

FCC 15.247& RSS-247 2.4 GHz Report

for

Powertech Industrial Co Ltd

**10F, No. 407, Sec. 2, Chung-Shan Road,
Chung-Ho City, Taipei Hsien 235 Taiwan**

Product Name : WiFi-MCU Module
Model Name : WSDB-750GN_A
FCC ID : NHS-WSDB750GN
IC : 3653A-WSDB750GN

**Prepared by: : AUDIX Technology Corporation,
EMC Department**



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APPENDIX A TEST PHOTOGRAPHS

APPENDIX B TEST PLOTS

TEST REPORT CERTIFICATION

Applicant : Powertech Industrial Co Ltd
Manufacture : Ampak Technology Inc.
Product Name : WiFi-MCU Module
Model No. : WSDB-750GN_A
Serial No. : N/A

Applicable Standards:

47 CFR FCC Part 15 Subpart C: 2015
RSS-Gen (Issue 4), November 2014
RSS-247 (Issue 1), May 2015
ANSI C63.10:2013
KDB 558074 D01 DTS Meas Guidance v03r05

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: 2016. 07. 18 ~ 19

Date of Report: 2016. 07. 20

Producer: Annie Yu
(Annie Yu/Administrator)

Signatory: Ben Cheng
(Ben Cheng/Manager)

1. REPORT HISTORY

Revision	Date	Revision Summary	Report Number
0	2016. 07. 20	Original Report.	EM-F160453

2. SUMMARY OF TEST RESULTS

Rule		Description	Results
FCC	IC		
15.207	RSS-Gen §8.8	Conducted Emission	PASS
15.247(d)/ 15.205	RSS-Gen §8.9 RSS-247 §5.5	Radiated Band Edge and Radiated Spurious Emission	PASS
15.247(a)(2)	RSS-247 §5.2(1)	6dB Bandwidth	PASS
15.247(b)(3)	RSS-247 §5.4(4)	Maximum Peak Output	PASS
15.247(d)	RSS-247 §5.5	Conducted Band Edges and Conducted Spurious Emission	PASS
15.247 (e)	RSS-247 §5.2(2)	Peak Power Spectral Density	PASS
15.203	----	Antenna Requirement	PASS

3. GENERAL INFORMATION

3.1. Description of EUT

Product	WiFi-MCU Module							
Model Number	WSDB-750GN_A							
Serial Number	N/A							
Applicant	Powertech Industrial Co Ltd 10F, No. 407, Sec. 2, Chung-Shan Road, Chung-Ho City, Taipei Hsien 235 Taiwan							
Manufacture	Ampak Technology Inc. No1. Jan Ai Road, Hulou, Hsinchu, Taiwan, 30352							
RF Features	802.11/b/g/n							
Transmit Type	<table><tr><td>802.11b</td><td>1T1R</td></tr><tr><td>802.11g</td><td>1T1R</td></tr><tr><td>802.11n-HT20</td><td>1T1R</td></tr></table>		802.11b	1T1R	802.11g	1T1R	802.11n-HT20	1T1R
802.11b	1T1R							
802.11g	1T1R							
802.11n-HT20	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	2016. 06. 29							

3.2. EUT Specifications Assessed in Current Report

Mode	Fundamental Range (MHz)	Channel Number	Modulation	Data Rate (Mbps)
802.11b	2412-2462	11	DSSS (DBPSK/DQPSK/CCK)	1/2/5.5/11
802.11g		11	OFDM (BPSK/QPSK/16QAM/64QAM)	6/9/12/18/24/36/48/54
802.11n-HT20				Up to 65

Channel List	
802.11 b/g/n-HT20	
Channel Number	Frequency (MHz)
1	2412
2	2417
3	2422
4	2427
5	2432
6	2437
7	2442
8	2447
9	2452
10	2457
11	2462

3.3. Antenna Information

Antenna Part Number	Manufacture	Antenna Type	Frequency	Max Gain (dBi)
WSDB-733GN	Gemtek Technology Co., Ltd.	Printed Antenna	2400-2500MHz	2.0

3.4. Data Rate Relative to Output Power

802.11b			
Channel	Modulation	Date Rate(Mbps)	Power(dBm)
1	DBPSK	1	18.01
1	DQPSK	2	17.89
1	CCK	5.5	17.73
1	CCK	11	17.68

802.11g			
Channel	Modulation	Date Rate (Mbps)	Power (dBm)
1	BPSK	6	20.54
1	BPSK	9	20.31
1	QPSK	12	20.16
1	QPSK	18	20.22
1	16-QAM	24	20.04
1	16-QAM	36	19.91
1	64-QAM	48	19.78
1	64-QAM	54	19.68

802.11n-HT20			
Channel	Modulation	Date Rate	Power (dBm)
1	BPSK	MCS0	20.15
1	QPSK	MCS1	20.03
1	QPSK	MCS2	19.87
1	16-QAM	MCS3	19.74
1	16-QAM	MCS4	19.54
1	64-QAM	MCS5	19.66
1	64-QAM	MCS6	19.48
1	64-QAM	MCS7	19.39

Note: Above results are assessed in average power.

3.5. Test Configuration

Mode	Duty Cycle (x)	T (ms)	Duty Cycle Factor (dB)
802.11b	0.99	N/A	N/A
802.11g	0.98	N/A	N/A
802.11n-HT20	0.98	N/A	N/A

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

AC Conduction	
Test Case	Normal operation

Item		Mode	Data Rate	Test Channel
Radiated Test Case	Radiated Band Edge Note1	802.11b	1Mbps	1/11
		802.11g	6Mbps	1/11
		802.11n-HT20	MCS0	1/11
	Radiated Spurious Emission Note1 & 2	802.11b	1Mbps	1
		802.11g	6Mbps	6
		802.11n-HT20	MCS0	6
Conducted Test Case	6dB Bandwidth	802.11b	1Mbps	1/6/11
		802.11g	6Mbps	1/6/11
		802.11n-HT20	MCS0	1/6/11
	Peak Power Spectral Density	802.11b	1Mbps	1/6/11
		802.11g	6Mbps	1/6/11
		802.11n-HT20	MCS0	1/6/11
	Peak Output Power	802.11b	1Mbps	1/6/11
		802.11g	6Mbps	1/6/11
		802.11n-HT20	MCS0	1/6/11
	Band Edge	802.11b	1Mbps	1/11
		802.11g	6Mbps	1/11
		802.11n-HT20	MCS0	1/11
	Spurious Emission	802.11b	1Mbps	1/6/11
		802.11g	6Mbps	1/6/11
		802.11n-HT20	MCS0	1/6/11

Note 1:

☐ Mobile Device

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

- ☒ Lie
- ☐ Side
- ☐ Stand

Note 2: Low, mid, and high channels were measured, only the worst channel of each modulation was presented in this report.

3.6. Tested Supporting System List

3.6.1. Support Peripheral Unit

No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Notebook PC	ASUS	X5502E	N/A	PPD-AAR5B225
2.	Test JIG	N/A	N/A	N/A	N/A

3.6.2. Cable Lists

No.	Cable Description Of The Above Support Units
1.	USB Cable: Non-Shielded, Detachable, 1.m Adapter: Enerironix, M/N M/N EXA1208UH, DC Power Cord: Non-Shielded, Detachable, 1.8m AC Power Cord: Shielded, Undetachable, 1.8m, Bonded a ferrite core
2.	NA

3.7. Setup Configuration

3.7.1. EUT Configuration for Power Line Emission



3.7.2. EUT Configuration for Conducted Test Items



3.8. Operating Condition of EUT

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

3.9. 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	:	No. 7 Shielded Room No. 67-4, Dingfu, Linkou Dist., New Taipei City 244, Taiwan Semi-Anechoic Chamber No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan IC Test Site Registration No.: 5183B-1 Renewal on September 17, 2014 Fully Anechoic Chamber No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan IC Test Site Registration No.: 5183B-4 Renewal on August 31, 2015
NVLAP Lab. Code	:	200077-0
TAF Accreditation No	:	1724
FCC OET Designation	:	TW1004 & TW1090

3.10. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Conduction Test	150kHz~30MHz	±3.5dB
Radiation Test (Distance: 3m)	30MHz~1000MHz	± 3.68dB
	Above 1GHz	± 5.82dB

Remark : Uncertainty = $k_{uc}(y)$

Test Item	Uncertainty
6dB Bandwidth	± 0.05kHz
Maximum peak output power	± 0.33dB
Power spectral density	± 0.13dB
Conducted Emission Limitations	± 0.13dB

4. MEASUREMENT EQUIPMENT LIST

4.1. Conducted Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Test Receiver	R&S	ESCI	101276	2016. 03. 31	1 Year
2.	A.M.N.	R&S	ESH2-Z5	100366	2016. 03. 15	1 Year
3.	L.I.S.N.	Kyoritsu	KNW-407	8-881-13	2016. 01. 07	1 Year
4.	Pulse Limiter	R&S	ESH3-Z2	101495	2016. 01. 17	1 Year
	Test Software	Audix	e3	V.120619C	N.C.R.	N.C.R.

4.2. Radiated Emission Measurement

4.2.1. Frequency Range 9kHz~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	2016. 06. 22	1 Year
3.	Amplifier	HP	8447D	2944A06305	2016. 02. 23	1 Year
4.	Bilog Antenna	TESEQ	CBL6112D	33821	2016. 01. 30	1 Year
5.	Test Software	Audix	e3	V.6.110601	N.C.R.	N.C.R.
6.	Loop Antenna	R&S	HFH2-Z2	891847/27	2015. 12. 24	1 Year

4.2.2. Frequency Range Above 1GHz (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	HP	8449B	3008A02678	2016. 03. 04	1 Year
3.	Horn Antenna	ETS-Lindgren	3117	00135902	2016. 03. 09	1 Year
4.	Horn Antenna	EMCO	3116	2653	2015. 10. 20	1 Year
5.	2.4GHz Notch Filter	K&L	7NSL10-244 1.5E130.5-00	1	2015. 07. 28	1 Year
6.	Test Software	Audix	e3	V.6.110601	N.C.R.	N.C.R.

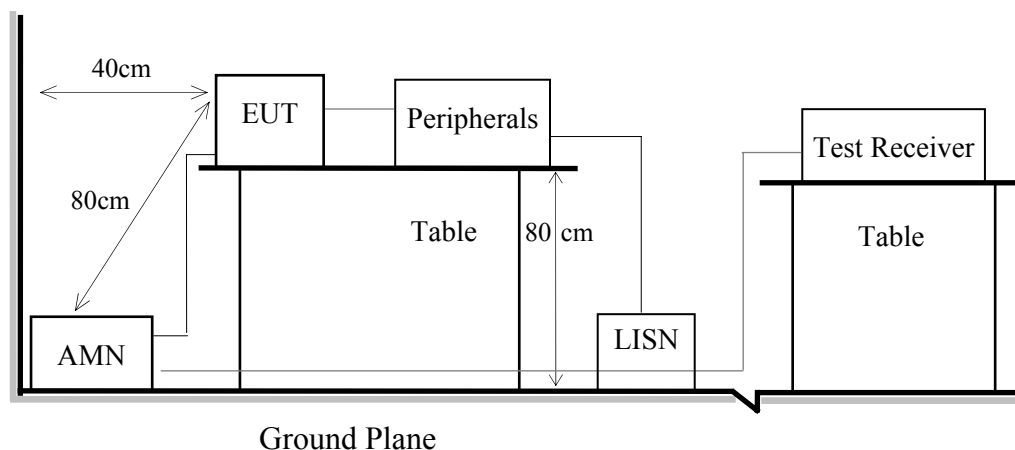
4.3. RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9030A-526	MY53310269	2015. 11. 28	1 Year
2.	Power Meter	Anritsu	ML2495A	1145008	2015. 10. 23	1 Year
3.	Power Sensor	Anritsu	MA2411B	1126096	2015. 10. 23	1 Year

5. CONDUCTED EMISSION MEASUREMENT

5.1. Block Diagram of Test Setup

Shielded Room Setup Diagram



5.2. Power Line Conducted Emission Limit

Frequency	Conducted Limit	
	Quasi-Peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 dB μ V	56 ~ 46 dB μ V
500kHz ~ 5MHz	56 dB μ V	46 dB μ V
5MHz ~ 30MHz	60 dB μ V	50 dB μ V

Remark 1.: If the average limit is met when using a Quasi-Peak detector, the measurement using the average detector is not required.

2.: The lower limit applies to the band edges.

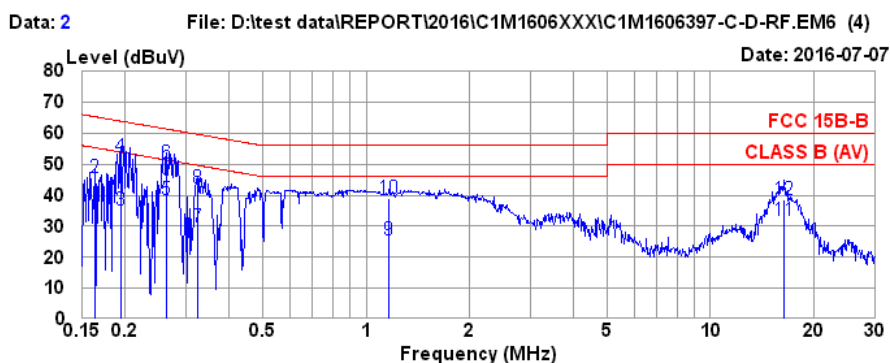
5.3. Test Procedure

- 5.3.1. To set up the EUT as indicated in ANSI C 63.10. The EUT was placed on the table which has 80 cm height to the ground and 40 cm distance to the conducting wall.
- 5.3.2. Power supplier of the EUT was connected to the AC mains through an Artificial Mains Network (A.M.N.).
- 5.3.3. The AC power supplies to all peripheral devices must be provided through line impedance stabilization network (L.I.S.N.)
- 5.3.4. Checking frequency range from 150 kHz to 30 MHz and record the emission which does not have 20 dB below limit.

5.4. Conducted Emission Measurement Results

PASSED.

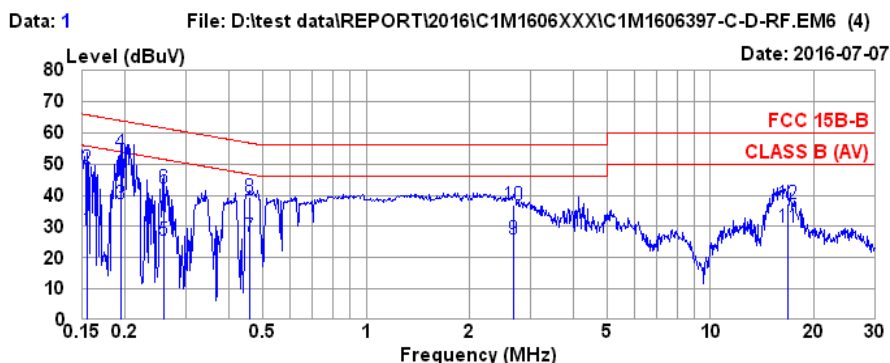
Test Date	2016/07/07	Temp./Hum.	25 /59%
Test Voltage	DC 3.3V (Via test jig)		



Site no. : No.7 Shielded Room Data no. : 2
Condition : ESH2-Z5 366 Phase : NEUTRAL
Limit : FCC 15B-B
Env. / Ins. : 25°C / 59% ESCI (1276) Engineer : NICK DU
EUT : WSD8-750GN_A
Power Rating : DC 3.3V
Test Mode : Operating

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.163	0.17	0.03	9.85	20.87	30.92	55.30	24.38	Average
2	0.163	0.17	0.03	9.85	35.82	45.87	65.30	19.43	QP
3	0.194	0.18	0.03	9.85	25.25	35.31	53.84	18.53	Average
4	0.194	0.18	0.03	9.85	42.27	52.33	63.84	11.51	QP
5	0.263	0.18	0.03	9.85	28.52	38.58	51.34	12.76	Average
6	0.263	0.18	0.03	9.85	40.24	50.30	61.34	11.04	QP
7	0.323	0.19	0.03	9.85	19.63	29.70	49.62	19.92	Average
8	0.323	0.19	0.03	9.85	32.41	42.48	59.62	17.14	QP
9	1.166	0.21	0.05	9.92	15.51	25.69	46.00	20.31	Average
10	1.166	0.21	0.05	9.92	28.75	38.93	56.00	17.07	QP
11	16.398	0.70	0.18	9.91	20.95	31.74	50.00	18.26	Average
12	16.398	0.70	0.18	9.91	27.65	38.44	60.00	21.56	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
2. If the average limit is met when using a quasi-peak detector,
the EUT shall be deemed to meet both limits and measurement
with average detector is unnecessary.



Site no. : No.7 Shielded Room Data no. : 1
Condition : ESH2-Z5 366 Phase : LINE
Limit : FCC 15B-B
Env. / Ins. : 25°C / 59% ESCI (1276) Engineer : NICK DU
EUT : WSD8-750GN_A
Power Rating : DC 3.3V
Test Mode : Operating

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.155	0.17	0.03	9.85	18.88	28.93	55.74	26.81	Average
2	0.155	0.17	0.03	9.85	38.67	48.72	65.74	17.02	QP
3	0.194	0.15	0.03	9.85	27.14	37.17	53.84	16.67	Average
4	0.194	0.15	0.03	9.85	43.76	53.79	63.84	10.05	QP
5	0.259	0.16	0.03	9.85	15.55	25.59	51.47	25.88	Average
6	0.259	0.16	0.03	9.85	32.39	42.43	61.47	19.04	QP
7	0.459	0.17	0.03	9.85	16.93	26.98	46.71	19.73	Average
8	0.459	0.17	0.03	9.85	29.45	39.50	56.71	17.21	QP
9	2.692	0.26	0.07	9.93	15.56	25.82	46.00	20.18	Average
10	2.692	0.26	0.07	9.93	26.43	36.69	56.00	19.31	QP
11	16.750	0.65	0.18	9.91	18.97	29.71	50.00	20.29	Average
12	16.750	0.65	0.18	9.91	26.64	37.38	60.00	22.62	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
2. If the average limit is met when using a quasi-peak detector,
the EUT shall be deemed to meet both limits and measurement
with average detector is unnecessary.

