AUDIX Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
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FCC 15.247
2.4 GHz Report

for

Sinopulsar Technology Inc.

7F., No.466-1, Beida Rd., North Dist., Hsinchu City, Taiwan

Brand : SINOPULSAR
Product Name : Thermal Sensing Module (with Bluetooth)
Model Name : SPTS01
FCC ID : 2AGGGSPTS01

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TEST REPORT CERTIFICATION

Applicant	:	Sinopulsar Technology Inc.
Manufacture	:	Ningbo Keytech medicalcare material Co., Ltd
Product Name	:	Thermal Sensing Module (with Bluetooth)
Model No.	:	SPTS01
Serial No.	:	N/A
Brand	:	SINOPULSAR
Power Supply	:	DC 3.7V (Via Battery)

Applicable Standards:

FCC Rules and Regulations Part 15 Subpart C, Oct. 2014
ANSI C63.10:2013
FCC Public Notice DA 00-705

AUDIX Technology Corp. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report. ***AUDIX Technology Corp.*** does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens and samples.

Date of Test: 2015. 11. 20 ~ 12. 13 Date of Report: 2015. 12. 15

Producer: Sabrina Wang
(Sabrina Wang/Administrator)

Signatory: Ben Cheng
(Ben Cheng/Manager)

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1. REPORT HISTORY

Revision	Date	Revision Summary	Report Number
0	2015. 12. 15	Original Report.	EM-F150794

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2. SUMMARY OF TEST RESULTS

Rule	Description	Results
15.207	Conducted Emission	**N/A**
15.247(d)/15.205	Radiated Band Edge and Radiated Spurious Emission	**PASS**
15.247(a)(1)	20dB Bandwidth	**PASS**
15.247(a)(1)	Carrier Frequency Separation	**PASS**
15.247(a)(1)(iii)	Time of Occupancy	**PASS**
15.247(a)(1)(iii)	Number of Hopping Channels	**PASS**
15.247(b)(1)	Maximum Peak Output Power	**PASS**
15.247(d)	Conducted Band Edges and Conducted Spurious Emission	**PASS**
15.203	Antenna Requirement	**PASS**
Note: The EUT only employs battery power for operation, so it is unnecessary to test.		

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3. GENERAL INFORMATION

3.1. Description of EUT

Product	Thermal Sensing Module (with Bluetooth)
Model Number	SPTS01
Serial Number	N/A
Brand Name	SINOPULSAR
Applicant	Sinopulsar Technology Inc. 7F., No.466-1, Beida Rd., North Dist., Hsinchu City, Taiwan
Manufacture	Ningbo Keytech medicalcare material Co., Ltd No. 8, Chang Feng Qiao Rd., Yuyao City, Zhejiang, China
RF Features	Bluetooth
Transmit Type	1T1R
Device Category	☐Outdoor Access Point ☐Fixed point-to-point Access Point ☐Indoor Access Point ■Mobile and Portable client device
Date of Receipt of Sample	2015. 10. 26

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3.2. EUT Specifications Assessed in Current Report

Mode	Fundamental Range (MHz)	Channel Number	Modulation	Data Rate (Mbps)
Bluetooth	2402-2480	79	FHSS (GFSK)	1

Channel List					
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

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3.3. Antenna Information

Antenna Part Number	Manufacture	Antenna Type	Frequency (MHz)	Max Gain (dBi)
GPL52P245000-00	WIESON INTERNATIONAL CO., LTD.	LTCC Antenna	2400-2480	1.87149

3.4. Test Configuration

Item		Modulation	Data Rate	Test Channel
Radiated Test Case	Radiated Band Edge Note1	GFSK	1Mbps	00/78
	Radiated Spurious Emission Note1	GFSK	1Mbps	00/38/78
Conducted Test Case Note2	20dB Bandwidth	GFSK	1Mbps	00/38/78
	Carrier Frequency Separation	GFSK	1Mbps	00/38/78
	Time of Occupancy	GFSK	1Mbps	00/38/78
	Number of Hopping Channels	GFSK	1Mbps	38
	Maximum Peak Output Power	GFSK	1Mbps	00/38/78
	Band Edges	GFSK	1Mbps	00/78
	Spurious Emission	GFSK	1Mbps	00/38/78

Note 1:

■Mobile Device

□Portable Device, and 3 axis were assessed. The worst scenario for Radiated Spurious Emission as follow:

- □ Lie
- □ Side
- □ Stand

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3.5. Tested Supporting System List

3.5.1. Support Peripheral Unit

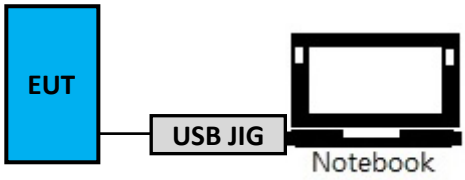
No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Notebook PC	acer	MS2362	P20G001	PPD-AR5B22
2.	USB Jig	N/A	N/A	N/A	N/A

3.5.2. Cable Lists

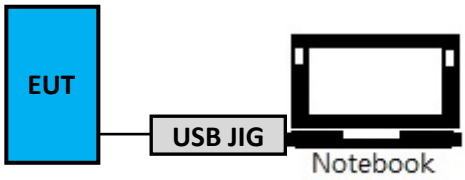
No.	Cable Description Of The Above Support Units
1.	USB Cable: Shielded, Detachable, 1.8m Adapter: Chicony, M/N CPA09-A065N1,, DC Cord: Shielded, Undetachable, 1.8m Bonded a ferrite core AC Power Cord: Unshielded, Detachable, 1.8m
2.	BUS Cable: Unshielded, Detachable, 0.1m

3.6. Setup Configuration

3.6.1. EUT Configuration for Power Line and Radiated Emission



3.6.2. EUT Configuration for Conducted Test Items



3.7. Operating Condition of EUT

To set EUT RF function under continues transmitting and choosing channel.

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3.8. Description of Test Facility

Test Firm Name	:	**AUDIX Technology Corporation** **EMC Department** No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan
Test Location & Facility	:	**Semi-Anechoic Chamber** No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan **Fully Anechoic Chamber** No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan
NVLAP Lab. Code	:	200077-0
TAF Accreditation No	:	1724

3.9. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Radiation Test (Distance: 3m)	30MHz~300MHz	± 3.64dB
	300MHz~1000MHz	± 4.70dB
	Above 1GHz	± 2.94dB

Remark：Uncertainty = $ku_c(y)$

Test Item	Uncertainty
20dB Bandwidth	±0.2kHz
Carrier Frequency Separation	±0.2kHz
Time of Occupancy	±0.03sec
Maximum peak Output power	± 0.52dB
Conducted Emission Limitations	± 0.13dB

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4. MEASUREMENT EQUIPMENT LIST

4.1. Radiated Emission Measurement

4.1.1. Frequency Range 30MHz~1000MHz (Semi-Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9010A-526	MY53400071	2015. 09. 14	1 Year
2	Test Receiver	R & S	ESCS30	100338	2015. 06. 24	1 Year
3	Amplifier	HP	8447D	2944A06305	2015. 02. 12	1 Year
4	Bilog Antenna	CHASE	CBL6112D	33821	2015. 02. 27	1 Year

4.1.2. Frequency Range Above 1000MHz (Fully Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	2015. 08. 20	1 Year
2.	Amplifier	Sonoma	310N	187161	2015. 06. 17	1 Year
3.	Horn Antenna	ETS-Lindgren	3117	00135902	2015. 03. 06	1 Year
4.	2.4GHz Notch Filter	K&L	7NSL10-2441.5 E130.5-00	1	2015. 07. 22	1 Year
5.	3G High Pass Filter	Microware Circuits	H3G018G1	484796	2015. 08. 24	1 Year

4.2. RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1	Spectrum Analyzer	Agilent	N9030A-544	US51350140	2015. 06. 10	1 Year

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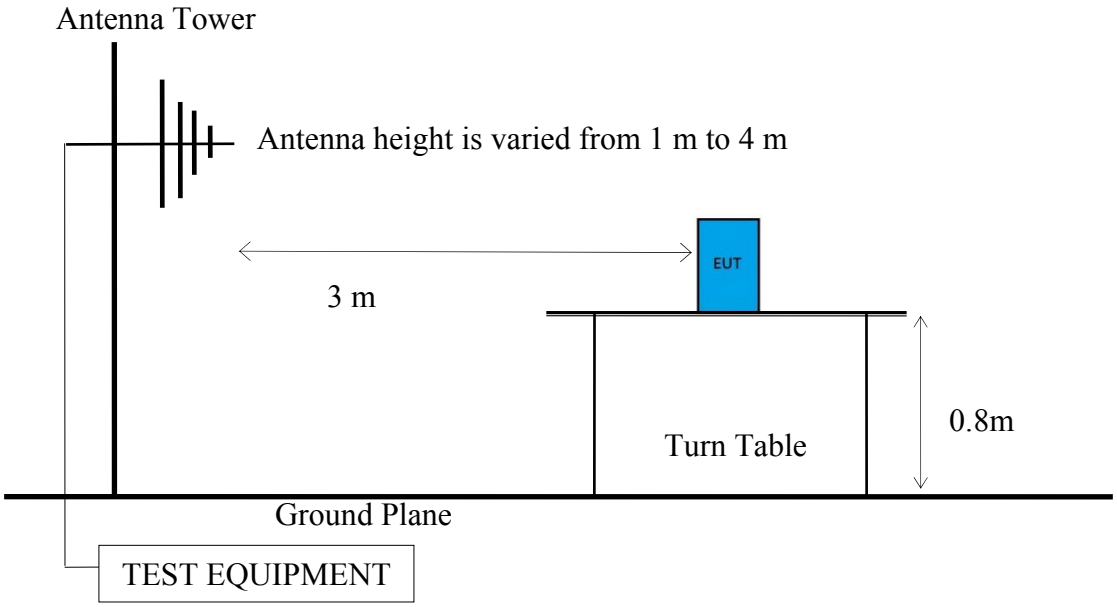
5. RADIATED EMISSION MEASUREMENT

