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UTTR-RF-RSS247-V1.0



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UTTR-RF-RSS247-V1.0

5.5 MAXIMUM CONDUCTED OUTPUT POWER OR E.I.R.P

Test Requirement: FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(3)
RSS-247 Issue 2 Section 6.2.1.1/6.2.4.1

Test Method: KDB 789033 D02 v02r01 Section E.3.a (Method PM)

Limits: FCC 47 CFR Part 15 Subpart E

1. For the band 5.15-5.25 GHz.
 - (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
 - (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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.
 - (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. 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. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
 - (iv) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, 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.
2. For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz 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. 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. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Limits: RSS-247 Issue 2

1. Frequency band 5150-5250 MHz

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or $1.76 + 10 \log_{10} B$, dBm, whichever is less. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

For other devices, the maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10} B$, dBm, whichever

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power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

2. Frequency band 5725-5850 MHz

The maximum conducted output power shall not exceed 1 W. The output power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the output 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 devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipoint³ systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

Test Procedure:

1. Connected the EUT's antenna port to measure device by 10dB attenuator.
2. Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of Tx on burst.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.5.3 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Transmitter mode

Test Results: Pass

Test Data:

Directional gain and the maximum output power limit.

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Frequency Band	Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Correlated chains directional gain (dBi)	Peak Power Limits (dBm)
U-NII-1	3.00	3.00	6.01	22.99
U-NII-3	3.00	3.00	6.01	29.99
Unequal antenna gains, with equal transmit powers. Directional gain is to be computed as follows: If transmit signals are correlated, then Directional gain = $10 \log[(10^{G1}/20 + 10^{G2}/20 + \dots + 10^{GN}/20)^2 / NANT]$ dBi [Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]				

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Frequency Band	Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Correlated chains directional gain (dBi)	Peak Power Limits (dBm)
U-NII-1	3.00	3.00	6.01	23.99
U-NII-3	3.00	3.00	6.01	29.99
Unequal antenna gains, with equal transmit powers. Directional gain is to be computed as follows: If transmit signals are correlated, then Directional gain = $10 \log[(10^{G1}/20 + 10^{G2}/20 + \dots + 10^{GN}/20)^2 / NANT]$ dBi [Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]				

Frequency band 5150-5250 MHz

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For IEEE 802.11 a, the minimum 99% emission bandwidth is 16.67 MHz

$$10 \text{ dBm} + 10\log_{10}(16.67) = 22.22 \text{ dBm} < 23 \text{ dBm}$$

So the 22.22 dB limit applicable

For IEEE 802.11 n-HT20/ac-VHT20, the minimum 99% emission bandwidth is 17.69 MHz

$$10 \text{ dBm} + 10\log_{10}(17.69) = 22.48 \text{ dBm} < 23 \text{ dBm}$$

So the 22.48 dB limit applicable

For IEEE 802.11 n-HT40/ac-VHT40/ac-VHT80, the minimum 99% emission bandwidth is 36.41 MHz

$$10 \text{ dBm} + 10\log_{10}(36.41) = 25.61 \text{ dBm} > 23 \text{ dBm}$$

So the 23 dB limit applicable

Mode	Channel/ Frequency (MHz)	Maximum e.i.r.p (dBm)		Total e.i.r.p MIMO_ Chain 0+1 (dBm)	Limit (dBm)	Pass / Fail
		SISO				
		Chain 0	Chain 1			
IEEE 802.11a	36 (5180)	17.67	17.43	N/A	22.22	Pass
	44 (5220)	18.23	17.12	N/A	22.22	Pass
	48 (5240)	18.32	16.96	N/A	22.22	Pass
IEEE 802.11n-HT20	36 (5180)	17.82	17.24	20.55	22.48	Pass
	44 (5220)	17.72	17.28	20.52	22.48	Pass
	48 (5240)	17.41	17.12	20.28	22.48	Pass
IEEE 802.11n-HT40	38 (5190)	14.72	14.02	17.39	23.00	Pass
	46 (5230)	14.53	14.31	17.43	23.00	Pass
IEEE 802.11ac-VHT20	36 (5180)	17.46	16.93	20.21	22.48	Pass
	44 (5220)	17.30	17.17	20.25	22.48	Pass
	48 (5240)	17.21	17.01	20.12	22.48	Pass
IEEE 802.11ac-VHT40	38 (5190)	14.25	13.66	16.98	23.00	Pass
	46 (5230)	14.20	13.90	17.06	23.00	Pass
IEEE 802.11ac-VHT80	42 (5210)	13.83	13.57	16.71	23.00	Pass

Remark:

1. Maximum e.i.r.p = Maximum conducted output power + Antenna Gain
2. Total e.i.r.p (Chain 0+1) = $10 \cdot \log_{10}[(10^{\text{Chain 0}/10}) + (10^{\text{Chain 1}/10})]$

FCC 47 CFR Part 15 Subpart E:

Mode	Channel/ Frequency (MHz)	Maximum conducted output power (dBm)		Total Power MIMO_ Chain 0+1 (dBm)	Limit (dBm)	Pass / Fail
		SISO				
		Chain 0	Chain 1			
IEEE 802.11a	36 (5180)	14.67	14.43	N/A	23.99	Pass
	44 (5220)	15.23	14.12	N/A	23.99	Pass
	48 (5240)	15.32	13.96	N/A	23.99	Pass
IEEE 802.11n-HT20	36 (5180)	14.82	14.24	17.55	23.99	Pass
	44 (5220)	14.72	14.28	17.52	23.99	Pass
	48 (5240)	14.41	14.12	17.28	23.99	Pass
IEEE 802.11n-HT40	38 (5190)	11.72	11.02	14.39	23.99	Pass
	46 (5230)	11.53	11.31	14.43	23.99	Pass
IEEE 802.11ac-VHT20	36 (5180)	14.46	13.93	17.21	23.99	Pass
	44 (5220)	14.30	14.17	17.25	23.99	Pass
	48 (5240)	14.21	14.01	17.12	23.99	Pass
IEEE 802.11ac-VHT40	38 (5190)	11.25	10.66	13.98	23.99	Pass
	46 (5230)	11.20	10.90	14.06	23.99	Pass
IEEE 802.11ac-VHT80	42 (5210)	10.83	10.57	13.71	23.99	Pass

Remark:

1. Maximum conducted output power = Conducted output power + Duty Cycle Factor
2. Total Power (Chain 0+1) = $10 \cdot \log_{10} [10^{\text{Chain 0}/10} + 10^{\text{Chain 1}/10}]$

Frequency band 5725-5850 MHz

Mode	Channel/ Frequency (MHz)	Maximum conducted output power (dBm)		Total Power MIMO_ Chain 0+1 (dBm)	Limit (dBm)	Pass / Fail
		SISO				
		Chain 0	Chain 1			
IEEE 802.11a	149 (5745)	15.72	14.91	N/A	29.99	Pass
	157 (5785)	15.43	14.46	N/A	29.99	Pass
	165 (5825)	15.49	14.21	N/A	29.99	Pass
IEEE 802.11n-HT20	149 (5745)	12.71	12.16	15.45	29.99	Pass
	157 (5785)	12.24	11.87	15.07	29.99	Pass
	165 (5825)	12.17	11.32	14.78	29.99	Pass
IEEE 802.11n-HT40	151 (5755)	12.77	13.40	16.11	29.99	Pass
	159 (5795)	12.48	13.42	15.99	29.99	Pass
IEEE 802.11ac-VHT20	149 (5745)	11.86	10.87	14.40	29.99	Pass
	157 (5785)	11.42	10.30	13.91	29.99	Pass
	165 (5825)	11.20	10.00	13.65	29.99	Pass
IEEE 802.11ac-VHT40	151 (5755)	12.37	10.94	14.72	29.99	Pass
	159 (5795)	11.85	10.41	14.20	29.99	Pass
IEEE 802.11ac-VHT80	155 (5775)	13.25	12.18	15.76	29.99	Pass

Remark:

1. Maximum conducted output power = Conducted output power + Duty Cycle Factor
2. Total Power(Chain 0+1) = $10 \cdot \log[(10^{\text{Chain 0}/10}) + (10^{\text{Chain 1}/10})]$

5.6 PEAK POWER SPECTRAL DENSITY

Test Requirement: FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(3)
RSS-247 Issue 2 Section 6.2.1.1/6.2.4.1

Test Method: KDB 789033 D02 v02r01 Section F

Limits: FCC 47 CFR Part 15 Subpart E

1. For the band 5.15-5.25 GHz.
 - (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
 - (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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.
 - (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. 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. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.
 - (iv) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, 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.
2. For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz 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. 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. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Limits: RSS-247 Issue 2

1. Frequency band 5150-5250 MHz

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or $1.76 + 10 \log_{10} B$, dBm, whichever is less. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

For other devices, the maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10} B$, dBm, whichever

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power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

2. Frequency band 5725-5850 MHz

The maximum conducted output power shall not exceed 1 W. The output power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the output 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 devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed point-to-point operations exclude the use of point-to-multipoint³ systems, omnidirectional applications and multiple collocated transmitters transmitting the same information.

Test Procedure:

The output from the transmitter was connected to an attenuator and then to the input of the RF Spectrum Analyzer.

Spectrum analyzer according to the following Settings:

1. For U-NII-1, U-NII-2A, U-NII-2C band:

Using method SA-2

- a) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- b) Set RBW = 1 MHz, Set VBW ≥ 3 RBW, Detector = RMS
- c) Sweep time = auto, trigger set to “free run”.
- d) Trace average at least 100 traces in power averaging mode.
- e) Record the max value and add 10 log (1/duty cycle)

2. For U-NII-3 band:

- a) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- b) Set RBW = 500 kHz, Set VBW ≥ 3 RBW, Detector = RMS
- c) Use the peak marker function to determine the maximum power level in any 500 kHz band segment within the fundamental EBW.
- d) Sweep time = auto, trigger set to “free run”.
- e) Trace average at least 100 traces in power averaging mode.
- f) Record the max value and add 10 log (1/duty cycle)

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.5.3 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Transmitter mode

Test Results: Pass

Test Data:

**Directional gain and the maximum output power limit.
RSS-247 Issue 2:**

Frequency Band	Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Correlated chains directional gain (dBi)	PSD Limits (dBm/MHz or dBm/500kHz)
U-NII-1	3.00	3.00	6.01	9.99
U-NII-3	3.00	3.00	6.01	29.99

Unequal antenna gains, with equal transmit powers. Directional gain is to be computed as follows:
If transmit signals are correlated, then

$$\text{Directional gain} = 10 \log\left[\frac{10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20}}{N}\right]^2 / N \text{ dBi}$$

[Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

FCC 47 CFR Part 15 Subpart E:

Frequency Band	Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Correlated chains directional gain (dBi)	PSD Limits (dBm/MHz or dBm/500kHz)
U-NII-1	3.00	3.00	6.01	10.99
U-NII-3	3.00	3.00	6.01	29.99

Unequal antenna gains, with equal transmit powers. Directional gain is to be computed as follows:
If transmit signals are correlated, then

$$\text{Directional gain} = 10 \log\left[\frac{10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20}}{N}\right]^2 / N \text{ dBi}$$

[Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

Frequency band 5150-5250 MHz
RSS-247 Issue 2

Mode	Channel/ Frequency (MHz)	e.i.r.p. spectral density (dBm/MHz)		Total e.i.r.p. spectral density MIMO_Chain 0+1 (dBm/MHz)	Limit (dBm/MHz)	Pass / Fail
		SISO				
		Chain 0	Chain 1			
IEEE 802.11a	36 (5180)	7.30	7.23	N/A	9.99	Pass
	44 (5220)	6.79	6.92	N/A	9.99	Pass
	48 (5240)	6.52	6.67	N/A	9.99	Pass
IEEE 802.11n-HT20	36 (5180)	6.64	6.18	9.43	9.99	Pass
	44 (5220)	6.42	6.34	9.39	9.99	Pass
	48 (5240)	6.20	6.47	9.35	9.99	Pass
IEEE 802.11n-HT40	38 (5190)	0.54	0.31	3.44	9.99	Pass
	46 (5230)	0.10	0.26	3.19	9.99	Pass
IEEE 802.11ac-VHT20	36 (5180)	6.42	5.86	9.16	9.99	Pass
	44 (5220)	6.07	6.06	9.08	9.99	Pass
	48 (5240)	5.75	5.76	8.77	9.99	Pass
IEEE 802.11ac-VHT40	38 (5190)	0.51	-0.01	3.27	9.99	Pass
	46 (5230)	0.34	-0.19	3.09	9.99	Pass
IEEE 802.11ac-VHT80	42 (5210)	-2.02	-2.45	0.78	9.99	Pass

Remark:

- e.i.r.p. spectral density = Power spectral density + Duty Cycle Factor + Antenna Gain
- Total e.i.r.p. spectral density (Chain 0+1) = $10 \cdot \log[(10^{\text{Chain 0}/10}) + (10^{\text{Chain 1}/10})]$

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Mode	Channel/ Frequency (MHz)	Power spectral density (dBm/MHz)		Total power spectral density MIMO_Chain 0+1 (dBm/MHz)	Limit (dBm/MHz)	Pass / Fail
		SISO				
		Chain 0	Chain 1			
IEEE 802.11a	36 (5180)	4.30	4.23	N/A	10.99	Pass
	44 (5220)	3.79	3.92	N/A	10.99	Pass
	48 (5240)	3.52	3.67	N/A	10.99	Pass
IEEE 802.11n-HT20	36 (5180)	3.64	3.18	6.43	10.99	Pass
	44 (5220)	3.42	3.34	6.39	10.99	Pass
	48 (5240)	3.2	3.47	6.35	10.99	Pass
IEEE 802.11n-HT40	38 (5190)	-2.46	-2.69	0.44	10.99	Pass
	46 (5230)	-2.9	-2.74	0.19	10.99	Pass
IEEE 802.11ac-VHT20	36 (5180)	3.42	2.86	6.16	10.99	Pass
	44 (5220)	3.07	3.06	6.08	10.99	Pass
	48 (5240)	2.75	2.76	5.77	10.99	Pass
IEEE 802.11ac-VHT40	38 (5190)	-2.49	-3.01	0.27	10.99	Pass
	46 (5230)	-2.66	-3.19	0.09	10.99	Pass
IEEE 802.11ac-VHT80	42 (5210)	-5.02	-5.45	-2.22	10.99	Pass

Remark:

- Power spectral density = Conducted power spectral density + Duty Cycle Factor
- Total Power (Chain 0+1) = $10 \cdot \log[(10^{\text{Chain 0}/10}) + (10^{\text{Chain 1}/10})]$

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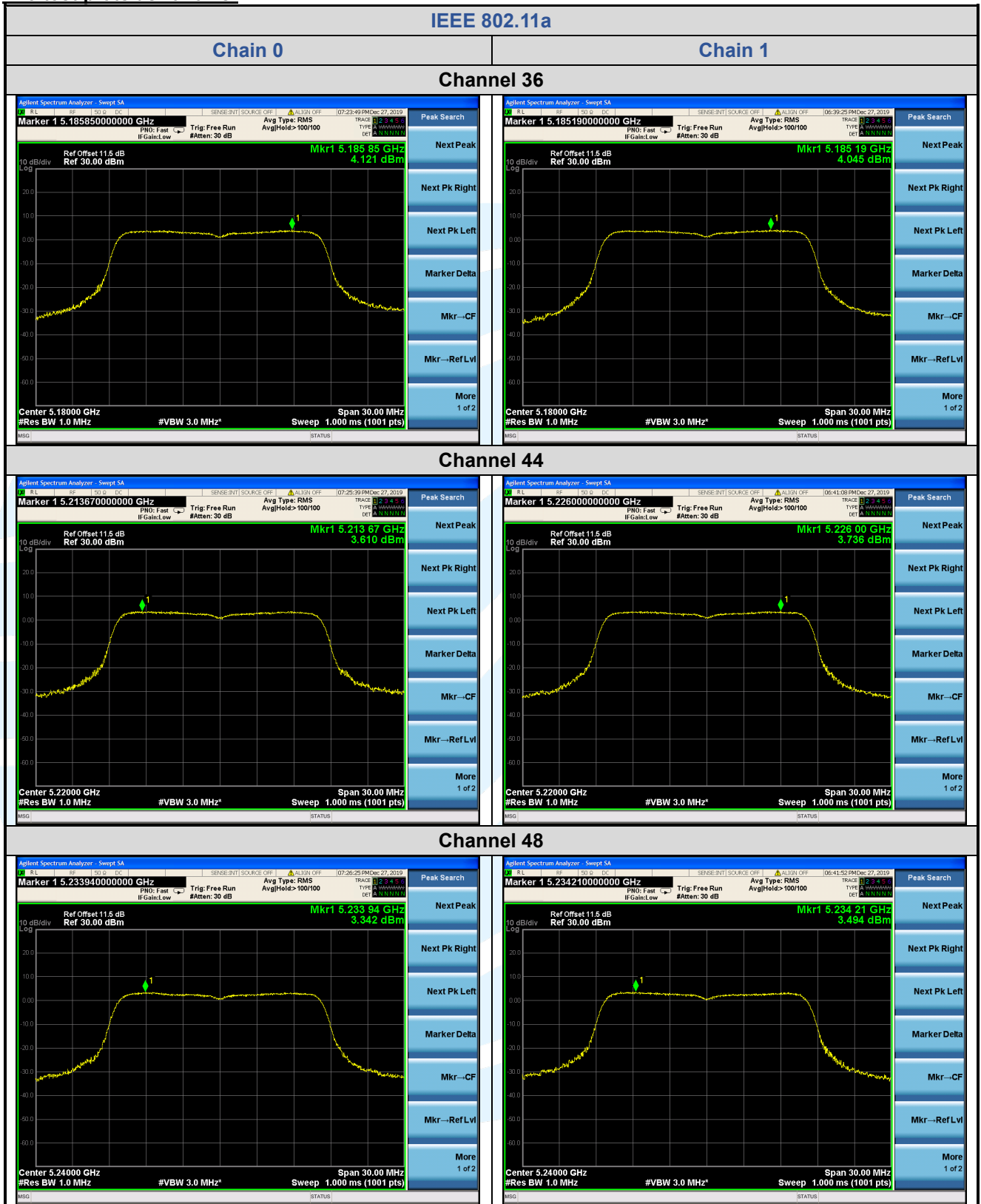
Frequency band 5725-5850 MHz

Mode	Channel/ Frequency (MHz)	Power spectral density (dBm/MHz)		Total power spectral density MIMO_ Chain 0+1 (dBm/MHz)	Limit (dBm/500KHz)	Pass / Fail
		SISO				
		Chain 0	Chain 1			
IEEE 802.11a	149 (5745)	1.69	0.52	N/A	29.99	Pass
	157 (5785)	1.00	0.21	N/A	29.99	Pass
	165 (5825)	0.88	-0.32	N/A	29.99	Pass
IEEE 802.11n-HT20	149 (5745)	-1.99	-1.41	1.32	29.99	Pass
	157 (5785)	-2.33	-1.56	1.08	29.99	Pass
	165 (5825)	-2.53	-2.25	0.62	29.99	Pass
IEEE 802.11n-HT40	151 (5755)	-5.06	-3.64	-1.28	29.99	Pass
	159 (5795)	-6.14	-3.82	-1.82	29.99	Pass
IEEE 802.11ac- VHT20	149 (5745)	-2.88	-2.75	0.20	29.99	Pass
	157 (5785)	-2.9	-3.11	0.01	29.99	Pass
	165 (5825)	-3.4	-3.68	-0.53	29.99	Pass
IEEE 802.11ac- VHT40	151 (5755)	-4.13	-6.08	-1.99	29.99	Pass
	159 (5795)	-4.34	-6.11	-2.13	29.99	Pass
IEEE 802.11ac- VHT80	155 (5775)	-7.19	-7.31	-4.24	29.99	Pass

Remark:

1. Power spectral density = Conducted power spectral density + Duty Cycle Factor
2. Total Power (Chain 0+1) = $10 \cdot \log[(10^{\text{Chain 0}/10}) + (10^{\text{Chain 1}/10})]$

The test plots as follows:



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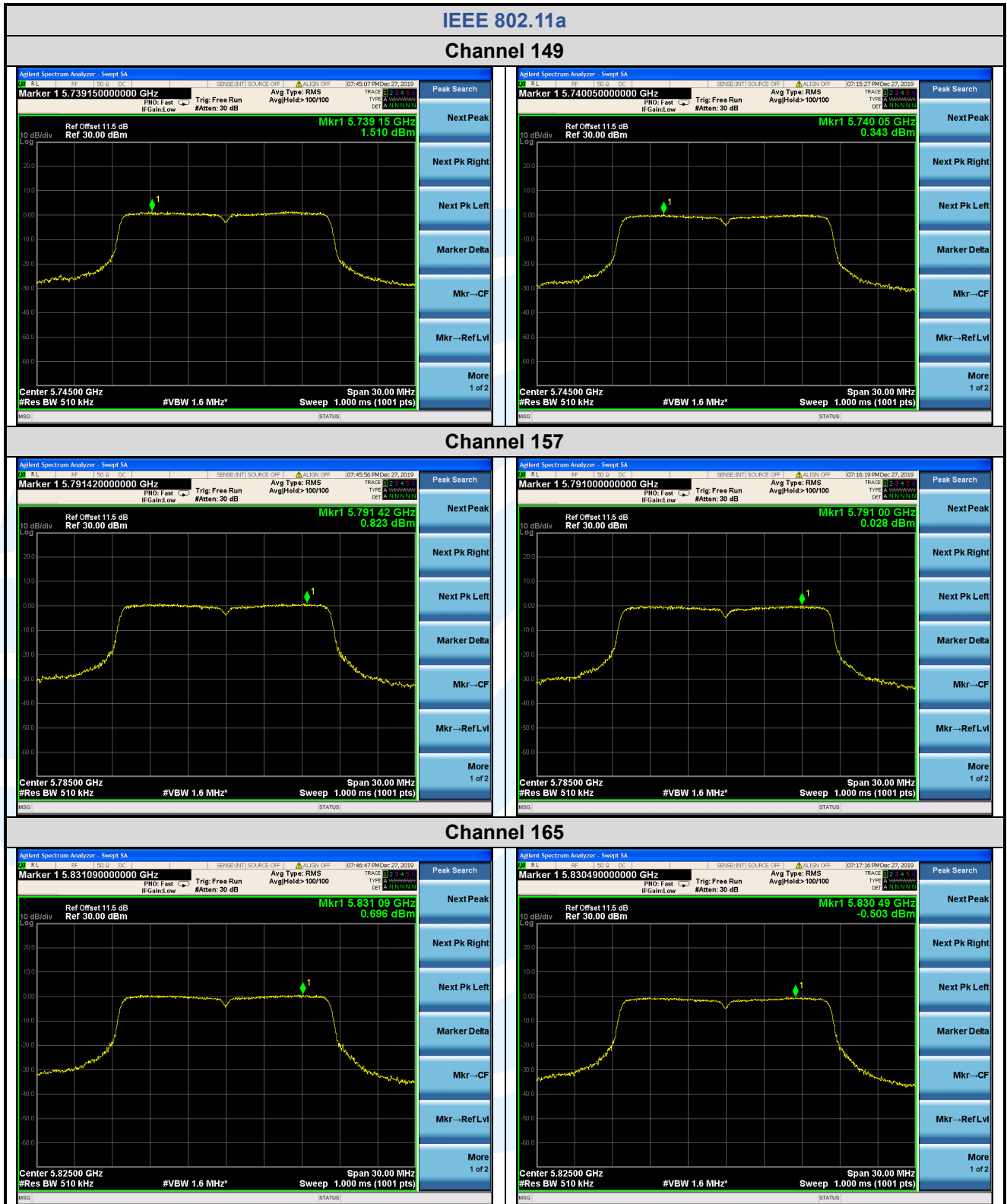
Tel: +86-755-28230888

