



Test report No.: 2380298R-RFUSV01S-A

TEST REPORT

Product Name	Notebook Computer
Trademark	LG
Model and /or type reference	14Z90S,14ZD90S,14ZG90S,14ZB90S,14ZW90S,14ZN90S* (* can be 0 to 9 or A to Z or blank denoting buyer request)
FCC ID	BEJNT-14Z90S
Applicant's name / address	LG Electronics USA, Inc. 111 Sylvan Avenue North Building Englewood Cliffs, NJ 07632 United States
Manufacturer's name	LG ELECTRONICS INC.
Test method requested, standard	FCC CFR Title 47 Part 15 Subpart C ANSI C63.4: 2014, ANSI C63.10: 2013
Verdict Summary	IN COMPLIANCE
Documented By (Senior Project Specialist / Joanne Lin)	<i>Joanne Lin</i>
Tested By (Senior Engineer / Ivan Chuang)	<i>Ivan Chuang</i>
Approved By (Senior Engineer / Jack Hsu)	<i>Jack Hsu</i>
Date of Receipt	2023/08/10
Date of Issue	2023/10/31
Report Version	V1.0

INDEX

	Page
1. General Information.....	6
1.1. EUT Description.....	6
1.2. Tested System Details.....	8
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 Peak Power Output.....	15
4. Radiated Emission	31
4.1. Test Setup	31
4.2. Limits.....	32
4.3. Test Procedure	33
4.4. Test Result of Radiated Emission.....	35
5. RF Antenna Conducted Test	60
5.1. Test Setup	60
5.2. Limits.....	60
5.3. Test Procedure	60
5.4. Test Result of RF Antenna Conducted Test.....	61
6. Band Edge	67
6.1. Test Setup	67
6.2. Limits.....	68
6.3. Test Procedure	68

6.4.	Test Result of Band Edge	70
7.	6dB Bandwidth	118
7.1.	Test Setup	118
7.2.	Limits.....	118
7.3.	Test Procedure	118
7.4.	Test Result of 6dB Bandwidth.....	119
8.	Power Density.....	125
8.1.	Test Setup	125
8.2.	Limits.....	125
8.3.	Test Procedure	125
8.4.	Test Result of Power Density	126
9.	Duty Cycle	136
9.1.	Test Setup	136
9.2.	Test Procedure	136
9.3.	Test Result of Duty Cycle.....	137

Appendix 1: EUT Test Photographs

Appendix 2: Product Photos-Please refer to the file: 2380298R-Product Photos

Competences and Guarantees

DEKRA is a testing laboratory competent to carry out the tests described in this report.

In order to assure the traceability to other national and international laboratories, DEKRA has a calibration and maintenance program for its measurement equipment.

DEKRA guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated in the report and it is based on the knowledge and technical facilities available at DEKRA at the time of performance of the test.

DEKRA is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

IMPORTANT: No parts of this report may be reproduced or quoted out of context, in any form or by any means, except in full, without the previous written permission of DEKRA.

General conditions

1. The test results relate only to the samples tested.
2. 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.
3. This report must not be used to claim product endorsement by TAF or any agency of the government.
4. The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.
5. 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.

Revision History

Report No.	Version	Description	Issued Date
2380298R-RFUSV01S-A	V1.0	Initial issue of report.	2023/10/31

1. General Information

1.1. EUT Description

Product Name	Notebook Computer
Trademark	LG
Model and /or type reference	14Z90S,14ZD90S,14ZG90S,14ZB90S,14ZW90S,14ZN90S* (* can be 0 to 9 or A to Z or blank denoting buyer request)
EUT Rated Voltage	AC 100-240 V, 50-60 Hz
EUT Test Voltage	AC 120V/60 Hz
Frequency Range	802.11b/g/n/ax-20 MHz: 2412-2472 MHz 802.11n/ax-40 MHz: 2422-2462 MHz
Number of Channels	802.11b/g/n/ax-20 MHz: 13CH 802.11n/ax-40 MHz: 9CH
Data Speed	802.11b: 1-11Mbps 802.11g: 6-54Mbps 802.11n: up to 300Mbps 802.11ax: up to 573.6Mbps
Channel separation	802.11b/g/n/ax: 5 MHz
Type of Modulation	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
Channel Control	Auto
Type C to Type C Cable	Shielded, 2m
Adapter	Bao Hui / LP65WFC20P-NJ W Input: AC 100-240 V~1.6A, 50-60 Hz Output: 5.0V=3A, 15W or 9V=3A, 27W or 15V=3A, 45W or 20V=3.25A, 65W

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	INPAQ	DQ6WAPLEL31 (WA-P-LELE-02-017) (Main)	PIFA	2.86 dBi for 2400 MHz
		DQ6WAPLEL31 (WA-P-LELE-02-017) (Aux)	PIFA	2.97 dBi for 2400 MHz
2	Pulse	QD602700000 (TQ27000) (Main)	PIFA	2.48 dBi for 2400 MHz
		QD602700000 (TQ27000) (Aux)	PIFA	2.65 dBi for 2400 MHz

Note:

1. The antenna of EUT is conforming to FCC 15.203.
2. The antenna gain as by the manufacturer provided.
3. Each antenna has been evaluated and only the worst case (higher gain antenna) is presented in the report.
4. The device uses Space Time Block Codes (STBC) technical, not support CDD and Beamforming modes.
STBC mode signals are completely uncorrelated, the Directional gain = G_{ANT} (According to KDB 662911 D01 F)2)a)ii).

802.11b/g/n/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/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	--	--	--	--	--	--

Note:

1. The EUT is a Notebook Computer with a built-in WLAN and Bluetooth transceiver, this report for 2.4GHz WLAN.
2. It's declared by manufacture about all models are electrically identical, different model names for marketing purpose. The different of each model is shown as below:

Model Number	System
14Z90S	(B2C, Windows)
14ZD90S	(NonOS)
14ZG90S	(B2G, Windows)
14ZB90S	(B2B, Windows)
14ZW90S	(B2C/B2B, Whale OS)
14ZN90S* (* can be 0 to 9 or A to Z or blank denoting buyer request)	(All, Whale OS)
The identification of test sample is 14Z90S.	

3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test. The other channels are for reference only.
4. 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 is MCS0)
5. The modulation and bandwidth are similar for 802.11n mode and 802.11ax mode, therefore investigated worst case (802.11ax) to representative mode.
6. The spectrum plot against conducted item only shows the worst case.
7. DEKRA has evaluated each test mode. Only the worst case is shown in the report.
8. 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.

Test Mode	Mode 1
	Transmit (802.11b)
	Transmit (802.11g)
	Transmit (802.11ax-20 MHz)
	Transmit (802.11ax-40 MHz)
	Transmit (802.11ax-20 MHz) (Partial RU)
	Transmit (802.11ax-40 MHz) (Partial RU)

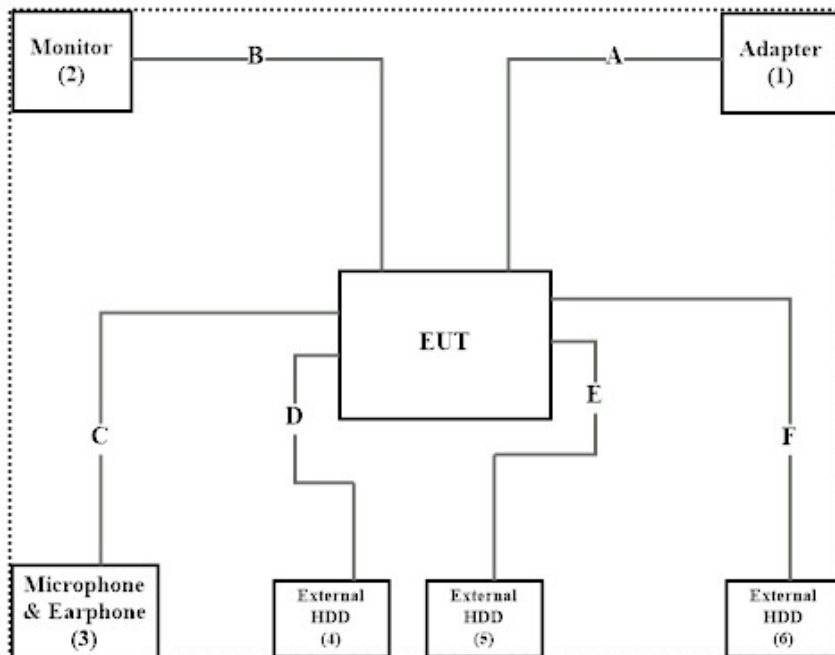
1.2. Tested System Details

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 Adapter	Bao Hui	LP65WFC20P-NJ W	N/A	N/A
2 Monitor	DELL	U2415	CN-01RMGX-74261-63H-09UL-A02	Non-Shielded, 1.8m
3 Microphone & Earphone	Verbatim	C09024VB	N/A	N/A
4 External HDD	Transcend	TS1TSJ25MC	F30467-0011	N/A
5 External HDD	Transcend	TS1TSJ25H3B	F21786-0019	N/A
6 External HDD	Transcend	TS1TSJ25H3B	F21786-0103	N/A

Cable Type	Cable Description
A Type C to Type C Cable	Shielded, 2m
B HDMI Cable	Shielded, 1.8m
C Microphone & Earphone Cable	Non-shielded, 1.2m
D USB Cable	Shielded, 0.5m
E USB Cable	Shielded, 0.5m
F 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 “DRTU version 04824.23.0.0” 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
Conducted Emission	Temperature (°C)	10~40 °C	25.1 °C
	Humidity (%RH)	10~90 %	56.0 %
Radiated Emission	Temperature (°C)	10~40 °C	24.1 °C
	Humidity (%RH)	10~90 %	65.7 %
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.
	Linkou Laboratory
Address	No.5-22, Ruishukeng Linkou District, New Taipei City, 24451, Taiwan, R.O.C
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

1.6. List of Test Item and Equipment

For Conduction Measurements / HY-SR01

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
V	EMI Test Receiver	R&S	ESR7	101601	2023/06/20	2024/06/19
V	Two-Line V-Network	R&S	ENV216	101306	2023/03/16	2024/03/15
V	Two-Line V-Network	R&S	ENV216	101307	2023/08/17	2024/08/16
V	Coaxial Cable	SUHNER	RG400_BNC	RF001	2023/01/10	2024/01/09

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 230303 dekra V9.

For Conducted Measurements / HY-SR02

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
V	Spectrum Analyzer	R&S	FSV30	103466	2022/12/22	2023/12/21
V	Spectrum Analyzer	KEYSIGHT	N9010A	MY53470892	2022/11/07	2023/11/06
V	Peak Power Analyzer	KEYSIGHT	8990B	MY51000539	2023/05/15	2024/05/14
V	Wideband Power Sensor	KEYSIGHT	N1923A	MY59240002	2023/05/18	2024/05/18
V	Wideband Power Sensor	KEYSIGHT	N1923A	MY59240003	2023/05/18	2024/05/17

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 V3.0.0.14.

For Radiated Measurements / HY-CB01

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
V	Loop Antenna	AMETEK	HLA6121	56736	2023/05/23	2024/05/24
V	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-0675	2023/08/09	2025/08/08
V	Horn Antenna	RF SPIN	DRH18-E	210802A18ES	2023/07/19	2024/03/22
V	Horn Antenna	Com-Power	AH-840	101101	2021/11/30	2023/11/29
V	Pre-Amplifier	SGH	0301	20211007-7	2023/01/10	2024/01/09
V	Pre-Amplifier	EMCI	EMC051845SE	980632	2023/01/10	2024/01/09
V	Pre-Amplifier	EMCI	EMC05820SE	980362	2023/01/10	2024/01/09
V	Pre-Amplifier	EMCI	EMC184045SE	980369	2023/01/10	2024/01/09
	Coaxial Cable	EMCI	EMC102-KM-KM-600	1160314		
	Coaxial Cable	EMCI	EMC102-KM-KM-7000	170242		
V	Filter	MICRO TRONICS	BRM50702	G251	2023/01/05	2024/01/04
	Filter	MICRO TRONICS	BRM50716	067	2023/01/05	2024/01/04
	WIFI 6E Filter	MVE	MFN-5850/5895/S1	A80006N	2023/01/05	2024/01/04
	WIFI 6E Filter	MVE	MFN-5925/6425/S1	A80007N	2023/01/05	2024/01/04
	WIFI 6E Filter	MVE	MFN-6425/6525/S1	A80008N	2023/01/05	2024/01/04
	WIFI 6E Filter	MVE	MFN-6525/6875/S1	A80009N	2023/01/05	2024/01/04
	WIFI 6E Filter	MVE	MFN-6875/7125/S1	A80010N	2023/01/05	2024/01/04
V	EMI Test Receiver	R&S	ESR3	102792	2022/12/29	2023/12/28
V	Spectrum Analyzer	R&S	FSV3044	101115	2023/01/06	2024/01/05
V	Coaxial Cable	SUHNER	SUCOFLEX 106	25450/6	2023/01/10	2024/01/09
	Coaxial Cable	SGH	HA800	GD20110222-8		
	Coaxial Cable	SGH	SGH18	2021003-8		
	Coaxial Cable	EMCI	EMC106	151113		

Note:

1. Bi-Log Antenna and Horn Antenna(AH-840) is calibrated every two years, the other 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 230303 dekra V9.

1.7. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document.

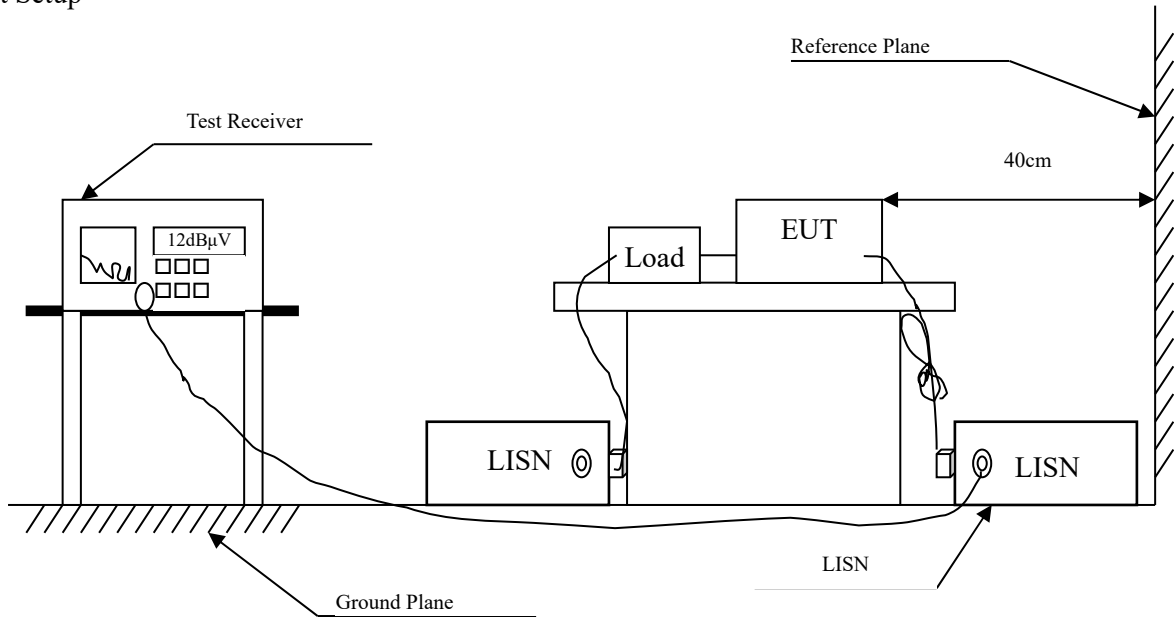
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

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	± 3.50 dB
Maximum Power Output	Spectrum Analyzer: ± 2.14 dB Power Meter: ± 1.05 dB
Radiated Emission	9 kHz~30 MHz: ± 3.88 dB 30 MHz~1 GHz: ± 4.42 dB 1 GHz~18 GHz: ± 4.28 dB 18 GHz~40 GHz: ± 3.90 dB
RF Antenna Conducted Test	± 2.14 dB
Band Edge	9 kHz~30 MHz: ± 3.88 dB 30 MHz~1 GHz: ± 4.42 dB 1 GHz~18 GHz: ± 4.28 dB 18 GHz~40 GHz: ± 3.90 dB
6dB Bandwidth	± 1580.61 Hz
Power Density	± 2.14 dB
Duty Cycle	± 0.53 %

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

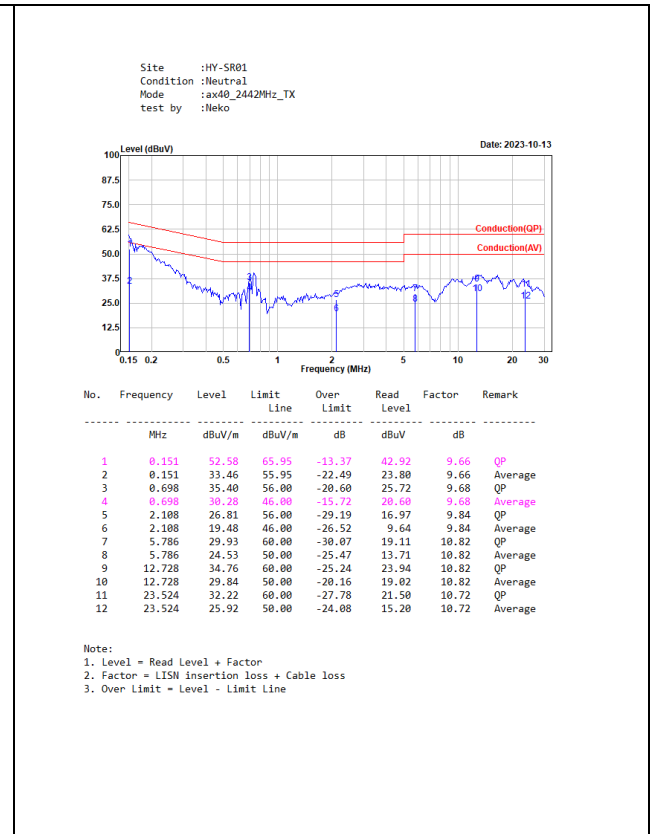
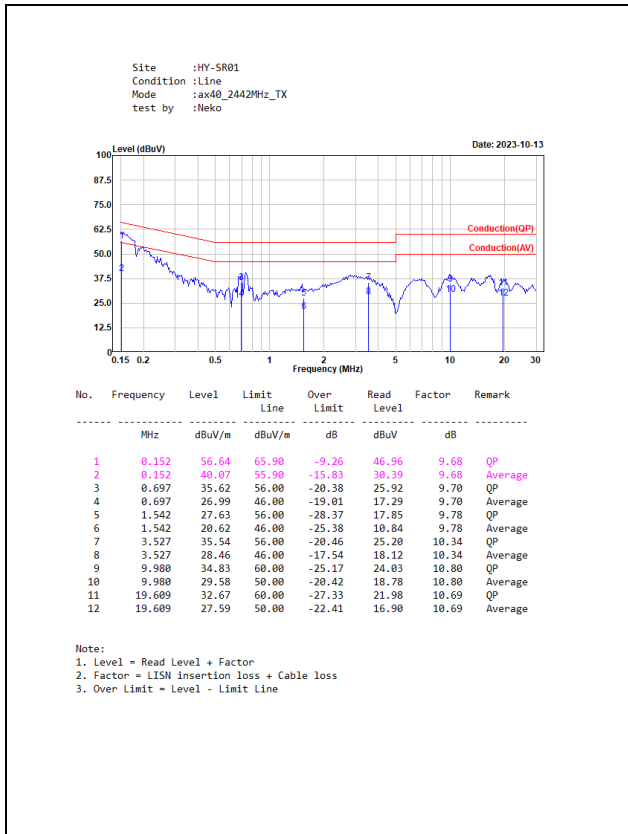
The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling 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.

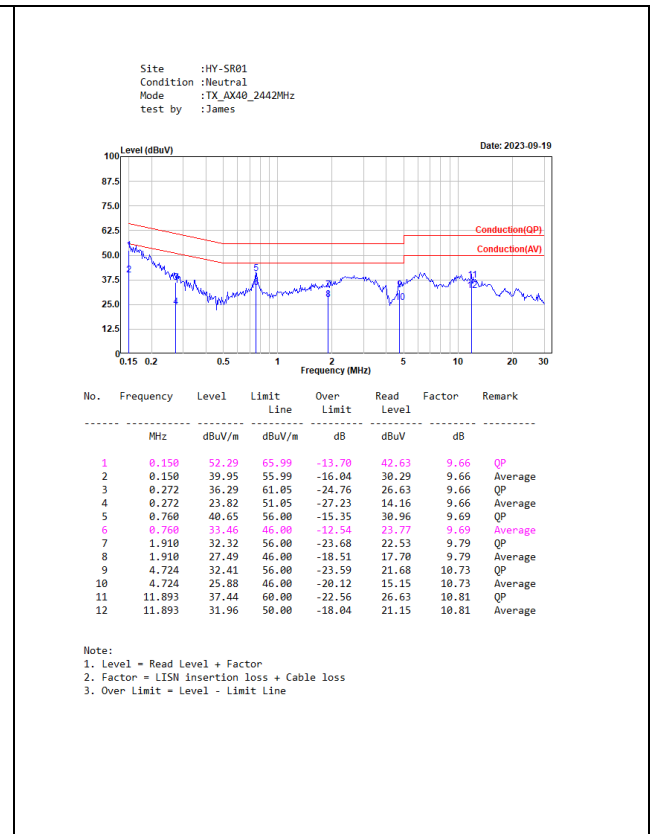
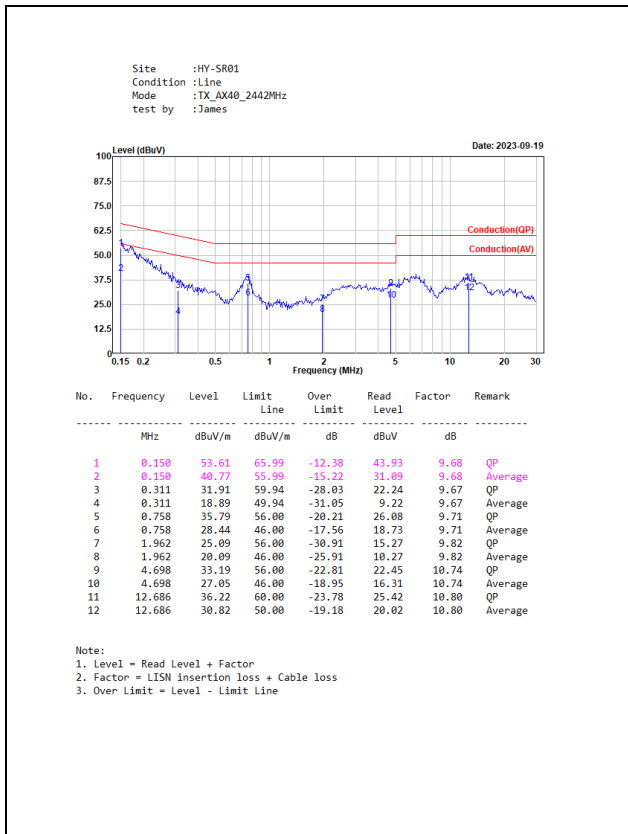
Conducted emissions were invested over the frequency range from 0.15 MHz to 30 MHz using a receiver bandwidth of 9 kHz.

2.4. Test Result of Conducted Emission

SISO A

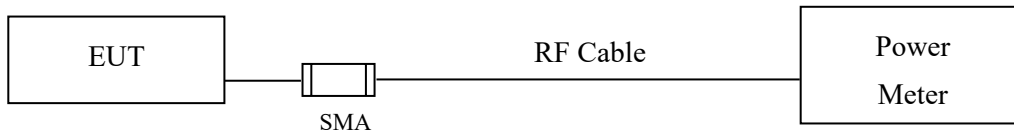


MIMO



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).

