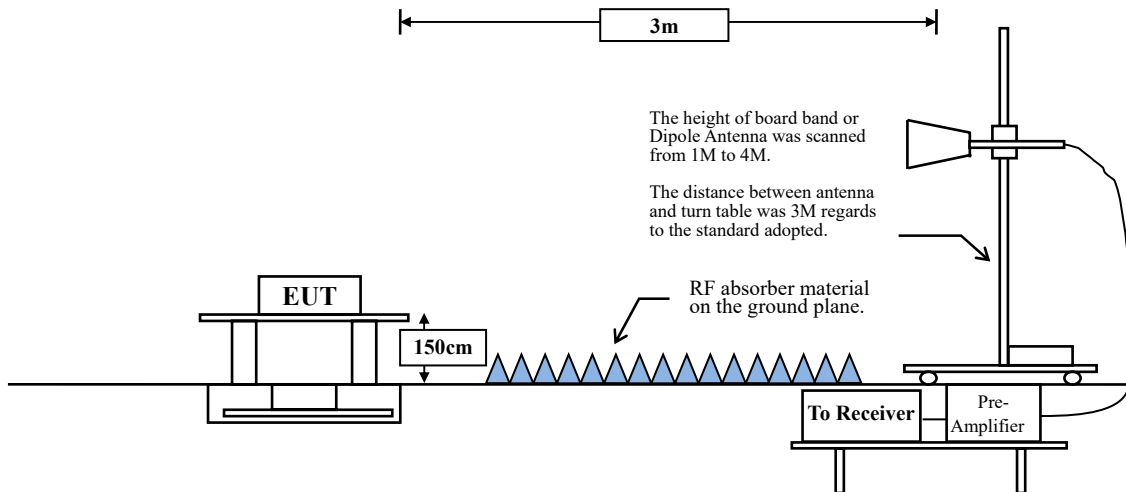


7. Band Edge

7.1. Test Setup

Radiated Emission Above 1GHz



7.2. Limits

General Radiated Emission Limits

The provisions of Section 15.205 of this part apply to intentional radiators operating under this section. Radiated emissions which fall in the restricted bands, as defined in Section 15.205, must also comply with the radiated emission Limits specified in Section 15.209:

FCC CFR Title 47 Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	uV/m @3m	dBµV/m@3m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

Remark:

1. RF Voltage (dBµV) = 20 log RF Voltage (uV)
2. In the Above Table, the tighter Limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Unwanted Emission out of the restricted bands Limits

FCC CFR Title 47 Part 15 Subpart E Paragraph 15.407(b) Limits		
Frequency (MHz)	EIRP Limit (dBm/MHz)	Equivalent Field Strength (dBμV/m@3m)
5925 MHz > F 7125 MHz	Peak: -7	88.2
	Average: -27	68.2

Remark:

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

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

7.3. Test Procedure

The EUT and its simulators are placed on a turn table which is 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter is 120 KHz, above 1GHz are 1 MHz.

RBW and VBW Parameter setting:

According to KDB 789033 section II.G.5 Procedure for Unwanted Maximum Emissions Measurements above 1000 MHz.

RBW = 1 MHz.

VBW \geq 3 MHz.

According to KDB 789033 section II.G.6 Procedures for Average Unwanted Emissions Measurements above 1000 MHz.

RBW = 1 MHz.

VBW = 10 Hz, when duty cycle \geq 98 %

VBW \geq 1/T, when duty cycle < 98 %

(T refers to 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.)

SISO A

6 GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11 ax20	98.51	3.9750	252	10
802.11 ax40	98.88	3.9900	251	10
802.11 ax80	98.88	3.9900	251	10
802.11 ax160	98.51	3.9750	252	10

SISO B

6 GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11 ax20	98.51	3.9750	252	10
802.11 ax40	98.51	3.9750	252	10
802.11 ax80	98.88	3.9900	251	10
802.11 ax160	98.88	3.9900	251	10

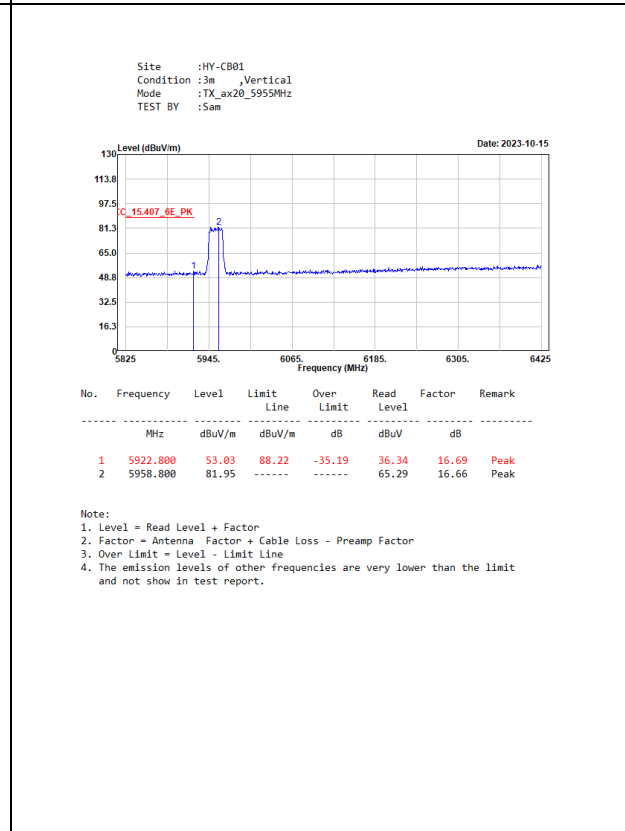
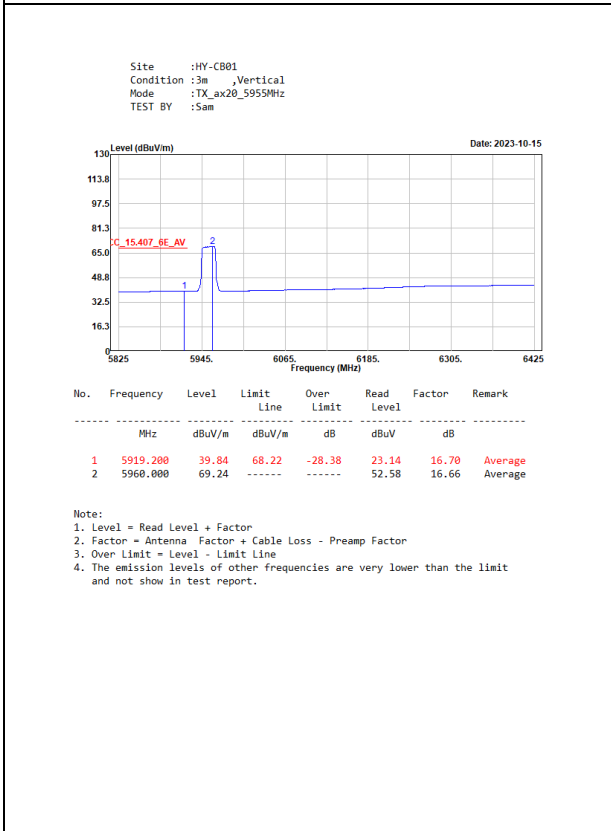
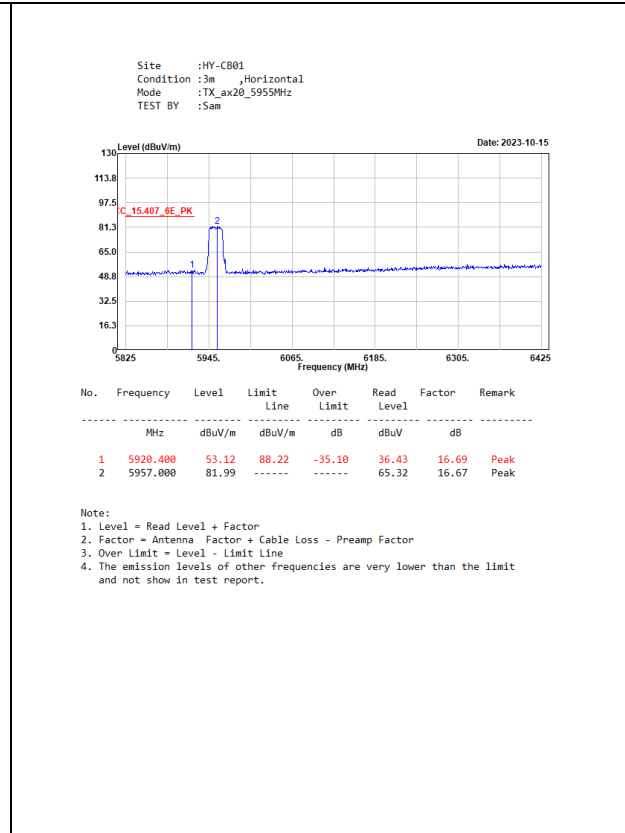
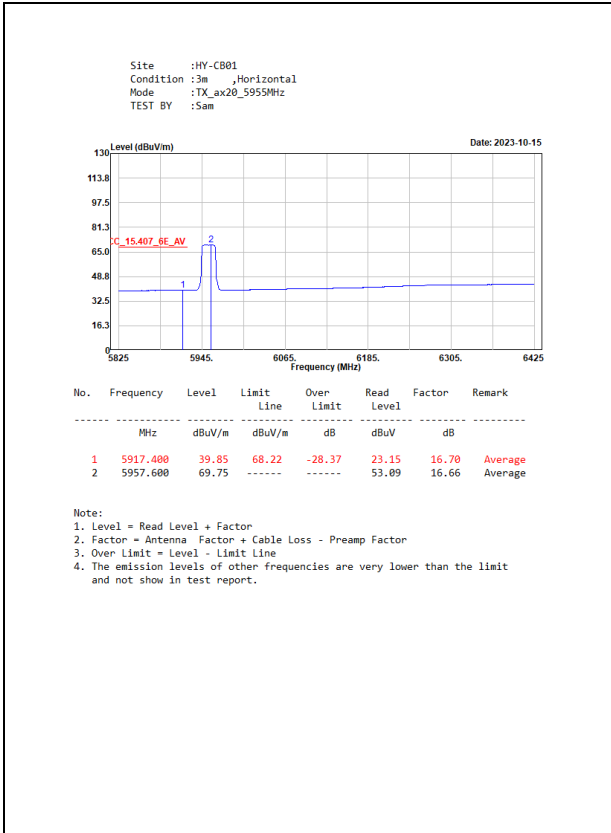
MIMO

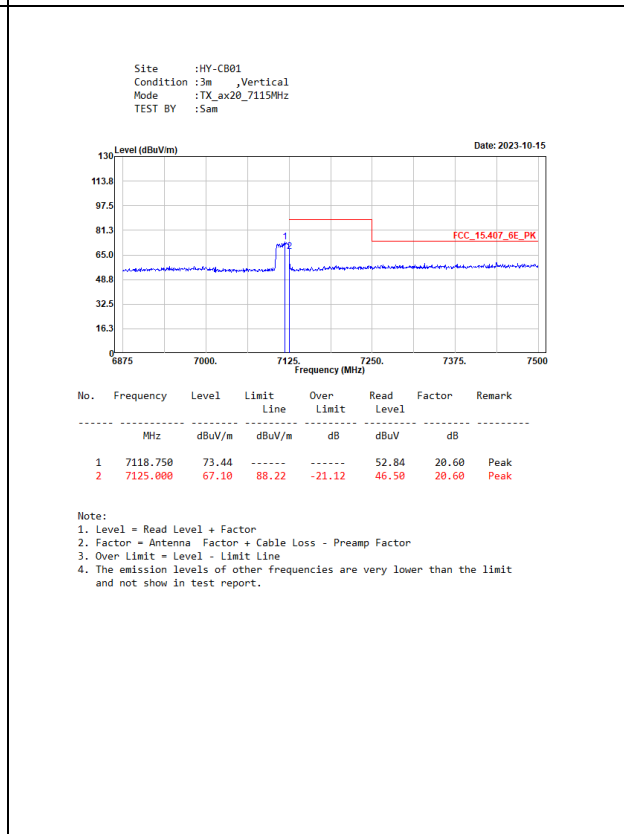
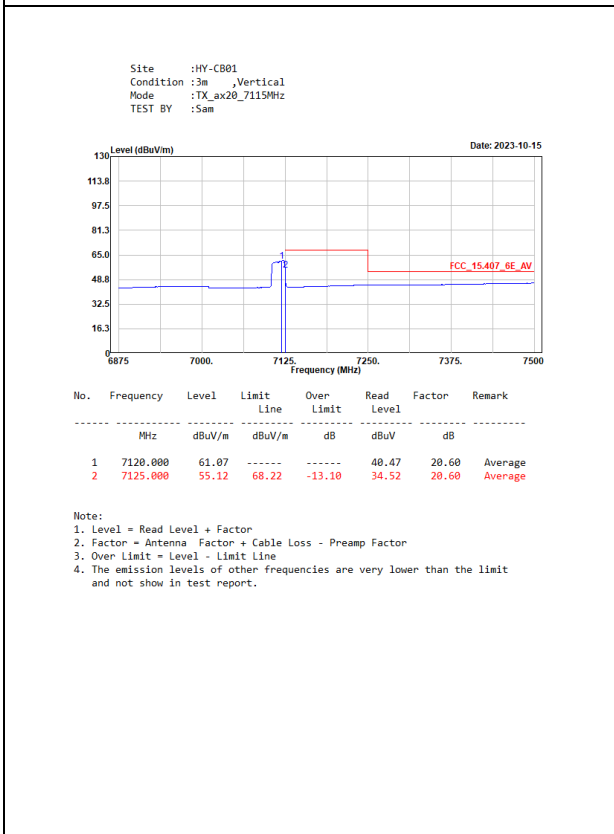
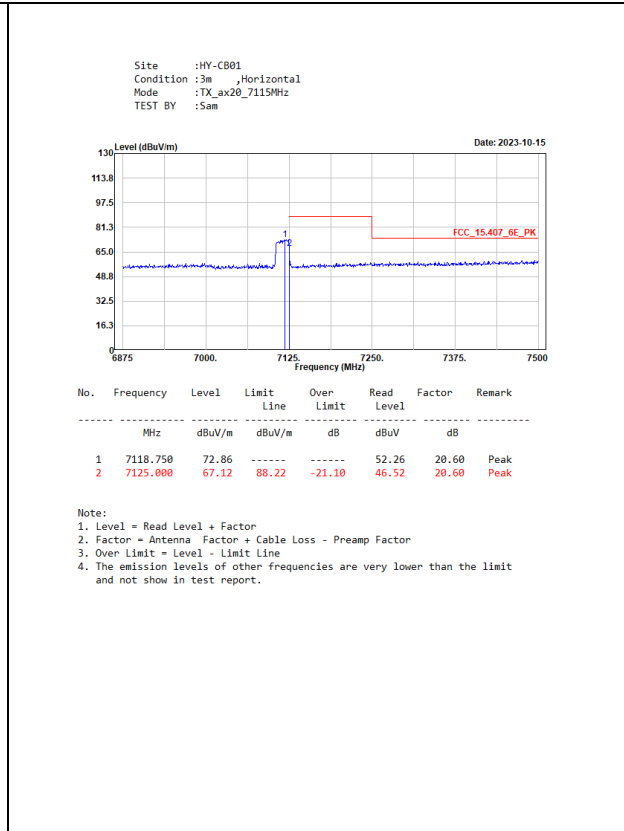
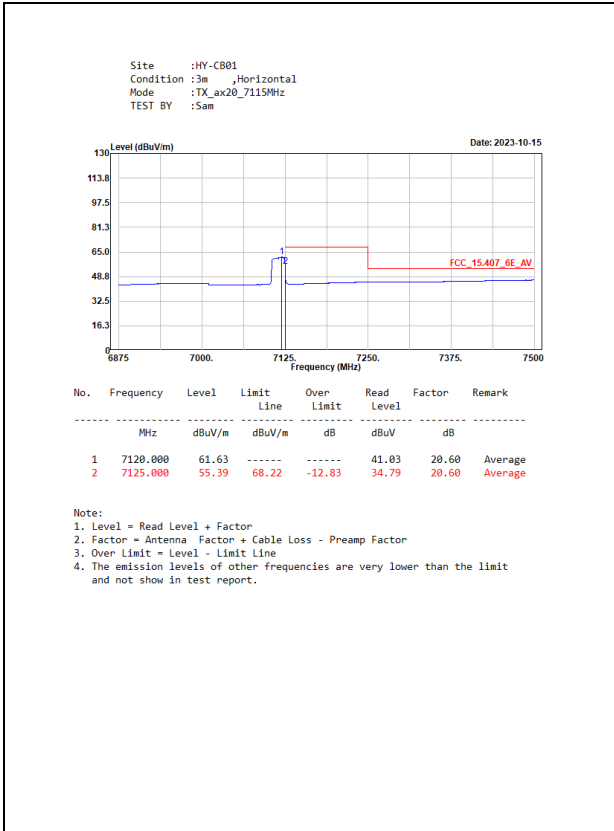
6 GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11 ax20	98.99	3.9990	250	10
802.11 ax40	98.99	3.9990	250	10
802.11 ax80	98.26	3.9990	250	10
802.11 ax160	98.30	2.3120	433	10

