

**FCC 15.407 NII  
(Class II Permissive Change)  
5 GHz Report**

**for**

**AmTRAN Technology Co., Ltd.**

**17F., No. 268, Liancheng Rd., Jhonghe District,  
New Taipei City 23553, Taiwan, R.O.C.**

**Brand : AMTRAN**  
**Product Name : (1)5G Wireless Audio Transceiver Module  
(2)5G Wireless Audio Receiver Module**  
**Model Name : (1)WLL7010-D113 (2)WLL7011-D113  
(3)SM5D2TV001 (4)SM5D2RV001**  
**FCC ID : MDZ-WLL701X**

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

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

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APPENDIX A TEST PLOTS  
APPENDIX B TEST PHOTOGRAPHS

## TEST REPORT CERTIFICATION (Class II Permissive Change)

Applicant : AmTRAN Technology Co., Ltd.  
Manufacture : #1 Askey Computer Corp.  
                  #2 ASKEY TECHNOLOGY (JIANG SU) LTD.  
Product Name : (1)5G Wireless Audio Transceiver Module  
                  (2)5G Wireless Audio Receiver Module  
Model No. : (1)WLL7010-D113 (2)WLL7011-D113  
                  (3)SM5D2TV001 (4)SM5D2RV001  
Serial No. : N/A  
Brand : AMTRAN

Applicable Standards:

FCC Rules and Regulations Part 15 Subpart C, Oct. 2014  
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: 2014. 11. 18 ~ 12. 01

Date of Report: 2015. 12. 04

Producer: Sabrina Wang  
(Sabrina Wang/Administrator)

Signatory: Ben Cheng  
(Ben Cheng/Manager)

## 1. REPORT HISTORY

Revision	Date	Revision Summary	Report Number
Rev. A	2015. 12. 04	<ol style="list-style-type: none"><li>1. To update the FCC 15.407 standard to the latest version.</li><li>2. To add two new models (1)SM5D2TV001 (2)SM5D2RV001 for different marketing purpose and accessory.</li><li>3. Supplementary test data are recorded in this report.</li></ol>	EM-F150225
<b>** Original Report is tested by Sporton International Inc.**</b>			

## 2. SUMMARY OF TEST RESULTS

Rule	Description	Results
15.207	Conducted Emission	N/A, Note
15.247(d)/ 15.205	Radiated Band Edge and Radiated Spurious Emission	PASS
15.407(a)(5)/ 15.407(e)	Emission Bandwidth Measurement	PASS
15.407(a)	Maximum Output	PASS
15.407(b)	Conducted Band Edges and Conducted Spurious Emission	PASS
15.407(a)	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	(1)5G Wireless Audio Transceiver Module (2)5G Wireless Audio Receiver Module
Model Number	(1)WLL7010-D113 (2)WLL7011-D113 (3)SM5D2TV001 (4)SM5D2RV001
Serial Number	N/A
Brand Name	AMTRAN
Applicant	AmTRAN Technology Co., Ltd. 17F., No. 268, Liancheng Rd., Jhonghe District, New Taipei City 23553, Taiwan, R.O.C.
Manufacture	Askey Computer Corp. 10F, No. 119, Chienkang Rd., Chung-Ho, Taiwan, R.O.C.
	ASKEY TECHNOLOGY (JIANG SU) LTD. No. 1388, Jiao Tong Road, Wujiang Economic-Technological Development Area, Jiangsu Province, P.R. China
RF Features	802.11a
Transmit Type	1T1R
Device Category	Outdoor Access Point Fixed point-to-point Access Point Indoor Access Point Mobile and Portable client device
Date of Receipt of Sample	2015. 11. 20
Antenna Type	5.36dBi
Information for Class II Change Permissive:	<b>1. To update the FCC 15.407 standard to the latest version.</b> <b>2. To add two new models (1)SM5D2TV001 (2)SM5D2RV001 for different marketing purpose and accessory.</b> <b>3. Supplementary test data are recorded in this report.</b> <b>4. Original Report is tested by Sporton International Inc.</b>

### 3.2. EUT Specifications Assessed in Current Report

UNII Band	Fundamental Range (MHz)	Channel Number	Modulation	Data Rate (Mbps)
I	5180-5240	4	OFDM Modulation (BPSK/QPSK/16QAM/64QAM)	6/9/12/18/24/36/ 48/54
IV	5725-5825	3		

Channel List			
UNII Band	Frequency (MHz)	UNII Band	Frequency (MHz)
I	5180	IV	5736
	5210		5762
	5220		5814
	5240		

### 3.3. Test Configuration

Duty Cycle (x)	T (ms)	Duty Cycle Factor (dB)
1	N/A	N/A

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



Item		Test Frequency
Radiated Test Case	Radiated Band Edge <sup>Note1</sup>	TX 5180MHz, TX 5210MHz, TX 5240MHz, TX 5736MHz, TX 5762MHz, TX 5814MHz, RX 5180MHz
	Radiated Spurious Emission <sup>Note1</sup>	5180MHz,
Conducted Test Case	Emission Bandwidth	5180MHz, 5210MHz, 5240MHz, 5736MHz, 5762MHz, 5814MHz
	Maximum output power	5180MHz, 5210MHz, 5240MHz, 5736MHz, 5762MHz, 5814MHz
	Emission Limitations	5180MHz, 5210MHz, 5240MHz, 5736MHz, 5762MHz, 5814MHz
Conducted Test Case	Power spectral density	5180MHz, 5210MHz, 5240MHz, 5736MHz, 5762MHz, 5814MHz

Note 1:

Mobile Device

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

Lie

Side

Stand

### 3.4. Tested Supporting System List

#### 3.4.1. Support Peripheral Unit

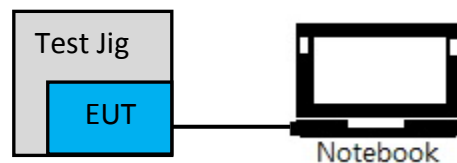
No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Notebook PC	acer	MS2362	N/A	PPD-AAR5B225
2.	Test Jig	N/A	N/A	N/A	N/A

#### 3.4.2. Cable Lists

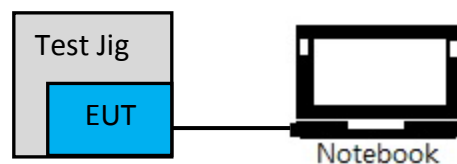
No.	Cable Description Of The Above Support Units
1.	LAN Cable: Shielded, Detachable, 1.0m USB Cable: Shielded, Detachable, 1.8m Adapter: Chicony, M/N CPA09-A065N1, DC Cord: Shielded, Undetachable, 1.8m, Bonded a ferrite core AC Power Cord: Unshielded, Detachable, 1.8m
2.	N/A

### 3.5. Setup Configuration

#### 3.5.1. EUT Configuration for Power Line Emission



#### 3.5.2. EUT Configuration for Conducted Test Items



### 3.6. Operating Condition of EUT

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

### 3.7. Description of Test Facility

Test Firm Name	:	<b>AUDIX Technology Corporation</b> <b>EMC Department</b> No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan
Test Location & Facility	:	<b>No. 1 3M Semi-Anechoic Chamber</b> No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan IC Test Site Registration No.: 5183B-1 Renewal on August 24, 2015  <b>Fully Anechoic Chamber</b> 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

### 3.8. Measurement Uncertainty

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

Remark : Uncertainty =  $ku_c(y)$

Test Item	Uncertainty
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 1000MHz (Fully Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	2015. 08. 20	1 Year
2.	Amplifier	Sonoma	310N	187161	2015. 06. 17	1 Year
3.	Horn Antenna	ETS-Lindgren	3117	00135902	2015. 03. 06	1 Year
4.	5GHz Notch Filter	Microwave Circuits	N0452502	459775	2015. 01. 12	1 Year
5.	5GHz Notch Filter	Microwave Circuits	N0258771	459776	2015. 01. 12	1 Year

### 4.2. RF Conducted Measurement

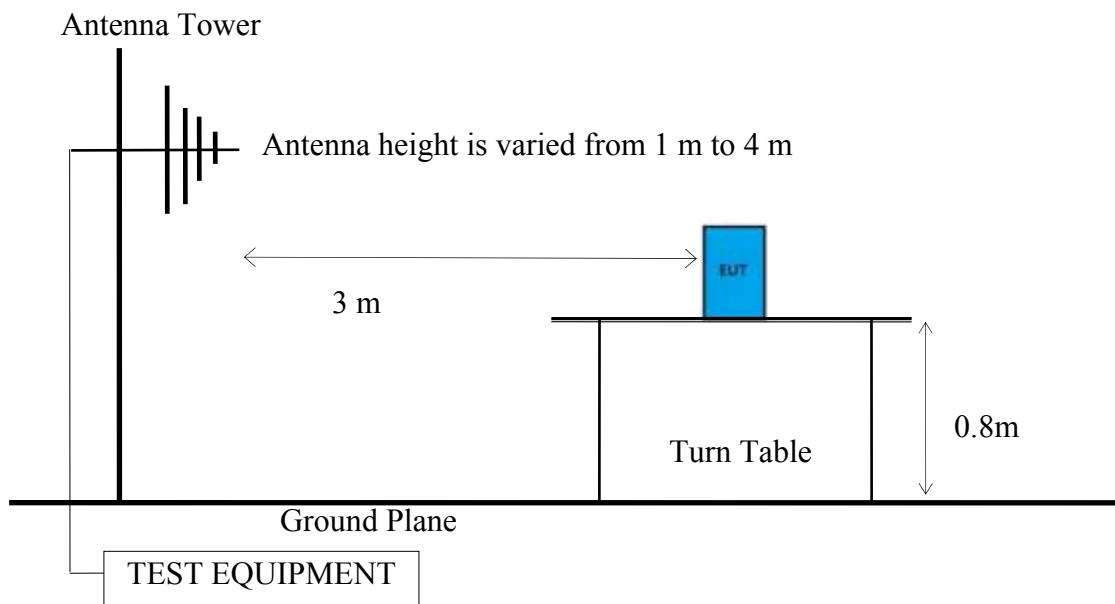
Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	2015. 06. 10	1 Year
2.	Spectrum Analyzer	R&S	FSV30	101181	2015. 03. 06	1 Year
3.	Power Meter	Anritsu	ML2495A	1145008	2015. 10. 23	1 Year
4.	Power Sensor	Anritsu	MA2411B	1126096	2015. 10. 23	1 Year

