



FCC RADIO TEST REPORT

Applicant : Ubiquiti Networks, Inc.
Address : 2580 Orchard Parkway, San Jose,
California 95131, United States
Equipment : AmpliFi Router
Model No. : AFi-R-LP, AFi-R
Trade Name : ULABS
FCC ID : SWX-AFR

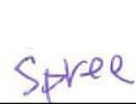
I HEREBY CERTIFY THAT :

The sample was received on Mar. 29, 2016 and the testing was carried out on May 12, 2016 at Cerpass Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of Cerpass Technology Corp., the test report shall not be reproduced except in full.

Approved by:


Ray Chou / Assistant Manager

Tested by:


Spree Yei / Engineer

Laboratory Accreditation:

Cerpass Technology Corporation Test Laboratory





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History of this test report

Report No.	Issue Date	Description
TEFE1511044	May 18, 2016	Original



1. Summary of Test Procedure and Test Results

1.1. Applicable Standards

ANSI C63.4:2014

ANSI C63.10:2013

FCC Rules and Regulations Part 15 Subpart E §15.407

KDB662911

KDB789033

KDB644545

FCC Rule	Description of Test	Result
15.203	. Antenna Requirement	Pass
15.207(a)	. AC Power Line Conducted Emission	Pass
15.407(b) 15.209	. Radiated Spurious Emission	Pass
15.407(a)	. 26 dB Occupied Bandwidth	Pass
15.407	. 6dB Bandwidth	Pass
15.407 (a) & (a)(3)	. Average Power	Pass
15.407(a)	. Output and PPSD	Pass



2. Test Configuration of Equipment under Test

2.1. Feature of Equipment under Test

Modulation Type	DSSS, OFDM, FHSS, GFSK (Bluetooth low energy)
Frequency Range	802.11b/g/n: 2400-2483.5MHz 802.11a/an/ac: 5150-5250MHz, 5725-5850MHz Bluetooth: 2400-2483.5MHz
Data Rate	802.11b: 1, 2, 5.5, 11Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11n: 6.5Mbps to 450Mbps (MCS0 – MCS23, HT20/40) 802.11a: 6, 9, 12, 18, 24, 36, 48, 54Mbps 802.11ac: 13Mbps to 1300Mbps (MCS0 – MCS9, VHT 20/40/80) Bluetooth: 1MHz
Antenna Type	PIFA Antenna
Antenna Gain	802.11b/g/n/a/an/ac: Antenna 0: 4.0 dBi Antenna 1: 4.0 dBi Antenna 2: 4.0 dBi Bluetooth: 1.0 dBi
Adapter	GP-L015-QC Input: 100-240V~ 50/60Hz MAX. 0.5A Output: 5V / 2A or 9V /1.7A or 12V / 1.25A

2.2. The difference of Model No.

Model No.	Difference
AFi-R-LP	Marketing differentiation
AFi-R	



2.3. Carrier Frequency of Channels

Band: 5150MHz-5250MHz

802.11a, 802.11an HT 20, 802.11ac VHT20

Channel	Frequency(MHz)	Channel	Frequency(MHz)
*36	5180	*44	5220
40	5200	*48	5240

802.11an HT 40, 802.11ac VHT40

Channel	Frequency(MHz)	Channel	Frequency(MHz)
*38	5190	*46	5230

802.11ac VHT80

Channel	Frequency(MHz)
*42	5210

Band: 5725MHz -5850MHz

802.11a, 802.11an HT20, 802.11ac VHT20

Channel	Frequency(MHz)	Channel	Frequency(MHz)
*149	5745	161	5805
153	5765	*165	5825
*157	5785		

802.11an HT 40, 802.11ac VHT40

Channel	Frequency(MHz)	Channel	Frequency(MHz)
*151	5755	*159	5795

802.11ac VHT80

Channel	Frequency(MHz)
*155	5775

Note: Channels remarked * are selected to perform test.

2.4. Test Mode and Test Software

- During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
- The complete test system included remote workstation and EUT for RF test. The remote workstation included Notebook.
- An executive program,"Art2_ver_4_9_815" under WIN 7 was executed to transmit and receive data via WLAN.



d. Pre-Scanned RF Power:

Band: 5150MHz - 5250MHz

802.11a mode								
Antenna 0								
Data Rate	6M	9M	12M	18M	24M	36M	48M	54M
Avg. Power Output(dBm)	11.93	11.88	11.72	11.69	11.52	11.44	11.41	11.25
Antenna 1								
Data Rate	6M	9M	12M	18M	24M	36M	48M	54M
Avg. Power Output(dBm)	11.15	11.07	11.01	10.68	10.96	10.88	11.03	10.75
Antenna 2								
Data Rate	6M	9M	12M	18M	24M	36M	48M	54M
Avg. Power Output(dBm)	11.54	11.49	11.36	11.21	11.1	11.18	11.25	11.31

802.11n HT20 mode								
Antenna 0								
Data Rate	MCS 16	MCS 17	MCS 18	MCS 19	MCS 20	MCS 21	MCS 22	MCS 23
Avg. Power Output(dBm)	11.79	11.62	11.51	11.47	11.39	11.34	11.31	11.23
Antenna 1								
Data Rate	MCS 16	MCS 17	MCS 18	MCS 19	MCS 20	MCS 21	MCS 22	MCS 23
Avg. Power Output(dBm)	11.42	11.3	11.17	11.23	11.18	11.26	10.84	10.87
Antenna 2								
Data Rate	MCS 16	MCS 17	MCS 18	MCS 19	MCS 20	MCS 21	MCS 22	MCS 23
Avg. Power Output(dBm)	11.46	11.09	10.77	10.47	10.08	9.62	9.51	9.49

802.11n HT40 mode								
Antenna 0								
Data Rate	MCS 16	MCS 17	MCS 18	MCS 19	MCS 20	MCS 21	MCS 22	MCS 23
Avg. Power Output(dBm)	11.46	11.28	11.39	11.35	11.44	11.46	11.45	11.44
Antenna 1								
Data Rate	MCS 16	MCS 17	MCS 18	MCS 19	MCS 20	MCS 21	MCS 22	MCS 23
Avg. Power Output(dBm)	10.89	10.84	10.59	10.26	10.47	10.25	10.23	10.12
Antenna 2								
Data Rate	MCS 16	MCS 17	MCS 18	MCS 19	MCS 20	MCS 21	MCS 22	MCS 23
Avg. Power Output(dBm)	10.56	10.12	9.65	9.41	9.28	9.16	9.07	9.01



802.11n VHT20 mode									
Antenna 0									
Data Rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
Avg. Power Output (dBm)	10.54	10.47	10.53	10.52	10.48	10.31	10.36	10.49	10.44
Antenna 1									
Data Rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
Avg. Power Output (dBm)	10.89	10.83	10.75	10.72	10.61	10.53	10.69	10.67	10.65
Antenna 2									
Data Rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
Avg. Power Output (dBm)	11.52	11.41	11.22	11.08	10.27	10.36	10.29	10.18	9.98

802.11n VHT40 mode										
Antenna 0										
Data Rate	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Avg. Power Output (dBm)	10.88	10.67	10.68	10.59	10.41	10.38	10.25	10.31	10.19	10.15
Antenna 1										
Data Rate	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Avg. Power Output (dBm)	10.95	10.84	10.69	10.5	10.58	10.46	10.28	10.39	10.35	10.08
Antenna 2										
Data Rate	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Avg. Power Output (dBm)	11.63	11.36	11.25	11.15	10.94	10.62	10.47	10.37	10.19	10.04



802.11n VHT80 mode										
Antenna 0										
Data Rate	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Avg. Power Output (dBm)	9.85	9.71	9.68	9.61	9.74	9.36	9.48	9.33	9.54	9.12
Antenna 1										
Data Rate	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Avg. Power Output (dBm)	9.28	9.26	9.26	9.03	9.01	8.94	8.83	8.71	8.46	8.62
Antenna 2										
Data Rate	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Avg. Power Output (dBm)	10.53	10.12	9.71	9.39	9.29	9.33	9.24	9.25	9.07	9.05

Band: 5725MHz - 5850MHz

802.11a mode									
Antenna 0									
Data Rate	6M	9M	12M	18M	24M	36M	48M	54M	
Avg. Power Output(dBm)	11.97	11.89	11.58	11.69	11.73	11.28	11.44	11.71	
Antenna 1									
Data Rate	6M	9M	12M	18M	24M	36M	48M	54M	
Avg. Power Output(dBm)	11.07	10.58	10.69	10.94	10.83	11.05	11.02	10.64	
Antenna 2									
Data Rate	6M	9M	12M	18M	24M	36M	48M	54M	
Avg. Power Output(dBm)	11.92	11.58	11.69	11.88	11.25	11.36	11.15	11.63	

802.11n HT20 mode									
Antenna 0									
Data Rate	MCS 16	MCS 17	MCS 18	MCS 19	MCS 20	MCS 21	MCS 22	MCS 23	
Avg. Power Output(dBm)	11.36	11.3	11.28	11.2	11.15	11.12	11.1	11.01	
Antenna 1									
Data Rate	MCS 16	MCS 17	MCS 18	MCS 19	MCS 20	MCS 21	MCS 22	MCS 23	
Avg. Power Output(dBm)	11.46	11.35	11.29	11.06	11.08	11.18	11.32	11.43	
Antenna 2									
Data Rate	MCS 16	MCS 17	MCS 18	MCS 19	MCS 20	MCS 21	MCS 22	MCS 23	
Avg. Power Output(dBm)	11.76	11.56	10.82	10.38	10.77	10.66	10.42	10.43	



802.11n HT40 mode								
Antenna 0								
Data Rate	MCS 16	MCS 17	MCS 18	MCS 19	MCS 20	MCS 21	MCS 22	MCS 23
Avg. Power Output(dBm)	11.95	11.45	11.39	11.26	11.46	11.45	11.35	11.28
Antenna 1								
Data Rate	MCS 16	MCS 17	MCS 18	MCS 19	MCS 20	MCS 21	MCS 22	MCS 23
Avg. Power Output(dBm)	11.3	11.02	10.98	10.6	10.94	10.79	10.31	10.68
Antenna 2								
Data Rate	MCS 16	MCS 17	MCS 18	MCS 19	MCS 20	MCS 21	MCS 22	MCS 23
Avg. Power Output(dBm)	11.47	10.82	10.41	10.07	9.85	9.87	9.58	9.63

802.11n VHT20 mode									
Antenna 0									
Data Rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
Avg. Power Output (dBm)	11.78	11.67	11.45	11.49	11.51	11.39	11.58	11.49	11.52
Antenna 1									
Data Rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
Avg. Power Output (dBm)	11.42	11.29	11.32	10.96	10.79	10.83	10.88	10.74	10.59
Antenna 2									
Data Rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
Avg. Power Output (dBm)	12.78	12.48	12.28	12.02	11.74	11.43	11.37	11.14	11.02



802.11n VHT40 mode										
Antenna 0										
Data Rate	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Avg. Power Output (dBm)	10.58	10.36	10.32	10.44	10.47	10.14	10.39	10.52	10.16	10.02
Antenna 1										
Data Rate	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Avg. Power Output (dBm)	10.85	10.74	10.68	10.59	10.5	10.51	10.48	10.35	10.36	10
Antenna 2										
Data Rate	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Avg. Power Output (dBm)	11.64	11.46	11.26	11.12	10.78	10.48	10.34	10.21	10.11	10.08

802.11n VHT80 mode										
Antenna 0										
Data Rate	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Avg. Power Output (dBm)	10.03	9.89	9.68	9.49	9.18	9.36	9.48	9.56	9.26	9.2
Antenna 1										
Data Rate	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Avg. Power Output (dBm)	10.38	10.27	10.19	10.22	9.83	9.77	9.68	10.23	10.18	10.05
Antenna 2										
Data Rate	MCS 0	MCS 1	MCS 2	MCS 3	MCS 4	MCS 5	MCS 6	MCS 7	MCS 8	MCS 9
Avg. Power Output (dBm)	11.24	10.79	10.33	10.06	9.6	9.77	9.47	9.52	9.44	9.45



e. The following test modes were performed for the test:

Test Mode 1. 802.11a (6Mbps)

Test Mode 2. 802.11an HT20 (19.5Mbps)

Test Mode 3. 802.11an HT40 (40.5Mbps)

Test Mode 4. 802.11ac VHT20 (6.5Mbps)

Test Mode 5. 802.11ac VHT40 (13.5Mbps)

Test Mode 6. 802.11ac VHT80 (29.3Mbps)

caused "Test Mode 6" generated the worst case, it was reported as the final data.

2.5. Description of Test System

Device	Manufacturer	Model No.	Description
Remote Workstation			
Notebook	DELL	Vostro 3560	Power Cable, Unshielding, 1.8m

Used cable

Cable	Quantity	Description
RJ45	1	Unshielding, 3.0m



2.6. General Information of Test

Test Site	Cerpass Technology Corporation Test Laboratory Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.) Tel:+886-3-3226-888 Fax:+886-3-3226-881 Address: No.68-1, Shihbachongsi, Shihding Township, New Taipei City 223, Taiwan, R.O.C. Tel: +886-2-2663-8582	
	FCC	TW1079, TW1061, 390316, 228391, 641184
	IC	4934E-1, 4934E-2
	VCCI	T-2205 for Telecommunication Test C-4663 for Conducted emission test R-3428, R-4218 for Radiated emission test G-812, G-813 for radiated disturbance above 1GHz
Frequency Range Investigated:	Conducted: from 150kHz to 30 MHz Radiation: from 30 MHz to 40,000MHz	
Test Distance:	The test distance of radiated emission from antenna to EUT is 3 M.	



3. Test Equipment and Ancillaries Used for Tests

Instrument	Model No.	Manufacturer	Serial No.	Calibration Date	Valid Date
Bilog Antenna	Schwarzbeck	VULB9168	275	2015/09/03	2016/09/02
Active Loop Antenna	EMCO	6507	40855	2016/03/11	2017/03/10
Horn Antenna	EMCO	3115	31601	2015/09/02	2016/09/01
Horn Antenna	EMCO	3116	31974	2015/09/07	2016/09/06
EXA Signal Analyzer	KEYSIGHT	N9010A	MY54200207	2016/03/16	2017/03/15
Preamplifier	EM	EM330	060660	2016/03/16	2017/03/15
Preamplifier	Agilent	8449B	3008A01954	2016/03/04	2017/03/03
Preamplifier	MITEQ	AMF-7D-001 0100-30-10P	1860212	2016/03/16	2017/03/15
Preamplifier	EMC INSTRUMENTS	EMC184045	980065	2015/11/04	2016/11/03
Signal Generator	KEYSIGHT	83640A	2927A00107	2015/09/01	2016/08/31
MXG MW Analog Signal Generator	KEYSIGHT	N5183A	MY50142931	2016/03/18	2017/03/17
MXG-B RF Vector Signal Generator	KEYSIGHT	N5182B	MY53051383	2016/03/18	2017/03/17
BLUETOOTH TESTER	R&S	CBT	101133	2016/03/18	2017/03/17
Attenuator	KEYSIGHT	8491B	MY39250703	2016/03/07	2017/03/06
Rotary Attenuator	Agilent	8494B	MY42154466	2016/03/08	2017/03/07
Rotary Attenuator	Agilent	8495B	MY42146680	2016/03/08	2017/03/07
Temp & Humi chamber	T-MACHINE	TMJ-9712	T-12-040111	2015/09/08	2016/09/07
Series Power Meter	Anritsu	ML2495A	1224005	2016/03/03	2017/03/02
Power Sensor	Anritsu	MA2411B	1207295	2016/03/03	2017/03/02
USB Average Power Sensor	Theda	4PS6A	TW5451013~16	2014/11/08	2016/11/07



4. Antenna Requirements

4.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

4.2. Antenna Construction and Directional Gain

Antenna Type	Antenna Gain
PIFA Antenna	Antenna 0: 4.0 dBi
	Antenna 1: 4.0 dBi
	Antenna 2: 4.0 dBi

$$\begin{aligned}\text{Directional gain} &= G_{\text{ant}} + 10\log(N) \text{ dBi} \\ &= 4 + 10\log(3) \\ &= 8.77 \text{ (dBi)}\end{aligned}$$



5. Test of AC Power Line Conducted Emission

5.1. Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 120 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-2009 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 2.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

Frequency (MHz)	Quasi Peak (dB μ V)	Average (dB μ V)
0.15 – 0.5	66-56*	56-46*
0.5 – 5.0	56	46
5.0 – 30.0	60	50

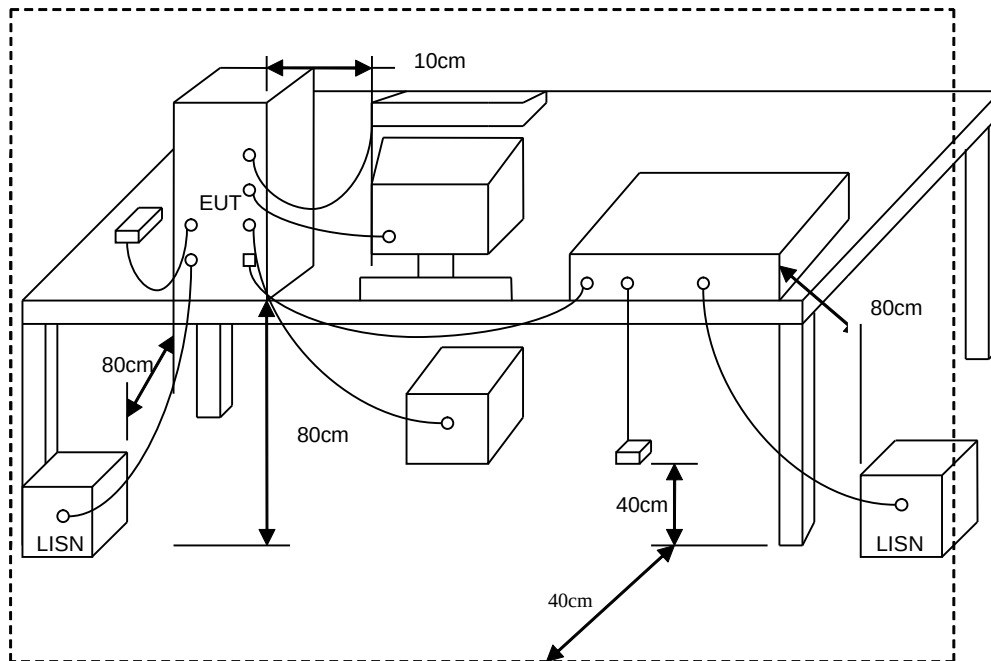
*Decreases with the logarithm of the frequency.

5.2. Test Procedures

- The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- Connect EUT to the power mains through a line impedance stabilization network (LISN).
- All the support units are connecting to the other LISN.
- The LISN provides 50 ohm coupling impedance for the measuring instrument.
- The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



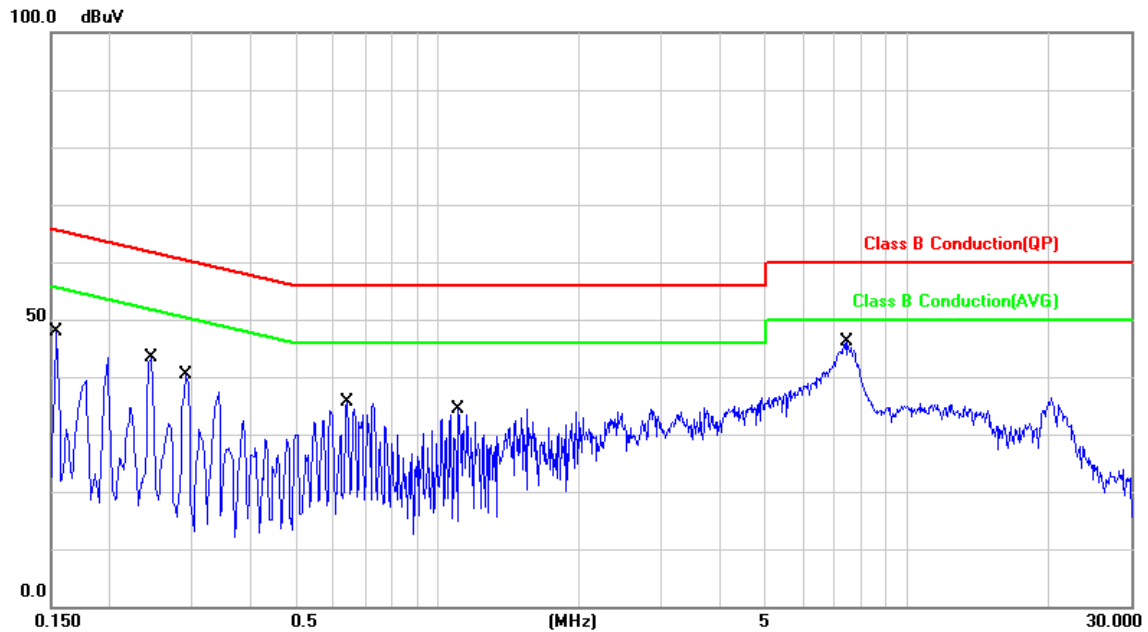
5.3. Typical Test Setup





5.4. Test Result and Data

Power	: AC 120V	Pol/Phase	: LINE
Test Mode	: Mode 6	Temperature	: 26 °C
Test date	: Apr. 05, 2016	Humidity	: 48 %
Memo	: CH42	Atmospheric Pressure	: 1008 hPa



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1539	9.99	34.93	44.92	65.78	-20.86	QP	P
2	0.1539	9.99	18.23	28.22	55.78	-27.56	AVG	P
3	0.2460	10.01	31.09	41.10	61.89	-20.79	QP	P
4	0.2460	10.01	16.37	26.38	51.89	-25.51	AVG	P
5	0.2900	10.01	26.85	36.86	60.52	-23.66	QP	P
6	0.2900	10.01	12.60	22.61	50.52	-27.91	AVG	P
7	0.6419	10.04	23.61	33.65	56.00	-22.35	QP	P
8	0.6419	10.04	14.76	24.80	46.00	-21.20	AVG	P
9	1.1100	10.04	21.94	31.98	56.00	-24.02	QP	P
10	1.1100	10.04	14.40	24.44	46.00	-21.56	AVG	P
11	7.4700	10.32	31.54	41.86	60.00	-18.14	QP	P
12	7.4700	10.32	20.67	30.99	50.00	-19.01	AVG	P

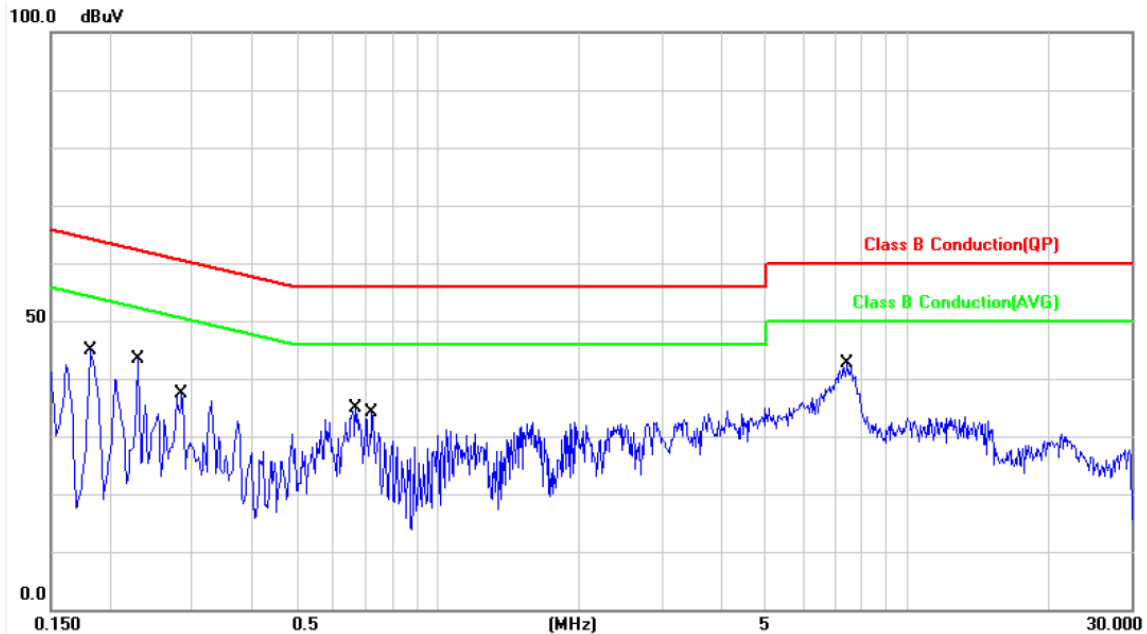
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC, or Current Probe) Factor + Cable Loss + Attenuator



Power	: AC 120V	Pol/Phase	: NEUTRAL
Test Mode	: Mode 6	Temperature	: 26 °C
Test date	: Apr. 05, 2016	Humidity	: 48 %
Memo	: CH42	Atmospheric Pressure	: 1008 hPa



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1819	9.98	34.15	44.13	64.39	-20.26	QP	P
2	0.1819	9.98	19.30	29.28	54.39	-25.11	AVG	P
3	0.2300	9.97	28.10	38.07	62.45	-24.38	QP	P
4	0.2300	9.97	13.03	23.00	52.45	-29.45	AVG	P
5	0.2860	9.97	23.95	33.92	60.64	-26.72	QP	P
6	0.2860	9.97	10.51	20.48	50.64	-30.16	AVG	P
7	0.6700	10.00	19.28	29.28	56.00	-26.72	QP	P
8	0.6700	10.00	14.53	24.53	46.00	-21.47	AVG	P
9	0.7260	10.00	20.88	30.88	56.00	-25.12	QP	P
10	0.7260	10.00	15.74	25.74	46.00	-20.26	AVG	P
11	7.4660	10.35	32.30	42.65	60.00	-17.35	QP	P
12	7.4660	10.35	26.60	36.95	50.00	-13.05	AVG	P

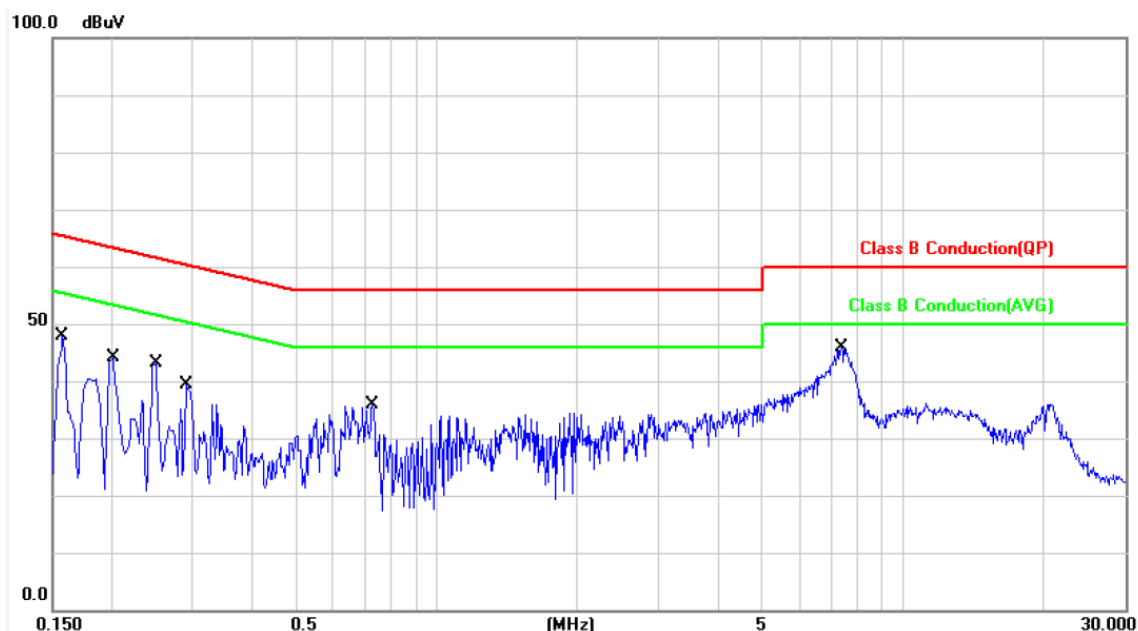
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC, or Current Probe) Factor + Cable Loss + Attenuator



Power	: AC 120V	Pol/Phase	: LINE
Test Mode	: Mode 6	Temperature	: 26 °C
Test date	: Apr. 05, 2016	Humidity	: 48 %
Memo	: CH155	Atmospheric Pressure	: 1008 hPa



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1582	9.99	36.14	46.13	65.55	-19.42	QP	P
2	0.1582	9.99	19.55	29.54	55.55	-26.01	AVG	P
3	0.2020	10.00	32.67	42.67	63.52	-20.85	QP	P
4	0.2020	10.00	17.21	27.21	53.52	-26.31	AVG	P
5	0.2500	10.01	29.54	39.55	61.75	-22.20	QP	P
6	0.2500	10.01	14.44	24.45	51.75	-27.30	AVG	P
7	0.2900	10.01	26.40	36.41	60.52	-24.11	QP	P
8	0.2900	10.01	12.48	22.49	50.52	-28.03	AVG	P
9	0.7300	10.04	23.28	33.32	56.00	-22.68	QP	P
10	0.7300	10.04	16.10	26.14	46.00	-19.86	AVG	P
11	7.3980	10.32	34.02	44.34	60.00	-15.66	QP	P
12	7.3980	10.32	24.21	34.53	50.00	-15.47	AVG	P