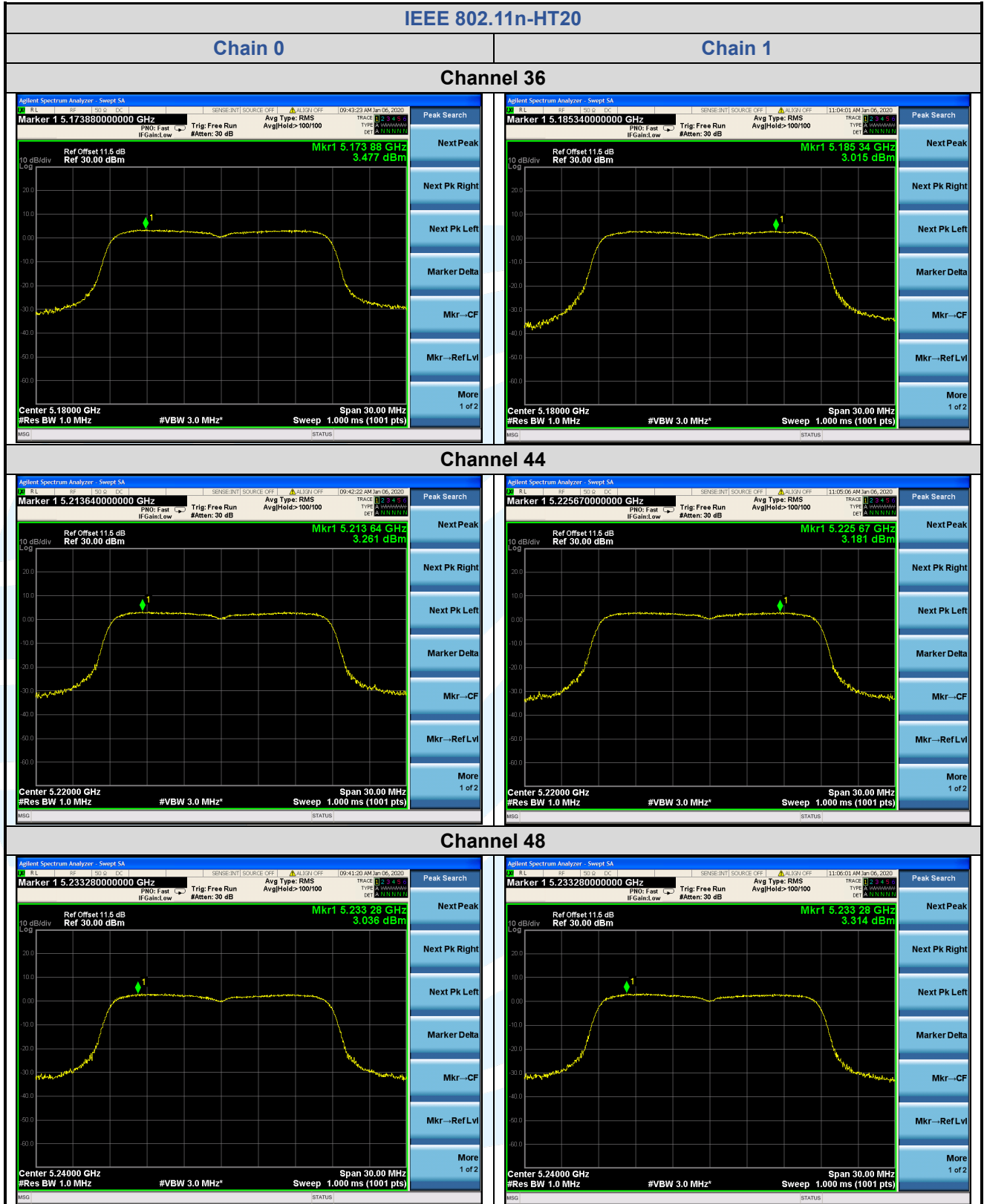
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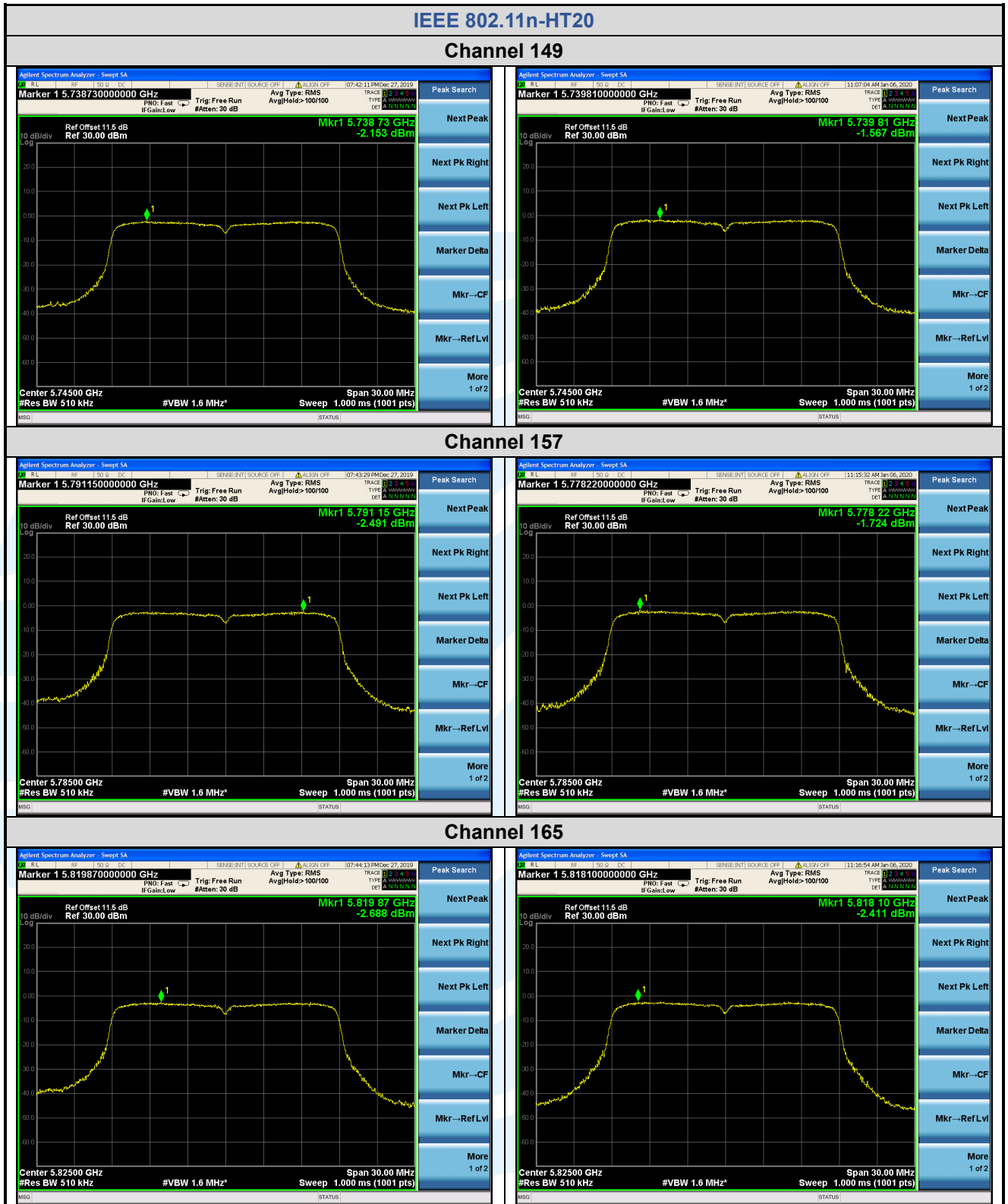
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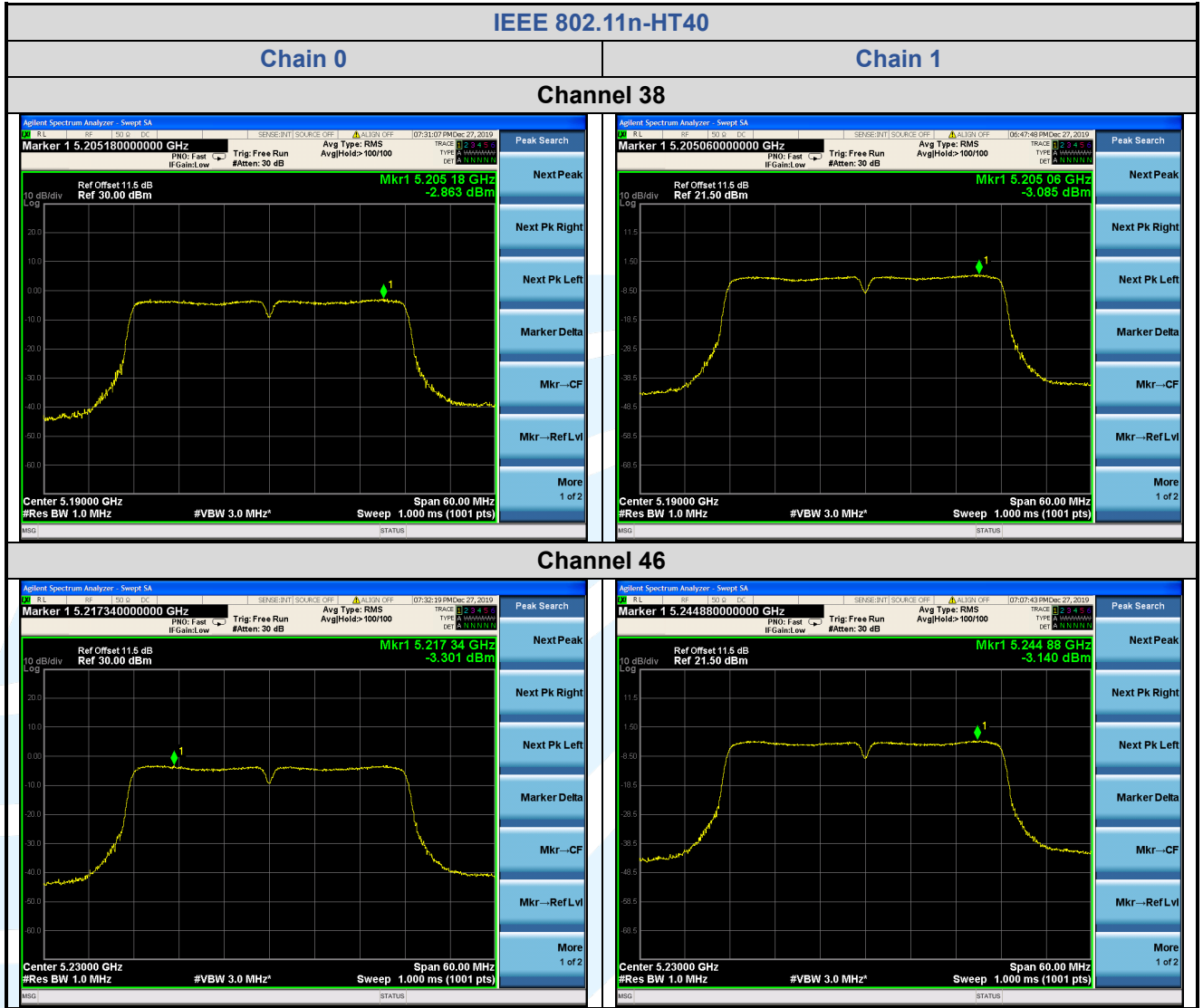
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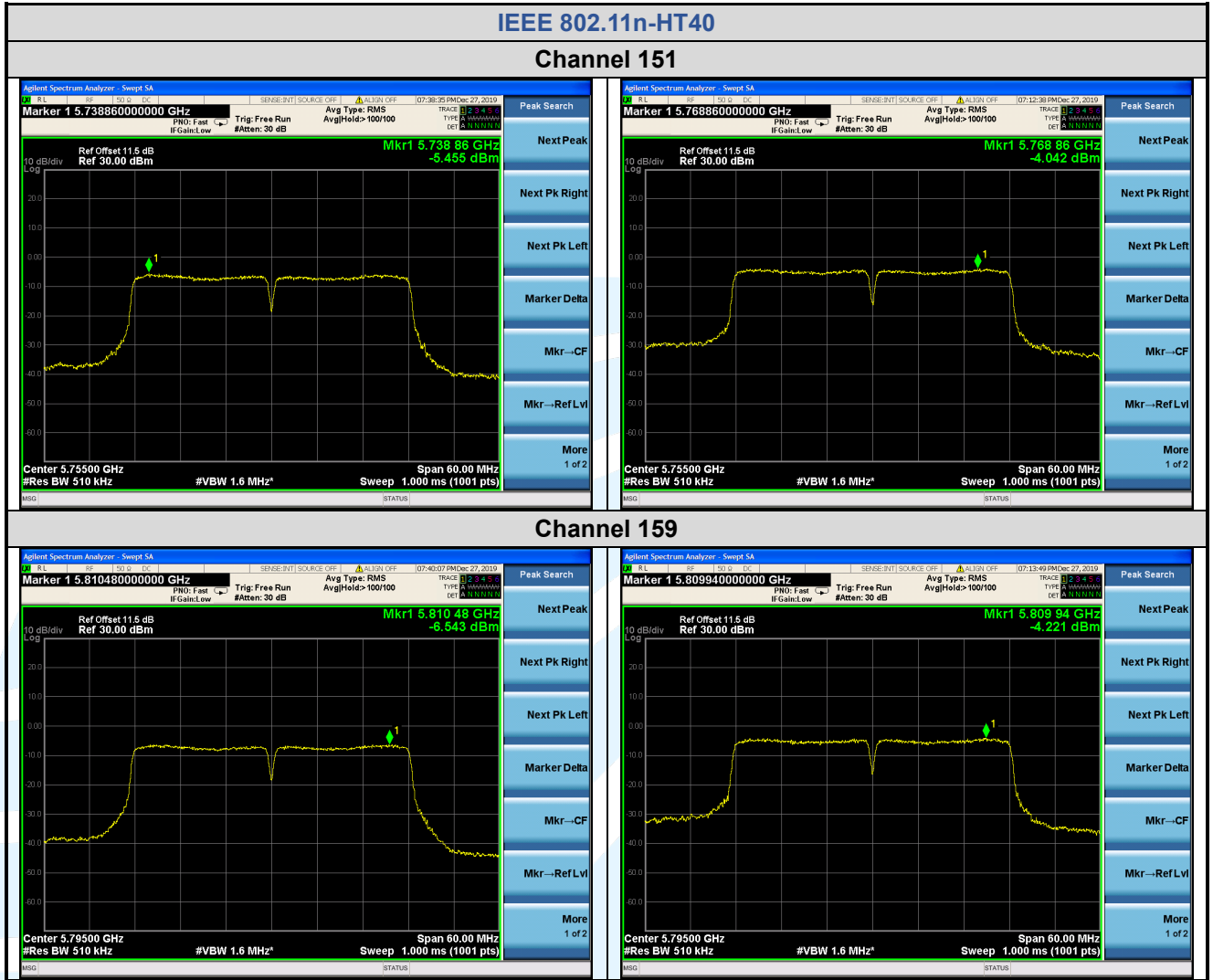
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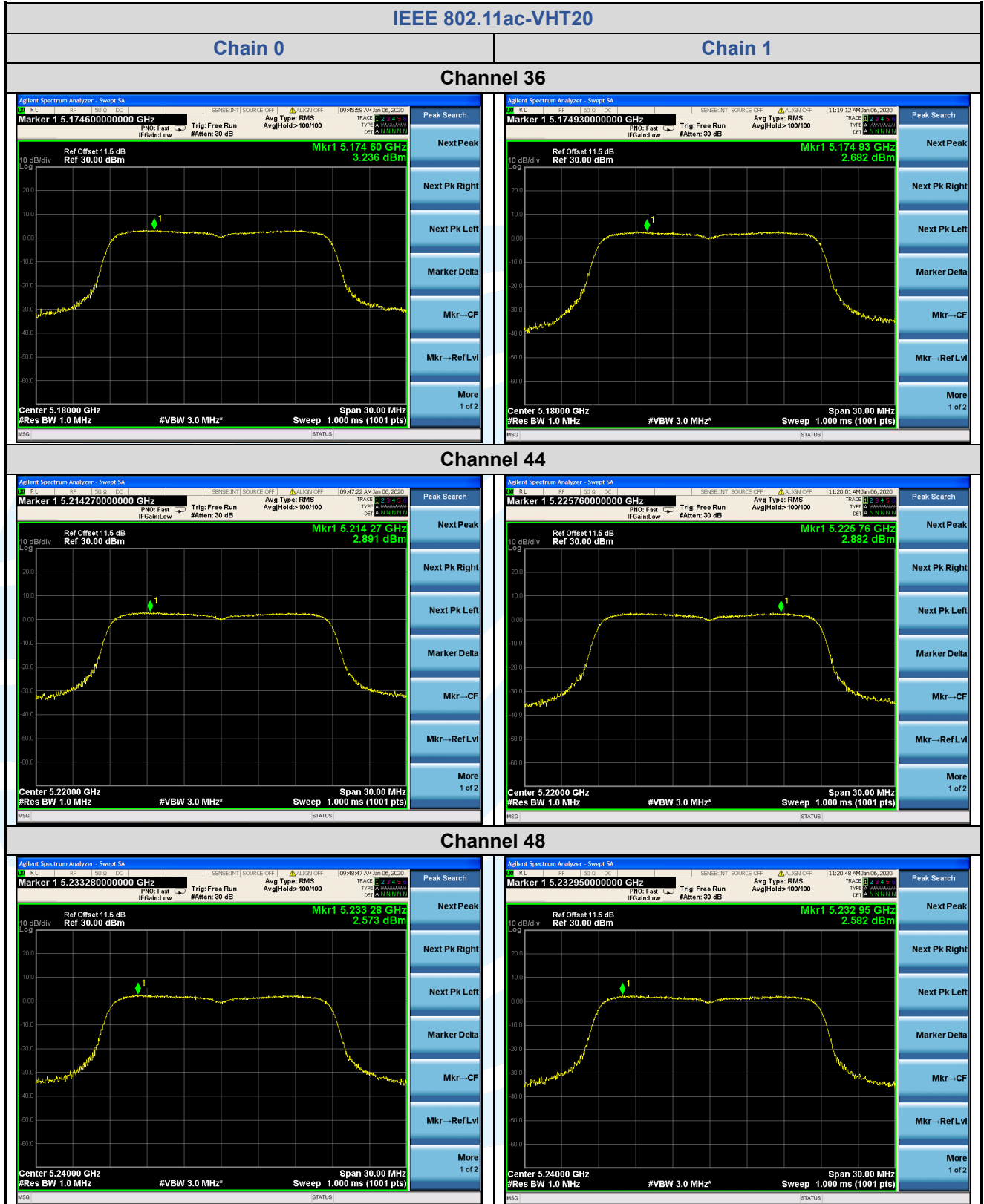
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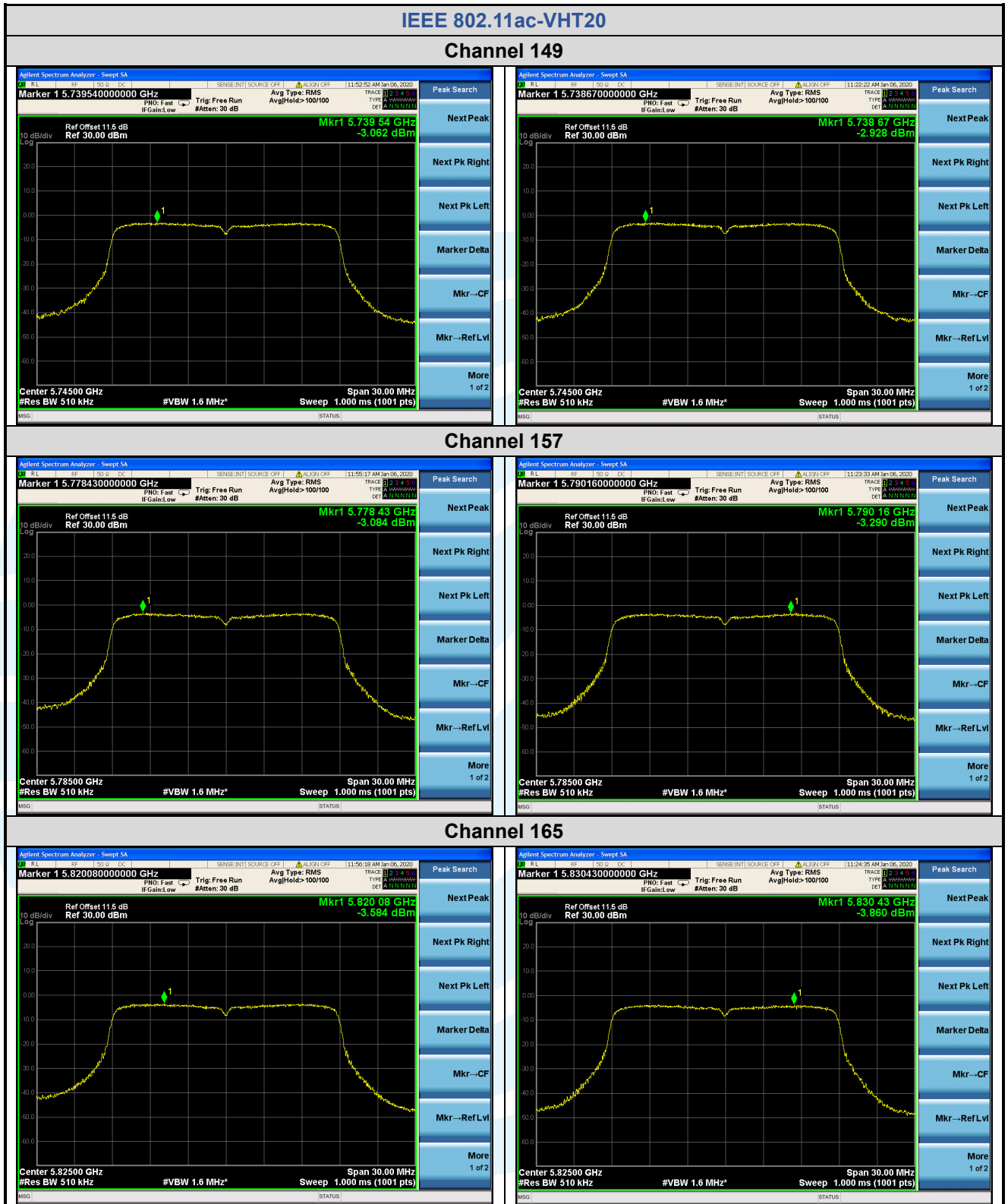
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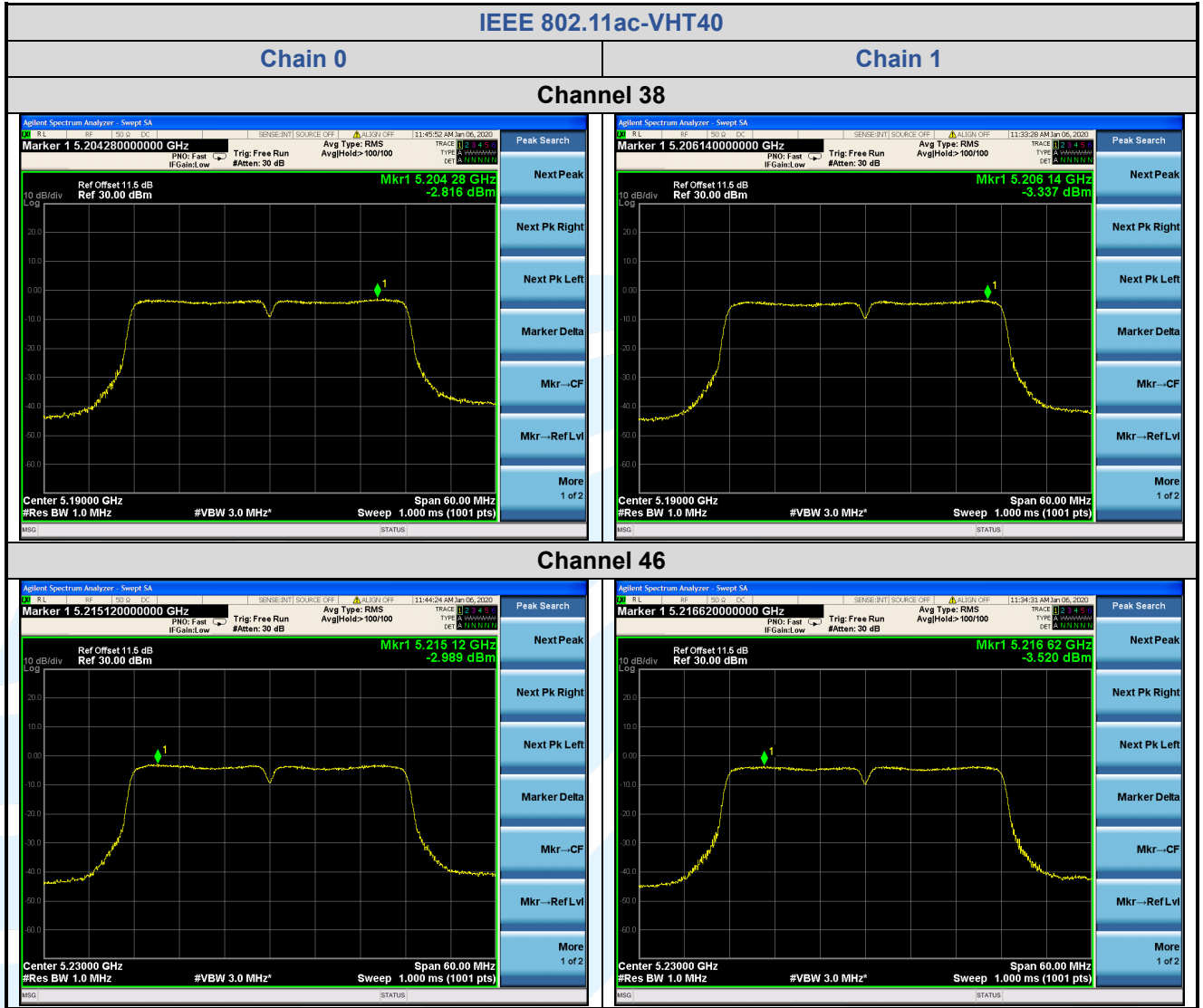
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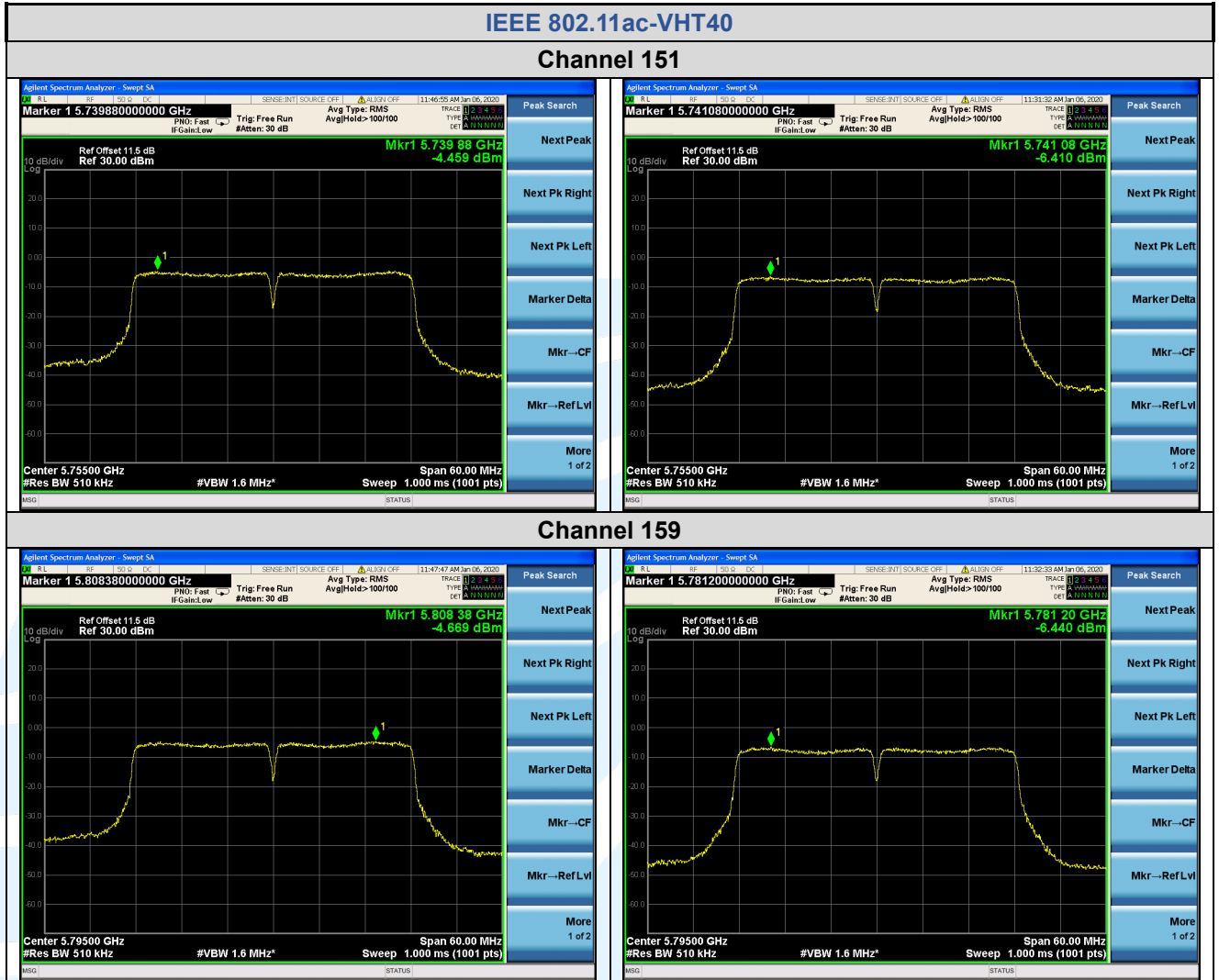
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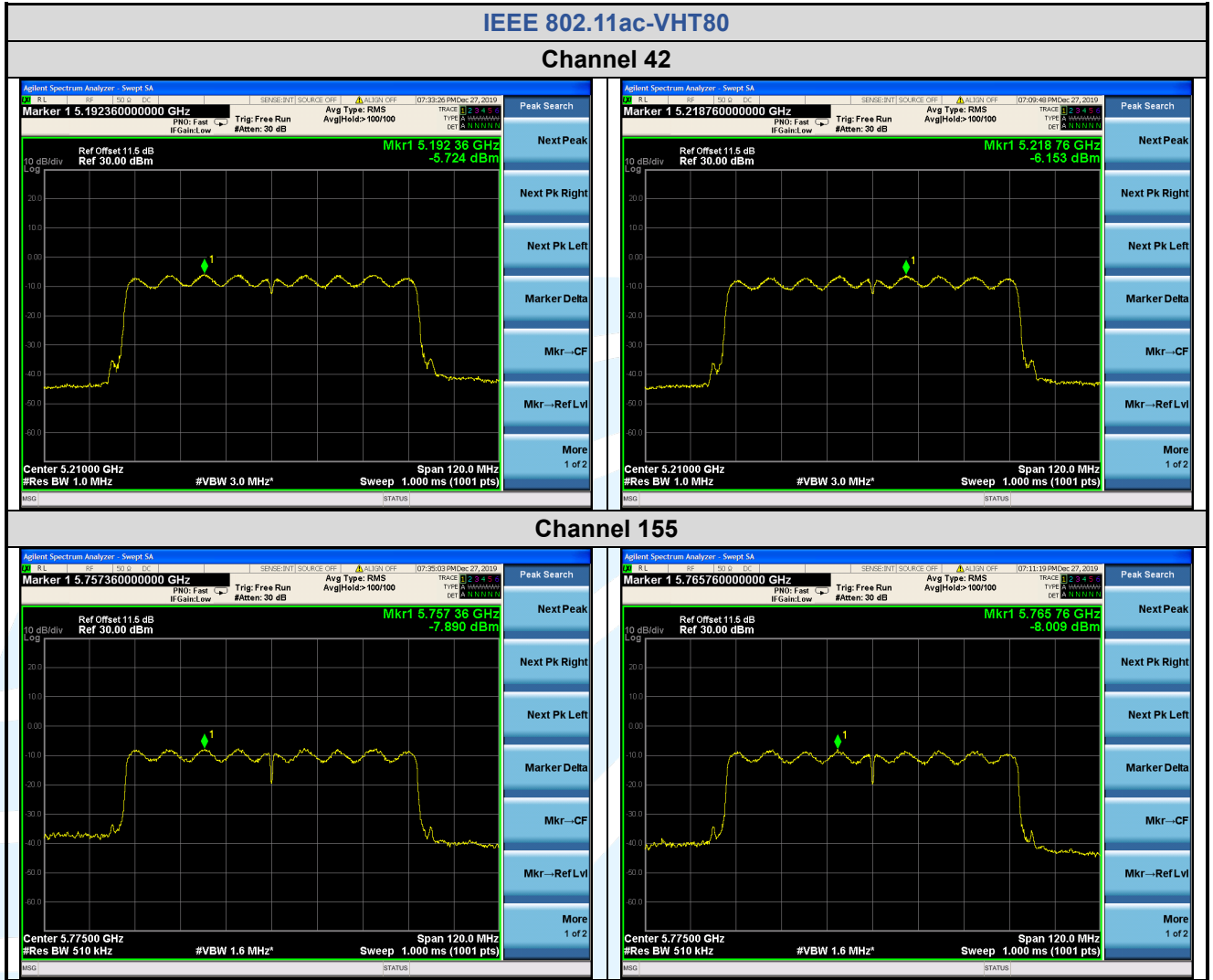
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5.7 RADIATED EMISSIONS AND BAND EDGE MEASUREMENT

Test Requirement: FCC 47 CFR Part 15 Subpart E Section 15.407 (b)(1)(4)(6)
 FCC 47 CFR Part 15 Subpart C Section 15.209/205
 RSS-247 Issue 2 Section 6.2.1.2/6.2.4.2

Test Method: KDB 789033 D02 v02r01 Section G.3, G.4, G.5, and G.6

Receiver Setup:

Frequency	RBW
0.009 MHz-0.150 MHz	200/300 kHz
0.150 MHz -30 MHz	9/10 kHz
30 MHz-1 GHz	100/120 kHz
Above 1 GHz	1 MHz

Limits:

1. Limits of Radiated Emission and Band edge Measurement

Radiated emissions that fall in the restricted bands must comply with the general emissions limits in 15.209(a) as below table. Other emissions shall be at least 20 dB below the highest level of the desired power.

