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

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FCC 15.407 NII
5GHz Test Report

for

LG Electronics Inc.

222, LG-roJinwi-myeon, Pyeongtaek-Si, Gyeonggi-Do, 451-713, Korea

Product Name	:	**Notebook Computer**
Model Name	:	**(1)14Z990 (2)14ZD990 (3)14ZB990 (4)14ZG990 (5)LG14Z99**
Brand		**LG**
FCC ID	:	**BEJNT-14Z990**

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

Testing Laboratory
1724

TESTING
NVLAP LAB CODE 200077-0

The test report is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

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TEST REPORT CERTIFICATION

Applicant	:	LG Electronics Inc.
Factory	:	LG Electronics Nanjing New Technology Co., Ltd.
EUT Description		
(1) Product	:	Notebook Computer
(2) Model	:	(1)14Z990 (2)14ZD990 (3)14ZB990 (4)14ZG990 (5)LG14Z99
(3) Brand	:	LG
(4) Power Rating	:	DC 19V, 2.53A

Applicable Standards:

47CFRFCC Part 15 Subpart E
ANSI C63.10:2013
KDB 789033 D02 General UNII Test Procedures New Rules v02r01

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 Report: 2018. 11. 02

Reviewed by: Sabrina Wang (Sabrina Wang/Administrator)

Approved by: Ben Cheng (Ben Cheng/Manager)

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1. REVISION RECORD OF TEST REPORT

Edition No	Issued Date	Revision Summary	Report Number
0	2018. 11. 02	Original Report	EM-F180458

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2. SUMMARY OF TEST RESULTS

Rule	Description	Results
15.207	Conducted Emission	**PASS**
15.205/15.209	Radiated Band Edge and Radiated Spurious Emission	**PASS**
15.407(a)(5)/15.407(e)	Emission Bandwidth Measurement	**PASS**
15.407(a)	Maximum Output Power	**PASS**
15.407(b)	Conducted Band Edges and Conducted Spurious Emission	**PASS**
15.407(a)	Power Spectral Density	**PASS**
15.203	Antenna Requirement	**Compliance**
15.407	Frequency Stability	**PASS**

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3. GENERAL INFORMATION

3.1. Description of Application

Applicant	LG Electronics Inc. 222, LG-ro, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do 451-713 Korea.
Factory	LG Electronics Nanjing New Technology Co., Ltd. No.346,Yaoxin Road, Economic & Technical Development Zone, Nanjing, China.
Product	Notebook Computer
Brand	LG
Model	(1)14Z990 (2)14ZD990 (3)14ZB990 (4)14ZG990 (5)LG14Z99 The difference between all models is different in the sales customers.

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3.2. Description of EUT

<table>
<tr><td>Test Model</td><td>14Z990</td></tr>
<tr><td>Serial Number</td><td>N/A</td></tr>
<tr><td>Power Rating</td><td>DC 19V, 2.53A</td></tr>
<tr><td>RF Features</td><td>WLAN:802.11a/b/g/n/ac
Bluetooth: BT and BLE</td></tr>
<tr><td>Transmit Type</td><td>
<table>
<tr><th colspan="2">2.4 GHz</th></tr>
<tr><td>802.11b</td><td>1T1R</td></tr>
<tr><td>802.11g</td><td>1T1R</td></tr>
<tr><td>802.11n-HT20</td><td>2T2R</td></tr>
<tr><td>802.11n-HT40</td><td>2T2R</td></tr>
<tr><td>BT/BLE</td><td>1T1R</td></tr>
</table>
<table>
<tr><th colspan="2">UNII Bands</th></tr>
<tr><td>802.11a</td><td>1T1R</td></tr>
<tr><td>802.11n-HT20/
802.11ac-VHT20</td><td>2T2R</td></tr>
<tr><td>802.11n-HT40/
802.11ac-VHT40</td><td>2T2R</td></tr>
<tr><td>802.11ac-VHT80</td><td>2T2R</td></tr>
<tr><td>802.11ac-VHT160</td><td>2T2R</td></tr>
</table>
</td></tr>
<tr><td>Device Category</td><td>☐Outdoor Access Point
☐Fixed point-to-point Access Point
☐Indoor Access Point
■Mobile and Portable client device</td></tr>
<tr><td>Sample Status</td><td>Production</td></tr>
<tr><td>Date of Receipt</td><td>2018. 10. 15</td></tr>
<tr><td>Date of Test</td><td>2018. 10. 20 ~ 11. 01</td></tr>
<tr><td>Interface Ports of EUT</td><td>• One Micro SD Card Slot
• One Earphone Port
• Two USB 3.0 Ports
• One USB Type C Port
• One HDMI Port
• One DC Input Port</td></tr>
<tr><td>Accessories Supplied</td><td>• AC Adapter
• LAN Gender</td></tr>
</table>

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3.3. Antenna Information

2.4G Antenna					
No.	Antenna Part Number	Manufacture	Antenna Type	Frequency (MHz)	Max Gain (dBi)
1	WA-F-LBLB-04-058 (Main)	INPAQ	FPCB	2400	1.94
				2450	2.72
				2500	1.20
2	WA-F-LBLB-04-058 (AUX)	INPAQ	FPCB	2400	2.79
				2450	2.29
				2500	1.90

5G Antenna					
No.	Antenna Part Number	Manufacture	Antenna Type	Frequency (MHz)	Max Gain (dBi)
1	WA-F-LBLB-04-058 (Main)	INPAQ	FPCB	5100	1.35
				5400	3.06
				5800	2.10
2	WA-F-LBLB-04-058 (AUX)	INPAQ	FPCB	5100	2.82
				5400	1.12
				5800	0.58

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3.4. EUT Specifications Assessed in Current Report

Mode	UNII Band	Fundamental Range (MHz)	Channel Number
802.11a	I	5180-5240	4
	II-2A	5260-5320	4
	II-2C	5500-5700	11
	III	5745-5825	5
802.11n-HT20/ 802.11ac-VHT20	I	5180-5240	4
	II-2A	5260-5320	4
	II-2C	5500-5720	12
	III	5745-5825	5
802.11n-HT40/ 802.11ac-VHT40	I	5190-5230	2
	II-2A	5270-5310	2
	II-2C	5510-5710	6
	III	5755-5795	2
802.11ac-VHT80	I	5210	1
	II-2A	5290	1
	II-2C	5530-5690	3
	III	5775	1
802.11ac-VHT160	I	5250	1
	II-2C	5570	1
Remark: UNII Band II-2A and II-2C (DFS Function, Slave/no In service monitor, no Ad-Hoc mode)			

Mode	Modulation	Data Rate (Mbps)
802.11a	OFDM (BPSK/QPSK/16QAM/64QAM)	Up to 54
802.11n-HT20	OFDM (BPSK/QPSK/16QAM/64QAM)	Up to 144.4
802.11n-HT40		Up to 300
802.11ac-VHT20	OFDM (BPSK/QPSK/16QAM/64QAM/256QAM)	Up to 173.3
802.11ac-VHT40		Up to 400
802.11ac-VHT80		Up to 866.7
802.11ac-VHT160		Up to 1733.3

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Channel List					
802.11a					
UNII Band	Channel Number	Frequency (MHz)	UNII Band	Channel Number	Frequency (MHz)
I	36	5180	II-2C	120	5600
	40	5200		124	5620
	44	5220		128	5640
	48	5240		132	5660
II-2A	52	5260		136	5680
	56	5280		140	5700
	60	5300	III	149	5745
	64	5320		153	5765
II-2C	100	5500		157	5785
	104	5520		161	5805
	108	5540		165	5825
	112	5560			
	116	5580			

Channel List					
802.11n-HT20/802.11ac-VHT20					
UNII Band	Channel Number	Frequency (MHz)	UNII Band	Channel Number	Frequency (MHz)
I	36	5180	II-2C	120	5600
	40	5200		124	5620
	44	5220		128	5640
	48	5240		132	5660
II-2A	52	5260		136	5680
	56	5280		140	5700
	60	5300		144	5720
	64	5320	III	149	5745
II-2C	100	5500		153	5765
	104	5520		157	5785
	108	5540		161	5805
	112	5560		165	5825
	116	5580			

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Channel List					
802.11n-HT40/802.11ac-VHT40					
UNII Band	Channel Number	Frequency (MHz)	UNII Band	Channel Number	Frequency (MHz)
I	38	5190	II-2C	118	5590
	46	5230		126	5630
II-2A	54	5270		134	5670
	62	5310		142	5710
II-2C	102	5510	III	151	5755
	110	5550		159	5795

Channel List					
802.11ac-VHT80					
UNII Band	Channel Number	Frequency (MHz)	UNII Band	Channel Number	Frequency (MHz)
I	42	5210	II-2C	138	5690
II-2A	58	5290	III	155	5775
II-2C	106	5530			
	122	5610			

Channel List					
802.11ac-VHT160					
UNII Band	Channel Number	Frequency (MHz)	UNII Band	Channel Number	Frequency (MHz)
I	50	5250	II-2C	114	5570

NoteTest modes are presented at section 3.7.

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3.6. Description of Key Components

3.6.1. For the All Component Lists

Item	Supplier	Model / Type	Character
System	Microsoft	Win10 Home	---
		Win10 Pro	---
Main Board	LG	14/15Z990 Main B/D PCB	(without Thunderbolt) Manufacturer: #1 Hannstar Board Tech (Jiang Yin) Corp., Ltd. #2 Elec & Eltek Company (MCO) Limited
	LG	14/15Z990 Main B/D PCB	(with Thunderbolt) Manufacturer: #1 Hannstar Board Tech (Jiang Yin) Corp., Ltd. #2 Elec & Eltek Company (MCO) Limited
SUB Board	LG	14Z990 WLAN SUB B/D	(without Finger Print) Manufacturer: #1 Hannstar Board Tech (Jiang Yin) Corp., Ltd. #2 Elec & Eltek Company (MCO) Limited
	LG	14Z990 WLAN SUB B/D	(with Finger Print) Manufacturer: #1 Hannstar Board Tech (Jiang Yin) Corp., Ltd. #2 Elec & Eltek Company (MCO) Limited
CPU (Socket: BGA1528)	Intel	i5-8265U	1.6GHz, up to 3.9GHz
		i7-8565U	1.8GHz, up to 4.6GHz
14” LCD Panel	LG Display	LP140WF7-SPG1	Resolution: 1920 x 1080, 60Hz FHD IPS (Normal Non touch)
		LP140WF5-SPG2	Resolution: 1920 x 1080, 60Hz FHD IPSW/ Touch (AIT Including touch)
Storage (SSD)	Samsung	MZ-VLB5120 (P/N MZVLB512HAJQ-0000)	512GB (NVMe)
		MZ-NLN128C (P/N MZNLN128HAHQ-0000)	128GB (SATA)
	SK hynix	P/N HFS256G39TNF	256GB (SATA)
Memory (RAM)	Samsung	K4AAG16 5WB MCRC	8GB DDR4 (On Board).
		K4A8G16 5WB-BCTD	4GB DDR4 (On Board).
	SK hynix	H5ANAG6NAMR	8GB DDR4 (On Board).
		H5AN8G6NAFR	4GB DDR4 (On Board).
	Samsung	M471A5244CB0-CRC	4GB DDR4 SODIMM (On Card)
		M471A5244CB0-CTD	4GB DDR4 SODIMM (On Card)
		M471A1K43CB1-CRC	8GB DDR4 SODIMM (On Card)
		M471A1K43CB1-CTD	8GB DDR4 SODIMM (On Card)
	SK hynix	HMA851S6AFR6N-UH	4GB DDR4 SODIMM (On Card)
		HMA81GS6AFR8N-UH	8GB DDR4 SODIMM (On Card)
Battery Pack	LG	LBS1224E	DC 7.7V, 72Wh, Typ 9450mAh

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Item	Supplier	Model / Type	Character
WLAN Combo Card	Intel	9560D2W	802.11a/b/g/n/ac 2.4GHz/5GHz+BT 5.0 BLE
WLAN Combo Antenna	LG (INPAQ)	WA-F-LBLB-04-058	FPCB Type, Main: Black, Aux: Gray
Web Camera	Chicony	CKFIH2821005290LH	With two microphones
		CKFIH28-121005290LH	With one microphone
	Luxvisions	7BF109N2DC	With two microphones
		7BF109N2DD	With one microphone
Keyboard	LG	SN3871BL1 (White)	---
		SN3871BL (Black)	---
		Above model have the same circuit and hardware. The model SN3871BL1 (White) is tested in this report.	
Finger Print	SUNTEL	SFPA-L002STA (White)	---
		SFPA-L002STB (Black)	---
		Above model have the same circuit and hardware. The model SFPA-L002STA (White) is tested in this report.	
LAN Gender (Type C to LAN)	SUZHOU MEC ELECTRONICS	80-5946-111 (White)	10/100 Megabit Ethernet
		80-5946-101 (Black)	
		Above model have the same circuit and hardware. The model 80-5946-111 (White) is tested in this report.	
	ARIN TECH CO. LTD	GD-08MF-36-WH-LP05 (White)	10/100 Megabit Ethernet
		GD-08MF-36-BK-LP06 (Black)	
		Above model have the same circuit and hardware. The model GD-08MF-36-WH-LP05 (White) is tested in this report.	
	Type C to LAN: Shielded, Undetached, 0.12m		
AC Adapter (48W)	LG (HONOR)	ADS-48MS-19-2 19048E	BSMI ID: R3C189 I/P: AC 100-240V, 50-60Hz, 1.5A, O/P: DC 19V, Max. 2.53A
	DC Power Cord: Non-Shielded, Undetached, 1.8m AC Power Cord: Non-Shielded, Detached, 1.0m (2C) (For Other Countries) AC Power Cord: Non-Shielded, Detached, 1.55m (2C) (For US, Canada, Mexico)		

Remark: For more detailed features description, please refer to the manufacturer's specifications or the user manual.

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3.6.2. The EUT collocates with following worst components, which are used to establish a basic configuration of system during test:

SKU	
Main Board	LG, 14/15Z990 Main B/D PCB (with Thunderbolt)
SUB Board	LG, 14Z990 WLAN SUB B/D (with Finger Print)
CPU	Intel, i7-8565U
14” LCD Panel	LG Display, LP140WF5-SPG2 (AIT Including touch)
Storage (SSD)	Samsung, 512GB (NVMe)
	Samsung, 128GB (SATA)
Memory (RAM)	8GB (On Board)
	8GB (On Card)
Battery Pack	LG, LBS1224E
WLAN Combo Card	Intel, 8265D2W
WLAN Combo Antenna	LG (INPAQ), WA-F-LBLB-04-058
Web Camera	Chicony, CKFIH2821005290LH (With two microphones)
Keyboard	LG,SN3871BL1(White)
Finger Print	SUNTEL, SFPA-L002STA(White)
LAN Gender (Type C to LAN)	MEC, 80-5946-111 (White)
AC Adapter	HONOR, ADS-48MS-19-2 19048E
Display	HDMI, 1920 x 1080, 60Hz (“H” Pattern)

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3.7. Data Rate Relative to Output Power

802.11a				802.11n-HT20			
Channel	Modulation	Date Rate	Power (dBm)	Channel	Modulation	Date Rate	Power (dBm)
36	BPSK	6	18.43	36	BPSK	HT MCS8	19.01
36	QPSK	9	18.32	36	QPSK	HT MCS9	18.84
36	QPSK	12	18.26	36	QPSK	HT MCS10	18.66
36	16-QAM	18	18.12	36	16-QAM	HT MCS11	18.49
36	16-QAM	24	18.03	36	16-QAM	HT MCS12	18.35
36	64-QAM	36	17.94	36	64-QAM	HT MCS13	18.21
36	64-QAM	48	17.87	36	64-QAM	HT MCS14	18.12
36	64-QAM	54	17.64	36	64-QAM	HT MCS15	18.06

802.11n-HT40				802.11ac-VHT80			
Channel	Modulation	Date Rate	Power (dBm)	Channel	Modulation	Date Rate	Power (dBm)
38	BPSK	HT MCS8	16.97	42	BPSK	VHT MCS0	12.94
38	QPSK	HT MCS9	16.82	42	QPSK	VHT MCS1	12.76
38	QPSK	HT MCS10	16.71	42	QPSK	VHT MCS2	12.69
38	16-QAM	HT MCS11	16.56	42	16-QAM	VHT MCS3	12.57
38	16-QAM	HT MCS12	16.34	42	16-QAM	VHT MCS4	12.48
38	64-QAM	HT MCS13	16.25	42	64-QAM	VHT MCS5	12.35
38	64-QAM	HT MCS14	16.12	42	64-QAM	VHT MCS6	12.28
38	64-QAM	HT MCS15	16.05	42	64-QAM	VHT MCS7	12.17
				42	256-QAM	VHT MCS8	12.08
				42	256-QAM	VHT MCS9	11.95

802.11ac-VHT160			
Channel	Modulation	Date Rate	Power (dBm)
50	BPSK	VHT MCS0	14.06
50	QPSK	VHT MCS1	13.97
50	QPSK	VHT MCS2	13.86
50	16-QAM	VHT MCS3	13.71
50	16-QAM	VHT MCS4	13.62
50	64-QAM	VHT MCS5	13.49
50	64-QAM	VHT MCS6	13.37
50	64-QAM	VHT MCS7	13.26
50	256-QAM	VHT MCS8	13.04
50	256-QAM	VHT MCS9	12.98

Note: Above results are assessed in average power.

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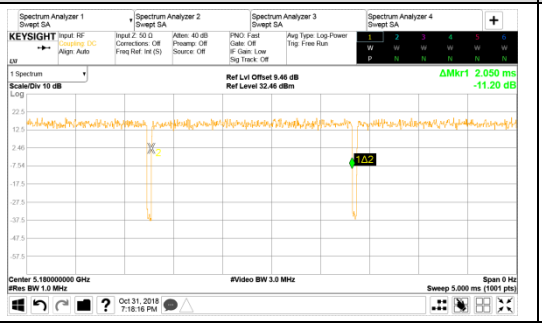
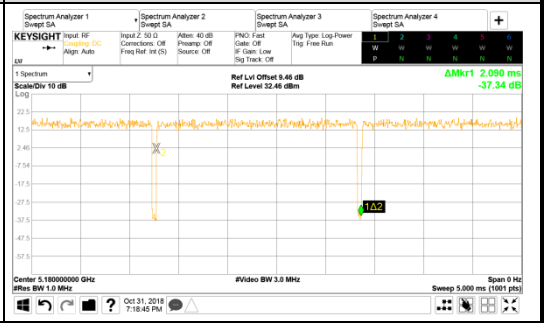
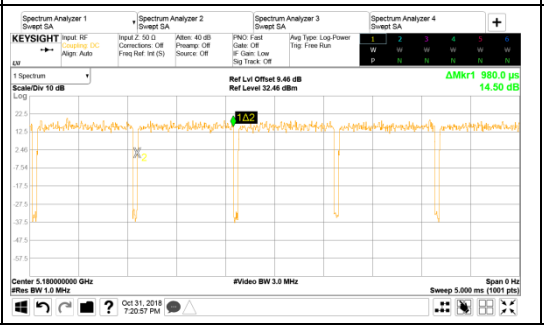
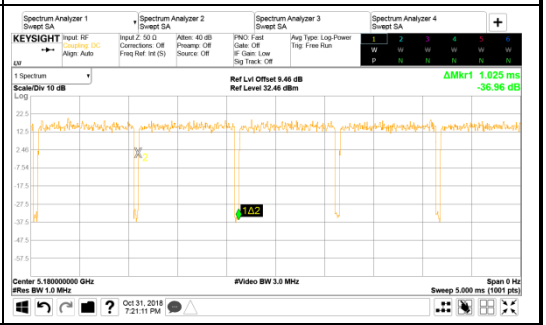
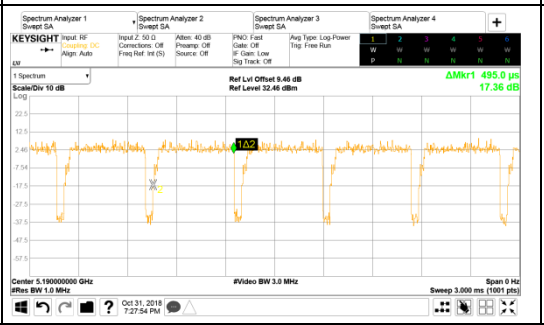
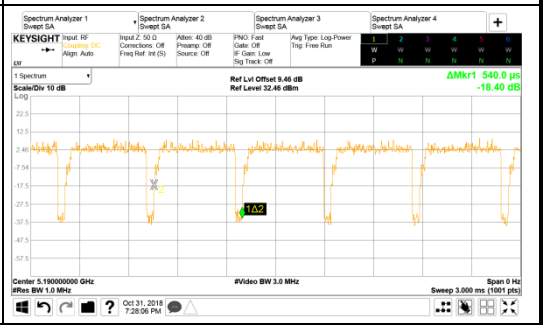
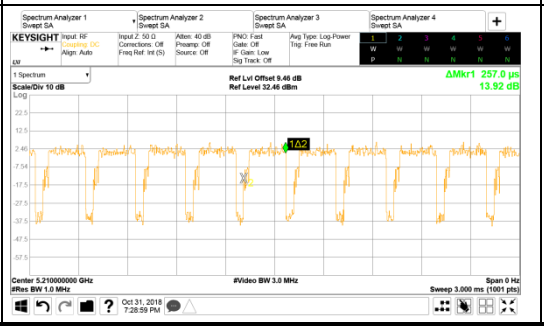
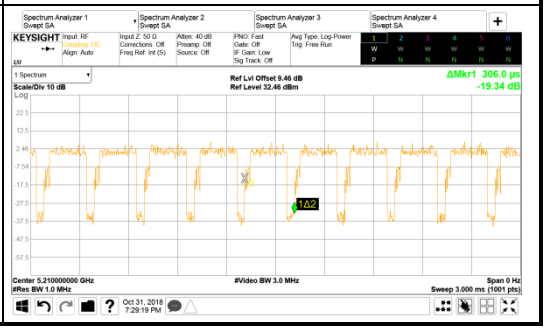
3.8. Test Configuration

Mode	Duty Cycle (x)	T (ms)	Duty Cycle Factor (dB)
802.11a	0.98	2.050	0
802.11n-HT20	0.96	0.980	0.18
802.11n-HT40	0.92	0.495	0.36
802.11ac-VHT80	0.84	0.257	0.76
802.11ac-VHT160	0.76	0.154	1.19

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

Mode	Duty Cycle (x)	
	TX_{on}	TX_{on+off}
802.11a		
802.11n-HT20		
802.11n-HT40		
802.11ac-VHT80		

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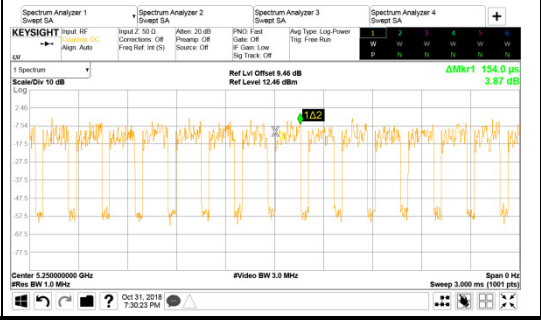
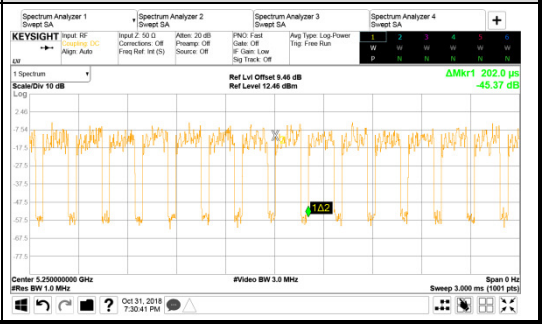
Mode	Duty Cycle (x)	
	TX_{on}	TX_{on+off}
802.11ac-VHT160		

AC Conduction	
Test Case	Normal operation

Item		Mode	Data Rate	Test Channel
Radiated Test Case	Radiated Band Edge Note1	802.11a	6 Mbps	36/64/100/140
		802.11n-HT20	HT MCS8	36/64/100/140/144
		802.11n-HT40	HT MCS8	38/62/102/134
		802.11ac-VHT80	VHT MCS0	42/58/106/122
		802.11ac-VHT160	VHT MCS0	50/144
	Radiated Spurious Emission Note1& 2	802.11a	6 Mbps	40/52/116/149
		802.11n-HT20	HT MCS8	40/52/116/144/165
		802.11n-HT40	HT MCS8	46/54/134/142/159
		802.11ac-VHT80	VHT MCS0	42/58/138/155
		802.11ac-VHT160	VHT MCS0	50/144
Conducted Test Case	Emission Bandwidth	802.11a	6 Mbps	36/40/48/52/60/64/100/ 116/140/149/157/165
		802.11n-HT20	HT MCS8	36/40/48/52/60/64/100/ 116/140/144/149/157/165
		802.11n-HT40	HT MCS8	38/46/54/62/102/110/ 134/142/151/159
		802.11ac-VHT80	HT MCS0	42/58/106/122/138/155
		802.11ac-VHT160	VHT MCS0	50/114
	Maximum output power	802.11a	6 Mbps	36/40/48/52/60/64/100/ 116/140/149/157/165
		802.11n-HT20	MCS8	36/40/48/52/60/64/100/ 116/140/144/149/157/165
		802.11n-HT40	MCS8	38/46/54/62/102/110/ 134/142/151/159
		802.11ac-VHT80	MCS0	42/58/106/122/138/155
		802.11ac-VHT160	VHT MCS0	50/114

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Item		Mode	Data Rate	Test Channel
Conducted Test Case	Emission Limitations	802.11a	6 Mbps	36/40/48/52/60/64/100/ 116/140/149/157/165
		802.11n-HT20	MCS8	36/40/48/52/60/64/100/ 116/140/144/149/157/165
		802.11n-HT40	MCS8	38/46/54/62/102/110/ 134/142/151/159
		802.11ac-VHT80	MCS0	42/58/106/122/138/155
		802.11ac-VHT160	VHT MCS0	50/114
	Power spectral density	802.11a	6 Mbps	36/40/48/52/60/64/100/ 116/140/149/157/165
		802.11n-HT20	MCS8	36/40/48/52/60/64/100/ 116/140/144/149/157/ 165
		802.11n-HT40	MCS8	38/46/54/62/102/110/ 134/142/151/159
		802.11ac-VHT80	MCS0	42/58/106/122/138/155
		802.11ac-VHT160	VHT MCS0	50/114
	Frequency Stability	---	---	36

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.

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3.9. Tested Supporting System List

3.9.1. Support Peripheral Unit

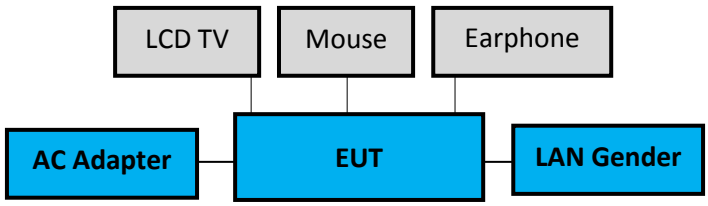
No.	Product	Brand	Model No.	Serial No.	Approval
1.	LCD TV	LG	22LK330-DB	N/A	N/A
2.	USB Mouse	DELL	MS111-L	CN-09RRC7-48723-2B7-0H3M	FCC By DoC
3.	Earphone	SAMPO	EK-Y1251MP	N/A	N/A

3.9.2. Cable Lists

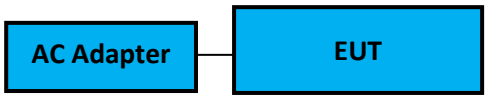
No.	Cable Description Of The Above Support Units
1.	HDMI Cable: Shielded, Detachable, 1.8m AC Power Cord: Unshielded, Detachable, 1.8m
2.	USB Cable: Unshielded, Undetachable, 1.8m
3.	Earphone Cable: Unshielded, Undetachable, 2.0m

3.10.Setup Configuration

3.10.1. EUT Configuration for Power Line & Radiated Emission



3.10.2. EUT Configuration for RF Conducted Test Items



3.11.Operating Condition of EUT

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

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3.12.Description of Test Facility

Name of Test Firm	Audix Technology Corporation / EMC Department No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan Tel: +886-2-26092133 Fax: +886-2-26099303 Website : www.audixtech.com Contact e-mail: attemc_report@audixtech.com
Accreditations	The laboratory is accredited by following organizations under ISO/IEC 17025:2005 (1) NVLAP(USA) NVLAP Lab Code 200077-0 (2) TAF(Taiwan) No. 1724
Test Facilities	FCC OET Designation Number under APEC MRA by NCC is : TW1724 (1) No. 8Shielding Room (2) Semi-Anechoic Chamber (IC Test Site Registration No.:5183B-1)

3.13.Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Conduction Test	150kHz~30MHz	±3.50dB
Radiation Test (Distance: 3m)	30MHz~1000MHz	± 3.68dB
	Above 1GHz	±5.82dB

Remark：Uncertainty = $ku_c(y)$

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

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4. MEASUREMENT EQUIPMENTLIST

4.1. Conducted Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Test Receiver	R&S	ESR3	101774	2018. 01. 24	1 Year
2.	A.M.N.	R&S	ENV4200	100169	2017. 11. 12	1 Year
3.	L.I.S.N.	Kyoritsu	KNW-407	8-855-9	2017. 12. 14	1 Year
4.	Pulse Limiter	R&S	ESH3-Z2	100354	2018. 01. 16	1 Year
5.	Signal Cable	Yeida	RG/58AU	CE-08	2018. 09. 21	1 Year
6.	Digital Thermo- Hygro Meter	iMax	HTC-1	No.8 S/R	2018. 04. 20	1 Year

4.2. Radiated Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A-526	MY53400071	2018. 09. 12	1 Year
2.	Test Receiver	R & S	ESCS30	100338	2018. 06. 20	1 Year
3.	Amplifier	HP	8447D	2944A06305	2018. 01. 30	1 Year
4.	Amplifier	HP	8449B	3008A00529	2018. 01. 24	1 Year
5.	Loop Antenna	R&S	HFH2-Z2	891847/27	2017. 12. 18	1 Year
6.	Bilog Antenna	CHASE	CBL6112D	33821	2018. 01. 21	1 Year
7.	Horn Antenna	COM-POWER	AH-840	101092	2018 .05. 07	1 Year
8.	Horn Antenna	EMCO	3115	9609-4927	2018. 06. 22	1 Year
9.	5G Notch Filter	Microware Circuits	N0452502	459775	2018. 01. 05	1 Year
10.	5G Notch Filter	Microware Circuits	N0555983	459481	2018. 05. 21	1 Year
11.	5G Notch Filter	Microware Circuits	N0257881	459776	2018. 08. 22	1 Year
12.	Digital Thermo-Hygro Meter	iMax	HTC-1	No.1 3m A/C	2018. 04. 20	1 Year
13.	Test Software	Audix	e3	V.6.110601	N.C.R.	N.C.R.

