

Shenzhen UnionTrust Quality and Technology Co., Ltd.

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UTTR-RF-FCCPART15.247-V1.1

Radiated Emission Test Data (Above 1GHz):								
IEEE 802.11b Channel 1:								
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4824	40.5	-2.3	38.2	74	-35.8	Peak	Horizontal
2	4824	30.1	-2.3	27.8	54	-26.2	Average	Horizontal
3	7236	40.6	1.5	42.1	74	-31.9	Peak	Horizontal
4	7236	29.3	1.5	30.8	54	-23.2	Average	Horizontal
5	4824	40.6	-2.3	38.3	74	-35.7	Peak	Vertical
6	4824	29.0	-2.3	26.7	54	-27.3	Average	Vertical
7	7236	40.4	1.5	41.9	74	-32.1	Peak	Vertical
8	7236	30.3	1.5	31.7	54	-22.3	Average	Vertical
IEEE 802.11b Channel 6:								
1	4874	41.0	-2.3	38.8	74	-35.3	Peak	Horizontal
2	4874	29.2	-2.3	26.9	54	-27.1	Average	Horizontal
3	7311	41.4	1.6	43.0	74	-31.0	Peak	Horizontal
4	7311	29.6	1.6	31.2	54	-22.8	Average	Horizontal
5	4874	41.4	-2.3	39.1	74	-34.9	Peak	Vertical
6	4874	29.0	-2.3	26.7	54	-27.3	Average	Vertical
7	7311	40.2	1.6	41.8	74	-32.2	Peak	Vertical
8	7311	29.5	1.6	31.1	54	-22.9	Average	Vertical
IEEE 802.11b Channel 11:								
1	4924	41.9	-2.3	39.6	74	-34.4	Peak	Horizontal
2	4924	22.3	-2.3	20.1	54	-33.9	Average	Horizontal
3	7386	39.2	1.7	40.9	74	-33.1	Peak	Horizontal
4	7386	28.0	1.7	29.7	54	-24.3	Average	Horizontal
5	4924	41.2	-2.3	38.9	74	-35.1	Peak	Vertical
6	4924	30.1	-2.3	27.8	54	-26.2	Average	Vertical
7	7386	40.0	1.7	41.8	74	-32.2	Peak	Vertical
8	7386	27.6	1.7	29.4	54	-24.6	Average	Vertical
IEEE 802.11b Channel 12:								
1	4934	41.3	-2.3	39.0	74	-35.0	Peak	Horizontal
2	4934	30.5	-2.3	28.2	54	-25.8	Average	Horizontal
3	7401	41.3	1.7	43.1	74	-31.0	Peak	Horizontal
4	7401	30.3	1.7	32.1	54	-21.9	Average	Horizontal
5	4934	41.4	-2.3	39.1	74	-34.9	Peak	Vertical
6	4934	30.4	-2.3	28.2	54	-25.8	Average	Vertical
7	7401	38.3	1.7	40.0	74	-34.0	Peak	Vertical
8	7401	28.9	1.7	30.6	54	-23.4	Average	Vertical

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IEEE 802.11b_ Channel 13:								
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4944	41.9	-2.3	39.7	74	-34.3	Peak	Horizontal
2	4944	30.6	-2.3	28.3	54	-25.7	Average	Horizontal
3	7416	41.0	1.8	42.8	74	-31.3	Peak	Horizontal
4	7416	30.3	1.8	32.1	54	-21.9	Average	Horizontal
5	4944	42.1	-2.3	39.9	74	-34.1	Peak	Vertical
6	4944	30.5	-2.3	28.2	54	-25.8	Average	Vertical
7	7416	42.2	0.8	42.9	74	-31.1	Peak	Vertical
8	7416	29.9	0.8	30.6	54	-23.4	Average	Vertical
IEEE 802.11g_ Channel 1:								
1	4824	42.4	-2.3	40.1	74	-33.9	Peak	Horizontal
2	4824	30.1	-2.3	27.8	54	-26.2	Average	Horizontal
3	7236	40.9	1.5	42.4	74	-31.7	Peak	Horizontal
4	7236	29.3	1.5	30.8	54	-23.2	Average	Horizontal
5	4824	42.0	-2.3	39.6	74	-34.4	Peak	Vertical
6	4824	30.0	-2.3	27.6	54	-26.4	Average	Vertical
7	7236	41.3	1.5	42.8	74	-31.2	Peak	Vertical
8	7236	29.5	1.5	30.9	54	-23.1	Average	Vertical
IEEE 802.11g_ Channel 6:								
1	4874	40.3	-2.3	38.0	74	-36.0	Peak	Horizontal
2	4874	29.2	-2.3	26.9	54	-27.1	Average	Horizontal
3	7311	41.5	1.6	43.1	74	-30.9	Peak	Horizontal
4	7311	29.7	1.6	31.3	54	-22.7	Average	Horizontal
5	4874	43.0	-2.3	40.7	74	-33.3	Peak	Vertical
6	4874	30.0	-2.3	27.7	54	-26.3	Average	Vertical
7	7311	39.9	3.6	43.5	74	-30.5	Peak	Vertical
8	7311	26.2	3.6	29.8	54	-24.3	Average	Vertical
IEEE 802.11g_ Channel 11:								
1	4924	39.9	-2.3	37.6	74	-36.4	Peak	Horizontal
2	4924	30.3	-2.3	28.1	54	-25.9	Average	Horizontal
3	7386	40.4	1.7	42.1	74	-31.9	Peak	Horizontal
4	7386	27.9	1.7	29.7	54	-24.3	Average	Horizontal
5	4924	42.3	-2.3	40.0	74	-34.0	Peak	Vertical
6	4924	30.4	-2.3	28.2	54	-25.9	Average	Vertical
7	7386	40.8	1.7	42.5	74	-31.5	Peak	Vertical
8	7386	28.1	1.7	29.8	54	-24.2	Average	Vertical

IEEE 802.11g_Channel 12:								
No.	Frequency (MHz)	Reading (dBµV)	Correction factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4934	41.4	-2.3	39.2	74	-34.9	Peak	Horizontal
2	4934	30.4	-2.3	28.2	54	-25.8	Average	Horizontal
3	7401	40.7	1.7	42.5	74	-31.5	Peak	Horizontal
4	7401	30.3	1.7	32.0	54	-22.0	Average	Horizontal
5	4934	41.3	-2.3	39.0	74	-35.0	Peak	Vertical
6	4934	29.5	-2.3	27.2	54	-26.8	Average	Vertical
7	7401	40.6	1.7	42.3	74	-31.7	Peak	Vertical
8	7401	29.1	1.7	30.8	54	-23.2	Average	Vertical
IEEE 802.11g_Channel 13:								
1	4944	41.0	-2.3	38.8	74	-35.3	Peak	Horizontal
2	4944	31.5	-2.3	29.2	54	-24.8	Average	Horizontal
3	7416	40.7	1.8	42.5	74	-31.5	Peak	Horizontal
4	7416	29.3	1.8	31.1	54	-22.9	Average	Horizontal
5	4944	30.5	-2.3	28.2	74	-45.8	Peak	Vertical
6	4944	41.8	-2.3	39.5	54	-14.5	Average	Vertical
7	7416	28.9	1.8	30.6	74	-43.4	Peak	Vertical
8	7416	40.5	1.8	42.2	54	-11.8	Average	Vertical
IEEE 802.11n-HT20_Channel 1:								
1	4824	41.9	-2.3	39.6	74	-34.5	Peak	Horizontal
2	4824	30.2	-2.3	27.9	54	-26.1	Average	Horizontal
3	7236	39.6	1.5	41.1	74	-32.9	Peak	Horizontal
4	7236	29.5	1.5	30.9	54	-23.1	Average	Horizontal
5	4824	41.4	-2.3	39.1	74	-34.9	Peak	Vertical
6	4824	30.0	-2.3	27.6	54	-26.4	Average	Vertical
7	7236	40.4	1.5	41.9	74	-32.1	Peak	Vertical
8	7236	29.4	1.5	30.9	54	-23.1	Average	Vertical
IEEE 802.11n-HT20_Channel 6:								
1	4874	40.4	-2.3	38.1	74	-35.9	Peak	Horizontal
2	4874	29.1	-2.3	26.8	54	-27.2	Average	Horizontal
3	7311	39.8	1.6	41.4	74	-32.6	Peak	Horizontal
4	7311	29.6	1.6	31.2	54	-22.8	Average	Horizontal
5	4874	41.7	-2.3	39.4	74	-34.6	Peak	Vertical
6	4874	29.0	-2.3	26.7	54	-27.3	Average	Vertical
7	7311	40.1	1.6	41.7	74	-32.4	Peak	Vertical
8	7311	27.9	1.6	29.5	54	-24.5	Average	Vertical

IEEE 802.11n-HT20_ Channel 11:								
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4924	41.2	-2.3	38.9	74	-35.1	Peak	Horizontal
2	4924	29.6	-2.3	27.3	54	-26.7	Average	Horizontal
3	7386	39.7	1.7	41.4	74	-32.6	Peak	Horizontal
4	7386	28.0	1.7	29.7	54	-24.3	Average	Horizontal
5	4924	41.4	-2.3	39.1	74	-34.9	Peak	Vertical
6	4924	30.3	-2.3	28.0	54	-26.0	Average	Vertical
7	7386	41.0	1.7	42.7	74	-31.3	Peak	Vertical
8	7386	28.0	1.7	29.7	54	-24.3	Average	Vertical
IEEE 802.11n-HT20_ Channel 12:								
1	4934	41.7	-2.3	39.4	74	-34.6	Peak	Horizontal
2	4934	29.5	-2.3	27.2	54	-26.8	Average	Horizontal
3	7401	40.8	1.7	42.5	74	-31.5	Peak	Horizontal
4	7401	29.3	1.7	31.1	54	-22.9	Average	Horizontal
5	4934	41.3	-1.5	39.8	74	-34.2	Peak	Vertical
6	4934	29.6	-1.5	28.2	54	-25.8	Average	Vertical
7	7401	41.1	1.7	42.9	74	-31.2	Peak	Vertical
8	7401	29.1	1.7	30.8	54	-23.2	Average	Vertical
IEEE 802.11n-HT20_ Channel 13:								
1	4944	41.3	-2.3	39.0	74	-35.0	Peak	Horizontal
2	4944	30.3	-2.3	28.1	54	-25.9	Average	Horizontal
3	7416	40.7	1.8	42.5	74	-31.5	Peak	Horizontal
4	7416	29.4	1.8	31.1	54	-22.9	Average	Horizontal
5	4944	41.1	-2.3	38.9	74	-35.2	Peak	Vertical
6	4944	29.5	-2.3	27.2	54	-26.8	Average	Vertical
7	7416	40.5	1.8	42.3	74	-31.7	Peak	Vertical
8	7416	29.2	1.8	30.9	54	-23.1	Average	Vertical
IEEE 802.11n-HT40_ Channel 3:								
1	4844	40.7	-2.3	38.3	74	-35.7	Peak	Horizontal
2	4844	29.0	-2.3	26.7	54	-27.3	Average	Horizontal
3	7266	40.1	1.5	41.6	74	-32.4	Peak	Horizontal
4	7266	29.2	1.5	30.7	54	-23.3	Average	Horizontal
5	4844	42.7	-2.3	40.4	74	-33.7	Peak	Vertical
6	4844	30.0	-2.3	27.7	54	-26.3	Average	Vertical
7	7266	42.3	1.5	43.9	74	-30.1	Peak	Vertical
8	7266	30.4	1.5	31.9	54	-22.1	Average	Vertical

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IEEE 802.11n-HT40_ Channel 6:								
No.	Frequency (MHz)	Reading (dBμV)	Correction factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4874	39.8	-2.3	37.5	74	-36.5	Peak	Horizontal
2	4874	27.1	-2.3	24.8	54	-29.2	Average	Horizontal
3	7311	40.0	1.6	41.6	74	-32.4	Peak	Horizontal
4	7311	27.7	1.6	29.3	54	-24.7	Average	Horizontal
5	4874	41.2	-2.3	38.9	74	-35.1	Peak	Vertical
6	4874	29.9	-2.3	27.6	54	-26.4	Average	Vertical
7	7311	39.7	1.6	41.3	74	-32.7	Peak	Vertical
8	7311	28.0	1.6	29.6	54	-24.4	Average	Vertical
IEEE 802.11n-HT40_ Channel 9:								
1	4904	41.3	-2.3	39.0	74	-35.0	Peak	Horizontal
2	4904	30.4	-2.3	28.1	54	-25.9	Average	Horizontal
3	7356	39.0	1.7	40.6	74	-33.4	Peak	Horizontal
4	7356	27.7	1.7	29.4	54	-24.6	Average	Horizontal
5	4904	40.9	-2.3	38.6	74	-35.4	Peak	Vertical
6	4904	30.4	-2.3	28.1	54	-25.9	Average	Vertical
7	7356	41.8	1.7	43.5	74	-30.5	Peak	Vertical
8	7356	28.1	1.7	29.8	54	-24.2	Average	Vertical
IEEE 802.11n-HT40_ Channel 10:								
1	4914	41.6	-2.3	39.3	74	-34.7	Peak	Horizontal
2	4914	29.4	-2.3	27.2	54	-26.9	Average	Horizontal
3	7371	38.7	1.7	40.4	74	-33.6	Peak	Horizontal
4	7371	27.8	1.7	29.5	54	-24.5	Average	Horizontal
5	4914	39.8	-2.3	37.5	74	-36.5	Peak	Vertical
6	4914	30.3	-2.3	28.0	54	-26.0	Average	Vertical
7	7371	40.1	1.7	41.8	74	-32.2	Peak	Vertical
8	7371	28.1	1.7	29.8	54	-24.2	Average	Vertical
IEEE 802.11n-HT40_ Channel 11:								
1	4924	39.6	-2.3	37.3	74	-36.7	Peak	Horizontal
2	4924	30.2	-2.3	27.9	54	-26.1	Average	Horizontal
3	7386	40.1	1.7	41.8	74	-32.2	Peak	Horizontal
4	7386	27.9	1.7	29.7	54	-24.3	Average	Horizontal
5	4924	41.6	-2.3	39.3	74	-34.7	Peak	Vertical
6	4924	30.3	-2.3	28.0	54	-26.0	Average	Vertical
7	7386	40.3	2.5	42.8	74	-31.2	Peak	Vertical
8	7386	27.3	2.5	29.8	54	-24.2	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.

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5.8 BAND EDGE MEASUREMENTS (RADIATED)

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.205/15.209

Test Method: ANSI C63.10-2013 Clause 11.13

Limits:

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

Frequency	Limit (dBµV/m @3m)	Remark
30 MHz-88 MHz	40.0	Quasi-peak Value
88 MHz-216 MHz	43.5	Quasi-peak Value
216 MHz-960 MHz	46.0	Quasi-peak Value
960 MHz-1 GHz	54.0	Quasi-peak Value
Above 1 GHz	54.0	Average Value
	74.0	Peak Value

Test Setup: Refer to section 4.4.1 for details.

Test Procedures:

Radiated band edge measurements at 2390 MHz and 2483.5 MHz were made with the unit transmitting in the low end of the channel range and the high end closest to the restricted bands respectively. The emissions were made on the 966 Semi-Chamber. Use (resolution bandwidth (RBW) = 1 MHz, video bandwidth (VBW) = 3 MHz for peak levels and RBW = 1 MHz and VBW = 10 Hz or 1/T for average levels).

