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			9.00005 GHz	-10.26 dBm		
M1		1	9.0 GHz	-67.46 dBm		
D1	FDX	1	8.491517 GHz	-33.86 dB		
D2	FDX	1	8.491517 GHz	-33.86 dB		

Date: 19.FEB.2018 15:36:31

Cond Spur – CH0 (18GHz – 26.5GHz)



Spurious Emissions

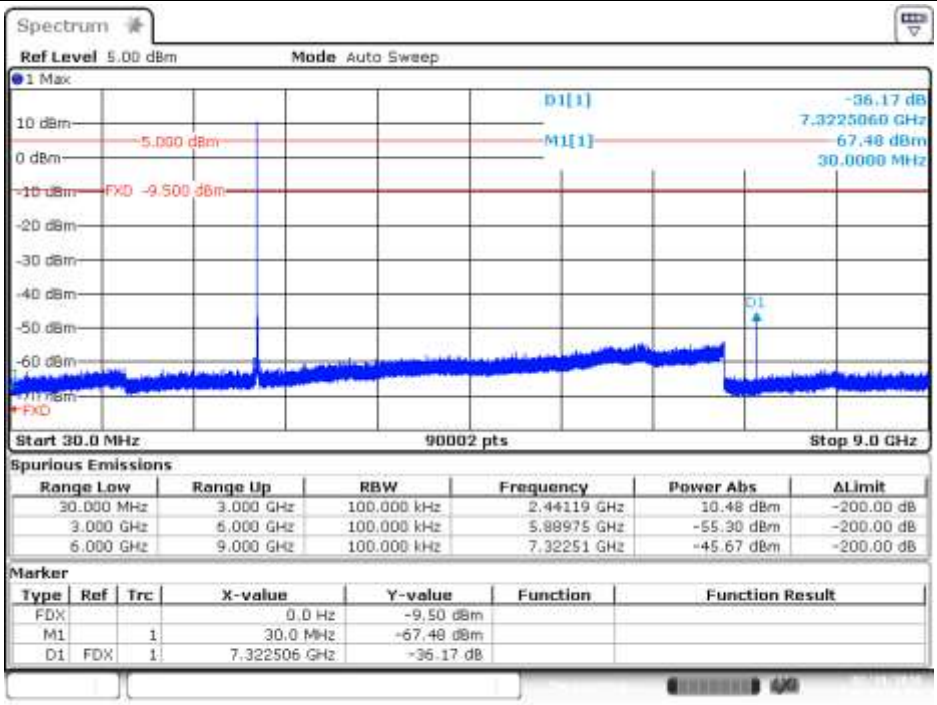
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
18.000 GHz	21.000 GHz	100.000 kHz	19.80335 GHz	-51.81 dBm	-200.00 dB
21.000 GHz	24.000 GHz	100.000 kHz	21.55073 GHz	-51.12 dBm	-200.00 dB
24.000 GHz	26.500 GHz	100.000 kHz	25.72307 GHz	-52.44 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			0.0 Hz	-10.26 dBm		
M1		1	18.0 GHz	-58.77 dBm		
D1	FDX	1	19.38515 GHz	-41.77 dB		

Date: 19.FEB.2018 15:38:57

Cond Spur – CH39 (30MHz - 9GHz)



Spurious Emissions

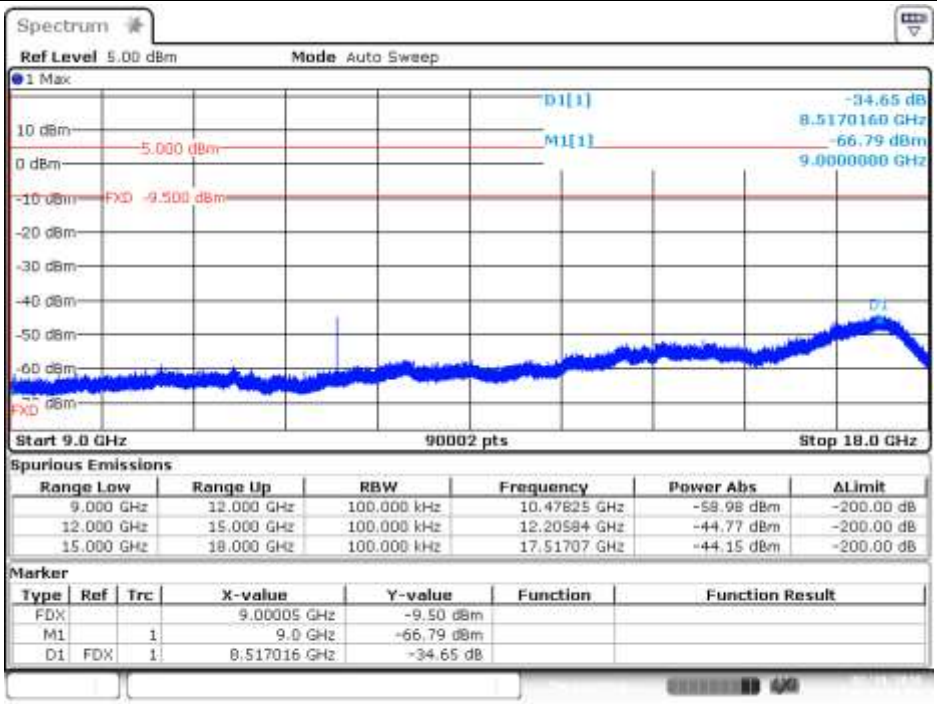
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	3.000 GHz	100.000 kHz	2.44119 GHz	10.48 dBm	-200.00 dB
3.000 GHz	6.000 GHz	100.000 kHz	5.88975 GHz	-55.30 dBm	-200.00 dB
6.000 GHz	9.000 GHz	100.000 kHz	7.32251 GHz	-45.67 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			0.0 Hz	-9.50 dBm		
M1		1	30.0 MHz	-67.48 dBm		
D1	FDX	1	7.322506 GHz	-36.17 dB		

Date: 19.FEB.2018 15:43:46

Cond Spur – CH39 (9GHz - 18GHz)



Spurious Emissions

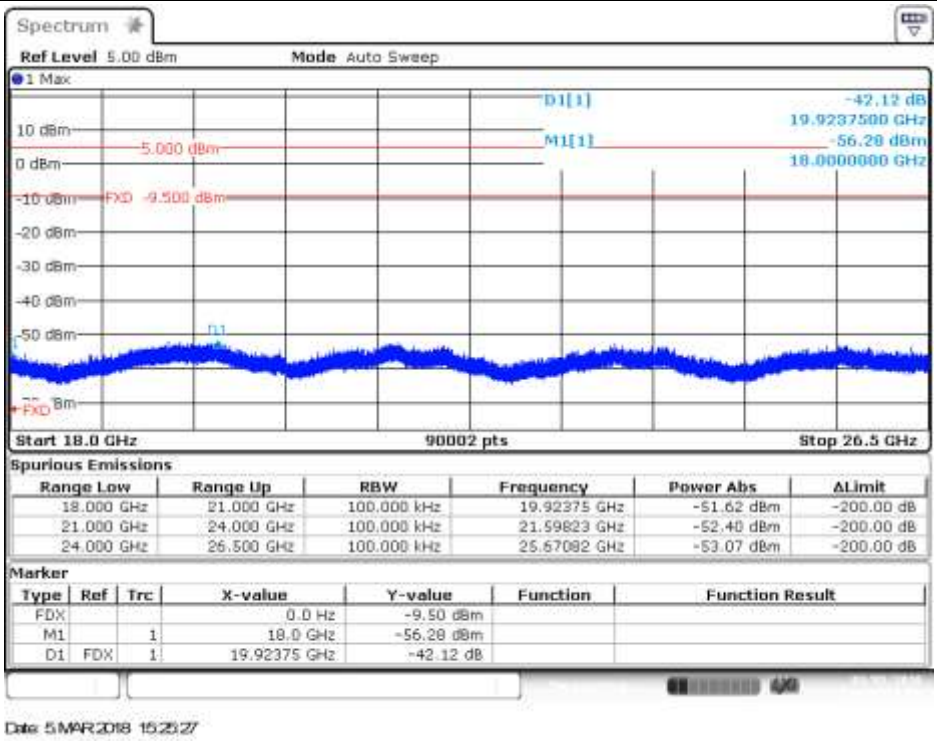
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 GHz	12.000 GHz	100.000 kHz	10.47825 GHz	-58.98 dBm	-200.00 dB
12.000 GHz	15.000 GHz	100.000 kHz	12.20584 GHz	-44.77 dBm	-200.00 dB
15.000 GHz	18.000 GHz	100.000 kHz	17.51707 GHz	-44.15 dBm	-200.00 dB

Marker

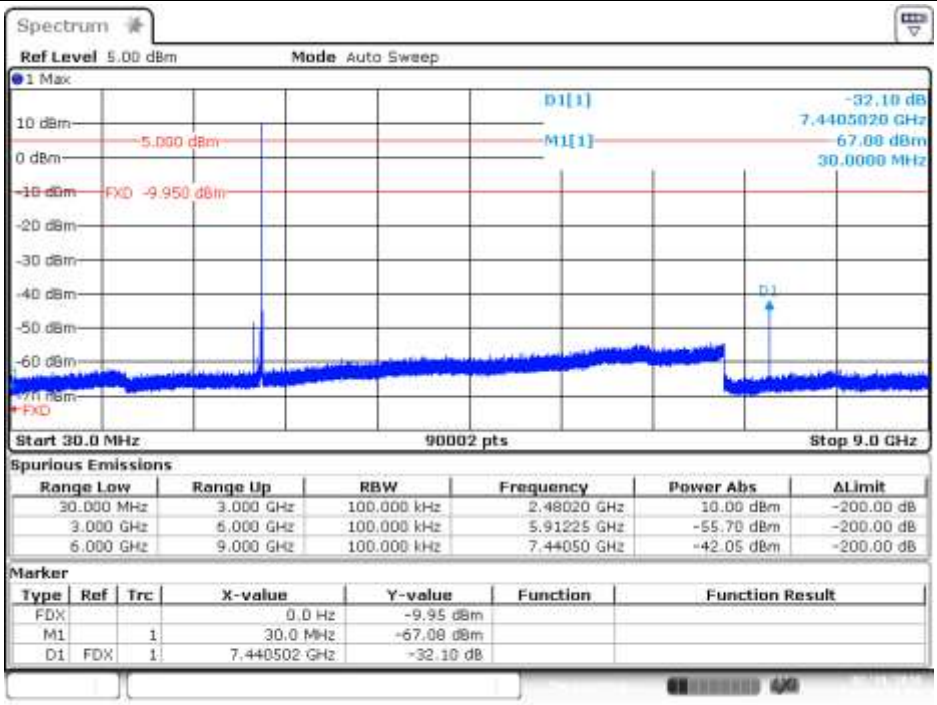
Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			9.00005 GHz	-9.50 dBm		
M1		1	9.0 GHz	-66.79 dBm		
D1	FDX	1	8.517016 GHz	-34.65 dB		

