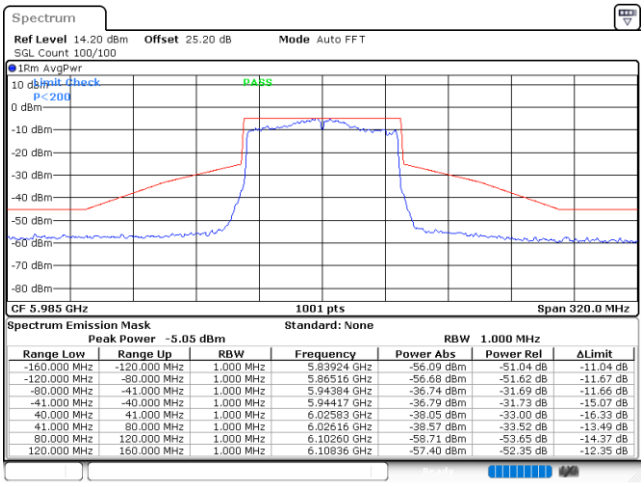
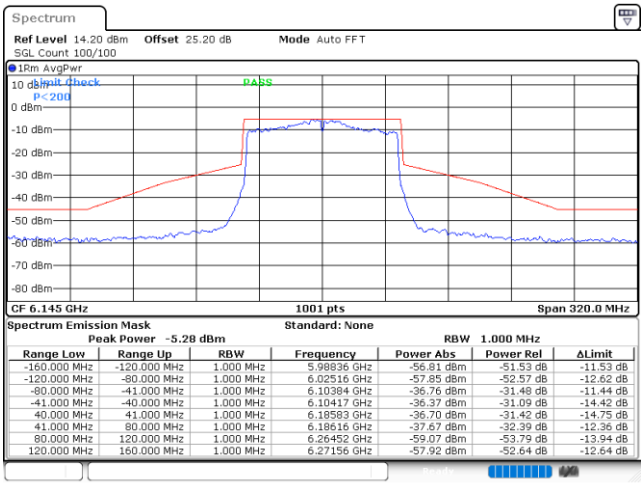
EUT Mode :	802.11ac VHT80

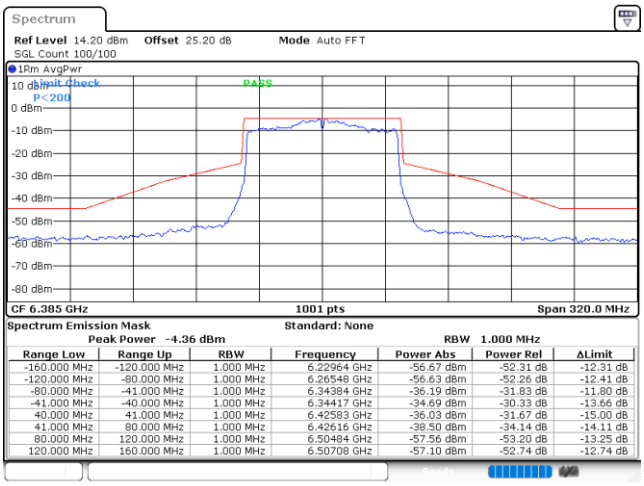
Plot on Channel 5985MHz



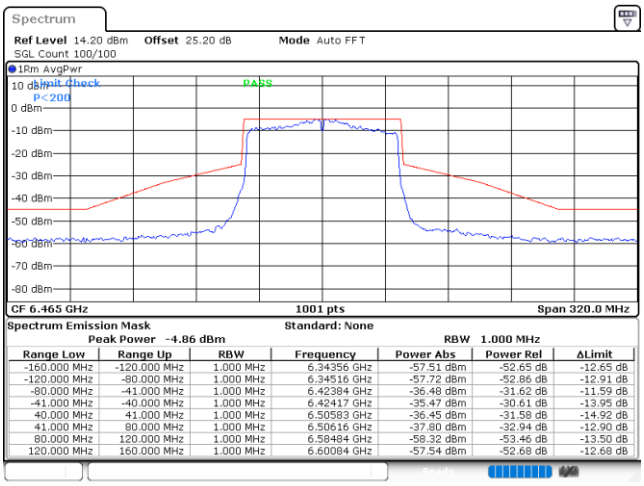
Plot on Channel 6145MHz



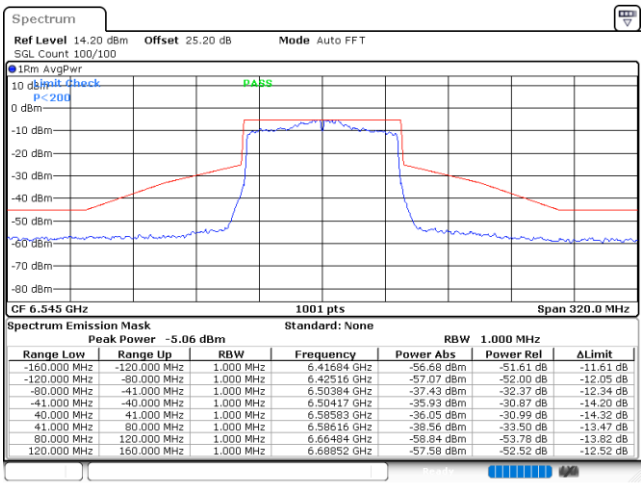
Plot on Channel 6385MHz



Plot on Channel 6465MHz



Plot on Channel 6545MHz



Spectrum Emission Mask Standard: None
Peak Power -5.06 dBm RBW 1.000 MHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-160.000 MHz	-120.000 MHz	1.000 MHz	6.41684 GHz	-56.68 dBm	-51.61 dB	-11.61 dB
-120.000 MHz	-80.000 MHz	1.000 MHz	6.42516 GHz	-57.07 dBm	-52.00 dB	-12.05 dB
-80.000 MHz	-41.000 MHz	1.000 MHz	6.50384 GHz	-37.43 dBm	-32.37 dB	-12.34 dB
-41.000 MHz	-40.000 MHz	1.000 MHz	6.50417 GHz	-35.93 dBm	-30.87 dB	-14.20 dB
40.000 MHz	41.000 MHz	1.000 MHz	6.58583 GHz	-36.05 dBm	-30.99 dB	-14.32 dB
41.000 MHz	80.000 MHz	1.000 MHz	6.58616 GHz	-38.56 dBm	-33.50 dB	-13.47 dB
80.000 MHz	120.000 MHz	1.000 MHz	6.66484 GHz	-58.84 dBm	-53.78 dB	-13.82 dB
120.000 MHz	160.000 MHz	1.000 MHz	6.68852 GHz	-57.58 dBm	-52.52 dB	-12.52 dB

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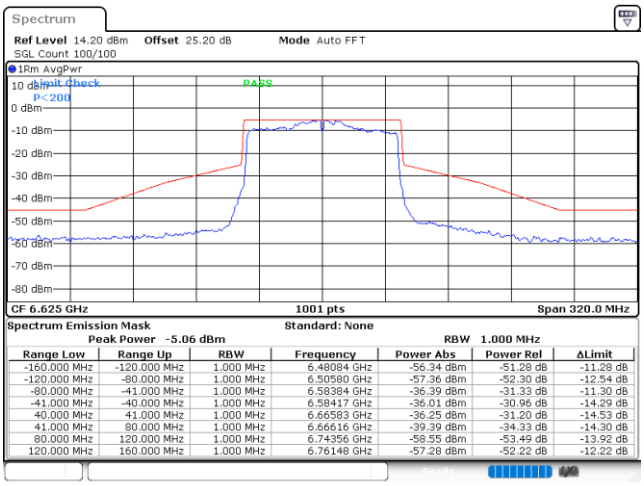
Plot on Channel 6625MHz



Spectrum Emission Mask Standard: None
Peak Power -5.06 dBm RBW 1.000 MHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-160.000 MHz	-120.000 MHz	1.000 MHz	6.48084 GHz	-56.34 dBm	-51.28 dB	-11.28 dB
-120.000 MHz	-80.000 MHz	1.000 MHz	6.50580 GHz	-57.36 dBm	-52.30 dB	-12.54 dB
-80.000 MHz	-41.000 MHz	1.000 MHz	6.58384 GHz	-36.39 dBm	-31.33 dB	-11.30 dB
-41.000 MHz	-40.000 MHz	1.000 MHz	6.58417 GHz	-36.01 dBm	-30.96 dB	-14.29 dB
40.000 MHz	41.000 MHz	1.000 MHz	6.66583 GHz	-36.25 dBm	-31.20 dB	-14.53 dB
41.000 MHz	80.000 MHz	1.000 MHz	6.66616 GHz	-39.39 dBm	-34.33 dB	-14.30 dB
80.000 MHz	120.000 MHz	1.000 MHz	6.74356 GHz	-58.55 dBm	-53.49 dB	-13.92 dB
120.000 MHz	160.000 MHz	1.000 MHz	6.76148 GHz	-57.28 dBm	-52.22 dB	-12.22 dB

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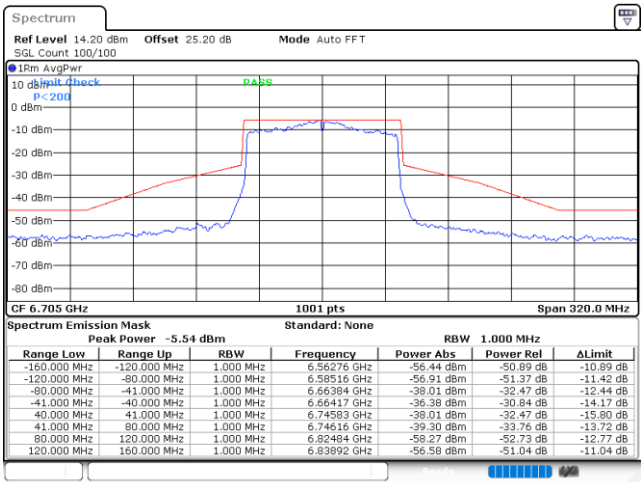
Plot on Channel 6705MHz



Spectrum Emission Mask Standard: None
Peak Power -5.54 dBm RBW 1.000 MHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-160.000 MHz	-120.000 MHz	1.000 MHz	6.56276 GHz	-56.44 dBm	-50.89 dB	-10.89 dB
-120.000 MHz	-80.000 MHz	1.000 MHz	6.58516 GHz	-56.91 dBm	-51.37 dB	-11.42 dB
-80.000 MHz	-41.000 MHz	1.000 MHz	6.66384 GHz	-38.01 dBm	-32.47 dB	-12.44 dB
-41.000 MHz	-40.000 MHz	1.000 MHz	6.66417 GHz	-36.38 dBm	-30.84 dB	-14.17 dB
40.000 MHz	41.000 MHz	1.000 MHz	6.74583 GHz	-38.01 dBm	-32.47 dB	-15.80 dB
41.000 MHz	80.000 MHz	1.000 MHz	6.74616 GHz	-39.30 dBm	-33.76 dB	-13.72 dB
80.000 MHz	120.000 MHz	1.000 MHz	6.82484 GHz	-58.27 dBm	-52.73 dB	-12.77 dB
120.000 MHz	160.000 MHz	1.000 MHz	6.83892 GHz	-56.58 dBm	-51.04 dB	-11.04 dB

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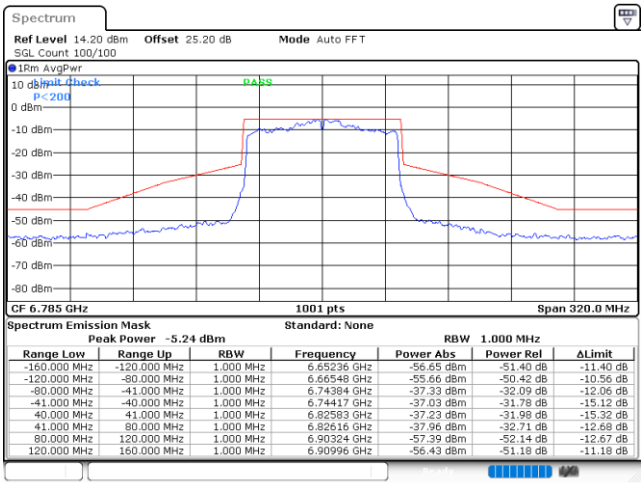
Plot on Channel 6785MHz



Spectrum Emission Mask Standard: None
Peak Power -5.24 dBm RBW 1.000 MHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-160.000 MHz	-120.000 MHz	1.000 MHz	6.65236 GHz	-56.65 dBm	-51.40 dB	-11.40 dB
-120.000 MHz	-80.000 MHz	1.000 MHz	6.66548 GHz	-55.66 dBm	-50.42 dB	-10.56 dB
-80.000 MHz	-41.000 MHz	1.000 MHz	6.74384 GHz	-37.33 dBm	-32.09 dB	-12.06 dB
-41.000 MHz	-40.000 MHz	1.000 MHz	6.74417 GHz	-37.03 dBm	-31.78 dB	-15.12 dB
40.000 MHz	41.000 MHz	1.000 MHz	6.82583 GHz	-37.23 dBm	-31.98 dB	-15.32 dB
41.000 MHz	80.000 MHz	1.000 MHz	6.82616 GHz	-37.96 dBm	-32.71 dB	-12.68 dB
80.000 MHz	120.000 MHz	1.000 MHz	6.90324 GHz	-57.39 dBm	-52.14 dB	-12.67 dB
120.000 MHz	160.000 MHz	1.000 MHz	6.90996 GHz	-56.43 dBm	-51.18 dB	-11.18 dB

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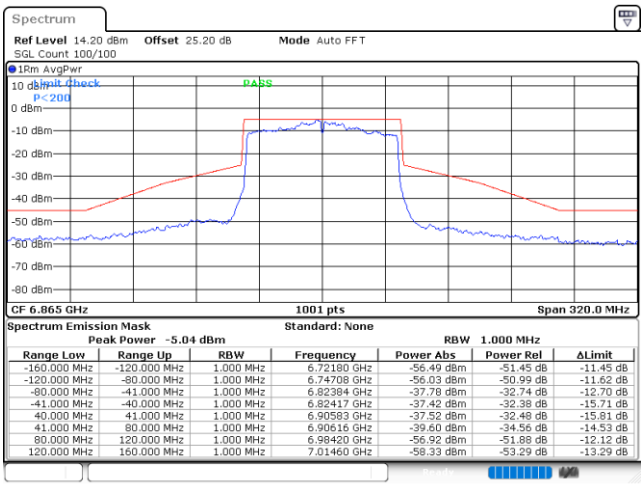
Plot on Channel 6865MHz