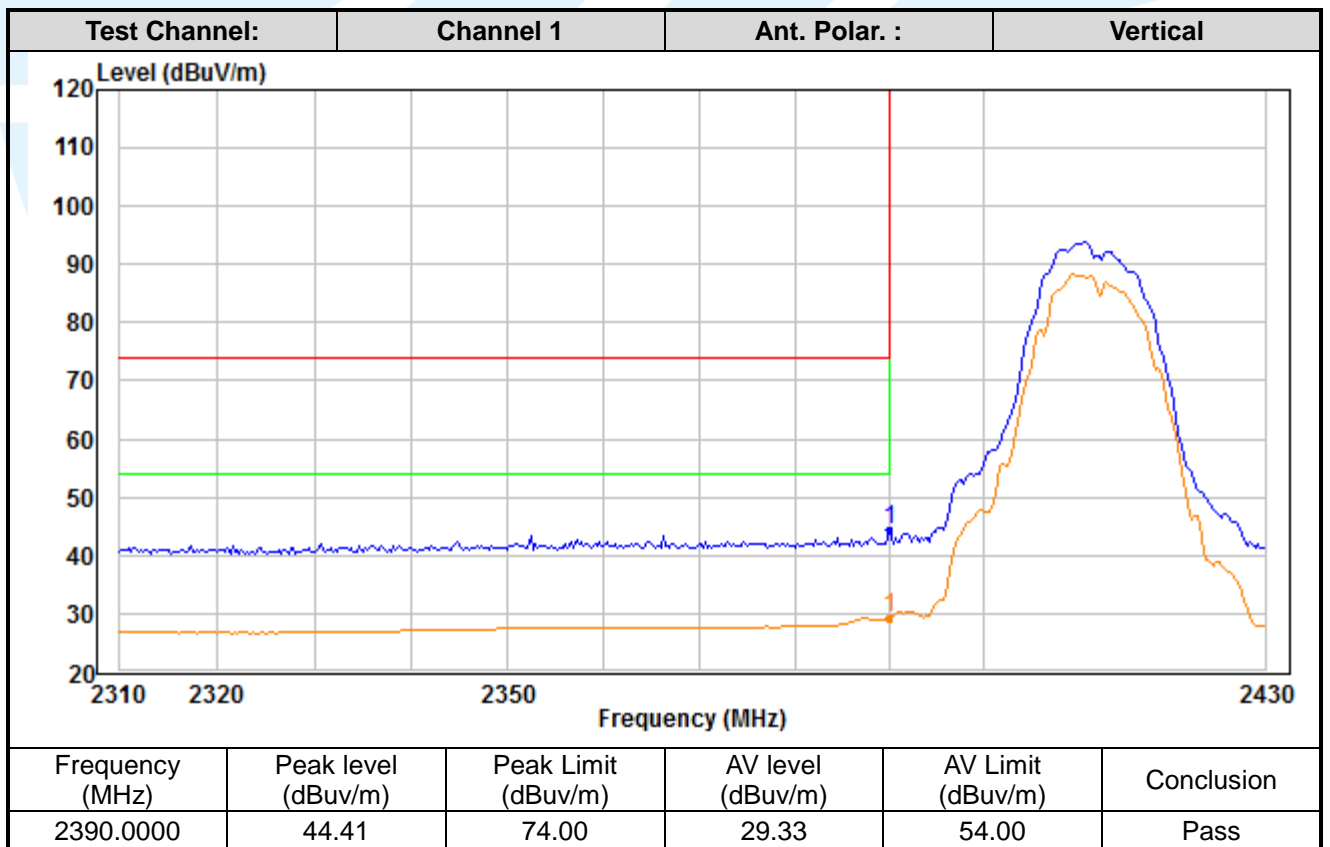
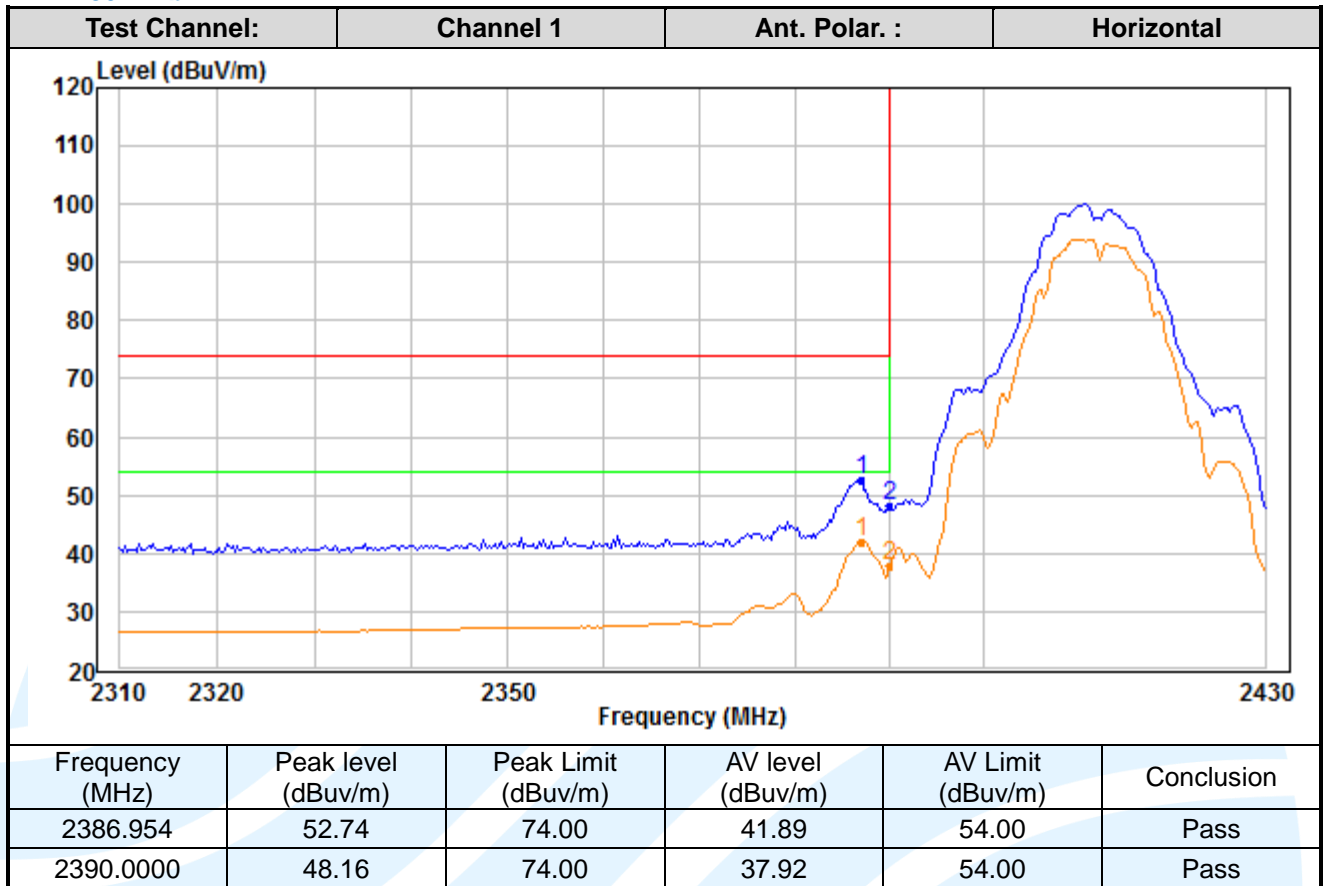
1. Use radiated spurious emission test procedure described in clause 5.10. The transmitter output (antenna port) was connected to the test receiver.
2. Set the PK and AV limit line.
3. Record the fundamental emission and emissions out of the band-edge.
4. Determine band-edge compliance as required.

Equipment Used: Refer to section 3 for details.

Test Result: Pass

The measurement data as follows:

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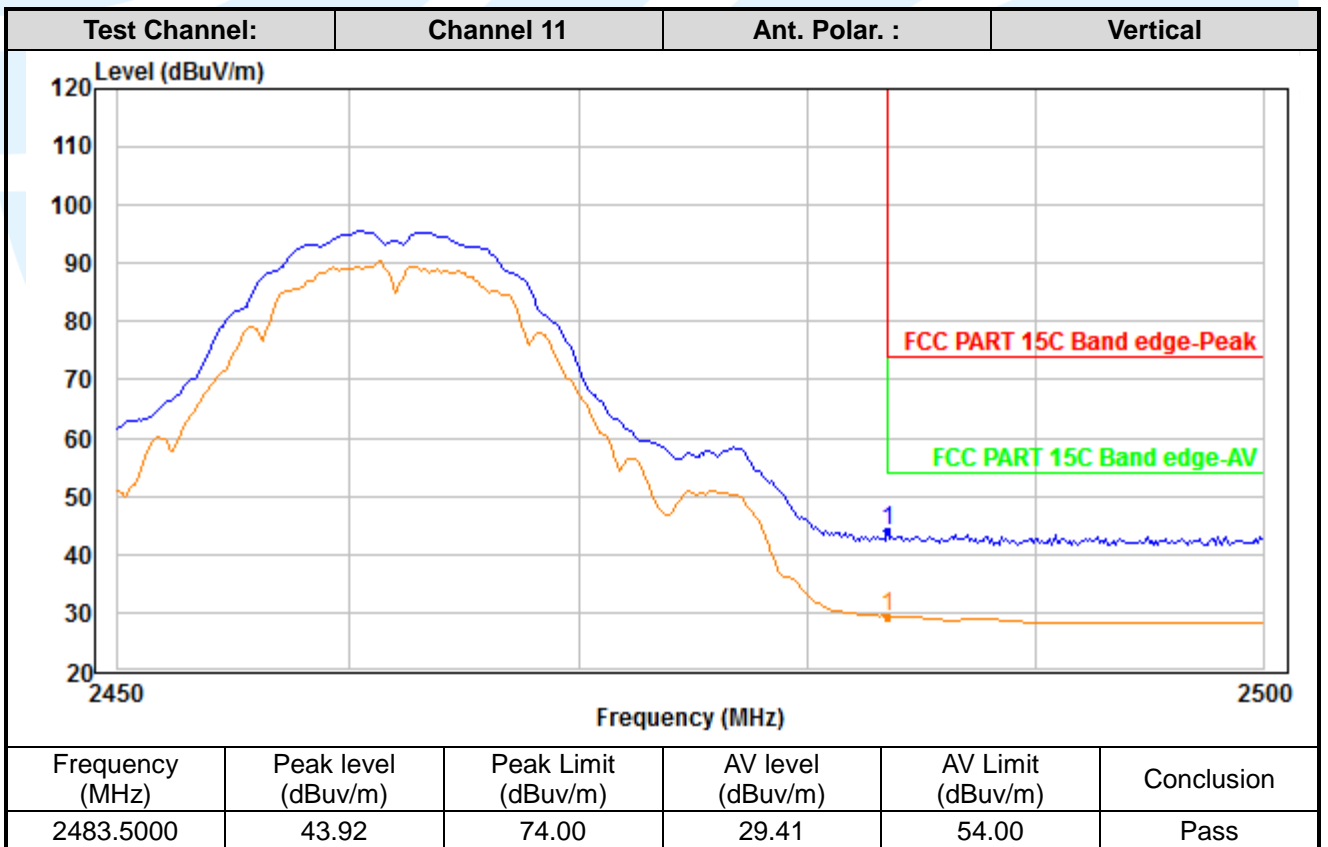
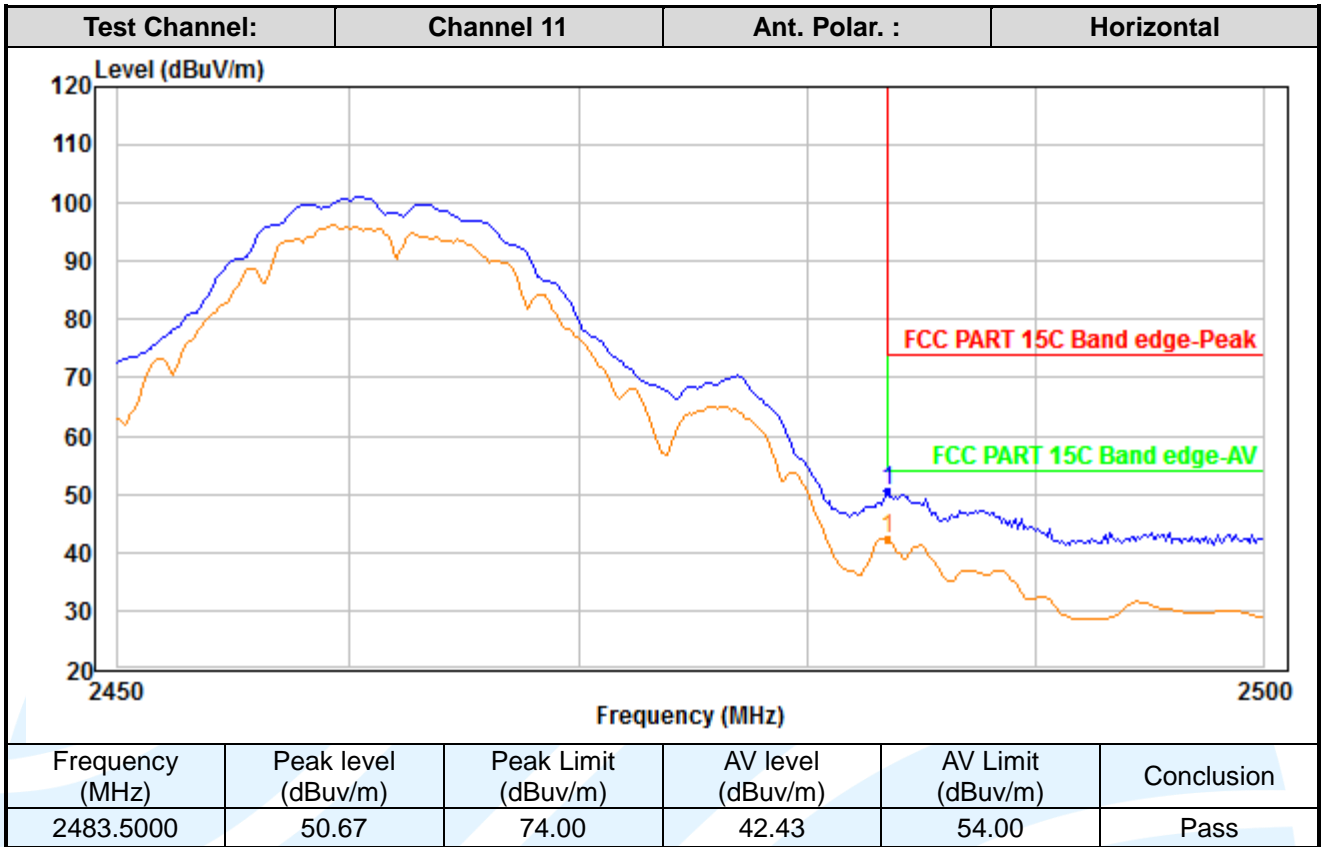
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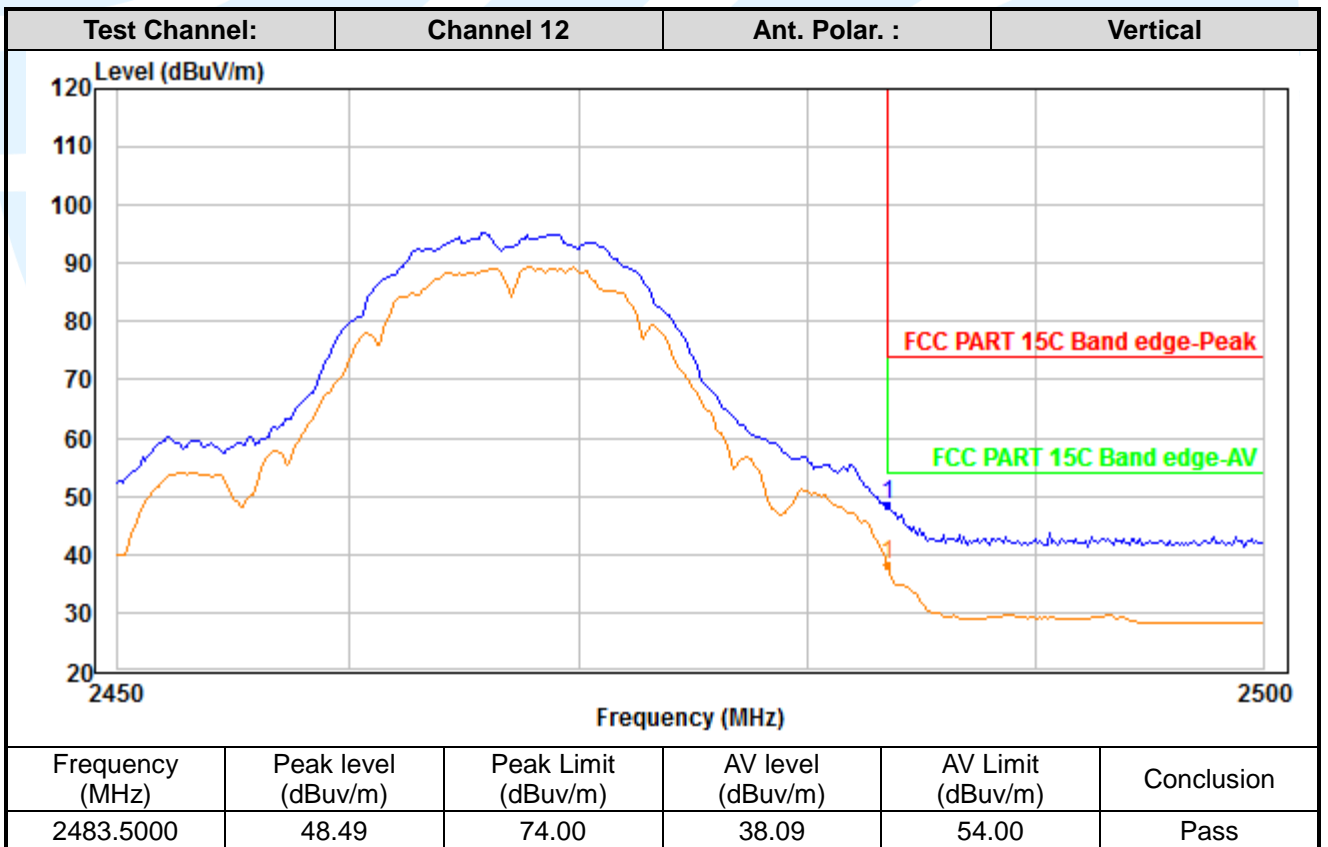
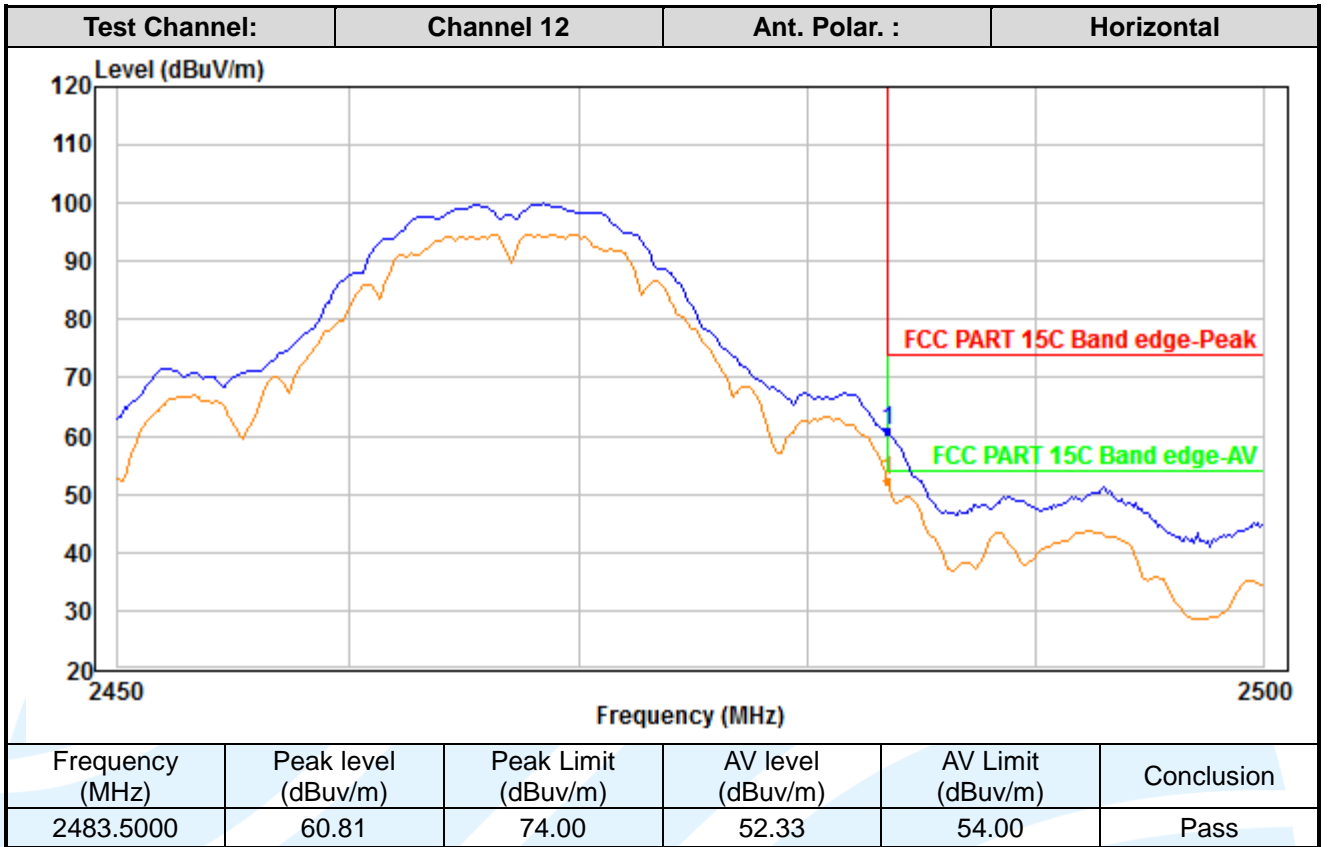
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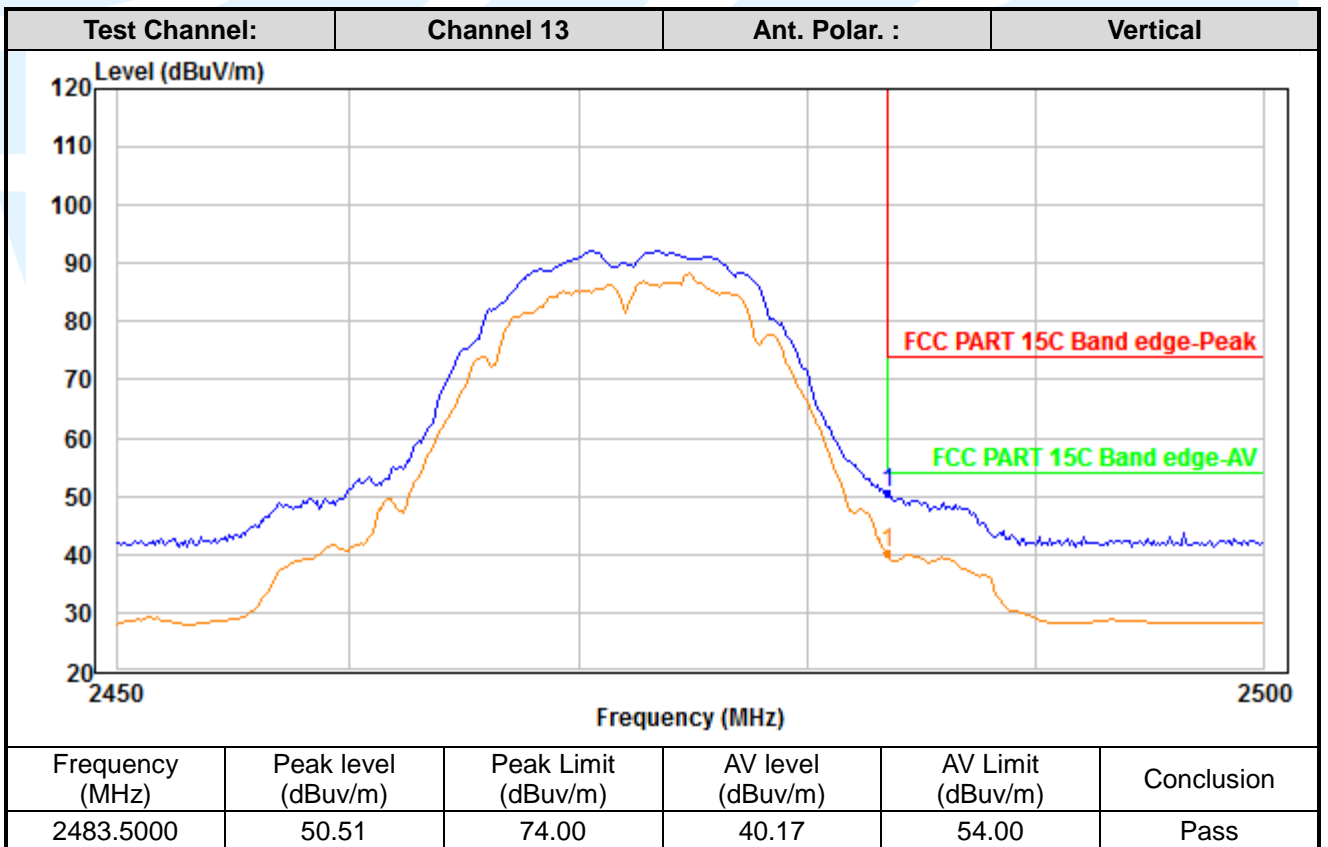
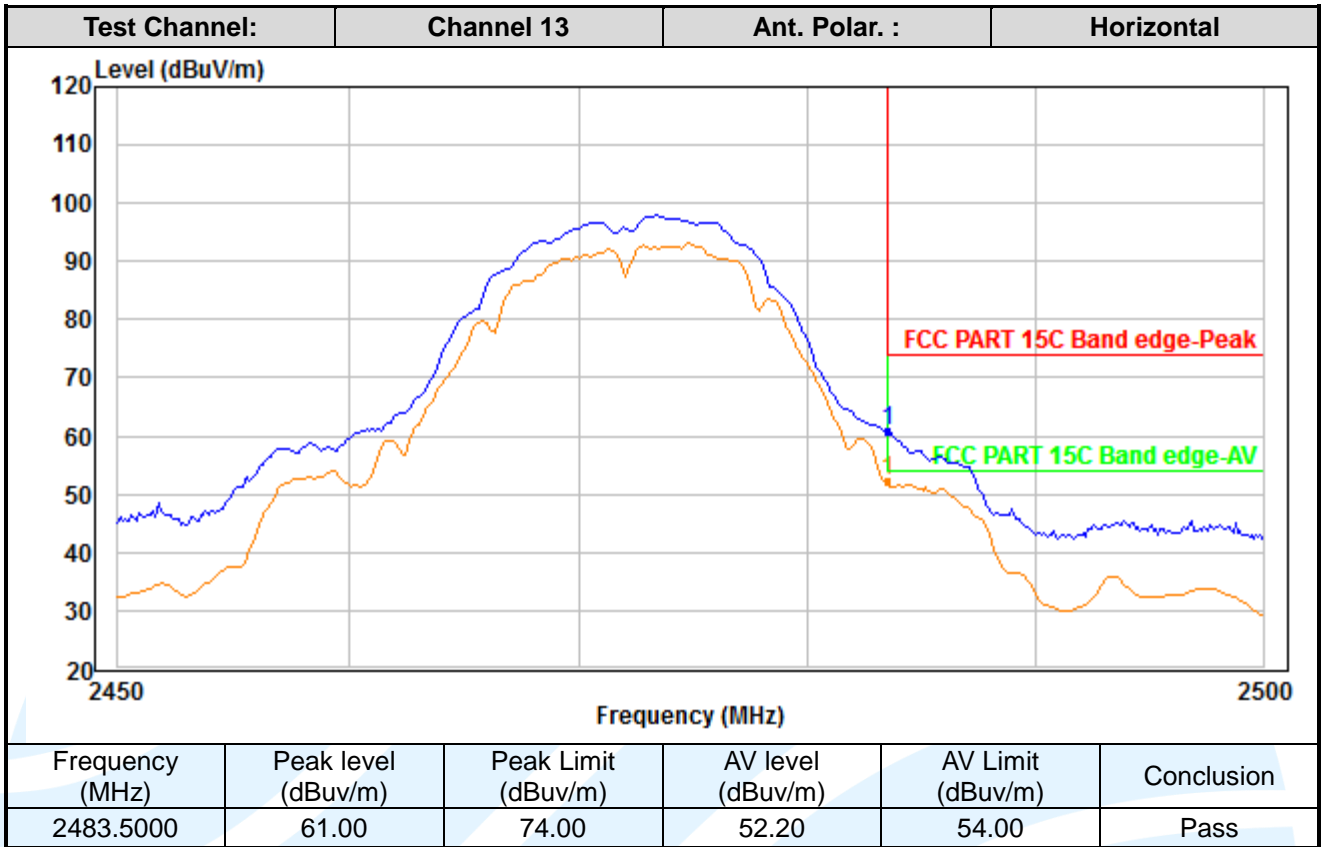