## 5. RADIATED EMISSION MEASUREMENT

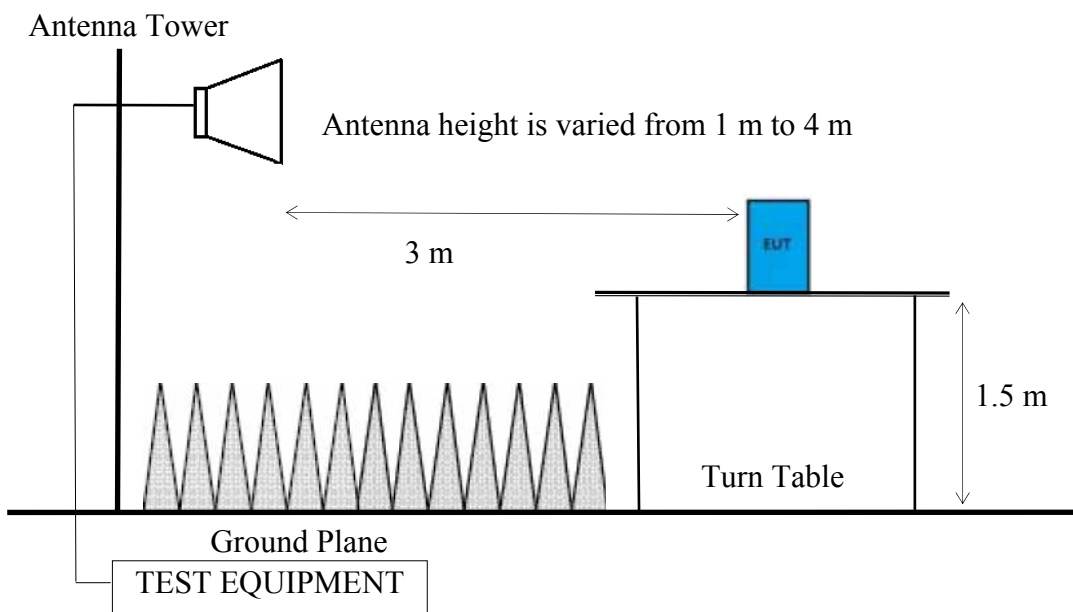
### 5.1. Block Diagram of Test Setup

5.1.1. Block Diagram of connection between EUT and simulators  
Indicated as section 3.7

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



5.1.3. Fully 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 $\text{dBm/MHz}$ <sup>Note 1</sup> -27 $\text{dBm/MHz}$ <sup>Note 2</sup>	78.2 <sup>Note 1</sup> 68.2 <sup>Note 2</sup>

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 80 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 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 (up to 40 GHz):

#### **Peak Detector:**

- (1) RBW = 1MHz
- (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 Measurement:**

##### **Option 1:**

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

##### **Option 2:**

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

#### 5.4. Measurement Result Explanation

Peak Emission Level=Antenna Factor + Cable Loss + Meter Reading  
Average Emission Level I=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	2015/11/30	Temp./Hum.	20 /45%
Test Voltage	DC 3.3V		

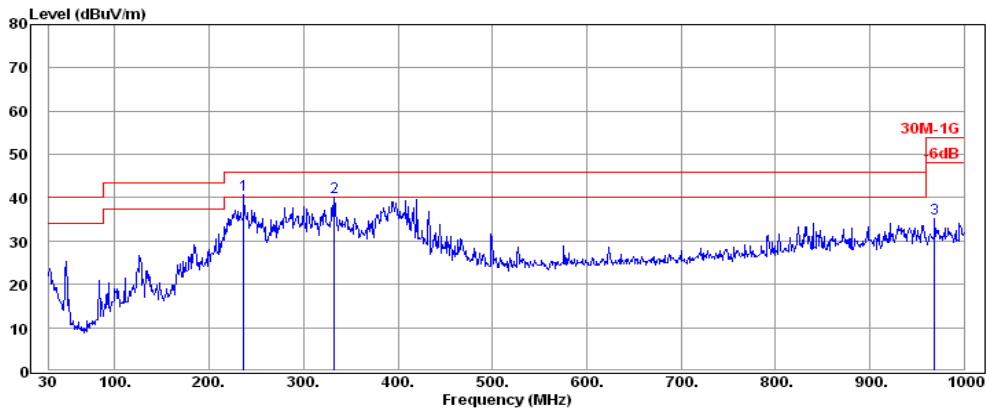


5.5.1. Emissions within Restricted Frequency Bands

5.5.1.1. Frequency Below 1 GHz

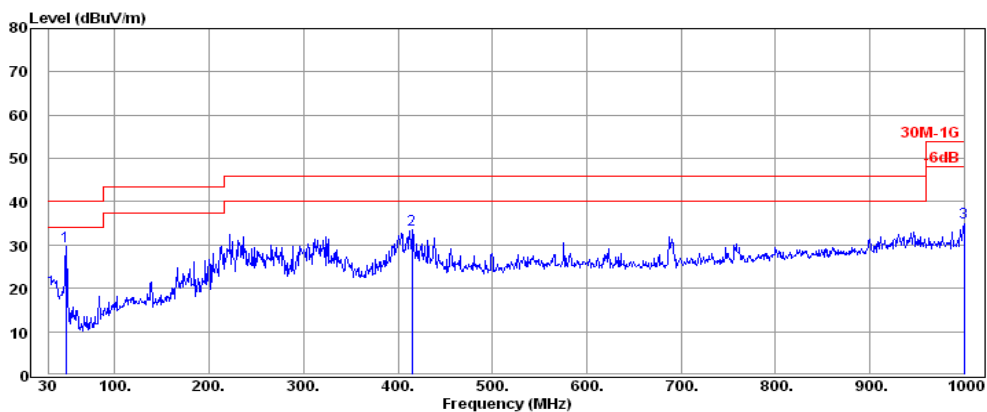
UNII Band	I	Frequency	TX 5180MHz
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**Antenna at Horizontal Polarization**



Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
236.61	11.62	4.24	24.83	40.69	46.00	5.31	Peak
332.64	13.99	5.01	21.27	40.27	46.00	5.73	Peak
968.96	20.94	7.94	6.30	35.18	54.00	18.82	Peak

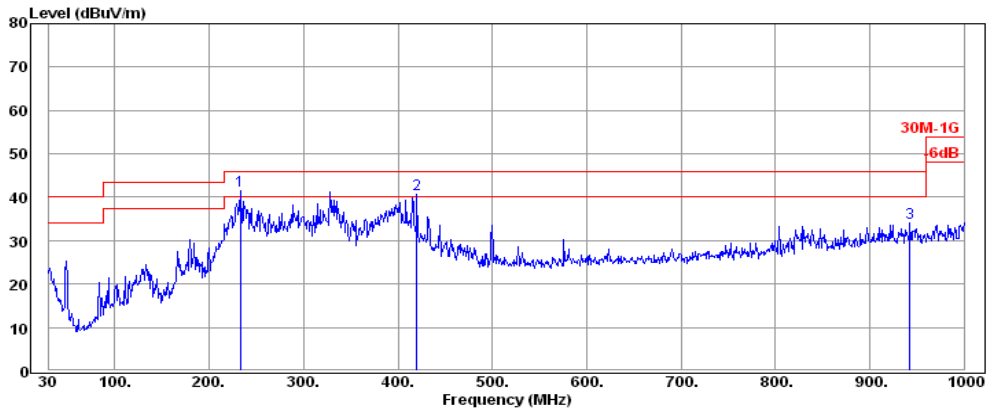
**Antenna at Vertical Polarization**



Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
48.43	9.08	2.62	17.95	29.65	40.00	10.35	Peak
415.09	15.78	5.78	11.96	33.52	46.00	12.48	Peak
1000.00	21.09	8.11	5.98	35.18	54.00	18.82	Peak

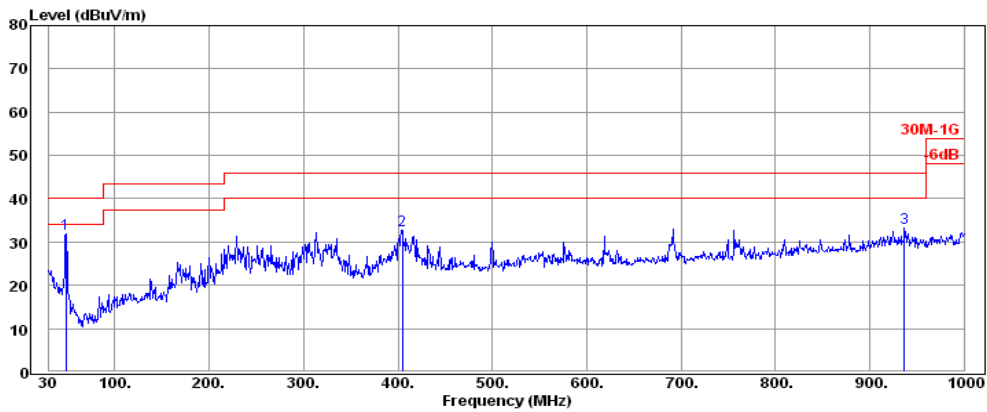
UNII Band	I	Frequency	TX 5210MHz
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**Antenna at Horizontal Polarization**



Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
232.73	11.37	4.22	25.99	41.58	46.00	4.42	Peak
419.94	15.87	5.83	18.94	40.64	46.00	5.36	Peak
942.77	20.80	7.79	5.42	34.01	46.00	11.99	Peak

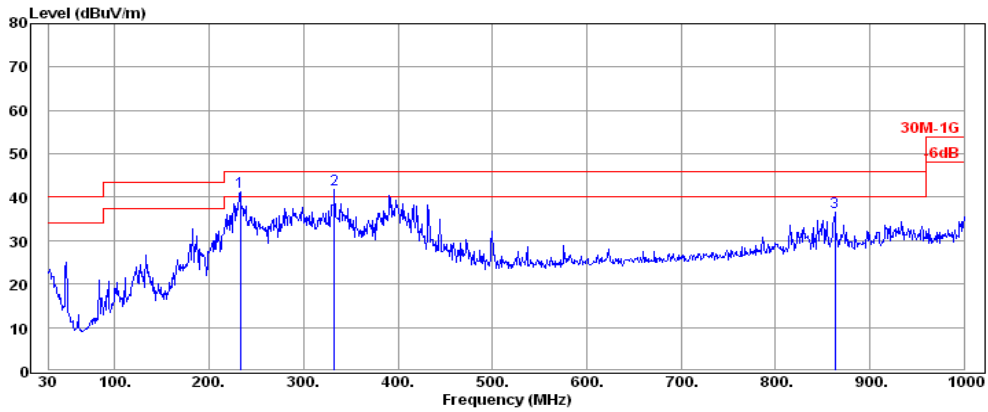
**Antenna at Vertical Polarization**



Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
48.43	9.08	2.62	20.20	31.90	40.00	8.10	Peak
404.42	15.63	5.70	11.37	32.70	46.00	13.30	Peak
936.95	20.77	7.75	4.72	33.24	46.00	12.76	Peak