Frequency	Field strength (microvolt/meter)	Limit (dB μ V/m)	Remark	Measurement distance (m)
0.009 MHz-0.490 MHz	2400/F(kHz)	--	--	300
0.490 MHz-1.705 MHz	24000/F(kHz)	--	--	30
1.705 MHz-30 MHz	30	--	--	30
30 MHz-88 MHz	100	40.0	Quasi-peak	3
88 MHz-216 MHz	150	43.5	Quasi-peak	3
216 MHz-960 MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1 GHz	500	54.0	Average	3

Remark:

- a. The lower limit shall apply at the transition frequencies.
- b. Emission level (dB μ V/m) = 20 log Emission level (uV/m).
- c. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

2. Limits of Unwanted Emission Out of the Restricted Bands

Applicable To	Limit	
789033 D02 General U-NII Test Procedures New Rules v01r04	Field Strength at 3 m	
	PK: 74 (dBμV/m)	AV: 54 (dBμV/m)
Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
RSS-247 Issue 2 Section 6.2.1.2	PK: -27 (dBm/MHz)	PK: 74 (dBμV/m)
RSS-247 Issue 2 Section 6.2.2.2	PK: -27 (dBm/MHz)	PK: 74 (dBμV/m)
RSS-247 Issue 2 Section 6.2.3.2	PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m)
RSS-247 Issue 2 Section 6.2.4.2	27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges;	PK: 68.2 (dBμV/m)
	15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;	
	10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges;	
	-27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.	

Test Setup: Refer to section 4.5.1 for details.

Test Procedures:

- The EUT was placed on the top of a rotating table 0.8 meters (for below 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Remark:

- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for RMS Average (Duty cycle < 98 %) for Average detection (AV) at frequency above 1 GHz, then the measurement results was added to a correction factor (10 log(1/duty cycle)).
- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz (Duty cycle ≥ 98 %) or ≥ 1/T(duty cycle is < 98%) for Average detection (AV) at frequency above 1 GHz.
- All modes of operation were investigated and the worst-case emissions are reported.

Equipment Used: Refer to section 3 for details.

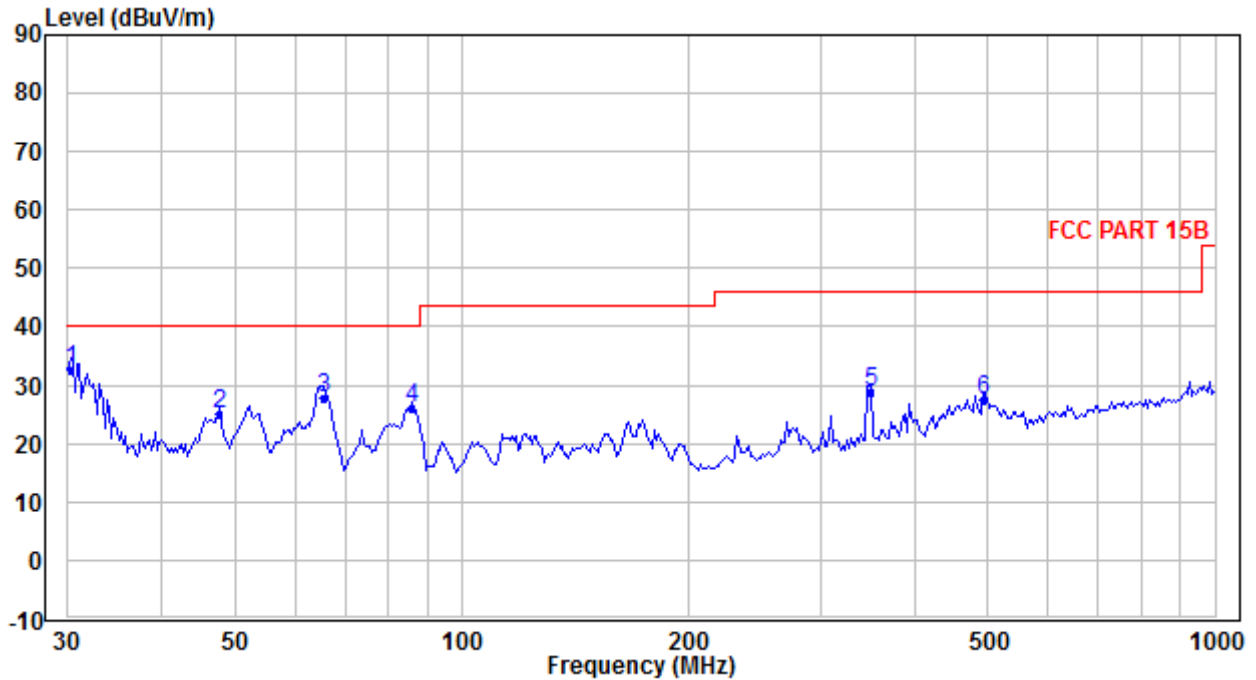
Test Result: Pass

The measurement data as follows:

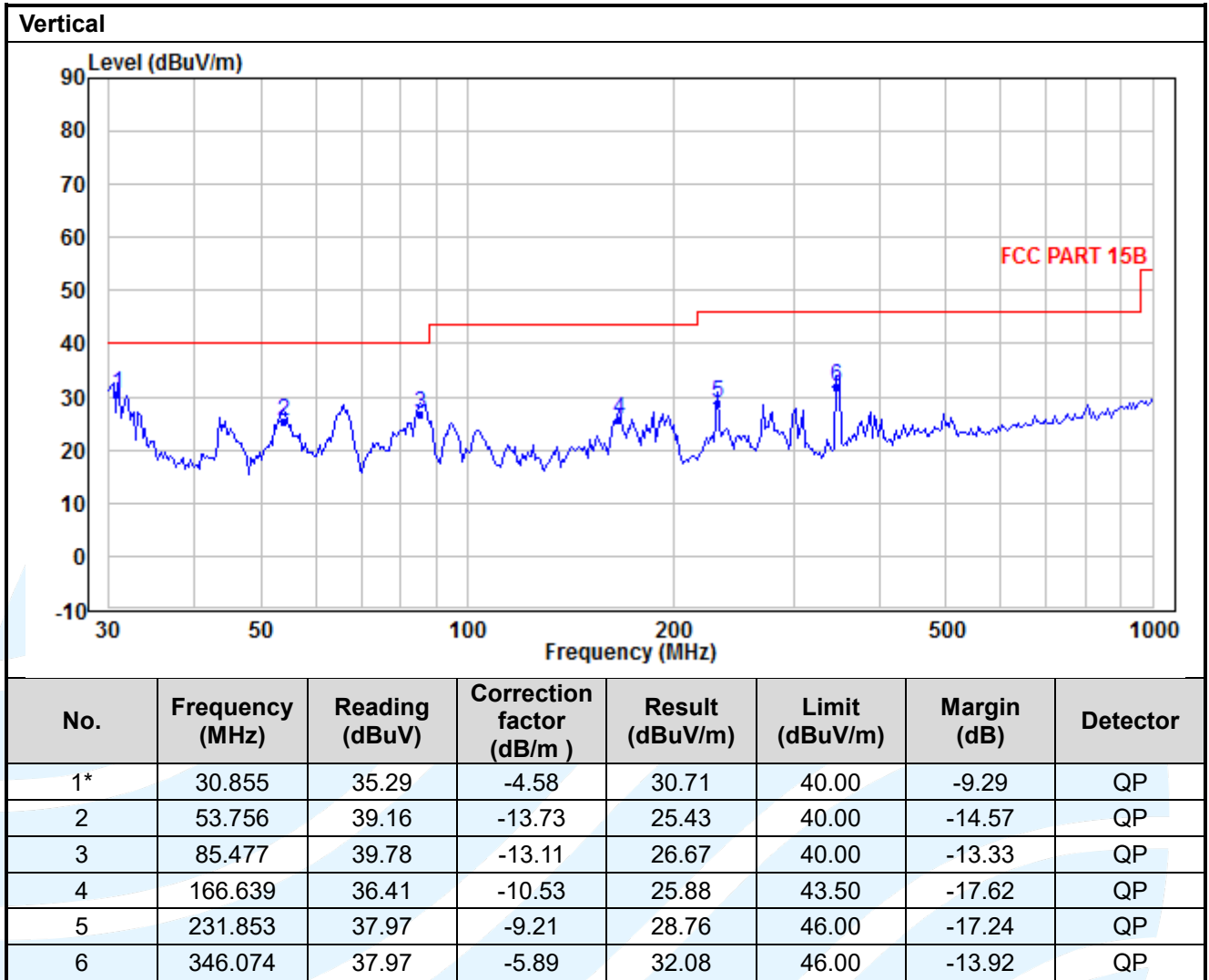
Radiated Emission Test Data (9 KHz ~ 30 MHz):
 The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

Radiated Emission Test Data (30 MHz ~ 1 GHz Worst Case):
Worst-Case Configuration

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB) Detector	Detector
1*	30.212	36.84	-4.15	32.69	40.00	-7.31	QP
2	47.703	38.24	-13.08	25.16	40.00	-14.84	QP
3	65.445	42.04	-14.14	27.90	40.00	-12.10	QP
4	86.080	39.00	-13.04	25.96	40.00	-14.04	QP
5	348.514	34.80	-5.82	28.98	46.00	-17.02	QP
6	491.770	31.39	-3.78	27.61	46.00	-18.39	QP



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Radiated Emission Test Data (Above 1GHz):								
SISO_Chain 0_IEEE 802.11a_Channel 36								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	10360.00	40.66	11.11	51.77	74.00	-22.23	Peak	Horizontal
2	10360.00	28.84	11.11	39.95	54.00	-14.05	Average	Horizontal
3	15540.00	39.44	10.76	50.20	74.00	-23.80	Peak	Horizontal
4	15540.00	28.11	10.76	38.87	54.00	-15.13	Average	Horizontal
5	10360.00	40.39	9.39	49.78	74.00	-24.22	Peak	Vertical
6	10360.00	28.14	9.39	37.53	54.00	-16.47	Average	Vertical
7	15540.00	39.20	11.59	50.79	74.00	-23.21	Peak	Vertical
8	15540.00	27.16	11.59	38.75	54.00	-15.25	Average	Vertical

SISO_Chain 0_IEEE 802.11a_Channel 44								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	10440.00	39.80	11.31	51.11	74.00	-22.89	Peak	Horizontal
2	10440.00	28.47	11.31	39.78	54.00	-14.22	Average	Horizontal
3	15660.00	39.88	11.00	50.88	74.00	-23.12	Peak	Horizontal
4	15660.00	27.36	11.00	38.36	54.00	-15.64	Average	Horizontal
5	10440.00	40.00	9.43	49.43	74.00	-24.57	Peak	Vertical
6	10440.00	28.24	9.43	37.67	54.00	-16.33	Average	Vertical
7	15660.00	38.78	11.93	50.71	74.00	-23.29	Peak	Vertical
8	15660.00	26.72	11.93	38.65	54.00	-15.35	Average	Vertical

SISO_Chain 0_IEEE 802.11a_Channel 48								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	10480.00	39.90	11.41	51.31	74.00	-22.69	Peak	Horizontal
2	10480.00	27.99	11.41	39.40	54.00	-14.60	Average	Horizontal
3	15720.00	39.12	11.08	50.20	74.00	-23.80	Peak	Horizontal
4	15720.00	27.03	11.08	38.11	54.00	-15.89	Average	Horizontal
5	10480.00	40.30	9.45	49.75	74.00	-24.25	Peak	Vertical
6	10480.00	27.84	9.45	37.29	54.00	-16.71	Average	Vertical
7	15720.00	39.10	12.05	51.15	74.00	-22.85	Peak	Vertical
8	15720.00	26.39	12.05	38.44	54.00	-15.56	Average	Vertical

SISO_Chain 0_IEEE 802.11a_Channel 149								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	11490.00	41.89	9.78	51.67	74.00	-22.33	Peak	Horizontal
2	11490.00	29.36	9.78	39.14	54.00	-14.86	Average	Horizontal
3	17235.00	39.44	13.98	53.42	74.00	-20.58	Peak	Horizontal
4	17235.00	26.99	13.98	40.97	54.00	-13.03	Average	Horizontal
5	11490.00	41.63	8.27	49.90	74.00	-24.10	Peak	Vertical
6	11490.00	29.26	8.27	37.53	54.00	-16.47	Average	Vertical
7	17235.00	39.23	13.24	52.47	74.00	-21.53	Peak	Vertical
8	17235.00	26.20	13.24	39.44	54.00	-14.56	Average	Vertical

SISO_Chain 0_IEEE 802.11a_Channel 157								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	11570.00	41.98	9.86	51.84	74.00	-22.16	Peak	Horizontal
2	11570.00	28.75	9.86	38.61	54.00	-15.39	Average	Horizontal
3	17355.00	39.66	14.49	54.15	74.00	-19.85	Peak	Horizontal
4	17355.00	28.03	14.49	42.52	54.00	-11.48	Average	Horizontal
5	11570.00	41.28	8.47	49.75	74.00	-24.25	Peak	Vertical
6	11570.00	28.78	8.47	37.25	54.00	-16.75	Average	Vertical
7	17355.00	41.17	13.68	54.85	74.00	-19.15	Peak	Vertical
8	17355.00	27.53	13.68	41.21	54.00	-12.79	Average	Vertical

SISO_Chain 0_IEEE 802.11a_Channel 165								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	11650.00	40.99	9.95	50.94	74.00	-23.06	Peak	Horizontal
2	11650.00	28.80	9.95	38.75	54.00	-15.25	Average	Horizontal
3	17475.00	39.50	14.89	54.39	74.00	-19.61	Peak	Horizontal
4	17475.00	26.74	14.89	41.63	54.00	-12.37	Average	Horizontal
5	11650.00	41.68	8.69	50.37	74.00	-23.63	Peak	Vertical
6	11650.00	29.02	8.69	37.71	54.00	-16.29	Average	Vertical
7	17475.00	40.12	14.00	54.12	74.00	-19.88	Peak	Vertical
8	17475.00	27.81	14.00	41.81	54.00	-12.19	Average	Vertical

SISO_Chain 1_IEEE 802.11a_Channel 36								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	10360.00	41.35	11.11	52.46	74.00	-21.54	Peak	Horizontal
2	10360.00	29.00	11.11	40.11	54.00	-13.89	Average	Horizontal
3	15540.00	40.29	10.76	51.05	74.00	-22.95	Peak	Horizontal
4	15540.00	28.96	10.76	39.72	54.00	-14.28	Average	Horizontal
5	10360.00	40.94	9.39	50.33	74.00	-23.67	Peak	Vertical
6	10360.00	29.17	9.39	38.56	54.00	-15.44	Average	Vertical
7	15540.00	39.66	11.59	51.25	74.00	-22.75	Peak	Vertical
8	15540.00	28.29	11.59	39.88	54.00	-14.12	Average	Vertical

SISO_Chain 1_IEEE 802.11a_Channel 44								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	10440.00	40.93	11.31	52.24	74.00	-21.76	Peak	Horizontal
2	10440.00	29.35	11.31	40.66	54.00	-13.34	Average	Horizontal
3	15660.00	40.87	11.00	51.87	74.00	-22.13	Peak	Horizontal
4	15660.00	28.94	11.00	39.94	54.00	-14.06	Average	Horizontal
5	10440.00	41.16	9.43	50.59	74.00	-23.41	Peak	Vertical
6	10440.00	29.03	9.43	38.46	54.00	-15.54	Average	Vertical
7	15660.00	39.26	11.93	51.19	74.00	-22.81	Peak	Vertical
8	15660.00	28.04	11.93	39.97	54.00	-14.03	Average	Vertical

SISO_Chain 1_IEEE 802.11a_Channel 48								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	10480.00	40.86	11.41	52.27	74.00	-21.73	Peak	Horizontal
2	10480.00	29.21	11.41	40.62	54.00	-13.38	Average	Horizontal
3	15720.00	40.76	11.08	51.84	74.00	-22.16	Peak	Horizontal
4	15720.00	28.59	11.08	39.67	54.00	-14.33	Average	Horizontal
5	10480.00	41.29	9.45	50.74	74.00	-23.26	Peak	Vertical
6	10480.00	29.23	9.45	38.68	54.00	-15.32	Average	Vertical
7	15720.00	40.69	12.05	52.74	74.00	-21.26	Peak	Vertical
8	15720.00	27.81	12.05	39.86	54.00	-14.14	Average	Vertical

SISO_Chain 1_IEEE 802.11a_Channel 149								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	11490.00	42.51	9.78	52.29	74.00	-21.71	Peak	Horizontal
2	11490.00	30.39	9.78	40.17	54.00	-13.83	Average	Horizontal
3	17235.00	40.66	13.98	54.64	74.00	-19.36	Peak	Horizontal
4	17235.00	27.28	13.98	41.26	54.00	-12.74	Average	Horizontal
5	11490.00	42.47	8.27	50.74	74.00	-23.26	Peak	Vertical
6	11490.00	30.39	8.27	38.66	54.00	-15.34	Average	Vertical
7	17235.00	40.15	13.24	53.39	74.00	-20.61	Peak	Vertical
8	17235.00	27.32	13.24	40.56	54.00	-13.44	Average	Vertical

SISO_Chain 1_IEEE 802.11a_Channel 157								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	11570.00	43.61	9.86	53.47	74.00	-20.53	Peak	Horizontal
2	11570.00	29.83	9.86	39.69	54.00	-14.31	Average	Horizontal
3	17355.00	41.63	14.49	56.12	74.00	-17.88	Peak	Horizontal
4	17355.00	29.90	14.49	44.39	54.00	-9.61	Average	Horizontal
5	11570.00	42.67	8.47	51.14	74.00	-22.86	Peak	Vertical
6	11570.00	31.20	8.47	39.67	54.00	-14.33	Average	Vertical
7	17355.00	42.17	13.68	55.85	74.00	-18.15	Peak	Vertical
8	17355.00	29.48	13.68	43.16	54.00	-10.84	Average	Vertical

SISO_Chain 1_IEEE 802.11a_Channel 165								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	11650.00	42.39	9.95	52.34	74.00	-21.66	Peak	Horizontal
2	11650.00	29.82	9.95	39.77	54.00	-14.23	Average	Horizontal
3	17475.00	41.56	14.89	56.45	74.00	-17.55	Peak	Horizontal
4	17475.00	28.48	14.89	43.37	54.00	-10.63	Average	Horizontal
5	11650.00	43.77	8.69	52.46	74.00	-21.54	Peak	Vertical
6	11650.00	30.42	8.69	39.11	54.00	-14.89	Average	Vertical
7	17475.00	40.89	14.00	54.89	74.00	-19.11	Peak	Vertical
8	17475.00	29.14	14.00	43.14	54.00	-10.86	Average	Vertical

MIMO_Chain 0+1_IEEE 802.11n-HT20_Channel 36								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	10360.00	41.35	11.11	52.46	74.00	-21.54	Peak	Horizontal
2	10360.00	29.65	11.11	40.76	54.00	-13.24	Average	Horizontal
3	15540.00	40.40	10.76	51.16	74.00	-22.84	Peak	Horizontal
4	15540.00	29.21	10.76	39.97	54.00	-14.03	Average	Horizontal
5	10360.00	41.12	9.39	50.51	74.00	-23.49	Peak	Vertical
6	10360.00	29.45	9.39	38.84	54.00	-15.16	Average	Vertical
7	15540.00	39.60	11.59	51.19	74.00	-22.81	Peak	Vertical
8	15540.00	28.07	11.59	39.66	54.00	-14.34	Average	Vertical

MIMO_Chain 0+1_IEEE 802.11n-HT20_Channel 44								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	10440.00	42.81	11.31	54.12	74.00	-19.88	Peak	Horizontal
2	10440.00	30.94	11.31	42.25	54.00	-11.75	Average	Horizontal
3	15660.00	41.36	11.00	52.36	74.00	-21.64	Peak	Horizontal
4	15660.00	29.17	11.00	40.17	54.00	-13.83	Average	Horizontal
5	10440.00	40.13	9.43	49.56	74.00	-24.44	Peak	Vertical
6	10440.00	29.38	9.43	38.81	54.00	-15.19	Average	Vertical
7	15660.00	39.21	11.93	51.14	74.00	-22.86	Peak	Vertical
8	15660.00	28.02	11.93	39.95	54.00	-14.05	Average	Vertical

MIMO_Chain 0+1_IEEE 802.11n-HT20_Channel 48								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	10480.00	39.56	11.41	50.97	74.00	-23.03	Peak	Horizontal
2	10480.00	28.27	11.41	39.68	54.00	-14.32	Average	Horizontal
3	15720.00	39.16	11.08	50.24	74.00	-23.76	Peak	Horizontal
4	15720.00	27.37	11.08	38.45	54.00	-15.55	Average	Horizontal
5	10480.00	40.50	9.45	49.95	74.00	-24.05	Peak	Vertical
6	10480.00	28.29	9.45	37.74	54.00	-16.26	Average	Vertical
7	15720.00	39.44	12.05	51.49	74.00	-22.51	Peak	Vertical
8	15720.00	26.61	12.05	38.66	54.00	-15.34	Average	Vertical

MIMO _ Chain 0+1 _IEEE 802.11n-HT20_Channel 149								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	11490.00	41.91	9.78	51.69	74.00	-22.31	Peak	Horizontal
2	11490.00	29.89	9.78	39.67	54.00	-14.33	Average	Horizontal
3	17235.00	40.24	13.98	54.22	74.00	-19.78	Peak	Horizontal
4	17235.00	27.13	13.98	41.11	54.00	-12.89	Average	Horizontal
5	11490.00	42.23	8.27	50.50	74.00	-23.50	Peak	Vertical
6	11490.00	30.57	8.27	38.84	54.00	-15.16	Average	Vertical
7	17235.00	40.00	13.24	53.24	74.00	-20.76	Peak	Vertical
8	17235.00	27.42	13.24	40.66	54.00	-13.34	Average	Vertical

MIMO _ Chain 0+1 _IEEE 802.11n-HT20_Channel 157								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	11570.00	42.02	9.86	51.88	74.00	-22.12	Peak	Horizontal
2	11570.00	28.81	9.86	38.67	54.00	-15.33	Average	Horizontal
3	17355.00	40.20	14.49	54.69	74.00	-19.31	Peak	Horizontal
4	17355.00	28.88	14.49	43.37	54.00	-10.63	Average	Horizontal
5	11570.00	41.74	8.47	50.21	74.00	-23.79	Peak	Vertical
6	11570.00	30.97	8.47	39.44	54.00	-14.56	Average	Vertical
7	17355.00	42.65	13.68	56.33	74.00	-17.67	Peak	Vertical
8	17355.00	28.55	13.68	42.23	54.00	-11.77	Average	Vertical

MIMO _ Chain 0+1 _IEEE 802.11n-HT20_Channel 165								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	11650.00	40.92	9.95	50.87	74.00	-23.13	Peak	Horizontal
2	11650.00	29.05	9.95	39.00	54.00	-15.00	Average	Horizontal
3	17475.00	40.35	14.89	55.24	74.00	-18.76	Peak	Horizontal
4	17475.00	27.44	14.89	42.33	54.00	-11.67	Average	Horizontal
5	11650.00	43.07	8.69	51.76	74.00	-22.24	Peak	Vertical
6	11650.00	30.13	8.69	38.82	54.00	-15.18	Average	Vertical
7	17475.00	41.13	14.00	55.13	74.00	-18.87	Peak	Vertical
8	17475.00	-10.00	14.00	4.00	54.00	-50.00	Average	Vertical

MIMO_Chain 0+1_IEEE 802.11n-HT40_Channel 38								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	10380.00	41.46	11.17	52.63	74.00	-21.37	Peak	Horizontal
2	10380.00	29.39	11.17	40.56	54.00	-13.44	Average	Horizontal
3	15570.00	40.15	10.84	50.99	74.00	-23.01	Peak	Horizontal
4	15570.00	27.73	10.84	38.57	54.00	-15.43	Average	Horizontal
5	10380.00	40.87	9.41	50.28	74.00	-23.72	Peak	Vertical
6	10380.00	29.24	9.41	38.65	54.00	-15.35	Average	Vertical
7	15570.00	39.01	11.69	50.70	74.00	-23.30	Peak	Vertical
8	15570.00	26.60	11.69	38.29	54.00	-15.71	Average	Vertical

MIMO_Chain 0+1_IEEE 802.11n-HT40_Channel 46								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	10460.00	41.31	11.35	52.66	74.00	-21.34	Peak	Horizontal
2	10460.00	29.41	11.35	40.76	54.00	-13.24	Average	Horizontal
3	15690.00	40.38	11.03	51.41	74.00	-22.59	Peak	Horizontal
4	15690.00	27.87	11.03	38.90	54.00	-15.10	Average	Horizontal
5	10460.00	41.24	9.43	50.67	74.00	-23.33	Peak	Vertical
6	10460.00	29.14	9.43	38.57	54.00	-15.43	Average	Vertical
7	15690.00	38.37	11.98	50.35	74.00	-23.65	Peak	Vertical
8	15690.00	26.67	11.98	38.65	54.00	-15.35	Average	Vertical

MIMO_Chain 0+1_IEEE 802.11n-HT40_Channel 151								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	11510.00	41.73	9.79	51.52	74.00	-22.48	Peak	Horizontal
2	11510.00	28.74	9.79	38.53	54.00	-15.47	Average	Horizontal
3	17265.00	39.94	14.11	54.05	74.00	-19.95	Peak	Horizontal
4	17265.00	27.13	14.11	41.24	54.00	-12.76	Average	Horizontal
5	11510.00	42.54	8.30	50.84	74.00	-23.16	Peak	Vertical
6	11510.00	29.72	8.30	38.02	54.00	-15.98	Average	Vertical
7	17265.00	38.38	13.35	51.73	74.00	-22.27	Peak	Vertical
8	17265.00	26.45	13.35	39.80	54.00	-14.20	Average	Vertical

MIMO_Chain 0+1_IEEE 802.11n-HT40_Channel 159								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	11590.00	41.08	9.87	50.95	74.00	-23.05	Peak	Horizontal
2	11590.00	29.10	9.87	38.97	54.00	-15.03	Average	Horizontal
3	17385.00	40.18	14.62	54.80	74.00	-19.20	Peak	Horizontal
4	17385.00	28.13	14.62	42.75	54.00	-11.25	Average	Horizontal
5	11590.00	41.35	8.52	49.87	74.00	-24.13	Peak	Vertical
6	11590.00	29.15	8.52	37.67	54.00	-16.33	Average	Vertical
7	17385.00	39.10	13.79	52.89	74.00	-21.11	Peak	Vertical
8	17385.00	27.54	13.79	41.33	54.00	-12.67	Average	Vertical