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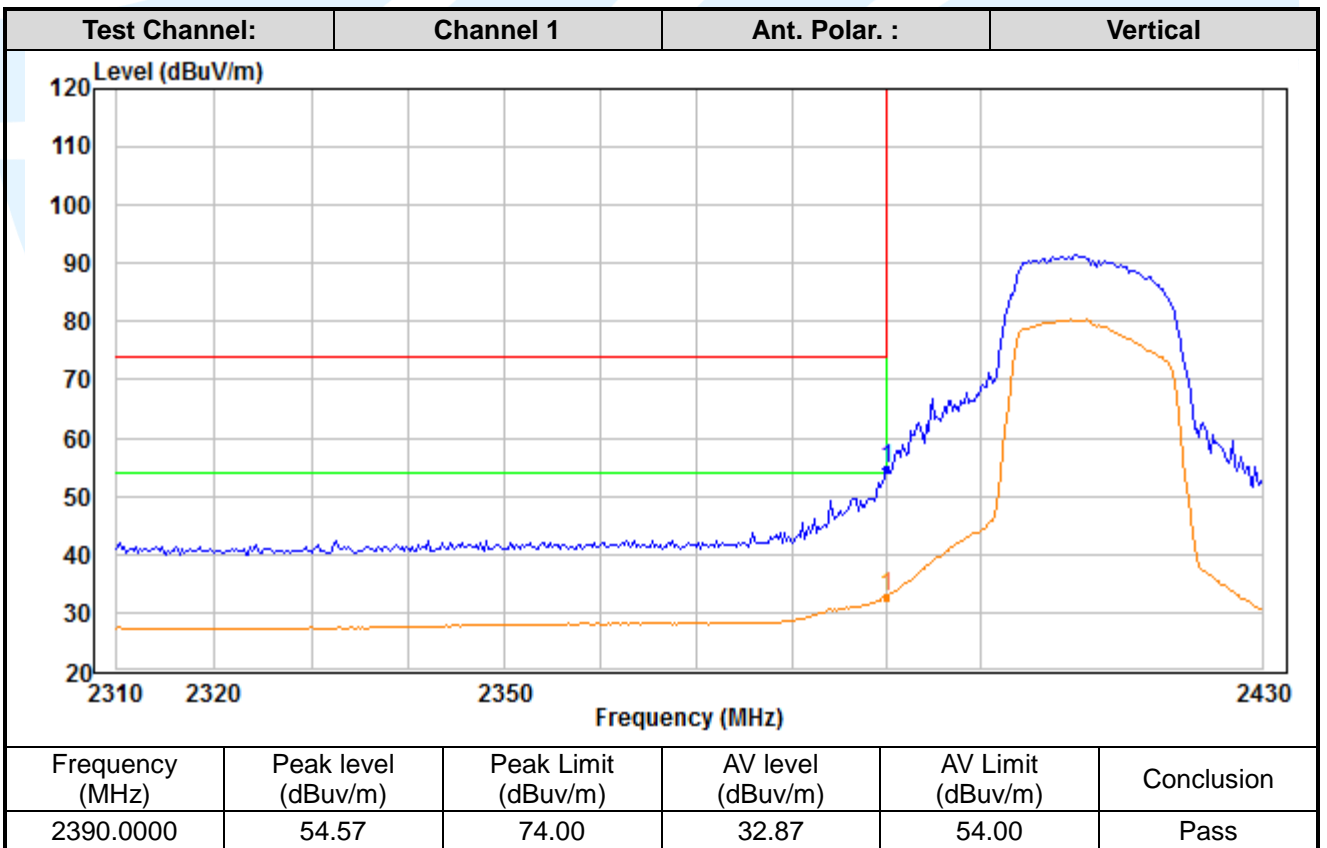
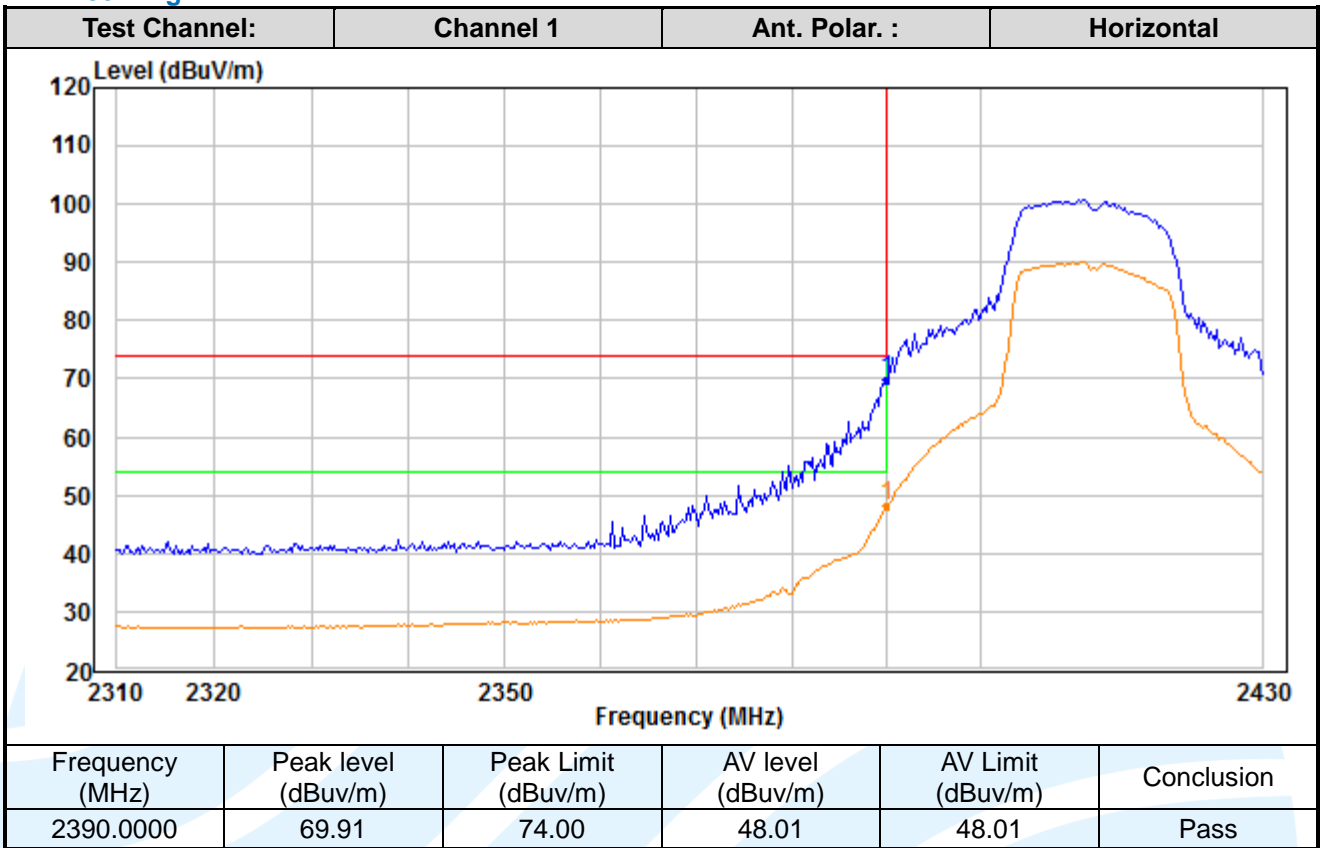
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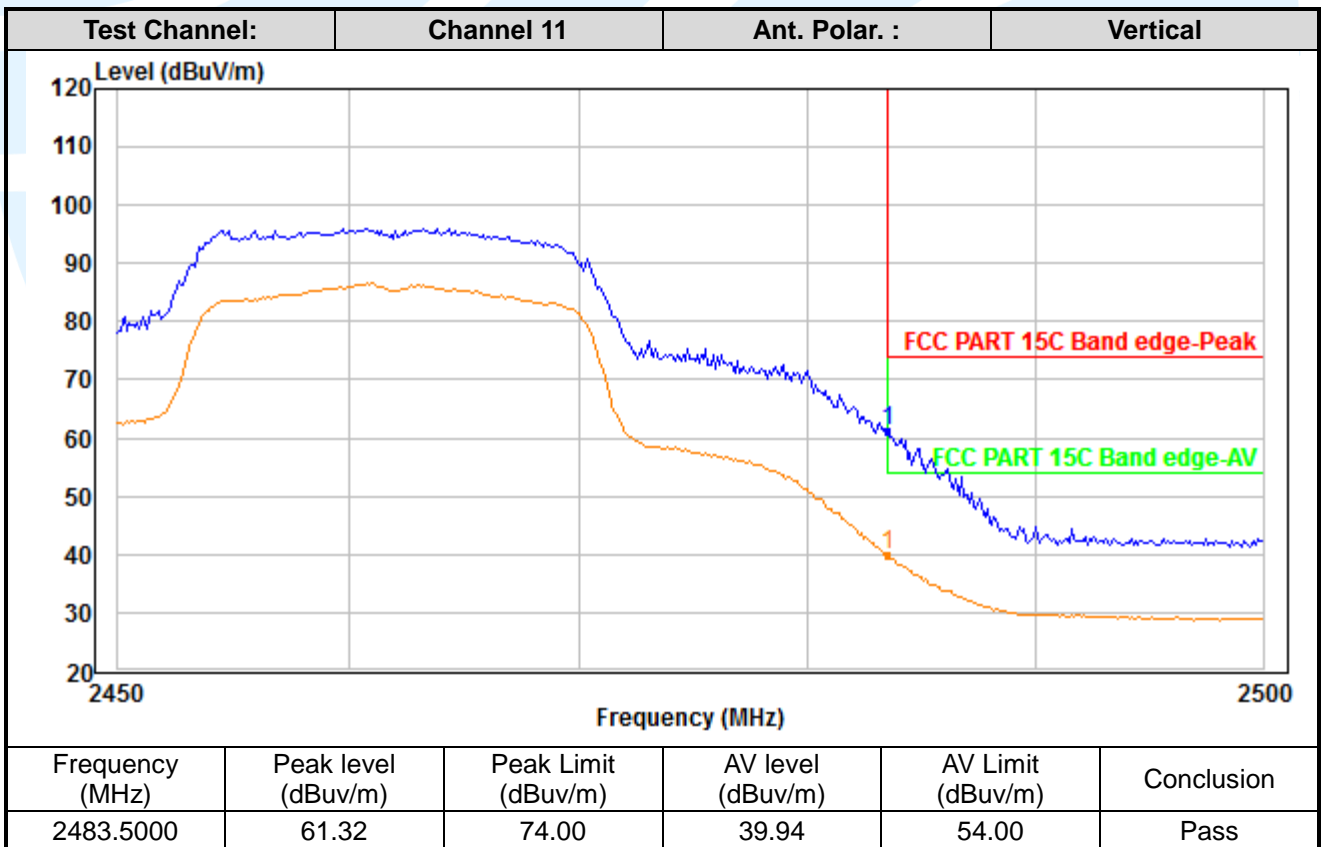
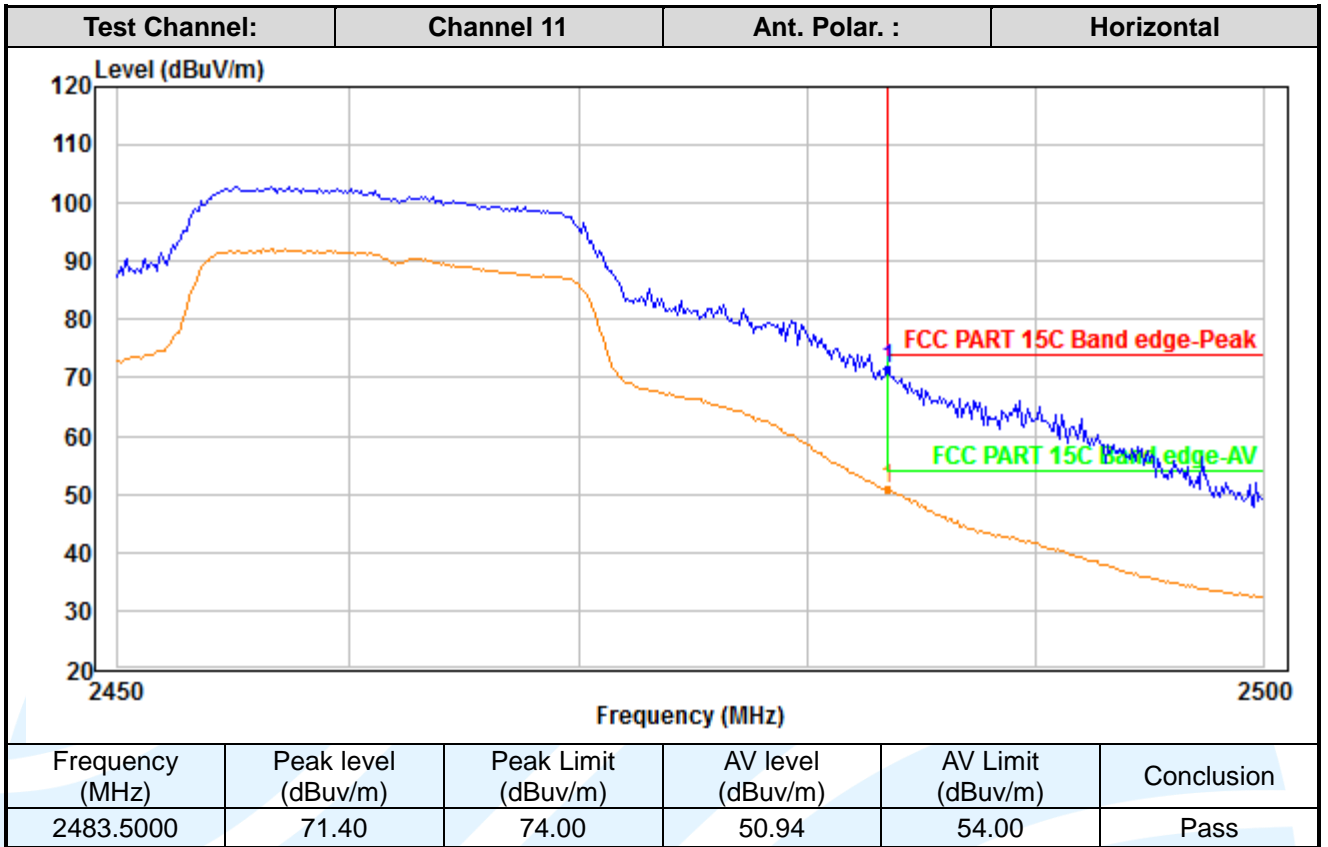
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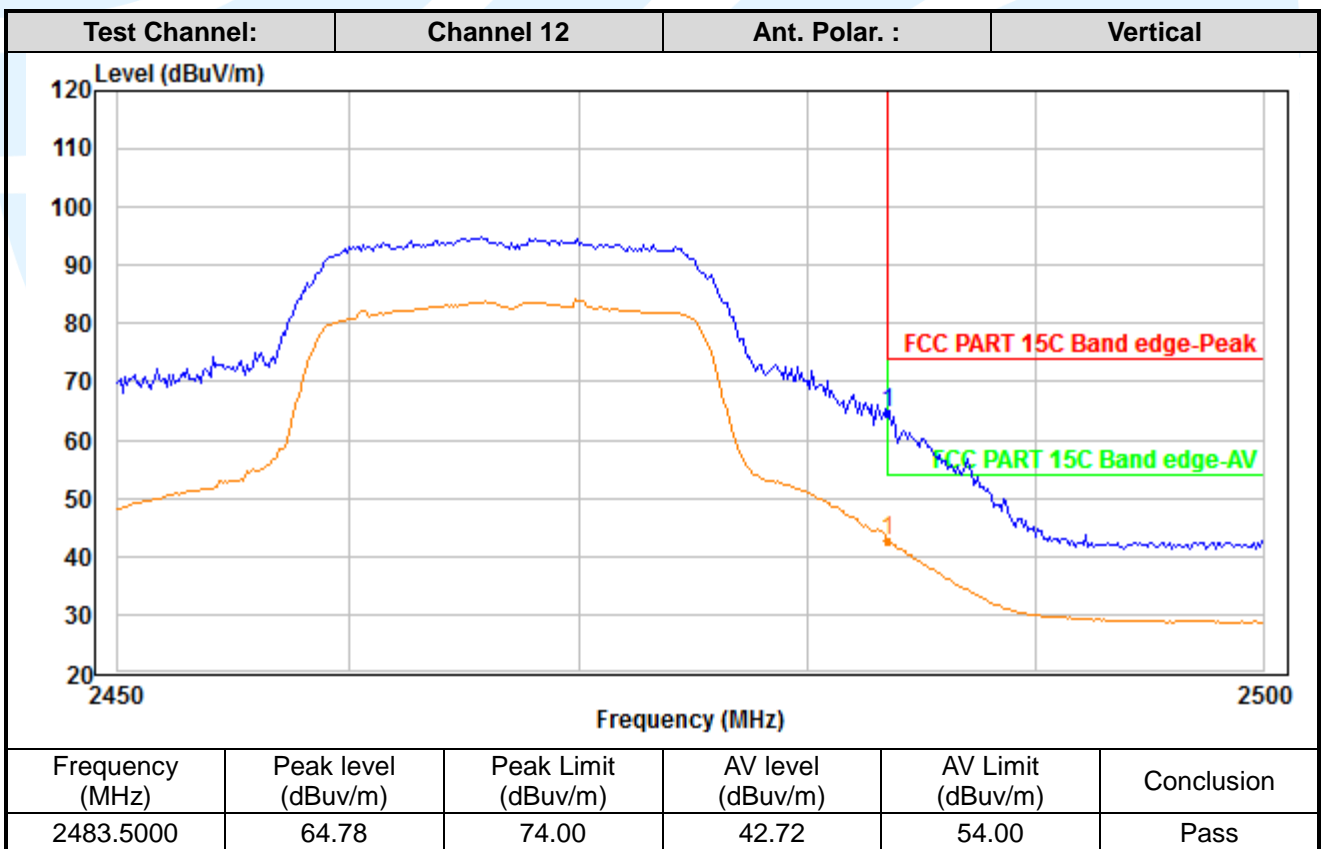