Date: 19.FEB.2018 15:48:05

Cond Spur – CH39 (18GHz – 26.5GHz)



Cond Spur – CH78 (30MHz - 9GHz)



Spurious Emissions

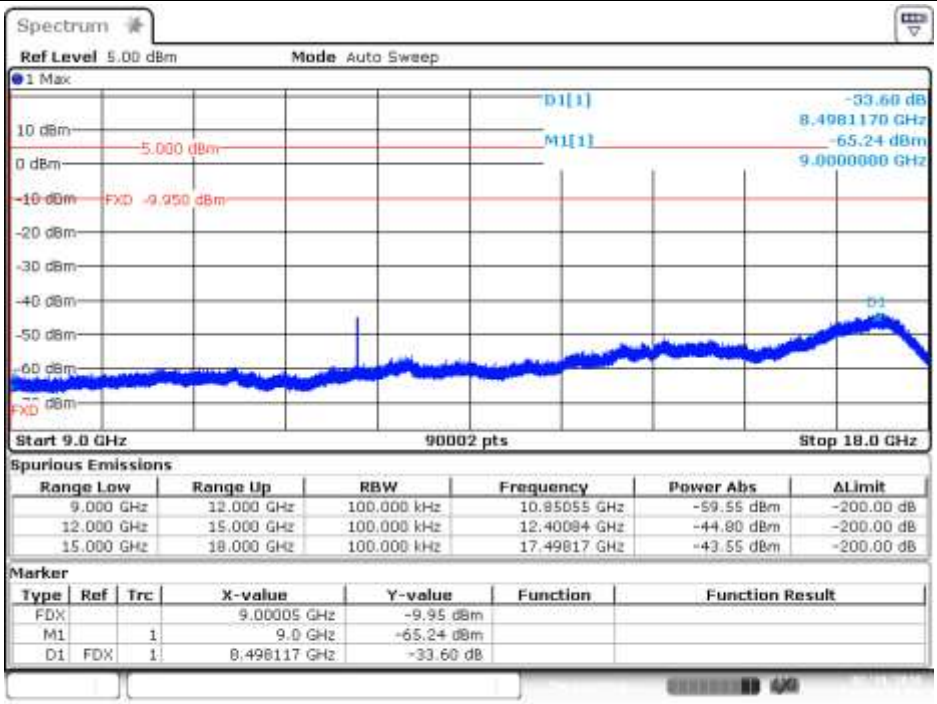
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	3.000 GHz	100.000 kHz	2.48020 GHz	10.00 dBm	-200.00 dB
3.000 GHz	6.000 GHz	100.000 kHz	5.91225 GHz	-55.70 dBm	-200.00 dB
6.000 GHz	9.000 GHz	100.000 kHz	7.44050 GHz	-42.05 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			0.0 Hz	-9.95 dBm		
M1		1	30.0 MHz	-67.08 dBm		
D1	FDX	1	7.440502 GHz	-32.10 dB		

Date: 19.FEB.2018 15:50:15

Cond Spur – CH78 (9GHz - 18GHz)



Spurious Emissions

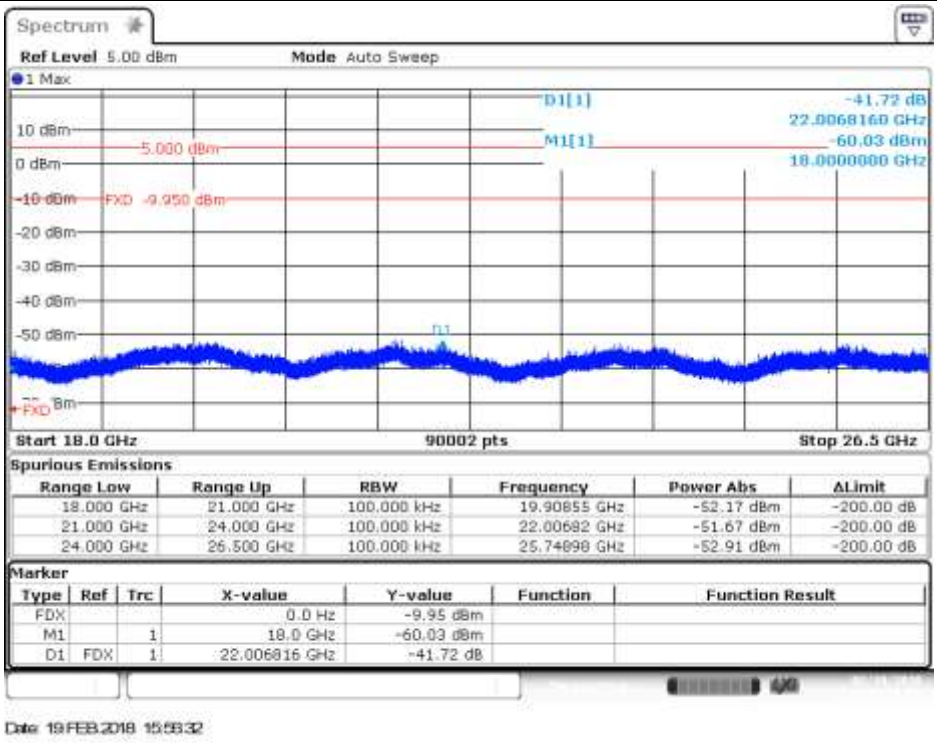
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 GHz	12.000 GHz	100.000 kHz	10.85055 GHz	-59.55 dBm	-200.00 dB
12.000 GHz	15.000 GHz	100.000 kHz	12.40084 GHz	-44.80 dBm	-200.00 dB
15.000 GHz	18.000 GHz	100.000 kHz	17.49817 GHz	-43.55 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			9.00005 GHz	-9.95 dBm		
M1		1	9.0 GHz	-65.24 dBm		
D1	FDX	1	8.498117 GHz	-33.60 dB		

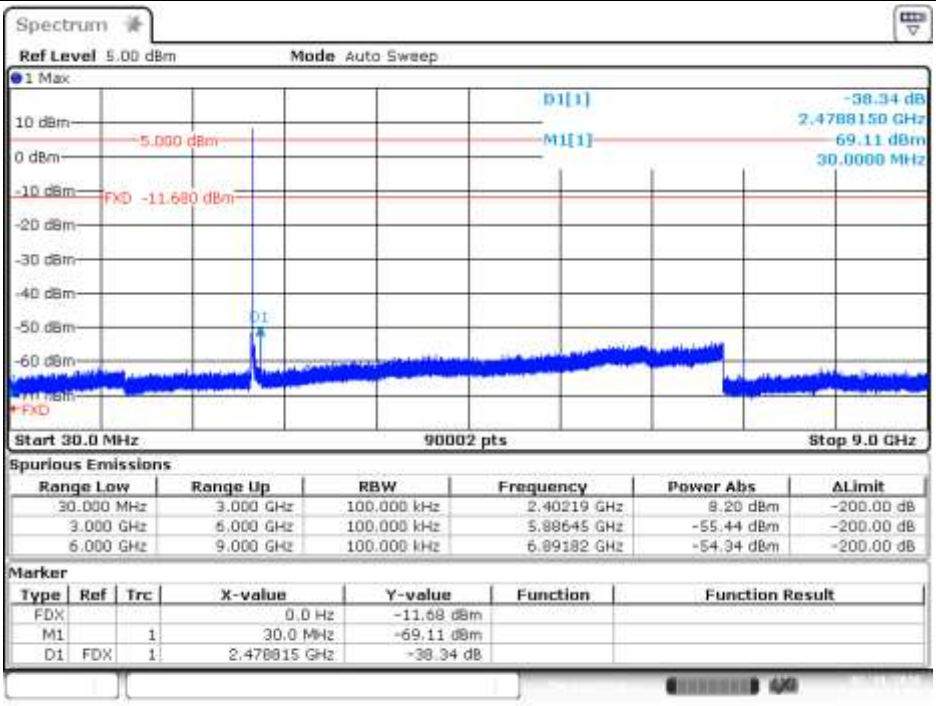
Date: 19.FEB.2018 15:55:32

Cond Spur – CH78 (18GHz – 26.5GHz)

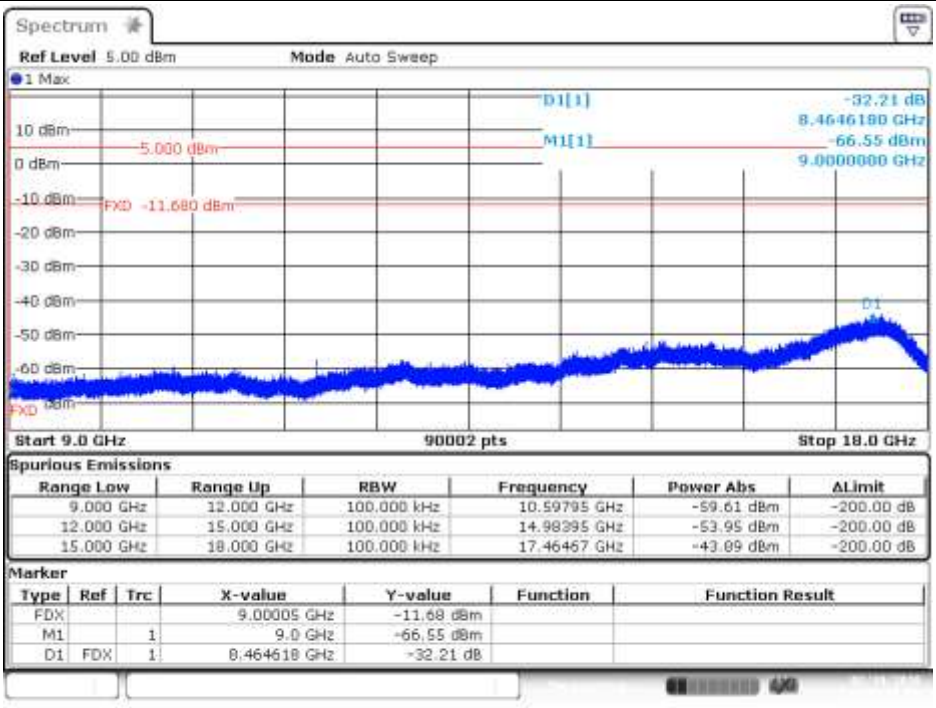


EDR – π/4-DQPSK

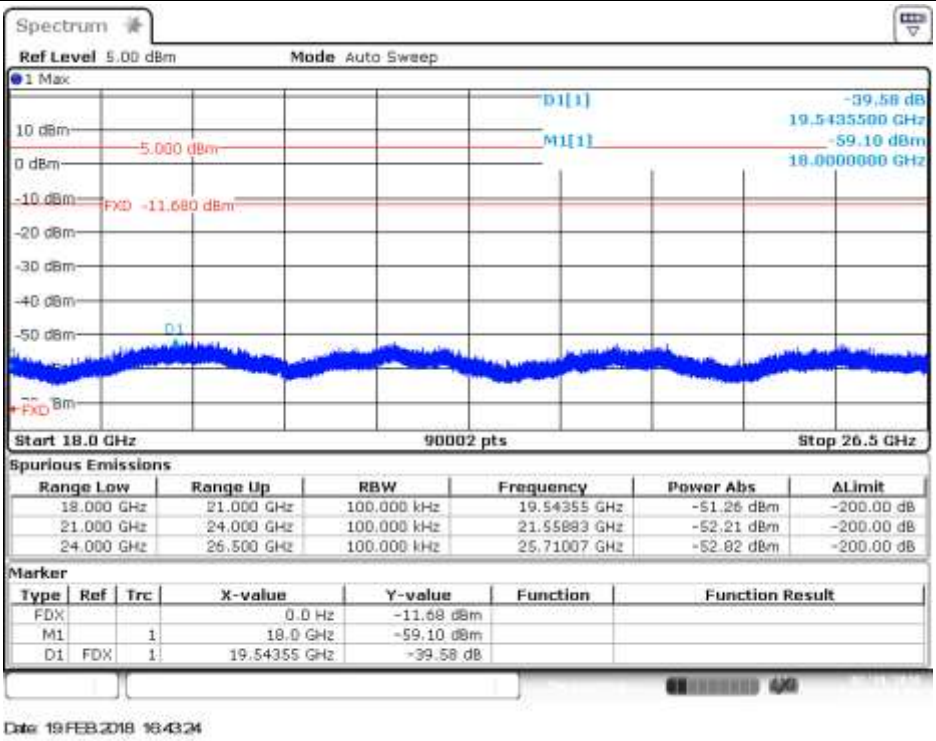
Cond Spur – CH0 (30MHz - 9GHz)



