

FCC 15.247 2.4 GHz Report

for

VoxMicro LTD.

**20955 Pathfinder Rd., STE100, Diamond Bar,
CA 91765 United States**

Brand : AIRETOS
**Product Name : 450Mbps Three Chain,
Dual-Band, 802.11abgn
WLAN , Full Size MiniPCI
Express Module**
**Model Name : (1)AEX-AR95X
(2)AEX-AR9590-NX
(3)AEX-AR9590-NI
(4)AEX-AR9590-NIB
(5)AEX-AR9580-NX**
FCC ID : 2AE3B-AEX-AR95X

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TEST REPORT CERTIFICATION

Applicant : VoxMicro LTD.
Manufacture : VoxMicro LTD.
Product Name : 450Mbps Three Chain, Dual-Band, 802.11abgn WLAN , Full
Size MiniPCI Express Module
Model No. : (1)AEX-AR95X (2)AEX-AR9590-NX
(3)AEX-AR9590-NI (4)AEX-AR9590-NIB
(5)AEX-AR9580-NX
Serial No. : N/A
Brand : AIRETOS

Applicable Standards:

47 CFR FCC Part 15 Subpart C: 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. 04. 13 ~ 05. 18

Date of Report: 2016. 05. 19

Producer: Annie Yu
(Annie Yu/Administrator)

Signatory: Ben Cheng
(Ben Cheng/Manager)

1. REPORT HISTORY

Edition No.	Date of Rev.	Revision Summary	Report No.
0	2016. 05. 19	Original Report.	EM-F160309

2. SUMMARY OF TEST RESULTS

Rule	Description	Results
15.207	Conducted Emission	PASS
15.247(d)/15.205	Radiated Band Edge and Radiated Spurious Emission	PASS
15.247(a)(2)	6dB Bandwidth	PASS
15.247(b)(3)	Maximum Peak Output	PASS
15.247(d)	Conducted Band Edges and Conducted Spurious Emission	PASS
15.247 (e)	Peak Power Spectral Density	PASS
15.203	Antenna Requirement	PASS

3. GENERAL INFORMATION

3.1. Description of EUT

Product	450Mbps Three Chain, Dual-Band, 802.11abgn WLAN , Full Size MiniPCI Express Module																			
Model Number	(1)AEX-AR95X (2)AEX-AR9590-NX (3)AEX-AR9590-NI (4)AEX-AR9590-NIB (5)AEX-AR9580-NX All models are identical except than for their market assignment classification. The model AEX-AR9590-NI was tested in this report.																			
Serial Number	N/A																			
Brand Name	AIRETOS																			
Applicant	VoxMicro LTD. 20955 Pathfinder Rd., STE100, Diamond Bar, CA 91765 United States																			
Manufacture	VoxMicro LTD. 37F, No 7 Section 5 XinYi Road, Taipei, Taiwan																			
RF Features	802.11a/b/g/n																			
Transmit Type	<table><tr><th colspan="2">2.4 GHz</th></tr><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>3T3R</td></tr><tr><td>802.11n-HT40</td><td>3T3R</td></tr></table> <table><tr><th colspan="2">UNII Bands</th></tr><tr><td>802.11a</td><td>1T1R</td></tr><tr><td>802.11n-HT20</td><td>3T3R</td></tr><tr><td>802.11n-HT40</td><td>3T3R</td></tr></table>		2.4 GHz		802.11b	1T1R	802.11g	1T1R	802.11n-HT20	3T3R	802.11n-HT40	3T3R	UNII Bands		802.11a	1T1R	802.11n-HT20	3T3R	802.11n-HT40	3T3R
2.4 GHz																				
802.11b	1T1R																			
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UNII Bands																				
802.11a	1T1R																			
802.11n-HT20	3T3R																			
802.11n-HT40	3T3R																			
Date of Receipt of Sample	2016. 03. 31																			

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)	Up to 11
802.11g		11	OFDM (BPSK/QPSK/16QAM/64QAM)	Up to 54
802.11n-HT20				Up to 450
802.11n-HT40	2422-2452	7		

Channel List			
802.11 b/g/n-HT20		802.11n-HT40	
Channel Number	Frequency (MHz)	Channel Number	Frequency (MHz)
1	2412	3	2422
2	2417	4	2427
3	2422	5	2432
4	2427	6	2437
5	2432	7	2442
6	2437	8	2447
7	2442	9	2452
8	2447		
9	2452		
10	2457		
11	2462		

3.3. Antenna Information

No.	Antenna Part Number	Manufacture	Antenna Type	Frequency (MHz)	Max Gain (dBi)	Directional Gain (3T3R) (dBi)
1	WAE-ISO3	OxfordTec	Dipole	2.4GHz	2.71	7.48
				5GHz	1.84	6.61
2	WAND2DBI-SMA	OxfordTec	Dipole	2.4GHz	2.81	7.58
				5GHz	1.4	6.17
3	WAND5DBI-SMA	OxfordTec	Dipole	2.4GHz	3.0	7.77
				5GHz	5.0	9.77
4	WAPH-2DBI-26 (Integrated Antenna)	OxfordTec	PCB Antenna	2.4GHz	2.0	6.77
				5GHz	2.5	7.27
Note 1. Directional gain = $10 \log[(10^{2.71/20} + 10^{2.71/20} + 10^{2.71/20})^2 / 3] = 7.48\text{dBi}$						
Note 2. Directional gain = $10 \log[(10^{1.84/20} + 10^{1.84/20} + 10^{1.84/20})^2 / 3] = 6.61\text{dBi}$						
Note 3. Directional gain = $10 \log[(10^{2.81/20} + 10^{2.81/20} + 10^{2.81/20})^2 / 3] = 7.58\text{dBi}$						
Note 4. Directional gain = $10 \log[(10^{1.4/20} + 10^{1.4/20} + 10^{1.4/20})^2 / 3] = 6.17\text{dBi}$						
Note 5. Directional gain = $10 \log[(10^{2.0/20} + 10^{2.0/20} + 10^{2.0/20})^2 / 3] = 6.77\text{dBi}$						
Note 6. Directional gain = $10 \log[(10^{3.0/20} + 10^{3.0/20} + 10^{3.0/20})^2 / 3] = 7.77\text{dBi}$						
Note 7. Directional gain = $10 \log[(10^{5.0/20} + 10^{5.0/20} + 10^{5.0/20})^2 / 3] = 9.77\text{dBi}$						
Note 8. Directional gain = $10 \log[(10^{2.5/20} + 10^{2.5/20} + 10^{2.5/20})^2 / 3] = 7.27\text{dBi}$						

3.4. Data Rate Relative to Output Power

802.11b			
Channel	Modulation	Date Rate (Mbps)	Power (dBm)
1	DBPSK	1	21.32
1	DQPSK	2	21.16
1	CCK	5.5	21.09
1	CCK	11	21.20
802.11g			
Channel	Modulation	Date Rate (Mbps)	Power (dBm)
1	BPSK	6	24.46
1	BPSK	9	24.19
1	QPSK	12	24.28
1	QPSK	18	24.09
1	16-QAM	24	24.34
1	16-QAM	36	24.13
1	64-QAM	48	24.22
1	64-QAM	54	24.27

802.11n-HT20				802.11n-HT40			
Channel	Modulation	Date Rate	Power (dBm)	Channel	Modulation	Date Rate	Power (dBm)
1	BPSK	MCS0	28.06	3	BPSK	MCS0	26.74
1	QPSK	MCS1	27.97	3	QPSK	MCS1	26.85
1	QPSK	MCS2	28.03	3	QPSK	MCS2	26.56
1	16-QAM	MCS3	27.94	3	16-QAM	MCS3	26.81
1	16-QAM	MCS4	27.93	3	16-QAM	MCS4	26.65
1	64-QAM	MCS5	27.89	3	64-QAM	MCS5	26.93
1	64-QAM	MCS6	28.11	3	64-QAM	MCS6	26.71
1	64-QAM	MCS7	27.82	3	64-QAM	MCS7	26.86
1	BPSK	MCS8	27.93	3	BPSK	MCS8	26.49
1	QPSK	MCS9	27.90	3	QPSK	MCS9	26.67
1	QPSK	MCS10	28.04	3	QPSK	MCS10	26.72
1	16-QAM	MCS11	28.01	3	16-QAM	MCS11	26.93
1	16-QAM	MCS12	27.94	3	16-QAM	MCS12	26.89
1	64-QAM	MCS13	28.02	3	64-QAM	MCS13	26.62
1	64-QAM	MCS14	27.88	3	64-QAM	MCS14	26.75
1	64-QAM	MCS15	27.81	3	64-QAM	MCS15	26.62
1	BPSK	MCS16	28.16	3	BPSK	MCS16	26.99
1	QPSK	MCS17	27.76	3	QPSK	MCS17	26.45
1	QPSK	MCS18	28.01	3	QPSK	MCS18	26.62
1	16-QAM	MCS19	27.95	3	16-QAM	MCS19	26.95
1	16-QAM	MCS20	27.86	3	16-QAM	MCS20	26.77
1	64-QAM	MCS21	27.78	3	64-QAM	MCS21	26.68
1	64-QAM	MCS22	27.99	3	64-QAM	MCS22	26.70
1	64-QAM	MCS23	27.85	3	64-QAM	MCS23	26.46

3.5. Test Configuration

Mode	Duty Cycle (x)	T (ms)	Duty Cycle Factor (dB)
802.11b	0.99	8.180	N/A
802.11g	0.95	1.340	0.22
802.11n-HT20	0.89	0.455	0.51
802.11n-HT40	0.84	0.240	0.76

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	MCS16	1/11
		802.11n-HT40	MCS16	3/9
	Radiated Spurious Emission Note1 & 2	802.11b	1 Mbps	1/6/11
		802.11g	6Mbps	1/6/11
		802.11n-HT20	MCS16	1/6/11
		802.11n-HT40	MCS16	3/6/9
Conducted Test Case Note3	6dB Bandwidth	802.11b	1Mbps	1/6/11
		802.11g	6Mbps	1/6/11
		802.11n-HT20	MCS16	1/6/11
		802.11n-HT40	MCS16	3/6/9
	Peak Power Spectral Density	802.11b	1Mbps	1/6/11
		802.11g	6Mbps	1/6/11
		802.11n-HT20	MCS16	1/6/11
		802.11n-HT40	MCS16	3/6/9
	Peak Output Power	802.11b	1Mbps	1/6/11
		802.11g	6Mbps	1/6/11
		802.11n-HT20	MCS16	1/6/11
		802.11n-HT40	MCS16	3/6/9
	Band Edge	802.11b	1Mbps	1/11
		802.11g	6Mbps	1/11
		802.11n-HT20	MCS16	1/11
		802.11n-HT40	MCS16	3/9
	Spurious Emission	802.11b	1Mbps	1/6/11
		802.11g	6Mbps	1/6/11
		802.11n-HT20	MCS16	1/6/11
		802.11n-HT40	MCS16	3/6/9

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.

Note 3: We performed testing of the highest Antenna Type WAND2DBI-SMA (Dipole Antenna).

3.6. Tested Supporting System List

3.6.1. Support Peripheral Unit

No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Notebook PC	Lenovo	TP00034A	895097	By DoC

3.6.2. Cable Lists

No.	Cable Description Of The Above Support Units
1.	Adapter: Lenovo, M/N: ADX65NCT3A AC Power Cord: Unshielded, Detachable, 1.7m DC Power Cord: Unshielded, Detachable, 1.7m, Bonded a ferrite core

3.7. Setup Configuration

3.7.1. EUT Configuration for Power Line & Radiated Emission



3.7.2. EUT Configuration for Conducted Test Items



3.8. Operating Condition of EUT

Test program “artgui” 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. 8 Shielded Room &**
Semi Anechoic Chamber &
Fully Anechoic Chamber
No. 53-11, Dingfu, Linkou Dist.,
New Taipei City 244, Taiwan

NVLAP Lab. Code : 200077-0

TAF Accreditation No : 1724

3.10. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Conduction Test	150kHz~30MHz	±3.50dB
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	ESR3	101774	2016. 02. 04	1 Year
2.	A.M.N.	R&S	ENV4200	100169	2015. 11. 17	1 Year
3.	L.I.S.N.	Kyoritsu	KNW-407	8-855-9	2015. 12. 23	1 Year
4.	Pulse Limiter	R&S	ESH3-Z2	100354	2016. 01. 17	1 Year
5.	Test Software	Audix	e3	V.6.120424	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	2015. 06. 24	1 Year
3.	Amplifier	HP	8447D	2944A06305	2016. 02. 23	1 Year
4.	Bilog Antenna	CHASE	CBL6112D	33821	2016. 01. 30	1 Year
5.	Loop Antenna	R&S	HFH2-Z2	891847/27	2015. 12. 24	1 Year
6.	Test Software	Audix	e3	V.6.110601	N.C.R.	N.C.R.

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	Sonoma	310N	187161	2015. 06. 17	1 Year
3.	2.4GHz Notch Filter	K&L	7NSL10-244 1.5E130.5-00	1	2015. 07. 28	1 Year
4.	Horn Antenna	ETS-Lindgren	3117	00135902	2016. 03. 05	1 Year
5.	Loop Antenna	R&S	HFH2-Z2	891847/27	2015. 12. 24	1 Year
6.	Test Software	Audix	e3	V.6.110601	N.C.R.	N.C.R.

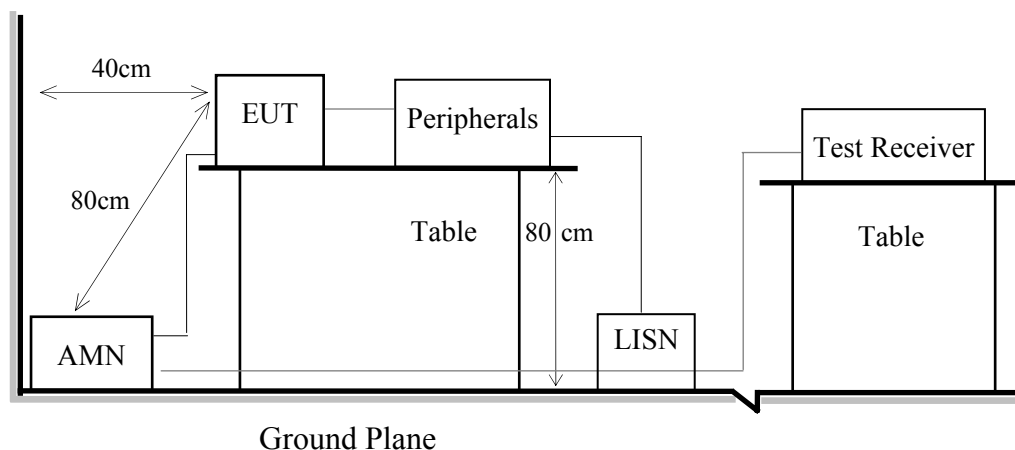
4.3. RF Conducted Measurement

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

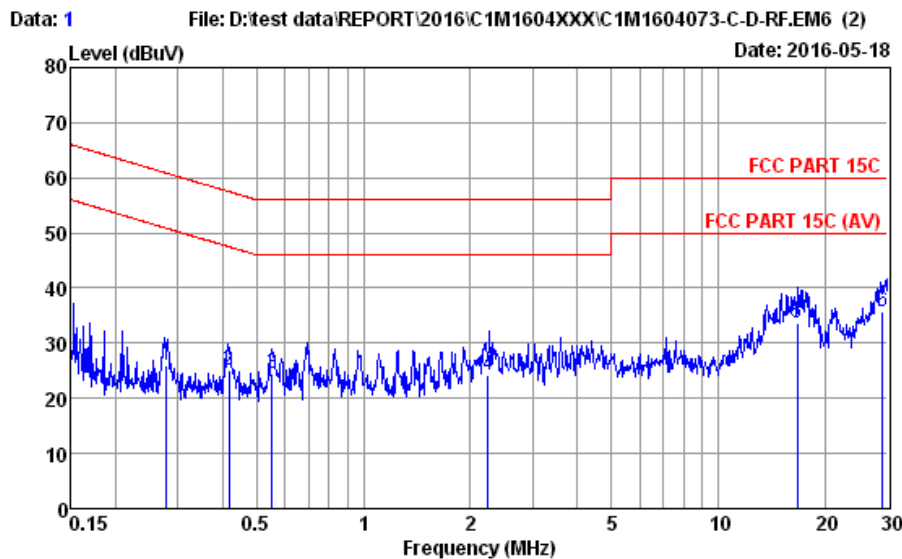
5.3. Test Procedure

- 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	2016/05/18	Temp./Hum.	25°C/61%
Test Voltage	AC 120V, 60Hz		



Site no. : No.8 Shielded Room Data no. : 1
Condition : ENV4200 100169 Phase : NEUTRAL
Limit : FCC PART 15C
Env. / Ins. : 25°C / 61% ESR3 (1774) Engineer : Tim
EUT : AEX-AR9590-NI
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	0.279	11.13	0.03	9.86	4.87	25.89	60.85	34.96	QP
2	0.417	11.00	0.03	9.86	4.19	25.08	57.51	32.43	QP
3	0.552	10.98	0.04	9.86	3.72	24.60	56.00	31.40	QP
4	2.237	11.03	0.09	9.86	3.31	24.29	56.00	31.71	QP
5	16.661	13.66	0.26	9.91	9.84	33.67	60.00	26.33	QP
6	29.061	16.55	0.31	9.99	8.87	35.72	60.00	24.28	QP

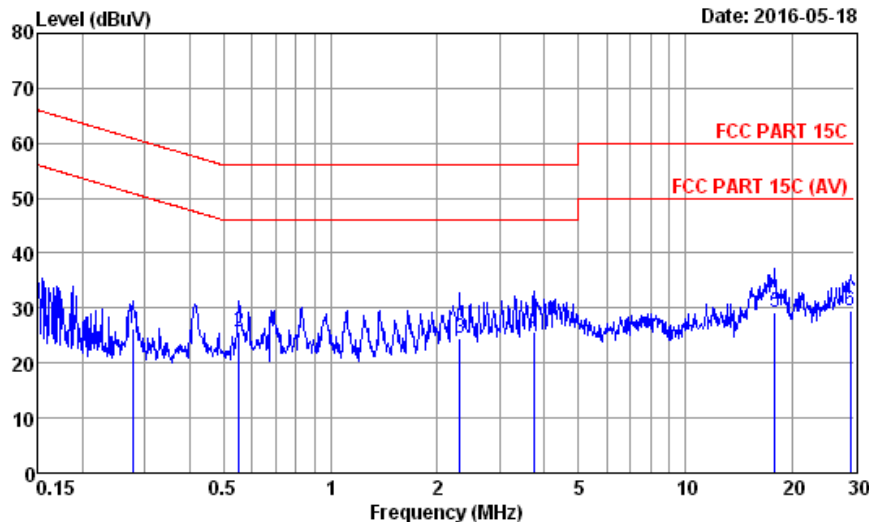
Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

AUDIX Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
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Test Date	2016/05/18	Temp./Hum.	25°C/61%
Test Voltage	AC 120V, 60Hz		

Data: 2 File: D:\test data\REPORT\2016\C1M1604XXX\C1M1604073-C-D-RE.M6 (2)



Site no. : No.8 Shielded Room Data no. : 2
Condition : ENV4200 100169 Phase : LINE
Limit : FCC PART 15C
Env. / Ins. : 25°C / 61% ESR3 (1774) Engineer : Tim
EUT : AEX-AR9590-NI
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	0.277	10.62	0.03	9.86	5.84	26.35	60.90	34.55	QP
2	0.552	10.55	0.04	9.86	5.21	25.66	56.00	30.34	QP
3	2.309	10.59	0.09	9.86	3.90	24.44	56.00	31.56	QP
4	3.740	10.64	0.12	9.87	5.10	25.73	56.00	30.27	QP
5	17.849	12.80	0.26	9.92	6.23	29.21	60.00	30.79	QP
6	29.216	15.69	0.32	9.99	3.63	29.63	60.00	30.37	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.