3.4. Test Result of Peak Power Output

Product : Notebook Computer
 Test Item : Maximum Power Output Data
 Test Mode : Transmit (802.11b)-SISO A
 Test Date : 2023/09/04

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Average Output Power (dBm)	Limit (dBm)	Result
01	2412	1	19.78	<30	Pass
07	2442	1	19.65	<30	Pass
11	2462	1	19.60	<30	Pass
12	2467	1	18.70	<30	Pass
13	2472	1	16.40	<30	Pass

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Peak Output Power (dBm)	Limit (dBm)	Result
01	2412	1	21.86	<30	Pass
07	2442	1	21.70	<30	Pass
11	2462	1	21.65	<30	Pass
12	2467	1	20.80	<30	Pass
13	2472	1	18.54	<30	Pass

Product : Notebook Computer
Test Item : Maximum Power Output Data
Test Mode : Transmit (802.11b)-SISO B
Test Date : 2023/10/12

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Average Output Power (dBm)	Limit (dBm)	Result
01	2412	1	19.68	<30	Pass
07	2442	1	19.58	<30	Pass
11	2462	1	19.55	<30	Pass
12	2467	1	18.56	<30	Pass
13	2472	1	15.22	<30	Pass

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Peak Output Power (dBm)	Limit (dBm)	Result
01	2412	1	21.55	<30	Pass
07	2442	1	21.61	<30	Pass
11	2462	1	21.53	<30	Pass
12	2467	1	20.70	<30	Pass
13	2472	1	17.37	<30	Pass

Product : Notebook Computer
Test Item : Maximum Power Output Data
Test Mode : Transmit (802.11g)-SISO A
Test Date : 2023/09/04

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Average Output Power (dBm)	Limit (dBm)	Result
01	2412	6	16.70	<30	Pass
07	2442	6	19.85	<30	Pass
11	2462	6	16.52	<30	Pass
12	2467	6	14.15	<30	Pass
13	2472	6	11.40	<30	Pass

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Peak Output Power (dBm)	Limit (dBm)	Result
01	2412	6	21.00	<30	Pass
07	2442	6	23.67	<30	Pass
11	2462	6	21.10	<30	Pass
12	2467	6	18.50	<30	Pass
13	2472	6	16.80	<30	Pass

Product : Notebook Computer
Test Item : Maximum Power Output Data
Test Mode : Transmit (802.11g)-SISO B
Test Date : 2023/10/12

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Average Output Power (dBm)	Limit (dBm)	Result
01	2412	6	16.63	<30	Pass
07	2442	6	19.76	<30	Pass
11	2462	6	16.44	<30	Pass
12	2467	6	13.86	<30	Pass
13	2472	6	11.06	<30	Pass

Channel No.	Frequency (MHz)	Data Rate (Mbps)	Peak Output Power (dBm)	Limit (dBm)	Result
01	2412	6	20.90	<30	Pass
07	2442	6	23.52	<30	Pass
11	2462	6	20.79	<30	Pass
12	2467	6	18.22	<30	Pass
13	2472	6	16.09	<30	Pass

Product : Notebook Computer
Test Item : Maximum Power Output Data
Test Mode : Transmit (802.11ax-20 MHz)-SISO A
Test Date : 2023/10/12

Channel No.	Frequency (MHz)	Data Rate	Average Output Power (dBm)	Limit (dBm)	Result
01	2412	MCS0	16.85	<30	Pass
07	2442	MCS0	19.80	<30	Pass
11	2462	MCS0	16.51	<30	Pass
12	2467	MCS0	14.25	<30	Pass
13	2472	MCS0	11.38	<30	Pass

Channel No.	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Result
01	2412	MCS0	21.12	<30	Pass
07	2442	MCS0	23.89	<30	Pass
11	2462	MCS0	21.12	<30	Pass
12	2467	MCS0	18.63	<30	Pass
13	2472	MCS0	17.10	<30	Pass

Product : Notebook Computer
Test Item : Maximum Power Output Data
Test Mode : Transmit (802.11ax-20 MHz)-SISO B
Test Date : 2023/10/12

Channel No.	Frequency (MHz)	Data Rate	Average Output Power (dBm)	Limit (dBm)	Result
01	2412	MCS0	16.63	<30	Pass
07	2442	MCS0	19.58	<30	Pass
11	2462	MCS0	16.42	<30	Pass
12	2467	MCS0	13.86	<30	Pass
13	2472	MCS0	11.21	<30	Pass

Channel No.	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Result
01	2412	MCS0	20.92	<30	Pass
07	2442	MCS0	23.62	<30	Pass
11	2462	MCS0	20.89	<30	Pass
12	2467	MCS0	18.32	<30	Pass
13	2472	MCS0	16.90	<30	Pass

Product : Notebook Computer
 Test Item : Maximum Power Output Data
 Test Mode : Transmit (802.11ax-20 MHz)-MIMO
 Test Date : 2023/09/04

Channel No.	Frequency (MHz)	Data Rate	Chain A Power (dBm)	Chain B Power (dBm)	Average Output Power Chain A+B (dBm)	Limit (dBm)	Result
01	2412	MCS0	11.70	11.42	14.57	<30	Pass
07	2442	MCS0	16.80	16.77	19.80	<30	Pass
11	2462	MCS0	12.00	11.77	14.90	<30	Pass
12	2467	MCS0	7.87	7.66	10.78	<30	Pass
13	2472	MCS0	3.00	2.78	5.90	<30	Pass

Note: Average Output Power (dBm) = $10 \cdot \log(\text{Chain A (mW)} + \text{Chain B (mW)})$.

Channel No.	Frequency (MHz)	Data Rate	Chain A Power (dBm)	Chain B Power (dBm)	Peak Output Power Chain A+B (dBm)	Limit (dBm)	Result
01	2412	MCS0	16.42	15.82	19.14	<30	Pass
07	2442	MCS0	21.58	21.45	24.53	<30	Pass
11	2462	MCS0	16.48	15.80	19.16	<30	Pass
12	2467	MCS0	12.45	12.08	15.28	<30	Pass
13	2472	MCS0	8.75	7.92	11.37	<30	Pass

Note: Peak Output Power (dBm) = $10 \cdot \log(\text{Chain A (mW)} + \text{Chain B (mW)})$.

Product : Notebook Computer
Test Item : Maximum Power Output Data
Test Mode : Transmit (802.11ax-40 MHz)-SISO A
Test Date : 2023/10/12

Channel No.	Frequency (MHz)	Data Rate	Average Output Power (dBm)	Limit (dBm)	Result
03	2422	MCS0	15.15	<30	Pass
07	2442	MCS0	16.26	<30	Pass
09	2452	MCS0	15.86	<30	Pass
10	2457	MCS0	11.47	<30	Pass
11	2462	MCS0	10.19	<30	Pass

Channel No.	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Result
03	2422	MCS0	20.98	<30	Pass
07	2442	MCS0	21.61	<30	Pass
09	2452	MCS0	21.75	<30	Pass
10	2457	MCS0	17.43	<30	Pass
11	2462	MCS0	16.23	<30	Pass

Product : Notebook Computer
Test Item : Maximum Power Output Data
Test Mode : Transmit (802.11ax-40 MHz)-SISO B
Test Date : 2023/10/12

Channel No.	Frequency (MHz)	Data Rate	Average Output Power (dBm)	Limit (dBm)	Result
03	2422	MCS0	14.14	<30	Pass
07	2442	MCS0	15.86	<30	Pass
09	2452	MCS0	14.49	<30	Pass
10	2457	MCS0	11.10	<30	Pass
11	2462	MCS0	8.88	<30	Pass

Channel No.	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Result
03	2422	MCS0	19.70	<30	Pass
07	2442	MCS0	21.36	<30	Pass
09	2452	MCS0	20.22	<30	Pass
10	2457	MCS0	16.83	<30	Pass
11	2462	MCS0	14.86	<30	Pass

Product : Notebook Computer
 Test Item : Maximum Power Output Data
 Test Mode : Transmit (802.11ax-40 MHz)-MIMO
 Test Date : 2023/09/04

Channel No.	Frequency (MHz)	Data Rate	Chain A Power (dBm)	Chain B Power (dBm)	Average Output Power Chain A+B (dBm)	Limit (dBm)	Result
03	2422	MCS0	10.68	10.55	13.63	<30	Pass
07	2442	MCS0	11.75	11.65	14.71	<30	Pass
09	2452	MCS0	10.54	10.50	13.53	<30	Pass
10	2457	MCS0	4.00	3.92	6.97	<30	Pass
11	2462	MCS0	2.40	2.33	5.38	<30	Pass

Note: Average Output Power (dBm) = $10 \cdot \log(\text{Chain A (mW)} + \text{Chain B (mW)})$.

Channel No.	Frequency (MHz)	Data Rate	Chain A Power (dBm)	Chain B Power (dBm)	Peak Output Power Chain A+B (dBm)	Limit (dBm)	Result
03	2422	MCS0	16.35	15.90	19.14	<30	Pass
07	2442	MCS0	17.08	17.02	20.06	<30	Pass
09	2452	MCS0	16.36	15.88	19.14	<30	Pass
10	2457	MCS0	9.73	9.63	12.69	<30	Pass
11	2462	MCS0	8.18	8.02	11.11	<30	Pass

Note: Peak Output Power (dBm) = $10 \cdot \log(\text{Chain A (mW)} + \text{Chain B (mW)})$.

Product : Notebook Computer
 Test Item : Maximum Power Output Data
 Test Mode : Transmit (802.11ax-20 MHz) (Partial RU)-SISO A
 Test Date : 2023/10/13

Channel No.	Frequency (MHz)	RU Config	Data Rate	Average Output Power (dBm)	Limit (dBm)	Result
01	2412	26/0	MCS0	16.74	<30	Pass
		52/37	MCS0	16.82	<30	Pass
		106/53	MCS0	16.84	<30	Pass
13	2472	26/8	MCS0	10.78	<30	Pass
		52/40	MCS0	11.37	<30	Pass
		106/54	MCS0	11.36	<30	Pass

Channel No.	Frequency (MHz)	RU Config	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Result
01	2412	26/0	MCS0	19.83	<30	Pass
		52/37	MCS0	20.31	<30	Pass
		106/53	MCS0	21.23	<30	Pass
13	2472	26/8	MCS0	18.72	<30	Pass
		52/40	MCS0	19.66	<30	Pass
		106/54	MCS0	20.44	<30	Pass

Product : Notebook Computer
 Test Item : Maximum Power Output Data
 Test Mode : Transmit (802.11ax-20 MHz) (Partial RU)-SISO B
 Test Date : 2023/10/13

Channel No.	Frequency (MHz)	RU Config	Data Rate	Average Output Power (dBm)	Limit (dBm)	Result
01	2412	26/0	MCS0	16.58	<30	Pass
		52/37	MCS0	16.61	<30	Pass
		106/53	MCS0	16.30	<30	Pass
13	2472	26/8	MCS0	10.60	<30	Pass
		52/40	MCS0	11.13	<30	Pass
		106/54	MCS0	11.19	<30	Pass

Channel No.	Frequency (MHz)	RU Config	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Result
01	2412	26/0	MCS0	19.66	<30	Pass
		52/37	MCS0	20.21	<30	Pass
		106/53	MCS0	21.99	<30	Pass
13	2472	26/8	MCS0	18.59	<30	Pass
		52/40	MCS0	19.42	<30	Pass
		106/54	MCS0	20.24	<30	Pass

Product : Notebook Computer
 Test Item : Maximum Power Output Data
 Test Mode : Transmit (802.11ax-20 MHz) (Partial RU)-MIMO
 Test Date : 2023/09/04

Channel No.	Frequency (MHz)	RU Config	Data Rate	Chain A Power (dBm)	Chain B Power (dBm)	Average Output Power Chain A+B (dBm)	Limit (dBm)	Result
01	2412	26/0	MCS0	11.78	11.57	14.69	<30	Pass
		52/37	MCS0	11.80	11.60	14.71	<30	Pass
		106/53	MCS0	11.72	11.55	14.65	<30	Pass
13	2472	26/8	MCS0	2.90	2.72	5.82	<30	Pass
		52/40	MCS0	3.00	2.75	5.89	<30	Pass
		106/54	MCS0	2.98	2.66	5.83	<30	Pass

Note: Average Output Power (dBm) = $10 \cdot \log (\text{Chain A (mW)} + \text{Chain B (mW)})$.

Channel No.	Frequency (MHz)	RU Config	Data Rate	Chain A Power (dBm)	Chain B Power (dBm)	Peak Output Power Chain A+B (dBm)	Limit (dBm)	Result
01	2412	26/0	MCS0	18.28	16.62	20.54	<30	Pass
		52/37	MCS0	20.20	20.18	23.20	<30	Pass
		106/53	MCS0	20.28	20.12	23.21	<30	Pass
13	2472	26/8	MCS0	9.92	9.81	12.88	<30	Pass
		52/40	MCS0	12.11	12.15	15.14	<30	Pass
		106/54	MCS0	11.55	10.90	14.25	<30	Pass

Note: Peak Output Power (dBm) = $10 \cdot \log (\text{Chain A (mW)} + \text{Chain B (mW)})$.

Product : Notebook Computer
Test Item : Maximum Power Output Data
Test Mode : Transmit (802.11ax-40 MHz) (Partial RU)-SISO A
Test Date : 2023/10/13

Channel No.	Frequency (MHz)	RU Config	Data Rate	Average Output Power (dBm)	Limit (dBm)	Result
03	2422	242/61	MCS0	15.13	<30	Pass
11	2462	242/62	MCS0	10.05	<30	Pass

Channel No.	Frequency (MHz)	RU Config	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Result
03	2422	242/61	MCS0	19.82	<30	Pass
11	2462	242/62	MCS0	18.36	<30	Pass

Product : Notebook Computer
Test Item : Maximum Power Output Data
Test Mode : Transmit (802.11ax-40 MHz) (Partial RU)-SISO B
Test Date : 2023/10/13

Channel No.	Frequency (MHz)	RU Config	Data Rate	Average Output Power (dBm)	Limit (dBm)	Result
03	2422	242/61	MCS0	14.12	<30	Pass
11	2462	242/62	MCS0	8.75	<30	Pass

Channel No.	Frequency (MHz)	RU Config	Data Rate	Peak Output Power (dBm)	Limit (dBm)	Result
03	2422	242/61	MCS0	18.24	<30	Pass
11	2462	242/62	MCS0	15.98	<30	Pass

Product : Notebook Computer
 Test Item : Maximum Power Output Data
 Test Mode : Transmit (802.11ax-40 MHz) (Partial RU)-MIMO
 Test Date : 2023/09/04

Channel No.	Frequency (MHz)	RU Config	Data Rate	Chain A Power (dBm)	Chain B Power (dBm)	Average Output Power Chain A+B (dBm)	Limit (dBm)	Result
03	2422	242/61	MCS0	10.58	10.45	13.53	<30	Pass
11	2462	242/62	MCS0	2.38	2.25	5.33	<30	Pass

Note: Average Output Power (dBm) = $10 \cdot \log(\text{Chain A (mW)} + \text{Chain B (mW)})$.

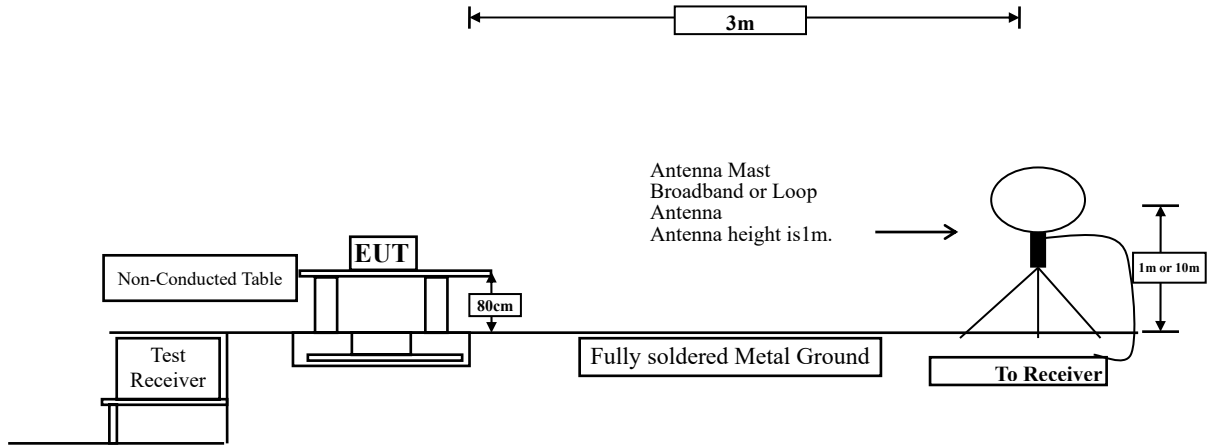
Channel No.	Frequency (MHz)	RU Config	Data Rate	Chain A Power (dBm)	Chain B Power (dBm)	Peak Output Power Chain A+B (dBm)	Limit (dBm)	Result
03	2422	242/61	MCS0	19.25	19.00	22.14	<30	Pass
11	2462	242/62	MCS0	11.40	11.22	14.32	<30	Pass

Note: Peak Output Power (dBm) = $10 \cdot \log(\text{Chain A (mW)} + \text{Chain B (mW)})$.

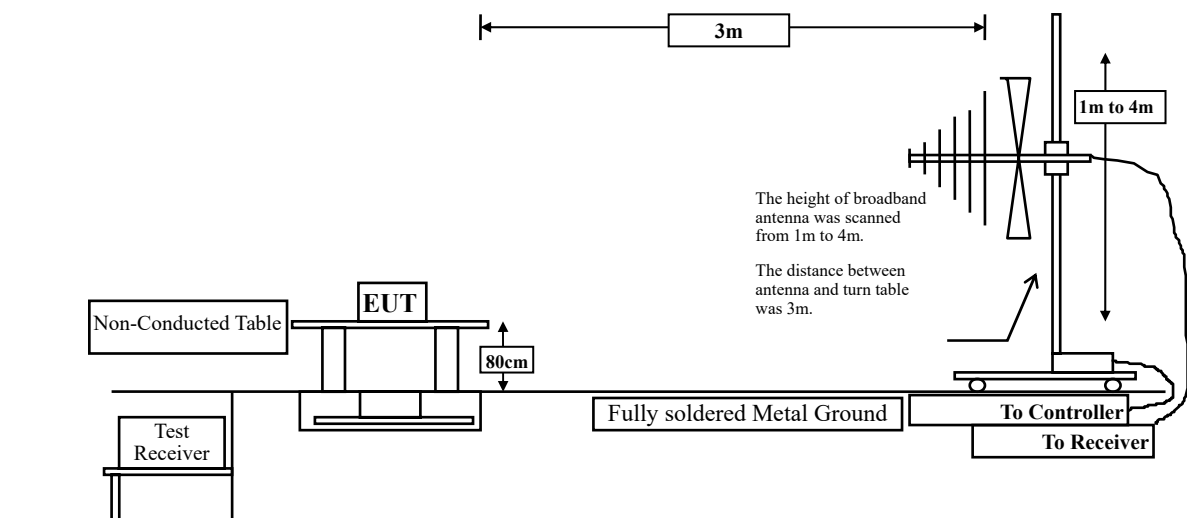
4. Radiated Emission

4.1. Test Setup

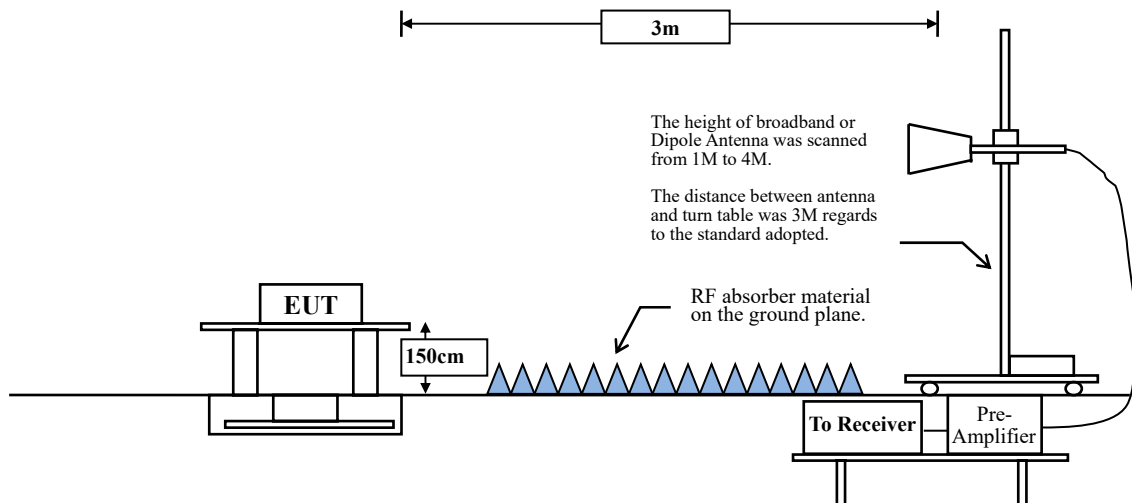
Radiated Emission Under 30 MHz



Radiated Emission Below 1 GHz



Radiated Emission Above 1 GHz



4.2. Limits

➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20 dB 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/m) = 20 log RF Voltage (μ V/m)
 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 1 GHz, 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 30 MHz setting on the field strength meter is 9 kHz and 30 MHz~1 GHz is 120 kHz and above 1 GHz is 1 MHz.

Radiated emission measurements below 30 MHz are made using Loop Antenna and 30 MHz~1 GHz are made using broadband Bilog antenna and above 1 GHz 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 9 kHz - 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 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 = 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.)

SISO A

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11b	99.05	8.3400	120	10
802.11g	97.43	2.0850	480	500
802.11ax-20 MHz	98.35	2.5942	385	10
802.11ax-40 MHz	98.31	3.9610	252	10

SISO B

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11b	99.21	8.3380	120	10
802.11g	97.38	2.0800	481	500
802.11ax-20 MHz	98.51	3.9750	252	10
802.11ax-40 MHz	98.51	3.9750	252	10

MIMO

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11ax-20 MHz	98.51	3.9700	252	10
802.11ax-40 MHz	98.76	3.9800	251	10

SISO A

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11ax-20 MHz (Partial RU)	97.73	2.5800	388	500
802.11ax-40 MHz (Partial RU)	98.10	2.5800	388	10

SISO B

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11ax-20 MHz (Partial RU)	98.48	2.5900	386	10
802.11ax-40 MHz (Partial RU)	98.10	2.5800	388	10