Cond Spur – CH0 (9GHz - 18GHz)



Cond Spur – CH0 (18GHz – 26.5GHz)



Spurious Emissions

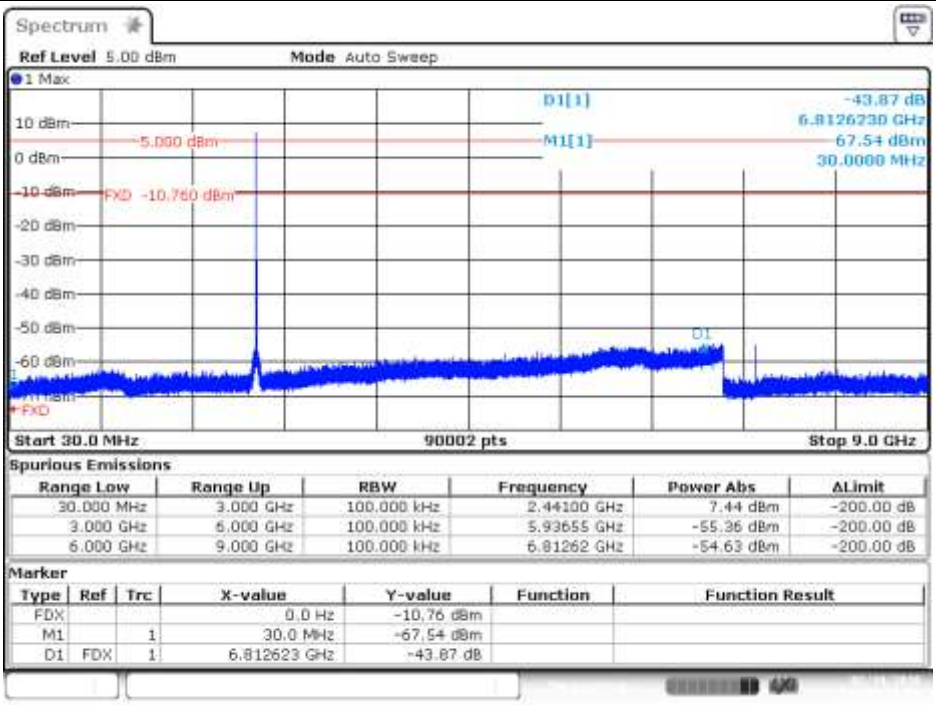
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
18.000 GHz	21.000 GHz	100.000 kHz	19.54355 GHz	-51.26 dBm	-200.00 dB
21.000 GHz	24.000 GHz	100.000 kHz	21.55883 GHz	-52.21 dBm	-200.00 dB
24.000 GHz	26.500 GHz	100.000 kHz	25.71007 GHz	-52.82 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			0.0 Hz	-11.68 dBm		
M1		1	18.0 GHz	-59.10 dBm		
D1	FDX	1	19.54355 GHz	-39.58 dB		

Date: 19.FEB.2018 16:43:24

Cond Spur – CH39 (30MHz - 9GHz)



Spurious Emissions

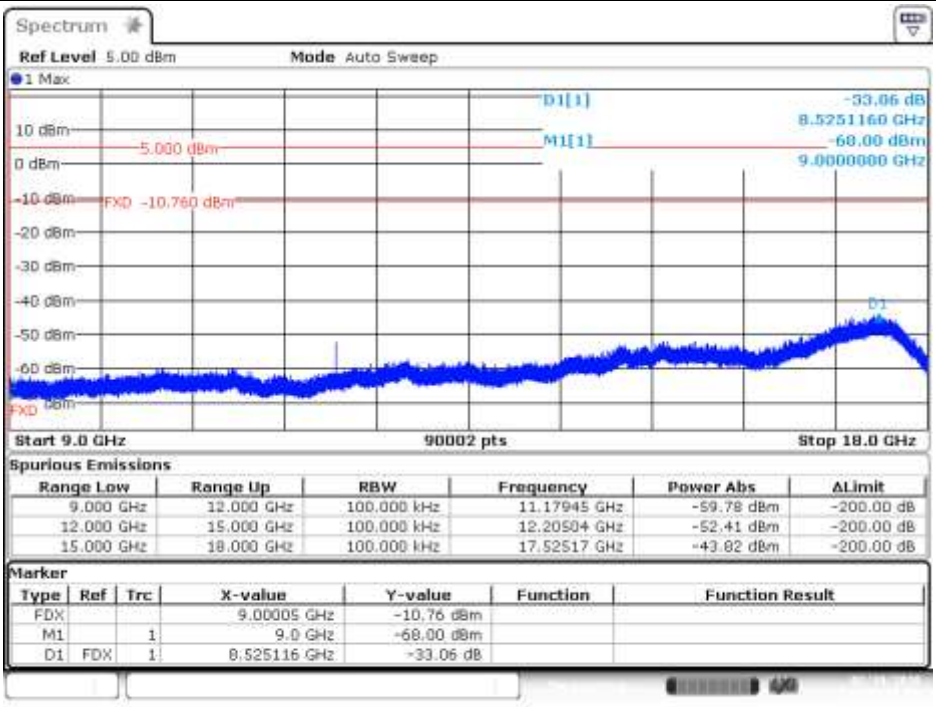
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	3.000 GHz	100.000 kHz	2.44100 GHz	7.44 dBm	-200.00 dB
3.000 GHz	6.000 GHz	100.000 kHz	5.93655 GHz	-55.36 dBm	-200.00 dB
6.000 GHz	9.000 GHz	100.000 kHz	6.81262 GHz	-54.63 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			0.0 Hz	-10.76 dBm		
M1		1	30.0 MHz	-67.54 dBm		
D1	FDX	1	6.812623 GHz	-43.87 dB		

Date: 19.FEB.2018 16:44:32

Cond Spur – CH39 (9GHz - 18GHz)



Spurious Emissions

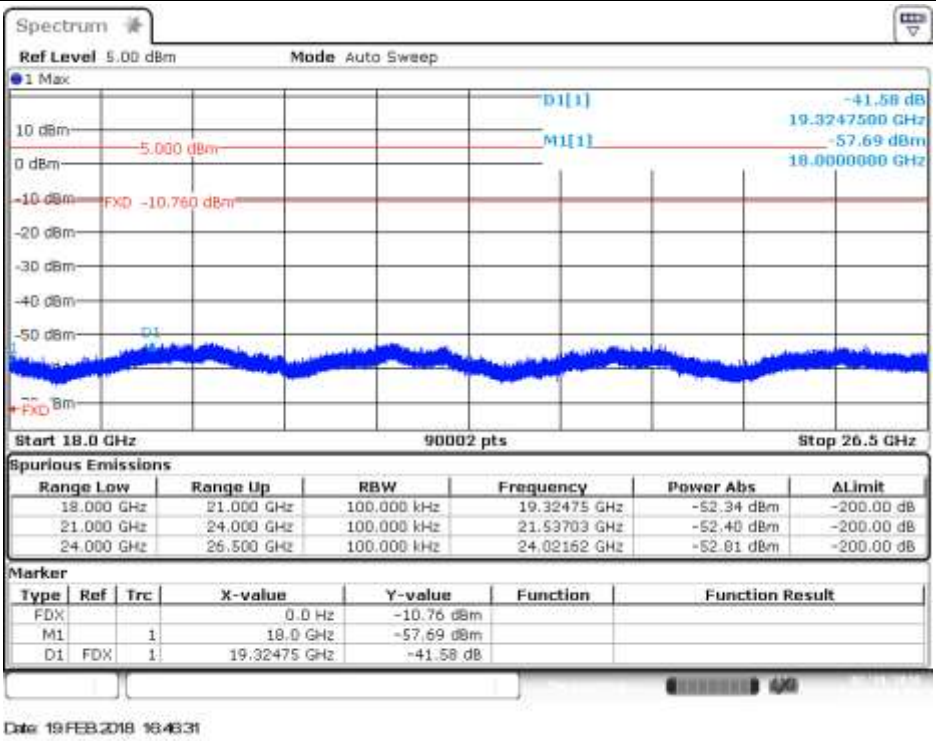
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 GHz	12.000 GHz	100.000 kHz	11.17945 GHz	-59.78 dBm	-200.00 dB
12.000 GHz	15.000 GHz	100.000 kHz	12.20504 GHz	-52.41 dBm	-200.00 dB
15.000 GHz	18.000 GHz	100.000 kHz	17.52517 GHz	-43.82 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			9.00005 GHz	-10.76 dBm		
M1		1	9.0 GHz	-68.00 dBm		
D1	FDX	1	8.525116 GHz	-33.06 dB		

Date: 19.FEB.2018 16:45:27

Cond Spur – CH39 (18GHz – 26.5GHz)



