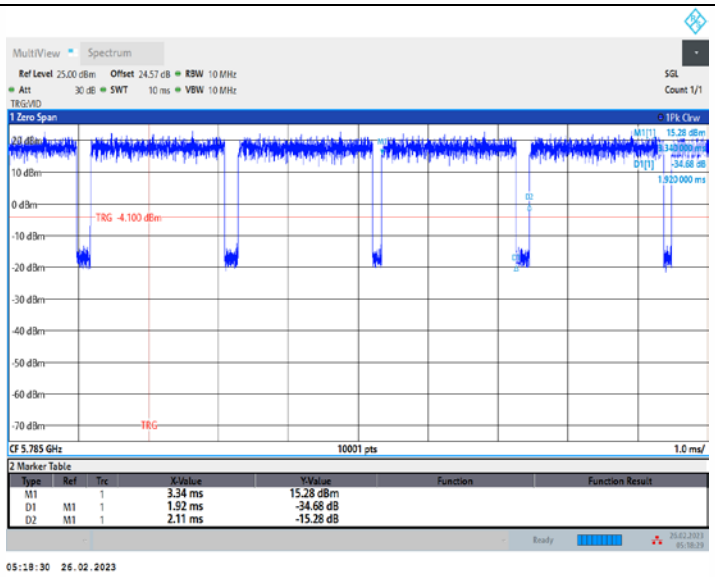
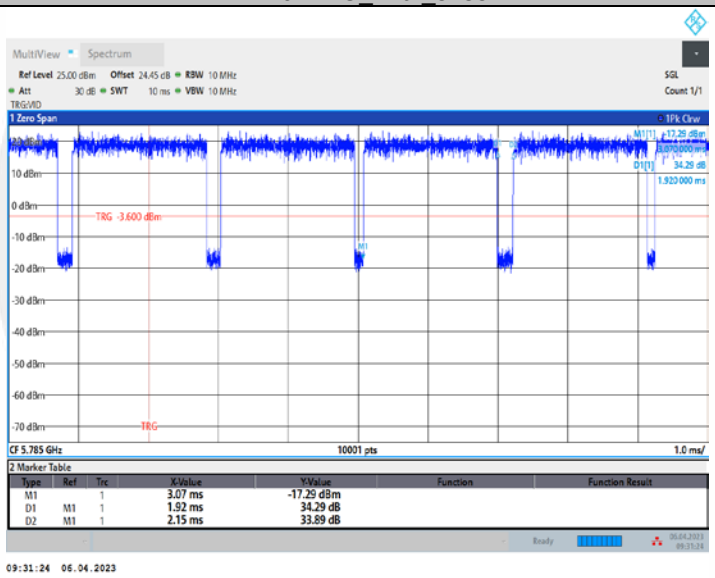
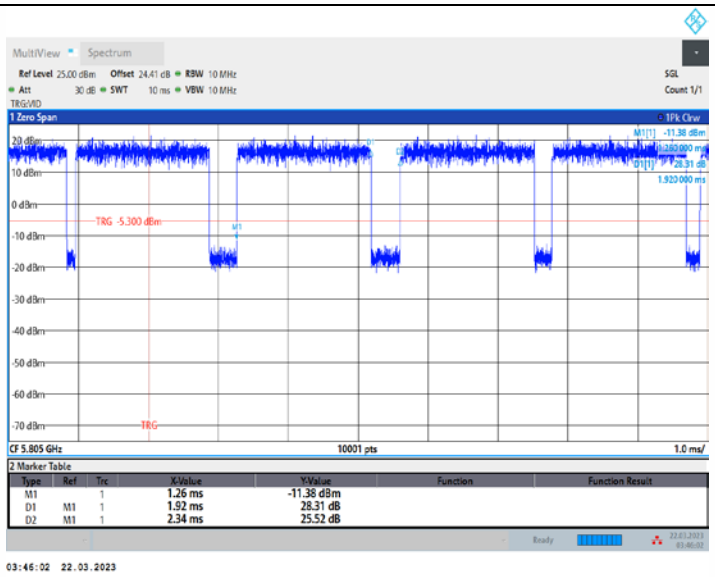


11N20MIMO_Ant2_5785



11N20MIMO_Ant1_5805



03:46:02 22.03.2023

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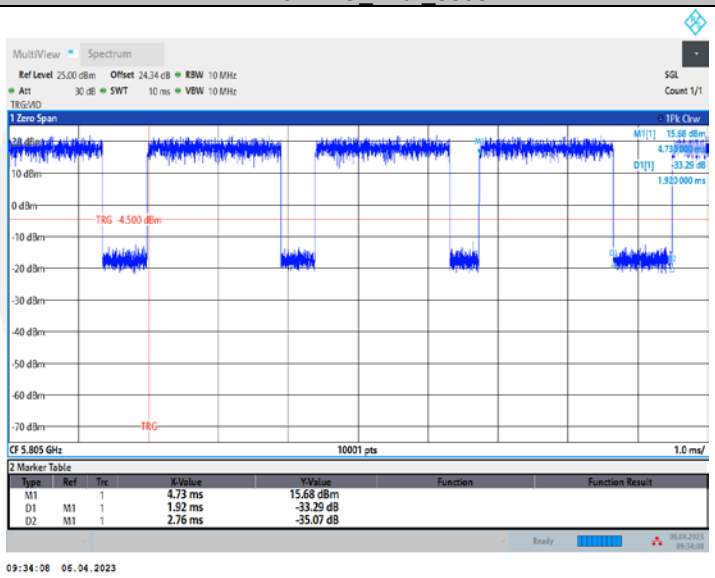
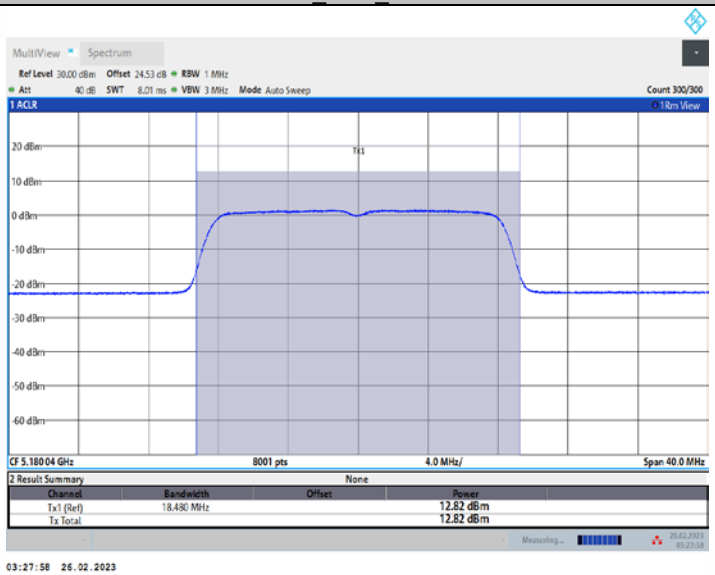


09:34:08 06.04.2023

Test Mode	Antenna	Frequency[MHz]	ChannelPowert [dBm]	Duty Cycle [%]	DC Factor [dBm]	Result [dBm]	Limit [dBm]	Verdict
11A	Ant1	5180	12.36	90.00	0.46	12.82	≤23.98	PASS
	Ant2	5180	11.53	90.35	0.44	11.97	≤23.98	PASS
	Ant1	5200	12.37	91.59	0.38	12.75	≤23.98	PASS
	Ant2	5200	11.98	92.79	0.32	12.30	≤23.98	PASS
	Ant1	5240	12.51	92.83	0.32	12.83	≤23.98	PASS
	Ant2	5240	11.71	92.00	0.36	12.07	≤23.98	PASS
	Ant1	5745	14.19	90.79	0.42	14.61	≤30.00	PASS
	Ant2	5745	14.22	92.38	0.34	14.56	≤30.00	PASS
	Ant1	5785	14.27	90.35	0.44	14.71	≤30.00	PASS
	Ant2	5785	15.47	90.75	0.42	15.89	≤30.00	PASS
	Ant1	5805	13.46	88.03	0.55	14.01	≤30.00	PASS
	Ant2	5805	15.20	91.96	0.36	15.56	≤30.00	PASS
11N20MIMO	Ant1	5180	12.04	89.30	0.49	12.53	≤23.98	PASS
	Ant2	5180	11.18	92.31	0.35	11.53	≤23.98	PASS
	total	5180	---	---	---	15.07	≤23.98	PASS
	Ant1	5200	12.64	89.72	0.47	13.11	≤23.98	PASS
	Ant2	5200	10.81	89.72	0.47	11.28	≤23.98	PASS
	total	5200	---	---	---	15.30	≤23.98	PASS
	Ant1	5240	12.35	90.14	0.45	12.80	≤23.98	PASS
	Ant2	5240	11.23	91.87	0.37	11.60	≤23.98	PASS
	total	5240	---	---	---	15.25	≤23.98	PASS
	Ant1	5745	13.54	90.14	0.45	13.99	≤30.00	PASS
	Ant2	5745	14.28	89.72	0.47	14.75	≤30.00	PASS
	total	5745	---	---	---	17.40	≤30.00	PASS
	Ant1	5785	14.41	91.00	0.41	14.82	≤30.00	PASS
	Ant2	5785	14.25	89.30	0.49	14.74	≤30.00	PASS
	total	5785	---	---	---	17.79	≤30.00	PASS
	Ant1	5805	13.01	82.05	0.86	13.87	≤30.00	PASS
	Ant2	5805	13.88	69.57	1.58	15.46	≤30.00	PASS
	total	5805	---	---	---	17.75	≤30.00	PASS
Note：The Duty Cycle Factoriscompensatedinthegraph.								

11A_Ant1_5180



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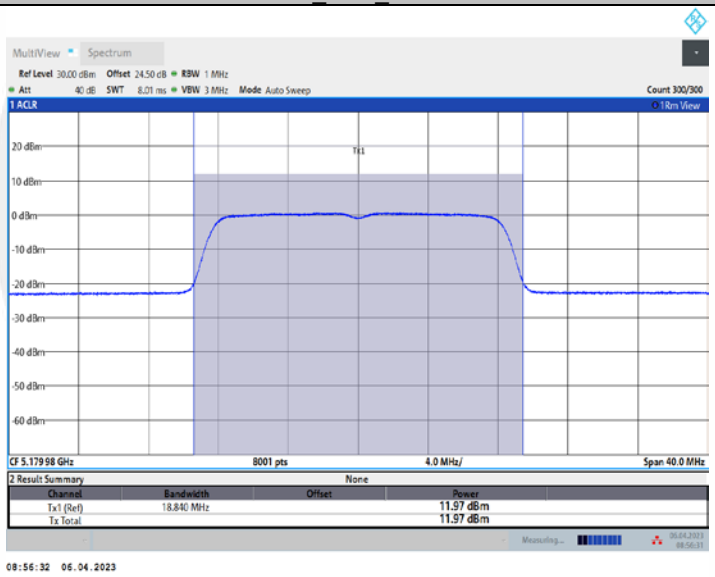

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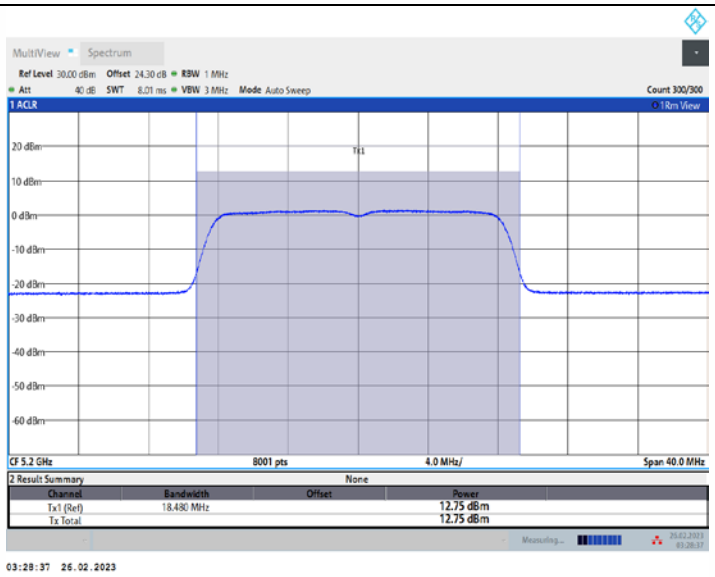

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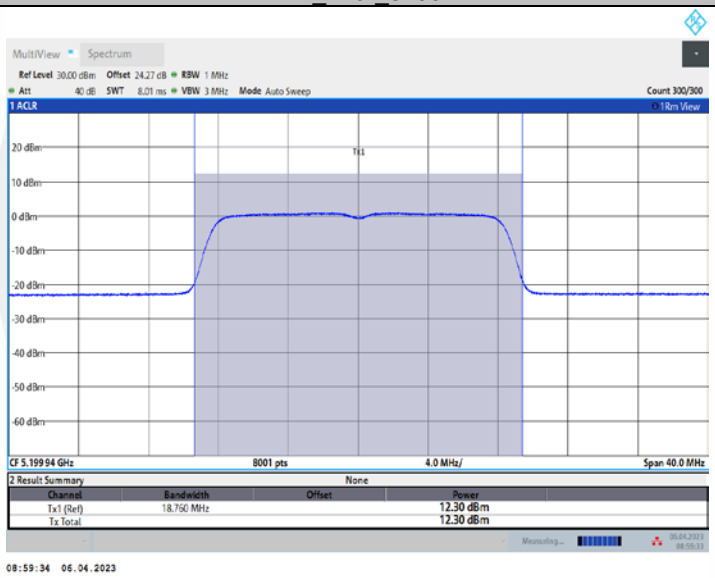

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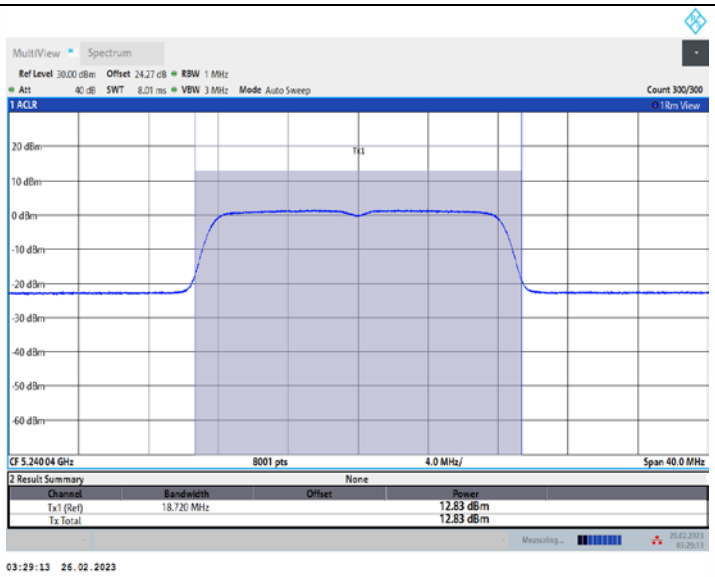

