International Certification Corp.
No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan Hsiang, Tao Yuan Hsien 333, Taiwan, R.O.C.
Tel: 886-3-271-8666 Fax: 886-3-318-0155

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 / Manager

Testing Laboratory
2732

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Release Record

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

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

1 General Description

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 π/4-DQPSK and 8DPSK.				

1.1.3 Antenna Details

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

1.1.4 EUT Operational Condition

Supply Voltage	☐ AC mains	☒ DC (5V)	
Type of DC Source	☐ Internal DC supply	☐ External DC adapter	☒ 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		

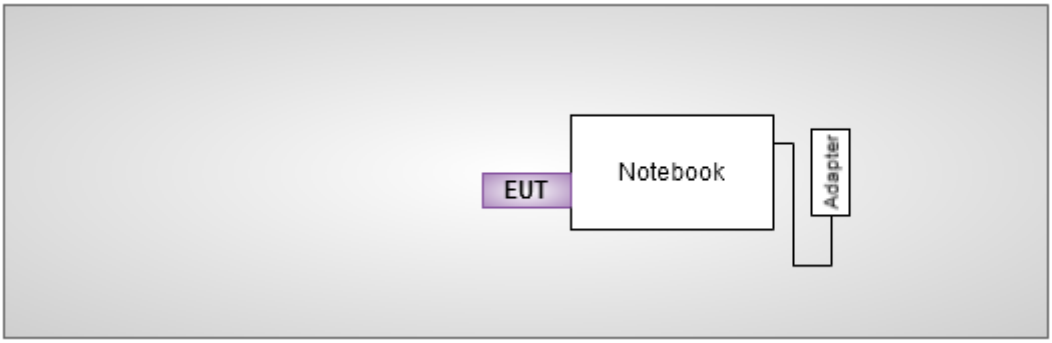
1.1.7 Test Tool

Test tool	Blue Tool V2.5

1.1.8 Power Setting

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

1.2 Test Setup Chart

Test Setup Diagram


1.3 Local Support Equipment List

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

1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
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
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission above 1GHz				
Test Site	966 chamber1 / (03CH01-WS)				
Instrument	**Manufacturer**	**Model No.**	**Serial No.**	**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&SCHWARZ	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
Note: Calibration Interval of instruments listed above is one year.					

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.					

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	CBT	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.

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

2 Test Configuration

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

2.2 The Worst Test Modes and Channel Details

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 2402, 2441, 2480	1Mbps 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
   2) Configuration 2 : BT820

3 Transmitter Test Results

3.1 AC Power Line Conducted Emissions

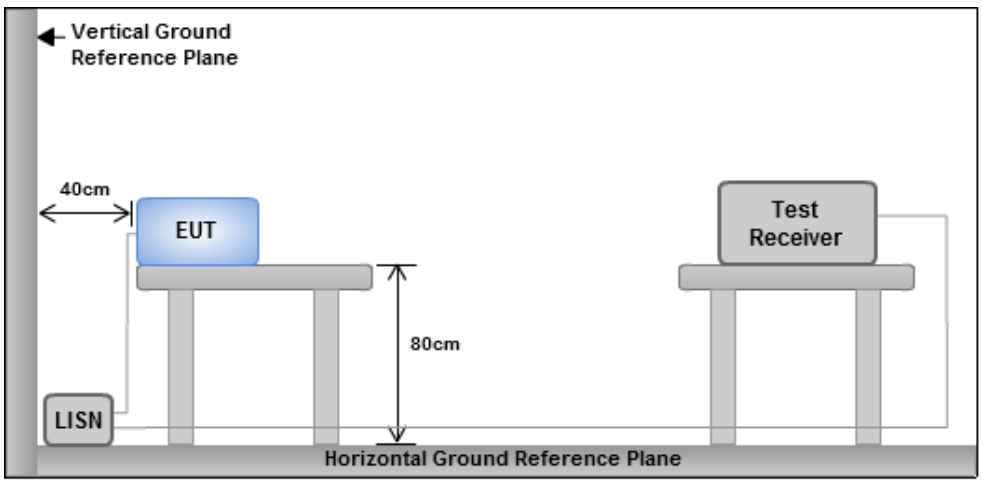
3.1.1 Limit of AC Power Line Conducted Emissions

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 Ω 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

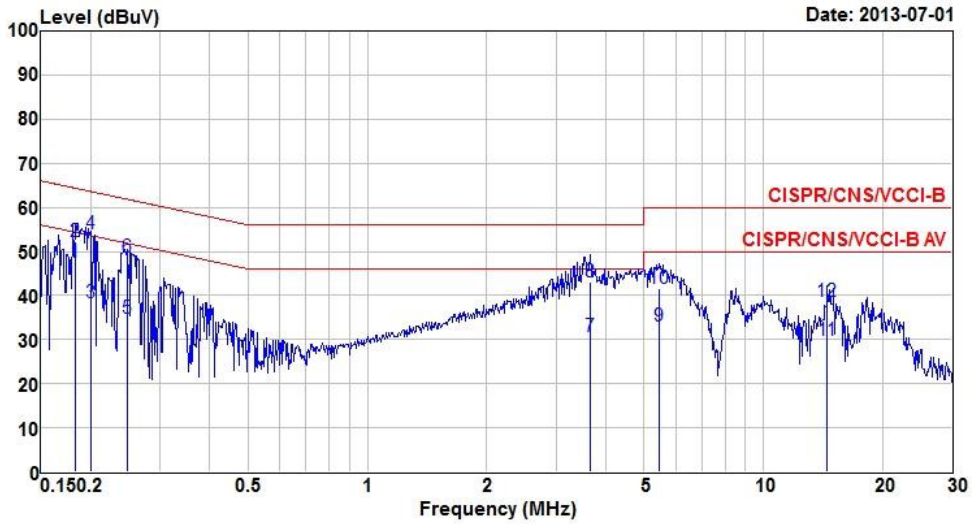


Note: 1. Support units were connected to second LISN.

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

3.1.4 Test Result of Conducted Emissions

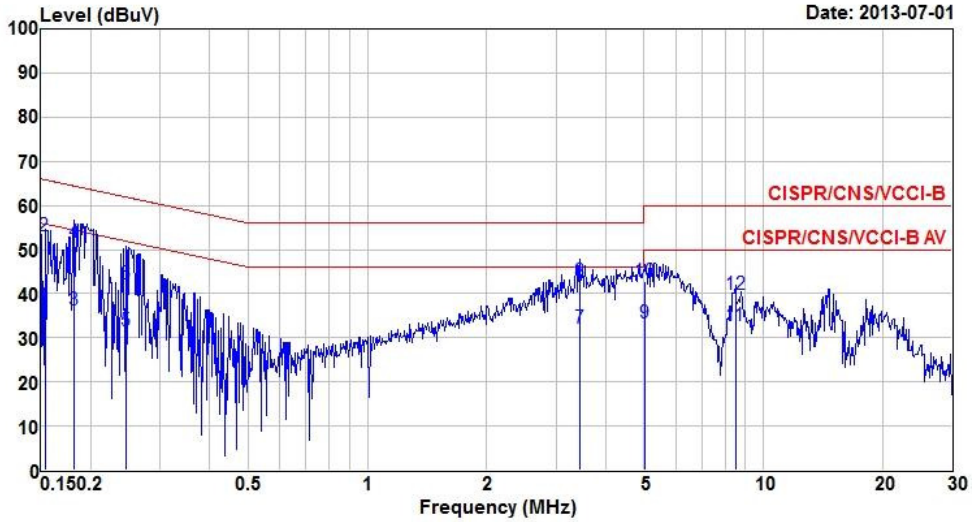
Modulation Mode	8DPSK	Test Freq. (MHz)	2402
Power Phase	Line	Test Configuration	1



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.182	47.36	54.37	-7.01	47.19	0.03	0.14	Average
2	0.182	52.29	64.37	-12.08	52.12	0.03	0.14	QP
3	0.201	38.41	53.58	-15.17	38.20	0.03	0.18	Average
4	0.201	53.92	63.58	-9.66	53.71	0.03	0.18	QP
5	0.247	34.92	51.86	-16.94	34.75	0.03	0.14	Average
6	0.247	48.74	61.86	-13.12	48.57	0.03	0.14	QP
7	3.661	30.55	46.00	-15.45	30.26	0.06	0.23	Average
8	3.661	42.96	56.00	-13.04	42.67	0.06	0.23	QP
9	5.476	33.02	50.00	-16.98	32.75	0.07	0.20	Average
10	5.476	41.61	60.00	-18.39	41.34	0.07	0.20	QP
11	14.517	29.75	50.00	-20.25	29.50	0.12	0.13	Average
12	14.517	38.72	60.00	-21.28	38.47	0.12	0.13	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dBuV) = Limit Line (dBuV) – Level (dBuV).

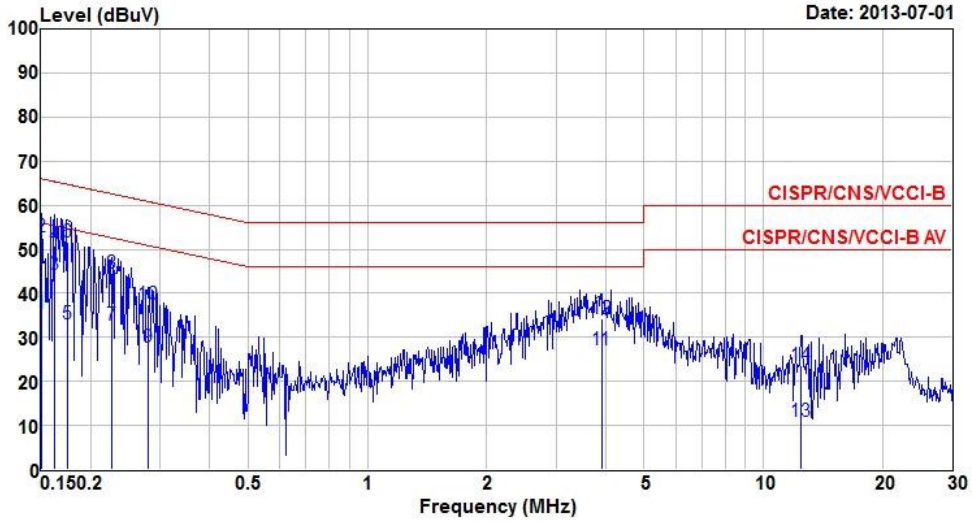
Modulation Mode	8DPSK	**Test Freq. (MHz)**	2402
Power Phase	Neutral	**Test Configuration**	1



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.153	37.04	55.82	-18.78	36.95	0.02	0.07	Average
2	0.153	53.04	65.82	-12.78	52.95	0.02	0.07	QP
3	0.182	36.20	54.42	-18.22	36.04	0.02	0.14	Average
4	0.182	51.68	64.42	-12.74	51.52	0.02	0.14	QP
5	0.246	31.49	51.91	-20.42	31.33	0.02	0.14	Average
6	0.246	42.28	61.91	-19.63	42.12	0.02	0.14	QP
7	3.436	32.21	46.00	-13.79	31.94	0.05	0.22	Average
8	3.436	42.83	56.00	-13.17	42.56	0.05	0.22	QP
9	5.031	33.25	50.00	-16.75	32.98	0.06	0.21	Average
10	5.031	42.80	60.00	-17.20	42.53	0.06	0.21	QP
11	8.501	32.63	50.00	-17.37	32.42	0.08	0.13	Average
12	8.501	39.80	60.00	-20.20	39.59	0.08	0.13	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dBuV) = Limit Line (dBuV) – Level (dBuV).

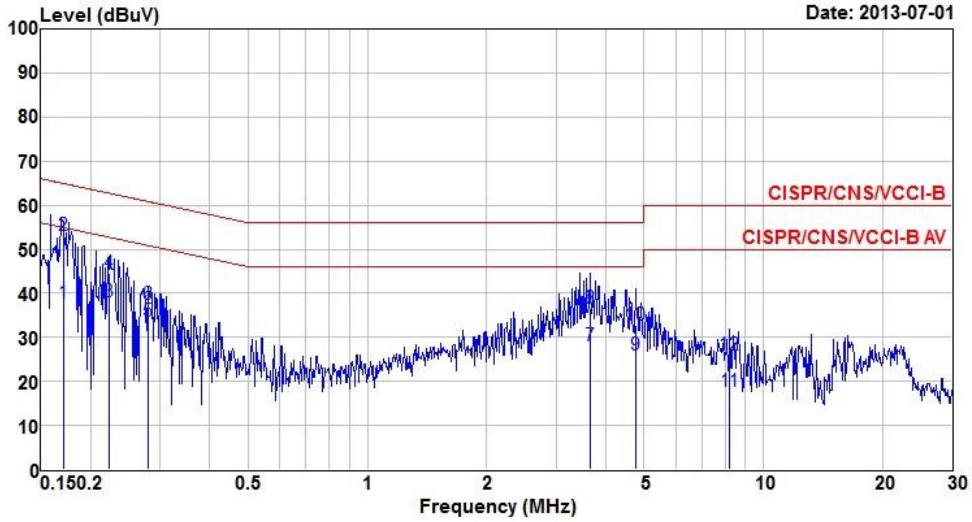
Modulation Mode	8DPSK	Test Freq. (MHz)	2402
Power Phase	Line	Test Configuration	2



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.151	35.51	55.96	-20.45	35.42	0.03	0.06	Average
2	0.151	52.82	65.96	-13.14	52.73	0.03	0.06	QP
3	0.162	44.32	55.34	-11.02	44.20	0.03	0.09	Average
4	0.162	50.84	65.34	-14.50	50.72	0.03	0.09	QP
5	0.175	33.07	54.72	-21.65	32.92	0.03	0.12	Average
6	0.175	51.72	64.72	-13.00	51.57	0.03	0.12	QP
7	0.226	32.82	52.61	-19.79	32.63	0.03	0.16	Average
8	0.226	44.47	62.61	-18.14	44.28	0.03	0.16	QP
9	0.280	27.87	50.81	-22.94	27.72	0.03	0.12	Average
10	0.280	37.49	60.81	-23.32	37.34	0.03	0.12	QP
11	3.901	27.25	46.00	-18.75	26.95	0.06	0.24	Average
12	3.901	34.18	56.00	-21.82	33.88	0.06	0.24	QP
13	12.449	10.93	50.00	-39.07	10.66	0.15	0.12	Average
14	12.449	23.74	60.00	-36.26	23.47	0.15	0.12	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dBuV) = Limit Line (dBuV) – Level (dBuV).

