

FCC 15.407 NII 5 GHz WLAN Report

for

ASUSTeK COMPUTER INC.

4F., No. 150, Li-Te Rd., Pietou, Taipei, Taiwan

Brand : ASUS
Product Name : Dual-band Wireless-AC750 Router
Model Name : (1)RT-AC51U (2)RT-AC750
FCC ID : MSQ-RTDV00

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



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TEST REPORT CERTIFICATION

Applicant : ASUSTeK COMPUTER INC.
Manufacture : Taicang T&W Electronics. Co., Ltd
Product Name : Dual-band Wireless-AC750 Router
Model No. : (1)RT-AC51U (2)RT-AC750
Serial No. : N/A
Brand : ASUS


Applicable Standards:

47 CFR FCC Part 15 Subpart E:2015
ANSI C63.10:2013
789033 D02 General UNII Test Procedures New Rules v01r02

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. 06. 16 ~ 29

Date of Report: 2016. 06. 30

Producer: 
(Annie Yu/Administrator)

Signatory: 
(Ben Cheng/Manager)

1. REPORT HISTORY

Revision	Date	Revision Summary	Report Number
0	2016. 06. 30	Original Report.	EM-F160402

2. SUMMARY OF TEST RESULTS

Rule	Description	Results
15.207	Conducted Emission	PASS
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

3. GENERAL INFORMATION

3.1. Description of EUT

Product	Dual-band Wireless-AC750 Router																				
Model Number	(1)RT-AC51U (2)RT-AC750 All models are identical except for designation of marketing purpose. The model RT-AC51U was tested in this report.																				
Serial Number	N/A																				
Brand Name	ASUS																				
Applicant	ASUSTeK COMPUTER INC. 4F., No. 150, Li-Te Rd., Pietou, Taipei, Taiwan																				
Manufacture	Taicang T&W Electronics. Co., Ltd Jiangnan Road 89, Ludu Town, Taicang, Suzhou, Jiangsu, 215412, P.R.China																				
RF Features	802.11a/b/g/n/ac																				
Transmit Type	<table border="1"> <thead> <tr> <th colspan="2">2.4 GHz</th> </tr> </thead> <tbody> <tr> <td>802.11b</td> <td>1T1R</td> </tr> <tr> <td>802.11g</td> <td>1T1R</td> </tr> <tr> <td>802.11n-HT20</td> <td>2T2R</td> </tr> <tr> <td>802.11n-HT40</td> <td>2T2R</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="2">UNIII Bands</th> </tr> </thead> <tbody> <tr> <td>802.11a</td> <td>1T1R</td> </tr> <tr> <td>802.11n-HT20/ 802.11ac-VHT20</td> <td>1T1R</td> </tr> <tr> <td>802.11n-HT40/ 802.11ac-VHT40</td> <td>1T1R</td> </tr> <tr> <td>802.11ac-VHT80</td> <td>1T1R</td> </tr> </tbody> </table>	2.4 GHz		802.11b	1T1R	802.11g	1T1R	802.11n-HT20	2T2R	802.11n-HT40	2T2R	UNIII Bands		802.11a	1T1R	802.11n-HT20/ 802.11ac-VHT20	1T1R	802.11n-HT40/ 802.11ac-VHT40	1T1R	802.11ac-VHT80	1T1R
2.4 GHz																					
802.11b	1T1R																				
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802.11n-HT20/ 802.11ac-VHT20	1T1R																				
802.11n-HT40/ 802.11ac-VHT40	1T1R																				
802.11ac-VHT80	1T1R																				
Switching Adapter #1 (2C)	Shenzhen Gongjin, M/N: S12B22-120A100-C4 I/P: 100-240V~, 50/60Hz, max 0.5A O/P: 12V, 1A Cord: Unshielded, Undetachable, 1.5m																				
Switching Adapter #2 (2C)	ShenZhen SOY, M/N: SUN-1200100US I/P: 100-240V~, 50/60Hz, 0.3A O/P: 12V, 1.0A Cord: Unshielded, Undetachable, 1.5m																				

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. 05. 19

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)	Up to 54
	III	5745-5825	5		
802.11n-HT20/ 802.11ac-VHT20	I	5180-5240	4	OFDM Modulation (BPSK/QPSK/16QAM/64QAM)	MCS0~7
	III	5745-5825	5		
802.11n-HT40/ 802.11ac-VHT40	I	5190-5230	2	OFDM Modulation (BPSK/QPSK/16QAM/64QAM)	MCS0~7
	III	5755-5795	2		
802.11ac-VHT80	I	5210	1	OFDM Modulation (BPSK/QPSK/16QAM/64QAM)	MCS0~7
	III	5775	1		

Channel List					
802.11a/802.11n-HT20/802.11ac-VHT20					
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

Channel List					
802.11n-HT40/802.11ac-VHT40					
UNII Band	Channel Number	Frequency (MHz)	UNII Band	Channel Number	Frequency (MHz)
I	38	5190	III	151	5755
	46	5230		159	5795

Channel List					
802.11ac-VHT80					
UNII Band	Channel Number	Frequency (MHz)	UNII Band	Channel Number	Frequency (MHz)
I	42	5210	III	155	5775

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

2.4G Antenna						
No.	Antenna Part Number	Manufacture	Antenna Type	Frequency	Max Gain (dBi)	Directional Gain (dBi)
1	RFDPA141015NNA B301 (Antenna 0)	PSA	Dipole Antenna	2.4GHz	5	7.07 ^{Note1}
2	TA2430DBE (Antenna 1)	T&W Electronics	PIFA Antenna	2.4GHz	3	

Note 1. Directional gain = $10 \log[(10^{5/20} + 10^{3/20})^2 / 2] = 7.07\text{dBi}$

5G Antenna					
No.	Antenna Part Number	Manufacture	Antenna Type	Frequency	Max Gain (dBi)
1	RFDPA141010NN5 B301	PSA	Dipole Antenna	5GHz	5

3.4. Data Rate Relative to Output Power

802.11a				802.11ac-VHT20			
Channel	Modulation	Date Rate	Power (dBm)	Channel	Modulation	Date Rate	Power (dBm)
36	BPSK	6	19.69	36	BPSK	MCS0	19.65
36	QPSK	9	19.64	36	QPSK	MCS1	19.61
36	QPSK	12	19.58	36	QPSK	MCS2	19.57
36	16-QAM	18	19.52	36	16-QAM	MCS3	19.52
36	16-QAM	24	19.46	36	16-QAM	MCS4	19.47
36	64-QAM	36	19.37	36	64-QAM	MCS5	19.40
36	64-QAM	48	19.29	36	64-QAM	MCS6	19.32
36	64-QAM	54	19.22	36	64-QAM	MCS7	19.26

802.11ac-VHT40				802.11ac-VHT80			
Channel	Modulation	Date Rate	Power (dBm)	Channel	Modulation	Date Rate	Power (dBm)
38	BPSK	MCS0	14.70	42	BPSK	MCS0	13.85
38	QPSK	MCS1	14.66	42	QPSK	MCS1	13.81
38	QPSK	MCS2	14.61	42	QPSK	MCS2	13.75
38	16-QAM	MCS3	14.55	42	16-QAM	MCS3	13.68
38	16-QAM	MCS4	14.49	42	16-QAM	MCS4	13.61
38	64-QAM	MCS5	14.42	42	64-QAM	MCS5	13.54
38	64-QAM	MCS6	14.35	42	64-QAM	MCS6	13.47
38	64-QAM	MCS7	14.31	42	64-QAM	MCS7	13.42

Note: Above results are assessed in average power.

3.5. Test Configuration

Mode	Duty Cycle (x)	T (ms)	Duty Cycle Factor (dB)
802.11a	1.00	N/A	N/A
802.11n-HT20/802.11ac-VHT20	1.00	N/A	N/A
802.11n-HT40/802.11ac-VHT40	1.00	N/A	N/A
802.11ac-VHT80	1.00	N/A	N/A

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

AC Conduction	
Test Case	Normal operation

Item		Mode	Data Rate	Test Channel
Radiated Test Case	Radiated Band Edge <small>Note1</small>	802.11a	6 Mbps	36
		802.11ac-VHT20	MCS0	
		802.11ac-VHT40	MCS0	38
		802.11ac-VHT80	MCS0	42
	Radiated Spurious Emission <small>Note1 & 2</small>	802.11a	6 Mbps	48/149
		802.11ac-VHT20	MCS0	48/149
		802.11ac-VHT40	MCS0	46/151
		802.11ac-VHT80	MCS0	42/155
Conducted Test Case <small>Note3</small>	Emission Bandwidth	802.11a	6 Mbps	36/40/48/ 149/157/165
		802.11ac-VHT20	MCS0	36/40/48/ 149/157/165
		802.11ac-VHT40	MCS0	38/46/151/159
		802.11ac-VHT80	MCS0	42/155
	Maximum output power	802.11a	6 Mbps	36/40/48/ 149/157/165
		802.11ac-VHT20	MCS0	36/40/48/ 149/157/165
		802.11ac-VHT40	MCS0	38/46/151/159
		802.11ac-VHT80	MCS0	42/155
	Emission Limitations	802.11a	6 Mbps	36/40/48/ 149/157/165
		802.11ac-VHT20	MCS0	36/40/48/ 149/157/165
		802.11ac-VHT40	MCS0	38/46/151/159
		802.11ac-VHT80	MCS0	42/155
	Power spectral density	802.11a	6 Mbps	36/40/48/ 149/157/165
		802.11ac-VHT20	MCS0	36/40/48/ 149/157/165
		802.11ac-VHT40	MCS0	38/46/151/159
		802.11ac-VHT80	MCS0	42/155

Note 1:

Mobile Device
 Portable Device, and 3 axis were assessed.
 Lie
 Side
 Stand

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

Note 3: We performed testing of the worst Switching Adapter: Shenzhen Gongjin, M/N S12B22-120A100-C4.