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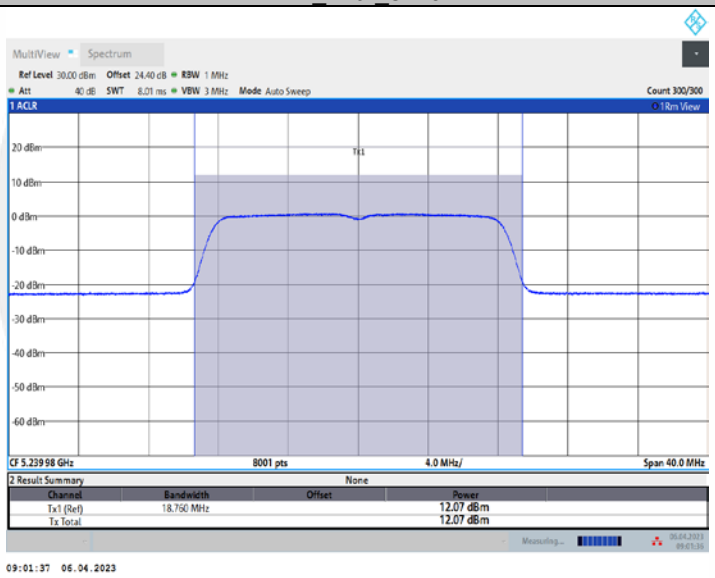

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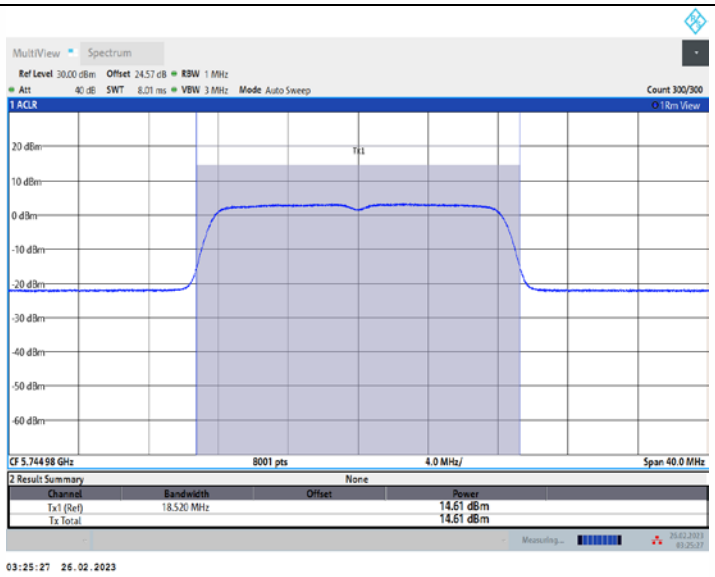

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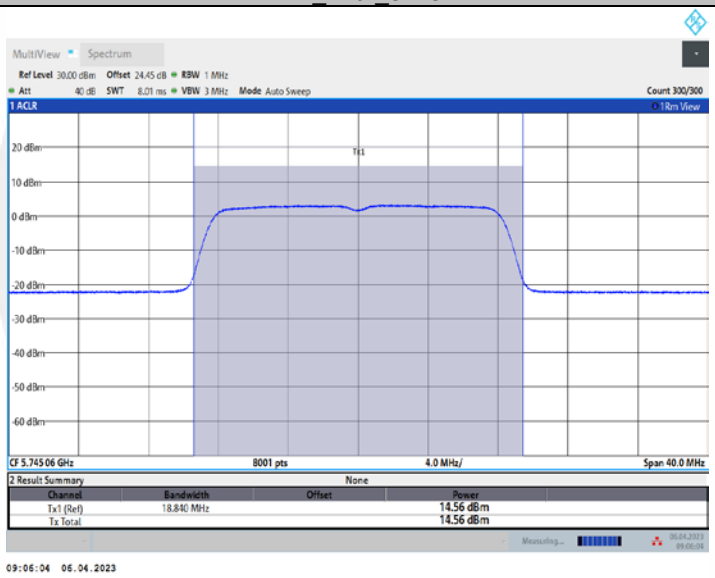

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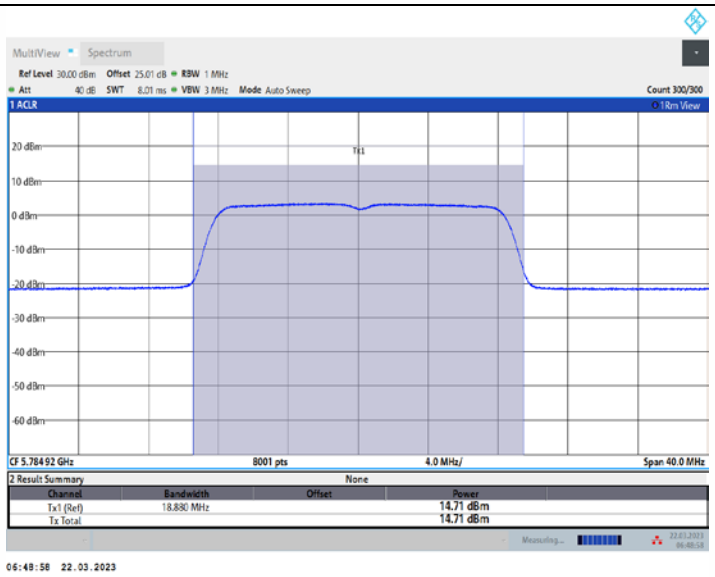

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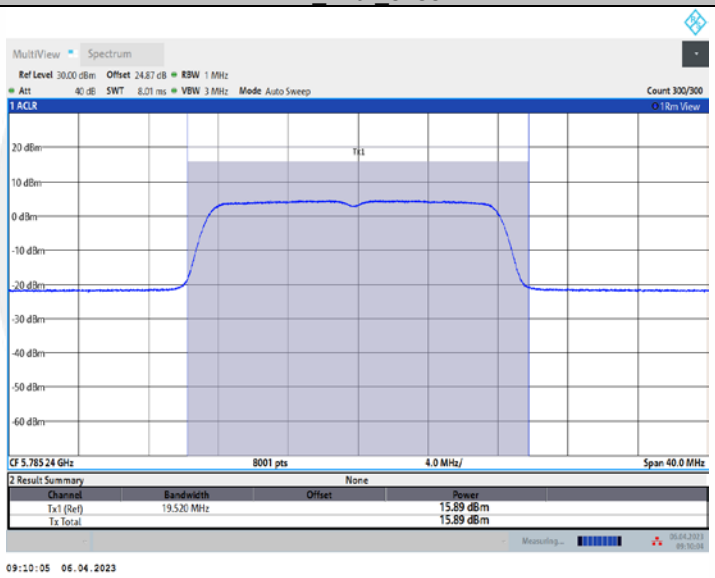

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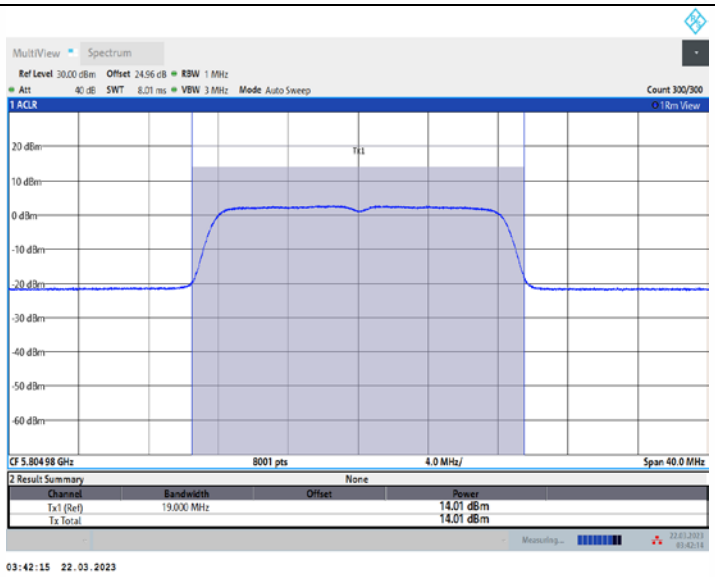

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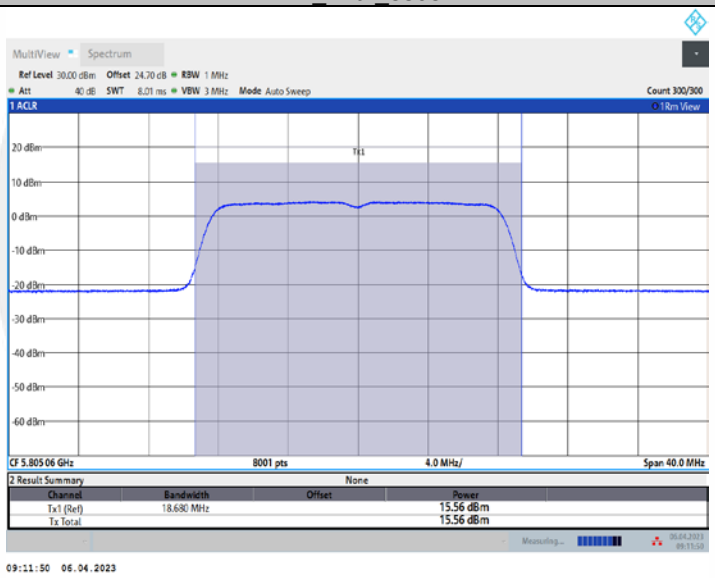

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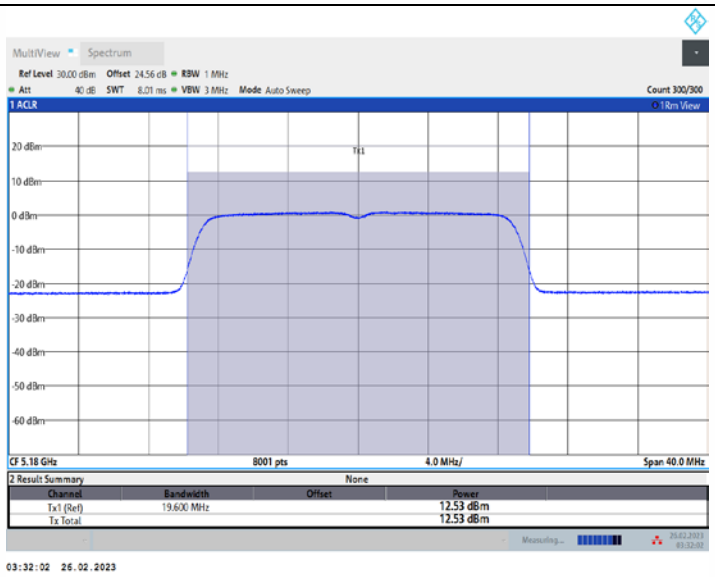

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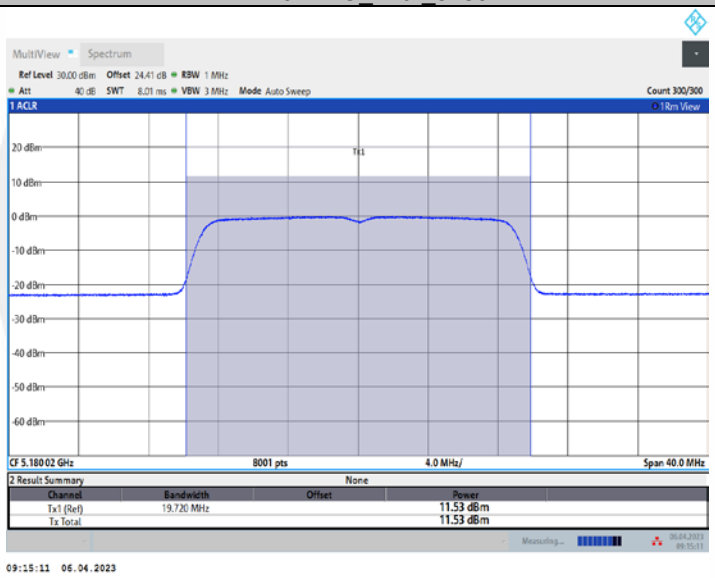

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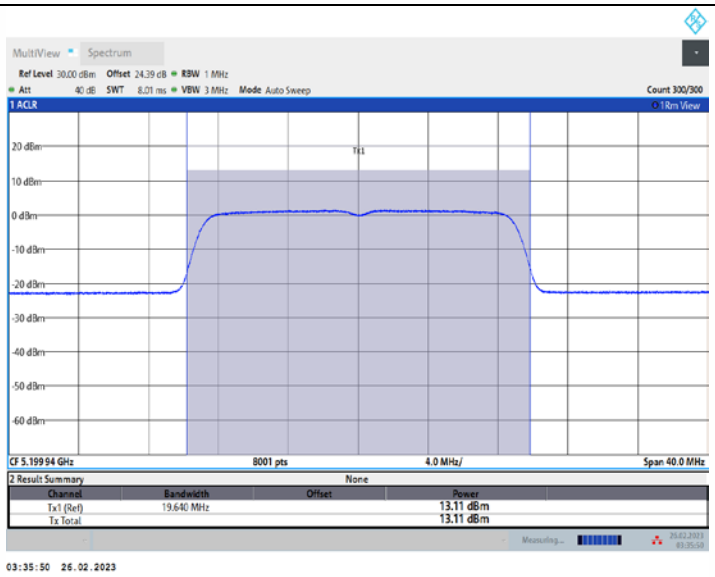

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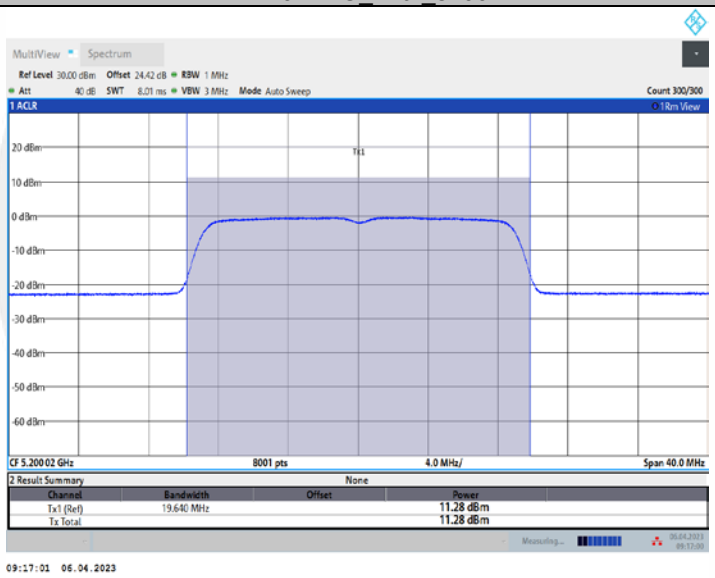

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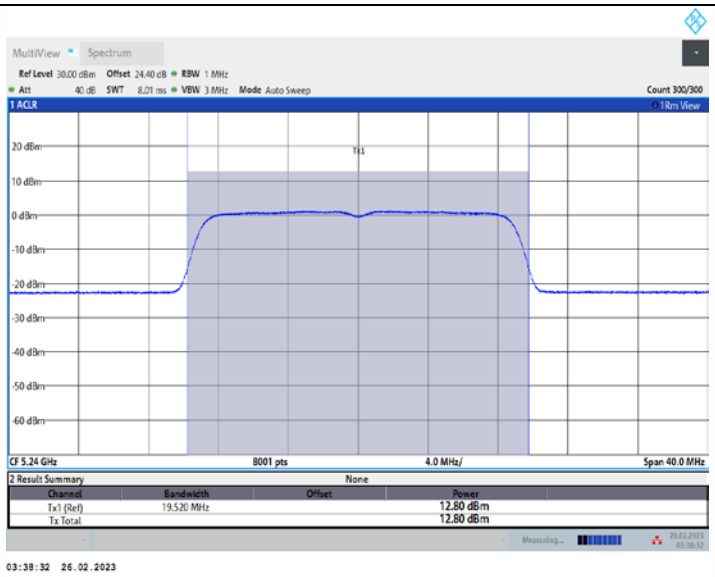

