

FCC 15.407 NII& RSS-247 5 GHz WLAN Report

for

LG Electronics Inc.

**222 LG-ro Jinwi-myeon 451-713
Pyeongtaek-si, Gyeonggi-do 451-713, Korea**

Brand	: GM
Product Name	: Silver box RADIO ASM-RECEIVER
Model Name	: LC10S-B
FCC ID	: BEJLC10SB
IC	: 2703H-LC10SB

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TEST REPORT CERTIFICATION

Applicant : LG Electronics Inc.
Manufacture : LG Electronics Inc.
Factory : LG ELECTRONICS VIETNAM HAI PHONG CO., LTD.
Product Name : Silver box RADIO ASM-RECEIVER
Model No. : LC10S-B
Serial No. : N/A
Brand : GM

Applicable Standards:

FCC Rules and Regulations Part 15 Subpart C, Oct. 2014
RSS-Gen (Issue 4), November 2014
RSS-247 (Issue 1), May 2015
ANSI C63.10:2013
KDB 789033 D02 General NII Test Procedures New Rules V01

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. 01. 12

Date of Report: 2016. 01. 20

Producer: 
(Annie Yu/Administrator)

Signatory: 
(Ben Cheng/Manager)

1. REPORT HISTORY

Revision	Date	Revision Summary	Report Number
0	2016. 01. 20	Original Report.	EM-F160036

2. SUMMARY OF TEST RESULTS

Rule		Description	Results
FCC	IC		
15.207	RSS-Gen §8.8	Conducted Emission	N/A, Note
15.247(d)/ 15.205	RSS-Gen §8.9 RSS-247 §5.5	Radiated Band Edge and Radiated Spurious Emission	PASS
15.407(a)(5)/ 15.407(e)	RSS-247 §5.2(1)	Emission Bandwidth Measurement	PASS
15.407(a)	RSS-247 §5.4(4)	Maximum Output	PASS
15.407(b)	RSS-247 §5.5	Conducted Band Edges and Conducted Spurious Emission	PASS
15.407(a)	RSS-247 §5.2(2)	Power Spectral Density	PASS
15.203	---	Antenna Requirement	PASS
Note: Due to update the standard, so it is unnecessary to re-test.			

3. GENERAL INFORMATION

3.1. Description of EUT

Product	Silver box RADIO ASM-RECEIVER						
Model Number	LC10S-B						
Serial Number	N/A						
Brand Name	GM						
Applicant	LG Electronics Inc. 222 LG-ro Jinwi-myeon 451-713 Pyeongtaek-si, Gyeonggi-do 451-713, Korea						
Manufacture	LG Electronics Inc. 222 LG-ro Jinwi-myeon 451-713 Pyeongtaek-si, Gyeonggi-do 451-713, Korea						
Factory	LG ELECTRONICS VIETNAM HAI PHONG CO., LTD. Lots CN2 and CN3, Trang Due Industrial Zone, An Duong District, within Dinh Vu - Cat Hai Economic Zone, Hai Phong City, Vietnam.						
RF Features	WLAN: 802.11a/b/g/n Bluetooth: BT 3.0+EDR						
Transmit Type	<table><thead><tr><th colspan="2">UNII Bands</th></tr></thead><tbody><tr><td>802.11a</td><td>1T1R</td></tr><tr><td>802.11n-HT20</td><td>1T1R</td></tr></tbody></table>	UNII Bands		802.11a	1T1R	802.11n-HT20	1T1R
UNII Bands							
802.11a	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. 01. 06						

3.2. EUT Specifications Assessed in Current Report

Mode	UNII Band	Fundamental Range (MHz)	Channel Number	Modulation	Data Rate (Mbps)
802.11a	I	5180-5240	4	OFDM Modulation (BPSK/QPSK/16QAM/64QAM)	6/9/12/18/24/36/48/54
	III	5745-5825	5		
802.11n-HT20	I	5180-5240	4	OFDM Modulation (BPSK/QPSK/16QAM/64QAM)	6.5/13/19.5/26/39/52/58.5/65
	III	5745-5825	5		
Remark: UNII Band II (DFS Function, Slave/no In service monitor, no Ad-Hoc mode)					

Channel List					
802.11a/n-HT20					
UNII Band	Channel Number	Frequency (MHz)	UNII Band	Channel Number	Frequency (MHz)
I	36	5180	III	149	5745
	40	5200		153	5765
	44	5220		157	5785
	48	5240		161	5805
				165	5825

Note 1: 802.11ac has similar modulation to 802.11n at 20 MHz and 40 MHz bandwidths, we assess the worst case to be the representative mode in this report.

2: Test modes are presented at section 3.5.

3.3. Antenna Information

Antenna Part Number	Manufacture	Antenna Type	Frequency	Max Gain (dBi)
AMAN1003030L G02	Amotech CO.LTD	Dielectric Chip Antenna	2.4GHz (WLAN & BT)	2.9
			5GHz (WLAN)	UNII Band I: 3.6 UNII Band III: 2.9

3.4. Data Rate Relative to Output Power

802.11a				802.11n-HT20			
Channel	Modulation	Date Rate	Power (dBm)	Channel	Modulation	Date Rate	Power (dBm)
48	BPSK	6	19.68	48	BPSK	MCS0	19.60
48	QPSK	9	19.37	48	QPSK	MCS1	19.44
48	QPSK	12	19.24	48	QPSK	MCS2	19.37
48	16-QAM	18	19.59	48	16-QAM	MCS3	19.15
48	16-QAM	24	18.97	48	16-QAM	MCS4	19.52
48	64-QAM	36	19.60	48	64-QAM	MCS5	19.28
48	64-QAM	48	19.13	48	64-QAM	MCS6	19.02
48	64-QAM	54	19.06	48	64-QAM	MCS7	18.99

Note: Above results are assessed in average power.

3.5. Test Configuration

Mode	Duty Cycle (x)	T (ms)	Duty Cycle Factor (dB)
802.11a	0.9447	2.05	0.25
802.11n-HT20	0.9400	1.90	0.27

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.

Item		Mode	Data Rate	Test Channel
Radiated Test Case	Radiated Band Edge ^{Note1}	802.11a	6 Mbps	36/149/165
		802.11n-HT20	MCS0	36/149/165
	Radiated Spurious Emission ^{Note1 & 2}	802.11a	6 Mbps	36/40/48/
		802.11n-HT20	MCS0	149/157/165
Conducted Test Case	Emission Bandwidth	802.11a	6 Mbps	36/40/48
		802.11n-HT20	MCS0	149/157/165
	Maximum output power	802.11a	6 Mbps	36/40/48
		802.11n-HT20	MCS0	149/157/165
	Emission Limitations	802.11a	6 Mbps	36/40/48
		802.11n-HT20	MCS0	149/157/165
Conducted Test Case	Power spectral density	802.11a	MCS0	36/40/48
		802.11n-HT20	MCS0	149/157/165

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.	Display	LG	LC10S	511194947	N/A
2.	DC Power Supply	TOP WARD	3303A	721773	N/A
3.	DC Power Supply	KIKUSUI	PWR400L	N/A	N/A

3.6.2. Cable Lists

No.	Cable Description Of The Above Support Units
1.	Adapter: DELTA, M/N SADP-65KB B, DC Power Cord: Non-Shielded, Detachable, 1.8m AC Power Cord: Non-Shielded, Undetachable, 1.8m
2.	DC Power Cord*2: Unshielded, Detachable, 0.6+0.6m*2
3.	DC Power Cord*2: Unshielded, Detachable, 0.6+0.6m*2

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 installed in EUT 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	:	Semi-Anechoic Chamber No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan Date of Renewal: May 06, 2015 Federal Communication Commission Registration Number: 90993 Fully Semi-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

3.10. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Conduction Test	150kHz~30MHz	±3.5dB
Radiation Test (Distance: 3m)	30MHz~300MHz	± 3.64dB
	300MHz~1000MHz	± 4.70dB
	Above 1GHz	± 1.60dB

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

Test Item	Uncertainty
Emission Bandwidth	± 0.2kHz
Maximum output power	± 0.33dB
Power spectral density	± 0.13dB
Conducted Emission Limitations	± 0.13dB

4. MEASUREMENT EQUIPMENT LIST

4.1. Radiated Emission Measurement

4.1.1. Frequency Range 30MHz~1000MHz

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

4.1.2. Frequency Range Above 1GHz

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	2015. 08. 20	1 Year
2.	Test Receiver	R & S	ESCS30	100338	2015. 06. 24	1 Year
3.	Amplifier	Agilent	8449B	3008A02678	2015. 03. 04	1 Year
4.	5G Notch Filter	Microwave Circuits	N0452502	459775	2015. 01. 29	1 Year
5.	5G Notch Filter	Microwave Circuits	N0257881	459776	2015. 09. 03	1 Year
6.	Horn Antenna	ETS-Lindgren	3117	00135902	2015. 03. 06	1 Year
7.	Horn Antenna	EMCO	3116	2653	2015. 10. 20	1 Year

4.2. RF Conducted Measurement

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

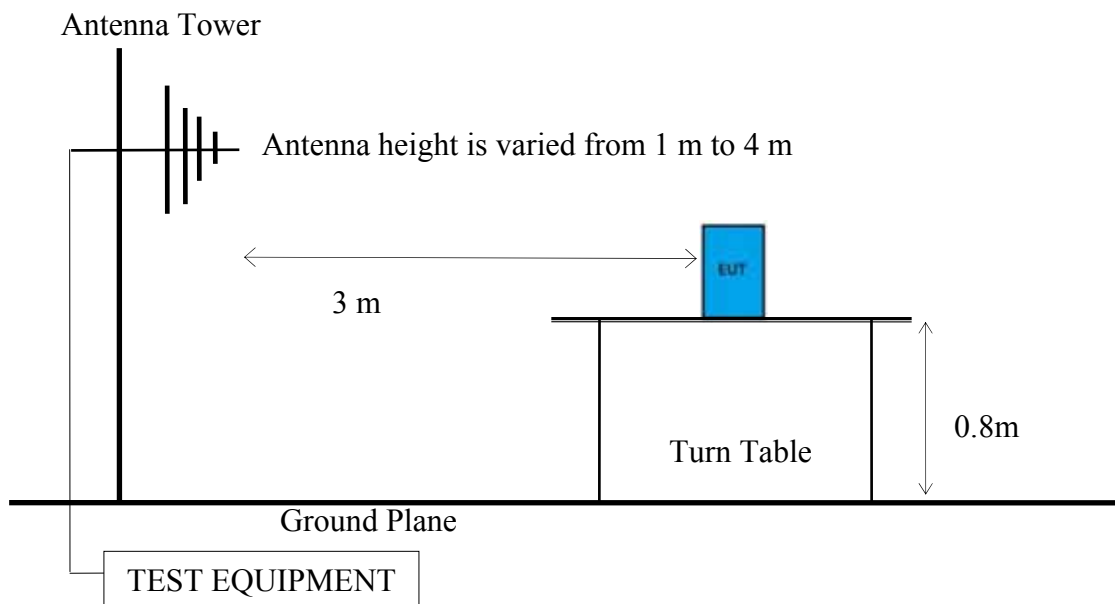
5. RADIATED EMISSION MEASUREMENT

5.1. Block Diagram of Test Setup

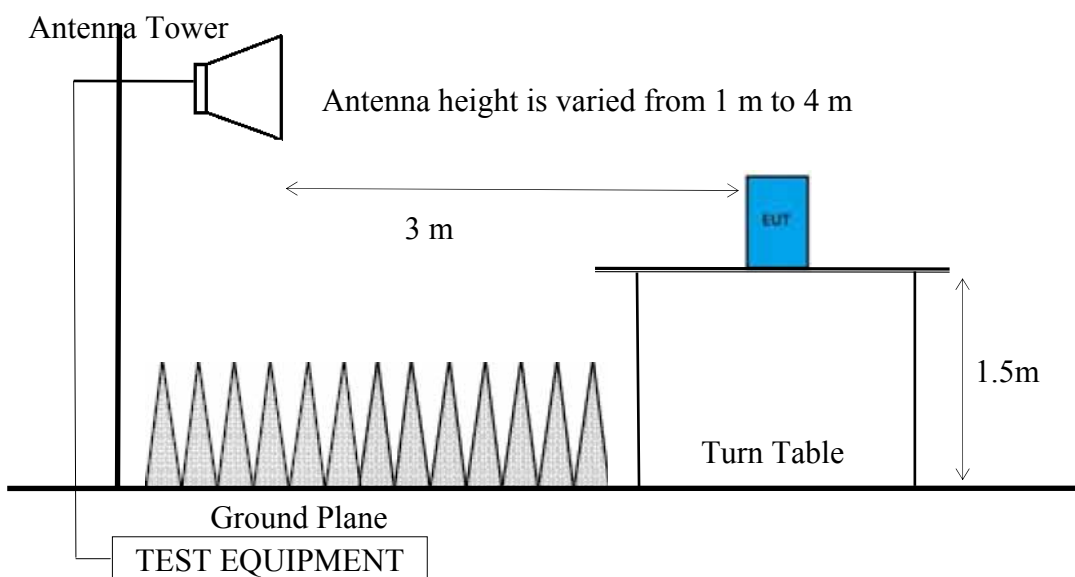
5.1.1. Block Diagram of connection between EUT and simulators

Indicated as section 3.7

5.1.2. Setup Diagram for 30-1000 MHz



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



5.2. Radiated Emission Limits

Radiated emissions fall in restricted bands, as defined in Section 15.205 must be in compliance with the radiated emission limits specified in 15.209 as below.

5.2.1. General Limit

Frequency (MHz)	Distance (m)	Field Strengths Limits	
		$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0
Above 1000	3	74.0 $\text{dB}\mu\text{V/m}$ (Peak) 54.0 $\text{dB}\mu\text{V/m}$ (Average)	

Remark: (1) $\text{dB}\mu\text{V/m} = 20 \log (\mu\text{V/m})$

- (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.

5.2.2. Limit for non-restricted frequency above 1 GHz

Frequency Band (MHz)	E.I.R.P. Limit	Field Strength Limit at 3 m
5150 to 5250	-27 dBm	68.2
5250 to 5350		68.2
5470 to 5725		68.2
5725 to 5850	-17 dBm/MHz ^{Note 1} -27 dBm/MHz ^{Note 2}	78.2 ^{Note 1} 68.2 ^{Note 2}

Note 1: Applicable to frequency within 10MHz to band edge.

2: Applicable to frequency beyond 10 MHz out of band edge.

3: Field Strength at 3 m = E.I.R.P. + 95.2 dB

5.3. Test Procedure

The EUT setup on the turn find table which has 150 cm 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 = 120 kHz
- (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 (up to 40 GHz):

Peak Detector:

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

Modulation Type	T (ms)	1/ T (Hz)	VBW Setting
802.11a	2.05	487.8049	5k
802.11n-HT20	1.90	526.3158	5k

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.

5.4. 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

5.5. Test Results

PASSED.

Test Date	2016/01/12	Temp./Hum.	24 /41%
Test Voltage	DC 12V		

5.5.1. Emissions within Restricted Frequency Bands

5.5.1.1. Frequency Below 1 GHz

Mode	802.11a	UNII Band	I
		Frequency	TX 5240MHz

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
83.35	7.97	3.04	27.43	38.44	40.00	1.56	Peak
190.05	9.19	3.90	24.61	37.70	43.50	5.80	Peak
958.29	20.89	7.88	15.46	44.23	46.00	1.77	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
45.52	10.51	2.59	25.55	38.65	40.00	1.35	Peak
74.62	7.01	2.94	28.92	38.87	40.00	1.13	Peak
611.03	18.38	6.53	13.72	38.63	46.00	7.37	Peak

Mode	802.11a	UNII Band	III
		Frequency	TX 5785MHz

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
83.35	7.97	3.04	28.44	39.45	40.00	0.55	Peak
180.35	9.12	3.84	24.83	37.79	43.50	5.71	Peak
956.35	20.87	7.86	16.47	45.20	46.00	0.80	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
44.55	10.98	2.57	26.04	39.59	40.00	0.41	Peak
84.32	8.17	3.06	28.01	39.24	40.00	0.76	Peak
605.21	18.35	6.51	13.16	38.02	46.00	7.98	Peak

Mode	802.11n-HT20	UNII Band	I
		Frequency	TX 5240MHz

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
83.35	7.97	3.04	26.39	37.40	40.00	2.60	Peak
220.12	10.59	4.13	21.07	35.79	46.00	10.21	Peak
953.44	20.85	7.84	16.40	45.09	46.00	0.91	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
46.49	10.03	2.60	26.07	38.70	40.00	1.30	Peak
83.35	7.97	3.04	28.30	39.31	40.00	0.69	Peak
671.17	18.62	6.66	12.90	38.18	46.00	7.82	Peak

Mode	802.11n-HT20	UNII Band	III
		Frequency	TX 5785MHz

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
83.35	7.97	3.04	28.09	39.10	40.00	0.90	Peak
191.02	9.20	3.91	25.01	38.12	43.50	5.38	Peak
958.29	20.89	7.88	16.98	45.75	46.00	0.25	Peak

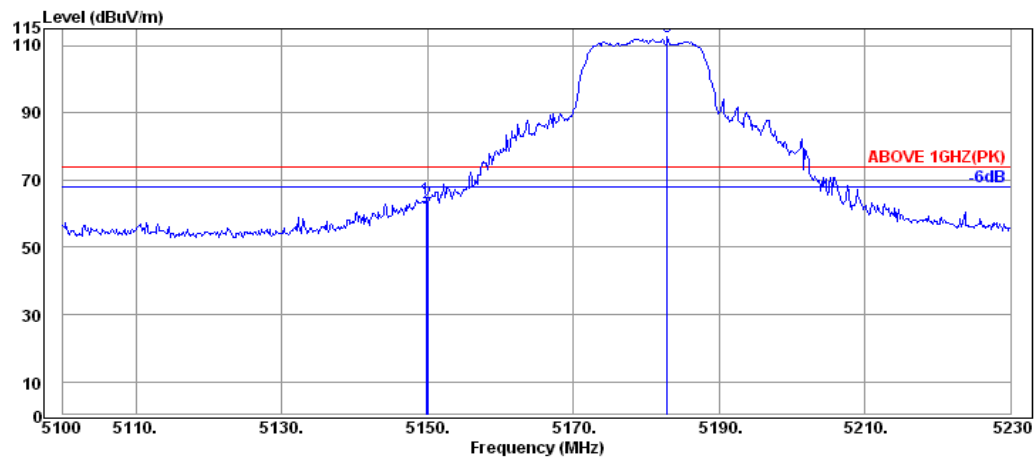
Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
45.52	10.51	2.59	24.75	37.85	40.00	2.15	Peak
82.38	7.83	3.02	28.10	38.95	40.00	1.05	Peak
604.24	18.34	6.51	13.66	38.51	46.00	7.49	Peak

5.5.1.2. Frequency Above 1 GHz to 10th harmonics

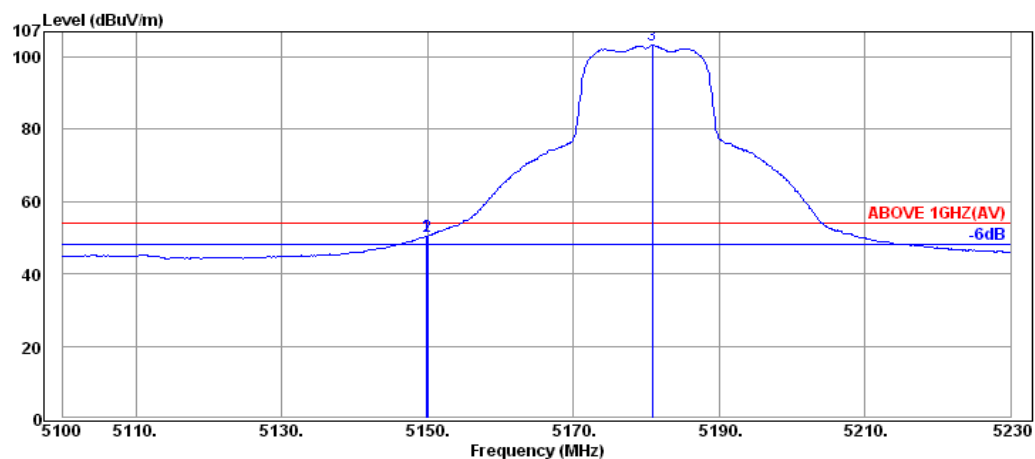
Band Edge:

Mode	802.11a	Frequency	TX 5180MHz
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Antenna at Horizontal Polarization

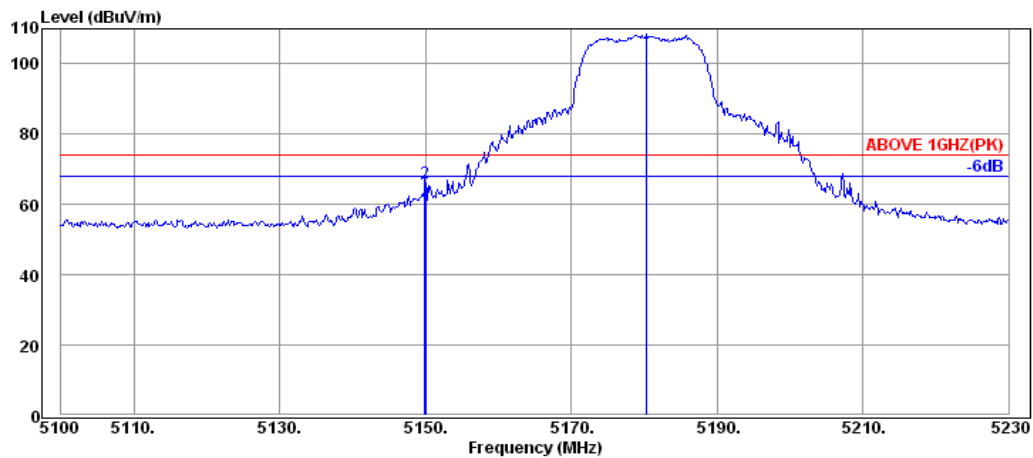
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5149.79	34.05	9.41	20.77	64.23	74.00	9.77	Peak
5150.05	34.05	9.41	19.69	63.15	74.00	10.85	Peak
5182.94	34.08	9.39	69.28	112.75	---	---	Peak



