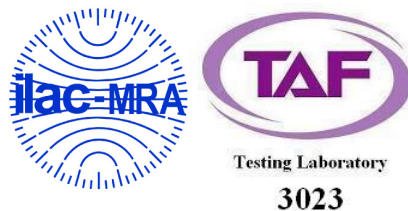


FCC Test Report

Product Name	RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
Model No	GRAXE66
FCC ID.	I4L-GRAXE66

Applicant	Micro-Star Int'l Co., Ltd.
Address	No.69, Lide St., Zhonghe Dist., New Taipei City 235, Taiwan (R.O.C.)

Date of Receipt	Jan. 11, 2022
Issue Date	Jul. 19, 2022
Report No.	2210313R-RFUSWL2V01-A
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

Issue Date: Jul. 19, 2022

Report No.: 2210313R-RFUSWL2V01-A



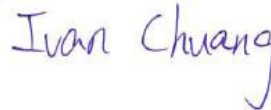
Product Name	RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
Applicant	Micro-Star Int'l Co., Ltd.
Address	No.69, Lide St., Zhonghe Dist., New Taipei City 235, Taiwan (R.O.C.)
Manufacturer	LEADER ELECTRONICS INC.
Model No.	GRAXE66
FCC ID.	I4L-GRAXE66
EUT Rated Voltage	AC 100-240V, 50/60Hz
EUT Test Voltage	AC 120V/60Hz
Trade Name	msi
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By :



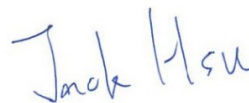
(Senior Project Specialist / Joanne Lin)

Tested By :



(Senior Engineer / Ivan Chuang)

Approved By :



(Senior Engineer / Jack Hsu)

TABLE OF CONTENTS

Description	Page
1. GENERAL INFORMATION	6
1.1. EUT Description.....	6
1.2. Tested System Details.....	7
1.3. Configuration of Tested System	8
1.4. EUT Exercise Software	8
1.5. Test Facility	9
1.6. List of Test Item and Equipment	10
1.7. Uncertainty	11
2. Conducted Emission.....	12
2.1. Test Setup	12
2.2. Limits	12
2.3. Test Procedure	12
2.4. Test Result of Conducted Emission.....	13
3. Maximum Power Output.....	14
3.1. Test Setup	14
3.2. Limits	14
3.3. Test Procedure	14
3.4. Test Result of Maximum Power Output.....	15
4. Radiated Emission	20
4.1. Test Setup	21
4.2. Limits	22
4.3. Test Procedure	23
4.4. Test Result of Radiated Emission.....	25
5. RF Antenna Conducted Test.....	32
5.1. Test Setup	32
5.2. Limits	32
5.3. Test Procedure	32
5.4. Test Result of RF antenna conducted test.....	33
6. Band Edge	37
6.1. Test Setup	37
6.2. Limits	38
6.3. Test Procedure	38
6.4. Test Result of Band Edge	40
7. 6dB Bandwidth	61
7.1. Test Setup	61
7.2. Limits	61
7.3. Test Procedure	61
7.4. Test Result of 6dB Bandwidth.....	62
8. Power Density	66
8.1. Test Setup	66

8.2.	Limits	66
8.3.	Test Procedure	66
8.4.	Test Result of Power Density	67
9.	Duty Cycle	71
9.1.	Test Setup	71
9.2.	Test Procedure	71
9.3.	Test Result of Duty Cycle.....	72

Appendix 1: EUT Test Photographs

Appendix 2: Product Photos-Please refer to the file: 2210313R-Product Photos

Revision History

Report No.	Version	Description	Issued Date
2210313R-RFUSWL2V01-A	V1.0	Initial issue of report.	Jul. 19, 2022

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
Trade Name	msi
Model No.	GRAXE66
FCC ID.	I4L-GRAXE66
Frequency Range	802.11b/g/n/ac/ax-20: 2412-2462MHz, 802.11n/ac/ax-40: 2422-2452MHz
Number of Channels	802.11b/g/n/ac/ax-20MHz: 11CH, n/ac/ax-40MHz: 7CH
Data Speed	802.11b: 1-11Mbps, 802.11g: 6-54Mbps, 802.11ac: up to 400Mbps 802.11ax: up to 573.6Mbps
Channel separation	802.11b/g/n/ac/ax: 5 MHz
Type of Modulation	DSSS, DBPSK, DQPSK, CCK OFDM, BPSK, QPSK, 16QAM, 64QAM, 256QAM OFDMA, BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM
Antenna Type	Dipole antenna
Antenna Gain	Refer to the table "Antenna List"
Channel Control	Auto
LAN Cable	Non-shielded, 1m
Power Adapter	MFR: CWT, M/N: 2AEJ042FC Input: AC 100-240V~50/60Hz, 1.3A Output: 12.0V=3.5A, 42.0W Cable Out: Non-shielded, 1.5m

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	WIESON	ARY121-0350-005-00	Dipole antenna	2.46dBi for 2.4 GHz
2	WIESON	ARY121-0350-006-00	Dipole antenna	2.89dBi for 2.4 GHz

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

For power CDD Directional gain	For power Beamforming Directional gain
2.89dBi for 2.4 GHz	5.9dBi for 2.4 GHz

For CDD mode:

2400MHz: Directional gain = 2.89 dBi

(Directional gain = $G_{ANT\ MAX} + \text{Array Gain}$, Array Gain = 0 dB for $N_{ANT} \leq 4$)

For Beamforming mode:

2400MHz: Directional gain = 5.9 dBi

(Directional gain = $G_{ANT\ MAX} + \text{Array Gain}$, Array Gain = $10 \cdot \log(2) = 3.01\text{dB}$)

For PSD Directional gain
5.68dBi for 2.4 GHz

2400MHz: Directional gain = 5.68 dBi

Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / N_{ANT}]$ dBi

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		

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		

Note:

1. The EUT is a RadiX AXE6600 WiFi 6E Tri-Band Gaming Router with a built-in WLAN(802.11a/b/g/n/ac/ax) transceiver, this report for 2.4GHz WLAN.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test. The other channels are for reference only.
3. Lowest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 1Mbps 、 802.11g is 6Mbps 、 802.11ax-20BW/40BW is MCS0)
4. The CDD mode and Beamforming mode are presented in the power output test item. For other test items, CDD mode is the worst case for the final test and shown in this report.
5. The spectrum plot against conducted item only shows the worst case.
6. This device does not support partial RU function.
7. These tests are conducted on a sample for the purpose of demonstrating compliance of 802.11b/g/n/ac/ax transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices.

Test Mode	Mode 1: Transmit (802.11b)-CDD
	Mode 2: Transmit (802.11g)-CDD
	Mode 3: Transmit (802.11ax-20BW)-CDD
	Mode 4: Transmit (802.11ax-40BW)-CDD
	Mode 5: Transmit (802.11ax-20BW)-Beamforming
	Mode 6: Transmit (802.11ax-40BW)-Beamforming

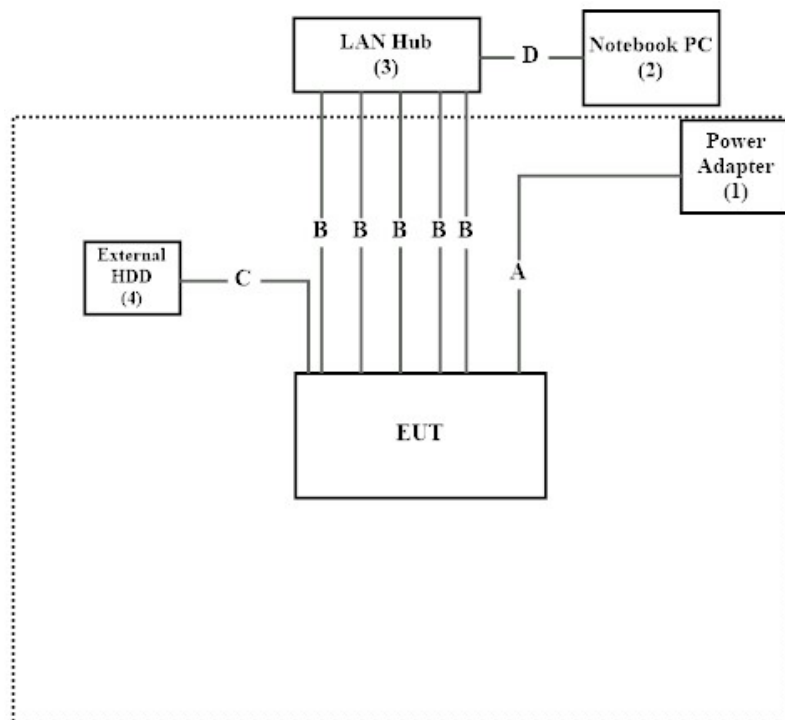
1.2. Tested System Details

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	CWT	2AEJ042FC	N/A	N/A
2 Notebook PC	DELL	P62G	CY9FJC2	N/A
3 LAN Hub	TP-LINK	TL-SG108	2161597000471	Non-Shielded, 1.5m
4 External HDD	Transcend	TS1T5J25H3B	F21786-0103	N/A

Signal Cable Type	Signal cable Description
A Power Cable	Non-shielded, 1.5m
B LAN Cable	Non-shielded, 3m
C USB Cable	Shielded, 1m
D LAN Cable	Non-shielded, 3m

1.3. Configuration of Tested System



1.4. EUT Exercise Software

1. Setup the EUT as shown in Section 1.3.
2. Execute software “QRCT Version 4.0.00192.0” on the Notebook PC.
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
Conducted Emission	Temperature (°C)	10~40 °C	23.9 °C
	Humidity (%RH)	10~90 %	62.7 %
Radiated Emission	Temperature (°C)	10~40 °C	24.1 °C
	Humidity (%RH)	10~90 %	63.8 %
Conductive	Temperature (°C)	10~40 °C	25 °C
	Humidity (%RH)	10~90 %	55.8 %

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 : +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 Conduction measurements / HY-SR01

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
X	EMI Test Receiver	R&S	ESR7	101601	2021.06.19	2022.06.18
X	Two-Line V-Network	R&S	ENV216	101306	2022.05.23	2023.05.22
X	Two-Line V-Network	R&S	ENV216	10147	2021.08.13	2022.08.12
X	Coaxial Cable	SUHNER	RG400_BNC	RF001	2022.05.24	2023.05.23

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 : E3 210616 dekra V9.

For Conducted measurements / HY-SR02

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
X	Spectrum Analyzer	R&S	FSV30	103466	2021.12.27	2022.12.26
X	Peak Power Analyzer	KEYSIGHT	8900B	MY51000539	2022.05.27	2023.05.26
X	Power Sensor	KEYSIGHT	N1923A	MY59240002	2022.05.19	2023.05.18
X	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 "X" are used to measure the final test results.
3. Test Software version : RF Conducted Test Tools R3 V3.0.1.19.

For Radiated measurements / HY-CB01

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due. Date
X	Loop Antenna	AMETEK	HLA6121	56736	2022.05.14	2023.05.13
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-675	2021.08.10	2022.08.09
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	SGH	SGH0301	20211007-7	2022.02.22	2023.02.21
X	Pre-Amplifier	EMCI	EMC051835SE	980312	2022.02.22	2023.02.21
X	Pre-Amplifier	EMCI	EMC05820SE	980362	2021.08.24	2022.08.23
	Pre-Amplifier	EMCI	EMC184045SE	980369		
	Coaxial Cable	EMCI	EMC102-KM-KM-600	1160314	2022.05.12	2023.05.11
	Coaxial Cable	EMCI	EMC102-KM-KM-7000	170242		
X	Filter	MICRO TRONICS	BRM50702	G251	2021.09.16	2022.09.15
	Filter	MICRO TRONICS	BRM50716	G188	2021.09.16	2022.09.15
X	EMI Test Receiver	R&S	ESR	102792	2021.12.15	2022.12.14
X	Spectrum Analyzer	R&S	FSV3044	101113	2022.01.25	2023.02.24
	Coaxial Cable	SUHNER	SUCOFLEX 106	25450/6		
X	Coaxial Cable	SGH	HA800	GD20110222-8	2022.03.22	2023.03.21
	Coaxial Cable	SGH	SGH18	2021003-8		
	Coaxial Cable	EMCI	EMC106	151113		

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 : E3 210616 dekra V9.

1.7. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document.

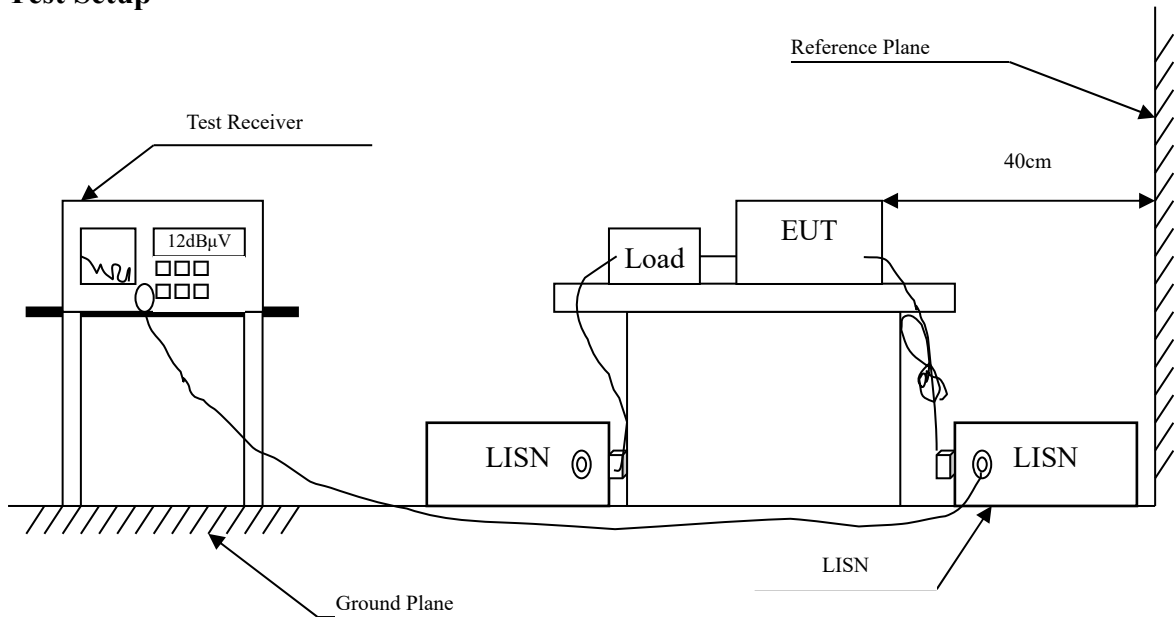
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

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	
Conducted Emission	±3.42 dB	
Peak Power Output	±0.91 dB	
Radiated Emission	Under 1GHz ±4.06 dB	Above 1GHz ±3.73 dB
RF Antenna Conducted Test	±2.53 dB	
Band Edge	Under 1GHz ±4.06 dB	Above 1GHz ±3.73 dB
6dB Bandwidth	±682.83 Hz	
Power Density	±2.53 dB	
Duty Cycle	±2.31 ms	

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dB μ V) Limit		
Frequency MHz	Limits	
	QP	AVG
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

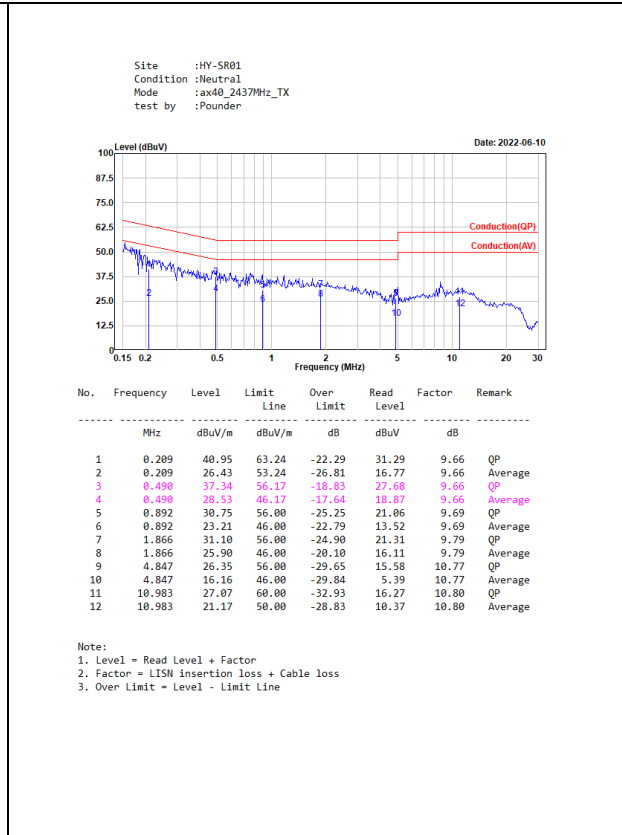
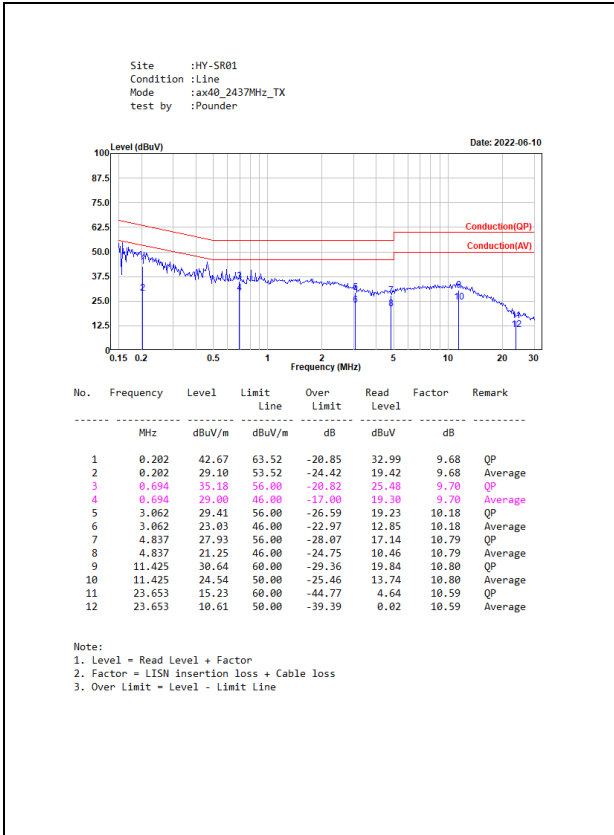
2.3. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

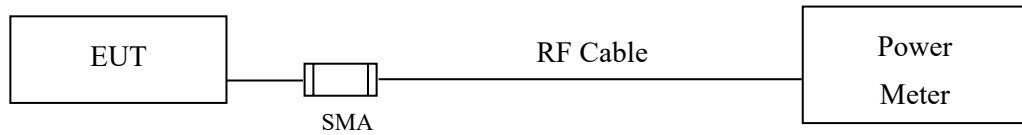
Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.4. Test Result of Conducted Emission



3. Maximum Power Output

3.1. Test Setup



3.2. Limits

The maximum peak power shall be less 1 Watt.

3.3. 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).

The maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For CDD mode:

2400MHz: Directional gain = 2.89 dBi, Limit= 30dBm

(Directional gain = $G_{ANT MAX} + \text{Array Gain}$, Array Gain = 0 dB for $N_{ANT} \leq 4$)

For Beamforming mode:

2400MHz: Directional gain = 5.9 dBi, Limit= 30dBm

(Directional gain = $G_{ANT MAX} + \text{Array Gain}$, Array Gain = $10 \cdot \log(2) = 3.01$ dB)

3.4. Test Result of Maximum Power Output

Product : RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
 Test Item : Maximum Power Output Data
 Test Mode : Mode 1: Transmit (802.11b)-CDD
 Test Date : 2022/04/18

Chain A+B

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain A+B Power (dBm)	Limit (dBm)	Result
01	2412	1	22.45	22.81	25.64	<30dBm	Pass
02	2417	1	26.22	26.58	29.41	<30dBm	Pass
06	2437	1	26.55	26.93	29.75	<30dBm	Pass
10	2457	1	26.60	26.66	29.64	<30dBm	Pass
11	2462	1	23.85	23.78	26.83	<30dBm	Pass

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

Product : RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
 Test Item : Maximum Power Output Data
 Test Mode : Mode 2: Transmit (802.11g)-CDD
 Test Date : 2022/04/18

Chain A+B

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain A+B Power (dBm)	Limit (dBm)	Result
01	2412	6	19.59	19.78	22.70	<30dBm	Pass
02	2417	6	22.53	22.92	25.74	<30dBm	Pass
03	2422	6	25.45	25.85	28.66	<30dBm	Pass
06	2437	6	26.72	26.78	29.76	<30dBm	Pass
09	2452	6	25.78	26.04	28.92	<30dBm	Pass
10	2457	6	22.96	22.86	25.92	<30dBm	Pass
11	2462	6	21.82	21.77	24.81	<30dBm	Pass

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

Product : RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
 Test Item : Maximum Power Output Data
 Test Mode : Mode 3: Transmit (802.11ax-20BW)-CDD
 Test Date : 2022/04/18

Chain A+B

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain A+B Power (dBm)	Limit (dBm)	Result
01	2412	MCS0	20.92	21.27	24.11	<30dBm	Pass
02	2417	MCS0	23.06	23.25	26.17	<30dBm	Pass
06	2437	MCS0	24.96	25.34	28.16	<30dBm	Pass
10	2457	MCS0	23.52	23.35	26.45	<30dBm	Pass
11	2462	MCS0	19.75	19.78	22.78	<30dBm	Pass

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

Product : RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
Test Item : Maximum Power Output Data
Test Mode : Mode 4: Transmit (802.11ax-40BW)-CDD
Test Date : 2022/04/18

Chain A+B

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain A+B Power (dBm)	Limit (dBm)	Result
03	2422	MCS0	16.96	17.43	20.21	<30dBm	Pass
04	2427	MCS0	18.48	18.92	21.72	<30dBm	Pass
06	2437	MCS0	19.41	19.71	22.57	<30dBm	Pass
09	2452	MCS0	19.35	19.54	22.46	<30dBm	Pass

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

Product : RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
Test Item : Maximum Power Output Data
Test Mode : Mode 5: Transmit (802.11ax-20BW)-Beamforming
Test Date : 2022/06/02

Chain A+B

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain A+B Power (dBm)	Limit (dBm)	Result
01	2412	MCS0	17.91	18.26	21.10	<30dBm	Pass
02	2417	MCS0	20.05	20.24	23.16	<30dBm	Pass
06	2437	MCS0	21.95	22.33	25.15	<30dBm	Pass
10	2457	MCS0	20.51	20.34	23.44	<30dBm	Pass
11	2462	MCS0	16.74	16.77	19.77	<30dBm	Pass

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

Product : RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
Test Item : Maximum Power Output Data
Test Mode : Mode 6: Transmit (802.11ax-40BW)-Beamforming
Test Date : 2022/06/02

Chain A+B

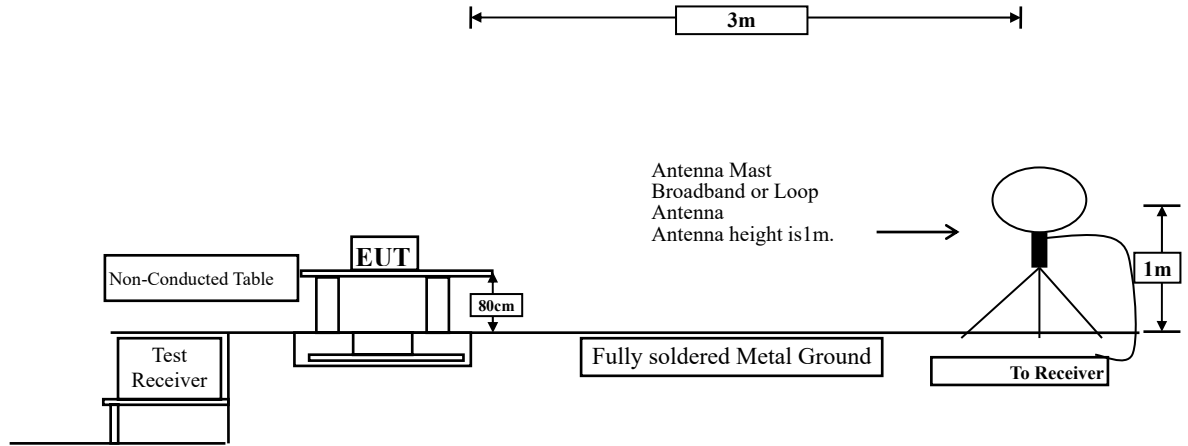
Channel No.	Frequency (MHz)	Data Rate (Mbps)	Chain A Power (dBm)	Chain B Power (dBm)	Chain A+B Power (dBm)	Limit (dBm)	Result
03	2422	MCS0	13.95	14.42	17.20	<30dBm	Pass
04	2427	MCS0	15.47	15.91	18.71	<30dBm	Pass
06	2437	MCS0	16.40	16.70	19.56	<30dBm	Pass
09	2452	MCS0	16.34	16.53	19.45	<30dBm	Pass

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

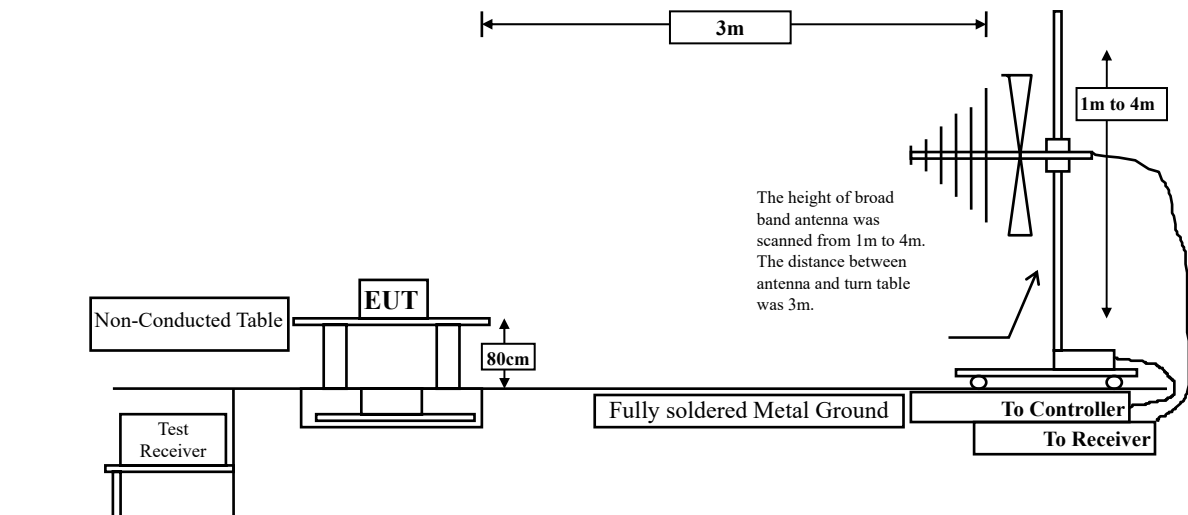
4. Radiated Emission

4.1. Test Setup

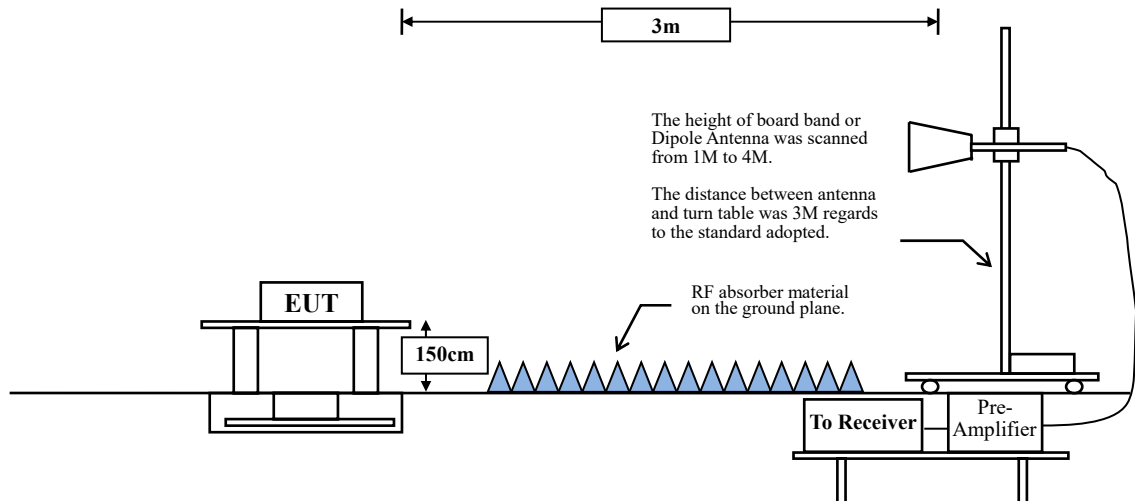
Radiated Emission Under 30MHz



Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



4.2. 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 (dBuV) = 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.

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.

