

FCC RF Inspection Report

Product Name	2TX 11ax (WiFi6E) BW160+BT/BLE Combo Card
Model No	MT7922A22M
FCC ID.	HLZMT7922A22M

Applicant	Acer Incorporated
Address	9F, 88, Sec. 1, Xintai 5th Rd. New Taipei City 221 Taiwan

Date of Receipt	Jan. 25, 2022
Issue Date	Mar. 21, 2022
Report No.	2210770R-RFNAOTHV03-7
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

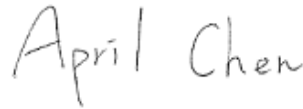
Issued Date: Mar. 21, 2022

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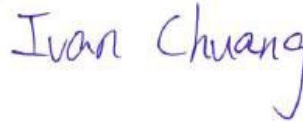
Product Name	2TX 11ax (WiFi6E) BW160+BT/BLE Combo Card
Applicant	Acer Incorporated
Address	9F, 88, Sec. 1, Xintai 5th Rd. New Taipei City 221 Taiwan
Manufacturer	Acer Incorporated
Model No.	MT7922A22M
FCC ID.	HLZMT7922A22M
EUT Rated Voltage	DC 3.3V
EUT Test Voltage	DC 3.3V (Power By Test Platform)
Trade Name	acer
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By :



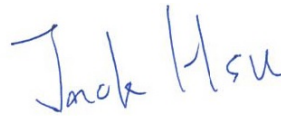
(Senior Project Specialist / April Chen)

Tested By :



(Senior Engineer / Ivan Chuang)

Approved By :



(Senior Engineer / Jack Hsu)

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Revision History

Report No.	Version	Description	Issued Date
2210770R-RFNAOTHV03-7	V1.0	Initial issue of report.	Mar. 21, 2022

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	2TX 11ax (WiFi6E) BW160+BT/BLE Combo Card
Trade Name	acer
Model No.	MT7922A22M
FCC ID.	HLZMT7922A22M
Frequency Range	2412-2472MHz for 802.11b/g/n/ac/ax-20BW, 2422-2462MHz for 802.11n/ac/ax-40BW
Number of Channels	802.11b/g/n/ac/ax-20MHz: 13, 802.11n/ac/ax-40MHz: 9
Data Speed	802.11b: 1-11Mbps, 802.11g: 6-54Mbps, 802.11n: up to 300Mbps, 802.11ac: up to 400Mbps, 802.11ax: up to 573.5Mbps
Channel separation	802.11b/g/n/ac/ax: 5 MHz
Type of Modulation	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n/ac/ax: OFDM, OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
Antenna Type	PIFA Antenna
Channel Control	Auto
Antenna Gain	Refer to the table "Antenna List"

Antenna List

No.	Manufacturer	Part No	Antenna type	Peak Gain
1.	WNC	81EABS15.G35 (Main)	PIFA Antenna	-0.51dBi for 2.4GHz
		81EABS15.G36 (Aux)	PIFA Antenna	-0.05dBi for 2.4GHz

Note: The antenna of EUT is conforming to FCC 15.203.

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

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

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

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

Note:

1. The EUT is a 2TX 11ax (WiFi6E) BW160+BT/BLE Combo Card with a built-in WLAN (802.11a/b/g/n/ac/ax) with Bluetooth (5.0 and V3.0+HS, V2.1+EDR) transceiver, this report for 2.4GHz WLAN.
2. Regarding the operation frequency, the customer-provided frequency and worst-case is selected to perform the test.
3. Lowest data rate is tested in each mode. The only worst case is shown in the report.
4. 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.
5. This is a permissive change for FCC ID: HLZMT7922A22M, originally granted on 02/13/2022. According to the major change, DEKRA tests Peak Power Output, Radiated Emission and Radiated Band Edge worst-case, and other testing data refer to original module reports (report no.: RFBARR-WTW-P21030485). Additional the host: Notebook Computer (Model number: N21H1) is contain this module's FCC ID.

Test Mode	Mode 1 MIMO: Transmit (802.11b)
	Mode 2 MIMO: Transmit (802.11g)
	Mode 3 MIMO: Transmit (802.11ax-20BW)
	Mode 4 MIMO: Transmit (802.11ax-40BW)

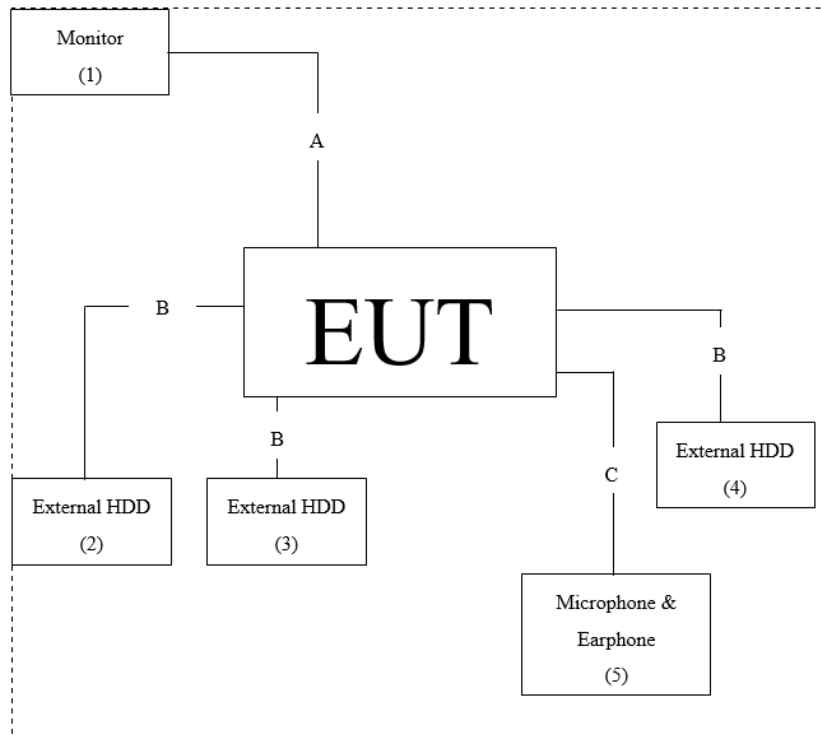
1.2. Tested System Details

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	Monitor	Lenovo	A21215FS0	V5DMD987	Non-Shielded, 1.8m
2	External HDD	Transcend	TS1TSJ25MC	F30467-0003	N/A
3	External HDD	Transcend	TS1TSJ25H3B	F21786-0019	N/A
4	External HDD	Transcend	TS1TSJ25H3B	F21786-0005	N/A
5	Microphone & Earphone	Verbatim	C09024VB	N/A	N/A