Antenna at Horizontal Polarization

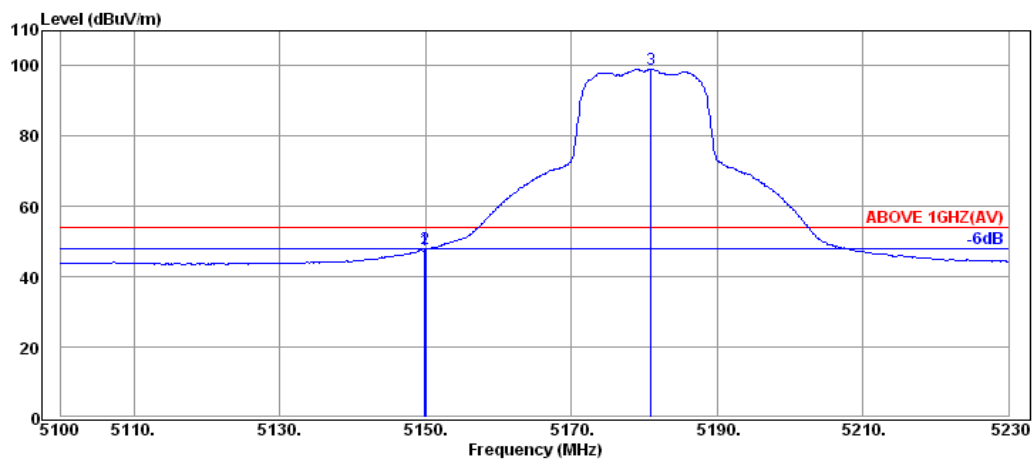
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5149.92	34.05	9.41	6.90	50.36	54.00	3.64	Average
5150.05	34.05	9.41	7.03	50.49	54.00	3.51	Average
5180.86	34.08	9.39	59.78	103.25	---	---	Average

Mode	802.11a	Frequency	TX 5180MHz
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Antenna at Vertical Polarization

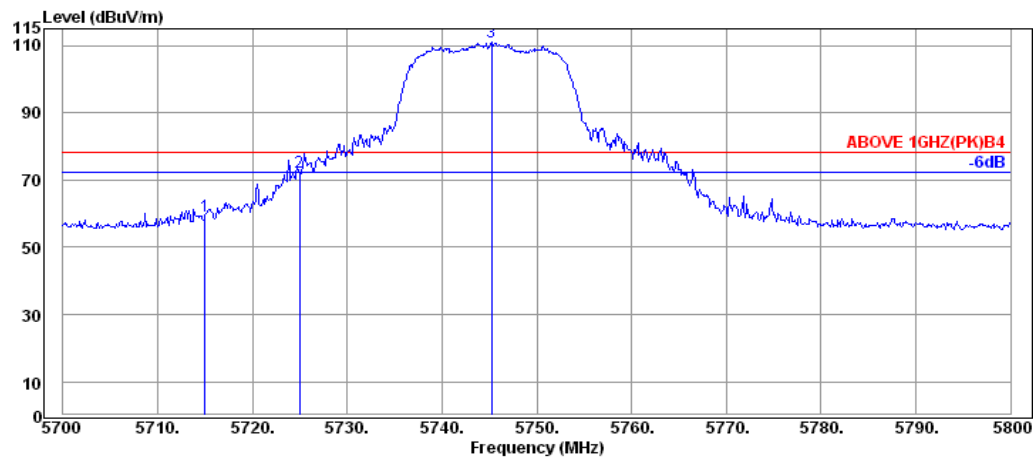
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5149.92	34.05	9.41	20.14	63.60	74.00	10.40	Peak
5150.05	34.05	9.41	22.57	66.03	74.00	7.97	Peak
5180.34	34.08	9.39	65.01	108.48	---	---	Peak



Antenna at Vertical Polarization

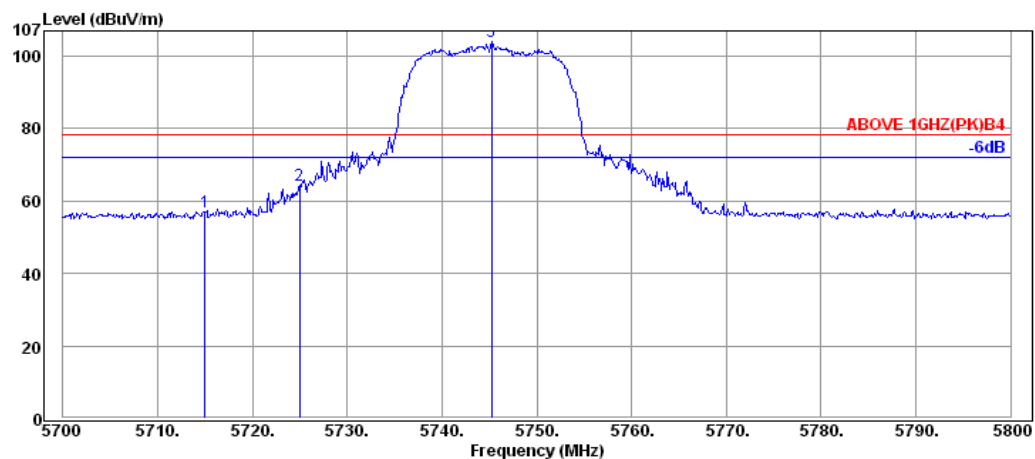
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5149.92	34.05	9.41	4.28	47.74	54.00	6.26	Average
5150.05	34.05	9.41	4.39	47.85	54.00	6.15	Average
5180.99	34.08	9.39	55.69	99.16	---	---	Average

Mode	802.11a	Frequency	TX 5745MHz
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Antenna at Horizontal Polarization

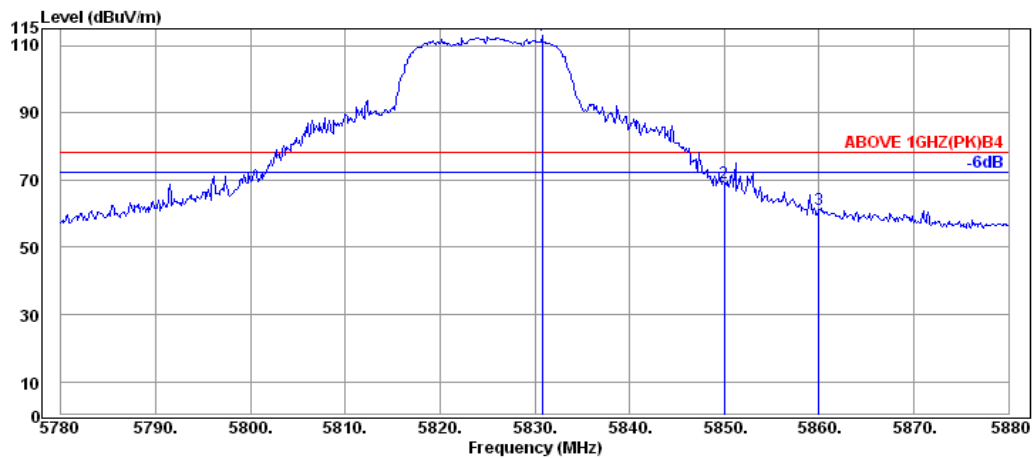
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5715.00	34.83	10.29	14.06	59.18	78.20	19.02	Peak
5725.00	34.87	10.29	27.00	72.16	78.20	6.04	Peak
5745.20	34.90	10.42	65.68	111.00	---	---	Peak



Antenna at Vertical Polarization

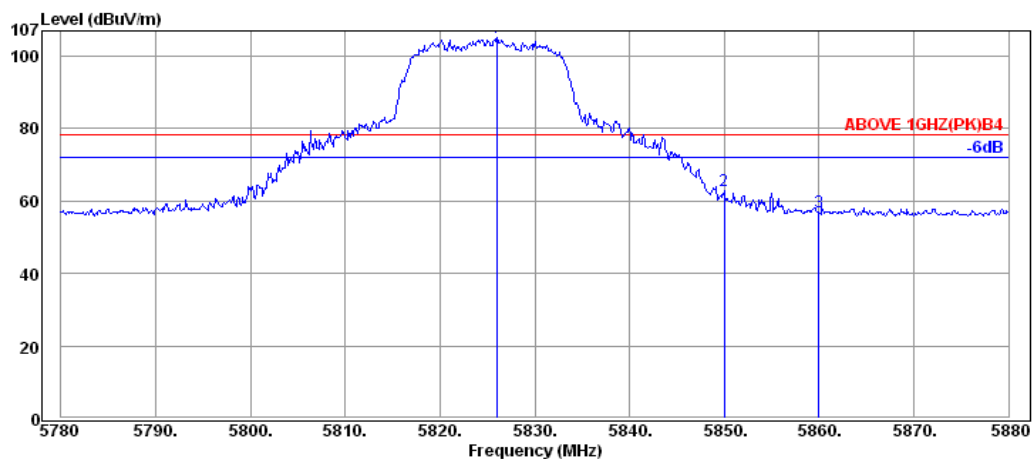
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5715.00	34.83	10.29	11.72	56.84	78.20	21.36	Peak
5725.00	34.87	10.29	19.03	64.19	78.20	14.01	Peak
5745.20	34.90	10.42	58.82	104.14	---	---	Peak

Mode	802.11a	Frequency	TX 5825MHz
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Antenna at Horizontal Polarization

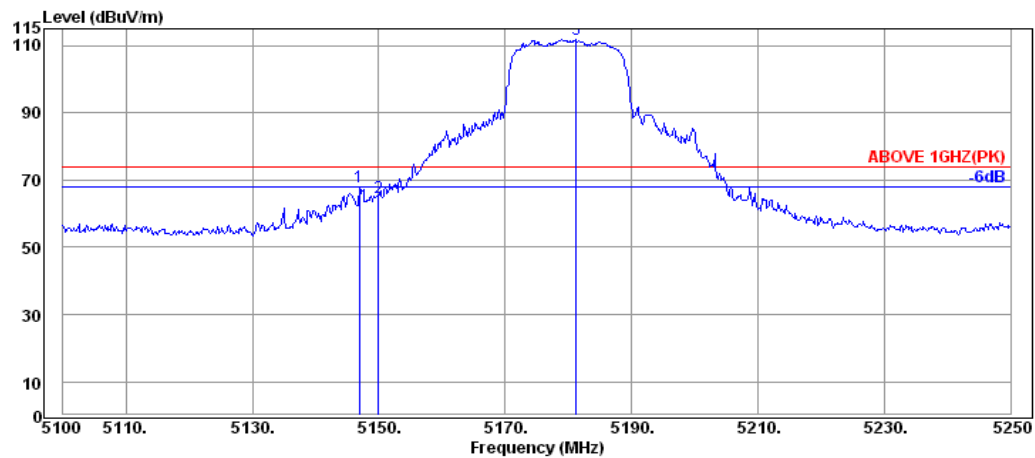
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5830.80	35.07	10.26	67.52	112.85	---	---	Peak
5850.00	35.10	10.22	23.91	69.23	78.20	8.97	Peak
5860.00	35.13	10.18	16.09	61.40	78.20	16.80	Peak



Antenna at Vertical Polarization

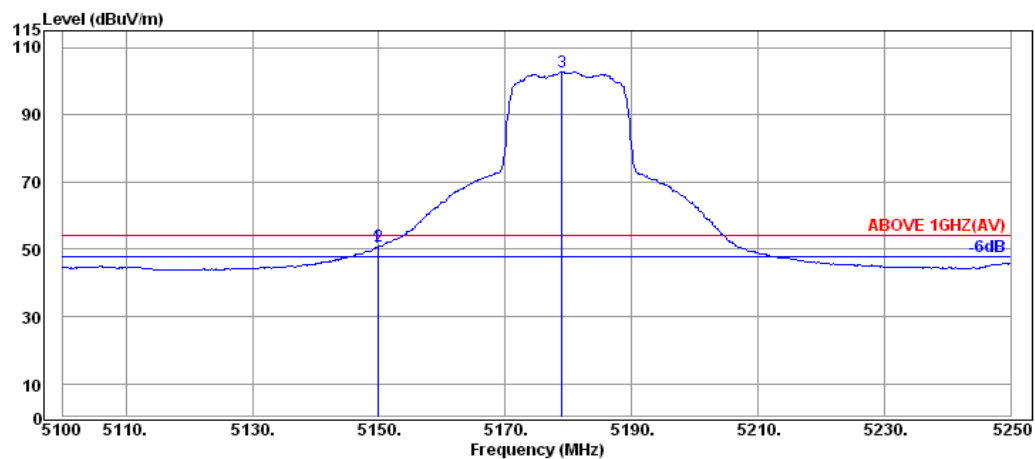
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5826.00	35.07	10.26	59.89	105.22	---	---	Peak
5850.00	35.10	10.22	17.42	62.74	78.20	15.46	Peak
5860.00	35.13	10.18	11.66	56.97	78.20	21.23	Peak

Mode	802.11n-HT20	Frequency	TX 5180MHz
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Antenna at Horizontal Polarization

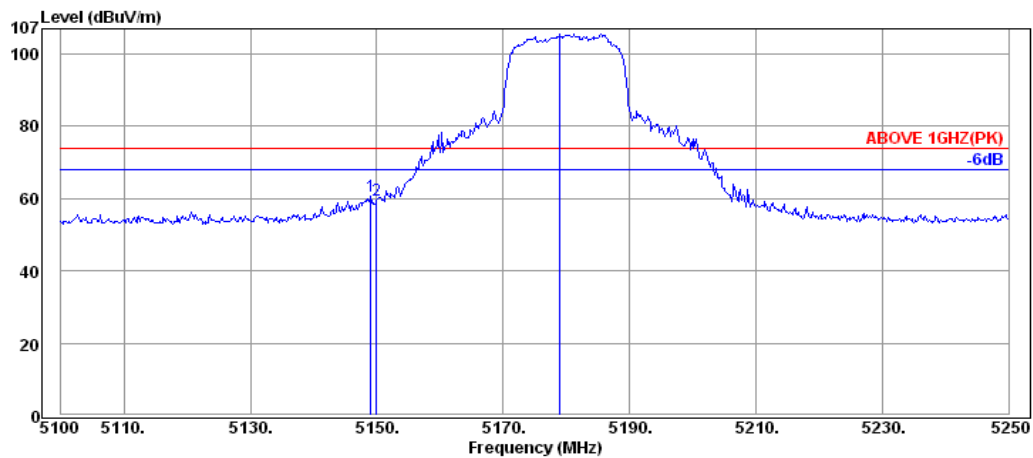
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5146.95	34.05	9.41	24.35	67.81	74.00	6.19	Peak
5149.95	34.05	9.41	21.51	64.97	74.00	9.03	Peak
5181.30	34.08	9.39	68.27	111.74	---	---	Peak



Antenna at Horizontal Polarization

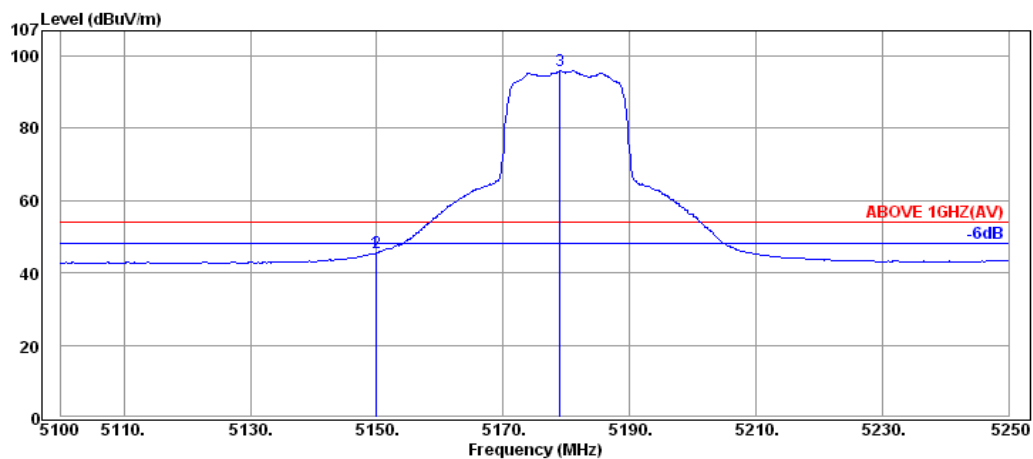
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5149.80	34.05	9.41	7.19	50.65	54.00	3.35	Average
5149.95	34.05	9.41	7.40	50.86	54.00	3.14	Average
5179.05	34.08	9.39	59.46	102.93	---	---	Average

Mode	802.11n-HT20	Frequency	TX 5180MHz
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Antenna at Vertical Polarization

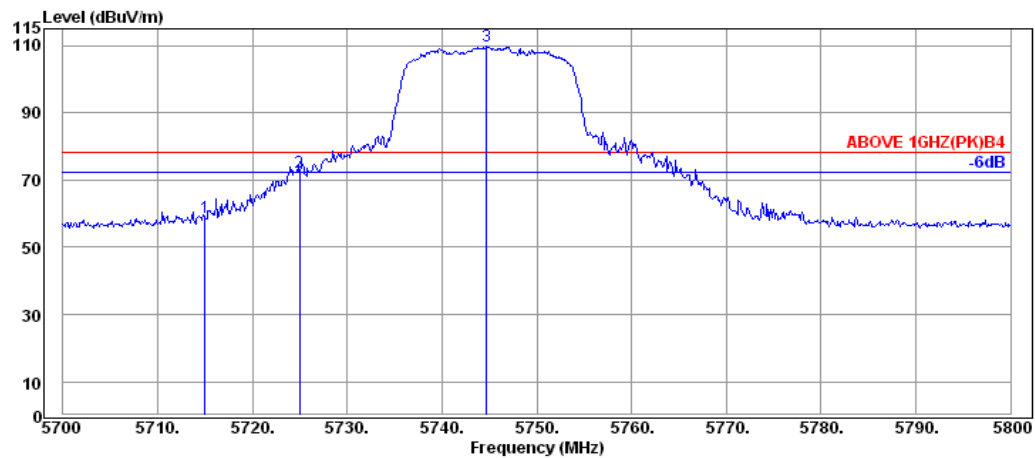
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5149.05	34.05	9.41	17.06	60.52	74.00	13.48	Peak
5149.95	34.05	9.41	16.19	59.65	74.00	14.35	Peak
5179.05	34.08	9.39	61.96	105.43	---	---	Peak



Antenna at Vertical Polarization

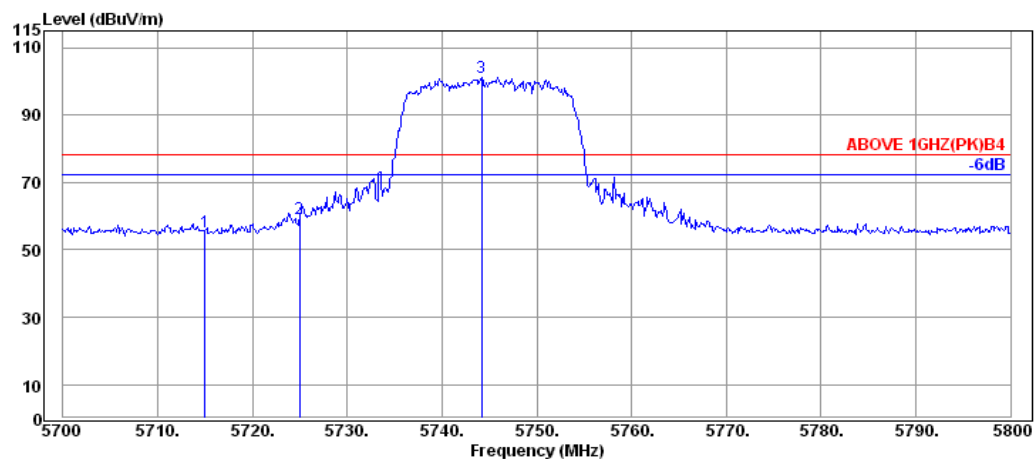
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5149.80	34.05	9.41	1.99	45.45	54.00	8.55	Average
5149.95	34.05	9.41	2.03	45.49	54.00	8.51	Average
5179.05	34.08	9.39	52.41	95.88	---	---	Average

Mode	802.11n-HT20	Frequency	TX 5745MHz
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Antenna at Horizontal Polarization