Spurious Emissions

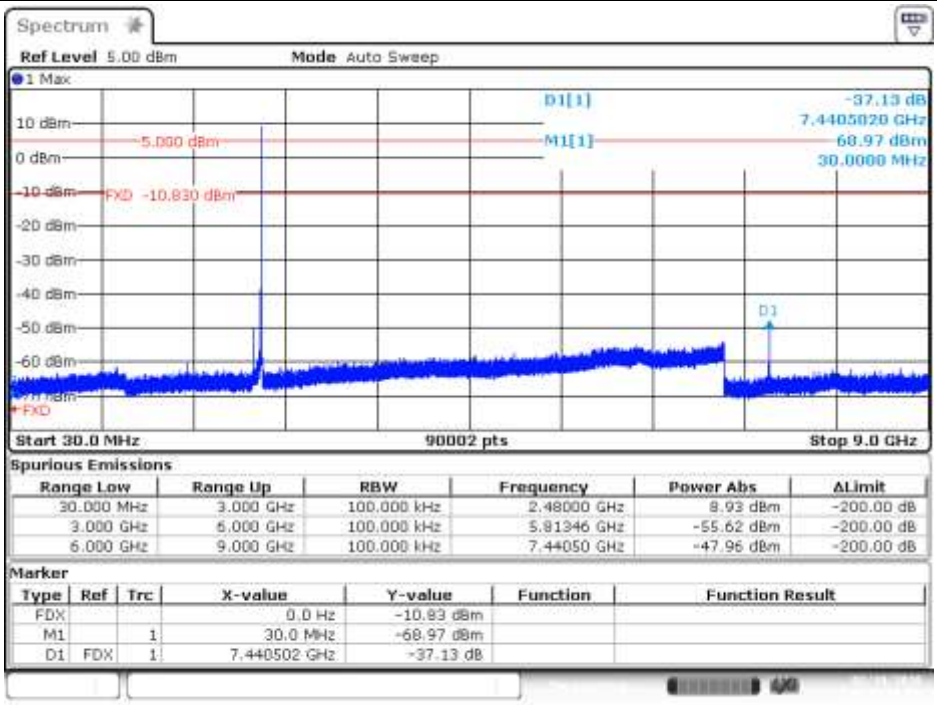
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
18.000 GHz	21.000 GHz	100.000 kHz	19.32475 GHz	-52.34 dBm	-200.00 dB
21.000 GHz	24.000 GHz	100.000 kHz	21.53703 GHz	-52.40 dBm	-200.00 dB
24.000 GHz	26.500 GHz	100.000 kHz	24.02152 GHz	-52.81 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			0.0 Hz	-10.76 dBm		
M1		1	18.0 GHz	-57.69 dBm		
D1	FDX	1	19.32475 GHz	-41.58 dB		

Date: 19.FEB.2018 16:48:31

Cond Spur – CH78 (30MHz - 9GHz)



Spurious Emissions

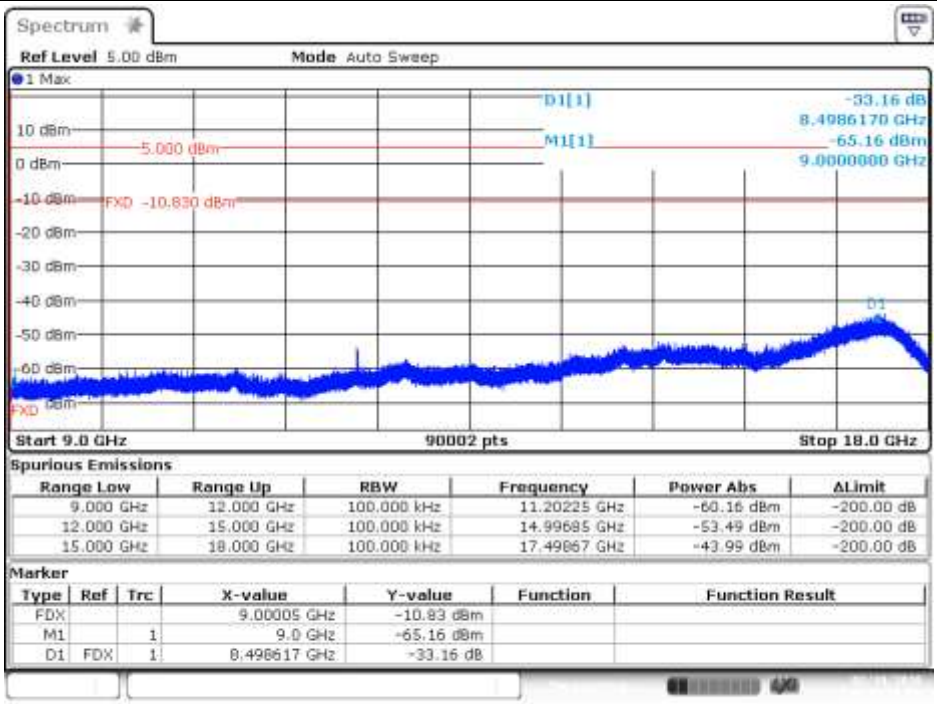
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	3.000 GHz	100.000 kHz	2.48000 GHz	8.93 dBm	-200.00 dB
3.000 GHz	6.000 GHz	100.000 kHz	5.81346 GHz	-55.62 dBm	-200.00 dB
6.000 GHz	9.000 GHz	100.000 kHz	7.44050 GHz	-47.96 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			0.0 Hz	-10.83 dBm		
M1		1	30.0 MHz	-68.97 dBm		
D1	FDX	1	7.440502 GHz	-37.13 dB		

Date: 19.FEB.2018 16:39:27

Cond Spur – CH78 (9GHz - 18GHz)



Spurious Emissions

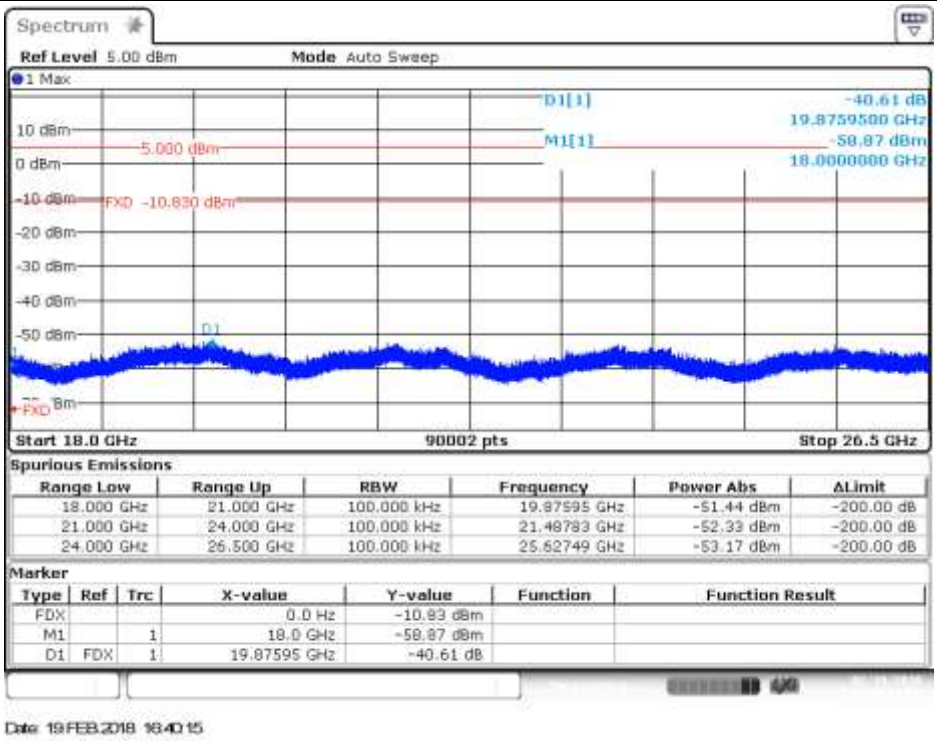
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 GHz	12.000 GHz	100.000 kHz	11.20225 GHz	-60.16 dBm	-200.00 dB
12.000 GHz	15.000 GHz	100.000 kHz	14.99685 GHz	-53.49 dBm	-200.00 dB
15.000 GHz	18.000 GHz	100.000 kHz	17.49867 GHz	-43.99 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			9.00005 GHz	-10.83 dBm		
M1		1	9.0 GHz	-65.16 dBm		
D1	FDX	1	8.498617 GHz	-33.16 dB		

Date: 19.FEB.2018 16:38:16

Cond Spur – CH78 (18GHz – 26.5GHz)



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
18.000 GHz	21.000 GHz	100.000 kHz	19.87595 GHz	-51.44 dBm	-200.00 dB
21.000 GHz	24.000 GHz	100.000 kHz	21.48783 GHz	-52.33 dBm	-200.00 dB
24.000 GHz	26.500 GHz	100.000 kHz	25.62749 GHz	-53.17 dBm	-200.00 dB

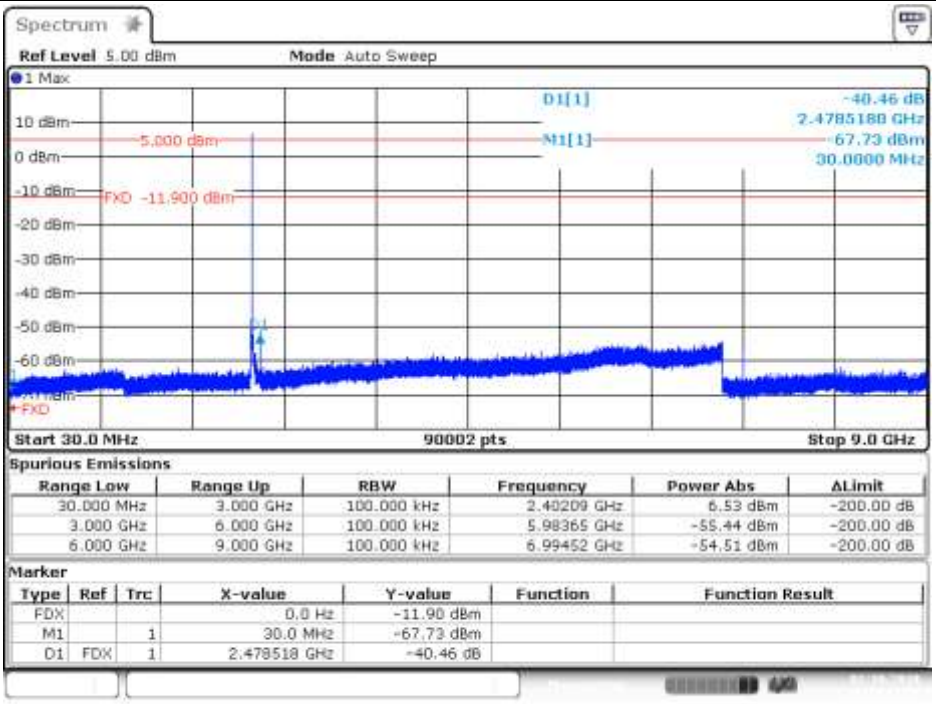
Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			0.0 Hz	-10.83 dBm		
M1		1	18.0 GHz	-58.87 dBm		
D1	FDX	1	19.87595 GHz	-40.61 dB		

Date: 19.FEB.2018 16:40:15

EDR – 8-DPSK

Cond Spur – CH0 (30MHz - 9GHz)