Signal Cable Type	Signal cable Description
A	HDMI Cable Shielded, 1.8m
B	USB Cable Shielded, 0.5m, three PCS.
C	Microphone & Earphone Cable Non-shielded, 1.2m

1.3. Configuration of Tested System



1.4. EUT Exercise Software

1. Setup the EUT as shown in Section 1.4.
2. Execute software “QA Tool” on the Notebook Computer.
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	22.0 °C
	Humidity (%RH)	10~90 %	64.0 %
Conductive	Temperature (°C)	10~40 °C	23.2 °C
	Humidity (%RH)	10~90 %	58.0 %

USA : FCC Registration Number: TW0033

Canada : IC Registration 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 : +866-3-327-8031
Email address : info.tw@dekra.com
Website : <http://www.dekra.com.tw>

1.6. List of Test Item and Equipment

For Radiated measurements /966-1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Horn Antenna	ETS-Lindgren	3117	00201259	2021/11/09	2022/11/08
X	Horn Antenna	Com-Power	AH-1840	101101	2021/11/30	2022/11/29
X	Pre-Amplifier	EMCI	EMC05820SE	980362	2021/08/24	2022/08/23
X	Pre-Amplifier	EMCI	EMC184045SE	980369	2021/04/27	2022/04/26
X	Spectrum Analyzer	R&S	FSV3044	101115	2022/01/10	2023/01/09
X	Coaxial Cable	SUHNER	SUCOFLEX 106	25450/6	2021/03/05	2022/03/04
X	Coaxial Cable	SGH	HA800	GD20110222-8	2021/03/05	2022/03/04
X	Coaxial Cable	SGH	SGH18	2021003-8	2021/03/05	2022/03/04
X	Coaxial Cable	EMCI	EMC106	151113	2021/03/05	2022/03/04
X	Power Meter	Anritsu	ML2496A	1739004	2021/04/27	2022/04/26
X	Power Sensor	Anritsu	MA2411B	1726078	2021/04/27	2022/04/26

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : e3v9

1.7. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document.

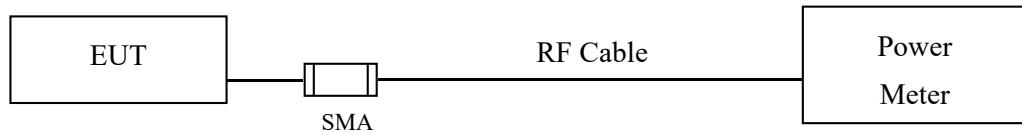
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

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	±0.91 dB	
Radiated Emission	Under 1GHz ±4.06 dB	Above 1GHz ±3.73 dB
Band Edge	Under 1GHz ±4.06 dB	Above 1GHz ±3.73 dB
Duty Cycle	±2.31 ms	

2. Peak Power Output

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 : 2TX 11ax (WiFi6E) BW160+BT/BLE Combo Card
 Test Item : Peak Power Output
 Test Date : 2022/03/02
 Test Mode : Mode 1 MIMO: Transmit (802.11b)

Chain A

Channel No.	Frequency (MHz)	Average Power	Peak Power	Required Limit
Data Rate		1M	1M	
01	2412	15.88	18.15	<30dBm
06	2437	15.95	18.19	<30dBm
11	2462	15.83	18.11	<30dBm
12	2467	15.48	17.74	<30dBm
13	2472	13.97	16.29	<30dBm

Chain B

Channel No.	Frequency (MHz)	Average Power	Peak Power	Required Limit
Data Rate		1M	1M	
01	2412	15.87	18.12	<30dBm
06	2437	15.94	18.15	<30dBm
11	2462	15.77	18.09	<30dBm
12	2467	15.02	17.31	<30dBm
13	2472	14.88	17.18	<30dBm

Chain A+B

Channel	Frequency (MHz)	Data Rate (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain A+B Power (dBm)	Limit (dBm)	Result
01	2412	1M	18.15	18.12	21.15	30	Pass
06	2437	1M	18.19	18.15	21.18	30	Pass
11	2462	1M	18.11	18.09	21.11	30	Pass
12	2467	1M	17.74	17.31	20.54	30	Pass
13	2472	1M	16.29	17.18	19.77	30	Pass

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

Product : 2TX 11ax (WiFi6E) BW160+BT/BLE Combo Card
 Test Item : Peak Power Output
 Test Date : 2022/03/02
 Test Mode : Mode 2 MIMO: Transmit (802.11g)

Chain A

Channel No.	Frequency (MHz)	Average Power	Peak Power	Required Limit
Data Rate		6M	6M	
01	2412	15.08	21.02	<30dBm
06	2437	15.17	21.14	<30dBm
11	2462	15.23	21.15	<30dBm
12	2467	14.19	19.41	<30dBm
13	2472	11.69	17.48	<30dBm

Chain B

Channel No.	Frequency (MHz)	Average Power	Peak Power	Required Limit
Data Rate		6M	6M	
01	2412	15.04	21.01	<30dBm
06	2437	15.45	21.31	<30dBm
11	2462	15.13	21.03	<30dBm
12	2467	15.05	20.28	<30dBm
13	2472	12.04	17.89	<30dBm

Chain A+B

Channel	Frequency (MHz)	Data Rate (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain A+B Power (dBm)	Limit (dBm)	Result
01	2412	6M	21.02	21.01	24.03	30	Pass
06	2437	6M	21.14	21.31	24.24	30	Pass
11	2462	6M	21.15	21.03	24.10	30	Pass
12	2467	6M	19.41	20.28	22.88	30	Pass
13	2472	6M	17.48	17.89	20.70	30	Pass

