AUDIX Technology Corp.
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New Taipei City244,Taiwan
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FCC 15.247 DSS
2.4GHz Report

for

FUTABA Corporation

1080 YabutsukaChosei-son Chosei-gun
Chiba, 299-4395 Japan.

Brand	**:**	**Futaba**
Product Name	**:**	**Radio Control**
Model Name	**:**	**T18SZ**
FCC ID	**:**	**AZPT18SZ-24G**

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TABLE OF CONTENTS

AUDIX Technology Corp.
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TEST REPORT CERTIFICATION

Applicant	:	FUTABA Corporation
Manufacture	:	FUTABA Corporation
Product Name	:	Radio Control
Model No.	:	T18SZ
Serial No.	:	N/A
Brand	:	Futaba

Rules of Compliance and Measurement Standards:

FCC CFR 47 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. 07. 15 ~ 08. 12 Date of Report: 2015. 08. 12

Producer: Annie Yu
(Annie Yu/Administrator)

Signatory: Ben Cheng
(Ben Cheng/Manager)

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1. REPORT HISTORY

Revision	Date	Revision Summary	Report Number
0	2015. 08. 12	Original Report.	EM-F150474

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2. SUMMARY OF TEST RESULTS

Rule	Description	Results
15.207	Conducted Emission	**N/A**
15.247(d)/15.209	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)/15.205	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	Radio Control
Model Number	T18SZ
Serial Number	N/A
Brand Name	Futaba
Applicant	FUTABA Corporation 1080 YabutsukaChosei-son Chosei-gun Chiba, 299-4395 Japan.
Manufacture	FUTABA Corporation 1080 YabutsukaChosei-son Chosei-gun Chiba, 299-4395 Japan.
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. 06. 15

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3.2. EUT Specifications Assessed in Current Report

Fundamental Range (MHz)	Channel Number	Modulation	Data Rate (kbps)
2407.5-2467.5	31	T-FHSS	128
2403.25-2447.50	60	S-FHSS	128

Modulation: T-FHSS			
Channel List			
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
1	2407.5	17	2439.5
2	2409.5	18	2441.5
3	2411.5	19	2443.5
4	2413.5	20	2445.5
5	2415.5	21	2447.5
6	2417.5	22	2449.5
7	2419.5	23	2451.5
8	2421.5	24	2453.5
9	2423.5	25	2455.5
10	2425.5	26	2457.5
11	2427.5	27	2459.5
12	2429.5	28	2461.5
13	2431.5	29	2463.5
14	2433.5	30	2465.5
15	2435.5	31	2467.5
16	2437.5		

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Modulation: S-FHSS					
Channel List					
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
1	2403.25	21	2418.25	41	2433.25
2	2404.00	22	2419.00	42	2434.00
3	2404.75	23	2419.75	43	2434.75
4	2405.50	24	2420.50	44	2435.50
5	2406.25	25	2421.25	45	2436.25
6	2407.00	26	2422.00	46	2437.00
7	2407.75	27	2422.75	47	2437.75
8	2408.50	28	2423.50	48	2438.50
9	2409.25	29	2424.25	49	2439.25
10	2410.00	30	2425.00	50	2440.00
11	2410.75	31	2425.75	51	2440.75
12	2411.50	32	2426.50	52	2441.50
13	2412.25	33	2427.25	53	2442.25
14	2413.00	34	2428.00	54	2443.00
15	2413.75	35	2428.75	55	2443.75
16	2414.50	36	2429.50	56	2444.50
17	2415.25	37	2430.25	57	2445.25
18	2416.00	38	2431.00	58	2446.00
19	2416.75	39	2431.75	59	2446.75
20	2417.50	40	2432.50	60	2447.50

3.3. Antenna Information

Manufacture	Antenna Type	Frequency	Max Gain (dBi)
SANSEI ELECTRIC CO., LTD	1/2λ Pencil Type	2.4GHz	2.14

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3.4. Test Configuration

Modulation	Duty Cycle (x)	T (ms)	Duty Cycle Factor (dB)
T-FHSS	0.09	N/A	N/A
S-FHSS	0.8757	N/A	N/A

Note: When duty cycle is less than 98% (0.98) that duty cycle factor 10log(1/x) is needed to add in conducted test items measured in average detector.

Item		Modulation	Test Channel
Radiated Test Case	Radiated Band Edge Note1	T-FHSS	1/31
		S-FHSS	1/60
	Radiated Spurious Emission Note1	T-FHSS	1/16/31
		S-FHSS	1/30/60
Conducted Test Case	20dB Bandwidth	T-FHSS	1/16/31
		S-FHSS	1/30/60
	Carrier Frequency Separation	T-FHSS	1/16/31
		S-FHSS	1/30/60
	Time of Occupancy	T-FHSS	1/16/31
		S-FHSS	1/30/60
	Number of Hopping Channels	T-FHSS	15
		S-FHSS	30
	Maximum Peak Output Power	T-FHSS	1/16/31
		S-FHSS	1/30/60
	Band Edges	T-FHSS	1/31
		S-FHSS	1/60
	Spurious Emission	T-FHSS	1/16/31
		S-FHSS	1/30/60

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.	DC Power Supply	TOP WARD	3303A	721773	N/A

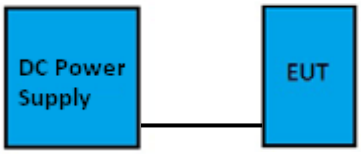
3.5.2. Cable Lists

No.	Cable Description Of The Above Support Units
1.	DC Power Cord*2: Unshielded, Detachable, 1.05m

3.6. Setup Configuration

3.6.1. EUT Configuration for Power Line Emission

3.6.2. EUT Configuration for Conducted Test Items



3.7. Operating Condition of EUT

Test program “Futaba Term” is used for enabling EUT RF function under continues transmitting and choosing data rate/ channel.

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3.8. Description of Test Facility

Test Firm Name	:	**AUDIXTechnology Corporation** **EMC Department** No. 53-11, Dingfu, Linkou Dist., New TaipeiCity 244, Taiwan
Test Location& Facility	:	No. 53-11, Dingfu, Linkou Dist., New TaipeiCity 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	± 1.60dB

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 EQUIPMENTLIST

4.1. Radiated Emission Measurement

4.1.1. Frequency Range 30MHz~1000MHz

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	2014. 08. 21	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	TESEQ	CBL6112D	33821	2015. 02. 27	1 Year

4.1.2. Frequency Range 30MHz~1000MHz

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	2014. 08. 21	1 Year
2.	Pre-Amplifier	HP	8449B	3008A02678	2015. 03. 04	1 Year
3.	2.4GHz Notch Filter	K&L	7NSL10-2441.5E130.5-00	1	2015. 07. 22	1 Year
4.	3G High Pass Filter	Microware Circuits	H3G018G1	484796	2014. 08. 25	1 Year
5.	Horn Antenna	ETS-Lindgren	3117	00135902	2015. 03. 06	1 Year
6.	Horn Antenna	EMCO	3116	2653	2014. 10. 14	1 Year

4.2. RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9030A-526	MY53310269	2014. 11. 08	1 Year

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5. CONDUCTED EMISSION MEASUREMET

【The EUT only employs battery power for operation, no conductive emission limits are required according to FCC Part 15 Section §15.207】

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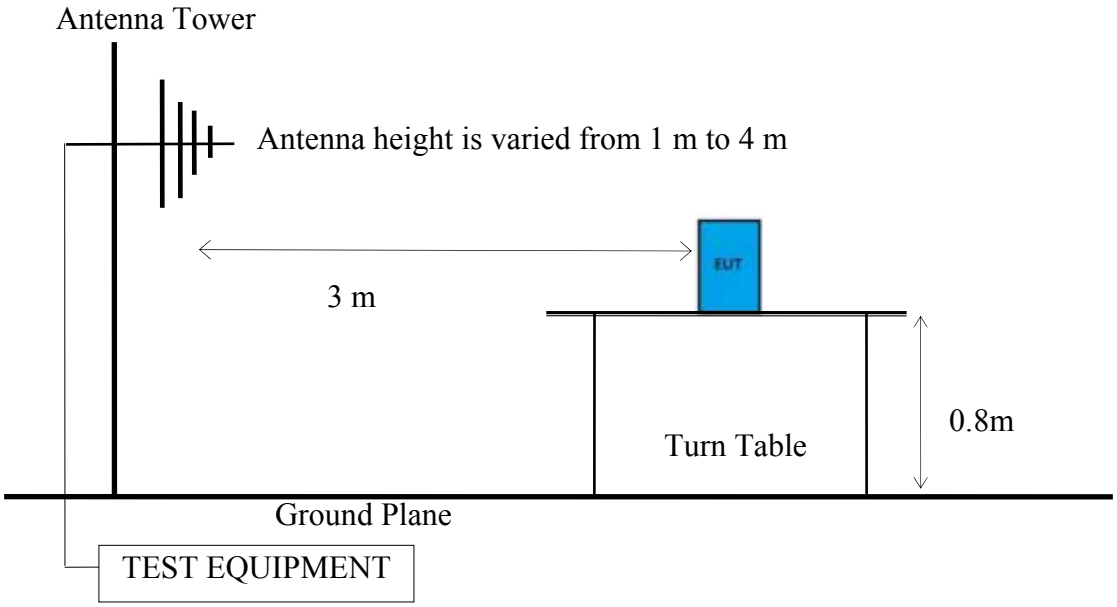
6. RADIATED EMISSION MEASUREMENT

6.1. Block Diagram of Test Setup

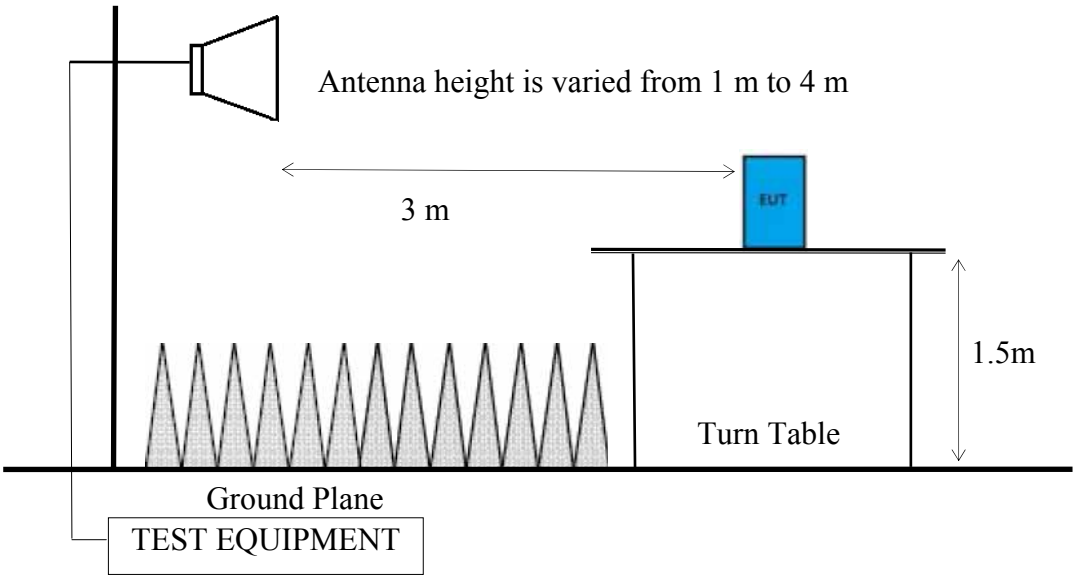
6.1.1. Block Diagram of connection between EUT and simulators

Indicated as section 3.7

6.1.2. Setup Diagram for 30-1000MHz



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



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6.2. 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.

6.3. Test Procedure

The EUT setup on the turn table which has1.5 m 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 1GHz:
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 Measurement:

(1) RBW = 1 MHz
(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, where T is Tx-on presented in Appendix A.3.
(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.

6.4. 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

6.5. Test Results

PASSED.

Test Date	2015/08/10	Temp./Hum.	23℃/41%
Test Voltage	DC 6.6V		

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6.5.1. Emissions within Restricted Frequency Bands

6.5.1.1. Frequency Below 1GHz

Modulation	T-FHSS	Frequency	TX 2407.5MHz

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
72.68	6.85	2.92	19.55	29.32	40.00	10.68	Peak
299.66	13.12	4.65	18.44	36.21	46.00	9.79	Peak
345.25	14.32	5.15	17.29	36.76	46.00	9.24	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
110.51	11.68	3.30	18.04	33.02	43.50	10.48	Peak
431.58	16.02	5.92	10.87	32.81	46.00	13.19	Peak
973.81	20.95	7.96	2.95	31.86	54.00	22.14	Peak

Modulation	T-FHSS	Frequency	TX 2437.5MHz

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
108.57	11.55	3.29	10.58	25.42	43.50	18.08	Peak
285.11	12.92	4.56	16.26	33.74	46.00	12.26	Peak
345.25	14.32	5.15	15.40	34.87	46.00	11.13	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
112.45	11.82	3.32	15.31	30.45	43.50	13.05	Peak
414.12	15.78	5.78	9.44	31.00	46.00	15.00	Peak
986.42	21.02	8.03	1.79	30.84	54.00	23.16	Peak

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Modulation	T-FHSS	Frequency	TX 2467.5MHz

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
108.57	11.55	3.29	13.13	27.97	43.50	15.53	Peak
299.66	13.12	4.65	18.24	36.01	46.00	9.99	Peak
345.25	14.32	5.15	17.28	36.75	46.00	9.25	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
112.45	11.82	3.32	17.59	32.73	43.50	10.77	Peak
299.66	13.12	4.65	18.24	36.01	46.00	9.99	Peak
435.46	16.09	5.96	12.52	34.57	46.00	11.43	Peak

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Modulation	S-FHSS	Frequency	TX 2403.25MHz