3.6. Tested Supporting System List

3.6.1. Support Peripheral Unit

No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Notebook PC	acer	MS2343	N/A	HLZ-AR5B97
2.	Power Socket	N/A	N/A	N/A	N/A

3.6.2. Cable Lists

No.	Cable Description Of The Above Support Units
1.	LAN Cable: Unshielded, Detachable, 0.6m Adapter: DELTA, M/N ADP-90CDDDB AC Power Cord: Unshielded, Detachable, 1.8m DC Power Cord: Unshielded, Detachable, 1.8m, Bonded a ferrite core
2.	Power Cord: Unshielded, Detachable, 1.8m

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 “MT7620QxxE_AP” is used for enabling EUT WLAN function under continues transmitting and choosing data rate/ channel.

3.9. Description of Test Facility

Test Firm Name	:	AUDIX Technology Corporation EMC Department No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan
Test Location & Facility	:	No. 7 Shielded Room 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

3.10. Measurement Uncertainty

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

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

Test Item	Uncertainty
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. Conducted Emission Measurement

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

4.2. Radiated Emission Measurement

4.2.1. Frequency Range 9kHz~1000MHz (Semi Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
1.	Spectrum Analyzer	Agilent	N9010A-526	MY53400071	2015. 09. 14	1 Year
2.	Test Receiver	R & S	ESCS30	100338	2015. 06. 24	1 Year
3.	Amplifier	HP	8447D	2944A06305	2016. 02. 23	1 Year
4.	Bilog Antenna	CHASE	CBL6112D	33821	2016. 01. 30	1 Year
5.	Loop Antenna	R&S	HFH2-Z2	891847/27	2015. 12. 24	1 Year
6.	Test Software	Audix	e3	V.6.110601	N.C.R.	N.C.R.

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

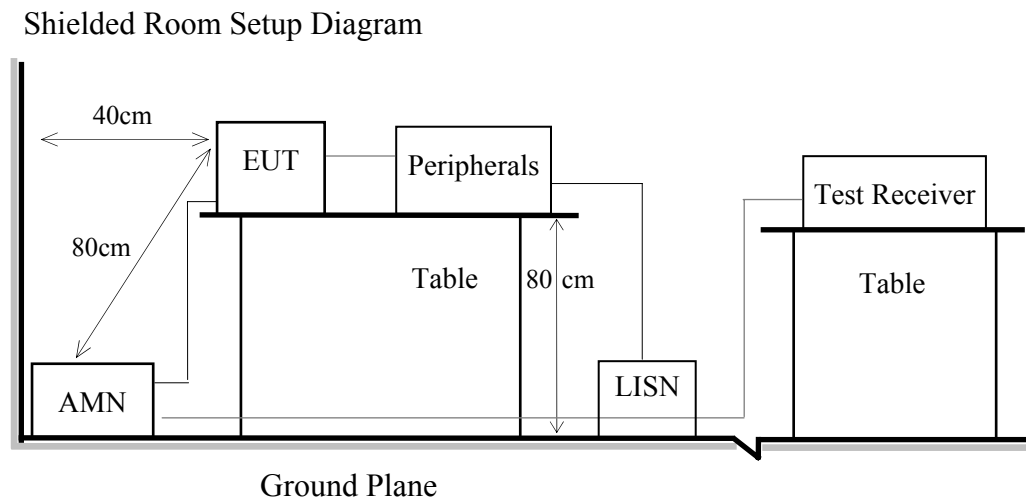
Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	2015. 08. 20	1 Year
3.	Amplifier	Sonoma	310N	187161	2015. 06. 17	1 Year
4.	5G Notch Filter	Microwave Circuits	N0452502	459775	2016. 01. 28	1 Year
5.	5G Notch Filter	Microwave Circuits	N0555983	459481	2016. 01. 28	1 Year
6.	5G Notch Filter	Microwave Circuits	N0258771	459776	2016. 01. 28	1 Year
7.	Double-Ridged Waveguide Horn	ETS-Lindgren	3117	00135902	2016. 03. 05	1 Year
8.	Horn Antenna	EMCO	3116	2653	2015. 10. 20	1 Year
9.	Test Software	Audix	e3	V.6.110601	N.C.R.	N.C.R.

4.3. RF Conducted Measurement

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

5. CONDUCTED EMISSION MEASUREMENT

5.1. Block Diagram of Test Setup



5.2. Power Line Conducted Emission Limit

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

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

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

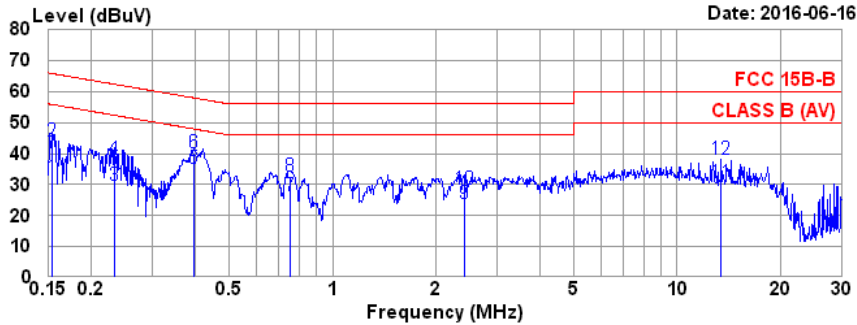
5.3. Test Procedure

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

5.4. Conducted Emission Measurement Results

PASSED.

Test Date	2016/06/16	Temp./Hum.	25 /65%
Test Voltage	AC 120V, 60Hz		

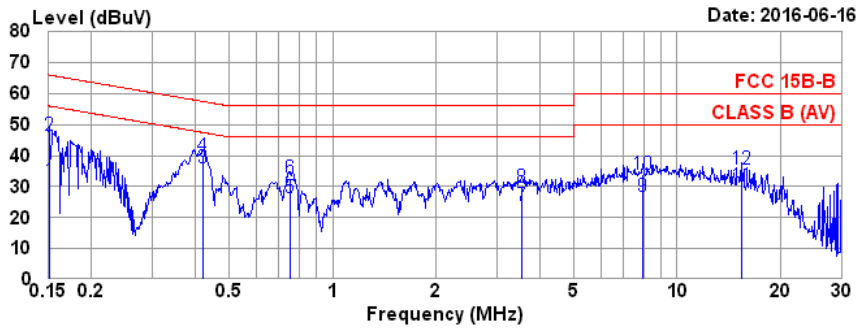


Site no. : No.7 Shielded Room Data no. : 2
 Condition : ESH2-Z5 366 Phase : NEUTRAL
 Limit : FCC 15B-B
 Env. / Ins. : 25°C / 65% ESCI (1276) Engineer : Nick Du
 EUT : RT-AC51U
 Power Rating : 120Vac/60Hz
 Test Mode : Operating
 ADP:S12B22-120A100-C4

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.153	0.17	0.03	9.85	22.38	32.43	55.82	23.39	Average
2	0.153	0.17	0.03	9.85	34.06	44.11	65.82	21.71	QP
3	0.234	0.18	0.03	9.85	19.69	29.75	52.30	22.55	Average
4	0.234	0.18	0.03	9.85	28.20	38.26	62.30	24.04	QP
5	0.398	0.19	0.03	9.85	25.16	35.23	47.90	12.67	Average
6	0.398	0.19	0.03	9.85	30.18	40.25	57.90	17.65	QP
7	0.755	0.20	0.04	9.88	16.38	26.50	46.00	19.50	Average
8	0.755	0.20	0.04	9.88	22.64	32.76	56.00	23.24	QP
9	2.409	0.24	0.07	9.94	13.50	23.75	46.00	22.25	Average
10	2.409	0.24	0.07	9.94	18.06	28.31	56.00	27.69	QP
11	13.408	0.60	0.16	9.89	19.90	30.55	50.00	19.45	Average
12	13.408	0.60	0.16	9.89	27.56	38.21	60.00	21.79	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.

Test Date	2016/06/16	Temp./Hum.	25 /65%
Test Voltage	AC 120V, 60Hz		

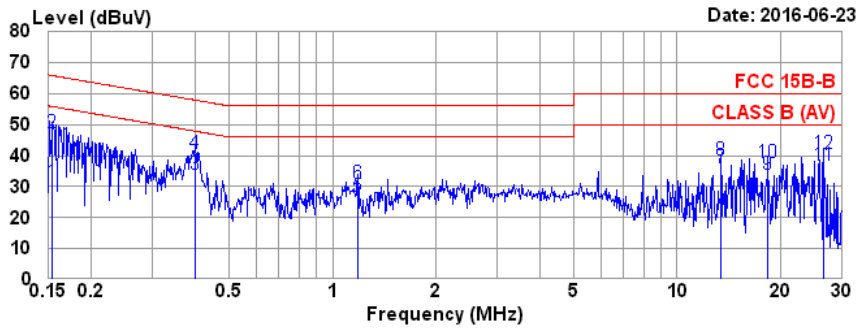


Site no. : No.7 Shielded Room Data no. : 1
 Condition : ESH2-Z5 366 Phase : LINE
 Limit : FCC 15B-B
 Env. / Ins. : 25°C / 65% ESCI (1276) Engineer : Nick Du
 EUT : RT-AC51U
 Power Rating : 120Vac/60Hz
 Test Mode : Operating
 ADP:S12B22-120A100-C4

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.151	0.17	0.03	9.85	21.85	31.90	55.96	24.06	Average
2	0.151	0.17	0.03	9.85	36.58	46.63	65.96	19.33	QP
3	0.421	0.17	0.03	9.85	25.94	35.99	47.42	11.43	Average
4	0.421	0.17	0.03	9.85	29.76	39.81	57.42	17.61	QP
5	0.755	0.17	0.04	9.88	16.41	26.50	46.00	19.50	Average
6	0.755	0.17	0.04	9.88	22.75	32.84	56.00	23.16	QP
7	3.528	0.29	0.08	9.90	13.48	23.75	46.00	22.25	Average
8	3.528	0.29	0.08	9.90	19.68	29.95	56.00	26.05	QP
9	7.935	0.38	0.13	9.87	16.35	26.73	50.00	23.27	Average
10	7.935	0.38	0.13	9.87	23.69	34.07	60.00	25.93	QP
11	15.388	0.61	0.17	9.90	19.58	30.26	50.00	19.74	Average
12	15.388	0.61	0.17	9.90	25.02	35.70	60.00	24.30	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.

