

**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

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



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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:

47 CFR FCC Part 15 Subpart E:2016
ANSI C63.10:2013
789033 D02 General UNII Test Procedures New Rules v01r03

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. 12. 05 ~ 08

Date of Report: 2016. 12. 09

Producer: Sabrina Wang
(Sabrina Wang/Administrator)

Signatory: Ben Cheng
(Ben Cheng/Manager)

1. REPORT HISTORY

Edition No.	Date of Rev.	Revision Summary	Report No.
0	2016. 12. 09	Original Report.	EM-F160829

2. SUMMARY OF TEST RESULTS

Rule	Description	Results
15.207	Conducted Emission	N/A
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	PASS
	Conducted Spurious Emission	N/A, Note
15.407(a)	Power Spectral Density	N/A, Note
15.203	Antenna Requirement	PASS

Note: To Class II Change Permissive is not influence on this test.

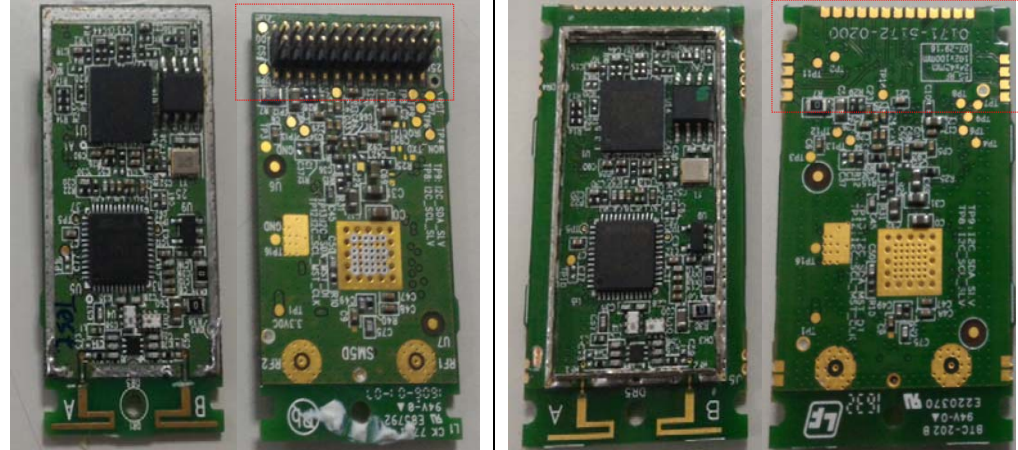
3. GENERAL INFORMATION

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	
Model Difference	Product	Model
	5G Wireless Audio Transceiver Module	WLL7010-D113, SM5D2TV001
	5G Wireless Audio Receiver Module	WLL7011-D113, SM5D2RV001
Test Model	SM5D2TV001	
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	5GHz	
Transmit Type	1T1R	
Device Category	<input type="checkbox"/> Outdoor Access Point <input type="checkbox"/> Fixed point-to-point Access Point <input type="checkbox"/> Indoor Access Point <input checked="" type="checkbox"/> Mobile and Portable client device	
Date of Receipt of Sample	2016. 11. 10	
Antenna Type/ Gain	PCB Antenna / 5.36dBi	

3.2. Information for Class II Change Permissive

1. The EUT is an addition version with original FCC ID: MDZ-WLL701X.
2. The difference with original report as following list.

Item	Original	Class II Change Permissive
Module dimensions	40x20mm	42x24mm
	To add new Module dimensions (from “40x20mm” to “42x24mm”)	
PCB Board		
	To add new connector interface. (from “connector ” to “stamp hole”)	

3.3. 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)	Up to 54
III	5725-5825	3		

Channel List			
UNII Band	Frequency (MHz)	UNII Band	Frequency (MHz)
I	5180	III	5736
	5200		5762
	5210		5814
	5240		

3.4. Test Configuration

Duty Cycle (x)	T (ms)	Duty Cycle Factor (dB)
0.21	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	5180MHz
	Radiated Spurious Emission	5180MHz, 5210MHz, 5240MHz, 5736MHz, 5762MHz, 5814MHz
Conducted Test Case	Emission Bandwidth	5180MHz, 5210MHz, 5240MHz, 5736MHz, 5762MHz, 5814MHz
	Maximum output power	5180MHz, 5210MHz, 5240MHz, 5736MHz, 5762MHz, 5814MHz
	Conducted Band Edge	5736MHz, 5814MHz

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.

3.5. Tested Supporting System List

3.5.1. Support Peripheral Unit

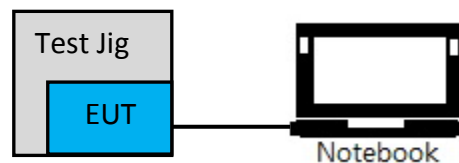
No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Notebook PC	acer	MS2362	N/A	PPD-AAR5B225
2.	Test Jig	N/A	N/A	N/A	N/A

3.5.2. Cable Lists

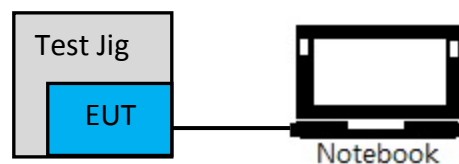
No.	Cable Description Of The Above Support Units
1.	LAN Cable: Shielded, Detachable, 1.0m USB Cable: Shielded, Detachable, 1.8m Adapter: Chicony, M/N CPA09-A065N1, DC Cord: Shielded, Undetachable, 1.8m, Bonded a ferrite core AC Power Cord: Unshielded, Detachable, 1.8m
2.	N/A