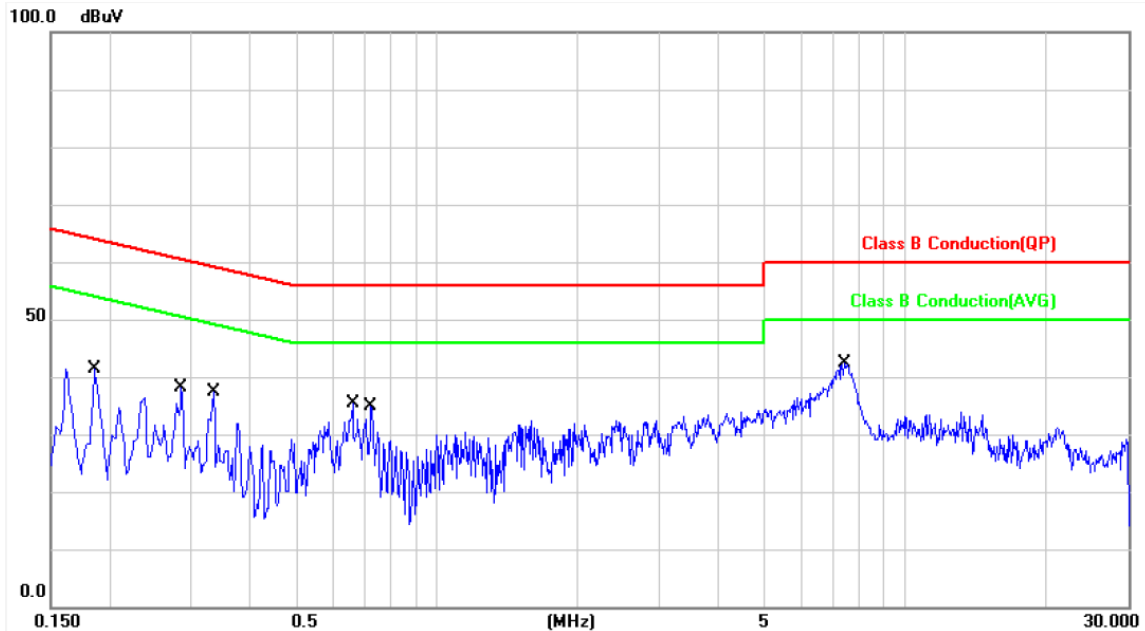
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC, or Current Probe) Factor + Cable Loss + Attenuator



Power	: AC 120V	Pol/Phase	: NEUTRAL
Test Mode	: Mode 6	Temperature	: 26 °C
Test date	: Apr. 05, 2016	Humidity	: 48 %
Memo	: CH155	Atmospheric Pressure	: 1008 hPa



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1860	9.98	27.30	37.28	64.21	-26.93	QP	P
2	0.1860	9.98	11.62	21.60	54.21	-32.61	AVG	P
3	0.2860	9.97	23.56	33.53	60.64	-27.11	QP	P
4	0.2860	9.97	10.49	20.46	50.64	-30.18	AVG	P
5	0.3339	9.98	23.95	33.93	59.35	-25.42	QP	P
6	0.3339	9.98	12.89	22.87	49.35	-26.48	AVG	P
7	0.6620	10.00	24.30	34.30	56.00	-21.70	QP	P
8	0.6620	10.00	20.34	30.34	46.00	-15.66	AVG	P
9	0.7260	10.00	21.21	31.21	56.00	-24.79	QP	P
10	0.7260	10.00	16.04	26.04	46.00	-19.96	AVG	P
11	7.4220	10.34	30.31	40.65	60.00	-19.35	QP	P
12	7.4220	10.34	26.02	36.36	50.00	-13.64	AVG	P

Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC, or Current Probe) Factor + Cable Loss + Attenuator



6. Test of Spurious Emission (Radiated)

6.1. Test Limit

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
- (6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.
- (7) The provisions of §15.205 apply to intentional radiators operating under this section.
- (8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

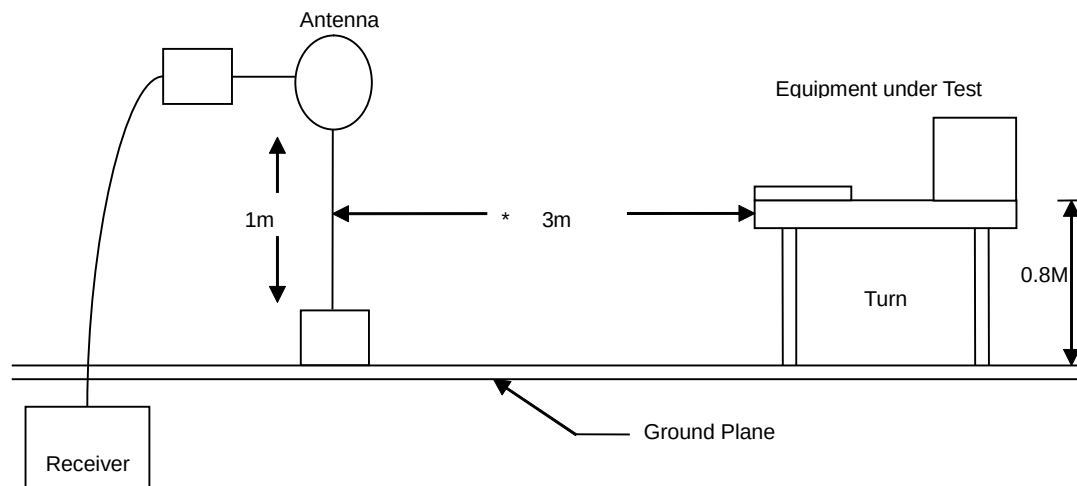
6.2. Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- i. "Cone of radiation" has been considered to be 3dB bandwidth of the measurement antenna.

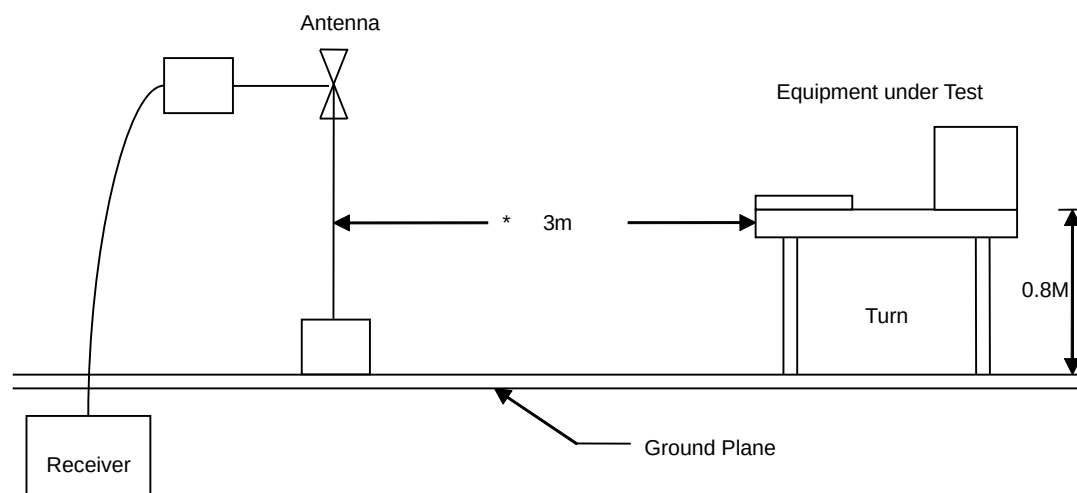


6.3. Typical Test Setup

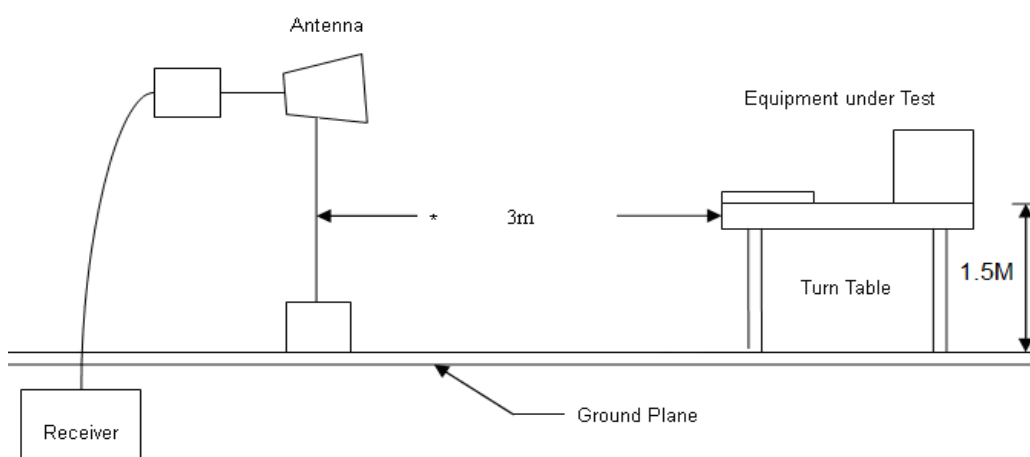
Below 30MHz test setup



30MHz- 1GHz Test Setup



Above 1GHz Test Setup



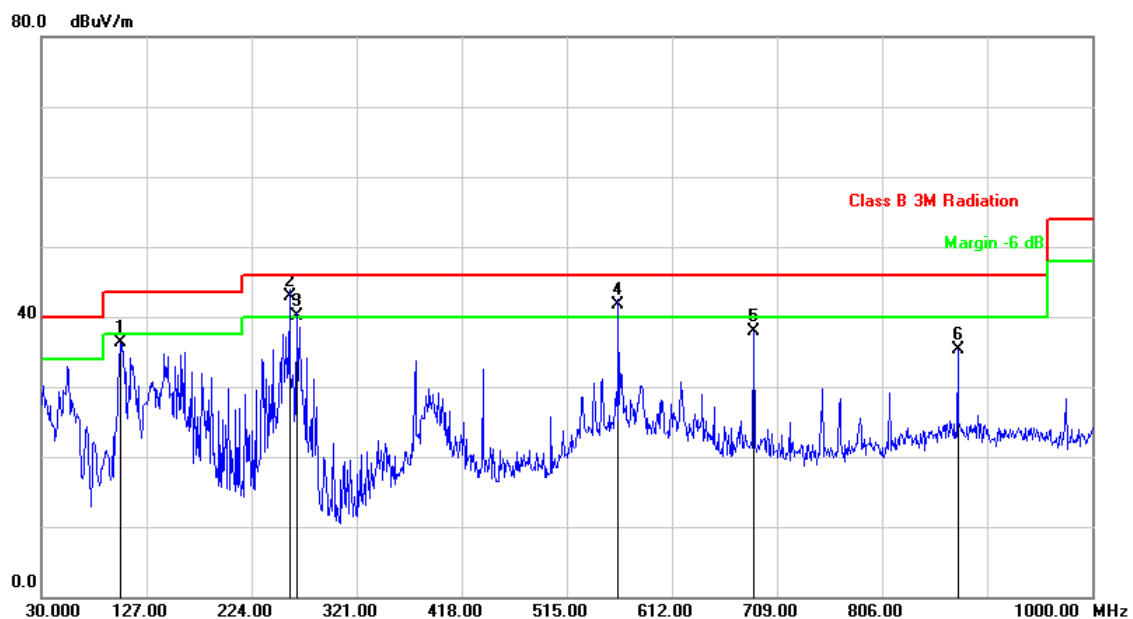


6.4. Test Result and Data (9kHz ~ 30MHz)

The 9kHz - 30MHz spurious emission is under limit 20dB more.

6.5. Test Result and Data (30MHz ~ 1GHz)

Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Mode 6	Temperature	: 22.3 °C
Test Date	: Mar. 29, 2016	Humidity	: 49 %
Memo	: CH 42	Atmospheric Pressure	: 1008 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	102.7500	-20.64	56.87	36.23	43.50	-7.27	peak	100	0	P
2	258.9200	-16.52	59.51	42.99	46.00	-3.01	QP	100	157	P
3	265.7100	-16.20	56.21	40.01	46.00	-5.99	QP	100	169	P
4	562.5300	-8.83	50.50	41.67	46.00	-4.33	QP	100	187	P
5	687.6599	-6.67	44.55	37.88	46.00	-8.12	peak	100	0	P
6	875.8400	-3.80	39.16	35.36	46.00	-10.64	peak	100	0	P

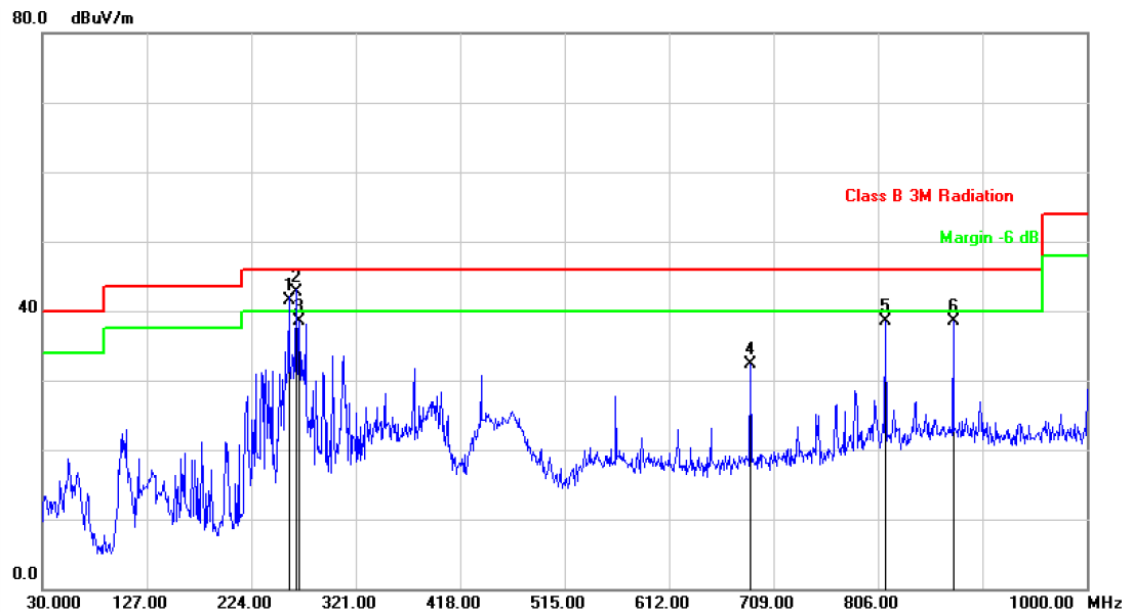
Note: Level = Reading + Factor

Margin = Level - Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 6	Temperature	: 22.3 °C
Test Date	: Mar. 29, 2016	Humidity	: 49 %
Memo	: CH 42	Atmospheric Pressure	: 1008 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	258.9200	-16.52	58.10	41.58	46.00	-4.42	QP	100	177	P
2	265.7100	-16.20	58.87	42.67	46.00	-3.33	QP	100	186	P
3	268.6200	-16.06	54.54	38.48	46.00	-7.52	peak	200	0	P
4	687.6599	-6.67	39.06	32.39	46.00	-13.61	peak	200	0	P
5	812.7900	-4.86	43.40	38.54	46.00	-7.46	peak	200	0	P
6	875.8400	-3.80	42.22	38.42	46.00	-7.58	peak	200	0	P

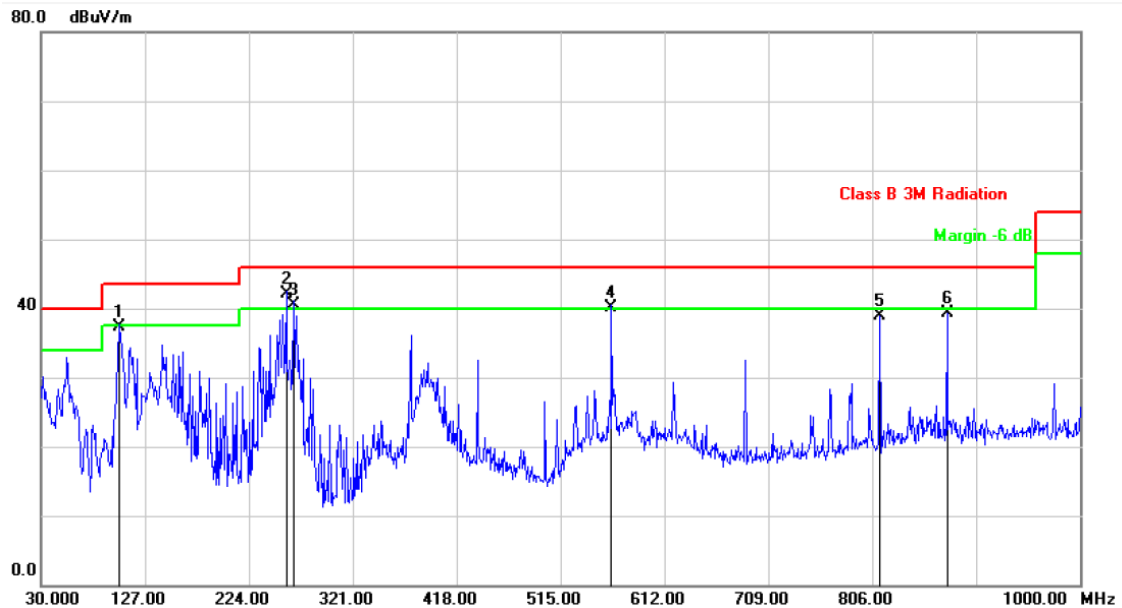
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Mode 6	Temperature	: 22.3 °C
Test Date	: Mar. 29, 2016	Humidity	: 49 %
Memo	: CH 155	Atmospheric Pressure	: 1008 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	102.7500	-20.64	57.89	37.25	43.50	-6.25	QP	100	112	P
2	258.9200	-16.52	58.55	42.03	46.00	-3.97	QP	100	184	P
3	265.7100	-16.20	56.78	40.58	46.00	-5.42	QP	100	169	P
4	562.5300	-8.83	48.85	40.02	46.00	-5.98	QP	100	177	P
5	812.7900	-4.86	43.81	38.95	46.00	-7.05	peak	100	0	P
6	875.8400	-3.80	43.20	39.40	46.00	-6.60	peak	100	0	P

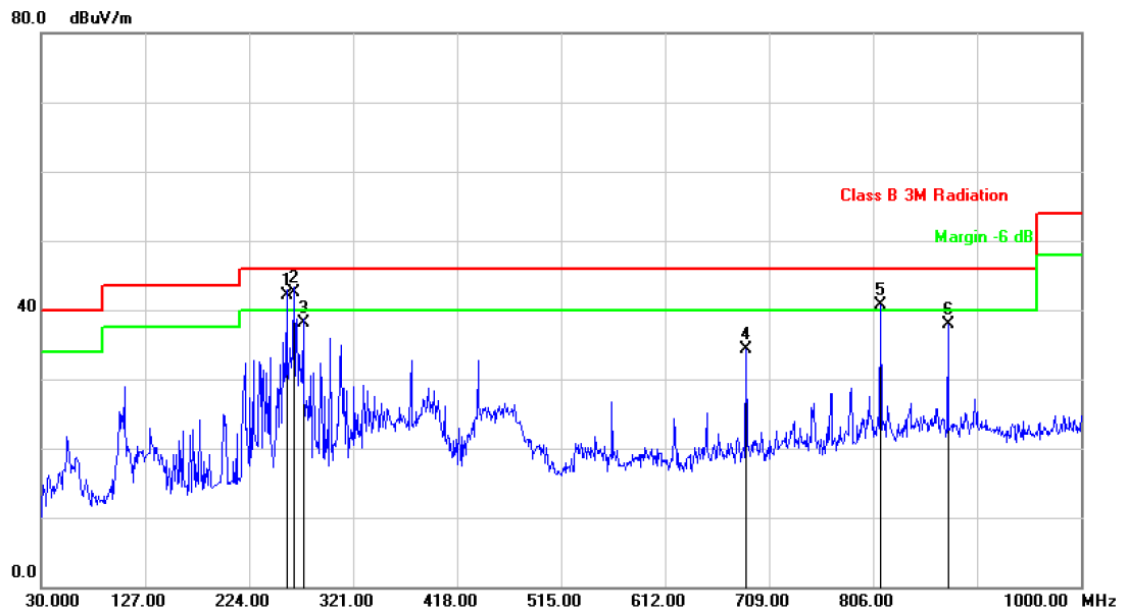
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 6	Temperature	: 22.3 °C
Test Date	: Mar. 29, 2016	Humidity	: 49 %
Memo	: CH 155	Atmospheric Pressure	: 1008 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	258.9200	-16.52	58.65	42.13	46.00	-3.87	QP	100	0	P
2	265.7100	-16.20	58.77	42.57	46.00	-3.43	QP	100	0	P
3	274.4400	-15.85	53.89	38.04	46.00	-7.96	QP	200	0	P
4	687.6599	-6.67	41.07	34.40	46.00	-11.60	peak	200	0	P
5	812.7900	-4.86	45.50	40.64	46.00	-5.36	peak	100	0	P
6	875.8400	-3.80	41.63	37.83	46.00	-8.17	peak	200	0	P

Note: Level = Reading + Factor

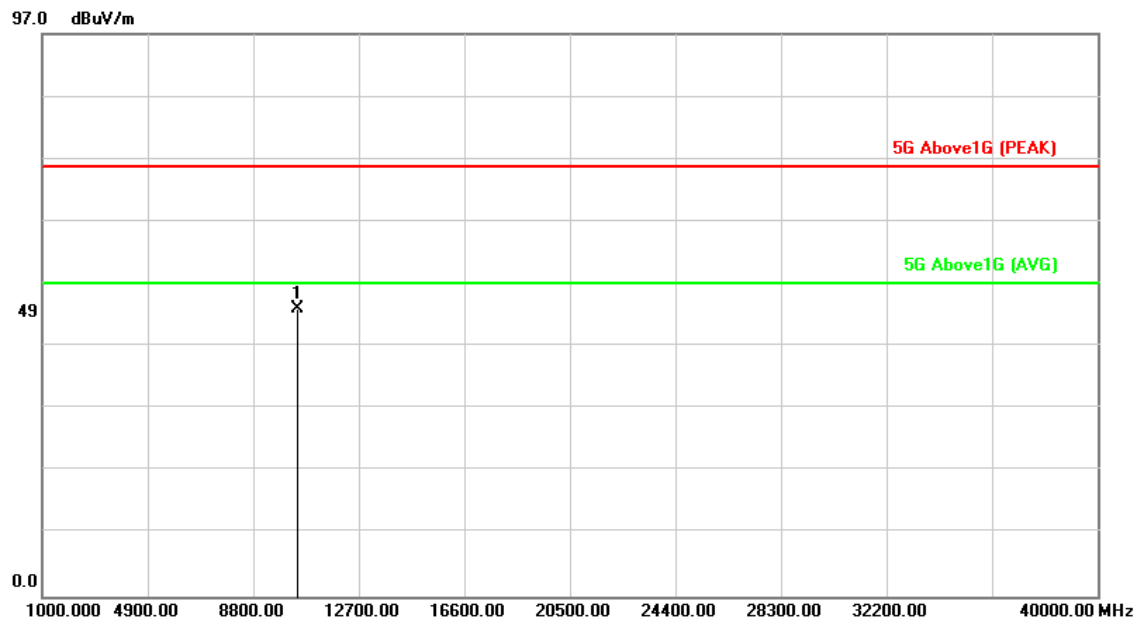
Margin = Level - Limit

Factor = Antenna Factor + Cable Loss - Amplifier Factor



6.6. Test Result and Data (1GHz ~ 40GHz)

Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Mode 6	Temperature	: 21 °C
Test Date	: Apr. 09, 2016	Humidity	: 53 %
Memo	: CH 42	Atmospheric Pressure	: 1008 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	10420.000	-8.66	58.34	49.68	74.00	-24.32	peak	400	0	P

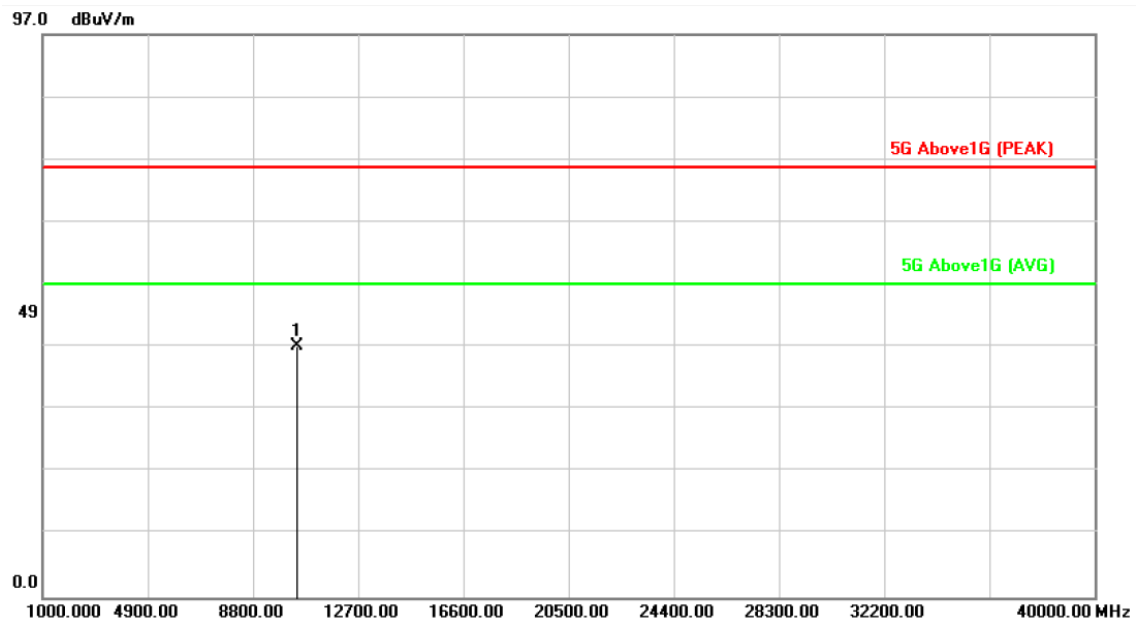
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 6	Temperature	: 21 °C
Test Date	: Apr. 09, 2016	Humidity	: 53 %
Memo	: CH 42	Atmospheric Pressure	: 1008 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	10420.000	-8.66	51.95	43.29	74.00	-30.71	peak	100	0	P

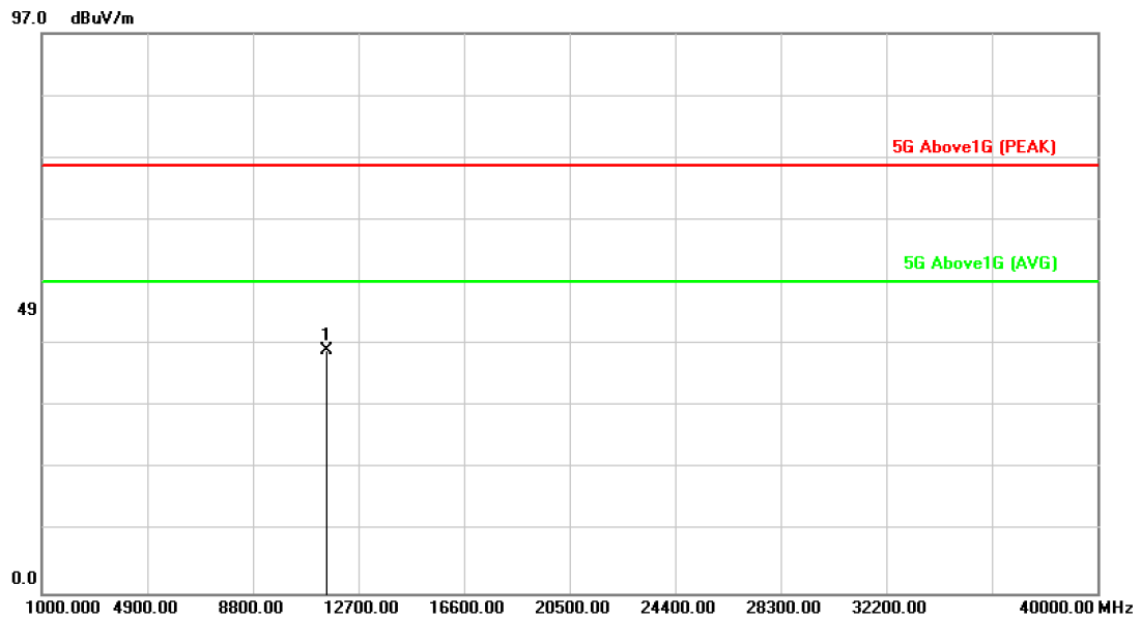
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: VERTICAL
Test Mode	: Mode 6	Temperature	: 21 °C
Test Date	: Apr. 09, 2016	Humidity	: 53 %
Memo	: CH 155	Atmospheric Pressure	: 1008 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	11550.000	-4.88	47.01	42.13	74.00	-31.87	peak	400	0	P

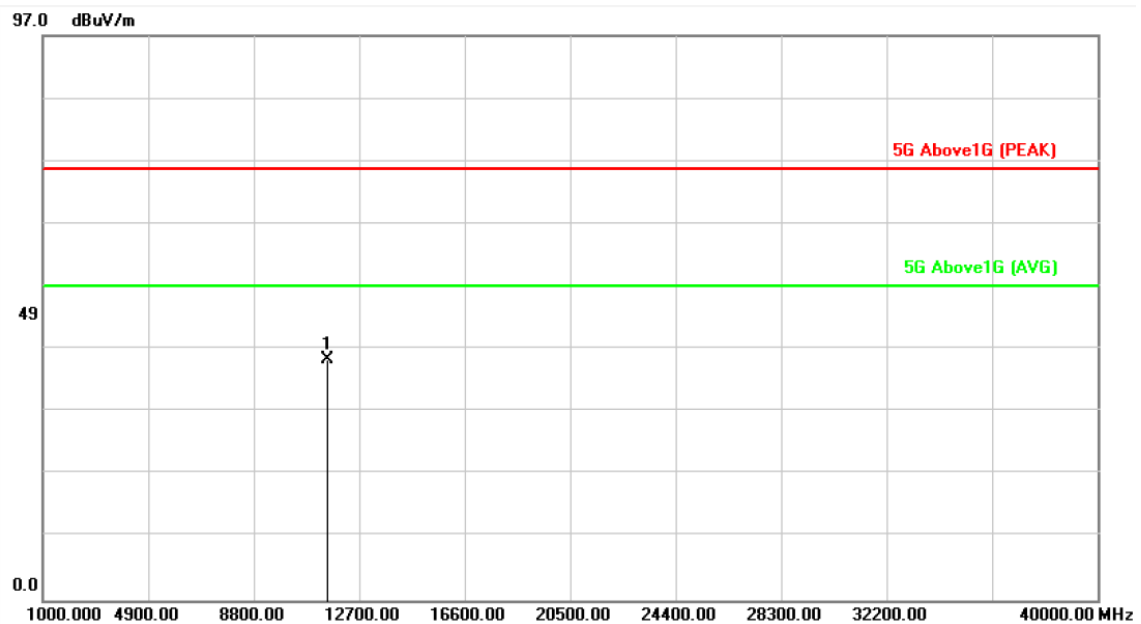
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