Test Date	2016/06/23	Temp./Hum.	25 /65%
Test Voltage	AC 120V, 60Hz		

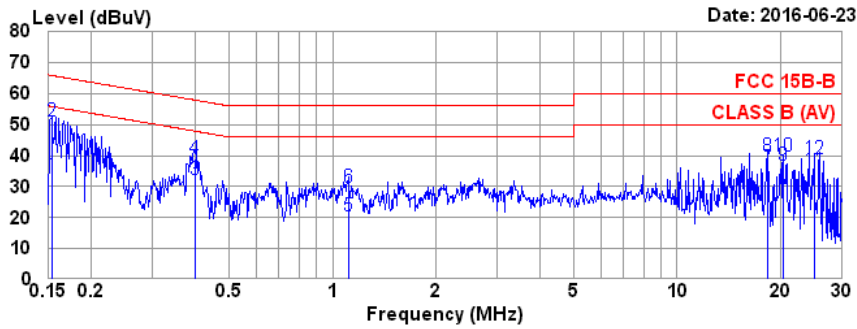


Site no. : No.7 Shielded Room Data no. : 4
 Condition : ESH2-Z5 366 Phase : NEUTRAL
 Limit : FCC 15B-B
 Env. / Ins. : 25°C / 65% ESCI (1276) Engineer : Nick Du
 EUT : RT-AC51U
 Power Rating : 120Vac/60Hz
 Test Mode : Operating
 ADP:SUN-1200100US

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.154	0.17	0.03	9.85	21.30	31.35	55.78	24.43	Average
2	0.154	0.17	0.03	9.85	37.35	47.40	65.78	18.38	QP
3	0.400	0.19	0.03	9.85	24.05	34.12	47.86	13.74	Average
4	0.400	0.19	0.03	9.85	30.56	40.63	57.86	17.23	QP
5	1.184	0.21	0.05	9.92	16.58	26.76	46.00	19.24	Average
6	1.184	0.21	0.05	9.92	20.97	31.15	56.00	24.85	QP
7	13.420	0.60	0.16	9.89	25.35	36.00	50.00	14.00	Average
8	13.420	0.60	0.16	9.89	28.05	38.70	60.00	21.30	QP
9	18.360	0.75	0.20	9.92	23.02	33.89	50.00	16.11	Average
10	18.360	0.75	0.20	9.92	26.90	37.77	60.00	22.23	QP
11	26.610	0.65	0.25	9.98	26.03	36.91	50.00	13.09	Average
12	26.610	0.65	0.25	9.98	29.90	40.78	60.00	19.22	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.

Test Date	2016/06/23	Temp./Hum.	25 /65%
Test Voltage	AC 120V, 60Hz		



Site no. : No.7 Shielded Room Data no. : 3
 Condition : ESH2-Z5 366 Phase : LINE
 Limit : FCC 15B-B
 Env. / Ins. : 25°C / 65% ESCI (1276) Engineer : Nick Du
 EUT : RT-AC51U
 Power Rating : 120Vac/60Hz
 Test Mode : Operating
 ADP:SUN-1200100US

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.153	0.17	0.03	9.85	23.66	33.71	55.82	22.11	Average
2	0.153	0.17	0.03	9.85	41.07	51.12	65.82	14.70	QP
3	0.400	0.17	0.03	9.85	22.26	32.31	47.86	15.55	Average
4	0.400	0.17	0.03	9.85	29.02	39.07	57.86	18.79	QP
5	1.111	0.18	0.05	9.91	10.20	20.34	46.00	25.66	Average
6	1.111	0.18	0.05	9.91	19.81	29.95	56.00	26.05	QP
7	18.370	0.69	0.20	9.92	25.40	36.21	50.00	13.79	Average
8	18.370	0.69	0.20	9.92	28.92	39.73	60.00	20.27	QP
9	20.320	0.73	0.21	9.93	26.14	37.01	50.00	12.99	Average
10	20.320	0.73	0.21	9.93	28.89	39.76	60.00	20.24	QP
11	24.960	0.74	0.24	9.97	24.43	35.38	50.00	14.62	Average
12	24.960	0.74	0.24	9.97	28.22	39.17	60.00	20.83	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.

6. RADIATED EMISSION MEASUREMENT

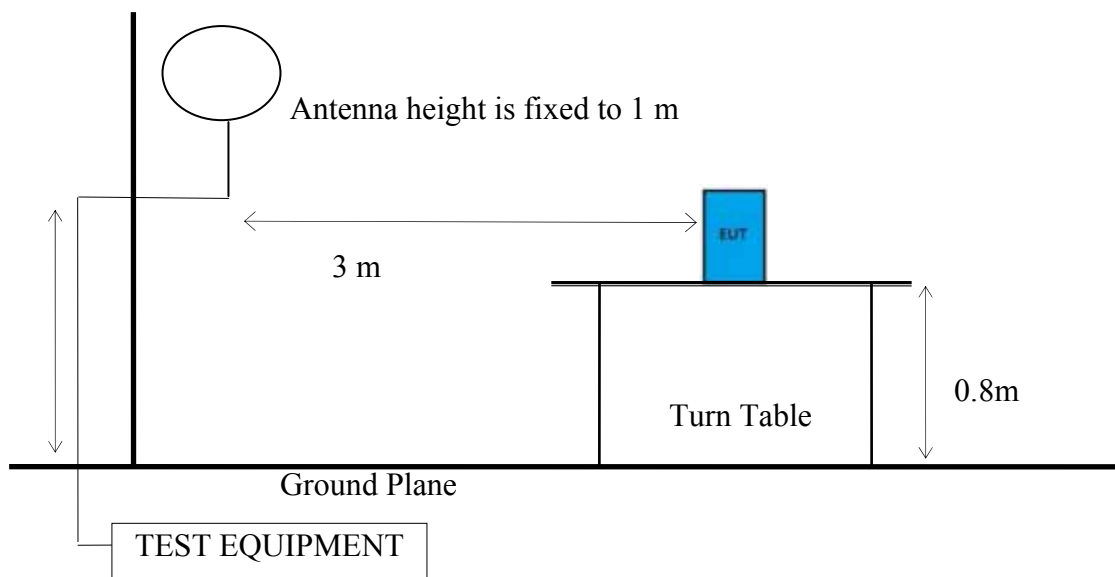
6.1. Block Diagram of Test Setup

6.1.1. Block Diagram of connection between EUT and simulators

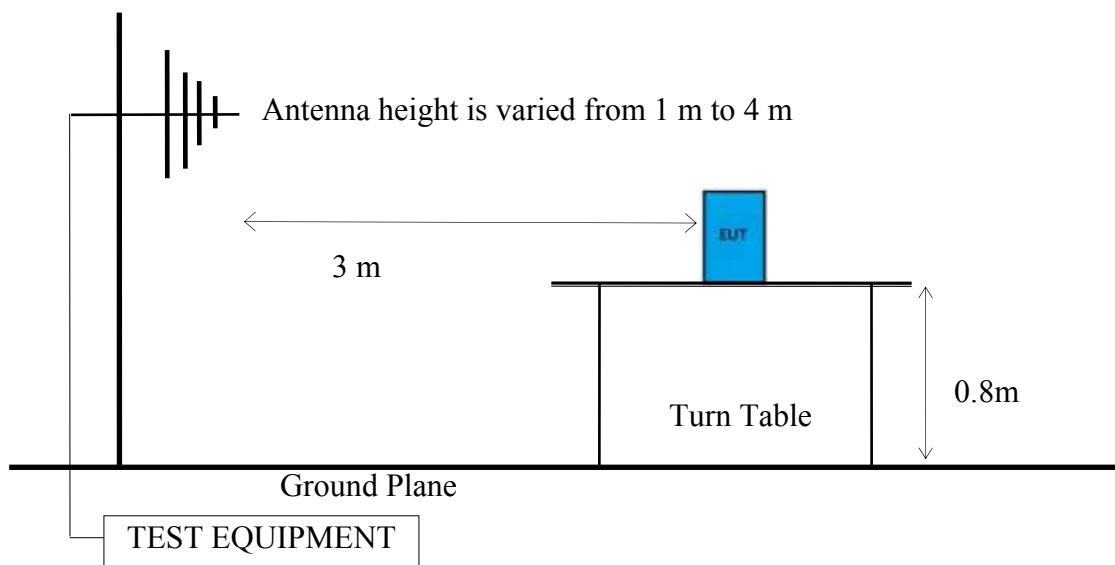
Indicated as section 3.7

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

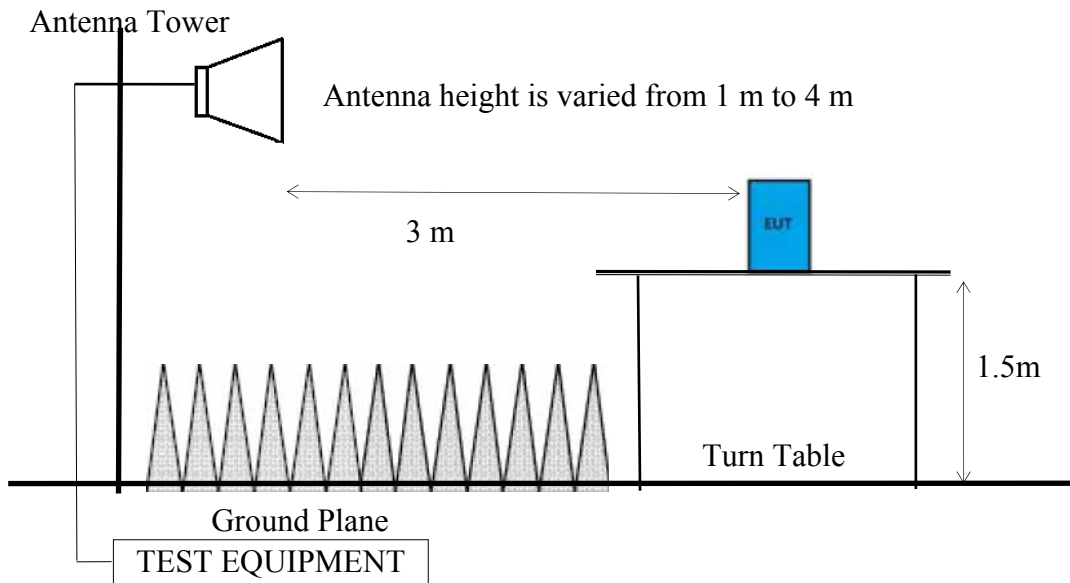
Antenna Tower



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



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



6.2. Radiated Emission Limits

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.

