# **FCC Test Report**

FCC ID : SQGBT800

Equipment : BTv4.0 Dual Mode USB HCI Module

refer to item 1.1.1 for more details

Model No. : BT800 refer to item 1.1.1 for more details

Brand Name : Laird Technologies

Applicant : Laird Technologies

Address : 11160 Thompson Ave. / Lenexa, Kansas /

66219 / USA

Standard : 47 CFR FCC Part 15.247

Received Date : Jun. 25, 2013

Tested Date : Jun. 25 ~ Jul. 08, 2013

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Approved & Reviewed by:

Gary Chang<sup>l</sup>/ Manager

Iac MRA



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# **Release Record**

Report No.	Version	Description	Issued Date
FR362601AD	Rev. 01	Initial issue	Aug. 09, 2013

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**Summary of Test Results** 

FCC Rules	Test Items	Measured	Result
15.207	AC Power Line Conducted Emissions	[dBuV]: 0.201MHz 53.92 (Margin 9.66dB) - QP	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 32.63MHz 38.71 (Margin 1.29dB) - QP	Pass
15.247(d)	Band Edge	Meet the requirement of limit	Pass
15.247(b)(1)	Conducted Output Power	Power [dBm]: BR: 8.19 EDR: 7.08	Pass
15.247(a)(1)(iii)	Number of Hopping Channels	Meet the requirement of limit	Pass
15.247(a)(1)	Hopping Channel Separation	Meet the requirement of limit	Pass
15.247(a)(1)(iii)	Dwell Time	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

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#### **General Description** 1

#### 1.1 Information

#### 1.1.1 **Product Details**

The following models are provided to this EUT.

Model Name	Description	Difference
BT800	BTv4.0 Dual Mode USB HCI Module	
BT810	BTv4.0 Dual Mode USB HCI Module (BG carrier board)	BT800 module mounted onto a PCB carrier board to change footprint – no other differences.
BT820	BTv4.0 Dual Mode USB Dongle	BT800 module mounted onto a carrier board with USB connector.

The above models, model BT810and BT820 were selected as representative ones for the radiated final test and only its data was recorded in this report.

#### 1.1.2 Specification of the Equipment under Test (EUT)

RF General Information								
Frequency Range (MHz)	Bluetooth Mode	Ch. Frequency (MHz)	Channel Number	Data Rate				
2400-2483.5	BR V2.1	2402-2480	0-78 [79]	1 Mbps				
2400-2483.5	EDR V2.1	2402-2480	0-78 [79]	2 Mbps				
2400-2483.5	EDR V2.1	2402-2480	0-78 [79]	3 Mbps				

Note 1: RF output power specifies that Maximum Peak Conducted Output Power.

Note 2: Bluetooth BR uses a GFSK.

Note 3: Bluetooth EDR uses a combination of  $\pi/4$ -DQPSK and 8DPSK.

#### 1.1.3 Antenna Details

Ant. No.	Brand	Туре	Gain (dBi)	Connector	Model
1	ACX	Chip	0.5	N/A	AT3216-B2R7HAA_3216

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# 1.1.4 EUT Operational Condition

Supply Voltage	AC mains	$\boxtimes$	DC (5V)		
Type of DC Source	Internal DC supply		External DC adapter	$\boxtimes$	From Host

## 1.1.5 Accessories

N/A

#### 1.1.6 Channel List

	Frequency	band (MHz)		2400~2483.5			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

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## 1.1.7 Test Tool

Test tool	Blue Tool V2.5

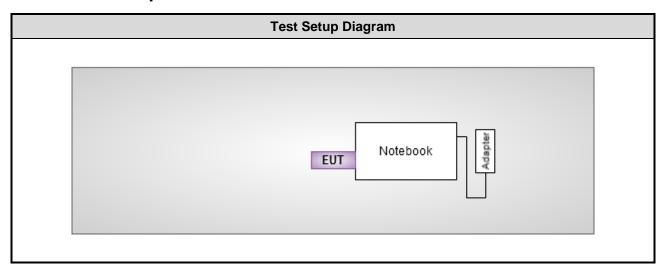
## 1.1.8 Power Setting

Madulation Mada	Test Frequency (MHz)				
Modulation Mode	2402	2440	2480		
GFSK/1Mbps	255,63	255,63	255,63		
8DPSK/3Mbps	255,63	255,63	255,63		

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# 1.2 Test Setup Chart



# 1.3 Local Support Equipment List

	Support Equipment List							
No. Equipment Brand			Model	S/N	FCC ID	Length (m)		
1	Notebook	DELL	E6430					

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#### **The Equipment List** 1.4

Test Item	Conducted Emission  Conduction room 1 / (CO01-WS)								
Test Site									
Instrument	Manufacturer	Model No. Serial No.		Calibration Date	Calibration Until				
EMC Receiver	R&S	ESCS 30	100169	Dec. 12, 2012	Dec. 11, 2013				
LISN	SCHWARZBECK MESS-ELEKTRONIK	Schwarzbeck 8127	8127-667	Dec. 04, 2012	Dec. 03, 2013				
LISN (Support Unit)	SCHWARZBECK MESS-ELEKTRONIK	Schwarzbeck 8127	8127-666	Dec. 04, 2012	Dec. 03, 2013				
ISN	TESEQ	ISN T800	34406	Apr. 08, 2013	Apr. 07, 2014				
ISN	TESEQ	ISN T200A	30494	Apr. 09, 2013	Apr. 08, 2014				
ISN	TESEQ	ISN T8-Cat6	27262	Sep. 17, 2012	Sep. 16, 2013				
ISN	TESEQ	ISN ST08	22589	Jan. 24, 2013	Jan. 23, 2014				
RF Current Probe	FCC	F-33-4	121630	Dec. 04, 2012	Dec. 03, 2013				
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Dec. 25, 2012	Dec. 24, 2013				
ESH3-Z6 V-Network(+)	R&S	ESH3-Z6	100920	Nov. 21, 2012	Nov. 20, 2013				
ESH3-Z6 V-Network(-)	R&S	ESH3-Z6	100951	Jan. 03, 2013	Jan. 02, 2014				
Two-Line V-Network	R&S	ENV216	101579	Jan. 07, 2013	Jan. 06, 2014				
50 ohm terminal	NA	50	01	Apr. 22, 2013	Apr. 21, 2014				
50 ohm terminal	NA	50	02	Apr. 22, 2013	Apr. 21, 2014				
50 ohm terminal	NA	50	03	Apr. 22, 2013	Apr. 21, 2014				
50 ohm terminal (Support Unit)	NA	50	04	Apr. 22, 2013	Apr. 21, 2014				

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Test Item	Radiated Emission ab	ove 1GHz									
Test Site	966 chamber1 / (03Ch	966 chamber1 / (03CH01-WS)									
Instrument	Manufacturer	Calibration Date	Calibration Until								
3m semi-anechoic chamber	CHAMPRO	SAC-03	03CH01-WS	Jan. 04, 2013	Jan. 03, 2014						
Spectrum Analyzer	R&S	FSV40	101498	Jan. 24, 2013	Jan. 23, 2014						
Receiver	ROHDE&SCHWAR Z	ESR3	101658	Jan. 28, 2013	Jan. 27, 2014						
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jan. 11, 2013	Jan. 10, 2014						
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Feb. 18, 2013	Feb. 17, 2014						
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Jan. 14, 2013	Jan. 13, 2014						
Amplifier	Burgeon	BPA-530	100219	Nov. 28, 2012	Nov. 27, 2013						
Amplifier	Agilent	83017A	MY39501308	Dec. 18, 2012	Dec. 17, 2013						
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Dec. 25, 2012	Dec. 24, 2013						
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Dec. 25, 2012	Dec. 24, 2013						
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16139/4	Dec. 25, 2012	Dec. 24, 2013						
RF Cable-R03m	Woken	CFD400NL-LW	CFD400NL-001	Dec. 25, 2012	Dec. 24, 2013						
RF Cable-R10m	Woken	CFD400NL-LW	CFD400NL-002	Dec. 25, 2012	Dec. 24, 2013						
control	EM Electronics	EM1000	60612	N/A	N/A						

Loop Antenna	R&S	HFH2-Z2	100330	Nov. 15, 2012	Nov. 14, 2014			
Amplifier	MITEQ	AMF-6F-260400	9121372	Apr. 19, 2013	Apr. 18, 2015			
Note: Calibration Interval of instruments listed above is two year.								

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Test Item	RF Conducted						
Test Site	(TH01-WS)						
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until		
Spectrum Analyzer	R&S	FSV 40	101063	Feb. 18, 2013	Feb. 17, 2014		
TEMP&HUMIDITY CHAMBER	GIANT FORCE	GCT-225-40-SP-SD	MAF1212-002	Nov. 29, 2012	Nov. 28, 2013		
Power Meter	Anritsu	ML2495A	1241002	Oct. 15, 2012	Oct. 14, 2013		
Power Sensor	Anritsu	MA2411B	1027366	Oct. 24, 2012	Oct. 23, 2013		
Signal Generator	R&S	SMB100A	175727	Jan. 14, 2013	Jan. 13, 2014		
Bluetooth Tester	R&S	СВТ	100959	Jan. 09, 2013	Jan. 08, 2014		
MXG-B RF Vector Signal Generator	Agilent	N5182B	MY53050081	Apr. 19, 2013	Apr. 18, 2014		
Note: Calibration Interval of instruments listed above is one year.							

## 1.5 Test Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.247 FCC Public notice DA 00-705 ANSI C63.10-2009

Note: The EUT has been tested and complied with FCC part 15B requirement. FCC Part 15B test results are issued to another report.