4.3. RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Keysight	N9010B-544	MY55460198	2018. 04. 26	1 Year
2.	Power Meter	Anritsu	ML2495A	1145008	2017. 11. 03	1 Year
3.	Power Sensor	Anritsu	MA2411B	1126096	2017. 11. 03	1 Year
4.	Digital Thermo-Hygro Meter	Shenzhen Datronn Electronics	KT-905	RF	2018. 04. 20	1 Year

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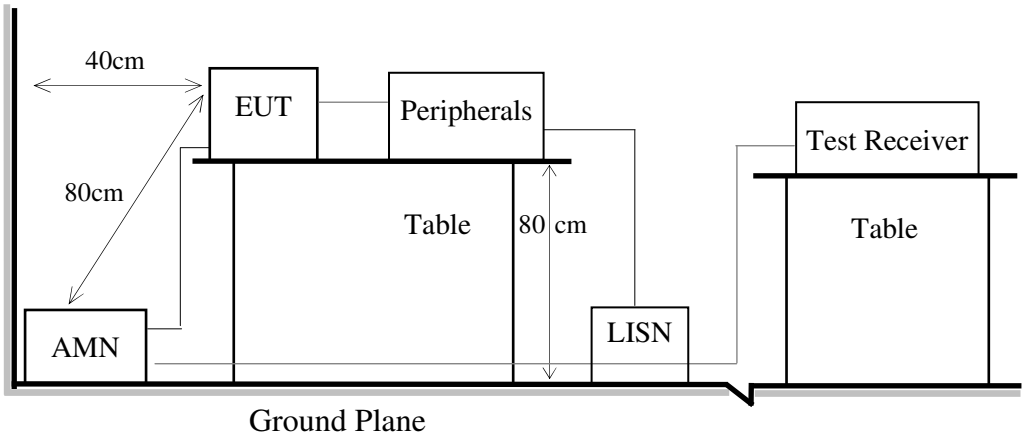
5. CONDUCTED EMISSION

5.1. Block Diagram of Test Setup

5.1.1. Block Diagram of EUT

Indicated as section 3.9

5.1.2. Shielded Room Setup Diagram



5.2. Conducted Emission Limit

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

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. Test Results

Please refer to Appendix A.

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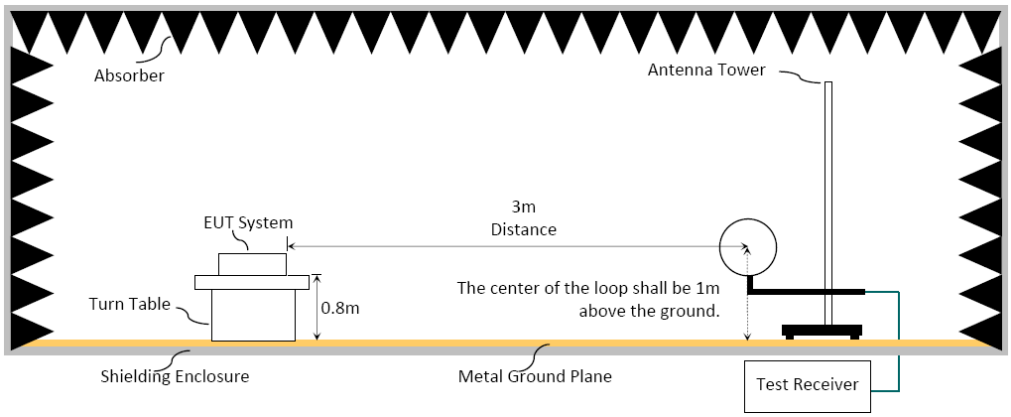
6. RADIATED EMISSION

6.1. Block Diagram of Test Setup

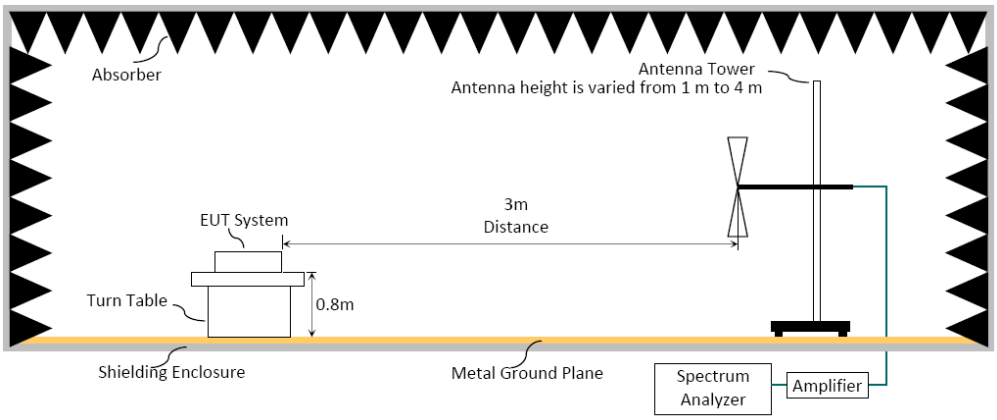
6.1.1. Block Diagram of EUT

Indicated as section 3.9

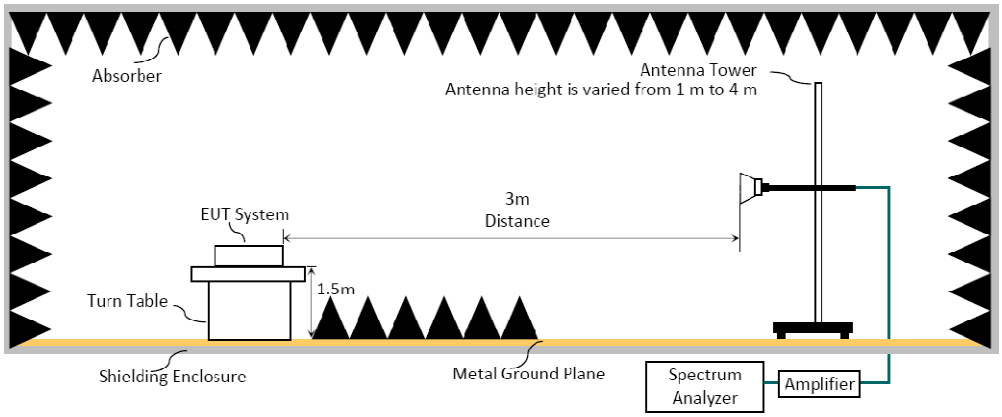
6.1.2. Setup Diagram for 9kHz-30MHz



6.1.3. Setup Diagram for 30-1000 MHz



6.1.4. Setup Diagram for above 1GHz



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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)	Limits	
		dBμV/m	μV/m
0.009 - 0.490	300	67.6-20 log f(kHz)	2400/f kHz
0.490 - 1.705	30	87.6-20 log f(kHz)	24000/f kHz
1.705 - 30	30	29.5	30
30 - 88	3	40.0	100
88- 216	3	43.5	150
216- 960	3	46.0	200
Above 960	3	54.0	500
Above 1000	3	74.0 dBμV/m (Peak) 54.0 dBμV/m (Average)	

Remark：(1) dBμV/m = 20 log (μV/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.

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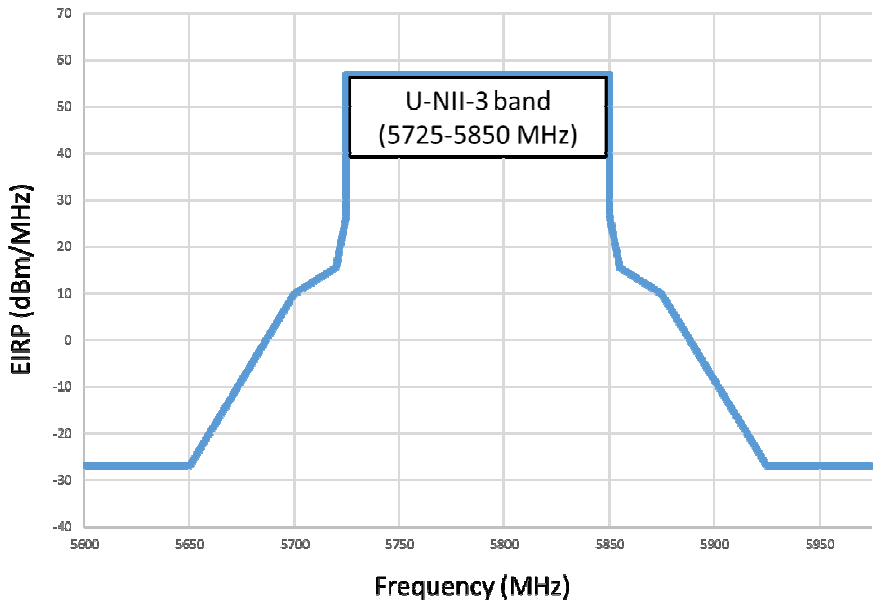
6.2.2. Limit for non-restricted frequency above 1 GHz

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	☒	15.407(b)(4)(i) All emissions shall be limited to a level of 68.2 dBμV/mat 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.
	☐	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))



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6.3. Test Procedure

Frequency Range 9kHz~30MHz:
The EUT setup on the turntable 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 C63.10-2013regulation.

(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 80cm (for 30-1000MHz) and 1.5m (for above 1GHz) height to the ground. The turn table rotated 360 degrees and antenna varied from 1 m to 4 m to find the maximum emission level. Both horizontal and vertical polarization are required. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013regulation.

Frequency below 1GHz:
Spectrum Analyzer is used for pre-testing with following setting:
(1)RBW = 120KHz
(2)VBW ≥ 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 final measurement.

Frequency above 1GHz to 10th harmonic(up to 40 GHz):
Peak Detector:
(1)RBW = 1MHz
(2)VBW ≥ 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 average detector is not required, otherwise using average detector for final measurement.

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Average Detector:

■Option 1:

(1)RBW = 1MHz

(2)VBW ≥ 1/ T.

Modulation Type	T (ms)	1/ T (kHz)	VBW Setting(kHz)
802.11a	2.050	0.488	10Hz
802.11n-HT20	0.980	1.020	1kHz
802.11n-HT40	0.495	2.020	2kHz
802.11ac-VHT80	0.257	3.890	3.9kHz
802.11ac-VHT160	0.154	6.494	6.8kHz

N/A: 1/ T is not implemented when duty cycle presented in section 3.7 is ≥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 l=Antenna Factor + Cable Loss + Meter Reading

□Average Emission Level= Peak Emission Level+ DCCF

Duty Cycle Correction Factor (DCCF)= 20log(TX_{on}/TX_{on+off}) presented in section 3.7

□ERP= Peak Emission Level-95.2dB-2.14dB

6.5. Test Results

Please refer to Appendix A.

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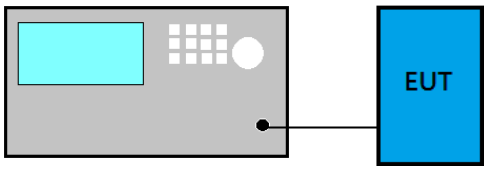
7. EMISSION BANDWIDTH

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	≥ 500kHz

7.3. Test Procedure

Following measurement procedure is reference to KDB 789033 D02 General UNII Test Procedures New Rules v02r01:

■ 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) ≥ 3 × RBW.
(3) Detector = Peak.
(4) Trace mode = max hold.
(5) Sweep = auto couple.
(6) Allow the trace to stabilize.
(7) Setting channel bandwidth function x dB to -6 dB to record the final bandwidth.

7.4. Test Results

Please refer to Appendix A

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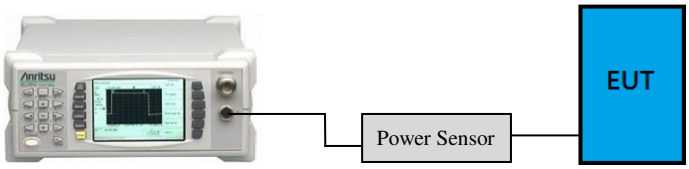
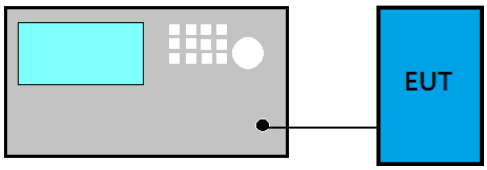
8. MAXIMUM OUTPUT POWER

8.1. Block Diagram of Test Setup



- **For 802.11ac-VHT80/VHT160modes only**



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.

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8.3. Test Procedure

Following measurement procedure is reference to KDB 789033 D02 General UNII Test Procedures New Rules v02r01:

■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 3.7 is < 98%.

■Method AVGSA-2 (Spectrum channel power) for 802.11ac-VHT80/VHT 160 modes only

(1) Set span to at least 1.5 times the OBW
(2) Set RBW = 1 MHz
(3) Set the video bandwidth (VBW) ≥ 3 MHz.
(4) Detector = RMS.
(5) Trace mode = trace average at least 100 traces
(6) Sweep = auto couple.
(7) 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 3.7 is < 98%.

8.4. Test Results

Please refer to Appendix A

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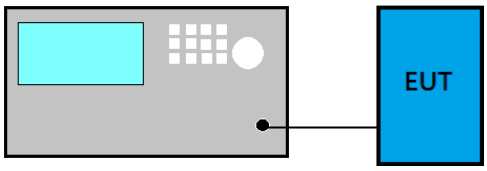
9. EMISSION LIMITATIONS MEASUREMENT

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	

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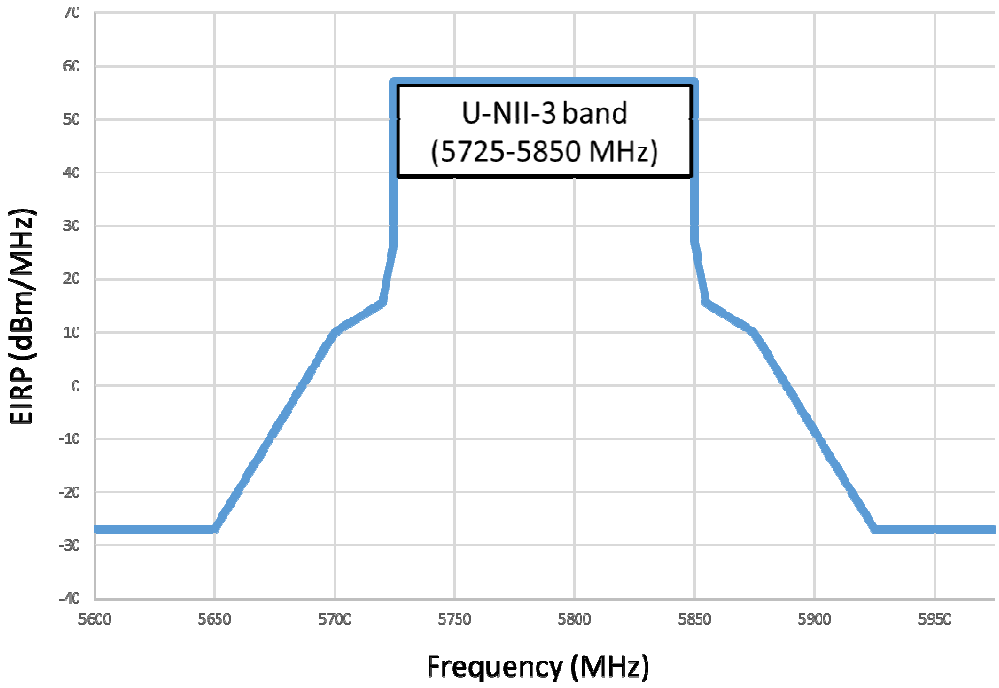
Frequency Band (MHz)	E.I.R.P. Limit	
5725 to 5850	☒	15.407(b)(4)(i) All emissions shall be limited to a level of –27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing 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.
	☐	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))



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9.3. Test Procedure

Following measurement procedure is reference to KDB 789033 D02 General UNII Test Procedures New Rules v02r01:

(1) RBW = 1 MHz
(2) VBW ≥ 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

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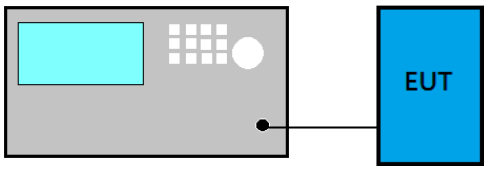
10. POWER SPECTRAL DENSITY

10.1. Block Diagram of Test Setup



10.2. Specification Limits

Frequency Band (MHz)	Category	Limit
5150 to 5250	Outdoor Access Point	17dBm/MHz
	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 v02r01:

■Method AVGSA-2 (Spectrum channel power)

(1) Set span to at least 1.5 times the OBW
(2) Set RBW = 1 MHz
(3) Set the video bandwidth (VBW) ≥ 3 MHz.
(4) Detector = RMS.
(5) Trace mode = trace average at least 100 traces
(6) Sweep = auto couple.
(7) Use peak search function to find out the maximum power density.
(8) Duty cycle factor is added when duty cycle presented in section 3.7 is < 98%.

10.4. Test Results

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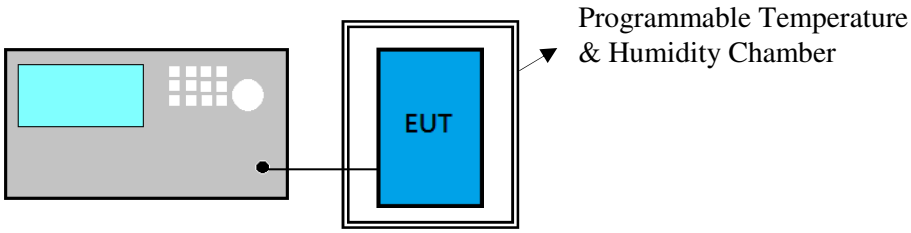
11. FREQUENCY STABILITY

11.1. Block Diagram of Test Setup



11.2. Specification Limits

NONE

11.3. Test Procedure

(1) Frequency: Test frequency.
(2) Span: enough to cover the complete power envelope
(3) RBW: 1MHz(modulation ON) ; 10KHz(CW)
(4) VBW: 1MHz(modulation ON) ; 10KHz(CW)
(5) Detector Mode: Positive Peak
(6) Indication mode: Max hold
(7) Find the peak frequency and take calculate by the formula:
(Measurement Value-declaration frequency)/ declaration frequency)

11.4. Test Results

Please refer to Appendix A

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12. DEVIATION TO TEST SPECIFICATIONS

【NONE】

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APPDNDIX A

TEST DATA AND PLOTS

(Model: 14Z990)

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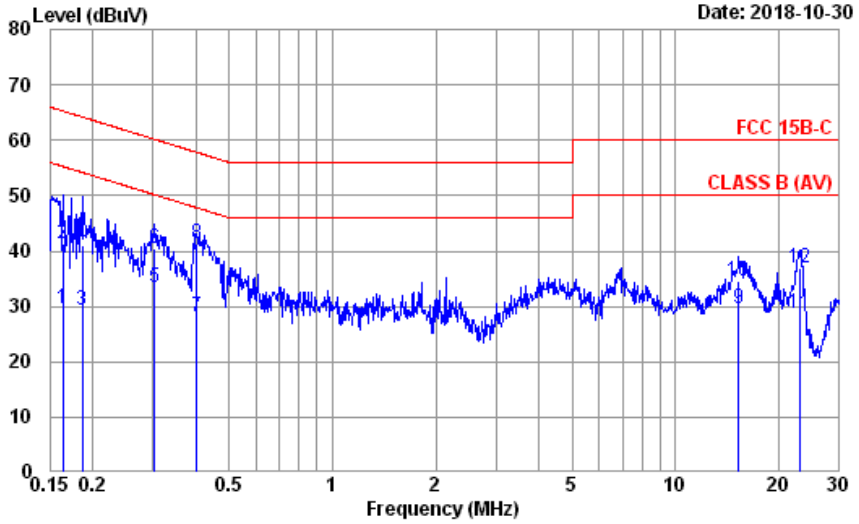
A.1 CONDUCTED EMISSION

Test Date	2018/10/30	Temp./Hum.	24℃/49%
Test Voltage	AC 120V 60Hz (Via AC Adapter)		



Site no. : No.8 Shielded Room Data no. : 4
Condition : ENV4200 100169 LISN Phase : NEUTRAL
Limit : FCC 15B-C
Env. / Ins. : 24*C / 49% ESR3(1774) Engineer : Nick Du
EUT : 14Z990
Power Rating : 120Vac/60Hz
Test Mode : Operating

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.163	10.56	0.03	9.98	8.99	29.56	55.30	25.74	Average
2	0.163	10.56	0.03	9.98	20.75	41.32	65.30	23.98	QP
3	0.186	10.53	0.03	9.98	8.77	29.31	54.20	24.89	Average
4	0.186	10.53	0.03	9.98	20.54	41.08	64.20	23.12	QP
5	0.303	10.47	0.04	9.98	12.97	33.46	50.15	16.69	Average
6	0.303	10.47	0.04	9.98	20.02	40.51	60.15	19.64	QP
7	0.402	10.43	0.04	9.98	7.60	28.05	47.81	19.76	Average
8	0.402	10.43	0.04	9.98	20.77	41.22	57.81	16.59	QP
9	15.307	12.65	0.23	10.05	6.60	29.53	50.00	20.47	Average
10	15.307	12.65	0.23	10.05	11.62	34.55	60.00	25.45	QP
11	23.018	14.47	0.29	10.08	3.85	28.69	50.00	21.31	Average
12	23.018	14.47	0.29	10.08	12.15	36.99	60.00	23.01	QP

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

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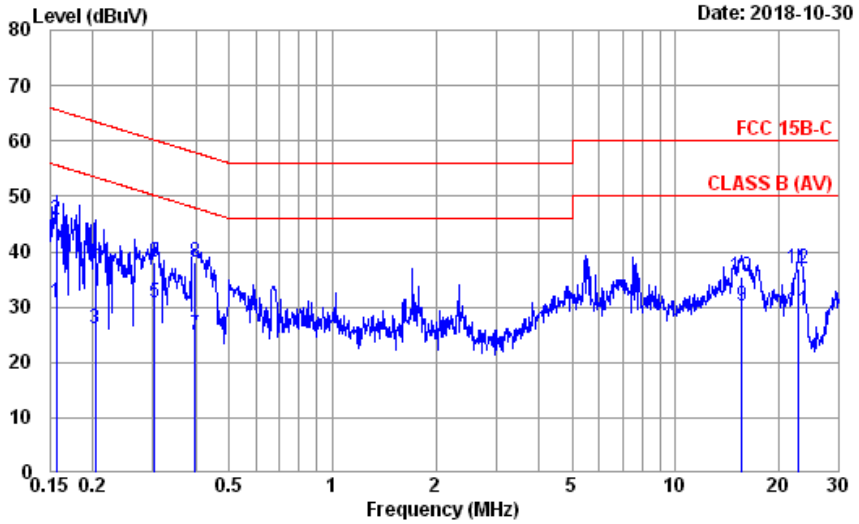
Test Date	2018/10/30	Temp./Hum.	24℃/49%
Test Voltage	AC 120V 60Hz (Via AC Adapter)		



Site no. : No.8 Shielded Room Data no. : 3
Condition : ENV4200 100169 LISN Phase : LINE
Limit : FCC 15B-C
Env. / Ins. : 24*C / 49% ESR3(1774) Engineer : Nick Du
EUT : 14Z990
Power Rating : 120Vac/60Hz
Test Mode : Operating

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.156	10.62	0.03	9.98	10.20	30.83	55.65	24.82	Average
2	0.156	10.62	0.03	9.98	25.14	45.77	65.65	19.88	QP
3	0.204	10.56	0.03	9.98	5.64	26.21	53.45	27.24	Average
4	0.204	10.56	0.03	9.98	18.00	38.57	63.45	24.88	QP
5	0.303	10.49	0.04	9.98	10.32	30.83	50.15	19.32	Average
6	0.303	10.49	0.04	9.98	17.67	38.18	60.15	21.97	QP
7	0.398	10.45	0.04	9.98	4.34	24.81	47.90	23.09	Average
8	0.398	10.45	0.04	9.98	17.64	38.11	57.90	19.79	QP
9	15.635	12.75	0.24	10.05	7.07	30.11	50.00	19.89	Average
10	15.635	12.75	0.24	10.05	12.36	35.40	60.00	24.60	QP
11	22.896	14.50	0.29	10.08	4.46	29.33	50.00	20.67	Average
12	22.896	14.50	0.29	10.08	11.93	36.80	60.00	23.20	QP

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

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A.2 RADIATED EMISSION

Test Date	2018/10/27	Temp./Hum.	24℃/51%
Test Voltage	AC 120V, 60Hz (via AC Adapter)		

A.2.1 Emissions within Restricted Frequency Bands

A.2.1.1 Frequency 9kHz~30MHz

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

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A.2.1.2 Frequency Below 1GHz

Mode	802.11n-HT20	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
31.9400	23.76	1.25	2.31	27.32	40.00	12.68	Peak
101.7800	17.60	2.29	8.69	28.58	43.50	14.92	Peak
268.6200	19.29	4.00	3.69	26.98	46.00	19.02	Peak
385.9900	21.76	5.41	3.36	30.53	46.00	15.47	Peak
570.2900	24.24	6.66	1.74	32.64	46.00	13.36	Peak
779.8100	25.72	7.50	1.56	34.78	46.00	11.22	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
30.9700	24.27	1.22	11.66	37.15	40.00	2.85	Peak
94.0200	16.36	2.20	11.95	30.51	43.50	12.99	Peak
163.8600	16.17	2.97	10.46	29.60	43.50	13.90	Peak
242.4300	18.68	3.74	4.84	27.26	46.00	18.74	Peak
326.8200	20.25	4.68	7.76	32.69	46.00	13.31	Peak
434.4900	22.46	5.87	3.67	32.00	46.00	14.00	Peak

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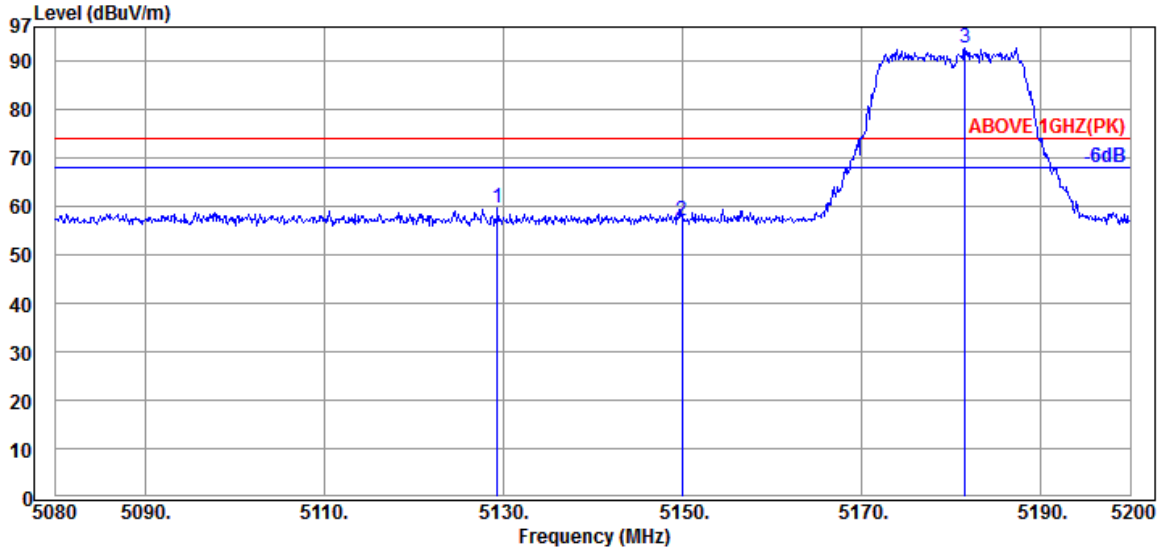
A.2.1.3 Frequency Above 1 GHz to 10th harmonics

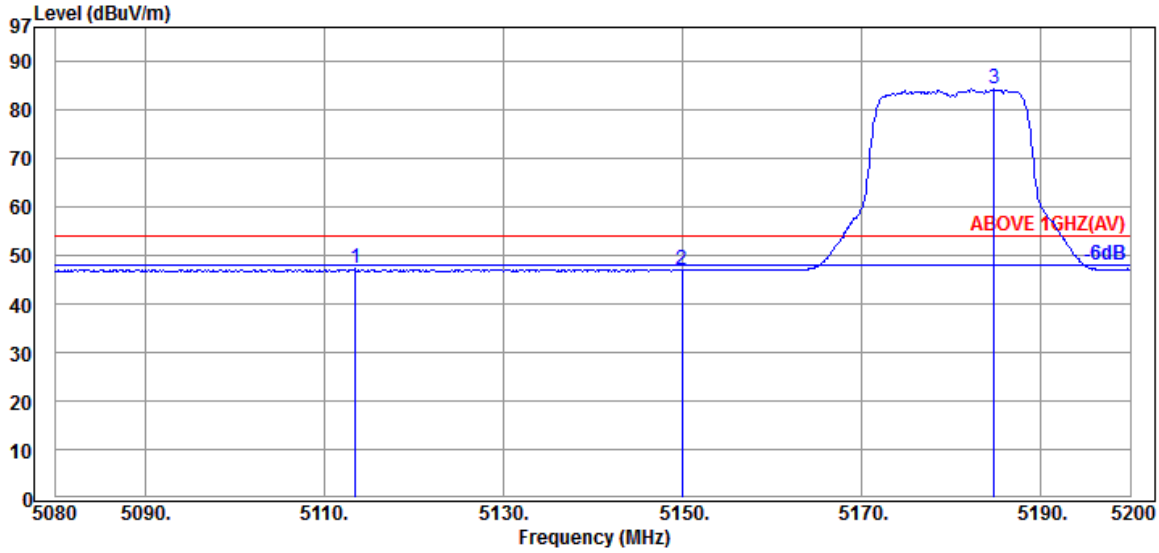
Band Edge:

Mode	802.11a	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
5129.32	33.42	9.33	17.01	59.76	74.00	14.24	Peak
5149.96	33.44	9.34	14.13	56.91	74.00	17.09	Peak
5181.52	33.49	9.36	49.90	92.75	---	---	Peak



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5113.48	33.39	9.32	4.52	47.23	54.00	6.77	Average
5149.96	33.44	9.34	4.07	46.85	54.00	7.15	Average
5184.76	33.49	9.36	41.34	84.19	---	---	Average

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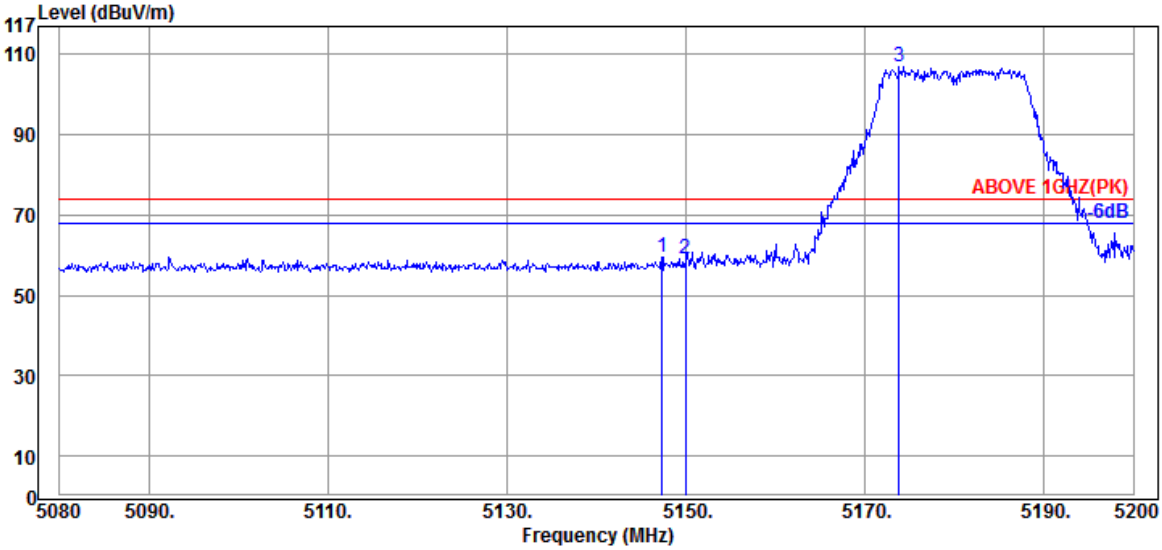
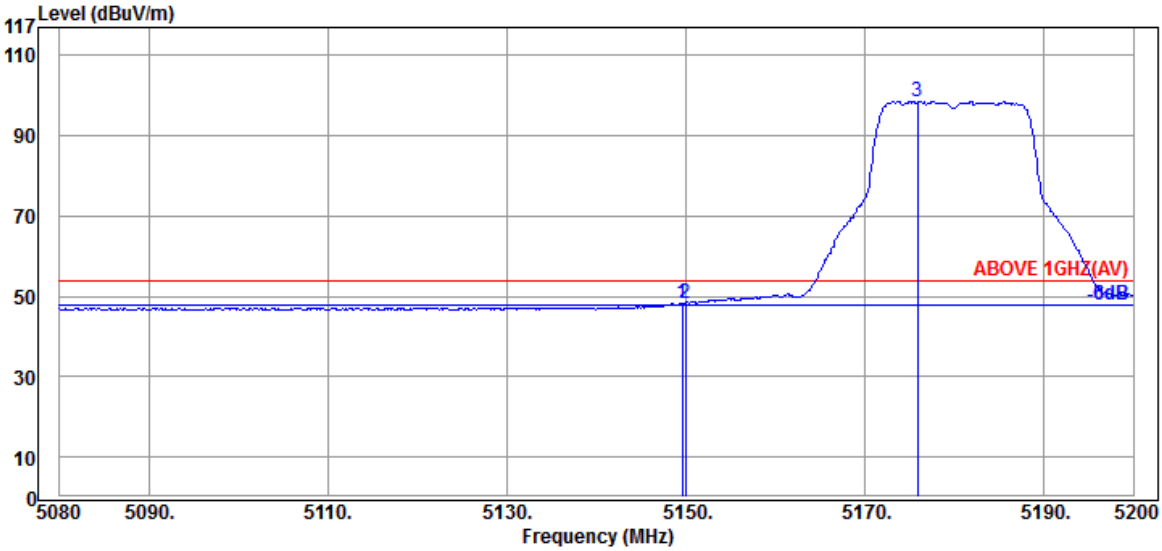
Mode	802.11a	UNII Band	I
		Frequency	TX 5180MHz