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 $\geq 98 \%$

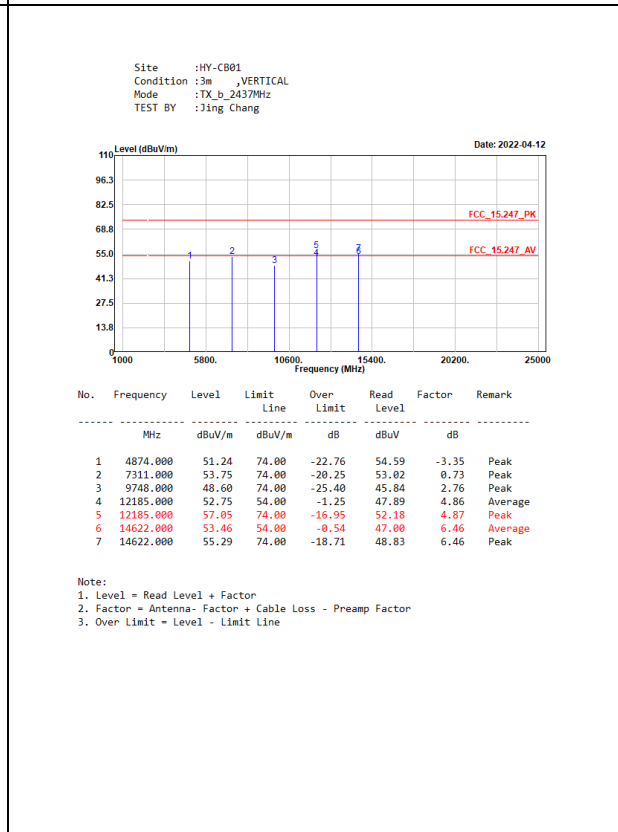
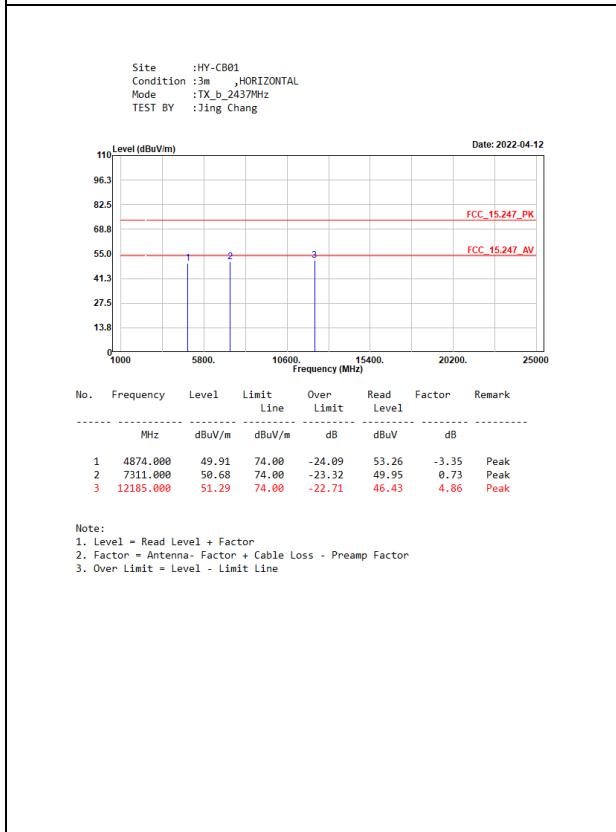
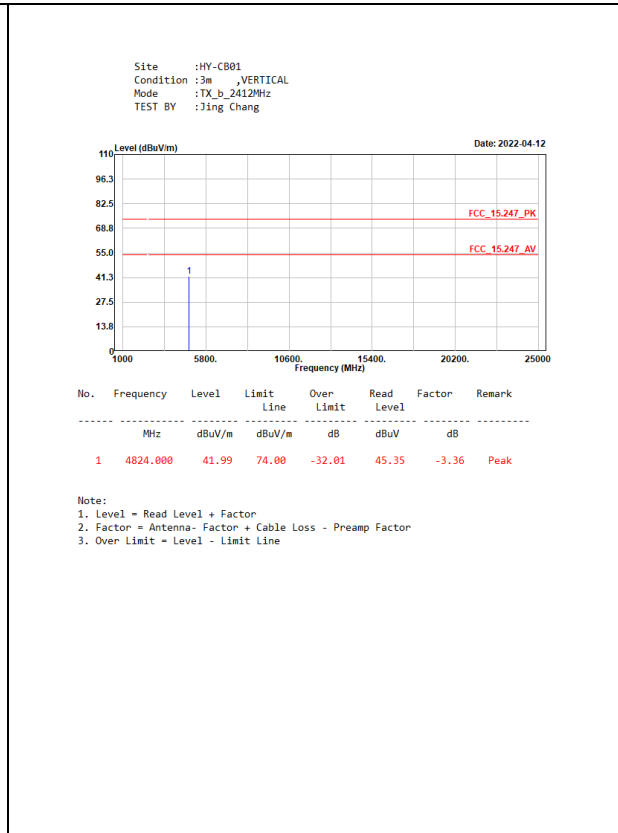
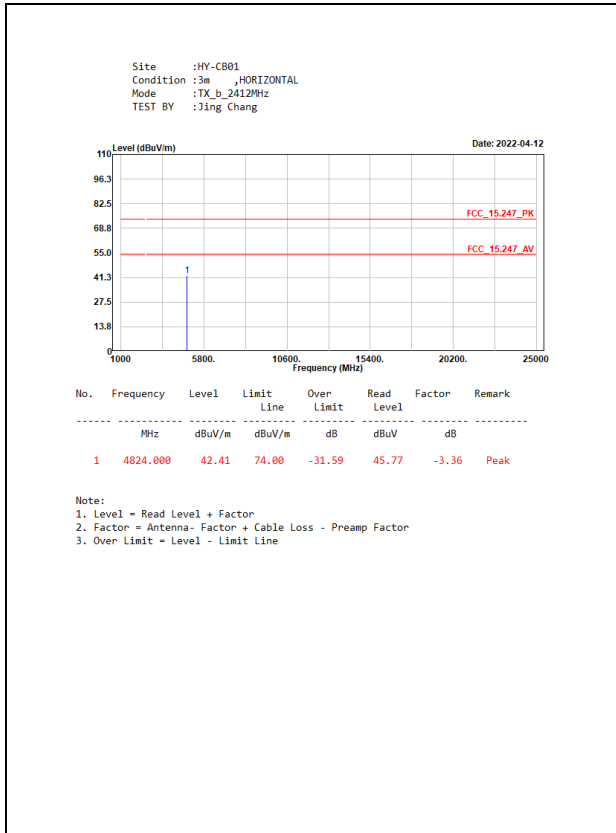
$VBW \geq 1/T$, when duty cycle $< 98 \%$

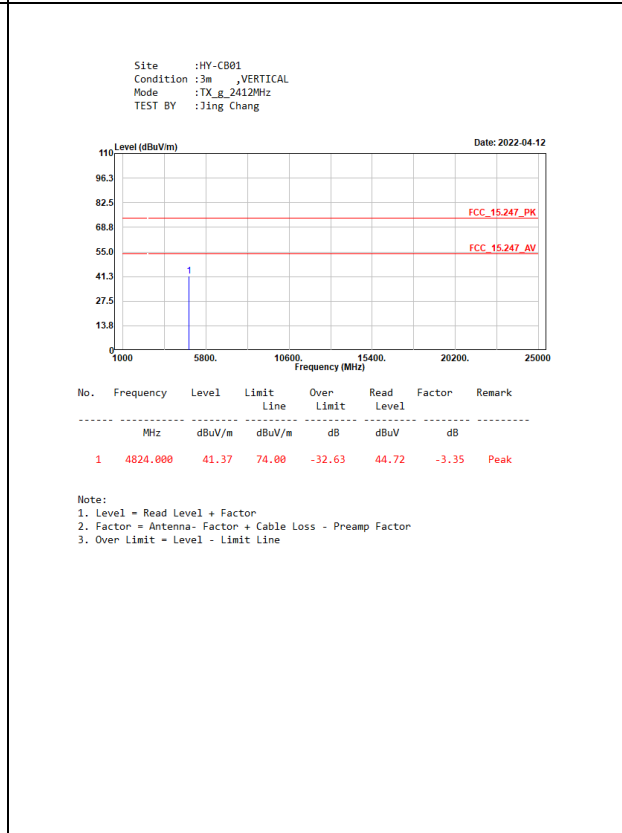
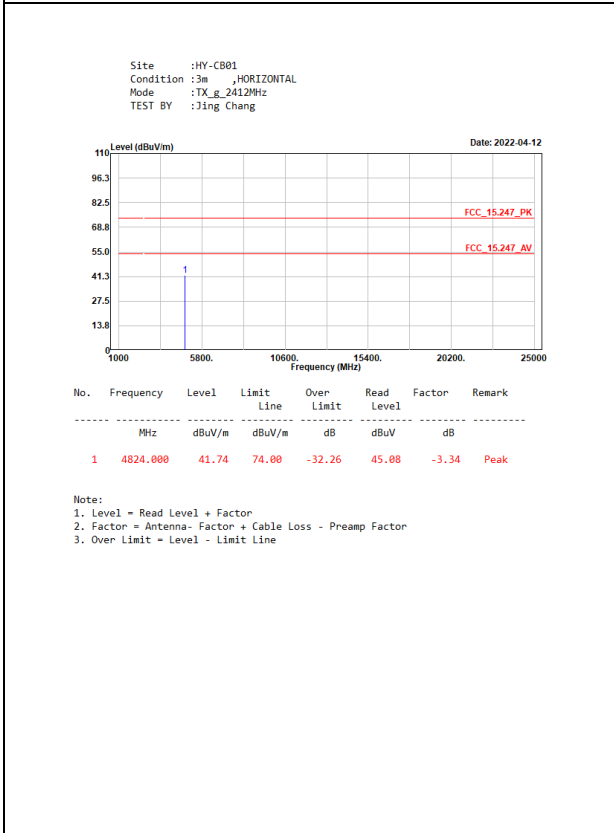
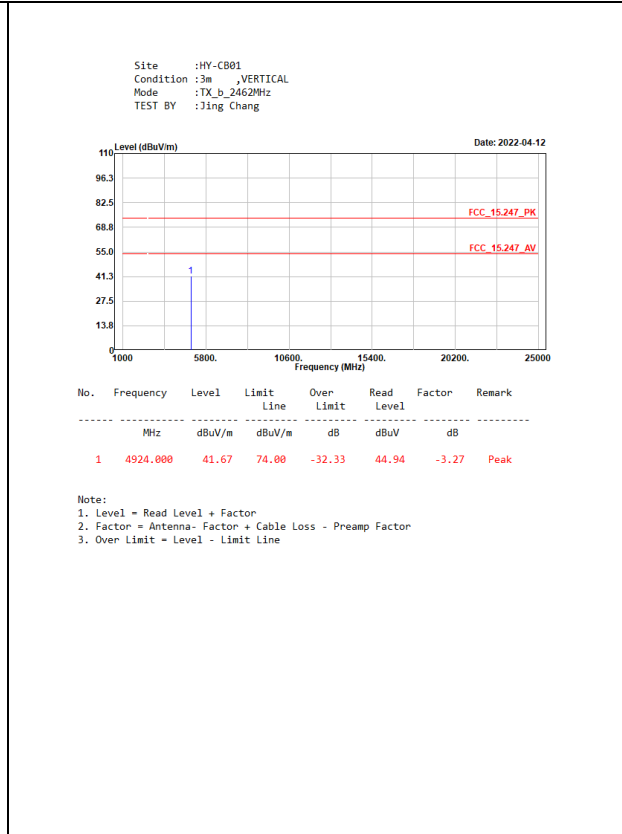
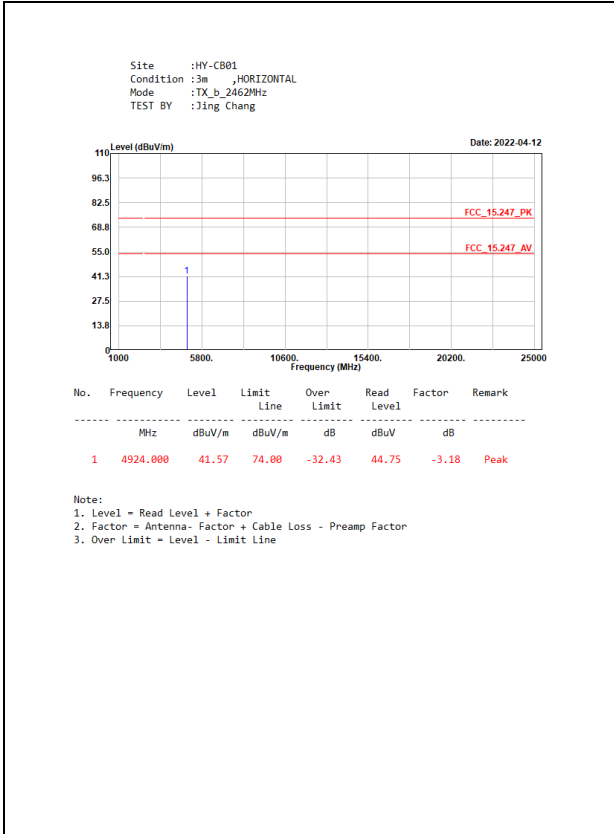
(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

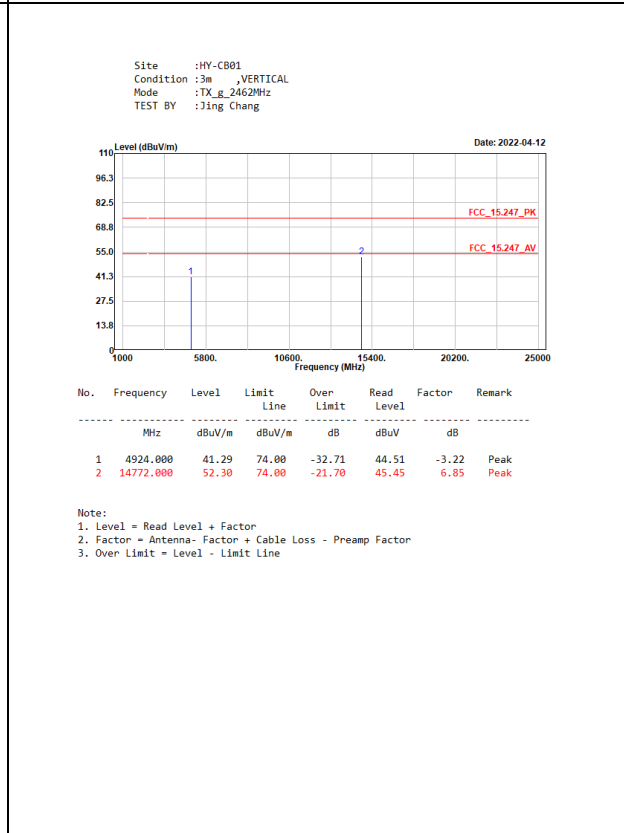
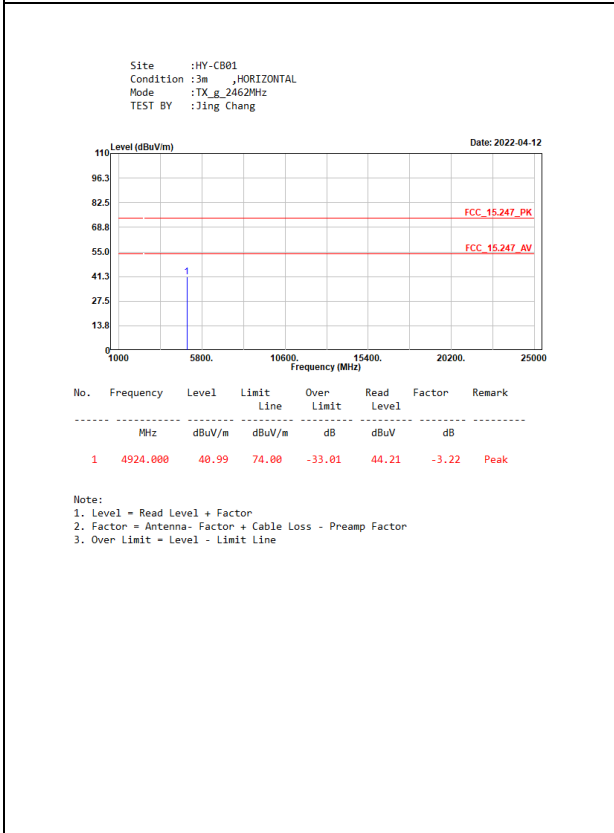
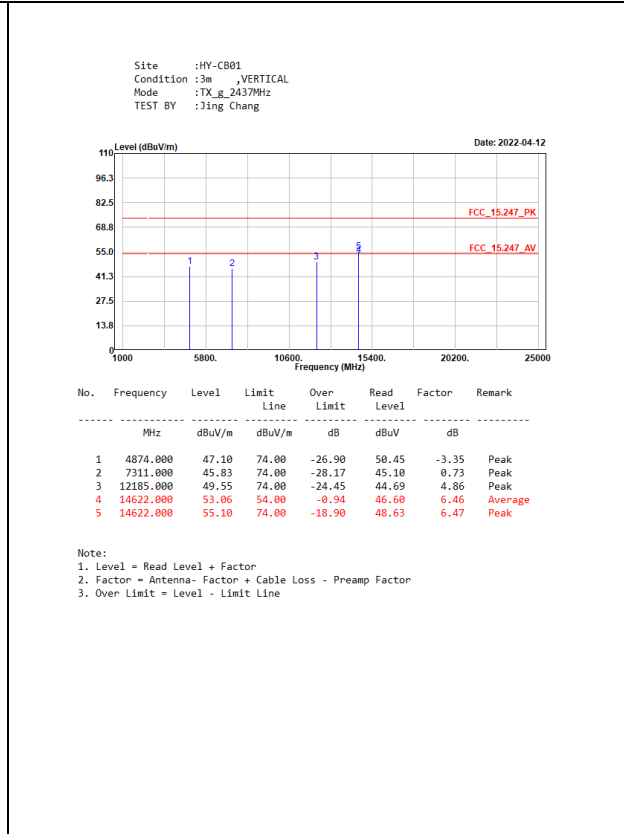
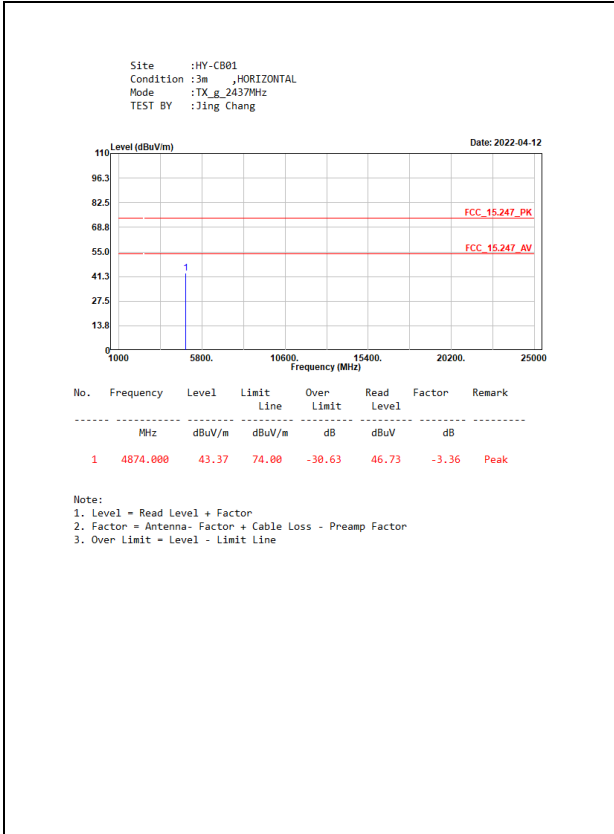
2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11b	53.47	0.6480	1543	2000
802.11g	93.10	1.5649	639	1000
802.11ax20	94.93	5.2400	191	200
802.11ax40	93.57	5.2400	191	200

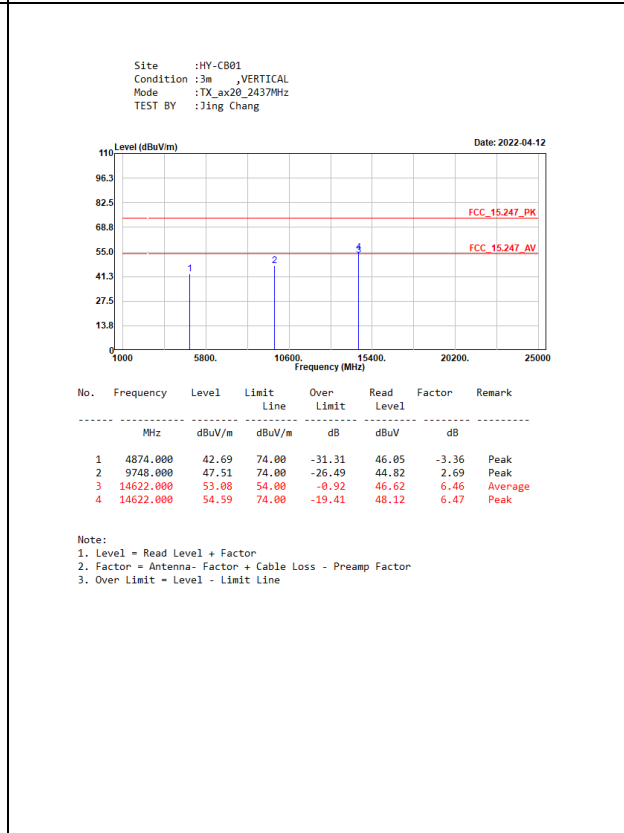
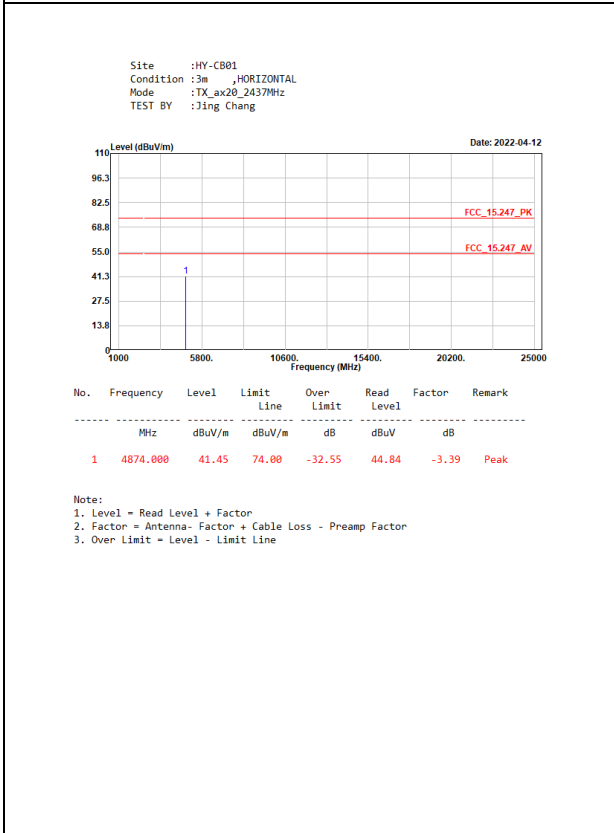
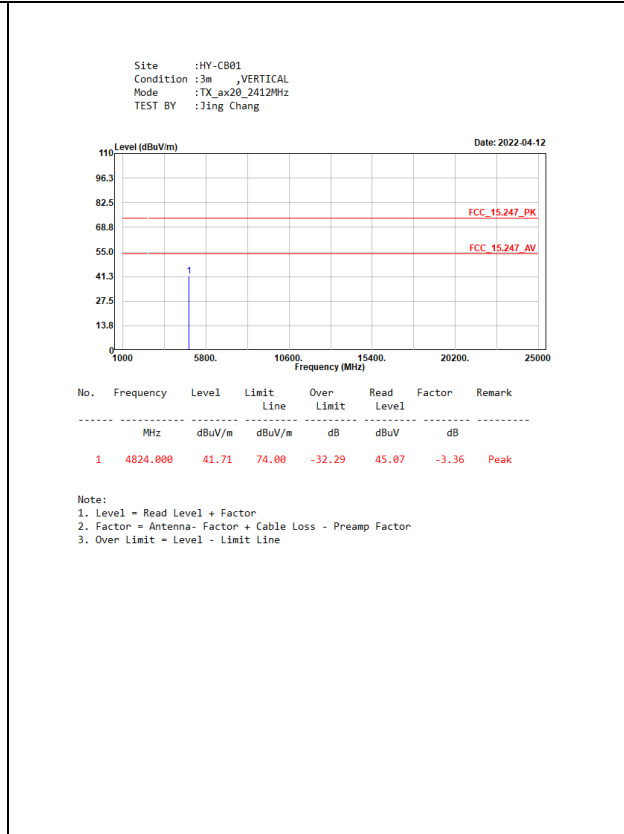
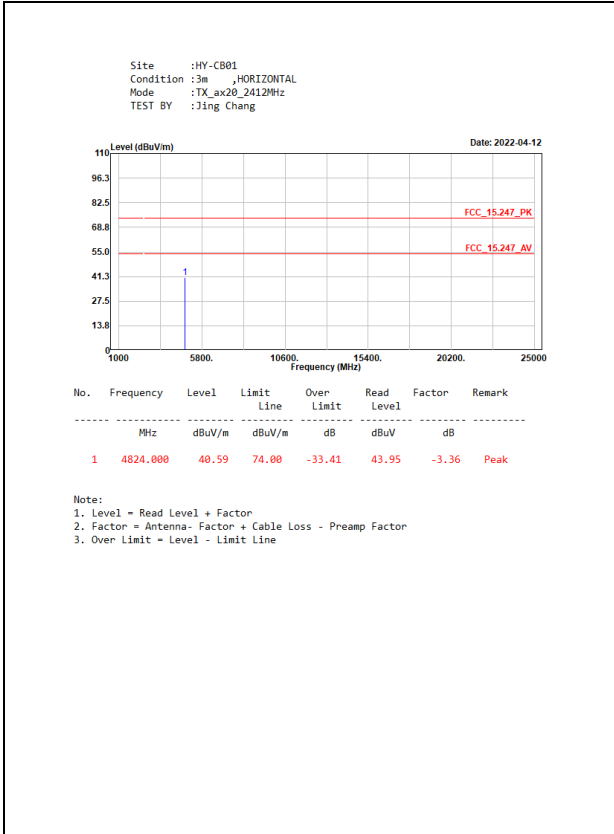
Note: Duty Cycle Refer to Section 9.

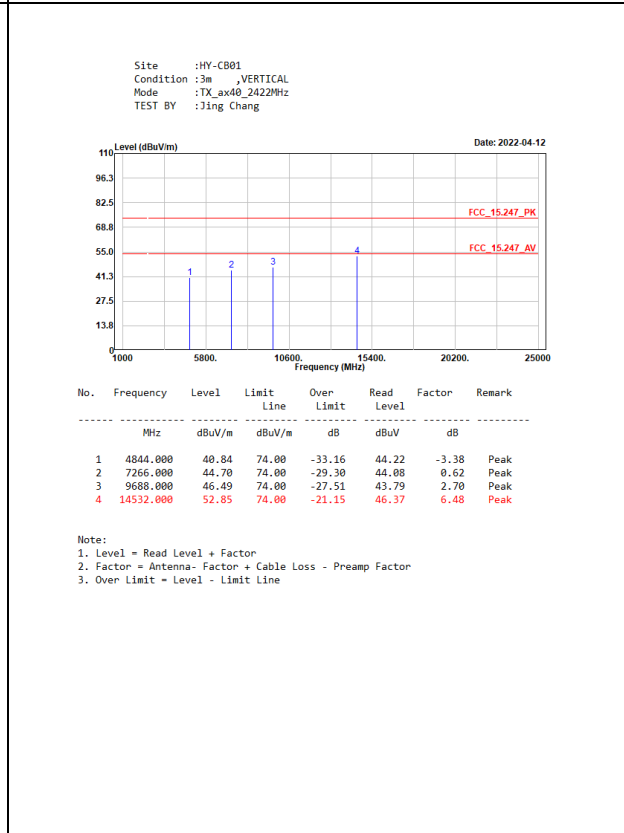
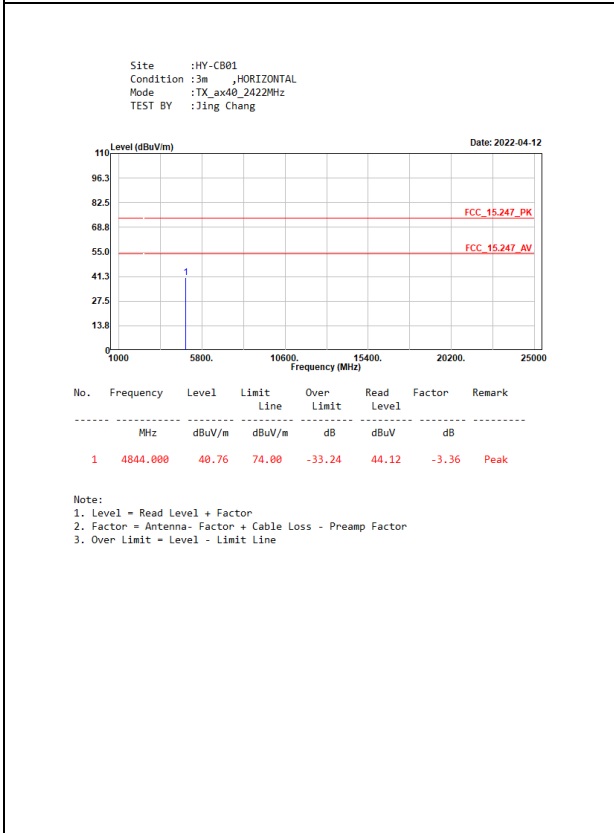
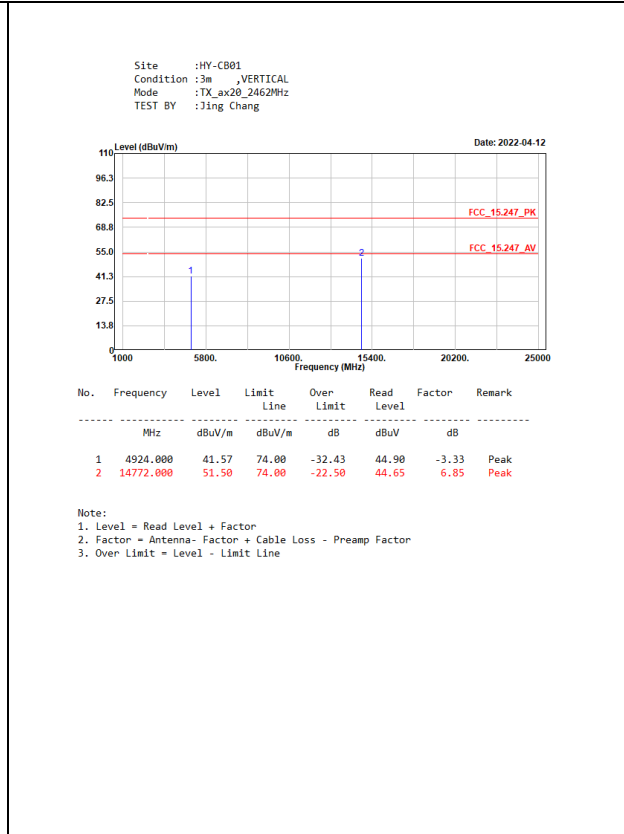
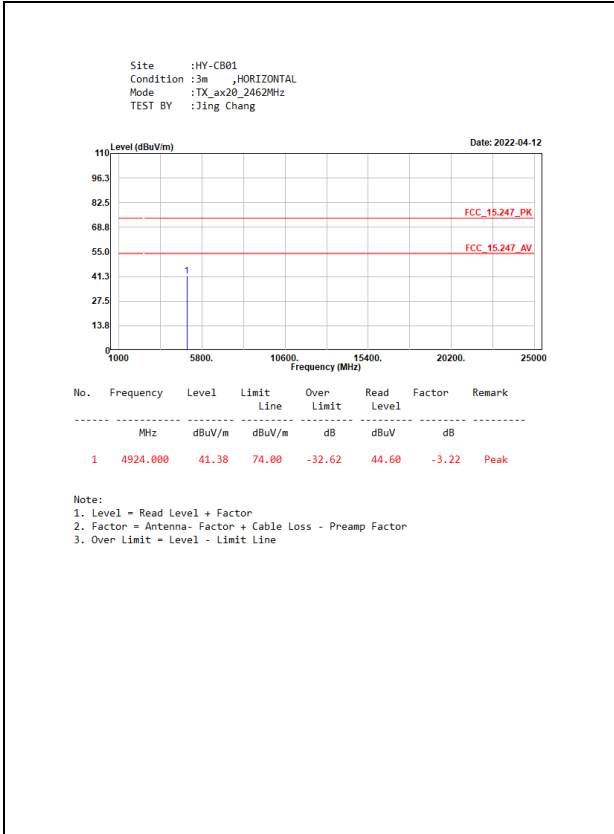
4.4. Test Result of Radiated Emission