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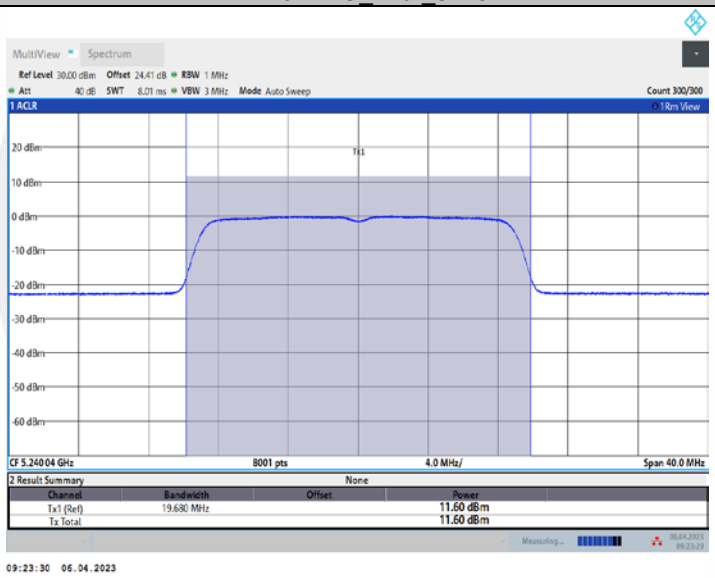

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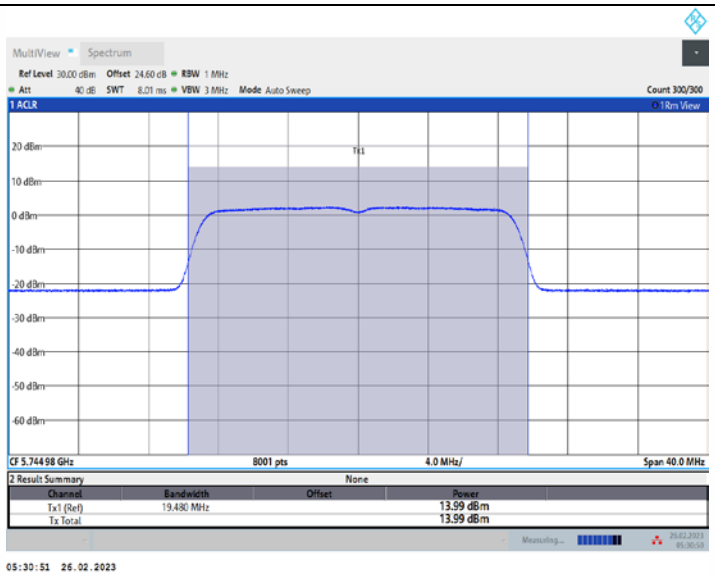

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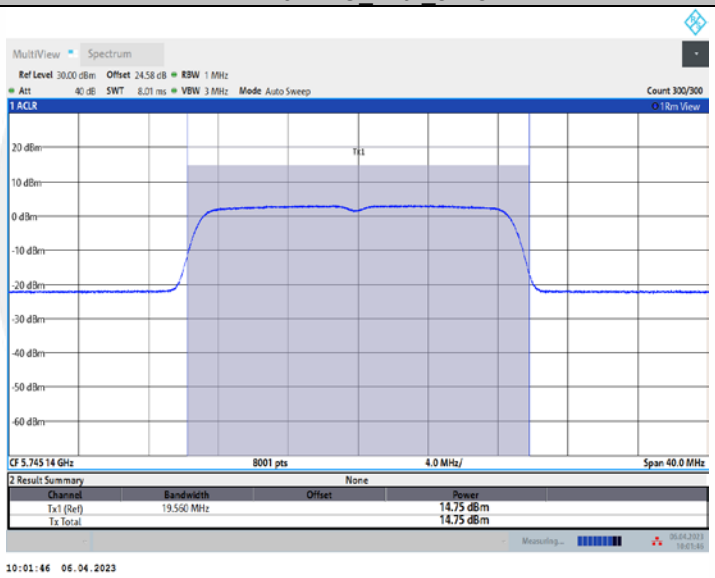

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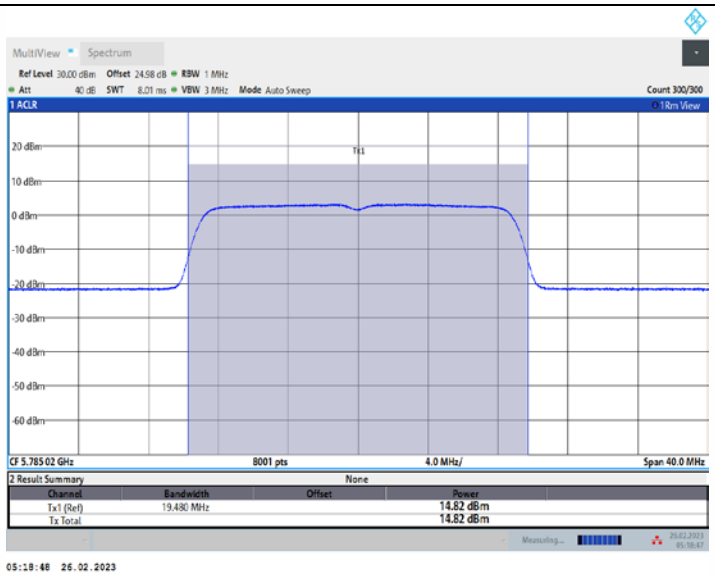

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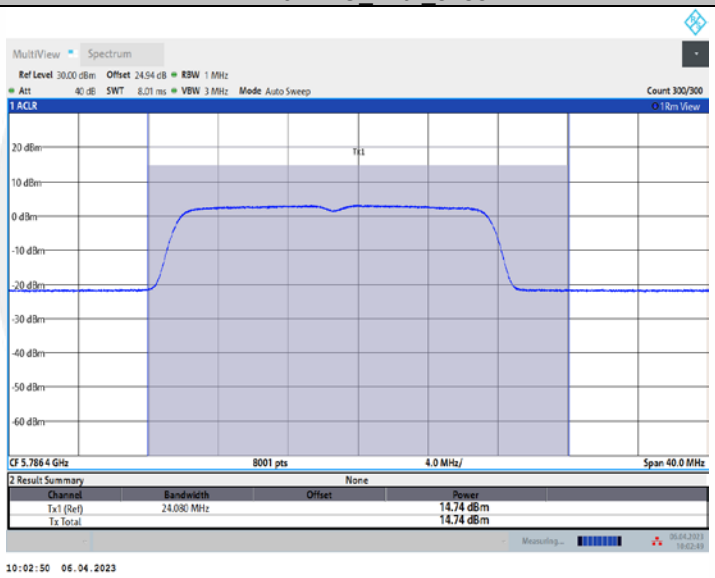
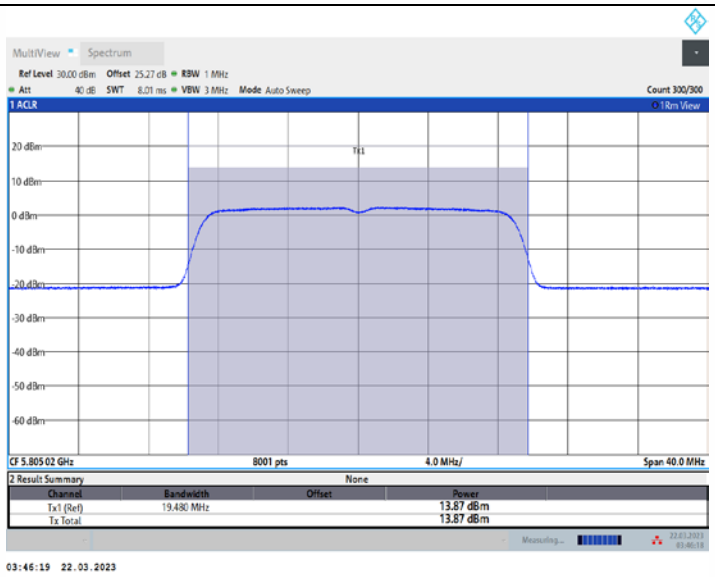


11N20MIMO_Ant1_5805



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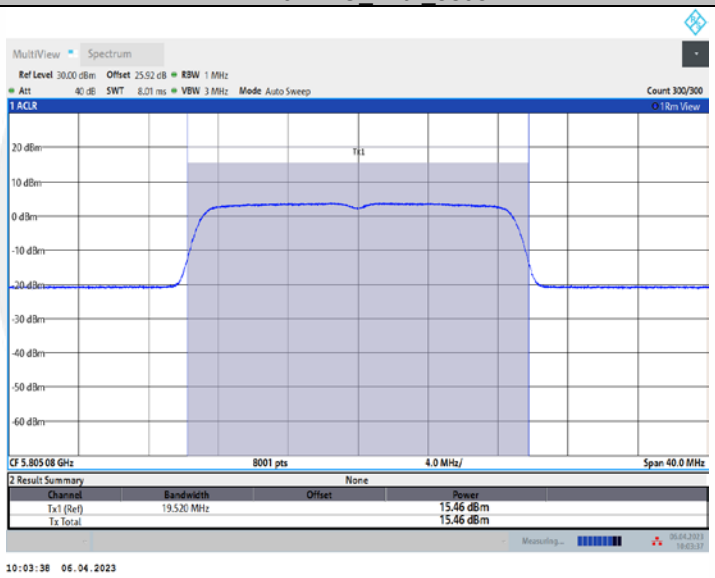


8.3 MAXIMUM PEAK POWER DENSITY

8.3.1 Applicable Standard

According to FCC Part 15.407(a)(1) for UNII Band I
According to FCC Part 15.407(a)(2) for UNII Band II-A and UNII Band II-C
According to FCC Part 15.407(a)(3) for UNII Band III
According to 789033 D02 Section II(F)

8.3.2 Conformance Limit

■ For the band 5.15-5.25 GHz,
(a) (1) (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).

(a) (1) (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.

(a) (1) (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.

(a) (1) (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.

■ For the 5.25-5.35 GHz and 5.47-5.725 GHz bands
(b) (2) The maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. 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.

■ For the band 5.725-5.85 GHz
(a) (3) 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

8.3.3 Test Configuration

Test according to clause 6.1 radio frequency test setup

8.3.4 Test Procedure

Methods refer to FCC KDB 789033

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:

a) Set RBW ≥ 1/T, where T is defined in section II.B.l.a).

b) Set VBW ≥ 3 RBW.

c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10log(1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.

e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

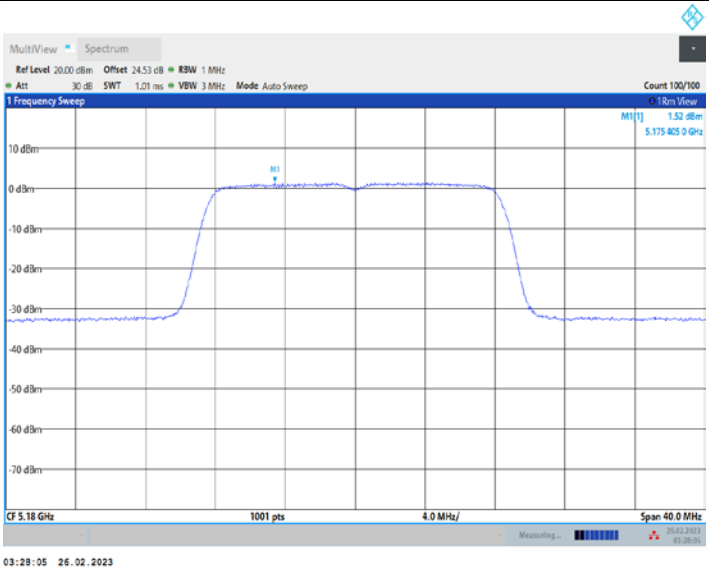
Note: As a practical matter, it is recommended to use reduced RBW of 100 KHz for the sections

5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.

8.3.5 Test Results

TestMode	Antenna	Frequency[MHz]	Result [dBm/MHz]	Limit[dBm/MHz]	Verdict
11A	Ant1	5180	1.52	≤11.00	PASS
	Ant2	5180	0.69	≤11.00	PASS
	Ant1	5200	1.53	≤11.00	PASS
	Ant2	5200	1.13	≤11.00	PASS
	Ant1	5240	1.56	≤11.00	PASS
	Ant2	5240	0.76	≤11.00	PASS
	Ant1	5745	0.1	≤30.00	PASS
	Ant2	5745	0.51	≤30.00	PASS
	Ant1	5785	0.7	≤30.00	PASS
	Ant2	5785	1.86	≤30.00	PASS
	Ant1	5805	0.04	≤30.00	PASS
	Ant2	5805	1.67	≤30.00	PASS
11N20MIMO	Ant1	5180	0.99	≤11.00	PASS
	Ant2	5180	-0.03	≤11.00	PASS
	total	5180	3.52	≤11.00	PASS
	Ant1	5200	1.52	≤11.00	PASS
	Ant2	5200	0.61	≤11.00	PASS
	total	5200	4.10	≤11.00	PASS
	Ant1	5240	1.26	≤11.00	PASS
	Ant2	5240	0.18	≤11.00	PASS
	total	5240	3.76	≤11.00	PASS
	Ant1	5745	-0.4	≤30.00	PASS
	Ant2	5745	0.27	≤30.00	PASS
	total	5745	2.96	≤30.00	PASS
	Ant1	5785	0.59	≤30.00	PASS
	Ant2	5785	0.32	≤30.00	PASS
	total	5785	3.47	≤30.00	PASS
	Ant1	5805	-0.34	≤30.00	PASS
	Ant2	5805	2.93	≤30.00	PASS
	total	5805	4.61	≤30.00	PASS

Note：1.TheResult and LimitUnit is dBm/500 kHz in the band 5.725–5.85 GHz.
2.The Duty Cycle Factorand RBW Factoriscompensatedinthegraph.