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
5147.32	33.44	9.34	16.92	59.70	74.00	14.30	Peak
5149.96	33.44	9.34	16.37	59.15	74.00	14.85	Peak
5173.84	33.49	9.36	64.27	107.12	---	---	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
5149.60	33.44	9.34	5.52	48.30	54.00	5.70	Average
5149.96	33.44	9.34	5.59	48.37	54.00	5.63	Average
5175.88	33.49	9.36	55.69	98.54	---	---	Average

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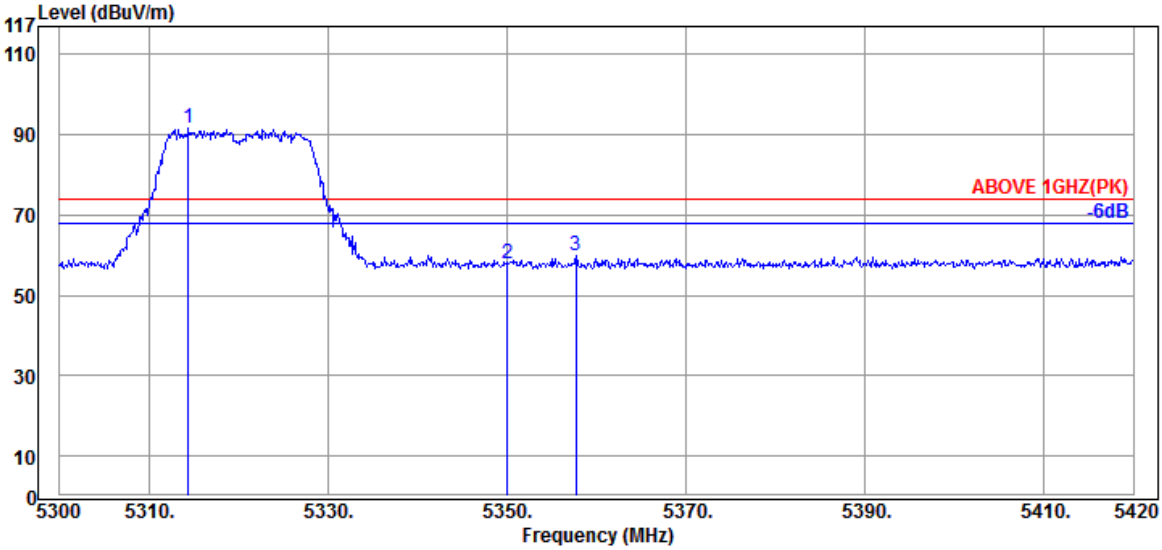
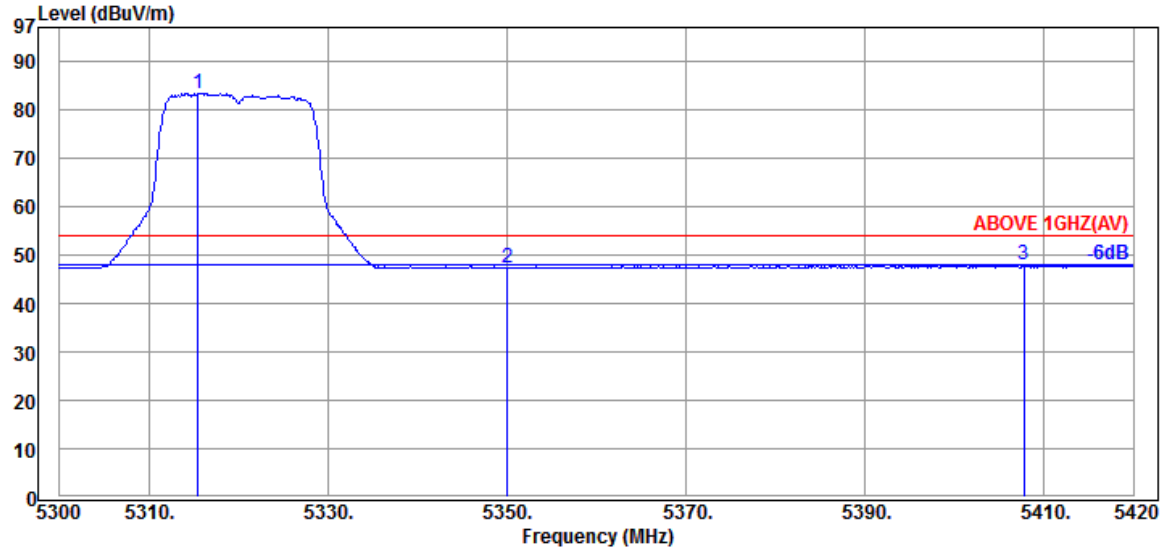
Mode	802.11a	UNII Band	II-2A
		Frequency	TX 5320MHz



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
5314.40	33.71	9.44	48.35	91.50	---	---	Peak
5350.04	33.76	9.46	14.79	58.01	74.00	15.99	Peak
5357.72	33.78	9.46	16.47	59.71	74.00	14.29	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
5315.48	33.71	9.44	40.25	83.40	---	---	Average
5350.04	33.76	9.46	4.11	47.33	54.00	6.67	Average
5407.76	33.85	9.49	4.50	47.84	54.00	6.16	Average

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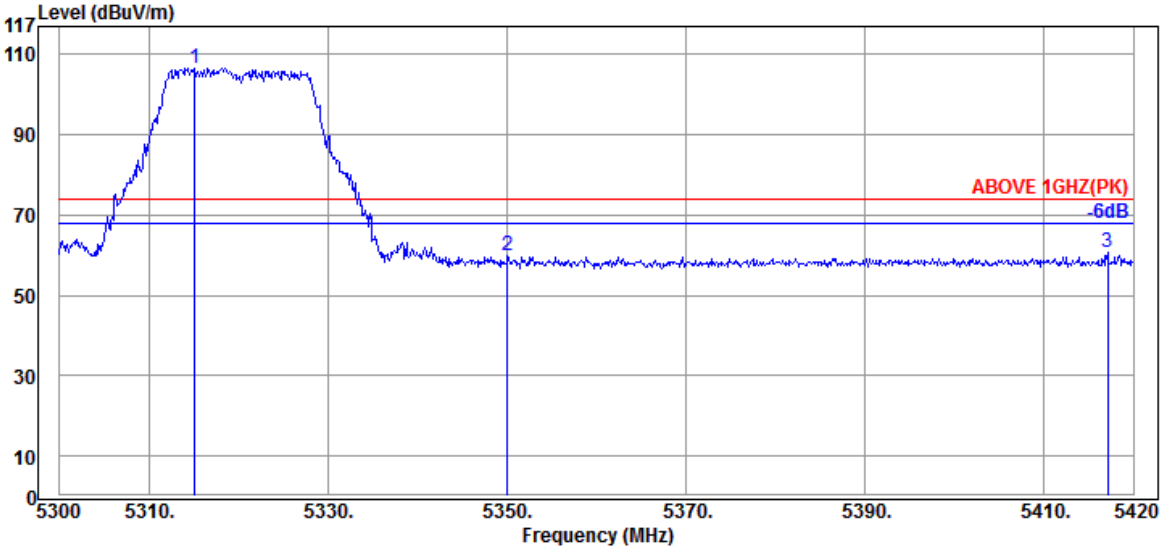
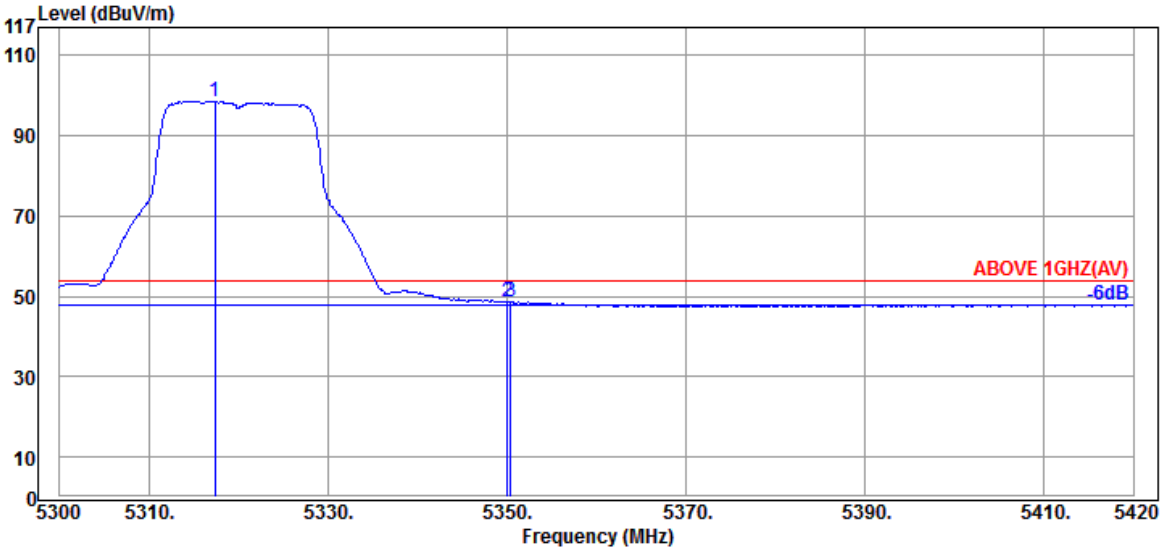
Mode	802.11a	UNII Band	II-2A
		Frequency	TX 5320MHz



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
5315.12	33.71	9.44	63.50	106.65	---	---	Peak
5350.04	33.76	9.46	16.50	59.72	74.00	14.28	Peak
5417.12	33.88	9.50	17.14	60.52	74.00	13.48	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
5317.40	33.71	9.44	55.38	98.53	---	---	Average
5350.04	33.76	9.46	5.44	48.66	54.00	5.34	Average
5350.40	33.76	9.46	5.40	48.62	54.00	5.38	Average

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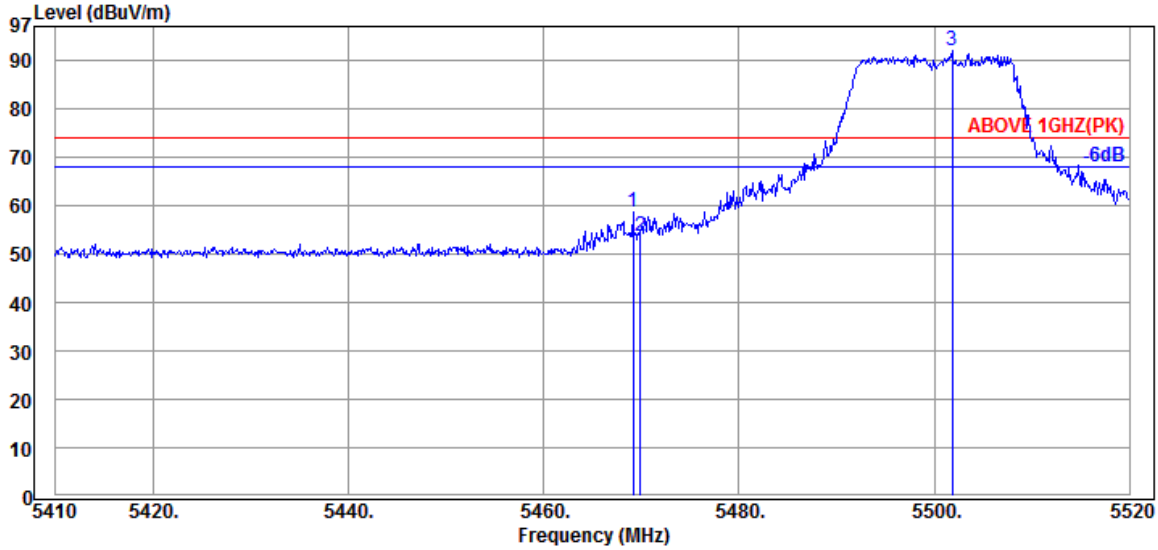
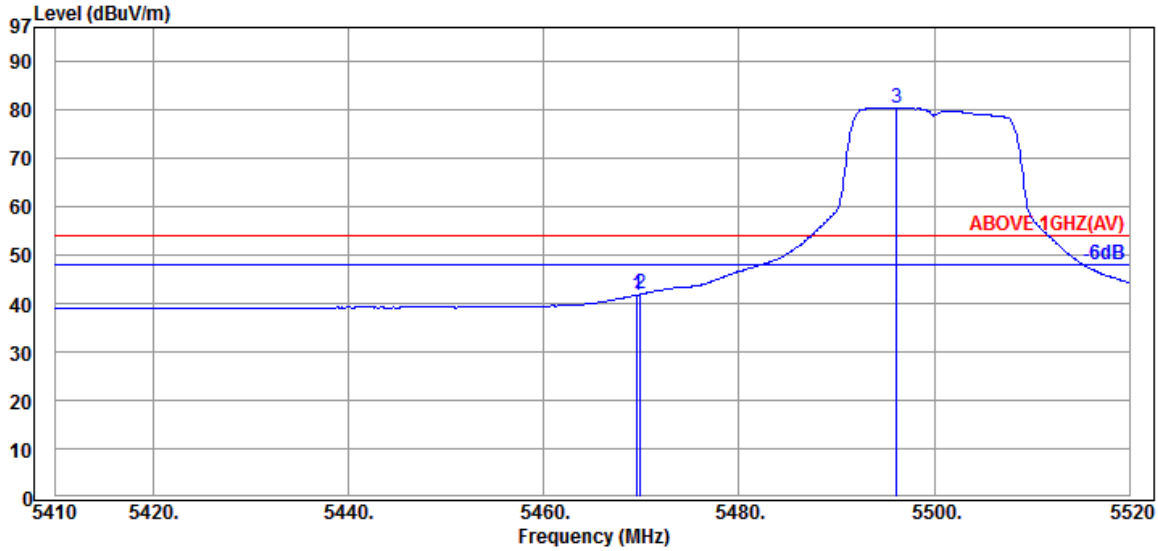
Mode	802.11a	UNII Band	II-2C
		Frequency	TX 5500MHz



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
5469.18	33.95	9.53	15.17	58.65	74.00	15.35	Peak
5469.95	33.95	9.53	10.20	53.68	74.00	20.32	Peak
5501.85	34.00	9.55	48.42	91.97	---	---	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
5469.62	33.95	9.53	-1.74	41.74	54.00	12.26	Average
5469.95	33.95	9.53	-1.58	41.90	54.00	12.10	Average
5496.13	34.00	9.55	36.91	80.46	---	---	Average

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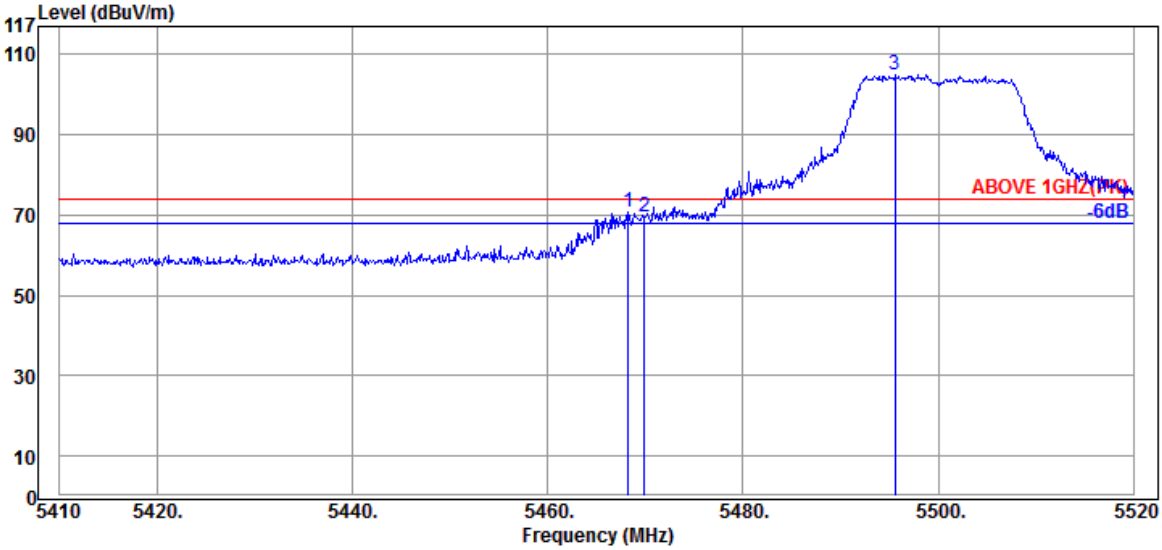
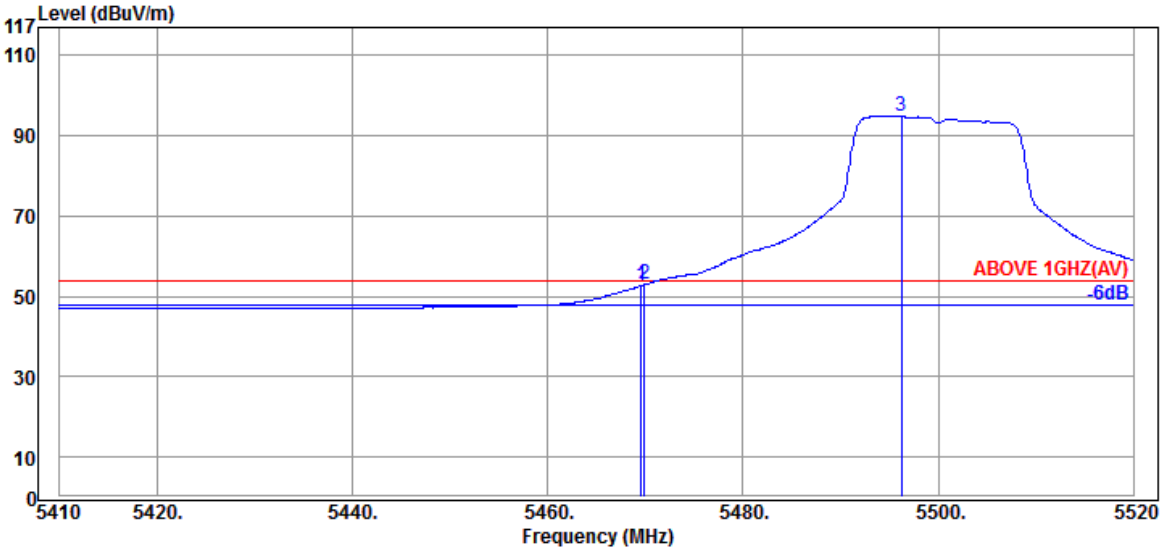
Mode	802.11a	UNII Band	II-2C
		Frequency	TX 5500MHz



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
5468.30	33.95	9.53	27.14	70.62	74.00	3.38	Peak
5469.95	33.95	9.53	25.94	69.42	74.00	4.58	Peak
5495.58	34.00	9.55	61.52	105.07	---	---	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
5469.62	33.95	9.53	9.18	52.66	54.00	1.34	Average
5469.95	33.95	9.53	9.44	52.92	54.00	1.08	Average
5496.24	34.00	9.55	51.28	94.83	---	---	Average

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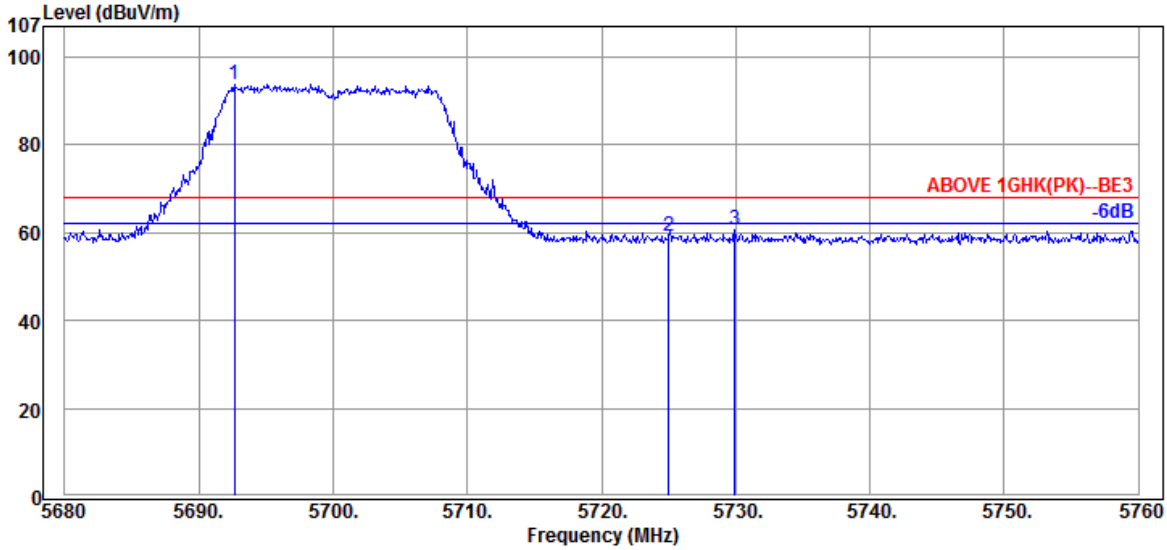
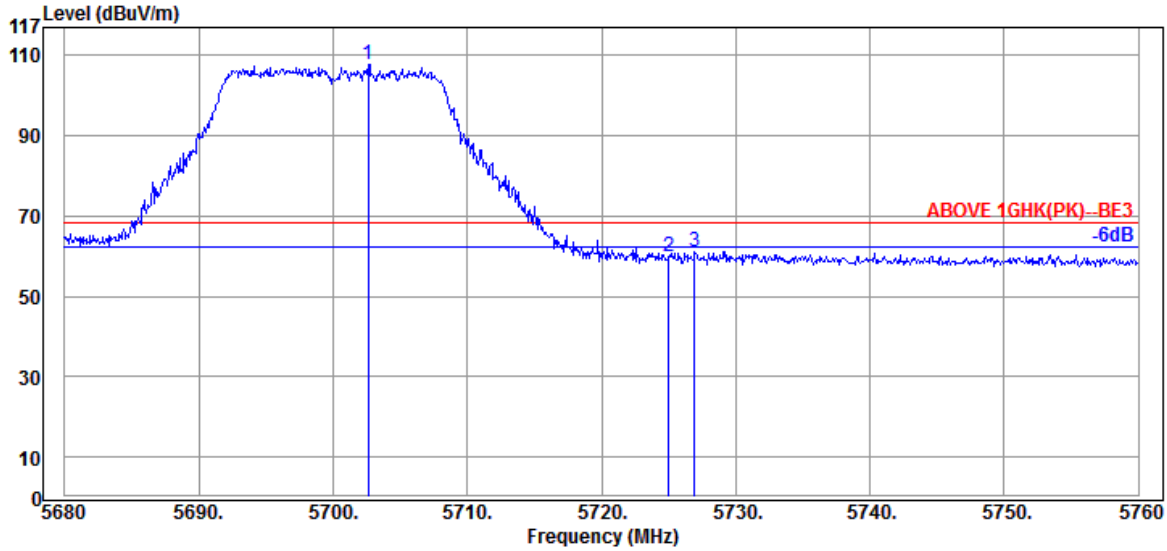
Mode	802.11a	UNII Band	II-2C
		Frequency	TX 5700MHz



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
5692.64	34.04	9.67	50.09	93.80	68.20	---	Peak
5725.04	34.05	9.68	15.47	59.20	68.20	9.00	Peak
5729.92	34.05	9.68	16.78	60.51	68.20	7.69	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
5702.64	34.04	9.67	63.96	107.67	68.20	---	Peak
5725.04	34.05	9.68	16.31	60.04	68.20	8.16	Peak
5726.96	34.05	9.68	17.37	61.10	68.20	7.10	Peak

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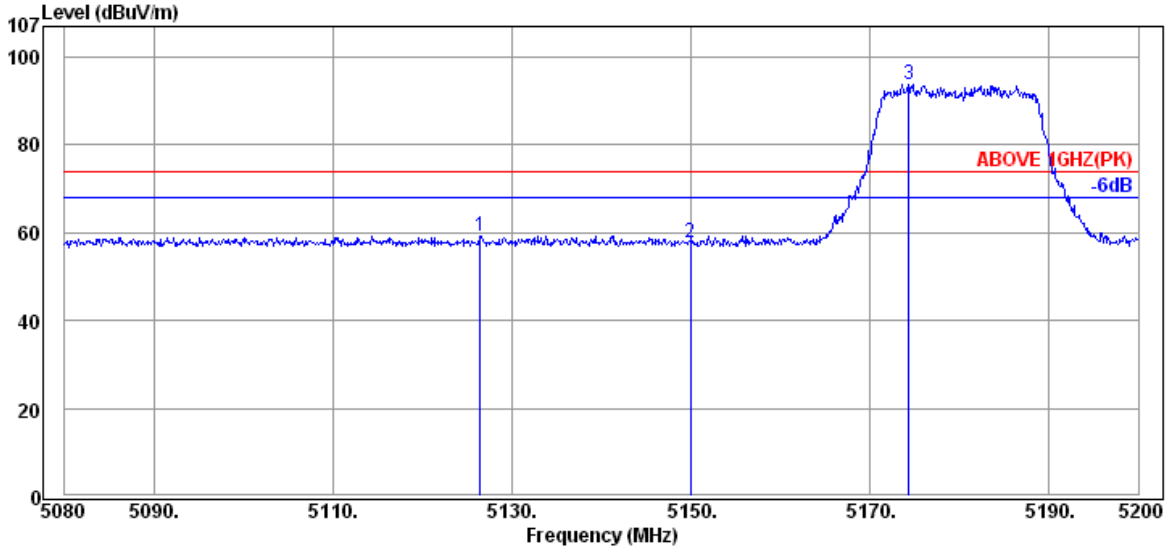
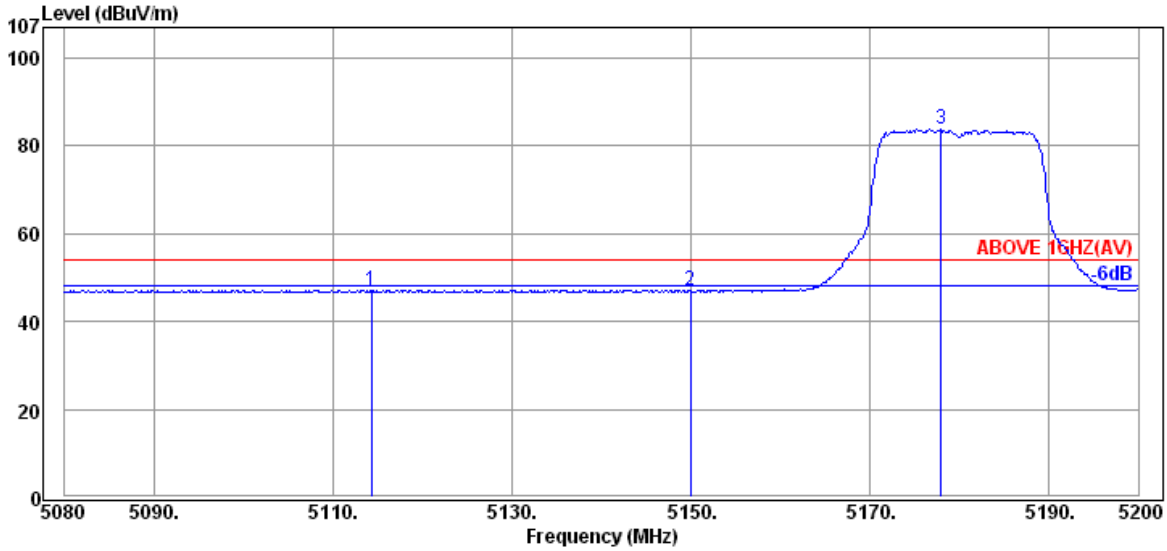
Mode	802.11n-HT20	UNII Band	I
		Frequency	TX 5180MHz



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
5126.44	33.39	9.33	16.46	59.18	74.00	14.82	Peak
5149.96	33.44	9.34	14.81	57.59	74.00	16.41	Peak
5174.32	33.49	9.36	50.95	93.80	---	---	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
5114.32	33.39	9.32	4.40	47.11	54.00	6.89	Average
5149.96	33.44	9.34	4.13	46.91	54.00	7.09	Average
5177.92	33.49	9.36	40.98	83.83	---	---	Average