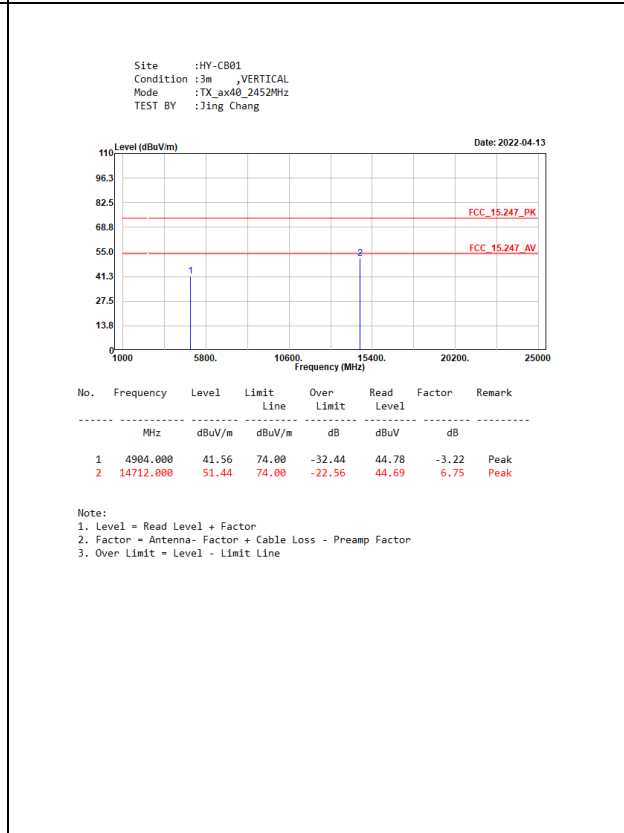
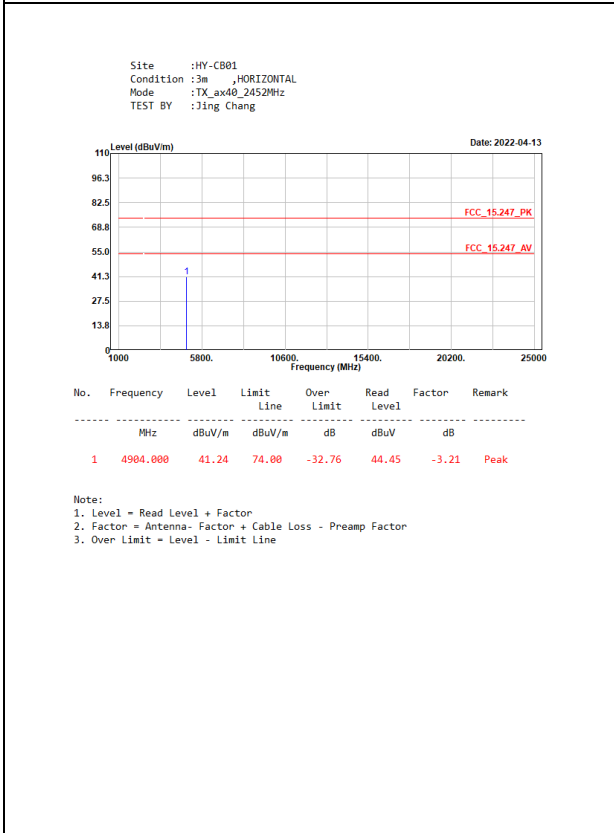
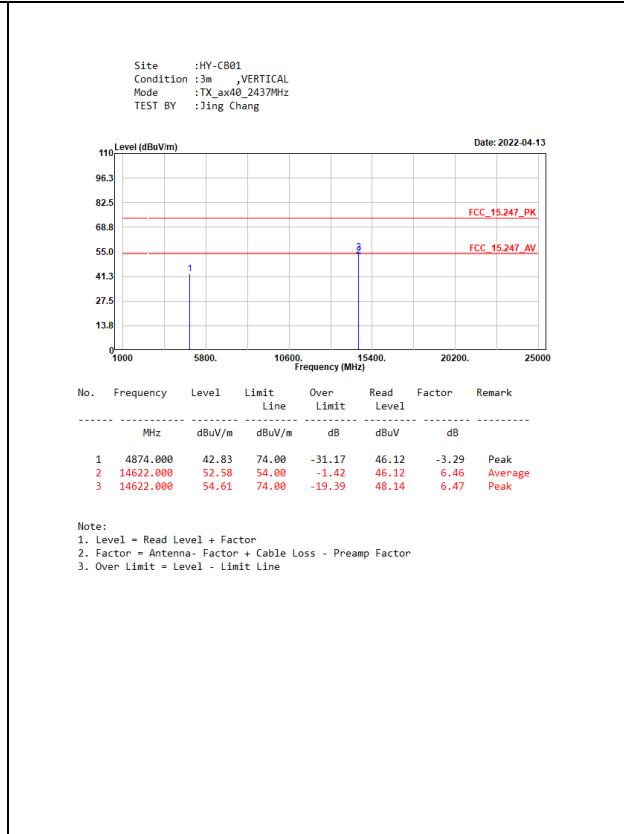
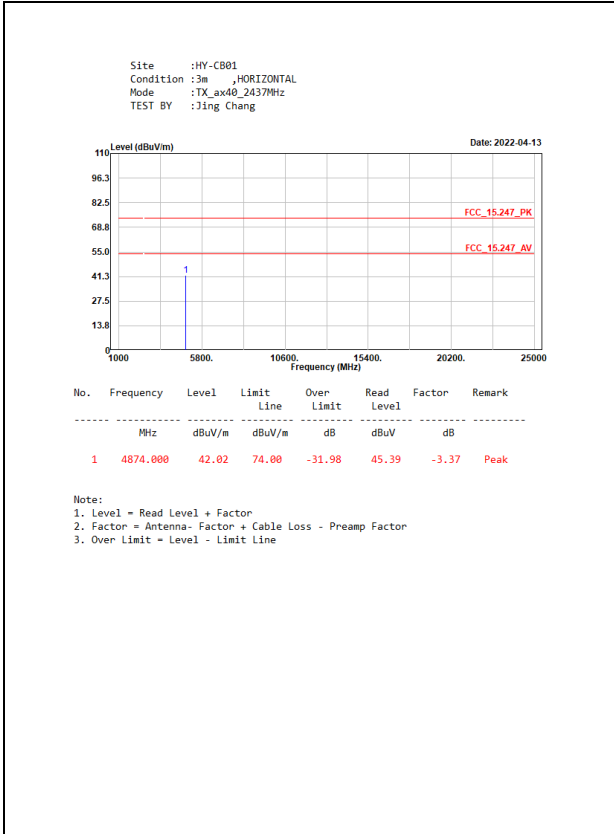


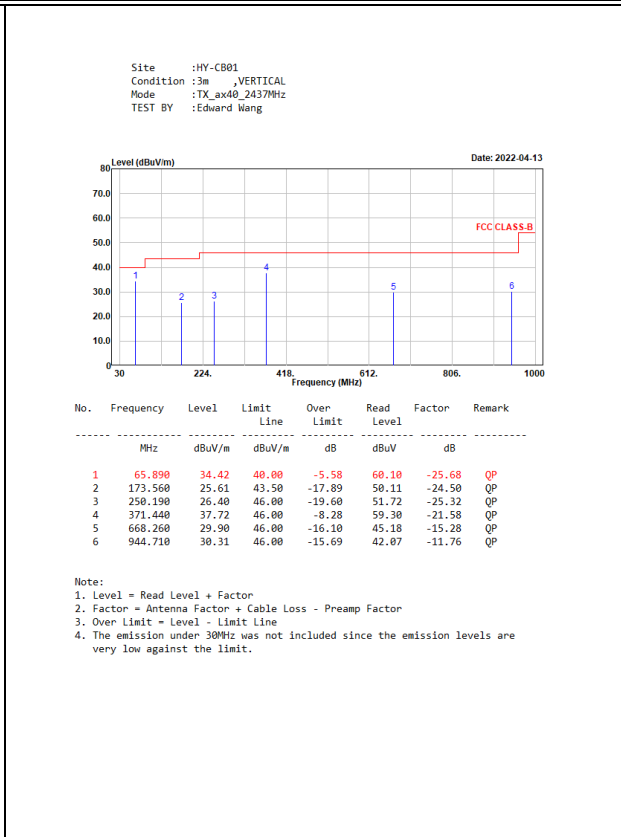
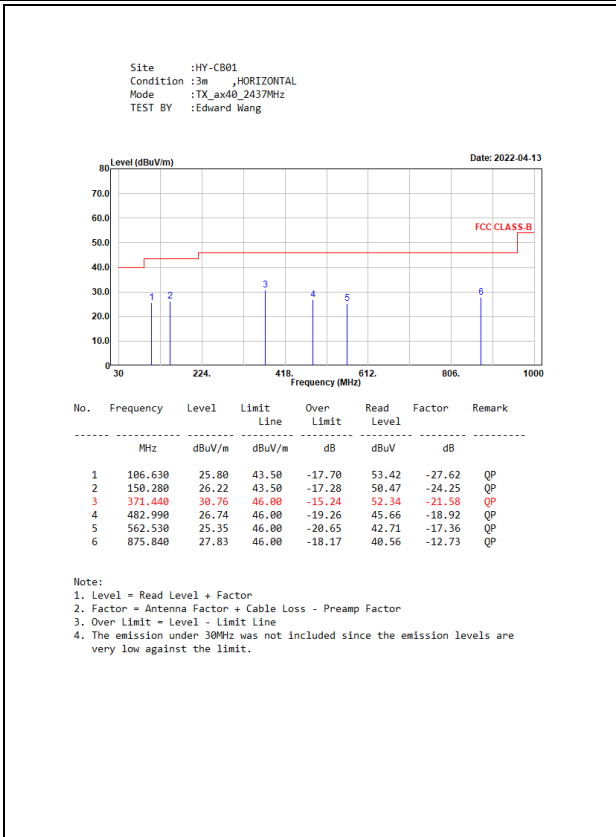








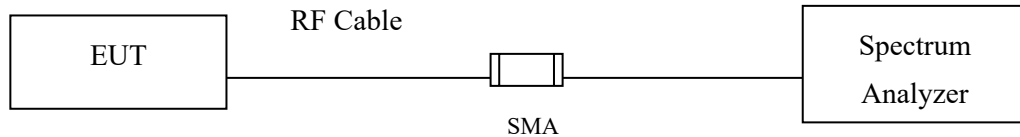




5. RF Antenna Conducted Test

5.1. Test Setup

RF antenna Conducted Measurement:



5.2. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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 a radiated measurement. 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)).

5.3. Test Procedure

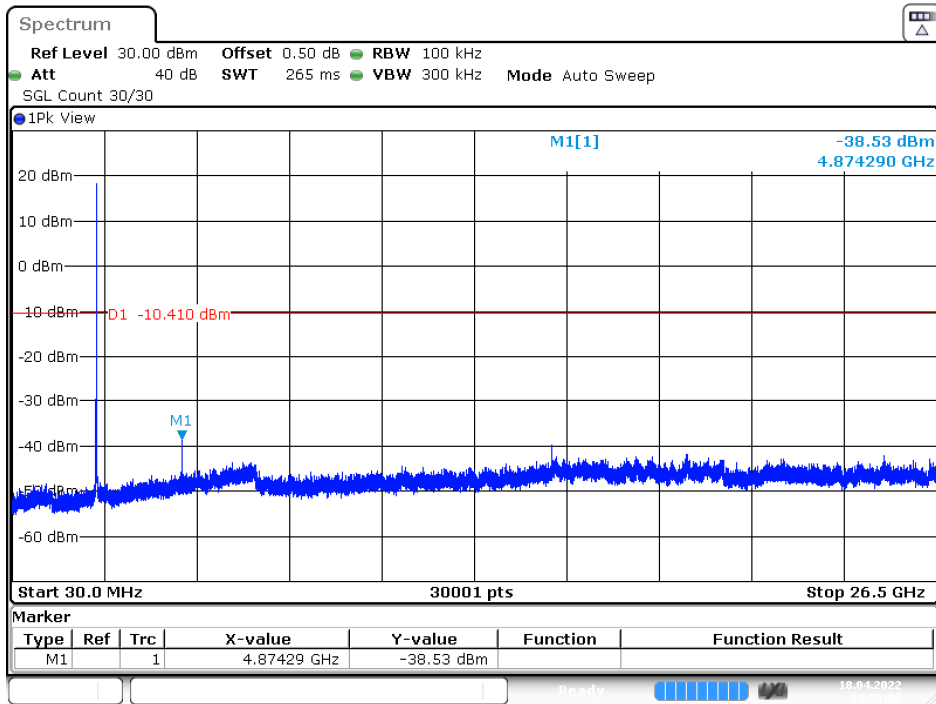
The EUT was tested according to C63.10:2013 Section 11.11 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Set VBW > RBW, scan up through 10th harmonic.

5.4. Test Result of RF antenna conducted test

Product : RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
 Test Item : RF antenna conducted test
 Test Mode : Mode 1: Transmit (802.11b)-CDD
 Test Date : 2022/04/18

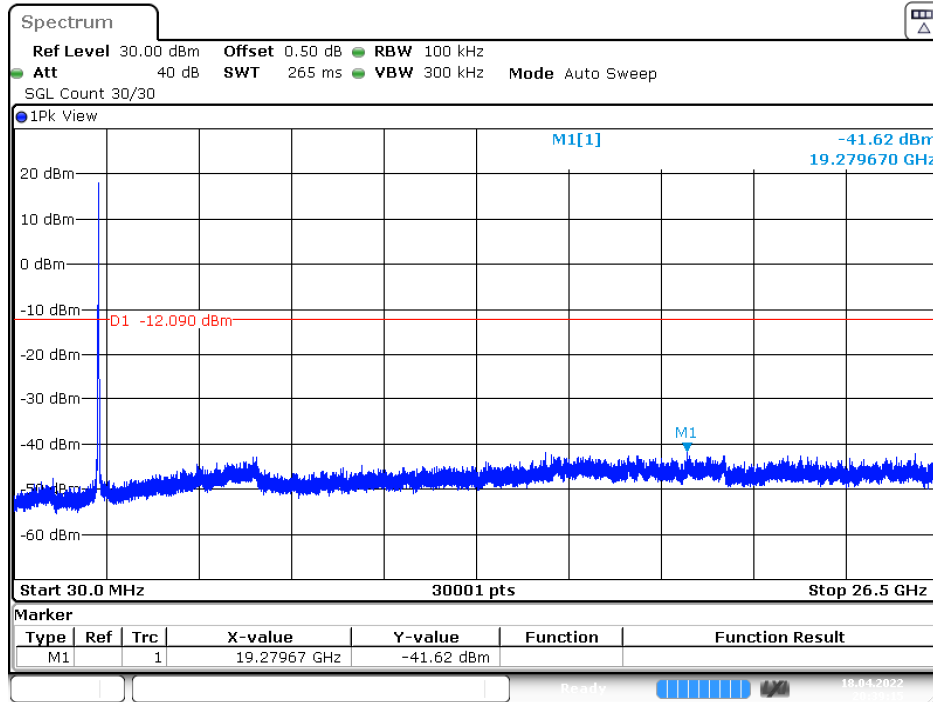
Channel 06 (2437MHz)



Date: 18.APR.2022 19:56:07

Product : RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
 Test Item : RF Antenna Conducted Spurious
 Test Mode : Mode 2: Transmit (802.11g)-CDD
 Test Date : 2022/04/18

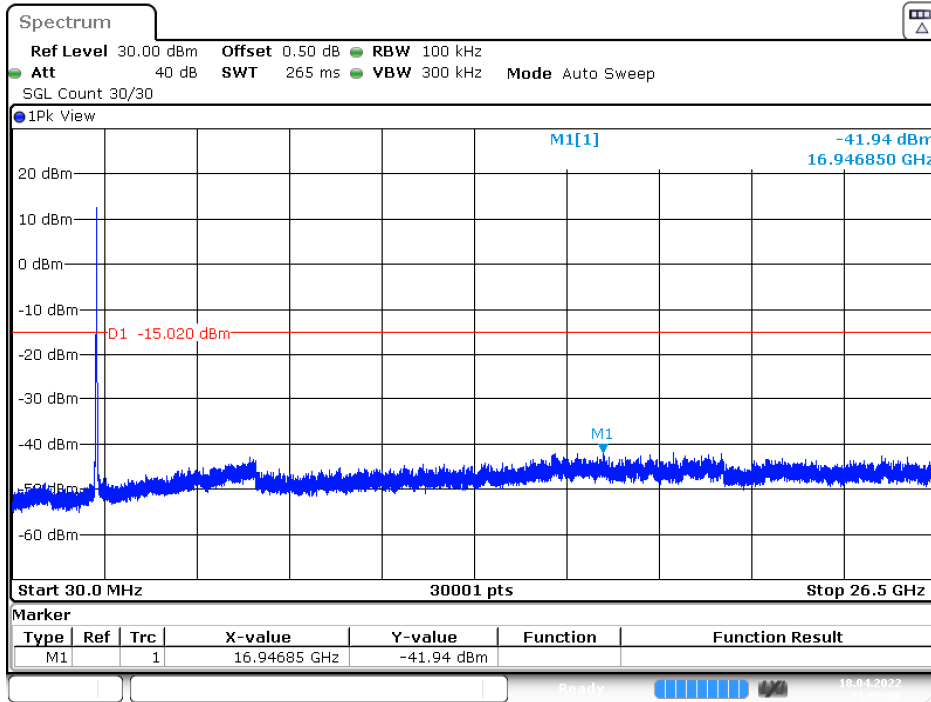
Channel 06 (2437MHz)



Date: 18.APR.2022 20:39:16

Product : RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
 Test Item : RF Antenna Conducted Spurious
 Test Mode : Mode 3: Transmit (802.11ax-20BW)-CDD
 Test Date : 2022/04/18

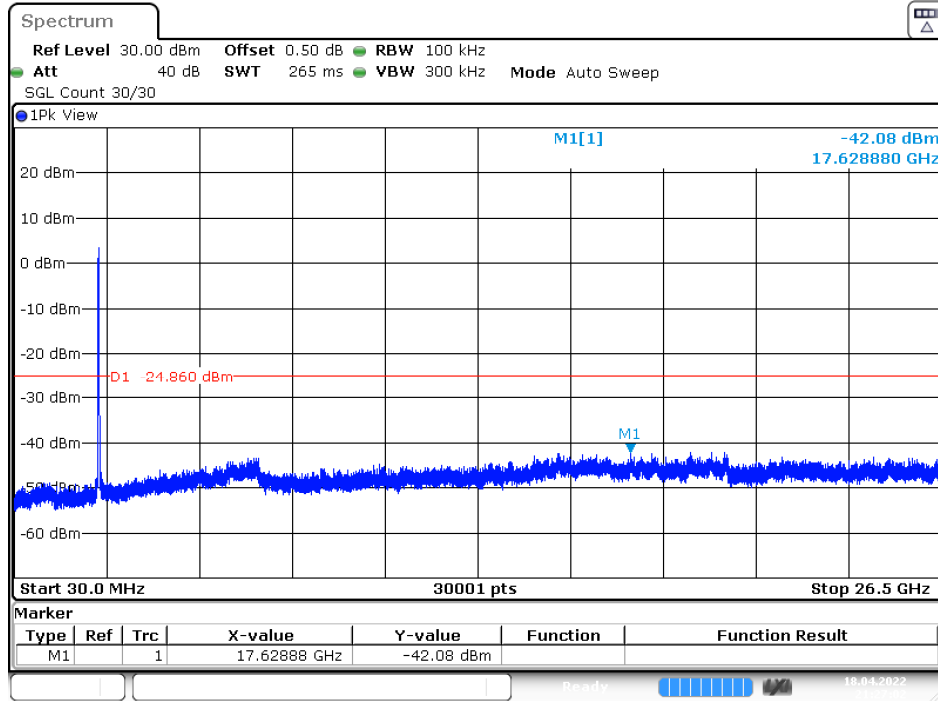
Channel 06 (2437MHz)



Date: 18.APR.2022 21:05:06

Product : RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
 Test Item : RF Antenna Conducted Spurious
 Test Mode : Mode 4: Transmit (802.11ax-40BW)-CDD
 Test Date : 2022/04/18

Channel 06 (2437MHz)

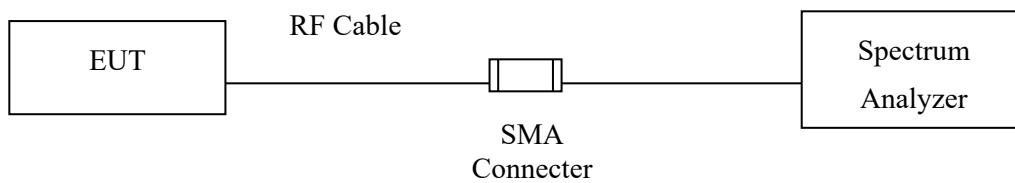


Date: 18.APR.2022 21:27:02

6. Band Edge

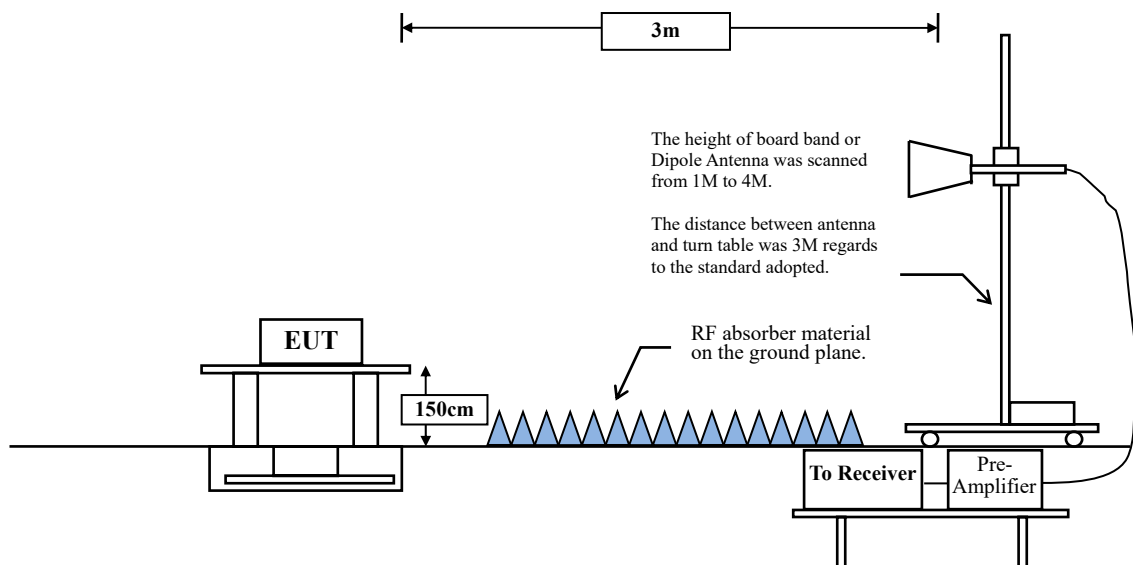
6.1. Test Setup

RF Conducted Measurement



RF Radiated Measurement:

Above 1GHz



6.2. 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)).

6.3. 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 $\geq 98 \%$

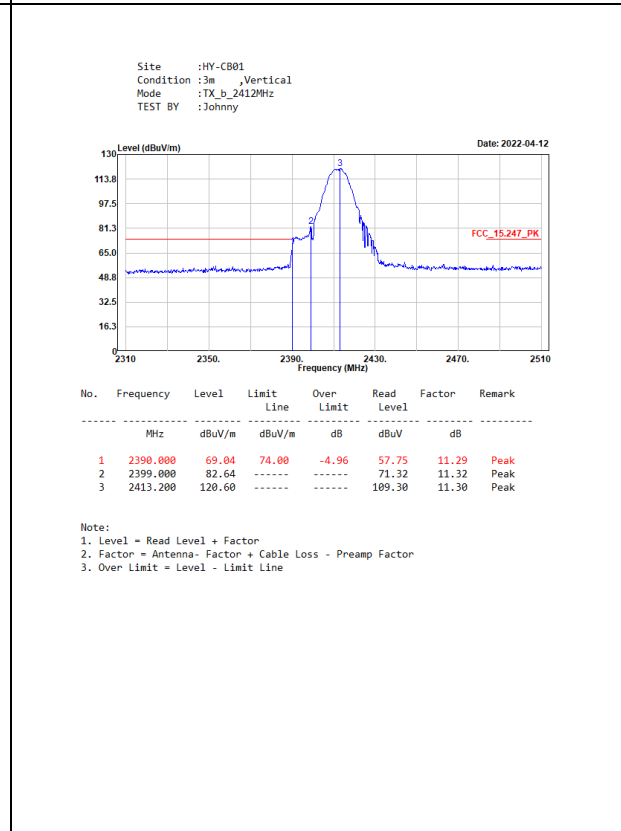
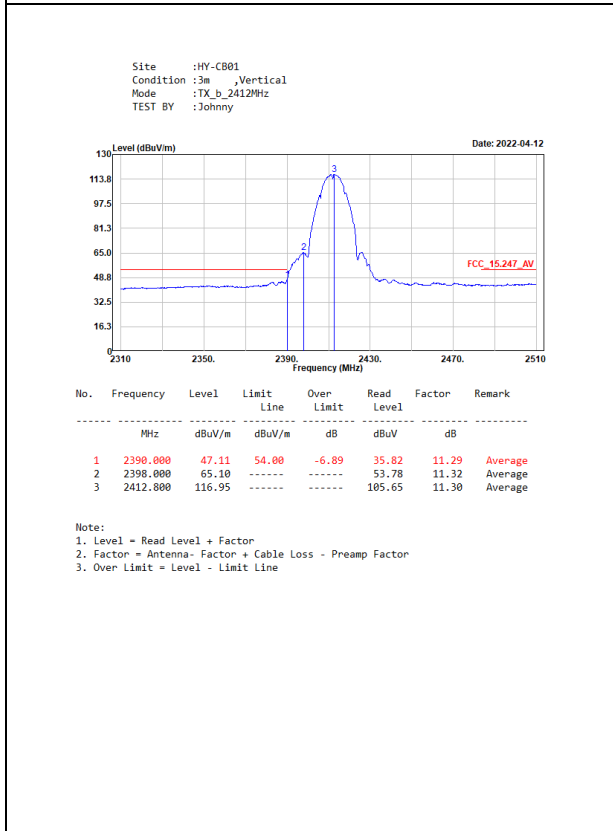
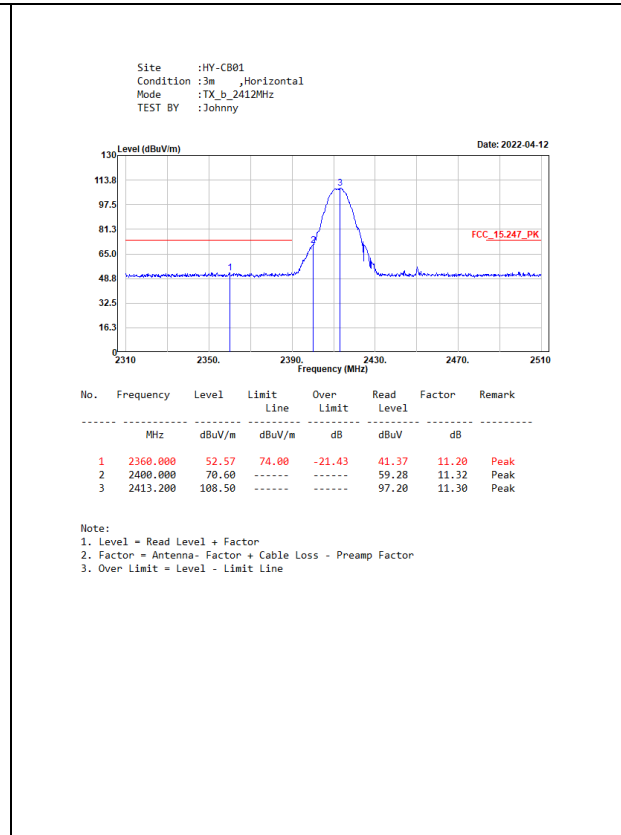
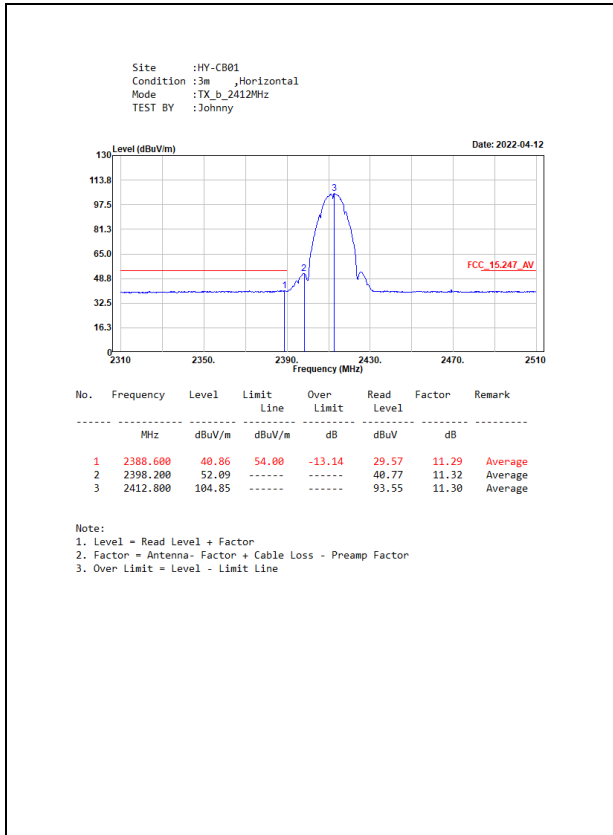
$VBW \geq 1/T$, when duty cycle $< 98 \%$

