



TEST REPORT

EUT Description	WLAN and BT, 2x2 PCIe M.2 1216 SD adapter card			
Brand Name	Intel® Wireless-AC 9560			
Model Name	9560D2W			
FCC ID ISED ID	PD99560D2 1000M-9560D2			
Date of Test Start/End	2017-10-10 / 2017-11-28			
Features	802.11ac, Dual Band, 2x2 Wi-Fi + Bluetooth® 5 (see section 5)			
Applicant	Intel Mobile Communications			
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Reference Standards	FCC CFR Title 47 Part 15 C RSS-247 issue 2, RSS-Gen issue 4 (see section 1)			
Test Report identification	170919-03.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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1. Standards, reference documents and applicable test methods

- 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.
- \checkmark 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	23 °C ±3 °C
Humidity	40 % ± 10 %



4. Test samples

Sample	Control #	Description	Model	Serial #	Date of receipt	Note
	170919-03.S29	Module	9560D2W	WFM: 3413E8702821	2017-10-02	
	170524-02.S15	Extender Board	PCB00609_01	6092416-442	2017-05-30	Used for conducted
#01	170000-01.S01	Laptop	Latitude E5470	DPBLMC2	2017-03-28	tests
	170220-04.S04	Adapter 1216SD to M.2	JfP Adapter M2	N/A	2017-04-10	
	170919-03.S22	Module	9560D2W	WFM:3413 E870281C	2017-10-02	
#02	170220-02.S03	Extender Board	PCB00609_01	6092416-446	2017-02-20	
#02	170000-01.S13	Laptop	Latitude E5470	FT6LMC2	2017-05-30	
	170727-02.S11	Adapter 1216SD to M.2	JfP Adapter M2	N/A	2017-08-09	Used for radiated
	170919-03.S21	Module	9560D2W	WFM:3413 E8702826	2017-10-02	tests
	170220-02.S04	Extender Board	PCB00609_01	6092416-493	2017-02-20	
#03	170801-01.S10	Laptop	Latitude E7470	7KNOXF2	2017-09-13	
	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	9560D2W				
FCC ID	PD99560D2				
ISED ID	1000M-9560D2				
Software Version	10.1739.0-06012				
Driver Version	99.0.28.6	99.0.28.6			
Prototype / Production	Production	Production			
Supported Radios	802.11b/g/n 802.11a/n/ac	2.4GHz (2400.0 – 2483.5 MHz) 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	Р
15.247 (a) (1) (iii)	RSS-247 Clause 5.1 (d)	Number of hopping channels	Р
15.247 (a) (1) (iii)	RSS-247 Clause 5.1 (d)	Time of Occupancy (Dwell Time)	Р
15.247 (b) (1)	RSS-247 Clause 5.4 (b)	Maximum Peak Output Power and antenna gain	Р
15.247 (d)	RSS-247 Clause 5.5	Out-of-band Emissions (conducted)	Р
15.247 (d) 15.209	RSS-247 Clause 5.5 RSS GEN Clause 8.9	Out-of-band Emissions (radiated)	Р

8. Document Revision History

Revision #	Date	Modified by	Revision Details
Rev.00	2017-11-28	A.Sayoud	First Issue



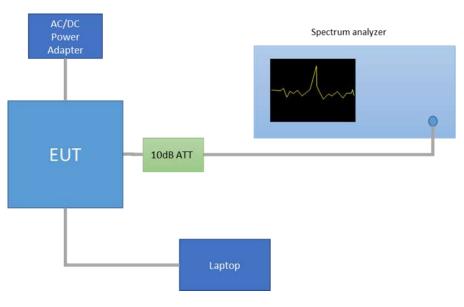
Annex A. Test & System Description

A.1 Measurement System

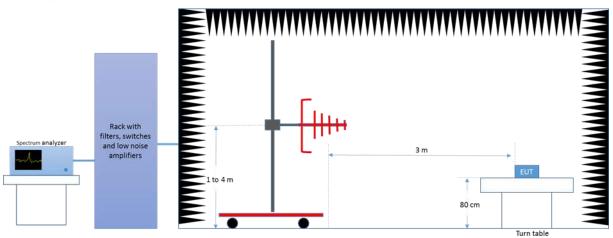
Measurements were performed using the following setups.

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.

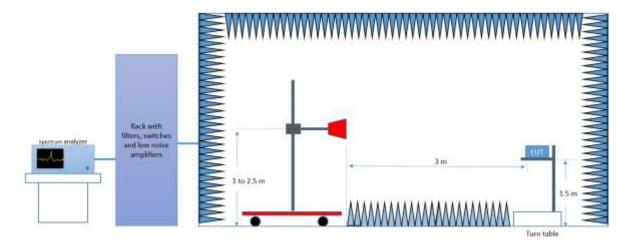
Conducted Setup



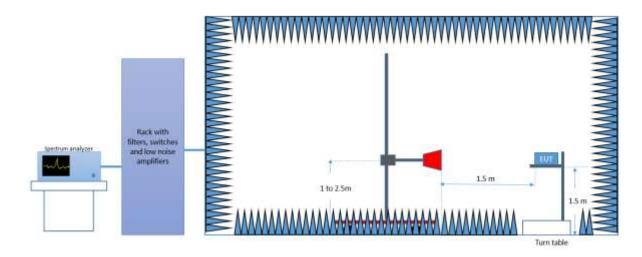
Radiated Setup < 1GHz



Radiated Setup 1 GHz - 18 GHz



Radiated Setup > 18 GHz





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	2015-12-11	2017-12-11
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
0296	Power Supply	6673A	MY41000318	Agilent	N/A	N/A
0346	Multimeter	34401A	US36054685	HP	2016-02-04	2018-02-04

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	2016-04-15	2018-04-15
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
0409	PreAmplifier	3117-PA	00157993	ETS Lindgren	N/A	N/A
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



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

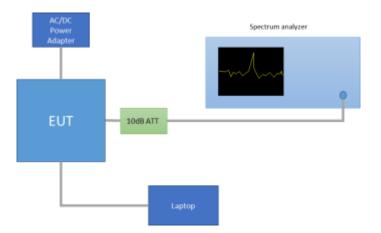


Annex B. Test Results

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.



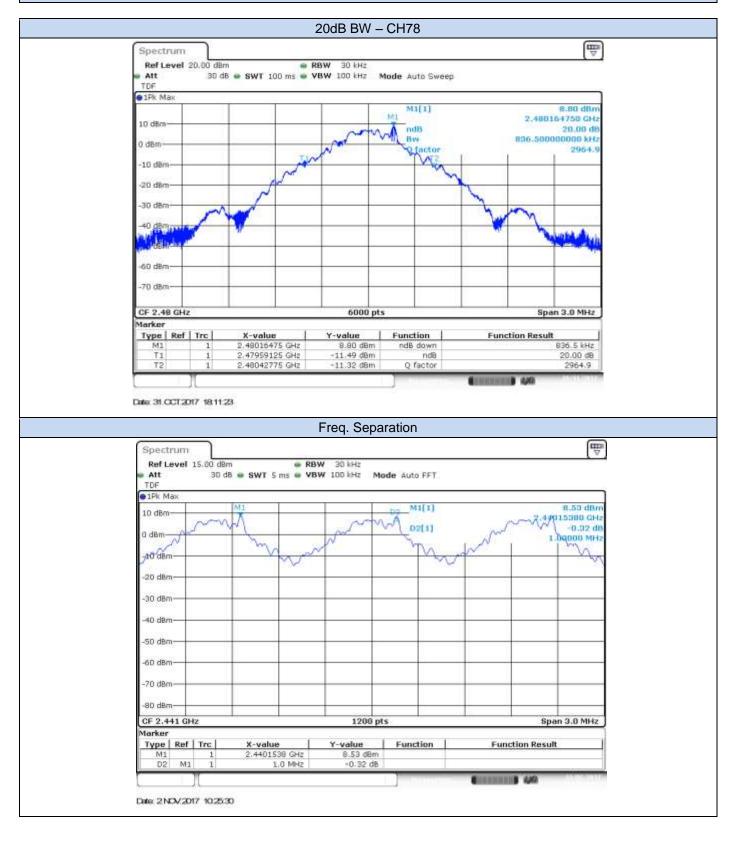
Results tables:

Mode	Packet Type	Channel Number	Frequency [MHz]	20dB BW [MHz]	Freq. Separation [kHz]
Devis Dete		0	2402	0.818	
Basic Rate GFSK	DH5	39	2441	0.816	1000
		78	2480	0.837	
		0	2402	1.445	
EDR π/4-DQPSK	2DH5	39	2441	1.452	1000
		78	2480	1.420	
		0	2402	1.409	
EDR 8-DPSK	3DH5	39	2441	1.427	1000
		78	2480	1.422	



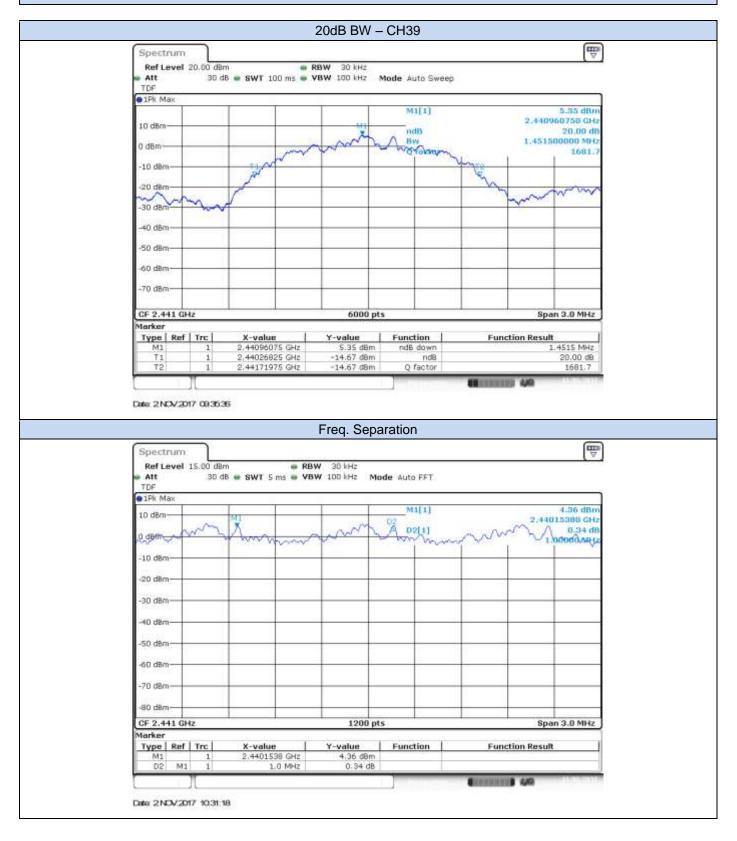
Results screenshot

Basic Rate - GFSK





EDR – $\pi/4$ -DQPSK





EDR – 8-DPSK





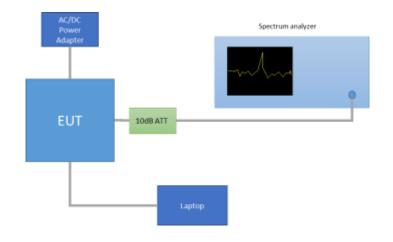
B.2 Number of hopping channels

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.