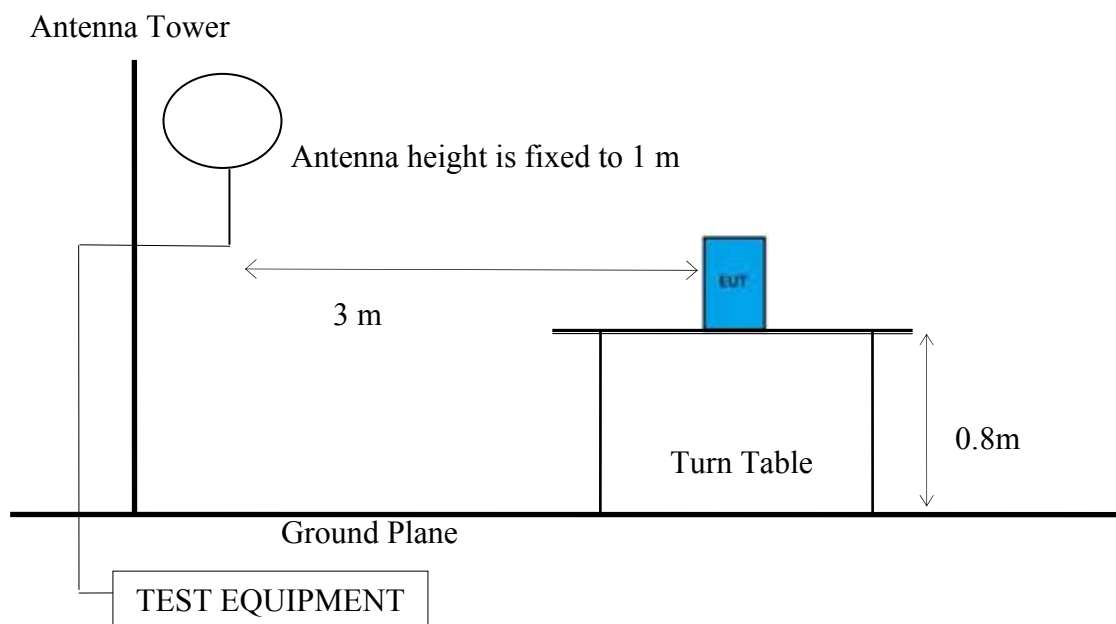
6. RADIATED EMISSION MEASUREMENT

6.1. Block Diagram of Test Setup

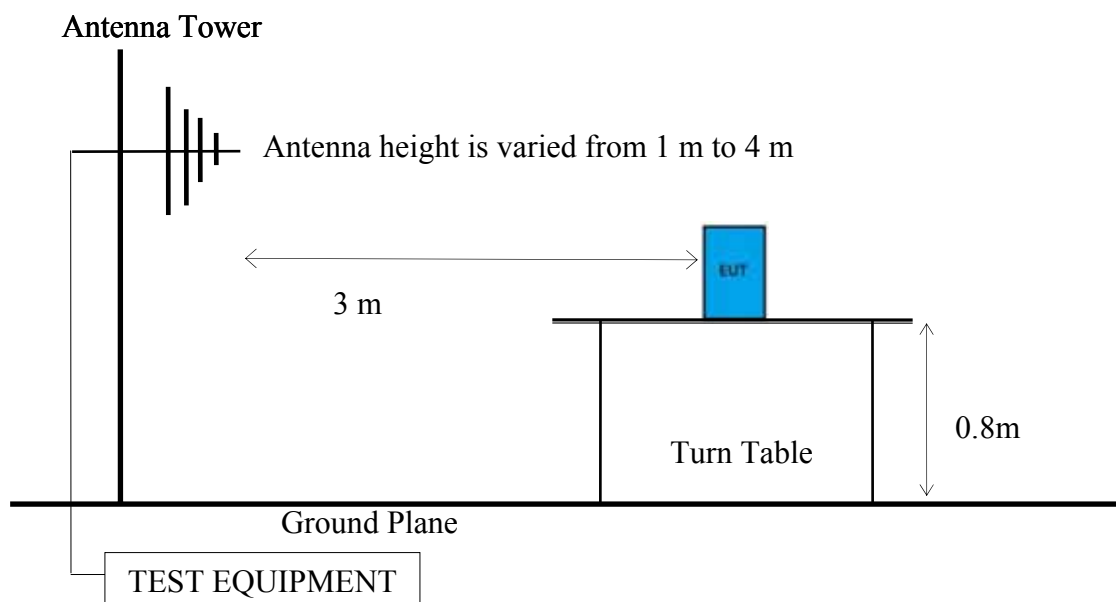
6.1.1. Block Diagram of connection between EUT and simulators

Indicated as section 3.7

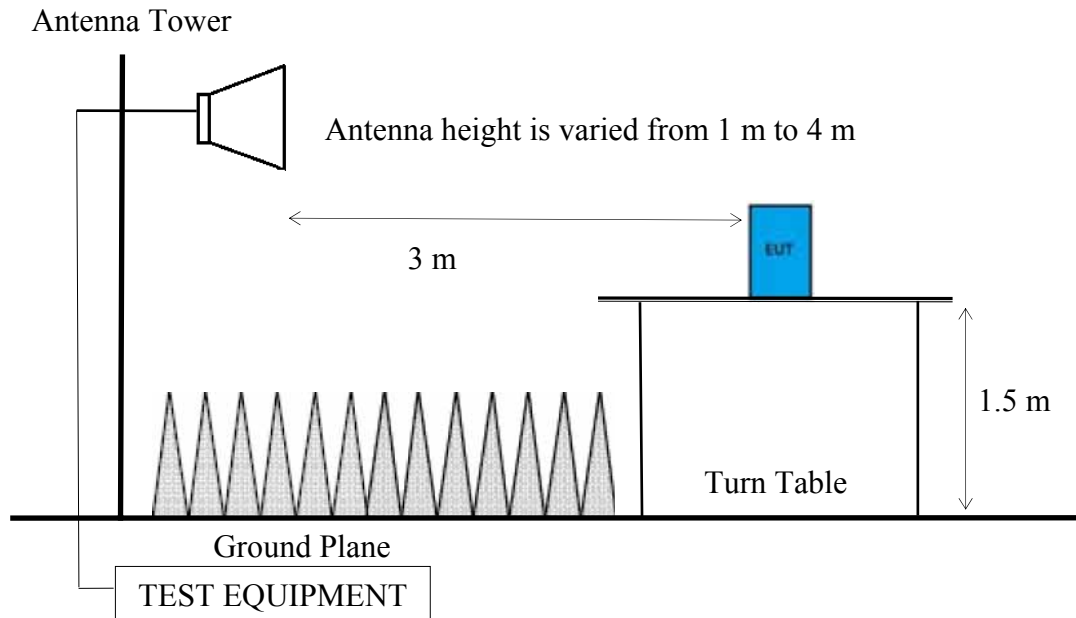
6.1.2. Semi Anechoic Chamber (3m) Setup Diagram for 9kHz-30MHz



6.1.3. Semi Anechoic Chamber (3m) Setup Diagram for 30-1000 MHz



6.1.4. Fully Anechoic Chamber (3m) Setup Diagram for above 1GHz



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/RSS-Gen Section 8.10 table 6, must also comply with the radiated emission limits specified as below.

Frequency (MHz)	Distance (m)	Limits	
		dB μ V/m	μ V/m
0.009 - 0.490	300	67.6	2400/kHz
0.490 - 1.705	30	87.6	24000/kHz
1.705 - 30	30	29.5	30
30 - 88	3	40.0	100
88- 216	3	43.5	150
216- 960	3	46.0	200
Above 960	3	54.0	500
Above 1000	3	74.0 dB μ V/m (Peak) 54.0 dB μ V/m (Average)	

Remark : (1) dB μ V/m = 20 log (μ V/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

Frequency Range 9kHz~30MHz:

The EUT setup on the turn table which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna fixed to 1 m to find the maximum emission level. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

- (1) RBW = 9kHz with peak and average detector.
- (2) Detector: average and peak (9kHz-490kHz)
Q.P. (490kHz-30MHz)

Frequency Range 30MHz ~ 40GHz:

The EUT setup on the turn find table which has 80 cm (for 30-1000 MHz) and 1.5m (for above 1GHz) 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, RSS-Gen and RSS-247 regulation.

Frequency below 1 GHz:

Spectrum Analyzer is used for pre-testing with following setting:

- (1) RBW = 120KHz
- (2) VBW $\geq 3 \times$ 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.

Frequency above 1GHz to 10th harmonic:

Peak Detector:

- (1) RBW = 120KHz
- (2) VBW $\geq 3 \times$ 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 Detector:**■ Option 1:**

- (1) RBW = 1MHz
- (2) VBW $\geq$ 1/ T.

Modulation Type	T (ms)	1/ T (kHz)	VBW Setting (kHz)
802.11b	N/A	N/A	10 Hz
802.11g	N/A	N/A	10 Hz
802.11n-HT20	N/A	N/A	10 Hz

N/A: 1/ T is not implemented when duty cycle presented in section 3.5 is $\geq$ 98 %.

- (1) Detector = Peak.
- (2) Sweep time = auto.
- (3) Trace mode = max hold.
- (4) 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=Antenna Factor + Cable Loss + Meter Reading
- Average Emission Level= Peak Emission Level+ DCCF
Duty Cycle Correction Factor (DCCF)= $20\log(TX_{on}/TX_{on+off})$ presented in section 3.5
- EPR= Peak Emission Level-95.2dB-2.14dB

6.5. Test Results

PASSED.

Test Date	2016/07/19	Temp./Hum.	25 /49%
Test Voltage	DC 3.3V (Via test jig)		

6.5.1. Emissions within Restricted Frequency Bands

6.5.1.1. Frequency 9kHz~30MHz

The emissions (9kHz~30MHz) not reported for there is no emission be found.

6.5.1.2. Frequency Below 1 GHz

Mode	802.11b	Frequency	TX 2412MHz
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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
120.21	12.28	3.37	20.48	36.13	43.50	7.37	Peak
332.64	13.99	5.01	26.24	45.24	46.00	0.76	Peak
480.08	16.71	6.30	18.32	41.33	46.00	4.67	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
60.07	6.25	2.72	29.46	38.43	40.00	1.57	Peak
503.36	17.00	6.44	16.97	40.41	46.00	5.59	Peak
528.58	17.37	6.46	19.83	43.66	46.00	2.34	Peak

Mode	802.11g	Frequency	TX 2437MHz
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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
120.21	12.28	3.37	20.36	36.01	43.50	7.49	Peak
332.64	13.99	5.01	22.40	41.40	46.00	4.60	Peak
359.80	14.64	5.28	21.29	41.21	46.00	4.79	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
60.07	6.25	2.72	26.44	35.41	40.00	4.59	Peak
332.64	13.99	5.01	22.17	41.17	46.00	4.83	Peak
661.47	18.58	6.64	13.62	38.84	46.00	7.16	Peak

Mode	802.11n-HT20	Frequency	TX 2437MHz
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Antenna at Horizontal Polarization

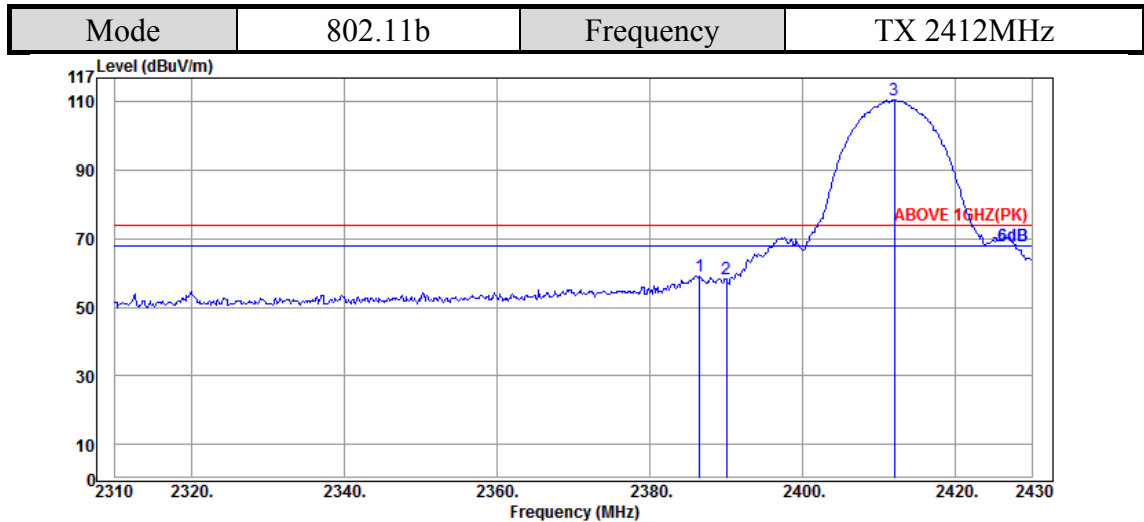
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
120.21	12.28	3.37	20.86	36.51	43.50	6.99	Peak
331.67	13.96	5.00	21.50	40.46	46.00	5.54	Peak
480.08	16.71	6.30	18.31	41.32	46.00	4.68	Peak

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
30.97	18.07	2.34	17.63	38.04	40.00	1.96	Peak
60.07	6.25	2.72	30.41	39.38	40.00	0.62	Peak
332.64	13.99	5.01	20.70	39.70	46.00	6.30	Peak

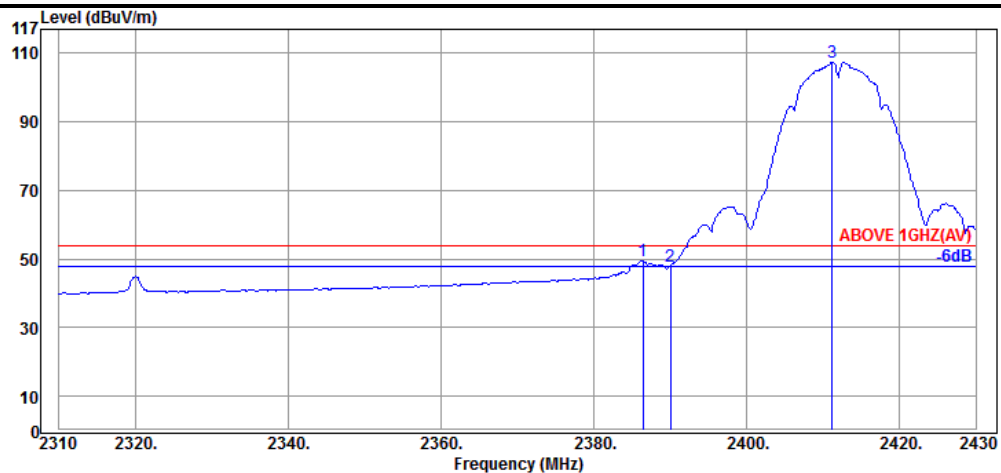
6.5.2. Frequency Above 1 GHz to 10th harmonics

Band Edge:



Antenna at Horizontal Polarization

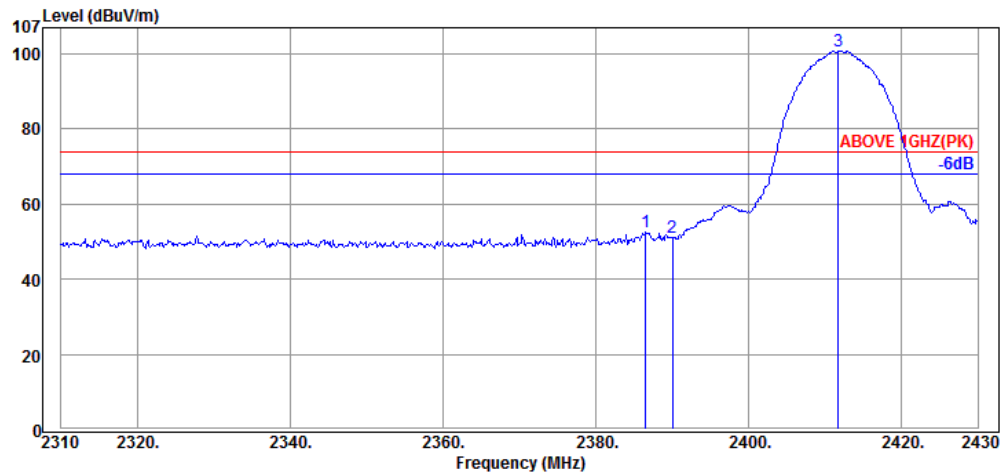
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2386.56	32.16	6.07	20.87	59.10	74.00	14.90	Peak
2390.04	32.16	6.08	19.98	58.22	74.00	15.78	Peak
2412.00	32.18	6.11	72.23	110.52	---	---	Peak