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
110.51	11.68	3.30	10.24	25.22	43.50	18.28	Peak
299.66	13.12	4.65	18.35	36.12	46.00	9.88	Peak
345.25	14.32	5.15	16.96	36.43	46.00	9.57	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
112.45	11.82	3.32	16.27	31.41	43.50	12.09	Peak
435.46	16.09	5.96	10.77	32.82	46.00	13.18	Peak
990.30	21.04	8.05	2.39	31.48	54.00	22.52	Peak

Modulation	S-FHSS	Frequency	TX 2425.0MHz

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
48.43	9.08	2.62	16.72	28.42	40.00	11.58	Peak
299.66	13.12	4.65	18.98	36.75	46.00	9.25	Peak
345.25	14.32	5.15	16.74	36.21	46.00	9.79	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
110.51	11.68	3.30	17.79	32.77	43.50	10.73	Peak
428.67	15.98	5.90	10.51	32.39	46.00	13.61	Peak
993.21	21.06	8.07	3.04	32.17	54.00	21.83	Peak

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Modulation	S-FHSS	Frequency	TX 2447.5MHz

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
50.37	8.28	2.64	17.18	28.10	40.00	11.90	Peak
285.11	12.92	4.56	18.17	35.65	46.00	10.35	Peak
345.25	14.32	5.15	16.47	35.94	46.00	10.06	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
52.31	7.83	2.66	20.96	31.45	40.00	8.55	Peak
112.45	11.82	3.32	16.47	31.61	43.50	11.89	Peak
428.67	15.98	5.90	10.79	32.67	46.00	13.33	Peak

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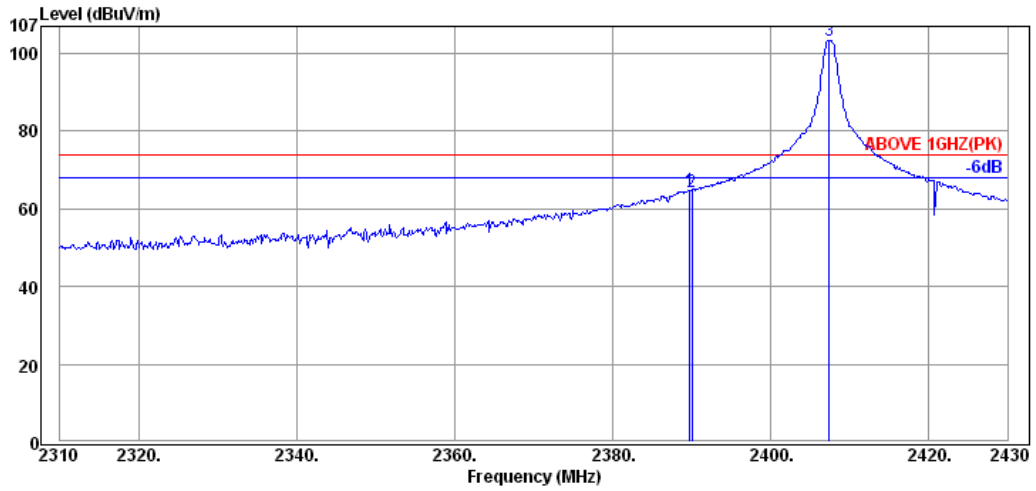
6.5.1.2.Frequency Above 1 GHz to 10th harmonics

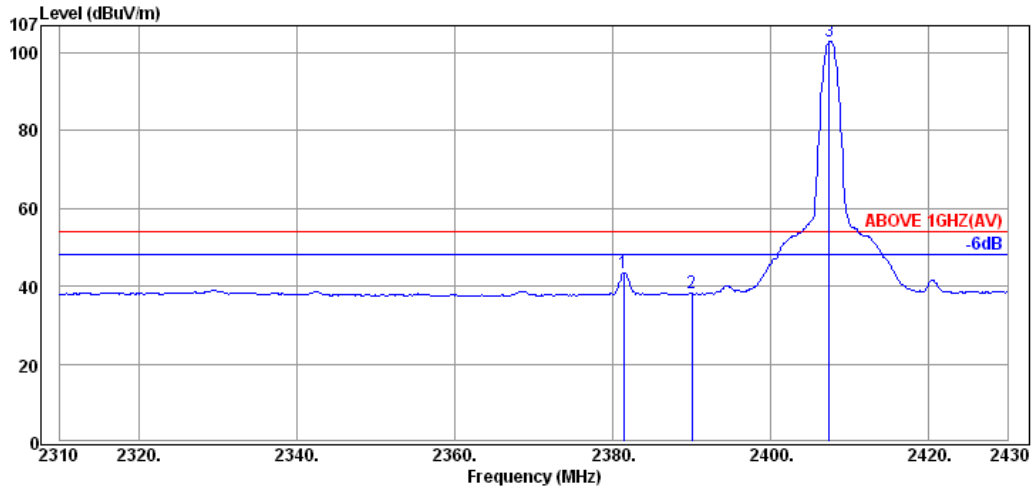
Band Edge:

Modulation	T-FHSS	Frequency	TX 2407.5MHz



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
2389.80	31.68	6.08	27.05	64.81	74.00	9.19	Peak
2390.04	31.68	6.08	26.77	64.53	74.00	9.47	Peak
2407.44	31.70	6.10	65.59	103.39	---	---	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
2381.40	31.67	6.07	5.75	43.49	54.00	10.51	Average
2390.04	31.68	6.08	0.39	38.15	54.00	15.85	Average
2407.44	31.70	6.10	65.25	103.05	---	---	Average

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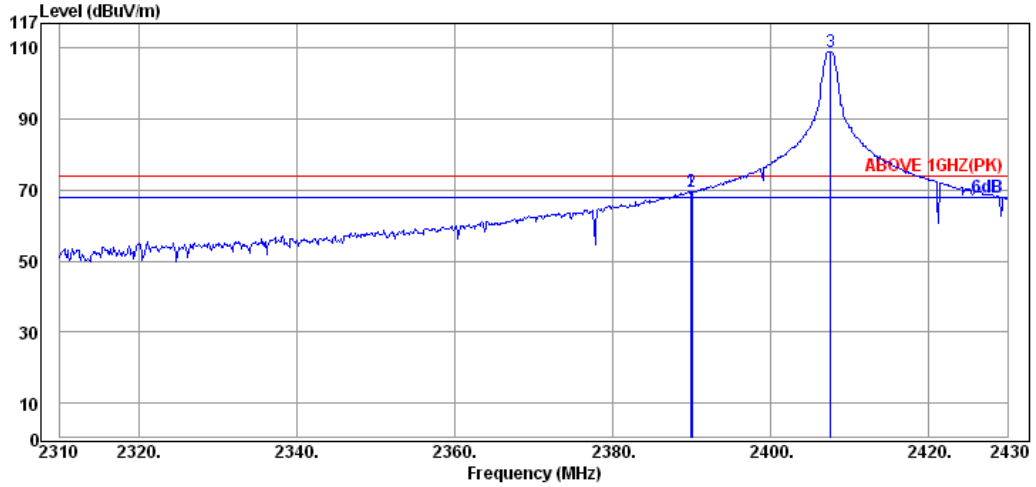
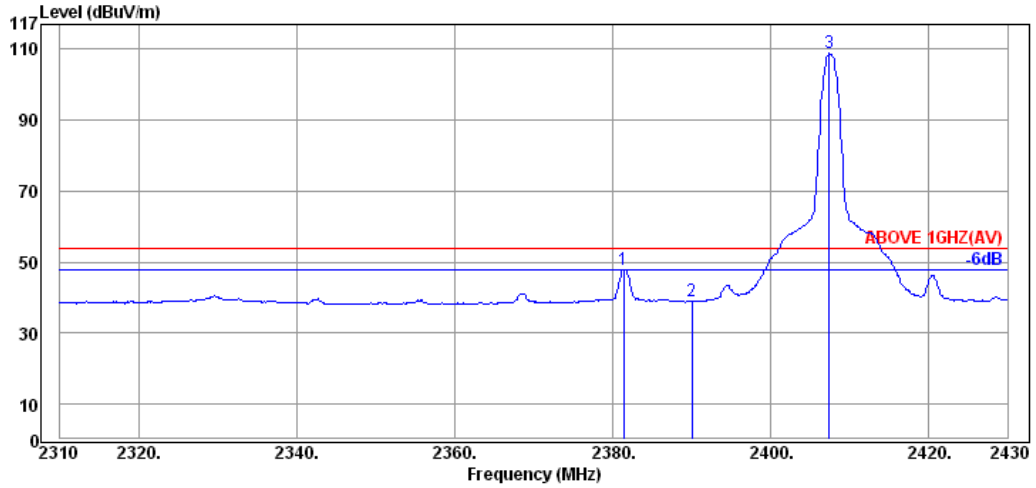
Modulation	T-FHSS	Frequency	TX 2407.5MHz



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
2389.92	31.68	6.08	31.71	69.47	74.00	4.53	Peak
2390.04	31.68	6.08	31.86	69.62	74.00	4.38	Peak
2407.56	31.70	6.10	71.35	109.15	---	---	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
2381.40	31.67	6.07	10.27	48.01	54.00	5.99	Average
2390.04	31.68	6.08	1.07	38.83	54.00	15.17	Average
2407.44	31.70	6.10	70.98	108.78	---	---	Average

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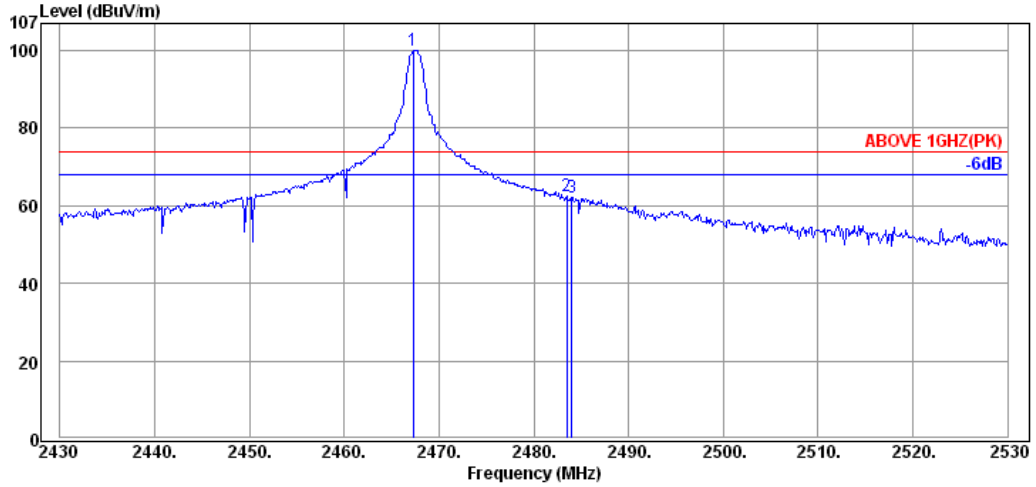
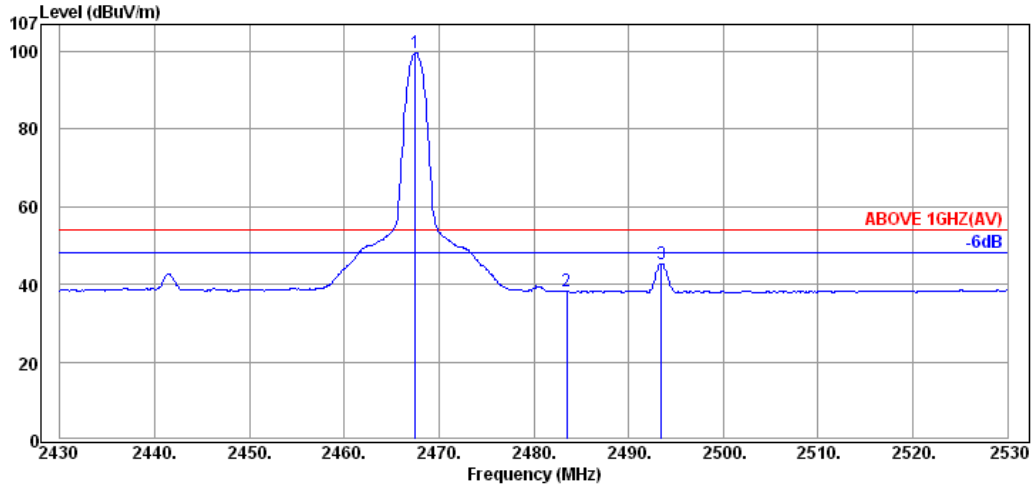
Modulation	T-FHSS	Frequency	TX 2467.5MHz



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
2467.30	31.76	6.17	62.07	100.00	---	---	Peak
2483.50	31.78	6.19	24.38	62.35	74.00	11.65	Peak
2484.00	31.78	6.19	24.10	62.07	74.00	11.93	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
2467.50	31.76	6.17	61.70	99.63	---	---	Average
2483.50	31.78	6.19	0.15	38.12	54.00	15.88	Average
2493.50	31.79	6.20	7.27	45.26	54.00	8.74	Average