Modulation Mode	8DPSK	**Test Freq. (MHz)**	2402
Power Phase	Neutral	**Test Configuration**	2



	Freq	Level	Limit Line	Over Limit	Read Level	LISN factor	cable loss	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	dB	
1	0.170	37.86	54.94	-17.08	37.73	0.02	0.11	Average
2	0.170	53.07	64.94	-11.87	52.94	0.02	0.11	QP
3	0.222	37.97	52.74	-14.77	37.79	0.02	0.16	Average
4	0.222	44.54	62.74	-18.20	44.36	0.02	0.16	QP
5	0.279	33.74	50.85	-17.11	33.60	0.02	0.12	Average
6	0.279	37.57	60.85	-23.28	37.43	0.02	0.12	QP
7	3.642	27.91	46.00	-18.09	27.63	0.05	0.23	Average
8	3.642	36.74	56.00	-19.26	36.46	0.05	0.23	QP
9	4.746	25.99	46.00	-20.01	25.72	0.05	0.22	Average
10	4.746	32.79	56.00	-23.21	32.52	0.05	0.22	QP
11	8.235	17.76	50.00	-32.24	17.54	0.08	0.14	Average
12	8.235	26.02	60.00	-33.98	25.80	0.08	0.14	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).
2: Over Limit (dBuV) = Limit Line (dBuV) – Level (dBuV).

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
Note 2:
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

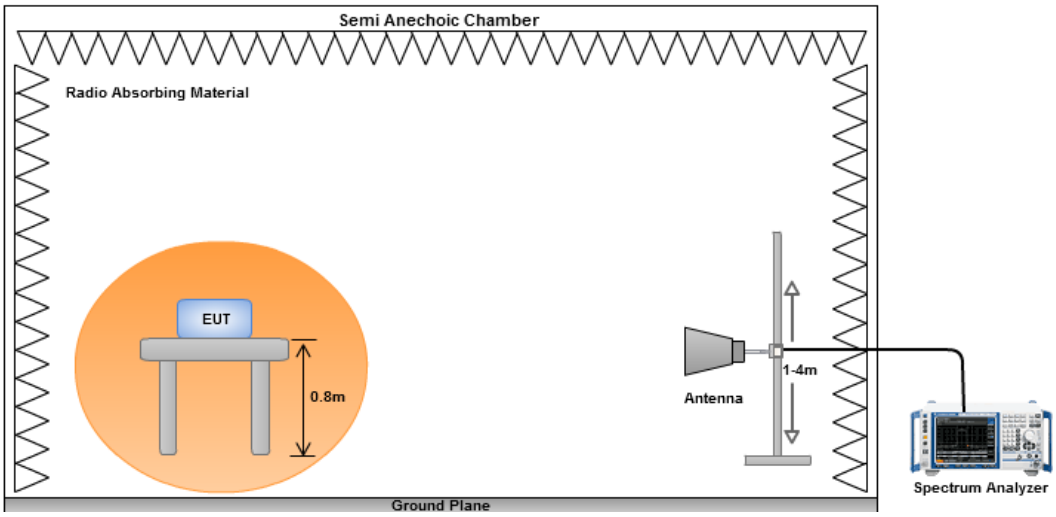
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission 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

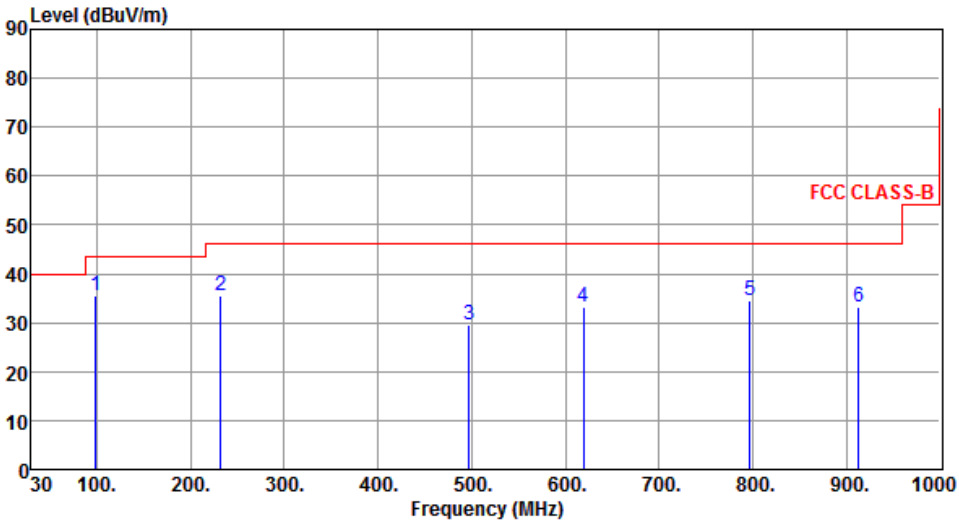
   DH5 packet is the worst case since DH5 has more TX slots than other packet types.
4. Hopping randomly between 79 channels is 1600 times per second (0.625 ms time slot).The duty factor is 20 * log (0.625 * 5 / 100) = -30.1 dB . Average value = Peak reading + duty factor

3.2.3 Test Setup



3.2.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

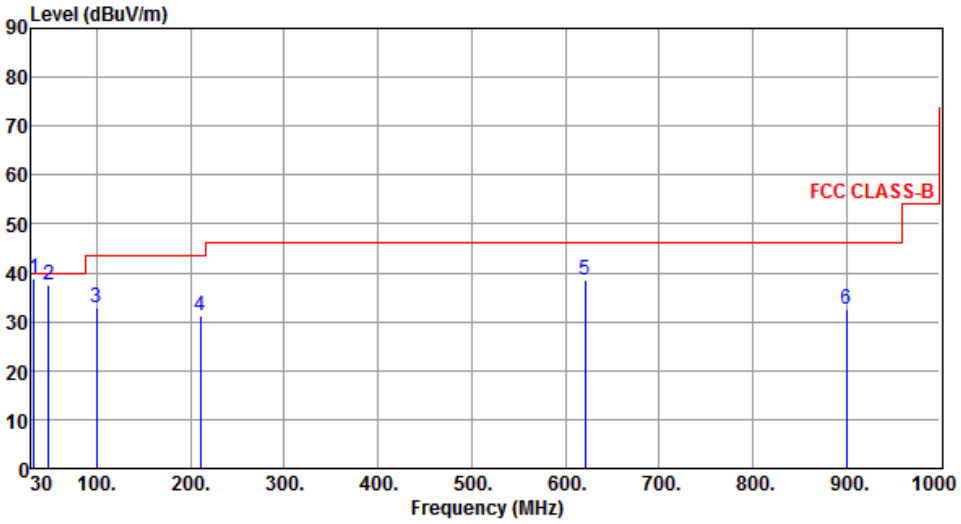
Polarization	Horizontal	**Test Freq. (MHz)**	2402
Test Configuration	1		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	98.87	35.64	43.50	-7.86	57.41	-21.77	Peak	---	---
2	231.76	35.60	46.00	-10.40	54.32	-18.72	Peak	---	---
3	497.54	29.55	46.00	-16.45	41.26	-11.71	Peak	---	---
4	619.76	33.37	46.00	-12.63	42.83	-9.46	Peak	---	---
5	797.27	34.55	46.00	-11.45	41.34	-6.79	Peak	---	---
6	912.70	33.07	46.00	-12.93	38.41	-5.34	Peak	---	---

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).

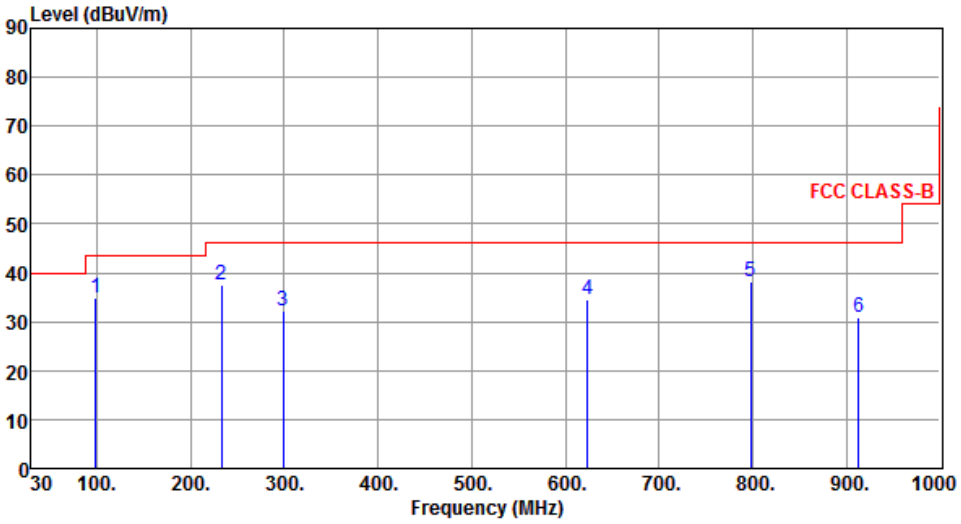
Polarization	Vertical	Test Freq. (MHz)	2402
Test Configuration	1		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	32.63	38.71	40.00	-1.29	56.27	-17.56	QP	---	---
2	48.43	37.67	40.00	-2.33	54.27	-16.60	QP	---	---
3	99.84	32.74	43.50	-10.76	54.38	-21.64	Peak	---	---
4	210.42	31.23	43.50	-12.27	50.64	-19.41	Peak	---	---
5	620.73	38.38	46.00	-7.62	47.83	-9.45	Peak	---	---
6	900.09	32.62	46.00	-13.38	38.13	-5.51	Peak	---	---

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).

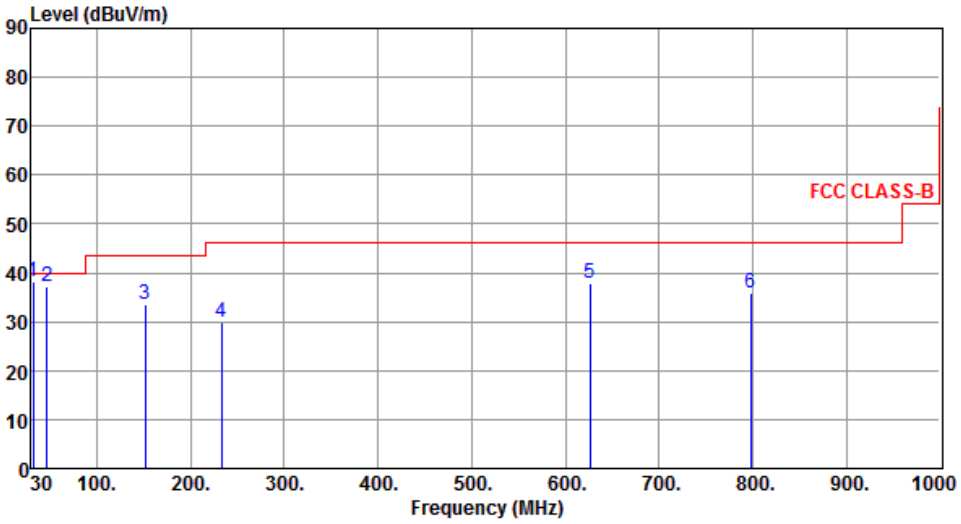
Polarization	Horizontal	**Test Freq. (MHz)**	2402
Test Configuration	2		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	98.87	34.74	43.50	-8.76	56.51	-21.77	Peak	---	---
2	232.73	37.42	46.00	-8.58	56.07	-18.65	Peak	---	---
3	298.69	32.08	46.00	-13.92	48.34	-16.26	Peak	---	---
4	623.64	34.50	46.00	-11.50	43.90	-9.40	Peak	---	---
5	798.24	38.29	46.00	-7.71	45.06	-6.77	Peak	---	---
6	912.70	30.80	46.00	-15.20	36.14	-5.34	Peak	---	---

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).

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

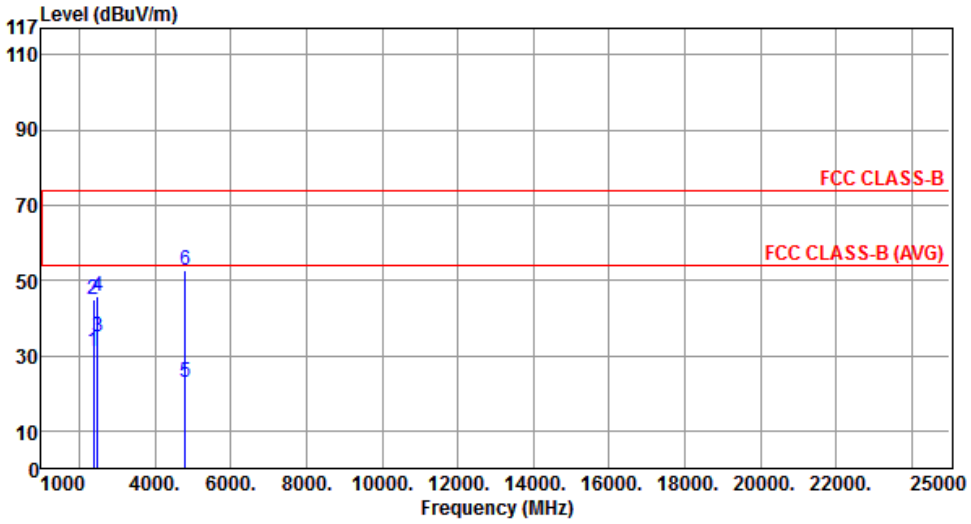


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	32.14	38.12	40.00	-1.88	55.72	-17.60	QP	---	---
2	46.49	37.21	40.00	-2.79	53.87	-16.66	QP	---	---
3	151.25	33.54	43.50	-9.96	50.47	-16.93	Peak	---	---
4	232.73	30.02	46.00	-15.98	48.67	-18.65	Peak	---	---
5	626.55	37.85	46.00	-8.15	47.21	-9.36	Peak	---	---
6	798.24	35.85	46.00	-10.15	42.62	-6.77	Peak	---	---

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).