6.2.1. General Limit

Frequency (MHz)	Distance (m)	Field Strengths Limits	
		$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
0.009 - 0.490	300	67.6	2400/kHz
0.490 - 1.705	30	87.6	24000/kHz
1.705 - 30	30	29.5	30
30 ~ 88	3	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) $\text{dB}\mu\text{V/m} = 20 \log (\mu\text{V/m})$

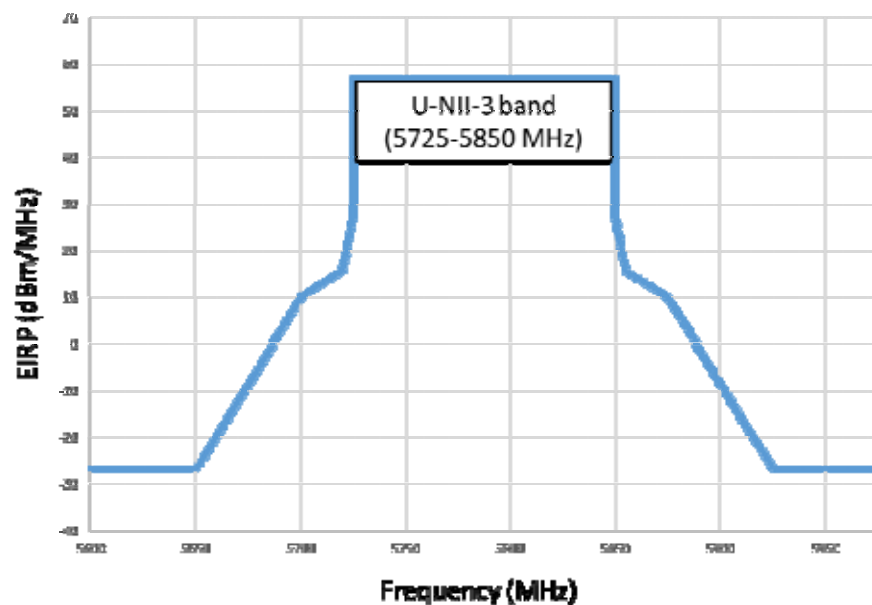
- (2) The tighter limit applies to the edge between two frequency bands.
- (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
- (4) Fundamental and emission fall within operation band are exempted from this 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.

6.2.2. 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

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

Frequency Band (MHz)	Field Strength Limit at 3 m	
5725 to 5850	<input checked="" type="checkbox"/>	15.407(b)(4)(i) All emissions shall be limited to a level of 68.2 dBμV/m at 75 MHz or more above or below the band edge increasing linearly to 105.2dBμV/m 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 110.8 dBμV/m 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 68.2 dBμV/m 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))



6.3. Test Procedure

Frequency Range 9kHz~30MHz:

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

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

Q.P. (490kHz-30MHz)

Frequency Range 30MHz ~ 40GHz:

The EUT setup on the turn 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 x 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 (kHz)	VBW Setting (kHz)
802.11a	N/A	N/A	10Hz
802.11ac-VHT20	N/A	N/A	10Hz
802.11ac-VHT40	N/A	N/A	10Hz
802.11ac-VHT80	N/A	N/A	10Hz

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

- (1) Detector = Peak.
- (2) Sweep time = auto.
- (3) Trace mode = max hold.
- (4) Allow sweeps to continue until the trace stabilizes.

Option 2:

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

6.4. Measurement Result Explanation

Peak Emission Level=Antenna Factor + Cable Loss + Meter Reading

Average Emission Level=Antenna Factor + Cable Loss + Meter Reading

Average Emission Level= Peak Emission Level+ DCCF

Duty Cycle Correction Factor (DCCF)= $20\log (TX_{on}/TX_{on+off})$ presented in section 3.5

6.5. Test Results

PASSED.

Test Date	2016/06/21	Temp./Hum.	29 /52%
Test Voltage	AC 120V, 60Hz		

6.5.1. Emissions within Restricted Frequency Bands

6.5.1.1. Frequency 9kHz~30MHz

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

6.5.1.2. Frequency 30MHz~1000MHz

[Note: We performed testing of the worst switching adapter]

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 (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
240.49	11.86	4.27	26.96	43.09	46.00	2.91	Peak
483.96	16.75	6.33	12.06	35.14	46.00	10.86	Peak
829.28	20.20	7.28	11.87	39.35	46.00	6.65	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
51.34	8.08	2.65	27.18	37.91	40.00	2.09	Peak
484.93	16.77	6.34	11.37	34.48	46.00	11.52	Peak
830.25	20.20	7.28	14.23	41.71	46.00	4.29	Peak

Mode	802.11a	UNII Band	III
		Frequency	TX 5745MHz

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
236.61	11.62	4.24	26.27	42.13	46.00	3.87	Peak
483.96	16.75	6.33	11.88	34.96	46.00	11.04	Peak
831.22	20.20	7.28	11.73	39.21	46.00	6.79	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
51.34	8.08	2.65	27.25	37.98	40.00	2.02	Peak
483.96	16.75	6.33	11.14	34.22	46.00	11.78	Peak
829.28	20.20	7.28	14.71	42.19	46.00	3.81	Peak

Mode	802.11ac-VHT20	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
240.49	11.86	4.27	26.39	42.52	46.00	3.48	Peak
483.96	16.75	6.33	12.97	36.05	46.00	9.95	Peak
830.25	20.20	7.28	11.17	38.65	46.00	7.35	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
43.58	11.52	2.56	23.39	37.47	40.00	2.53	Peak
484.93	16.77	6.34	11.36	34.47	46.00	11.53	Peak
831.22	20.20	7.28	13.95	41.43	46.00	4.57	Peak

Mode	802.11ac-VHT20	UNII Band	III
		Frequency	TX 5745MHz

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
240.49	11.86	4.27	26.30	42.43	46.00	3.57	Peak
484.93	16.77	6.34	11.88	34.99	46.00	11.01	Peak
829.28	20.20	7.28	11.69	39.17	46.00	6.83	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
240.49	11.86	4.27	24.17	40.30	46.00	5.70	Peak
484.93	16.77	6.34	12.11	35.22	46.00	10.78	Peak
830.25	20.20	7.28	14.09	41.57	46.00	4.43	Peak

Mode	802.11ac-VHT40	UNII Band	I
		Frequency	TX 5230MHz

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
240.49	11.86	4.27	27.18	43.31	46.00	2.69	Peak
483.96	16.75	6.33	13.31	36.39	46.00	9.61	Peak
828.31	20.18	7.27	11.53	38.98	46.00	7.02	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
51.34	8.08	2.65	27.25	37.98	40.00	2.02	Peak
482.99	16.73	6.32	10.93	33.98	46.00	12.02	Peak
828.31	20.18	7.27	14.69	42.14	46.00	3.86	Peak

Mode	802.11ac-VHT40	UNII Band	III
		Frequency	TX 5795MHz

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
240.49	11.86	4.27	26.12	42.25	46.00	3.75	Peak
482.99	16.73	6.32	13.63	36.68	46.00	9.32	Peak
828.31	20.18	7.27	12.60	40.05	46.00	5.95	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
240.49	11.86	4.27	23.41	39.54	46.00	6.46	Peak
484.93	16.77	6.34	11.47	34.58	46.00	11.42	Peak
831.22	20.20	7.28	14.94	42.42	46.00	3.58	Peak

Mode	802.11ac-VHT80	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
240.49	11.86	4.27	27.72	43.85	46.00	2.15	Peak
482.99	16.73	6.32	13.23	36.28	46.00	9.72	Peak
830.25	20.20	7.28	11.32	38.80	46.00	7.20	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
43.58	11.52	2.56	23.90	37.98	40.00	2.02	Peak
483.96	16.75	6.33	12.06	35.14	46.00	10.86	Peak
831.22	20.20	7.28	14.34	41.82	46.00	4.18	Peak

Mode	802.11ac-VHT80	UNII Band	III
		Frequency	TX 5775MHz

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
240.49	11.86	4.27	25.46	41.59	46.00	4.41	Peak
484.93	16.77	6.34	12.88	35.99	46.00	10.01	Peak
829.28	20.20	7.28	12.50	39.98	46.00	6.02	Peak

Antenna at Vertical Polarization

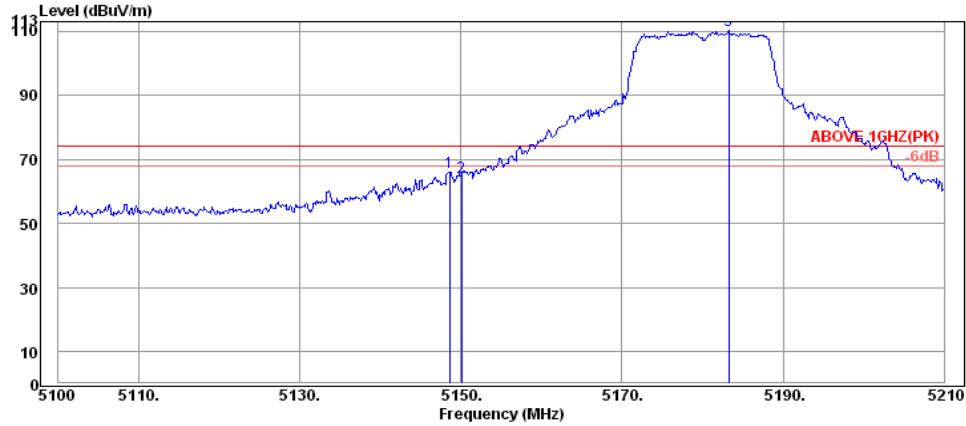
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector
59.10	6.45	2.71	28.13	37.29	40.00	2.71	Peak
482.99	16.73	6.32	12.00	35.05	46.00	10.95	Peak
827.34	20.18	7.27	15.17	42.62	46.00	3.38	Peak

6.5.1.3. Frequency Above 1 GHz to 10th harmonics

[Note: We performed testing of the worst switching adapter]