Spurious Emissions

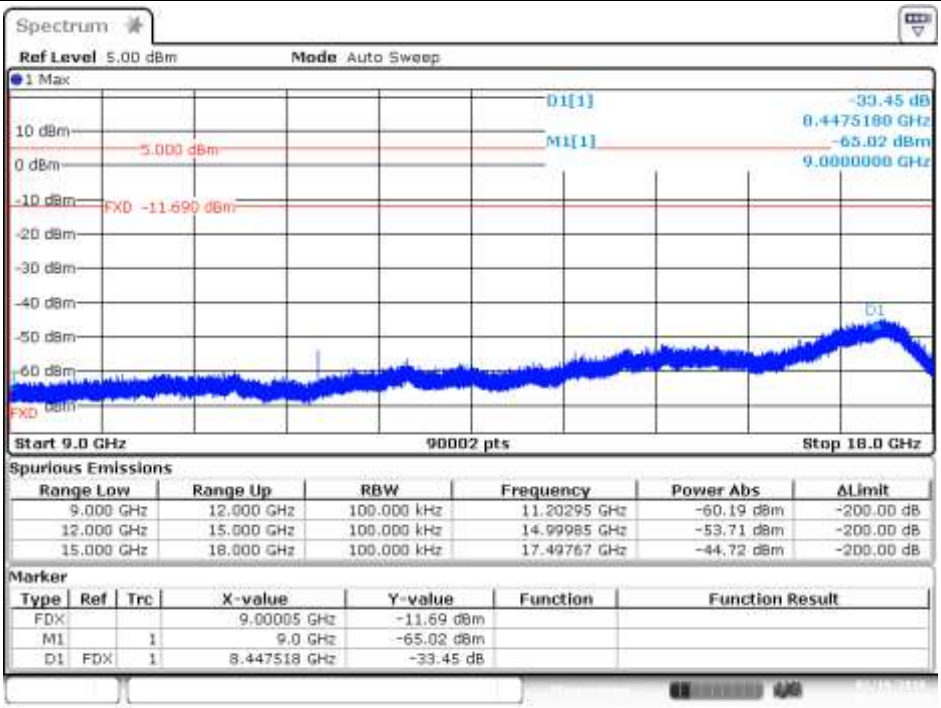
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	3.000 GHz	100.000 kHz	2.40209 GHz	6.53 dBm	-200.00 dB
3.000 GHz	6.000 GHz	100.000 kHz	5.98365 GHz	-55.44 dBm	-200.00 dB
6.000 GHz	9.000 GHz	100.000 kHz	6.99452 GHz	-54.51 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			0.0 Hz	-11.90 dBm		
M1		1	30.0 MHz	-67.73 dBm		
D1	FDX	1	2.478518 GHz	-40.46 dB		

Date: 19.FEB.2018 17:24:17

Cond Spur – CH0 (9GHz - 18GHz)



Spurious Emissions

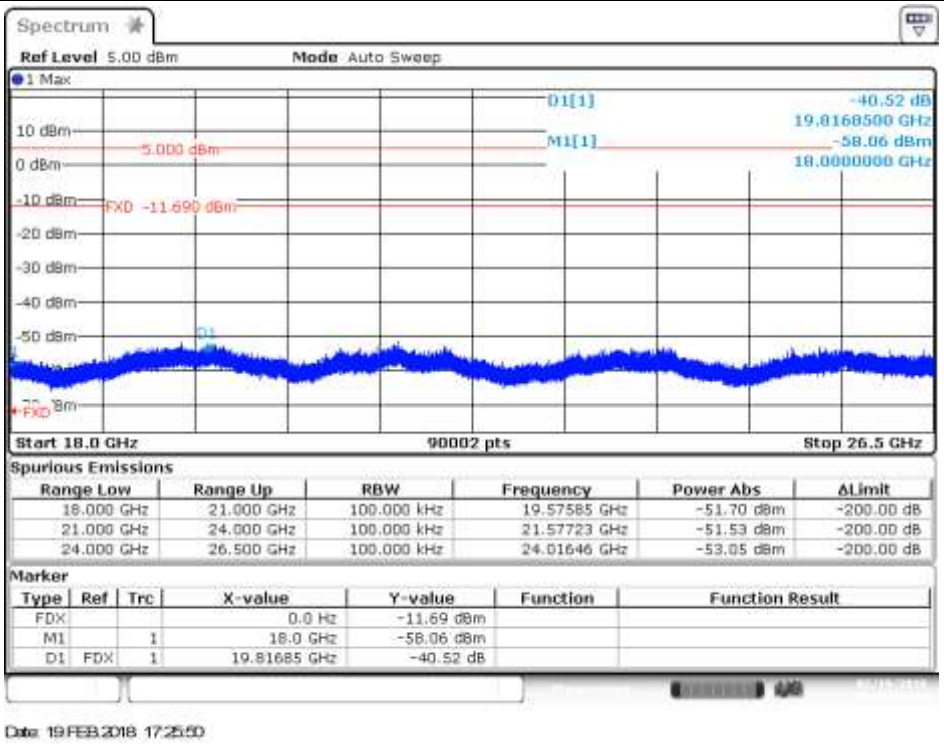
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 GHz	12.000 GHz	100.000 kHz	11.20295 GHz	-60.19 dBm	-200.00 dB
12.000 GHz	15.000 GHz	100.000 kHz	14.99985 GHz	-53.71 dBm	-200.00 dB
15.000 GHz	18.000 GHz	100.000 kHz	17.49767 GHz	-44.72 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			9.00005 GHz	-11.69 dBm		
M1		1	9.0 GHz	-65.02 dBm		
D1	FDX	1	8.447518 GHz	-33.45 dB		

Date: 19.FEB.2018 17:25:05

Cond Spur – CH0 (18GHz – 26.5GHz)



Spurious Emissions

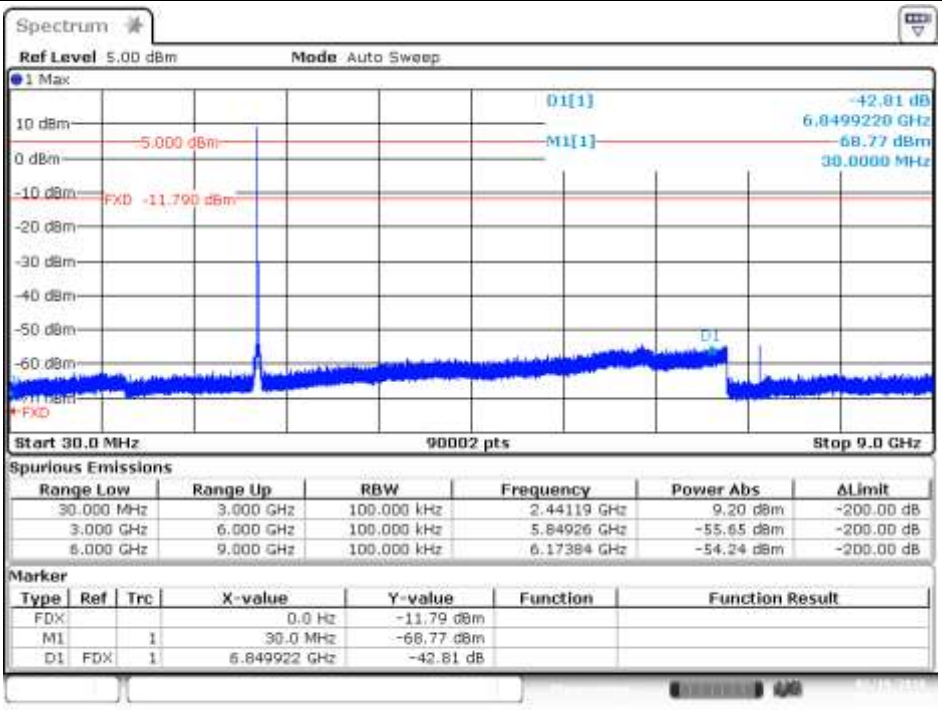
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
18.000 GHz	21.000 GHz	100.000 kHz	19.57585 GHz	-51.70 dBm	-200.00 dB
21.000 GHz	24.000 GHz	100.000 kHz	21.57723 GHz	-51.53 dBm	-200.00 dB
24.000 GHz	26.500 GHz	100.000 kHz	24.01646 GHz	-53.05 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			0.0 Hz	-11.69 dBm		
M1		1	18.0 GHz	-58.06 dBm		
D1	FDX	1	19.81685 GHz	-40.52 dB		

Date: 19.FEB.2018 17:25:50

Cond Spur – CH39 (30MHz - 9GHz)



Spurious Emissions

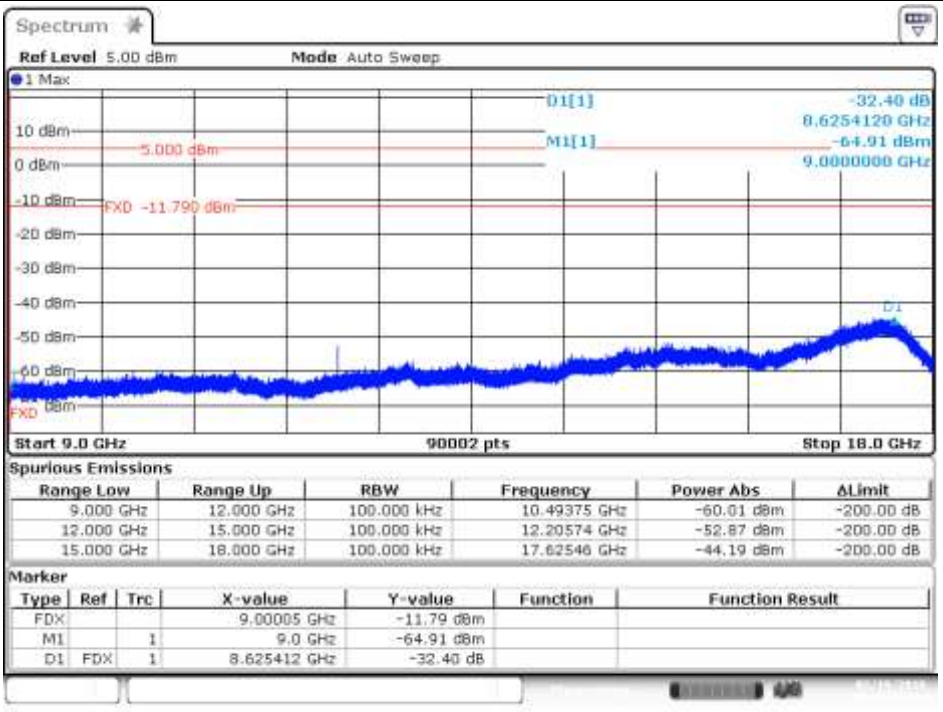
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	3.000 GHz	100.000 kHz	2.44119 GHz	9.20 dBm	-200.00 dB
3.000 GHz	6.000 GHz	100.000 kHz	5.84926 GHz	-55.65 dBm	-200.00 dB
6.000 GHz	9.000 GHz	100.000 kHz	6.17384 GHz	-54.24 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			0.0 Hz	-11.79 dBm		
M1		1	30.0 MHz	-68.77 dBm		
D1	FDX	1	6.849922 GHz	-42.81 dB		

Date: 19.FEB.2018 17:27:18

Cond Spur – CH39 (9GHz - 18GHz)