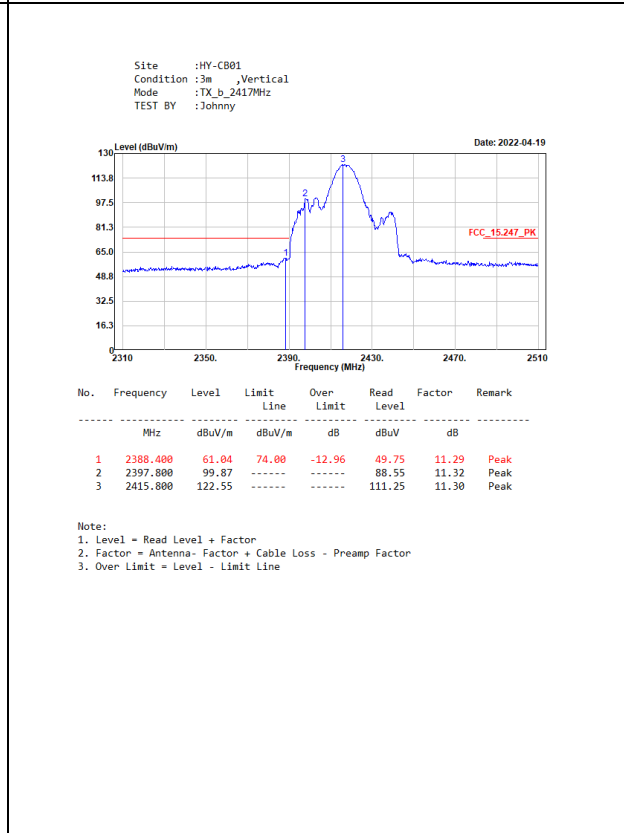
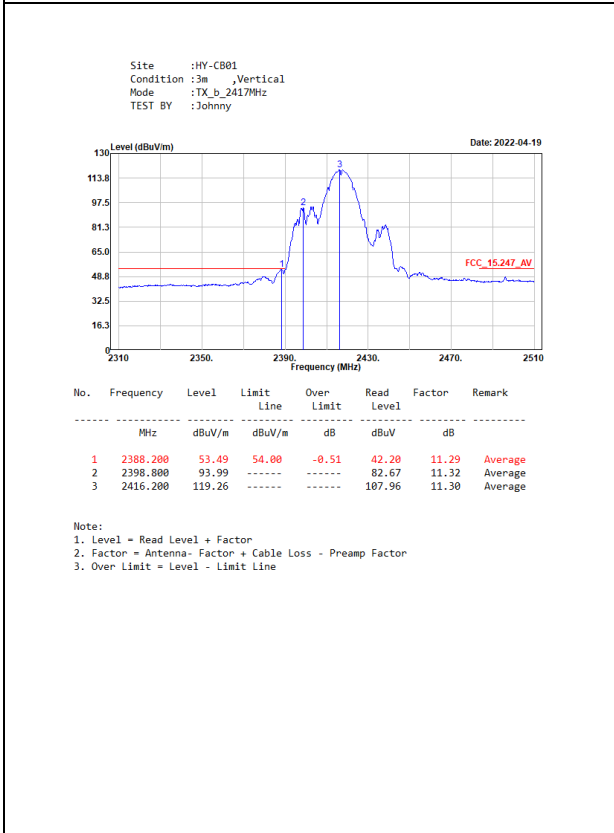
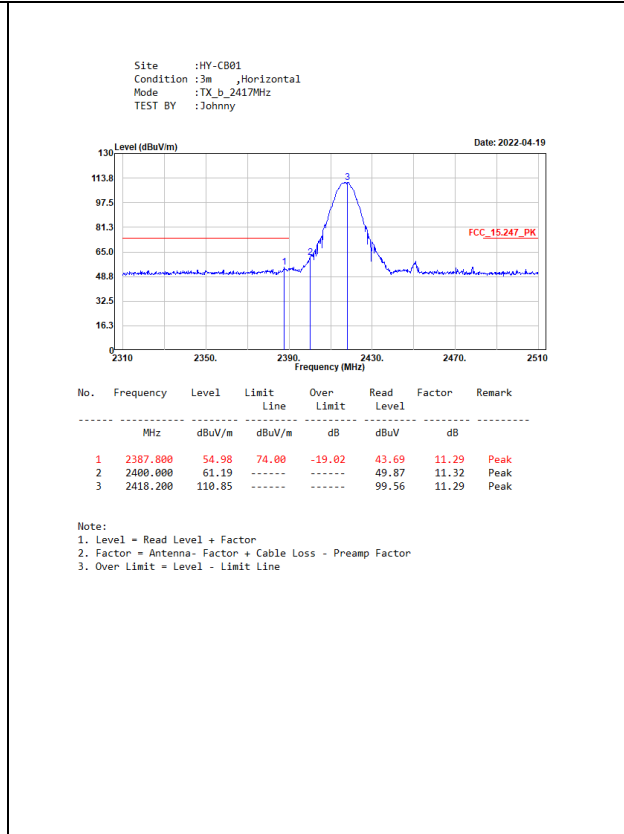
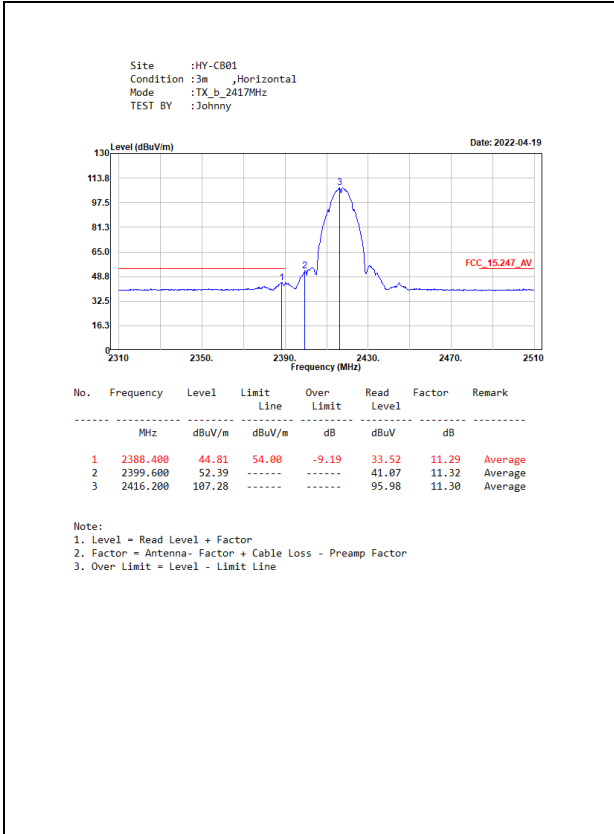
(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

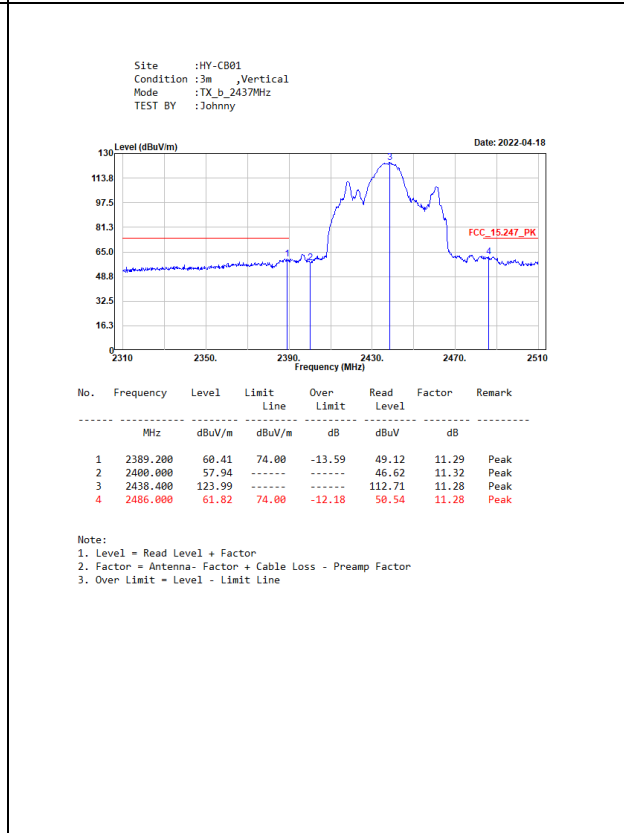
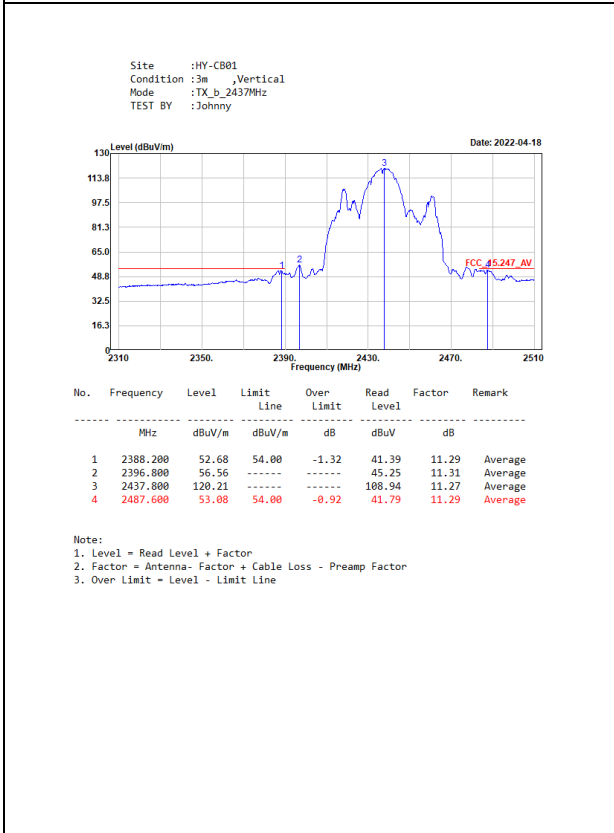
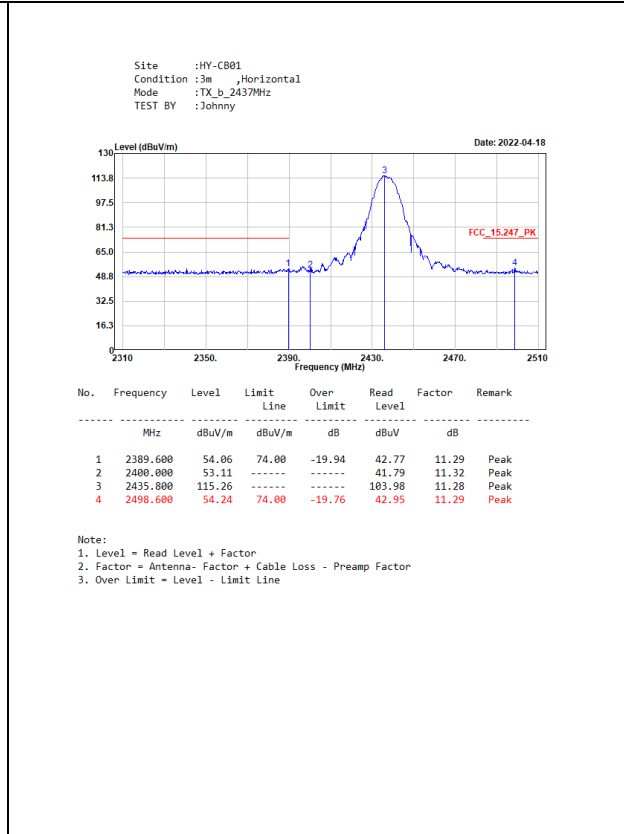
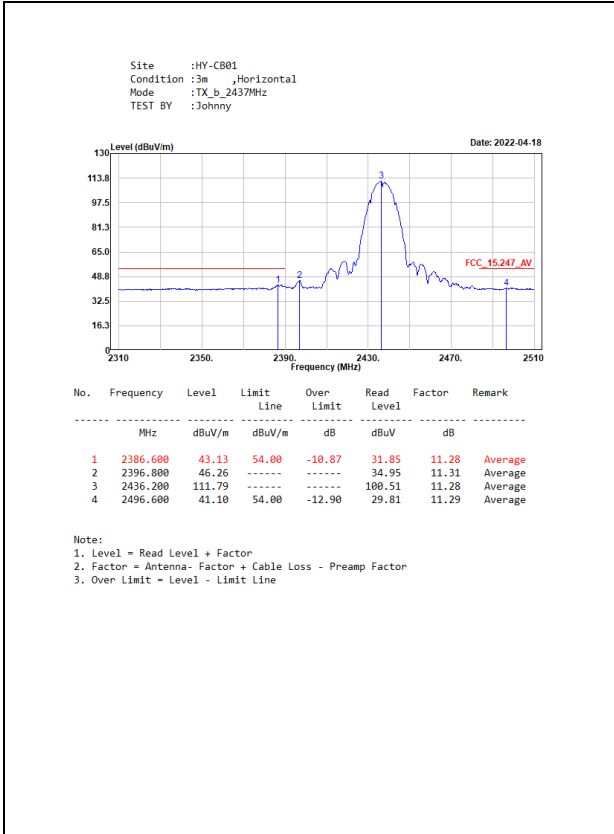
2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11b	53.47	0.6480	1543	2000
802.11g	93.10	1.5649	639	1000
802.11ax20	94.93	5.2400	191	200
802.11ax40	93.57	5.2400	191	200

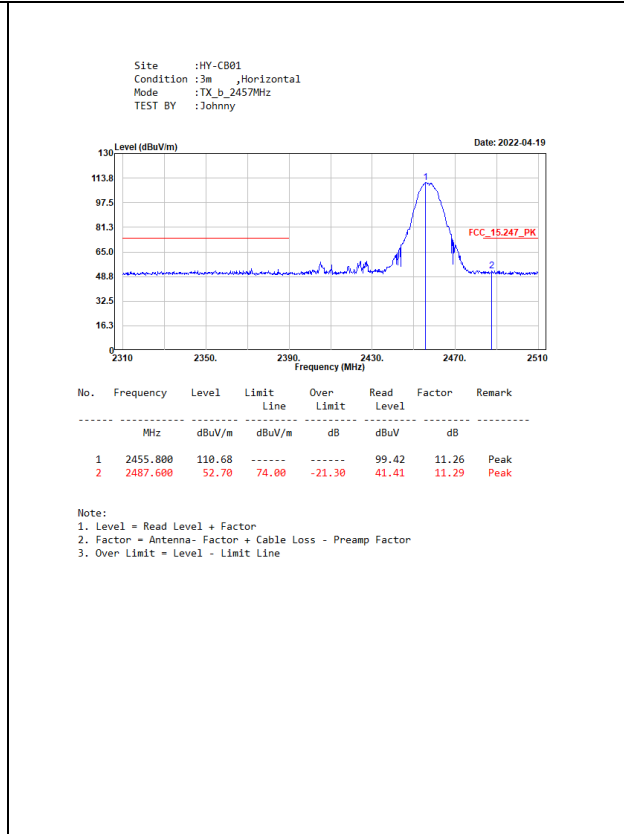
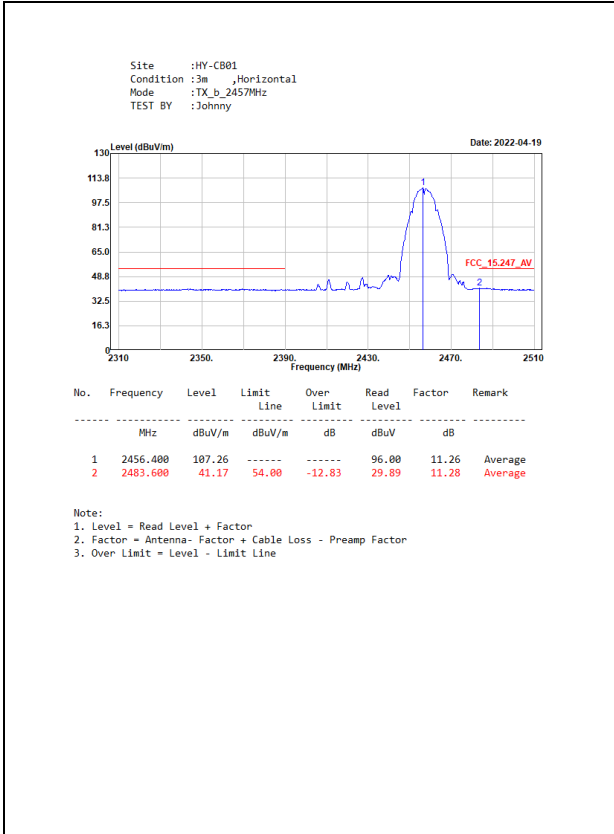
Note: Duty Cycle Refer to Section 9.

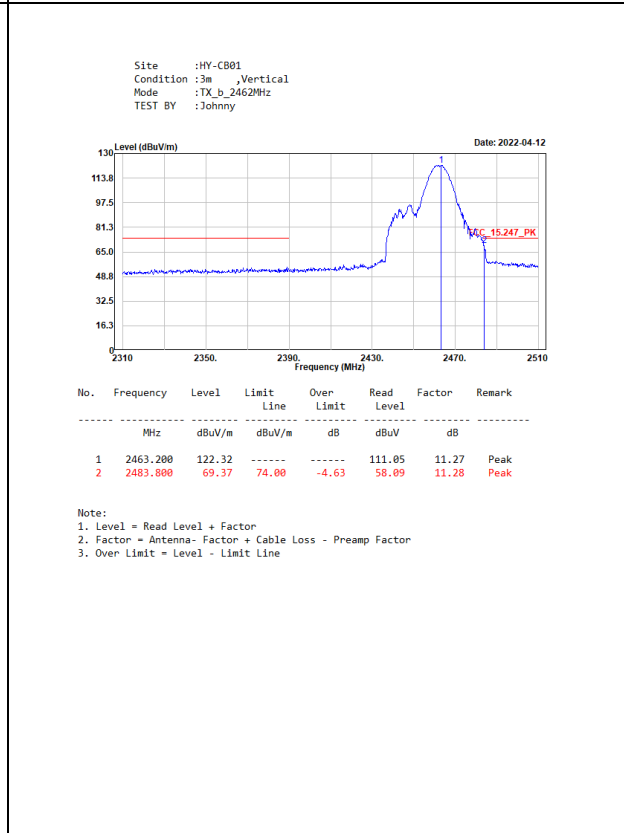
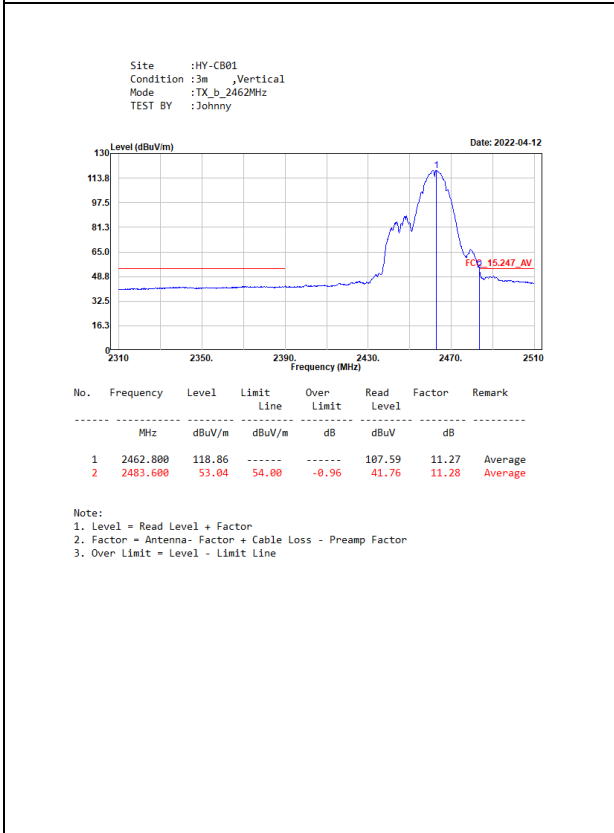
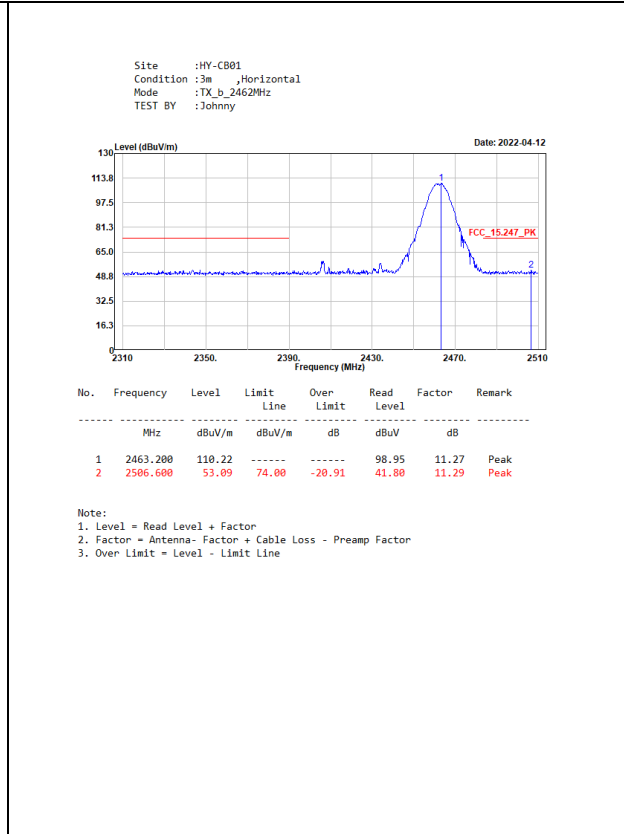
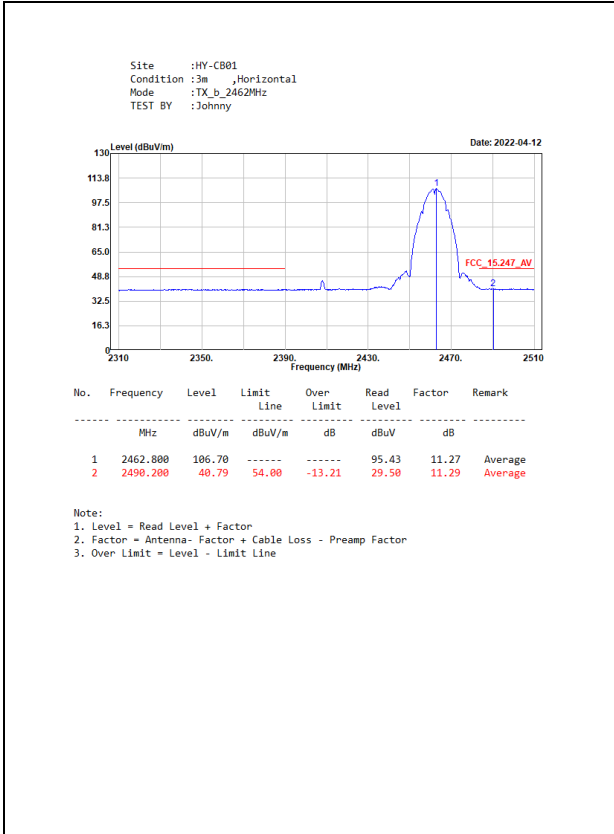
6.4. Test Result of Band Edge

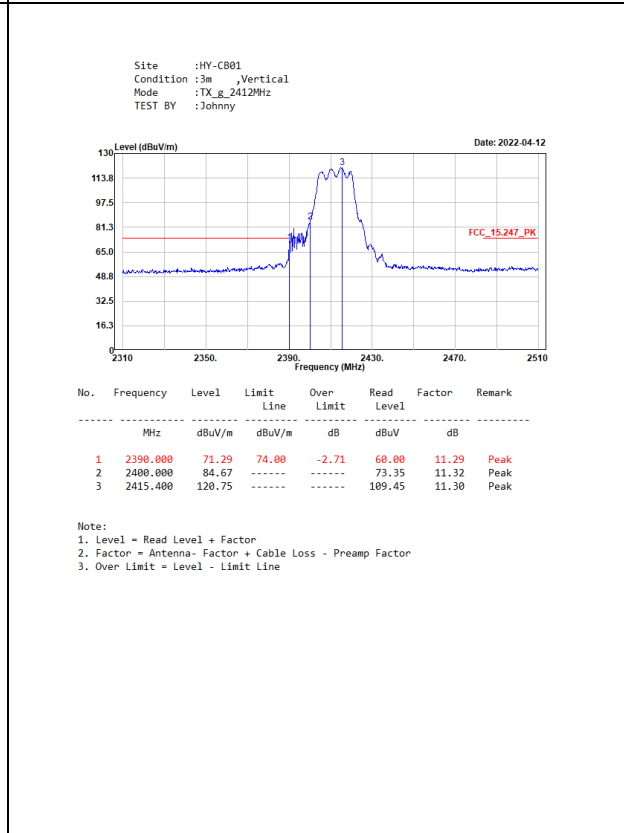
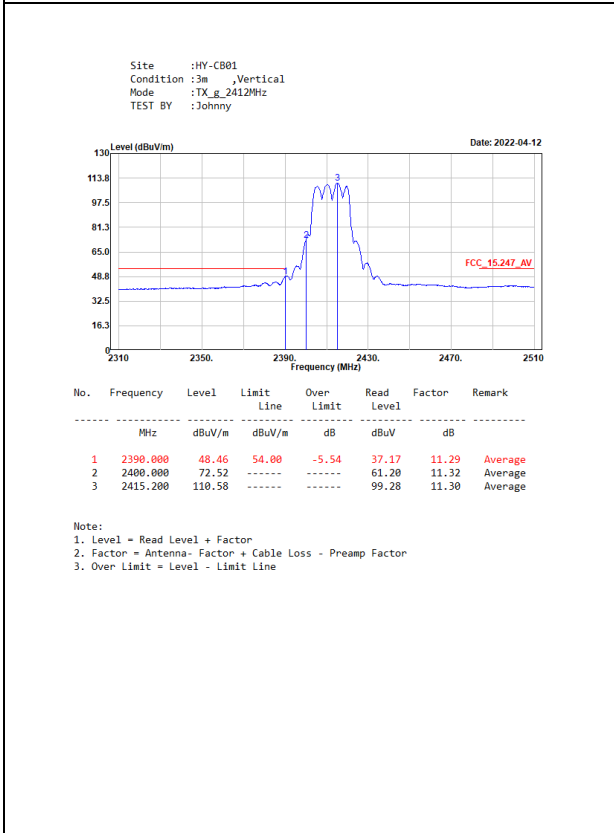
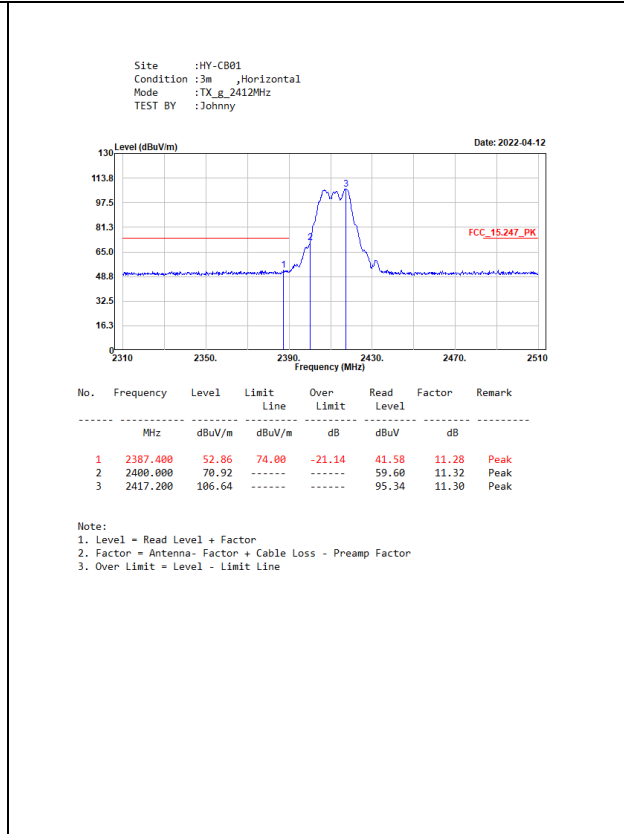
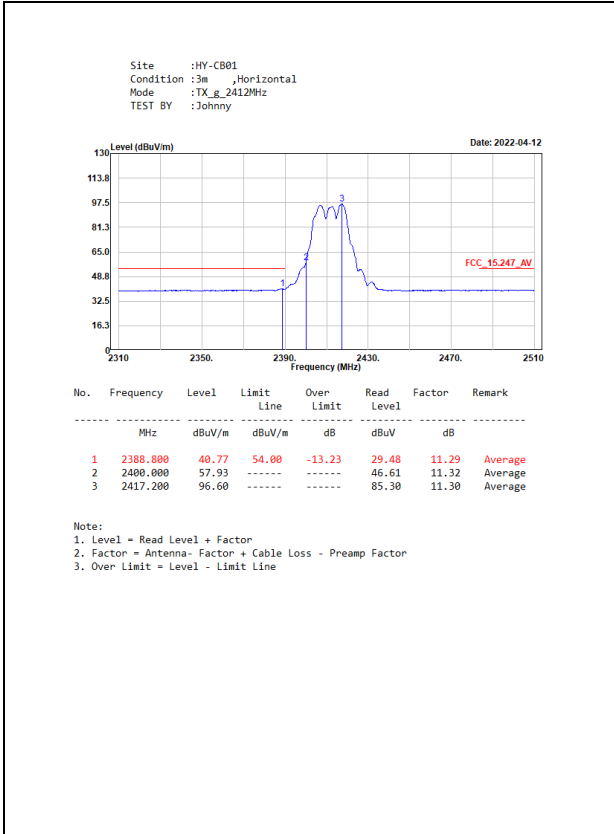


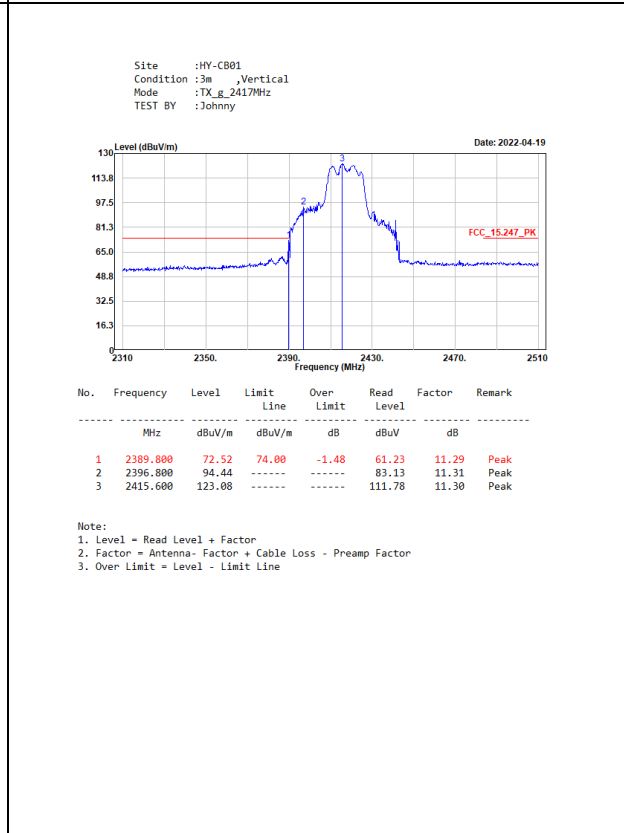
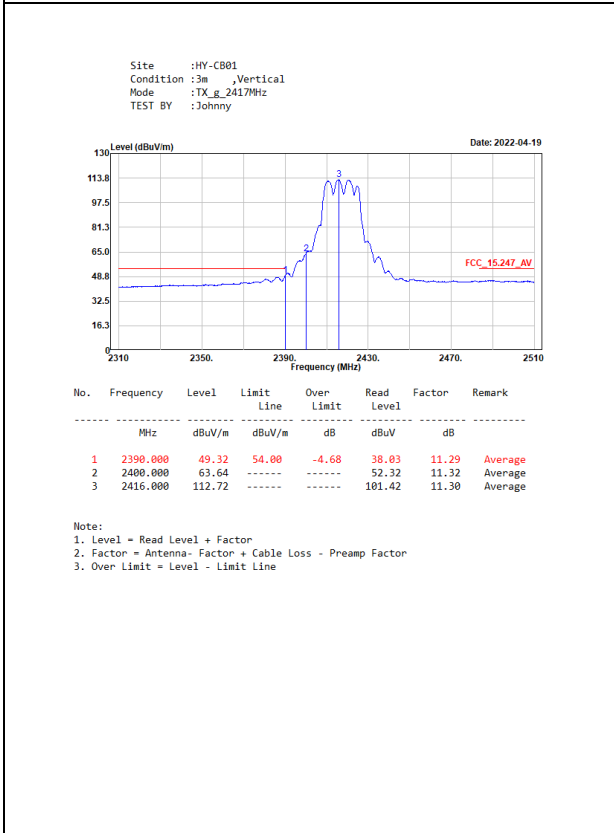
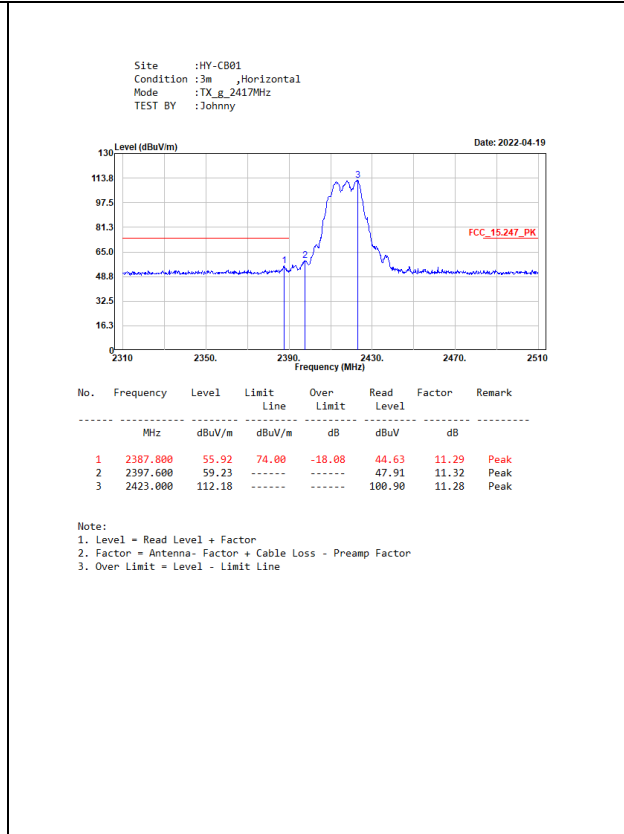
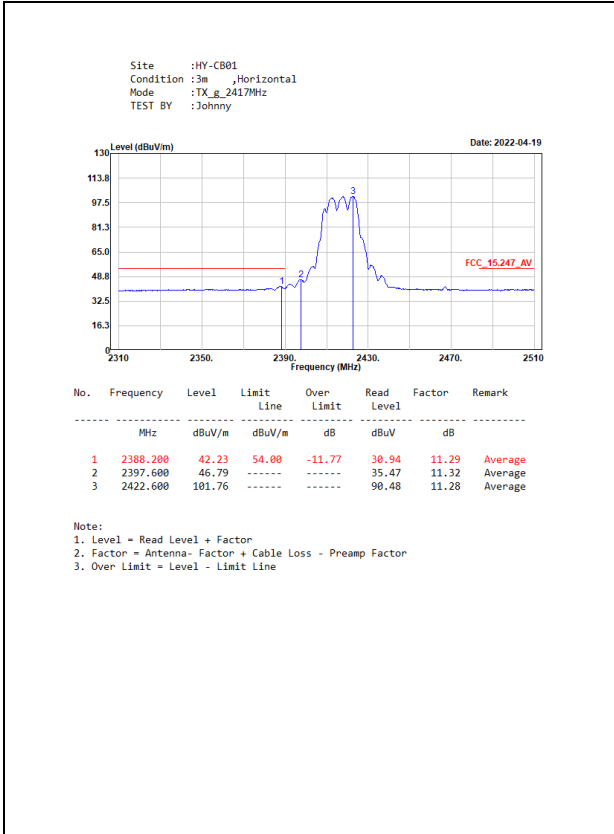


