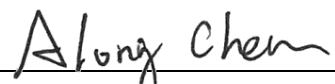


FCC Test Report

FCC ID : SQGBT850
Equipment : Bluetooth 4.2 Dual Mode USB HCI Module
(Refer to item 1.1.1 for more details)
Model No. : BT850-SA
(Refer to item 1.1.1 for more details)
Brand Name : Laird
Applicant : Laird Technologies, Inc.
Address : W66N220 Commerce Court, Cedarburg,
Wisconsin 53012, USA
Standard : 47 CFR FCC Part 15.247
Received Date : Sep. 28, 2017
Tested Date : Sep. 29 ~ Oct. 20, 2017

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.

Reviewed by:


Along Chen / Assistant Manager

Approved by:

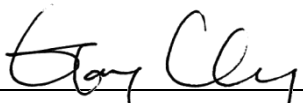

Gary Chang / Manager



Table of Contents

1	GENERAL DESCRIPTION	5
1.1	Information.....	5
1.2	Local Support Equipment List	7
1.3	Test Setup Chart	7
1.4	The Equipment List	8
1.5	Test Standards	9
1.6	Measurement Uncertainty	9
2	TEST CONFIGURATION	10
2.1	Testing Condition	10
2.2	The Worst Test Modes and Channel Details	10
3	TRANSMITTER TEST RESULTS.....	11
3.1	Conducted Emissions.....	11
3.2	Unwanted Emissions into Restricted Frequency Bands	16
3.3	Unwanted Emissions into Non-Restricted Frequency Bands	74
3.4	Conducted Output Power	83
3.5	Number of Hopping Frequency	86
3.6	20dB and Occupied Bandwidth	89
3.7	Channel Separation.....	92
3.8	Number of Dwell Time	95
4	TEST LABORATORY INFORMATION	100

Release Record

Report No.	Version	Description	Issued Date
FR791801AD	Rev. 01	Initial issue	Nov. 30, 2017

Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 0.186MHz 52.84 (Margin -11.36dB) - QP	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 70.74MHz 30.36 (Margin -9.64dB) - PK	Pass
15.247(d)	Band Edge	Meet the requirement of limit	Pass
15.247(b)(1)	Conducted Output Power	Power [dBm]: 7.89	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.

Brand Name	Model Name	Product Name	Description
Laird	BT850-SA	Bluetooth 4.2 Dual Mode USB HCI Module	chip antenna
	BT850-ST		trace to external antenna
	BT860-SA	Bluetooth 4.2 Dual Mode UART HCI Module	chip antenna
	BT860-ST		trace to external antenna

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	2402-2480	0-78 [79]	1 Mbps
2400-2483.5	EDR	2402-2480	0-78 [79]	2 Mbps
2400-2483.5	EDR	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.	Band/ Model	Type	Connector	Antenna Gain (dBi)
1	ACX / AT3216-B2R7HAA	Chip	NA	0.5
2	Laird / 0600-00040	Dipole	UFL	2
3	Laird / NANOBLUE	PCB Dipole	UFL	2
4	Laird / 001-0014	PIFA	UFL	2
5	Laird / 001-0030	PIFA	UFL	2

1.1.4 Power Supply Type of Equipment under Test (EUT)

Power Supply Type	3.3Vdc 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 and Duty Cycle

Test Tool	Blue Toll, Version: 1.8.2.5
-----------	-----------------------------

1.1.8 Power Setting

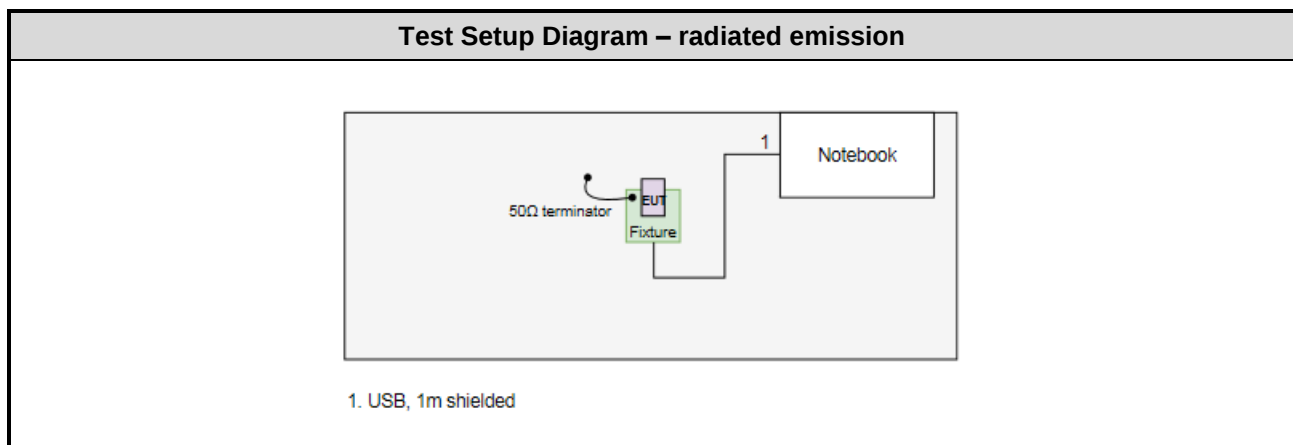
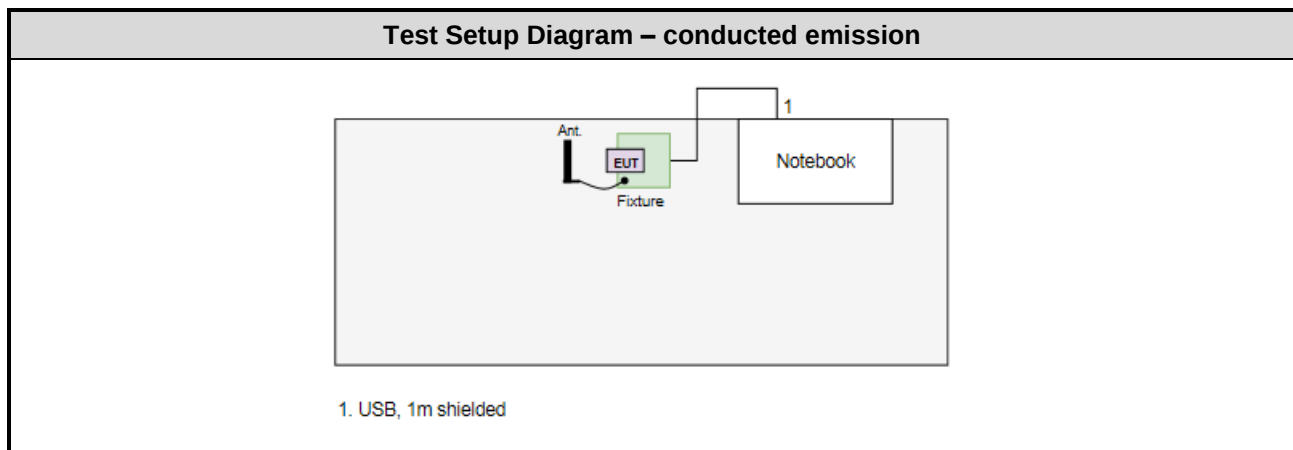
Modulation Mode	Test Frequency (MHz)		
	2402	2441	2480
GFSK/1Mbps	specify power index 0	specify power index 0	specify power index 0
$\pi/4$ DQPSK/3Mbps	specify power index 0	specify power index 0	specify power index 0
8DPSK/3Mbps	specify power index 0	specify power index 0	specify power index 0

1.2 Local Support Equipment List

Support Equipment List					
No.	Equipment	Brand	Model	FCC ID	Signal cable / Length (m)
1	Notebook	DELL	Latitude E6430	DoC	USB, 1m shielded.
2	50 Ω terminator	---	---	---	---
3	Fixture	---	---	---	---

Note: Fixture is provided by applicant.

1.3 Test Setup Chart



1.4 The Equipment List

Test Item	Conducted Emission				
Test Site	Conduction room 1 / (CO01-WS)				
Tested Date	Oct. 12, 2017				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Receiver	R&S	ESR3	101657	Dec. 21, 2016	Dec. 20, 2017
LISN	SCHWARZBECK	Schwarzbeck 8127	8127-667	Nov. 08, 2016	Nov. 07, 2017
RF Cable-CON	EMC	EMCCFD300-BM-BM-6000	50821	Dec. 20, 2016	Dec. 19, 2017
Measurement Software	AUDIX	e3	6.120210k	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	Radiated Emission				
Test Site	966 chamber 3 / (03CH03-WS)				
Tested Date	Sep. 29, 2017				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	ROHDE&SCHWARZ	FSV40	101486	Nov. 15, 2016	Nov. 14, 2017
Receiver	Agilent	N9038A	MY53290044	Sep. 26, 2017	Sep. 25, 2018
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-685	Apr. 28, 2017	Apr. 27, 2018
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1206	Feb. 09, 2017	Feb. 08, 2018
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Oct. 25, 2016	Oct. 24, 2017
Loop Antenna	R&S	HFH2-Z2	100330	Nov. 10, 2016	Nov. 09, 2017
Loop Antenna Cable	KOAX KABEL	101354-BW	101354-BW	Dec. 09, 2016	Dec. 08, 2017
Preamplifier	EMC	EMC02325	980187	Sep. 04, 2017	Sep. 03, 2018
Preamplifier	Agilent	83017A	MY53270014	Aug. 21, 2017	Aug. 20, 2018
Preamplifier	EMC	EMC184045B	980192	Aug. 22, 2017	Aug. 21, 2018
RF cable-3M	HUBER+SUHNER	SUCOFLEX104	MY22620/4	Feb. 04, 2017	Feb. 03, 2018
RF cable-8M	HUBER+SUHNER	SUCOFLEX104	MY22600/4	Feb. 04, 2017	Feb. 03, 2018
RF cable-1M	HUBER+SUHNER	SUCOFLEX104	MY22624/4	Feb. 04, 2017	Feb. 03, 2018
LF cable-0.8M	EMC	EMC8D-NM-NM-800	EMC8D-NM-NM-800-001	Feb. 04, 2017	Feb. 03, 2018
LF cable-3M	EMC	EMC8D-NM-NM-3000	131103	Feb. 04, 2017	Feb. 03, 2018
LF cable-13M	EMC	EMC8D-NM-NM-13000	131104	Feb. 04, 2017	Feb. 03, 2018
Measurement Software	AUDIX	e3	6.120210g	NA	NA
Note: Calibration Interval of instruments listed above is one year.					

Test Item	RF Conducted				
Test Site	(TH01-WS)				
Tested Date	Oct. 06 ~ Oct. 20, 2017				
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until
Spectrum Analyzer	R&S	FSV40	101063	Mar. 15, 2017	Mar. 14, 2018
Power Meter	Anritsu	ML2495A	1241001	Aug. 18, 2017	Aug. 17, 2018
Power Sensor	Anritsu	MA2411B	1207362	Aug. 18, 2017	Aug. 17, 2018
Measurement Software	Sporton	Sporton_1	1.3.30	NA	NA
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

ANSI C63.10-2013

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	±34.134 Hz
Conducted power	±0.808 dB
Power density	±0.463 dB
Conducted emission	±2.670 dB
AC conducted emission	±2.90 dB
Radiated emission ≤ 1GHz	±3.66 dB
Radiated emission > 1GHz	±5.37 dB

2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	23°C / 56%	Alex Tsai
Radiated Emissions	03CH03-WS	24-25°C / 64-66%	Brad Wu Vincent Yeh
RF Conducted	TH01-WS	21°C / 64%	Felix Sung

- FCC Designation No.: TW0009
- FCC site registration No.: 207696
- IC site registration No.: 10807C-1

2.2 The Worst Test Modes and Channel Details

Test item	Mode	Test Frequency (MHz)	Data Rate (Mbps)	Test Configuration
Conducted Emissions	GFSK	2441	1Mbps	2, 4
Radiated Emissions ≤ 1GHz	GFSK	2441	1Mbps	2, 4
Radiated Emissions > 1GHz	GFSK 8DPSK	2402, 2441, 2480 2402, 2441, 2480	1Mbps 3Mbps	2, 4
Conducted Output Power	GFSK π/4 QDPSK 8DPSK	2402, 2441, 2480 2402, 2441, 2480 2402, 2441, 2480	1Mbps 2Mbps 3Mbps	2, 4
Number of Hopping Channels	GFSK 8DPSK	2402~2480 2402~2480	1Mbps 3Mbps	2, 4
Hopping Channel Separation 20dB and Occupied bandwidth	GFSK 8DPSK	2402, 2441, 2480 2402, 2441, 2480	1Mbps 3Mbps	2, 4
Dwell Time	GFSK / 8DPSK	2441	1Mbps	2
	GFSK / 8DPSK	2402	3Mbps	4

NOTE:

- The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement – X, Y, and Z-plane. The **Y-plane** results were found as the worst case and were shown in this report.
- The device can be operated under adapter mode and charging mode. Each mode was selected for related test items as below configuration.
Configuration 1 : BT850-SA
Configuration 2 : BT850-ST
Configuration 3 : BT860-SA
Configuration 4 : BT860-ST
- 50Ω terminators are connected to antenna port of EUT for radiated emission measurement.