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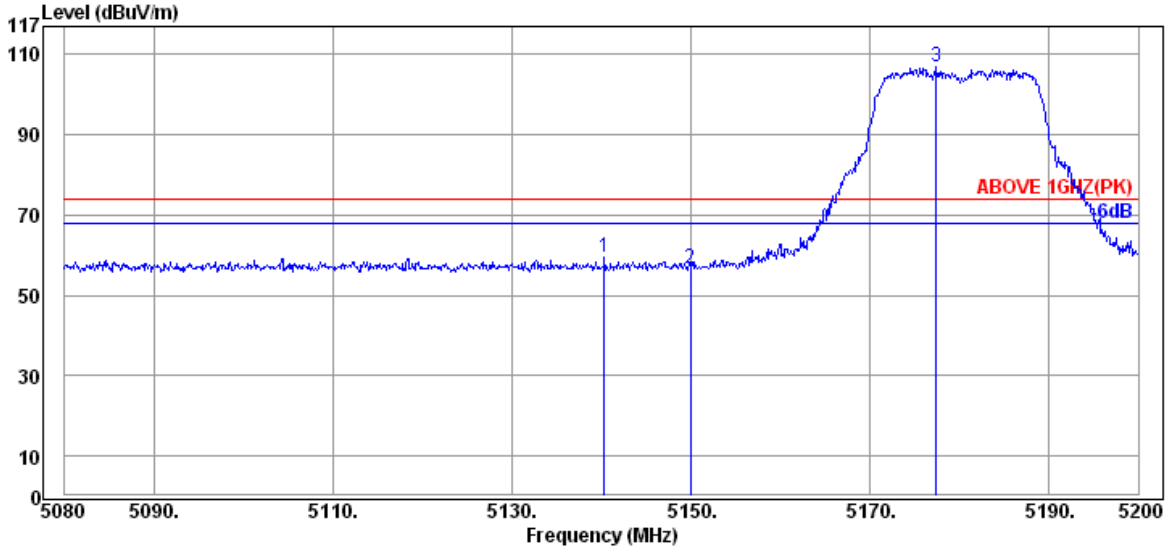
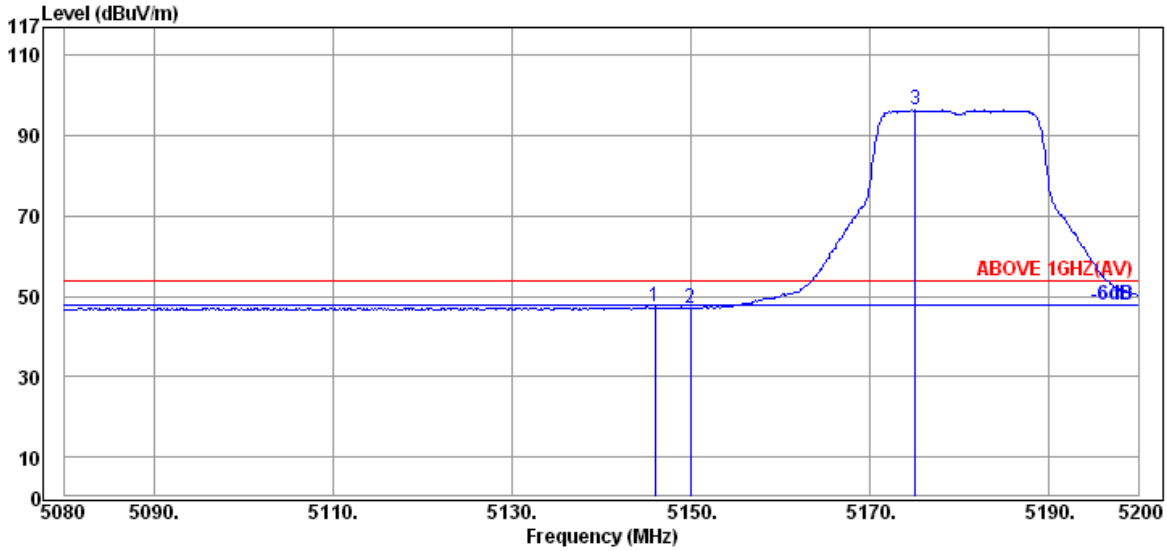
Mode	802.11n-HT20	UNII Band	I
		Frequency	TX 5180MHz



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
5140.36	33.42	9.33	16.91	59.66	74.00	14.34	Peak
5149.96	33.44	9.34	14.00	56.78	74.00	17.22	Peak
5177.44	33.49	9.36	64.06	106.91	---	---	Peak



Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5146.00	33.44	9.34	4.59	47.37	54.00	6.63	Average
5149.96	33.44	9.34	4.30	47.08	54.00	6.92	Average
5175.04	33.49	9.36	53.51	96.36	---	---	Average

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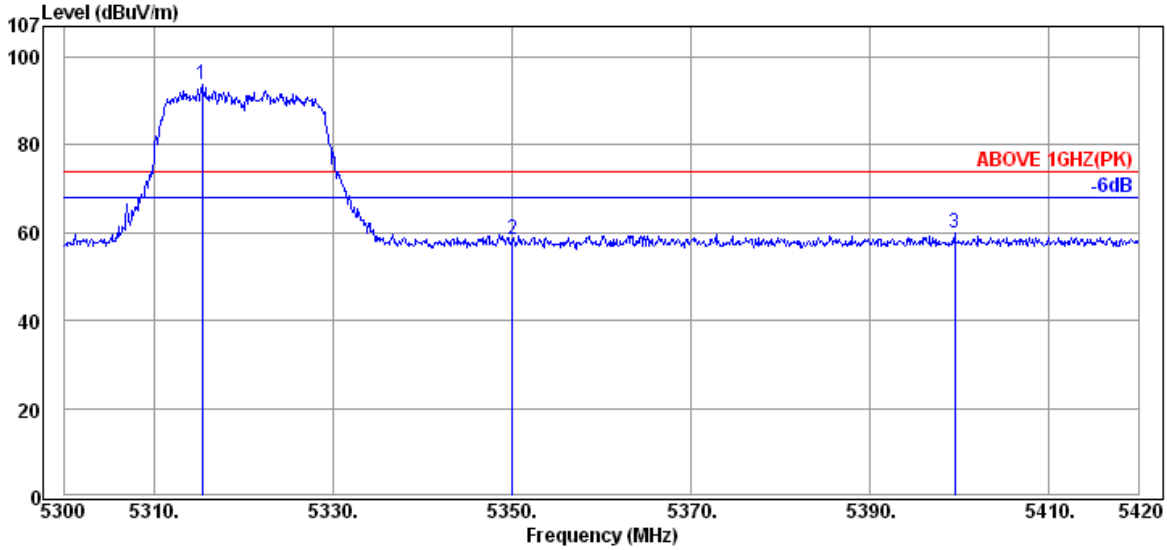
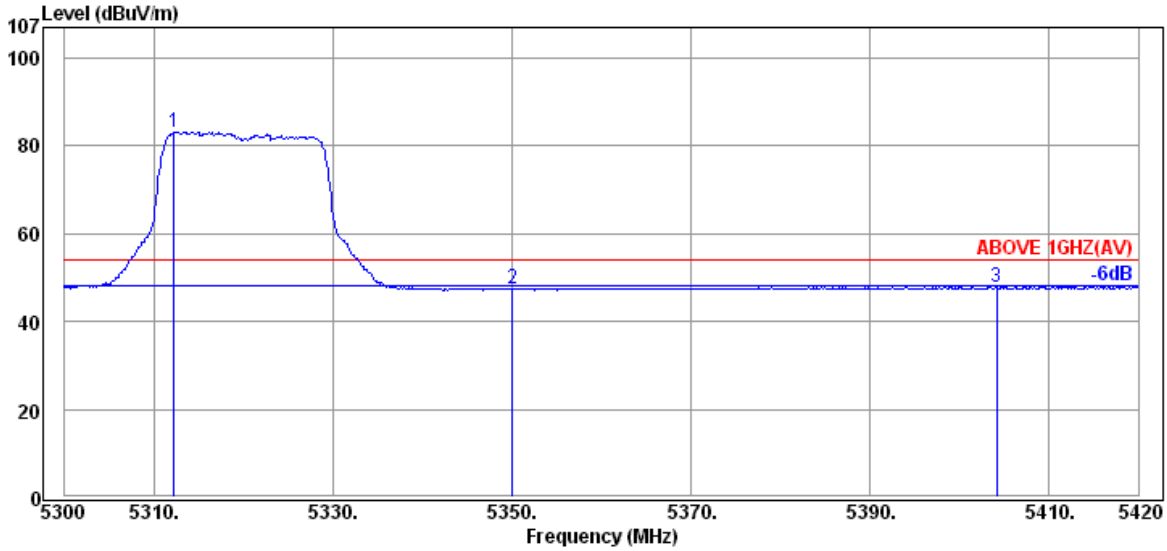
Mode	802.11n-HT20	UNII Band	II-2A
		Frequency	TX 5320MHz



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
5315.36	33.71	9.44	50.60	93.75	---	---	Peak
5350.04	33.76	9.46	15.42	58.64	74.00	15.36	Peak
5399.48	33.83	9.49	16.48	59.80	74.00	14.20	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
5312.24	33.71	9.43	40.10	83.24	---	---	Average
5350.04	33.76	9.46	4.07	47.29	54.00	6.71	Average
5404.16	33.85	9.49	4.60	47.94	54.00	6.06	Average

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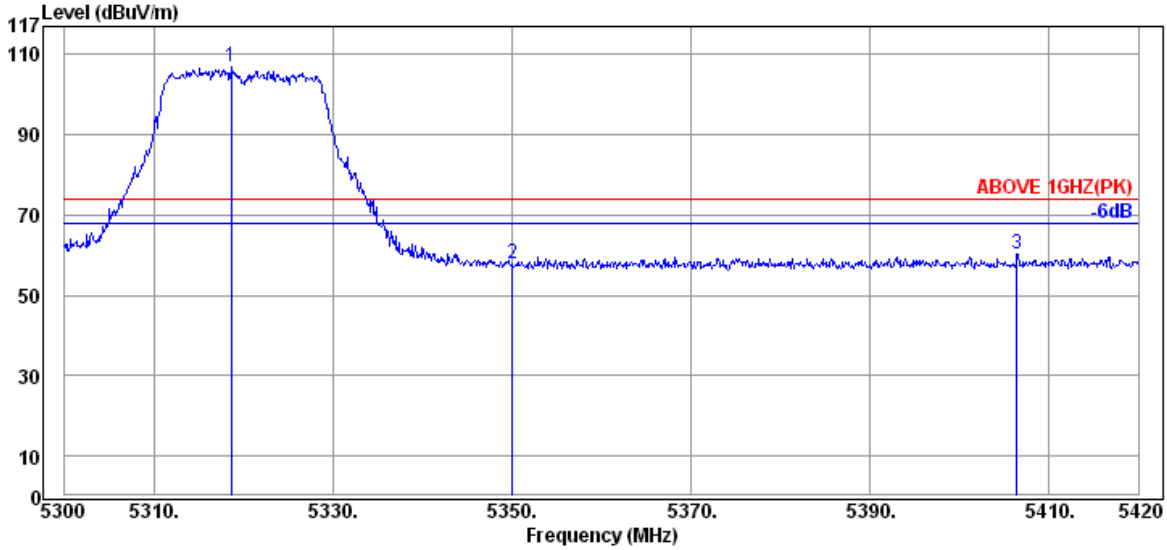
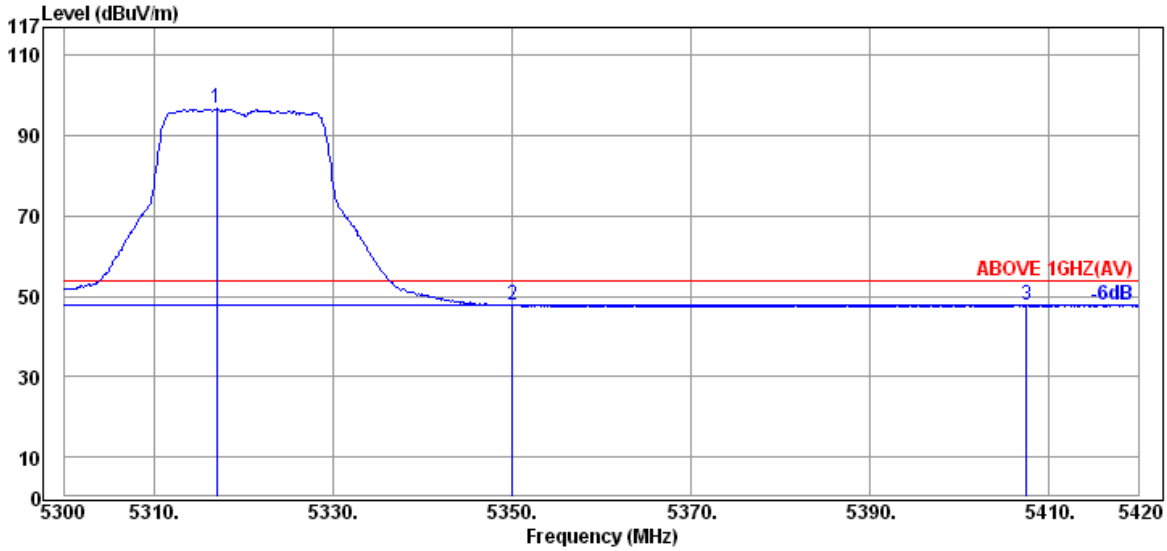
Mode	802.11n-HT20	UNII Band	II-2A
		Frequency	TX 5320MHz



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
5318.60	33.71	9.44	63.63	106.78	---	---	Peak
5350.04	33.76	9.46	14.56	57.78	74.00	16.22	Peak
5406.44	33.85	9.49	16.98	60.32	74.00	13.68	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
5317.04	33.71	9.44	53.61	96.76	54.00	---	Average
5350.04	33.76	9.46	4.62	47.84	54.00	6.16	Average
5407.52	33.85	9.49	4.63	47.97	54.00	6.03	Average

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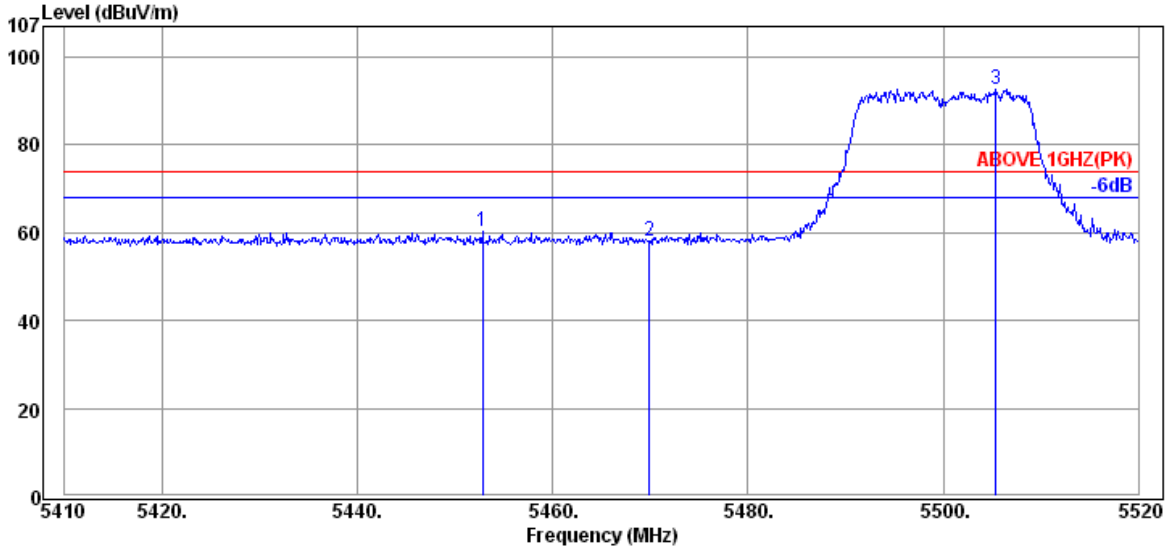
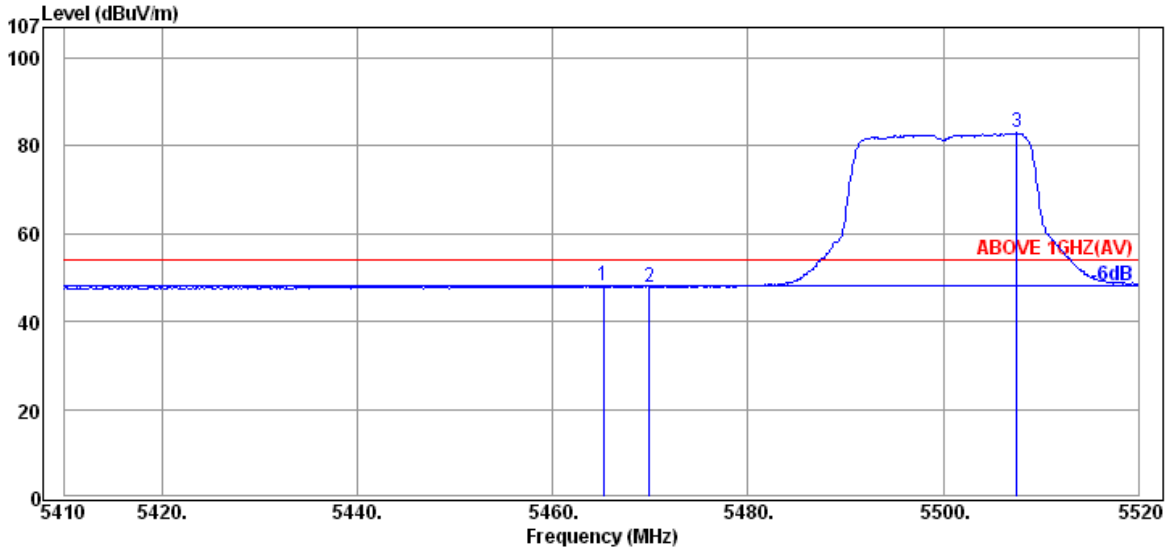
Mode	802.11n-HT20	UNII Band	II-2C
		Frequency	TX 5500MHz



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
5452.79	33.93	9.52	16.77	60.22	74.00	13.78	Peak
5469.95	33.95	9.53	14.61	58.09	74.00	15.91	Peak
5505.37	34.00	9.55	49.03	92.58	---	---	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
5465.22	33.95	9.53	4.81	48.29	54.00	5.71	Average
5469.95	33.95	9.53	4.44	47.92	54.00	6.08	Average
5507.57	34.00	9.56	39.45	83.01	---	---	Average

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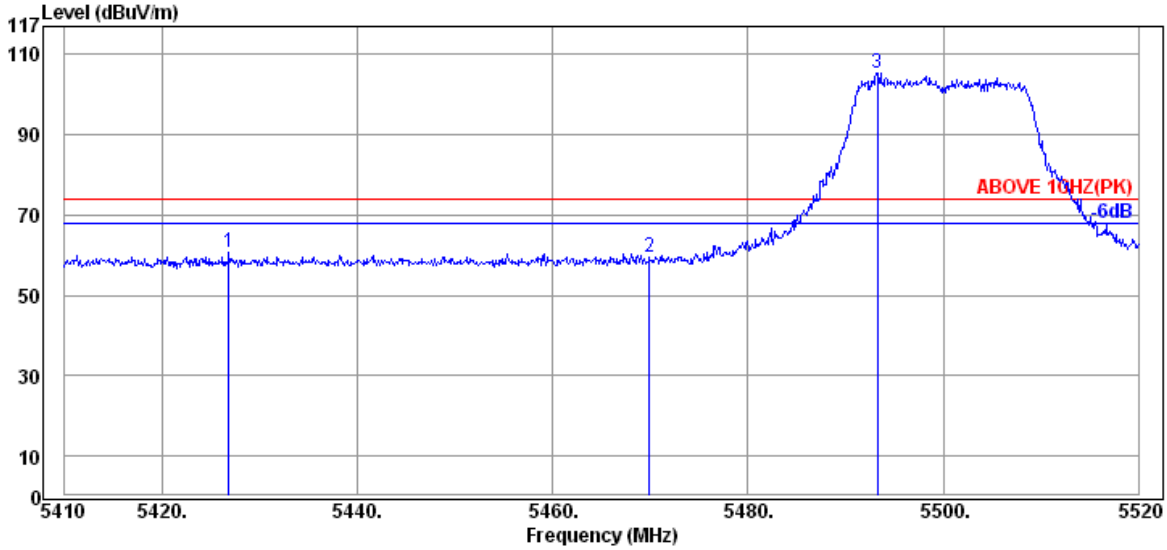
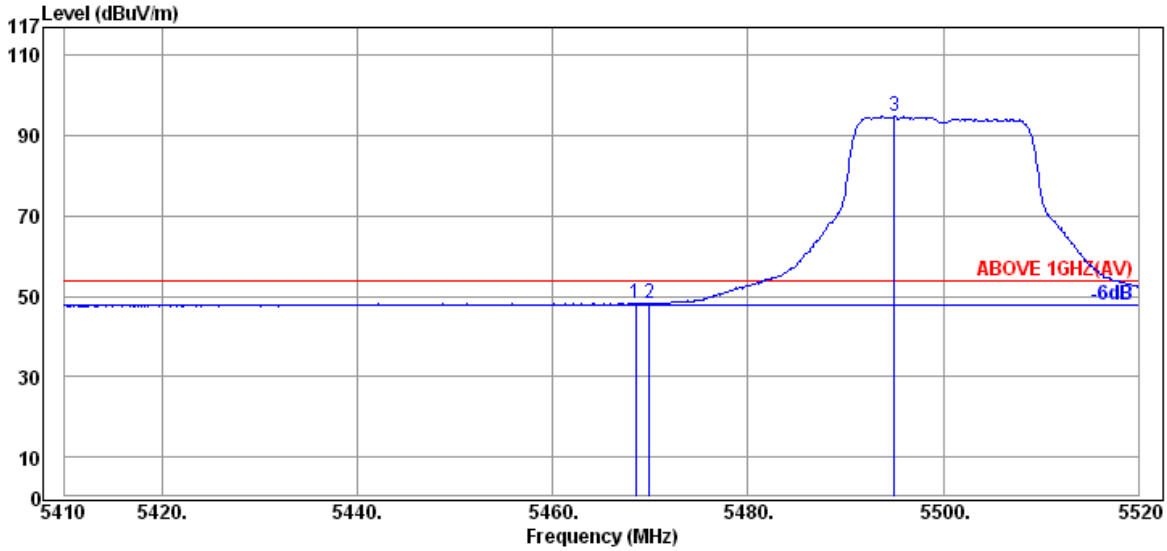
Mode	802.11n-HT20	UNII Band	II-2C
		Frequency	TX 5500MHz



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
5426.83	33.88	9.51	17.28	60.67	74.00	13.33	Peak
5469.95	33.95	9.53	16.03	59.51	74.00	14.49	Peak
5493.27	33.98	9.55	61.66	105.19	---	---	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
5468.52	33.95	9.53	4.89	48.37	54.00	5.63	Average
5469.95	33.95	9.53	4.67	48.15	54.00	5.85	Average
5495.03	33.98	9.55	51.38	94.91	---	---	Average

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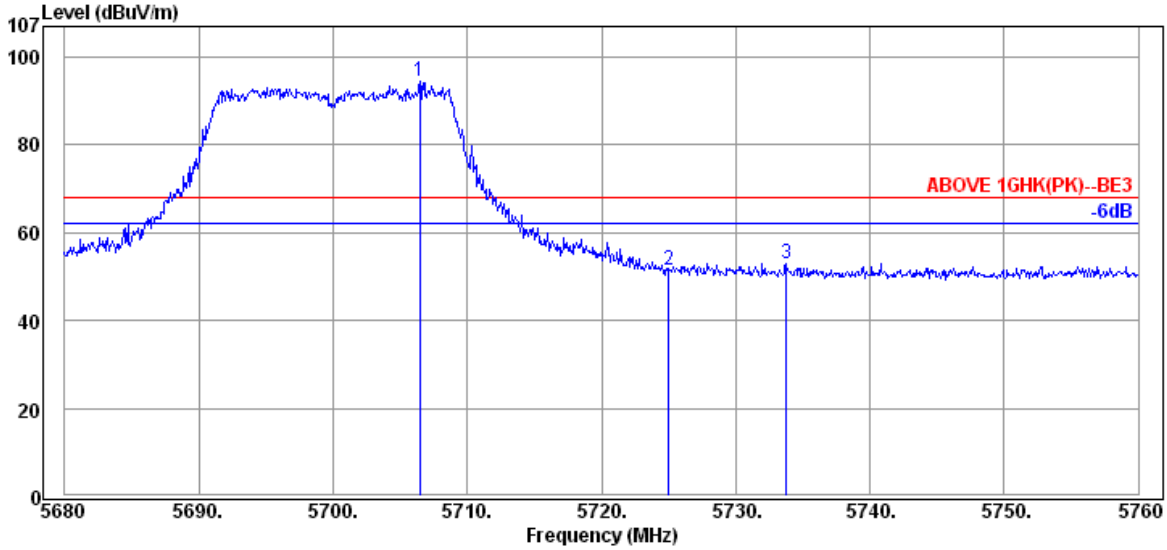
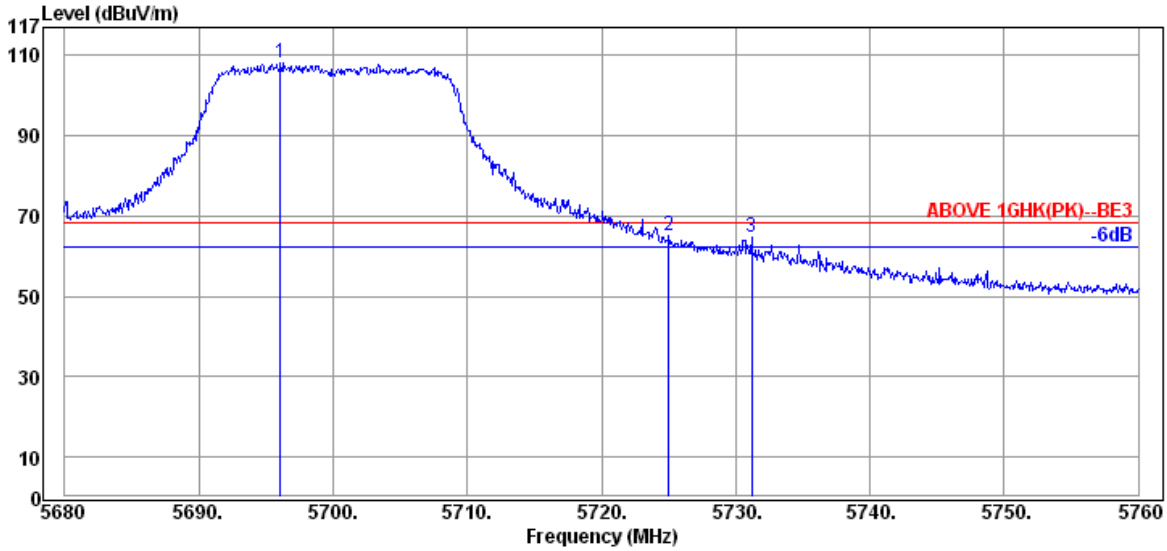
Mode	802.11n-HT20	UNII Band	II-2C
		Frequency	TX 5700MHz



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
5706.48	34.04	9.67	50.68	94.39	68.20	---	Peak
5725.04	34.05	9.68	7.59	51.32	68.20	16.88	Peak
5733.76	34.05	9.68	9.26	52.99	68.20	15.21	Peak



Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
5696.08	34.04	9.67	64.46	108.17	68.20	---	Peak
5725.04	34.05	9.68	21.54	65.27	68.20	2.93	Peak
5731.20	34.05	9.68	21.19	64.92	68.20	3.28	Peak

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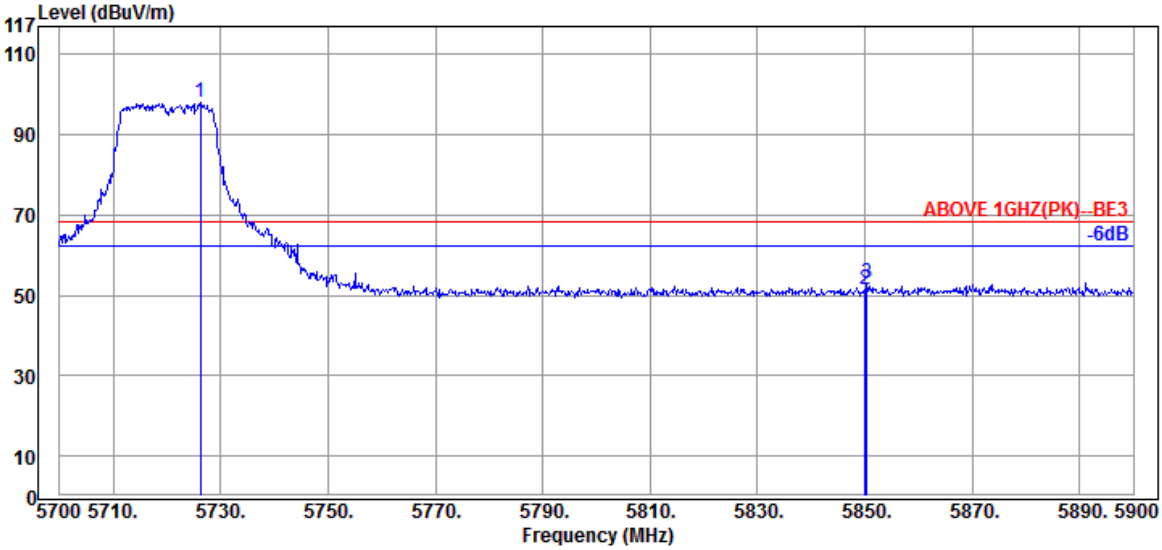
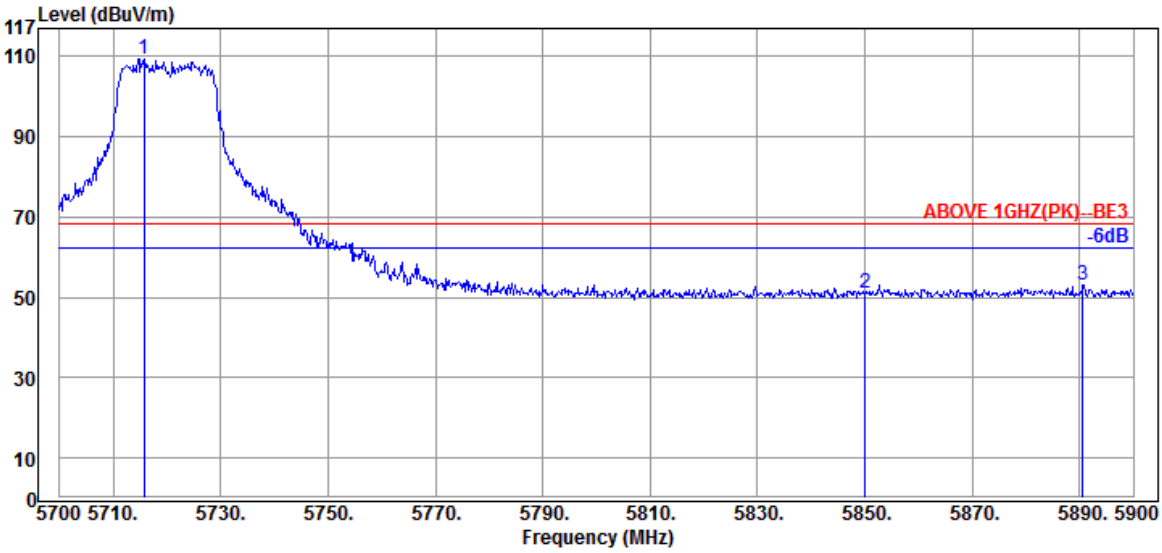
Mode	802.11n-HT20	UNII Band	II-2C
		Frequency	TX 5720MHz



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
5726.20	34.05	9.68	54.41	98.14	68.20	---	Peak
5850.00	34.07	9.75	7.53	51.35	68.20	16.85	Peak
5850.40	34.07	9.75	9.34	53.16	68.20	15.04	Peak



Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5715.80	34.04	9.68	65.66	109.38	68.20	---	Peak
5850.00	34.07	9.75	7.21	51.03	68.20	17.17	Peak
5890.60	34.08	9.77	9.39	53.24	68.20	14.96	Peak