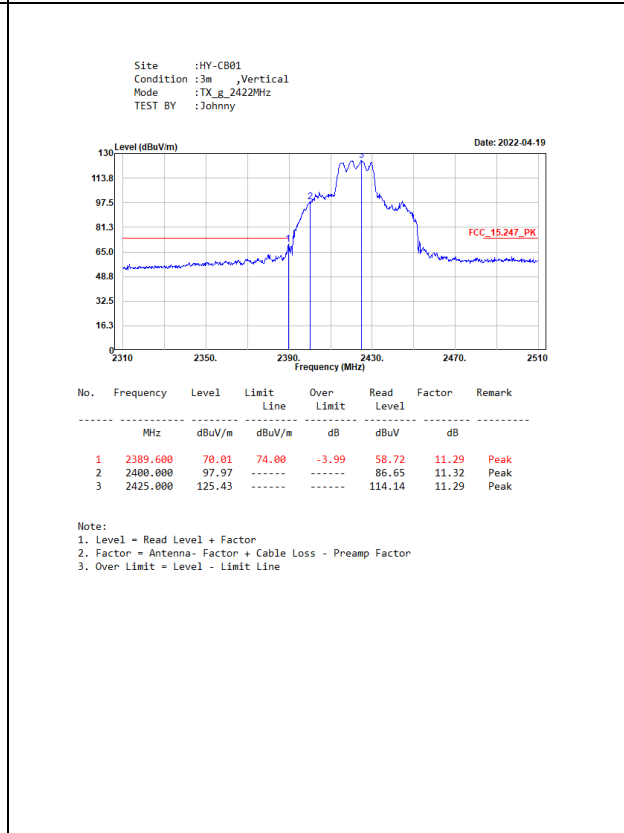
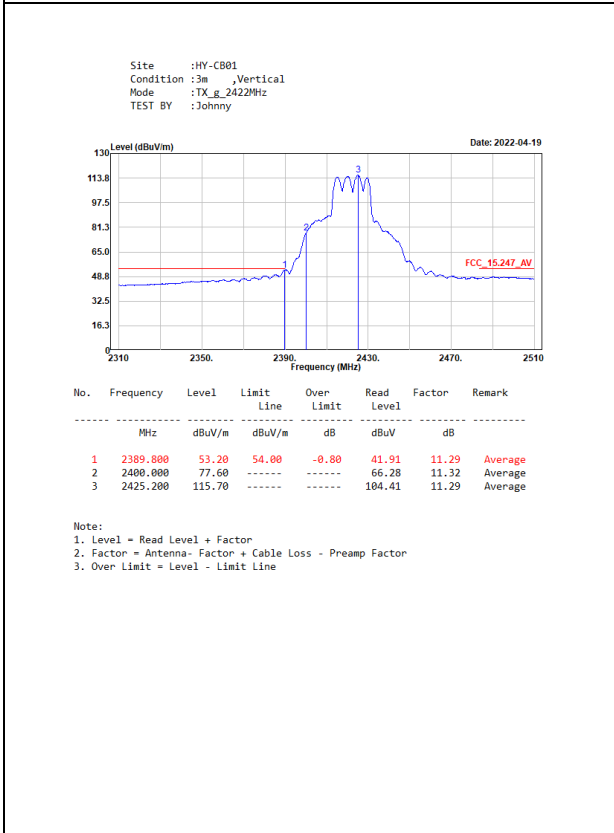
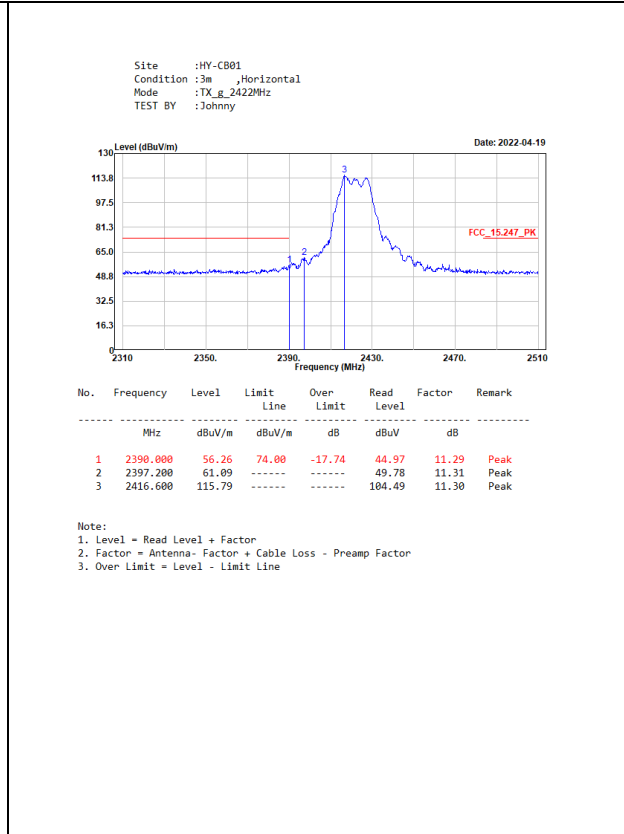
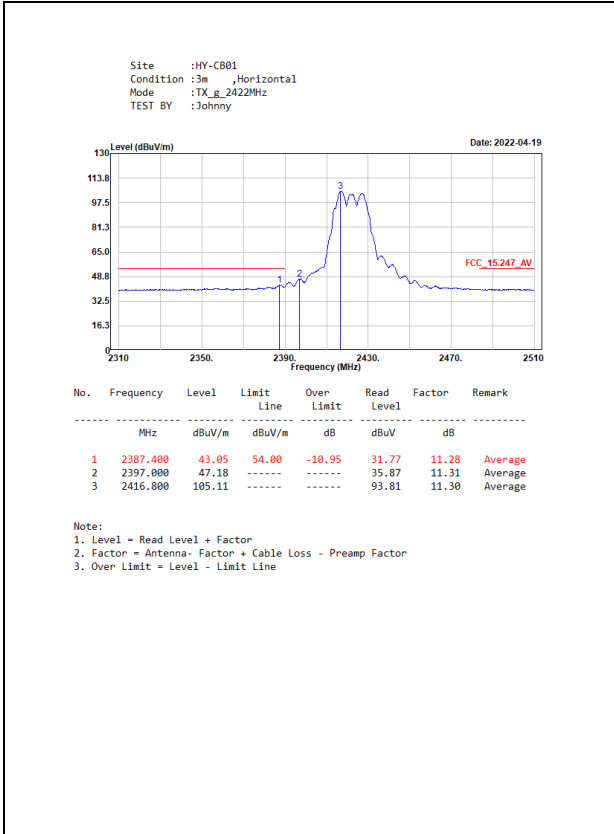


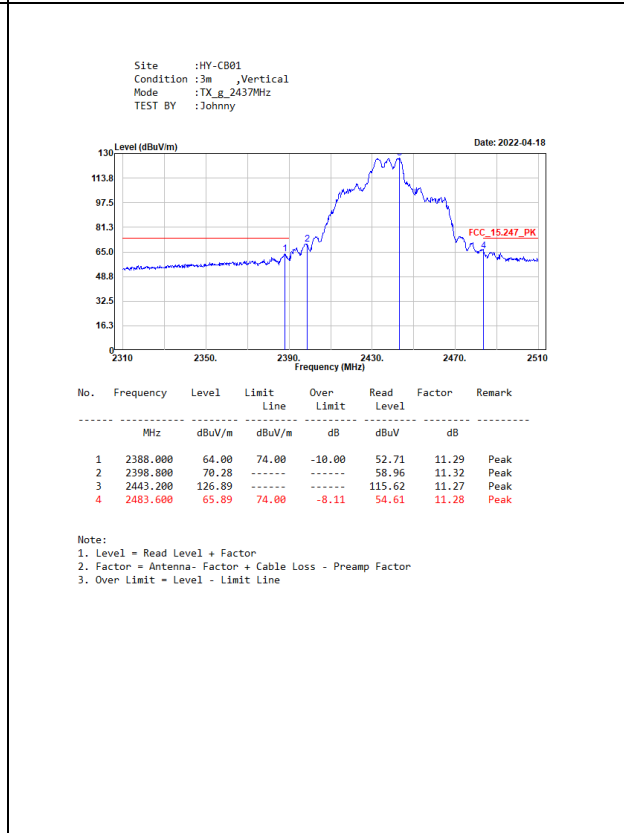
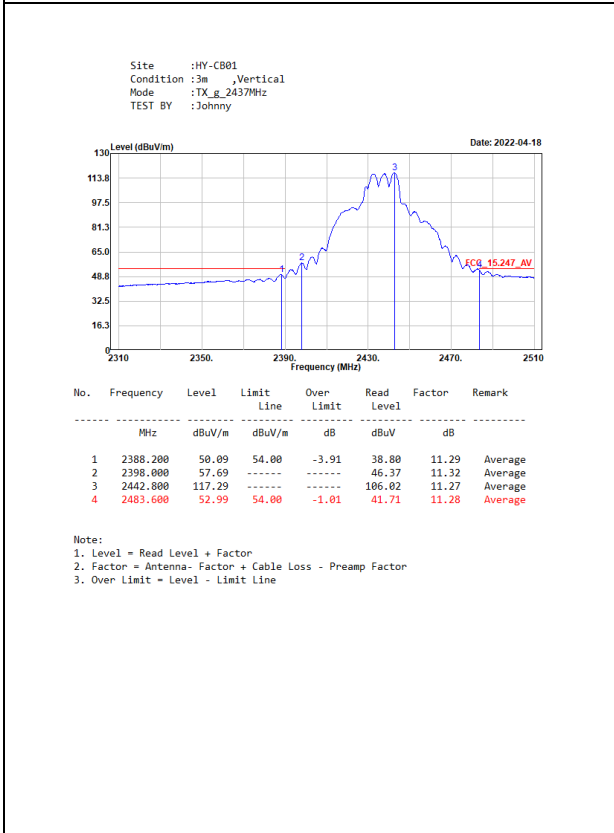
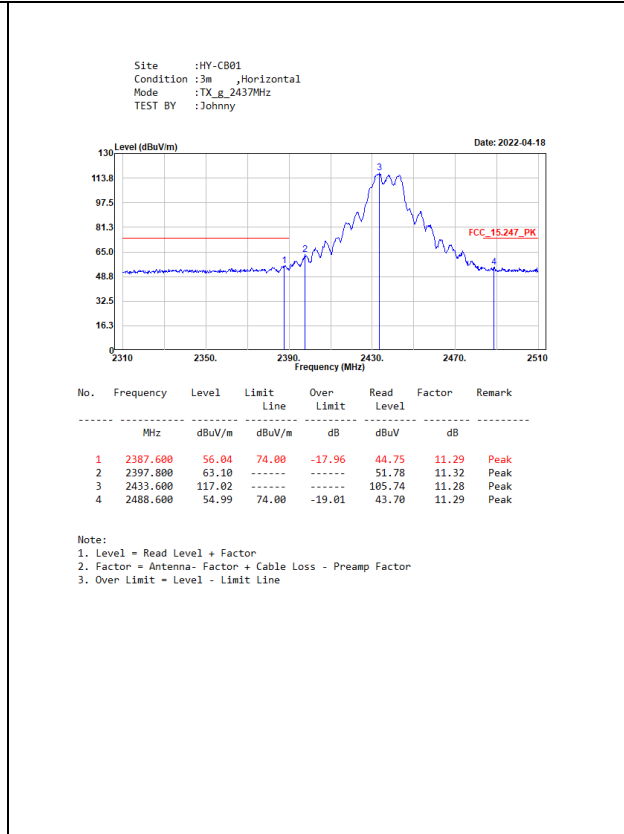
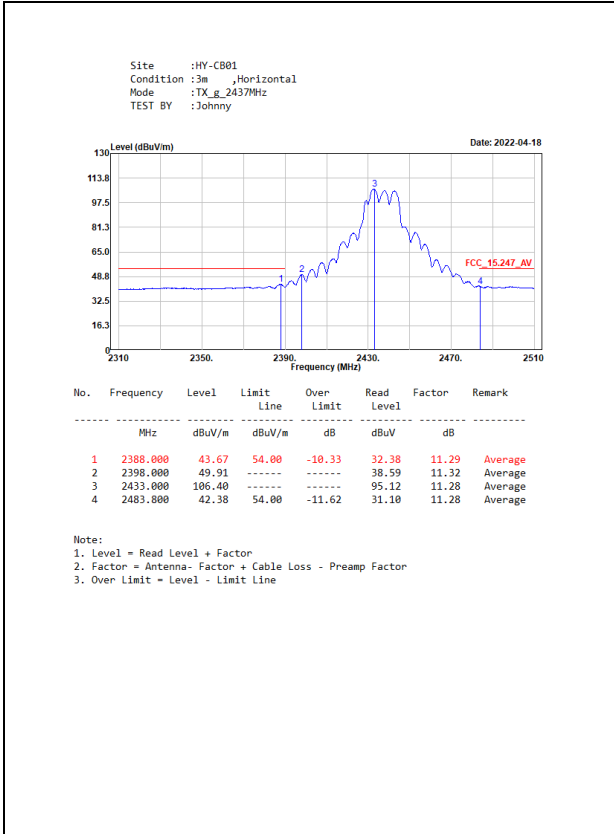


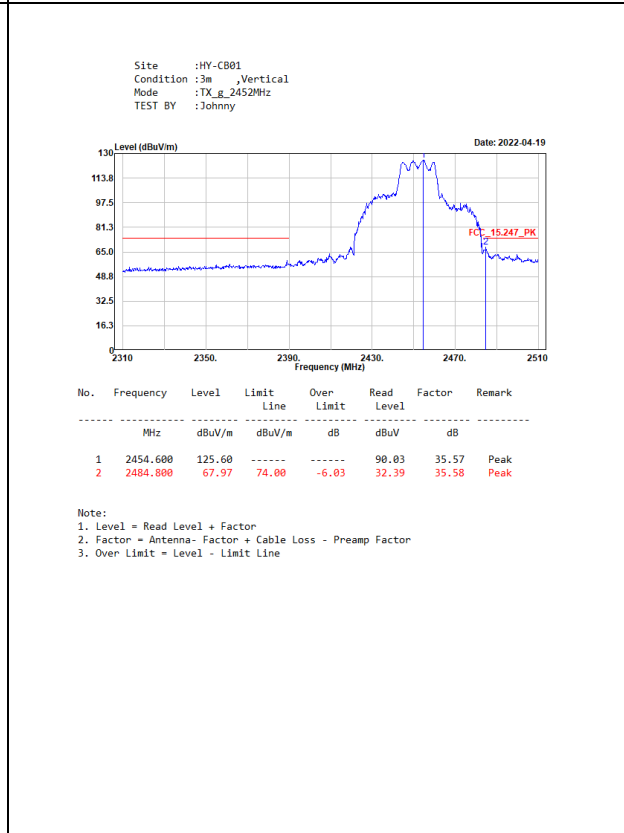
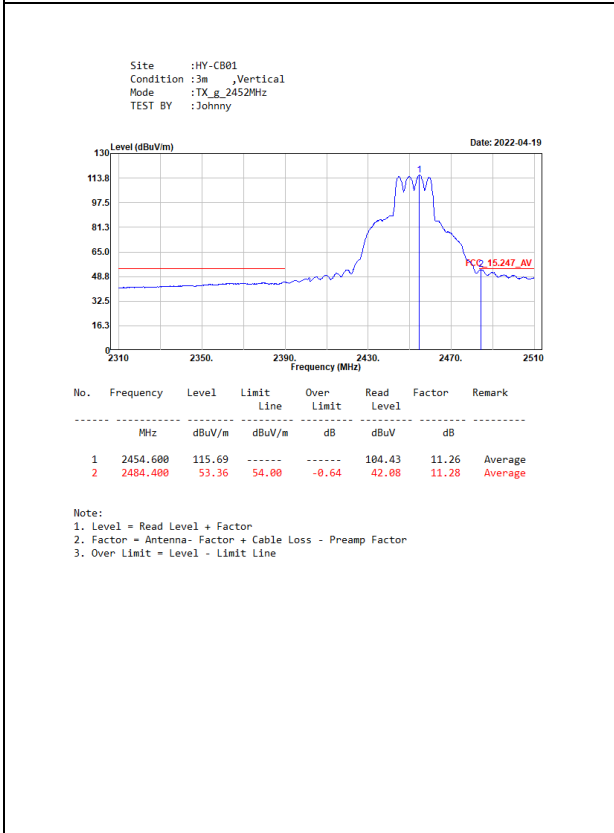
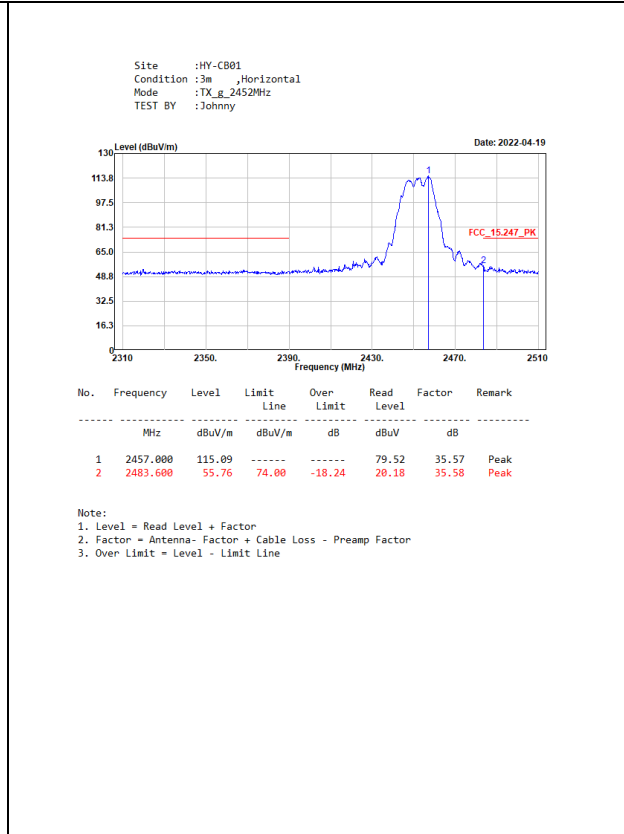
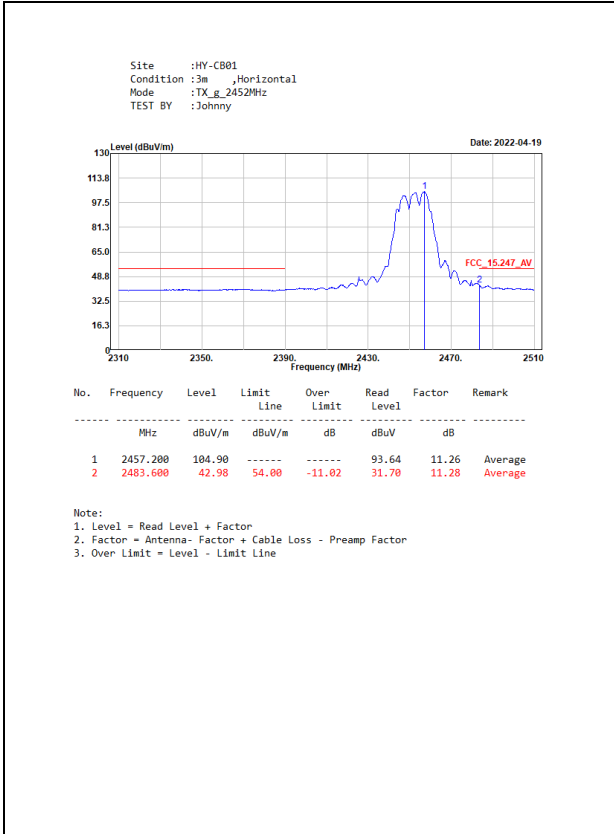


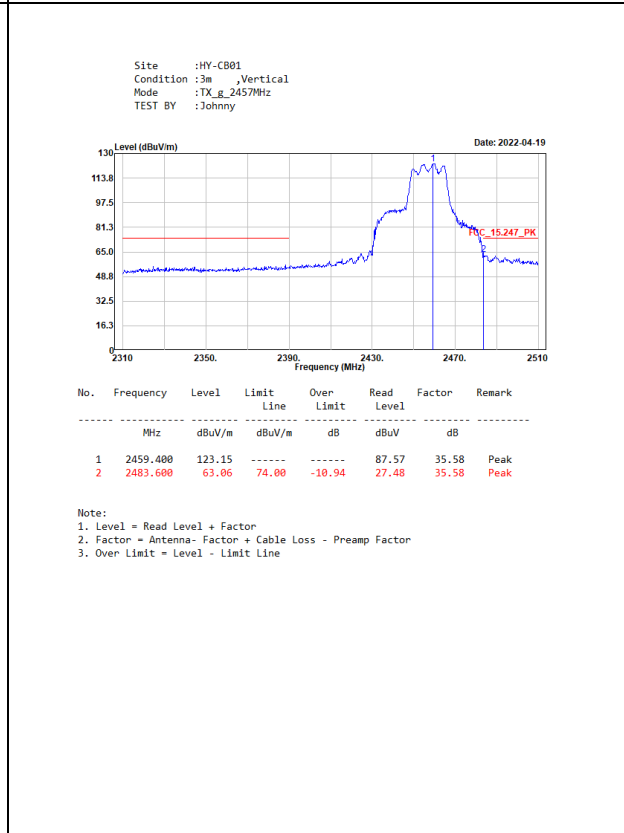
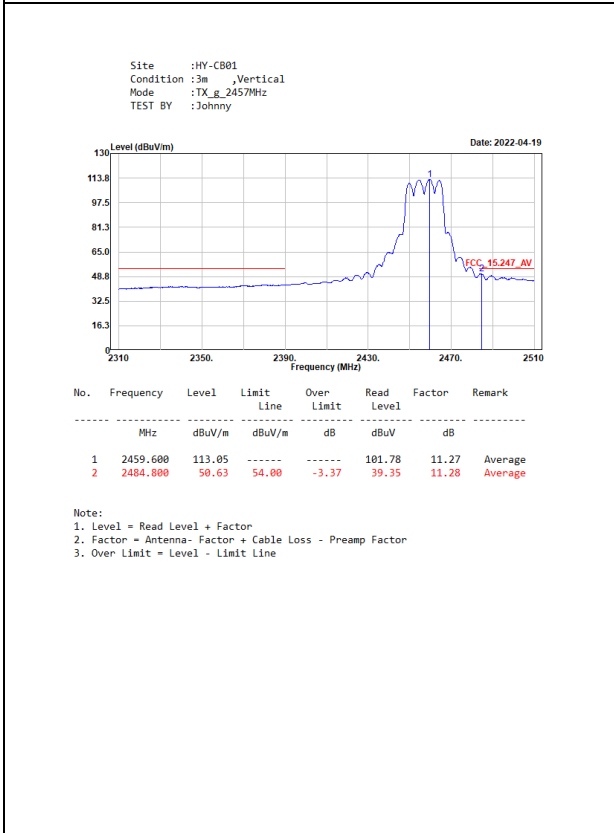
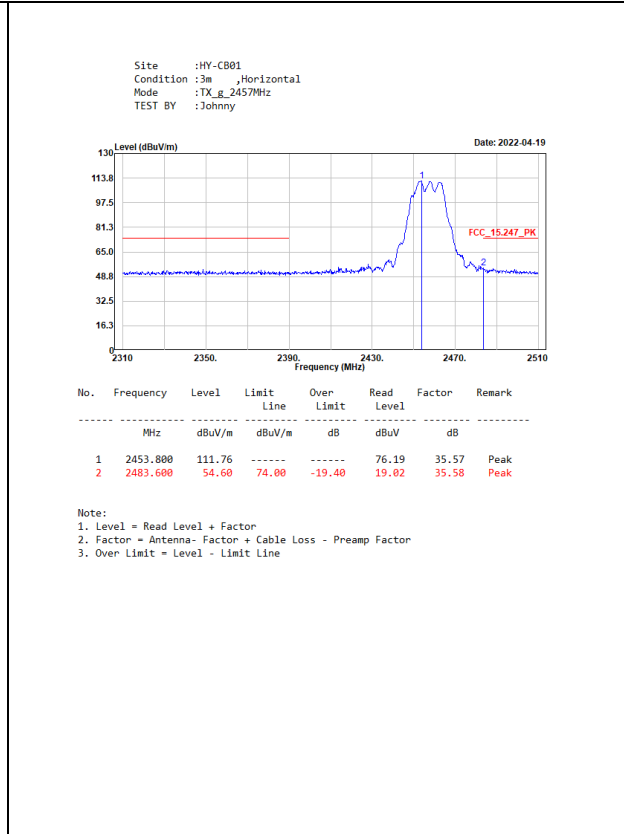
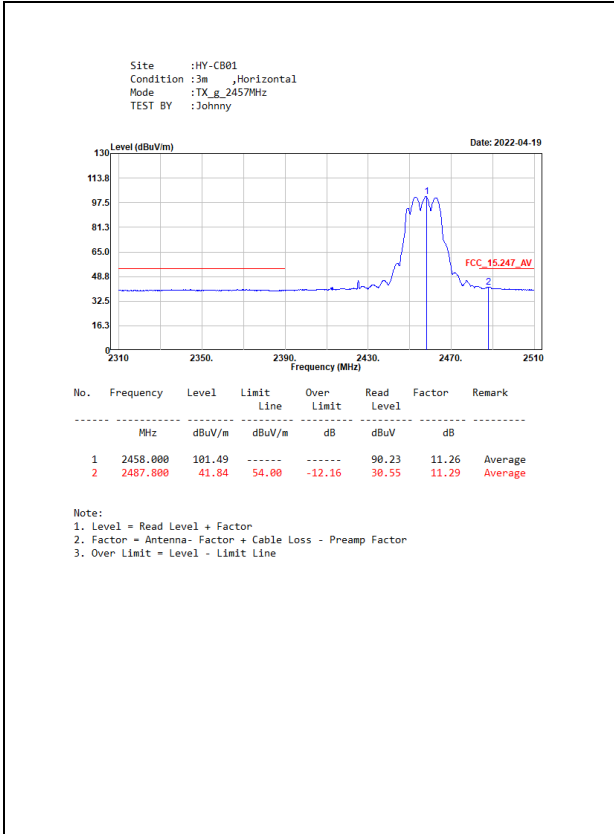


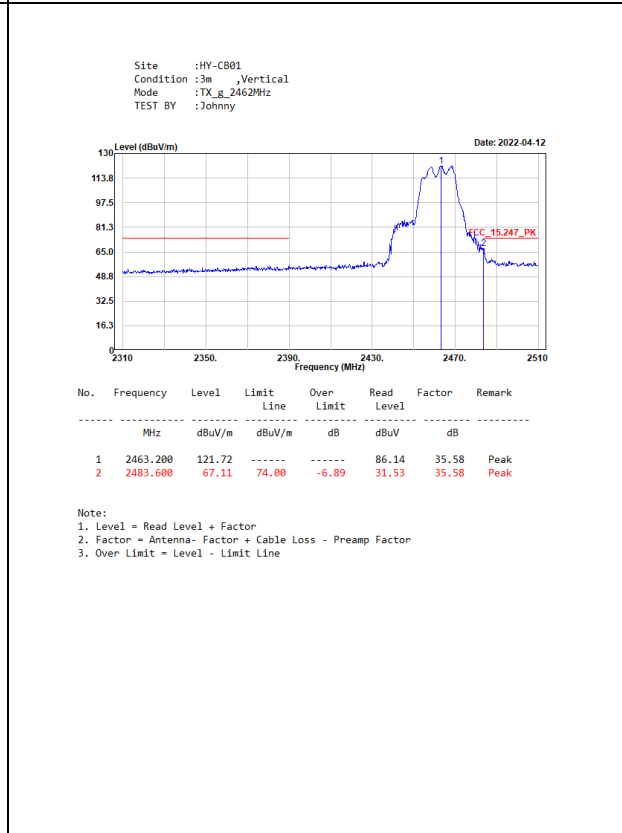
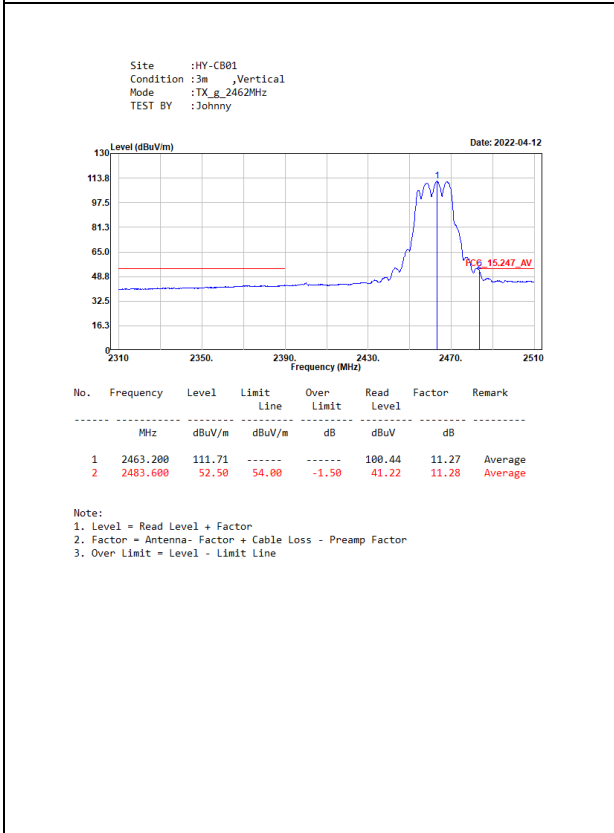
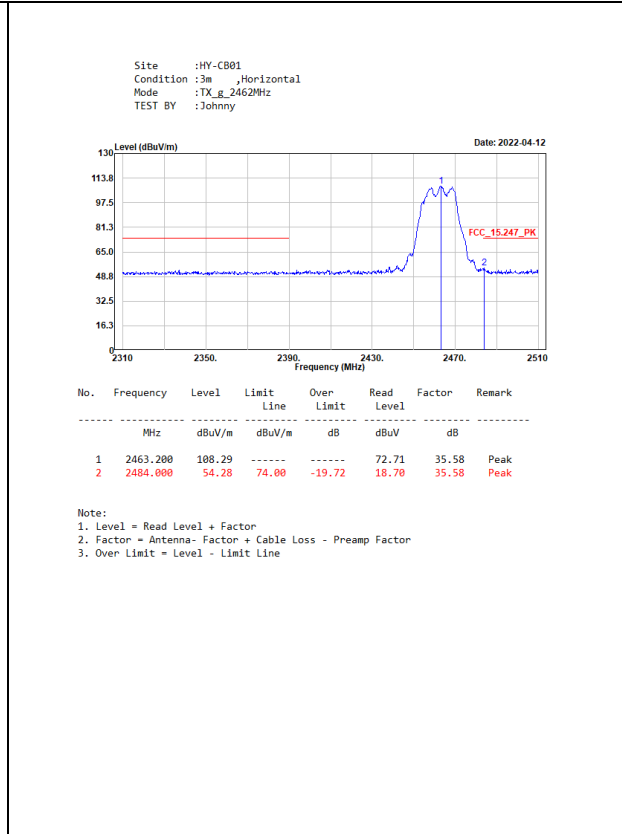
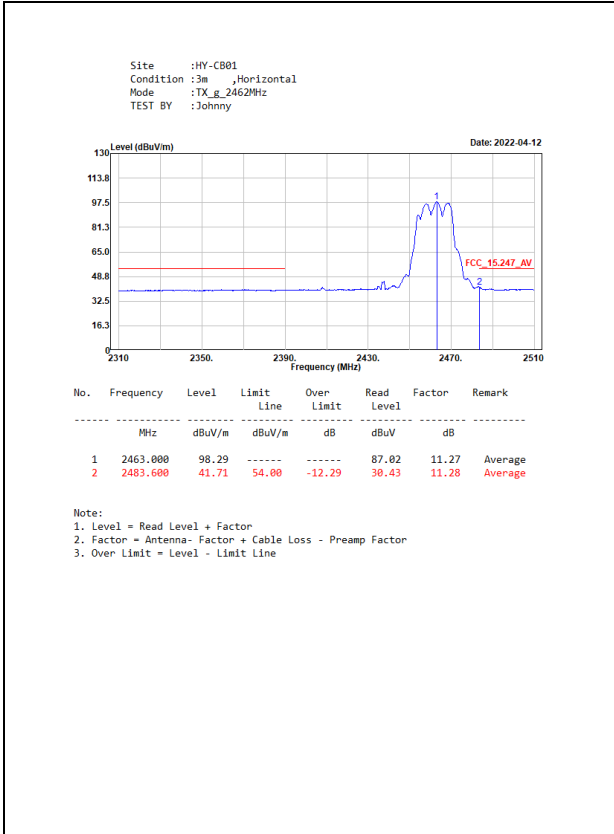