MIMO

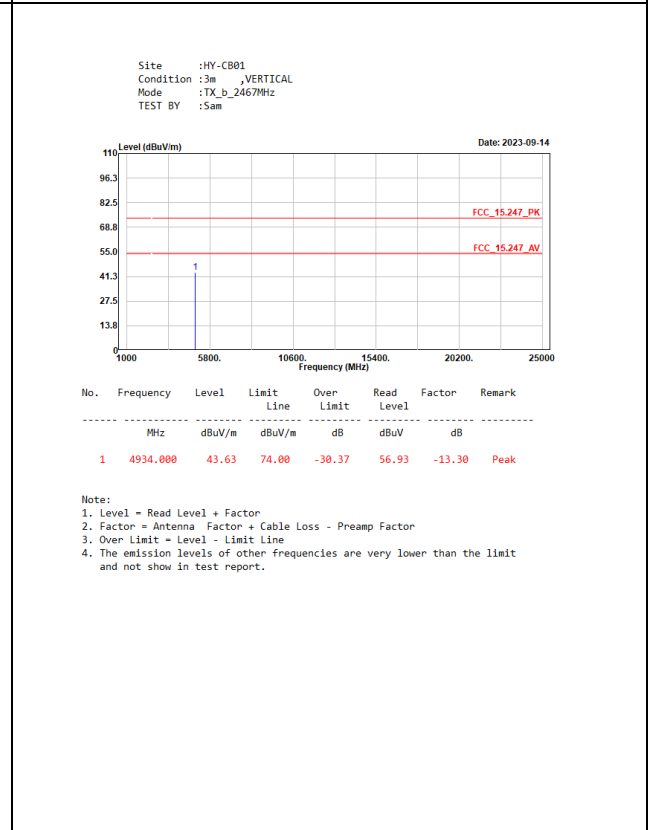
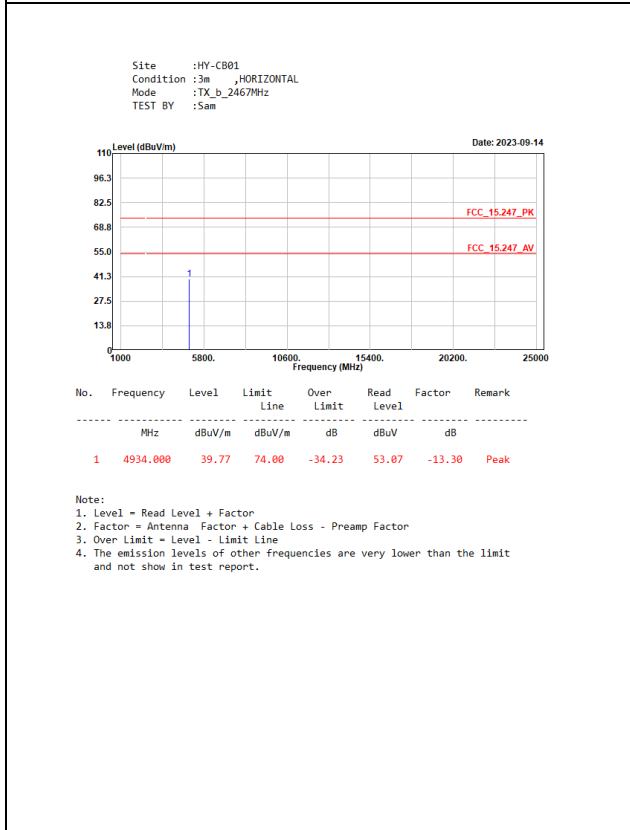
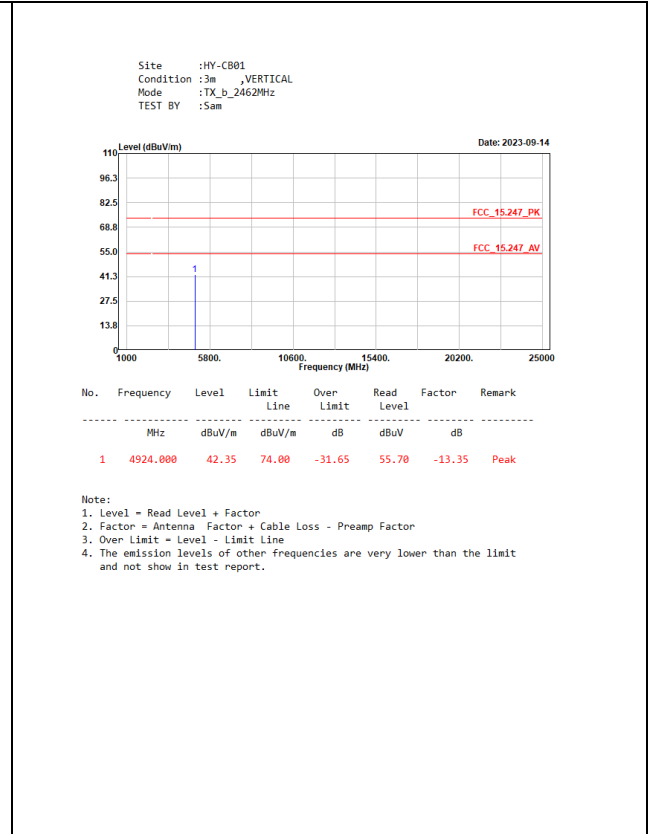
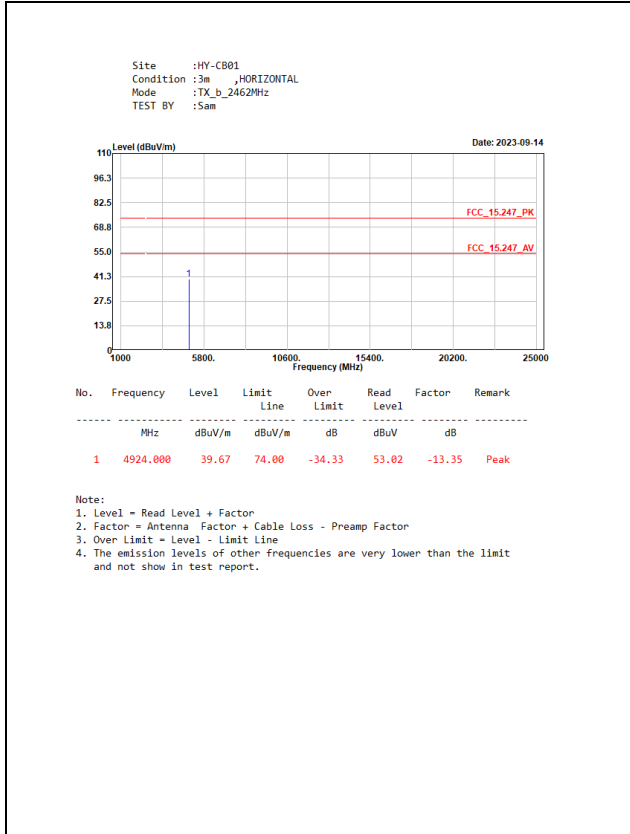
2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11ax-20 MHz (Partial RU)	98.35	2.5942	385	10
802.11ax-40 MHz (Partial RU)	97.81	2.5942	385	500

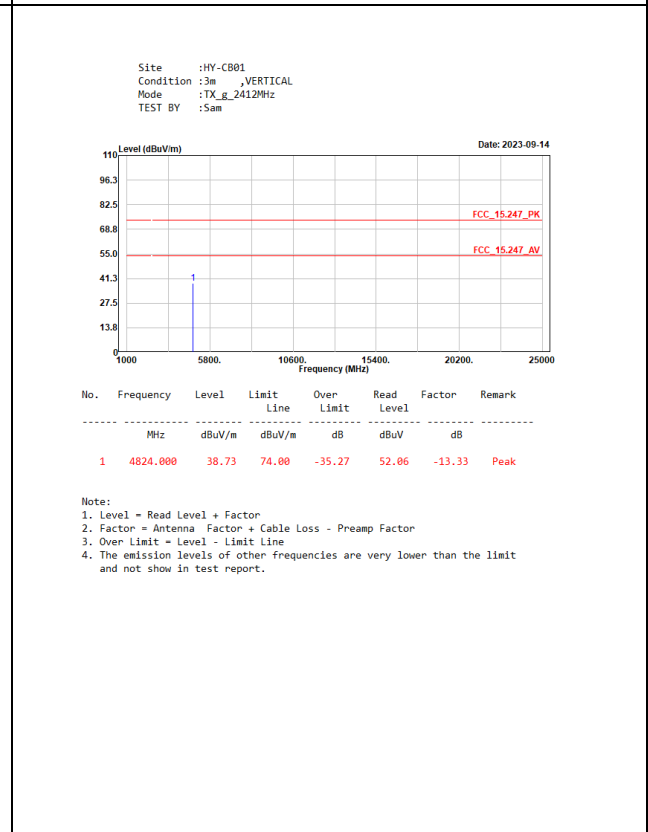
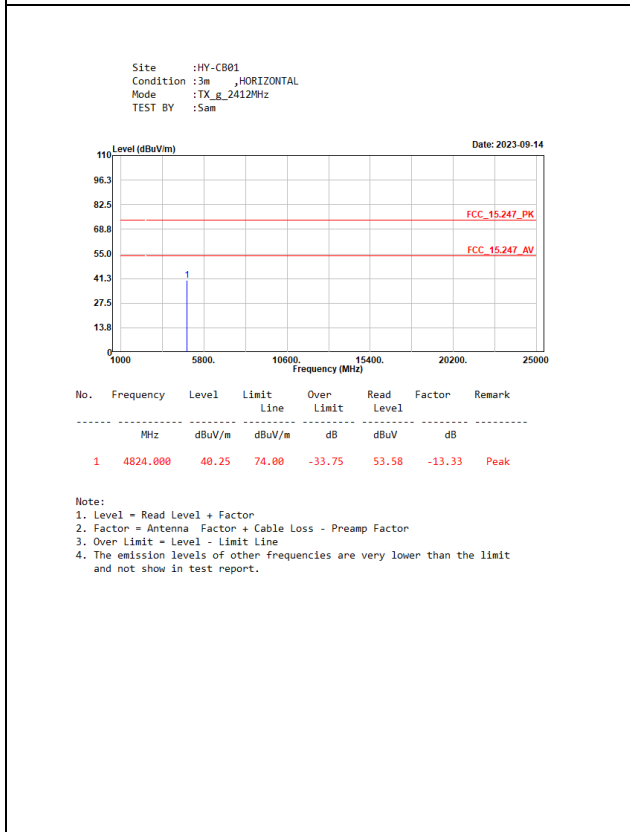
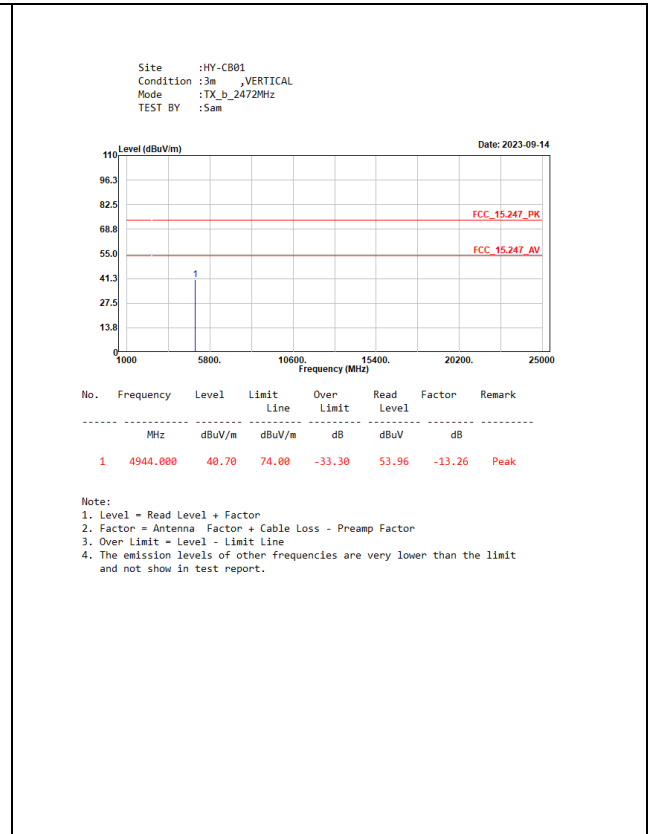
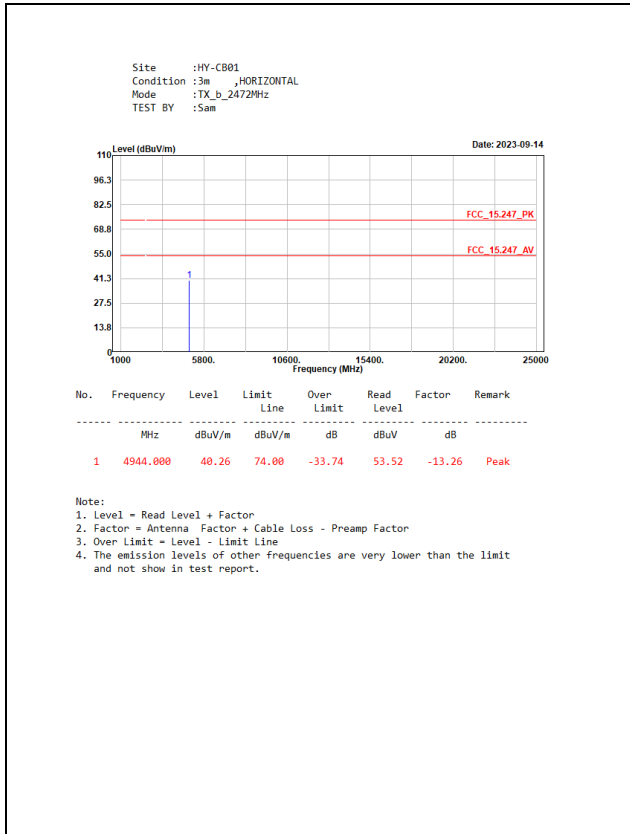
Note: Duty Cycle Refer to Section 9.

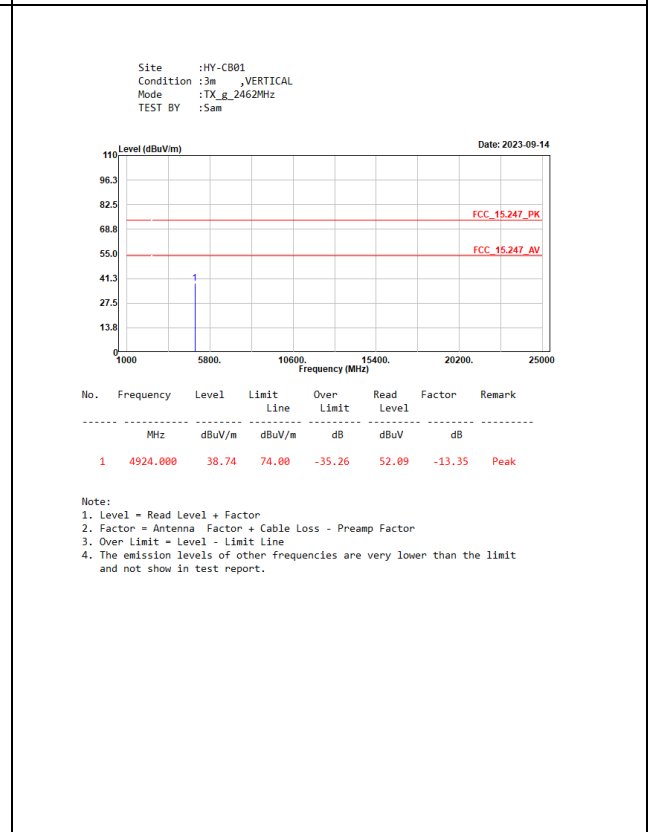
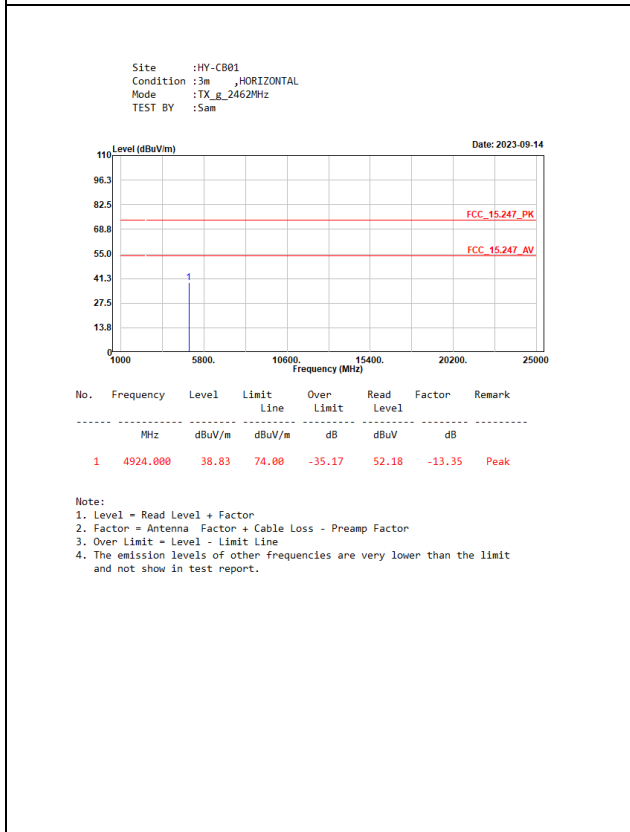
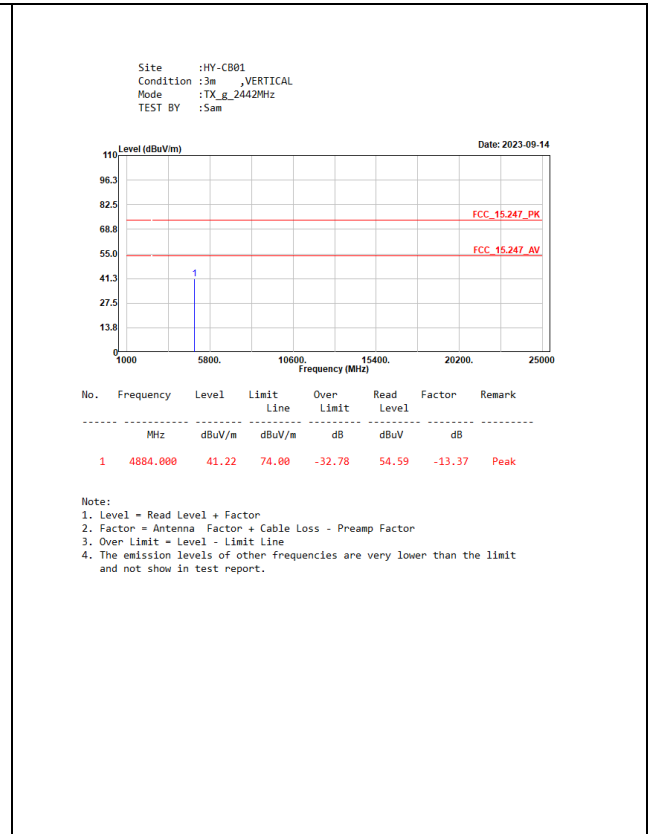
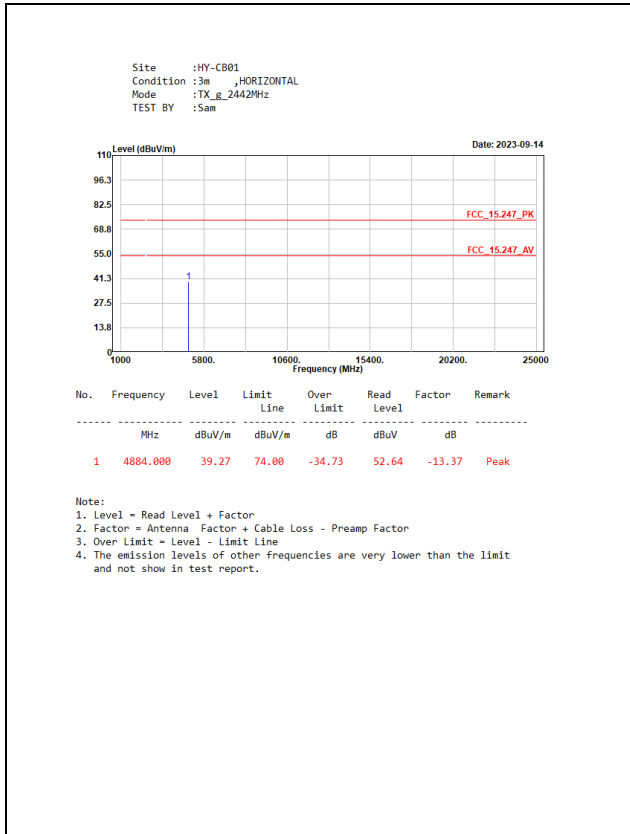
4.4. Test Result of Radiated Emission

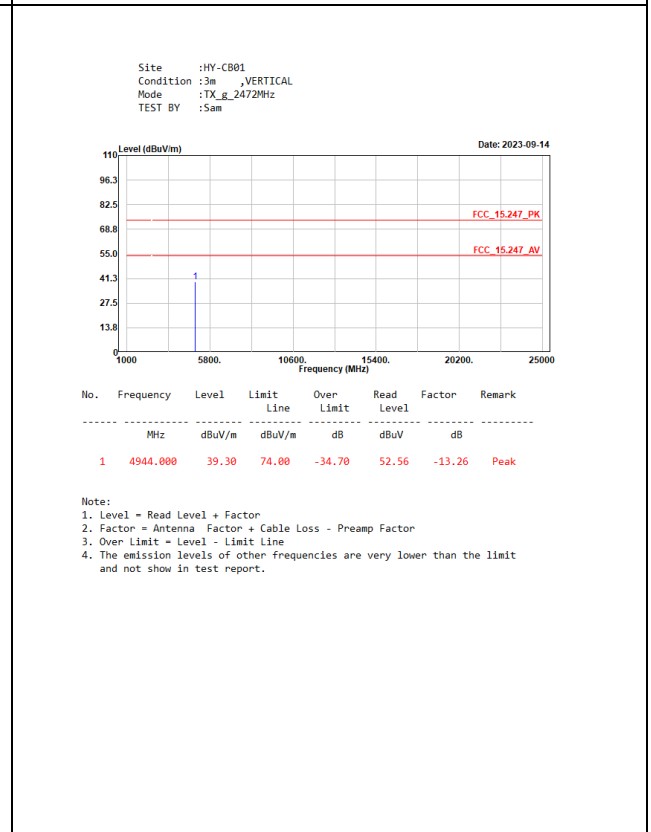
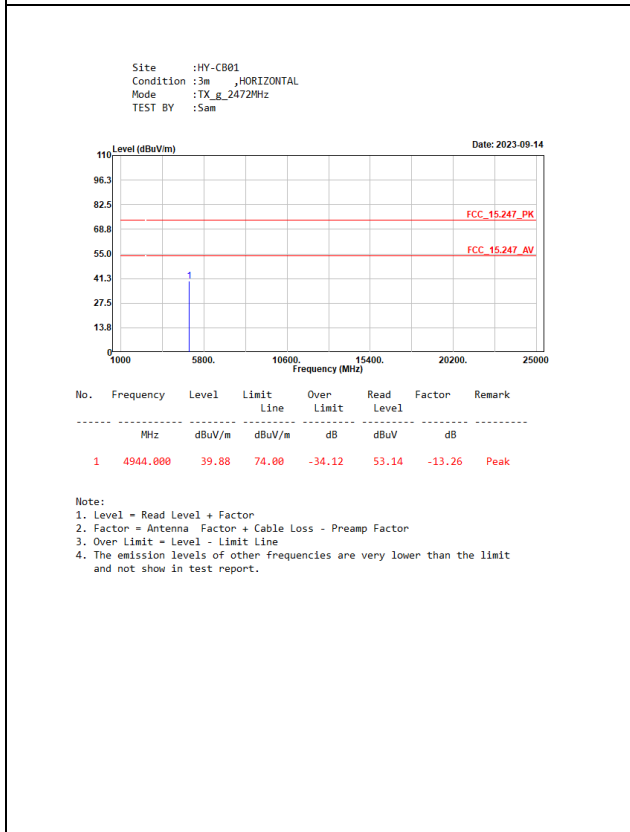
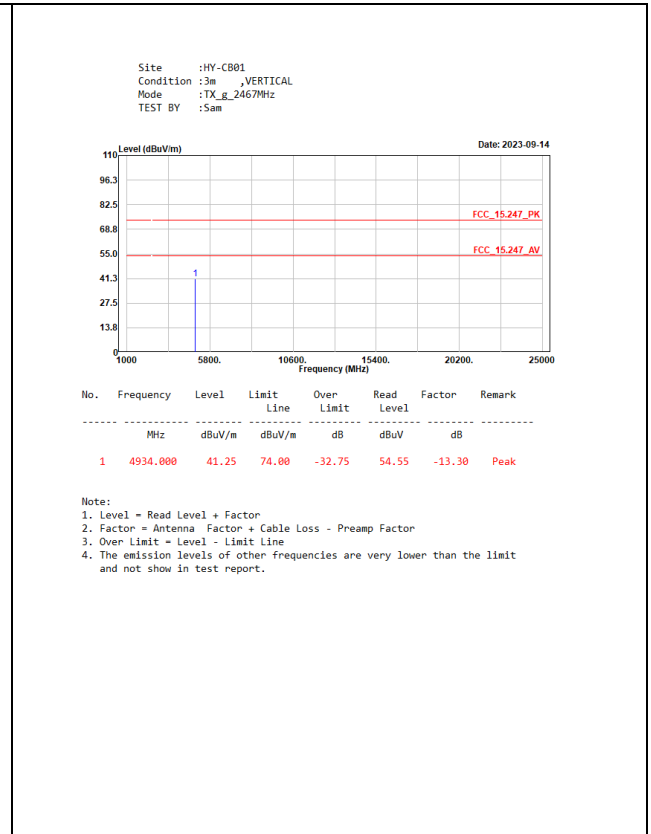
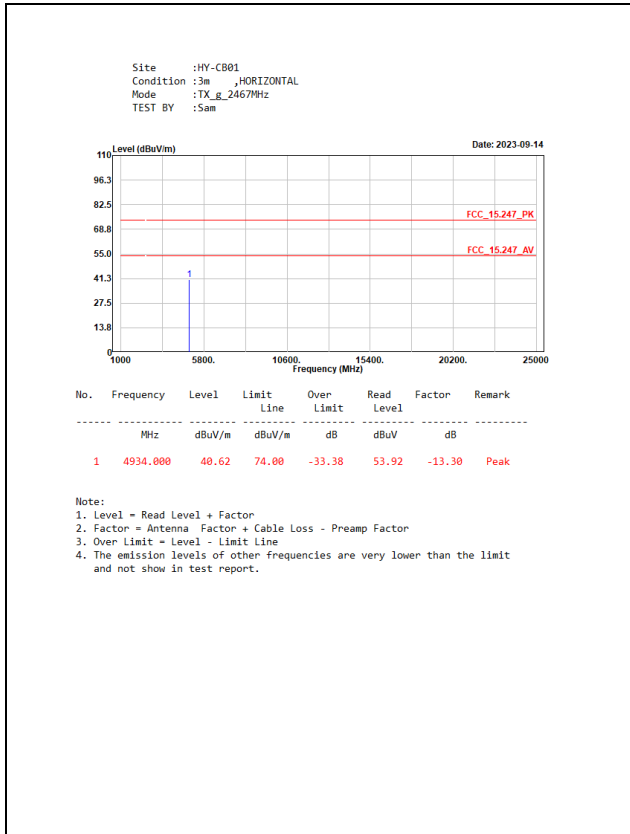
SISO A