11A_Ant1_5180


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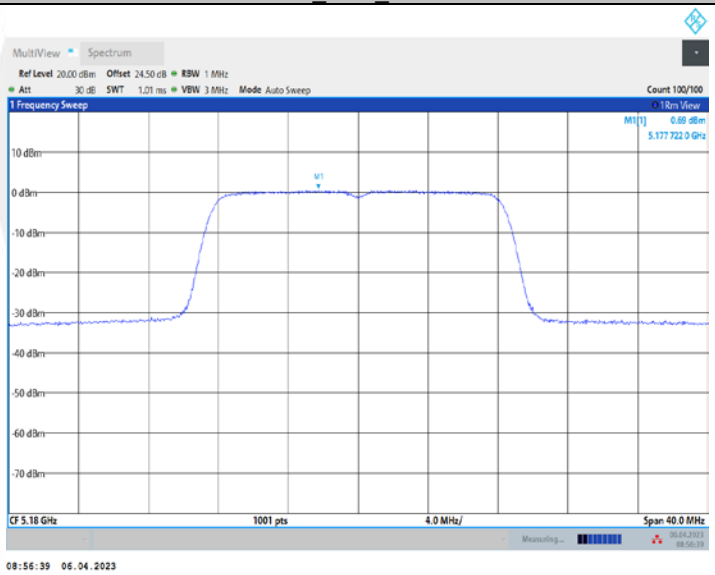

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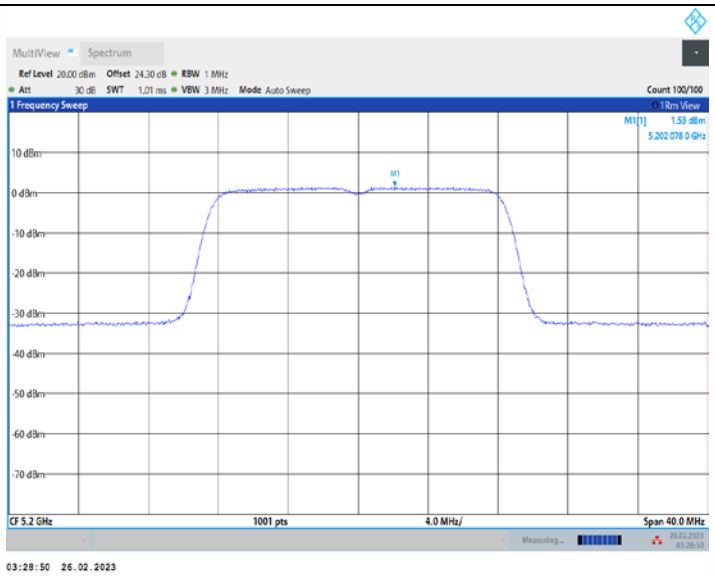

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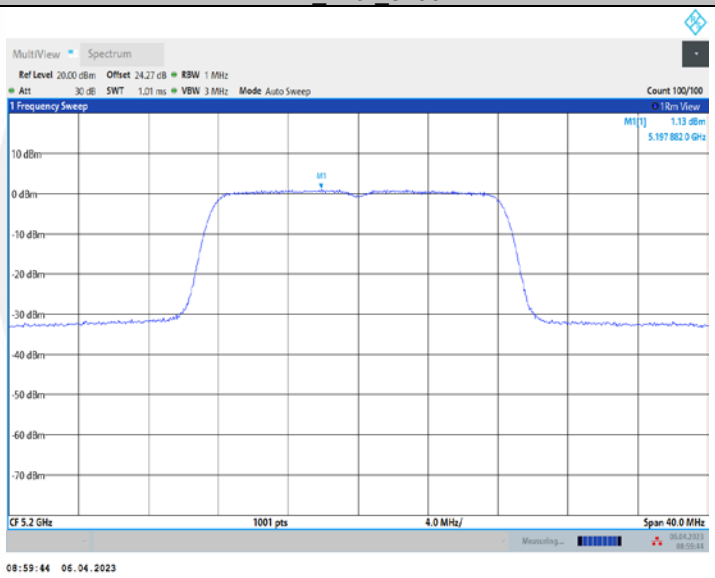
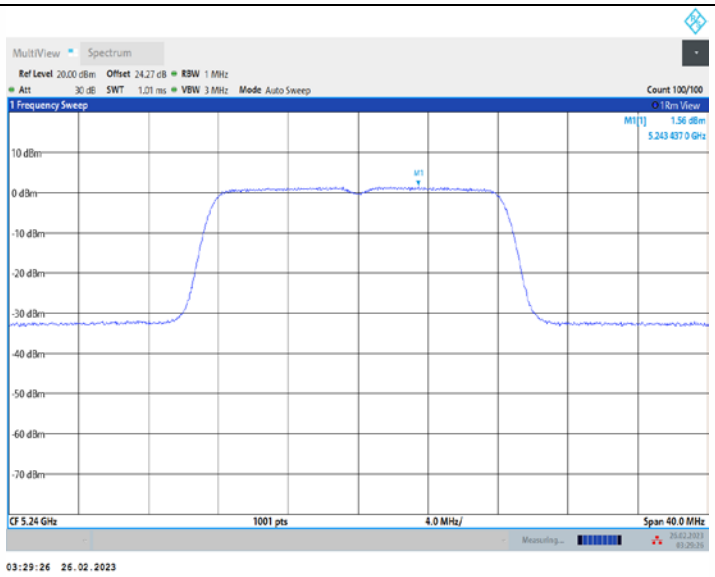


11A_Ant1_5240



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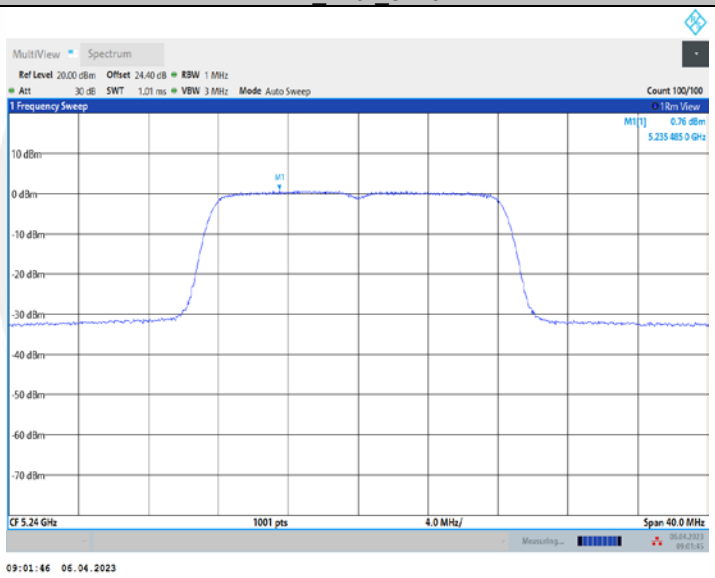

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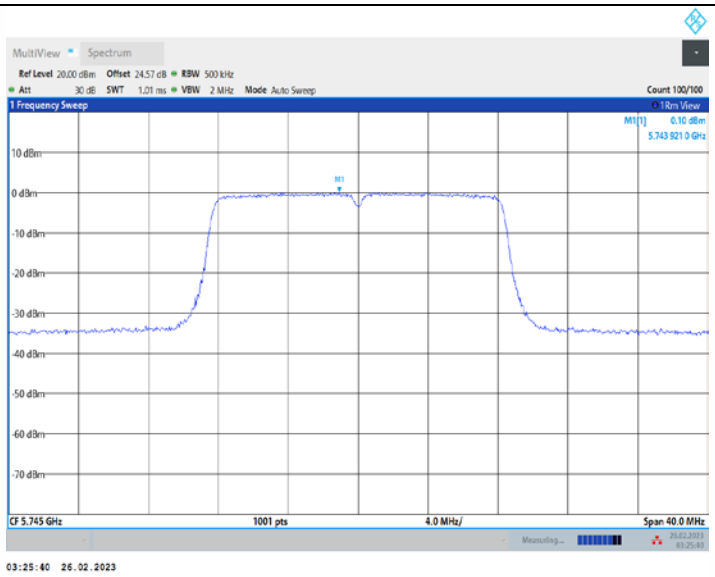

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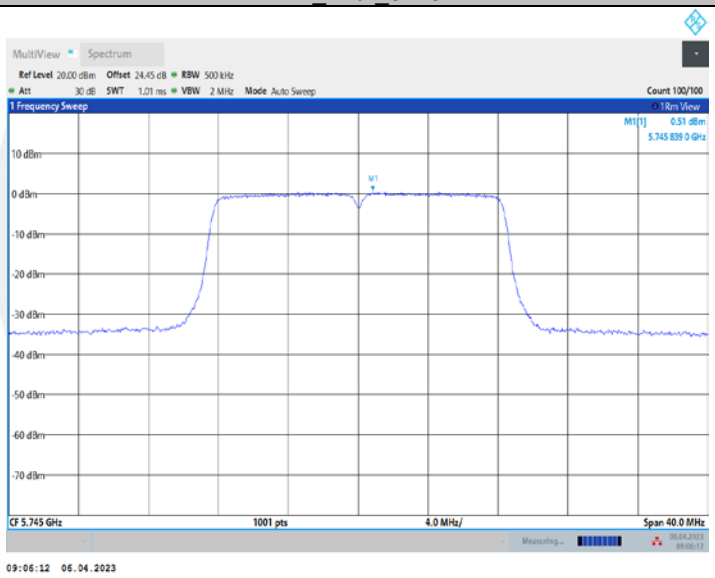

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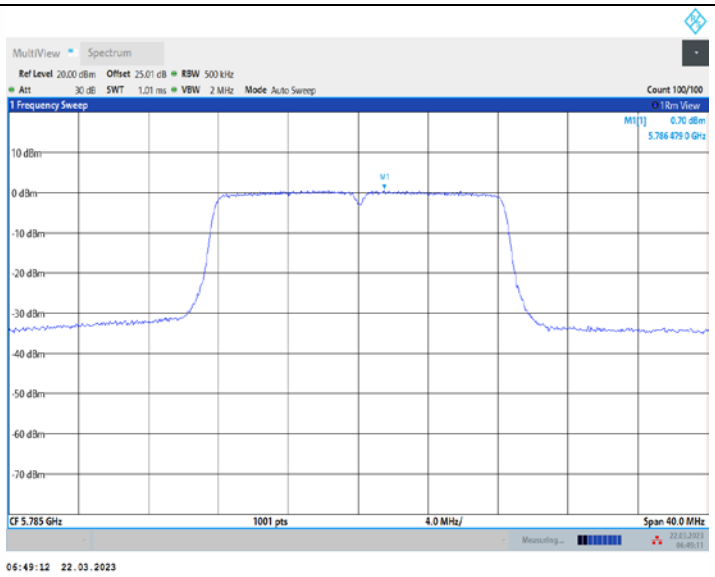

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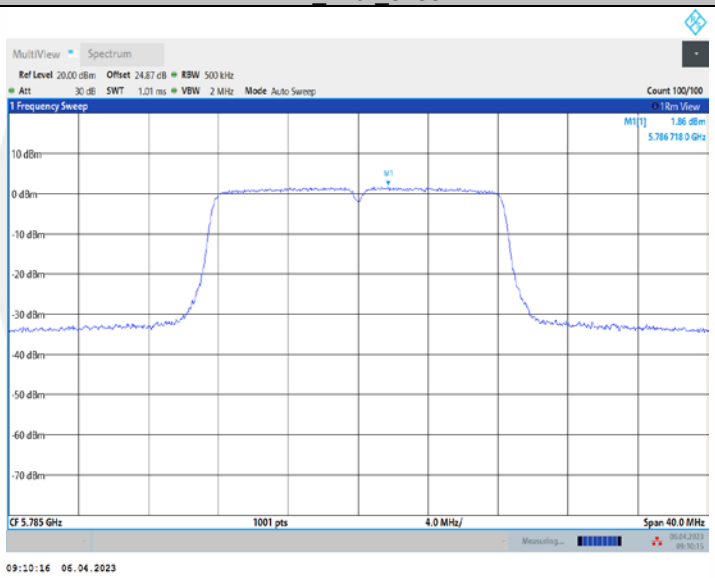

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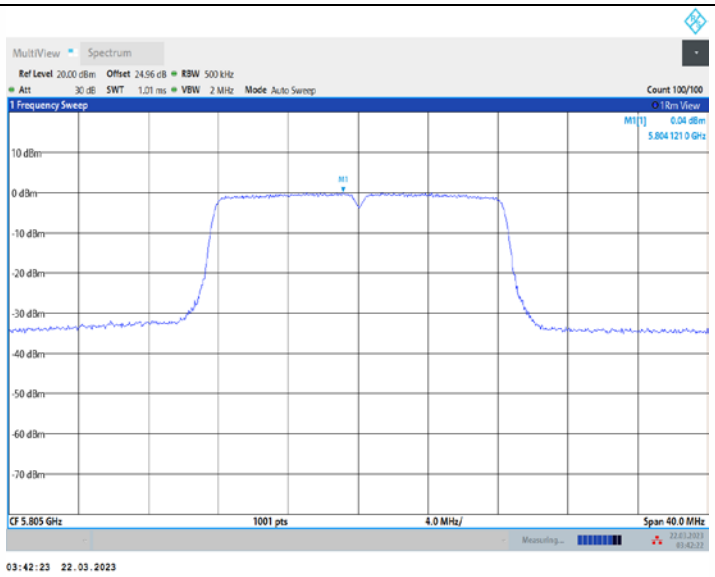

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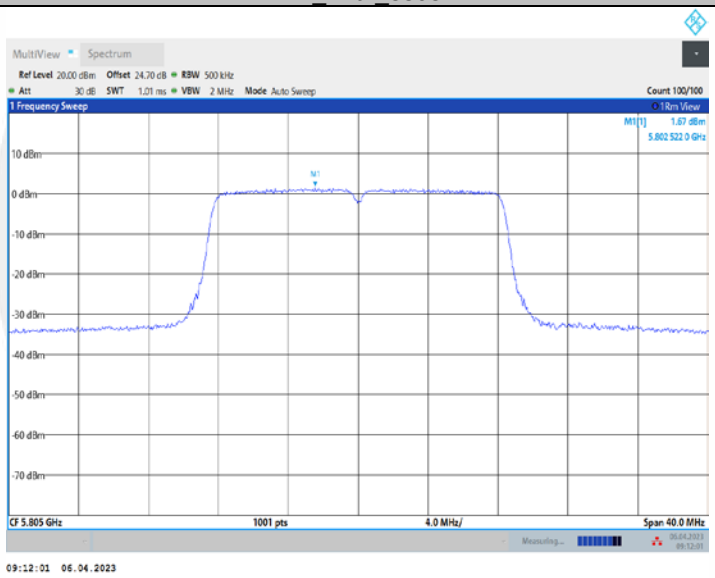

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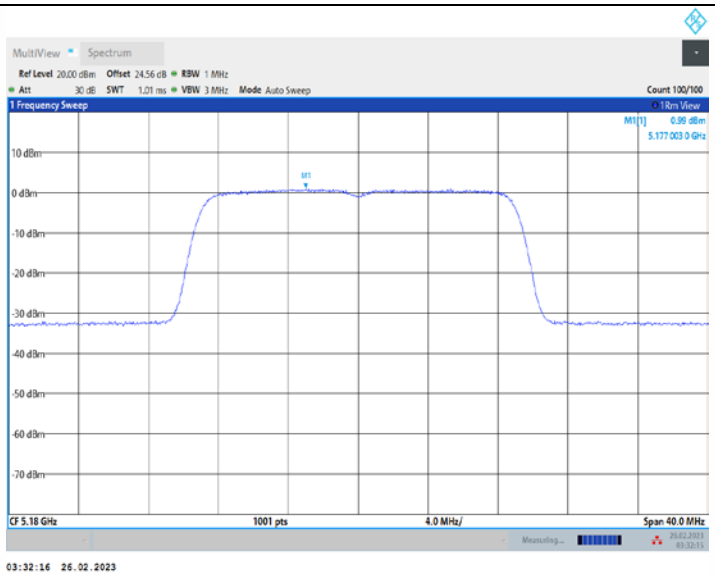