Spurious Emissions

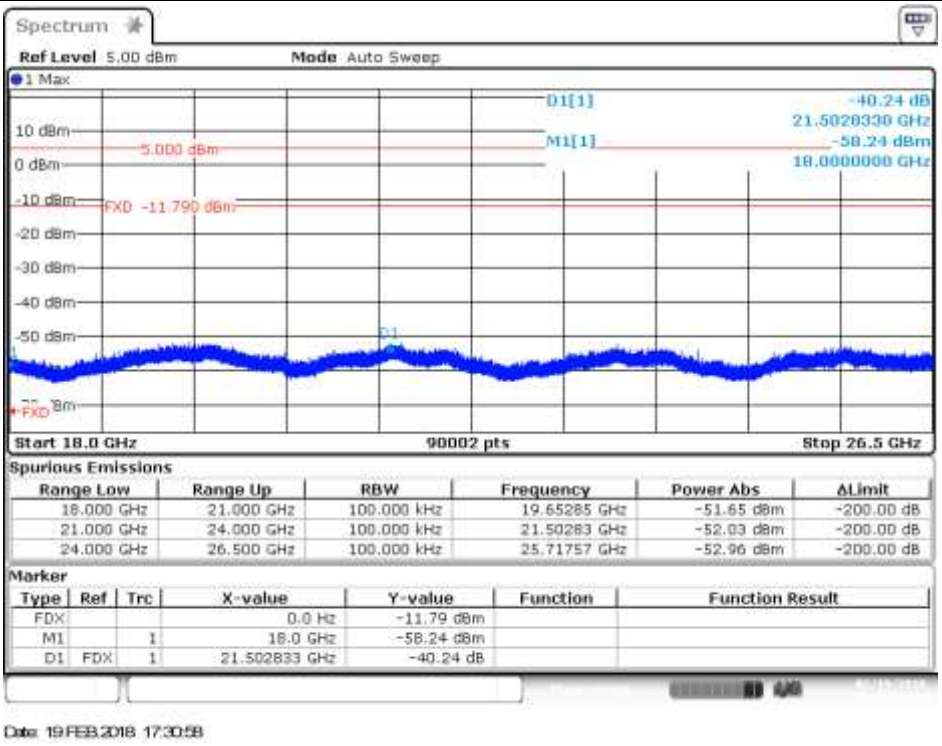
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 GHz	12.000 GHz	100.000 kHz	10.49375 GHz	-60.01 dBm	-200.00 dB
12.000 GHz	15.000 GHz	100.000 kHz	12.20574 GHz	-52.87 dBm	-200.00 dB
15.000 GHz	18.000 GHz	100.000 kHz	17.62546 GHz	-44.19 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			9.00005 GHz	-11.79 dBm		
M1		1	9.0 GHz	-64.91 dBm		
D1	FDX	1	8.625412 GHz	-32.40 dB		

Date: 19.FEB.2018 17:28:47

Cond Spur – CH39 (18GHz – 26.5GHz)



Spurious Emissions

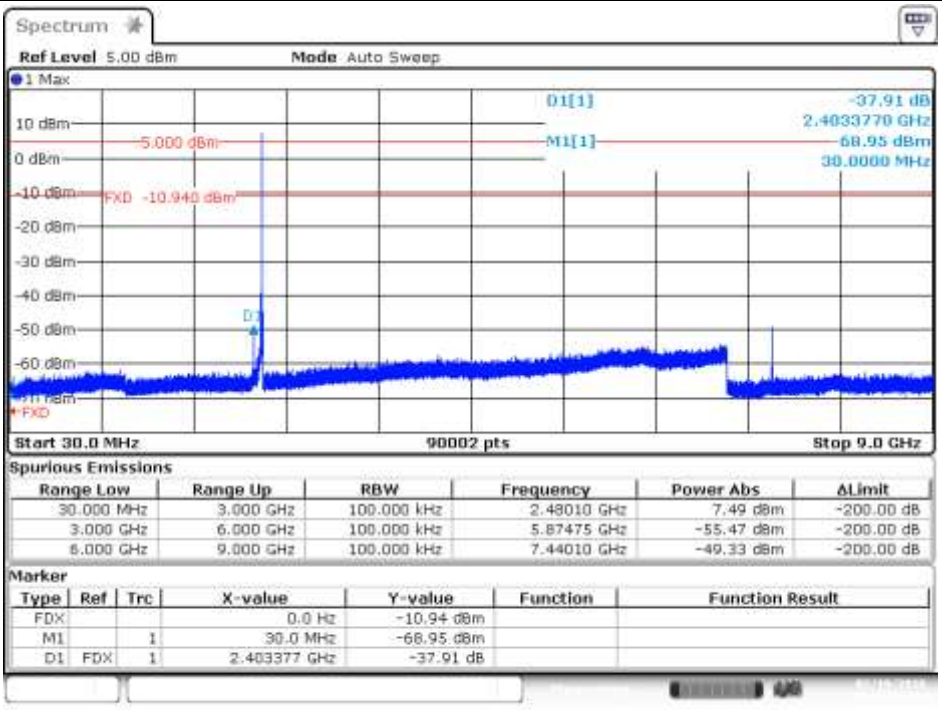
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
18.000 GHz	21.000 GHz	100.000 kHz	19.65285 GHz	-51.65 dBm	-200.00 dB
21.000 GHz	24.000 GHz	100.000 kHz	21.50283 GHz	-52.03 dBm	-200.00 dB
24.000 GHz	26.500 GHz	100.000 kHz	25.71757 GHz	-52.96 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			0.0 Hz	-11.79 dBm		
M1		1	18.0 GHz	-58.24 dBm		
D1	FDX	1	21.502833 GHz	-40.24 dB		

Date: 19.FEB.2018 17:30:58

Cond Spur – CH78 (30MHz - 9GHz)



Spurious Emissions

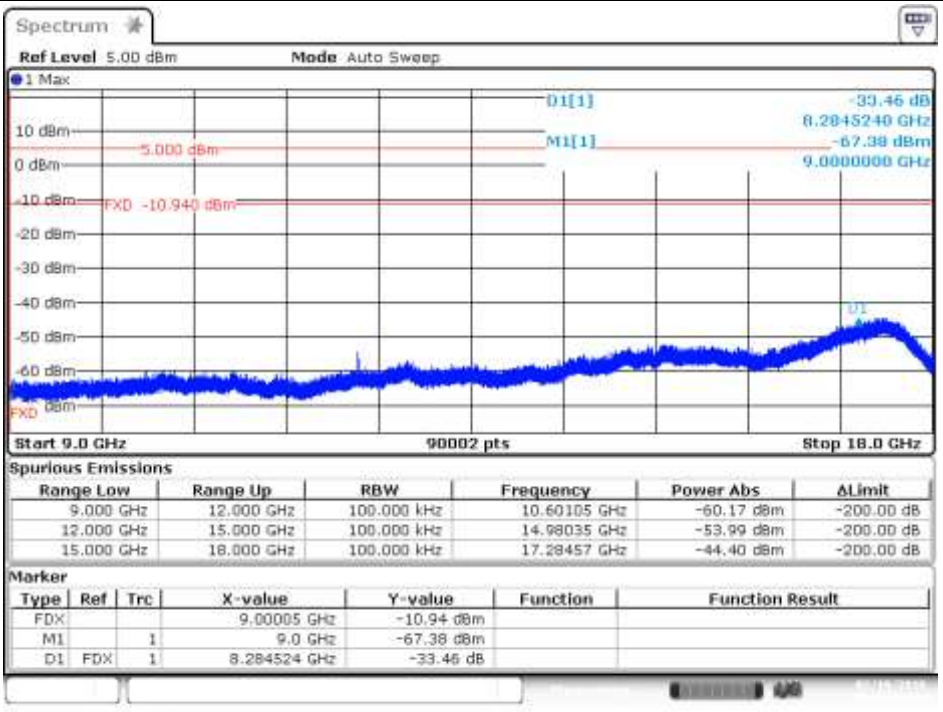
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
30.000 MHz	3.000 GHz	100.000 kHz	2.48010 GHz	7.49 dBm	-200.00 dB
3.000 GHz	6.000 GHz	100.000 kHz	5.87475 GHz	-55.47 dBm	-200.00 dB
6.000 GHz	9.000 GHz	100.000 kHz	7.44010 GHz	-49.33 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			0.0 Hz	-10.94 dBm		
M1		1	30.0 MHz	-68.95 dBm		
D1	FDX	1	2.403377 GHz	-37.91 dB		

Date: 19.FEB.2018 17:23:02

Cond Spur – CH78 (9GHz - 18GHz)



Spurious Emissions

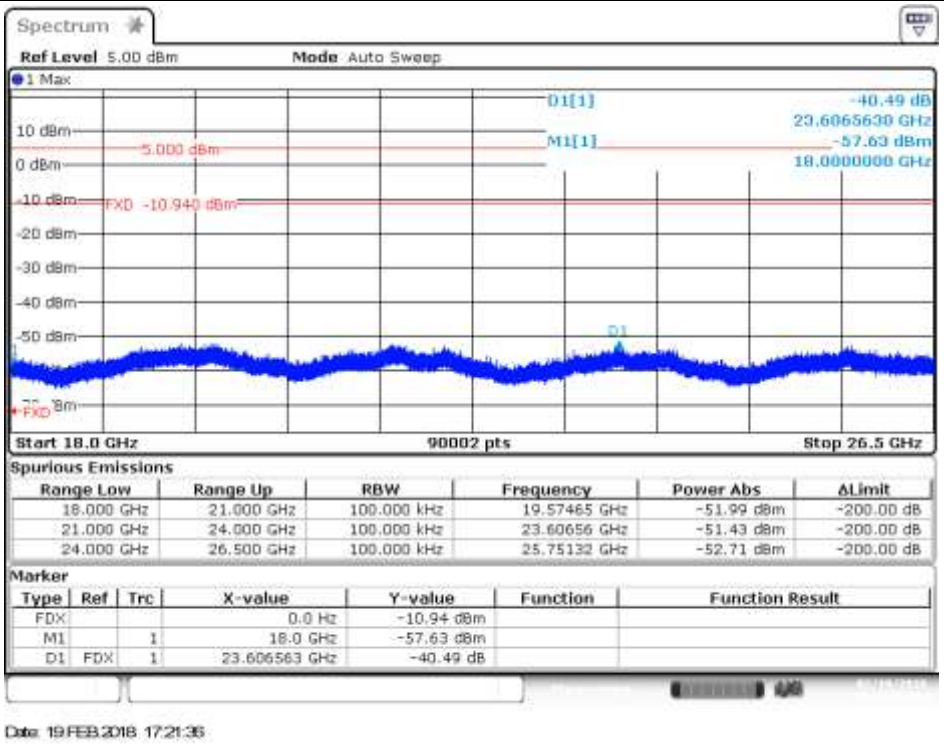
Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
9.000 GHz	12.000 GHz	100.000 kHz	10.60105 GHz	-60.17 dBm	-200.00 dB
12.000 GHz	15.000 GHz	100.000 kHz	14.98035 GHz	-53.99 dBm	-200.00 dB
15.000 GHz	18.000 GHz	100.000 kHz	17.28457 GHz	-44.40 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			9.00005 GHz	-10.94 dBm		
M1		1	9.0 GHz	-67.38 dBm		
D1	FDX	1	8.284524 GHz	-33.46 dB		