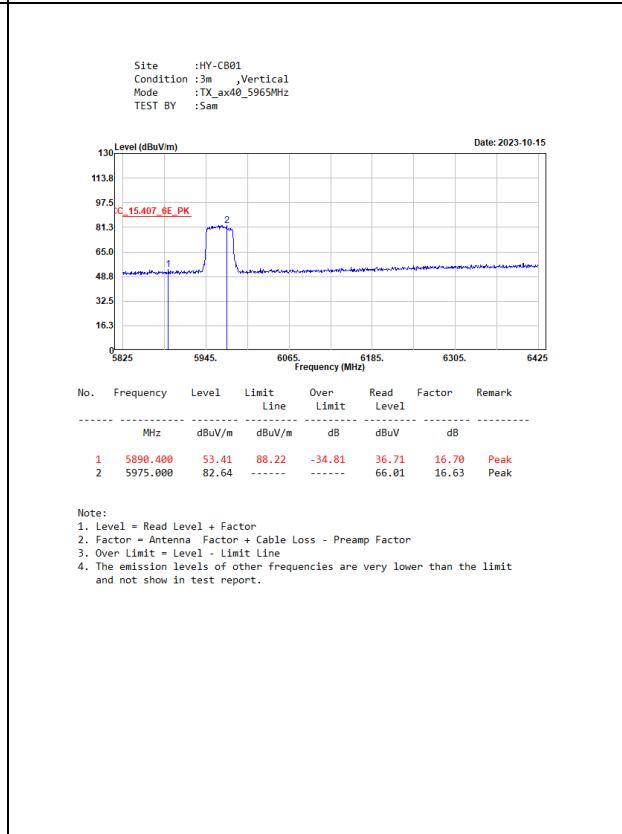
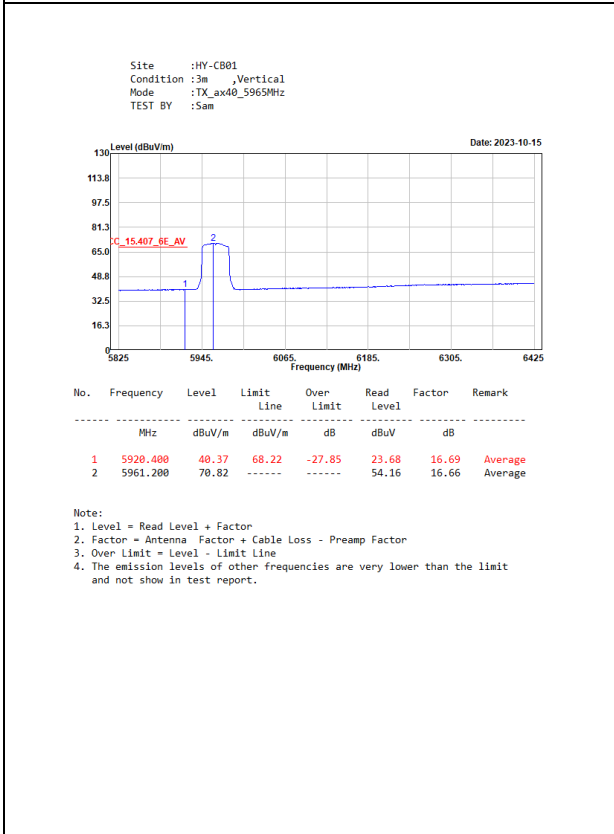
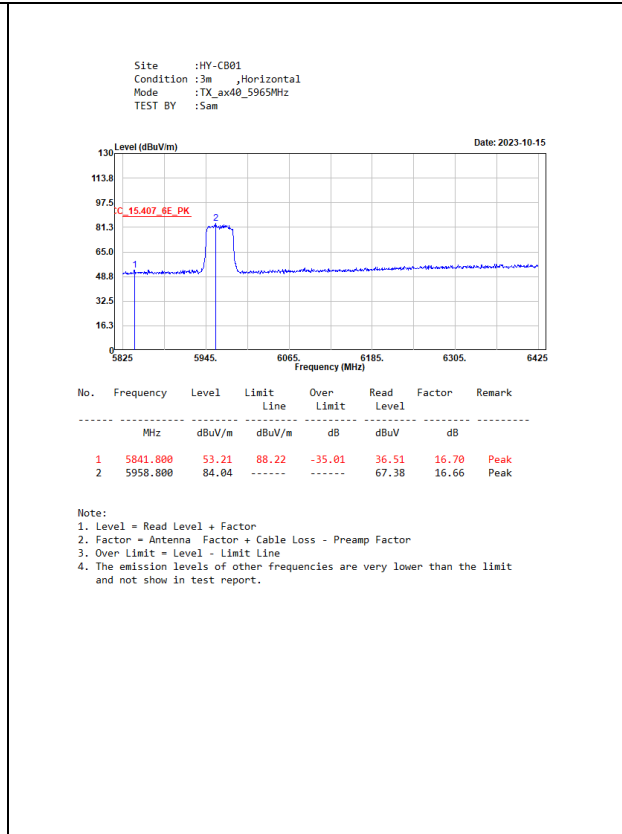
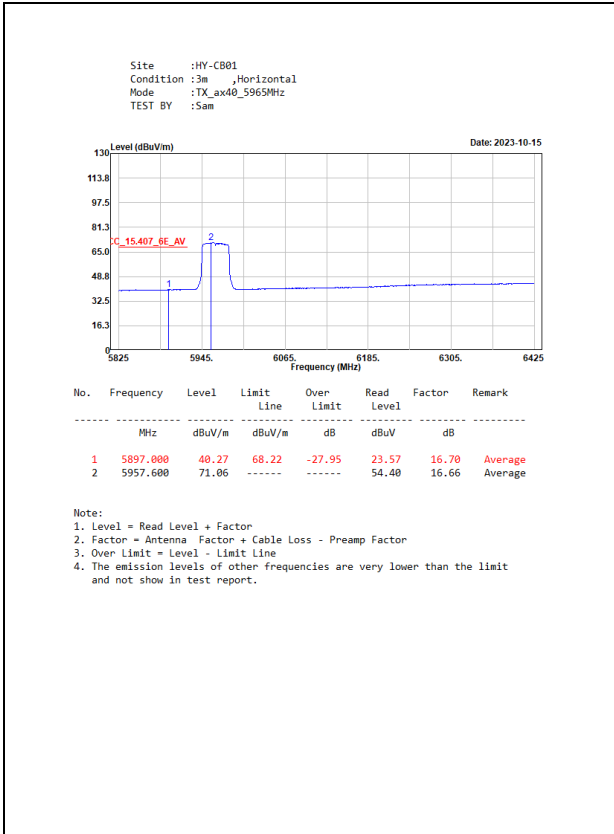
Note: Duty Cycle Refer to Section 10.

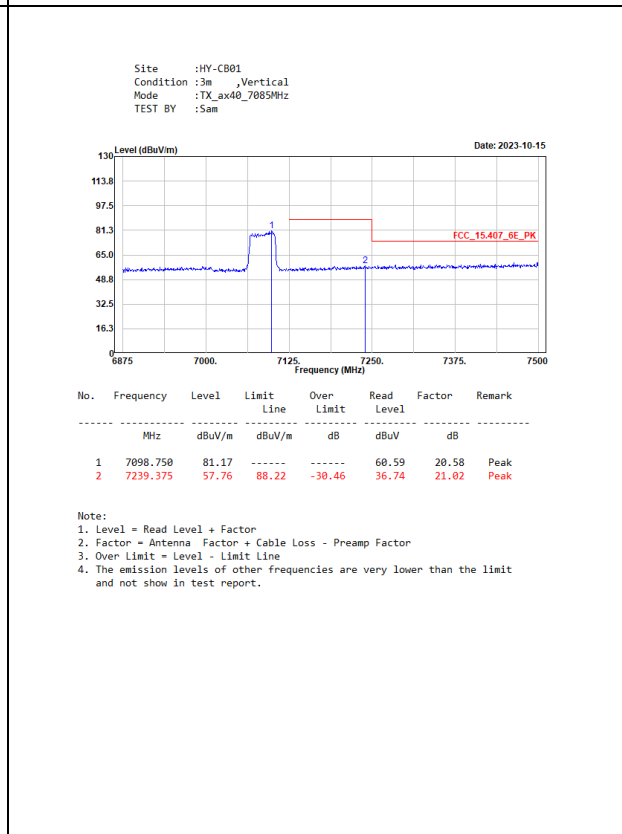
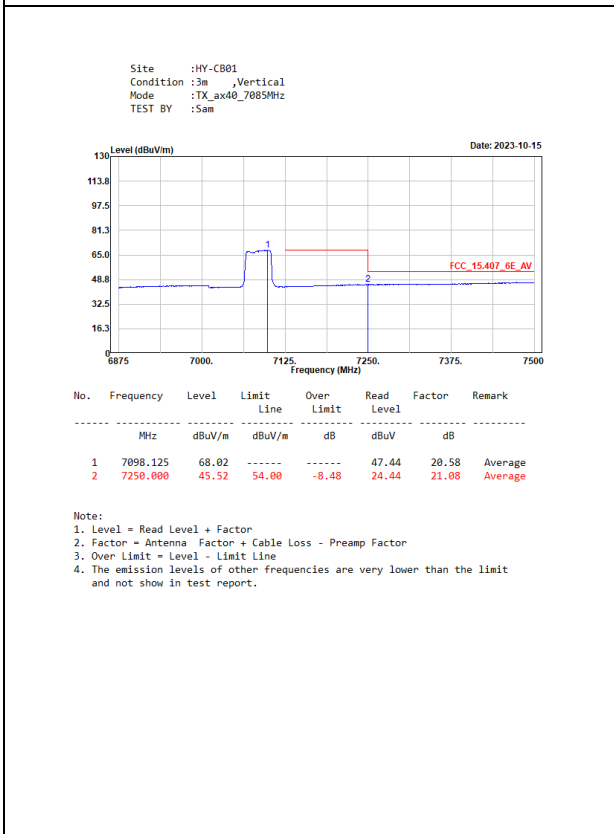
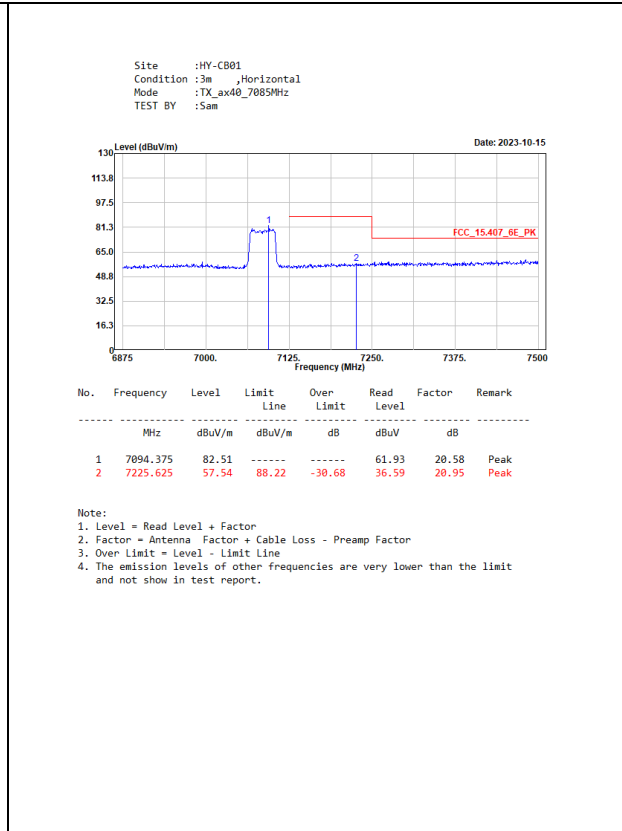
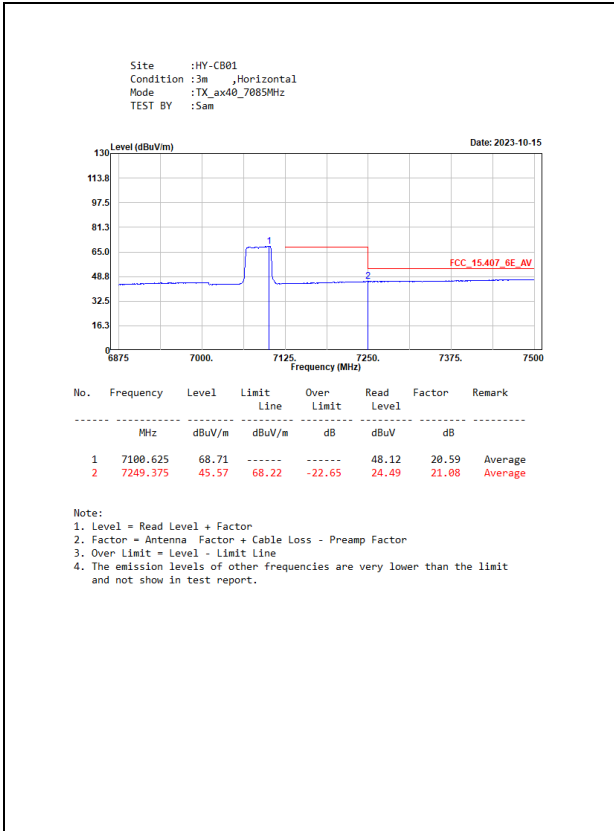
7.4. Test Result of Band Edge