Antenna at Horizontal Polarization

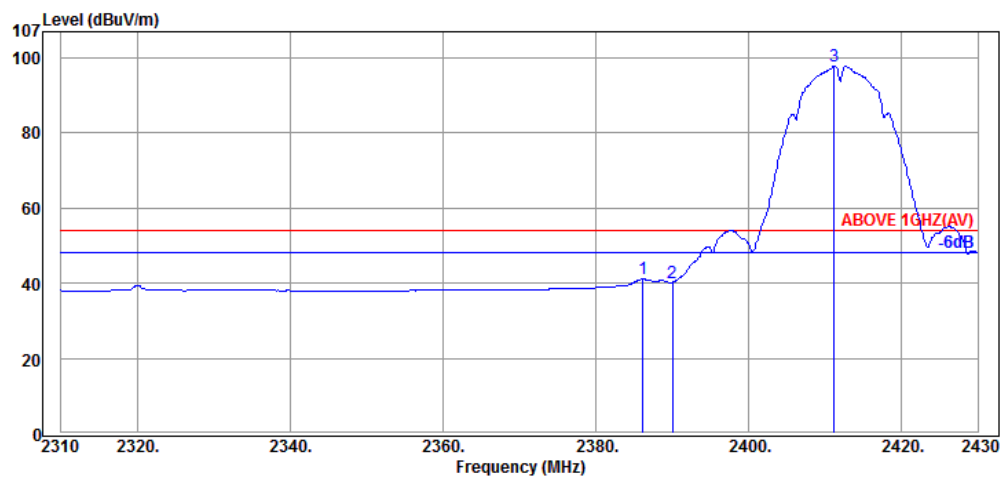
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2386.44	32.16	6.07	11.13	49.36	54.00	4.64	Average
2390.04	32.16	6.08	9.70	47.94	54.00	6.06	Average
2411.16	32.18	6.11	69.20	107.49	---	---	Average

Mode	802.11b	Frequency	TX 2412MHz
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Antenna at Vertical Polarization

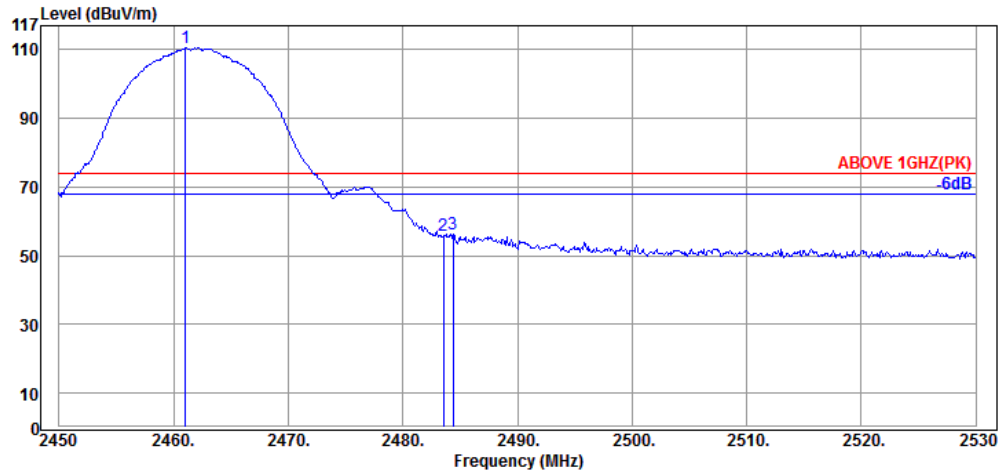
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	imits (dBμV/m)	Margin (dB)	Detector
2386.56	32.16	6.07	14.29	52.52	74.00	21.48	Peak
2390.04	32.16	6.08	12.84	51.08	74.00	22.92	Peak
2411.76	32.18	6.11	62.50	100.79	---	---	Peak



Antenna at Vertical Polarization

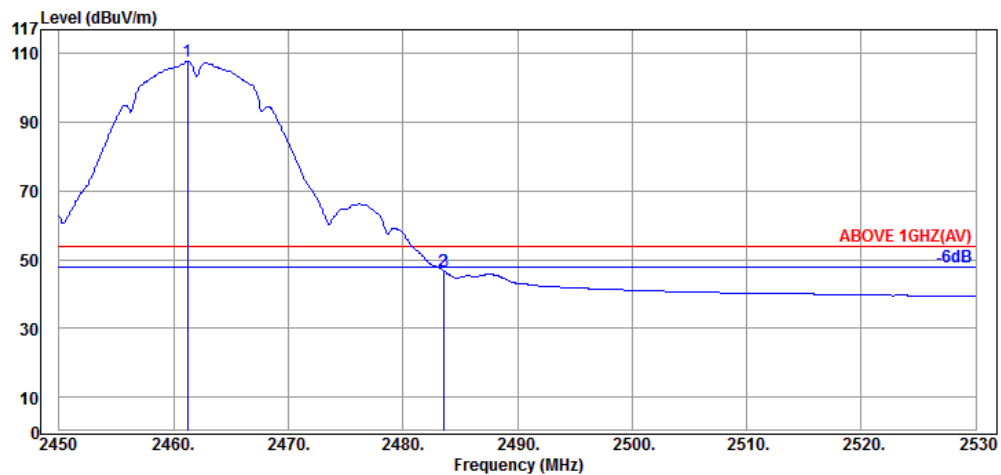
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2386.20	32.16	6.07	2.80	41.03	54.00	12.97	Average
2390.04	32.16	6.08	1.93	40.17	54.00	13.83	Average
2411.16	32.18	6.11	59.67	97.96	---	---	Average

Mode	802.11b	Frequency	TX 2462MHz
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Antenna at Horizontal Polarization

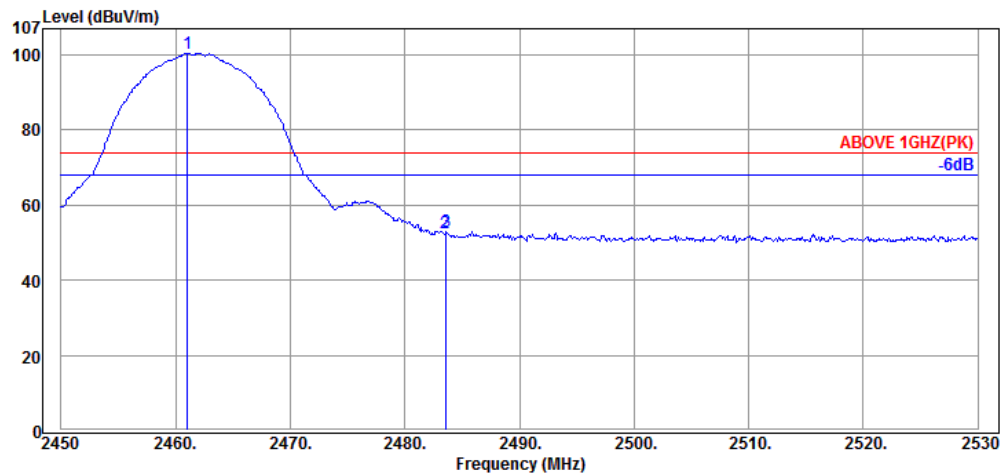
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2461.04	32.25	6.16	72.08	110.49	---	---	Peak
2483.52	32.28	6.19	17.28	55.75	74.00	18.25	Peak
2484.40	32.28	6.19	17.94	56.41	74.00	17.59	Peak



Antenna at Horizontal Polarization

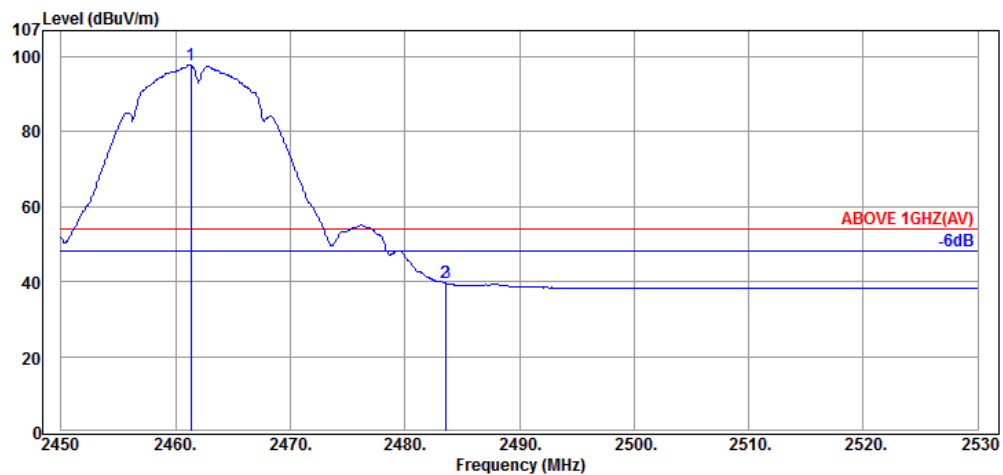
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2461.20	32.25	6.16	69.30	107.71	---	---	Average
2483.52	32.28	6.19	8.34	46.81	54.00	7.19	Average
2483.60	32.28	6.19	8.17	46.64	54.00	7.36	Average

Mode	802.11b	Frequency	TX 2462MHz
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Antenna at Vertical Polarization

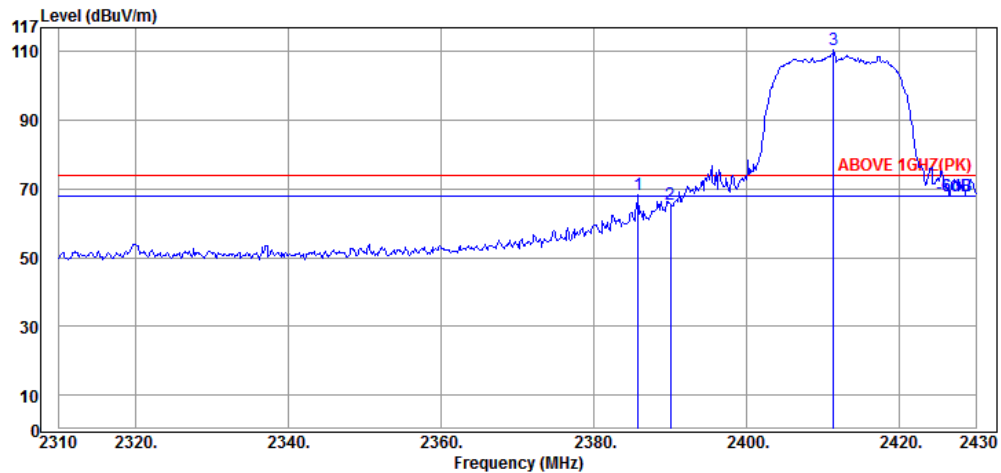
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2461.04	32.25	6.16	62.07	100.48	---	---	Peak
2483.52	32.28	6.19	14.09	52.56	74.00	21.44	Peak
2483.60	32.28	6.19	14.48	52.95	74.00	21.05	Peak



Antenna at Vertical Polarization

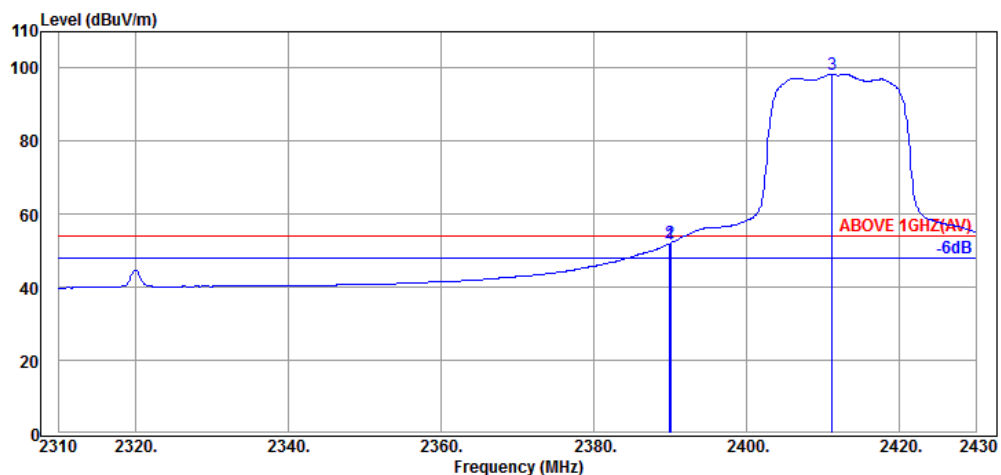
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2461.36	32.25	6.16	59.46	97.87	---	---	Average
2483.52	32.28	6.19	1.14	39.61	54.00	14.39	Average
2483.60	32.28	6.19	1.06	39.53	54.00	14.47	Average

Mode	802.11g	Frequency	TX 2412MHz
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Antenna at Horizontal Polarization

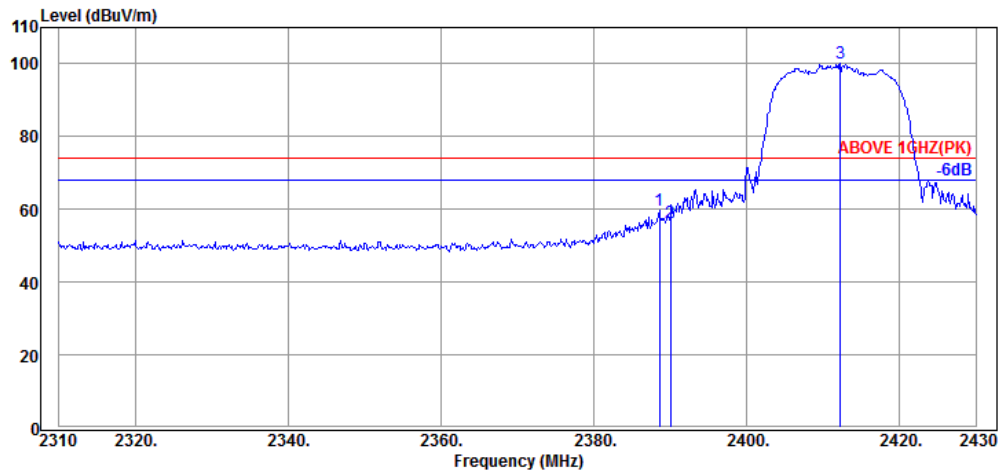
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2385.84	32.16	6.07	29.94	68.17	74.00	5.83	Peak
2390.04	32.16	6.08	27.38	65.62	74.00	8.38	Peak
2411.40	32.18	6.11	72.37	110.66	---	---	Peak



Antenna at Horizontal Polarization

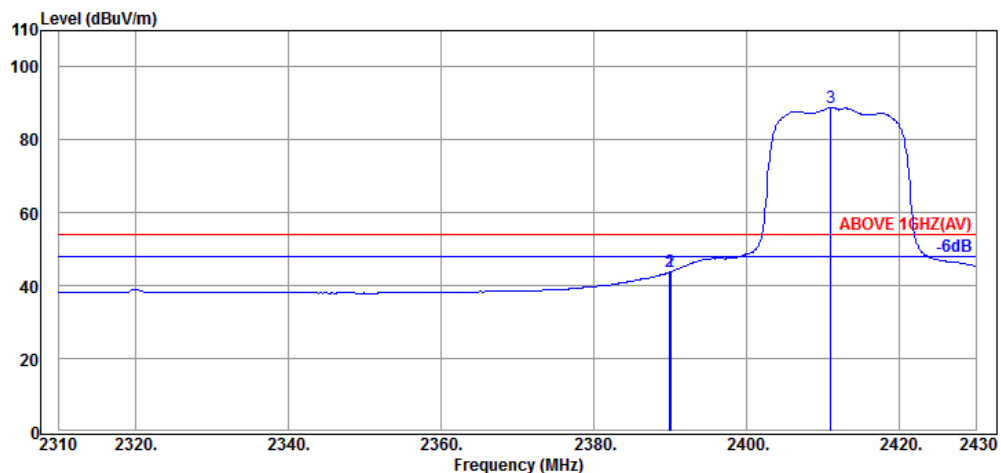
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.92	32.16	6.08	13.69	51.93	54.00	2.07	Average
2390.04	32.16	6.08	13.77	52.01	54.00	1.99	Average
2411.16	32.18	6.11	60.13	98.42	---	---	Average

Mode	802.11g	Frequency	TX 2412MHz
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Antenna at Vertical Polarization

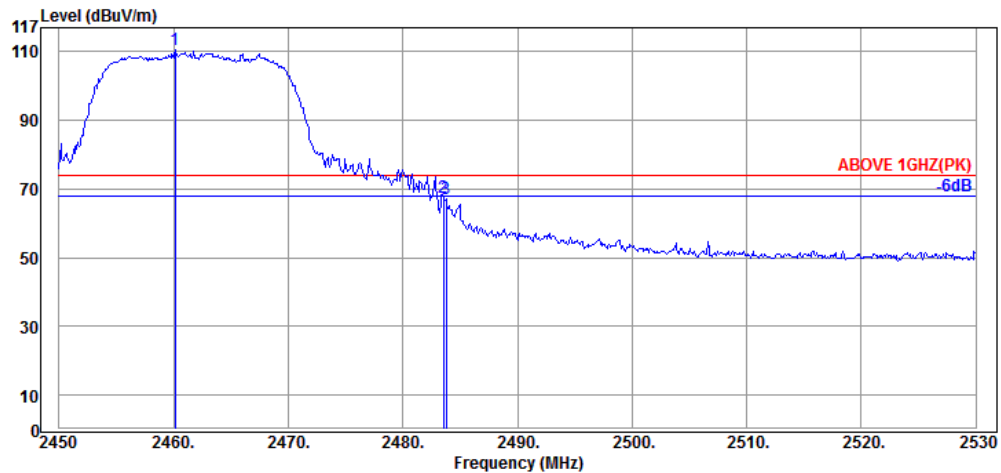
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2388.60	32.16	6.08	21.49	59.73	74.00	14.27	Peak
2390.04	32.16	6.08	18.16	56.40	74.00	17.60	Peak
2412.24	32.18	6.11	61.97	100.26	---	---	Peak



