

Test Result for Inspection

(Class II Permissive Change)

Product Name	1TX 11ax (WiFi6E) BW160 + BT/BLE Combo Card
Model No.	MT7902
FCC ID	RAS-MT7902

Applicant	MediaTek Inc.
Address	No. 1, Dusing 1st Rd. Hsinchu Science Park, Hsinchu City, Taiwan

Date of Receipt	Nov. 26, 2022
Issue Date	Jan. 11, 2023
Report No.	22B0941R-RFNAV03S-5
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF or any agency of the government.

The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

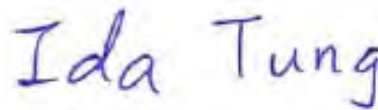
Test Report



Product Name	1TX 11ax (WiFi6E) BW160 + BT/BLE Combo Card
Applicant	MediaTek Inc.
Address	No. 1, Dusing 1st Rd. Hsinchu Science Park, Hsinchu City, Taiwan
Manufacturer	MediaTek Inc.
Model No.	MT7902
FCC ID	RAS-MT7902
EUT Rated Voltage	DC 3.3V
EUT Test Voltage	DC 3.3V(Power by Test Platform)
Trade Name	MediaTek
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C FCC CFR Title 47 Part 15 Subpart E ANSI C63.4: 2014, ANSI C63.10: 2013 KDB Publication 789033
Test Result	Complied

Documented By

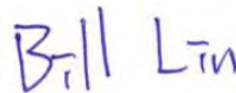
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(Project Specialist / Ida Tung)

Tested By

:



(Senior Engineer / Bill Lin)

Approved By

:



(Senior Engineer / Alan Chen)

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Appendix 1: EUT Test Photographs

Appendix 2: Product Photos-Please refer to the file: 22B0941R-Product Photos

Revision History

Report No.	Version	Description	Issued Date
22B0941R-RFNAV03S-5	V1.0	Initial issue of report.	Jan. 11, 2023

1. General information

1.1. EUT Description

Product Name	1TX 11ax (WiFi6E) BW160 + BT/BLE Combo Card
Trade Name	MediaTek
Model No.	MT7902
FCC ID	RAS-MT7902
Frequency Range	802.11b/g/n/ac/ax-20 MHz: 2412-2472 MHz 802.11n/ac/ax-40 MHz: 2422-2462 MHz 802.11a/n/ac/ax-20 MHz: 5180-5320 MHz, 5500-5700 MHz, 5720 MHz, 5745-5825 MHz 802.11n/ac/ax-40 MHz: 5190-5310 MHz, 5510-5670 MHz, 5710 MHz, 5755-5795 MHz 802.11ac/ax-80 MHz: 5210-5290 MHz, 5530-5690 MHz, 5775 MHz 802.11ac/ax-160 MHz: 5250 MHz, 5570 MHz
Number of Channels	2.4 GHz: 802.11b/g/n/ac/ax-20 MHz: 13 CH 802.11n/ac/ax-40 MHz: 9 CH 5 GHz: 802.11a/n/ac/ax-20 MHz: 25 CH 802.11n/ac/ax-40 MHz: 12 CH 802.11ac/ax-80 MHz: 6 CH 802.11ac/ax-160: 2 CH
Data Speed	802.11b: 1-11 Mbps 802.11a/g: 6-54 Mbps 802.11n: up to 150 Mbps 802.11ac: up to 866.7 Mbps 802.11ax: up to 1201 Mbps
Channel separation	2.4 GHz: 802.11b/g/n/ac/ax: 5MHz 5 GHz: 802.11a/n/ac/ax-20 MHz: 20 MHz 802.11n/ac/ax-40 MHz: 40 MHz 802.11ac/ax-80 MHz: 80 MHz 802.11ac/ax-160 MHz: 160 MHz
Type of Modulation	802.11b: DSSS, DBPSK, DQPSK, CCK 802.11a/g/n/ac/ax: OFDM, OFDMA, BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM
Antenna Type	PIFA
Channel Control	Auto
Antenna Gain	Refer to the Antenna List
Power Adapter	MFR: PI, M/N: AD10280 Input: AC 100V-240V~50/60Hz, 1.0A Output: 19.0V=2.37A 45.0W Cable Out: Non-shielded, 1.6m

Antenna List

No.	Manufacturer	Part No.	ASUS Part No.	Antenna Type	Peak Gain
1	INPAQ	WA-P-LE-02-064 (Main)	14008-04890100 (Main)	PIFA	2.75 dBi for 2400 MHz 2.90 dBi for 5150~5250 MHz 3.25 dBi for 5250~5350 MHz 4.39 dBi for 5470~5725 MHz 4.57 dBi for 5725~5850 MHz
		WA-P-LE-01-006 (Aux)	14008-04890000 (Aux)	PIFA	2.71 dBi for 2400 MHz 3.50 dBi for 5150~5250 MHz 3.49 dBi for 5250~5350 MHz 4.35 dBi for 5470~5725 MHz 4.63 dBi for 5725~5850 MHz
2	Pulse	TZ20921 (Main)	14008-04890300 (Main)	PCB PIFA	2.55 dBi for 2400 MHz 2.78 dBi for 5150~5250 MHz 3.12 dBi for 5250~5350 MHz 4.11 dBi for 5470~5725 MHz 4.33 dBi for 5725~5850 MHz
		TZ20924 (Aux)	14008-04890200 (Aux)	PCB PIFA	2.22 dBi for 2400 MHz 1.22 dBi for 5150~5250 MHz 1.71 dBi for 5250~5350 MHz 4.15 dBi for 5470~5725 MHz 4.15 dBi for 5725~5850 MHz

Note:

1. The antenna of EUT is conforming to FCC 15.203.
2. Only the higher gain antenna was tested and recorded in this report.

802.11b/g/n/ac/ax-20 MHz Center Frequency of Each Channel:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	02	2417	03	2422	04	2427
05	2432	06	2437	07	2442	08	2447
09	2452	10	2457	11	2462	12	2467
13	2472	--	--	--	--	--	--

802.11n/ac/ax-40 MHz Center Frequency of Each Channel:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
03	2422	04	2427	05	2432	06	2437
07	2442	08	2447	09	2452	10	2457
11	2462	--	--	--	--	--	--

802.11a/n/ac/ax-20 MHz Center Working Frequency of Each Channel:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
036	5180	040	5200	044	5220	048	5240
052	5260	056	5280	060	5300	064	5320
100	5500	104	5520	108	5540	112	5560
116	5580	120	5600	124	5620	128	5640
132	5660	136	5680	140	5700	144	5720
149	5745	153	5765	157	5785	161	5805
165	5825	--	--	--	--	--	--

802.11n/ac/ax-40 MHz Center Working Frequency of Each Channel:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
038	5190	046	5230	054	5270	062	5310
102	5510	110	5550	118	5590	126	5630
134	5670	142	5710	151	5755	159	5795

802.11ac/ax-80 MHz Center Working Frequency of Each Channel:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
042	5210	058	5290	106	5530	122	5610
138	5690	155	5775	--	--	--	--

802.11ac/ax-160 MHz Center Working Frequency of Each Channel:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	--	--	--	--
50	5250	114	5570	--	--	--	--

Note:

1. The EUT is a 1TX 11ax (WiFi6E) BW160 + BT/BLE Combo Card with a built-in WLAN and Bluetooth transceiver, this report for WLAN.
2. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report.
3. These tests are conducted on a sample for the purpose of demonstrating compliance of transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices.
4. This is to request a Class II permissive change.
5. The major change filed under this application is:

Change #1: Addition host platform, Product name: VivoBook/ASUS Laptop, Model number: M1405Y, D1405Y, Y1405CY.

Brand	Model No.	Difference
ASUS	M1405Y	All models are electrically identical, different model names are for marketing purpose.
	D1405Y	
	Y1405CY	
The identification of test sample is M1405Y.		

Change #2: Reduce the Output Power through firmware, and SAR measurement were evaluated. (Only reduce Wi-Fi Output Power, Bluetooth Output Power haven't changes).

Change #3: Addition two antennas, the antenna type is same, the antenna gain is lower than the original application.

6. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance of transmitter with Part 15 Subpart E for Unlicensed National Information Infrastructure devices.

Test Mode (2.4 GHz)	Mode 1	SISO B: Transmit (802.11b)
		SISO B: Transmit (802.11ax-20 MHz)
		SISO B: Transmit (802.11ax-40 MHz)
Test Mode (5 GHz)		SISO A: Transmit (802.11ax-80 MHz)
		SISO A: Transmit (802.11ax-160 MHz)
		SISO B: Transmit (802.11ax-160 MHz)

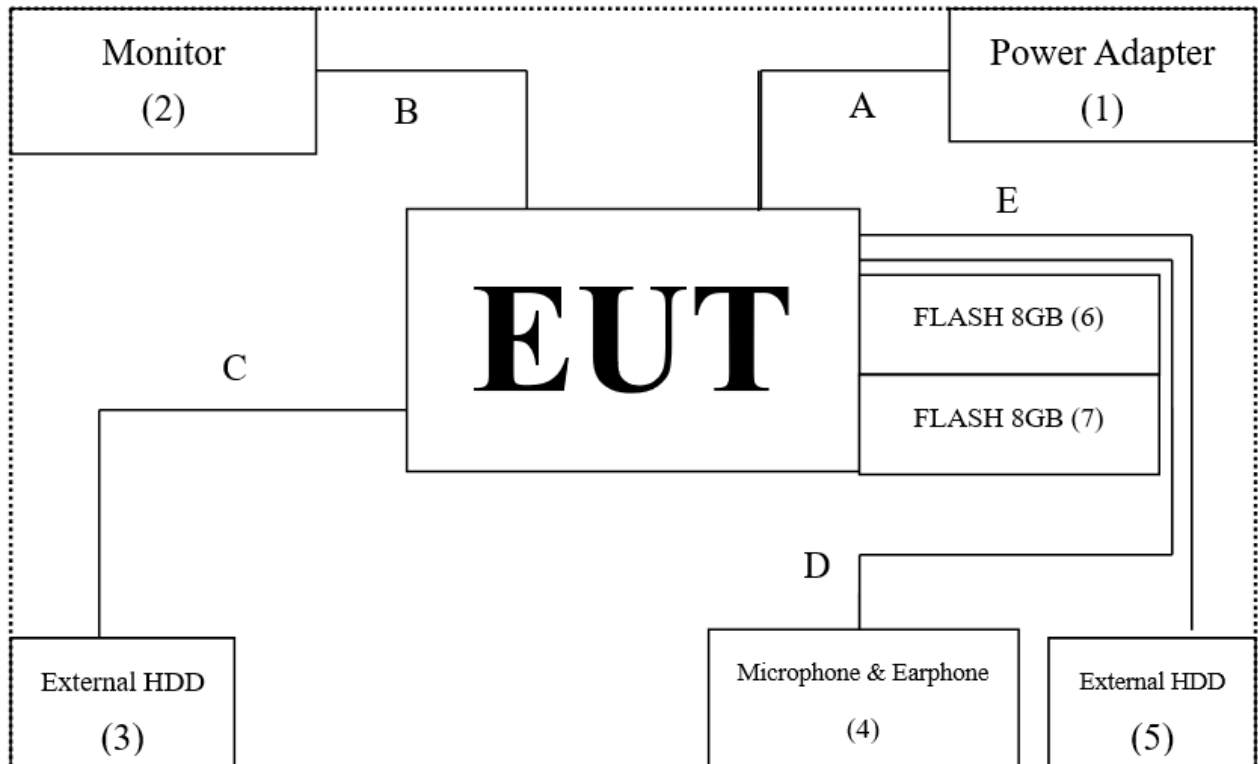
1.2. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
1. Power Adapter	PI	AD10280	N/A	N/A
2. Monitor	Lenovo	H20215FE0	VY549765	Non-shielded, 1.8m
3. External HDD	Transcend	TS1TSJ25H3B	F21786-0125	N/A
4. Microphone & Earphone	Verbatim	C09024VB	N/A	N/A
5. External HDD	Transcend	TS1TSJ25MC	F30467-0003	N/A
6. FLASH 8GB	Kingston	DT100G3/8GB	N/A	N/A
7. FLASH 8GB	Kingston	DT100G3/8GB	N/A	N/A

Cable Type	Cable Description
A Power Cable	Non-shielded, 2m
B HDMI Cable	Shielded, 1.8m
C USB Cable	Shielded, 0.5m
D Microphone & Earphone Cable	Non-shielded, 1.2m
E USB Cable	Shielded, 0.5m

1.3. Configuration of Tested System



1.4. EUT Exercise Software

1. Setup the EUT as shown in Section 1.3.
2. Execute software “QATool Ver. 0.0.2.83” on the EUT.
3. Configure the test mode, the test channel, and the data rate.
4. Press “OK” to start the continuous Transmit.
5. Verify that the EUT works properly.

1.5. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
Radiated Emission	Temperature (°C)	10~40 °C	21.8 °C
	Humidity (%RH)	10~90 %	60.0 %
Conductive	Temperature (°C)	10~40 °C	22.0 °C
	Humidity (%RH)	10~90 %	55.0 %

USA : FCC Registration Number: TW0033

Canada : CAB Identifier Number: TW3023 / Company Number: 26930

Site Description : Accredited by TAF
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd

Address : No. 5-22, Ruishukeng Linkou District, New Taipei City, 24451, Taiwan

Performed Location : No. 26, Huaya 1st Rd., Guishan Dist., Taoyuan City 333411, Taiwan, R.O.C.

Phone Number : +886-3-275-7255

Fax Number : +886-3-327-8031

Email Address : info.tw@dekra.comWebsite : <http://www.dekra.com.tw>

1.6. List of Test Item and Equipment

For Conducted Measurements /HY-SR02

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
V	Spectrum Analyzer	R&S	FSV30	103466	2021/12/27	2022/12/26
V	Peak Power Analyzer	KEYSIGHT	8990B	MY51000539	2022/05/27	2023/05/26
V	Power Sensor	KEYSIGHT	N1923A	MY59240002	2022/05/19	2023/05/18
V	Power Sensor	KEYSIGHT	N1923A	MY59240003	2022/05/19	2023/05/18

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “V” are used to measure the final test results.
3. Test Software Version: RF Conducted Test Tools R3 V3.0.1.14.

For Radiated Measurements / HY-CB02

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
V	Horn Antenna	RF SPIN	DRH18-E	210508A18ES	2022/06/08	2023/06/07
V	Pre-Amplifier	EMCI	EMC05820SE	980825	2022/07/28	2023/07/27
V	Spectrum Analyzer	R&S	FSV3044	101114	2022/02/11	2023/02/10
V	Coaxial Cable	SGH	HA800	GD20110223-2	2022/03/17	2023/03/16
	Coaxial Cable	SGH	HA800	GD20110222-4		
	Coaxial Cable	SGH	SGH18	2021005-2		
	Coaxial Cable	SGH	SGH18	202108-5		

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “V” are used to measure the final test results.
3. Test Software Version: E3 210616 dekra V9.