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

Product : 2TX 11ax (WiFi6E) BW160+BT/BLE Combo Card
 Test Item : Peak Power Output
 Test Date : 2022/03/02
 Test Mode : Mode 3 MIMO: Transmit (802.11ax-20BW)

Chain A

Channel No.	Frequency (MHz)	Average Power	Peak Power	Required Limit
Data Rate		MCS0	MCS0	
01	2412	15.01	21.99	<30dBm
06	2437	15.06	21.85	<30dBm
11	2462	15.03	21.82	<30dBm
12	2467	14.12	19.51	<30dBm
13	2472	9.71	15.88	<30dBm

Chain B

Channel No.	Frequency (MHz)	Average Power	Peak Power	Required Limit
Data Rate		MCS0	MCS0	
01	2412	15.37	21.42	<30dBm
06	2437	15.02	21.1	<30dBm
11	2462	14.95	21.03	<30dBm
12	2467	14.86	19.82	<30dBm
13	2472	10.27	16.54	<30dBm

Chain A+B

Channel	Frequency (MHz)	Data Rate (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain A+B Power (dBm)	Limit (dBm)	Result
01	2412	MCS0	21.99	21.42	24.72	30	Pass
06	2437	MCS0	21.85	21.10	24.50	30	Pass
11	2462	MCS0	21.82	21.03	24.45	30	Pass
12	2467	MCS0	19.51	19.82	22.68	30	Pass
13	2472	MCS0	15.88	16.54	19.23	30	Pass

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

Product : 2TX 11ax (WiFi6E) BW160+BT/BLE Combo Card
 Test Item : Peak Power Output
 Test Date : 2022/03/02
 Test Mode : Mode 4 MIMO: Transmit (802.11ax-40BW)

Chain A

Channel No.	Frequency (MHz)	Average Power	Peak Power	Required Limit
Data Rate		MCS0	MCS0	
03	2422	15.36	20.56	<30dBm
06	2437	15.43	20.86	<30dBm
09	2452	15.04	20.47	<30dBm
10	2457	12.54	18.38	<30dBm
11	2462	9.54	15.34	<30dBm

Chain B

Channel No.	Frequency (MHz)	Average Power	Peak Power	Required Limit
Data Rate		MCS0	MCS0	
03	2422	15.04	20.45	<30dBm
06	2437	15.11	20.58	<30dBm
09	2452	15.09	20.56	<30dBm
10	2457	13.01	18.46	<30dBm
11	2462	10.92	16.96	<30dBm

Chain A+B

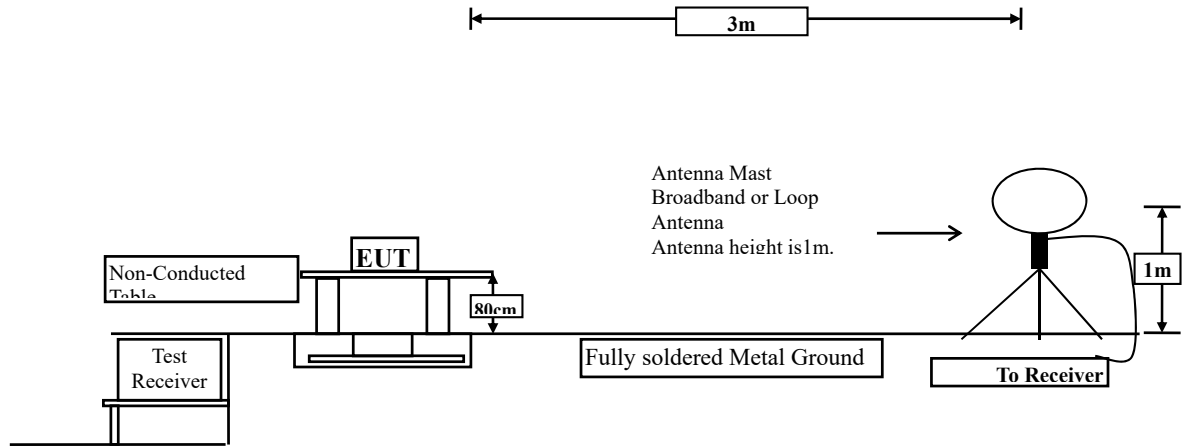
Channel	Frequency (MHz)	Data Rate (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain A+B Power (dBm)	Limit (dBm)	Result
03	2422	MCS0	20.56	20.45	23.52	30	Pass
06	2437	MCS0	20.86	20.58	23.73	30	Pass
09	2452	MCS0	20.47	20.56	23.53	30	Pass
10	2457	MCS0	18.38	18.46	21.43	30	Pass
11	2462	MCS0	15.34	16.96	19.24	30	Pass