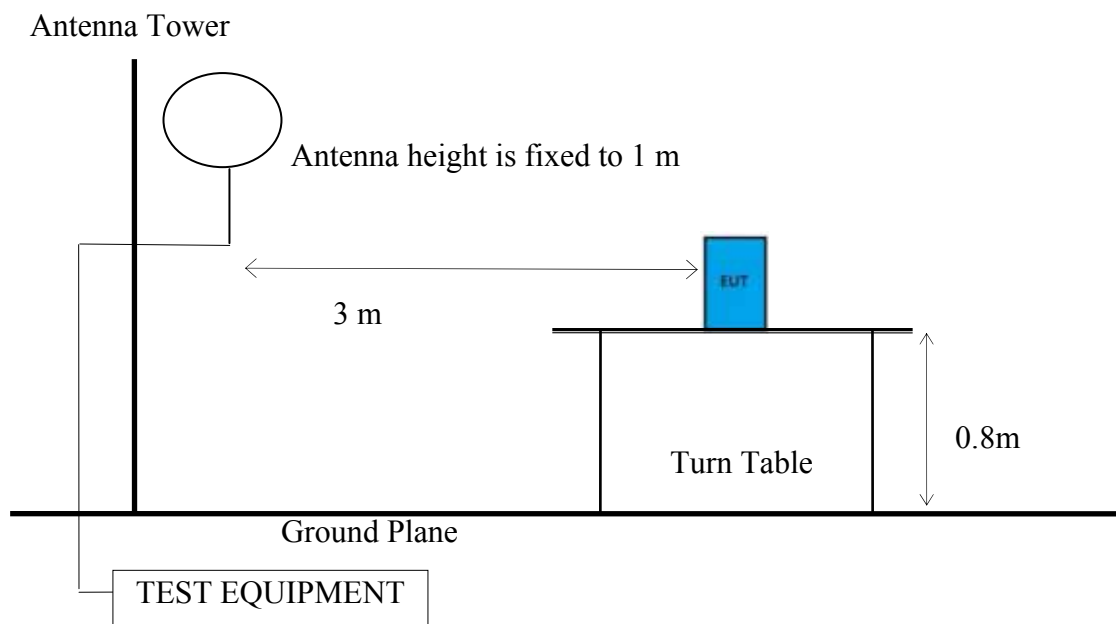
6. RADIATED EMISSION MEASUREMENT

6.1. Block Diagram of Test Setup

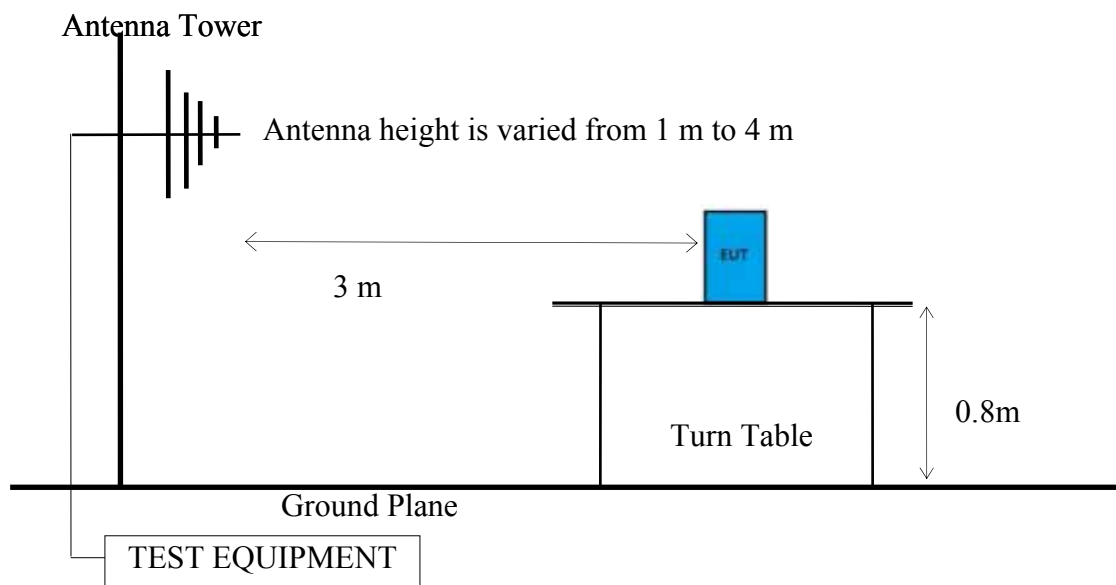
6.1.1. Block Diagram of connection between EUT and simulators

Indicated as section 3.7

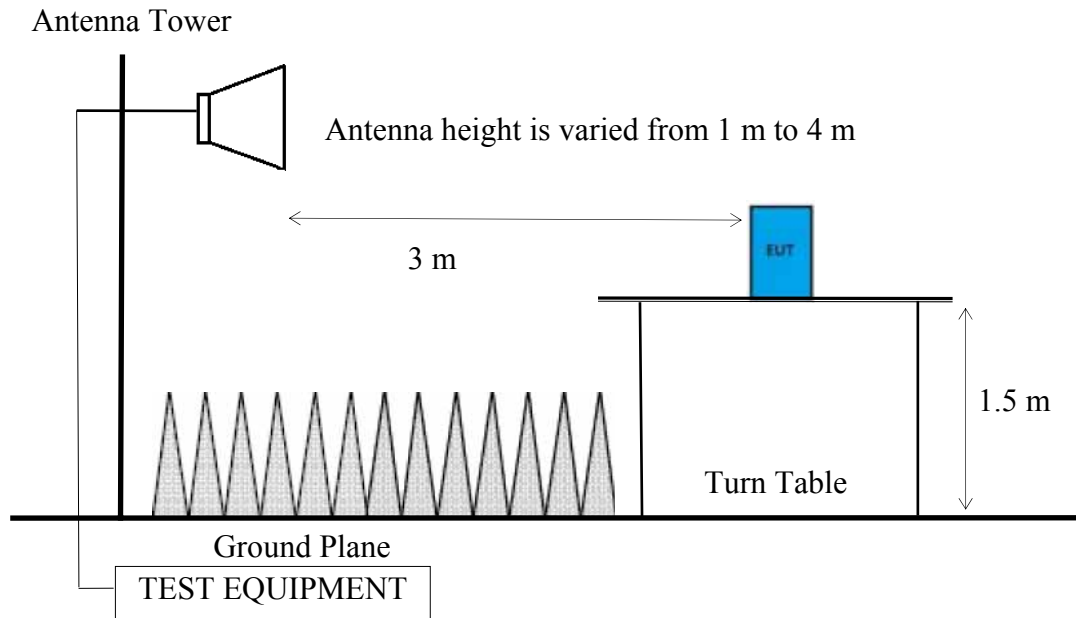
6.1.2. Semi Anechoic Chamber (3m) Setup Diagram for 9kHz-30MHz



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, 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 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 Q.P. detector is not required. Otherwise using Q.P. for finally measurement.

Average Detector:**■ Option 1:**

- (1) RBW = 120KHz
(2) VBW $\geq 1/T$.

Modulation Type	T (ms)	1/ T (Hz)	VBW Setting
802.11b	8.180	0.122	0.122Hz
802.11g	1.340	0.746	0.746Hz
802.11n-HT20	0.455	2.198	2.198Hz
802.11n-HT40	0.240	4.167	4.167Hz

- (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	2016/05/18	Temp./Hum.	24°C/51%
Test Voltage	DC 3.3V		

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 30MHz~1000MHz

[Note: We performed testing of the highest Antenna Type]

Mode	802.11b	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
99.84	11.93	2.64	24.61	39.18	43.50	4.32	Peak
298.69	13.74	4.57	24.78	43.09	46.00	2.91	Peak
796.30	19.57	7.72	4.94	32.23	46.00	13.77	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
99.84	11.93	2.64	13.44	28.01	43.50	15.49	Peak
298.69	13.74	4.57	19.39	37.70	46.00	8.30	Peak
497.54	17.11	6.48	7.23	30.82	46.00	15.18	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
99.84	11.93	2.64	26.30	40.87	43.50	2.63	Peak
299.66	13.76	4.58	23.89	42.23	46.00	3.77	Peak
800.18	19.60	7.73	4.67	32.00	46.00	14.00	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
99.84	11.93	2.64	15.59	30.16	43.50	13.34	Peak
299.66	13.76	4.58	17.51	35.85	46.00	10.15	Peak
499.48	17.13	6.49	7.23	30.85	46.00	15.15	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
99.84	11.93	2.64	24.63	39.20	43.50	4.30	Peak
299.66	13.76	4.58	26.60	44.94	46.00	1.06	Peak
796.30	19.57	7.72	4.39	31.68	46.00	14.32	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
99.84	11.93	2.64	13.66	28.23	43.50	15.27	Peak
298.69	13.74	4.57	19.43	37.74	46.00	8.26	Peak
499.48	17.13	6.49	6.79	30.41	46.00	15.59	Peak

Mode	802.11n-HT40	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
99.84	11.93	2.64	25.85	40.42	43.50	3.08	Peak
298.69	13.74	4.57	24.54	42.85	46.00	3.15	Peak
705.12	18.57	7.27	4.26	30.10	46.00	15.90	Peak

Antenna at Vertical Polarization

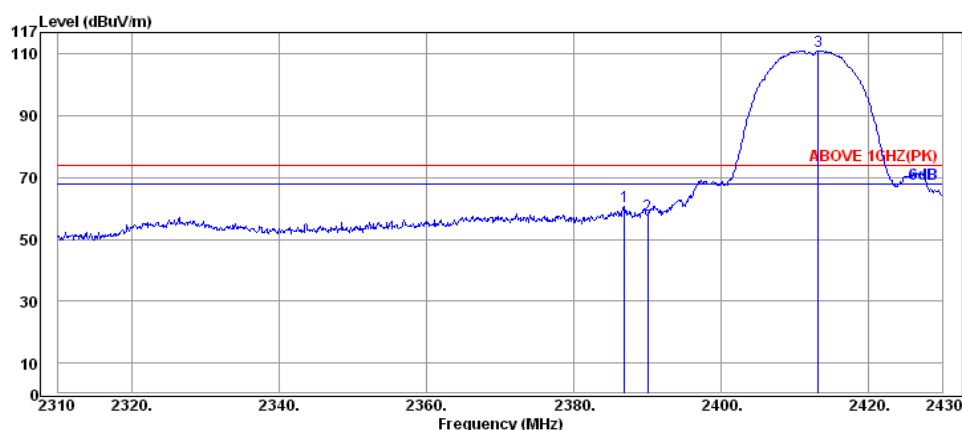
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
99.84	11.93	2.64	14.79	29.36	43.50	14.14	Peak
299.66	13.76	4.58	18.79	37.13	46.00	8.87	Peak
497.54	17.11	6.48	7.39	30.98	46.00	15.02	Peak

6.5.2. Frequency Above 1 GHz to 10th harmonics

Band Edge:

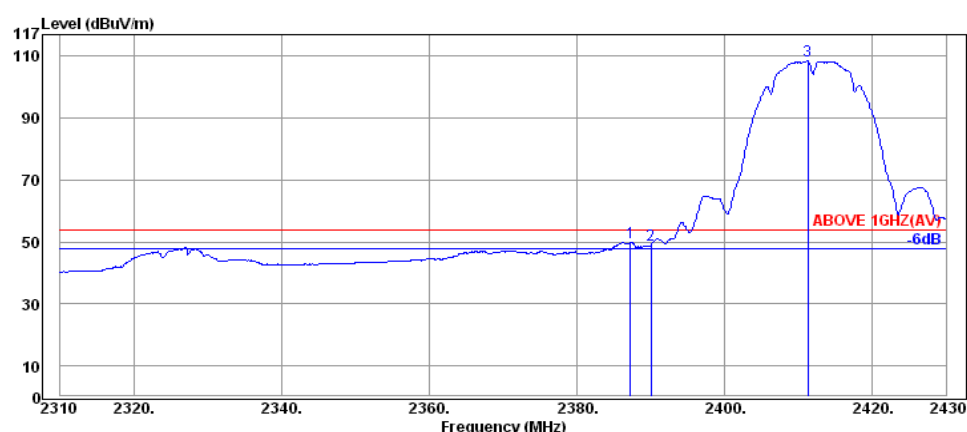
[Note: We performed testing of the highest Antenna Type]

Mode	802.11b	Frequency	TX 2412MHz
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Antenna at Horizontal Polarization

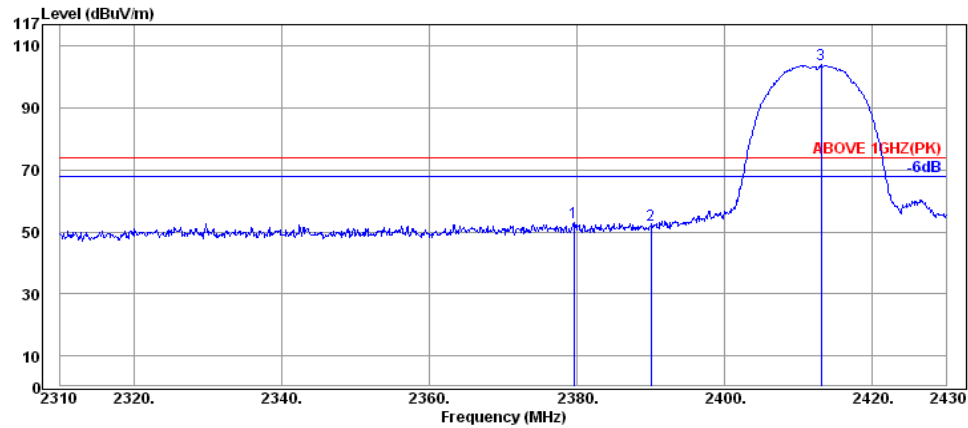
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2386.92	32.16	6.07	22.49	60.72	74.00	13.28	Peak
2390.04	32.16	6.08	19.49	57.73	74.00	16.27	Peak
2413.20	32.18	6.11	72.84	111.13	---	---	Peak



Antenna at Horizontal Polarization

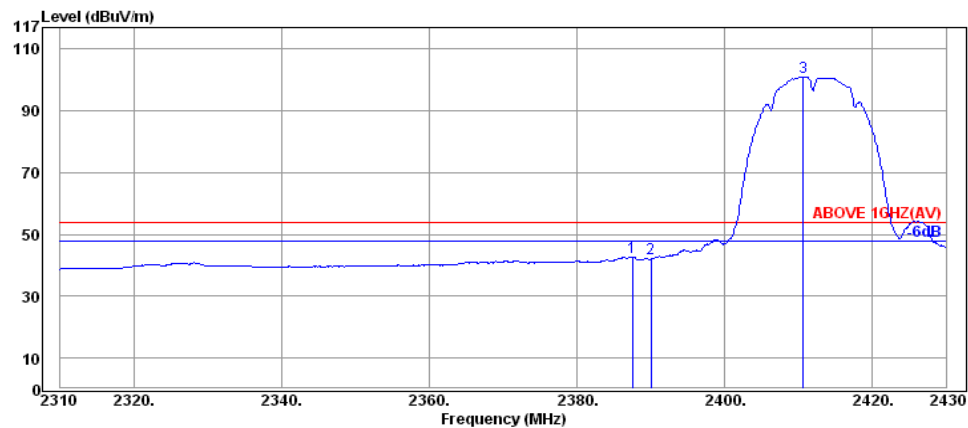
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2387.28	32.16	6.08	11.57	49.81	54.00	4.19	Average
2390.04	32.16	6.08	10.87	49.11	54.00	4.89	Average
2411.28	32.18	6.11	70.12	108.41	---	---	Average

Mode	802.11b	Frequency	TX 2412MHz
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Antenna at Vertical Polarization

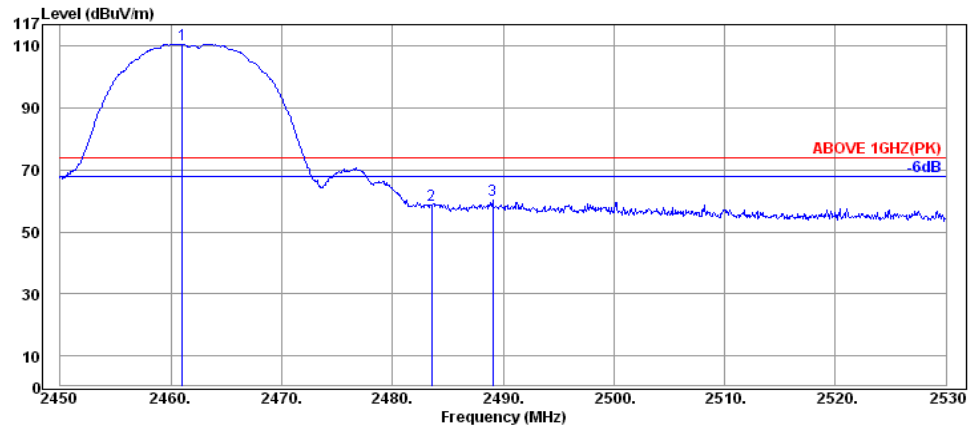
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2379.60	32.13	6.07	14.83	53.03	74.00	20.97	Peak
2390.04	32.16	6.08	13.83	52.07	74.00	21.93	Peak
2413.08	32.18	6.11	65.68	103.97	---	---	Peak



Antenna at Vertical Polarization

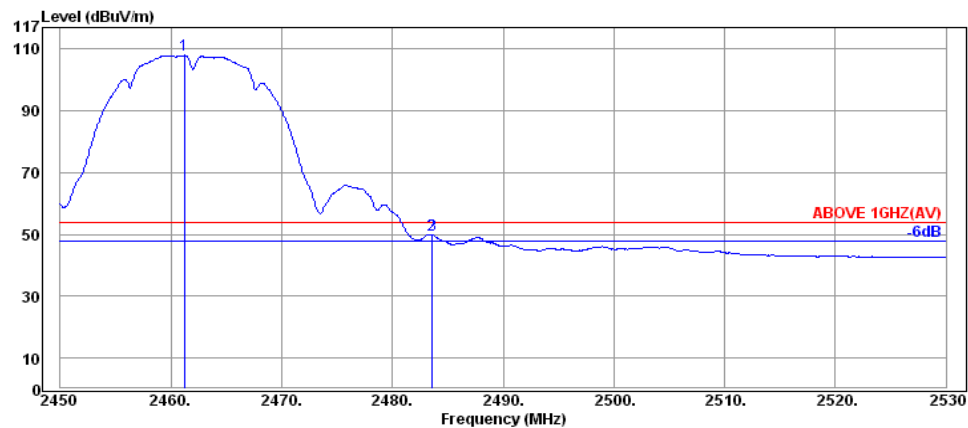
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2387.52	32.16	6.08	4.58	42.82	54.00	11.18	Average
2390.04	32.16	6.08	3.80	42.04	54.00	11.96	Average
2410.68	32.18	6.10	62.70	100.98	---	---	Average

Mode	802.11b	Frequency	TX 2462MHz
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Antenna at Horizontal Polarization

