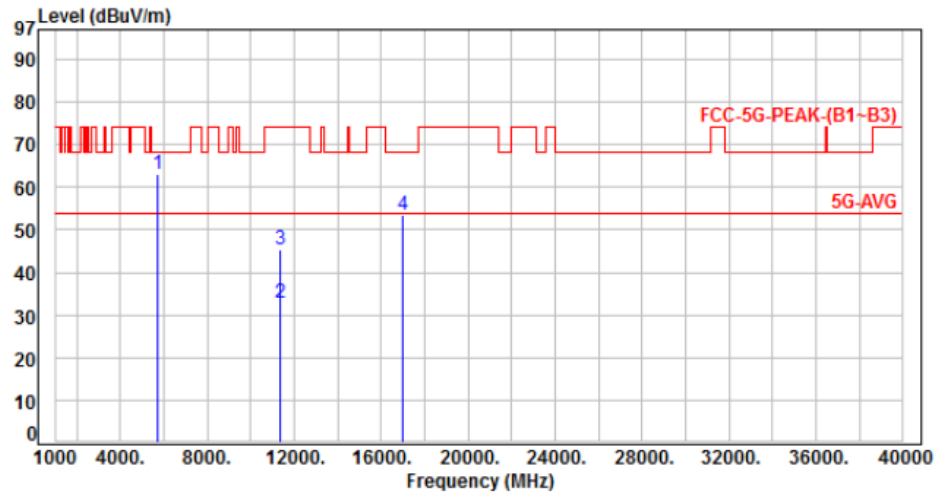




Power	: From PoE	Pol/Phase	: VERTICAL
Test Mode	: Mode 3, Band 3, CH134	Temperature	: 22 °C
Test Date	: Nov. 12, 2018	Humidity	: 63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	5725.00	-6.95	70.11	63.16	68.20	-5.04	Peak	160	230	P
2	11340.00	0.96	31.88	32.84	54.00	-21.16	Average	100	189	P
3	11340.00	0.96	44.25	45.21	74.00	-28.79	Peak	100	189	P
4	17010.00	10.22	43.20	53.42	68.20	-14.78	Peak	100	196	P

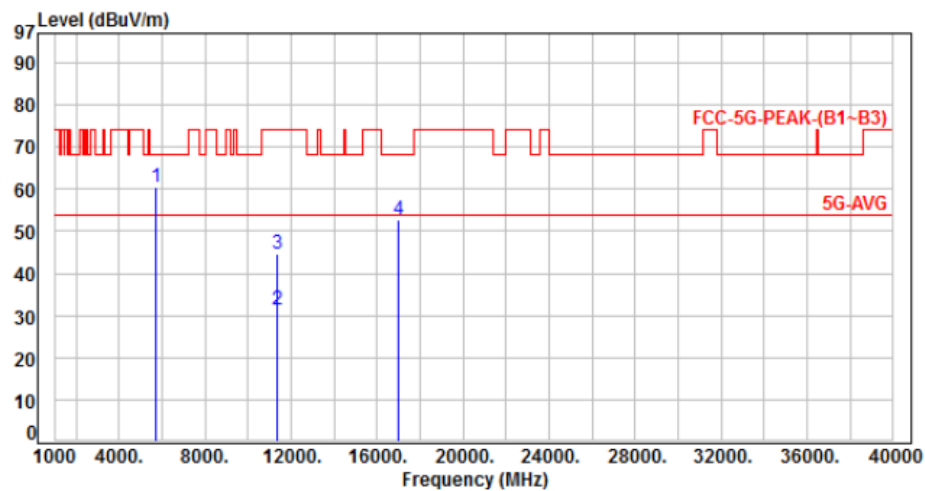
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: From PoE	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 3, Band 3, CH134	Temperature	: 22 °C
Test Date	: Nov. 12, 2018	Humidity	: 63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	5725.00	-6.95	67.51	60.56	68.20	-7.64	Peak	183	15	P
2	11340.00	0.96	30.24	31.20	54.00	-22.80	Average	106	177	P
3	11340.00	0.96	43.51	44.47	74.00	-29.53	Peak	106	177	P
4	17010.00	10.22	42.67	52.89	68.20	-15.31	Peak	100	328	P

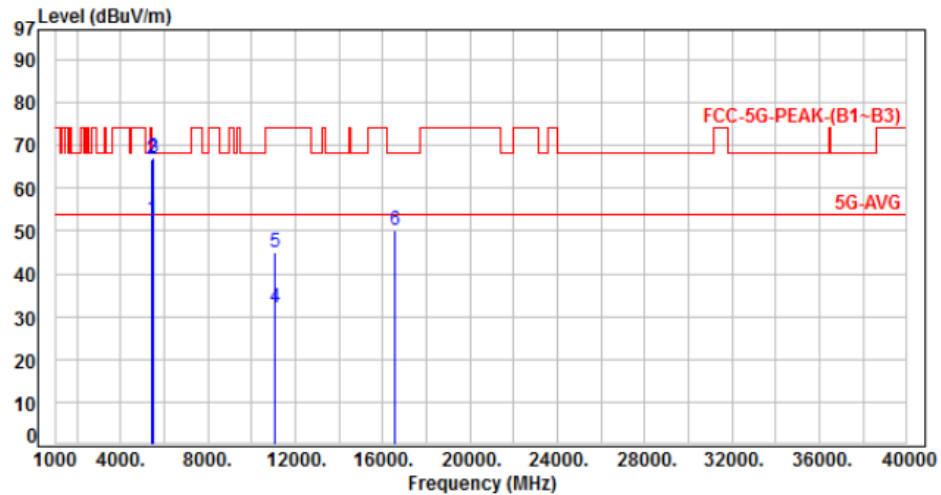
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: From PoE	Pol/Phase	: VERTICAL
Test Mode	: Mode 4, Band 3, CH106	Temperature	: 22 °C
Test Date	: Nov. 12, 2018	Humidity	: 63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	5460.00	-7.10	59.80	52.70	54.00	-1.30	Average	152	215	P
2	5460.00	-7.10	73.80	66.70	74.00	-7.30	Peak	152	215	P
3	5470.00	-7.08	74.20	67.12	68.20	-1.08	Peak	152	215	P
4	11060.00	0.55	31.53	32.08	54.00	-21.92	Average	100	247	P
5	11060.00	0.55	44.30	44.85	74.00	-29.15	Peak	100	247	P
6	16590.00	7.78	42.35	50.13	68.20	-18.07	Peak	100	91	P

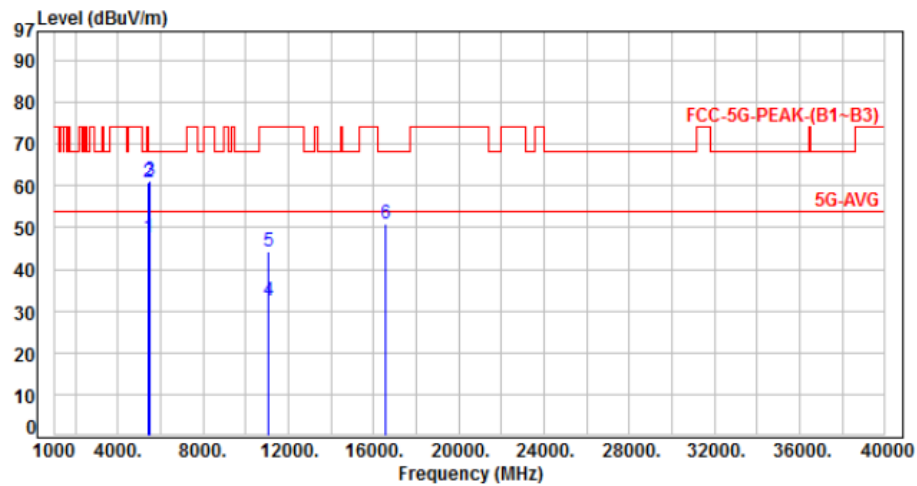
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: From PoE	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 4, Band 3, CH106	Temperature	: 22 °C
Test Date	: Nov. 12, 2018	Humidity	: 63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	5460.00	-7.10	54.50	47.40	54.00	-6.60	Average	100	13	P
2	5460.00	-7.10	67.80	60.70	74.00	-13.30	Peak	100	13	P
3	5470.00	-7.08	68.20	61.12	68.20	-7.08	Peak	100	13	P
4	11060.00	0.55	31.88	32.43	54.00	-21.57	Average	100	186	P
5	11060.00	0.55	43.87	44.42	74.00	-29.58	Peak	100	186	P
6	16590.00	7.78	43.21	50.99	68.20	-17.21	Peak	100	309	P

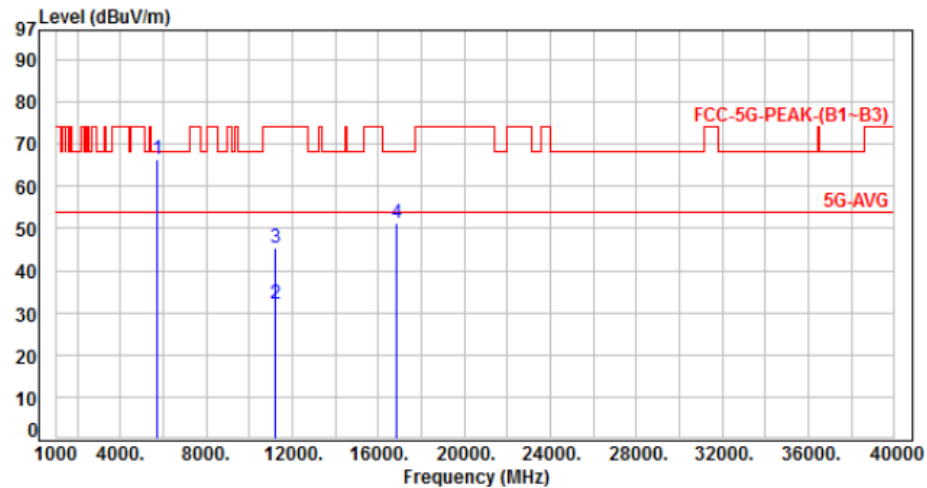
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	: From PoE	Pol/Phase	: VERTICAL
Test Mode	: Mode 4, Band 3, CH122	Temperature	: 22 °C
Test Date	: Nov. 12, 2018	Humidity	: 63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBUV)	Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	5725.00	-6.95	73.51	66.56	68.20	-1.64	Peak	133	220	P
2	11220.00	0.79	31.35	32.14	54.00	-21.86	Average	100	192	P
3	11220.00	0.79	44.50	45.29	74.00	-28.71	Peak	100	192	P
4	16830.00	9.16	42.23	51.39	68.20	-16.81	Peak	100	82	P

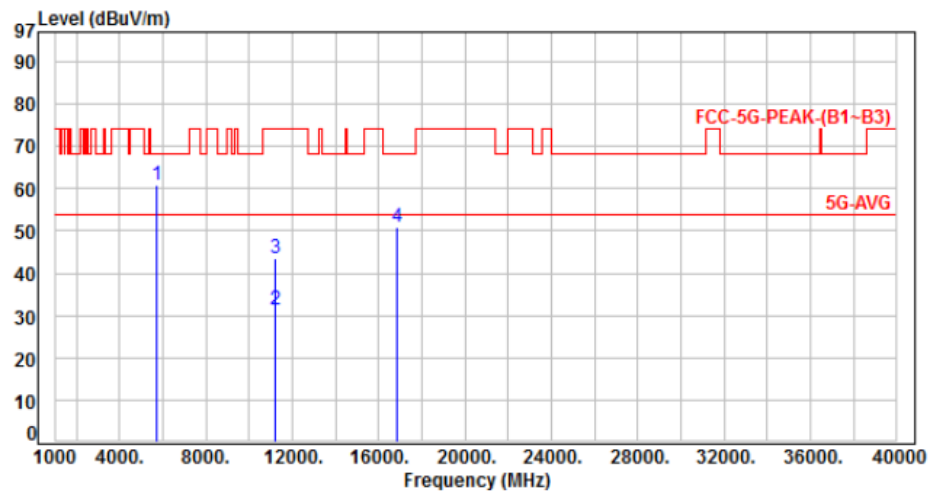
Note: Level=Reading+Factor

Margin=Level-Limit

Factor=Antenna Factor + cable loss - Amplifier Factor



Power	:	From PoE	Pol/Phase	:	HORIZONTAL
Test Mode	:	Mode 4, Band 3, CH122	Temperature	:	22 °C
Test Date	:	Nov. 12, 2018	Humidity	:	63 %



No.	Frequency (MHz)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	5725.00	-6.95	67.91	60.96	68.20	-7.24	Peak	100	104	P
2	11220.00	0.79	30.63	31.42	54.00	-22.58	Average	100	171	P
3	11220.00	0.79	42.81	43.60	74.00	-30.40	Peak	100	171	P
4	16830.00	9.16	41.68	50.84	68.20	-17.36	Peak	100	314	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



7. On Time, Duty Cycle and Measurement methods

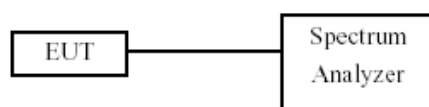
7.1. Test Limit

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

Temperature: 22°C

Humidity: 64%

Test Date: Dec. 19, 2018

Modulation Mode	On Time (ms)	Period Time (ms)	Duty Cycle (%)
802.11a,6M	2.11	2.15	98.14%
802.11ac VHT20 ,M0	5.10	5.12	99.61%
802.11ac VHT40 ,M0	2.48	2.53	98.02%
802.11ac VHT80 ,M0	1.17	1.22	95.90%

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



8. 26dB Bandwidth & 99% Occupied Bandwidth

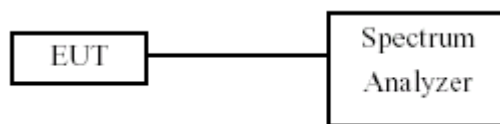
8.1. Test Limit

None; for reporting purposes only.

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 = approximately 1% of the emission bandwidth, the VBW $\geq 3 \times$ RBW, peak detector and max hold.

8.3. Test Setup Layout



8.4. Test Result and Data (26dB Bandwidth)

Temperature: 22°C

Humidity: 64%

Test Date: Dec. 19, 2018

In the 5.3GHz Band

Modulation Mode	Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
			ANT A	ANT B
802.11a	52	5260	19.50	19.20
	60	5300	19.40	19.10
	64	5320	19.40	19.10
802.11ac VHT20	52	5260	20.50	20.30
	60	5300	20.40	20.30
	64	5320	20.40	20.30
802.11ac VHT40	54	5270	41.00	41.20
	62	5310	40.60	41.00
802.11ac VHT80	58	5290	83.52	83.52

**In the 5.5GHz Band**

Modulation Mode	Channel	Frequency (MHz)	26dB Bandwidth (MHz)	
			ANT A	ANT B
802.11a	100	5500	19.90	19.90
	120	5600	20.00	19.70
	140	5700	20.00	19.80
802.11ac VHT20	100	5500	20.50	21.10
	120	5600	20.80	20.70
	140	5700	20.90	20.60
802.11ac VHT40	102	5510	40.80	40.80
	118	5590	41.00	41.00
	134	5670	40.80	41.00
802.11ac VHT80	106	5530	84.16	83.84
	122	5610	83.84	83.52



8.5. Test Result and Data (99% Occupied Bandwidth)

Temperature: 22°C

Humidity: 64%

Test Date: Dec. 19, 2018

In the 5.3GHz Band

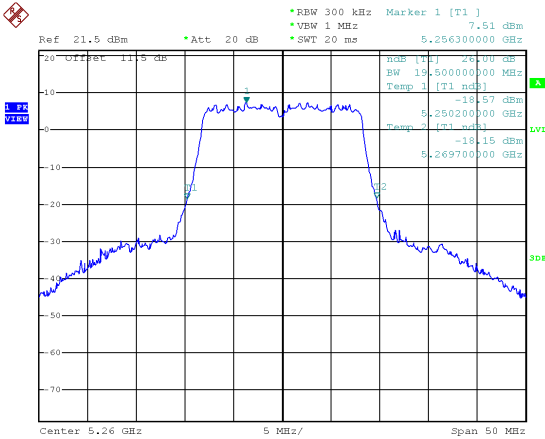
Modulation Mode	Channel	Frequency (MHz)	99% Bandwidth (MHz)	
			ANT A	ANT B
802.11a	52	5260	16.50	16.50
	60	5300	16.60	16.50
	64	5320	16.50	16.50
802.11ac VHT20	52	5260	17.70	17.70
	60	5300	17.70	17.70
	64	5320	17.70	17.70
802.11ac VHT40	54	5270	36.40	36.40
	62	5310	36.20	36.20
802.11ac VHT80	58	5290	75.52	75.84