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

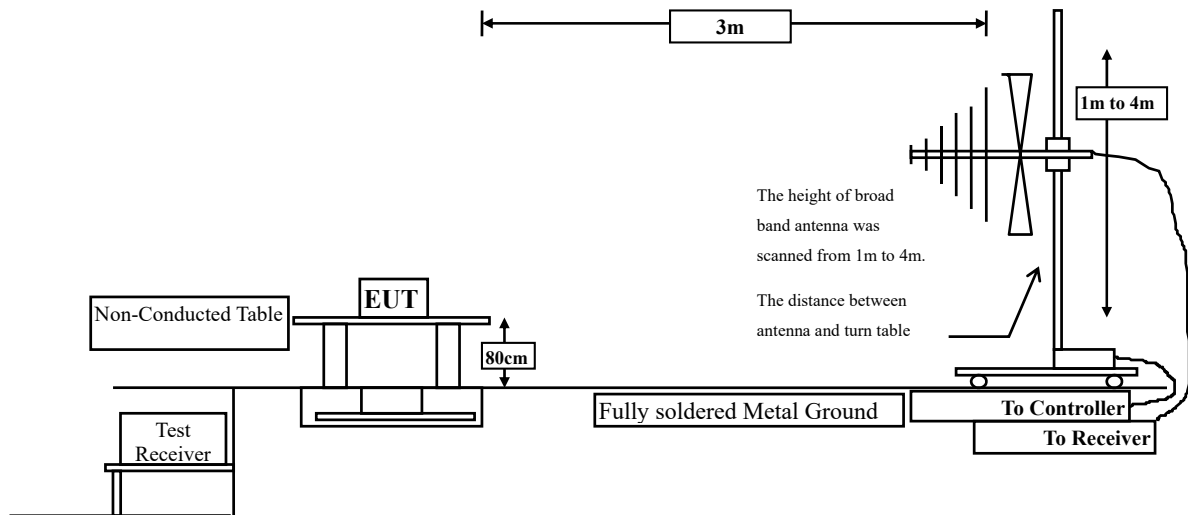
3. Radiated Emission

3.1. Test Setup

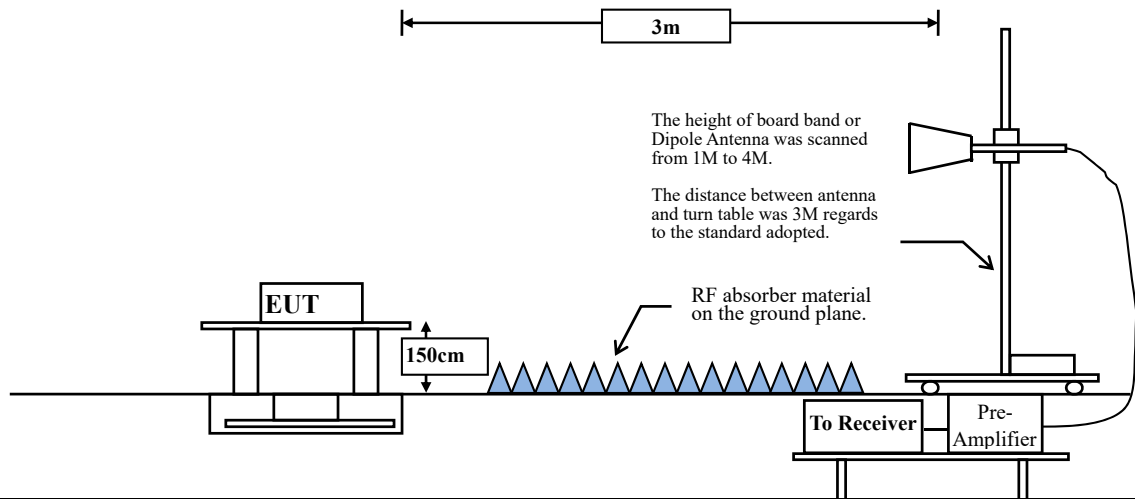
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



3.2. Limits

➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

- Remarks:
1. RF Voltage (dB μ V) = 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.

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.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, 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 between 1 meter and 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.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

RBW and VBW Parameter setting:

According to C63.10 Section 11.12.2.4 Peak measurement procedure.

RBW = as specified in Table 1.

$VBW \geq 3 \times RBW$.

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 = 1MHz.