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MIMO_Chain 0+1_IEEE 802.11ac-VHT80_Channel 42								
No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	10460.00	41.34	11.35	52.69	74.00	-21.31	Peak	Horizontal
2	10460.00	29.60	11.35	40.95	54.00	-13.05	Average	Horizontal
3	15690.00	40.01	11.03	51.04	74.00	-22.96	Peak	Horizontal
4	15690.00	27.69	11.03	38.72	54.00	-15.28	Average	Horizontal
5	10460.00	41.15	9.43	50.58	74.00	-23.42	Peak	Vertical
6	10460.00	30.55	9.43	39.98	54.00	-14.02	Average	Vertical
7	15690.00	39.16	11.98	51.14	74.00	-22.86	Peak	Vertical
8	15690.00	26.57	11.98	38.55	54.00	-15.45	Average	Vertical

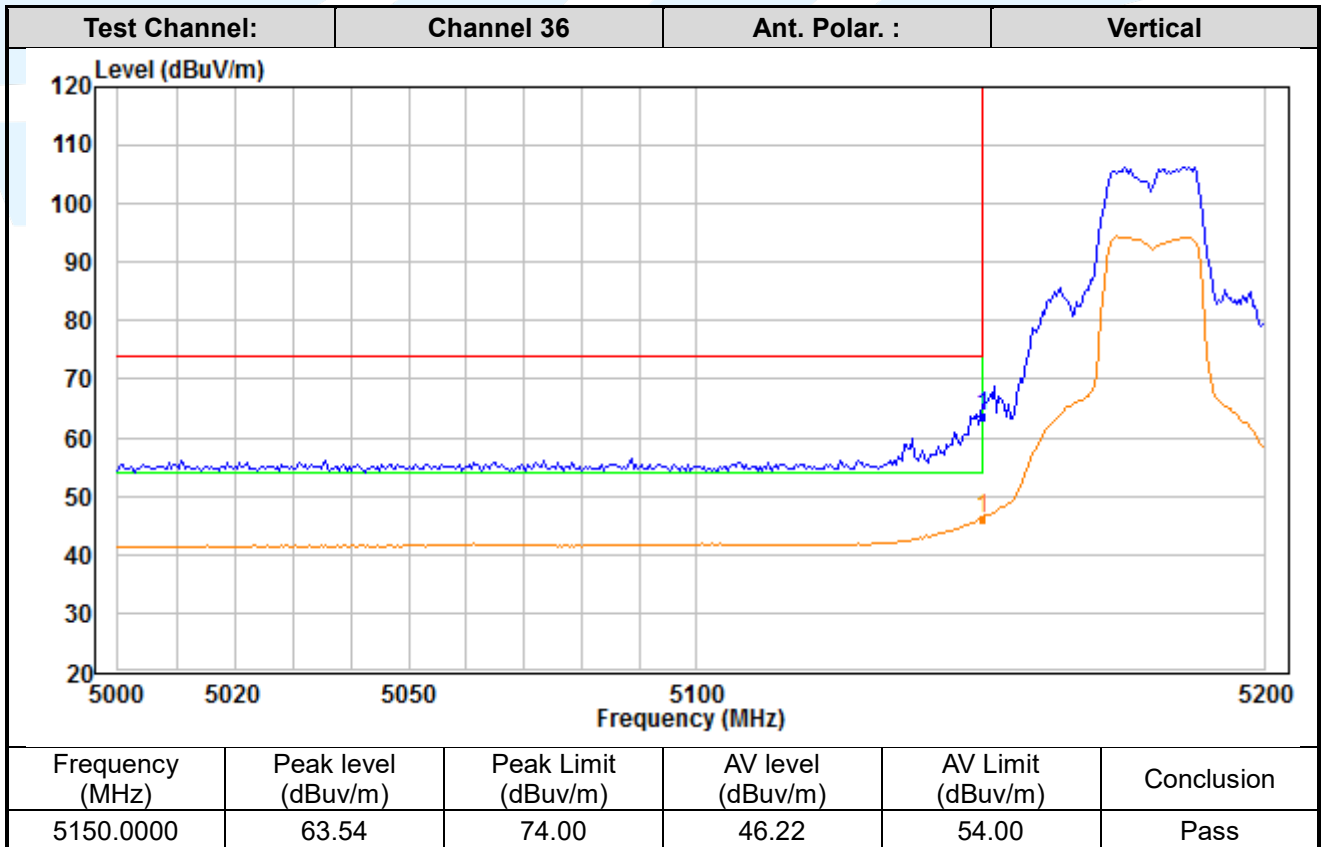
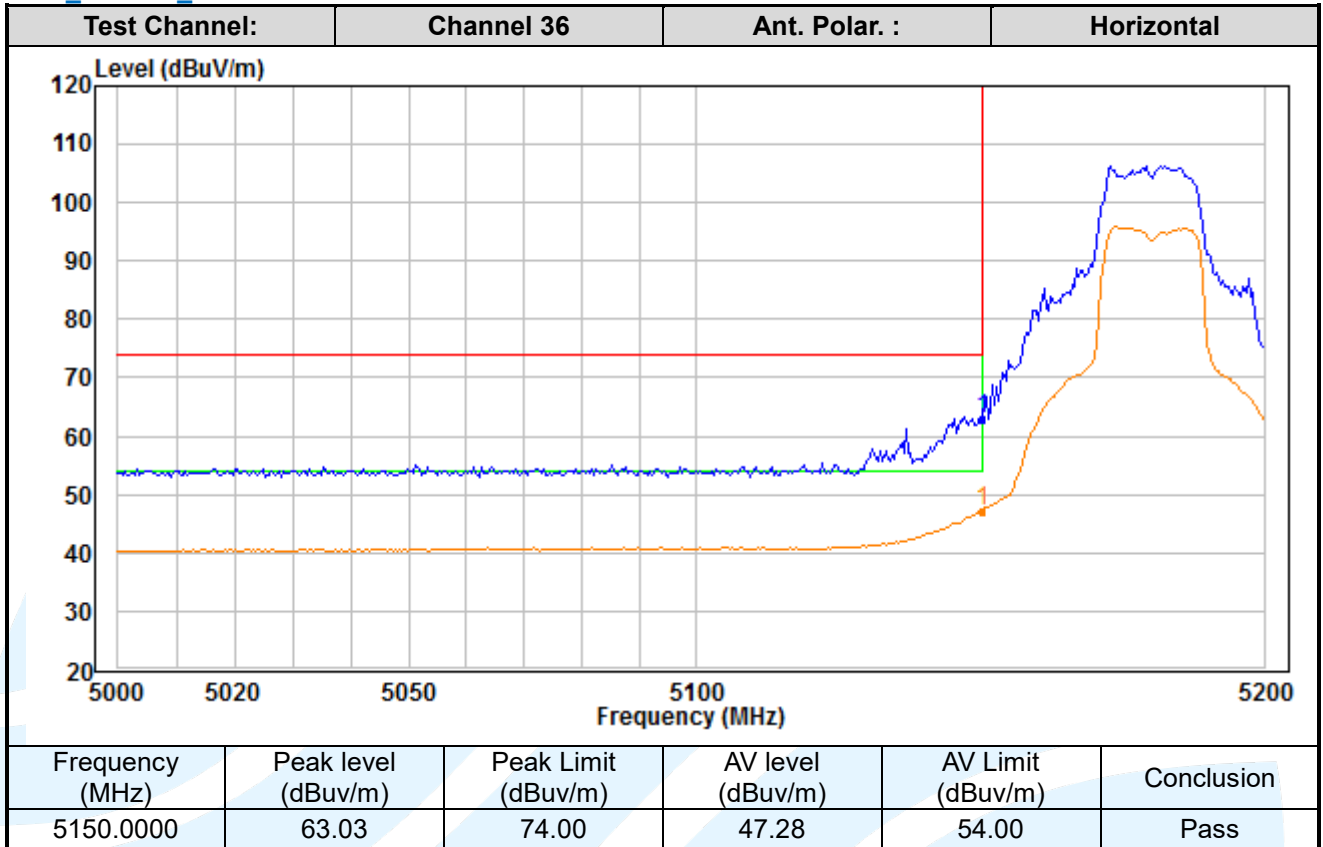
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No.	Frequency (MHz)	Reading (dBuV/m)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	11550.00	42.52	9.83	52.35	74.00	-21.65	Peak	Horizontal
2	11550.00	29.60	9.83	39.43	54.00	-14.57	Average	Horizontal
3	17325.00	40.36	13.98	54.34	74.00	-19.66	Peak	Horizontal
4	17325.00	27.26	13.98	41.24	54.00	-12.76	Average	Horizontal
5	11550.00	41.28	8.41	49.69	74.00	-24.31	Peak	Vertical
6	11550.00	29.56	8.41	37.97	54.00	-16.03	Average	Vertical
7	17325.00	38.87	13.24	52.11	74.00	-21.89	Peak	Vertical
8	17325.00	26.49	13.24	39.73	54.00	-14.27	Average	Vertical

Remark:

1. Correct Factor = Antenna Factor + Cable Loss - Amplifier Gain, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result – Limit

Band Edge Measurements (Radiated)

SISO_Chain 0_IEEE 802.11a



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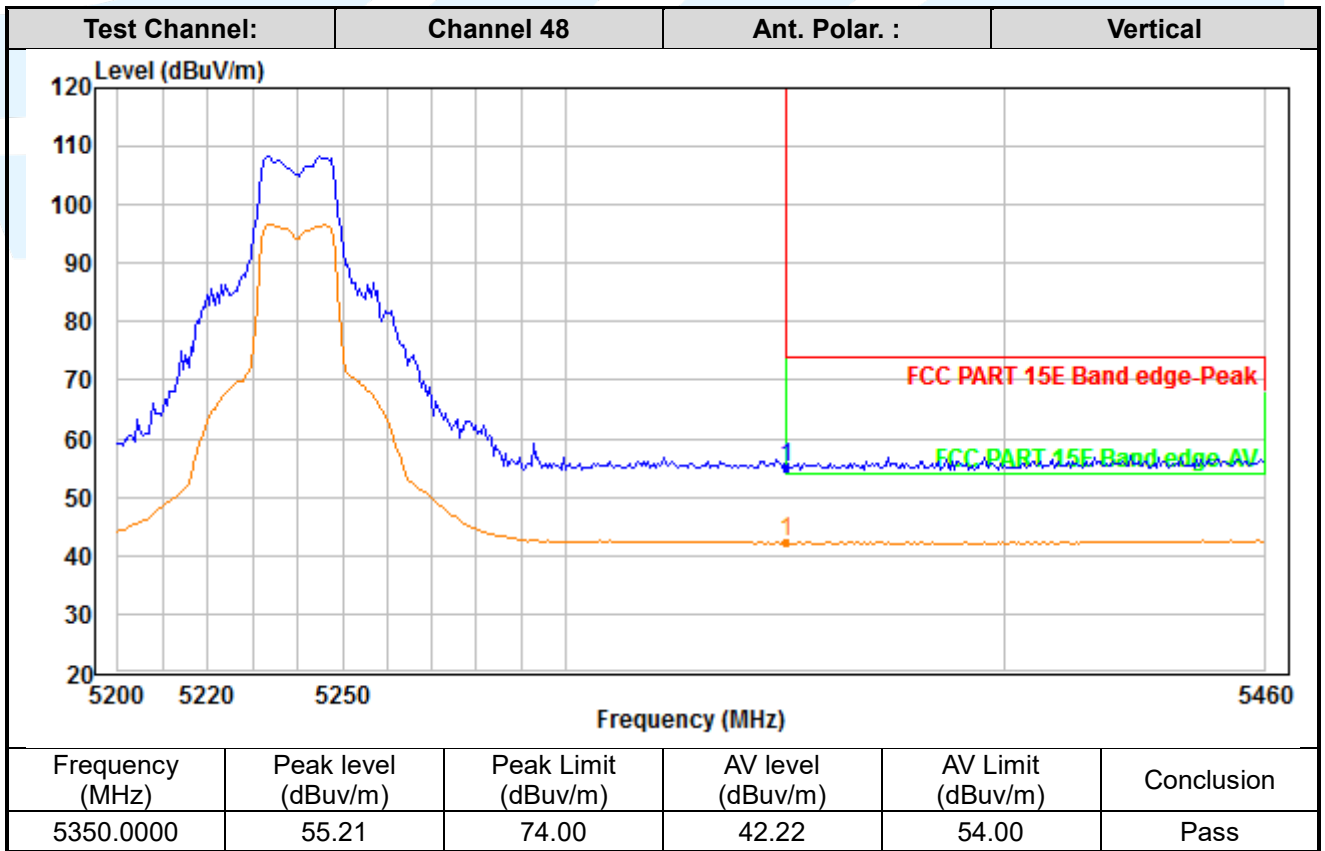
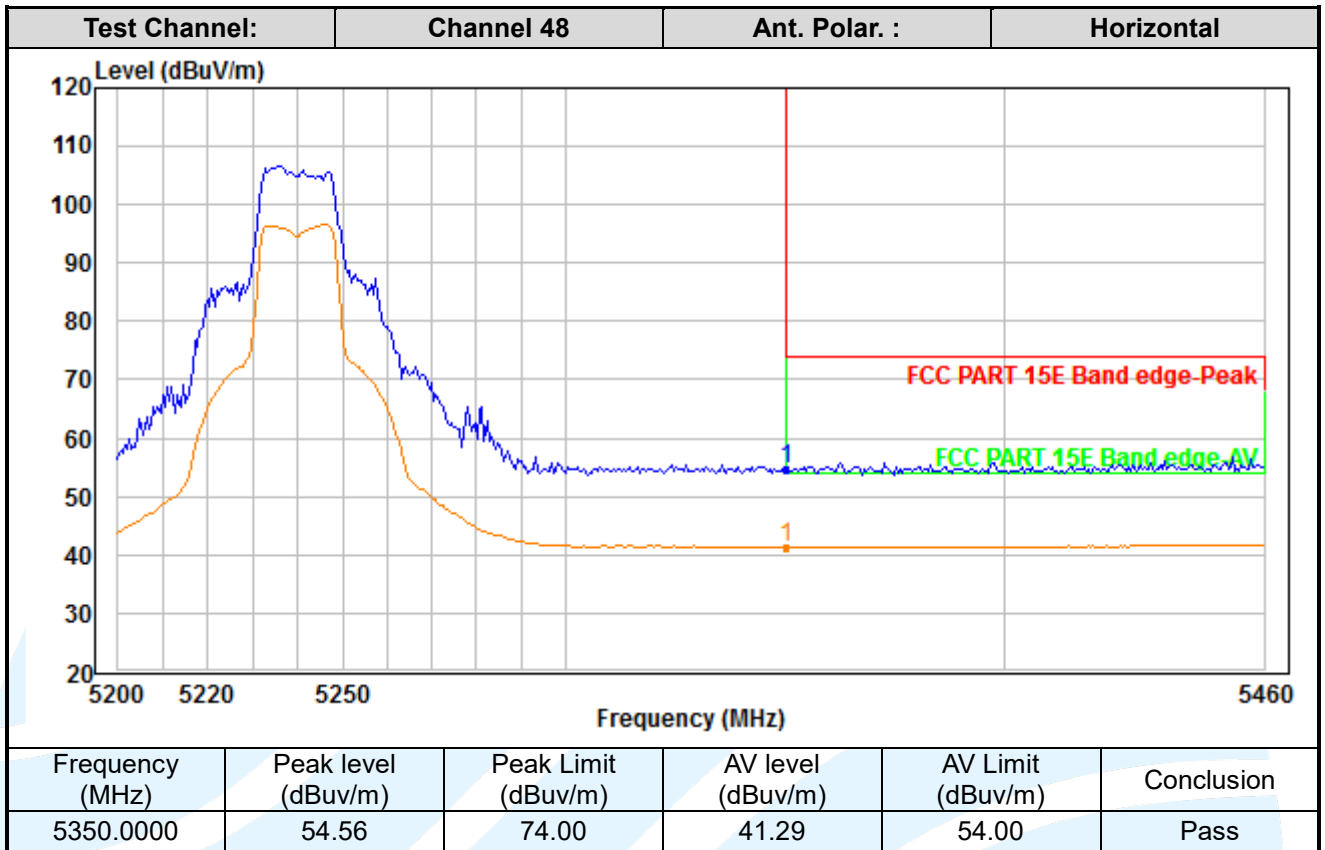
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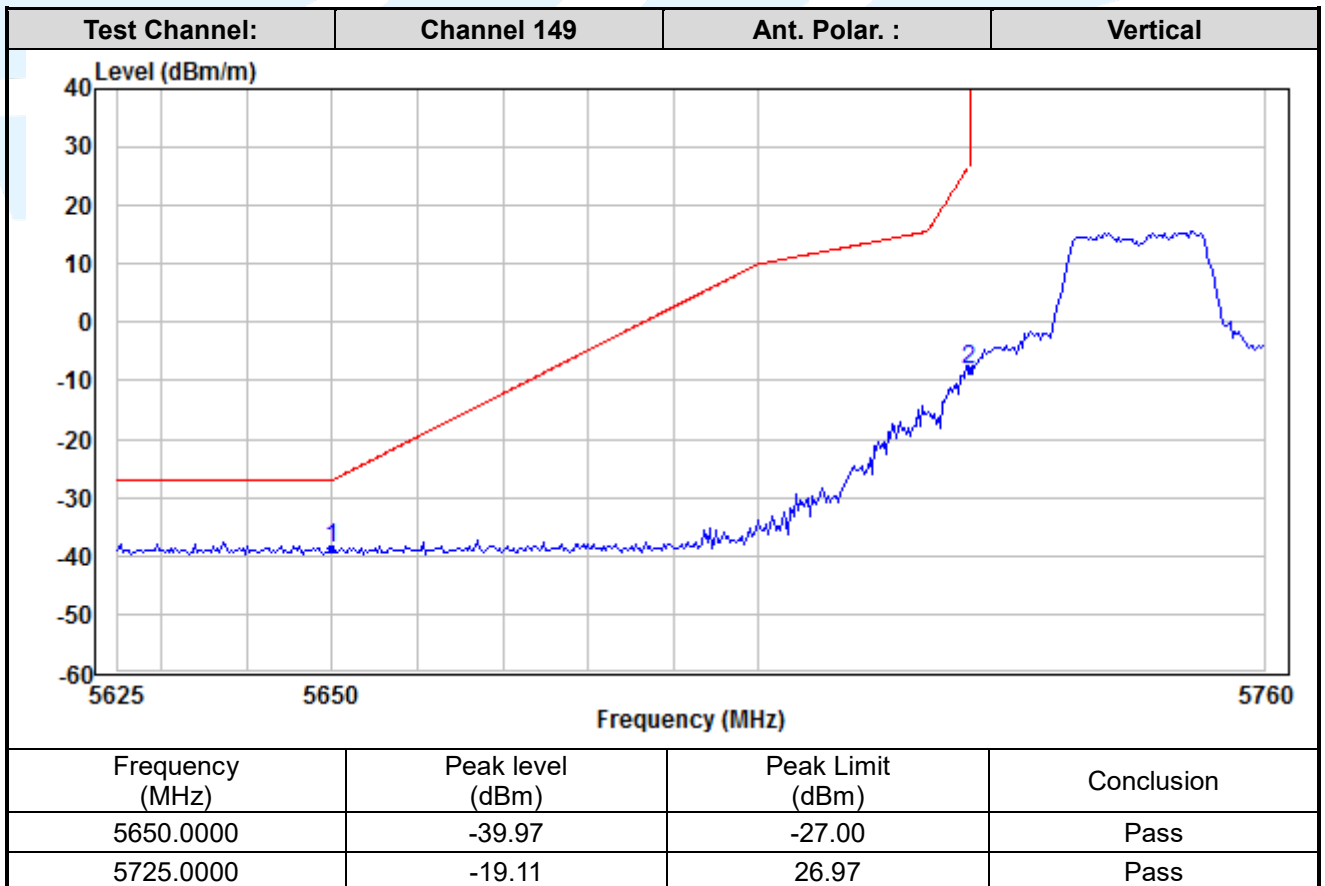
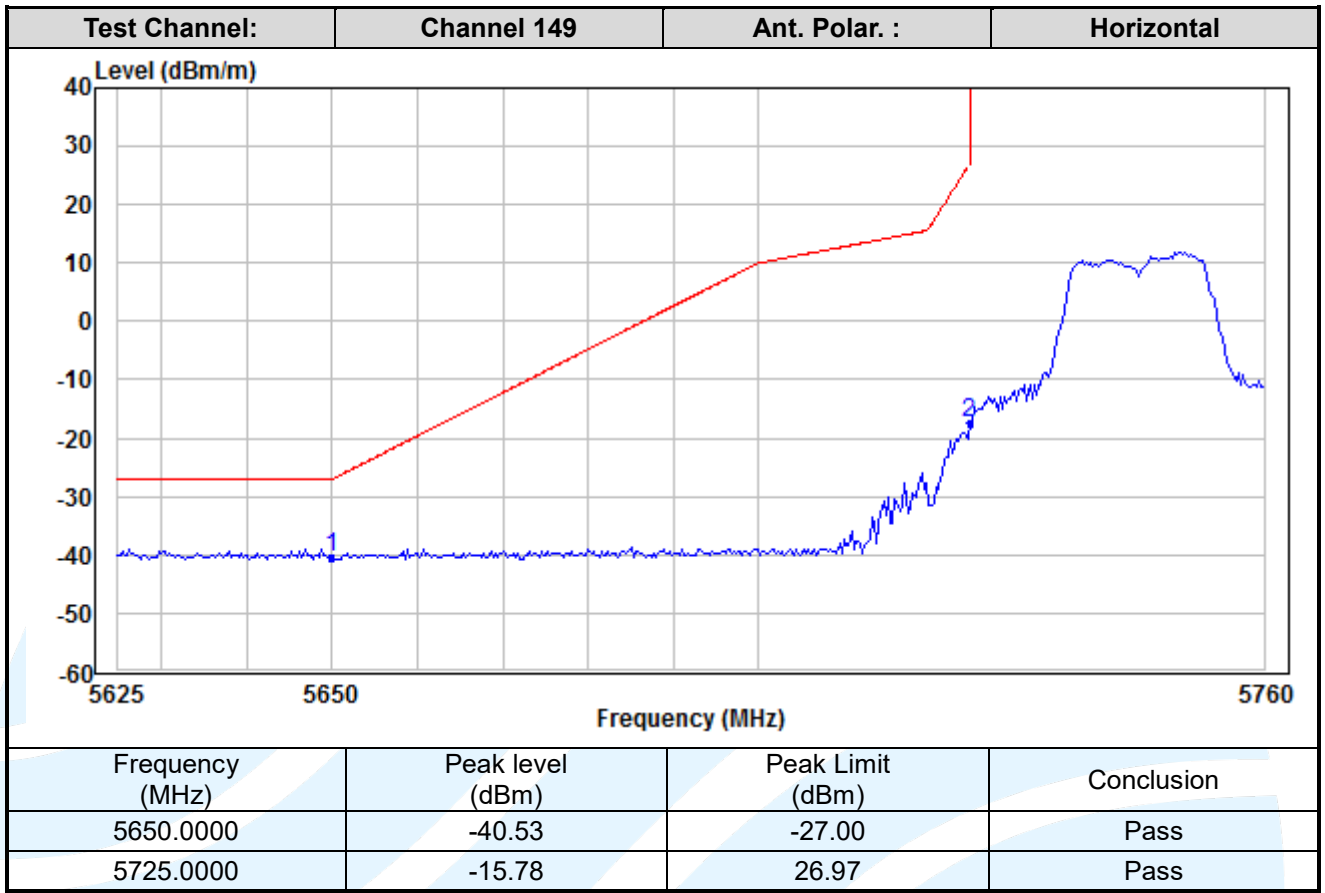
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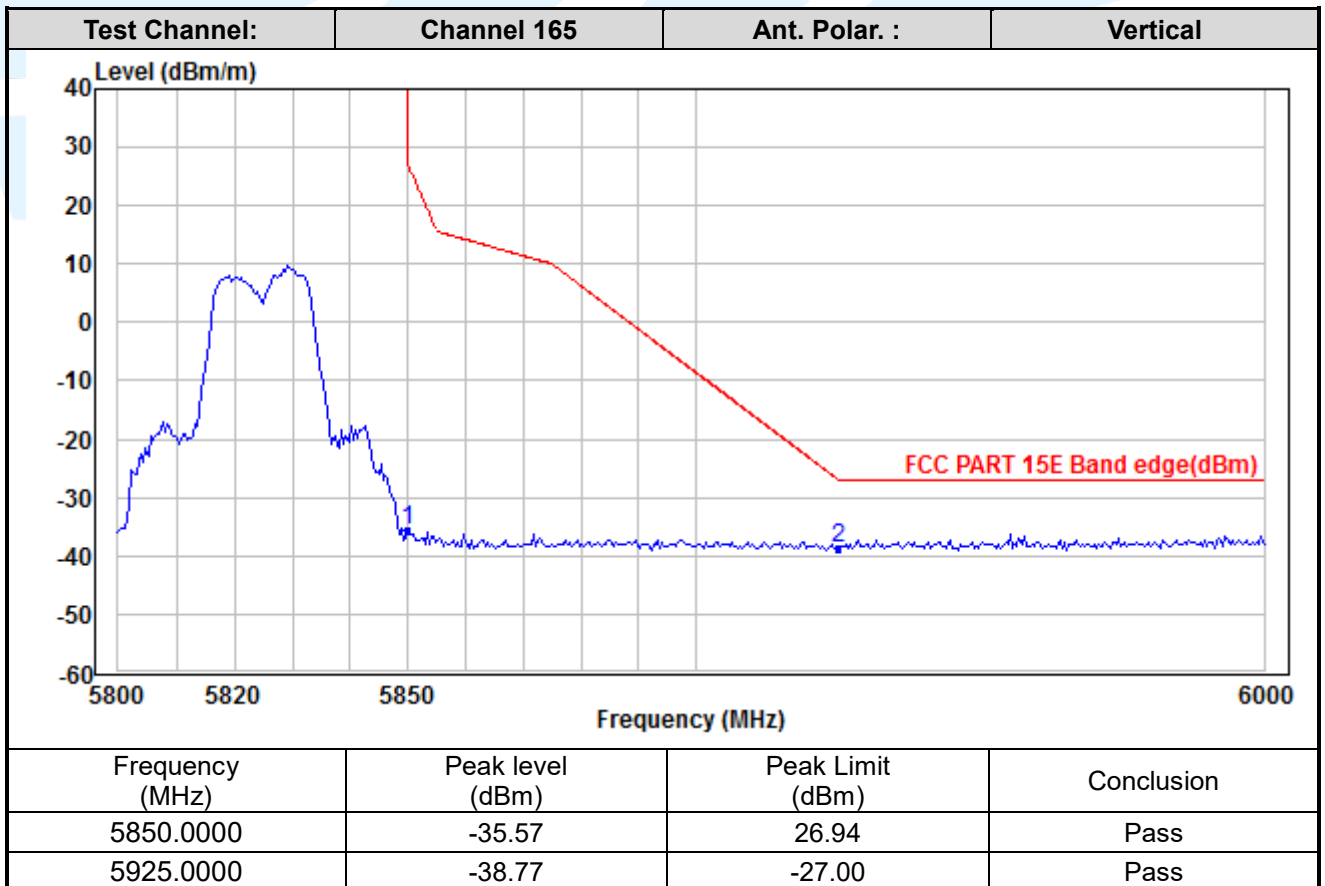
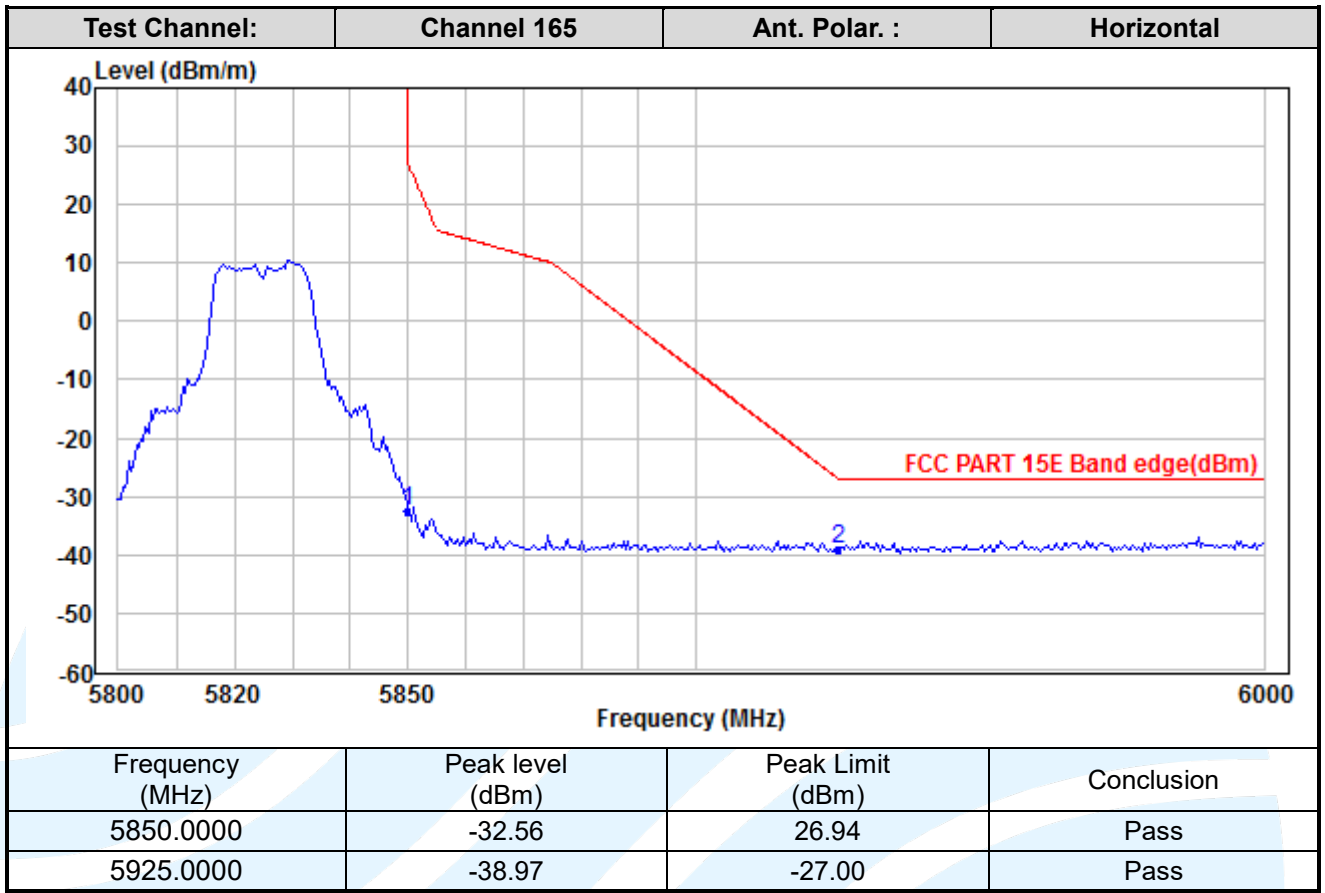
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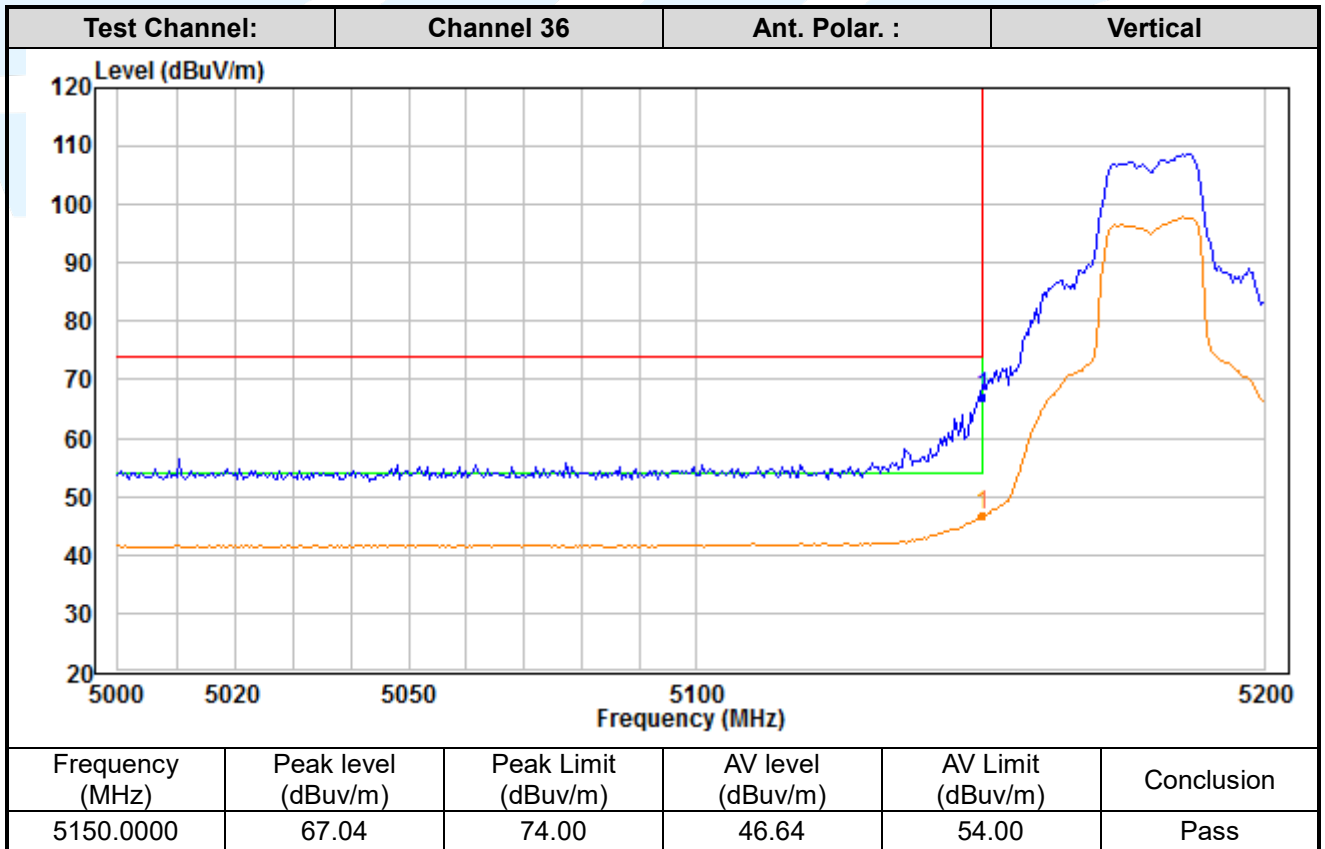
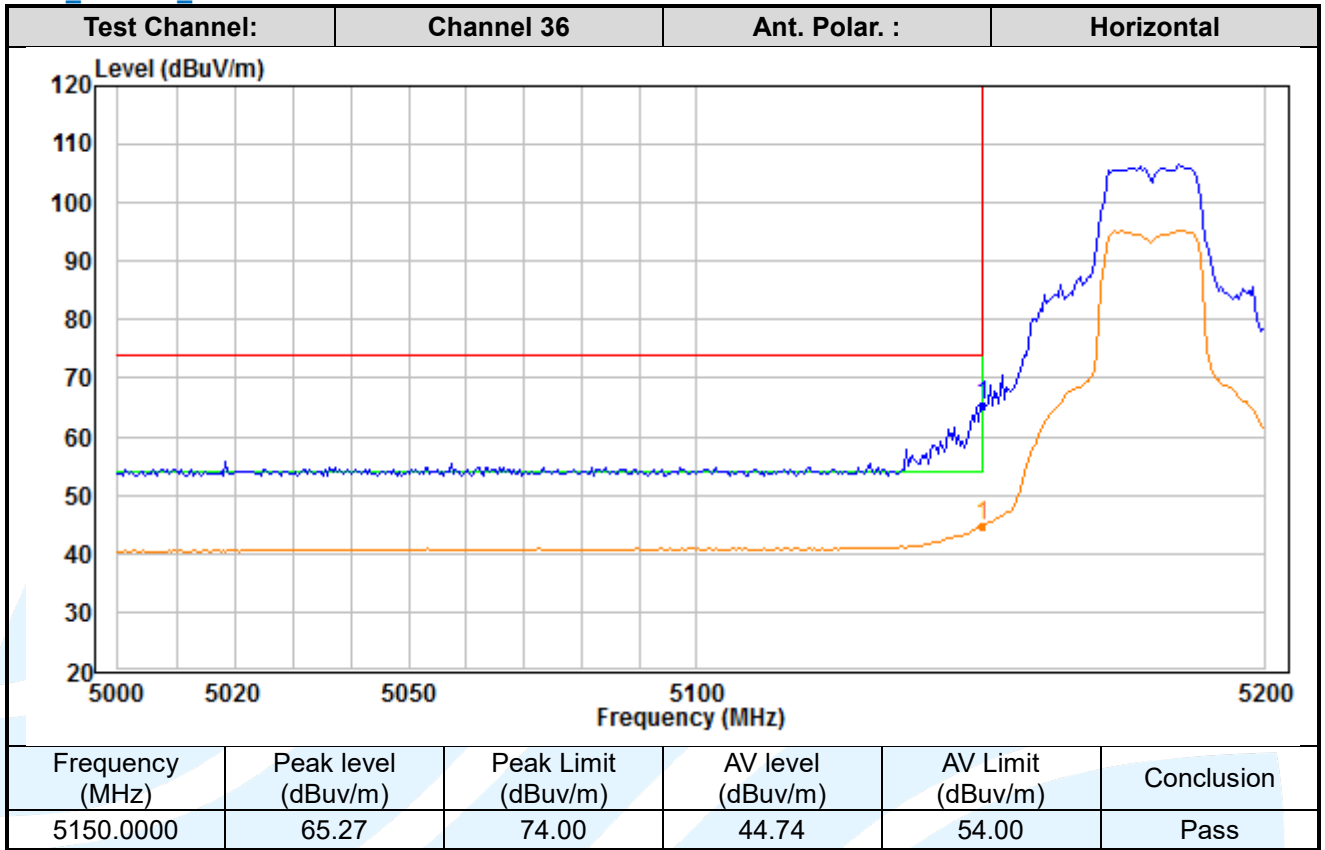
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SISO_Chain 1_ IEEE 802.11a