3 Transmitter Test Results

3.1 Conducted Emissions

3.1.1 Limit of 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

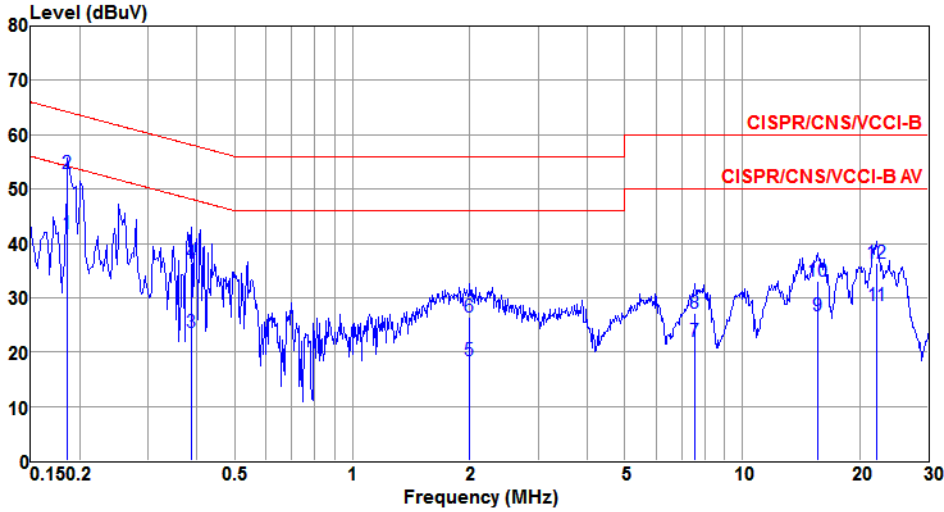


- Note: 1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.4 Test Result of Conducted Emissions

Configuration 2 : BT850-ST

Modulation Mode	GFSK	Test Freq. (MHz)	2441
Power Phase	Line		



	Freq	Level	Limit	Over	Read	LISN	cable	Remark
	MHz	dBuV	Line	Limit	Level	factor	loss	
			dBuV	dB	dBuV	dB	dB	
1	0.186	41.73	54.20	-12.47	41.60	0.09	0.04	Average
2	0.186	52.84	64.20	-11.36	52.71	0.09	0.04	QP
3	0.387	23.50	48.12	-24.62	23.40	0.06	0.04	Average
4	0.387	36.26	58.12	-21.86	36.16	0.06	0.04	QP
5	2.001	18.50	46.00	-27.50	18.33	0.13	0.04	Average
6	2.001	26.47	56.00	-29.53	26.30	0.13	0.04	QP
7	7.566	21.91	50.00	-28.09	21.52	0.19	0.20	Average
8	7.566	27.23	60.00	-32.77	26.84	0.19	0.20	QP
9	15.635	26.61	50.00	-23.39	26.05	0.33	0.23	Average
10	15.635	33.02	60.00	-26.98	32.46	0.33	0.23	QP
11	22.180	28.53	50.00	-21.47	27.85	0.41	0.27	Average
12	22.180	36.25	60.00	-23.75	35.57	0.41	0.27	QP

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

Modulation Mode	GFSK	Test Freq. (MHz)	2441																																																																																																																					
Power Phase	Neutral																																																																																																																							
Level (dBuV) <table><thead><tr><th></th><th>Freq MHz</th><th>Level dBuV</th><th>Limit Line dBuV</th><th>Over Limit dB</th><th>Read Level dBuV</th><th>LISN factor dB</th><th>cable loss dB</th><th>Remark</th></tr></thead><tbody><tr><td>1</td><td>0.192</td><td>32.72</td><td>53.93</td><td>-21.21</td><td>32.59</td><td>0.09</td><td>0.04</td><td>Average</td></tr><tr><td>2</td><td>0.192</td><td>47.80</td><td>63.93</td><td>-16.13</td><td>47.67</td><td>0.09</td><td>0.04</td><td>QP</td></tr><tr><td>3</td><td>0.415</td><td>24.98</td><td>47.55</td><td>-22.57</td><td>24.81</td><td>0.13</td><td>0.04</td><td>Average</td></tr><tr><td>4</td><td>0.415</td><td>39.79</td><td>57.55</td><td>-17.76</td><td>39.62</td><td>0.13</td><td>0.04</td><td>QP</td></tr><tr><td>5</td><td>1.519</td><td>22.70</td><td>46.00</td><td>-23.30</td><td>22.53</td><td>0.13</td><td>0.04</td><td>Average</td></tr><tr><td>6</td><td>1.519</td><td>31.69</td><td>56.00</td><td>-24.31</td><td>31.52</td><td>0.13</td><td>0.04</td><td>QP</td></tr><tr><td>7</td><td>3.661</td><td>22.10</td><td>46.00</td><td>-23.90</td><td>21.82</td><td>0.14</td><td>0.14</td><td>Average</td></tr><tr><td>8</td><td>3.661</td><td>27.91</td><td>56.00</td><td>-28.09</td><td>27.63</td><td>0.14</td><td>0.14</td><td>QP</td></tr><tr><td>9</td><td>15.307</td><td>19.95</td><td>50.00</td><td>-30.05</td><td>19.35</td><td>0.37</td><td>0.23</td><td>Average</td></tr><tr><td>10</td><td>15.307</td><td>28.74</td><td>60.00</td><td>-31.26</td><td>28.14</td><td>0.37</td><td>0.23</td><td>QP</td></tr><tr><td>11</td><td>21.260</td><td>23.07</td><td>50.00</td><td>-26.93</td><td>22.38</td><td>0.42</td><td>0.27</td><td>Average</td></tr><tr><td>12</td><td>21.260</td><td>30.26</td><td>60.00</td><td>-29.74</td><td>29.57</td><td>0.42</td><td>0.27</td><td>QP</td></tr></tbody></table>					Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark	1	0.192	32.72	53.93	-21.21	32.59	0.09	0.04	Average	2	0.192	47.80	63.93	-16.13	47.67	0.09	0.04	QP	3	0.415	24.98	47.55	-22.57	24.81	0.13	0.04	Average	4	0.415	39.79	57.55	-17.76	39.62	0.13	0.04	QP	5	1.519	22.70	46.00	-23.30	22.53	0.13	0.04	Average	6	1.519	31.69	56.00	-24.31	31.52	0.13	0.04	QP	7	3.661	22.10	46.00	-23.90	21.82	0.14	0.14	Average	8	3.661	27.91	56.00	-28.09	27.63	0.14	0.14	QP	9	15.307	19.95	50.00	-30.05	19.35	0.37	0.23	Average	10	15.307	28.74	60.00	-31.26	28.14	0.37	0.23	QP	11	21.260	23.07	50.00	-26.93	22.38	0.42	0.27	Average	12	21.260	30.26	60.00	-29.74	29.57	0.42	0.27	QP
	Freq MHz	Level dBuV	Limit Line dBuV	Over Limit dB	Read Level dBuV	LISN factor dB	cable loss dB	Remark																																																																																																																
1	0.192	32.72	53.93	-21.21	32.59	0.09	0.04	Average																																																																																																																
2	0.192	47.80	63.93	-16.13	47.67	0.09	0.04	QP																																																																																																																
3	0.415	24.98	47.55	-22.57	24.81	0.13	0.04	Average																																																																																																																
4	0.415	39.79	57.55	-17.76	39.62	0.13	0.04	QP																																																																																																																
5	1.519	22.70	46.00	-23.30	22.53	0.13	0.04	Average																																																																																																																
6	1.519	31.69	56.00	-24.31	31.52	0.13	0.04	QP																																																																																																																
7	3.661	22.10	46.00	-23.90	21.82	0.14	0.14	Average																																																																																																																
8	3.661	27.91	56.00	-28.09	27.63	0.14	0.14	QP																																																																																																																
9	15.307	19.95	50.00	-30.05	19.35	0.37	0.23	Average																																																																																																																
10	15.307	28.74	60.00	-31.26	28.14	0.37	0.23	QP																																																																																																																
11	21.260	23.07	50.00	-26.93	22.38	0.42	0.27	Average																																																																																																																
12	21.260	30.26	60.00	-29.74	29.57	0.42	0.27	QP																																																																																																																
Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB). 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).																																																																																																																								

Configuration 4 : BT860-ST

Modulation Mode	GFSK	Test Freq. (MHz)	2441																																																																																																																																							
Power Phase	Line																																																																																																																																									
Level (dBuV) <table><thead><tr><th></th><th>Freq</th><th>Level</th><th>Limit</th><th>Over</th><th>Read</th><th>LISN</th><th>cable</th><th></th></tr><tr><th></th><th>MHz</th><th>dBuV</th><th>Line</th><th>Limit</th><th>Level</th><th>factor</th><th>loss</th><th>Remark</th></tr><tr><th></th><th></th><th></th><th>dBuV</th><th>dB</th><th>dBuV</th><th>dB</th><th>dB</th><th></th></tr></thead><tbody><tr><td>1</td><td>0.162</td><td>30.44</td><td>55.34</td><td>-24.90</td><td>30.32</td><td>0.08</td><td>0.04</td><td>Average</td></tr><tr><td>2</td><td>0.162</td><td>46.25</td><td>65.34</td><td>-19.09</td><td>46.13</td><td>0.08</td><td>0.04</td><td>QP</td></tr><tr><td>3@</td><td>0.454</td><td>31.03</td><td>46.80</td><td>-15.77</td><td>30.93</td><td>0.06</td><td>0.04</td><td>Average</td></tr><tr><td>4</td><td>0.454</td><td>40.16</td><td>56.80</td><td>-16.64</td><td>40.06</td><td>0.06</td><td>0.04</td><td>QP</td></tr><tr><td>5</td><td>1.762</td><td>19.91</td><td>46.00</td><td>-26.09</td><td>19.75</td><td>0.12</td><td>0.04</td><td>Average</td></tr><tr><td>6</td><td>1.762</td><td>28.01</td><td>56.00</td><td>-27.99</td><td>27.85</td><td>0.12</td><td>0.04</td><td>QP</td></tr><tr><td>7</td><td>7.852</td><td>22.99</td><td>50.00</td><td>-27.01</td><td>22.60</td><td>0.19</td><td>0.20</td><td>Average</td></tr><tr><td>8</td><td>7.852</td><td>27.97</td><td>60.00</td><td>-32.03</td><td>27.58</td><td>0.19</td><td>0.20</td><td>QP</td></tr><tr><td>9</td><td>15.470</td><td>26.08</td><td>50.00</td><td>-23.92</td><td>25.53</td><td>0.32</td><td>0.23</td><td>Average</td></tr><tr><td>10</td><td>15.470</td><td>32.90</td><td>60.00</td><td>-27.10</td><td>32.35</td><td>0.32</td><td>0.23</td><td>QP</td></tr><tr><td>11</td><td>22.535</td><td>26.10</td><td>50.00</td><td>-23.90</td><td>25.41</td><td>0.41</td><td>0.28</td><td>Average</td></tr><tr><td>12</td><td>22.535</td><td>32.72</td><td>60.00</td><td>-27.28</td><td>32.03</td><td>0.41</td><td>0.28</td><td>QP</td></tr></tbody></table>					Freq	Level	Limit	Over	Read	LISN	cable			MHz	dBuV	Line	Limit	Level	factor	loss	Remark				dBuV	dB	dBuV	dB	dB		1	0.162	30.44	55.34	-24.90	30.32	0.08	0.04	Average	2	0.162	46.25	65.34	-19.09	46.13	0.08	0.04	QP	3@	0.454	31.03	46.80	-15.77	30.93	0.06	0.04	Average	4	0.454	40.16	56.80	-16.64	40.06	0.06	0.04	QP	5	1.762	19.91	46.00	-26.09	19.75	0.12	0.04	Average	6	1.762	28.01	56.00	-27.99	27.85	0.12	0.04	QP	7	7.852	22.99	50.00	-27.01	22.60	0.19	0.20	Average	8	7.852	27.97	60.00	-32.03	27.58	0.19	0.20	QP	9	15.470	26.08	50.00	-23.92	25.53	0.32	0.23	Average	10	15.470	32.90	60.00	-27.10	32.35	0.32	0.23	QP	11	22.535	26.10	50.00	-23.90	25.41	0.41	0.28	Average	12	22.535	32.72	60.00	-27.28	32.03	0.41	0.28	QP
	Freq	Level	Limit	Over	Read	LISN	cable																																																																																																																																			
	MHz	dBuV	Line	Limit	Level	factor	loss	Remark																																																																																																																																		
			dBuV	dB	dBuV	dB	dB																																																																																																																																			
1	0.162	30.44	55.34	-24.90	30.32	0.08	0.04	Average																																																																																																																																		
2	0.162	46.25	65.34	-19.09	46.13	0.08	0.04	QP																																																																																																																																		
3@	0.454	31.03	46.80	-15.77	30.93	0.06	0.04	Average																																																																																																																																		
4	0.454	40.16	56.80	-16.64	40.06	0.06	0.04	QP																																																																																																																																		
5	1.762	19.91	46.00	-26.09	19.75	0.12	0.04	Average																																																																																																																																		
6	1.762	28.01	56.00	-27.99	27.85	0.12	0.04	QP																																																																																																																																		
7	7.852	22.99	50.00	-27.01	22.60	0.19	0.20	Average																																																																																																																																		
8	7.852	27.97	60.00	-32.03	27.58	0.19	0.20	QP																																																																																																																																		
9	15.470	26.08	50.00	-23.92	25.53	0.32	0.23	Average																																																																																																																																		
10	15.470	32.90	60.00	-27.10	32.35	0.32	0.23	QP																																																																																																																																		
11	22.535	26.10	50.00	-23.90	25.41	0.41	0.28	Average																																																																																																																																		
12	22.535	32.72	60.00	-27.28	32.03	0.41	0.28	QP																																																																																																																																		
Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB). 2: Over Limit (dB) = Level (dBuV) – Limit Line (dBuV).																																																																																																																																										

Modulation Mode	GFSK	Test Freq. (MHz)	2441
Power Phase	Neutral		
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

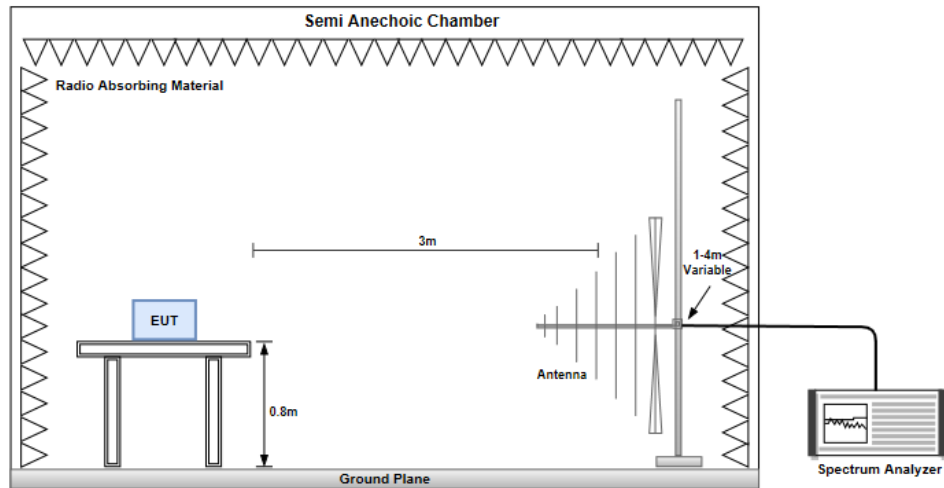
1. Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at test table. For emissions testing at or below 1 GHz, the table height is 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height is 1.5 m
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:

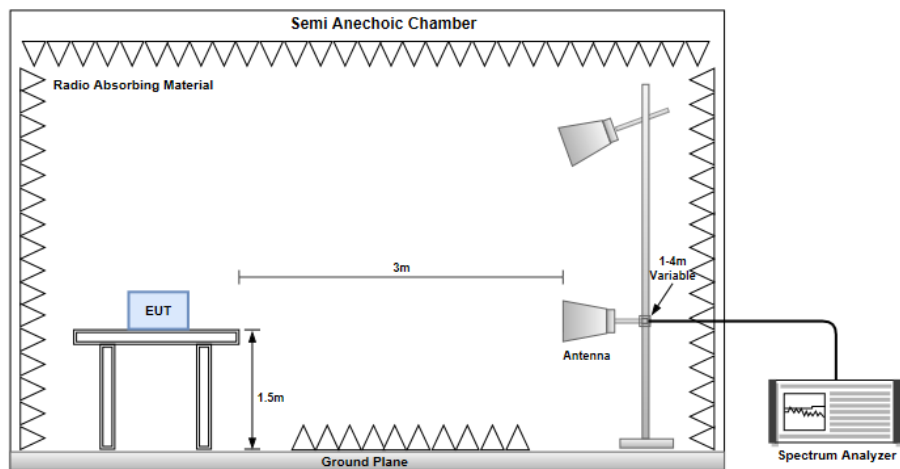
1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
2. Radiated emission above 1GHz / Peak value
RBW=1MHz, VBW=3MHz and Peak detector
Radiated emission above 1GHz / Average value for harmonics
The average value is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula for DH5 packet type which has worst duty factor:
3.
$$20\log (\text{Duty cycle}) = 20\log \frac{1\text{s} / 1600 * 5}{100 \text{ ms}} = -30.1\text{dB}$$
4. Radiated emission above 1GHz / Average value for other emissions
RBW=1MHz, VBW=1/T and Peak detector