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# 1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Measurement Uncertainty							
Parameters	Uncertainty						
Bandwidth	±35.286 Hz						
Conducted power	±0.536 dB						
Frequency error	±35.286 Hz						
Temperature	±0.3 °C						
Conducted emission	±2.946 dB						
AC conducted emission	±2.43 dB						
Radiated emission	±2.49 dB						

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#### **Test Configuration** 2

#### 2.1 **Testing Condition**

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	22°C / 52%	Skys Huang
Radiated Emissions	03CH01-WS	25°C / 65%	Haru Yang
RF Conducted	TH01-WS	24°C / 61%	Brad Wu

> FCC site registration No.: 657002 ➤ IC site registration No.: 10807A-2

#### The Worst Test Modes and Channel Details 2.2

Test item	Mode	Test Frequency (MHz)	Data rate (Mbps)	Test Configuration
AC Power Line Conducted Emissions	8DPSK	2402	3Mbps	1, 2
Radiated Emissions (below 1GHz)	8DPSK	2402	3Mbps	1, 2
Radiated Emissions (above 1GHz)	GFSK 8DPSK	2402, 2441, 2480 2402, 2441, 2480	1Mbps 3Mbps	1, 2
Conducted Output Power	GFSK 8DPSK	2402, 2441, 2480 1Mbps 2402, 2441, 2480 3Mbps		1
Number of Hopping Channels	GFSK 8DPSK	2402~2480 2402~2480	1Mbps 3Mbps	1
Hopping Channel Separation	GFSK 8DPSK	2402, 2441, 2480 2402, 2441, 2480	1Mbps 3Mbps	1
Dwell Time	GFSK 8DPSK	2480 2480	1Mbps 3Mbps	1

#### NOTE:

1. 2 types EUT were selected to perform radiated emission test as below test configuration

1) Configuration 1: BT810 Configuration 2: BT820

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## 3 Transmitter Test Results

#### 3.1 AC Power Line Conducted Emissions

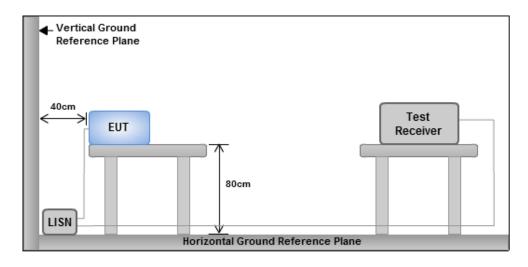
#### 3.1.1 Limit of AC Power Line Conducted Emissions

Conducted Emissions Limit							
Frequency Emission (MHz)	Quasi-Peak	Average					
0.15-0.5	66 - 56 *	56 - 46 *					
0.5-5	56	46					
5-30	60	50					
Note 1: * Decreases with the logarithm of the frequency.							

#### 3.1.2 Test Procedures

- 1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
- 2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50  $\Omega$  LISN port.
- 3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
- 4. This measurement was performed with AC 120V/60Hz

#### 3.1.3 Test Setup



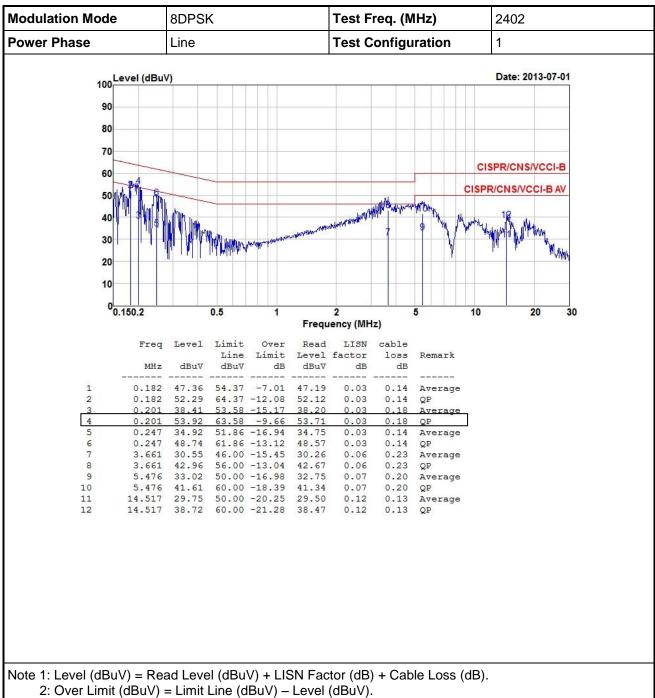
Note: 1. Support units were connected to second LISN.

Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

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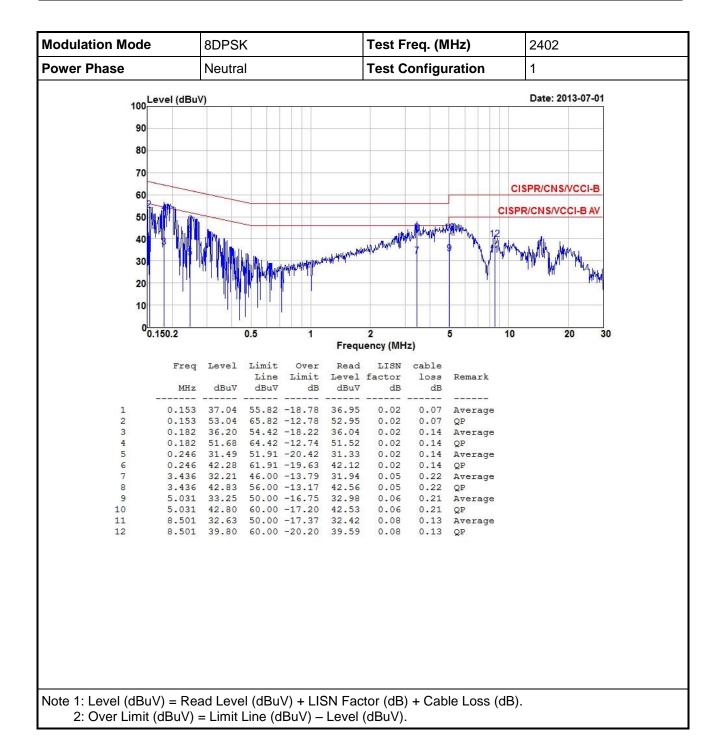
#### **Test Result of Conducted Emissions** 3.1.4



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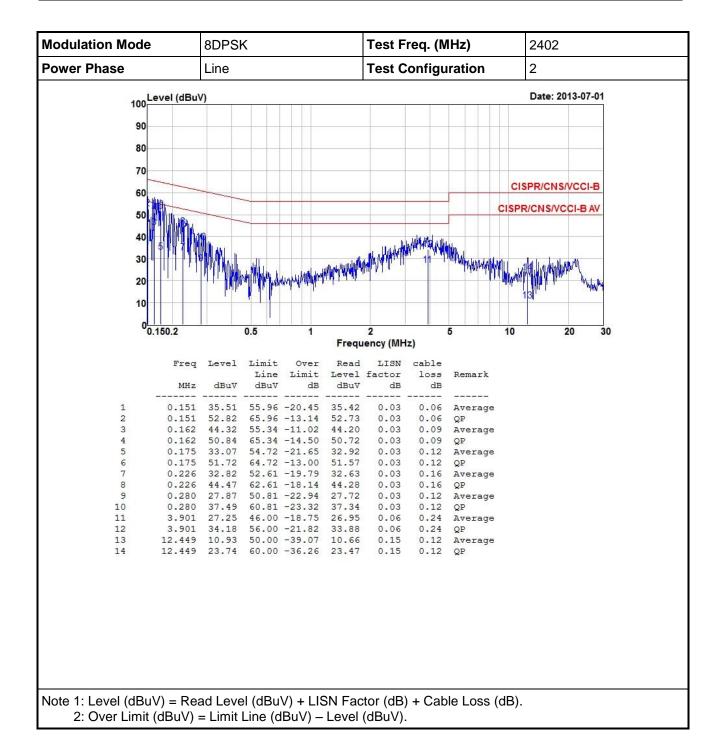
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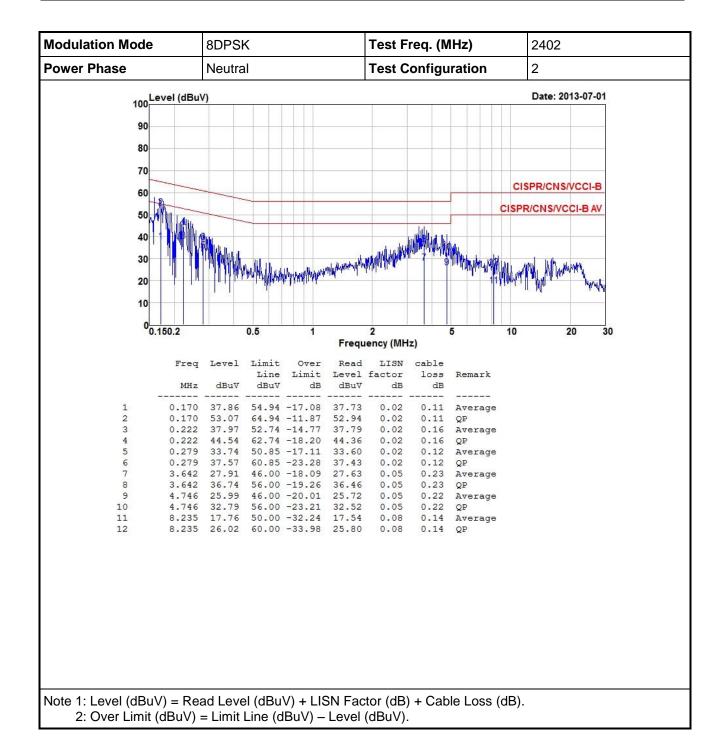
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## 3.2 Unwanted Emissions into Restricted Frequency Bands