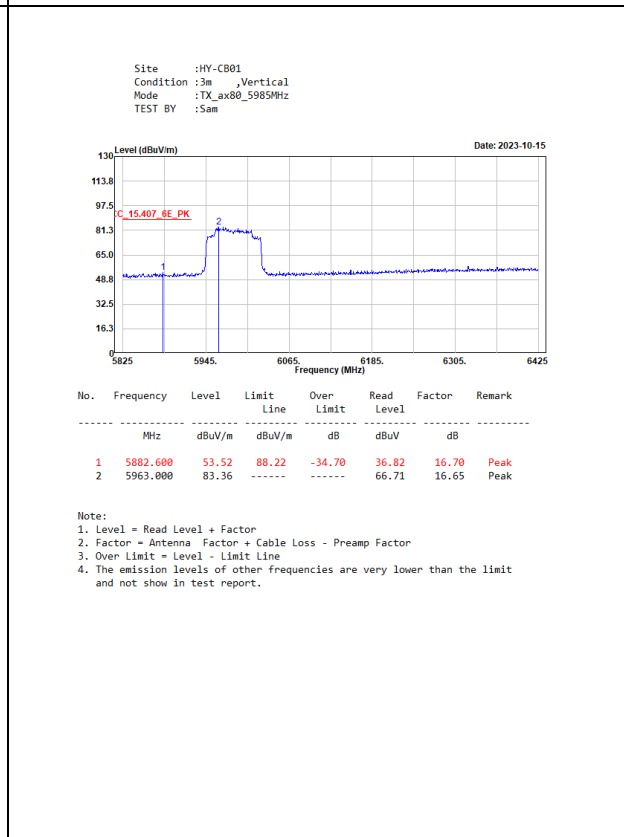
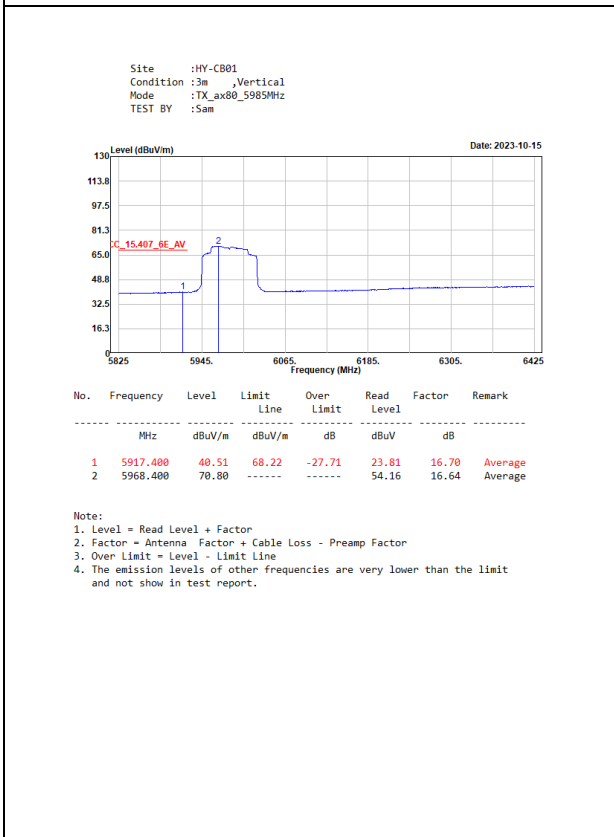
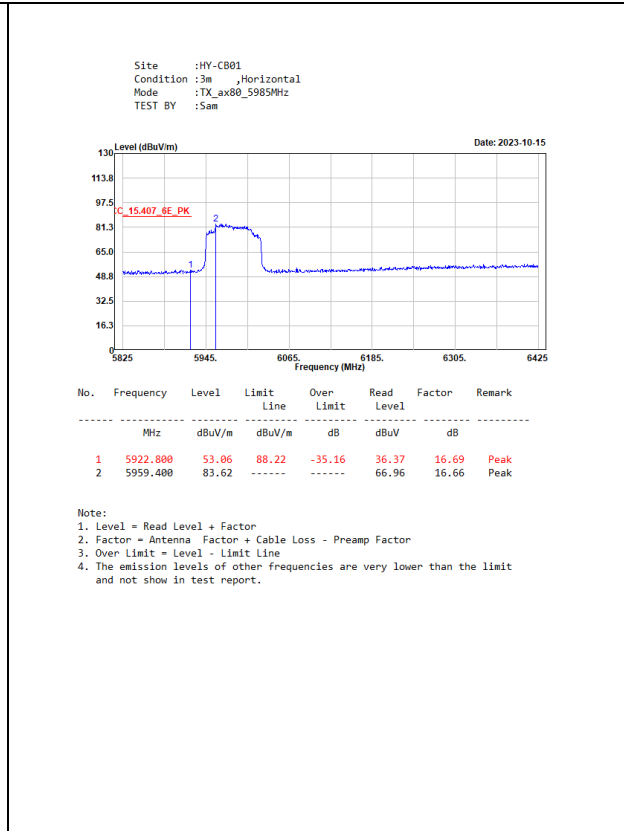
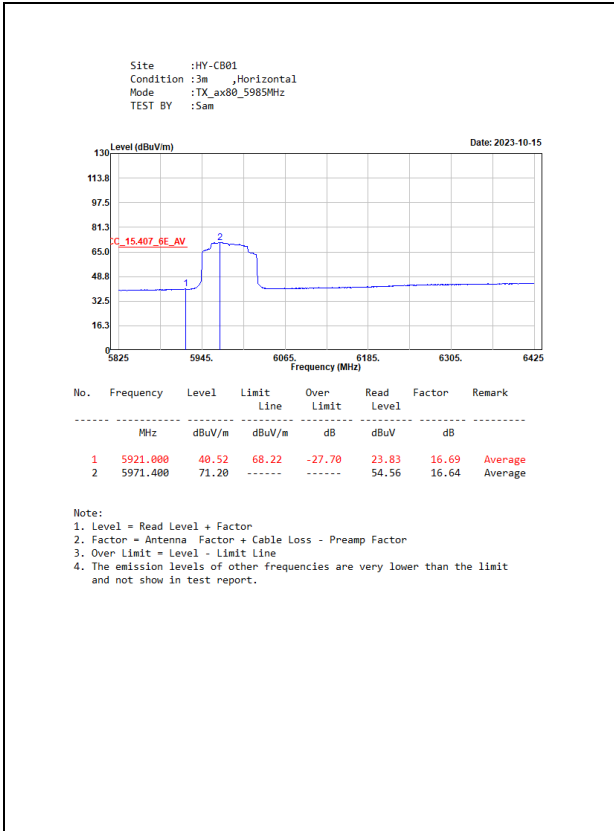
SISO A

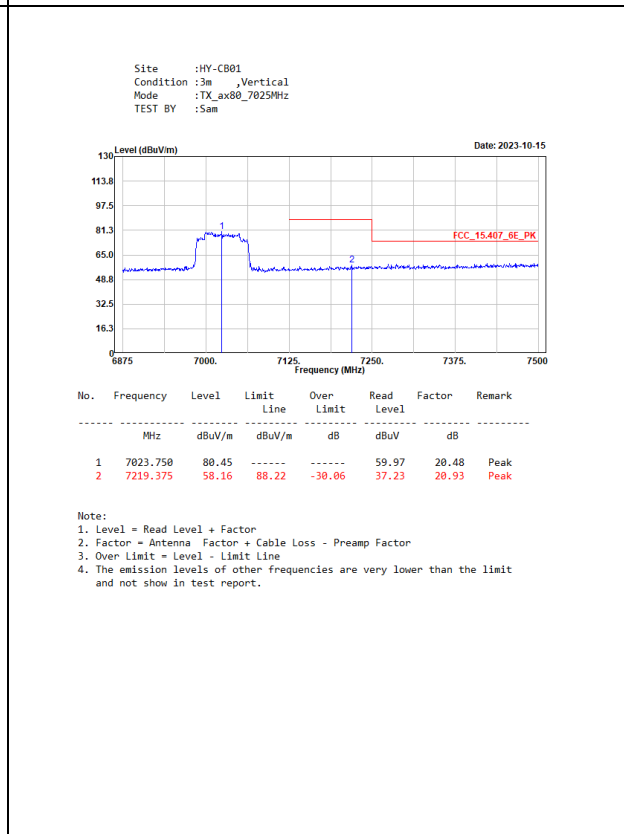
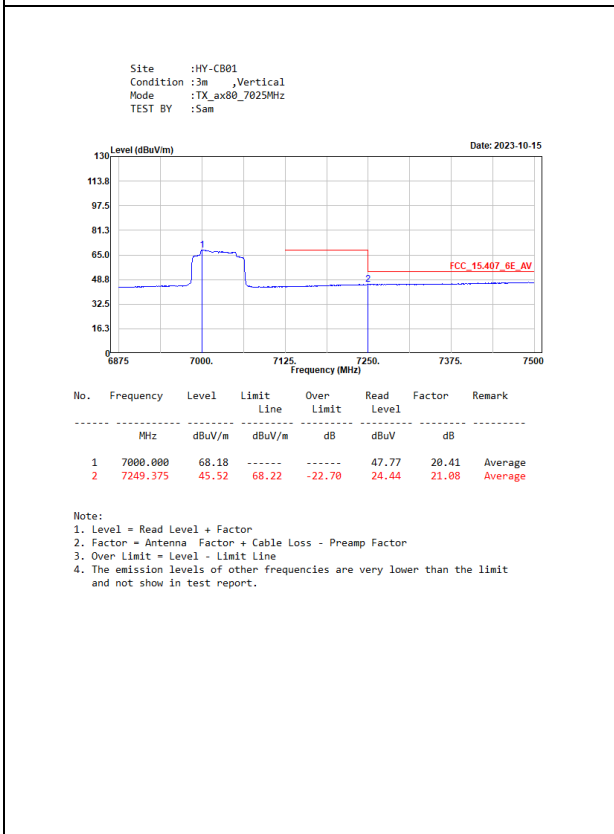
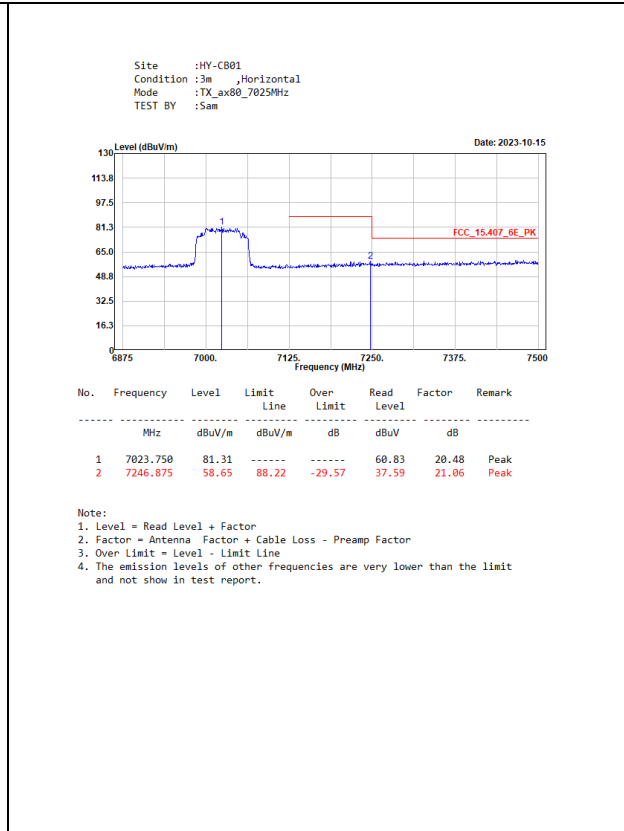
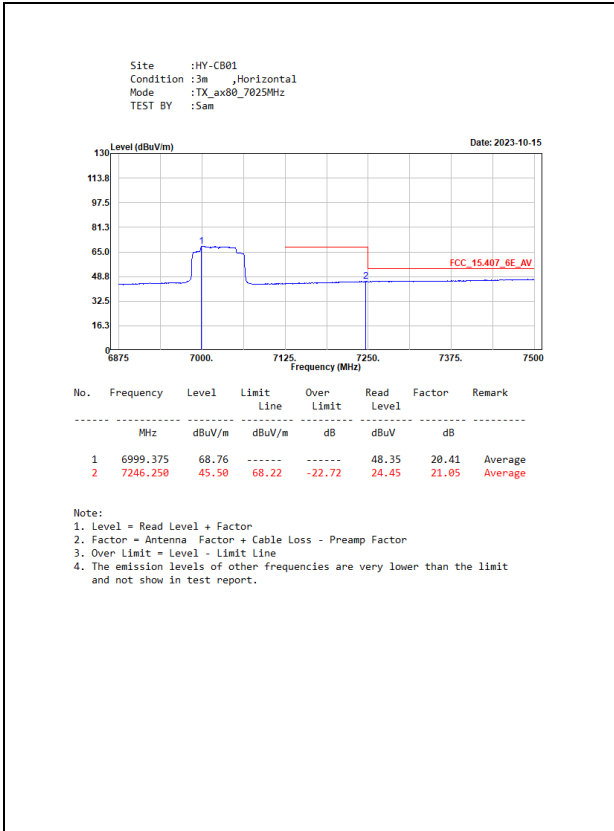