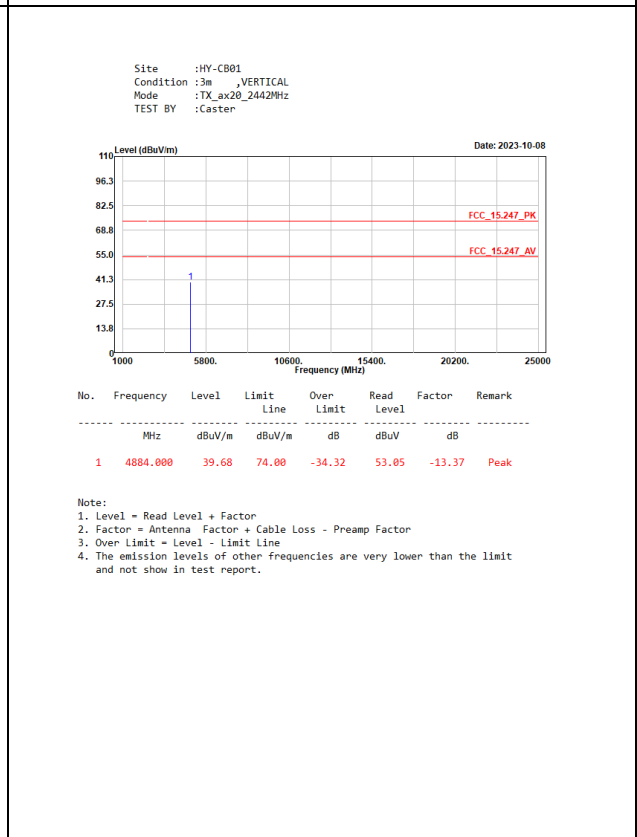
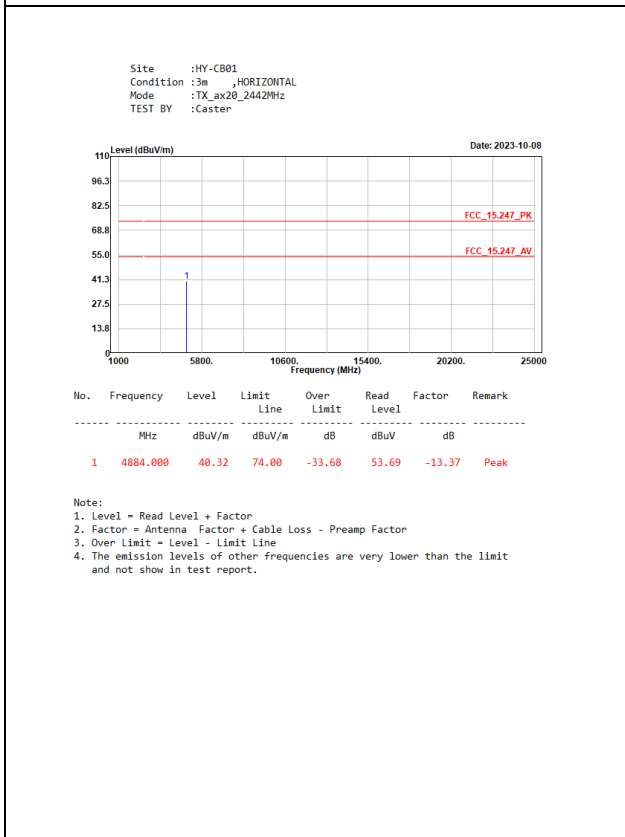
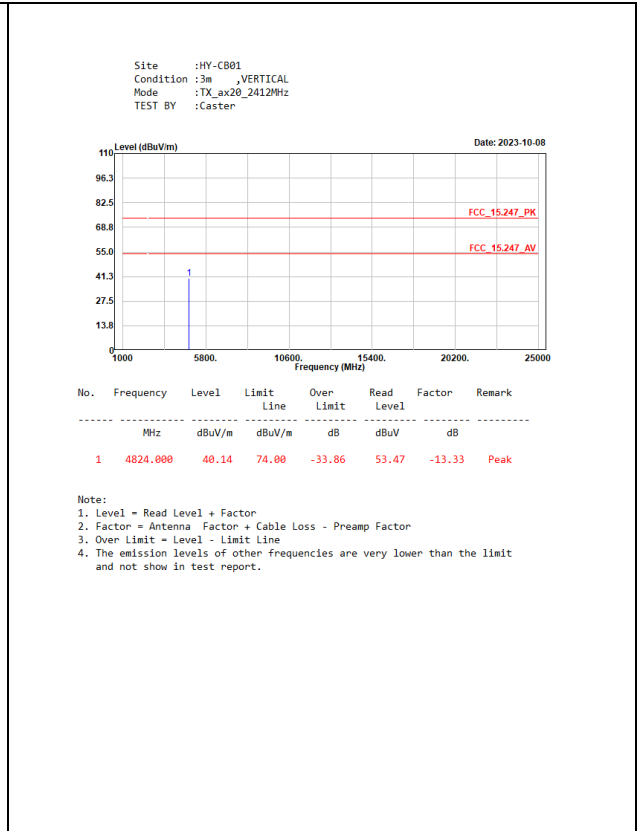
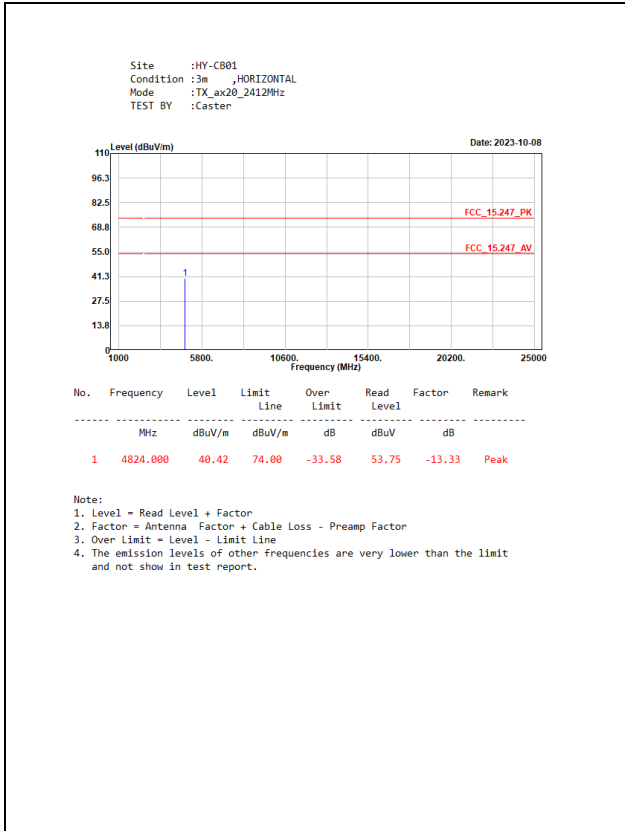
<p>Site :HY-CB01 Condition :3m ,HORIZONTAL Mode :TX_b_2412MHz TEST BY :Sam</p> <p style="text-align: right;">Date: 2023-09-14</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Frequency MHz</th> <th>Level dBuV/m</th> <th>Limit Line dBuV/m</th> <th>Over Limit dB</th> <th>Read Level dBuV</th> <th>Factor dB</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4824.000</td> <td>39.84</td> <td>74.00</td> <td>-34.16</td> <td>53.17</td> <td>-13.33</td> <td>Peak</td> </tr> </tbody> </table> <p>Note: 1. Level = Read Level + Factor 2. Factor = Antenna Factor + Cable Loss - Preamp Factor 3. Over Limit = Level - Limit Line 4. The emission levels of other frequencies are very lower than the limit and not show in test report.</p>	No.	Frequency MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Factor dB	Remark	1	4824.000	39.84	74.00	-34.16	53.17	-13.33	Peak	<p>Site :HY-CB01 Condition :3m ,VERTICAL Mode :TX_b_2412MHz TEST BY :Sam</p> <p style="text-align: right;">Date: 2023-09-14</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Frequency MHz</th> <th>Level dBuV/m</th> <th>Limit Line dBuV/m</th> <th>Over Limit dB</th> <th>Read Level dBuV</th> <th>Factor dB</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4824.000</td> <td>46.51</td> <td>74.00</td> <td>-27.49</td> <td>59.84</td> <td>-13.33</td> <td>Peak</td> </tr> </tbody> </table> <p>Note: 1. Level = Read Level + Factor 2. Factor = Antenna Factor + Cable Loss - Preamp Factor 3. Over Limit = Level - Limit Line 4. The emission levels of other frequencies are very lower than the limit and not show in test report.</p>	No.	Frequency MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Factor dB	Remark	1	4824.000	46.51	74.00	-27.49	59.84	-13.33	Peak
No.	Frequency MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Factor dB	Remark																										
1	4824.000	39.84	74.00	-34.16	53.17	-13.33	Peak																										
No.	Frequency MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Factor dB	Remark																										
1	4824.000	46.51	74.00	-27.49	59.84	-13.33	Peak																										
<p>Site :HY-CB01 Condition :3m ,HORIZONTAL Mode :TX_b_2442MHz TEST BY :Sam</p> <p style="text-align: right;">Date: 2023-09-14</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Frequency MHz</th> <th>Level dBuV/m</th> <th>Limit Line dBuV/m</th> <th>Over Limit dB</th> <th>Read Level dBuV</th> <th>Factor dB</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4884.000</td> <td>39.73</td> <td>74.00</td> <td>-34.27</td> <td>53.10</td> <td>-13.37</td> <td>Peak</td> </tr> </tbody> </table> <p>Note: 1. Level = Read Level + Factor 2. Factor = Antenna Factor + Cable Loss - Preamp Factor 3. Over Limit = Level - Limit Line 4. The emission levels of other frequencies are very lower than the limit and not show in test report.</p>	No.	Frequency MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Factor dB	Remark	1	4884.000	39.73	74.00	-34.27	53.10	-13.37	Peak	<p>Site :HY-CB01 Condition :3m ,VERTICAL Mode :TX_b_2442MHz TEST BY :Sam</p> <p style="text-align: right;">Date: 2023-09-14</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Frequency MHz</th> <th>Level dBuV/m</th> <th>Limit Line dBuV/m</th> <th>Over Limit dB</th> <th>Read Level dBuV</th> <th>Factor dB</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4884.000</td> <td>39.45</td> <td>74.00</td> <td>-34.55</td> <td>52.82</td> <td>-13.37</td> <td>Peak</td> </tr> </tbody> </table> <p>Note: 1. Level = Read Level + Factor 2. Factor = Antenna Factor + Cable Loss - Preamp Factor 3. Over Limit = Level - Limit Line 4. The emission levels of other frequencies are very lower than the limit and not show in test report.</p>	No.	Frequency MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Factor dB	Remark	1	4884.000	39.45	74.00	-34.55	52.82	-13.37	Peak
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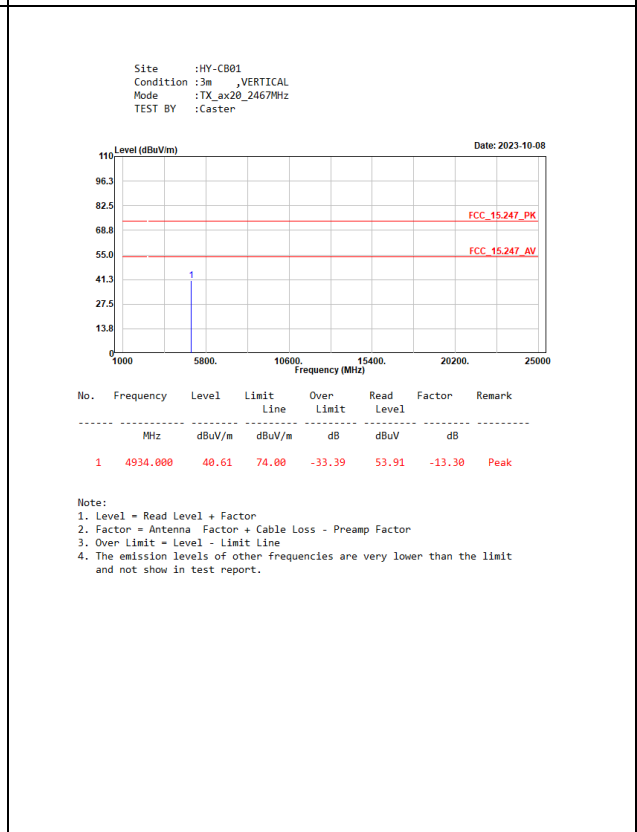
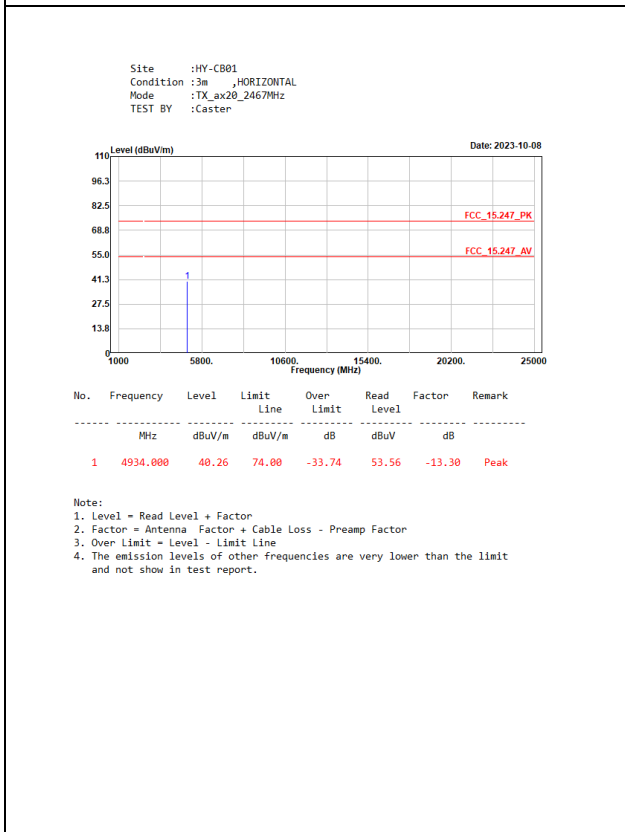
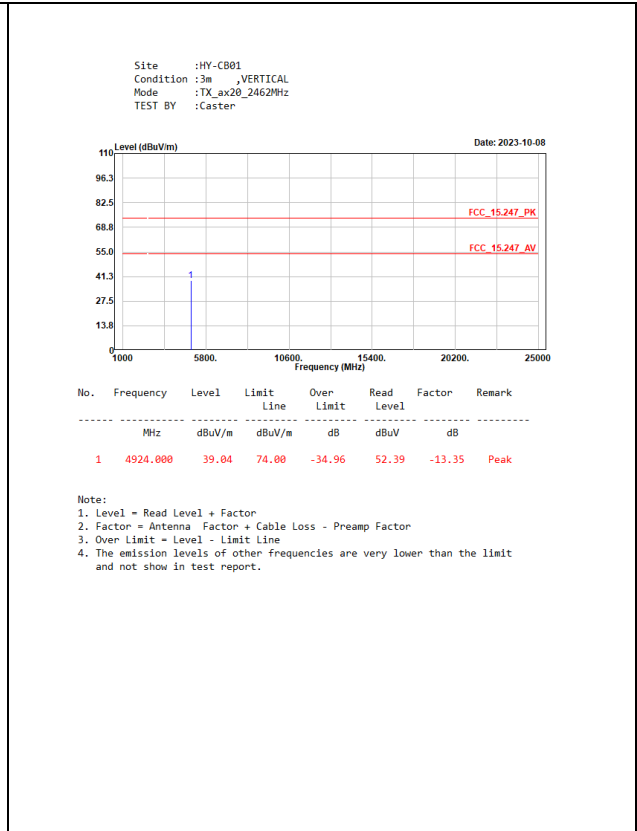
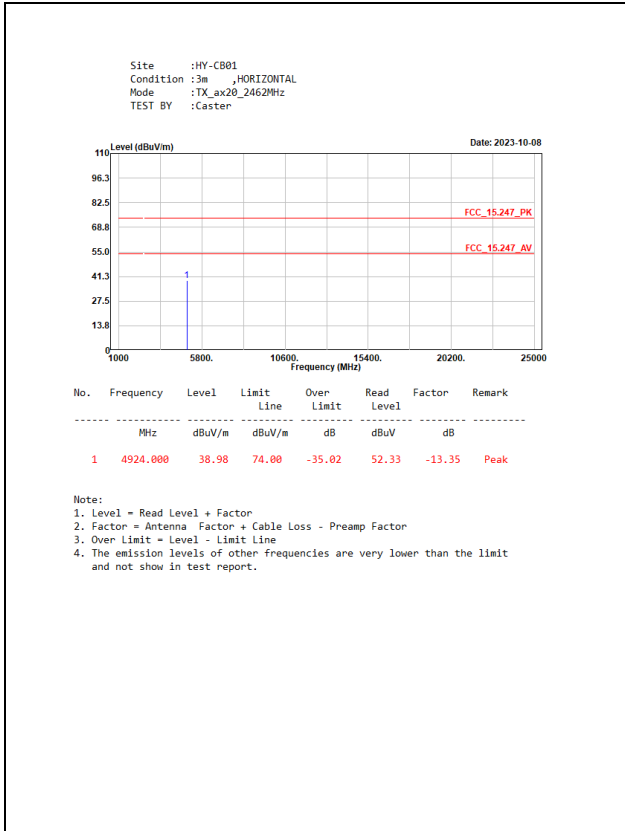


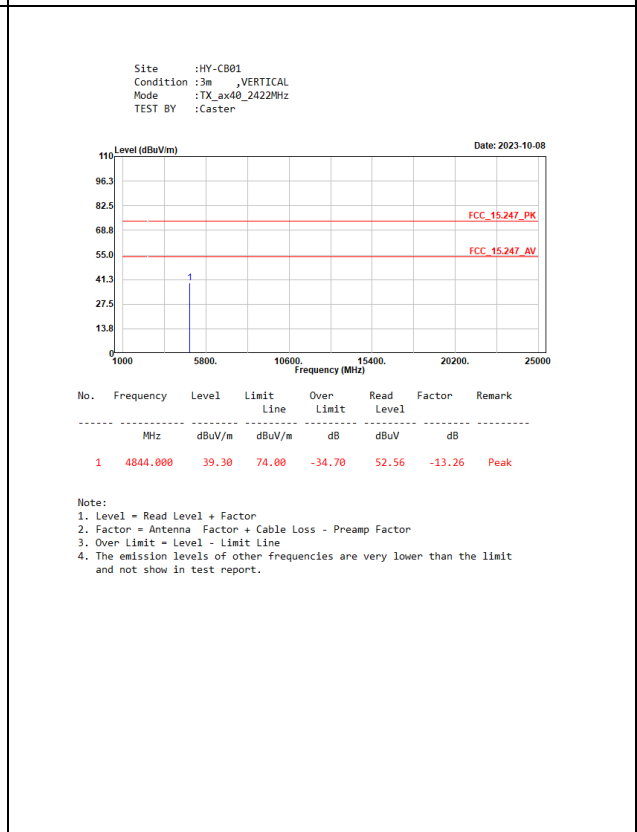
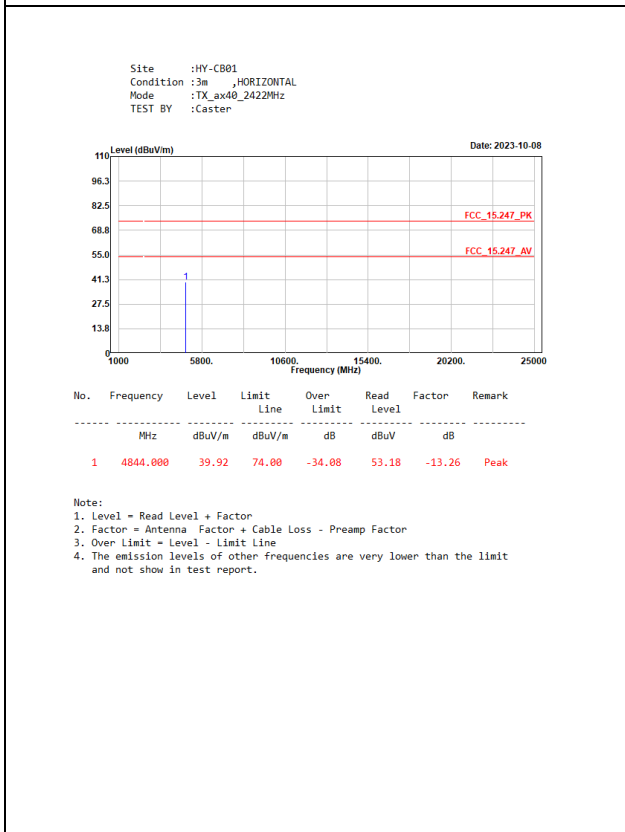
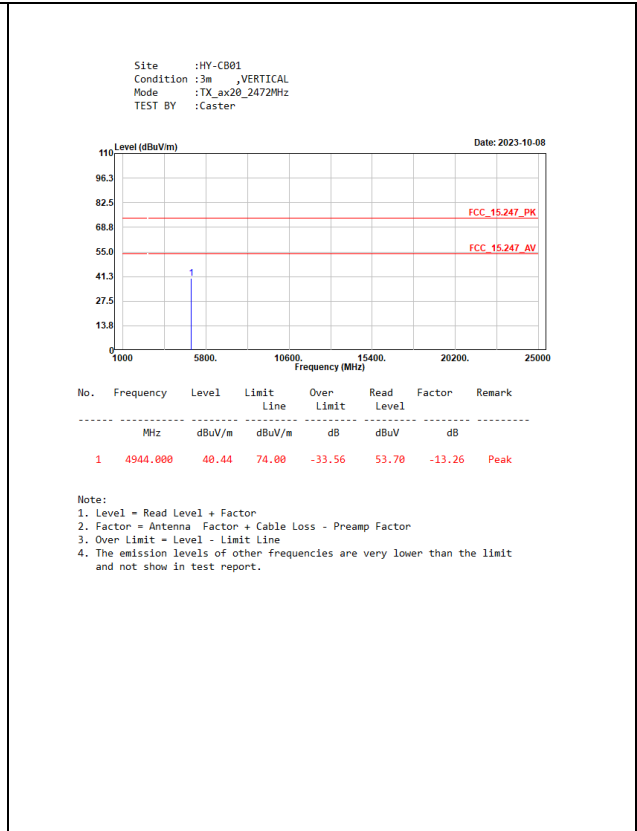
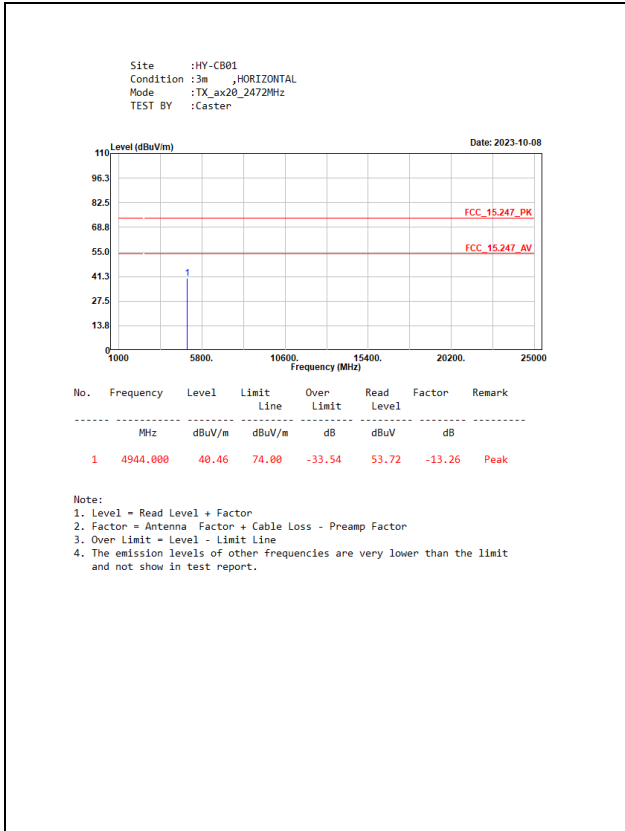