3.2.3 Test Setup

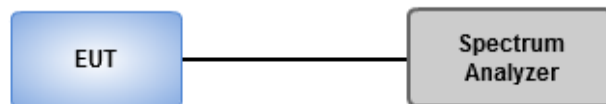
Radiated Emissions below 1 GHz



Radiated Emissions above 1 GHz



Conducted Emissions



Configuration 2 : BT850-ST

3.2.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	GFSK	Test Freq. (MHz)	2441
Polarization	Horizontal		
Level (dBuV/m)			

Modulation	GFSK	Test Freq. (MHz)	2441
Polarization	Vertical		
Level (dBUV/m)			

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

Modulation	GFSK	Test Freq. (MHz)	2402
Polarization	Horizontal		
Level (dBuV/m)			

Modulation	GFSK	Test Freq. (MHz)	2402
Polarization	Vertical		
Level (dBUV/m) </			

Modulation	GFSK	Test Freq. (MHz)	2441
Polarization	Horizontal		
Level (dBuV/m) <			

Modulation	GFSK	Test Freq. (MHz)	2441
Polarization	Vertical		
Level (dBuV/m) </			

Modulation	GFSK	Test Freq. (MHz)	2480
Polarization	Horizontal		
Level (dBUV/m)			

Modulation	GFSK	Test Freq. (MHz)	2480
Polarization	Vertical		
Level (dBuV/m)			

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

Modulation	8DPSK	Test Freq. (MHz)	2402
Polarization	Horizontal		
Level (dBuV/m)			

Modulation	8DPSK	Test Freq. (MHz)	2402
Polarization	Vertical		
Level (dBUV/m) </			

Modulation	8DPSK	Test Freq. (MHz)	2441
Polarization	Horizontal		
Level (dBuV/m) </			

Modulation	8DPSK	Test Freq. (MHz)	2441
Polarization	Vertical		
Level (dBUV/m) </			

Modulation	8DPSK	Test Freq. (MHz)	2480
Polarization	Horizontal		
Level (dBUV/m)			

Modulation	8DPSK	Test Freq. (MHz)	2480
Polarization	Vertical		
Level (dBuV/m) </			

Configuration 4 : BT860-ST

3.2.7 Transmitter Radiated Unwanted Emissions (Below 1GHz)

Modulation	GFSK	Test Freq. (MHz)	2441
Polarization	Horizontal		
Level (dBuV/m)			

Modulation	GFSK	Test Freq. (MHz)	2441
Polarization	Vertical		
Level (dBuV/m) </			

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

Modulation	GFSK	Test Freq. (MHz)	2402
Polarization	Horizontal		
Level (dBuV/m) <			

Modulation	GFSK	Test Freq. (MHz)	2402						
Polarization	Vertical								
Level (dBUV/m) 90 80 70 60 50 40 30 20 10 0 1000 4000 6000 8000 10000 12000 14000 16000 18000 20000 22000 25000 Frequency (MHz) 1 2 3 4 5 6 14.91 45.01 24.53 54.63 28.53 58.63 54.00 74.00 54.00 74.00 54.00 74.00 -39.09 -28.99 -29.47 -19.37 -25.47 -15.37 10.29 40.39 10.62 40.72 11.08 41.18 4.62 4.62 13.91 13.91 17.45 17.45 Average Peak Average Peak Average Peak 100 100 100 100 100 100 158 158 256 256 149 149 Freq. Emission Limit Margin SA Factor Remark ANT Turn level reading High Table MHz dBUV/m dBUV/m dB dBuV dB cm deg									
1	4804.00	14.91	54.00	-39.09	10.29	4.62	Average	100	158
2	4804.00	45.01	74.00	-28.99	40.39	4.62	Peak	100	158
3	12010.00	24.53	54.00	-29.47	10.62	13.91	Average	100	256
4	12010.00	54.63	74.00	-19.37	40.72	13.91	Peak	100	256
5	14412.00	28.53	54.00	-25.47	11.08	17.45	Average	100	149
6	14412.00	58.63	74.00	-15.37	41.18	17.45	Peak	100	149

Note 1: Emission Level (dBUV/m) = SA Reading (dBUV/m) + Factor* (dB)
*Factor includes antenna factor , cable loss and amplifier gain
Note 2: Margin (dB) = Emission level (dBUV/m) – Limit (dBUV/m).

Modulation	GFSK	Test Freq. (MHz)	2441
Polarization	Horizontal		
Level (dBUV/m) </			

Modulation	GFSK	Test Freq. (MHz)	2441
Polarization	Vertical		
Level (dBUV/m)			

Modulation	GFSK	Test Freq. (MHz)	2480
Polarization	Horizontal		
Level (dBuV/m) </			

Modulation	GFSK	Test Freq. (MHz)	2480
Polarization	Vertical		
Level (dBuV/m) <			

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

Modulation	8DPSK	Test Freq. (MHz)	2402																																																																																										
Polarization	Horizontal																																																																																												
Level (dBuV/m) 90 80 70 60 50 40 30 20 10 0 1000 4000 6000 8000 10000 12000 14000 16000 18000 20000 22000 25000 Frequency (MHz) 2 4 6 1 3 5 FCC CLASS-B FCC CLASS-B (AVG) <table><tr><th></th><th>Freq.</th><th>Emission</th><th>Limit</th><th>Margin</th><th>SA</th><th>Factor</th><th>Remark</th><th>ANT</th><th>Turn</th></tr><tr><th></th><th>MHz</th><th>level</th><th></th><th></th><th>reading</th><th></th><th></th><th>High</th><th>Table</th></tr><tr><th></th><th></th><th>dBuV/m</th><th>dBuV/m</th><th>dB</th><th>dBuV</th><th>dB</th><th></th><th>cm</th><th>deg</th></tr><tr><td>1</td><td>4804.00</td><td>14.79</td><td>54.00</td><td>-39.21</td><td>10.17</td><td>4.62</td><td>Average</td><td>100</td><td>257</td></tr><tr><td>2</td><td>4804.00</td><td>44.89</td><td>74.00</td><td>-29.11</td><td>40.27</td><td>4.62</td><td>Peak</td><td>100</td><td>257</td></tr><tr><td>3</td><td>12010.00</td><td>23.88</td><td>54.00</td><td>-30.12</td><td>9.97</td><td>13.91</td><td>Average</td><td>100</td><td>315</td></tr><tr><td>4</td><td>12010.00</td><td>53.98</td><td>74.00</td><td>-20.02</td><td>40.07</td><td>13.91</td><td>Peak</td><td>100</td><td>315</td></tr><tr><td>5</td><td>14412.00</td><td>27.23</td><td>54.00</td><td>-26.77</td><td>9.78</td><td>17.45</td><td>Average</td><td>100</td><td>292</td></tr><tr><td>6</td><td>14412.00</td><td>57.33</td><td>74.00</td><td>-16.67</td><td>39.88</td><td>17.45</td><td>Peak</td><td>100</td><td>292</td></tr></table>					Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn		MHz	level			reading			High	Table			dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg	1	4804.00	14.79	54.00	-39.21	10.17	4.62	Average	100	257	2	4804.00	44.89	74.00	-29.11	40.27	4.62	Peak	100	257	3	12010.00	23.88	54.00	-30.12	9.97	13.91	Average	100	315	4	12010.00	53.98	74.00	-20.02	40.07	13.91	Peak	100	315	5	14412.00	27.23	54.00	-26.77	9.78	17.45	Average	100	292	6	14412.00	57.33	74.00	-16.67	39.88	17.45	Peak	100	292
	Freq.	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn																																																																																				
	MHz	level			reading			High	Table																																																																																				
		dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg																																																																																				
1	4804.00	14.79	54.00	-39.21	10.17	4.62	Average	100	257																																																																																				
2	4804.00	44.89	74.00	-29.11	40.27	4.62	Peak	100	257																																																																																				
3	12010.00	23.88	54.00	-30.12	9.97	13.91	Average	100	315																																																																																				
4	12010.00	53.98	74.00	-20.02	40.07	13.91	Peak	100	315																																																																																				
5	14412.00	27.23	54.00	-26.77	9.78	17.45	Average	100	292																																																																																				
6	14412.00	57.33	74.00	-16.67	39.88	17.45	Peak	100	292																																																																																				
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor , cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).																																																																																													

Modulation	8DPSK	Test Freq. (MHz)	2402
Polarization	Vertical		
Level (dBUV/m)			

Modulation	8DPSK	Test Freq. (MHz)	2441
Polarization	Horizontal		
Level (dBUV/m) </			

Modulation	8DPSK	Test Freq. (MHz)	2441
Polarization	Vertical		
Level (dBuV/m) <			

Modulation	8DPSK	Test Freq. (MHz)	2480
Polarization	Horizontal		
Level (dBuV/m) </			

Modulation	8DPSK	Test Freq. (MHz)	2480
Polarization	Vertical		
Level (dBuV/m) <			

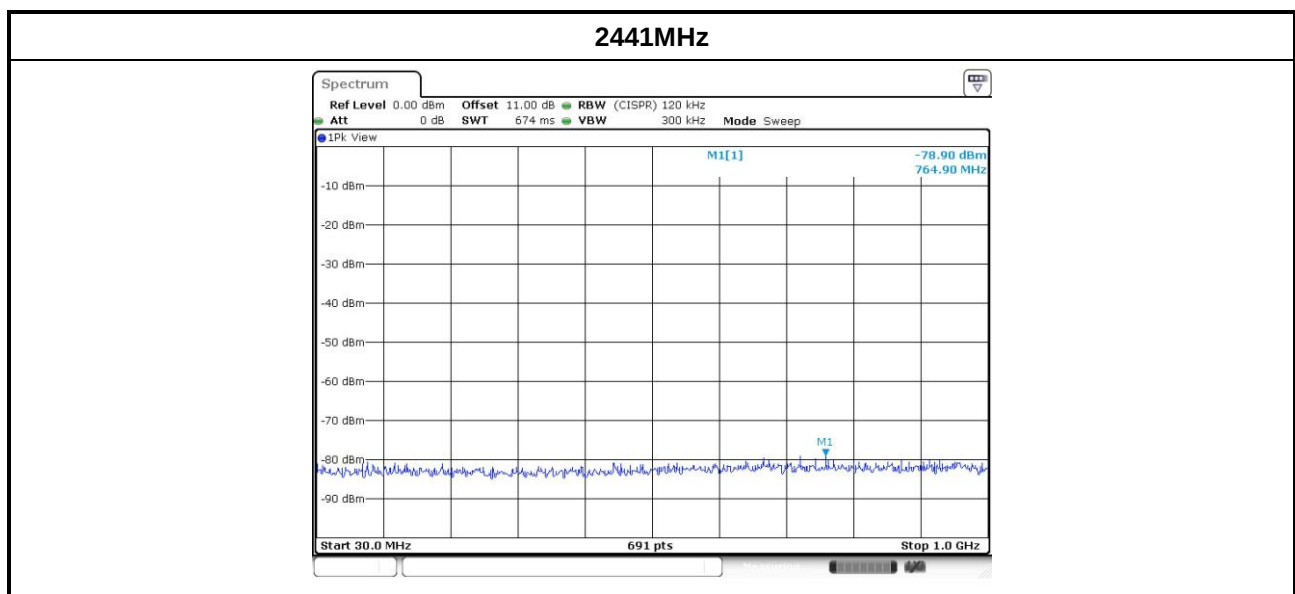
Configuration 2 : BT850-ST

3.2.10 Transmitter Conducted Unwanted Emissions (Below 1 GHz)

Modulation Mode		GFSK		Frequency	2441MHz	
Range (MHz)	Max Value chain0 (dBm)	DG (dBi)	GRF (dB)	EIRP (dBm)	Min E-Field Limit (dBm)	E-Field Margin (dB)
30~1000MHz	-78.90	2.00	4.70	-72.20	-55.20	-17.00

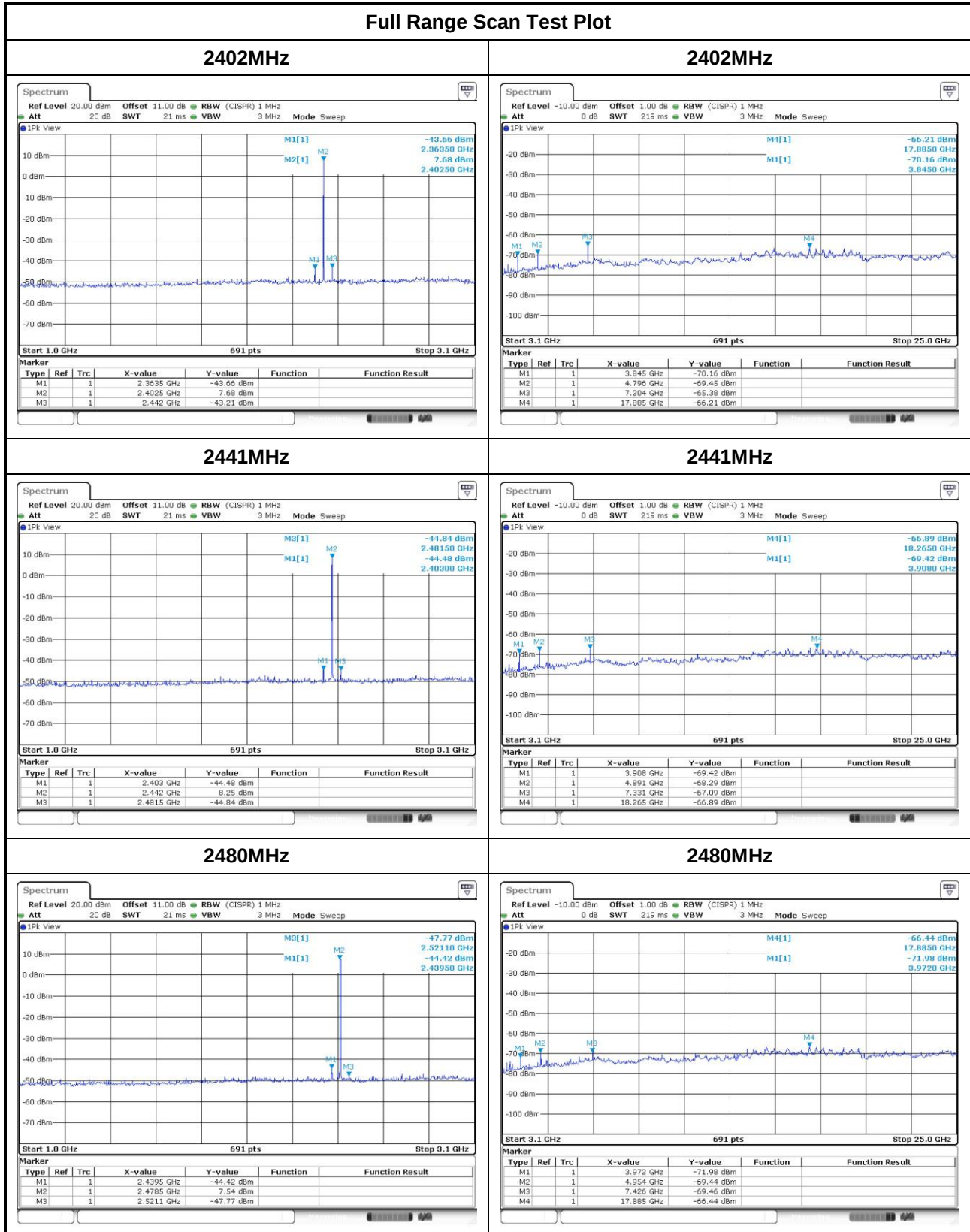
Note:

1. GRF = Ground Reflection Factor.
2. DG = Directional Gain.
3. Worst case of emission limit below 1GHz is selected to be limit.