Power	: AC 120V	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 6	Temperature	: 21 °C
Test Date	: Apr. 09, 2016	Humidity	: 53 %
Memo	: CH 155	Atmospheric Pressure	: 1008 hpa



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (°)	P/F
1	11550.000	-4.88	46.16	41.28	74.00	-32.72	peak	100	0	P

Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



6.7. Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.09000 – 0.11000	16.42000 – 16.42300	399.9 – 410.0	4.500 – 5.150
0.49500 – 0.505**	16.69475 – 16.69525	608.0 – 614.0	5.350 – 5.460
2.17350 – 2.19050	16.80425 – 16.80475	960.0 – 1240.0	7.250 – 7.750
4.12500 – 4.12800	25.50000 – 25.67000	1300.0 – 1427.0	8.025 – 8.500
4.17725 – 4.17775	37.50000 – 38.25000	1435.0 – 1626.5	9.000 – 9.200
4.20725 – 4.20775	73.00000 – 74.60000	1645.5 – 1646.5	9.300 – 9.500
6.21500 – 6.21800	74.80000 – 75.20000	1660.0 – 1710.0	10.600 – 12.700
6.26775 – 6.26825	108.00000 – 121.94000	1718.8 – 1722.2	13.250 – 13.400
6.31175 – 6.31225	123.00000 – 138.00000	2200.0 – 2300.0	14.470 – 14.500
8.29100 – 8.29400	149.90000 – 150.05000	2310.0 – 2390.0	15.350 – 16.200
8.36200 – 8.36600	156.52475 – 156.52525	2483.5 – 2500.0	17.700 – 21.400
8.37625 – 8.38675	156.70000 – 156.90000	2655.0 – 2900.0	22.010 – 23.120
8.41425 – 8.41475	162.01250 – 167.17000	3260.0 – 3267.0	23.600 – 24.000
12.29000 – 12.29300	167.72000 – 173.20000	3332.0 – 3339.0	31.200 – 31.800
12.51975 – 12.52025	240.00000 – 285.00000	3345.8 – 3358.0	36.430 – 36.500
12.57675 – 12.57725	322.00000 – 335.40000	3600.0 – 4400.0	Above 38.6
13.36000 – 13.41000			

** : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

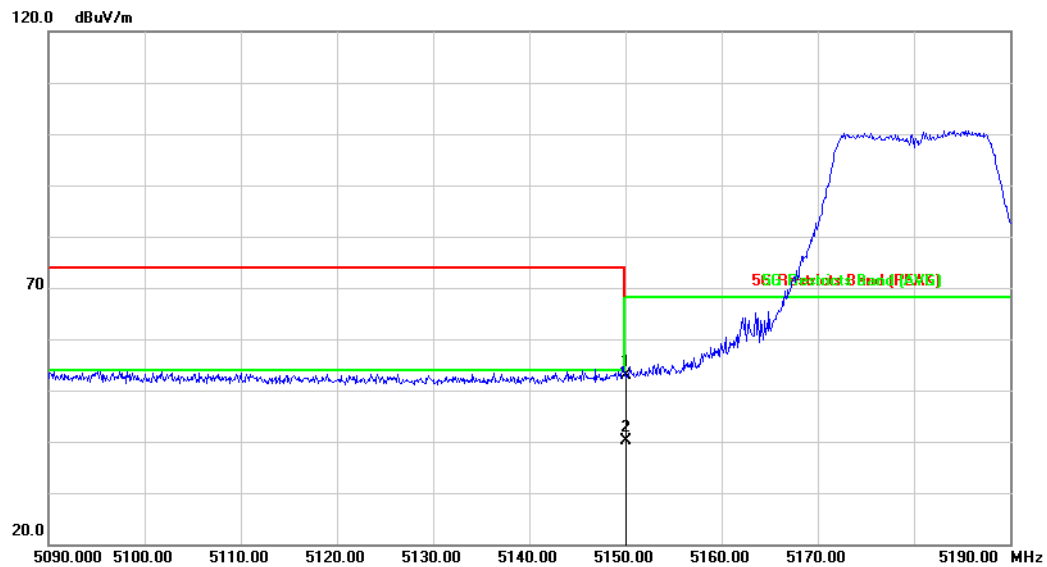


6.8. Restrict Band Emission and Band Edges Measurement Data

Antenna 0+1+2

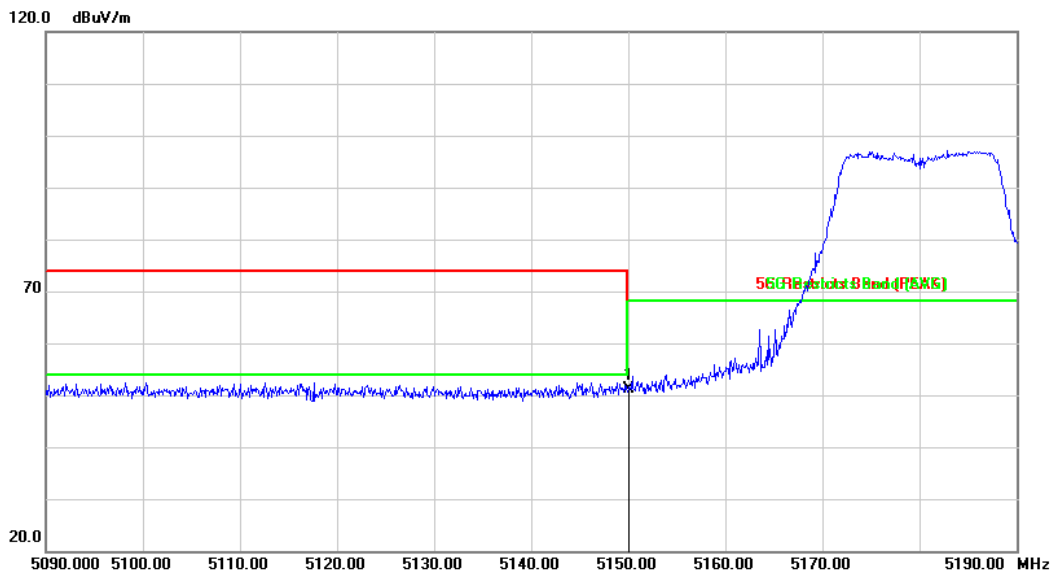
Modulation Standard: 802.11a (6Mbps), Pol/Phase: Vertical

Channel: 36



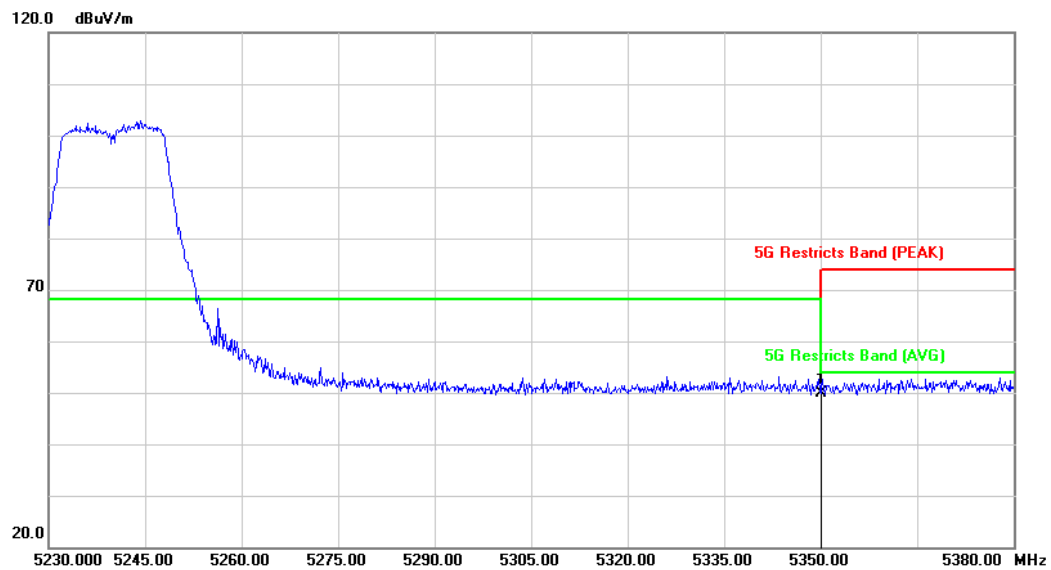
Modulation Standard: 802.11a (6Mbps), Pol/Phase: Horizontal

Channel: 36

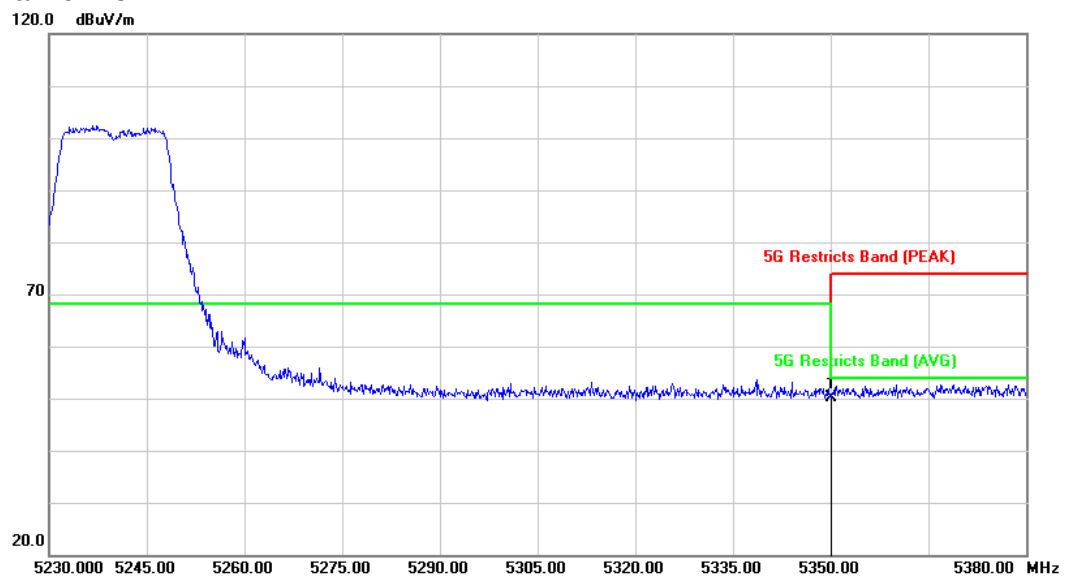




Modulation Standard: 802.11a (6Mbps), Pol/Phase: Vertical
Channel: 48

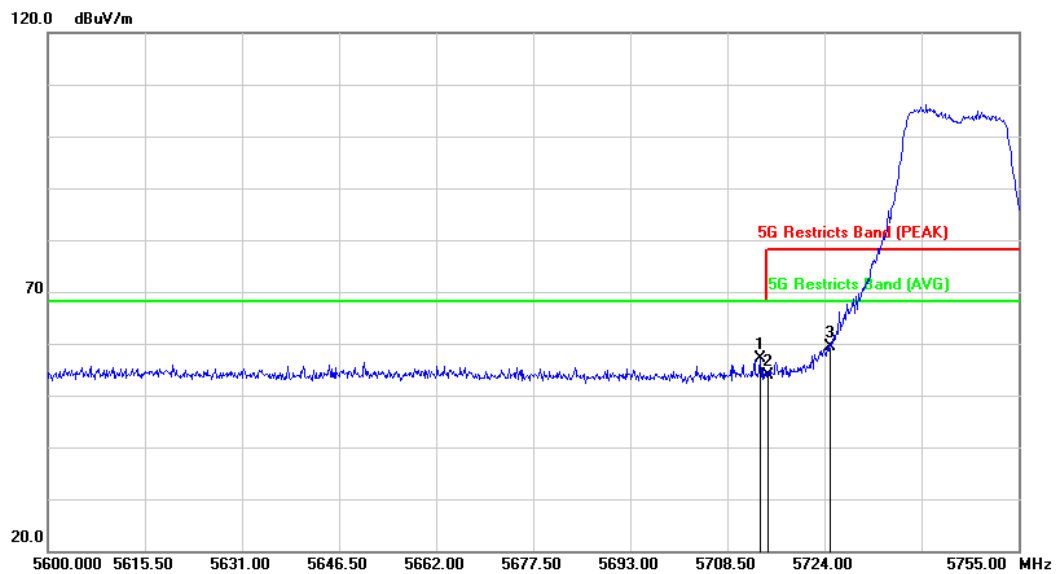


Modulation Standard: 802.11a (6Mbps), Pol/Phase: Horizontal
Channel: 48

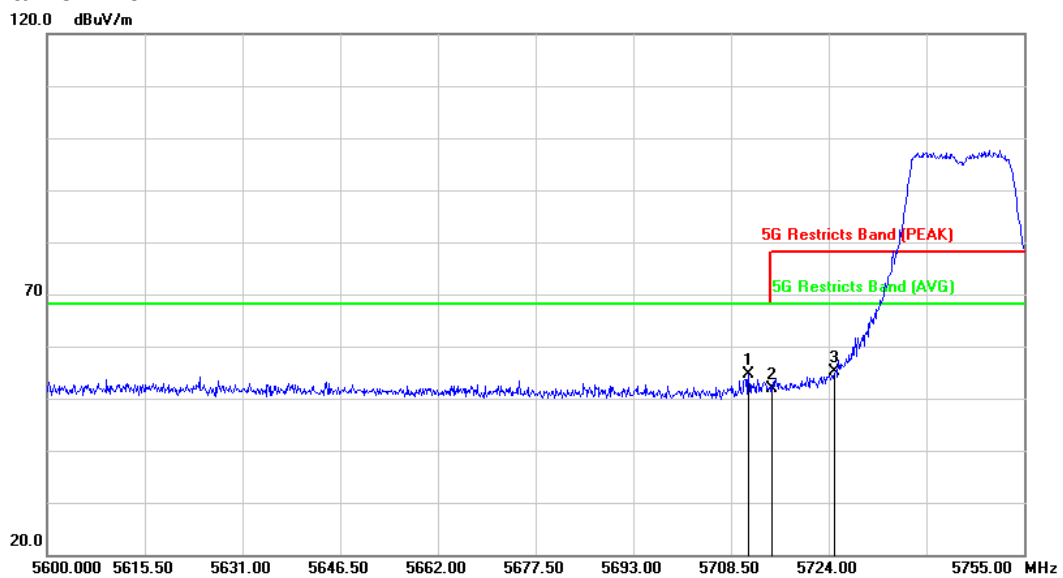




Modulation Standard: 802.11a (6Mbps), Pol/Phase: Vertical
Channel: 149

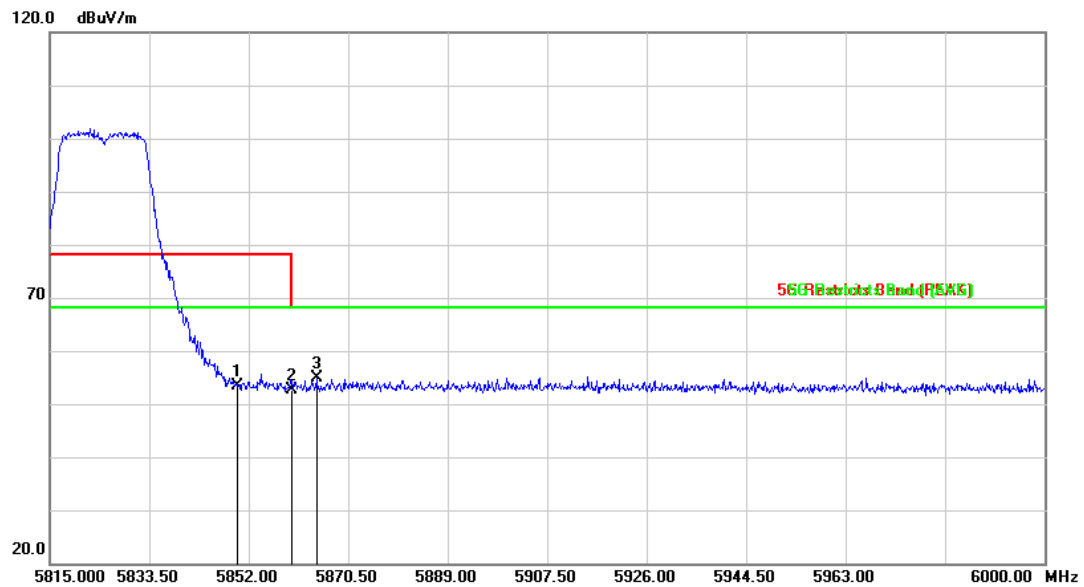


Modulation Standard: 802.11a (6Mbps), Pol/Phase: Horizontal
Channel: 149

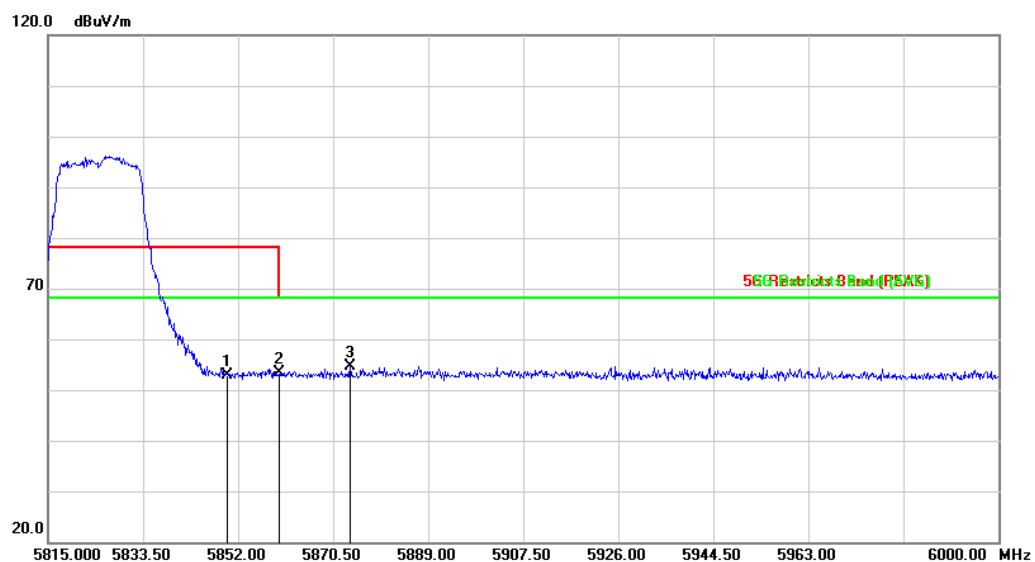




Modulation Standard: 802.11a (6Mbps), Pol/Phase: Vertical
Channel: 165

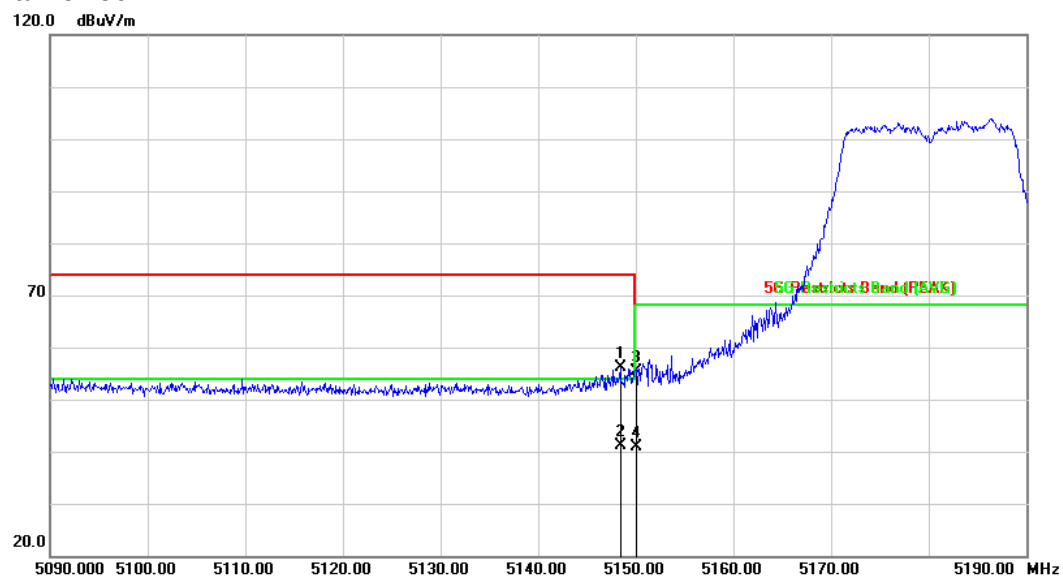


Modulation Standard: 802.11a (6Mbps), Pol/Phase: Horizontal
Channel: 165

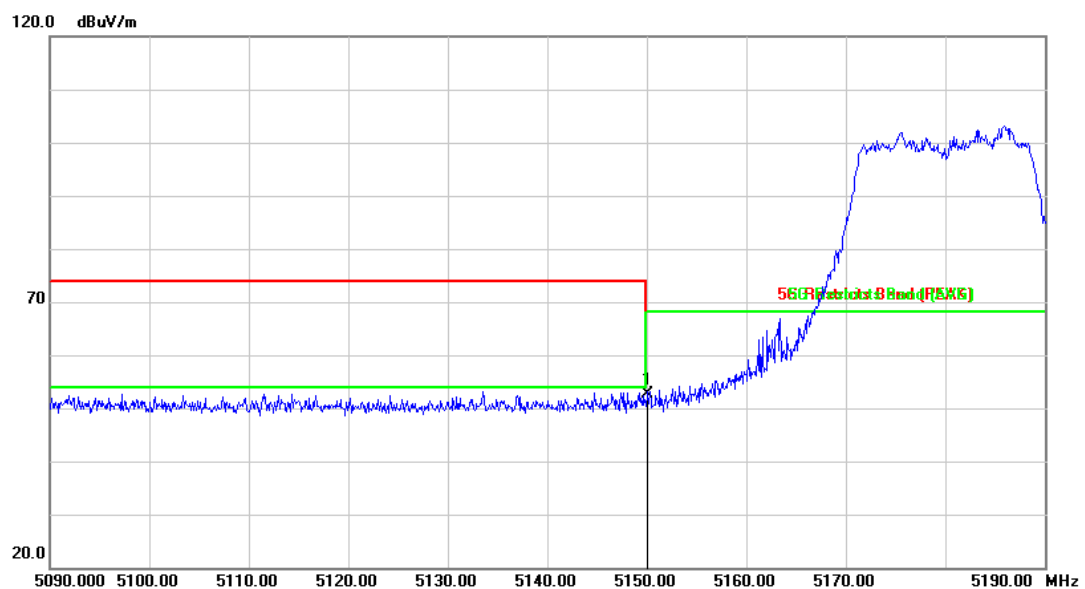




Modulation Standard: 802.11an HT20 (19.5Mbps), Pol/Phase: Vertical
Channel: 36

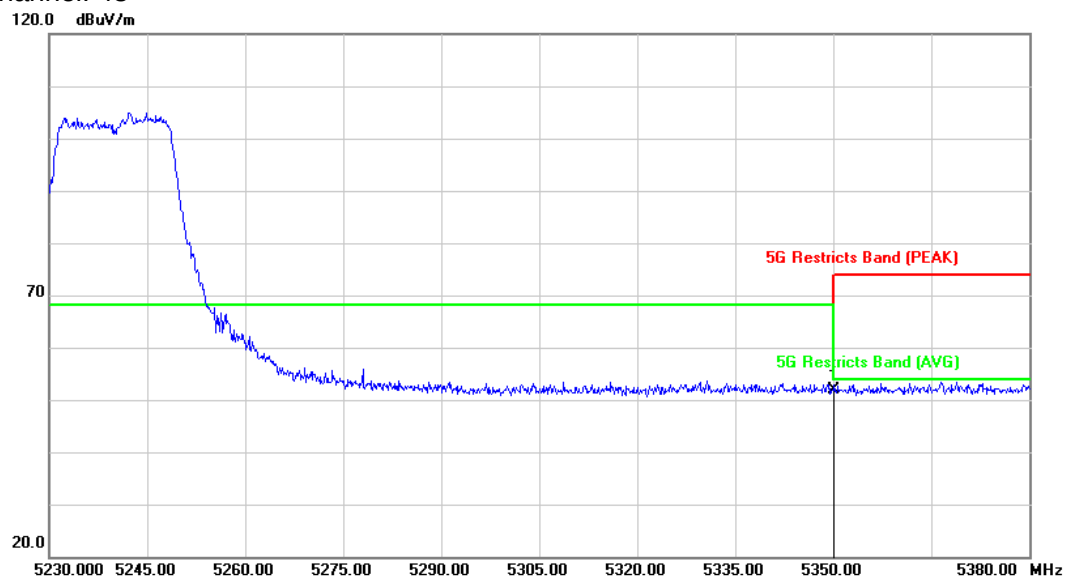


Modulation Standard: 802.11an HT20 (19.5Mbps), Pol/Phase: Horizontal
Channel: 36

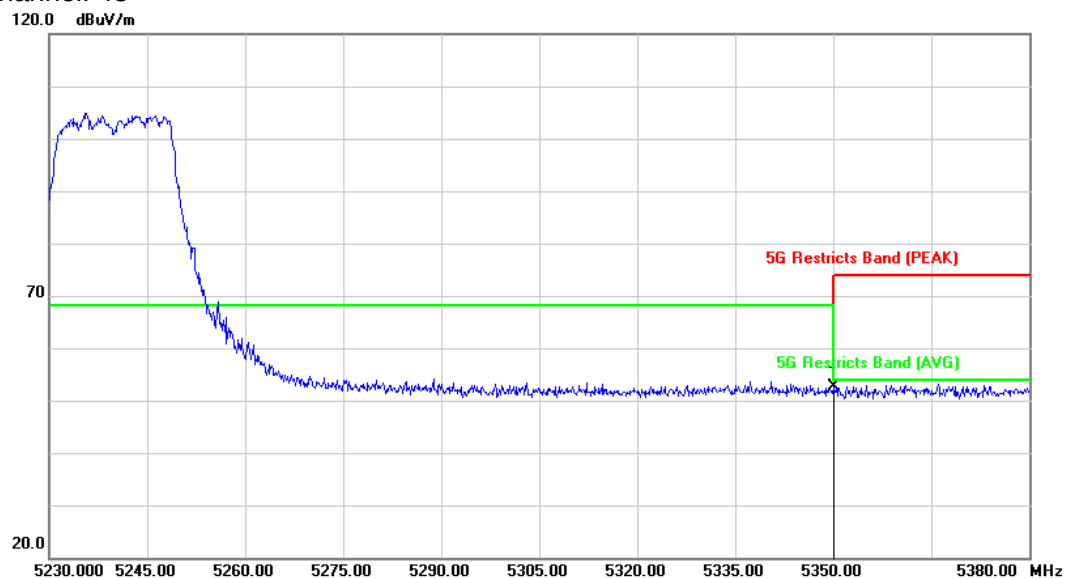




Modulation Standard: 802.11an HT20 (19.5Mbps), Pol/Phase: Vertical
Channel: 48

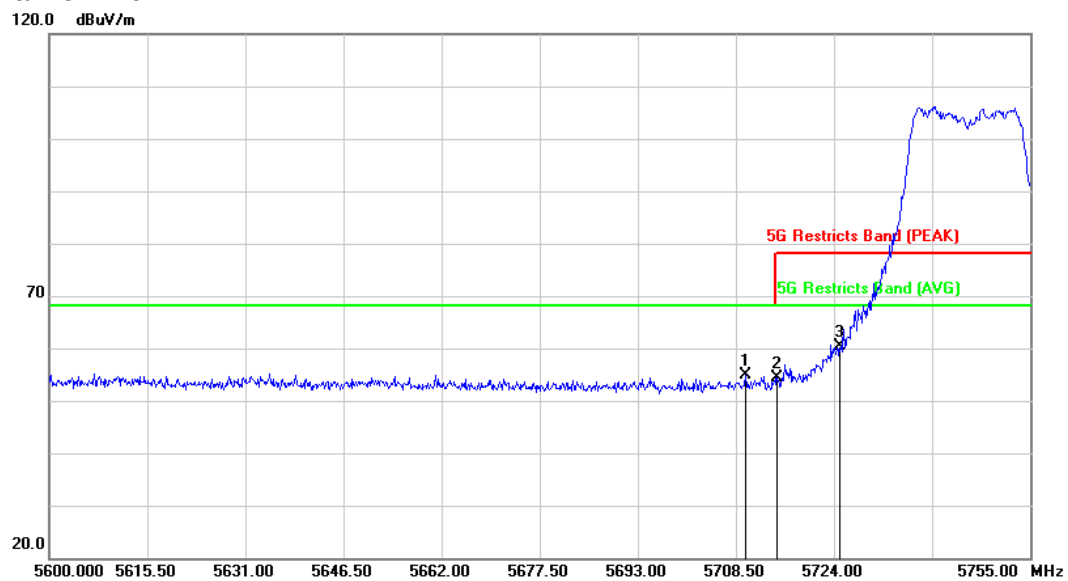


Modulation Standard: 802.11an HT20 (19.5Mbps), Pol/Phase: Horizontal
Channel: 48

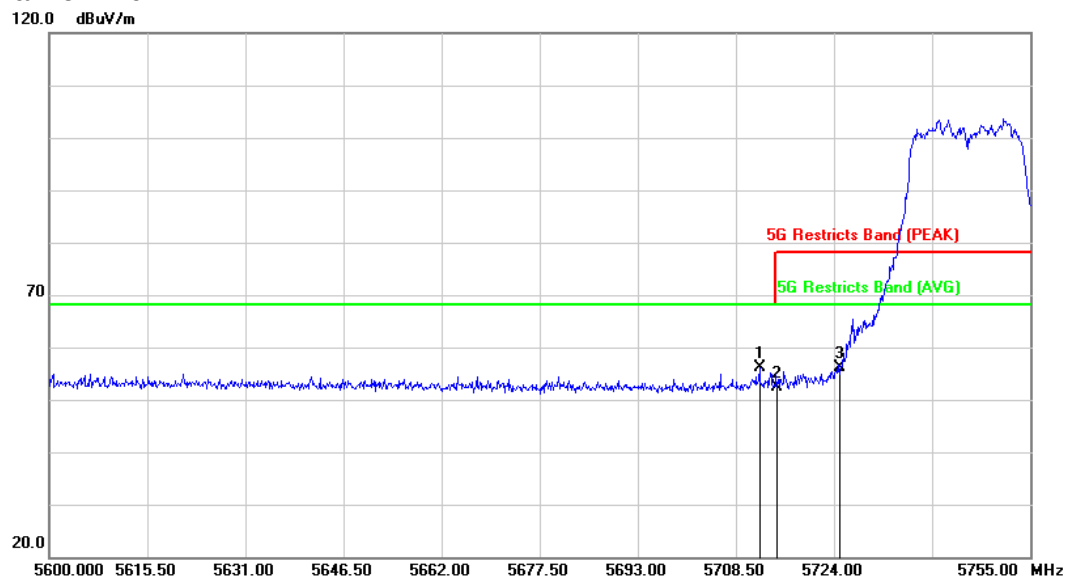




Modulation Standard: 802.11an HT20 (19.5Mbps), Pol/Phase: Vertical
Channel: 149

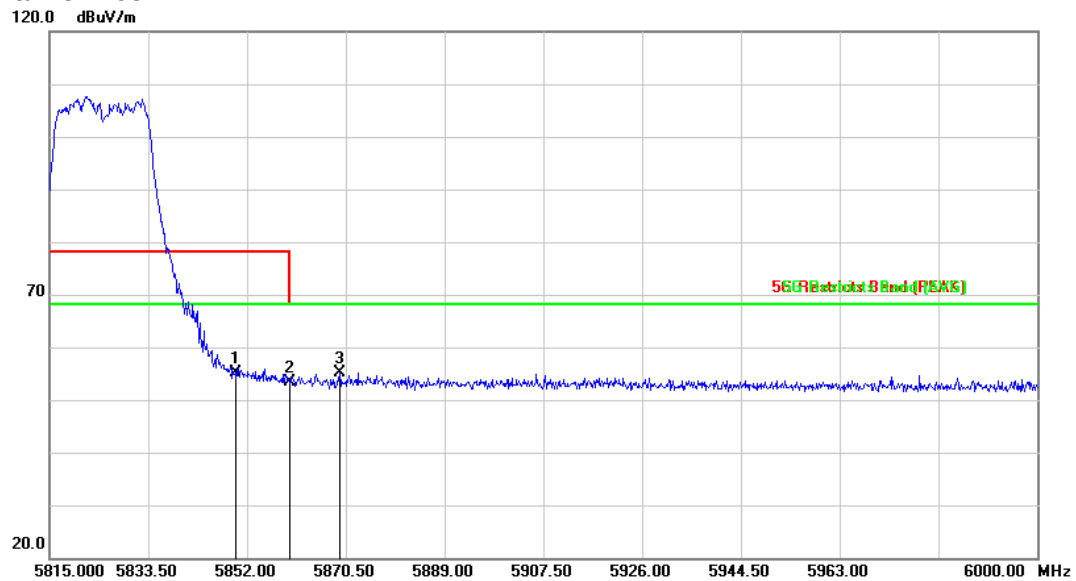


Modulation Standard: 802.11an HT20 (19.5Mbps), Pol/Phase: Horizontal
Channel: 149