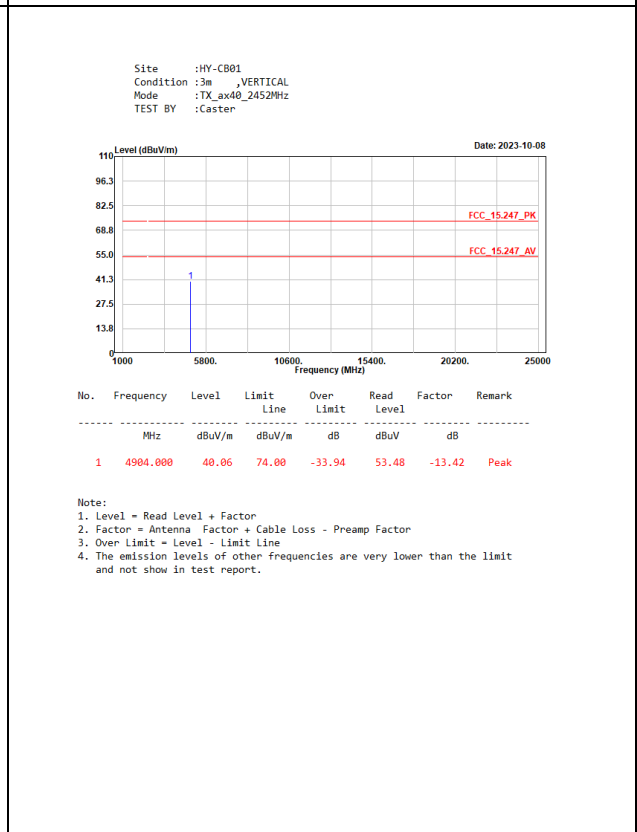
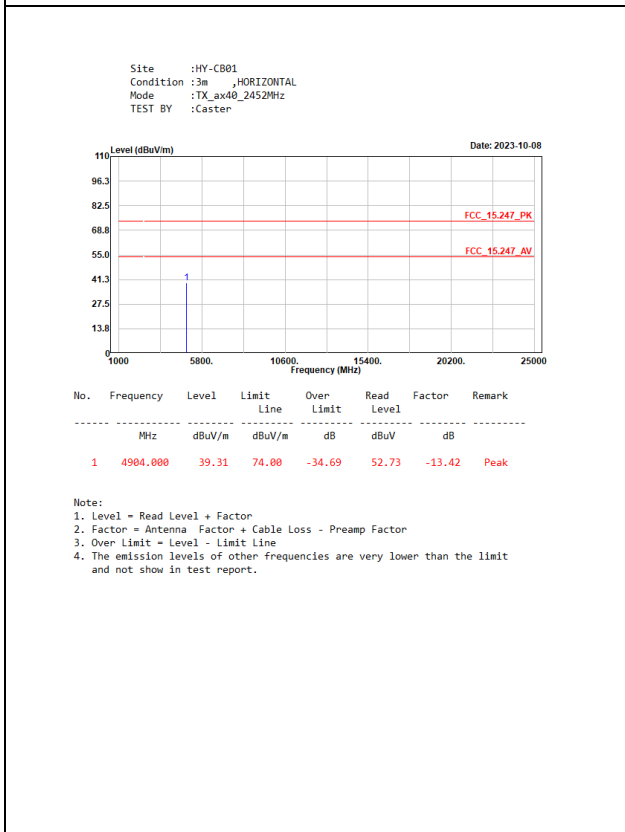
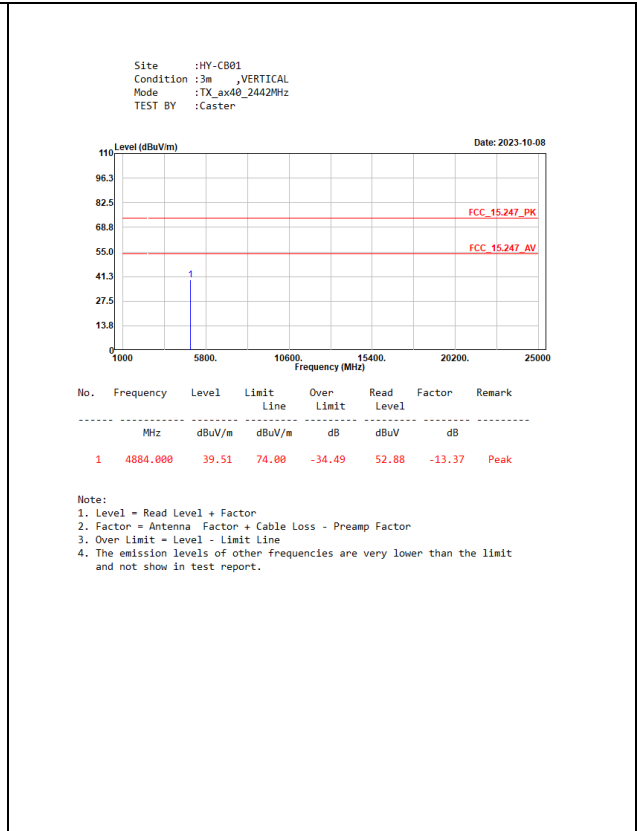
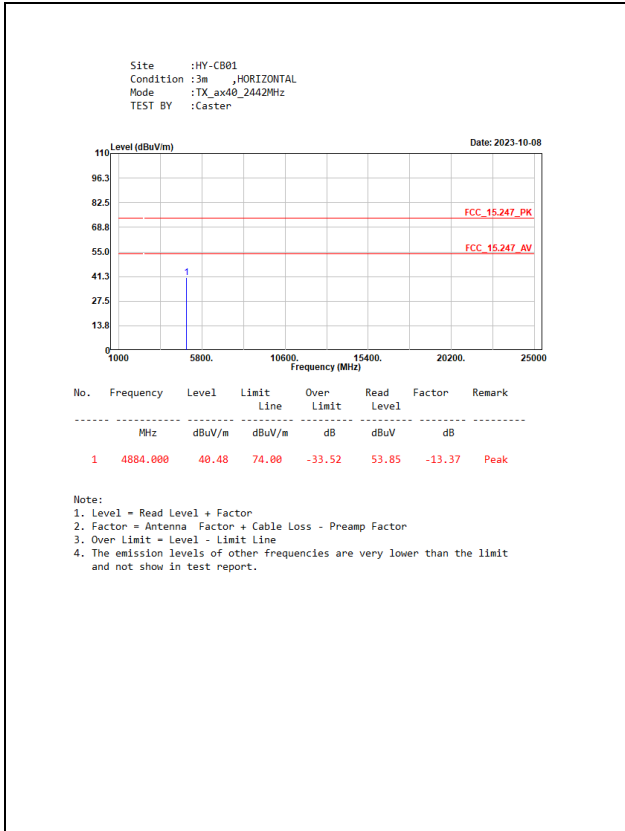


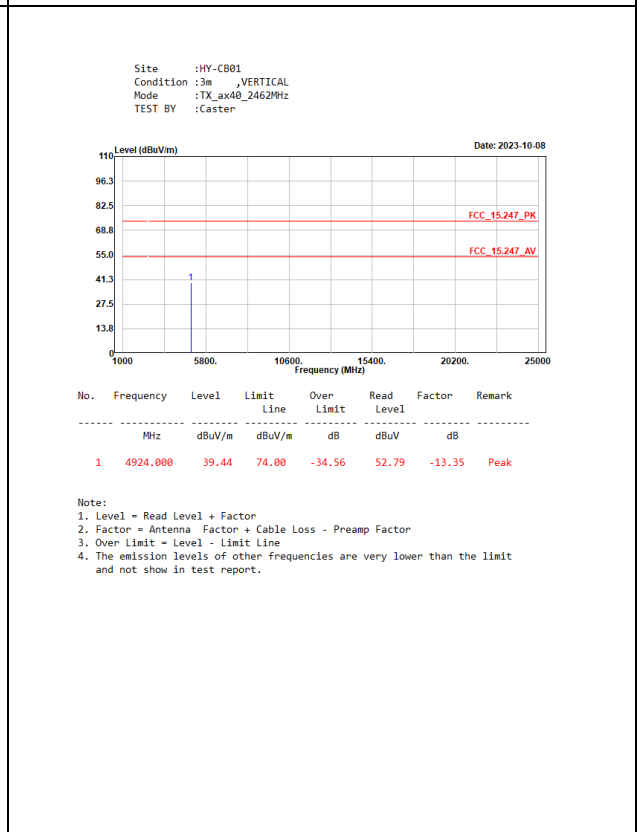
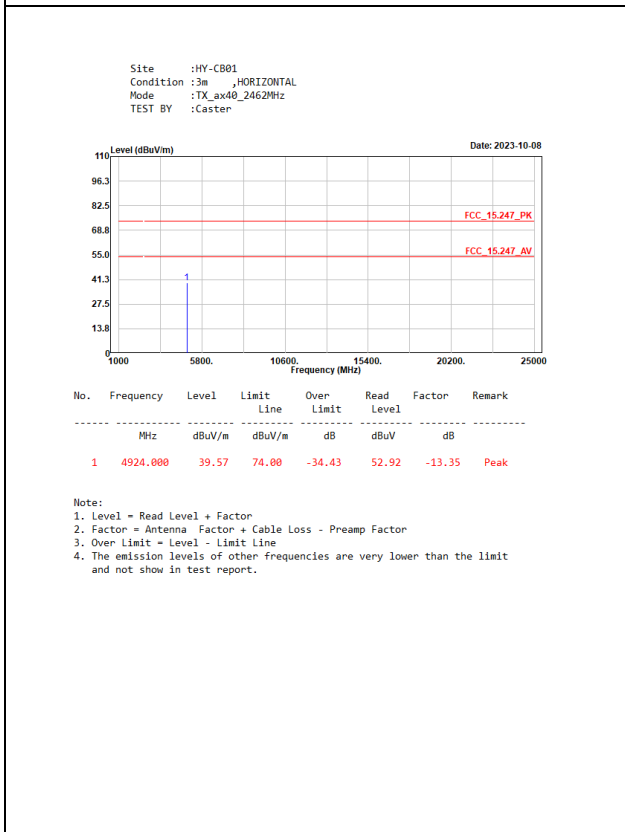
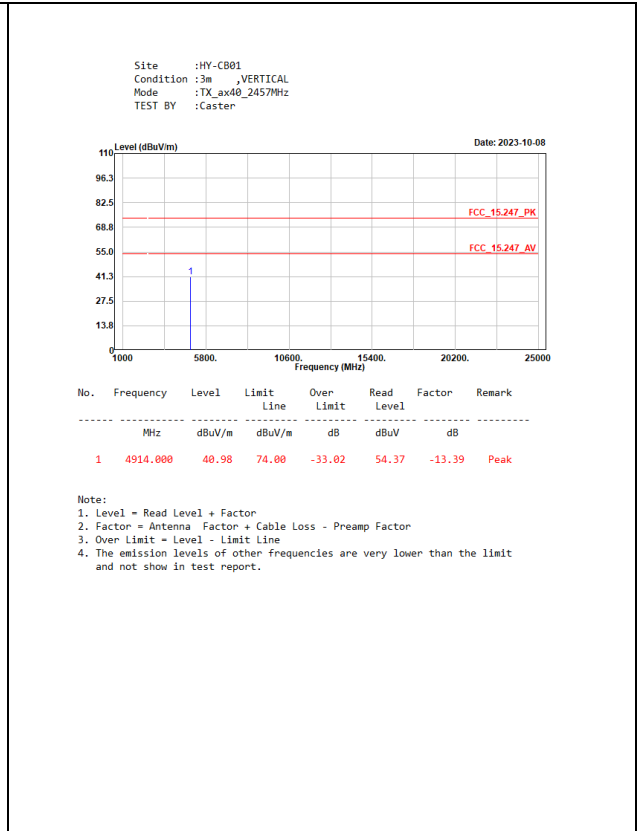
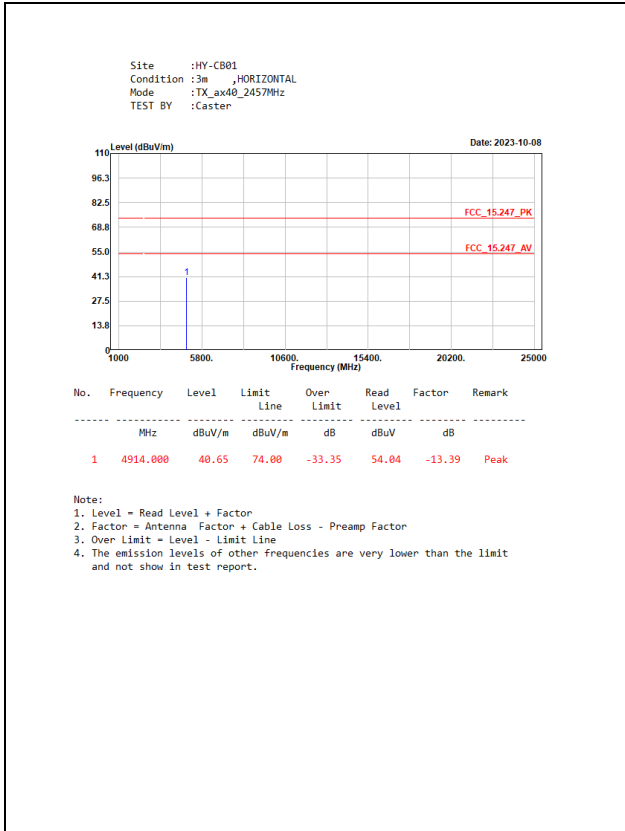


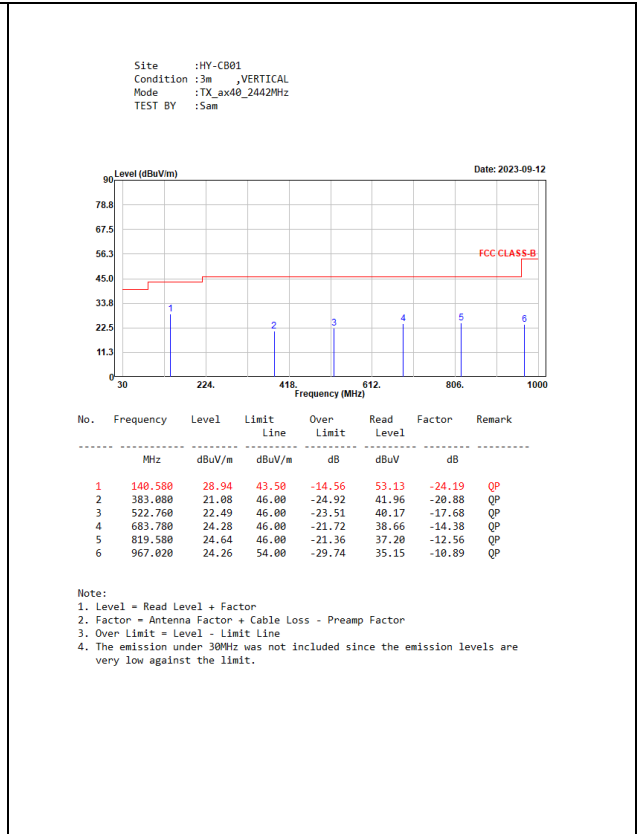
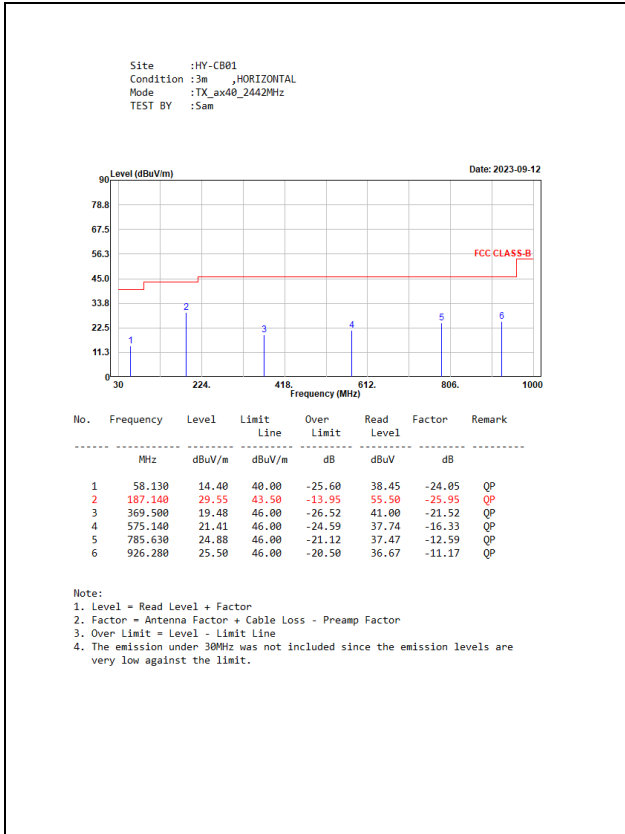




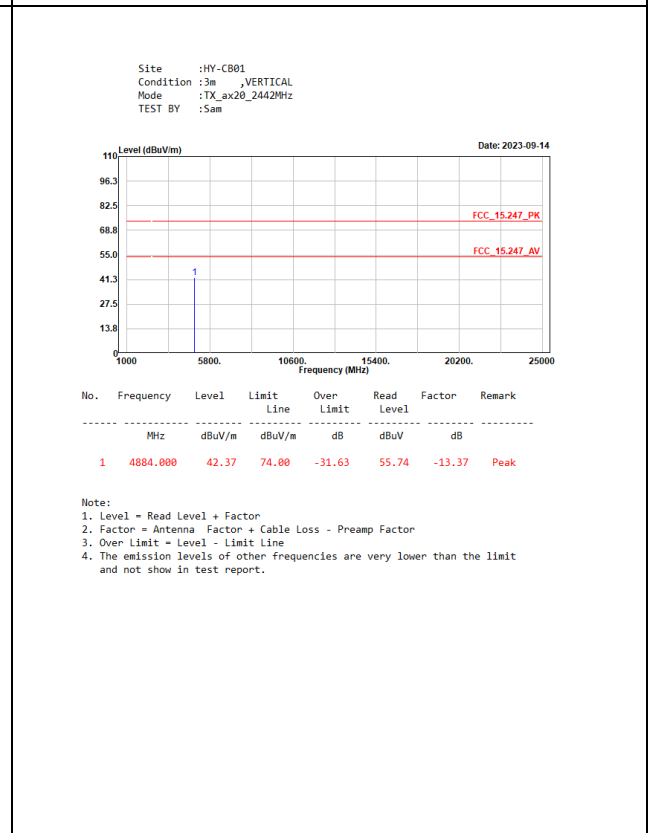
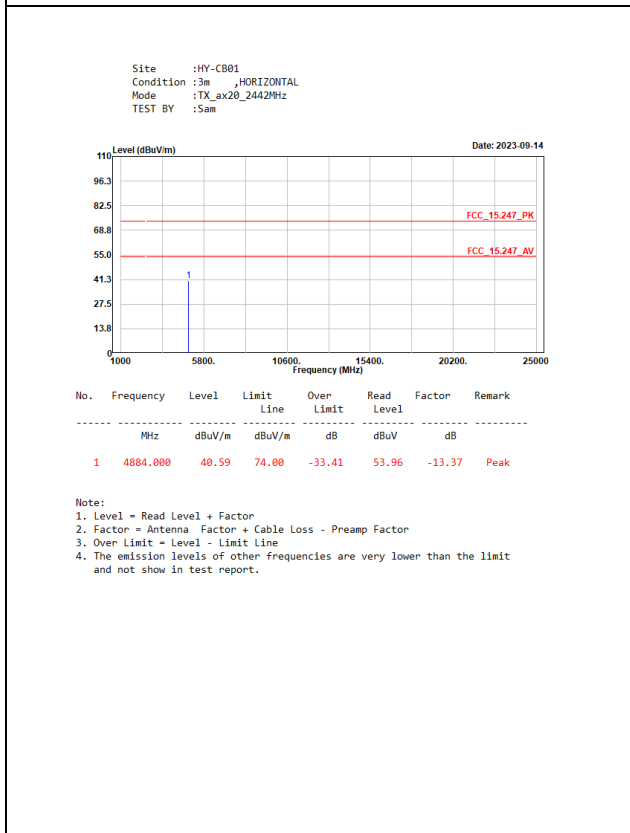
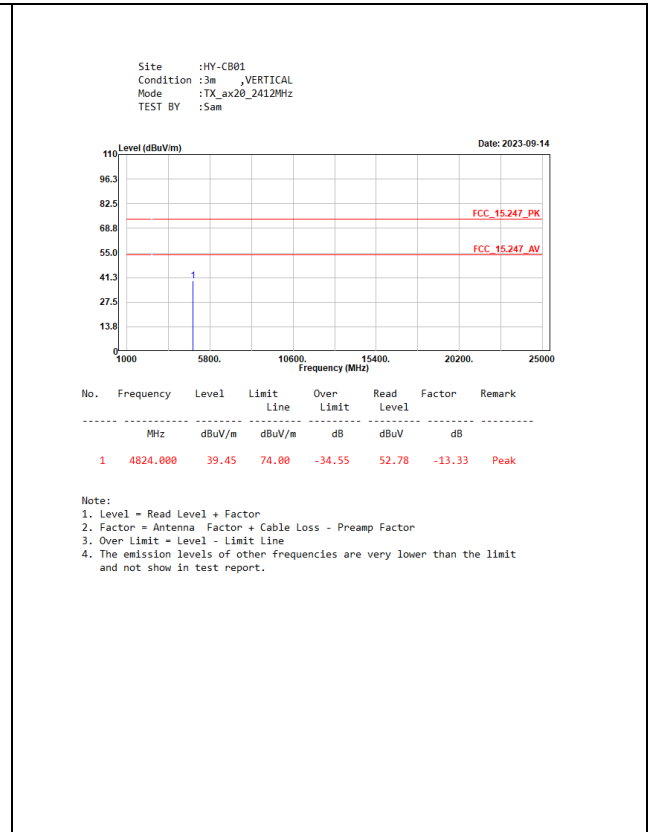
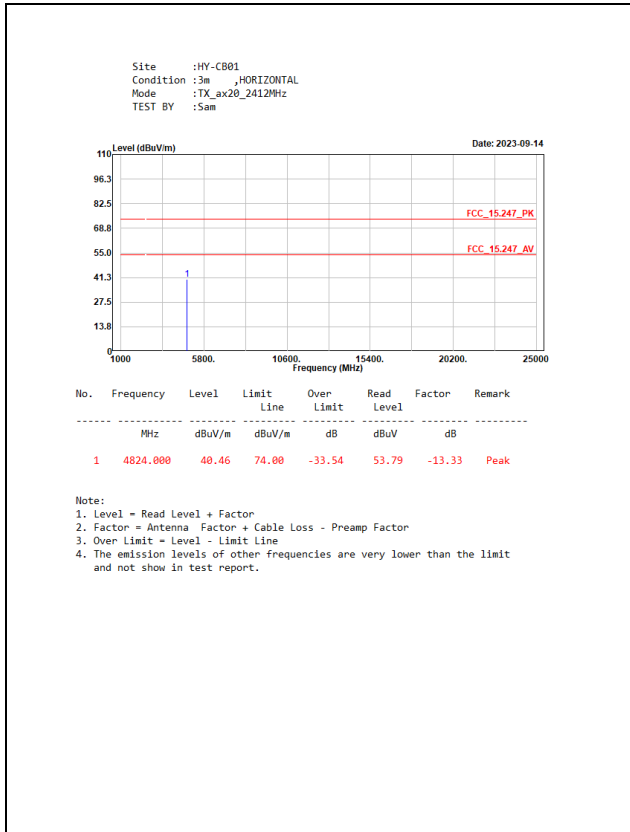