#### 3.2.1 Limit of Unwanted Emissions into Restricted Frequency Bands

Restricted Band Emissions Limit									
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)						
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300						
0.490~1.705	24000/F(kHz)	33.8 - 23	30						
1.705~30.0	30	29	30						
30~88	100	40	3						
88~216	150	43.5	3						
216~960	200	46	3						
Above 960	500	54	3						

#### Note 1:

Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit

Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

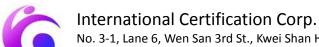
#### 3.2.2 Test Procedures

- Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at a height of 0.8 m test table above the ground plane.
- 2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
- 3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

#### Note:

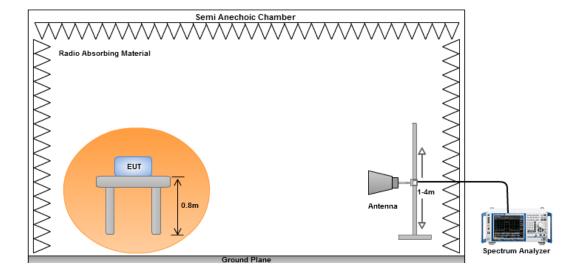
- 1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
- 2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
- 3. RBW=1MHz, VBW=10Hz and Peak detector is for average measured value of radiated emission above 1GHz DH5 packet is the worst case since DH5 has more TX slots than other packet types.
- 4. Hopping randomly between 79 channels is 1600 times per second (0.625 ms time slot). The duty factor is 20 \* log (0.625 \* 5 / 100) = -30.1 dB. Average value = Peak reading + duty factor

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## 3.2.3 Test Setup

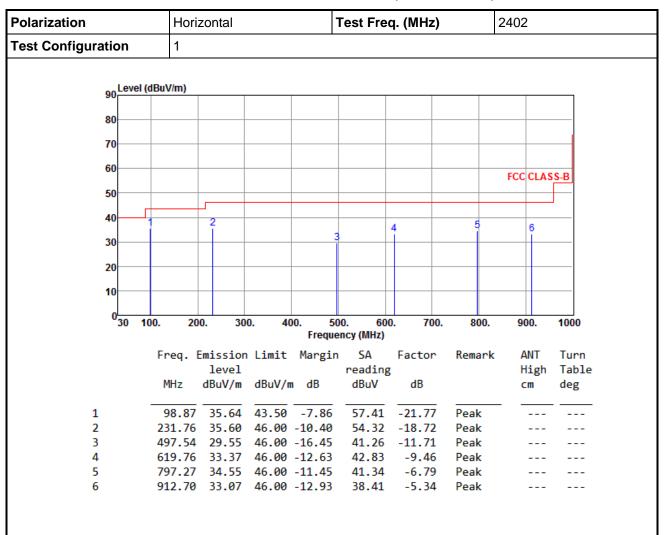


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### 3.2.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

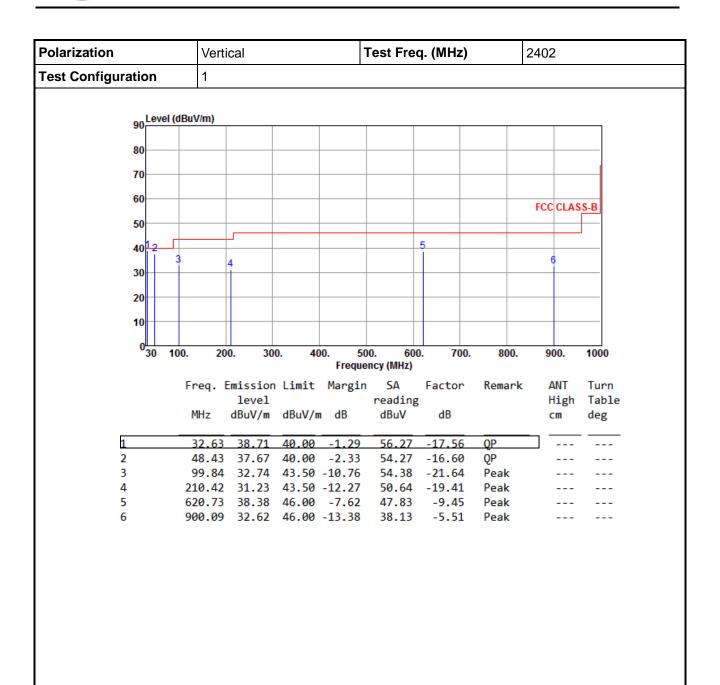


Note 1: Level (dBuV/m) = Read Level (dBuV/m) + Antenna Factor (dB) + Cable Loss (dB) - Preamp Factor (dB).

2: Over Limit (dBuV/m) = Limit Line (dBuV/m) – Level (dBuV/m).

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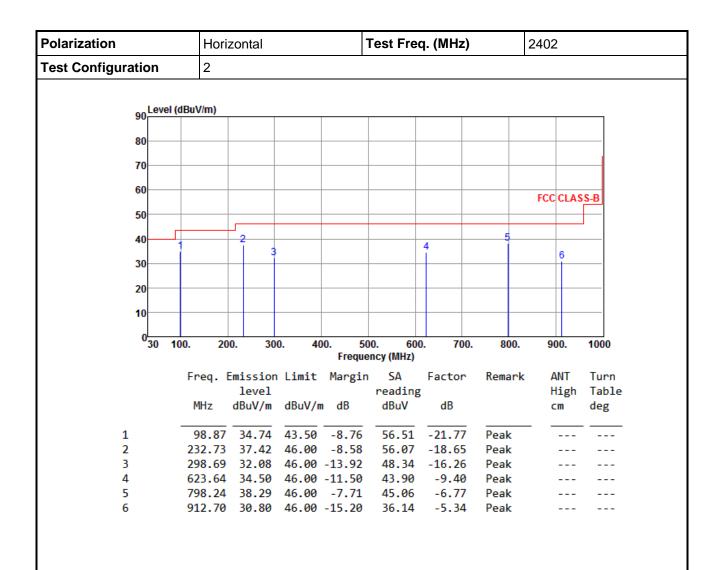


Note 1: Level (dBuV/m) = Read Level (dBuV/m) + Antenna Factor (dB) + Cable Loss (dB) - Preamp Factor (dB). 2: Over Limit (dBuV/m) = Limit Line (dBuV/m) - Level (dBuV/m).

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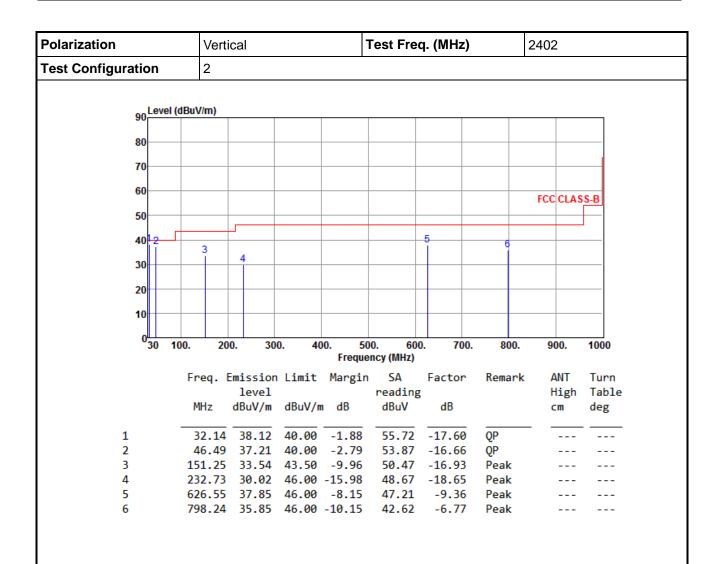
Note 1: Level (dBuV/m) = Read Level (dBuV/m) + Antenna Factor (dB) + Cable Loss (dB) - Preamp Factor (dB). 2: Over Limit (dBuV/m) = Limit Line (dBuV/m) - Level (dBuV/m).

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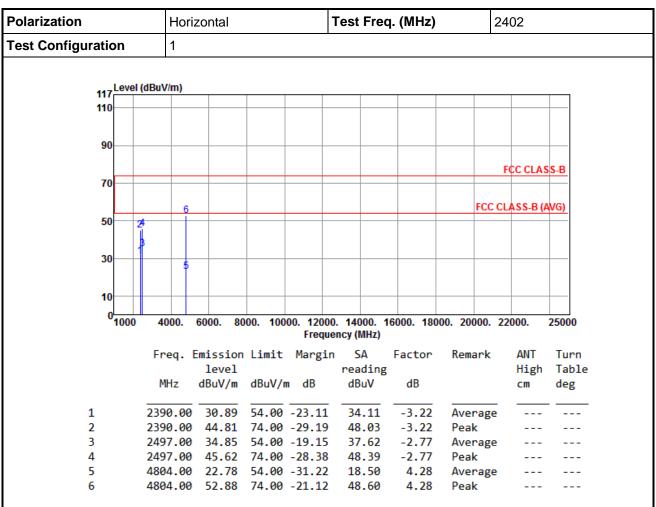
Note 1: Level (dBuV/m) = Read Level (dBuV/m) + Antenna Factor (dB) + Cable Loss (dB) - Preamp Factor (dB). 2: Over Limit (dBuV/m) = Limit Line (dBuV/m) - Level (dBuV/m).

