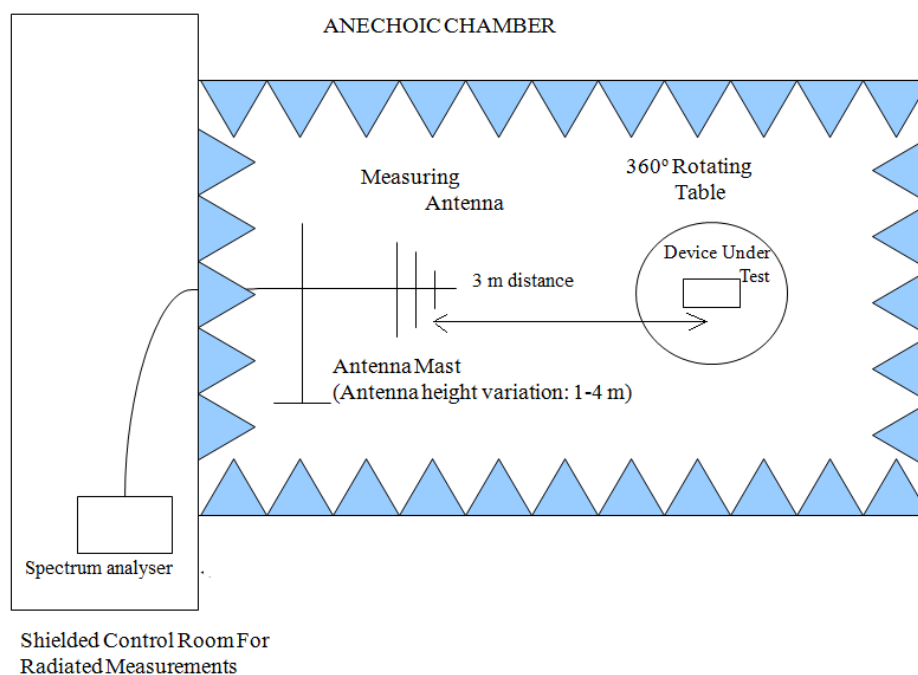
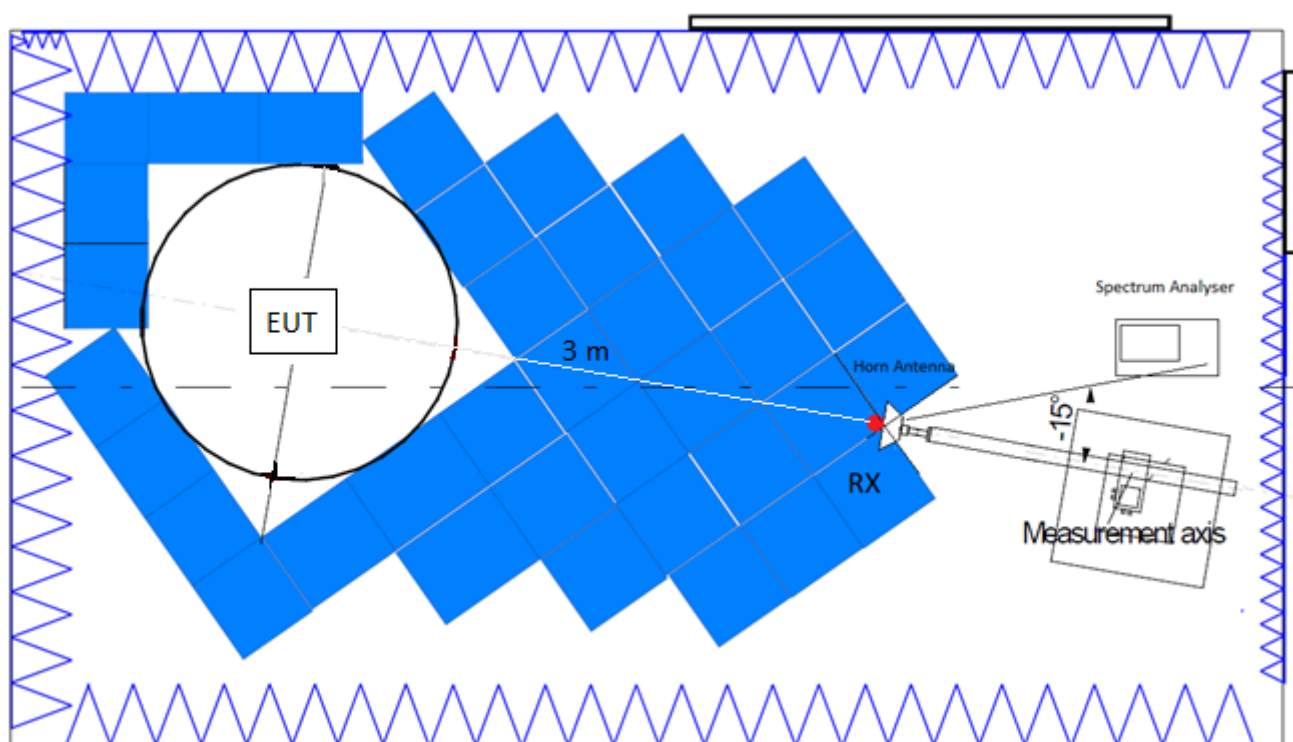


Radiated measurements setup $f < 1$ GHz



Radiated measurements setup $f > 1$ GHz



FCC Section 15.407 Subclause (a)(1)(iv). Transmitter Maximum Conducted Output Power / RSS-247 Clause 6.2.1.1. Transmitter Maximum Equivalent Isotropically Radiated Power

SPECIFICATION

FCC 15.407: For mobile and portable client devices in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW (24 dBm) provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

RSS-247: The maximum e.i.r.p. shall not exceed 200 mW (23 dBm) or $10 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.

RESULTS:

The maximum conducted output power was measured using the channel power integration method according to point E) 2) b) (Method SA-1) of 789033 D02 General UNII Test Procedures New Rules v02r01 when the duty cycle is >98% and the channel power integration method according to point E) 2) d) (Method SA-2) of 789033 D02 General UNII Test Procedures New Rules v02r01 when the duty cycle is <98%.

For data rates where the EUT was transmitting at <98% duty cycle, the duty calculated in Appendix A was added to the measured power in order to calculate the total average power during the actual transmission time.

For all SISO modes of operation, the antenna gain is less than 6dBi.

The e.i.r.p. levels are calculated by adding the declared maximum antenna gain (dBi).

FCC setting power

Mode : 802.11a - 20MHz – SISO – CORE Aux

	channel 36 5180 MHz	channel 40 5200 MHz	channel 48 5240 MHz
Max. conducted power (dBm)	12.99	20.13	20.26
Conducted Power Limit (dBm)	24		
Margin (dB)	11.01	3.87	3.74
Measurement uncertainty (dB)	<±1.20		

Mode : 802.11n HT20 - 20MHz – SISO – CORE Aux

	channel 36 5180 MHz	channel 40 5200 MHz	channel 48 5240 MHz
Max. conducted power (dBm)	12.82	20.45	20.35
Conducted Power Limit (dBm)	24		
Margin (dB)	11.18	3.55	2.65
Measurement uncertainty (dB)	<±1.20		

Mode : 802.11n HT40 - 40MHz – SISO – CORE Aux

	channel 38 5190 MHz	channel 46 5230 MHz
Max. conducted power (dBm)	10.82	18.95
Conducted Power Limit (dBm)	24	
Margin (dB)	13.18	5.05
Measurement uncertainty (dB)	<±1.20	

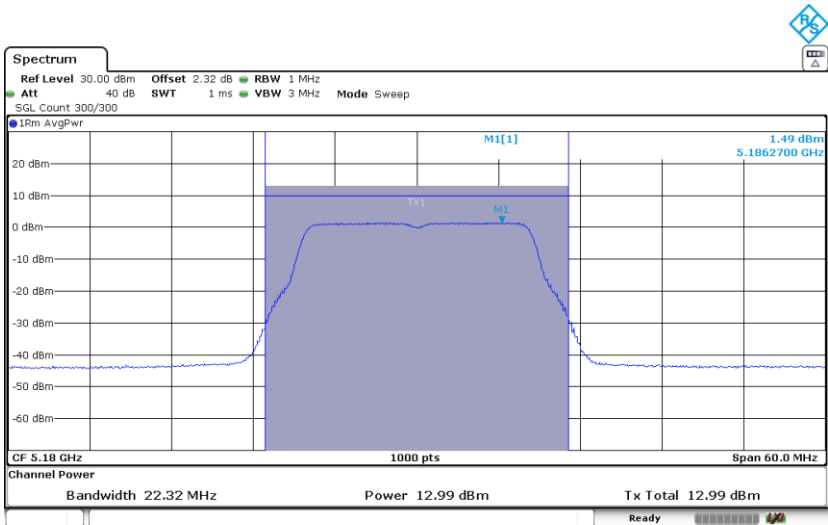
Mode : 802.11ac VHT80 - 80MHz – SISO – CORE Aux

	channel 42 5210 MHz
Max. conducted power (dBm)	10.07
Duty Cycle Correction Factor (dB)	0.18
Max. conducted power corrected (dBm)	10.25
Conducted Power Limit (dBm)	24
Margin (dB)	13.75
Measurement uncertainty (dB)	<±1.20

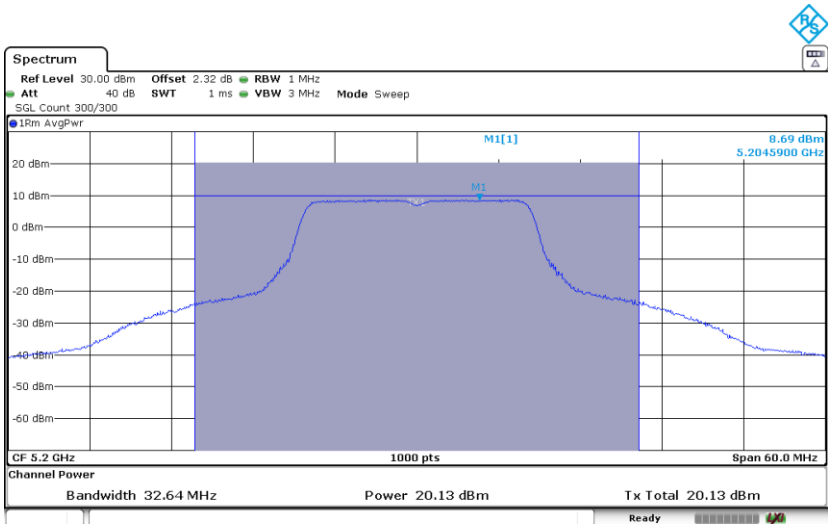
Verdict: PASS

Mode : 802.11a - 20MHz – SISO – CORE Aux

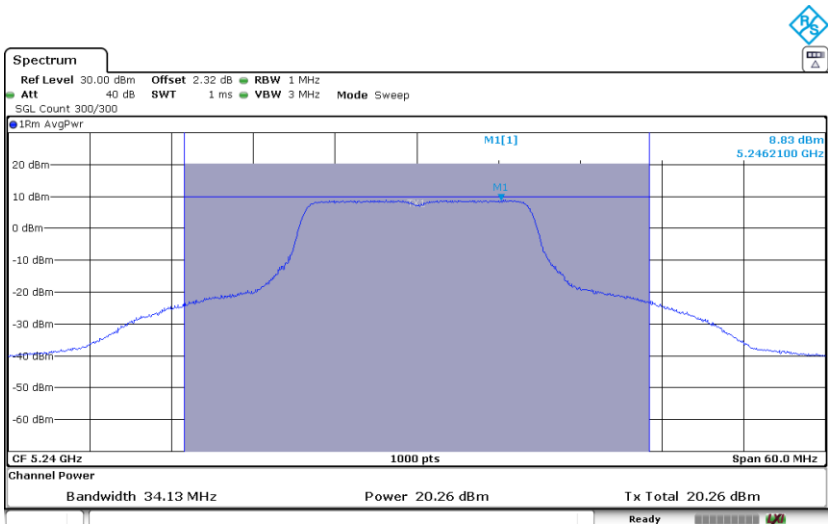
Channel 36



Channel 40

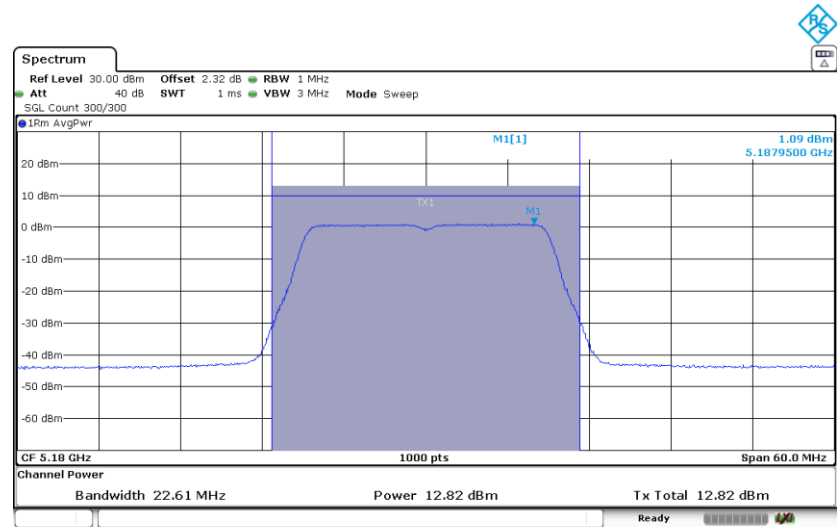


Channel 48

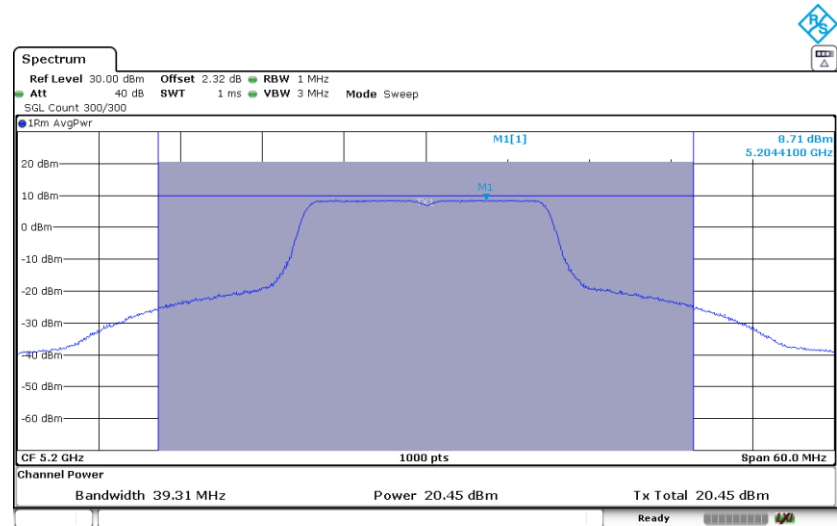


Mode : 802.11n HT20 - 20MHz – SISO – CORE Aux

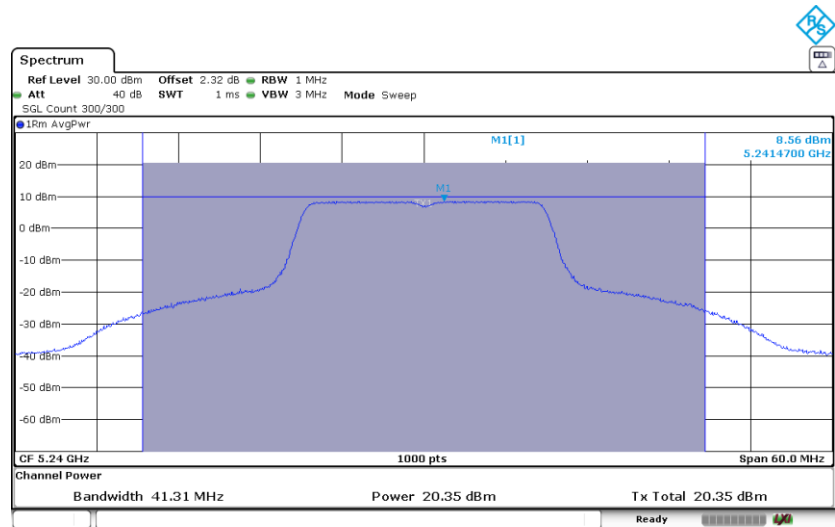
Channel 36



Channel 40

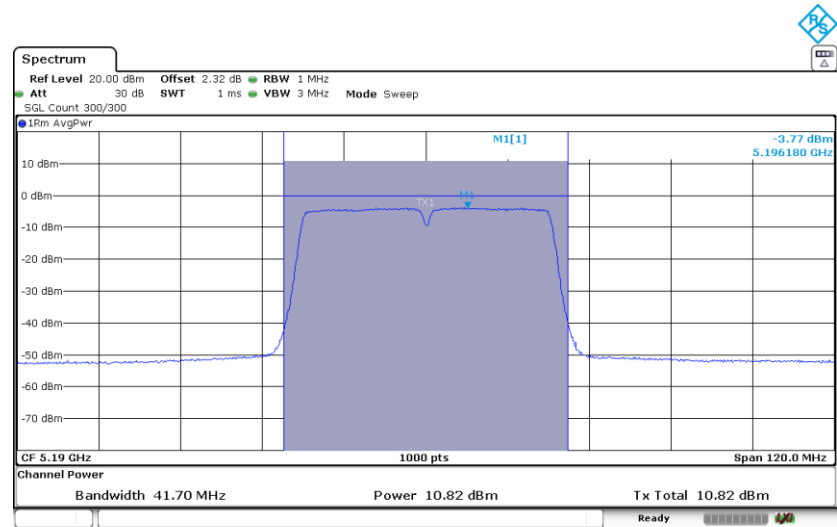


Channel 48

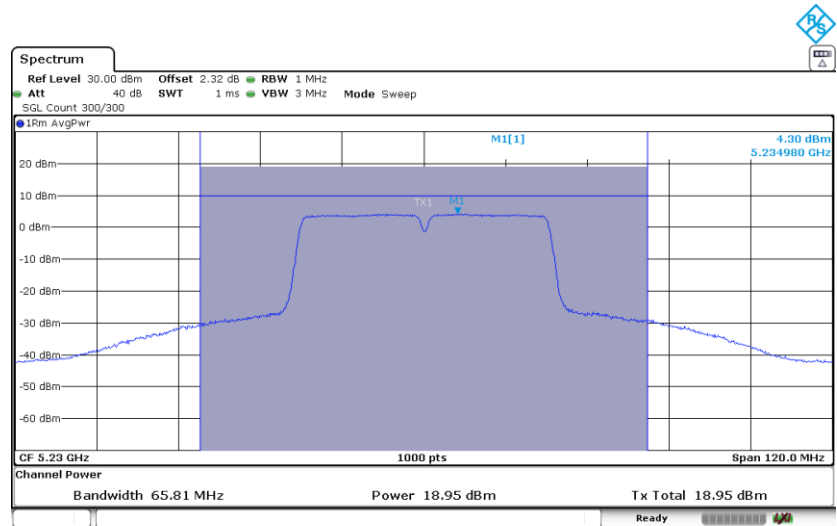


Mode : 802.11n HT40 - 40MHz – SISO – CORE Aux

Channel 38

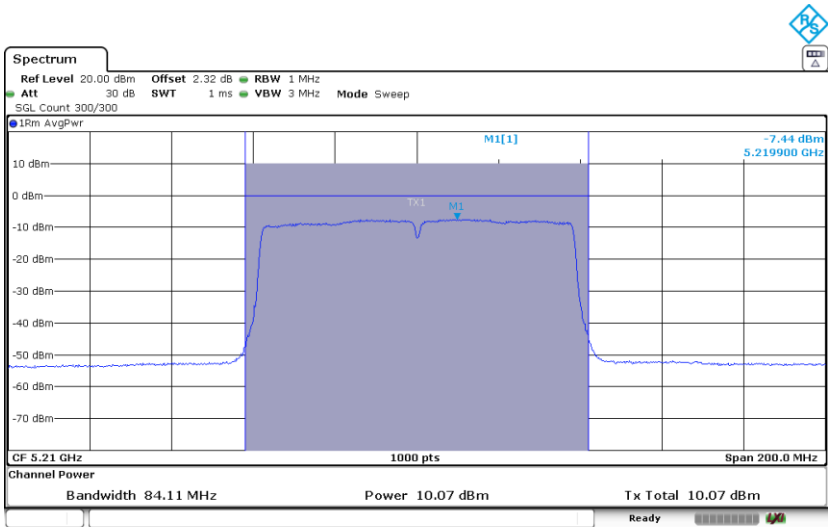


Channel 46



Mode : 802.11ac VHT80 - 80MHz – SISO – CORE Aux

Channel 42



Canada setting power

Mode : 802.11a - 20MHz – SISO – CORE Aux

Declared antenna gain: 4.15 dBi

	channel 36 5180 MHz	channel 40 5200 MHz	channel 48 5240 MHz
Max. conducted power (dBm)	12.99	15.42	15.45
Maximum EIRP power (dBm)	17.14	19.57	19.60
EIRP power Limit (dBm)	23		
Margin (dB)	5.86	3.43	3.40
Measurement uncertainty (dB)	<±1.20		

Mode : 802.11n HT20 - 20MHz – SISO – CORE Aux

Declared antenna gain: 4.15 dBi

	channel 36 5180 MHz	channel 40 5200 MHz	channel 48 5240 MHz
Max. conducted power (dBm)	12.82	15.44	15.33
Maximum EIRP power (dBm)	16.97	19.59	19.48
EIRP power Limit (dBm)	23		
Margin (dB)	6.03	3.41	4.52
Measurement uncertainty (dB)	<±1.20		

Mode : 802.11n HT40 - 40MHz – SISO – CORE Aux

Declared antenna gain: 4.15 dBi

	channel 38 5190 MHz	channel 46 5230 MHz
Max. conducted power (dBm)	10.82	17.43
Maximum EIRP power (dBm)	13.18	21.58
EIRP power Limit (dBm)	23	
Margin (dB)	8.03	1.42
Measurement uncertainty (dB)	<±1.20	

Mode : 802.11ac VHT80 - 80MHz – SISO – CORE Aux

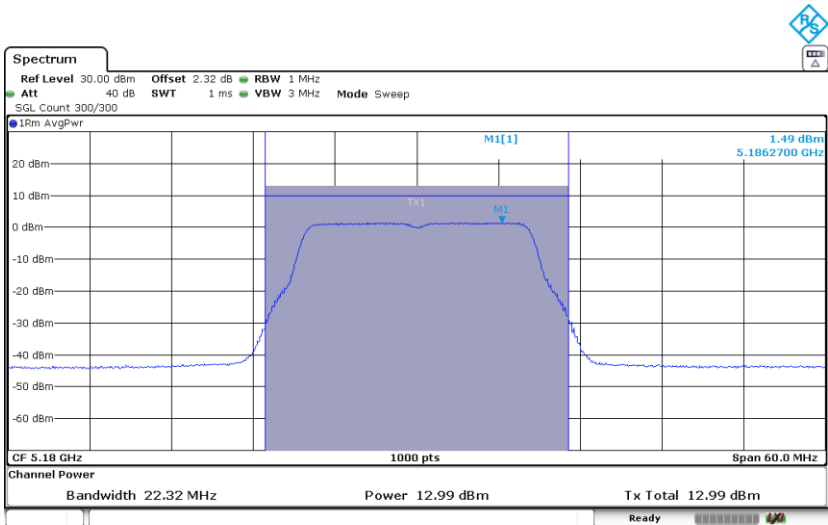
Declared antenna gain: 4.15 dBi

	channel 42 5210 MHz
Max. conducted power (dBm)	10.07
Duty Cycle Correction Factor (dB)	0.18
Max. conducted power corrected (dBm)	10.25
Maximum EIRP power (dBm)	14.40
Conducted Peak Power Limit (dBm)	23
Margin (dB)	8.60
Measurement uncertainty (dB)	<±1.20