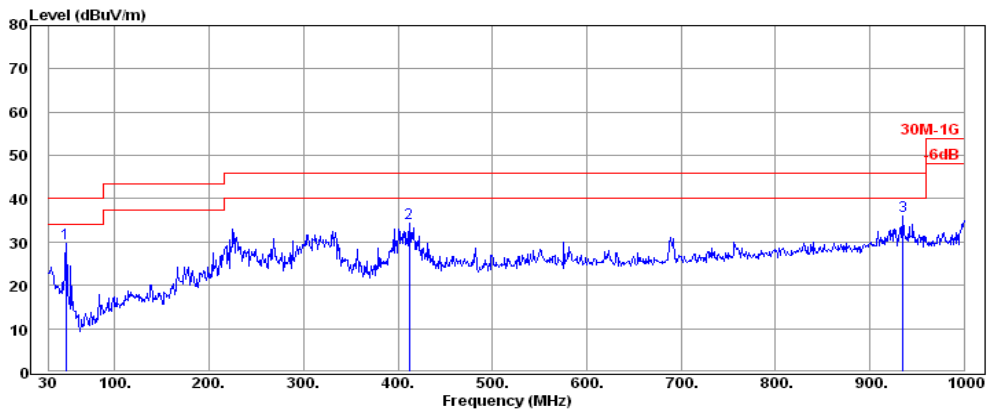
UNII Band	I	Frequency	TX 5240MHz
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**Antenna at Horizontal Polarization**



Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
232.73	11.37	4.22	25.62	41.21	46.00	4.79	Peak
332.64	13.99	5.01	22.81	41.81	46.00	4.19	Peak
863.23	20.38	7.41	8.79	36.58	46.00	9.42	Peak

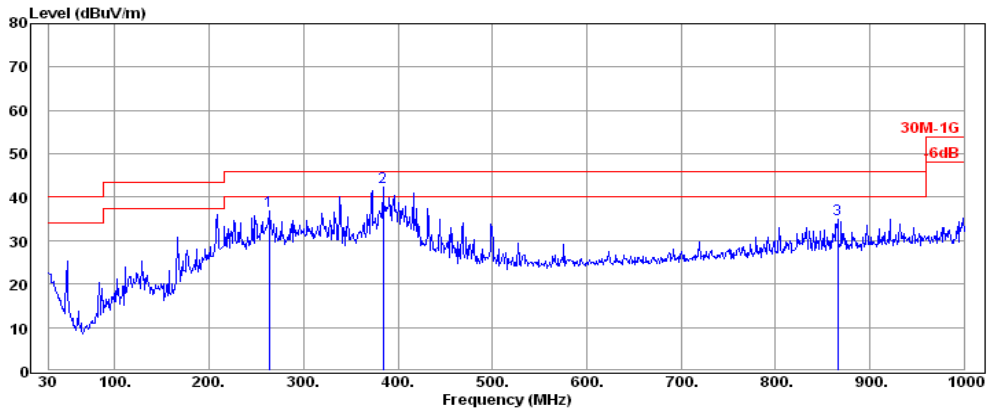
**Antenna at Vertical Polarization**



Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
48.43	9.08	2.62	18.01	29.71	40.00	10.29	Peak
412.18	15.74	5.76	12.88	34.38	46.00	11.62	Peak
935.01	20.77	7.75	7.43	35.95	46.00	10.05	Peak

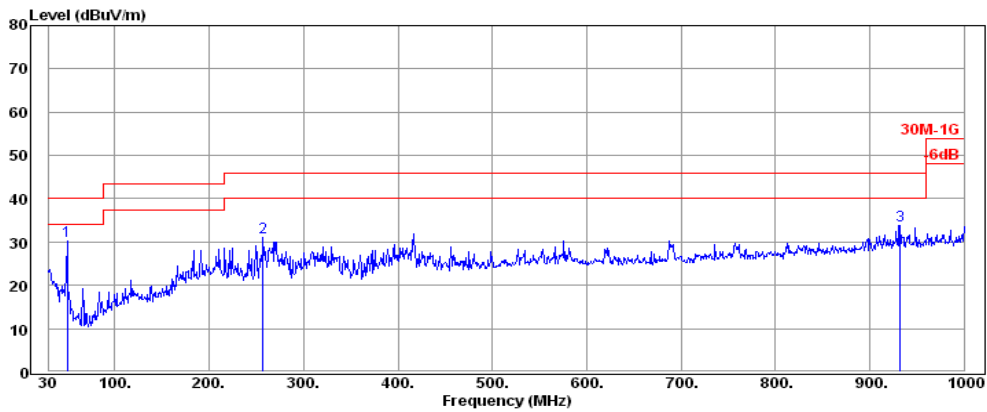
UNII Band	IV	Frequency	TX 5736MHz
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**Antenna at Horizontal Polarization**



Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
263.77	12.61	4.43	19.67	36.71	46.00	9.29	Peak
384.05	15.20	5.51	21.56	42.27	46.00	3.73	Peak
866.14	20.40	7.42	7.09	34.91	46.00	11.09	Peak

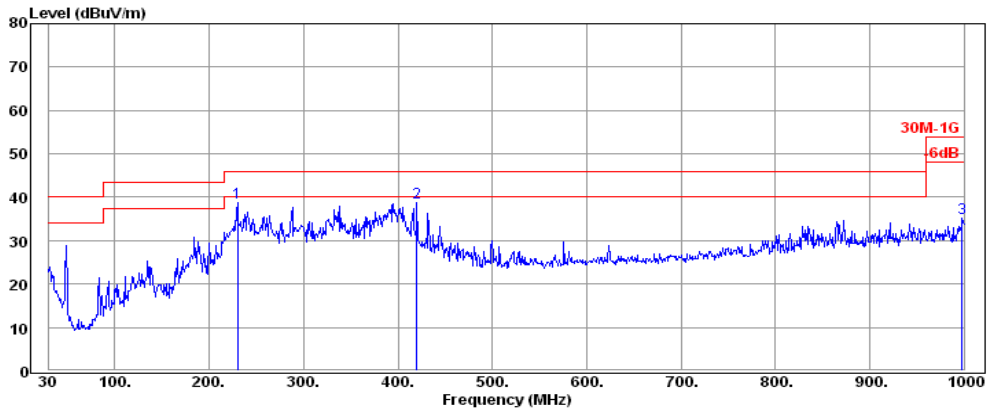
**Antenna at Vertical Polarization**



Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
49.40	8.68	2.63	18.80	30.11	40.00	9.89	Peak
256.98	12.51	4.38	14.27	31.16	46.00	14.84	Peak
932.10	20.75	7.73	5.36	33.84	46.00	12.16	Peak

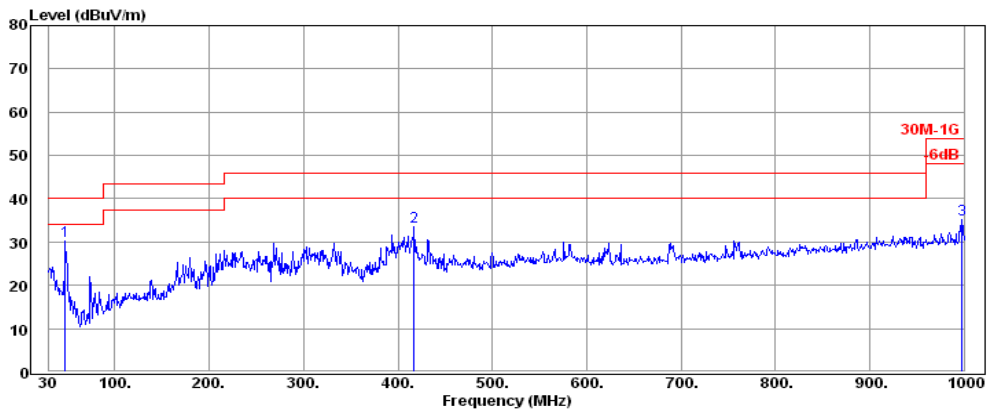
UNII Band	IV	Frequency	TX 5762MHz
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**Antenna at Horizontal Polarization**



Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
229.82	11.23	4.20	23.46	38.89	46.00	7.11	Peak
419.94	15.87	5.83	17.00	38.70	46.00	7.30	Peak
998.06	21.07	8.09	6.01	35.17	54.00	18.83	Peak

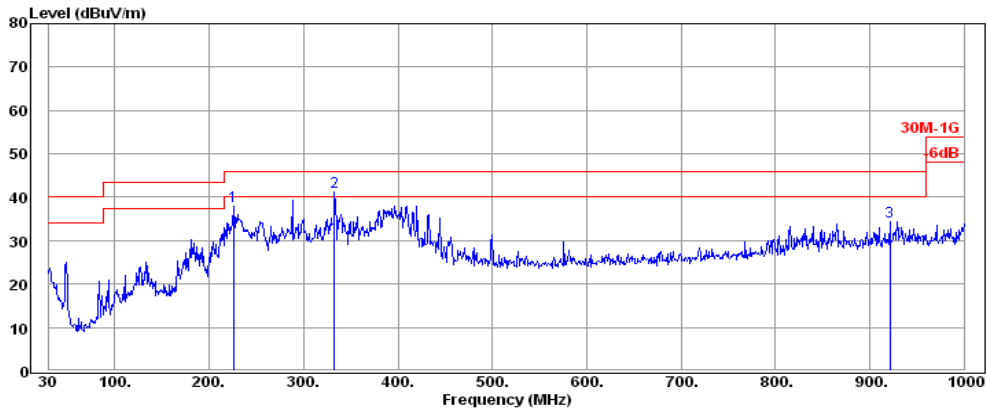
**Antenna at Vertical Polarization**



Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
47.46	9.56	2.61	18.19	30.36	40.00	9.64	Peak
417.03	15.82	5.81	11.99	33.62	46.00	12.38	Peak
998.06	21.07	8.09	6.15	35.31	54.00	18.69	Peak