Date: 19.FEB.2018 17:33:04

Cond Spur – CH78 (18GHz – 26.5GHz)



Spurious Emissions

Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit
18.000 GHz	21.000 GHz	100.000 kHz	19.57465 GHz	-51.99 dBm	-200.00 dB
21.000 GHz	24.000 GHz	100.000 kHz	23.60656 GHz	-51.43 dBm	-200.00 dB
24.000 GHz	26.500 GHz	100.000 kHz	25.75132 GHz	-52.71 dBm	-200.00 dB

Marker

Type	Ref	Trc	X-value	Y-value	Function	Function Result
FDX			0.0 Hz	-10.94 dBm		
M1		1	18.0 GHz	-57.63 dBm		
D1	FDX	1	23.606563 GHz	-40.49 dB		

Date: 19.FEB.2018 17:21:36

B.6 Radiated spurious emission

Standards references

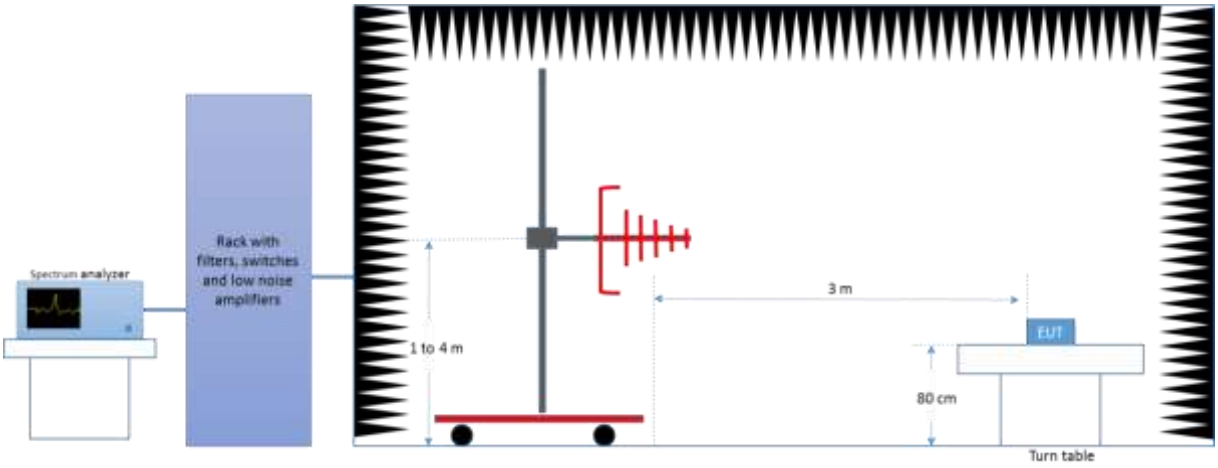
<table>
<tr><th>FCC part</th><th>RSS part</th><th>Limits</th></tr>
<tr><td>15.247 (d)
15.209 (a)</td><td>RSS-247
Clause 5.5

RSS GEN
Clause 8.9</td><td>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):
<table>
<tr><th>Freq Range (MHz)</th><th>Field Stregth (µV/m)</th><th>Field Stregth (dBµV/m)</th><th>Meas. Distance (m)</th></tr>
<tr><td>30-88</td><td>100</td><td>40</td><td>3</td></tr>
<tr><td>88-216</td><td>150</td><td>43.5</td><td>3</td></tr>
<tr><td>216-960</td><td>200</td><td>46</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>54</td><td>3</td></tr>
</table>
The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
For average radiated emission measurements above 1000 MHz, there is also a limit specified when measuring with peak detector function, corresponding to 20 dB above the indicated values in the table.</td></tr>
</table>

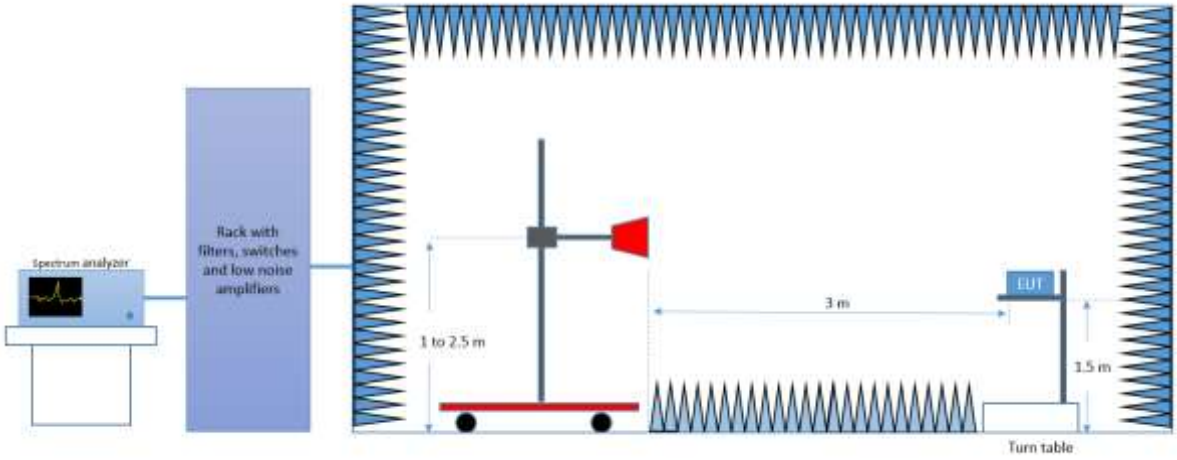
Test procedure:

The setups below were used to measure the radiated spurious emissions.
Depending of the frequency range and bands being tested, different antennas and filters were used.
The final measurement is done by varying the antenna height as indicated in the setups below for each band, the EUT azimuth over 360º and for both Vertical and Horizontal polarizations.
The radiated spurious emission was measured on the worst case configuration found.

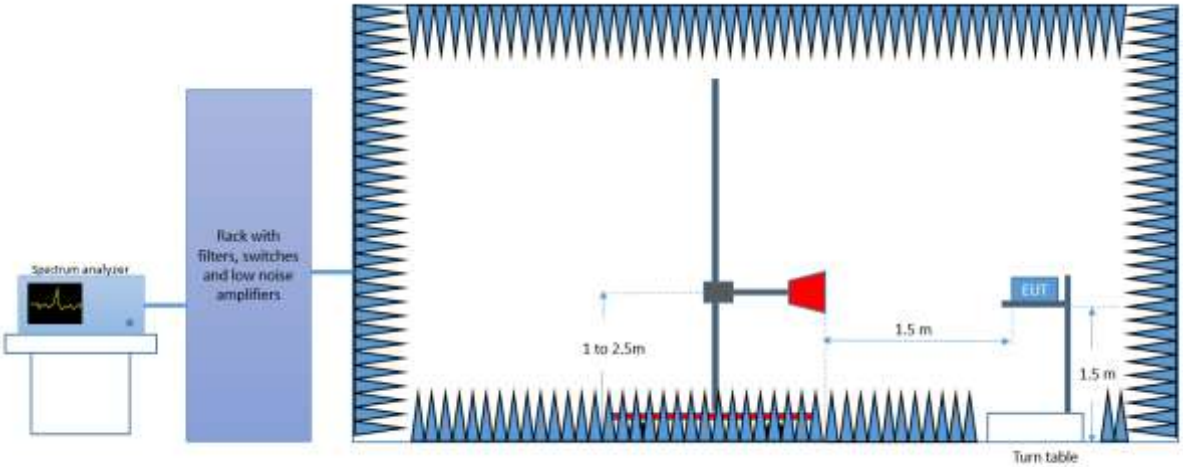
Radiated Setup 30 MHz - 1GHz



Radiated Setup 1 GHz - 18 GHz



Radiated Setup 18 GHz – 26.5 GHz



Sample Calculation

The field strength is deduced from the radiated measurement using the following equation:

$$E = 126.8 - 20\log(\lambda) + P - G$$

where

E is the field strength of the emission at the measurement distance, in dBµV/m

P is the power measured at the output of the test antenna, in dBm

λ is the wavelength of the emission under investigation [300/f_{MHz}], in m

G is the gain of the test antenna, in dBi

NOTE – The measured power P includes all applicable instrument correction factors up to the connection to the test

Antenna e.g. cable losses, amplifier gains.

For field strength measurements made at other than the distance at which the applicable limit is specified, the field strength of the emission at the distance specified by the limit is deduced as follows:

$$E_{SpecLimit} = E_{Meas} + 20\log(D_{Meas}/D_{SpecLimit})$$

where

$E_{SpecLimit}$ is the field strength of the emission at the distance specified by the limit, in dBµV/m

E_{Meas} is the field strength of the emission at the measurement distance, in dBµV/m

D_{Meas} is the measurement distance, in m

$D_{SpecLimit}$ is the distance specified by the limit, in m

Test Results

30 MHz – 26.5 GHz, BR – GFSK

Radiated Spurious – CH0 DH5

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
115.2	29.7	---	43.6	13.9
216.0	27.5	---	43.6	16.1
576.0	38.1	---	46.0	7.9
1113.4	---	40.6	54.0	13.4
1189.1	51.4	---	74.0	22.6
1190.3	---	42.2	54.0	11.8
2473.4	58.1	---	74.0	15.9
2478.8	---	47.4	54.0	6.6
7205.2	49.6	---	74.0	24.4
7205.7	---	40.3	54.0	13.7
12009.6	---	43.0	54.0	11.0
12009.1	52.5	---	74.0	21.5
24216.3	48.1	---	74.0	25.9
24256.7	---	35.0	54.0	19.0

Radiated Spurious – CH39 DH5

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
115.2	29.6	---	43.6	14.0
215.9	27.3	---	43.6	16.3
576.0	38.2	---	46.0	7.8
1107.2	51.5	---	74.0	22.5
1113.4	---	40.4	54.0	13.6
1190.0	52.0	---	74.0	22.0
1190.3	---	42.2	54.0	11.8
2496.3	61.4	---	74.0	12.6
2503.1	---	45.7	54.0	8.3
7322.7	48.3	---	74.0	25.7
7322.7	---	39.7	54.0	14.3
12204.4	52.8	---	74.0	21.2
12204.8	---	43.6	54.0	10.4
21215.1	47.9	---	74.0	26.1
21197.1	---	34.3	54.0	19.7

Radiated Spurious – CH78 DH5

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
115.2	28.9	---	43.6	14.7
216.0	26.3	---	46.0	19.7
576.0	37.8	---	46.0	8.2
1112.5	50.7	---	74.0	23.3
1113.4	---	40.6	54.0	13.4
1189.7	52.9	---	74.0	21.1
1190.3	---	42.2	54.0	11.8
7439.7	51.5	---	74.0	22.5
7439.7	---	44.6	54.0	9.4
12399.6	---	44.6	54.0	9.4
12400.6	53.2	---	74.0	20.8
19907.2	47.6	---	74.0	26.4
19912.1	---	34.3	74.0	19.7