In the 5.5GHz Band

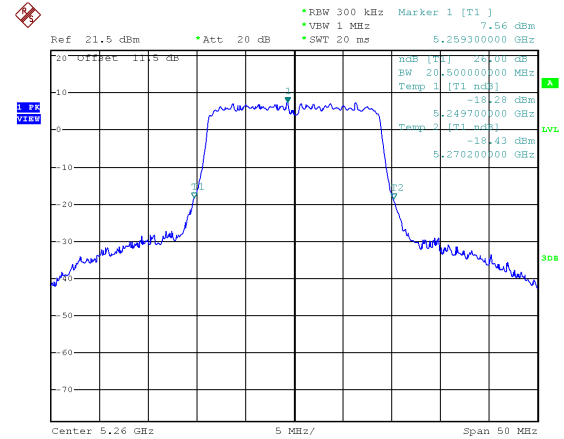
Modulation Mode	Channel	Frequency (MHz)	99% Bandwidth (MHz)	
			ANT A	ANT B
802.11a	100	5500	16.40	16.60
	120	5600	16.50	16.50
	140	5700	16.60	16.50
802.11ac VHT20	100	5500	17.70	17.80
	120	5600	17.60	17.70
	140	5700	17.70	17.60
802.11ac VHT40	102	5510	36.20	36.00
	118	5590	36.40	36.40
	134	5670	36.20	36.40
802.11ac VHT80	106	5530	75.52	75.84
	122	5610	76.16	75.52



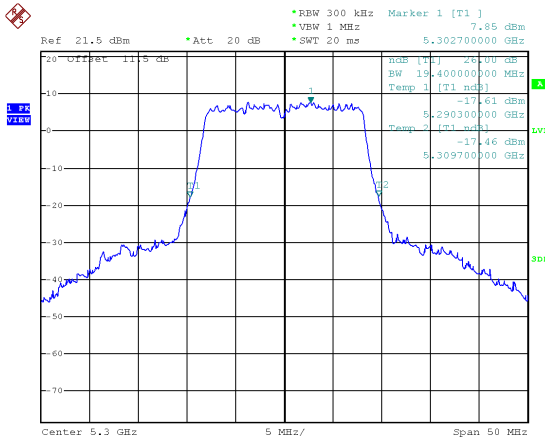
26dB Bandwidth
Band 2, ANT A
Modulation Standard: 802.11a (6Mbps)
CH52



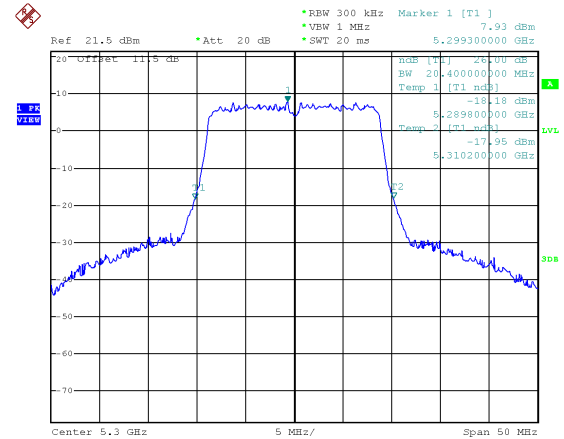
Modulation Standard: 802.11ac VHT20 (6.5Mbps)
CH52



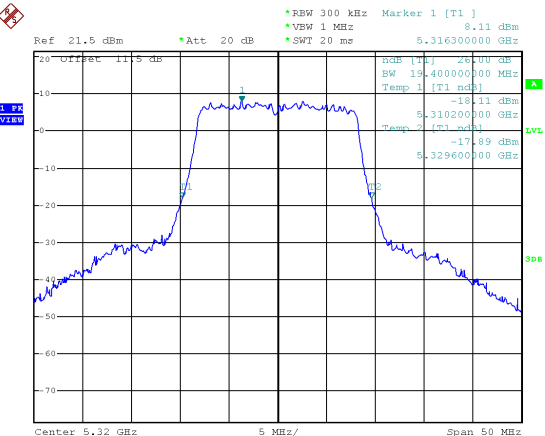
CH60



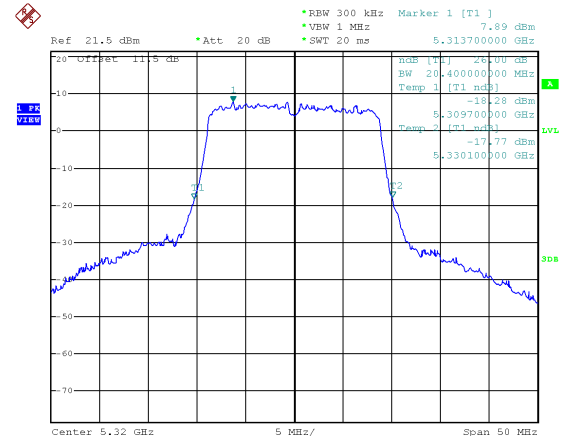
CH60



CH64

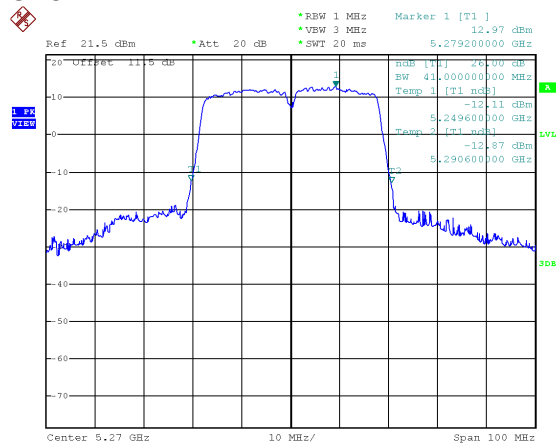
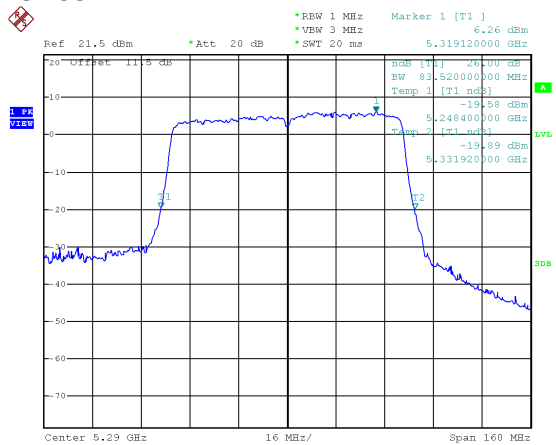


CH64

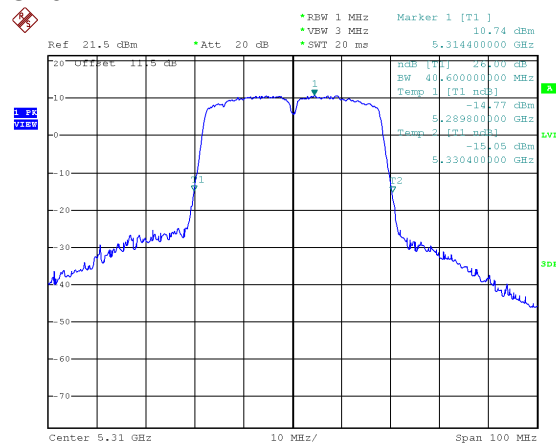




Band 2, ANT A

Modulation Standard: 802.11ac VHT40 (13.5Mbps)
CH54Modulation Standard: 802.11ac VHT80 (29.3Mbps)
CH58

CH62

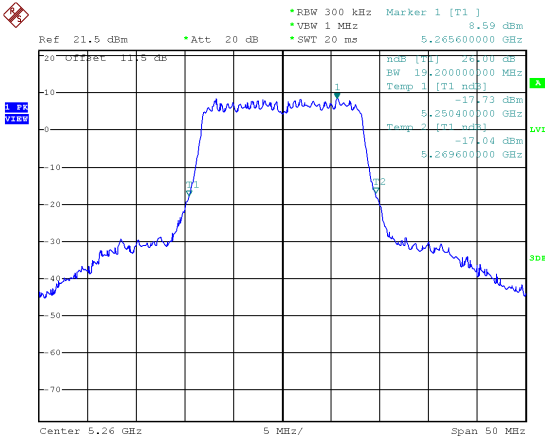
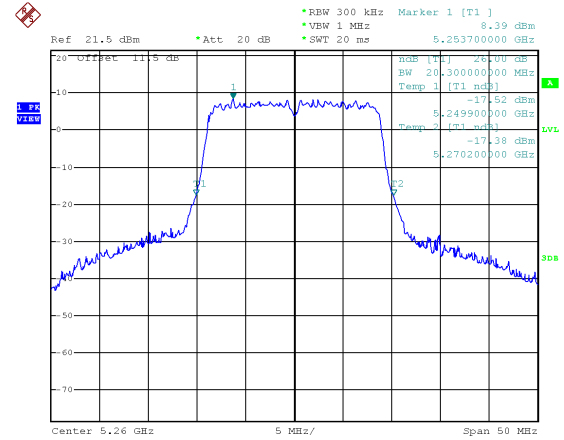




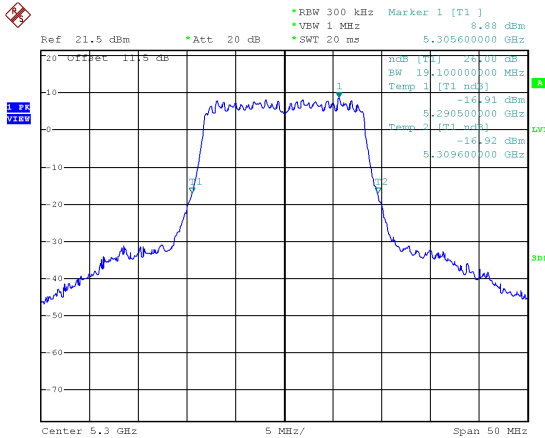
Band 2, ANT B

Modulation Standard: 802.11a (6Mbps)

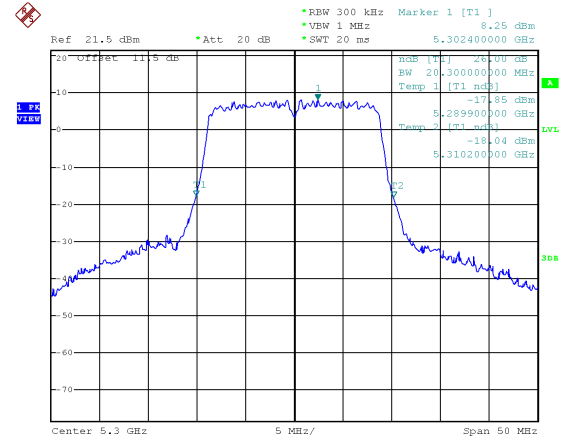
CH52

Modulation Standard: 802.11ac VHT20 (6.5Mbps)
CH52

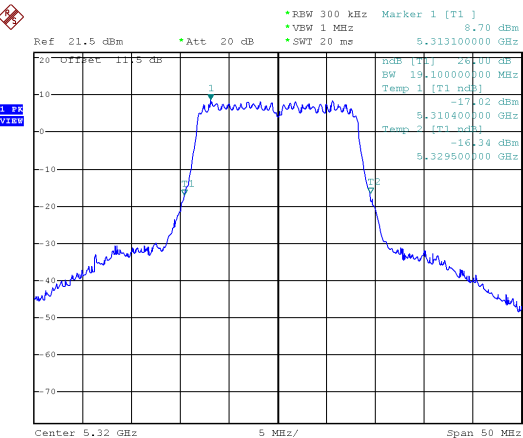
CH60



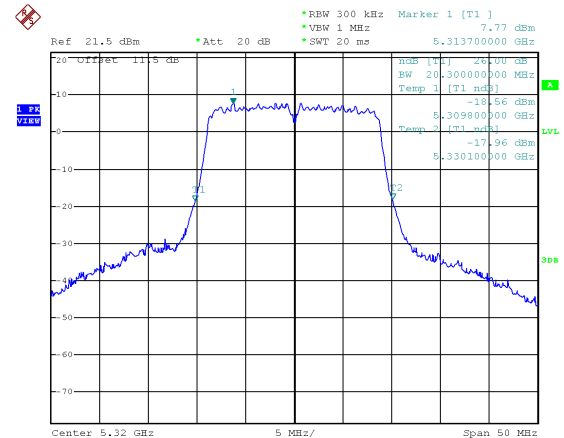
CH60



CH64

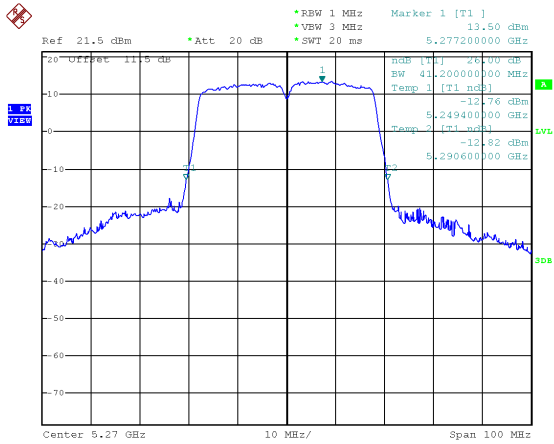
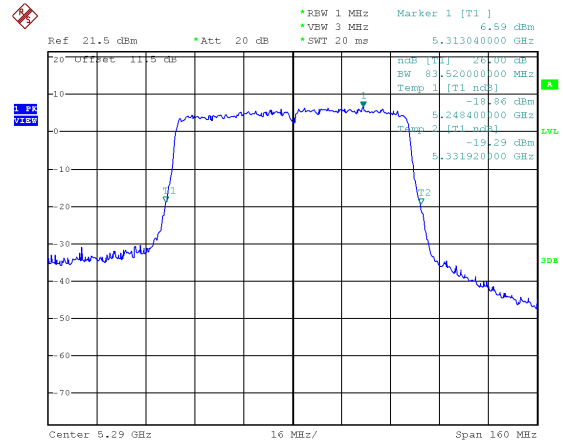


CH64

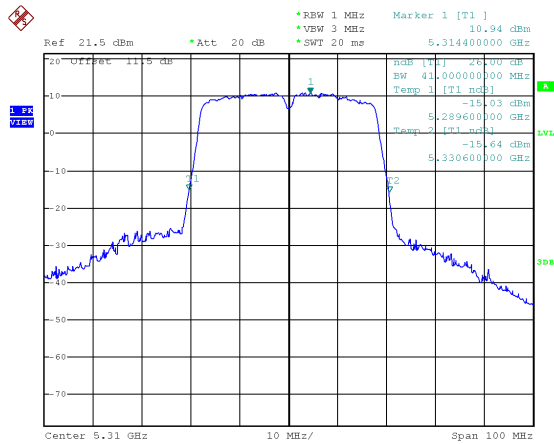




Band 2, ANT B

Modulation Standard: 802.11ac VHT40 (13.5Mbps)
CH54Modulation Standard: 802.11ac VHT80 (29.3Mbps)
CH58

CH62

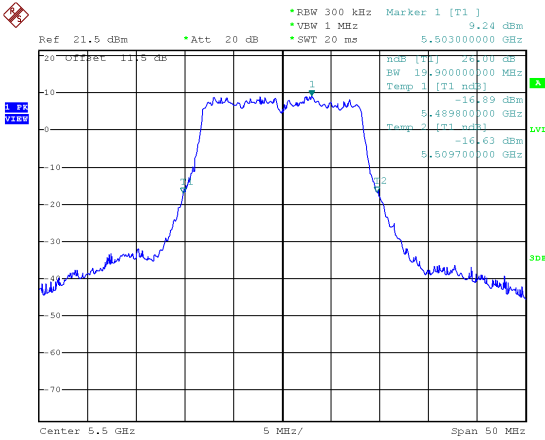
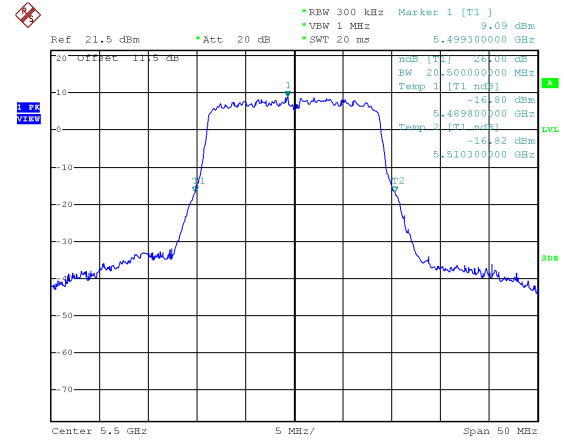