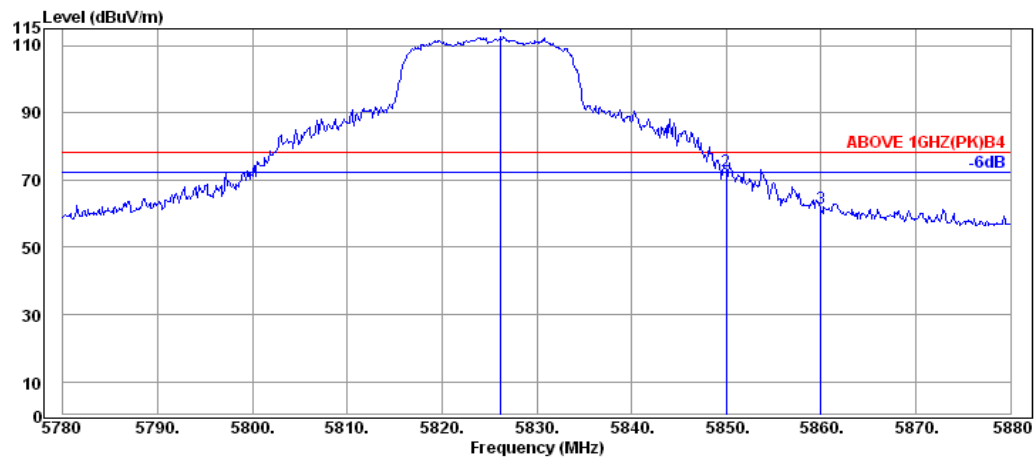
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5715.00	34.83	10.29	13.58	58.70	78.20	19.50	Peak
5725.00	34.87	10.29	27.13	72.29	78.20	5.91	Peak
5744.70	34.90	10.35	64.58	109.83	---	---	Peak



Antenna at Vertical Polarization

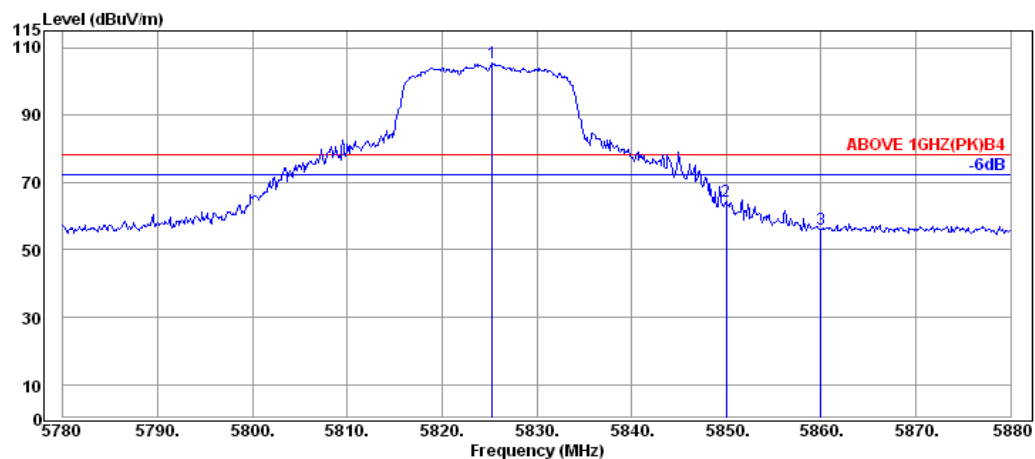
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5715.00	34.83	10.29	44.71	55.45	78.20	22.75	Peak
5725.00	34.87	10.29	14.03	59.19	78.20	19.01	Peak
5744.20	34.90	10.35	55.93	101.18	---	---	Peak

Mode	802.11n-HT20	Frequency	TX 5825MHz
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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
5826.20	35.07	10.26	67.30	112.63	---	---	Peak
5850.00	35.10	10.22	27.46	72.78	78.20	5.42	Peak
5860.00	35.13	10.18	16.16	61.47	78.20	16.73	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
5825.30	35.07	10.26	60.03	105.36	---	---	Peak
5850.00	35.10	10.22	18.90	64.22	78.20	13.98	Peak
5860.00	35.13	10.18	10.68	55.99	78.20	22.21	Peak

5.5.2. Emissions outside the frequency band:

The emissions (up to 40GHz) not reported for there is no emission be found.

Mode	802.11a	UNII Band	I
		Frequency	TX 5200MHz

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
5040.00	33.95	9.48	6.80	50.23	54.00	3.77	Peak
5428.00	34.32	9.44	9.04	52.80	54.00	1.20	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
5428.00	34.32	9.44	4.46	48.22	54.00	5.78	Peak

Mode	802.11a	UNII Band	III
		Frequency	TX 5785MHz

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
5480.00	34.38	9.47	9.28	53.13	74.00	20.87	Peak
5568.00	34.88	9.75	3.31	47.94	54.00	6.06	Average
5568.00	34.88	9.75	12.40	57.03	74.00	16.97	Peak
5628.00	34.94	9.95	7.55	52.44	54.00	1.56	Average
5628.00	34.94	9.95	15.52	60.41	74.00	13.59	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5488.00	34.38	9.48	4.65	48.51	54.00	5.49	Peak
5560.00	34.53	9.75	8.19	52.47	54.00	1.53	Peak
5628.00	34.67	9.95	9.37	53.99	54.00	0.01	Peak

Mode	802.11n-HT20	UNII Band	I
		Frequency	TX 5200MHz

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
5040.00	33.95	9.48	9.66	53.09	54.00	0.91	Peak
5428.00	34.32	9.44	6.61	50.37	54.00	3.63	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
5040.00	33.95	9.48	3.34	46.77	54.00	7.23	Peak
5428.00	34.32	9.44	3.16	46.92	54.00	7.08	Peak

Mode	802.11n-HT20	UNII Band	III
		Frequency	TX 5785MHz

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
5492.00	34.38	9.48	8.94	52.80	74.00	21.20	Peak
5560.00	34.86	9.75	1.50	46.11	54.00	7.89	Average
5560.00	34.86	9.75	10.05	54.66	74.00	19.34	Peak
5628.00	34.67	9.95	8.79	53.41	54.00	0.59	Peak

Antenna at Vertical Polarization

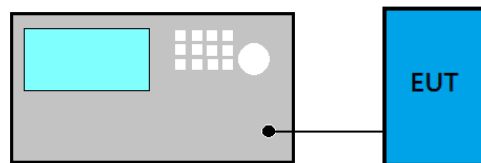
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5560.00	34.53	9.75	8.90	53.18	54.00	0.82	Peak
5628.00	34.67	9.95	8.32	52.94	54.00	1.06	Peak

5.5.3. Emissions in Non-restricted Frequency Bands

Pursuant to KDB 789033 D02 General NII Test Procedures New Rules V01 that emission levels below the 15.209 general radiated emissions limits is not required.

6. EMISSION BANDWIDTH MEASUREMENT

6.1. Block Diagram of Test Setup



6.2. Specification Limits

Frequency Band (MHz)	Limit
5150 to 5250	Reference only
5725 to 5850	$\geq 500\text{kHz}$

6.3. Test Procedure

Following measurement procedure is reference to KDB 789033 D02 General UNII Test Procedures New Rules v01:

- Applicable to all bands except to 5725 MHz- 5850 MHz

- (1) Set RBW= 1% of the emission bandwidth
- (2) Set VBW > RBW
- (3) Detector = Peak
- (4) Trace mode = max hold
- (5) Setting channel bandwidth function x dB to -26 dB to record the final bandwidth.

- 5725 MHz- 5850 MHz

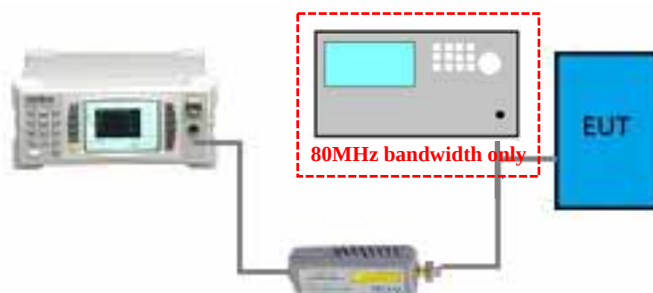
- (1) Set RBW = 100 kHz.
- (2) Set the video bandwidth (VBW) $\geq 3 \times \text{RBW}$.
- (3) Detector = Peak.
- (4) Trace mode = max hold.
- (5) Sweep = auto couple.
- (6) Allow the trace to stabilize.
- (7) Setting channel bandwidth function x dB to -6 dB to record the final bandwidth.

6.4. Test Results

Please refer to Appendix A

7. MAXIMUM OUTPUT POWER MEASUREMENT

7.1. Block Diagram of Test Setup



7.2. Specification Limits

Frequency Band (MHz)	Category	Limit
5150 to 5250	Outdoor Access Point	1 W(30 dBm)/ Max e.i.r.p. $\leq$ 125 mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon
	Fixed point-to-point Access Point	1 W(30 dBm)
	Indoor Access Point	1 W(30 dBm)
	Mobile and Portable client device	250 mW(24 dBm)
5725 to 5850		1 W(30 dBm)

Note 1: B is the 26 dB emission bandwidth, which presented in section 7 and appendix A.1.

7.3. Test Procedure

Following measurement procedure is reference to KDB 789033 D02 General UNII Test Procedures New Rules v01:

■ **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)**

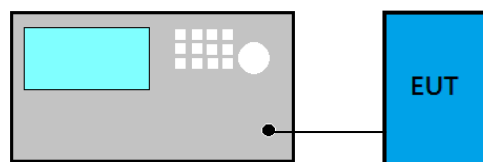
- (1) Set span to at least 1.5 times the OBW
- (2) Set RBW = 1 MHz
- (3) Set the video bandwidth (VBW) $\geq$ 3 MHz.
- (4) Detector = RMS.
- (5) Trace mode = trace average at least 100 traces
- (6) Sweep = auto couple.
- (7) Compute power by integrating the spectrum across the OBW of the signal using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

7.4. Test Results

Please refer to Appendix A

8. EMISSION LIMITATIONS MEASUREMENT

8.1. Block Diagram of Test Setup



8.2. Specification Limits

Frequency Band (MHz)	E.I.R.P. Limit
5150 to 5250	-27 dBm
5725 to 5850	-17 dBm/MHz ^{Note 1} -27 dBm/MHz ^{Note 2}

Note 1: Applicable to frequency within 10MHz to band edge.

2: Applicable to frequency beyond 10 MHz out of band edge.

8.3. Test Procedure

Following measurement procedure is reference to KDB 789033 D02 General UNII Test Procedures New Rules v01:

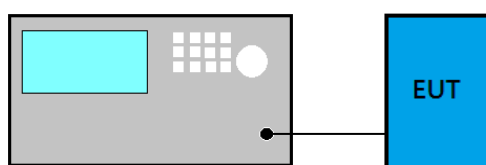
- (1) RBW = 1 MHz
- (2) VBW $\geq 3 \times$ RBW
- (3) Detector = Peak
- (4) Sweep time = auto
- (5) Trace mode = max hold
- (6) Allow sweeps to continue until the trace stabilizes.

8.4. Test Results

Please refer to Appendix A

9. POWER SPECTRAL DENSITY MEASUREMENT

9.1. Block Diagram of Test Setup



9.2. Specification Limits

Frequency Band (MHz)	Category	Limit
5150 to 5250	Outdoor Access Point	17dBm)
	Fixed point-to-point Access Point	
	Indoor Access Point	
	Mobile and Portable client device	11 dBm/MHz
5725 to 5850	N/A	30dBm/500 kHz

9.3. Test Procedure

Following measurement procedure is reference to KDB 789033 D02 General UNII Test Procedures New Rules v01:

■ Method AVGSA-2 (Spectrum channel power)

- (1) Set span to at least 1.5 times the OBW
- (2) Set RBW = 1 MHz
- (3) Set the video bandwidth (VBW) ≥ 3 MHz.
- (4) Detector = RMS.
- (5) Trace mode = trace average at least 100 traces
- (6) Sweep = auto couple.
- (7) Use peak search function to find out the maximum power density.
- (8) Duty cycle factor is added when duty cycle presented in section 3.5 is $< 98\%$.

9.4. Test Results

Please refer to Appendix A

10.DEVIATION TO TEST SPECIFICATIONS

【NONE】



AUDIX Technology Corp.
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APPENDIX A

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APPDNDIX A

TEST PLOTS

(Model: LC10S-B)

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A.1 EMISSION BANDWIDTH MEASUREMENT

Test Date	2016/01/12	Temp./Hum.	22 /42%
Test Voltage	DC 12V		

A.1.1 Emission Bandwidth Result

Modulation Type	UNII Band	Centre Frequency (MHz)	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Limit
802.11a	I	5180	31.16	17.568	Reference only
		5200	29.89	17.269	
		5240	30.56	17.404	
802.11n-HT20	I	5180	22.08	17.593	
		5200	34.79	18.669	
		5240	30.70	17.964	

Modulation Type	UNII Band	Centre Frequency (MHz)	6dB Bandwidth (MHz)	Limit
802.11a	III	5745	15.37	≥ 500kHz
		5785	15.16	
		5825	15.19	
802.11n-HT20	III	5745	16.06	
		5785	16.77	
		5825	15.98	

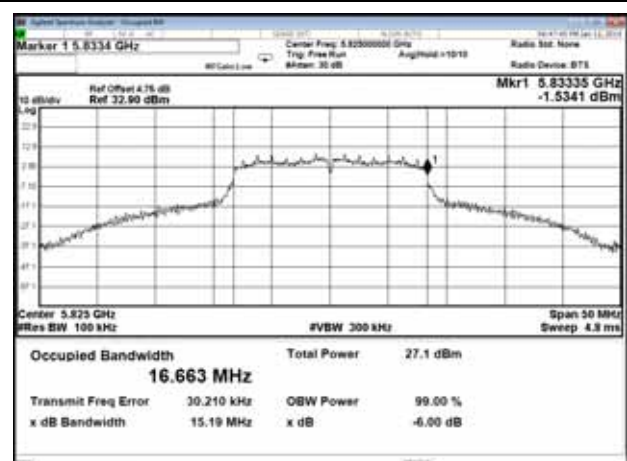
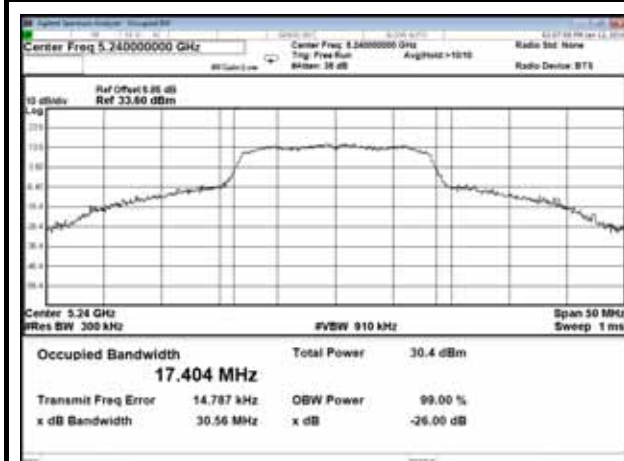
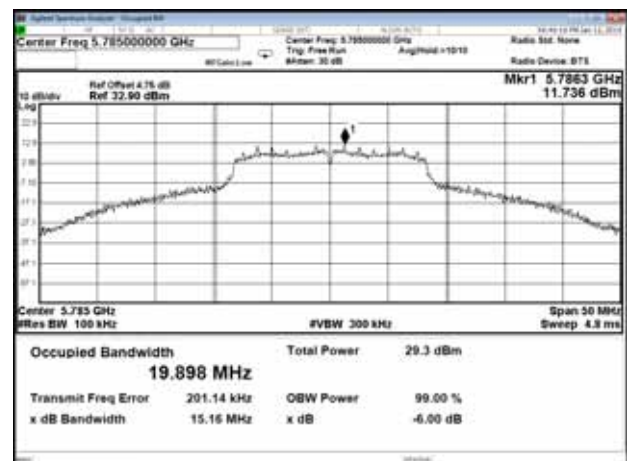
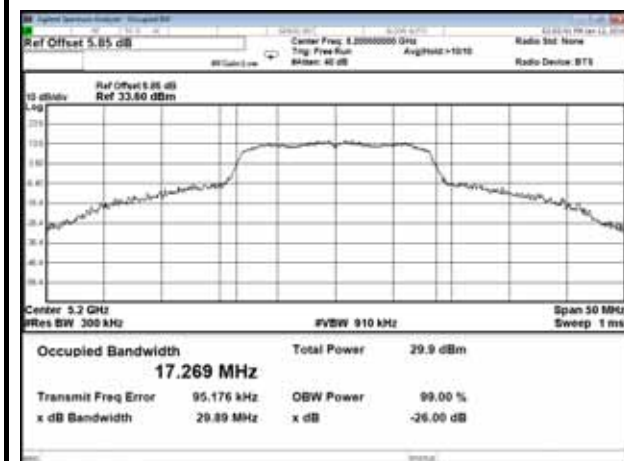
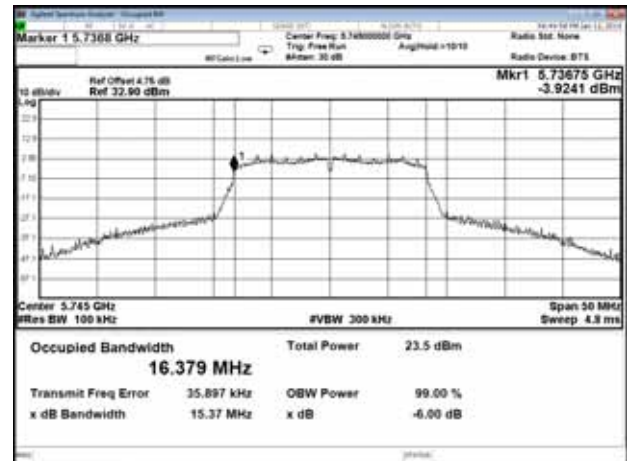
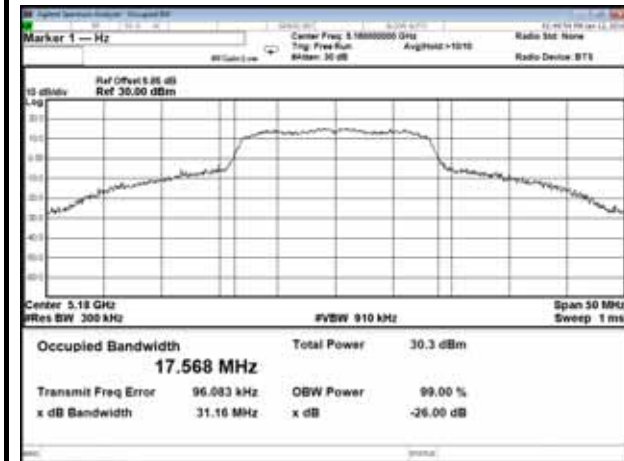
Note: The results have been included cable loss.