1.7. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document.

The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test item	Uncertainty	
Peak Power Output (2.4 GHz)	Power Meter ± 0.89 dB	Spectrum Analyzer ± 2.06 dB
Band Edge (2.4 GHz)	Under 1 GHz ± 4.05 dB	Above 1 GHz ± 3.73 dB
Duty Cycle (2.4 GHz)	± 2.31 ms	
Maximum conducted output power (5 GHz)	Power Meter ± 0.89 dB	Spectrum Analyzer ± 2.06 dB
Band Edge (5 GHz)	Under 1 GHz ± 4.05 dB	Above 1 GHz ± 3.73 dB
Duty Cycle (5 GHz)	± 2.31 ms	

2. Peak Power Output (2.4 GHz)

2.1. Test Setup



2.2. Limits

The maximum peak power shall be less 1 Watt.

2.3. Test Procedure

The EUT was tested according to C63.10:2013 for compliance to FCC 47CFR 15.247 requirements. The maximum peak conducted output power using C63.10:2013 Section 11.9.1.3 PKPM1 Peak power meter method. The maximum average conducted output power using C63.10:2013 Section 11.9.2.3 Measurement using a power meter (PM). (Measurement using a gated RF average-reading power meter).

2.4. Test Result of Peak Power Output

Product : 1TX 11ax (WiFi6E) BW160 + BT/BLE Combo Card
Test Item : Peak Power Output
Test Date : 2022/11/30
Test Mode : SISO B: Transmit (802.11b)

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Average Output Power (dBm)	Limit (dBm)	Result
12	2467	1	16.33	<30 dBm	Pass
13	2472	1	15.83	<30 dBm	Pass

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Peak Output Power (dBm)	Limit (dBm)	Result
12	2467	1	18.67	<30 dBm	Pass
13	2472	1	18.22	<30 dBm	Pass

Product : 1TX 11ax (WiFi6E) BW160 + BT/BLE Combo Card
Test Item : Peak Power Output
Test Date : 2022/12/20
Test Mode : SISO B: Transmit (802.11ax-20 MHz)

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Average Output Power (dBm)	Limit (dBm)	Result
12	2467	VHT0	15.72	<30 dBm	Pass
13	2472	VHT0	13.40	<30 dBm	Pass

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Peak Output Power (dBm)	Limit (dBm)	Result
12	2467	VHT0	20.23	<30 dBm	Pass
13	2472	VHT0	18.02	<30 dBm	Pass

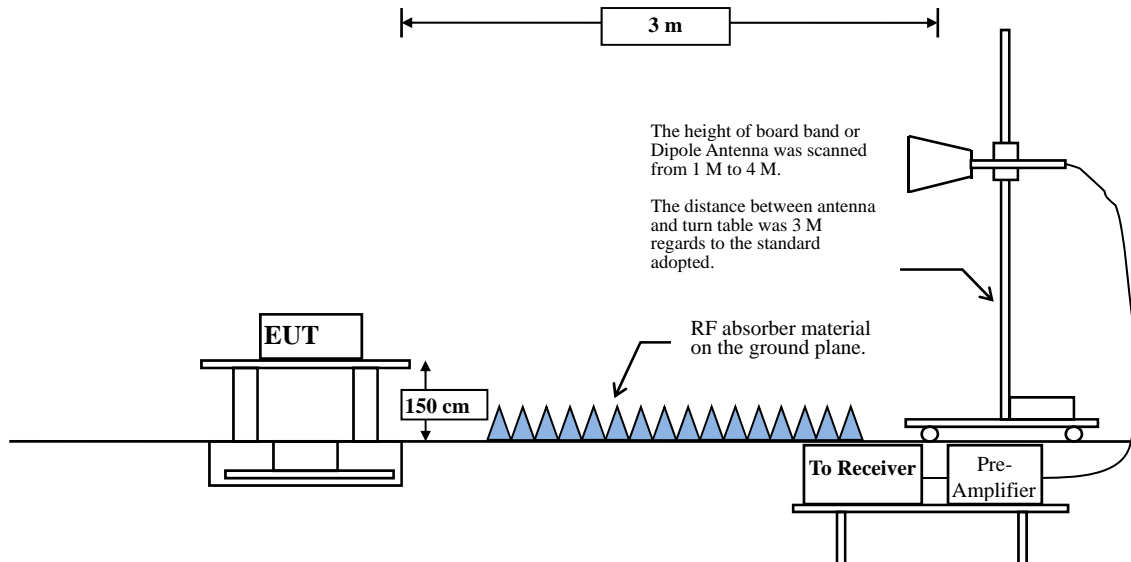
Product : 1TX 11ax (WiFi6E) BW160 + BT/BLE Combo Card
Test Item : Peak Power Output
Test Date : 2022/12/20
Test Mode : SISO B: Transmit (802.11ax-40 MHz)

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Average Output Power (dBm)	Limit (dBm)	Result
03	2422	VHT0	16.13	<30 dBm	Pass
09	2452	VHT0	16.10	<30 dBm	Pass
10	2457	VHT0	15.41	<30 dBm	Pass
11	2462	VHT0	11.84	<30 dBm	Pass

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Peak Output Power (dBm)	Limit (dBm)	Result
03	2422	VHT0	21.79	<30 dBm	Pass
09	2452	VHT0	21.83	<30 dBm	Pass
10	2457	VHT0	21.17	<30 dBm	Pass
11	2462	VHT0	17.92	<30 dBm	Pass

3. Band Edge (2.4 GHz)

3.1. Test Setup



3.2. Limits

According to FCC Section 15.247(d). In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

3.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested according to C63.10:2013 Section 11.12.1 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 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 is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.

RBW and VBW Parameter setting:

According to C63.10 Section 11.12.2.4 Peak measurement procedure.

RBW = as specified in Table 1.

VBW \geq 3 x RBW.

Table 1 —RBW as a function of frequency

Frequency	RBW
9-150 kHz	200-300 Hz
0.15-30 MHz	9-10 kHz
30-1000 MHz	100-120 kHz
> 1000 MHz	1 MHz

According to C63.10 Section 11.12.2.5 Average measurement procedure.

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.)