Spectrum Emission Mask Standard: None
Peak Power -5.04 dBm RBW 1.000 MHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-160.000 MHz	-120.000 MHz	1.000 MHz	6.72180 GHz	-56.49 dBm	-51.45 dB	-11.45 dB
-120.000 MHz	-80.000 MHz	1.000 MHz	6.74708 GHz	-56.03 dBm	-50.99 dB	-11.62 dB
-80.000 MHz	-41.000 MHz	1.000 MHz	6.82384 GHz	-37.78 dBm	-32.74 dB	-12.70 dB
-41.000 MHz	-40.000 MHz	1.000 MHz	6.82417 GHz	-37.42 dBm	-32.38 dB	-15.71 dB
40.000 MHz	41.000 MHz	1.000 MHz	6.90583 GHz	-37.52 dBm	-32.48 dB	-15.81 dB
41.000 MHz	80.000 MHz	1.000 MHz	6.90616 GHz	-39.60 dBm	-34.56 dB	-14.53 dB
80.000 MHz	120.000 MHz	1.000 MHz	6.98420 GHz	-56.92 dBm	-51.88 dB	-12.12 dB
120.000 MHz	160.000 MHz	1.000 MHz	7.01460 GHz	-58.33 dBm	-53.29 dB	-13.29 dB

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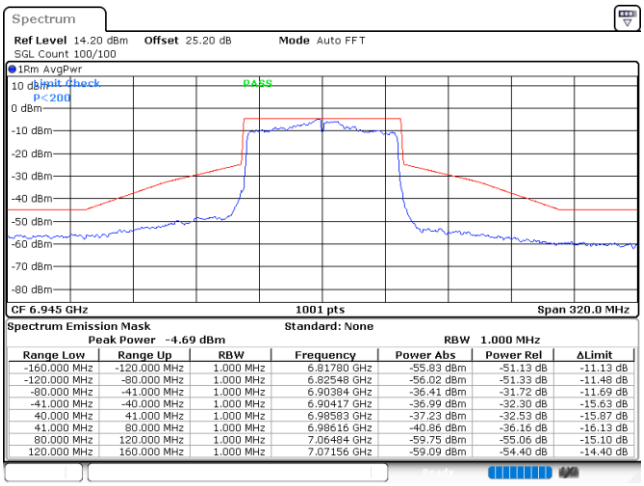
Plot on Channel 6945MHz



Spectrum Emission Mask Standard: None
Peak Power -4.69 dBm RBW 1.000 MHz

Range Low	Range Up	RBW	Frequency	Power Abs	Power Rel	ΔLimit
-160.000 MHz	-120.000 MHz	1.000 MHz	6.81780 GHz	-55.83 dBm	-51.13 dB	-11.13 dB
-120.000 MHz	-80.000 MHz	1.000 MHz	6.82548 GHz	-56.02 dBm	-51.33 dB	-11.48 dB
-80.000 MHz	-41.000 MHz	1.000 MHz	6.90384 GHz	-36.41 dBm	-31.72 dB	-11.69 dB
-41.000 MHz	-40.000 MHz	1.000 MHz	6.90417 GHz	-36.99 dBm	-32.30 dB	-15.63 dB
40.000 MHz	41.000 MHz	1.000 MHz	6.98583 GHz	-37.23 dBm	-32.53 dB	-15.87 dB
41.000 MHz	80.000 MHz	1.000 MHz	6.98616 GHz	-40.86 dBm	-36.16 dB	-16.13 dB
80.000 MHz	120.000 MHz	1.000 MHz	7.06484 GHz	-59.75 dBm	-55.06 dB	-15.10 dB
120.000 MHz	160.000 MHz	1.000 MHz	7.07156 GHz	-59.09 dBm	-54.40 dB	-14.40 dB

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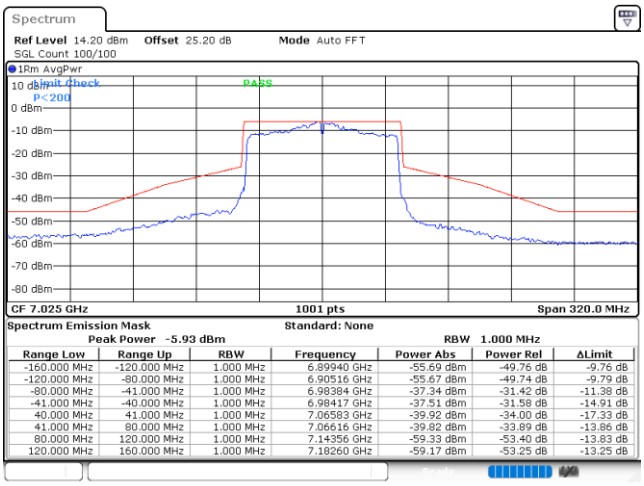
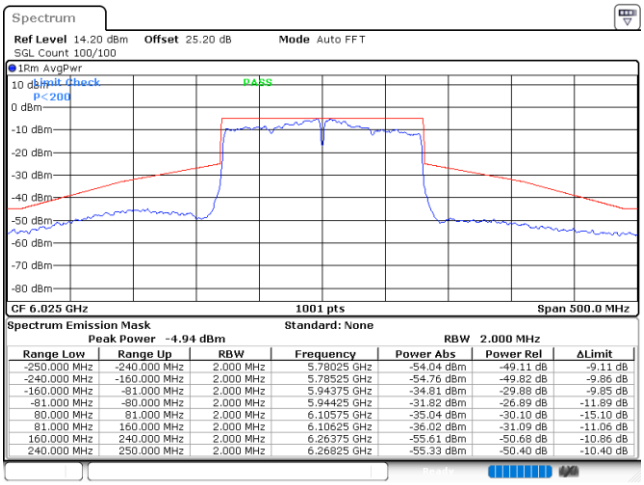
Plot on Channel 7025MHz