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

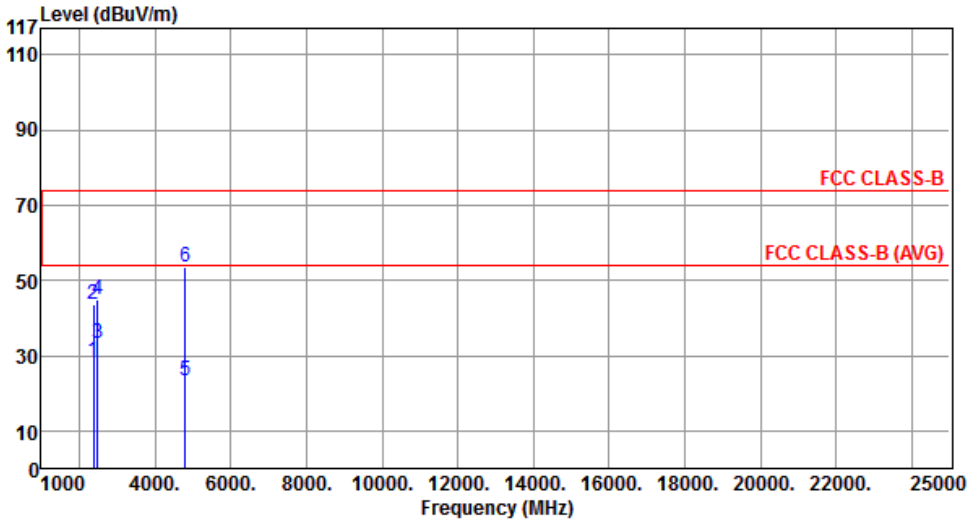
Polarization	Horizontal	Test Freq. (MHz)	2402
Test Configuration	1		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	30.89	54.00	-23.11	34.11	-3.22	Average	---	---
2	2390.00	44.81	74.00	-29.19	48.03	-3.22	Peak	---	---
3	2497.00	34.85	54.00	-19.15	37.62	-2.77	Average	---	---
4	2497.00	45.62	74.00	-28.38	48.39	-2.77	Peak	---	---
5	4804.00	22.78	54.00	-31.22	18.50	4.28	Average	---	---
6	4804.00	52.88	74.00	-21.12	48.60	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.

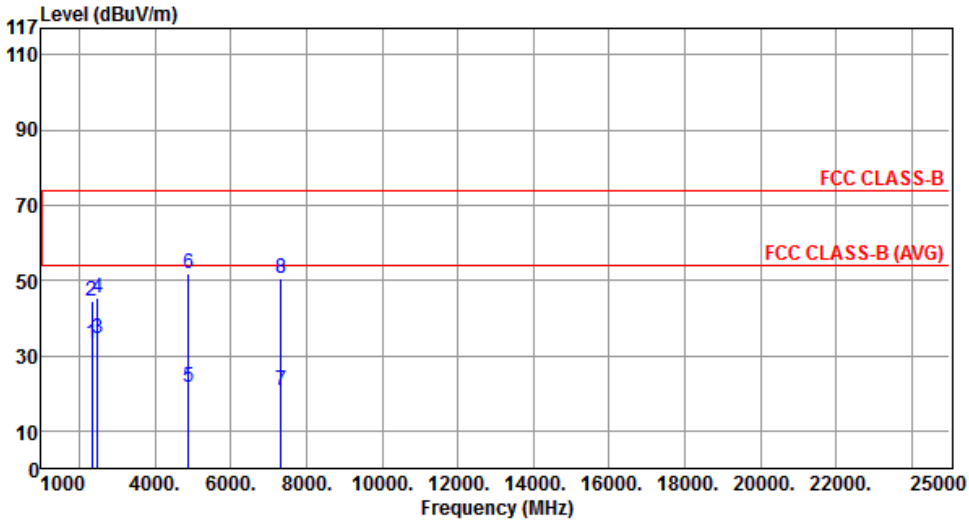
Polarization	Vertical	**Test Freq. (MHz)**	2402
Test Configuration	1		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table 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.

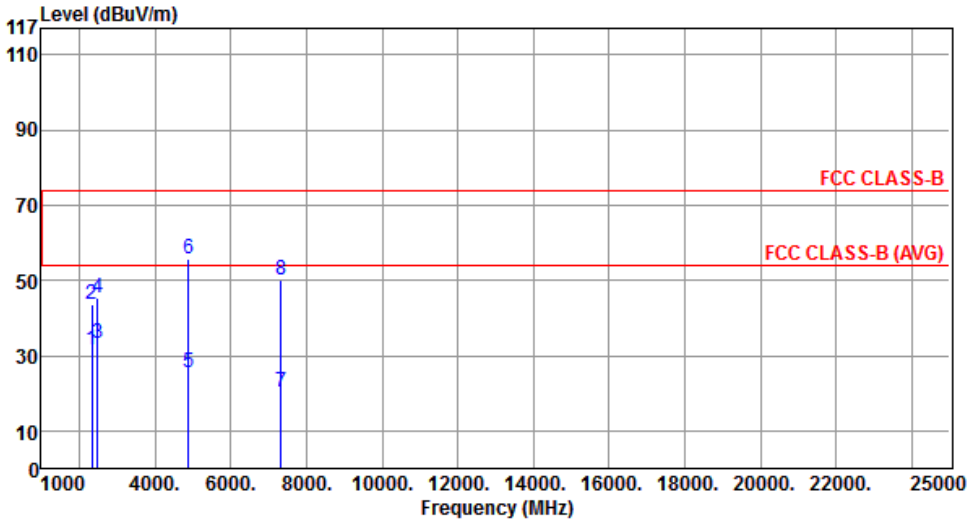
Polarization	Horizontal	Test Freq. (MHz)	2441
Test Configuration	1		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table 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.

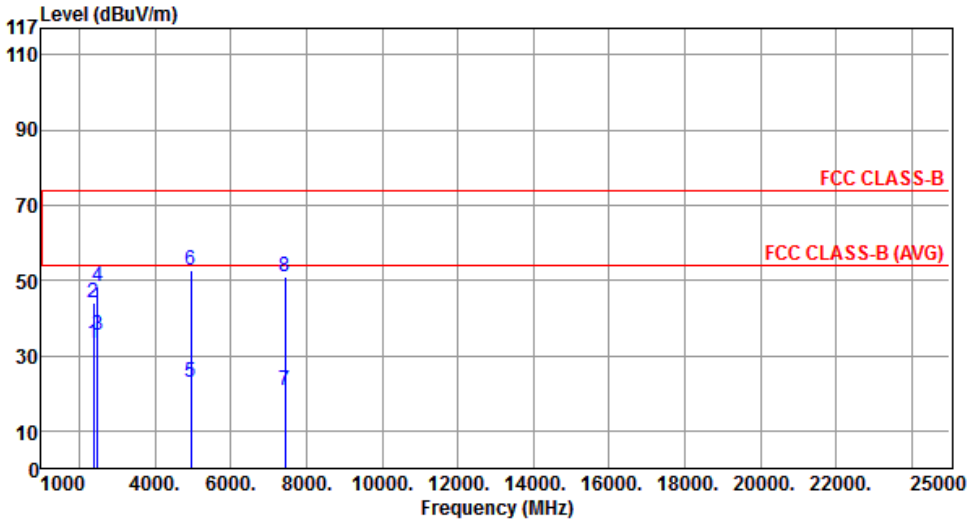
Polarization	Vertical	Test Freq. (MHz)	2441
Test Configuration	1		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table 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.

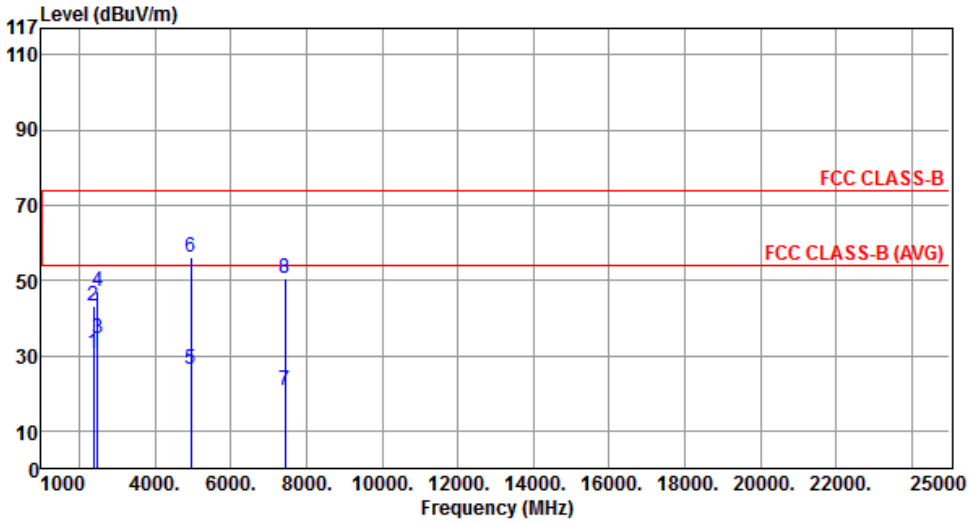
Polarization	Horizontal	Test Freq. (MHz)	2480
Test Configuration	1		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table 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.

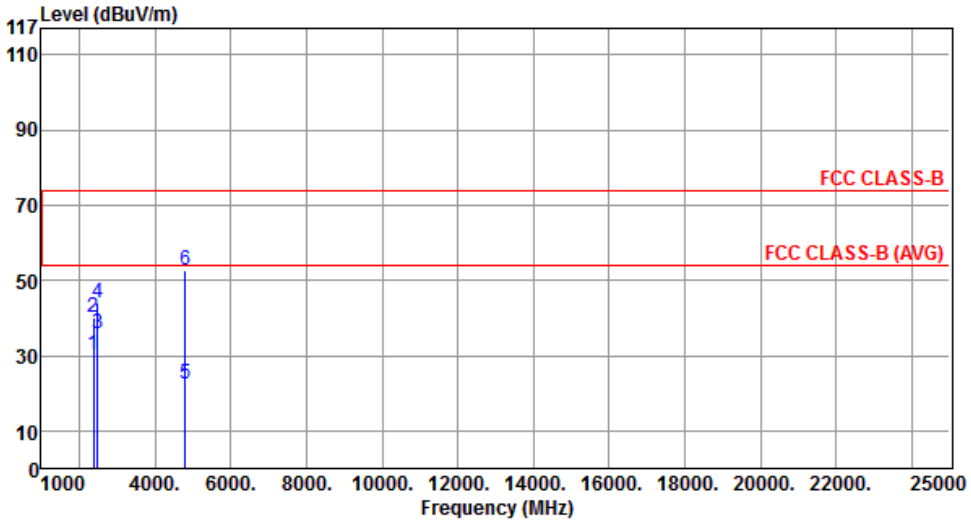
Polarization	Vertical	Test Freq. (MHz)	2480
Test Configuration	1		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2375.00	30.68	54.00	-23.32	33.96	-3.28	Average	---	---
2	2375.00	42.96	74.00	-31.04	46.24	-3.28	Peak	---	---
3	2483.50	34.35	54.00	-19.65	37.18	-2.83	Average	---	---
4	2483.50	47.19	74.00	-26.81	50.02	-2.83	Peak	---	---
5	4960.00	26.22	54.00	-27.78	21.68	4.54	Average	---	---
6	4960.00	56.32	74.00	-17.68	51.78	4.54	Peak	---	---
7	7440.00	20.55	54.00	-33.45	11.43	9.12	Average	---	---
8	7440.00	50.65	74.00	-23.35	41.53	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.

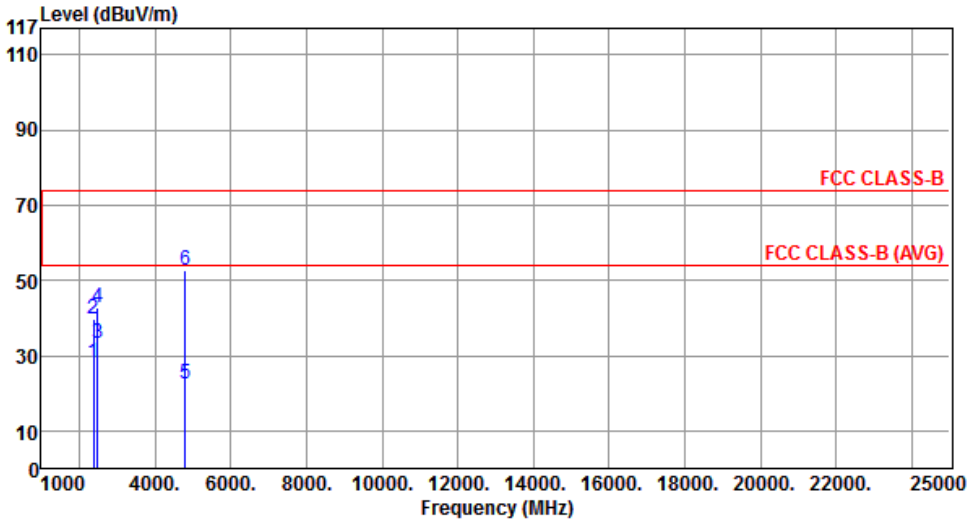
Polarization	Horizontal	**Test Freq. (MHz)**	2402
Test Configuration	2		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	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	---	---

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.