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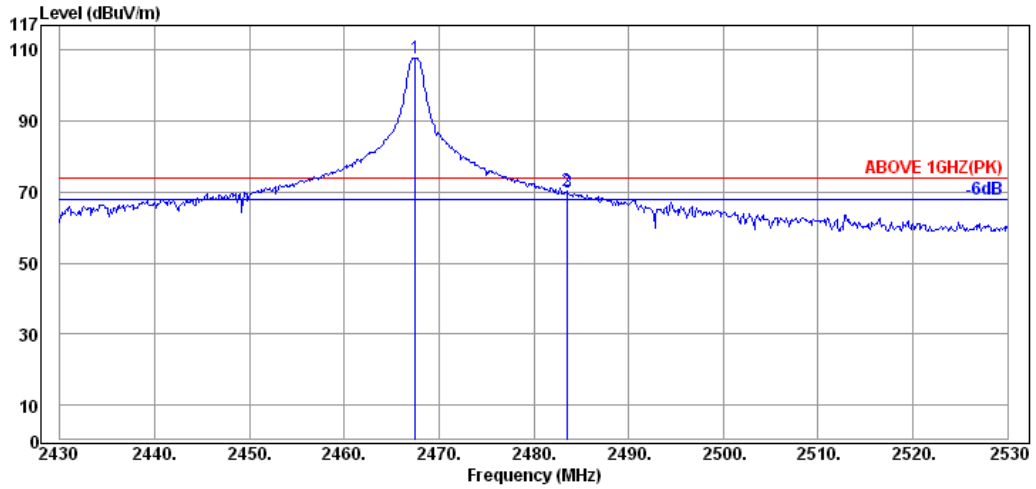
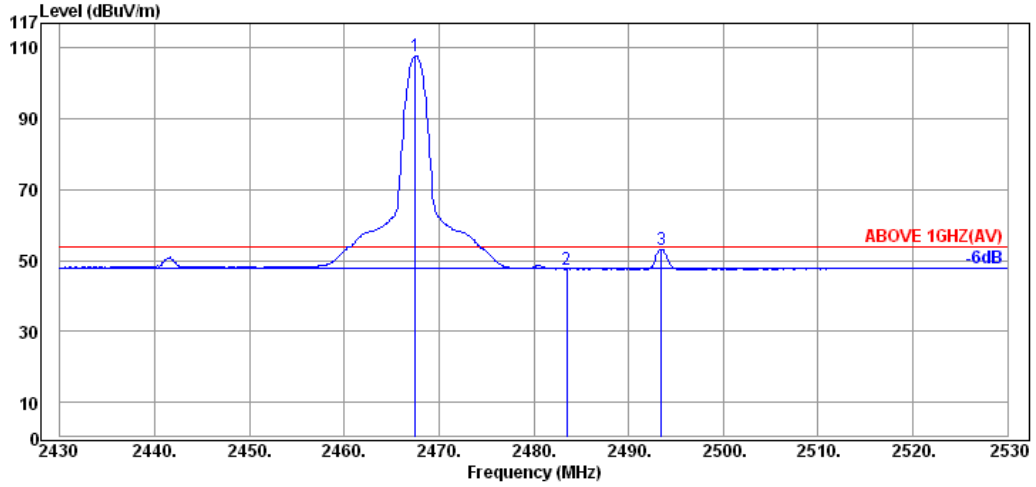
Modulation	T-FHSS	Frequency	TX 2467.5MHz



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
2467.50	31.76	6.17	69.96	107.89	---	---	Peak
2483.50	31.78	6.19	32.30	70.27	74.00	3.73	Peak
2483.60	31.78	6.19	31.95	69.92	74.00	4.08	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
2467.50	31.76	6.17	69.74	107.67	---	---	Average
2483.50	31.78	6.19	9.58	47.55	54.00	6.45	Average
2493.50	31.79	6.20	15.26	53.25	54.00	0.75	Average

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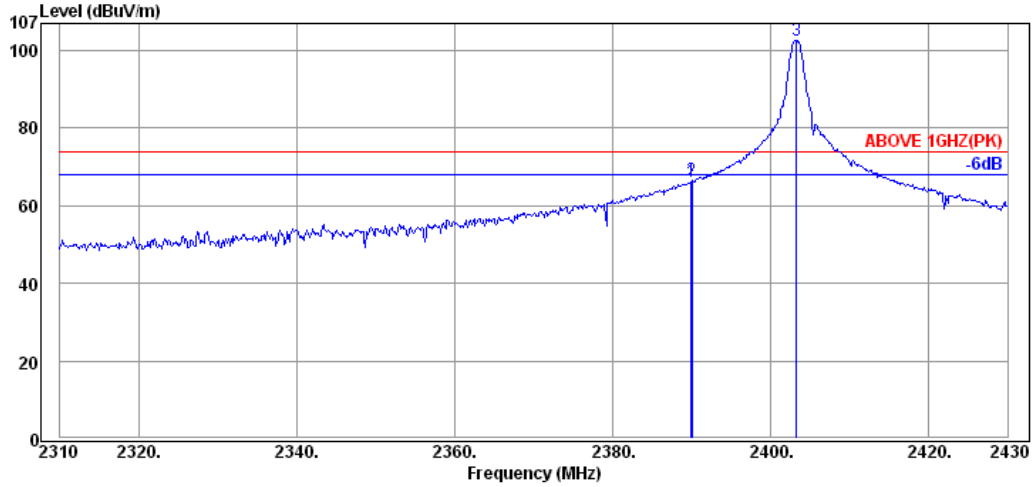
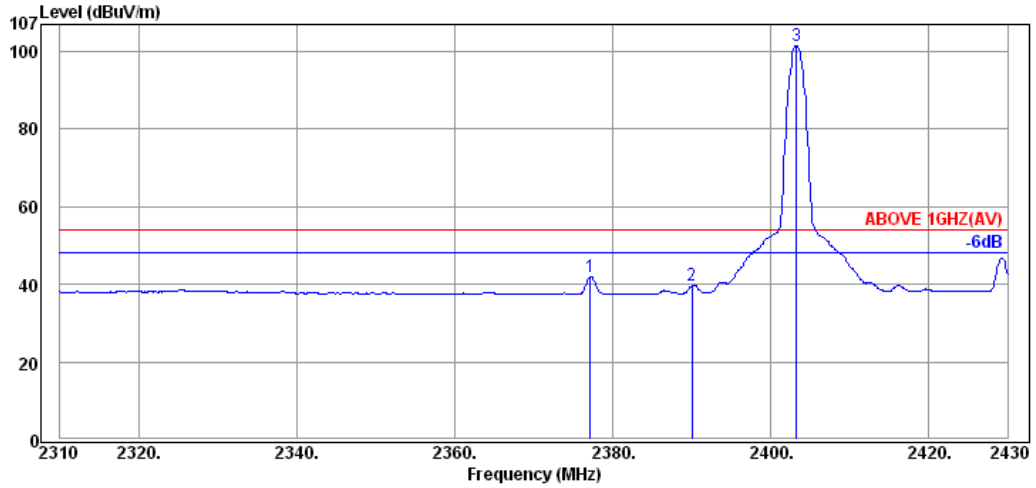
Modulation	S-FHSS	Frequency	TX 2403.25MHz



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
2389.92	31.68	6.08	28.46	66.22	74.00	7.78	Peak
2390.04	31.68	6.08	28.74	66.50	74.00	7.50	Peak
2403.24	31.69	6.10	64.72	102.51	---	---	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
2377.20	31.67	6.06	4.14	41.87	54.00	12.13	Average
2390.04	31.68	6.08	1.89	39.65	54.00	14.35	Average
2403.24	31.69	6.10	63.80	101.59	---	---	Average

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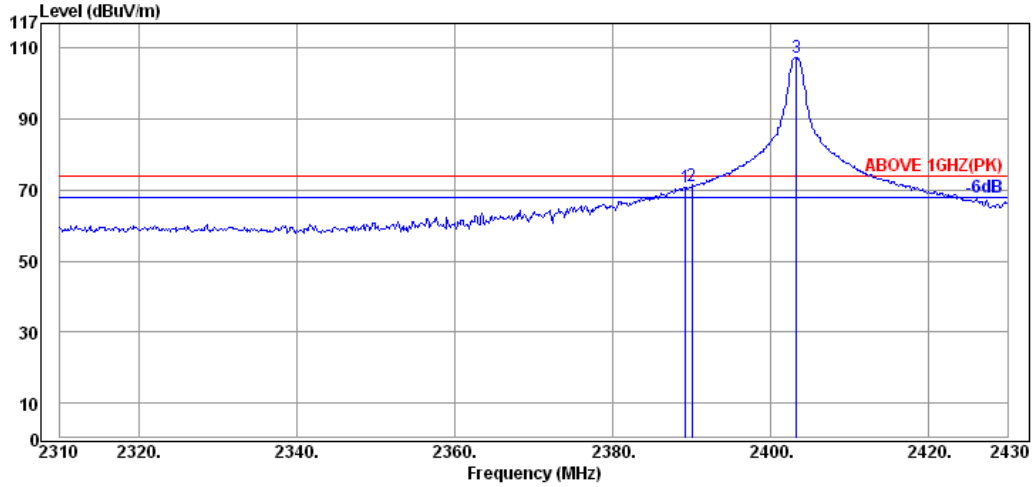
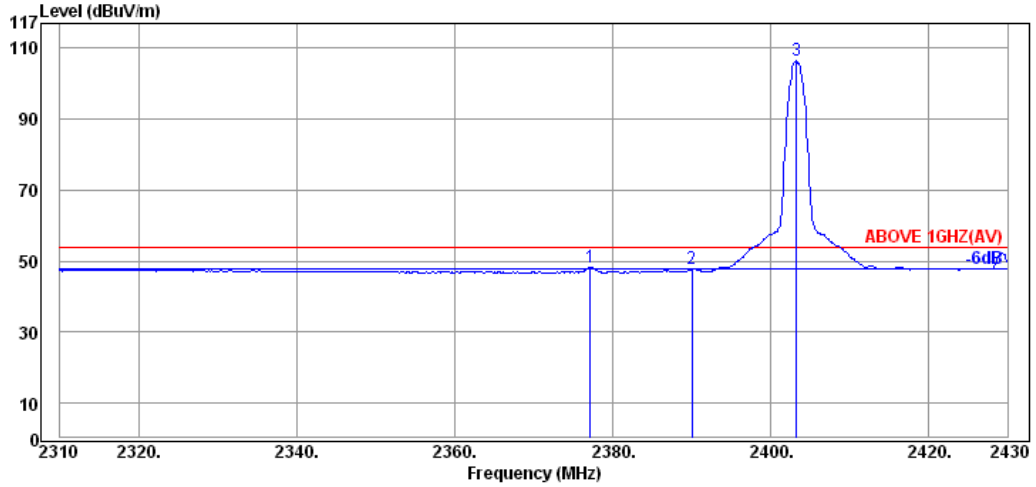
Modulation	S-FHSS	Frequency	TX 2403.25MHz



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
2389.20	31.68	6.08	33.20	70.96	74.00	3.04	Peak
2390.04	31.68	6.08	33.22	70.98	74.00	3.02	Peak
2403.24	31.69	6.10	69.51	107.30	---	---	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
2377.20	31.67	6.06	10.65	48.38	54.00	5.62	Average
2390.04	31.68	6.08	9.91	47.67	54.00	6.33	Average
2403.24	31.69	6.10	68.68	106.47	---	---	Average

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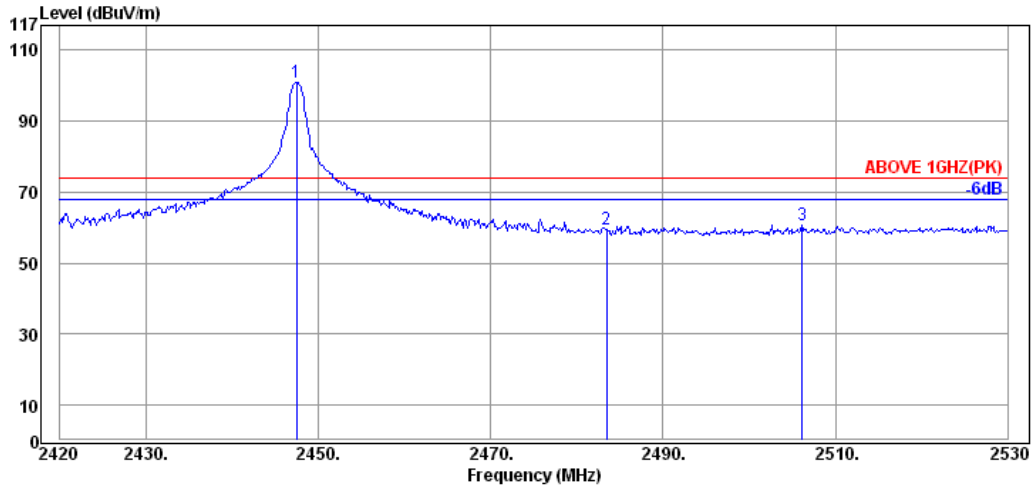
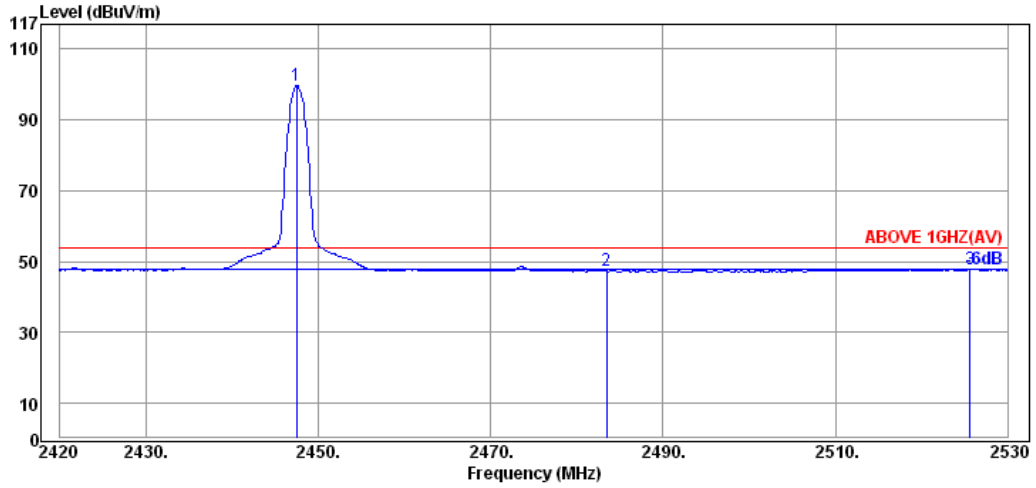
Modulation	S-FHSS	Frequency	TX 2447.5MHz



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
2447.50	31.75	6.14	62.96	100.85	---	---	Peak
2483.47	31.78	6.19	21.56	59.53	74.00	14.47	Peak
2506.13	31.81	6.21	22.61	60.63	74.00	13.37	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
2447.50	31.75	6.14	61.91	99.80	---	---	Average
2483.47	31.78	6.19	9.43	47.40	54.00	6.60	Average
2525.60	31.83	6.25	9.85	47.93	54.00	6.07	Average