30 MHz – 26.5 GHz, EDR – π/4-DQPSK

Radiated Spurious – CH0 2DH5

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
115.2	28.8	---	43.6	14.8
216.0	27.2	---	43.6	16.4
576.0	36.9	---	46.0	9.1
1113.4	---	40.6	54.0	13.4
1115.3	51.0	---	74.0	23.0
1190.3	52.5	---	74.0	21.5
1190.3	---	42.4	54.0	11.6
7205.7	48.0	---	74.0	26.0
7205.7	---	36.5	54.0	17.5
12009.1	---	39.8	54.0	14.2
24246.4	---	35.1	54.0	18.9
24285.8	48.2	---	74.0	25.8

Radiated Spurious – CH39 2DH5

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
115.2	28.8	---	43.6	14.8
216.0	27.0	---	46.0	19.0
576.0	38.0	---	46.0	8.0
1113.4	---	40.9	54.0	13.1
1151.9	---	40.6	54.0	13.4
1190.3	---	42.0	54.0	12.0
1266.9	---	41.2	54.0	12.8
12204.8	50.0	---	74.0	24.0
12205.3	---	39.5	54.0	14.5
25550.5	48.0	---	74.0	26.0
25972.6	---	35.1	54.0	18.9

Radiated Spurious – CH78 2DH5

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
115.2	28.8	---	43.6	14.8
216.0	27.2	---	43.6	16.4
576.0	36.2	---	46.0	9.8
1190.0	52.5	---	74.0	21.5
1190.3	---	42.4	54.0	11.6
7439.2	49.2	---	74.0	24.8
7439.7	---	39.4	54.0	14.6
12399.6	51.0	---	74.0	23.0
12400.1	---	41.0	54.0	13.0
25952.1	---	34.5	54.0	19.5
25953.2	46.9	---	74.0	27.1

30 MHz – 26.5 GHz, EDR – 8-DPSK

Radiated Spurious – CH0 3DH5

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
115.2	29.5	---	43.6	14.1
215.9	27.3	---	43.6	16.3
576.0	37.1	---	46.0	8.9
1113.4	---	40.8	54.0	13.2
1114.1	50.5	---	74.0	23.5
1190.3	52.5	---	74.0	21.5
1190.3	---	42.2	54.0	11.8
7205.7	---	36.9	54.0	17.1
7205.7	48.1	---	74.0	25.9
12010.1	50.1	---	74.0	23.9
12010.1	---	39.9	54.0	14.1
25984.3	45.5	---	74.0	28.5
25992.5	---	34.8	54.0	19.2

Radiated Spurious – CH39 3DH5

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
32.6	34.0	---	40.0	**6.0**
115.2	28.5	---	43.6	15.1
216.0	27.2	---	43.6	16.4
576.0	37.1	---	46.0	8.9
1113.4	---	40.9	54.0	13.1
1151.9	---	40.7	54.0	13.3
1190.3	---	42.1	54.0	11.9
1266.9	---	41.1	54.0	12.9
12204.8	49.5	---	74.0	24.5
12204.8	---	40.1	54.0	13.9
25943.3	---	34.9	54.0	19.1
25952.8	47.2	---	74.0	26.8

Radiated Spurious – CH78 3DH5

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
115.2	29.2	---	43.6	14.4
216.0	25.8	---	43.6	17.8
576.0	37.1	---	46.0	8.9
1113.4	---	40.9	54.0	13.1
1152.2	---	40.3	54.0	13.7
1189.7	52.8	---	74.0	21.2
1190.3	---	42.7	54.0	11.3
7439.2	48.9	---	74.0	25.1
7440.1	---	39.2	54.0	14.8
12399.6	50.9	---	74.0	23.1
12399.6	---	41.2	54.0	12.8
25960.6	47.2	---	74.0	26.8
25976.9	---	34.9	54.0	19.1

B.7 AC power-line conducted emission

Standard references:

<table>
<tr><th>FCC part</th><th>Limits</th></tr>
<tr><td>15.207</td><td>Except as shown in paragraphs (b) and (c) of this section, 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 µH/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.
<table>
<tr><th rowspan="2">Frequency of emission (MHz)</th><th colspan="2">Conducted limit (dBµV)</th></tr>
<tr><th>Quasi-peak</th><th>Average</th></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
*Decreases with the logarithm of the frequency.</td></tr>
</table>

Test procedure:

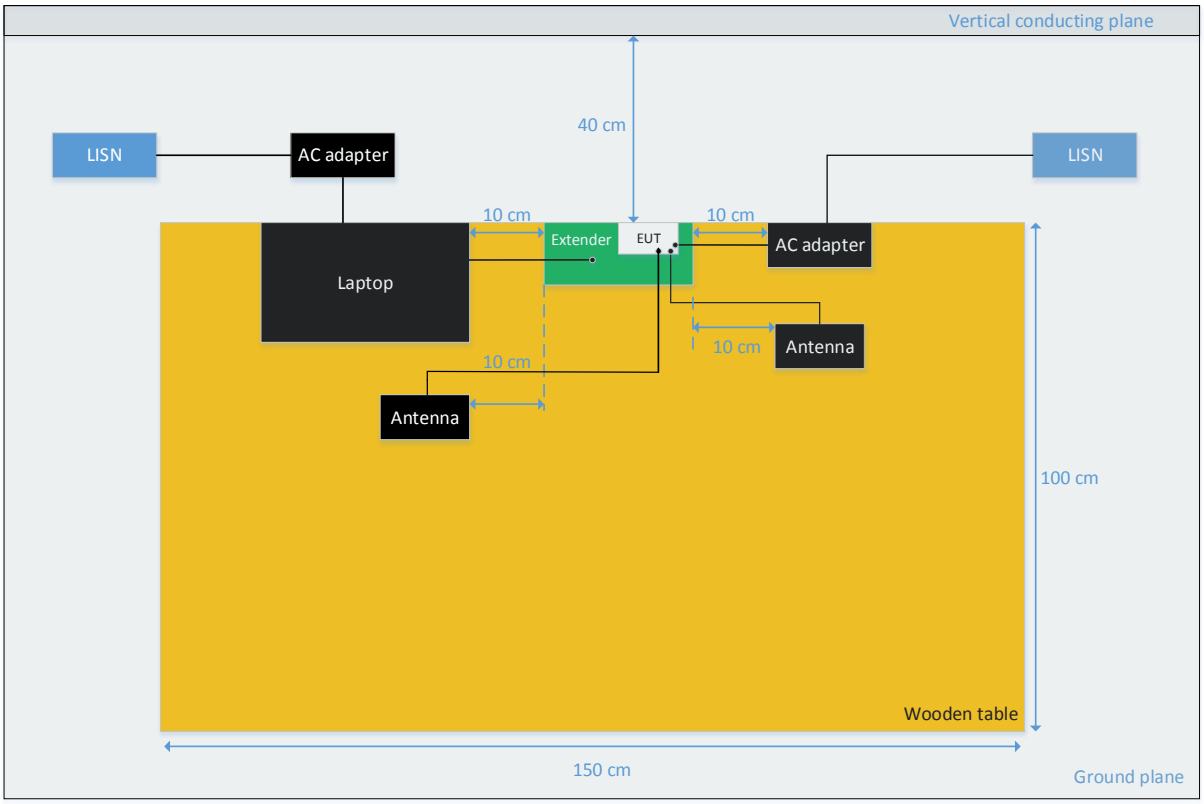
The EUT and peripherals are placed on a wooden table with a nominal size of 1.0 m by 1.5 m, raised 80 cm above the reference ground plane. The EUT is connected to AC-Power line through a Line Impedance Stabilization Network (LISN) to accommodate a 50 Ω/50 µH coupling impedance for the measurement system. The EUT control PC is considered as a peripheric and therefore is connected to a second LISN which has the measurement port connected to a 50 ohms impedance.

Each measurement is done for each current-carrying conductor (Line and Neutral) at the end plug of the EUT power cord. The EUT is tested for several transmission modes (frequency channel, modulation, etc.) and the result providing the maximum measured emission is reported.

The exploratory measurement is done over the frequency range from 150 kHz to 30 MHz, while the measurement receiver is recording the Peak and Average signal at 10 kHz steps in Max Hold mode. The cables manipulation is performed within the range of likely configurations to determine the maximum emission. Once the EUT cable configuration, arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit is found the six highest AC power-line conducted emissions relative to 20 dB of the limit are reported as the final measurement. If fewer than six emission frequencies are within 20 dB of the limit, the noise level is reported. For the final measurement, the measurement receiver records the Quasi Peak values with 9 kHz resolution bandwidth and the average values with 10 kHz resolution bandwidth.

The results present in this report are the maximum spurious levels detected during the measurements. (configuration BT BR 3DH5 Channel 78)

EUT arrangement for AC power-line conducted emission tests



Sample Calculation:

The measured level at the spectrum analyzer in dBuV is corrected by a transducer factor taking into account the losses of the RF cable and the LISN as follows:

Conducted Emission level (dBuV) = SA_{Level} + $RFCable_{Losses}$ + $LISN_{Losses}$

Where:
SA_{Level} is the voltage level displayed on the measurement receiver, in dBuV.
$RFCable_{Losses}$ is the value of the cable losses between the LISN and the measurement receiver, in dB.
$LISN_{Losses}$ is the value of the insertion losses of the LISN, in dB.

Test Results:

150kHz – 30MHz, all modes

AC power-line conducted – Phase L1

Frequency	Max Peak	Avg	Limit	Margin
MHz	dBµV	dBµV	dBµV	dB
0.16	51.1	---	65.6	14.5
0.16	---	27.9	55.7	27.8
0.38	43.0	---	59.4	16.4
0.38	---	28.5	49.5	21.0
3.82	40.7	---	56.0	15.3
3.78	---	29.2	46.0	16.8
6.36	43.5	---	60.0	16.5
6.32	---	28.1	50.0	21.9
13.55	52.0	---	60.0	8.0
13.56	---	38.4	50.0	11.6
26.03	30.6	---	60.0	29.4
26.13	---	17.3	50.0	32.7

Note: The emissions found do not change with the modulation and/or frequency.

AC power-line conducted – Neutral N

Frequency	Max Peak	Avg	Limit	Margin
MHz	dBµV	dBµV	dBµV	dB
0.16	53.6	---	65.7	12.1
0.16	---	28.6	55.7	27.1
0.37	44.2	---	59.6	15.4
0.37	---	28.1	49.7	21.6
2.94	33.4	---	56.0	22.6
2.93	---	22.2	46.0	23.8
4.21	41.1	---	56.0	14.9
4.30	---	29.6	46.0	16.4
13.56	46.3	---	60.0	13.7
13.56	---	41.8	50.0	8.2
18.29	38.6	---	60.0	21.4
18.22	---	27.2	50.0	22.8

Note: The emissions found do not change with the modulation and/or frequency.