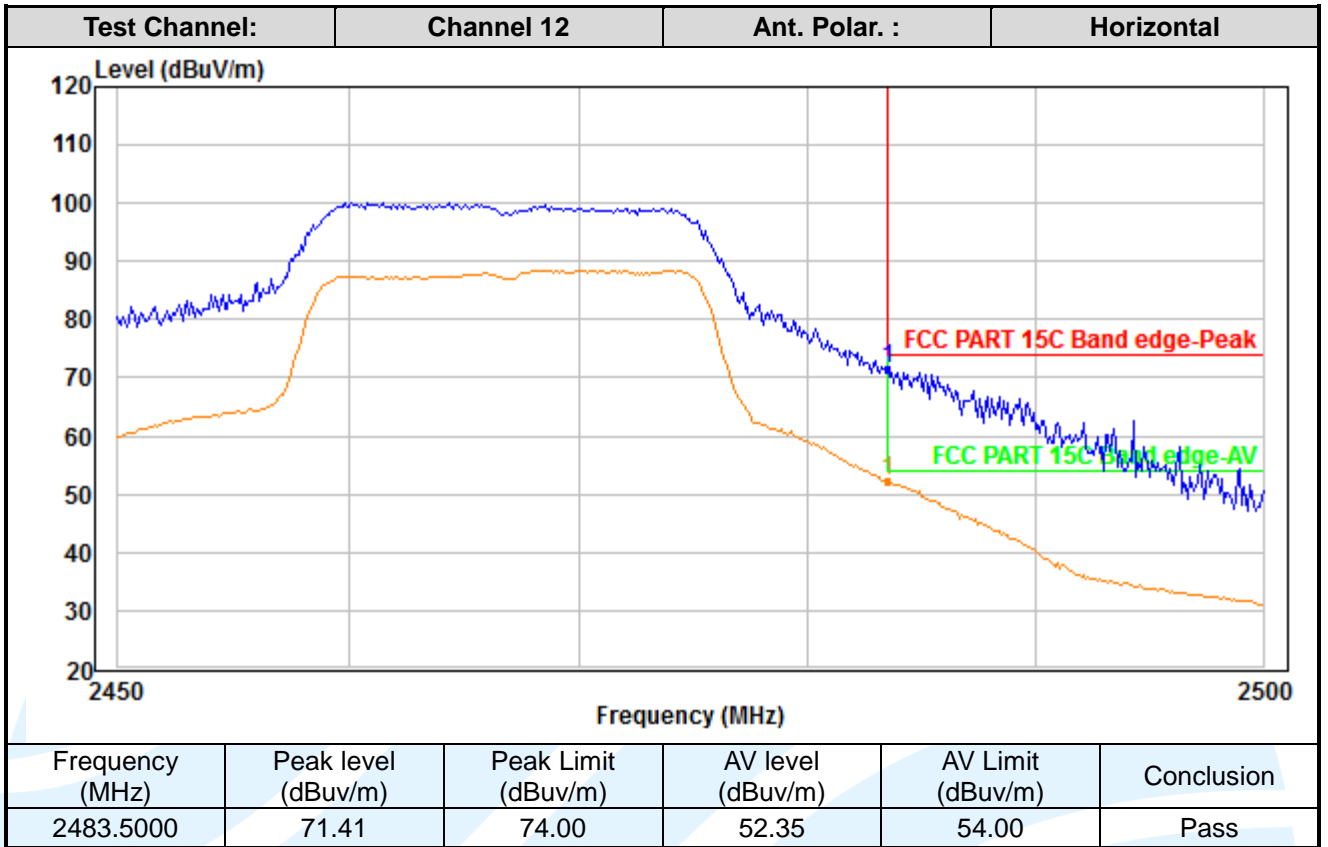
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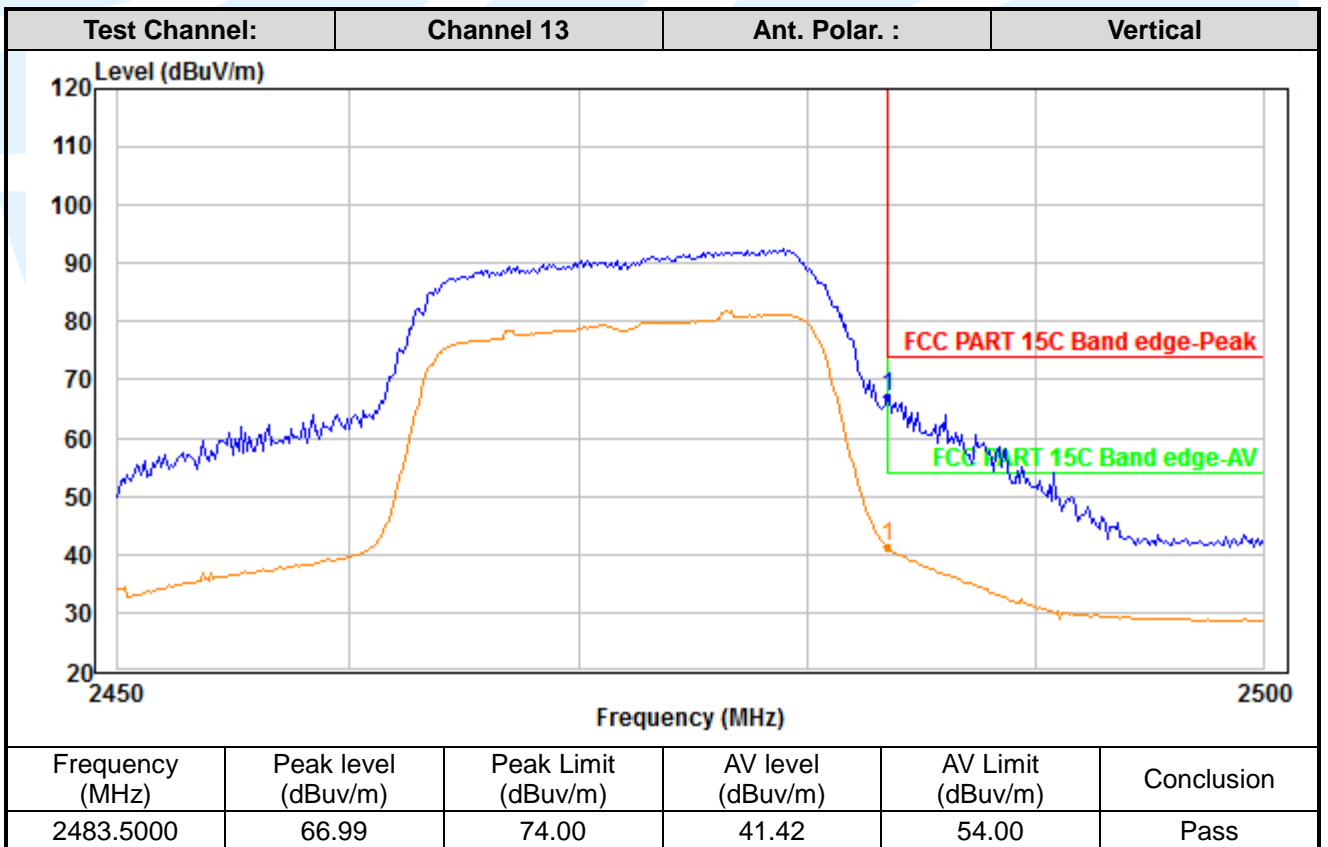
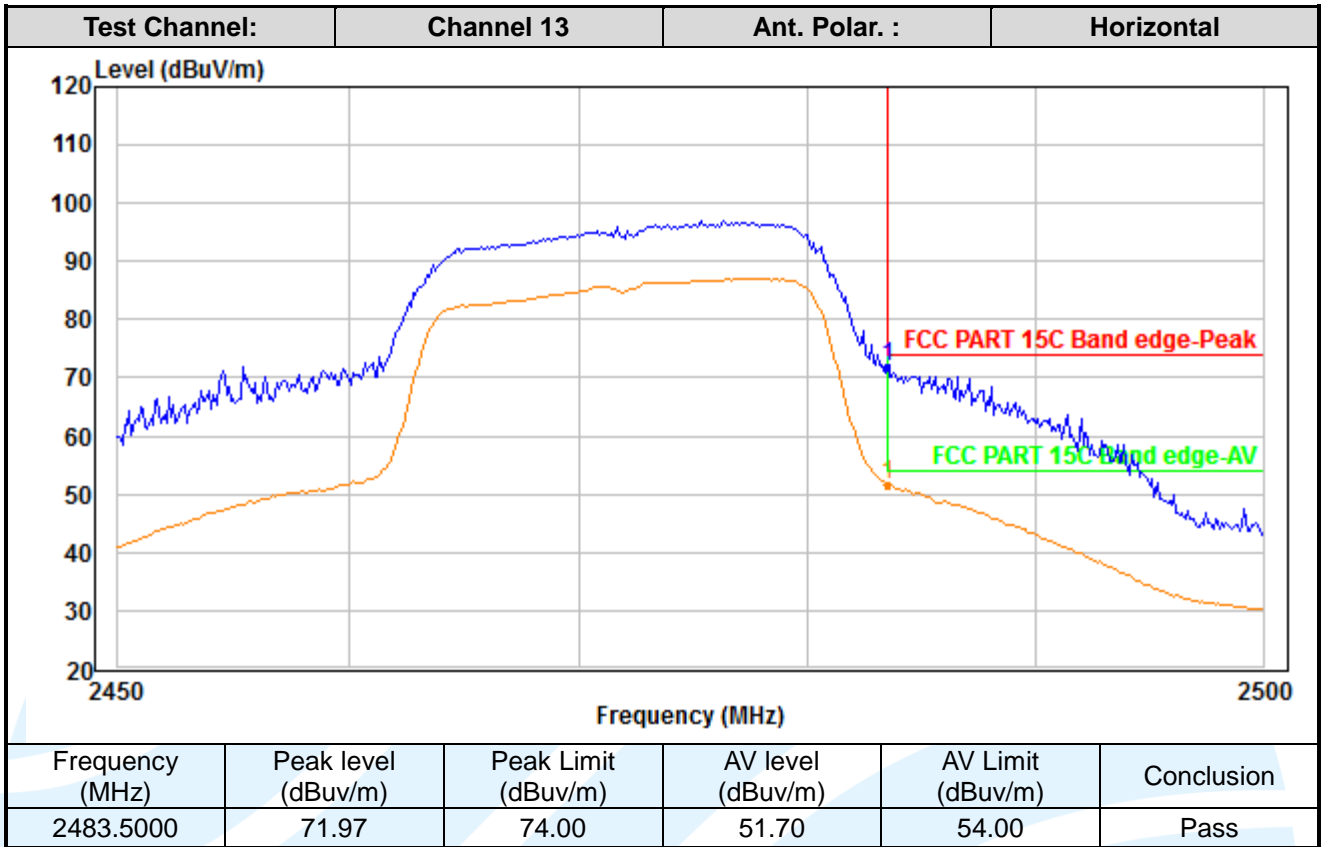
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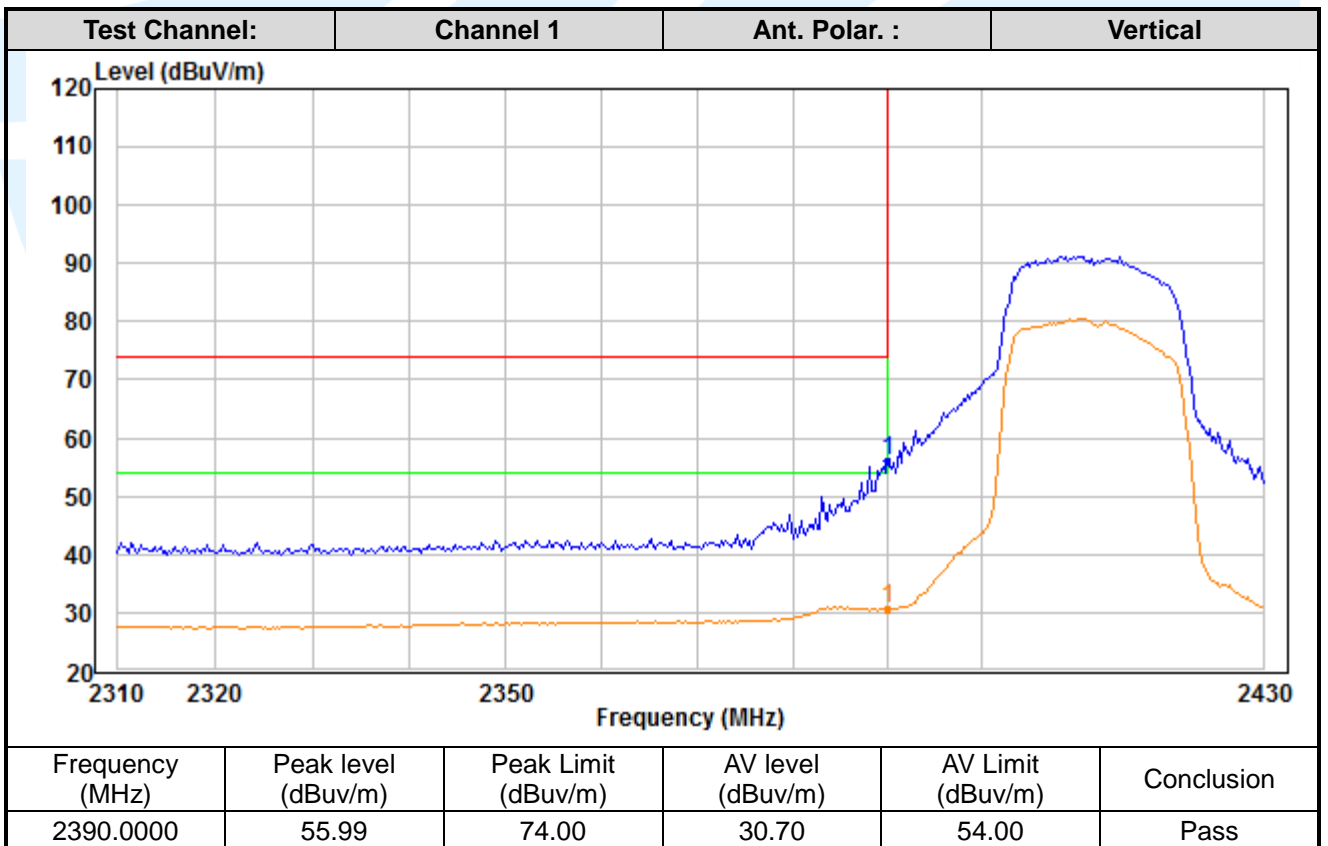
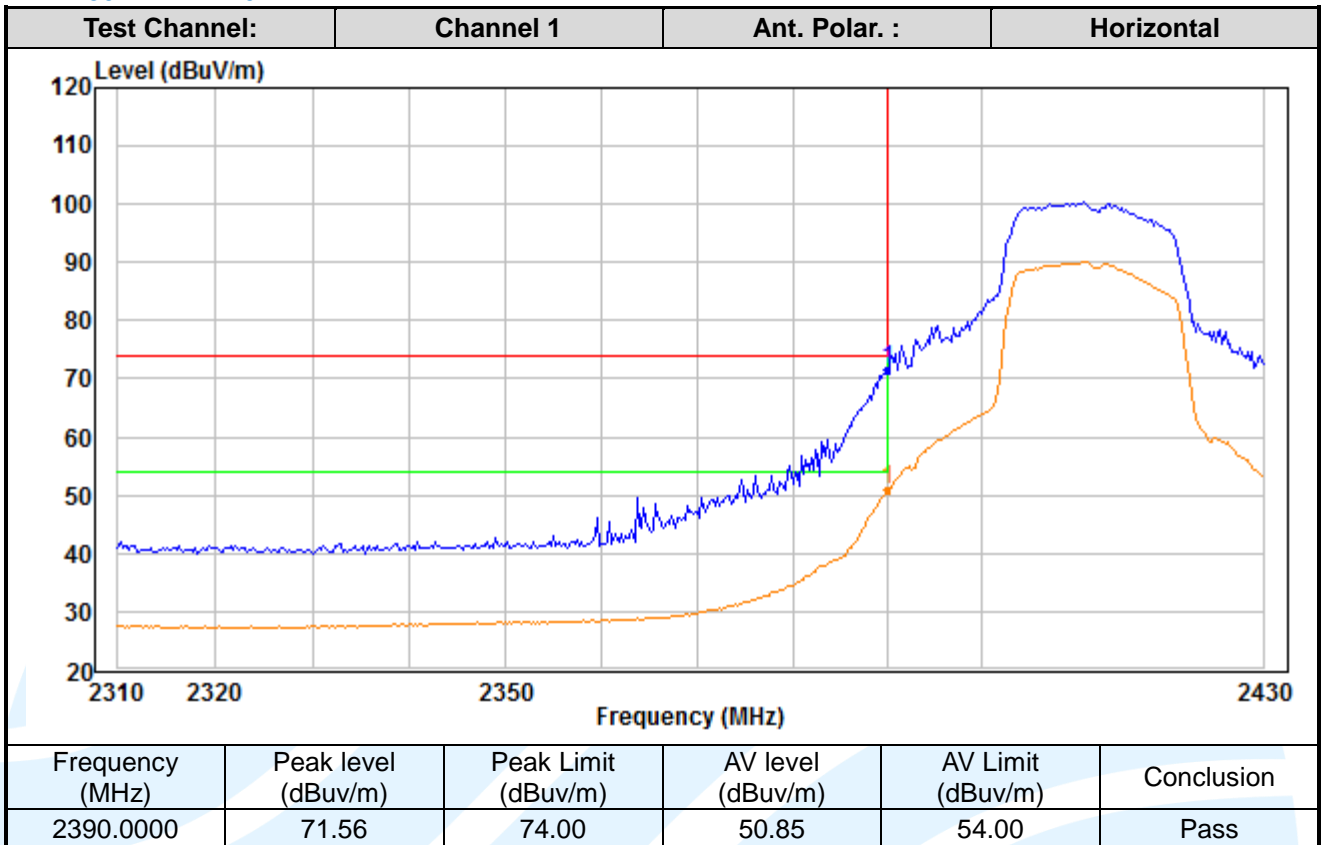
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IEEE 802.11n-HT20