Antenna at Vertical Polarization

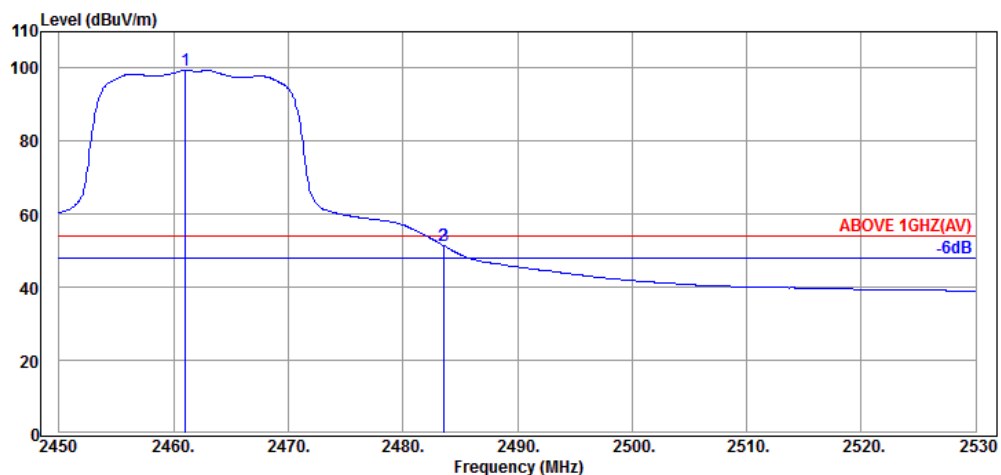
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.92	32.16	6.08	5.48	43.72	54.00	10.28	Average
2390.04	32.16	6.08	5.58	43.82	54.00	10.18	Average
2411.04	32.18	6.11	50.59	88.88	---	---	Average

Mode	802.11g	Frequency	TX 2462MHz
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Antenna at Horizontal Polarization

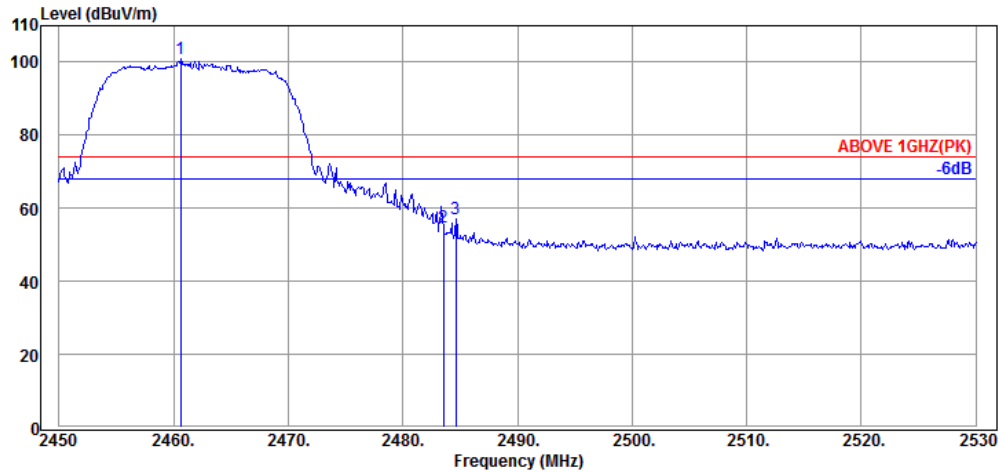
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2460.16	32.25	6.16	71.96	110.37	---	---	Peak
2483.52	32.28	6.19	28.97	67.44	74.00	6.56	Peak
2483.76	32.28	6.19	28.67	67.14	74.00	6.86	Peak



Antenna at Horizontal Polarization

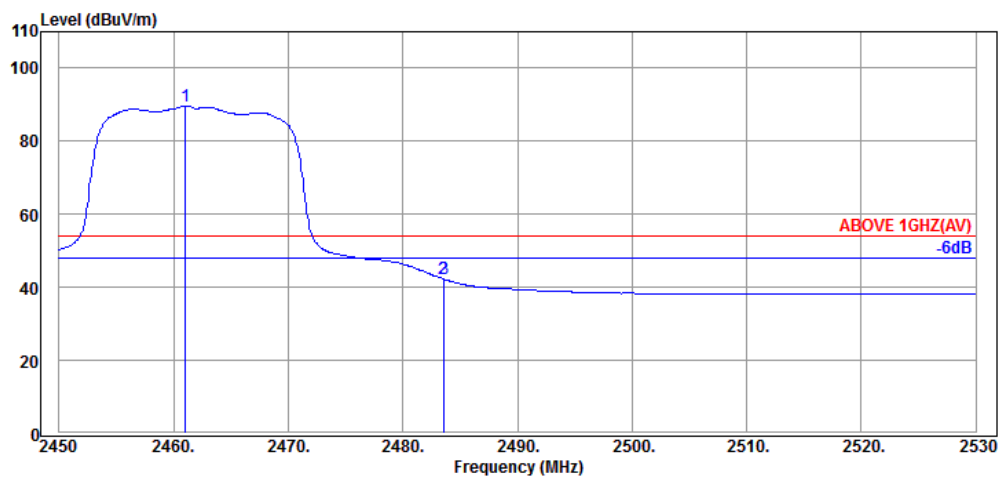
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2461.04	32.25	6.16	61.08	99.49	---	---	Average
2483.52	32.28	6.19	13.00	51.47	54.00	2.53	Average
2483.60	32.28	6.19	12.89	51.36	54.00	2.64	Average

Mode	802.11g	Frequency	TX 2462MHz
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Antenna at Vertical Polarization

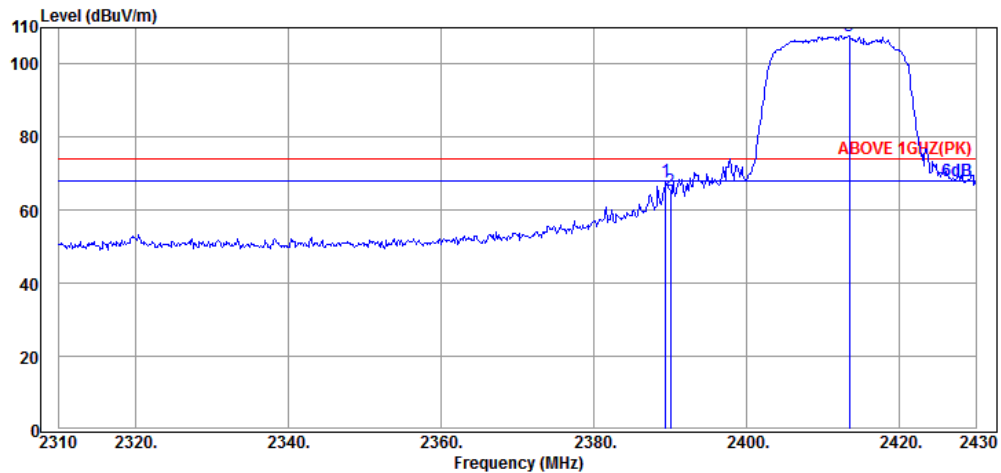
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2460.64	32.25	6.16	62.35	100.76	---	---	Peak
2483.52	32.28	6.19	16.47	54.94	74.00	19.06	Peak
2484.64	32.28	6.19	18.66	57.13	74.00	16.87	Peak



Antenna at Vertical Polarization

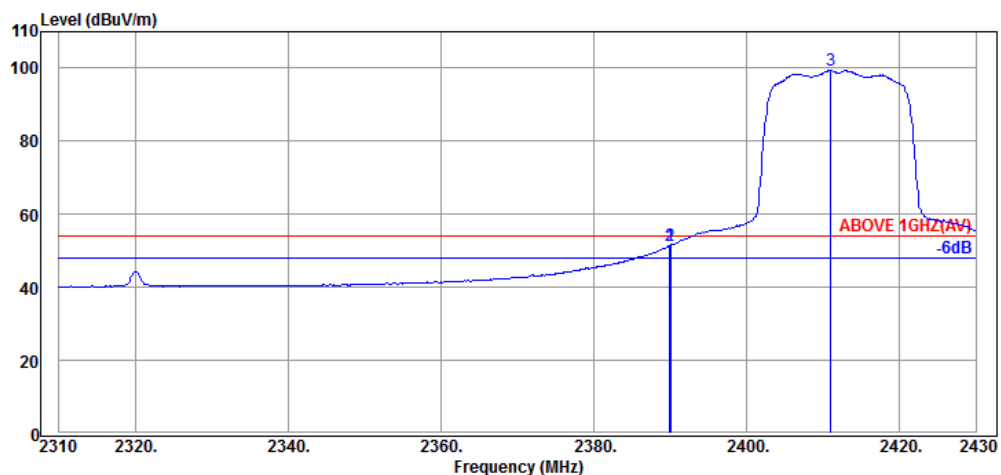
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2461.04	32.25	6.16	51.24	89.65	---	---	Average
2483.52	32.28	6.19	3.82	42.29	54.00	11.71	Average
2483.60	32.28	6.19	3.74	42.21	54.00	11.79	Average

Mode	802.11n-HT20	Frequency	TX 2412MHz
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Antenna at Horizontal Polarization

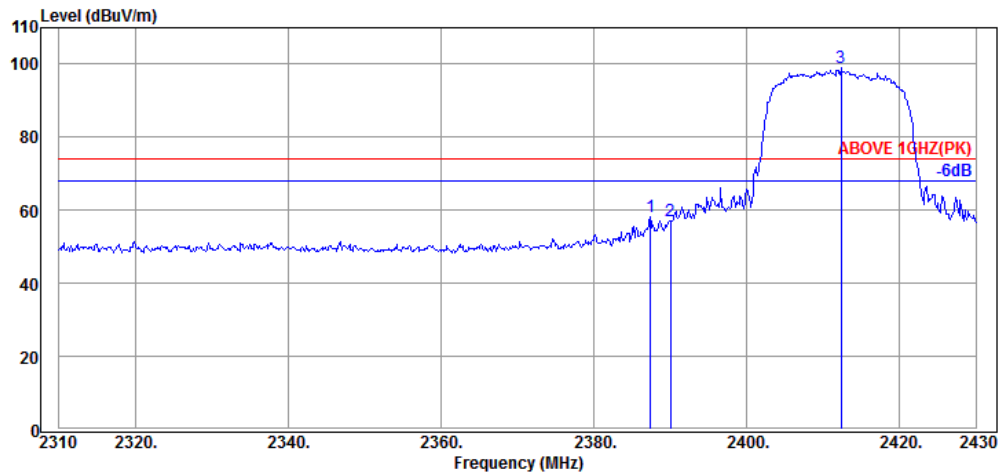
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.44	32.16	6.08	29.88	68.12	74.00	5.88	Peak
2390.04	32.16	6.08	27.15	65.39	74.00	8.61	Peak
2413.44	32.18	6.11	69.60	107.89	---	---	Peak



Antenna at Horizontal Polarization

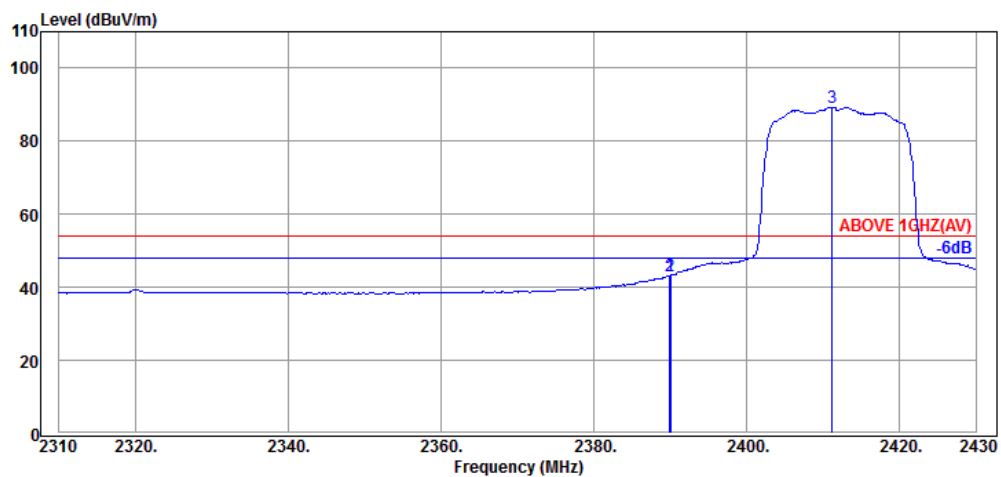
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.92	32.16	6.08	13.06	51.30	54.00	2.70	Average
2390.04	32.16	6.08	13.09	51.33	54.00	2.67	Average
2411.04	32.18	6.11	61.06	99.35	---	---	Average

Mode	802.11n-HT20	Frequency	TX 2412MHz
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Antenna at Vertical Polarization

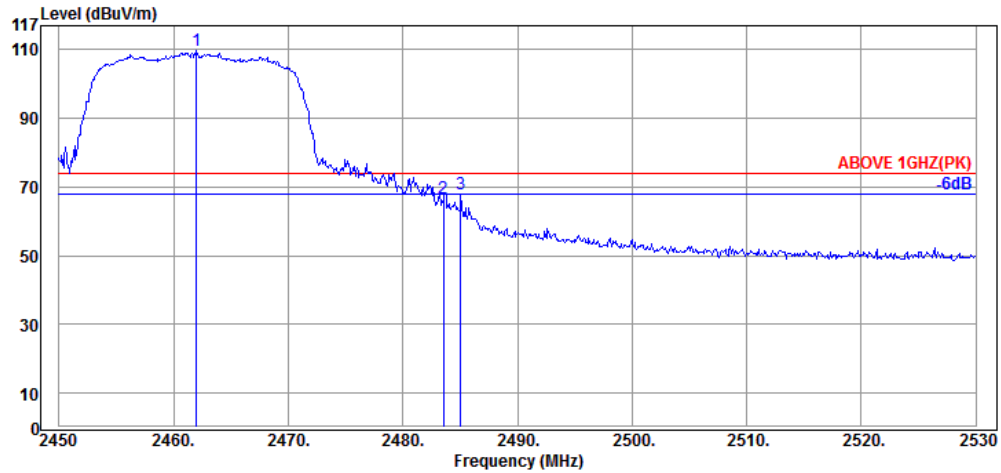
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2387.40	32.16	6.08	20.14	58.38	74.00	15.62	Peak
2390.04	32.16	6.08	18.83	57.07	74.00	16.93	Peak
2412.36	32.18	6.11	60.67	98.96	---	---	Peak



Antenna at Vertical Polarization

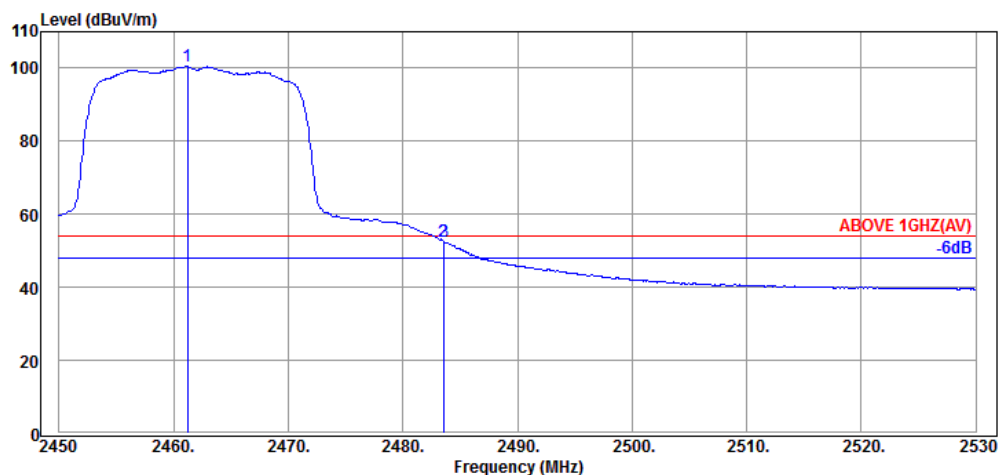
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.92	32.16	6.08	4.79	43.03	54.00	10.97	Average
2390.04	32.16	6.08	4.82	43.06	54.00	10.94	Average
2411.16	32.18	6.11	51.08	89.37	---	---	Average

Mode	802.11n-HT20	Frequency	TX 2462MHz
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Antenna at Horizontal Polarization

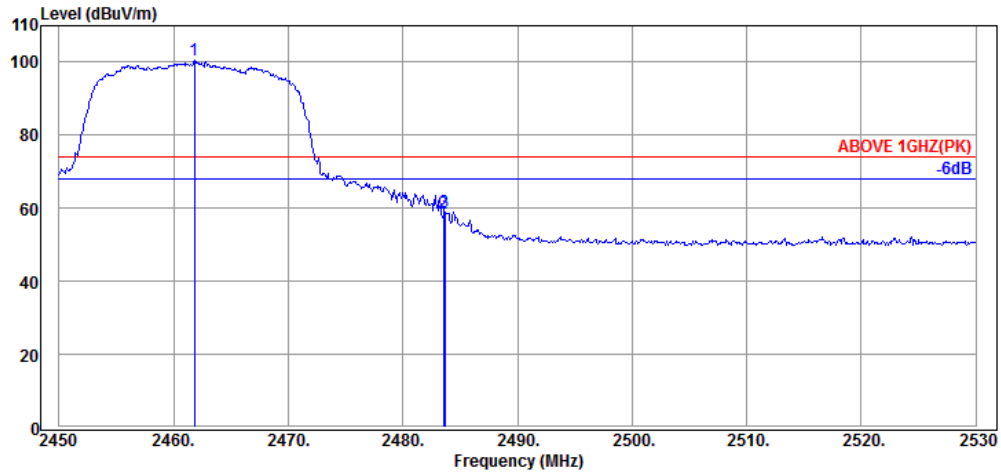
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2462.00	32.25	6.16	71.50	109.91	---	---	Peak
2483.52	32.28	6.19	28.36	66.83	74.00	7.17	Peak
2485.04	32.28	6.19	29.58	68.05	74.00	5.95	Peak