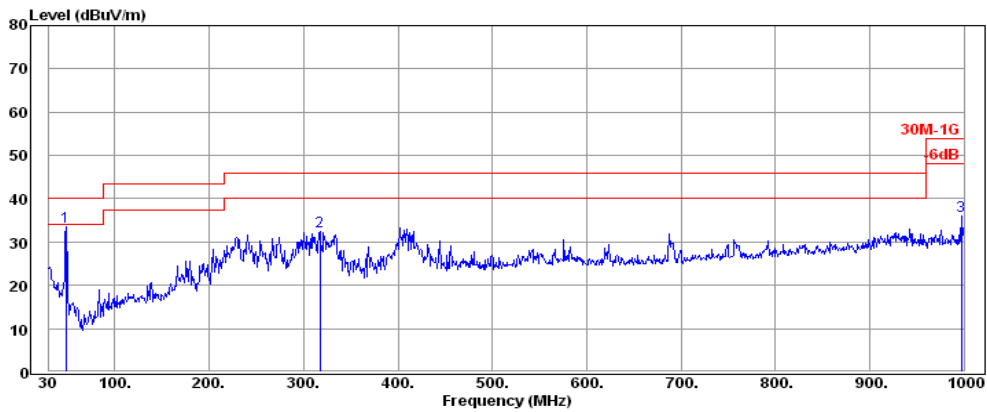
UNII Band	IV	Frequency	TX 5814MHz
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**Antenna at Horizontal Polarization**



Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
225.94	10.98	4.17	22.90	38.05	46.00	7.95	Peak
332.64	13.99	5.01	22.14	41.14	46.00	4.86	Peak
921.43	20.70	7.67	5.97	34.34	46.00	11.66	Peak

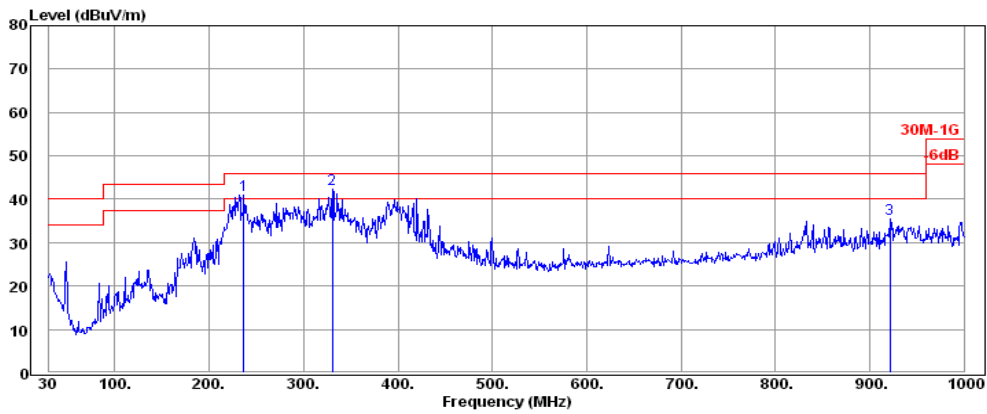
**Antenna at Vertical Polarization**



Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
48.43	9.08	2.62	21.80	33.50	40.00	6.50	Peak
317.12	13.57	4.84	14.05	32.46	46.00	13.54	Peak
997.09	21.07	8.09	6.74	35.90	54.00	18.10	Peak

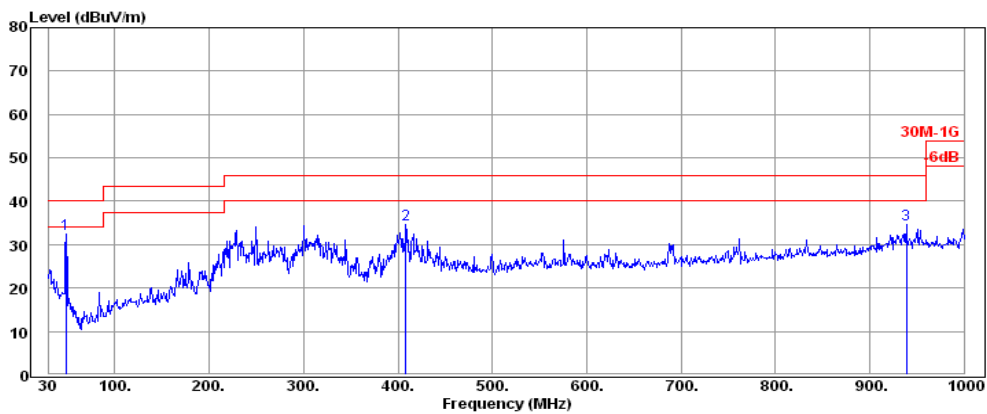
UNII Band	IV	Frequency	RX 5180MHz
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**Antenna at Horizontal Polarization**



Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
236.61	11.62	4.24	25.04	40.90	46.00	5.10	Peak
330.70	13.93	4.99	23.49	42.41	46.00	3.59	Peak
921.43	20.70	7.67	6.96	35.33	46.00	10.67	Peak

**Antenna at Vertical Polarization**



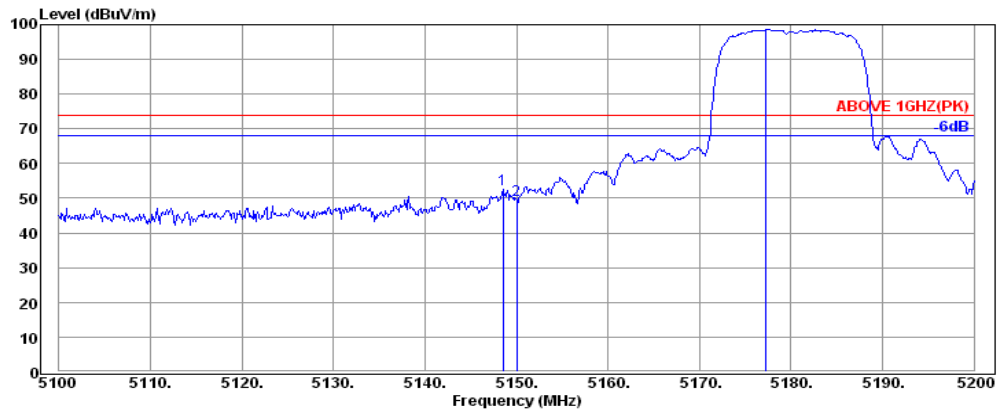
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
48.43	9.08	2.62	20.61	32.31	40.00	7.69	Peak
408.30	15.69	5.73	13.29	34.71	46.00	11.29	Peak
938.89	20.78	7.77	6.08	34.63	46.00	11.37	Peak

5.5.1.2. Frequency Above 1 GHz to 10<sup>th</sup> harmonics

**Band Edge:**

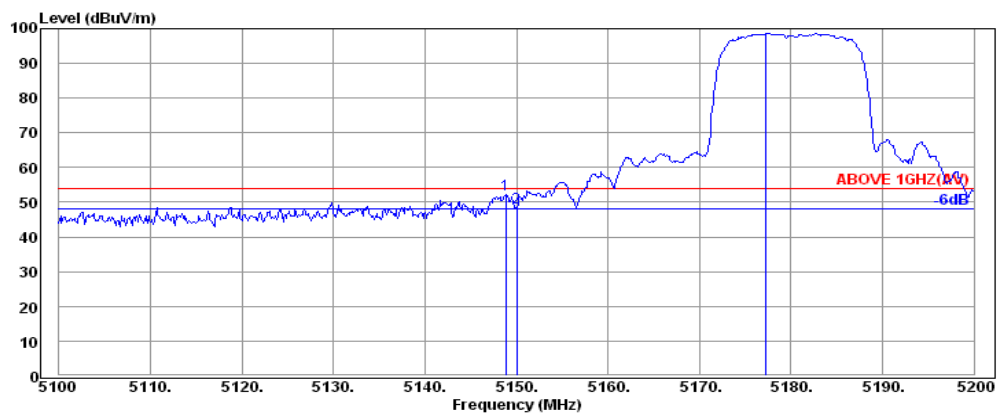
UNII Band	I	Frequency	TX 5180MHz
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**Antenna at Horizontal Polarization**



Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5148.50	34.45	8.84	9.33	52.62	74.00	21.38	Peak
5150.00	34.45	8.84	6.14	49.43	74.00	24.57	Peak
5177.30	34.48	8.77	55.46	98.71	---	---	Peak

**Antenna at Horizontal Polarization**

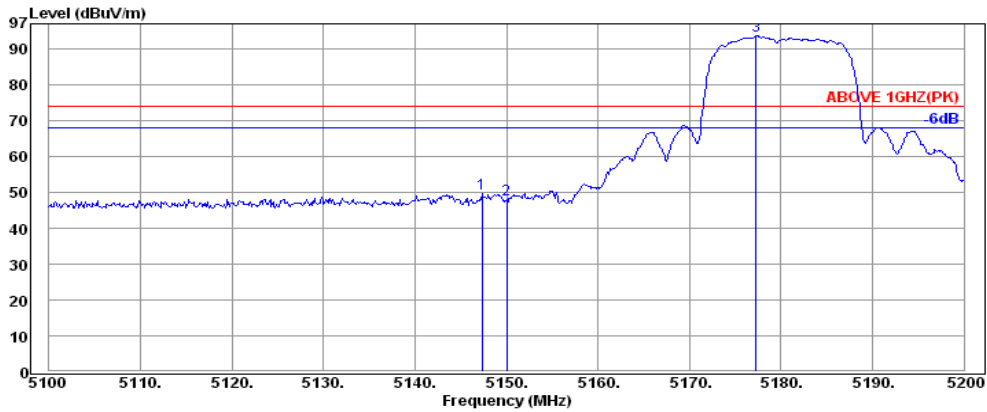


Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5148.80	34.45	8.84	9.03	52.32	54.00	1.68	Average
5150.00	34.45	8.84	5.27	48.56	54.00	5.44	Average
5177.30	34.48	8.77	55.50	98.75	---	---	Average



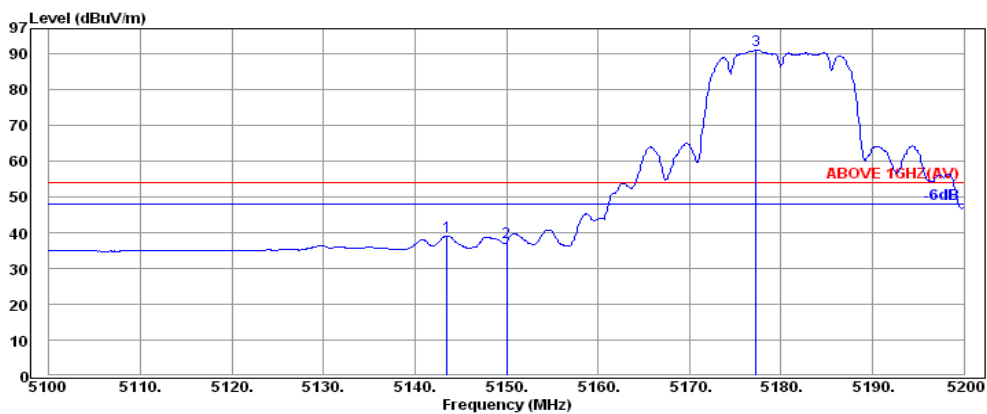
UNII Band	I	Frequency	TX 5180MHz
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**Antenna at Vertical Polarization**



Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5147.30	34.45	8.84	6.22	49.51	74.00	24.49	Peak
5150.00	34.45	8.84	4.64	47.93	74.00	26.07	Peak
5177.30	34.48	8.77	50.36	93.61	---	---	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
5143.50	34.45	8.84	-4.16	39.13	54.00	14.87	Average
5150.00	34.45	8.84	-6.03	37.26	54.00	16.74	Average
5177.30	34.48	8.77	47.84	91.09	---	---	Average

5.5.2. Emissions outside the frequency band:

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

UNII Band	IV	Frequency	TX 5762MHz
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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
5000.00	34.30	8.78	6.24	49.32	54.00	4.68	Peak

UNII Band	I	Frequency	RX 5180MHz
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**Antenna at Vertical Polarization**

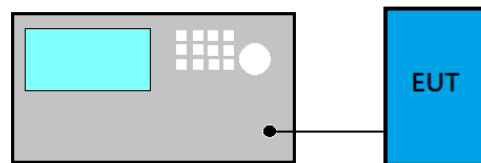
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4992.00	34.30	8.78	5.82	48.90	54.00	5.10	Peak

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, RSS-Gen Section 8.9 table 4 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
5250 to 5350	
5470 to 5725	
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

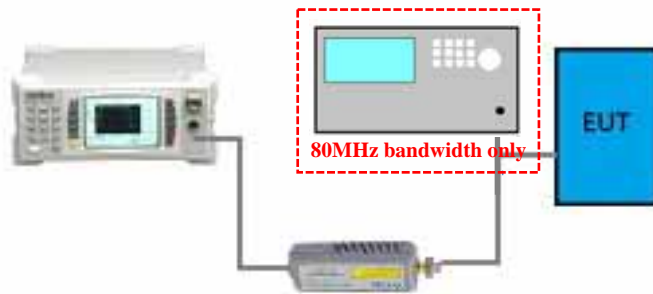
- (1) Set RBW = 100 kHz.
- (2) Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
- (3) Detector = Peak.
- (4) Trace mode = max hold.
- (5) Sweep = auto couple.
- (6) Allow the trace to stabilize.
- (7) Setting channel bandwidth function x dB to -6 dB to record the final bandwidth.

### 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)
5250 to 5350	N/A	250 mW or $11 \text{ dBm} + 10 \log B$ <sup>Note1</sup>
5470 to 5725		250 mW or $11 \text{ dBm} + 10 \log B$ <sup>Note1</sup>
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)**

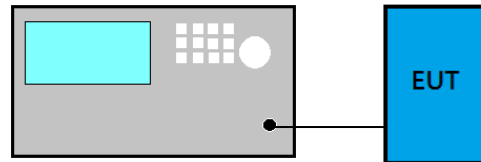
- (1) Set span to at least 1.5 times the OBW
- (2) Set RBW = 1 MHz
- (3) Set the video bandwidth (VBW)  $\geq$  3 MHz.
- (4) Detector = RMS.
- (5) Trace mode = trace average at least 100 traces
- (6) Sweep = auto couple.
- (7) Compute power by integrating the spectrum across the OBW of the signal using 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
5250 to 5350	
5470 to 5725	
5725 to 5850	-17 dBm/MHz <sup>Note 1</sup> -27 dBm/MHz <sup>Note 2</sup>

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:

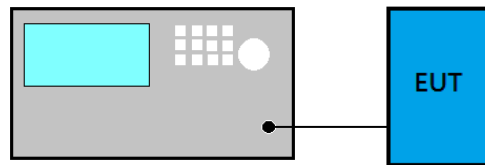
- (1) RBW = 1 MHz
- (2) VBW  $\geq 3 \times$  RBW
- (3) Detector = Peak
- (4) Sweep time = auto
- (5) Trace mode = max hold
- (6) Allow sweeps to continue until the trace stabilizes.

### 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
5250 to 5350	N/A	11 dBm/MHz
5470 to 5725		11 dBm/MHz
5725 to 5850		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)  $\geq$  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.  
No. 53-11, Dingfu, Linkou, Dist.,  
New Taipei City 244, Taiwan*

*APPENDIX A*

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

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# APPDNDIX A

## TEST PLOTS

(Model: (1)WLL7010-D113 (2)WLL7011-D113

(3)SM5D2TV001 (4)SM5D2RV001)

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## A.1 EMISSION BANDWIDTH MEASUREMENT

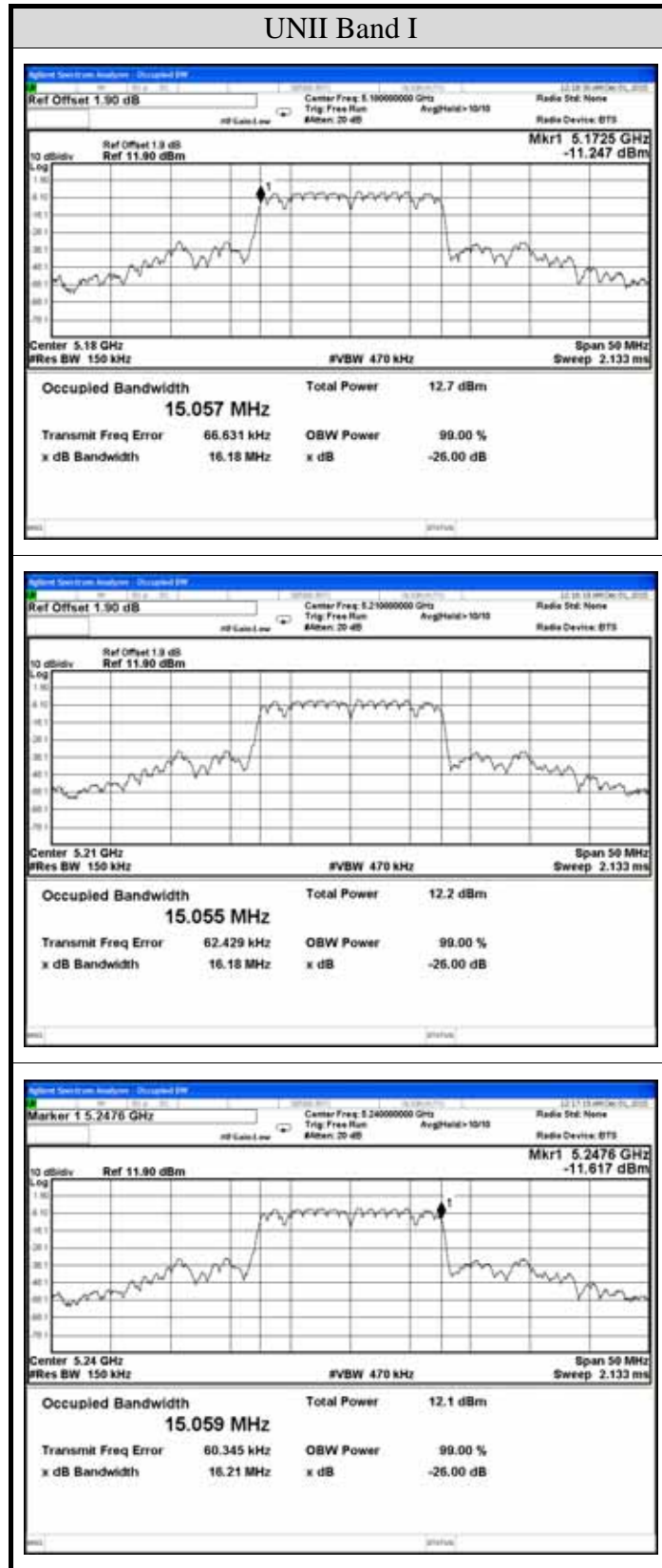
Test Date	2015/12/01	Temp./Hum.	23 /57%
Cable Loss	N/A	Test Voltage	DC 3.3V

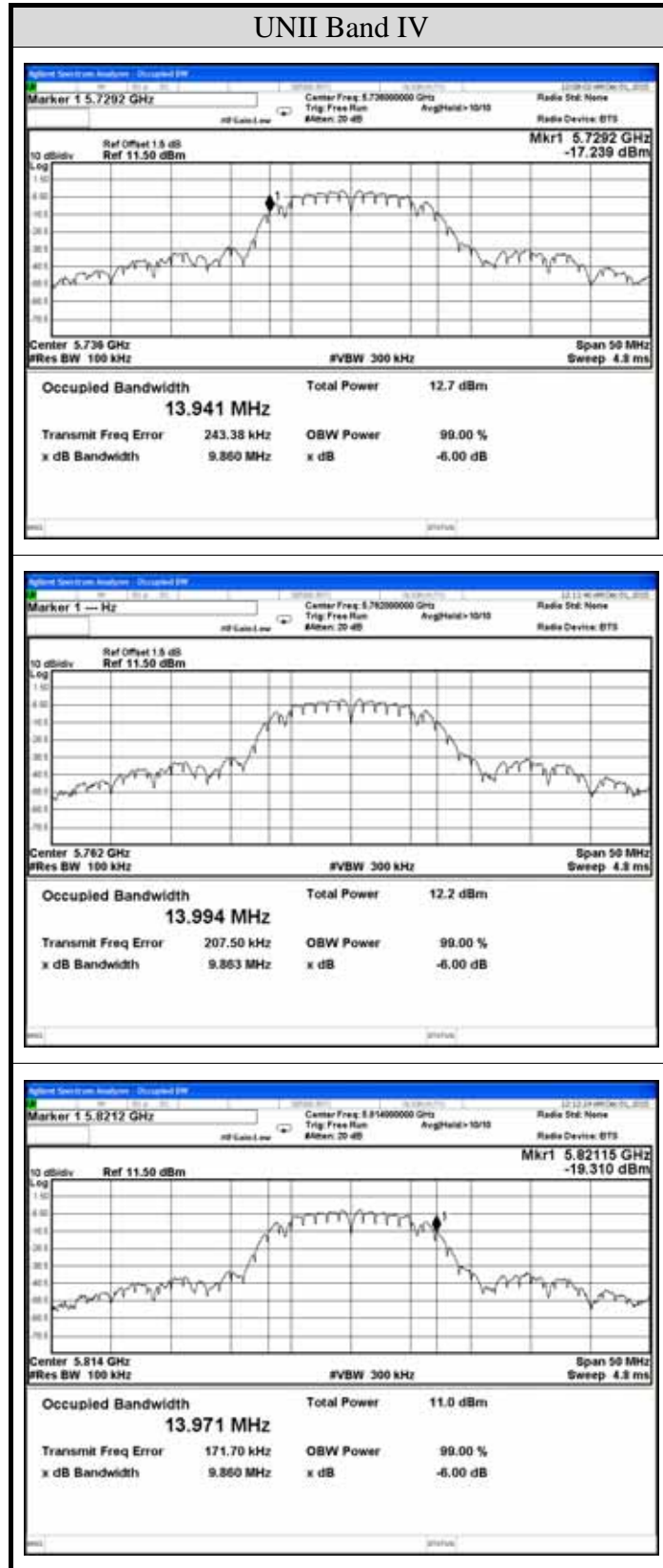
### A.1.1 Emission Bandwidth Result

Modulation Type	UNII Band	Centre Frequency (MHz)	26dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Limit
802.11a	I	5180	16.18	15.057	Reference only
		5210	16.18	15.055	
		5240	16.21	15.059	