5.1. Block Diagram of Test Setup

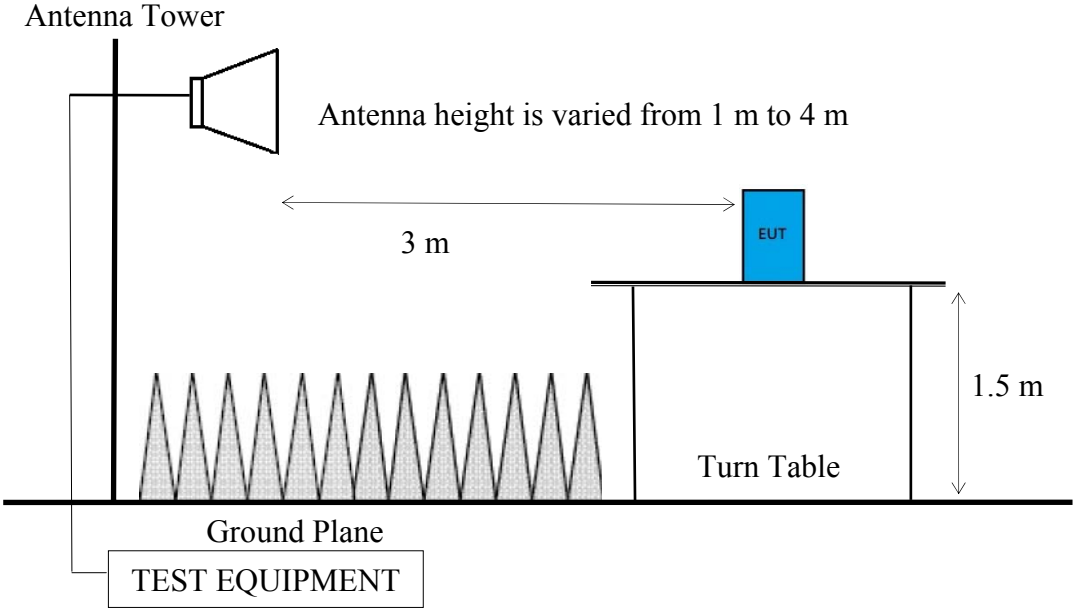
5.1.1. Block Diagram of EUT

Indicated as section 3.6

5.1.2. Setup Diagram for 30-1000 MHz



5.1.3. Semi-Anechoic Chamber (3m) Setup Diagram for above 1GHz



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5.2. Radiated Emission Limits

In any 100kHz bandwidth outside the frequency band, the radio frequency power produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified as below.

Frequency (MHz)	Distance (m)	Field Strengths Limits	
		μV/m	dBμV/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0
Above 1000	3	74.0 dBμV/m (Peak) 54.0 dBμV/m (Average)	

Remark：(1) dBμV/m = 20 log (μV/m)
(2) The tighter limit applies to the edge between two frequency bands.
(3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
(4) Fundamental and emission fall within operation band are exempted from this section.
(5) Pursuant to ANSI C63.10: 6.6.4.3, if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.

5.3. Test Procedure

The EUT setup on the turn table which has 1.5m height to the ground. The turn table rotated 360 degrees and antenna varied from 1 m to 4 m to find the maximum emission level. Both horizontal and vertical polarization are required. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.
Frequency below 1 GHz:
Spectrum Analyzer is used for pre-testing with following setting:

(1) RBW = 120KHz
(2) VBW ≥ 3 x RBW.
(3) Detector = Peak.
(4) Sweep time = auto.
(5) Trace mode = max hold.
(6) Allow sweeps to continue until the trace stabilizes.
(7) When peak-detected value is lower than limit that the measurement using the Q.P. detector is not required. Otherwise using Q.P. for finally measurement.

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Frequency above 1GHz to 10th harmonic:

Peak Detector:

(1) RBW = 1MHz
(2) VBW ≥ 3 x RBW.
(3) Detector = Peak.
(4) Sweep time = auto.
(5) Trace mode = max hold.
(6) Allow sweeps to continue until the trace stabilizes.
(7) When peak-detected value is lower than limit that the measurement using the average detector is not required. Otherwise using average for finally measurement.

Average Measurement:

■**Option 1:**

(1) RBW = 1 MHz
(2) VBW =1/T
(3) Detector = Peak.
(4) Sweep time = auto.
(5) Trace mode = max hold.
(6) Allow sweeps to continue until the trace stabilizes.

□**Option 2:**

Average Emission Level= Peak Emission Level+ D.C.C.F.

5.4. Measurement Result Explanation

■Peak Emission Level=Antenna Factor + Cable Loss + Meter Reading
■Average Emission Level l=Antenna Factor + Cable Loss + Meter Reading
□Average Emission Level= Peak Emission Level+ DCCF
Duty Cycle Correction Factor (DCCF)= 20log (TX_{on}/100ms) presented in section 3.4
□EPR= Peak Emission Level-95.2dB-2.14dBi

5.5. Test Results

PASSED.

Test Date	2015/12/13	Temp./Hum.	21℃/51%
Test Voltage	DC 3.7V (Via Battery)		

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5.5.1. Emissions within Restricted Frequency Bands

5.5.1.1. Frequency Below 1 GHz

Modulation	GFSK	Frequency	TX 2402MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
276.38	13.43	1.49	20.57	35.49	46.00	10.51	Peak
431.58	16.44	1.94	14.45	32.83	46.00	13.17	Peak
828.31	20.15	2.84	16.94	39.93	46.00	6.07	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
158.04	10.63	1.09	23.04	34.76	43.50	8.74	Peak
483.96	17.36	2.06	15.85	35.27	46.00	10.73	Peak
831.22	20.18	2.85	17.16	40.19	46.00	5.81	Peak

Modulation	GFSK	Frequency	TX 2440MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
299.66	13.75	1.56	20.03	35.34	46.00	10.66	Peak
419.94	16.24	1.91	14.53	32.68	46.00	13.32	Peak
827.34	20.15	2.84	17.10	40.09	46.00	5.91	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
170.65	9.78	1.13	26.39	37.30	43.50	6.20	Peak
482.99	17.33	2.06	16.30	35.69	46.00	10.31	Peak
830.25	20.18	2.85	16.46	39.49	46.00	6.51	Peak

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Modulation	GFSK	Frequency	TX 2480MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
276.38	13.43	1.49	20.26	35.18	46.00	10.82	Peak
395.69	15.77	1.84	13.87	31.48	46.00	14.52	Peak
831.22	20.18	2.85	17.14	40.17	46.00	5.83	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
277.35	13.44	1.50	20.14	35.08	46.00	10.92	Peak
484.93	17.39	2.07	15.08	34.54	46.00	11.46	Peak
830.25	20.18	2.85	15.80	38.83	46.00	7.17	Peak

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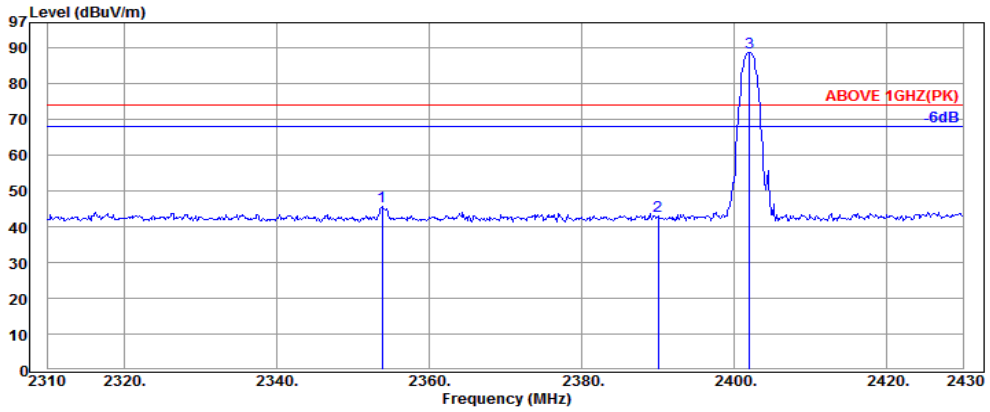
5.5.1.2. Frequency Above 1 GHz to 10th harmonics

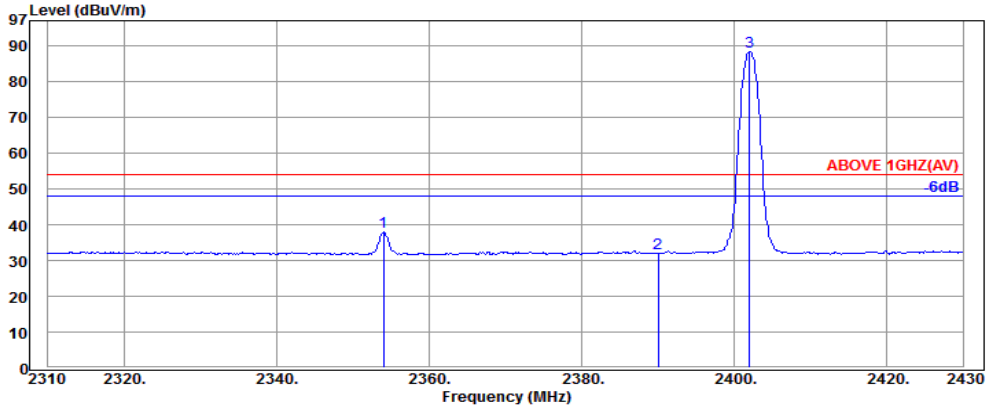
Band Edge:

Modulation	GFSK	Frequency	TX 2402MHz



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2353.80	32.11	5.69	7.86	45.66	74.00	28.34	Peak
2390.04	32.16	5.72	5.26	43.14	74.00	30.86	Peak
2402.04	32.16	5.72	50.74	88.62	---	---	Peak



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2354.04	32.11	5.69	0.27	38.07	54.00	15.93	Average
2390.04	32.16	5.72	-5.76	32.12	54.00	21.88	Average
2402.04	32.16	5.72	50.36	88.24	---	---	Average

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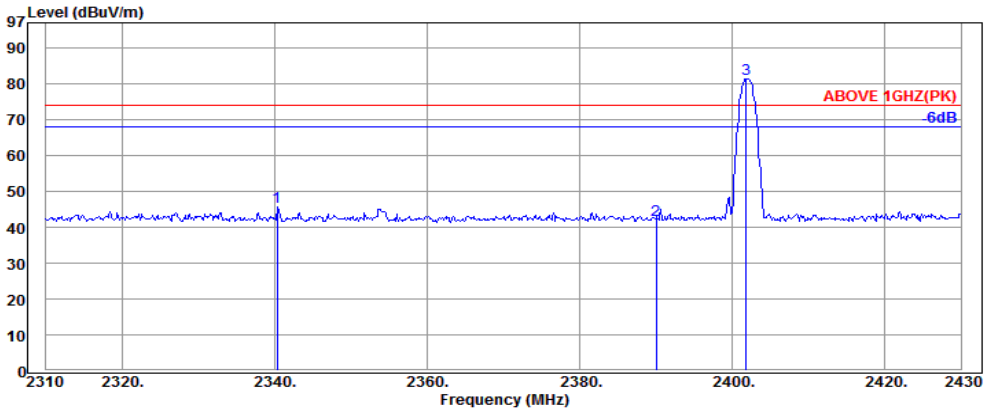
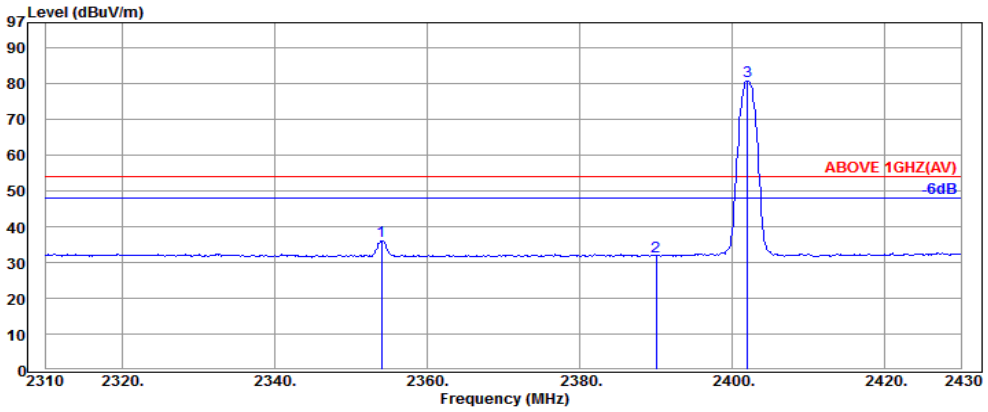
Modulation	GFSK	Frequency	TX 2402MHz



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2340.36	32.08	5.68	7.81	45.57	74.00	28.43	Peak
2390.04	32.16	5.72	4.03	41.91	74.00	32.09	Peak
2401.80	32.16	5.72	43.48	81.36	---	---	Peak



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2354.04	32.11	5.69	-1.69	36.11	54.00	17.89	Average
2390.04	32.16	5.72	-6.08	31.80	54.00	22.20	Average
2402.04	32.16	5.72	42.95	80.83	---	---	Average

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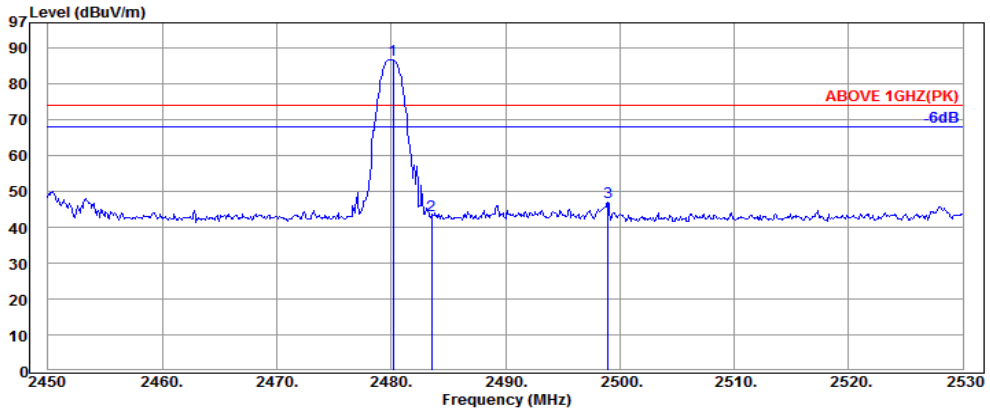
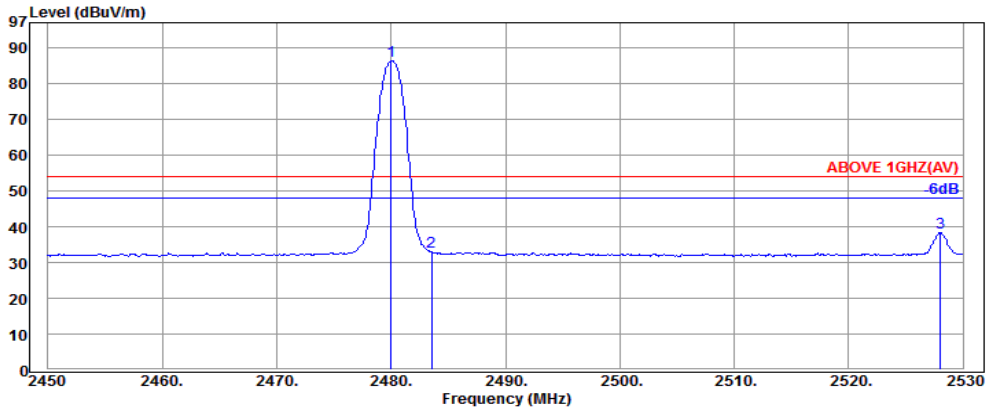
Modulation	GFSK	Frequency	TX 2480MHz



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2480.16	32.28	5.82	48.66	86.76	---	---	Peak
2483.52	32.28	5.82	5.10	43.20	74.00	30.80	Peak
2498.96	32.30	5.84	9.01	47.15	74.00	26.85	Peak



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2480.00	32.28	5.82	48.17	86.27	---	---	Average
2483.52	32.28	5.82	-5.22	32.88	54.00	21.12	Average
2528.00	32.34	5.89	0.17	38.40	54.00	15.60	Average

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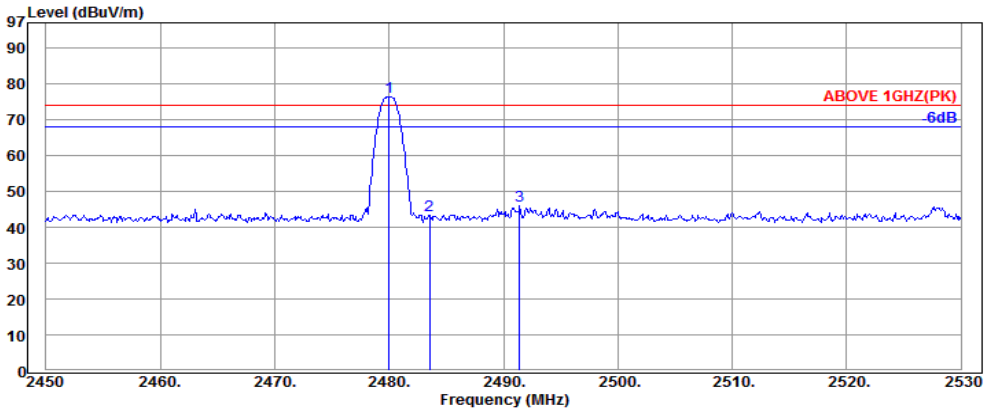
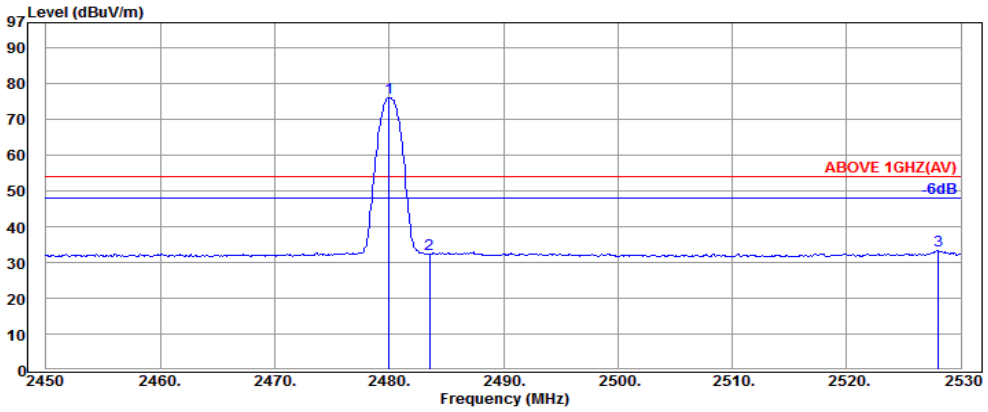
Modulation	GFSK	Frequency	TX 2480MHz



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2480.00	32.28	5.82	38.26	76.36	---	---	Peak
2483.52	32.28	5.82	5.14	43.24	74.00	30.76	Peak
2491.44	32.30	5.84	7.78	45.92	74.00	28.08	Peak



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2480.00	32.28	5.82	37.99	76.09	---	---	Average
2483.52	32.28	5.82	-5.92	32.18	54.00	21.82	Average
2528.00	32.34	5.89	-4.96	33.27	54.00	20.73	Average

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5.5.2. Emissions outside the frequency band:

The emissions (up to 25GHz) not reported for there is no emission be found.