3.6. Setup Configuration

3.6.1. EUT Configuration for Power Line Emission



3.6.2. EUT Configuration for Conducted Test Items



3.7. Operating Condition of EUT

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

3.8. 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 Fully Anechoic Chamber No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan
NVLAP Lab. Code	:	200077-0
TAF Accreditation No	:	1724
FCC OET Designation	:	TW1004 & TW1090

3.9. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Radiation Test (Distance: 3m)	30MHz~300MHz	±3.5dB
	300MHz~1000MHz	± 3.68dB
	Above 1GHz	± 5.82dB

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 9kHz~1000MHz (Semi Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A-526	MY53400071	2016. 09. 19	1 Year
2.	Test Receiver	R & S	ESCS30	100338	2016. 06. 22	1 Year
3.	Amplifier	HP	8447D	2944A06305	2016. 02. 23	1 Year
4.	Bilog Antenna	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.

4.1.2. Frequency Range Above 1GHz (Fully Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	2016. 08. 19	1 Year
2.	Amplifier	Agilent	8449B	3008A02678	2016. 03. 04	1 Year
3.	5G Notch Filter	Microwave Circuits	N0452502	459775	2016. 01. 28	1 Year
4.	5G Notch Filter	Microwave Circuits	N0258771	459776	2016. 01. 28	1 Year
5.	Double-Ridged Waveguide Horn	ETS-Lindgren	3117	00135902	2016. 03. 05	1 Year
6.	Horn Antenna	EMCO	3116	2653	2016. 10. 24	1 Year
7.	Test Software	Audix	e3	V.6.110601	N.C.R.	N.C.R.

4.2. RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Power Meter	Anritsu	ML2495A	1145008	2016. 10. 27	1 Year
2.	Power Sensor	Anritsu	MA2411B	1126096	2016. 10. 27	1 Year