Modulation Type	UNII Band	Centre Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Limit
802.11a	IV	5736	9.860	13.941	Reference only
		5762	9.863	13.994	
		5814	9.860	13.971	

A.1.2 Measurement Plots





## A.2 MAXIMUM OUTPUT POWER MEASUREMENT

### A.2.1 Emission Bandwidth Result

Test Date	2015/12/01	Temp./Hum.	23 /57%
Cable Loss	N/A	Test Voltage	DC 3.3V

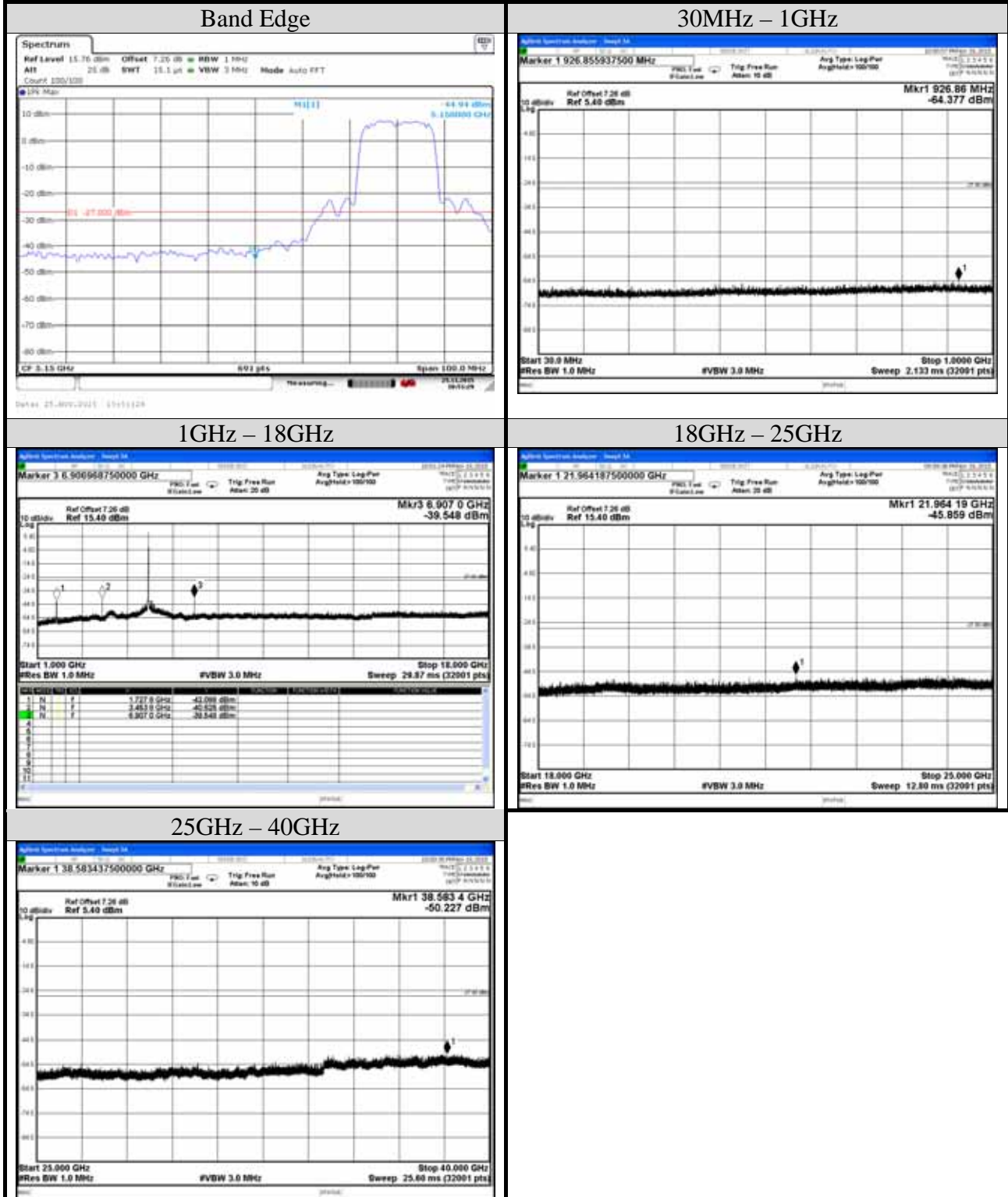
Modulation Type	UNII Band	Centre Frequency (MHz)	Output Power				Limit
			(dBm)	10log(1/X)	(W)	(mW)	
802.11a	I	5180	11.98	0	0.015776	15.78	< 250 mW (24 dBm)
		5210	9.45	0	0.008810	8.81	
		5240	8.81	0	0.007603	7.60	
	IV	5736	8.89	0	0.007745	7.74	< 1 W (30 dBm)
		5762	7.67	0	0.005848	5.85	
		5814	7.78	0	0.005998	6.00	

Duty Cycle=1, 10log(1/X)=0

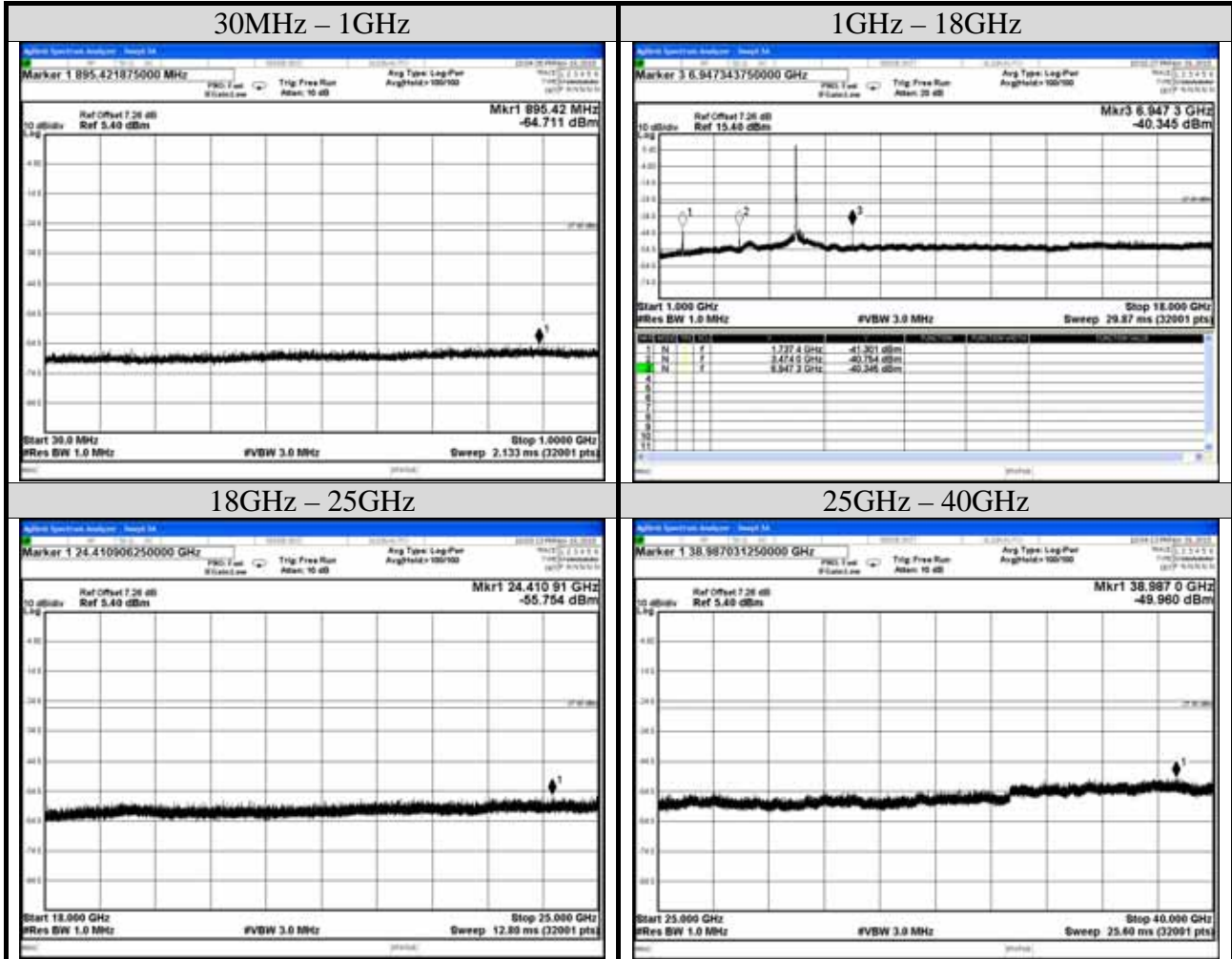
Note: The results have been included cable loss.