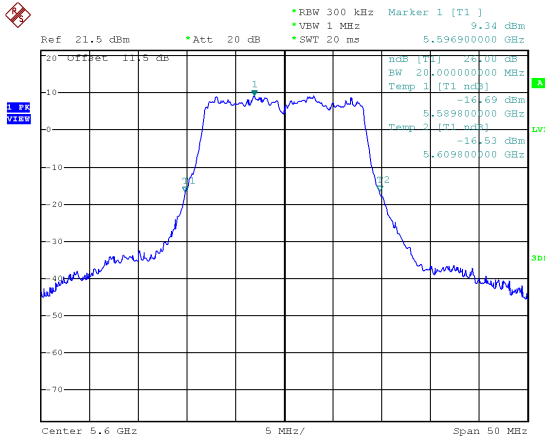
Band 3, ANT A

Modulation Standard: 802.11a (6Mbps)

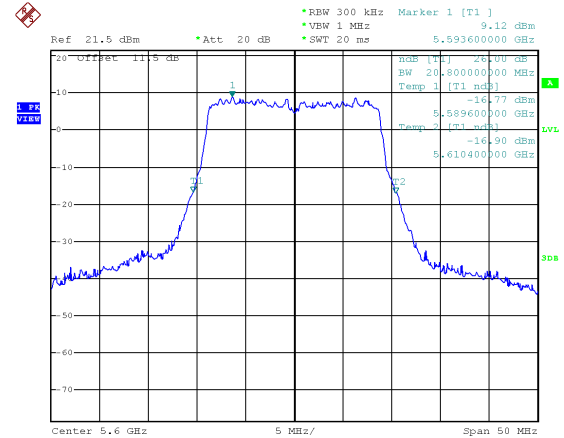
CH100

Modulation Standard: 802.11ac VHT20 (6.5Mbps)
CH100

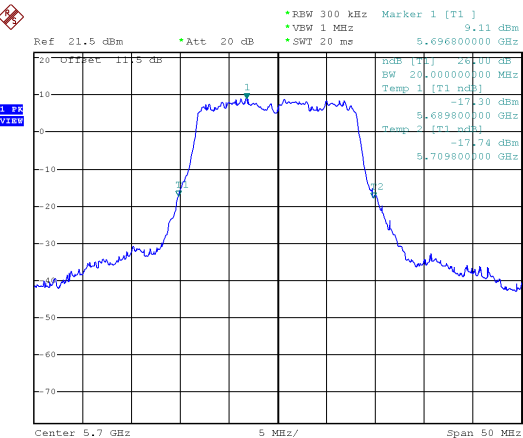
CH120



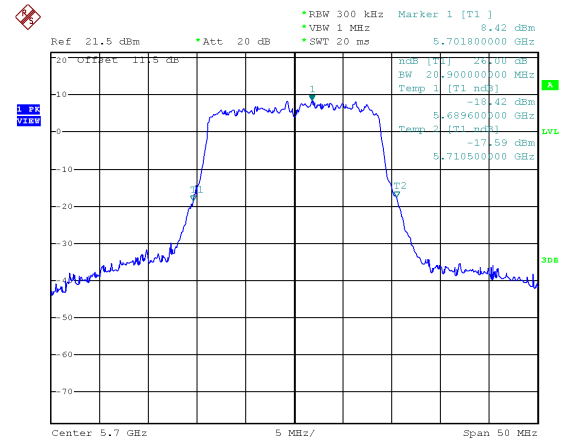
CH120



CH140

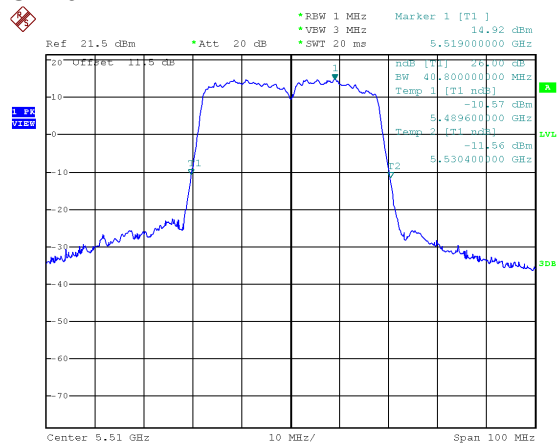
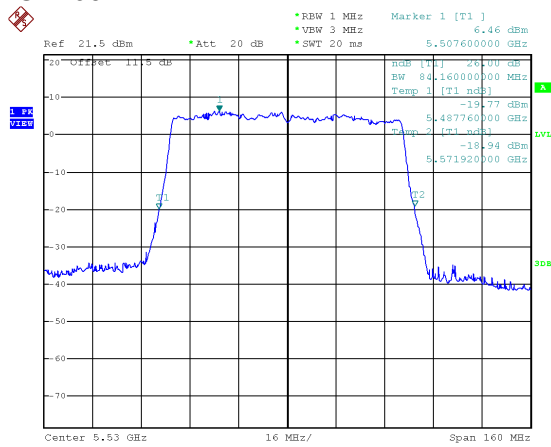


CH140

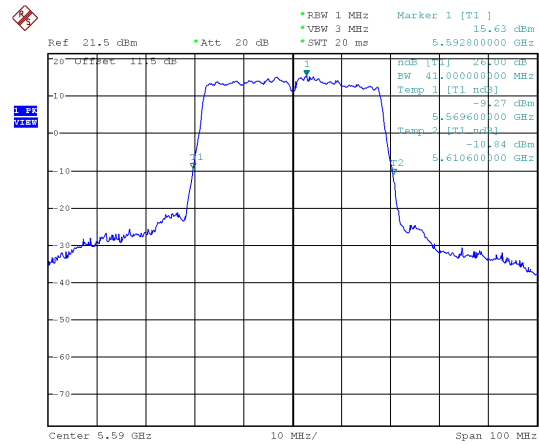




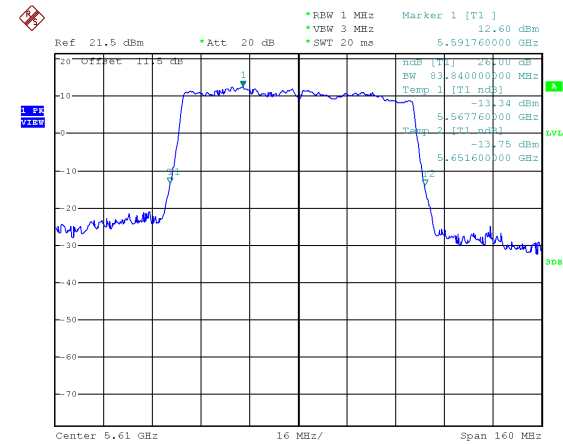
Band 3, ANT A

Modulation Standard: 802.11ac VHT40 (13.5Mbps)
CH102Modulation Standard: 802.11ac VHT80 (29.3Mbps)
CH106

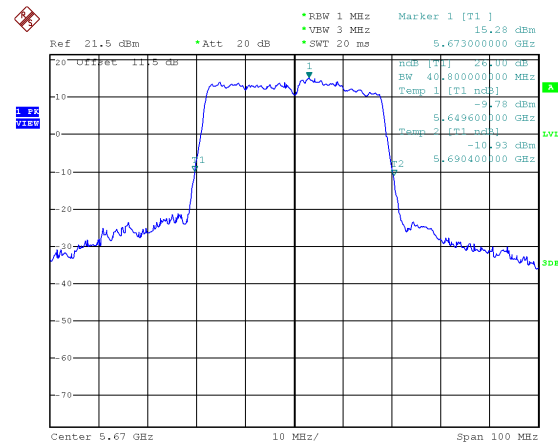
CH118



CH122



CH134

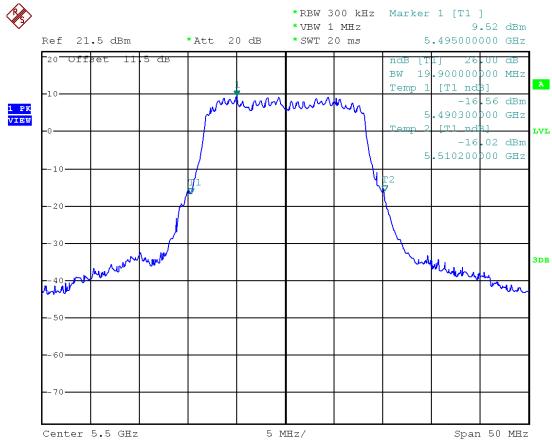
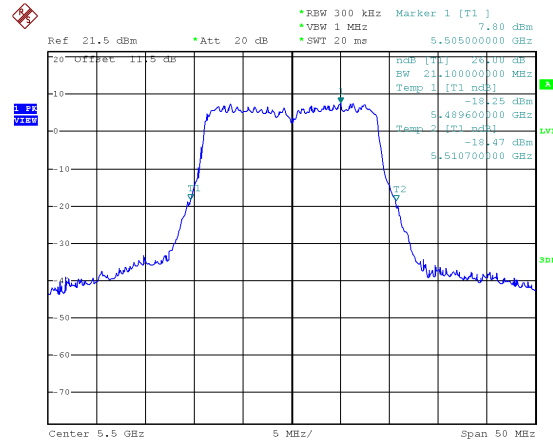




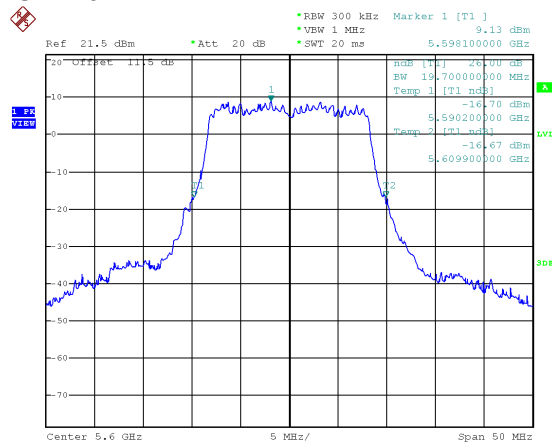
Band 3, ANT B

Modulation Standard: 802.11a (6Mbps)

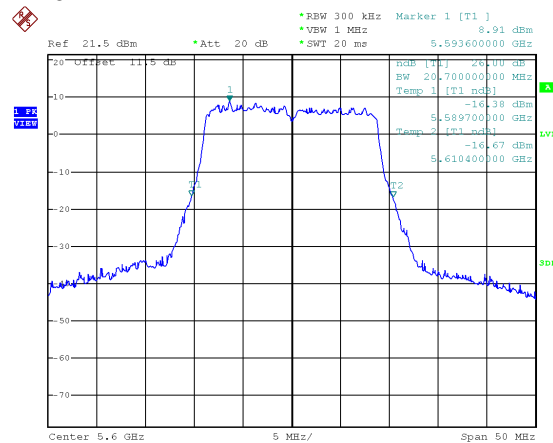
CH100

Modulation Standard: 802.11ac VHT20 (6.5Mbps)
CH100

CH120

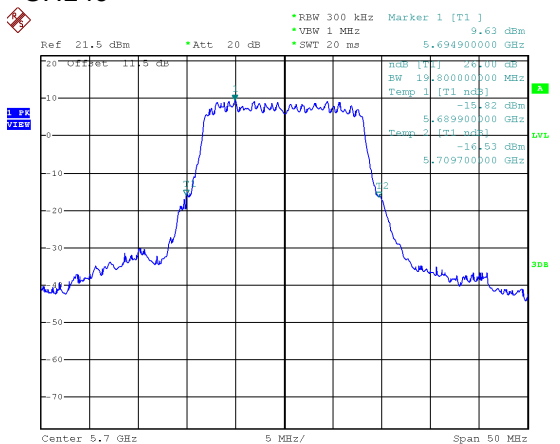


CH120

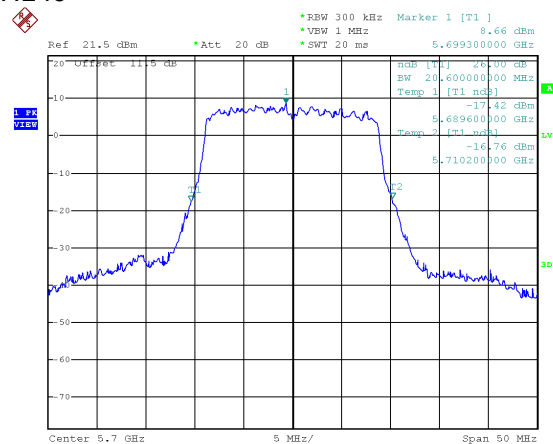


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CH140

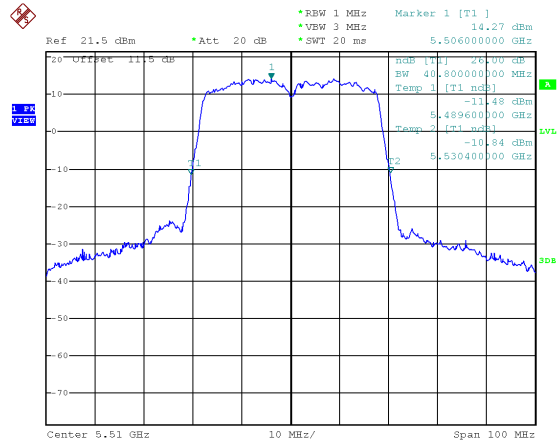
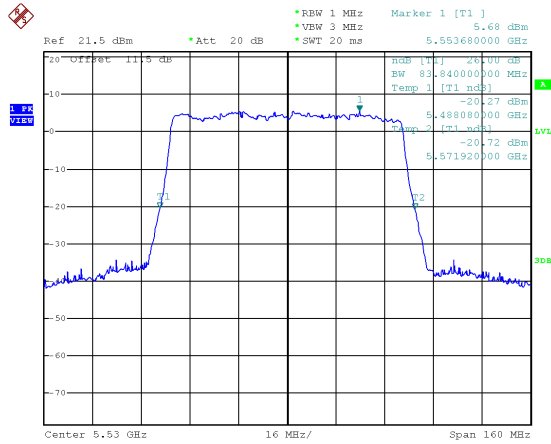


CH140

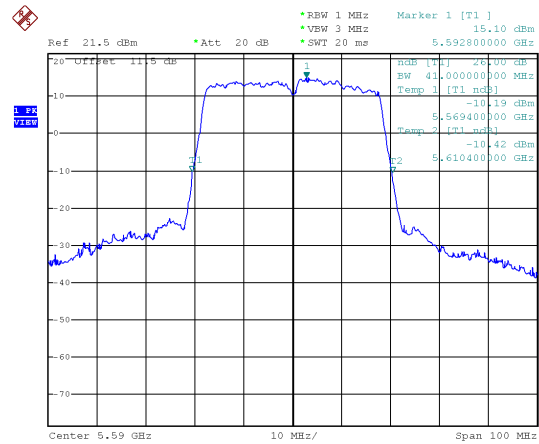




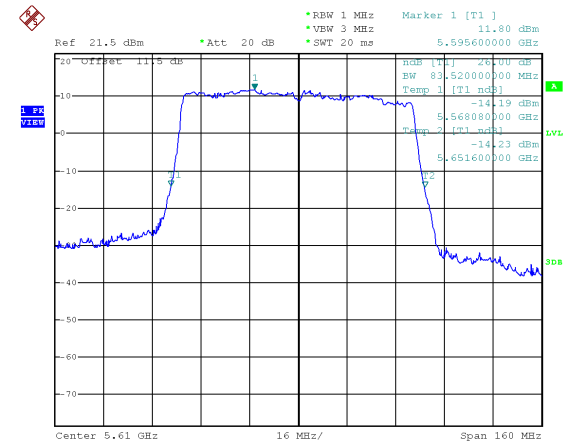
Band 3, ANT B

Modulation Standard: 802.11ac VHT40 (13.5Mbps)
CH102Modulation Standard: 802.11ac VHT80 (29.3Mbps)
CH106