5. RADIATED EMISSION MEASUREMENT

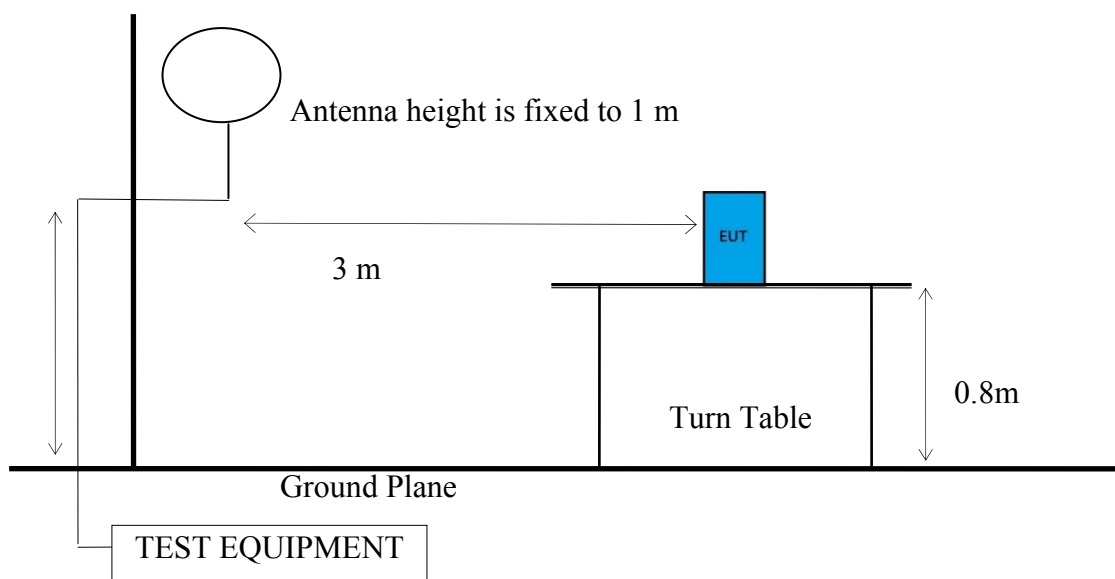
5.1. Block Diagram of Test Setup

5.1.1. Block Diagram of connection between EUT and simulators

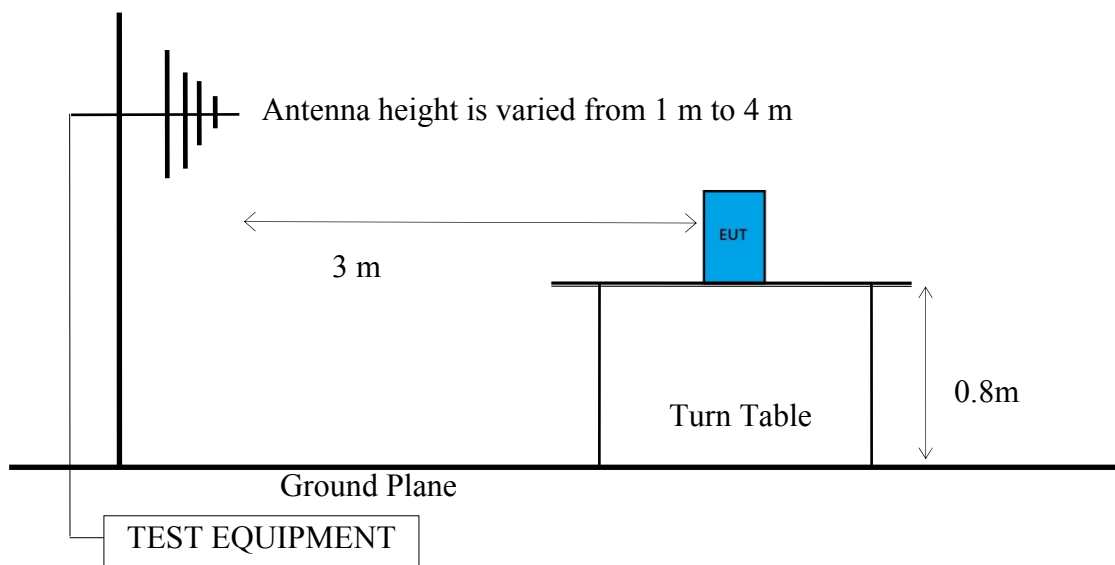
Indicated as section 3.6

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

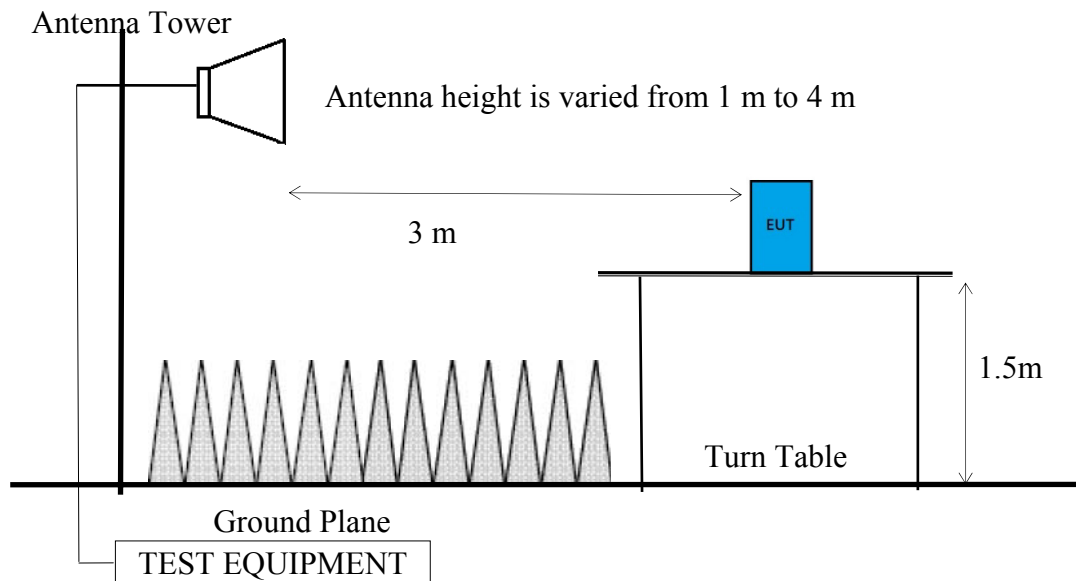
Antenna Tower



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



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



5.1. 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 table which has 0.8m (For 30-1000MHz) or 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 = 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 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.

5.2. 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

5.3. Test Results

PASSED.

Test Date	2016/12/05	Temp./Hum.	23°C/53%
Test Voltage	DC 3.3V		

5.3.1. Emissions within Restricted Frequency Bands

5.3.1.1. Frequency 9kHz~30MHz

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

5.3.1.2. Frequency 30MHz~1000MHz

Mode	5GHz	UNII Band	I
		Frequency	TX 5180MHz

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
86.26	10.16	2.09	20.86	33.11	40.00	6.89	Peak
277.35	13.32	4.09	13.45	30.86	46.00	15.14	Peak
394.72	15.84	5.50	14.80	36.14	46.00	9.86	Peak
828.31	19.85	7.77	7.01	34.63	46.00	11.37	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
86.26	10.16	2.09	20.63	32.88	40.00	7.12	Peak
207.51	10.03	3.42	12.22	25.67	43.50	17.83	Peak
394.72	15.84	5.50	14.54	35.88	46.00	10.12	Peak
829.28	19.87	7.78	9.03	36.68	46.00	9.32	Peak

Mode	5GHz	UNII Band	I
		Frequency	TX 5210MHz

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
86.26	10.16	2.09	20.72	32.97	40.00	7.03	Peak
276.38	13.30	4.08	12.91	30.29	46.00	15.71	Peak
396.66	15.87	5.51	13.87	35.25	46.00	10.75	Peak
831.22	19.87	7.78	5.85	33.50	46.00	12.50	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
86.26	10.16	2.09	20.54	32.79	40.00	7.21	Peak
298.69	13.74	4.29	7.71	25.74	46.00	20.26	Peak
394.72	15.84	5.50	15.40	36.74	46.00	9.26	Peak
830.25	19.87	7.78	7.82	35.47	46.00	10.53	Peak