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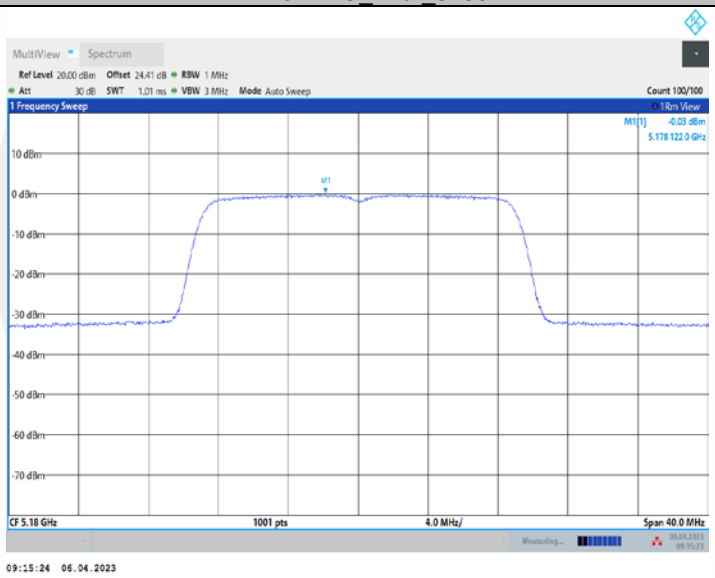

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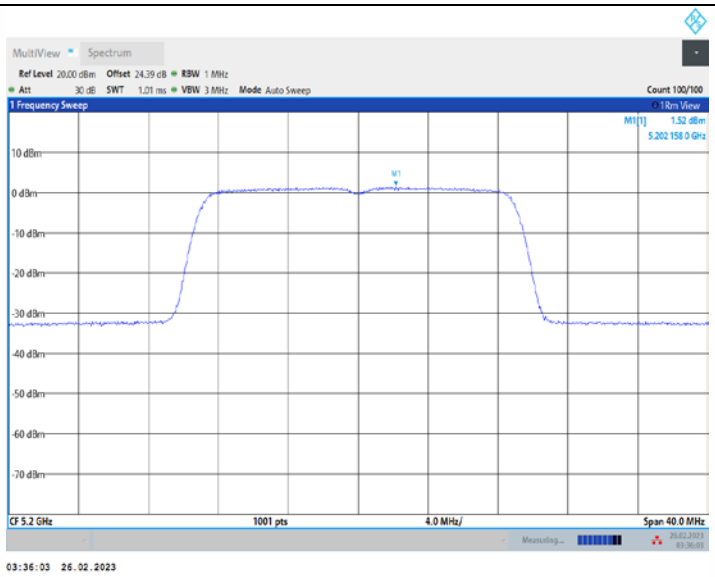

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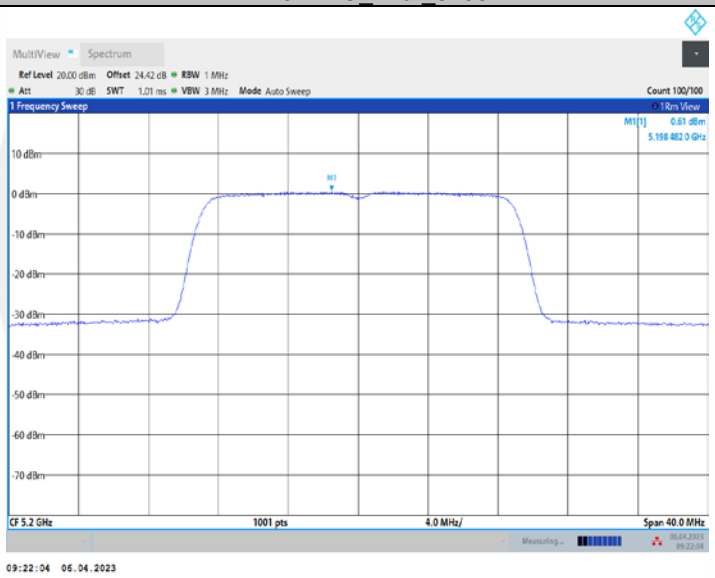

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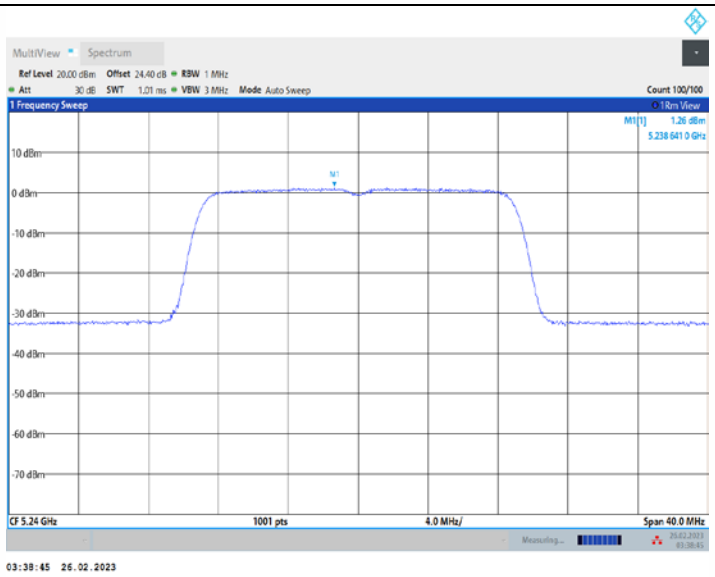

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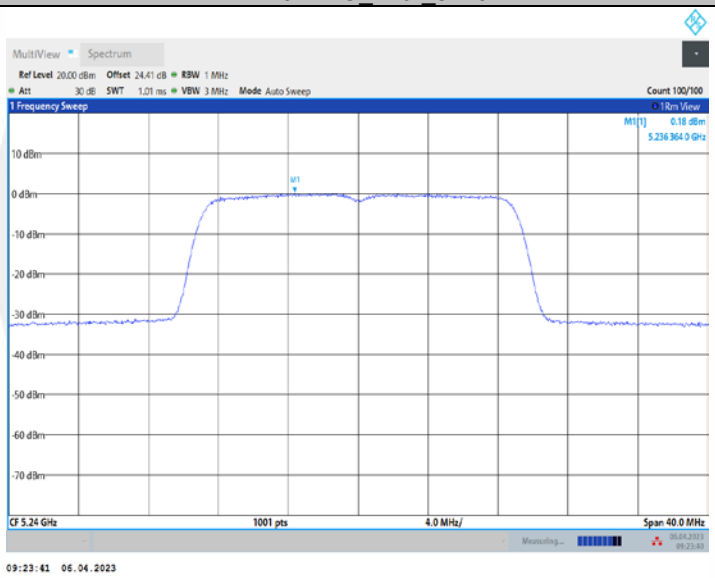

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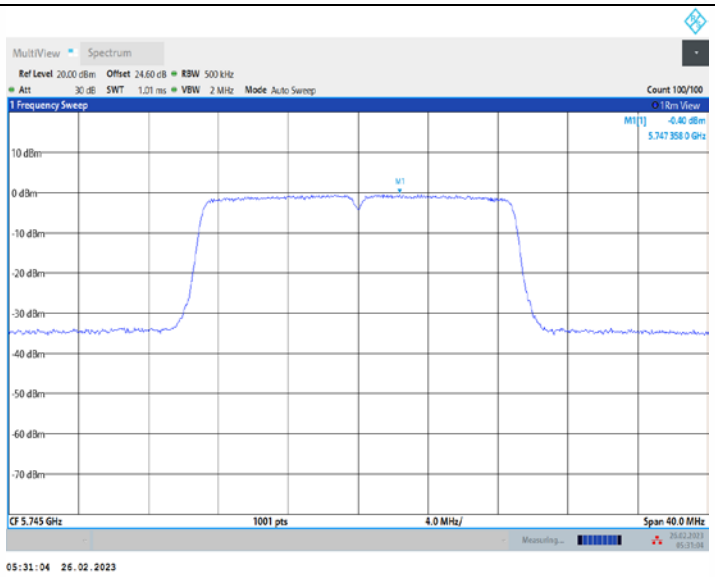

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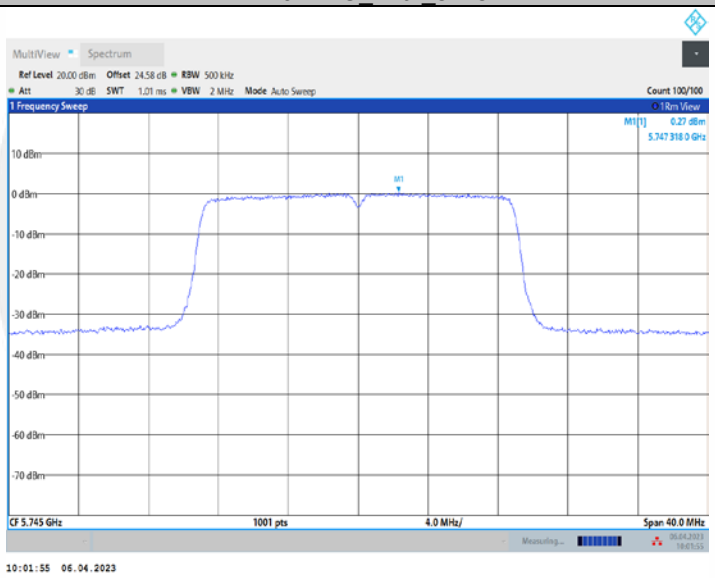

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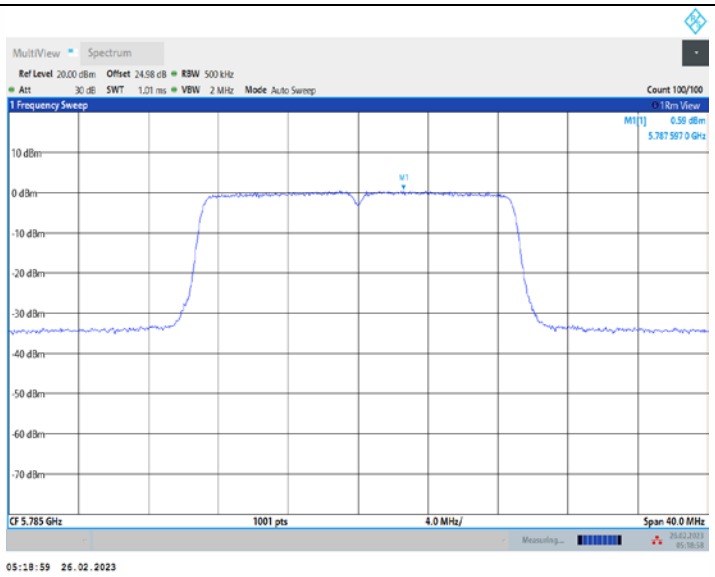
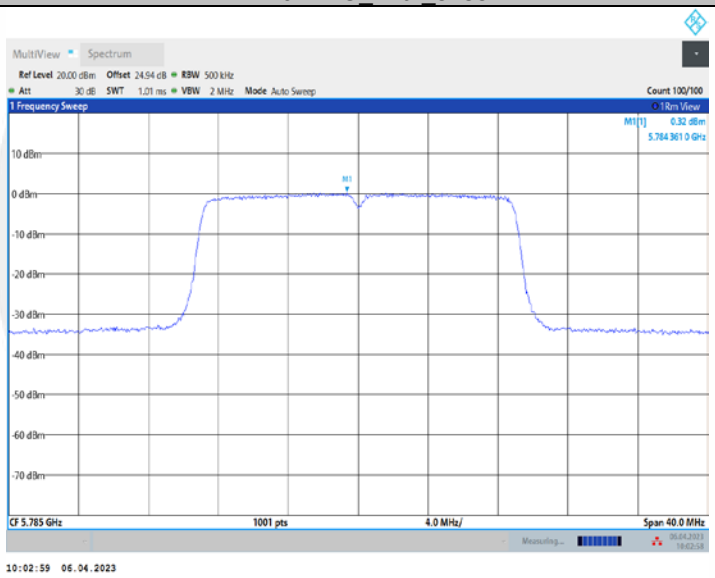
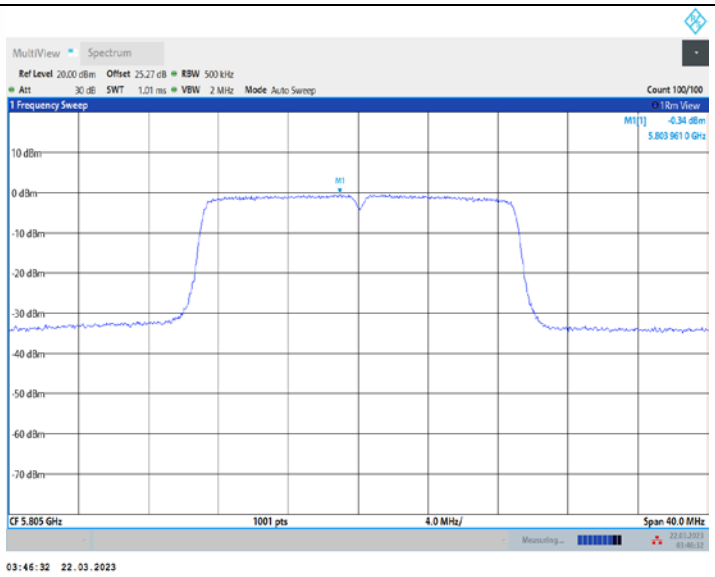


11N20MIMO_Ant2_5785



11N20MIMO_Ant1_5805



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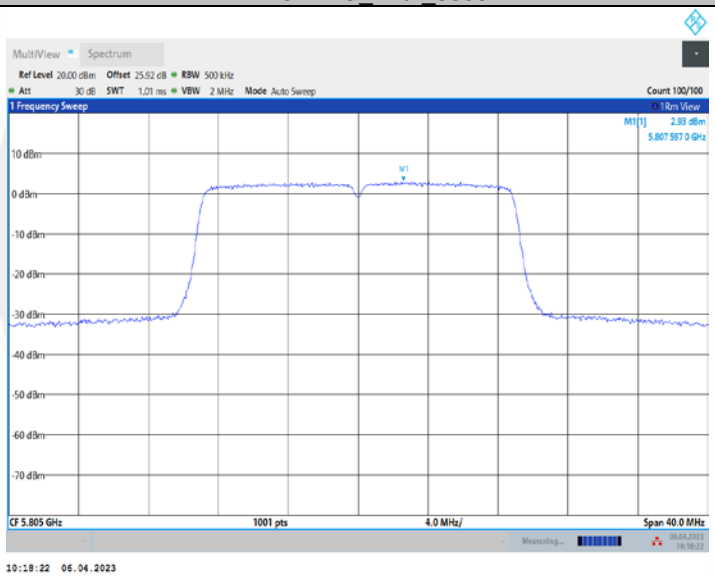


8.4 UNDESIRABLE RADIATED SPURIOUS EMISSION

8.4.1 Applicable Standard

According to FCC Part 15.407 (b)
According to 789033 D02 Section II(G)

8.4.2 Conformance Limit

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209 The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table 15.209(a):

Restricted Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009-0.490	2400/F(KHz)	20 log (uV/m)	300
0.490-1.705	24000/F(KHz)	20 log (uV/m)	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

The provisions of §15.205 apply to intentional radiators operating under this section,15.205 Restricted bands of operation

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

Remark: 1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of ξ 15.205, and the emissions located in restricted bands also comply with 15.209 limit.