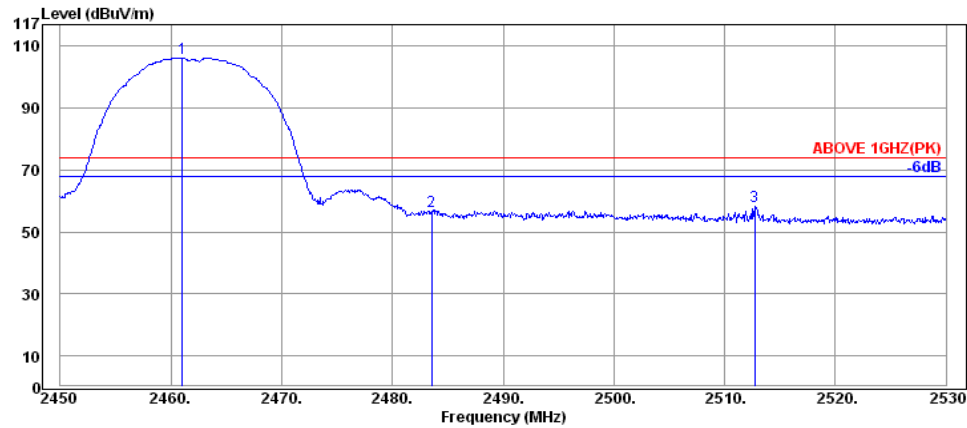
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2461.04	32.25	6.16	72.35	110.76	---	---	Peak
2483.52	32.28	6.19	20.06	58.53	74.00	15.47	Peak
2489.04	32.30	6.19	21.89	60.38	74.00	13.62	Peak



Antenna at Horizontal Polarization

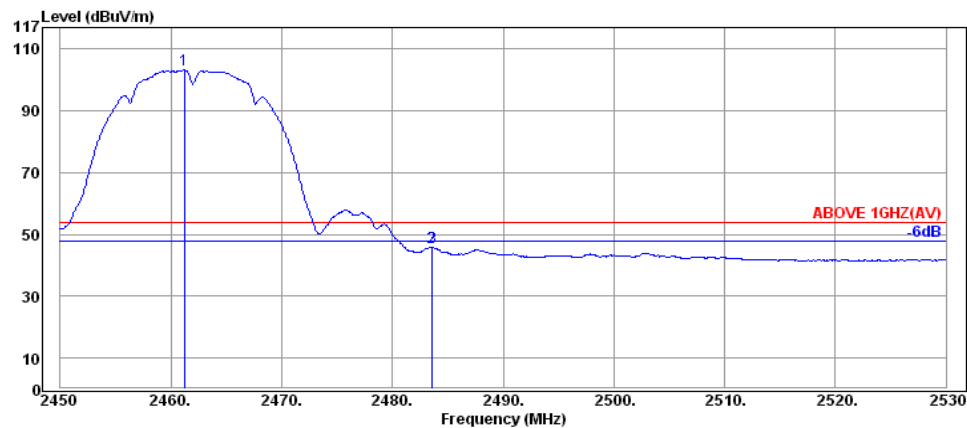
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2461.20	32.25	6.16	69.57	107.98	---	---	Average
2483.52	32.28	6.19	11.48	49.95	54.00	4.05	Average
2483.60	32.28	6.19	11.46	49.93	54.00	4.07	Average

Mode	802.11b	Frequency	TX 2462MHz
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Antenna at Vertical Polarization

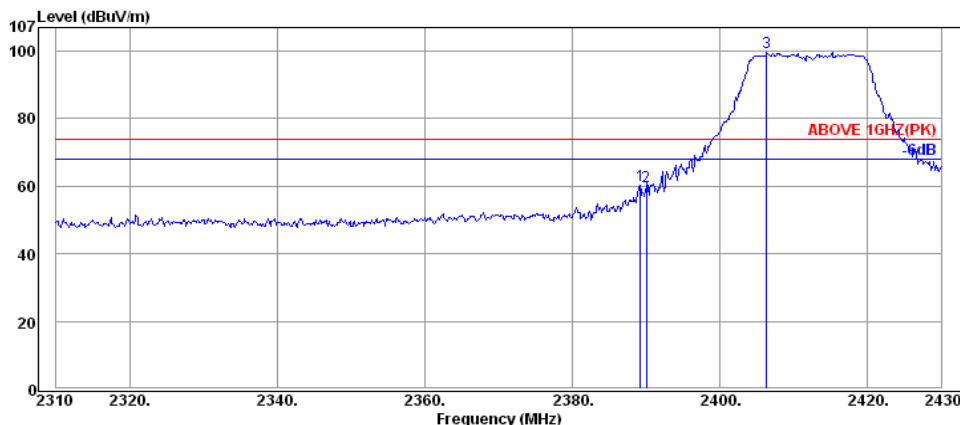
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2461.04	32.25	6.16	67.83	106.24	---	---	Peak
2483.52	32.28	6.19	18.19	56.66	74.00	17.34	Peak
2512.72	32.32	6.22	19.56	58.10	74.00	15.90	Peak



Antenna at Vertical Polarization

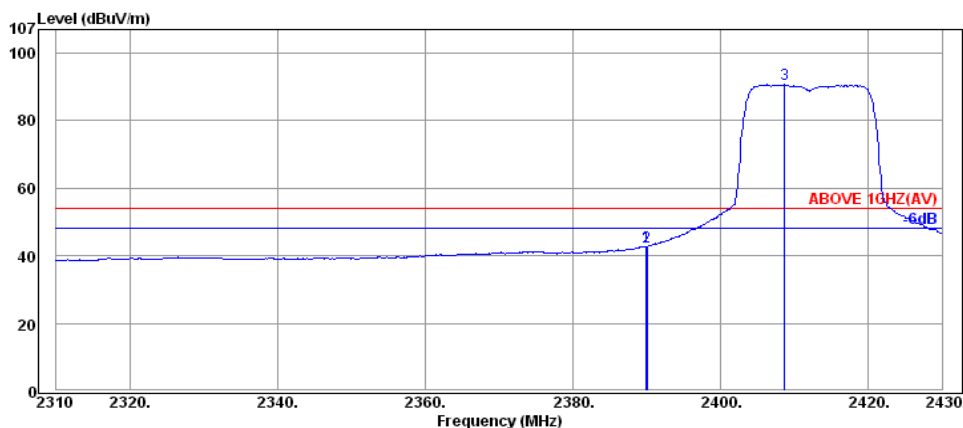
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2461.20	32.25	6.16	64.78	103.19	---	---	Average
2483.52	32.28	6.19	7.33	45.80	54.00	8.20	Average
2483.60	32.28	6.19	7.31	45.78	54.00	8.22	Average

Mode	802.11g	Frequency	TX 2412MHz
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Antenna at Horizontal Polarization

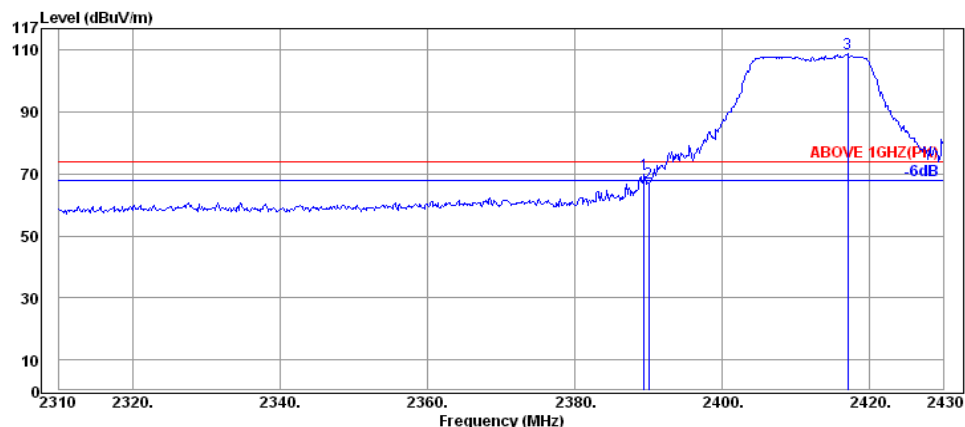
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBUV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Detector
2389.20	32.16	6.08	22.24	60.48	74.00	13.52	Peak
2390.04	32.16	6.08	21.77	60.01	74.00	13.99	Peak
2406.36	32.18	6.10	61.43	99.71	---	---	Peak



Antenna at Horizontal Polarization

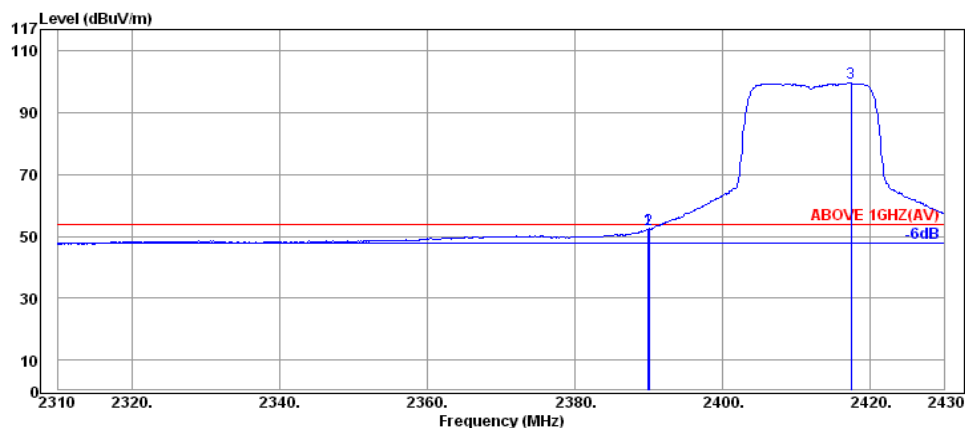
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBUV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Detector
2389.92	32.16	6.08	4.40	42.64	54.00	11.36	Average
2390.04	32.16	6.08	4.46	42.70	54.00	11.30	Average
2408.64	32.18	6.10	52.41	90.69	---	---	Average

Mode	802.11g	Frequency	TX 2412MHz
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Antenna at Vertical Polarization

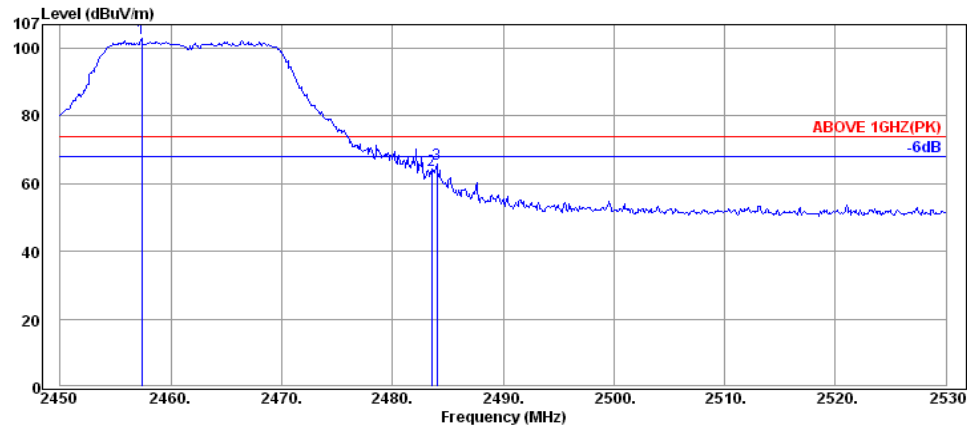
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.44	32.16	6.08	31.63	69.87	74.00	4.13	Peak
2390.04	32.16	6.08	29.08	67.32	74.00	6.68	Peak
2417.04	32.18	6.11	70.49	108.78	---	---	Peak



Antenna at Vertical Polarization

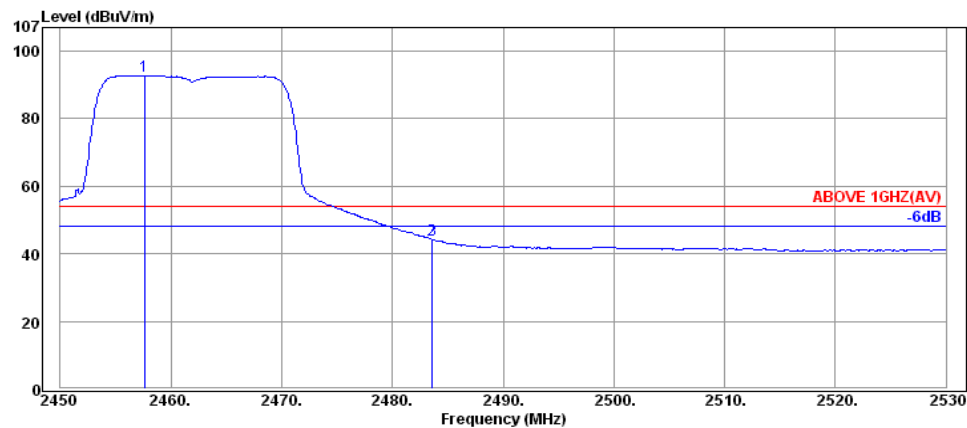
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.92	32.16	6.08	14.06	52.30	54.00	1.70	Average
2390.04	32.16	6.08	14.13	52.37	54.00	1.63	Average
2417.40	32.18	6.11	61.38	99.67	---	---	Average

Mode	802.11g	Frequency	TX 2462MHz
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Antenna at Horizontal Polarization

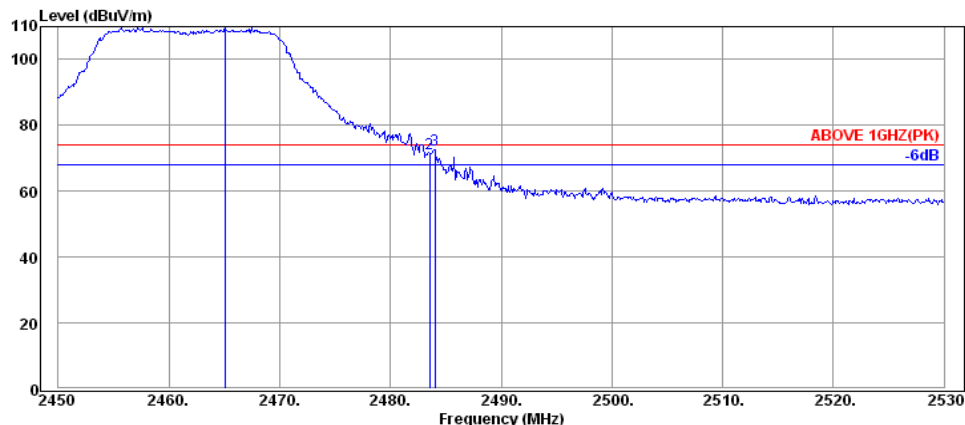
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2457.36	32.25	6.15	64.48	102.88	---	---	Peak
2483.52	32.28	6.19	25.39	63.86	74.00	10.14	Peak
2484.00	32.28	6.19	27.45	65.92	74.00	8.08	Peak



Antenna at Horizontal Polarization

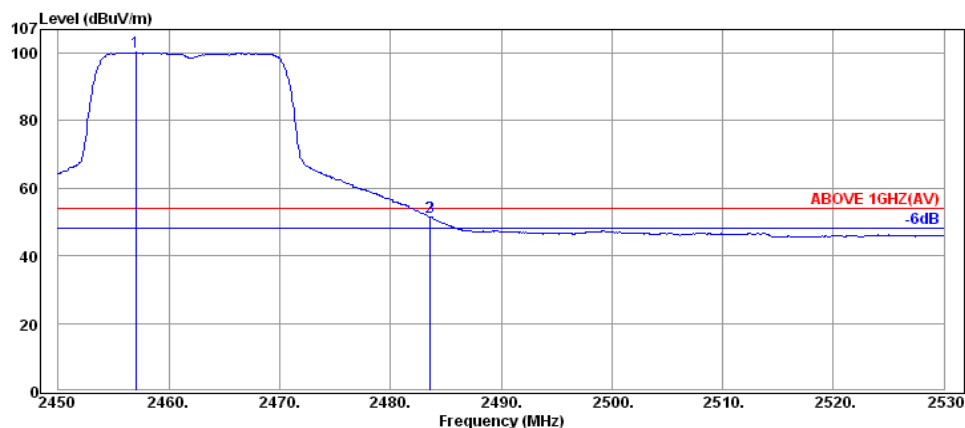
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2457.60	32.25	6.15	54.39	92.79	---	---	Average
2483.52	32.28	6.19	5.80	44.27	54.00	9.73	Average
2483.60	32.28	6.19	5.70	44.17	54.00	9.83	Average

Mode	802.11g	Frequency	TX 2462MHz
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Antenna at Vertical Polarization

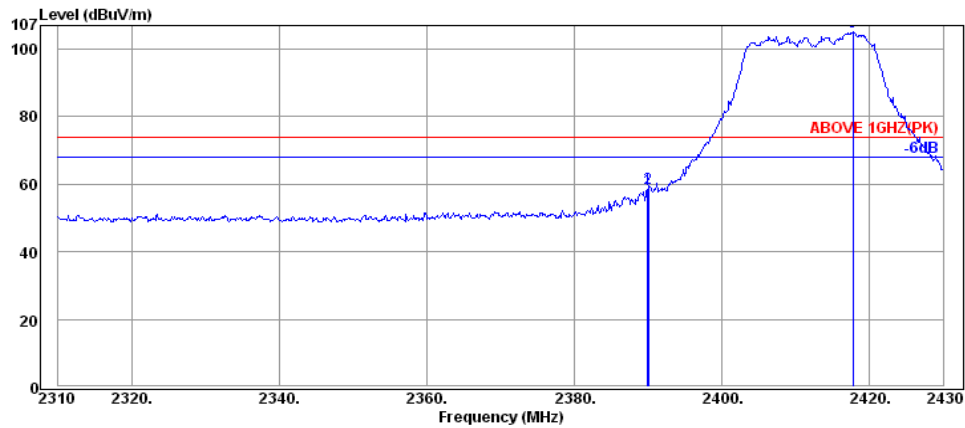
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2465.04	32.25	6.16	71.70	110.11	---	---	Peak
2483.52	32.28	6.19	33.04	71.51	74.00	2.49	Peak
2484.00	32.28	6.19	34.03	72.50	74.00	1.50	Peak



Antenna at Vertical Polarization

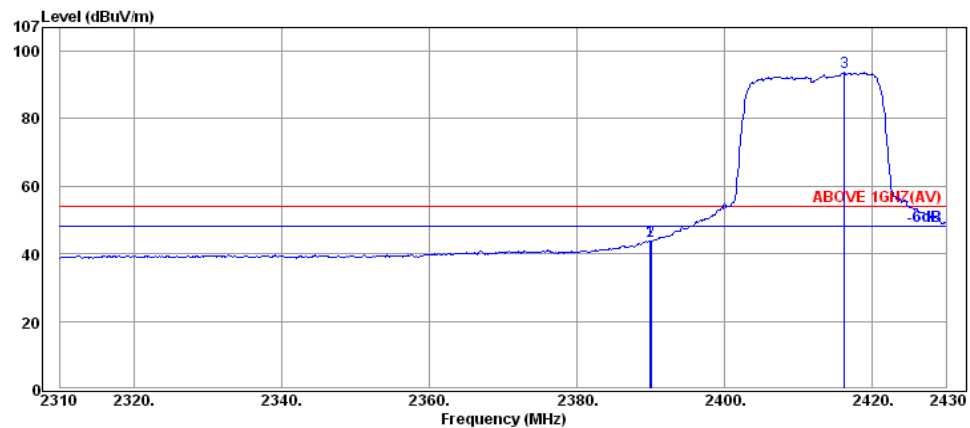
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2457.04	32.25	6.15	61.84	100.24	---	---	Average
2483.52	32.28	6.19	12.95	51.42	54.00	2.58	Average
2483.60	32.28	6.19	12.92	51.39	54.00	2.61	Average