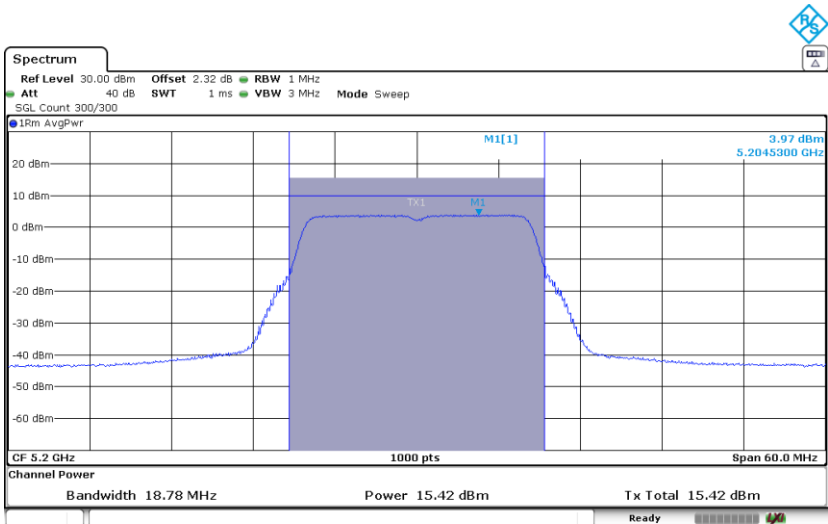
Verdict: PASS

Mode : 802.11a - 20MHz – SISO – CORE Aux

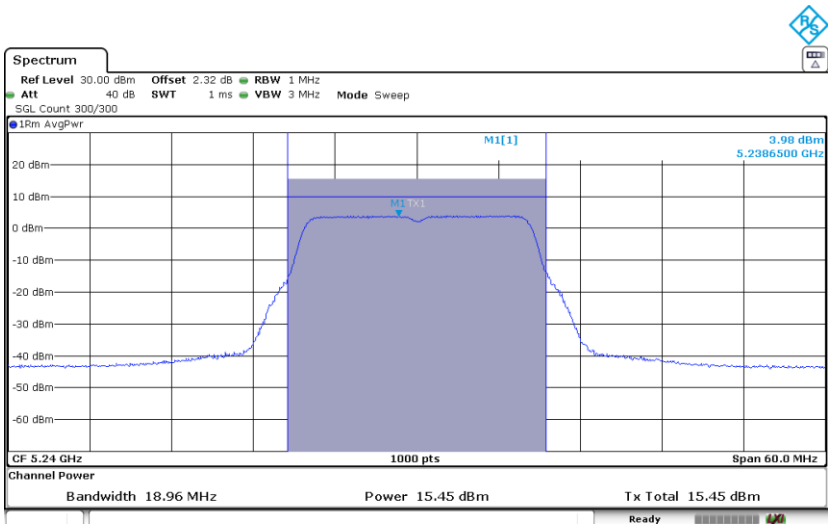
Channel 36



Channel 40

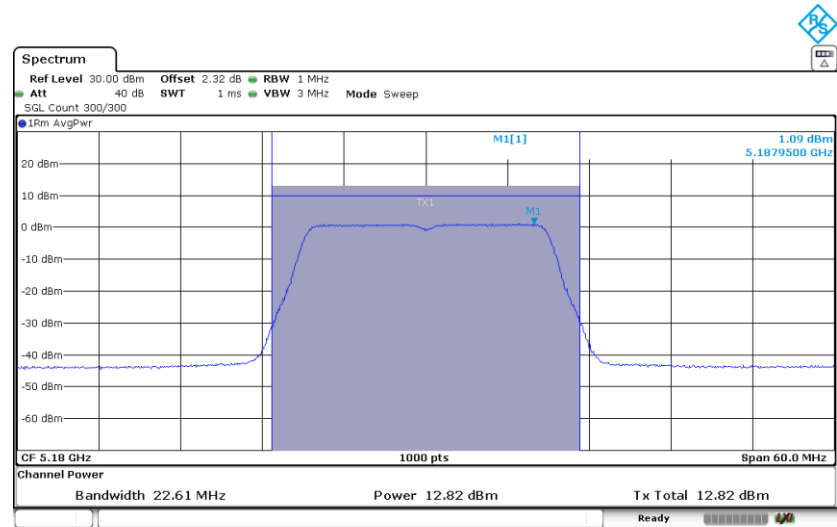


Channel 48

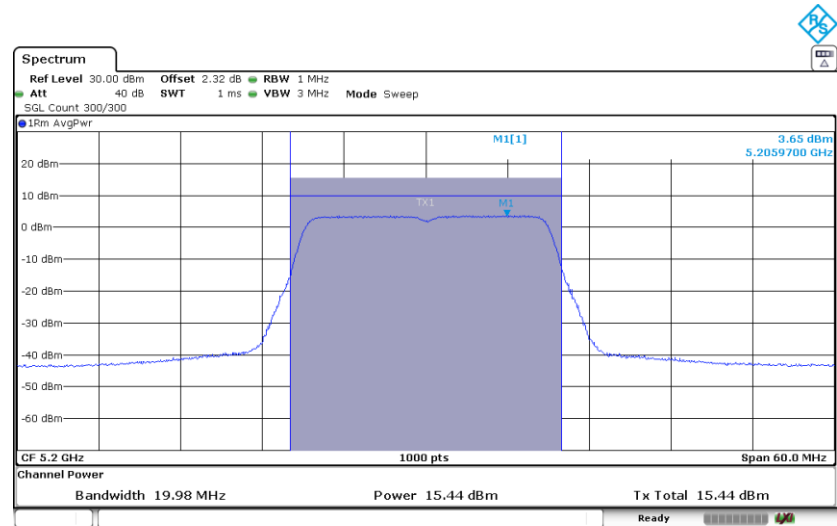


Mode : 802.11n HT20 - 20MHz – SISO – CORE Aux

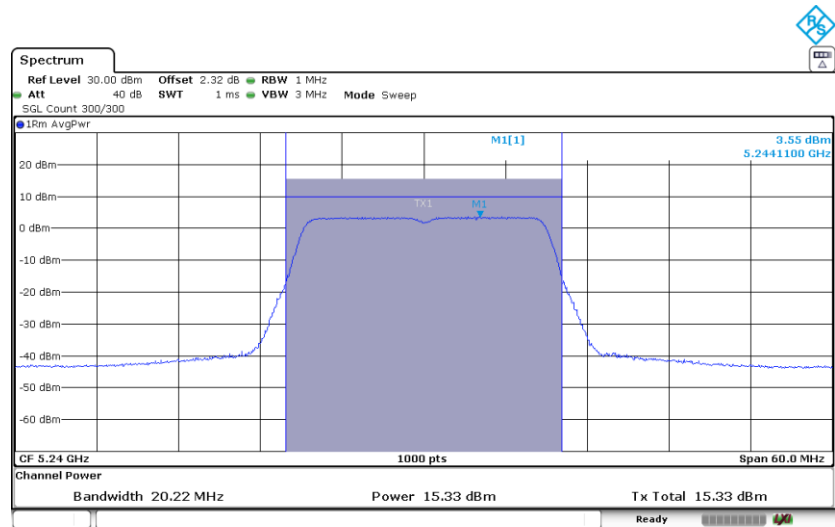
Channel 36



Channel 40

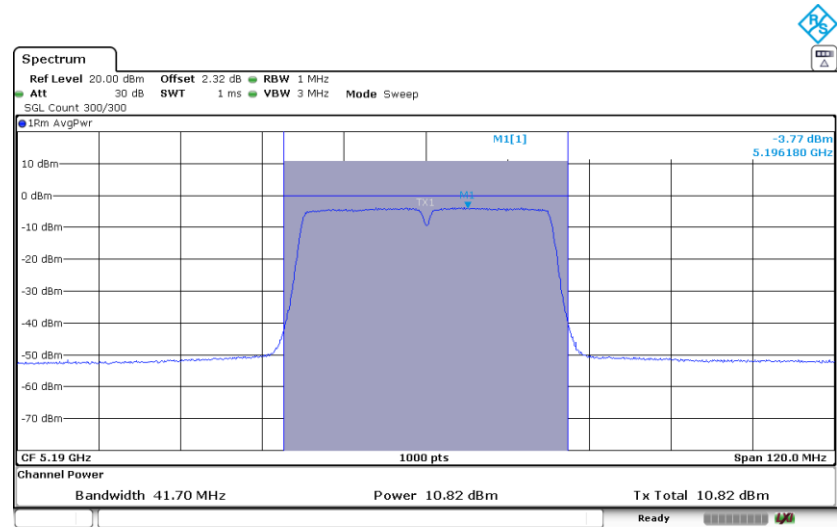


Channel 48

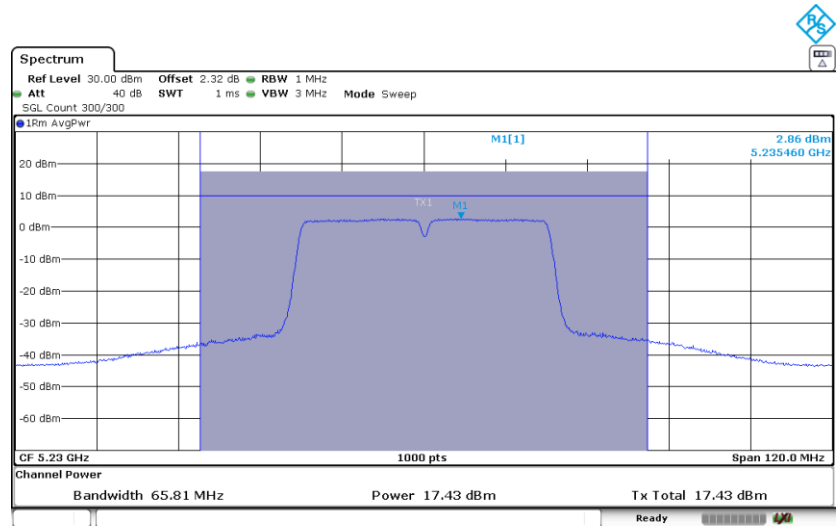


Mode : 802.11n HT40 - 40MHz – SISO – CORE Aux

Channel 38

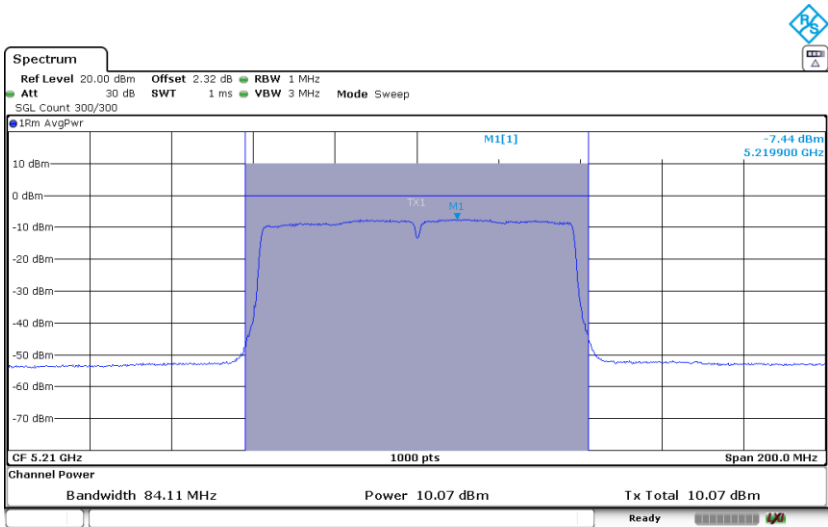


Channel 46



Mode : 802.11ac VHT80 - 80MHz – SISO – CORE Aux

Channel 42



FCC Section 15.407 Subclause (a) (1) (iv). Transmitter Peak Power Spectral Density / RSS-247 Clause 6.2.1.1. Transmitter EIRP Spectral Density

FCC 15.407: The maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. 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.

RSS-247: The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

RESULTS

The maximum power spectral density (PSD) was measured using the method according to point F) referencing E.2.b) (Method SA-1) and E.2.b) (Method SA-2) of Guidance 789033 D02 General UNII Test Procedures New Rules v02r01.

For all modes of operation, the antenna gain is < 6 dBi.

The PSD test uses the same setup than the transmitter maximum conducted output power test. The result of the Peak PSD was measured by colocation a marker on the peak of the signal and the results are in the tables below.

FCC setting power

Mode : 802.11a - 20MHz – SISO – CORE Aux

	channel 36 5180 MHz	channel 40 5200 MHz	channel 48 5240 MHz
PSD (dBm/MHz)	1.49	8.69	8.83
PSD Limit (dBm/MHz)	11		
Margin (dB)	9.51	2.31	2.17
Measurement uncertainty (dB)	<±1.20		

Mode : 802.11n HT20 - 20MHz – SISO – CORE Aux

	channel 36 5180 MHz	channel 40 5200 MHz	channel 48 5240 MHz
PSD (dBm/MHz)	1.09	8.71	8.56
PSD Limit (dBm/MHz)	11		
Margin (dB)	9.91	2.29	2.44
Measurement uncertainty (dB)	<±1.20		

Mode : 802.11n HT40 - 40MHz – SISO – CORE Aux

	channel 38 5190 MHz	channel 46 5230 MHz
PSD (dBm/MHz)	-3.77	4.30
PSD Limit (dBm/MHz)	11	
Margin (dB)	14.77	6.70
Measurement uncertainty (dB)	<±1.20	

Mode : 802.11ac VHT80 - 80MHz – SISO – CORE Aux

	channel 42 5210 MHz
PSD (dBm/MHz)	-7.44
Duty Cycle Correction Factor (dB)	0.18
PSD Corrected (dBm/MHz)	-7.26
PSD Limit (dBm/MHz)	11
Margin (dB)	18.26
Measurement uncertainty (dB)	<±1.20

Verdict: PASS

Canada setting power

Mode : 802.11a - 20MHz – SISO – CORE Aux

Declared antenna gain: 4.15 dBi

	channel 36 5180 MHz	channel 40 5200 MHz	channel 48 5240 MHz
PSD (dBm/MHz)	1.49	3.97	3.98
e.i.r.p PSD (dBm/MHz)	5.64	8.12	8.13
e.i.r.p PSD Limit (dBm/MHz)	10		
Margin (dB)	4.36	1.88	1.87
Measurement uncertainty (dB)	<±1.20		

Mode : 802.11n HT20 - 20MHz – SISO – CORE Aux

Declared antenna gain: 4.15 dBi

	channel 36 5180 MHz	channel 40 5200 MHz	channel 48 5240 MHz
PSD (dBm/MHz)	1.09	3.65	3.55
e.i.r.p PSD (dBm/MHz)	5.24	7.80	7.70
e.i.r.p PSD Limit (dBm/MHz)	10		
Margin (dB)	4.76	2.20	2.30
Measurement uncertainty (dB)	<±1.20		

Mode : 802.11n HT40 - 40MHz – SISO – CORE Aux

Declared antenna gain: 4.15 dBi

	channel 38 5190 MHz	channel 46 5230 MHz
PSD (dBm/MHz)	-3.77	2.86
e.i.r.p PSD (dBm/MHz)	0.38	7.01
e.i.r.p PSD Limit (dBm/MHz)	10	
Margin (dB)	9.62	2.99
Measurement uncertainty (dB)	<±1.20	

Mode : 802.11ac VHT80 - 80MHz – SISO – CORE Aux

Declared antenna gain: 4.15 dBi

	channel 42 5210 MHz
PSD (dBm/MHz)	-7.44
Duty Cycle Correction Factor (dB)	0.18
PSD Corrected (dBm/MHz)	-7.26
e.i.r.p PSD (dBm/MHz)	-3.11
e.i.r.p PSD Limit (dBm/MHz)	10
Margin (dB)	13.11
Measurement uncertainty (dB)	<±1.20

Verdict: PASS

FCC Section 15.407(b)(1)(6) /RSS-247 6.2.1.2. Transmitter Out of Band Radiated Emissions

SPECIFICATION

For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.25 GHz band shall not exceed an EIRP of –27 dBm/MHz (68.23 dB μ V/m at 3 m distance).

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)):

Frequency Range (MHz)	Field strength (μ V/m)	Field strength (dB μ V/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	300
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 40000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RESULTS:

The situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

All tests were performed in a semi-anechoic chamber at a distance of 3 m for the frequency range 30 MHz-40 GHz.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

Core Aux allows the simultaneous Wi-Fi transmission in both bands (2.4 GHz and 5GHz).Core Aux shares the third antenna from the main radio and cannot operate completely independently from the main radio.

The tests were performed in worst case with the equipment transmitting with Core Aux (802.11n HT20) in channel 36 (5180MHz) and with WiFi 2.4GHz (802.11n HT20 MIMO 3Tx)) in channel 13 (2472MHz).

Mode: 802.11n HT20 – Core Aux (5180MHz) + 802.11n HT20 – CDD – 20MHz – MIMO – CORE 0 & CORE 1 & CORE 2 (2472MHz)

Frequency range 30 MHz-1000 MHz.

Note: The spurious emissions below 1 GHz do not depend on either the operating channel or the modulation mode selected in the EUT.

Spurious levels operating (radiated) closest to limit.

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement Uncertainty (dB)
78.840	Vertical	Quasi-Peak	28.1	40	11.9	± 3.88
144.832	Horizontal	Quasi-Peak	28.60	43.5	14.9	± 3.88
168.953	Horizontal	Quasi-Peak	36	43.5	7.5	± 3.88
180.431	Horizontal	Quasi-Peak	30.6	43.5	12.9	± 3.88
191.295	Horizontal	Quasi-Peak	31.4	43.5	12.1	± 3.88

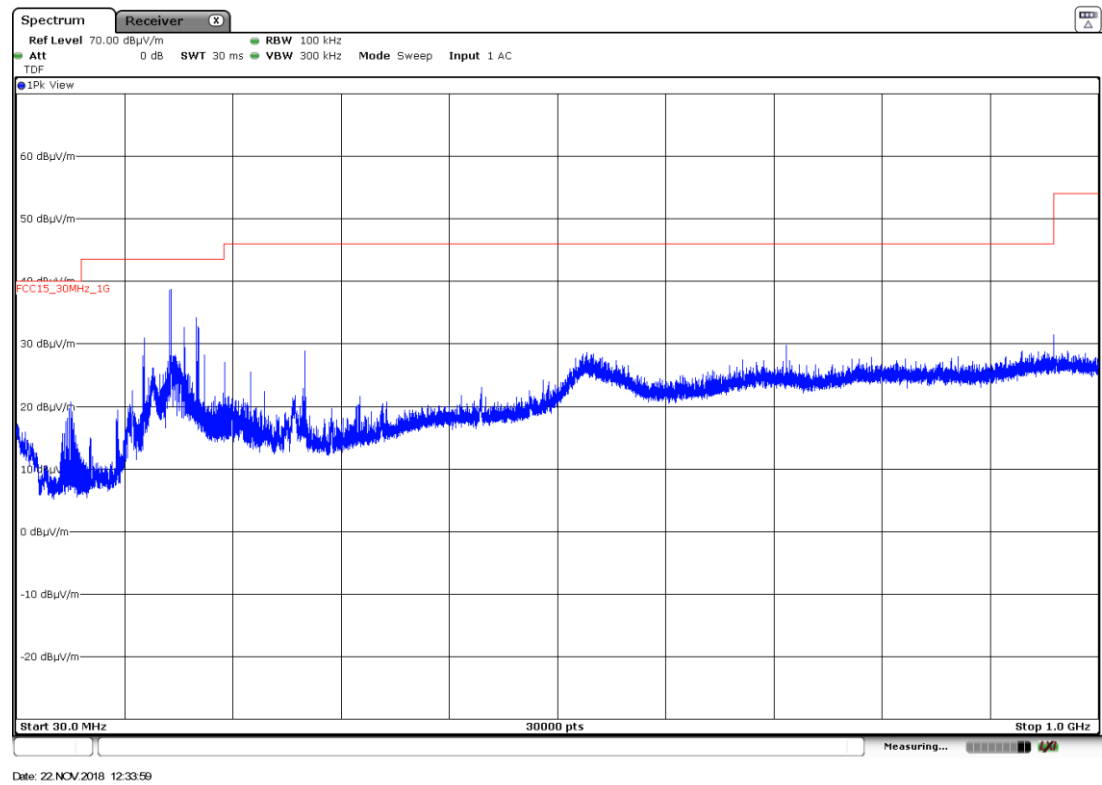
Frequency range 1 GHz-40 GHz

The results in the next tables show the maximum measured levels in the 1-40 GHz frequency range.

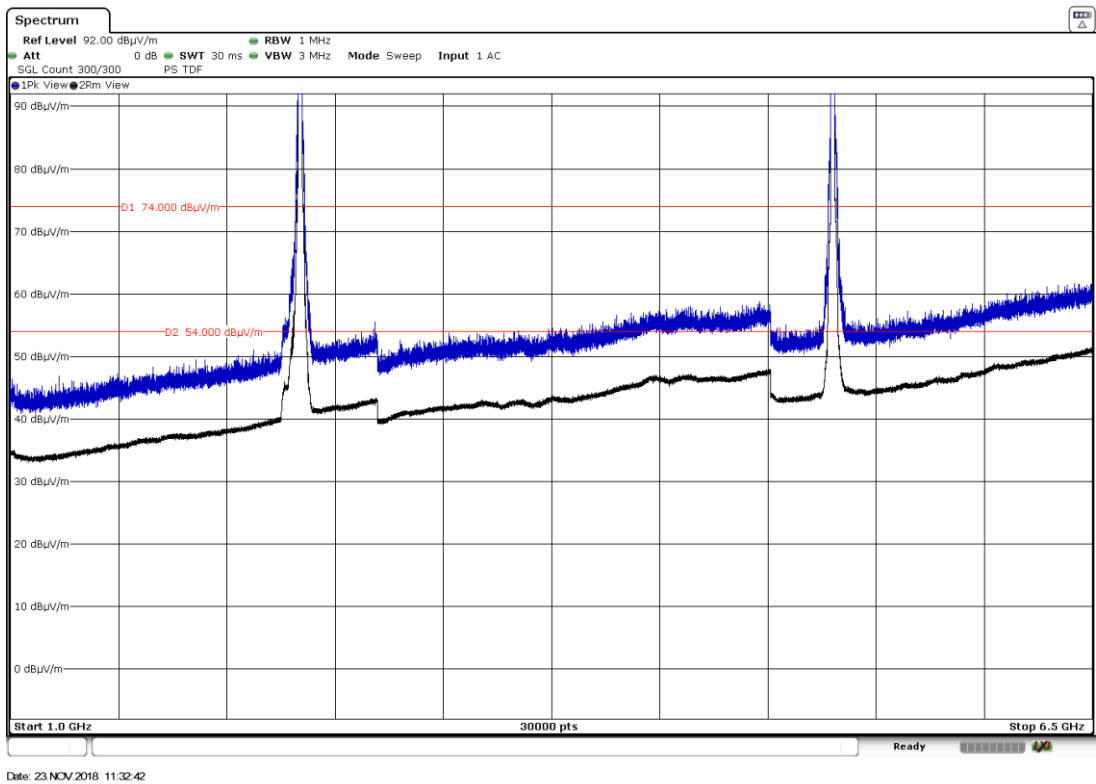
Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement Uncertainty (dB)
7415.78	Horizontal	Peak	52.91	74	21.09	± 3.05
7412.63		Average	43.07	54	10.93	± 3.05

Verdict: PASS

FREQUENCY RANGE 30 MHz-1000 MHz.

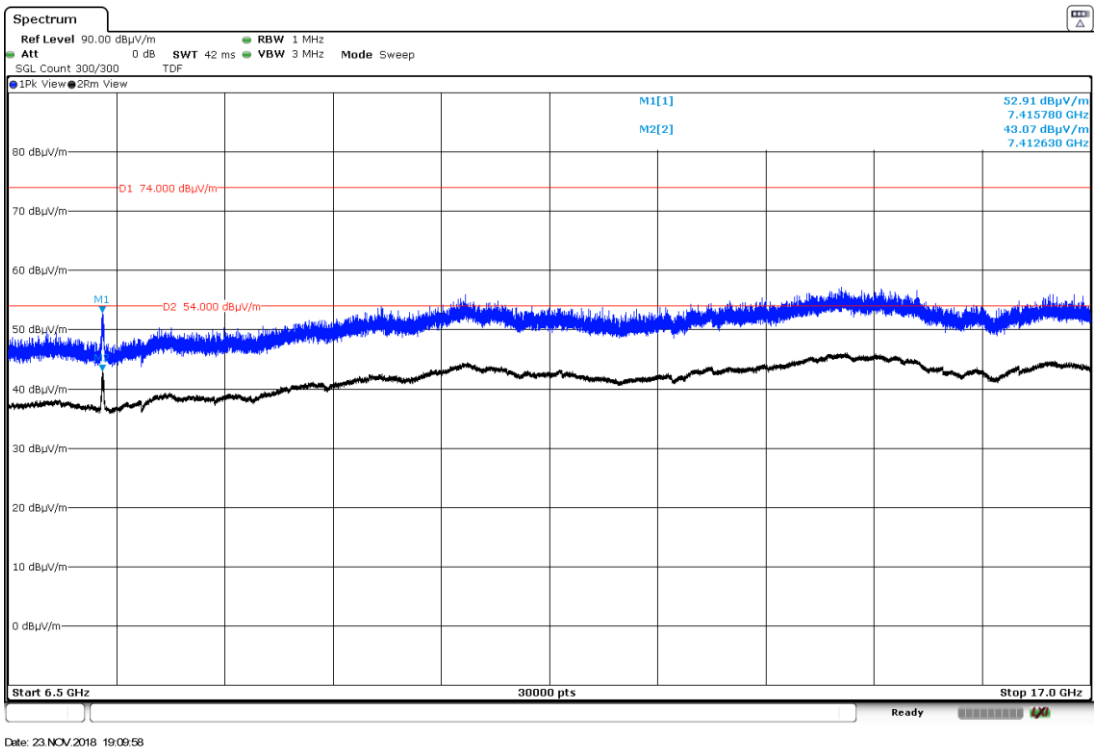


FREQUENCY RANGE 1 GHz to 6.5 GHz.