8.4.3 Test Configuration

Test according to clause 6.2 radio frequency test setup

8.4.4 Test Procedure

■ Unwanted Emissions Measurements below 1000 MHz

Compliance shall be demonstrated using CISPR quasi-peak detection; however, peak detection is permitted as an alternative to quasi-peak detection.
The EUT was placed on a turn table which is 0.8m above ground plane.
And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
Repeat above procedures until all frequency measured was complete.
We use software control the EUT, Let EUT hopping on and transmit with highest power, All the modes have been tested and the worst result was reported.
Use the following spectrum analyzer settings:
Set RBW=120kHz for f < 1 GHz(30MHz to 1GHz), 200Hz for f<150KHz(9KHz to 150KHz), 9KHz for <30MHz
(150KHz to 30KHz).
Set the VBW > RBW.
Detector = Peak.
Trace mode = max hold.
Follow the guidelines in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b). Submit this data.
Repeat above procedures until all frequency measured was complete.

■ Unwanted Maximum peak Emissions Measurements above 1000 MHz

Maximum emission levels are measured by setting the analyzer as follows:
RBW = 1 MHz.
VBW ≥ 3 MHz.
Detector = Peak.
Sweep time = auto.
Trace mode = max hold.
Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately 1/x, where x is the duty cycle. For example, at 50 percent duty cycle, the measurement time will increase by a factor of two relative to measurement time for continuous transmission.

■ Unwanted Average Emissions Measurements above 1000 MHz

Method VB (Averaging using reduced video bandwidth): Alternative method.
RBW = 1 MHz.
Video bandwidth. • If the EUT is configured to transmit with duty cycle ≥ 98 percent, set VBW ≤ RBW/100 (i.e., 10 kHz) but not less than 10 Hz.
• If the EUT duty cycle is < 98 percent, set VBW ≥ 1/T, where T is defined in section II.B.1.a).
Video bandwidth mode or display mode • The instrument shall be set to ensure that video filtering is applied in the power domain. Typically, this requires setting the detector mode to RMS and setting the Average-VBW Type to Power (RMS).
• As an alternative, the analyzer may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some analyzers require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to “Voltage” regardless of the display mode.

Detector = Peak.
Sweep time = auto.
Trace mode = max hold.
Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of 1/x, where x is the duty cycle. For example, use at least 200 traces if the duty cycle is 25 percent. (If a specific emission is demonstrated to be continuous—i.e., 100 percent duty cycle—rather than turning on and off with the transmit cycle, at least 50 traces shall be averaged.)

■ Band edge measurements.

Unwanted band-edge emissions may be measured using either of the special band-edge measurement techniques (the marker-delta or integration methods) described below. Note that the marker-delta method is primarily a radiated measurement technique that requires the 99% occupied bandwidth edge to be within 2 MHz of the authorized band edge, whereas the integration method can be used in either a radiated or conducted measurement without any special requirement with regards to the displacement of the unwanted emission(s) relative to the authorized bandwidth.
Marker-Delta Method.
The marker-delta method, as described in ANSI C63.10, can be used to perform measurements of the radiated unwanted emissions level of emissions provided that the 99% occupied bandwidth of the fundamental is within 2 MHz of the authorized band-edge.

8.4.5 Test Results

Temperature:	26° C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

■ Spurious Emission below 30MHz(9KHz to 30MHz)

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
--	--	--	--	--	--	--	--

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor

■ ☒For Undesirable radiated Spurious Emission in U-NII – 1
☒Undesirable radiated Spurious Emission Above 1GHz (1GHz to 40GHz)

All the antenna(Antenna 1&2) and modes(802.11a/n) has been tested and the worst(Antenna 1,802.11a) result recorded was report as below:

Test mode: 802.11a Frequency(MHz): 5180

Freq. (MHz)	Ant.Pol.	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)
11486.875	V	59.10	-36.13	-27	-9.13
14668	V	62.53	-32.70	-27	-5.70
17496.375	V	65.64	-29.59	-27	-2.59
11542.125	H	59.58	-35.65	-27	-8.65
14818.875	H	63.15	-32.08	-27	-5.08
17517.625	H	66.81	-28.42	-27	-1.42

Test mode: 802.11a Frequency(MHz): 5200

Freq. (MHz)	Ant.Pol.	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)
11431.625	V	54.33	-40.90	-27	-13.90
14555.375	V	62.65	-32.58	-27	-5.58
17524	V	64.22	-31.01	-27	-4.01
11329.625	H	59.66	-35.57	-27	-8.57
14529.875	H	62.36	-32.87	-27	-5.87
17498.5	H	65.69	-29.54	-27	-2.54

Test mode: 802.11a Frequency(MHz): 5240

Freq. (MHz)	Ant.Pol.	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)
10743.125	V	58.84	-36.39	-27	-9.39
14731.75	V	62.58	-32.65	-27	-5.65
17498.5	V	65.26	-29.97	-27	-2.97
11102.25	H	59.63	-35.60	-27	-8.60
15165.25	H	63.00	-32.23	-27	-5.23
17485.75	H	65.72	-29.51	-27	-2.51

Note: (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3)EIRP[dBm] = E[dBμV/m] + 20 log(d[meters]) - 104.77
d is the measurement distance in 3 meters

Test mode: 802.11a Frequency(MHz): 5180

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
11486.875	V	59.10	48.85	74.00	54.00	-14.90	-5.15
14668	V	62.53	48.89	74.00	54.00	-11.47	-5.11
17496.375	V	65.64	47.57	74.00	54.00	-8.36	-6.43
11542.125	H	59.58	48.65	74.00	54.00	-14.42	-5.35
14818.875	H	63.15	47.79	74.00	54.00	-10.85	-6.21
17517.625	H	66.81	46.94	74.00	54.00	-7.19	-7.06

Test mode: 802.11a Frequency(MHz): 5200

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
11431.625	V	54.33	48.50	74.00	54.00	-14.23	-5.50
14555.375	V	62.65	49.55	74.00	54.00	-11.52	-4.45
17524	V	64.22	46.75	74.00	54.00	-6.16	-7.25
11329.625	H	59.66	48.66	74.00	54.00	-14.34	-5.34
14529.875	H	62.36	48.78	74.00	54.00	-11.64	-5.22
17498.5	H	65.69	47.13	74.00	54.00	-8.31	-6.87

Test mode: 802.11a Frequency(MHz): 5240

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
10743.125	V	58.84	48.71	74.00	54.00	-15.16	-5.29
14731.75	V	62.58	48.00	74.00	54.00	-11.42	-6.00
17498.5	V	65.26	46.92	74.00	54.00	-8.74	-7.08
11102.25	H	59.63	48.82	74.00	54.00	-14.37	-5.18
15165.25	H	63.00	47.20	74.00	54.00	-11.00	-6.80
17485.75	H	65.72	46.33	74.00	54.00	-8.28	-7.67

Note: (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
(2) Emission Level= Reading Level+Correct Factor.
(3) Correct Factor= Ant_F + Cab_L - Preamp
(4) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

- ☒Undesirable radiated Undesirable radiated Spurious Emission in Band Edge

Test mode: 802.11a Frequency(MHz): 5180

Freq. (MHz)	Ant.Pol.	Field Strength (RBW=100KHz) (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Verdict
5034.46	H	53.93	-41.30	-27	Pass
5018.78	V	53.66	-41.57	-27	Pass

Test mode: 802.11a Frequency(MHz): 5240

Freq. (MHz)	Ant.Pol.	Field Strength (RBW=100KHz) (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Verdict
5406.05	H	52.96	-42.27	-27	Pass
5419.31	V	52.93	-42.30	-27	Pass

Note: (1) All Readings are Peak Value (VBW=3MHz) and AV Value (VBW=10Hz).
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3)EIRP[dBm] = E[dBμV/m] + 20 log(d[meters]) - 104.77
d is the measurement distance in 3 meters

Test mode: 802.11a Frequency(MHz): 5180

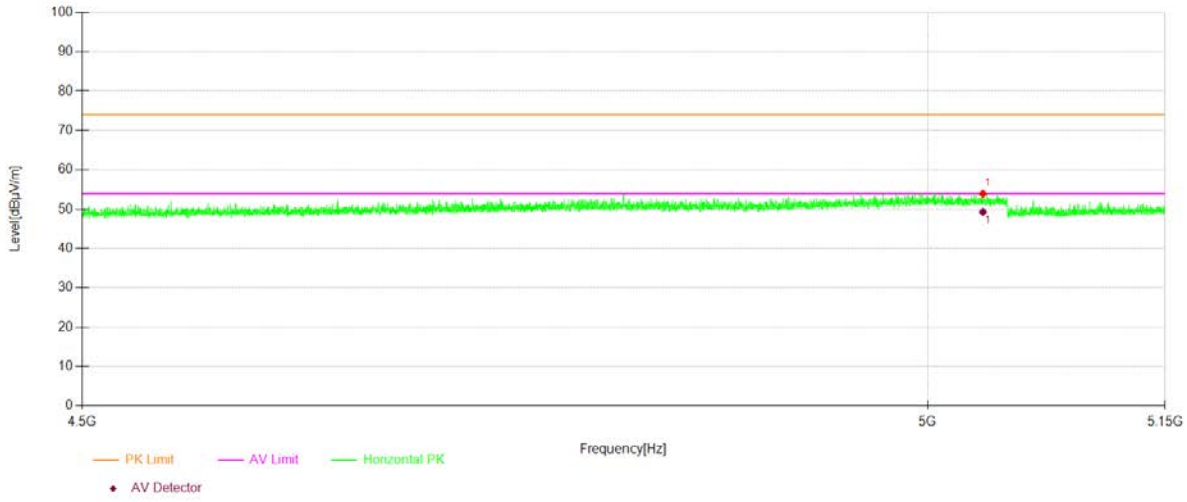
Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
5034.46	H	53.93	74	49.30	54
5018.78	V	53.66	74	48.79	54

Test mode: 802.11a Frequency(MHz): 5240

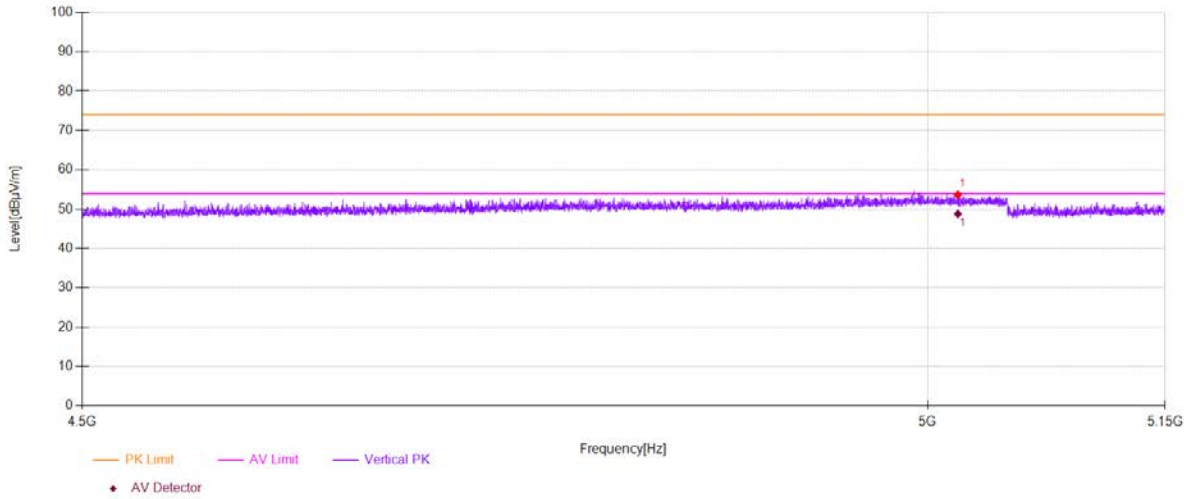
Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
5406.05	H	52.96	74	49.35	54
5419.31	V	52.93	74	50.41	54

Note: (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
(2) Emission Level= Reading Level+Correct Factor.
(3) Correct Factor= Ant_F + Cab_L - Preamp
(4) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

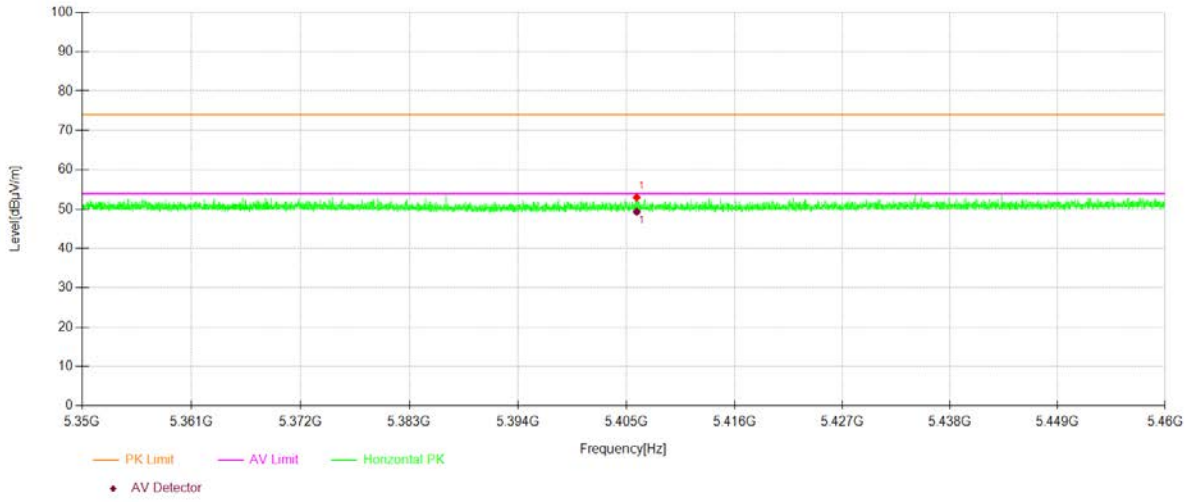
Test Model	U-NII - 1 Undesirable radiated Spurious Emission in Restricted Band (5100-5150MHz) ☒802.11a ☐802.11n(HT20) ☐802.11n(HT40) ☒5180 ☐5200 ☐5240 Ant.Pol H



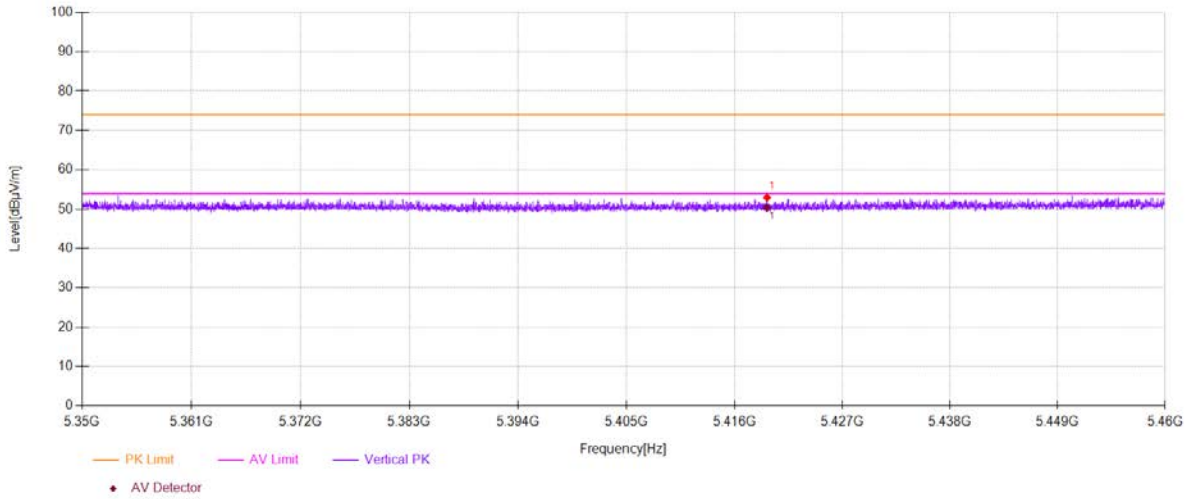
Test Model	U-NII - 1 Undesirable radiated Spurious Emission in Restricted Band (5100-5150MHz) ☒802.11a ☐802.11n(HT20) ☐802.11n(HT40) ☒5180 ☐5200 ☐5240 Ant.Pol V