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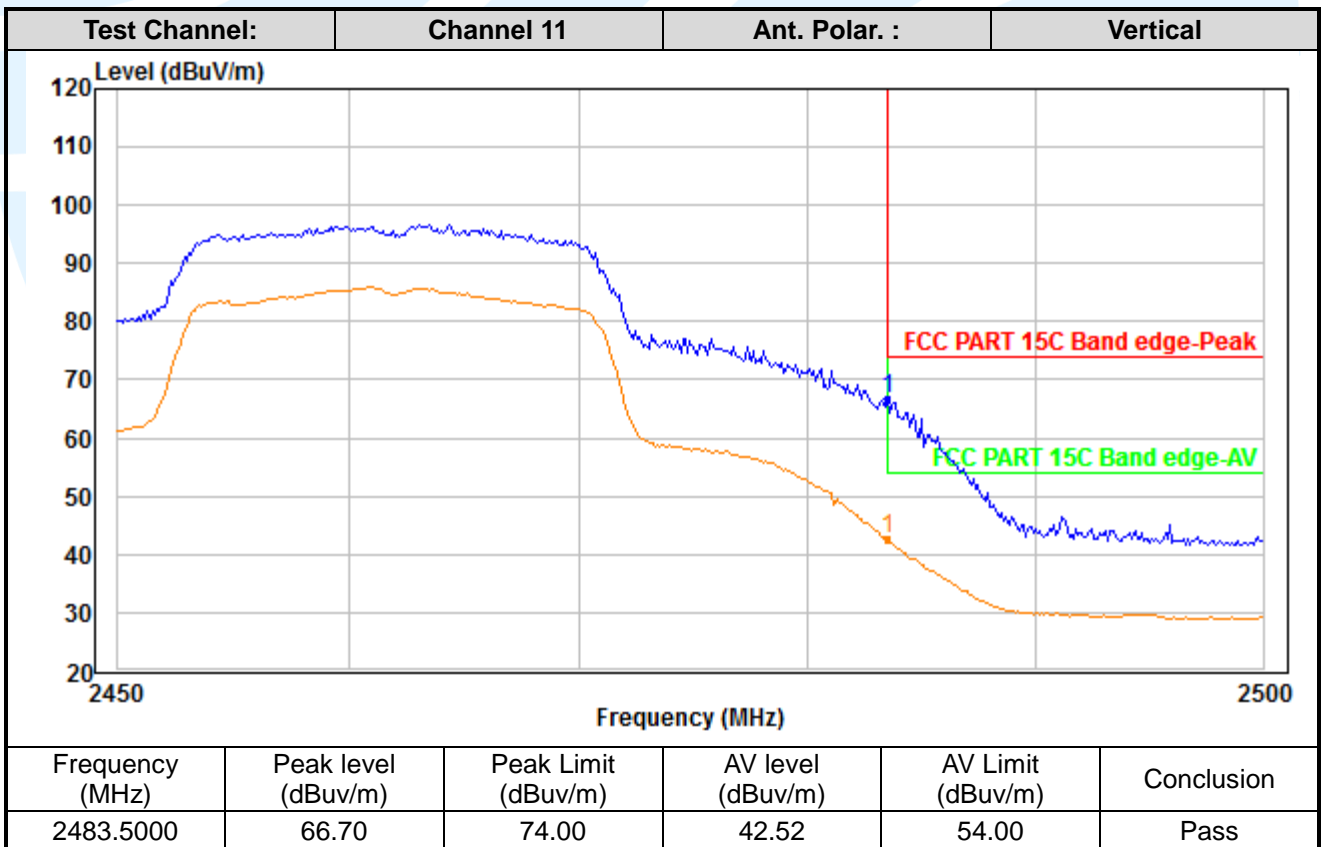
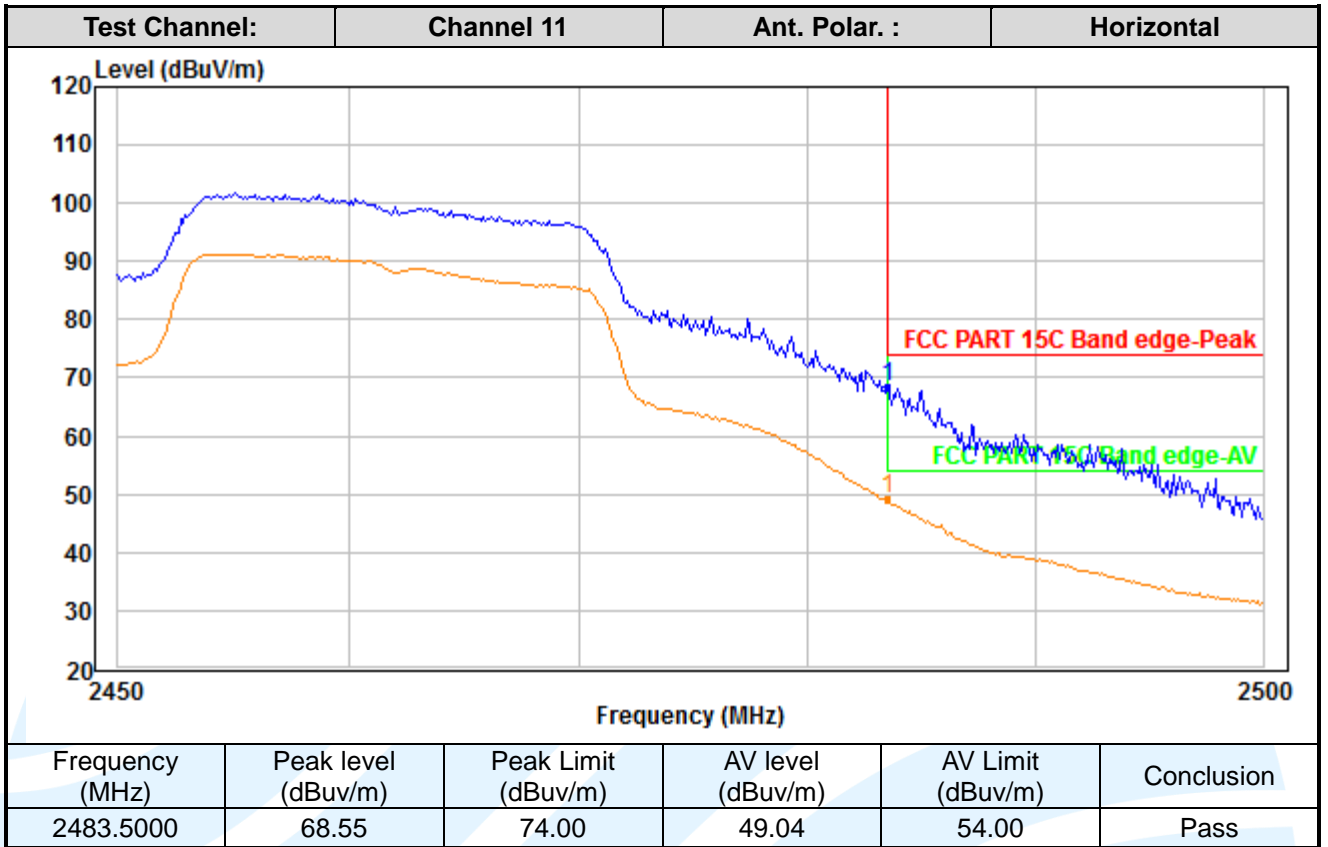
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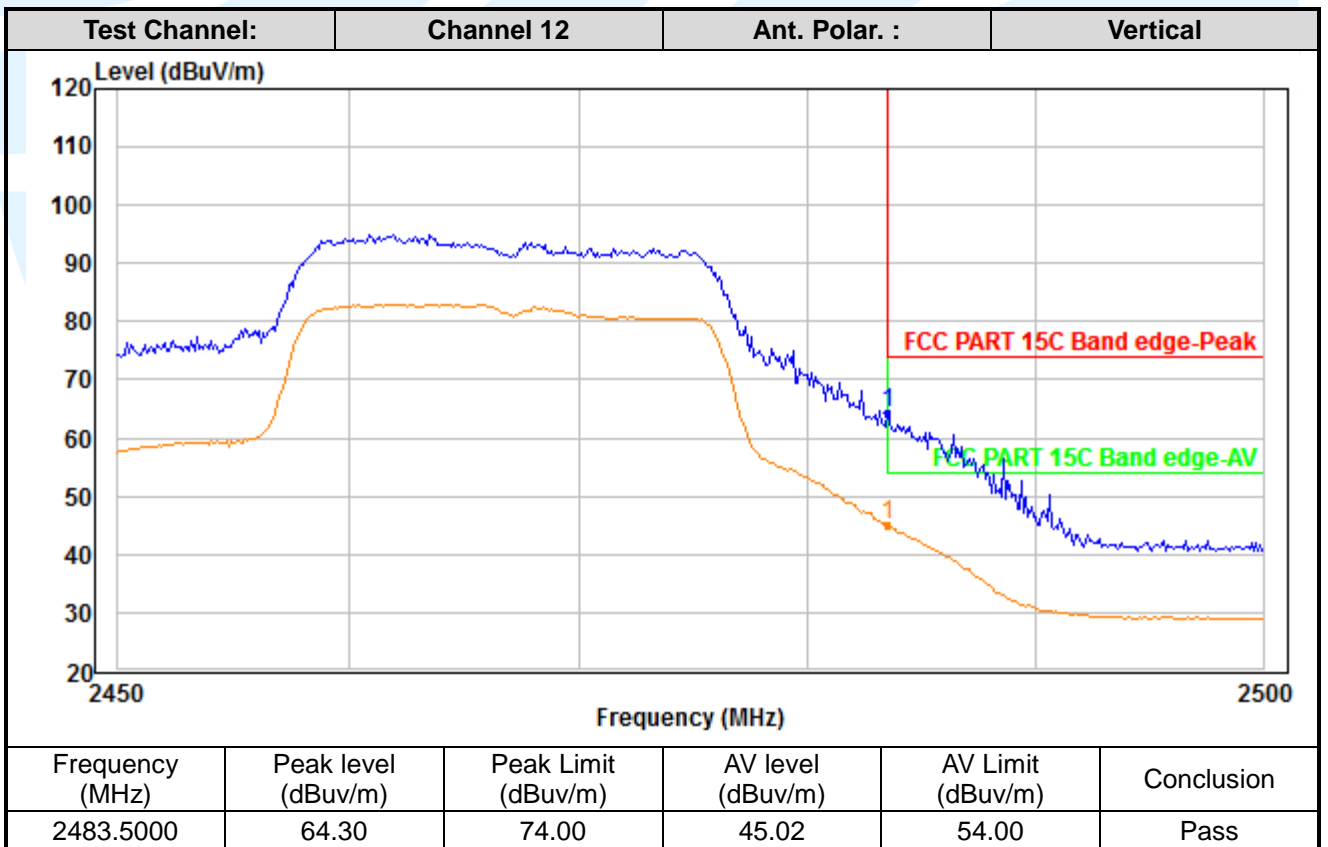
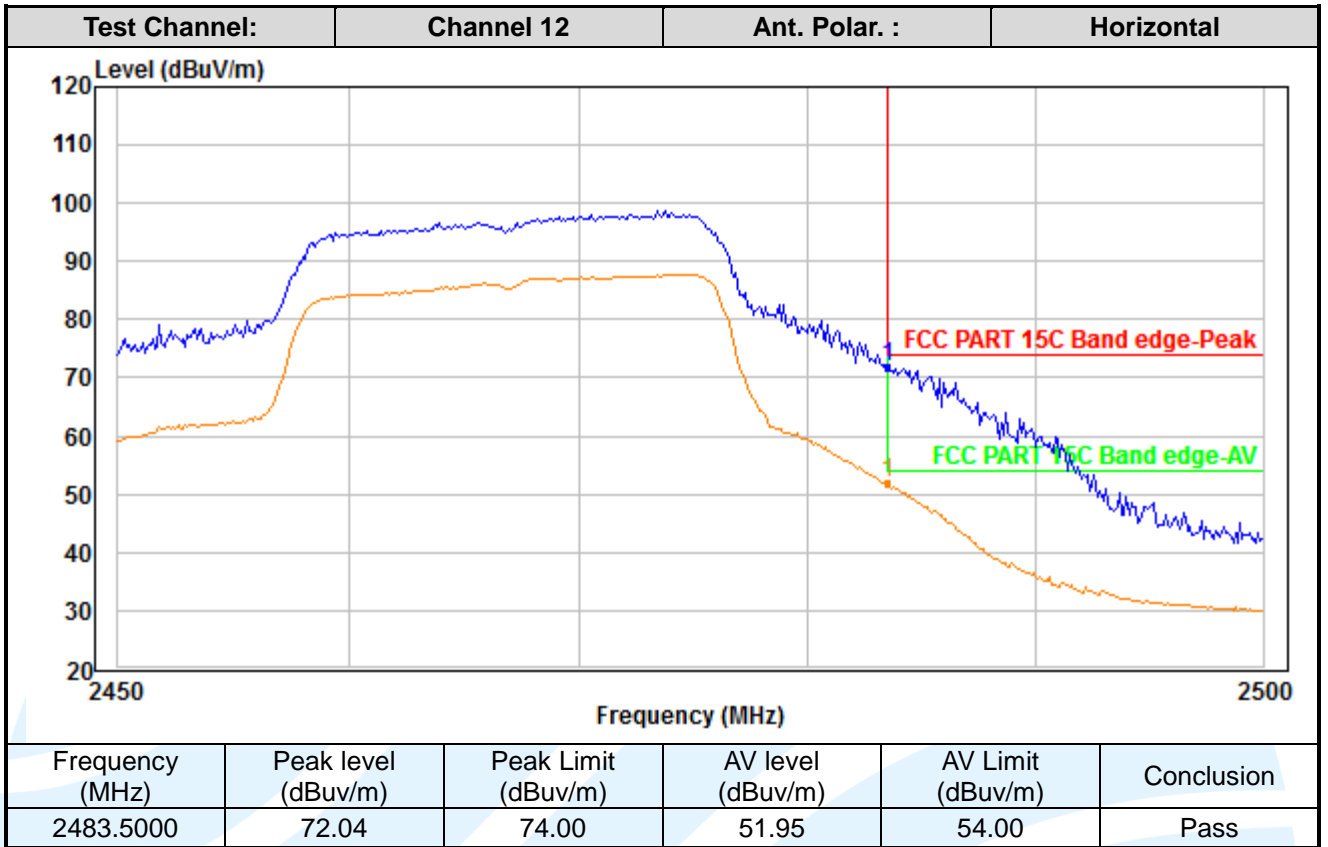
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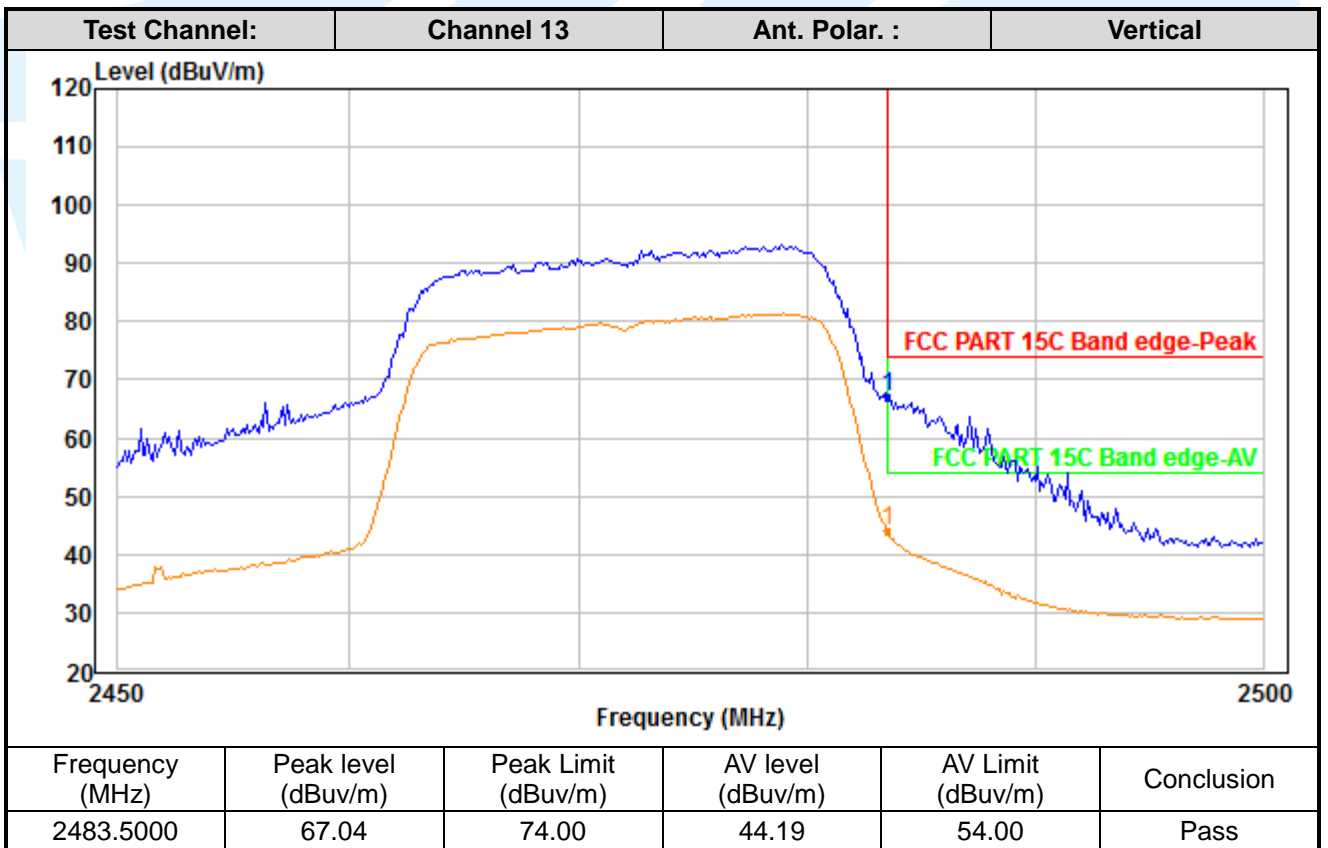
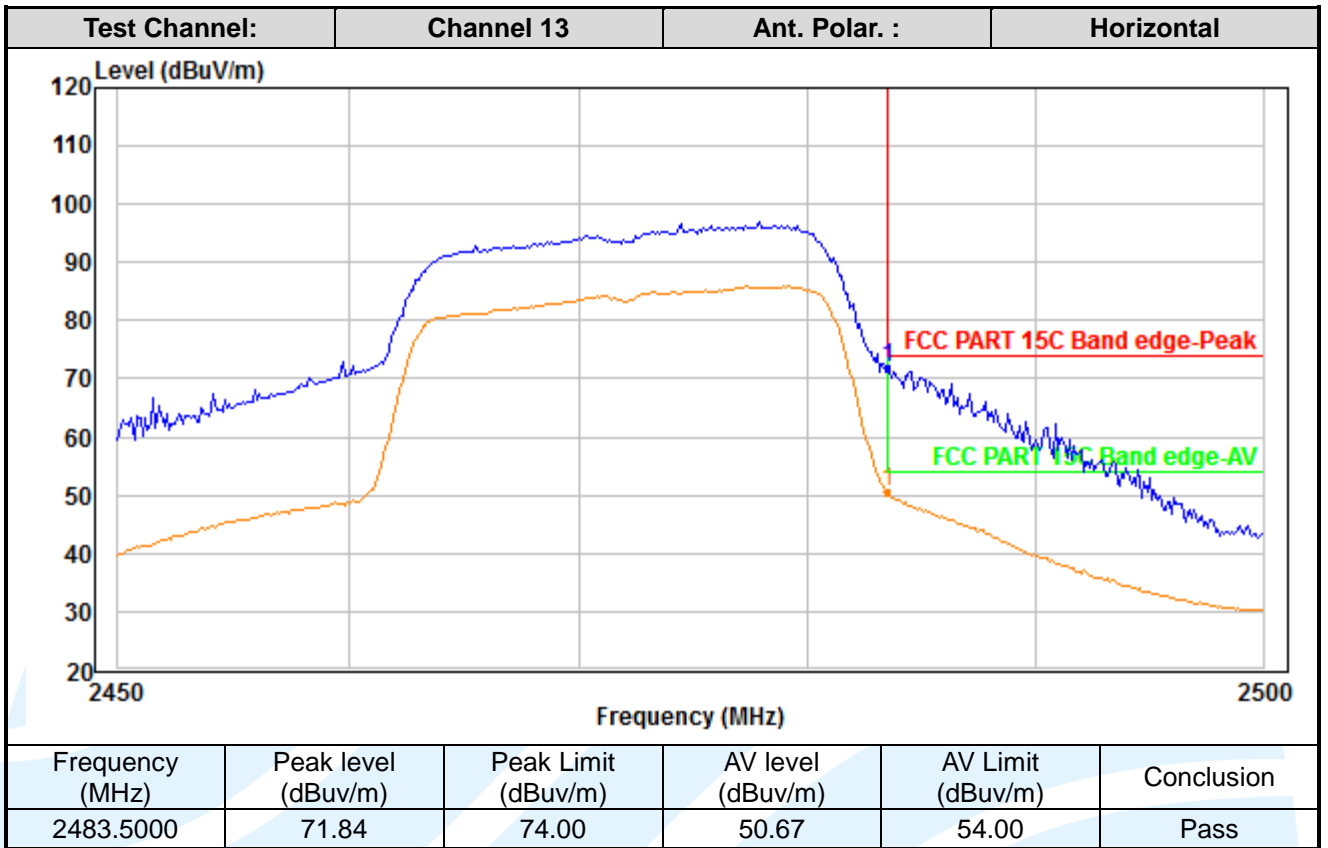
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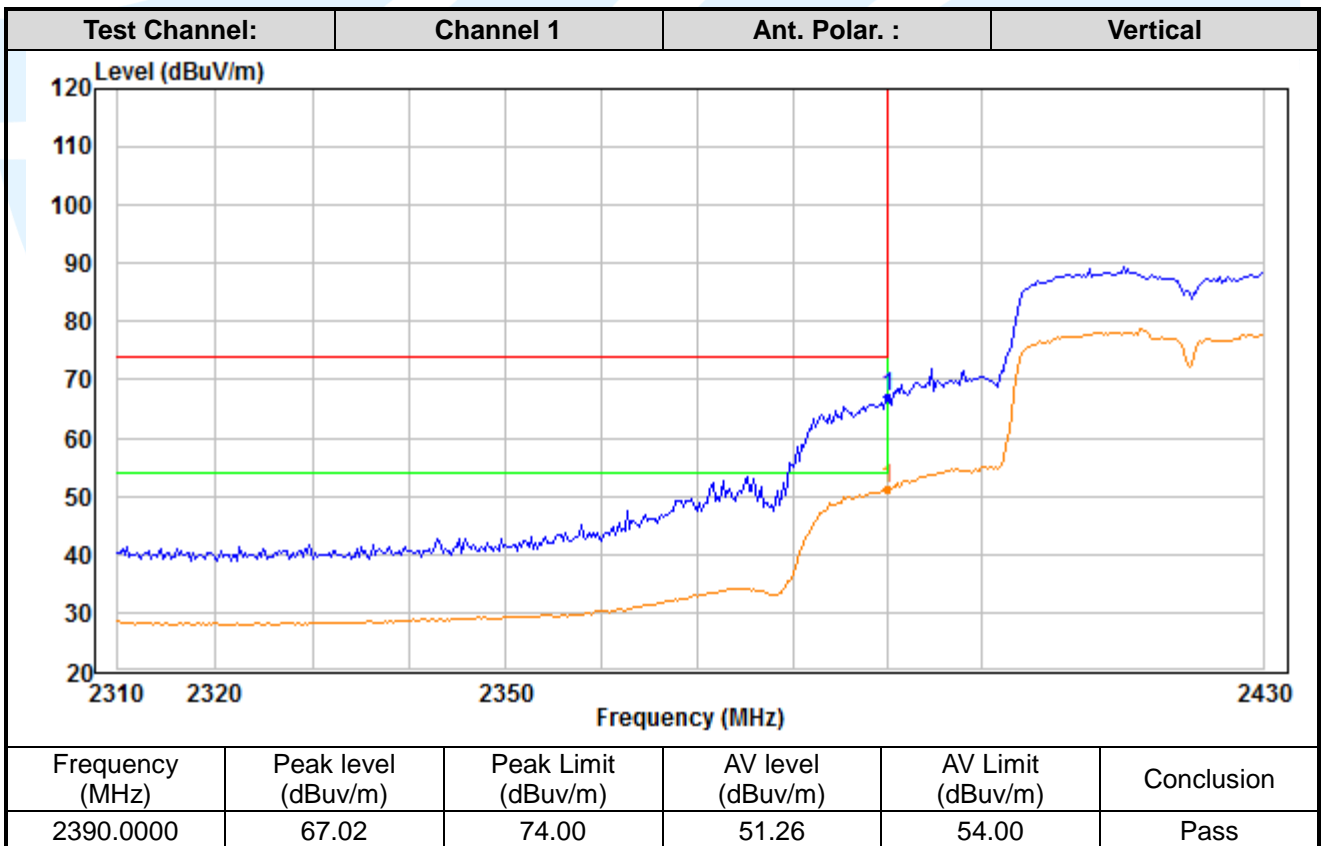
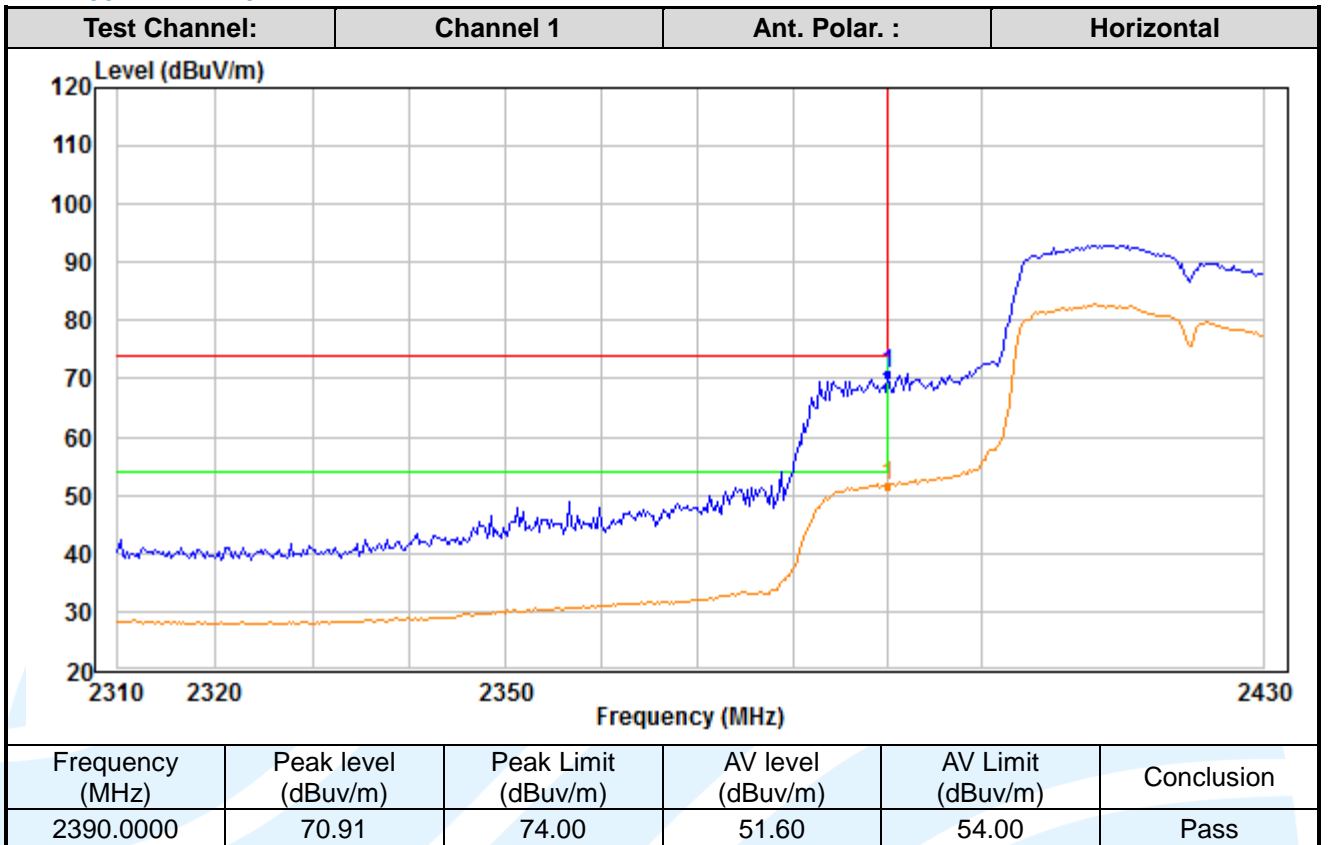
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IEEE 802.11n-HT40