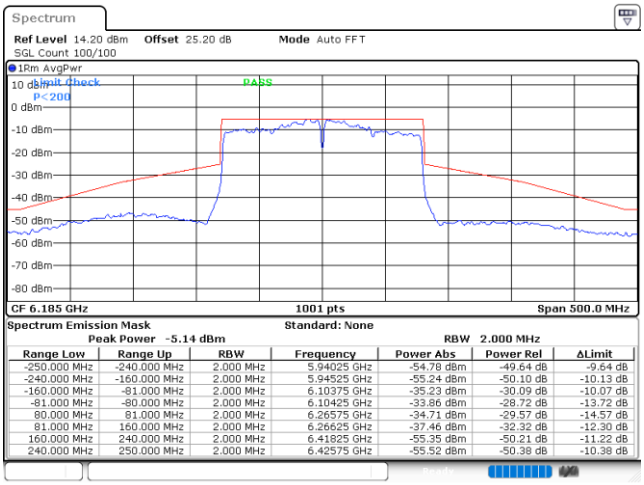


EUT Mode :	802.11ac VHT160

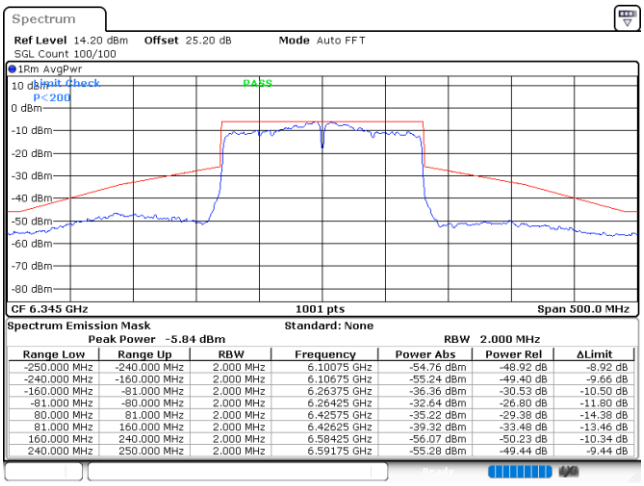
Plot on Channel 6025MHz



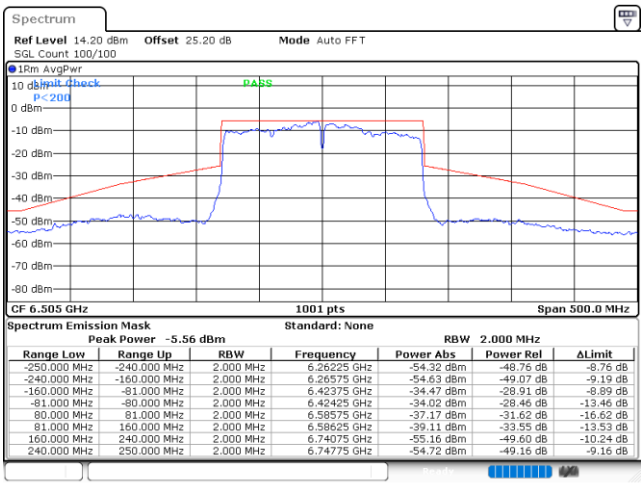
Plot on Channel 6185MHz



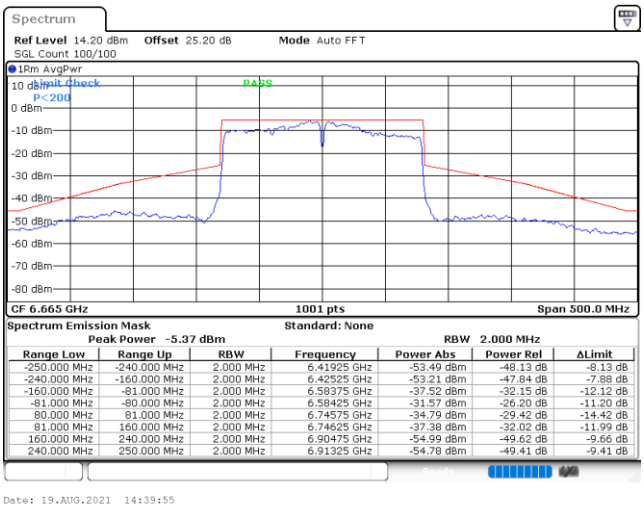
Plot on Channel 6345MHz



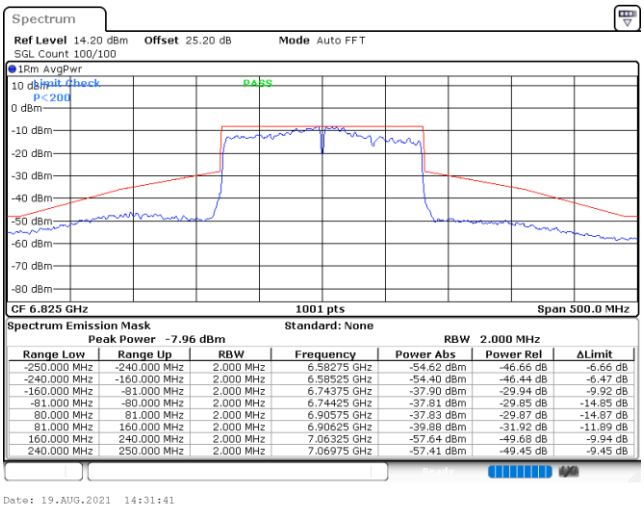
Plot on Channel 6505MHz



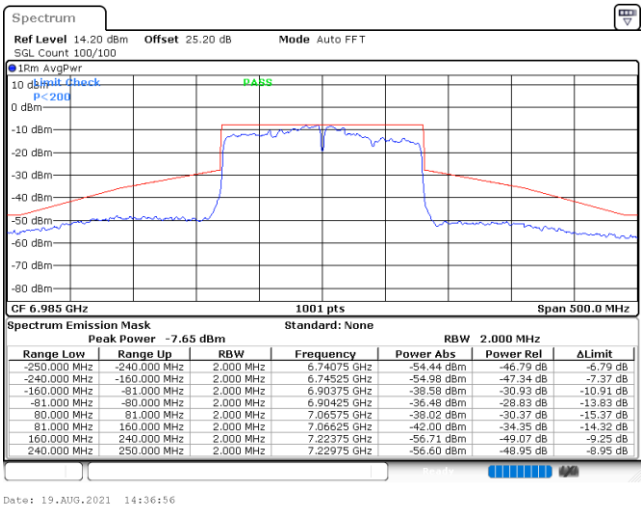
Plot on Channel 6665MHz



Plot on Channel 6825MHz

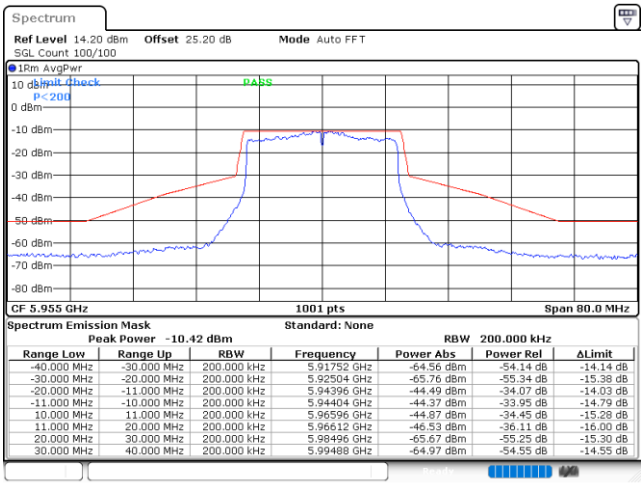


Plot on Channel 6985MHz

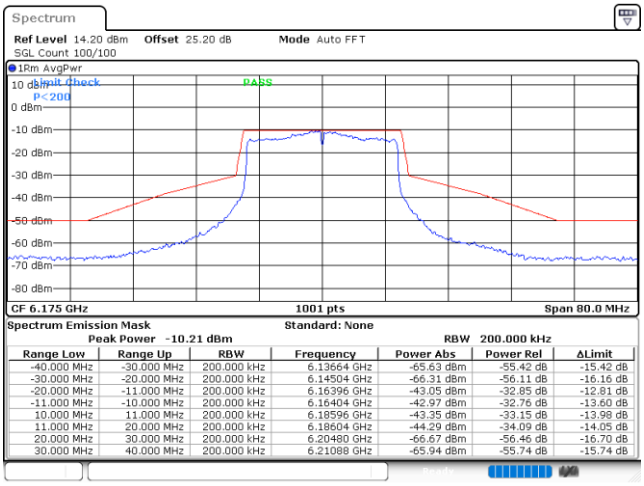


EUT Mode :	802.11ax HE20

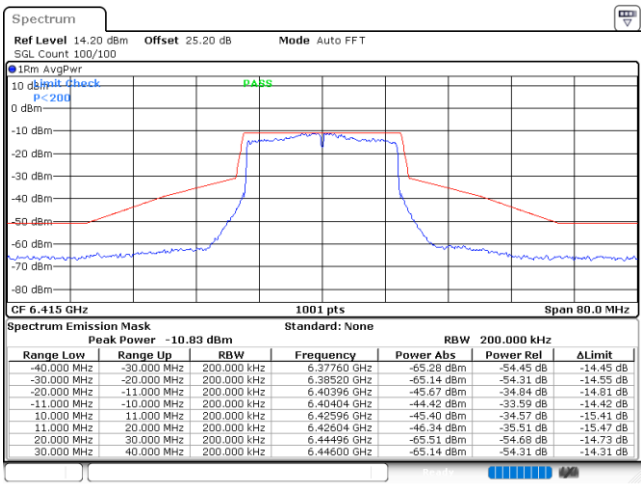
Plot on Channel 5955MHz



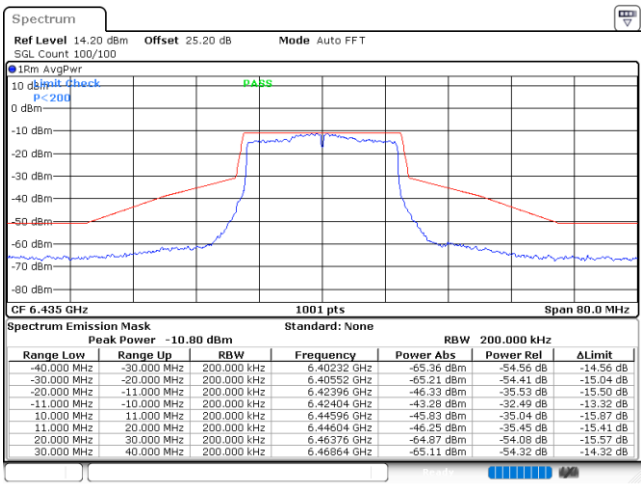
Plot on Channel 6175MHz



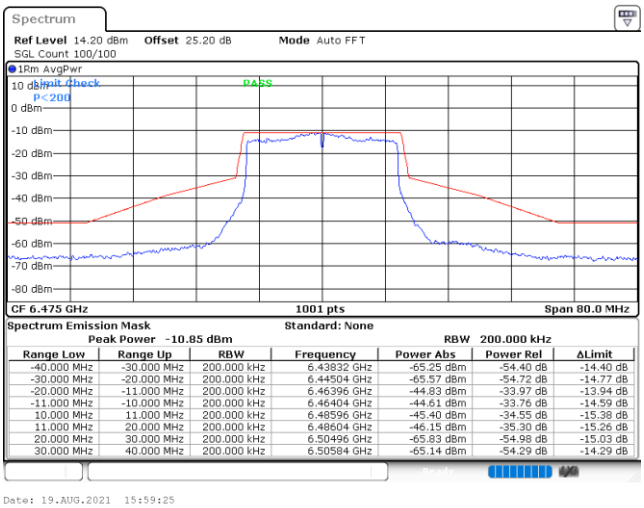
Plot on Channel 6415MHz



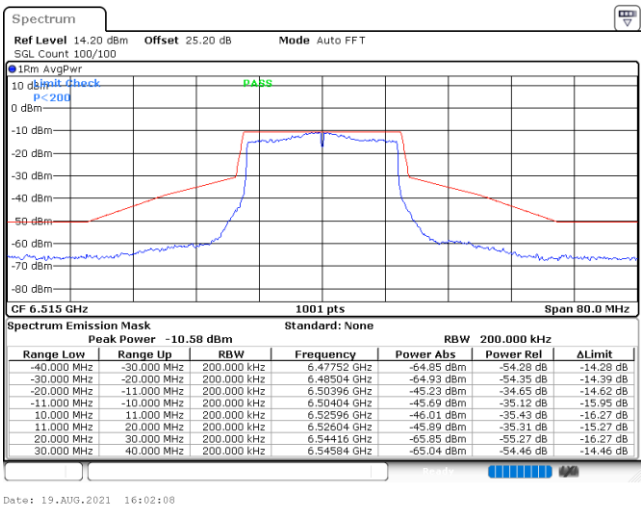
Plot on Channel 6435MHz



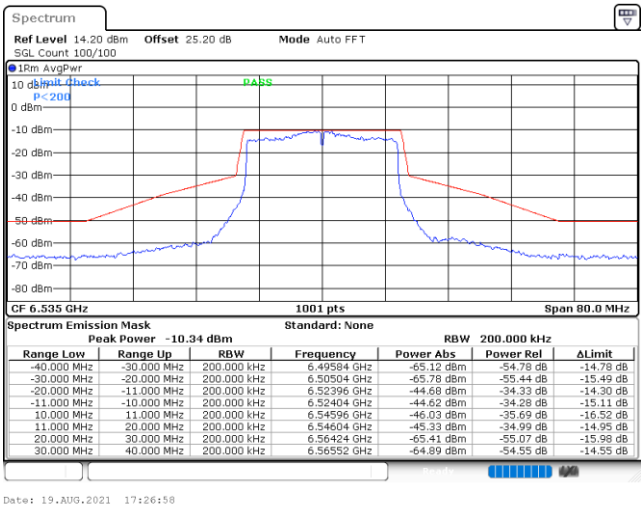
Plot on Channel 6475MHz



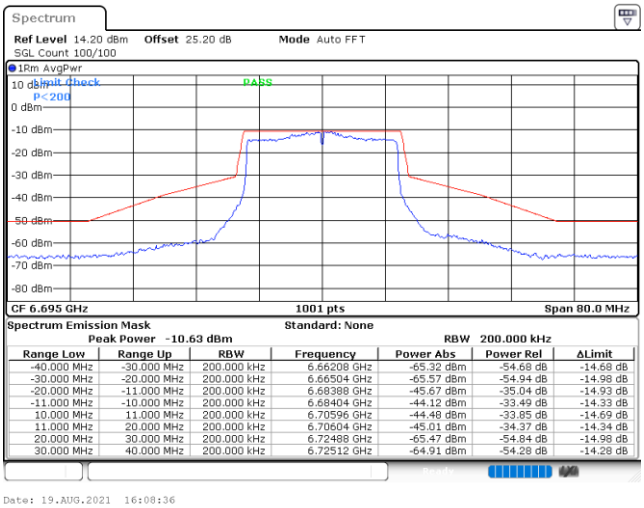
Plot on Channel 6515MHz



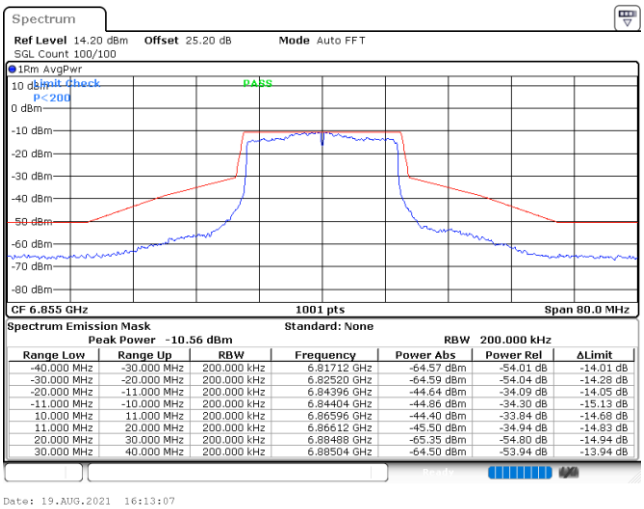
Plot on Channel 6535MHz



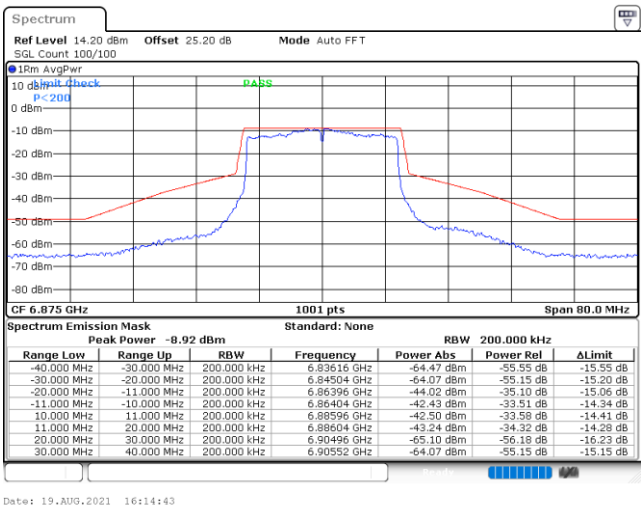
Plot on Channel 6695MHz



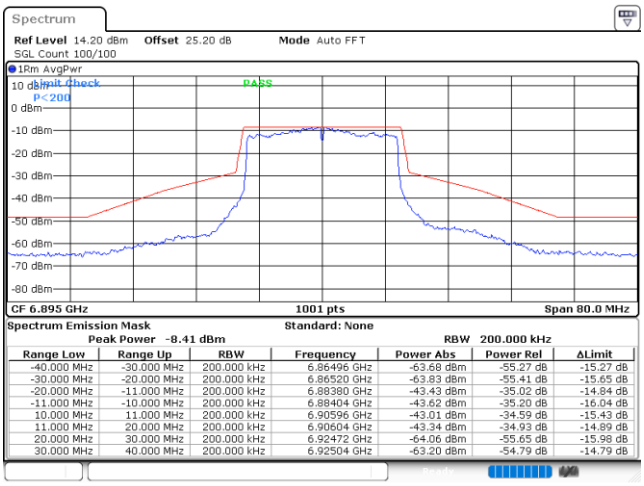
Plot on Channel 6855MHz



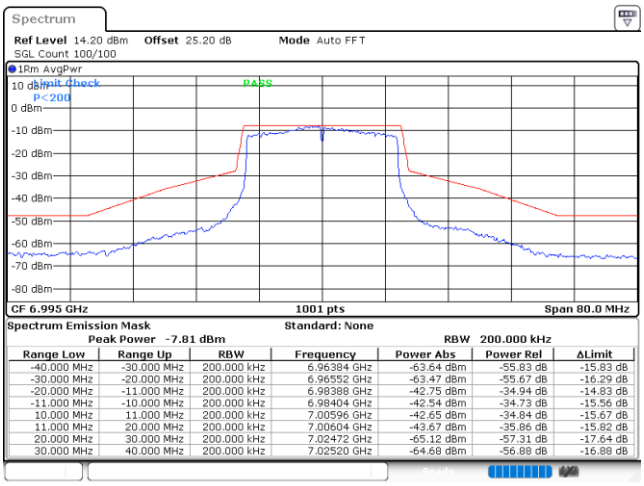
Plot on Channel 6875MHz



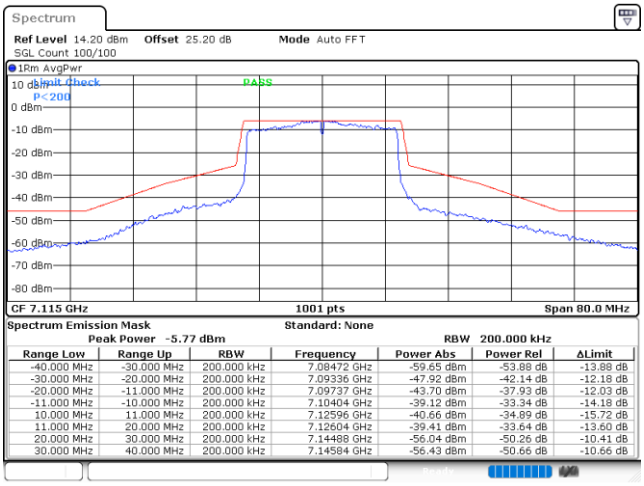
Plot on Channel 6895MHz



Plot on Channel 6995MHz

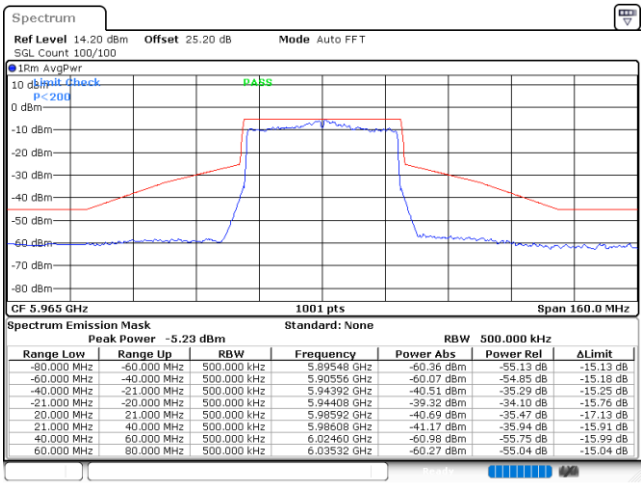


Plot on Channel 7115MHz

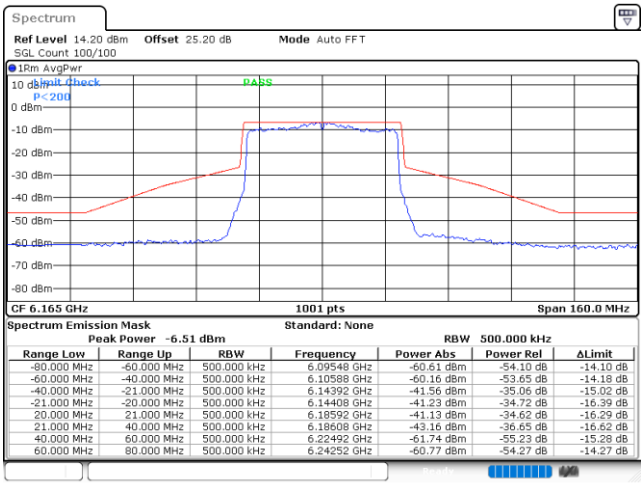


EUT Mode :	802.11ax HE40

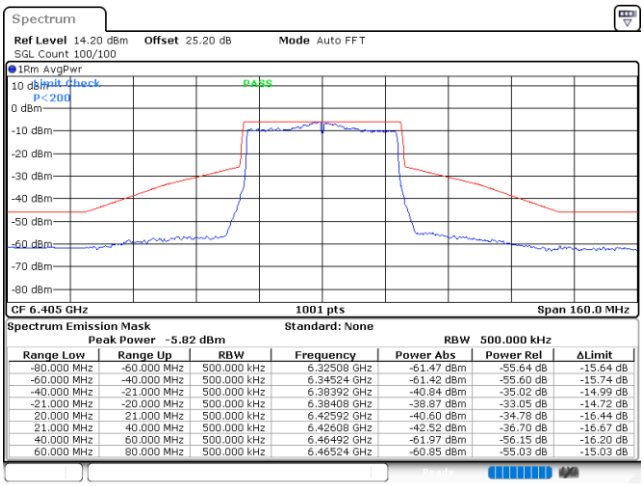
Plot on Channel 5965MHz



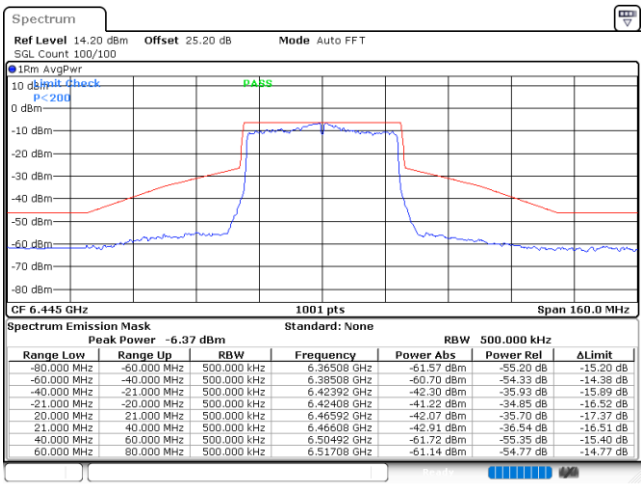
Plot on Channel 6165MHz



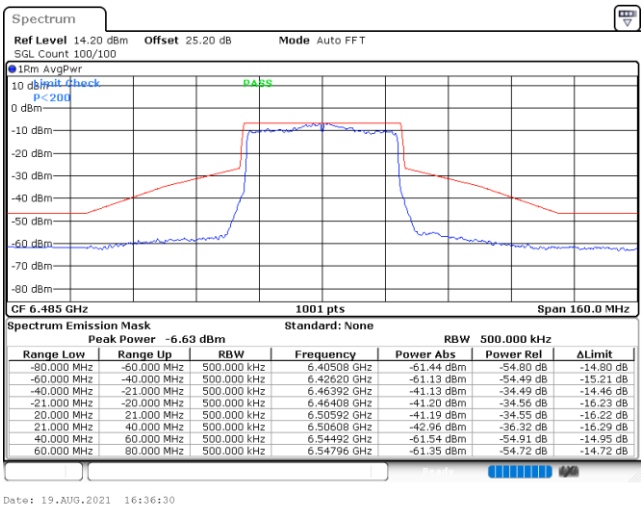
Plot on Channel 6405MHz



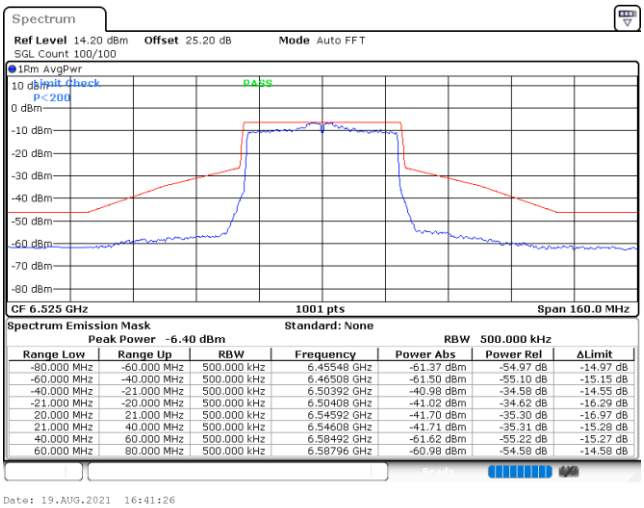
Plot on Channel 6445MHz



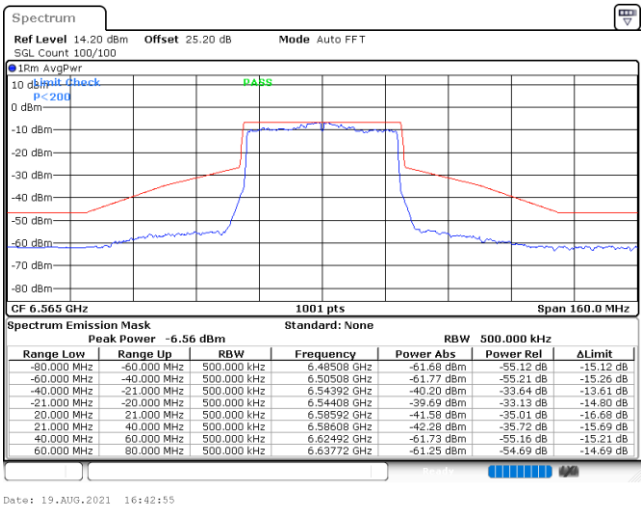
Plot on Channel 6485MHz



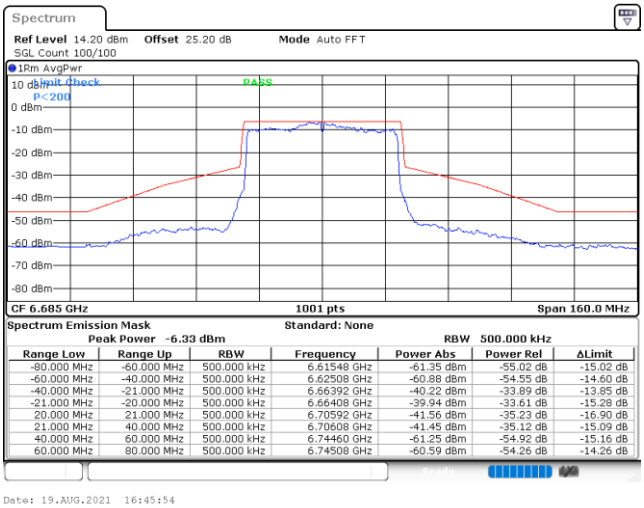
Plot on Channel 6525MHz



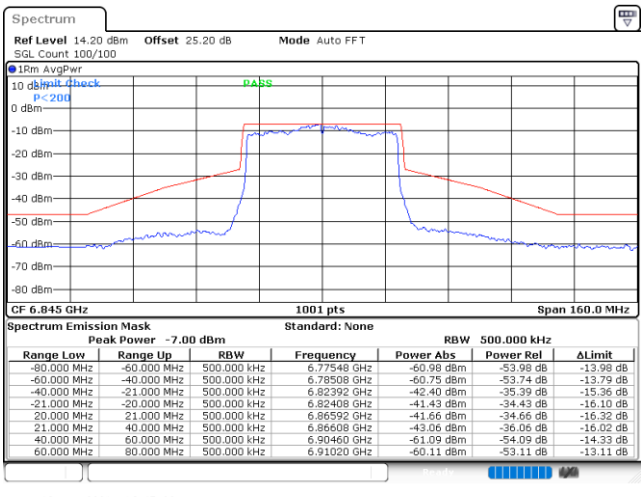
Plot on Channel 6565MHz



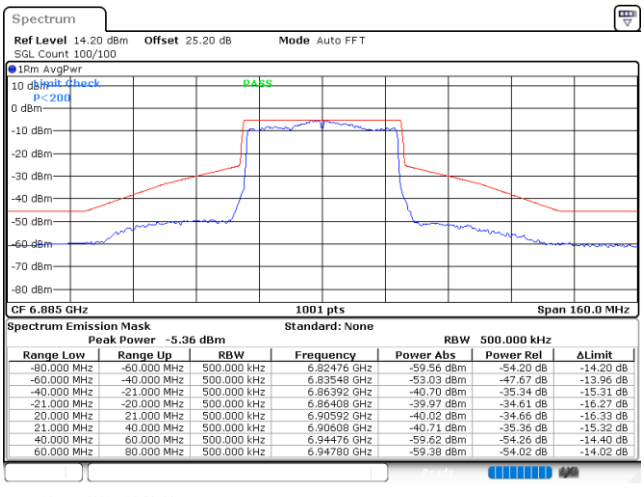
Plot on Channel 6685MHz



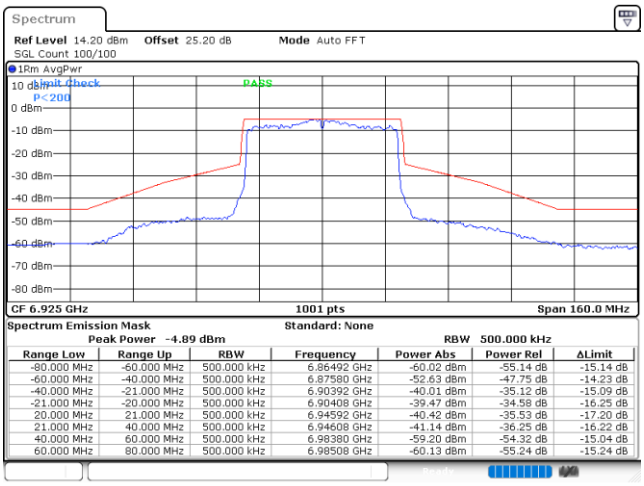
Plot on Channel 6845MHz



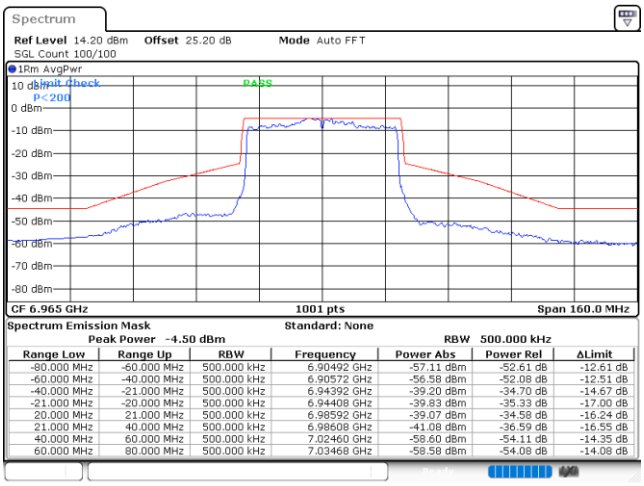
Plot on Channel 6885MHz



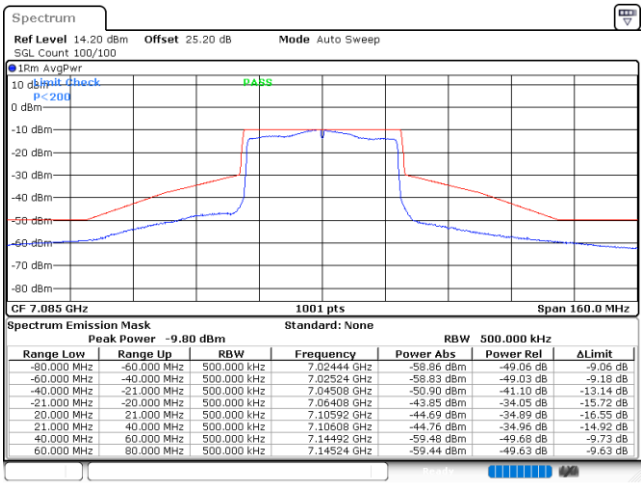