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### 3.2.5 Transmitter Radiated Unwanted Emissions (Above 1GHz) for GFSK



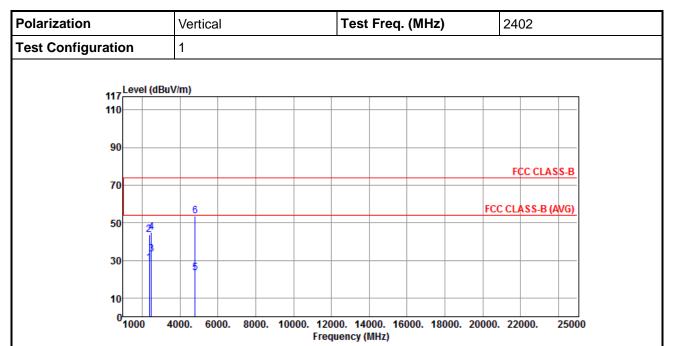
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.





	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	28.46	54.00	-25.54	31.68	-3.22	Average		
2	2390.00	43.52	74.00	-30.48	46.74	-3.22	Peak		
3	2497.00	33.15	54.00	-20.85	35.92	-2.77	Average		
4	2497.00	45.06	74.00	-28.94	47.83	-2.77	Peak		
5	4804.00	23.31	54.00	-30.69	19.03	4.28	Average		
6	4804.00	53.41	74.00	-20.59	49.13	4.28	Peak		

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

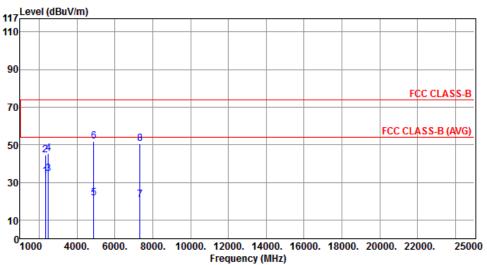
Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Polarization	Horizontal	Test Freq. (MHz)	2441
Test Configuration	1		



	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2336.00	33.17	54.00	-20.83	36.59	-3.42	Average		
2	2336.00	44.53	74.00	-29.47	47.95	-3.42	Peak		
3	2492.00	34.45	54.00	-19.55	37.24	-2.79	Average		
4	2492.00	45.40	74.00	-28.60	48.19	-2.79	Peak		
5	4882.00	21.63	54.00	-32.37	17.23	4.40	Average		
6	4882.00	51.73	74.00	-22.27	47.33	4.40	Peak		
7	7323.00	20.51	54.00	-33.49	11.58	8.93	Average		
8	7323.00	50.61	74.00	-23.39	41.68	8.93	Peak		

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

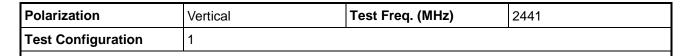
Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

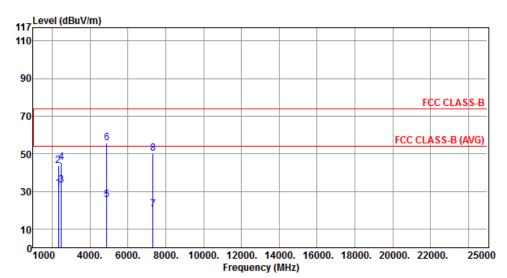
Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2336.00	31.51	54.00	-22.49	34.93	-3.42	Average		
2	2336.00	43.65	74.00	-30.35	47.07	-3.42	Peak		
3	2492.00	33.05	54.00	-20.95	35.84	-2.79	Average		
4	2492.00	45.48	74.00	-28.52	48.27	-2.79	Peak		
5	4882.00	25.62	54.00	-28.38	21.22	4.40	Average		
6	4882.00	55.72	74.00	-18.28	51.32	4.40	Peak		
7	7323.00	20.09	54.00	-33.91	11.16	8.93	Average		
8	7323.00	50.19	74.00	-23.81	41.26	8.93	Peak		

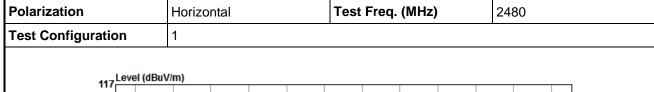
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

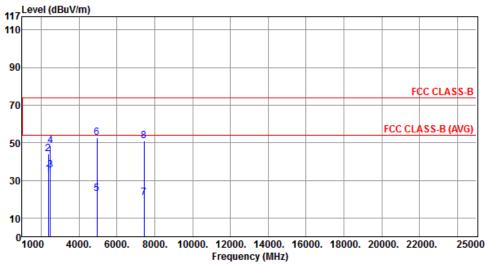
Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2375.00	33.44	54.00	-20.56	36.72	-3.28	Average		
2	2375.00	44.23	74.00	-29.77	47.51	-3.28	Peak		
3	2483.50	35.29	54.00	-18.71	38.12	-2.83	Average		
4	2483.50	48.50	74.00	-25.50	51.33	-2.83	Peak		
5	4960.00	22.68	54.00	-31.32	18.14	4.54	Average		
6	4960.00	52.78	74.00	-21.22	48.24	4.54	Peak		
7	7440.00	20.64	54.00	-33.36	11.52	9.12	Average		
8	7440.00	50.74	74.00	-23.26	41.62	9.12	Peak		

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

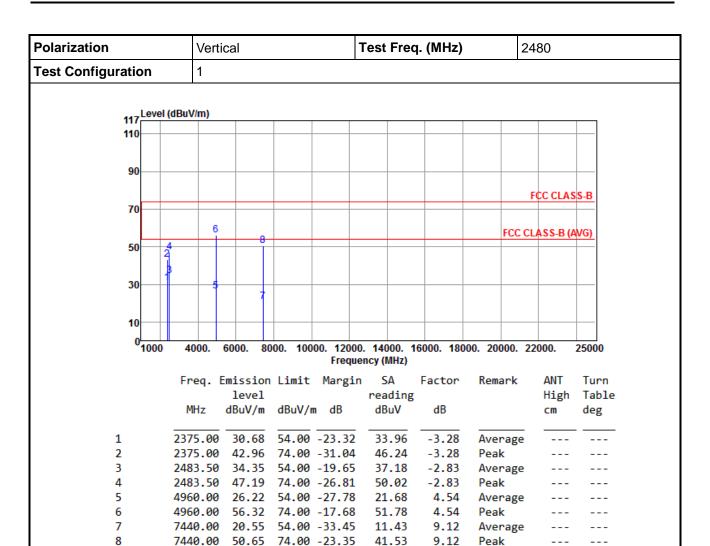
Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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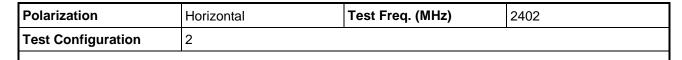
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

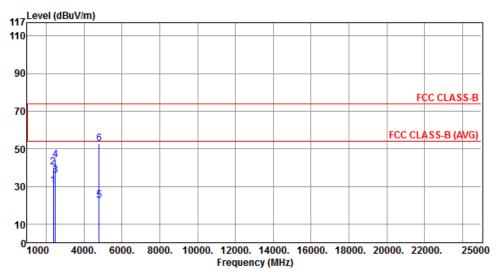
Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.







	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Ū	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	30.36	54.00	-23.64	33.58	-3.22	Average		
2	2390.00	40.15	74.00	-33.85	43.37	-3.22	Peak		
3	2497.00	35.91	54.00	-18.09	38.68	-2.77	Average		
4	2497.00	43.95	74.00	-30.05	46.72	-2.77	Peak		
5	4804.00	22.40	54.00	-31.60	18.12	4.28	Average		
6	4804.00	52.50	74.00	-21.50	48.22	4.28	Peak		
2 3 4 5	2390.00 2497.00 2497.00 4804.00	40.15 35.91 43.95 22.40	74.00 54.00 74.00 54.00	-33.85 -18.09 -30.05 -31.60	43.37 38.68 46.72 18.12	-3.22 -2.77 -2.77 4.28	Peak Average Peak Average		

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

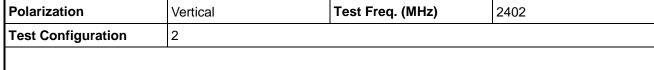
Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

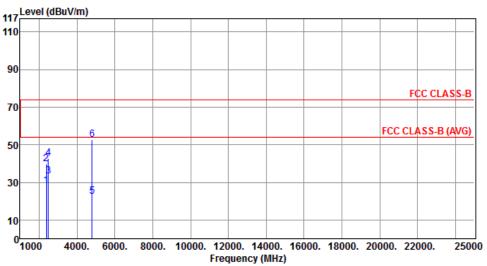
Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2390.00	28.13	54.00	-25.87	31.35	-3.22	Average		
2	2390.00	39.52	74.00	-34.48	42.74	-3.22	Peak		
3	2497.00	33.32	54.00	-20.68	36.09	-2.77	Average		
4	2497.00	42.60	74.00	-31.40	45.37	-2.77	Peak		
5	4804.00	22.66	54.00	-31.34	18.38	4.28	Average		
6	4804.00	52.76	74.00	-21.24	48.48	4.28	Peak		

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

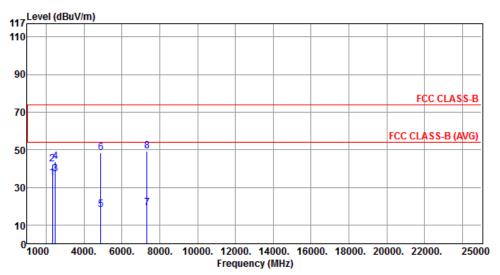
Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Polarization	Horizontal	Test Freq. (MHz)	2441
Test Configuration	2		