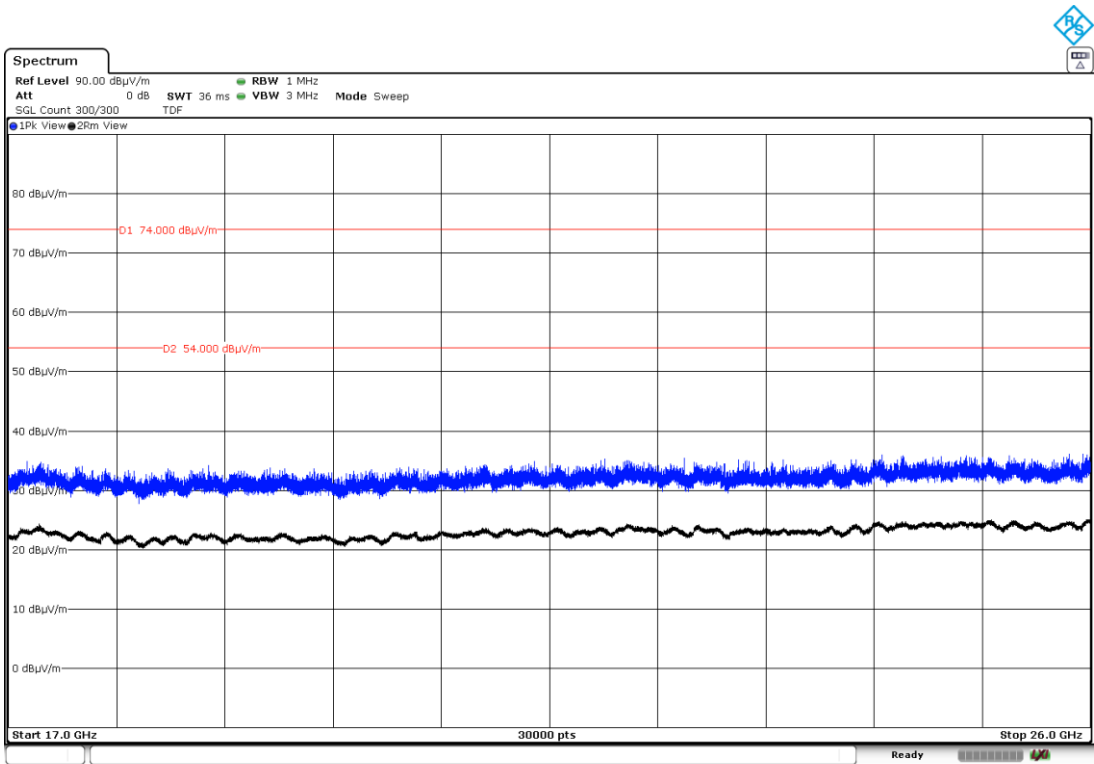


Note: The peak shown in the plot above the limit is the carrier frequency.

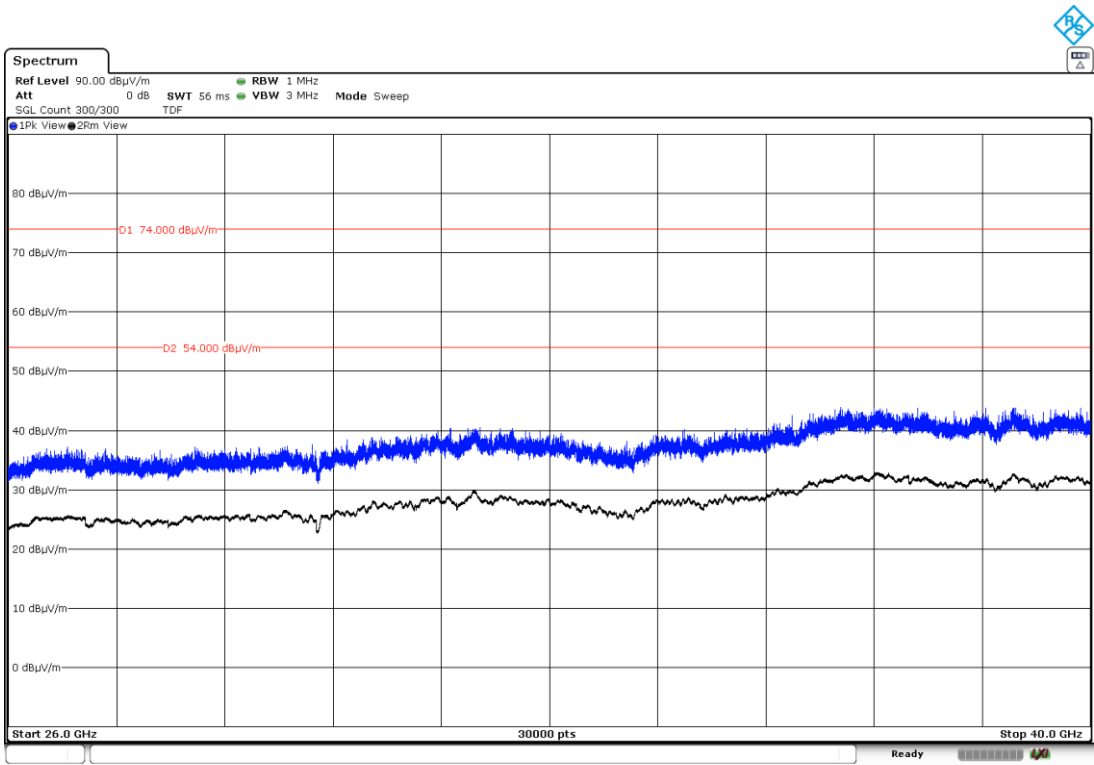
FREQUENCY RANGE 6.5 GHz to 17 GHz.



FREQUENCY RANGE 17 GHz to 26 GHz.



FREQUENCY RANGE 26 GHz to 40 GHz.



FCC Section 15.407 Subclause (b) (1) / RSS-247 6.2.1.2. Transmitter Band Edge Radiated Emissions.

SPECIFICATION

For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.25 GHz band shall not exceed an EIRP of –27 dBm/MHz (68.20 dBμV/m at 3 m distance).

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)):

Frequency Range (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	300
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 40000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RESULTS:

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

All emissions outside of the 5.15-5.35GHz band shall not exceed an EIRP of -27dBm/MHz. There are restricted bands of operation below band edge at 4.5-5.15 GHz also above the upper band edge at 5.35-5.46GHz therefore the provision of FCC Part 15.205 apply.

Field strength measurements using peak and average detector performed in the restricted bands below 5.15GHz and above 5.35 GHz.

Test performed on the following worst cases modes in all relevant tests channels:

- 802.11a: 6 Mbit/s / SISO on Core Aux
- 802.11n HT20: MCS0 / SISO on Core Aux
- 802.11n HT40: MCS0 / SISO on Core Aux
- 802.11ac VHT80: MCS0x1 / SISO on Core Aux

Results for Mode: 802.11a - 20 MHz – SISO – CORE Aux

Results: Peak / Channel 36

Frequency (MHz)	Antenna Polarity	Peak Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5150	Vertical	60.95	74	13.05	<± 3.05	PASS
5143.613	Vertical	63.07	74	10.93	<± 3.05	PASS

Results: Average / Channel 36

Frequency (MHz)	Antenna Polarity	Average Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5149.933	Vertical	50.93	54	3.07	<± 3.05	PASS

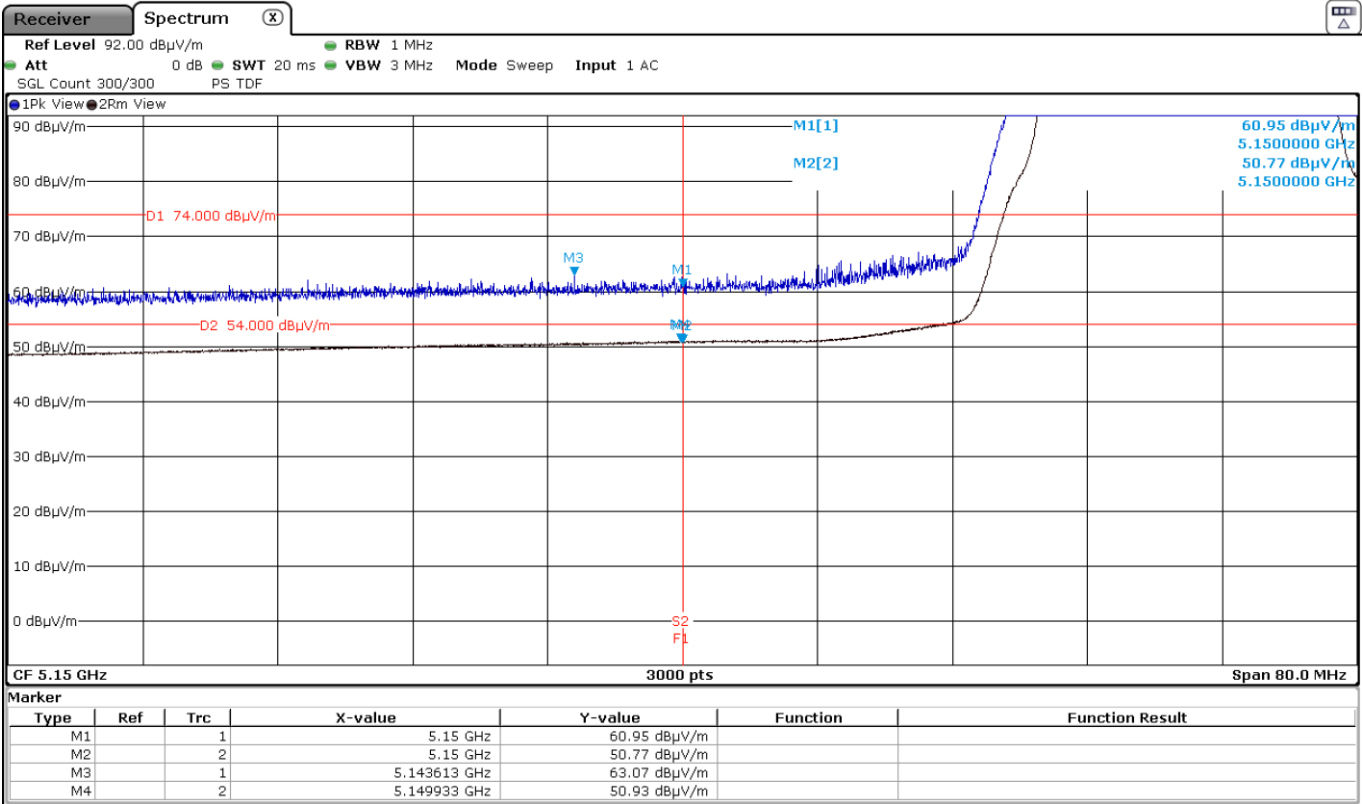
Results: Peak / Channel 48

Frequency (MHz)	Antenna Polarity	Peak Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5150	Vertical	60.09	74	13.91	<± 3.05	PASS
5127.215	Vertical	61.85	74	12.15	<± 3.05	PASS

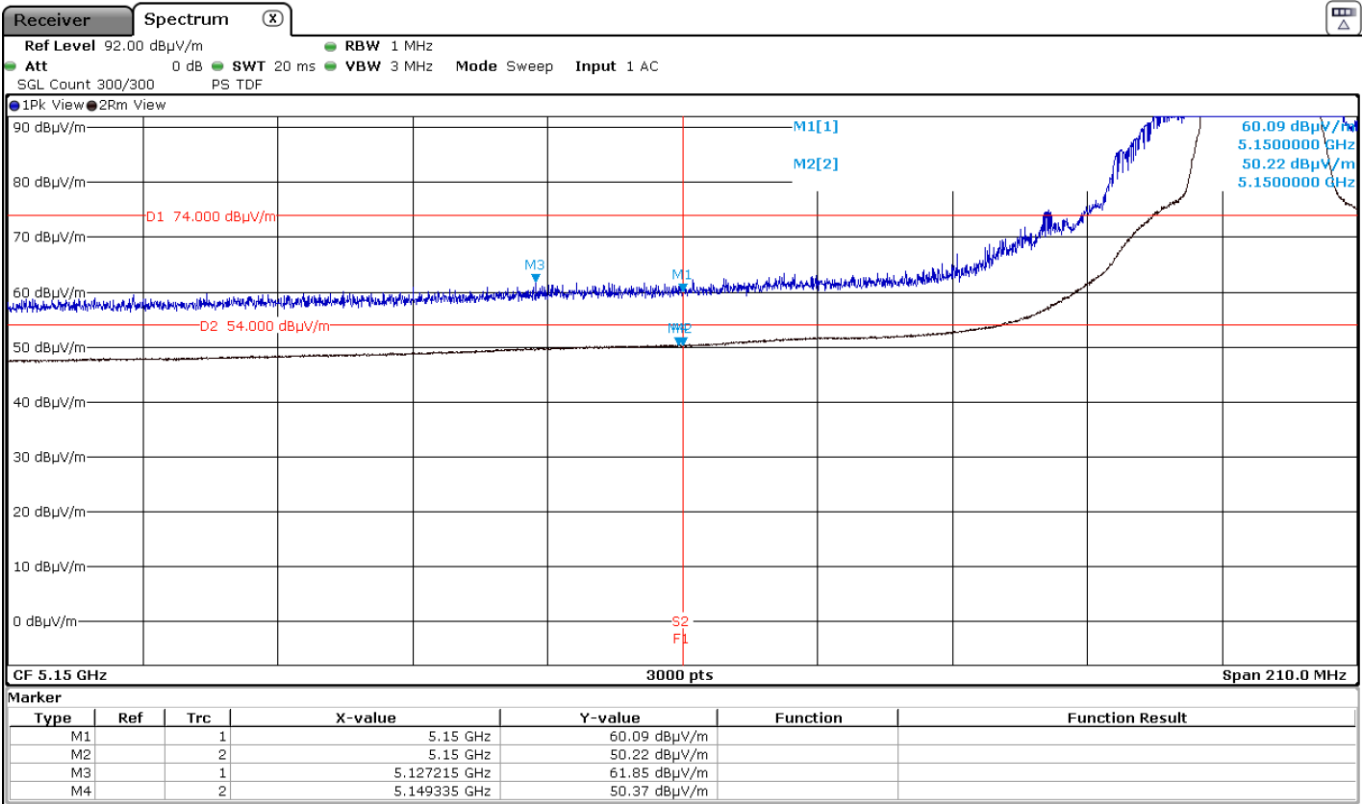
Results: Average / Channel 48

Frequency (MHz)	Antenna Polarity	Average Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5150	Vertical	50.22	54	3.78	<± 3.05	PASS
5149.335	Vertical	50.37	54	3.63	<± 3.05	PASS

4500 MHz to 5150 MHz Lower Band Edge Channel 36



4500 MHz to 5150 MHz Lower Band Edge Channel 48



Results: 802.11n HT20 - 20 MHz – SISO - CORE Aux

Results: Peak / Channel 36

Frequency (MHz)	Antenna Polarity	Peak Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5150	Vertical	60.27	74	13.73	<± 3.05	PASS
5139.560	Vertical	62.42	74	11.58	<± 3.05	PASS

Results: Average / Channel 36

Frequency (MHz)	Antenna Polarity	Average Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5150	Vertical	50.71	54	3.29	<± 3.05	PASS
5148.787	Vertical	50.93	54	3.07	<± 3.05	PASS

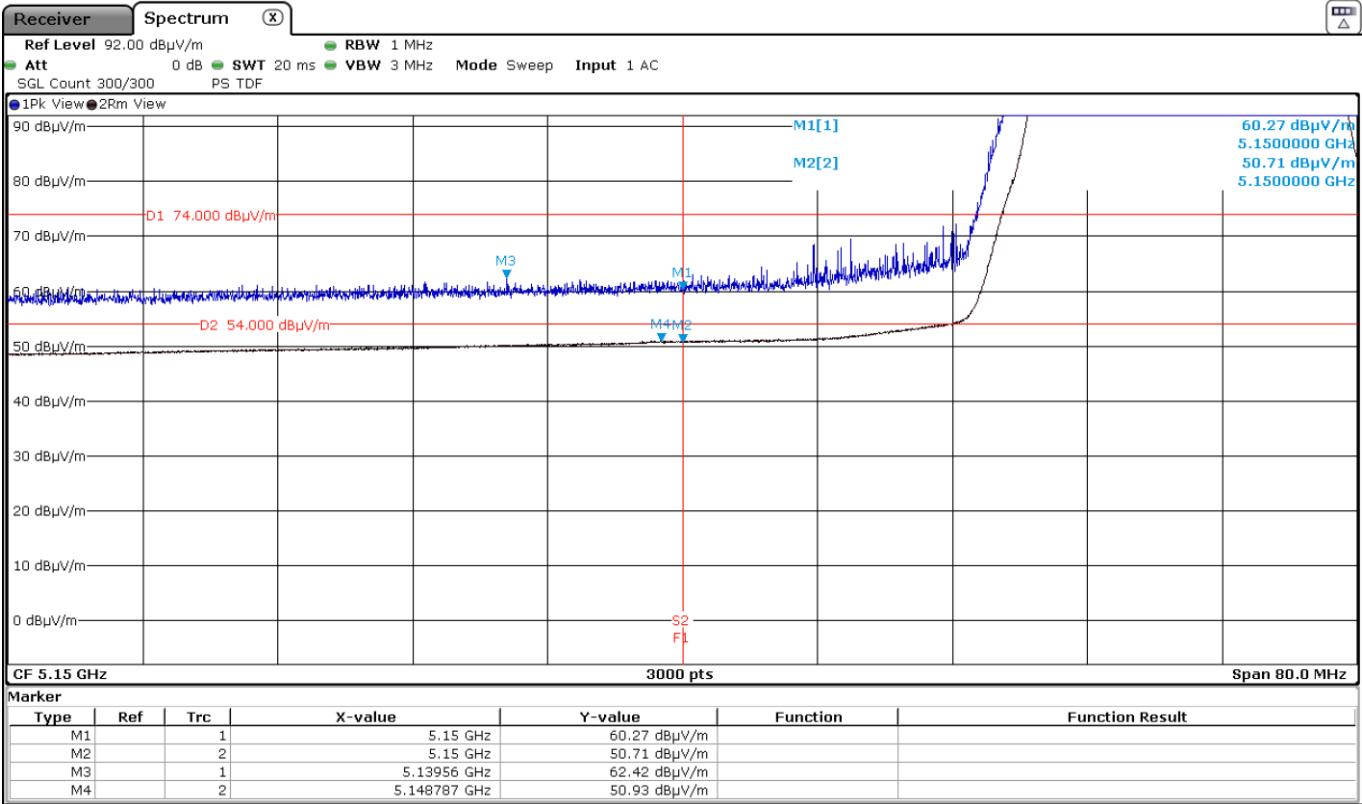
Results: Peak / Channel 48

Frequency (MHz)	Antenna Polarity	Peak Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5150	Vertical	61.01	74	12.99	<± 3.05	PASS
5146.955	Vertical	62.55	74	11.45	<± 3.05	PASS

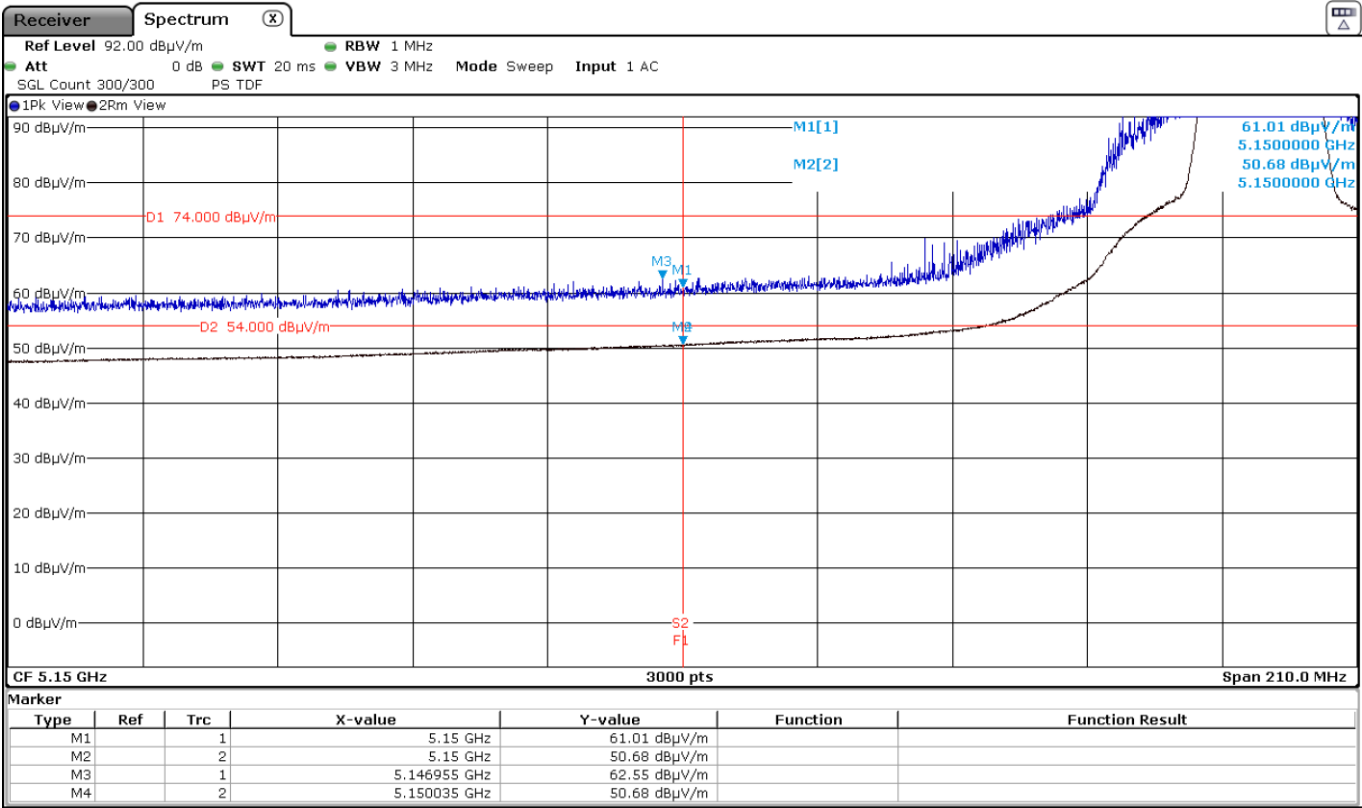
Results: Average / Channel 48

Frequency (MHz)	Antenna Polarity	Average Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5150	Vertical	50.68	54	3.32	<± 3.05	PASS

4500 MHz to 5150 MHz Lower Band Edge Channel 36



4500 MHz to 5150 MHz Lower Band Edge Channel 48



Results for Mode: 802.11n HT40 - 40 MHz – SISO - CORE Aux

Results: Peak / Channel 38

Frequency (MHz)	Antenna Polarity	Peak Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5150	Vertical	59.82	74	14.18	<± 3.05	PASS
5149.250	Vertical	61.76	74	12.24	<± 3.05	PASS

Results: Average / Channel 38

Frequency (MHz)	Antenna Polarity	Average Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5150	Vertical	49.72	54	4.28	<± 3.05	PASS
5149.380	Vertical	49.96	54	4.04	<± 3.05	PASS