Modulation	GFSK	Frequency	TX 2402MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4800.00	34.22	7.86	7.91	49.99	54.00	4.01	Peak

Modulation	GFSK	Frequency	TX 2441MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4885.00	34.26	8.47	4.95	47.68	54.00	6.32	Peak

Modulation	GFSK	Frequency	TX 2480MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4960.00	34.29	8.68	7.82	50.79	54.00	3.21	Peak

5.5.3. Emissions in Non-restricted Frequency Bands

All emission levels below the 15.209 general radiated emissions limits is not required.

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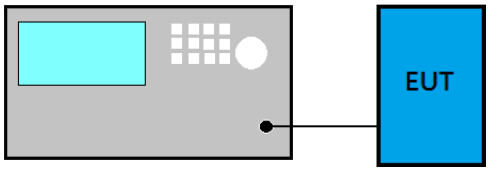
6. 20dB BANDWIDTH MEASUREMENT

6.1. Block Diagram of Test Setup



6.2. Specification Limits

Alternatively, frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

6.3. Test Procedure

Following measurement procedure is reference to DA00-705:

(1) Set RBW close to1% of OBW.
(2) Set VBW≥RBW.
(3) Detector = Peak.
(4) Trace mode = max hold.
(5) Sweep = auto couple.
(6) Allow the trace to stabilize.
(7) Setting channel bandwidth function x dB to -20 dB to record the final bandwidth.

6.4. Test Results

Please refer to Appendix A

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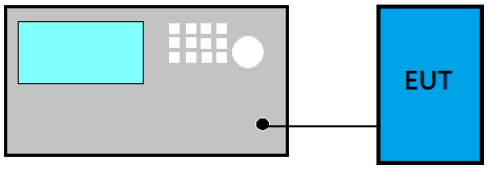
7. CARRIER FREQUENCY SEPARATION MEASUREMENT

7.1. Block Diagram of Test Setup



7.2. Specification Limits

Alternatively, frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output no greater than 125mW.

7.3. Test Procedure

Following measurement procedure is reference to DA00-705:

(1) Span = wide enough to capture the peaks of two adjacent channels
(2) RBW ≥ 1% of the span
(3) VBW≥ RBW
(4) Sweep = auto
(5) Detector function = peak
(6) Trace = max hold

7.4. Test Results

Please refer to Appendix A

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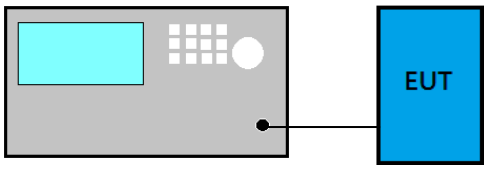
8. TIME OF OCCUPANCY MEASUREMENT

8.1. Block Diagram of Test Setup



8.2. Specification Limits

Frequency hopping systems in the 2400-2483.5MHz shall use at least 15 non-overlapping channels. 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 number of hopping channels employed.

8.3. Test Procedure

Following measurement procedure is reference to DA00-705:

(1) Span = zero span, centered on a hopping channel
(2) RBW = 1 MHz
(3) VBW ≥ RBW
(4) Sweep = as necessary to capture the entire dwell time per hopping channel
(5) Detector function = peak
(6) Trace = max hold

8.4. Test Results

Please refer to Appendix A

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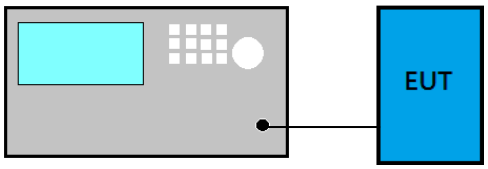
9. NUMBER OF HOPPING CHANNELS MEASUREMENT

9.1. Block Diagram of Test Setup



9.2. Specification Limits

Frequency hopping systems which use fewer than 20 hopping frequencies may employ intelligent hopping techniques to avoid interference to other transmissions. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 non-overlapping channels.

9.3. Test Procedure

Following measurement procedure is reference to DA00-705:

(1) Span = the frequency band of operation
(2) RBW ≥ 1% of the span
(3) VBW ≥ RBW
(4) Sweep = auto
(5) Detector function = peak
(6) Trace = max hold

9.4. Test Results

Please refer to Appendix A

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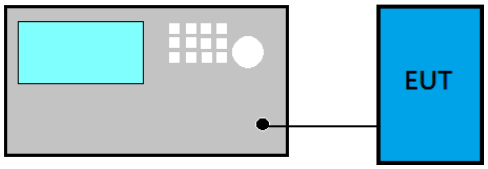
10. MAXIMUM PEAK OUTPUT POWER MEASUREMENT

10.1. Block Diagram of Test Setup



10.2. Specification Limits

The Limits of maximum Peak Output Power for frequency hopping systems in 2400-2483.5MHz is: 0.125Watt. (21dBm)

10.3. Test Procedure

Following measurement procedure is reference to DA00-705:

(1) Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
(2) RBW ≥ 1% of the span
(3) VBW ≥ RBW
(4) Sweep = auto
(5) Detector function = peak
(6) Trace = max hold

10.4. Test Results

Please refer to Appendix A

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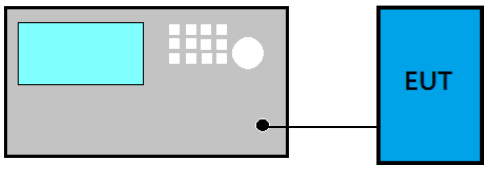
11. EMISSION LIMITATIONS MEASUREMENT

11.1. Block Diagram of Test Setup



11.2. Specification Limits

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (See Section 15.205(c)).

11.3. Test Procedure

Following measurement procedure is reference to DA00-705:

(1) Set span wide enough to capture the peak level of the in-band emission and all spurious emissions; up to 10th harmonic.
(2) RBW = 100 kHz
(3) VBW ≥ RBW
(4) Sweep = auto
(5) Detector function = peak
(6) Trace = max hold

11.4. Test Results

Please refer to Appendix A

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12. DEVIATION TO TEST SPECIFICATIONS

【NONE】

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APPDNDIX A

TEST PLOTS

(Model: SPTS01)

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A.1 20dB BANDWIDTH MEASUREMENT

Test Date	2015/11/20	Temp./Hum.	22℃/51%
Cable Loss	1.16dB	Test Voltage	DC 3.7V (Via Battery)

A.1.1 20dB Bandwidth Result

Modulation	Centre Frequency (MHz)	20 dB Bandwidth (MHz)	2/3 (20dB Bandwidth)
GFSK	2402	0.9227	0.615
	2440	0.9210	0.614
	2480	0.9212	0.614

Remark: The maximum two-thirds of the 20dB bandwidth is the limit for carrier frequency separation presented.

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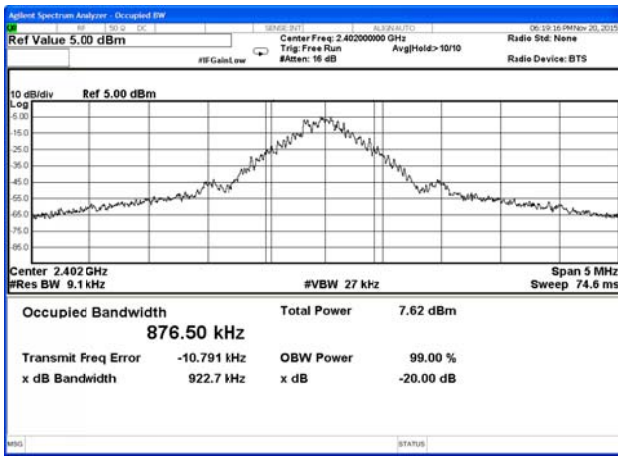
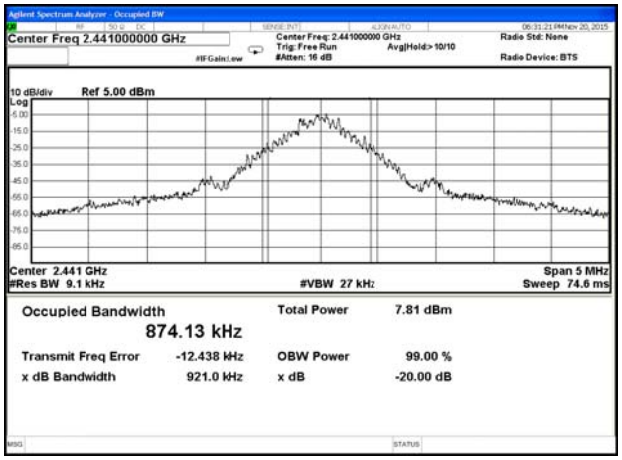
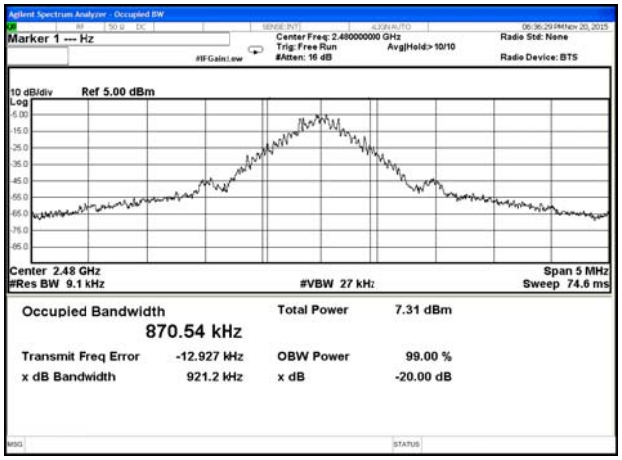
A.1.2 Measurement Plots