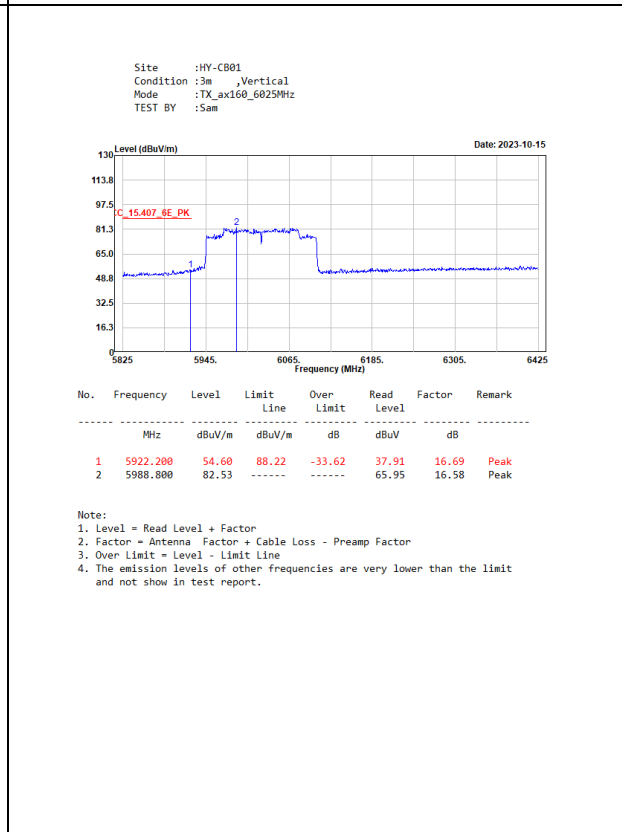
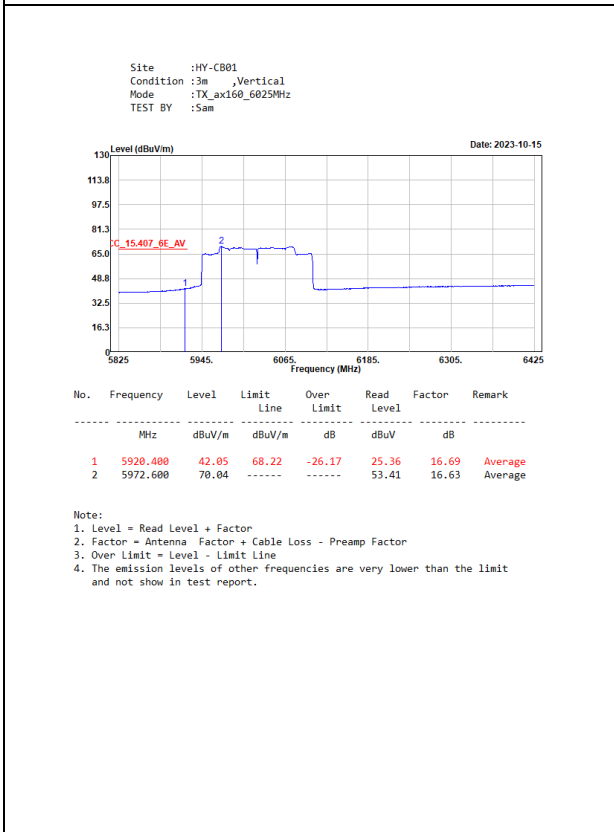
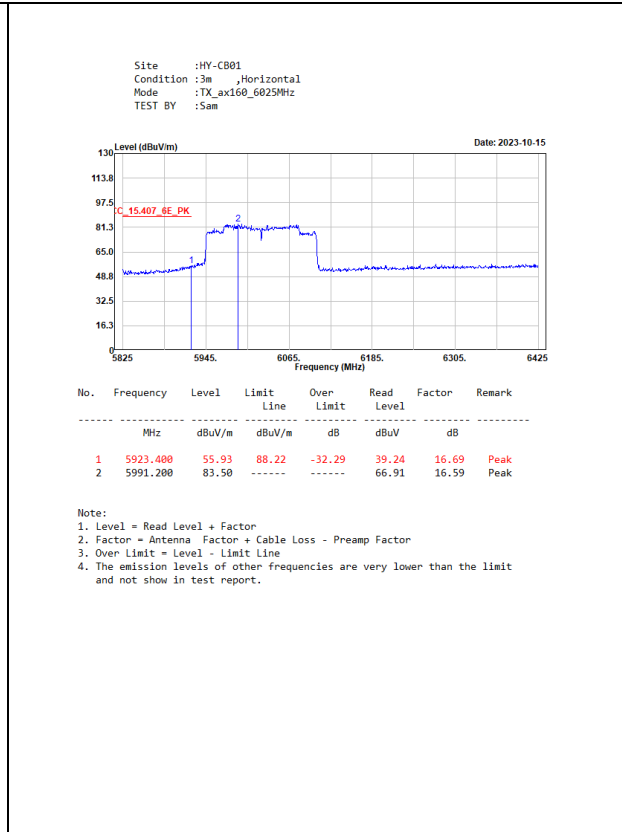
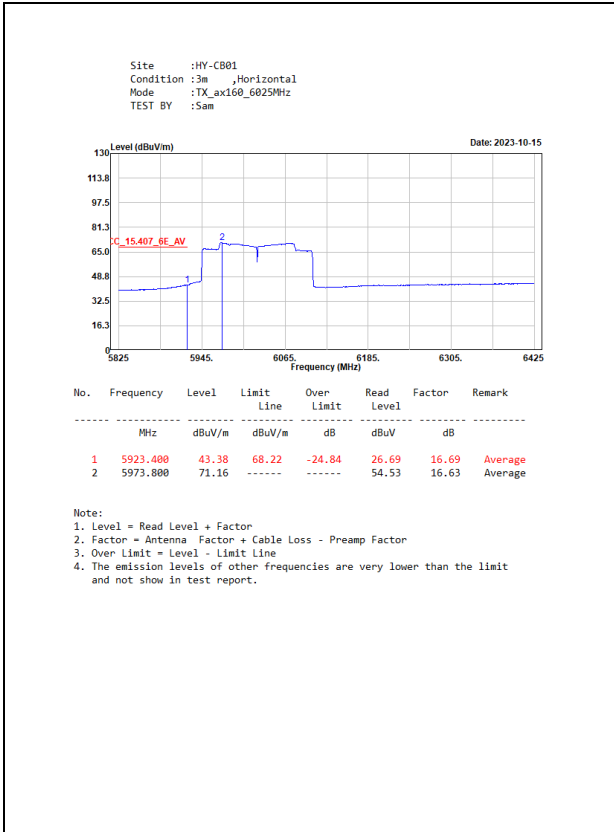


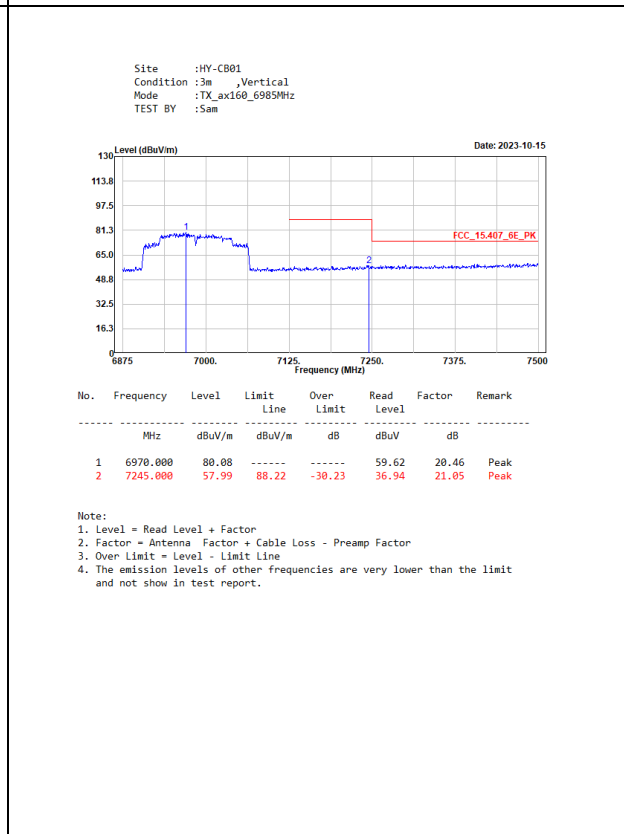
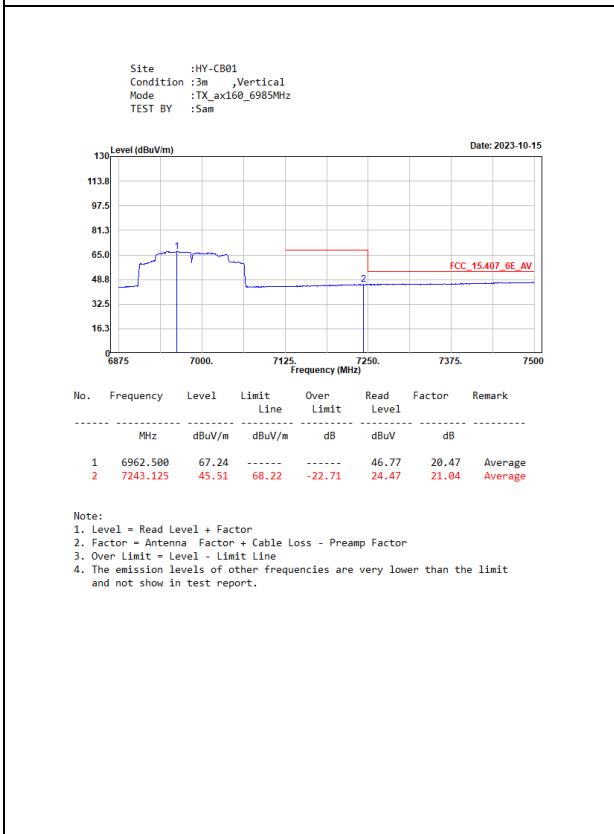
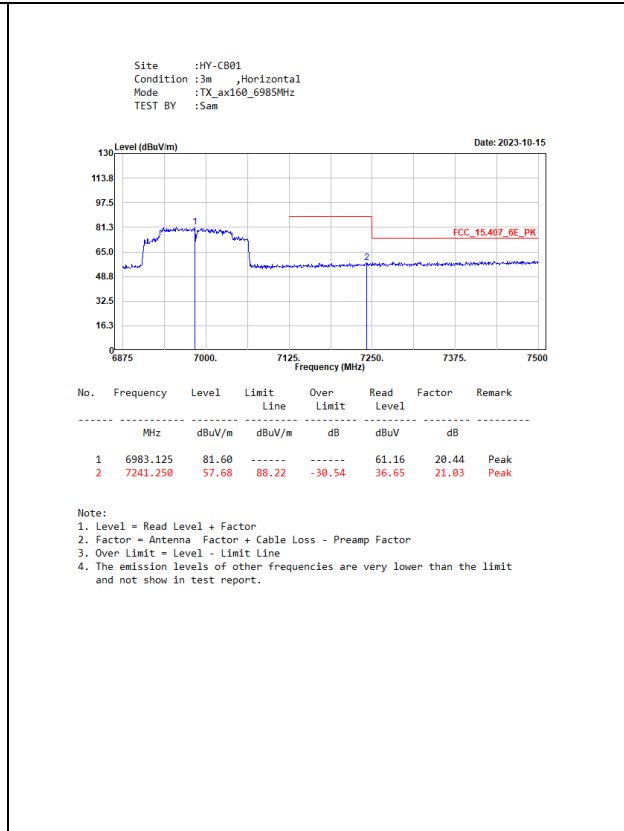
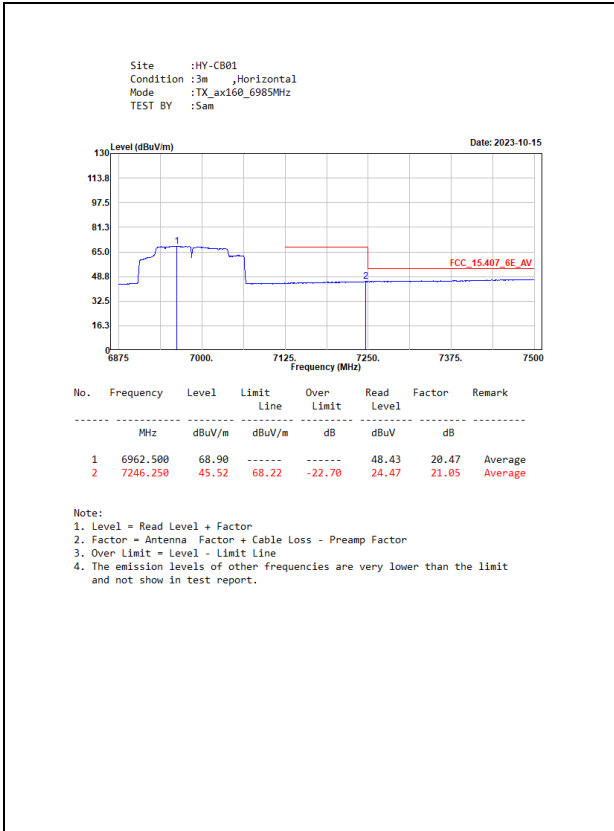




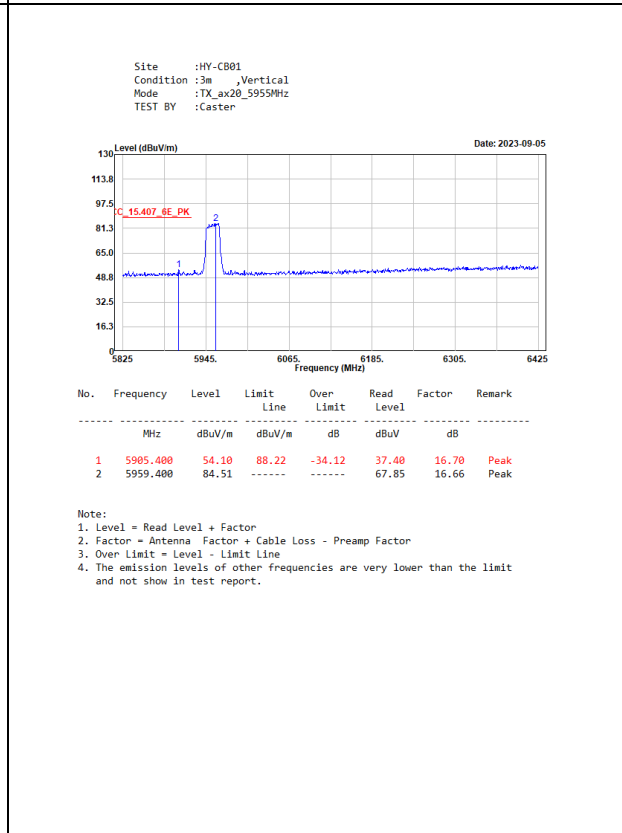
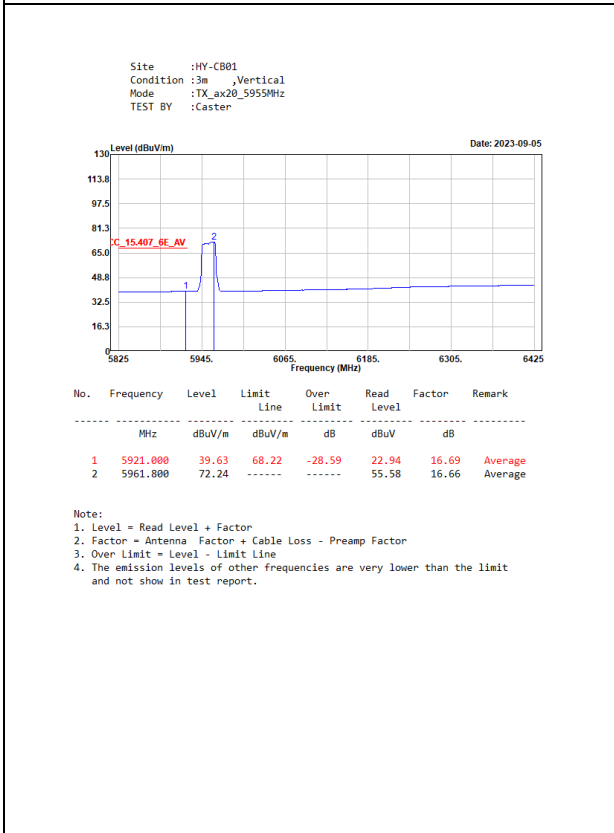
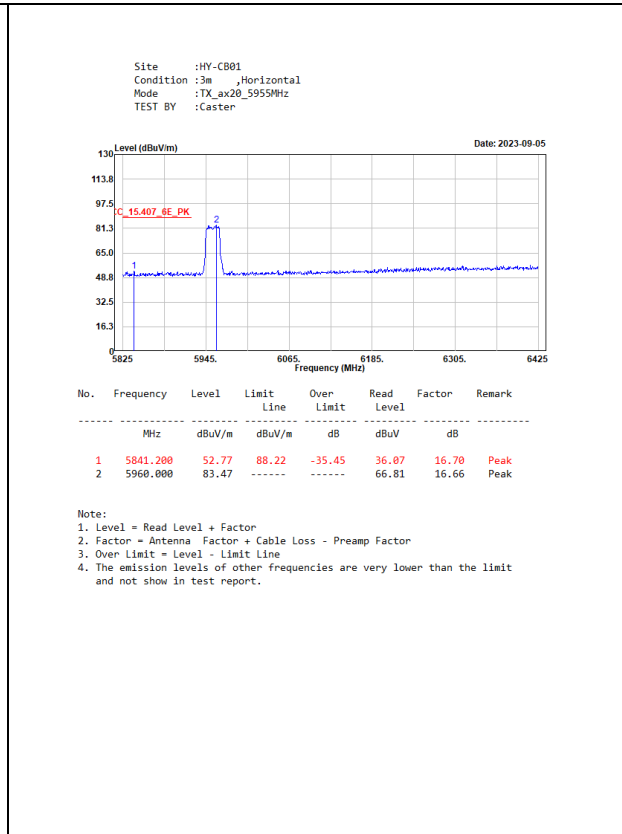
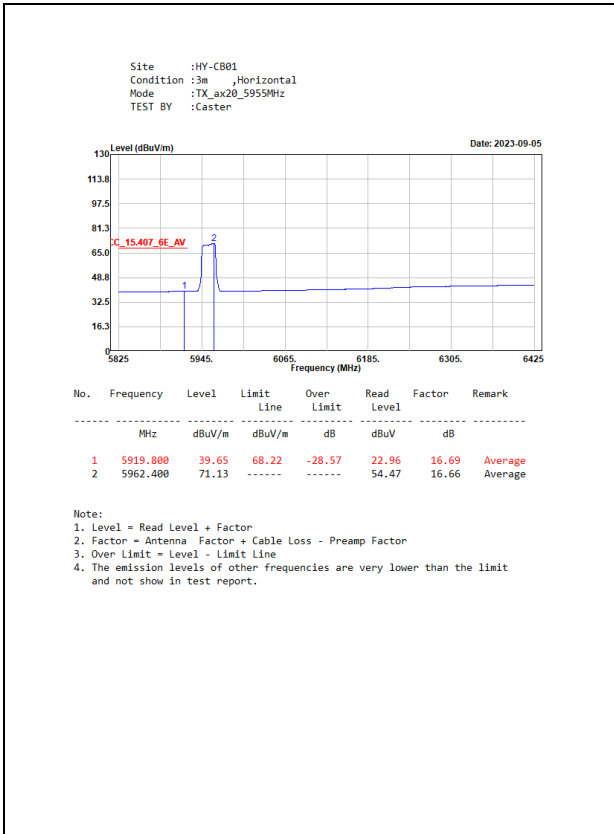