Antenna at Horizontal Polarization

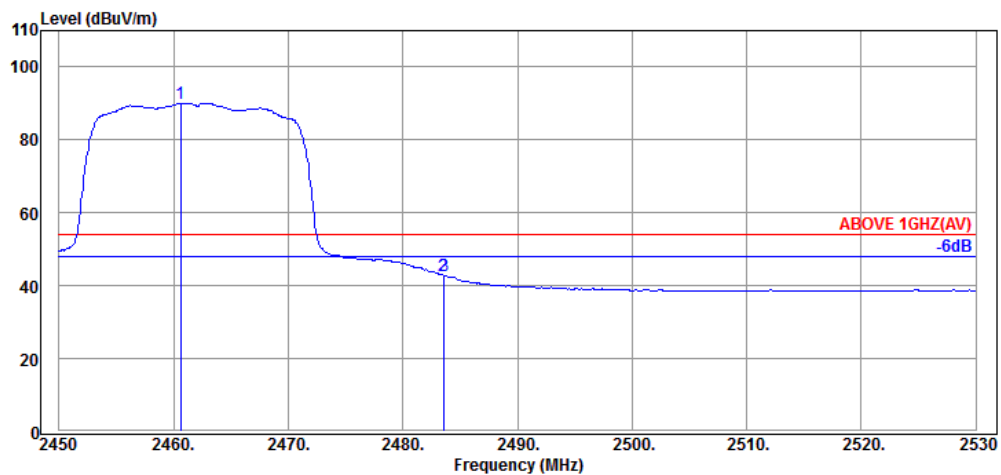
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2461.20	32.25	6.16	62.04	100.45	---	---	Average
2483.52	32.28	6.19	14.24	52.71	54.00	1.29	Average
2483.60	32.28	6.19	14.01	52.48	54.00	1.52	Average

Mode	802.11n-HT20	Frequency	TX 2462MHz
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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
2461.84	32.25	6.16	62.11	100.52	---	---	Peak
2483.52	32.28	6.19	20.18	58.65	74.00	15.35	Peak
2483.68	32.28	6.19	20.67	59.14	74.00	14.86	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
2460.64	32.25	6.16	51.72	90.13	---	---	Average
2483.52	32.28	6.19	4.41	42.88	54.00	11.12	Average
2483.60	32.28	6.19	4.25	42.72	54.00	11.28	Average

6.5.3. Emissions outside the frequency band:

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

Mode	802.11b	Frequency	TX 2412MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector
1440.00	28.01	4.43	11.87	44.31	54.00	9.69	Peak
2160.00	31.82	5.69	15.37	52.88	54.00	1.12	Peak
7235.00	35.80	11.35	3.82	50.97	54.00	3.03	Average
7235.00	35.80	11.35	8.32	55.47	74.00	18.53	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector
1440.00	28.01	4.43	10.82	43.26	54.00	10.74	Peak
2160.00	31.82	5.69	8.05	45.56	54.00	8.44	Peak
4425.00	33.97	8.68	3.12	45.77	54.00	8.23	Peak

Mode	802.11g	Frequency	TX 2437MHz
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Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector
1220.00	28.06	4.07	12.27	44.40	54.00	9.60	Peak
1440.00	28.01	4.43	10.71	43.15	54.00	10.85	Peak
2096.00	31.72	5.53	13.69	50.94	54.00	3.06	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector
1440.00	28.01	4.43	10.50	42.94	54.00	11.06	Peak
2160.00	31.82	5.69	7.91	45.42	54.00	8.58	Peak
3310.00	32.84	7.42	5.40	45.66	54.00	8.34	Peak

Mode	802.11n-HT20	Frequency	TX 2437MHz
------	--------------	-----------	------------

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
1220.00	28.06	4.07	12.18	44.31	54.00	9.69	Peak
1416.00	28.02	4.39	7.00	39.41	54.00	14.59	Peak
2160.00	31.82	5.69	12.97	50.48	54.00	3.52	Peak

Antenna at Vertical Polarization

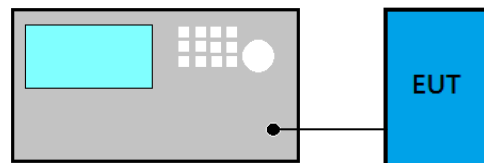
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
1090.00	28.08	3.87	10.80	42.75	54.00	11.25	Peak
1440.00	28.01	4.43	9.81	42.25	54.00	11.75	Peak

6.5.4. Emissions in Non-restricted Frequency Bands

Pursuant to KDB 558074 D01 v03r03 that emission levels below the 15.209/RSS-Gen Section 8.9 table 4 general radiated emissions limits is not required.

7. 6dB BANDWIDTH MEASUREMENT

7.1. Block Diagram of Test Setup



7.2. Specification Limits

The minimum 6dB bandwidth shall be at least 500kHz.

7.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v03r05:

■ Option 2

- (1) Set RBW = 100 kHz.
- (2) Set the video bandwidth (VBW) $\geq 3 \times$ 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 -6 dB to record the final bandwidth.

7.4. Test Results

Please refer to Appendix A

8. MAXIMUM PEAK OUTPUT POWER MEASUREMENT

8.1. Block Diagram of Test Setup



8.2. Specification Limits

The Limits of maximum Peak Output Power for digital modulation in 2400-2483.5MHz is : 1Watt. (30dBm), and E.I.R.P.: 4Watt (36dBm)

8.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v03r05:

■ **PKPM1 Peak power meter method:**

EUT is connected to power sensor and record the maximum output power.

□ **Method AVGPM (Measurement using an RF average power meter):**

EUT is connected to power sensor and record the maximum average output power and duty cycle factor is added when duty cycle presented in section 3.5 is < 98%.

□ **Method AVGSA-2 (Spectrum channel power)**

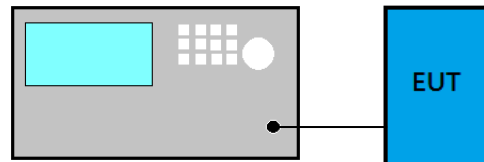
- (1) Set span to at least 1.5 times the OBW
- (2) Set RBW = 1 -5% of OBW
- (3) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- (4) Detector = RMS.
- (5) Trace mode = trace average at least 100 traces
- (6) Sweep = auto couple.
- (7) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges.
- (8) Duty cycle factor is added when duty cycle presented in section 3.5 is < 98%.

8.4. Test Results

Please refer to Appendix A

9. EMISSION LIMITATIONS MEASUREMENT

9.1. Block Diagram of Test Setup



9.2. 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)/RSS-Gen Section 8.9 table 4 is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a)/RSS-Gen Section 8.10 table 6, must also comply with the radiated emission limits specified in Section 15.209(a)/RSS-Gen Section 8.9 table 4 (See Section 15.205(c)).

9.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v03r05:

■ Reference Level

- (1) Set analyzer center frequency to DTS channel center frequency.
- (2) Set the span to 1.5 times the DTS bandwidth.
- (3) Set the RBW to: 100 kHz.
- (4) Set the VBW $\geq 3 \times$ RBW.
- (5) Detector = peak.
- (6) Sweep time = auto couple.
- (7) Trace mode = max hold.
- (8) Allow trace to fully stabilize to find the max PSD as reference level.

■ **Emission Level Measurement**

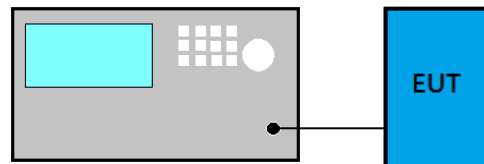
- (1) Set analyzer center frequency to DTS channel center frequency.
- (2) Set the span to 1.5 times the DTS bandwidth.
- (3) Set the RBW to: 100 kHz.
- (4) Set the VBW $\geq 3 \times$ RBW.
- (5) Detector = peak.
- (6) Sweep time = auto couple.
- (7) Trace mode = max hold.
- (8) Allow trace to fully stabilize to find the max level.

9.4. Test Results

Please refer to Appendix A

10. POWER SPECTRAL DENSITY

10.1. Block Diagram of Test Setup



10.2. Specification Limits

The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band.

10.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v03r05:

■ Method PKPSD (peak PSD)

- (1) Set analyzer center frequency to DTS channel center frequency.
- (2) Set the span to 1.5 times the DTS bandwidth.
- (3) Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- (4) Set the VBW $\geq 3 \times \text{RBW}$.
- (5) Detector = peak.
- (6) Sweep time = auto couple.
- (7) Trace mode = max hold.
- (8) Allow trace to fully stabilize.
- (9) Use the peak marker function to determine the maximum amplitude level.
- (10) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

□ Method AVGPSD-2

- (1) Using peak PSD procedure step 1 to step 4.
- (2) Detector = RMS detector
- (3) Sweep time = auto couple
- (4) Trace mode = trace averaging over a minimum of 100 traces
- (5) Use the peak marker function to determine the maximum amplitude level.
- (6) Duty cycle factor is added when duty cycle presented in section 3.5 $< 98\%$.
- (7) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

10.4. Test Results

Please refer to Appendix A

11.DEVIATION TO TEST SPECIFICATIONS

【NONE】



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APPENDIX A

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APPENDIX A

TEST PLOTS

(Model: WSDB-750GN_A)

File Number: C1M1606397

Report Number: EM-F160453

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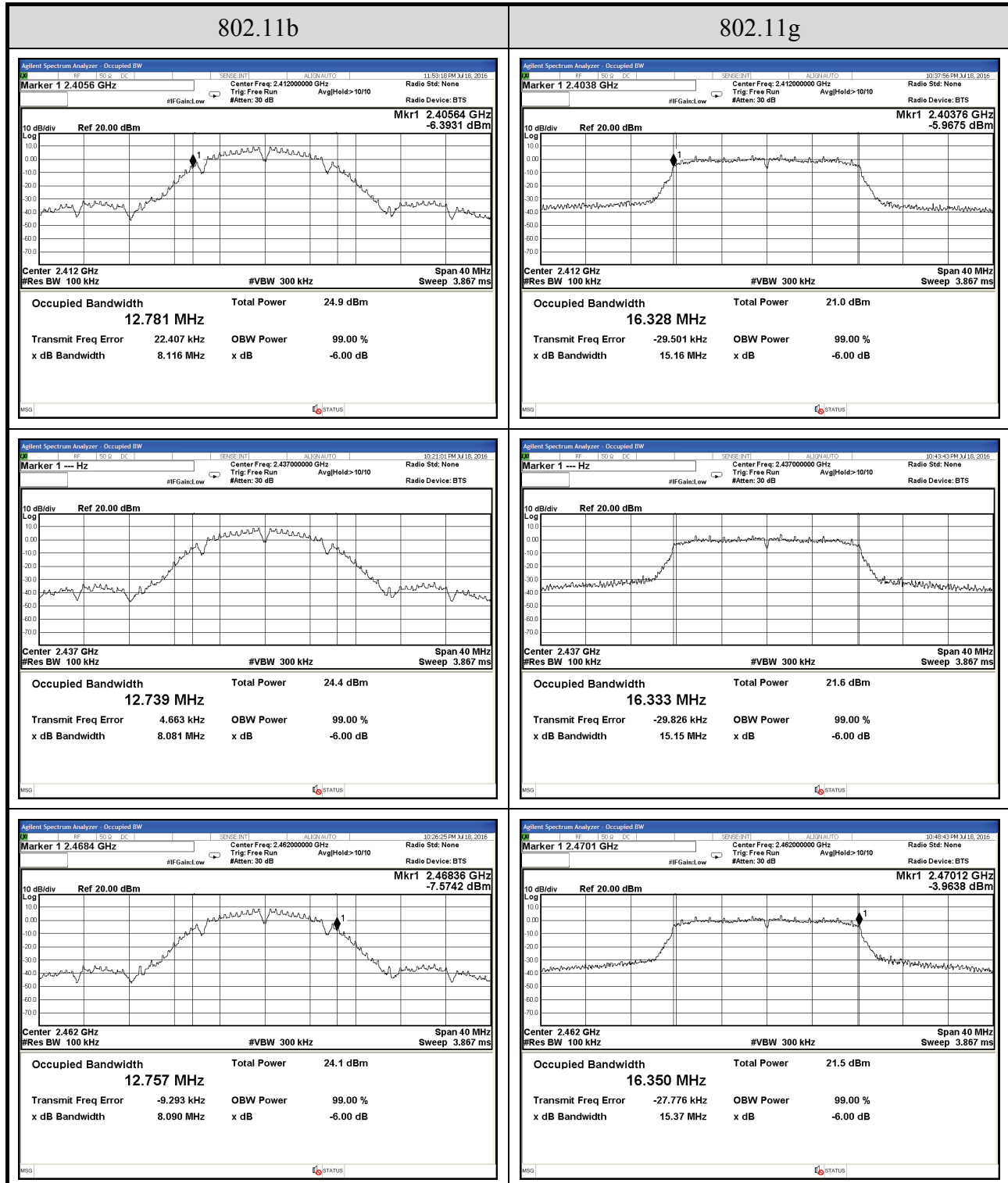
A.1 6dB BANDWIDTH MEASUREMENT

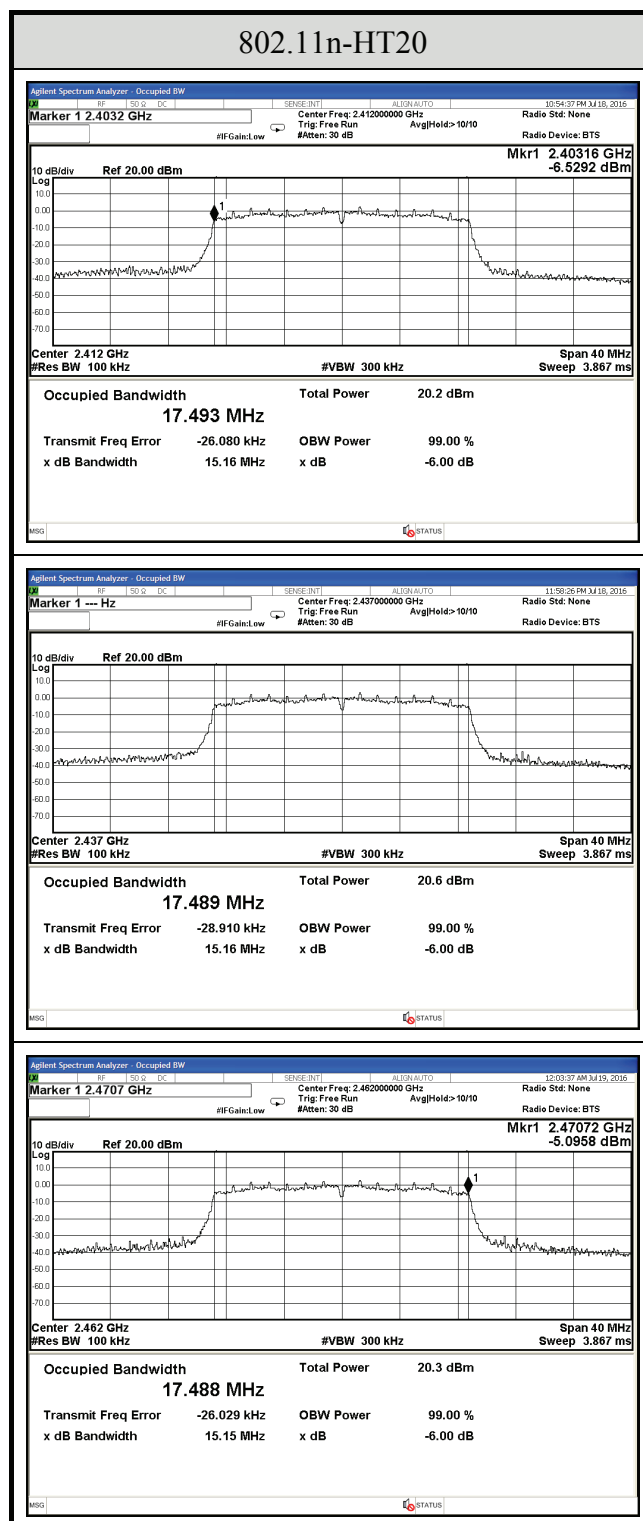
Test Date	2015/07/18 ~ 19	Temp./Hum.	24°C/53%
Cable Loss	---	Test Voltage	DC 3.3V (Via test jig)

A.1.1 6dB Bandwidth Result

Modulation Type	Centre Frequency (MHz)	6 dB Bandwidth (MHz)	Limit
802.11b	2412	8.116	>500kHz
	2437	8.081	
	2462	8.090	
802.11g	2412	15.16	
	2437	15.15	
	2462	15.37	
802.11n-HT20	2412	15.16	
	2437	15.16	
	2462	15.15	

A.1.2 Measurement Plots





A.2 MAXIMUM PEAK OUTPUT POWER MEASUREMENT

Test Date	2015/07/18	Temp./Hum.	24°C/53%
Cable Loss	---	Test Voltage	DC 3.3V (Via test jig)

A.2.1 Peak Output Power

Modulation Type	Centre Frequency (MHz)	Maximum Peak Output Power		Antenna Gain (dBi)	Peak Output Power (E.I.R.P.)		Limit
		(dBm)	(W)		(dBm)	(W)	
802.11b	2412	18.01	0.063241	2.0	20.01	0.100231	< 30dBm (1W) (Maximum Peak Output Power) < 36dBm (4W) (E.I.R.P)
	2437	17.96	0.062517		19.96	0.099083	
	2462	17.83	0.060674		19.83	0.096161	
802.11g	2412	20.54	0.113240		22.54	0.179473	
	2437	20.66	0.116413		22.66	0.184502	
	2462	20.57	0.114025		22.57	0.180717	
802.11n-HT20	2412	20.15	0.103514		22.15	0.164059	
	2437	20.24	0.105682		22.24	0.167494	
	2462	20.16	0.103753		22.16	0.164437	

Note: The results have been included cable loss.