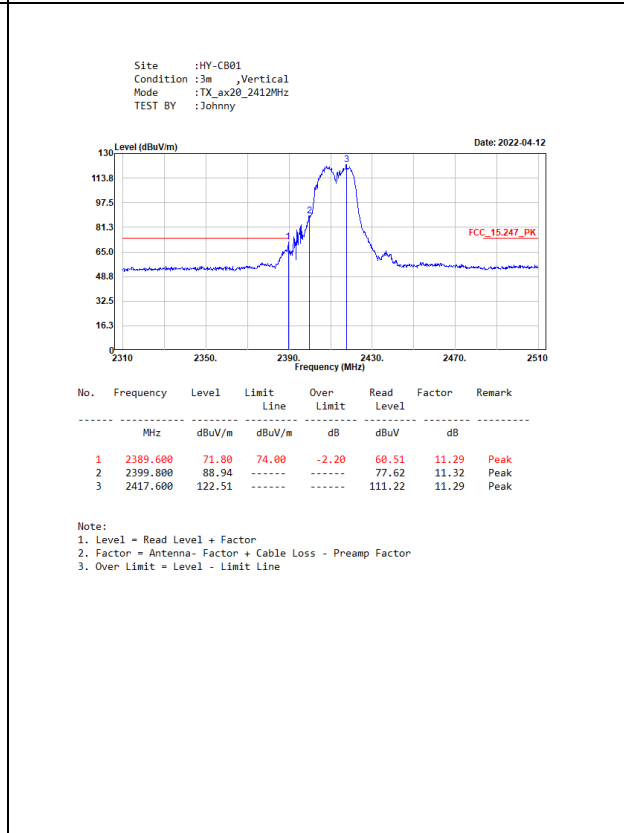
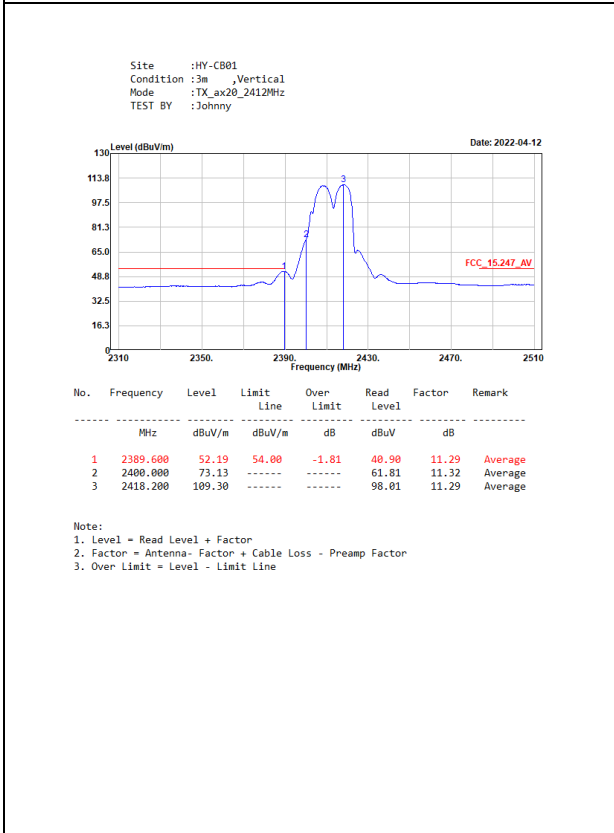
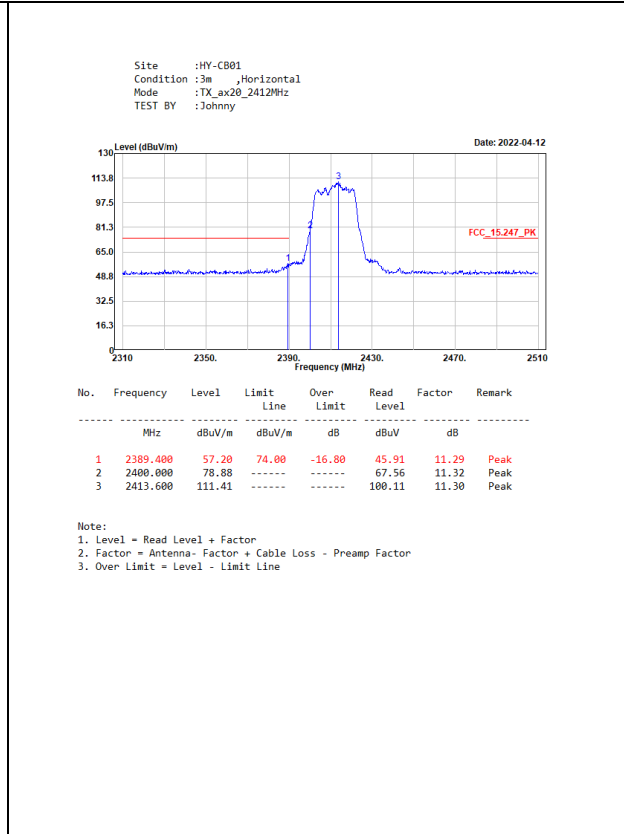
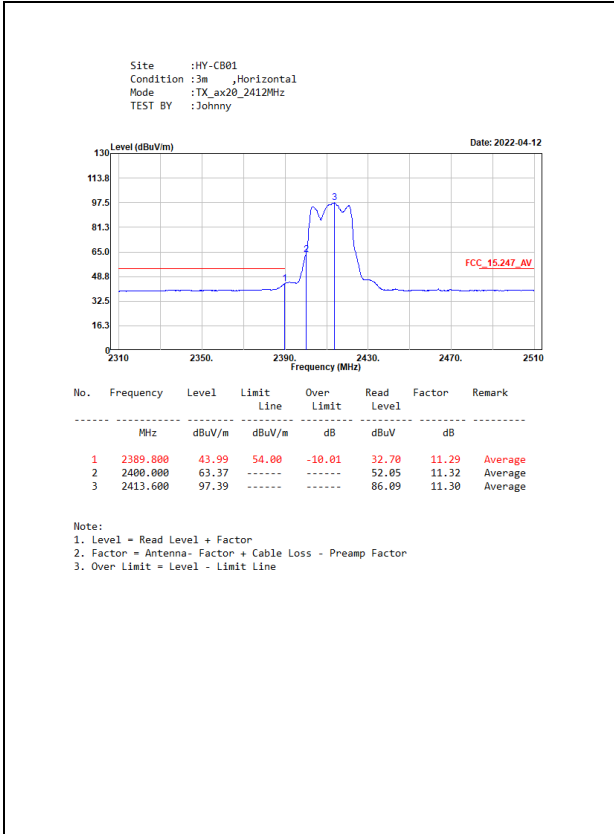


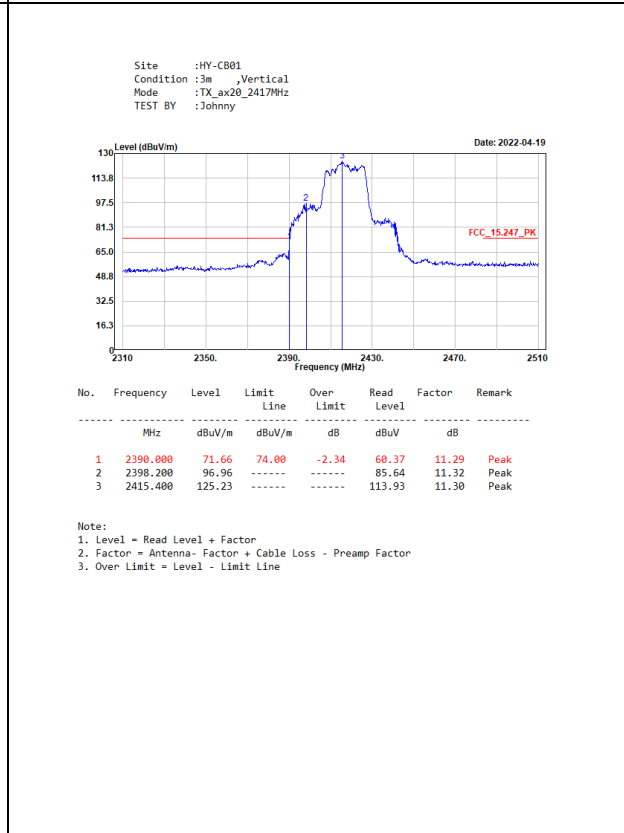
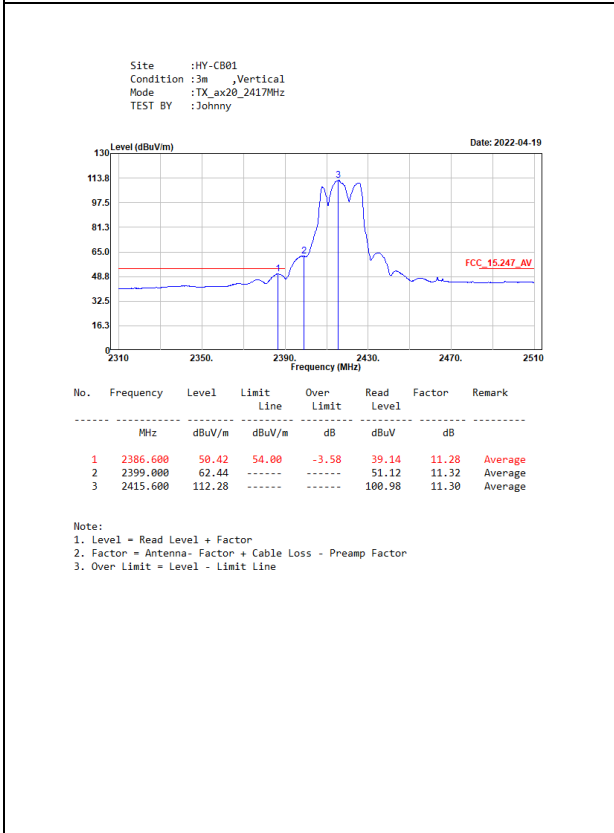
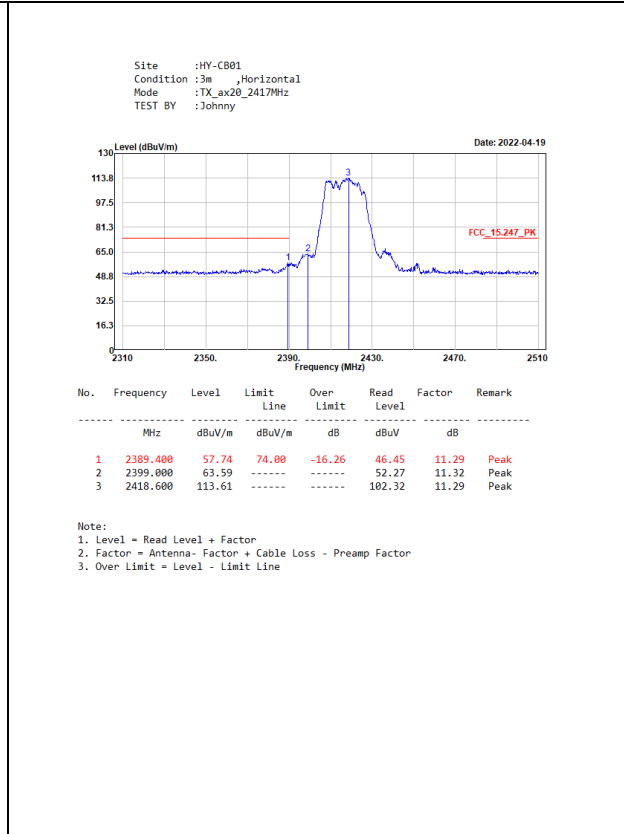
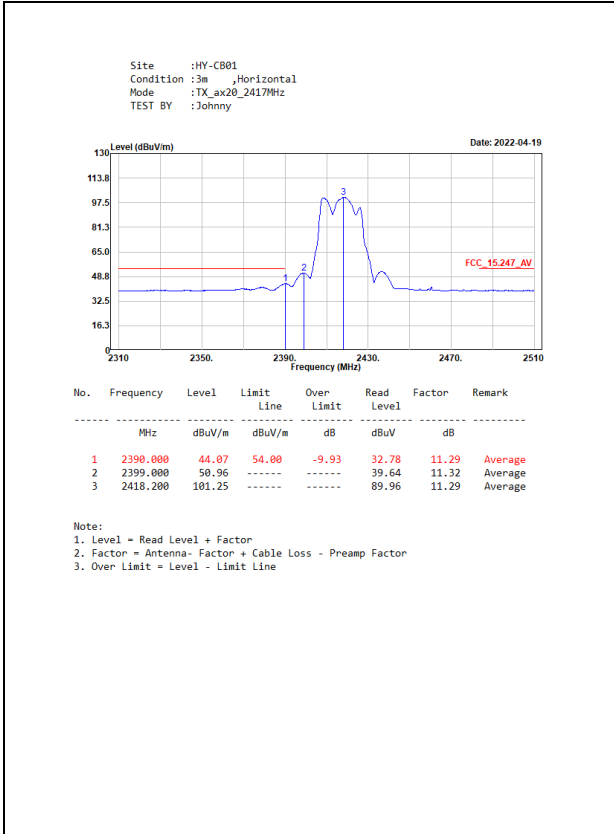


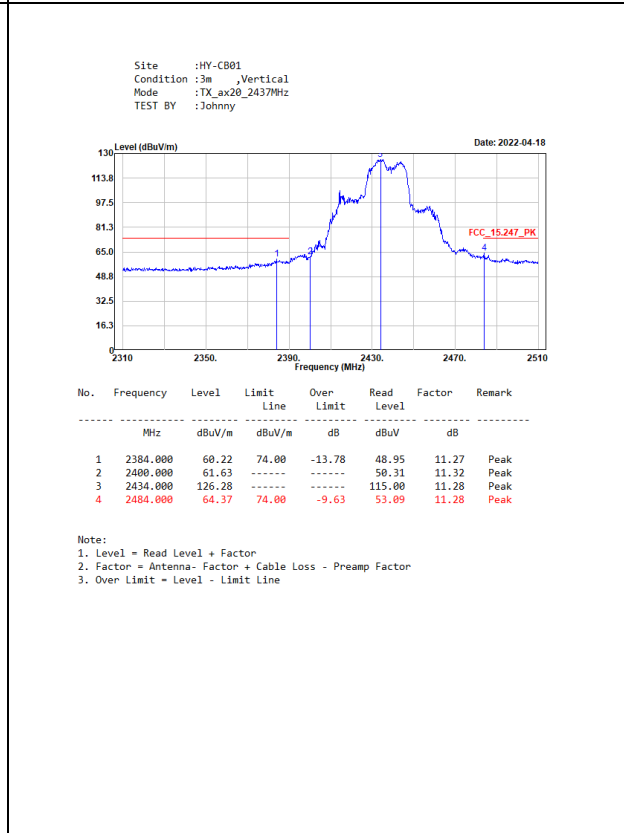
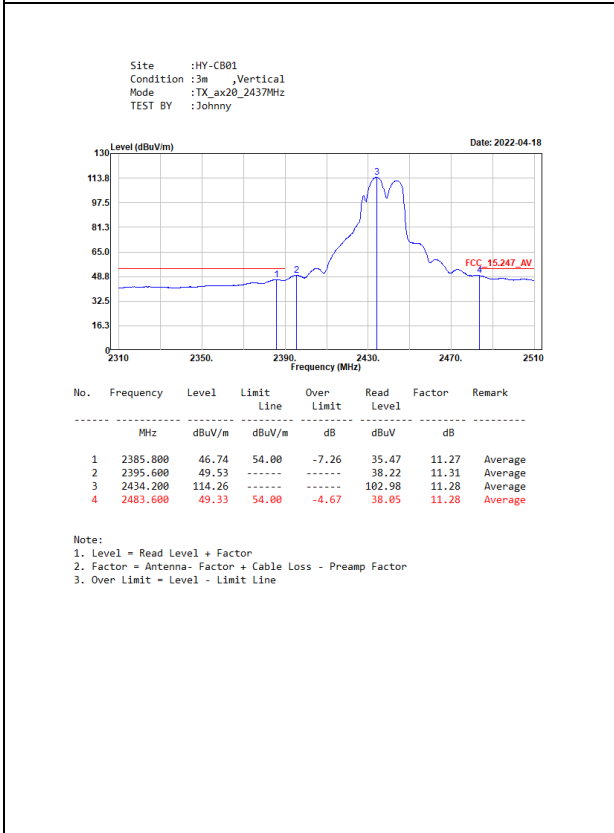
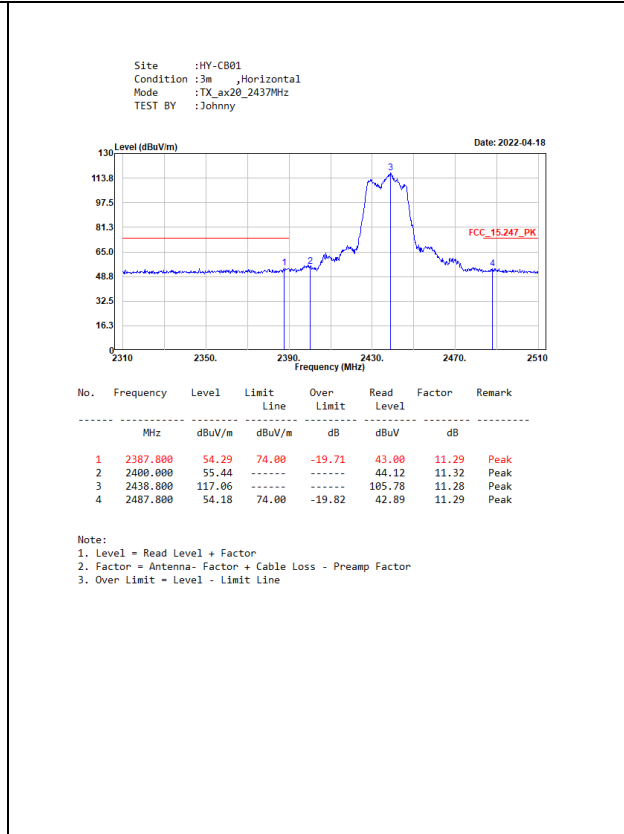
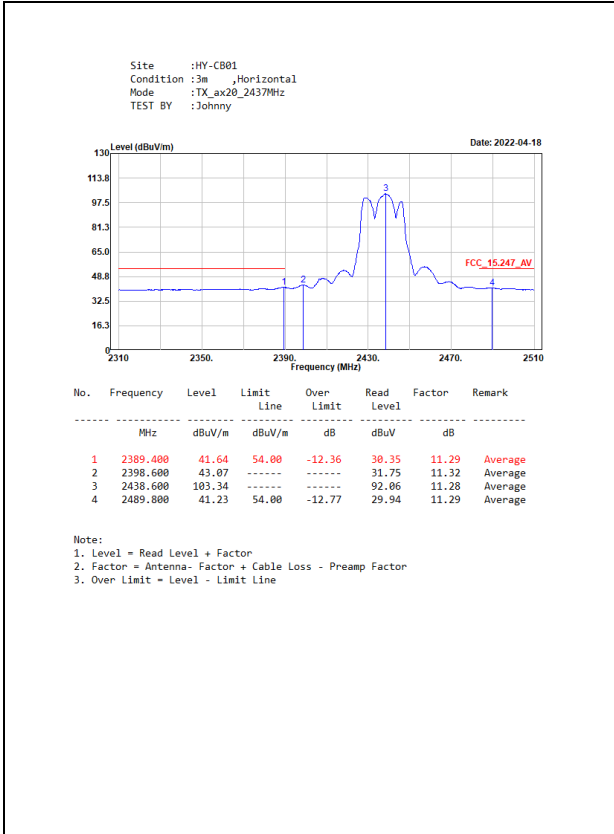


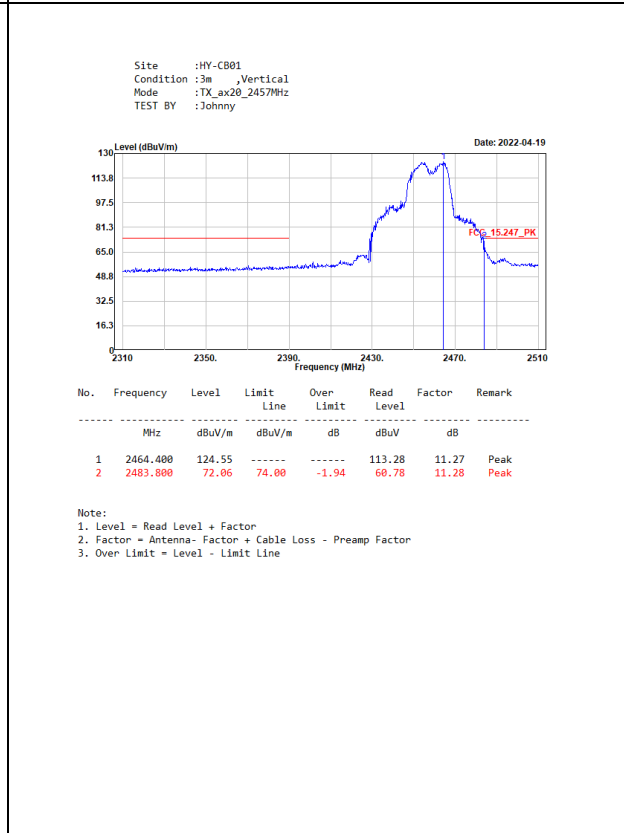
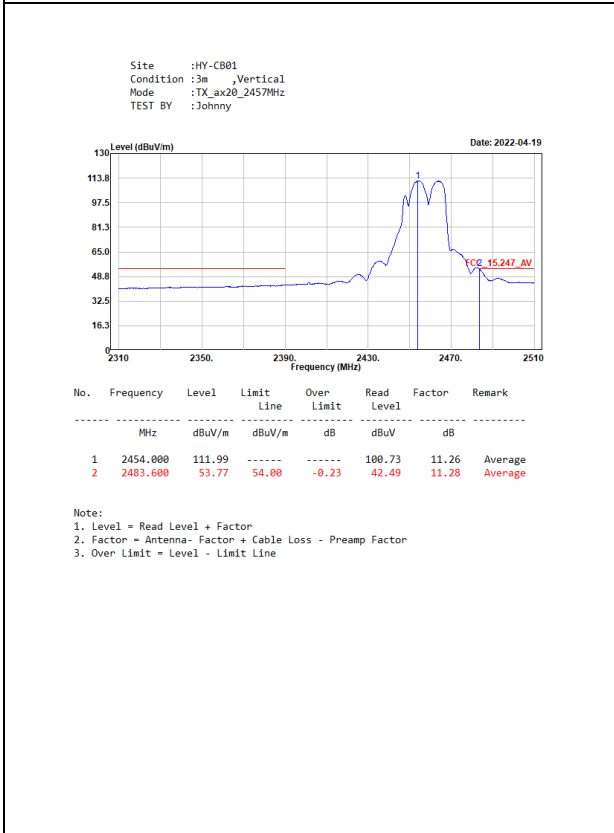
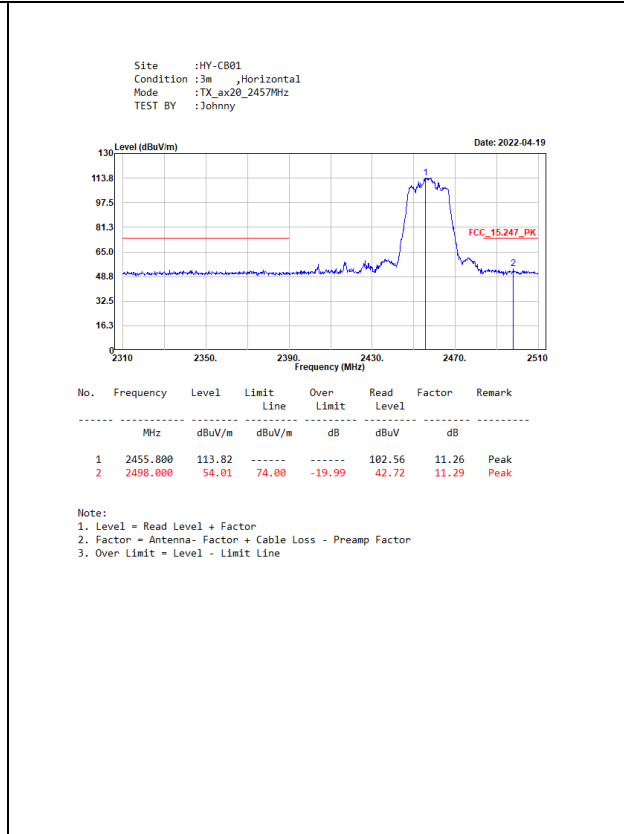
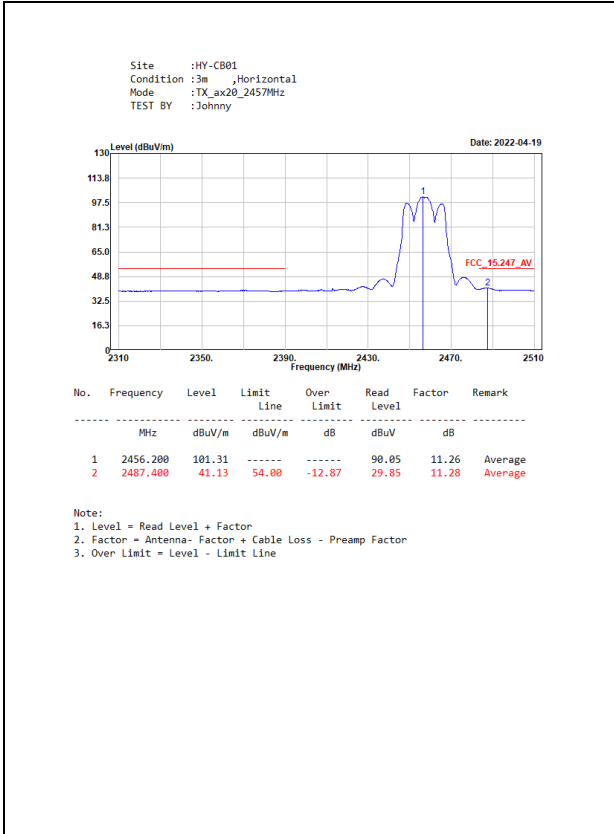