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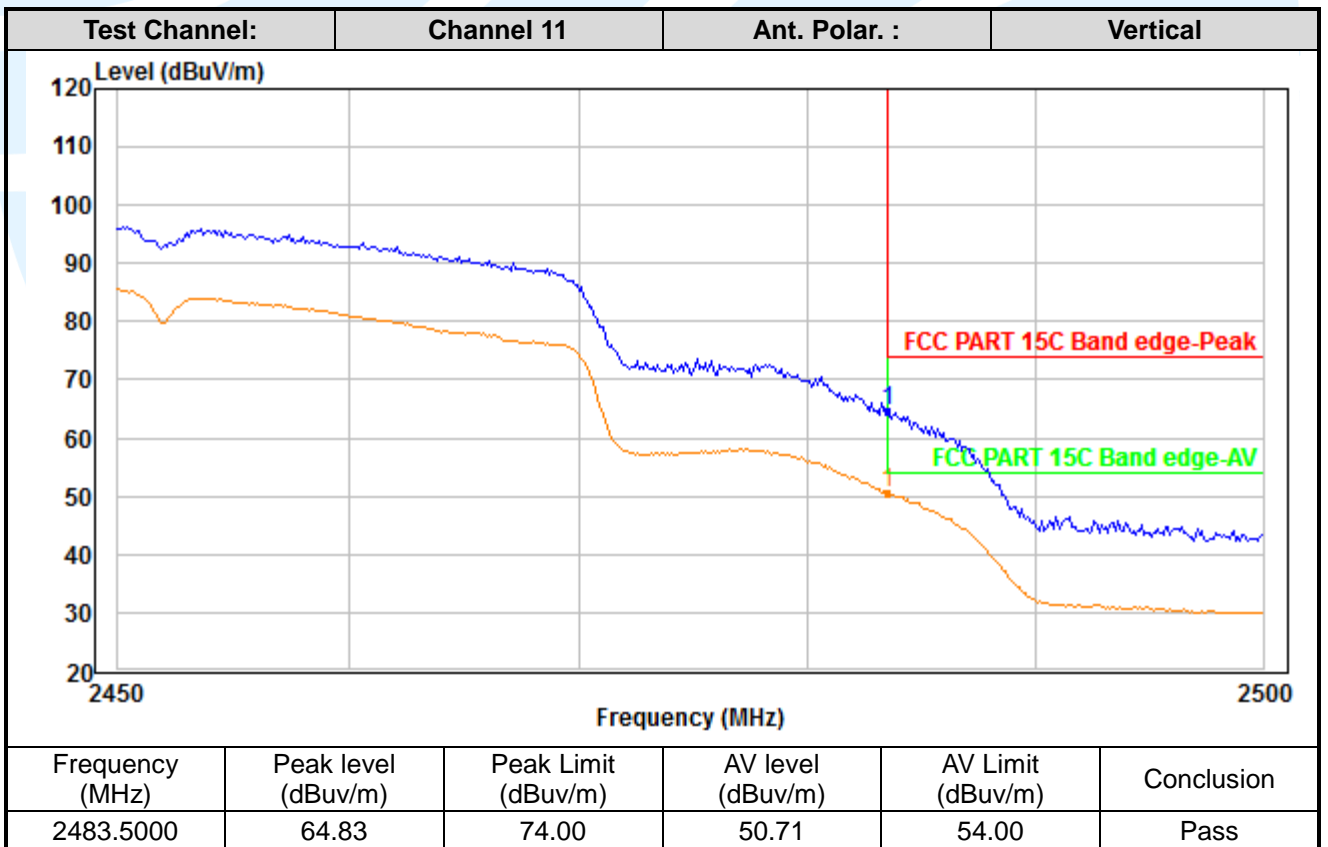
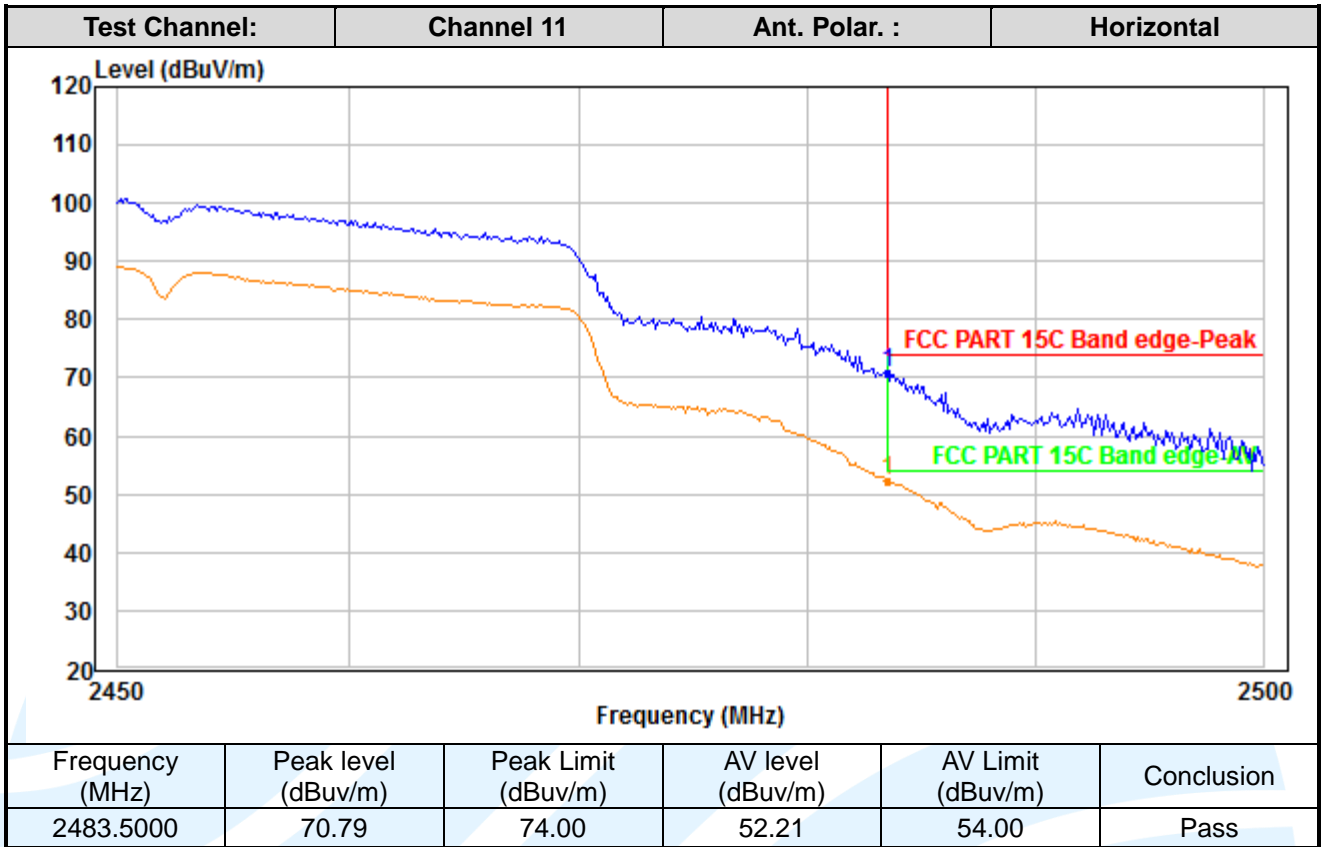
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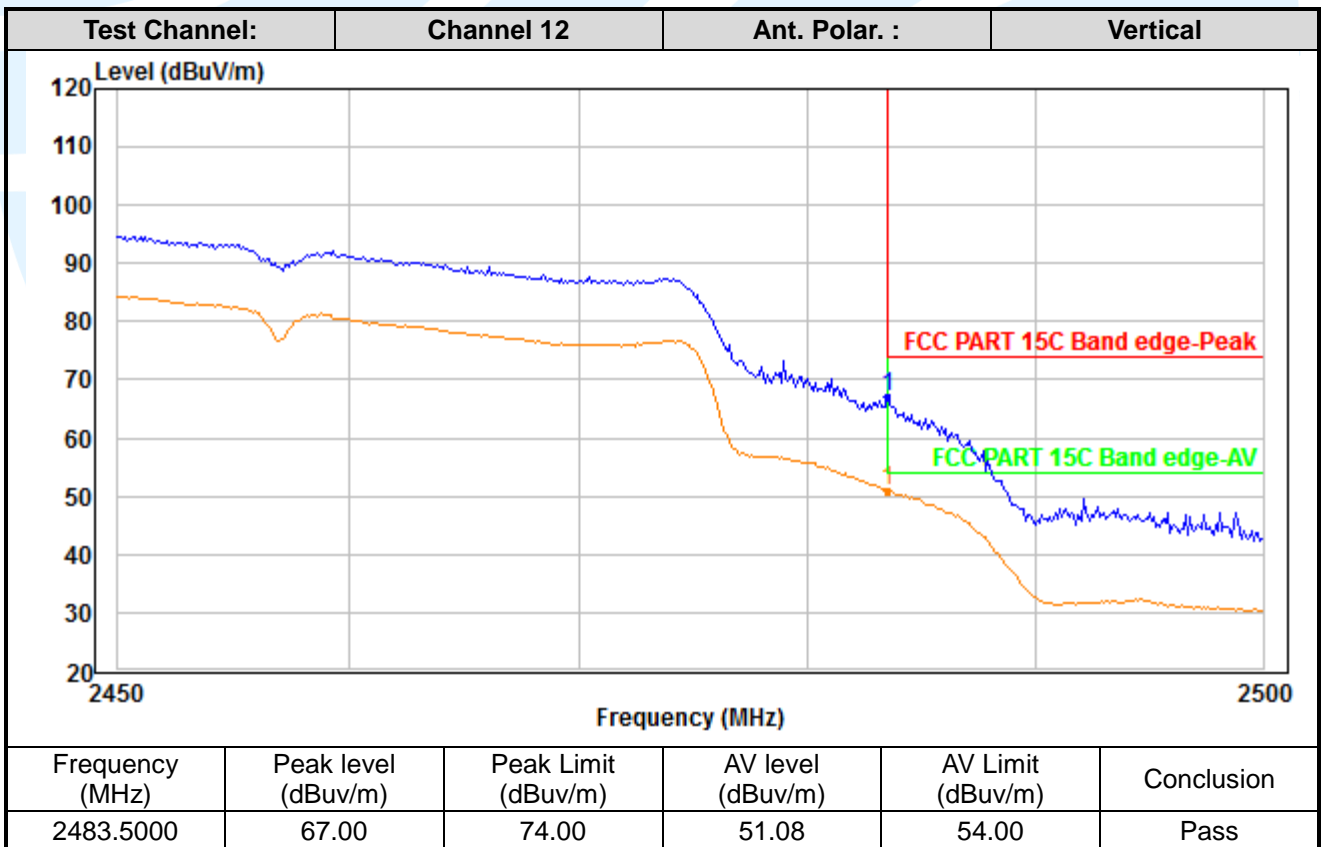
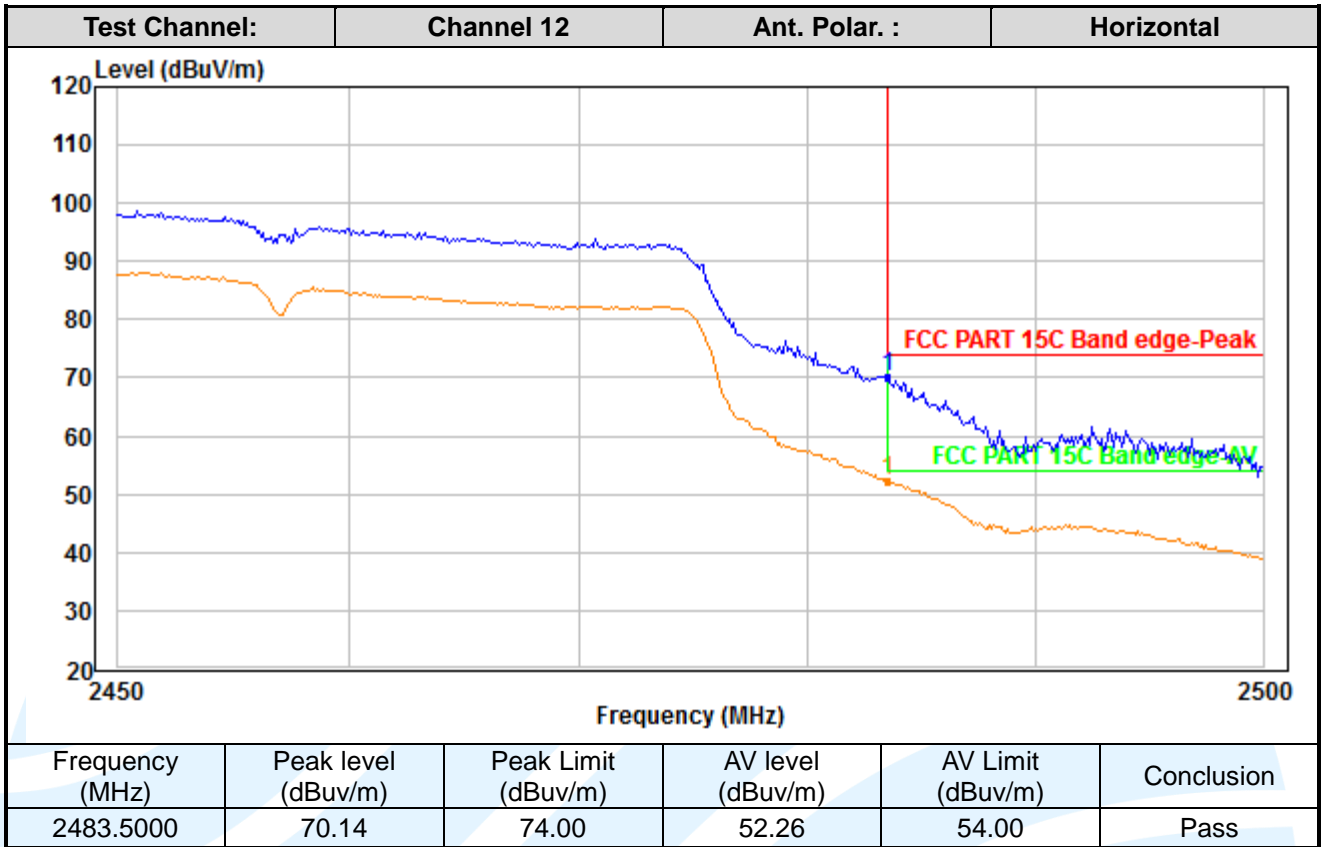
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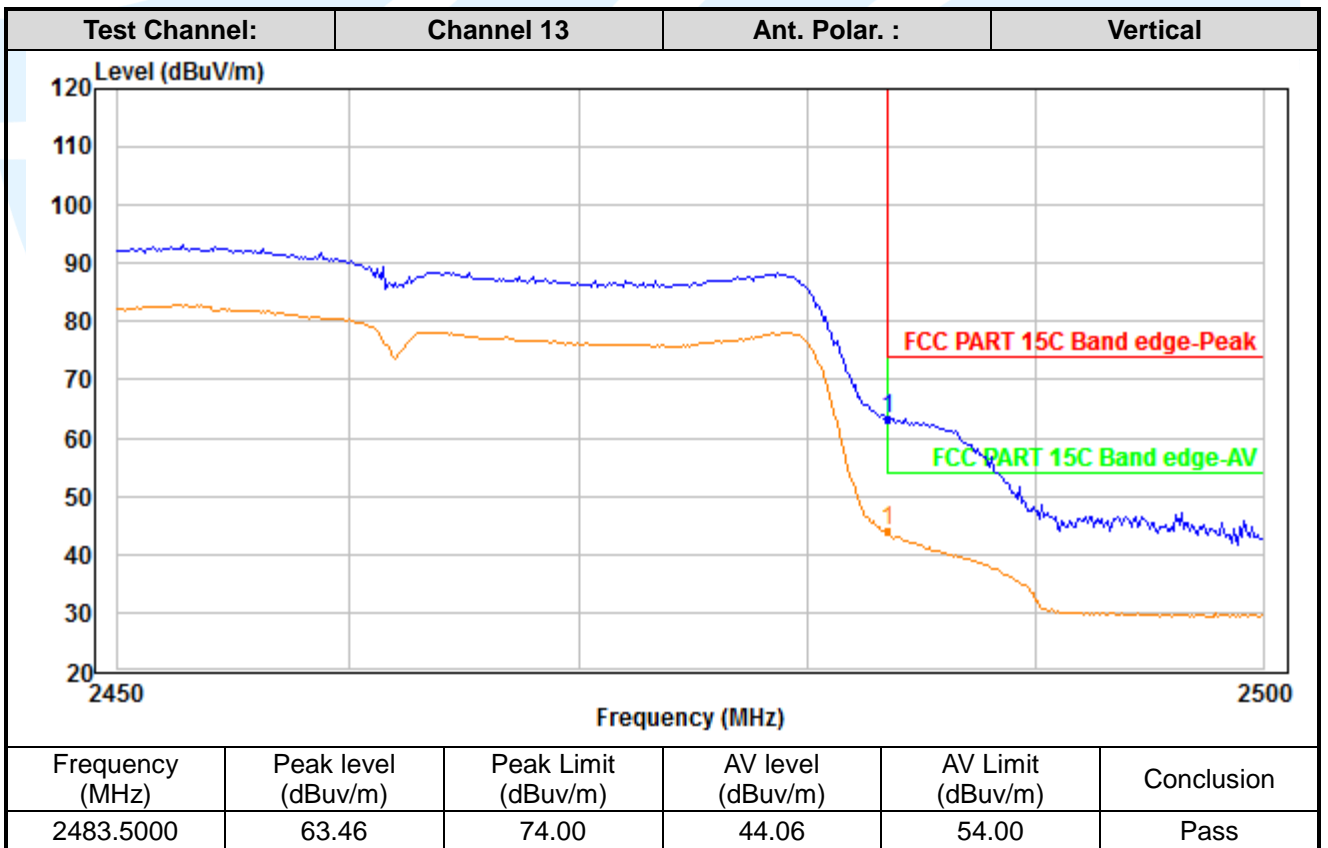
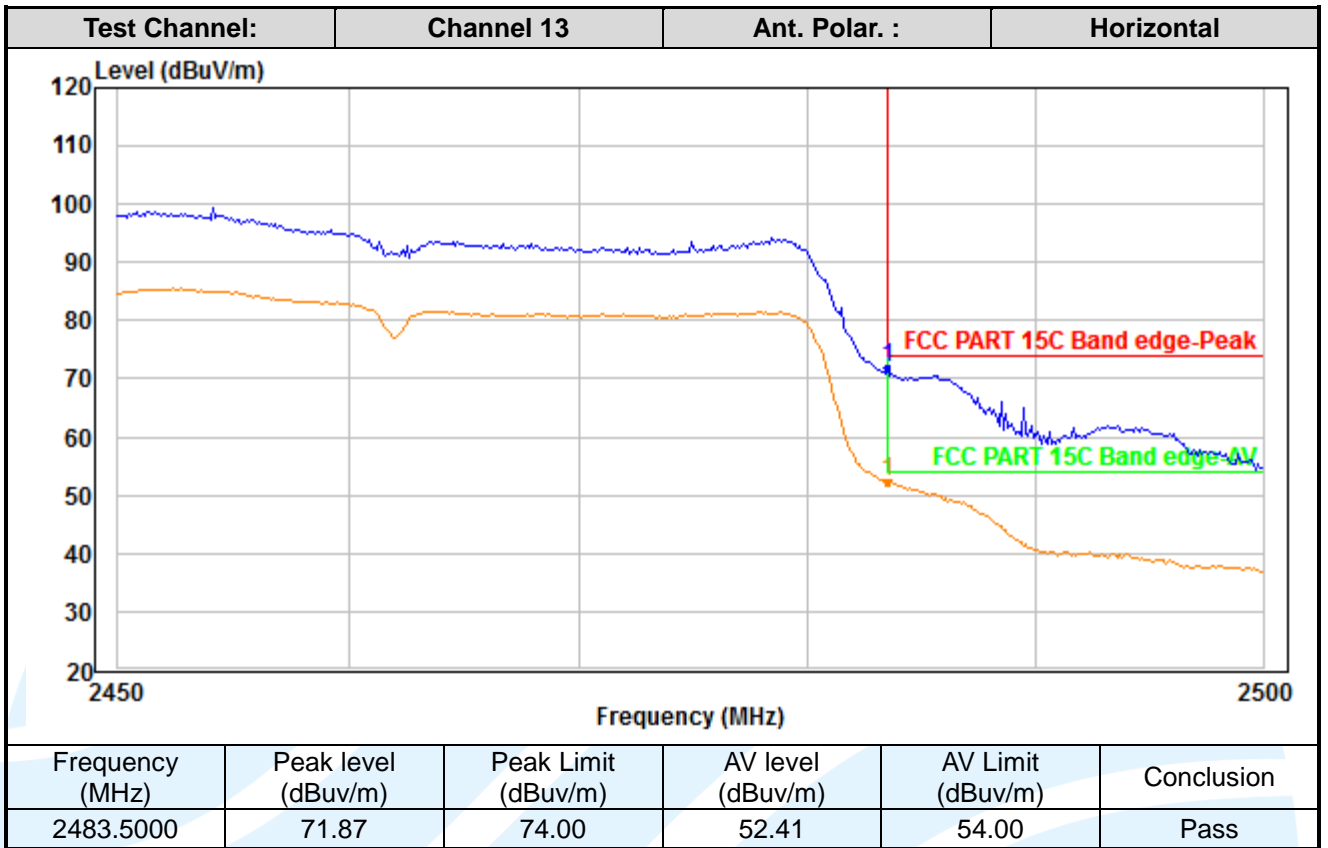
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5.9 CONDUCTED EMISSION