Modulation: GFSK




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A.2 CARRIER FREQUENCY SEPARATION MEASUREMENT

Test Date	2015/11/20	Temp./Hum.	22℃/51%
Cable Loss	0.2dB	Test Voltage	DC 3.7V (Via Battery)

A.2.1 Measurement Plots

<table>
<tr><td colspan="2">Modulation: GFSK</td></tr>
<tr><td>2402MHz</td><td>2440MHz
adjacent channel of right carrier frequency</td></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>2440MHz
adjacent channel of left carrier frequency</td><td>2480MHz</td></tr>
<tr><td> 
</td><td> 
</td></tr>
</table>

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A.3 TIME OF OCCUPANCY MEASUREMENT

Test Date	2015/11/20	Temp./Hum.	22℃/51%
Cable Loss	1.16dB	Test Voltage	DC 3.7V (Via Battery)

A.3.1 Time of Occupancy

Modulation	Centre Frequency (MHz)	Mode	Time of Occupancy (ms)	Maximum accumulated Time of Occupancy (ms)	Limit (ms)
GFSK	2402	DH1	0.396	125.136	<400
		DH3	1.650	239.844	<400
		DH5	2.900	293.248	<400
	2440	DH1	0.396	125.136	<400
		DH3	1.655	271.950	<400
		DH5	2.900	238.264	<400
	2480	DH1	0.396	125.136	<400
		DH3	1.650	281.556	<400
		DH5	2.900	256.592	<400

Observation Period: 79 channels*0.4 seconds = 31.6 seconds

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Centre Frequency: 2402MHz

DH1: For each 5 second of 50 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

50 channels*31.6 seconds/5* **0.396** ms= **125.136** ms

DH3: For each 5 second of 23 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

23 channels*31.6 seconds/5* **1.650** ms= **239.844** ms

DH5: For each 5 second of 16 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

16 channels*31.6 seconds/5* **2.900** ms= **293.248** ms

Centre Frequency: 2440MHz

DH1: For each 5 second of 50 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

50 channels*31.6 seconds* **0.396** ms= **625.680** ms

DH3: For each 5 second of 26 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

26 channels*31.6 seconds/5* **1.655** ms= **271.950** ms

DH5: For each 5 second of 13 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

13 channels*31.6 seconds/5* **2.900** ms= **238.264** ms

Centre Frequency: 2480MHz

DH1: For each 5 second of 50 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

50 channels*31.6 seconds* **0.396** ms= **625.680** ms

DH3: For each 5 second of 27 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

27 channels*31.6 seconds/5* **1.650** ms= **281.556** ms

DH5: For each 5 second of 14 channel appearance, the longest time of occupancy for each of 31.6 seconds is:

14 channels*31.6 seconds/5* **2.900** ms= **256.592** ms

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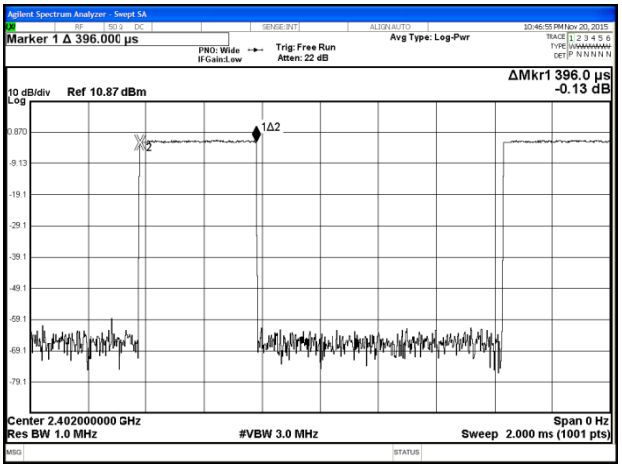
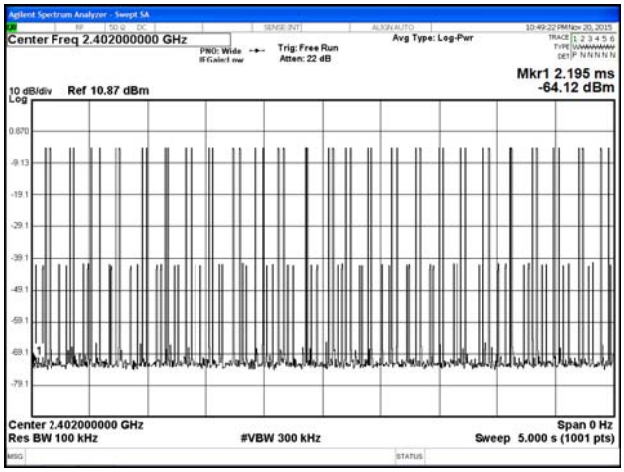
A.3.2 Measurement Plots

Modulation: GFSK	
Centre Frequency: 2402MHz	
Mode: DH1	
	
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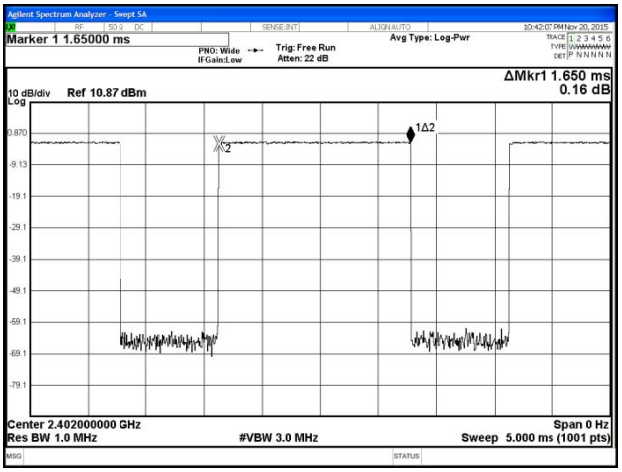	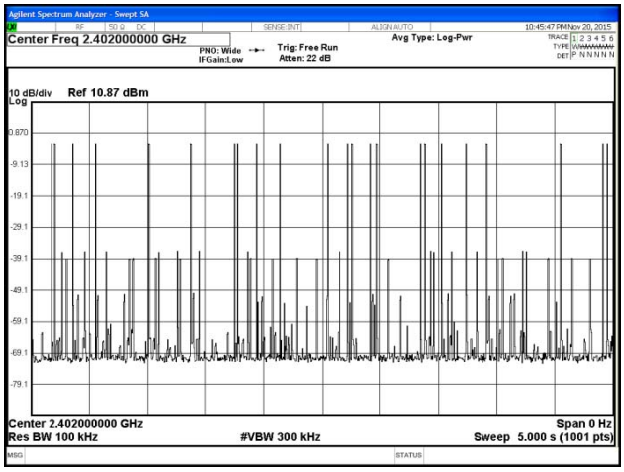
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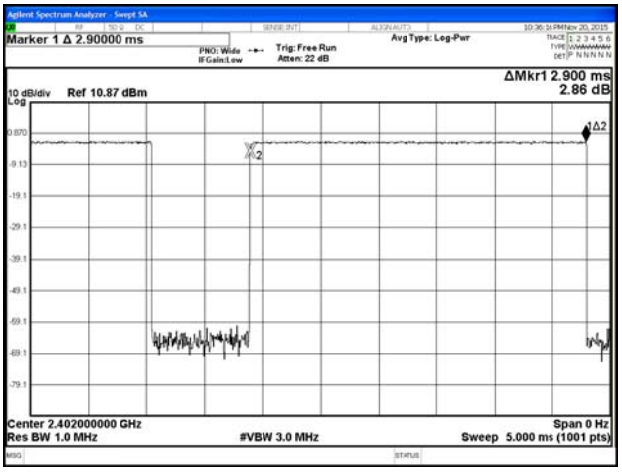	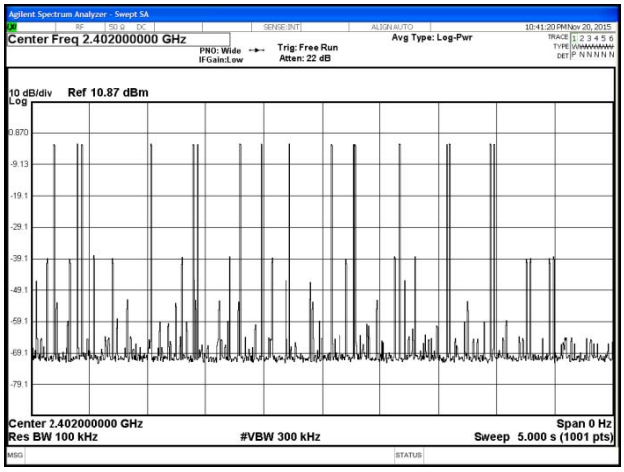