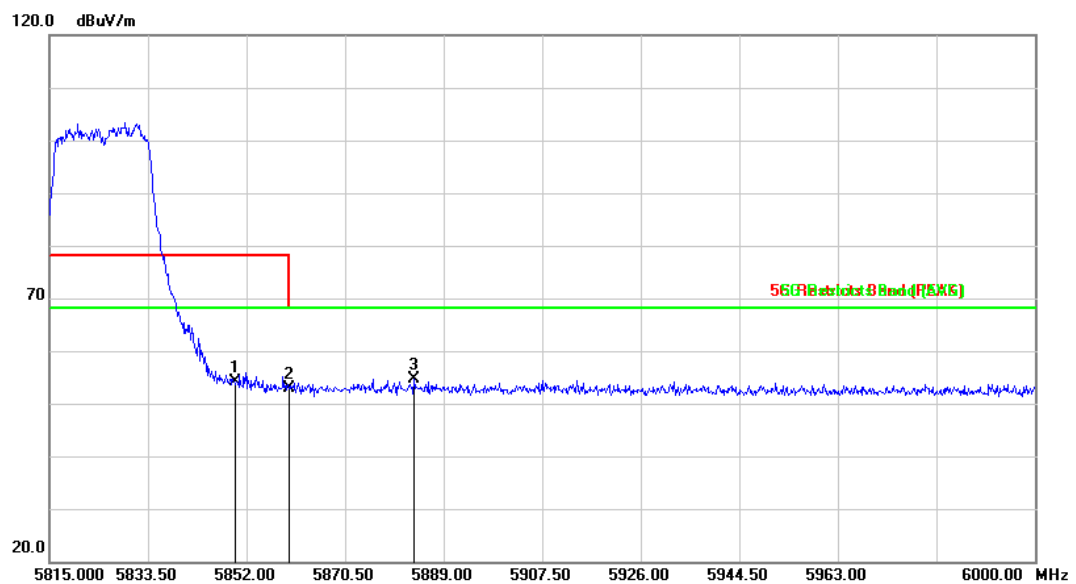




Modulation Standard: 802.11an HT20 (19.5Mbps), Pol/Phase: Vertical
Channel: 165

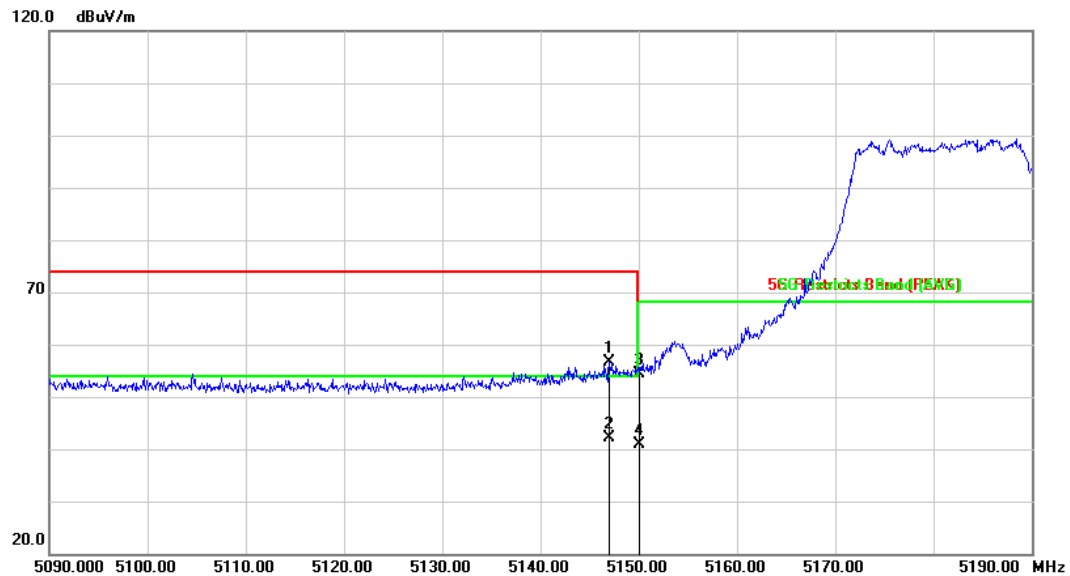


Modulation Standard: 802.11an HT20 (19.5Mbps), Pol/Phase: Horizontal
Channel: 165

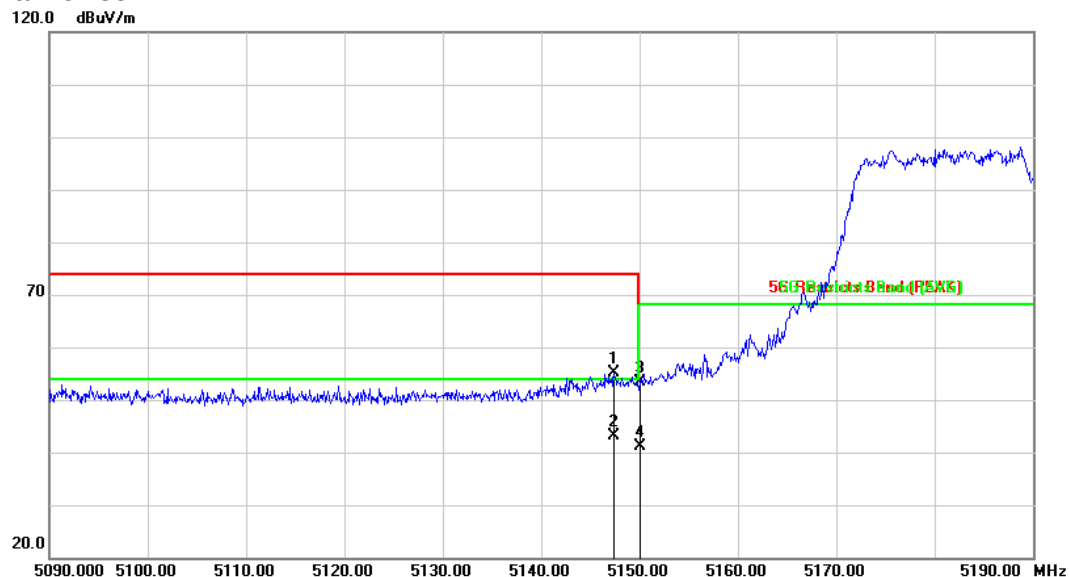




Modulation Standard: 802.11an HT40 (40.5Mbps), Pol/Phase: Vertical
Channel: 38

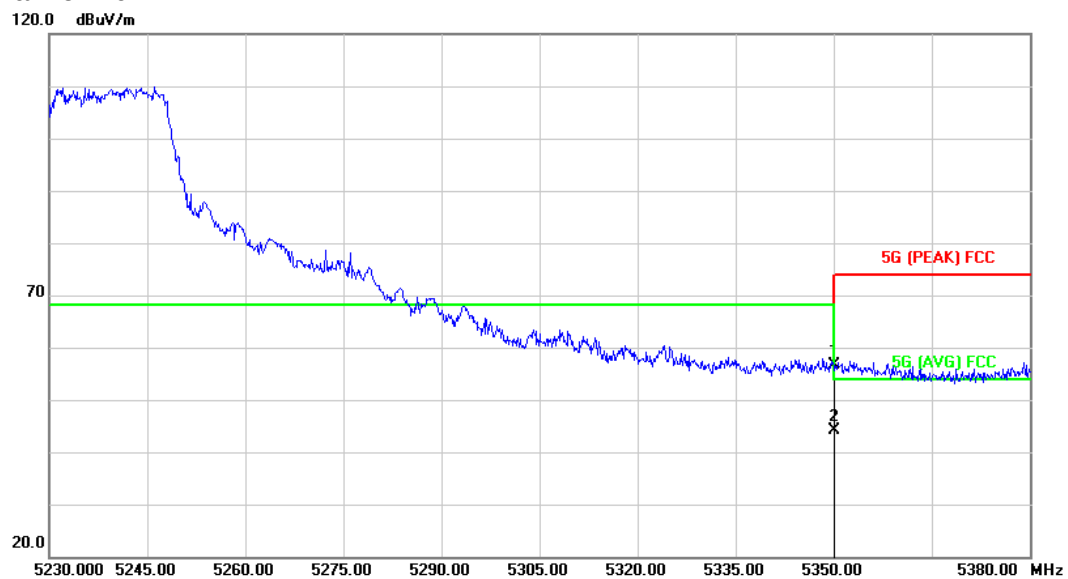


Modulation Standard: 802.11an HT40 (40.5Mbps), Pol/Phase: Horizontal
Channel: 38

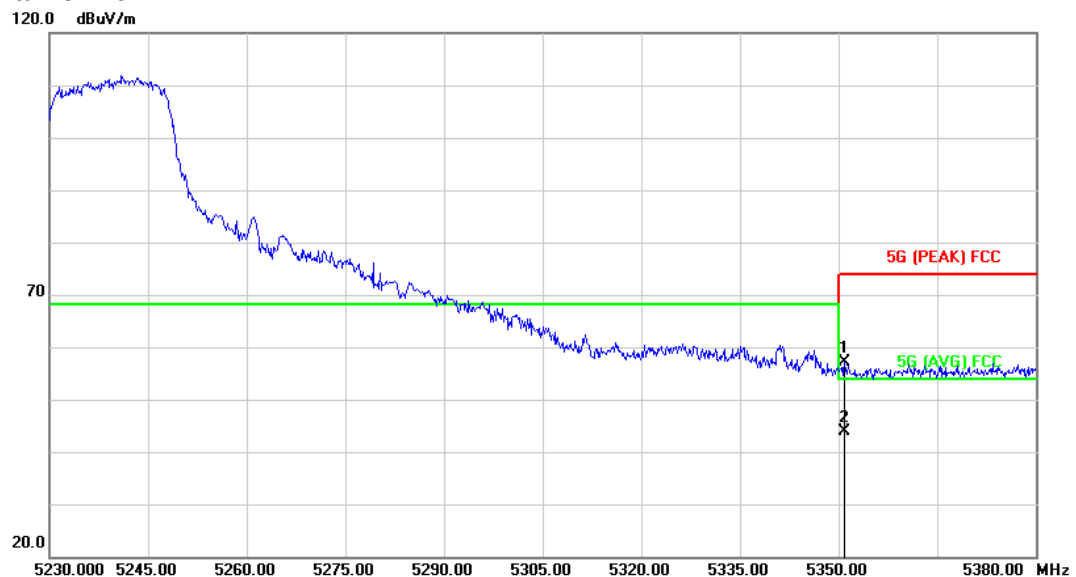




Modulation Standard: 802.11an HT40 (40.5Mbps), Pol/Phase: Vertical
Channel: 46

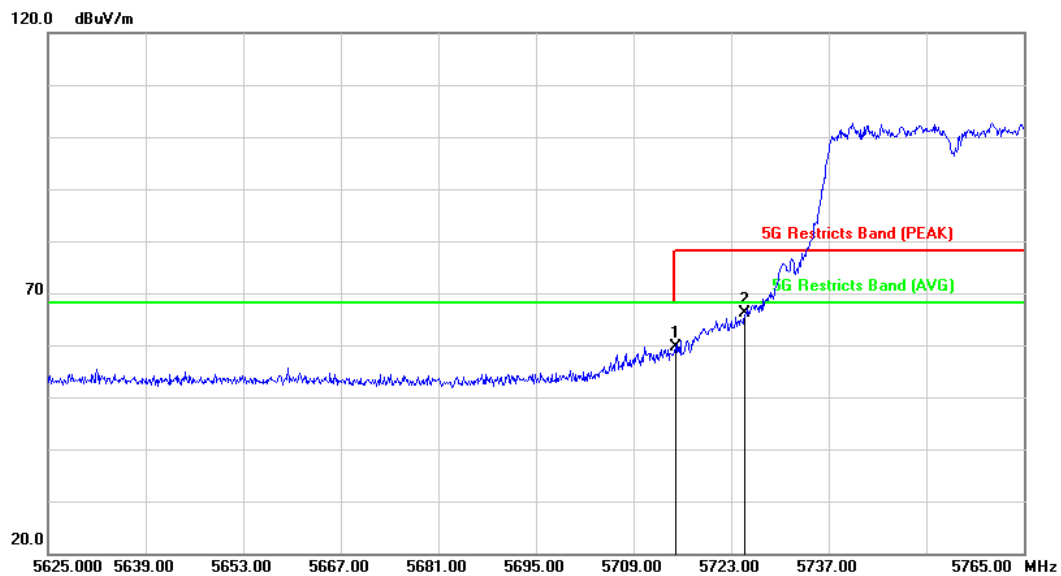


Modulation Standard: 802.11an HT40 (40.5Mbps), Pol/Phase: Horizontal
Channel: 46

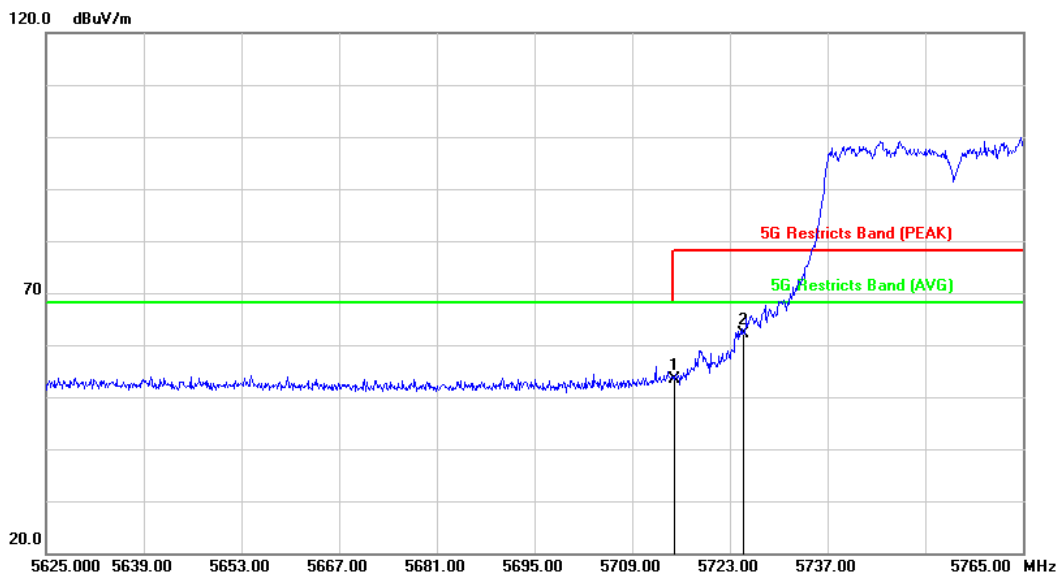




Modulation Standard: 802.11an HT40 (40.5Mbps), Pol/Phase: Vertical
Channel: 151

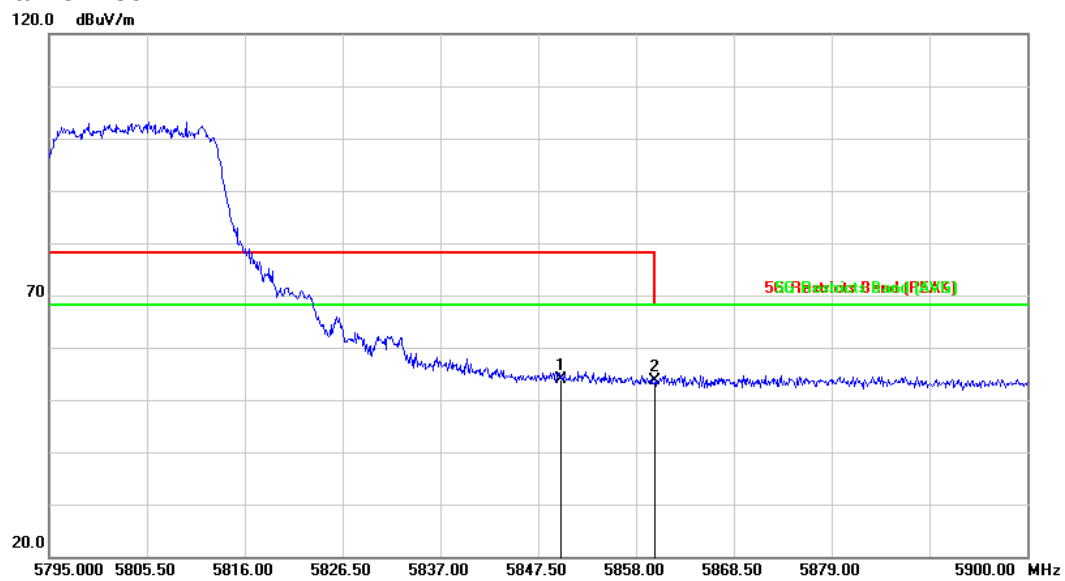


Modulation Standard: 802.11an HT40 (40.5Mbps), Pol/Phase: Horizontal
Channel: 151

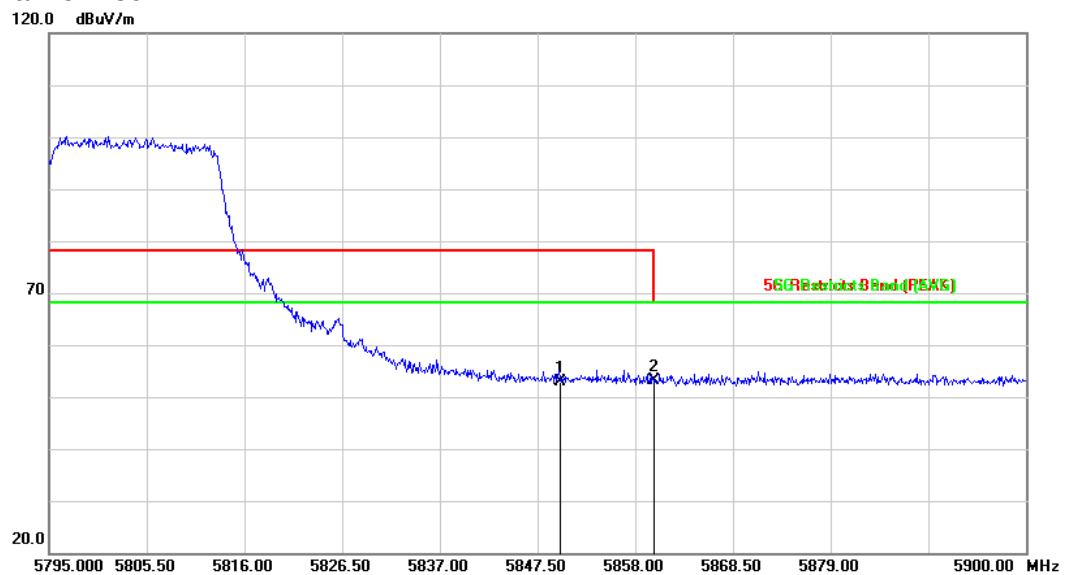




Modulation Standard: 802.11an HT40 (40.5Mbps), Pol/Phase: Vertical
Channel: 159

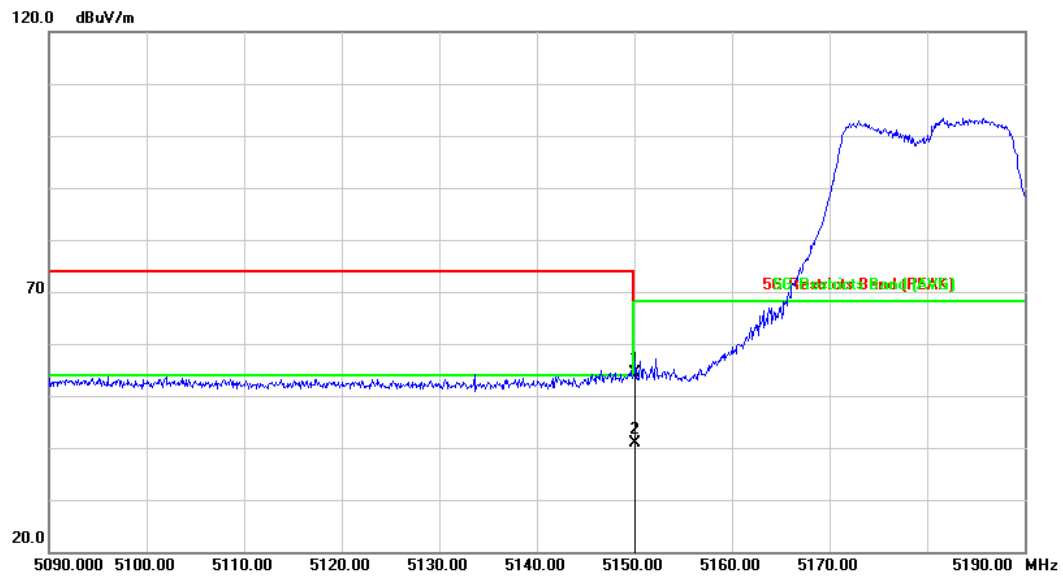


Modulation Standard: 802.11an HT40 (40.5Mbps), Pol/Phase: Horizontal
Channel: 159