Test Requirement: 47 CFR Part 15C Section 15.207

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 4.4.2 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.

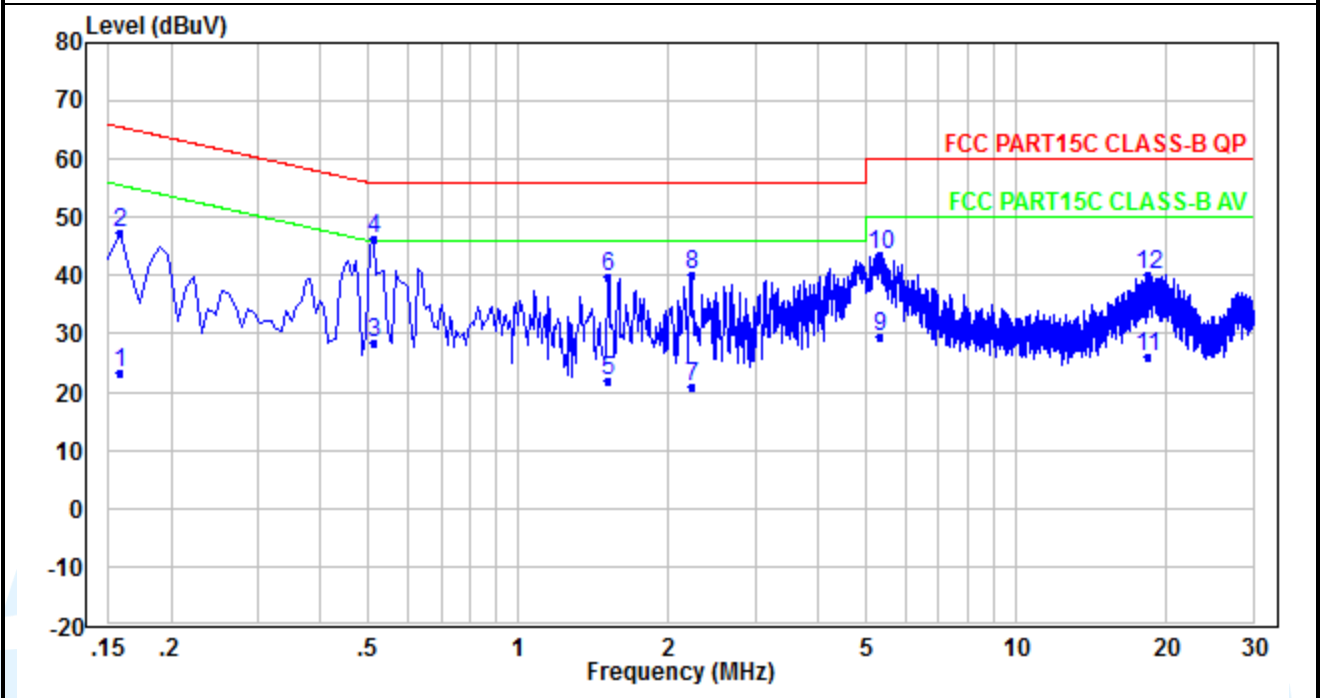
Test Result: Pass

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
1	0.158	13.21	10.13	23.34	55.57	-32.23	Average
2	0.158	37.21	10.13	47.34	65.57	-18.23	QP
3	0.510	18.18	10.16	28.34	46.00	-17.66	Average
4	0.510	36.18	10.16	46.34	56.00	-9.66	QP
5	1.518	11.60	10.23	21.83	46.00	-24.17	Average
6	1.518	29.60	10.23	39.83	56.00	-16.17	QP
7	2.230	10.76	10.24	21.00	46.00	-25.00	Average
8	2.230	29.76	10.24	40.00	56.00	-16.00	QP
9	5.341	19.16	10.35	29.51	50.00	-20.49	Average
10	5.341	33.16	10.35	43.51	60.00	-16.49	QP
11	18.418	15.22	10.94	26.16	50.00	-23.84	Average
12	18.418	29.22	10.94	40.16	60.00	-19.84	QP

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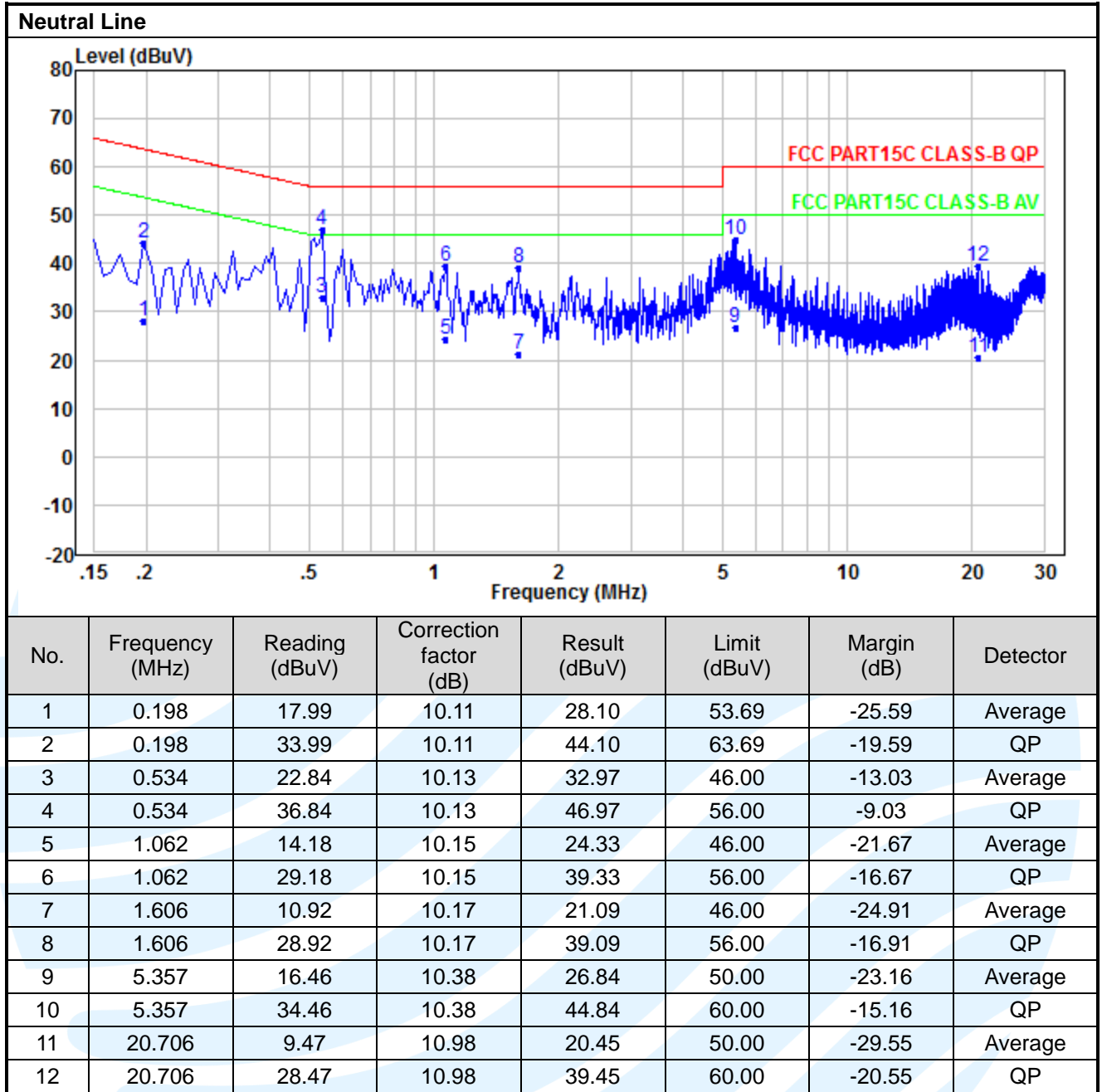
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Remark:

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.
5. All possible modes of operation were investigated, and testing at two nominal voltages of 240V/50Hz and 120V/60Hz, only the worst case emissions reported.

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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 ***

The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of UnionTrust, this report can't be reproduced except in full.