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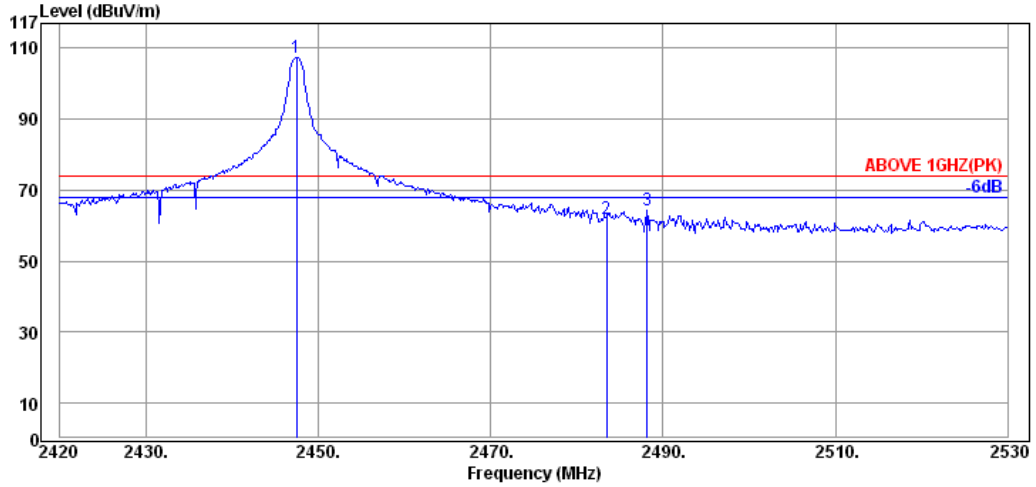
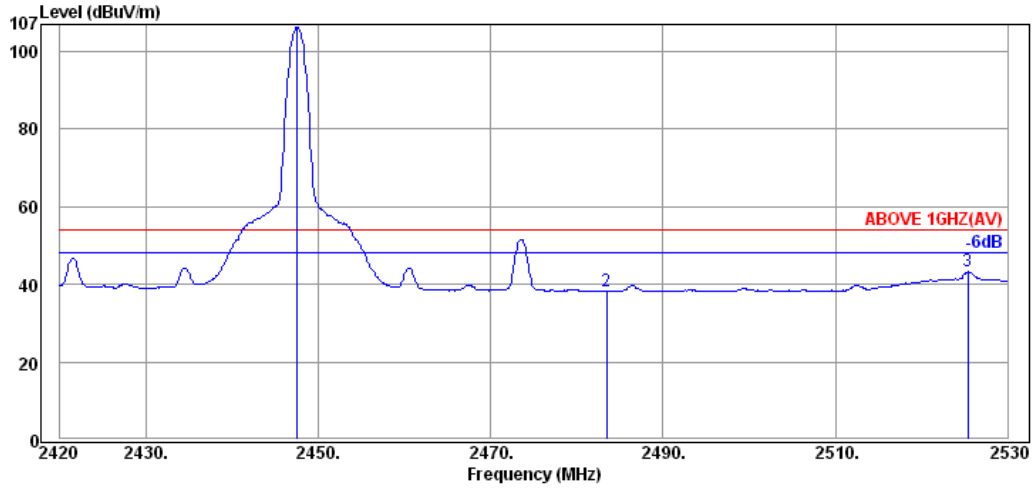
Modulation	S-FHSS	Frequency	TX 2447.5MHz



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
2447.50	31.75	6.14	69.52	107.41	---	---	Peak
2483.47	31.78	6.19	23.94	61.91	74.00	12.09	Peak
2488.20	31.78	6.19	26.39	64.36	74.00	9.64	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
2447.50	31.75	6.14	68.41	106.30	---	---	Average
2483.47	31.78	6.19	0.29	38.26	54.00	15.74	Average
2525.38	31.83	6.25	5.16	43.24	54.00	10.76	Average

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6.5.2. Emissions outside the frequency band:

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

Modulation	T-FHSS	Frequency	TX 2407.5MHz

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
4814.50	34.22	8.93	12.31	55.46	74.00	18.54	Peak
4814.50	34.22	8.93	10.25	53.40	54.00	0.60	Average

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
4814.50	33.83	8.93	8.45	51.21	54.00	2.79	Peak

Modulation	T-FHSS	Frequency	TX 2437.5MHz

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
4874.50	33.85	9.09	9.64	52.58	54.00	1.42	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
4874.50	33.85	9.09	6.54	49.48	54.00	4.52	Peak

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Modulation	T-FHSS	Frequency	TX 2467.5MHz

Antenna at a 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
4934.50	33.87	9.30	5.80	48.97	54.00	5.03	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
4934.50	33.87	9.30	6.53	49.70	54.00	4.30	Peak

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Modulation	S-FHSS	Frequency	TX 2403.25MHz

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
4807.00	34.22	8.87	11.53	54.62	74.00	19.38	Peak
4807.00	34.22	8.87	9.84	52.93	54.00	1.07	Average

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
4807.00	33.82	8.87	9.21	51.90	54.00	2.10	Peak

Modulation	S-FHSS	Frequency	TX 2425.0MHz

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
4850.50	33.84	9.03	9.81	52.68	54.00	1.32	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
4850.50	33.84	9.03	7.82	50.69	54.00	3.31	Peak

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Modulation	S-FHSS	Frequency	TX 2447.5MHz

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
4895.50	33.86	9.19	7.36	50.41	54.00	3.59	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
4895.50	33.86	9.19	5.76	48.81	54.00	5.19	Peak

6.5.3. Emissions in Non-restricted Frequency Bands

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

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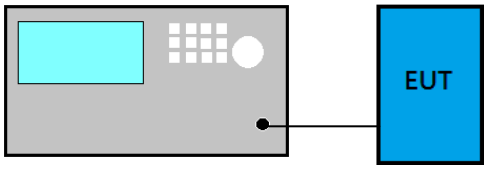
7. 20dB BANDWIDTH MEASUREMENT

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.

7.3. Test Procedure

Following measurement procedure is reference toDA00-705:

(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.

7.4. Test Results

Please refer to Appendix A

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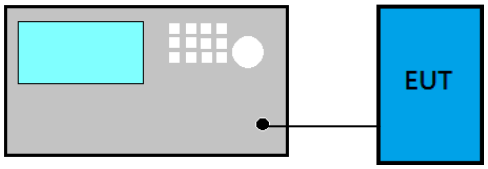
8. CARRIER FREQUENCY SEPARATION MEASUREMENT

8.1. Block Diagram of Test Setup



8.2. 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.

8.3. 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

8.4. Test Results

Please refer to Appendix A

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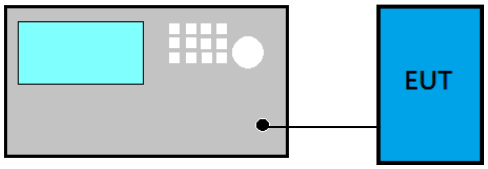
9. TIME OF OCCUPANCY MEASUREMENT

9.1. Block Diagram of Test Setup



9.2. 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.

9.3. 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

9.4. Test Results

Please refer to Appendix A

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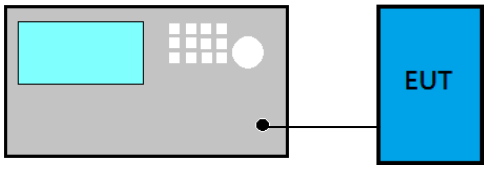
10. NUMBER OF HOPPING CHANNELS MEASUREMENT

10.1. Block Diagram of Test Setup



10.2. 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.

10.3. 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

10.4. Test Results

Please refer to Appendix A

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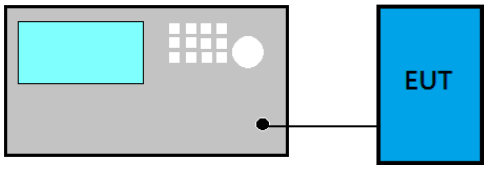
11. MAXIMUM PEAK OUTPUT POWER MEASUREMENT

11.1. Block Diagram of Test Setup



11.2. Specification Limits

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

11.3. 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 ≥ OBW
(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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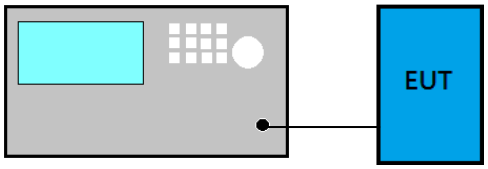
12. EMISSION LIMITATIONS MEASUREMENT

12.1. Block Diagram of Test Setup



12.2. 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)).(※This test result attaching to §3.6.3)

12.3. 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

12.4. Test Results

Please refer to Appendix A

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13. DEVIATION TO TEST SPECIFICATIONS

【NONE】

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APPDNDIX A

TEST PLOTS

(Model: T18SZ)

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TABLE OF CONTENTS

AUDIX Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
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A.1 20DB BANDWIDTH MEASUREMENT

Test Date	2015/07/26	Temp./Hum.	25℃/58%
Cable Loss	1.64dB	Test Voltage	DC 6.6V

A.1.1 20dB Bandwidth Result

Modulation	Centre Frequency (MHz)	20 dB Bandwidth (MHz)	Limit 2/3 (20dB Bandwidth)
T-FHSS	2407.50	0.2614	0.1743
	2437.50	0.2628	0.1752
	2467.50	0.2618	0.1745

Remark: The maximum two-thirds of the 20dB bandwidth shall be at maximum 0.1752MHz.

Modulation	Centre Frequency (MHz)	20 dB Bandwidth (MHz)	Limit 2/3 (20dB Bandwidth)
S-FHSS	2403.25	0.2639	0.1759
	2425.00	0.2620	0.1747
	2447.50	0.2614	0.1743

Remark: The maximum two-thirds of the 20dB bandwidth shall be at maximum 0.1759MHz.

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A.1.2 Measurement Plots

T-FHSS	S-FHSS
	
	
	

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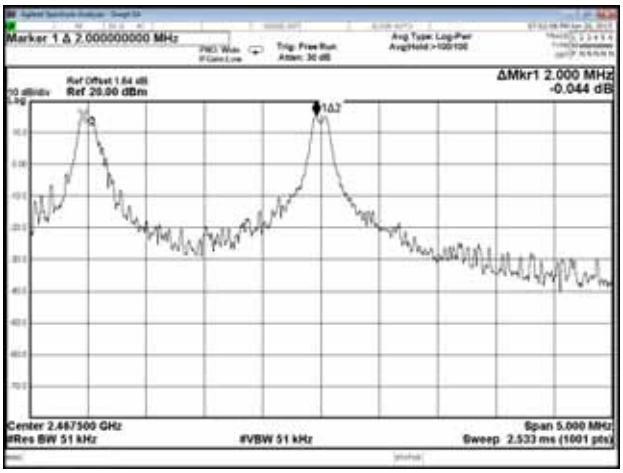
A.2 CARRIER FREQUENCY SEPARATION MEASUREMENT

Test Date	2015/07/26	Temp./Hum.	25℃/58%
Cable Loss	1.64dB	Test Voltage	DC 6.6V

A.2.1 Measurement Plots

Modulation: T-FHSS	
2407.50MHz	2437.50MHz adjacent channel of right carrier frequency
	
2437.50MHz adjacent channel of left carrier frequency	2467.50MHz
	

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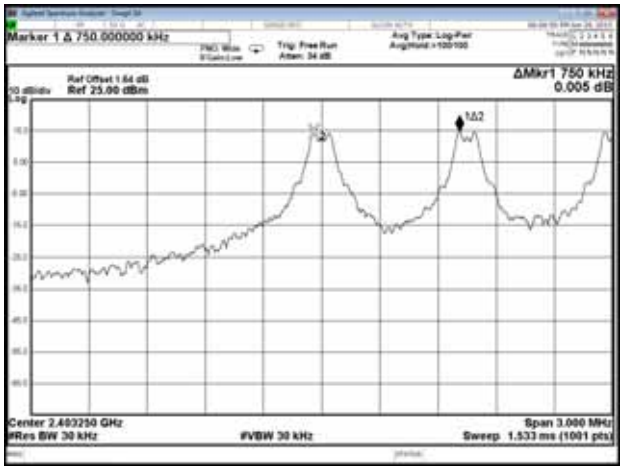
adjacent channel of right carrier frequency</td></tr>
<tr><td> 
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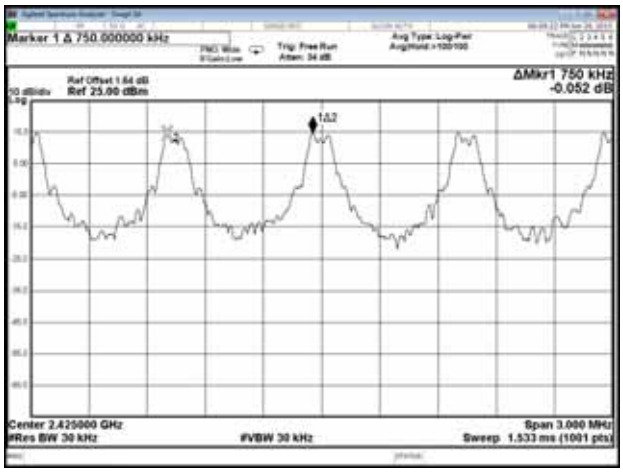
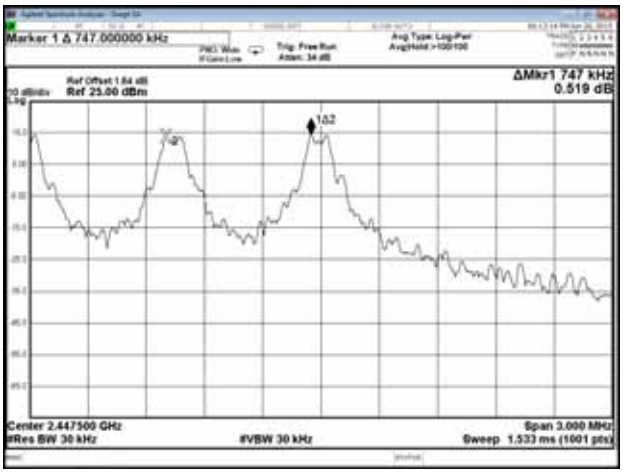
</td></tr>
<tr><td>2425.00MHz
adjacent channel of left carrier frequency</td><td>2447.50MHz</td></tr>
<tr><td> 
</td><td> 
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A.3 TIME OF OCCUPANCY MEASUREMENT