Plot on Channel 6925MHz



Plot on Channel 6965MHz

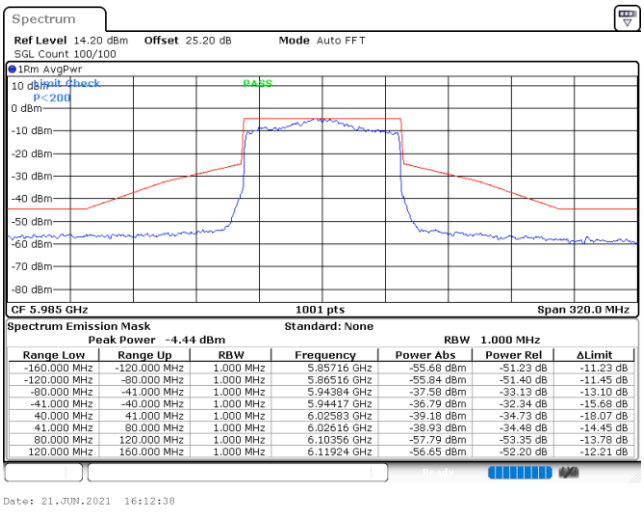


Plot on Channel 7085MHz

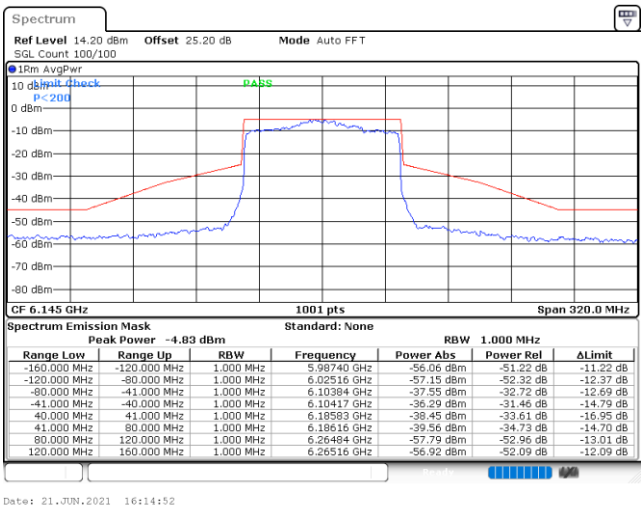


EUT Mode :	802.11ax HE80

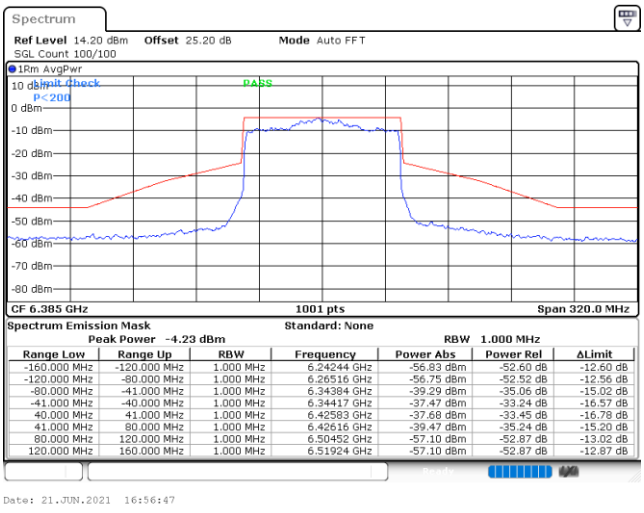
Plot on Channel 5985MHz



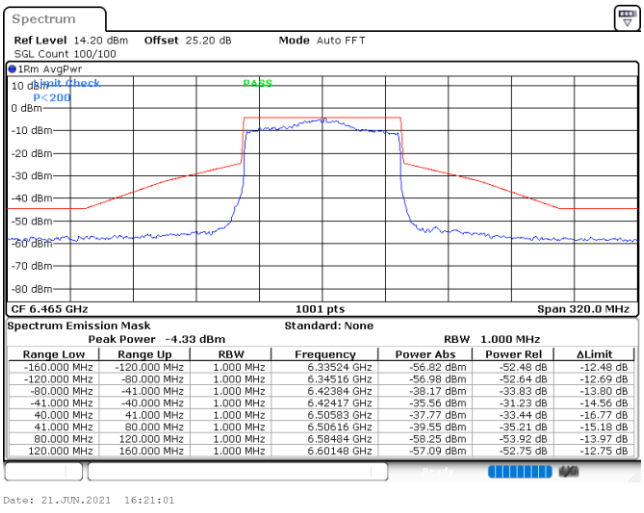
Plot on Channel 6145MHz



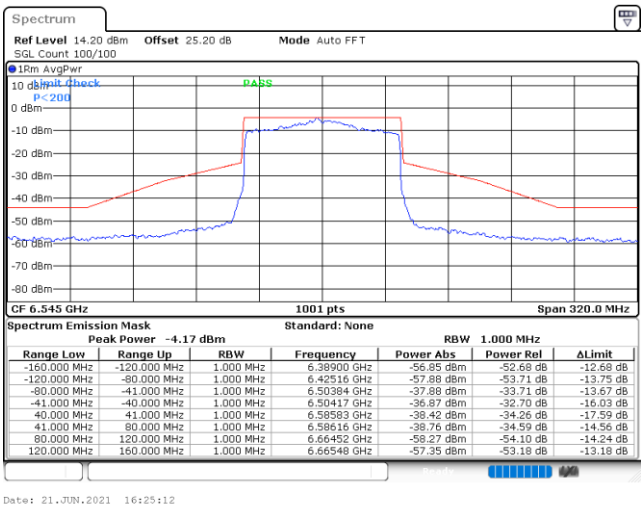
Plot on Channel 6385MHz



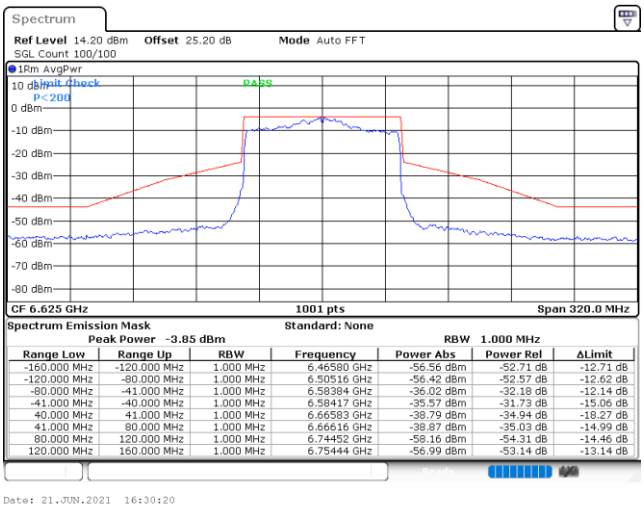
Plot on Channel 6465MHz



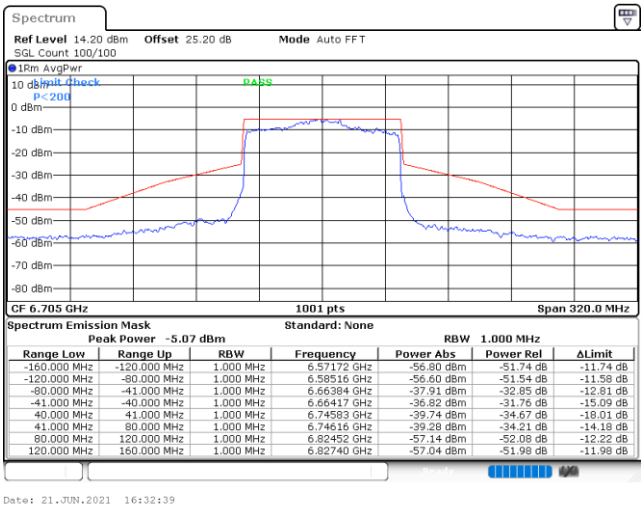
Plot on Channel 6545MHz



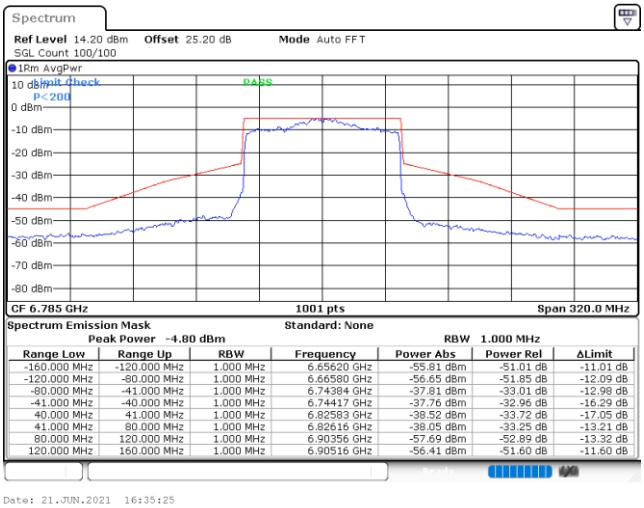
Plot on Channel 6625MHz



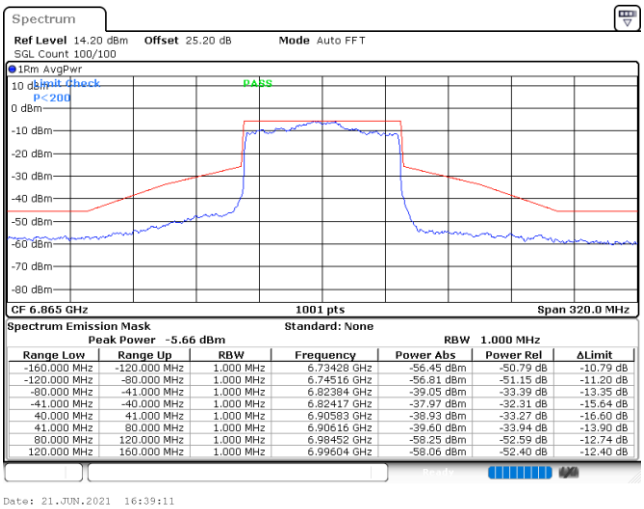
Plot on Channel 6705MHz



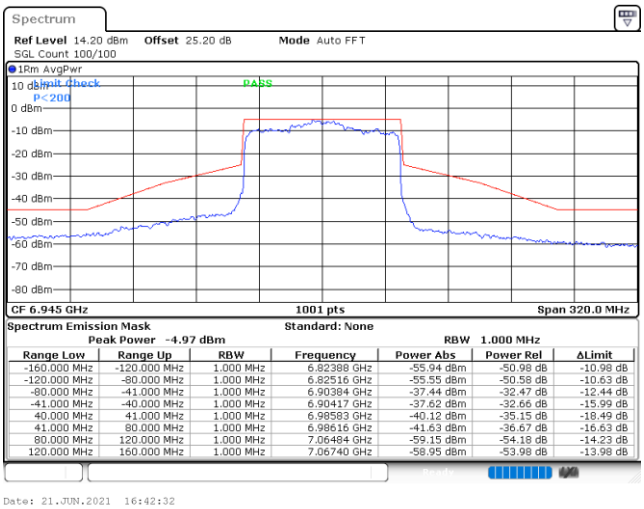
Plot on Channel 6785MHz



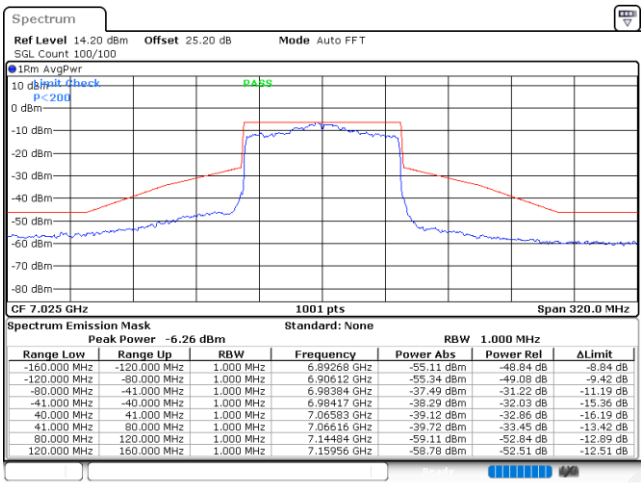
Plot on Channel 6865MHz



Plot on Channel 6945MHz

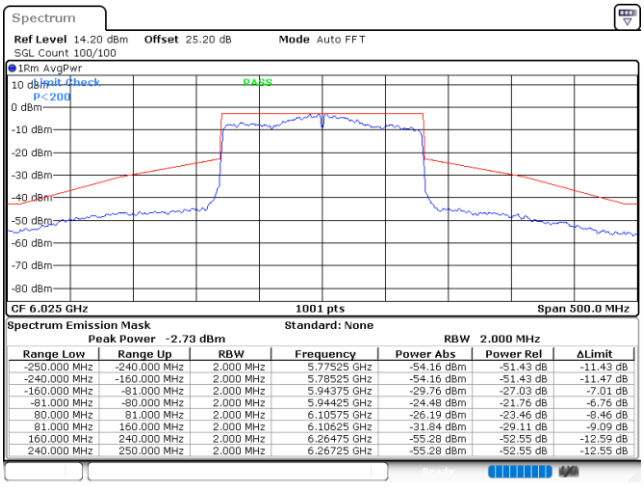


Plot on Channel 7025MHz

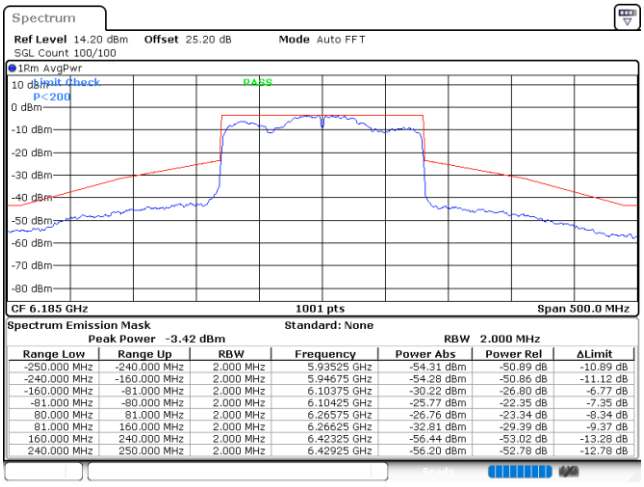


EUT Mode :	802.11ax HE160

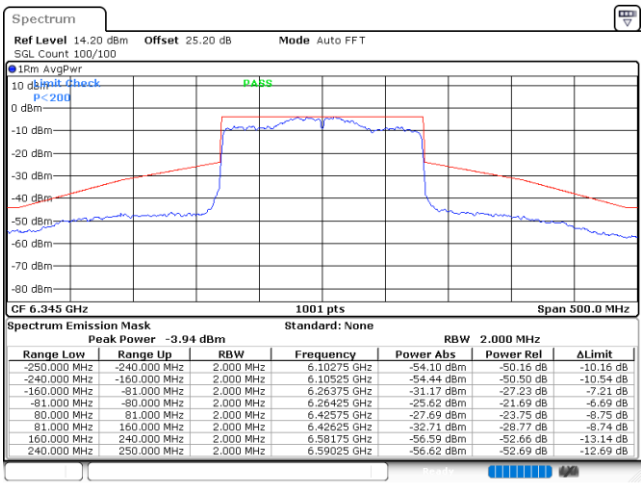
Plot on Channel 6025MHz



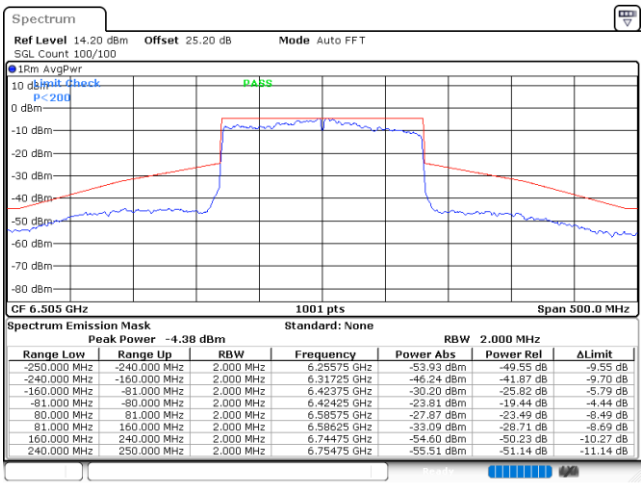
Plot on Channel 6185MHz



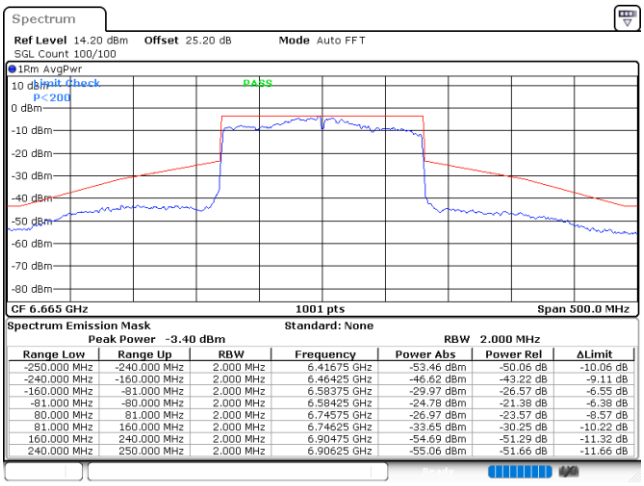
Plot on Channel 6345MHz



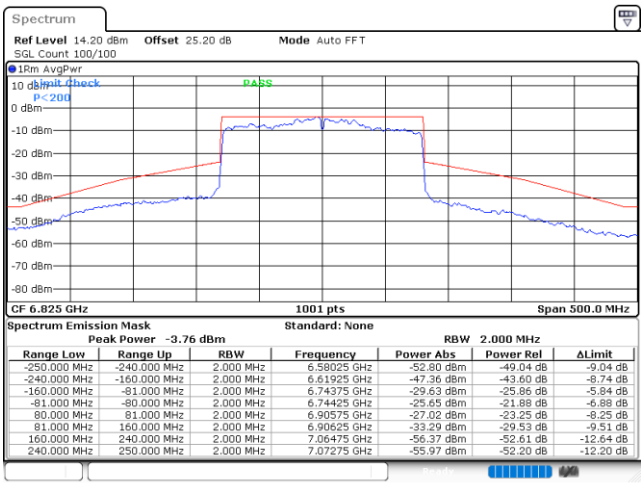
Plot on Channel 6505MHz



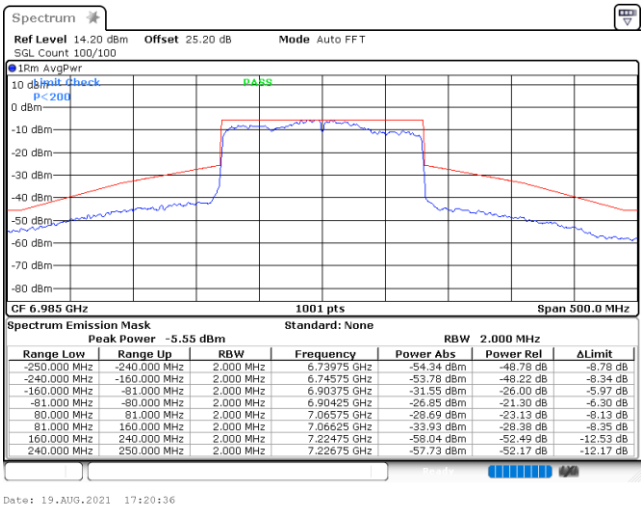
Plot on Channel 6665MHz



Plot on Channel 6825MHz



Plot on Channel 6985MHz



3.5 Contention Based Protocol

3.5.1 Limit of Contention Based Protocol

<FCC 14-30 CFR 15.407>

(d)(6) Indoor access points, subordinate devices and client devices operating in the 5.925-7.125 GHz band must employ a contention-based protocol.

FCC KDB 987594 D02 U-NII 6GHz EMC Measurement v01

Unlicensed low-power indoor devices must detect co-channel radio frequency power that is at least -62 dBm or lower. Upon detection of energy in the band, unlicensed low power indoor devices must vacate the channel and stay off the channel as long as detected radio frequency power is equal to or greater than the threshold (-62 dBm). The -62 dBm (or lower) threshold is referenced to a 0 dBi antenna gain. To ensure incumbent operations are reliably detected in the band, low power indoor devices must detect RF energy throughout their intended operating channel. For example, an 802.11 device that plans to transmit a 40 MHz- wide signal (on a primary 20 MHz channel and a secondary 20 MHz channel) must detect energy throughout the entire 40 MHz channel. Additionally, low-power indoor devices must detect co-channel energy with 90% or greater certainty.