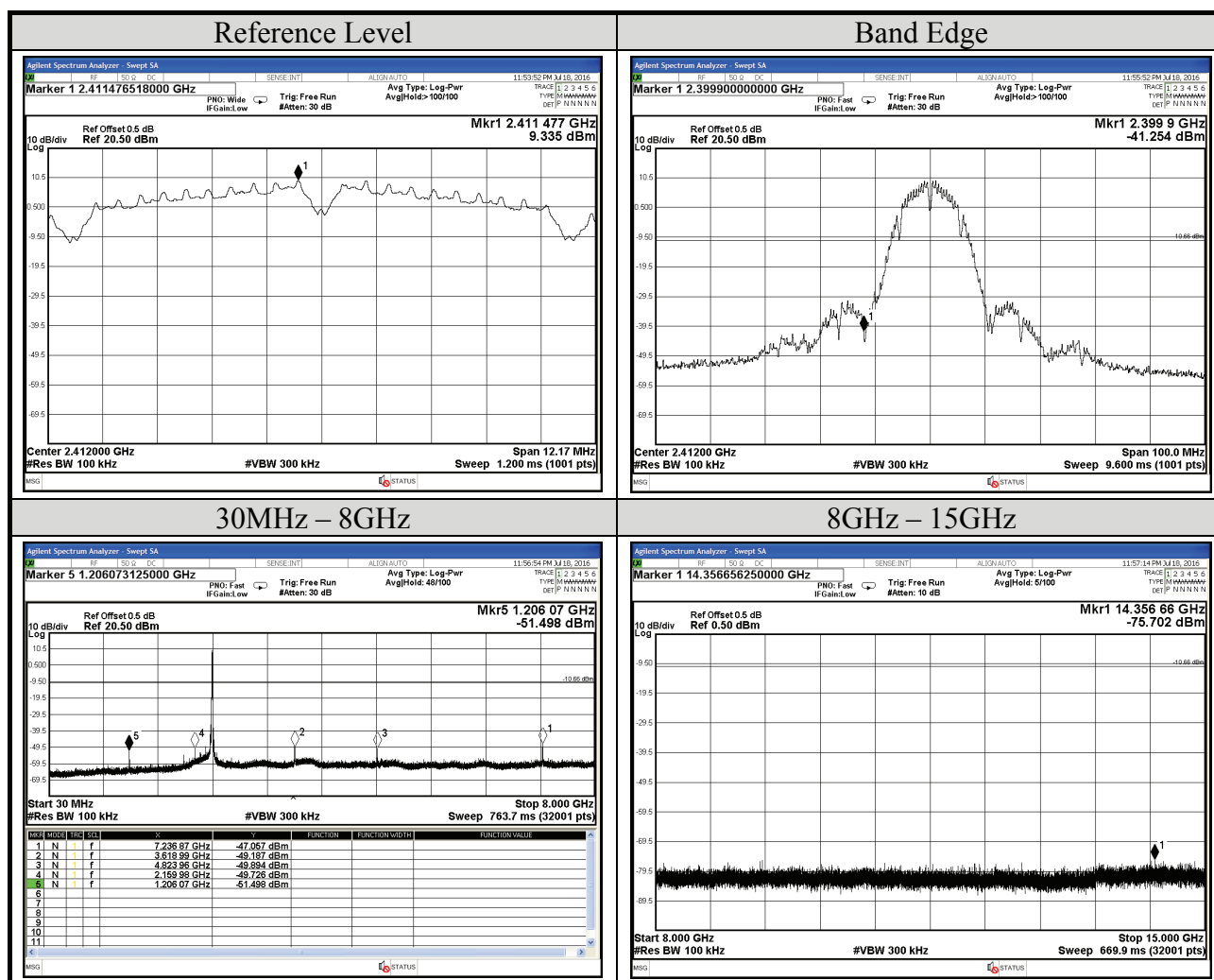
A.2.2 Average Output Power (Reporting only)

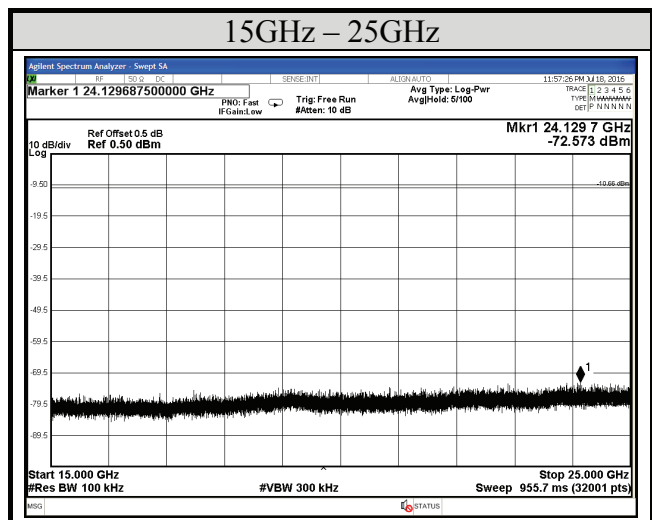
Modulation Type	Centre Frequency (MHz)	Output Power(dBm)	10log (1/X)	Maximum Peak Output Power		Antenna Gain (dBi)	Average Output Power (E.I.R.P.)		Limit
				(dBm)	(W)		(dBm)	(W)	
802.11b	2412	15.42	0.04	15.46	0.035156	2.0	17.46	0.055719	< 30dBm (1W) (Maximum Peak Output Power) < 36dBm (4W) (E.I.R.P)
	2437	15.37		15.41	0.034754		17.41	0.055081	
	2462	15.20		15.24	0.033420		17.24	0.052966	
802.11g	2412	12.52	0.09	12.61	0.018239		14.61	0.028907	
	2437	13.24		13.33	0.021528		15.33	0.034119	
	2462	13.14		13.23	0.021038		15.23	0.033343	
802.11n-HT20	2412	11.65	0.18	11.83	0.015241		13.83	0.024155	
	2437	12.19		12.37	0.017258		14.37	0.027353	
	2462	12.13		12.31	0.017022		14.31	0.026977	

Note: The results have been included cable loss presented in section.

A.3 EMISSION LIMITATIONS MEASUREMENT

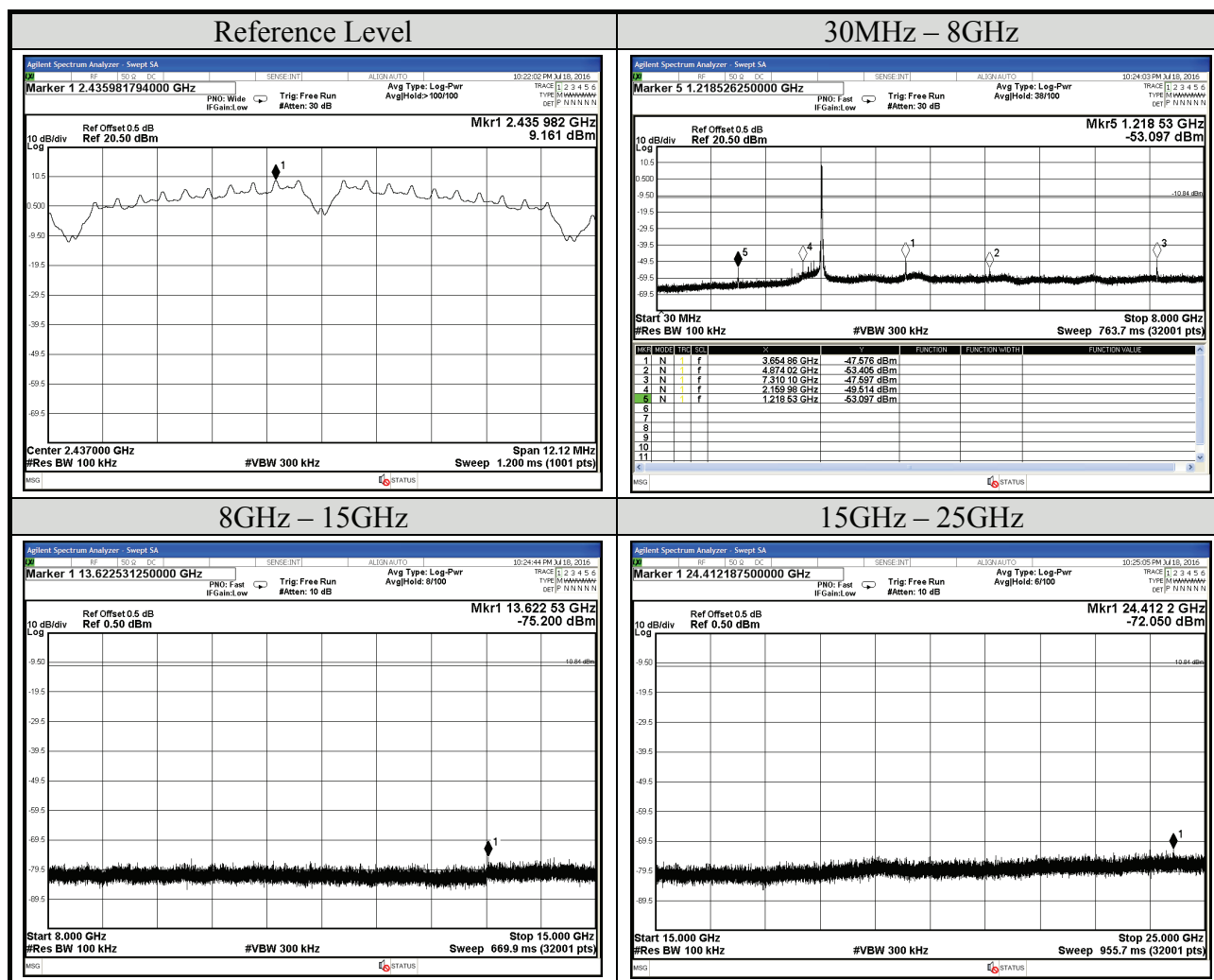
Test Date	2015/07/18	Temp./Hum.	24°C/53%
Mode	802.11b	Frequency	TX 2412MHz
Cable Loss	0.5dB	Test Voltage	DC 3.3V (Via test jig)
Simultaneous 10 log(n) (Note: "n" is antenna number)	1		





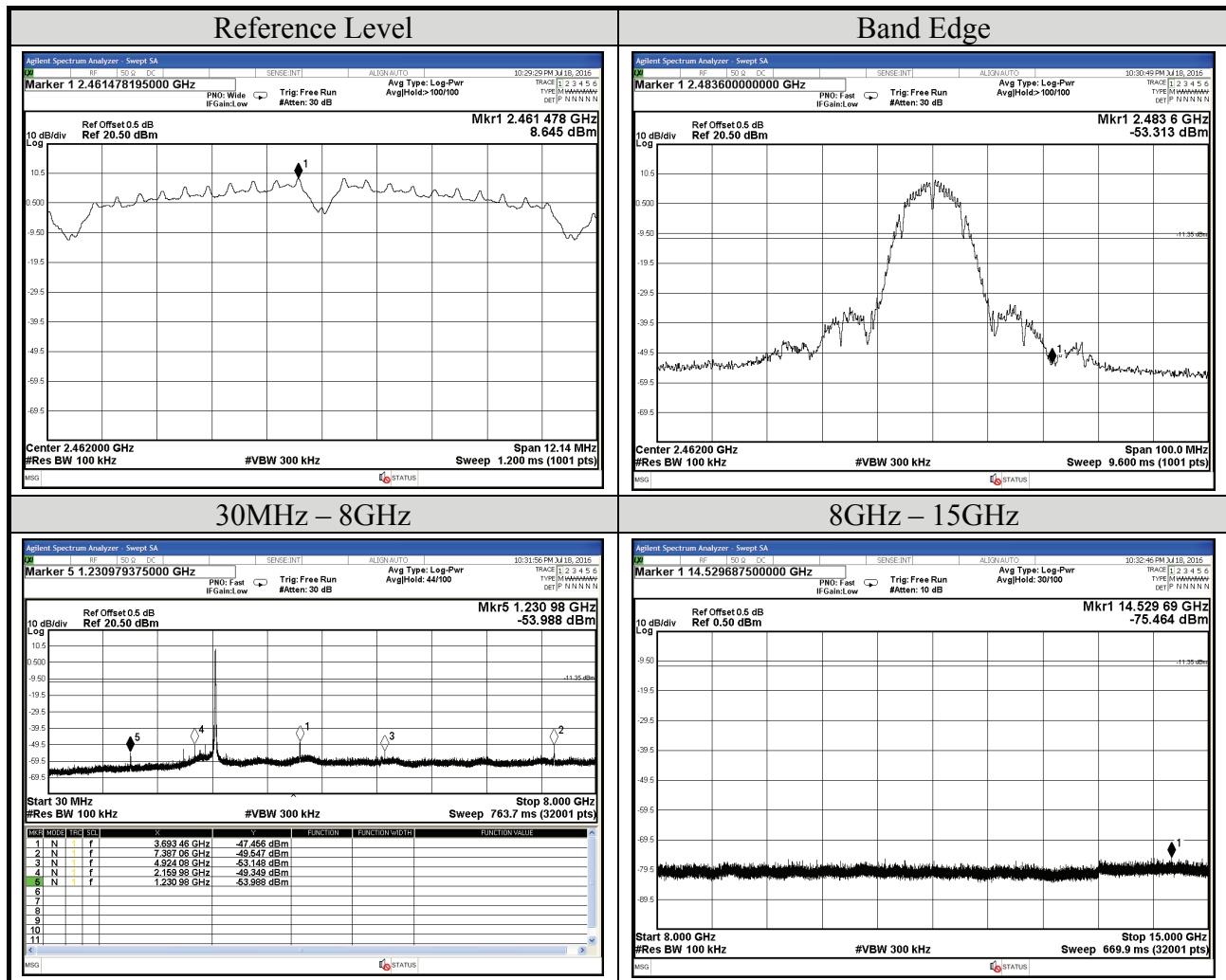
Note: All results have been included cable loss and simultaneous factor.

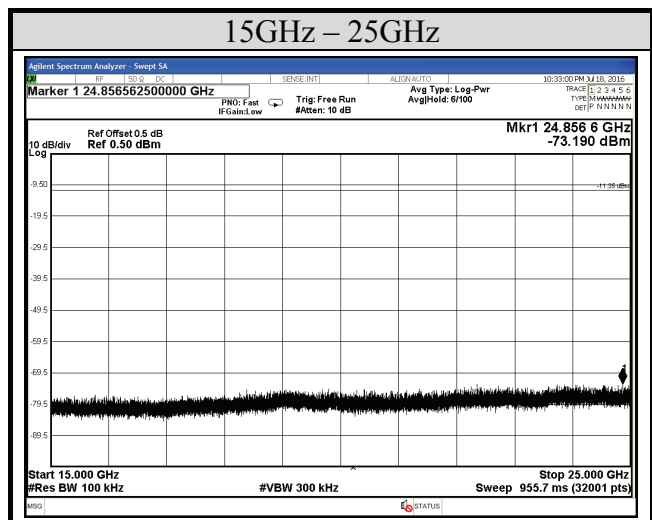
Test Date	2015/07/18	Temp./Hum.	24°C/53%
Mode	802.11b	Frequency	TX 2437MHz
Cable Loss	0.5dB	Test Voltage	DC 3.3V (Via test jig)
Simultaneous 10 log(n) (Note: "n" is antenna number)		1	