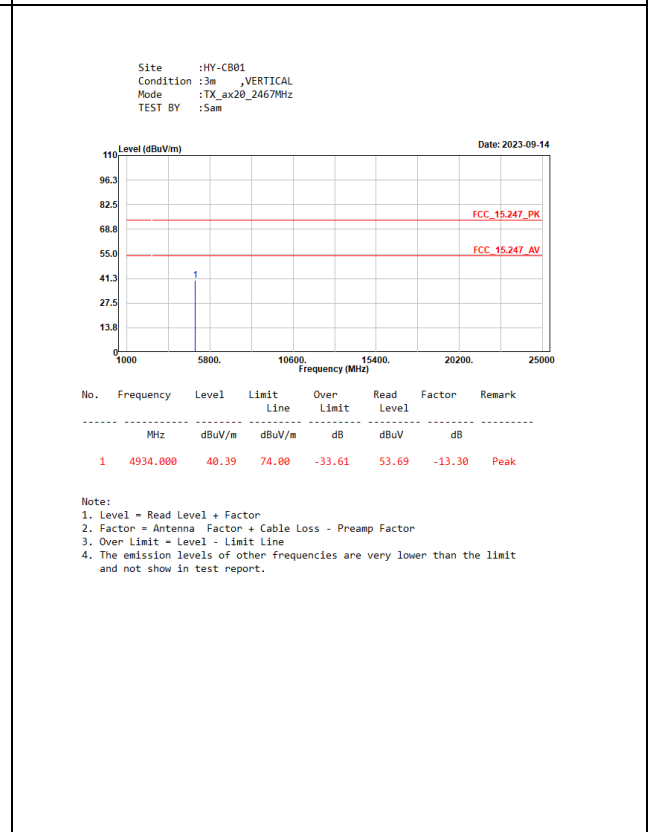
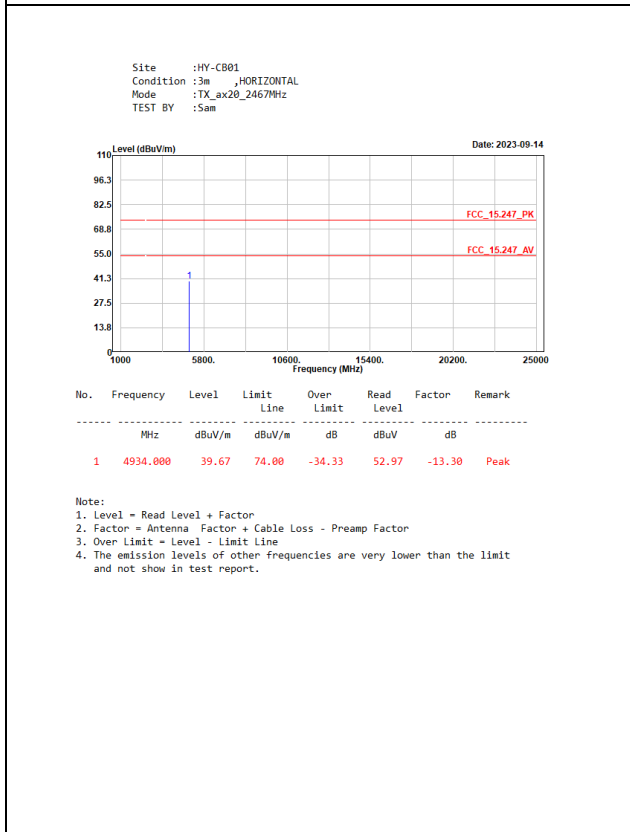
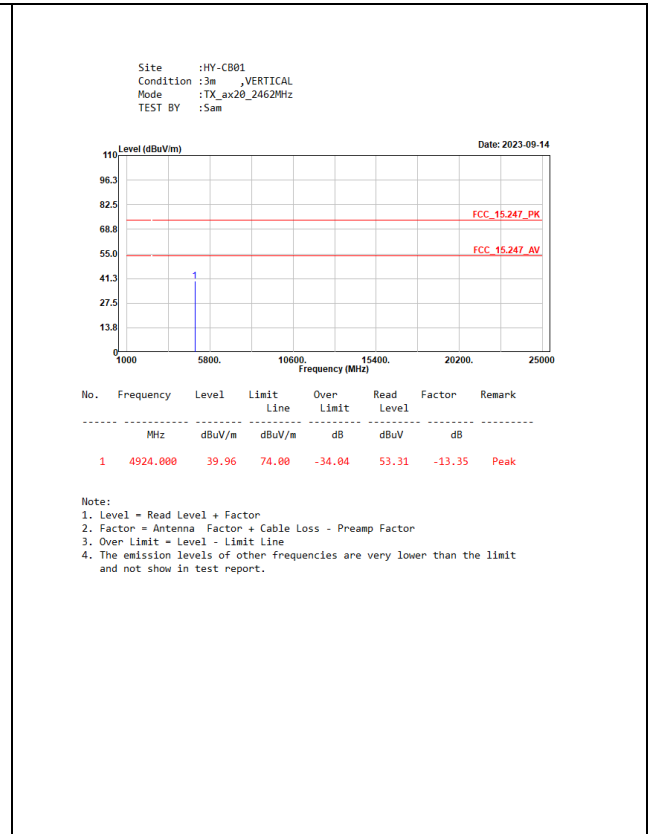
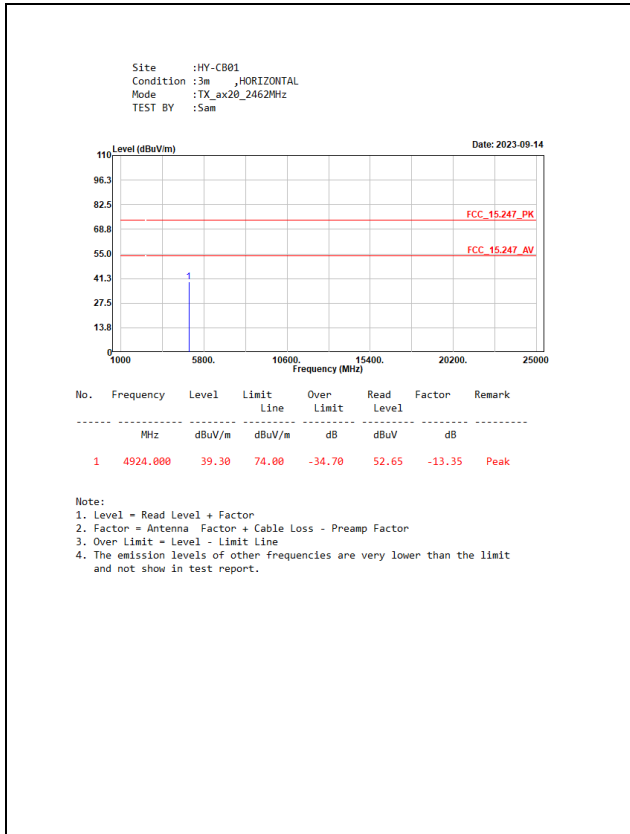


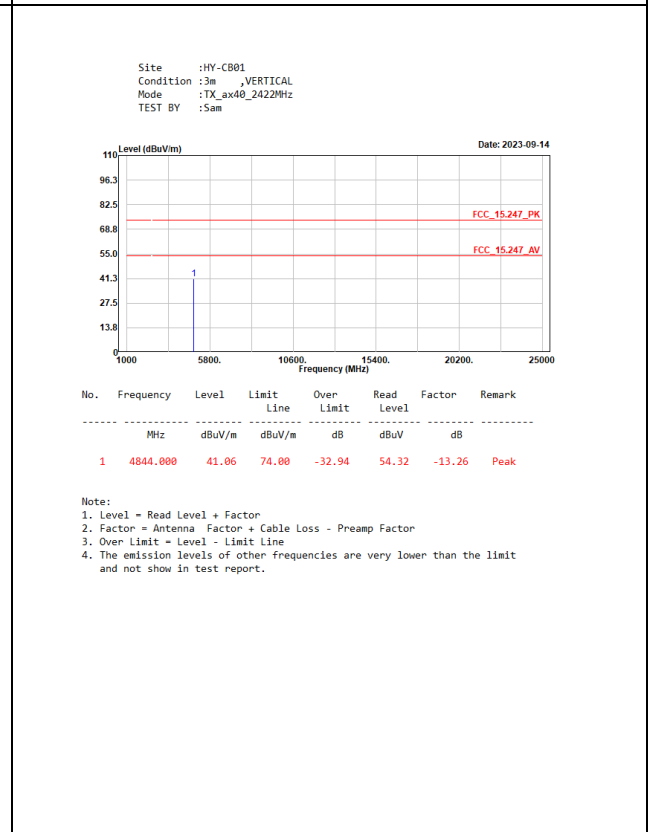
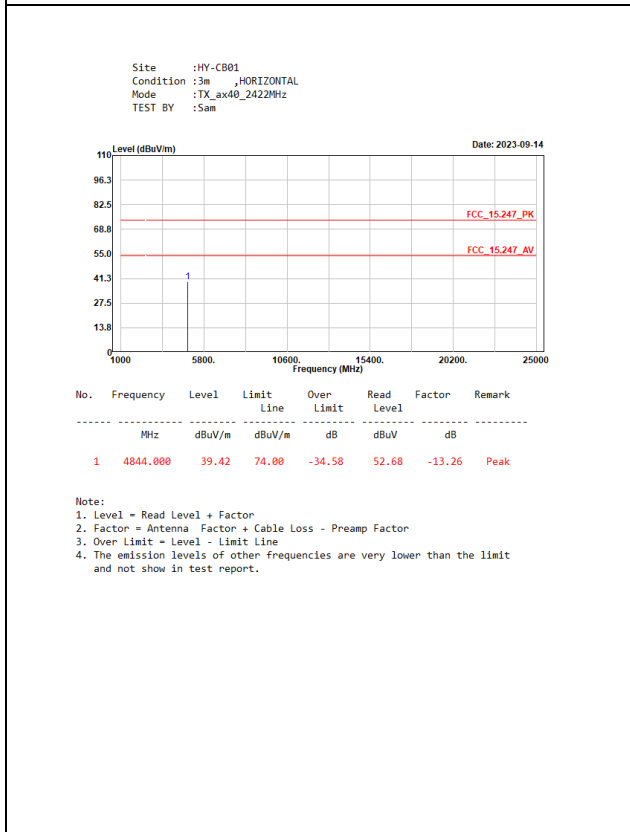
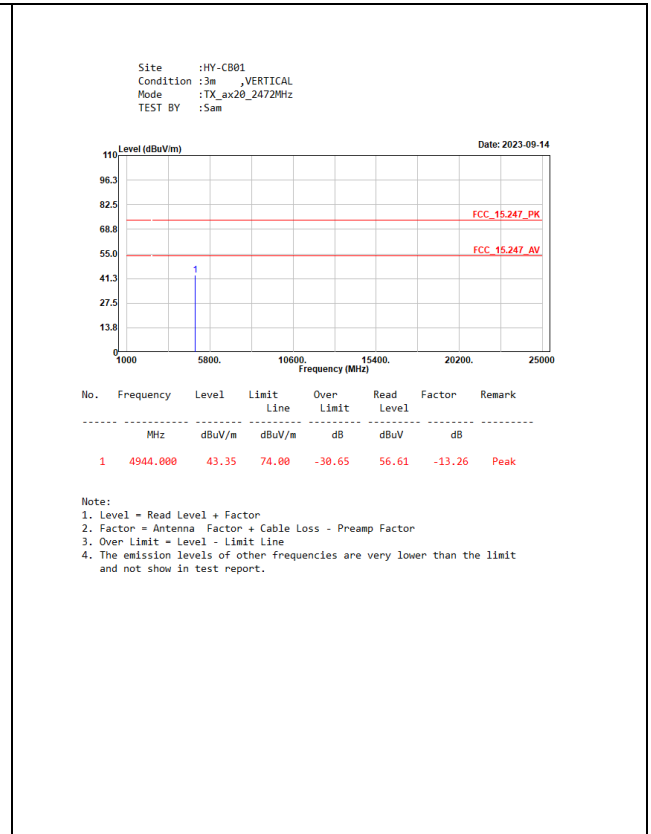
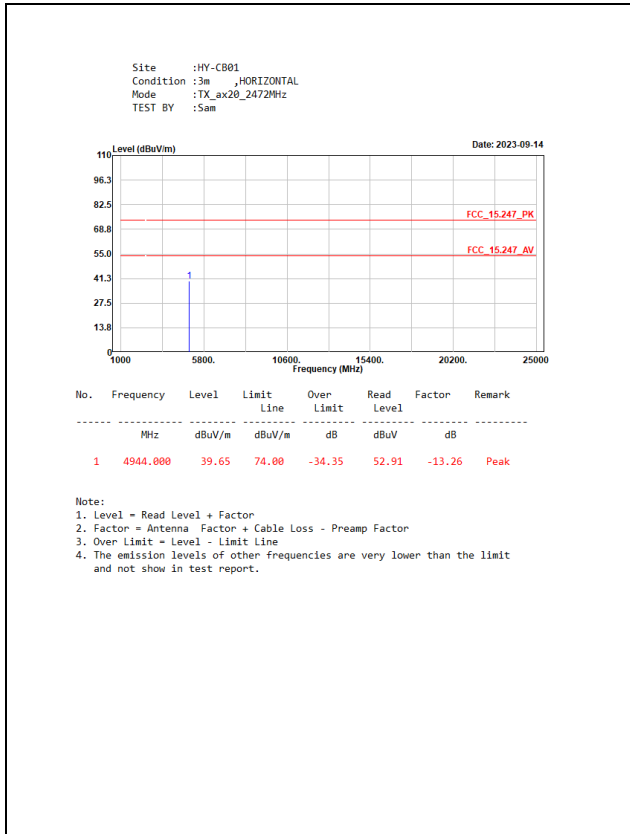


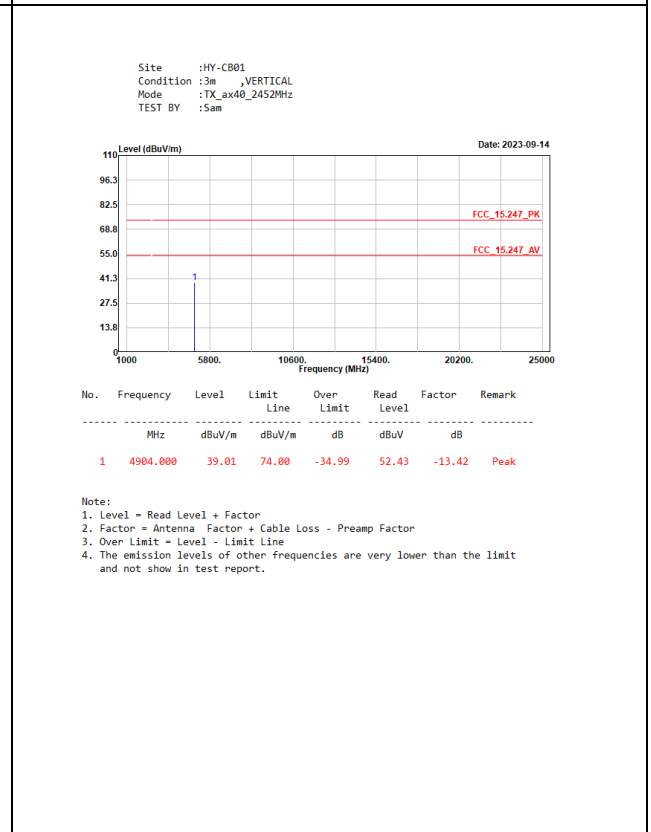
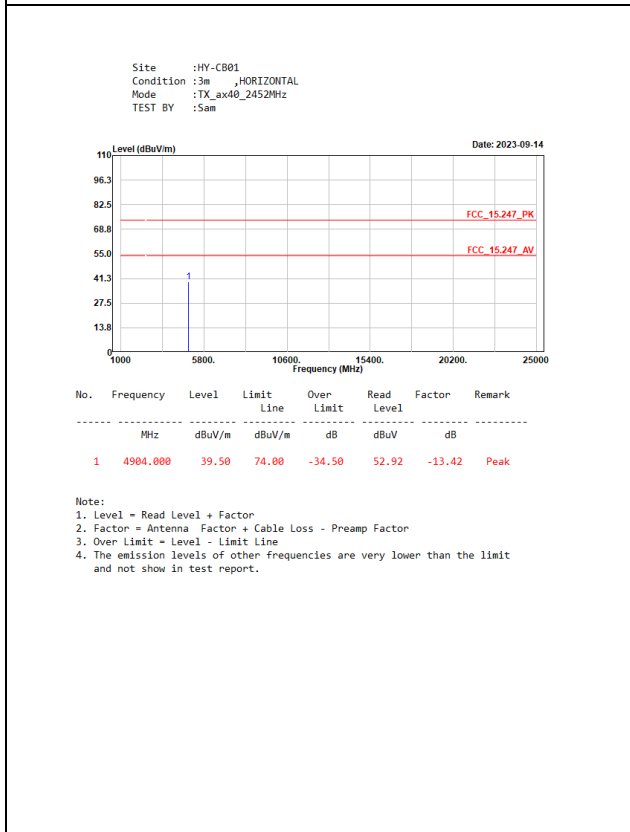
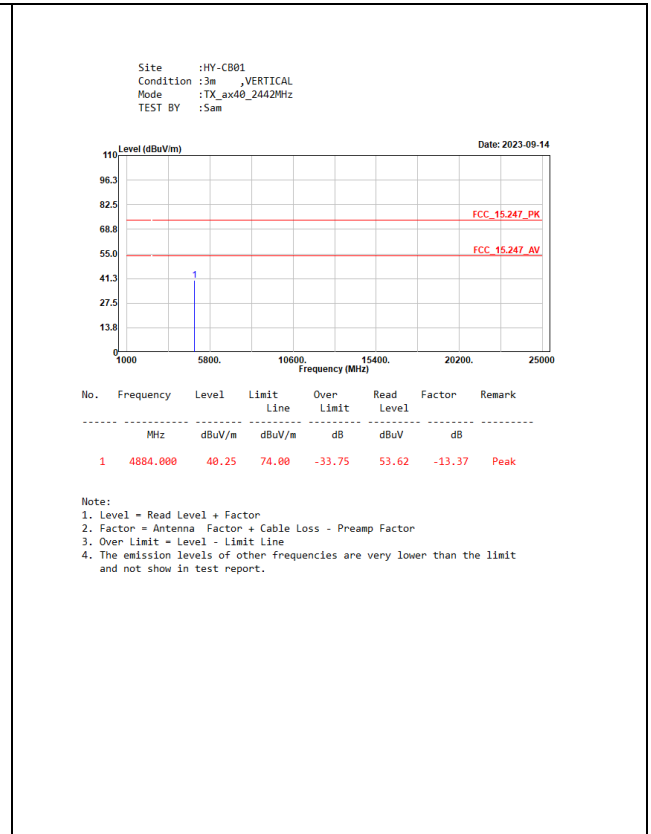
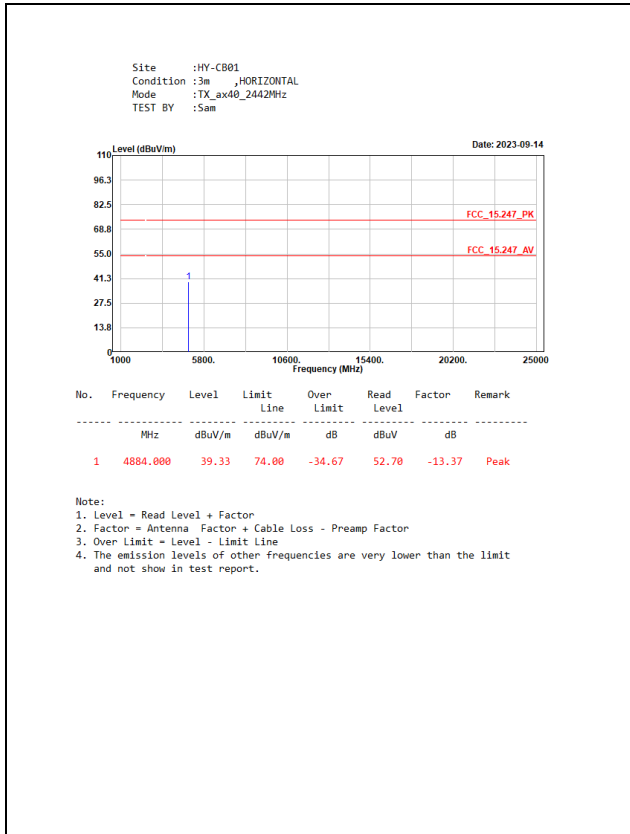


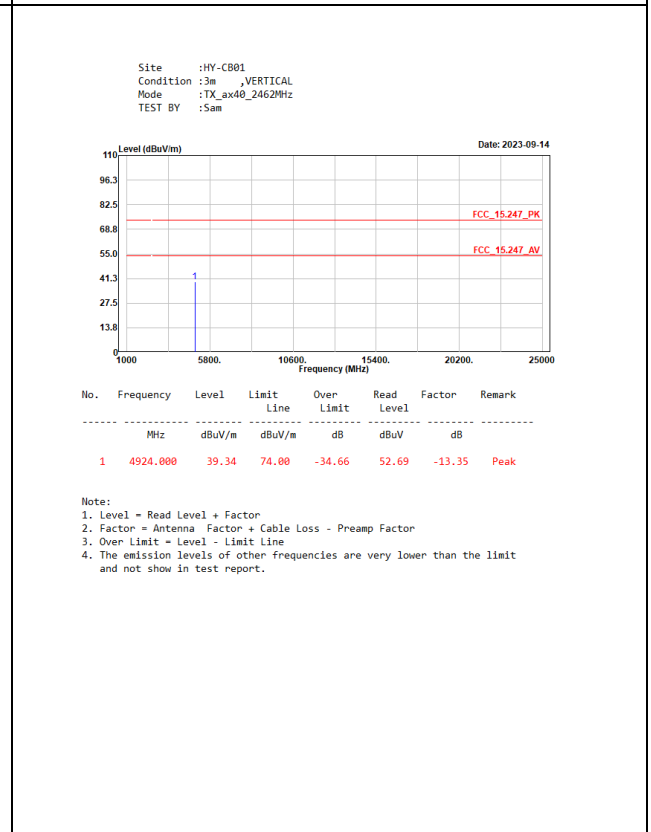
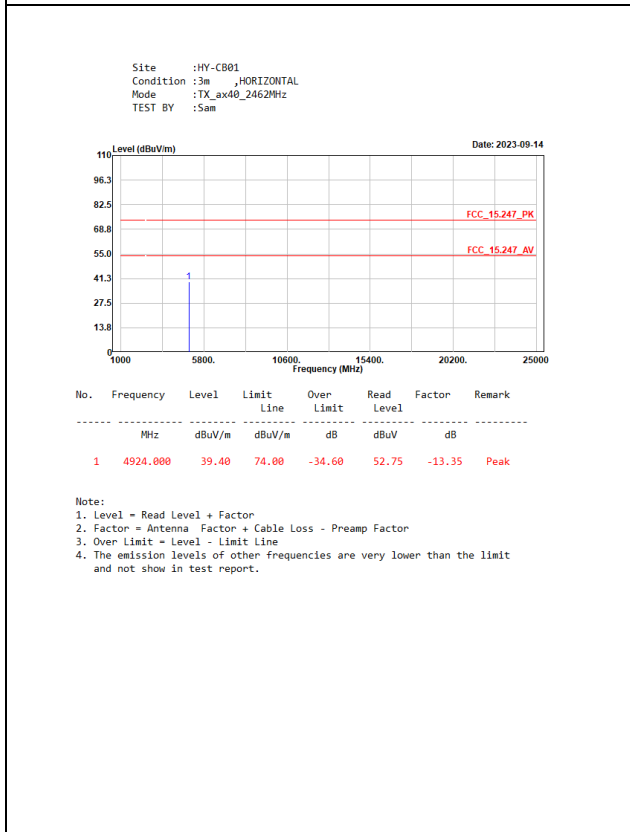
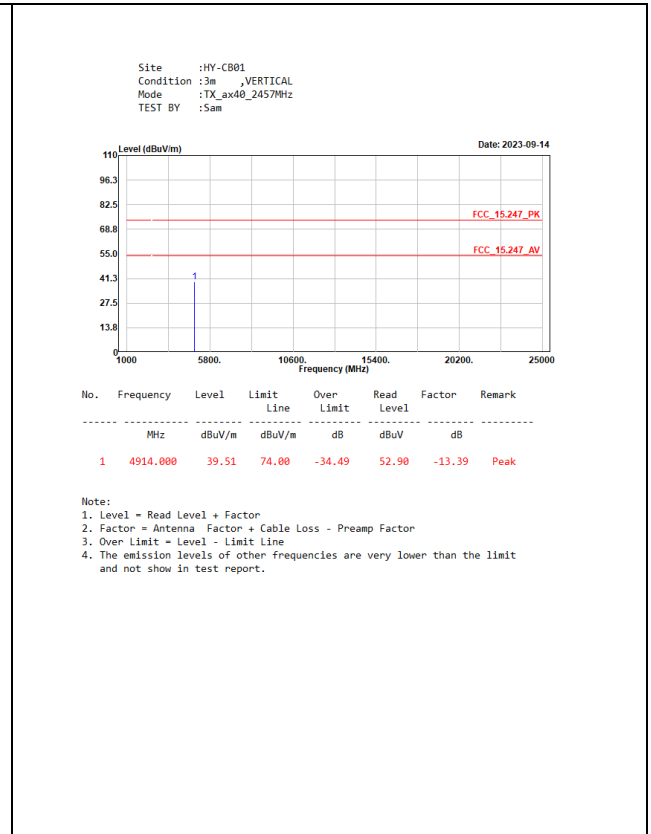
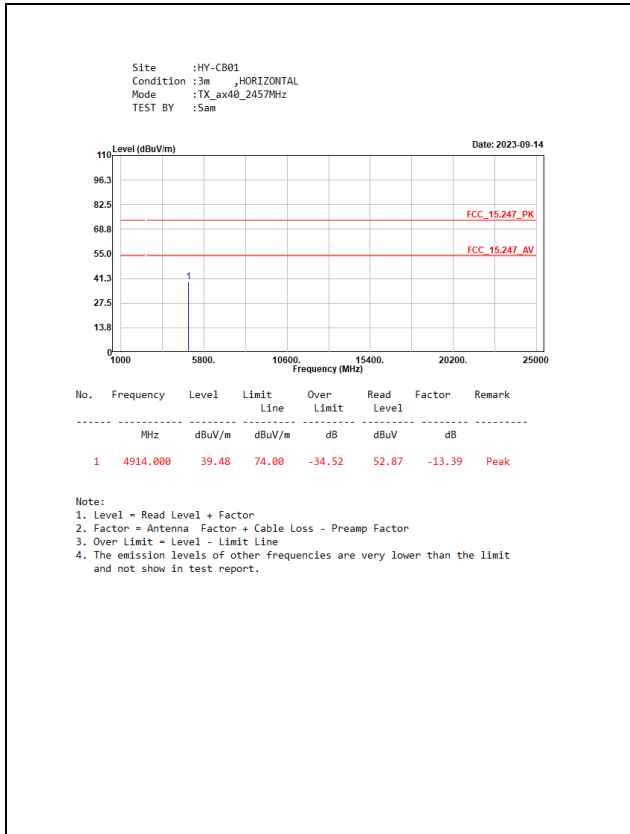
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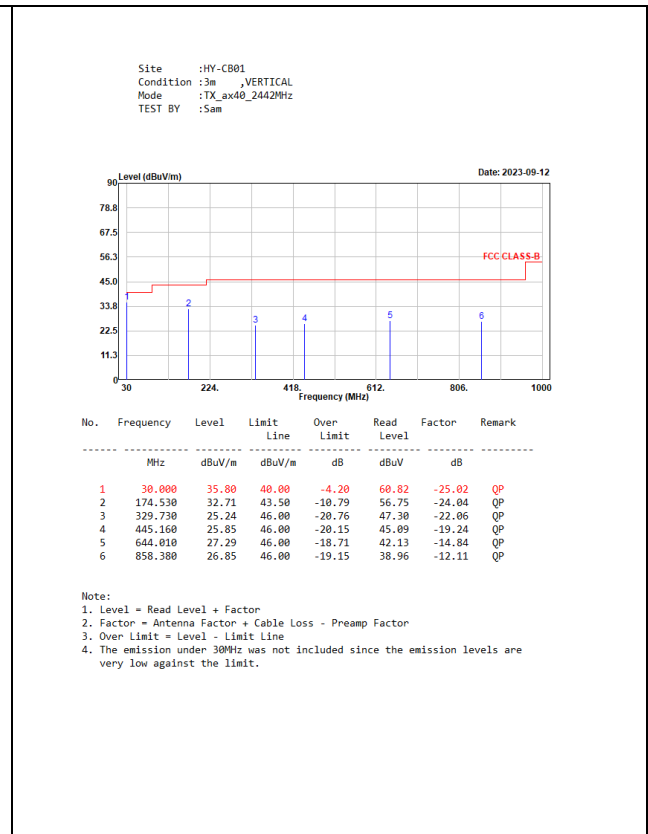
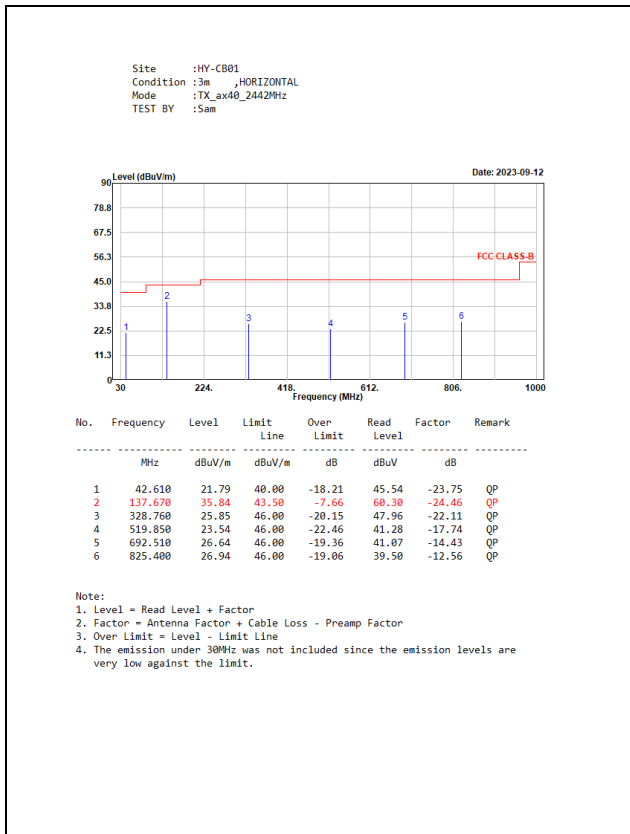