	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2336.00	34.86	54.00	-19.14	38.28	-3.42	Average		
2	2336.00	42.31	74.00	-31.69	45.73	-3.42	Peak		
3	2492.00	37.03	54.00	-16.97	39.82	-2.79	Average		
4	2492.00	43.81	74.00	-30.19	46.60	-2.79	Peak		
5	4882.00	18.21	54.00	-35.79	13.81	4.40	Average		
6	4882.00	48.31	74.00	-25.69	43.91	4.40	Peak		
7	7323.00	19.16	54.00	-34.84	10.23	8.93	Average		
8	7323.00	49.26	74.00	-24.74	40.33	8.93	Peak		

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

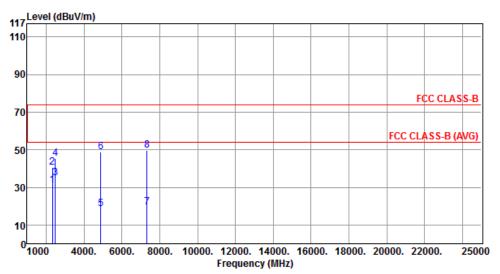
Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Polarization	Vertical	Test Freq. (MHz)	2441
Test Configuration	2		



		Emission level		Ū	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		CM	deg
1	2336.00	30.93	54.00	-23.07	34.35	-3.42	Average		
2	2336.00	40.70	74.00	-33.30	44.12	-3.42	Peak		
3	2492.00	34.92	54.00	-19.08	37.71	-2.79	Average		
4	2492.00	45.50	74.00	-28.50	48.29	-2.79	Peak		
5	4882.00	18.48	54.00	-35.52	14.08	4.40	Average		
6	4882.00	48.58	74.00	-25.42	44.18	4.40	Peak		
7	7323.00	19.62	54.00	-34.38	10.69	8.93	Average		
8	7323.00	49.72	74.00	-24.28	40.79	8.93	Peak		

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

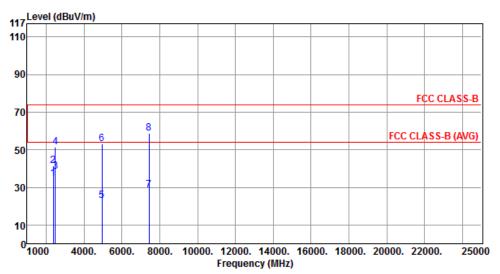
Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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PolarizationHorizontalTest Freq. (MHz)2480Test Configuration2



	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2375.00	34.73	54.00	-19.27	38.01	-3.28	Average		
2	2375.00	41.36	74.00	-32.64	44.64	-3.28	Peak		
3	2483.50	38.29	54.00	-15.71	41.12	-2.83	Average		
4	2483.50	51.30	74.00	-22.70	54.13	-2.83	Peak		
5	4960.00	23.01	54.00	-30.99	18.47	4.54	Average		
6	4960.00	53.11	74.00	-20.89	48.57	4.54	Peak		
7	7440.00	28.50	54.00	-25.50	19.38	9.12	Average		
8	7440.00	58.60	74.00	-15.40	49.48	9.12	Peak		

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

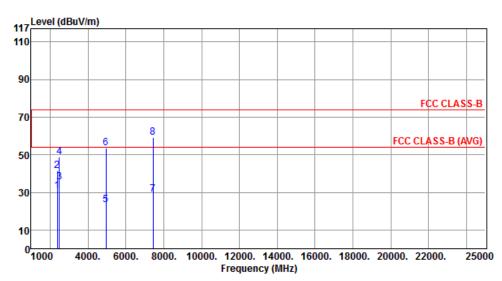
Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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PolarizationVerticalTest Freq. (MHz)2480Test Configuration2



	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2375.00	30.53	54.00	-23.47	33.81	-3.28	Average		
2	2375.00	41.39	74.00	-32.61	44.67	-3.28	Peak		
3	2483.50	35.53	54.00	-18.47	38.36	-2.83	Average		
4	2483.50	48.93	74.00	-25.07	51.76	-2.83	Peak		
5	4960.00	23.26	54.00	-30.74	18.72	4.54	Average		
6	4960.00	53.36	74.00	-20.64	48.82	4.54	Peak		
7	7440.00	28.96	54.00	-25.04	19.84	9.12	Average		
8	7440.00	59.06	74.00	-14.94	49.94	9.12	Peak		

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

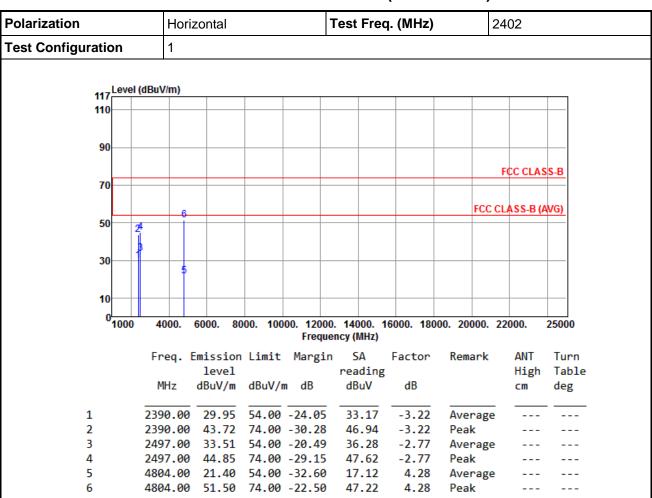
Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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## 3.2.6 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 8DPSK



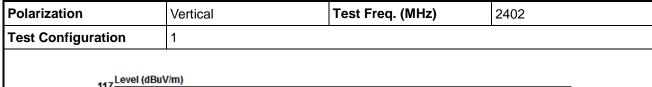
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

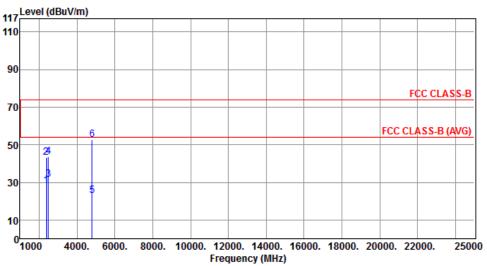
Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.







	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Ū	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	28.17	54.00	-25.83	31.39	-3.22	Average		
2	2390.00	43.30	74.00	-30.70	46.52	-3.22	Peak		
3	2497.00	31.42	54.00	-22.58	34.19	-2.77	Average		
4	2497.00	43.80	74.00	-30.20	46.57	-2.77	Peak		
5	4804.00	22.75	54.00	-31.25	18.47	4.28	Average		
6	4804.00	52.85	74.00	-21.15	48.57	4.28	Peak		

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

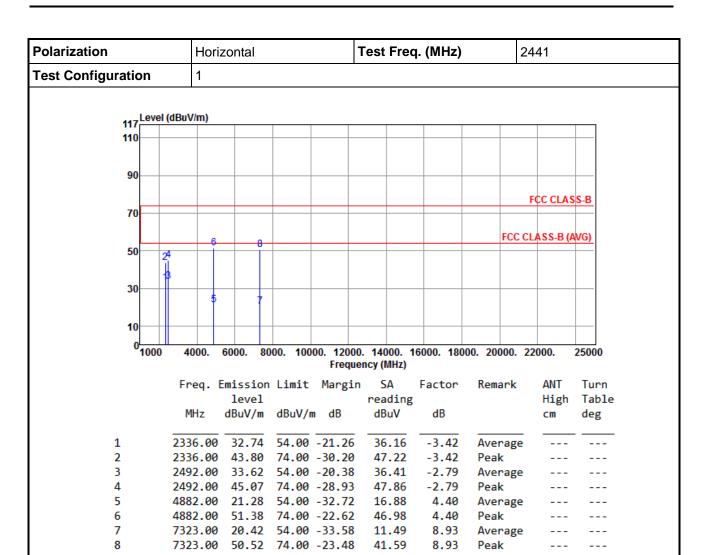
Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.



4882.00

7323.00

6

7

54.83

74.00 -19.17

20.01 54.00 -33.99

7323.00 50.11 74.00 -23.89 41.18

50.43

11.08

4.40

8.93

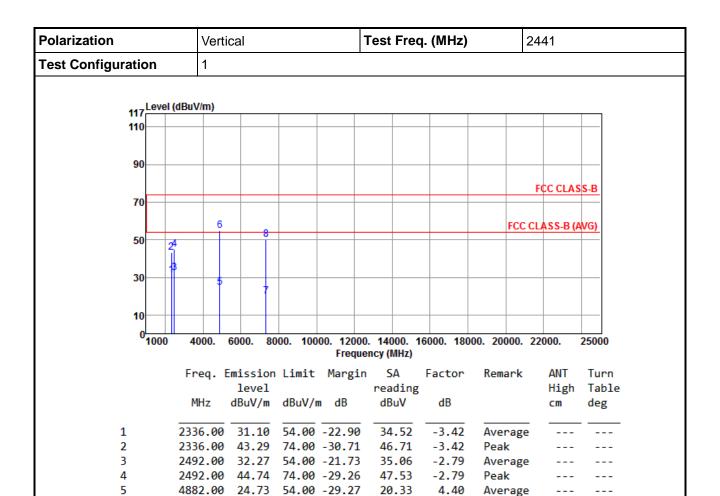
8.93

Peak

Peak

Average

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Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