### A.3 EMISSION LIMITATIONS MEASUREMENT

Test Date	2015/11/19, 11/25	Temp./Hum.	24 /55%, 25 /57%
Frequency	TX 5180MHz	Test Voltage	DC 3.3V
Cable Loss	7.56dB		

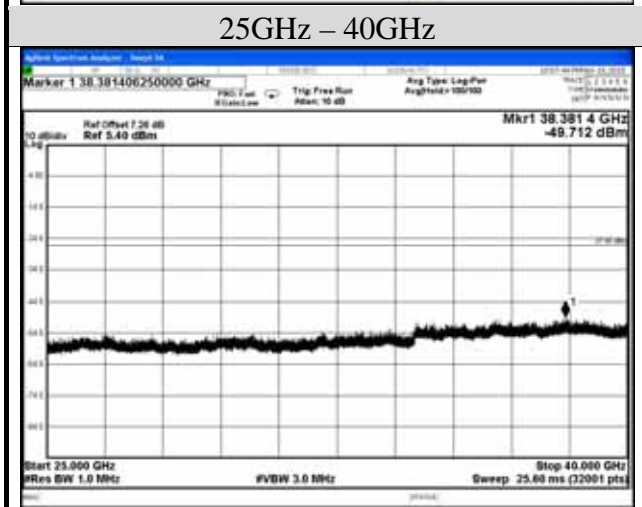
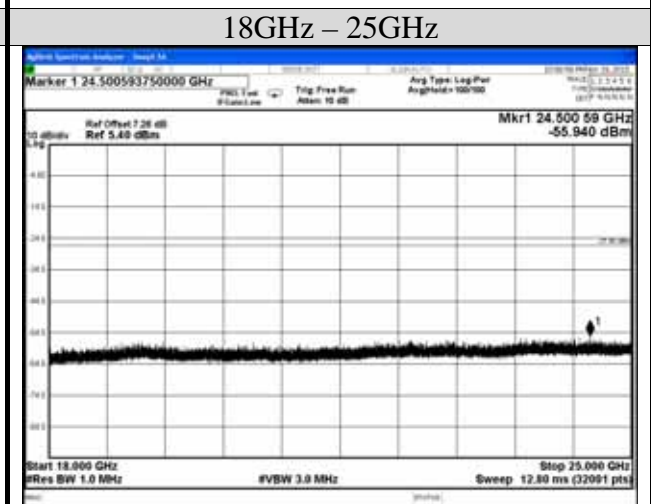
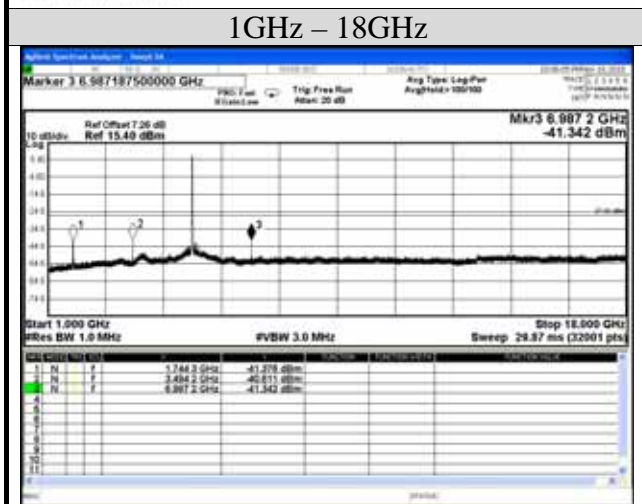
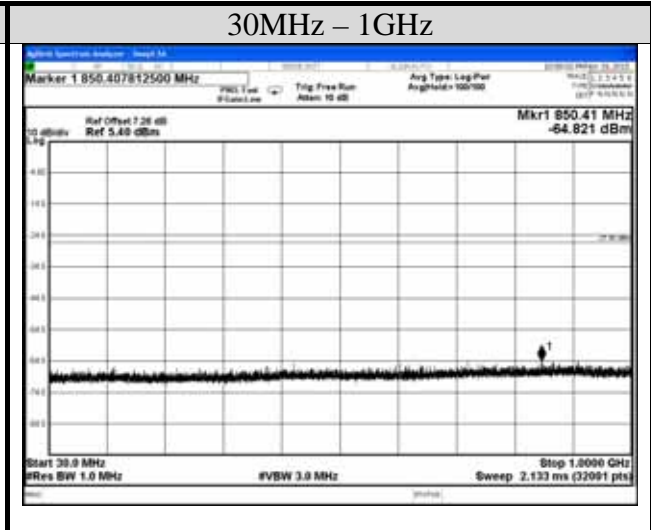
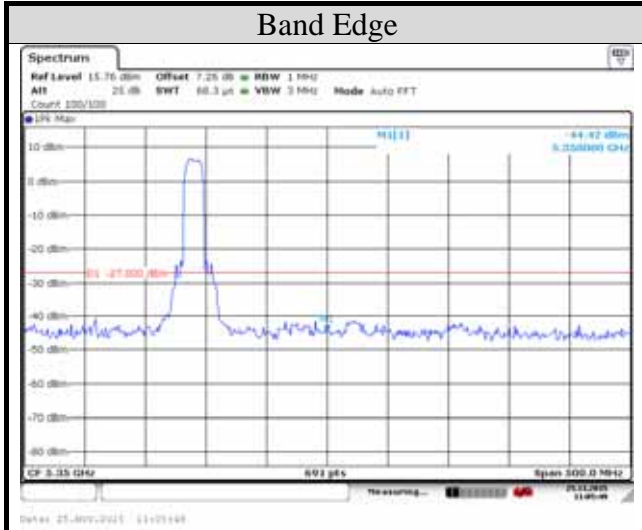


Test Date	2015/11/19	Temp./Hum.	24 /55%
Frequency	TX 5210MHz	Test Voltage	DC 3.3V
Cable Loss	7.56dB		

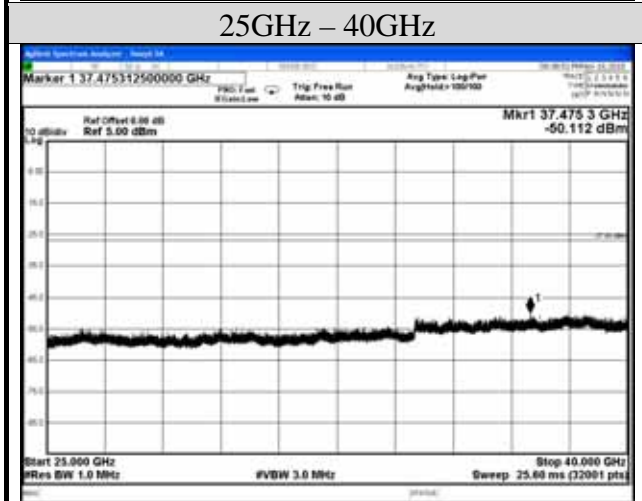
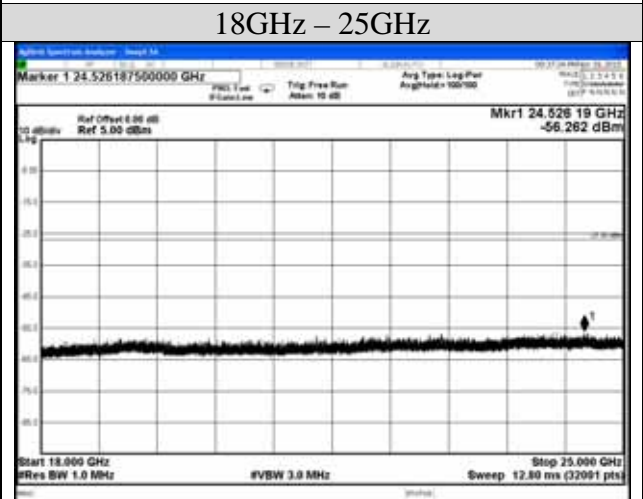
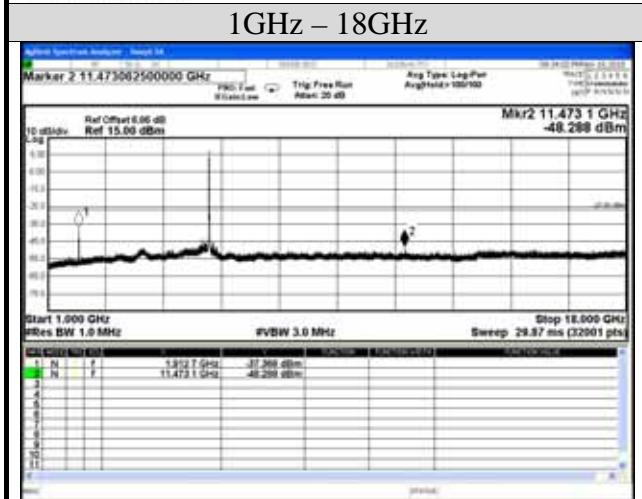
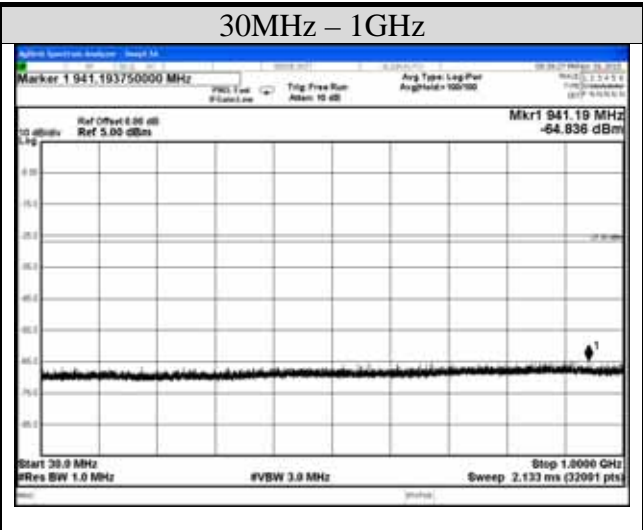
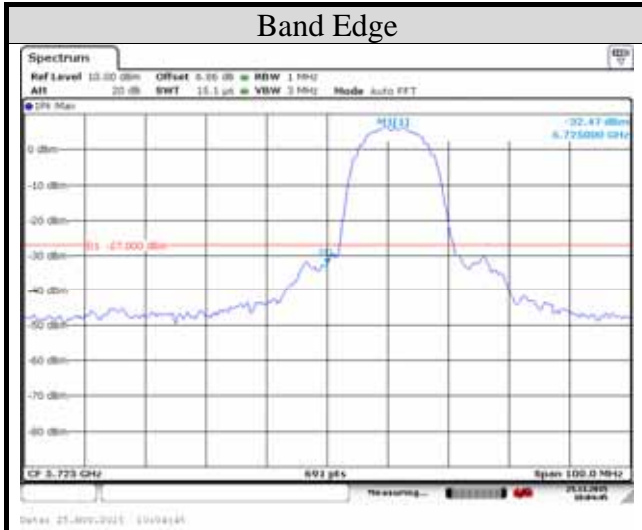