Table 1. Criteria to determine number of times detection threshold test may be performed

If	Number of Tests	Placement of Incumbent Transmission
$BW_{EUT} \leq BW_{Inc}$	Once	Tune incumbent and EUT transmissions ($f_{c1} = f_{c2}$)
$BW_{Inc} < BW_{EUT} \leq 2BW_{Inc}$	Once	Incumbent transmission is contained within BW_{EUT}
$2BW_{Inc} < BW_{EUT} \leq 4BW_{Inc}$	Twice. Incumbent transmission is contained within BW_{EUT}	Incumbent transmission is located as closely as possible to the lower edge and upper edge, respectively, of the EUT channel
$BW_{EUT} > 4BW_{Inc}$	Three times	Incumbent transmission is located as closely as possible to the lower edge of the EUT channel, in the middle of EUT channel, and as closely as possible to the upper edge of the EUT channel

where:
$BWEUT$: Transmission bandwidth of EUT signal
$BWInc$: Transmission bandwidth of the simulated incumbent signal (10 MHz wide AWGN signal)
$fc1$: Center frequency of EUT transmission
$fc2$: Center frequency of simulated incumbent signal

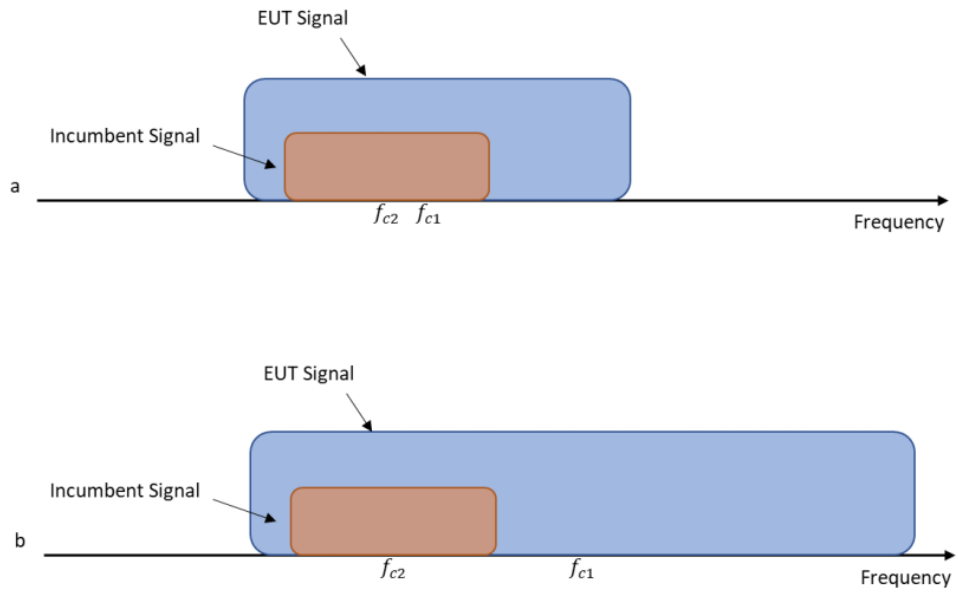


Figure 1. Two possible scenarios where a) center frequency of EUT transmission falls within incumbent's bandwidth, or b) outside of it

3.5.2 Measuring Instruments

See list of measuring equipment of this test report.

3.5.3 Test Procedures

Refer to KDB 987594 D02 v01v01.

1. To ensure EUT reliably detects an incumbent signal in both scenarios shown in Figure 1, the detection threshold test may be repeated more than once with the incumbent signal (having center frequency $fc2$) tuned to different center frequencies within the UT transmission bandwidth. The criteria specified in Table 1 determines how many times the detection threshold test must be performed
2. Using an AWGN signal source, generate (but do not transmit, i.e., RF OFF) a 10 MHz-wide AWGN signal. Use Table 1 to determine the center frequency of the 10 MHz AWGN signal relative to the EUT's channel bandwidth and center frequency.