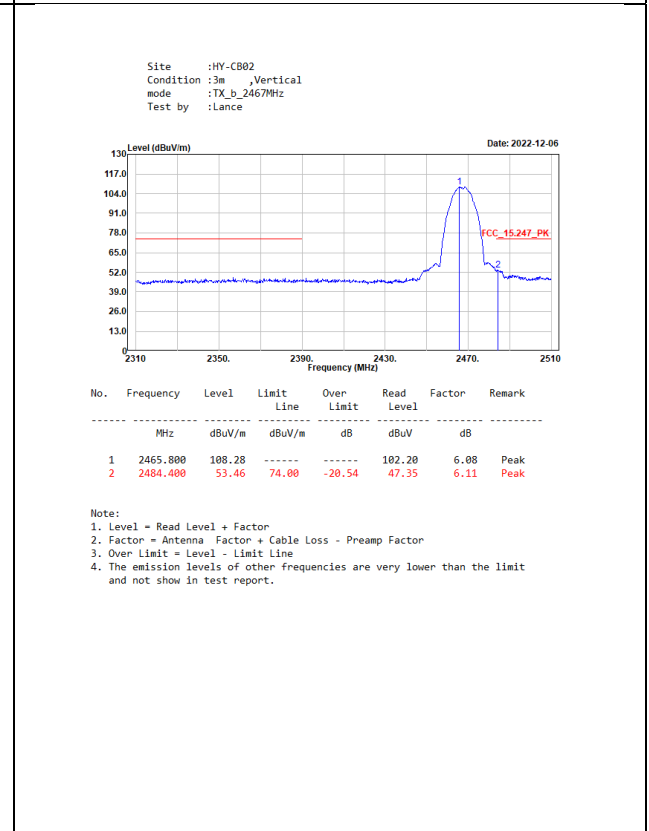
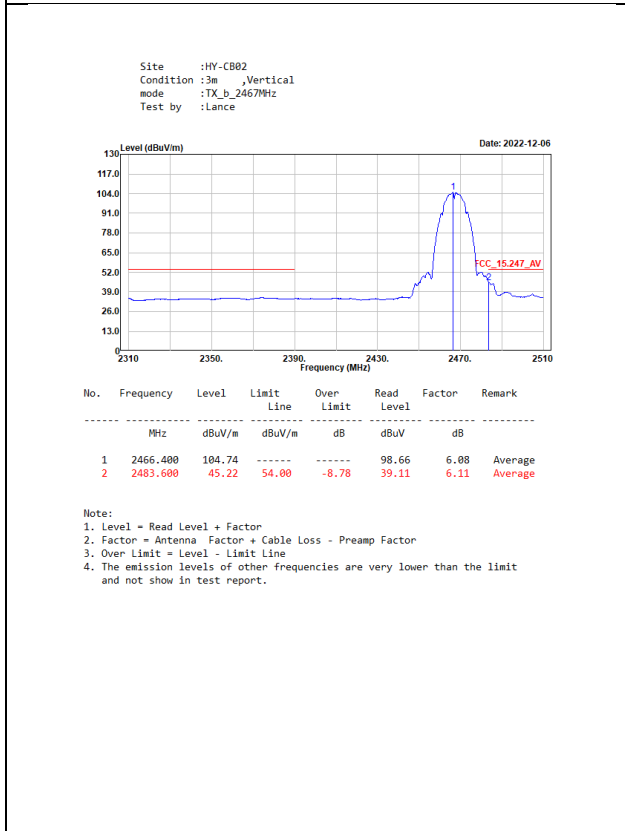
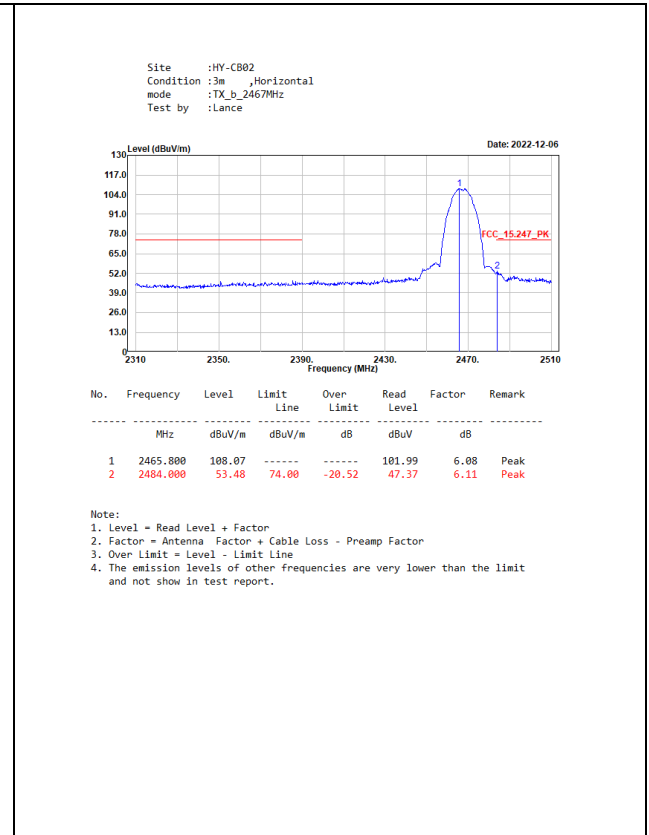
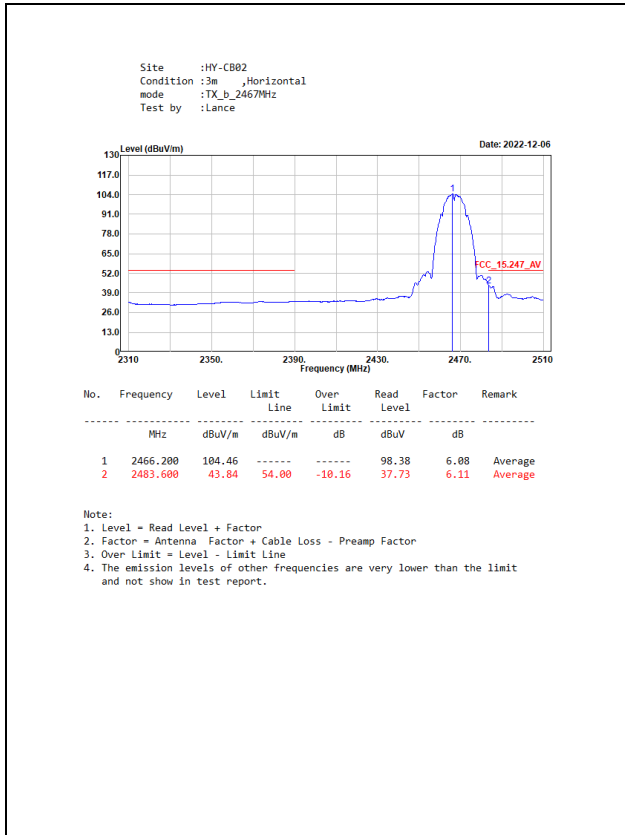
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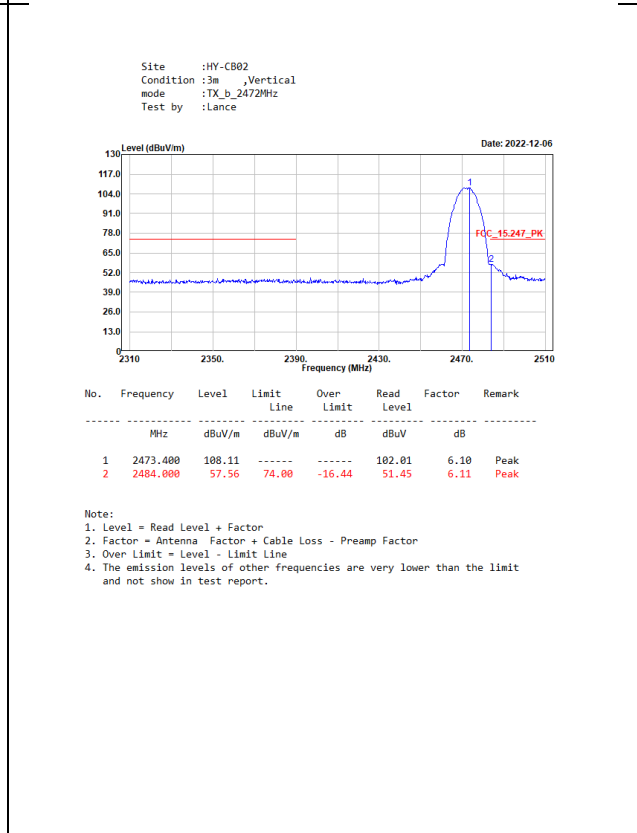
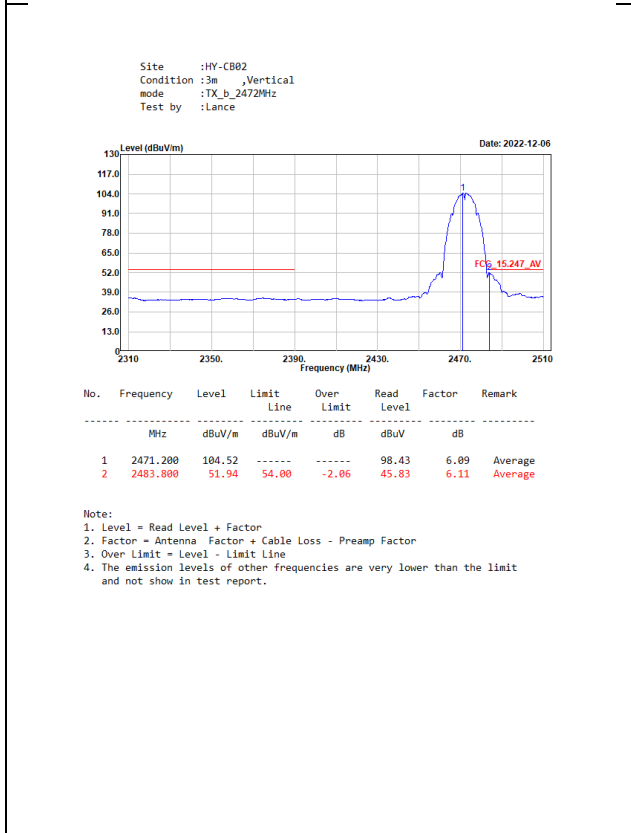
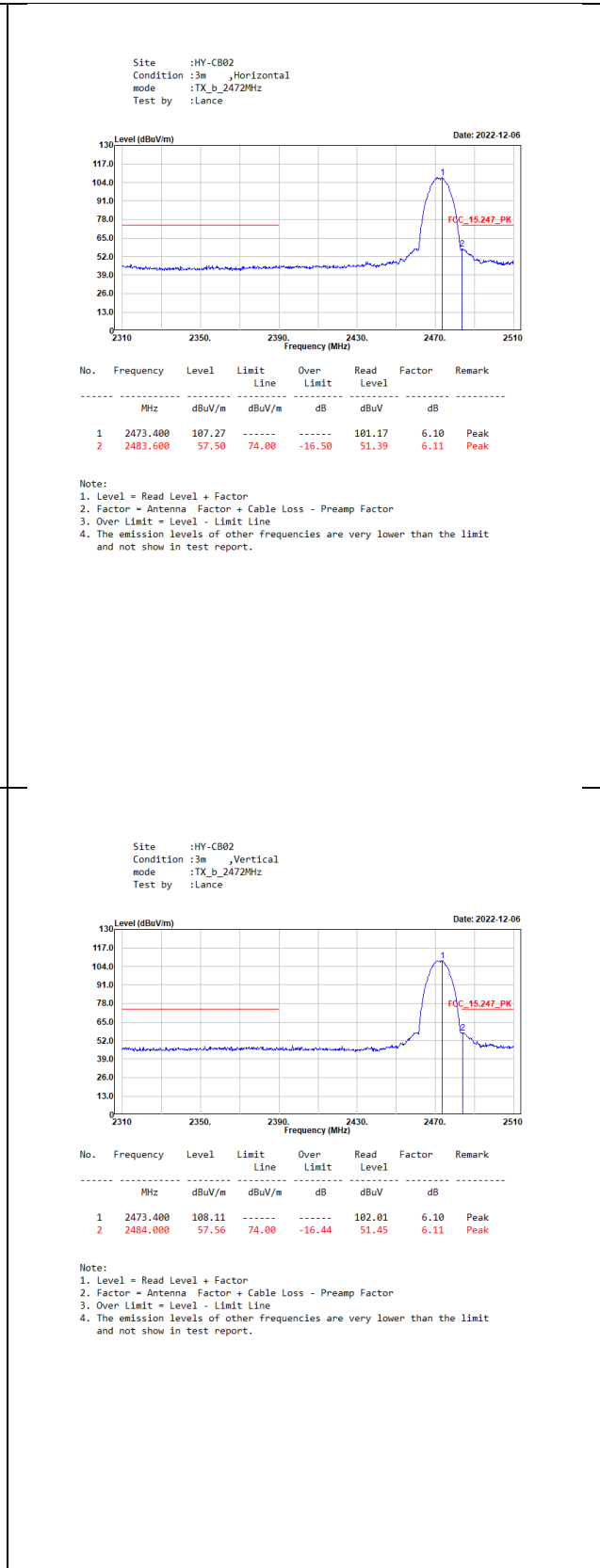
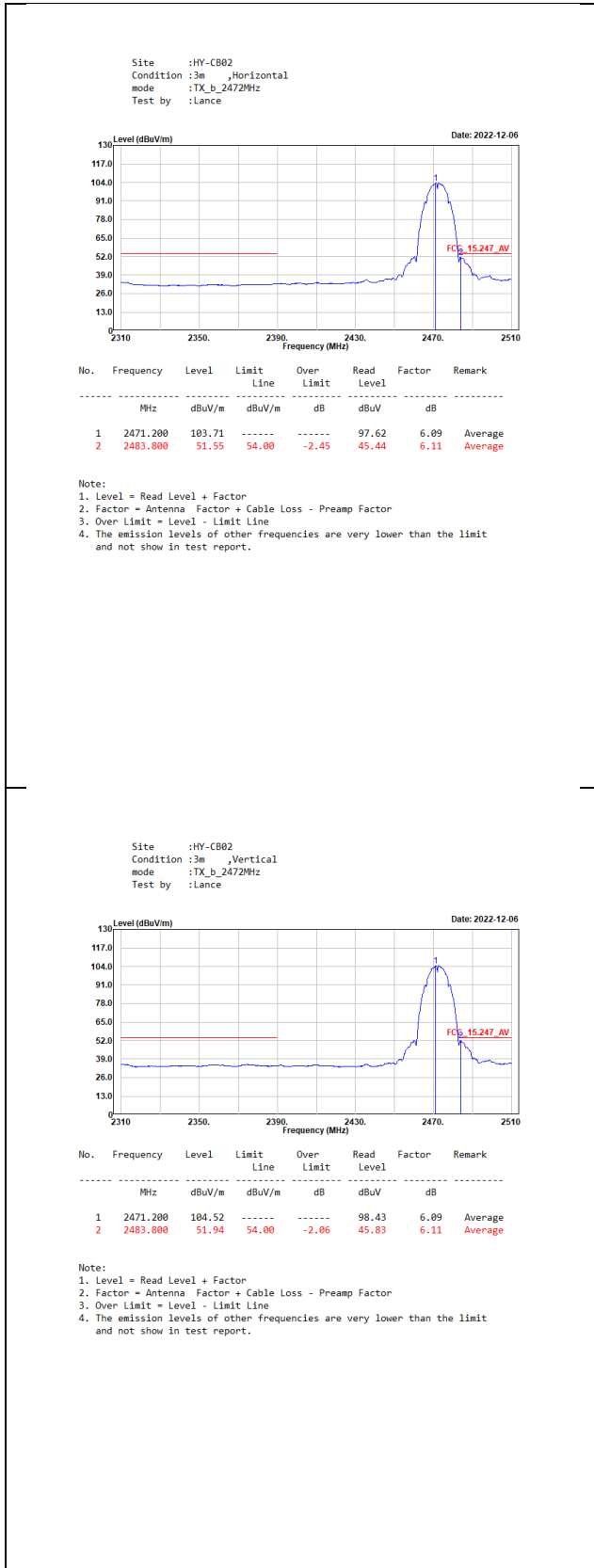
2.4 GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11 b	95.39	8.4058	119	200
802.11 ax20	76.17	1.2971	771	1000
802.11 ax40	61.54	0.6492	1540	2000

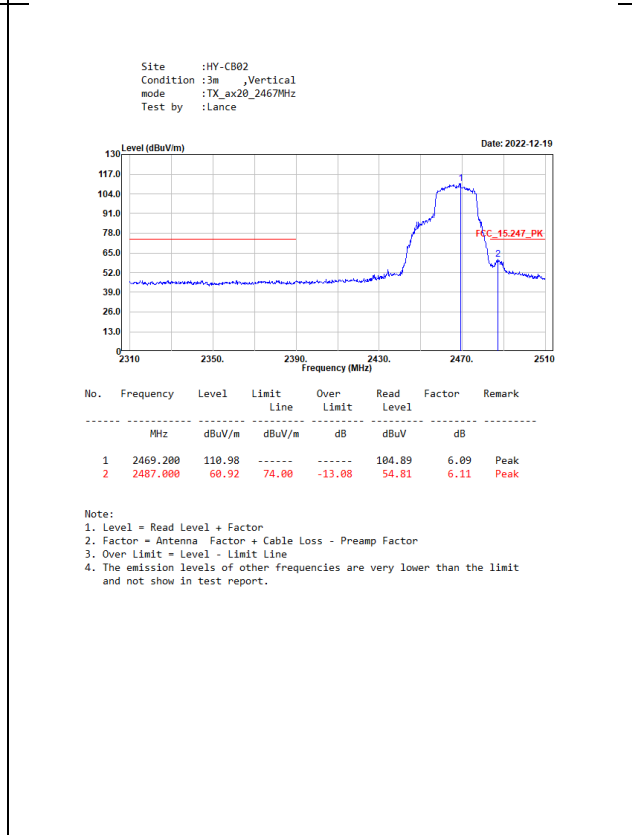
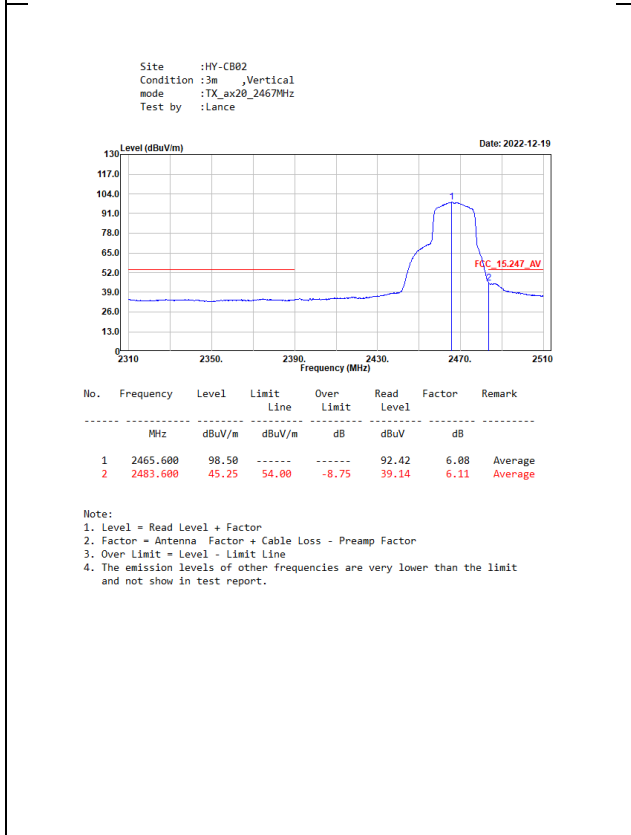
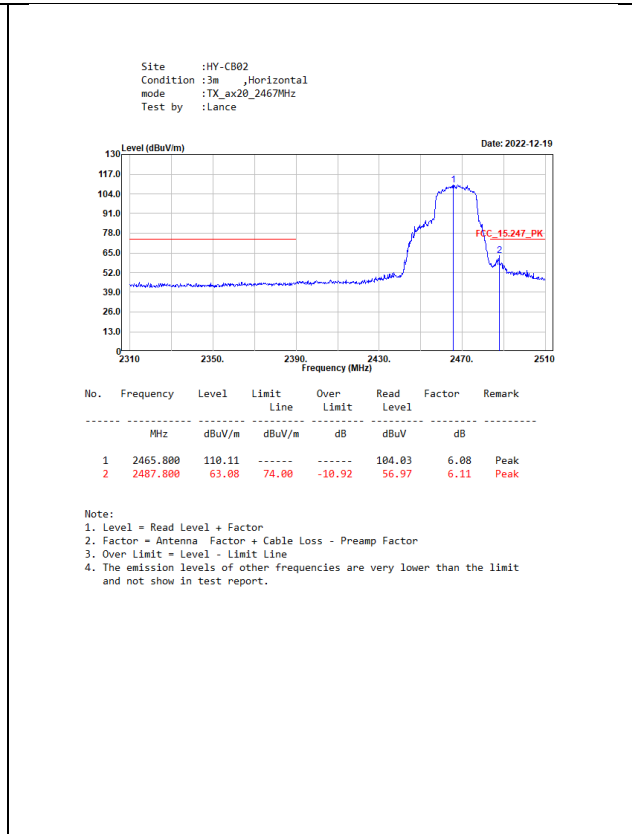
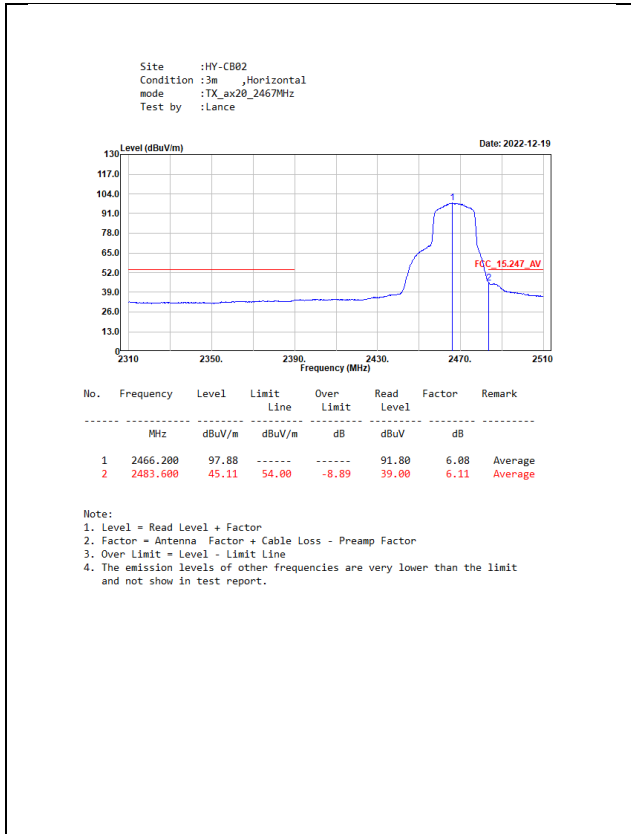
Note: Duty Cycle Refer to Section 4.