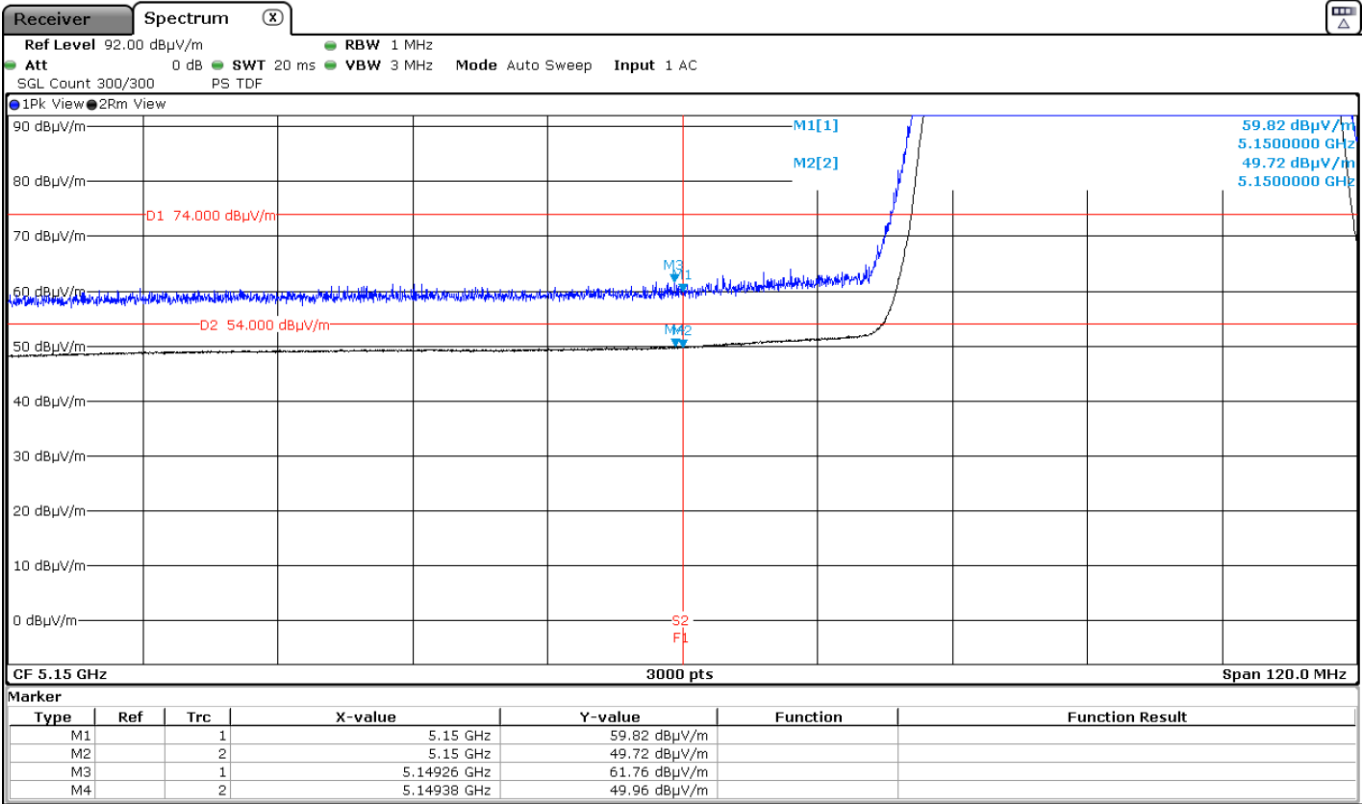
Results: Peak / Channel 46

Frequency (MHz)	Antenna Polarity	Peak Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5150	Vertical	59.98	74	14.02	<± 3.05	PASS
5134.167	Vertical	62.11	74	11.89	<± 3.05	PASS
5350	Vertical	57.93	74	16.07	<± 3.05	PASS
5350.145	Vertical	59.25	74	14.75	<± 3.05	PASS

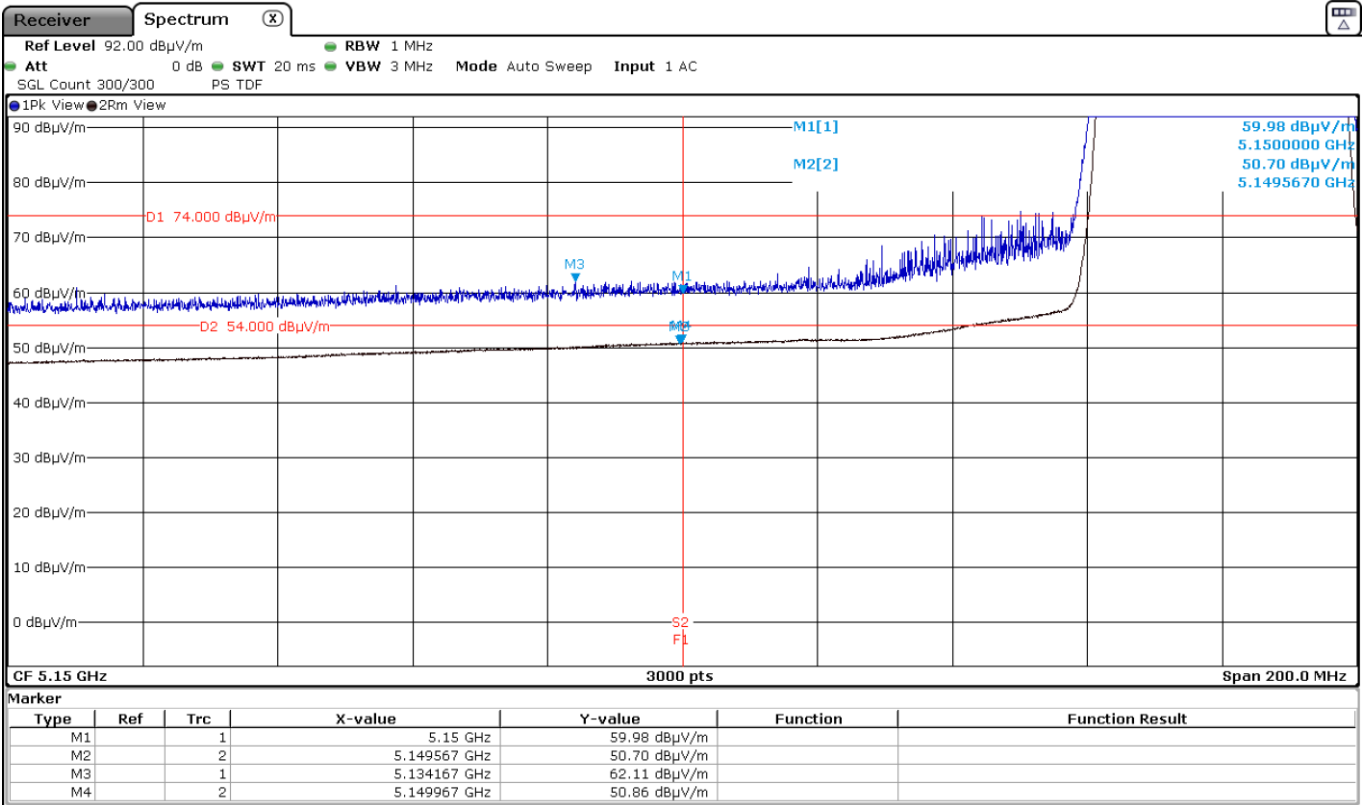
Results: Average / Channel 46

Frequency (MHz)	Antenna Polarity	Average Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5149.967	Vertical	50.86	54	3.14	<± 3.05	PASS
5350.145	Vertical	47.96	54	6.04	<± 3.05	PASS

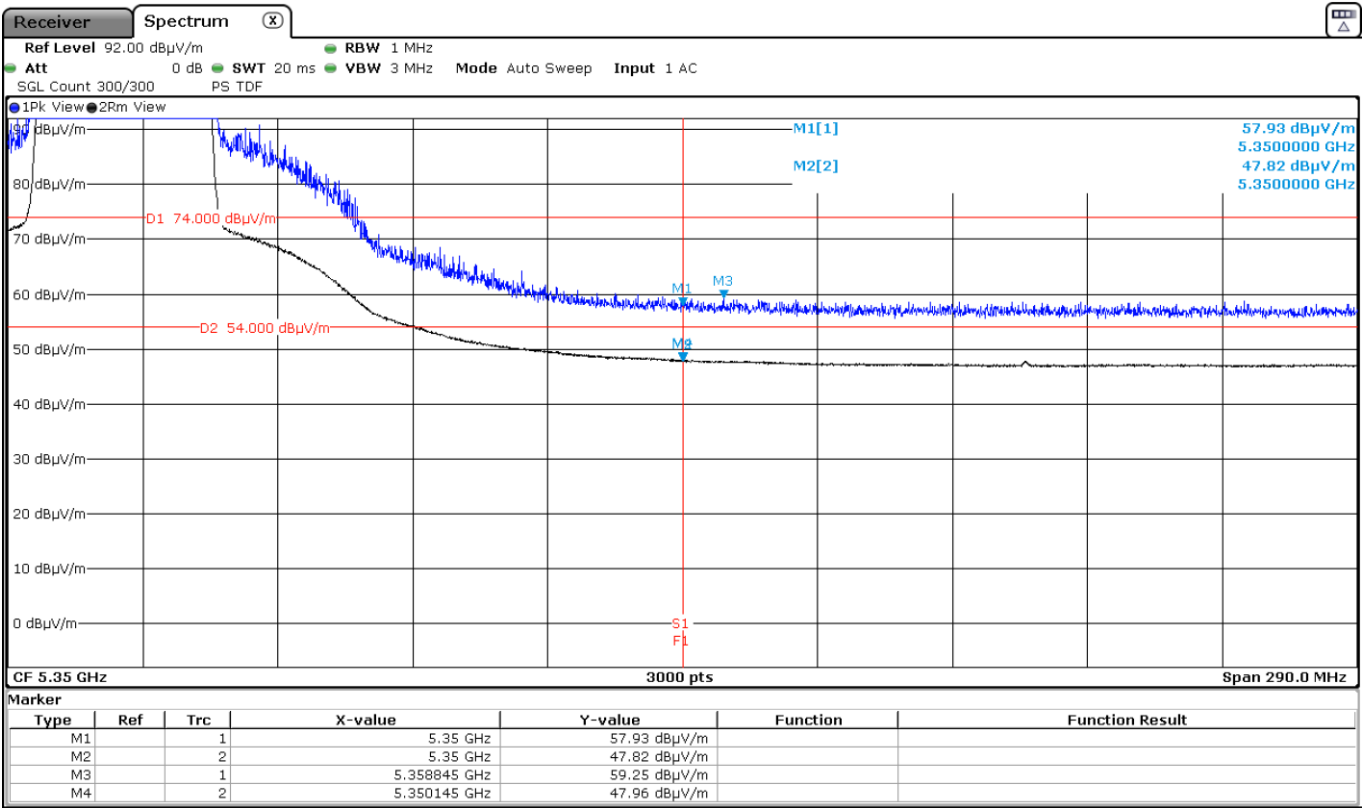
4500 MHz to 5150 MHz Lower Band Edge Channel 38



4500 MHz to 5150 MHz Lower Band Edge Channel 46



5350 MHz to 5460 MHz Upper Band Edge Channel 46



Results for Mode: 802.11ac VHT80 - 80 MHz - SISO - CORE Aux

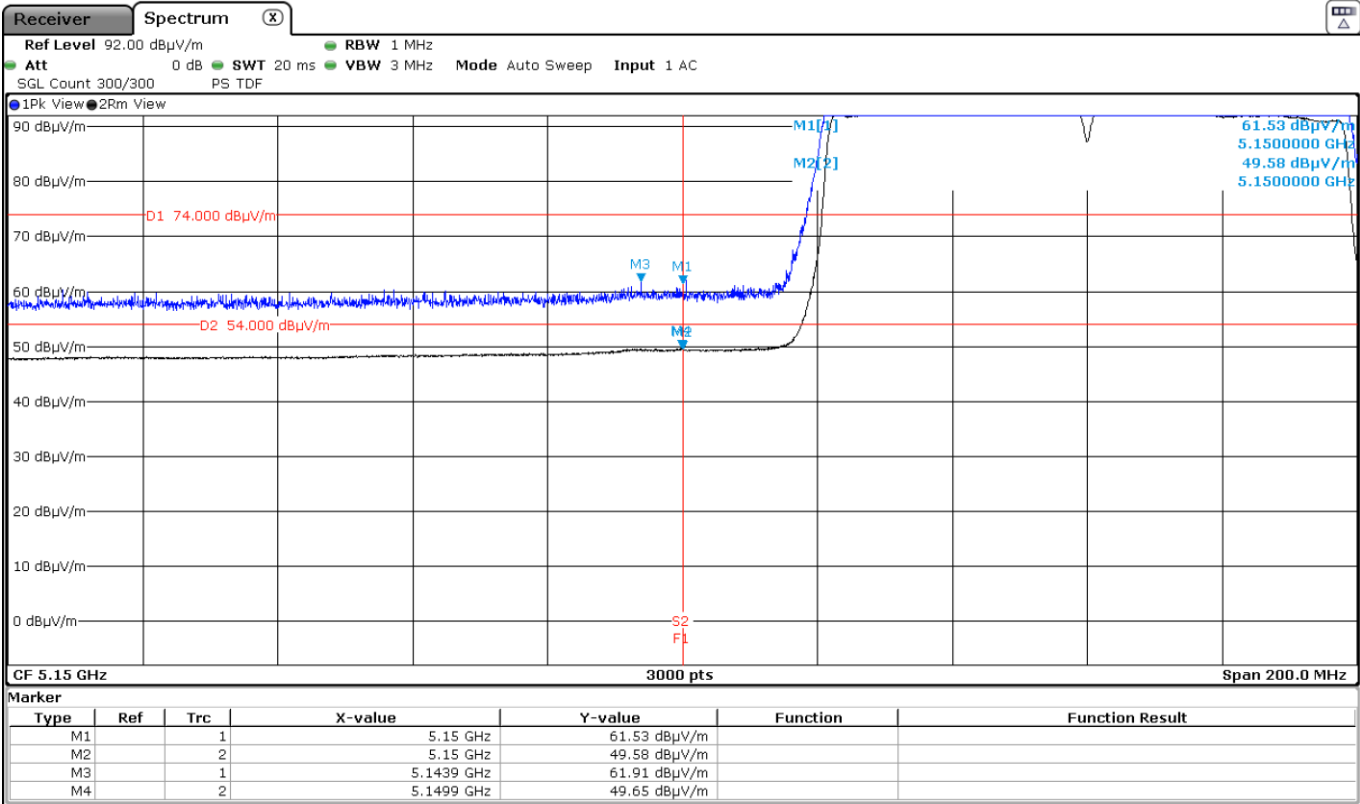
Results: Peak / Channel 42

Frequency (MHz)	Antenna Polarity	Peak Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5150	Vertical	61.53	74	12.47	<± 3.05	PASS
5143.900	Vertical	61.91	74	12.09	<± 3.05	PASS
5350	Vertical	56.60	74	17.40	<± 3.05	PASS
5369.020	Vertical	59.28	74	14.72	<± 3.05	PASS

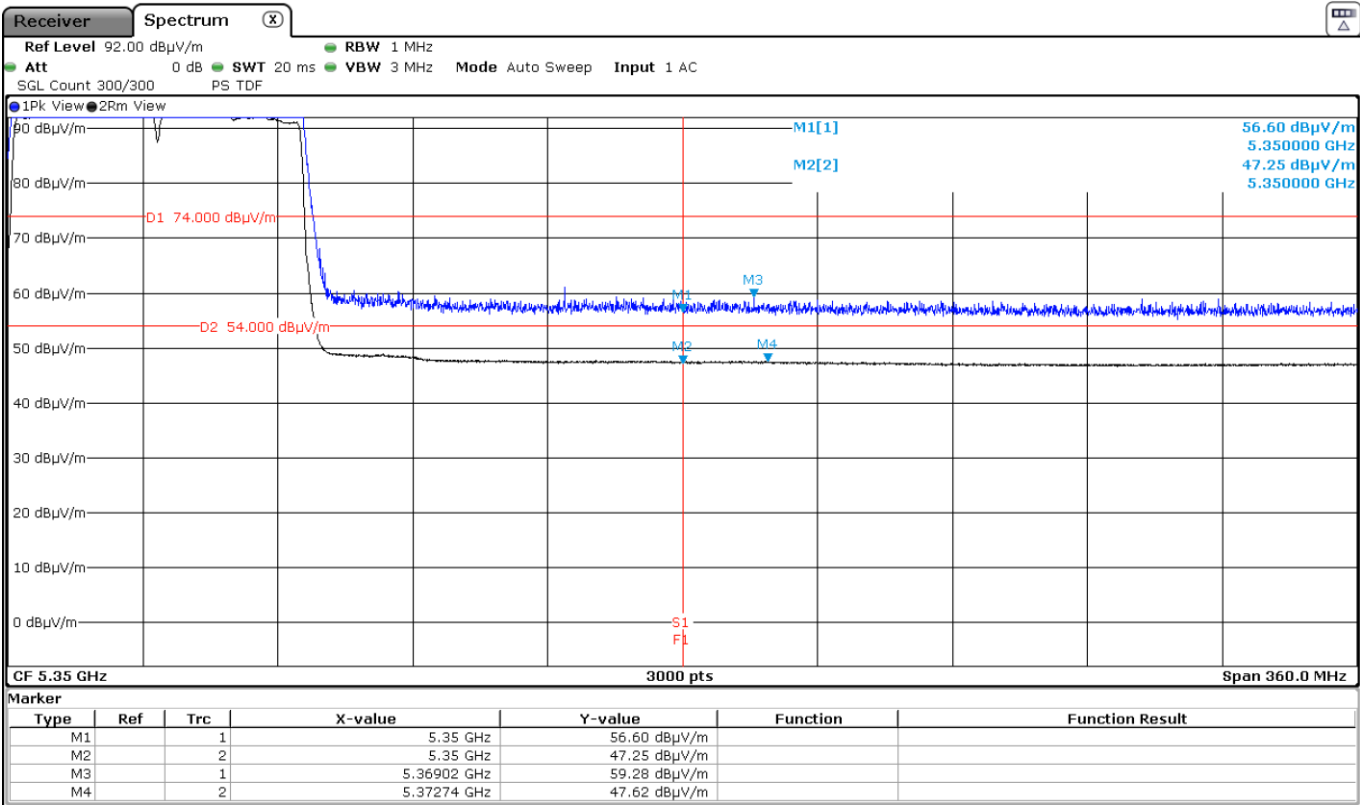
Results: Average / Channel 42

Frequency (MHz)	Antenna Polarity	Average Level (dBuV/m)	Duty Cycle Correction (dB)	Corrected Average Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5149.900	Vertical	49.65	0.18	49.83	54	4.17	<± 3.05	PASS
5350	Vertical	47.25	0.18	47.43	54	6.57	<± 3.05	PASS
5372.740	Vertical	47.62	0.18	47.80	54	6.20	<± 3.05	PASS

4500 MHz to 5150 MHz Lower Band Edge Channel 42



5350 MHz to 5460 MHz Upper Band Edge Channel 42



Appendix C: Test result for 5.25GHz – 5.35GHz.

INDEX

TEST CONDITIONS.....95

FCC Section 15.407 Subclause (a)(2). Transmitter Maximum Conducted Output Power / RSS-247 Clause
6.2.2.1(a). Transmitter Maximum Equivalent Isotropically Radiated Power98

FCC Section 15.407 Subclause (a) (2) / RSS-247 Clause 6.2.2.1. Transmitter Maximum Power Spectral Density
.....105

FCC Section 15.407(b)(2)(6) /RSS-247 6.2.2.2 Transmitter Out of Band Radiated Emissions108

FCC Section 15.407 Subclause (b) / RSS-247 6.2.2.2. Transmitter Band Edge Radiated Emissions.114

TEST CONDITIONS

Power supply (V):

Vnominal = 120 Vac

Type of power supply = AC voltage main supply.

Type of antenna = Internal antenna.

Declared Gain for antenna (maximum):

G_{COREAUX} = 3.91 dBi

Technology Tested:	WLAN (IEEE 802.11 a,n,ac) / U-NII	
Modes:	802.11a: 6, 9, 12, 18, 24, 36, 48 & 54 Mbps (SISO)	
	802.11n HT20: MCS0 to MCS7	
	802.11n HT40: MCS0 to MCS7	
	802.11ac VHT20: MCS0 to MCS8	
	802.11ac VHT40: MCS0 to MCS9	
	802.11ac VHT80: MCS0 to MCS9	
Setting of cores / ports:	AUX	
Beamforming:	NO	
Frequency Range:	5250 MHz to 5350 MHz	
Channel Spacing:	20 MHz	
Transmit Channels	Channel	Channel Frequency (MHz)
	Lowest: 52	5260
	Middle: 56	5280
	Highest: 64	5320
Channel Spacing:	40 MHz	
Transmit Channels	Channel	Channel Frequency (MHz)
	Lowest: 54	5270
	Highest: 62	5310
Channel Spacing:	80 MHz	
Transmit Channels	Middle: 58	5290

The test set-up was made in accordance to the general provisions of FCC Unlicensed National Information Infrastructure (U-NII) Devices 789033 D02 General U-NII Test Procedures New Rules v02r01 dated Dec 14, 2017.

The EUT was tested in the following operating mode:

- Continuously transmitting with a modulated carrier at maximum power in all required channels using the supported data rates/modulations types.

The field strength at the band edges was evaluated for each mode for the channel under test.

For all modes, the EUT was configured in test mode using a software application. The application was used to enable a continuous transmission and to select the test channels as required. The client supplied scripts to configure the EUT. The customer supplied a document containing the setup instructions.

The customer declared the worst case SISO for testing which were:

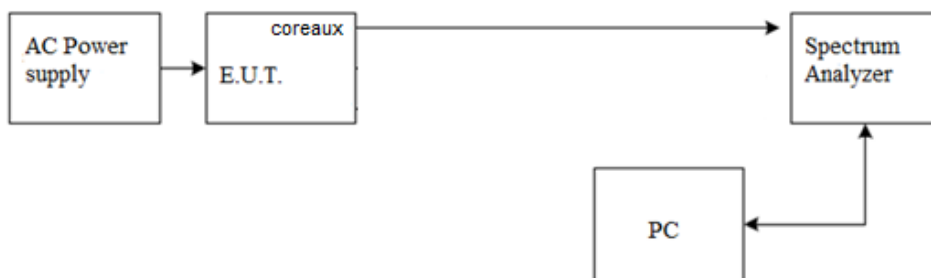
- 802.11a: 6 Mbit/s / SISO on Core Aux
- 802.11n HT20: MCS0 / SISO on Core Aux
- 802.11n HT40: MCS0 / SISO on Core Aux
- 802.11ac VHT80: MCS0x1 / SISO on Core Aux

The client supplied U.FL RF cables with the EUT in order to perform conducted measurements. The measured additional path loss was included in any path loss calculations.

CONDUCTED MEASUREMENTS

The equipment under test was set up in a shielded room and connected to the spectrum analyzer using a low loss RF cable. The reading in the spectrum analyzer is corrected taking into account the internal and external RF cable loss.

For all modes:



The AC supply voltage is applied using an external power supply.

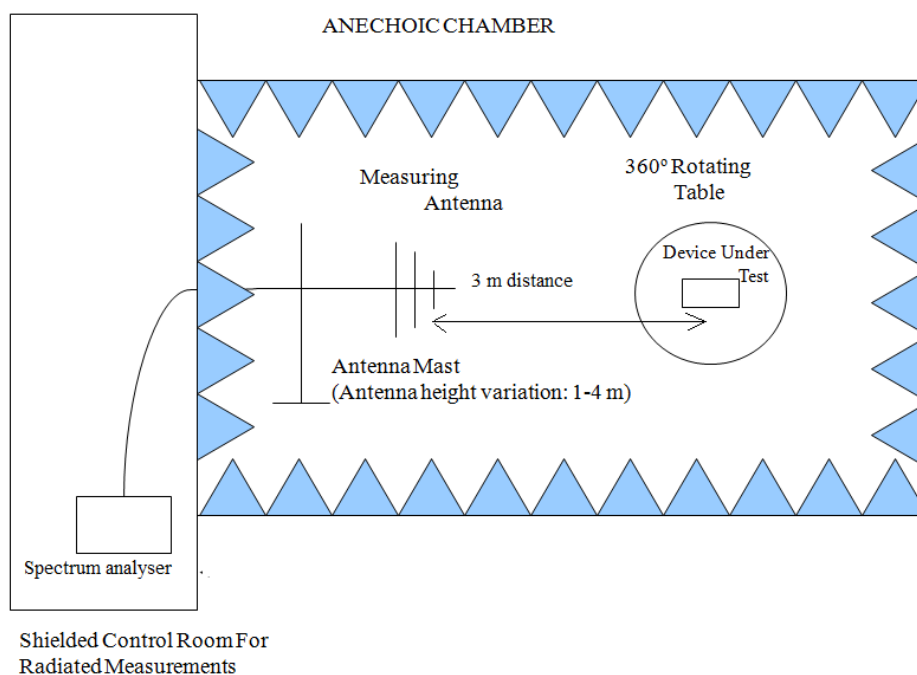
RADIATED MEASUREMENTS

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m. The EUT was placed at a height of 80 cm above the reference ground plane in the center of the chamber turntable to perform the measurements below 1GHz and The EUT was placed at a height of 1.5 meters above the test chamber floor in the center of the chamber turntable to perform the measurements above 1GHz. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

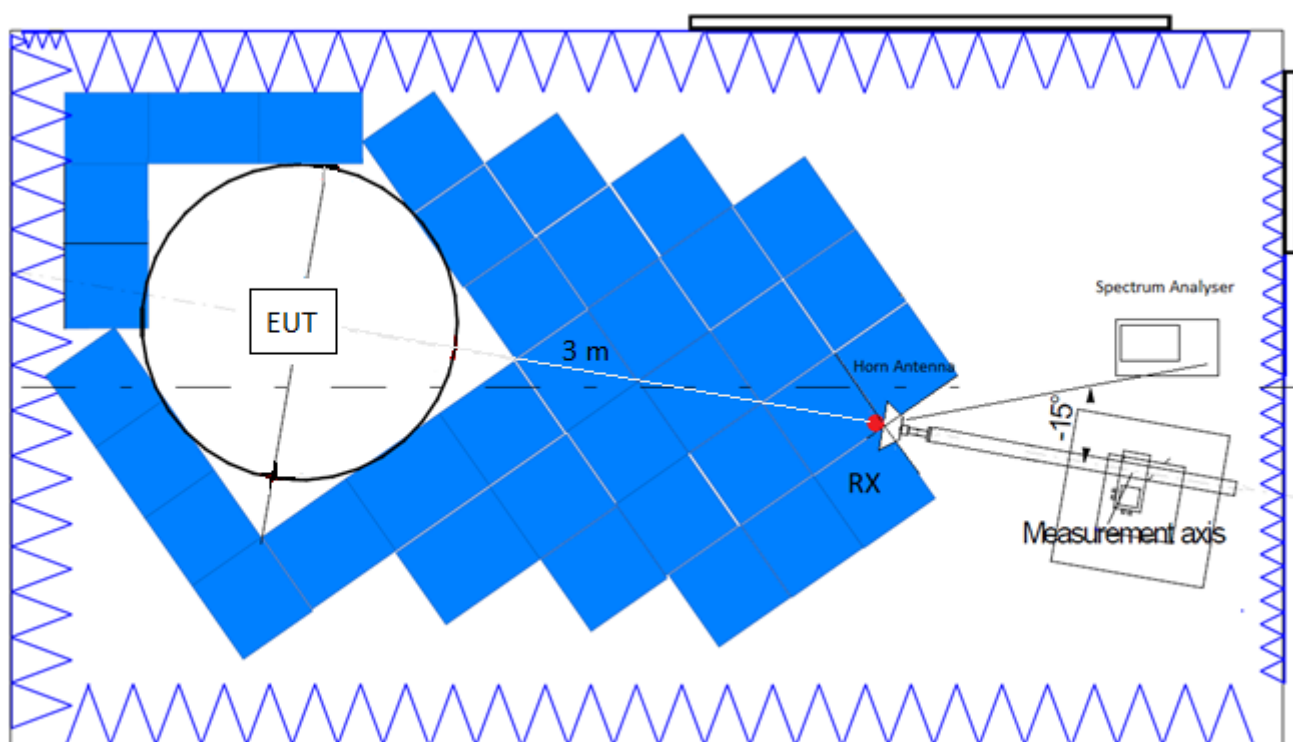
Measurements were made in both horizontal and vertical planes of polarization.