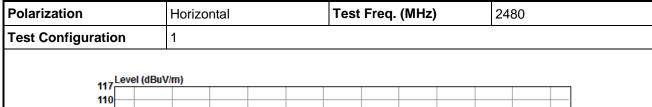
Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

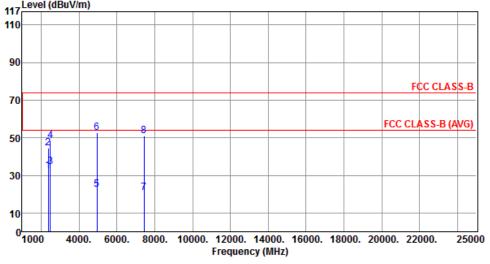
Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2375.00	32.49	54.00	-21.51	35.77	-3.28	Average		
2	2375.00	44.61	74.00	-29.39	47.89	-3.28	Peak		
3	2483.50	34.73	54.00	-19.27	37.56	-2.83	Average		
4	2483.50	48.41	74.00	-25.59	51.24	-2.83	Peak		
5	4960.00	22.42	54.00	-31.58	17.88	4.54	Average		
6	4960.00	52.52	74.00	-21.48	47.98	4.54	Peak		
7	7440.00	20.85	54.00	-33.15	11.73	9.12	Average		
8	7440.00	50.95	74.00	-23.05	41.83	9.12	Peak		

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

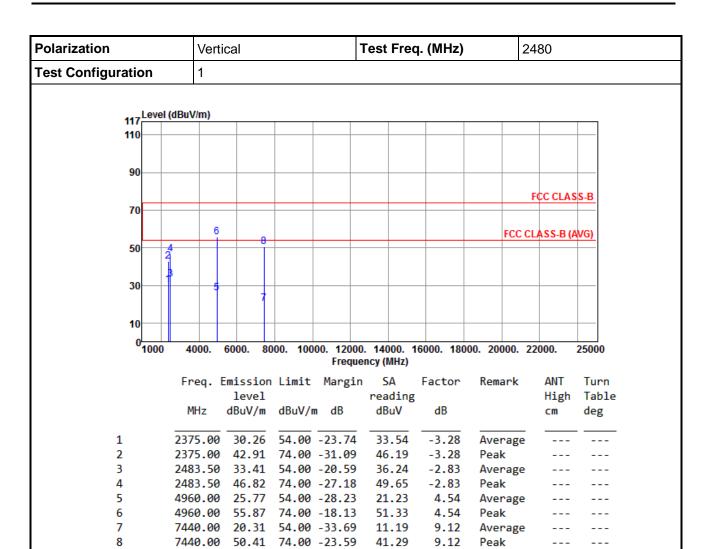
Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

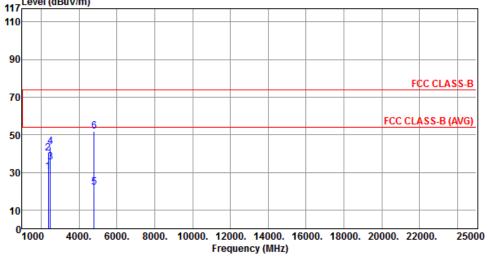
Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.



Polarization			Horizontal 1			Test	Freq.	(MHz)	24	02		
Test Configuration			2									
117	Level	I (dBuV/	m)		ı					ı	ı	
110												



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Ū	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	30.16	54.00	-23.84	33.38	-3.22	Average		
2	2390.00	40.05	74.00	-33.95	43.27	-3.22	Peak		
3	2497.00	35.35	54.00	-18.65	38.12	-2.77	Average		
4	2497.00	43.72	74.00	-30.28	46.49	-2.77	Peak		
5	4804.00	21.84	54.00	-32.16	17.56	4.28	Average		
6	4804.00	51.94	74.00	-22.06	47.66	4.28	Peak		

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

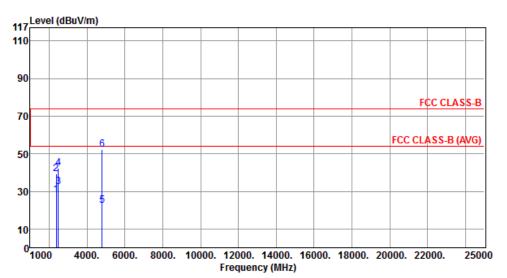
Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Polarization	Vertical	Test Freq. (MHz)	2402
Test Configuration	2		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Ū	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	27.96	54.00	-26.04	31.18	-3.22	Average		
2	2390.00				42.46	-3.22	Peak		
3	2497.00	32.37	54.00	-21.63	35.14	-2.77	Average		
4	2497.00	42.36	74.00	-31.64	45.13	-2.77	Peak		
5	4804.00	22.31	54.00	-31.69	18.03	4.28	Average		
6	4804.00	52.41	74.00	-21.59	48.13	4.28	Peak		

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

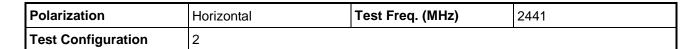
Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

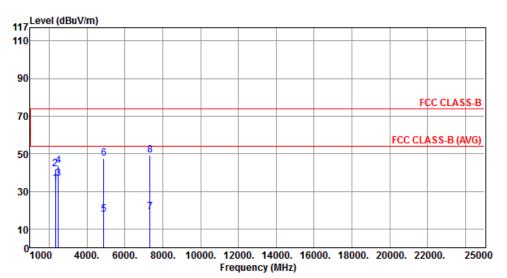
Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2336.00	34.20	54.00	-19.80	37.62	-3.42	Average		
2	2336.00	41.84	74.00	-32.16	45.26	-3.42	Peak		
3	2492.00	36.63	54.00	-17.37	39.42	-2.79	Average		
4	2492.00	43.59	74.00	-30.41	46.38	-2.79	Peak		
5	4882.00	17.58	54.00	-36.42	13.18	4.40	Average		
6	4882.00	47.68	74.00	-26.32	43.28	4.40	Peak		
7	7323.00	19.04	54.00	-34.96	10.11	8.93	Average		
8	7323.00	49.14	74.00	-24.86	40.21	8.93	Peak		

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

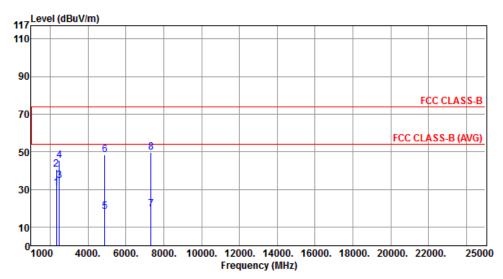
Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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PolarizationVerticalTest Freq. (MHz)2441Test Configuration2



	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2336.00	30.70	54.00	-23.30	34.12	-3.42	Average		
2	2336.00	40.42	74.00	-33.58	43.84	-3.42	Peak		
3	2492.00	34.46	54.00	-19.54	37.25	-2.79	Average		
4	2492.00	45.17	74.00	-28.83	47.96	-2.79	Peak		
5	4882.00	18.28	54.00	-35.72	13.88	4.40	Average		
6	4882.00	48.38	74.00	-25.62	43.98	4.40	Peak		
7	7323.00	19.35	54.00	-34.65	10.42	8.93	Average		
8	7323.00	49.45	74.00	-24.55	40.52	8.93	Peak		

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

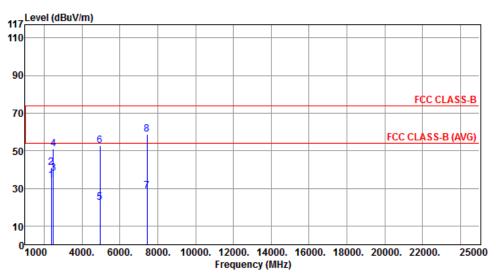
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Polarization	Horizontal	Test Freq. (MHz)	2480
Test Configuration	2		



	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2375.00	34.27	54.00	-19.73	37.55	-3.28	Average		
2	2375.00	40.93	74.00	-33.07	44.21	-3.28	Peak		
3	2483.50	38.01	54.00	-15.99	40.84	-2.83	Average		
4	2483.50	50.89	74.00	-23.11	53.72	-2.83	Peak		
5	4960.00	22.66	54.00	-31.34	18.12	4.54	Average		
6	4960.00	52.76	74.00	-21.24	48.22	4.54	Peak		
7	7440.00	28.43	54.00	-25.57	19.31	9.12	Average		
8	7440.00	58.53	74.00	-15.47	49.41	9.12	Peak		

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

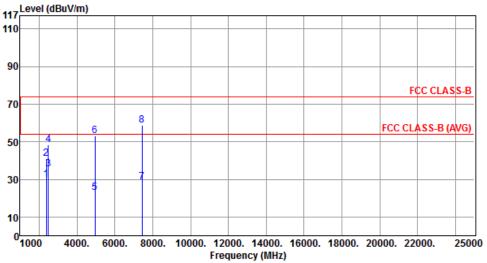
Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Polarization	Vertical	Test Freq. (MHz)	2480
Test Configuration	2		
117 Level (dBu)	V/m)		



	Freq.	Emission level	Limit	Margin	SA reading	Factor	Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	2375.00	29.98	54.00	-24.02	33.26	-3.28	Average		
2	2375.00	41.20	74.00	-32.80	44.48	-3.28	Peak		
3	2483.50	35.29	54.00	-18.71	38.12	-2.83	Average		
4	2483.50	48.54	74.00	-25.46	51.37	-2.83	Peak		
5	4960.00	22.91	54.00	-31.09	18.37	4.54	Average		
6	4960.00	53.01	74.00	-20.99	48.47	4.54	Peak		
7	7440.00	28.64	54.00	-25.36	19.52	9.12	Average		
8	7440.00	58.74	74.00	-15.26	49.62	9.12	Peak		

Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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# 3.3 Emissions in non-restricted frequency bands

### 3.3.1 Emissions in non-restricted frequency bands limit

Peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz

### 3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

### 3.3.3 Test Procedures

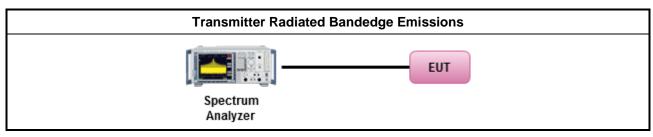
#### Reference level measurement

- 1. Set RBW=100kHz, VBW = 300kHz, Detector = Peak, Sweep time = Auto
- 2. Trace = max hold, Allow Trace to fully stabilize
- 3. Use the peak marker function to determine the maximum PSD level

### **Emission level measurement**

- 1. Set RBW=100kHz, VBW = 300kHz, Detector = Peak, Sweep time = Auto
- 2. Trace = max hold, Allow Trace to fully stabilize
- 3. Scan Frequency range is up to 26.5GHz
- 4. Use the peak marker function to determine the maximum amplitude level

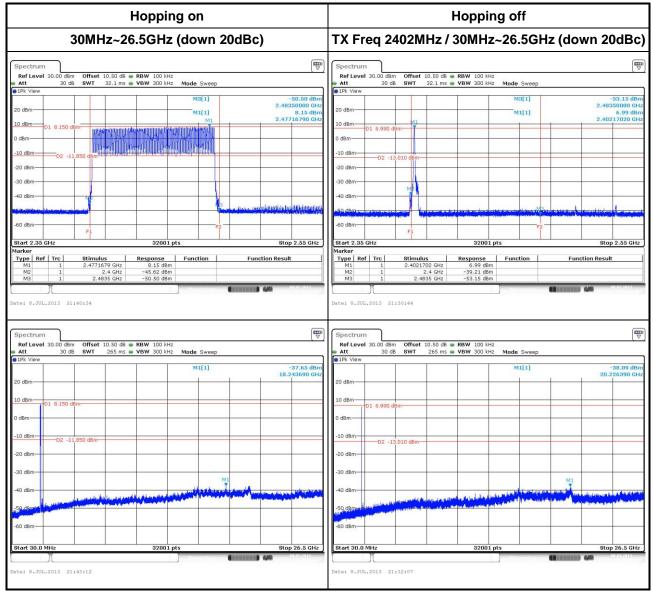
### 3.3.4 Test Setup



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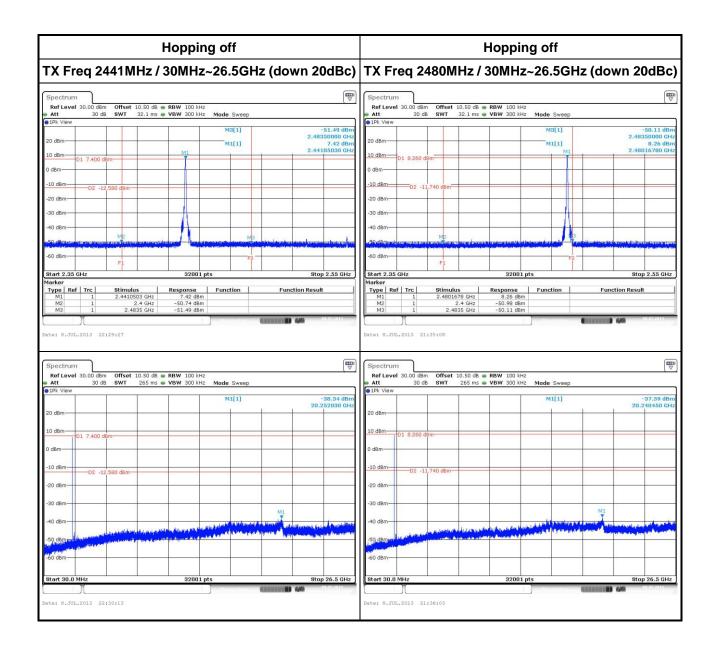
# 3.3.5 Test Result of Emissions in non-restricted frequency bands

### **GFSK**



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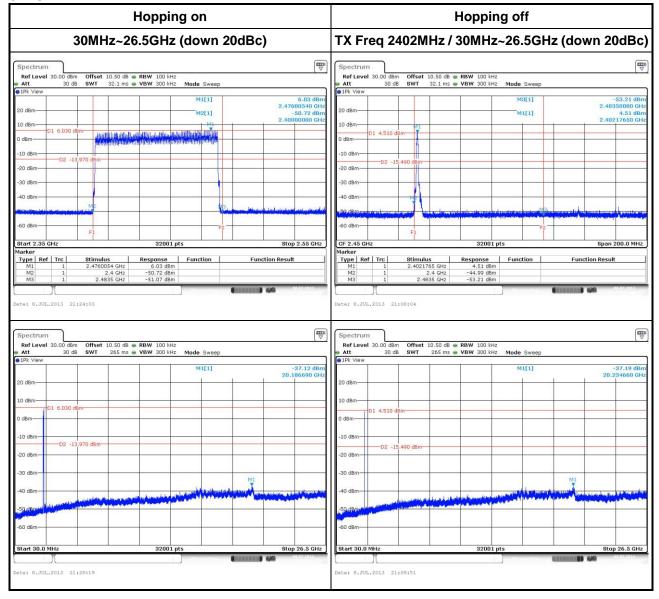
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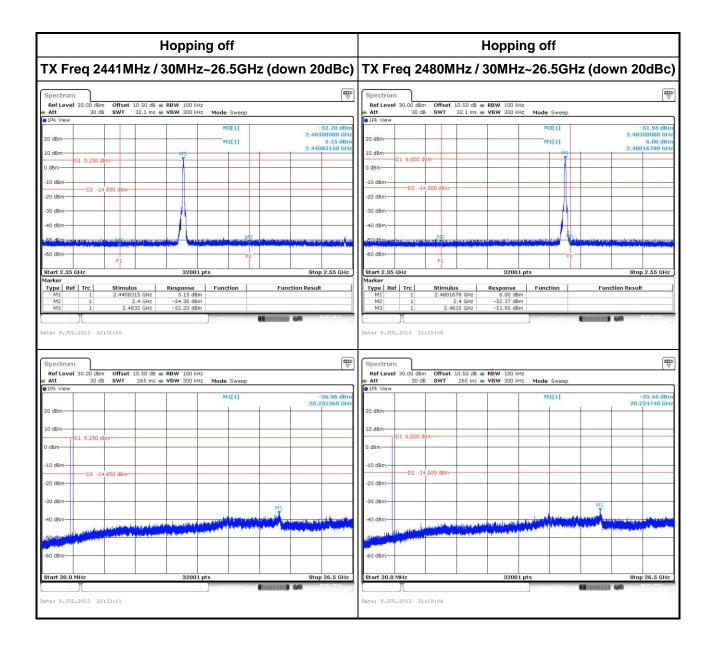
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### 8DPSK



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# 3.4 Conducted Output Power

### 3.4.1 Limit of Unwanted Emissions into Non-Restricted Frequency Bands

1 Watt 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.
0.125 Watt For all other frequency hopping systems in the 2400–2483.5 MHz band.
0.125 Watt For Frequency hopping systems operating in the 2400–2483.5 MHz band have hopping channel carrier frequencies that are separated by two-thirds of the 20 dB bandwidth of the hopping channel.

#### 3.4.2 Test Procedures

Procedure for Peak Power

 A wideband power meter is used for power measurement. Bandwidth of power senor and meter is 50MHz. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power

Procedure for Average Power (Average power is for reference only)

1. A wideband power meter is used for power measurement. Bandwidth of power senor and meter is 50MHz. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power

### 3.4.3 Test Setup



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# 3.4.4 Test Result of Conducted Output Power

Modulation Mode	Freq. (MHz)	Output Power (mW)	Output Power (dBm)	Limit (mW)
GFSK	2402	5.04	7.02	21
GFSK	2441	6.07	7.83	21
GFSK	2480	6.59	8.19	21
8DPSK	2402	4.09	6.12	21
8DPSK	2441	4.78	6.79	21
8DPSK	2480	5.11	7.08	21

Modulation Mode	Freq. (MHz)	AV Output Power (mW)	AV Output Power (dBm)
GFSK	2402	4.78	6.79
GFSK	2441	5.73	7.58
GFSK	2480	6.22	7.94
8DPSK	2402	2.58	4.11
8DPSK	2441	2.78	4.44
8DPSK	2480	3.16	4.99

Note: Average power is for reference only

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# 3.5 Number of Hopping Frequency

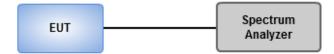
## 3.5.1 Limit of Number of Hopping Frequency

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

### 3.5.2 Test Procedures

- 1. Set RBW = 100kHz, VBW = 300kHz, Sweep time = Auto, Detector = Peak Trace max hold.
- 2 Allow trace to stabilize.