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

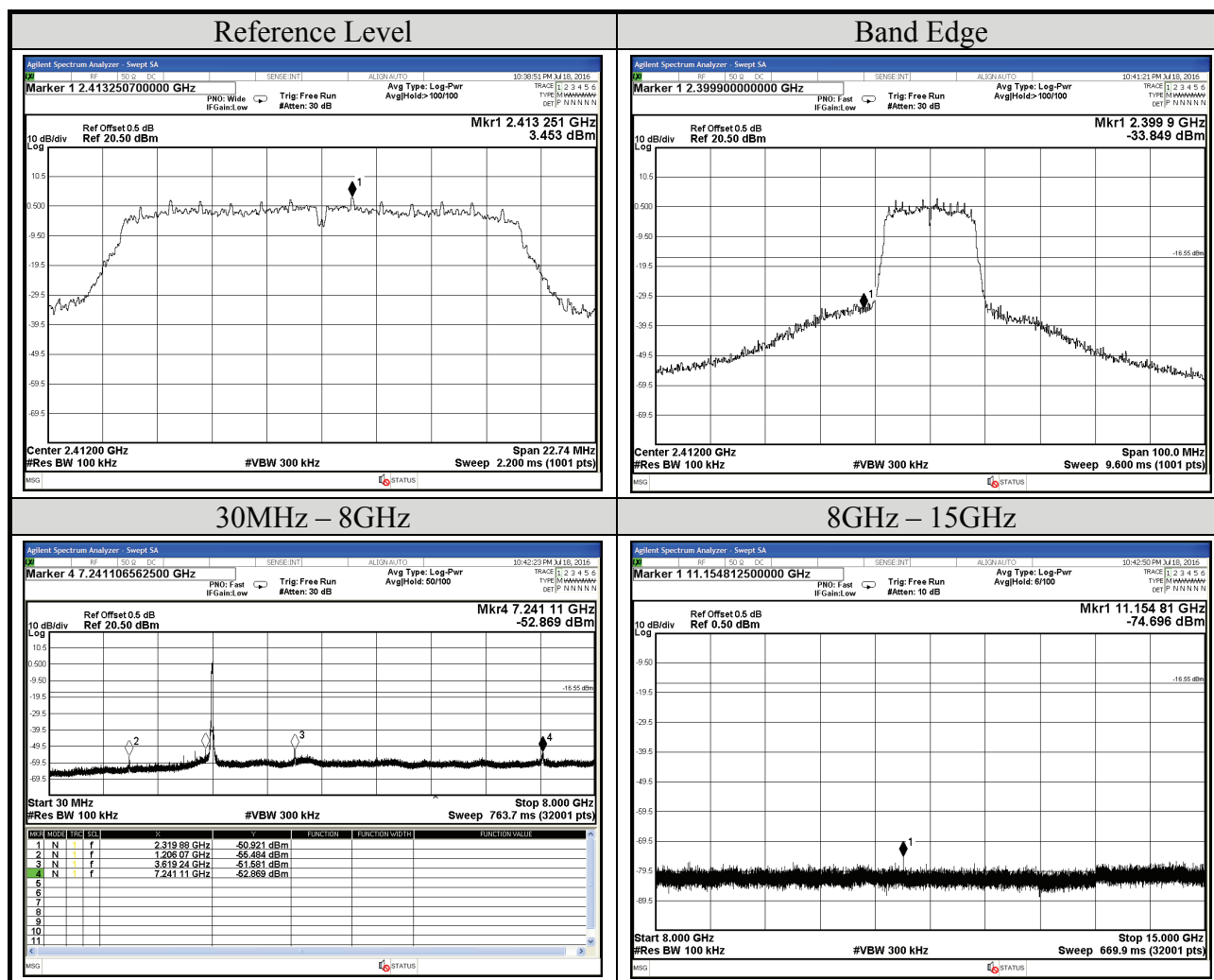
Test Date	2015/07/18	Temp./Hum.	24°C/53%
Mode	802.11b	Frequency	TX 2462MHz
Cable Loss	0.5dB	Test Voltage	DC 3.3V (Via test jig powered by Test JIG)
Simultaneous 10 log(n) (Note: "n" is antenna number)		1	

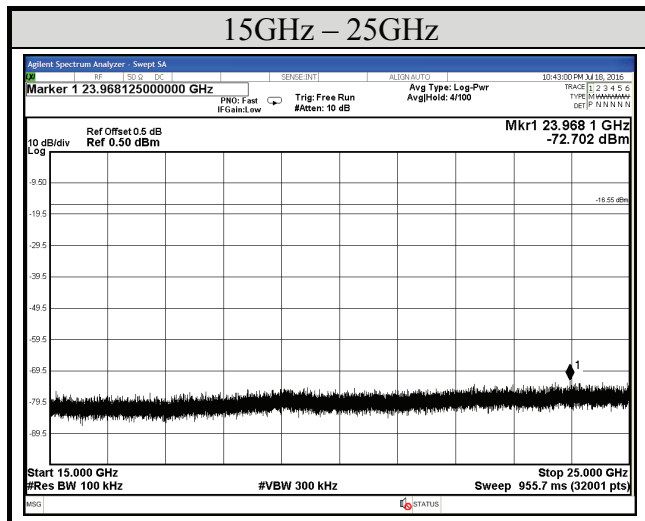




Note: All results have been included cable loss and simultaneous factor.

Test Date	2015/07/18	Temp./Hum.	24°C/53%
Mode	802.11g	Frequency	TX 2412MHz
Cable Loss	0.5dB	Test Voltage	DC 3.3V (Via test jig)
Simultaneous 10 log(n) (Note: "n" is antenna number)		1	



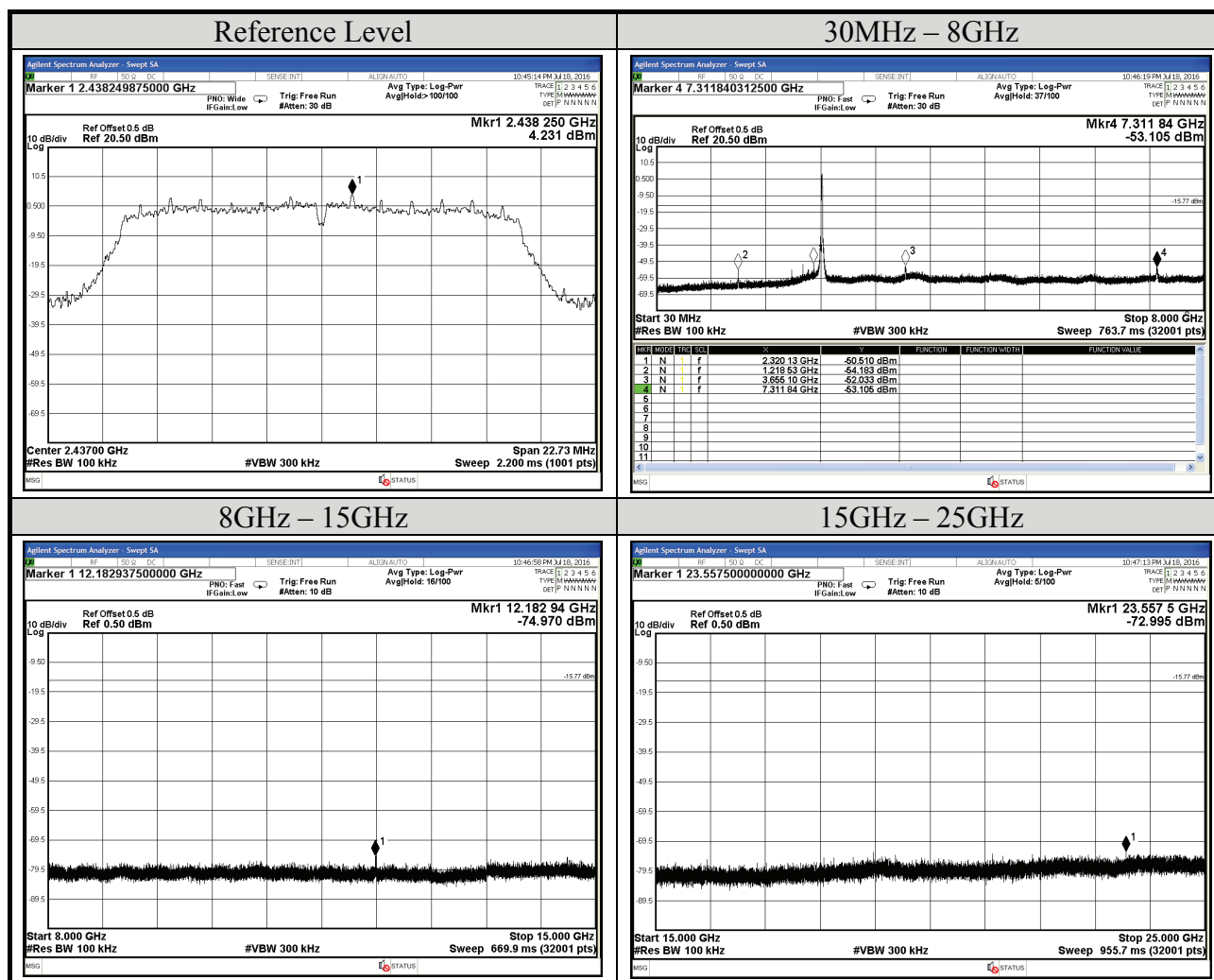


Note: All results have been included cable loss and simultaneous factor.

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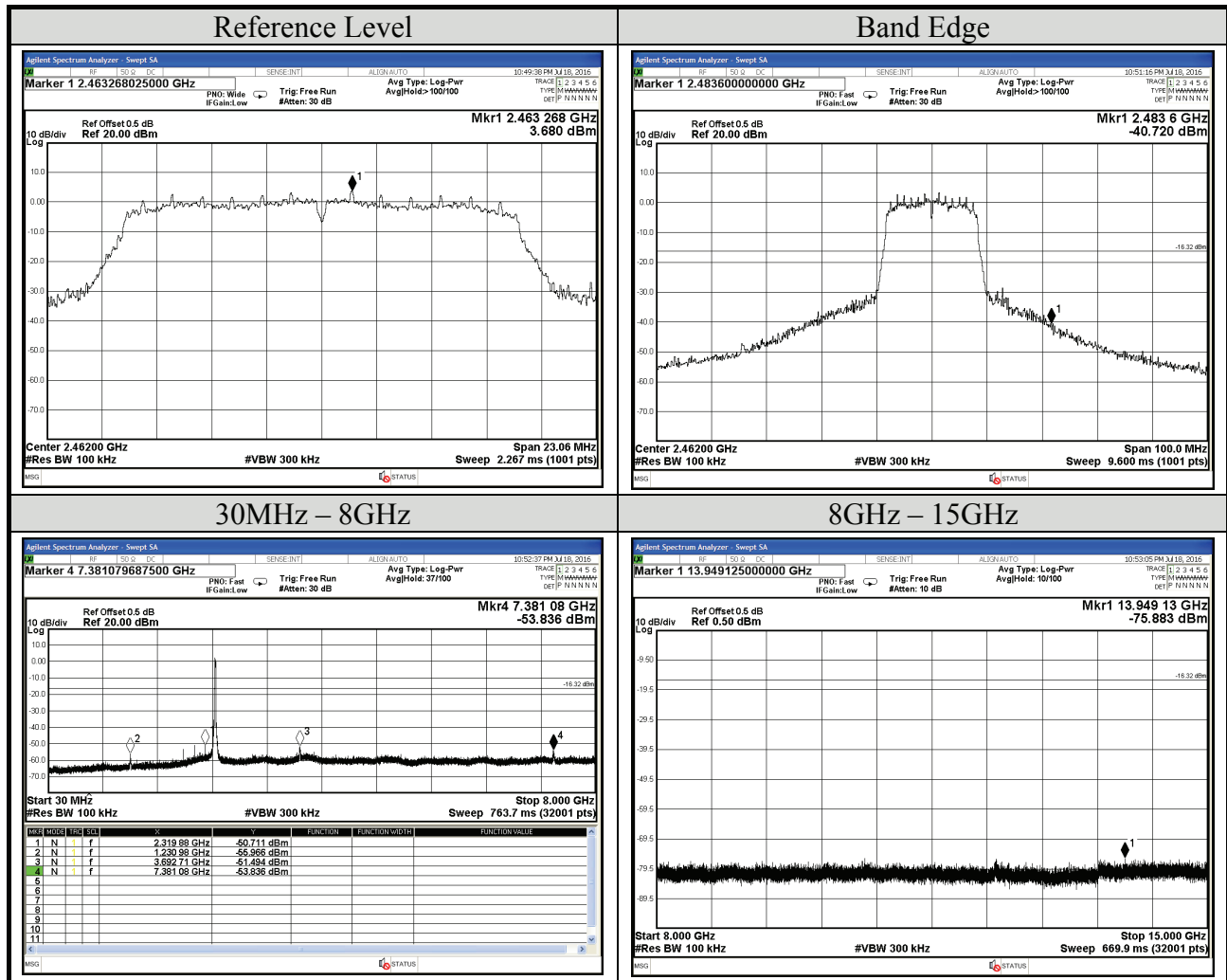
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Test Date	2015/07/18	Temp./Hum.	24°C/53%
Mode	802.11g	Frequency	TX 2437MHz
Cable Loss	0.5dB	Test Voltage	DC 3.3V (Via test jig)
Simultaneous 10 log(n) (Note: “n” is antenna number)		1	



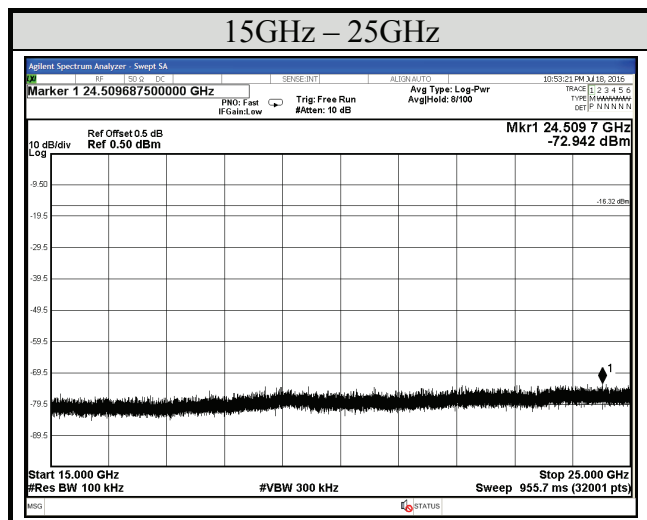
Note: All results have been included cable loss and simultaneous factor.

Test Date	2015/07/18	Temp./Hum.	24°C/53%
Mode	802.11g	Frequency	TX 2462MHz
Cable Loss	0.5dB	Test Voltage	DC 3.3V (Via test jig)
Simultaneous 10 log(n) (Note: "n" is antenna number)		1	



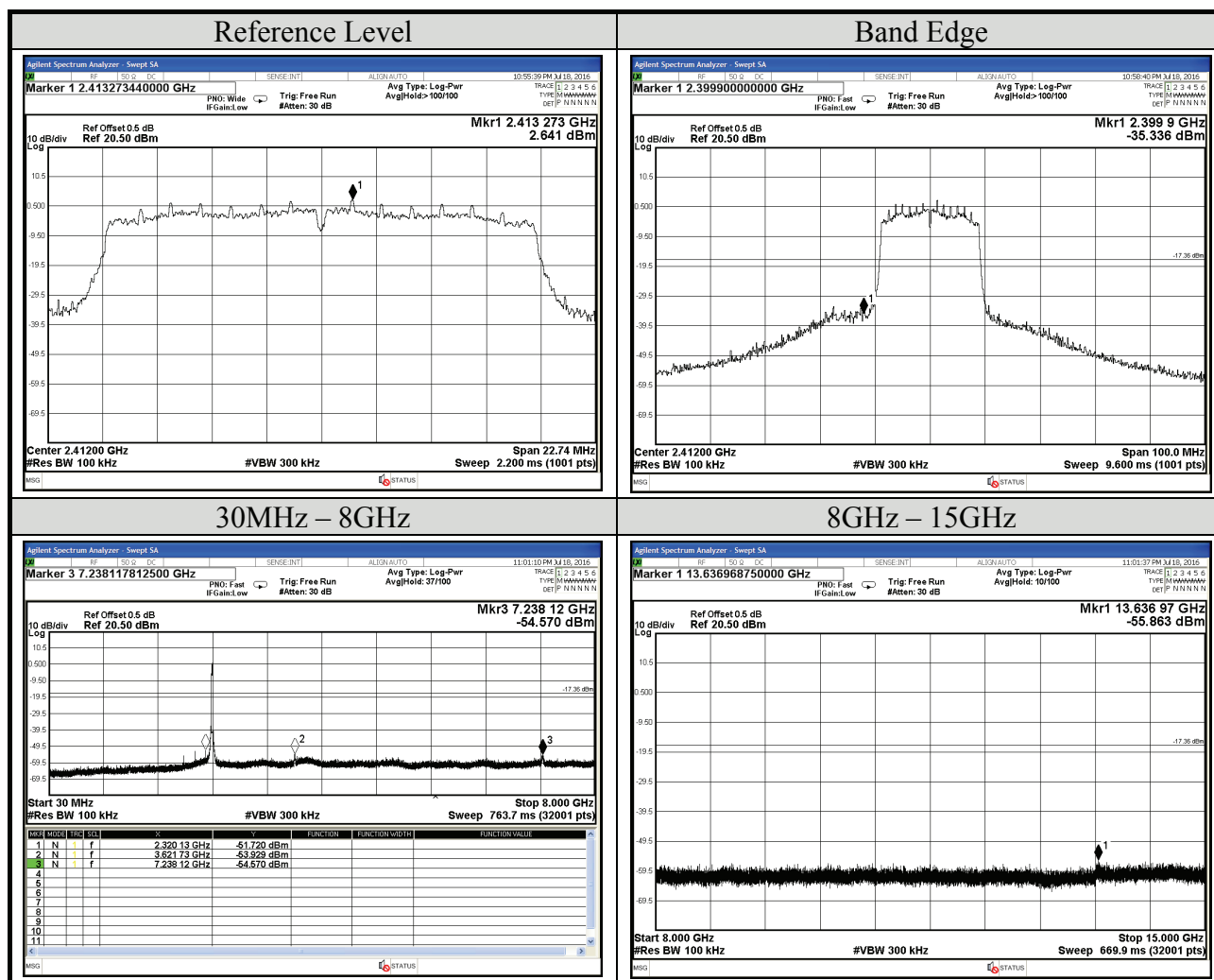
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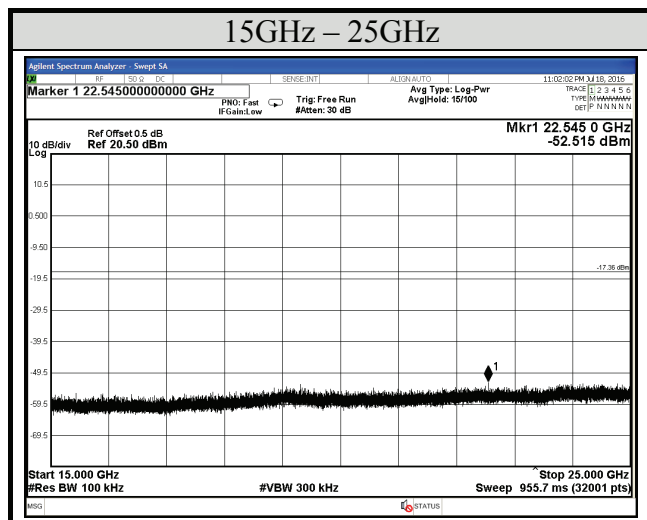
Note: All results have been included cable loss and simultaneous factor.