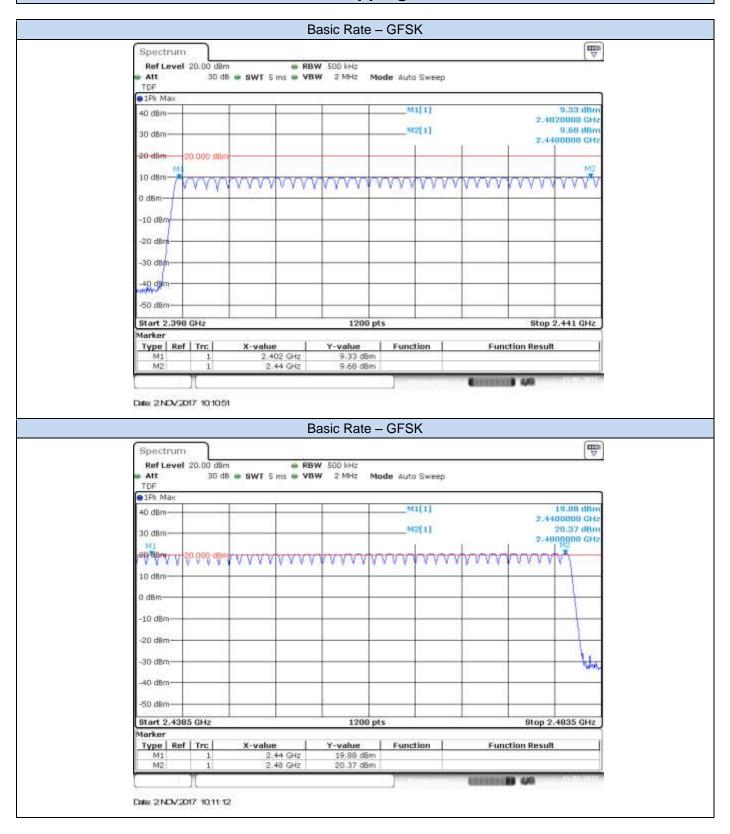


Results tables

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









Spectrum									1
Ref Level	00000		· RB	W 500 kHz					1
Att .		SWT 5	ms . VB	W 2 MHz	Mode Auto	Sweep			
TDF 1Pk Max									
40 dBm-					M1	[1]			8.47 dBr
HO GDIT								2.40	20000 GH
3D dBm-				+	M12	[1]		2.44	8.99 dBr 00000 GH
20 d0m 2	0.000 dBmg								
M									M2
10 dBm	m	~~~~	vvvv	www.	mm	vvvv	vvvvv	~~~~	~~~
0 dBm	_		-				-		
10.00									
-10.d8m									
-20 dam				-					
-30,0em-									
Manager.									
-40 d8m				-					
-50 d8m									
2017-1017-104	CH-				D mbr			Phone 1	447 (11)
Start 2.398 Marker	GHZ			120	0 pts			stop	2.441 GHz
Type Ref		X-value		Y-value	Funct	ion	Fund	tion Result	t.,
M1 M2	1		02 GHz 44 GHz	8.47 di 8.99 di		_			
1-36	1		TT Gran	479.8.04				10.040	
Snectrum	_	4) 4)		EDR – 8	8-DPSK				a
Spectrum Ref Level	20.00 dBm			W 500 kHz				1 6/11	(ª
Spectrum	20.00 dBm			W 500 kHz	8-DPSK	Sweep			्षि
Spectrum Ref Level	20.00 dBm			W 500 kHz	Mode Auto				
Spectrum Ref Level Att TDF	20.00 dBm			W 500 kHz	Mode Auto	1 Sweep			18.52 dB
Spectrum Ref Level Att TDF IPk Max	20.00 dBm			W 500 kHz	Mode Auto			2.4	18.52 dB 400000 GF 19.26 dB
Spectrum Ref Level Att TDF 1Pk Max 40 dBm 30 dBm	20.00 dBm 30 dB			W 500 kHz	Mode Auto	1[1]		2.4	18.52 dB 400000 GF 19.26 dB 200000 GF
Spectrum Ref Level Att TDF 1Pk Max 40 dBm	20.00 dBm			W 500 kHz	Mode Auto	1[1]		2.4	18.52 dB 400000 GF 19.26 dB
Spectrum Ref Level Att TDF 1Pk Max 40 dBm 30 dBm	20.00 dBm 30 dB			W 500 kHz	Mode Auto	1[1]		2.4	18.52 dB 400000 GF 19.26 dB 200000 GF
Spectrum Ref Level Att TDF 1Pk Max 40 dBm 30 dBm 10 dBm	20.00 dBm 30 dB			W 500 kHz	Mode Auto	1[1]		2.4	18.52 dB 400000 GF 19.26 dB 200000 GF
Spectrum Ref Level Att TDF 1Pk Max 40 dBm 30 dBm 10 dBm 0 dBm	20.00 dBm 30 dB			W 500 kHz	Mode Auto	1[1]		2.4	18.52 dB 400000 GF 19.26 dB 200000 GF
Spectrum Ref Level Att TDF 1Pk Max 40 dBm 30 dBm 10 dBm	20.00 dBm 30 dB			W 500 kHz	Mode Auto	1[1]		2.4	18.52 dB 400000 GF 19.26 dB 200000 GF
Spectrum Ref Level Att TDF 1Pk Max 40 dBm 30 dBm 10 dBm 0 dBm	20.00 dBm 30 dB			W 500 kHz	Mode Auto	1[1]		2.4	18.52 dB 400000 GF 19.26 dB 200000 GF
Spectrum Ref Level Att TDF 1Pk Max 40 dBm 30 dBm 28 d00 28 d00 0 dBm 0 dBm -10 dBm -20 dBm	20.00 dBm 30 dB			W 500 kHz	Mode Auto	1[1]		2.4	18.52 dB 400000 GF 19.26 dB 200000 GF
Spectrum Ref Level Att TDF 1Pk Max 40 dBm 30 dBm 10 dBm 0 dBm -10 dBm	20.00 dBm 30 dB			W 500 kHz	Mode Auto	1[1]		2.4	18.52 dB 400000 GF 19.26 dB 200000 GF
Spectrum Ref Level Att TDF 1Pk Max 40 dBm 30 dBm 28 d00 28 d00 0 dBm 0 dBm -10 dBm -20 dBm	20.00 dBm 30 dB			W 500 kHz	Mode Auto	1[1]		2.4	18.52 dB 400000 GF 19.26 dB 200000 GF
Spectrum Ref Level Att TDF 1Pk Max 40 dBm 30 dBm 28 000 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm	20.00 dBm 30 dB			W 500 kHz	Mode Auto	1[1]		2.4	18.52 dB 400000 GF 19.26 dB 200000 GF
Spectrum Ref Level Att TDF 1Pk Max 40 dBm 30 dBm 20 dBm 0 dBm -10 dBm -20 dBm -30 dBm -30 dBm -50 dBm	20.00 dBm 30 dB			W 500 kHz W 2 MHz	Made Auto	1[1]		2.4	18.52 dB 400000 GF 19.26 dB 800000 GF M2
Spectrum Ref Level Att TDF 1Pk Max 40 dBm 30 dBm 28 300 0 dBm -10 dBm -10 dBm -20 dBm -30 dBm -30 dBm -50 dBm -50 dBm	20.00 dBm 30 dB			W 500 kHz W 2 MHz	Mode Auto	1[1]		2.4	18.52 dB 400000 GF 19.26 dB 200000 GF
Spectrum Ref Level Att TDF 1Pk Max 40 dBm 30 dBm 20 dBm 0 dBm -10 dBm -20 dBm -30 dBm -30 dBm -50 dBm	20.00 dBm 30 dB 30 gB 30			W 500 kHz W 2 MHz	Made Auto	1[1] 2[1]		2.4	18.52 dB 400000 GF 19.26 dB 800000 GF M2
Spectrum Ref Level Att TDF 1Pk Max 40 dBm 30 dBm 20 dBm 0 dBm -10 dBm -20 dBm -30	20.00 dBm 30 dB 30 dB 5 GHz 1 Trc 1	• SWT 5	ms = VB	W 500 kHz W 2 MHz	Made Auto	1[1] 2[1]		2.4 2.4 	18.52 dB 400000 GF 19.26 dB 800000 GF M2
Spectrum Ref Level Att TDF 1Pk Max 40 dBm 30 dBm 28 300 10 dBm 0 dBm -10 dBm -20 dBm -20 dBm -30 dBm -50 dBm Start 2.438 Marker Type Ref	20.00 dBm 30 dB 30 dB	• SWT 5		W 500 kHz W 2 MHz	Made Auto	1[1] 2[1]	Func	2.4 2.4 	18.52 dB 400000 GF 19.26 dB 800000 GF M2

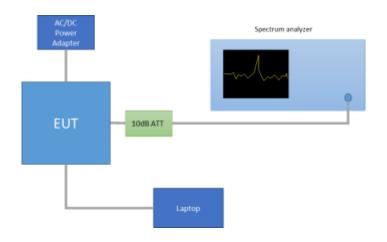


B.3 <u>Time of Occupancy (Dwell Time)</u>

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 $0.4 \times 79 = 31.6$ seconds, each channel appears $10.13 \times 31.6 = 320.11$ 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 $0.4 \times 79 = 31.6$ seconds, each channel appears $5.1 \times 31.6 = 161.16$ 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 $0.4 \times 79 = 31.6$ seconds, each channel appears $3.37 \times 31.6 = 106.49$ 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.

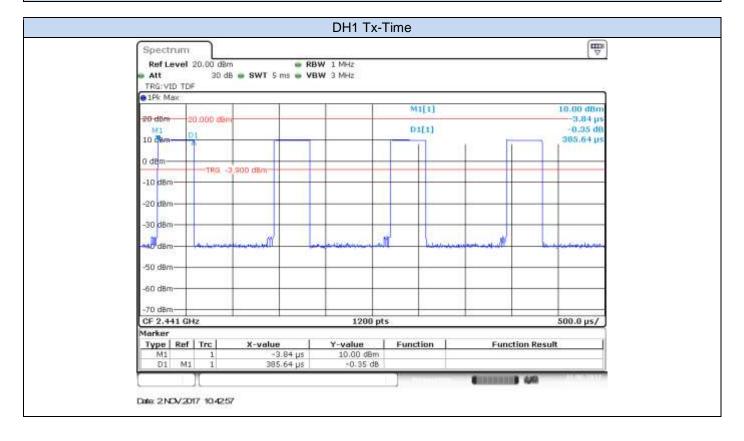


Results tables

Mode	Packet Type	Times of appearance	Tx-time [ms]	Dwell Time [ms]
Basic Rate	DH1	320.11	0.386	123.562
GFSK	DH3	161.16	1.638	263.980
GFSK	DH5	106.49	2.886	307.330
	2-DH1	320.11	0.395	126.443
EDR π/4-DQPSK	2-DH3	161.16	1.646	265.269
11/4-DQF SK	2-DH5	106.49	2.890	307.756
	3-DH1	320.11	0.526	168.378
EDR 8-DPSK	3-DH3	161.16	1.638	263.980
0-DF3K	3-DH5	106.49	2.886	307.302

Results Screenshot:

BDR – GFSK

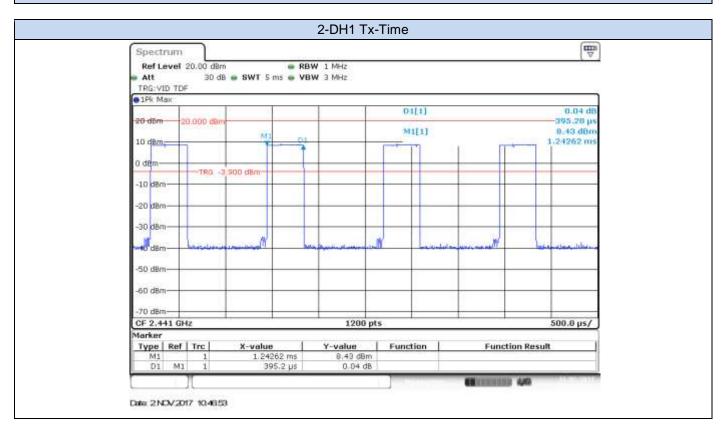




				DH3 T	k-Time			
Spectru	m							E
	el 20.00 d	Bm	RBW	/ 1 MHz				(*
Att		dB 😑 SWT S	ms 🖷 VBV	V 3 MHz				
TRG:VID	TDF							
					D1[[1]		-0.32 dB
20 dBm	20.000 d	Bm						
M1 10 dBm-			D1		M1	[1]		9.99 dBm
			l î					
0 dBm	TRG	-3.900 dBm						
-10 dBm-								
00 dBm								
-20 dBm—								
-30 dBm—								
dBm-								
-50 dBm-								
-60 dBm-		_						
-70 dBm CF 2.441	GHz			1200	nts			500.0 µs/
Marker					10			00010 p37
Type R		X-value	9.84 µs	Y-value 9.99 dB	Functi	on	Functio	on Result
M1 D1 /	1 M1 1		3.84 µs 317 ms	-0.32 (
					Ne			440
Date: 2NDV	707 10 4	N57			,			
Late. 2NOV.	2017 1046	a.ur						
				DH5 I	k-Time			
Spectru	m			DH5 I	k-lime			Ð
Spectrui Ref Leve	m	Bm	e RBW	UH5 T	k-lime			
Ref Leve	el 20.00 d 30	Bm dB e SWT 5		/ 1 MHz	k-lime			(The second seco
Ref Leve Att TRG: VID	el 20.00 d 30			/ 1 MHz	k-lime			Ţ
Ref Leve	el 20.00 d 30			/ 1 MHz	K-Time	[1]		9.99 dBm
Ref Leve Att TRG:VID 1 1Pk Max 20 dBm	el 20.00 d 30	dB 👄 SWT S		/ 1 MHz	MI			9.99 dBm 3.84 µs
Ref Leve Att TRG:VID 1 PK Max	el 20.00 d 30 TDF	dB 👄 SWT S		/ 1 MHz				9.99 dBm
Ref Leve Att TRG:VID 1 1Pk Max -20 dBm M1 10 dBm	el 20.00 d 30 TDF	dB 👄 SWT S		/ 1 MHz	MI			9.99 dBm 3.84 µs 0.30 dB
Ref Leve Att TRG:VID 1 1Pk Max -20 dBm M1	el 20.00 d 30 TDF	dB • SWT 5		/ 1 MHz	MI			9.99 dBm 3.84 µs 0.30 dB
Ref Leve Att TRG:VID 1 1Pk Max -20 dBm M1 10 dBm	el 20.00 d 30 TDF	dB 👄 SWT S		/ 1 MHz	MI			9.99 dBm 3.84 µs 0.30 dB
Ref Levi Att TRG:VID 1 1Pk Max 20 dBm M1 10 dBm 0 dBm	el 20.00 d 30 TDF	dB • SWT 5		/ 1 MHz	MI			9.99 dBm 3.84 µs 0.30 dB
Ref Leve Att TRG:VID 1 1Pk Max 20 dBm M1 10 dBm 0 dBm	el 20.00 d 30 TDF	dB • SWT 5		/ 1 MHz	MI			9.99 dBm 3.84 µs 0.30 dB
Ref Levi Att TRG:VID 1 1Pk Max 20 dBm M1 10 dBm 0 dBm	el 20.00 d 30 TDF	dB • SWT 5		/ 1 MHz	MI			9.99 dBm 3.84 µs 0.30 dB
Ref Levi Att TRG:VID 1Pk Max 20 dBm 0 dBm -10 dBm -20 dBm -30 dBm	el 20.00 d 30 TDF	dB • SWT 5		/ 1 MHz	MI			9.99 dBm 3.84 µs 0.30 dB
Ref Levi Att TRG:VID 1Pk Max 1Pk Max 20 dBm M1 10 dBm -10 dBm -20 dBm -30 dBm -30 dBm	el 20.00 d 30 TDF	dB • SWT 5		/ 1 MHz	MI			9.99 dBm 3.84 µs 0.30 dB
Ref Levi Att TRG:VID 1Pk Max 20 dBm 0 dBm -10 dBm -20 dBm -30 dBm	el 20.00 d 30 TDF	dB • SWT 5		/ 1 MHz	MI			9.99 dBm 3.84 µs 0.30 dB
Ref Levi Att TRG:VID 1Pk Max 1Pk Max 20 dBm M1 10 dBm -10 dBm -20 dBm -30 dBm -30 dBm	el 20.00 d 30 TDF	dB • SWT 5		/ 1 MHz	MI			9.99 dBm 3.84 µs 0.30 dB
Ref Levi Att TRG:VID 1Pk Max 1Pk Max 20 dBm M1 10 dBm -10 dBm -20 dBm -30 dBm -30 dBm -50 dBm -60 dBm	el 20.00 d 30 TDF	dB • SWT 5		/ 1 MHz	MI			9.99 dBm 3.84 µs 0.30 dB
Ref Levi Att TRG:VID 1Pk Max 20 dBm M1 10 dBm -10 dBm -20 dBm -30 dBm -30 dBm -50 dBm -60 dBm	el 20.00 d 30 TDF 20.000 d TRG	dB • SWT 5		V 1 MHz V 3 MHz	M1			9.99 dBm 3.84 µs -0.30 dB -2.88574 ms
Ref Levi Att TRG:VID 1Pk Max 20 dBm M1 10 dBm -10 dBm -20 dBm -30 dBm -30 dBm -60 dBm -70 dBm -70 dBm -70 dBm CF 2.441	el 20.00 d 30 TDF 20.000 d TRG	dB • SWT 5		/ 1 MHz	M1			9.99 dBm 3.84 µs 0.30 dB
Ref Levi Att TRG:VID 1Pk Max 20 dBm M1 10 dBm -10 dBm -20 dBm -30 dBm -50 dBm -60 dBm -70 dBm CF 2.441 Marker Type	el 20.00 d 30 TDF 20.000 d 7RG GHz GHz	dB • SWT 5		V 1 MH2 V 3 MH2	M1		Functio	9.99 dBm 3.84 µs -0.30 dB -2.88574 ms
Ref Levi Att TRG:VID 1Pk Max 20 dBm M1 10 dBm -10 dBm -20 dBm -30 dBm -30 dBm -60 dBm -60 dBm -70 dBm -70 dBm Marker Type M1	el 20.00 d 30 TDF 20.000 d TRG GHz ef Trc 1	dB • SWT S	ms • VBV	V 1 MHz V 3 MHz	pts		Functic	9.99 dBm 3.84 μs -0.30 dB 2.88574 ms
Ref Levi Att TRG:VID 1Pk Max 20 dBm M1 10 dBm -10 dBm -20 dBm -30 dBm -30 dBm -60 dBm -60 dBm -70 dBm -70 dBm Marker Type M1	el 20.00 d 30 TDF 20.000 d 7RG GHz GHz	dB • SWT S		V 1 MH2 V 3 MH2	pts			9.99 dBm 3.84 µs -0.30 dB 2.88574 ms
Ref Levi Att TRG:VID 1Pk Max 20 dBm M1 10 dBm -10 dBm -20 dBm -30 dBm -30 dBm -60 dBm -60 dBm -70 dBm CF 2.441 Marker Type M1 D1	el 20.00 d 30 TDF 20.000 d TRG GHz Ef Trc M1 1	dB • SWT 5	ms • VBV	V 1 MHz V 3 MHz	pts		Function	9.99 dBm 3.84 µs -0.30 dB 2.88574 ms
Ref Levi Att TRG:VID 1Pk Max 20 dBm M1 10 dBm -10 dBm -20 dBm -30 dBm -30 dBm -60 dBm -60 dBm -70 dBm -70 dBm Marker Type M1	el 20.00 d 30 TDF 20.000 d TRG GHz Ef Trc M1 1	dB • SWT 5	ms • VBV	V 1 MHz V 3 MHz	pts			9.99 dBm 3.84 µs -0.30 dB 2.88574 ms