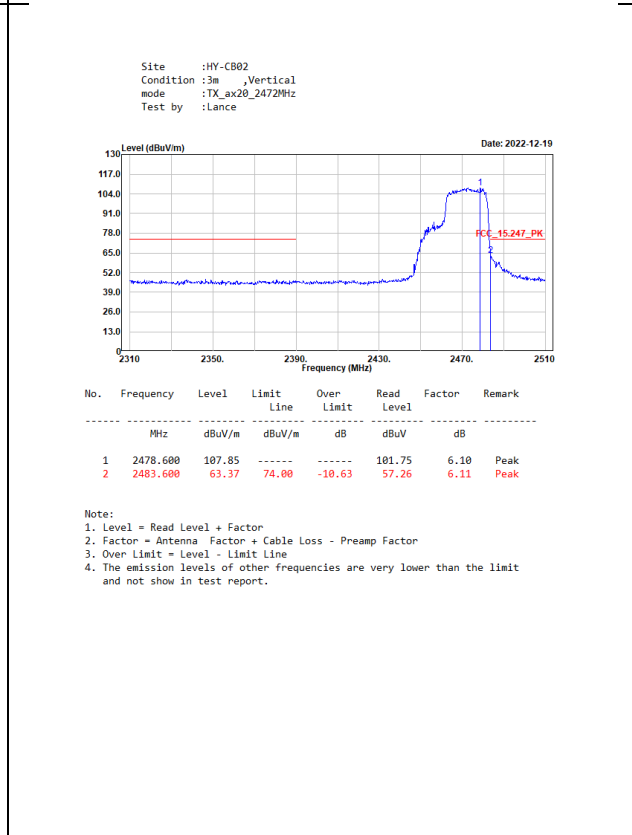
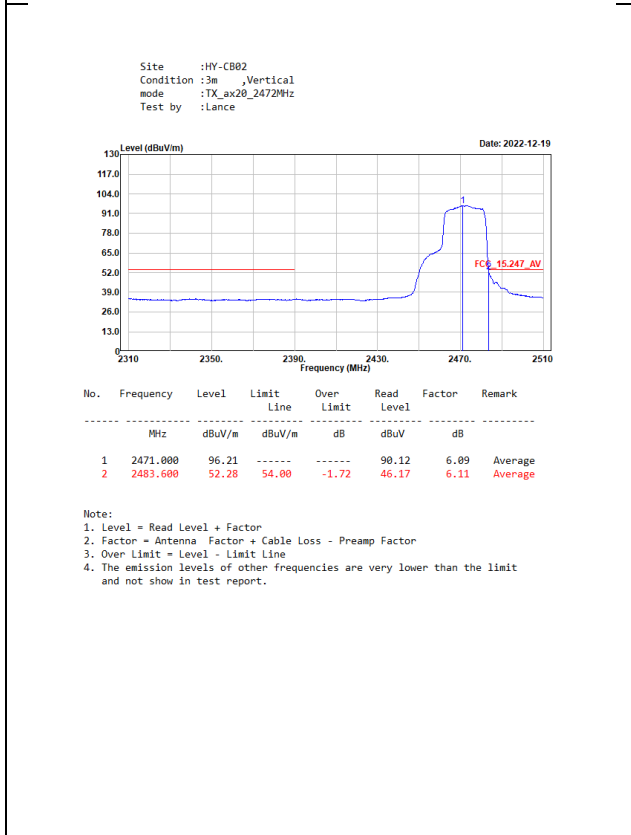
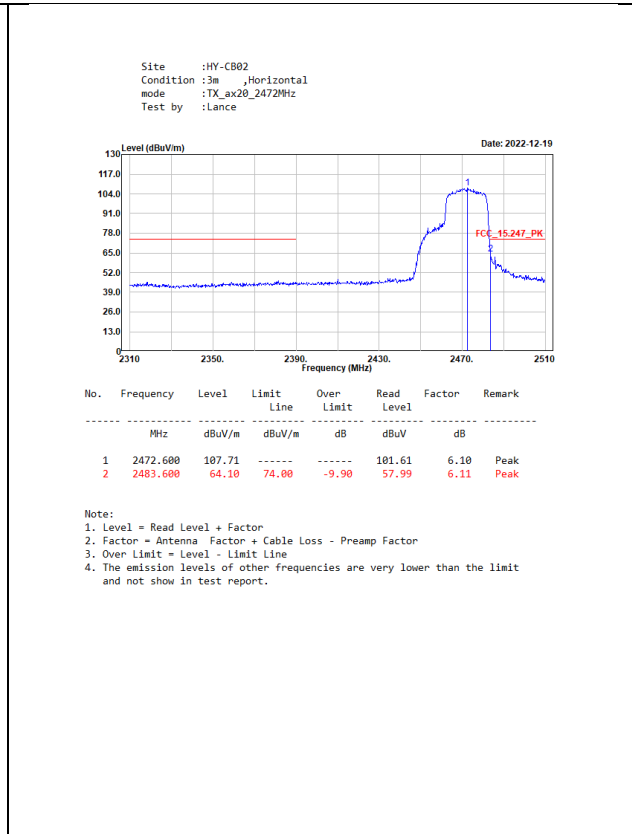
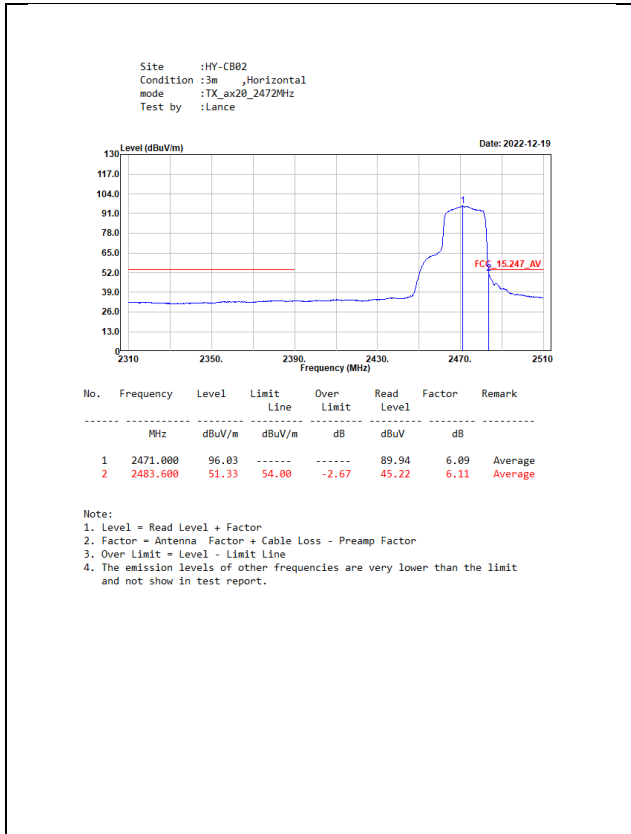
3.4. Test Result of Band Edge

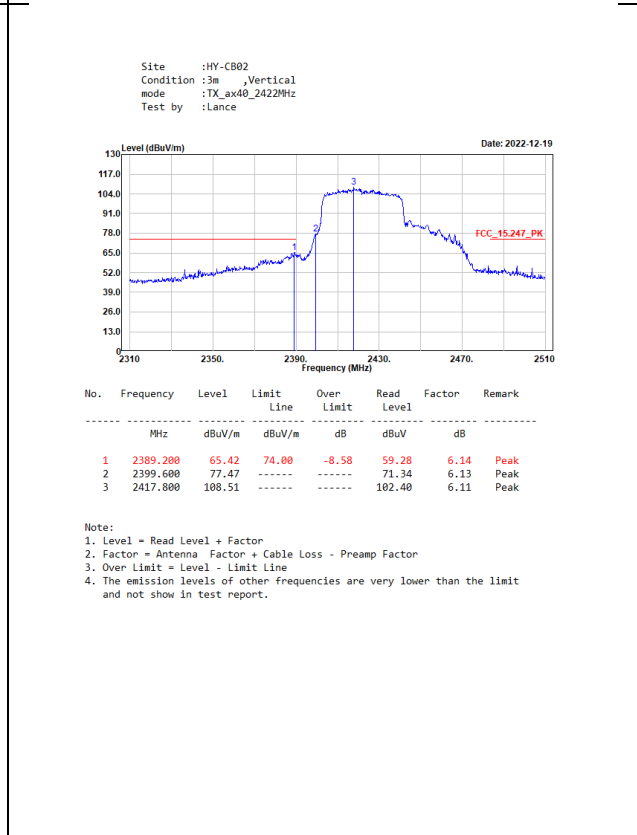
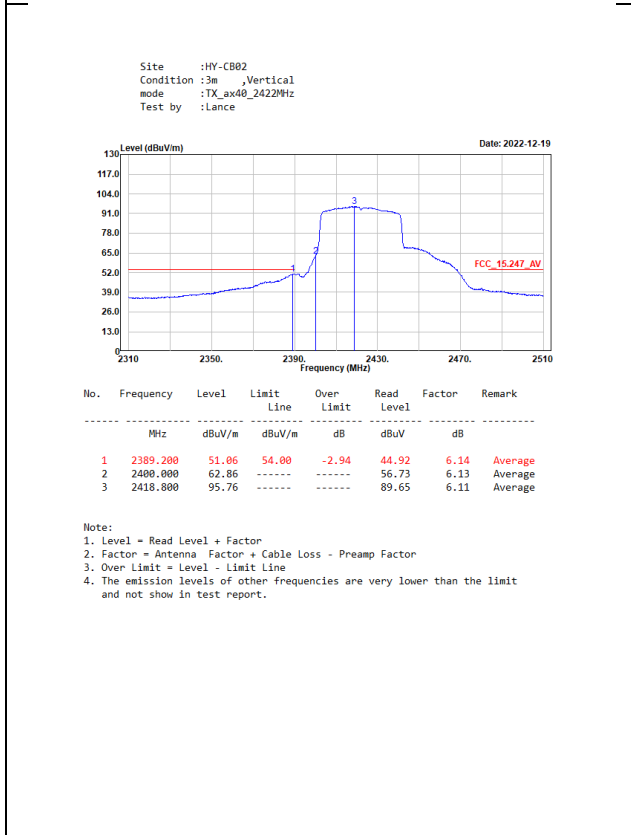
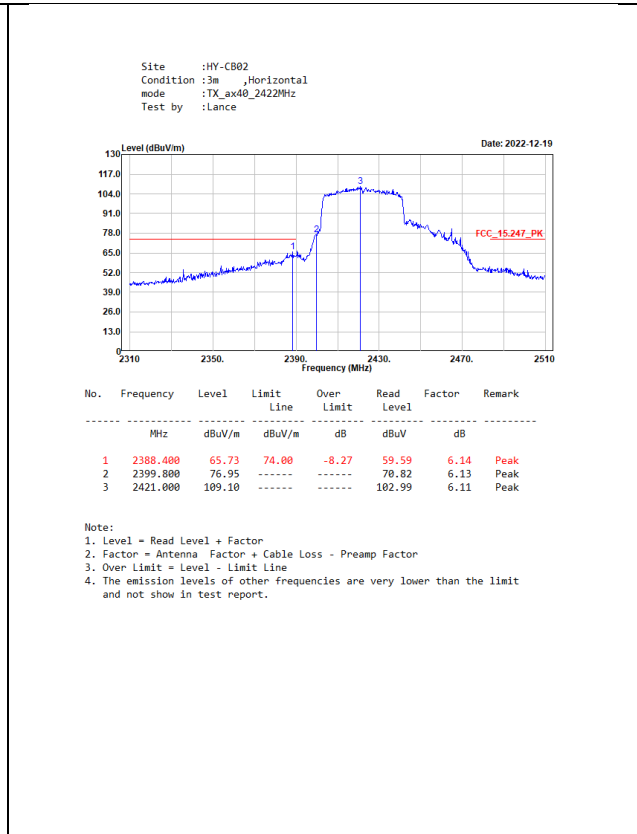
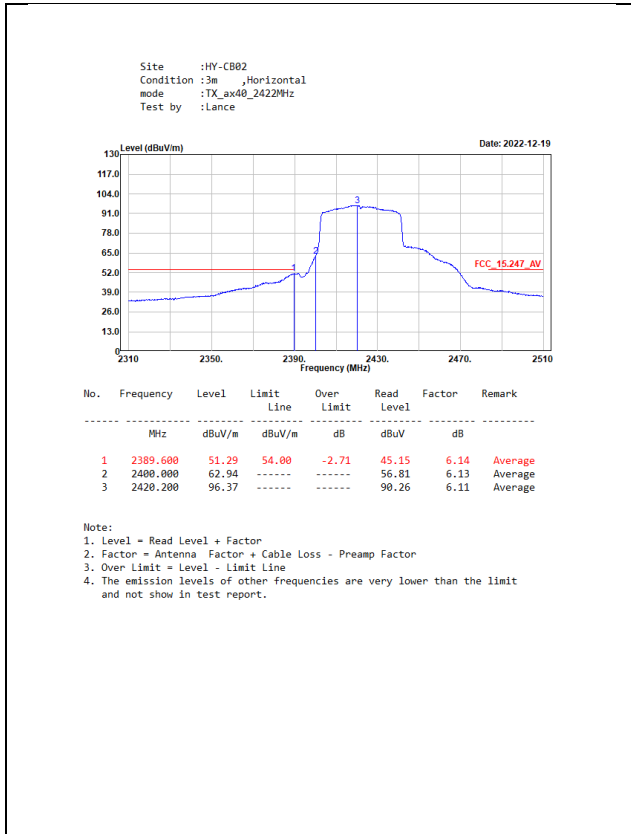
SISO B