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

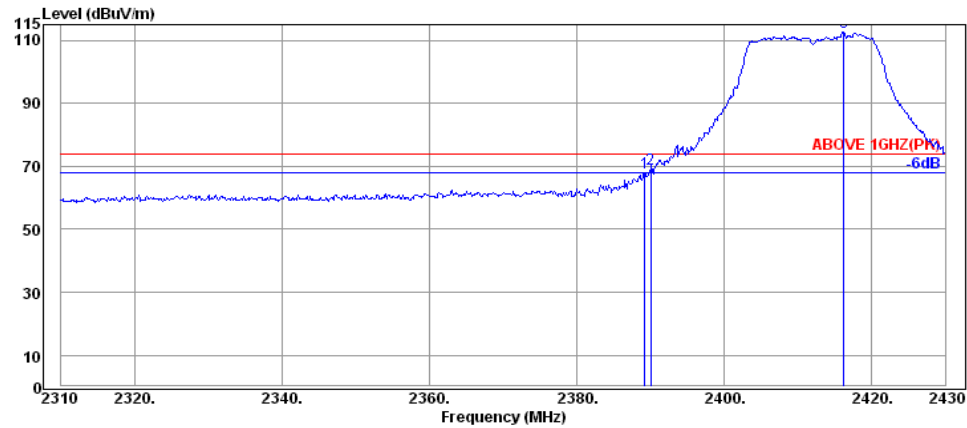
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.92	32.16	6.08	20.04	58.28	74.00	15.72	Peak
2390.04	32.16	6.08	20.45	58.69	74.00	15.31	Peak
2417.76	32.18	6.11	66.73	105.02	---	---	Peak



Antenna at Horizontal Polarization

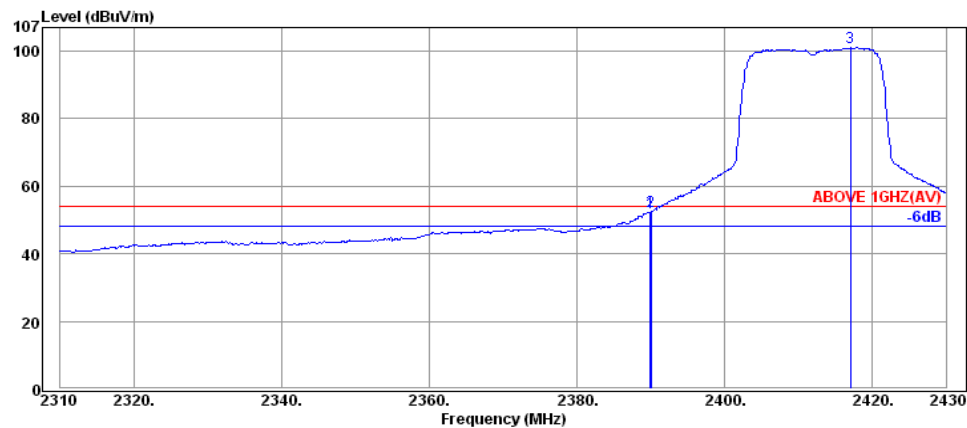
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.92	32.16	6.08	5.46	43.70	54.00	10.30	Average
2390.04	32.16	6.08	5.43	43.67	54.00	10.33	Average
2416.20	32.18	6.11	55.30	93.59	---	---	Average

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

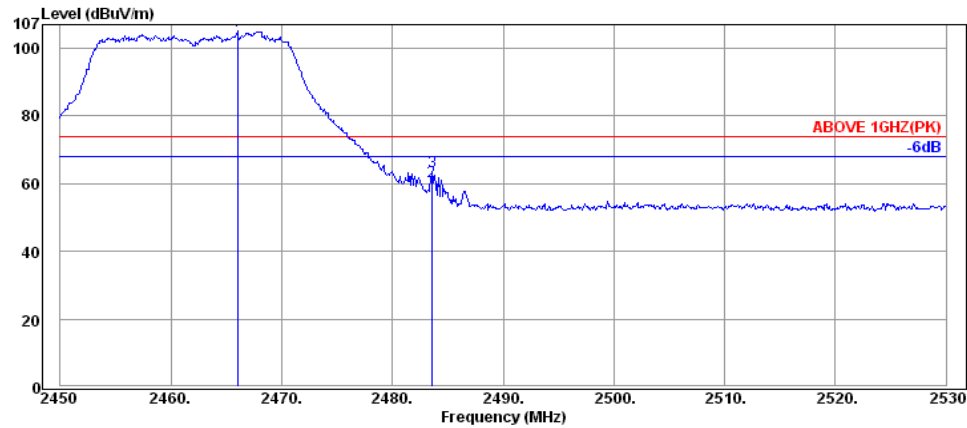
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.20	32.16	6.08	29.90	68.14	74.00	5.86	Peak
2390.04	32.16	6.08	30.90	69.14	74.00	4.86	Peak
2416.20	32.18	6.11	74.41	112.70	---	---	Peak



Antenna at Vertical Polarization

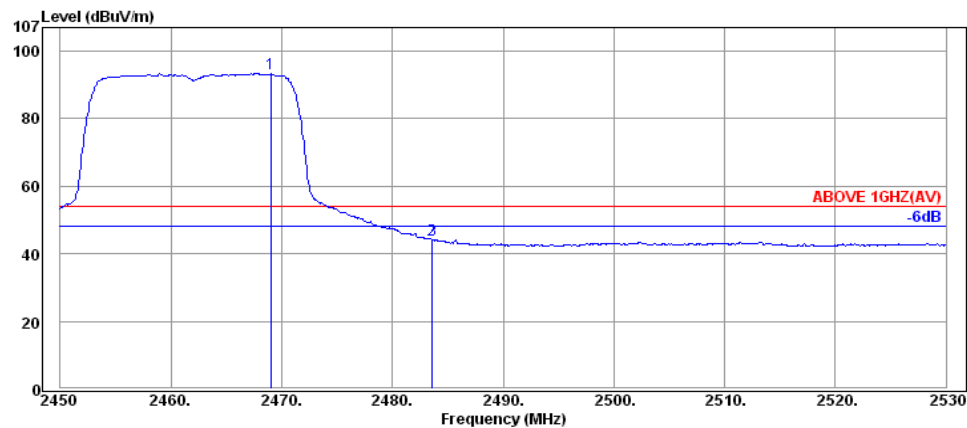
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.92	32.16	6.08	14.02	52.26	54.00	1.74	Average
2390.04	32.16	6.08	14.16	52.40	54.00	1.60	Average
2417.04	32.18	6.11	62.81	101.10	---	---	Average

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

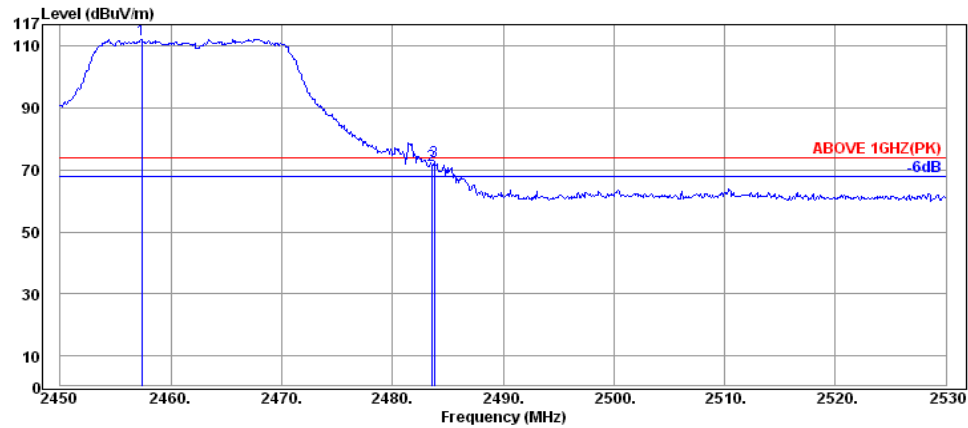
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2466.00	32.25	6.16	66.58	104.99	---	---	Peak
2483.52	32.28	6.19	22.25	60.72	74.00	13.28	Peak
2483.60	32.28	6.19	25.05	63.52	74.00	10.48	Peak



Antenna at Horizontal Polarization

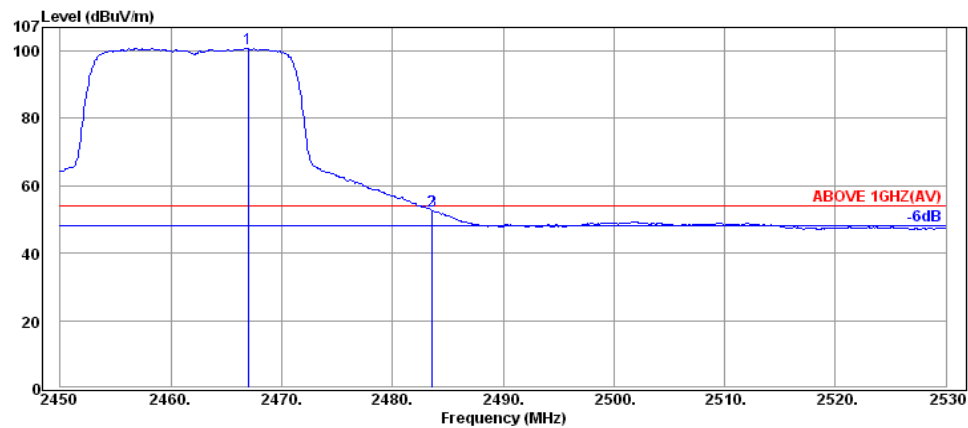
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2469.04	32.25	6.17	54.94	93.36	---	---	Average
2483.52	32.28	6.19	5.80	44.27	54.00	9.73	Average
2483.60	32.28	6.19	5.60	44.07	54.00	9.93	Average

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

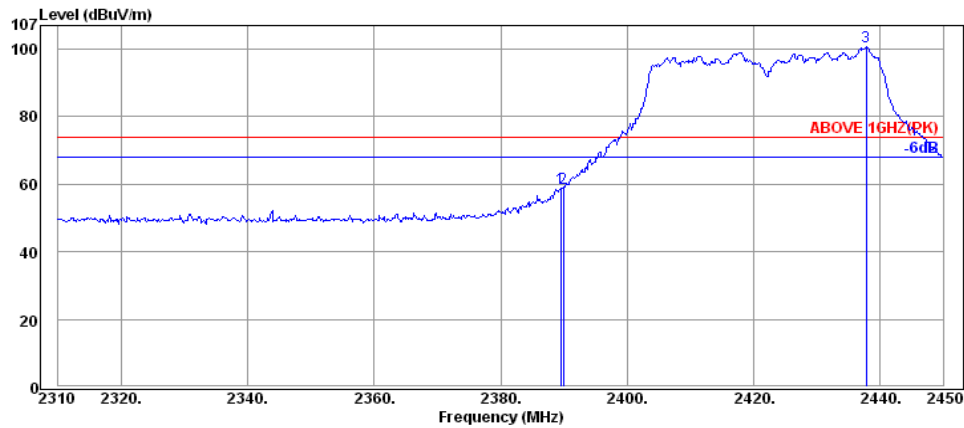
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2457.36	32.25	6.15	73.94	112.34	---	---	Peak
2483.52	32.28	6.19	33.11	71.58	74.00	2.42	Peak
2483.76	32.28	6.19	34.24	72.71	74.00	1.29	Peak



Antenna at Vertical Polarization

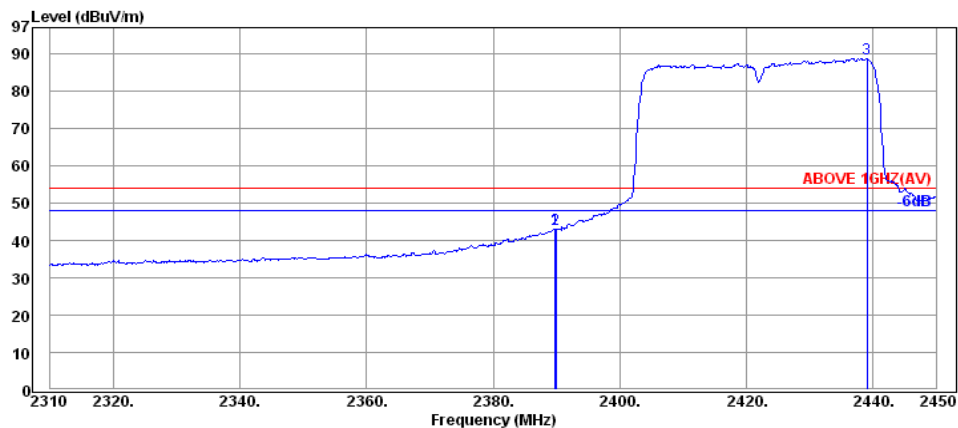
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2466.96	32.25	6.17	62.49	100.91	---	---	Average
2483.52	32.28	6.19	14.21	52.68	54.00	1.32	Average
2483.60	32.28	6.19	14.09	52.56	54.00	1.44	Average

Mode	802.11n-HT40	Frequency	TX 2422MHz
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Antenna at Horizontal Polarization

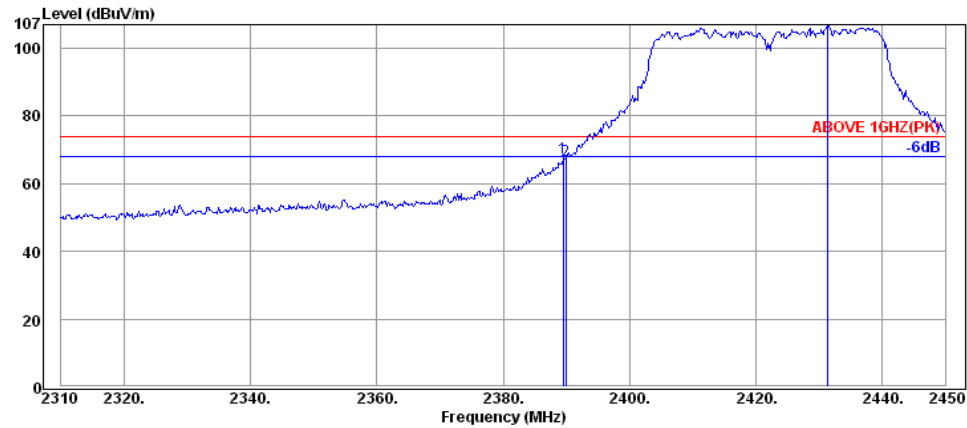
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.52	32.16	6.08	20.72	58.96	74.00	15.04	Peak
2389.94	32.16	6.08	20.66	58.90	74.00	15.10	Peak
2437.82	32.23	6.13	62.40	100.76	---	---	Peak



Antenna at Horizontal Polarization

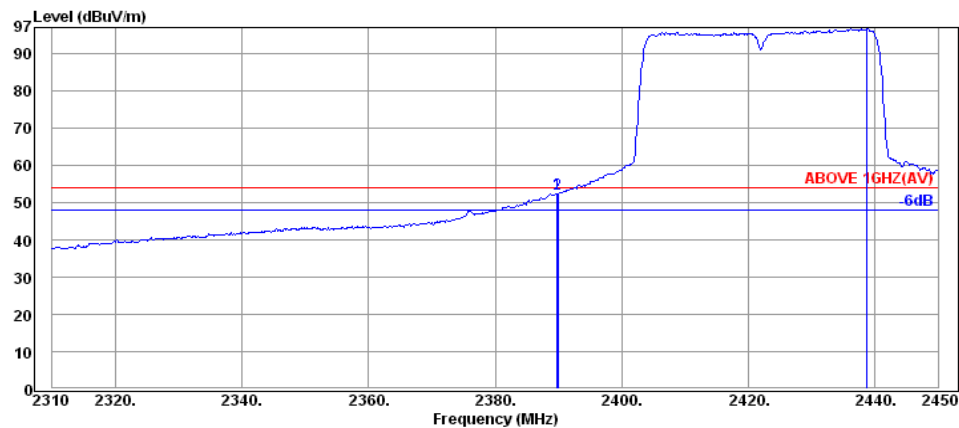
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.80	32.16	6.08	4.69	42.93	54.00	11.07	Average
2389.94	32.16	6.08	4.67	42.91	54.00	11.09	Average
2439.08	32.23	6.13	50.43	88.79	---	---	Average

Mode	802.11n-HT40	Frequency	TX 2422MHz
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Antenna at Vertical Polarization

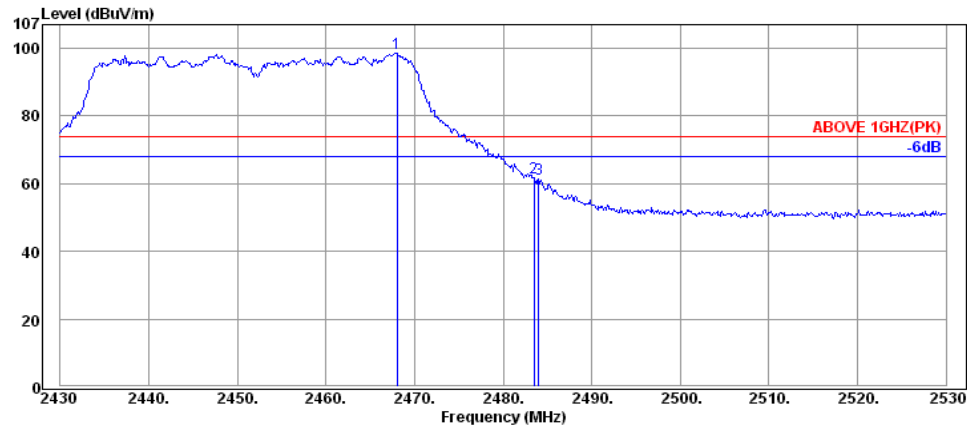
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.52	32.16	6.08	29.35	67.59	74.00	6.41	Peak
2389.94	32.16	6.08	28.79	67.03	74.00	6.97	Peak
2431.38	32.20	6.13	68.31	106.64	---	---	Peak



Antenna at Vertical Polarization

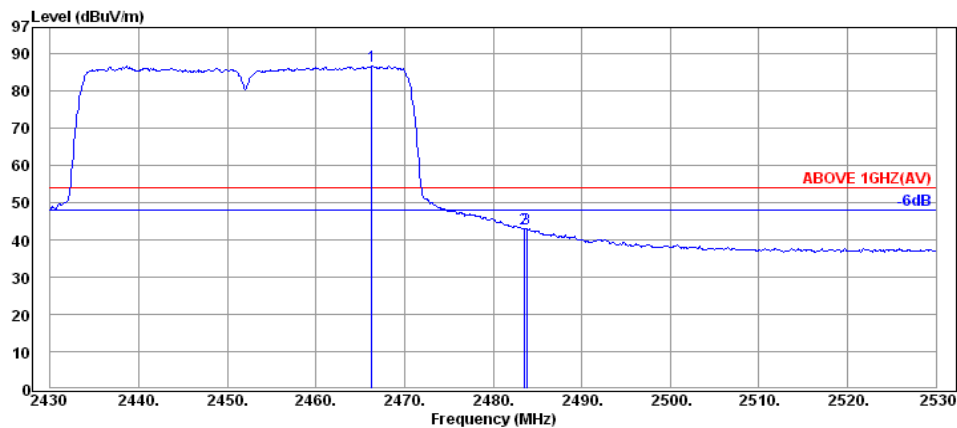
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2389.80	32.16	6.08	14.11	52.35	54.00	1.65	Average
2389.94	32.16	6.08	14.04	52.28	54.00	1.72	Average
2438.80	32.23	6.13	58.57	96.93	---	---	Average

Mode	802.11n-HT40	Frequency	TX 2452MHz
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Antenna at Horizontal Polarization