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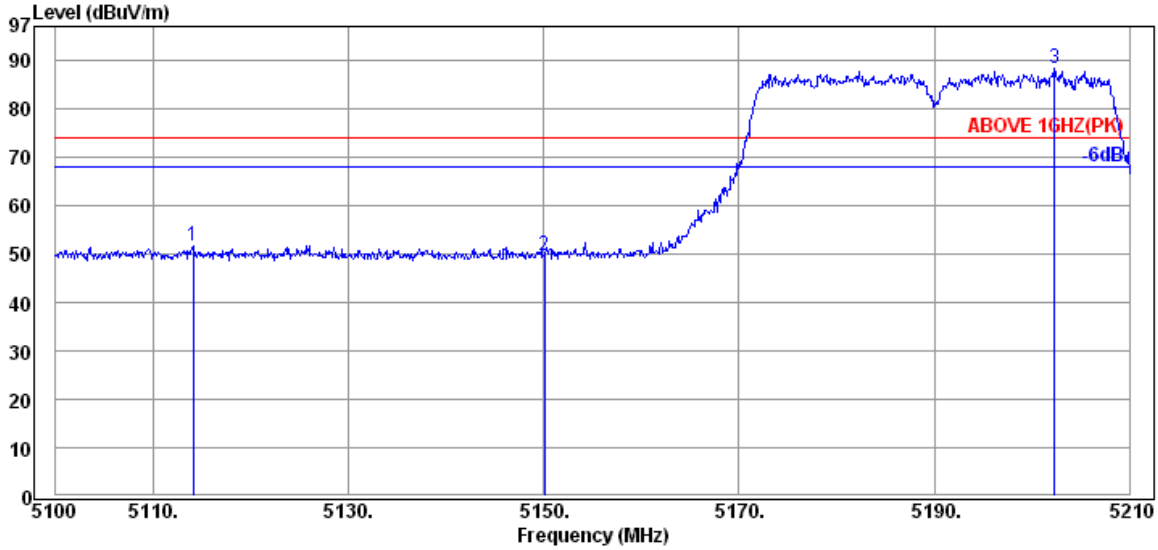
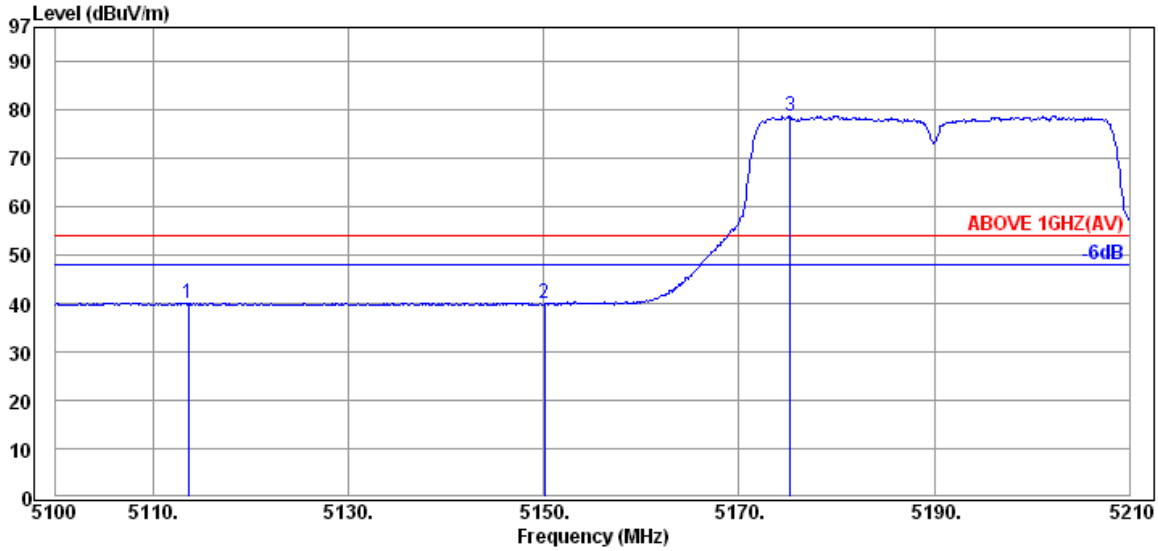
Mode	802.11n-HT40	UNII Band	I
		Frequency	TX 5190MHz



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
5114.08	33.39	9.32	9.11	51.82	74.00	22.18	Peak
5150.05	33.44	9.34	6.76	49.54	74.00	24.46	Peak
5202.30	33.54	9.37	45.27	88.18	---	---	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
5113.64	33.39	9.32	-2.54	40.17	54.00	13.83	Average
5150.05	33.44	9.34	-2.79	39.99	54.00	14.01	Average
5175.24	33.49	9.36	35.96	78.81	---	---	Average

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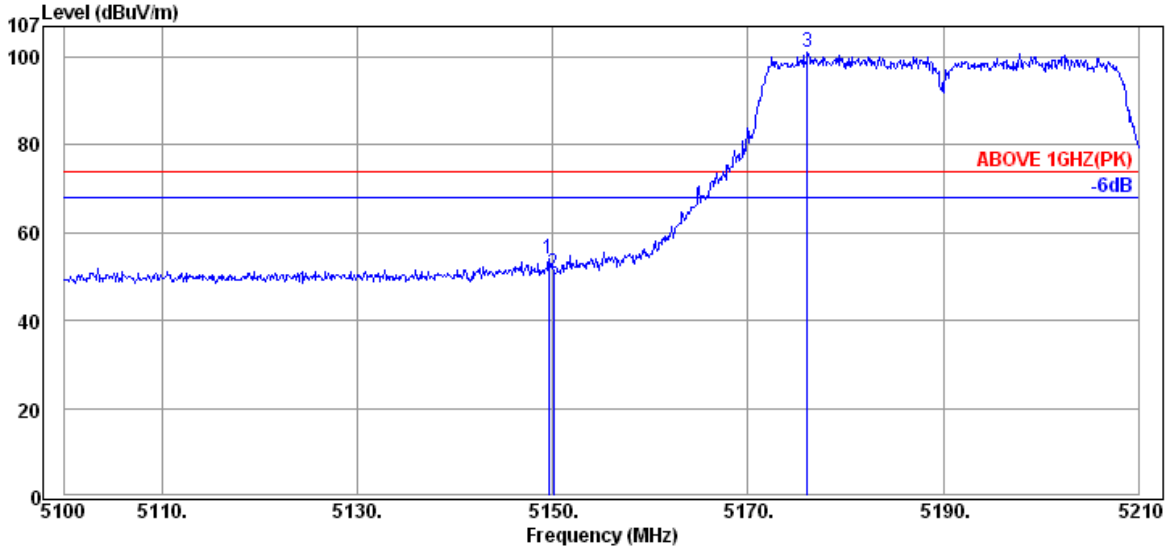
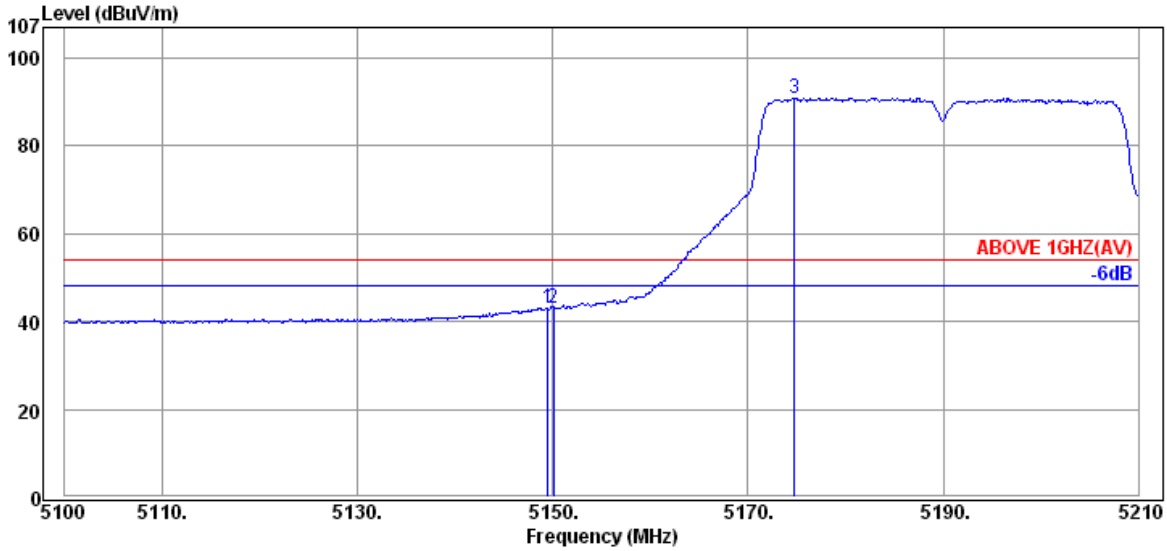
Mode	802.11n-HT40	UNII Band	I
		Frequency	TX 5190MHz



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
5149.61	33.44	9.34	11.12	53.90	74.00	20.10	Peak
5150.05	33.44	9.34	8.11	50.89	74.00	23.11	Peak
5176.12	33.49	9.36	58.13	100.98	---	---	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
5149.50	33.44	9.34	0.27	43.05	54.00	10.95	Average
5150.05	33.44	9.34	0.40	43.18	54.00	10.82	Average
5174.80	33.49	9.36	48.16	91.01	---	---	Average

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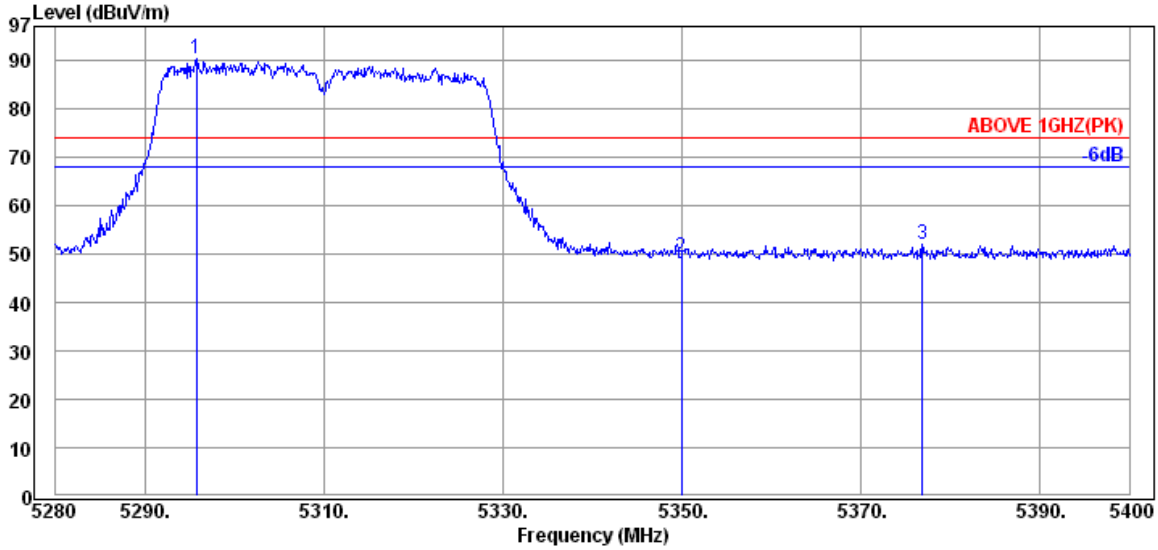
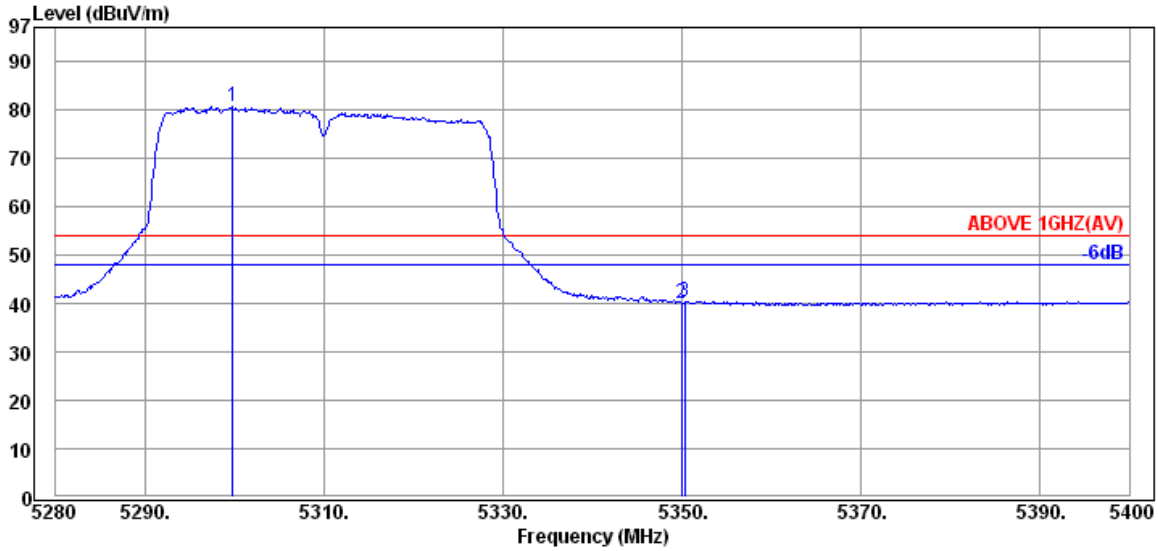
Mode	802.11n-HT40	UNII Band	II-2A
		Frequency	TX 5310MHz



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
5295.72	33.68	9.42	47.36	90.46	---	---	Peak
5349.96	33.76	9.46	6.15	49.37	74.00	24.63	Peak
5376.84	33.81	9.47	8.59	51.87	74.00	22.13	Peak



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5299.80	33.68	9.43	37.47	80.58	---	---	Average
5349.96	33.76	9.46	-3.20	40.02	54.00	13.98	Average
5350.32	33.76	9.46	-2.80	40.42	54.00	13.58	Average

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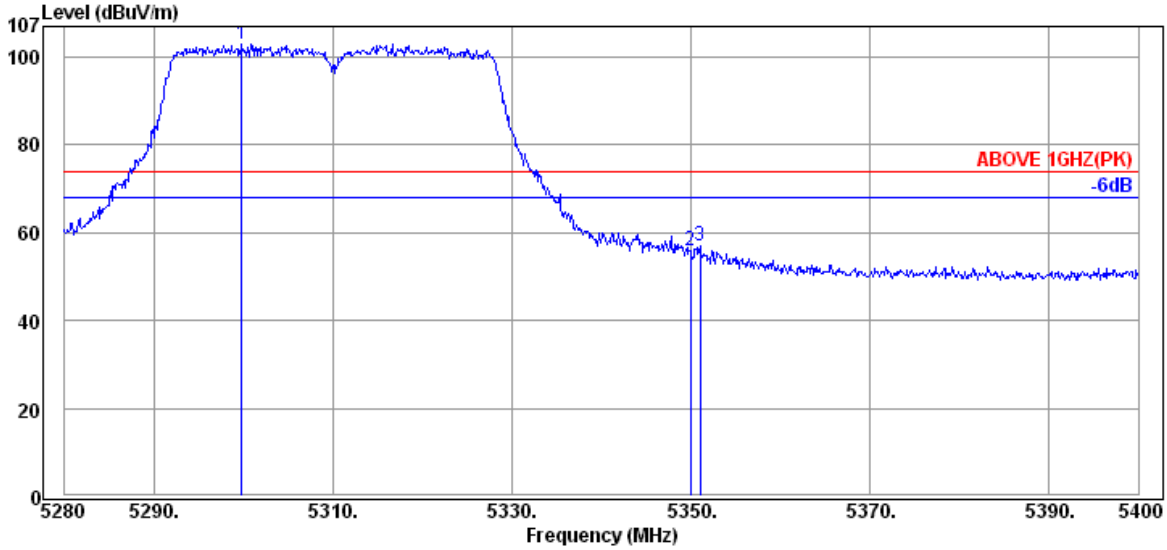
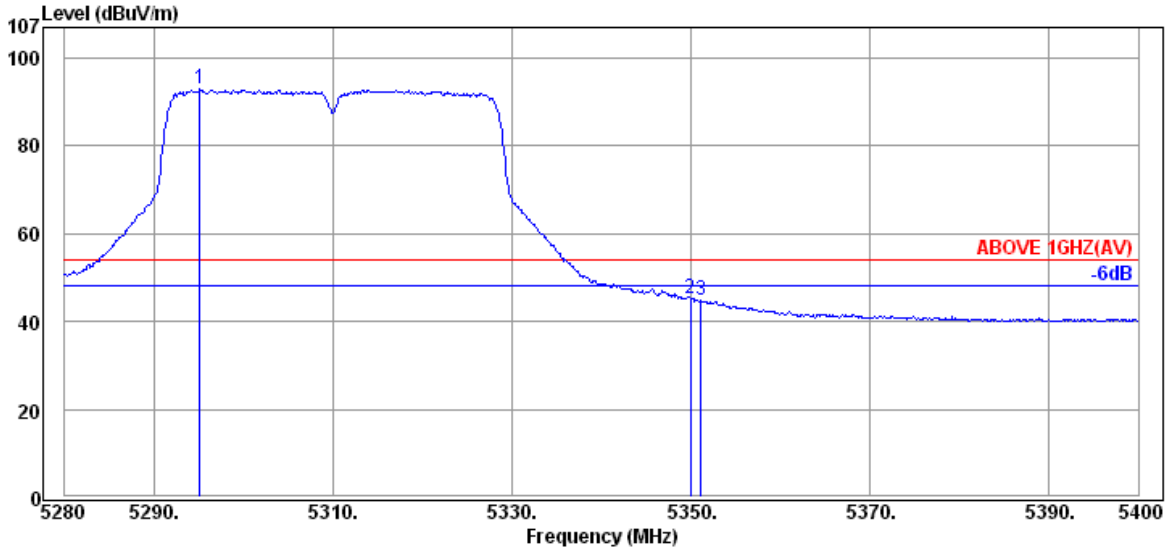
Mode	802.11n-HT40	UNII Band	II-2A
		Frequency	TX 5310MHz



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
5299.80	33.68	9.43	59.83	102.94	---	---	Peak
5349.96	33.76	9.46	12.76	55.98	74.00	18.02	Peak
5351.04	33.76	9.46	13.60	56.82	74.00	17.18	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
5295.12	33.68	9.42	49.80	92.90	---	---	Average
5349.96	33.76	9.46	2.15	45.37	54.00	8.63	Average
5351.16	33.76	9.46	1.64	44.86	54.00	9.14	Average

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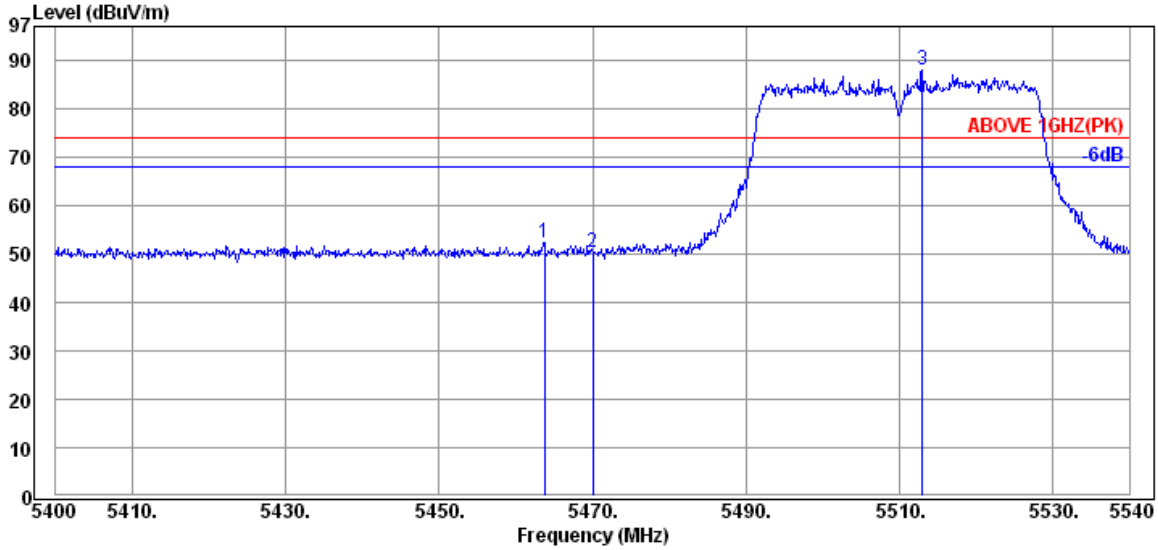
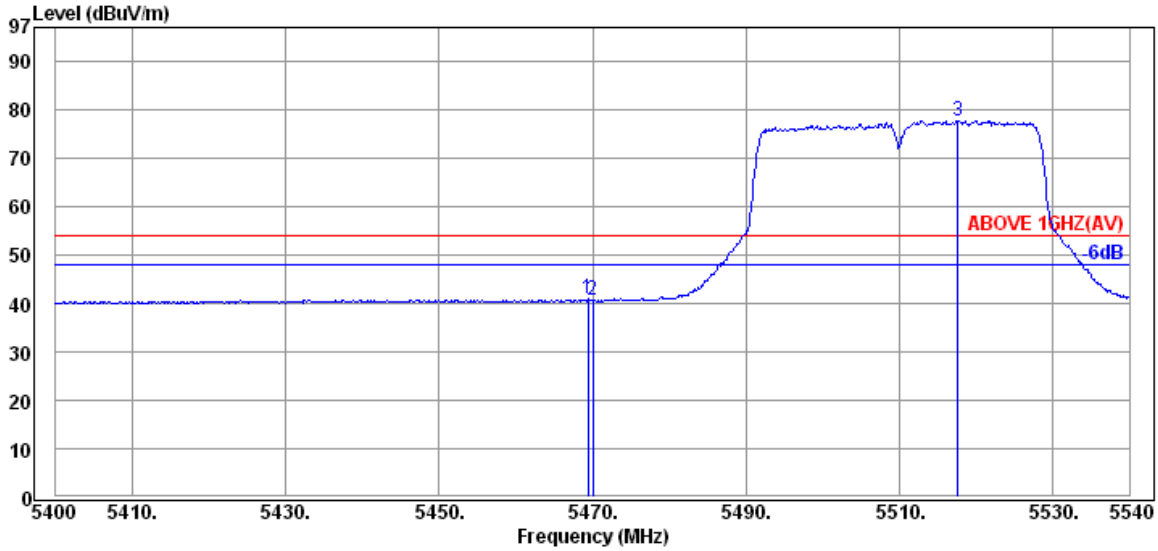
Mode	802.11n-HT40	UNII Band	II-2C
		Frequency	TX 5510MHz



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
5463.70	33.95	9.53	8.71	52.19	74.00	21.81	Peak
5470.00	33.95	9.53	6.74	50.22	74.00	23.78	Peak
5512.98	34.00	9.56	44.31	87.87	---	---	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
5469.44	33.95	9.53	-2.58	40.90	54.00	13.10	Average
5470.00	33.95	9.53	-2.83	40.65	54.00	13.35	Average
5517.60	34.00	9.56	34.07	77.63	---	---	Average

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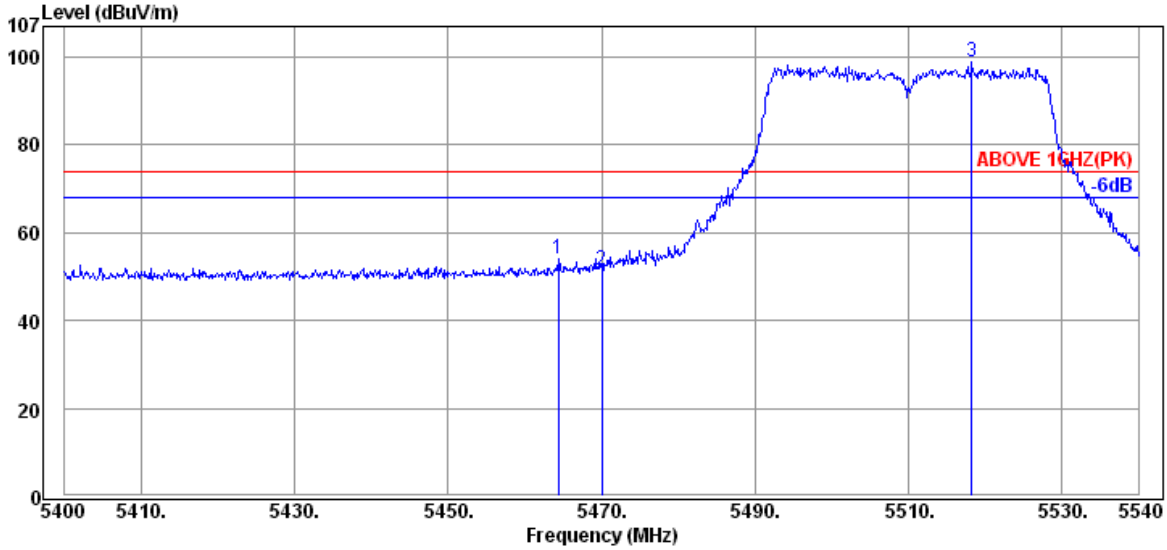
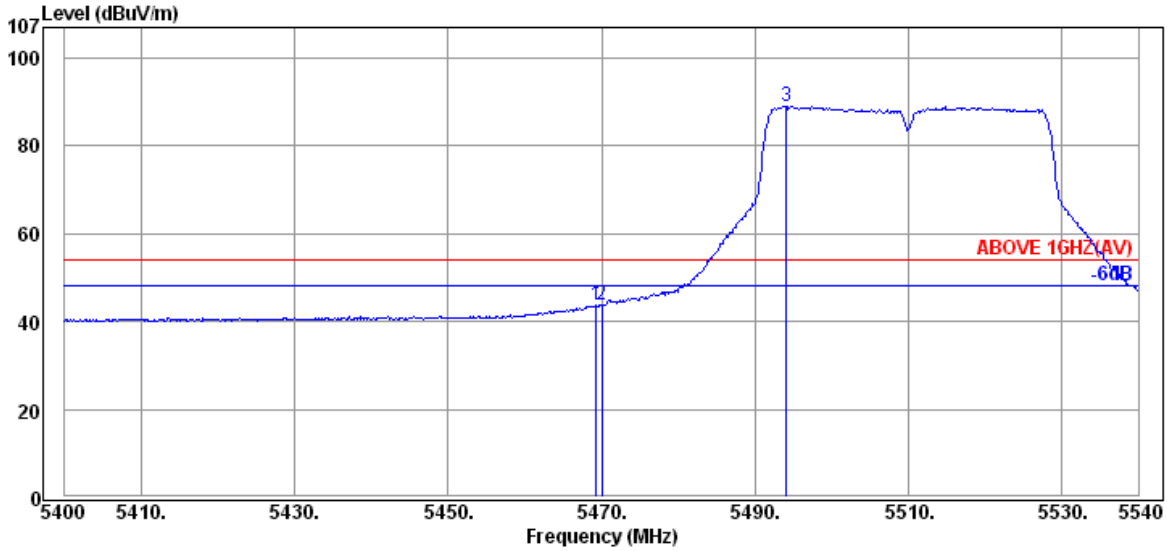
Mode	802.11n-HT40	UNII Band	II-2C
		Frequency	TX 5510MHz



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
5464.40	33.95	9.53	10.50	53.98	74.00	20.02	Peak
5470.00	33.95	9.53	8.05	51.53	74.00	22.47	Peak
5518.30	34.00	9.56	55.18	98.74	---	---	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
5469.30	33.95	9.53	0.34	43.82	54.00	10.18	Average
5470.00	33.95	9.53	0.37	43.85	54.00	10.15	Average
5494.08	33.98	9.55	45.62	89.15	---	---	Average

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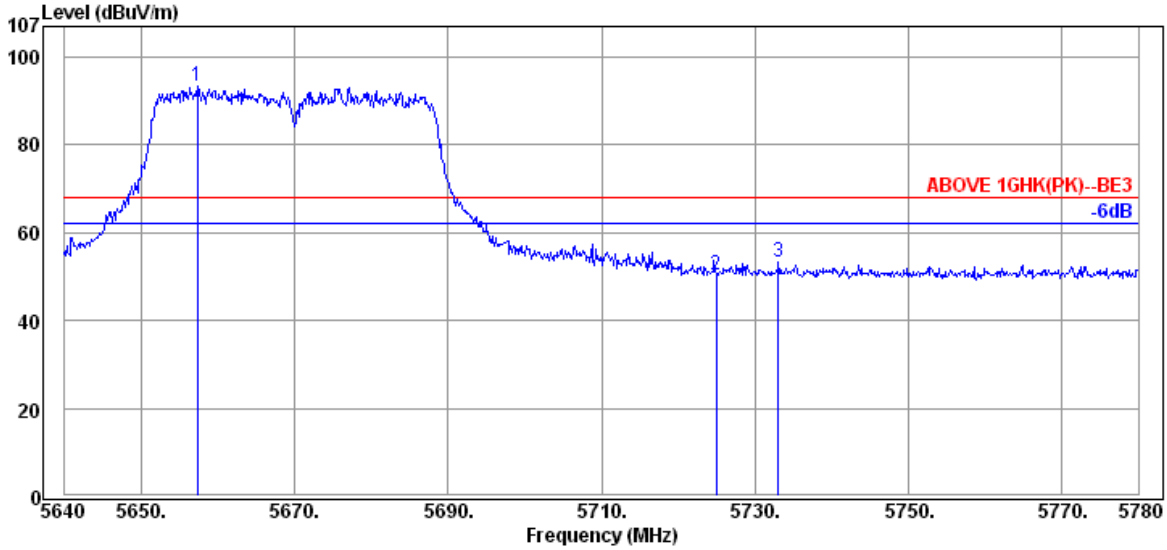
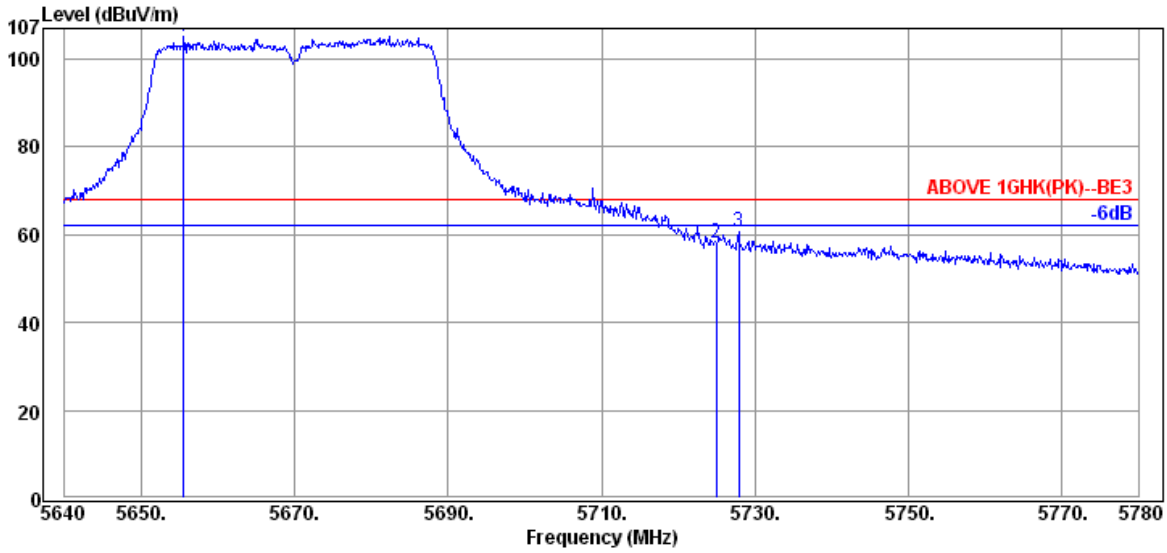
Mode	802.11n-HT40	UNII Band	II-2C
		Frequency	TX 5670MHz



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
5657.36	34.03	9.64	49.60	93.27	68.20	---	Peak
5724.98	34.05	9.68	6.54	50.27	68.20	17.93	Peak
5733.10	34.05	9.68	9.43	53.16	68.20	15.04	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
5655.54	34.03	9.64	61.47	105.14	68.20	---	Peak
5724.98	34.05	9.68	14.41	58.14	68.20	10.06	Peak
5727.92	34.05	9.68	16.85	60.58	68.20	7.62	Peak