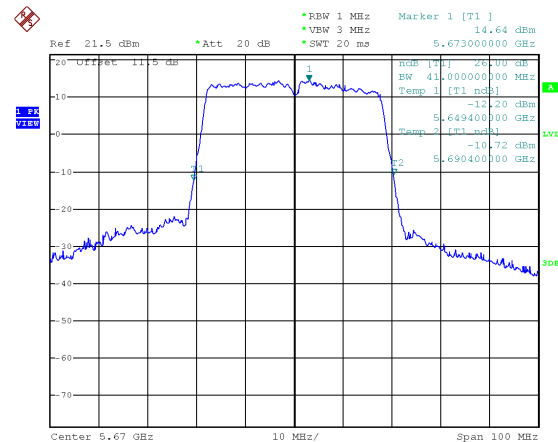
CH118



CH122

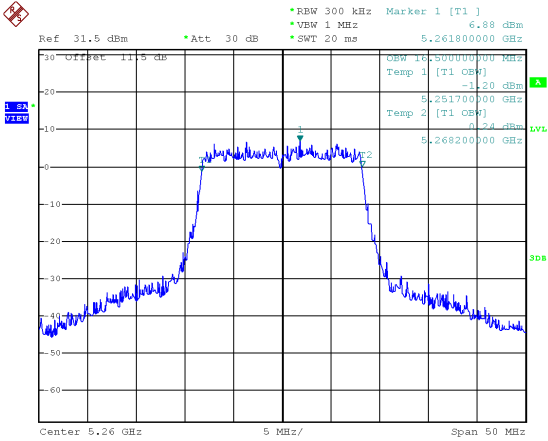


CH134

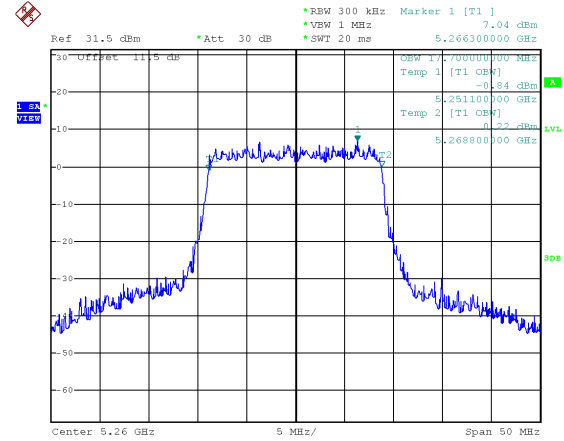




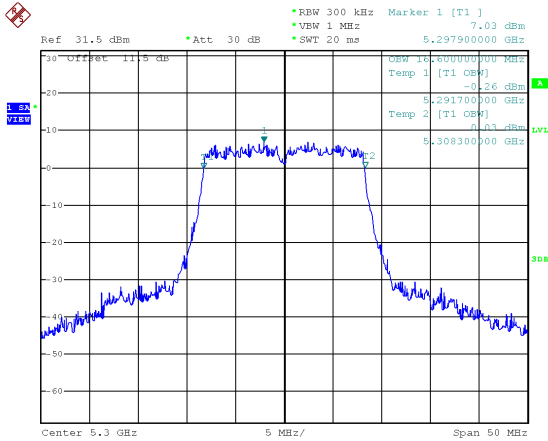
99% Occupied Bandwidth
Band 2, ANT A
Modulation Standard: 802.11a (6Mbps)
CH52



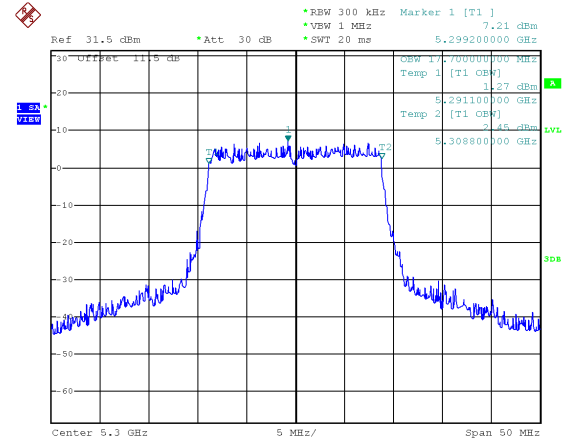
Modulation Standard: 802.11ac VHT20 (6.5Mbps)
CH52



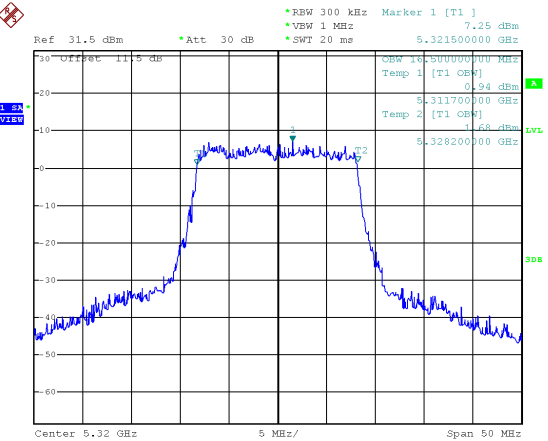
CH60



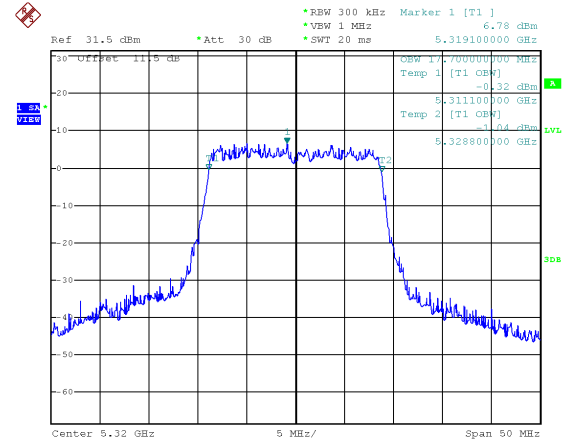
CH60



CH64

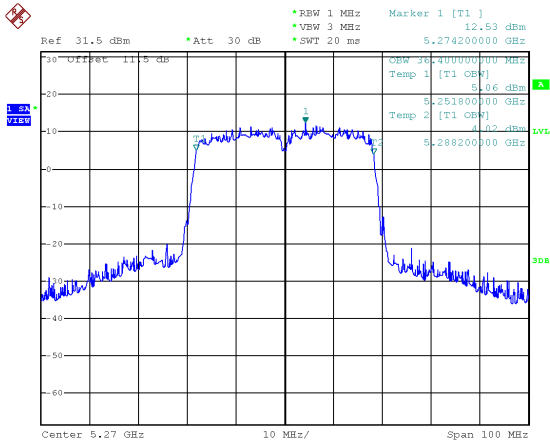
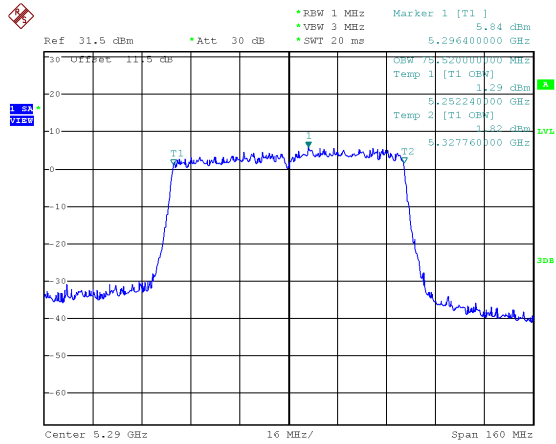


CH64



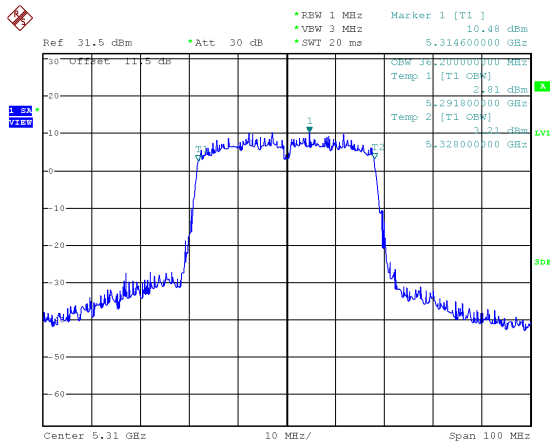


Band 2, ANT A

Modulation Standard: 802.11ac VHT40 (13.5Mbps)
CH54Modulation Standard: 802.11ac VHT80 (29.3Mbps)
CH58

Da

CH62

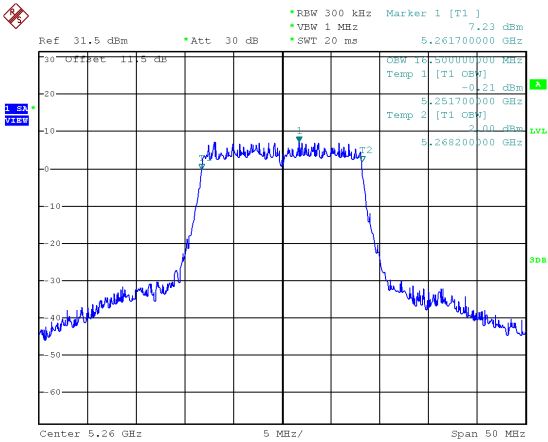
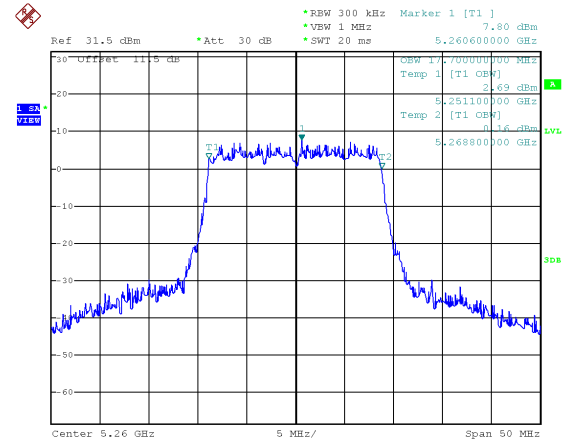




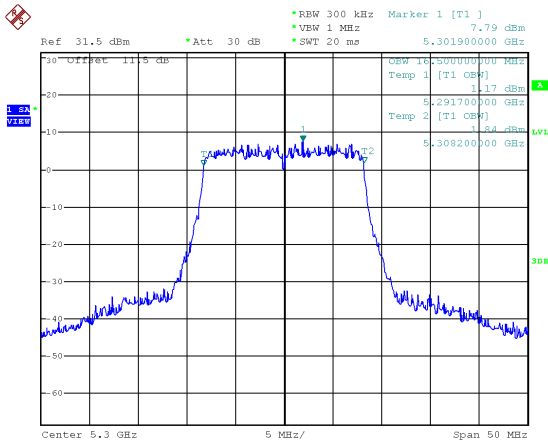
Band 2, ANT B

Modulation Standard: 802.11a (6Mbps)

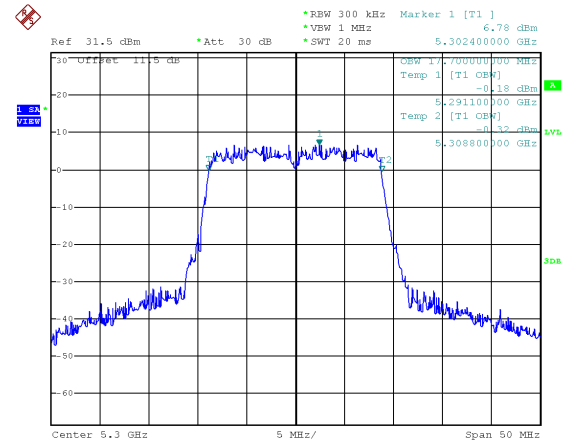
CH52

Modulation Standard: 802.11ac VHT20 (6.5Mbps)
CH52

CH60

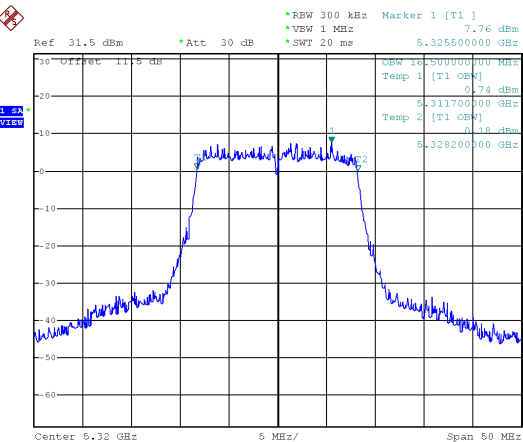


CH60

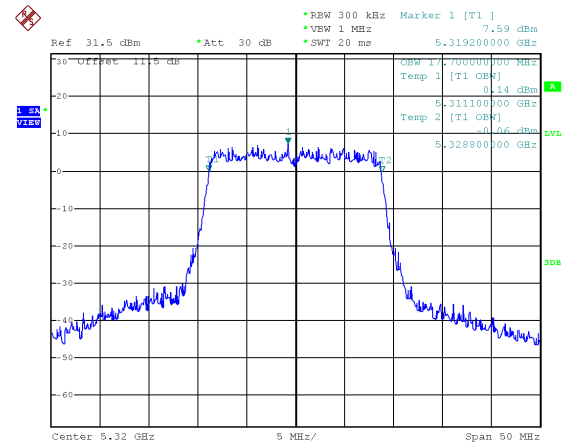


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CH64

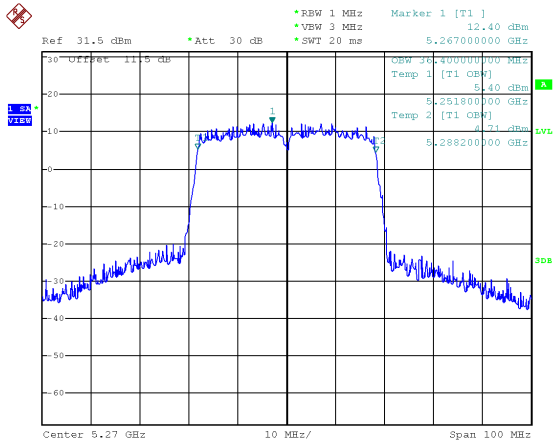
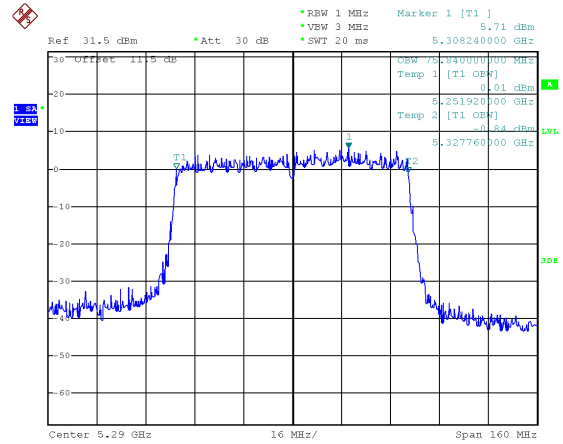


CH64

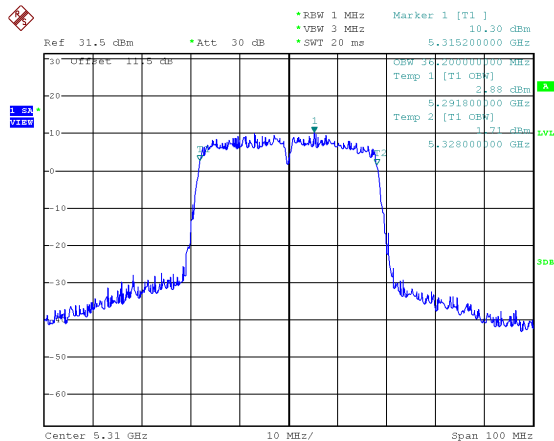




Band 2, ANT B

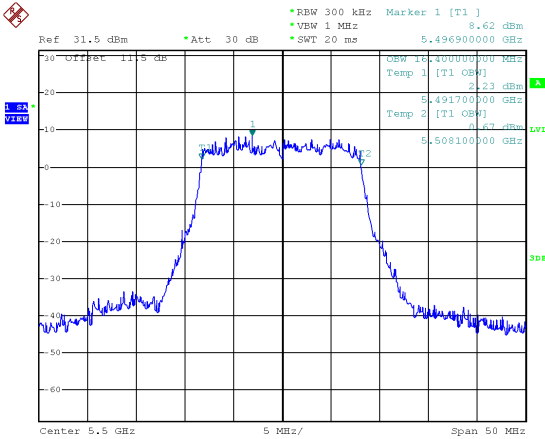
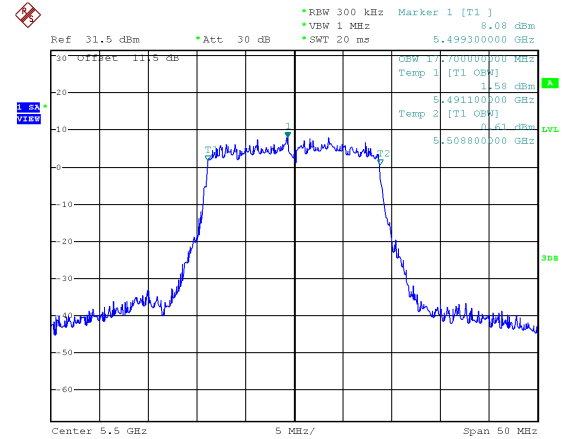
Modulation Standard: 802.11ac VHT40 (13.5Mbps)
CH54Modulation Standard: 802.11ac VHT80 (29.3Mbps)
CH58