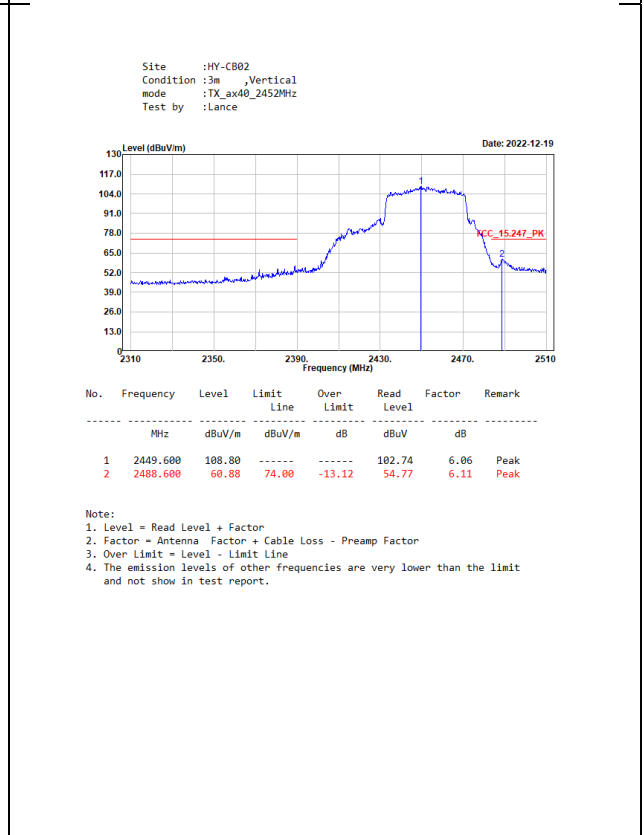
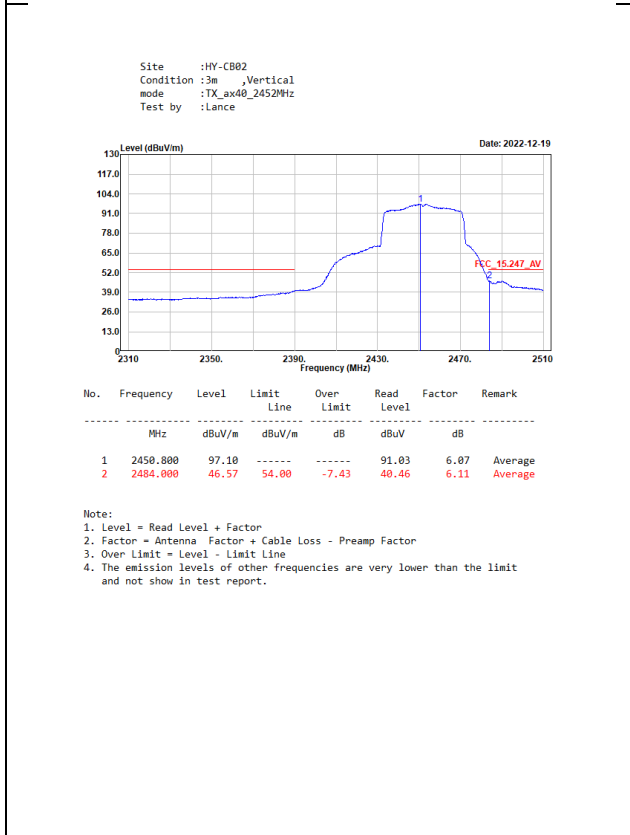
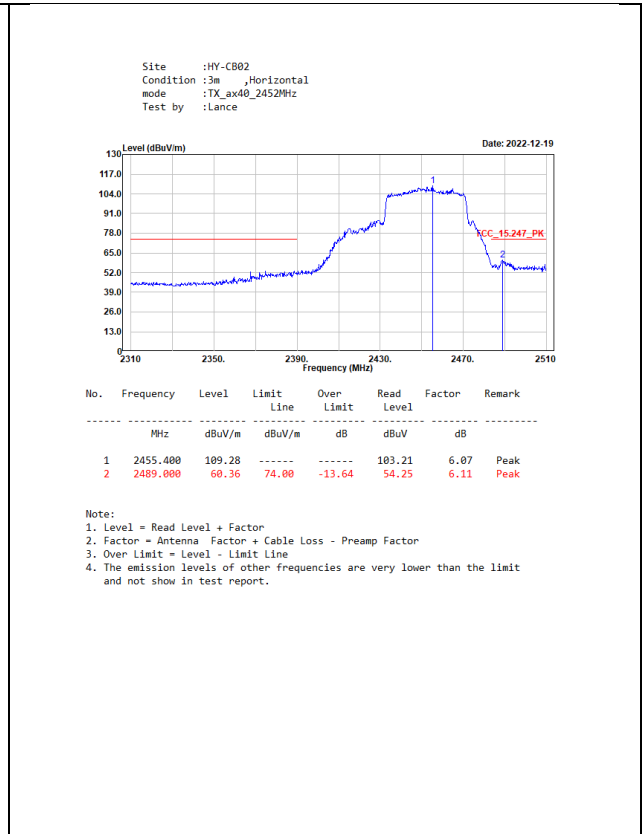
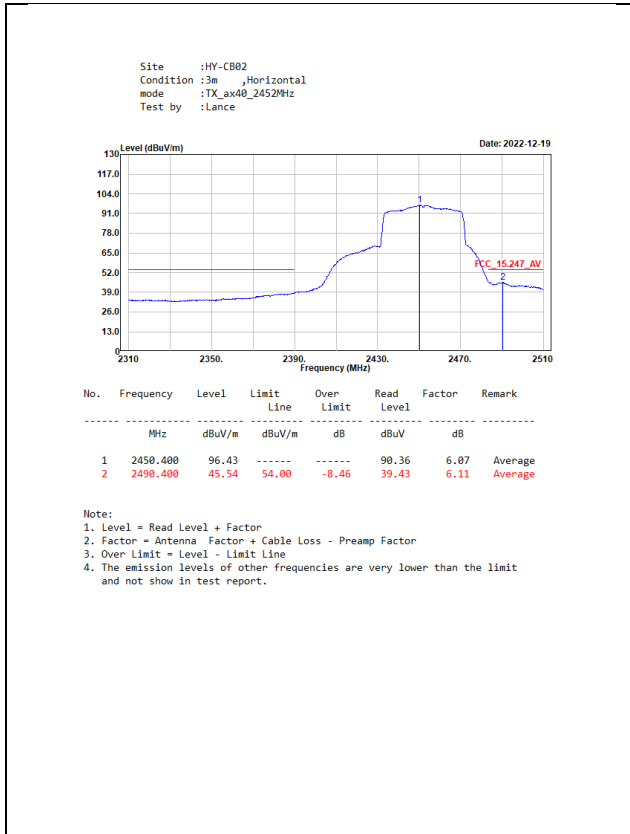


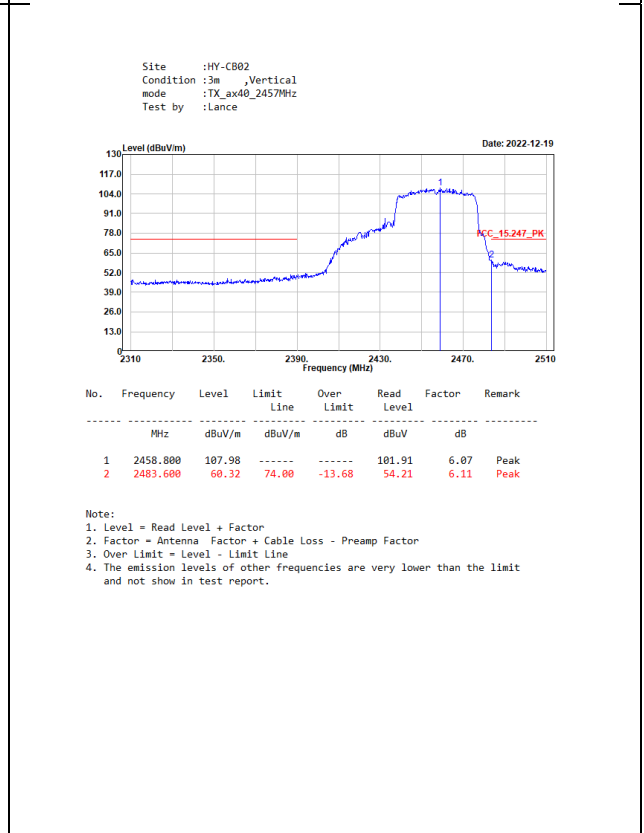
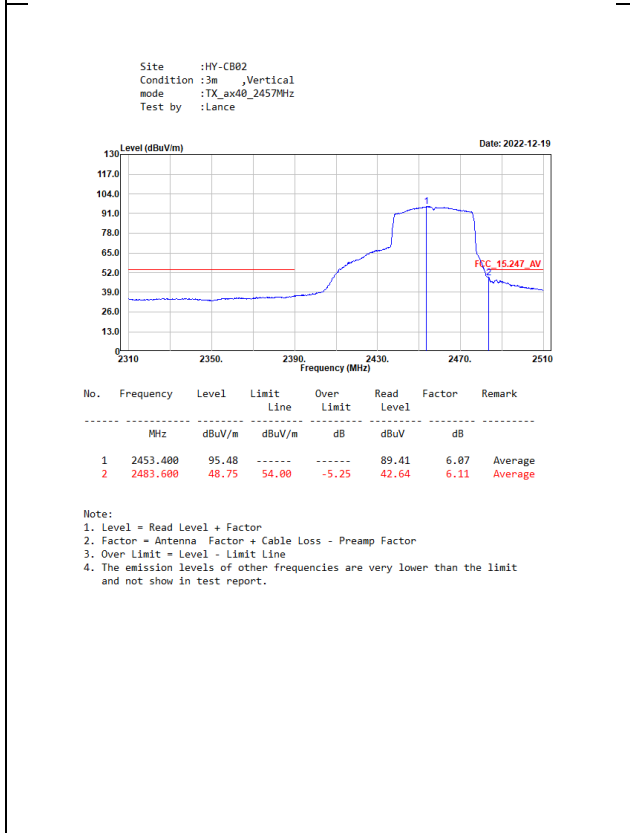
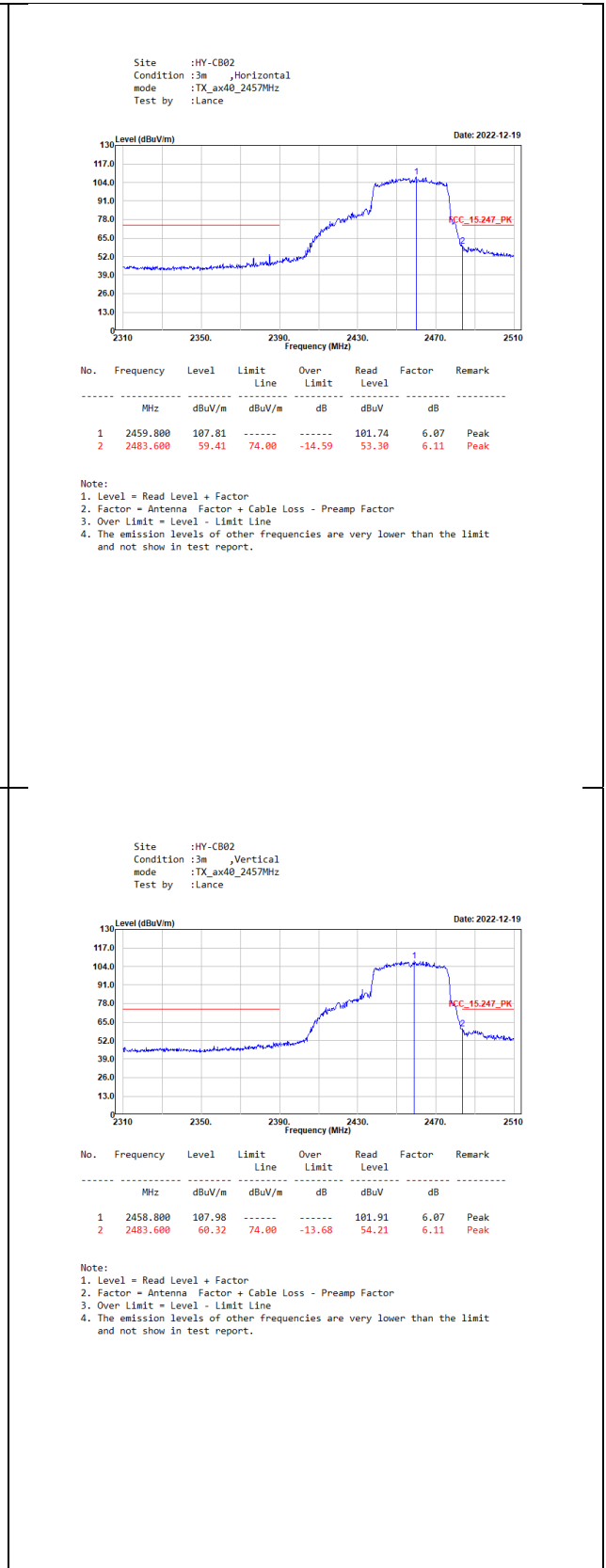
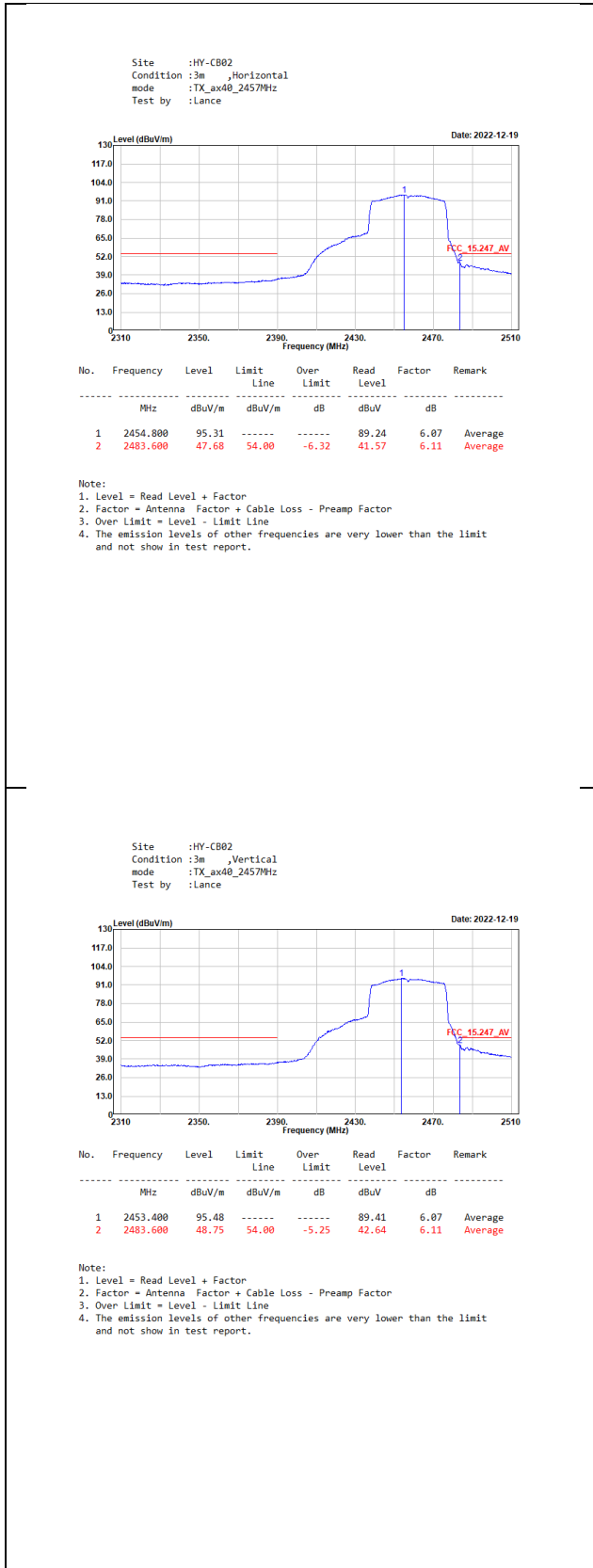