3.2.11 Transmitter Conducted Unwanted Emissions (Above 1GHz)

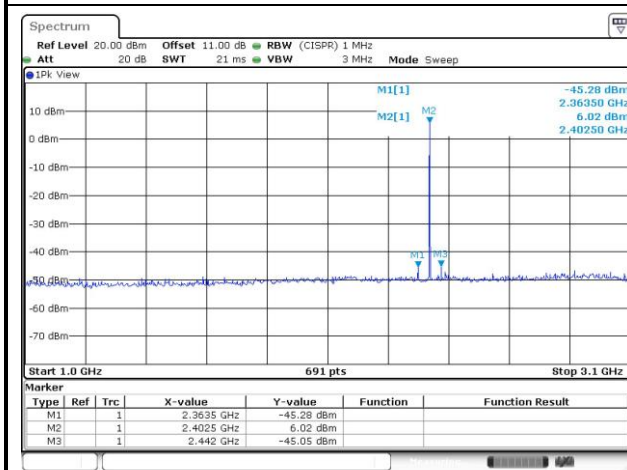
GFSK



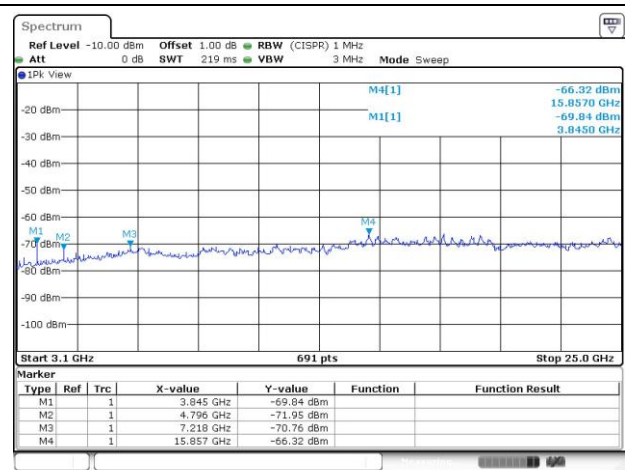
8DPSK

Full Range Scan Test Plot

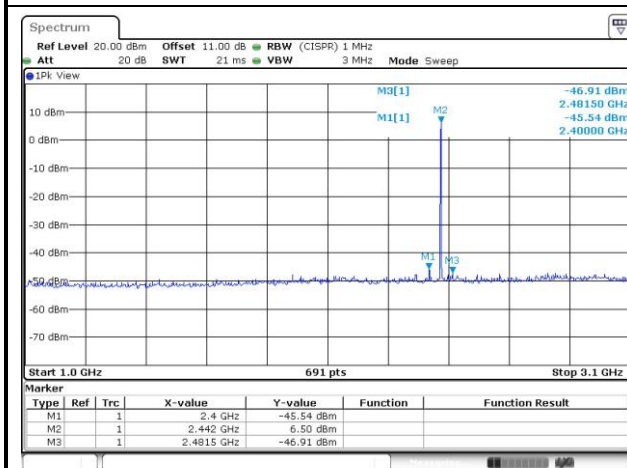
2402MHz



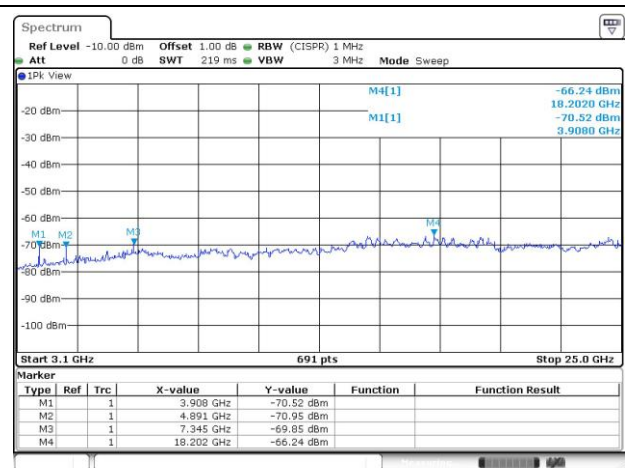
2402MHz



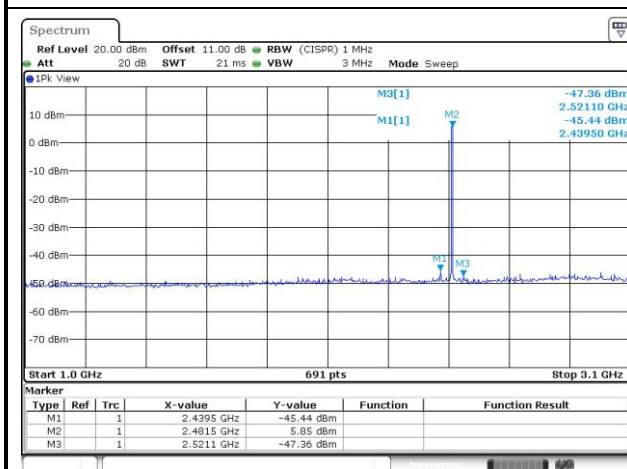
2441MHz



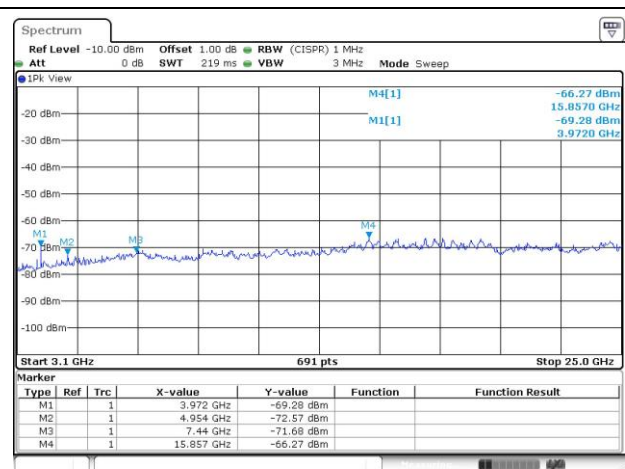
2441MHz



2480MHz



2480MHz



GFSK

Transmitter Conducted Unwanted Emissions Results in Band Edge							
Test ch. Freq. (MHz)	Range (MHz)	Max Value chain0 (dBm)	DG (dBi)	EIRP (dBm)	E-Field Limit (dBm)	E-Field Margin (dB)	Remark
2402	2310~2390	-44.09	2.00	-42.09	-21.20	-20.89	PK
	2310~2390	-47.74	2.00	-45.74	-41.20	-4.54	AV
	2483.5~2500	-50.61	2.00	-48.61	-21.20	-27.41	PK
	2483.5~2500	-61.59	2.00	-59.59	-41.20	-18.39	AV
2441	2310~2390	-47.95	2.00	-45.95	-21.20	-24.75	PK
	2310~2390	-59.50	2.00	-57.50	-41.20	-16.30	AV
	2483.5~2500	-50.28	2.00	-48.28	-21.20	-27.08	PK
	2483.5~2500	-61.76	2.00	-59.76	-41.20	-18.56	AV
2480	2310~2390	-50.39	2.00	-48.39	-21.20	-27.19	PK
	2310~2390	-61.17	2.00	-59.17	-41.20	-17.97	AV
	2485.5~2500	-48.46	2.00	-46.46	-21.20	-25.26	PK
	2485.5~2500	-59.52	2.00	-57.52	-21.20	-36.32	AV

Note: DG = Directional Gain.

8DPSK

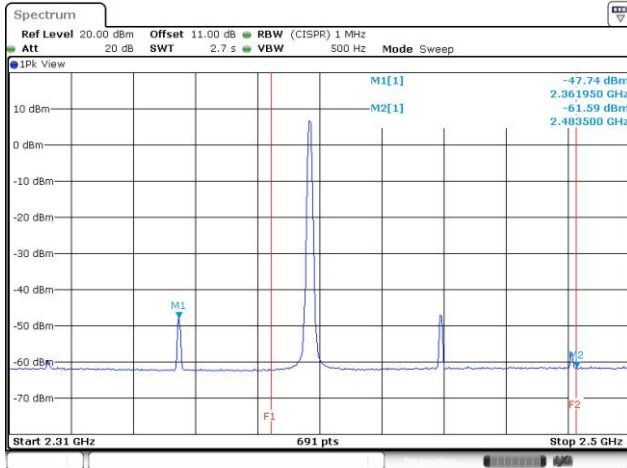
Transmitter Conducted Unwanted Emissions Results in Band Edge							
Test ch. Freq. (MHz)	Range (MHz)	Max Value chain0 (dBm)	DG (dBi)	EIRP (dBm)	E-Field Limit (dBm)	E-Field Margin (dB)	Remark
2402	2310~2390	-45.07	2.00	-43.07	-21.20	-21.87	PK
	2310~2390	-52.28	2.00	-50.28	-41.20	-9.08	AV
	2483.5~2500	-49.53	2.00	-47.53	-21.20	-26.33	PK
	2483.5~2500	-61.70	2.00	-59.70	-41.20	-18.50	AV
2441	2310~2390	-50.77	2.00	-48.77	-21.20	-27.57	PK
	2310~2390	-60.83	2.00	-58.83	-41.20	-17.63	AV
	2483.5~2500	-49.23	2.00	-47.23	-21.20	-26.03	PK
	2483.5~2500	-61.62	2.00	-59.62	-41.20	-18.42	AV
2480	2310~2390	-50.68	2.00	-48.68	-21.20	-27.48	PK
	2310~2390	-62.40	2.00	-60.40	-41.20	-19.20	AV
	2485.5~2500	-48.58	2.00	-46.58	-21.20	-25.38	PK
	2485.5~2500	-60.31	2.00	-58.31	-21.20	-37.11	AV

Note: DG = Directional Gain.

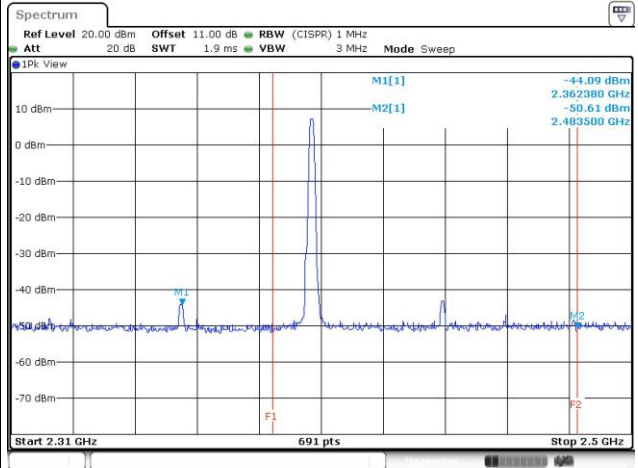
GFSK

Band Edge Test Plot

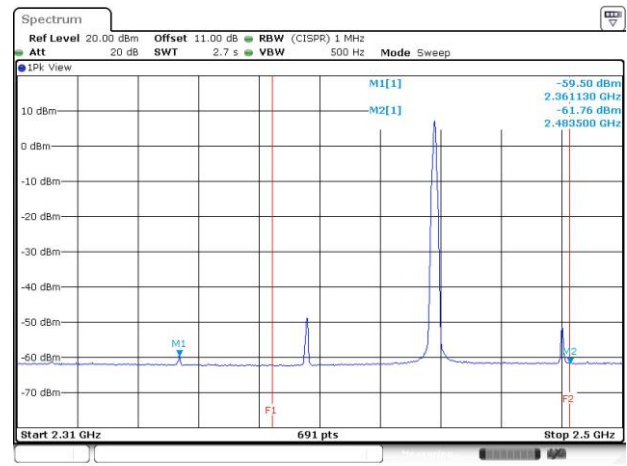
2402MHz - AV



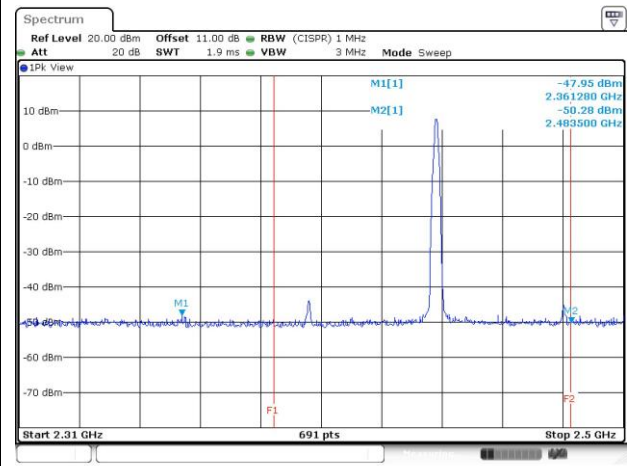
2402MHz - PK



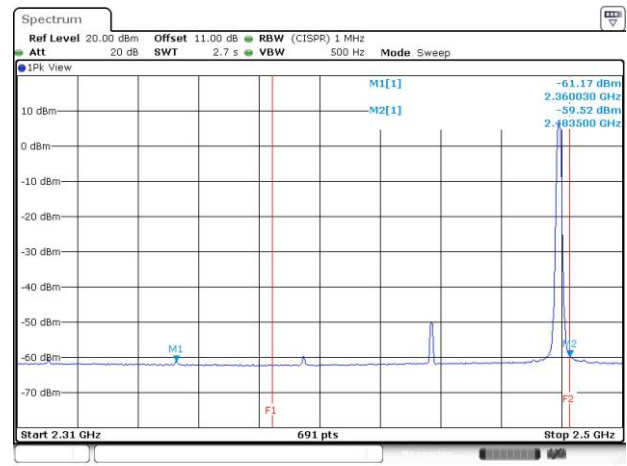
2441MHz - AV



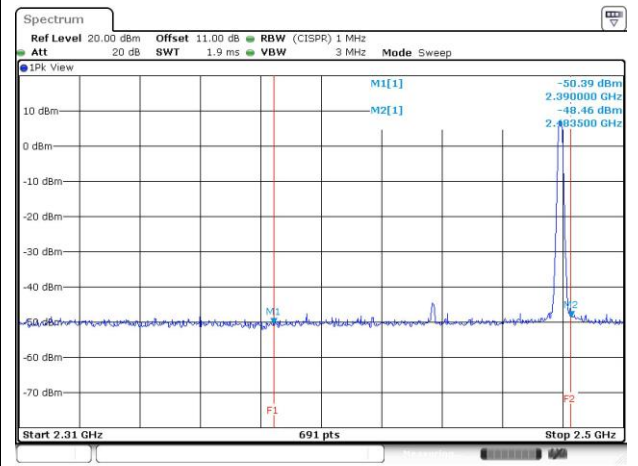
2441MHz - PK



2480MHz - AV



2480MHz - PK



Transmitter Conducted Unwanted Emissions Results in Restricted Frequency Band						
Modulation Mode		GFSK		Frequency	2402MHz	
Freq. (MHz)	Remark	Max Value chain0 (dBm)	DG (dBi)	EIRP (dBm)	E-Field Limit (dBm)	E-Field Margin (dB)
3843.20	PK	-69.12	2.00	-67.12	-21.20	-45.92
3843.20	AV note1	-	2.00	-	-41.20	-
4804.00	PK	-68.14	2.00	-66.14	-21.20	-44.94
4804.00	AV note1	-	2.00	-	-41.20	-