The final measured value, for the given emission, in the tables below incorporates the calibrated antenna factor and cable loss.

Radiated measurements setup $f < 1$ GHz



Radiated measurements setup $f > 1$ GHz



FCC Section 15.407 Subclause (a)(2). Transmitter Maximum Conducted Output Power / RSS-247 Clause 6.2.2.1(a). Transmitter Maximum Equivalent Isotropically Radiated Power

SPECIFICATION

FCC 15.407: For the 5.25-5.35 GHz band, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

RSS-247: The maximum conducted output power shall not exceed 250 mW (24 dBm) or $11 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.

The maximum e.i.r.p. shall not exceed 1.0 W (30 dBm) or $17 + 10 \log_{10} B$, dBm, whichever is less. B is the 99% emission bandwidth in megahertz.

RESULTS

The maximum conducted output power was measured using the channel power integration method according to point E) 2) b) (Method SA-1) of 789033 D02 General UNII Test Procedures New Rules v02r01 when the duty cycle is >98% and the channel power integration method according to point E) 2) d) (Method SA-2) of 789033 D02 General UNII Test Procedures New Rules v02r01 when the duty cycle is <98%.

For data rates where the EUT was transmitting at <98% duty cycle, the duty calculated in Appendix A was added to the measured power in order to calculate the total average power during the actual transmission time.

For all SISO modes of operation, the antenna gain is less than 6dBi.

The e.i.r.p. levels are calculated by adding the declared maximum antenna gain (dBi).

FCC and Canada power setting

Mode : 802.11a - 20MHz – SISO – CORE Aux

Declared antenna gain: 3.91 dBi

	channel 52 5260 MHz	Channel56 5280 MHz	channel 64 5320 MHz
Max. conducted power (dBm)	20.17	20.17	14.73
Conducted Power Limit (dBm)	24		
Margin (dB)	3.83	3.83	9.27
Maximum EIRP power (dBm)	24.08	24.08	18.64
EIRP power Limit (dBm)	30		
Margin (dB)	5.92	5.92	11.36
Measurement uncertainty (dB)	<±1.20		

Mode : 802.11n HT20 - 20MHz – SISO – CORE Aux

Declared antenna gain: 3.91 dBi

	channel 52 5260 MHz	Channel56 5280 MHz	channel 64 5320 MHz
Max. conducted power (dBm)	20.46	20.49	14.99
Conducted Power Limit (dBm)	24		
Margin (dB)	3.54	3.51	9.01
Maximum EIRP power (dBm)	24.37	24.40	18.90
EIRP power Limit (dBm)	30		
Margin (dB)	5.63	5.60	11.10
Measurement uncertainty (dB)	<±1.20		

Mode : 802.11n HT40 - 40MHz – SISO – CORE Aux

Declared antenna gain: 3.91 dBi

	channel 64 5320 MHz	channel 64 5320 MHz
Max. conducted power (dBm)	18.79	12.43
Conducted Power Limit (dBm)	24	
Margin (dB)	5.21	11.57
Maximum EIRP power (dBm)	22.70	16.34
EIRP power Limit (dBm)	30	
Margin (dB)	7.30	13.66
Measurement uncertainty (dB)	<±1.20	

Mode : 802.11ac VHT80 - 80MHz – SISO – CORE Aux

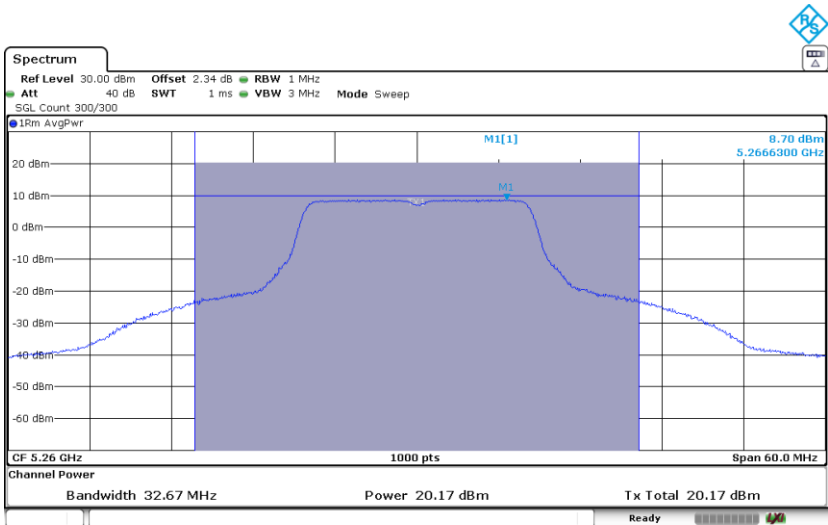
Declared antenna gain: 3.91 dBi

	channel 58 5290 MHz
Max. conducted power (dBm)	11.15
Duty Cycle Correction Factor (dB)	0.18
Max. conducted power corrected (dBm)	11.33
Conducted Power Limit (dBm)	24
Margin (dB)	12.67
Maximum EIRP power (dBm)	15.24
EIRP power Limit (dBm)	30
Margin (dB)	14.76
Measurement uncertainty (dB)	<±1.20

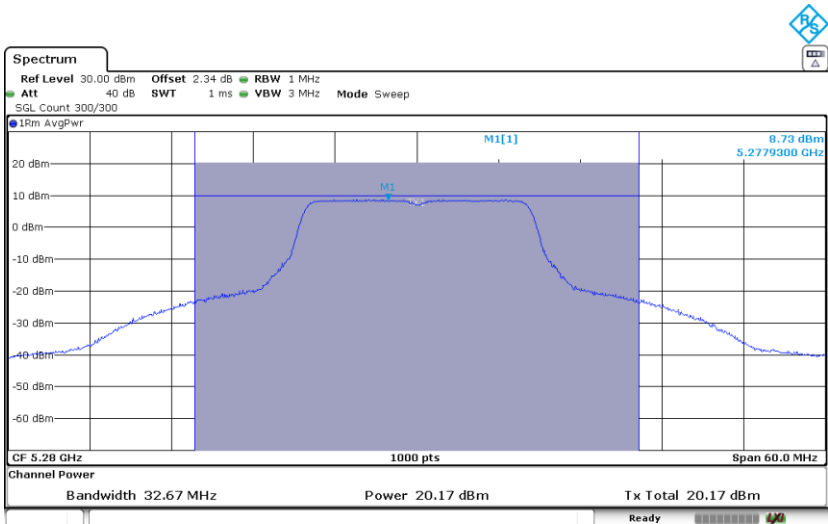
Verdict: PASS

Mode : 802.11a - 20MHz – SISO – CORE Aux

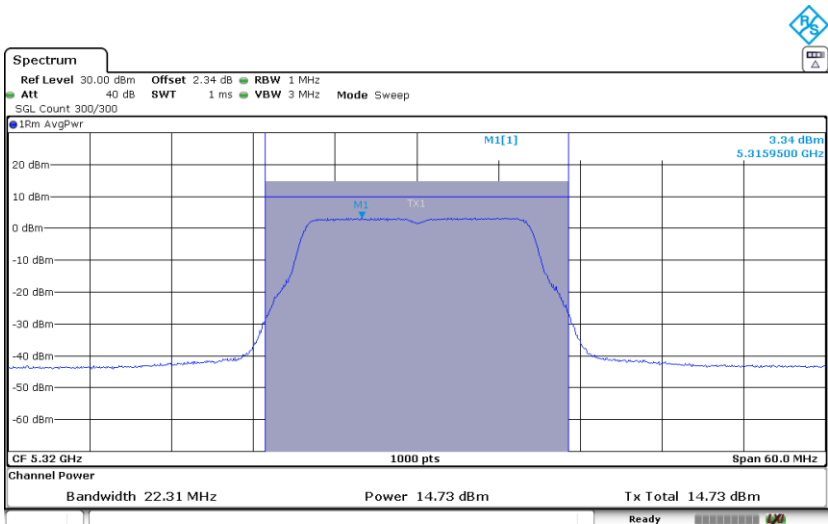
Channel 52



Channel 56

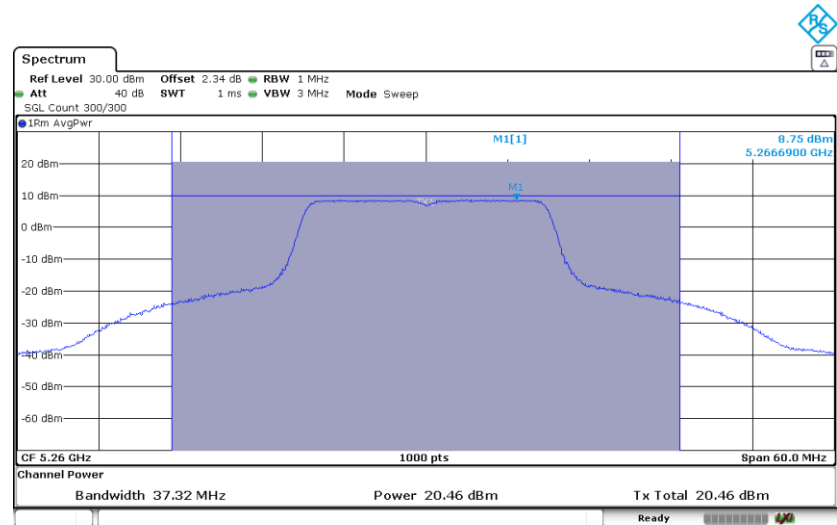


Channel 64

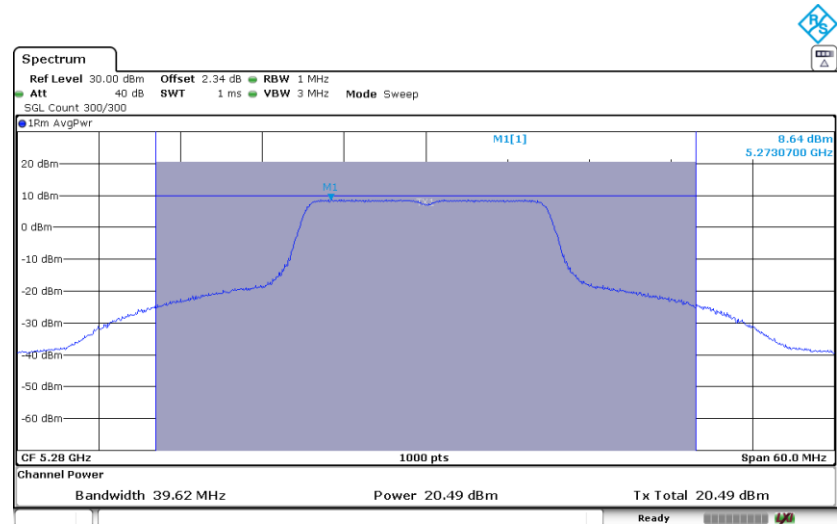


Mode : 802.11n HT20 - 20MHz – SISO – CORE Aux

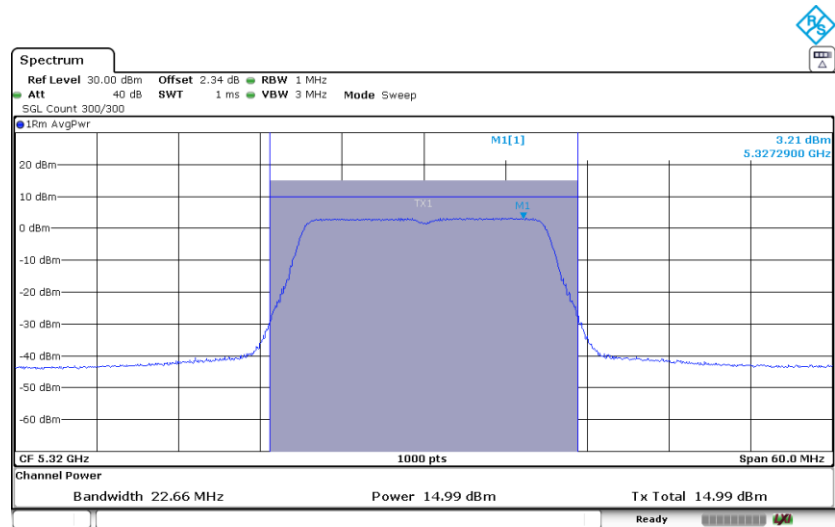
Channel 52



Channel 56

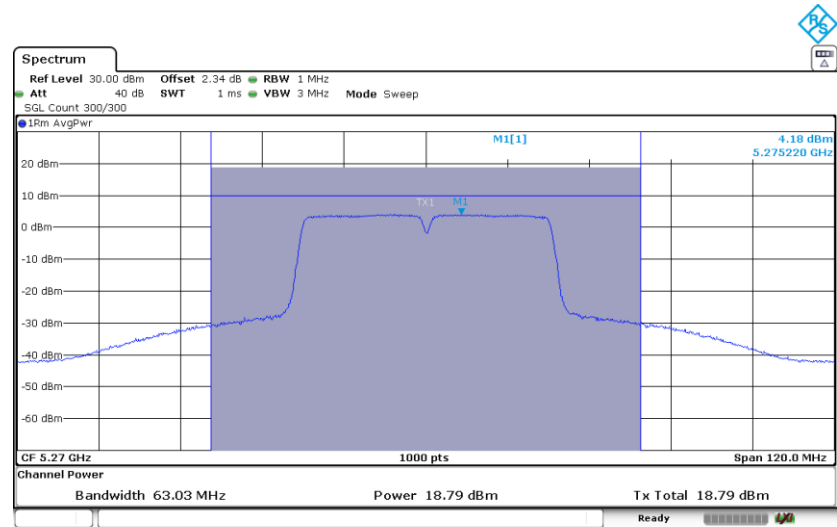


Channel 64

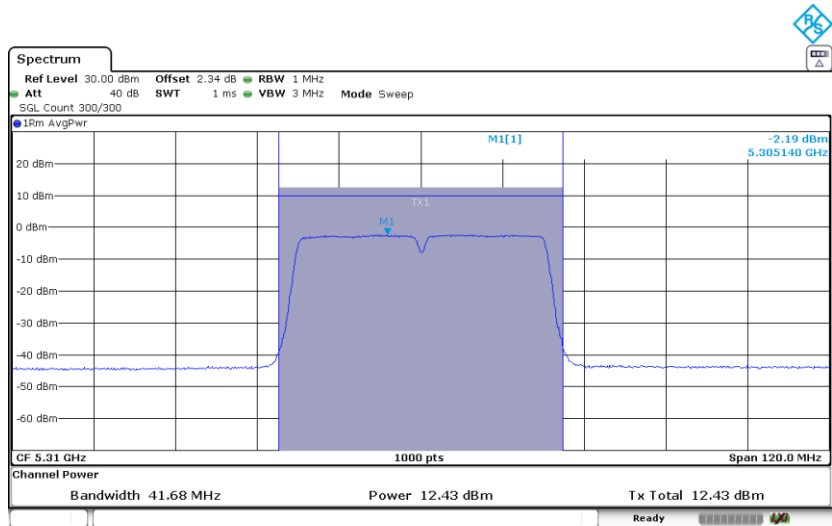


Mode : 802.11n HT40 - 40MHz – SISO – CORE Aux

Channel 54

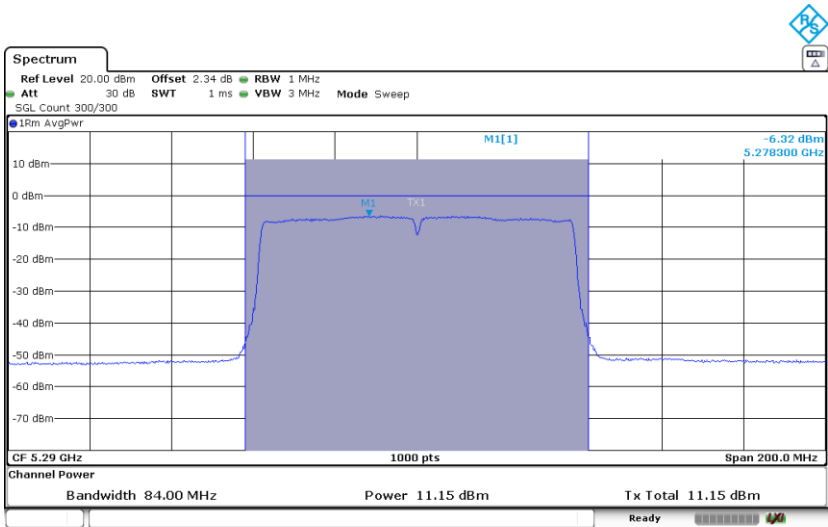


Channel 62



Mode : 802.11ac VHT80 - 80MHz – SISO – CORE Aux

Channel 58



FCC Section 15.407 Subclause (a) (2) / RSS-247 Clause 6.2.2.1. Transmitter Maximum Power Spectral Density

FCC 15.407: The maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. 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.

RSS-247: The e.i.r.p. spectral density shall not exceed 11 dBm in any 1.0 MHz band.

Within the emission bandwidth, when the peak spectral density per MHz over any continuous transmission exceeds the average ($10 \log_{10} B$) value by more than 3 dB, the permissible power spectral density shall be reduced by the excess amount.

RESULTS

The maximum power spectral density (PSD) was measured using the method according to point F) referencing E.2.b) (Method SA-1) and E.2.b) (Method SA-2) of Guidance 789033 D02 General UNII Test Procedures New Rules v02r01.

For all modes of operation, the antenna gain is < 6 dBi.

The PSD test uses the same setup than the transmitter maximum conducted output power test. The result of the Peak PSD was measured by collocation a marker on the peak of the signal and the results are in the tables below.

FCC and Canada power setting

Mode : 802.11a - 20MHz – SISO – CORE Aux

	channel 52 5260 MHz	channel 56 5280 MHz	channel 64 5320 MHz
PSD (dBm/MHz)	8.70	8.73	3.34
PSD Limit (dBm/MHz)	11		
Margin (dB)	2.30	2.27	7.66
Measurement uncertainty (dB)	<±1.20		

Mode : 802.11n HT20 - 20MHz – SISO – CORE Aux

	channel 52 5260 MHz	channel 56 5280 MHz	channel 64 5320 MHz
PSD (dBm/MHz)	8.75	8.64	3.21
PSD Limit (dBm/MHz)	11		
Margin (dB)	2.25	2.36	7.79
Measurement uncertainty (dB)	<±1.20		

Mode : 802.11n HT40 - 40MHz – SISO – CORE Aux

	channel 54 5270 MHz	channel 62 5310 MHz
PSD (dBm/MHz)	4.18	-2.19
PSD Limit (dBm/MHz)	11	
Margin (dB)	6.82	13.19
Measurement uncertainty (dB)	<±1.20	

Mode : 802.11ac VHT80 - 80MHz – SISO – CORE Aux

	channel 58 5290 MHz
PSD (dBm/MHz)	-6.32
Duty Cycle Correction Factor (dB)	0.18
PSD Corrected (dBm/MHz)	-6.14
PSD Limit (dBm/MHz)	11
Margin (dB)	17.14
Measurement uncertainty (dB)	<±1.20

Verdict: PASS

FCC Section 15.407(b)(2)(6) /RSS-247 6.2.2.2 Transmitter Out of Band Radiated Emissions

SPECIFICATION

For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.25–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz (68.23 dBμV/m at 3 m distance).

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)):

Frequency Range (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	300
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 40000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RESULTS:

The situation and orientation was varied to find the maximum radiated emission. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

Measurements were made in both horizontal and vertical planes of polarization.

All tests were performed in a semi-anechoic chamber at a distance of 3 m for the frequency range 30 MHz-40 GHz.

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

Core Aux allows the simultaneous Wi-Fi transmission in both bands (2.4 GHz and 5GHz).Core Aux shares the third antenna from the main radio and cannot operate completely independently from the main radio.

The tests were performed in worst case with the equipment transmitting with Core Aux (802.11n HT20) in channel 64 (5320MHz) and with WiFi 2.4GHz (802.11 n HT20 MIMO 3Tx)) in channel 1 (2412MHz).

Mode: 802.11n HT20 – Core Aux (5320MHz) + 802.11n HT20 – CDD – 20MHz – MIMO – CORE 0 & CORE 1 & CORE 2 (2412MHz)

Frequency range 30 MHz-1000 MHz.

Note: The spurious emissions below 1 GHz do not depend on either the operating channel or the modulation mode selected in the EUT.

Spurious levels operating (radiated) closest to limit.

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement Uncertainty (dB)
39.783	Vertical	Quasi-Peak	27.7	40	12.3	± 3.88
77.311	Vertical	Quasi-Peak	26.4	40	13.6	± 3.88
168.726	Horizontal	Quasi-Peak	39.9	43.5	3.6	± 3.88
180.425	Horizontal	Quasi-Peak	32.4	43.5	11.1	± 3.88
288.671	Horizontal	Quasi-Peak	29.5	43.5	16.5	± 3.88

Frequency range 1 GHz-40 GHz

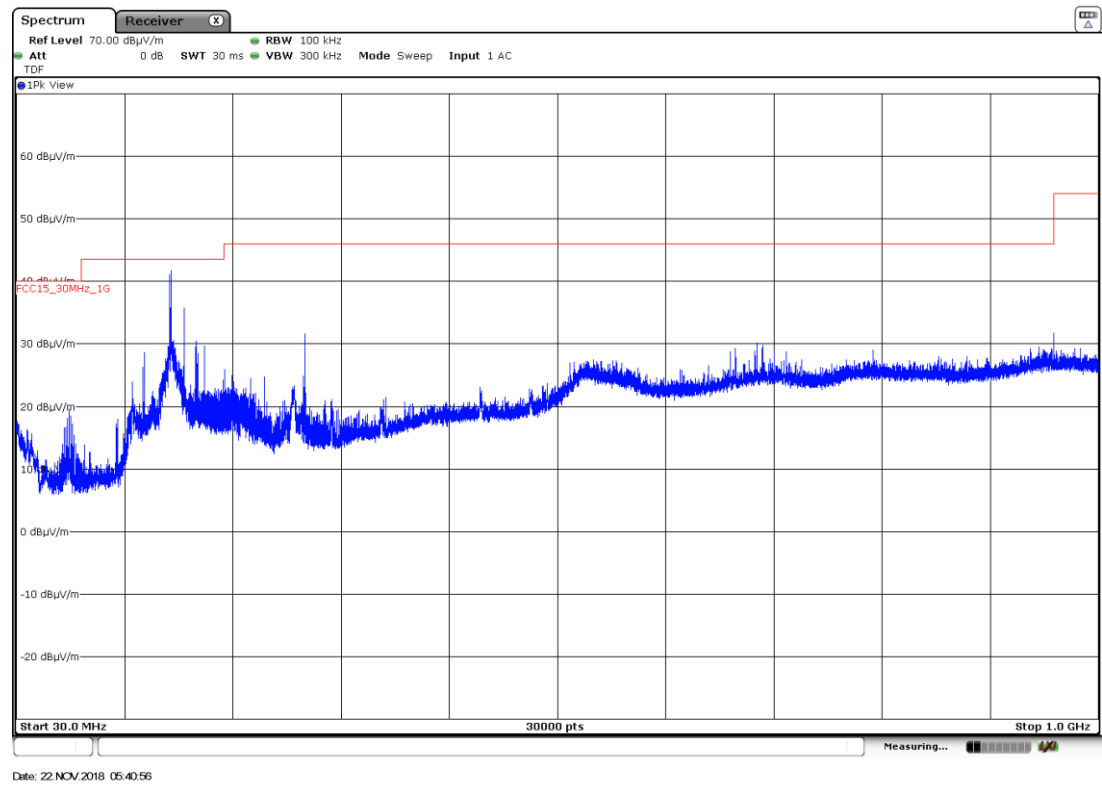
The results in the next tables show the maximum measured levels in the 1-40 GHz frequency range.