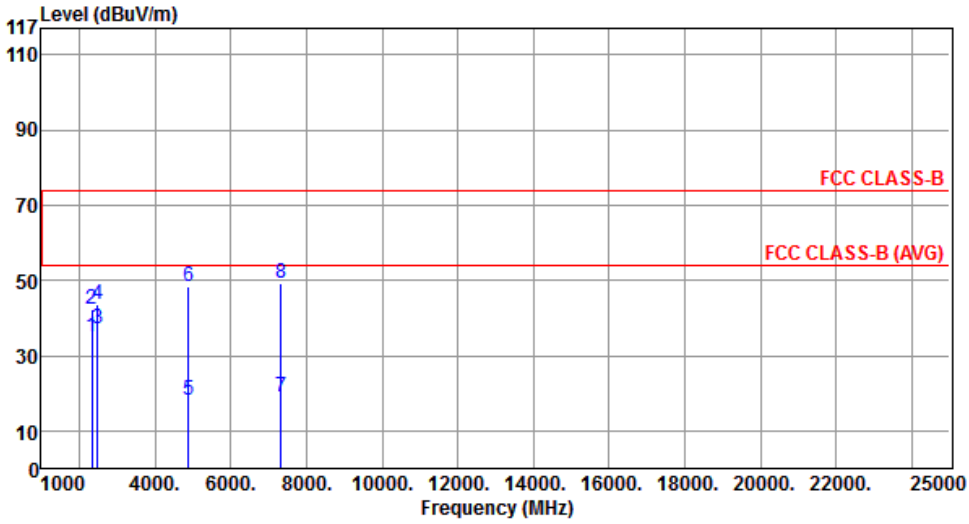
Polarization	Vertical	Test Freq. (MHz)	2402
Test Configuration	2		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table 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.

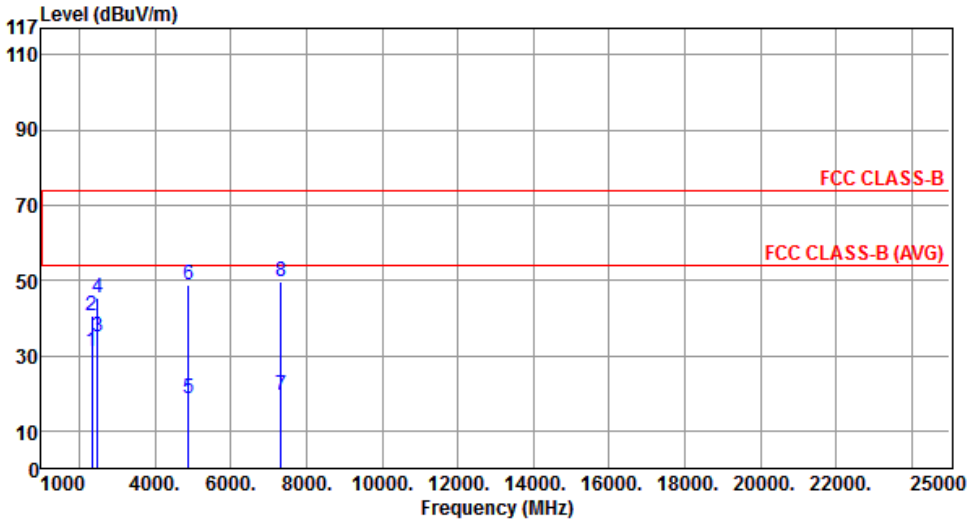
Polarization	Horizontal	Test Freq. (MHz)	2441
Test Configuration	2		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table 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.

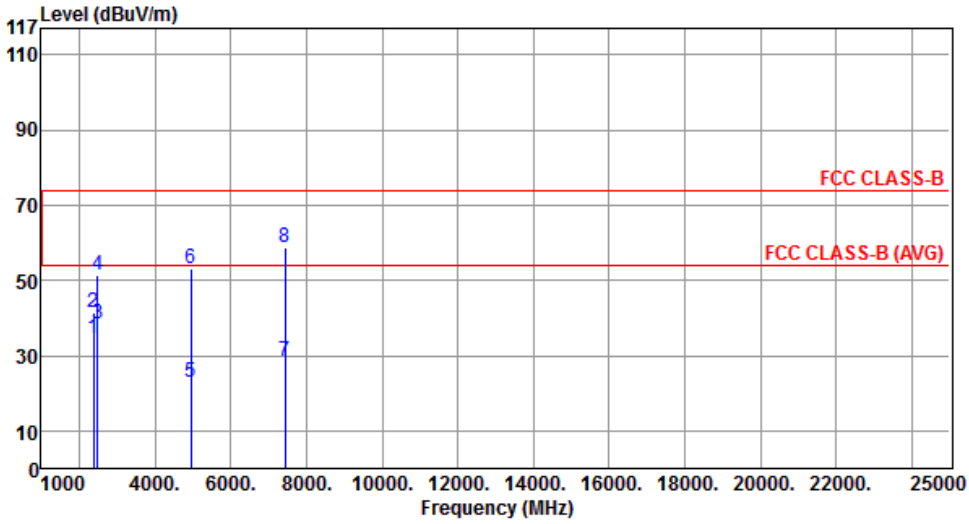
Polarization	Vertical	Test Freq. (MHz)	2441
Test Configuration	2		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table 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.

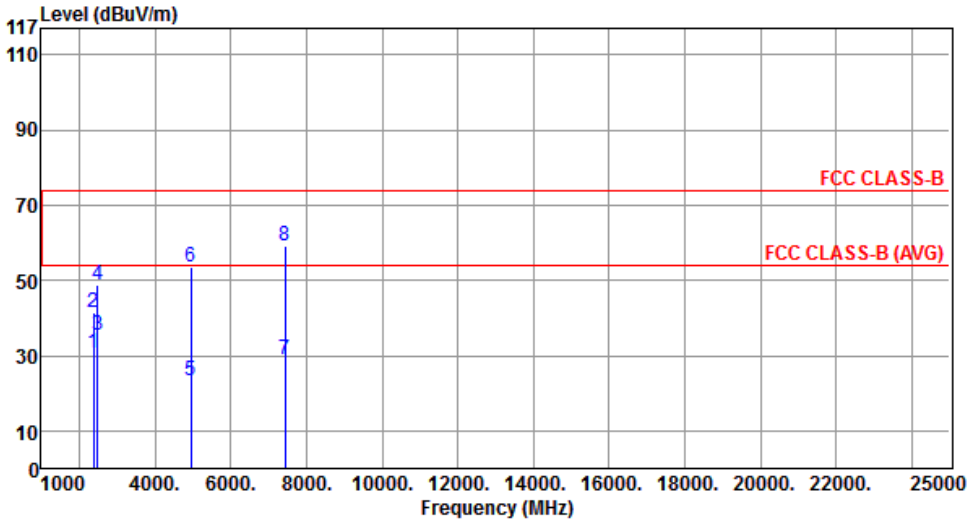
Polarization	Horizontal	Test Freq. (MHz)	2480
Test Configuration	2		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table 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.

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

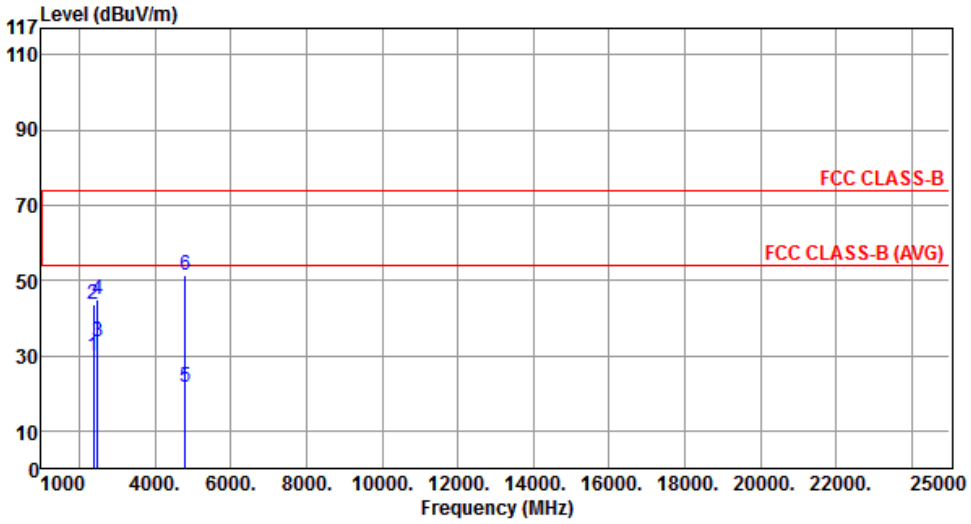


	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2375.00	30.53	54.00	-23.47	33.81	-3.28	Average	---	---
2	2375.00	41.39	74.00	-32.61	44.67	-3.28	Peak	---	---
3	2483.50	35.53	54.00	-18.47	38.36	-2.83	Average	---	---
4	2483.50	48.93	74.00	-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.

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

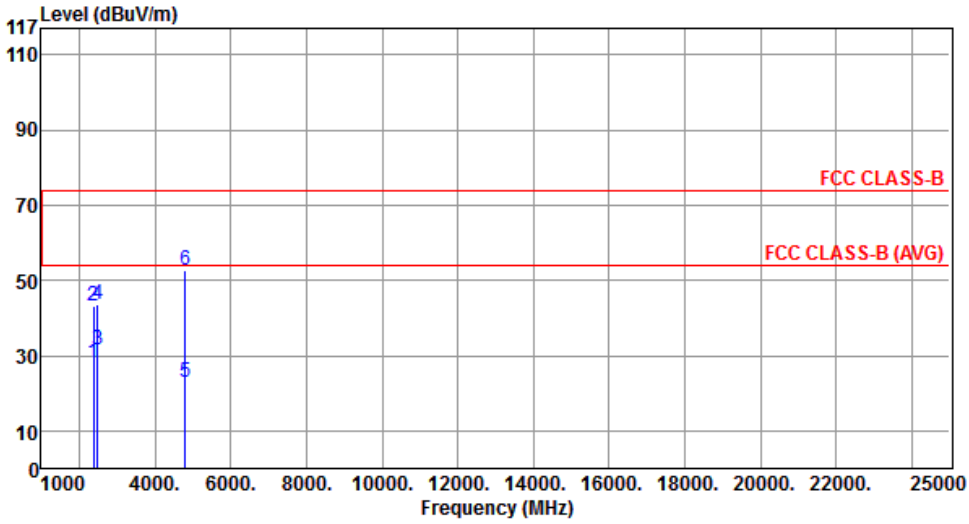
Polarization	Horizontal	Test Freq. (MHz)	2402
Test Configuration	1		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2390.00	29.95	54.00	-24.05	33.17	-3.22	Average	---	---
2	2390.00	43.72	74.00	-30.28	46.94	-3.22	Peak	---	---
3	2497.00	33.51	54.00	-20.49	36.28	-2.77	Average	---	---
4	2497.00	44.85	74.00	-29.15	47.62	-2.77	Peak	---	---
5	4804.00	21.40	54.00	-32.60	17.12	4.28	Average	---	---
6	4804.00	51.50	74.00	-22.50	47.22	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.

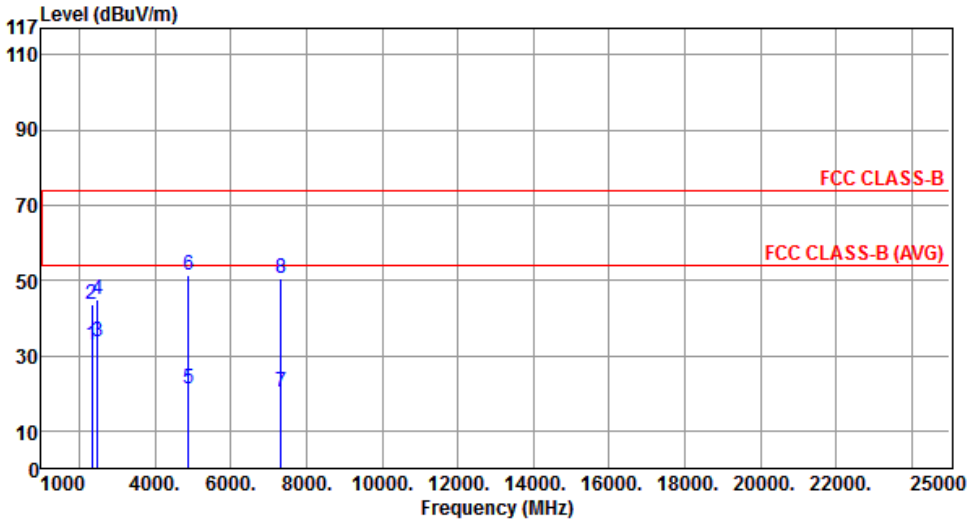
Polarization	Vertical	Test Freq. (MHz)	2402
Test Configuration	1		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	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.