Transmitter Conducted Unwanted Emissions Results in Restricted Frequency Band						
Modulation Mode		GFSK		Frequency	2441MHz	
Freq. (MHz)	Remark	Max Value chain0 (dBm)	DG (dBi)	EIRP (dBm)	E-Field Limit (dBm)	E-Field Margin (dB)
3905.60	PK	-68.11	2.00	-66.11	-21.20	-44.91
3905.60	AV note1	-	2.00	-	-41.20	-
4882.00	PK	-66.73	2.00	-64.73	-21.20	-43.53
4882.00	AV note1	-	2.00	-	-41.20	-
7323.00	PK	-64.59	2.00	-62.59	-21.20	-41.39
7323.00	AV note1	-	2.00	-	-41.20	-

Transmitter Conducted Unwanted Emissions Results in Restricted Frequency Band						
Modulation Mode		GFSK		Frequency	2480MHz	
Freq. (MHz)	Remark	Max Value chain0 (dBm)	DG (dBi)	EIRP (dBm)	E-Field Limit (dBm)	E-Field Margin (dB)
3968.00	PK	-67.98	2.00	-65.98	-21.20	-44.78
3968.00	AV note1	-	2.00	-	-41.20	-
4960.00	PK	-68.62	2.00	-66.62	-21.20	-45.42
4960.00	AV note1	-	2.00	-	-41.20	-
7440.00	PK	-66.84	2.00	-64.84	-21.20	-43.64
7440.00	AV note1	-	2.00	-	-41.20	-

Note:

1. If the PK margin greater than 20 dB, there is no need to get AVG reading.
2. DG = Directional Gain.

Transmitter Conducted Unwanted Emissions Results in Restricted Frequency Band						
Modulation Mode		8DPSK		Frequency	2402MHz	
Freq. (MHz)	Remark	Max Value chain0 (dBm)	DG (dBi)	EIRP (dBm)	E-Field Limit (dBm)	E-Field Margin (dB)
3843.20	PK	-68.73	2.00	-66.73	-21.20	-45.53
3843.20	AV note1	-	2.00	-	-41.20	-
4804.00	PK	-69.96	2.00	-67.96	-21.20	-46.76
4804.00	AV note1	-	2.00	-	-41.20	-

Transmitter Conducted Unwanted Emissions Results in Restricted Frequency Band						
Modulation Mode		8DPSK		Frequency	2441MHz	
Freq. (MHz)	Remark	Max Value chain0 (dBm)	DG (dBi)	EIRP (dBm)	E-Field Limit (dBm)	E-Field Margin (dB)
3905.60	PK	-68.20	2.00	-66.20	-21.20	-45.00
3905.60	AV note1	-	2.00	-	-41.20	-
4882.00	PK	-68.95	2.00	-66.95	-21.20	-45.75
4882.00	AV note1	-	2.00	-	-41.20	-
7323.00	PK	-67.24	2.00	-65.24	-21.20	-44.04
7323.00	AV note1	-	2.00	-	-41.20	-

Transmitter Conducted Unwanted Emissions Results in Restricted Frequency Band						
Modulation Mode		8DPSK		Frequency	2480MHz	
Freq. (MHz)	Remark	Max Value chain0 (dBm)	DG (dBi)	EIRP (dBm)	E-Field Limit (dBm)	E-Field Margin (dB)
3968.00	PK	-67.53	2.00	-65.53	-21.20	-44.33
3968.00	AV note1	-	2.00	-	-41.20	-
4960.00	PK	-70.01	2.00	-68.01	-21.20	-46.81
4960.00	AV note1	-	2.00	-	-41.20	-
7440.00	PK	-68.11	2.00	-66.11	-21.20	-44.91
7440.00	AV note1	-	2.00	-	-41.20	-

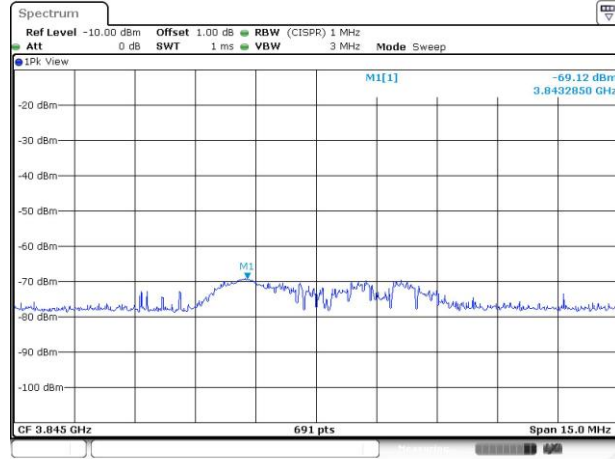
Note:

1. If the PK margin greater than 20 dB, there is no need to get AVG reading.
2. DG = Directional Gain.

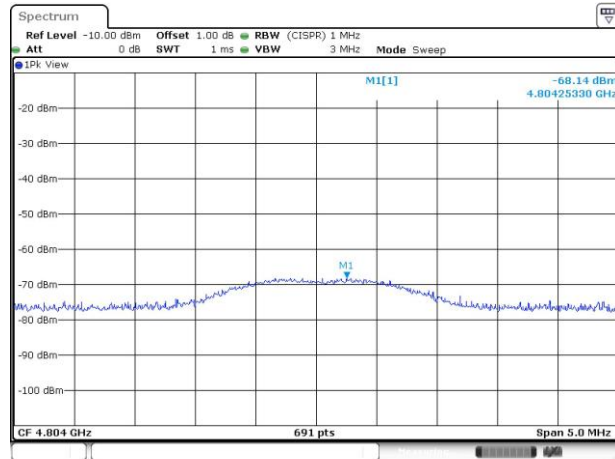
GFSK

Test Plots

3843MHz - PK

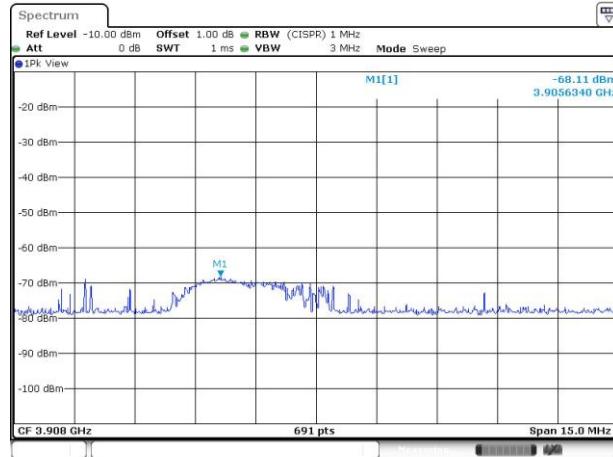


4804MHz - PK

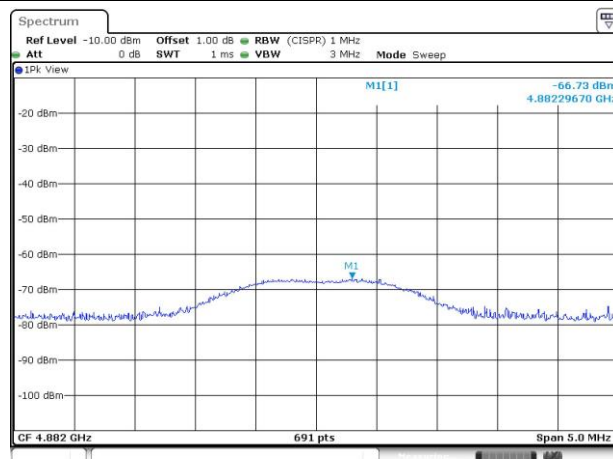


Test Plots

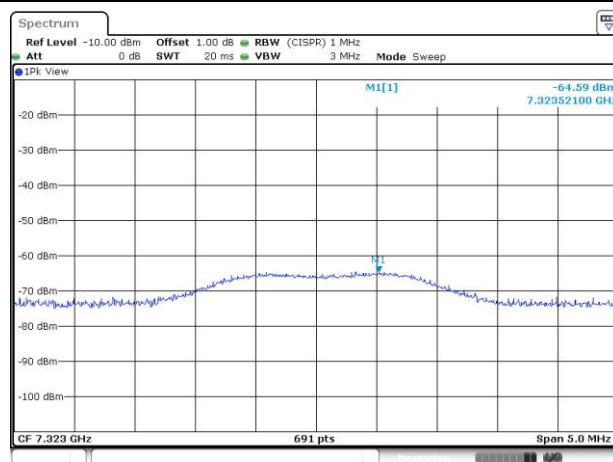
3905.6MHz - PK



4882MHz - PK

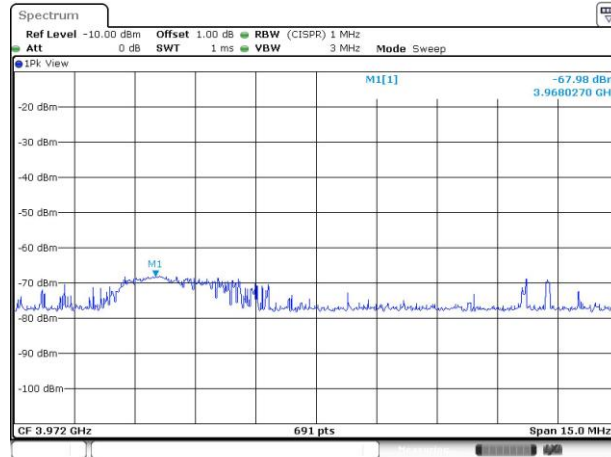


7323MHz - PK

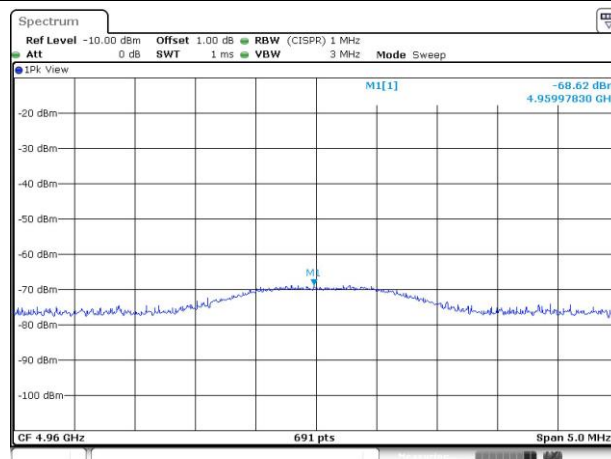


Test Plots

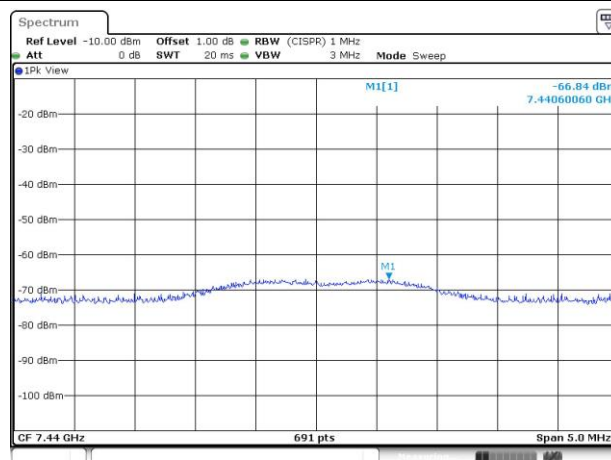
3968MHz - PK



4960MHz - PK



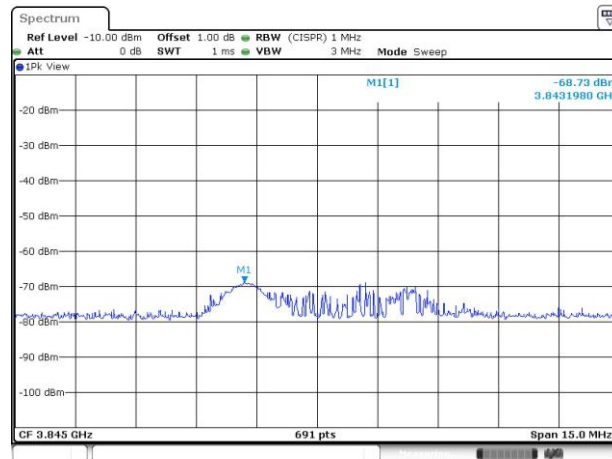
7440MHz - PK



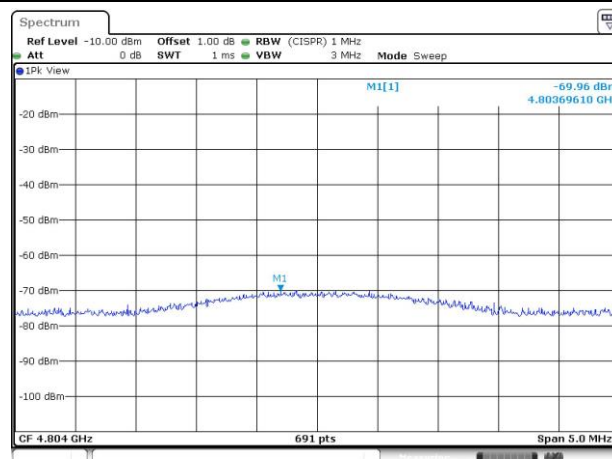
8DPSK

Test Plots

3843MHz - PK

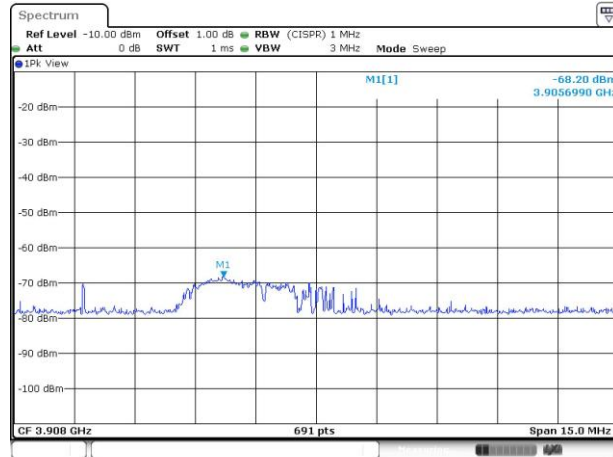


4804MHz - PK

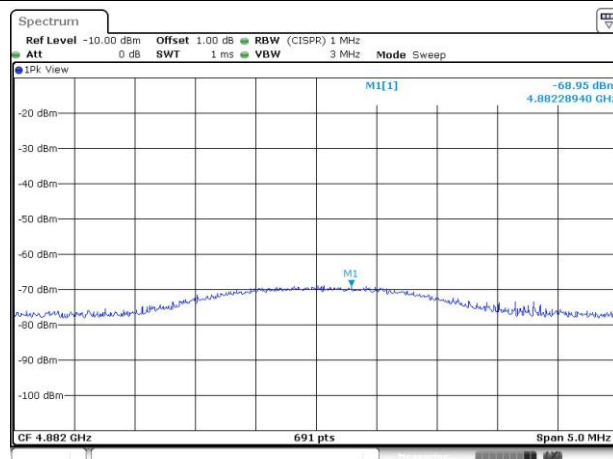


Test Plots

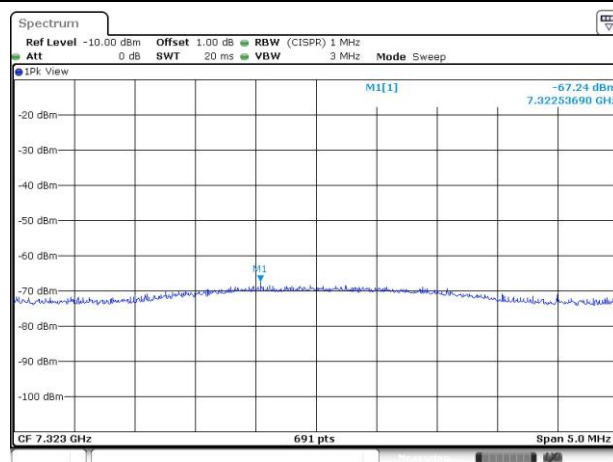
3905.6MHz - PK



4882MHz - PK



7323MHz - PK



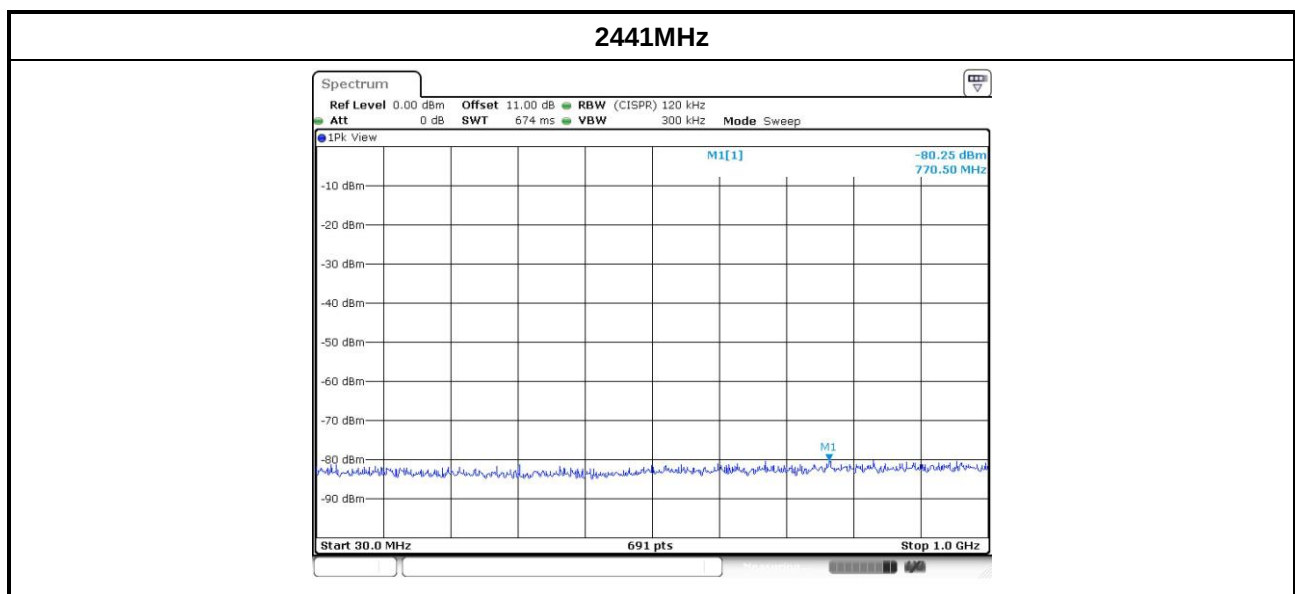
Configuration 4 : BT860-ST

3.2.12 Transmitter Conducted Unwanted Emissions (Below 1 GHz)

Modulation Mode		GFSK		Frequency	2441MHz	
Range (MHz)	Max Value chain0 (dBm)	DG (dBi)	GRF (dB)	EIRP (dBm)	Min E-Field Limit (dBm)	E-Field Margin (dB)
30~1000MHz	-80.25	2.00	4.70	-73.55	-55.20	-18.35

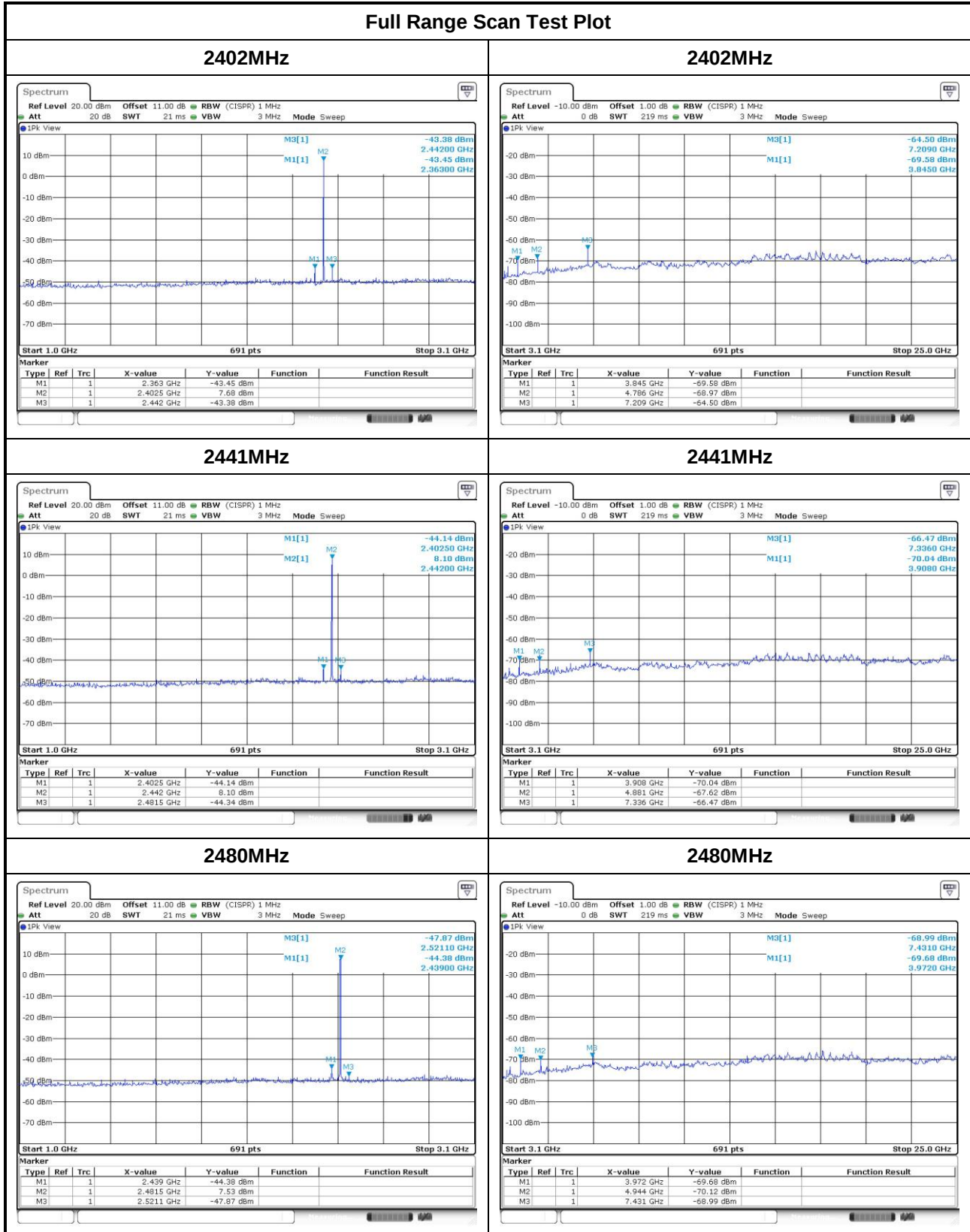
Note:

1. GRF = Ground Reflection Factor.
2. DG = Directional Gain.
3. Worst case of emission limit below 1GHz is selected to be limit.



3.2.13 Transmitter Conducted Unwanted Emissions (Above 1GHz)

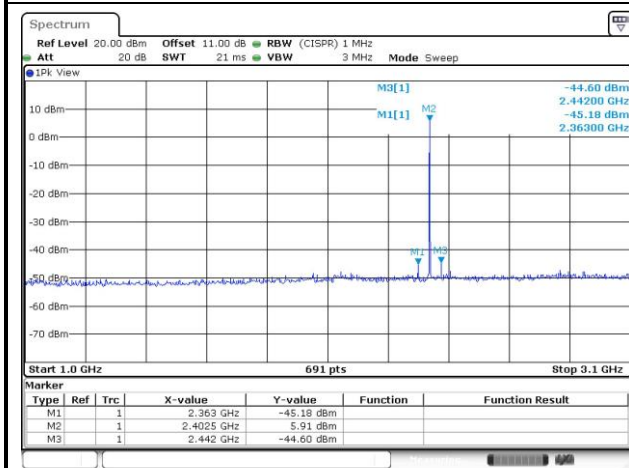
GFSK



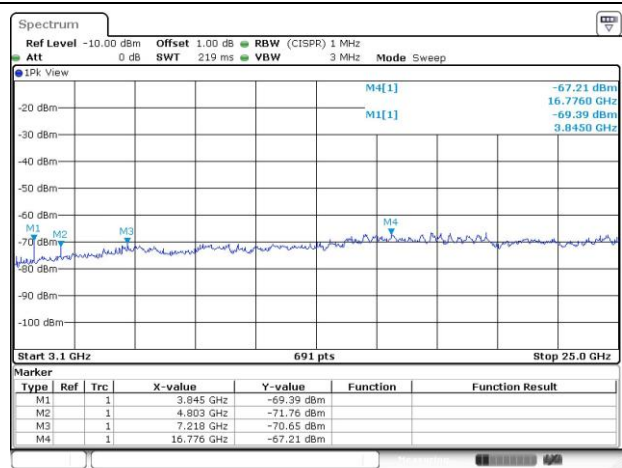
8DPSK

Full Range Scan Test Plot

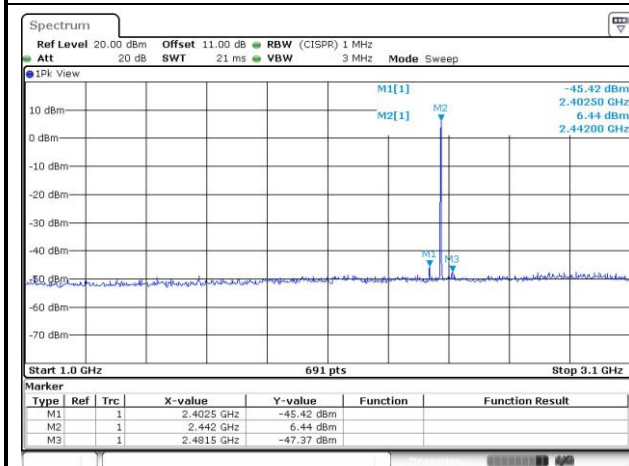
2402MHz



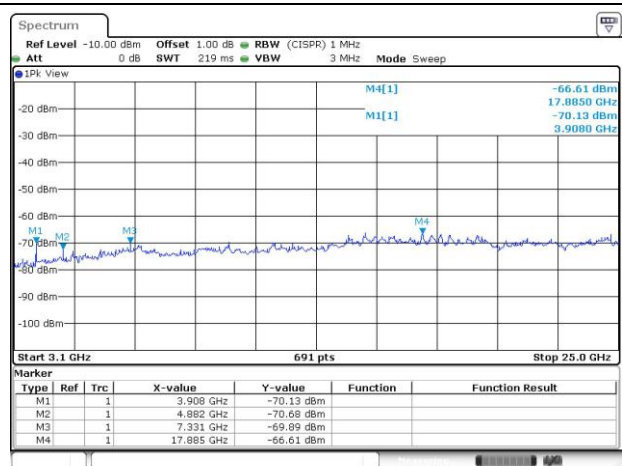
2402MHz



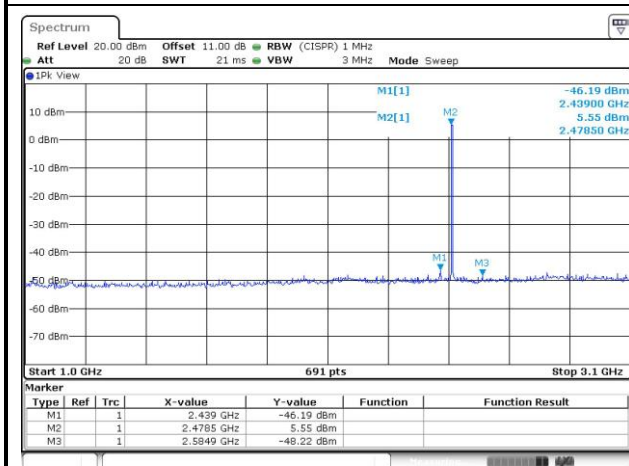
2441MHz



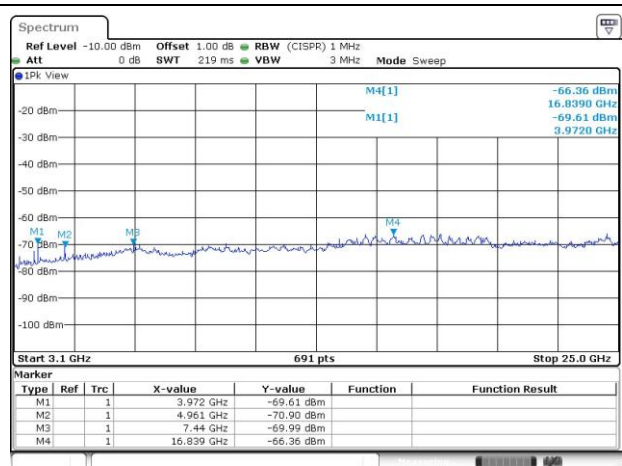
2441MHz



2480MHz



2480MHz



GFSK

Transmitter Conducted Unwanted Emissions Results in Band Edge							
Test ch. Freq. (MHz)	Range (MHz)	Max Value chain0 (dBm)	DG (dBi)	EIRP (dBm)	E-Field Limit (dBm)	E-Field Margin (dB)	Remark
2402	2310~2390	-43.32	2.00	-41.32	-21.20	-20.12	PK
	2310~2390	-46.99	2.00	-44.99	-41.20	-3.79	AV
	2483.5~2500	-48.21	2.00	-46.21	-21.20	-25.01	PK
	2483.5~2500	-61.77	2.00	-59.77	-41.20	-18.57	AV
2441	2310~2390	-48.84	2.00	-46.84	-21.20	-25.64	PK
	2310~2390	-59.42	2.00	-57.42	-41.20	-16.22	AV
	2483.5~2500	-47.75	2.00	-45.75	-21.20	-24.55	PK
	2483.5~2500	-60.19	2.00	-58.19	-41.20	-16.99	AV
2480	2310~2390	-47.60	2.00	-45.60	-21.20	-24.40	PK
	2310~2390	-60.53	2.00	-58.53	-41.20	-17.33	AV
	2485.5~2500	-47.59	2.00	-45.59	-21.20	-24.39	PK
	2485.5~2500	-59.49	2.00	-57.49	-21.20	-36.29	AV

Note: DG = Directional Gain.