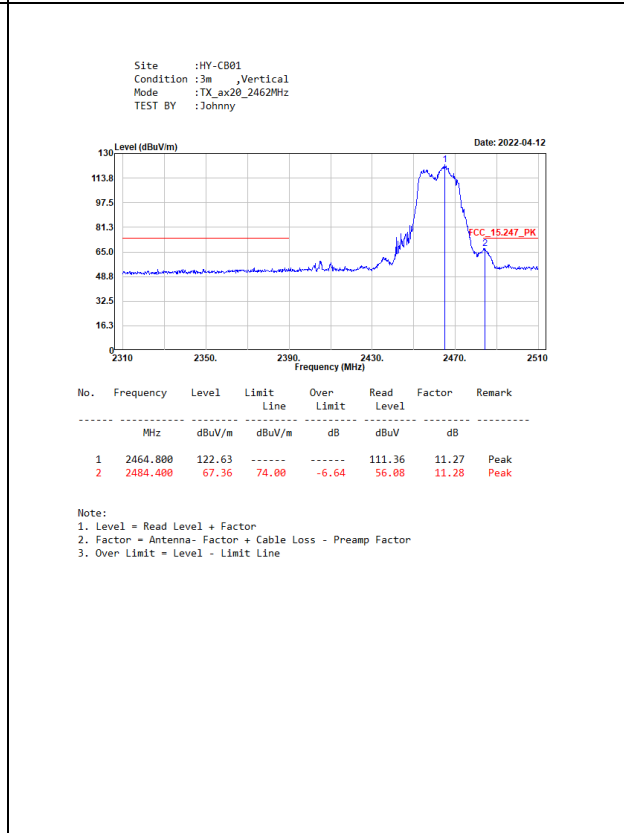
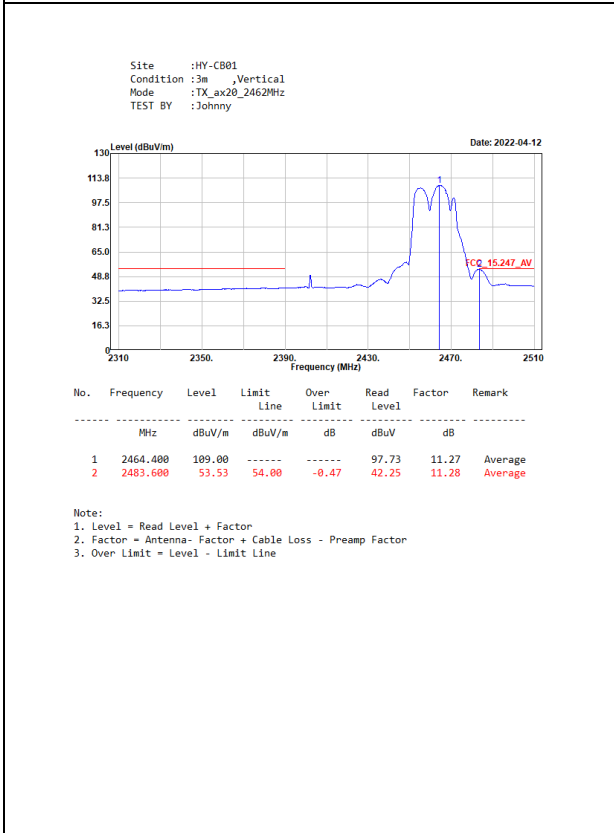
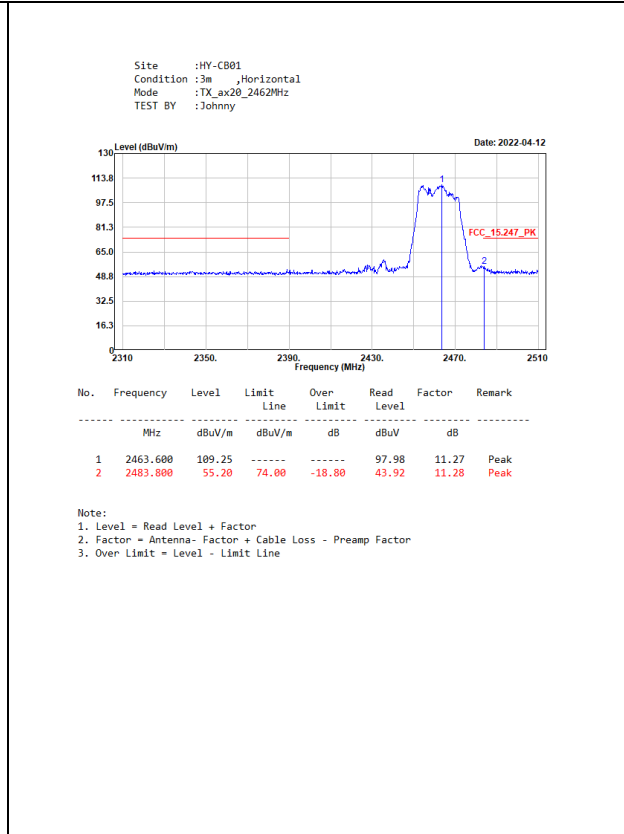
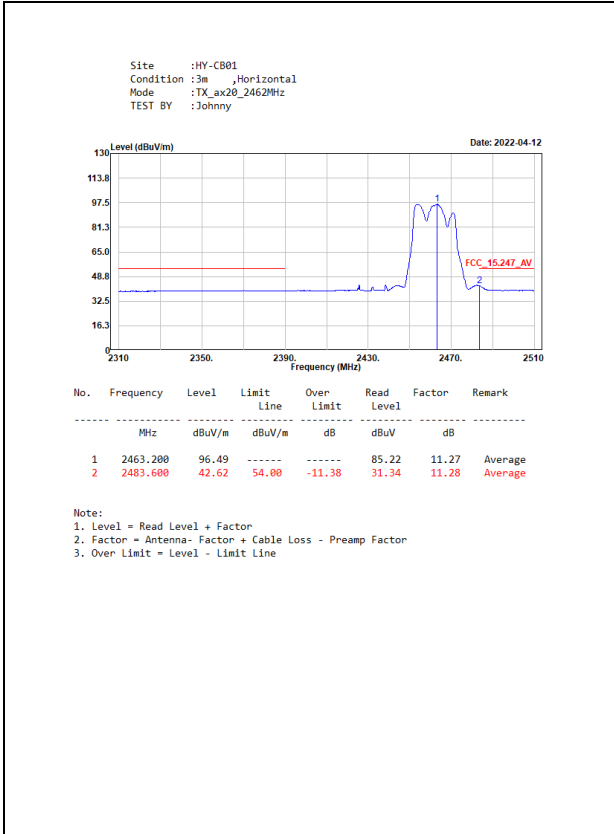


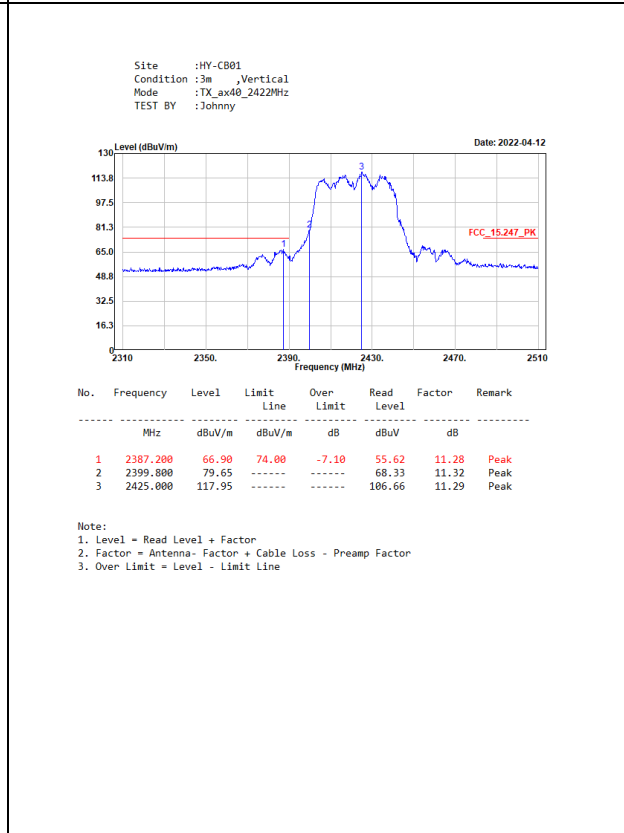
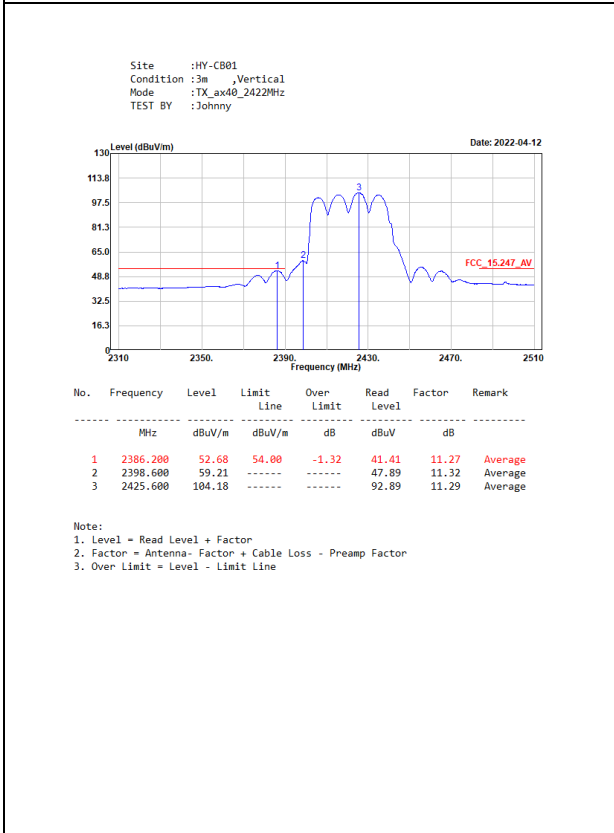
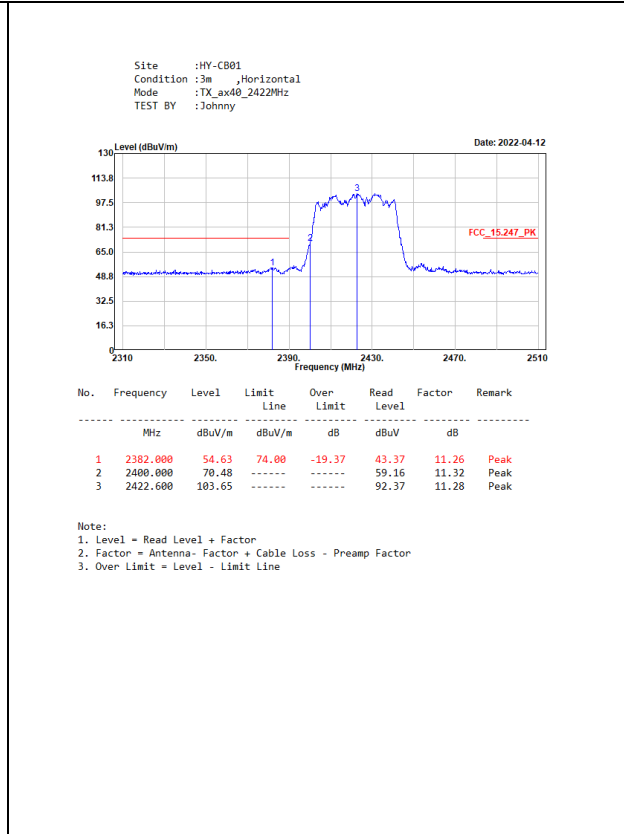
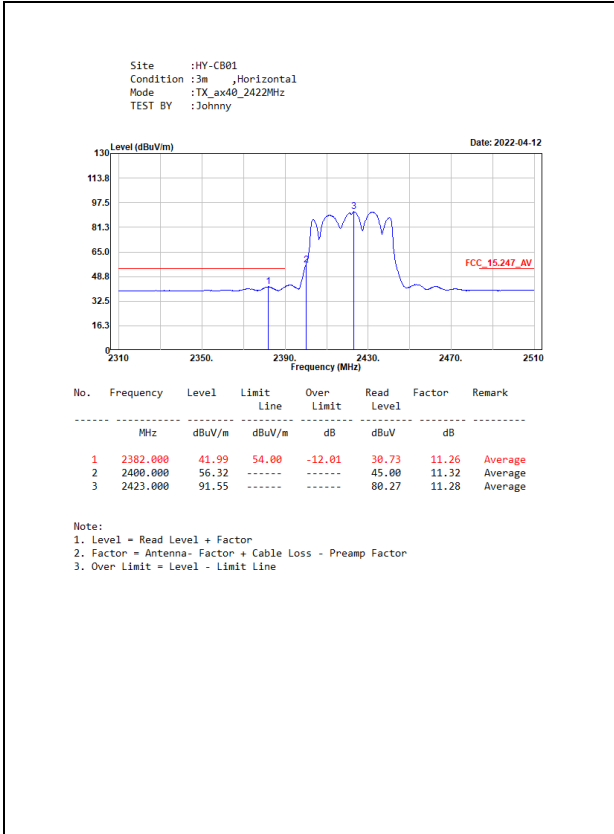


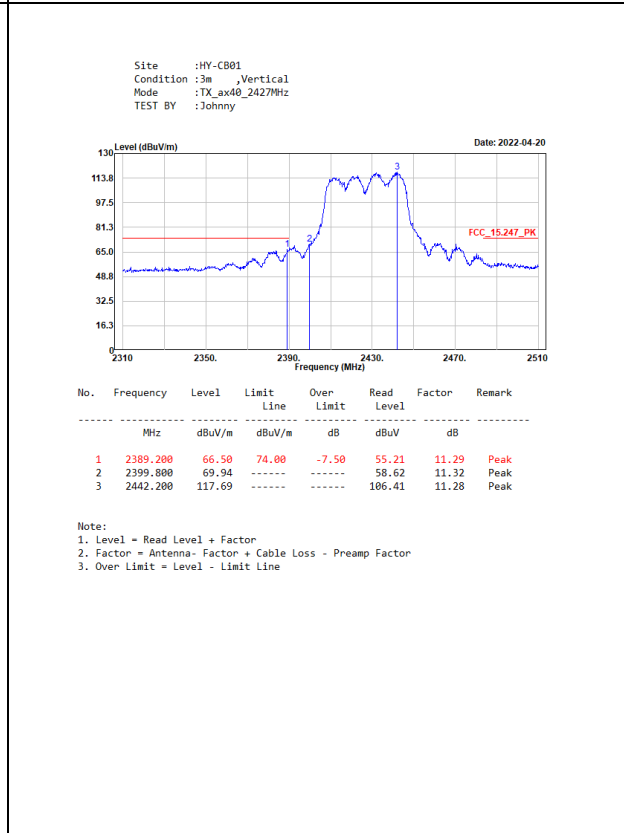
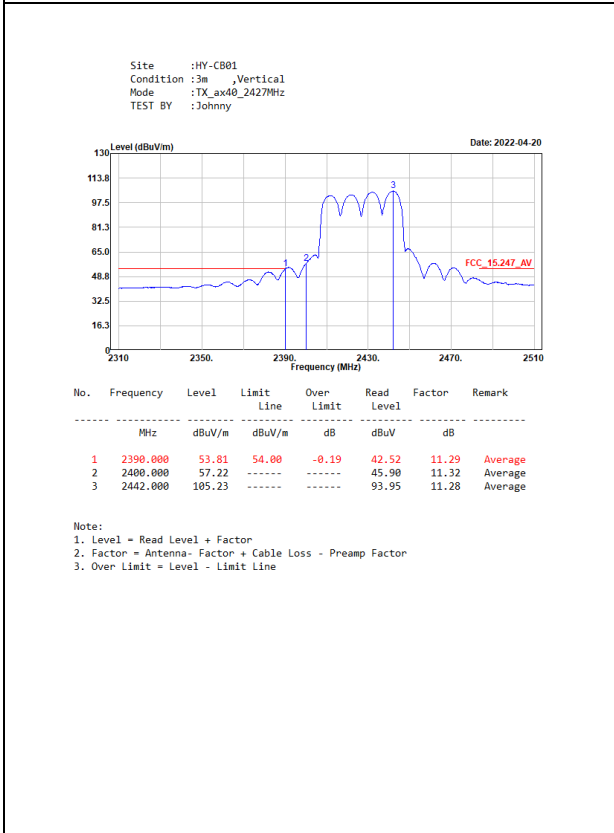
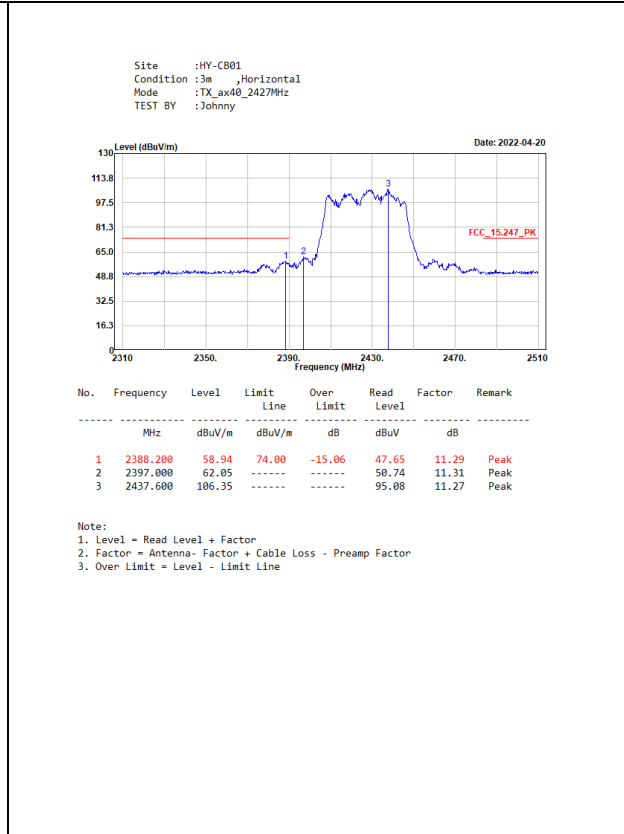
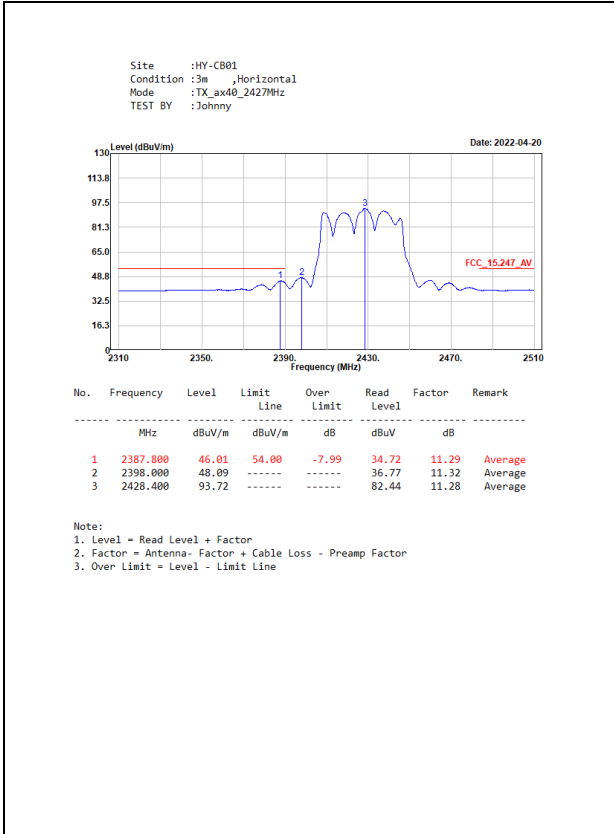


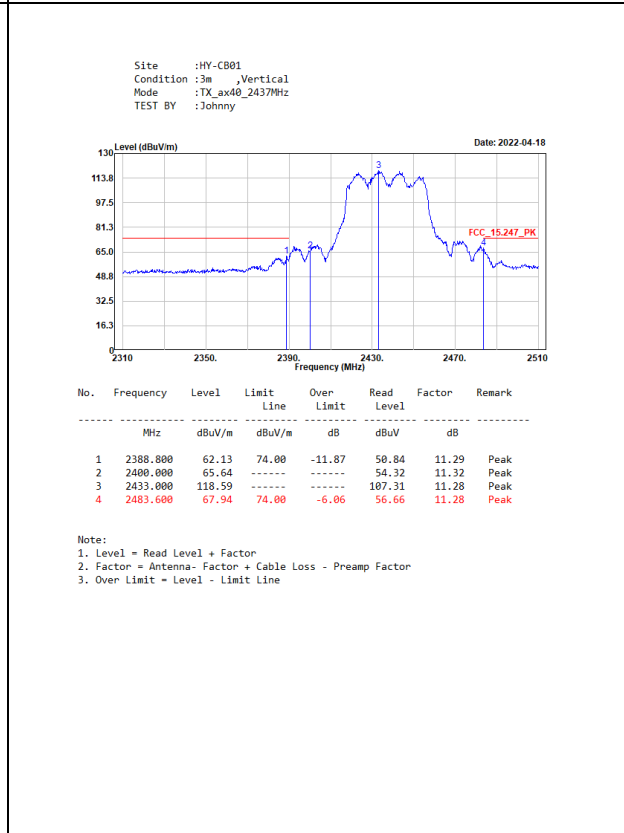
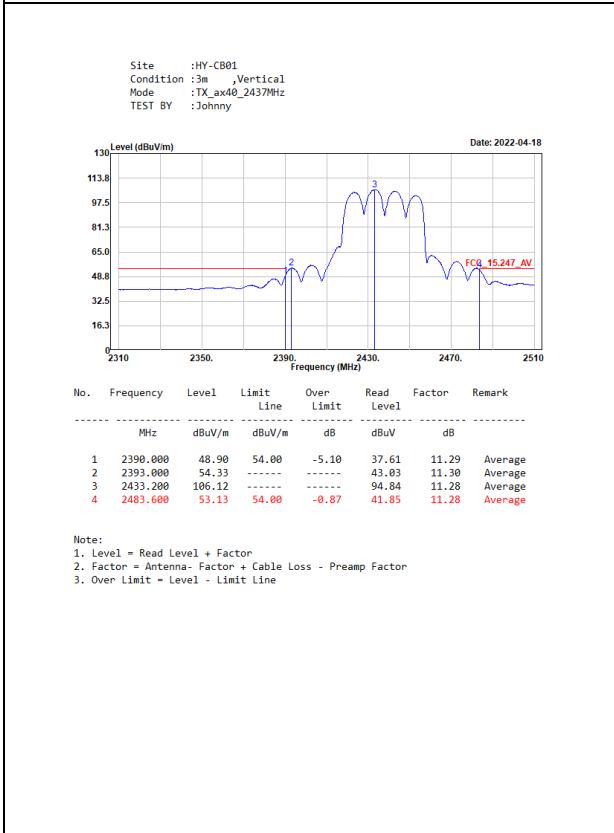
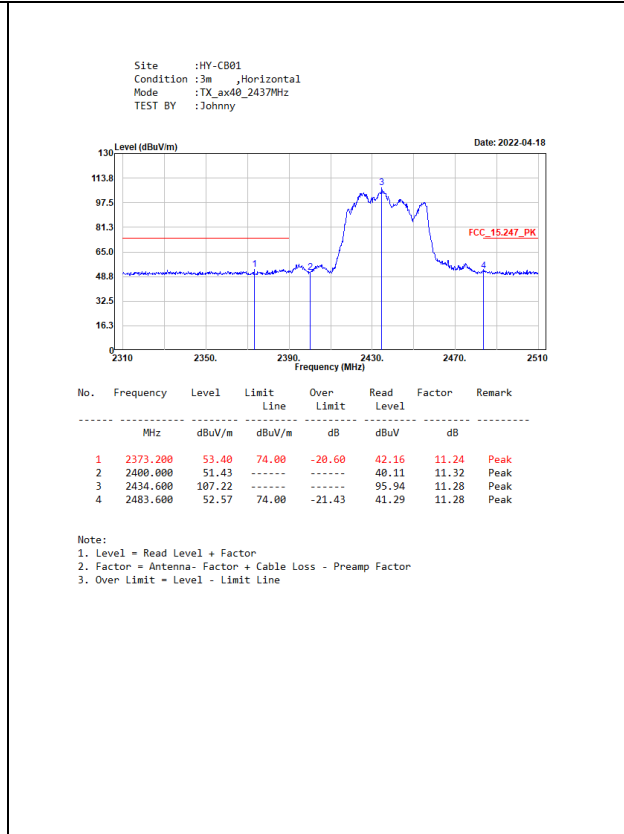
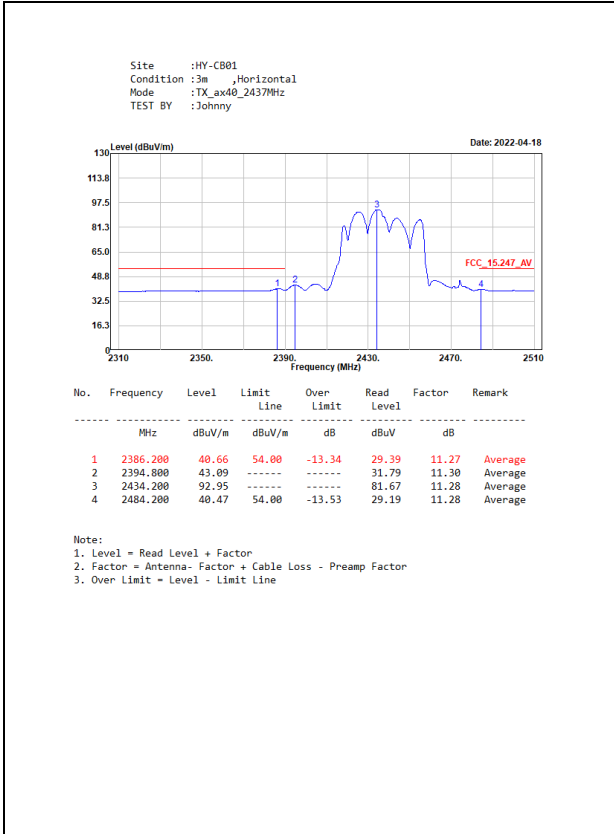


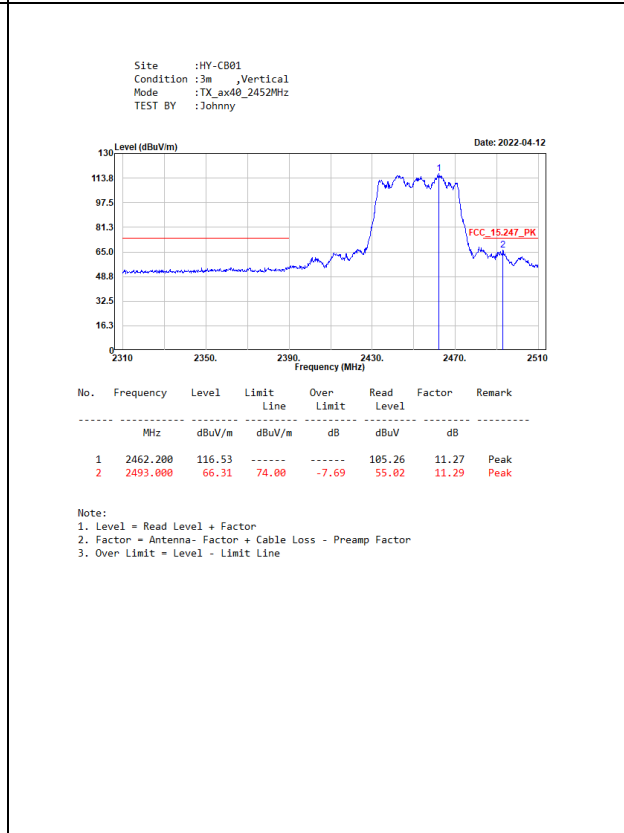
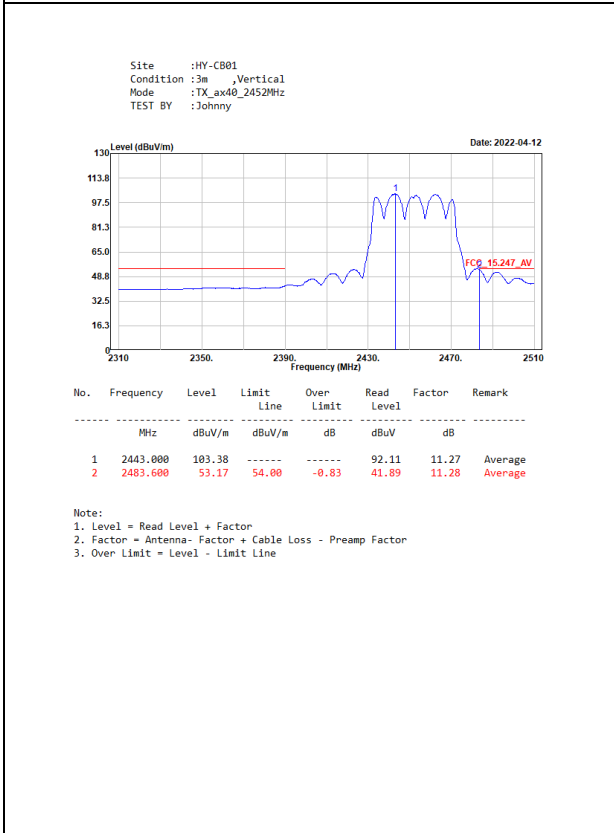
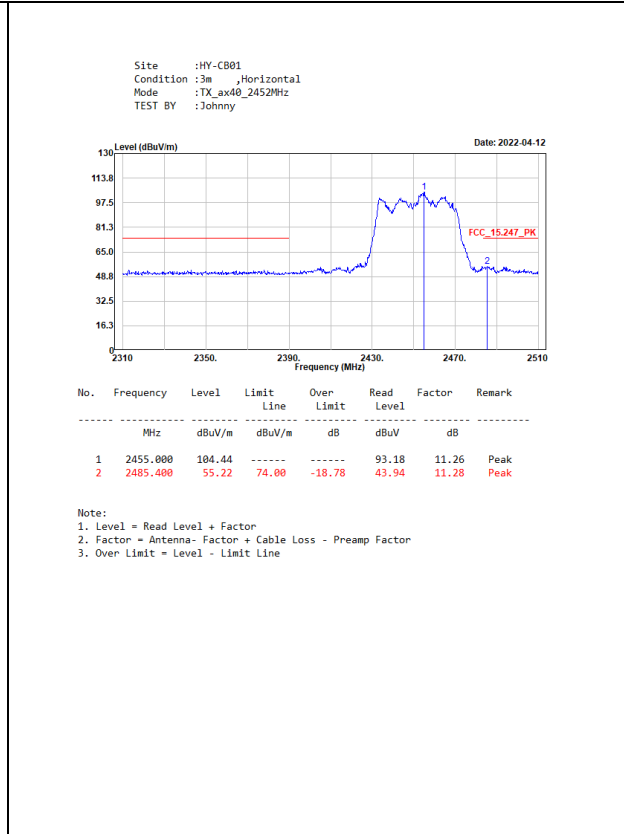
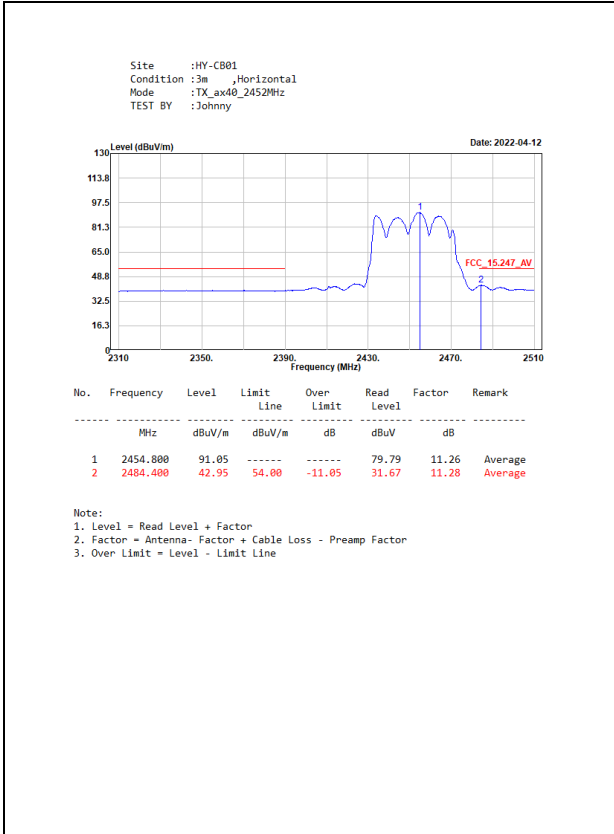






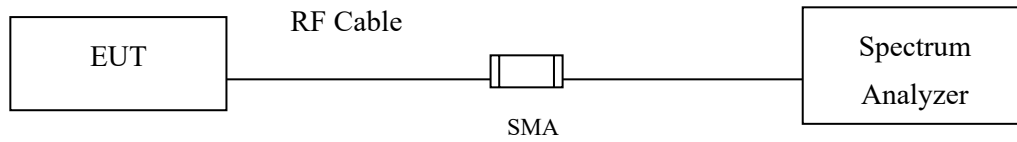






7. 6dB Bandwidth

7.1. Test Setup



7.2. Limits

The minimum bandwidth shall be at least 500 kHz.

7.3. Test Procedure

The EUT was setup according to ANSI C63.4, 2014; tested according to ANSI C63.10 Section 11.8 for compliance to FCC 47CFR 15.247 requirements.