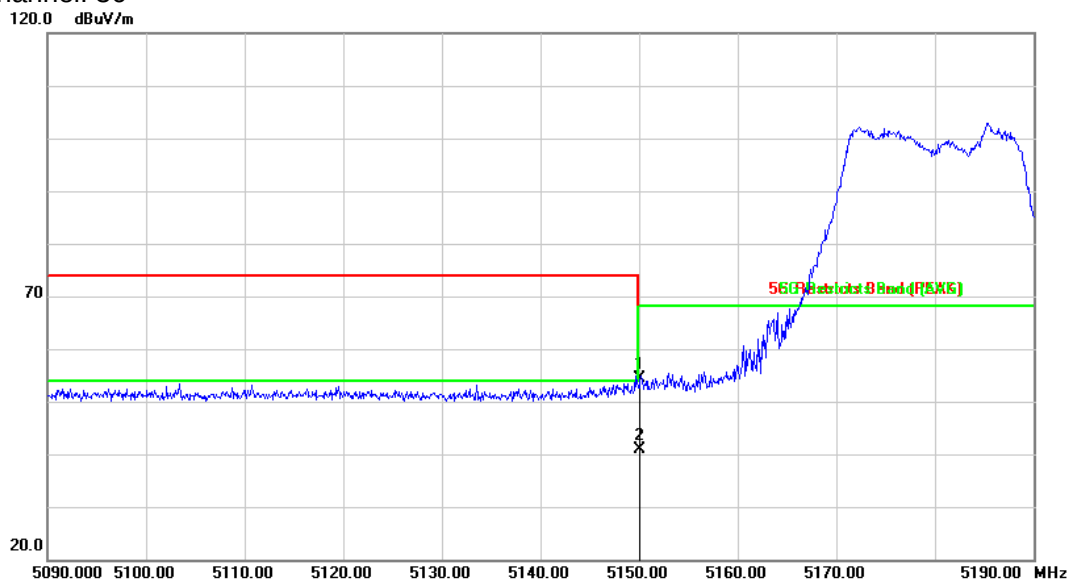




Modulation Standard: 802.11an VHT20 (6.5Mbps), Pol/Phase: Vertical
Channel: 36

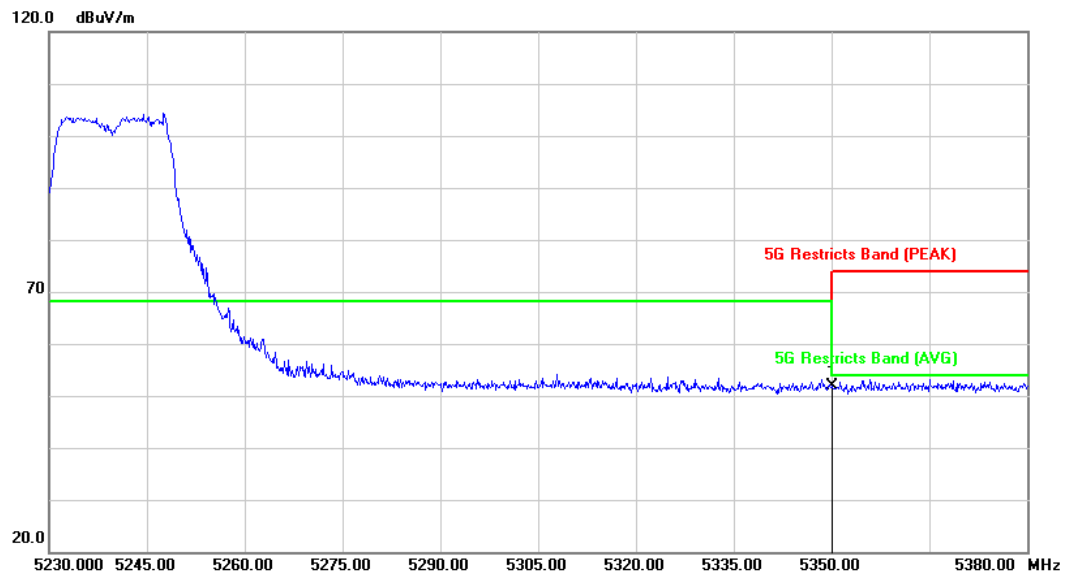


Modulation Standard: 802.11an VHT20 (6.5Mbps), Pol/Phase: Horizontal
Channel: 36

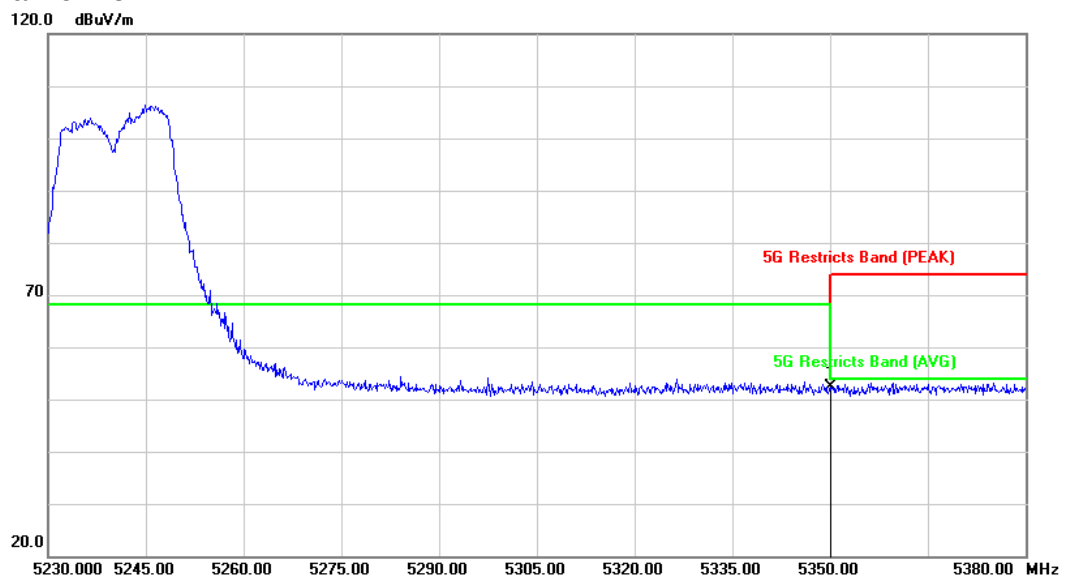




Modulation Standard: 802.11an VHT20 (6.5Mbps), Pol/Phase: Vertical
Channel: 48

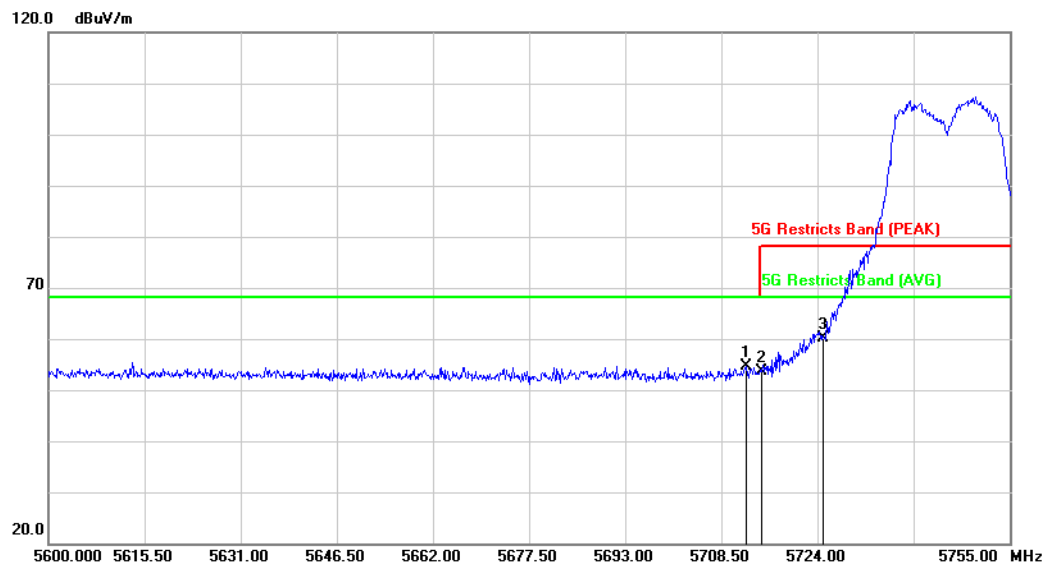


Modulation Standard: 802.11an VHT20 (6.5Mbps), Pol/Phase: Horizontal
Channel: 48

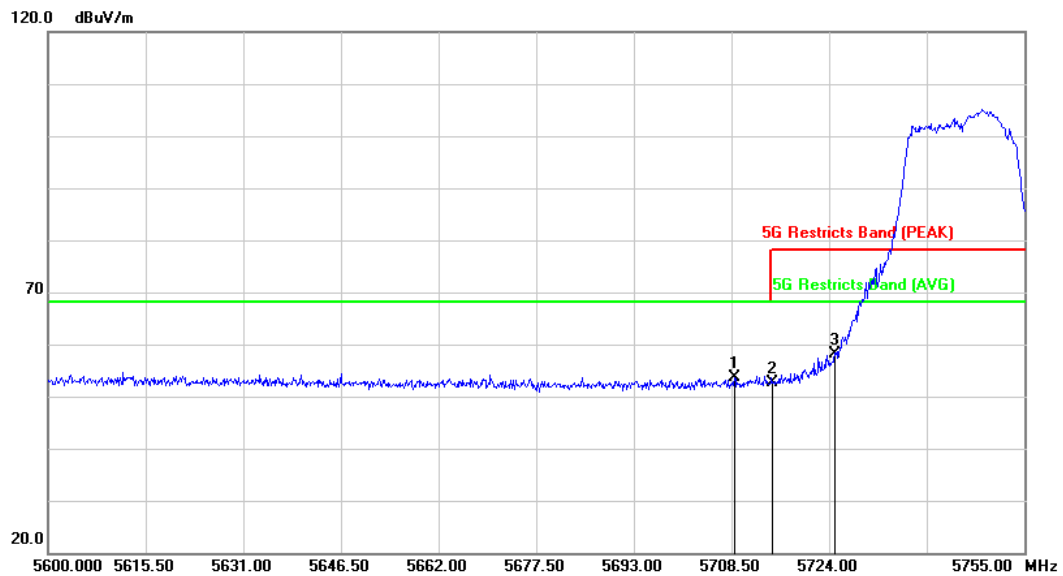




Modulation Standard: 802.11an VHT20 (6.5Mbps), Pol/Phase: Vertical
Channel: 149

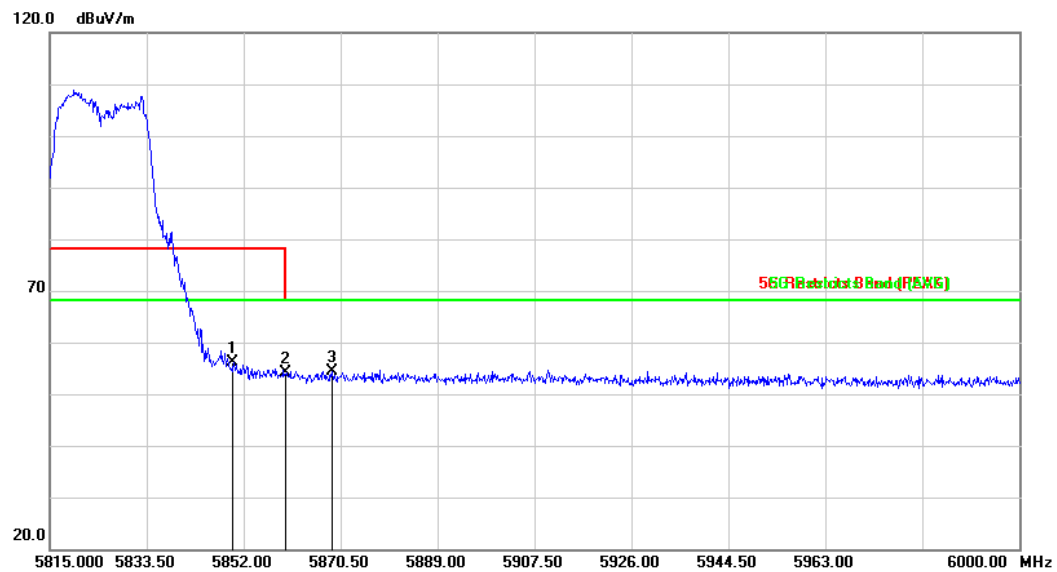


Modulation Standard: 802.11an VHT20 (6.5Mbps), Pol/Phase: Horizontal
Channel: 149

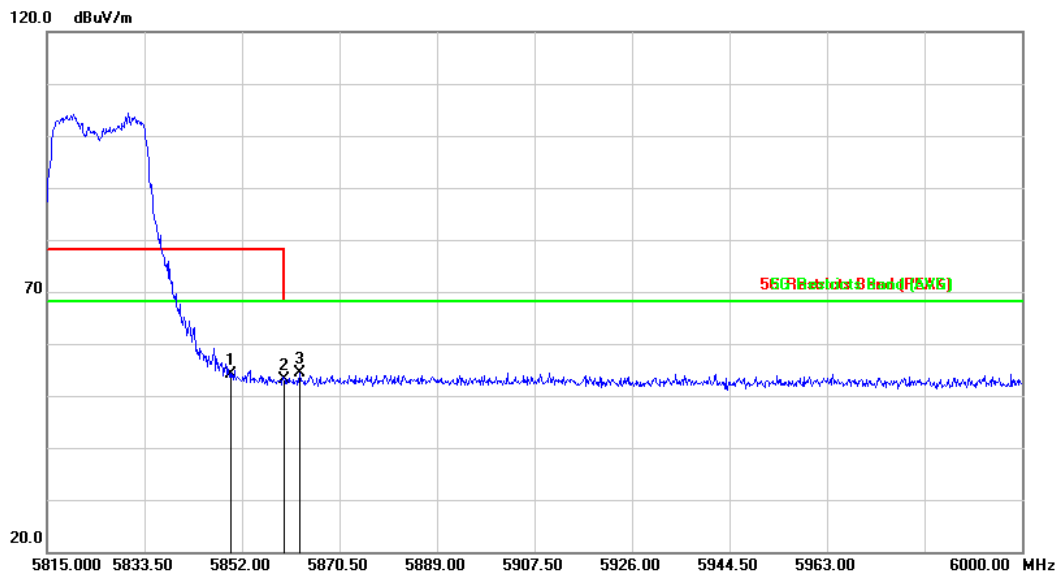




Modulation Standard: 802.11an VHT20 (6.5Mbps), Pol/Phase: Vertical
Channel: 165

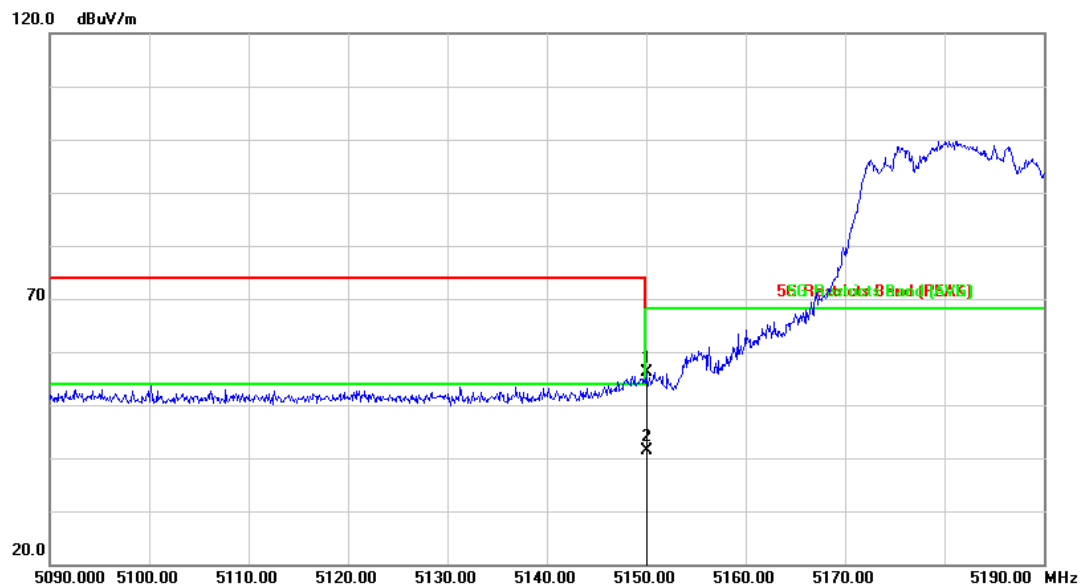


Modulation Standard: 802.11an VHT20 (6.5Mbps), Pol/Phase: Horizontal
Channel: 165

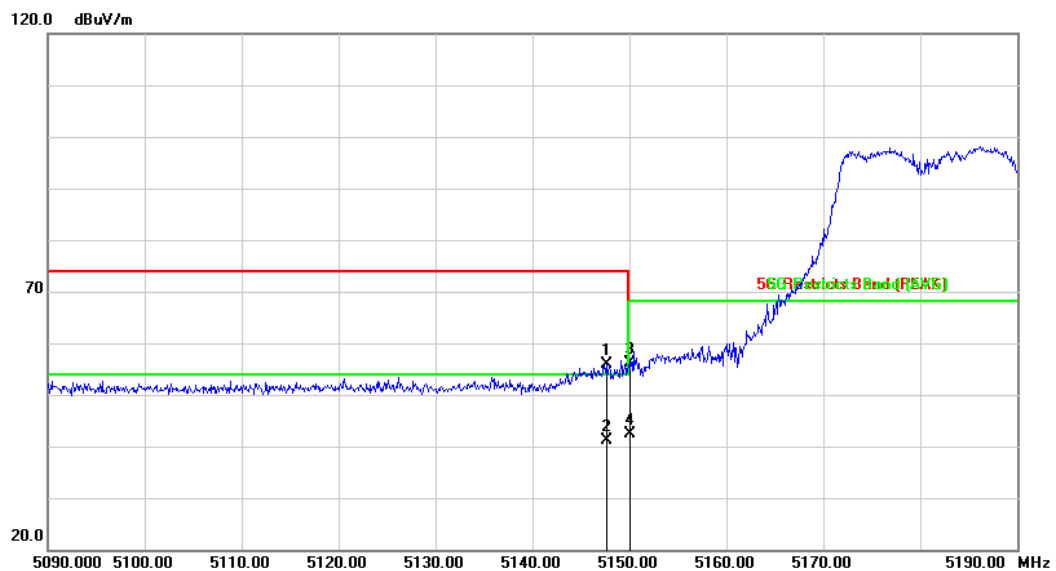




Modulation Standard: 802.11an VHT40 (13.5Mbps), Pol/Phase: Vertical
Channel: 38



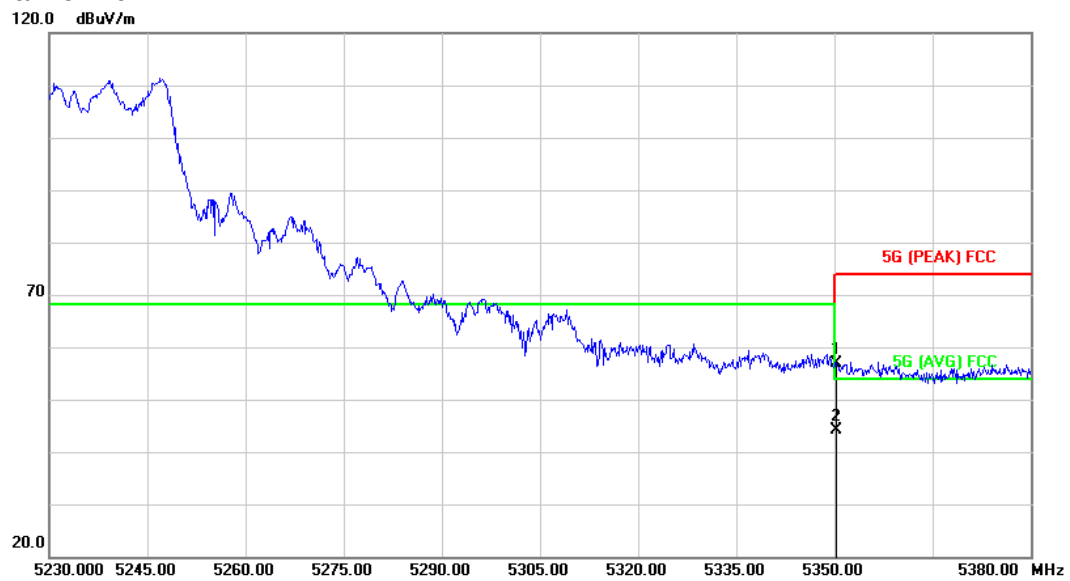
Modulation Standard: 802.11an VHT40 (13.5Mbps), Pol/Phase: Horizontal
Channel: 38





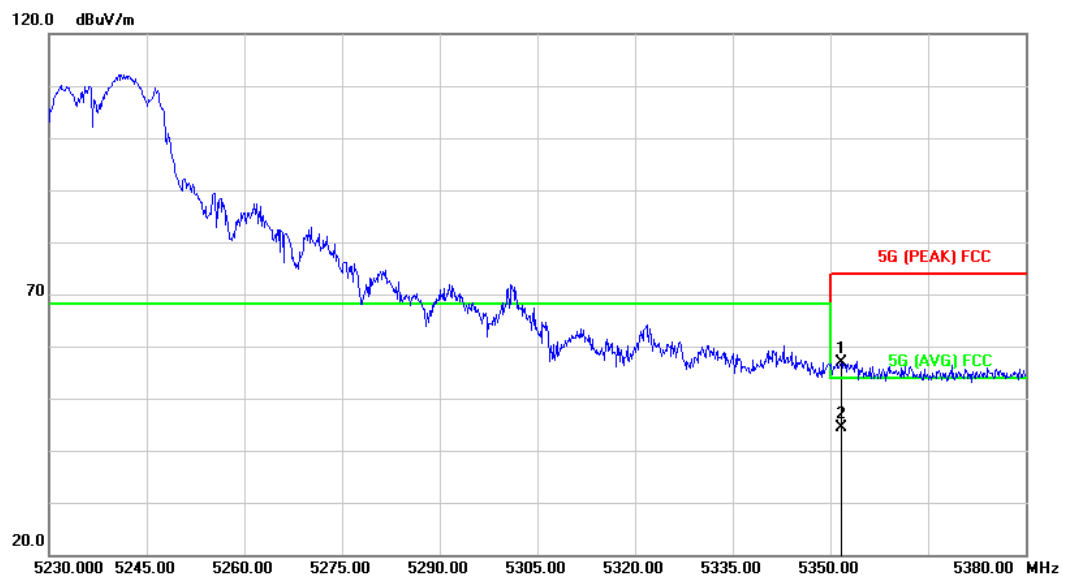
Modulation Standard: 802.11an VHT40 (13.5Mbps), Pol/Phase: Vertical

Channel: 46



Modulation Standard: 802.11an VHT40 (13.5Mbps), Pol/Phase: Horizontal

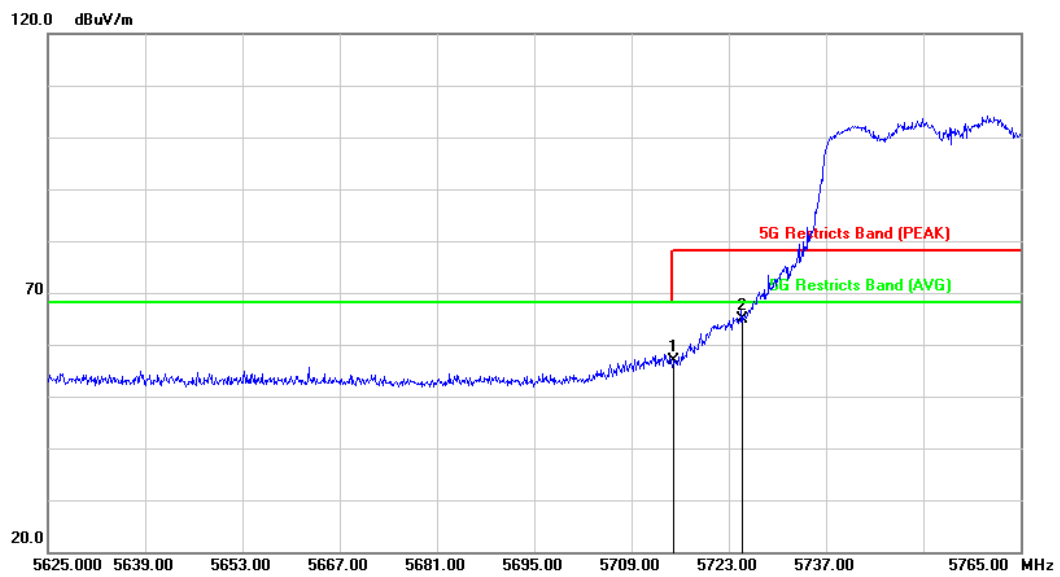
Channel: 46





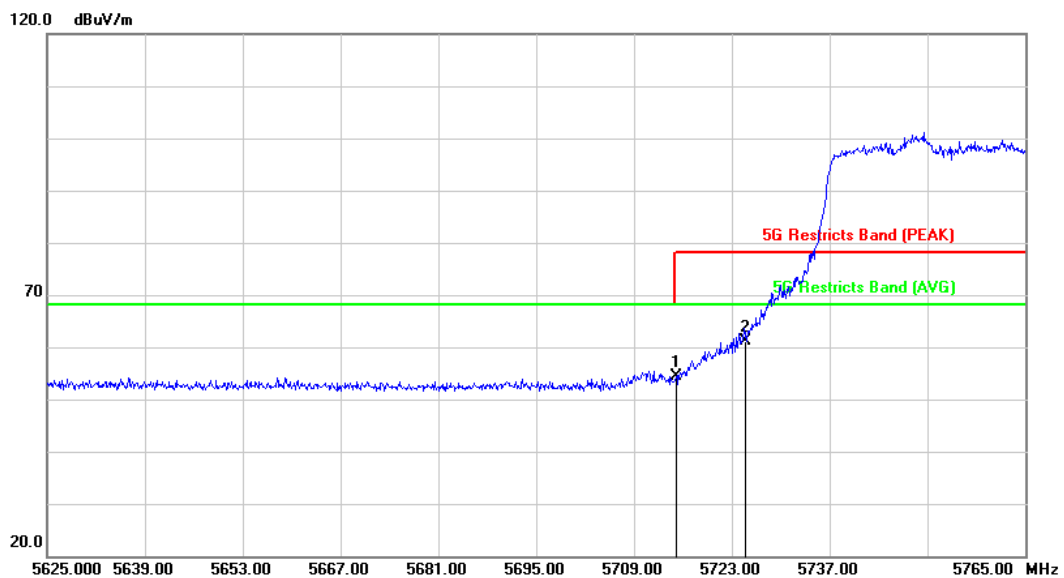
Modulation Standard: 802.11an VHT40 (13.5Mbps), Pol/Phase: Vertical

Channel: 151



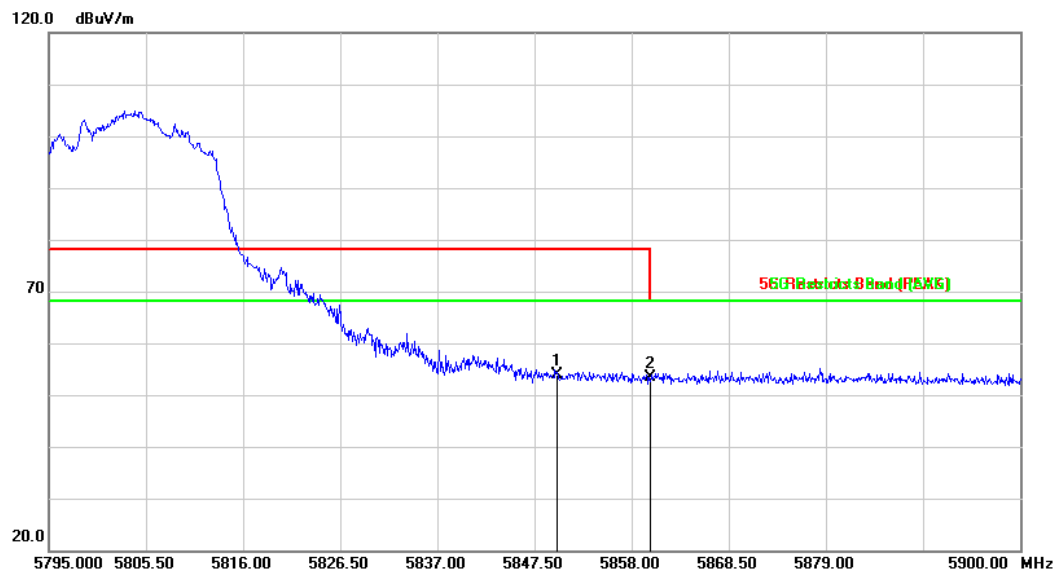
Modulation Standard: 802.11an VHT40 (13.5Mbps), Pol/Phase: Horizontal

Channel: 151

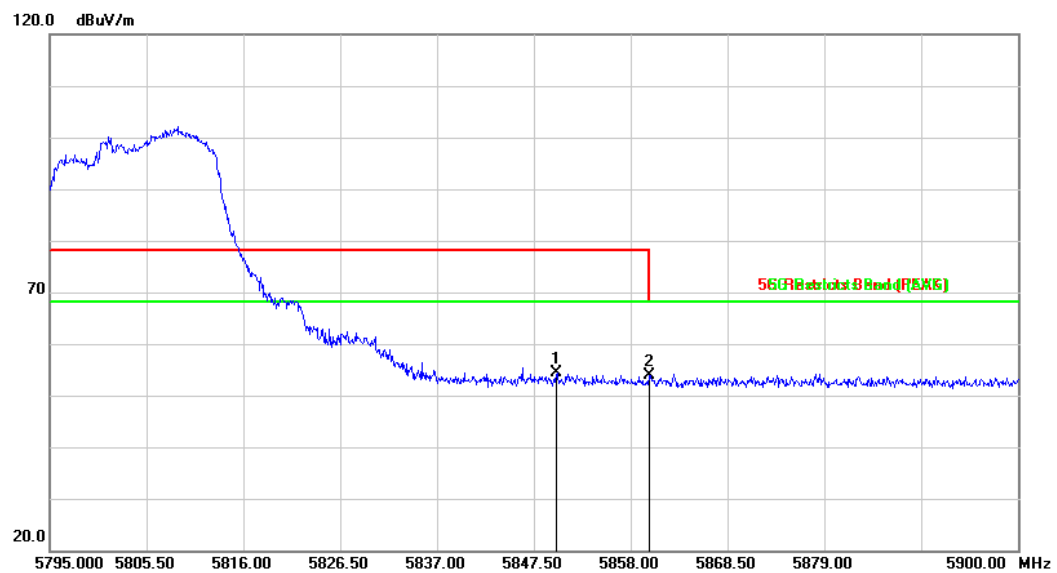




Modulation Standard: 802.11an VHT40 (13.5Mbps), Pol/Phase: Vertical
Channel: 159

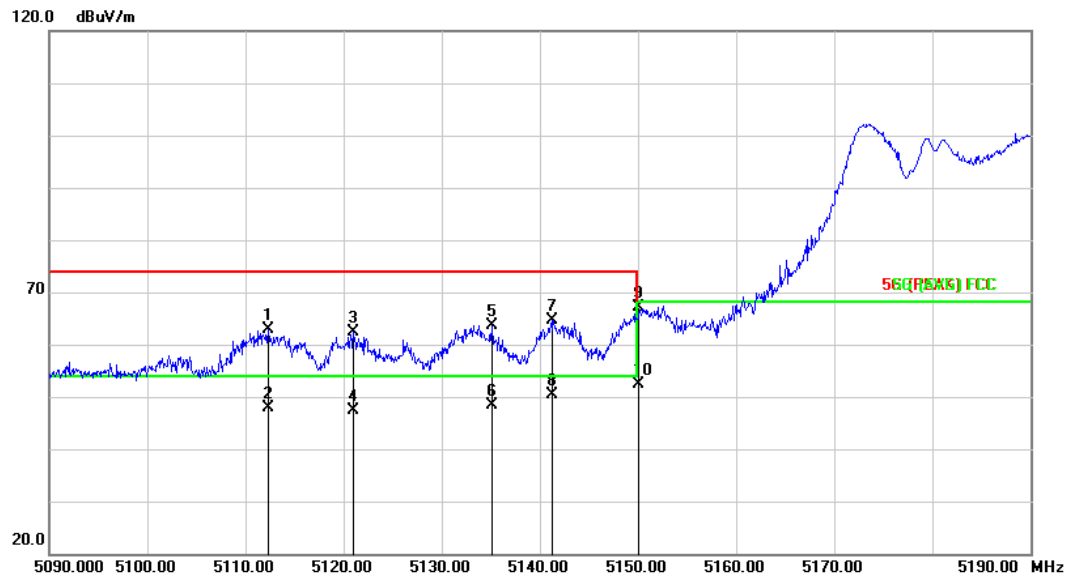


Modulation Standard: 802.11an VHT40 (13.5Mbps), Pol/Phase: Horizontal
Channel: 159

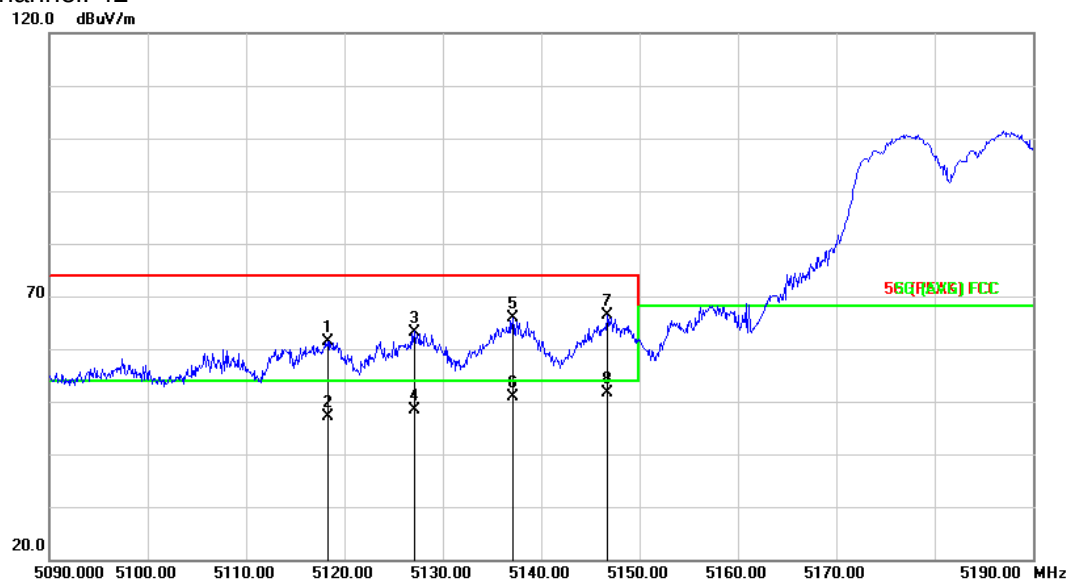




Modulation Standard: 802.11an VHT80 (29.3Mbps), Pol/Phase: Vertical
Channel: 42

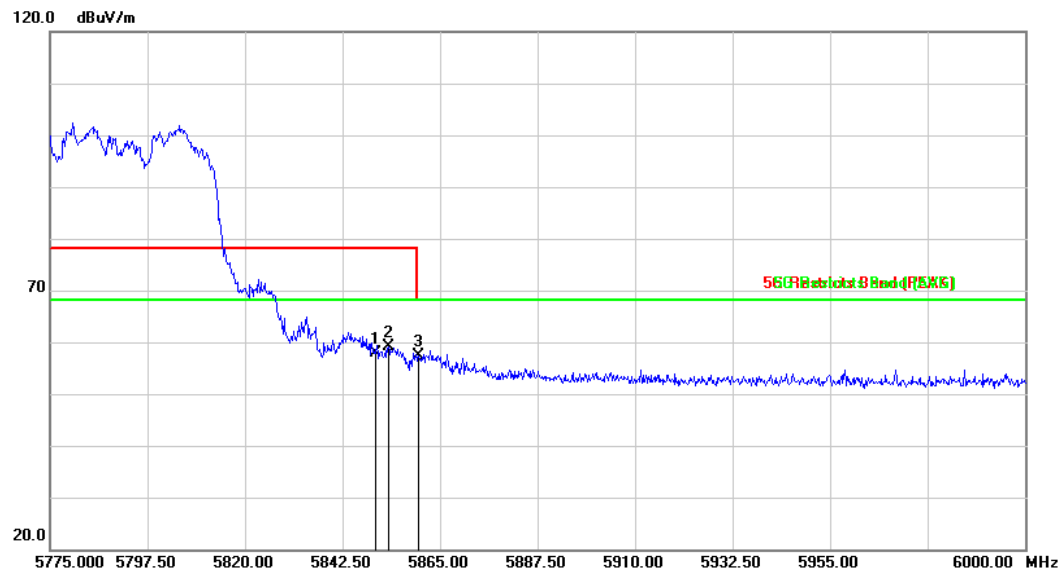


Modulation Standard: 802.11an VHT80 (29.3Mbps), Pol/Phase: Horizontal
Channel: 42

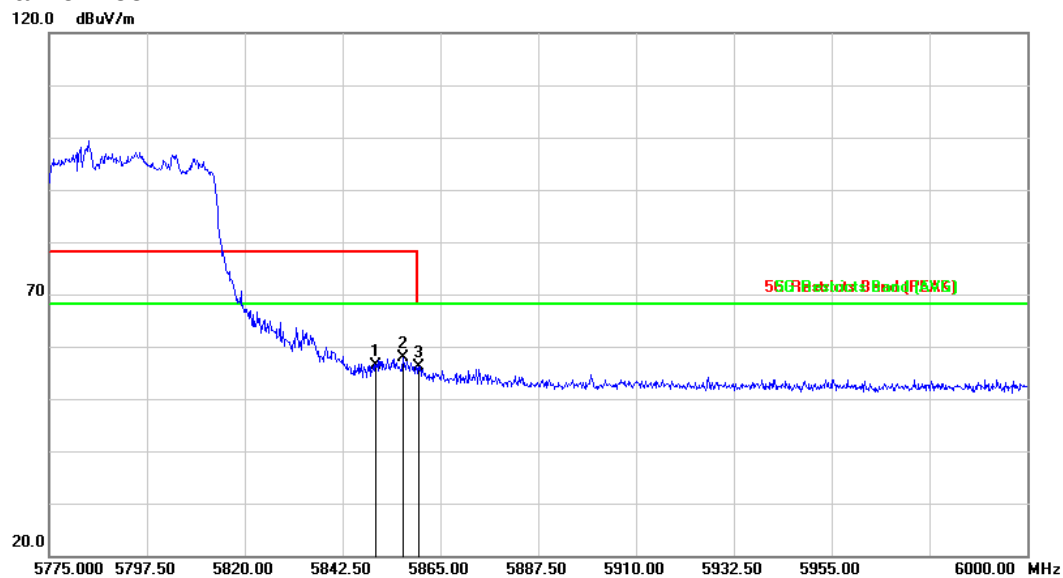




Modulation Standard: 802.11an VHT80 (29.3Mbps), Pol/Phase: Vertical
Channel: 155



Modulation Standard: 802.11an VHT80 (29.3Mbps), Pol/Phase: Horizontal
Channel: 155





7. On Time, Duty Cycle and Measurement methods

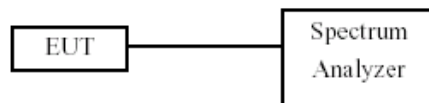
7.1. Test Limit

None; for reporting purposes only.