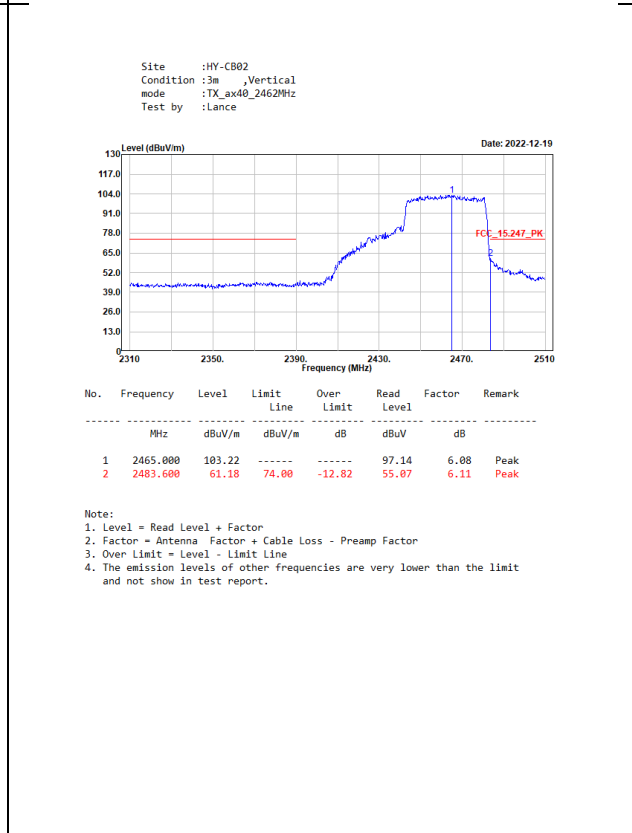
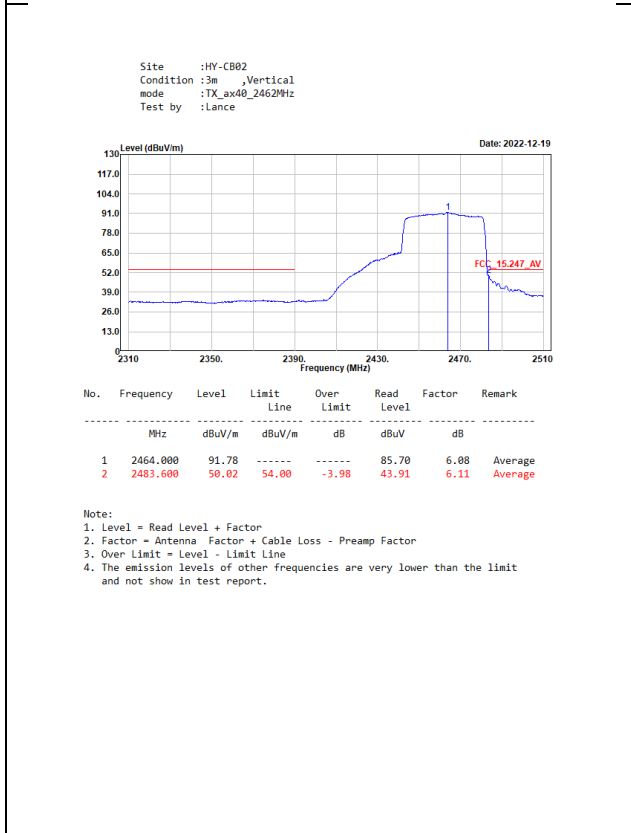
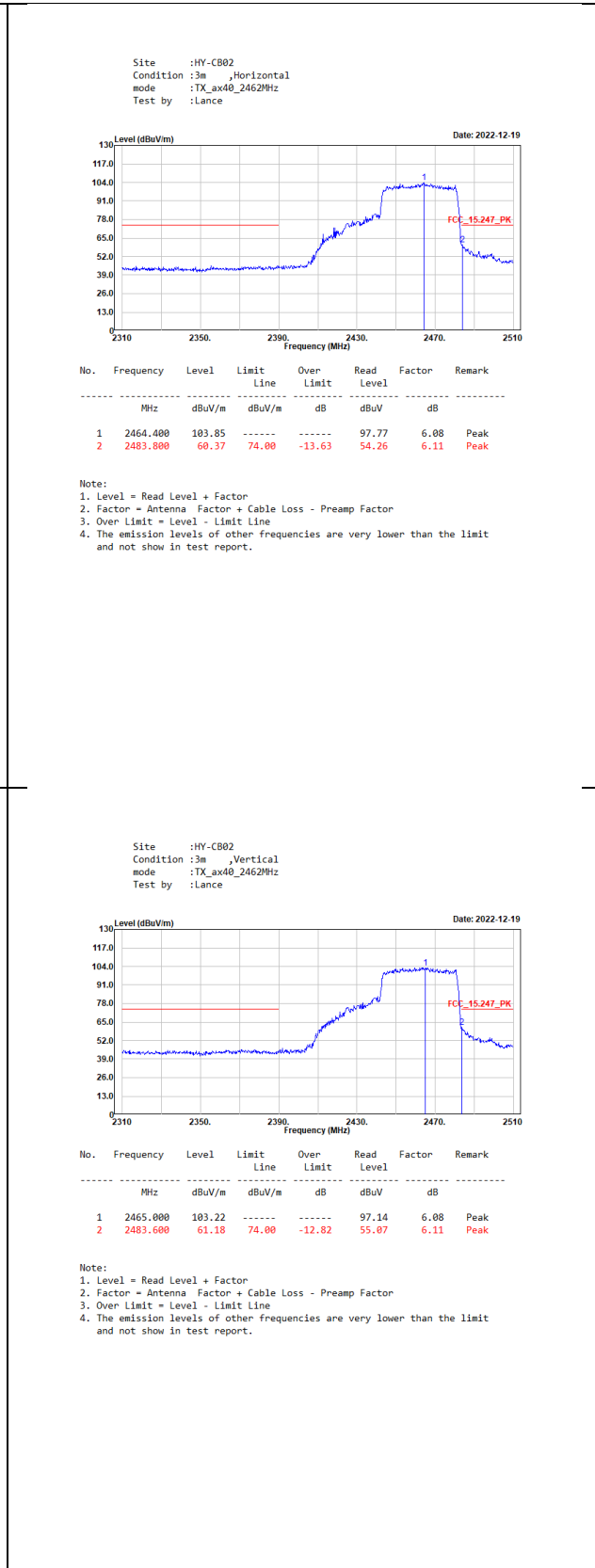
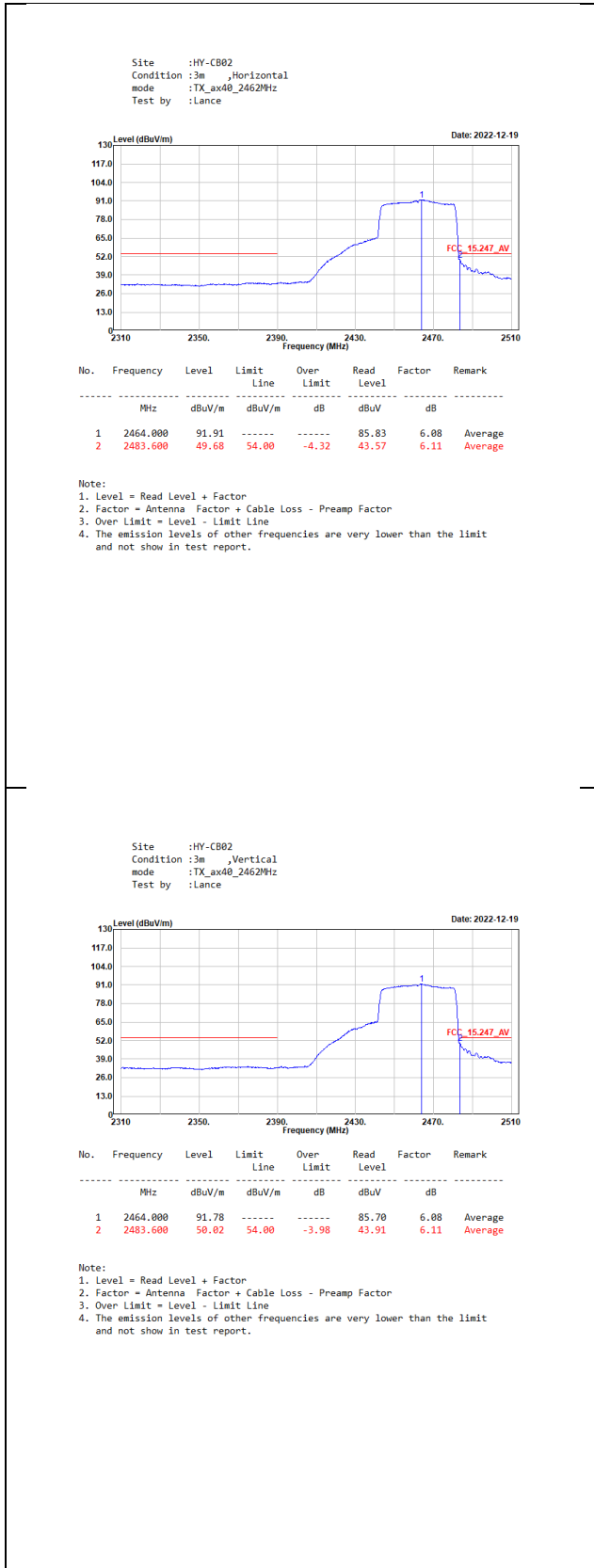






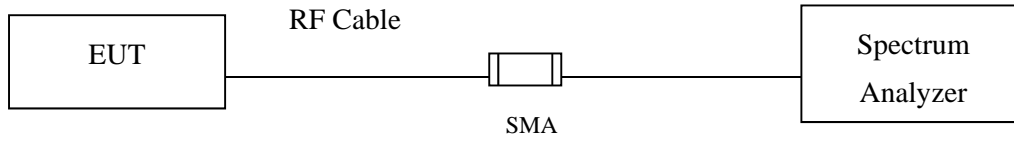






4. Duty Cycle (2.4 GHz)

4.1. Test Setup



4.2. Test Procedure

The EUT was setup according to ANSI C63.10 2013; tested according to ANSI C63.10 2013 for compliance to FCC 47CFR 15.247 requirements.

4.3. Test Result of Duty Cycle

Product : 1TX 11ax (WiFi6E) BW160 + BT/BLE Combo Card
Test Item : Duty Cycle
Test Mode : Transmit

Duty Cycle Formula:

Duty Cycle = $Ton / (Ton + Toff)$

Duty Factor = $10 \text{ Log } (1/\text{Duty Cycle})$

Results:

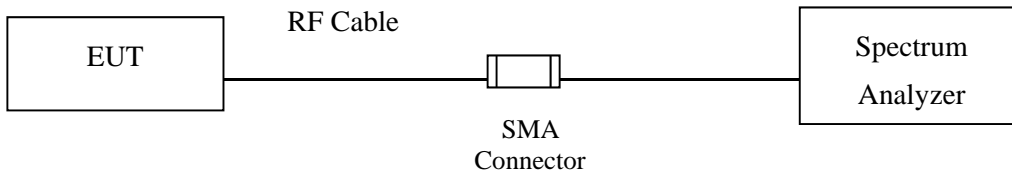
SISO B

2.4 GHz band	Ton (ms)	Ton + Toff (ms)	Duty Cycle (%)	Duty Factor (dB)
802.11 b	8.4058	8.8116	95.39	0.20
802.11 ax20	1.2971	1.7029	76.17	1.18
802.11 ax40	0.6492	1.0550	61.54	2.11

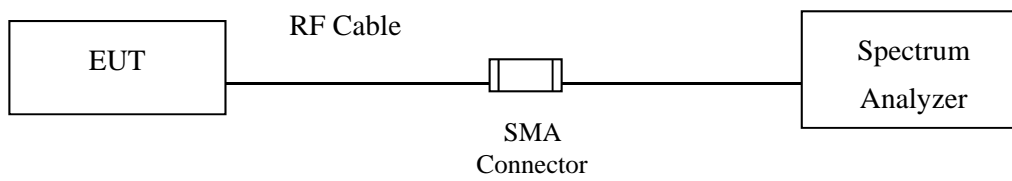
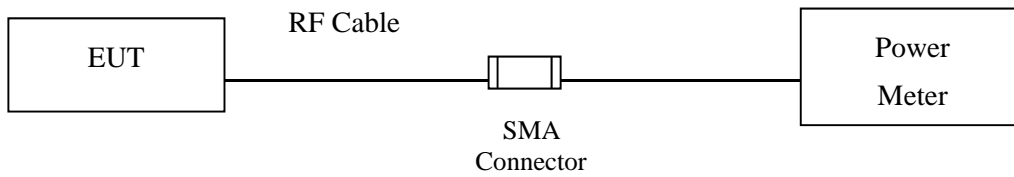
5. Maximum conducted output power (5 GHz)

5.1. Test Setup

Occupied Bandwidth



Conduction Power Measurement



5.2. Limits

For the band 5.15-5.25 GHz,

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W, provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, if transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. 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. 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 is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable 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, if transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power 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, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power 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, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, if transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point UNII 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.

5.3. Test Procedure

As an alternative to FCC KDB-789033, the EUT maximum conducted output power was measured with an average power meter employing a video bandwidth greater than the 6 dB BW of the emission under test. Maximum conducted output power was read directly from the meter across all data rates, and across three channels within each sub-band. Special care was used to make sure that the EUT was transmitting in continuous mode. This method exceeds the limitations of FCC KDB-789033, and provides more accurate measurements.