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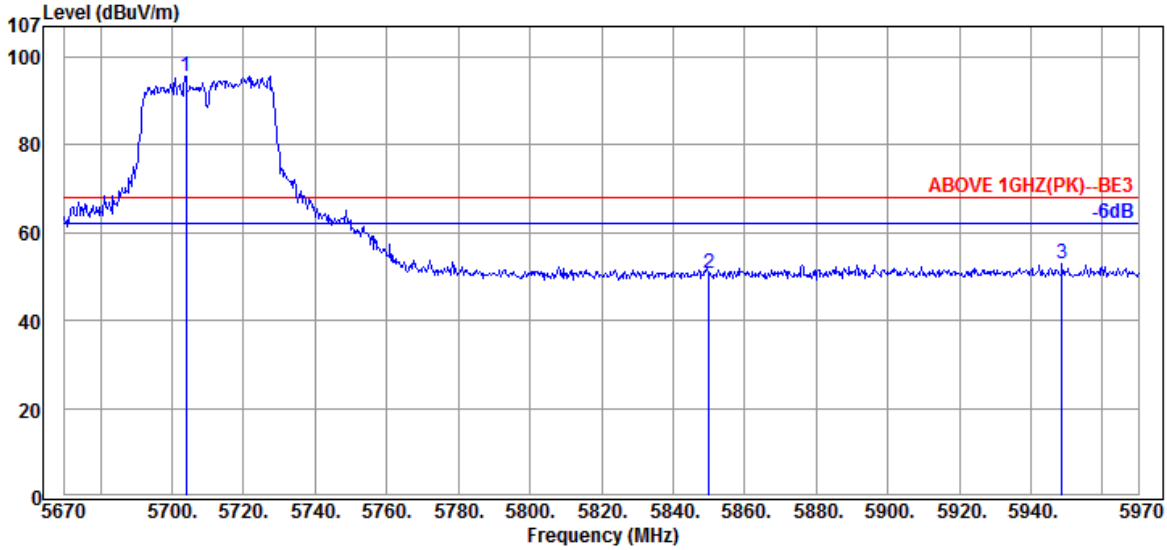
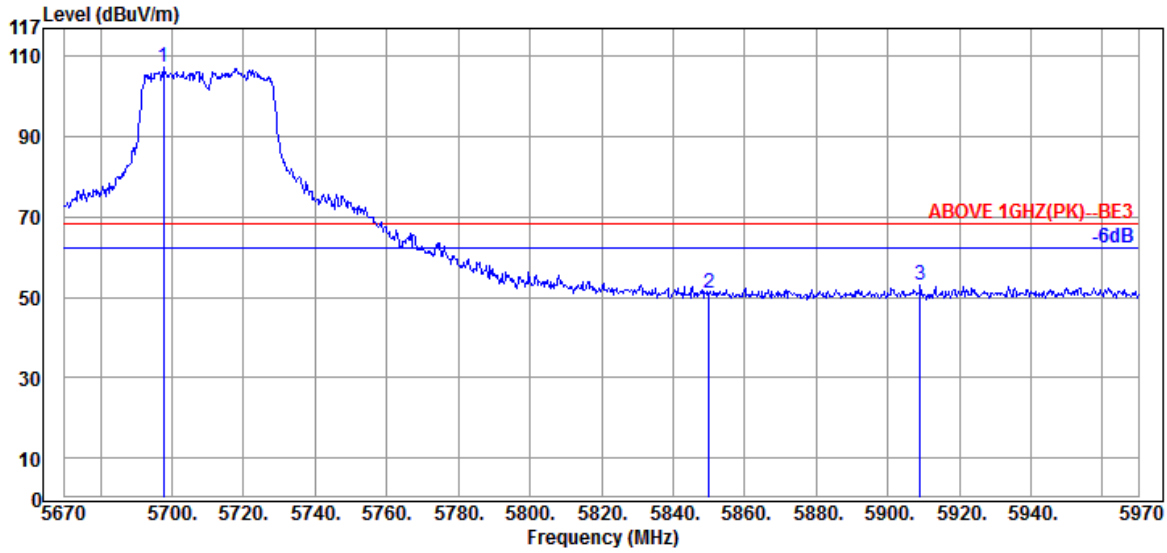
Mode	802.11n-HT40	UNII Band	II-2C
		Frequency	TX 5710MHz



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
5703.9000	34.04	9.67	52.00	95.71	68.20	---	Peak
5850.0000	34.07	9.75	6.83	50.65	68.20	17.55	Peak
5948.7000	34.09	9.80	8.90	52.79	68.20	15.41	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
5697.6000	34.04	9.67	63.76	107.47	68.20	---	Peak
5850.0000	34.07	9.75	7.17	50.99	68.20	17.21	Peak
5909.1000	34.08	9.78	9.22	53.08	68.20	15.12	Peak

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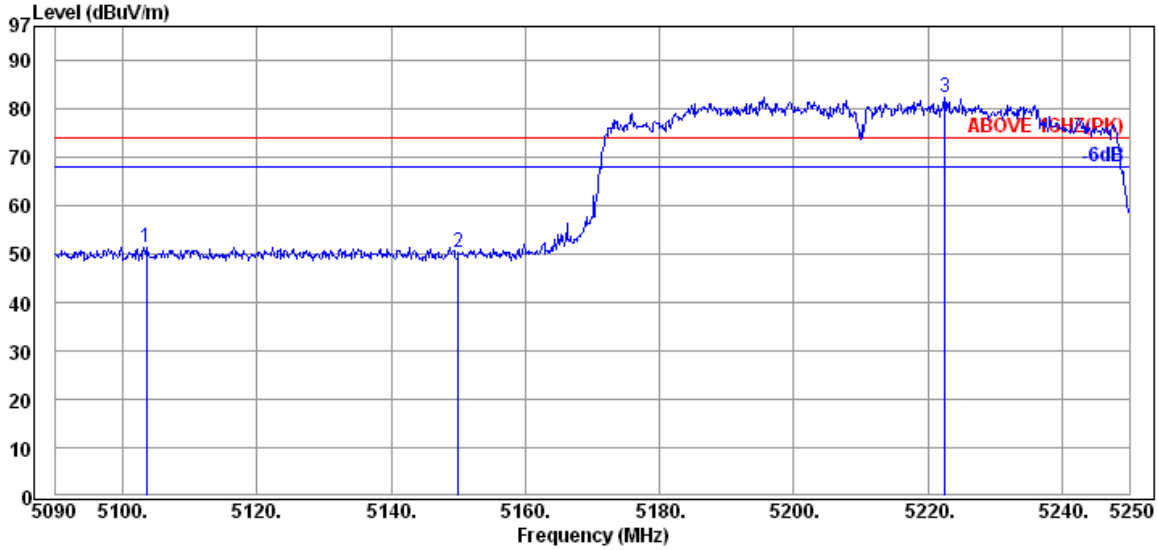
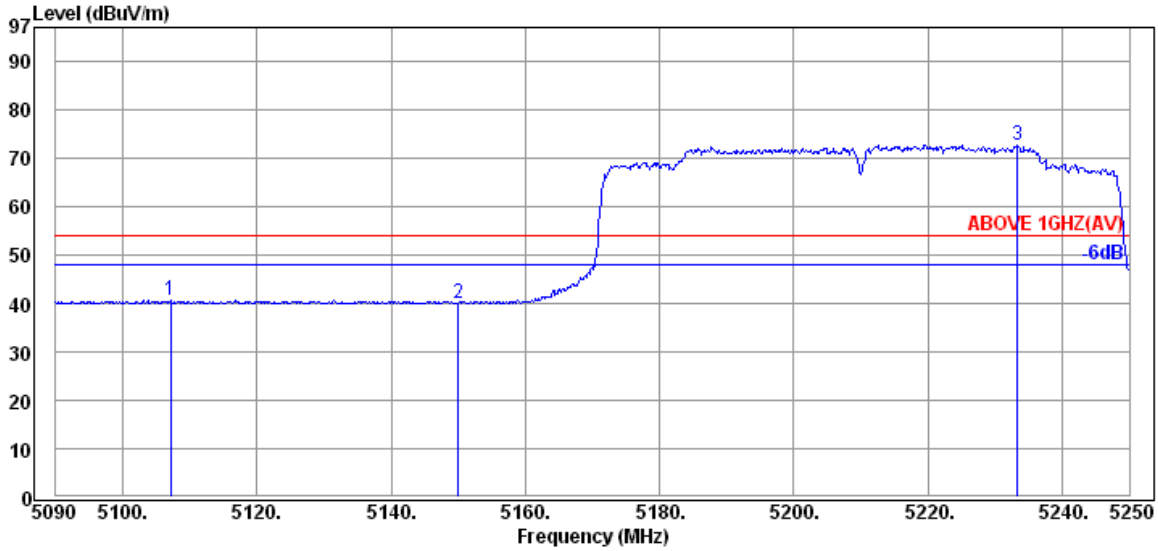
Mode	802.11ac-VHT80	UNII Band	I
		Frequency	TX 5210MHz



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
5103.60	33.37	9.31	8.66	51.34	74.00	22.66	Peak
5150.00	33.44	9.34	7.50	50.28	74.00	23.72	Peak
5222.48	33.56	9.39	39.36	82.31	---	---	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
5107.12	33.37	9.31	-2.13	40.55	54.00	13.45	Average
5150.00	33.44	9.34	-2.62	40.16	54.00	13.84	Average
5233.36	33.59	9.39	29.77	72.75	---	---	Average

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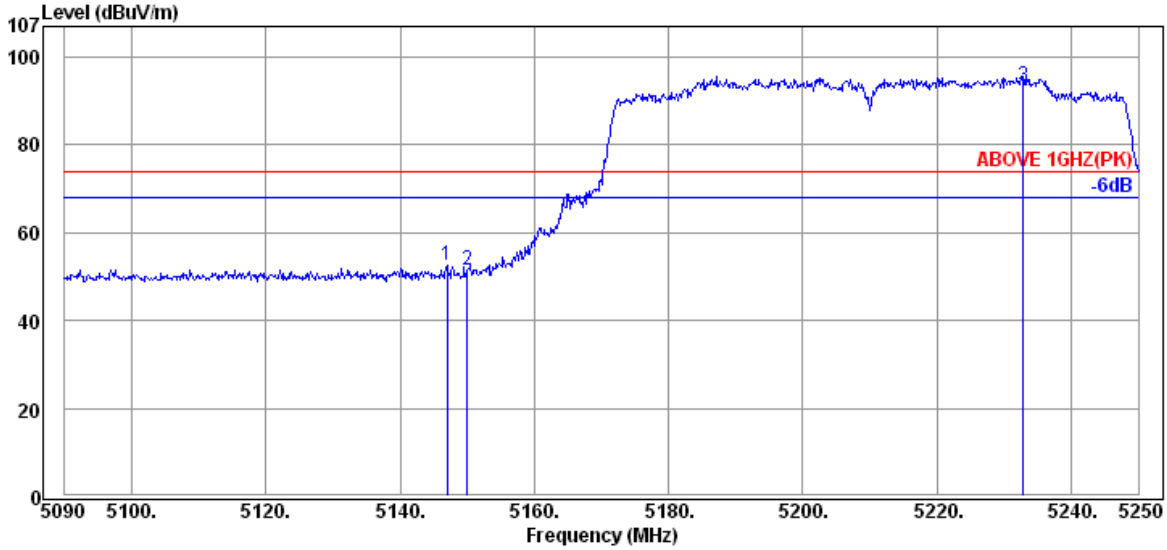
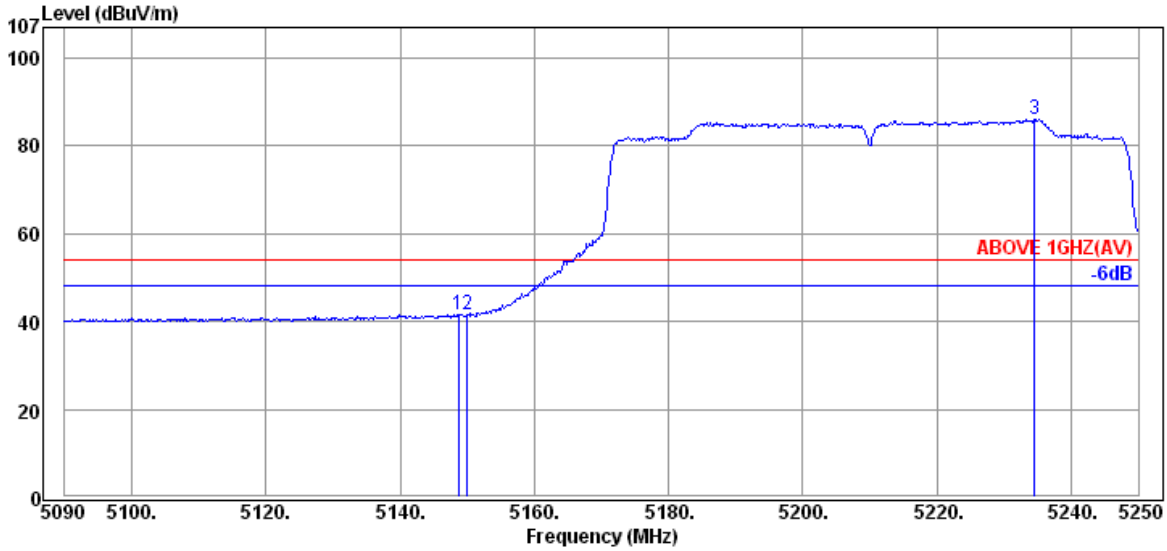
Mode	802.11ac-VHT80	UNII Band	I
		Frequency	TX 5210MHz



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
5146.96	33.44	9.34	9.63	52.41	74.00	21.59	Peak
5150.00	33.44	9.34	8.57	51.35	74.00	22.65	Peak
5232.88	33.59	9.39	50.54	93.52	---	---	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
5148.72	33.44	9.34	-1.23	41.55	54.00	12.45	Average
5150.00	33.44	9.34	-1.23	41.55	54.00	12.45	Average
5234.48	33.59	9.39	43.15	86.13	---	---	Average

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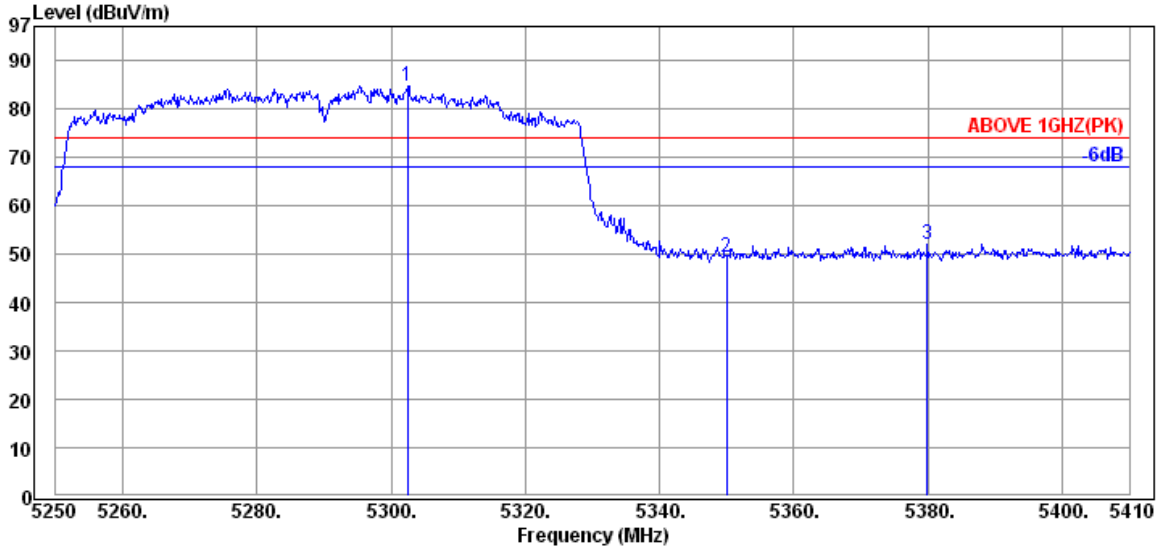
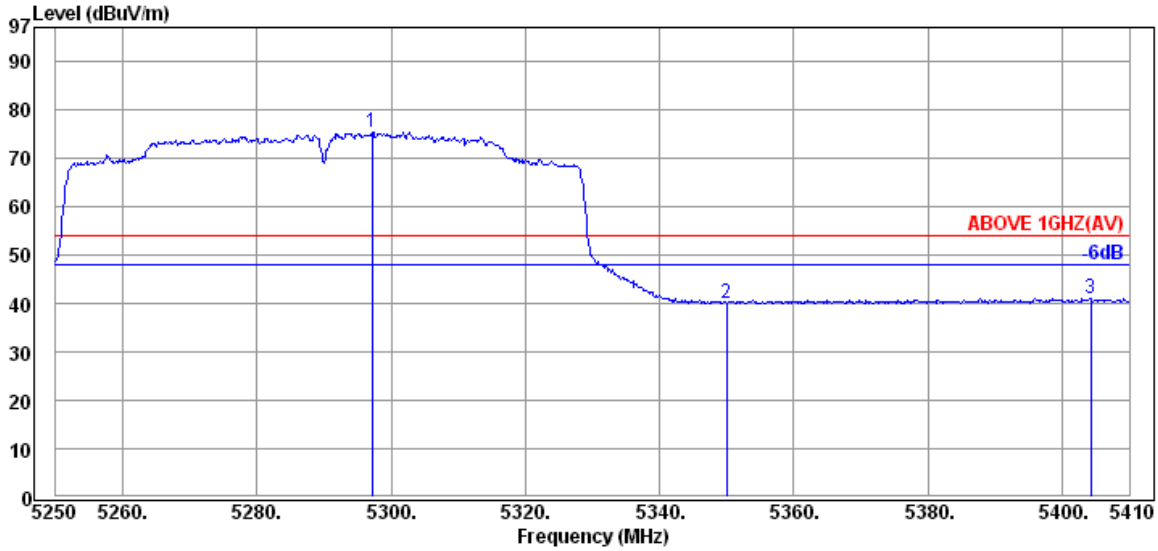
Mode	802.11ac-VHT80	UNII Band	II-2A
		Frequency	TX 5290MHz



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
5302.48	33.68	9.43	41.70	84.81	---	---	Peak
5350.00	33.76	9.46	6.05	49.27	74.00	24.73	Peak
5379.92	33.81	9.48	8.83	52.12	74.00	21.88	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
5297.20	33.68	9.43	32.28	75.39	---	---	Average
5350.00	33.76	9.46	-3.25	39.97	54.00	14.03	Average
5404.24	33.85	9.49	-2.36	40.98	54.00	13.02	Average

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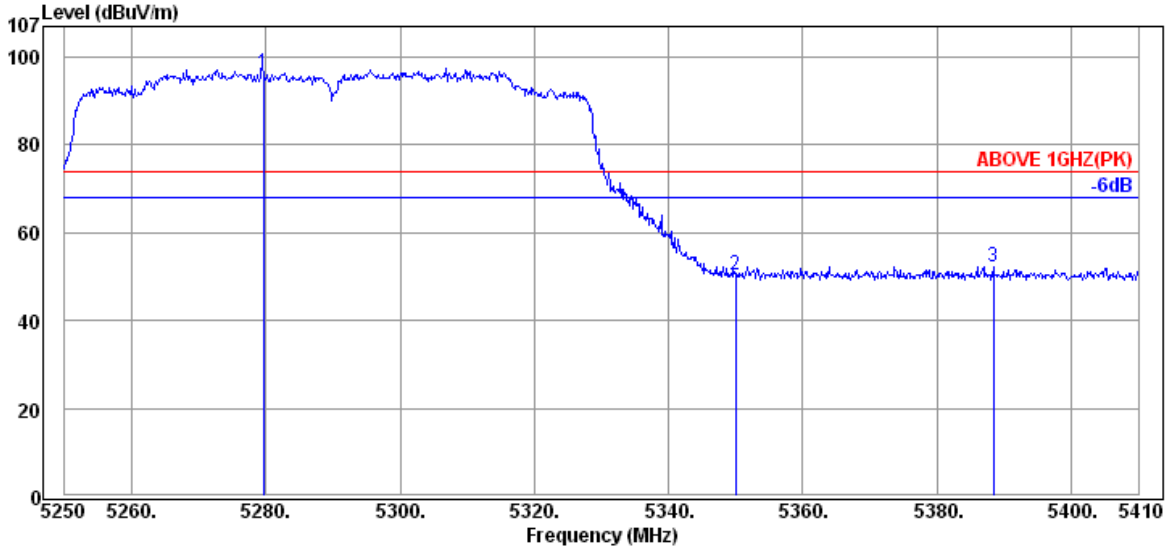
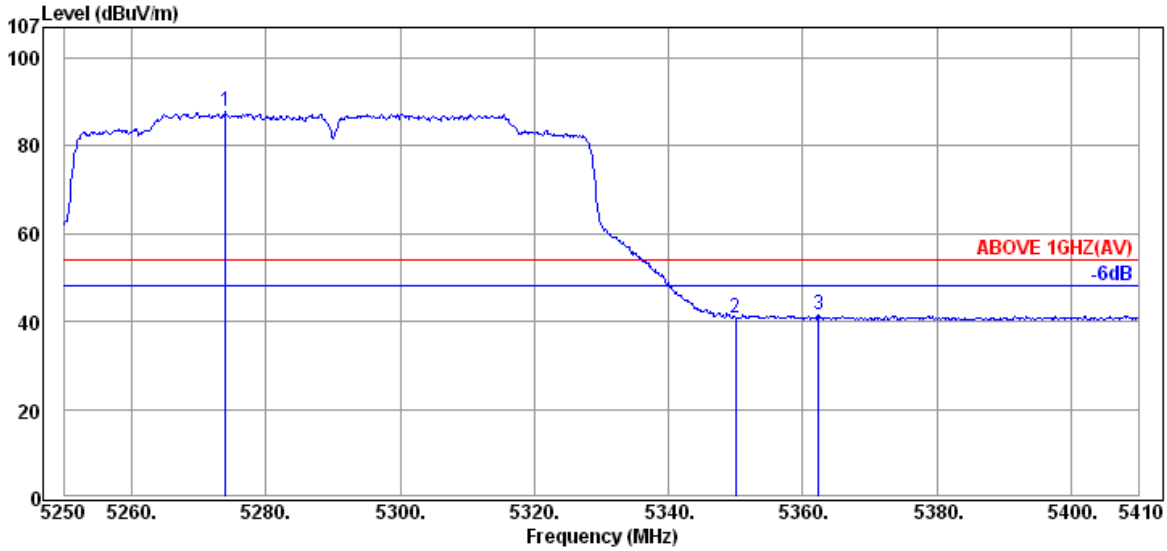
Mode	802.11ac-VHT80	UNII Band	II-2A
		Frequency	TX 5290MHz



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
5279.60	33.66	9.41	53.13	96.20	---	---	Peak
5350.00	33.76	9.46	6.99	50.21	74.00	23.79	Peak
5388.40	33.83	9.48	9.04	52.35	74.00	21.65	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
5274.00	33.64	9.41	44.76	87.81	---	---	Average
5350.00	33.76	9.46	-2.44	40.78	54.00	13.22	Average
5362.32	33.78	9.47	-1.70	41.55	54.00	12.45	Average

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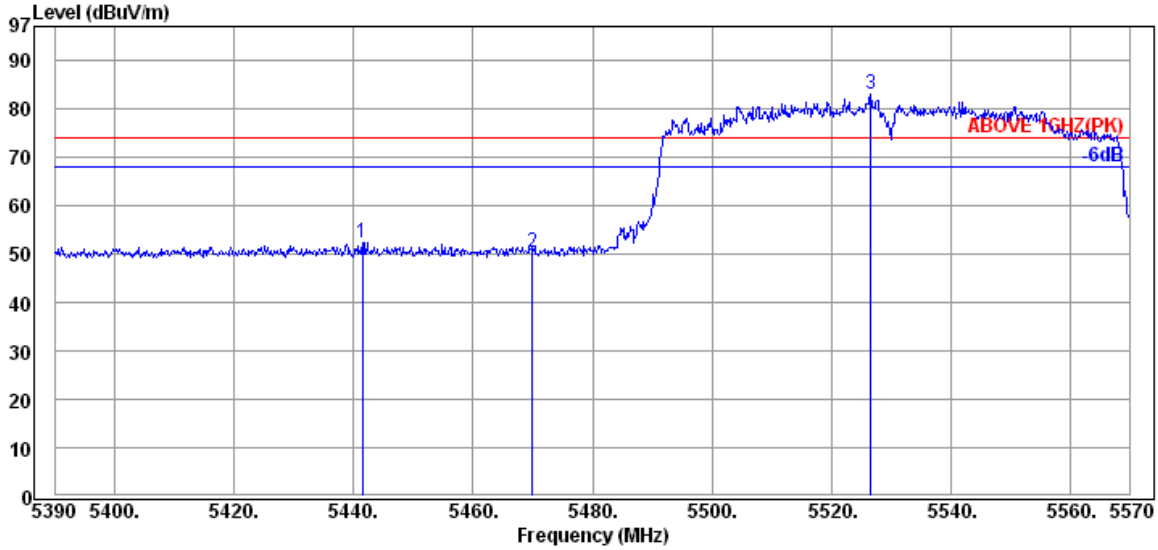
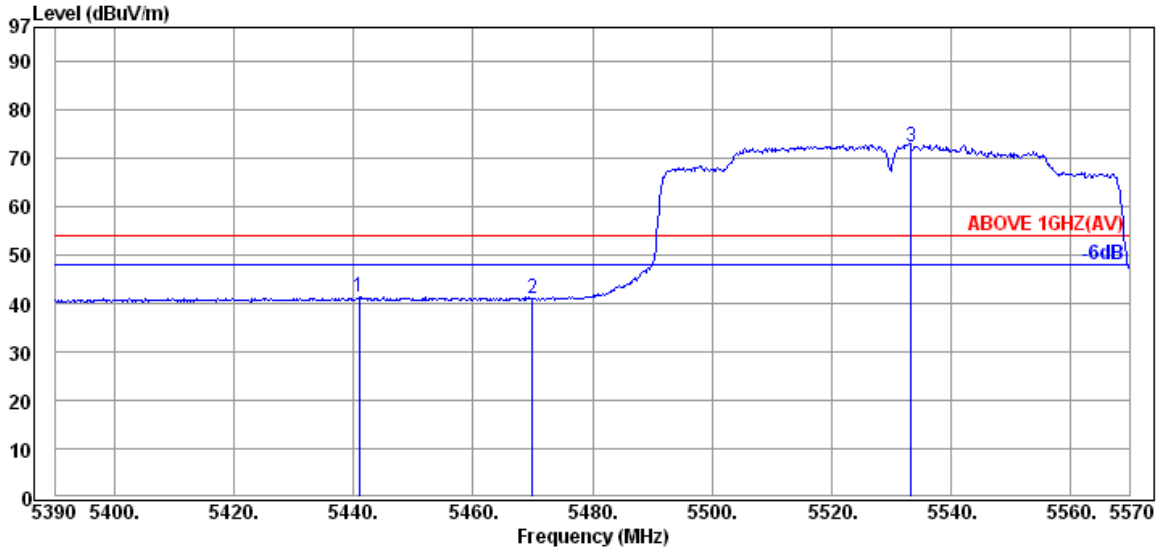
Mode	802.11ac-VHT80	UNII Band	II-2C
		Frequency	TX 5530MHz



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
5441.48	33.90	9.51	8.94	52.35	74.00	21.65	Peak
5469.92	33.95	9.53	6.98	50.46	74.00	23.54	Peak
5526.62	34.00	9.57	39.36	82.93	---	---	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
5440.94	33.90	9.51	-2.15	41.26	54.00	12.74	Average
5469.92	33.95	9.53	-2.59	40.89	54.00	13.11	Average
5533.46	34.01	9.57	28.89	72.47	---	---	Average

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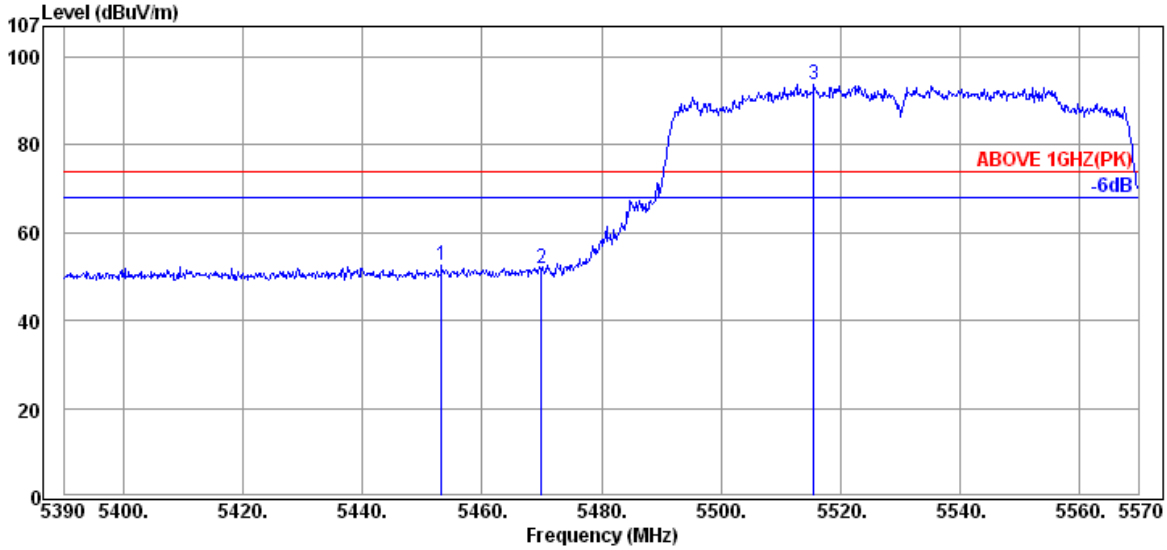
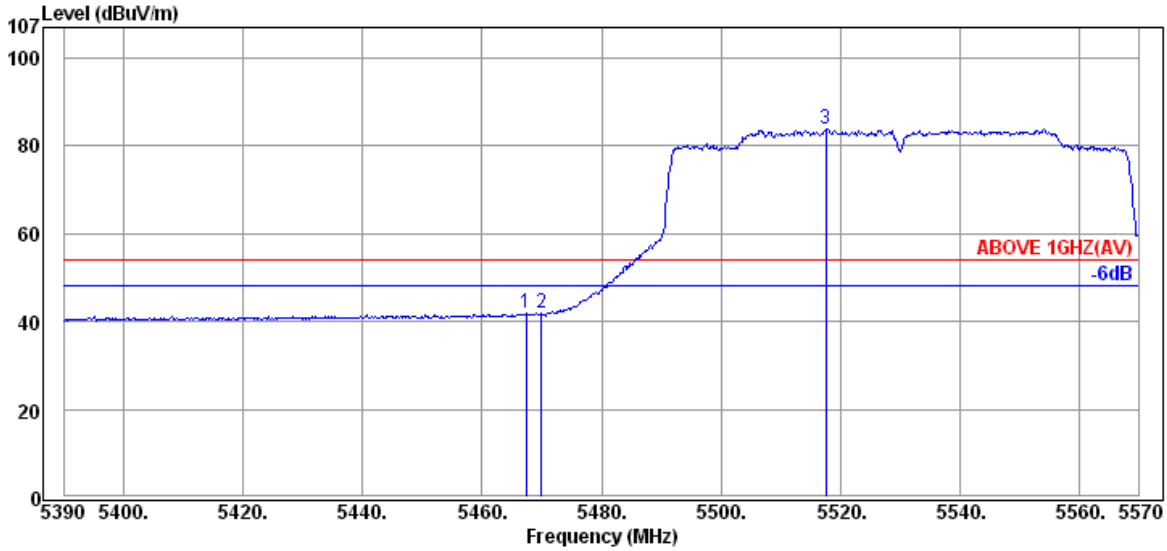
Mode	802.11ac-VHT80	UNII Band	II-2C
		Frequency	TX 5530MHz



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
5453.18	33.93	9.52	9.23	52.68	74.00	21.32	Peak
5469.92	33.95	9.53	8.30	51.78	74.00	22.22	Peak
5515.64	34.00	9.56	50.11	93.67	---	---	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
5467.40	33.95	9.53	-1.70	41.78	54.00	12.22	Average
5469.92	33.95	9.53	-1.70	41.78	54.00	12.22	Average
5517.62	34.00	9.56	40.42	83.98	---	---	Average