EDR – $\pi/4$ -DQPSK

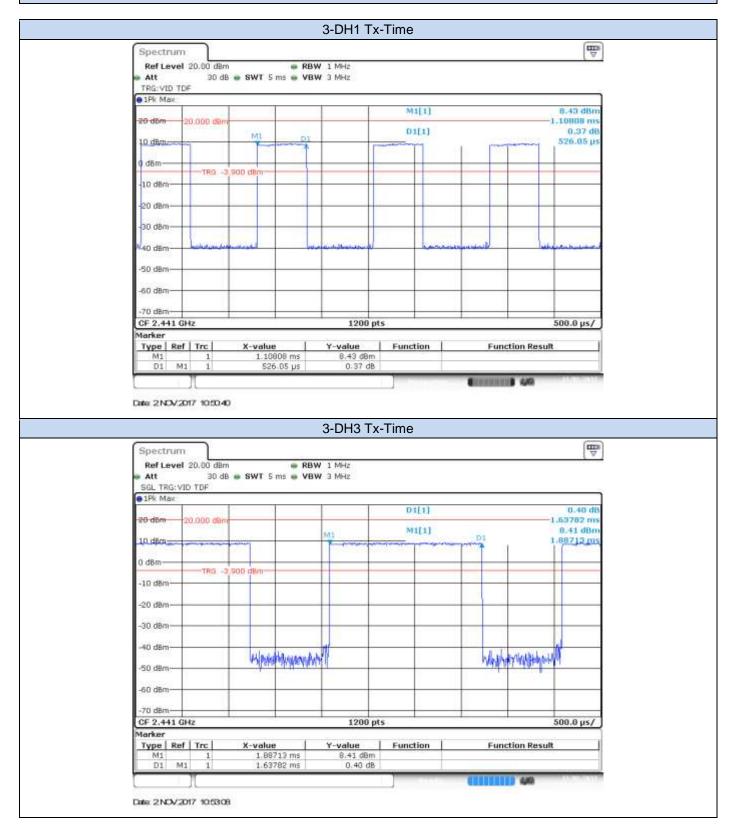




			2	2-DH3 T	x-Time					
Spectr	um									
	vel 20.00 dBm		RBW 1						(-	
Att TRG:VII		8 🖷 SWT 5 ms	VBW 3	3 MHz						
• 1Pk Ma										
					D1	[1]			0.02 dB	
20 dBm	20.000 dBm				M1	[1]			1.64643 ms 8.44 dBm	
10 dBm;									-4.44 µs	
0 d8m-					_					
		.900 dBm								
-10 dBm										
-20 dBm										
-30 dBm					_					
					.11					
+O ^r dBm·								1.44		
-50 dBm										
-60 dBm										
-70 dBm-				1200	pts				500.0 µs/	
Marker										
Type M1	Ref Trc 1	X-value -4.44		Y-value 8.44 dBm	Functi	ion	Func	tion Resul	t	
D1	M1 1	1.64643		0.02 dE						
					Ne.	asurino		1444	11/02/2017	
Date: 2NC	V.2017 10.480									
Date: 2NC	V.2017 10.480)								
Date: 2NC	V.2017 10.480	>	2	2-DH5 T	x-Time					
Date: 2NC			2	2-DH5 T	x-Time				E □)
Spect Ref L	rum	m	RBW	1 MHz	x-Time				(III)]
Spect Ref L	rum evel 20.00 dBr 30 d		RBW	1 MHz	x-Time				(E)]
Spect Ref L	rum evel 20.00 dBr 30 d D TDF	m	RBW	1 MHz					(E]
Spect Ref L • Att TRG:VI • 1Pk M	rum evel 20.00 dBr 30 d D TDF ax	m B e SWT 5 ms	RBW	1 MHz		1[1]			0.03 dE	
Spect Ref LL Att TRG:VI 1Pk M 20 dBm	rum evel 20.00 dBr 30 d D TDF ax 20.000 dBr	m B e SWT 5 ms	RBW	1 MHz	D	1[1]			0.03 dt -2.88991 m 8.42 dBn	
Spect Ref L • Att TRG:VI • 1Pk M	rum evel 20.00 dBr 30 d D TDF ax 20.000 dBr	m B e SWT 5 ms	RBW	1 MHz	D				0.03 de -2.88991 m	
Spect Ref LL Att TRG:VI 1Pk M 20 dBm	20.00 dBr	m B e SWT S ms	RBW	1 MHz	D	1[1]			0.03 dt -2.88991 m 8.42 dBn	
Spect Ref L Att TRG:VI • 1Pk M 20 dBm 10 dBm	rum evel 20.00 dBr 30 d D TDF ax 20.000 dBr	m B e SWT 5 ms	RBW	1 MHz	D	1[1]			0.03 dt -2.88991 m 8.42 dBn	
Spect Ref L Att TRG:VI 1Pk M 20 dBm 10 dBm -10 dBm	20.000 dBr	m B e SWT S ms	RBW	1 MHz	D	1[1]			0.03 dt -2.88991 m 8.42 dBn	
Spect Ref L Att TRG:VI • 1Pk M 20 dBm 10 dBm	20.000 dBr	m B e SWT S ms	RBW	1 MHz	D	1[1]			0.03 dt -2.88991 m 8.42 dBn	
Spect Ref L Att TRG:VI 1Pk M 20 dBm 10 dBm -10 dBm	rum evel 20.00 dBr 30 d D TDF ax 20.000 dBr TRG <	m B e SWT S ms	RBW	1 MHz	D	1[1]			0.03 dt -2.88991 m 8.42 dBn	
Spect Ref L Att TRG:VI 1Pk M 20 dBm 0 dBm- -10 dBm -20 dBm -30 dBm	rum evel 20.00 d8r 30 d D TDF 3x 20.000 d8r	m B e SWT S ms	RBW	1 MHz	D	1[1]			0.03 dt -2.88991 m 8.42 dBn	
Spect Ref L • Att TRG:VI • 1Pk M 20 dBm 10 dBm -10 dBm -20 dBm -30 dBm -30 dBm	Tum evel 20.00 dBr 30 d D TDF ax 20.000 dBr TRG -	m B e SWT S ms	RBW	1 MHz	D	1[1]			0.03 dt -2.88991 m 8.42 dBn	
Spect Ref L Att TRG:VI 1Pk M 20 dBm 0 dBm- -10 dBm -20 dBm -30 dBm	Tum evel 20.00 dBr 30 d D TDF ax 20.000 dBr TRG -	m B e SWT S ms	RBW	1 MHz	D	1[1]			0.03 dt -2.88991 m 8.42 dBn	
Spect Ref L • Att TRG:VI • 1Pk M 20 dBm 10 dBm -10 dBm -20 dBm -30 dBm -30 dBm	Tum evel 20.00 dBr 30 d D TDF ax 20.000 dBr TRG ~	m B e SWT S ms	RBW	1 MHz	D	1[1]			0.03 dt -2.88991 m 8.42 dBn	
Spect Ref L Att TRG:VI P1Pk M 20 dBm 10 dBm -10 dBm -20 dBm -30 dBm -30 dBm -30 dBm -50 dBm	TUM Evel 20.00 dBr 30 d D TDF ax 20.000 dBn TRG -	m B e SWT S ms	RBW	1 MHz	D	1[1]			0.03 dt -2.88991 m 8.42 dBn	
Spect Ref L Att TRG:VI 1Pk M 20 dBm 10 dBm -10 dBm -20 dBm -30 dBm -30 dBm -30 dBm	Tum 20.00 dBr 30 d D TDF 3x 20.000 dBr TRG -	m B e SWT S ms	RBW	1 MHz	D) 	1[1]			0.03 dt -2.88991 m 8.42 dBn	
Spect Ref L Att TRG:VI 1Pk M 20 dBm 0 dBm -10 dBm -20 dBm -30 dBm -30 dBm -30 dBm -50 dBm -50 dBm -50 dBm -50 dBm -50 dBm	Tum 20.00 dBr 30 d D TDF 3x 20.000 dBr TRG ~	m B • SWT 5 ms	RBW VBW	1 MHz 3 MHz	D) M				0.03 dt -2.88991 m 8.42 dBn -3.84 u -3.84 u	
Spect Ref L Att TrG:VI 1Pk M 20 dBm 10 dBm -10 dBm -10 dBm -20 dBm -30 dBm -30 dBm -30 dBm -30 dBm -50 dBm -50 dBm -50 dBm -70 dBm -70 dBm	Pum evel 20.00 dBr 30 d D TDF 3x 20.000 dBr TRG < TRG	m B • SWT 5 ms	RBW VBW	1 MHz 3 MHz 1200 1200 Y-value	D) M		Fun	ction Resu	0.03 dt -2.88991 m 8.42 dBn -3.84 u -3.84 u	
Spect Ref L Att TRG:VI P1Pk M 20 dBm 10 dBm -10 dBm -10 dBm -20 dBm -30 dBm -3	Tum 20.00 dBr 30 d D TDF 3x 20.000 dBr TRG ~	m B • SWT 5 ms	• RBW • VBW	1 MHz 3 MHz	pts				0.03 dt -2.88991 m 8.42 dBn -3.84 u -3.84 u	
Spect Ref L Att TRG:VI P1Pk M 20 dBm 10 dBm -10 dBm -10 dBm -20 dBm -30 dBm -3	Pum 20.00 dBr 30 d D TDF 38 20.000 dBr 7 20.000 dBr 7 7RG 4	m B SWT S ms 3,900 dBm 3,900 dBm 5,000 dBm 6,000 dBm 7,000 dBm 7,000 dBm 7,000 dBm 7,000 dBm 7,000 dBm 7,000 dBm	• RBW • VBW	1 MHz 3 MHz 1200 1200 Y-value 8,42 dB	pts		Fun		0.03 dt -2.88991 m 8.42 dBn -3.84 u -3.84 u	



EDR – 8-DPSK





		3-DH5	Tx-Time		
Spectrum)				Ē
Ref Level 20.0 Att SGL TRG: VID TD	30 dB 👄 SWT 5 m:	 RBW 1 MHz VBW 3 MHz 			
1Pk Max					
20.00	in dow		M1[1]		8.33 dBm 3.84 µs
10 d8m	10 dBm		D1[1]		0.25 dB 2.88574 ms
10 000000000000000000000000000000000000		and the second	A CONTRACTOR OF A CONTRACTOR A C	1	And the state of t
0 d8m					
	TRG -3.900 dBm	+	+++-		
-10 dBm					
-20 dBm					
-30 dBm					
-40 dBm			WAA	emphanenant	
00000					
-60 dBm					
-70 dBm					500.0
CF 2.441 GHz Marker		120	0 pts		500.0 µs/
Type Ref Tr	c X-value	Y-value	Function	Function	Result
M1 M1	1 -3.8			Function	I NO SUR
D1 M1	1 2.8857				
			Ready		UA 1020/200
Date: 28 NOV:2017	11:28:14				



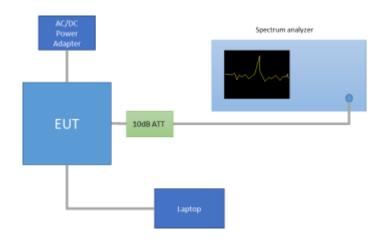
B.4 Maximum Peak Output Power antenna gain

Test Limits

FCC part	RSS part	Limits
		(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:
15.247 (b) (1)	RSS-247 Clause 5.4 (b)	 (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 neuron limit encoding in performance (b) of this
		(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.

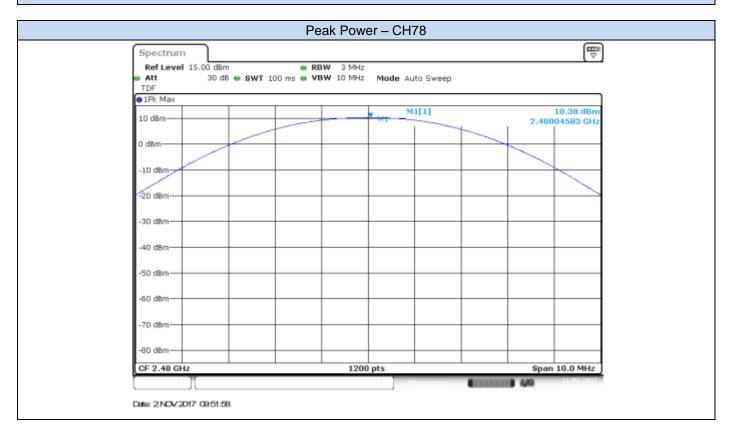
Results tables

Mode	Packet Type	Channel Number	Frequency [MHz]	Peak Power [dBm]	Peak Power [mW]	Peak Power EIRP [dBm]	Peak Power EIRP [mW]
		0	2402	9.69	9.31	12.9	19.6
Basic Rate GFSK	DH5	39	2441	10.02	10.05	13.3	21.2
		78	2480	10.38	10.91	13.6	23.0
		0	2402	9.27	8.45	12.5	17.8
EDR π/4-DQPSK	2DH5	39	2441	9.37	8.65	12.6	18.2
		78	2480	9.77	9.48	13.0	20.0
		0	2402	9.32	8.55	12.6	18.0
EDR 8-DPSK	3DH5	39	2441	9.41	8.73	12.7	18.4
0-01 51		78	2480	9.81	9.57	13.1	20.2

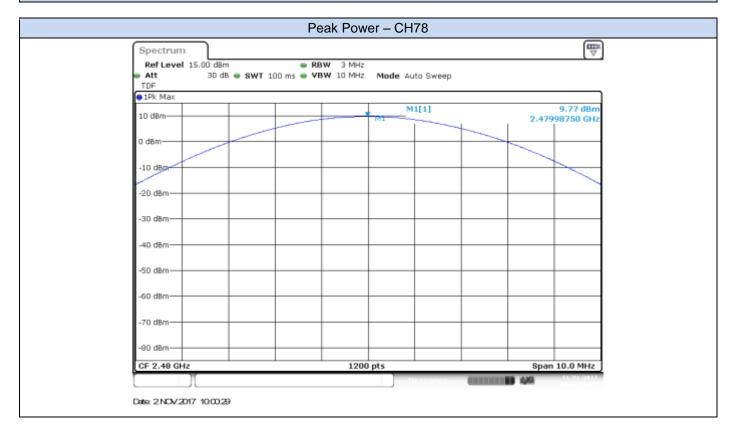


Results Screenshot

Basic Rate - GFSK

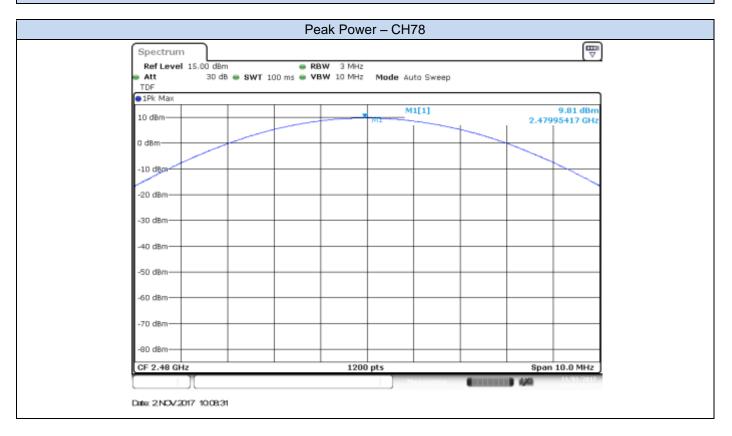


EDR – $\pi/4$ -DQPSK





EDR – 8-DPSK





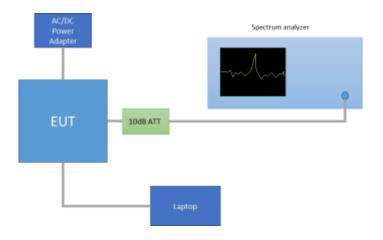
B.5 Out-of-band emission (conducted)

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.