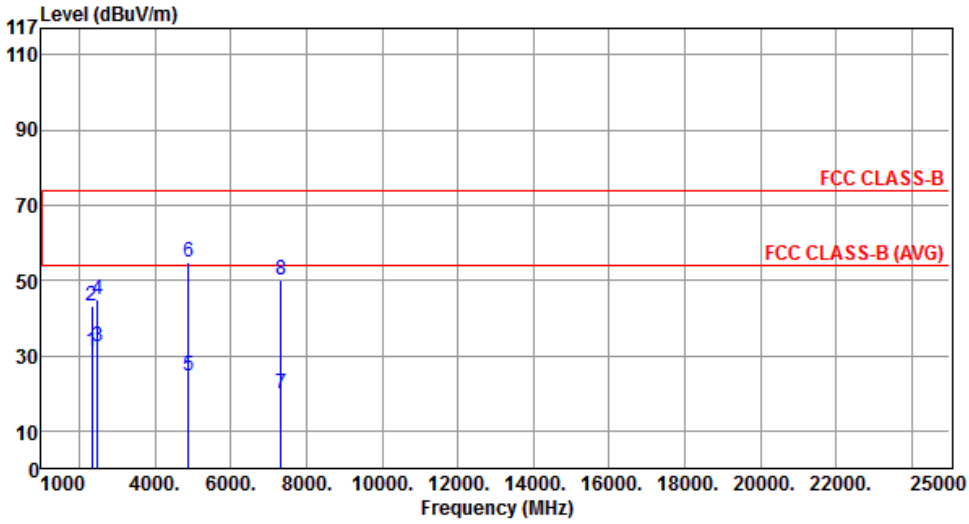
Polarization	Horizontal	Test Freq. (MHz)	2441
Test Configuration	1		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2336.00	32.74	54.00	-21.26	36.16	-3.42	Average	---	---
2	2336.00	43.80	74.00	-30.20	47.22	-3.42	Peak	---	---
3	2492.00	33.62	54.00	-20.38	36.41	-2.79	Average	---	---
4	2492.00	45.07	74.00	-28.93	47.86	-2.79	Peak	---	---
5	4882.00	21.28	54.00	-32.72	16.88	4.40	Average	---	---
6	4882.00	51.38	74.00	-22.62	46.98	4.40	Peak	---	---
7	7323.00	20.42	54.00	-33.58	11.49	8.93	Average	---	---
8	7323.00	50.52	74.00	-23.48	41.59	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.

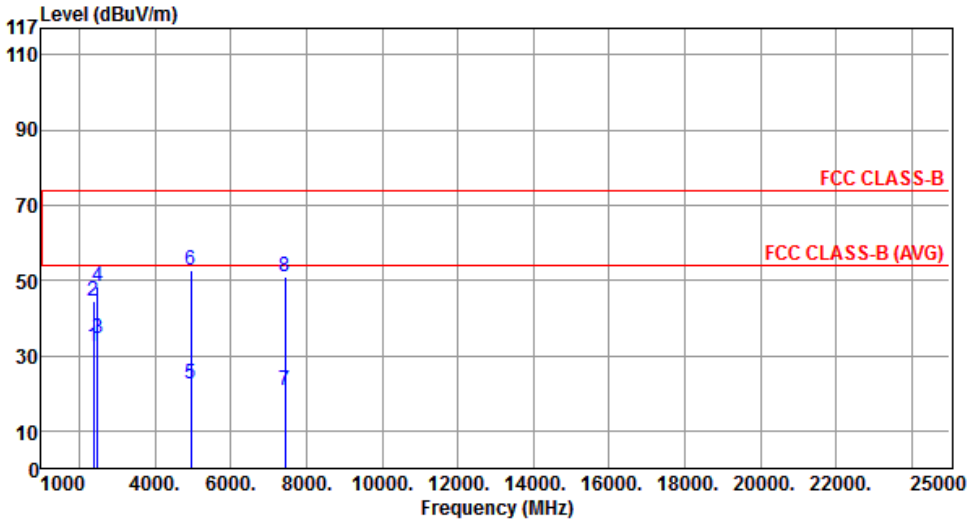
Polarization	Vertical	Test Freq. (MHz)	2441
Test Configuration	1		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2336.00	31.10	54.00	-22.90	34.52	-3.42	Average	---	---
2	2336.00	43.29	74.00	-30.71	46.71	-3.42	Peak	---	---
3	2492.00	32.27	54.00	-21.73	35.06	-2.79	Average	---	---
4	2492.00	44.74	74.00	-29.26	47.53	-2.79	Peak	---	---
5	4882.00	24.73	54.00	-29.27	20.33	4.40	Average	---	---
6	4882.00	54.83	74.00	-19.17	50.43	4.40	Peak	---	---
7	7323.00	20.01	54.00	-33.99	11.08	8.93	Average	---	---
8	7323.00	50.11	74.00	-23.89	41.18	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.

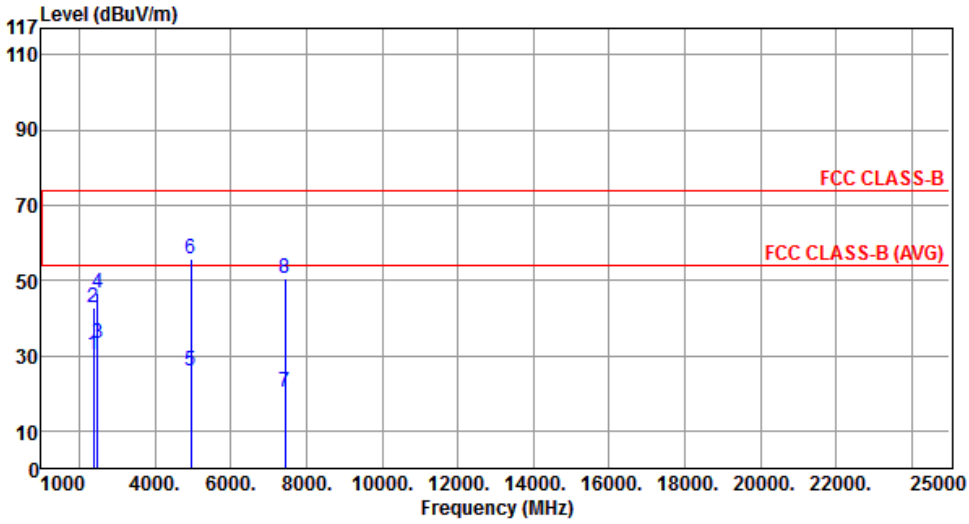
Polarization	Horizontal	Test Freq. (MHz)	2480
Test Configuration	1		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table 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.

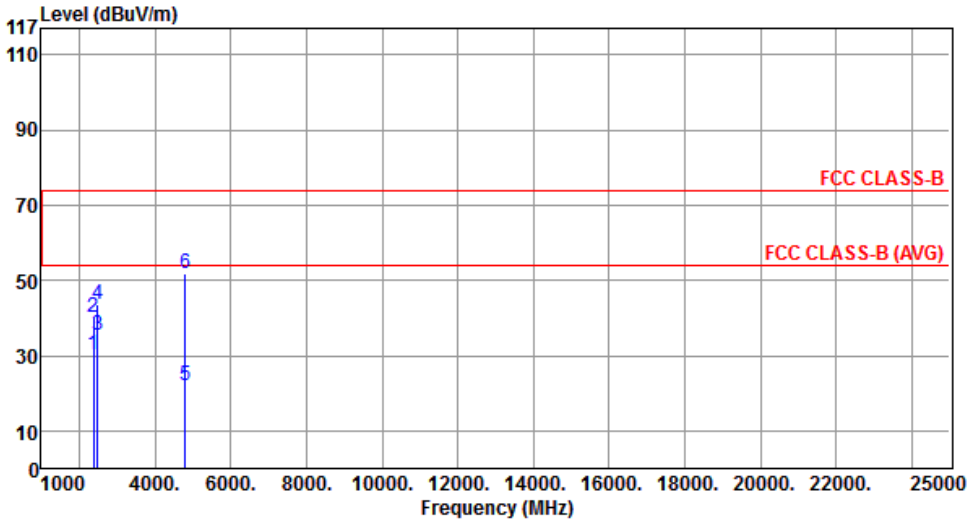
Polarization	Vertical	Test Freq. (MHz)	2480
Test Configuration	1		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	2375.00	30.26	54.00	-23.74	33.54	-3.28	Average	---	---
2	2375.00	42.91	74.00	-31.09	46.19	-3.28	Peak	---	---
3	2483.50	33.41	54.00	-20.59	36.24	-2.83	Average	---	---
4	2483.50	46.82	74.00	-27.18	49.65	-2.83	Peak	---	---
5	4960.00	25.77	54.00	-28.23	21.23	4.54	Average	---	---
6	4960.00	55.87	74.00	-18.13	51.33	4.54	Peak	---	---
7	7440.00	20.31	54.00	-33.69	11.19	9.12	Average	---	---
8	7440.00	50.41	74.00	-23.59	41.29	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.

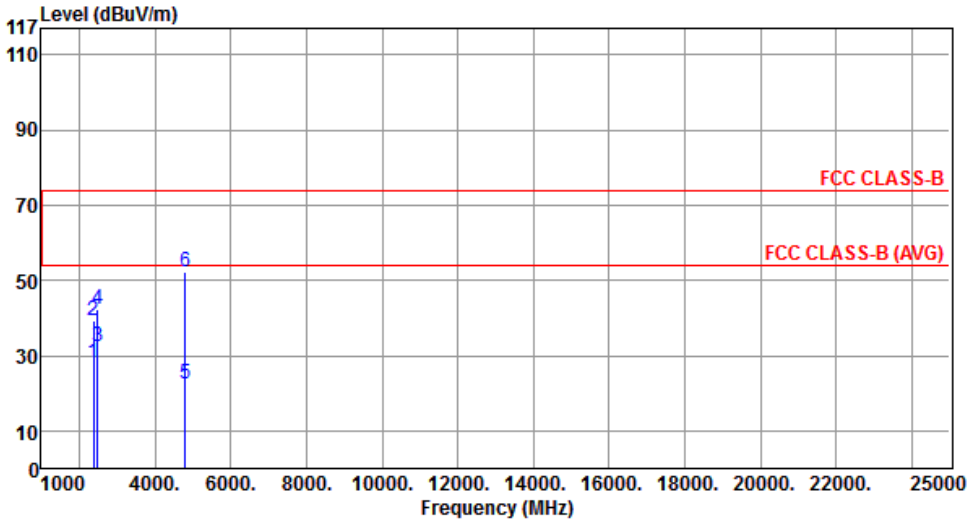
Polarization	Horizontal	Test Freq. (MHz)	2402
Test Configuration	2		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	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.

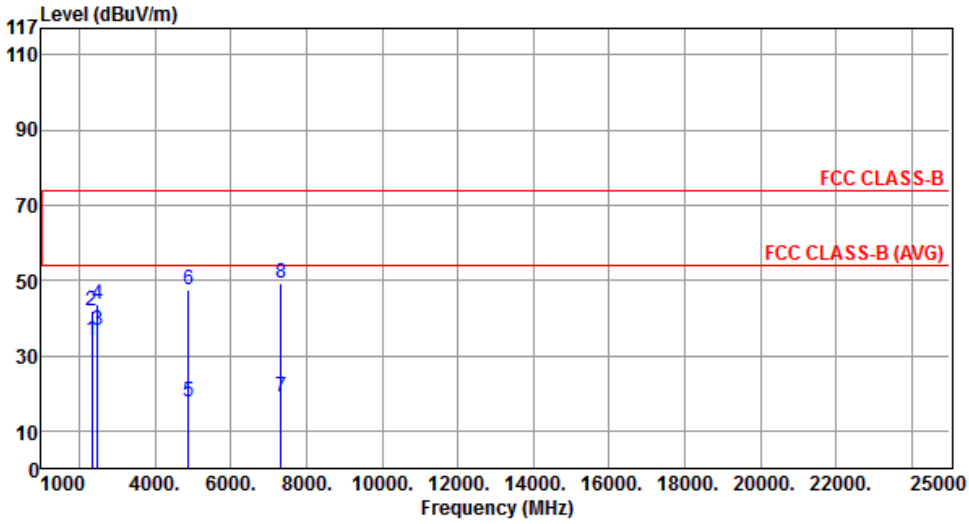
Polarization	Vertical	Test Freq. (MHz)	2402
Test Configuration	2		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	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	39.24	74.00	-34.76	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.

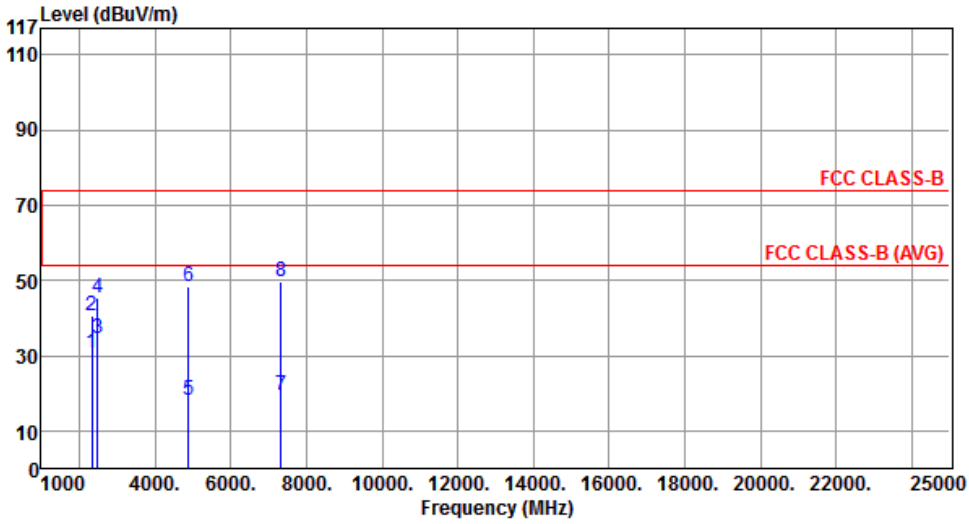
Polarization	Horizontal	Test Freq. (MHz)	2441
Test Configuration	2		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table 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.