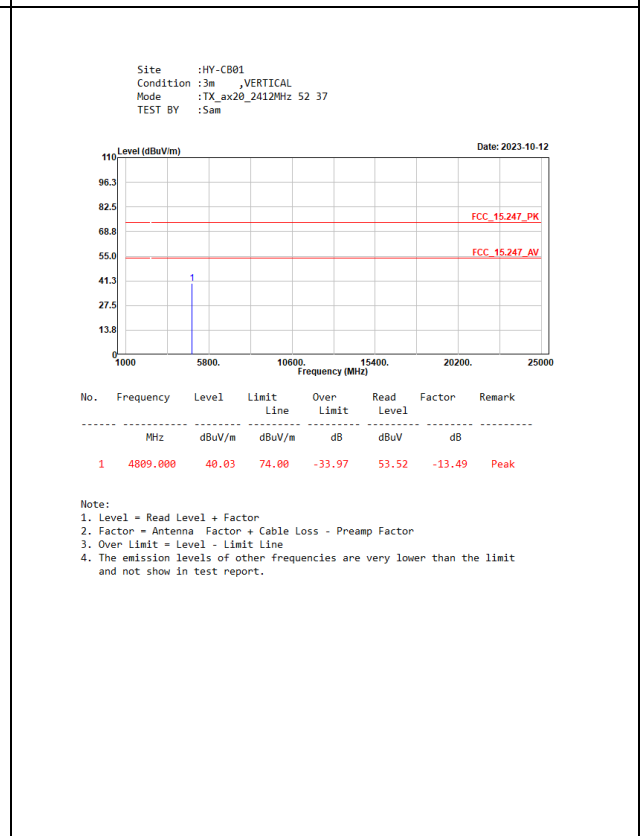
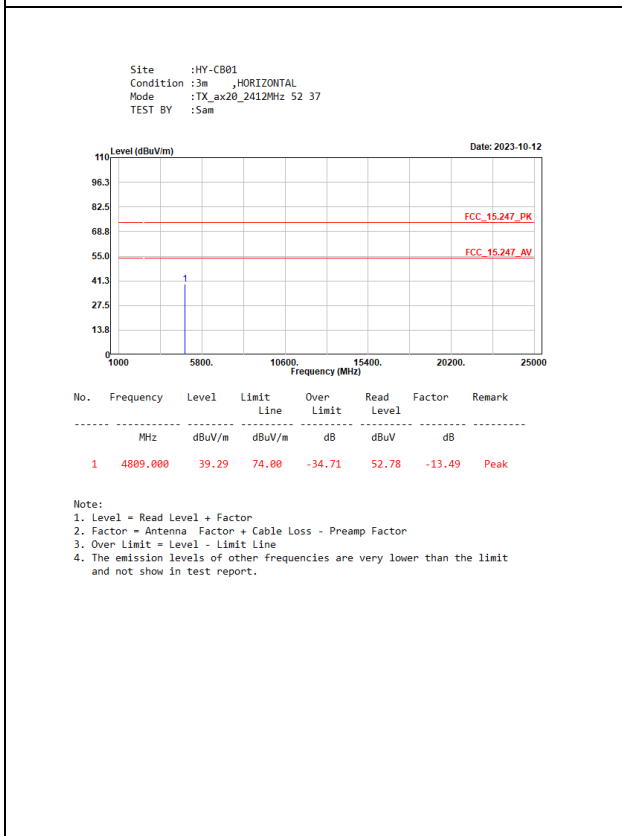
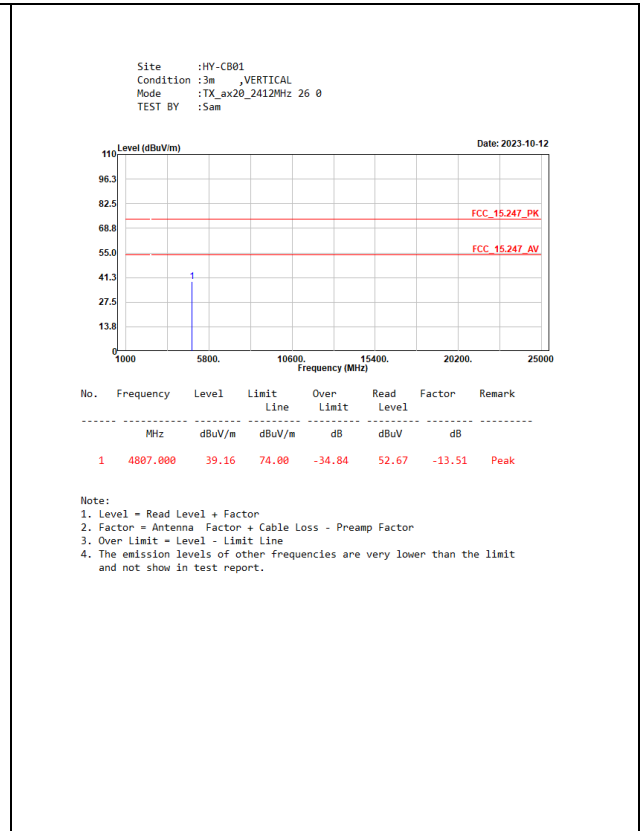
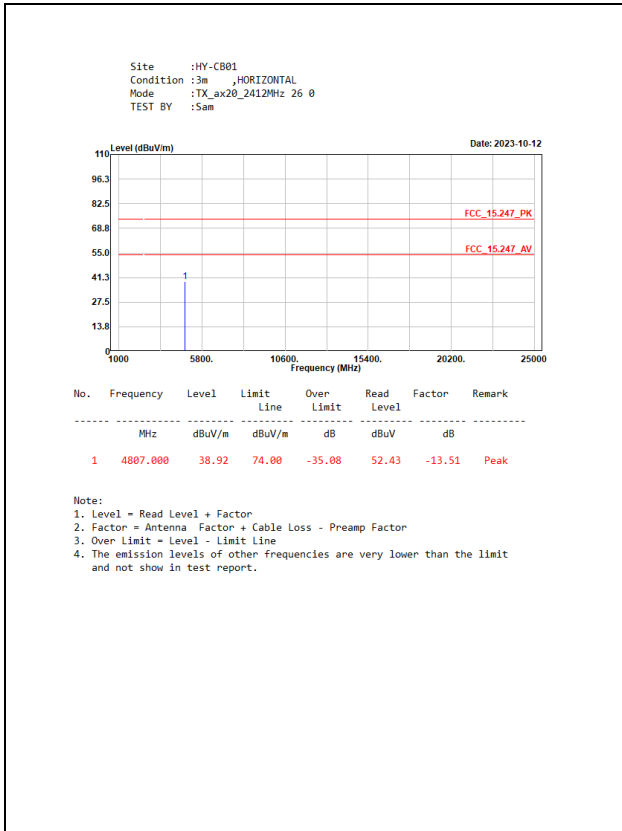


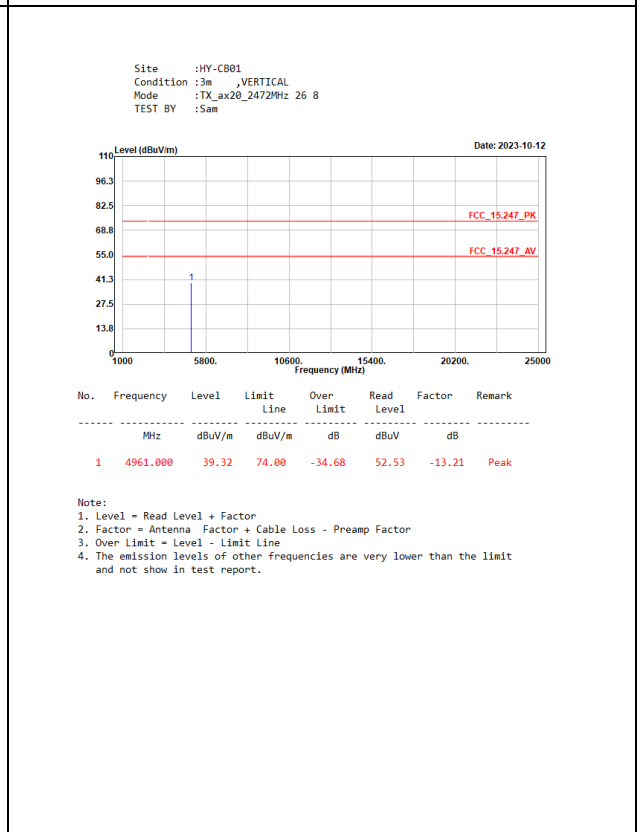
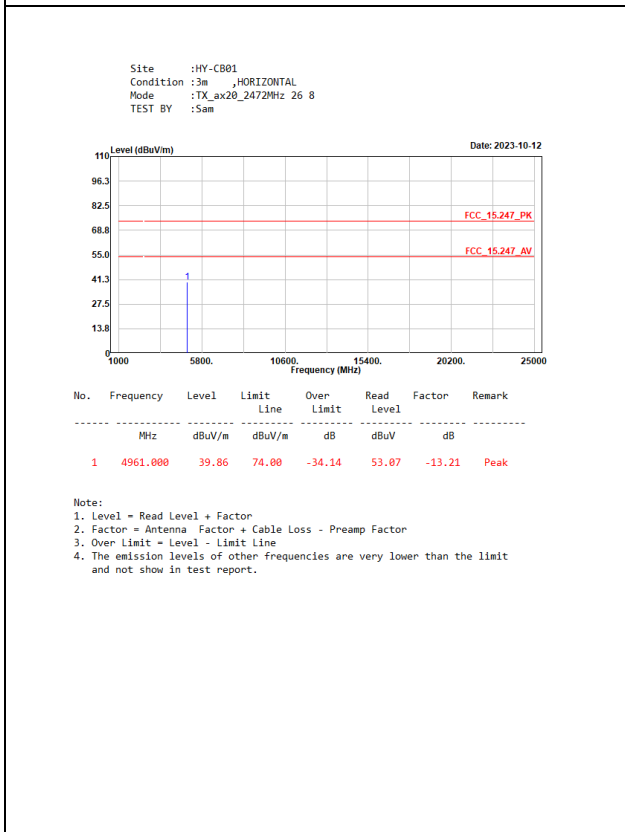
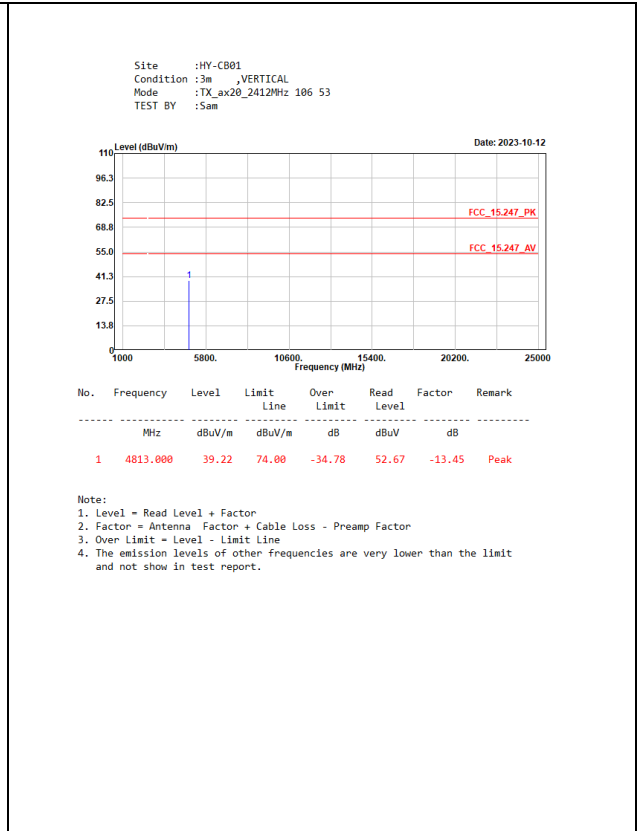
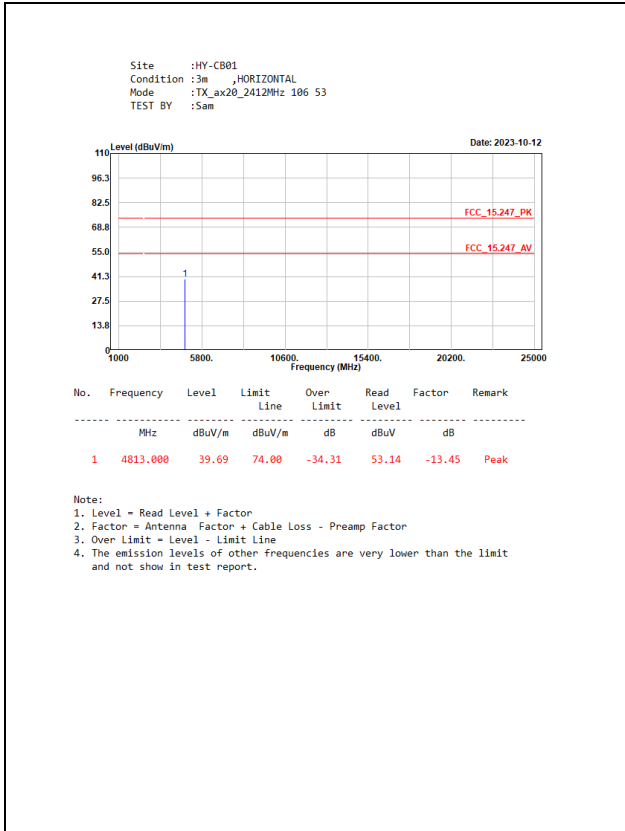


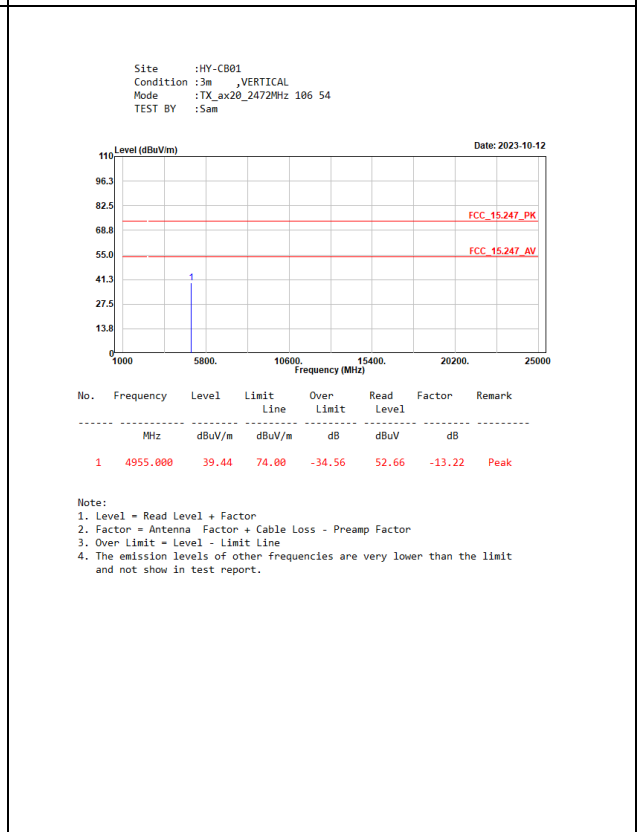
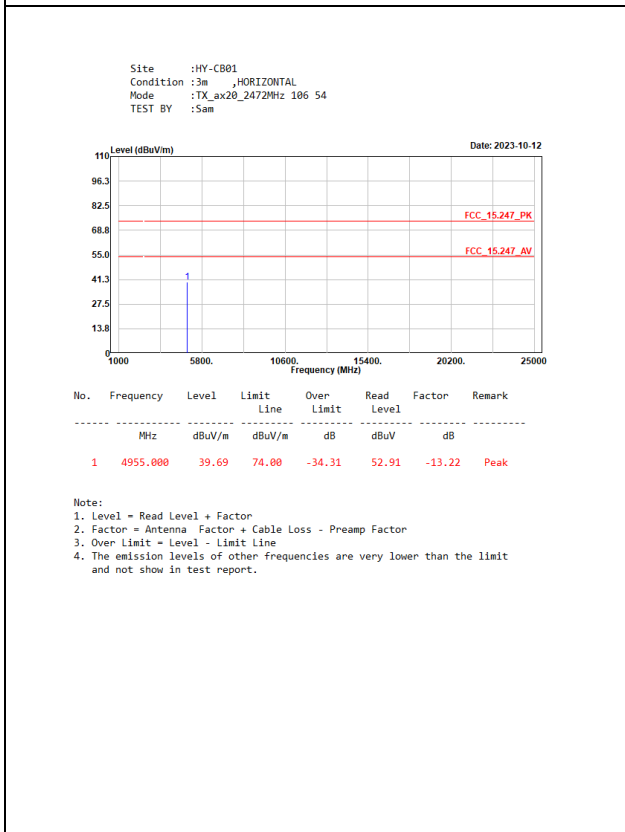
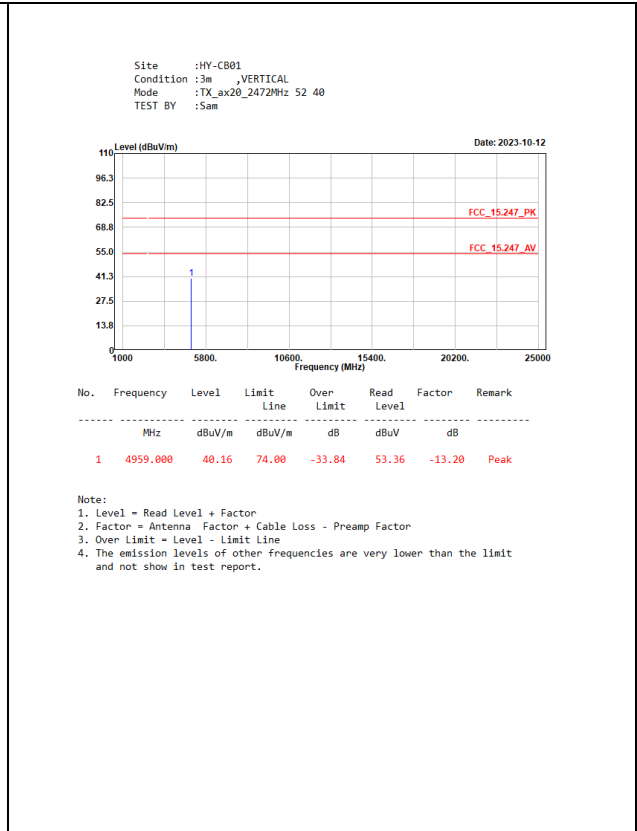
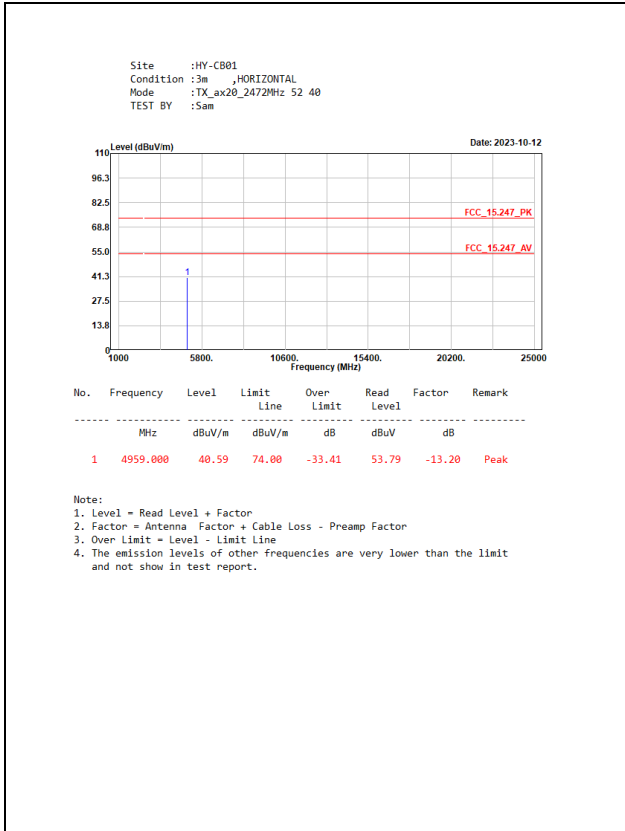