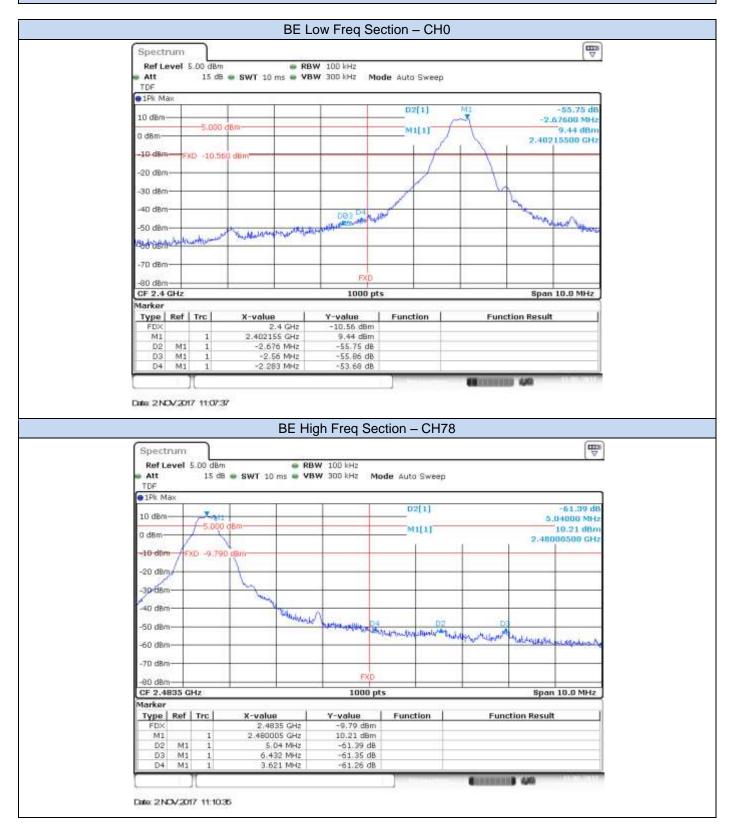


Note: these PSD_{Peak} values are shown just as a reference for the compliance of the Out-of-band Measurements. Thus the RBW used for these measurements was 100 kHz.

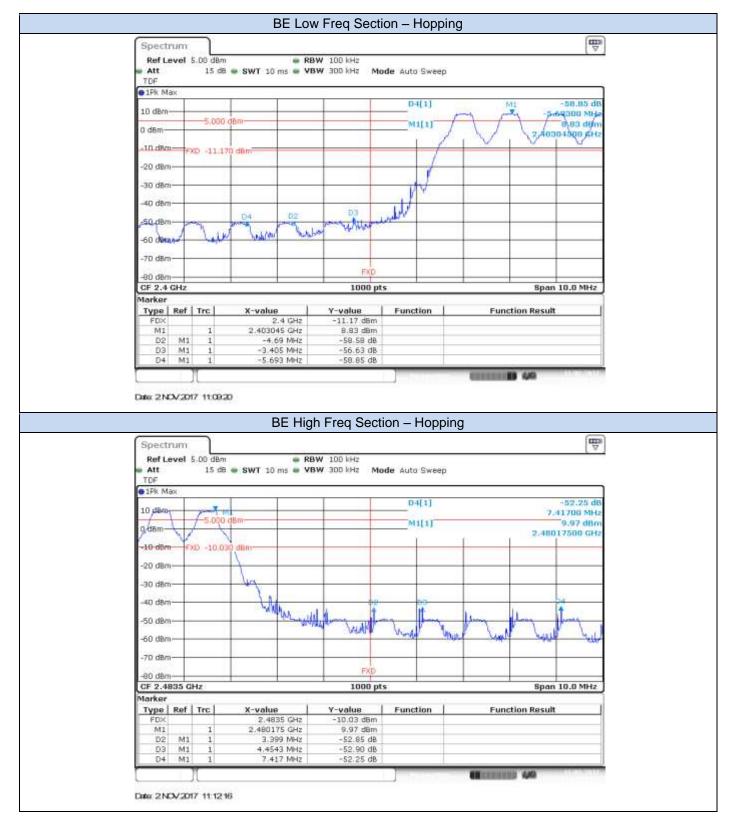
Mode	Packet Type	СН	Frequency [MHz]	PSD Peak [dBm]
Basic Rate - GFSK		0	2402	9.44
	DH5	39	2441	9.82
		78	2480	10.21
EDR – π/4- DQPSK	2DH5	0	2402	8.32
		39	2441	8.27
		78	2480	8.73
EDR – 8-DPSK	3DH5	0	2402	8.32
		39	2441	8.28
		78	2480	8.76



Basic Rate - GFSK





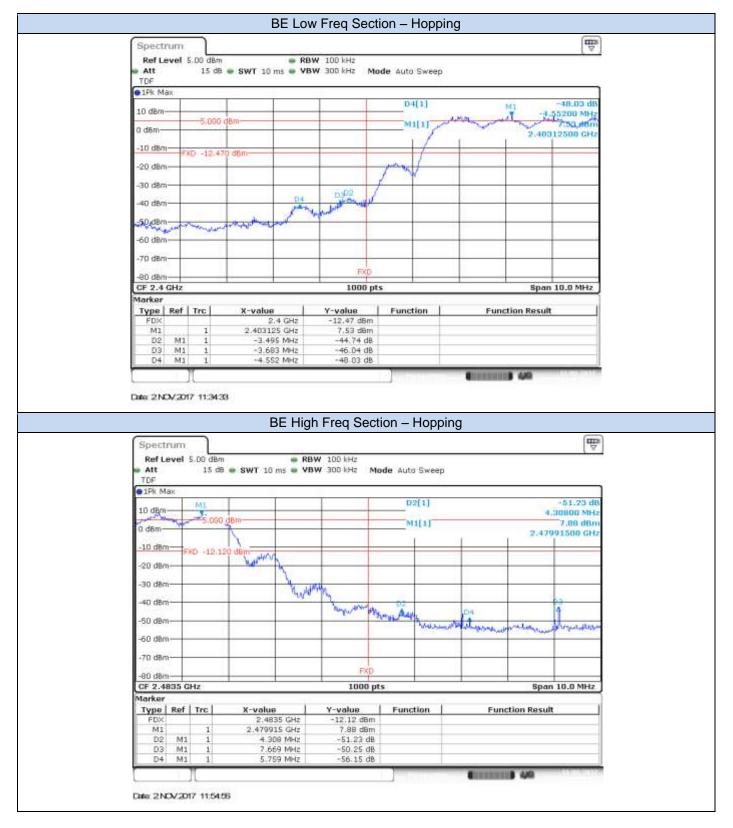




EDR – $\pi/4$ -DQPSK









EDR – 8-DPSK



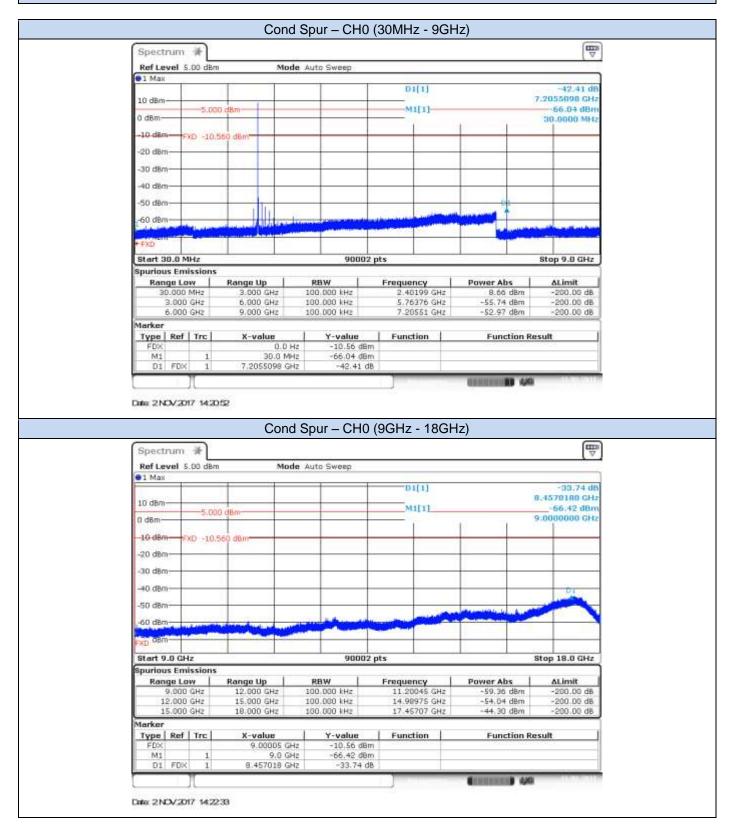






Conducted Spurious results Screenshot

Basic Rate - GFSK





Spect	rum	*								tm ∀
Ref Le	vel 5	.00 dBm	M	de	Auto Sweep					1.
91 Мак	al									
				_			D1(1)		10	-40.84 dB
10 dBm	-	10/01/18		19.8535500 GH M1[1] -58.96 dBr						
0 dBm-		-5,00	0 dBm						18	1.0000000 GHz
1233.04	2		100							
10 dBm	E D	© -10,	560 dBm							
-20 dBm	n				-		-	-		-
-30 d8m	n				-		_	-		_
-40 dBm	т II.									1
-40.080			100							
-S0 dBm	n	Concernance of	and an entry of	11.7		1	Constant.			and the second second
all had a set	100	-				diam'r		State of the state		
* FXD '8/				-		Section 100				_
1.8. 19. 19.	See.	as-							10	
Start 1	Cardon and a local data	the state of the s	1.010 55	_	90002	ts	102		S	top 26.5 GHz
Spuriou					120000 81		2002002 - 74	200 000000		
	ge Lo 8.000		Range Up 21.000 GHz	-	RBW 100.000 kHz		B5355 GHz	Power Ab -51.40		▲Limit -200.00 dB
	1.000		24.000 GHz		100.000 kHz		60513 GHz	-51.93		-200.00 dB
2	4.000	GHz	26.500 GHz		100.000 kHz	25	71148 GHz	-53,29	dBm	-200.00 dB
Marker										
Type FDX	Ref	Trc	X-value	Hz	-10.56 dBm	Fu	nction	Func	tion Re	sult
M1		1	18.0		-10.56 dBm	-				
	FDX	1	19.85355		-40.84 dB					
-				-					8 4.00	