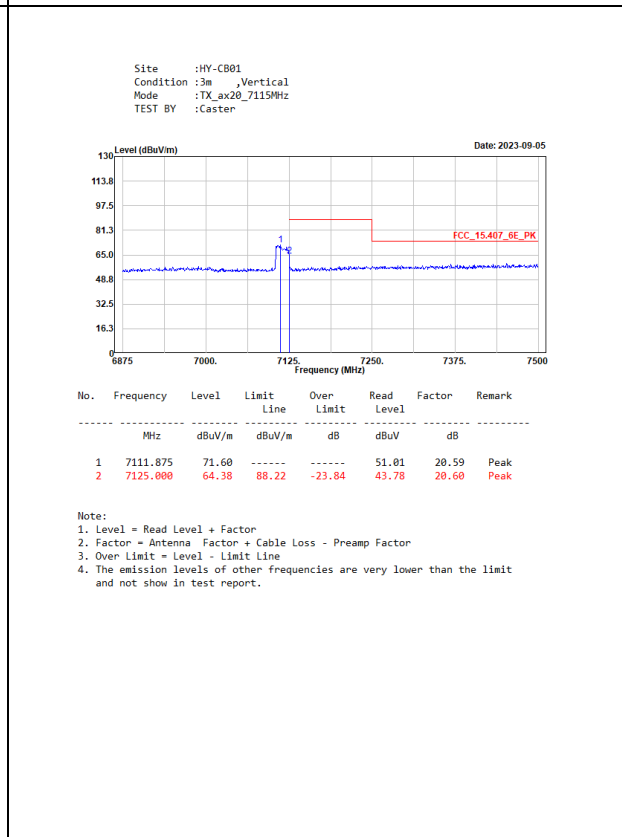
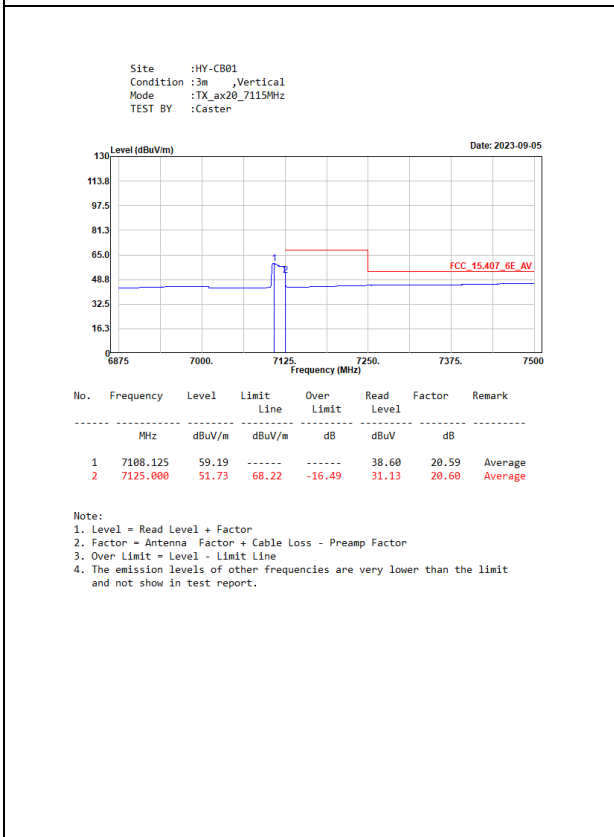
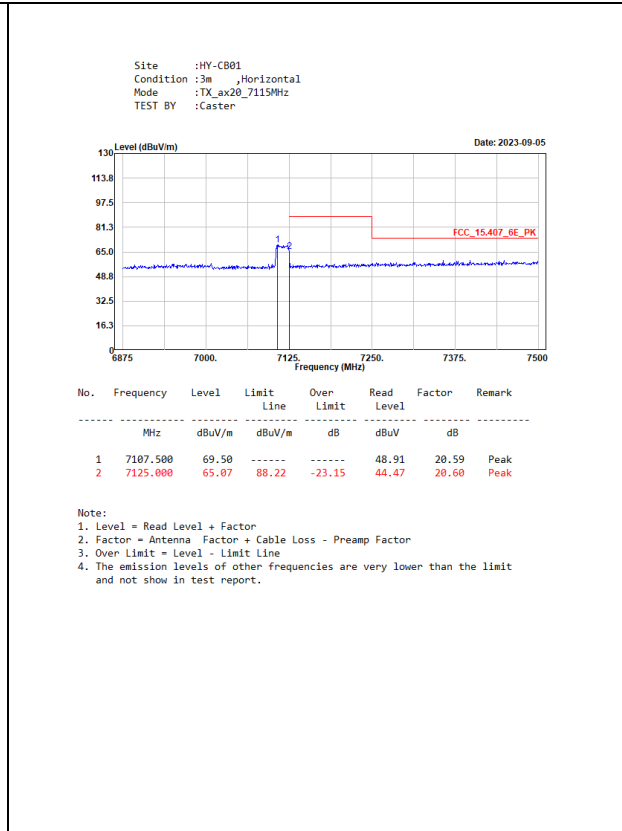
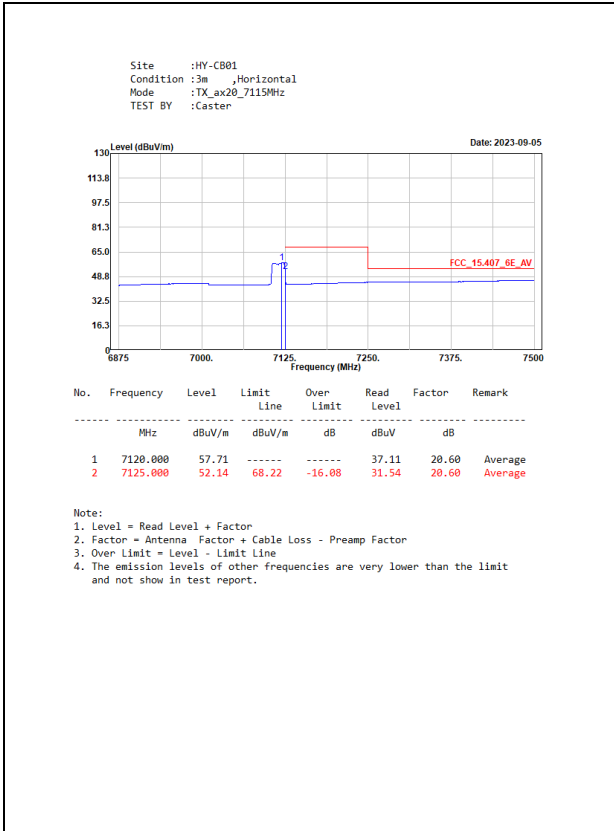


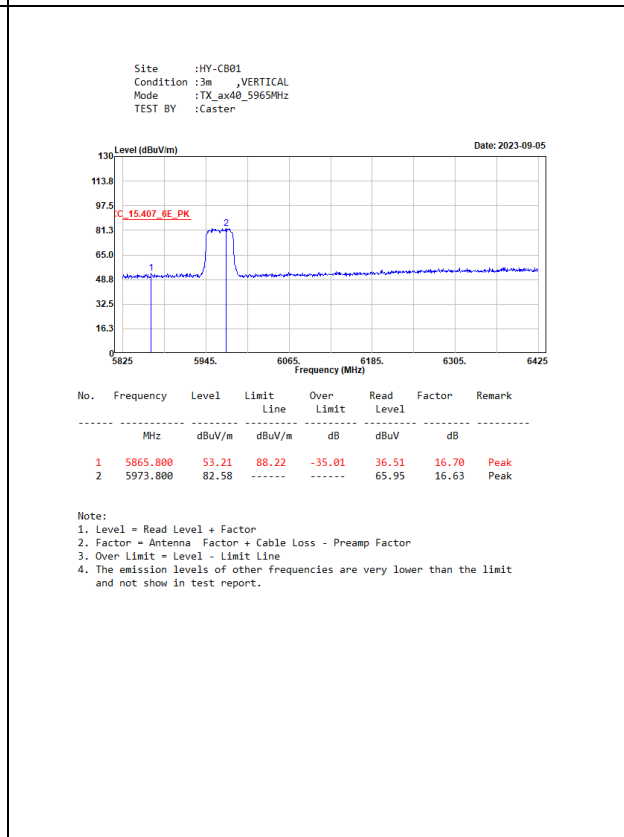
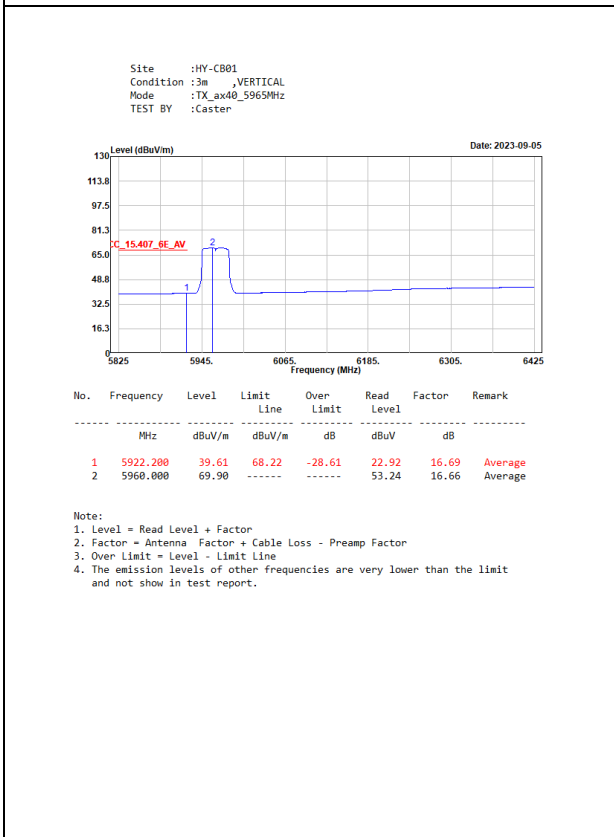
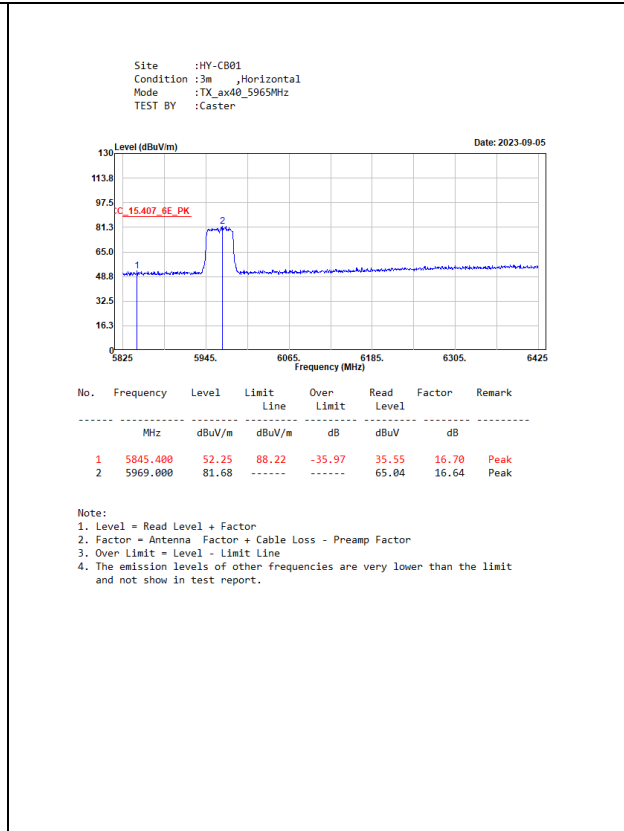
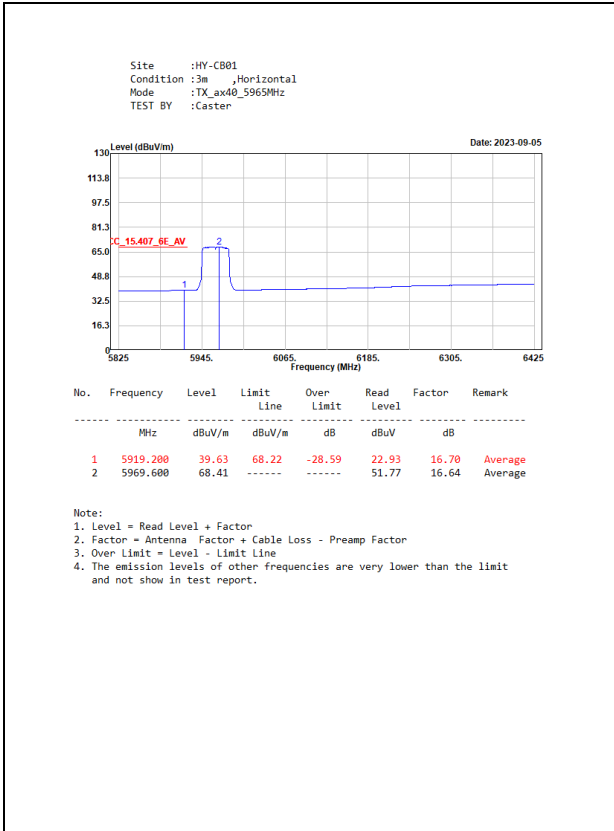