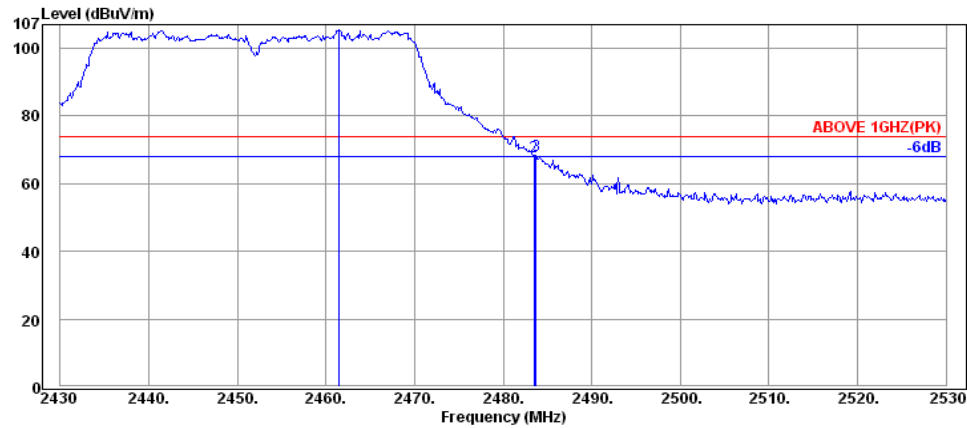
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2468.00	32.25	6.17	60.30	98.72	---	---	Peak
2483.50	32.28	6.19	23.12	61.59	74.00	12.41	Peak
2484.00	32.28	6.19	22.84	61.31	74.00	12.69	Peak



Antenna at Horizontal Polarization

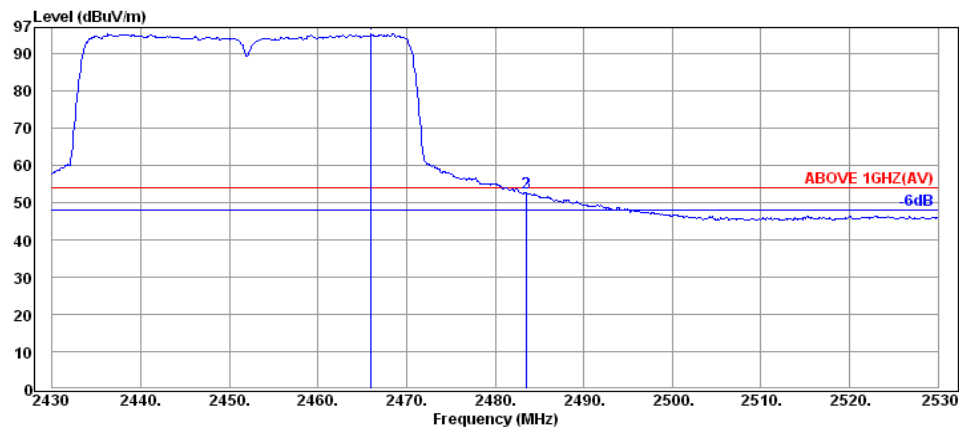
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2466.30	32.25	6.16	48.30	86.71	---	---	Average
2483.50	32.28	6.19	4.63	43.10	54.00	10.90	Average
2483.80	32.28	6.19	4.45	42.92	54.00	11.08	Average

Mode	802.11n-HT40	Frequency	TX 2452MHz
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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
2461.50	32.25	6.16	66.96	105.37	---	---	Peak
2483.50	32.28	6.19	29.63	68.10	74.00	5.90	Peak
2483.70	32.28	6.19	29.99	68.46	74.00	5.54	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
2466.00	32.25	6.16	56.89	95.30	---	---	Average
2483.50	32.28	6.19	14.33	52.80	54.00	1.20	Average
2483.60	32.28	6.19	14.11	52.58	54.00	1.42	Average

6.5.3. Emissions outside the frequency band:

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

[Note: We performed testing of the highest Antenna Type]

Mode	802.11b	Frequency	TX 2437MHz
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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
2354.00	32.11	6.03	18.86	57.00	74.00	17.00	Peak
2354.00	32.11	6.03	11.95	50.09	54.00	3.91	Average
2556.00	32.38	6.28	17.62	56.28	74.00	17.72	Peak
2556.00	32.38	6.28	9.16	47.82	54.00	6.18	Average
2640.00	32.46	6.40	15.77	54.63	74.00	19.37	Peak
2640.00	32.46	6.40	10.77	49.63	54.00	4.37	Average
4872.00	33.85	9.09	6.47	49.41	54.00	4.59	Peak
6000.00	35.40	9.91	2.06	47.37	54.00	6.63	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
2354.00	32.11	6.03	10.15	48.29	54.00	5.71	Peak
2556.00	32.38	6.28	10.38	49.04	54.00	4.96	Peak
4860.00	34.24	9.03	2.71	45.98	54.00	8.02	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
1596.00	28.72	4.67	11.88	45.27	74.00	28.73	Peak
2354.00	32.11	6.03	19.46	57.60	74.00	16.40	Peak
2354.00	32.11	6.03	9.61	47.75	54.00	6.25	Average
2526.00	32.34	6.25	17.60	56.19	74.00	17.81	Peak
2526.00	32.34	6.25	7.22	45.81	54.00	8.19	Average
2590.00	32.42	6.33	17.55	56.30	74.00	17.70	Peak
2590.00	32.42	6.33	12.30	51.05	54.00	2.95	Average
4112.00	33.49	8.29	5.38	47.16	54.00	6.84	Peak
4872.00	34.25	9.09	5.50	48.84	54.00	5.16	Peak
6000.00	35.40	9.91	3.35	48.66	54.00	5.34	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
2640.00	32.46	6.40	9.42	48.28	54.00	5.72	Peak
4912.00	33.87	9.24	1.85	44.96	54.00	9.04	Peak
6000.00	35.40	9.91	2.49	47.80	54.00	6.20	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
1596.00	28.72	4.67	11.16	44.55	54.00	9.45	Peak
1956.00	31.24	5.22	11.71	48.17	54.00	5.83	Peak
2356.00	32.11	6.03	17.39	55.53	74.00	18.47	Peak
2356.00	32.11	6.03	8.26	46.40	54.00	7.60	Average
2526.00	32.34	6.25	19.18	57.77	74.00	16.23	Peak
2526.00	32.34	6.25	9.18	47.77	54.00	6.23	Average
2640.00	32.46	6.40	17.81	56.67	74.00	17.33	Peak
2640.00	32.46	6.40	13.06	51.92	54.00	2.08	Average
6000.00	35.40	9.91	1.71	47.02	54.00	6.98	Peak

Mode	802.11n-HT40	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
2366.00	32.11	6.05	10.48	48.64	54.00	5.36	Peak
2580.00	32.40	6.32	10.07	48.79	54.00	5.21	Peak

Antenna at Vertical Polarization

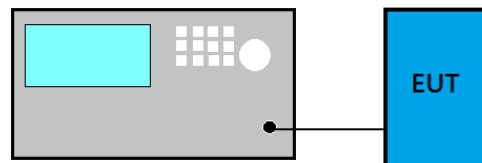
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2364.00	32.11	6.05	19.44	57.60	74.00	16.40	Peak
2364.00	32.11	6.05	7.76	45.92	54.00	8.08	Average
2550.00	32.36	6.28	20.03	58.67	74.00	15.33	Peak
2550.00	32.36	6.28	9.55	48.19	54.00	5.81	Average
2640.00	32.46	6.40	16.18	55.04	74.00	18.96	Peak
2640.00	32.46	6.40	11.02	49.88	54.00	4.12	Average
6000.00	35.40	9.91	1.69	47.00	54.00	7.00	Peak

6.5.4. Emissions in Non-restricted Frequency Bands

Pursuant to KDB 558074 D01 v03r05 that emission levels below the 15.209 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)

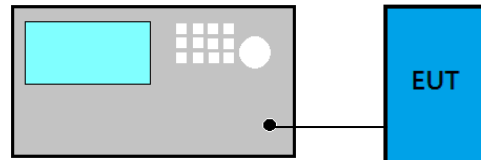
- (1) Set span to at least 1.5 times the OBW
- (2) Set RBW = 1 -5% of OBW
- (3) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- (4) Detector = RMS.
- (5) Trace mode = trace average at least 100 traces
- (6) Sweep = auto couple.
- (7) Compute power by integrating the spectrum across the OBW of the 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) 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)).

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

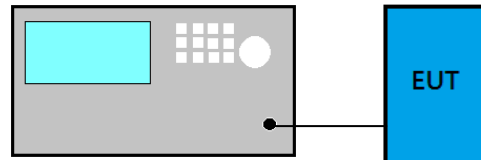
- (1) Set analyzer center frequency to DTS channel center frequency.
- (2) Set the span to 1.5 times the DTS bandwidth.
- (3) Set the RBW to: 100 kHz.
- (4) Set the VBW $\geq 3 \times$ RBW.
- (5) Detector = peak.
- (6) Sweep time = auto couple.
- (7) Trace mode = max hold.
- (8) Allow trace to fully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



AUDIX Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City 244, Taiwan

APPENDIX A

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APPENDIX A

TEST PLOTS

(Model: (1)AEX-AR95X (2)AEX-AR9590-NX (3)AEX-AR9590-NI
(4)AEX-AR9590-NIB (5)AEX-AR9580-NX)

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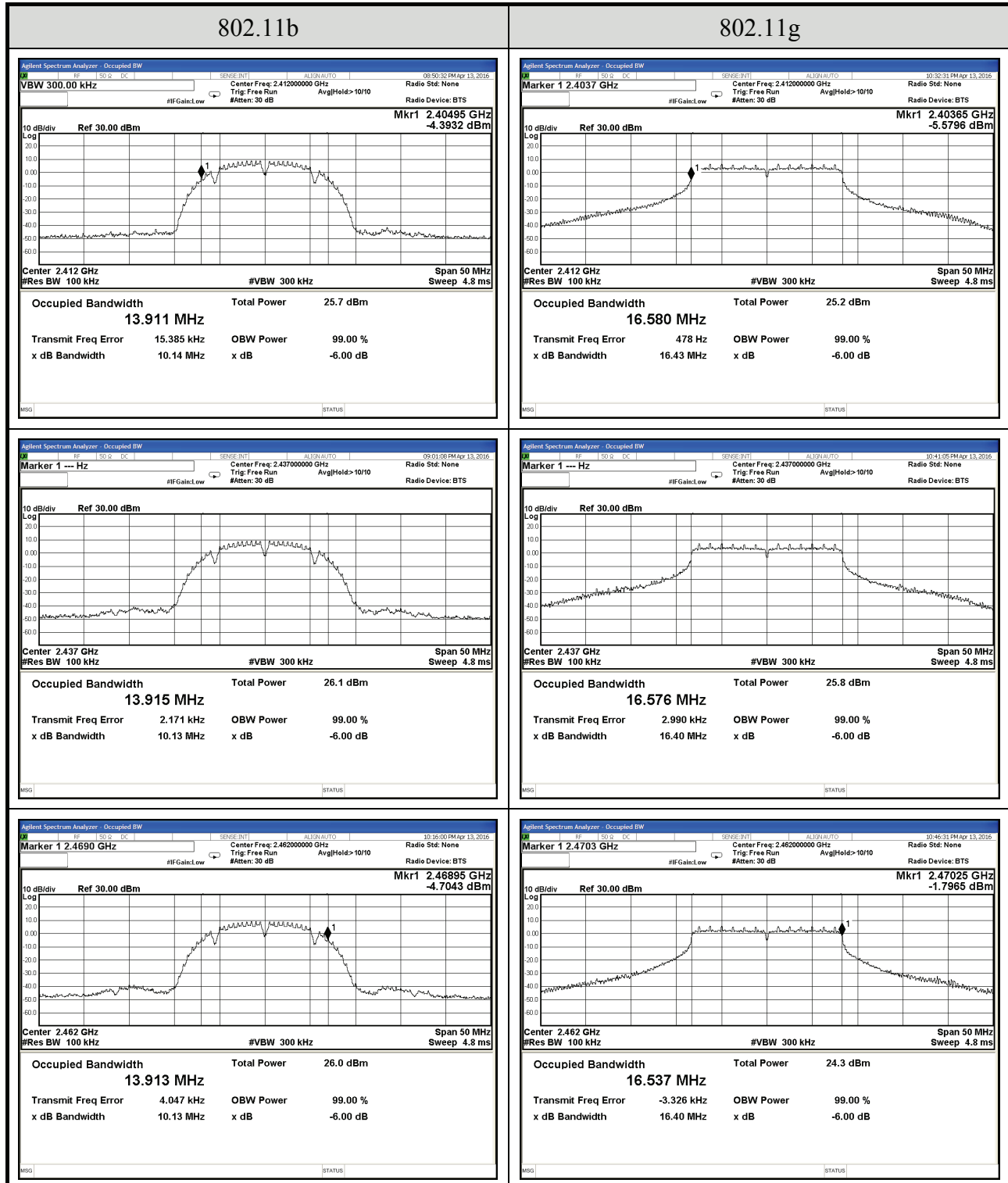
A.1 6dB BANDWIDTH MEASUREMENT

Test Date	2016/04/13	Temp./Hum.	25°C/58%
Cable Loss	---	Test Voltage	DC 3.3V

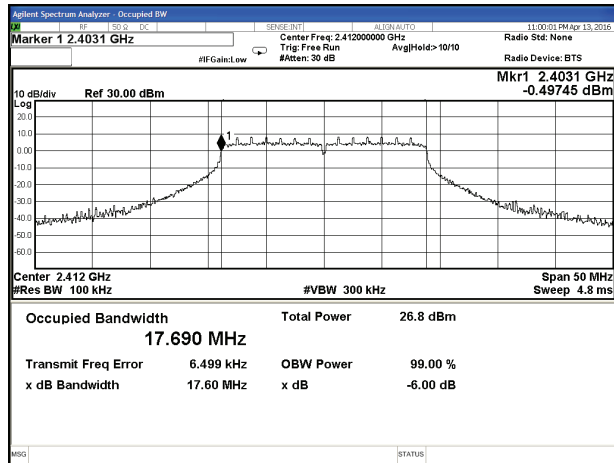
A.1.1 6dB Bandwidth Result

Modulation Type	Centre Frequency (MHz)	6 dB Bandwidth (MHz)	Limit
802.11b	2412	10.14	>500kHz
	2437	10.13	
	2462	10.13	
802.11g	2412	16.43	
	2437	16.40	
	2462	16.40	
802.11n-HT20	2412	17.60	
	2437	17.58	
	2462	17.60	
802.11n-HT40	2422	36.50	
	2437	36.48	
	2452	36.47	

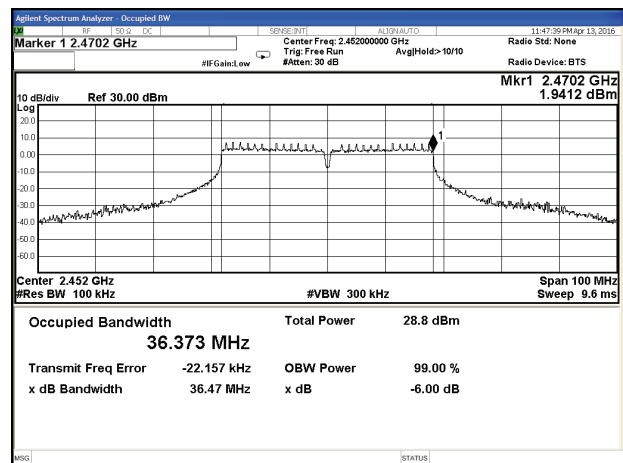
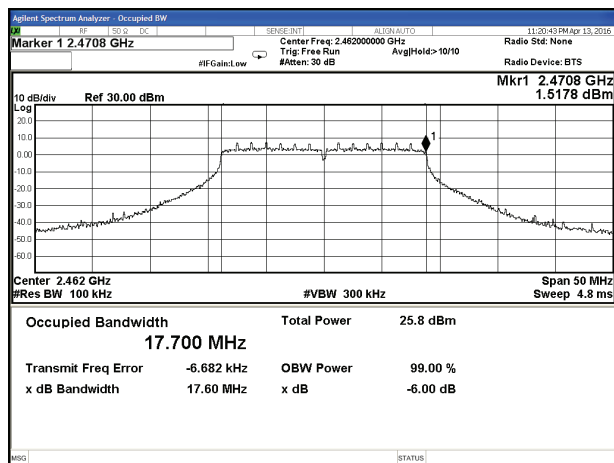
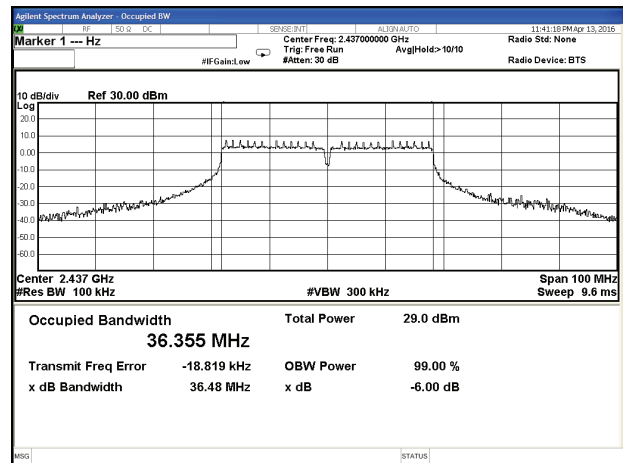
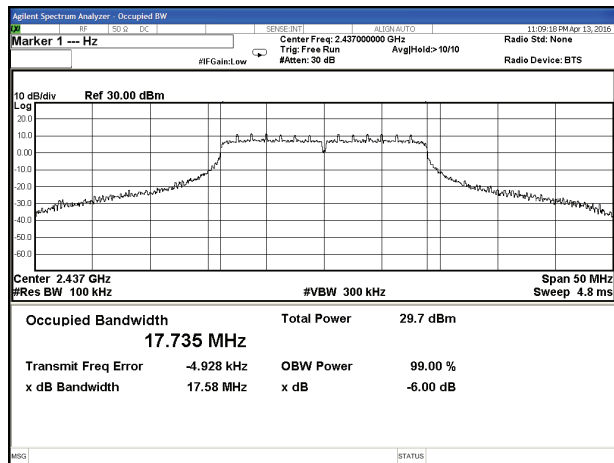
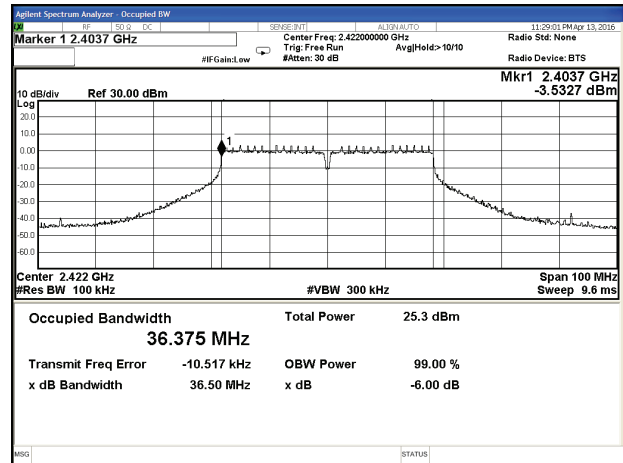
A.1.2 Measurement Plots



802.11n-HT20



802.11n-HT40



A.2 MAXIMUM PEAK OUTPUT POWER MEASUREMENT

Test Date	2016/04/13	Temp./Hum.	25°C/58%
Cable Loss	0.7dB	Test Voltage	DC 3.3V

A.2.1 Peak Output Power

Modulation Type	Centre Frequency (MHz)	Output Power (dBm)			Total Peak Output Power		Limit
		Chain 0	Chain 1	Chain 2	(dBm)	(W)	
802.11b	2412	21.32	--	--	21.32	0.136	< 30dBm (1W)
	2437	21.56	--	--	21.56	0.143	
	2462	21.03	--	--	21.03	0.127	
802.11g	2412	24.46	--	--	24.46	0.279	
	2437	26.13	--	--	26.13	0.410	
	2462	25.56	--	--	25.56	0.360	
802.11n-HT20	2412	23.60	23.36	23.21	28.16	0.655	< 28.23dBm Note 2
	2437	23.14	23.62	23.46	28.18	0.658	
	2462	23.52	23.11	22.51	27.84	0.608	
802.11n-HT40	2422	21.83	22.47	22.32	26.99	0.500	
	2437	23.51	23.27	23.47	28.19	0.659	
	2452	21.21	20.42	21.14	25.71	0.372	

Note 1: The results have been included cable loss.