Spurious frequency (MHz)	Polarization	Detector	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Measurement Uncertainty (dB)
7236.580	Horizontal	Peak	51.90	68.23	16.33	± 3.05
7235.903		Average	40.25	54	13.75	± 3.05

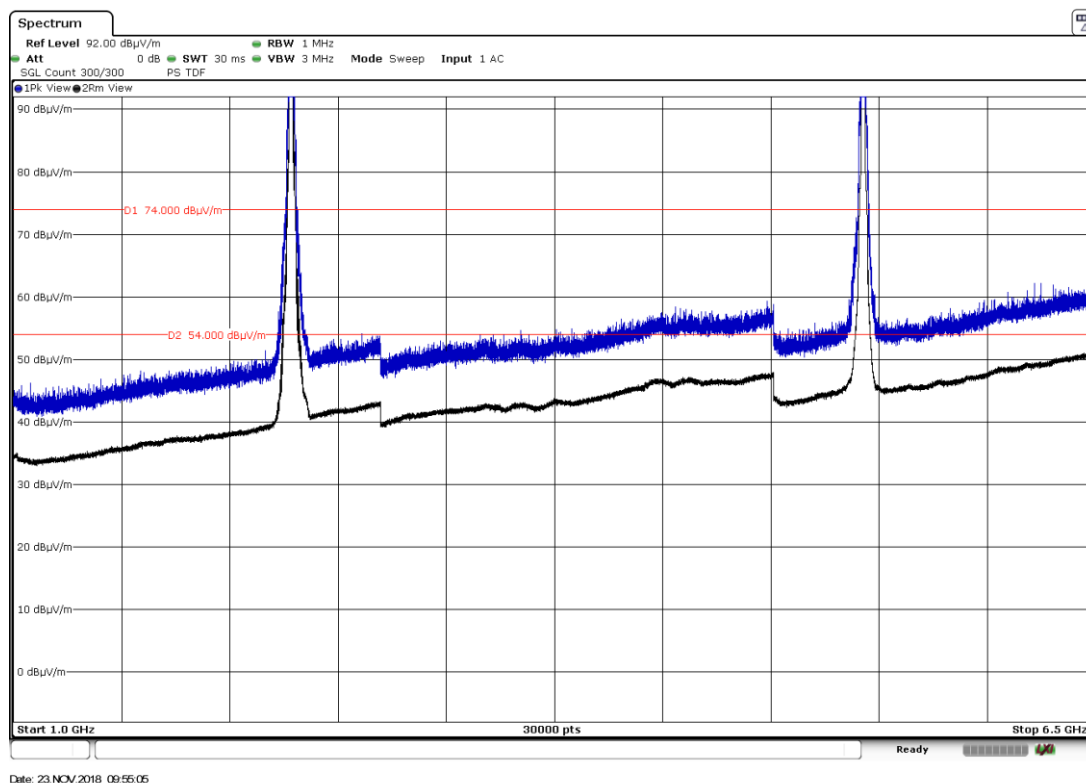
Measurement Uncertainty (dB) $< \pm 3.05$

Verdict: PASS

FREQUENCY RANGE 30 MHz-1000 MHz.

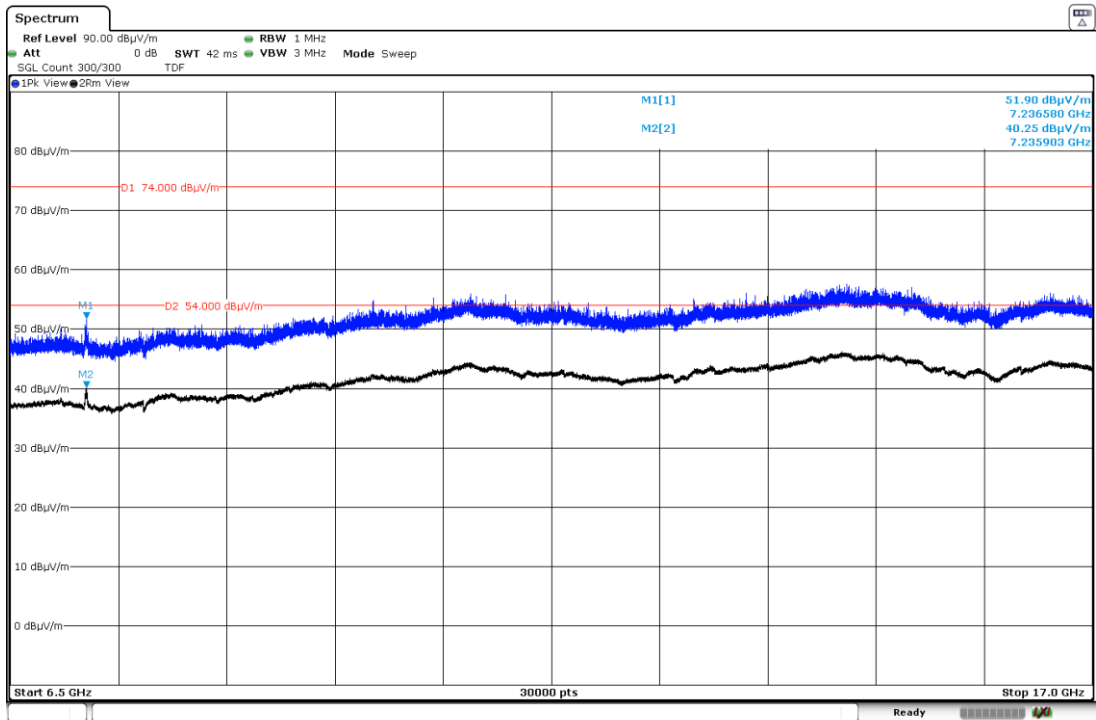


FREQUENCY RANGE 1 GHz to 6.5 GHz.

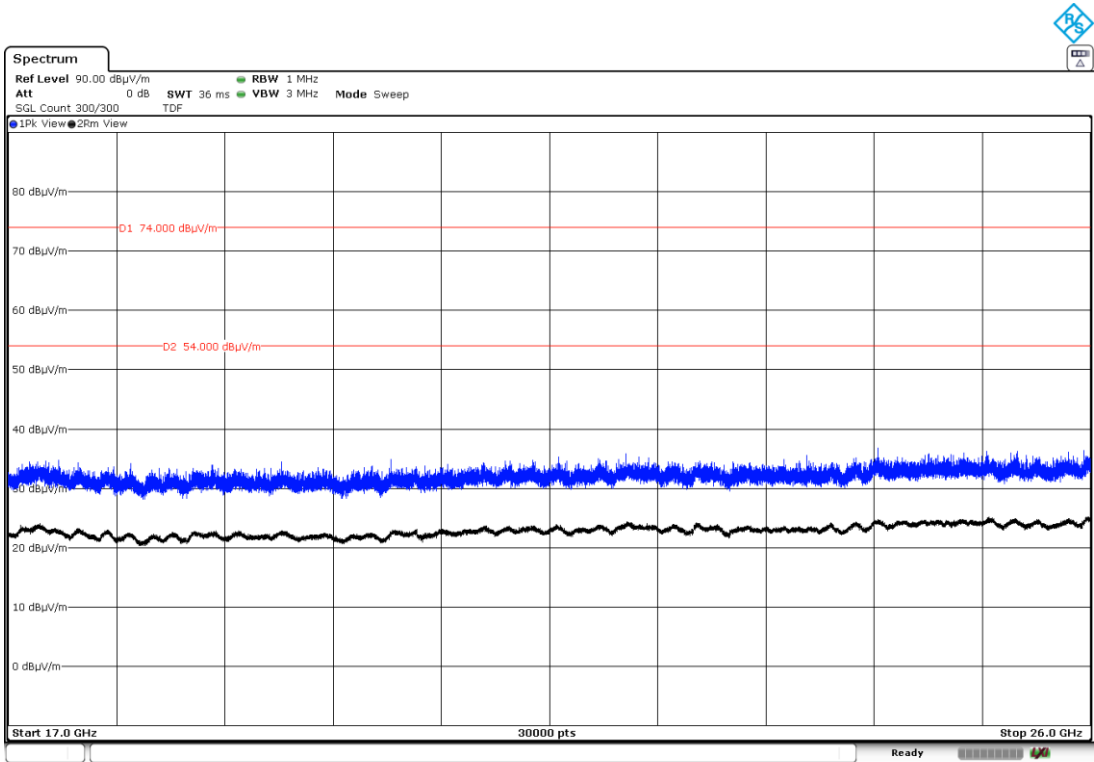


Note: The peak shown in the plot above the limit is the carrier frequency.

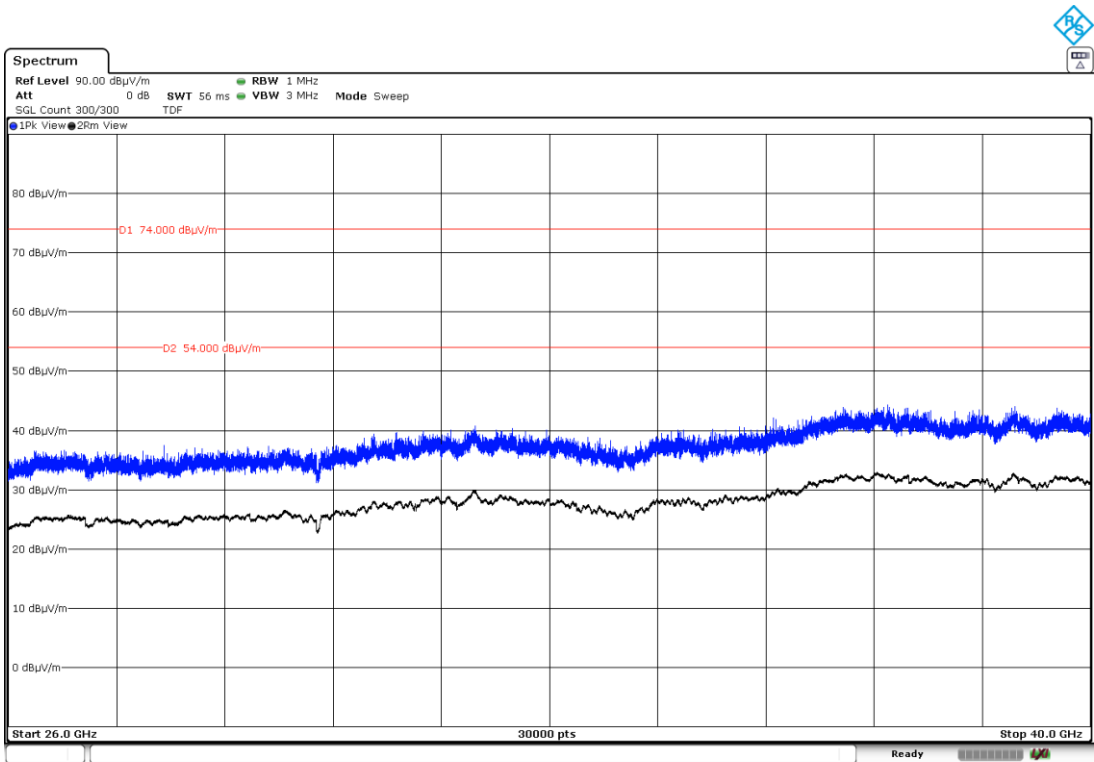
FREQUENCY RANGE 6.5 GHz to 17 GHz.



FREQUENCY RANGE 17 GHz to 26 GHz.



FREQUENCY RANGE 26 GHz to 40 GHz.



FCC Section 15.407 Subclause (b) / RSS-247 6.2.2.2. Transmitter Band Edge Radiated Emissions.

SPECIFICATION

For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.25–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz (68.20 dBμV/m at 3 m distance).

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)):

Frequency Range (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	-	300
0.490-1.705	24000/F(kHz)	-	300
1.705 - 30.0	30	-	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
960 - 40000	500	54	3

The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

RESULTS:

The field strength is calculated by adding correction factor to the measured level from the spectrum analyzer. This correction factor includes antenna factor, cable loss and pre-amplifiers gain.

All emissions outside of the 5.15-5.35GHz band shall not exceed an EIRP of -27dBm/MHz. There are restricted bands of operation below band edge at 4.5-5.15 GHz also above the upper band edge at 5.35-5.46GHz therefore the provision of FCC Part 15.205 apply.

Field strength measurements using peak and average detector performed in the restricted bands below 5.15GHz and above 5.35 GHz.

Test performed on the following worst cases modes in all relevant tests channels:

- 802.11a: 6 Mbit/s / SISO on Core Aux
- 802.11n HT20: MCS0 / SISO on Core Aux
- 802.11n HT40: MCS0 / SISO on Core Aux
- 802.11ac VHT80: MCS0x1 / SISO on Core Aux

Results for Mode: 802.11a - 20 MHz – SISO – CORE Aux

Results: Peak / Channel 52

Frequency (MHz)	Antenna Polarity	Peak Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5350	Vertical	57.34	74	16.66	<± 3.05	PASS
5368.445	Vertical	59.67	74	14.33	<± 3.05	PASS

Results: Average / Channel 52

Frequency (MHz)	Antenna Polarity	Average Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5350.665	Vertical	48.26	54	5.74	<± 3.05	PASS

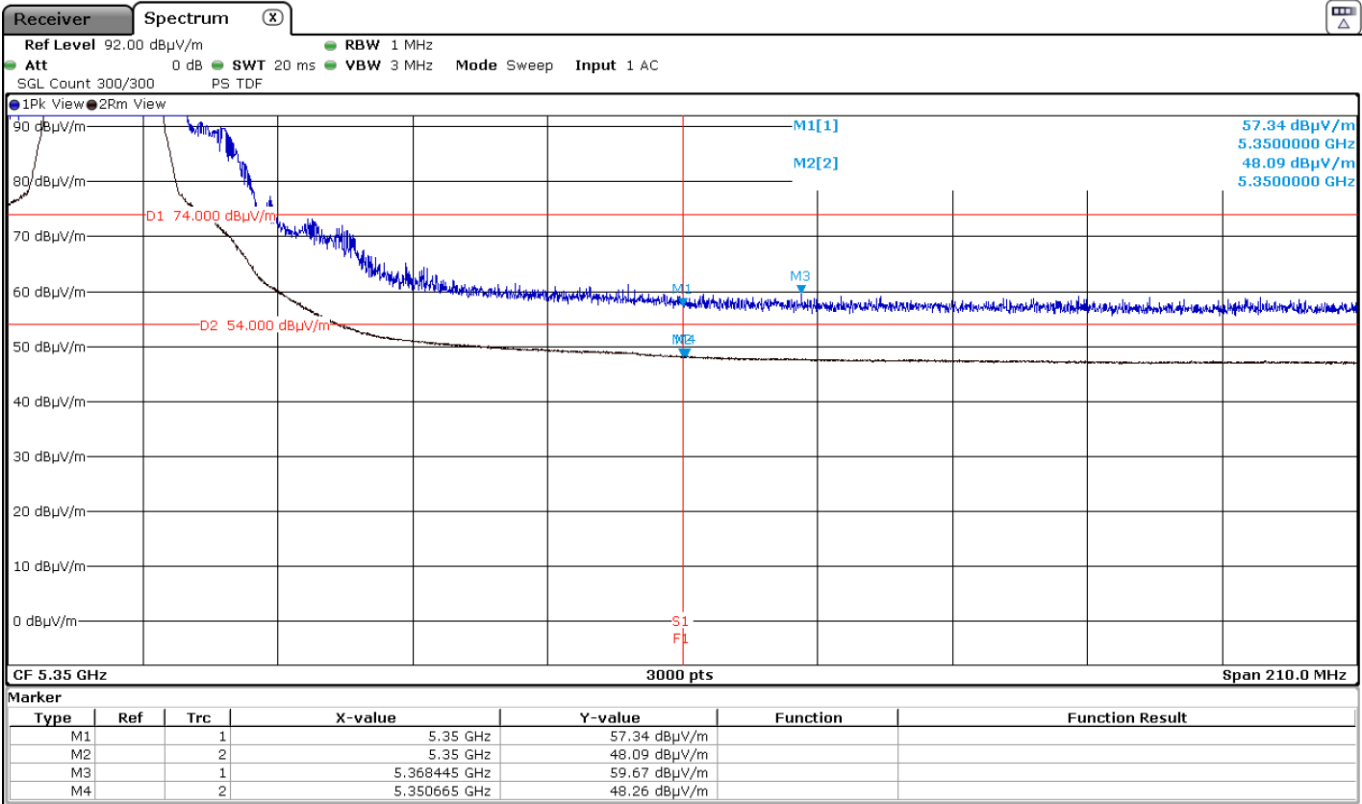
Results: Peak / Channel 64

Frequency (MHz)	Antenna Polarity	Peak Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5350	Vertical	59.60	74	14.40	<± 3.05	PASS
5350.893	Vertical	62.96	74	11.04	<± 3.05	PASS

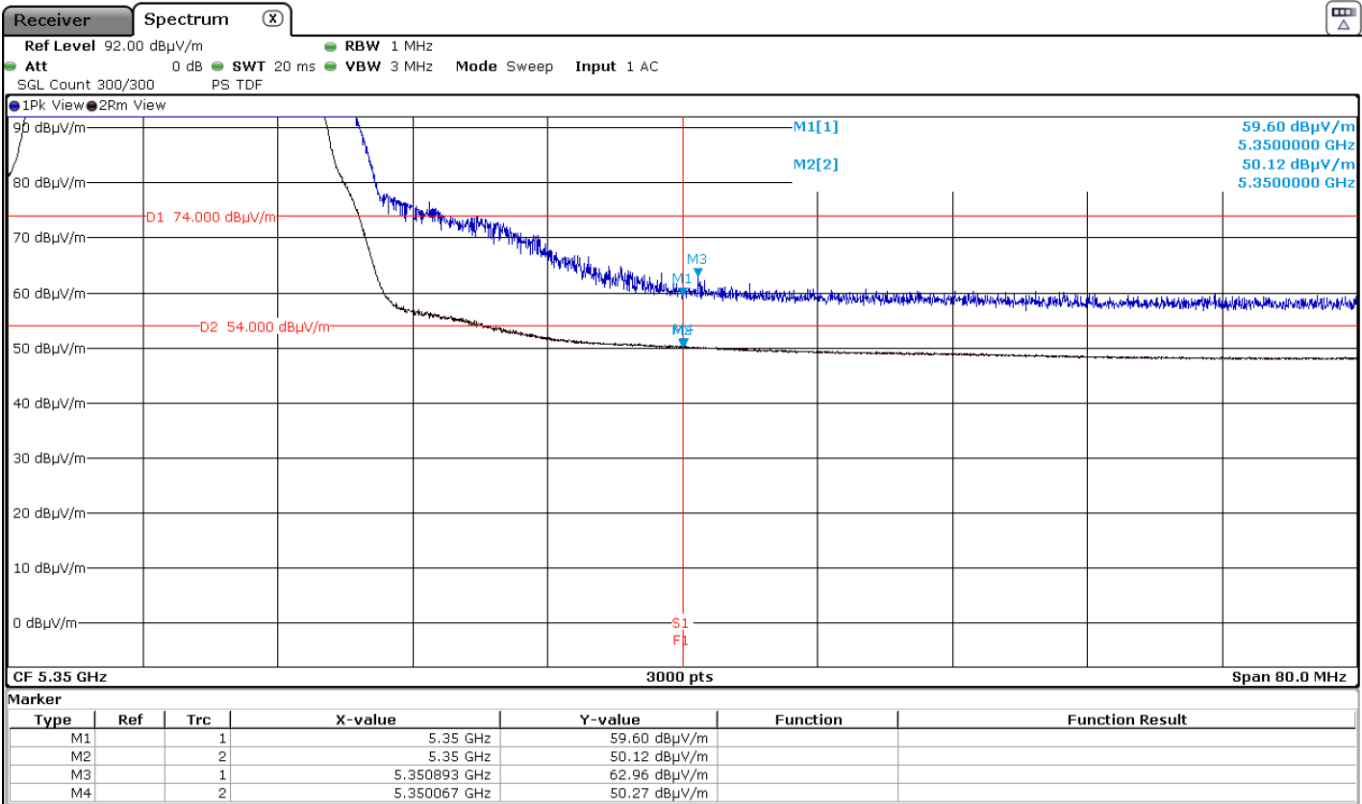
Results: Average / Channel 64

Frequency (MHz)	Antenna Polarity	Average Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5350.067	Vertical	50.27	54	3.73	<± 3.05	PASS

5350 MHz to 5460 MHz Upper Band Edge Channel 52



5350 MHz to 5460 MHz Upper Band Edge Channel 64



Results: 802.11n HT20 - 20 MHz – SISO - CORE Aux

Results: Peak / Channel 52

Frequency (MHz)	Antenna Polarity	Peak Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5350	Vertical	58.03	74	15.97	<± 3.05	PASS
5394.135	Vertical	59.61	74	14.39	<± 3.05	PASS

Results: Average / Channel 52

Frequency (MHz)	Antenna Polarity	Average Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5351.295	Vertical	48.15	54	5.85	<± 3.05	PASS

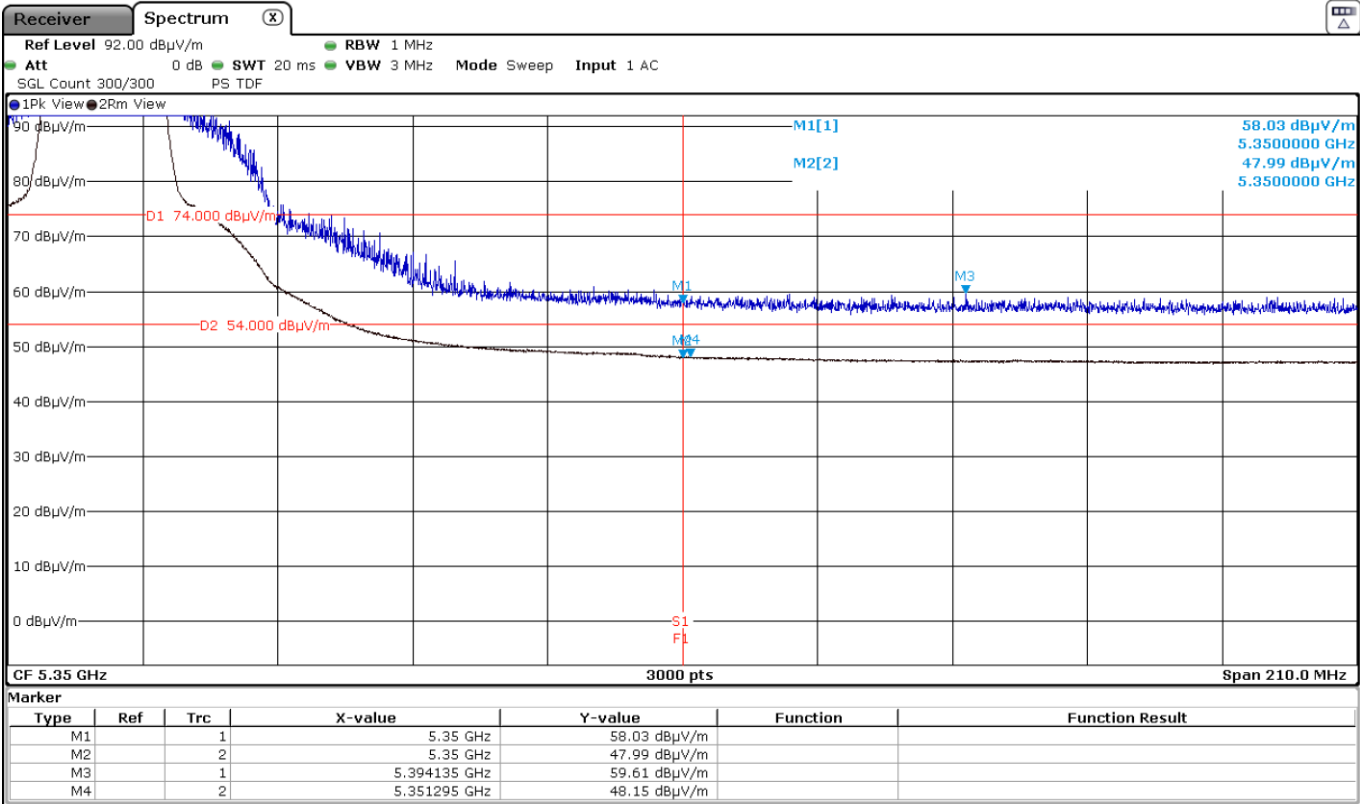
Results: Peak / Channel 64

Frequency (MHz)	Antenna Polarity	Peak Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5350	Vertical	60.17	74	13.83	<± 3.05	PASS
5351.027	Vertical	64.03	74	9.97	<± 3.05	PASS