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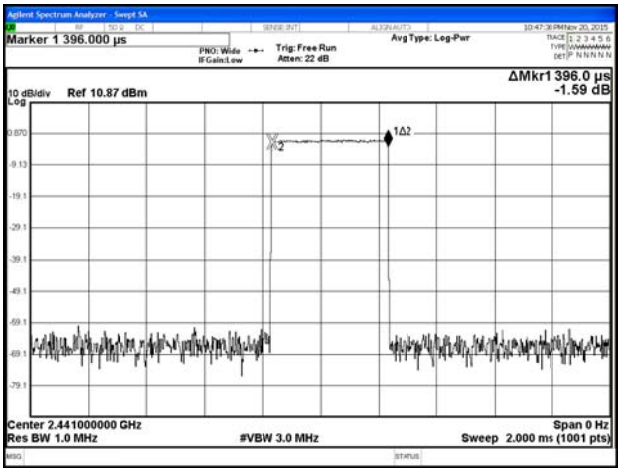
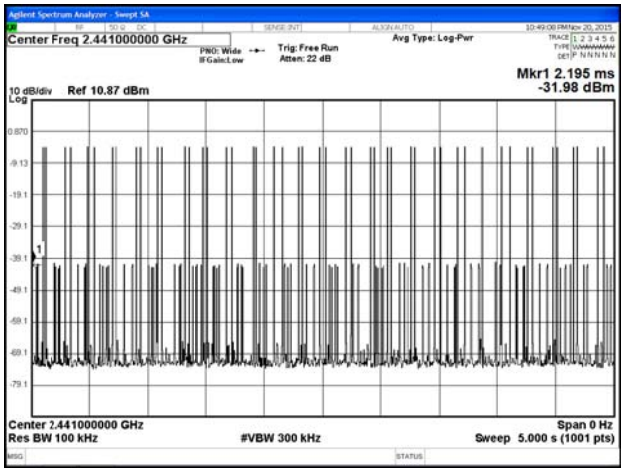
Modulation: GFSK	
Centre Frequency: 2440MHz	
Mode: DH1	
	
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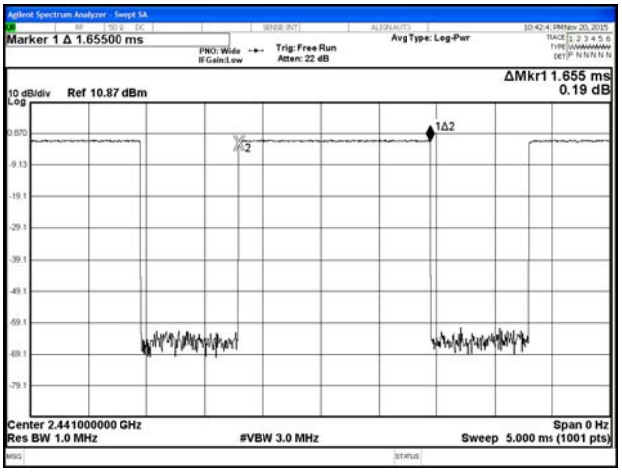	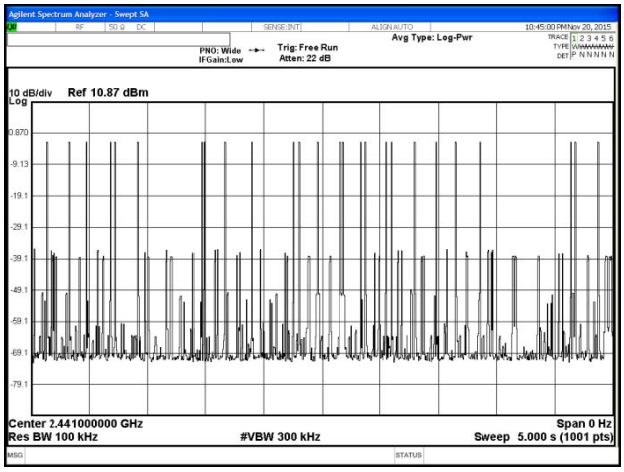
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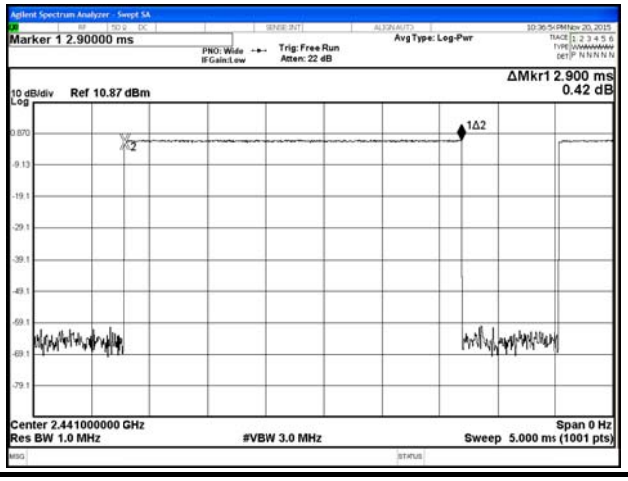	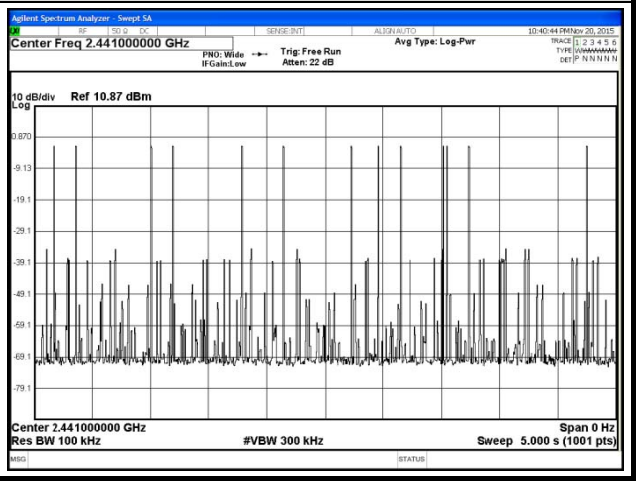

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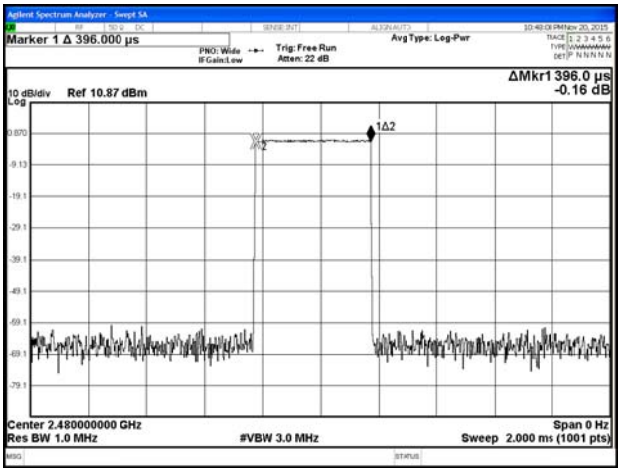
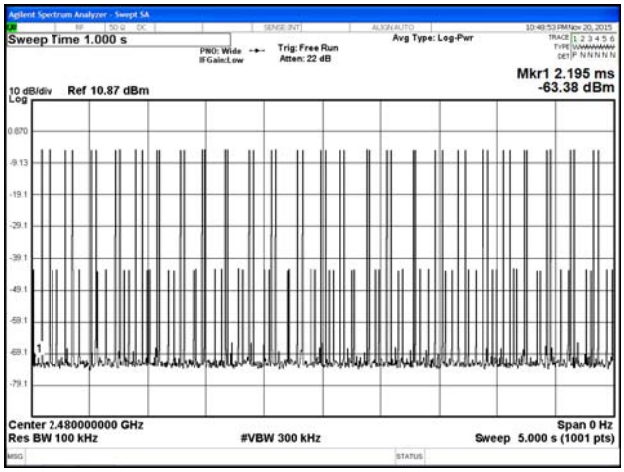
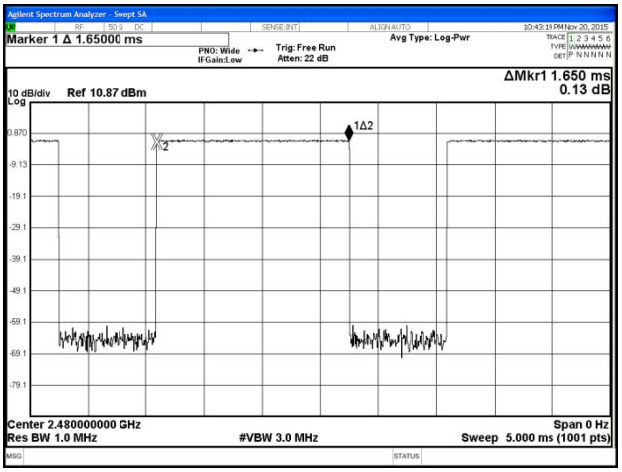
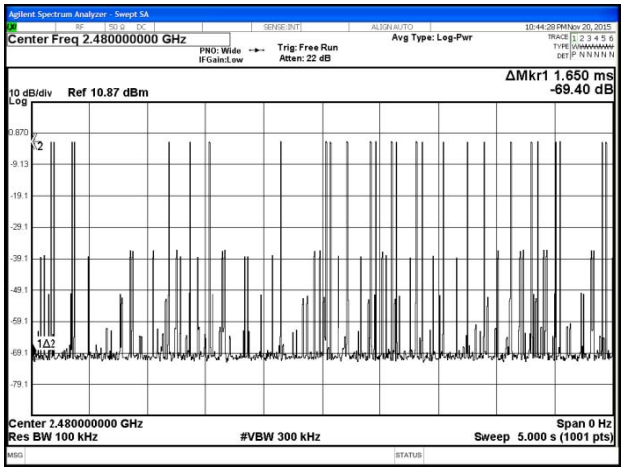
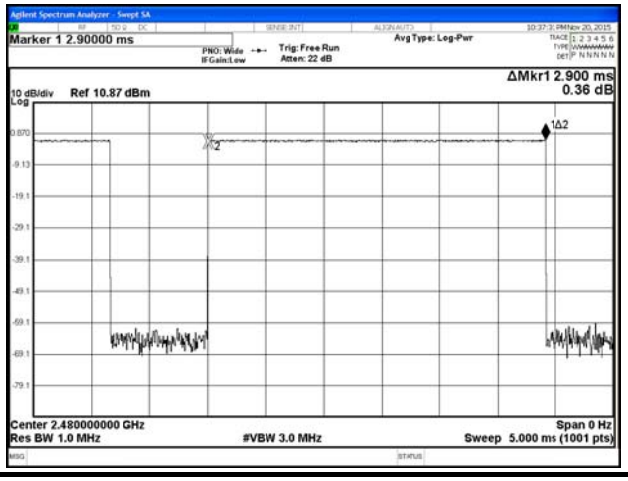
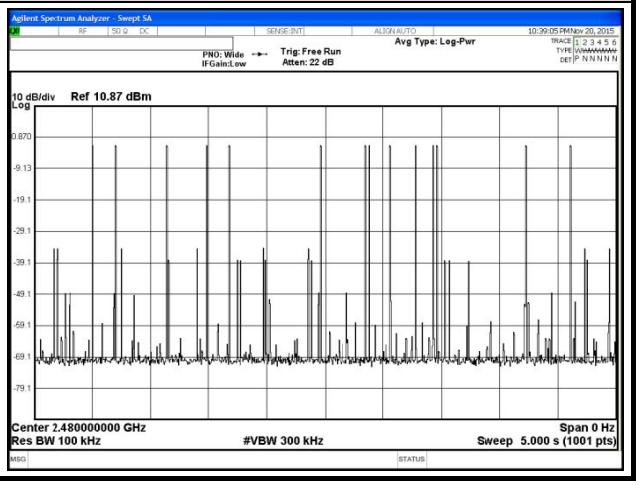
Modulation: GFSK	
Centre Frequency: 2480MHz	
Mode: DH1	
	