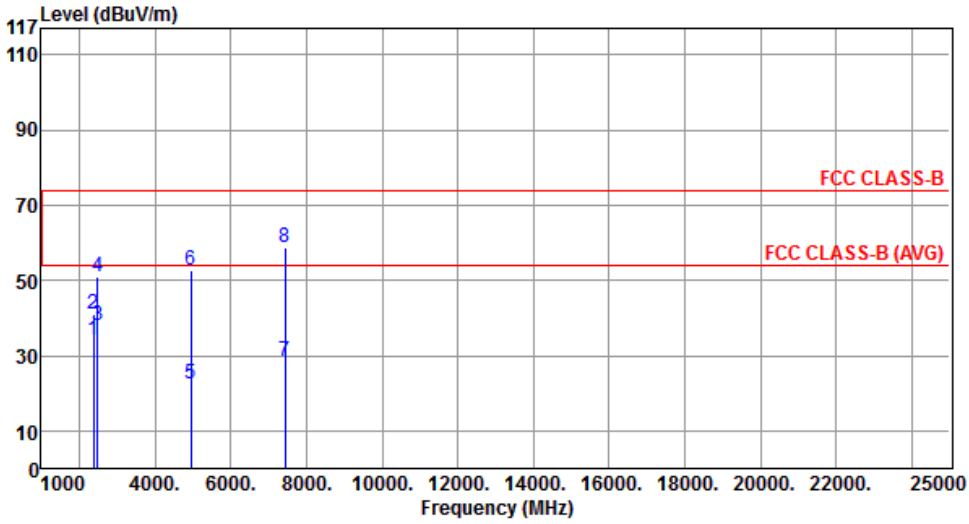
Polarization	Vertical	Test Freq. (MHz)	2441
Test Configuration	2		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table 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.

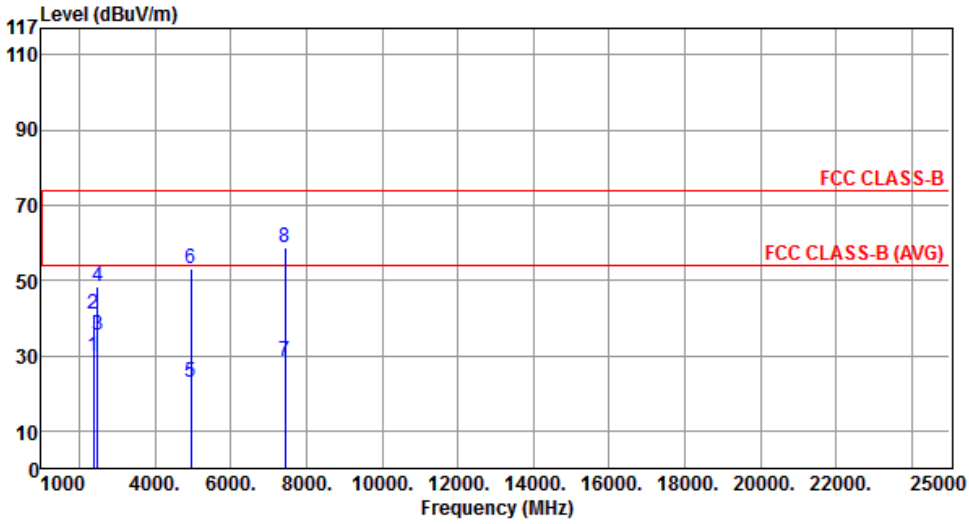
Polarization	Horizontal	Test Freq. (MHz)	2480
Test Configuration	2		



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table 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.

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



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Margin dB	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table 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.

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

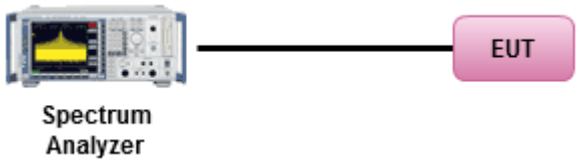
1. Set RBW=100kHz, VBW = 300kHz , Detector = Peak, Sweep time = Auto
2. Trace = max hold , Allow Trace to fully stabilize
3. Use the peak marker function to determine the maximum PSD level

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

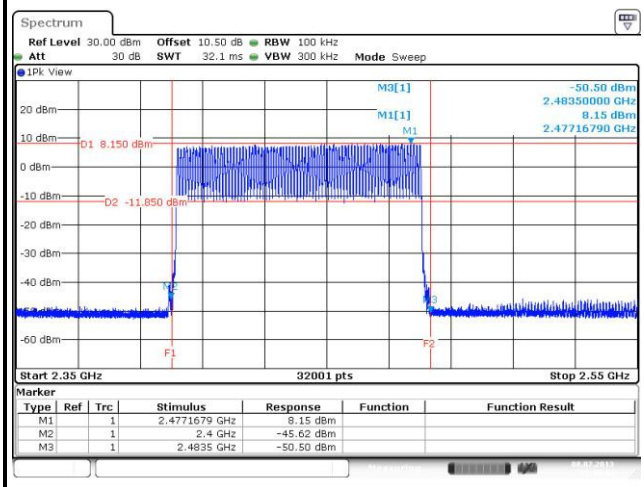
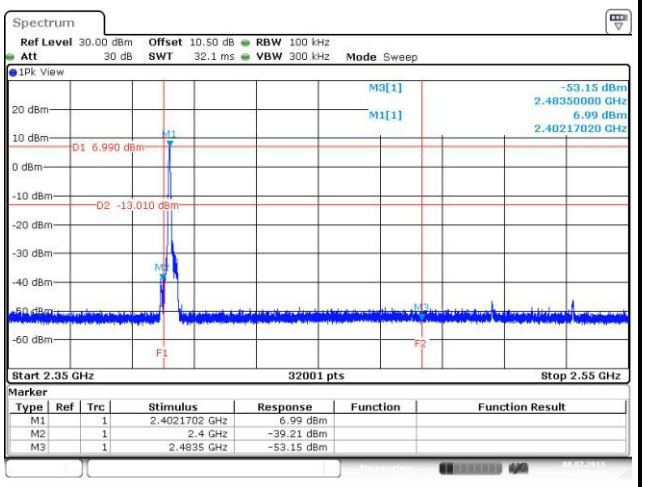
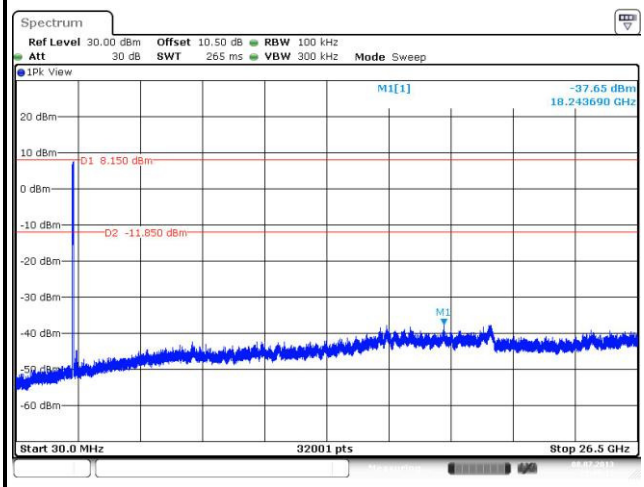
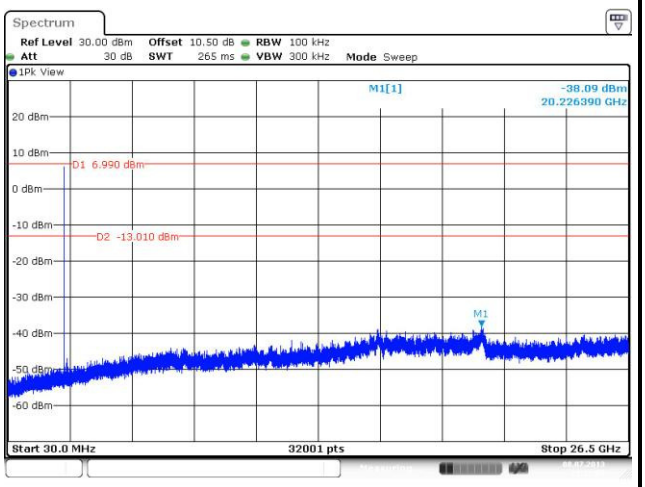
3.3.4 Test Setup

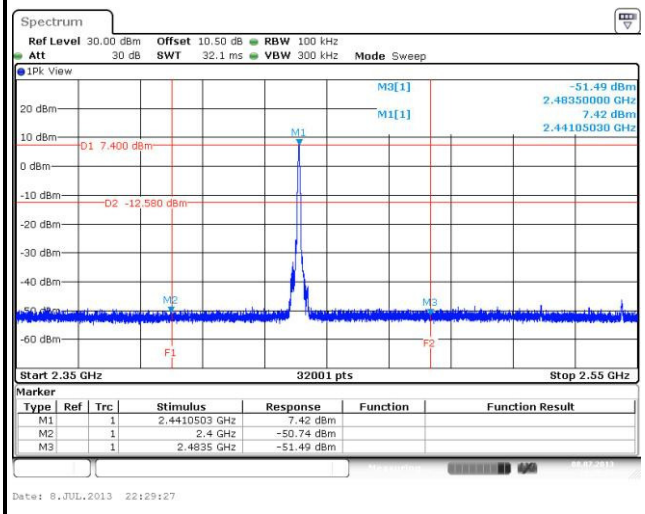
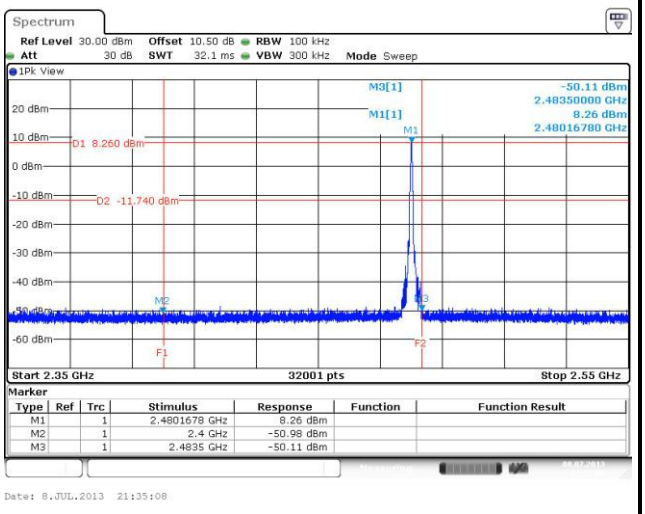
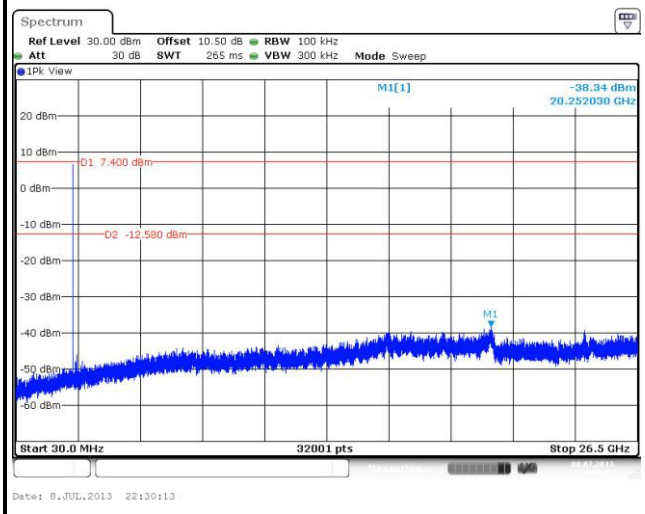
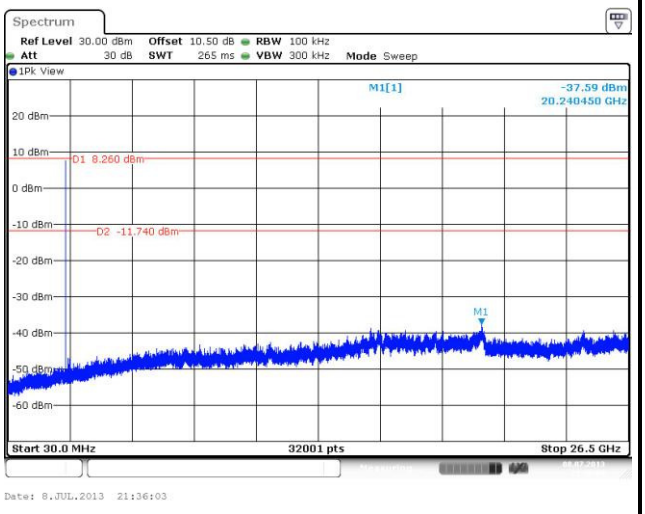
Transmitter Radiated Bandedge Emissions