8DPSK

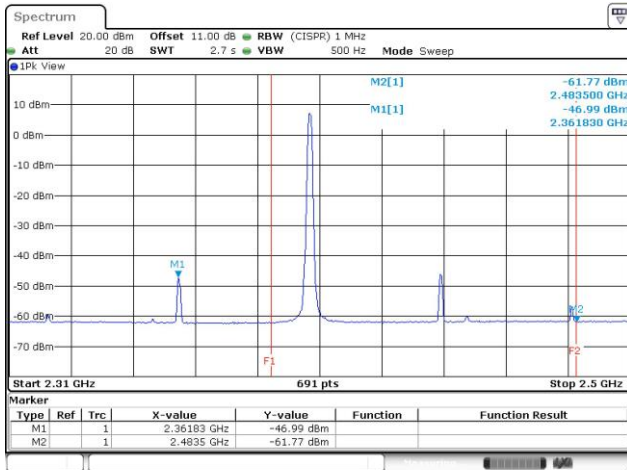
Transmitter Conducted Unwanted Emissions Results in Band Edge							
Test ch. Freq. (MHz)	Range (MHz)	Max Value chain0 (dBm)	DG (dBi)	EIRP (dBm)	E-Field Limit (dBm)	E-Field Margin (dB)	Remark
2402	2310~2390	-45.06	2.00	-43.06	-21.20	-21.86	PK
	2310~2390	-51.73	2.00	-49.73	-41.20	-8.53	AV
	2483.5~2500	-48.14	2.00	-46.14	-21.20	-24.94	PK
	2483.5~2500	-61.59	2.00	-59.59	-41.20	-18.39	AV
2441	2310~2390	-48.41	2.00	-46.41	-21.20	-25.21	PK
	2310~2390	-60.85	2.00	-58.85	-41.20	-17.65	AV
	2483.5~2500	-48.12	2.00	-46.12	-21.20	-24.92	PK
	2483.5~2500	-61.07	2.00	-59.07	-41.20	-17.87	AV
2480	2310~2390	-48.88	2.00	-46.88	-21.20	-25.68	PK
	2310~2390	-61.14	2.00	-59.14	-41.20	-17.94	AV
	2485.5~2500	-47.92	2.00	-45.92	-21.20	-24.72	PK
	2485.5~2500	-60.20	2.00	-58.20	-21.20	-37.00	AV

Note: DG = Directional Gain.

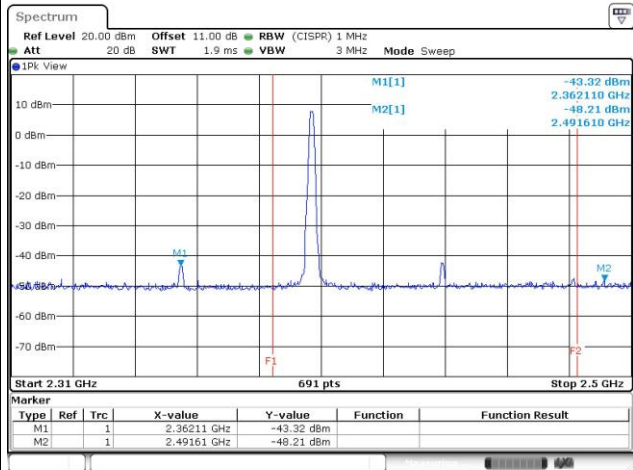
GFSK

Band Edge Test Plot

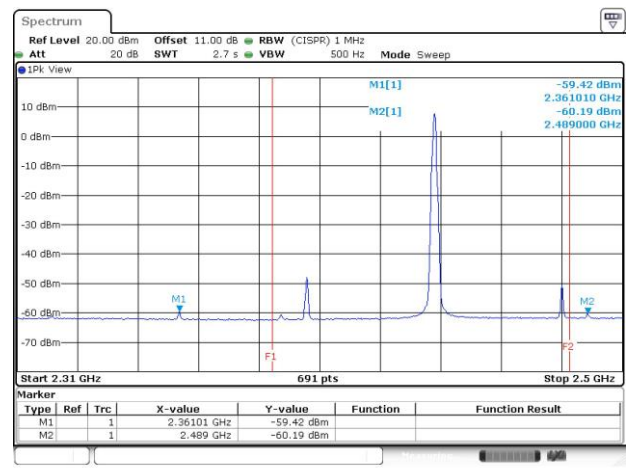
2402MHz - AV



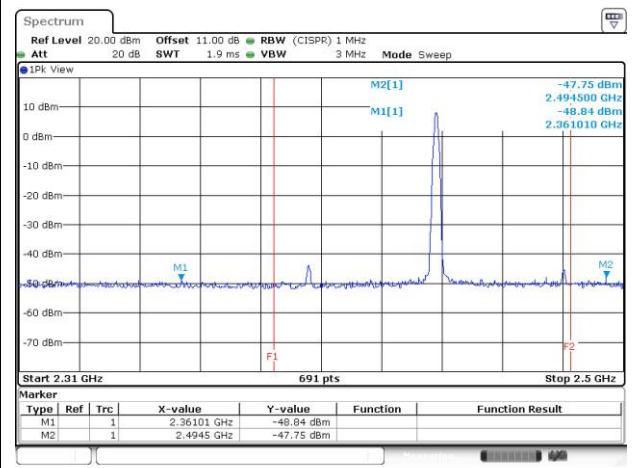
2402MHz - PK



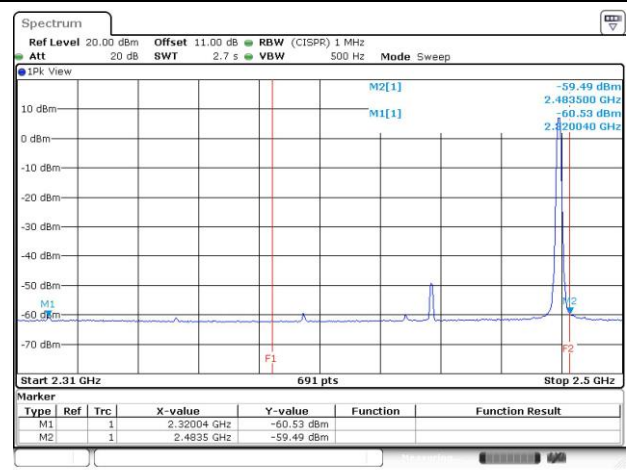
2441MHz - AV



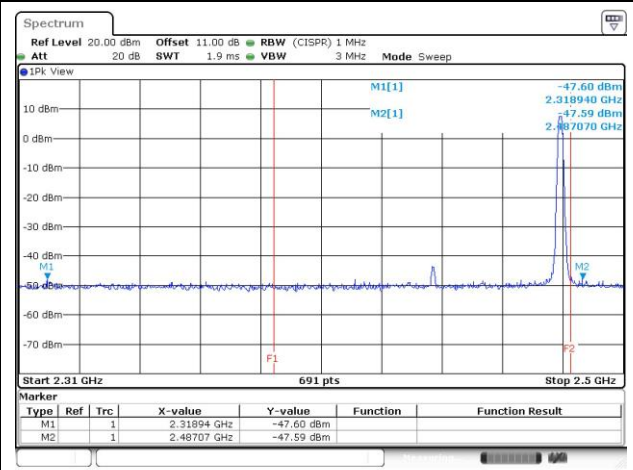
2441MHz - PK



2480MHz - AV



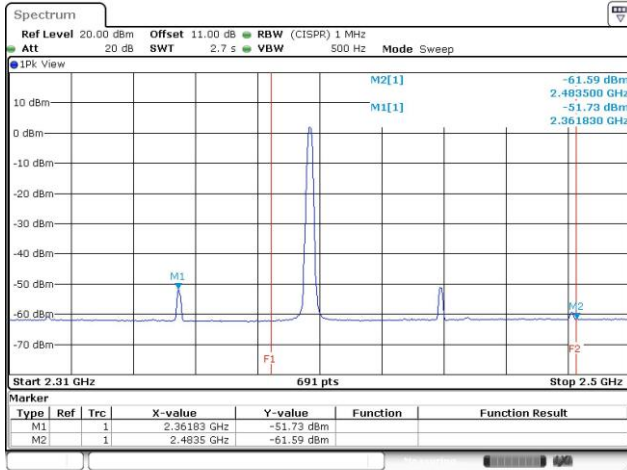
2480MHz - PK



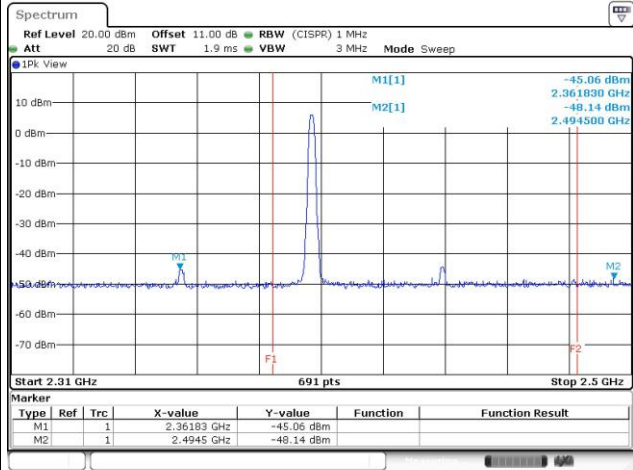
8DPSK

Band Edge Test Plot

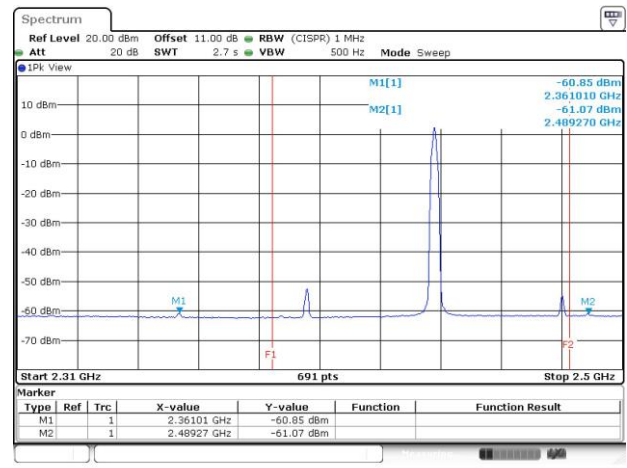
2402MHz - AV



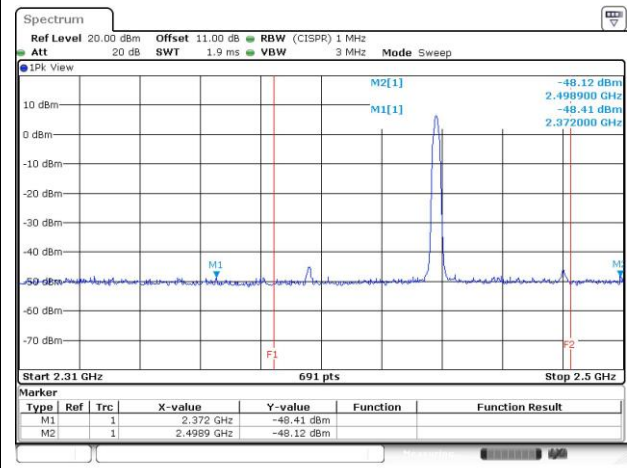
2402MHz - PK



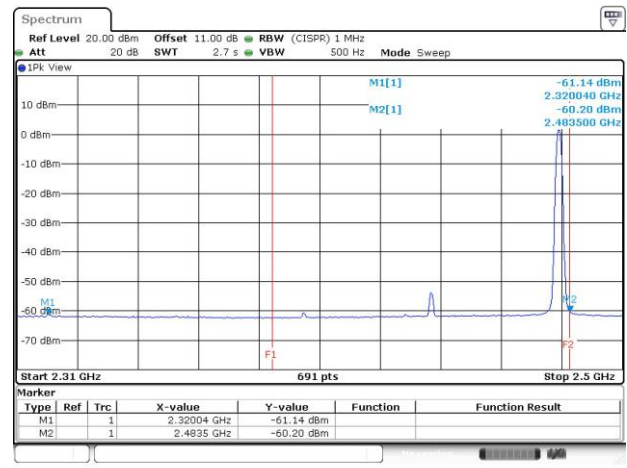
2441MHz - AV



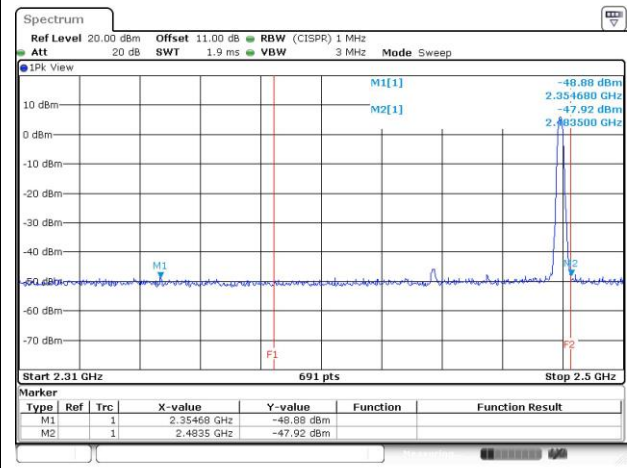
2441MHz - PK



2480MHz - AV



2480MHz - PK



Transmitter Conducted Unwanted Emissions Results in Restricted Frequency Band						
Modulation Mode		GFSK		Frequency	2402MHz	
Freq. (MHz)	Remark	Max Value chain0 (dBm)	DG (dBi)	EIRP (dBm)	E-Field Limit (dBm)	E-Field Margin (dB)
3843.20	PK	-68.80	2.00	-66.80	-21.20	-45.60
3843.20	AV note1	-	2.00	-	-41.20	-
4804.00	PK	-68.31	2.00	-66.31	-21.20	-45.11
4804.00	AV note1	-	2.00	-	-41.20	-

Transmitter Conducted Unwanted Emissions Results in Restricted Frequency Band						
Modulation Mode		GFSK		Frequency	2441MHz	
Freq. (MHz)	Remark	Max Value chain0 (dBm)	DG (dBi)	EIRP (dBm)	E-Field Limit (dBm)	E-Field Margin (dB)
3905.60	PK	-68.74	2.00	-66.74	-21.20	-45.54
3905.60	AV note1	-	2.00	-	-41.20	-
4882.00	PK	-66.26	2.00	-64.26	-21.20	-43.06
4882.00	AV note1	-	2.00	-	-41.20	-
7323.00	PK	-64.00	2.00	-62.00	-21.20	-40.80
7323.00	AV note1	-	2.00	-	-41.20	-