CH62

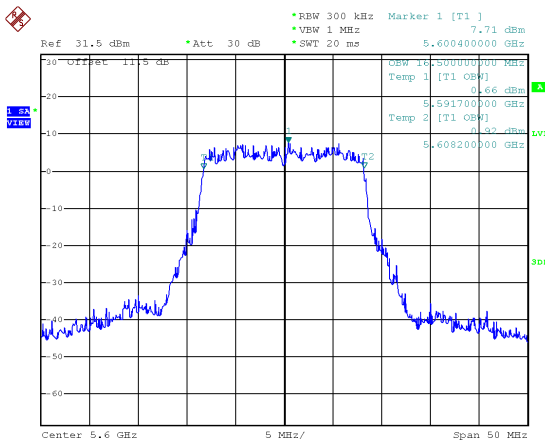




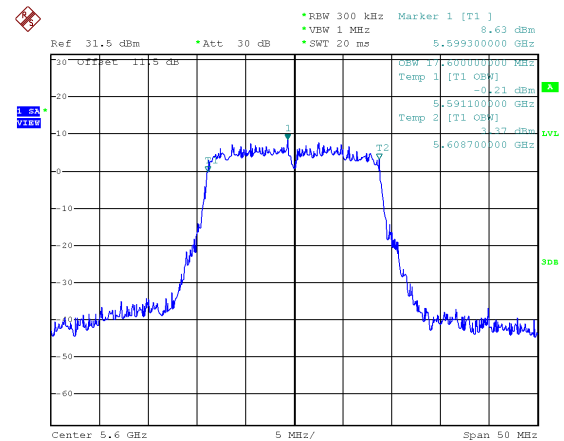
Band 3, ANT A

Modulation Standard: 802.11a (6Mbps)
CH100Modulation Standard: 802.11ac VHT20 (6.5Mbps)
CH100

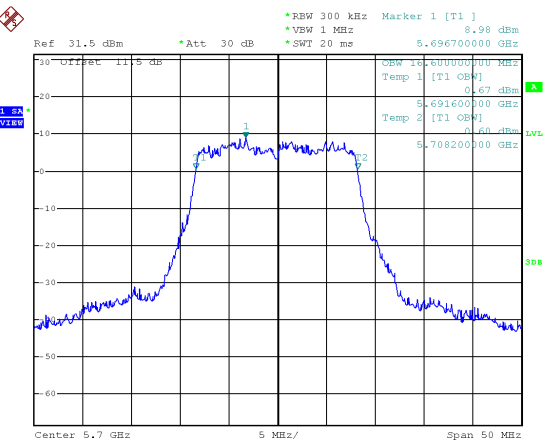
CH120



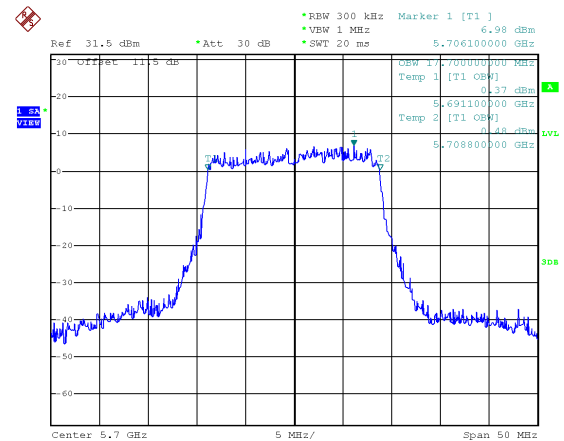
CH120



CH140

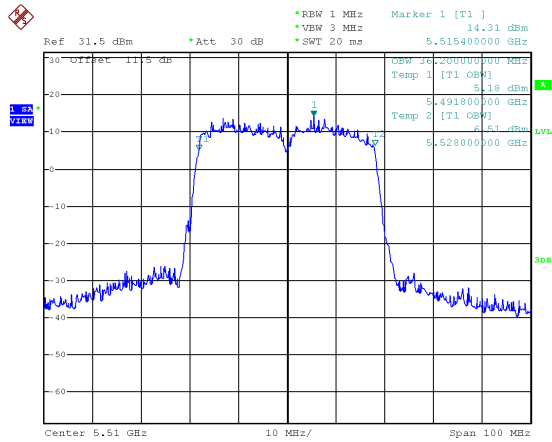
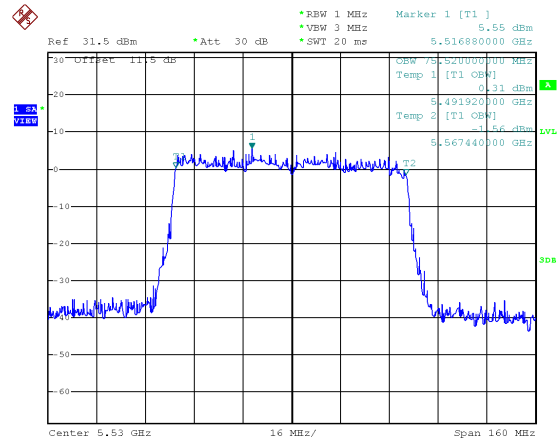


CH140

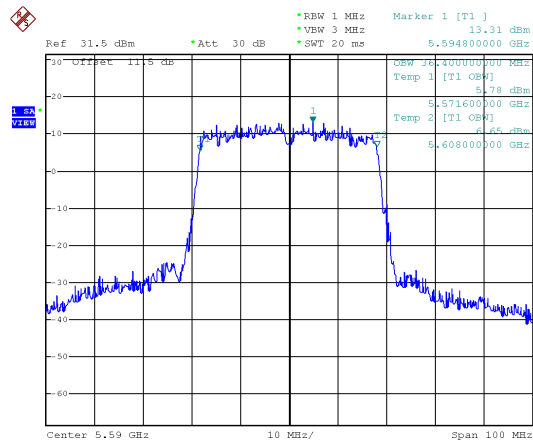




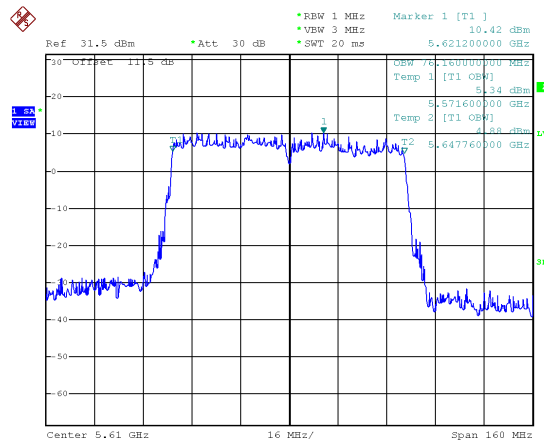
Band 3, ANT A

Modulation Standard: 802.11ac VHT40 (13.5Mbps)
CH102Modulation Standard: 802.11ac VHT80 (29.3Mbps)
CH106

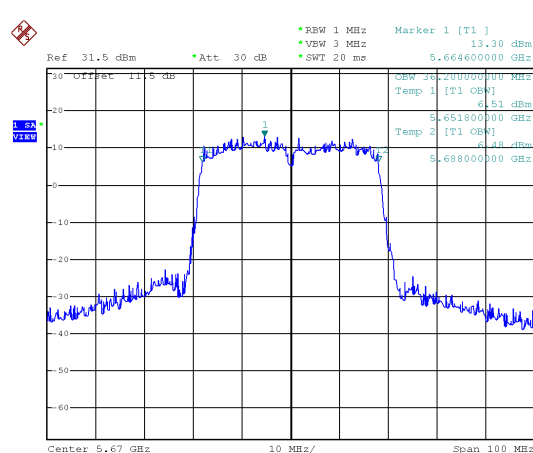
CH118



CH122



CH134

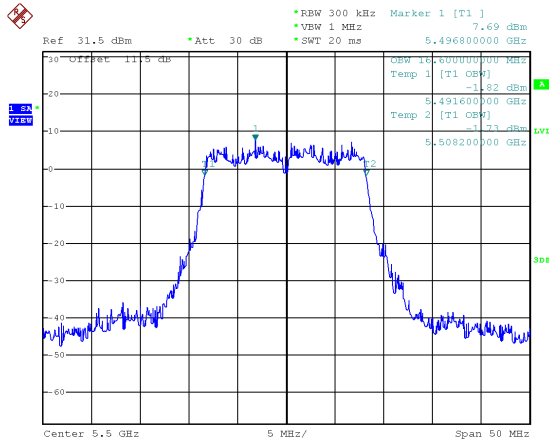




Band 3, ANT B

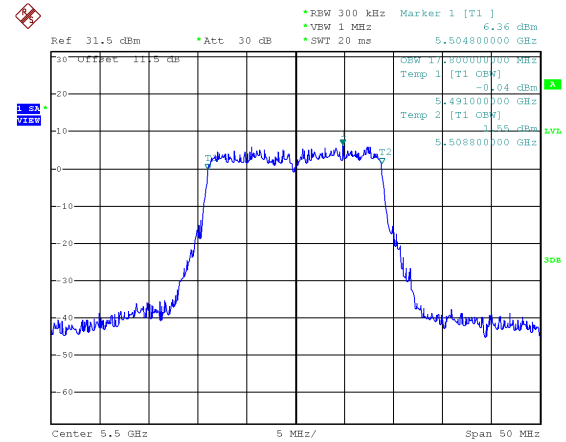
Modulation Standard: 802.11a (6Mbps)

CH100

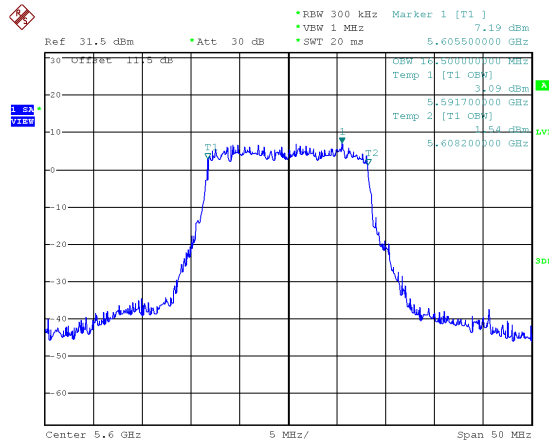


Modulation Standard: 802.11ac VHT20 (6.5Mbps)

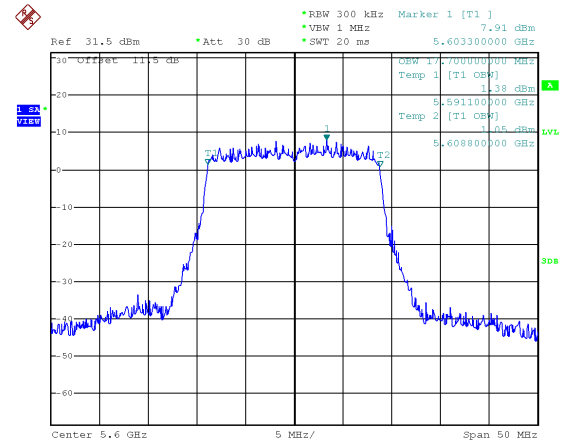
CH100



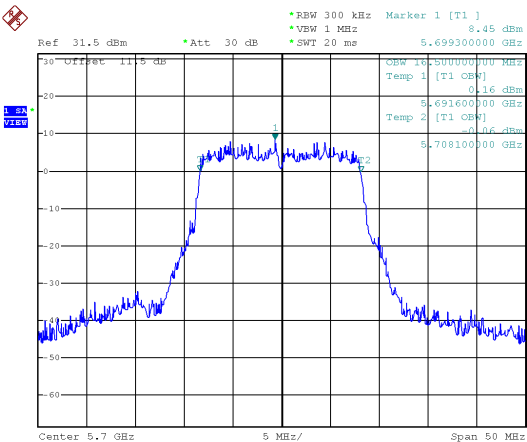
CH120



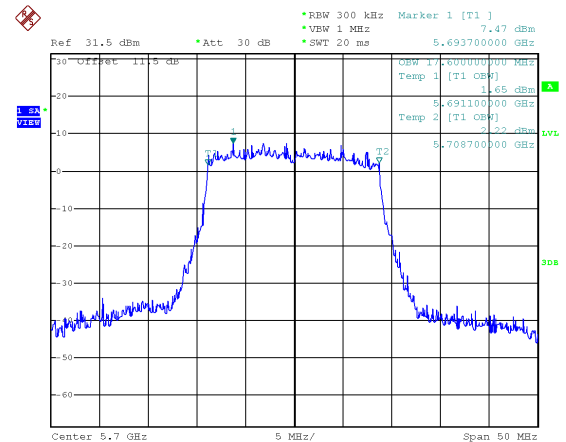
CH120



CH140

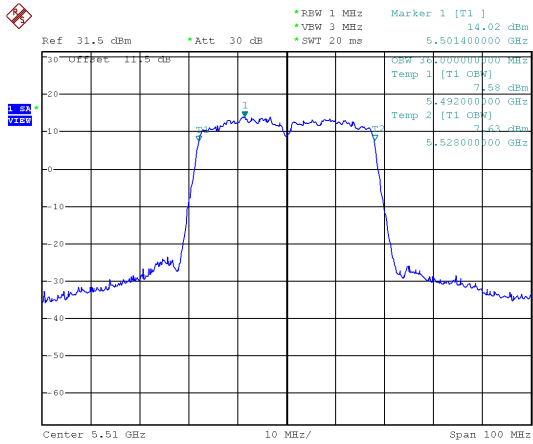
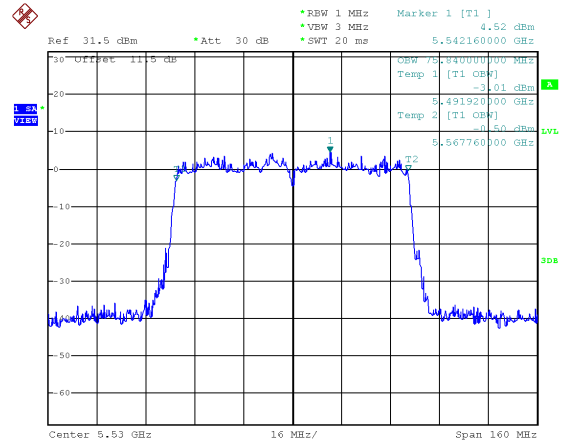


CH140

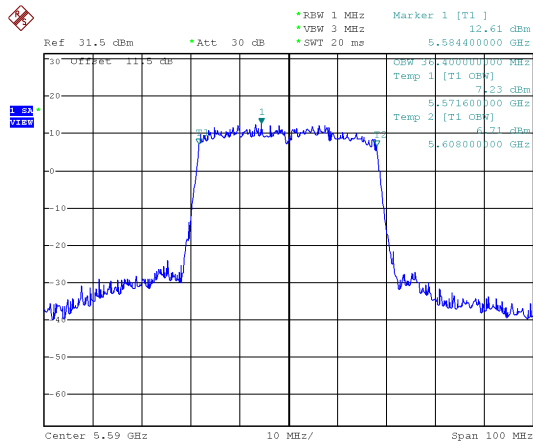




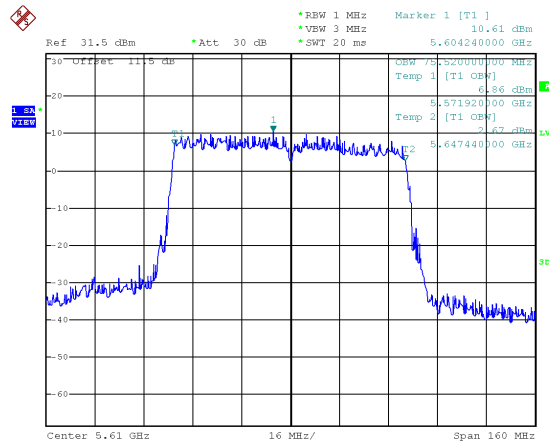
Band 3, ANT B

Modulation Standard: 802.11ac VHT40 (13.5Mbps)
CH102Modulation Standard: 802.11ac VHT80 (29.3Mbps)
CH106

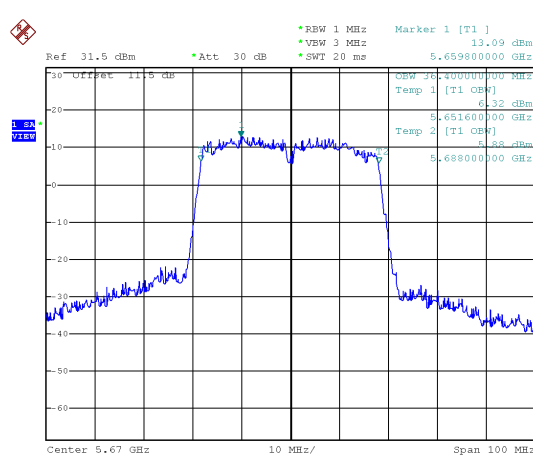
CH118



CH122



CH134





9. Average Power

9.1. Test Limit

Output Power:

Frequency Band		Limit
☐	5.15~5.25GHz	
Operating Mode		
☐	Outdoor access point	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm) provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30degrees as measured from the horizon must not exceed 125 mW (21 dBm).
☐	Indoor access point	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm) provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
☐	Fixed point-to-point access points	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi.
☐	client devices	The maximum conducted output power over the frequency band of operation shall not exceed 250 mW (24dBm) provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.