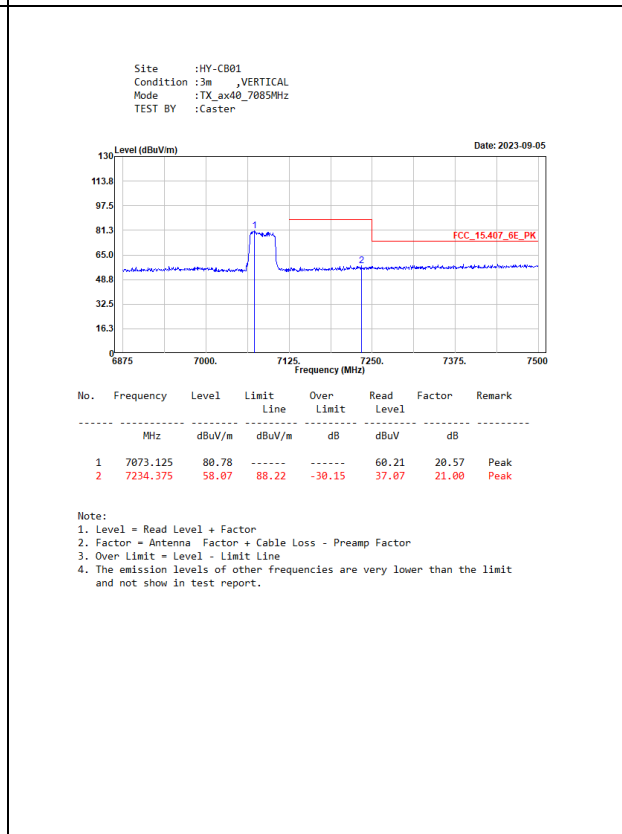
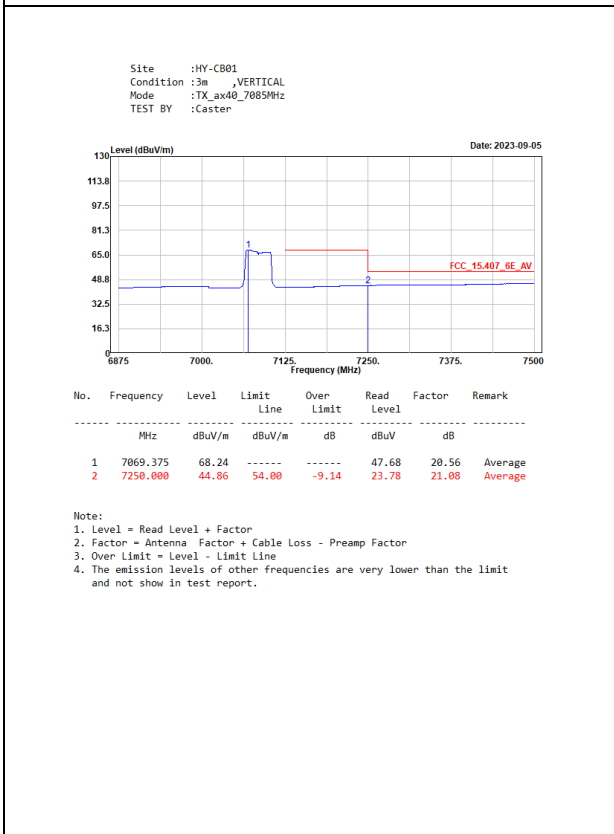
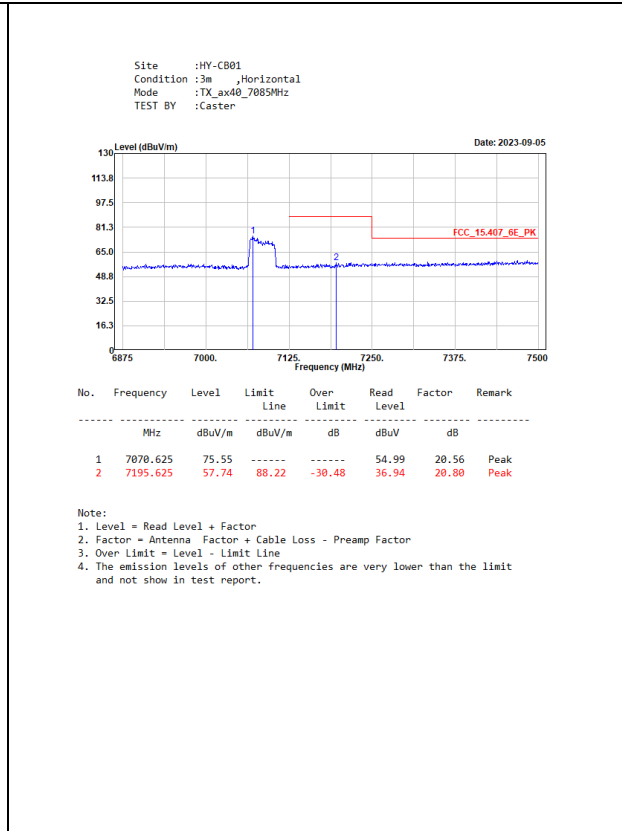
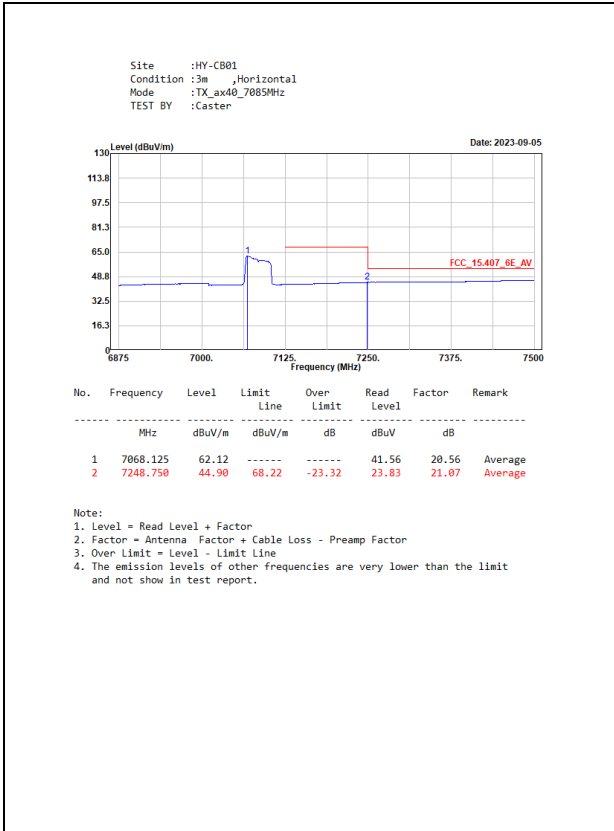


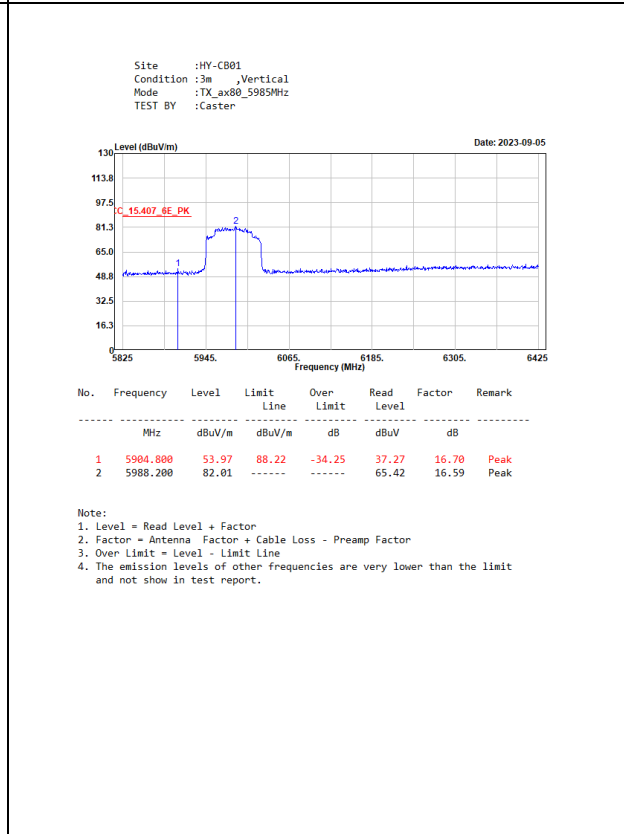
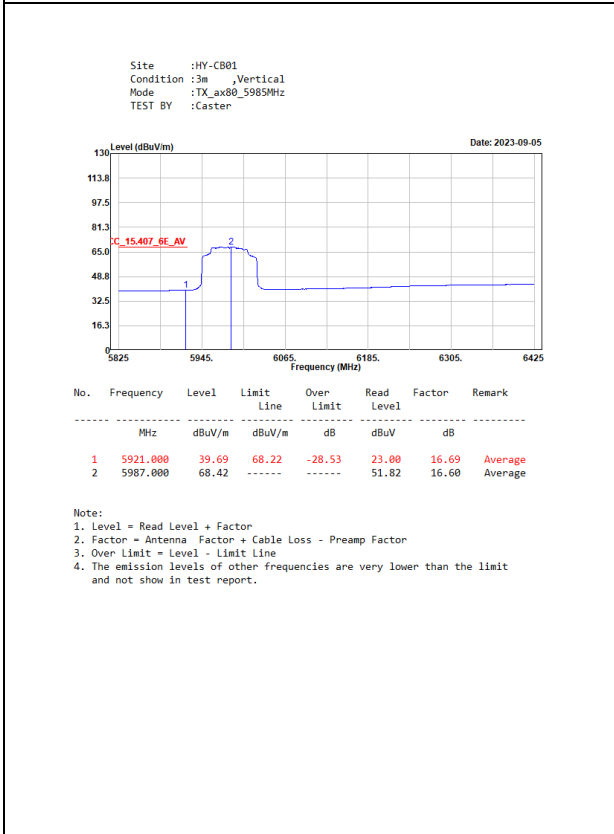
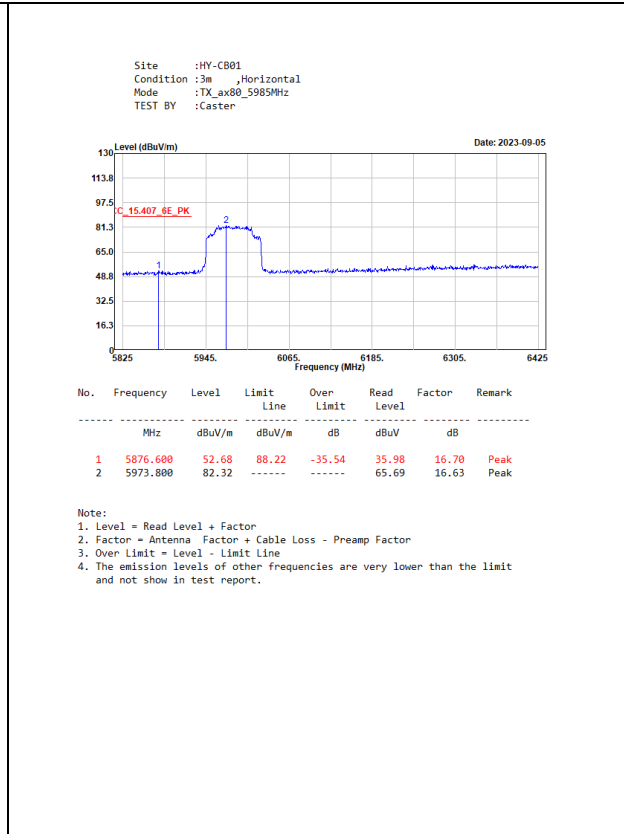
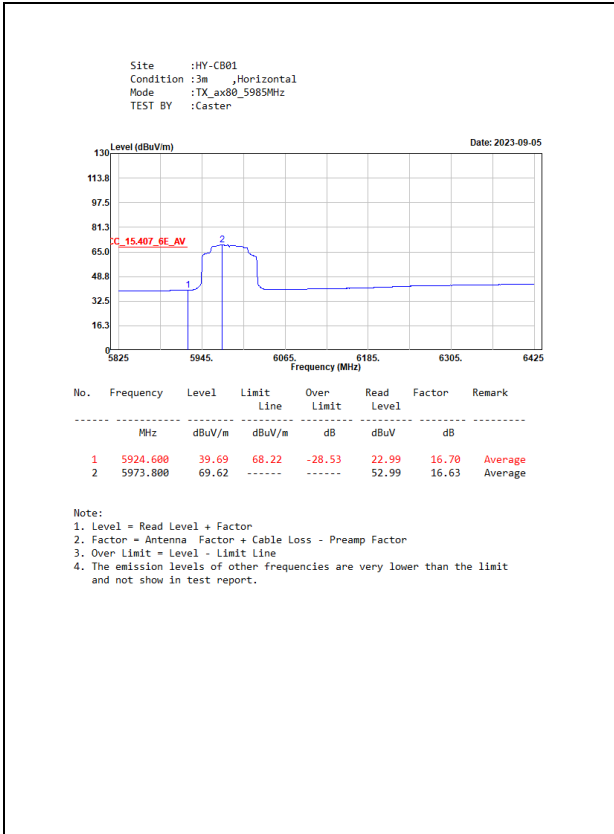
MIMO