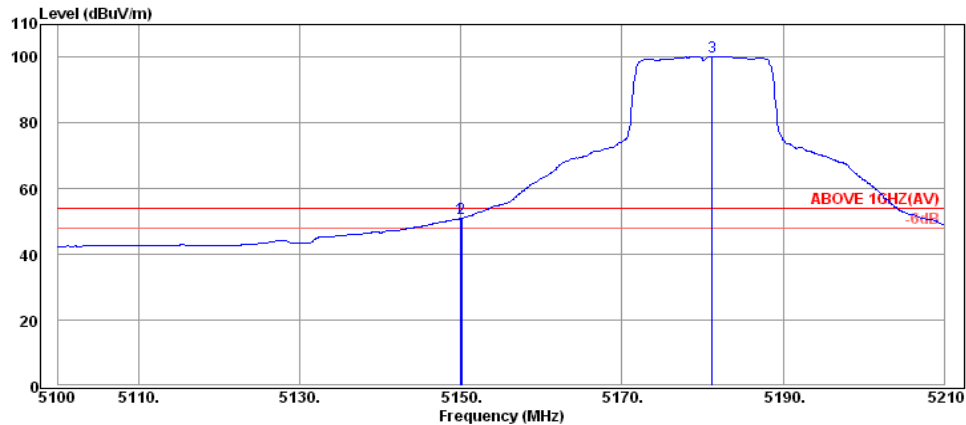
Band Edge:

Mode	802.11a	Frequency	TX 5180MHz
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Antenna at Horizontal Polarization

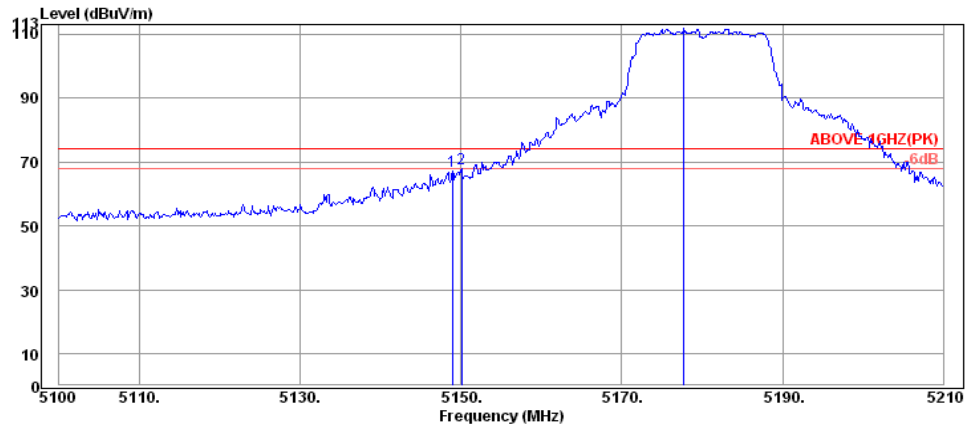
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5148.62	34.45	9.41	22.23	66.09	74.00	7.91	Peak
5150.05	34.45	9.41	20.61	64.47	74.00	9.53	Peak
5183.27	34.48	9.39	66.30	110.17	---	---	Peak



Antenna at Horizontal Polarization

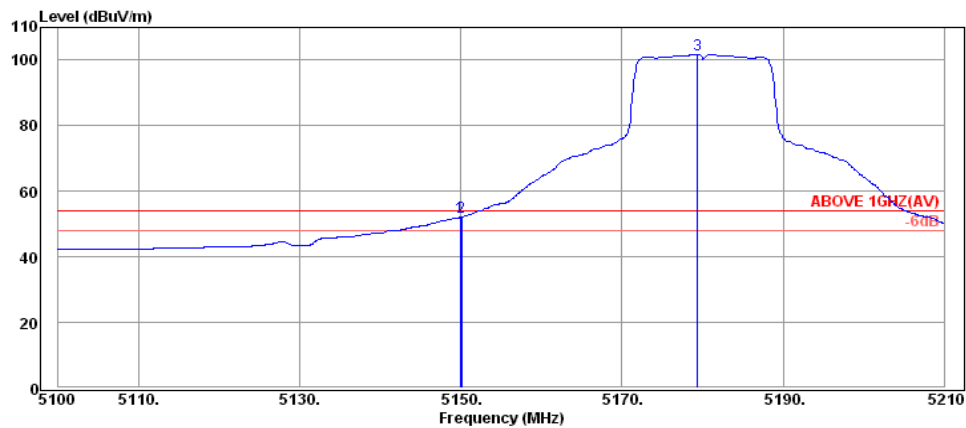
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5149.94	34.45	9.41	7.09	50.95	54.00	3.05	Average
5150.05	34.45	9.41	7.09	50.95	54.00	3.05	Average
5181.18	34.48	9.39	56.45	100.32	---	---	Average

Mode	802.11a	Frequency	TX 5180MHz
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Antenna at Vertical Polarization

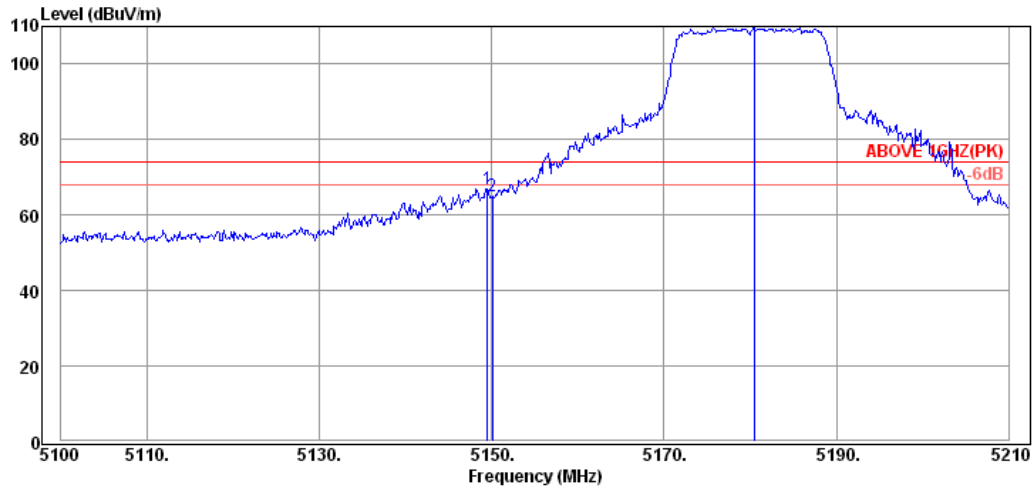
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5148.95	34.45	9.41	23.42	67.28	74.00	6.72	Peak
5150.05	34.45	9.41	24.11	67.97	74.00	6.03	Peak
5177.77	34.48	9.39	68.15	112.02	---	---	Peak



Antenna at Vertical Polarization

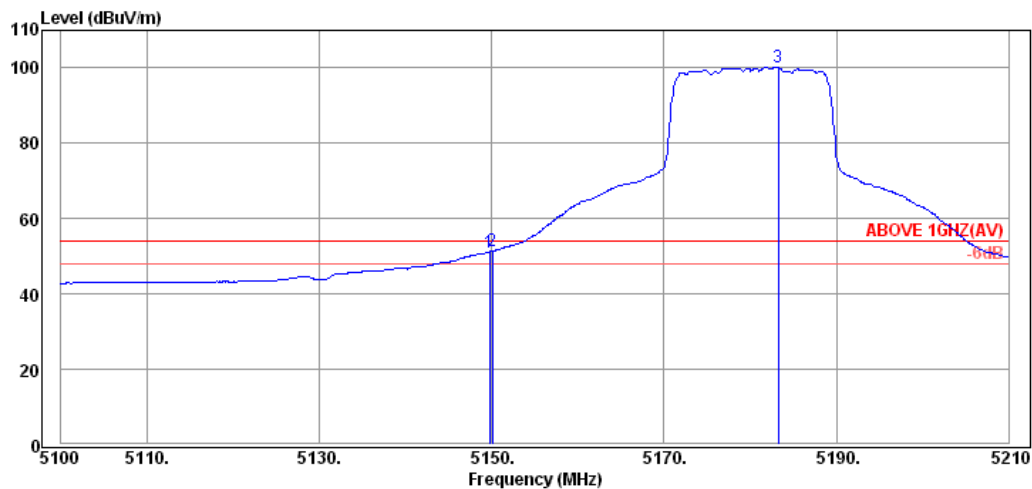
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5149.94	34.45	9.41	8.21	52.07	54.00	1.93	Average
5150.05	34.45	9.41	8.22	52.08	54.00	1.92	Average
5179.42	34.48	9.39	57.82	101.69	---	---	Average

Mode	802.11ac-VHT20	Frequency	TX 5180MHz
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Antenna at Horizontal Polarization

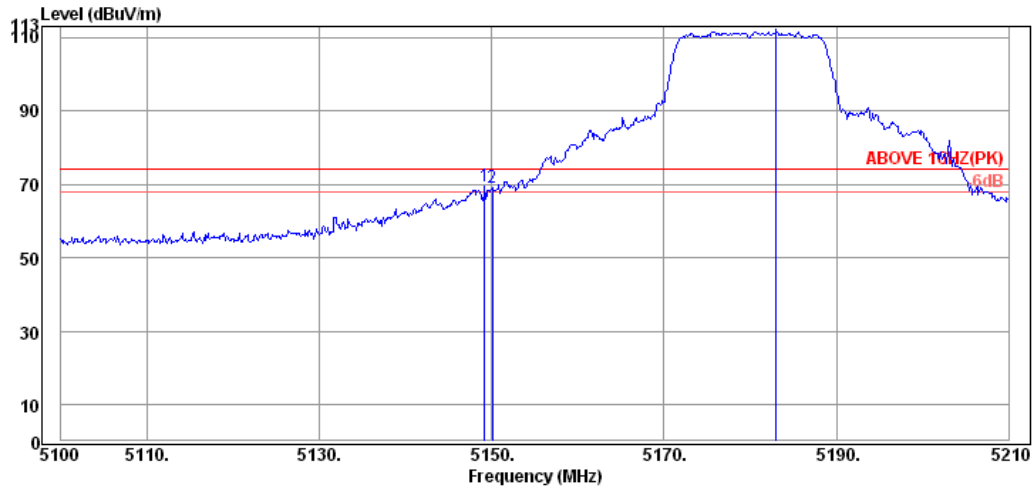
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5149.50	34.45	9.41	23.23	67.09	74.00	6.91	Peak
5150.05	34.45	9.41	21.00	64.86	74.00	9.14	Peak
5180.52	34.48	9.39	65.85	109.72	---	---	Peak