A.1.2 Measurement Plots

802.11a

UNII Band I

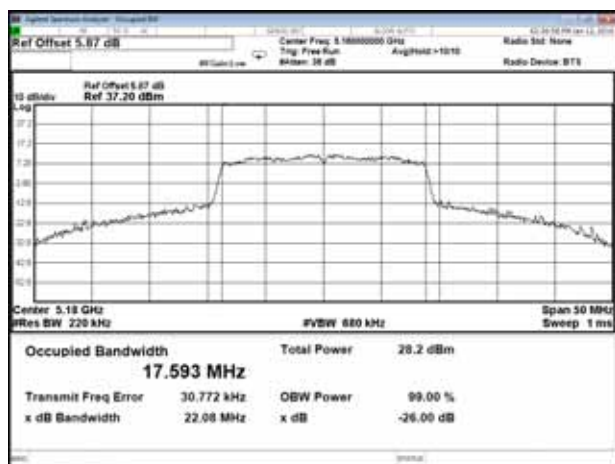
UNII Band III



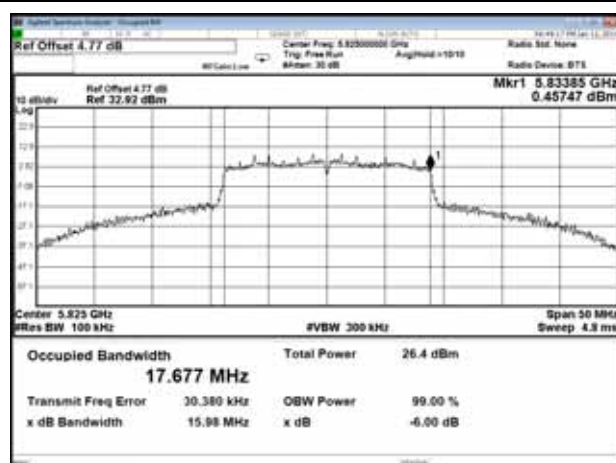
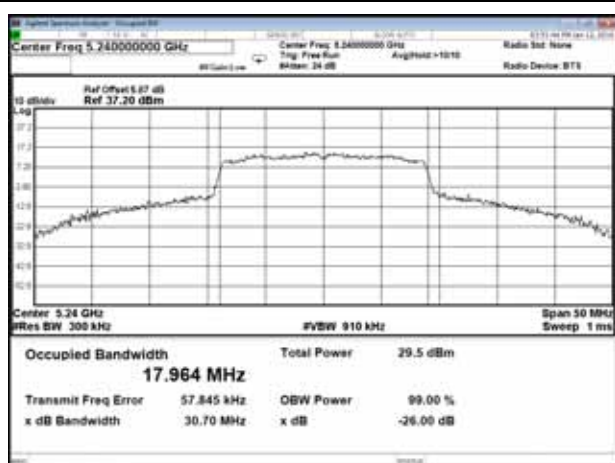
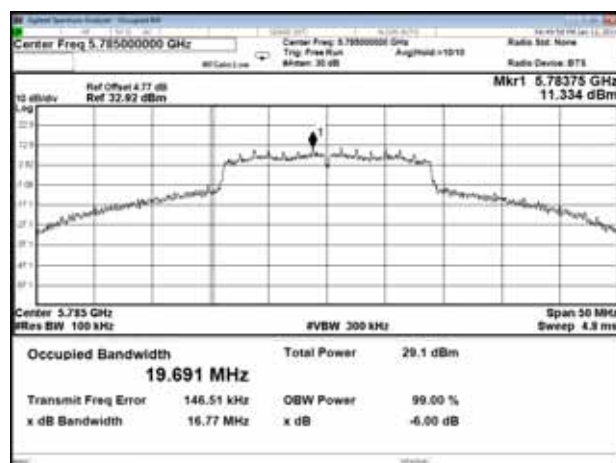
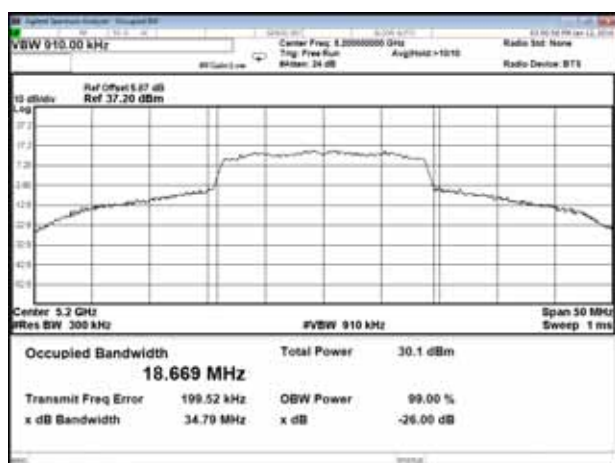
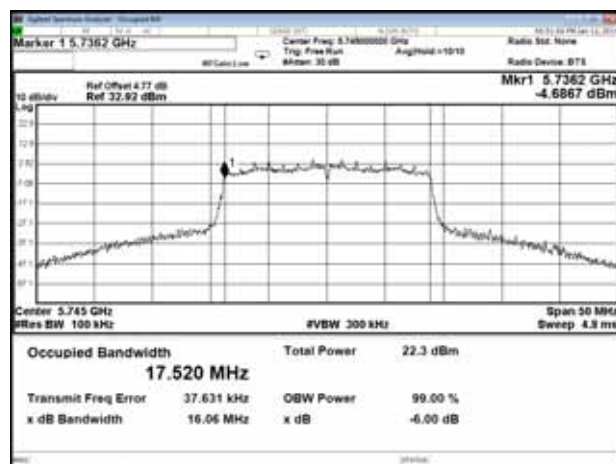
Note: The results have been included cable loss.

802.11n-HT20

UNII Band I



UNII Band III



Note: The results have been included cable loss.

A.2 MAXIMUM OUTPUT POWER MEASUREMENT

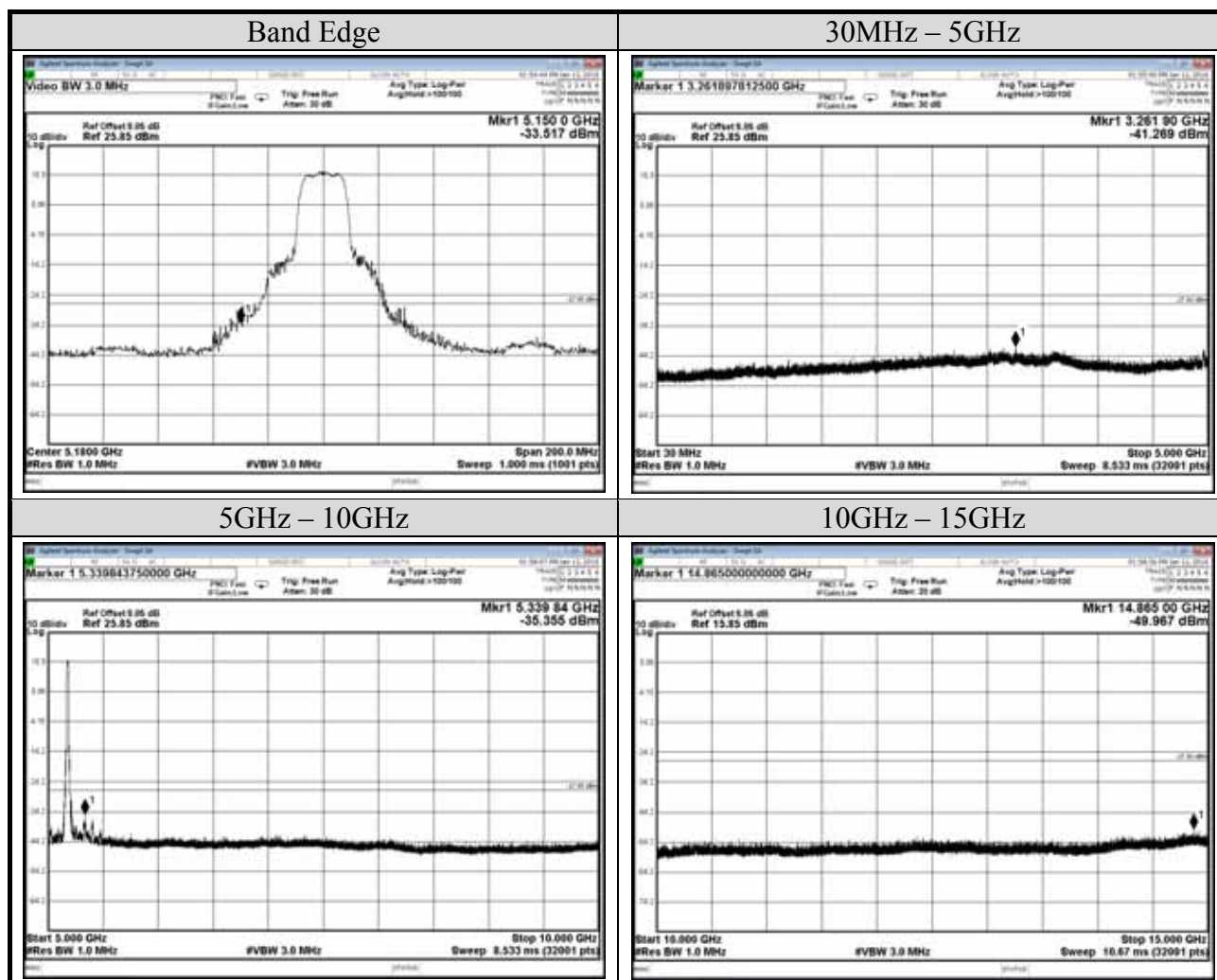
Test Date	2016/01/26	Temp./Hum.	22 /42%
Test Voltage	DC 12V		

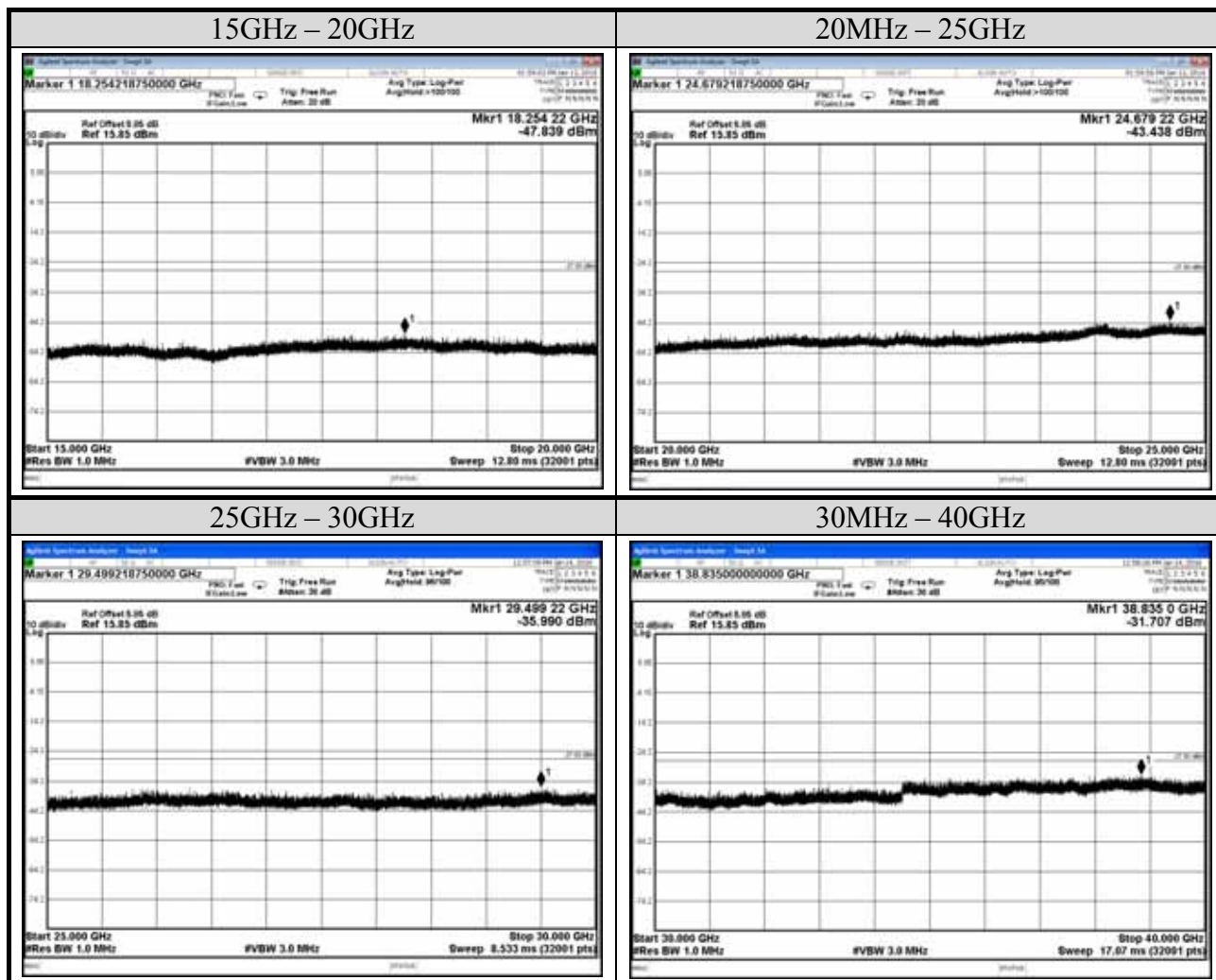
Modulation Type	UNII Band	Centre Frequency (MHz)	Output Power		Maximum Output Power		Antenna Gain (dBi)	Peak Output Power		Limit
			(dBm)	10log (1/X)	(dBm)	(W)		(dBm)	(W)	
802.11a	I	5180	15.48	0.25	15.73	0.037411	3.6	19.33	0.085704	< 250 mW (24 dBm) < 200 mW (E.I.R.P)
		5200	15.05		15.30	0.033884		18.90	0.077625	
		5240	14.70		14.95	0.031261		18.55	0.071614	
	III	5745	15.35		15.60	0.036308	2.9	18.50	0.070795	< 1 W (30 dBm) < 250 mW (Maximum Output Power) < 1W (E.I.R.P)
		5785	14.94		15.19	0.033037		18.09	0.064417	
		5825	14.33		14.58	0.028708		17.48	0.055976	
802.11n-HT 20	I	5180	12.95	0.27	13.22	0.020989	3.6	16.82	0.048084	< 250 mW (24 dBm) < 200 mW (E.I.R.P)
		5200	13.85		14.12	0.025823		17.72	0.059156	
		5240	13.71		13.98	0.025003		17.58	0.057280	
	III	5745	12.65		12.92	0.019588	2.9	15.82	0.038194	< 1 W (30 dBm) < 250 mW (Maximum Output Power) < 1W (E.I.R.P)
		5785	13.88		14.15	0.026002		17.05	0.050699	
		5825	13.12		13.39	0.021827		16.29	0.042560	

Note: The results have been included cable loss.

A.3 EMISSION LIMITATIONS MEASUREMENT

Test Date	2016/01/12	Temp./Hum.	22 /42%
Mode	802.11a	UNII Band	I
		Frequency	TX 5180MHz
Test Voltage	DC 12V		



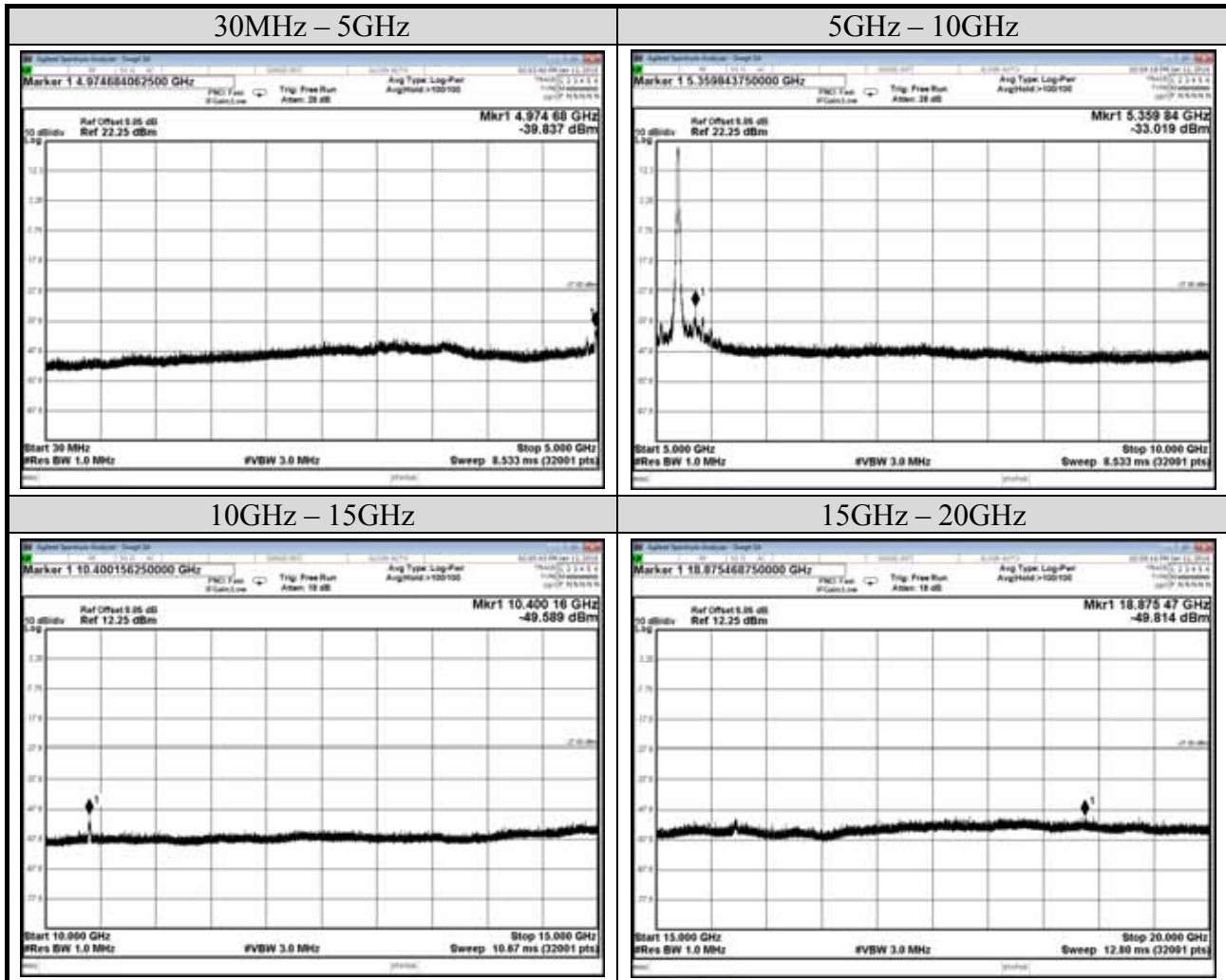


Note: The results have been included cable loss and antenna gain.

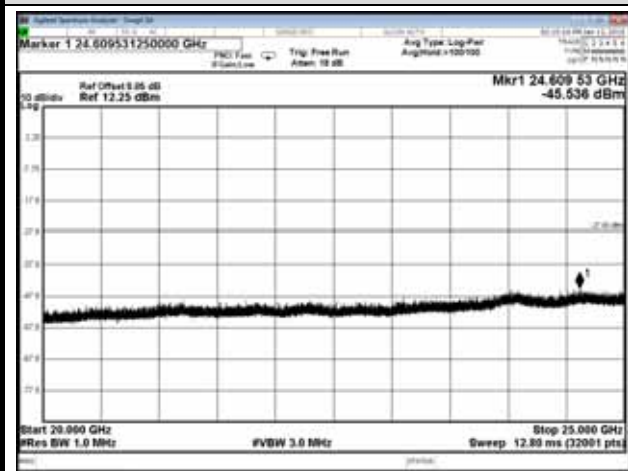
AUDIX Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan

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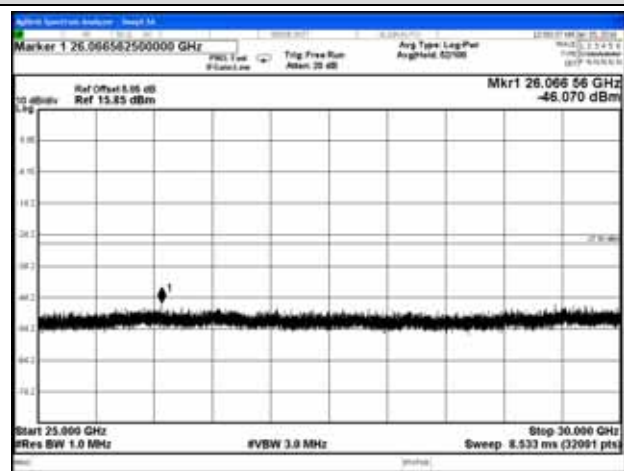
Test Date	2016/01/12	Temp./Hum.	22 /42%
Mode	802.11a	UNII Band	I
		Frequency	TX 5200MHz
Test Voltage	DC 12V		



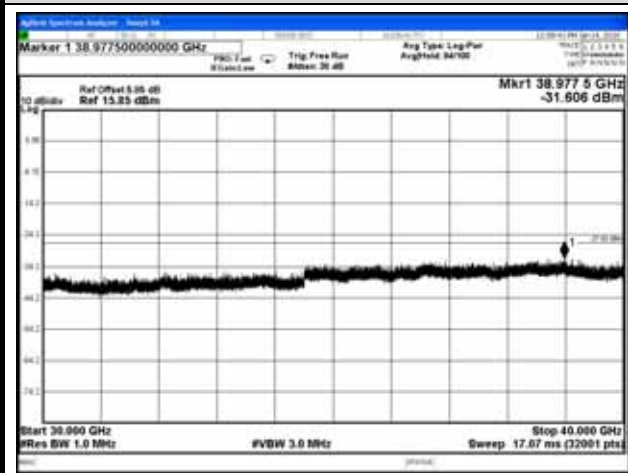
20GHz – 25GHz



25MHz – 30GHz



30GHz – 40GHz

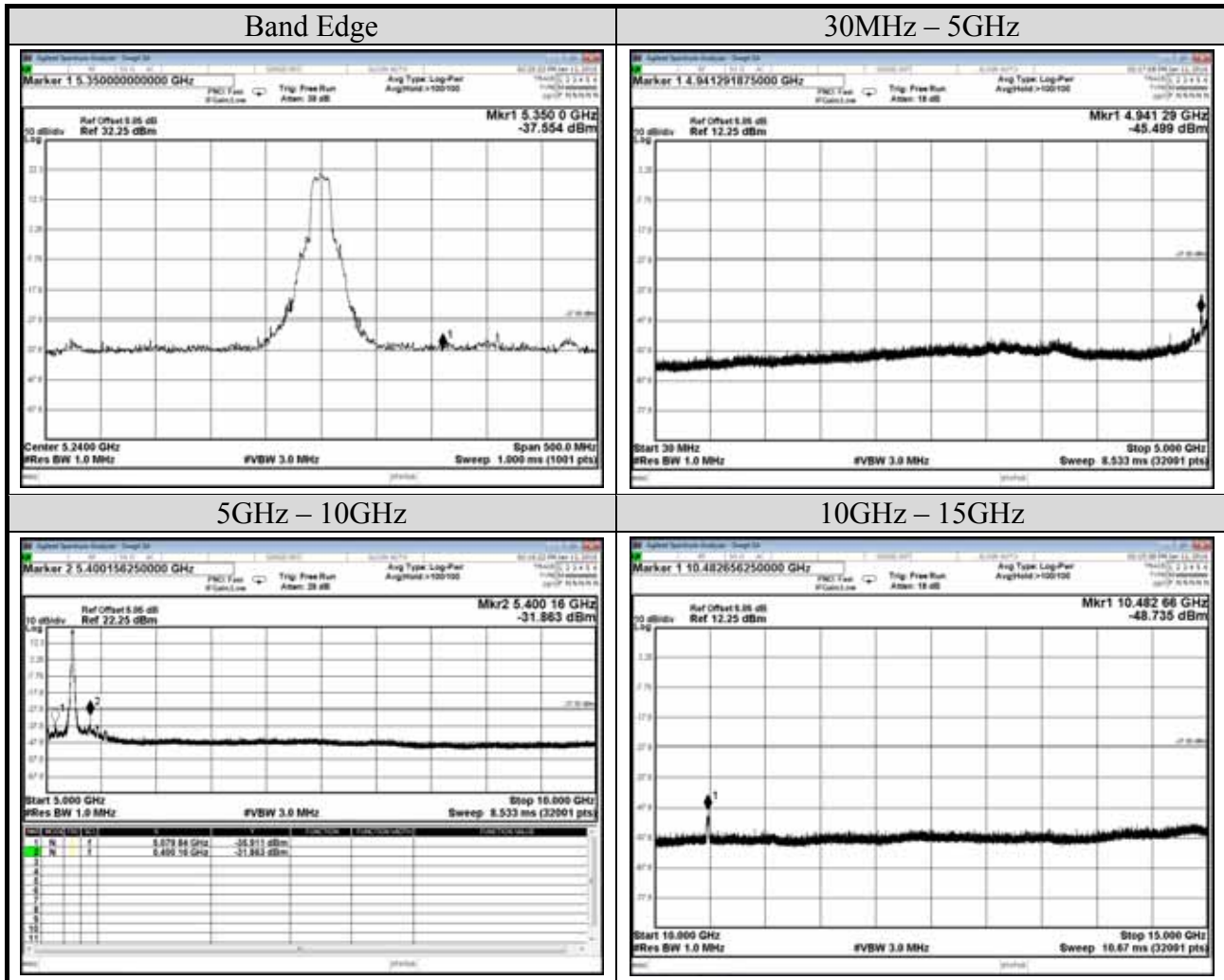


Note: The results have been included cable loss and antenna gain.