Test Date	2015/07/18	Temp./Hum.	24°C/53%
Mode	802.11n-HT20	Frequency	TX 2412MHz
Cable Loss	0.5dB	Test Voltage	DC 3.3V (Via test jig)
Simultaneous 10 log(n) (Note: "n" is antenna number)		1	



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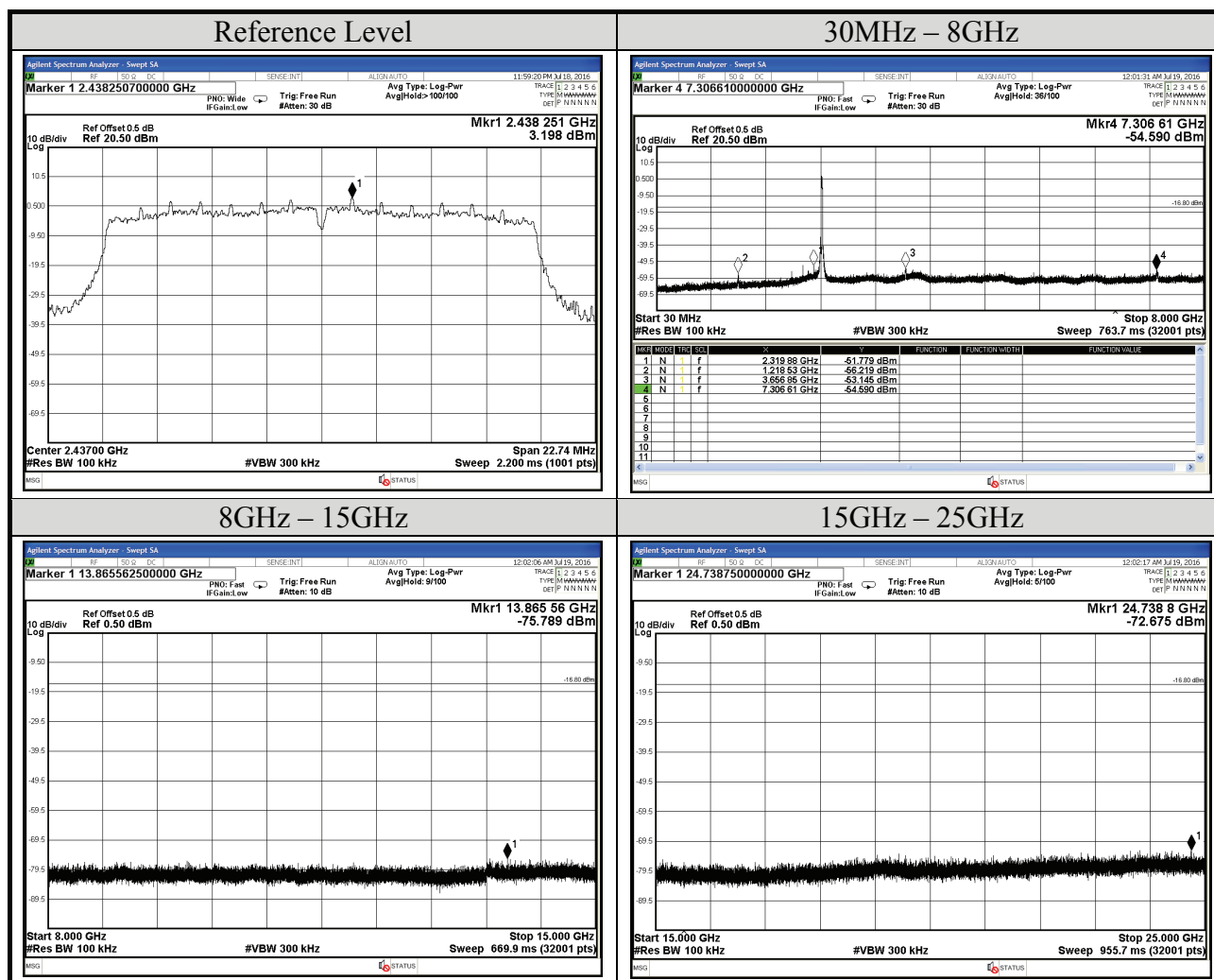


Note: All results have been included cable loss and simultaneous factor.

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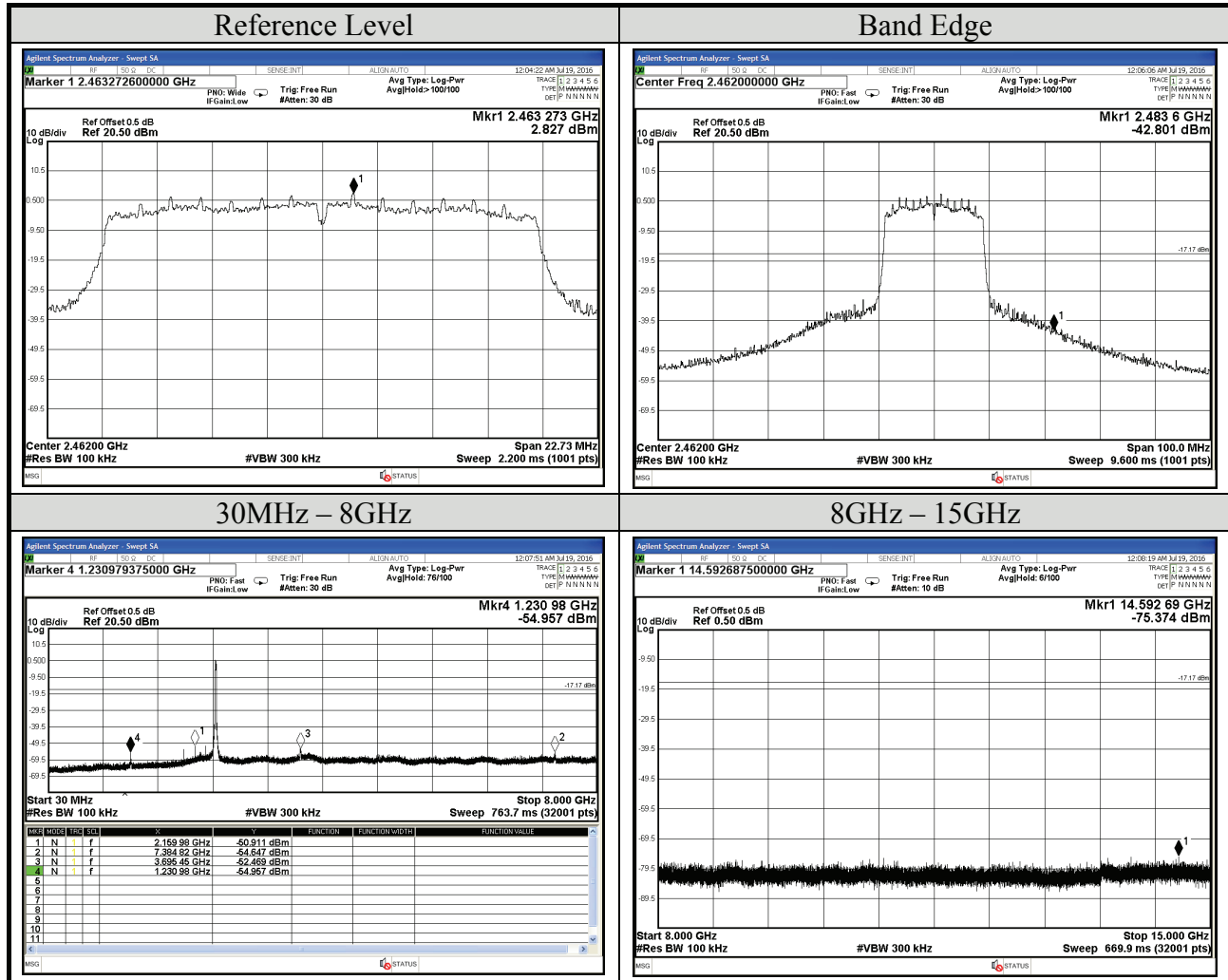
Tel: +886 2 26099301
Fax: +886 2 26099303

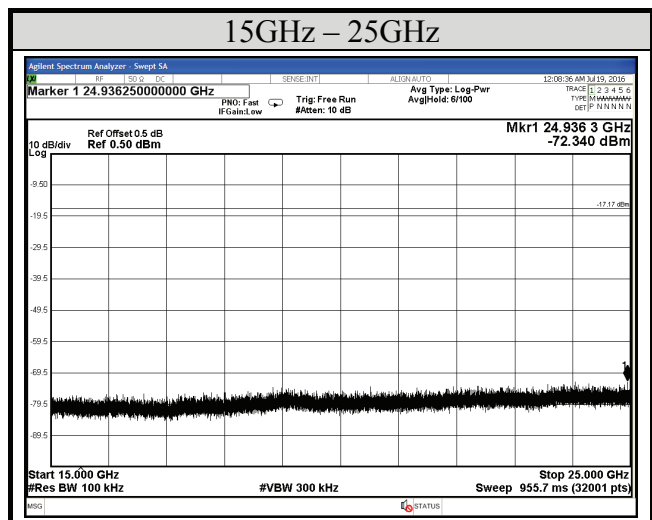
Test Date	2015/07/18 ~ 19	Temp./Hum.	24°C/53%
Mode	802.11n-HT20	Frequency	TX 2437MHz
Cable Loss	0.5dB	Test Voltage	DC 3.3V (Via test jig)
Simultaneous 10 log(n) (Note: “n” is antenna number)		1	



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

Test Date	2015/07/19	Temp./Hum.	24°C/53%
Mode	802.11n-HT20	Frequency	TX 2462MHz
Cable Loss	0.5dB	Test Voltage	DC 3.3V (Via test jig)
Simultaneous 10 log(n) (Note: “n” is antenna number)		1	





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

A.4 POWER SPECTRAL DENSITY

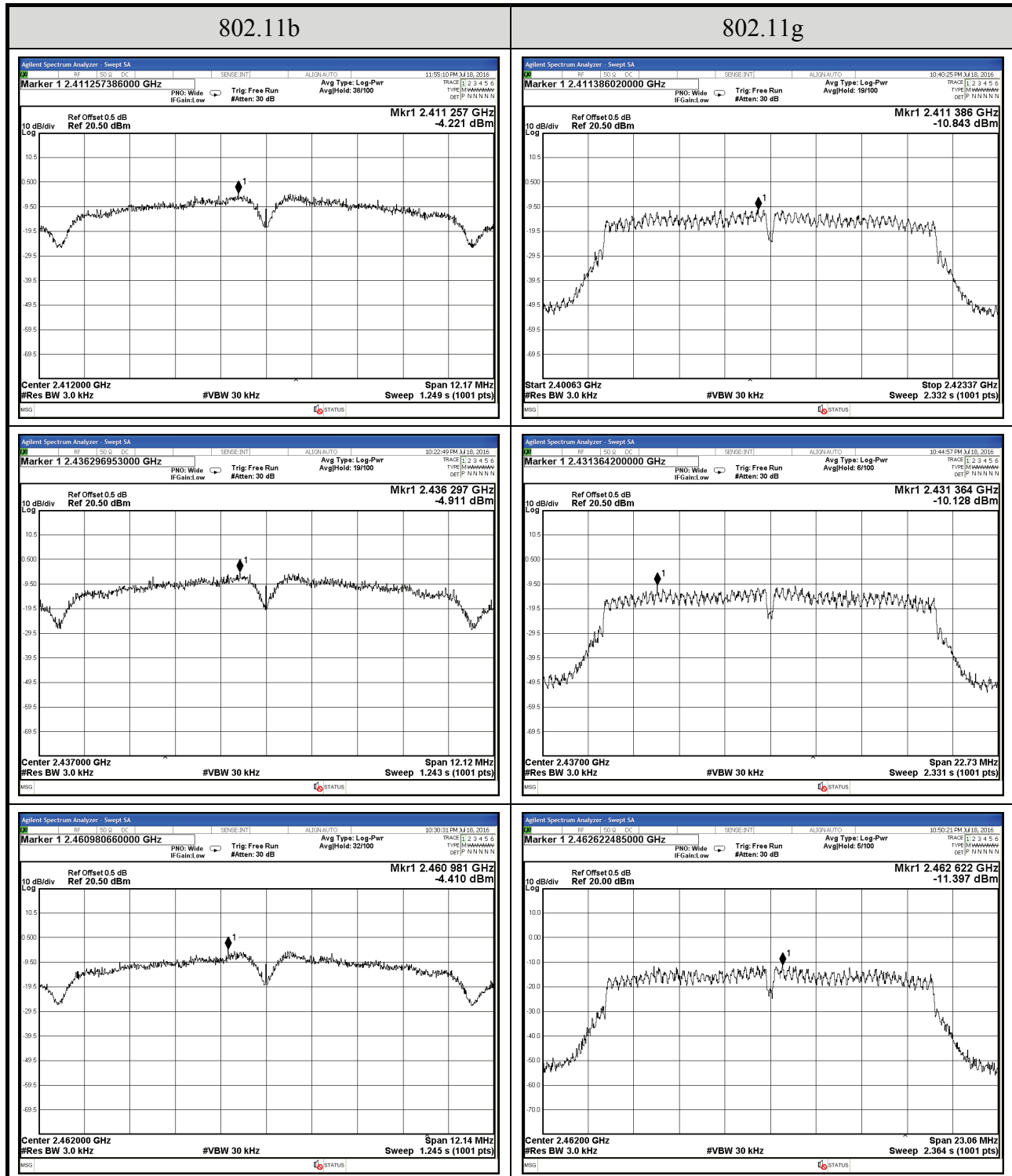
Test Date	2015/07/18 ~ 19	Temp./Hum.	24°C/53%
Cable Loss	0.5dB	Test Voltage	DC 3.3V (Via test jig)
Simultaneous 10 log(n) (Note: "n" is antenna number)		1	

A.4.1 Power Spectral Density Result

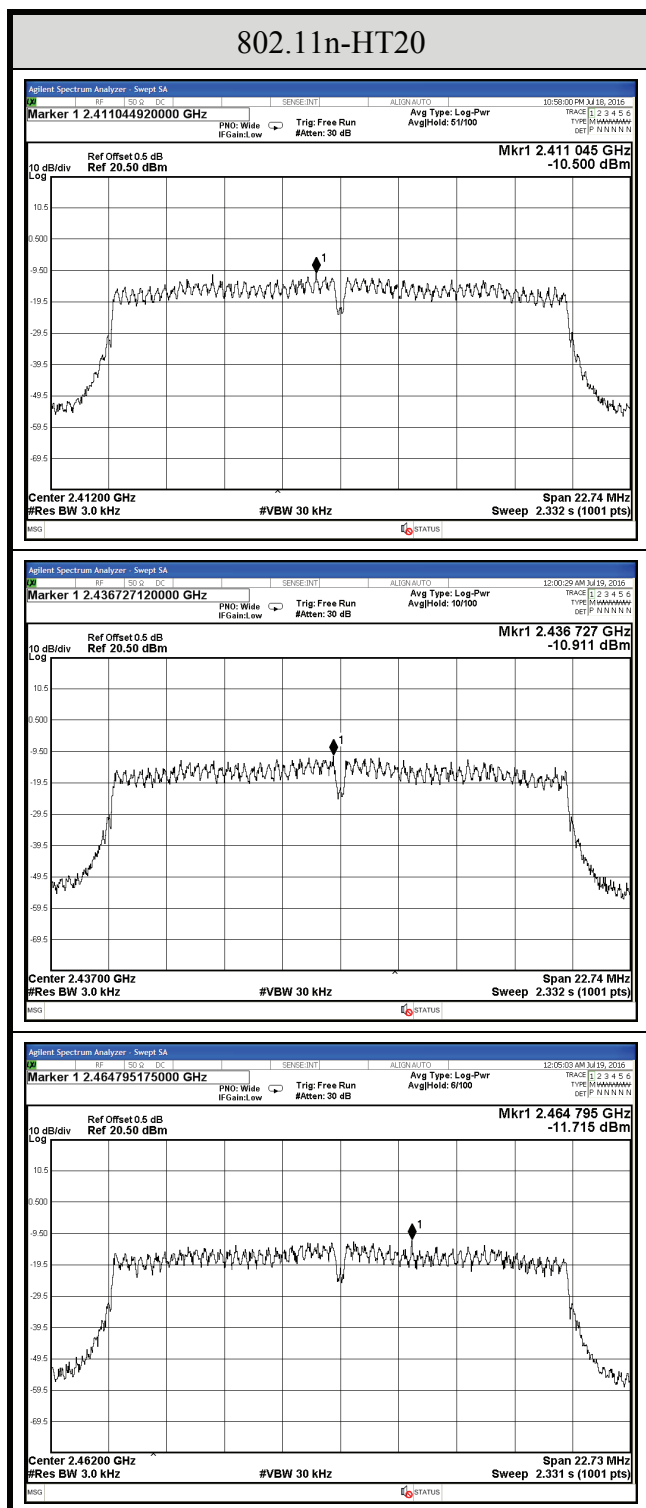
Modulation Type	Centre Frequency (MHz)	Power Spectral Density (dBm)	Limit
802.11b	2412	-4.221	< 8 dBm/3kHz
	2437	-4.911	
	2462	-4.410	
802.11g	2412	-10.843	
	2437	-10.128	
	2462	-11.397	
802.11n-HT20	2412	-10.500	
	2437	-10.911	
	2462	-11.715	

Note: All results have been included cable loss and Simultaneous Factor.

A.4.2 Measurement Plots



Note: All results have been included cable loss and Simultaneous Factor.



Note: All results have been included cable loss and Simultaneous Factor.