Test Model	U-NII - 1 Undesirable radiated Spurious Emission in Restricted Band (5350-5400MHz) ☒802.11a ☐802.11n(HT20) ☐802.11n(HT40) ☐5180 ☐5200 ☒5240 Ant.Pol H



Test Model	U-NII - 1 Undesirable radiated Spurious Emission in Restricted Band (5350-5400MHz) ☒802.11a ☐802.11n(HT20) ☐802.11n(HT40) ☐5180 ☐5200 ☒5240 Ant.Pol V



☒For Undesirable radiated Spurious Emission in U-NII -3

- ☒Undesirable radiated Spurious Emission Above 1GHz (1GHz to 40GHz)

All the antenna(Antenna 1&2) and modes(802.11a/n) has been tested and the worst(Antenna 1,802.11a) result recorded was report as below:

Test mode: 802.11a Frequency(MHz): 5745

Freq. (MHz)	Ant.Pol.	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)
11384.875	V	59.70	-35.53	-27	-8.53
14525.625	V	62.81	-32.42	-27	-5.42
17481.5	V	65.28	-29.95	-27	-2.95
11567.625	H	59.54	-35.69	-27	-8.69
14619.125	H	63.28	-31.95	-27	-4.95
17504.875	H	65.39	-29.84	-27	-2.84

Test mode: 802.11a Frequency(MHz): 5785

Freq. (MHz)	Ant.Pol.	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)
11716.375	V	59.43	-35.80	-27	-8.80
14561.75	V	62.63	-32.60	-27	-5.60
17492.125	V	66.79	-28.44	-27	-1.44
11319	H	59.44	-35.79	-27	-8.79
14723.25	H	62.55	-32.68	-27	-5.68
17490	H	65.00	-30.23	-27	-3.23

Test mode: 802.11a Frequency(MHz): 5805

Freq. (MHz)	Ant.Pol.	Field Strength (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Over(dB)
10743.125	V	59.66	-35.57	-27	-8.57
14693.5	V	63.42	-31.81	-27	-4.81
17485.75	V	65.04	-30.19	-27	-3.19
11344.5	H	59.52	-35.71	-27	-8.71
15284.25	H	62.30	-32.93	-27	-5.93
17483.625	H	66.62	-28.61	-27	-1.61

Note: (1) All Readings are Peak Value (VBW=3MHz) and AV Value (VBW=10Hz).
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3)EIRP[dBm] = E[dBμV/m] + 20 log(d[meters]) - 104.77
d is the measurement distance in 3 meters

Frequency: 802.11a Frequency(MHz): 5745

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
11384.875	V	59.70	48.14	74.00	54.00	-14.30	-5.86
14525.625	V	62.81	48.99	74.00	54.00	11.19	-5.01
17481.5	V	65.28	46.14	74.00	54.00	-8.72	-7.86
11567.625	H	59.54	48.71	74.00	54.00	-14.46	-5.29
14619.125	H	63.28	50.10	74.00	54.00	-10.72	-3.90
17504.875	H	65.39	47.37	74.00	54.00	-8.61	-6.63

Frequency: 802.11a Frequency(MHz): 5785

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
11716.375	V	59.43	48.05	74.00	54.00	-14.57	-5.95
14561.75	V	62.63	49.48	74.00	54.00	-11.37	-4.52
17492.125	V	66.79	46.68	74.00	54.00	-7.21	-7.32
11319	H	59.44	49.20	74.00	54.00	-14.56	-4.80
14723.25	H	62.55	48.06	74.00	54.00	-11.45	-5.94
17490	H	65.00	46.61	74.00	54.00	-9.00	-7.39

Frequency: 802.11a Frequency(MHz): 5805

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
10743.125	V	59.66	49.08	74.00	54.00	-14.34	-4.92
14693.5	V	63.42	48.23	74.00	54.00	-10.58	-5.77
17485.75	V	65.04	46.88	74.00	54.00	-8.96	-7.12
11344.5	H	59.52	49.18	74.00	54.00	-14.48	-4.82
15284.25	H	62.30	46.18	74.00	54.00	-11.70	-7.82
17483.625	H	66.62	46.32	74.00	54.00	-7.38	-7.68

Note: (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
(2) Emission Level= Reading Level+Correct Factor.
(3) Correct Factor= Ant_F + Cab_L - Preamp
(4) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

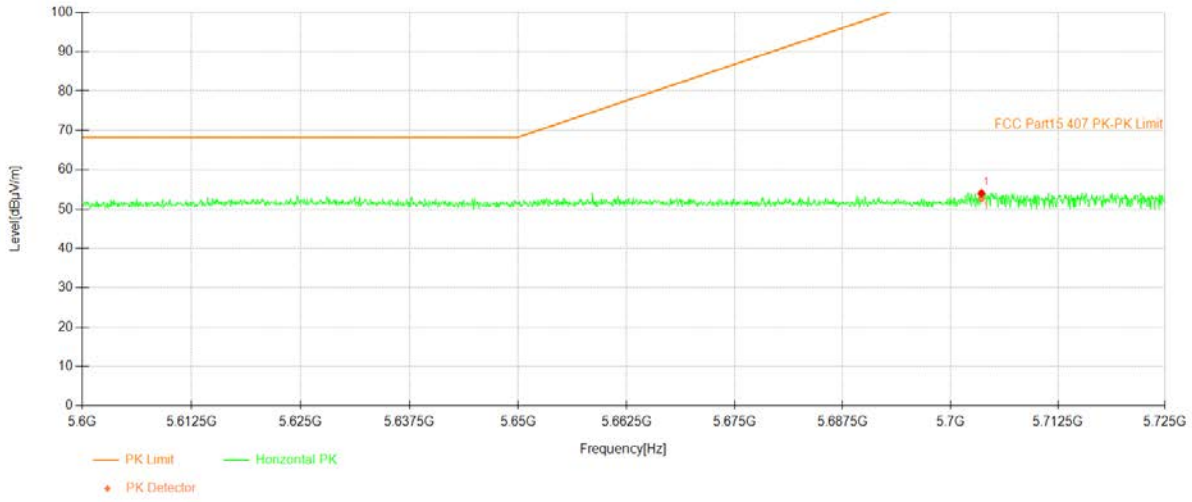
- ☒Undesirable radiated Spurious Emission in band edge

Test mode:	802.11a	Frequency:	5745		
Freq. (MHz)	Ant.Pol.	Field Strength (RBW=100KHz) (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Verdict
5703.61	H	54.05	-41.18	11.01	Pass
5712.99	V	53.33	-41.90	13.64	Pass

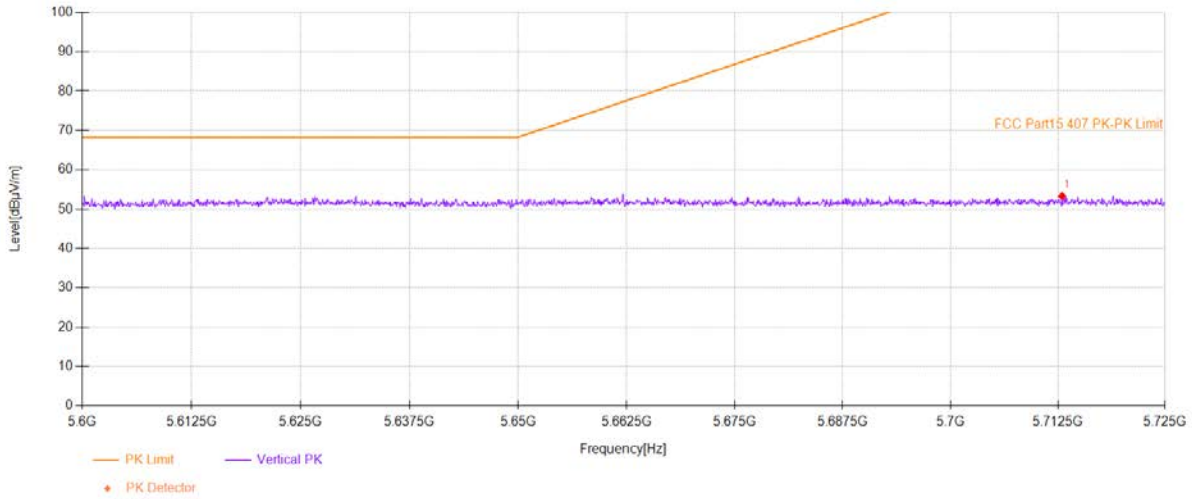
Test mode:	802.11a	Frequency:	5805		
Freq. (MHz)	Ant.Pol.	Field Strength (RBW=100KHz) (dBuV/m)	E.I.R.P (dBm)	Limit (dBm)	Verdict
5955.92	H	54.02	-41.21	-27	Pass
5939.48	V	53.63	-41.60	-27	Pass

Note: (1) All Readings are Peak Value (VBW=3MHz) and AV Value (VBW=10Hz).
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.

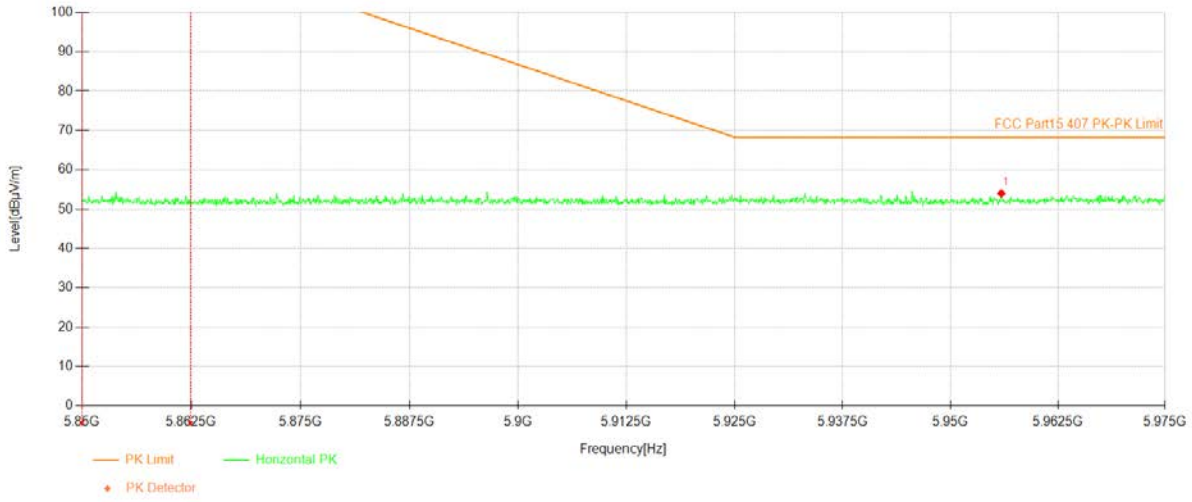
Test Model	U-NII -3 Undesirable radiated Undesirable radiated Spurious Emission in Band Edge ☒802.11a ☐802.11n(HT20) ☐802.11n(HT40) ☒5745 Ant.Pol H



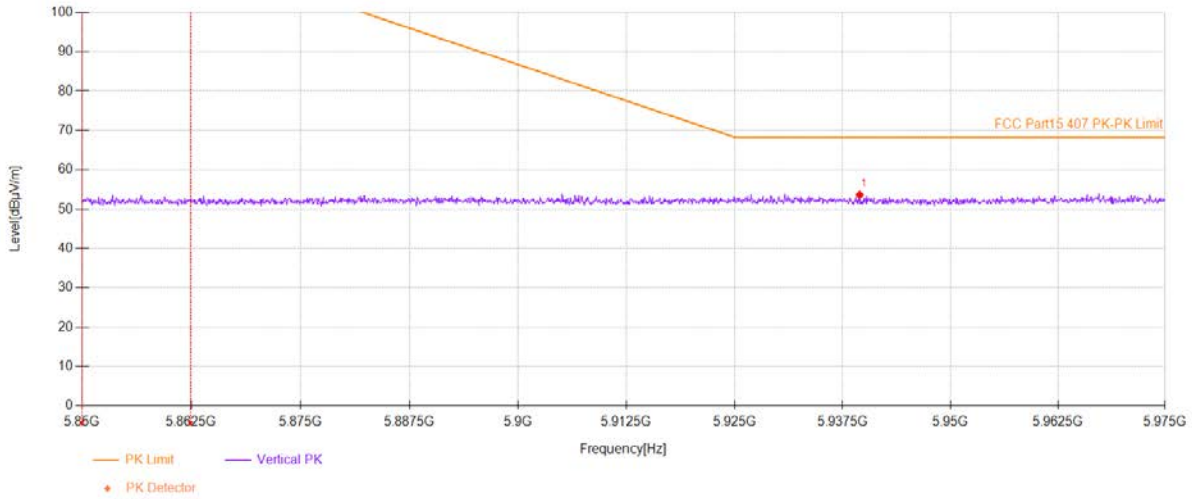
Test Model	U-NII -3 Undesirable radiated Undesirable radiated Spurious Emission in Band Edge ☒802.11a ☐802.11n(HT20) ☐802.11n(HT40) ☒5745 Ant.Pol V



Test Model	U-NII -3 Undesirable radiated Undesirable radiated Spurious Emission in Band Edge ☒802.11a ☐802.11n(HT20) ☐802.11n(HT40) ☒5805 Ant.Pol H



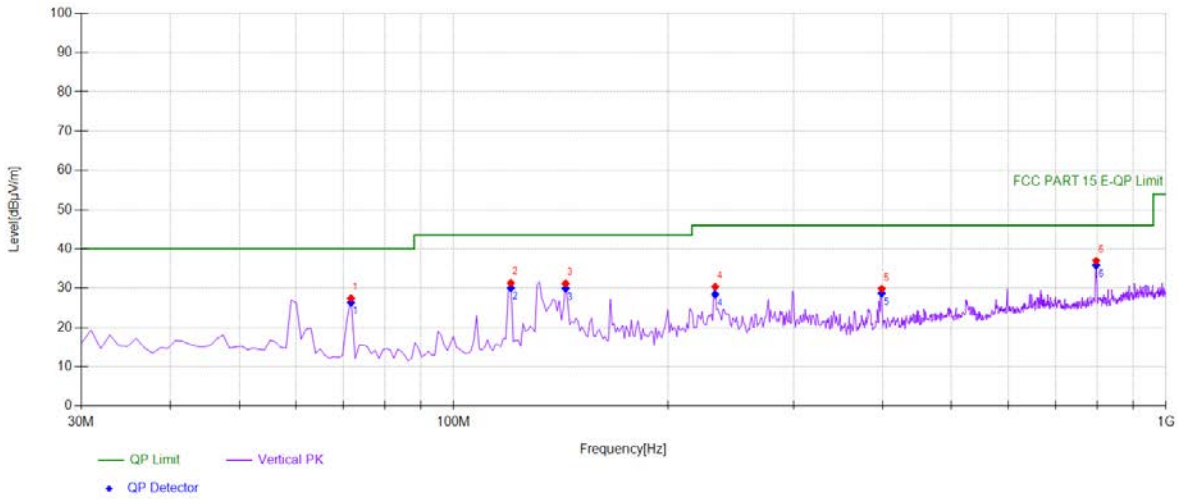
Test Model	U-NII -3 Undesirable radiated Undesirable radiated Spurious Emission in Band Edge ☒802.11a ☐802.11n(HT20) ☐802.11n(HT40) ☒5805 Ant.Pol V