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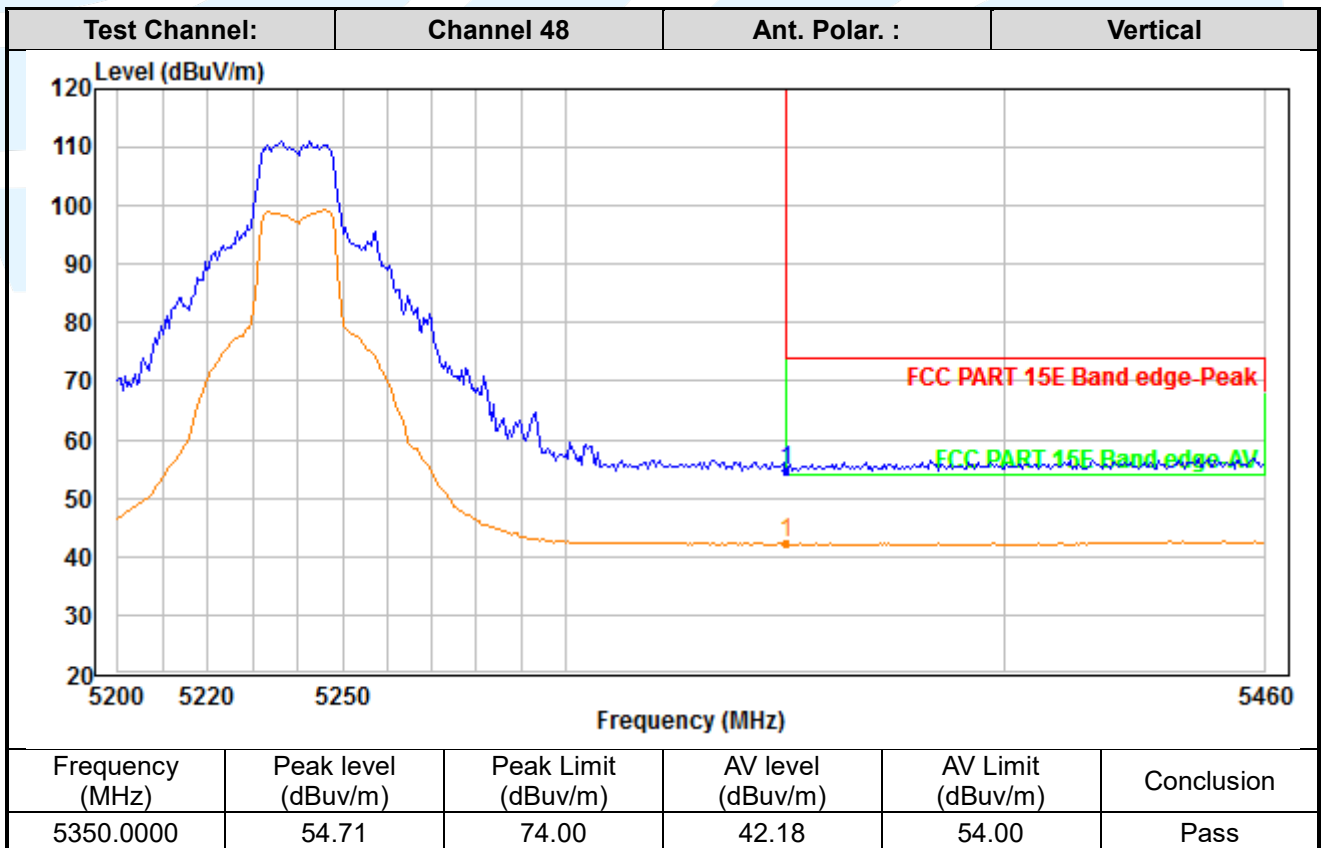
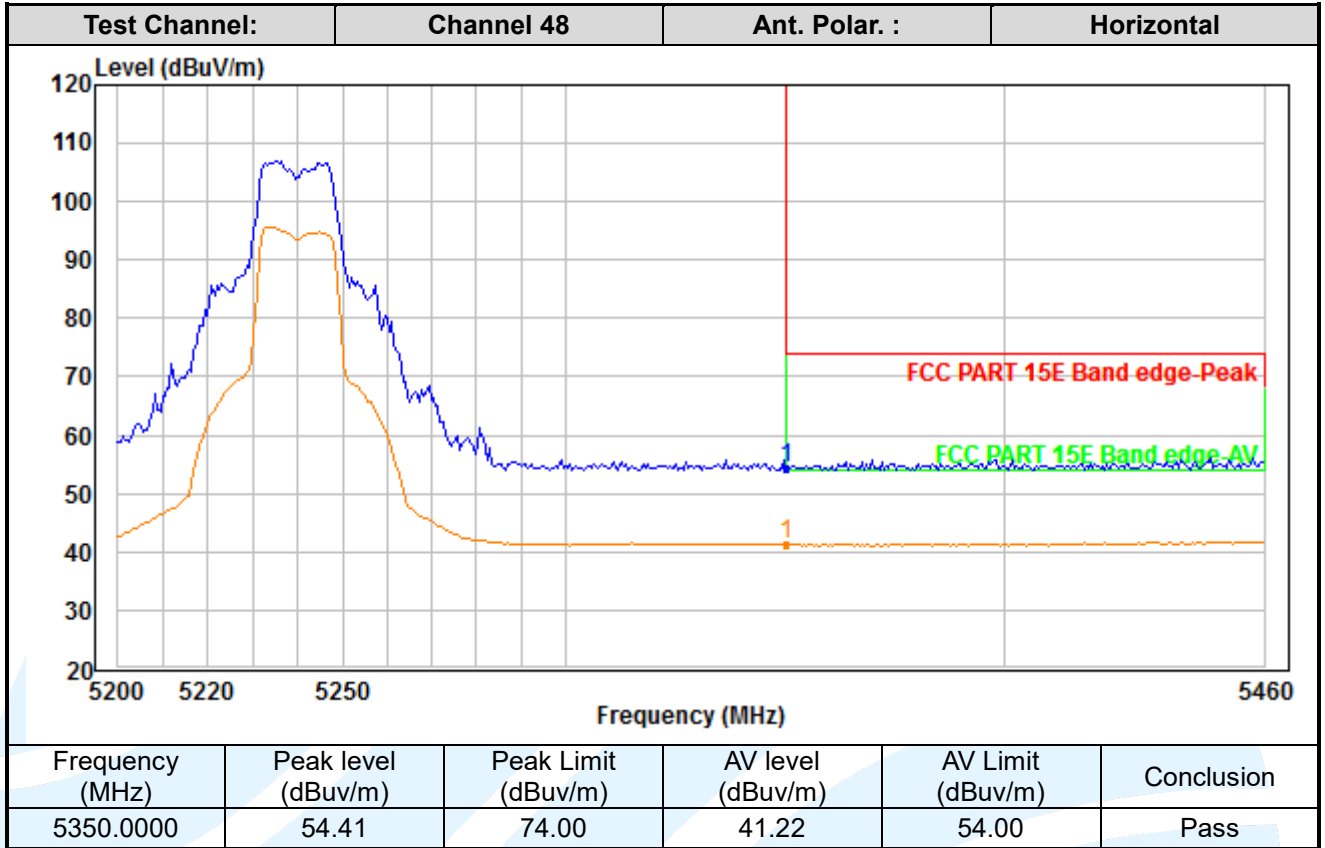
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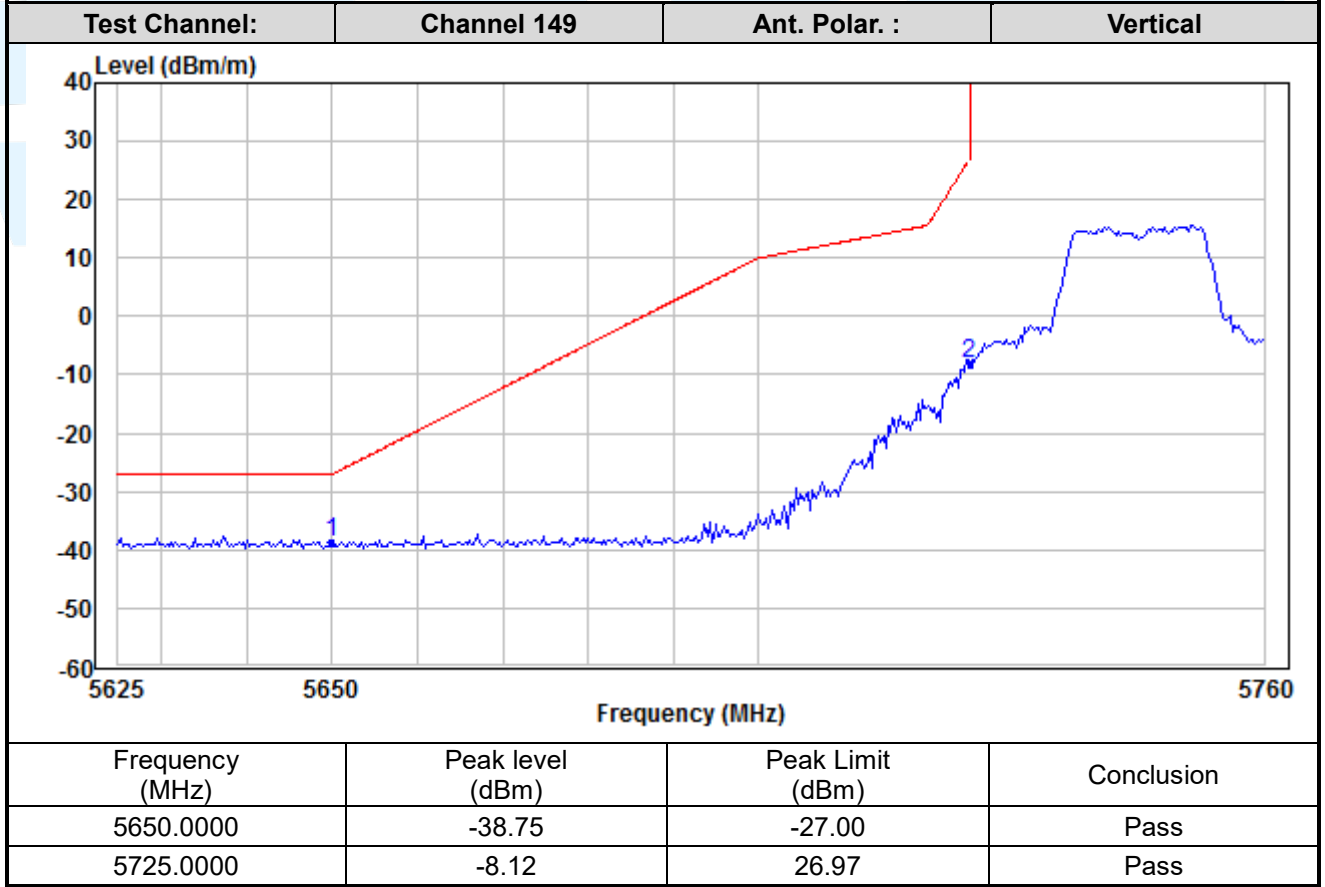
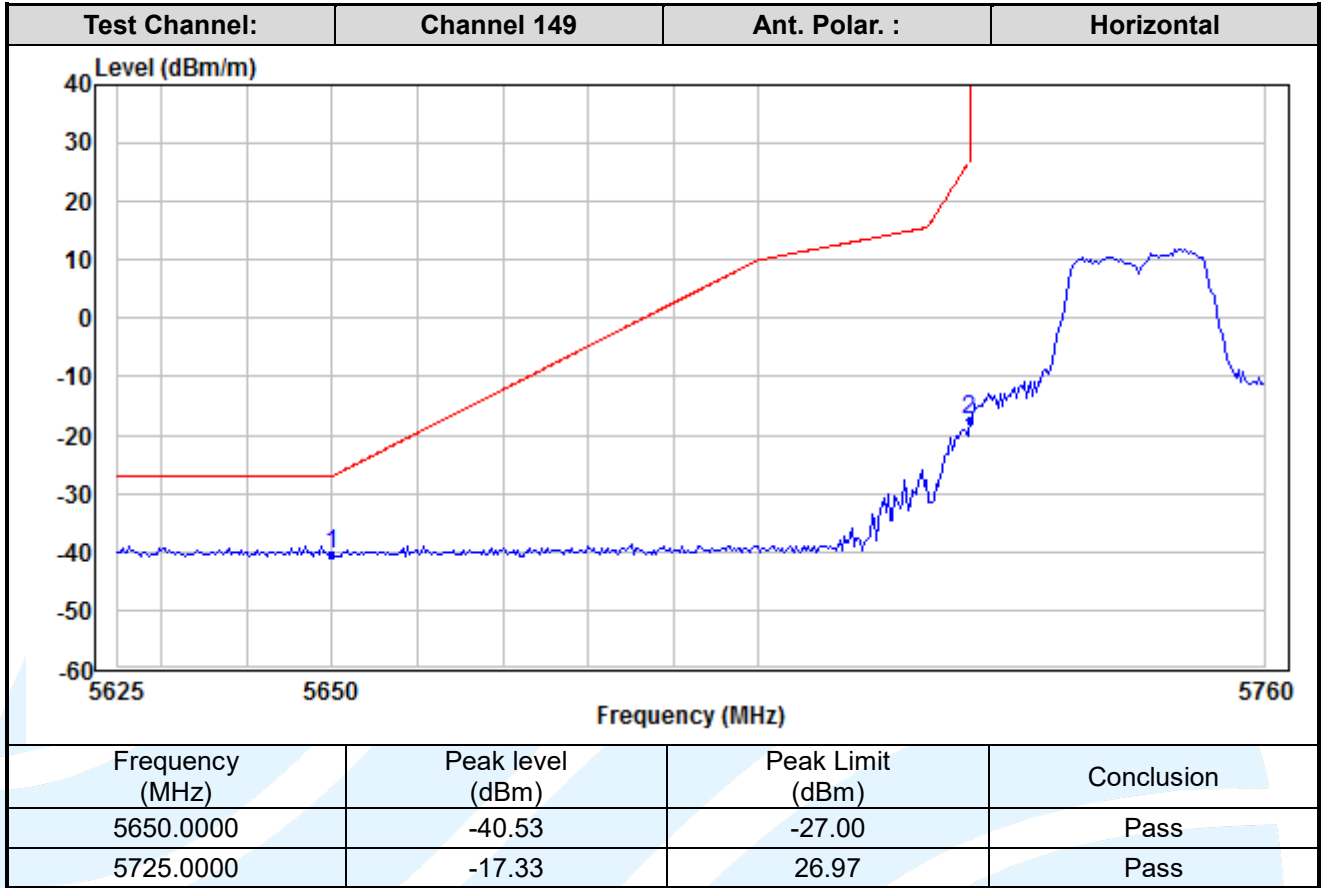
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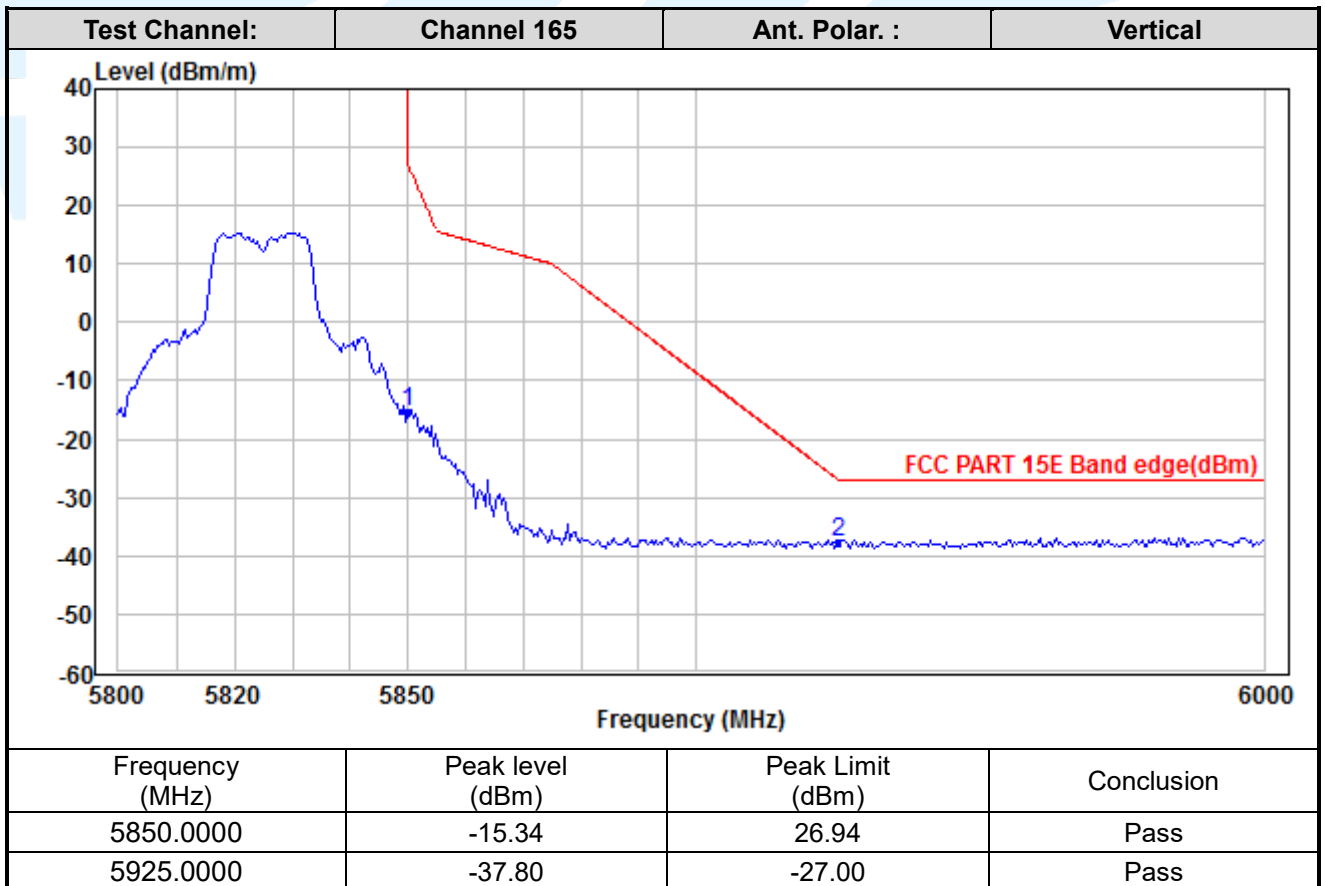
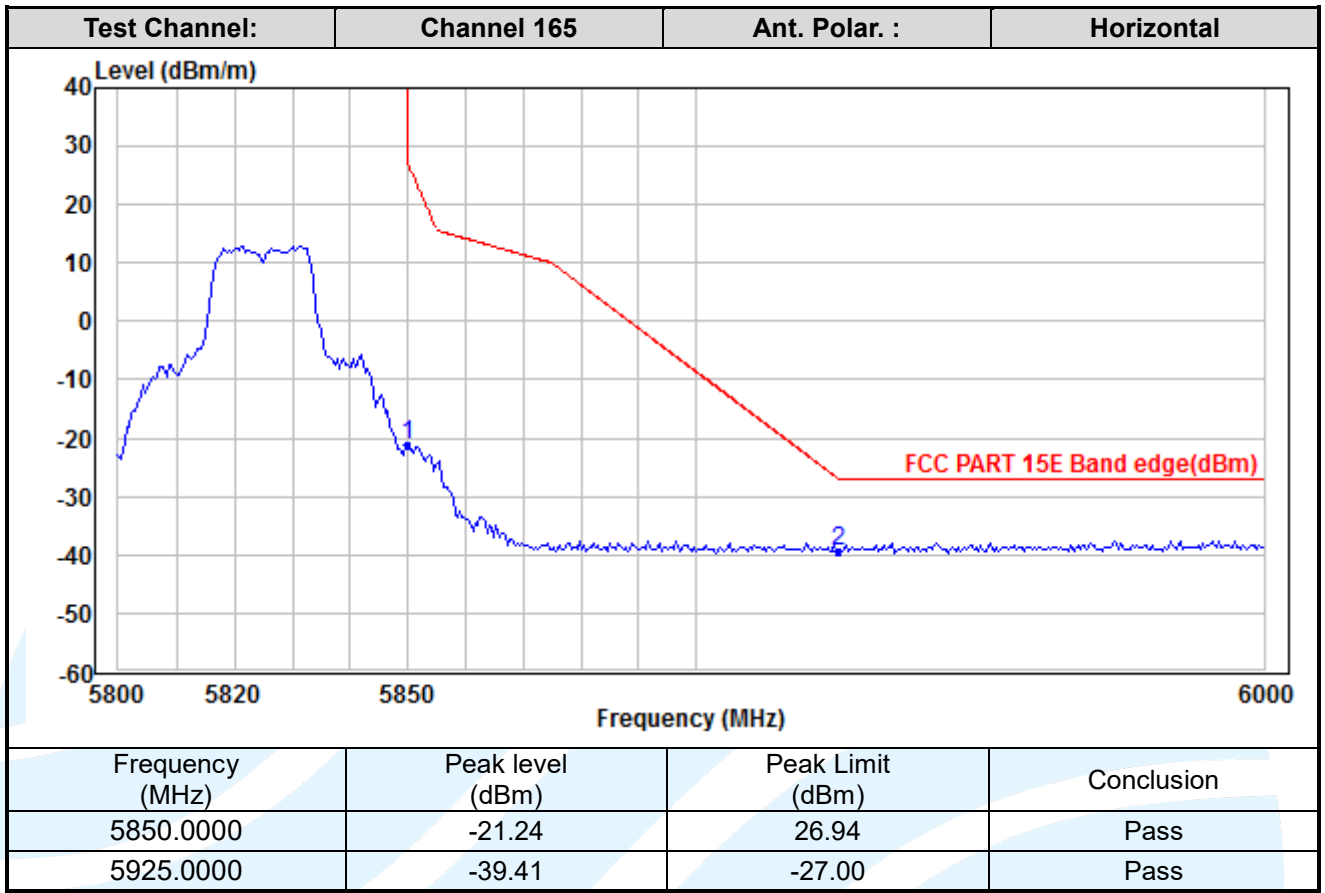
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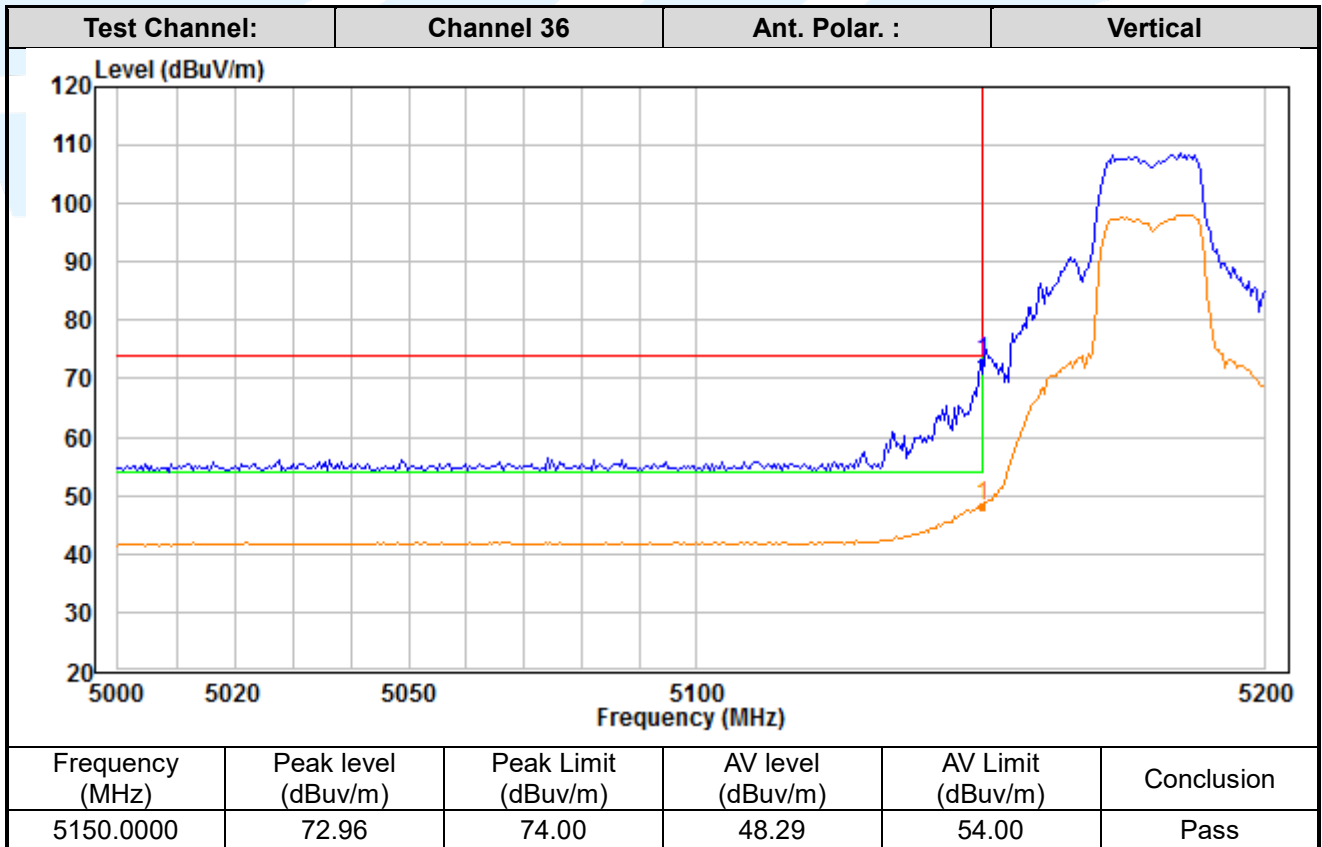
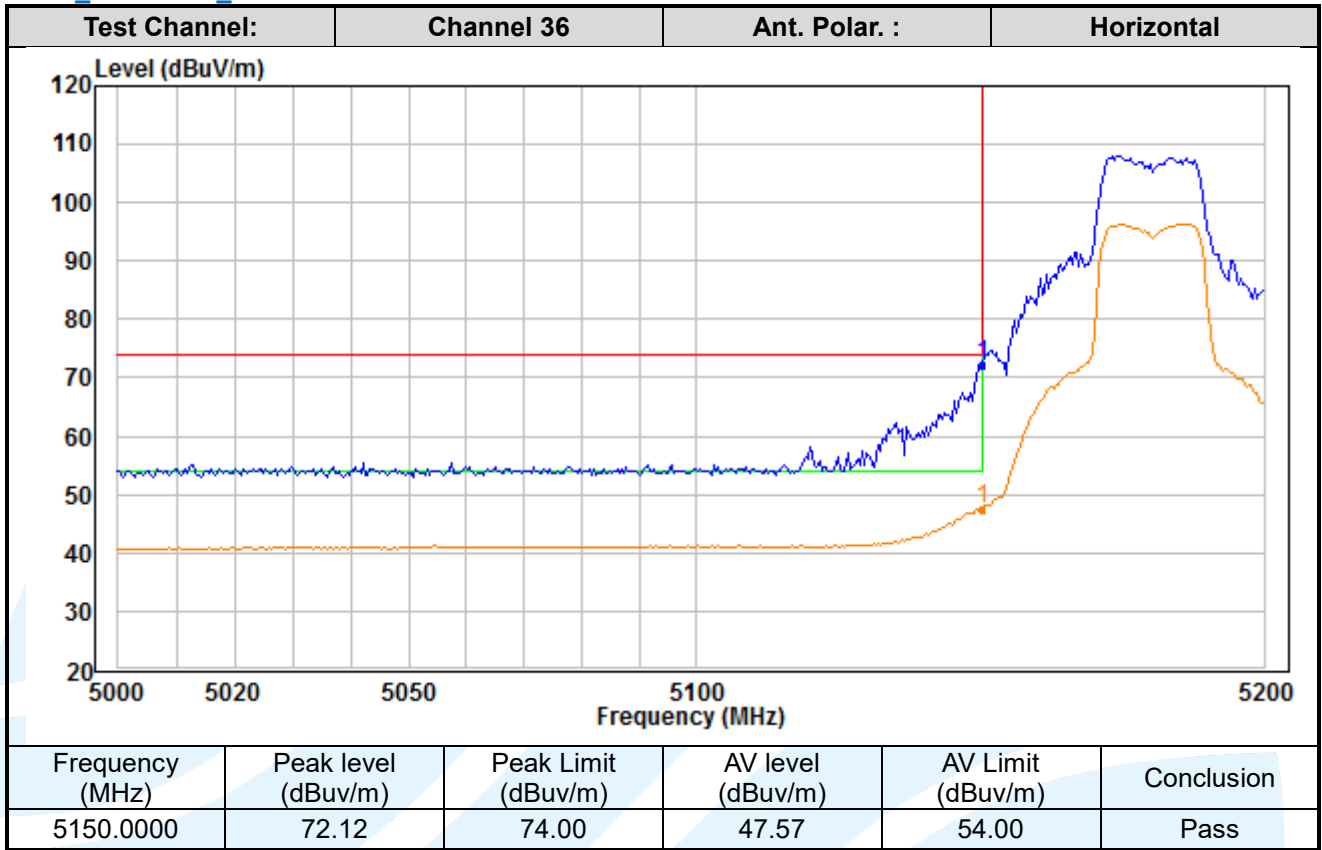
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MIMO_Chain 0+1_ IEEE 802.11n-HT20