Transmitter Conducted Unwanted Emissions Results in Restricted Frequency Band						
Modulation Mode		GFSK		Frequency	2480MHz	
Freq. (MHz)	Remark	Max Value chain0 (dBm)	DG (dBi)	EIRP (dBm)	E-Field Limit (dBm)	E-Field Margin (dB)
3968.00	PK	-67.42	2.00	-65.42	-21.20	-44.22
3968.00	AV note1	-	2.00	-	-41.20	-
4804.00	PK	-68.43	2.00	-66.43	-21.20	-45.23
4804.00	AV note1	-	2.00	-	-41.20	-
7440.00	PK	-66.55	2.00	-64.55	-21.20	-43.35
7440.00	AV note1	-	2.00	-	-41.20	-

Note:

1. If the PK margin greater than 20 dB, there is no need to get AVG reading.
2. DG = Directional Gain.

Transmitter Conducted Unwanted Emissions Results in Restricted Frequency Band						
Modulation Mode		8DPSK		Frequency	2402MHz	
Freq. (MHz)	Remark	Max Value chain0 (dBm)	DG (dBi)	EIRP (dBm)	E-Field Limit (dBm)	E-Field Margin (dB)
3843.20	PK	-68.20	2.00	-66.20	-21.20	-45.00
3843.20	AV note1	-	2.00	-	-41.20	-
4804.00	PK	-69.45	2.00	-67.45	-21.20	-46.25
4804.00	AV note1	-	2.00	-	-41.20	-

Transmitter Conducted Unwanted Emissions Results in Restricted Frequency Band						
Modulation Mode		8DPSK		Frequency	2441MHz	
Freq. (MHz)	Remark	Max Value chain0 (dBm)	DG (dBi)	EIRP (dBm)	E-Field Limit (dBm)	E-Field Margin (dB)
3905.60	PK	-68.45	2.00	-66.45	-21.20	-45.25
3905.60	AV note1	-	2.00	-	-41.20	-
4882.00	PK	-68.04	2.00	-66.04	-21.20	-44.84
4882.00	AV note1	-	2.00	-	-41.20	-
7323.00	PK	-67.61	2.00	-65.61	-21.20	-44.41
7323.00	AV note1	-	2.00	-	-41.20	-

Transmitter Conducted Unwanted Emissions Results in Restricted Frequency Band						
Modulation Mode		8DPSK		Frequency	2480MHz	
Freq. (MHz)	Remark	Max Value chain0 (dBm)	DG (dBi)	EIRP (dBm)	E-Field Limit (dBm)	E-Field Margin (dB)
3968.00	PK	-67.71	2.00	-65.71	-21.20	-44.51
3968.00	AV note1	-	2.00	-	-41.20	-
4804.00	PK	-69.42	2.00	-67.42	-21.20	-46.22
4804.00	AV note1	-	2.00	-	-41.20	-
7440.00	PK	-68.42	2.00	-66.42	-21.20	-45.22
7440.00	AV note1	-	2.00	-	-41.20	-

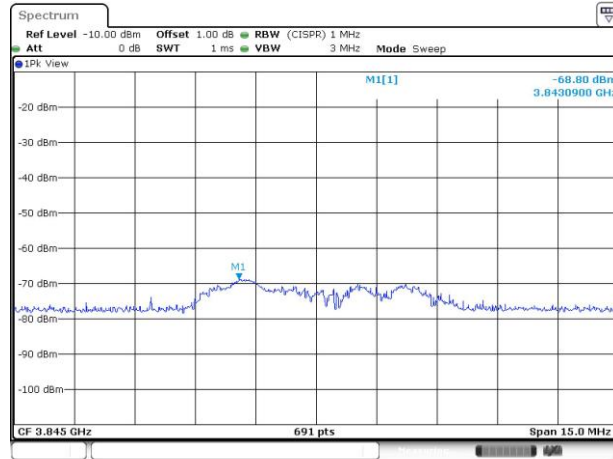
Note:

1. If the PK margin greater than 20 dB, there is no need to get AVG reading.
2. DG = Directional Gain.

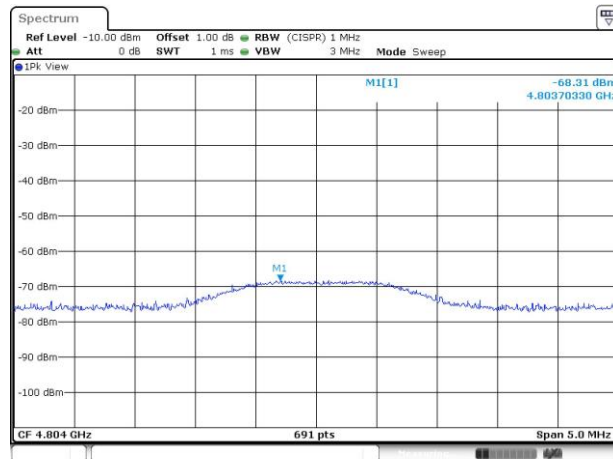
GFSK

Test Plots

3843MHz - PK

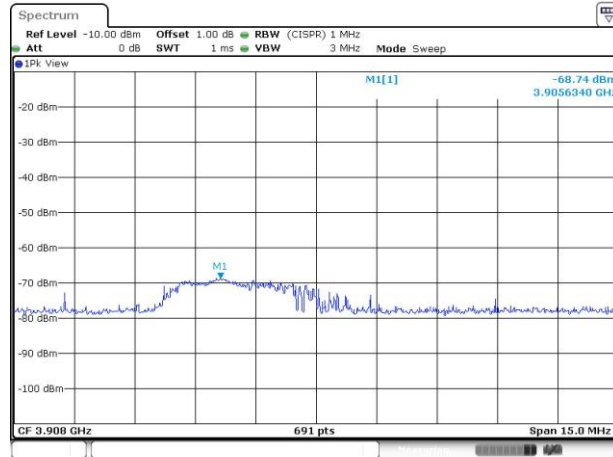


4804MHz - PK

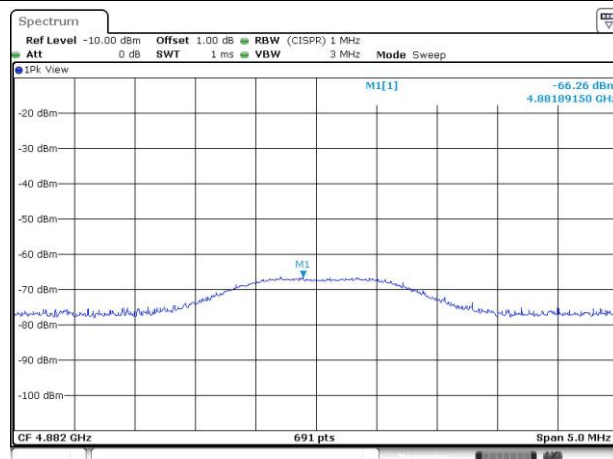


Test Plots

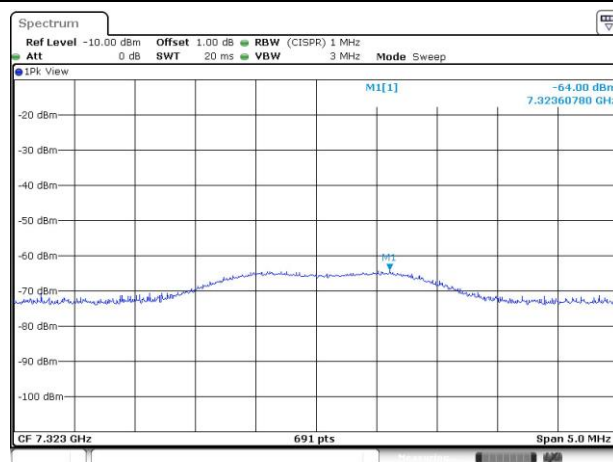
3905.6MHz - PK



4882MHz - PK



7323MHz - PK

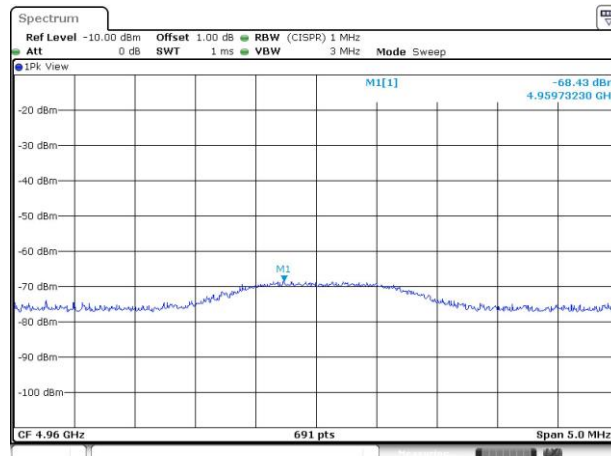


Test Plots

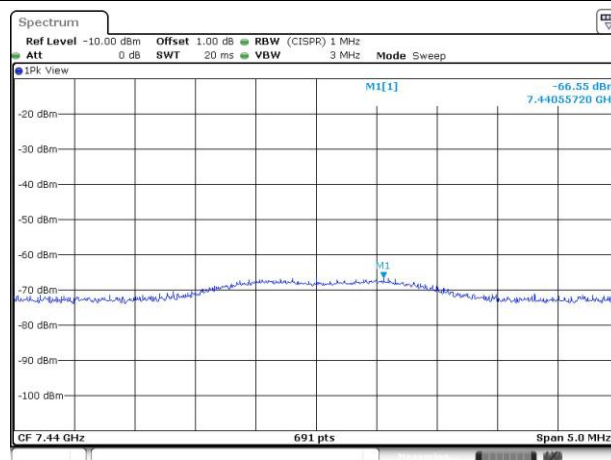
3968MHz - PK



4804MHz - PK



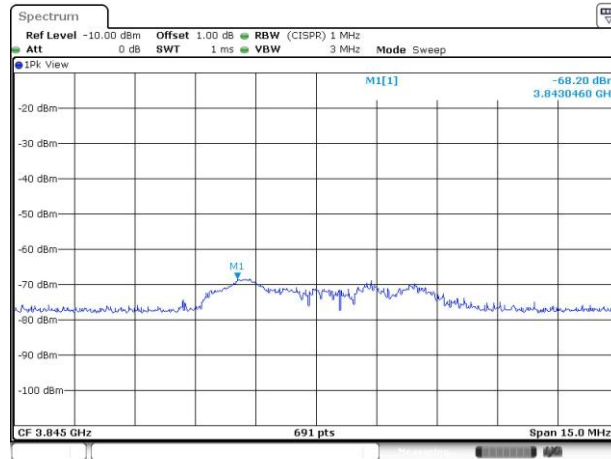
7440MHz - PK



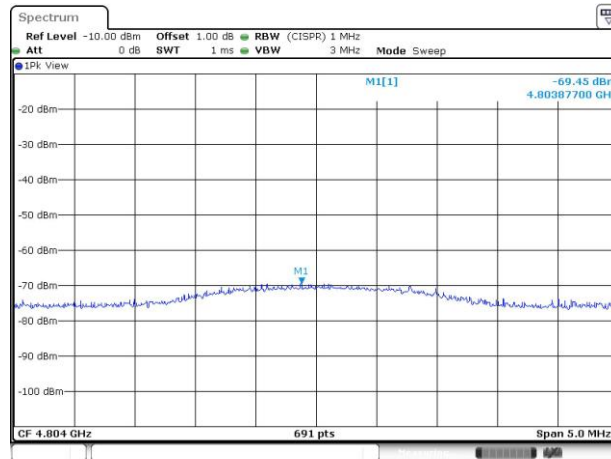
8DPSK

Test Plots

3843MHz - PK

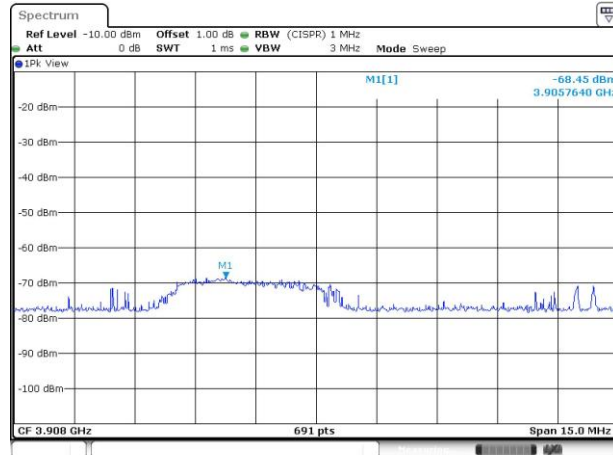


4804MHz - PK

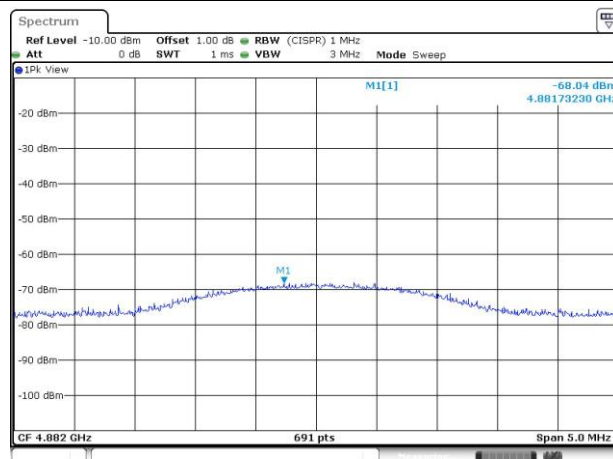


Test Plots

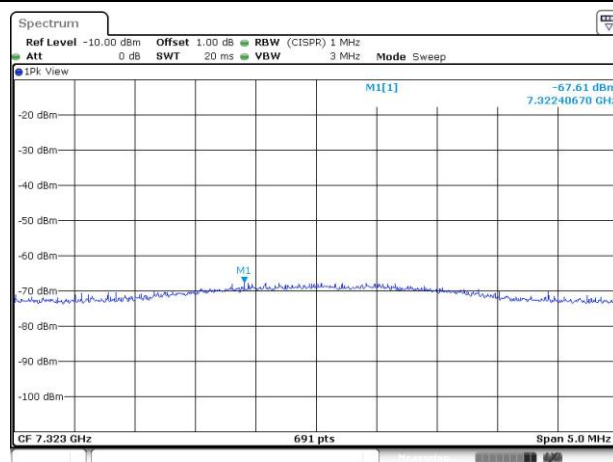
3905.6MHz - PK



4882MHz - PK



7323MHz - PK



3.3 Unwanted Emissions into Non-Restricted Frequency Bands

3.3.1 Limit of Unwanted Emissions into Non-Restricted Frequency Bands

The peak output power measured 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 Test Procedures

Reference Level Measurement

1. Set the RBW = 100 kHz, VBW = 300 kHz, Detector = peak.
2. Set Sweep time = auto couple, Trace mode = max hold.
3. Allow trace to fully stabilize.
4. Use the peak marker function to determine the maximum amplitude level.

Unwanted Emissions Level Measurement

1. Set RBW = 100 kHz, VBW = 300 kHz, Detector = peak.
2. Trace Mode = max hold, Sweep = auto couple.
3. Allow the trace to stabilize.
4. Use peak marker function to determine maximum amplitude of all unwanted emissions within any 100 kHz bandwidth.

3.3.3 Test Setup