Note 2: 802.11n Directional gain is 7.77dBi > 6dBi, the limit is $30 - (7.77-6) = 28.23\text{dBm}$

A.2.2 Average Output Power (Reporting only)

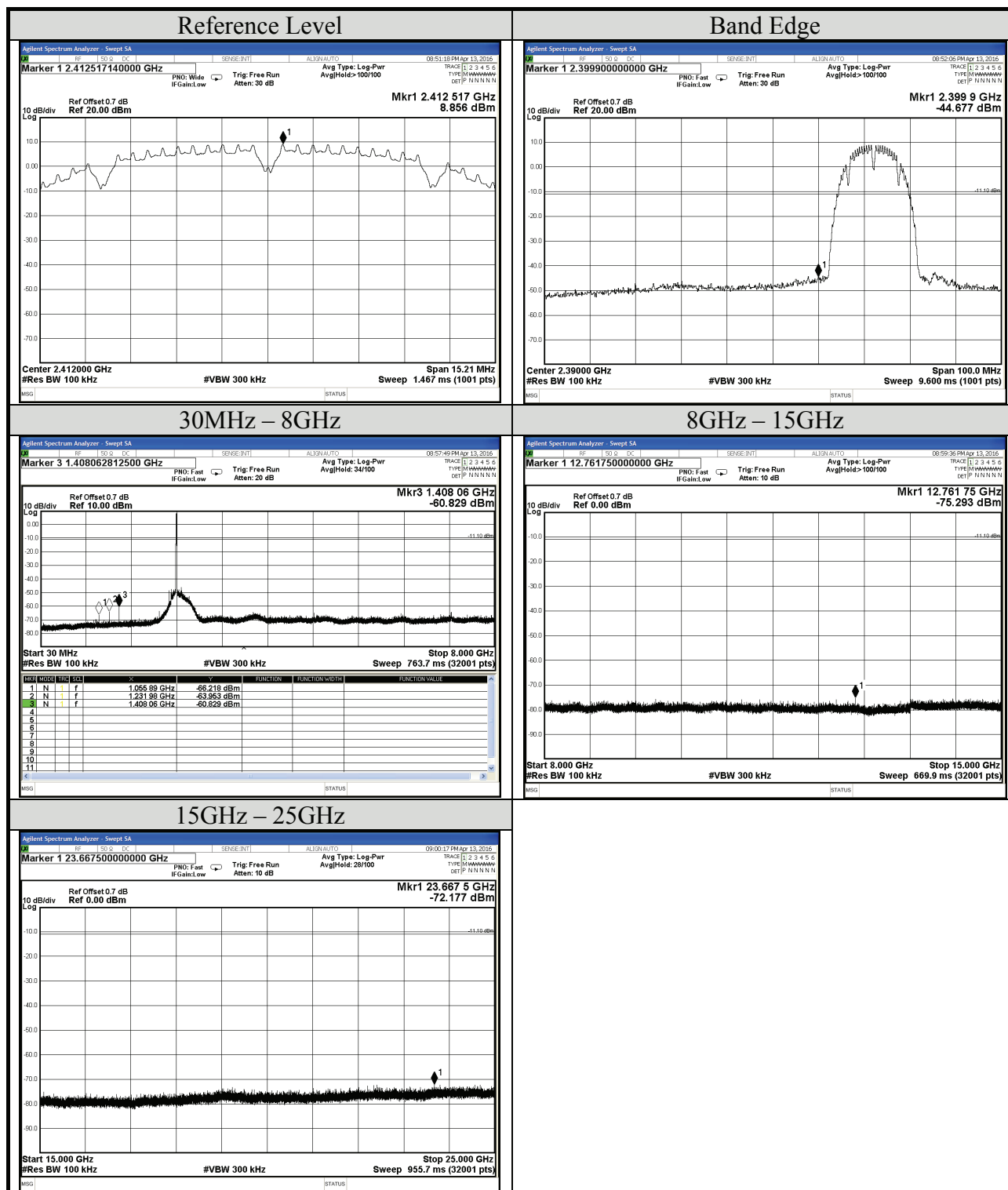
Modulation Type	Centre Frequency (MHz)	Output Power (dBm)			10log (1/X)	Total Average Output Power		Limit
		Chain 0	Chain 1	Chain 2		(dBm)	(W)	
802.11b	2412	18.54	--	--	0.04	18.58	0.072	< 30dBm (1W)
	2437	18.76	--	--		18.80	0.076	
	2462	18.53	--	--		18.57	0.072	
802.11g	2412	15.56	--	--	0.22	15.78	0.038	
	2437	18.34	--	--		18.56	0.072	
	2462	16.79	--	--		17.01	0.050	
802.11n-HT20	2412	13.02	12.53	12.50	0.51	17.97	0.063	< 28.23dBm Note 2
	2437	12.87	13.02	13.01		18.24	0.067	
	2462	13.08	13.14	11.90		18.02	0.063	
802.11n-HT40	2422	10.46	11.31	11.19	0.76	16.53	0.045	
	2437	12.89	13.13	13.80		18.82	0.076	
	2452	9.80	9.30	10.02		15.25	0.033	

Note 1: The results have been included cable loss.

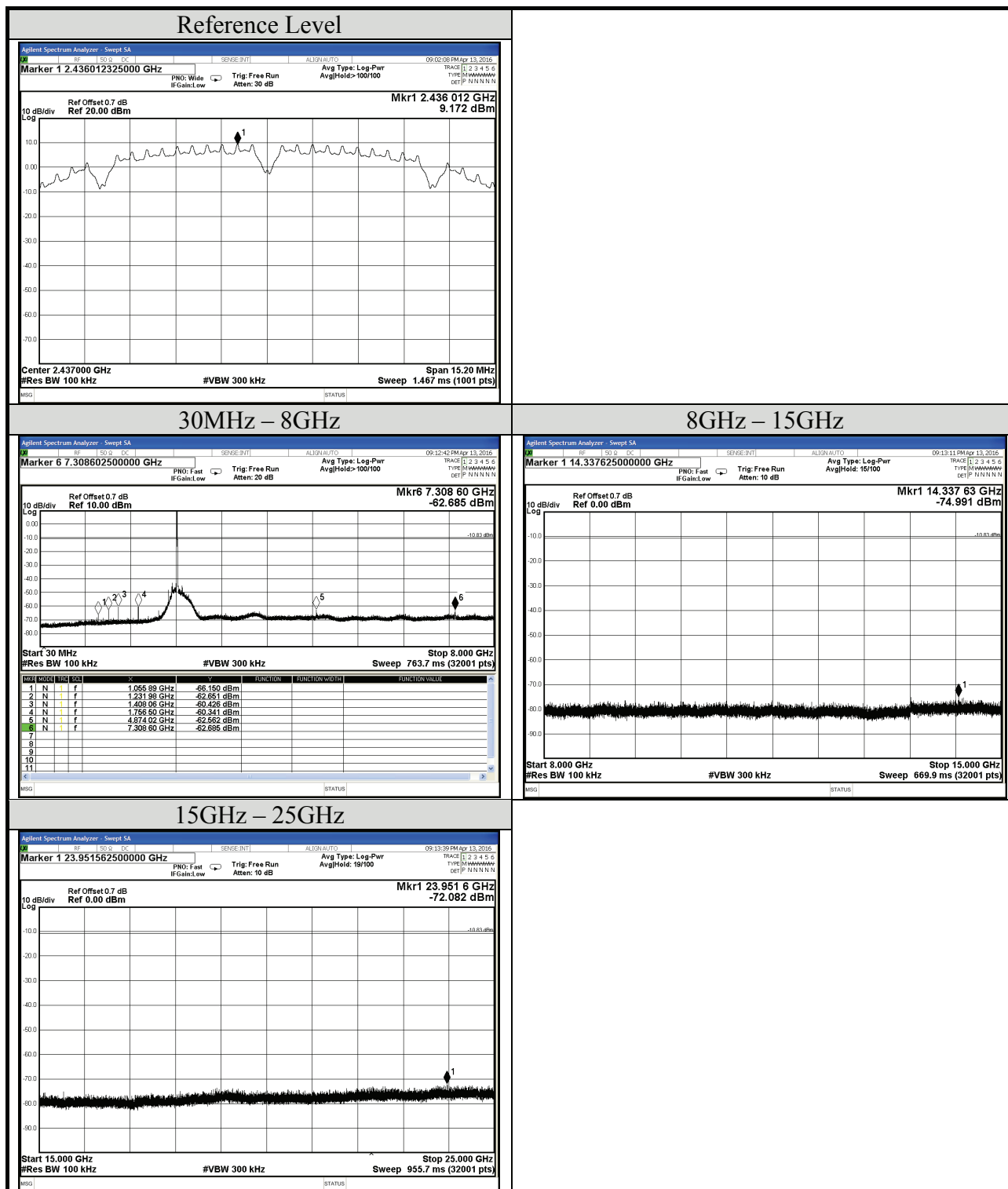
Note 2: 802.11n Directional gain is 7.77dBi > 6dBi, the limit is $30 - (7.77-6) = 28.23\text{dBm}$

A.3 EMISSION LIMITATIONS MEASUREMENT

Test Date	2016/04/13	Temp./Hum.	25°C/58%
Cable Loss	0.7dB	Test Voltage	DC 3.3V
Mode	802.11b	Frequency	TX 2412MHz
Simultaneous Factor10 log(n) (Note: "n" is antenna number)			N/A



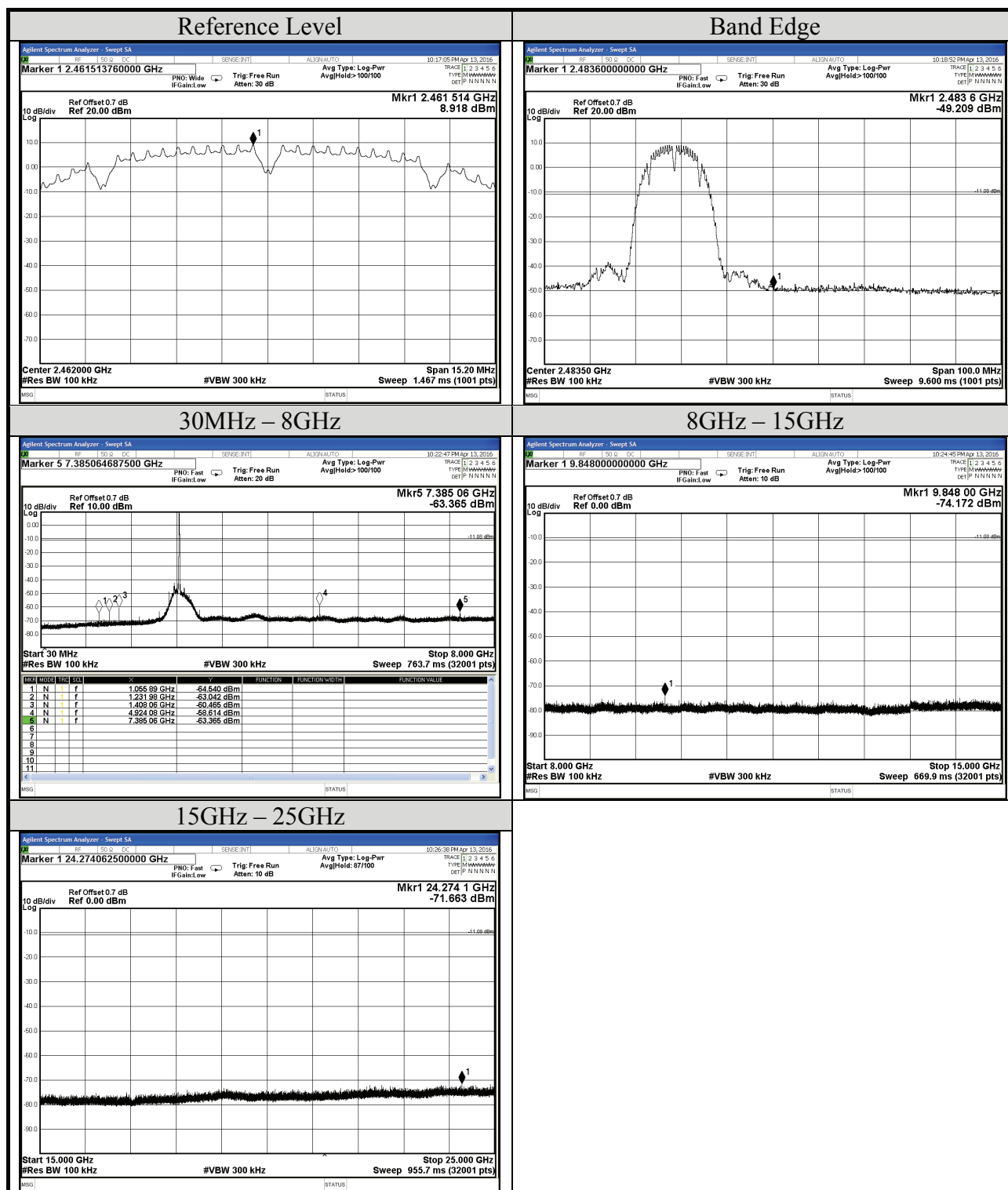
Test Date	2016/04/13	Temp./Hum.	25°C/58%
Cable Loss	0.7dB	Test Voltage	DC 3.3V
Mode	802.11b	Frequency	TX 2437MHz
Simultaneous Factor	10 log(n) (Note: "n" is antenna number)		N/A



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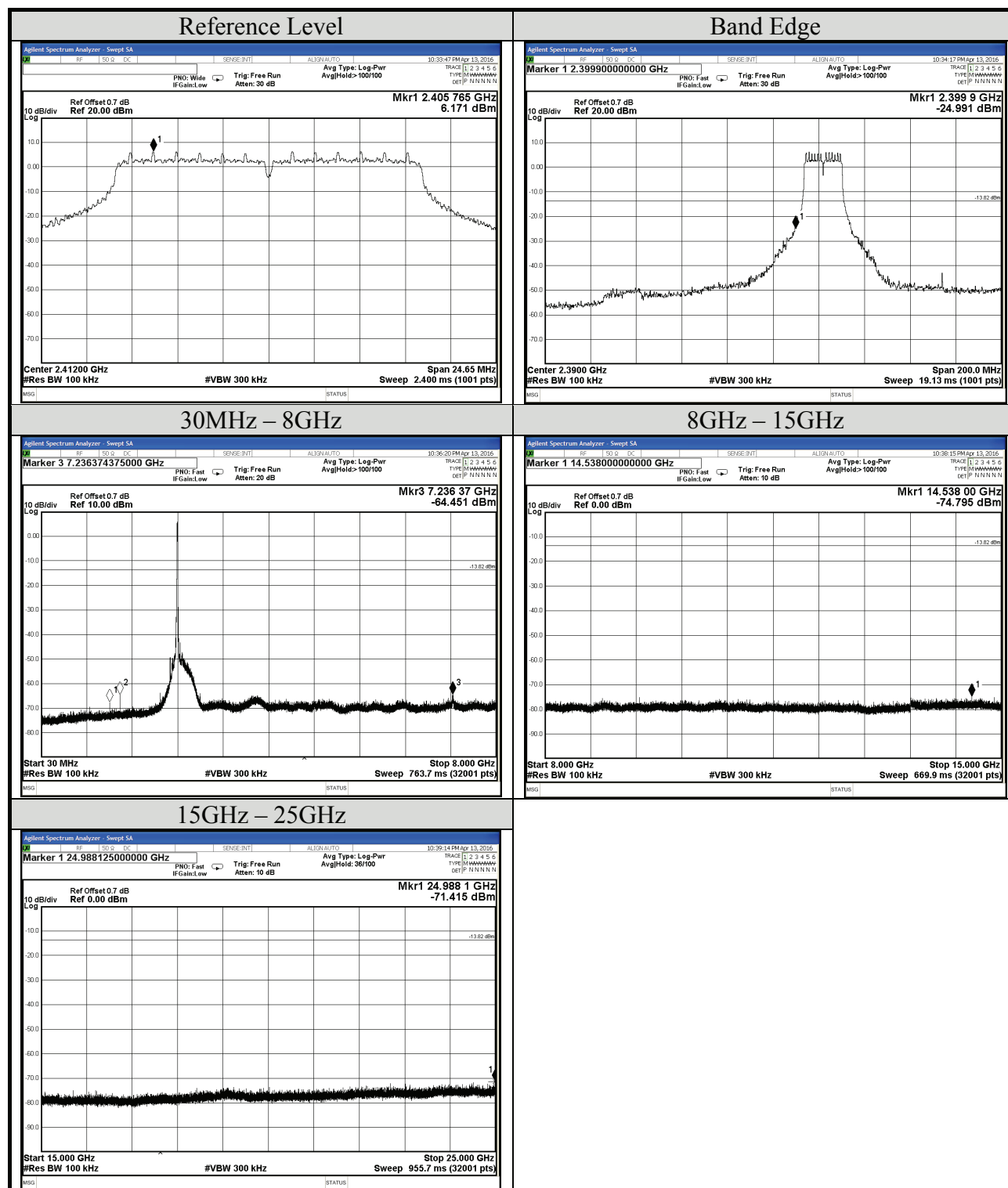
Test Date	2016/04/13	Temp./Hum.	25°C/58%
Cable Loss	0.7dB	Test Voltage	DC 3.3V
Mode	802.11b	Frequency	TX 2462MHz
Simultaneous Factor	10 log(n) (Note: "n" is antenna number)		N/A