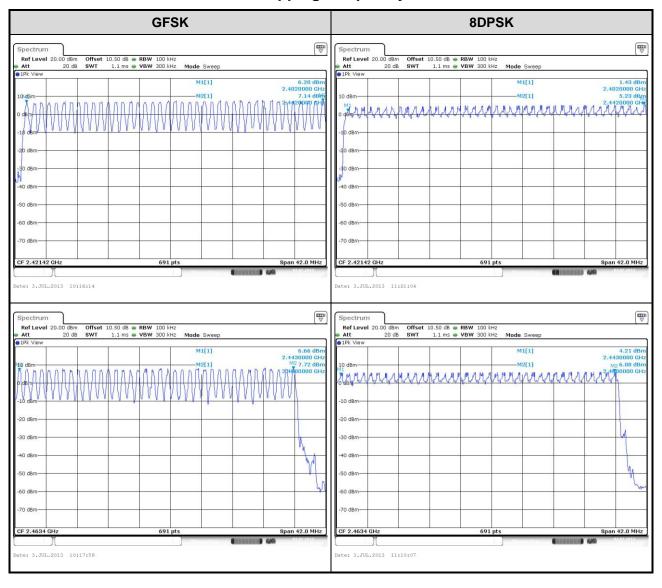
## 3.5.3 Test Setup



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#### **Test Result of Number of Hopping Frequency** 3.5.4



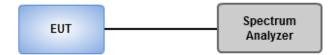
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# 3.6 20dB and Occupied Bandwidth

### 3.6.1 Test Procedures

- Set RBW=300kHz, VBW=300kHz,Sweep time = Auto, Detector=Peak Trace max hold
- 2 Allow trace to stabilize
- 3 Use N dB function of spectrum analyzer to measuring 20 dB bandwidth
- 4. Use Occupied bandwidth function of spectrum analyzer to measuring 99% occupied bandwidth

### 3.6.2 Test Setup

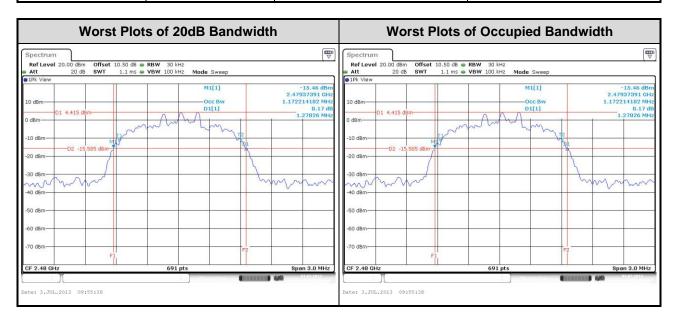


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# 3.6.3 Test result of 20dB and Occupied Bandwidth

Modulation Mode	Freq. (MHz)	20dB Bandwidth (MHz)	Occupied Bandwidth (MHz)
GFSK	2402	0.952	0.873
GFSK	2441	0.952	0.864
GFSK	2480	0.952	0.868
8DPSK	2402	1.278	1.164
8DPSK	2441	1.274	1.164
8DPSK	2480	1.278	1.172



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# 3.7 Channel Separation

## 3.7.1 Limit of Channel Separation

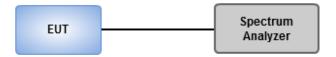
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum
of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

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.

### 3.7.2 Test Procedures

- 1. Set RBW=100kHz, VBW=300kHz, Sweep time = Auto, Detector=Peak Trace max hold
- 2 Allow trace to stabilize
- 3 Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The EUT shall show compliance with the appropriate regulatory limit

### 3.7.3 Test Setup

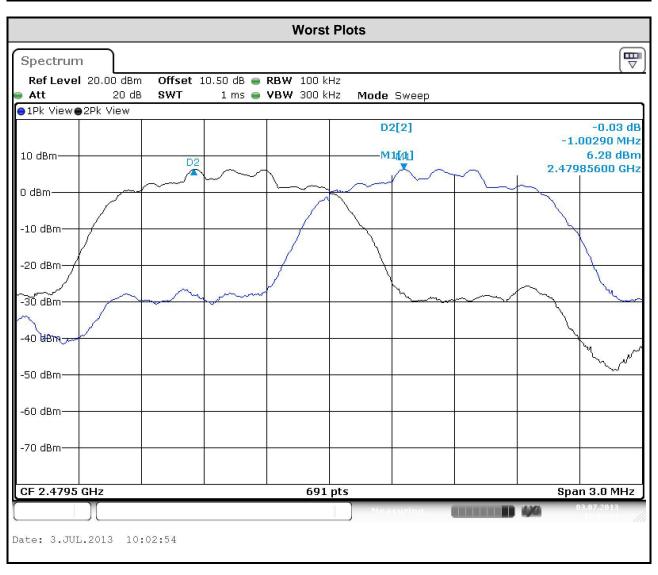


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## 3.7.4 Test result of Channel Separation

Modulation Mode	Freq. (MHz)	Channel Separation (MHz)	20dB Bandwidth (MHz)	Minimum Limit (MHz)
GFSK	2402	1.003	0.952	0.635
GFSK	2441	1.003	0.952	0.635
GFSK	2480	1.003	0.952	0.635
8DPSK	2402	1.003	1.278	0.852
8DPSK	2441	1.003	1.274	0.849
8DPSK	2480	1.003	1.278	0.852



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### 3.8 Number of Dwell Time

### 3.8.1 Limit of Dwell time

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

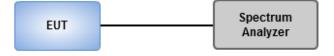
#### 3.8.2 Test Procedures

- Set RBW=100kHz,VBW=300kHz,Sw, Detector=Peak, Span=0Hz,Trace max hold Sweep time=1ms (DH1),2ms(DH3), 4ms(DH5)
- 2 Enable gating and trigger function of spectrum analyzer to measure burst on time.
- DH1 Packet permit maximum 1600 / 79 /2 = 10.12 hops per second in each channel (1 time slot RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times 10.12 x 31.6 = 320 within 31.6 seconds

DH3 Packet permit maximum 1600 / 79 / 4 = 5.06 hops per second in each channel (3 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times  $5.06 \times 31.6 = 160$  within 31.6 seconds

DH5 Packet permit maximum 1600/79/6 = 3.37 hops per second in each channel (5 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times  $3.37 \times 31.6 = 106.6$  within 31.6 seconds

### 3.8.3 Test Setup

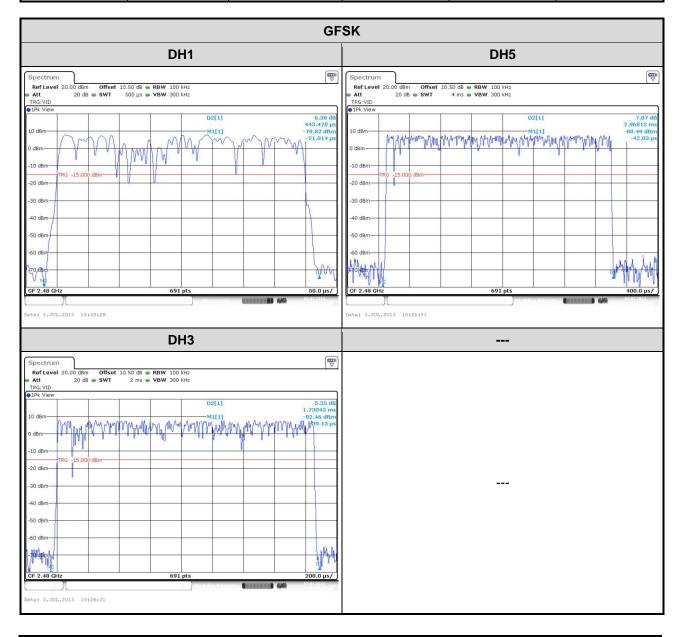


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### 3.8.4 Test Result of Dwell Time

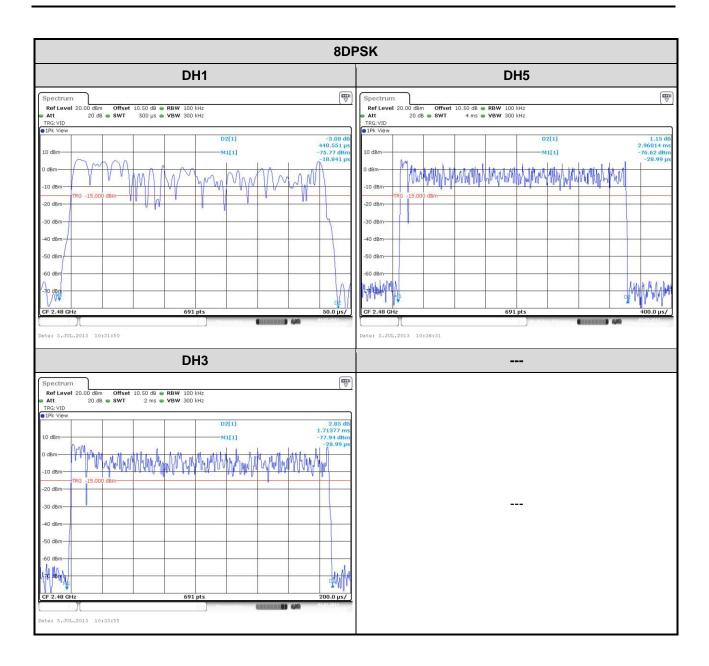
Time of Occupancy (Dwell Time) Result					
Modulation Mode	Freq. (MHz)	Pulse Time per Hop (ms)	Number of Pulse in [0.4 x N sec]	Dwell Time in  [0.4 x N sec] (s)	Dwell Time Limits (s)
GFSK-DH1	2480	0.44347	320	0.142	0.4
GFSK-DH3	2480	1.73040	160	0.277	0.4
GFSK-DH5	2480	2.96812	106.6	0.316	0.4
8DPSK-DH1	2480	0.44855	320	0.144	0.4
8DPSK-DH3	2480	1.71377	160	0.274	0.4
8DPSK-DH5	2480	2.96014	106.6	0.316	0.4



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