Mode: DH3	
	
Mode: DH5	
	

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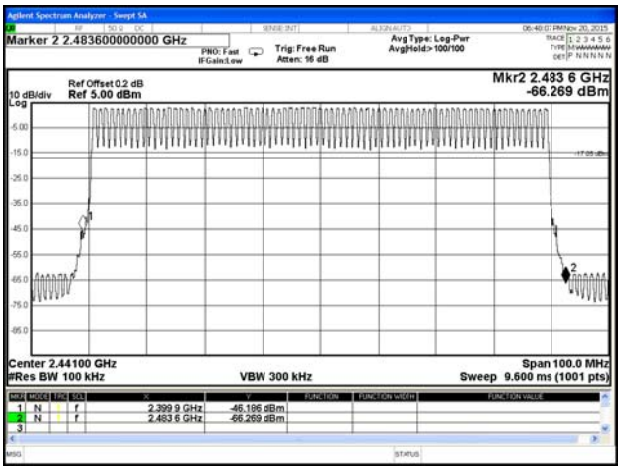
A.4 NUMBER OF HOPPING CHANNELS MEASUREMENT

Test Date	2015/11/20	Temp./Hum.	22℃/51%
Cable Loss	1.16dB	Test Voltage	DC 3.7V (Via Battery)

A.4.1 Measurement Plots

Modulation: GFSK

The number hopping channel is 79.

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A.5 MAXIMUM PEAK OUTPUT POWER MEASUREMENT

Test Date	2015/11/20	Temp./Hum.	22℃/51%
Cable Loss	1.16dB	Test Voltage	DC 3.7V (Via Battery)

A.5.1 Output Power

Modulation	Centre Frequency (MHz)	Peak Output Power		Limit
		dBm	W	
GFSK	2402	3.028	0.002008	21dBm (0.125W)
	2440	3.153	0.002067	
	2480	2.627	0.001831	

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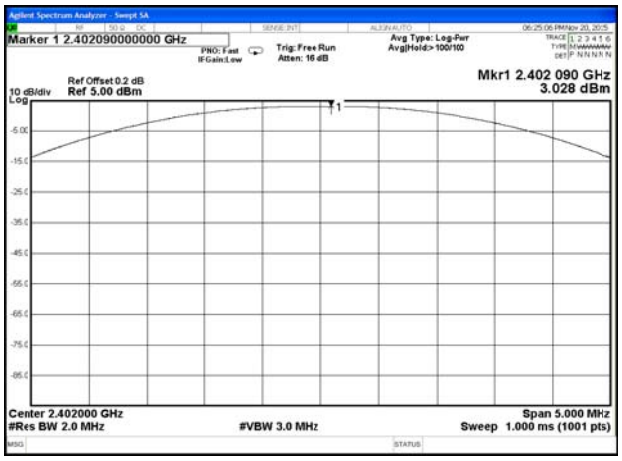
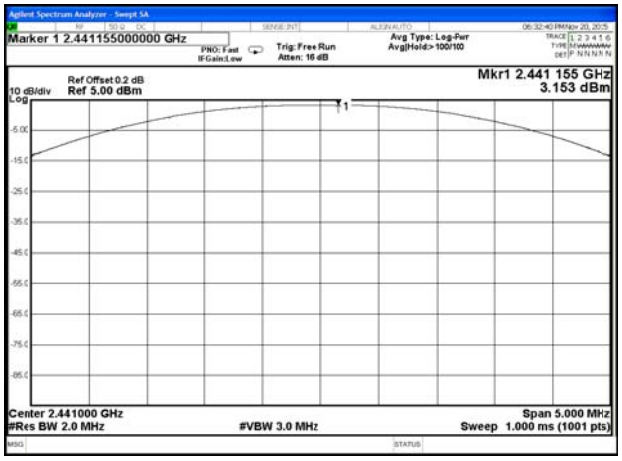
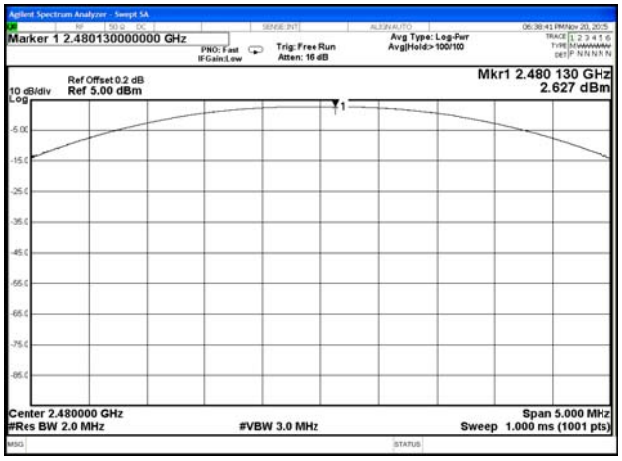
A.5.2 Measurement Plots

Modulation: GFSK




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A.6 EMISSION LIMITATIONS MEASUREMENT

A.6.1 Band Edge

Test Date	2015/11/20	Temp./Hum.	22℃/51%
Cable Loss	0.2dB	Test Voltage	DC 3.7V (Via Battery)