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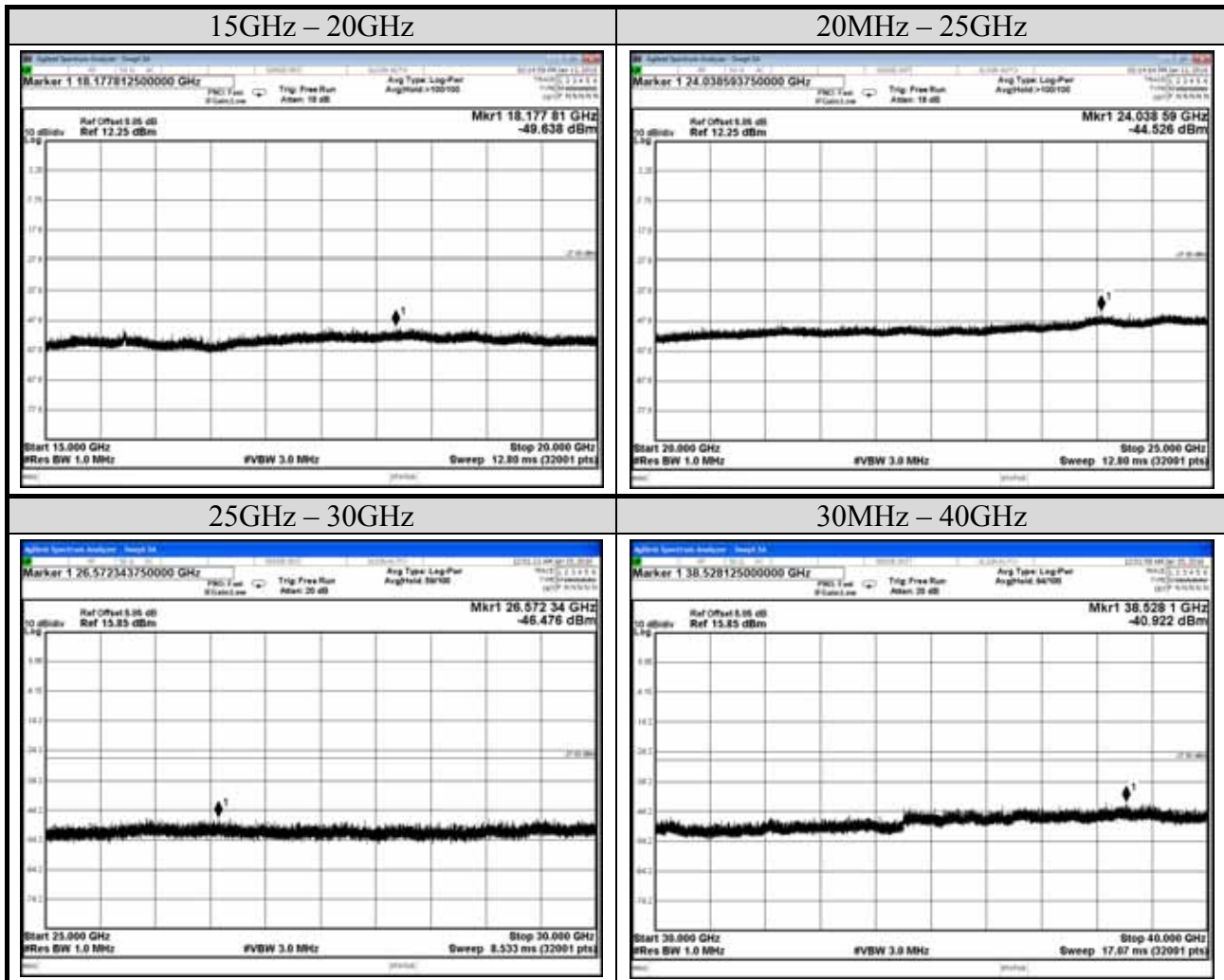
Tel: +886 2 26099301
Fax: +886 2 26099303

Test Date	2016/01/12	Temp./Hum.	22 /42%
Mode	802.11a	UNII Band	I
		Frequency	TX 5240MHz
Test Voltage	DC 12V		



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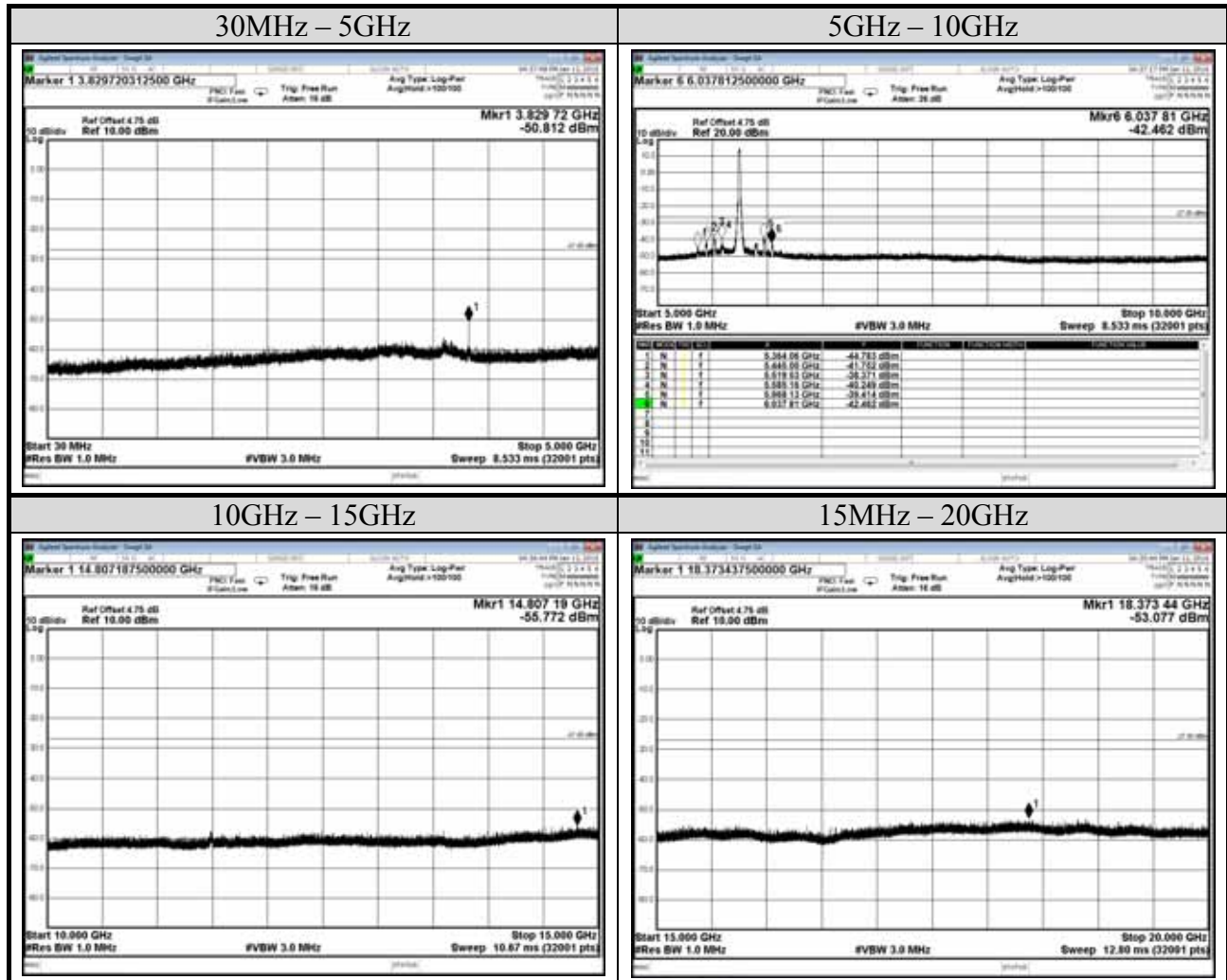


Note: The results have been included cable loss and antenna gain.

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New Taipei City 244, Taiwan

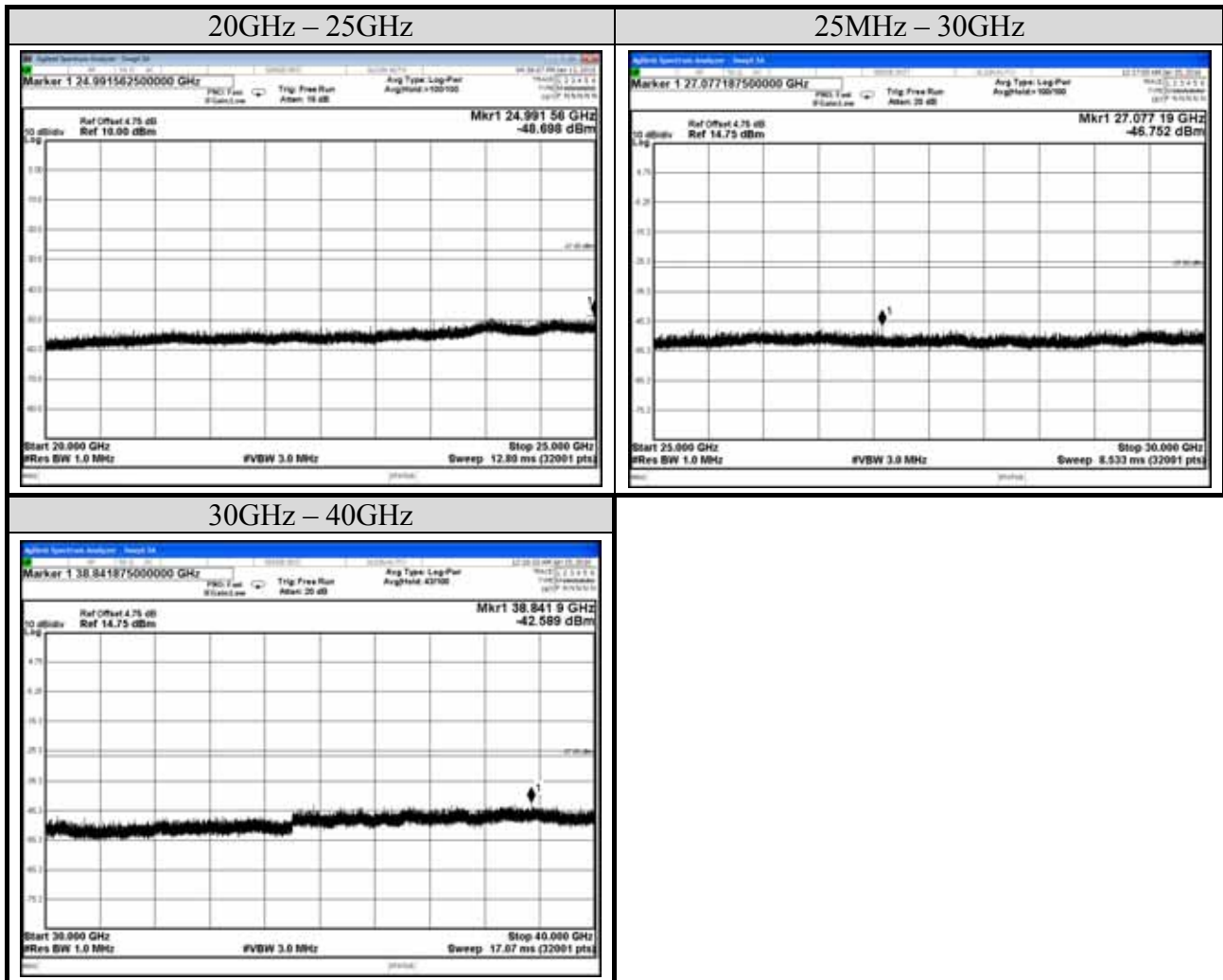
Tel: +886 2 26099301
Fax: +886 2 26099303

Test Date	2016/01/12	Temp./Hum.	22 /42%
Mode	802.11a	UNII Band	III
Test Voltage	DC 12V		



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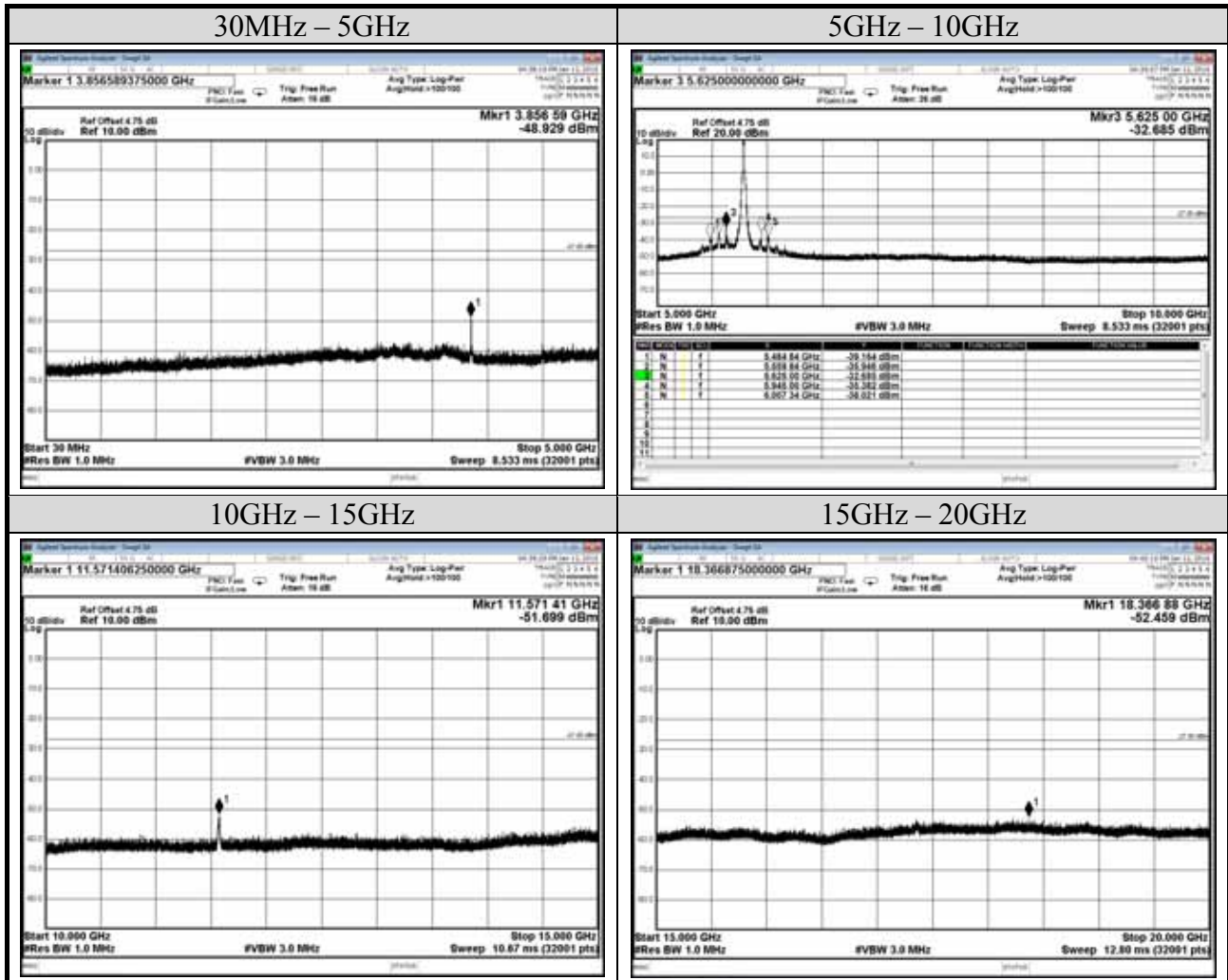


Note: The results have been included cable loss and antenna gain.

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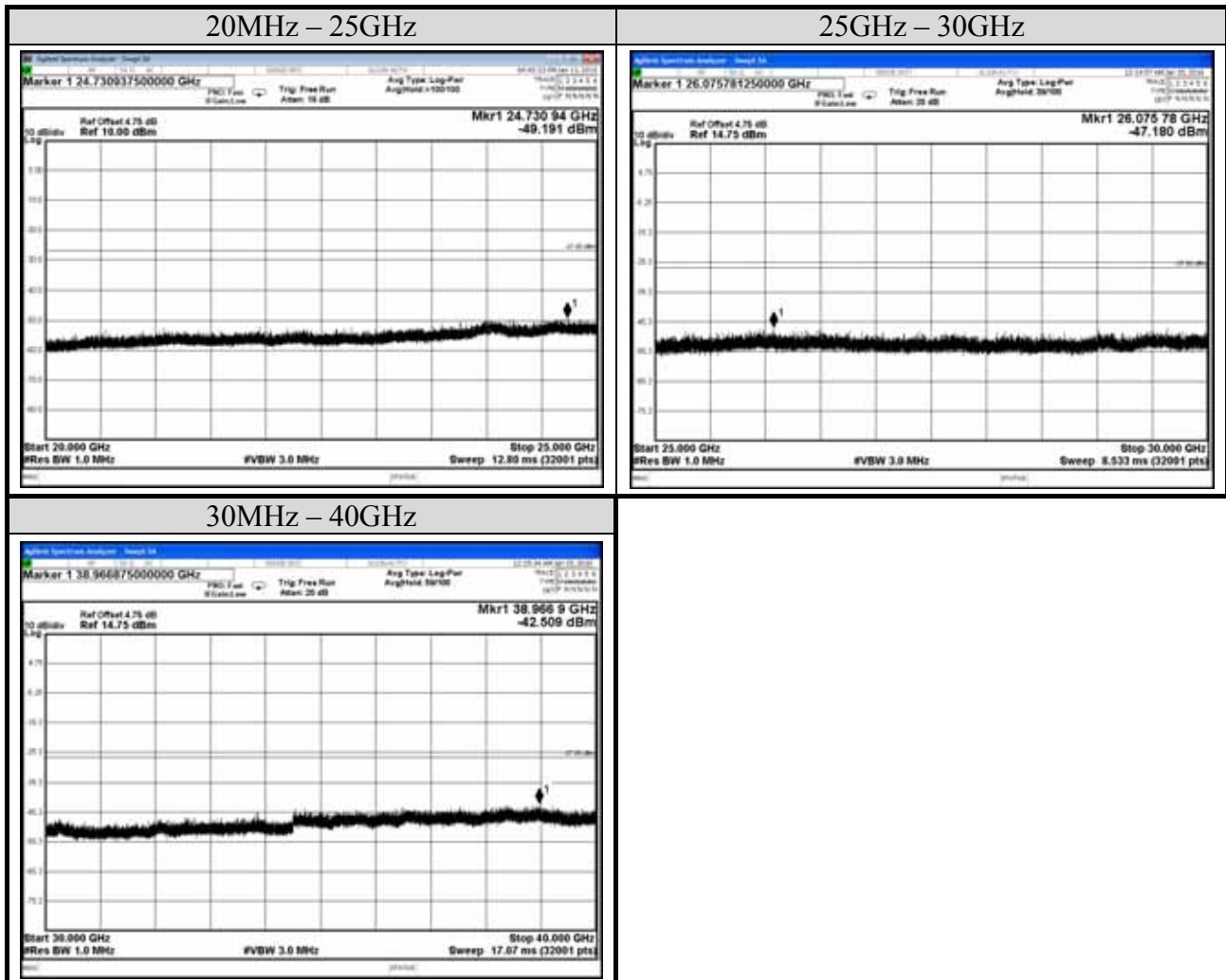
Tel: +886 2 26099301
Fax: +886 2 26099303

Test Date	2016/01/12	Temp./Hum.	22 /42%
Mode	802.11a	UNII Band	III
Test Voltage	DC 12V		
		Frequency	TX 5785MHz