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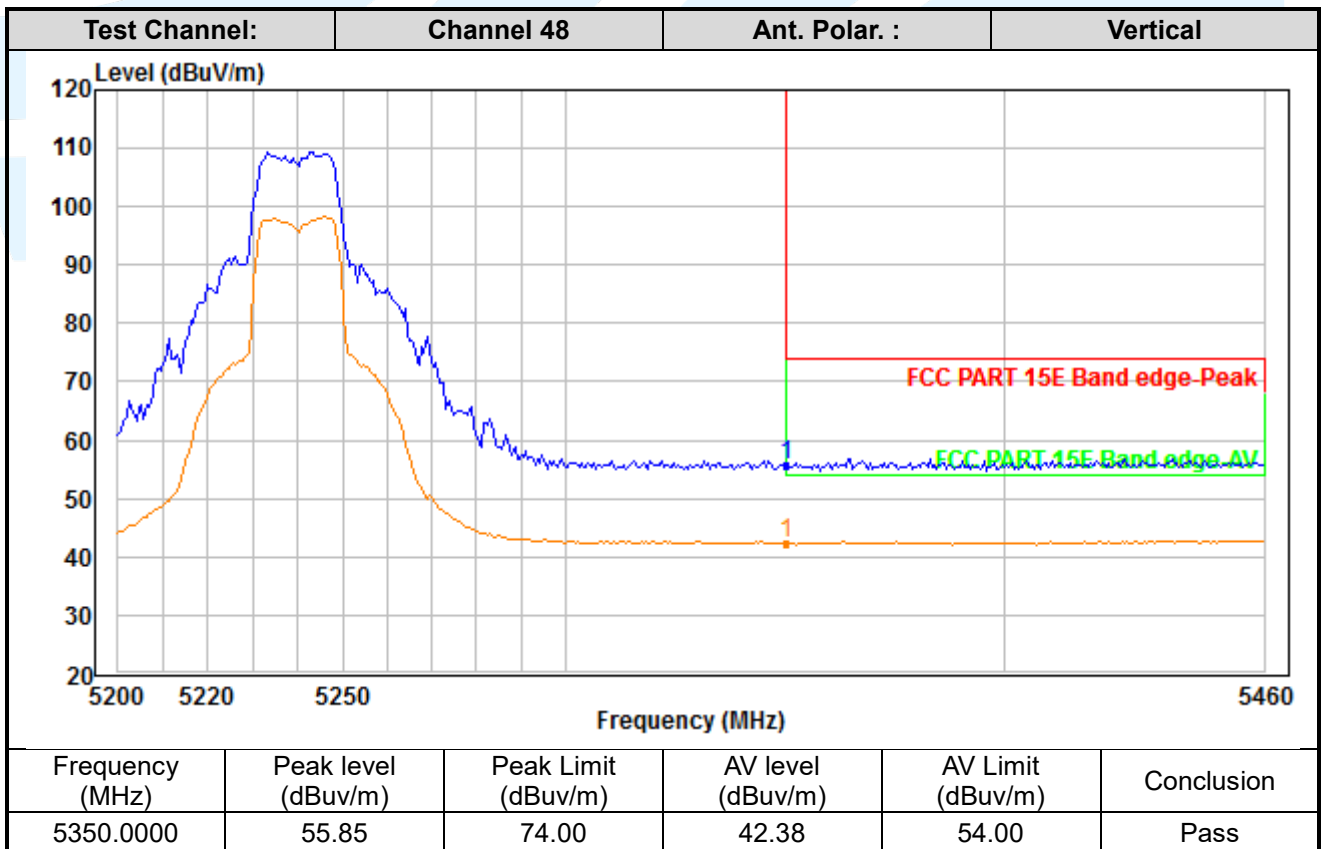
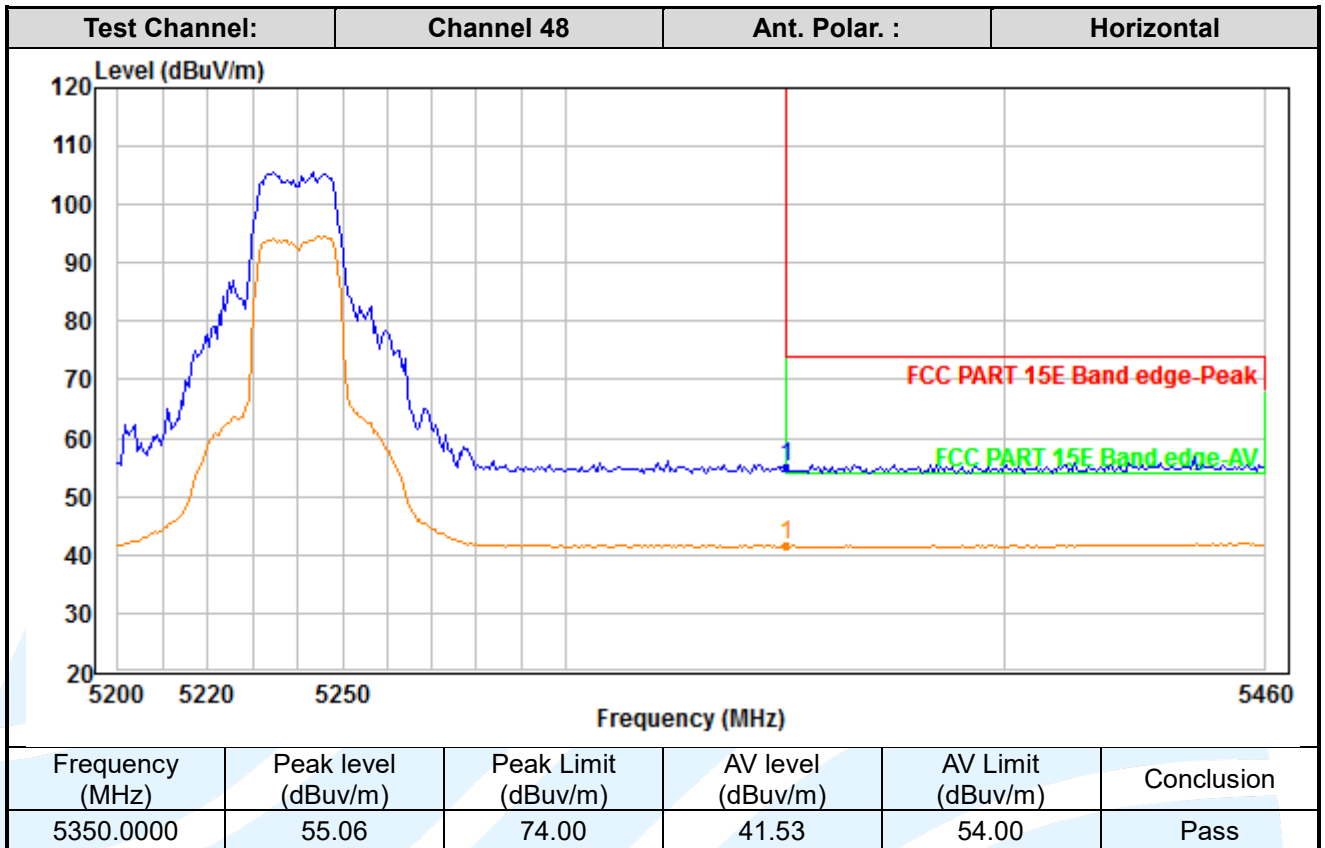
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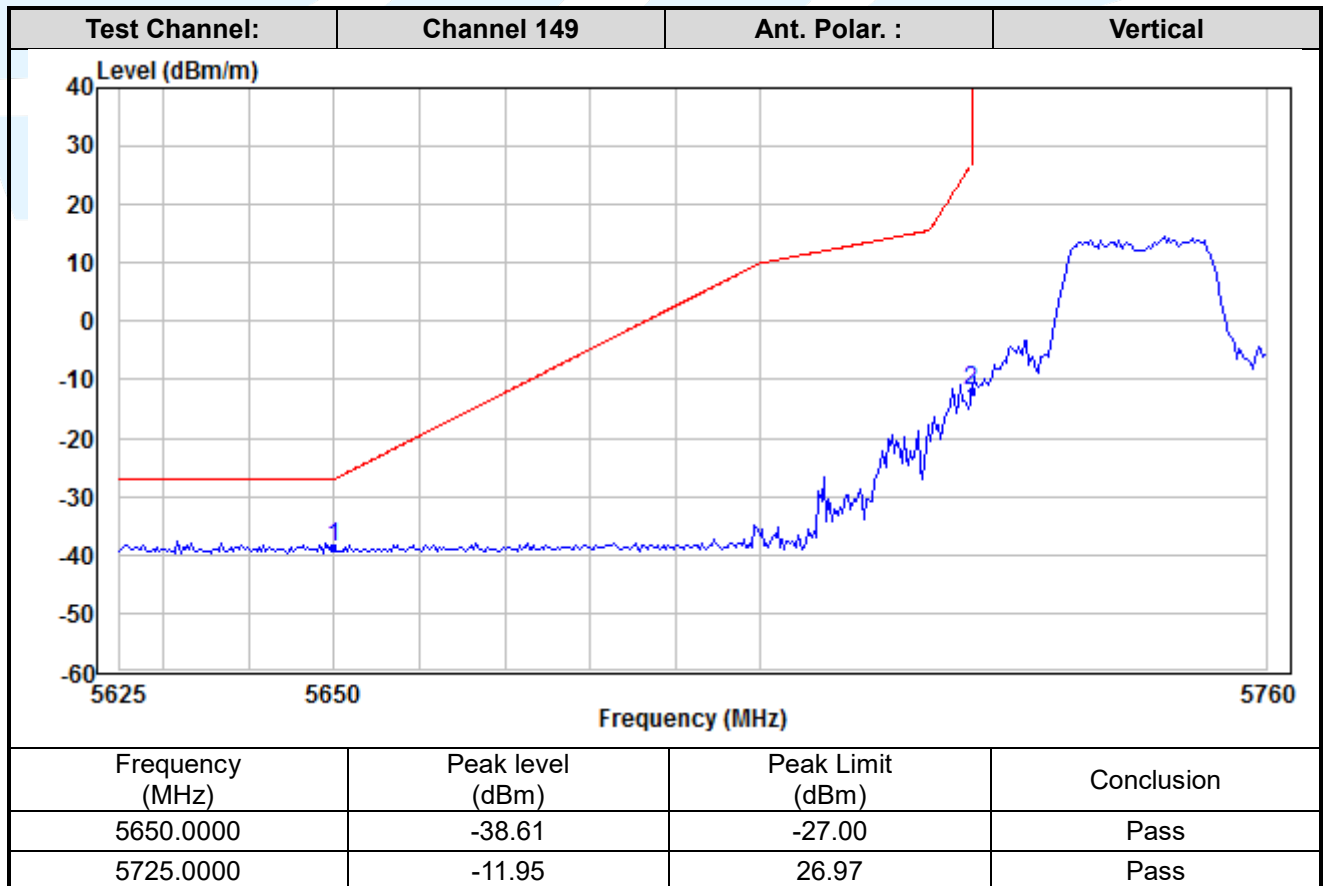
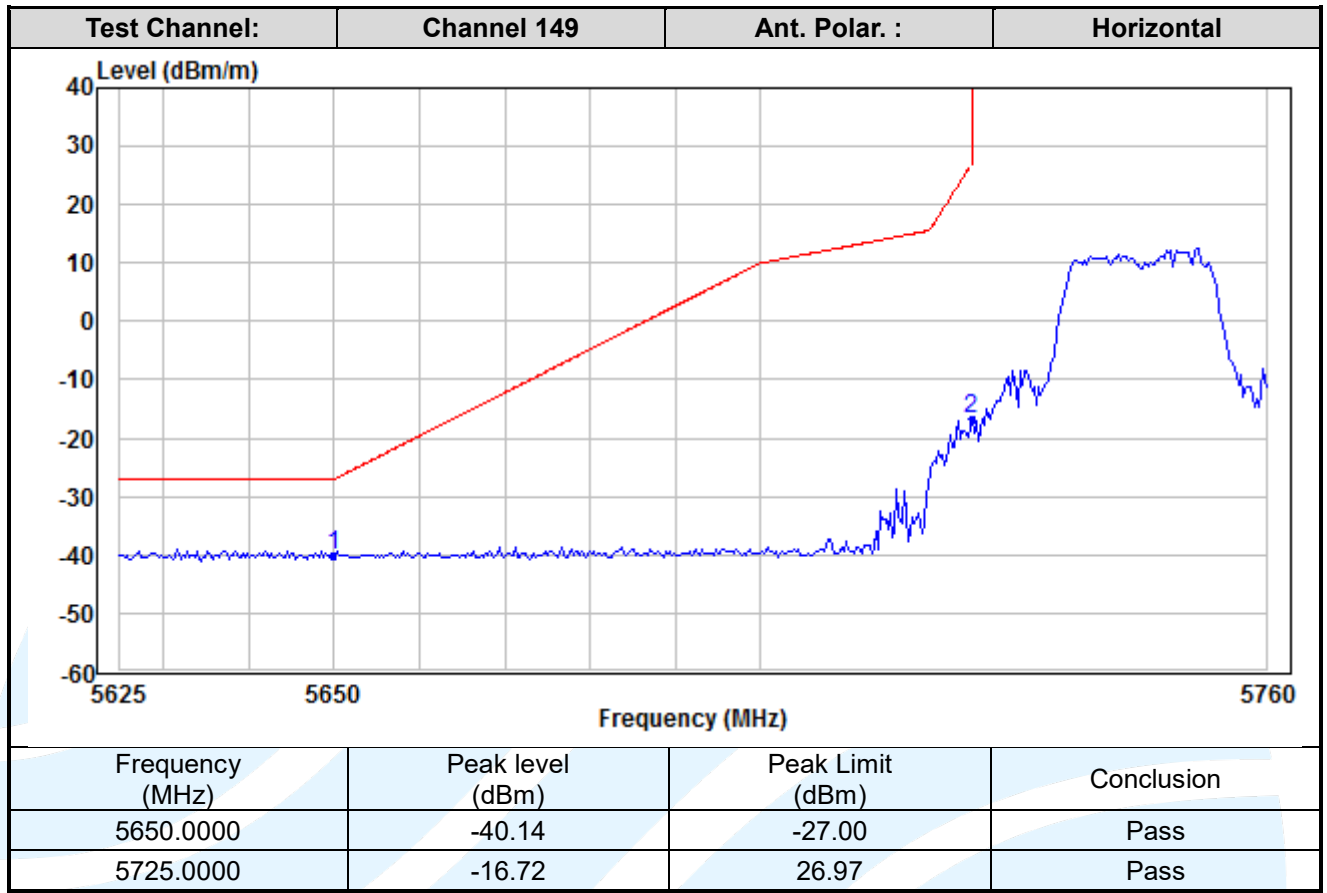
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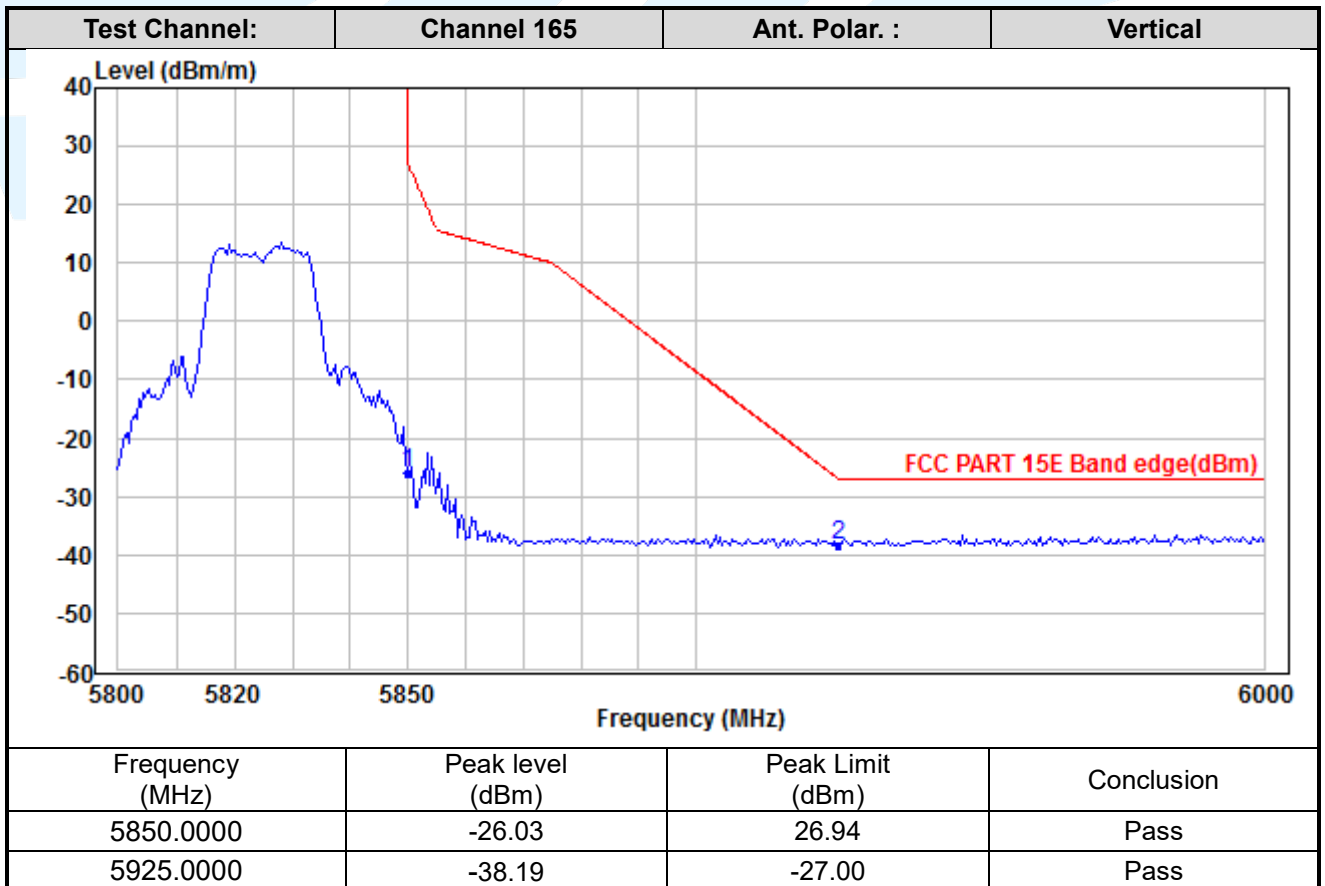
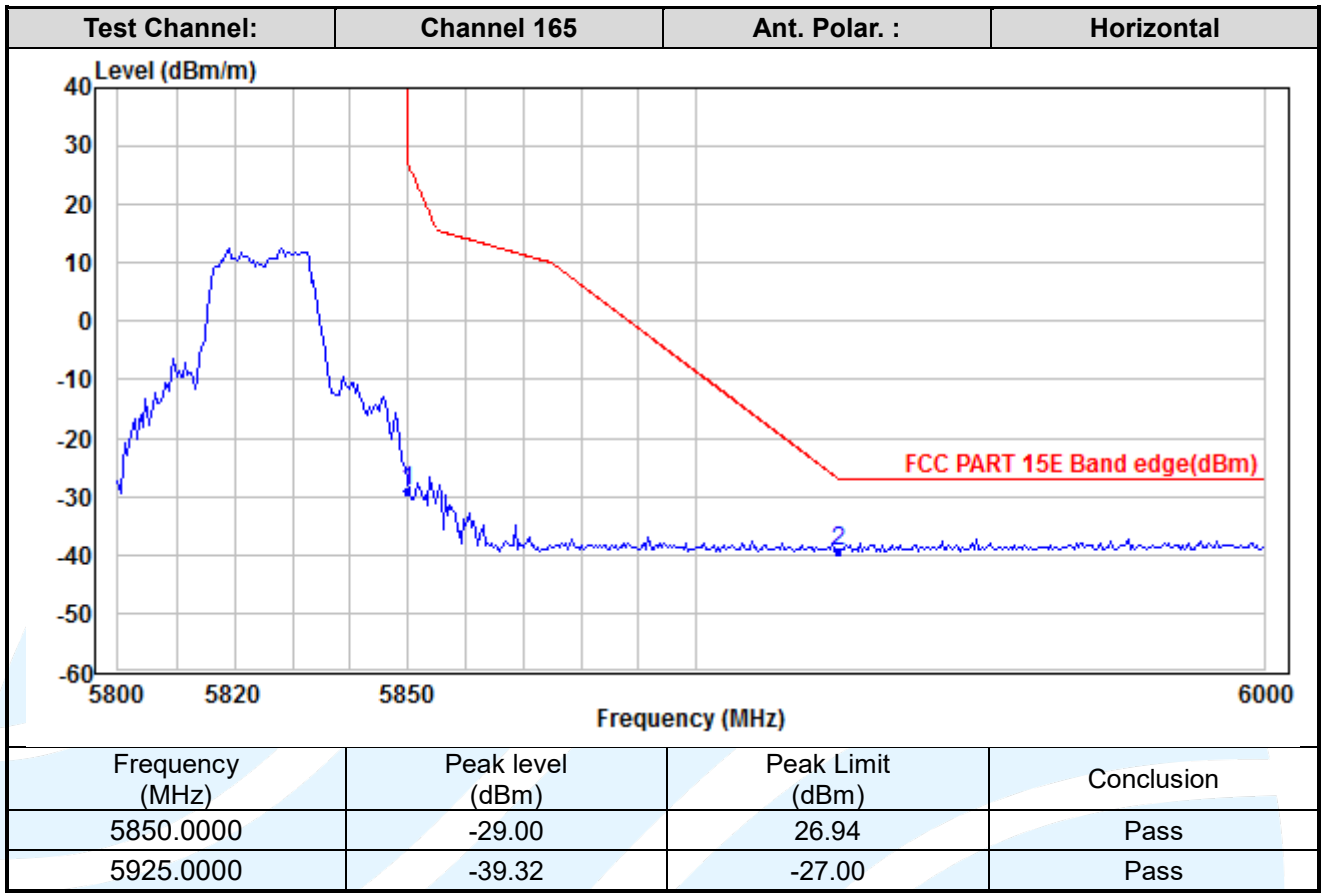
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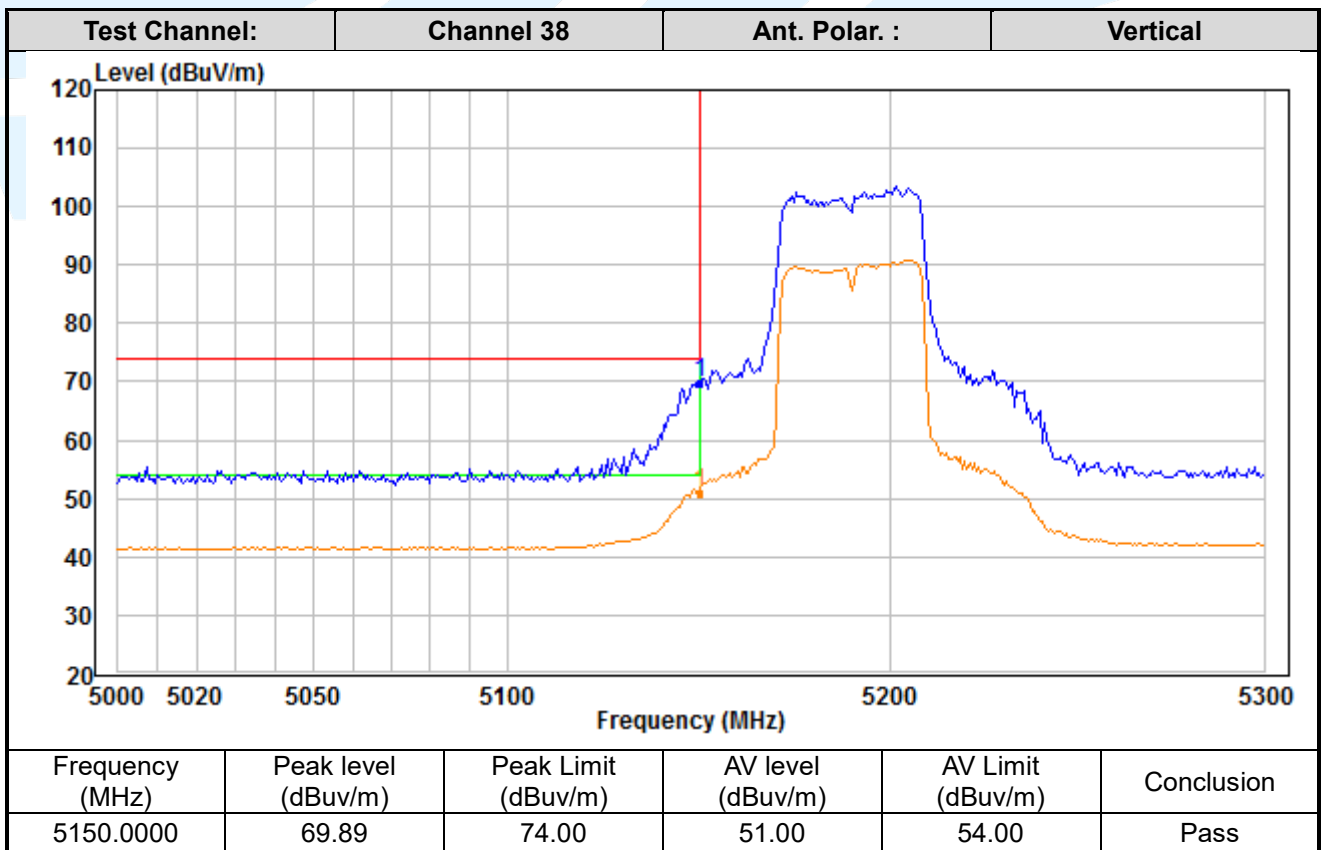
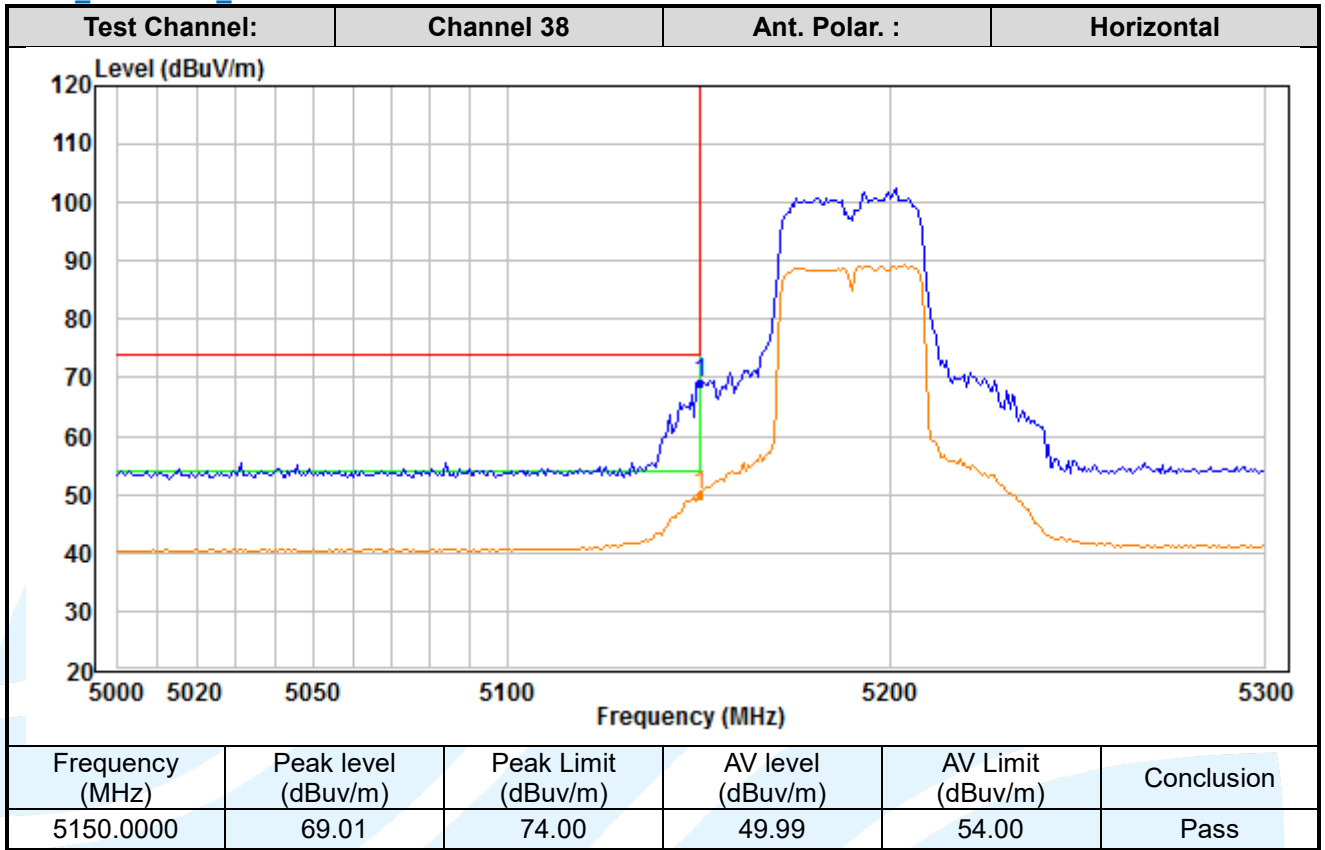
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MIMO_Chain 0+1_ IEEE 802.11n-HT40