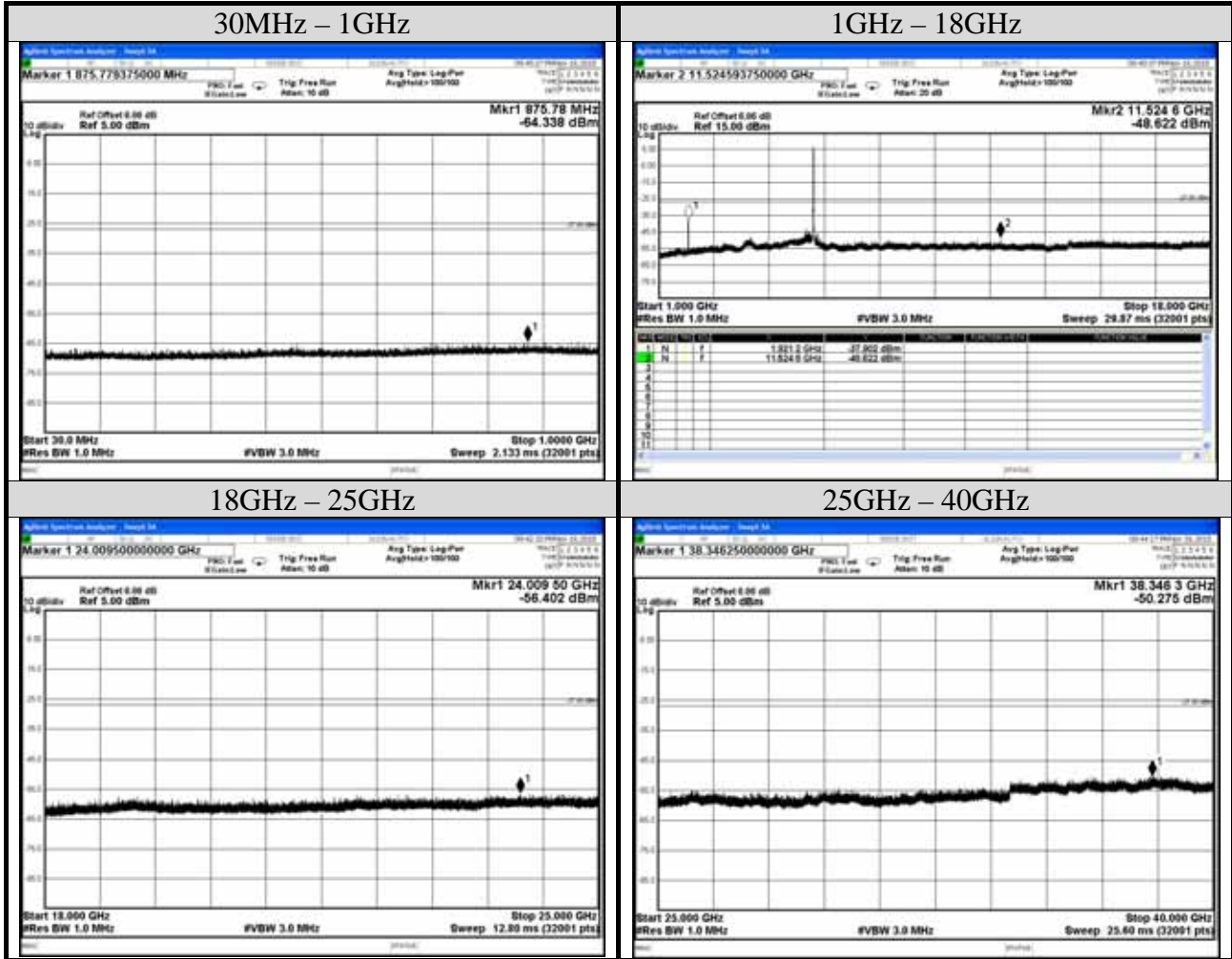
Test Date	2015/11/19, 11/25	Temp./Hum.	24 /55%, 25 /57%
Frequency	TX 5240MHz	Test Voltage	DC 3.3V
Cable Loss	7.56dB		



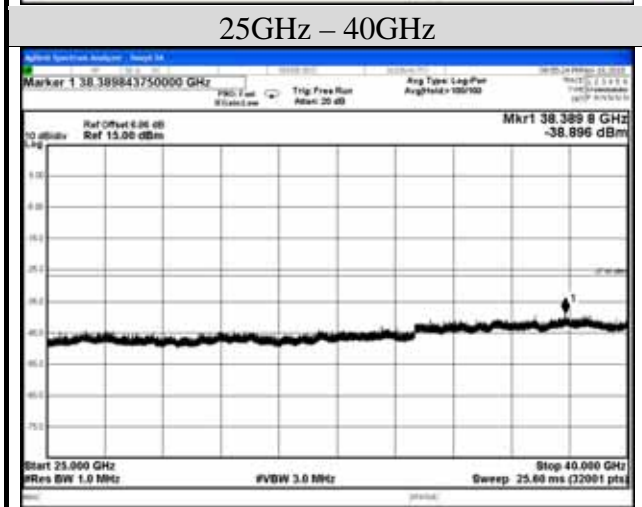
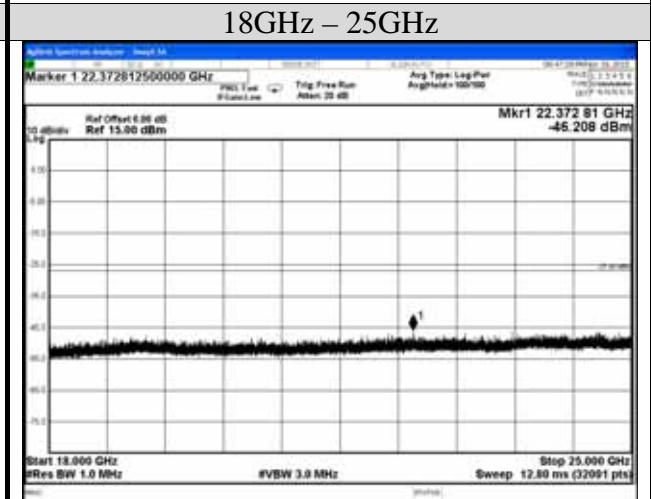
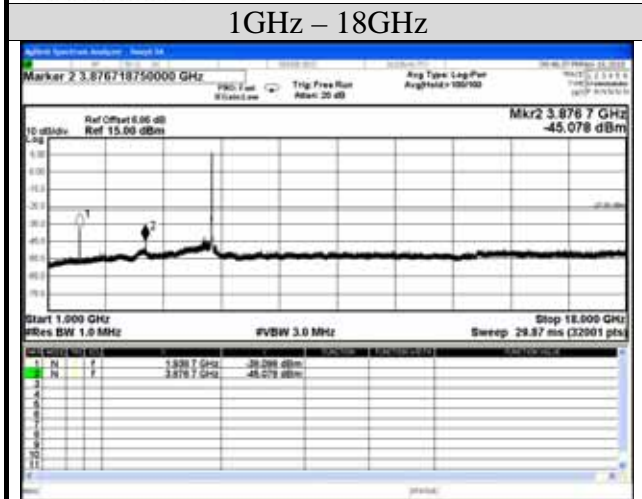
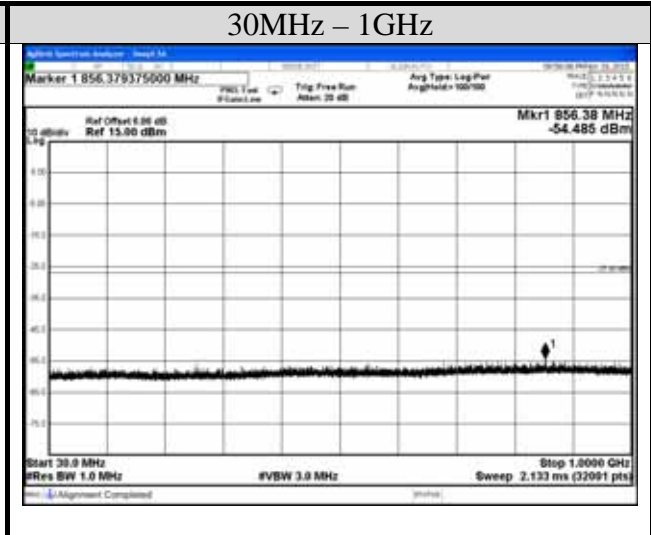
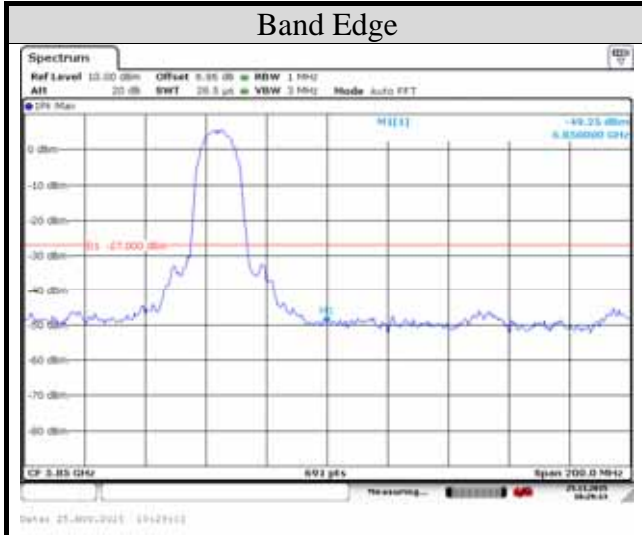
Test Date	2015/11/19, 11/25	Temp./Hum.	24 /55%, 25 /57%
Frequency	TX 5736MHz	Test Voltage	DC 3.3V
Cable Loss	7.56dB		



Test Date	2015/11/19	Temp./Hum.	24 /55%
Frequency	TX 5762MHz	Test Voltage	DC 3.3V
Cable Loss	7.56dB		



Test Date	2015/11/19, 11/25	Temp./Hum.	24 /55%, 25 /57%
Frequency	TX 5814MHz	Test Voltage	DC 3.3V
Cable Loss	7.56dB		



## A.4 POWER SPECTRAL DENSITY

### A.4.1 Power Spectral Density

Test Date	2015/11/18, 11/25	Temp./Hum.	23 /57%, 25 /52%
Cable Loss	N/A	Test Voltage	DC 3.3V

Modulation Type	UNII Band	Centre Frequency (MHz)	Power Spectral Density (dBm)	Limit
802.11a	I	5180	-2.76	11 dBm/MHz
		5210	-2.88	
		5240	-3.17	
	IV	5736	-9.25	30dBm/500 kHz
		5762	-9.05	
		5814	-10.18	

A.4.2 Measurement Plots