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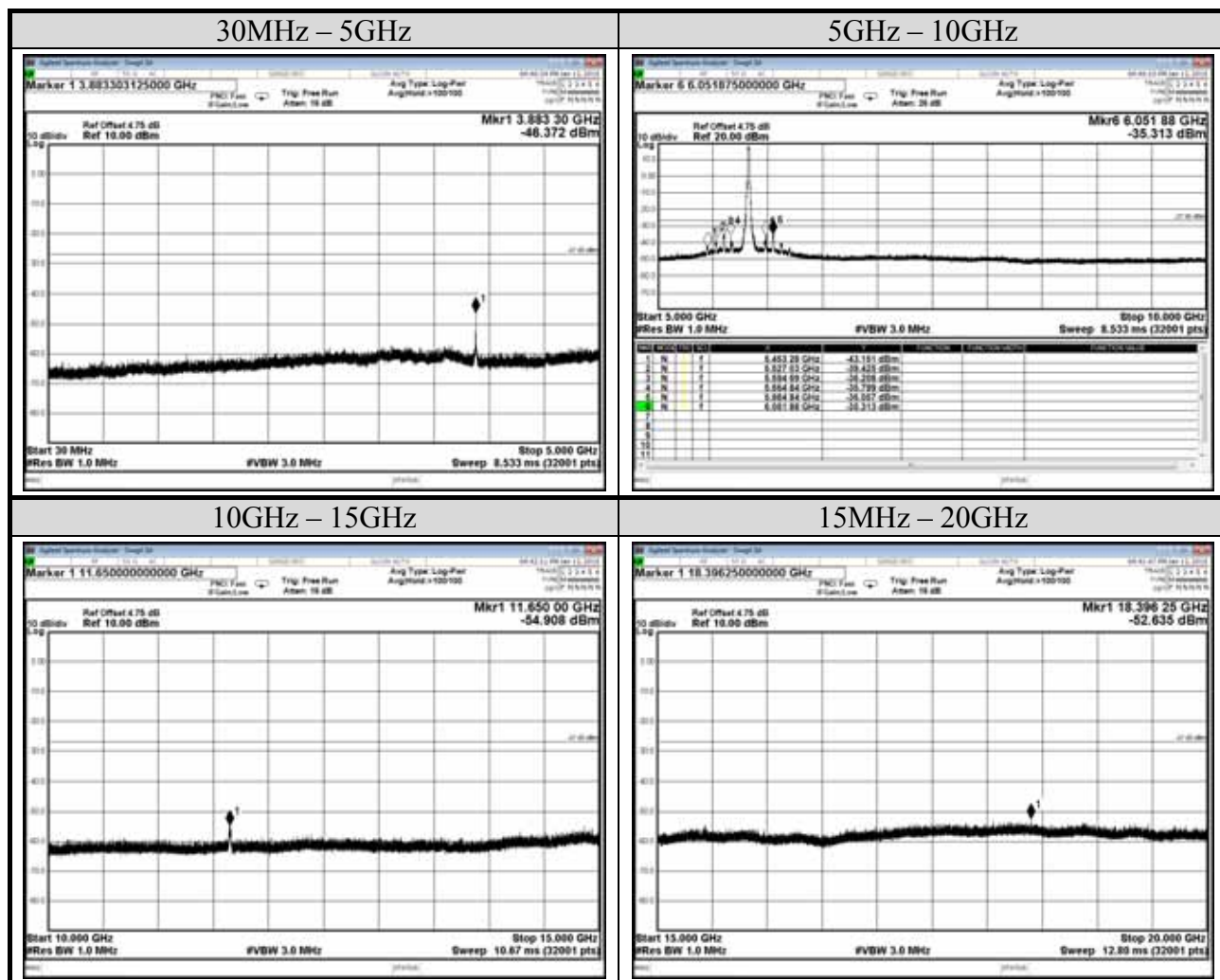


Note: The results have been included cable loss and antenna gain.

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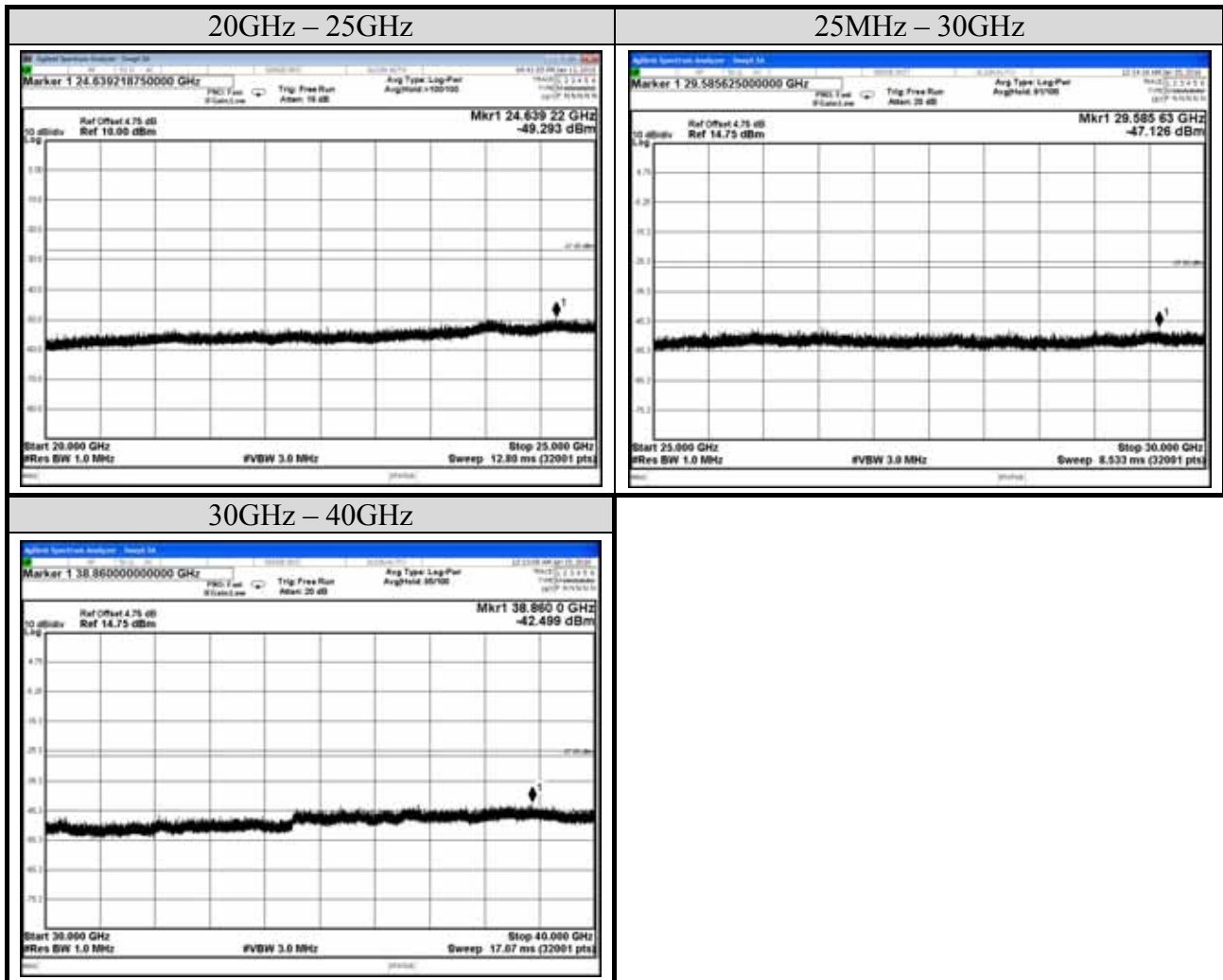
Tel: +886 2 26099301
Fax: +886 2 26099303

Test Date	2016/01/12	Temp./Hum.	22 /42%
Mode	802.11a	UNII Band	III
Test Voltage	DC 12V		
		Frequency	TX 5825MHz



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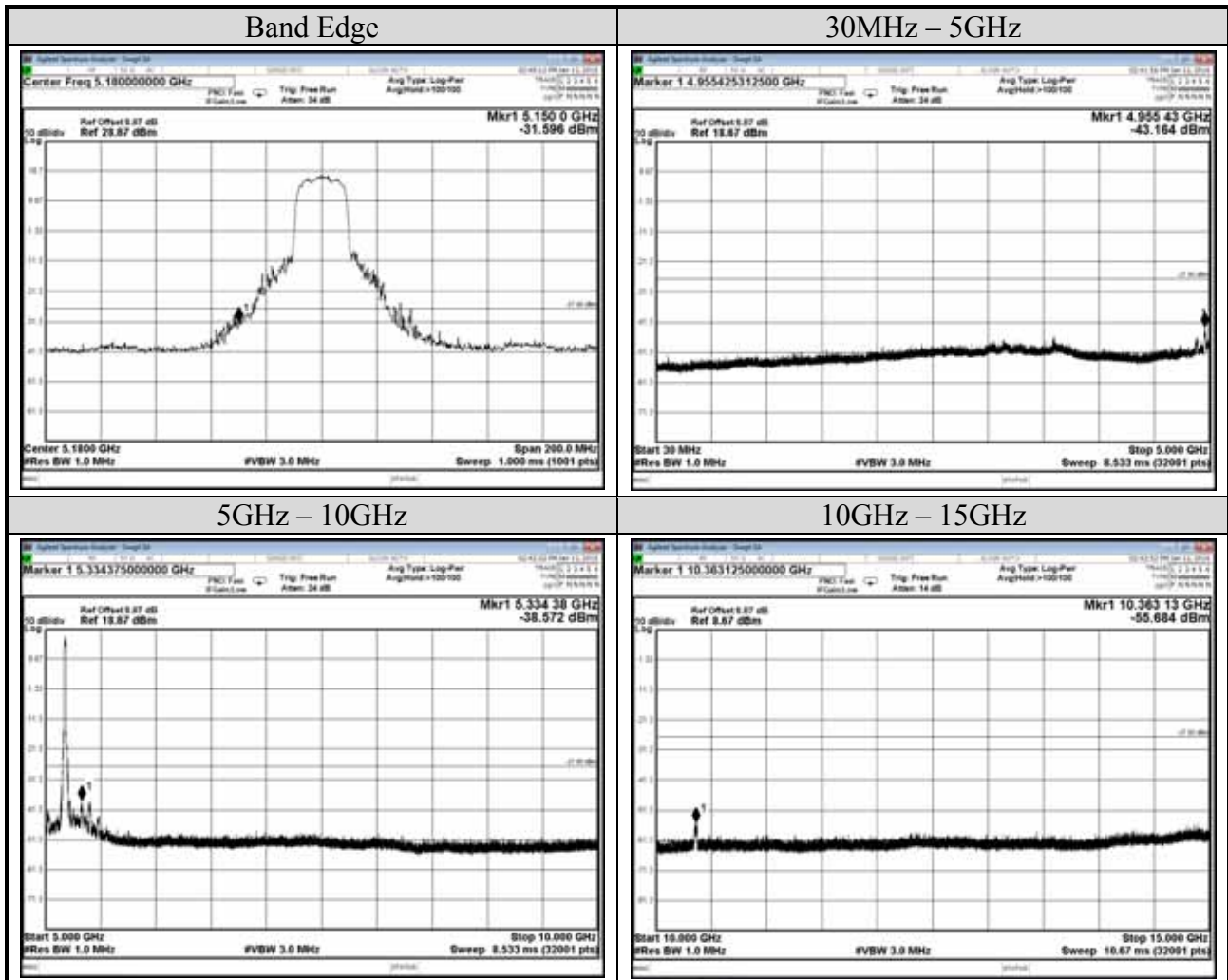


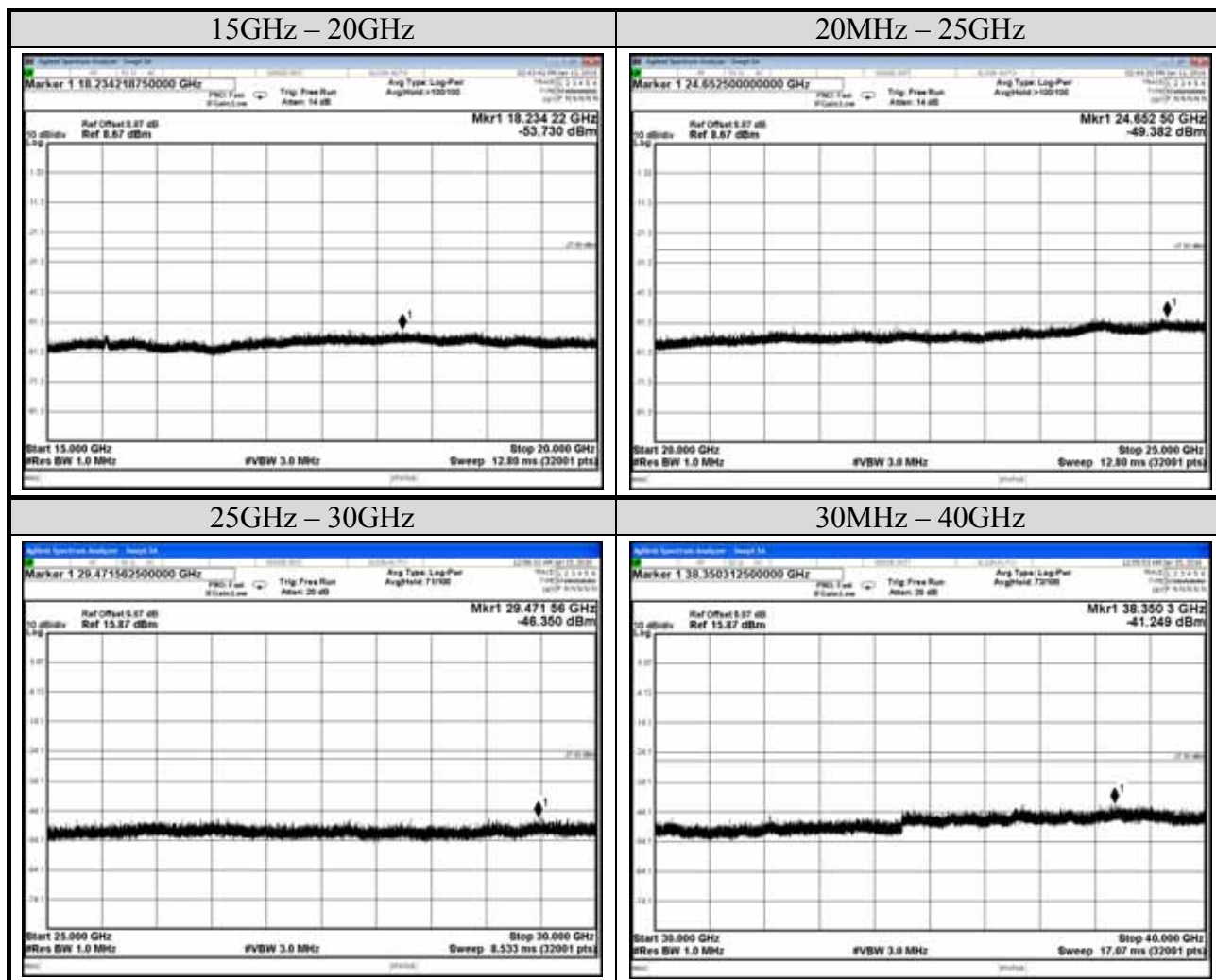
Note: The results have been included cable loss and antenna gain.

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Test Date	2016/01/12	Temp./Hum.	22 /42%
Mode	802.11n-HT20	UNII Band	I
		Frequency	TX 5180MHz
Test Voltage	DC 12V		



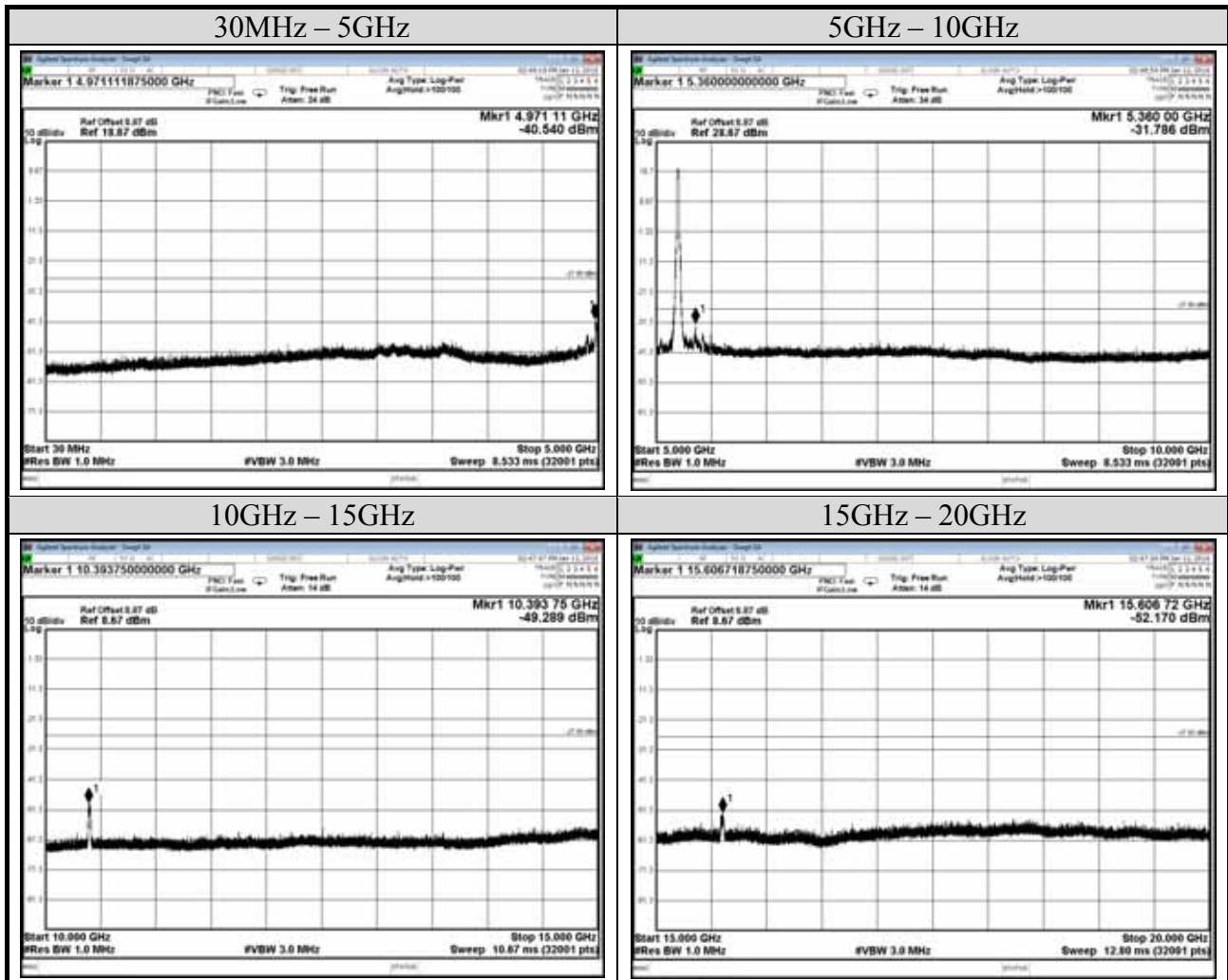


Note: The results have been included cable loss and antenna gain.