Test Date	2015/07/26	Temp./Hum.	25℃/58%
Cable Loss	1.64dB	Test Voltage	DC 6.6V

A.3.1 Time of Occupancy

Modulation	Centre Frequency (MHz)	Time of Occupancy (ms)	Maximum accumulated Time of Occupancy (ms)	Limit (ms)
T-FHSS	2407.500	1.440	53.568	<400
	2437.500	1.460	54.312	<400
	2467.500	1.440	53.568	<400

Duty cycle: 31 channels*0.4 seconds = 12.4 seconds

Test Frequency: 2407.500MHz

For each second of 3 channel appearance, the longest time of occupancy for each of 12.4 seconds is:

3 channels*12.4 seconds* 1.440ms = 53.568ms

Test Frequency: 2437.500MHz

For each second of 3 channel appearance, the longest time of occupancy for each of 12.4 seconds is:

3 channel*12.4 seconds* 1.460ms = 54.312ms

Test Frequency: 2467.500MHz

For each second of 3 channel appearance, the longest time of occupancy for each of 12.4 seconds is:

3 channel*12.4 seconds* 1.440ms = 53.568ms

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Modulation	Centre Frequency (MHz)	Time of Occupancy (ms)	Maximum accumulated Time of Occupancy (ms)	Limit (ms)
S-FHSS	2403.25	3.010	361.200	<400
	2425.00	3.040	364.800	<400
	2447.50	3.020	362.400	<400

Duty cycle: 60 channels*0.4 seconds = 24 seconds

Test Frequency: 2403.250MHz

For each second of 5 channel appearance, the longest time of occupancy for each of 24 seconds is:

5channels*24 seconds* 3.010ms = 361.200ms

Test Frequency: 2425.00MHz

For each second of 5 channel appearance, the longest time of occupancy for each of 24 seconds is:

5channel*24 seconds* 3.040ms = 364.800ms

Test Frequency: 2447.50MHz

For each second of 5 channel appearance, the longest time of occupancy for each of 24 seconds is:

5channel*24 seconds* 3.020ms = 362.400ms

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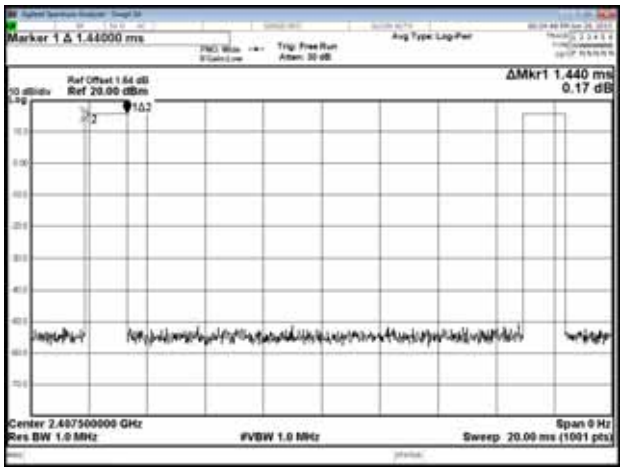
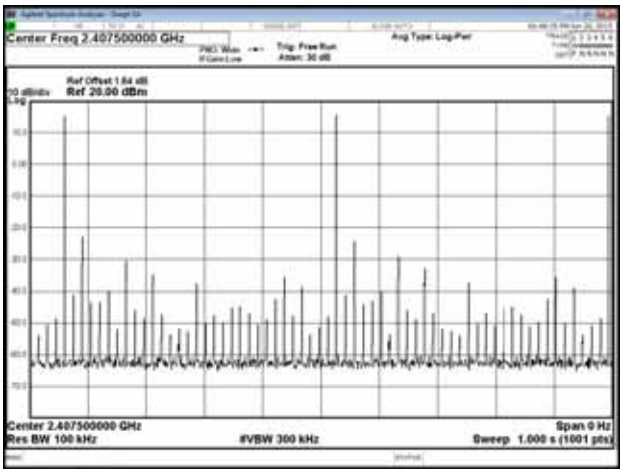
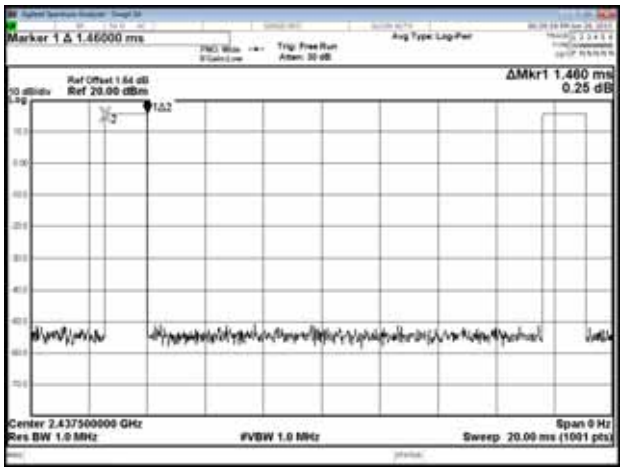
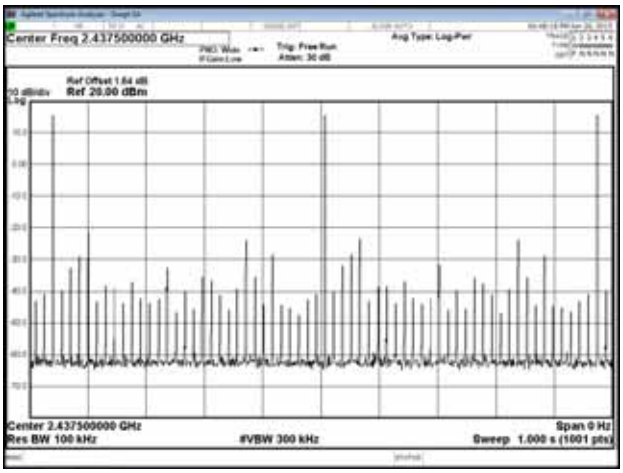
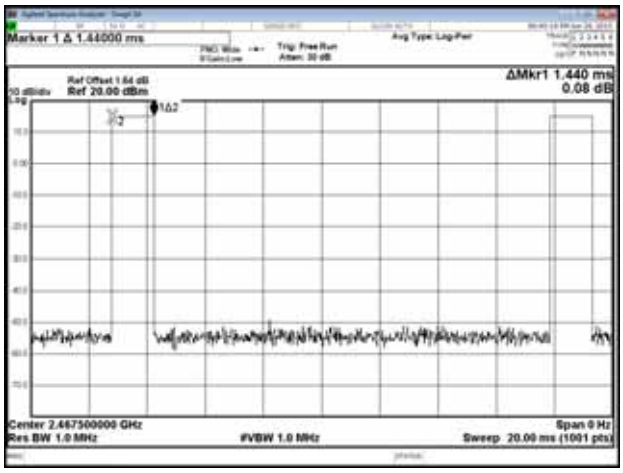
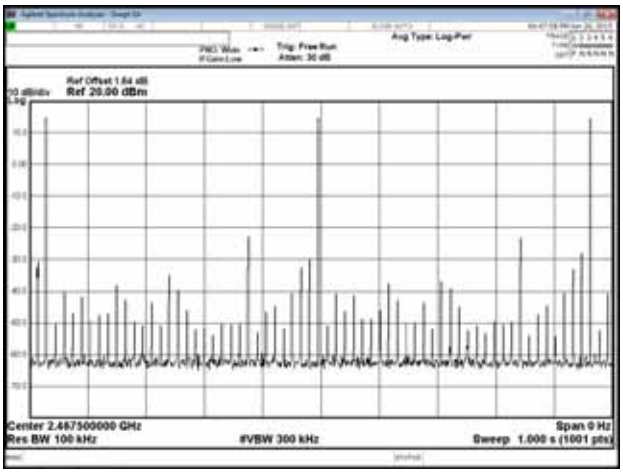
A.3.2 Measurement Plots

Modulation: T-FHSS	
2407.500MHz	
	
2437.500MHz	
	
2467.500MHz	
	

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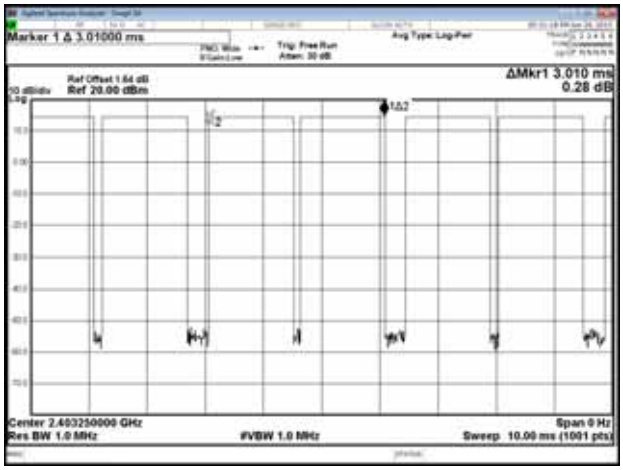
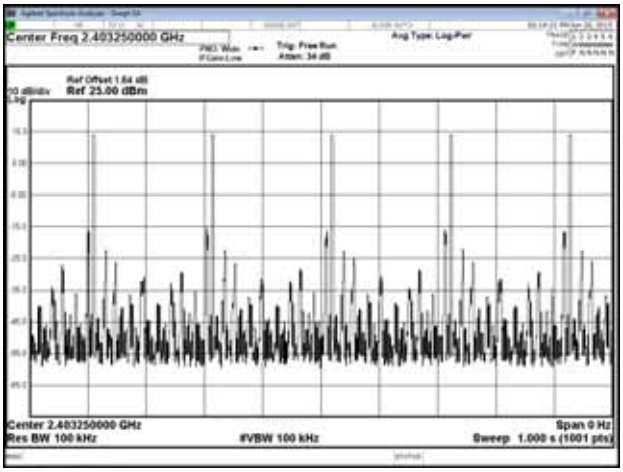
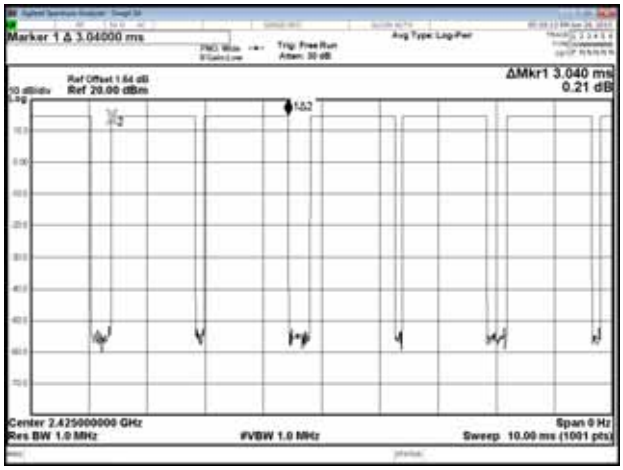
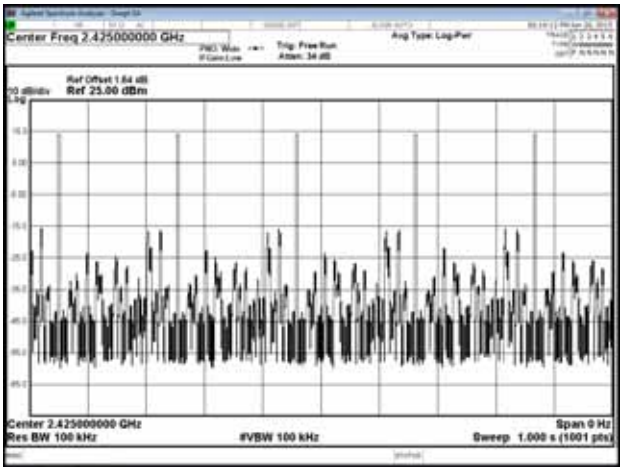
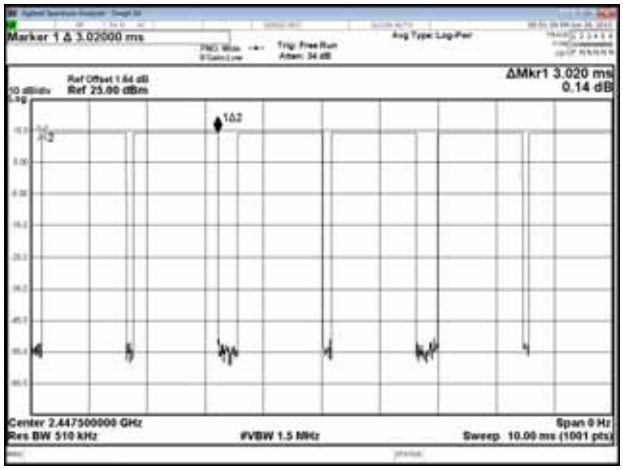
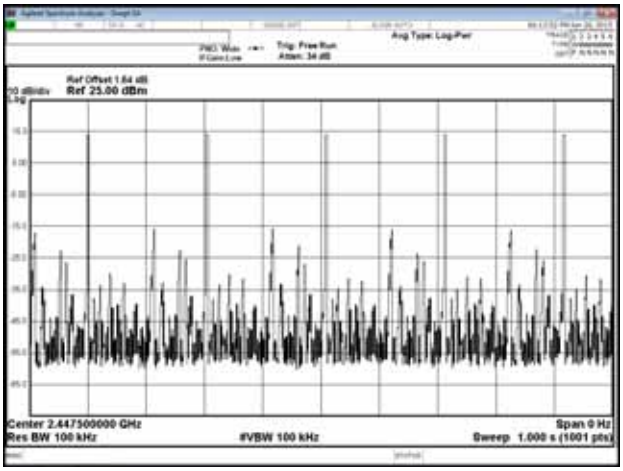
Modulation: S-FHSS	
2403.25MHz	
	