Antenna at Horizontal Polarization

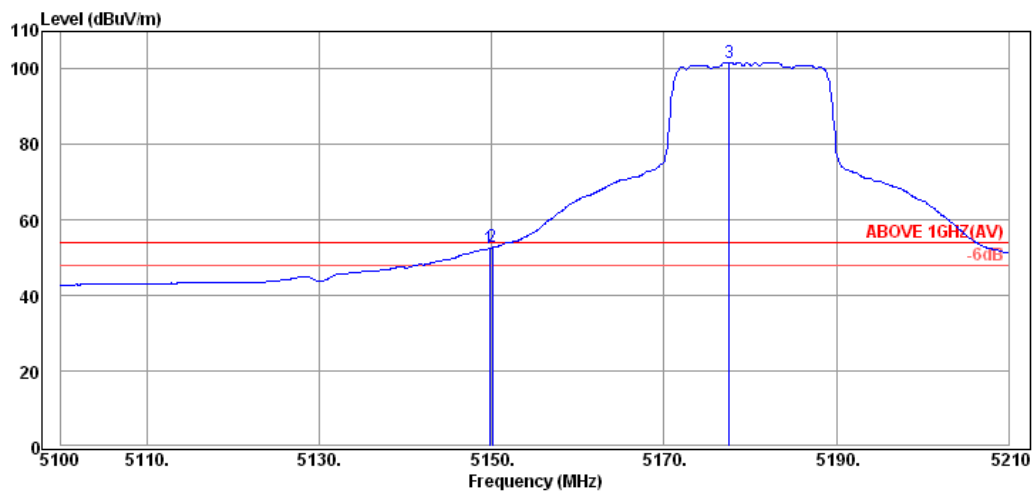
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5149.72	34.45	9.41	7.28	51.14	54.00	2.86	Average
5150.05	34.45	9.41	7.49	51.35	54.00	2.65	Average
5183.27	34.48	9.39	56.24	100.11	---	---	Average

Mode	802.11ac-VHT20	Frequency	TX 5180MHz
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Antenna at Vertical Polarization

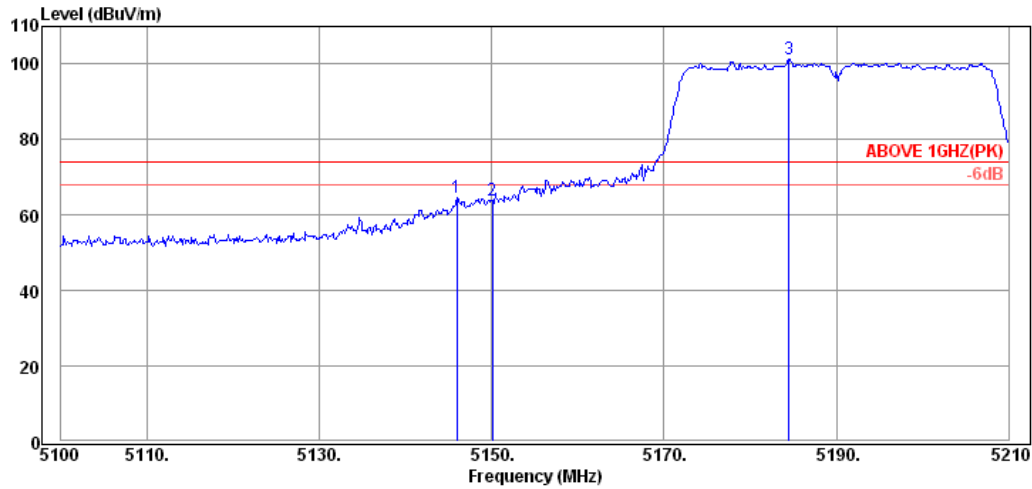
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5149.17	34.45	9.41	25.56	69.42	74.00	4.58	Peak
5150.05	34.45	9.41	25.40	69.26	74.00	4.74	Peak
5183.05	34.48	9.39	68.16	112.03	---	---	Peak



Antenna at Vertical Polarization

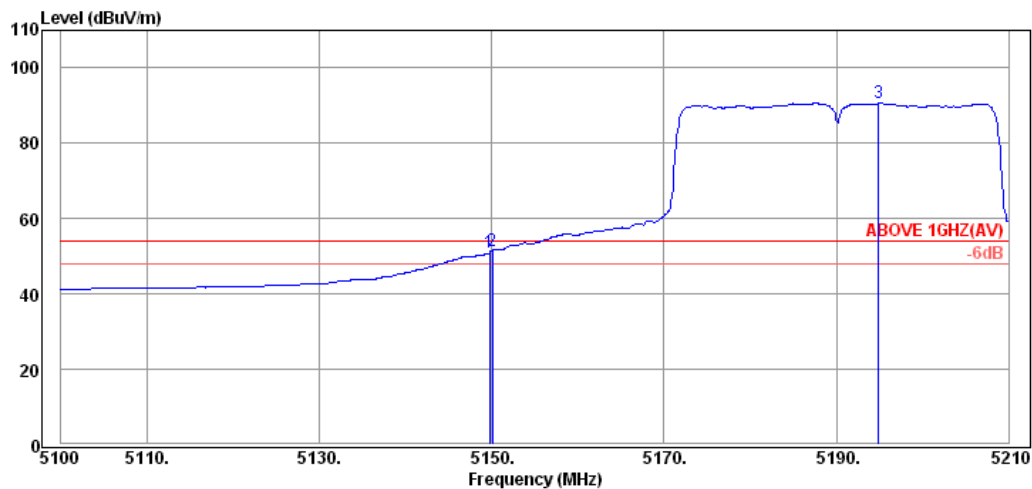
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5149.72	34.45	9.41	8.65	52.51	54.00	1.49	Average
5150.05	34.45	9.41	8.89	52.75	54.00	1.25	Average
5177.55	34.48	9.39	57.84	101.71	---	---	Average

Mode	802.11ac-VHT40	Frequency	TX 5190MHz
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Antenna at Horizontal Polarization

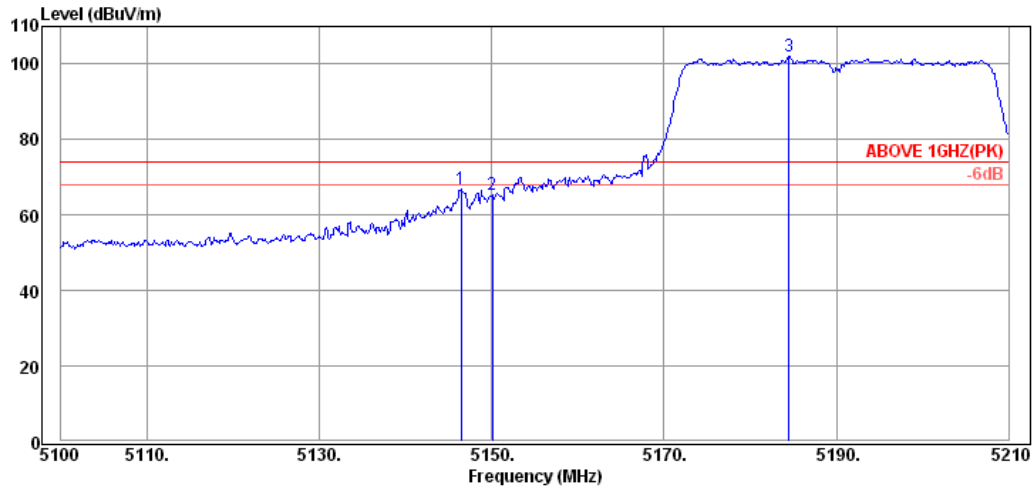
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5145.98	34.45	9.41	20.92	64.78	74.00	9.22	Peak
5150.05	34.45	9.41	19.98	63.84	74.00	10.16	Peak
5184.48	34.48	9.39	57.49	101.36	---	---	Peak



Antenna at Horizontal Polarization

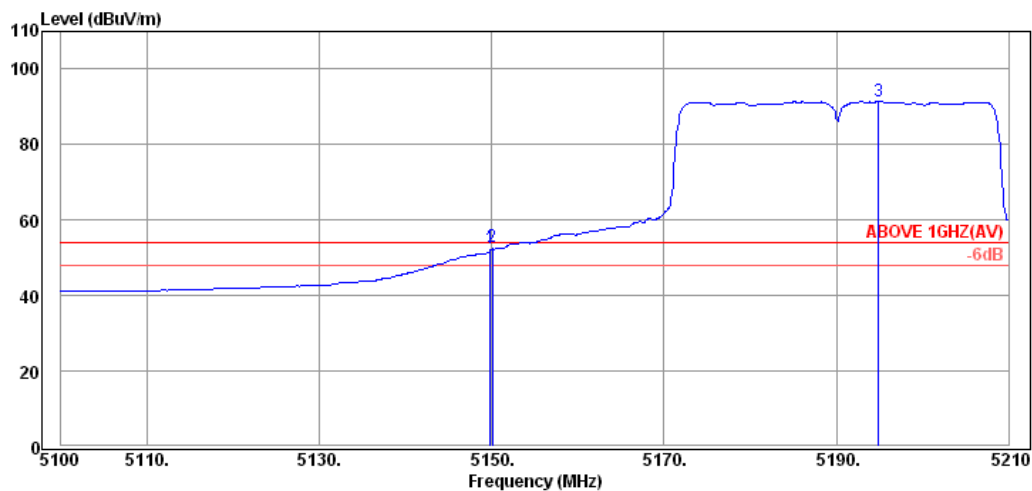
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5149.72	34.45	9.41	7.09	50.95	54.00	3.05	Average
5150.05	34.45	9.41	7.73	51.59	54.00	2.41	Average
5194.93	34.50	9.37	46.76	90.63	---	---	Average

Mode	802.11ac-VHT40	Frequency	TX 5190MHz
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Antenna at Vertical Polarization