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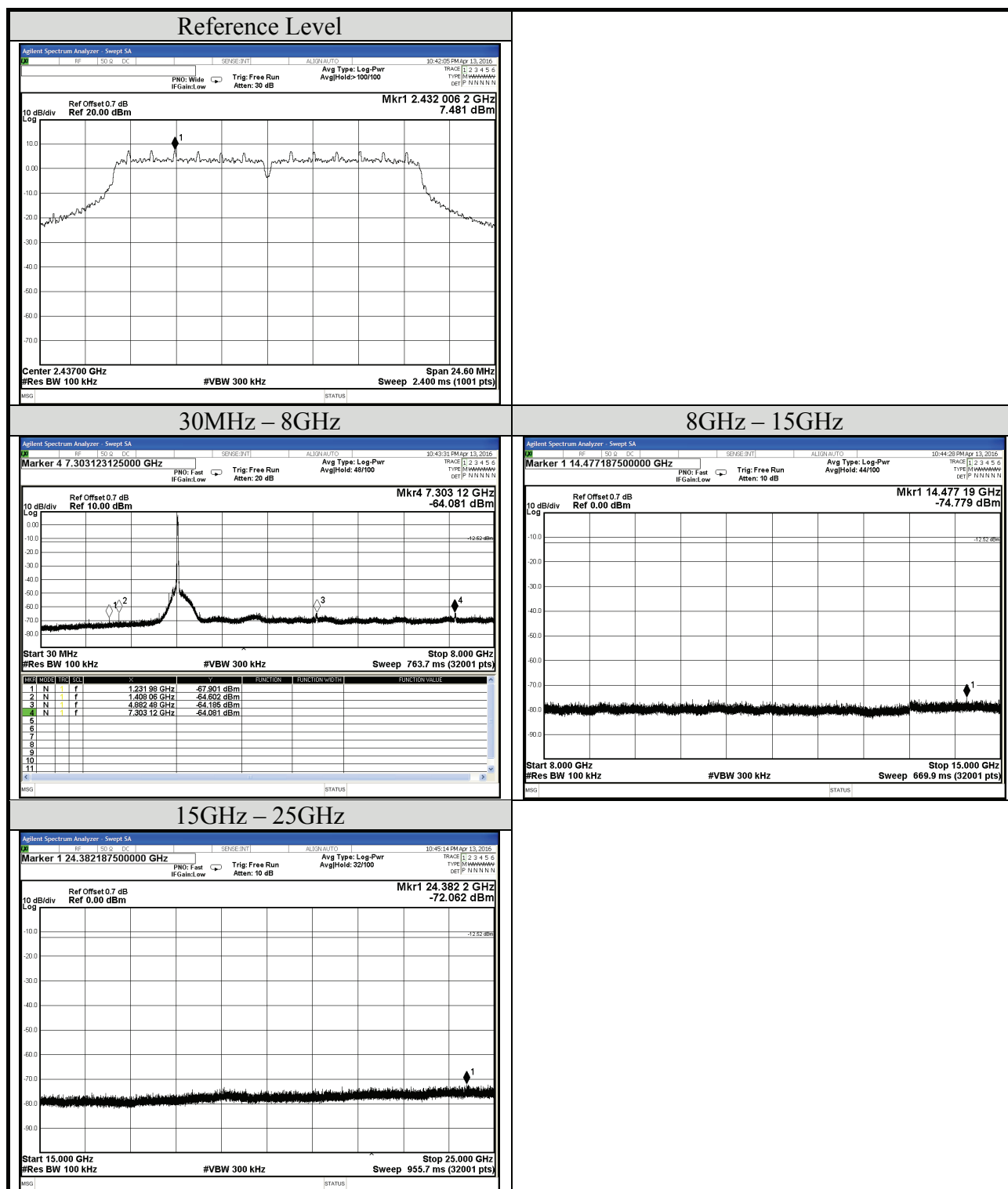
Test Date	2016/04/13	Temp./Hum.	25°C/58%
Cable Loss	0.7dB	Test Voltage	DC 3.3V
Mode	802.11g	Frequency	TX 2412MHz
Simultaneous Factor	10 log(n) (Note: "n" is antenna number)		N/A



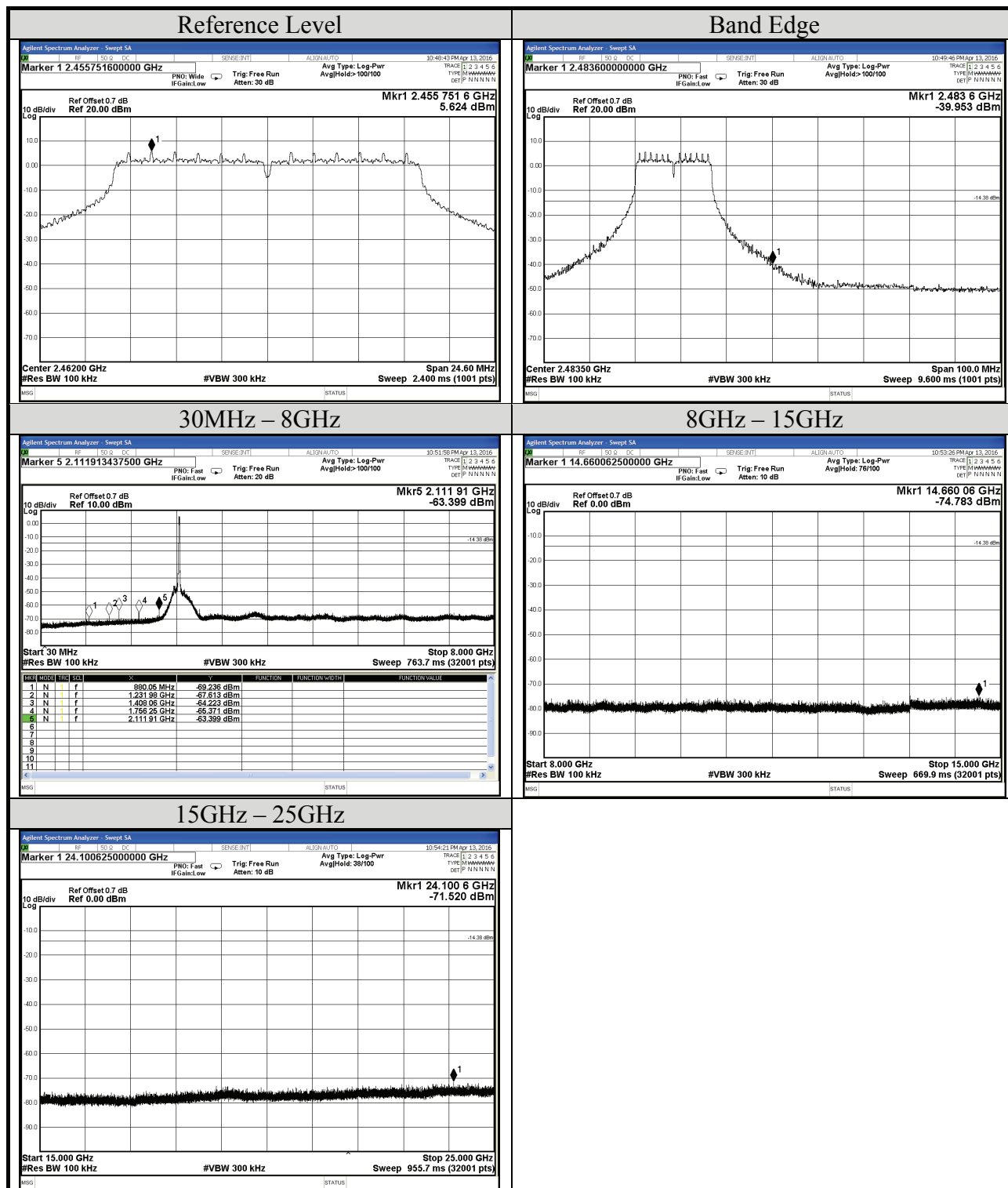
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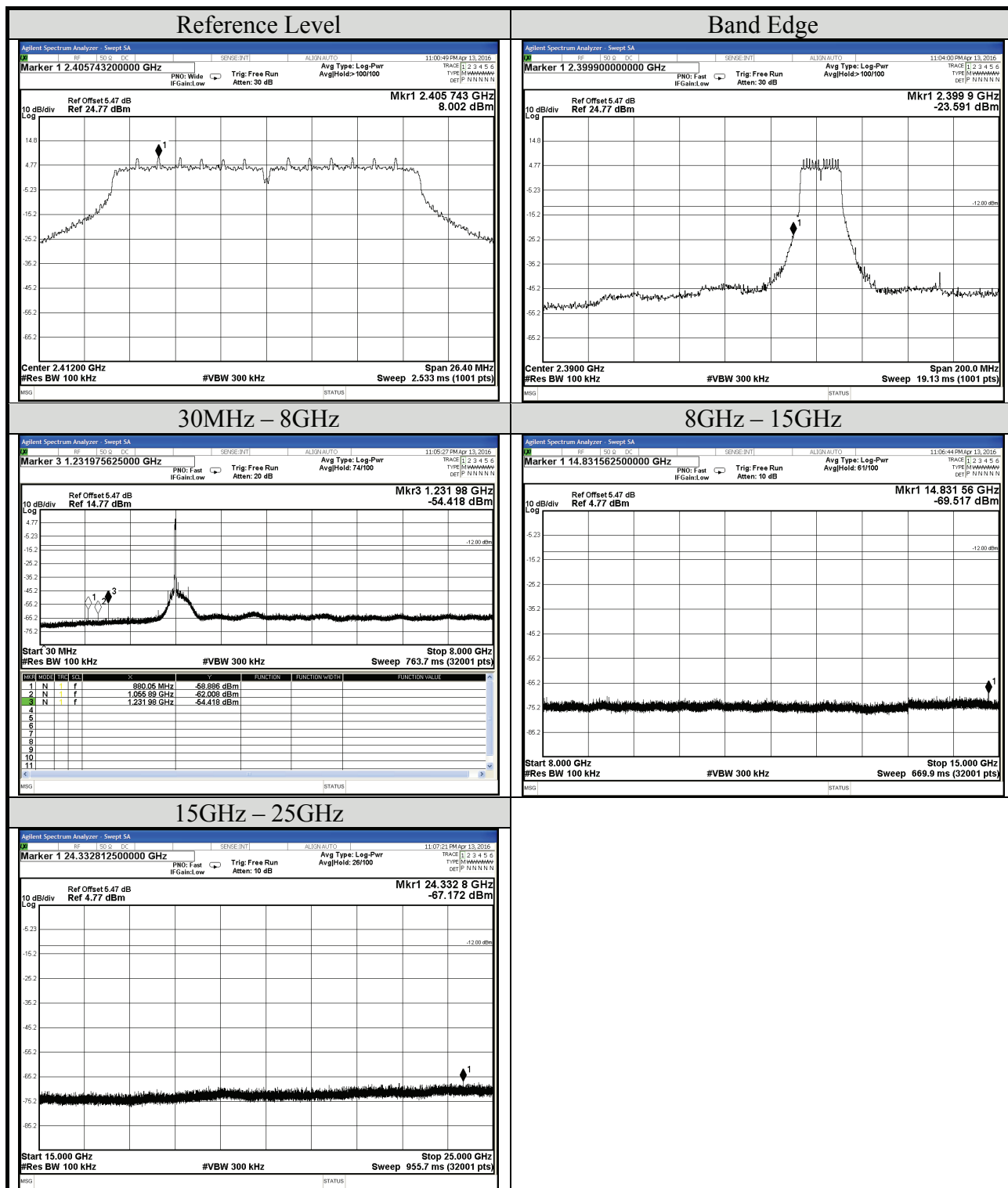
Test Date	2016/04/13	Temp./Hum.	25°C/58%
Cable Loss	0.7dB	Test Voltage	DC 3.3V
Mode	802.11g	Frequency	TX 2437MHz
Simultaneous Factor	10 log(n) (Note: "n" is antenna number)		N/A



Test Date	2016/04/13	Temp./Hum.	25°C/58%
Cable Loss	0.7dB	Test Voltage	DC 3.3V
Mode	802.11g	Frequency	TX 2462MHz
Simultaneous Factor	10 log(n) (Note: "n" is antenna number)		N/A



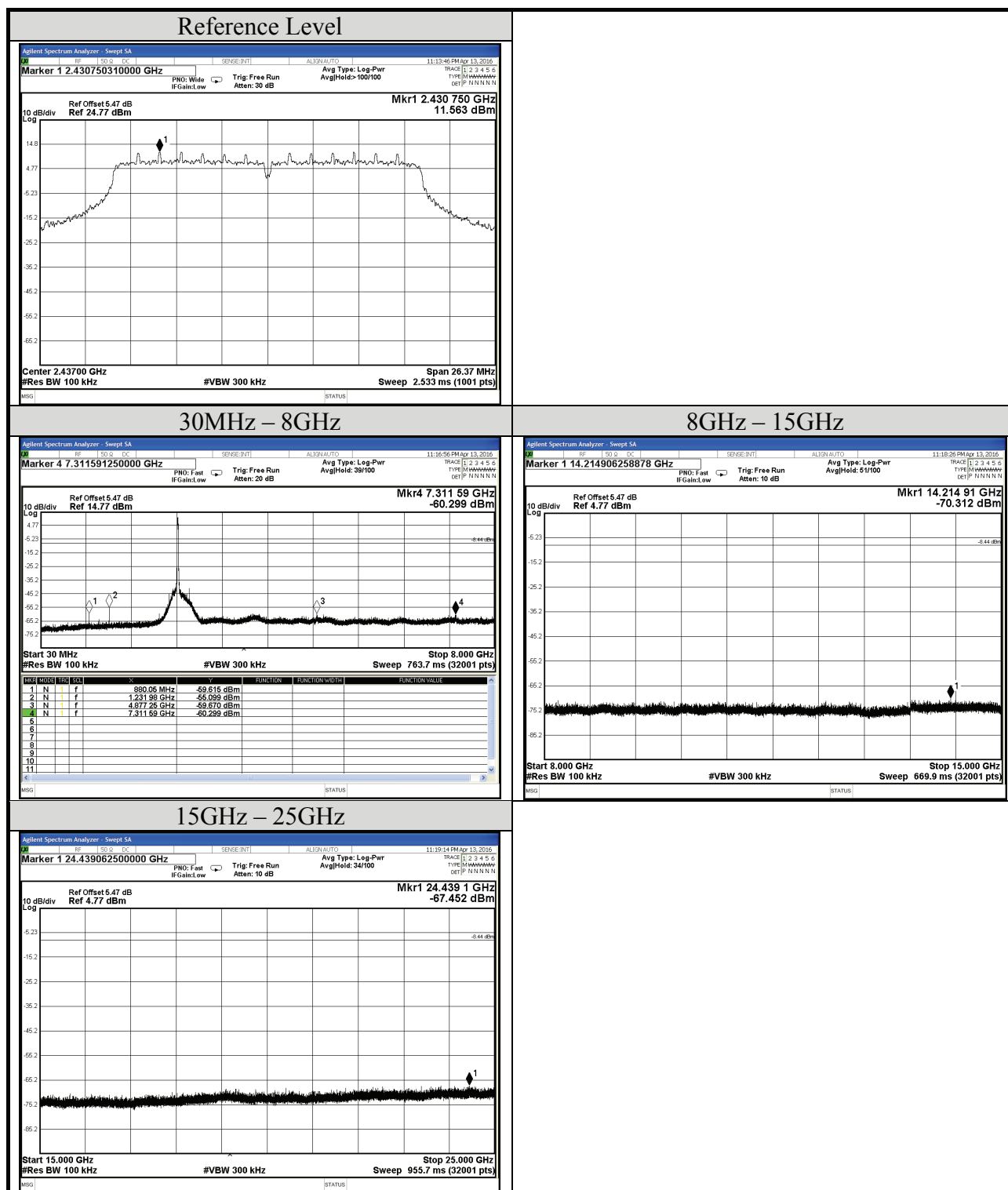
Test Date	2016/04/13	Temp./Hum.	25°C/58%
Cable Loss	0.7dB	Test Voltage	DC 3.3V
Mode	802.11n-HT20	Frequency	TX 2412MHz
Simultaneous Factor	10 log(n) (Note: "n" is antenna number)		4.77



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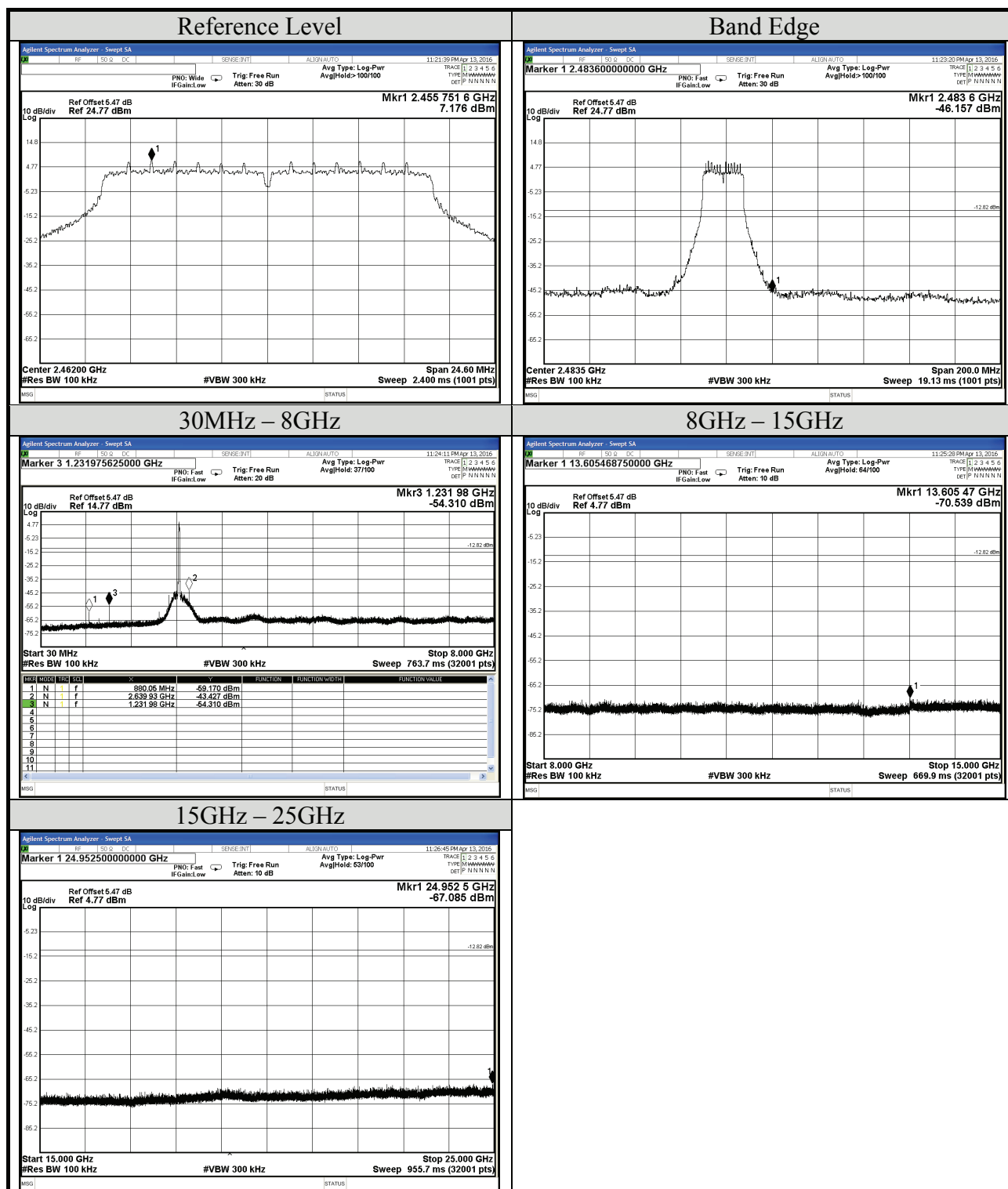
Test Date	2016/04/13	Temp./Hum.	25°C/58%
Cable Loss	0.7dB	Test Voltage	DC 3.3V
Mode	802.11n-HT20	Frequency	TX 2437MHz
Simultaneous Factor	10 log(n) (Note: "n" is antenna number)		4.77