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

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

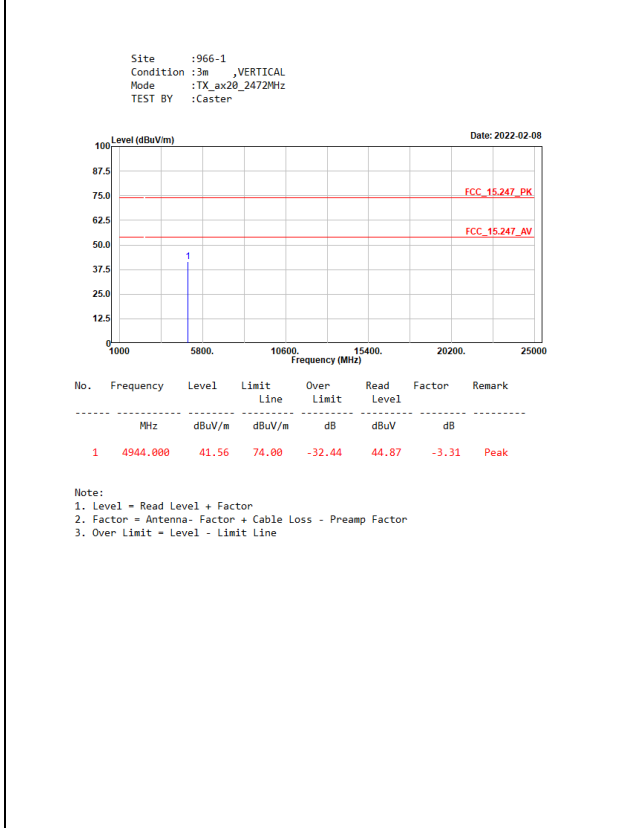
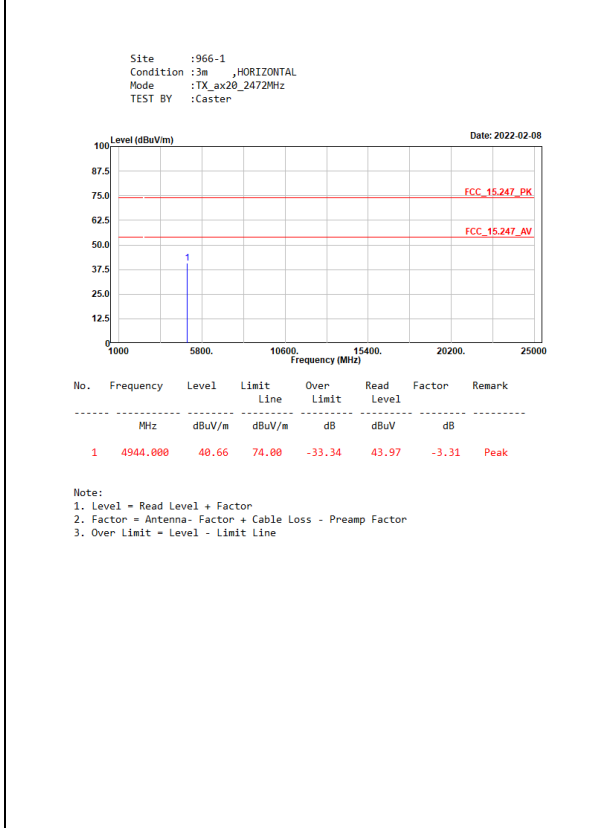
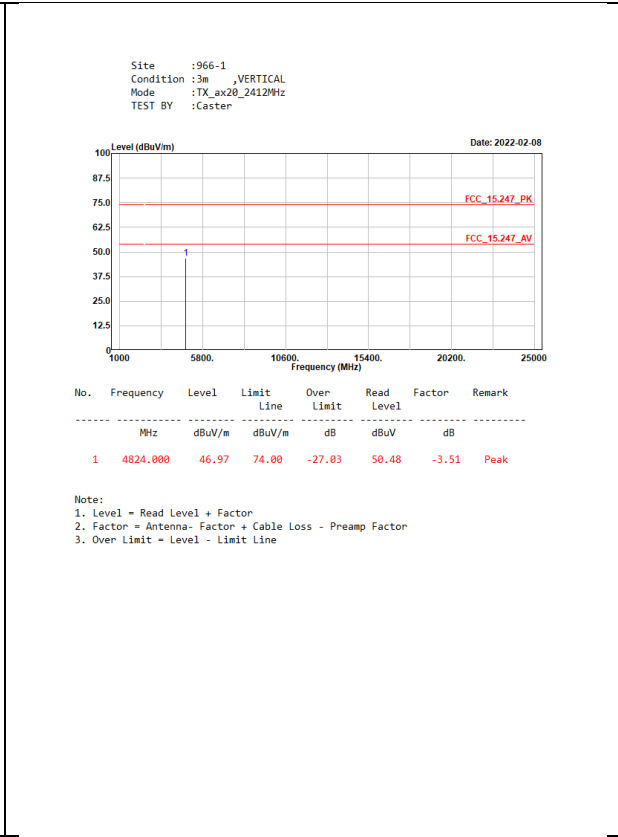
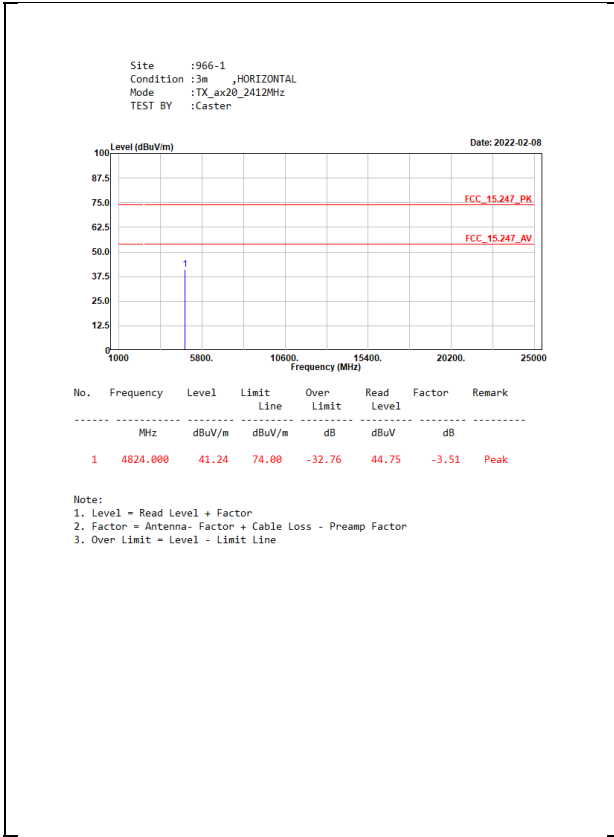
(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

MIMO

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11ax20	73.09	1.0050	995	1000

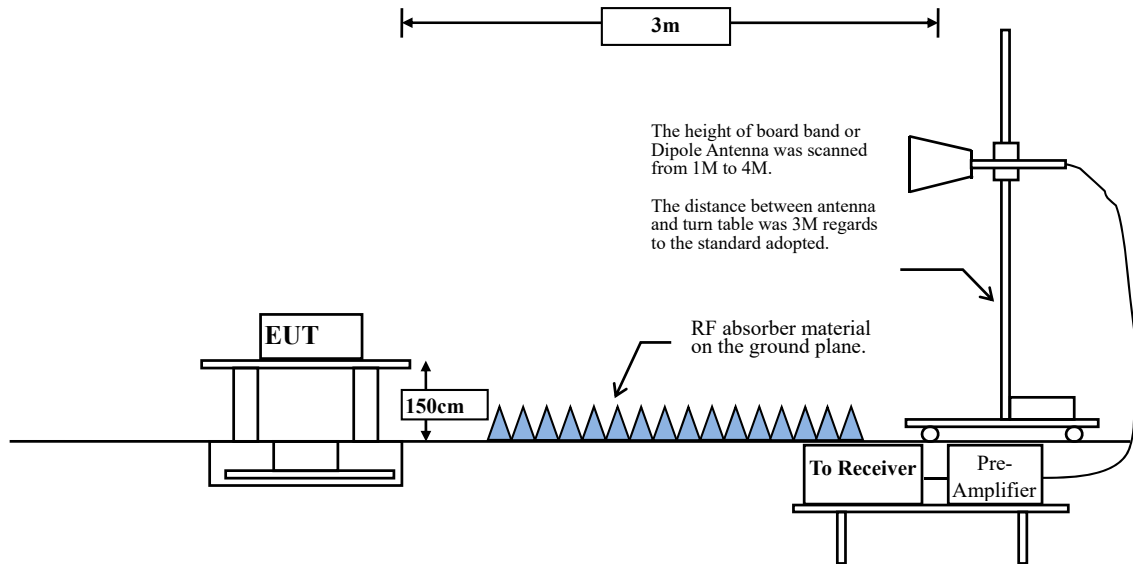
Note: Duty Cycle Refer to Section 5

3.4. Test Result of Radiated Emission



4. Band Edge

4.1. Test Setup



4.2. 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)).