- Undesirable radiated Spurious Emission below 1GHz (30MHz to 1GHz)

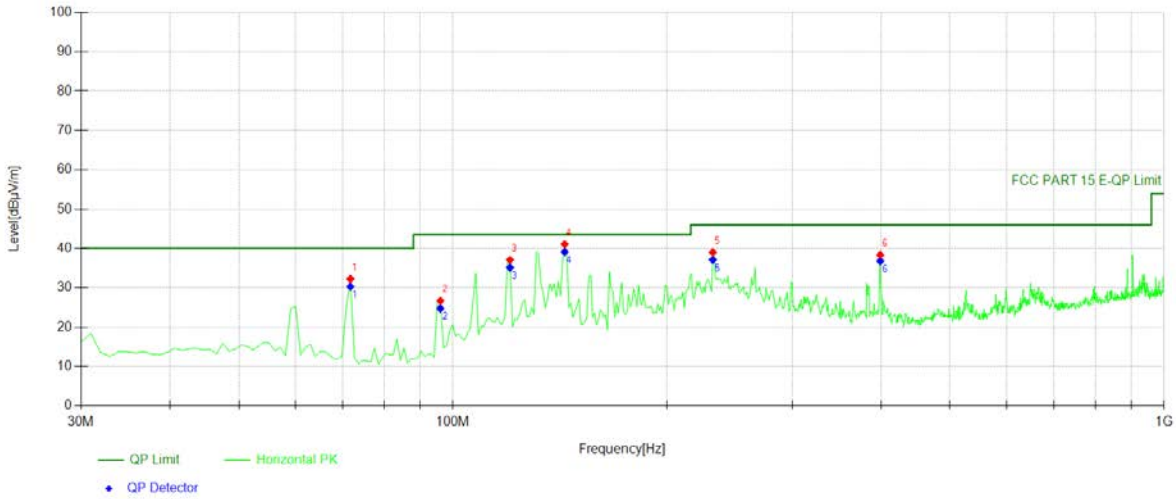
  All the antenna(Antenna 1&2) and modes(802.11a/n) has been tested and the worst(Antenna 1,802.11a) result recorded was report as below:

Mode:	11A 5180



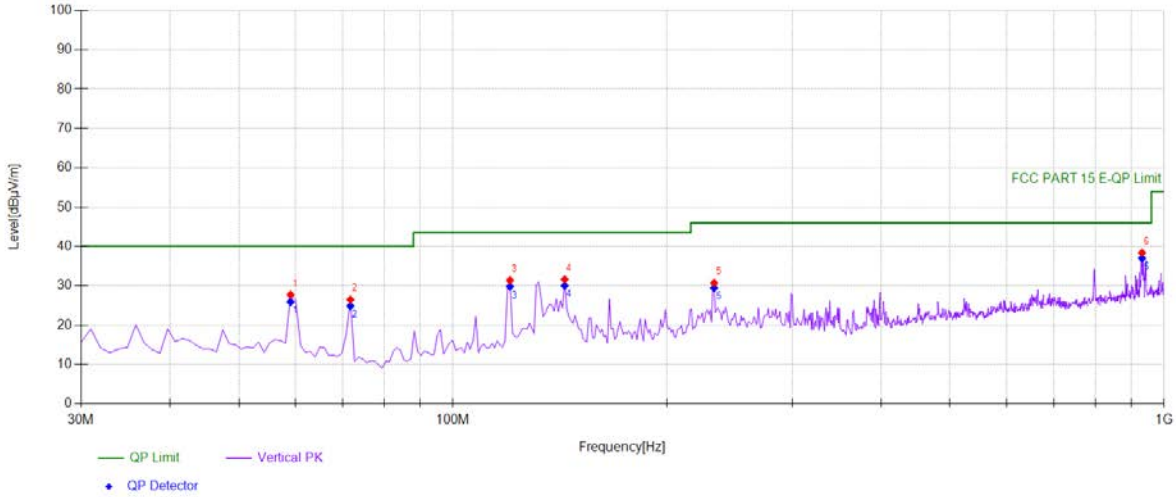
Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Detector	Limit [dBµV/m]	Margin [dB]	Polarity
1	71.7518	47.67	-20.23	27.44	PK	40.00	12.56	Vertical
2	120.3003	49.30	-17.95	31.35	PK	43.50	12.15	Vertical
3	143.6036	51.14	-19.92	31.22	PK	43.50	12.28	Vertical
4	232.9329	46.27	-15.87	30.40	PK	46.00	15.60	Vertical
5	398.969	41.62	-11.79	29.83	PK	46.00	16.17	Vertical
6	798.038	41.39	-4.44	36.95	PK	46.00	9.05	Vertical

Mode:	11A 5180



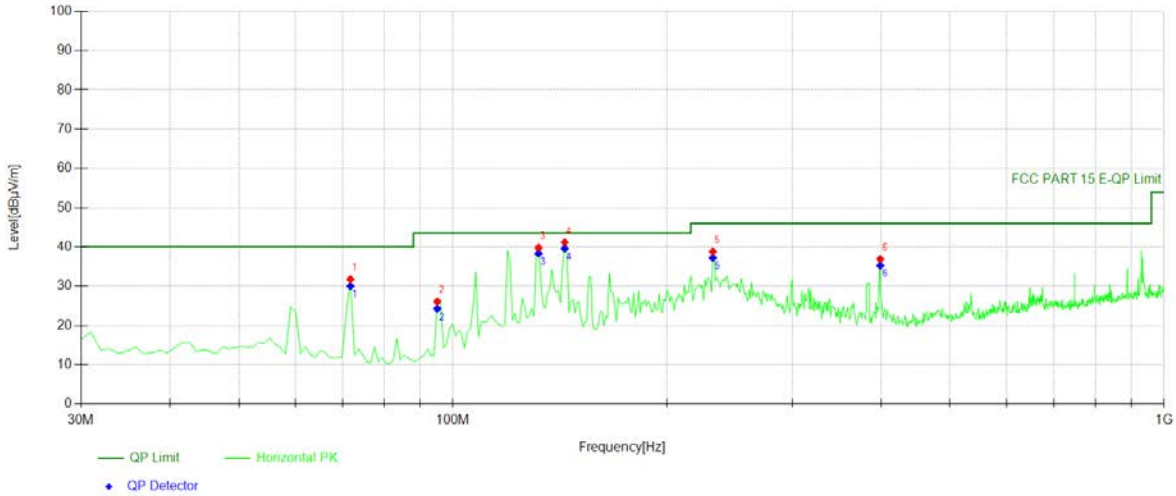
Suspected Data List								
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity
1	71.7518	52.49	-20.23	32.26	PK	40.00	7.74	Horizontal
2	96.026	44.43	-17.73	26.70	PK	43.50	16.80	Horizontal
3	120.3003	55.05	-17.95	37.10	PK	43.50	6.40	Horizontal
4	143.6036	61.02	-19.92	41.10	PK	43.50	2.40	Horizontal
5	231.962	55.00	-15.95	39.05	PK	46.00	6.95	Horizontal
6	398.969	50.18	-11.79	38.39	PK	46.00	7.61	Horizontal

Mode:	11A 5200



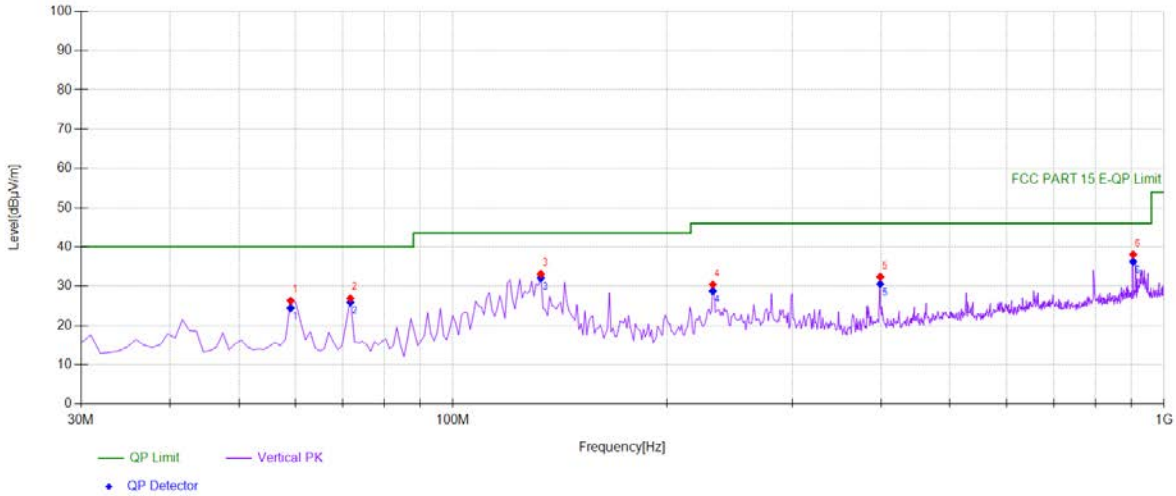
Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Detector	Limit [dBµV/m]	Margin [dB]	Polarity
1	59.1291	46.16	-18.43	27.73	PK	40.00	12.27	Vertical
2	71.7518	46.72	-20.23	26.49	PK	40.00	13.51	Vertical
3	120.3003	49.36	-17.95	31.41	PK	43.50	12.09	Vertical
4	143.6036	51.56	-19.92	31.64	PK	43.50	11.86	Vertical
5	232.9329	46.59	-15.87	30.72	PK	46.00	15.28	Vertical
6	931.0611	41.02	-2.60	38.42	PK	46.00	7.58	Vertical

Mode:	11A 5200



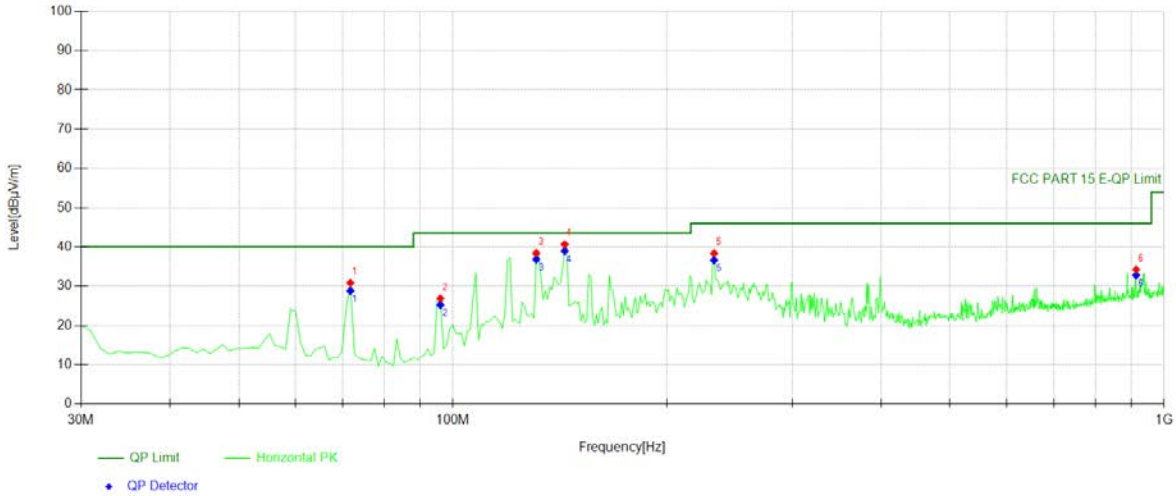
Suspected Data List								
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB/m]	Level [dBμV/m]	Detector	Limit [dBμV/m]	Margin [dB]	Polarity
1	71.7518	52.03	-20.23	31.80	PK	40.00	8.20	Horizontal
2	95.0551	44.05	-17.97	26.08	PK	43.50	17.42	Horizontal
3	131.952	58.98	-19.19	39.79	PK	43.50	3.71	Horizontal
4	143.6036	61.14	-19.92	41.22	PK	43.50	2.28	Horizontal
5	231.962	54.77	-15.95	38.82	PK	46.00	7.18	Horizontal
6	398.969	48.68	-11.79	36.89	PK	46.00	9.11	Horizontal

Mode:	11A 5240



Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Detector	Limit [dBµV/m]	Margin [dB]	Polarity
1	59.1291	44.72	-18.43	26.29	PK	40.00	13.71	Vertical
2	71.7518	47.15	-20.23	26.92	PK	40.00	13.08	Vertical
3	132.9229	52.39	-19.30	33.09	PK	43.50	10.41	Vertical
4	231.962	46.39	-15.95	30.44	PK	46.00	15.56	Vertical
5	398.969	44.18	-11.79	32.39	PK	46.00	13.61	Vertical
6	904.8448	40.89	-2.82	38.07	PK	46.00	7.93	Vertical

Mode:	11A 5240



Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB/m]	Level [dBµV/m]	Detector	Limit [dBµV/m]	Margin [dB]	Polarity
1	71.7518	51.05	-20.23	30.82	PK	40.00	9.18	Horizontal
2	96.026	44.61	-17.73	26.88	PK	43.50	16.62	Horizontal
3	130.981	57.56	-19.10	38.46	PK	43.50	5.04	Horizontal
4	143.6036	60.57	-19.92	40.65	PK	43.50	2.85	Horizontal
5	232.9329	54.29	-15.87	38.42	PK	46.00	7.58	Horizontal
6	913.5836	37.08	-2.85	34.23	PK	46.00	11.77	Horizontal

8.5 POWER LINE CONDUCTED EMISSIONS

8.5.1 Applicable Standard

According to FCC Part 15.207(a)

8.5.2 Conformance Limit

Conducted Emission Limit

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

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

8.5.3 Test Configuration

Test according to clause 6.3 conducted emission test setup

8.5.4 Test Procedure

The EUT was placed on a table which is 0.8m above ground plane.
Maximum procedure was performed on the highest emissions to ensure EUT compliance.
Repeat above procedures until all frequency measured were complete.

8.5.5 Test Results

N/A

8.6 ANTENNA APPLICATION

8.6.1 Antenna Requirement

Standard	Requirement
FCC CRF Part 15.203	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

8.6.2 Result

PASS.

- The EUT has two Brass Antennas: antenna 1 gains are 2.16 dBi; antenna 2 gains are 2.16 dBi

Note:
- ☒ Antennas use a permanently attached antenna which is not replaceable.
- ☐ Not using a standard antenna jack or electrical connector for antenna replacement
- ☐ The antenna has to be professionally installed (please provide method of installation)

Which in accordance to section 15.203, please refer to the internal photos.

--------- END OF REPORT --------