Mode	5GHz	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
86.26	10.16	2.09	20.38	32.63	40.00	7.37	Peak
276.38	13.30	4.08	13.61	30.99	46.00	15.01	Peak
394.72	15.84	5.50	13.31	34.65	46.00	11.35	Peak
830.25	19.87	7.78	5.75	33.40	46.00	12.60	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
86.26	10.16	2.09	20.88	33.13	40.00	6.87	Peak
207.51	10.03	3.42	13.08	26.53	43.50	16.97	Peak
394.72	15.84	5.50	13.83	35.17	46.00	10.83	Peak
829.28	19.87	7.78	8.33	35.98	46.00	10.02	Peak

Mode	5GHz	UNII Band	III
		Frequency	TX 5736MHz

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
86.26	10.16	2.09	21.03	33.28	40.00	6.72	Peak
277.35	13.32	4.09	12.28	29.69	46.00	16.31	Peak
395.69	15.87	5.51	15.04	36.42	46.00	9.58	Peak
829.28	19.87	7.78	7.87	35.52	46.00	10.48	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
86.26	10.16	2.09	21.32	33.57	40.00	6.43	Peak
207.51	10.03	3.42	12.91	26.36	43.50	17.14	Peak
396.66	15.87	5.51	14.49	35.87	46.00	10.13	Peak
831.22	19.87	7.78	9.24	36.89	46.00	9.11	Peak

Mode	5GHz	UNII Band	III
		Frequency	TX 5762MHz

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
86.26	10.16	2.09	21.14	33.39	40.00	6.61	Peak
276.38	13.30	4.08	16.72	34.10	46.00	11.90	Peak
396.66	15.87	5.51	14.46	35.84	46.00	10.16	Peak
831.22	19.87	7.78	6.45	34.10	46.00	11.90	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
86.26	10.16	2.09	21.35	33.60	40.00	6.40	Peak
298.69	13.74	4.29	8.09	26.12	46.00	19.88	Peak
396.66	15.87	5.51	13.95	35.33	46.00	10.67	Peak
828.31	19.85	7.77	8.81	36.43	46.00	9.57	Peak

Mode	5GHz	UNII Band	III
		Frequency	TX 5814MHz

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
86.26	10.16	2.09	20.60	32.85	40.00	7.15	Peak
276.38	13.30	4.08	12.79	30.17	46.00	15.83	Peak
396.66	15.87	5.51	14.79	36.17	46.00	9.83	Peak
828.31	19.85	7.77	7.49	35.11	46.00	10.89	Peak

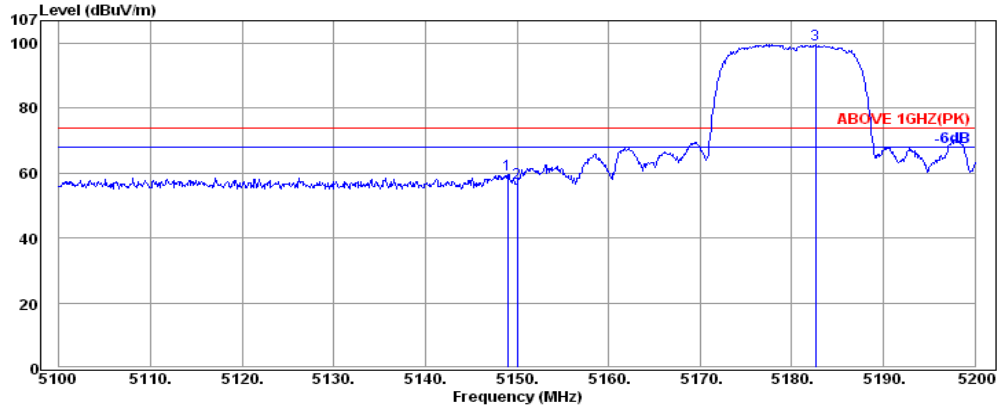
Antenna at Vertical Polarization

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
86.26	10.16	2.09	20.46	32.71	40.00	7.29	Peak
207.51	10.03	3.42	12.82	26.27	43.50	17.23	Peak
396.66	15.87	5.51	14.17	35.55	46.00	10.45	Peak
828.31	19.85	7.77	8.08	35.70	46.00	10.30	Peak

5.3.1.3. Frequency Above 1 GHz to 10th harmonics

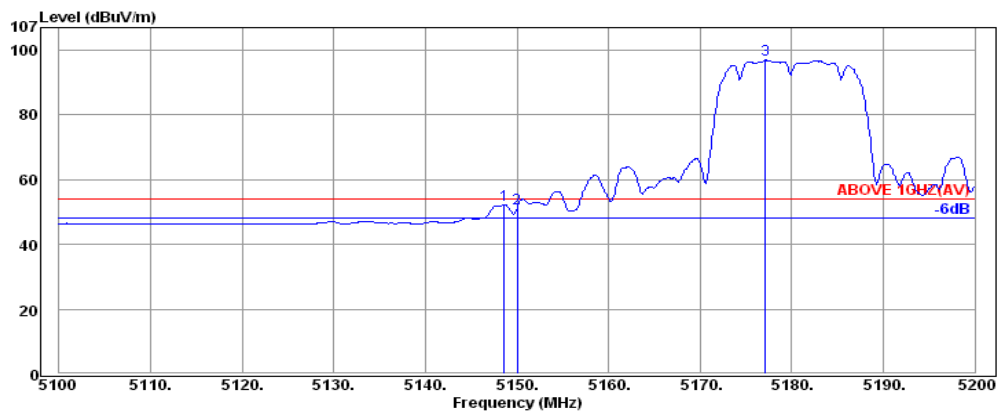
Band Edge:

UNII Band	I	Frequency	TX 5180MHz
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Antenna at Horizontal Polarization

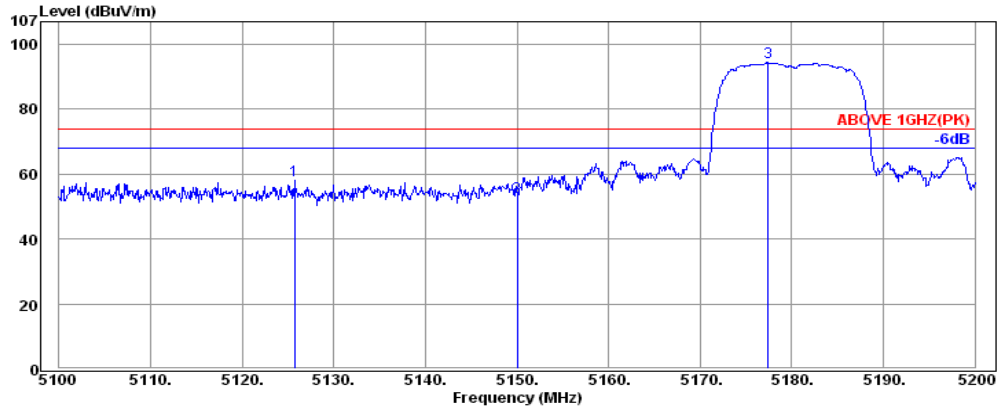
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5149.00	34.45	8.84	16.46	59.75	74.00	14.25	Peak
5150.00	34.45	8.84	13.79	57.08	74.00	16.92	Peak
5182.60	34.48	8.77	56.37	99.62	---	---	Peak



Antenna at Horizontal Polarization

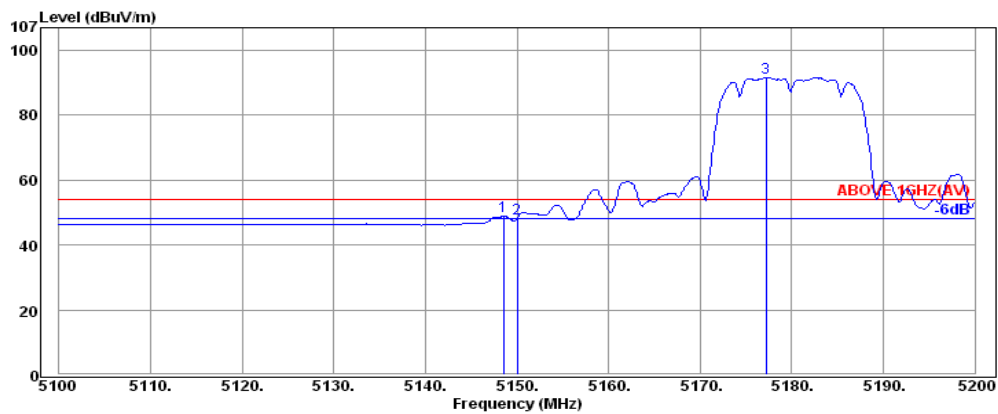
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5148.60	34.45	8.84	8.91	52.20	54.00	1.80	Average
5150.00	34.45	8.84	7.81	51.10	54.00	2.90	Average
5177.10	34.48	8.77	53.70	96.95	---	---	Average

UNII Band	I	Frequency	TX 5180MHz
-----------	---	-----------	------------



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
5125.70	34.43	8.88	14.95	58.26	74.00	15.74	Peak
5150.00	34.45	8.84	9.81	53.10	74.00	20.90	Peak
5177.40	34.48	8.77	51.11	94.36	---	---	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
5148.50	34.45	8.84	5.61	48.90	54.00	5.10	Average
5150.00	34.45	8.84	4.90	48.19	54.00	5.81	Average
5177.20	34.48	8.77	48.46	91.71	---	---	Average

5.3.2. Emissions outside the frequency band:

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

Mode	5GHz	UNII Band	I
		Frequency	TX 5180MHz

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
2664.00	32.50	6.07	8.26	46.83	54.00	7.17	Peak
10360.00	37.59	12.49	3.16	53.24	54.00	0.76	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
2588.00	32.40	5.97	10.93	49.30	54.00	4.70	Peak
10360.00	37.59	12.49	3.48	53.56	54.00	0.44	Peak

Mode	5GHz	UNII Band	I
		Frequency	TX 5210MHz

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
1996.00	31.60	5.09	12.27	48.96	54.00	5.04	Peak
10420.00	37.63	12.51	3.11	53.25	54.00	0.75	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
2594.00	32.42	6.00	11.22	49.64	54.00	4.36	Peak
10420.00	37.63	12.51	3.55	53.69	54.00	0.31	Peak

Mode	5GHz	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
2536.00	32.34	5.89	7.94	46.17	54.00	7.83	Peak
10480.00	37.69	12.54	3.60	53.83	54.00	0.17	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
2600.00	32.42	6.00	8.59	47.01	54.00	6.99	Peak
10480.00	37.69	12.54	2.76	52.99	54.00	1.01	Peak