4.3. 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.

$VBW \geq 3 \times RBW$.

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 = 1MHz.

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

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

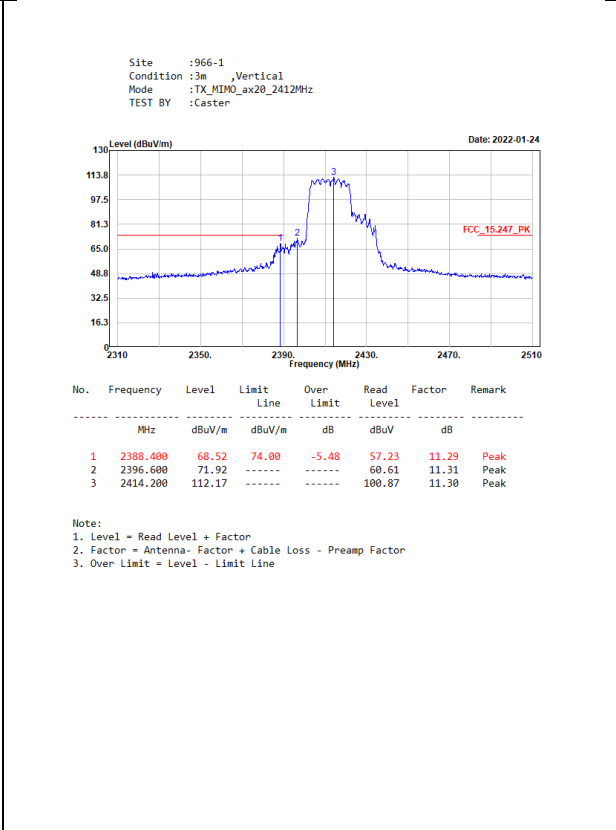
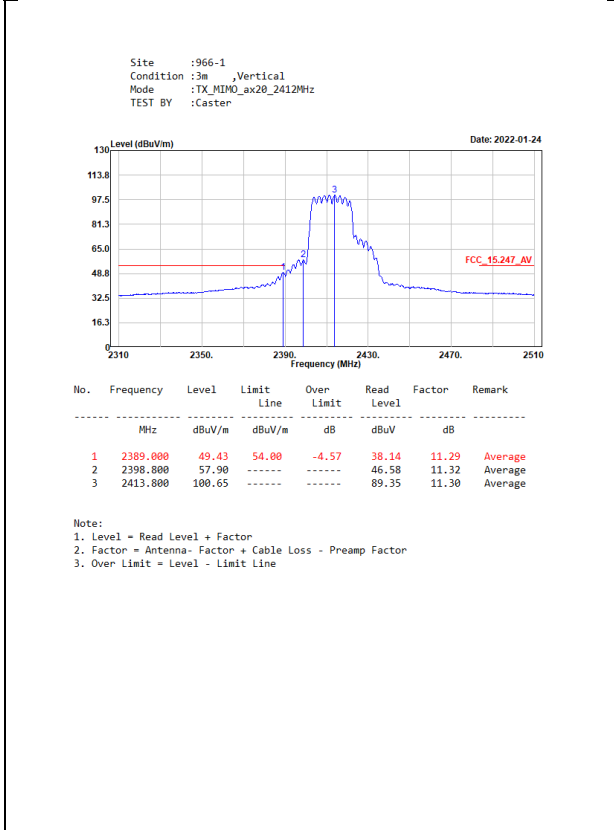
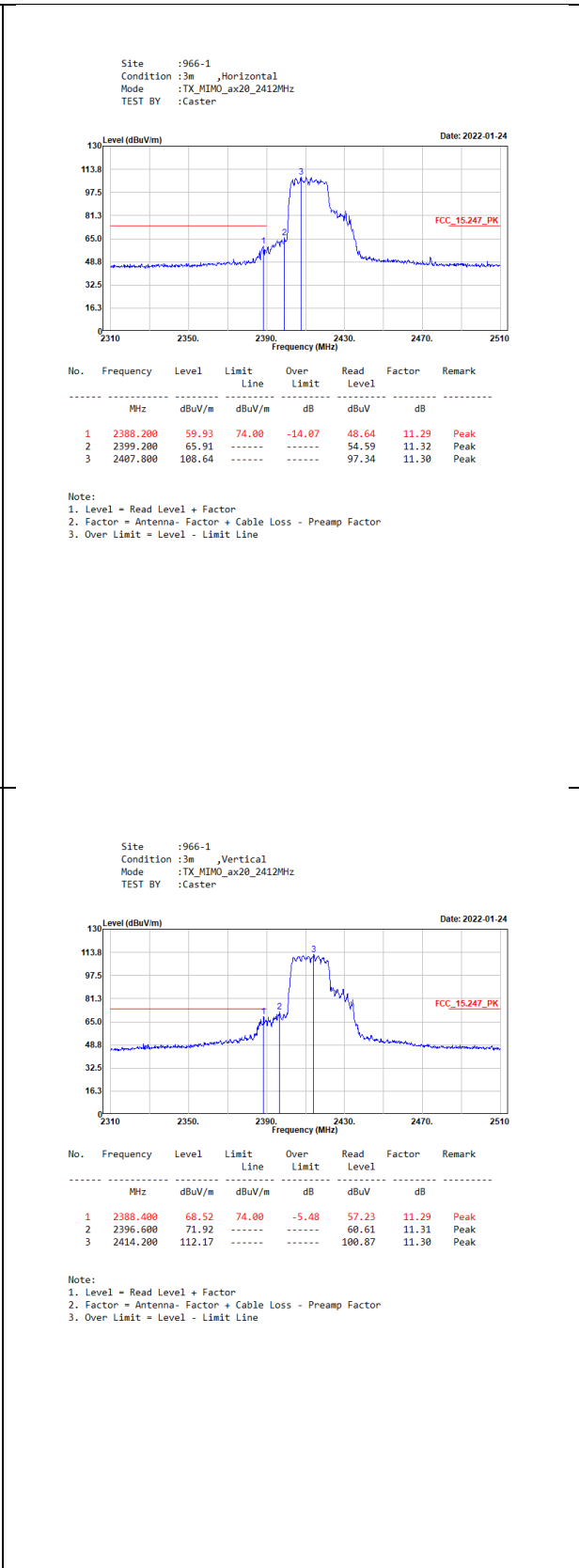
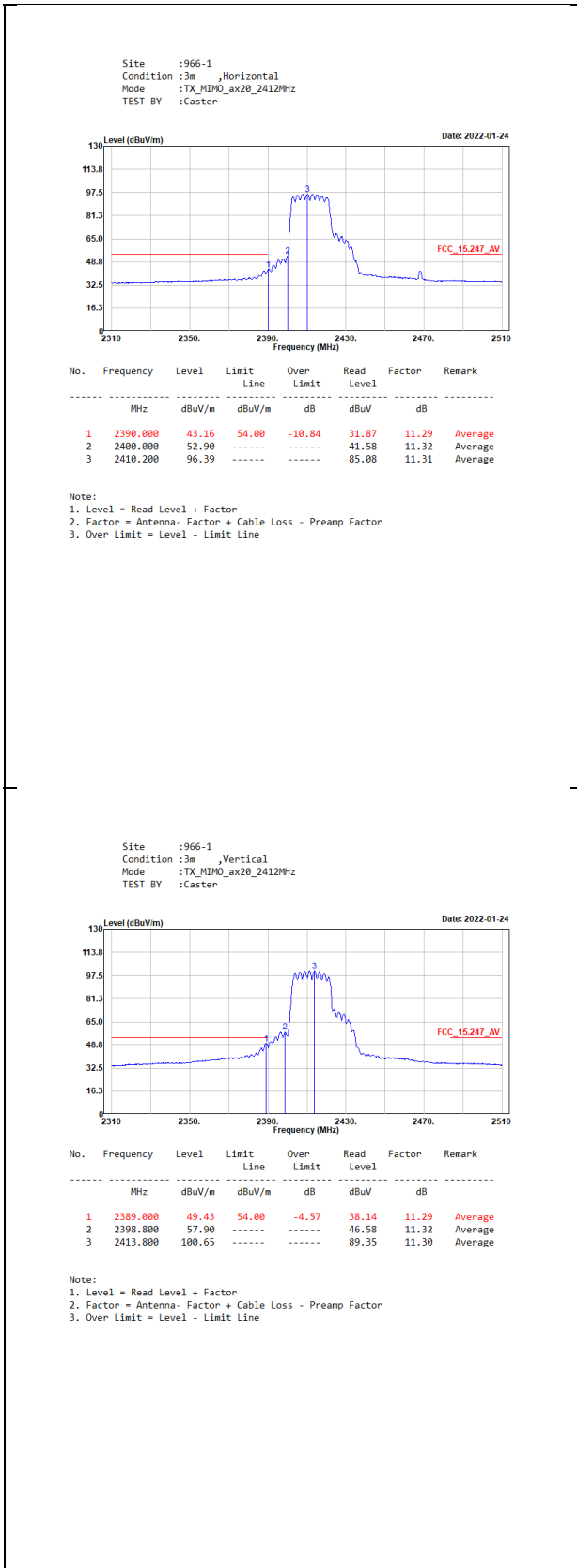
(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