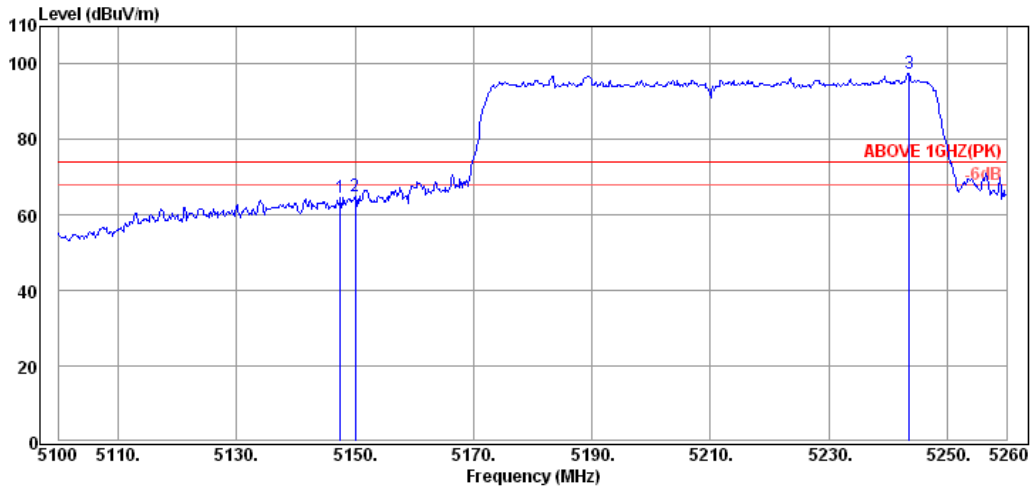
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5146.42	34.45	9.41	22.87	66.73	74.00	7.27	Peak
5150.05	34.45	9.41	21.46	65.32	74.00	8.68	Peak
5184.48	34.48	9.39	58.32	102.19	---	---	Peak



Antenna at Vertical Polarization

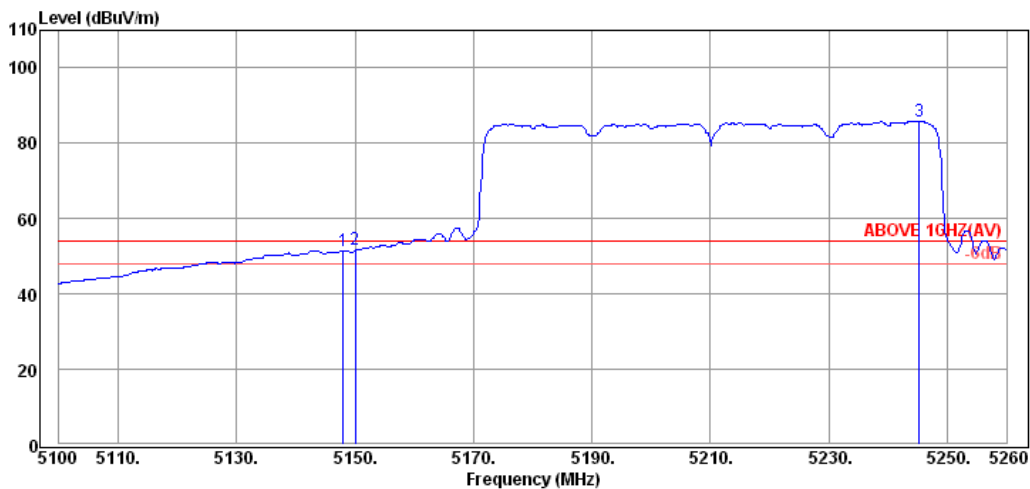
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5149.83	34.45	9.41	8.63	52.49	54.00	1.51	Average
5150.05	34.45	9.41	9.06	52.92	54.00	1.08	Average
5194.93	34.50	9.37	47.60	91.47	---	---	Average

Mode	802.11ac-VHT80	Frequency	TX 5210MHz
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Antenna at Horizontal Polarization

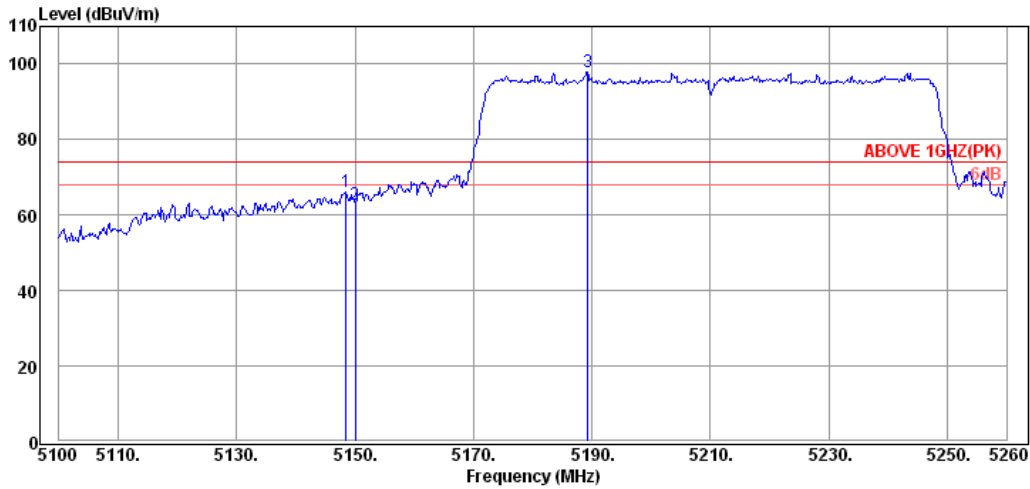
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5147.52	34.45	9.41	20.62	64.48	74.00	9.52	Peak
5150.08	34.45	9.41	21.00	64.86	74.00	9.14	Peak
5243.52	34.55	9.34	53.57	97.46	---	---	Peak



Antenna at Horizontal Polarization

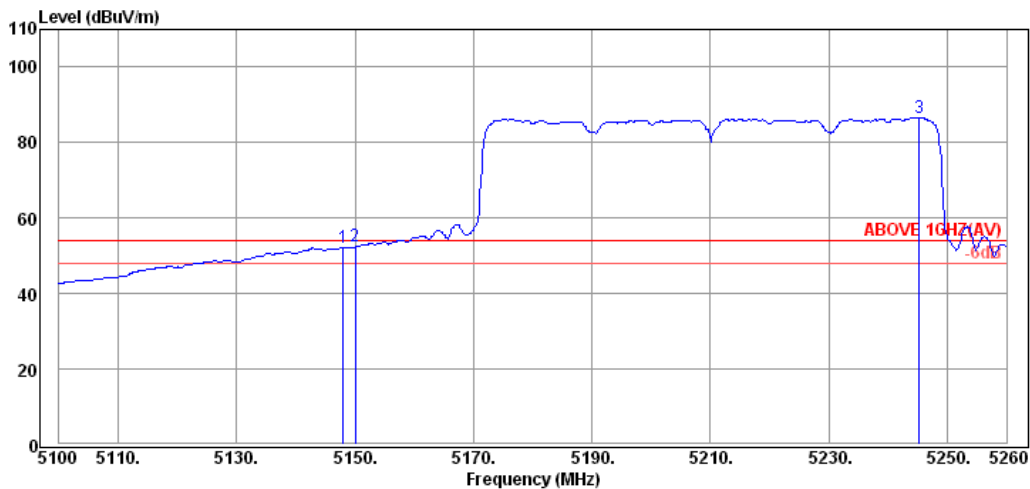
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5148.00	34.45	9.41	7.62	51.48	54.00	2.52	Average
5150.08	34.45	9.41	7.76	51.62	54.00	2.38	Average
5245.28	34.55	9.34	42.08	85.97	---	---	Average

Mode	802.11ac-VHT80	Frequency	TX 5210MHz
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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
5148.48	34.45	9.41	22.11	65.97	74.00	8.03	Peak
5150.08	34.45	9.41	18.90	62.76	74.00	11.24	Peak
5189.28	34.48	9.39	54.02	97.89	---	---	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
5148.00	34.45	9.41	8.46	52.32	54.00	1.68	Average
5150.08	34.45	9.41	8.56	52.42	54.00	1.58	Average
5245.28	34.55	9.34	42.79	86.68	---	---	Average

6.5.2. Emissions outside the frequency band:

[Note: We performed testing of the worst switching adapter]

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

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 (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
10480.00	37.69	12.62	-12.52	37.79	54.00	16.21	Average
10480.00	37.69	12.62	-2.49	47.82	74.00	26.18	Peak
15720.00	40.30	16.72	-11.77	45.25	54.00	8.75	Average
15720.00	40.30	16.72	-1.77	55.25	74.00	18.75	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
10480.00	37.69	12.62	-6.50	43.81	54.00	10.19	Average
10480.00	37.69	12.62	3.55	53.86	74.00	20.14	Peak
15720.00	40.30	16.72	-7.58	49.44	54.00	4.56	Average
15720.00	40.30	16.72	2.43	59.45	74.00	14.55	Peak

Mode	802.11a	UNII Band	III
		Frequency	TX 5745MHz

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
11500.00	38.50	15.40	-14.30	39.60	54.00	14.40	Average
11500.00	38.50	15.40	-1.24	52.66	74.00	21.34	Peak
17240.00	41.37	17.41	-14.27	44.51	54.00	9.49	Average
17240.00	41.37	17.41	-1.26	57.52	74.00	16.48	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
11500.00	38.50	15.40	-1.90	52.00	54.00	2.00	Average
11500.00	38.50	15.40	11.24	65.14	74.00	8.86	Peak
17230.00	41.37	17.41	-12.45	46.33	54.00	7.67	Average
17230.00	41.37	17.41	0.49	59.27	74.00	14.73	Peak

Mode	802.11ac-VHT20	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
10480.00	37.69	12.62	-12.65	37.66	54.00	16.34	Average
10480.00	37.69	12.62	-2.64	47.67	74.00	26.33	Peak
15720.00	40.30	16.72	-12.50	44.52	54.00	9.48	Average
15720.00	40.30	16.72	-2.47	54.55	74.00	19.45	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
10480.00	37.69	12.62	-7.00	43.31	54.00	10.69	Average
10480.00	37.69	12.62	2.99	53.30	74.00	20.70	Peak
15720.00	40.30	16.72	-6.45	50.57	54.00	3.43	Average
15720.00	40.30	16.72	3.56	60.58	74.00	13.42	Peak