3. Monitor the signal analyzer to verify if the AWGN signal has been detected and the EUT has ceased transmission. If the EUT continues to transmit, then incrementally increase the AWGN signal power level until the EUT stops transmitting.
4. (Including all losses in the RF paths) Determine and record the AWGN signal power level (at the EUT's antenna port) at which the EUT ceased transmission. Repeat the procedure at least 10 times to verify the EUT can detect an AWGN signal with 90% (or better) level of certainty.
5. Refer to Table 1 to determine number of times the detection threshold testing needs to be repeated. If testing is required more than once, then go back to step 2, choose a different center frequency for the AWGN signal and repeat the process.

3.5.4 Test Setup

Conducted Setup

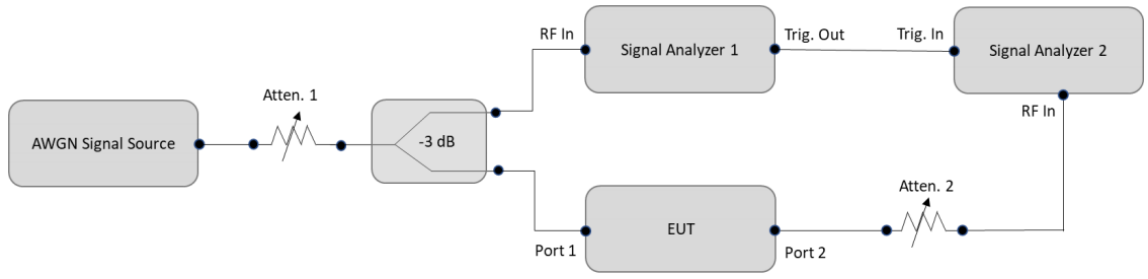


Figure 2. Contention-based protocol test setup, conducted method Step-by-Step Procedure, Conducted Setup

3.5.5 Support Unit used in test configuration and system

Instrument	Brand Name	Model No.	Characteristics
WLAN AP	ASUS	GT-AXE11000	Dual Band AP
Notebook	Dell	Inspiron 14-7467	LAN

3.5.6 Test Summary of Contention Based Protocol Test

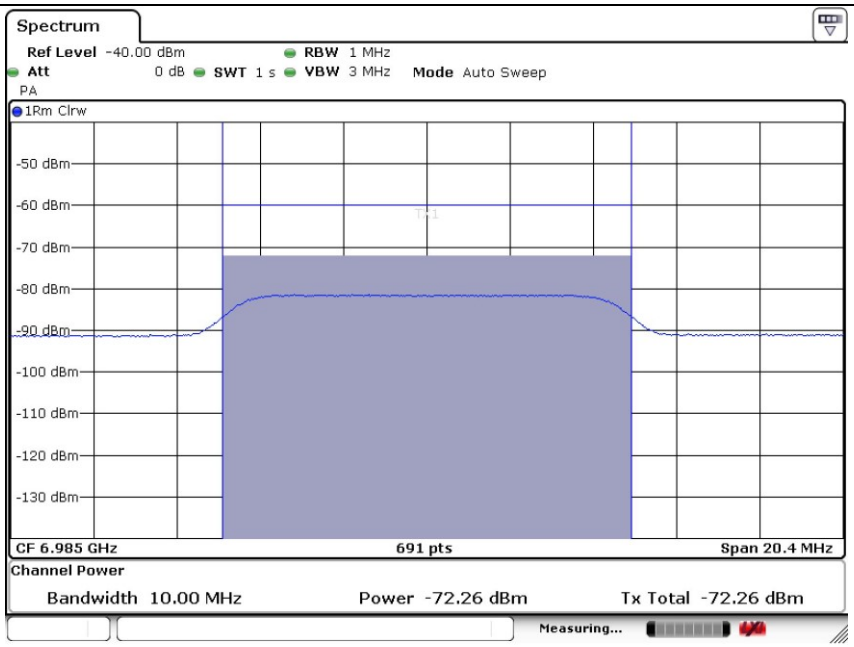
<Normal mode – WLAN Ant. 1+2>

Band	Channel Freq. (MHz)	Channel BW (MHz)	Incumbent freq. (MHz)	Measured Detection level (dBm)	Detection Rate (%)	Regulated Threshold level (dBm)	Margin (dB)
UNII Band 5	6135	20	6135	-78.61	100	-65.2	13.41
	6185	160	6110	-74.74	100	-65.2	9.54
			6185	-73.23	100	-65.2	8.03
			6260	-78.12	100	-65.2	12.92
UNII Band 6	6455	20	6455	-79.10	100	-65.2	14.10
	6505	160	6430	-75.99	100	-65.2	10.99
			6505	-72.33	100	-65.2	7.33
			6580	-75.22	100	-65.2	10.22
UNII Band 7	6695	20	6695	-75.37	100	-65.4	9.97
	6665	160	6590	-75.61	100	-65.4	10.21
			6665	-71.80	100	-65.4	6.40
			6740	-76.44	100	-65.4	11.04
UNII Band 8	7015	20	7015	-77.82	100	-67.5	10.32
	6985	160	6910	-77.36	100	-67.5	9.86
			6985	-72.26	100	-67.5	4.76
			7060	-72.96	100	-67.5	5.46

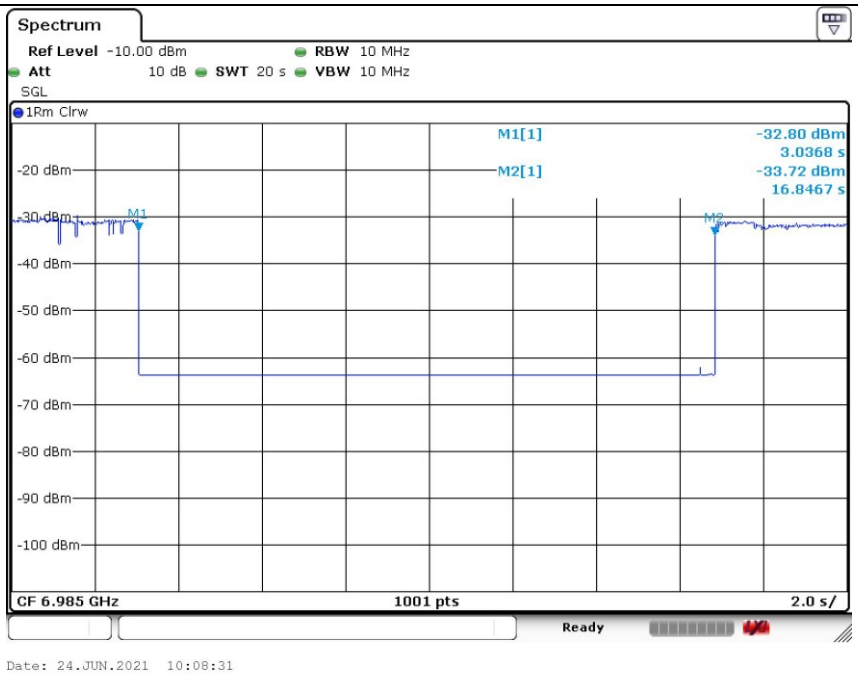
Note: Threshold Level (TL) = -62dBm + minimum antenna gain