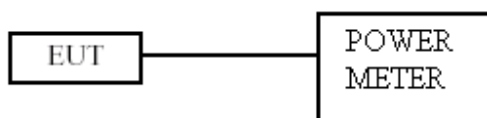
Frequency Band		Limit
☒	5.25-5.35 GHz	The maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (24dBm) or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
☒	5.470-5.725 GHz	
☐	5.725~5.85 GHz	The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power.

9.2. Test Procedure

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

9.3. Test Setup Layout





9.4. Test Result and Data

Temperature: 22°C

Humidity: 64%

Test Date: Dec. 19, 2018

Test Mode: Non-Beamforming

In the 5.3GHz Band

Modulation Mode	Data Rate	Channel	Frequency (MHz)	Measured value of each antenna port (dBm)		Total power (dBm)	FCC Limit (dBm)
				ANT A	ANT B		
802.11a	6 Mbps	52	5260	15.38	15.73	18.57	23.11
	6 Mbps	60	5300	15.66	15.59	18.64	23.11
	6 Mbps	64	5320	15.77	15.95	18.87	23.11
802.11n HT20	MCS 0	52	5260	15.82	16.28	19.07	23.28
	MCS 0	60	5300	16.02	16.11	19.08	23.28
	MCS 0	64	5320	16.00	16.03	19.03	23.28
802.11n HT40	MCS 0	54	5270	18.47	18.82	21.66	23.28
	MCS 0	62	5310	16.44	16.52	19.49	23.28
802.11ac VHT20	MCS0-NSS1	52	5260	15.86	16.32	19.11	23.28
	MCS0-NSS1	60	5300	16.11	16.23	19.18	23.28
	MCS0-NSS1	64	5320	16.05	16.12	19.10	23.28
802.11ac VHT40	MCS0-NSS1	54	5270	18.52	18.87	21.71	23.28
	MCS0-NSS1	62	5310	16.53	16.60	19.58	23.28
802.11ac VHT80	MCS0-NSS1	58	5290	14.60	14.78	17.70	23.28



Temperature: 22°C

Humidity: 64%

Test Date: Dec. 19, 2018

Test Mode: Non-Beamforming

In the 5.5GHz Band

Modulation Mode	Data Rate	Channel	Frequency (MHz)	Measured value of each antenna port (dBm)		Total power (dBm)	FCC Limit (dBm)
				ANT A	ANT B		
802.11a	6 Mbps	100	5500	16.04	15.43	18.76	23.65
	6 Mbps	120	5600	15.78	15.39	18.60	23.65
	6 Mbps	140	5700	16.62	16.90	19.77	23.65
802.11n HT20	MCS 0	100	5500	15.78	15.69	18.75	23.66
	MCS 0	120	5600	15.89	15.34	18.63	23.66
	MCS 0	140	5700	15.91	15.88	18.91	23.66
802.11n HT40	MCS 0	102	5510	19.18	18.71	21.96	23.66
	MCS 0	118	5590	19.44	19.17	22.32	23.66
	MCS 0	134	5670	19.73	19.90	22.83	23.66
802.11ac VHT20	MCS0-NSS1	100	5500	15.88	15.73	18.82	23.66
	MCS0-NSS1	120	5600	15.93	15.48	18.72	23.66
	MCS0-NSS1	140	5700	15.93	16.03	18.99	23.66
802.11ac VHT40	MCS0-NSS1	102	5510	19.21	18.78	22.01	23.66
	MCS0-NSS1	118	5590	19.57	19.21	22.40	23.66
	MCS0-NSS1	134	5670	19.78	19.92	22.86	23.66
802.11ac VHT80	MCS0-NSS1	106	5530	14.08	13.37	16.75	23.66
	MCS0-NSS1	122	5610	19.76	19.46	22.62	23.66



Temperature: 22°C

Humidity: 64%

Test Date: Dec. 19, 2018

Test Mode: Beamforming

In the 5.3GHz Band

Modulation Mode	Data Rate	Channel	Frequency (MHz)	Measured value of each antenna port (dBm)		Total power (dBm)	FCC Limit (dBm)
				ANT A	ANT B		
802.11a	6 Mbps	52	5260	12.37	12.72	15.56	20.10
	6 Mbps	60	5300	12.65	12.58	15.63	20.10
	6 Mbps	64	5320	12.76	12.94	15.86	20.10
802.11n HT20	MCS 0	52	5260	12.81	13.27	16.06	20.27
	MCS 0	60	5300	13.01	13.10	16.07	20.27
	MCS 0	64	5320	12.99	13.02	16.02	20.27
802.11n HT40	MCS 0	54	5270	15.46	15.81	18.65	20.27
	MCS 0	62	5310	13.43	13.51	16.48	20.27
802.11ac VHT20	MCS0-NSS1	52	5260	12.85	13.31	16.10	20.27
	MCS0-NSS1	60	5300	13.10	13.22	16.17	20.27
	MCS0-NSS1	64	5320	13.04	13.11	16.09	20.27
802.11ac VHT40	MCS0-NSS1	54	5270	15.51	15.86	18.70	20.27
	MCS0-NSS1	62	5310	13.52	13.59	16.57	20.27
802.11ac VHT80	MCS0-NSS1	58	5290	11.59	11.77	14.69	20.27



Temperature: 22°C

Humidity: 64%

Test Date: Dec. 19, 2018

Test Mode: Beamforming

In the 5.5GHz Band

Modulation Mode	Data Rate	Channel	Frequency (MHz)	Measured value of each antenna port (dBm)		Total power (dBm)	FCC Limit (dBm)
				ANT A	ANT B		
802.11a	6 Mbps	100	5500	13.03	12.42	15.75	20.64
	6 Mbps	120	5600	12.77	12.38	15.59	20.64
	6 Mbps	140	5700	13.61	13.89	16.76	20.64
802.11n HT20	MCS 0	100	5500	12.77	12.68	15.74	20.65
	MCS 0	120	5600	12.88	12.33	15.62	20.65
	MCS 0	140	5700	12.90	12.87	15.90	20.65
802.11n HT40	MCS 0	102	5510	16.17	15.70	18.95	20.65
	MCS 0	118	5590	16.43	16.16	19.31	20.65
	MCS 0	134	5670	16.72	16.89	19.82	20.65
802.11ac VHT20	MCS0-NSS1	100	5500	12.87	12.72	15.81	20.65
	MCS0-NSS1	120	5600	12.92	12.47	15.71	20.65
	MCS0-NSS1	140	5700	12.92	13.02	15.98	20.65
802.11ac VHT40	MCS0-NSS1	102	5510	16.20	15.77	19.00	20.65
	MCS0-NSS1	118	5590	16.56	16.20	19.39	20.65
	MCS0-NSS1	134	5670	16.77	16.91	19.85	20.65
802.11ac VHT80	MCS0-NSS1	106	5530	11.07	10.36	13.74	20.65
	MCS0-NSS1	122	5610	16.75	16.45	19.61	20.65



10. Maximum Power Spectral Density

10.1. Test Limit

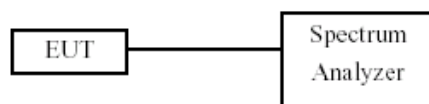
PSD:

Frequency Band		Limit
☐	5.15~5.25GHz	
	Operating Mode	
☐	Outdoor access point	17 dBm/MHz
☐	Indoor access point	17 dBm/MHz
☐	Fixed point-to-point access points	17 dBm/MHz
☐	client devices	11 dBm/MHz
☒	5.250~5.350 GHz	11 dBm/MHz
☒	5.470~5.725 GHz	11 dBm/MHz
☐	5.725~5.85 GHz	30 dBm/500kHz

10.2. Test Procedure

Reference to KDB789033 D02 General UNII Test Procedures New Rules v02r01

10.3. Test Setup Layout





10.4. Test Result and Data

Temperature: 22°C

Humidity: 64%

Test Date: Dec. 19, 2018

In the 5.3G Band

Modulation Mode	Channel	Frequency (MHz)	Meas PSD (dBm/MHz)		Sum chain (dBm)	Duty Cycle CF(dB)	Total Corr'd PSD (dBm/MHz)	PSD Limit (dBm/MHz)
			ANT A	ANT B				
802.11a	52	5260	3.42	4.06	6.76	0.00	6.76	7.27
	60	5300	3.56	3.81	6.70	0.00	6.70	7.27
	64	5320	3.98	4.22	7.11	0.00	7.11	7.27
802.11acV HT20	52	5260	3.70	4.64	7.21	0.00	7.21	7.27
	60	5300	3.85	4.36	7.12	0.00	7.12	7.27
	64	5320	3.59	4.02	6.82	0.00	6.82	7.27
802.11ac VHT40	54	5270	3.62	4.22	6.94	0.00	6.94	7.27
	62	5310	1.92	2.16	5.05	0.00	5.05	7.27
802.11ac VHT80	58	5290	-3.11	-2.88	0.02	0.18	0.20	7.27

In the 5.5G Band

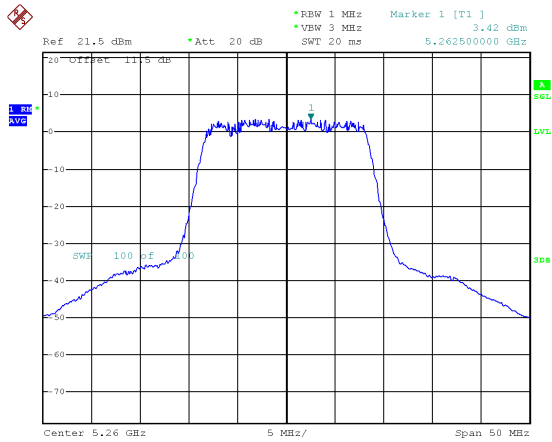
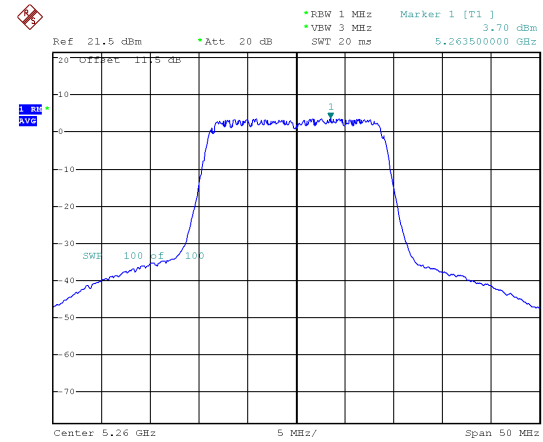
Modulation Mode	Channel	Frequency (MHz)	Meas PSD (dBm/MHz)		Sum chain (dBm)	Duty Cycle CF(dB)	Total Corr'd PSD (dBm/MHz)	PSD Limit (dBm/MHz)
			ANT A	ANT B				
802.11a	100	5500	4.75	4.00	7.40	0.00	7.40	7.65
	120	5600	4.50	3.86	7.20	0.00	7.20	7.65
	140	5700	4.54	4.48	7.52	0.00	7.52	7.65
802.11ac VHT20	100	5500	4.36	4.24	7.31	0.00	7.31	7.65
	120	5600	4.37	3.90	7.15	0.00	7.15	7.65
	140	5700	4.38	4.04	7.22	0.00	7.22	7.65
802.11ac VHT40	102	5510	4.70	4.27	7.50	0.00	7.50	7.65
	118	5590	4.47	4.67	7.58	0.00	7.58	7.65
	134	5670	4.35	4.31	7.34	0.00	7.34	7.65
802.11ac VHT80	106	5530	-2.69	-3.70	-0.16	0.18	0.02	7.65
	122	5610	3.87	3.24	6.58	0.18	6.76	7.65



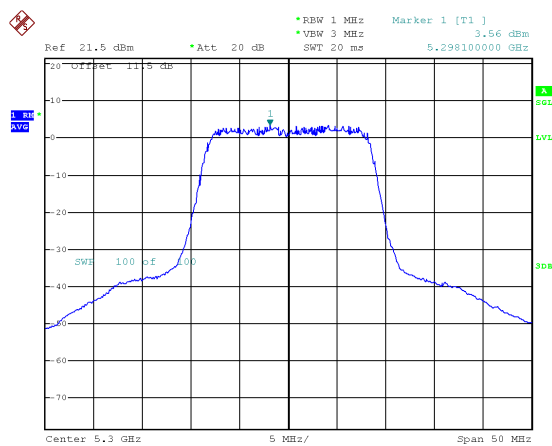
Band 2, ANT A

Modulation Standard: 802.11a (6Mbps)