	Cond					
Spectrum 🕷					Ē	
Ref Level 5.00 dB	m Mod	e Auto Sweep				
•1 Max	NC - N	- T - T	D1(1)		-38.21 dF	
10 dBm-	30 dBm-		M1[1]	2	-5945460 GH: 68.99 dBr	
0 dBm	an daw			ath 177	30.0000 MH	
-10 d0m FXD -10	180 dBm					
-20 dBm-			-		-	
-30 dBm						
-40 dBm						
-50 dBm	01				_	
-60 dBm		turner berner terrele	and the second se			
A A A A A A A A A A A A A A A A A A A						
FXD Start 30.0 MHz	100	90002	nts		Stop 9.0 GHz	
Spurious Emission	£	50001	pes	termine and the second second	arop y.u uni	
Range Low 30.000 MHz	Range Up 3.000 GHz	RBW 100.000 kHz	Erequency 2.44119 GHz	Power Abs 9.66 dBm	▲Limit -200.00 dB	
3.000 GHz	6.000 GHz	100.000 kHz	5.93405 GHz	-55.51 dBm	-200.00 dB	
6.000 GHz	9.000 GHz	100.000 kHz	6.77642 GHz	-55.02 dBm	-200.00 dB	
Type Ref Trc	X-value	Y-value	Function	Function Re	sult	
FDX M1 1		4z -68.99 d8m	Y			
M1 1 30.0 MHz -68.99 dBm D1 FDX 1 2.594545 GHz -38.21 dB						
143 XIX 2NOV 2017	758 (st.)	Spur – CH39	(9GHz - 18GH	tz)	-	
Spectrum 🕷	Cond		(9GHz - 18GF	HIZ)	(m	
	Cond	Spur – CH39 le Auto Sweep		Hz)		
Spectrum Ref Level 5.00 dBr	Cond		D1[1]		-34.83 dE	
Spectrum Ref Level 5.00 dBr	Cond			a	-34.83 de	
Spectrum Ref Level 5.00 dBr 1 Max 10 dBm 0 dBm 5.00	Cond		D1[1]	a	-34.83 dE 1.5743140 GH: 67.22 dBn	
Spectrum Ref Level 5.00 dBr 1 Max 10 dBm 0 dBm 5.00	Cond		D1[1]	a	-34.83 dE 1.5743140 GH: 67.22 dBn	
Spectrum Ref Level 5.00 dBr 1 Max 10 dBm -10 dBm FXD -10	Cond		D1[1]	a	-34.83 dE 1.5743140 GH: 67.22 dBn	
Spectrum Ref Level 5.00 dBr 1 Max 10 dBm -10 dBm -10 dBm -20 dBm	Cond		D1[1]	a	-34.83 dE	
Spectrum Ref Level 5.00 dBs 1 Max 10 dBm -10 dBm -20 dBm -20 dBm -30 dBm	Cond		D1[1]	a g	-34.83 dE 1.5743140 GH: 67.22 dBn	
Spectrum Ref Level 5.00 dBr 1 Max 10 dBm -10 dBm -20 dBm -30 dBm -40 dBm	Cond		D1[1]	a g	-34.83 dE	
Spectrum Ref Level 5.00 d8x 1 Max 10 d8m -10 d8m -20 d8m -20 d8m -30 d8m -30 d8m -50 d8m -50 d8m -50 d8m -50 d8m -60 d8m -70 d7m -70 d8m -70 d8m -70 d7m -70 d7m -70 d7m -70 d7m	Cond		D1[1]	a g	-34.83 dE	
Spectrum Imax Ref Level 5.00 dBr 1 Max 5.00 10 dBm 5.00 0 dBm 5.00 -10 dBm FXD -20 dBm -30 dBm -40 dBm -5.00	Cond		D1[1] 	8 9	-34.83 dE	
Spectrum Imax I Max Imax 10 dBm 5.00 0 dBm 5.00 -10 dBm FxD -20 dBm -10 -20 dBm -20 dBm -30 dBm -40 dBm -50 dBm -50 dBm -60 dBm -50 dBm -50 dBm -50 dBm -50 dBm -50 dBm	Cond	le Auto Sweep	D1[1] M1[1] 	8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	-94.83 dE	
Spectrum Ref Level 5.00 d8x 1 Max 10 d8m 5.00 0 d8m 5.00 -10 d8m FXD -10 -20 d8m - -30 d8m - -30 d8m - -50 d8m	Cond	le Auto Sweep	D1(1) M1[1] pts Frequency 11.21205 GHz	Power Abs -60.29 dbm	-34.83 dE .5743140 GH2 -67.22 dBn .0000000 GH2 .0000000 GH2 .01 .01 .01 .01 .01 .01 .01 .01	
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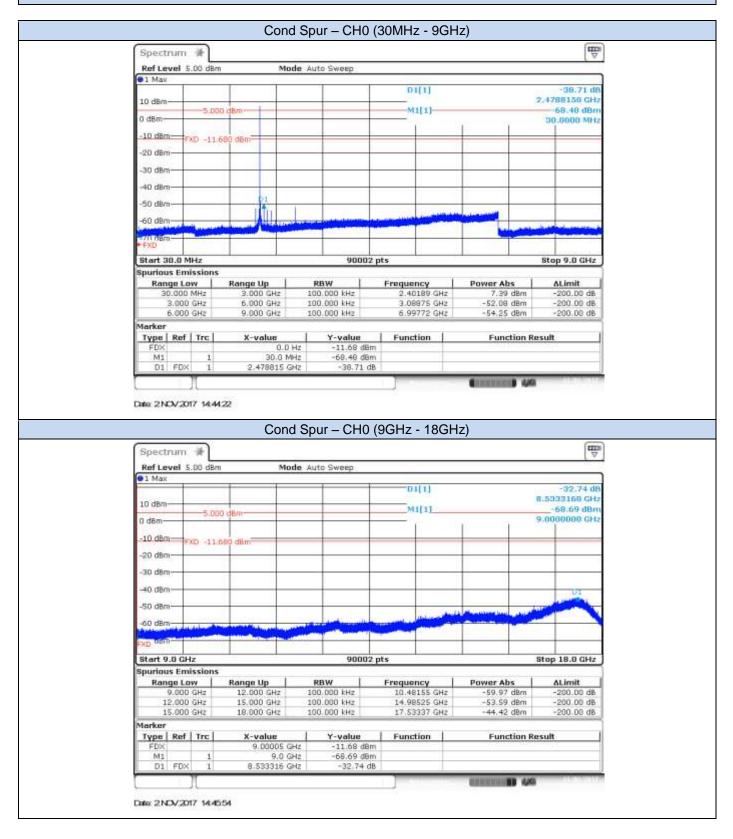
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6.000 GHz	9.000 GHz	100.000 kHz	6.94512 GHz	-53.83 dBm	-200.00 dB				
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Date: 2NOV:2017 14:3	8027	Spur – CH78	8 (9GHz - 18GF	lz)	(
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	8.000		21.000 GHz 24.000 GHz		100.000 kHz 100.000 kHz		9715 GHz	-52.23		-200.00 dB
	4.000		26.500 GHz		100.000 kHz		B224 GHZ	-53.29		-200.00 dB
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Type	Ref	Trc	X-value	. 1	Y-value	Fund	tion	Fund	tion Res	sult
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Spurious Emission		a statistical part			Active contraction for the	122122420			
Range Low	Range Up	RBW		Frequency	Power Abs	ALimit			
18.000 GHz 21.000 GHz	21.000 GHz 24.000 GHz	100.000 kH 100.000 kH		19.96985 GHz 21.58553 GHz	-52.50 dBm -52.61 dBm	-200.00 dB			
24.000 GHz	26.500 GHz	100.000 kH		25.71040 GHz	-52.16 dBm	-200.00 dB			
Marker				and the second second second	Carl Production				
Type Ref Trc	X-value	Y-val		Function	Function R	esult			
FDX M1 1	0.0		8 dBm	C29974.0.9907	5629/80202000	500000			
D1 FDX 1	25.710401		2 dBm 48 dB						
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0 dBm-5.0	xoo dBm-		M1[1]		68.16 dBn 30.0000 MH	
-10 dBm	1.730 d8m					
-20 dBm-	1.7.30 0607					
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Laura Later State	and the second second			a design	Contraction of the other	
+ FXD						
Start 30.0 MHz	nihi ol	90002	2 pts		Stop 9.0 GHz	
Spurious Emission Range Low	Range Up	RBW	Frequency	Power Abs	ΔLimit	
30.000 MHz	3.000 GHz	100.000 kHz	2.44119 GHz	8.00 dBm	-200.00 dB	
3.000 GHz 6.000 GHz	6.000 GHz 9.000 GHz	100.000 kHz 100.000 kHz	3.13795 GHz 6.98062 GHz	-53.22 dBm -53.84 dBm	-200.00 dB -200.00 dB	
Marker	000000000	1 9 5 4 5 9 5 5 4 5 4 5 4 5 4 5 4 5 4 5 4	1			
Type Ref Trc	X-value 0.0	Y-value Hz -11.73 dBr	Function	Function Re	esult	
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D1 FDX 1 2.51792 GHz -41.17 dB						
D1 F0X 1		l Spur – CH39) (9GHz - 18GF	(CARANAE) (40) Hz)		
	Cond	I Spur – CH39 de Auto Sweep	9 (9GHz - 18GF	1z)	(∰ ⊽	
Spectrum	Cond			1z)		
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Spectrum Ref Level 5.00 dB/ 1 Max 10 dBm 0 dBm 5.0	Cond		D1(1)	1	-32,70 dB 1.5152160 GHz -66,70 dBm	
Spectrum Ref Level 5.00 dB/ 1 Max 10 dBm -10 dBm -1	Cond		D1(1)	1	-32,70 dB 1.5152160 GHz -66,70 dBm	
Spectrum ₩ Ref Level 5.00 dBr 10 dBm -10 dBm -20 dBm	Cond		D1(1)	1	-32,70 dB 1.5152160 GHz -66,70 dBm	
Spectrum ₩ Ref Level 5.00 dB 1 Max 10 dBm -10 dBm -20 dBm -30 dBm	Cond		D1(1)	1	-32,70 dB 1.5152160 GHz -66.73 dBm -0000000 GHz	
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Date: 2 NCV/2017 14/2 Spectrum Imax Imax 10 dBm 5.00 dB/ -10 dBm -10 dBm FXD -11 -20 dBm -40 dBm -50 dBm	Cond		D1(1)	8 	-32,70 dB 1.5152160 GHz -66.73 dBm -0000000 GHz	
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21.000 0		24.000 GHz		100.000 kHz			173 GHz	-52.3		-200.00 dB	
24.000 0		26.500 GHz		100.000 kHz			682 GHz	-52.6		-200.00 dB	
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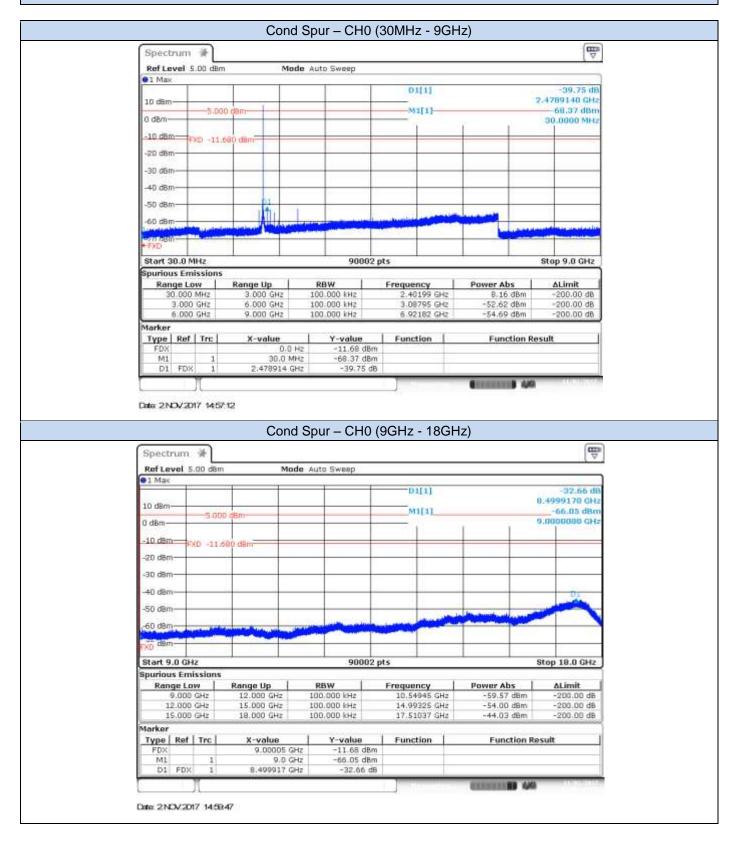
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Spurious Emission Range Low	s Range Up	RBW	Frequency	Power Abs	ΔLimit
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3.000 GHz 6.000 GHz	6.000 GHz 9.000 GHz	100.000 kHz 100.000 kHz	3.18804 GHz 6.97482 GHz	-53.28 dBm -54.14 dBm	-200.00 dB -200.00 dB
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[][Date 2NCV/2017 145 Spectrum ∦} Ref Level 5.00 dB	Cond	Spur – CH78	8 (9GHz - 18GF		(##
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Spectrum # Ref Level 5.00 dB 1 Max 10 dBm 0 dBm 5.0	Cond :		01(1)	łz)	-32.97 dF .4805170 GH: 68.48 dBn
Spectrum # Ref Level 5.00 dB 1 Max 10 dBm 0 dBm 5.0	Cond : m Mode		01(1)	łz)	-32.97 dF .4805170 GH: 68.48 dBn
Spectrum # Ref Level 5.00 dB 1 Max 10 dBm 0 dBm -10 dBm FXD -11	Cond : m Mode		01(1)	łz)	-32.97 dF .4805170 GH: 68.48 dBn
Spectrum # Ref Level 5.00 dB/ 1 Max 10 dBm -10 dBm -20 dBm -20 dBm	Cond : m Mode		01(1)	łz)	-32.97 dF .4805170 GH: 68.48 dBn
Spectrum Rof Level 5.00 dBr 1 Max 10 dBm -10 dBm -20 dBm -30 dBm -30 dBm	Cond : m Mode		D1[1]	łz)	-32.97 dF -32.97 dF -68.48 dBn -6000000 GH
Spectrum Ref Level 5.00 dBr 1 Max 10 dBm -10 dBm -10 dBm -20 dBm -30 dBm -40 dBm	Cond : m Mode		D1[1]	łz)	-32.97 dF -32.97 dF -68.48 dBn -6000000 GH
Spectrum Image: mail of the state of the s	Cond : m Mode		D1[1]	łz)	-32.97 dF -32.97 dF -68.48 dBn -6000000 GH
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Spectrum Image: mail of the state of the s	Cond : m Mode 00 dBm ,270 dBm			Hz)	-32.97 dF -32.97 dF -68.48 dBn -6000000 GH
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Spectrum Ref Level 5.00 dB/ 1 Max 10 dBm 5.00 10 dBm 5.00 -10 dBm -10 dBm -5.00 -11 -20 dBm -30 dBm -30 dBm -30 dBm -50 dBm -50 dBm -50 dBm -60 dBm -50 dBm -50 dBm -60 dBm -10 dBm -60 dBm -10 dBm -10 dBm -50 dBm -10 dBm -10 dBm <td>Cond : m Mode 00 dBm ,270 dBm ,270 dBm ,270 dBm ,270 dBm ,270 dBm ,270 dBm ,270 dBm ,270 dBm</td> <td>Auto Sweep</td> <td>D1(1) M1[1] pts Frequency 11.17635 GHz</td> <td>IZ)</td> <td>-32.97 dE -4805170 CH2 -68.40 dBm -0000000 CH2 -01 -01 -01 -01 -01 -01 -01 -01 -01 -01</td>	Cond : m Mode 00 dBm ,270 dBm ,270 dBm ,270 dBm ,270 dBm ,270 dBm ,270 dBm ,270 dBm ,270 dBm	Auto Sweep	D1(1) M1[1] pts Frequency 11.17635 GHz	IZ)	-32.97 dE -4805170 CH2 -68.40 dBm -0000000 CH2 -01 -01 -01 -01 -01 -01 -01 -01 -01 -01
Spectrum Imax Rof Level 5.00 dB/ 1 Max Imax 10 dBm 5.00 dB/ -10 dBm 5.00 e11 -20 dBm -30 dBm -30 dBm -30 dBm -50 dBm -30 dBm -50 dBm -30 dBm -50 dBm -50 dBm -50 dBm -60 dBm -50 dBm -60 dBm -50 dBm -60 dBm -60 dBm -60 dBm -50 dBm -60 dBm -60 dBm -70 dBm -60 dBm -70 dBm -60 dBm -70 dBm -70 dBm -70 dBm -90 dBm	Cond : m Mode 00 dBm ,270 dBm ,2	P0002 P00 P00	D1[1] M1[1] pts Frequency 11.17635 GHz 14.9395 GHz 17.46057 GHz	Example 2 and 2 an	-32.97 dE -69.48 dBm -69.48 dBm -69.48 dBm -69.48 dBm -0000000 GHz -01 -01 -01 -01 -01 -01 -01 -01
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Spectrum Ref Level 5.00 dB/ I Max II Max 10 dBm 5.00 dB/ 10 dBm 5.00 dB/ -10 dBm FXD -11 -20 dBm -30 dBm -30 dBm -30 dBm -50 dBm -50 dBm -60 dBm -50 dBm -50 dBm -50 dBm -60 dBm -50 dBm -80 dBm -90 GHz Spurious Emission: Range Law 9.000 GHz 12.000 GHz 12.000 GHz 15.00 GHz Type Ref [Trc]	Cond : m Mode 00 dBm ,270 dB	Auto Sweep Auto Sweep O	DI[1] MI[1] pts Frequency 11.17635 GHz 14.93395 GHz 17.48057 GHz Function	Example 2 and 2 an	-32.97 dE -69.48 dBm -69.48 dBm -69.48 dBm -69.48 dBm -0000000 GHz -01 -01 -01 -01 -01 -01 -01 -01