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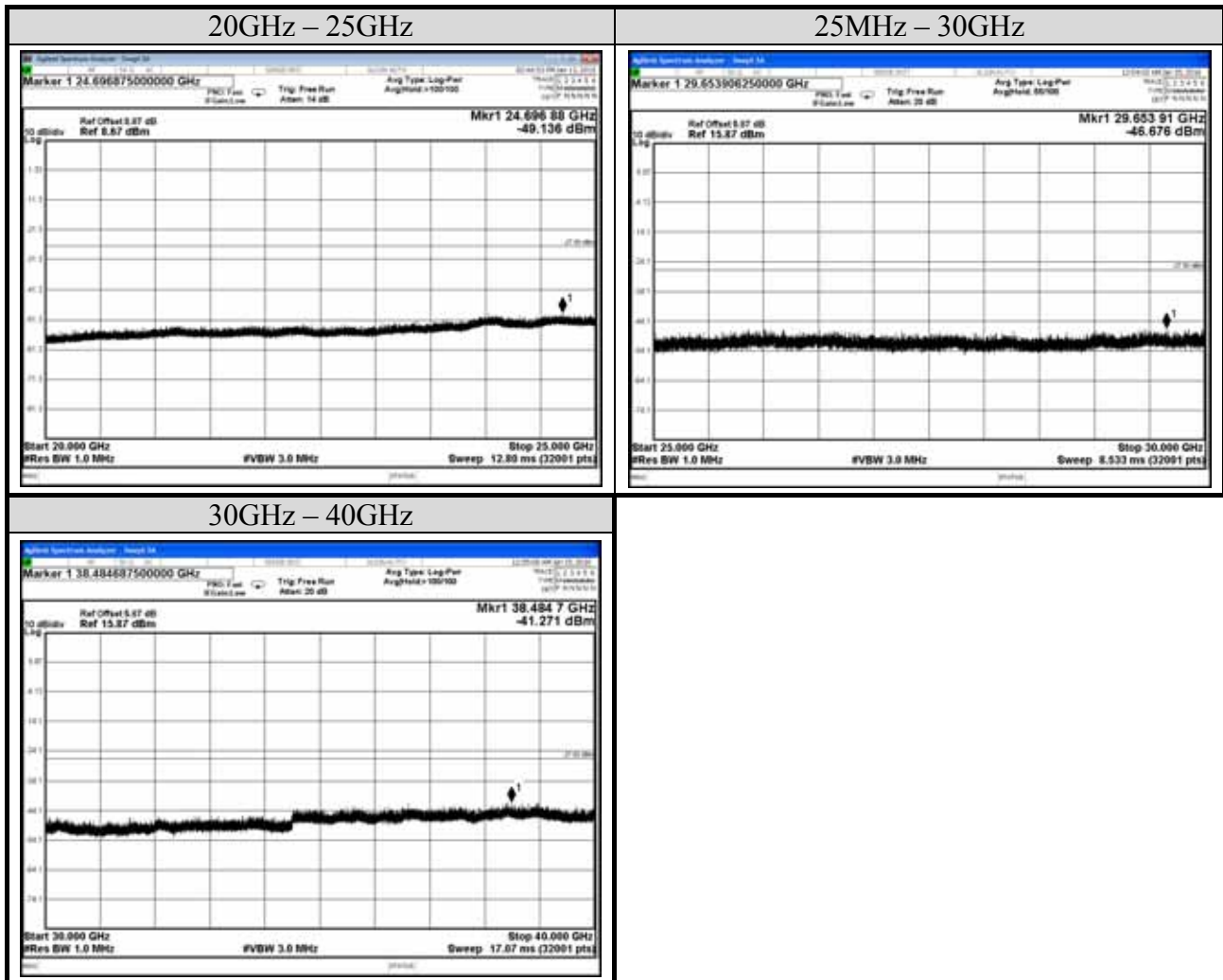
Tel: +886 2 26099301
Fax: +886 2 26099303

Test Date	2016/01/12	Temp./Hum.	22 /42%
Mode	802.11n-HT20	UNII Band	I
		Frequency	TX 5200MHz
Test Voltage	DC 12V		



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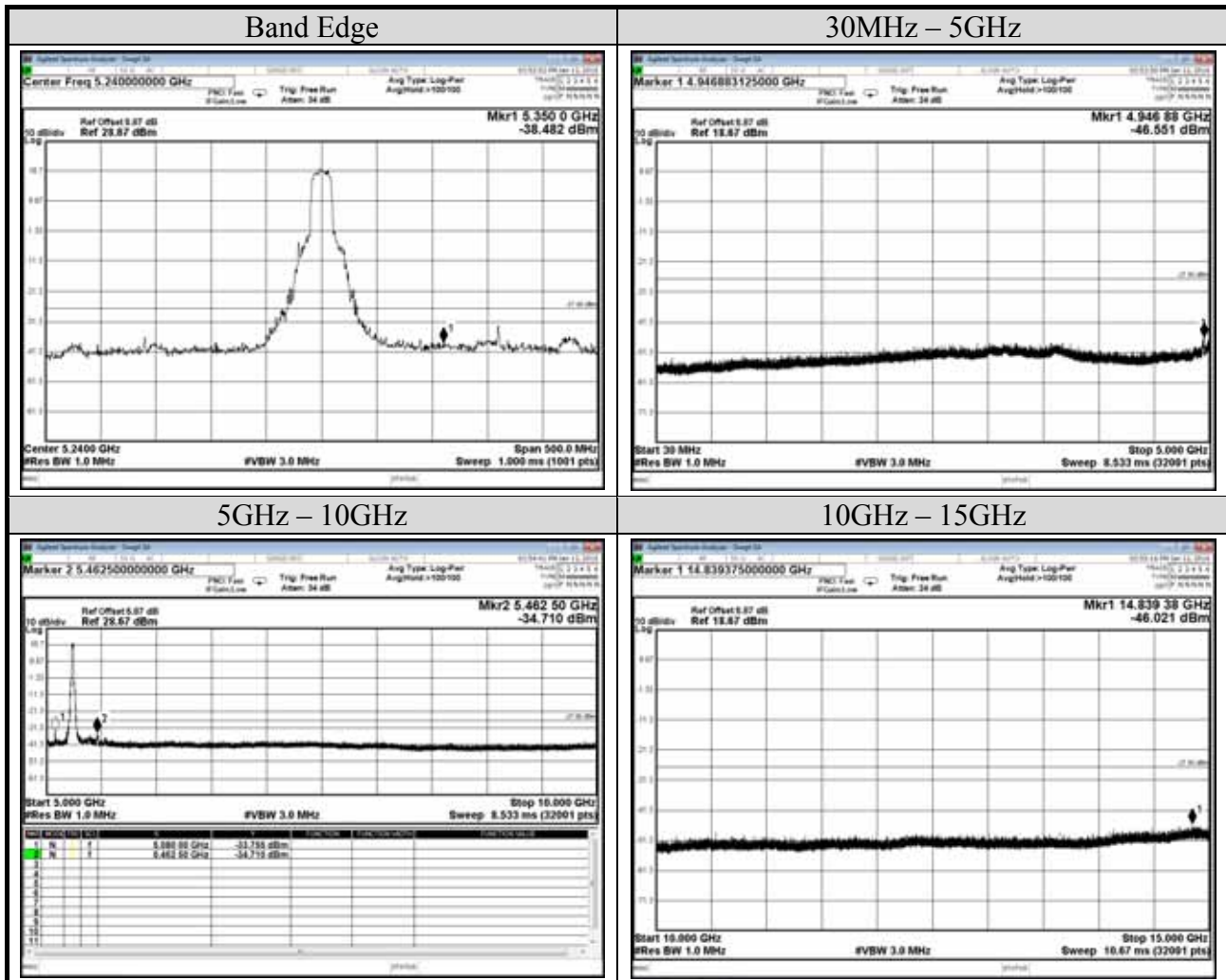


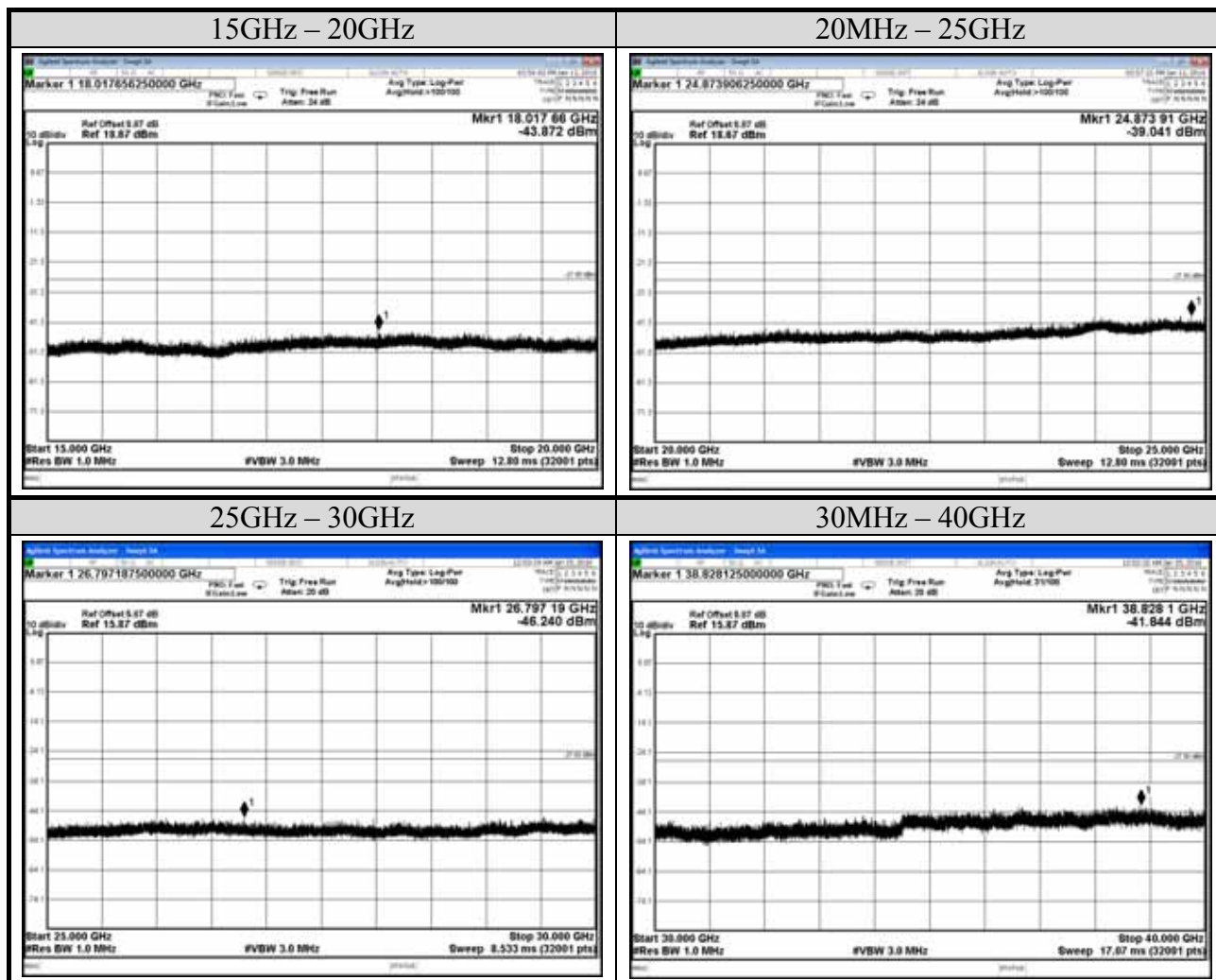
Note: The results have been included cable loss and antenna gain.

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Test Date	2016/01/12	Temp./Hum.	22 /42%
Mode	802.11n-HT20	UNII Band	I
		Frequency	TX 5240MHz
Test Voltage	DC 12V		



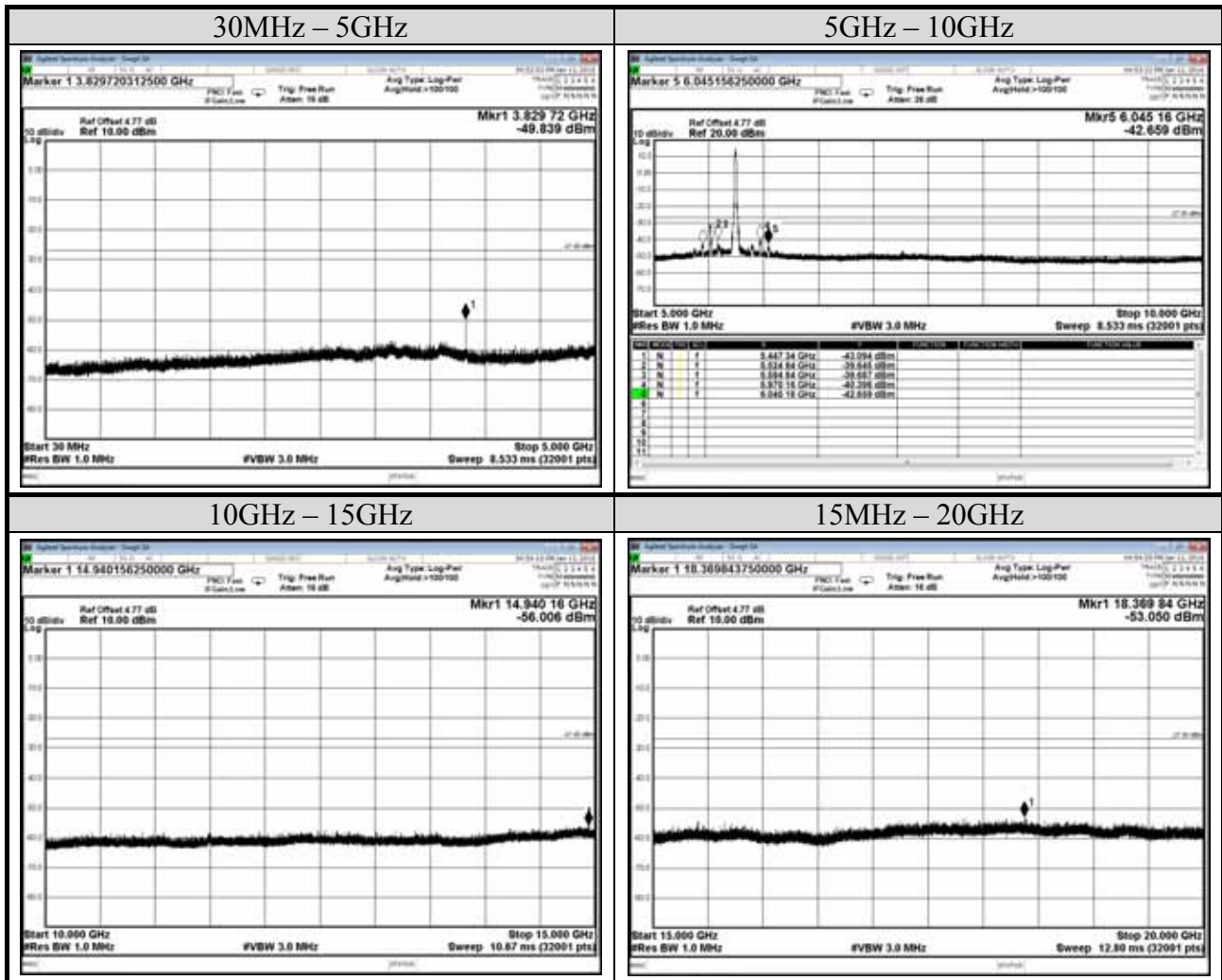


Note: The results have been included cable loss and antenna gain.

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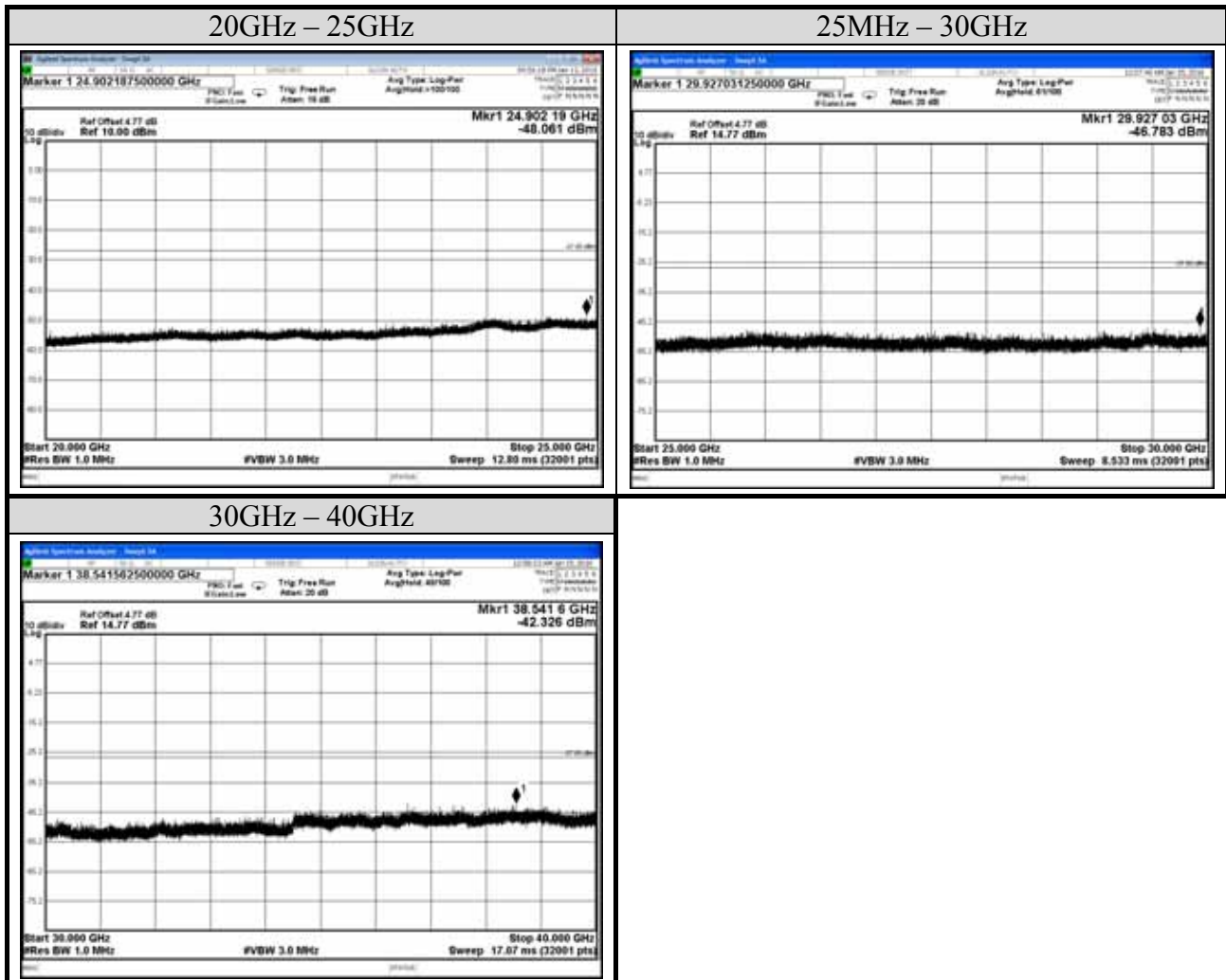
Tel: +886 2 26099301
Fax: +886 2 26099303

Test Date	2016/01/12	Temp./Hum.	22 /42%
Mode	802.11n-HT20	UNII Band	III
Test Voltage	DC 12V		
		Frequency	TX 5745MHz



AUDIX Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
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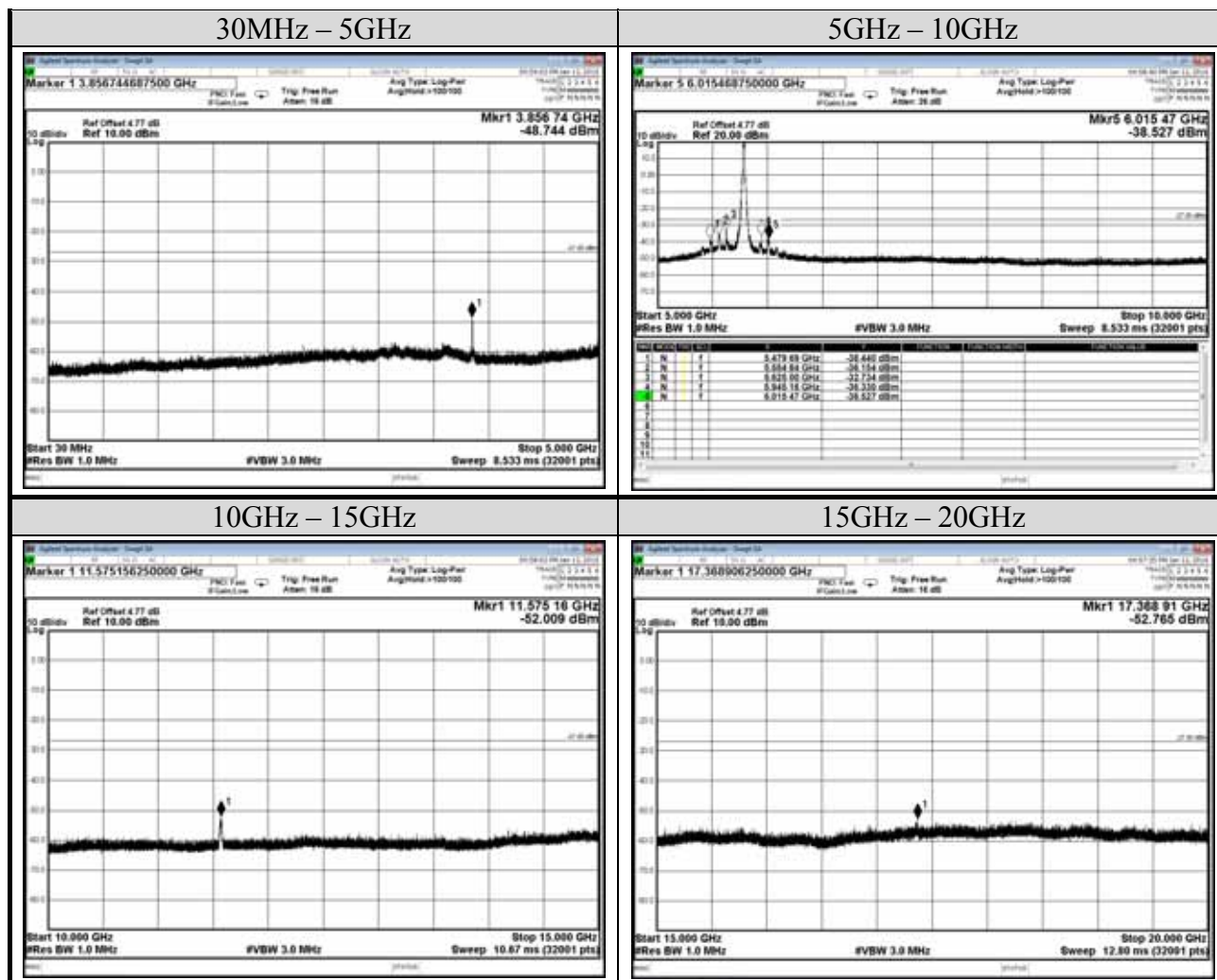


Note: The results have been included cable loss and antenna gain.