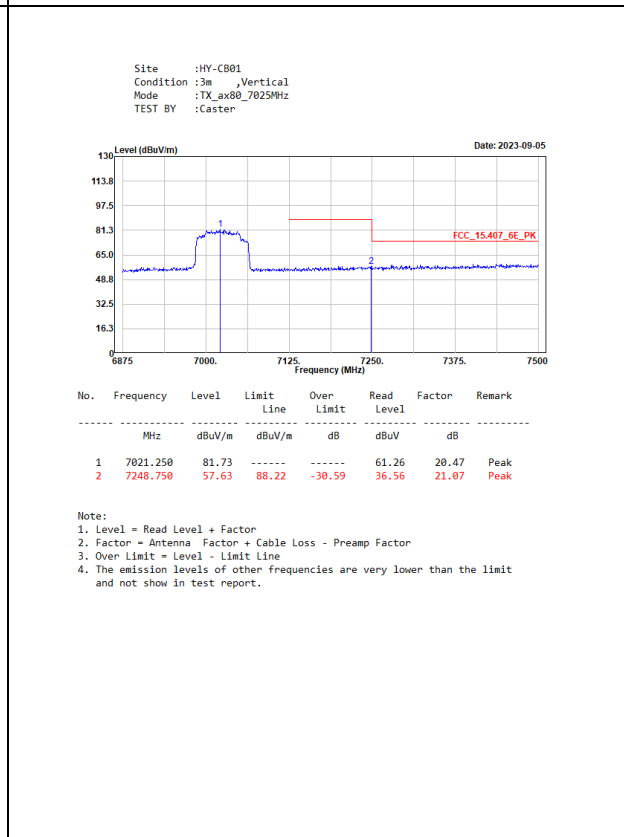
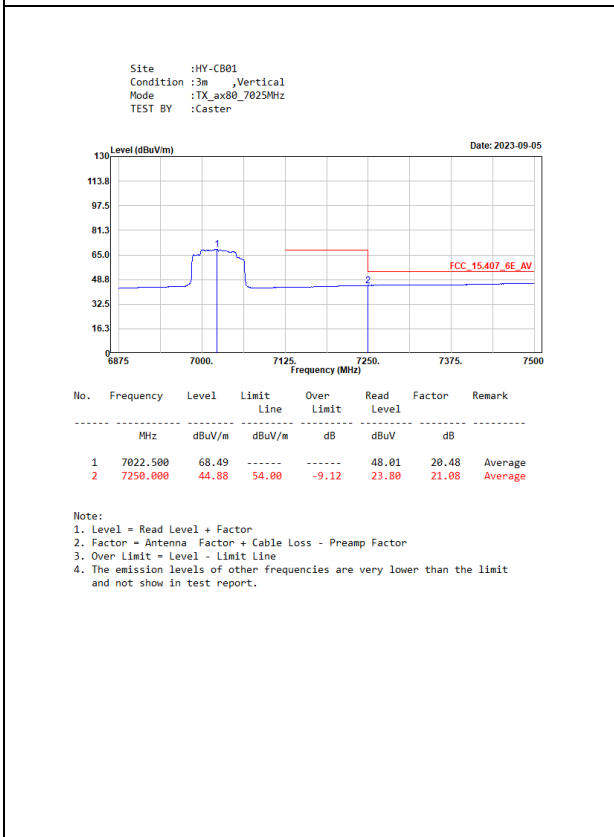
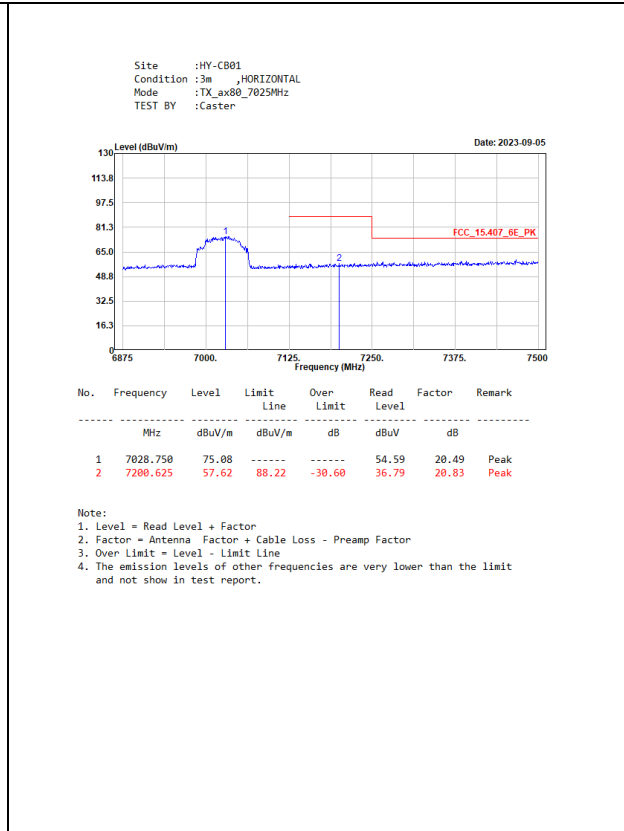
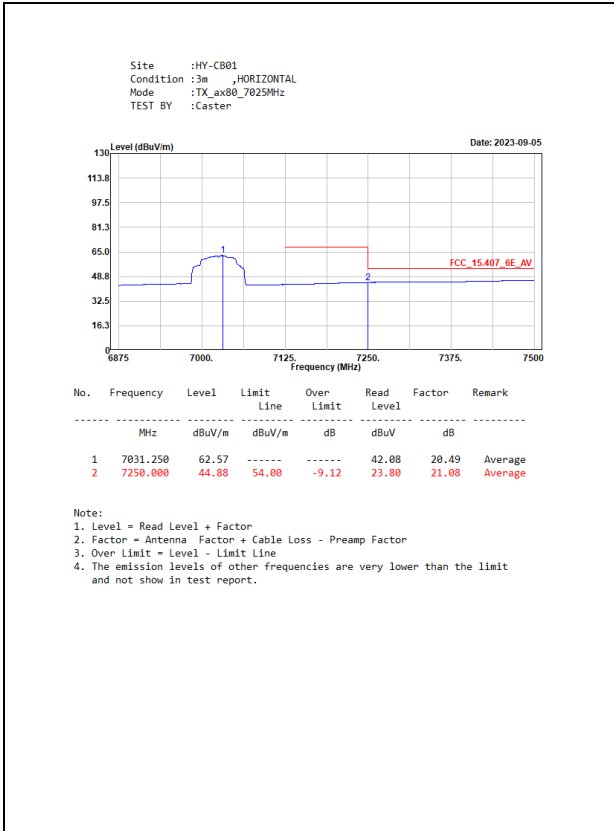


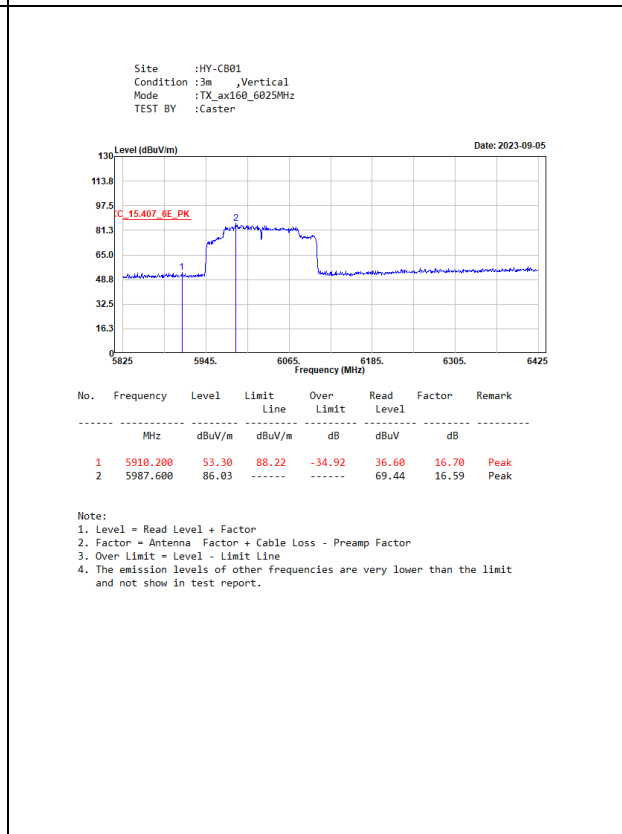
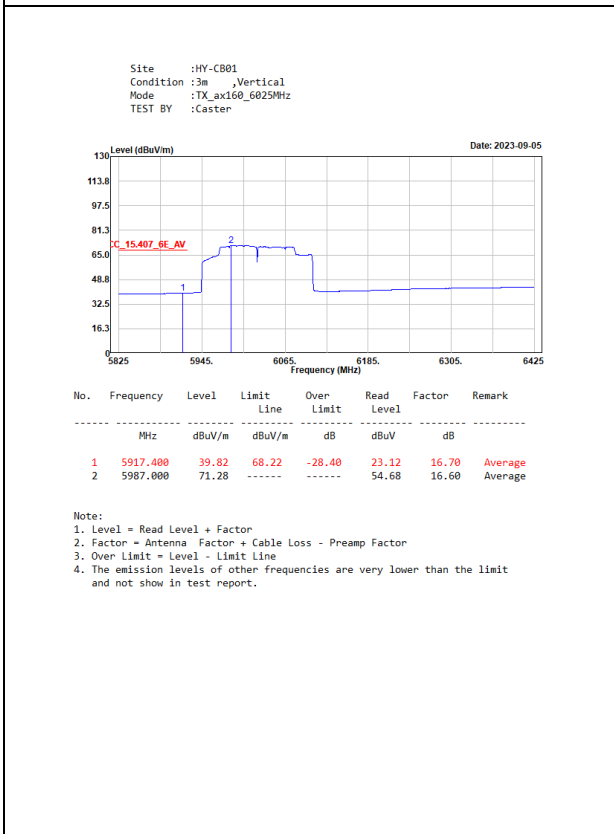
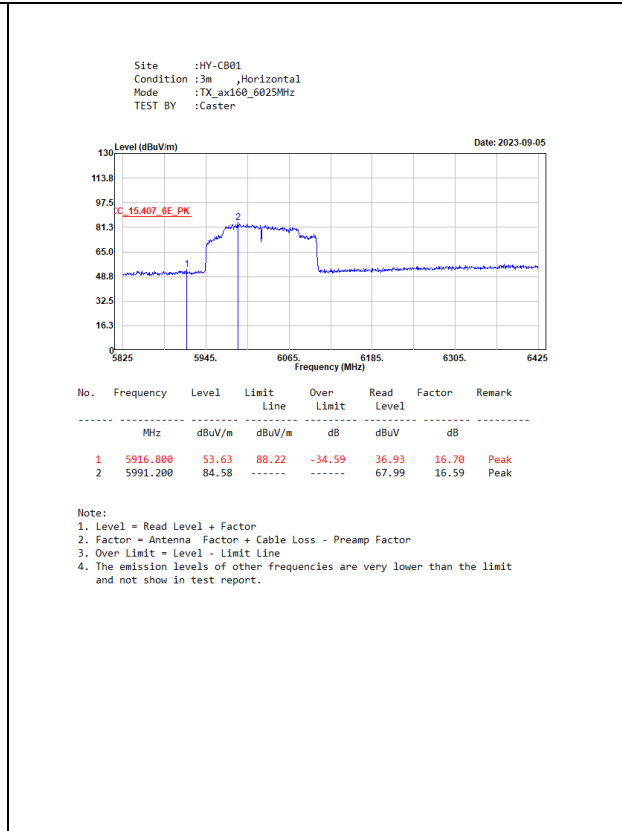
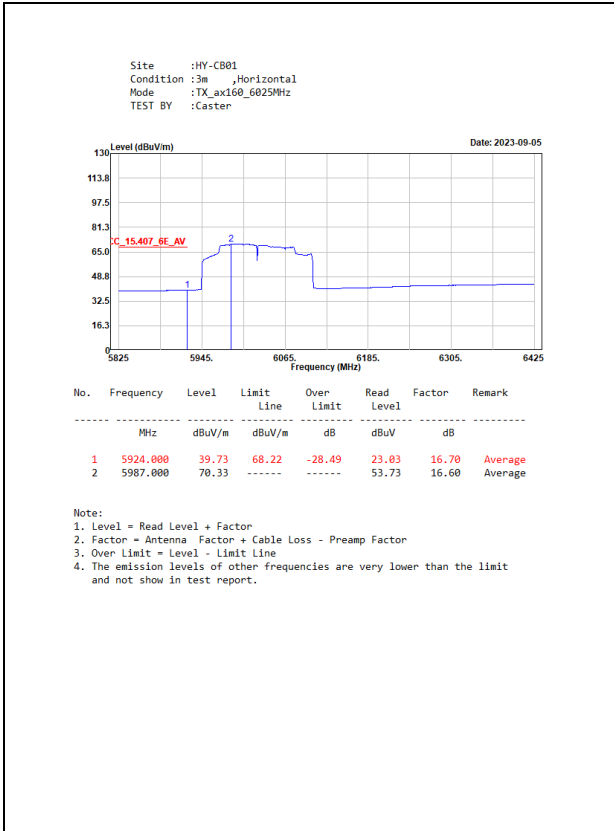


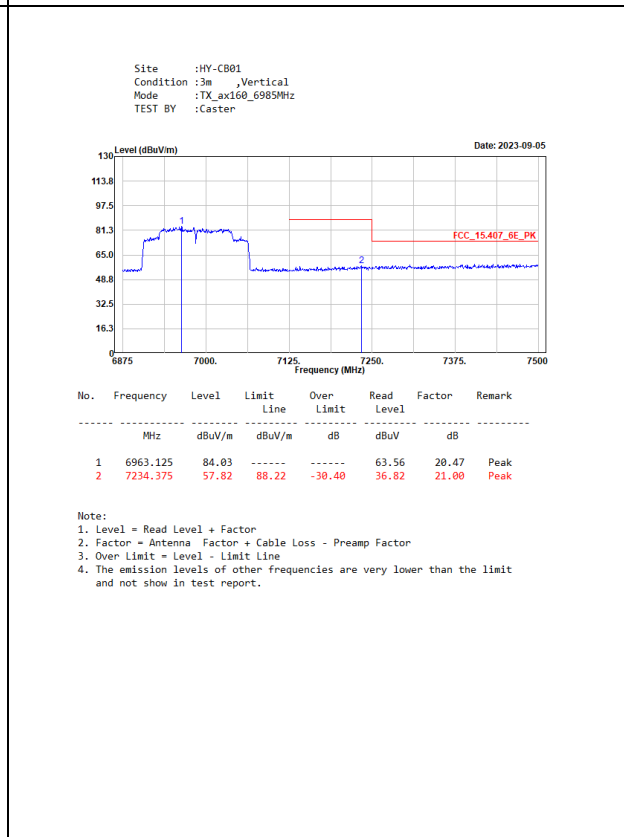
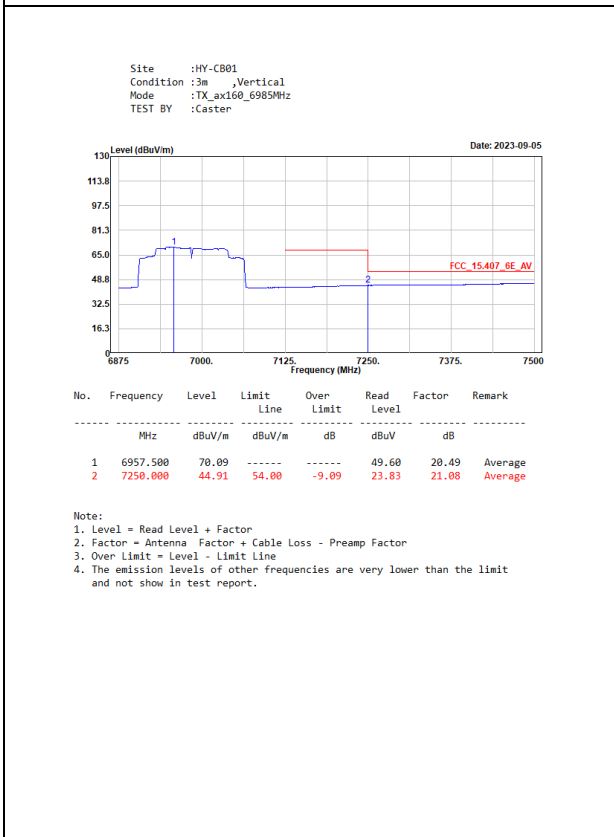
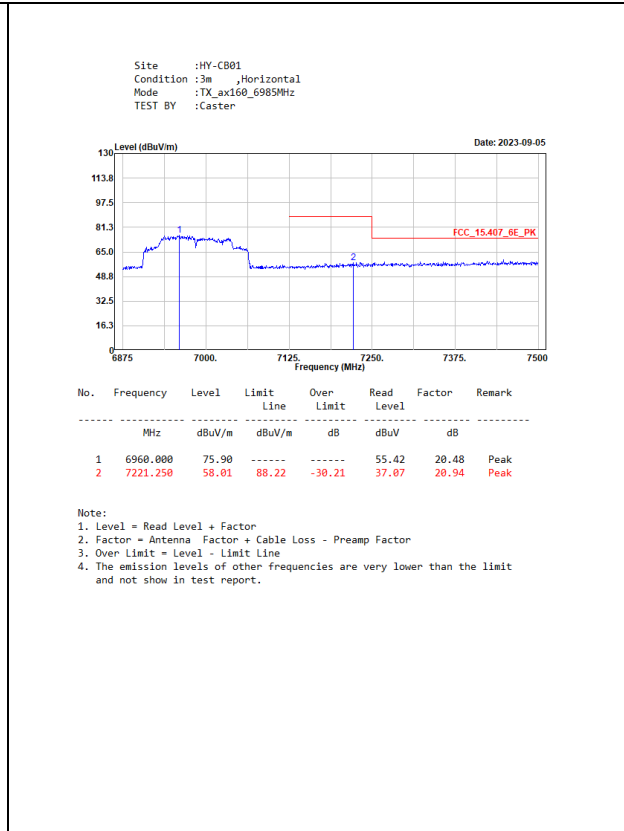
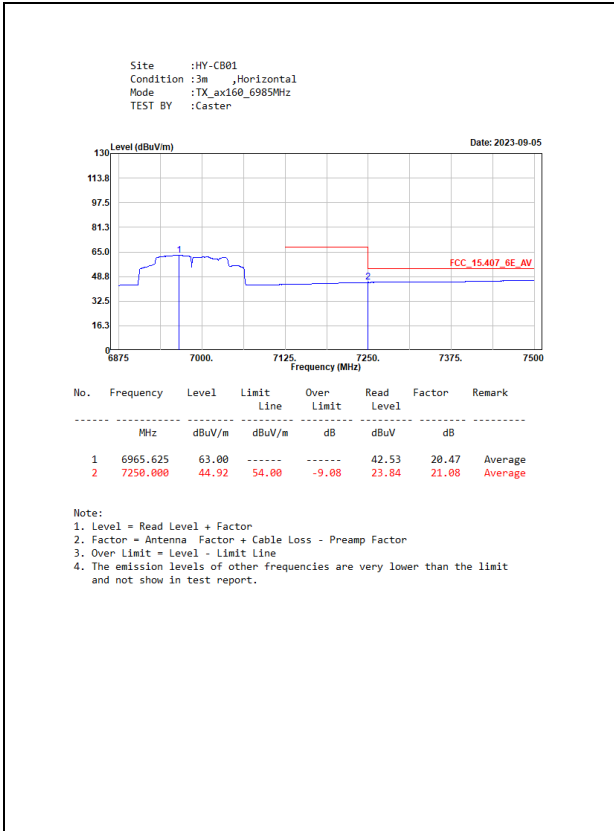