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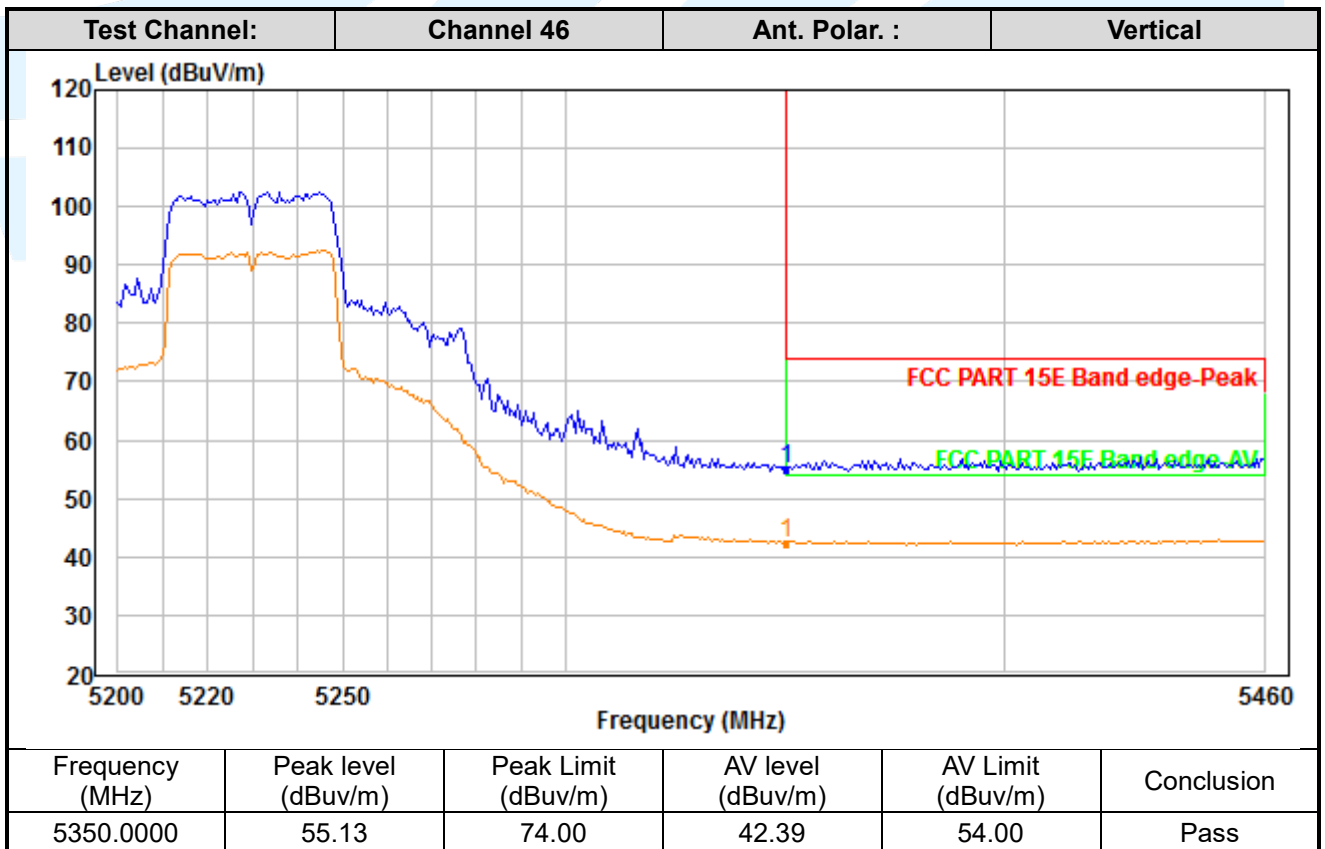
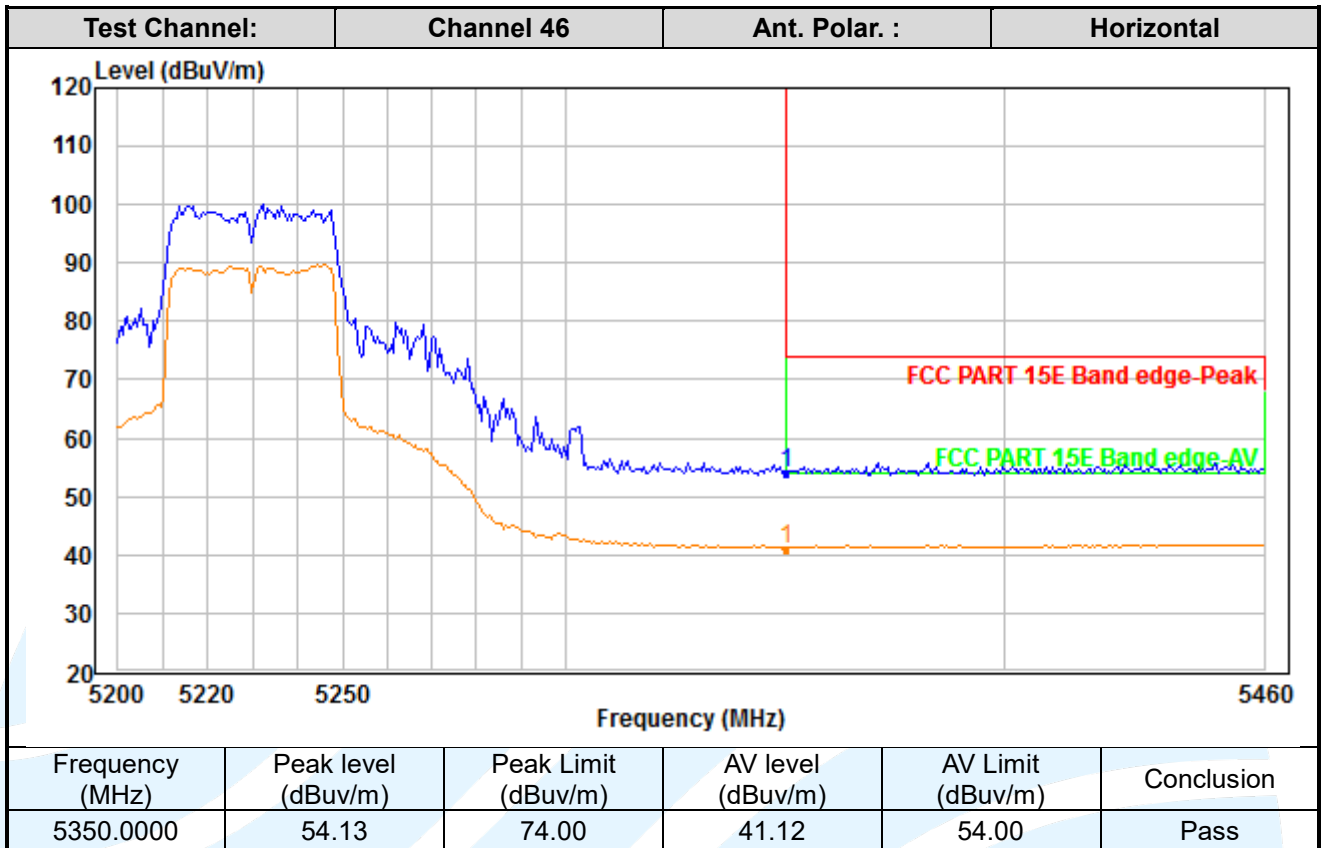
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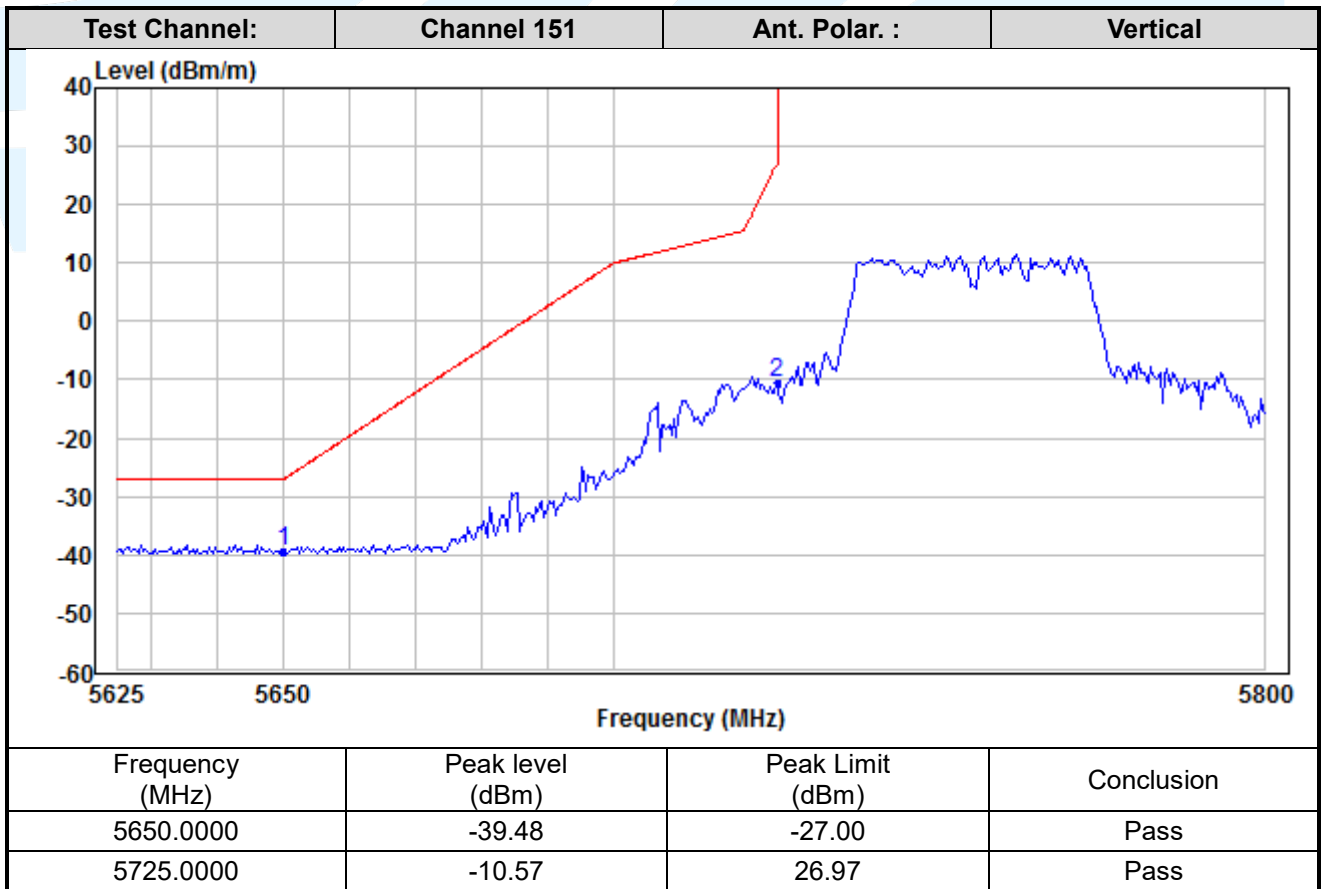
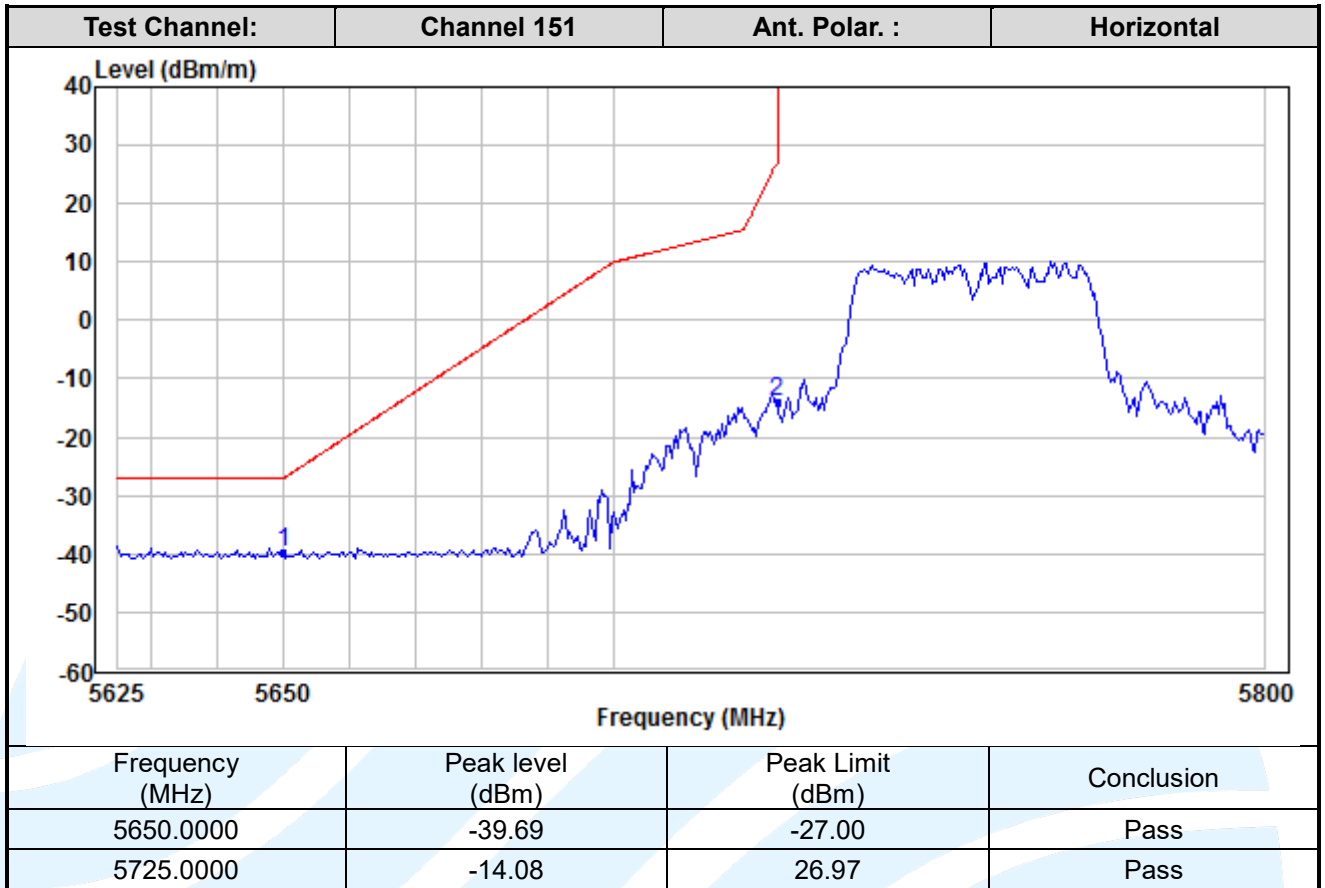
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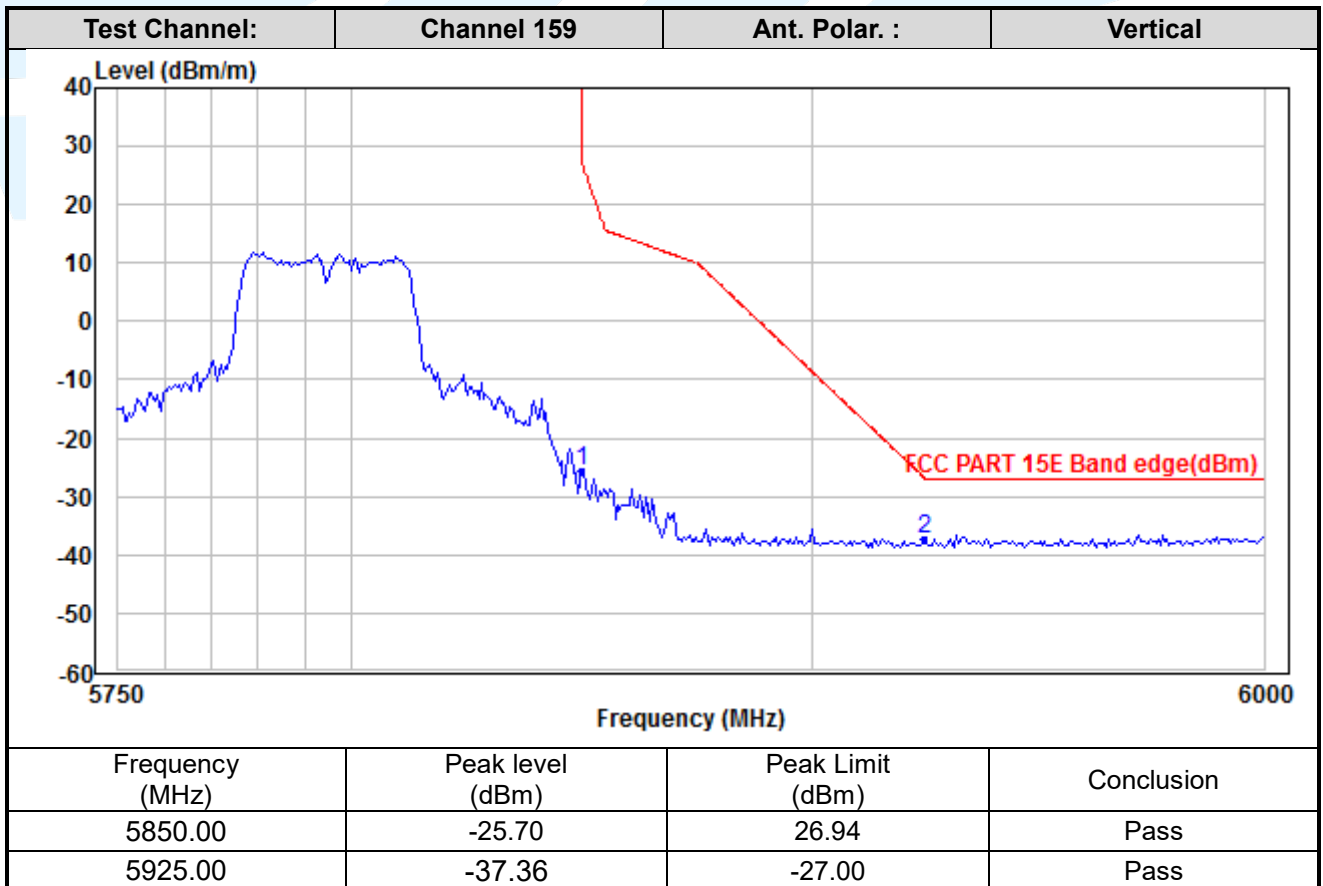
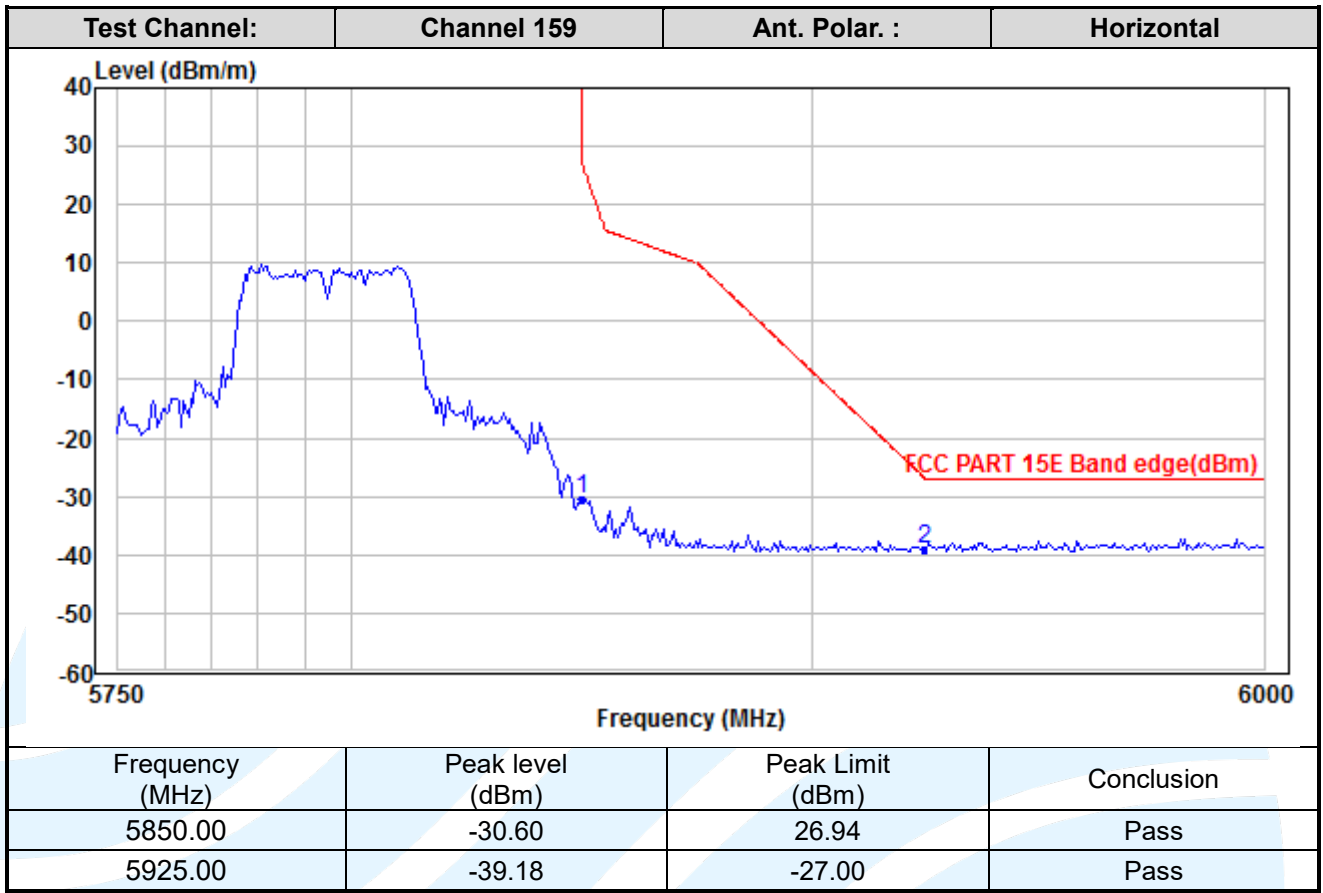
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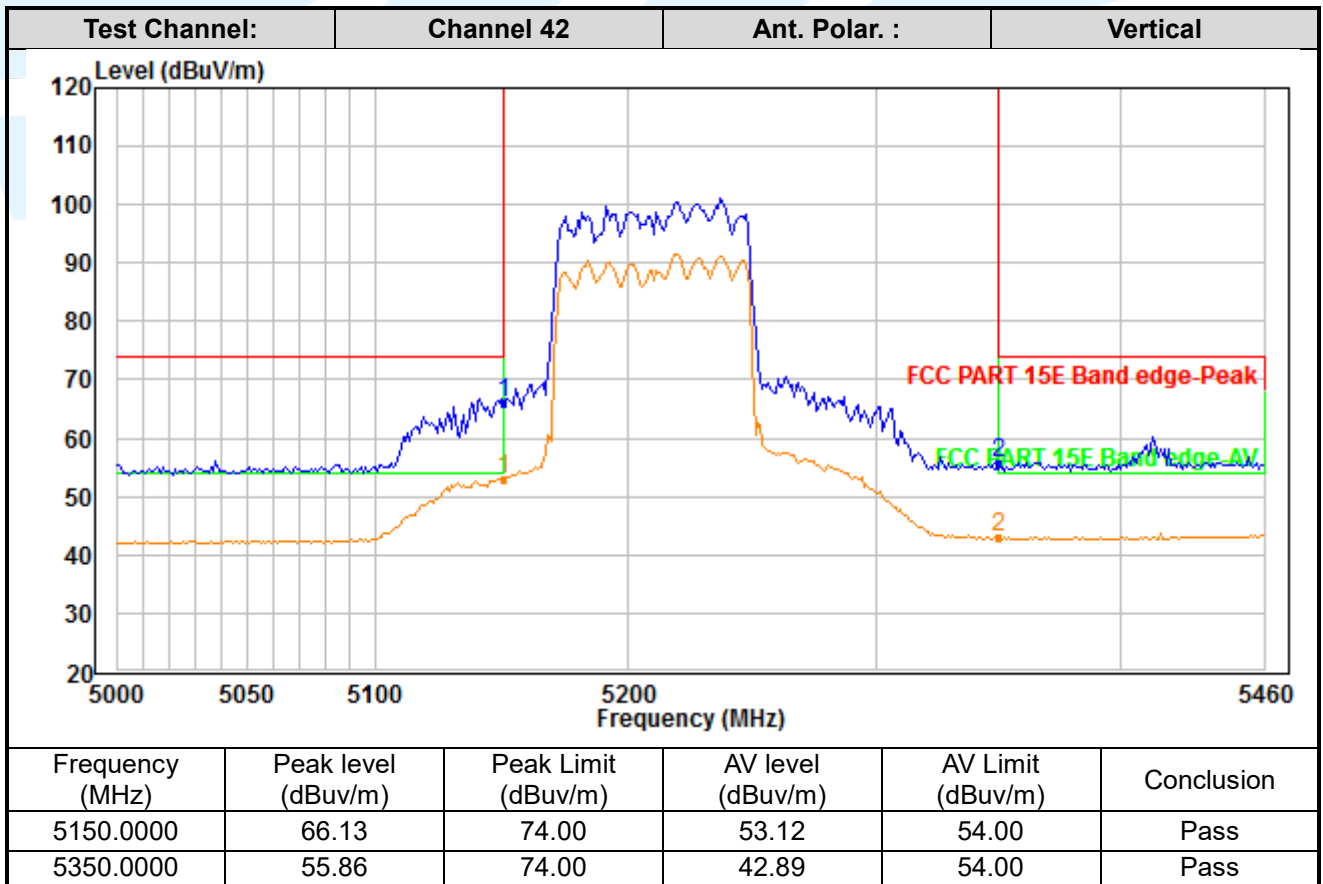
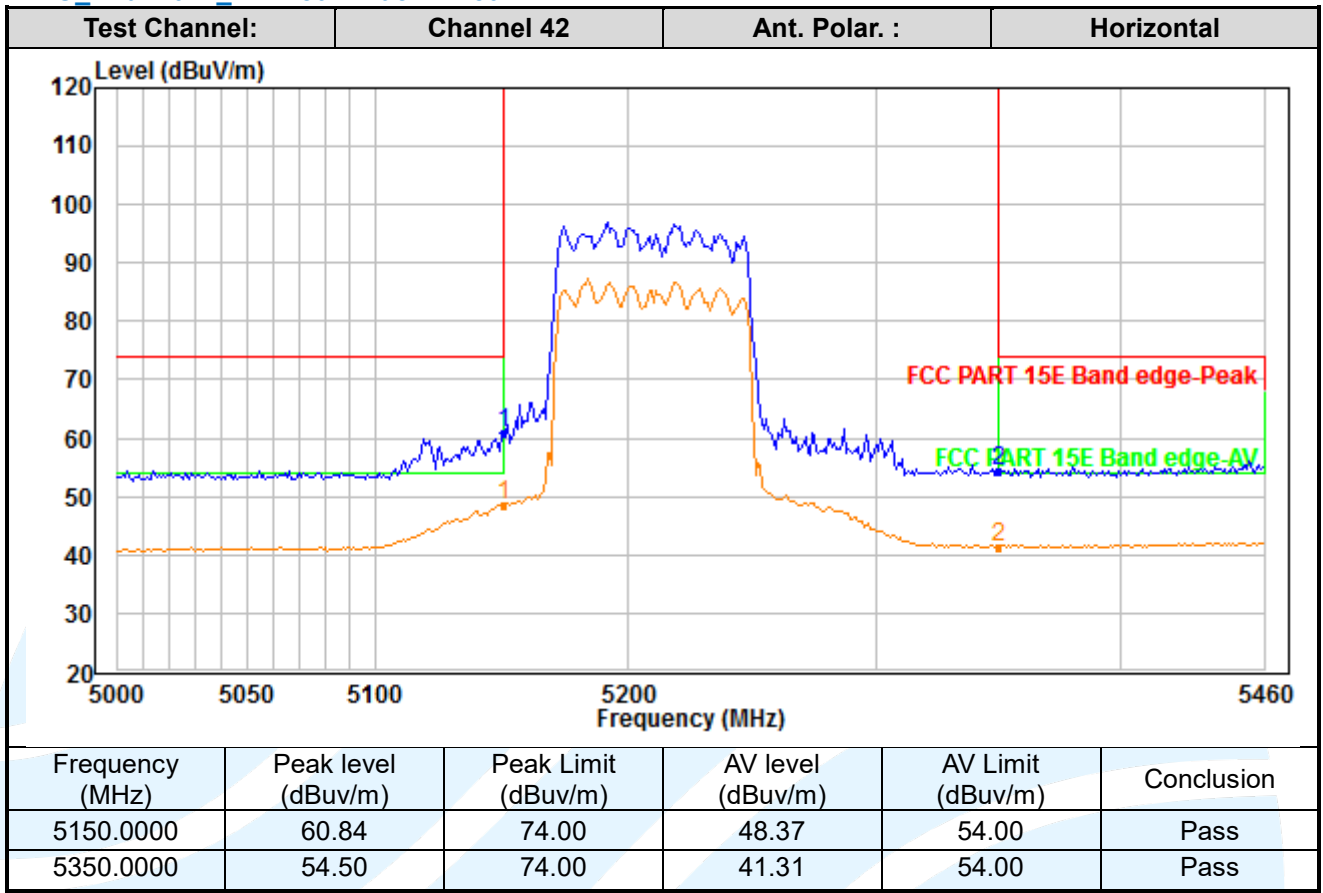
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MIMO_Chain 0+1_ IEEE 802.11ac-VHT80