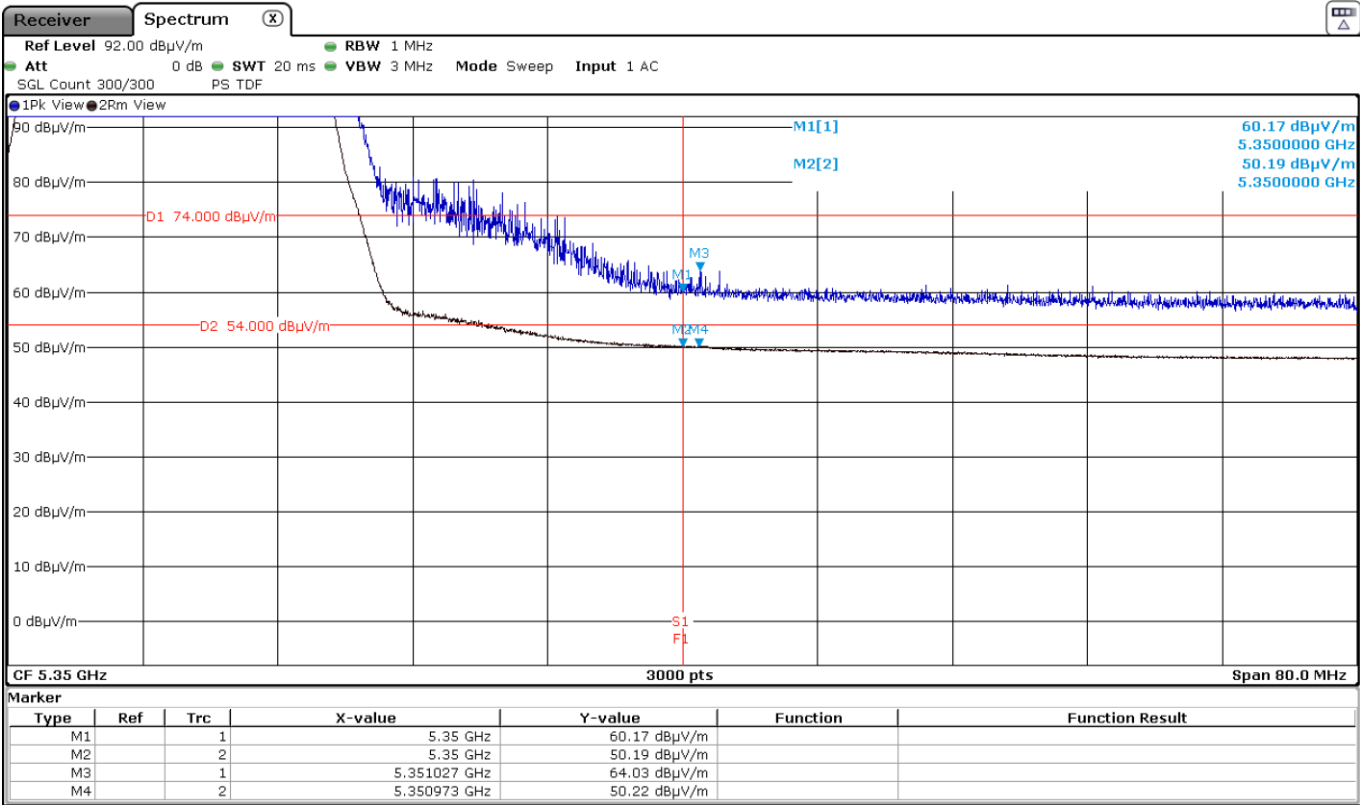
Results: Average / Channel 64

Frequency (MHz)	Antenna Polarity	Average Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5350	Vertical	50.19	54	3.81	<± 3.05	PASS
5350.973	Vertical	50.22	54	3.78	<± 3.05	PASS

5350 MHz to 5460 MHz Upper Band Edge Channel 52



5350 MHz to 5460 MHz Upper Band Edge Channel 64



Results for Mode: 802.11n HT40 - 40 MHz – SISO - Core Aux

Results: Peak / Channel 54

Frequency (MHz)	Antenna Polarity	Peak Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5149.082	Vertical	61.64	74	12.36	<± 3.05	PASS
5350	Vertical	61.68	74	12.32	<± 3.05	PASS
5356.167	Vertical	63.01	74	10.99	<± 3.05	PASS

Results: Average / Channel 54

Frequency (MHz)	Antenna Polarity	Average Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5149.468	Vertical	50.33	54	3.67	<± 3.05	PASS
5350.567	Vertical	49.82	54	4.18	<± 3.05	PASS

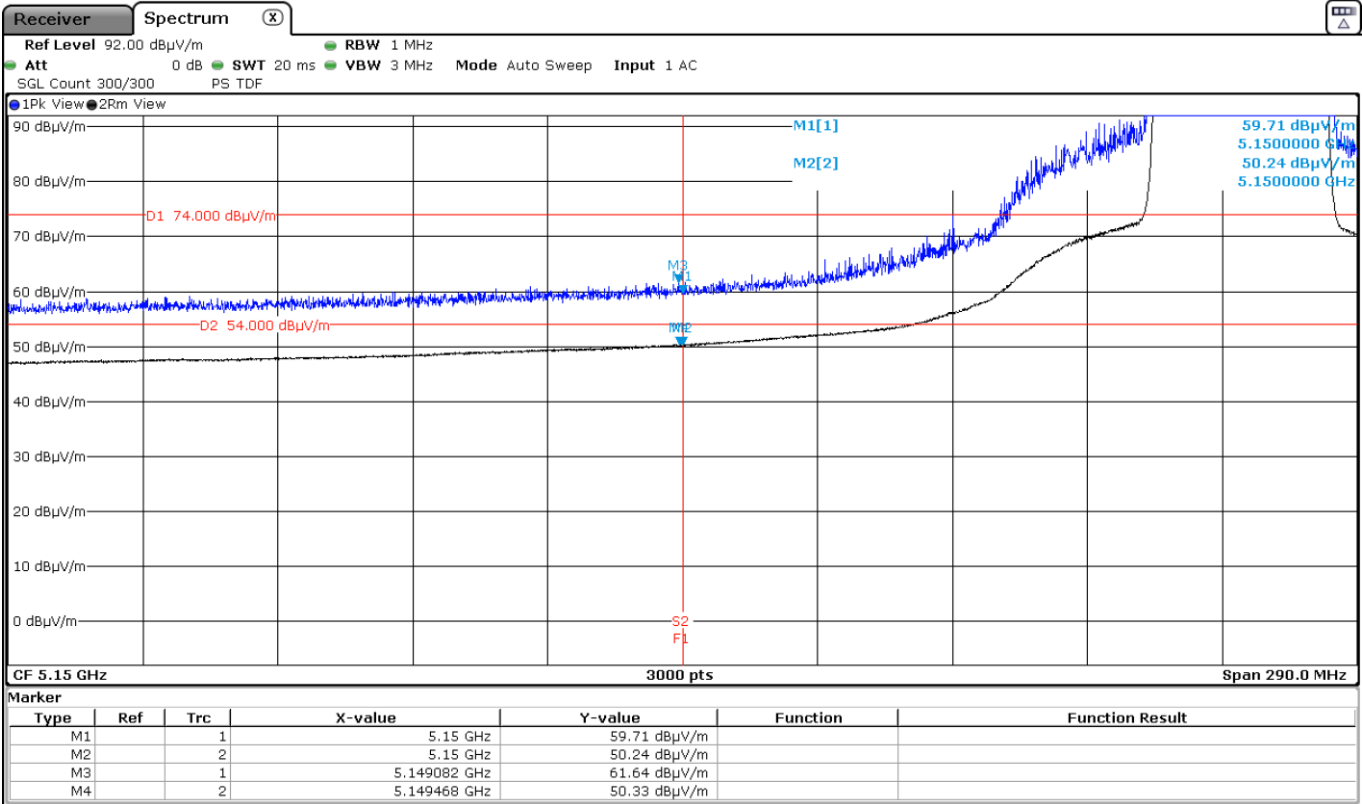
Results: Peak / Channel 62

Frequency (MHz)	Antenna Polarity	Peak Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5350	Vertical	64.08	74	9.92	<± 3.05	PASS
5350.740	Vertical	65.30	74	8.70	<± 3.05	PASS

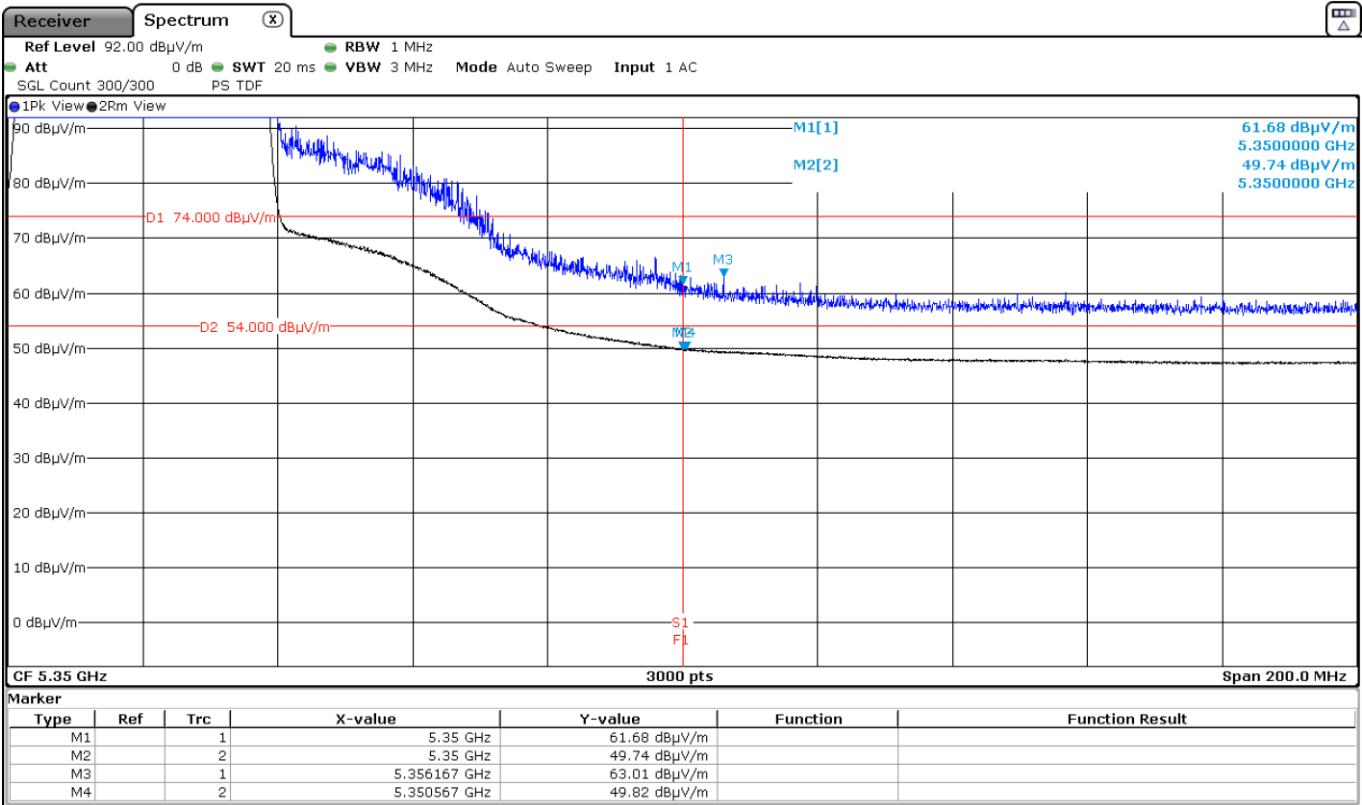
Results: Average / Channel 62

Frequency (MHz)	Antenna Polarity	Average Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5350	Vertical	48.38	54	5.62	<± 3.05	PASS
5353.460	Vertical	48.88	54	5.12	<± 3.05	PASS

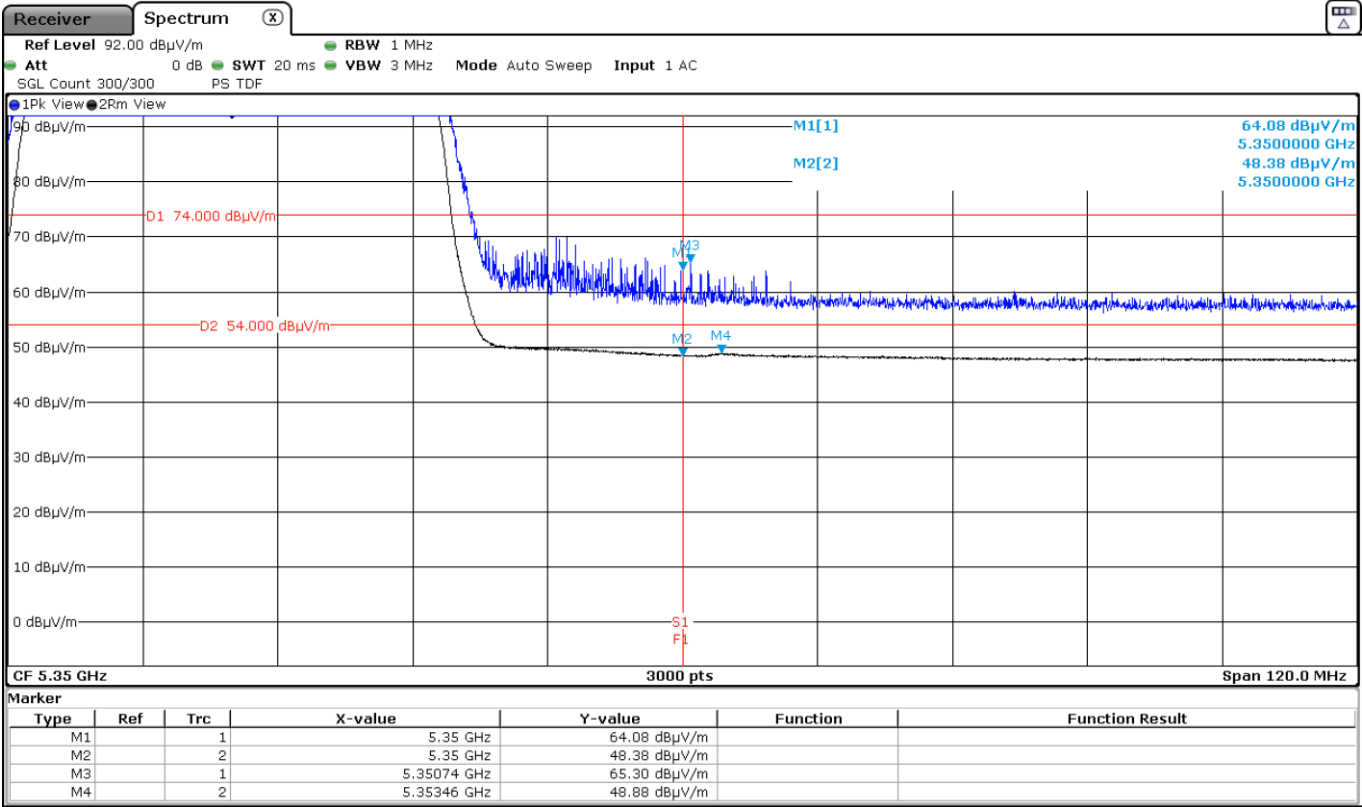
4500 MHz to 5150 MHz Lower Band Edge Channel 54



5350 MHz to 5460 MHz Upper Band Edge Channel 54



5350 MHz to 5460 MHz Upper Band Edge Channel 62



Results for Mode: 802.11ac VHT80 - 80 MHz - SISO - Core Aux

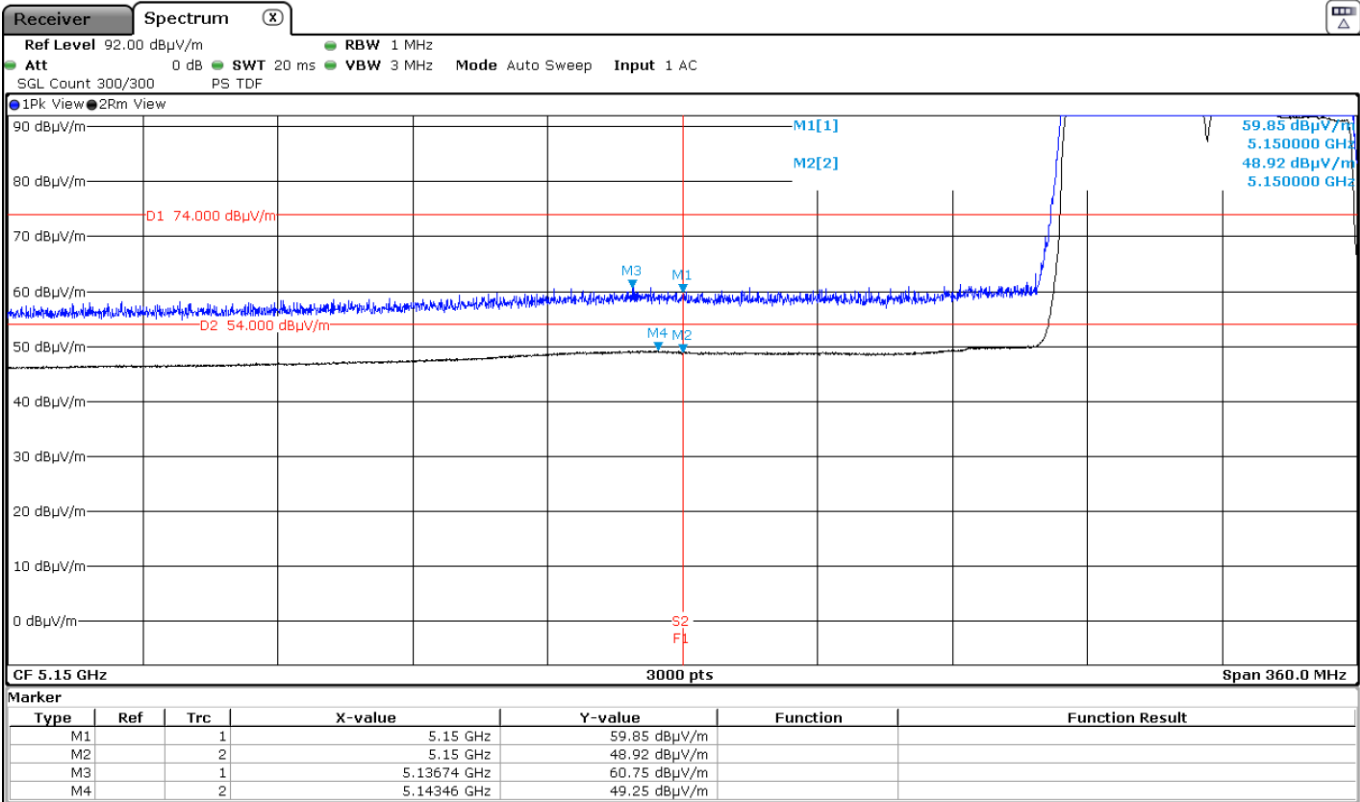
Results: Peak / Channel 58

Frequency (MHz)	Antenna Polarity	Peak Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5150	Vertical	59.85	74	14.15	<± 3.05	PASS
5136.740	Vertical	60.75	74	13.25	<± 3.05	PASS
5350	Vertical	58.80	74	15.20	<± 3.05	PASS
5441.367	Vertical	61.23	74	12.77	<± 3.05	PASS

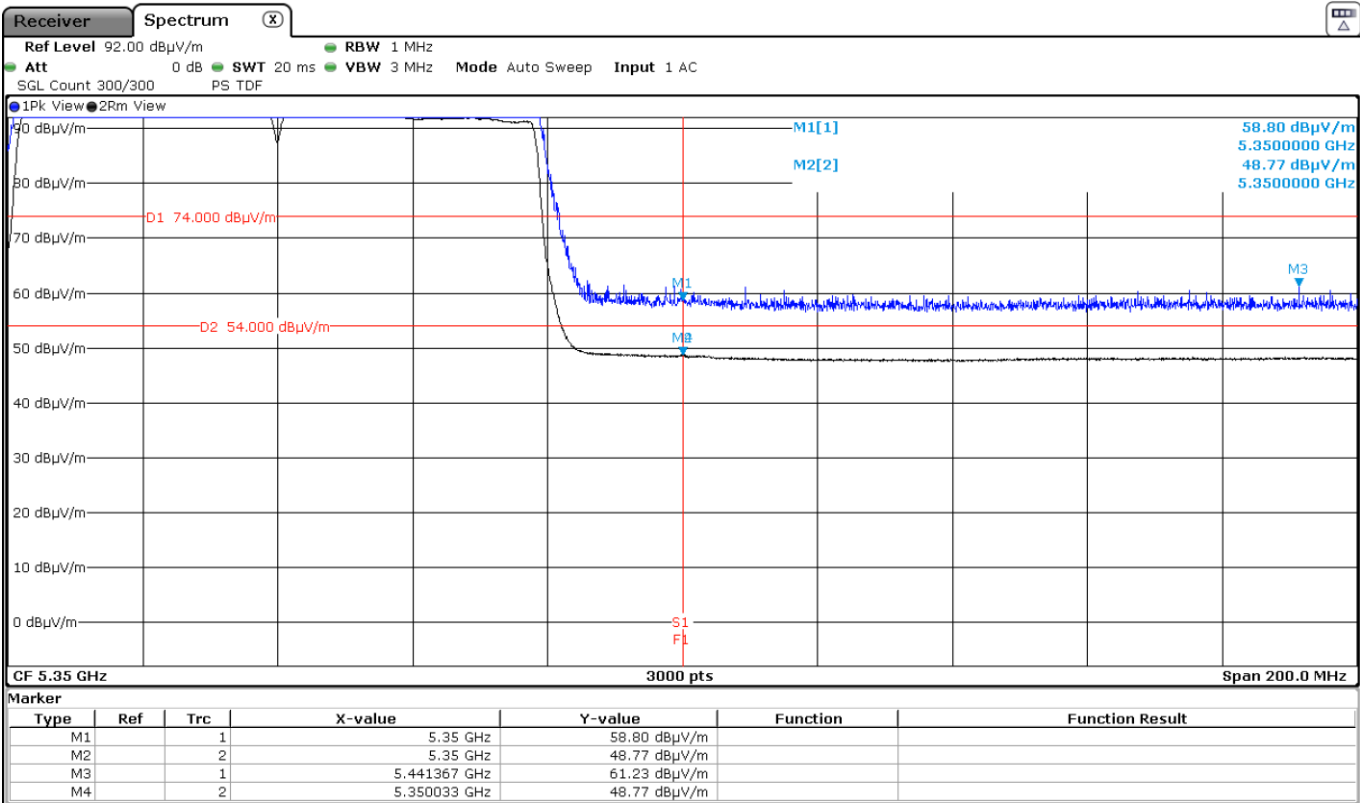
Results: Average / Channel 58

Frequency (MHz)	Antenna Polarity	Average Level (dBuV/m)	Duty Cycle Correction (dB)	Corrected Average Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Measurement uncertainty (dB)	Verdict
5150	Vertical	48.92	0.18	49.10	54	4.90	<± 3.05	PASS
5143.460	Vertical	49.25	0.18	49.43	54	4.57	<± 3.05	PASS
5350	Vertical	48.77	0.18	48.95	54	5.05	<± 3.05	PASS

4500 MHz to 5150 MHz Lower Band Edge Channel 58



5350 MHz to 5460 MHz Upper Band Edge Channel 58



Appendix D: Test result for 5.47GHz – 5.725GHz.

TEST CONDITIONS.....	127
FCC Section 15.407 Subclause (a)(2)/ Transmitter Maximum Conducted Output Power / RSS-247 6.2.3.1 Transmitter Maximum Equivalent Isotropically Radiated Power.....	130
FCC Section 15.407 Subclause (a) (2) / RSS-247 6.2.3.1 Transmitter Peak Power Spectral Density	141
FCC Section 15.407(b)(3)(6) /RSS-247 6.2.3.2. Transmitter Out of Band Radiated Emissions	146
FCC Section 15.407 Subclause (b) (2) / RSS-247 6.2.3.2. Transmitter Band Edge Radiated Emissions.	152

TEST CONDITIONS

Power supply (V):

Vnominal = 120 Vac

Type of power supply = AC voltage main supply.