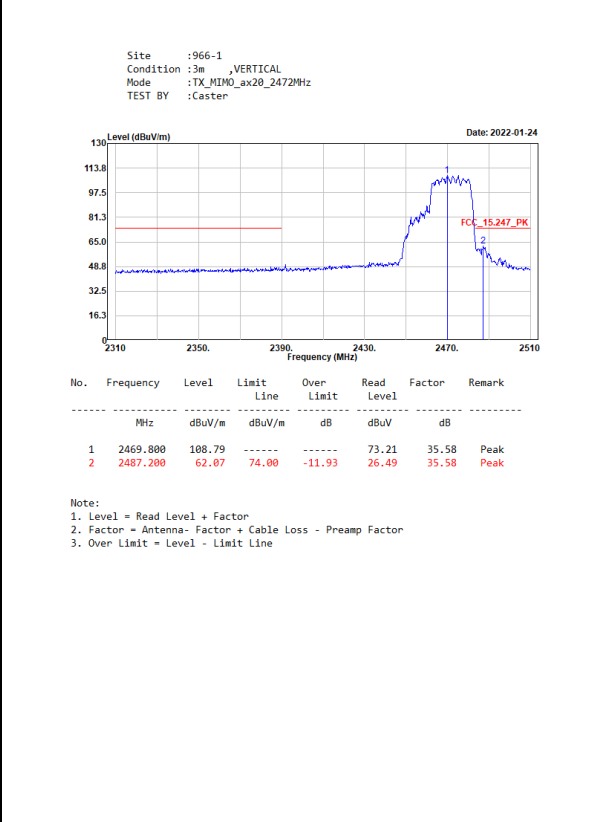
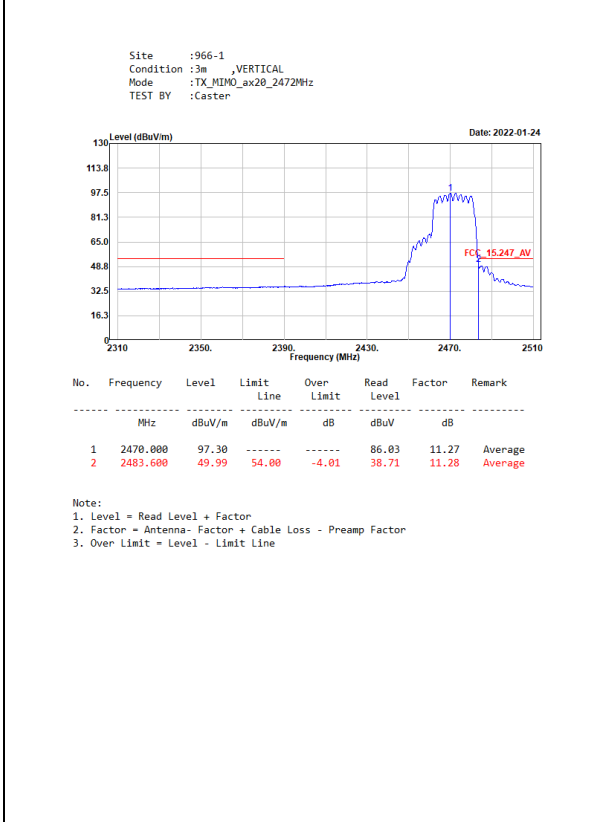
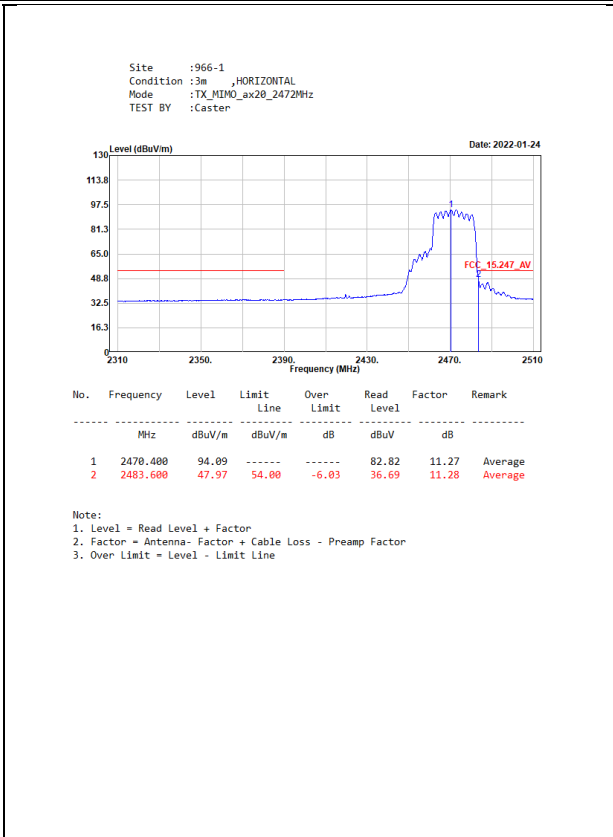
MIMO