3.5.7 Worst Case Plots of Contention Based Protocol

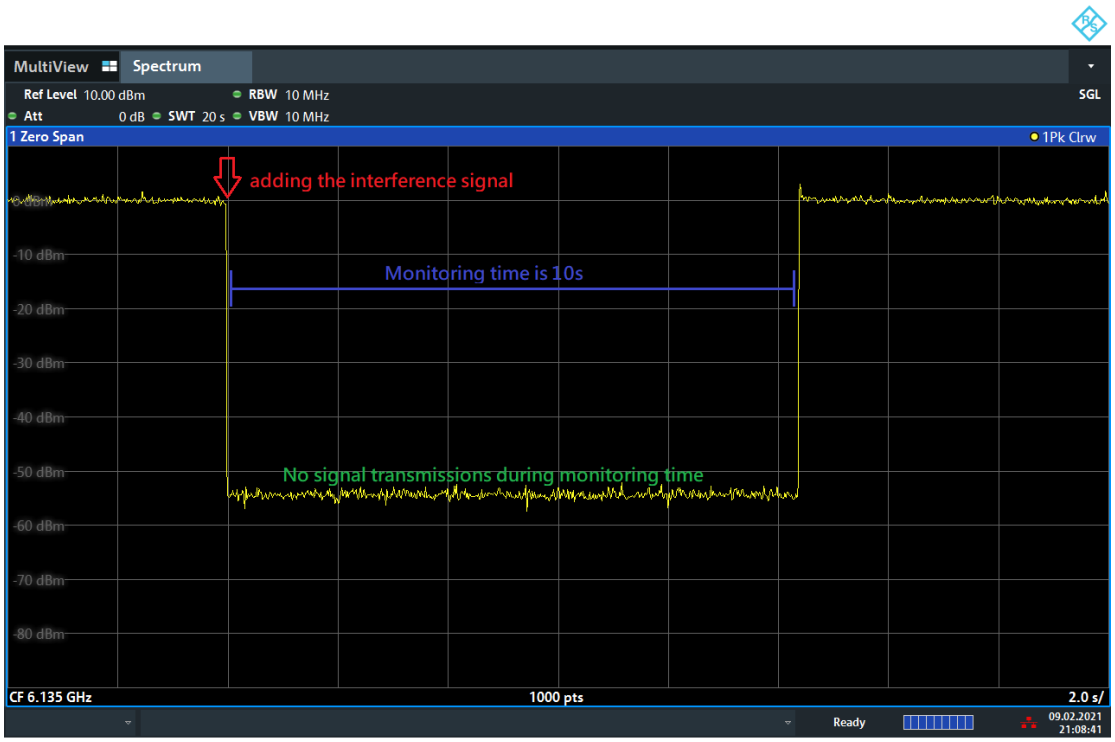
802.11ax (HE160) / 6985MHz
Threshold Level (TL) = -72.26dBm/MHz



802.11ax (HE160) / 6985MHz
Test result is pass due to no transmission occur.



Example of test result

Test Result Pass

Remark：No any transmission occurred in 10s monitoring time, so test result is pass.

3.6 Unwanted Emissions Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

3.6.1 Limit of Unwanted Emissions

(1) For transmitters operating within the 5.925-7.125 GHz band: Any emissions outside of the 5.925-7.125 GHz band must not exceed an e.i.r.p. of −27 dBm/MHz.

EIRP (dBm)	Field Strength at 3m (dBμV/m)
- 27 (RMS)	68.3
- 7 (Peak)	88.3

According 987594 D02 U-NII 6GHz EMC Measurement v01 section G:
Unwanted emissions outside of restricted bands are measured with a RMS detector.
In addition, 15.35(b) applies where the peak emissions must be limited to no more than 20 dB above the average limit

(2) Unwanted spurious emissions fallen in restricted bands shall comply with the general field strength limits as below table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

Note: The following formula is used to convert the EIRP to field strength.

$$E=\frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts)

3.6.2 Measuring Instruments

See list of measuring equipment of this test report.

3.6.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement.

   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz

   - RBW = 120 kHz
   - VBW = 300 kHz
   - Detector = Peak
   - Trace mode = max hold

   (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

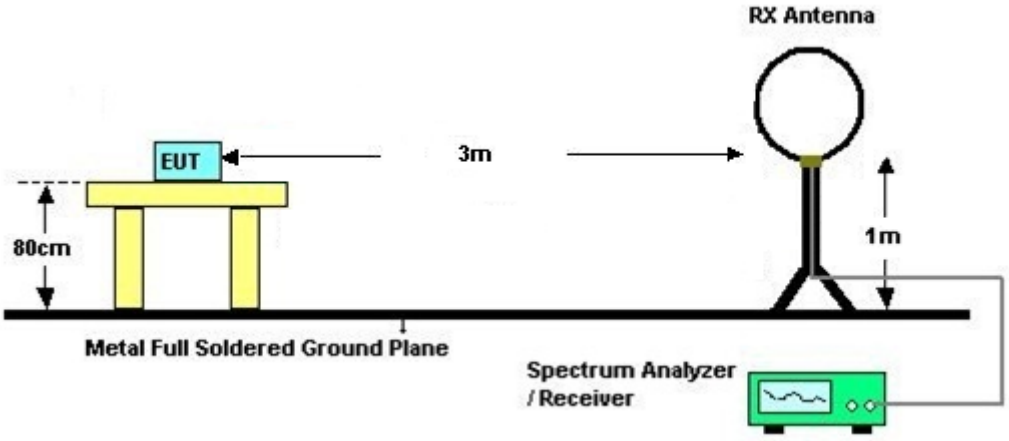
   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

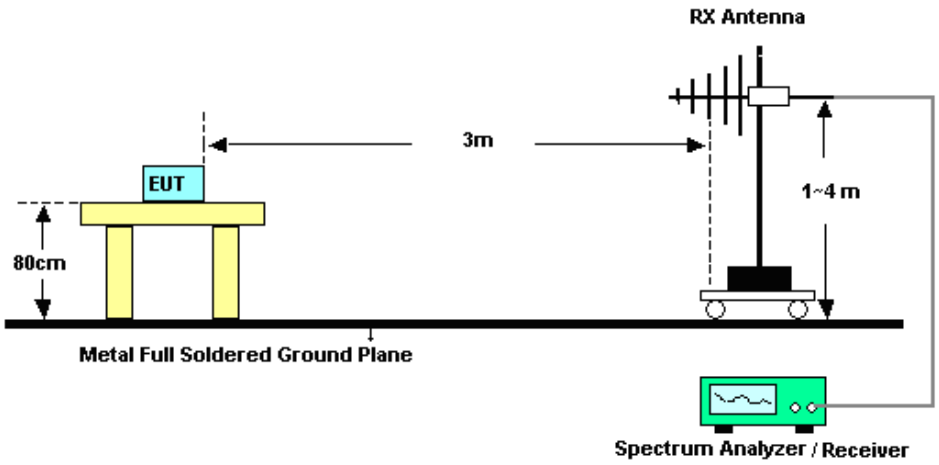
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.6.4 Test Setup

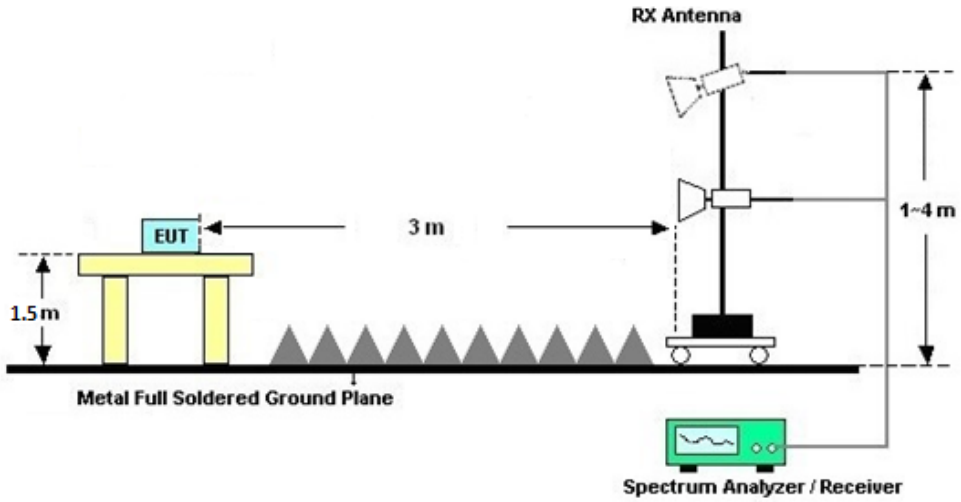
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.6.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is adequate comparison measurement of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

3.6.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C

3.6.7 Duty Cycle

Please refer to Appendix D.

3.6.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)

Please refer to Appendix C.

3.7 AC Conducted Emission Measurement

3.7.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

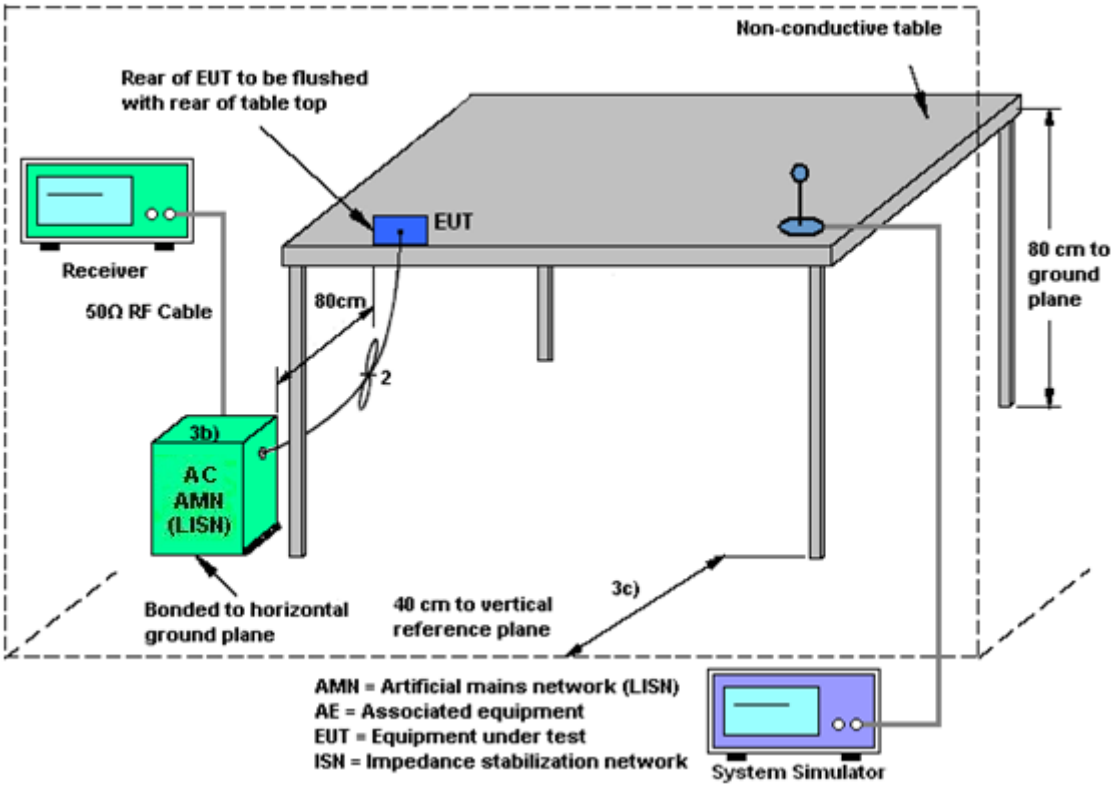
3.7.2 Measuring Instruments

See list of measuring equipment of this test report.

3.7.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

3.7.4 Test Setup



3.7.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.8 Automatically Discontinue Transmission

3.8.1 Limit of Automatically Discontinue Transmission

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

3.8.2 Measuring Instruments

See list of measuring equipment of this test report.

3.8.3 Test Result of Automatically Discontinue Transmission

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

3.9 Antenna Requirements

3.9.1 Standard Applicable

§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.

3.9.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used. The EUT complies with the requirement of 15.203.

3.9.3 Antenna Gain

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = GANT + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = 10 log(NANT/NSS=1) dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with GANT set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain GANT is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain “DG” is calculated as following table.