Mode	5GHz	UNII Band	III
		Frequency	TX 5736MHz

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
1332.00	28.03	3.87	9.66	41.56	54.00	12.44	Peak
2192.00	31.87	5.53	11.14	48.54	54.00	5.46	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
1334.00	28.03	3.87	9.86	41.76	54.00	12.24	Peak
2592.00	32.42	6.00	10.68	49.10	54.00	4.90	Peak

Mode	5GHz	UNII Band	III
		Frequency	TX 5762MHz

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
1048.00	28.09	3.40	12.39	43.88	54.00	10.12	Peak
2192.00	31.87	5.53	8.87	46.27	54.00	7.73	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
1328.00	28.03	3.84	9.01	40.88	54.00	13.12	Peak
2590.00	32.42	6.00	12.39	50.81	54.00	3.19	Peak

Mode	5GHz	UNII Band	III
		Frequency	TX 5814MHz

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
1600.00	28.72	4.22	9.67	42.61	54.00	11.39	Peak
2750.00	32.60	6.11	7.44	46.15	54.00	7.85	Peak

Antenna at Vertical Polarization

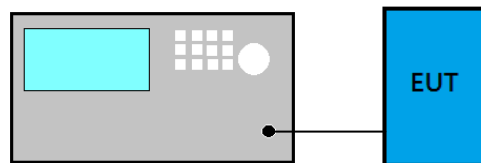
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
1330.00	28.03	3.84	9.73	41.60	54.00	12.40	Peak
2594.00	32.42	6.00	10.01	48.43	54.00	5.57	Peak

5.3.3. 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

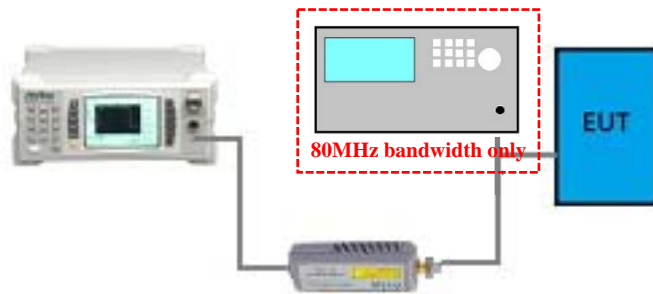
- (1) Set RBW = 100 kHz.
- (2) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- (3) Detector = Peak.
- (4) Trace mode = max hold.
- (5) Sweep = auto couple.
- (6) Allow the trace to stabilize.
- (7) Setting channel bandwidth function x dB to -6 dB to record the final bandwidth.

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. ≤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 dBm + 10 log B ^{Note1}
5470 to 5725		250 mW or 11 dBm + 10 log B ^{Note1}
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 789033 D02 General UNII Test Procedures New Rules v01r03:

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)

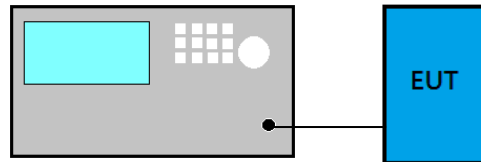
- (1) Set span to at least 1.5 times the OBW
- (2) Set RBW = 1 MHz
- (3) Set the video bandwidth (VBW) \geq 3 MHz.
- (4) Detector = RMS.
- (5) Trace mode = trace average at least 100 traces
- (6) Sweep = auto couple.
- (7) Compute power by integrating the spectrum across the OBW of the signal using the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

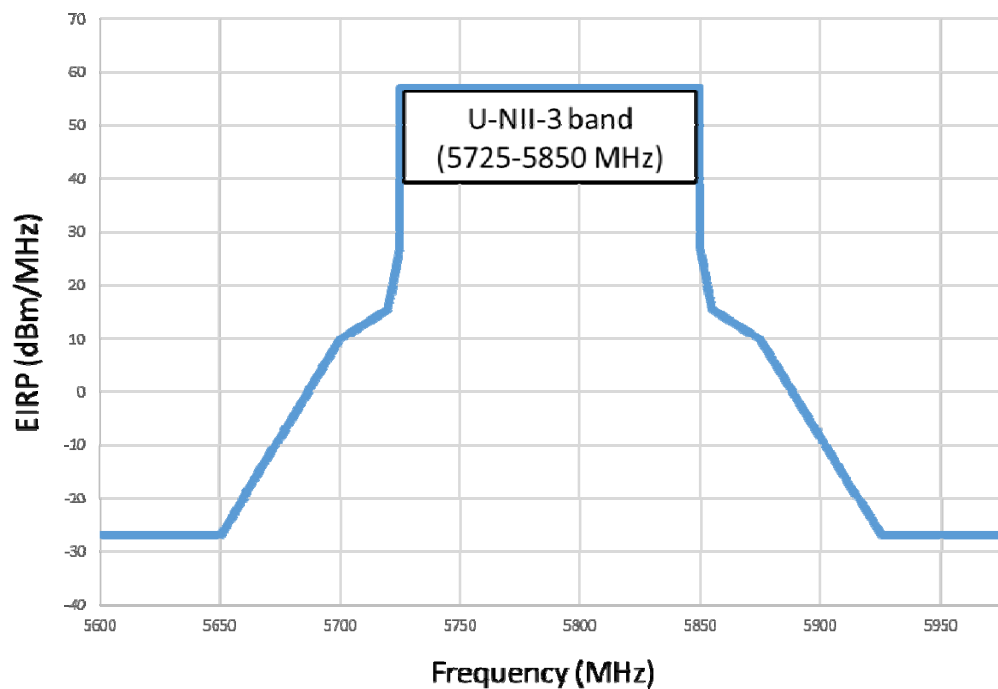
8.1. Block Diagram of Test Setup



8.2. Specification Limits

Frequency Band (MHz)	E.I.R.P. Limit
5150 to 5250	-27 dBm
5250 to 5350	
5470 to 5725	