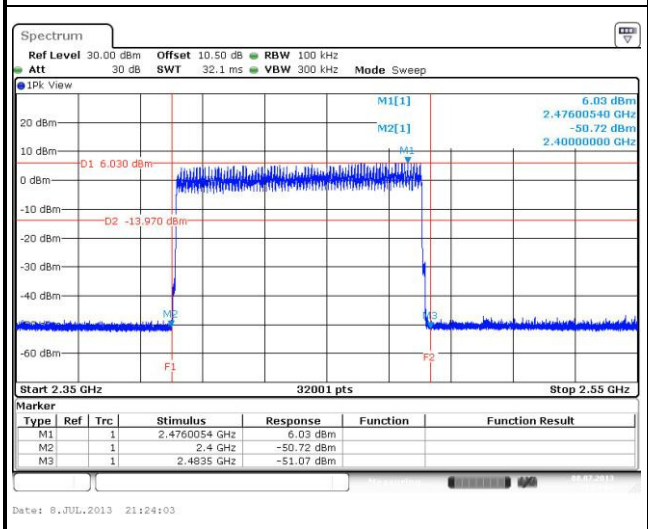
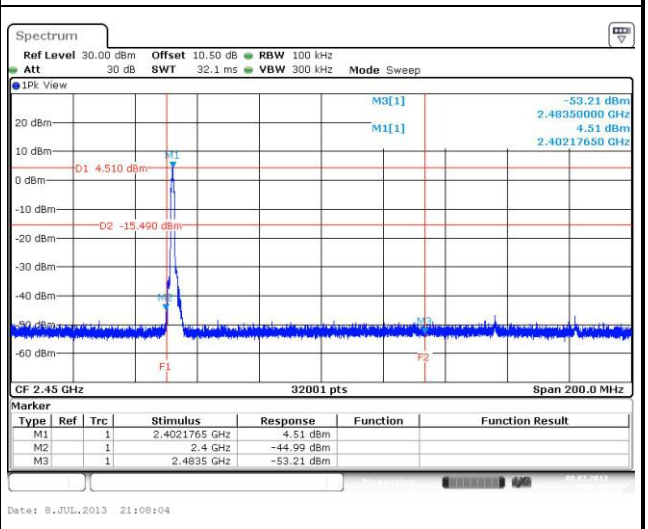
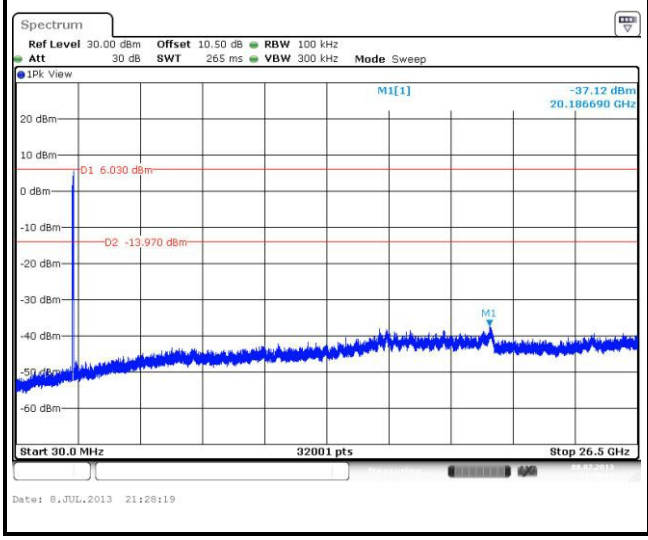
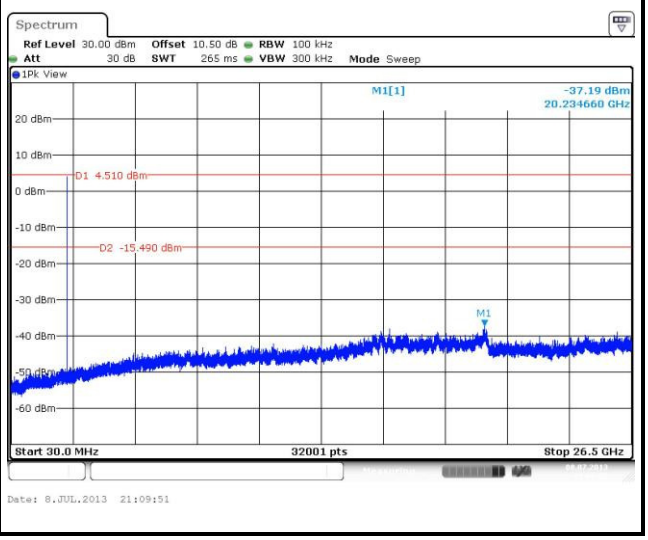
3.3.5 Test Result of Emissions in non-restricted frequency bands

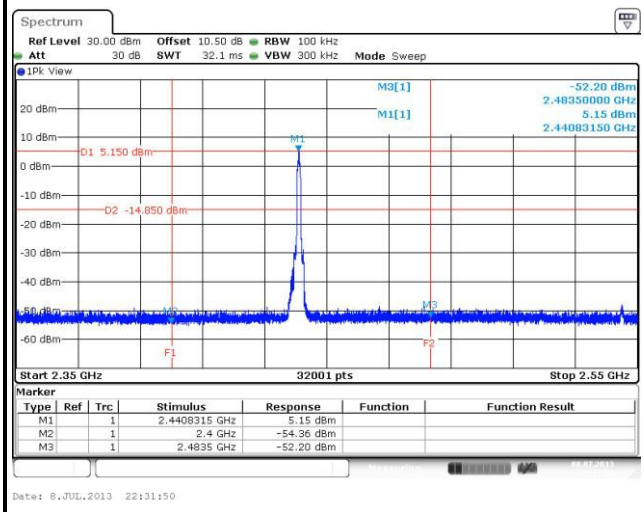
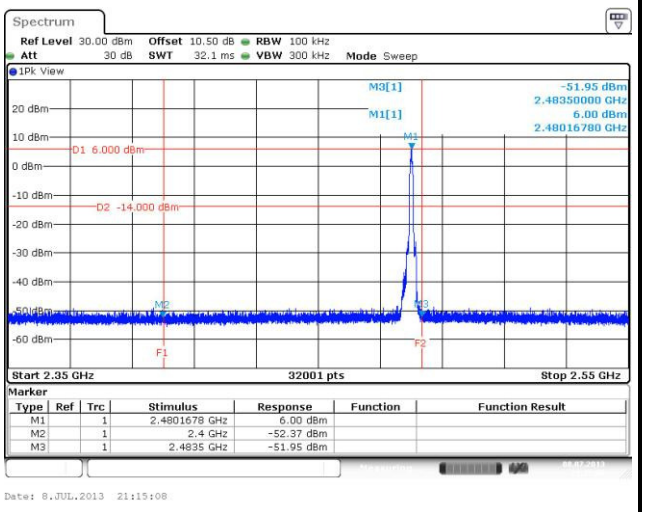
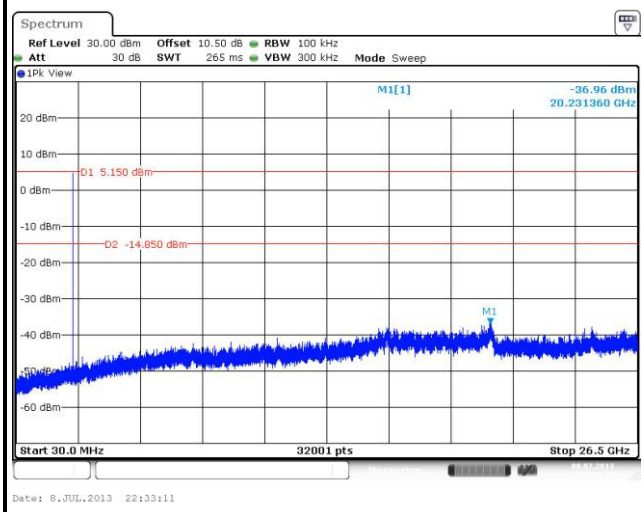
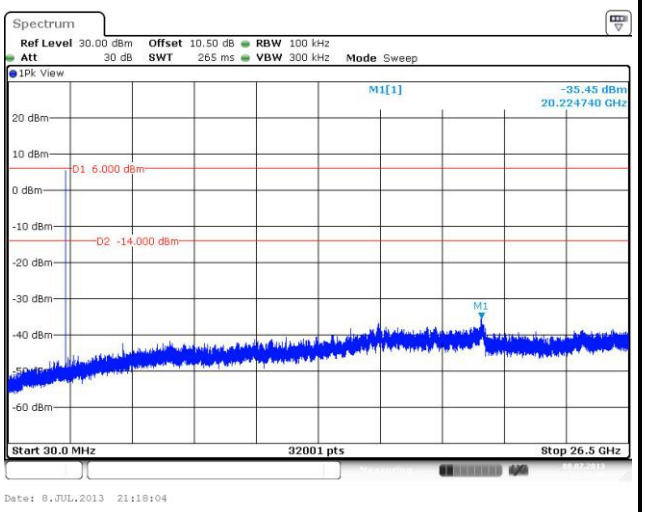
GFSK

Hopping on	Hopping off
30MHz~26.5GHz (down 20dBc)	TX Freq 2402MHz / 30MHz~26.5GHz (down 20dBc)
	
	

Hopping off	Hopping off
TX Freq 2441MHz / 30MHz~26.5GHz (down 20dBc)	**TX Freq 2480MHz / 30MHz~26.5GHz (down 20dBc)**
	
	

8DPSK

Hopping on	Hopping off
30MHz~26.5GHz (down 20dBc)	TX Freq 2402MHz / 30MHz~26.5GHz (down 20dBc)
	
	

Hopping off	Hopping off
TX Freq 2441MHz / 30MHz~26.5GHz (down 20dBc)	**TX Freq 2480MHz / 30MHz~26.5GHz (down 20dBc)**
	
	

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

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

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

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

3.5 Number of Hopping Frequency

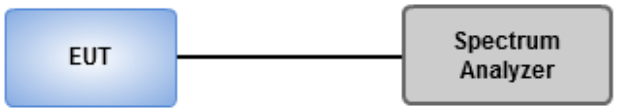
3.5.1 Limit of Number of Hopping Frequency

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

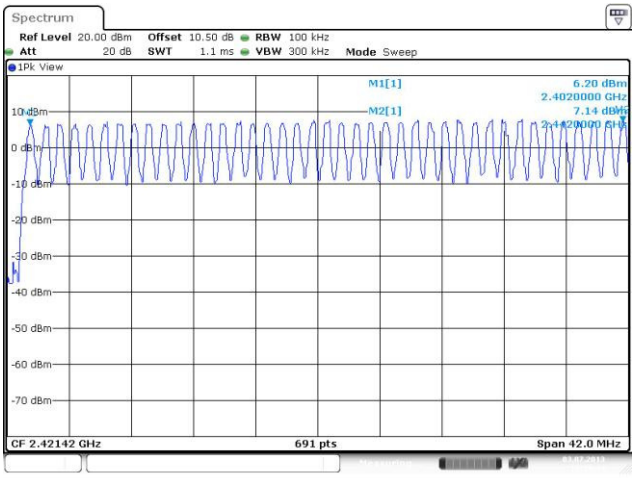
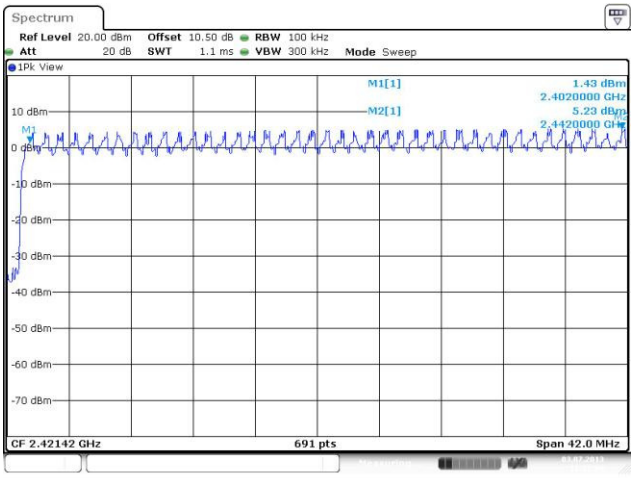
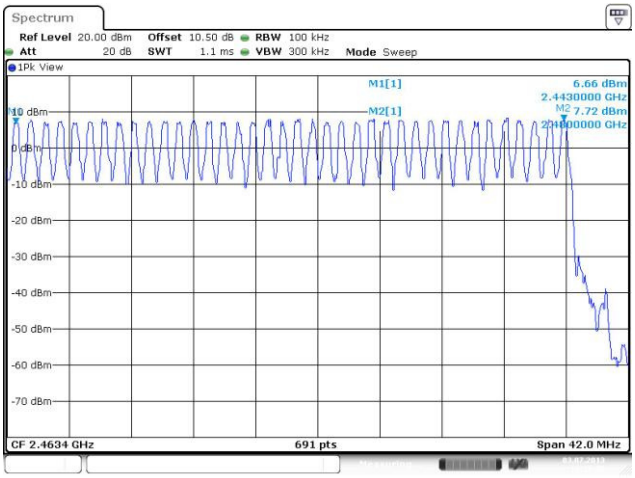
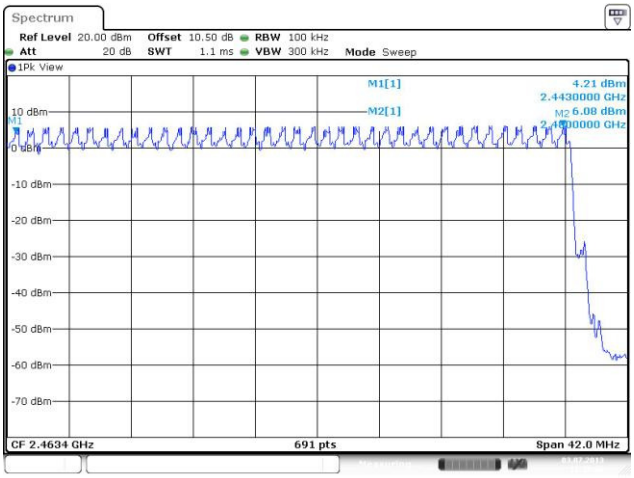
3.5.2 Test Procedures

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

3.5.3 Test Setup



3.5.4 Test Result of Number of Hopping Frequency

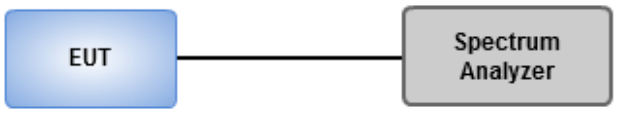
GFSK	8DPSK
	
	