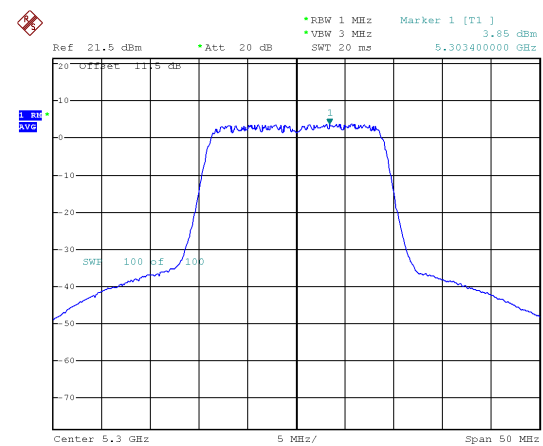
CH52

Modulation Standard: 802.11ac VHT20 (6.5Mbps)
CH52

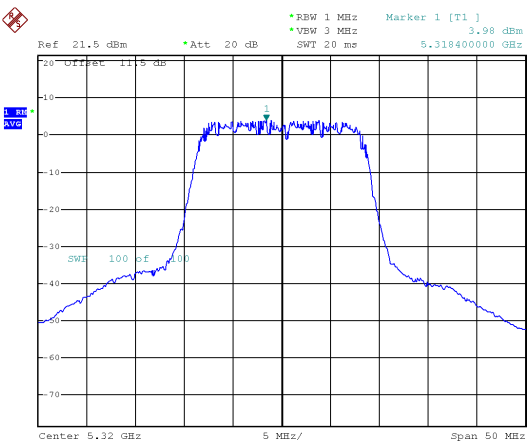
CH60



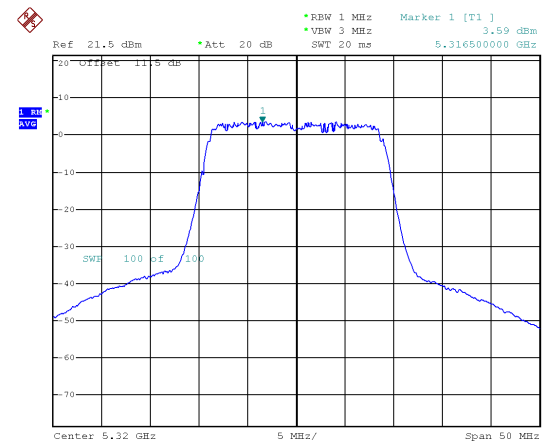
CH60



CH64



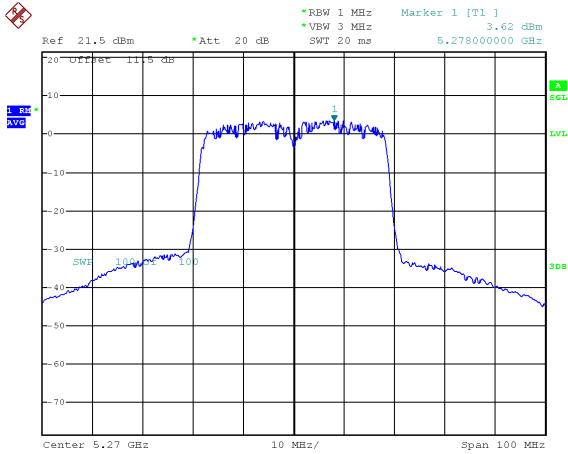
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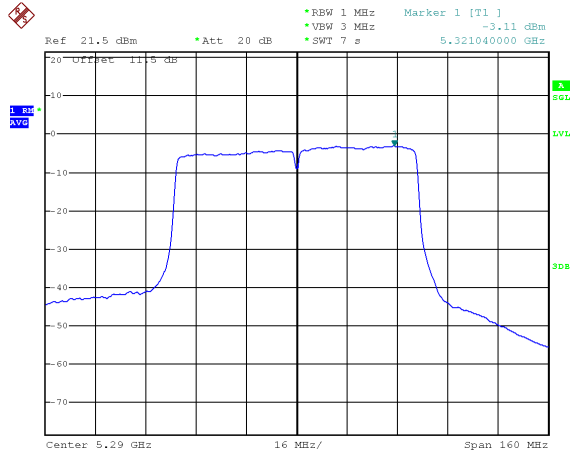


Band 2, ANT A

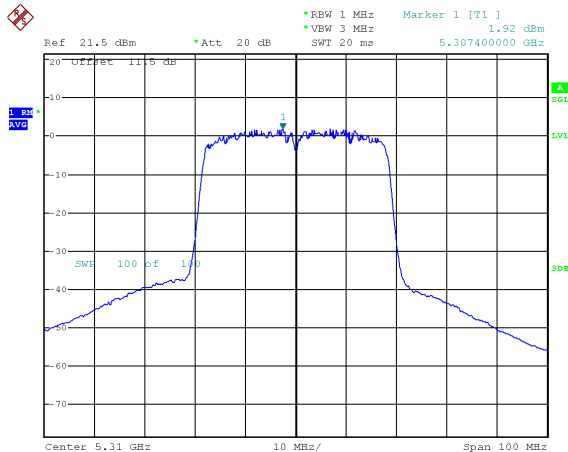
Modulation Standard: 802.11ac VHT40 (13.5Mbps)
CH54

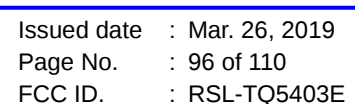
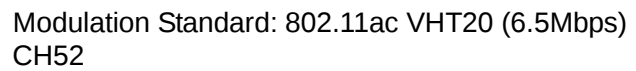


Modulation Standard: 802.11ac VHT80 (29.3Mbps)
CH58



CH62



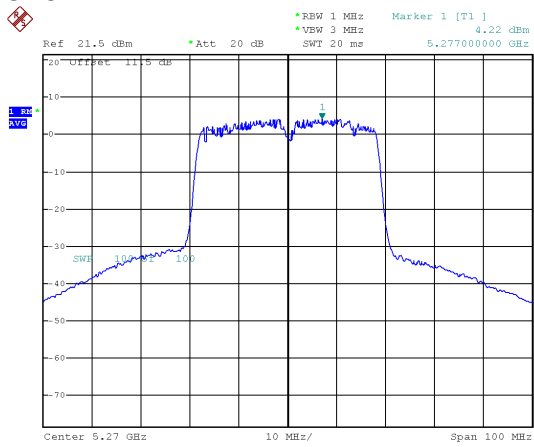




Band 2, ANT B

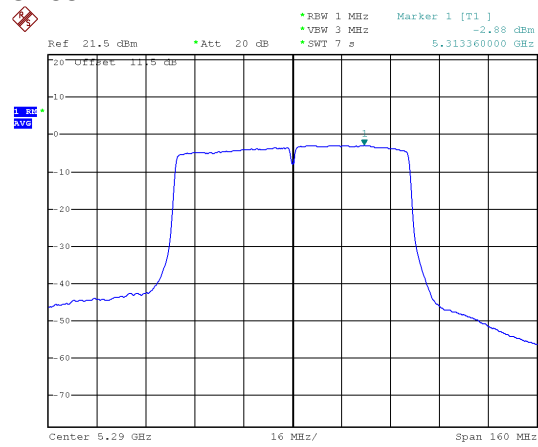
Modulation Standard: 802.11ac VHT40 (13.5Mbps)

CH54

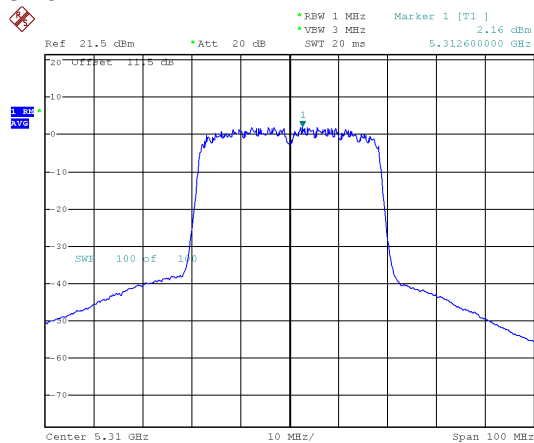


Modulation Standard: 802.11ac VHT80 (29.3Mbps)

CH58

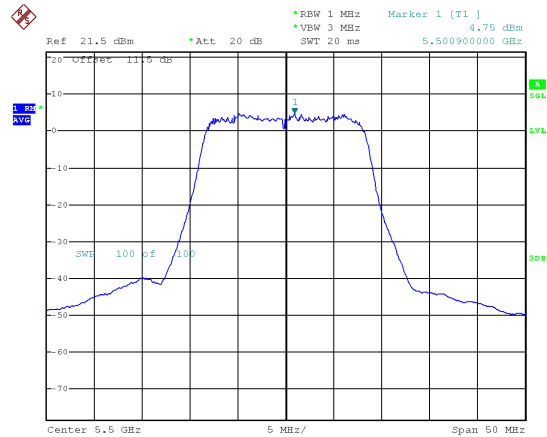


CH62

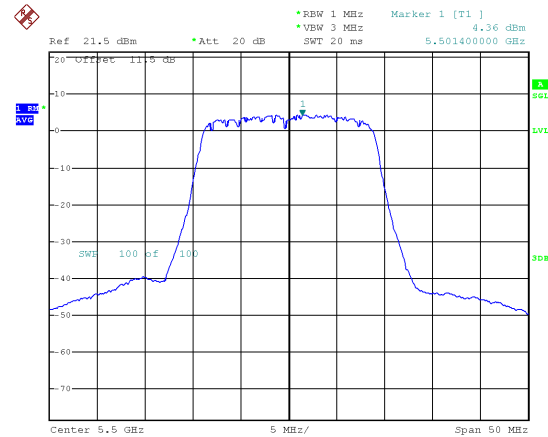




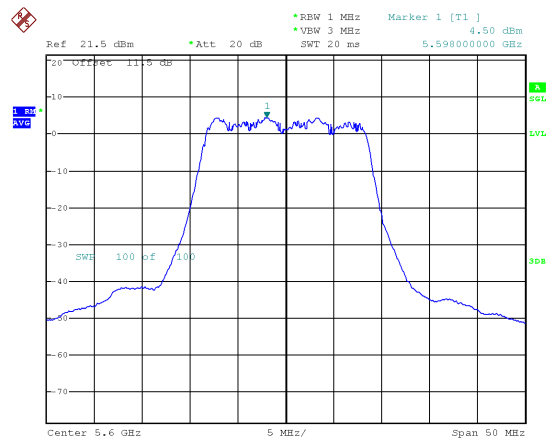
Band 3, ANT A
Modulation Standard: 802.11a (6Mbps)
CH100



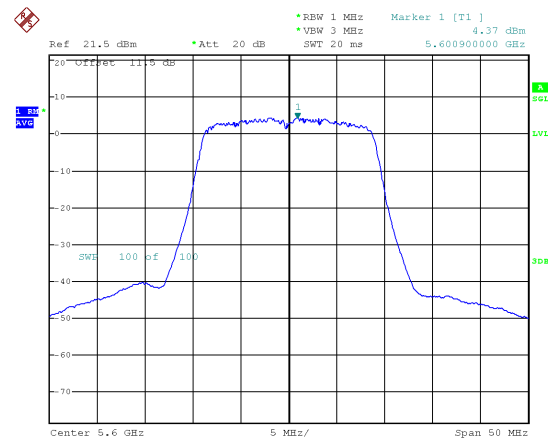
Modulation Standard: 802.11ac VHT20 (6.5Mbps)
CH100



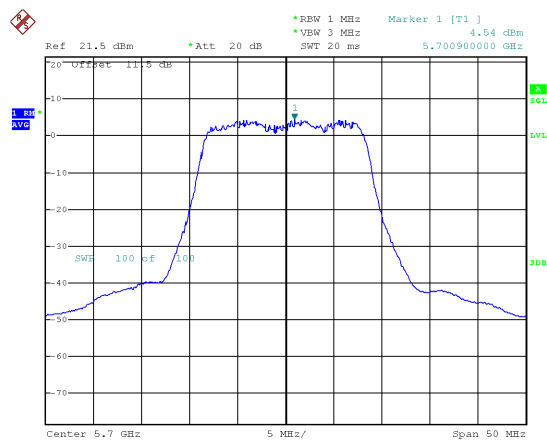
CH120



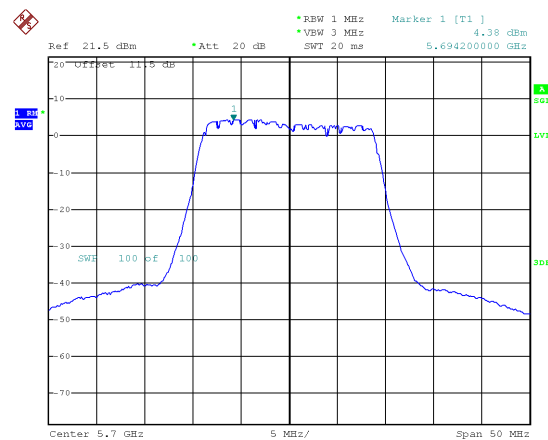
CH120



CH140

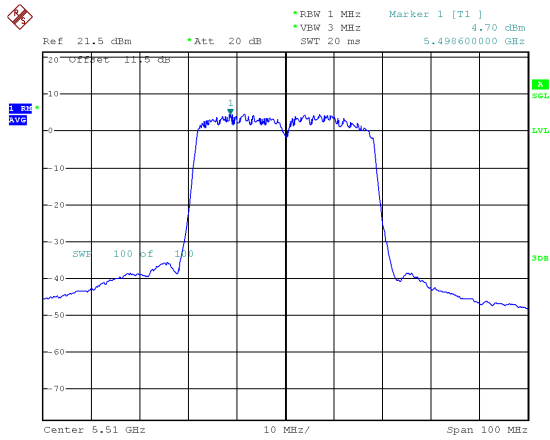
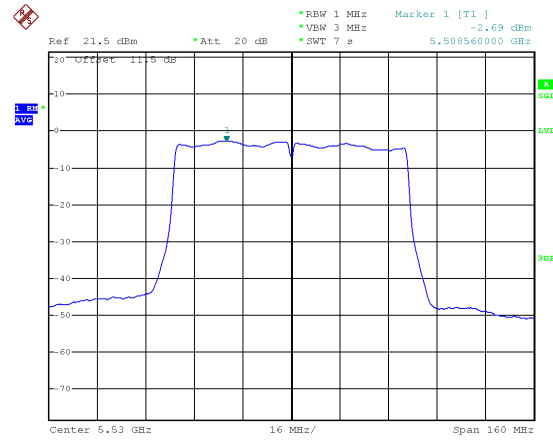


CH140

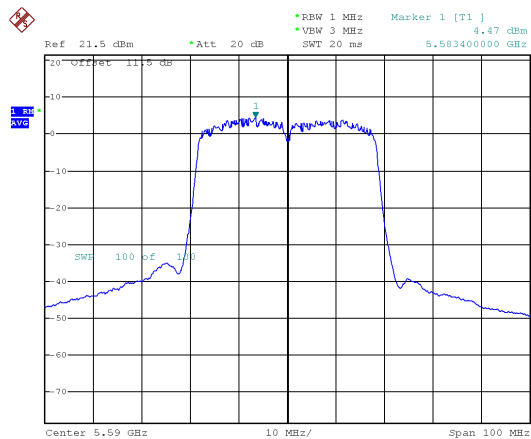




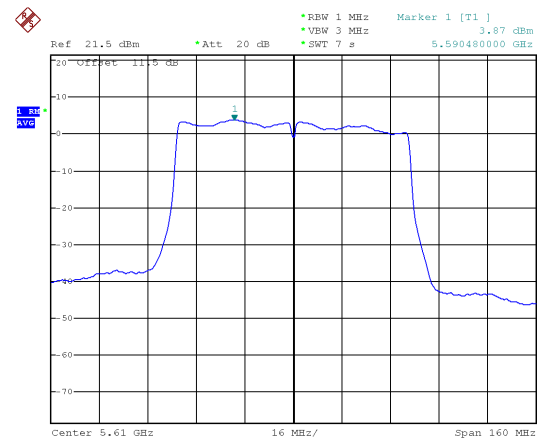
Band 3, ANT A

Modulation Standard: 802.11ac VHT40 (13.5Mbps)
CH102Modulation Standard: 802.11ac VHT80 (29.3Mbps)
CH106

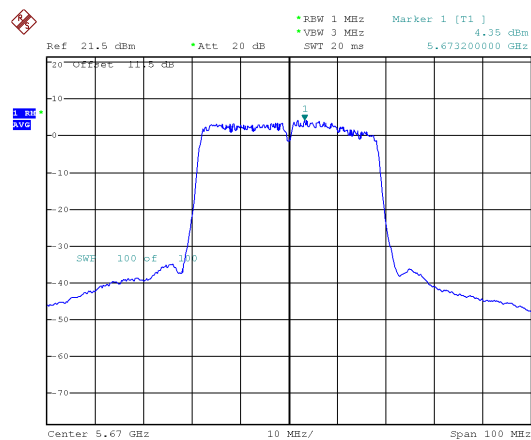
CH118



CH122

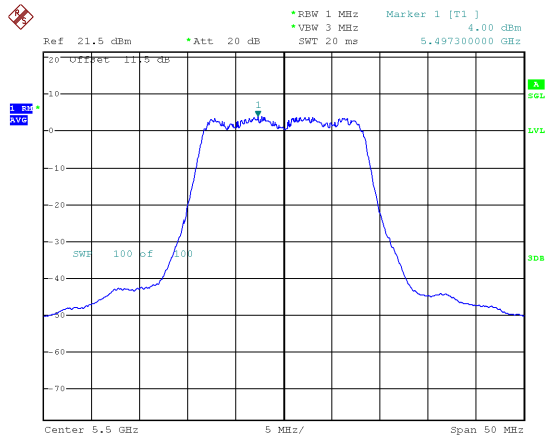


CH134

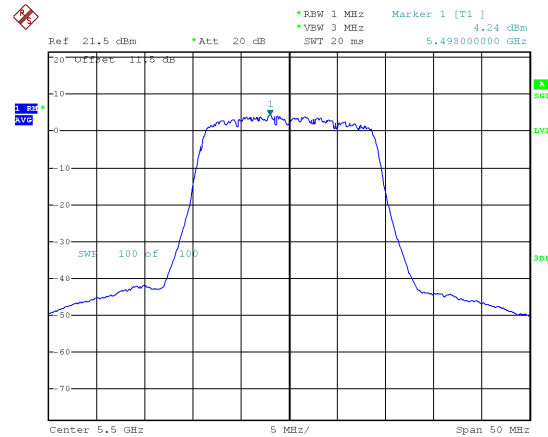




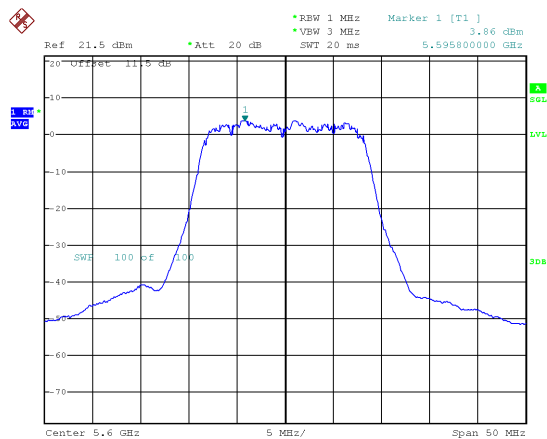
Band 3, ANT B
Modulation Standard: 802.11a (6Mbps)
CH100