Frequency Band (MHz)	E.I.R.P. Limit	
5725 to 5850	<input checked="" type="checkbox"/>	15.407(b)(4)(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
	<input type="checkbox"/>	15.407(b)(4)(ii) ,compliance with the emission limits in § 15.247(d) Shall be at least 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power,. Attenuation below the general limits specified in §15.209(a) is not required. In addition,radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c))



8.3. Test Procedure

Following measurement procedure is reference to 789033 D02 General UNII Test Procedures New Rules v01r03:

- (1) RBW = 1 MHz
- (2) VBW \geq 3 x 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. DEVIATION TO TEST SPECIFICATIONS

【NONE】



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APPENDIX A

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APPENDIX A

TEST PLOTS

(Model: SM5D2TV001)

File Number: C1M1611127

Report Number: EM-F160829

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A.1 EMISSION BANDWIDTH MEASUREMENT

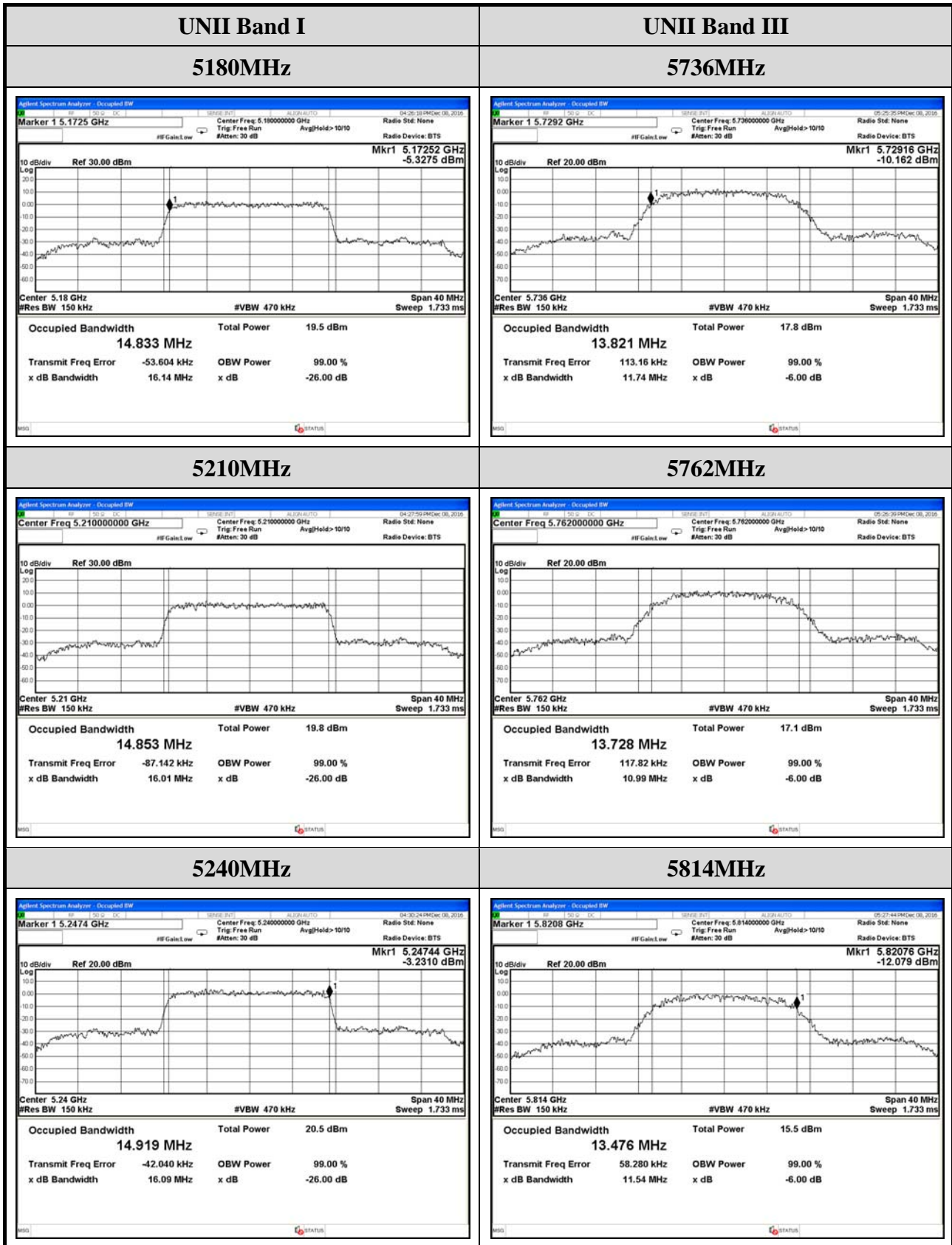
Test Date	2016/12/08	Temp./Hum.	23°C/55%
Cable Loss	N/A	Test Voltage	DC 3.3V