Maximum conducted output power using KDB 789033 section E)3)b) Method PM-G (Measurement using a gated RF average power meter)

Note: the power meter have a video bandwidth that is greater than or equal to the measurement bandwidth.

Maximum conducted output power using KDB 789033 section E)2)d) Method SA-2 (trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

When transmitted signals consist of two or more non-contiguous spectrum segments (e.g., 80+80 MHz mode) or when a single spectrum segment of a transmission crosses the boundary between two adjacent U-NII bands, KDB 644545 D03 section D) procedure is used for measurements.

5.4. Test Result of Maximum conducted output power

Product : 1TX 11ax (WiFi6E) BW160 + BT/BLE Combo Card
Test Item : Maximum conducted output power
Test Date : 2022/12/20
Test Mode : SISO A: Transmit (802.11ax-80 MHz)

Channel No.	FrequencyRange (MHz)	Output Power (dBm)	Output Power Limit (dBm)	Result
155	5775	14.27	30	Pass

Note: Output Power (dBm) = 10LOG (Chain A Power (mW)+ Chain B Power (mW))

Product : 1TX 11ax (WiFi6E) BW160 + BT/BLE Combo Card
Test Item : Maximum conducted output power
Test Date : 2022/12/20
Test Mode : SISO A: Transmit (802.11ax-160 MHz)

Channel No.	FrequencyRange (MHz)	Output Power (dBm)	Output Power Limit (dBm)	Result
50	5250	14.23	24	Pass

Note: Output Power (dBm) = 10LOG (Chain A Power (mW)+ Chain B Power (mW))

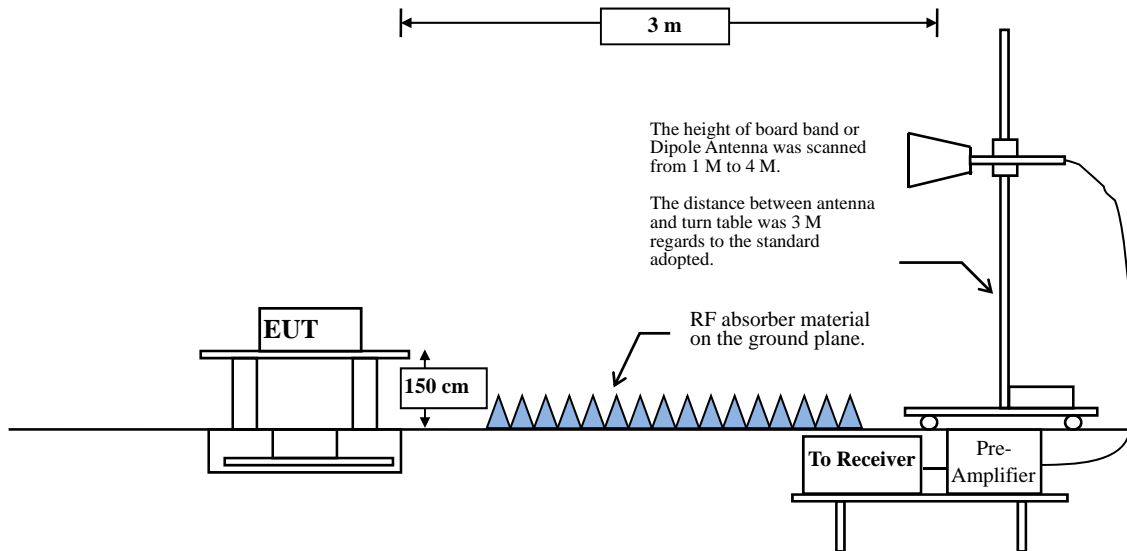
Product : 1TX 11ax (WiFi6E) BW160 + BT/BLE Combo Card
Test Item : Maximum conducted output power
Test Date : 2022/12/20
Test Mode : SISO B: Transmit (802.11ax-160 MHz)

Channel No.	FrequencyRange (MHz)	Output Power (dBm)	Output Power Limit (dBm)	Result
114	5570	14.32	24	Pass

Note: Output Power (dBm) = 10LOG (Chain A Power (mW)+ Chain B Power (mW))

6. Band Edge (5 GHz)

6.1. Test Setup



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

Remarks:

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.

6.3. Test Procedure

The EUT is 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 1 GHz setting on the field strength meter is 120 kHz, above 1 GHz are 1 MHz. The EUT was setup to ANSI C63.10, 2013; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

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

5 GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11 ax80	45.16	0.3246	3080	5000
802.11 ax160	32.81	0.1840	5435	10000

Note: Duty Cycle Refer to Section 7.

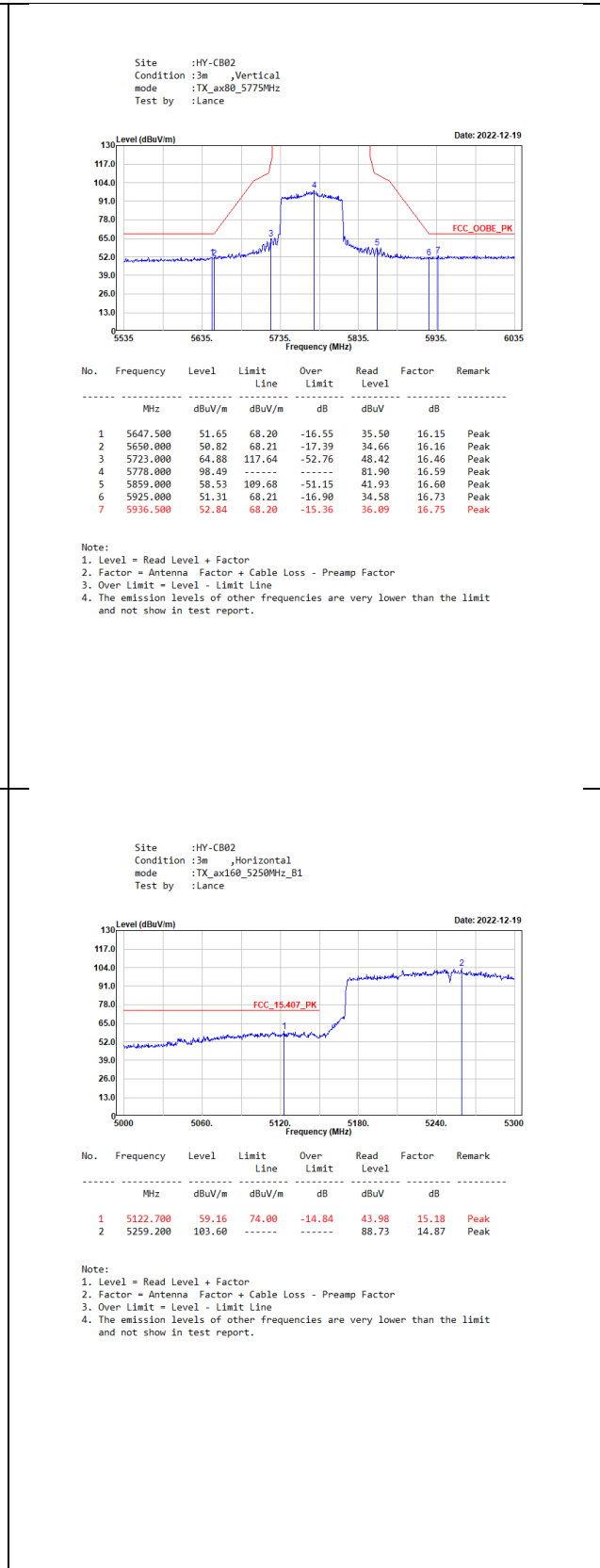
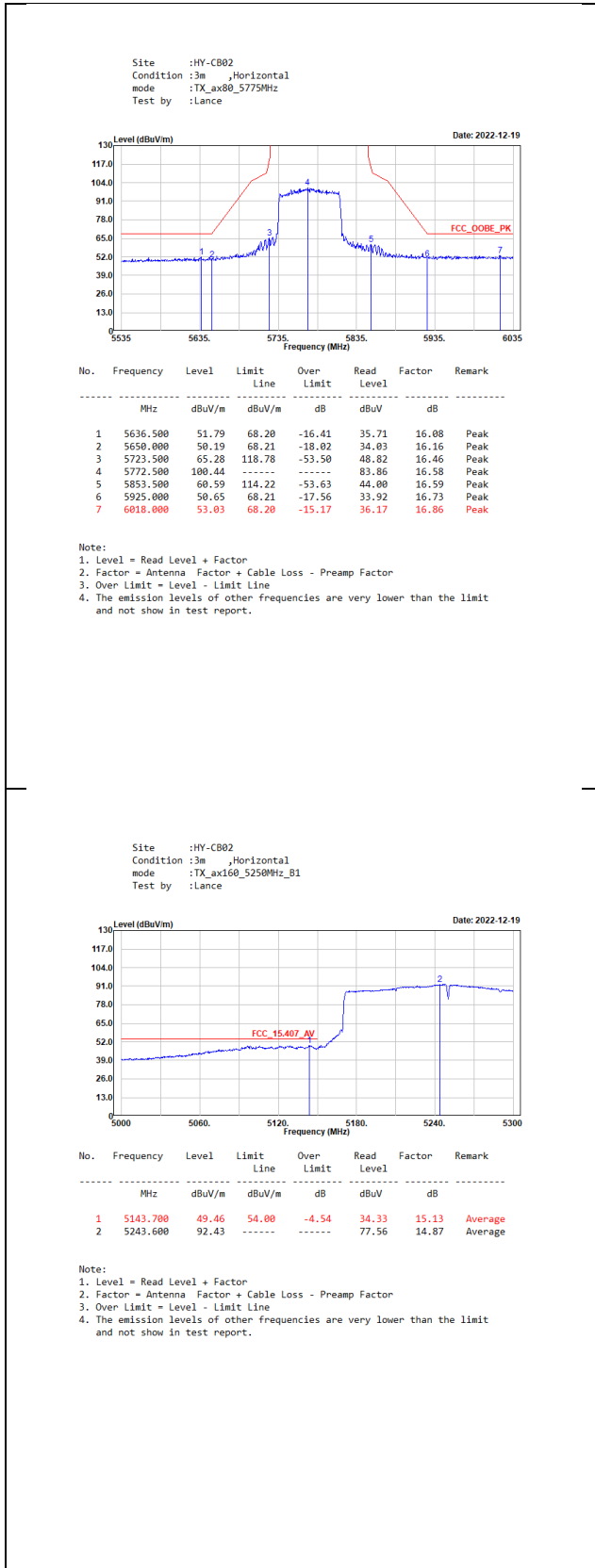
SISO B

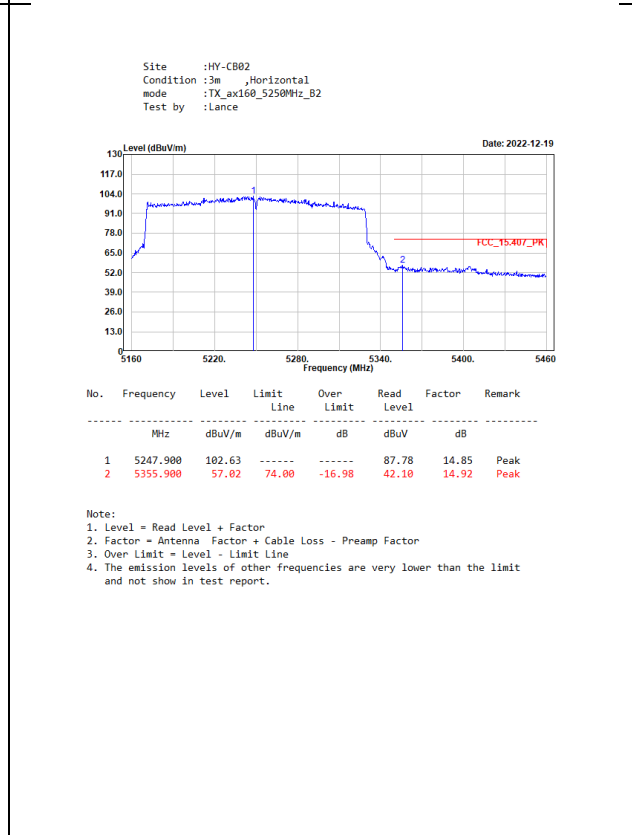
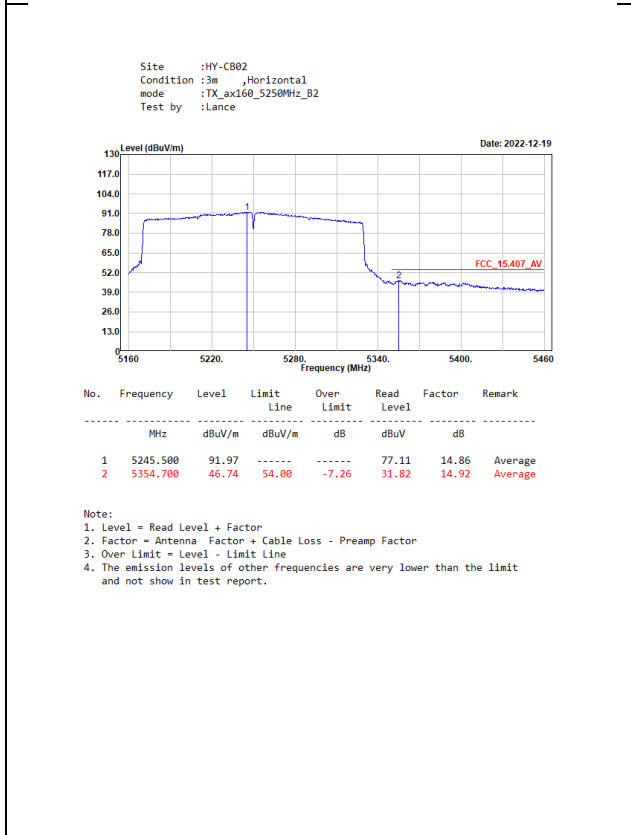
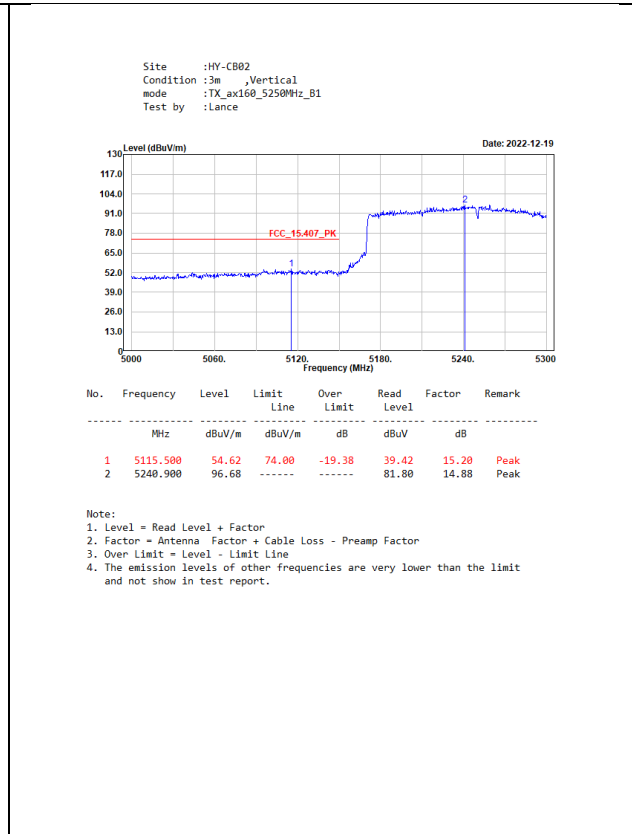
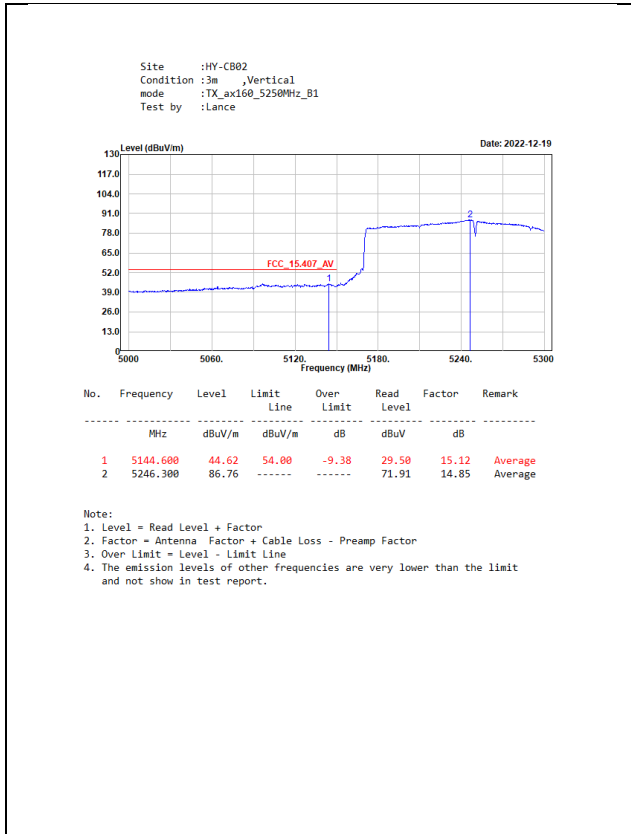
5 GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11 ax160	32.82	0.1841	5433	10000