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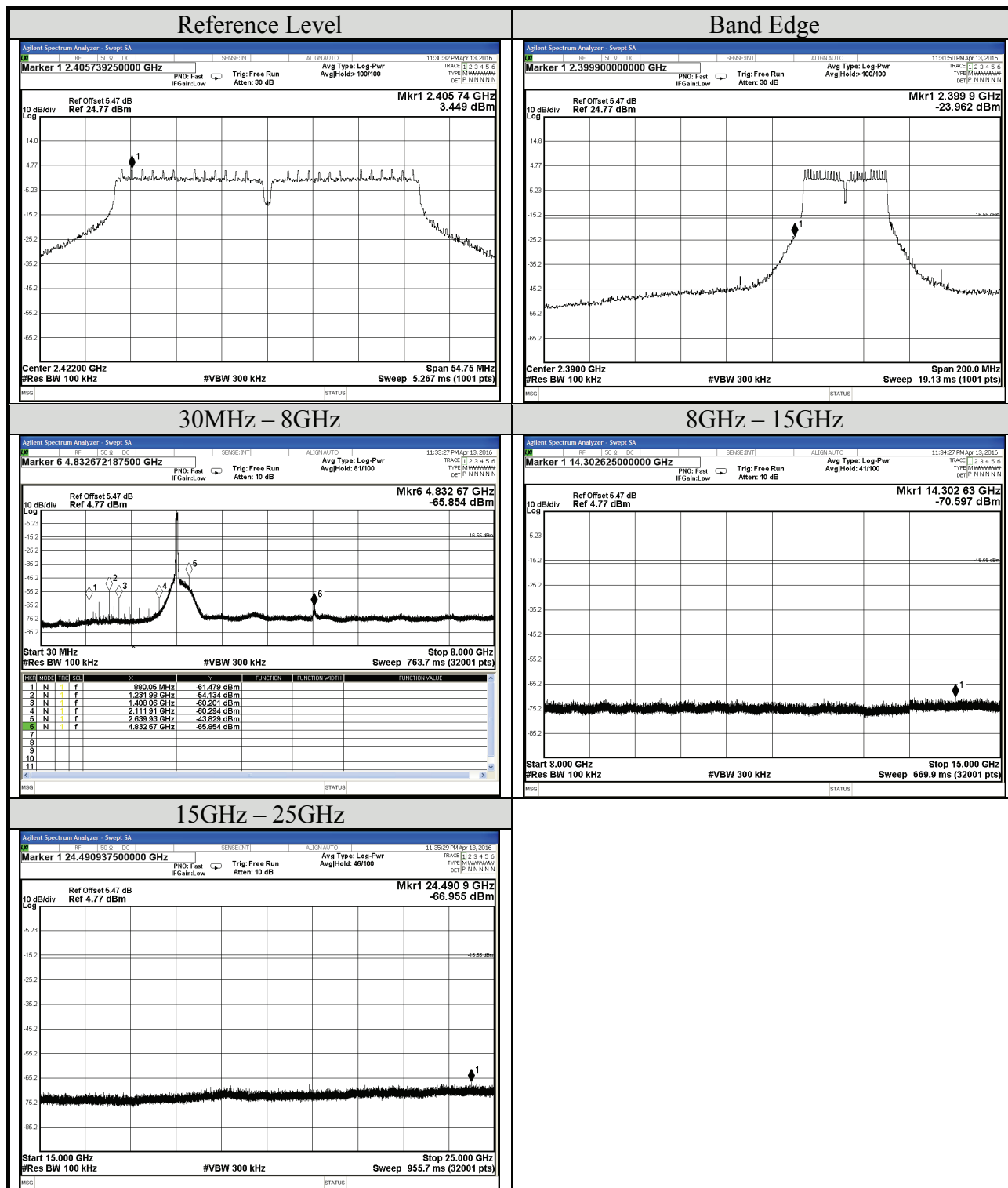
Test Date	2016/04/13	Temp./Hum.	25°C/58%
Cable Loss	0.7dB	Test Voltage	DC 3.3V
Mode	802.11n-HT20	Frequency	TX 2462MHz
Simultaneous Factor	10 log(n) (Note: "n" is antenna number)		4.77



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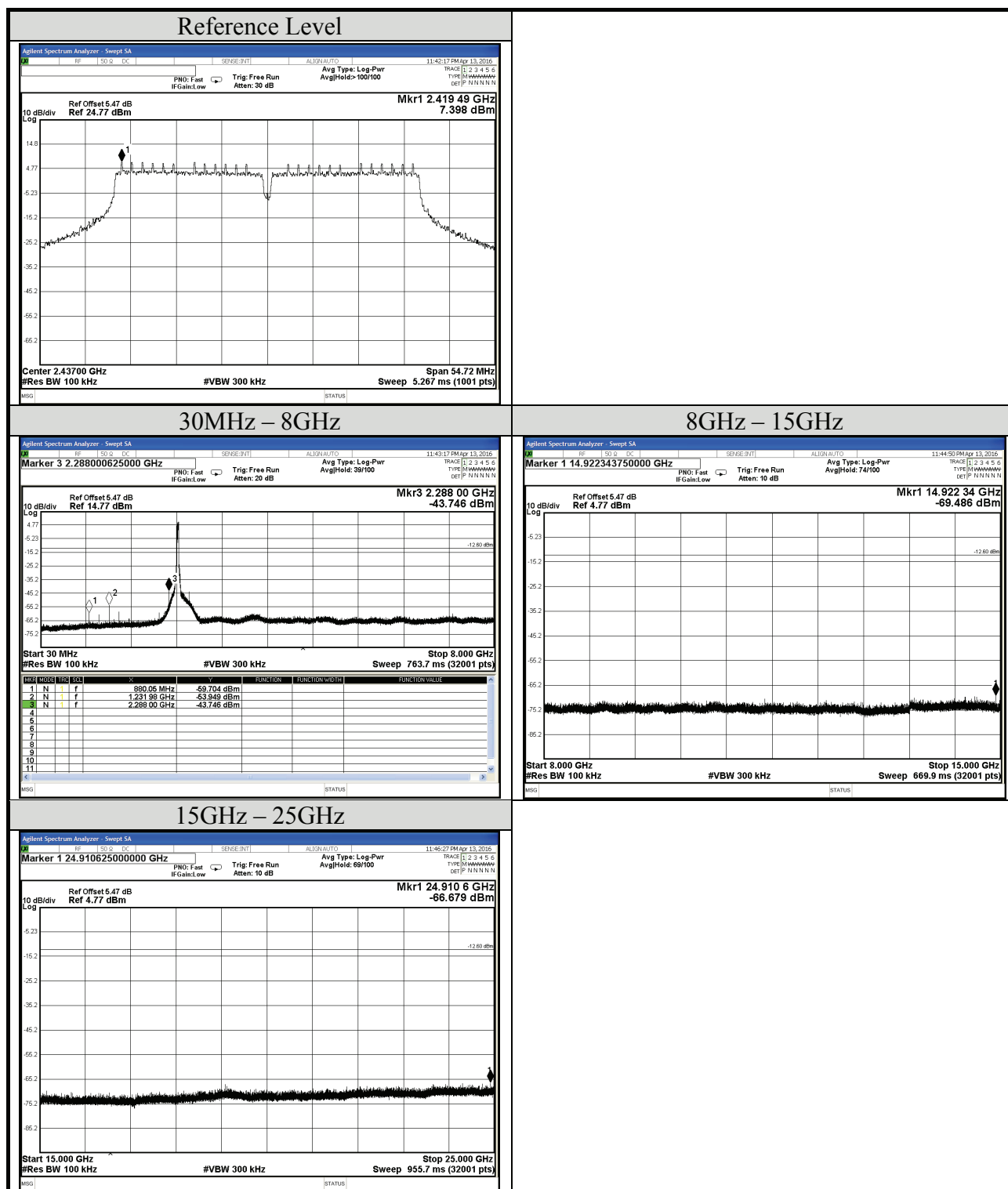
Test Date	2016/04/13	Temp./Hum.	25°C/58%
Cable Loss	0.7dB	Test Voltage	DC 3.3V
Mode	802.11n-HT40	Frequency	TX 2422MHz
Simultaneous Factor	10 log(n) (Note: "n" is antenna number)		4.77



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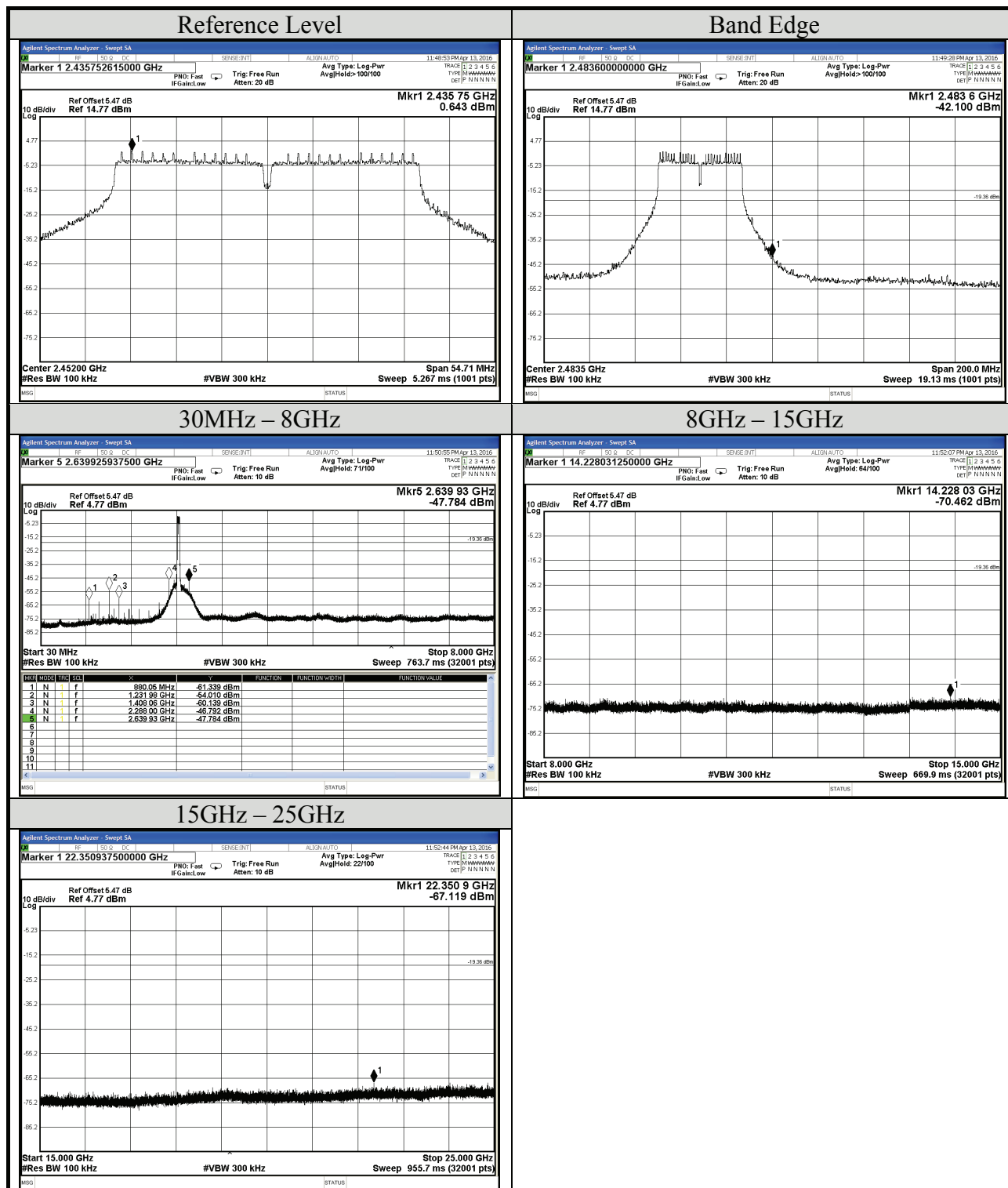
Test Date	2016/04/13	Temp./Hum.	25°C/58%
Cable Loss	0.7dB	Test Voltage	DC 3.3V
Mode	802.11n-HT40	Frequency	TX 2437MHz
Simultaneous Factor	10 log(n) (Note: "n" is antenna number)		4.77



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Test Date	2016/04/13	Temp./Hum.	25°C/58%
Cable Loss	0.7dB	Test Voltage	DC 3.3V
Mode	802.11n-HT40	Frequency	TX 2452MHz
Simultaneous Factor	10 log(n) (Note: "n" is antenna number)		4.77



A.4 POWER SPECTRAL DENSITY

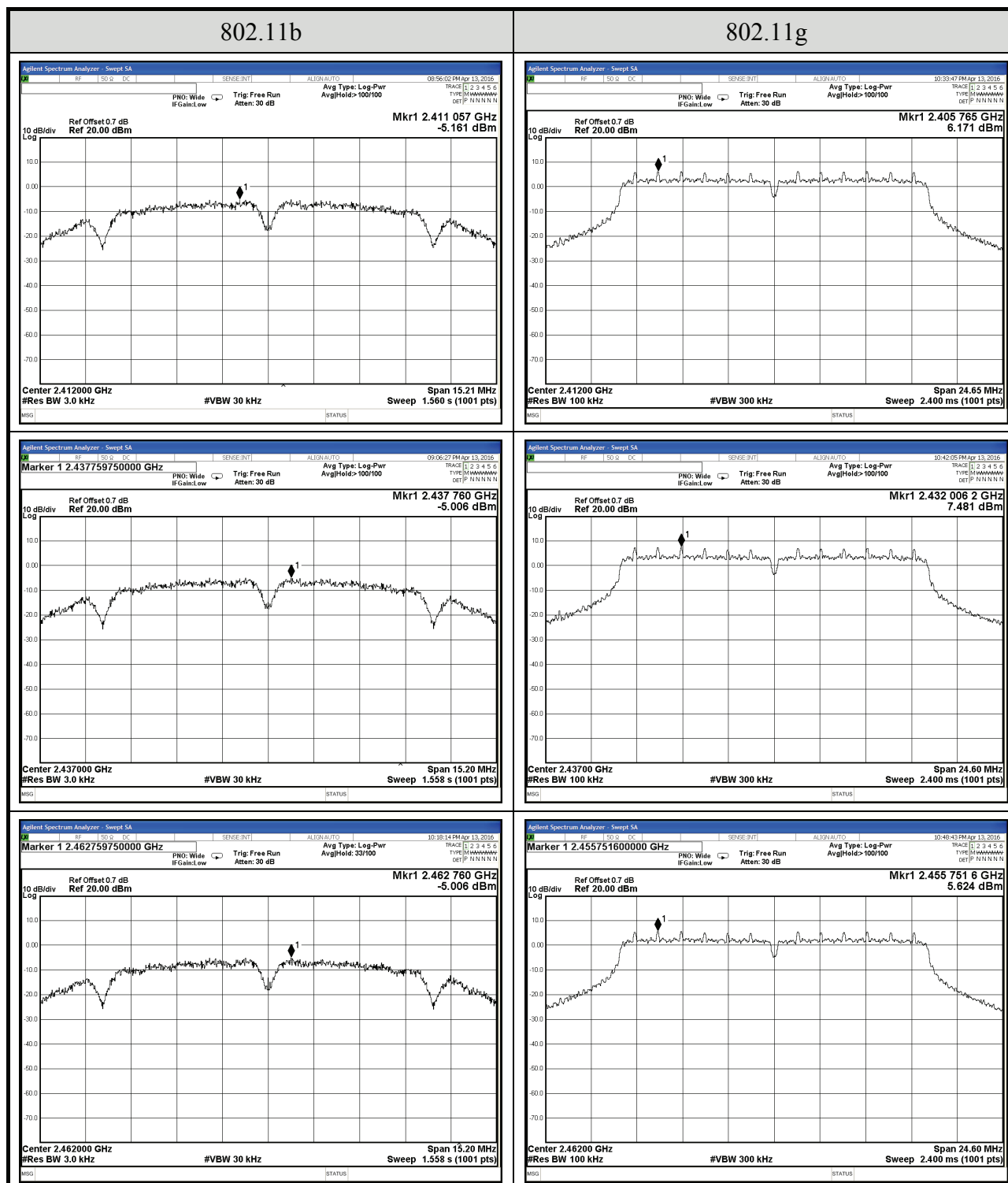
Test Date	2016/04/13	Temp./Hum.	25°C/58%
Cable Loss	0.7dB	Test Voltage	DC 3.3V
Simultaneous Factor 10 log(n) (Note: "n" is antenna number)			4.77

A.4.1 Power Spectral Density Result

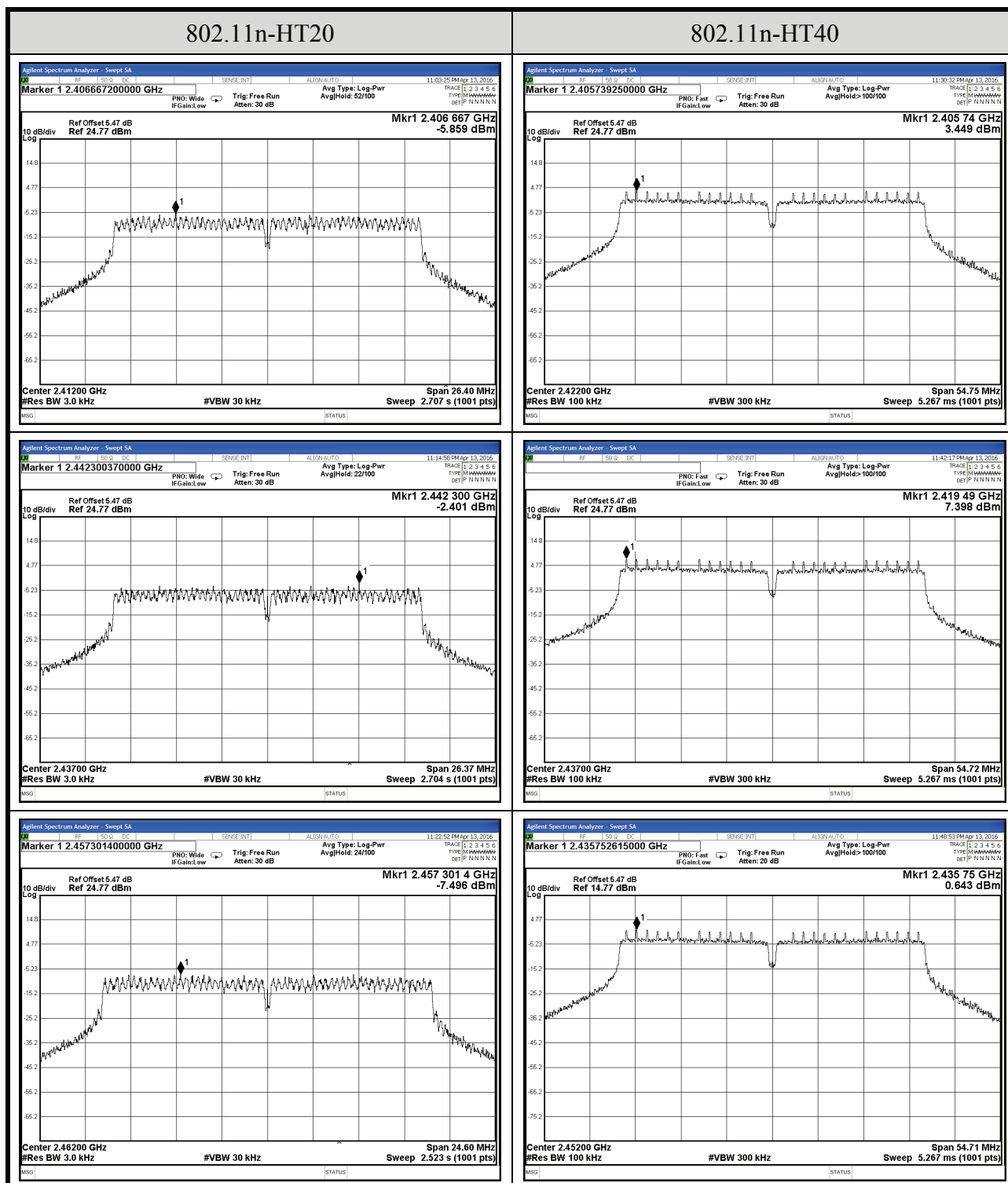
Modulation Type	Centre Frequency (MHz)	Power Spectral Density (dBm)	Limit
802.11b	2412	-5.161	< 8 dBm/3kHz
	2437	-5.006	
	2462	-5.006	
802.11g	2412	6.171	
	2437	7.481	
	2462	5.624	
802.11n-HT20 ^{Note}	2412	-5.859	
	2437	-2.401	
	2462	-7.496	
802.11n-HT40 ^{Note}	2422	3.449	
	2437	7.398	
	2452	0.643	

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.