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	16.14	14.833	Reference only
		5210	16.01	14.853	
		5240	16.09	14.919	

Modulation Type	UNII Band	Centre Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Limit
802.11a	III	5736	11.74	13.821	Reference only
		5762	10.99	13.728	
		5814	11.54	13.476	

A.1.2 Measurement Plots



A.2 MAXIMUM OUTPUT POWER MEASUREMENT

A.2.1 Emission Bandwidth Result

Test Date	2016/12/06	Temp./Hum.	25°C/55%
Test Voltage	DC 3.3V		

Modulation Type	UNII Band	Centre Frequency (MHz)	Output Power (dBm)		10log (1/X)	Maximum Output Power		Antenna Gain (dBi)	Output Power (E.I.R.P.)		Limit
			Ant A	Ant B		(dBm)	(W)		(dBm)	(W)	
5GHz	I	5180	0.24	---	6.78	7.02	0.005035	5.36	12.38	0.017298	< 250 mW (24 dBm)
		5210	0.77	---		7.55	0.005689		12.91	0.019543	
		5240	1.27	---		8.05	0.006383		13.41	0.021928	
5GHz	I	5180	---	1.48	6.78	8.26	0.006699	5.36	13.62	0.023014	
		5210	---	1.95		8.73	0.007464		14.09	0.025645	
		5240	---	1.36		8.14	0.006516		13.50	0.022387	

Note: The results have been included cable loss.

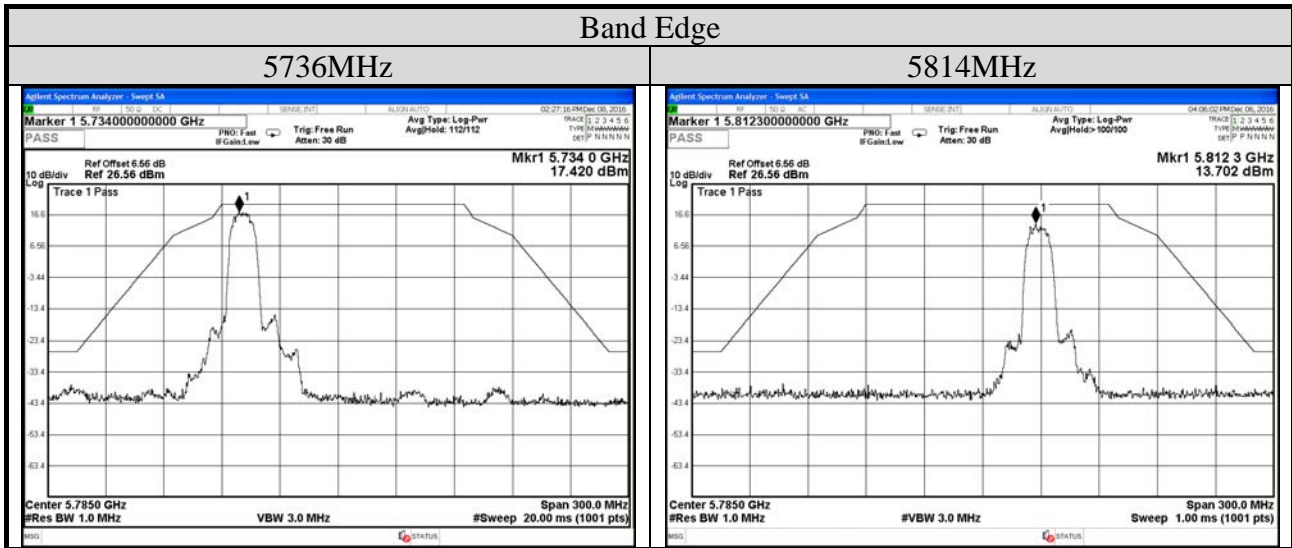
Modulation Type	UNII Band	Centre Frequency (MHz)	Output Power (dBm)		10log (1/X)	Maximum Output Power		Antenna Gain (dBi)	Output Power (E.I.R.P.)		Limit
			Ant A	Ant B		(dBm)	(W)		(dBm)	(W)	
5GHz	III	5736	0.83	---	6.78	7.61	0.005768	5.36	12.97	0.019815	< 1 W (30 dBm)
		5762	0.28	---		7.06	0.005082		12.42	0.017458	
		5814	-0.99	---		5.79	0.003793		11.15	0.013032	
5GHz	III	5736	---	0.74	6.78	7.52	0.005649	5.36	12.88	0.019409	
		5762	---	0.11		6.89	0.004887		12.25	0.016788	
		5814	---	-1.45		5.33	0.003412		10.69	0.011722	

Note:

1. The results have been included cable loss.
2. The device has 2 ants for diversity purpose and power listed is the ant has higher power than another port.
3. Maximum output power= output power+10log(1/X), where X is the duty cycle.

A.3 EMISSION LIMITATIONS MEASUREMENT

Test Date	2016/12/06 ~ 12/08	Temp./Hum.	25°C/55%, 23°C/58%
UNII Band	III	Test Voltage	DC 3.3V
Cable Loss	6.56dB		



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