3.6 20dB and Occupied Bandwidth

3.6.1 Test Procedures

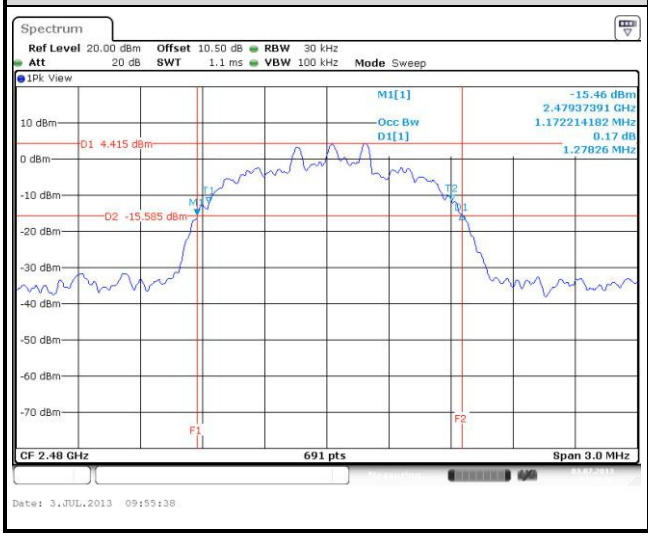
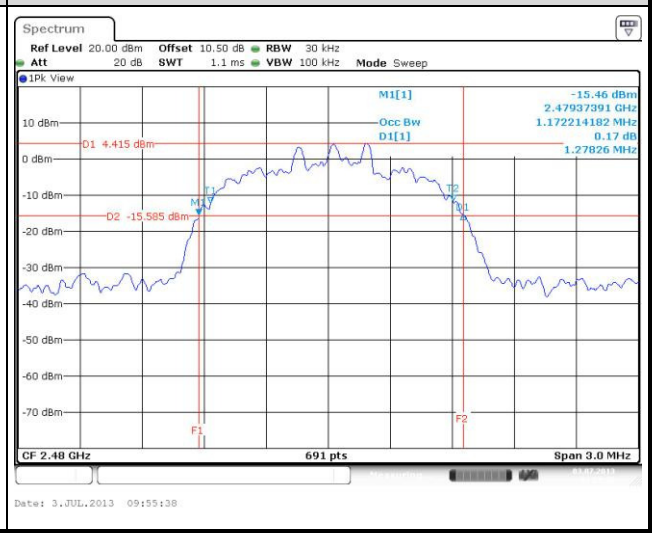
1. Set RBW=300kHz, VBW=300kHz,Sweep time = Auto, Detector=Peak Trace max hold
2 Allow trace to stabilize
3 Use N dB function of spectrum analyzer to measuring 20 dB bandwidth
4. Use Occupied bandwidth function of spectrum analyzer to measuring 99% occupied bandwidth

3.6.2 Test Setup



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

Worst Plots of 20dB Bandwidth	Worst Plots of Occupied Bandwidth
	

3.7 Channel Separation

3.7.1 Limit of Channel Separation

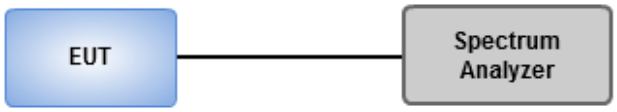
☐ Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

☒ 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

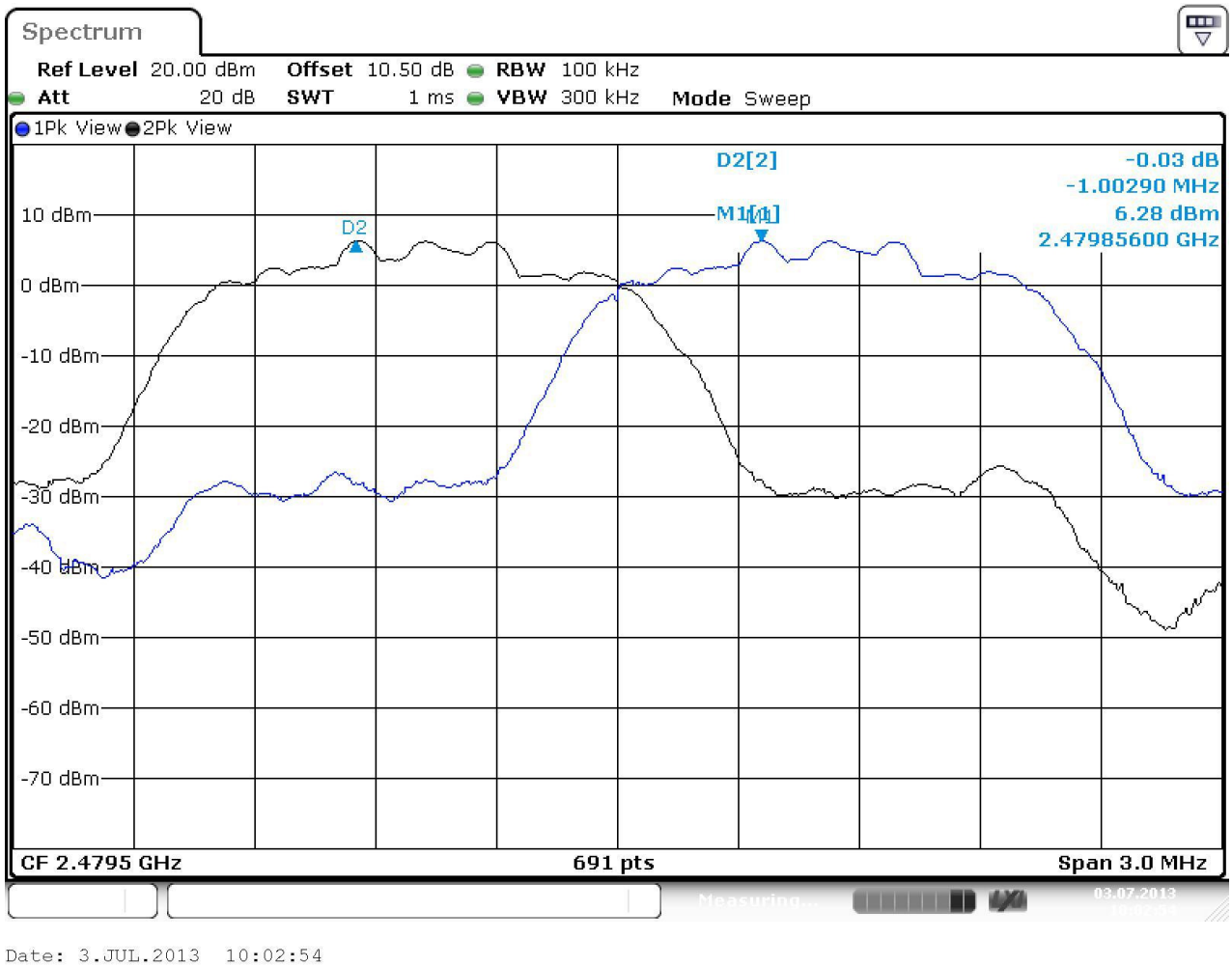
3.7.3 Test Setup



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

Worst Plots



3.8 Number of Dwell Time

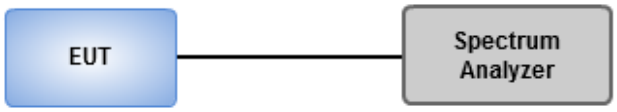
3.8.1 Limit of Dwell time

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

1. 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.
3. 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 x 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 x 31.6 = 106.6 within 31.6 seconds

3.8.3 Test Setup

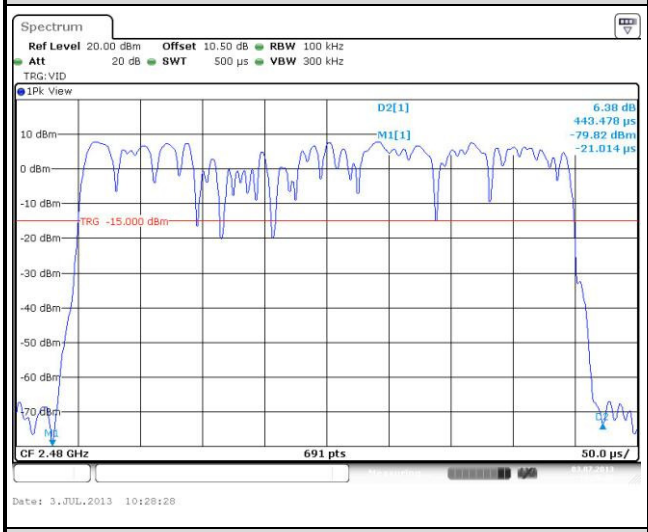


3.8.4 Test Result of Dwell Time

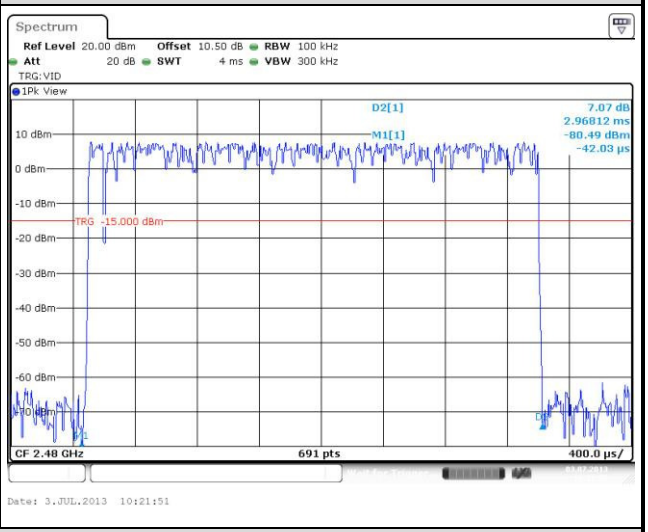
Time of Occupancy (Dwell Time) Result					
Modulation Mode	**Freq. (MHz)**	**Pulse Time per Hop (ms)**	**Number of Pulse in [0.4 x N sec]**	**Dwell Time in [0.4 x N sec] (s)**	**Dwell Time Limits (s)**
GFSK-DH1	2480	0.44347	320	0.142	0.4
GFSK-DH3	2480	1.73040	160	0.277	0.4
GFSK-DH5	2480	2.96812	106.6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

GFSK

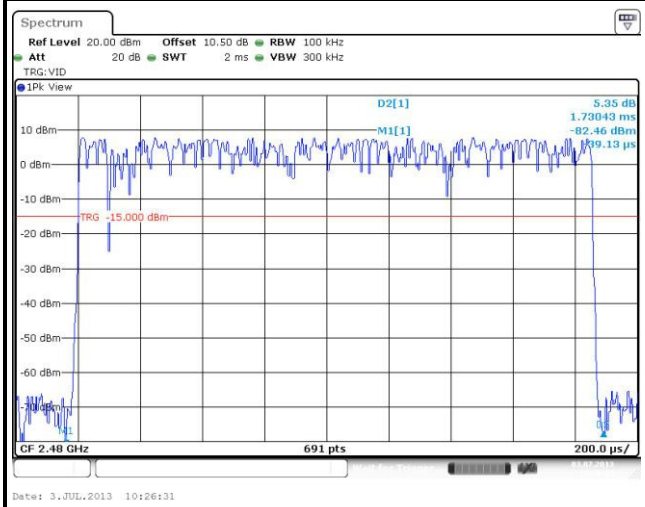
DH1

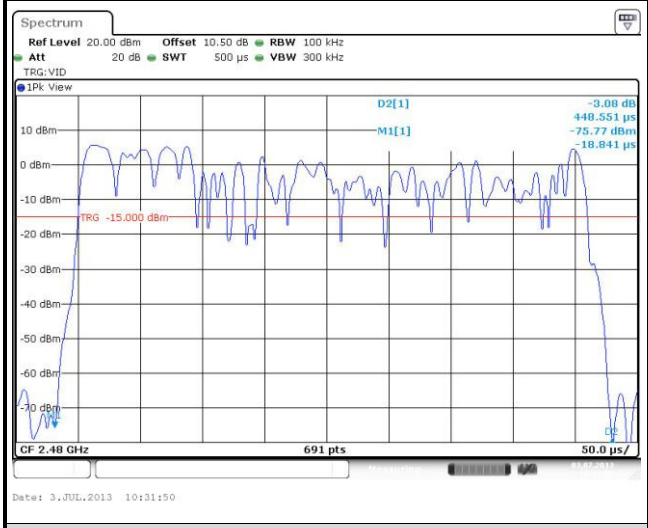
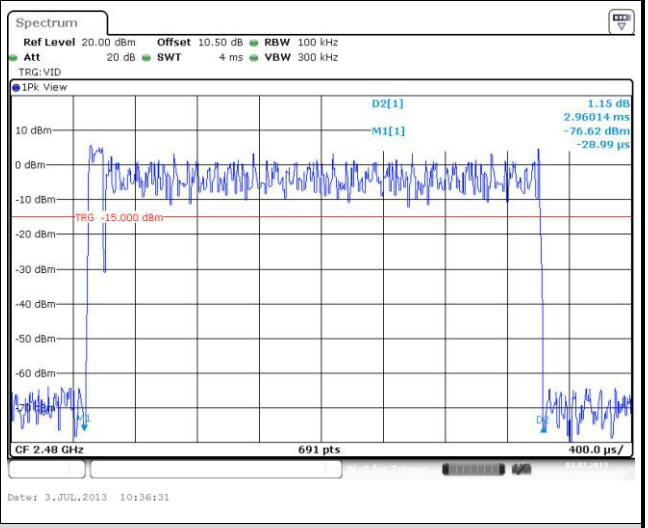
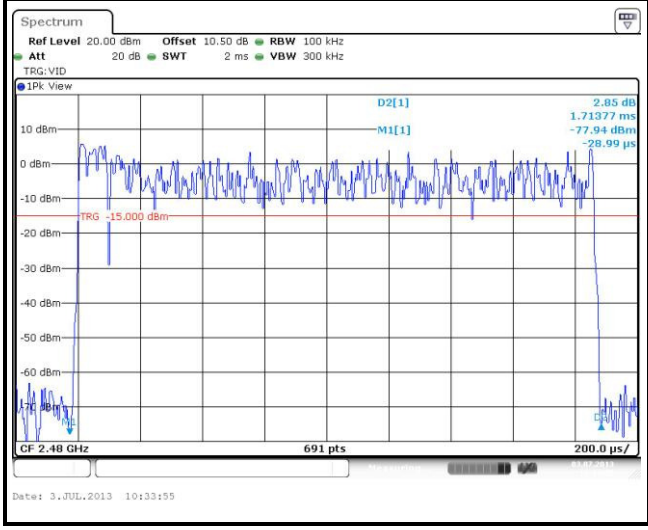


DH5



DH3



8DPSK	
DH1	**DH5**
	
DH3	**---**
	---

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