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11ax20	73.09	1.0050	995	1000

Note: Duty Cycle Refer to Section 5

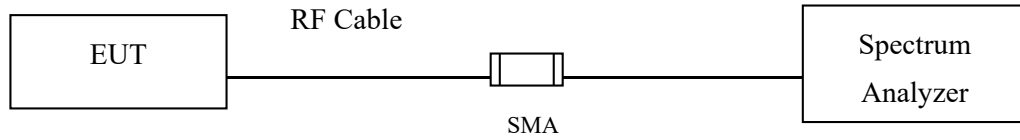
4.4. Test Result of Band Edge





5. Duty Cycle

5.1. Test Setup



5.2. 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.

5.3. Test Result of Duty Cycle

Product : 2TX 11ax (WiFi6E) BW160+BT/BLE Combo Card
 Test Item : Duty Cycle

Duty Cycle Formula:

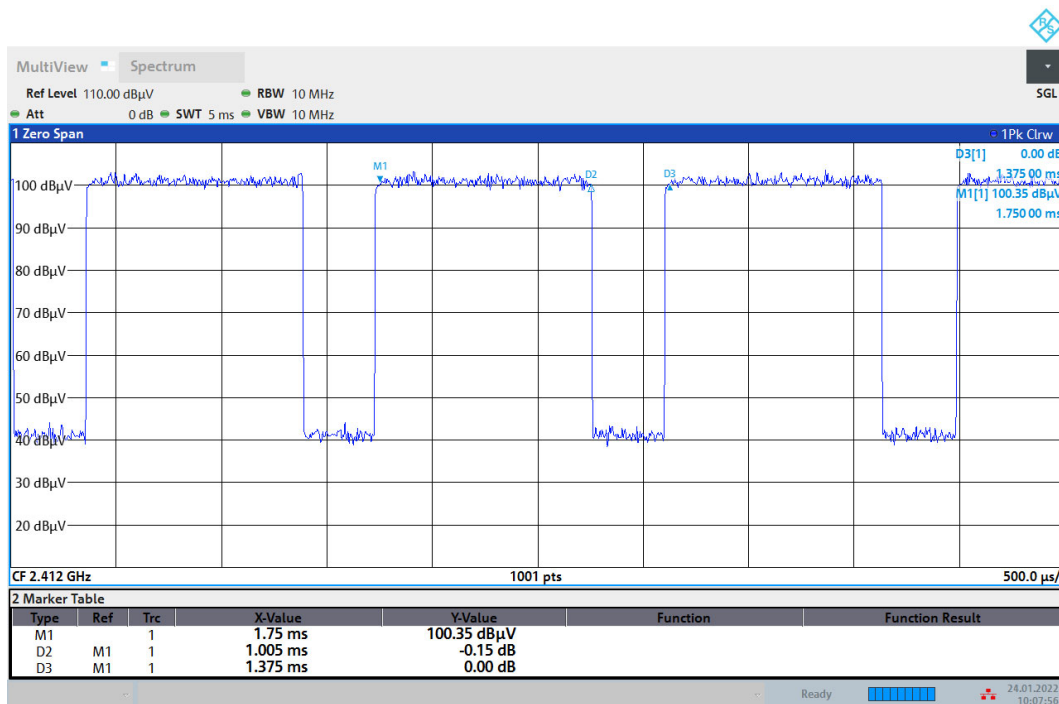
$$\text{Duty Cycle} = \text{Ton} / (\text{Ton} + \text{Toff})$$

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

Results:

2.4GHz Band	Ton (ms)	Ton + Toff (ms)	Duty Cycle (%)	Duty Factor (dB)
802.11ax20	1.0050	1.3750	73.09	1.36

802.11ax20 (MIMO)



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6. EMI Reduction Method During Compliance Testing

No modification was made during testing.