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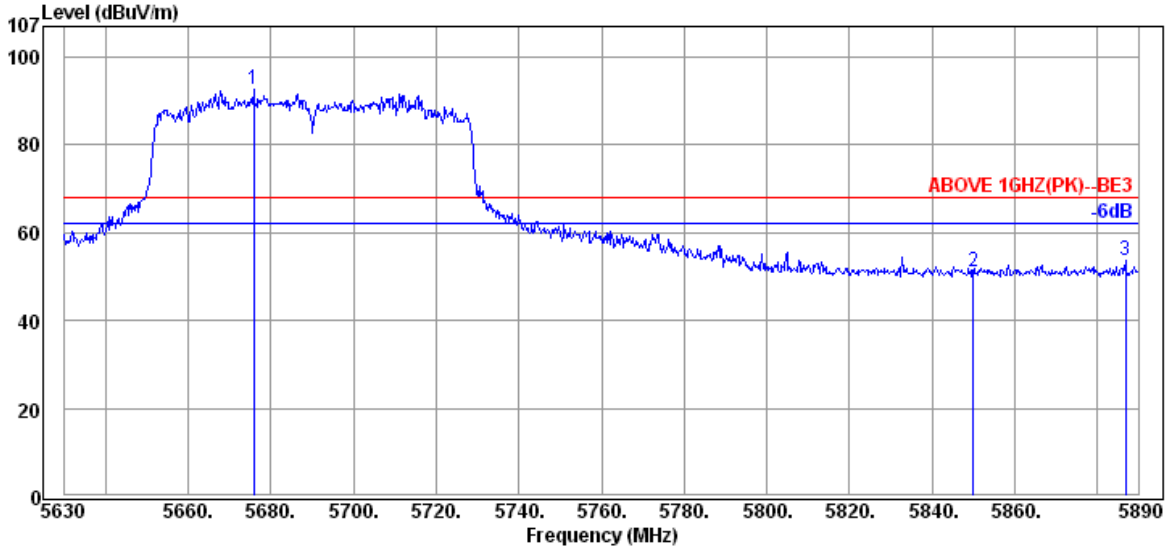
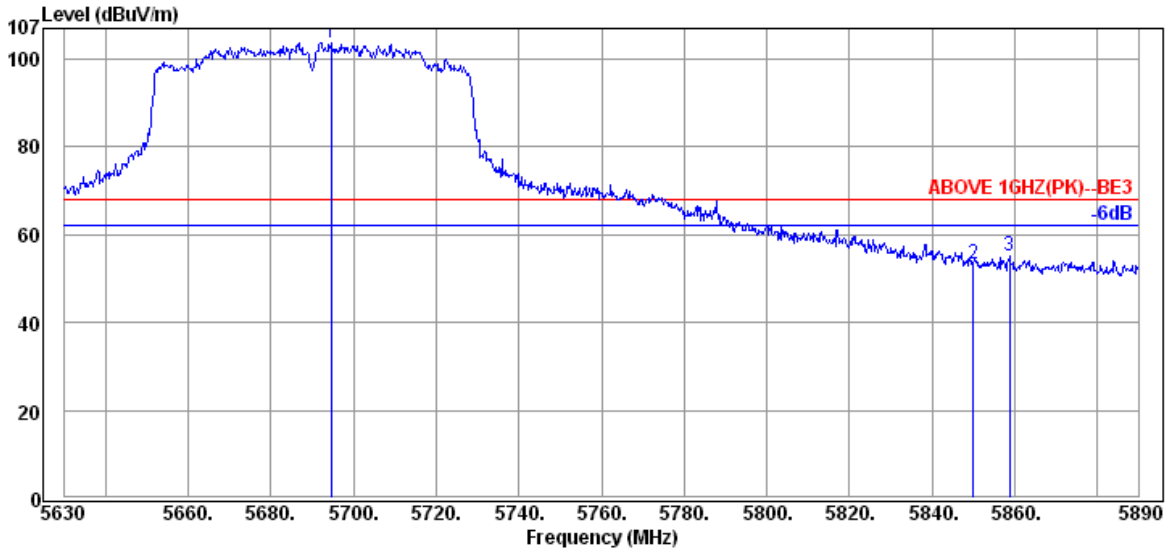
Mode	802.11ac-VHT80	UNII Band	II-2C
		Frequency	TX 5690MHz



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
5675.76	34.01	9.66	48.83	92.50	68.20	---	Peak
5849.96	34.11	9.75	7.38	51.24	68.20	16.96	Peak
5886.88	34.13	9.77	9.87	53.77	68.20	14.43	Peak



Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector
5694.48	34.02	9.67	60.02	103.71	68.20	---	Peak
5849.96	34.11	9.75	9.35	53.21	68.20	14.99	Peak
5858.80	34.12	9.75	11.39	55.26	68.20	12.94	Peak

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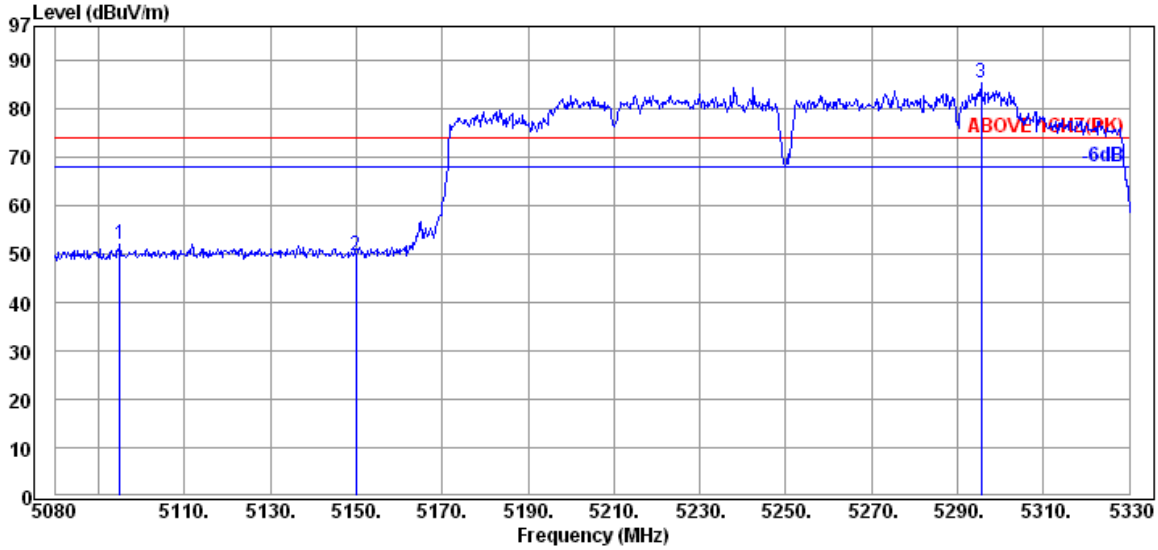
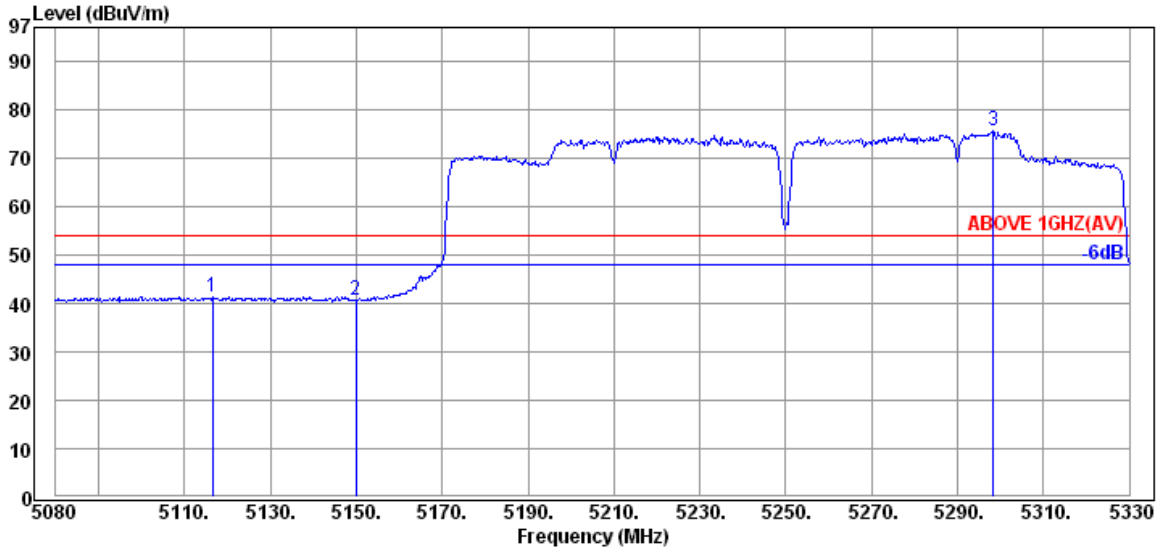
Mode	802.11ac-VHT160	UNII Band	I
		Frequency	TX 5250MHz



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
5095.00	33.35	9.31	9.34	52.00	74.00	22.00	Peak
5150.00	33.44	9.34	7.00	49.78	74.00	24.22	Peak
5295.50	33.68	9.42	42.34	85.44	---	---	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
5116.50	33.39	9.32	-1.33	41.38	54.00	12.62	Average
5150.00	33.44	9.34	-2.16	40.62	54.00	13.38	Average
5298.25	33.68	9.43	32.49	75.60	---	---	Average

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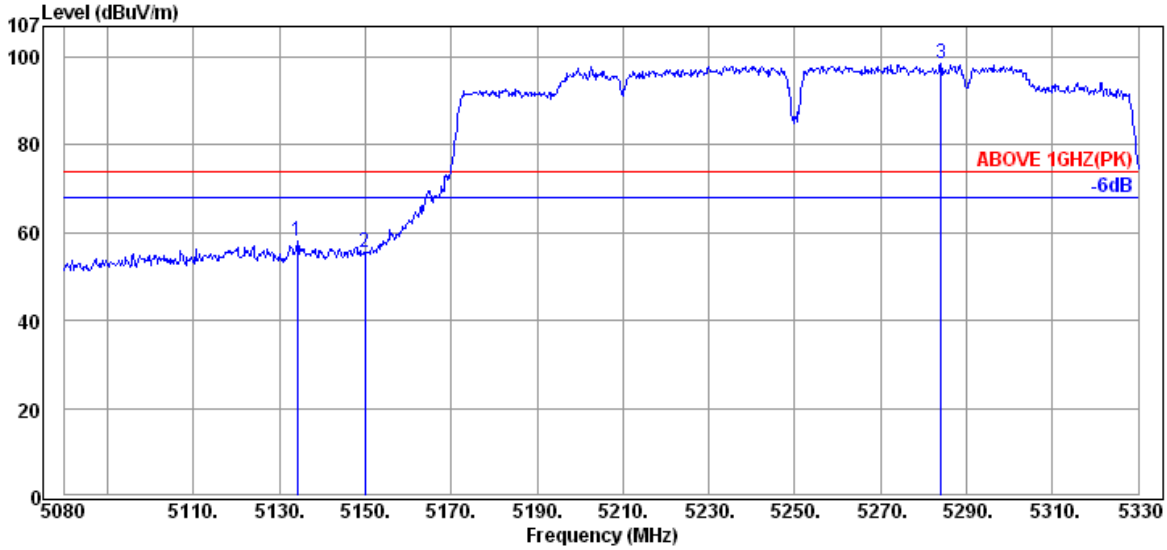
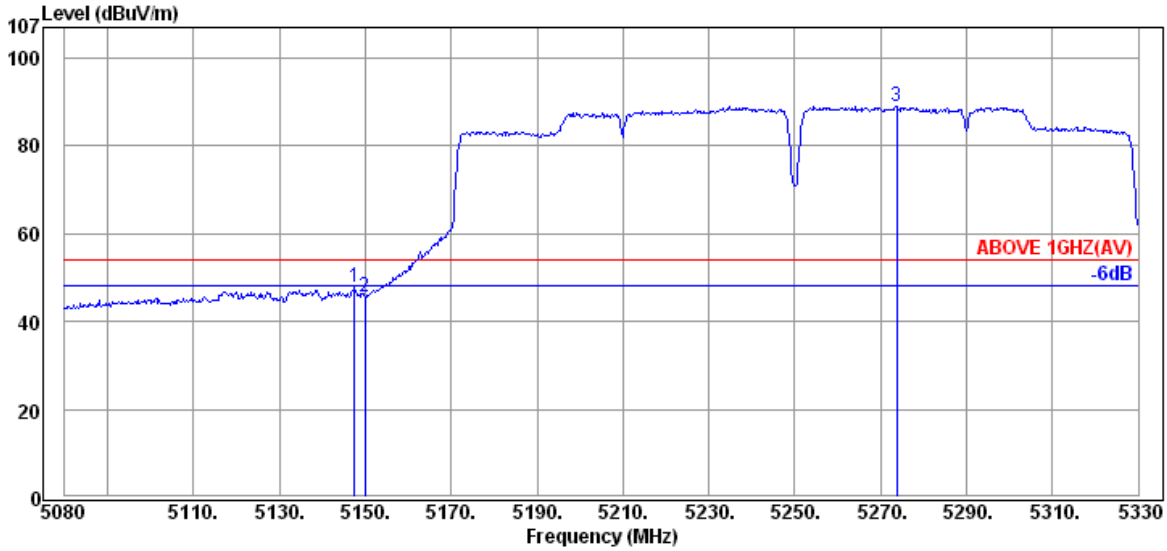
Mode	802.11ac-VHT160	UNII Band	I
		Frequency	TX 5250MHz



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
5134.25	33.42	9.33	15.40	58.15	74.00	15.85	Peak
5150.00	33.44	9.34	12.78	55.56	74.00	18.44	Peak
5284.00	33.66	9.42	55.34	98.42	---	---	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
5147.50	33.44	9.34	5.09	47.87	54.00	6.13	Average
5150.00	33.44	9.34	2.91	45.69	54.00	8.31	Average
5273.75	33.64	9.41	46.01	89.06	---	---	Average

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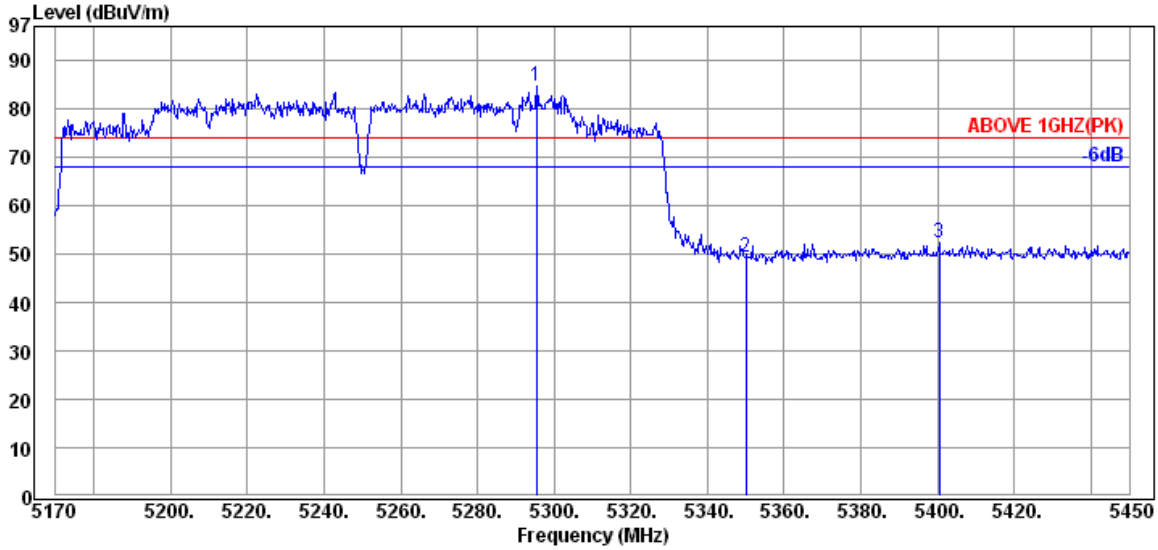
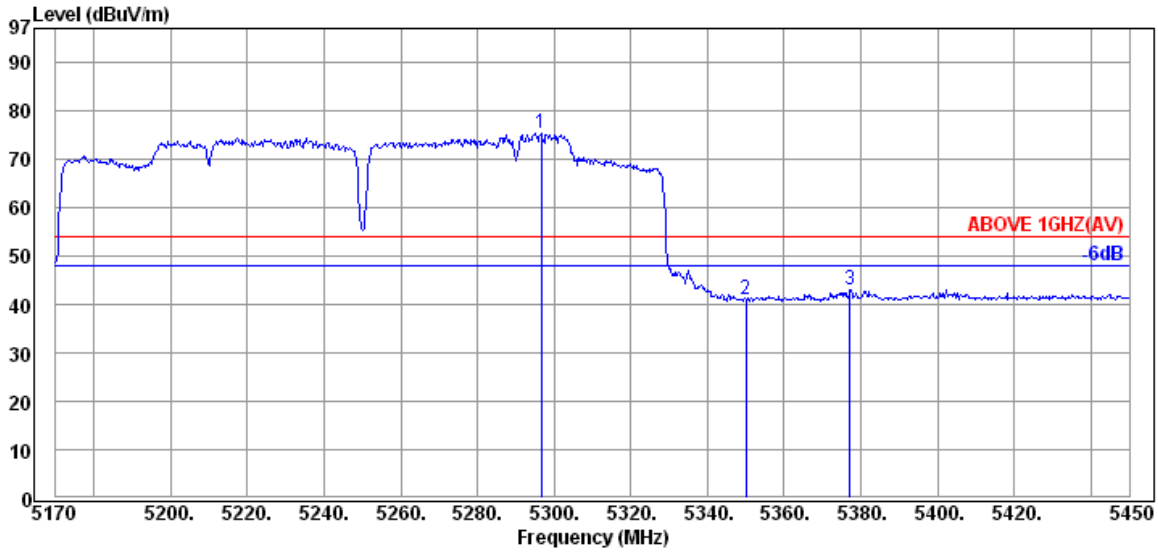
Mode	802.11ac-VHT160	UNII Band	I
		Frequency	TX 5250MHz



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
5295.44	33.68	9.42	41.47	84.57	---	---	Peak
5350.04	33.76	9.46	6.18	49.40	74.00	24.60	Peak
5400.44	33.83	9.49	9.16	52.48	74.00	21.52	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
5296.56	33.68	9.42	32.26	75.36	---	---	Average
5350.04	33.76	9.46	-2.37	40.85	54.00	13.15	Average
5377.20	33.81	9.48	-0.28	43.01	54.00	10.99	Average

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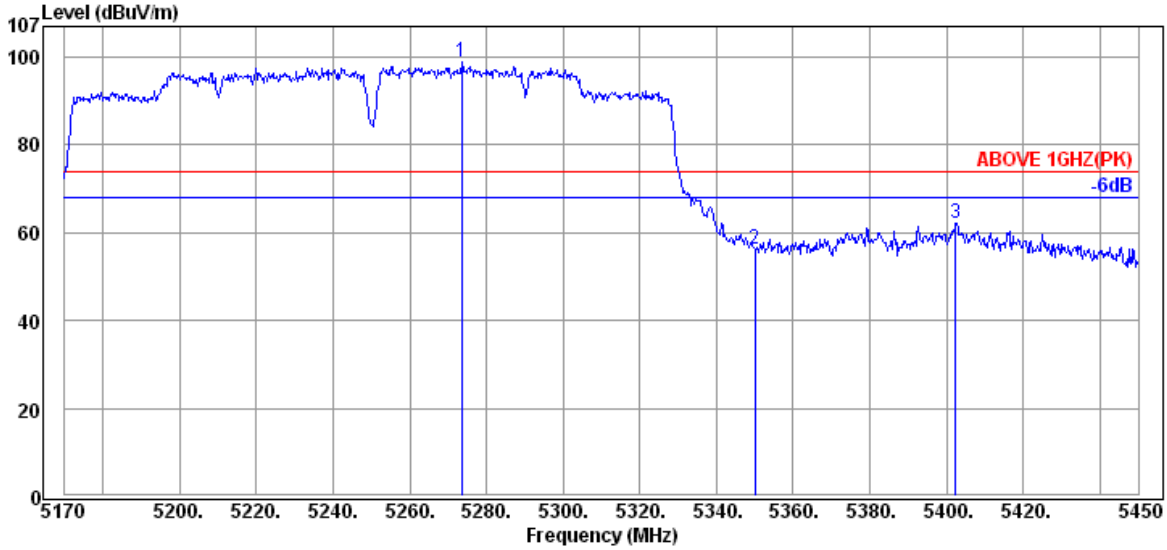
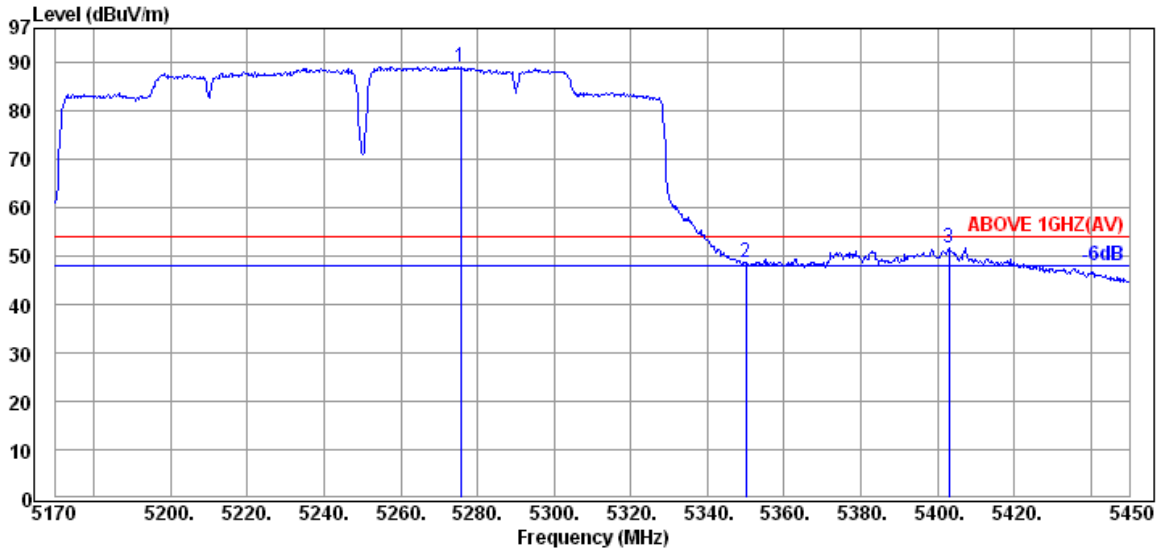
Mode	802.11ac-VHT160	UNII Band	I
		Frequency	TX 5250MHz



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
5273.60	33.64	9.41	55.81	98.86	---	---	Peak
5350.04	33.76	9.46	12.91	56.13	74.00	17.87	Peak
5402.40	33.85	9.49	18.89	62.23	74.00	11.77	Peak



Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5275.56	33.64	9.41	46.10	89.15	---	---	Average
5350.04	33.76	9.46	5.46	48.68	54.00	5.32	Average
5402.96	33.85	9.49	8.27	51.61	54.00	2.39	Average

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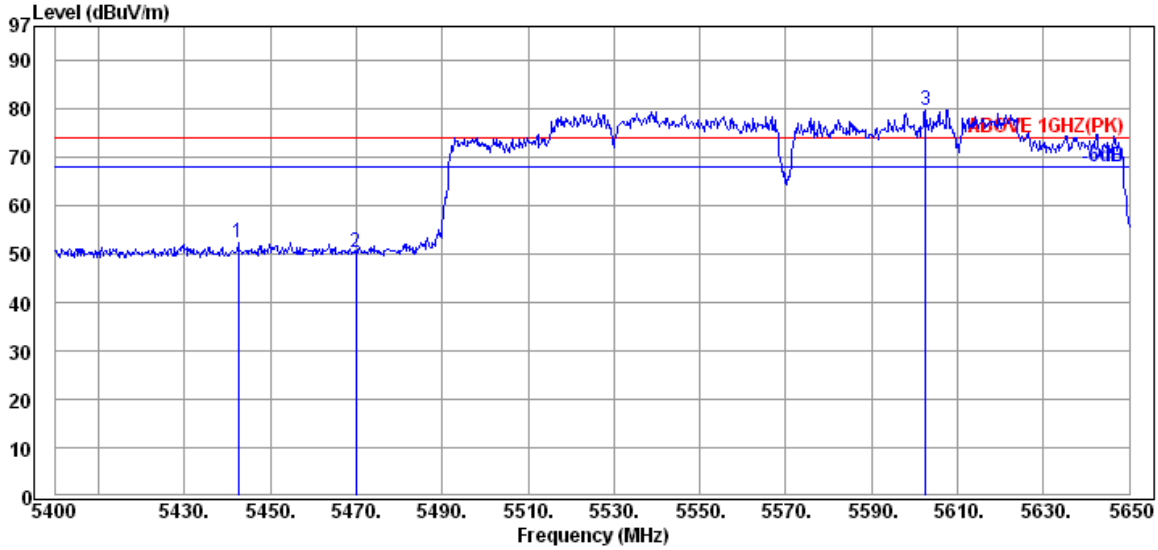
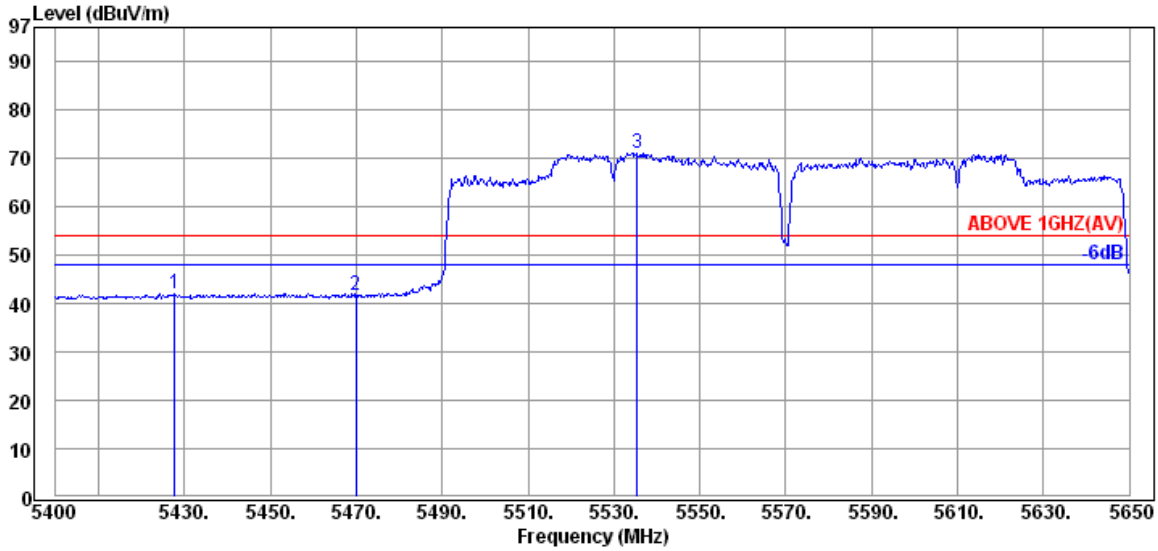
Mode	802.11ac-VHT160	UNII Band	II-2C
		Frequency	TX 5570MHz



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
5442.50	33.90	9.52	9.02	52.44	74.00	21.56	Peak
5470.00	33.95	9.53	6.71	50.19	74.00	23.81	Peak
5602.50	34.02	9.61	36.16	79.79	---	---	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
5427.75	33.88	9.51	-1.37	42.02	54.00	11.98	Average
5470.00	33.95	9.53	-1.89	41.59	54.00	12.41	Average
5535.50	34.01	9.57	27.50	71.08	---	---	Average

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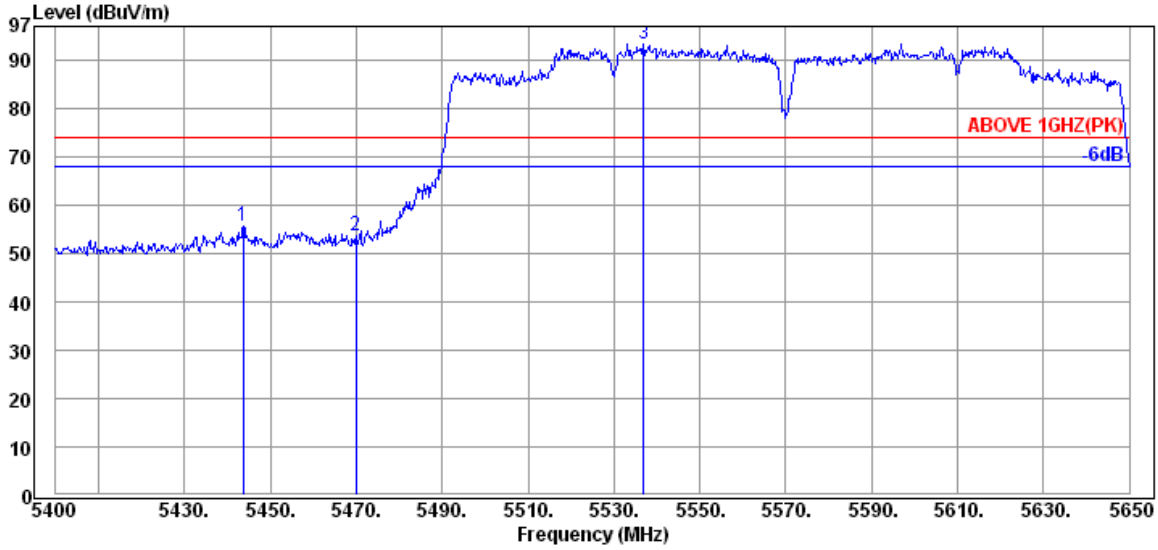
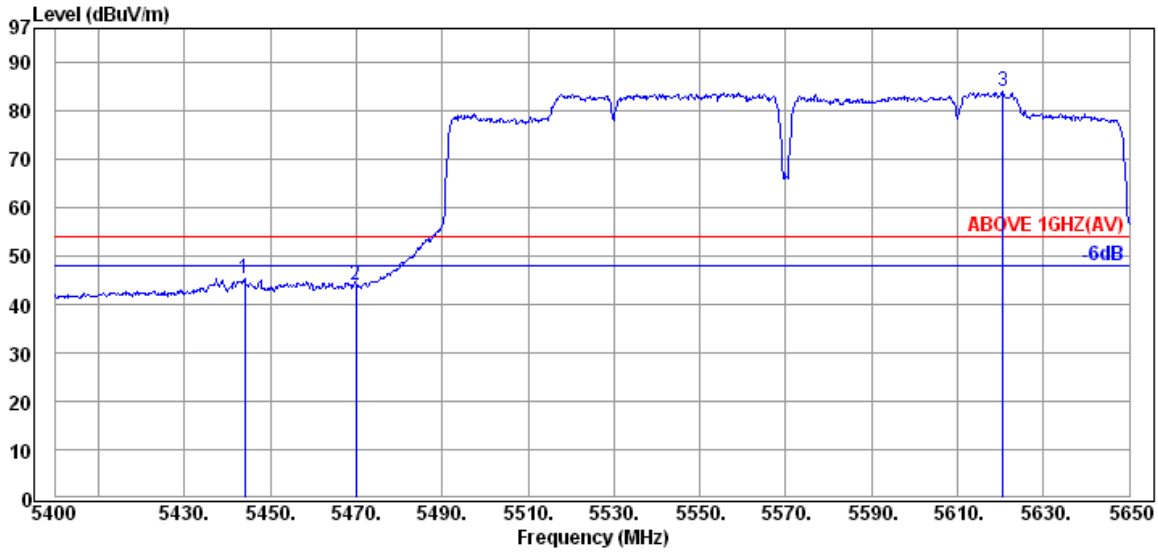
Mode	802.11ac-VHT160	UNII Band	II-2C
		Frequency	TX 5570MHz



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
5443.75	33.90	9.52	12.19	55.61	74.00	18.39	Peak
5470.00	33.95	9.53	10.08	53.56	74.00	20.44	Peak
5537.00	34.01	9.57	49.74	93.32	---	---	Peak



Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
5444.00	33.90	9.52	1.80	45.22	54.00	8.78	Average
5470.00	33.95	9.53	0.66	44.14	54.00	9.86	Average
5620.50	34.02	9.62	40.43	84.07	---	---	Average

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A.2.2 Emissions outside the frequency band

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

A.2.3 Emissions in Non-restricted Frequency Bands

Pursuant to KDB 789033 D02 General UNII Test Procedures New Rules v02r01 that emission levels below the 15.209 general radiated emissions limits is not required.