2425.00MHz	
	
2447.50MHz	
	

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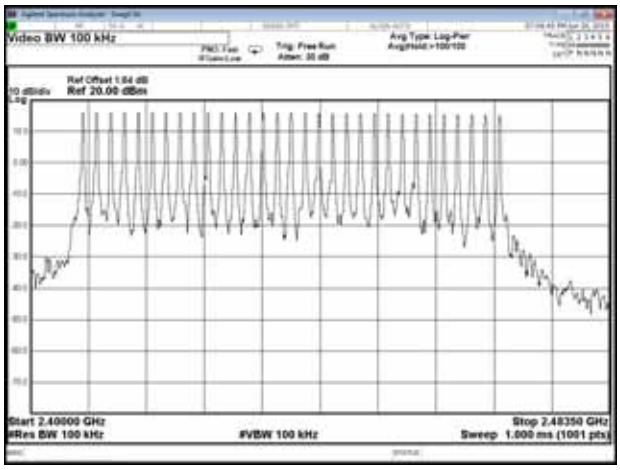
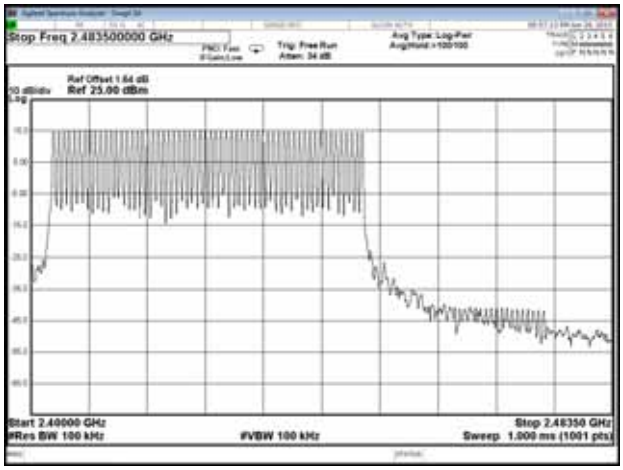
A.4 NUMBER OF HOPPING CHANNELS MEASUREMENT

Test Date	2015/07/26	Temp./Hum.	25℃/58%
Cable Loss	1.64dB	Test Voltage	DC 6.6V

A.4.1 Measurement Plots

Modulation: T-FHSS	Modulation: S-FHSS
	
The number hopping channel is 31.	The number hopping channel is 60.

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A.5 MAXIMUM PEAK OUTPUT POWER MEASUREMENT

Test Date	2015/08/12	Temp./Hum.	25℃/58%
Cable Loss	2.36dB	Test Voltage	DC 6.6V

A.5.1 Peak Output Power

Modulation	Centre Frequency (MHz)	Peak Output Power		Limit
		dBm	W	
T-FHSS	2407.50	11.268	0.013391	21dBm (0.125W)
	2437.50	10.854	0.012173	
	2467.50	10.415	0.011003	

Modulation	Centre Frequency (MHz)	Peak Output Power		Limit
		dBm	W	
S-FHSS	2403.25	10.799	0.012020	21dBm (0.125W)
	2425.00	10.405	0.010977	
	2447.50	10.284	0.010676	

A.5.2 Average Output Power (Reporting only)

Modulation	Centre Frequency (MHz)	Average Output Power		Limit
		dBm	W	
T-FHSS	2407.50	10.77	0.011940	21dBm (0.125W)
	2437.50	10.19	0.010447	
	2467.50	9.83	0.009616	

Modulation	Centre Frequency (MHz)	Average Output Power		Limit
		dBm	W	
S-FHSS	2403.25	10.35	0.010839	21dBm (0.125W)
	2425.00	9.95	0.009886	
	2447.50	9.87	0.009705	

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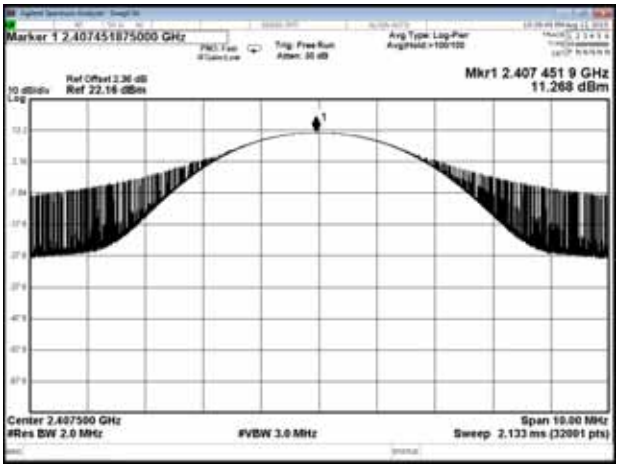
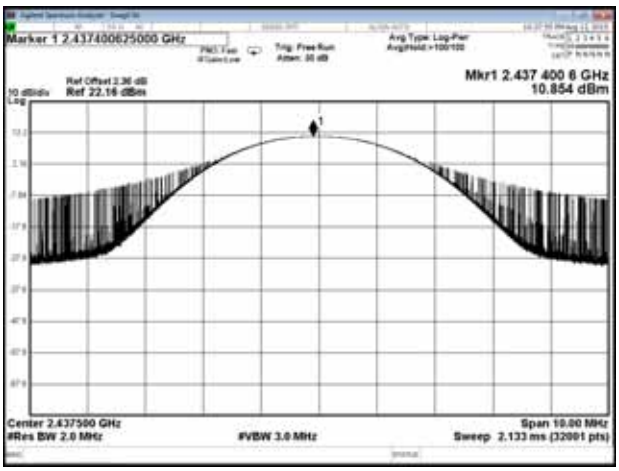
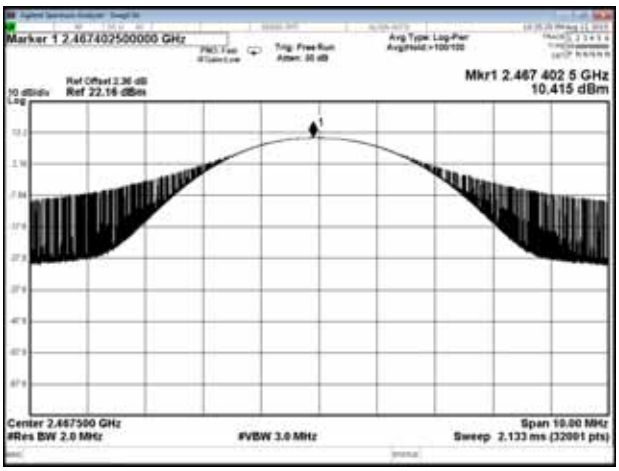
A.5.3 Peak Output Power Measurement Plots

Modulation: T-FHSS




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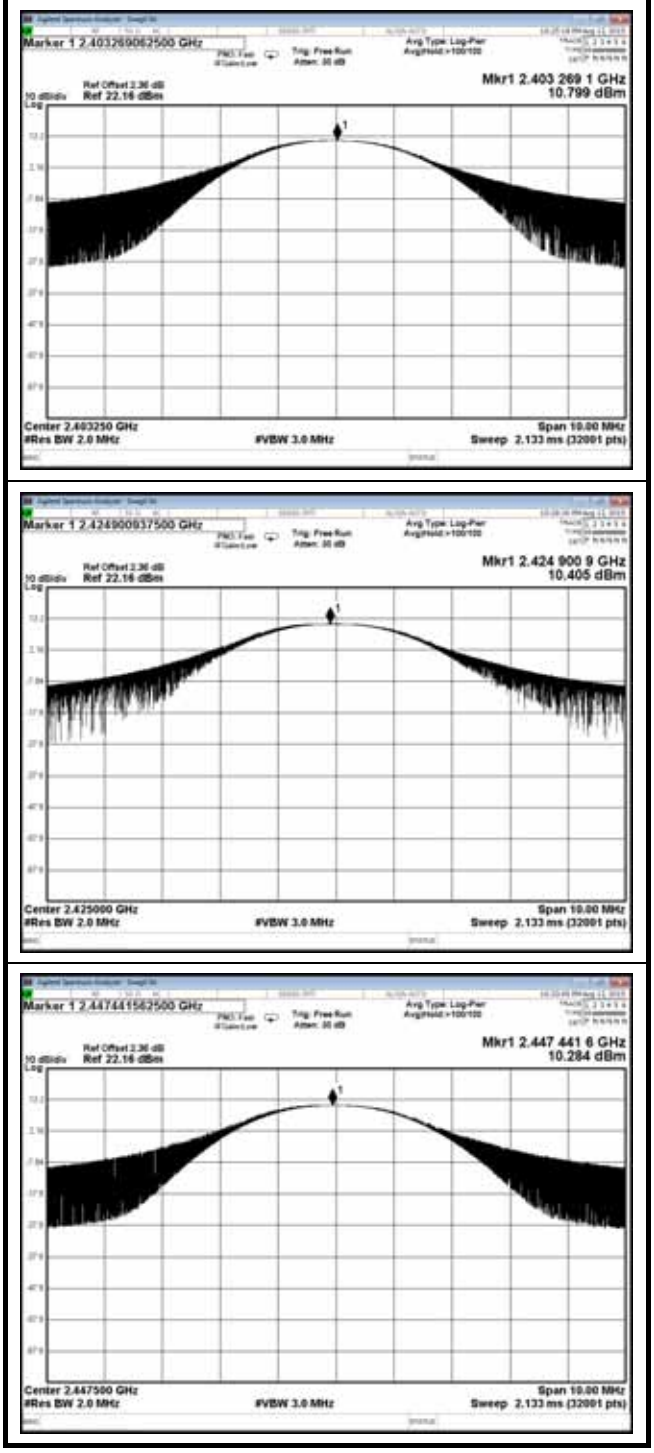
Modulation: S-FHSS



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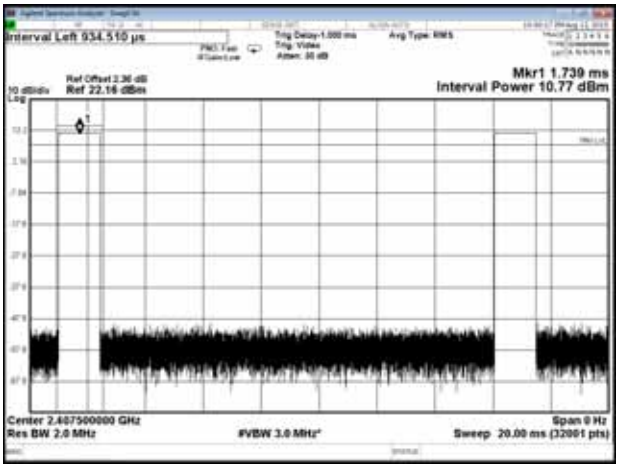
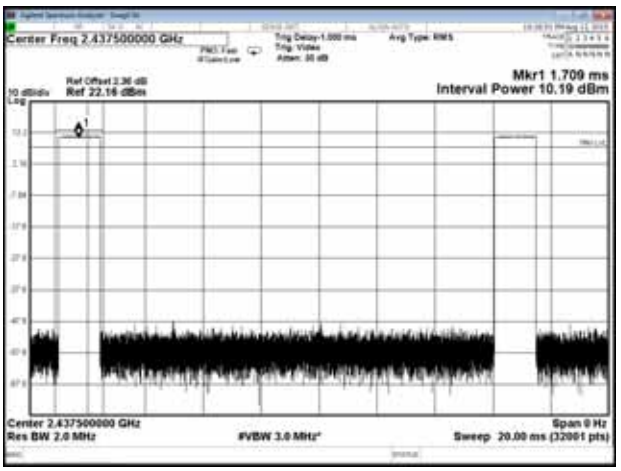
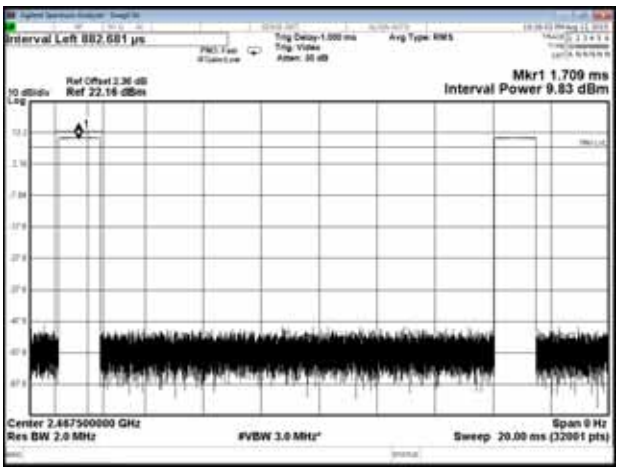
A.5.4 Average Output Power Measurement Plots (Reporting only)