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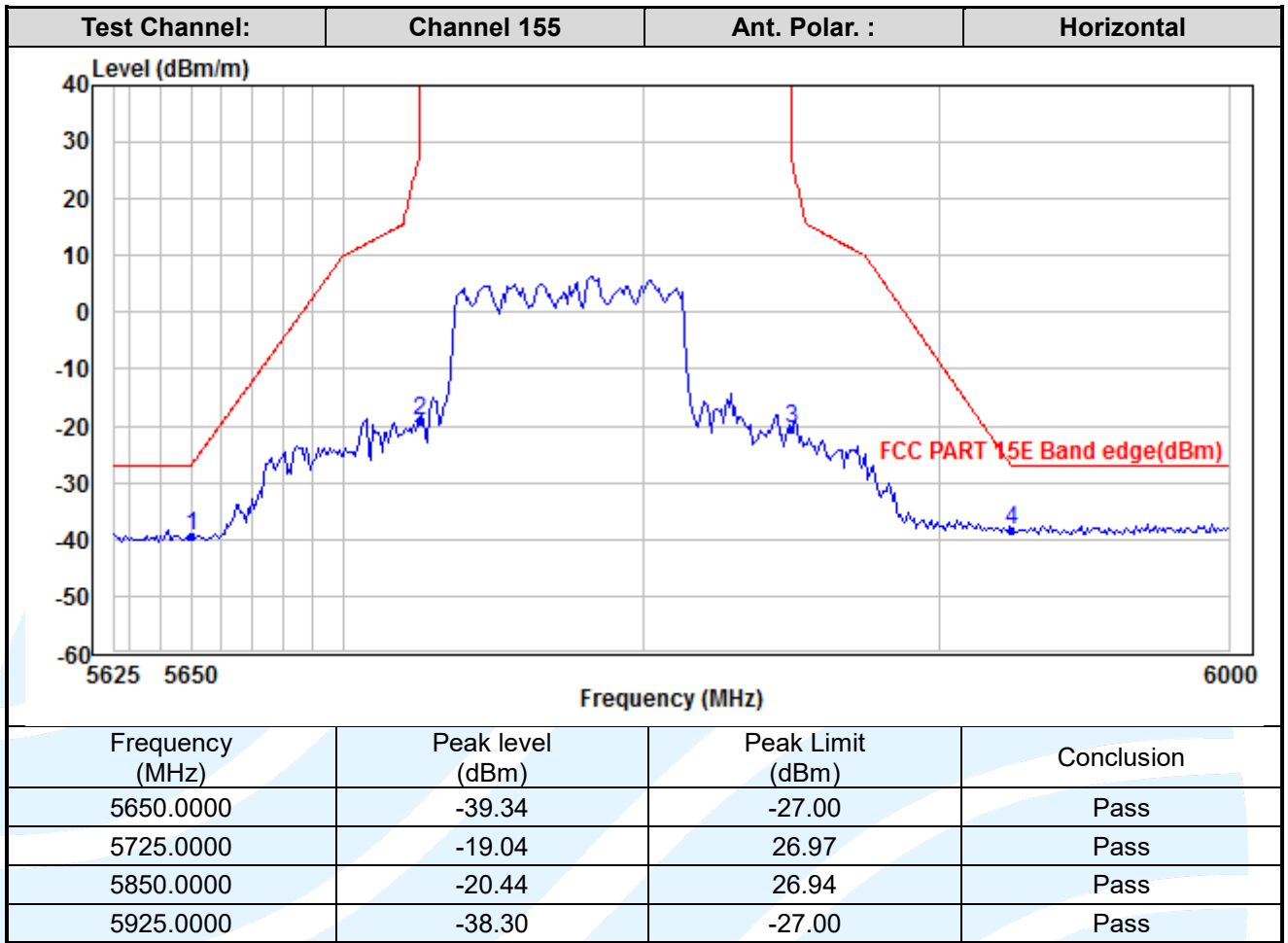
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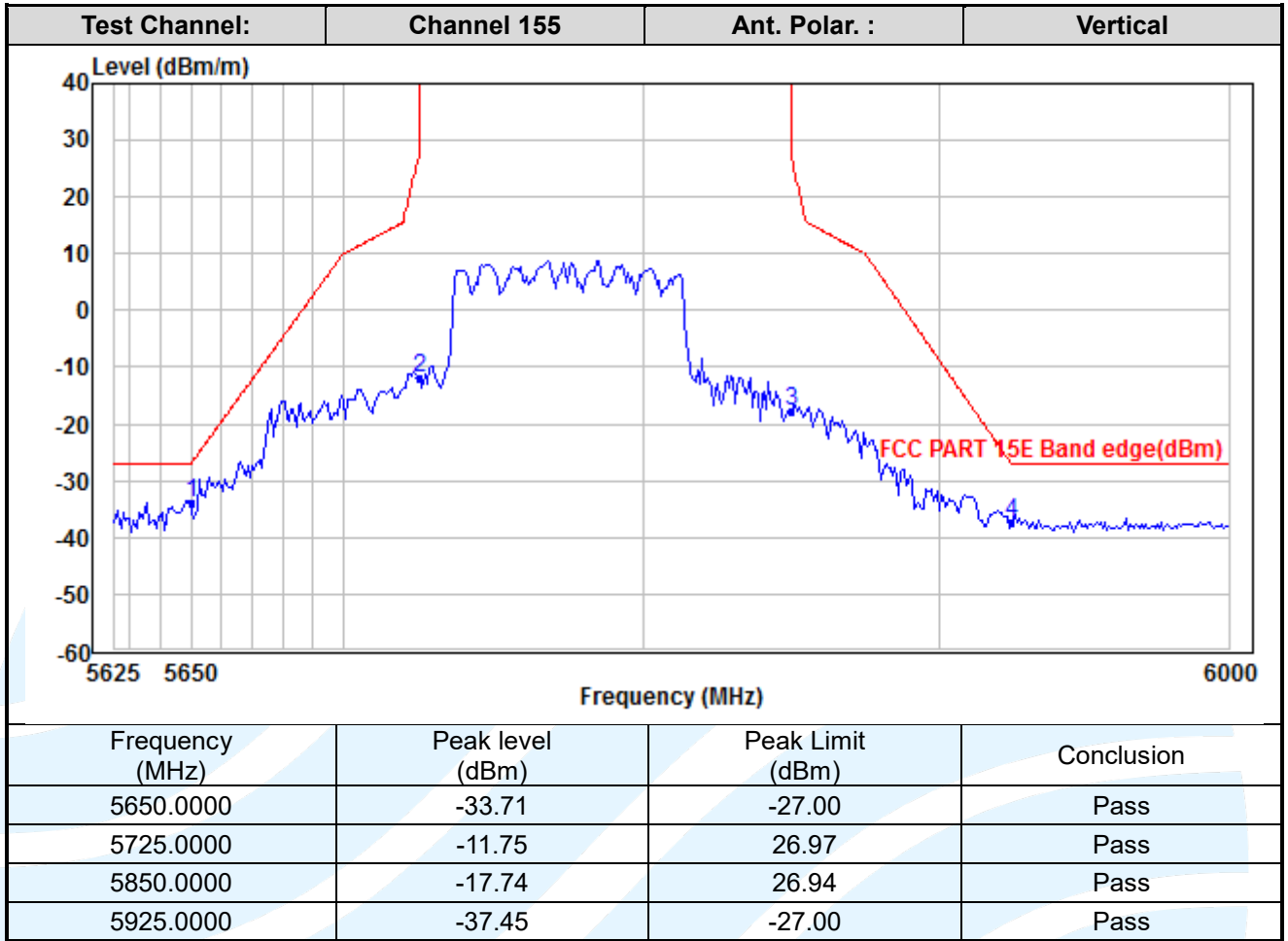
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5.8 AC POWER LINE CONDUCTED EMISSION

Test Requirement: FCC 47 CFR Part 15 Subpart E Section 15.407 (b)(6)
 FCC 47 CFR Part 15 Subpart C Section 15.207
 RSS-Gen Issue 5, Section 8.8

Test Method: ANSI C63.10-2013, Section 6.2.

Limits:

Frequency range (MHz)	Limits (dB(μV))	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

Remark:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

Test Setup: Refer to section 4.5.2 for details.

Test Procedures:

Test frequency range :150KHz-30MHz

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Equipment Used: Refer to section 3 for details.

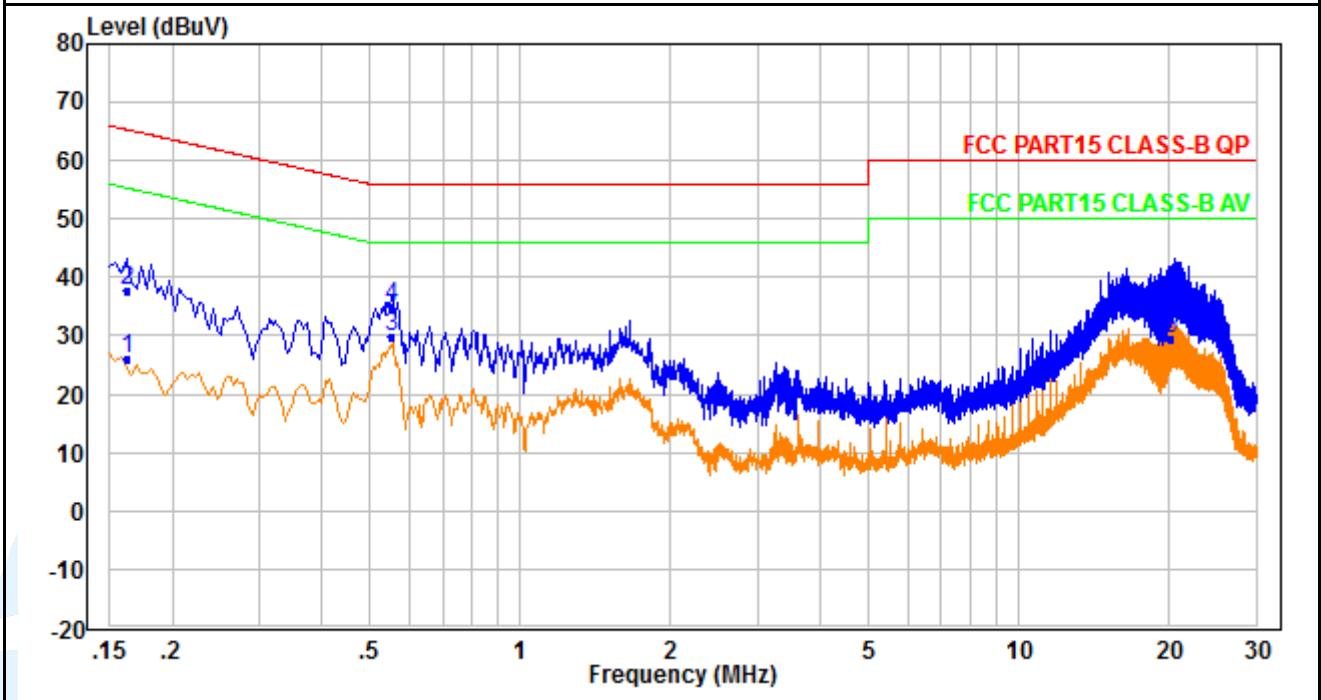
Test Result: Pass

The measurement data as follows:

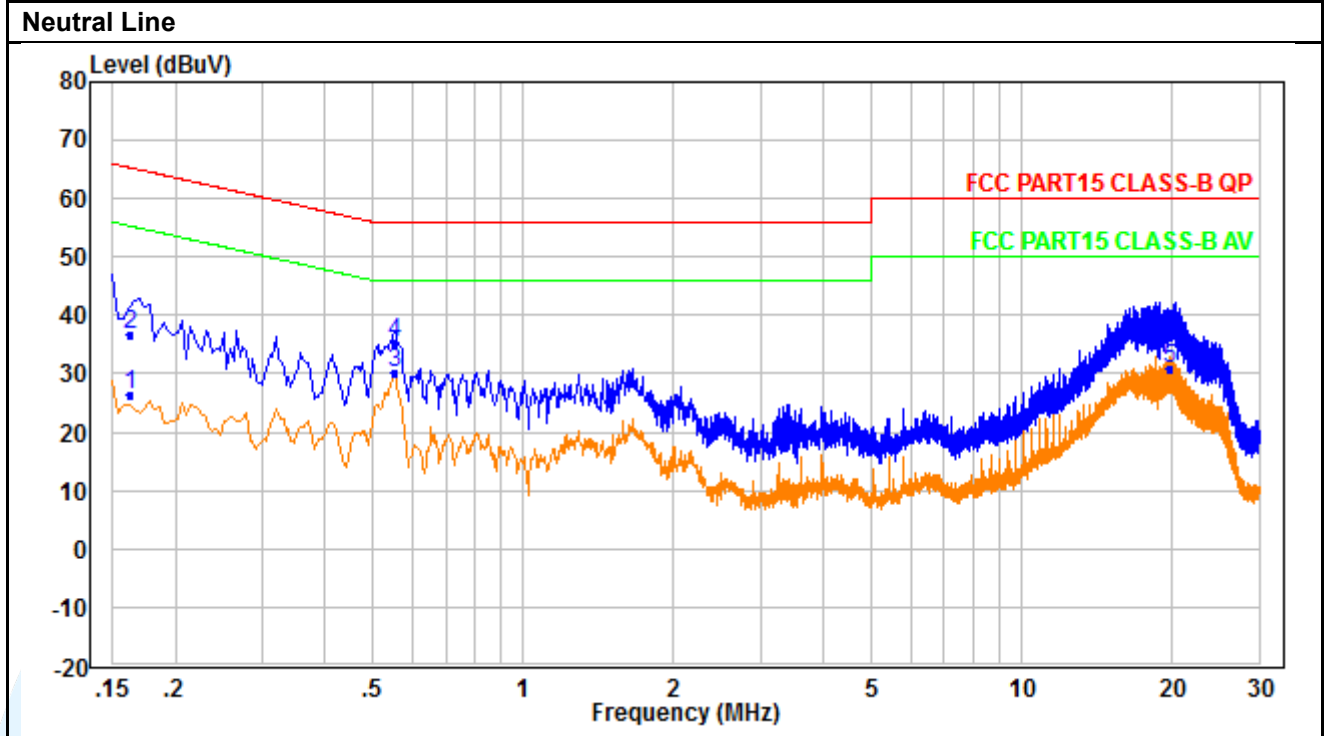
Quasi Peak and Average:

Mode: WIFI Link

Live Line



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
	0.163	16.10	10.02	26.12	55.31	-29.19	Average
	0.163	27.60	10.02	37.62	65.31	-27.69	QP
	0.550	19.99	10.00	29.99	46.00	-16.01	Average
	0.550	24.89	10.00	34.89	56.00	-21.11	QP
	20.320	17.11	12.33	29.44	50.00	-20.56	Average
	20.320	24.81	12.33	37.14	60.00	-22.86	QP



No.	Frequency (MHz)	Reading (dBUV)	Correction factor (dB)	Result (dBUV)	Limit (dBUV)	Margin (dB)	Detector
1	0.163	16.40	10.00	26.40	55.32	-28.92	Average
2	0.163	26.70	10.00	36.70	65.32	-28.62	QP
3	0.551	20.29	9.98	30.27	46.00	-15.73	Average
4	0.551	25.19	9.98	35.17	56.00	-20.83	QP
5	19.808	18.80	12.15	30.95	50.00	-19.05	Average
6	19.808	24.60	12.15	36.75	60.00	-23.25	QP

Remark:

1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Result = Reading + Correct Factor.
3. Margin = Result - Limit
4. An initial pre-scan was performed on the Phase and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

APPENDIX 1 PHOTOS OF TEST SETUP

See test photos attached in Appendix 1 for the actual connections between Product and support equipment.

APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

*** End of Report ***

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