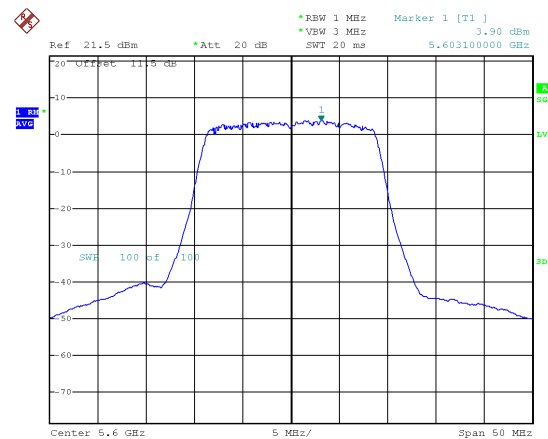
Modulation Standard: 802.11ac VHT20 (6.5Mbps)
CH100



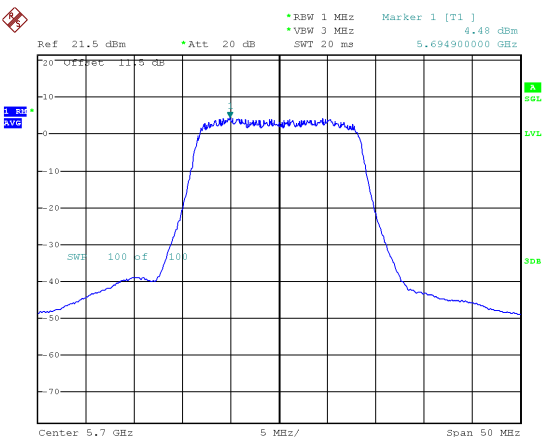
CH120



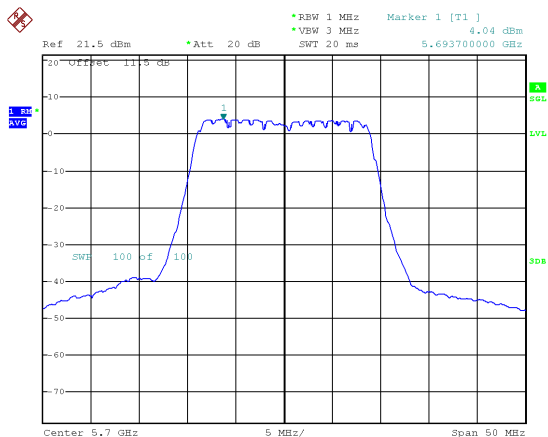
CH120



CH140

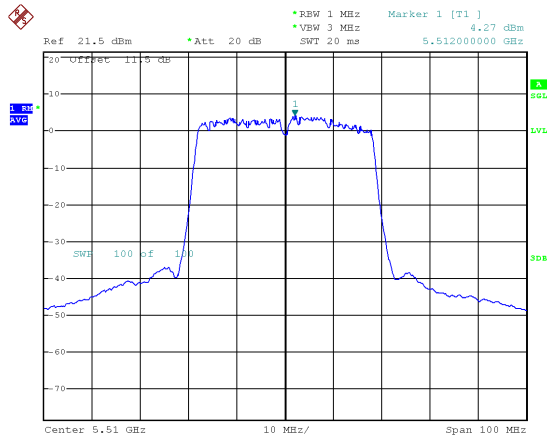
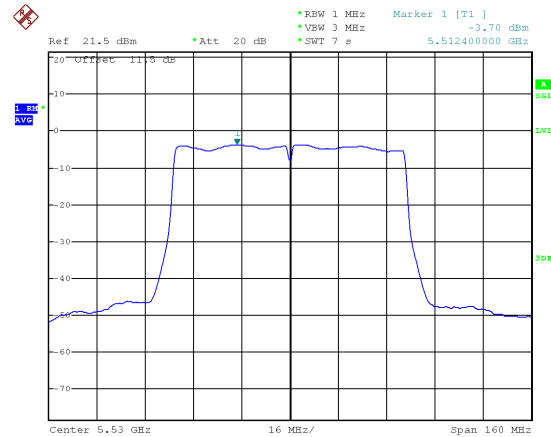


CH140

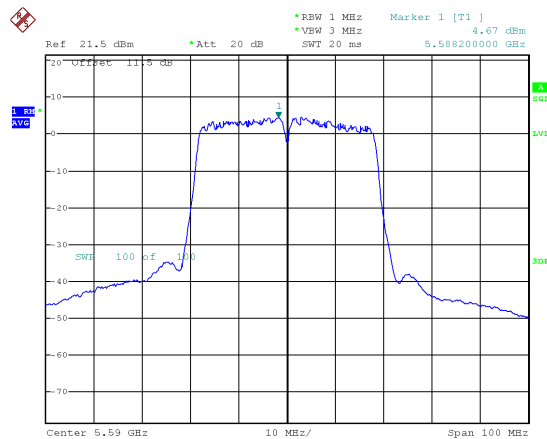




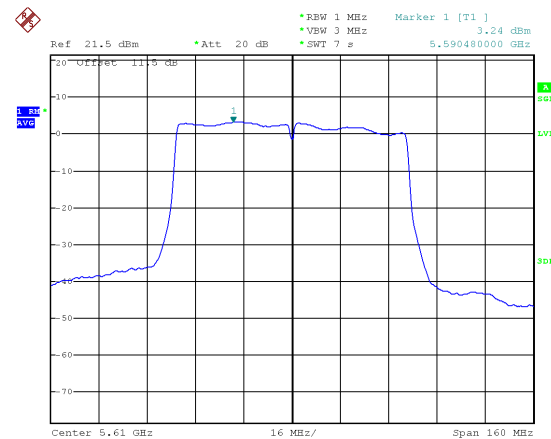
Band 3, ANT B

Modulation Standard: 802.11ac VHT40 (13.5Mbps)
CH102Modulation Standard: 802.11ac VHT80 (29.3Mbps)
CH106

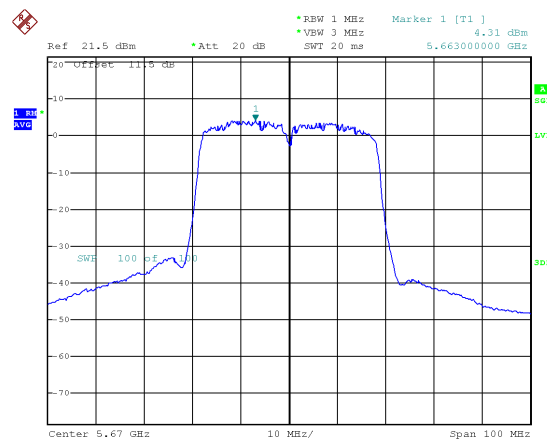
CH118



CH122



CH134



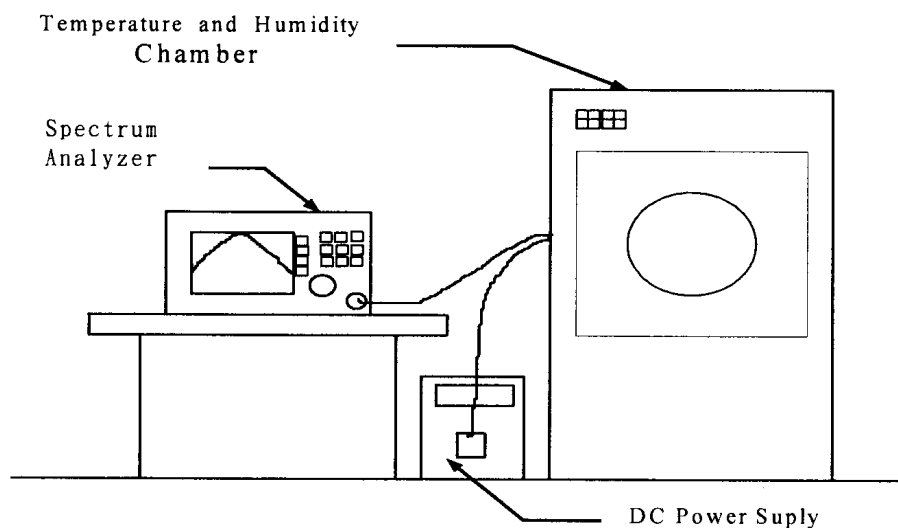


11. Frequency Stability

11.1. Test Procedure

1. The EUT was placed inside the Temperature and Humidity chamber.
2. The transmitter output was connected to spectrum analyzer.
3. Turn the EUT on and couple its output to a spectrum analyzer.
4. Turn the EUT off and set the chamber to the highest temperature specified.
5. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
6. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
7. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

11.2. Test Setup Layout



**11.3. Test Result and Data**

Temperature: 22°C

Humidity: 64%

Test Date: Nov. 28, 2018

Operating frequency: 5270 MHz							
Temp(°C)	Power supply(V)	2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
65	102	5270.0040	0.000075	5270.0042	0.000080	5270.0038	0.000072
	120	5270.0080	0.000152	5270.0081	0.000155	5270.0078	0.000148
	138	5270.0052	0.000099	5270.0047	0.000089	5270.0051	0.000096
60	102	5270.0066	0.000125	5270.0063	0.000120	5270.0066	0.000125
	120	5270.0055	0.000105	5270.0055	0.000105	5270.0059	0.000112
	138	5270.0078	0.000148	5270.0080	0.000152	5270.0078	0.000147
50	102	5270.0088	0.000166	5270.0088	0.000167	5270.0088	0.000166
	120	5270.0060	0.000114	5270.0060	0.000113	5270.0058	0.000111
	138	5270.0108	0.000204	5270.0105	0.000199	5270.0100	0.000190
40	102	5270.0076	0.000144	5270.0076	0.000145	5270.0078	0.000147
	120	5270.0052	0.000098	5270.0047	0.000089	5270.0049	0.000093
	138	5270.0095	0.000181	5270.0096	0.000182	5270.0094	0.000179
30	102	5270.0056	0.000107	5270.0059	0.000111	5270.0057	0.000108
	120	5270.0075	0.000143	5270.0071	0.000134	5270.0071	0.000135
	138	5270.0054	0.000102	5270.0056	0.000107	5270.0053	0.000100
20	102	5270.0075	0.000141	5270.0074	0.000140	5270.0077	0.000145
	120	5270.0083	0.000158	5270.0077	0.000146	5270.0083	0.000157
	138	5270.0060	0.000114	5270.0056	0.000107	5270.0059	0.000112
10	102	5270.0090	0.000171	5270.0089	0.000169	5270.0088	0.000167
	120	5270.0076	0.000144	5270.0072	0.000136	5270.0074	0.000140
	138	5270.0078	0.000147	5270.0076	0.000144	5270.0078	0.000148
0	102	5270.0102	0.000193	5270.0103	0.000196	5270.0102	0.000193
	120	5270.0085	0.000161	5270.0081	0.000153	5270.0080	0.000152
	138	5270.0088	0.000167	5270.0089	0.000169	5270.0084	0.000160
-10	102	5270.0084	0.000160	5270.0082	0.000155	5270.0084	0.000160
	120	5270.0088	0.000168	5270.0089	0.000168	5270.0086	0.000163
	138	5270.0096	0.000182	5270.0093	0.000177	5270.0099	0.000187
-20	102	5270.0042	0.000080	5270.0043	0.000082	5270.0042	0.000080
	120	5270.0086	0.000163	5270.0087	0.000166	5270.0090	0.000171
	138	5270.0056	0.000106	5270.0051	0.000097	5270.0051	0.000097
-30	102	5270.0061	0.000115	5270.0058	0.000109	5270.0059	0.000112
	120	5270.0043	0.000082	5270.0043	0.000081	5270.0043	0.000082
	138	5270.0083	0.000158	5270.0081	0.000153	5270.0081	0.000154
-40	102	5270.0082	0.000155	5270.0087	0.000166	5270.0085	0.000161
	120	5270.0063	0.000120	5270.0066	0.000126	5270.0068	0.000129
	138	5270.0098	0.000187	5270.0097	0.000185	5270.0101	0.000191



Operating frequency: 5670 MHz							
Temp(°C)	Power supply(V)	2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
65	102	5670.0039	0.000068	5670.0041	0.000072	5670.0044	0.000077
	120	5670.0079	0.000140	5670.0077	0.000136	5670.0080	0.000141
	138	5670.0048	0.000084	5670.0047	0.000083	5670.0055	0.000096
60	102	5670.0063	0.000111	5670.0063	0.000111	5670.0067	0.000118
	120	5670.0055	0.000097	5670.0058	0.000102	5670.0058	0.000103
	138	5670.0077	0.000136	5670.0078	0.000138	5670.0081	0.000144
50	102	5670.0086	0.000152	5670.0087	0.000153	5670.0084	0.000148
	120	5670.0056	0.000099	5670.0060	0.000106	5670.0063	0.000112
	138	5670.0102	0.000179	5670.0106	0.000187	5670.0109	0.000193
40	102	5670.0075	0.000133	5670.0076	0.000133	5670.0084	0.000148
	120	5670.0049	0.000087	5670.0052	0.000092	5670.0054	0.000095
	138	5670.0095	0.000168	5670.0096	0.000170	5670.0098	0.000172
30	102	5670.0056	0.000098	5670.0057	0.000100	5670.0055	0.000097
	120	5670.0072	0.000126	5670.0071	0.000125	5670.0072	0.000127
	138	5670.0051	0.000089	5670.0051	0.000089	5670.0055	0.000098
20	102	5670.0076	0.000134	5670.0078	0.000138	5670.0082	0.000145
	120	5670.0079	0.000139	5670.0081	0.000143	5670.0084	0.000148
	138	5670.0060	0.000105	5670.0059	0.000104	5670.0063	0.000111
10	102	5670.0089	0.000157	5670.0090	0.000158	5670.0091	0.000160
	120	5670.0074	0.000131	5670.0074	0.000130	5670.0079	0.000139
	138	5670.0075	0.000132	5670.0074	0.000130	5670.0074	0.000131
0	102	5670.0100	0.000177	5670.0102	0.000180	5670.0102	0.000179
	120	5670.0081	0.000143	5670.0087	0.000153	5670.0083	0.000147
	138	5670.0083	0.000147	5670.0083	0.000146	5670.0083	0.000147
-10	102	5670.0081	0.000143	5670.0080	0.000142	5670.0086	0.000152
	120	5670.0086	0.000151	5670.0086	0.000153	5670.0090	0.000158
	138	5670.0094	0.000166	5670.0095	0.000167	5670.0097	0.000172
-20	102	5670.0040	0.000071	5670.0044	0.000077	5670.0039	0.000069
	120	5670.0086	0.000151	5670.0086	0.000151	5670.0088	0.000155
	138	5670.0051	0.000090	5670.0055	0.000096	5670.0054	0.000096
-30	102	5670.0059	0.000105	5670.0064	0.000113	5670.0059	0.000104
	120	5670.0041	0.000072	5670.0040	0.000071	5670.0043	0.000075
	138	5670.0079	0.000140	5670.0078	0.000137	5670.0082	0.000145
-40	102	5670.0084	0.000148	5670.0084	0.000148	5670.0091	0.000160
	120	5670.0065	0.000114	5670.0066	0.000117	5670.0069	0.000121
	138	5670.0098	0.000173	5670.0101	0.000178	5670.0099	0.000175

Limit:

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.



12. Automatically Discontinue Transmission

12.1.Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

12.2.Test Result of Automatically Discontinue Transmission

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.