7.2. Test Procedure

KDB 789033 Zero-Span Spectrum Analyzer Method.

7.3. Test Setup Layout



7.4. Test Result and Data

Test Date: May 12, 2016

Temperature: 25°C

Atmospheric pressure: 1016 hPa

Humidity: 56%

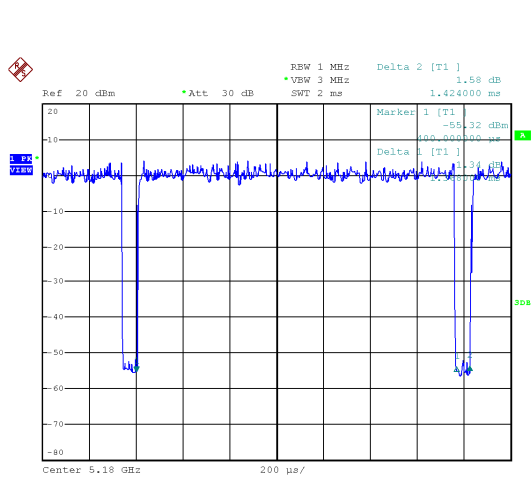
Mode	On Time B (msec)	Period Time (msec)	Duty Cycle x (linear)	Duty Cycle(%)	1/T Minimum VBW (kHz)	Duty Cycle correction Factor (dB)
802.11a	1.368	1.424	0.9607	96.07%	1.04	0.17
802.11a HT20	0.466	0.524	0.8893	88.93%	1.12	0.51
802.11a HT40	0.253	0.318	0.7956	79.56%	1.26	0.99
802.11ac VHT20	1.292	1.348	0.9585	95.85%	1.04	0.18
802.11ac VHT40	0.64	0.7	0.9143	91.43%	1.09	0.39
802.11ac VHT80	0.3225	0.3825	0.8431	84.31%	1.19	0.74

7.5. Measurement Methods

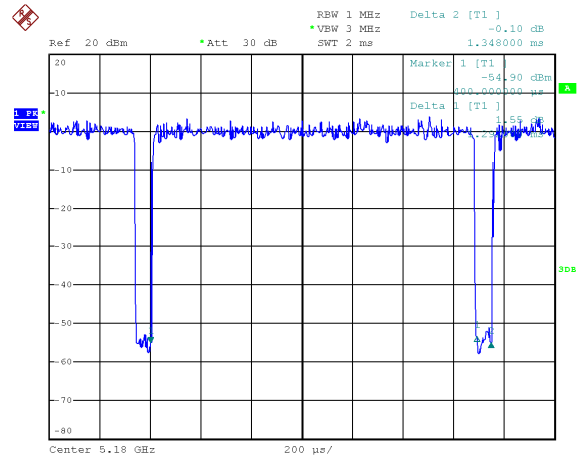
26 dB and 6dB Emission BW	KDB 789033 D02 v01, Section C
99% Occupied BW	KDB 789033 D02 v01, Section D
Conducted Output Power	KDB 789033 D02 v01, Section E.2.d and E.3.b (Method PM-G)
Power Spectral Density	KDB 789033 D02 v01, Section F
Unwanted emissions in restricted bands	KDB 789033 D02 v01, Sections G and H
Unwanted emissions in non-restricted bands	KDB 789033 D02 v01, Sections G and H



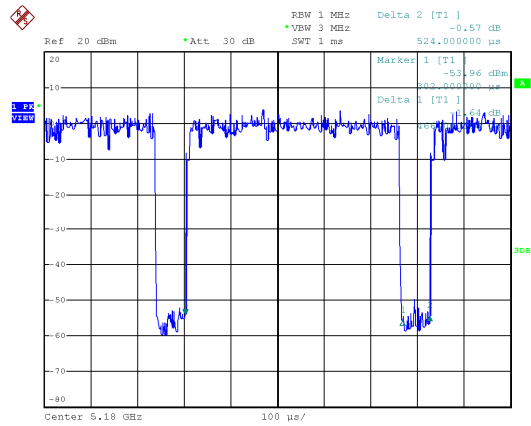
Modulation Standard: 802.11a (6Mbps)



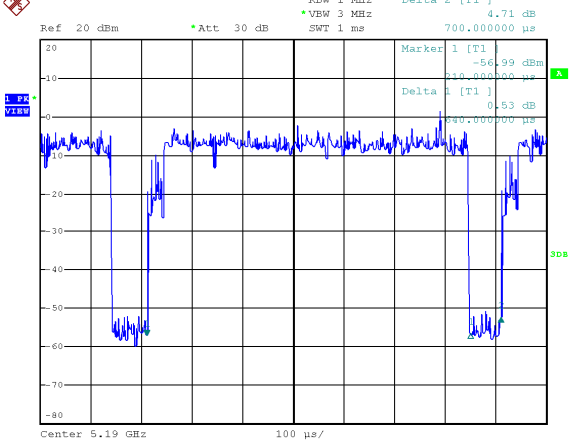
Modulation Standard: 802.11ac, VHT20 (6.5Mbps)



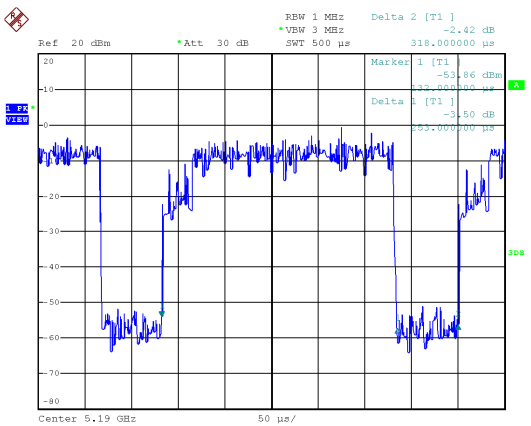
Modulation Standard: 802.11an HT20 (19.5Mbps)



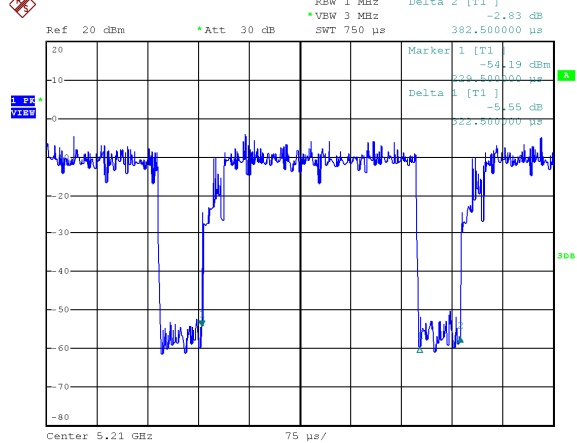
Modulation Standard: 802.11ac, VHT40 (13.5Mbps)



Modulation Standard: 802.11an, HT40 (40.5Mbps)



Modulation Standard: 802.11ac, VHT80 (29.3Mbps)





8. 6dB Bandwidth

8.1. Test Limit

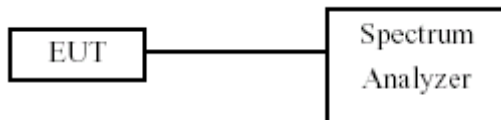
FCC §15.407

The minimum 6 dB bandwidth shall be at least 500 kHz.

8.2. Test Procedure

Reference to 789033 D02 General UNII Test Procedures New Rules v01: The transmitter output is connected to a spectrum analyzer with the RBW set to 100kHz, the VBW $\geq 3 \times$ RBW, peak detector and max hold.

8.3. Test Setup Layout



8.4. Test Result and Data

Test Date: May 12, 2016

Temperature: 25°C

Atmospheric pressure: 1016 hPa

Humidity: 56%

802.11a mode in the 5.8G Band

Channel	Frequency (MHz)	Ant. 0 6dB Bandwidth (MHz)	Ant. 1 6dB Bandwidth (MHz)	Ant. 2 6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	16.48	16.44	16.47	0.5
Middle	5785	16.40	16.70	16.50	0.5
High	5825	16.44	16.46	16.40	0.5
Worst		16.48	16.70	16.50	

802.11n HT20 mode in the 5.8G Band

Channel	Frequency (MHz)	Ant. 0 6dB Bandwidth (MHz)	Ant. 1 6dB Bandwidth (MHz)	Ant. 2 6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	17.28	17.05	17.40	0.5
Middle	5785	17.70	17.70	17.50	0.5
High	5825	17.04	16.99	17.73	0.5
Worst		17.28	17.7	17.73	

**802.11n HT40 mode in the 5.8G Band**

Channel	Frequency (MHz)	Ant. 0 6dB Bandwidth (MHz)	Ant. 1 6dB Bandwidth (MHz)	Ant. 2 6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5755	36.18	36.20	36.35	0.5
High	5795	35.35	36.25	35.95	0.5
Worst		36.18	36.25	36.35	

802.11ac VHT20 mode in the 5.8G Band

Channel	Frequency (MHz)	Ant. 0 6dB Bandwidth (MHz)	Ant. 1 6dB Bandwidth (MHz)	Ant. 2 6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	14.87	15.43	15.23	0.5
Middle	5785	17.70	17.50	17.50	0.5
High	5825	17.80	17.76	17.81	0.5
Worst		17.80	17.76	17.81	

802.11ac VHT40 mode in the 5.8G Band

Channel	Frequency (MHz)	Ant. 0 6dB Bandwidth (MHz)	Ant. 1 6dB Bandwidth (MHz)	Ant. 2 6dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5755	33.23	34.32	34.69	0.5
High	5795	30.73	36.13	36.27	0.5
Worst		33.23	36.13	36.27	

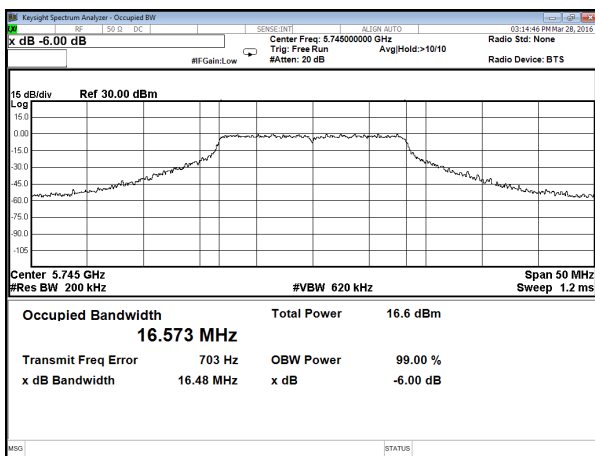
802.11ac VHT80 mode in the 5.8G Band

Channel	Frequency (MHz)	Ant. 0 6dB Bandwidth (MHz)	Ant. 1 6dB Bandwidth (MHz)	Ant. 2 6dB Bandwidth (MHz)	Minimum Limit (MHz)
Middle	5775	75.06	72.77	74.53	0.5
Worst		75.06	72.77	74.53	

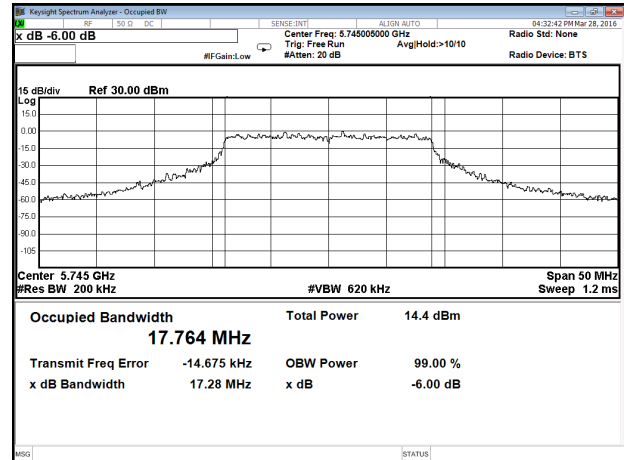


Antenna 0

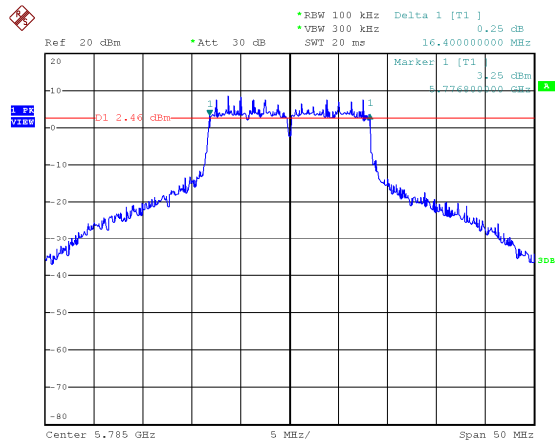
Modulation Standard: 802.11a (6Mbps)
CH149



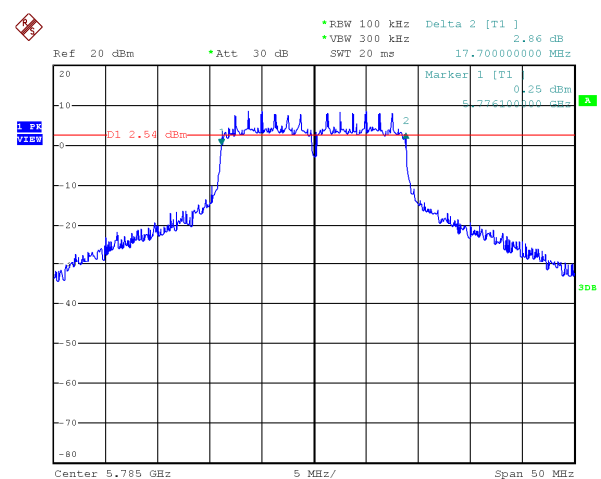
Modulation Standard: 802.11an, HT20 (19.5Mbps)
CH149



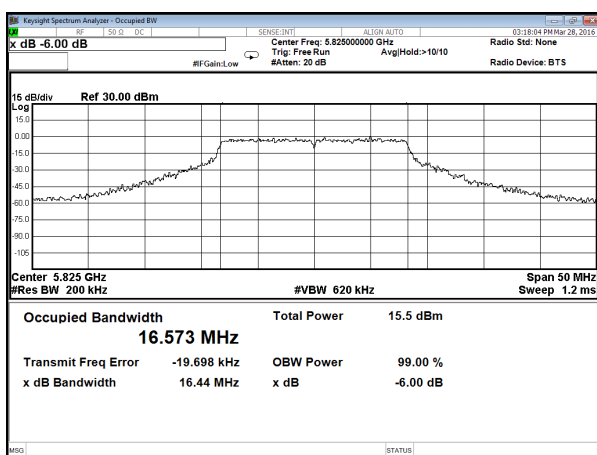
CH157



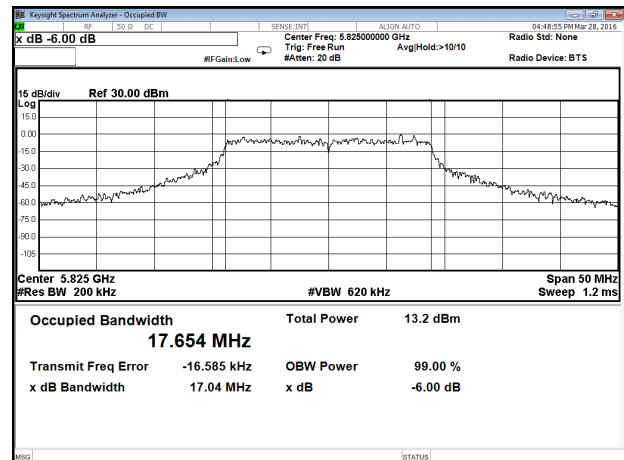
CH157

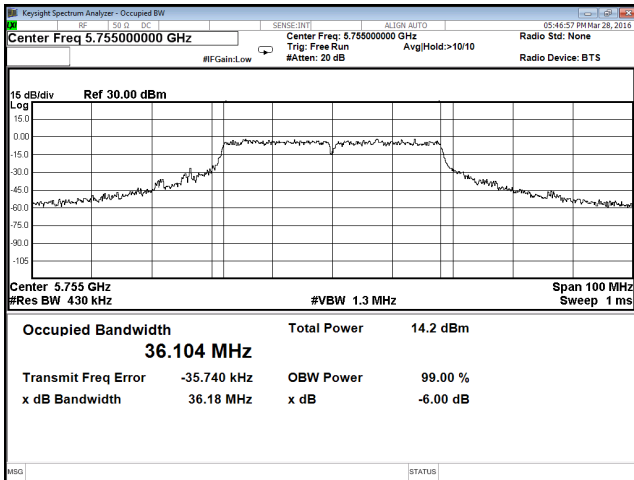
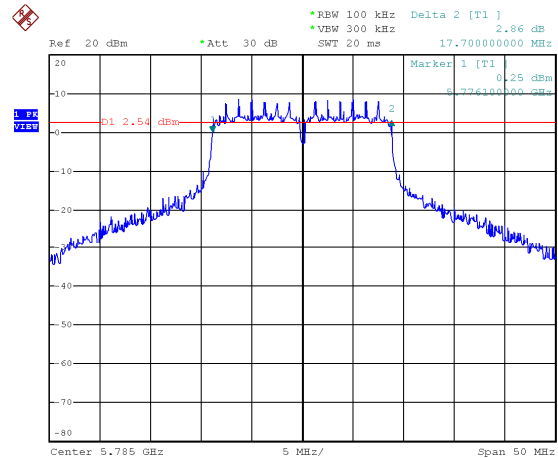


CH165

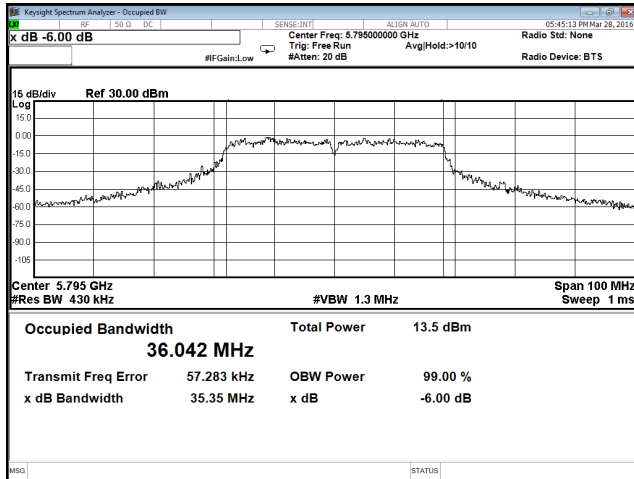


CH165

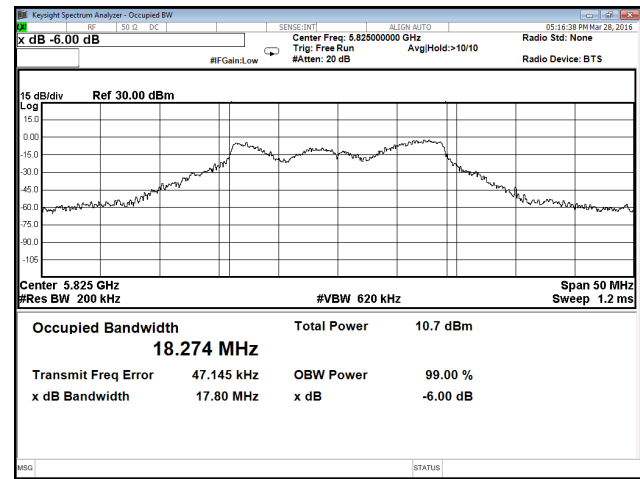
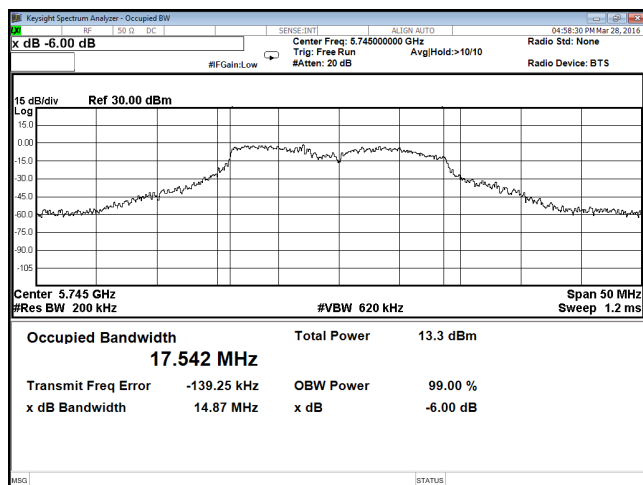
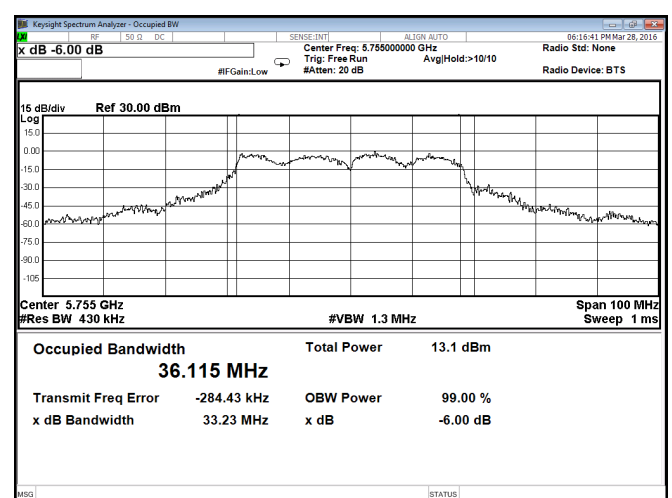


Modulation Standard: 802.11an, HT40 (40.5Mbps)
CH151Modulation Standard: 802.11ac, VHT20 (6.5Mbps)
CH157

CH159

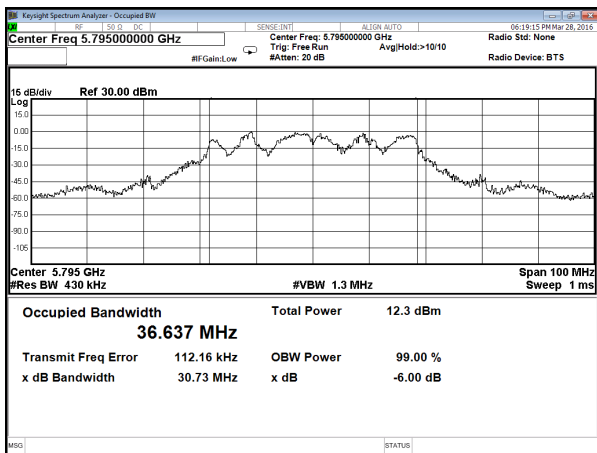


CH165

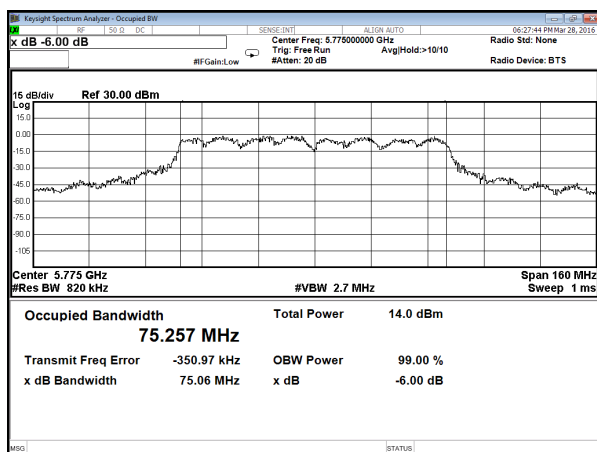
Modulation Standard: 802.11ac, VHT20 (65Mbps)
CH149Modulation Standard: 802.11ac, VHT40 (13.5Mbps)
CH151



Modulation Standard: 802.11ac, VHT40 (13.5Mbps)
CH159



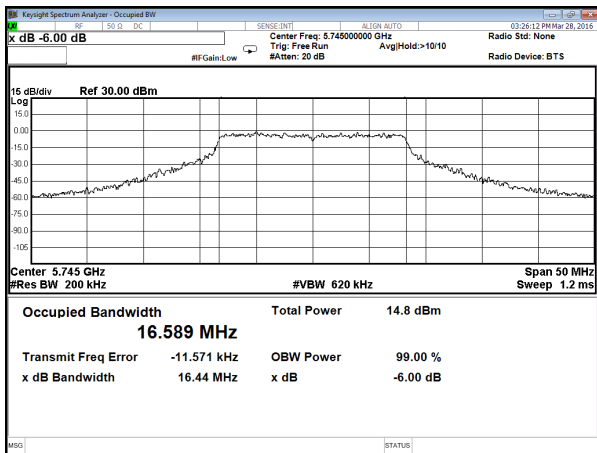
Modulation Standard: 802.11ac, VHT80 (29.3Mbps)
CH155



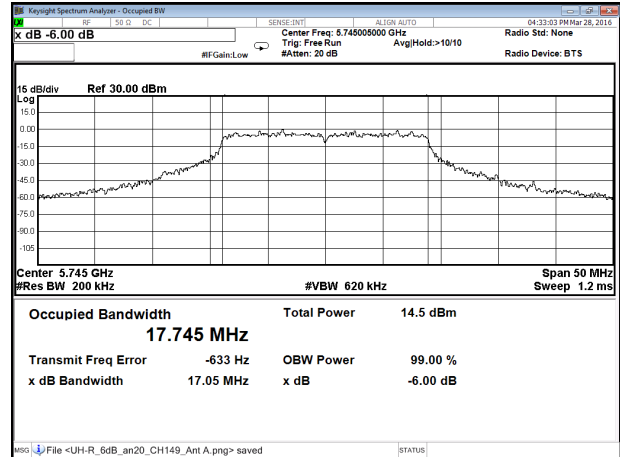


Antenna 1

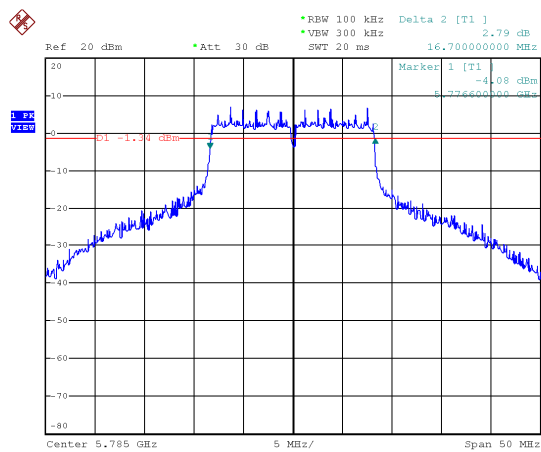
Modulation Standard: 802.11a (6Mbps)
CH149



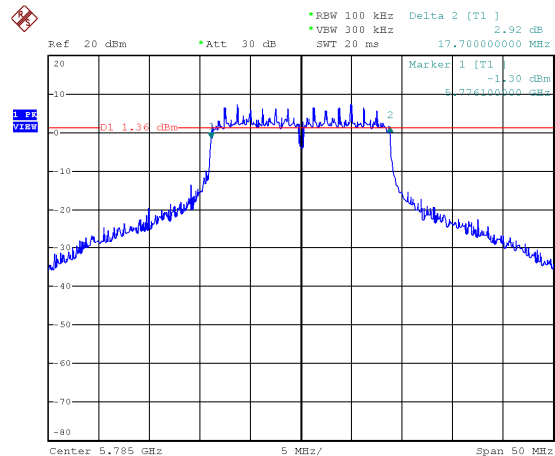
Modulation Standard: 802.11an, HT20 (19.5Mbps)
CH149