Modulation: T-FHSS







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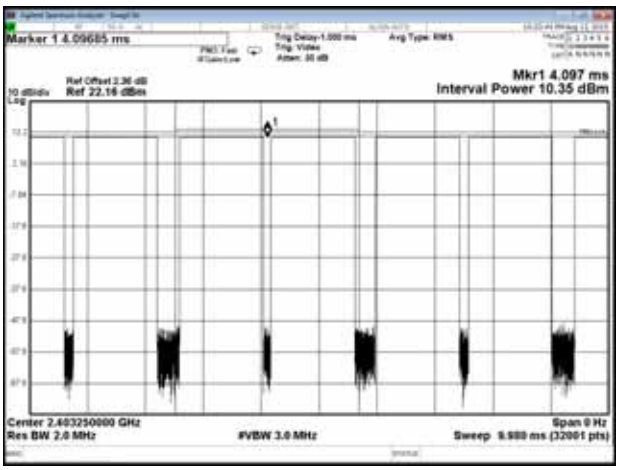
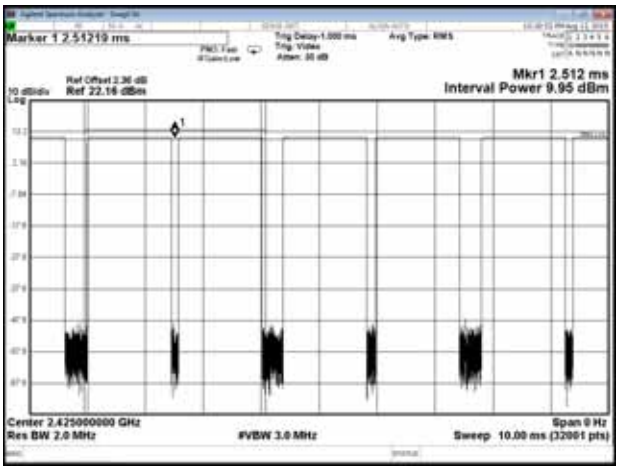
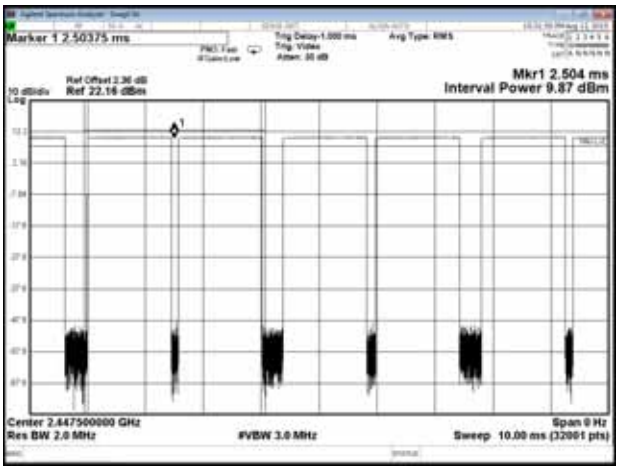
Modulation: S-FHSS







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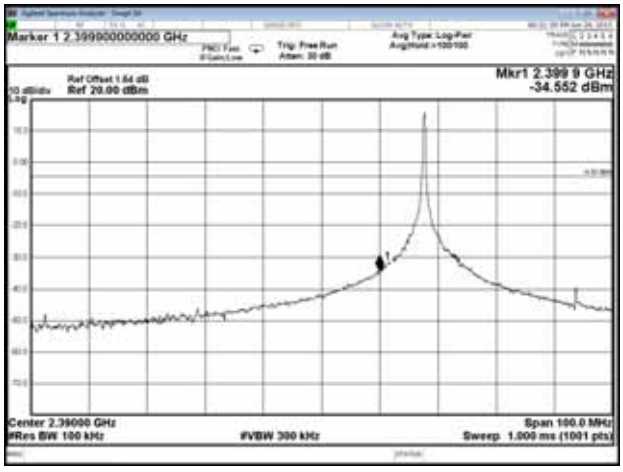
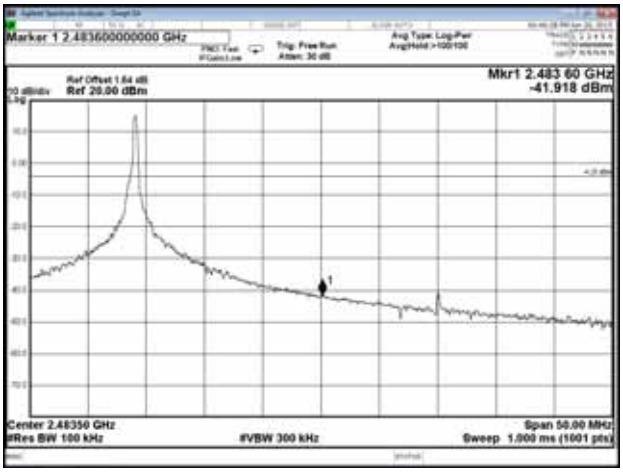
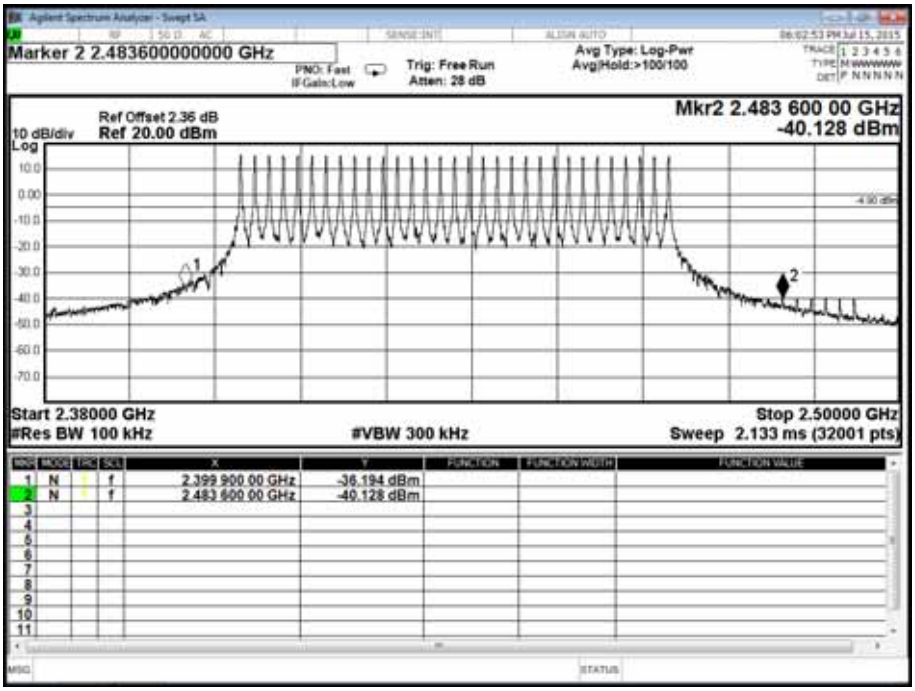
A.6 EMISSION LIMITATIONS MEASUREMENT

A.6.1 Band Edge

Test Date	2015/07/15 ~ 2015/07/26	Temp./Hum.	25℃/58%
Cable Loss	1.64dB, 2.36dB	Test Voltage	DC 6.6V

Modulation: T-FHSS	
Single Channel	
Low channel	High channel
	
Hopping Mode	
	

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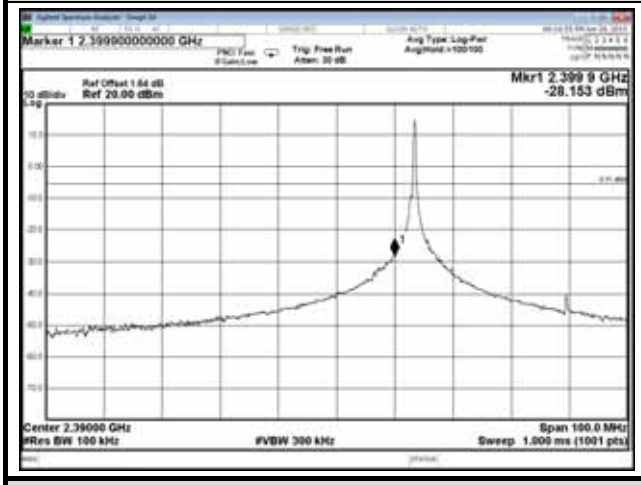
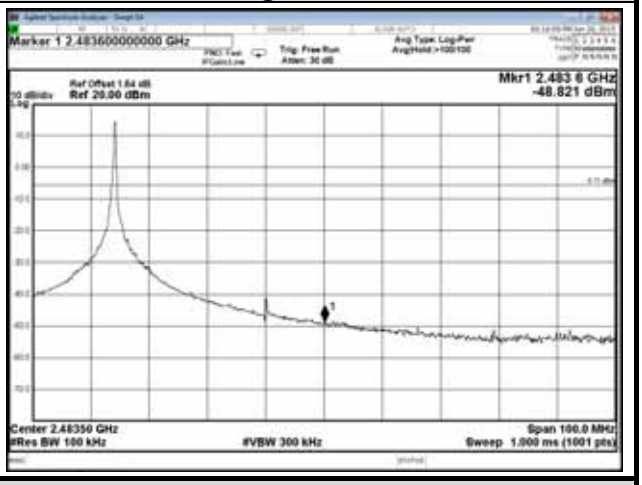
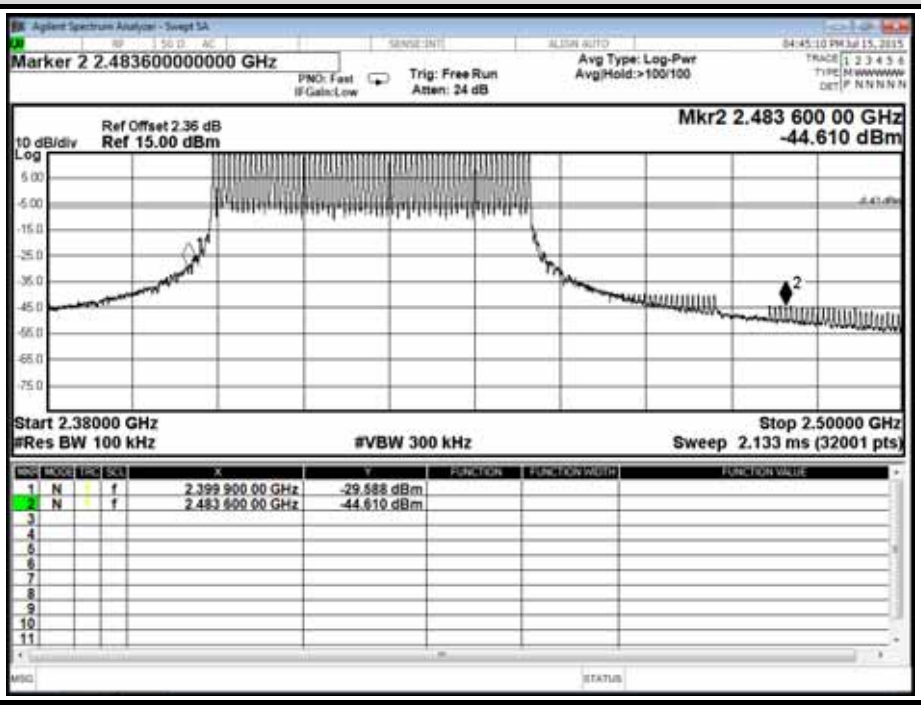
Modulation: S-FHSS	
Single Channel	
Low channel	High channel
	
Hopping Mode	
	

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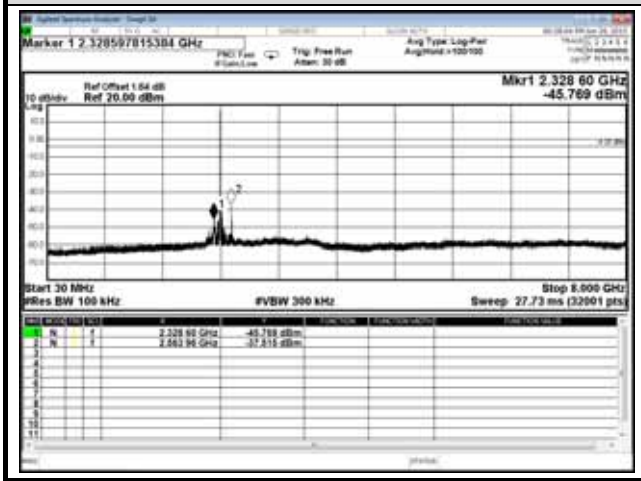
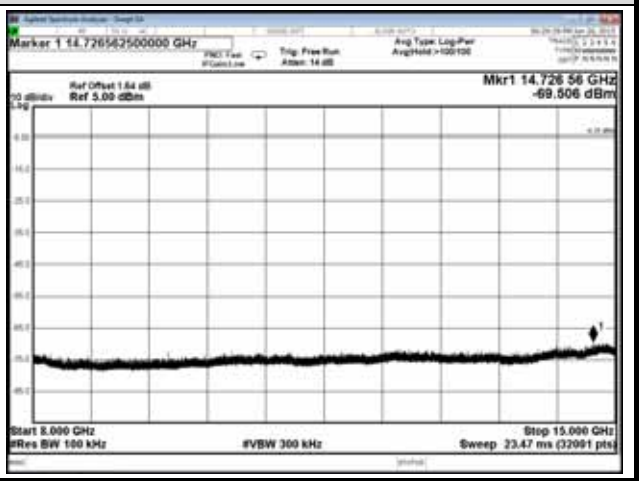
A.6.2 Spurious Emission

Test Date	2015/07/26	Temp./Hum.	25℃/58%
Mode	TX	Modulation	T-FHSS
		Frequency	2407.50MHz
Cable Loss	1.64dB	Test Voltage	DC 6.6V

30MHz – 8GHz	8GHz – 15GHz
	
15GHz – 25GHz	
	

Note: All results have been included cable loss and simultaneous factor.