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12330.2								1	100			
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+FXD'80	m			-	+			+		-		
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Spuriou	us Em	issions						100000000000	60.5 UV			
	ige Lo		Range Up	RBW	_	Freque		Power At		ΔLimit		
	8.000		21.000 GHz 24.000 GHz	100.000 kHz 100.000 kHz			165 GHz	-52.34		-200.00 dB -200.00 dB		
	4.000		26.500 GHz	100.000 kHz			379 GHz	-52.78		-200.00 dB		
Marker	Liste Martine	and the second second		and the second state of th			States of the last	1000				
Type		Tre	X-value	Y-value	1	Fund	tion	Fund	tion Re:	sult		
FDX			0.0 H			00000	~~~ - · · ·	552388	19 (20 (20)) 19 (20)	0.000		
M1	CD-1	1	18.0 GH									
01	FDX	1	19.79165 GH	-41.07	OB :	_		_	_			
								CONTRACTOR	4,000			



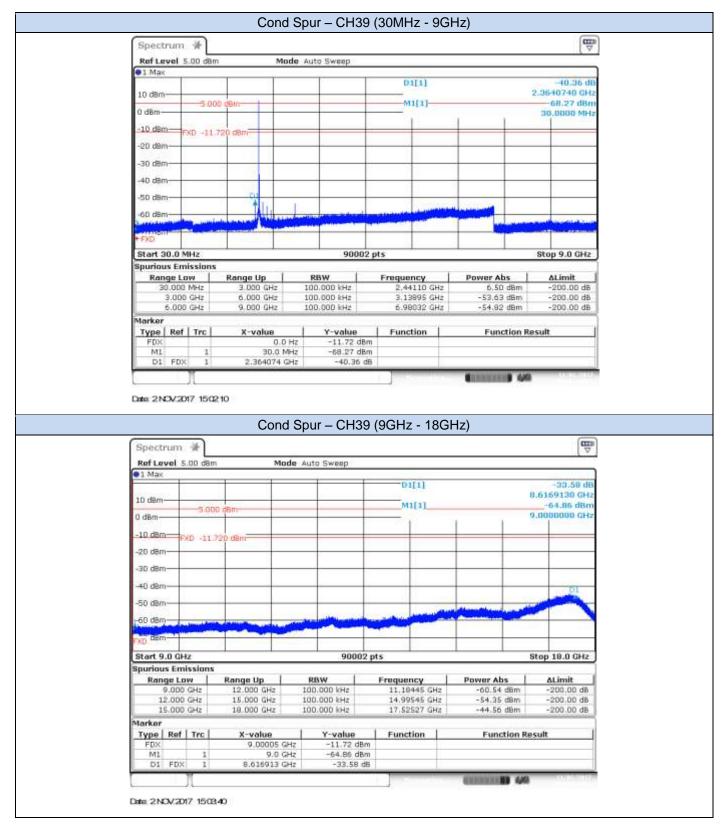
EDR – 8-DPSK





Spectrum	1 H					₩		
Ref Level	5.00 d8m	Mode	Auto Sweep					
•1 Max				100 00000				
				D1[1]		-+0.+0 dB		
10 dBm	Contrast.	in the second se	-	M1[1]	19	19.5990500 GHz -58.27 dBm		
0 dBm-	5.000	dBm		18.0000000 GHa				
						AND DECEMBER OF		
-10 d8m-	FXD -11.6	80 dBm				-		
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-30 dBm						_		
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-50 dBm		Aligned and an and a second	and a state of the second		4 46 G	and the state of the		
Market Description			and the second se	Contraction of the Contraction o				
+FXD Bm-								
2	211							
Start 18.0			90002 p	ts	S	top 26.5 GHz		
Spurious En Range L		Range Up	RBW	Frequency	Power Abs	ALimit		
18.00		21.000 GHz	100.000 kHz	19.59905 GHz	-52.08 dBm	-200.00 dB		
21.00		24.000 GHz	100.000 kHz	21.59253 GHz	-52.67 dBm	-200.00 dB		
And in case of the local division of the loc	0 GHz	26.500 GHz	100.000 kHz	24.04762 GHz	-53.38 dBm	-200.00 dB		
Marker		244930g/cm	7 (200-200-1		- Standy and Sec			
Type Ret	Trc	X-value 0.0 Hz	Y-value -11.68 dBm	Function	Function Re:	suit		
ML	1	18.0 GHz						
	× 1	19.59905 GHz	-40.40 dB					
D1 FD	the second s							

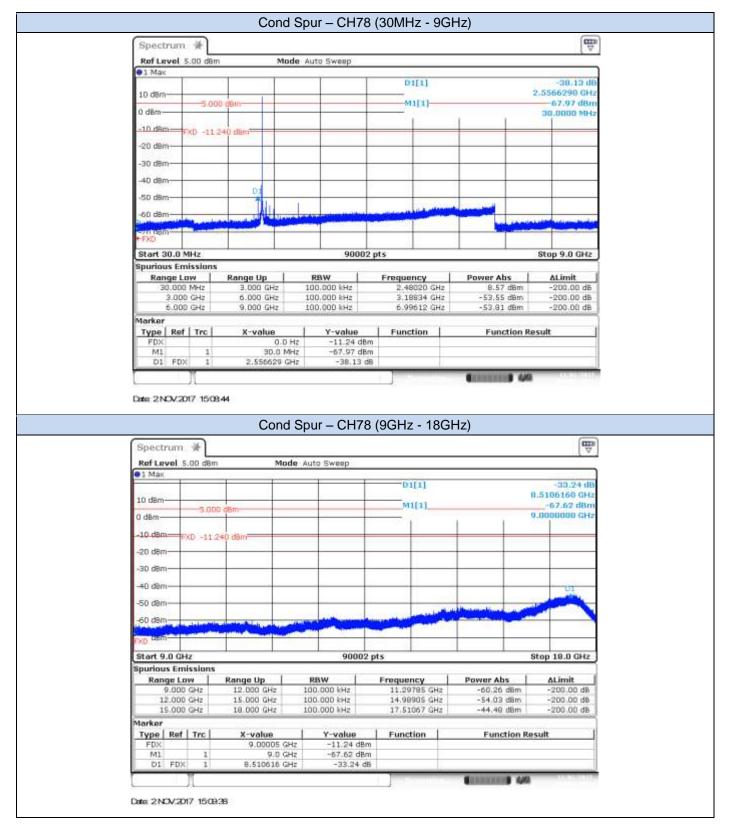






Spect	rum	*								tu an
RefLe	vel 5	.00 d8m	i M	ode /	uto Sweep					
•1 Max										
						D	1[1]			-+0.0+ di
10 dBm		0.474	2 Ann	19.5652500 M1[1] -58.64 d						
0 dBm-		-5.00	0 dBm		-		1111		18.	0000000 GH
2.5.5								1 1		and the second second
-10 dBn	R F	XD -11.	720 d8m		-					-
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	· •		1							
-40 dBr	n				_					-
-S0 dBr	n		11	in P.S.	200 - ACC - 1				10.6210	-
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+ FXD Br	n		0							1
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Spuriou					and an angle		10		- 44	
	ige Lo		Range Up		RBW	Freque		Power Ab:		ALimit
	8.000		21.000 GHz 24.000 GHz		100.000 kHz 100.000 kHz		525 GHz	-51.76		-200.00 dB -200.00 dB
	4.000		26.500 GHz		100.000 kHz		0532 GHz	-52.72		-200.00 dB
Marker	al state of the	alani a			an a			shift don on a	and the second	1000 USASCI1025
Туре	Ref	Trc	X-value	1	Y-value	Func	tion	Funct	ion Res	ult
FDX				3HZ	-11.72 dBm	-				
M1	FDX	1	18.0		-58.64 dBm -40.04 dB					
	TUN		10.00323	Gef 16	40.04 UD	1				
		11				1.1.1		CONTRACTOR OF	6464	