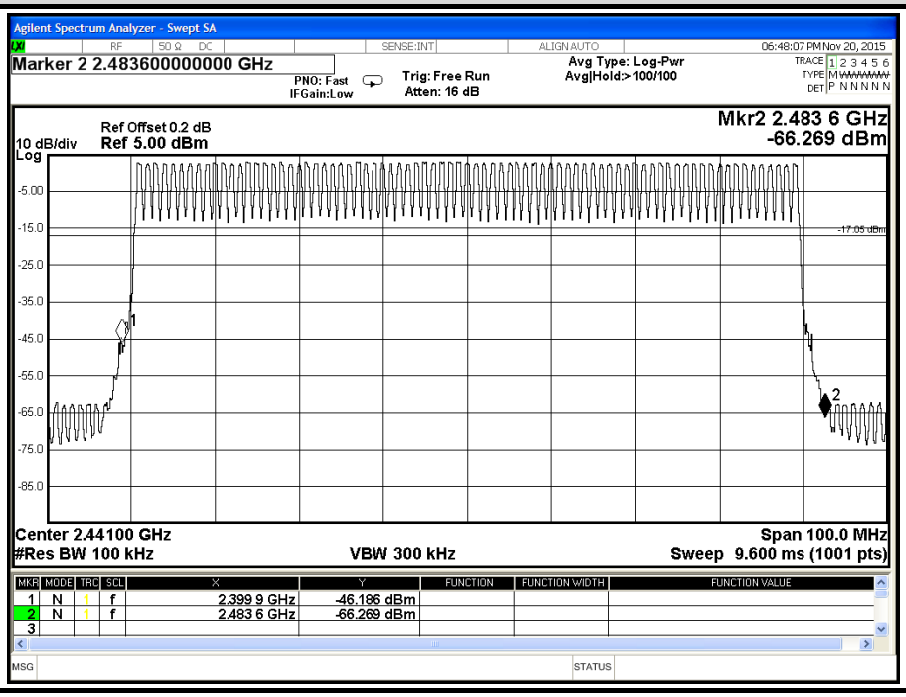
Modulation: GFSK

Single Channel

Low channel

High channel

Hopping Mode



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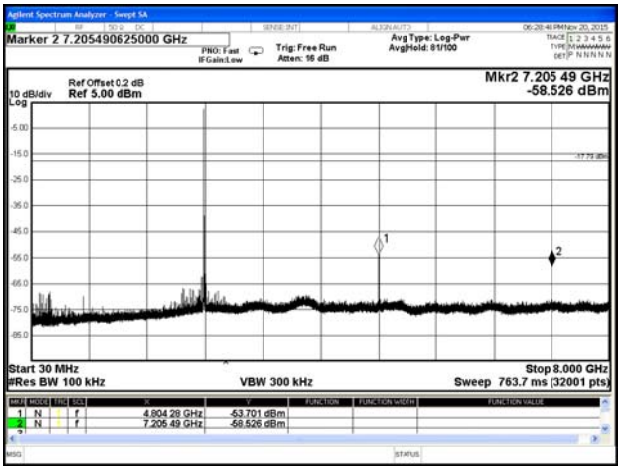
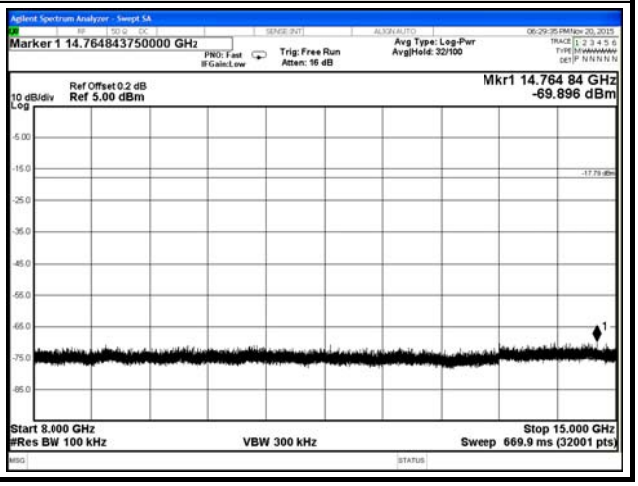
A.6.2 Spurious Emission

Test Date	2015/11/20	Temp./Hum.	22℃/51%
Modulation	GFSK	Frequency	2402MHz
Cable Loss	0.2dB	Test Voltage	DC 3.7V (Via Battery)

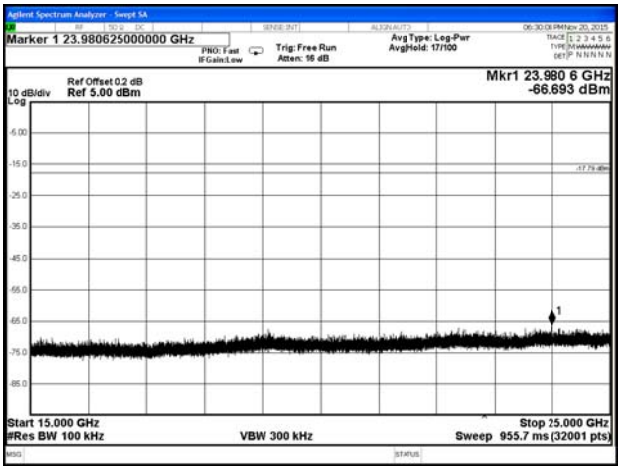
30MHz – 8GHz



8GHz – 15GHz



15GHz – 25GHz



Note: All results have been included cable loss.

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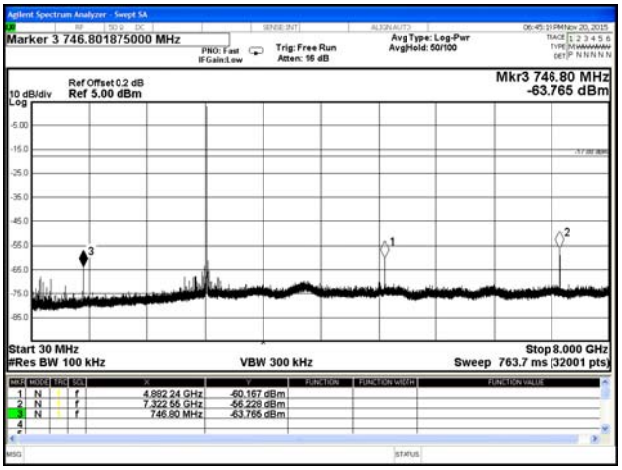
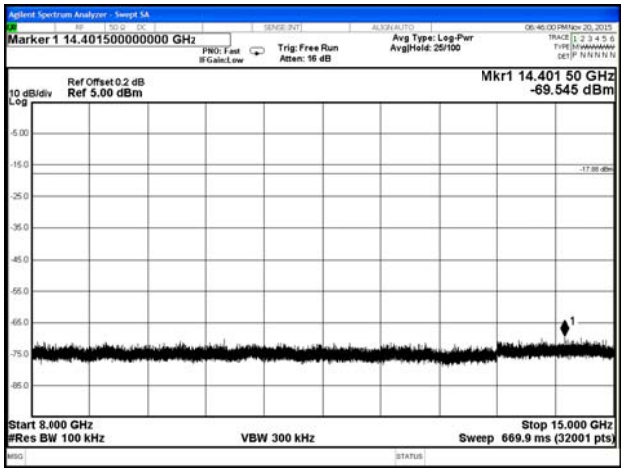
Test Date	2015/11/20	Temp./Hum.	22℃/51%
Modulation	GFSK	Frequency	2440MHz
Cable Loss	0.2dB	Test Voltage	DC 3.7V (Via Battery)

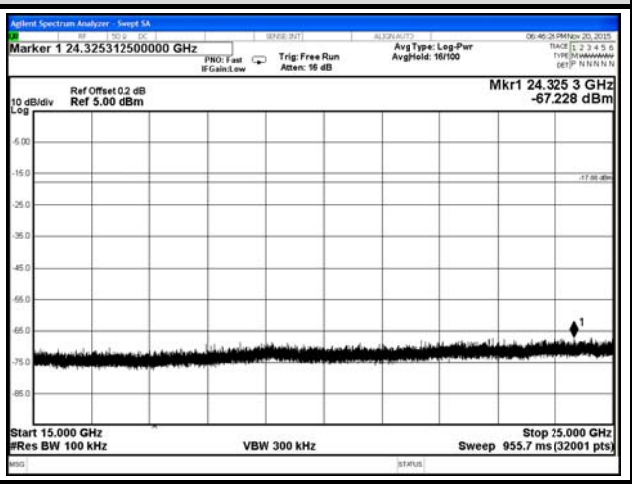
30MHz – 8GHz



8GHz – 15GHz



15GHz – 15GHz



Note: All results have been included cable loss.

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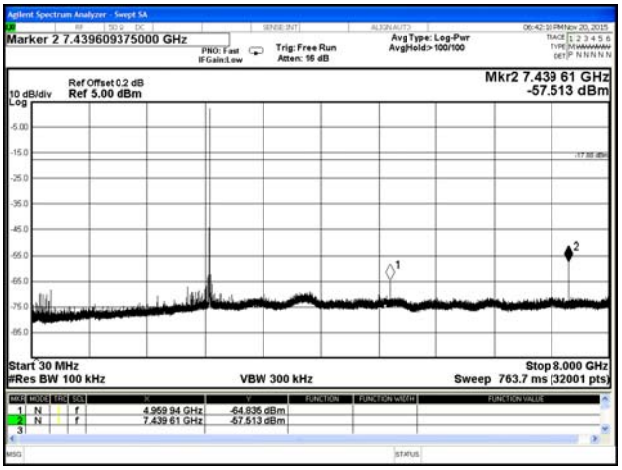
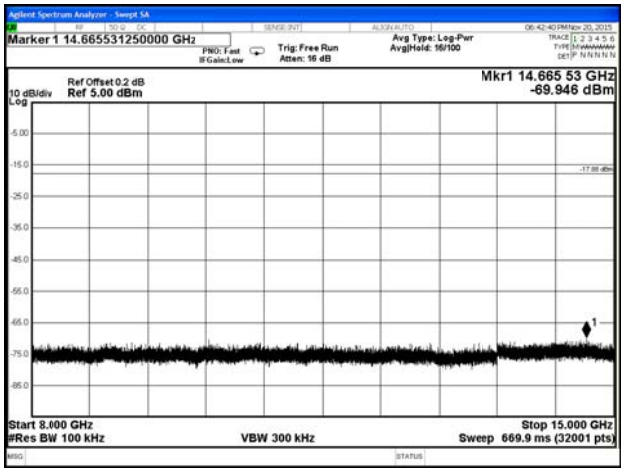
Test Date	2015/11/20	Temp./Hum.	22℃/51%
Modulation	GFSK	Frequency	2480MHz
Cable Loss	0.2dB	Test Voltage	DC 3.7V (Via Battery)

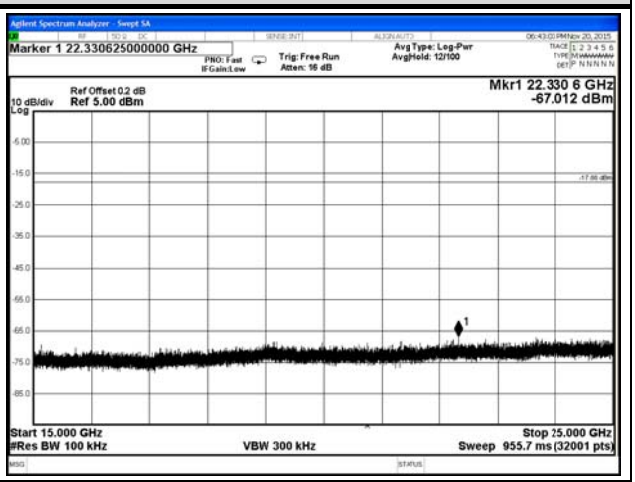
30MHz – 8GHz



8GHz – 15GHz



15GHz – 25GHz



Note: All results have been included cable loss.