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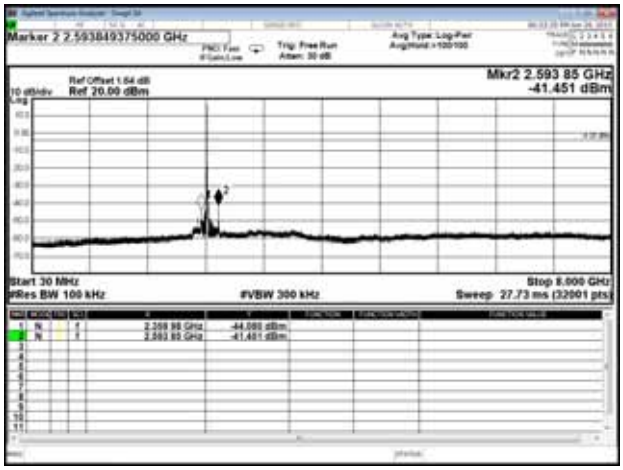
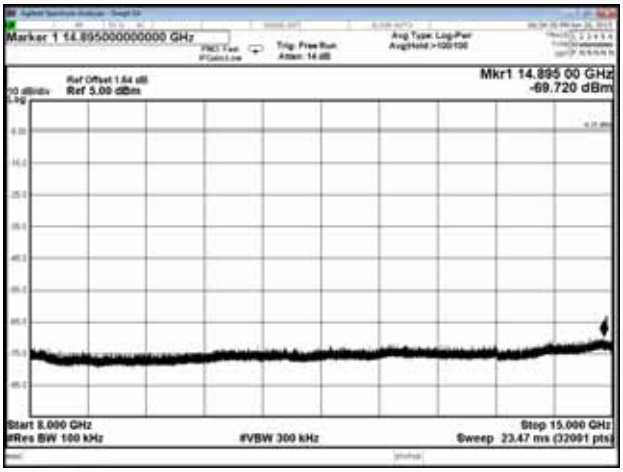
Test Date	2015/07/26	Temp./Hum.	25℃/58%
Mode	TX	Modulation	T-FHSS
		Frequency	2437.50MHz
Cable Loss	1.64dB	Test Voltage	DC 6.6V

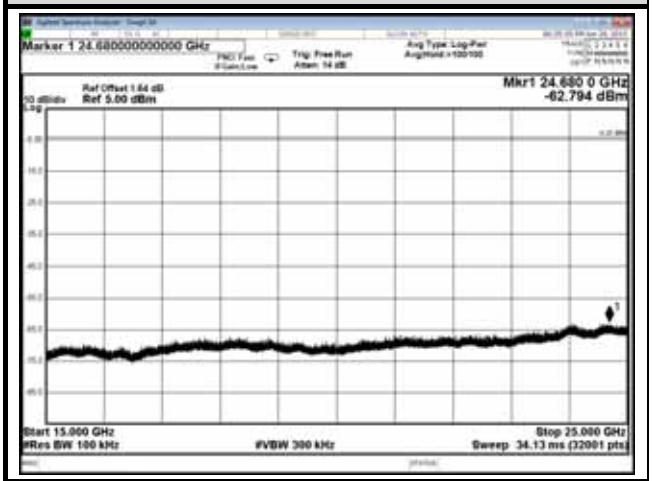
30MHz – 8GHz



8GHz – 15GHz



15GHz – 15GHz



Note: All results have been included cable loss and simultaneous factor.

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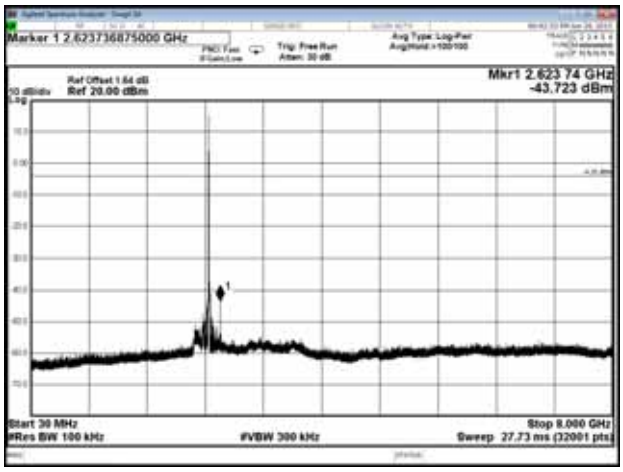
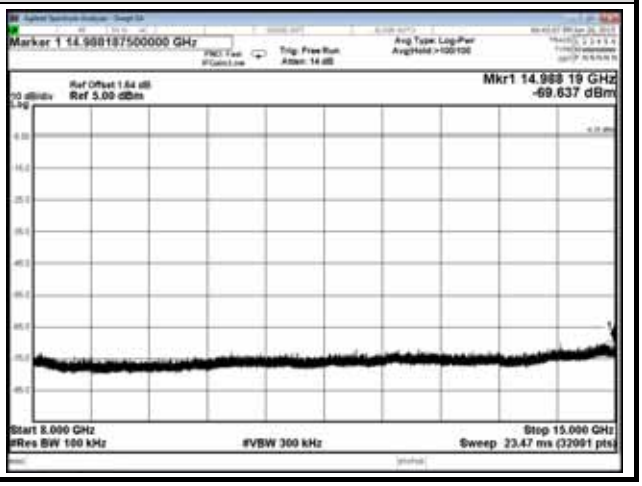
Test Date	2015/07/26	Temp./Hum.	25℃/58%
Mode	TX	Modulation	T-FHSS
		Frequency	2467.50MHz
Cable Loss	1.64dB	Test Voltage	DC 6.6V

30MHz – 8GHz	8GHz – 15GHz
	

15GHz – 25GHz

Note: All results have been included cable loss and simultaneous factor.

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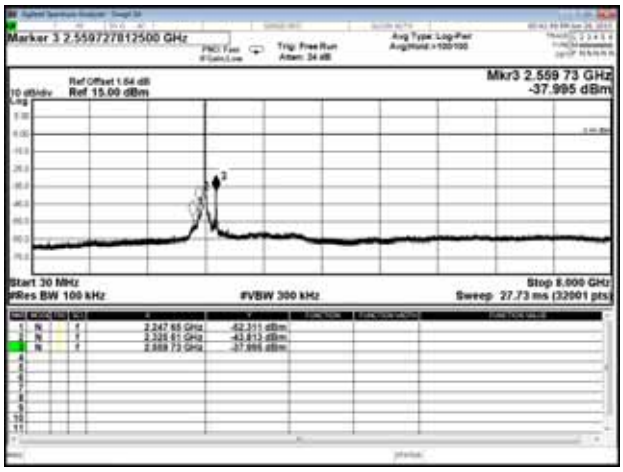
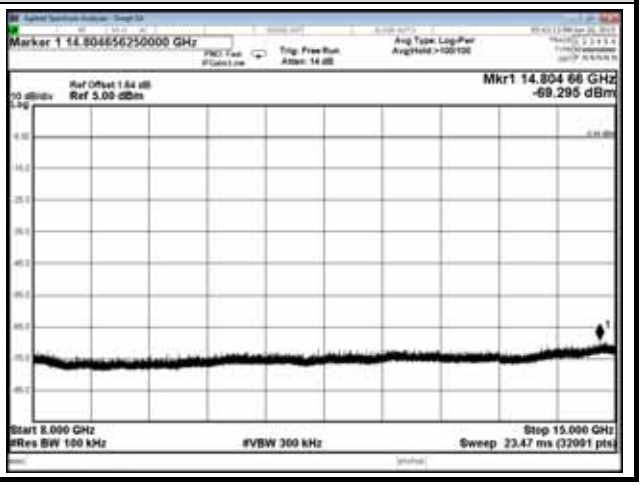
Test Date	2015/07/26	Temp./Hum.	25℃/58%
Mode	TX	Modulation	S-FHSS
		Frequency	2403.25MHz
Cable Loss	1.64dB	Test Voltage	DC 6.6V

30MHz – 8GHz



8GHz – 15GHz



15GHz – 25GHz

Note: All results have been included cable loss and simultaneous factor.

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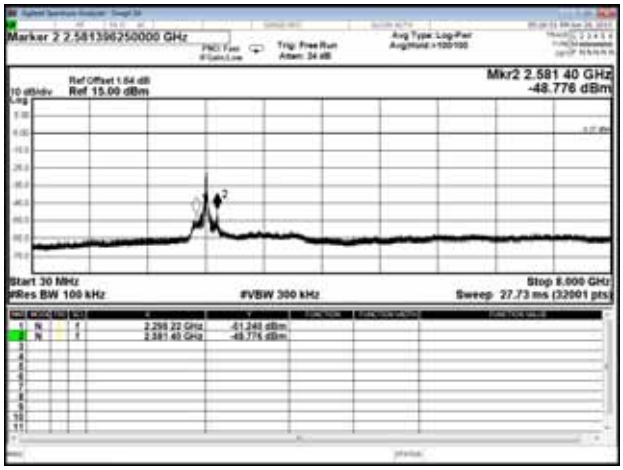
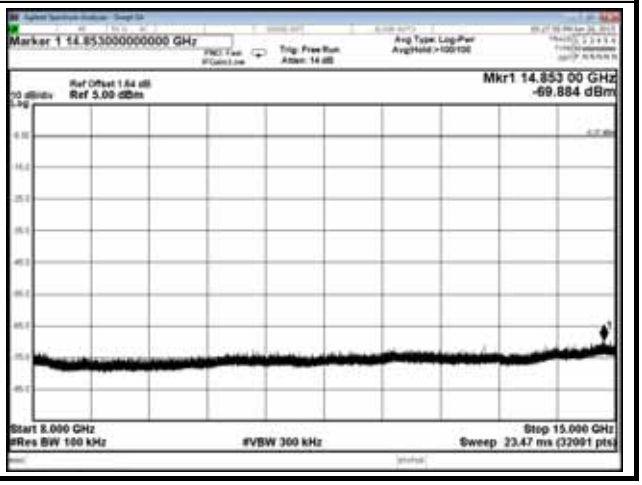
Test Date	2015/07/26	Temp./Hum.	25℃/58%
Mode	TX	Modulation	S-FHSS
		Frequency	2425.00MHz
Cable Loss	1.64dB	Test Voltage	DC 6.6V

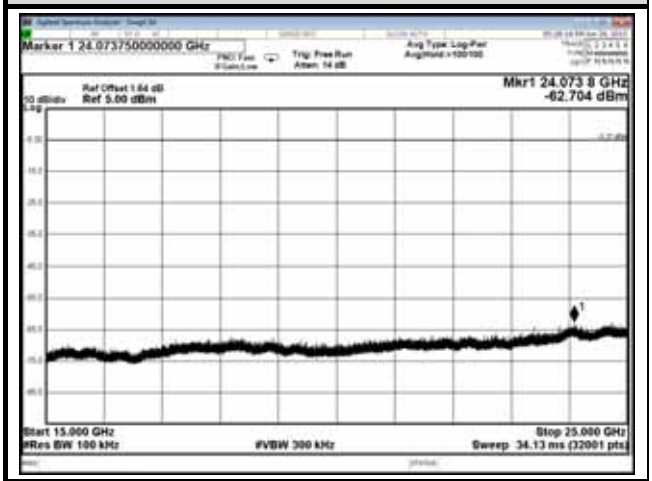
30MHz – 8GHz



8GHz – 15GHz



15GHz – 25GHz



Note: All results have been included cable loss and simultaneous factor.

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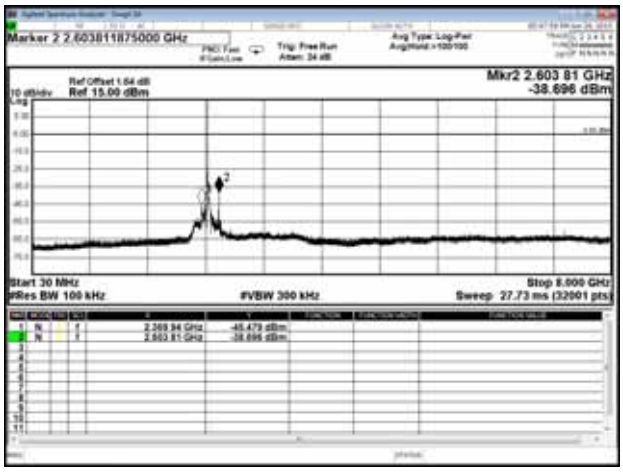
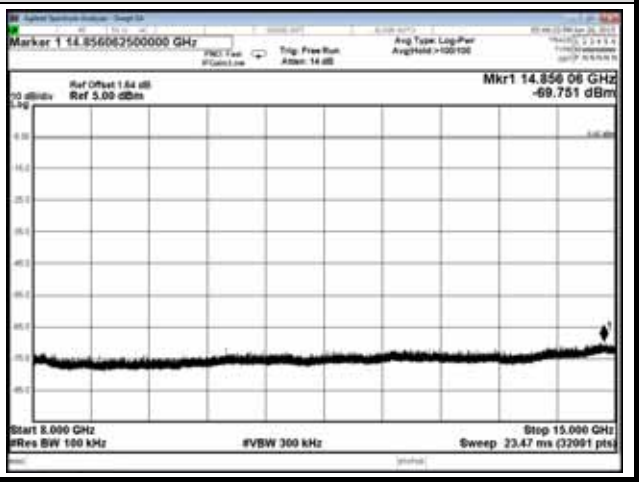
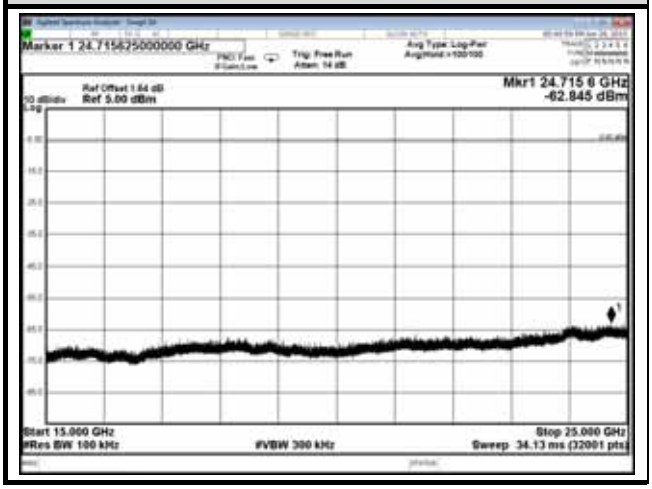
Test Date	2015/07/26	Temp./Hum.	25℃/58%
Mode	TX	Modulation	S-FHSS
		Frequency	2447.50MHz
Cable Loss	1.64dB	Test Voltage	DC 6.6V

30MHz – 8GHz	8GHz – 15GHz
	

15GHz – 25GHz


Note: All results have been included cable loss and simultaneous factor.