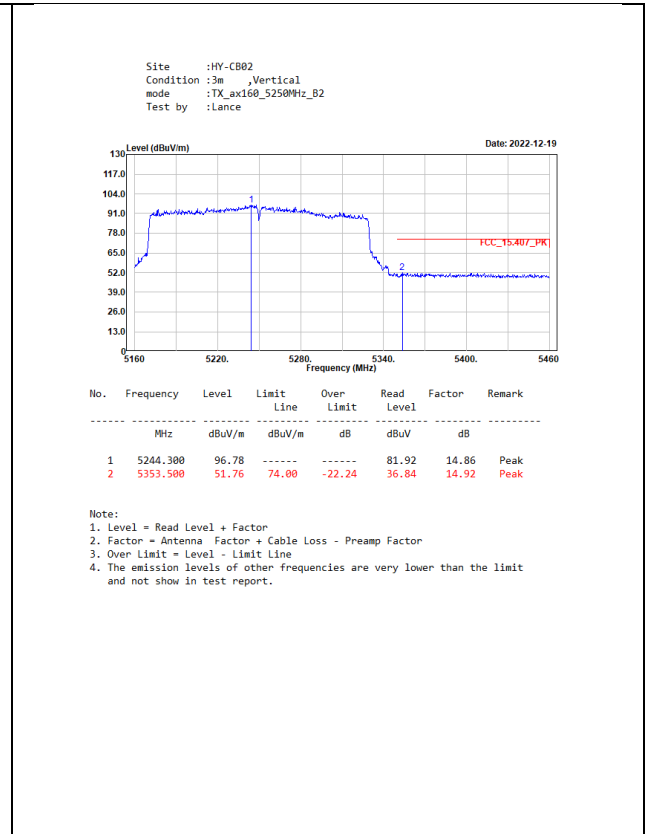
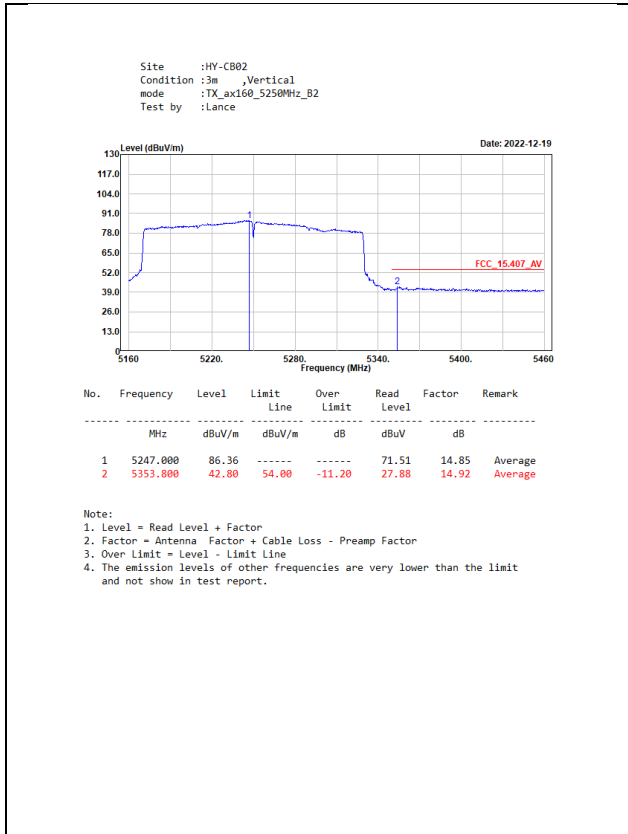
Note: Duty Cycle Refer to Section 7.

6.4. Test Result of Band Edge

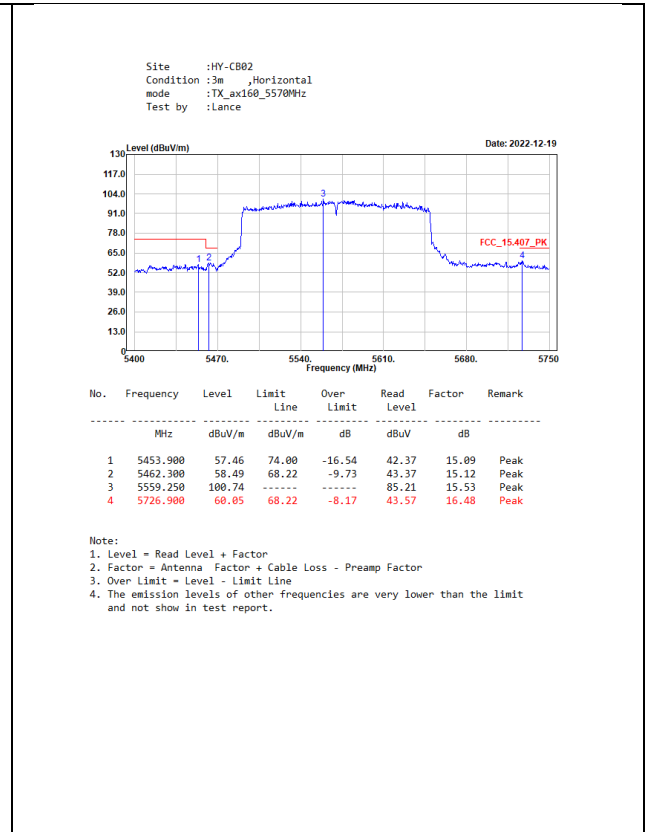
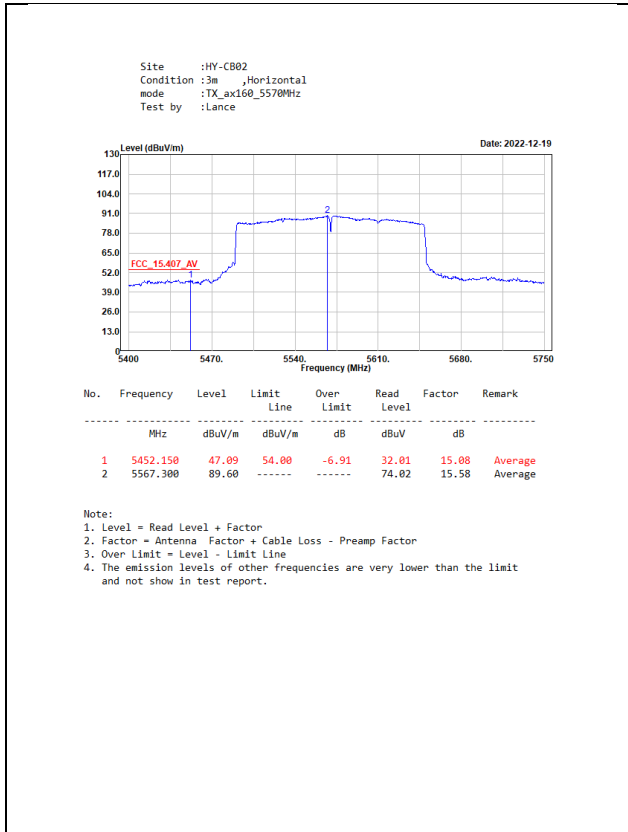
SISOA

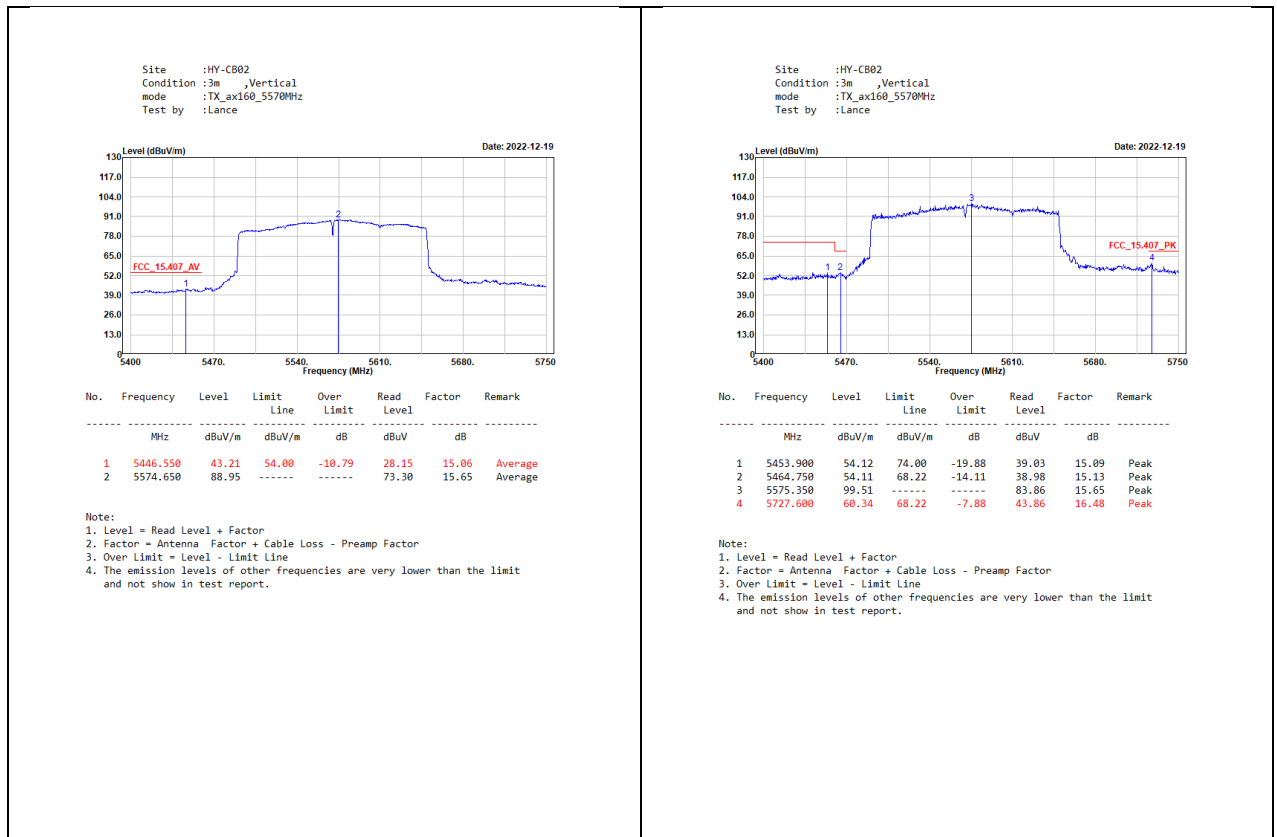






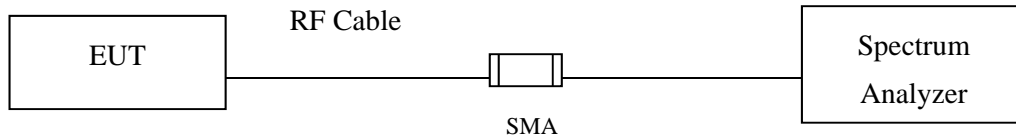
SISOB





7. Duty Cycle (5 GHz)

7.1. Test Setup



7.2. Test Procedure

The EUT was setup according to ANSI C63.10 2013; tested according to U-NII test procedure of KDB789033 for compliance to FCC 47CFR 15.407 requirements.

7.3. Test Result of Duty Cycle

Product : 1TX 11ax (WiFi6E) BW160 + BT/BLE Combo Card
 Test Item : Duty Cycle
 Test Mode : Transmit

Duty Cycle Formula:

Duty Cycle = Ton / (Ton + Toff)

Duty Factor = 10 Log (1/Duty Cycle)

Results:

SISO A

5 GHz band	Ton (ms)	Ton + Toff (ms)	Duty Cycle (%)	Duty Factor (dB)
802.11 ax80	0.3246	0.7188	45.16	3.45
802.11 ax160	0.1840	0.5608	32.81	4.84

SISO B

5 GHz band	Ton (ms)	Ton + Toff (ms)	Duty Cycle (%)	Duty Factor (dB)
802.11 ax160	0.1841	0.5608	32.82	4.84