<CDD Modes>

	Ant. 1 (dBi)	Ant. 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
U-NII-5	-3.20	-2.00	-2.00	0.43	0.00	0.00
U-NII-6	-2.70	-3.20	-2.70	0.06	0.00	0.00
U-NII-7	-3.00	-3.40	-3.00	-0.19	0.00	0.00
U-NII-8	-4.70	-5.50	-4.70	-2.08	0.00	0.00

Power limit reduction = Composite gain – 6dBi, (min = 0)

PSD limit reduction = Composite gain + PSD Array gain – 6dBi, (min = 0)

4 List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 08, 2021	Jul. 21, 2021~ Aug. 19, 2021	Apr. 07, 2022	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1207253	30MHz~40GHz	Dec. 25, 2020	Jul. 21, 2021~ Aug. 19, 2021	Dec. 24, 2021	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Dec. 25, 2020	Jul. 21, 2021~ Aug. 19, 2021	Dec. 24, 2021	Conducted (TH01-SZ)
EMI Test Receiver&SA	KEYSIGHT	N9038A	MY54450083	20Hz~8.4GHz	Apr. 17, 2021	Jul. 01, 2021	Apr. 16, 2022	Radiation (03CH03-SZ)
EXA Spectrum Anaiyzer	KEYSIGHT	N9010A	MY55150246	10Hz~44GHz;	Apr. 17, 2021	Jul. 01, 2021	Apr. 16, 2022	Radiation (03CH03-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jun. 22, 2021	Jul. 01, 2021	Jun. 21, 2022	Radiation (03CH03-SZ)
Bilog Antenna	TESEQ	CBL6112D	23183	25MHz~2GHz	Jan. 07, 2021	Jul. 01, 2021	Jan. 06, 2022	Radiation (03CH03-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1355	1GHz~18GHz	Apr. 25, 2021	Jul. 01, 2021	Apr. 24, 2022	Radiation (03CH03-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 23, 2021	Jul. 01, 2021	Apr. 22, 2022	Radiation (03CH03-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz ~3000MHz	Oct. 17, 2020	Jul. 01, 2021	Oct. 16, 2021	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1943528	1GHz~18GHz	Oct. 16, 2020	Jul. 01, 2021	Oct. 15, 2021	Radiation (03CH03-SZ)
Amplifier	Agilent Technologies	83017A	MY39501302	500MHz~26.5GHz	Dec. 25, 2020	Jul. 01, 2021	Dec. 24, 2021	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 21, 2020	Jul. 01, 2021	Jul. 20, 2021	Radiation (03CH03-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Jul. 01, 2021	NCR	Radiation (03CH03-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Jul. 01, 2021	NCR	Radiation (03CH03-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Jul. 01, 2021	NCR	Radiation (03CH03-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Mar. 07, 2021	Jun. 08, 2021	Mar. 06, 2022	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2 LISN	00103912	9kHz~30MHz	Dec. 25, 2020	Jun. 08, 2021	Dec. 24, 2021	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Oct. 15, 2020	Jun. 08, 2021	Oct. 14, 2021	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 21, 2020	Jun. 08, 2021	Jul. 20, 2021	Conduction (CO01-SZ)
Signal Analyzer	R&S	FSV7	101473	10Hz~7GHz	Dec. 27, 2020	Jun. 24, 2021	Dec. 26, 2021	CBP (DFS01-SZ)
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY56200424	9kHz~6GHz	Dec. 27, 2020	Jun. 24, 2021	Dec. 26, 2021	CBP (DFS01-SZ)
Combiner	TOJOIN	PS-2AM-0460	SZE14011007	0.4~6GHz	Sep. 04, 2020	Jun. 24, 2021	Sep. 03, 2021	CBP (DFS01-SZ)

NCR: No Calibration Required

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	2.2dB

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0dB

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	4.9dB

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	5.0dB

---------- THE END ----------

Appendix A. Conducted Test Results

Test Engineer:	Liu Qiu Qiu	Temperature:	21~25	°C
Test Date:	2021/6/21~2021/6/25	Relative Humidity:	51~54	%

TEST RESULTS DATA
26dB and 99% OBW

U-NII-5 MIMO								
Mod.	Data Rate	NTX	Freq. (MHz)	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)		Note
				Ant 1	Ant 2	Ant 1	Ant 2	
11a	6Mbps	2	5955	16.63	16.63	20.55	20.20	
11a	6Mbps	2	6175	16.53	16.58	20.80	20.40	
11a	6Mbps	2	6415	16.53	16.58	19.85	20.05	
HT20	MCS0	2	5955	17.53	17.53	19.70	19.65	
HT20	MCS0	2	6175	17.53	17.58	19.90	19.95	
HT20	MCS0	2	6415	17.53	17.53	20.30	20.05	
HT40	MCS0	2	5965	35.96	35.96	39.87	40.23	
HT40	MCS0	2	6165	36.06	35.96	39.69	39.87	
HT40	MCS0	2	6405	36.06	35.96	39.96	39.78	
VHT80	MCS0	2	5985	75.04	74.93	81.60	80.80	
VHT80	MCS0	2	6145	74.93	74.93	80.80	80.96	
VHT80	MCS0	2	6385	75.04	75.04	81.60	81.76	
VHT160	MCS0	2	6025	153.21	153.45	163.76	163.20	
VHT160	MCS0	2	6185	153.93	153.45	163.20	162.56	
VHT160	MCS0	2	6345	153.93	153.93	162.88	165.44	

TEST RESULTS DATA
26dB and 99% OBW

U-NII-5 MIMO									
Mod.	Data Rate	N_{TX}	Freq. (MHz)	RU Config.	99% Bandwidth (MHz)		26 dB Bandwidth (MHz)		Note
					Ant 1	Ant 2	Ant 1	Ant 2	
HE20	MCS0	2	5955	Full	18.83	18.93	21.05	20.35	
HE20	MCS0	2	6175	Full	18.83	18.83	20.95	20.65	
HE20	MCS0	2	6415	Full	18.83	18.83	20.70	20.95	
HE40	MCS0	2	5965	Full	37.56	37.76	40.32	40.59	
HE40	MCS0	2	6165	Full	37.66	37.76	40.50	40.23	
HE40	MCS0	2	6405	Full	37.66	37.76	40.50	40.41	
HE80	MCS0	2	5985	Full	76.60	76.72	81.60	81.44	
HE80	MCS0	2	6145	Full	76.48	76.72	81.44	82.24	
HE80	MCS0	2	6385	Full	76.72	76.84	81.44	82.08	
HE160	MCS0	2	6025	Full	154.89	154.65	164.80	164.48	
HE160	MCS0	2	6185	Full	155.60	153.69	164.16	161.92	
HE160	MCS0	2	6345	Full	155.36	154.17	164.80	162.56	

TEST RESULTS DATA
EIRP Power Table

U-NII-5 MIMO													
Mod.	Data Rate	NTX	Freq. (MHz)	Duty Factor (dB)		Conducted Power with duty factor (dBm)			DG (dBi)		EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
				Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	SUM		
11a	6Mbps	2	5955	0.03	0.03	5.30	5.28	8.30	-2.00		6.30	24.00	Pass
11a	6Mbps	2	6175	0.03	0.03	6.18	4.67	8.50	-2.00		6.50	24.00	Pass
11a	6Mbps	2	6415	0.03	0.03	5.69	5.56	8.64	-2.00		6.64	24.00	Pass
HT20	MCS0	2	5955	0.00	0.00	5.30	5.51	8.42	-2.00		6.42	24.00	Pass
HT20	MCS0	2	6175	0.00	0.00	6.60	5.06	8.91	-2.00		6.91	24.00	Pass
HT20	MCS0	2	6415	0.00	0.00	5.70	5.83	8.78	-2.00		6.78	24.00	Pass
HT40	MCS0	2	5965	0.00	0.00	8.42	8.63	11.54	-2.00		9.54	24.00	Pass
HT40	MCS0	2	6165	0.00	0.00	9.12	7.39	11.35	-2.00		9.35	24.00	Pass
HT40	MCS0	2	6405	0.00	0.00	8.17	8.00	11.10	-2.00		9.10	24.00	Pass
VHT20	MCS0	2	5955	0.00	0.00	5.29	5.50	8.41	-2.00		6.41	24.00	Pass
VHT20	MCS0	2	6175	0.00	0.00	6.58	5.04	8.89	-2.00		6.89	24.00	Pass
VHT20	MCS0	2	6415	0.00	0.00	5.68	5.80	8.75	-2.00		6.75	24.00	Pass
VHT40	MCS0	2	5965	0.00	0.00	8.40	8.60	11.51	-2.00		9.51	24.00	Pass
VHT40	MCS0	2	6165	0.00	0.00	9.10	7.30	11.30	-2.00		9.30	24.00	Pass
VHT40	MCS0	2	6405	0.00	0.00	8.16	7.98	11.08	-2.00		9.08	24.00	Pass
VHT80	MCS0	2	5985	0.00	0.00	10.99	10.66	13.84	-2.00		11.84	24.00	Pass
VHT80	MCS0	2	6145	0.00	0.00	11.38	10.00	13.75	-2.00		11.75	24.00	Pass
VHT80	MCS0	2	6385	0.00	0.00	11.12	10.55	13.85	-2.00		11.85	24.00	Pass
VHT160	MCS0	2	6025	0.00	0.00	11.36	11.05	14.22	-2.00		12.22	24.00	Pass
VHT160	MCS0	2	6185	0.00	0.00	11.83	10.09	14.06	-2.00		12.06	24.00	Pass
VHT160	MCS0	2	6345	0.00	0.00	11.15	10.13	13.68	-2.00		11.68	24.00	Pass

Remark:
1. Directional Gain = Max. Gain (Ant. 1, Ant.2) =Max. Gain (-3.2dBi, -2dBi) = -2dBi.

TEST RESULTS DATA
EIRP Power Table

U-NII-5 MIMO														
Mod.	Data Rate	NTX	Freq. (MHz)	RU Config.	Duty Factor (dB)		Conducted Power with duty factor (dBm)			DG (dBi)		EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	Ant 1	Ant 2	SUM		
HE20	MCS0	2	5955	Full	0.00	0.00	5.49	5.88	8.70	-2.00		6.70	24.00	Pass
HE20	MCS0	2	5955	26/0	0.00	0.00	-2.20	-3.48	0.22	-2.00		-1.78	24.00	Pass
HE20	MCS0	2	5955	52/37	0.00	0.00	-0.48	-1.18	2.19	-2.00		0.19	24.00	Pass
HE20	MCS0	2	5955	106/53	0.00	0.00	2.31	2.10	5.22	-2.00		3.22	24.00	Pass
HE20	MCS0	2	6175	Full	0.00	0.00	6.78	4.75	8.89	-2.00		6.89	24.00	Pass
HE20	MCS0	2	6415	Full	0.00	0.00	5.91	5.64	8.79	-2.00		6.79	24.00	Pass
HE20	MCS0	2	6415	26/8	0.00	0.00	-1.98	-4.18	0.07	-2.00		-1.93	24.00	Pass
HE20	MCS0	2	6415	52/40	0.00	0.00	0.22	-2.30	2.15	-2.00		0.15	24.00	Pass
HE20	MCS0	2	6415	106/54	0.00	0.00	2.52	1.90	5.23	-2.00		3.23	24.00	Pass
HE40	MCS0	2	5965	Full	0.00	0.00	8.89	8.55	11.73	-2.00		9.73	24.00	Pass
HE40	MCS0	2	5965	242/61	0.00	0.00	7.65	5.49	9.71	-2.00		7.71	24.00	Pass
HE40	MCS0	2	6165	Full	0.00	0.00	9.38	7.37	11.50	-2.00		9.50	24.00	Pass
HE40	MCS0	2	6405	Full	0.00	0.00	8.96	8.50	11.75	-2.00		9.75	24.00	Pass
HE40	MCS0	2	6405	242/62	0.00	0.00	7.36	6.52	9.97	-2.00		7.97	24.00	Pass
HE80	MCS0	2	5985	Full	0.00	0.00	11.08	10.90	14.00	-2.00		12.00	24.00	Pass
HE80	MCS0	2	5985	484/65	0.00	0.00	10.28	9.59	12.96	-2.00		10.96	24.00	Pass
HE80	MCS0	2	6145	Full	0.00	0.00	11.78	10.30	14.11	-2.00		12.11	24.00	Pass
HE80	MCS0	2	6385	Full	0.00	0.00	11.02	10.50	13.78	-2.00		11.78	24.00	Pass
HE80	MCS0	2	6385	484/66	0.00	0.00	10.02	9.12	12.60	-2.00		10.60	24.00	Pass
HE160	MCS0	2	6025	Full	0.00	0.00	11.40	11.05	14.24	-2.00		12.24	24.00	Pass
HE160	MCS0	2	6025	996/67	0.00	0.00	9.60	8.31	12.01	-2.00		10.01	24.00	Pass
HE160	MCS0	2	6185	Full	0.00	0.00	11.90	10.13	14.11	-2.00		12.11	24.00	Pass
HE160	MCS0	2	6345	Full	0.00	0.00	11.16	10.16	13.70	-2.00		11.70	24.00	Pass
HE160	MCS0	2	6345	996/S67	0.00	0.00	8.79	7.83	11.35	-2.00		9.35	24.00	Pass

Remark:
1. Directional Gain = Max. Gain (Ant. 1, Ant.2) =Max. Gain (-3.2dBi, -2dBi) = -2dBi.

TEST RESULTS DATA
EIRP Power Spectral Density

U-NII-5 MIMO											
Mod.	Data Rate	NTX	Freq. (MHz)	Conducted Power Density (dBm/MHz)			DG (dBi)		EIRP Power Density (dBm/MHz)	EIRP Power Density Limit (dBm)	Pass /Fail
				Ant 1	Ant 2	SUM	Ant 1	Ant 2	SUM		
11a	6Mbps	2	5955			-1.95	0.43		-1.52	-1.00	Pass
11a	6Mbps	2	6175			-1.90	0.43		-1.47	-1.00	Pass
11a	6Mbps	2	6415			-1.84	0.43		-1.41	-1.00	Pass
HT20	MCS0	2	5955			-2.18	0.43		-1.75	-1.00	Pass
HT20	MCS0	2	6175			-1.89	0.43		-1.46	-1.00	Pass
HT20	MCS0	2	6415			-2.03	0.43		-1.59	-1.00	Pass
HT40	MCS0	2	5965			-1.83	0.43		-1.40	-1.00	Pass
HT40	MCS0	2	6165			-2.04	0.43		-1.60	-1.00	Pass
HT40	MCS0	2	6405			-2.27	0.43		-1.84	-1.00	Pass
VHT80	MCS0	2	5985			-1.99	0.43		-1.56	-1.00	Pass
VHT80	MCS0	2	6145			-2.03	0.43		-1.59	-1.00	Pass
VHT80	MCS0	2	6385			-1.95	0.43		-1.52	-1.00	Pass
VHT160	MCS0	2	6025			-4.63	0.43		-4.19	-1.00	Pass
VHT160	MCS0	2	6185			-4.76	0.43		-4.33	-1.00	Pass
VHT160	MCS0	2	6345			-5.25	0.43		-4.82	-1.00	Pass

Remark:
1. Directional Gain = 10*log{((10^(Ant.1 Gain/20) +10^(Ant.2 Gain))^2)/2 } = 0.43dBi.