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A.3 EMISSIONBANDWIDTH

Test Date	2018/10/24 ~ 26	Temp./Hum.	23℃/55%
Cable Loss	Band I: 2.92dB Band II-2A/2C: 3.37dB Band III: 3.91dB	Test Voltage	AC 120V, 60Hz (via AC Adapter)

A.3.1 Emission Bandwidth Result

Mode	UNII Band	Centre Frequency (MHz)	26dB Bandwidth (MHz)	99%Occupied Bandwidth (MHz)	Limit
802.11a	I	5180	22.72	16.771	Reference only
		5200	38.76	19.972	
		5240	27.85	17.259	
	II-2A	5260	35.97	19.049	
		5300	29.89	17.816	
		5320	23.23	16.748	
	II-2C	5500	22.42	16.800	
		5580	33.71	18.362	
		5700	23.11	16.846	
802.11n-HT20	I	5180	22.67	17.849	Reference only
		5200	22.39	17.804	
		5240	22.99	17.862	
	II-2A	5260	22.93	17.850	
		5300	22.48	17.853	
		5320	23.38	17.996	
	II-2C	5500	23.94	17.865	
		5580	24.53	17.937	
		5700	23.85	17.898	
		5720	25.38	18.071	

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Mode	UNII Band	Centre Frequency (MHz)	Average Output Power(dBm)		10log (1/X)	Total Average Output Power		Limit
			Chain 0	Chain 1		(dBm)	(W)	
802.11n-HT20	I	5180	15.34	16.22	0.19	19.01	0.080	< 250 mW (24 dBm)
		5200	18.04	18.23		21.34	0.136	
		5240	17.81	18.13		21.18	0.131	
	II-2A	5260	18.21	18.37		21.50	0.141	
		5300	18.26	18.04		21.36	0.137	
		5320	15.52	15.24		18.59	0.072	
	II-2C	5500	15.78	15.73		18.96	0.079	
		5580	18.65	17.35		21.25	0.133	
		5700	17.53	17.72		20.83	0.121	
		5720	19.45	19.72		22.79	0.190	
	III	5745	20.04	20.34		23.40	0.219	< 1 W (30 dBm)
		5785	19.81	20.06		23.14	0.206	
		5825	19.97	20.73		23.57	0.228	
802.11n-HT40	I	5190	13.61	13.56	0.38	16.97	0.050	< 250 mW (24 dBm)
		5230	17.93	16.83		20.80	0.120	
	II-2A	5270	18.27	18.61		21.83	0.152	
		5310	13.74	14.65		17.61	0.058	
	II-2C	5510	12.15	12.83		15.89	0.039	
		5550	16.82	16.76		20.18	0.104	
		5670	16.95	18.26		21.04	0.127	
		5710	19.80	20.25		23.42	0.220	
	III	5755	17.41	17.53		20.86	0.122	< 1 W (30 dBm)
		5795	19.74	19.85		23.18	0.208	
802.11ac-VHT80	I	5210	8.53	9.73	0.76	12.94	0.020	< 250 mW (24 dBm)
	II-2A	5290	11.19	11.63		15.18	0.033	
	II-2C	5530	10.21	12.54		15.30	0.034	
		5610	17.45	17.24		21.11	0.129	
		5690	19.23	18.58		22.69	0.186	
	III	5775	12.66	13.81		17.04	0.051	< 1 W (30 dBm)
802.11ac-VHT160	I	5250	10.71	9.84	1.18	14.49	0.028	< 250 mW (24 dBm)
	II-2C	5570	11.0	10.86		15.12	0.033	

Note: The results have been included cable loss.

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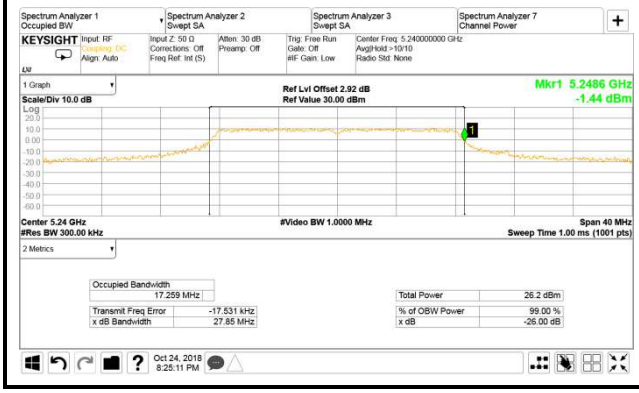
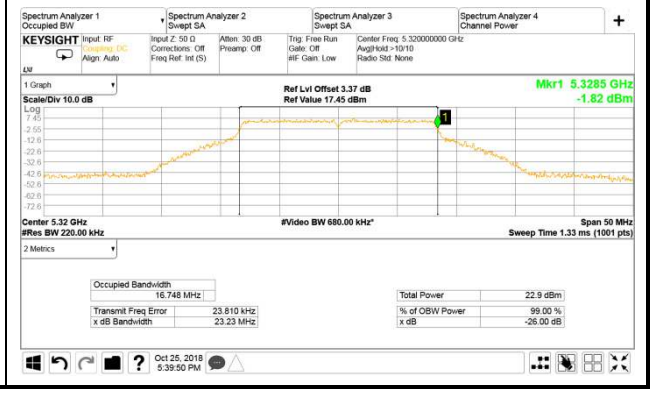
A.3.2 Measurement Plots

Mode: 802.11a	
UNII Band I	UNII Band II-2A





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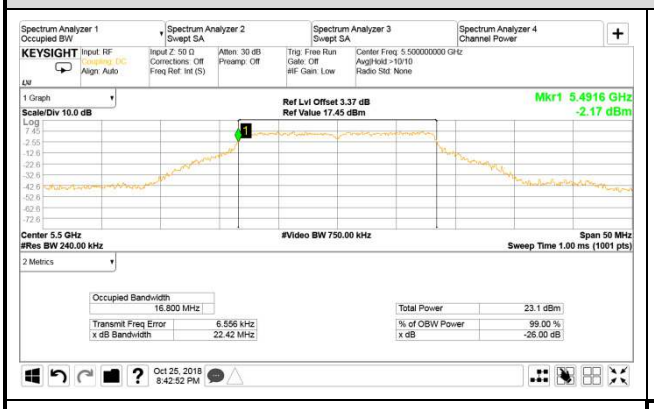
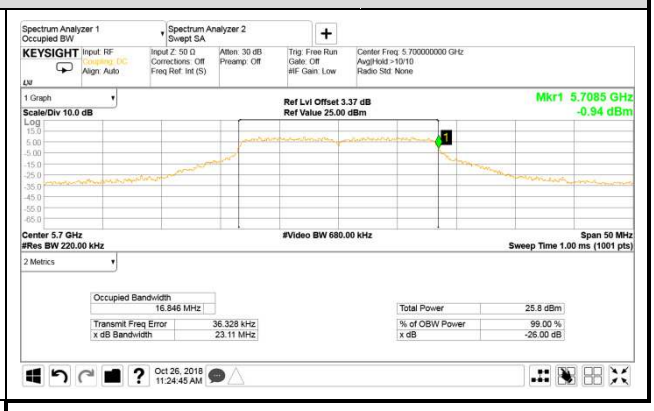
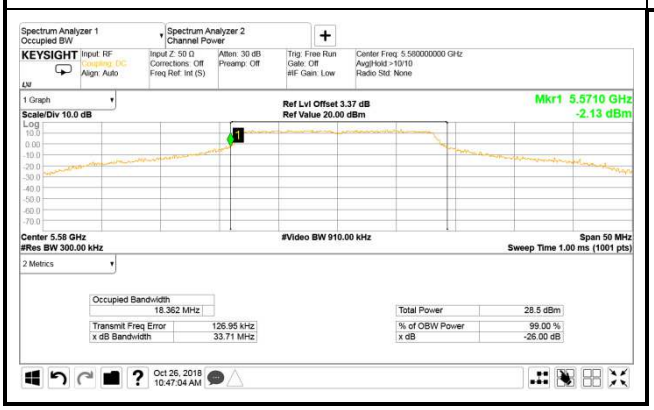
Mode: 802.11a
UNII Band II-2C







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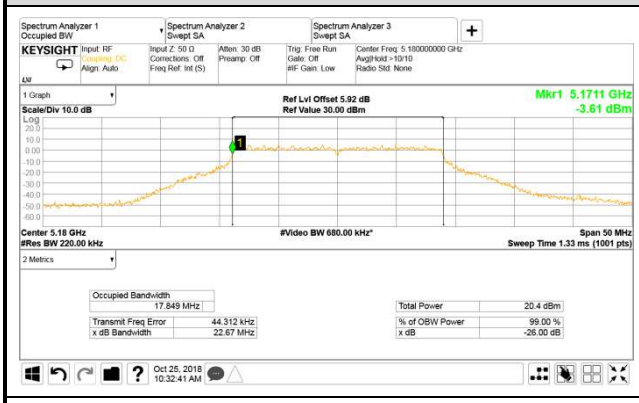
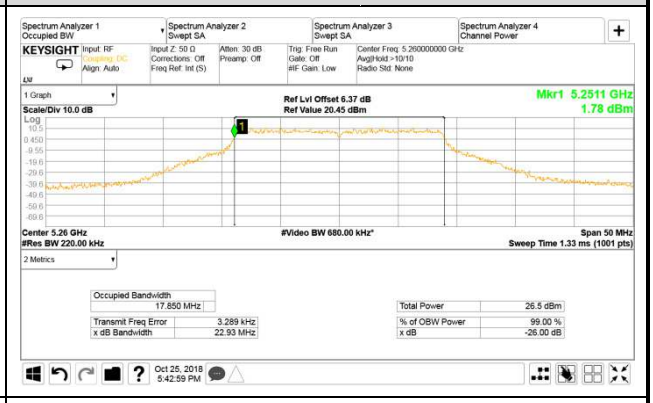
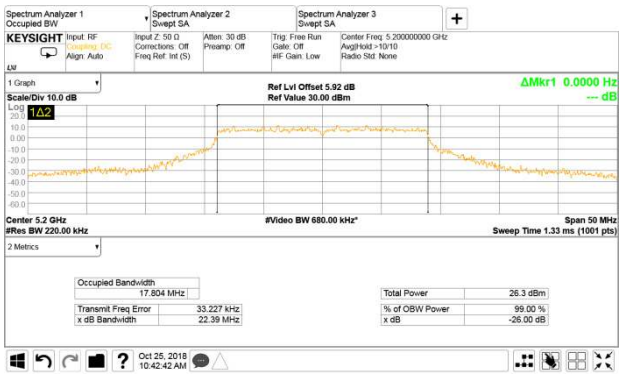
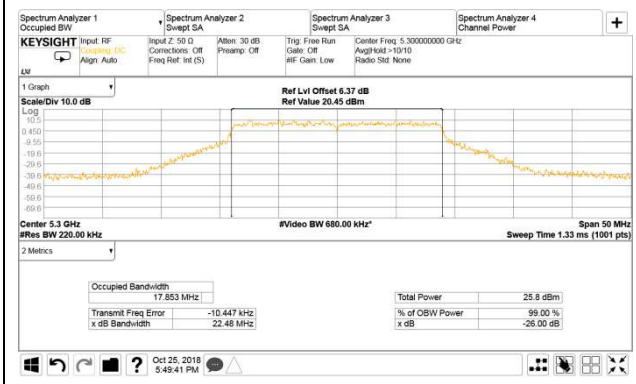
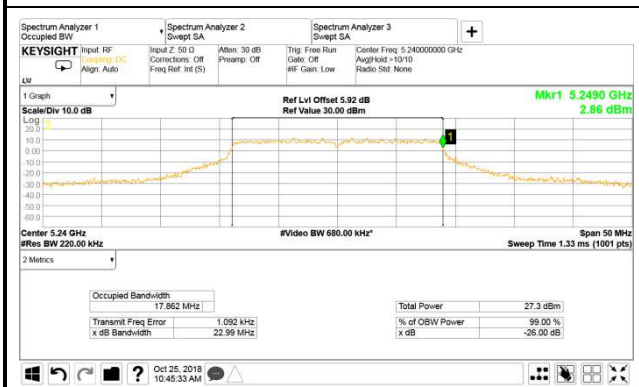
Mode: 802.11n-HT20	
UNII Band I	UNII Band II-2A

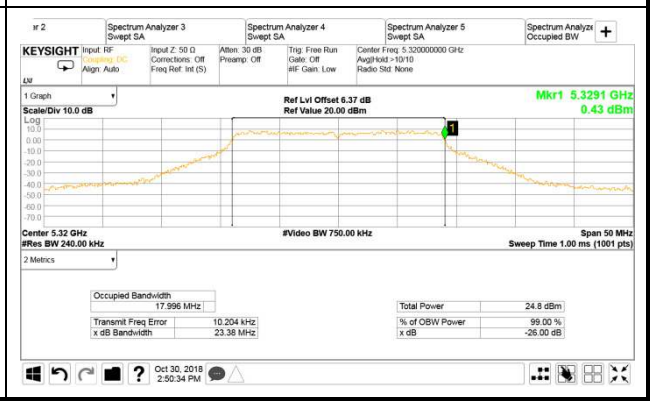












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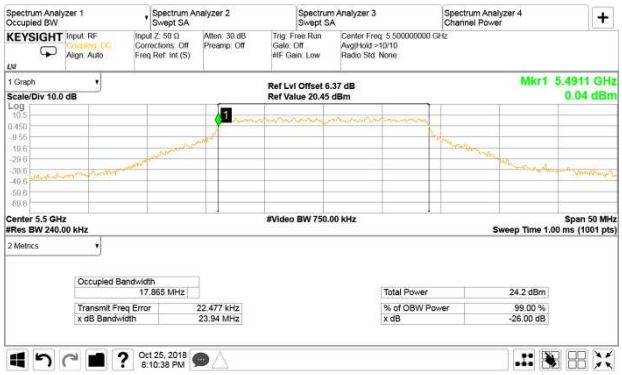
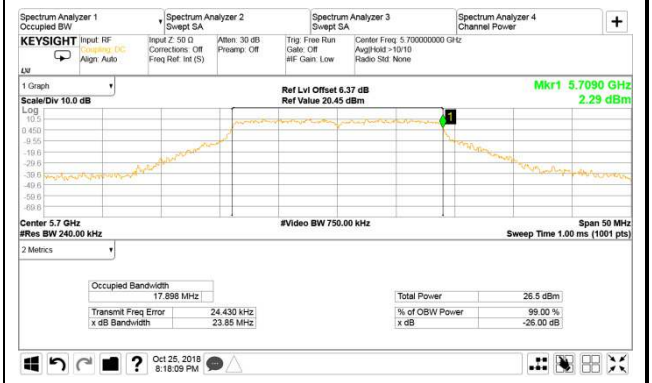
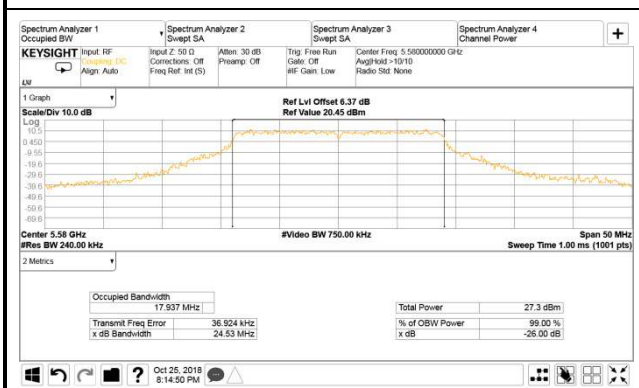
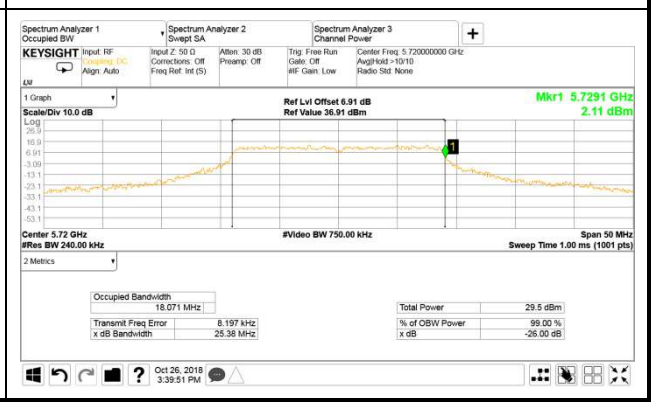
Mode: 802.11n-HT20	
UNII Band II-2C	









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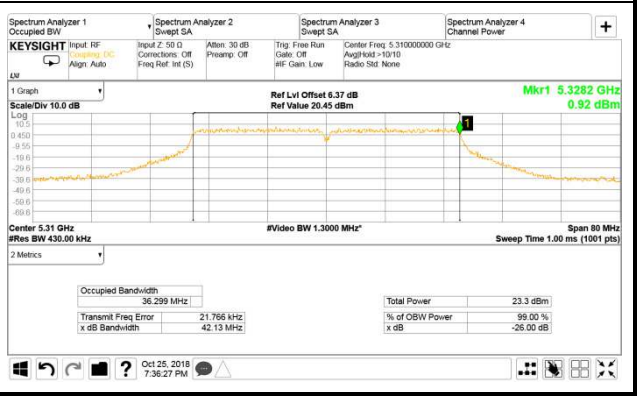
Mode: 802.11n-HT40	
UNII Band I	UNII Band II-2A
	

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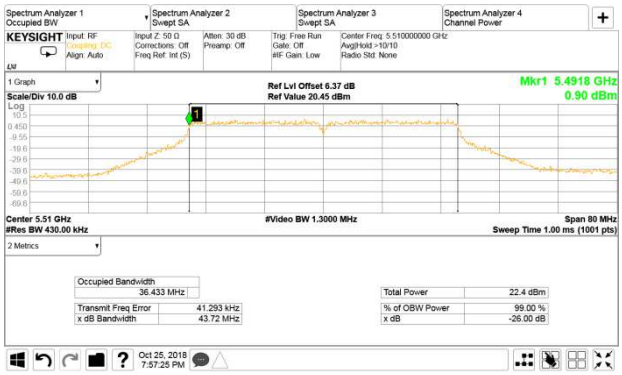
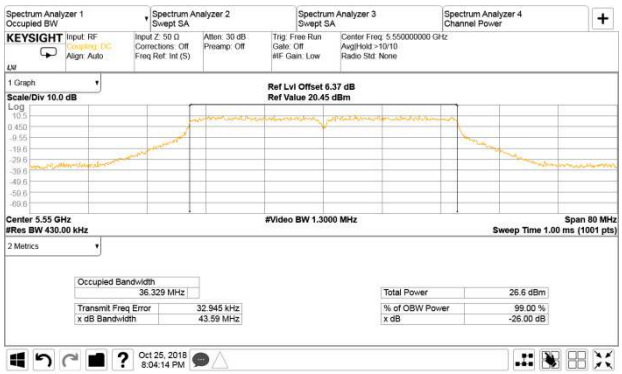
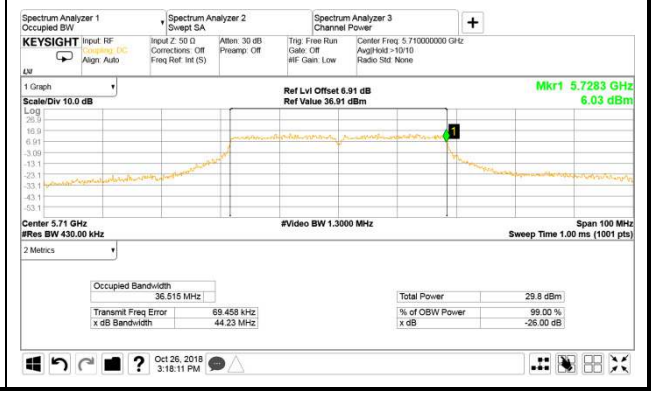
Mode: 802.11n-HT40	
UNII Band II-2C	







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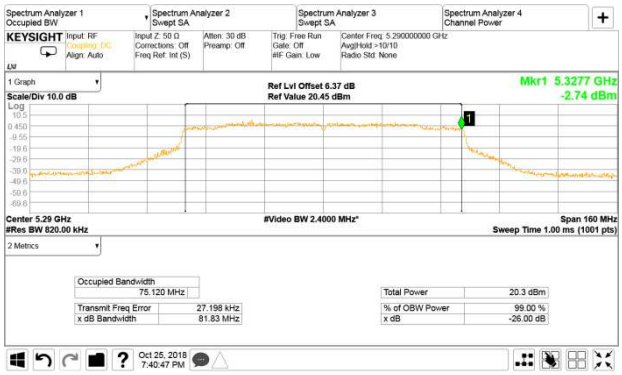
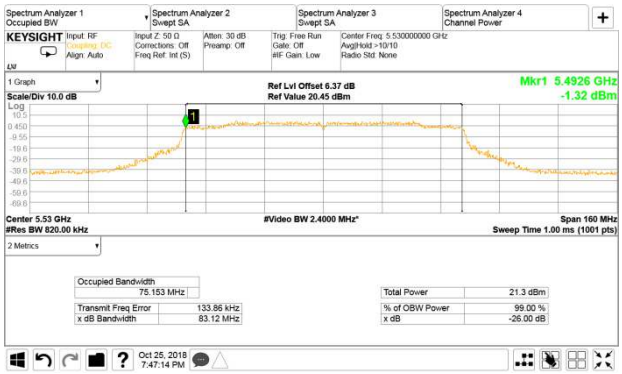
Mode: 802.11ac-VHT80

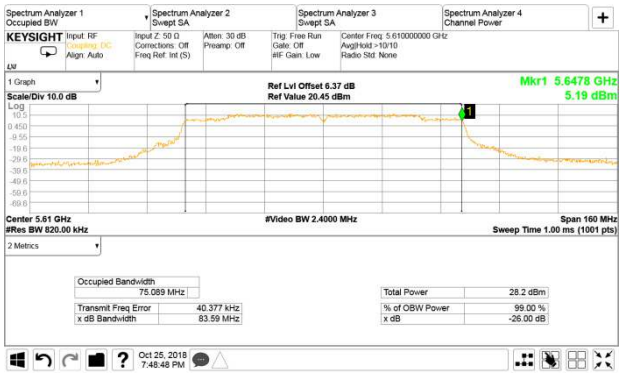
UNII Band I

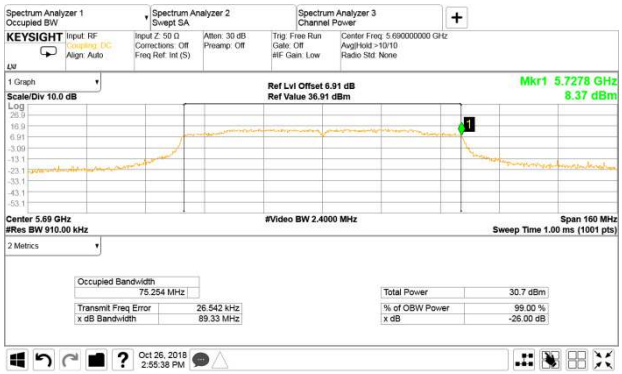
UNII Band II-2A



UNII Band II-2C







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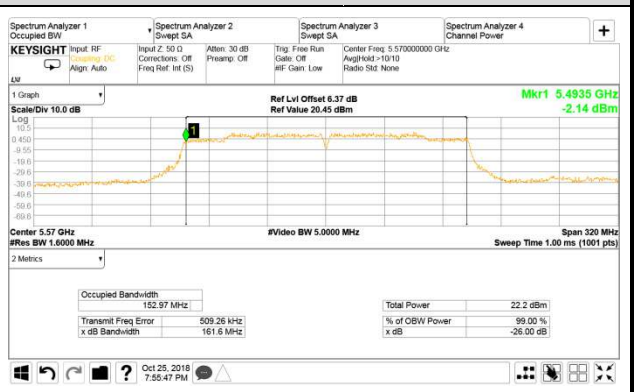
Mode: 802.11ac-VHT160	
UNII Band I	UNII Band II-2C
	

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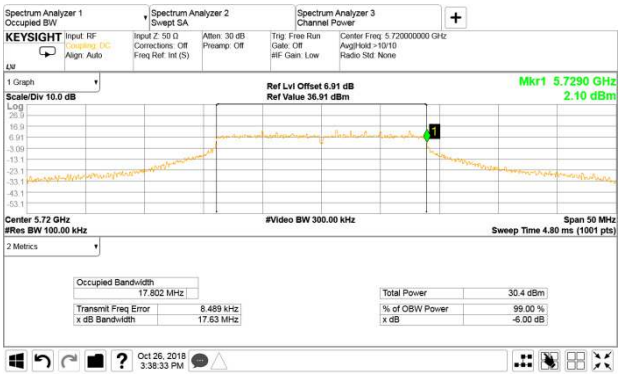
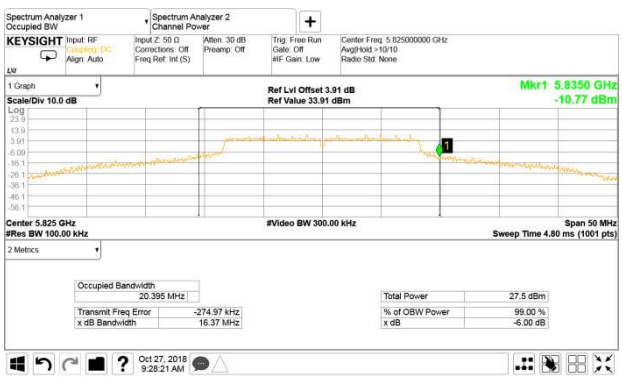
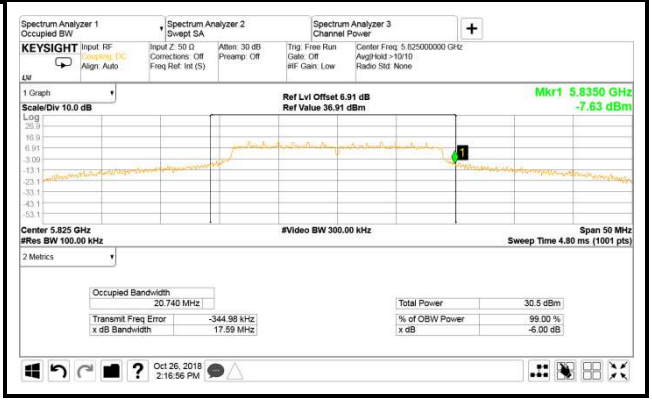
Mode: 802.11a	Mode: 802.11n-HT20
UNII Band III	UNII Band III
	
	
	

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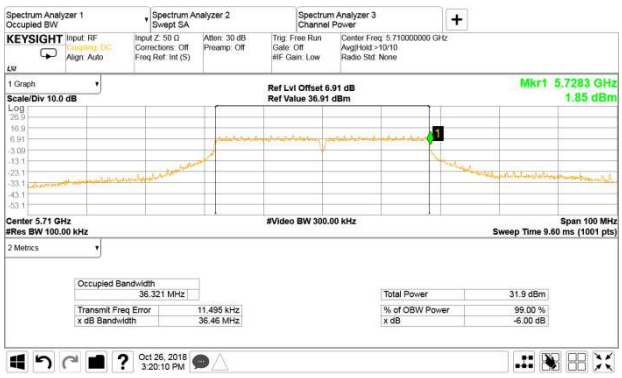
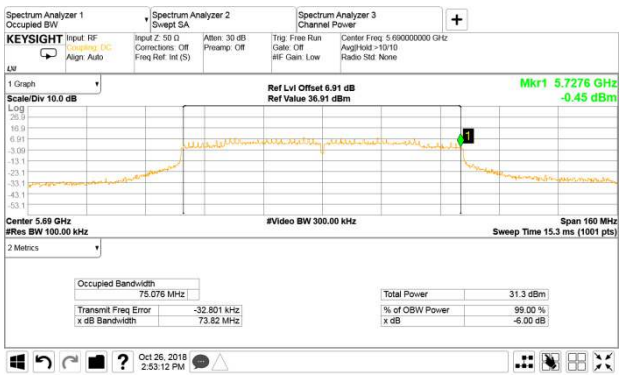
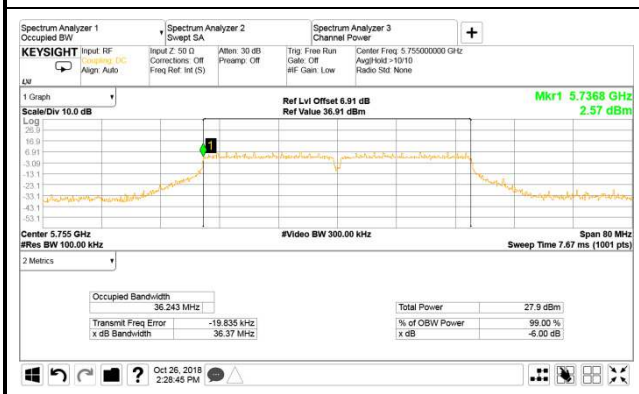
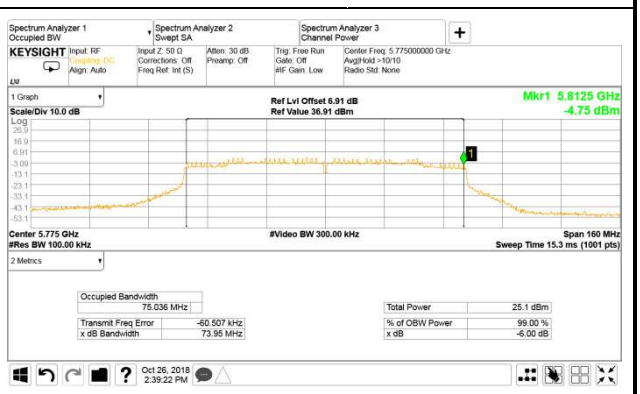
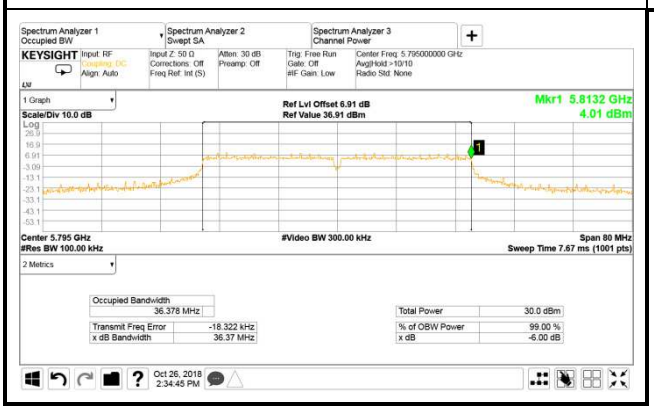
Mode: 802.11n-HT40	Mode: 802.11ac-VHT80
UNII Band III	UNII Band III
	
	
	

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