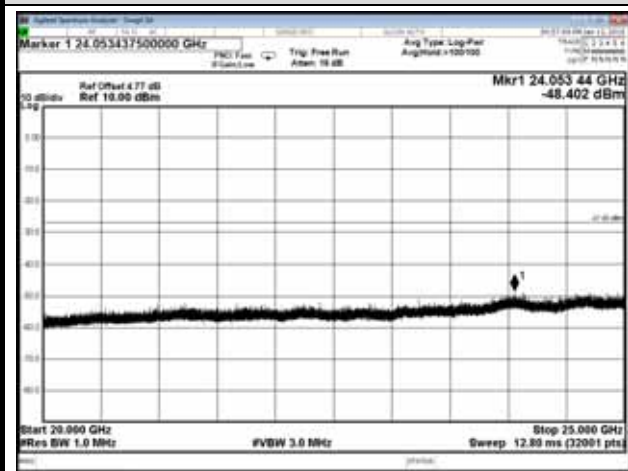
AUDIX Technology Corp.
No. 53-11, Dingfu, Linkou, Dist.,
New Taipei City244, Taiwan

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

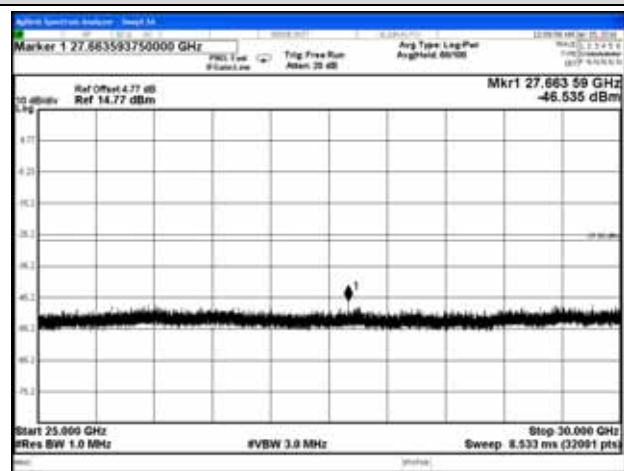
Test Date	2016/01/12	Temp./Hum.	22 /42%
Mode	802.11n-HT20	UNII Band	III
Test Voltage	DC 12V		
		Frequency	TX 5785MHz



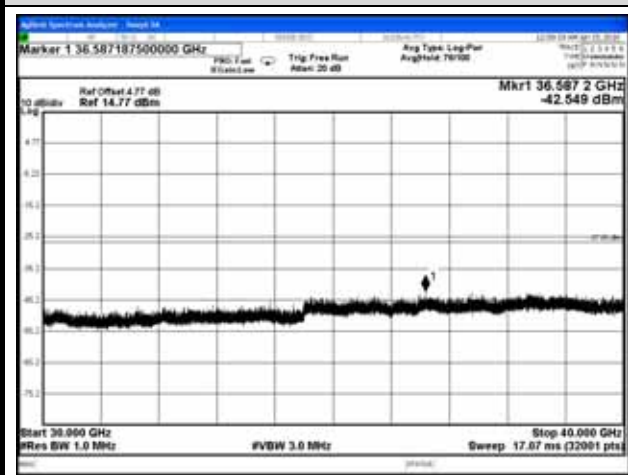
20GHz – 25GHz



25MHz – 30GHz



30GHz – 40GHz

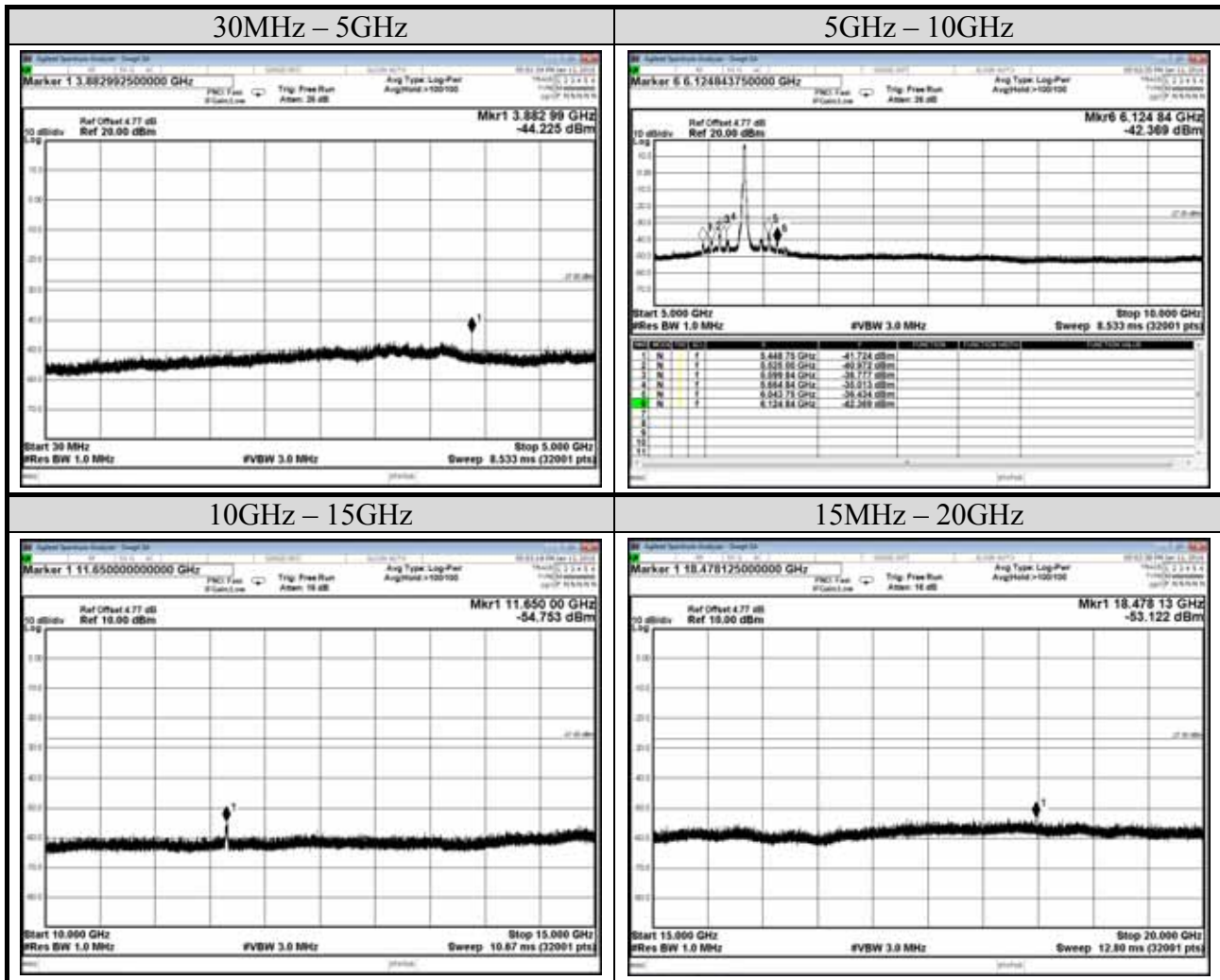


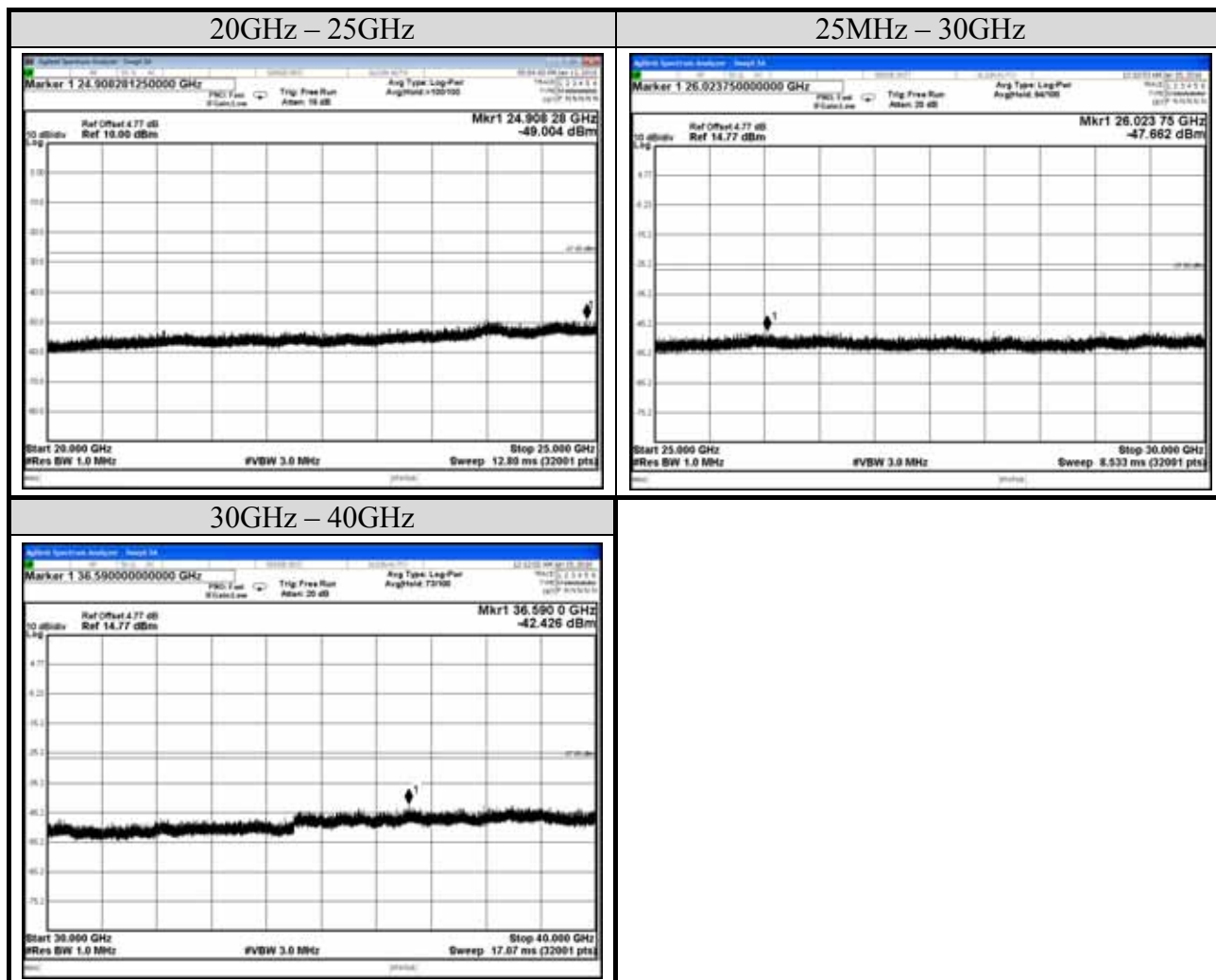
Note: The results have been included cable loss and antenna gain.

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Test Date	2016/01/12	Temp./Hum.	22 /42%
Mode	802.11n-HT20	UNII Band	III
Test Voltage	DC 12V		
		Frequency	TX 5825MHz





Note: The results have been included cable loss and antenna gain.

A.4 POWER SPECTRAL DENSITY

A.4.1 Power Spectral Density

Test Date	2016/01/12	Temp./Hum.	22 /42%
Test Voltage	DC 12V		

Modulation Type	UNII Band	Centre Frequency (MHz)	Power Spectral Density (dBm)	Limit
802.11a	I	5180	4.961	11 dBm/MHz
		5200	8.917	
		5240	9.431	
802.11n-HT20	I	5180	6.706	11 dBm/MHz
		5200	8.358	
		5240	8.866	

Modulation Type	UNII Band	Centre Frequency (MHz)	Power Spectral Density (dBm/100kHz)	BWCF Factor 100kHz to 500kHz (dB)	Total Power Density (dBm/500kHz)	Limit
802.11a	III	5745	-5.078	6.989	1.911	30dBm/500 kHz
		5785	-0.081		6.908	
		5825	-1.405		5.584	
802.11n-HT 20	III	5745	-6.012		0.977	
		5785	0.242		7.231	
		5825	-2.398		4.591	

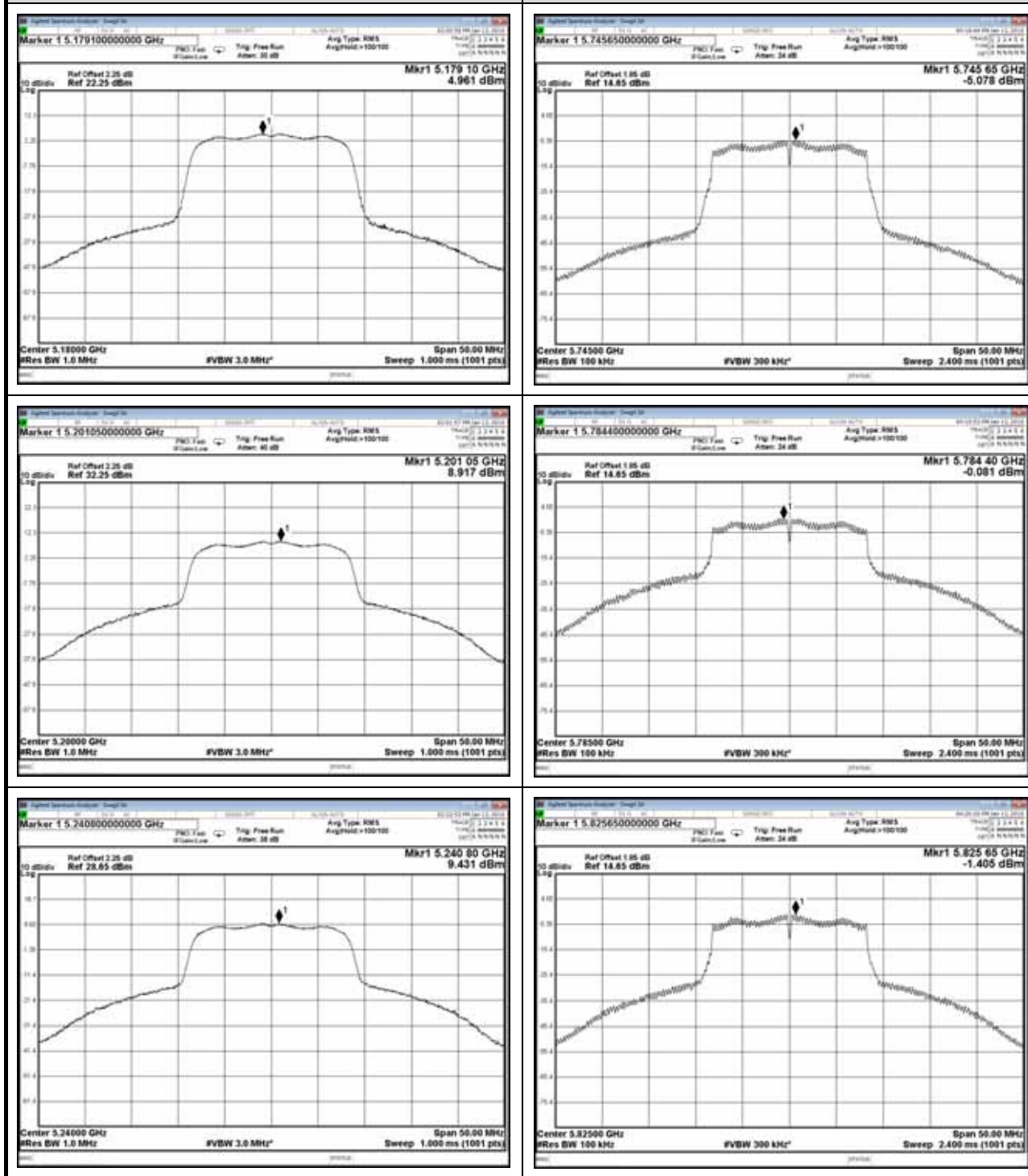
Note: The results have been included cable loss.

A.4.2 Measurement Plots

802.11a

UNII Band I

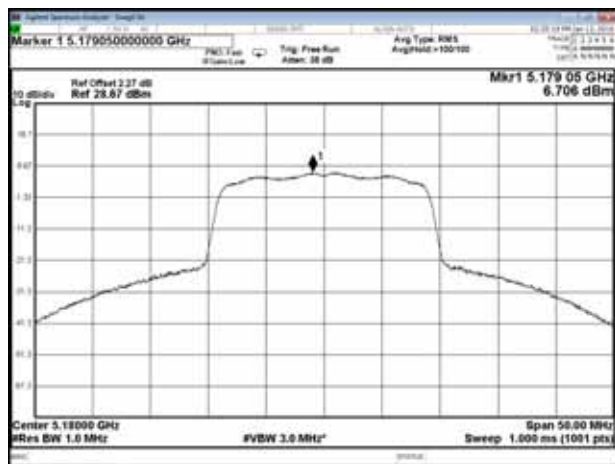
UNII Band III



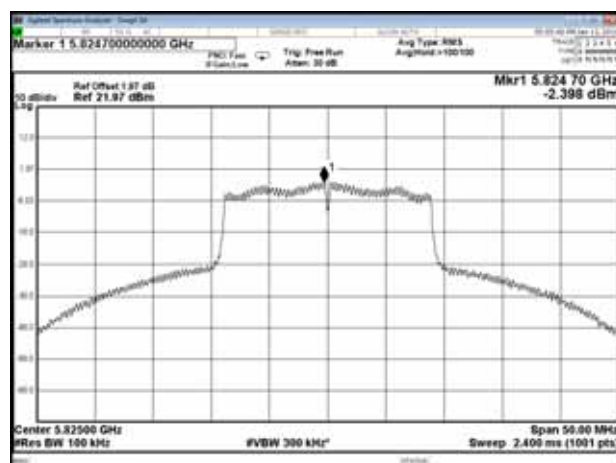
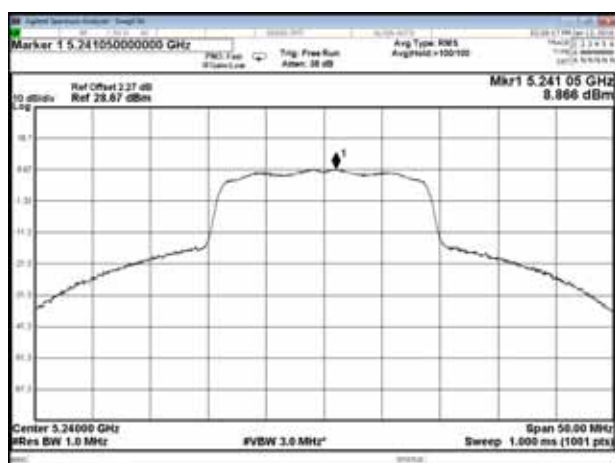
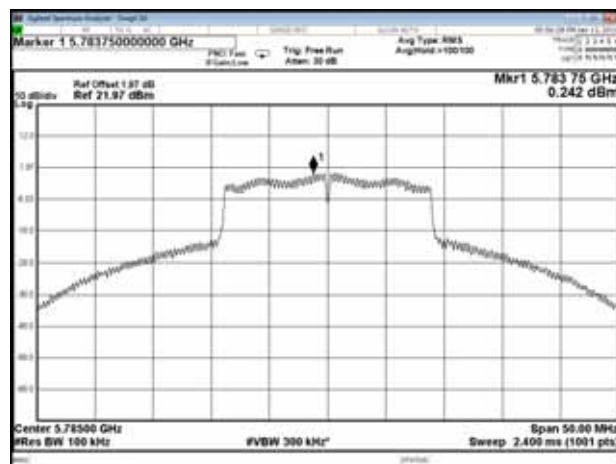
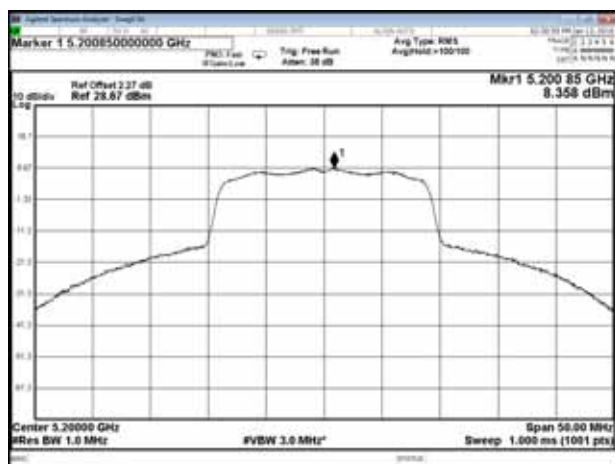
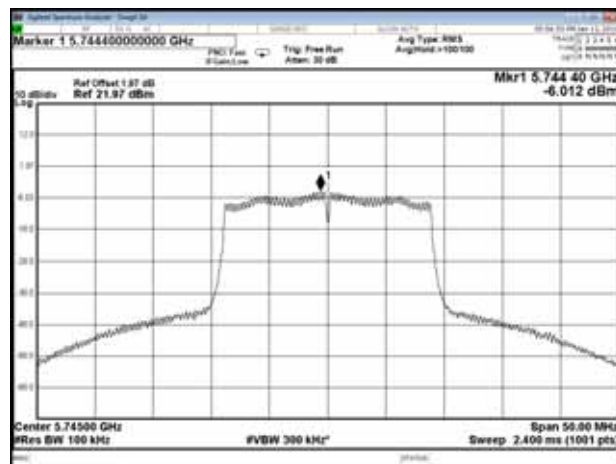
Note: The results have been included cable loss.

802.11n-HT20

UNII Band I



UNII Band III



Note: The results have been included cable loss.