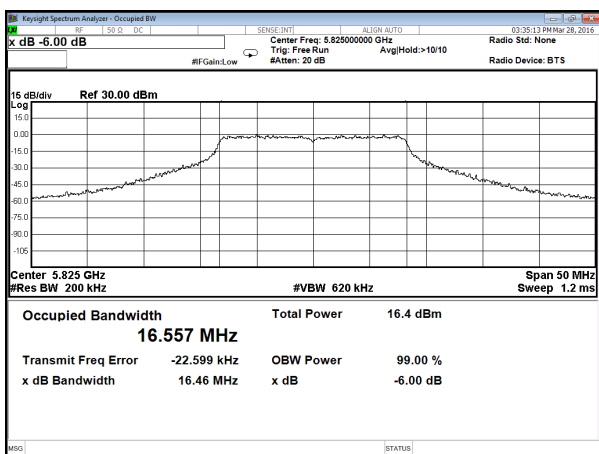
CH157



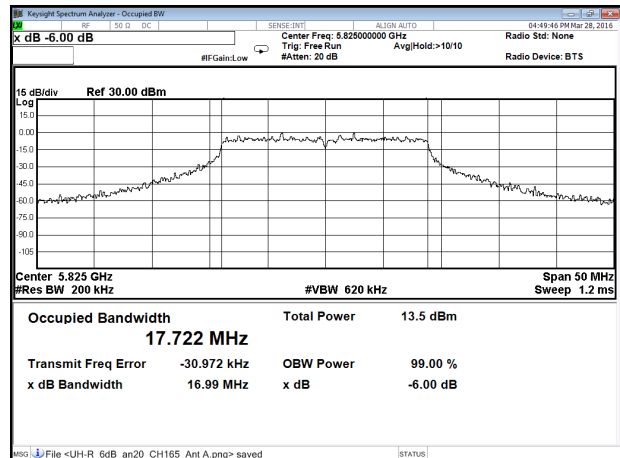
CH157

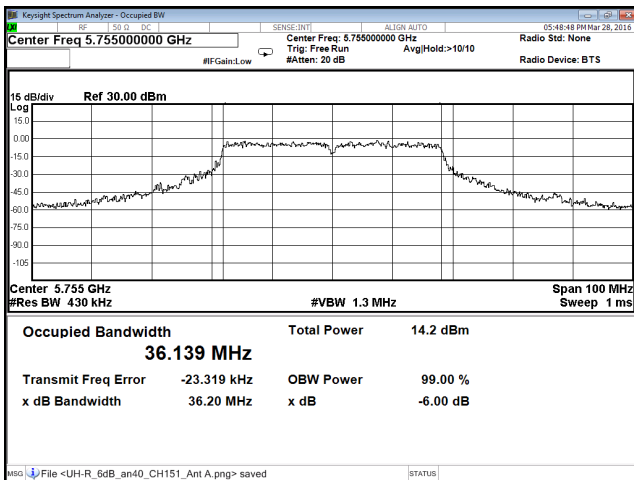
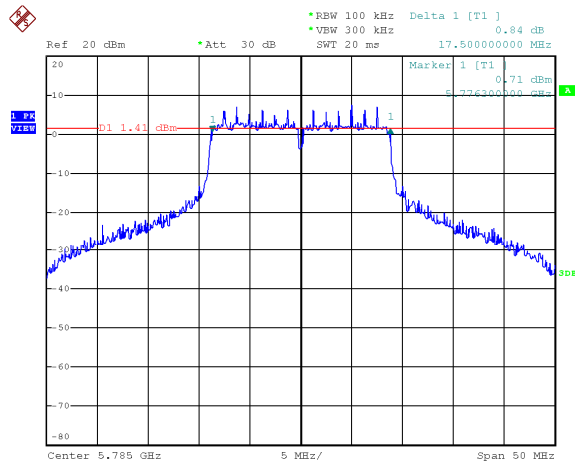


CH165

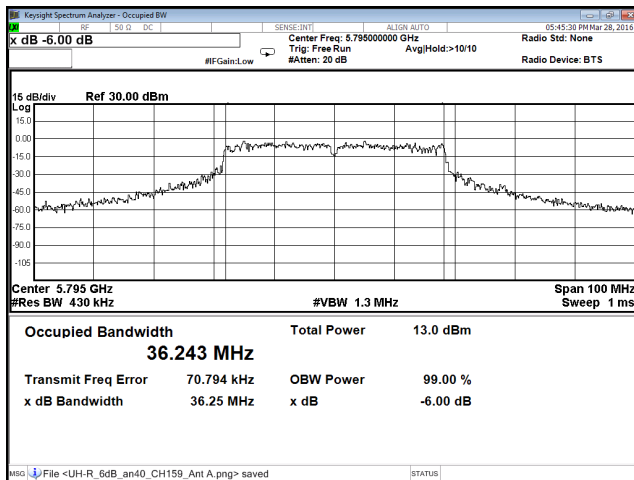


CH165

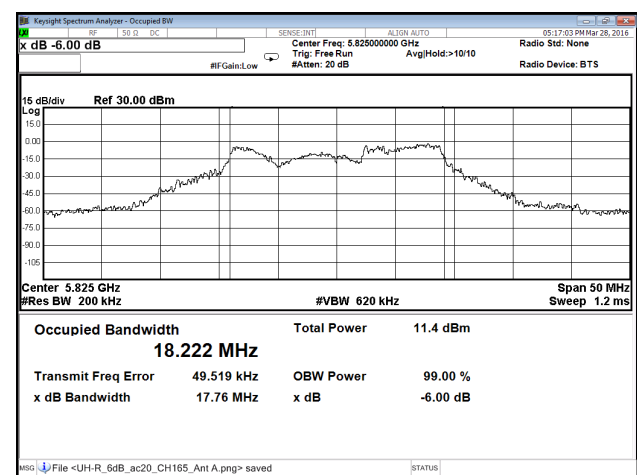
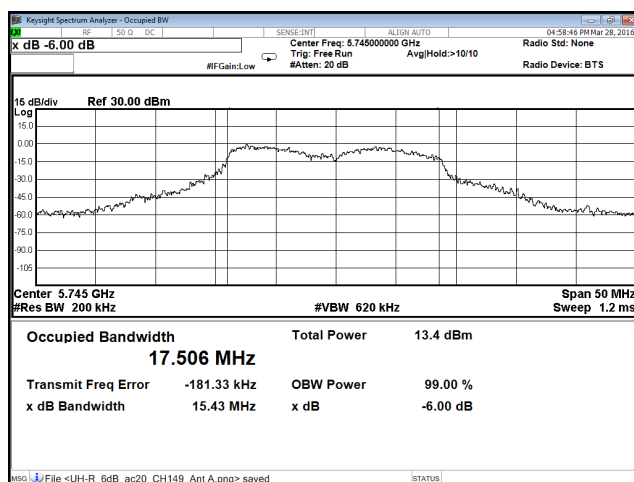
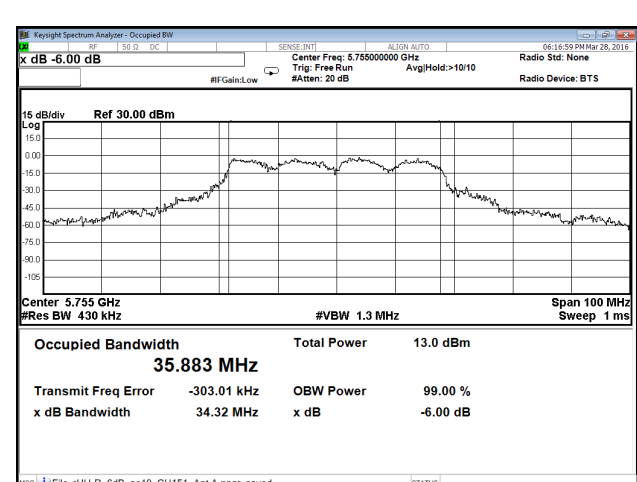


Modulation Standard: 802.11an, HT40 (40.5Mbps)
CH151Modulation Standard: 802.11ac, VHT20 (6.5Mbps)
CH157

CH159

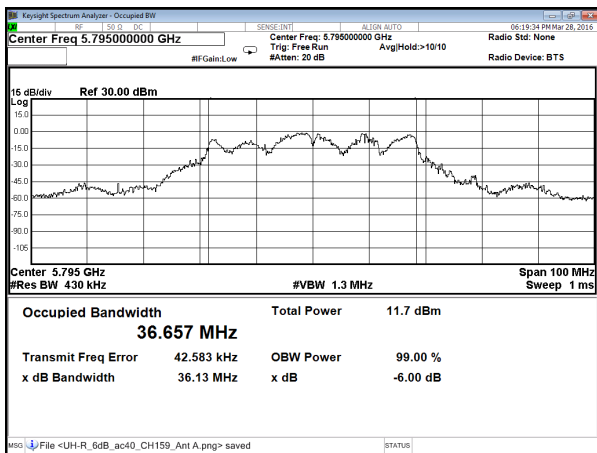


CH165

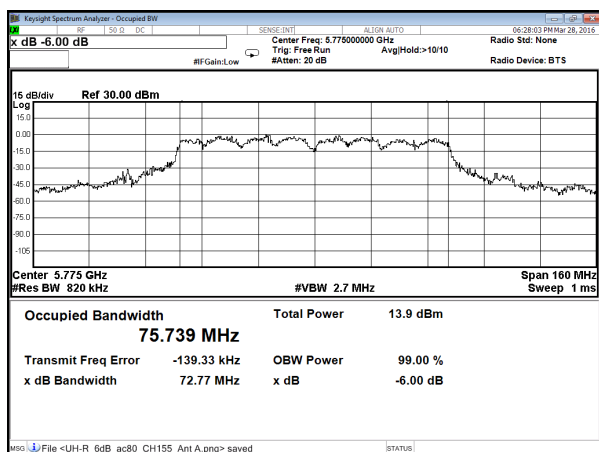
Modulation Standard: 802.11ac, VHT20 (65Mbps)
CH149Modulation Standard: 802.11ac, VHT40 (13.5Mbps)
CH151



Modulation Standard: 802.11ac, VHT40 (13.5Mbps)
CH159



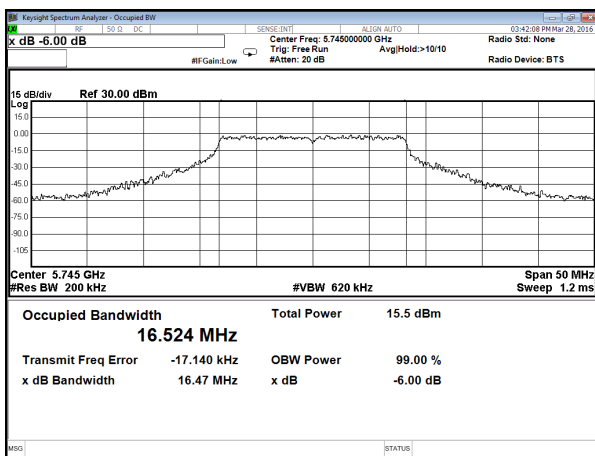
Modulation Standard: 802.11ac, VHT80 (29.3Mbps)
CH155



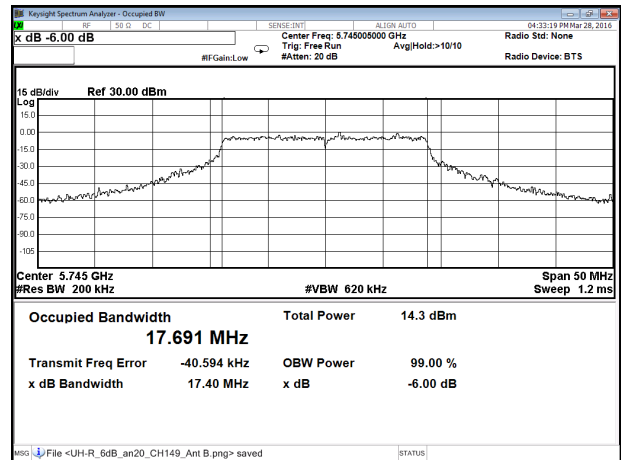


Antenna 2

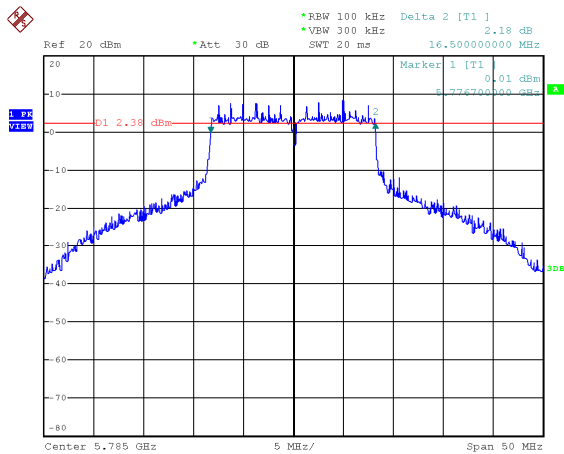
Modulation Standard: 802.11a (6Mbps)
CH149



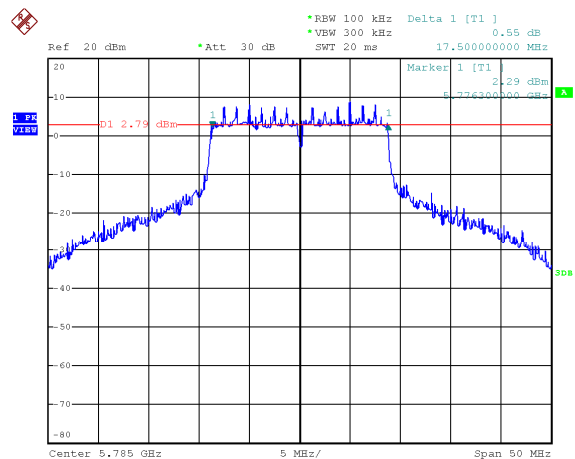
Modulation Standard: 802.11an, HT20 (19.5Mbps)
CH149



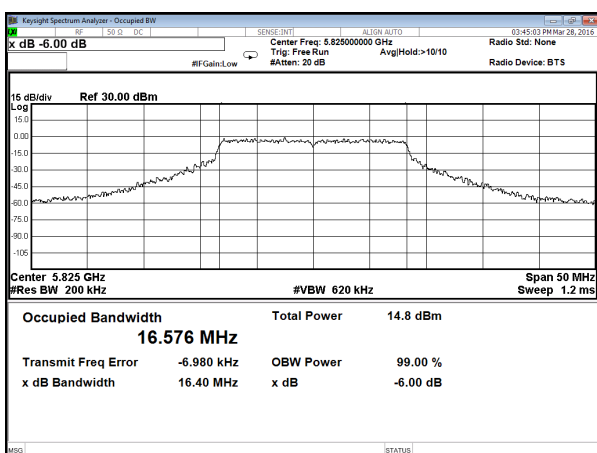
CH157



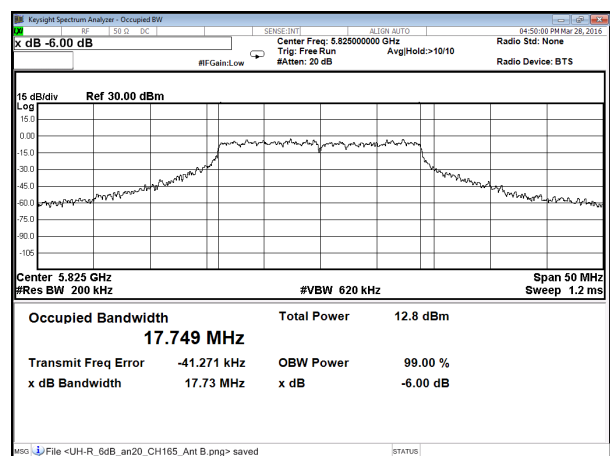
CH157

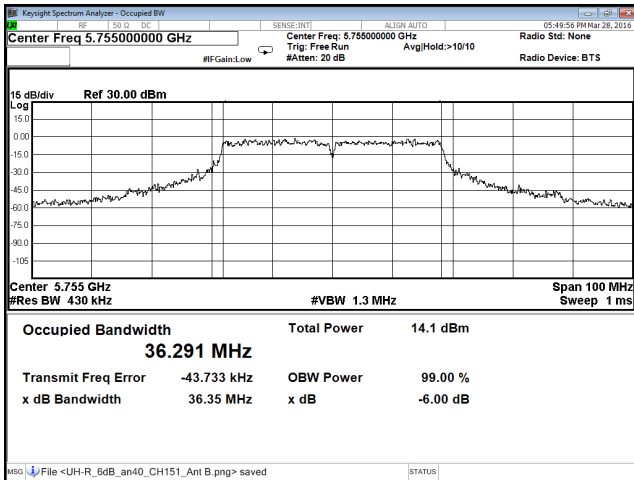
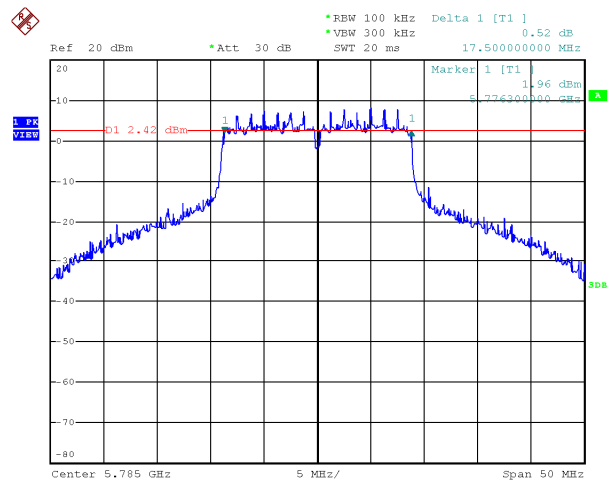


CH165

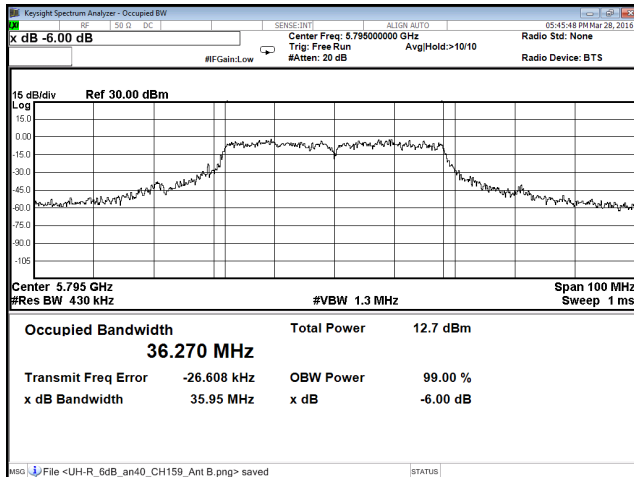


CH165

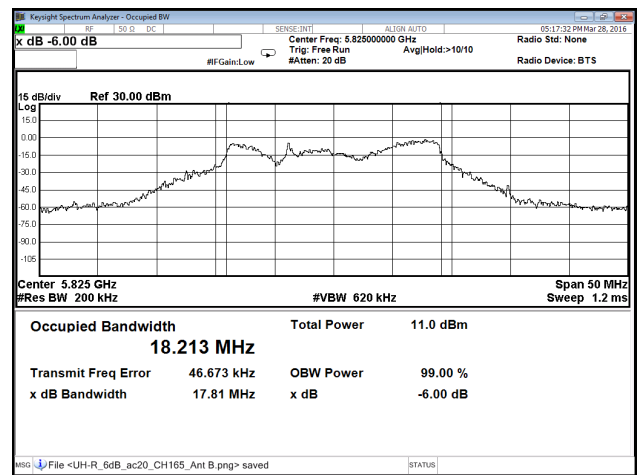
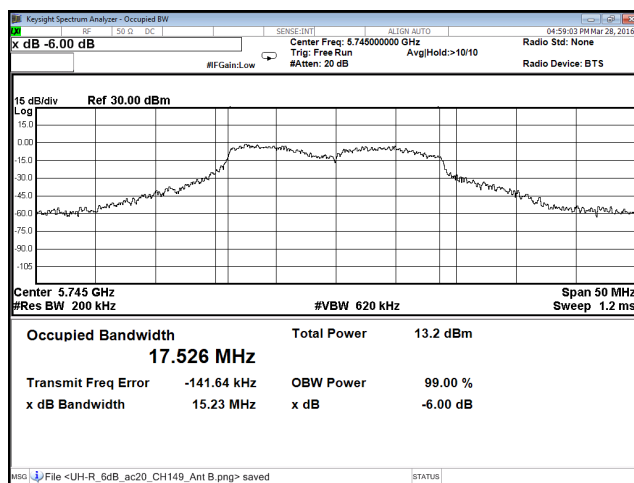
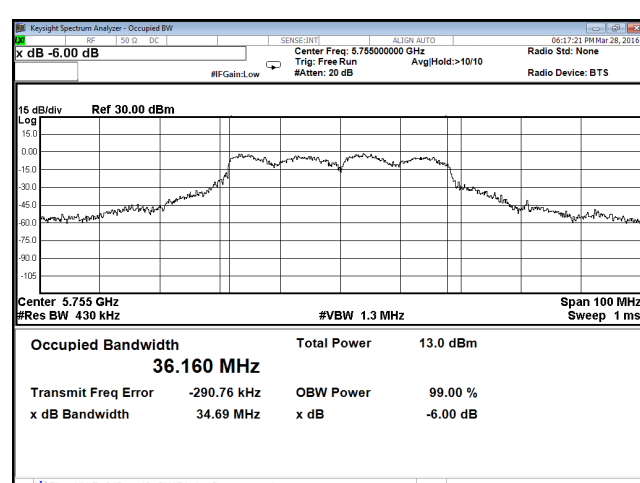


Modulation Standard: 802.11an, HT40 (40.5Mbps)
CH151Modulation Standard: 802.11ac, VHT20 (6.5Mbps)
CH157

CH159

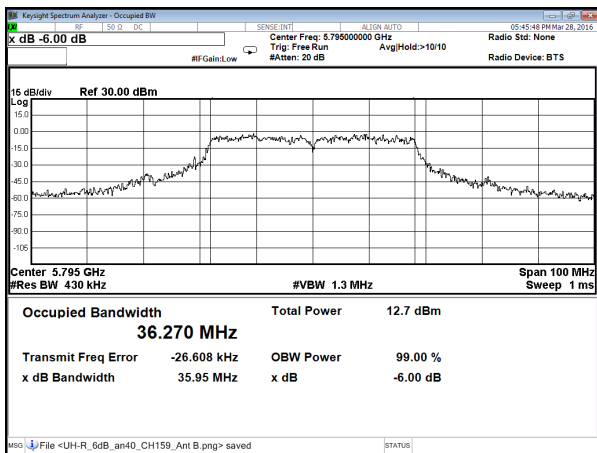


CH165

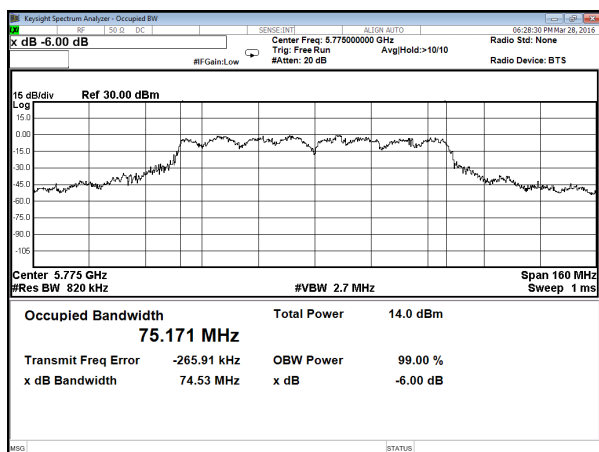
Modulation Standard: 802.11ac, VHT20 (6.5Mbps)
CH149Modulation Standard: 802.11ac, VHT40 (13.5Mbps)
CH151



Modulation Standard: 802.11ac, VHT40 (13.5Mbps)
CH159



Modulation Standard: 802.11ac, VHT80 (29.3Mbps)
CH155





9. 26dB Bandwidth

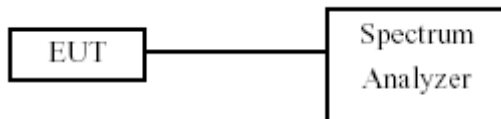
9.1. Test Limit

None; for reporting purposes only.

9.2. Test Procedure

Reference to 789033 D02 General UNII Test Procedures New Rules v01: The transmitter output is connected to a spectrum analyzer with the RBW = approximately 1% of the emission bandwidth, the VBW $\geq 3 \times$ RBW, peak detector and max hold.

9.3. Test Setup Layout





9.4. Test Result and Data

Test Date: May 12, 2016

Temperature: 25°C

Atmospheric pressure: 1016 hPa

Humidity: 56%

802.11a mode in the 5.2G Band

Channel	Frequency (MHz)	Ant. 0 26dB Bandwidth (MHz)	Ant. 1 26dB Bandwidth (MHz)	Ant. 2 26dB Bandwidth (MHz)
Low	5180	20.89	20.47	20.91
Middle	5220	27.10	24.10	28.80
High	5240	20.47	20.12	21.21
Worst		27.10	24.10	28.80

802.11n HT20 mode in the 5.2G Band

Channel	Frequency (MHz)	Ant. 0 26dB Bandwidth (MHz)	Ant. 1 26dB Bandwidth (MHz)	Ant. 2 26dB Bandwidth (MHz)
Low	5180	20.34	19.58	19.60
Middle	5220	33.60	28.70	27.70
High	5240	19.77	20.21	19.43
Worst		33.60	28.70	27.70

802.11n HT40 mode in the 5.2G Band

Channel	Frequency (MHz)	Ant. 0 26dB Bandwidth (MHz)	Ant. 1 26dB Bandwidth (MHz)	Ant. 2 26dB Bandwidth (MHz)
Low	5190	40.65	39.76	43.95
High	5230	50.00	47.40	47.60
Worst		50.00	46.80	47.60

**802.11ac VHT20 mode in the 5.2G Band**

Channel	Frequency (MHz)	Ant. 0 26dB Bandwidth (MHz)	Ant. 1 26dB Bandwidth (MHz)	Ant. 2 26dB Bandwidth (MHz)
Low	5180	20.93	19.96	19.62
Middle	5220	27.85	23.70	26.55
High	5240	20.42	20.45	20.06
Worst		27.85	23.70	26.55

802.11ac VHT40 mode in the 5.2G Band

Channel	Frequency (MHz)	Ant. 0 26dB Bandwidth (MHz)	Ant. 1 26dB Bandwidth (MHz)	Ant. 2 26dB Bandwidth (MHz)
Low	5190	40.59	40.14	40.60
High	5230	48.40	46.80	48.20
Worst		48.40	46.80	48.20

802.11ac VHT80 mode in the 5.2G Band

Channel	Frequency (MHz)	Ant. 0 26dB Bandwidth (MHz)	Ant. 1 26dB Bandwidth (MHz)	Ant. 2 26dB Bandwidth (MHz)
Middle	5210	84.16	85.76	83.84
Worst		84.16	85.76	83.84

**802.11a mode in the 5.8G Band**

Channel	Frequency (MHz)	Ant. 0 26dB Bandwidth (MHz)	Ant. 1 26dB Bandwidth (MHz)	Ant. 2 26dB Bandwidth (MHz)
Low	5745	21.24	20.93	20.67
Middle	5785	31.70	30.60	28.90
High	5825	21.20	20.40	21.21
Worst		31.70	30.60	28.90

802.11n HT20 mode in the 5.8G Band

Channel	Frequency (MHz)	Ant. 0 26dB Bandwidth (MHz)	Ant. 1 26dB Bandwidth (MHz)	Ant. 2 26dB Bandwidth (MHz)
Low	5745	20.10	20.39	19.98
Middle	5785	32.80	32.00	30.20
High	5825	20.13	20.79	19.87
Worst		32.80	32.00	30.20

802.11n HT40 mode in the 5.8G Band

Channel	Frequency (MHz)	Ant. 0 26dB Bandwidth (MHz)	Ant. 1 26dB Bandwidth (MHz)	Ant. 2 26dB Bandwidth (MHz)
Low	5755	40.37	41.93	40.94
High	5795	40.34	40.58	40.45
Worst		40.37	41.93	40.94

**802.11ac VHT20 mode in the 5.8G Band**

Channel	Frequency (MHz)	Ant. 0 26dB Bandwidth (MHz)	Ant. 1 26dB Bandwidth (MHz)	Ant. 2 26dB Bandwidth (MHz)
Low	5745	20.55	19.65	19.95
Middle	5785	35.10	31.40	34.50
High	5825	22.55	21.20	21.29
Worst		35.10	31.40	34.50

802.11ac VHT40 mode in the 5.8G Band

Channel	Frequency (MHz)	Ant. 0 26dB Bandwidth (MHz)	Ant. 1 26dB Bandwidth (MHz)	Ant. 2 26dB Bandwidth (MHz)
Low	5755	41.00	41.15	40.50
High	5795	41.66	41.58	42.91
Worst		41.66	41.58	42.91

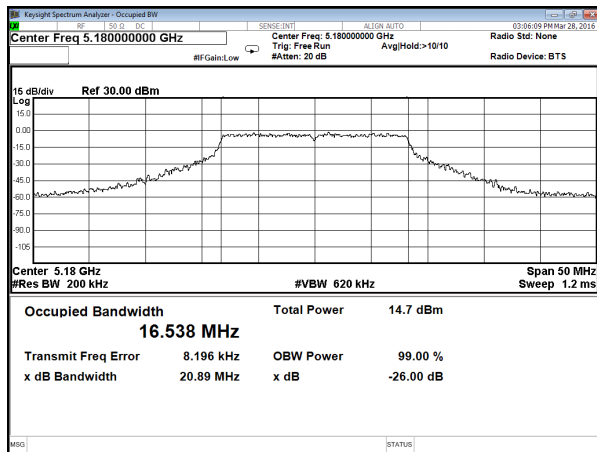
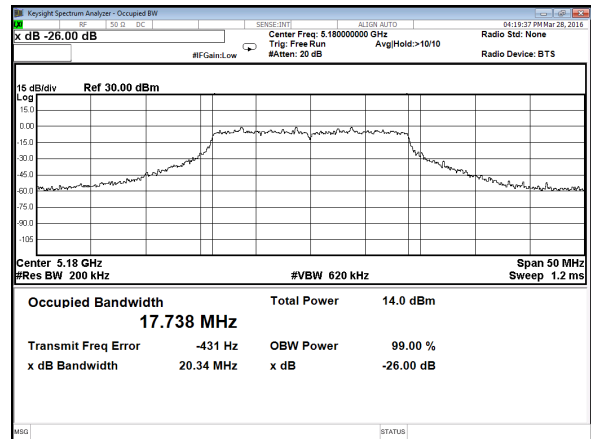
802.11ac VHT80 mode in the 5.8G Band