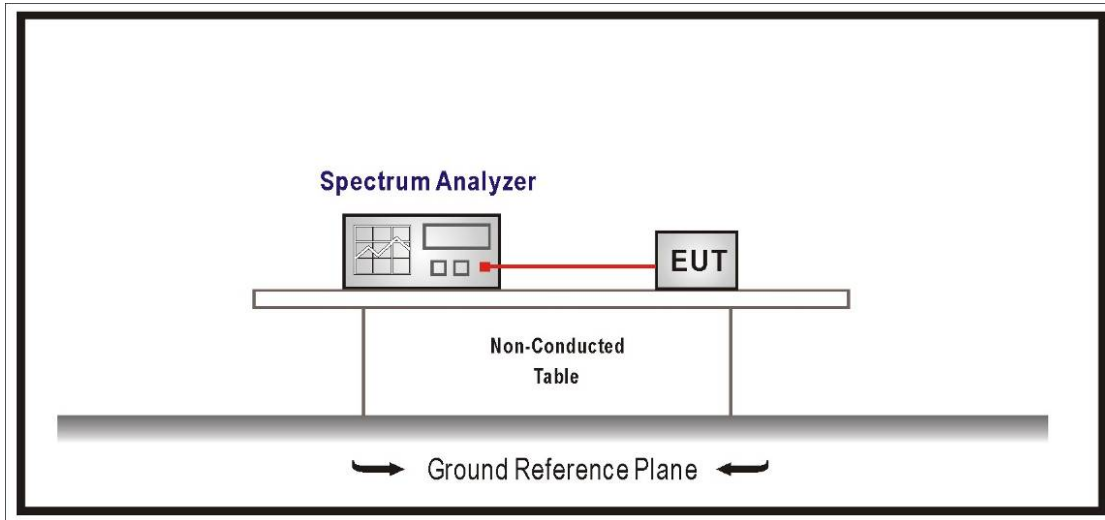






8. In-Band Emission (Mask)

8.1. Test Setup



8.2. Limits

Test Items	Frequencies (MHz)	(X) dBc*1
Emission Mask	At 1MHz outside of channel ege	20
	At one channel bandwidth from the channel center*2	28
	At one- and one-half times the channel bandwidth away from channek center*3	40
	More than one- and one-half times the channel bandwidth	40

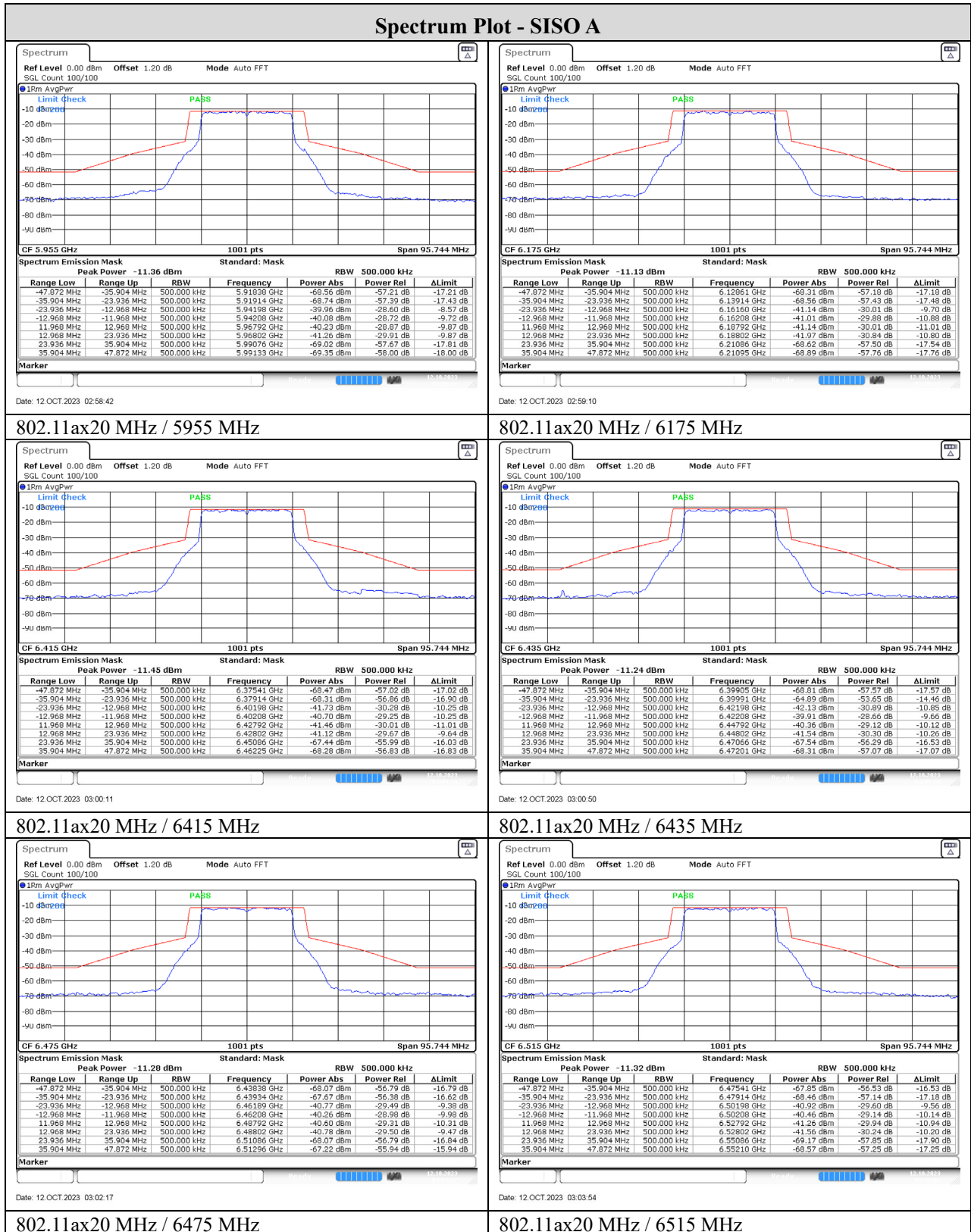
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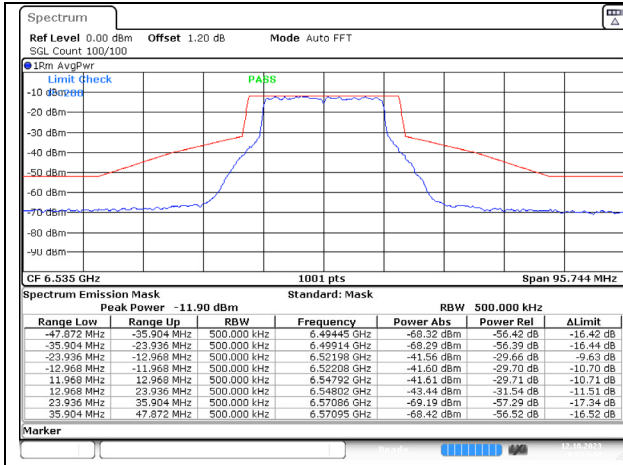
1. The power spectral density must be suppressed by “x” dB.
2. At frequencies between one megahertz outside an unlicensed device’s channek edge and one channel bandwidth from the center of the cannel, the Limits must be linearly interpolated between 20dB and 28dB suppression.
3. At frequencies between one and one- and one-half times an unlicensed device’s channel bandwidth, the Limits must be linearly interpolated between 28dB and 40dB suppression.

8.3. Test Procedure

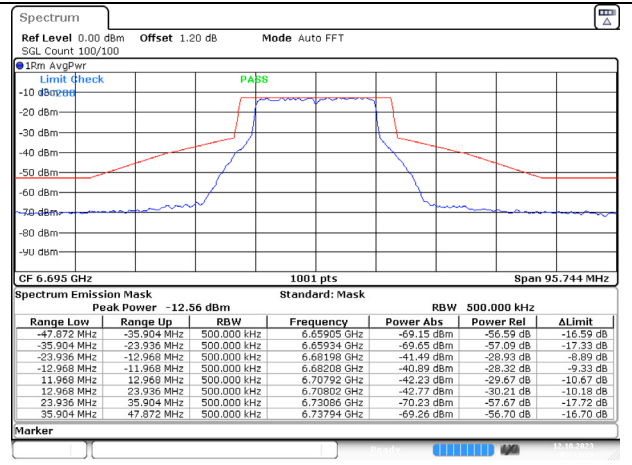
1. Connect output of the antenna port to a spectrum analyzer and adjust appropriate attenuation.
2. Measure the 26 dB EBW using the test procedure 12.4.1 of ANSI C63.10-2013. (Determine the channel edge.)
3. Measure the power spectral density (for emissions mask reference) using the following procedure:
 - (1) Set the span to encompass the entire 26 dB EBW of the signal.
 - (2) Set RBW = same RBW used for 26 dB EBW measurement.
 - (3) Set VBW $\geq 3 \times$ RBW
 - (4) Number of points in sweep $\geq [2 \times \text{span} / \text{RBW}]$.
 - (5) Sweep time = auto.
 - (6) Detector = RMS (i.e., power averaging)
 - (7) Trace average at least 100 traces in power averaging (rms) mode.
 - (8) Use the peak search function on the instrument to find the peak of the spectrum.
4. Using the measuring equipment Limit line function, develop the emissions mask based on the following requirements. The emissions power spectral density must be reduced below the peak power spectral density (in dB) as follows:
 - (1) Suppressed by 20 dB at 1 MHz outside of the channel edge. (The channel edge is defined as the 26-dB point on either side of the carrier center frequency.)
 - (2) Suppressed by 28 dB at one channel bandwidth from the channel center.
 - (3) Suppressed by 40 dB at one- and one-half times the channel bandwidth from the channel center.
5. Adjust the span to encompass the entire mask as necessary and clear trace.
6. Trace average at least 100 traces in power averaging (rms) mode.
7. Adjust the reference level as necessary so that the crest of the channel touches the top of the emission mask.

8.4. Test Result of In-Band Emission (Mask)



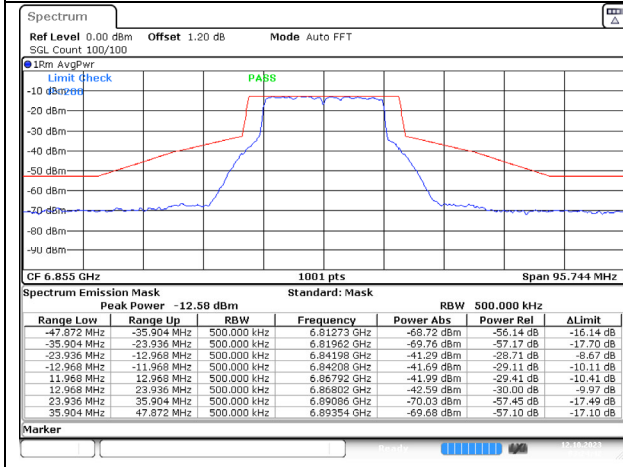


Date: 12.OCT.2023 03:11:48



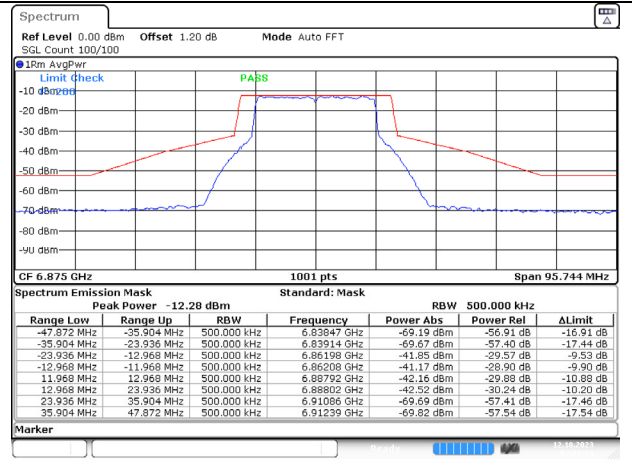
Date: 12.OCT.2023 03:13:16

802.11ax20 MHz / 6535 MHz



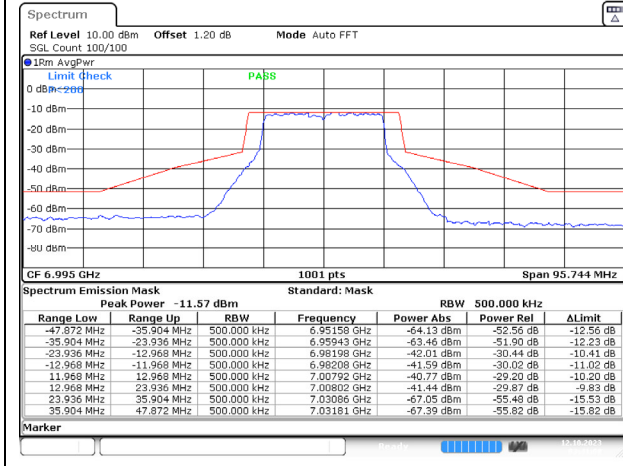
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802.11ax20 MHz / 6695 MHz



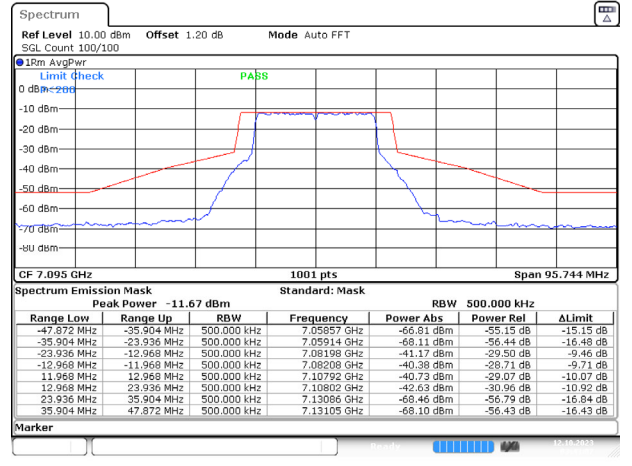
Date: 12.OCT.2023 03:26:13

802.11ax20 MHz / 6855 MHz



Date: 12.OCT.2023 03:41:08

802.11ax20 MHz / 6875 MHz



Date: 12.OCT.2023 03:43:07

802.11ax20 MHz / 6995 MHz

802.11ax20 MHz / 7095 MHz