7.4. Test Result of 6dB Bandwidth

Product : RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
 Test Item : 6dB Bandwidth Data
 Test Mode : Mode 1: Transmit (802.11b)-CDD

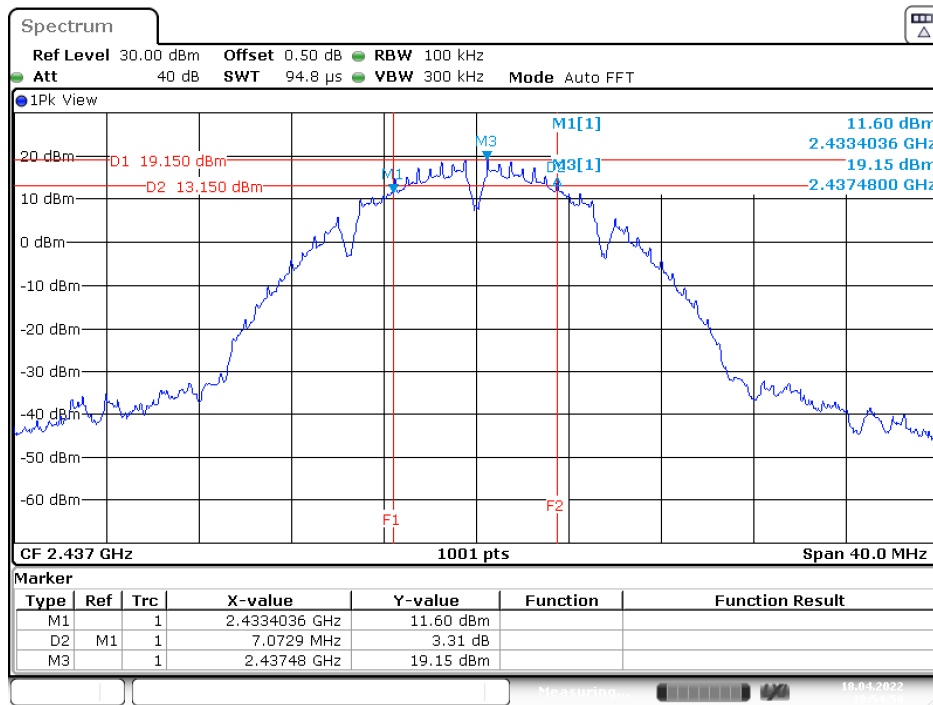
Chain A

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	7113	>500	Pass
06	2437	7113	>500	Pass
11	2462	7073	>500	Pass

Chain B

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	7073	>500	Pass
06	2437	7073	>500	Pass
11	2462	7033	>500	Pass

Figure Channel 06:



Date: 18.APR.2022 19:54:59

Product : RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
 Test Item : 6dB Bandwidth Data
 Test Mode : Mode 2: Transmit (802.11g)-CDD

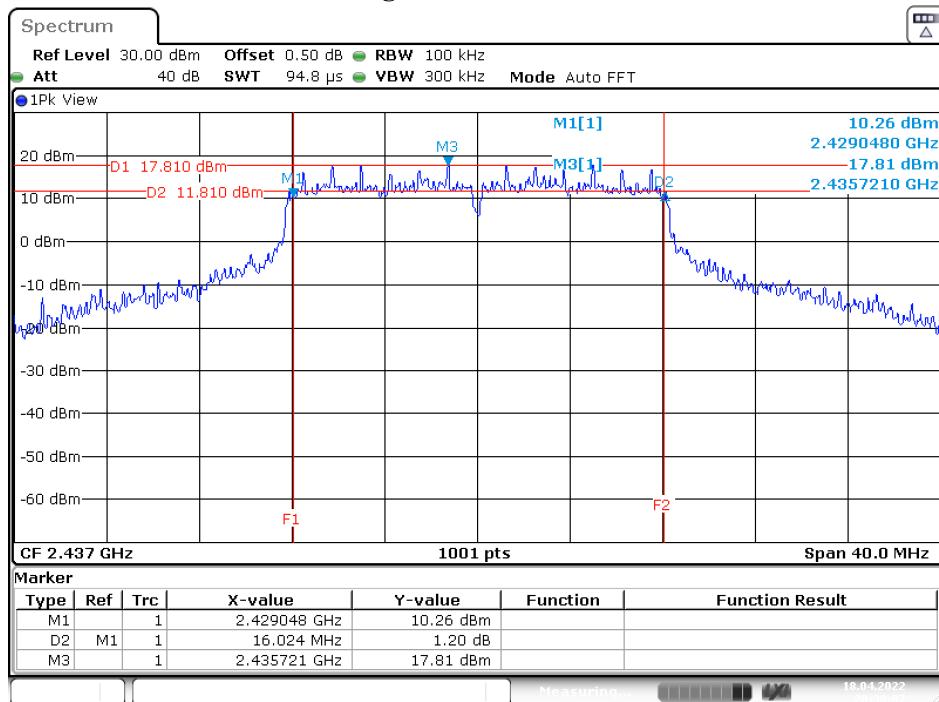
Chain A

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	15944	>500	Pass
06	2437	16024	>500	Pass
11	2462	16264	>500	Pass

Chain B

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	15704	>500	Pass
06	2437	16064	>500	Pass
11	2462	16264	>500	Pass

Figure Channel 06:



Date: 18.APR.2022 20:38:07

Product : RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
 Test Item : 6dB Bandwidth Data
 Test Mode : Mode 3: Transmit (802.11ax-20BW)-CDD

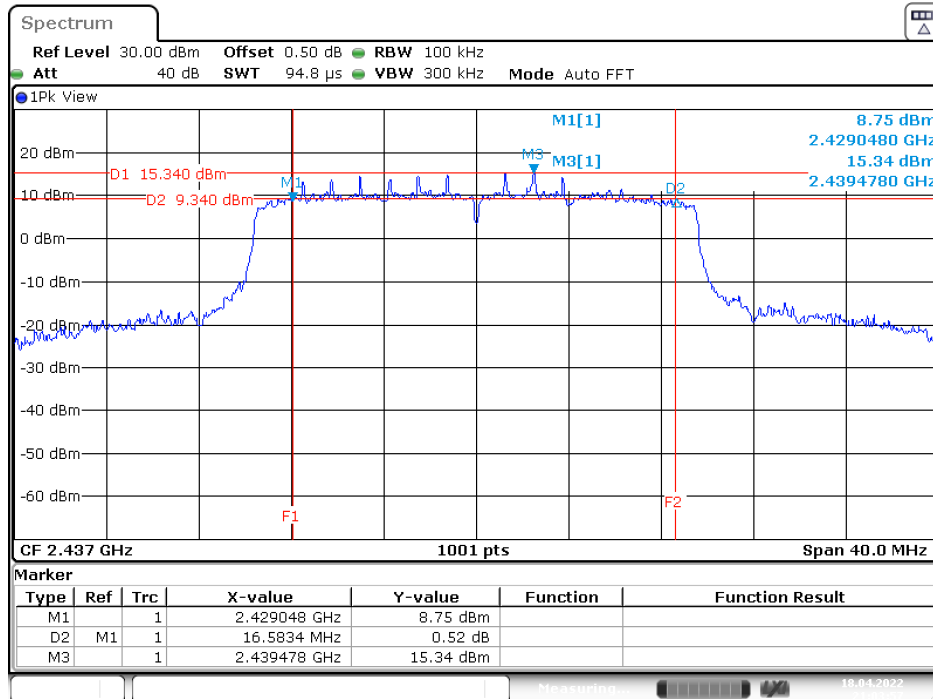
Chain A

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	16583	>500	Pass
06	2437	16623	>500	Pass
11	2462	17662	>500	Pass

Chain B

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	16304	>500	Pass
06	2437	16583	>500	Pass
11	2462	17183	>500	Pass

Figure Channel 06:



Date: 18.APR.2022 21:03:57

Product : RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
 Test Item : 6dB Bandwidth Data
 Test Mode : Mode 4: Transmit (802.11ax-40BW)-CDD

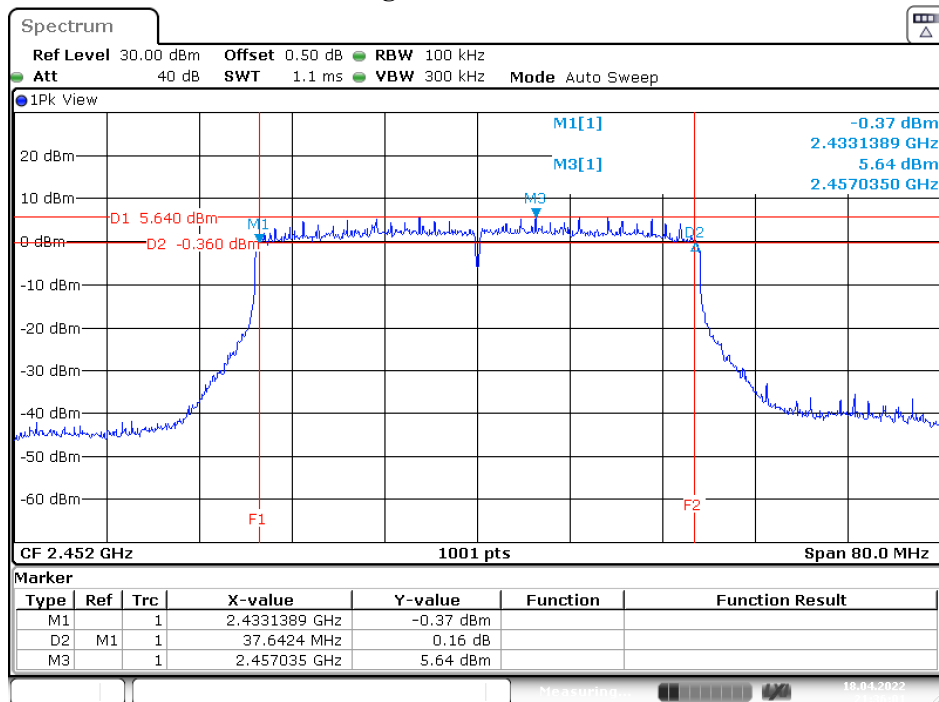
Chain A

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
03	2422	37642	>500	Pass
06	2437	37722	>500	Pass
09	2452	37642	>500	Pass

Chain B

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
03	2422	37403	>500	Pass
06	2437	37323	>500	Pass
09	2452	37323	>500	Pass

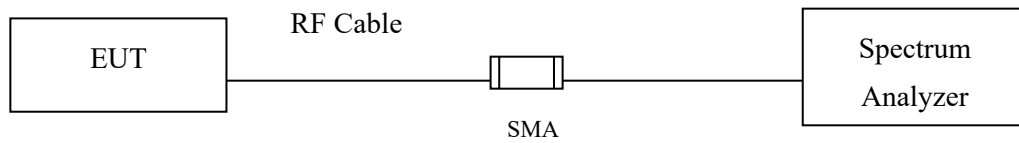
Figure Channel 09:



Date: 18.APR.2022 21:36:02

8. Power Density

8.1. Test Setup



8.2. Limits

The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

8.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013; tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

The maximum power spectral density using C63.10 Section 11.10.2 Method PKPSD (peak PSD)

The maximum power density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

2400MHz: Directional gain = 5.68 dBi, Limit= 8dBm

Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / N_{ANT}]$ dBi

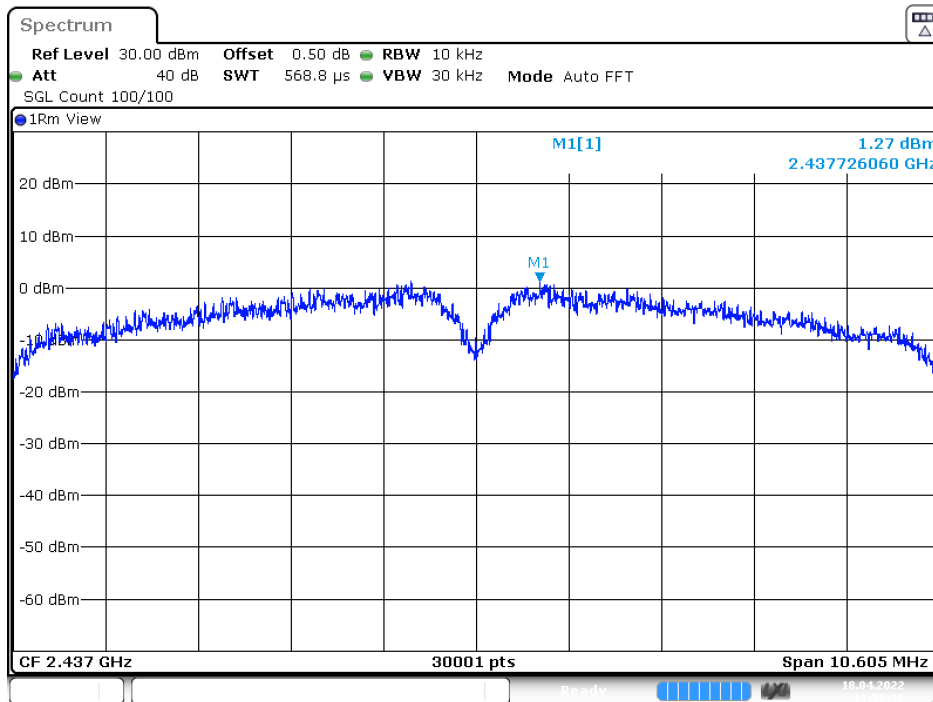
8.4. Test Result of Power Density

Product : RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
 Test Item : Power Density Data
 Test Mode : Mode 1: Transmit (802.11b)-CDD

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Chain	PPSD/MHz (dBm)	Duty factor (dBm)	Total PPSD/MHz (dBm)	Limit (dBm)	Result
01	2412	1	A	-4.310	2.719	1.070	8	Pass
			B	-5.040				
06	2437	1	A	0.940	2.719	6.838	8	Pass
			B	1.270				
11	2462	1	A	-2.300	2.719	2.761	8	Pass
			B	-3.760				

Note: Total PPSD/MHz = 10*log(Chain A (mW) + Chain B (mW)) + Duty factor

Figure Channel 06:



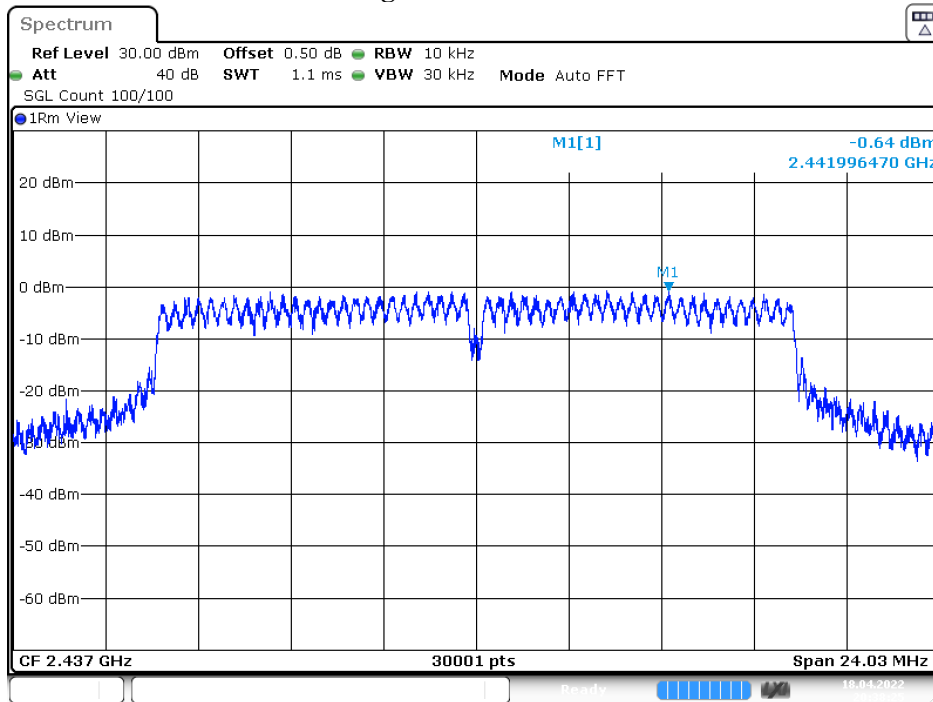
Date: 18.APR.2022 19:55:16

Product : RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
 Test Item : Power Density Data
 Test Mode : Mode 2: Transmit (802.11g)-CDD

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Chain	PPSD/MHz (dBm)	Duty factor (dBm)	Total PPSD/MHz (dBm)	Limit (dBm)	Result
01	2412	6	A	-9.210	0.310	-5.798	8	Pass
			B	-9.030				
06	2437	6	A	-0.640	0.310	2.553	8	Pass
			B	-0.900				
11	2462	6	A	-7.780	0.310	-4.181	8	Pass
			B	-7.240				

Note: Total PPSD/MHz = 10*log(Chain A (mW) + Chain B (mW)) + Duty factor

Figure Channel 06:



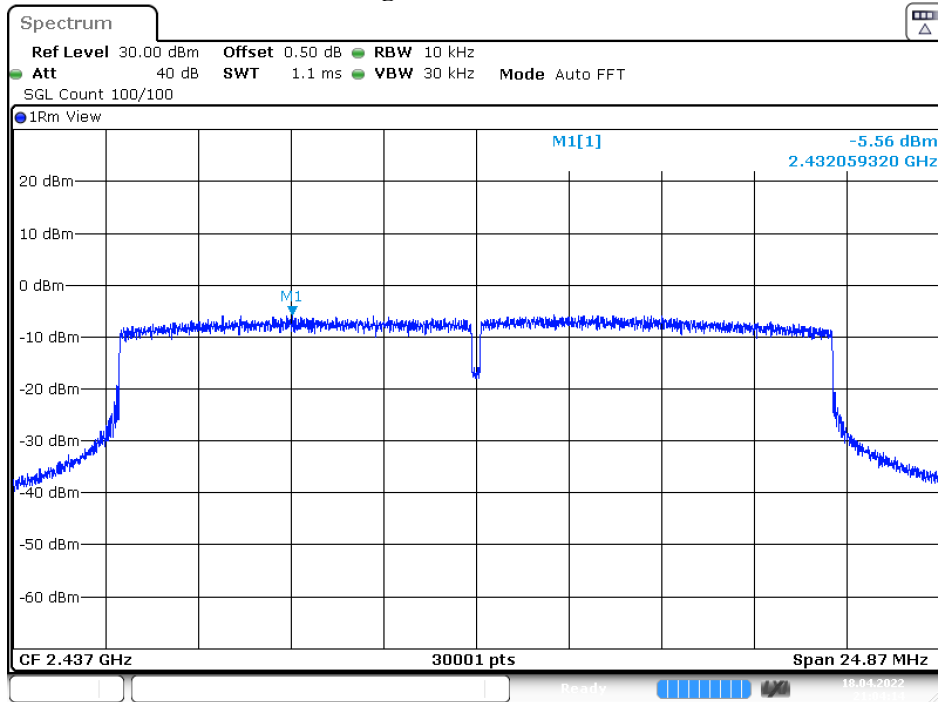
Date: 18.APR.2022 20:38:25

Product : RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
 Test Item : Power Density Data
 Test Mode : Mode 3: Transmit (802.11ax-20BW)-CDD

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Chain	PPSD/MHz (dBm)	Duty factor (dBm)	Total PPSD/MHz (dBm)	Limit (dBm)	Result
01	2412	MCS0	A	-9.910	0.226	-6.593	8	Pass
			B	-9.750				
06	2437	MCS0	A	-5.910	0.226	-2.495	8	Pass
			B	-5.560				
11	2462	MCS0	A	-10.620	0.226	-7.747	8	Pass
			B	-11.380				

Note: Total PPSD/MHz = 10*log(Chain A (mW) + Chain B (mW)) + Duty factor

Figure Channel 06:



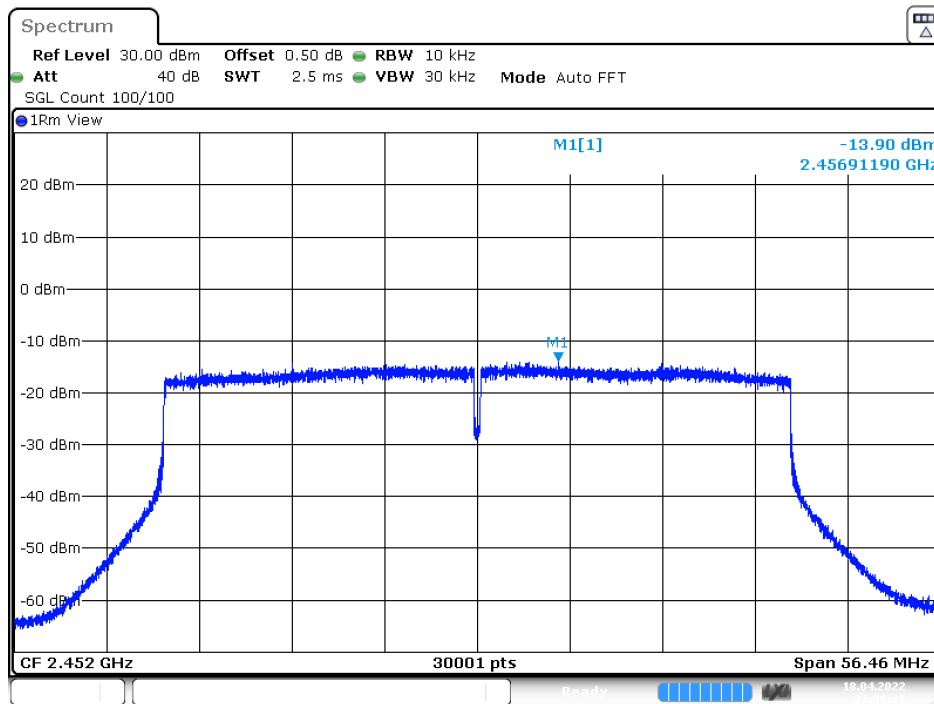
Date: 18.APR.2022 21:04:15

Product : RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
 Test Item : Power Density Data
 Test Mode : Mode 4: Transmit (802.11ax-40BW)-CDD

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Chain	PPSD/MHz (dBm)	Duty factor (dBm)	Total PPSD/MHz (dBm)	Limit (dBm)	Result
03	2422	MCS0	A	-16.850	0.289	-12.916	8	Pass
			B	-15.660				
06	2437	MCS0	A	-14.100	0.289	-10.761	8	Pass
			B	-14.020				
09	2452	MCS0	A	-13.900	0.289	-10.858	8	Pass
			B	-14.430				

Note: Total PPSD/MHz = 10*log(Chain A (mW) + Chain B (mW)) + Duty factor

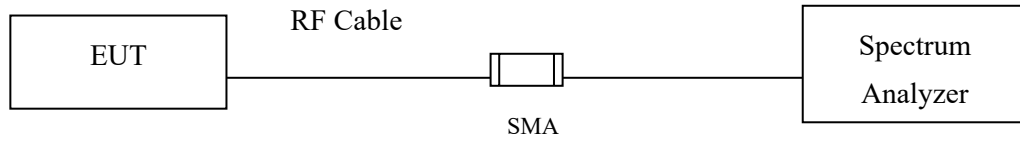
Figure Channel 09:



Date: 18.APR.2022 21:36:21

9. Duty Cycle

9.1. Test Setup



9.2. 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.

9.3. Test Result of Duty Cycle

Product : RadiX AXE6600 WiFi 6E Tri-Band Gaming Router
Test Item : Duty Cycle
Test Mode : Transmit-CDD mode

Duty Cycle Formula:

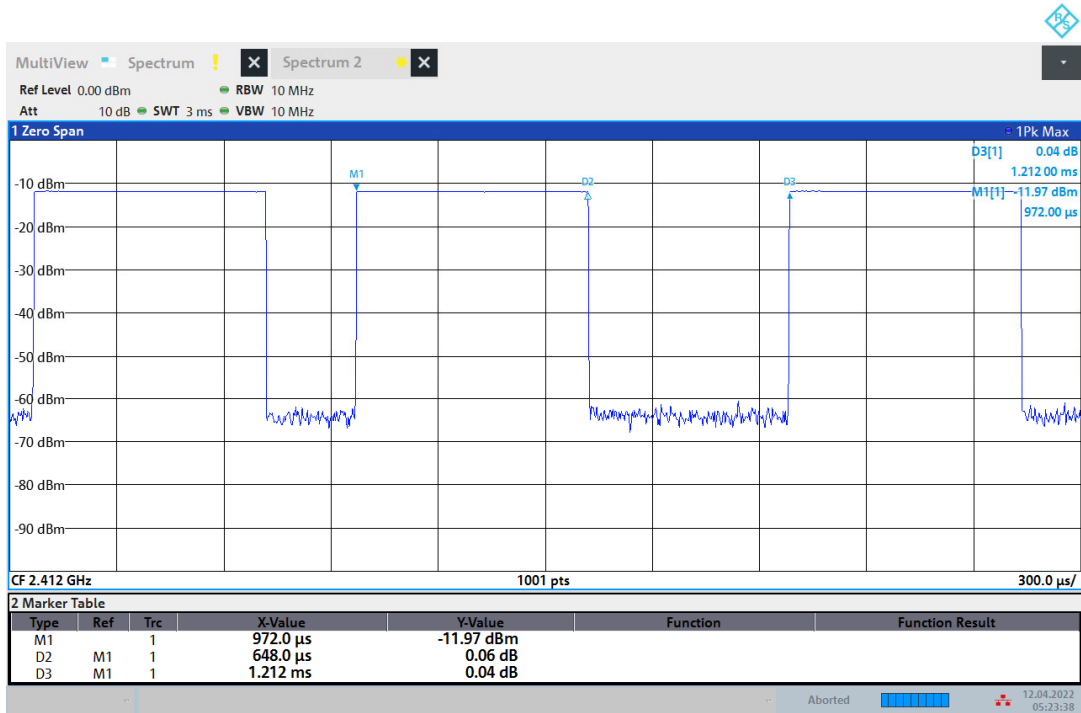
$\text{Duty Cycle} = \text{Ton} / (\text{Ton} + \text{Toff})$

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

Results:

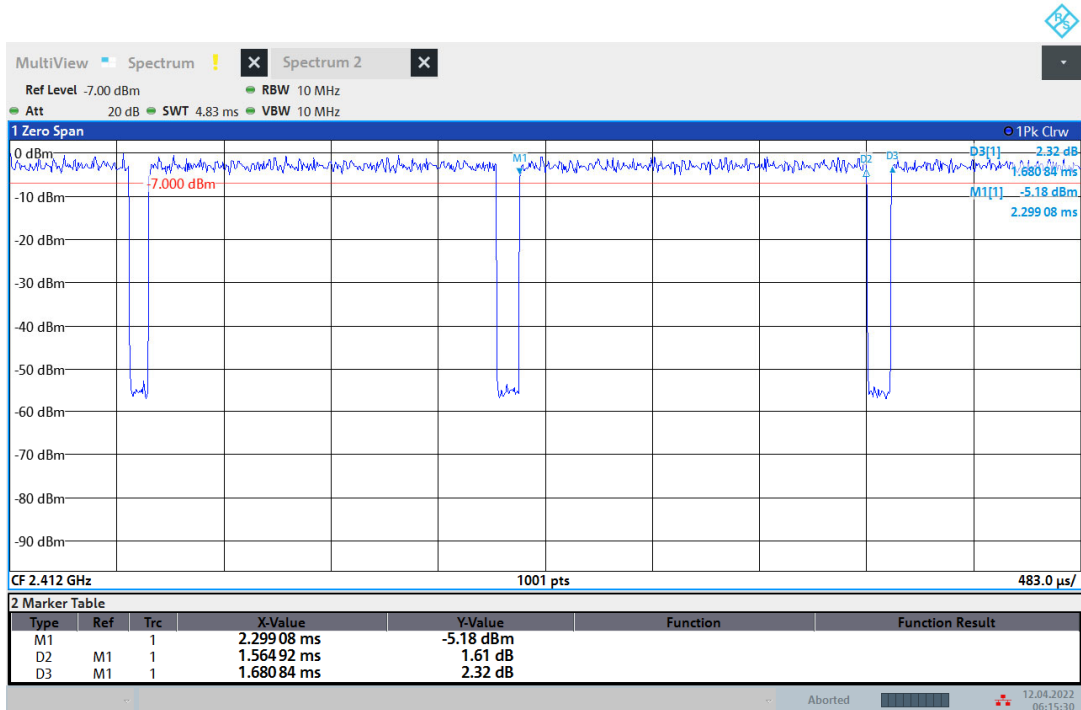
2.4GHz band	Ton (ms)	Ton + Toff (ms)	Duty Cycle (%)	Duty Factor (dB)
802.11b	0.6480	1.2120	53.47	2.72
802.11g	1.5649	1.6808	93.10	0.31
802.11ax20	5.2400	5.5200	94.93	0.23
802.11ax40	5.2400	5.6000	93.57	0.29

802.11b



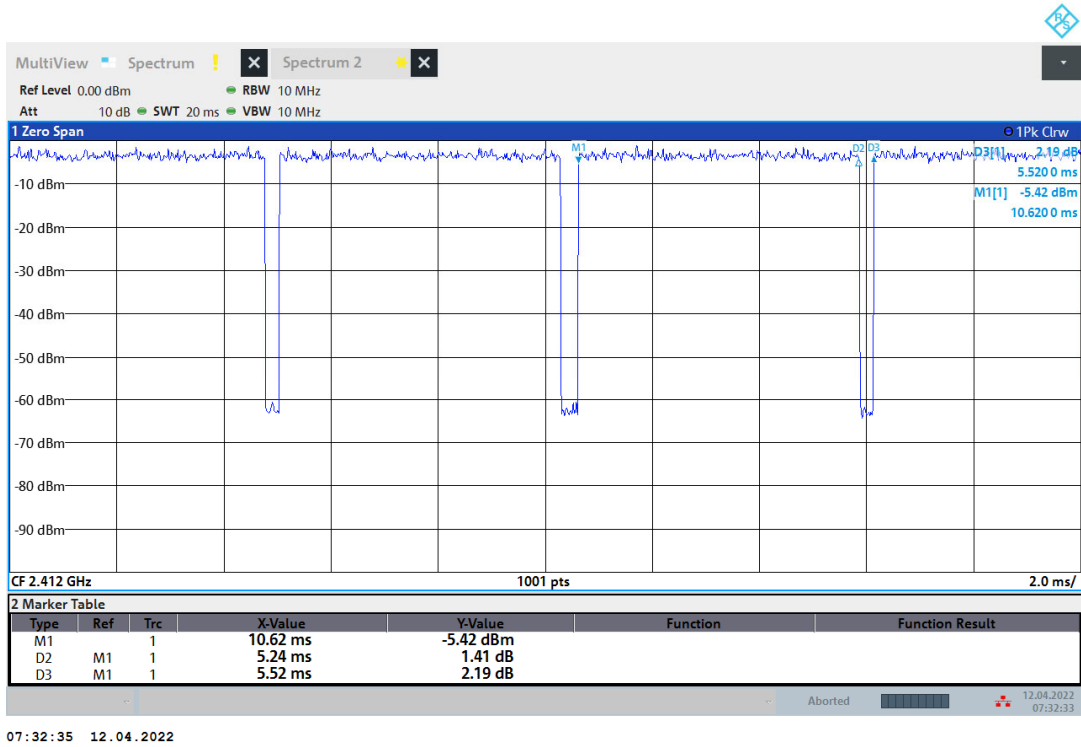
05:23:39 12.04.2022

802.11g



06:15:31 12.04.2022

802.11ax20



802.11ax40