Channel	Frequency (MHz)	Ant. 0 26dB Bandwidth (MHz)	Ant. 1 26dB Bandwidth (MHz)	Ant. 2 26dB Bandwidth (MHz)
Middle	5775	81.41	82.55	82.14
Worst		81.41	82.55	82.14

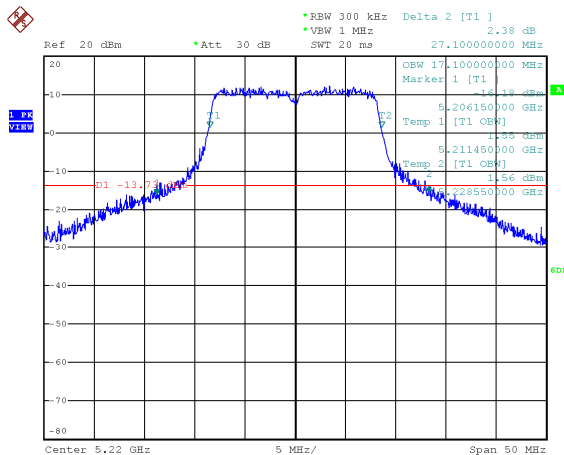


5.2G Band

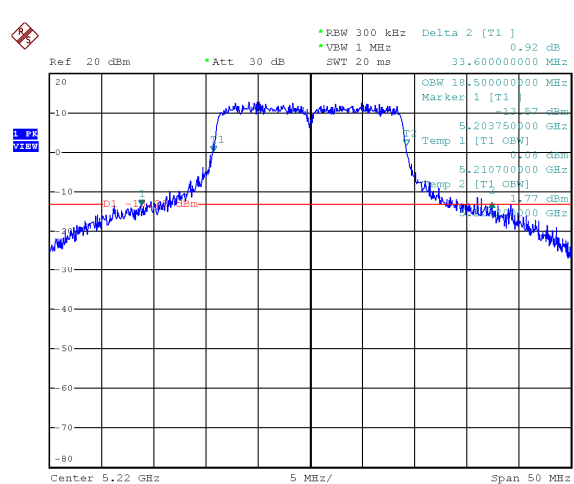
Antenna 0

Modulation Standard: 802.11a (6Mbps)
CH36Modulation Standard: 802.11an HT20 (19.5Mbps)
CH36

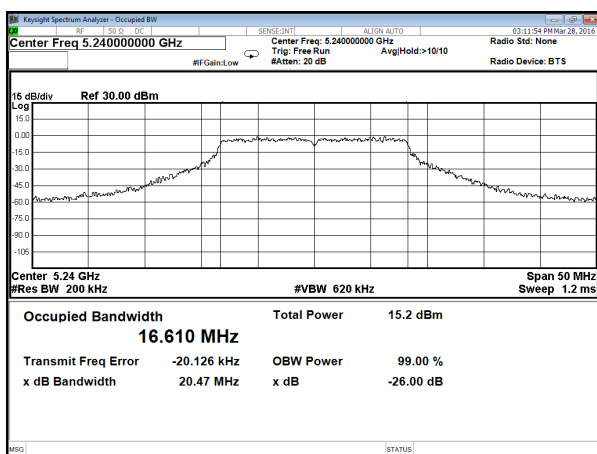
CH44



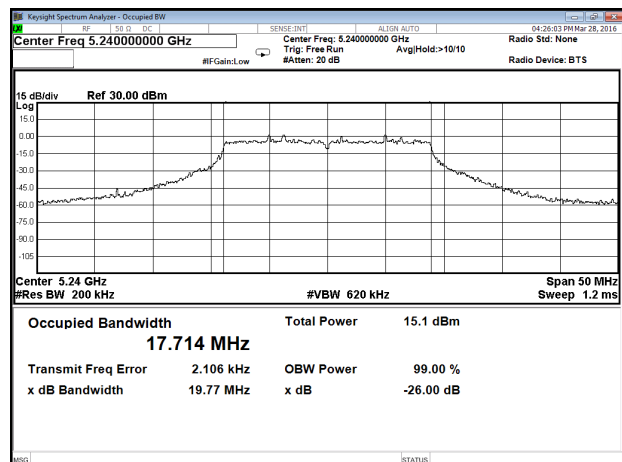
CH44

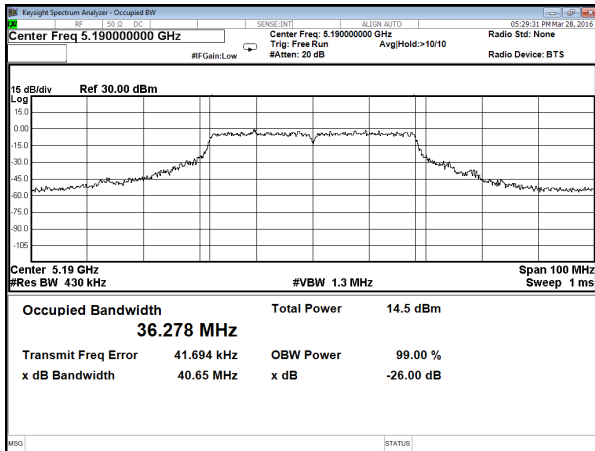
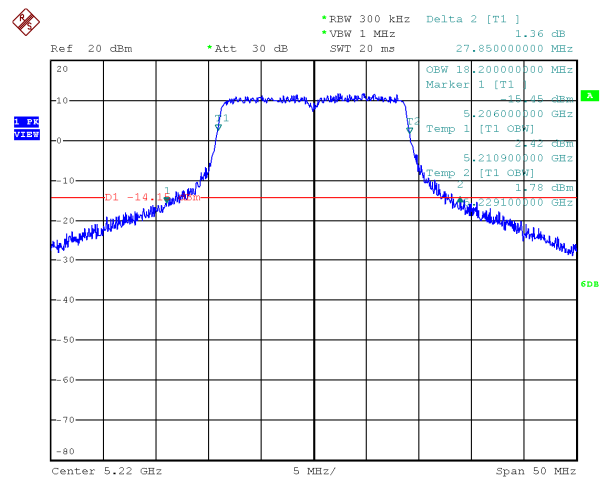


CH48

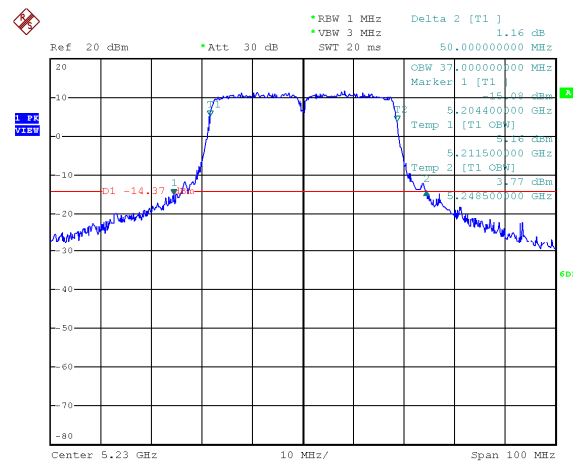


CH48

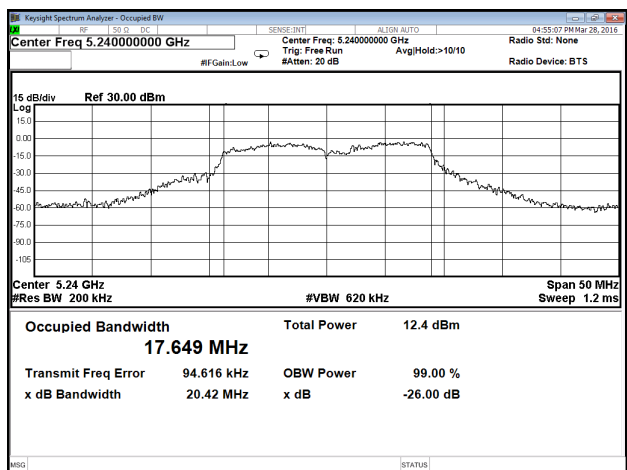
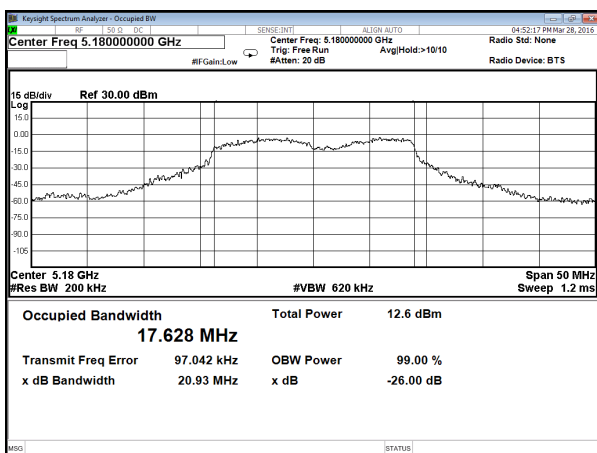
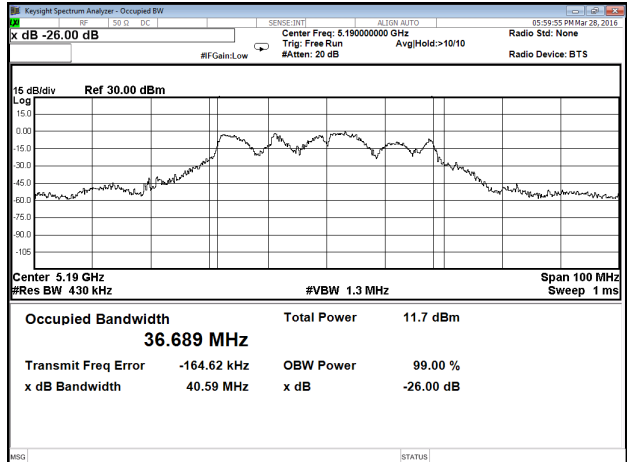


Modulation Standard: 802.11an HT40 (40.5Mbps)
CH38Modulation Standard: 802.11ac VHT20 (6.5Mbps)
CH44

CH46

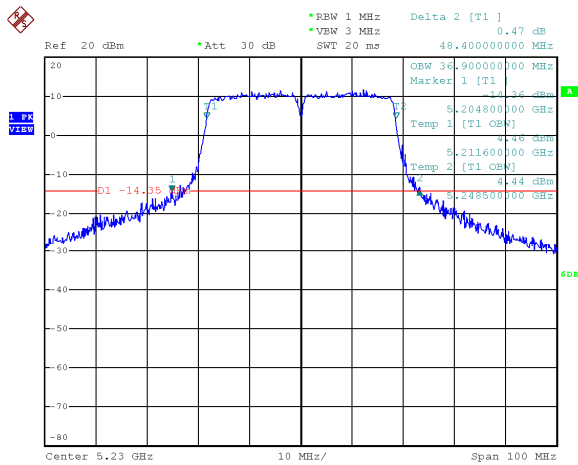


CH48

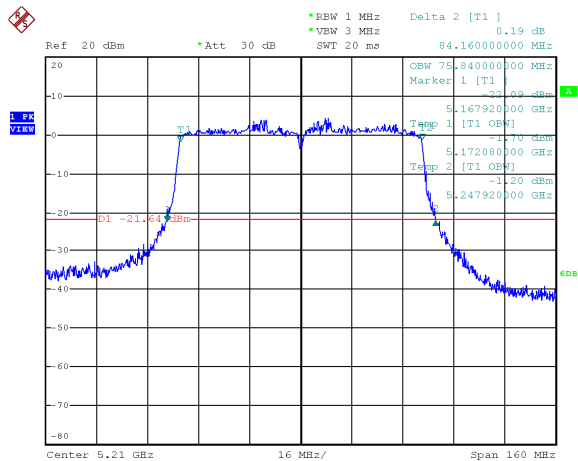
Modulation Standard: 802.11ac VHT20 (6.5Mbps)
CH36Modulation Standard: 802.11ac VHT40 (13.5Mbps)
CH38



Modulation Standard: 802.11ac VHT40 (13.5Mbps)
CH46

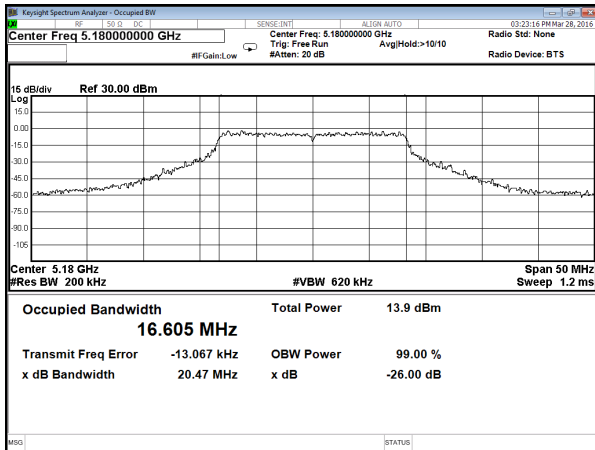
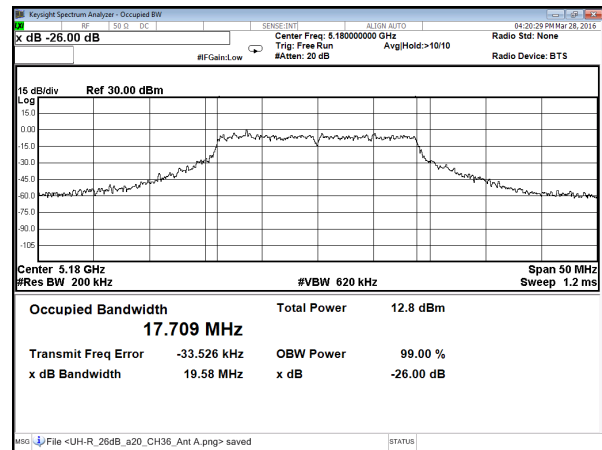


Modulation Standard: 802.11ac VHT80 (29.3Mbps)
CH42

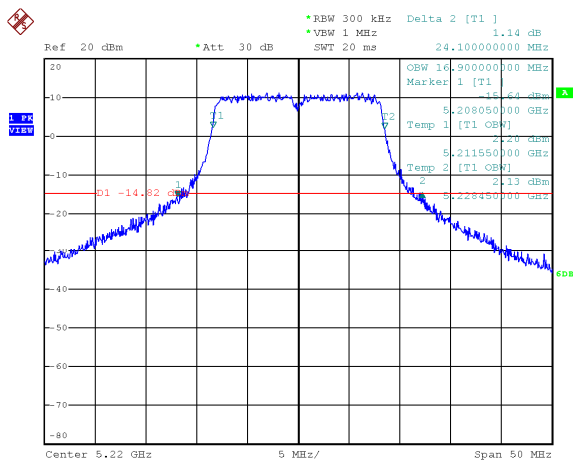




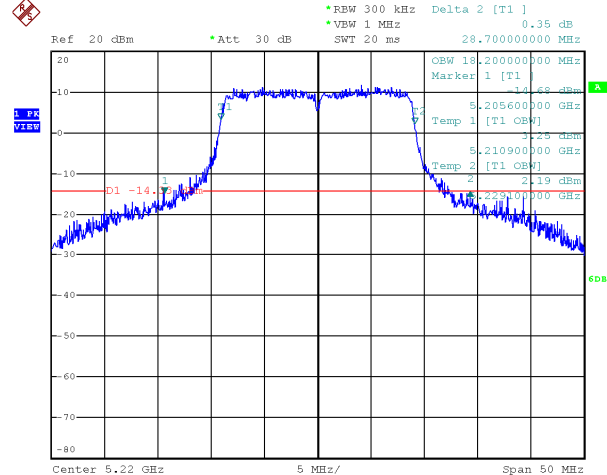
Antenna 1

Modulation Standard: 802.11a (6Mbps)
CH36Modulation Standard: 802.11an HT20 (19.5Mbps)
CH36

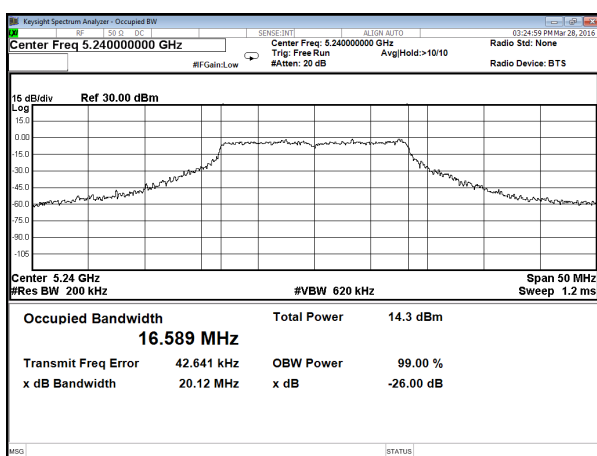
CH44



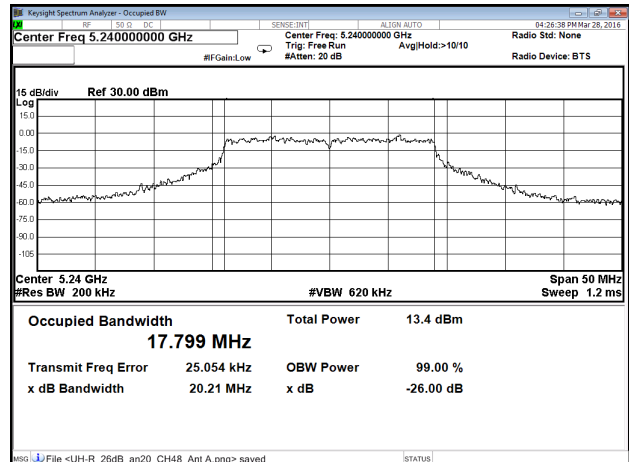
CH44

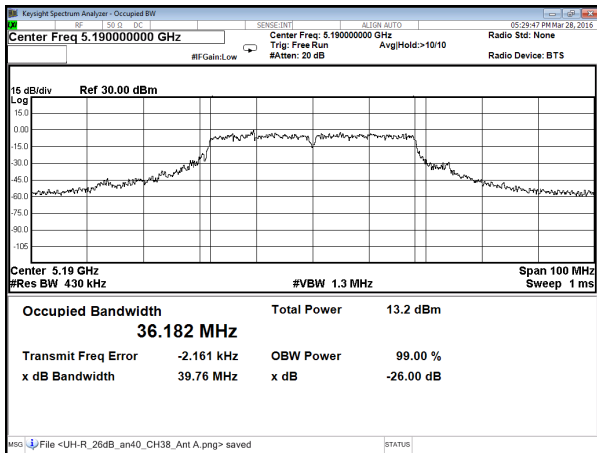
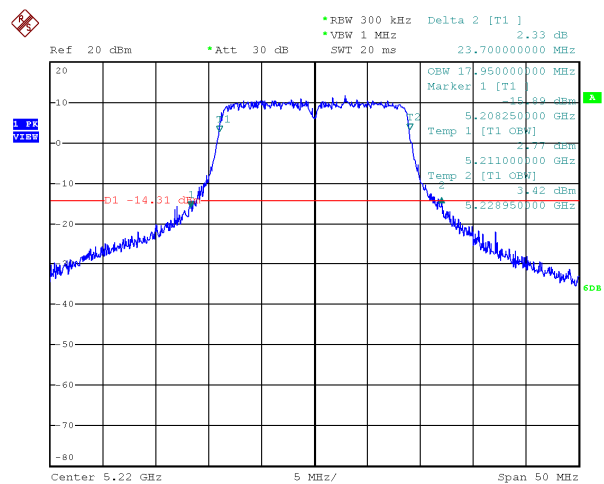


CH48

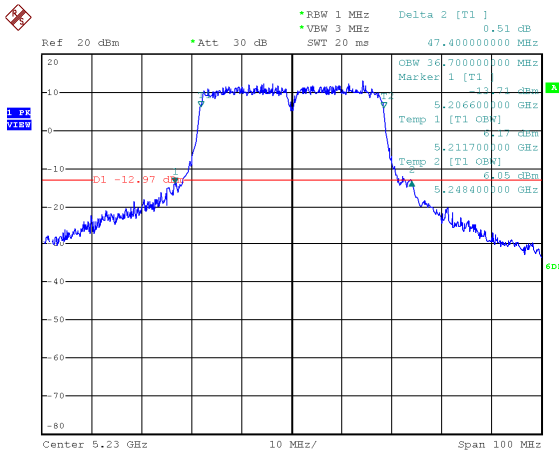


CH48

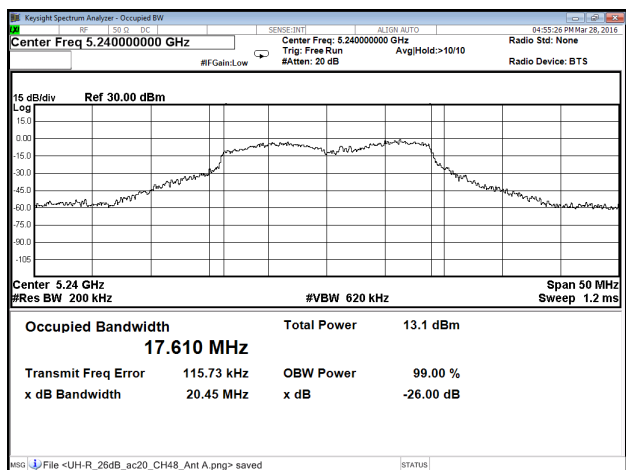
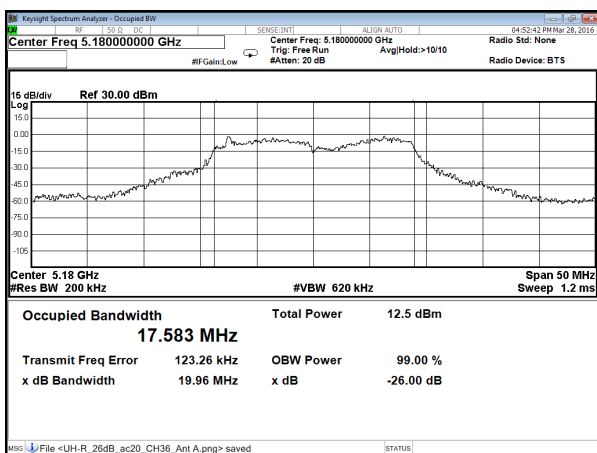
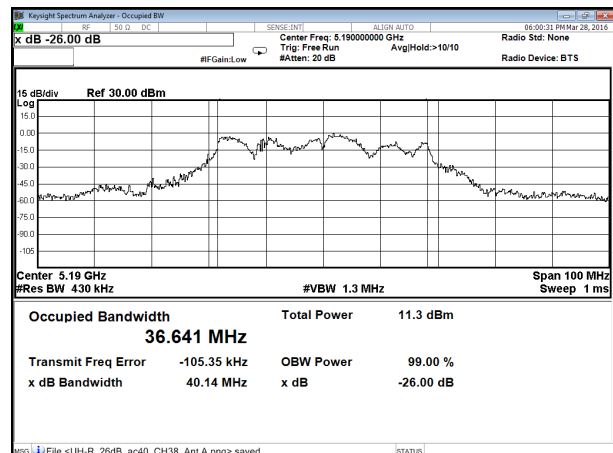


Modulation Standard: 802.11an HT40 (40.5Mbps)
CH38Modulation Standard: 802.11ac VHT20 (6.5Mbps)
CH44

CH46

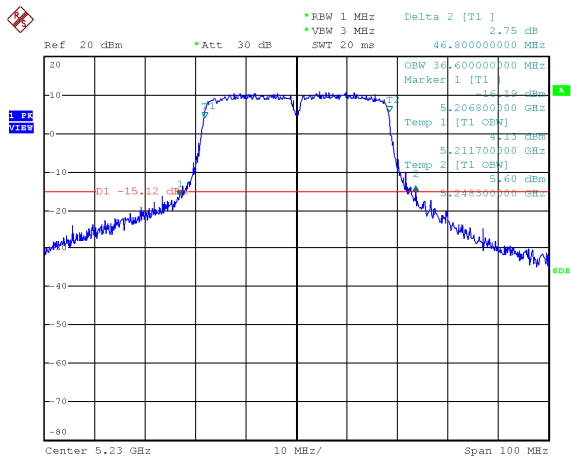


CH48

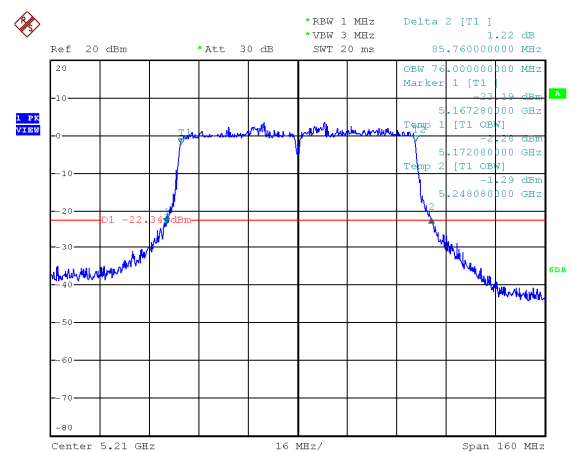
Modulation Standard: 802.11ac VHT20 (6.5Mbps)
CH36Modulation Standard: 802.11ac VHT40 (13.5Mbps)
CH38



Modulation Standard: 802.11ac VHT40 (13.5Mbps)
CH46



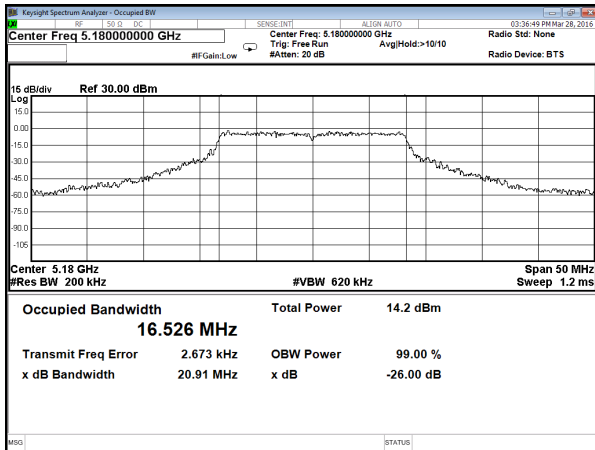
Modulation Standard: 802.11ac VHT80 (29.3Mbps)
CH42



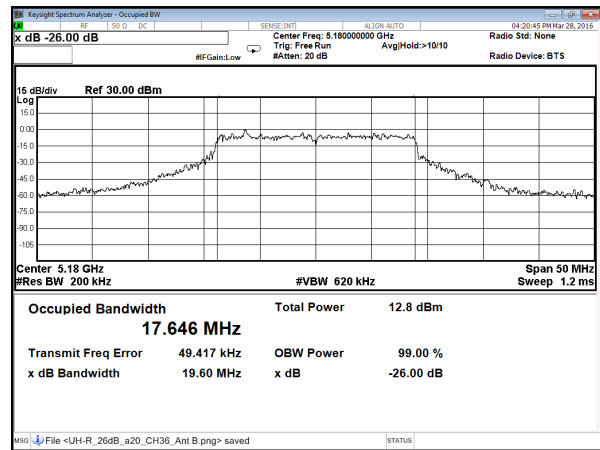


Antenna 2

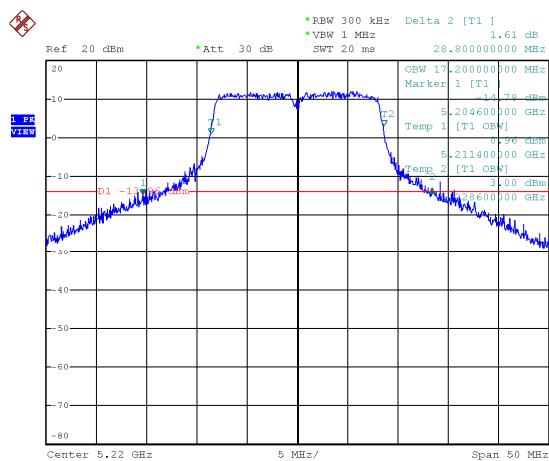
Modulation Standard: 802.11a (6Mbps)
CH36



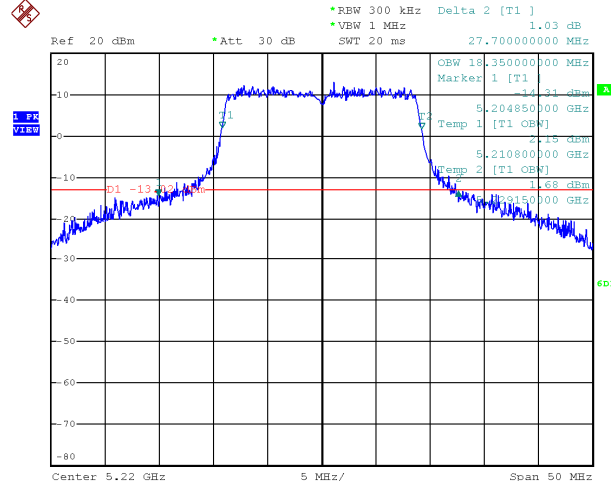
Modulation Standard: 802.11an HT20 (19.5Mbps)
CH36



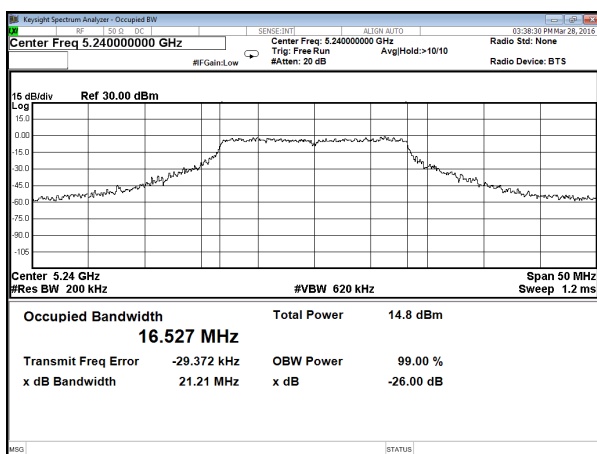
CH44



CH44



CH48



CH48