Type of antenna = Internal antenna.

Declared Gain for antenna (maximum) at each port/core:

G_{COREAUX} = 4.56 dBi

Technology Tested:	WLAN (IEEE 802.11 a,n,ac) / U-NII	
Modes:	802.11a: 6, 9, 12, 18, 24, 36, 48 & 54 Mbps (SISO)	
	802.11n HT20: MCS0 to MCS7	
	802.11n HT40: MCS0 to MCS7	
	802.11ac VHT20: MCS0 to	
	802.11ac VHT40: MCS0 to MCS9	
	802.11ac VHT80: MCS0 to MCS9	
Setting of cores / ports:	Aux	
Beamforming:	No	
Frequency Range:	5470 MHz to 5725 MHz	
Channel Spacing:	20 MHz	
Transmit Channels	Channel	Channel Frequency (MHz)
	Lowest: 100	5500
	Middle: 116	5580
	Highest: 140	5700
Channels that straddle the UNII-2C and UNII-3 bands at 5725MHz.	Single:144	5720
Channel Spacing:	40 MHz	
Transmit Channels	Channel	Channel Frequency (MHz)
	Lowest: 102	5510
	Middle (Canada): 110	5550
	Middle (FCC only): 118	5590
	Highest: 134	5670
Channels that straddle the UNII-2C and UNII-3 bands at 5725MHz.	Single:142	5710
Channel Spacing:	80 MHz	
Transmit Channels	Lowest: 106	5530
	Highest (FCC only): 122	5610
Channels that straddle the UNII-2C and UNII-3 bands at 5725MHz.	Single:138	5690

For RSS-247 (Canada Standard), this device shall not be capable of transmitting in the band 5600-5650 MHz. This restriction is for the protection of Environment Canada's weather radars operating in this band.

The test set-up was made in accordance to the general provisions of FCC Unlicensed National Information Infrastructure (U-NII) Devices 789033 D02 General U-NII Test Procedures New Rules v02r01 dated Dec 14, 2017.

The EUT was tested in the following operating mode:

- Continuously transmitting with a modulated carrier at maximum power in all required channels using the supported data rates/modulations types.

The field strength at the band edges was evaluated for each mode for the channel under test.

For all modes, the EUT was configured in test mode using a software application. The application was used to enable a continuous transmission and to select the test channels as required. The client supplied scripts to configure the EUT. The customer supplied a document containing the setup instructions.

The customer declared the worst case SISO for testing which were:

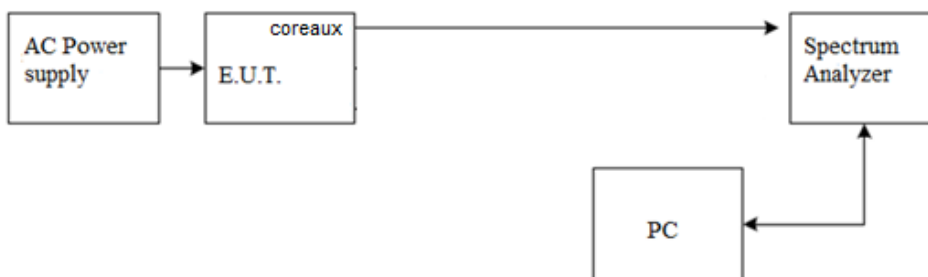
- 802.11a: 6 Mbit/s / SISO on Core Aux
- 802.11n HT20: MCS0 / SISO on Core Aux
- 802.11n HT40: MCS0 / SISO on Core Aux
- 802.11ac VHT80: MCS0x1 / SISO on Core Aux

The client supplied U.FL RF cables with the EUT in order to perform conducted measurements. The measured additional path loss was included in any path loss calculations.

CONDUCTED MEASUREMENTS

The equipment under test was set up in a shielded room and connected to the spectrum analyzer using a low loss RF cable. The reading in the spectrum analyzer is corrected taking into account the internal and external RF cable loss.

For all modes:



The AC supply voltage is applied using an external power supply.

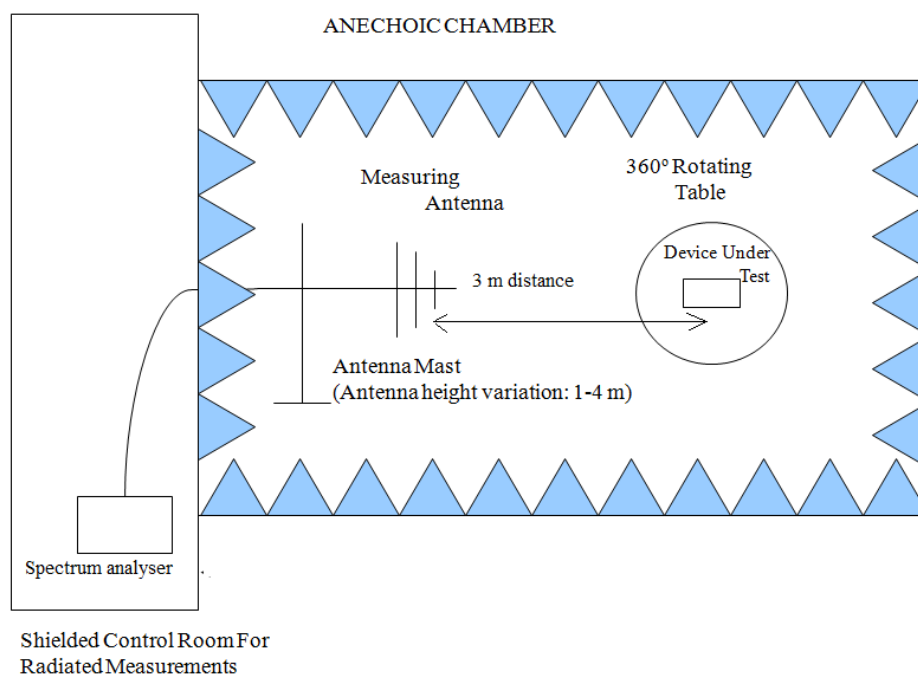
RADIATED MEASUREMENTS

All radiated tests were performed in a semi-anechoic chamber. The measurement antenna is situated at a distance of 3 m. The EUT was placed at a height of 80 cm above the reference ground plane in the center of the chamber turntable to perform the measurements below 1GHz and The EUT was placed at a height of 1.5 meters above the test chamber floor in the center of the chamber turntable to perform the measurements above 1GHz. It was also rotated 360° and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission.

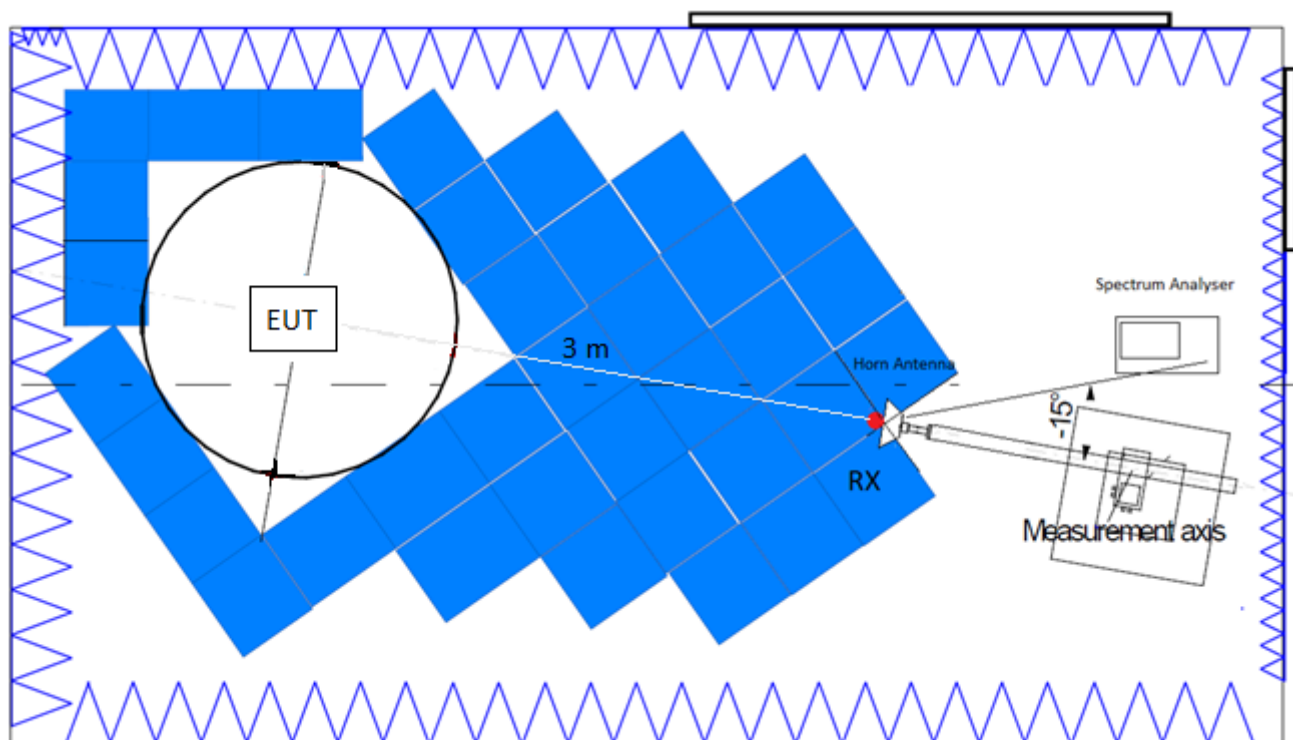
Measurements were made in both horizontal and vertical planes of polarization.

The final measured value, for the given emission, in the tables below incorporates the calibrated antenna factor and cable loss.

Radiated measurements setup $f < 1$ GHz



Radiated measurements setup $f > 1$ GHz



FCC Section 15.407 Subclause (a)(2)/ Transmitter Maximum Conducted Output Power / RSS-247 6.2.3.1 Transmitter Maximum Equivalent Isotropically Radiated Power

SPECIFICATION

FCC 15.407: For the 5.47-5.725 GHz band, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (24 dBm) or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

RSS-247: The maximum conducted output power shall not exceed 250 mW (24 dBm) or $11 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
The maximum e.i.r.p. shall not exceed 1.0 W (30 dBm) or $17 + 10 \log_{10} B$, dBm, whichever is less. B is the 99% emission bandwidth in megahertz.

RESULTS:

The maximum conducted output power was measured using the channel power integration method according to point E) 2) b) (Method SA-1) of 789033 D02 General UNII Test Procedures New Rules v02r01 when the duty cycle is >98% and the channel power integration method according to point E) 2) d) (Method SA-2) of 789033 D02 General UNII Test Procedures New Rules v02r01 when the duty cycle is <98%.

For data rates where the EUT was transmitting at <98% duty cycle, the duty calculated in Appendix A was added to the measured power in order to calculate the total average power during the actual transmission time.

For all SISO modes of operation, the antenna gain is less than 6dBi.

The e.i.r.p. levels are calculated by adding the declared maximum antenna gain (dBi).

Straddling channels in the U-NII-2C and U-NII-3 at 5725 MHz (144, 142 and 138) shall meet the requirements of both bands. Compliance is shown against the more stringent limit in band U-NII-2C and therefore is also compliant with the requirements for band U-NII-3.

FCC and Canada power setting

Mode : 802.11a - 20MHz – SISO – CORE Aux

Declared antenna gain: 4.56 dBi

	channel 100 5500 MHz	Channel116 5580 MHz	channel 140 5700 MHz
Max. conducted power (dBm)	12.83	20.47	13.39
Conducted Power Limit (dBm)	24		
Margin (dB)	11.17	3.53	10.61
Maximum EIRP power (dBm)	17.39	25.03	17.95
EIRP power Limit (dBm)	30		
Margin (dB)	12.61	4.97	12.05
Measurement uncertainty (dB)	<±1.20		

Mode : 802.11n HT20 - 20MHz – SISO – CORE Aux

Declared antenna gain: 4.56 dBi

	channel 100 5500 MHz	Channel116 5580 MHz	channel 140 5700 MHz
Max. conducted power (dBm)	12.88	20.30	13.32
Conducted Power Limit (dBm)	24		
Margin (dB)	11.12	3.70	10.68
Maximum EIRP power (dBm)	17.44	24.86	17.88
EIRP power Limit (dBm)	30		
Margin (dB)	12.56	5.14	12.12
Measurement uncertainty (dB)	<±1.20		

Mode : 802.11n HT40 - 40MHz – SISO – CORE Aux

Declared antenna gain: 4.56 dBi

	channel 102 5510 MHz	channel 110 5550MHz	channel 118 5590 MHz	channel 134 5670 MHz
Max. conducted power (dBm)	11.34	21.82	21.68	15.78
Conducted Power Limit (dBm)	24			
Margin (dB)	12.66	2.18	2.32	8.22
Maximum EIRP power (dBm)	15.90	26.38	26.24	20.34
EIRP power Limit (dBm)	30			
Margin (dB)	14.10	3.62	3.76	9.66
Measurement uncertainty (dB)	<±1.20			

Mode : 802.11ac VHT80 - 80MHz – SISO – CORE Aux

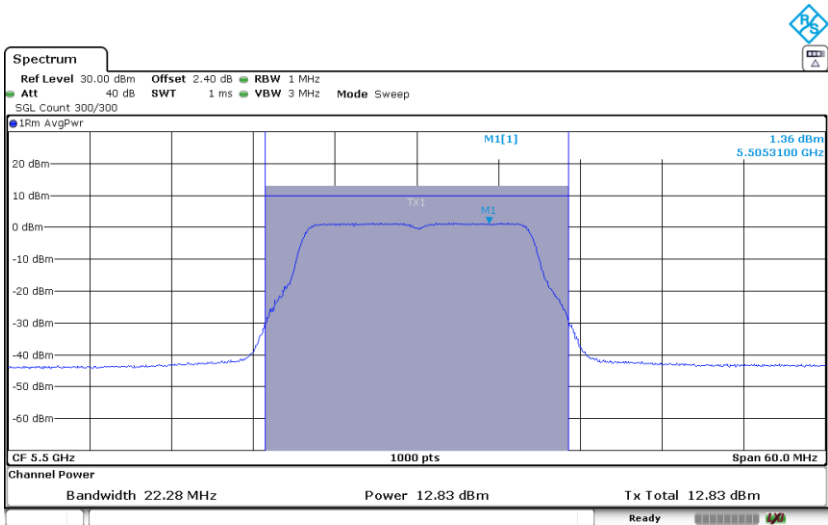
Declared antenna gain: 4.56 dBi

	channel 106 5530 MHz	channel 122 5530 MHz
Max. conducted power (dBm)	11.08	17.44
Duty Cycle Correction Factor (dB)	0.18	0.18
Max. conducted power corrected (dBm)	11.26	17.62
Conducted Power Limit (dBm)	24	
Margin (dB)	12.74	6.38
Maximum EIRP power (dBm)	15.82	22.18
EIRP power Limit (dBm)	30	
Margin (dB)	14.18	7.82
Measurement uncertainty (dB)	<±1.20	

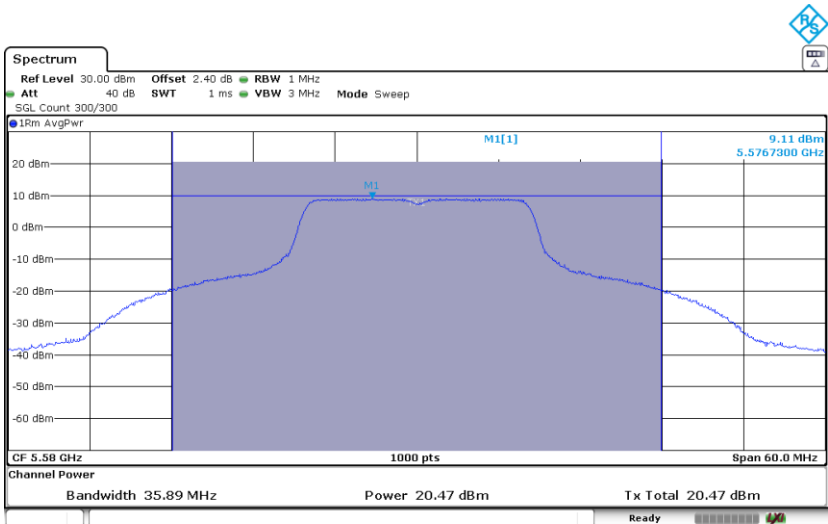
Verdict: PASS

Mode : 802.11a - 20MHz – SISO – CORE Aux

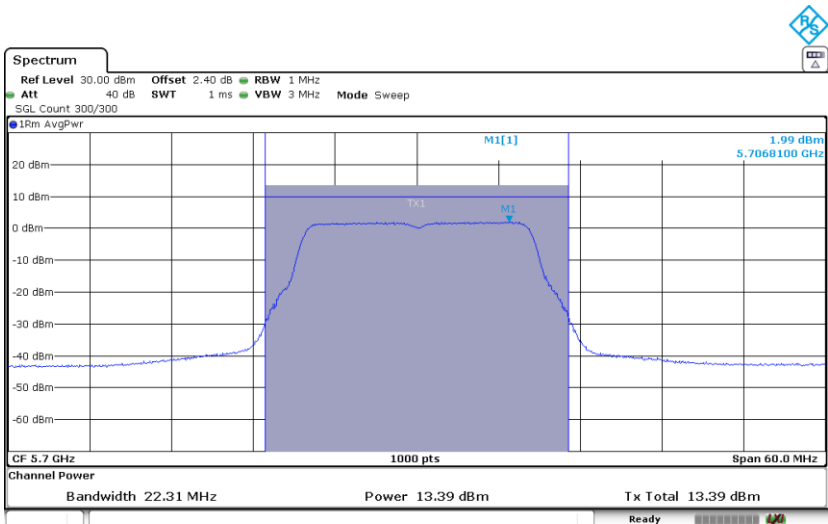
Channel 100



Channel 116

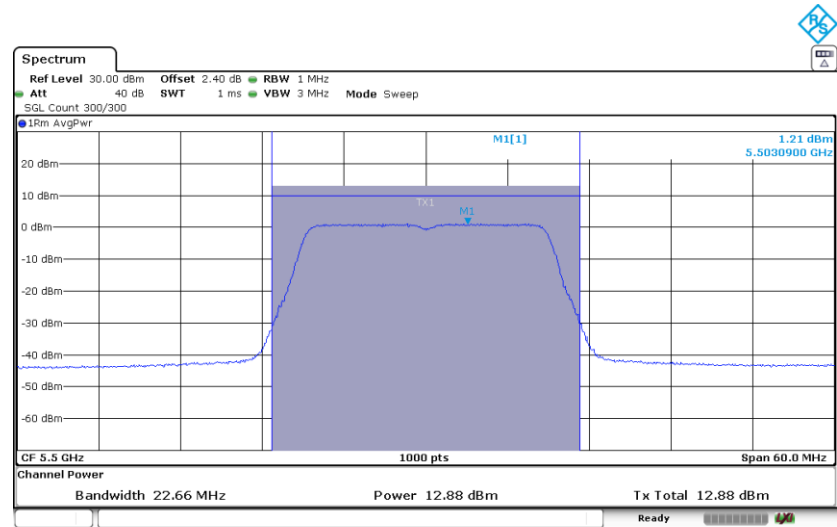


Channel 140

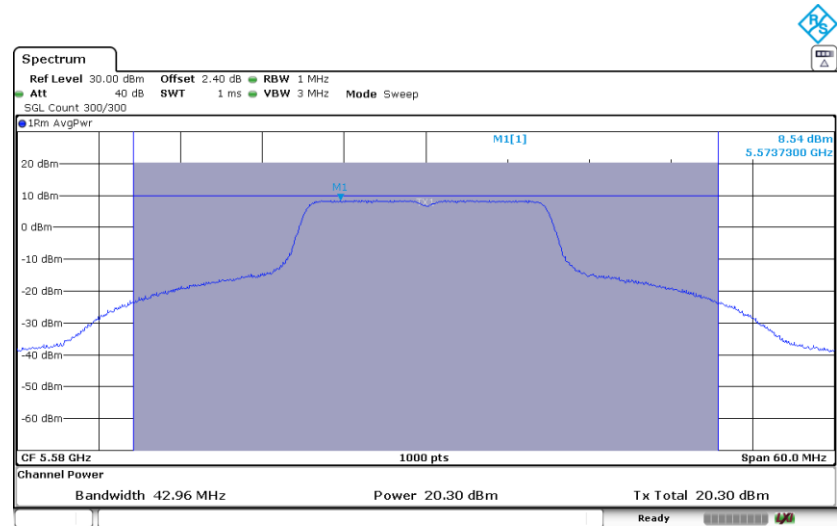


Mode : 802.11n HT20 - 20MHz – SISO – CORE Aux

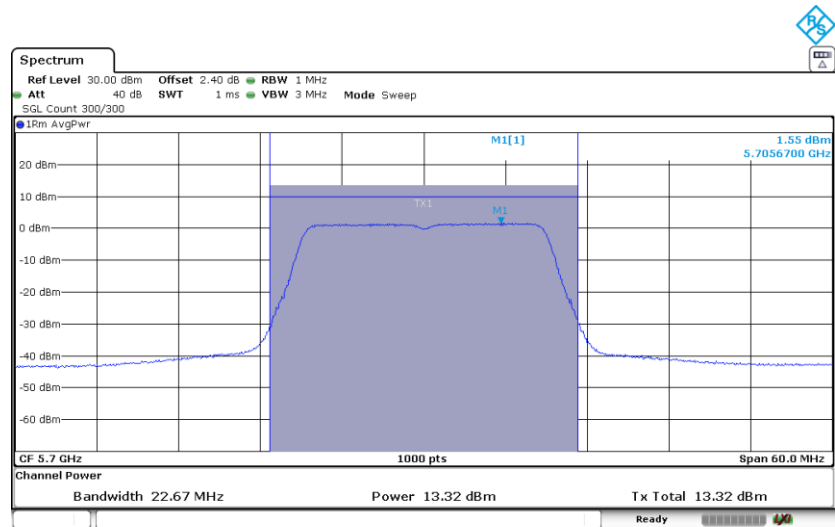
Channel 100



Channel 116

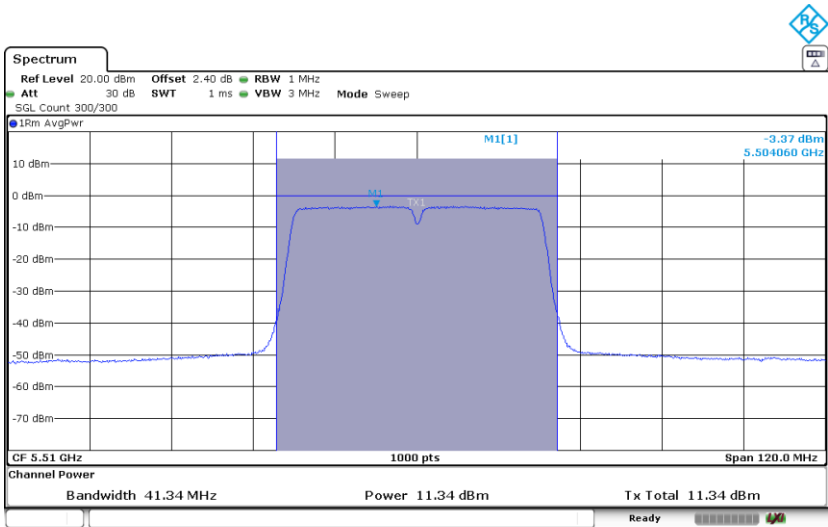


Channel 140

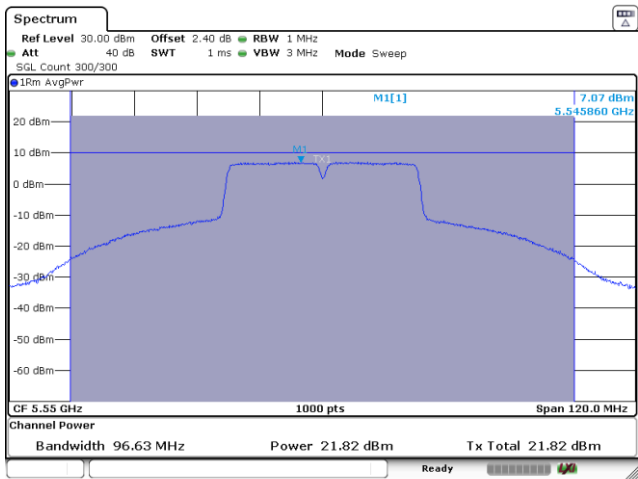


Mode : 802.11n HT40 - 40MHz – SISO – CORE Aux

Channel 102



Channel 110



Channel 118