Mode	802.11ac-VHT20	UNII Band	III
		Frequency	TX 5745MHz

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
11480.00	38.45	15.40	-15.32	38.53	54.00	15.47	Average
11480.00	38.45	15.40	-2.30	51.55	74.00	22.45	Peak
17240.00	41.37	17.41	-13.90	44.88	54.00	9.12	Average
17240.00	41.37	17.41	-0.92	57.86	74.00	16.14	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
11490.00	38.48	15.40	-3.06	50.82	54.00	3.18	Average
11490.00	38.48	15.40	10.96	64.84	74.00	9.16	Peak
17240.00	41.37	17.41	-14.12	44.66	54.00	9.34	Average
17240.00	41.37	17.41	-1.15	57.63	74.00	16.37	Peak

Mode	802.11ac-VHT40	UNII Band	I
		Frequency	TX 5230MHz

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
10450.00	37.66	12.59	-14.40	35.85	54.00	18.15	Average
10450.00	37.66	12.59	-3.88	46.37	74.00	27.63	Peak
15680.00	40.24	16.70	-11.90	45.04	54.00	8.96	Average
15680.00	40.24	16.70	-1.44	55.50	74.00	18.50	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
10450.00	37.66	12.59	-10.75	39.50	54.00	14.50	Average
10450.00	37.66	12.59	-0.07	50.18	74.00	23.82	Peak
15680.00	40.24	16.70	-10.72	46.22	54.00	7.78	Average
15680.00	40.24	16.70	-0.23	56.71	74.00	17.29	Peak

Mode	802.11ac-VHT40	UNII Band	III
		Frequency	TX 5795MHz

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
11580.00	38.56	15.53	-12.69	41.40	54.00	12.60	Average
11580.00	38.56	15.53	0.31	54.40	74.00	19.60	Peak
17380.00	41.16	17.54	-12.66	46.04	54.00	7.96	Average
17380.00	41.16	17.54	0.35	59.05	74.00	14.95	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
11580.00	38.56	15.53	-4.51	49.58	54.00	4.42	Average
11580.00	38.56	15.53	8.48	62.57	74.00	11.43	Peak
17380.00	41.16	17.54	-14.11	44.59	54.00	9.41	Average
17380.00	41.16	17.54	-1.11	57.59	74.00	16.41	Peak

Mode	802.11ac-VHT80	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
10420.00	37.63	12.51	-17.09	33.05	54.00	20.95	Average
10420.00	37.63	12.51	-6.07	44.07	74.00	29.93	Peak
15630.00	40.15	16.07	-13.61	42.61	54.00	11.39	Average
15630.00	40.15	16.07	-2.64	53.58	74.00	20.42	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
10420.00	37.63	12.51	-16.47	33.67	54.00	20.33	Average
10420.00	37.63	12.51	-5.42	44.72	74.00	29.28	Peak
15630.00	40.15	16.07	-13.37	42.85	54.00	11.15	Average
15630.00	40.15	16.07	-2.34	53.88	74.00	20.12	Peak

Mode	802.11ac-VHT80	UNII Band	III
		Frequency	TX 5775MHz

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
11550.00	38.54	15.53	-17.09	36.98	54.00	17.02	Average
11550.00	38.54	15.53	-4.02	50.05	74.00	23.95	Peak
17320.00	41.26	17.48	-14.23	44.51	54.00	9.49	Average
17320.00	41.26	17.48	-1.22	57.52	74.00	16.48	Peak

Antenna at Vertical Polarization

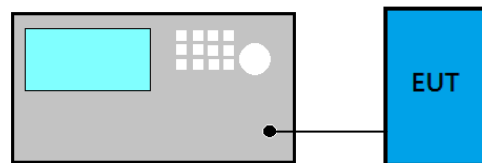
Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11550.00	38.54	15.53	-13.90	40.17	54.00	13.83	Average
11550.00	38.54	15.53	-0.89	53.18	74.00	20.82	Peak
17320.00	41.26	17.48	-14.13	44.61	54.00	9.39	Average
17320.00	41.26	17.48	-1.12	57.62	74.00	16.38	Peak

6.5.3. 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.

7. EMISSION BANDWIDTH MEASUREMENT

7.1. Block Diagram of Test Setup



7.2. Specification Limits

Frequency Band (MHz)	Limit
5150 to 5250	Reference only
5250 to 5350	
5470 to 5725	
5725 to 5850	$\geq 500\text{kHz}$

7.3. Test Procedure

Following measurement procedure is reference to KDB 789033 D02 General UNII Test Procedures New Rules v01r02:

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.

The following procedure shall be used for measuring (99 %) power bandwidth:

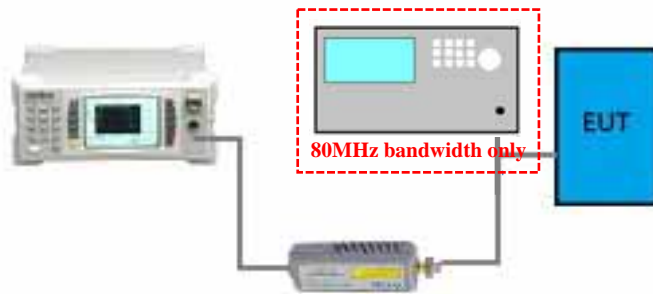
- (1) Set center frequency to the nominal EUT channel center frequency.
- (2) Set span = 1.5 times to 5.0 times the OBW.
- (3) Set RBW = 1 % to 5 % of the OBW
- (4) Set VBW $\geq 3 \cdot$ RBW
- (5) Detector = Sample.
- (6) Use the 99 % power bandwidth function of the instrument.

7.4. Test Results

Please refer to Appendix A

8. MAXIMUM OUTPUT POWER MEASUREMENT

8.1. Block Diagram of Test Setup



8.2. 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.

8.3. Test Procedure

Following measurement procedure is reference to KDB 789033 D02 General UNII Test Procedures New Rules v01r02:

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)

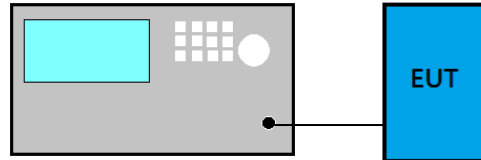
- (1) Set span to at least 1.5 times the OBW
- (2) Set RBW = 1 MHz
- (3) Set the video bandwidth (VBW) \geq 3 MHz.
- (4) Detector = RMS.
- (5) Trace mode = trace average at least 100 traces
- (6) Sweep = auto couple.
- (7) Compute power by integrating the spectrum across the OBW of the signal using the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

8.4. Test Results

Please refer to Appendix A

9. EMISSION LIMITATIONS MEASUREMENT

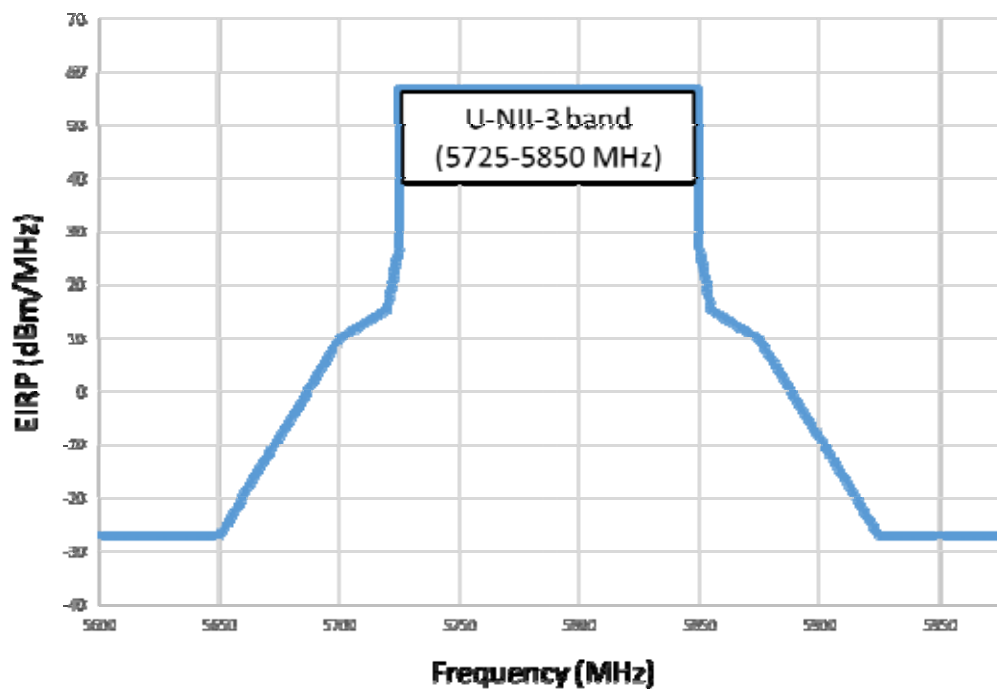
9.1. Block Diagram of Test Setup



9.2. 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))



9.3. Test Procedure

Following measurement procedure is reference to KDB 789033 D02 General UNII Test Procedures New Rules v01r02:

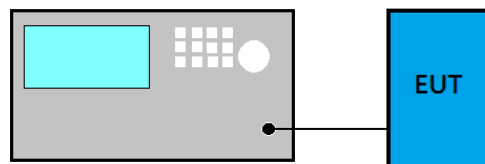
- (1) RBW = 1 MHz
- (2) VBW \geq 3 x RBW
- (3) Detector = Peak
- (4) Sweep time = auto
- (5) Trace mode = max hold
- (6) Allow sweeps to continue until the trace stabilizes.

9.4. Test Results

Please refer to Appendix A

10. POWER SPECTRAL DENSITY MEASUREMENT

10.1. Block Diagram of Test Setup



10.2. 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

10.3. Test Procedure

Following measurement procedure is reference to KDB 789033 D02 General UNII Test Procedures New Rules v01r02:

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%.

10.4. Test Results

Please refer to Appendix A

11.DEVIATION TO TEST SPECIFICATIONS

【NONE】