Spect	rum	*									~
distant in the local distance in the local d	af Level 5.00 dBm Mode Auto Sweep										
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							01	[1]		10	-41.33 di 5954500 GH
10 dBm		-	2 200		-		M1	[1]		131	-59.13 dBn
0 dBm-	_		0 dBm		_			-		18.	DODDOOD CH
-10 dBr											Ster Assentiation where
	in pea	(D113	240 dam								
-20 d8r	0		-			1			-	-	-
-3D dBr	n		-			-					-
-40 dBr	-										
		1					10				
-S0 dBr	n		and the second s	100	Alternation (An Automation Automation	1	1.00	a second second
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+ FXD Br	n						-				
Start 1 Spuriou				90002 pts					St	op 26.5 GHz	
and the second second	nge Lov		Range Up		RBW		Frequen	rv	Power Al	15. 1	ΔLimit
	18.000		21.000 GHz	- 3	100.000 kHz			45 GHz	-52.57		-200.00 dB
	21.000		24.000 GHz		100.000 kHz			165 GHz	-52.59		-200.00 dB
And in case of the local division of the loc	24.000	GHZ	26.500 GHz	_	100.000 kHz		25.700	23 GHz	-53.74	dBm	-200.00 dB
Marker		and I	X-value		Y-value	- 1	Funct		2702	tion Res	
FDX	Ref	Inc		3 Hz	-11.24 d	Bm	Funct	ion	Fun	ation Res	uit
M1		1	18.0		-59.13 d						
D1	FDX	1	19.59545	GHz	-41.33	dB					
		_					-	_	CONTRACTOR OF THE OWNER	B 446	



Standards references

FCC part	RSS part		Limits				
						defined in §15.2 cified in §15.209(
			Freq Range (MHz)	Field Stregth (μV/m)	Field Stregth (dBµV/m)	Meas. Distance (m)	
			30-88	100	40	3	
	RSS-247		88-216	150	43.5	3	
	Clause 5.5		216-960	200	46	3	
15.247 (d)	RSS GEN Clause 8.9 The empl kHz, three For a a lim	Above 960	500	54	3		
15.209 (a)		emple kHz, three For a a lim	oying CISPR qua 110-490 kHz an bands are based verage radiated t specified when	asi-peak detecto Id above 1000 M d on measureme emission measu	r except for the IHz. Radiated e nts employing ar rements above 1 peak detector fu	sed on measurer frequency bands mission limits in average detecto 000 MHz, there i unction, correspo	s 9-90 these or. s also

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.

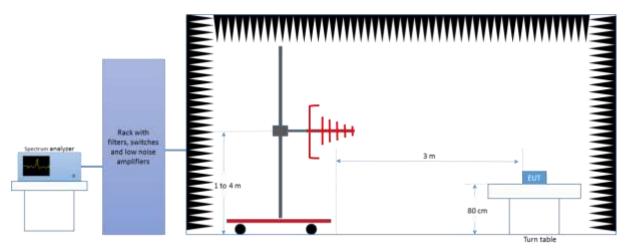
The final measurement is done by varying the antenna height as indicated in the setups below for each band, the EUT azimuth over 360° and for both Vertical and Horizontal polarizations.

The radiated spurious emission was measured on the worst case configuration found.

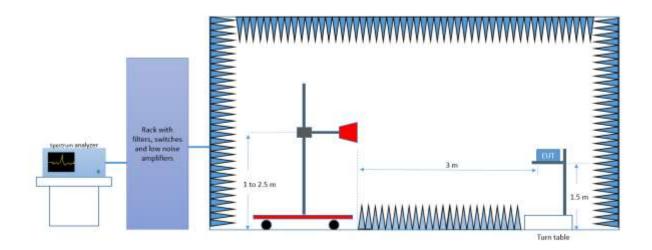




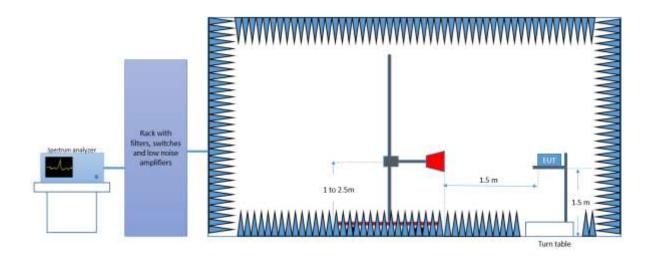
Radiated Setup < 1GHz



Radiated Setup 1 GHz - 18 GHz



Radiated Setup > 18 GHz





Sample Calculation

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

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

where

E is the field strength of the emission at the measurement distance, in $dB\mu V/m$

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} + 20log(D_{Meas}/D_{SpecLimit})

where

ESpecLimit 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 $dB\mu V/m$

D_{Meas} is the measurement distance, in m

DspecLimit 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	27.3		43.5	16.2
240.0	29.3		46.0	16.8
241.1	32.7		46.0	13.3
500.1	35.5		46.0	10.5
594.8	37.5		46.0	8.5
795.2	40.4		46.0	5.6
1190.3		43.4	54.0	10.6
2325.0		44.5	54.0	9.5
3297.8	60.9		74.0	13.1
6291.6	61.3		74.0	12.7
17499.8		45.4	54.0	8.6
17500.2	57.4		74.0	16.6
23952.6		36.0	54.0	18.0
23985.3	48.8		74.0	25.2
25985.5		36.6	54.0	17.4
25989.6	49.5		74.0	24.5



Radiated Spurious – CH39 DH5

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
62.4	37.2		40.0	2.9
115.2	27.1		43.5	16.4
169.5	27.8		43.5	15.7
288.0	31.3		46.0	14.7
500.1	36.6		46.0	9.4
576.0	34.2		46.0	11.8
2364.4		44.9	54.0	9.1
2517.8		45.7	54.0	8.3
3360.3	59.9		74.0	14.1
6374.6	62.5		74.0	11.5
7322.7		38.2	54.0	15.8
7323.2	47.3		74.0	26.8
17498.8		45.4	54.0	8.6
17501.2	58.8		74.0	15.2
25284.3		36.0	54.0	18.0
25859.1	49.0		74.0	25.1
25940.1		36.8	54.0	17.2
25960.0	49.9		74.0	24.1



Radiated Spurious – CH78 DH5

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
44.0	27.5		40.0	12.5
66.3	35.3		40.0	4.7
115.2	26.1		43.5	17.4
375.1	32.9		46.0	13.1
583.2	35.1		46.0	10.9
672.0	35.2		46.0	10.8
1190.3		42.7	54.0	11.3
2556.9		45.3	54.0	8.7
3342.5	59.9		74.0	14.1
6223.1	61.8		74.0	12.2
12399.6		41.4	54.0	12.6
12405.4	51.9		74.0	22.1
17029.0		44.3	54.0	9.7
17040.1	56.8		74.0	17.2
23532.6	49.2		74.0	24.8
25681.0		36.3	54.0	17.7
25965.3	49.3		74.0	24.7
25984.0		37.0	54.0	17.0



30 MHz – 26.5 GHz, EDR – $\pi/4$ -DQPSK

Radiated Spurious – CH0 2DH5

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
44.1	27.0		40.0	13.0
65.6	36.4		40.0	3.6
115.2	26.9		43.5	16.6
500.0	36.2		46.0	9.8
576.1	35.0		46.0	11.0
672.0	36.3		46.0	9.8
1190.3		42.4	54.0	11.6
2325.3		44.1	54.0	9.9
3179.7	59.4		74.0	14.6
6229.3	61.8		74.0	12.2
7205.7	42.2		74.0	31.8
7205.7		32.1	54.0	21.9
17491.1	58.1		74.0	15.9
17492.0		45.4	54.0	8.6
22864.4	48.5		74.0	25.5
22873.0		36.3	54.0	17.7
25966.4	49.8		74.0	24.2
25969.8		37.1	54.0	16.9



Radiated Spurious – CH39 2DH5

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
44.4	30.2		40.0	9.8
71.9	25.5		40.0	14.5
115.2	27.1		43.5	16.4
288.0	33.5		46.0	12.5
375.1	34.1		46.0	11.9
593.0	37.3		46.0	8.8
2364.4		44.6	54.0	9.4
2517.8		44.4	54.0	9.6
3481.3	60.3		74.0	13.7
6361.9	61.5		74.0	12.5
16980.2	56.6		74.0	17.4
17053.6		44.4	54.0	9.6
17488.6	58.3		74.0	15.7
17499.3		45.4	54.0	8.6
25209.6		36.4	54.0	17.6
25216.8	50.0		74.0	24.0
25980.3		37.2	54.0	16.8
25996.4	49.4		74.0	24.6



Radiated Spurious – CH78 2DH5

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
44.5	28.1		40.0	11.9
72.0	24.6		40.0	15.4
115.2	26.8		43.5	16.7
173.8	27.6		43.5	15.9
375.0	33.0		46.0	13.0
576.1	35.4		46.0	10.6
1190.3		42.5	54.0	11.5
2556.9		44.3	54.0	9.7
3340.9	59.8		74.0	14.2
6368.8	61.0		74.0	13.0
17027.1		44.2	54.0	9.8
17063.8	57.6		74.0	16.4
17498.3	57.8		74.0	16.2
17499.8		45.7	54.0	8.3
23924.9	49.3		74.0	24.7
25244.9		36.4	54.0	17.6
25940.9		37.1	54.0	16.9
25978.4	49.7		74.0	24.3



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
72.0	24.6		40.0	15.4
115.2	26.8		43.5	16.7
192.0	25.9		43.5	17.6
375.0	34.2		46.0	11.8
500.0	35.2		46.0	10.8
823.9	39.6		46.0	6.4
1190.3		42.3	54.0	11.7
2325.3		44.1	54.0	9.9
3368.8	60.0		74.0	14.1
6067.2	61.0		74.0	13.0
17021.3	56.5		74.0	17.5
17026.6		44.3	54.0	9.7
17495.4	57.3		74.0	16.7
17496.9		45.4	54.0	8.6
25250.9		36.4	54.0	17.6
25271.9	48.7		74.0	25.3
25955.5	49.4		74.0	24.6
25986.3		37.3	54.0	16.7



Radiated Spurious – CH39 3DH5

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
72.0	25.4		40.0	14.7
96.0	25.2		43.5	18.3
115.2	27.0		43.5	16.5
240.0	30.0		46.0	16.0
375.0	33.6		46.0	12.4
500.0	38.2		46.0	7.8
2364.7		44.1	54.0	9.9
2517.8		44.5	54.0	9.5
3293.1	59.6		74.0	14.4
6355.4	61.6		74.0	12.4
17012.1	56.9		74.0	17.1
17016.4		44.2	54.0	9.8
17492.5	58.2		74.0	15.8
17495.9		45.5	54.0	8.5
25240.0		36.5	54.0	17.5
25257.6	49.5		74.0	24.5
25919.1		37.3	54.0	16.8
25961.9	49.5		74.0	24.5



Radiated Spurious – CH78 3DH5

Frequency	MaxPeak	Avg	Limit	Margin
MHz	dBuV/m	dBuV/m	dBuV/m	dB
44.5	26.1		40.0	13.9
71.9	24.7		40.0	15.3
115.1	26.5		43.5	17.0
204.3	32.5		43.5	11.0
375.0	33.3		46.0	12.7
500.1	34.7		46.0	11.3
1190.3		42.6	54.0	11.4
2556.9		44.1	54.0	9.9
3445.9	59.7		74.0	14.3
6229.6	61.1		74.0	12.9
17023.7		44.3	54.0	9.8
17064.3	57.0		74.0	17.0
17480.9	57.9		74.0	16.1
17499.3		45.6	54.0	8.4
25274.1		36.4	54.0	17.6
25324.8	49.6		74.0	24.4
25931.9	49.9		74.0	24.2
25987.4		37.3	54.0	16.7