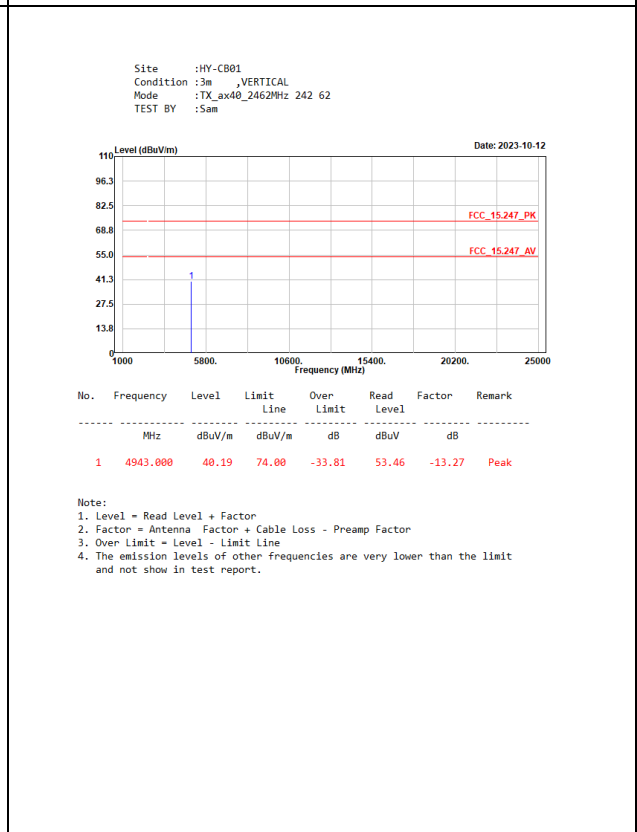
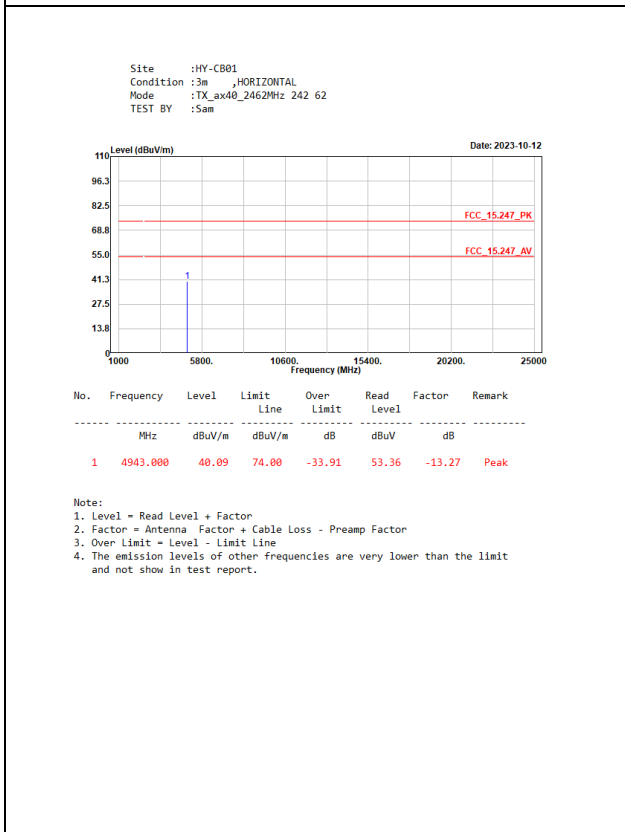
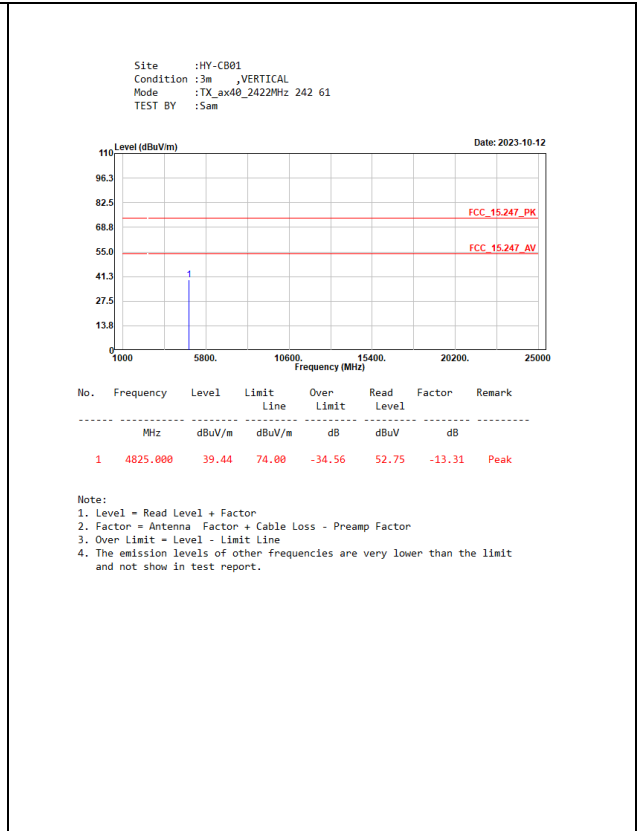
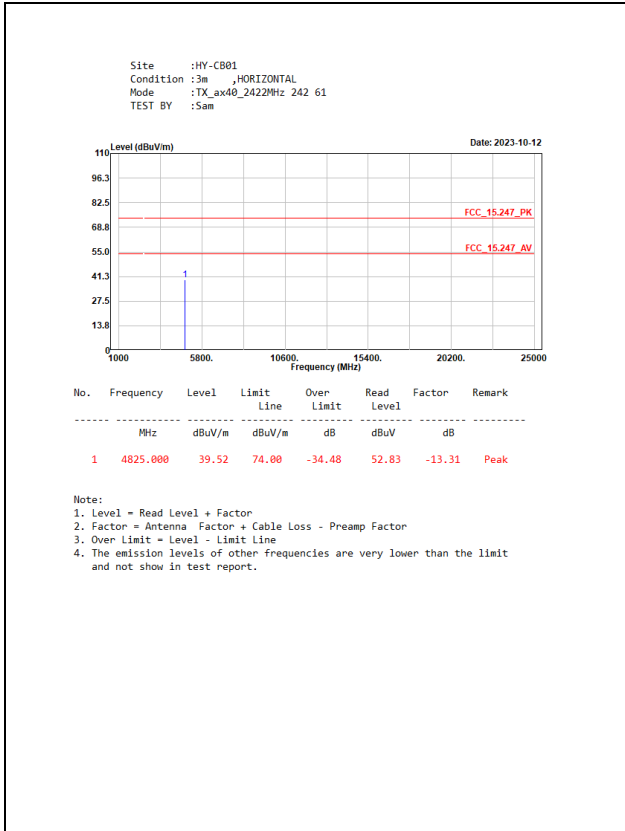


Partial RU-SISO A



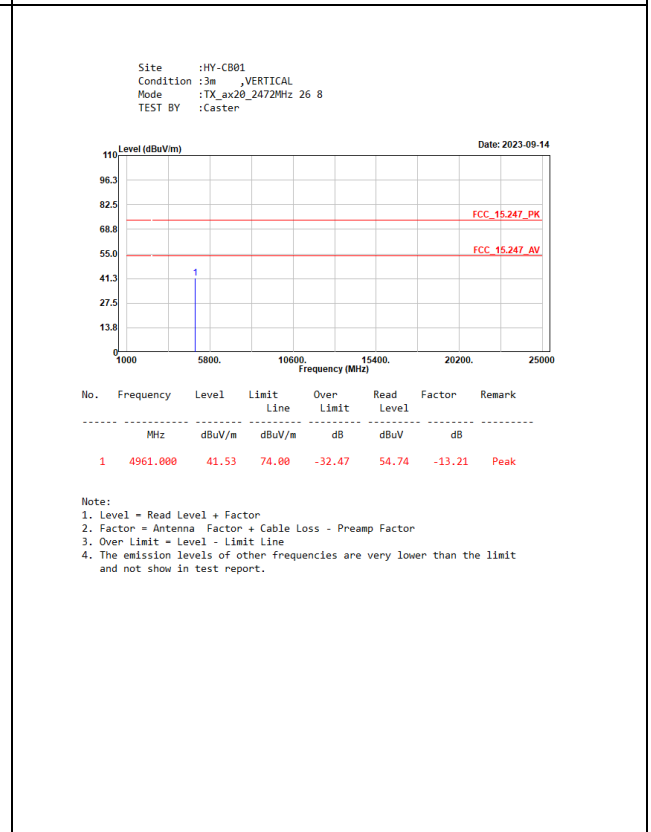
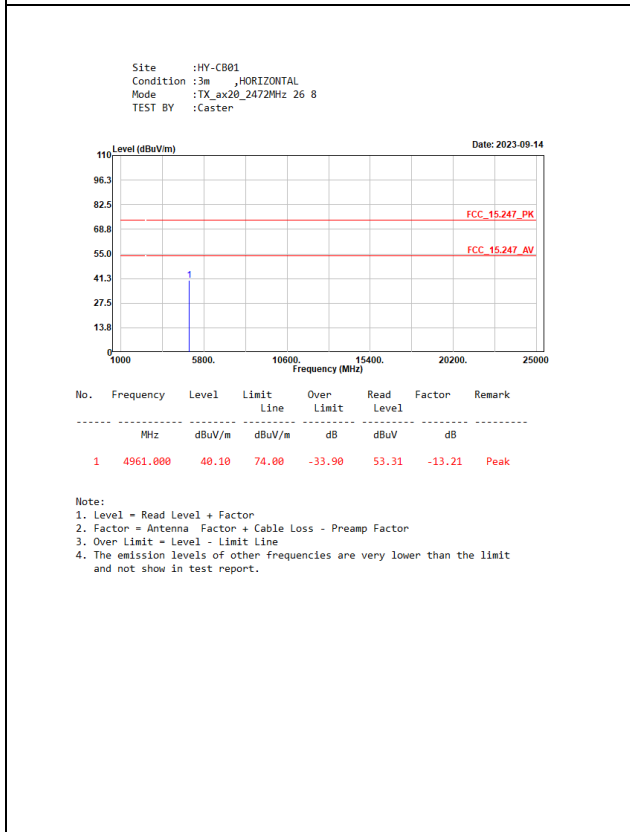
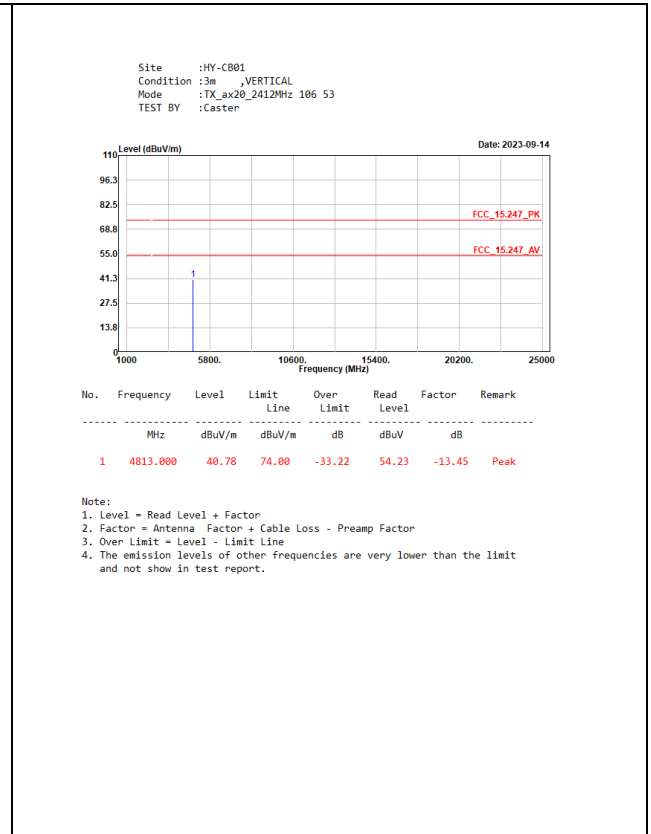
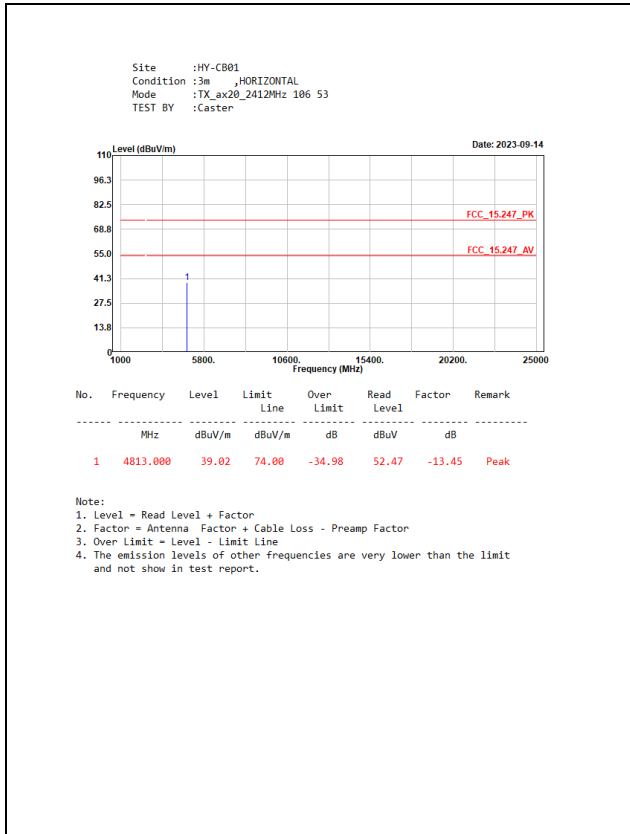


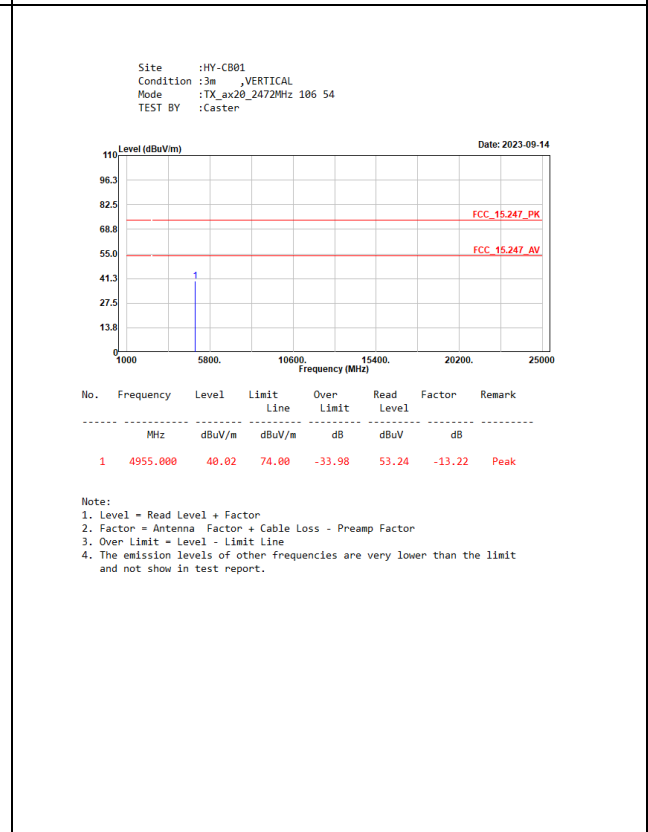
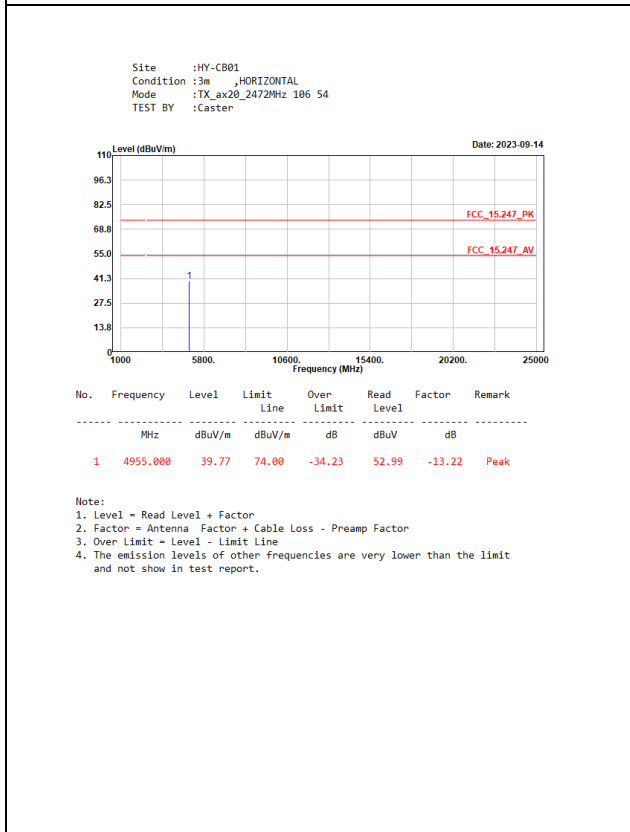
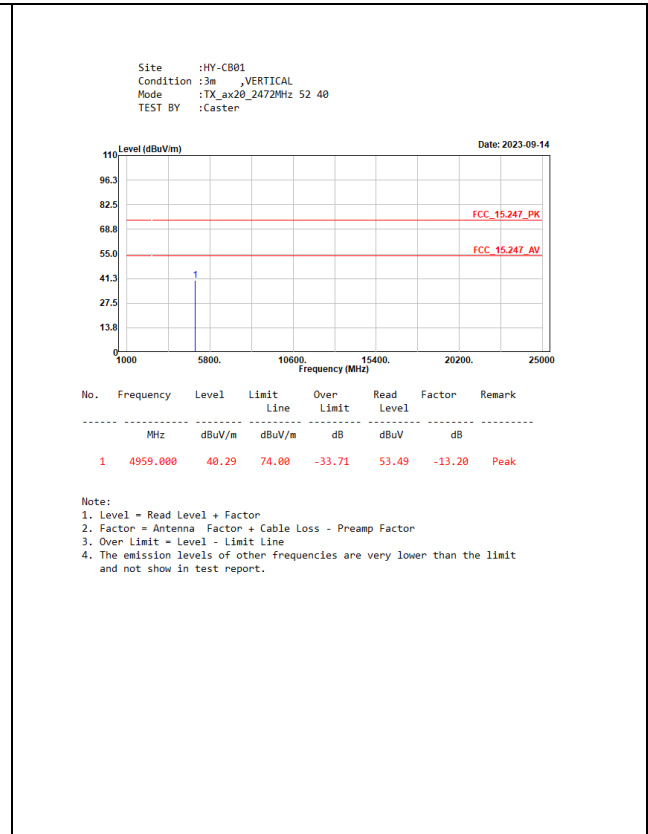
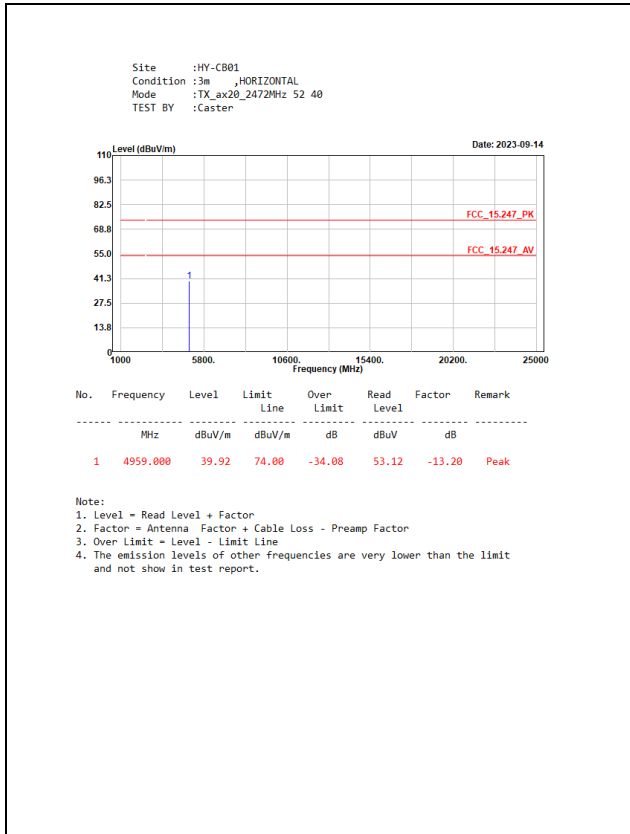


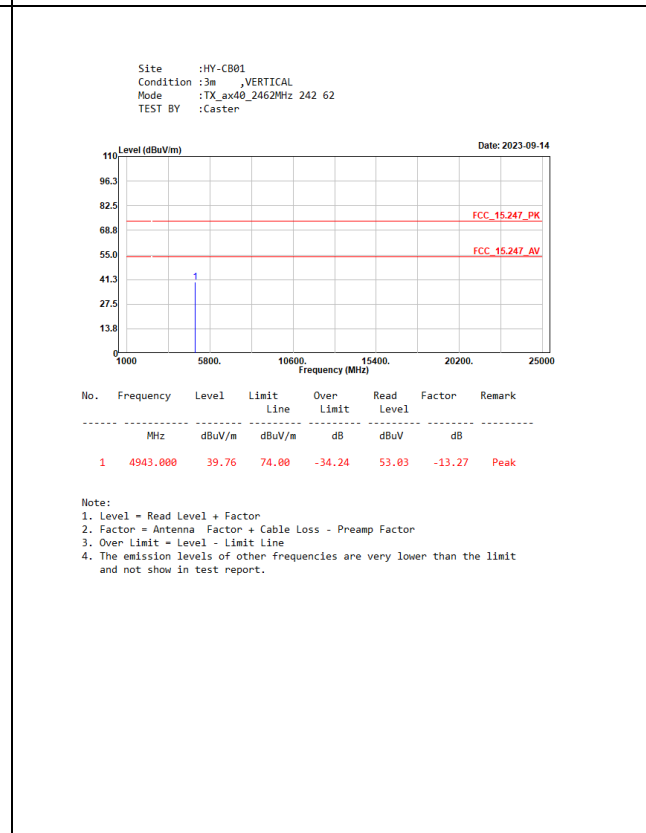
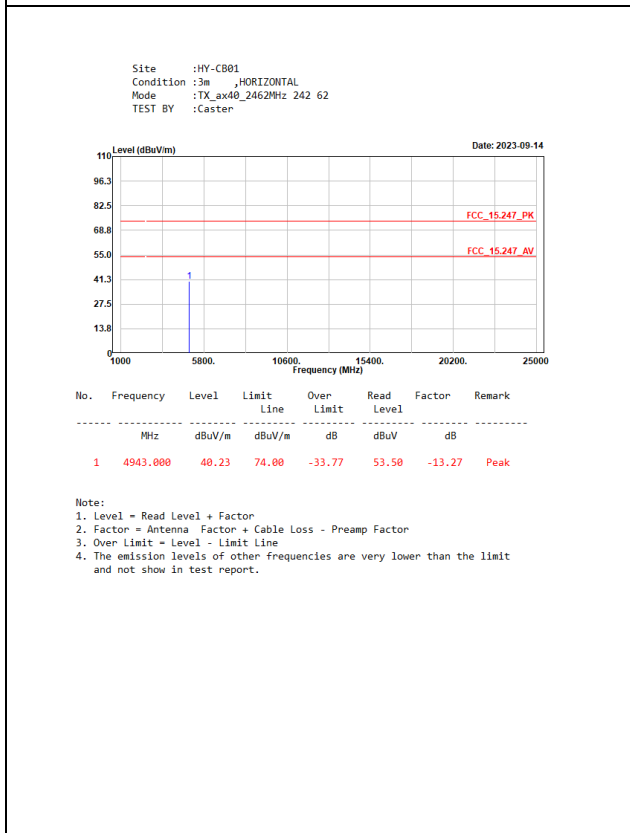
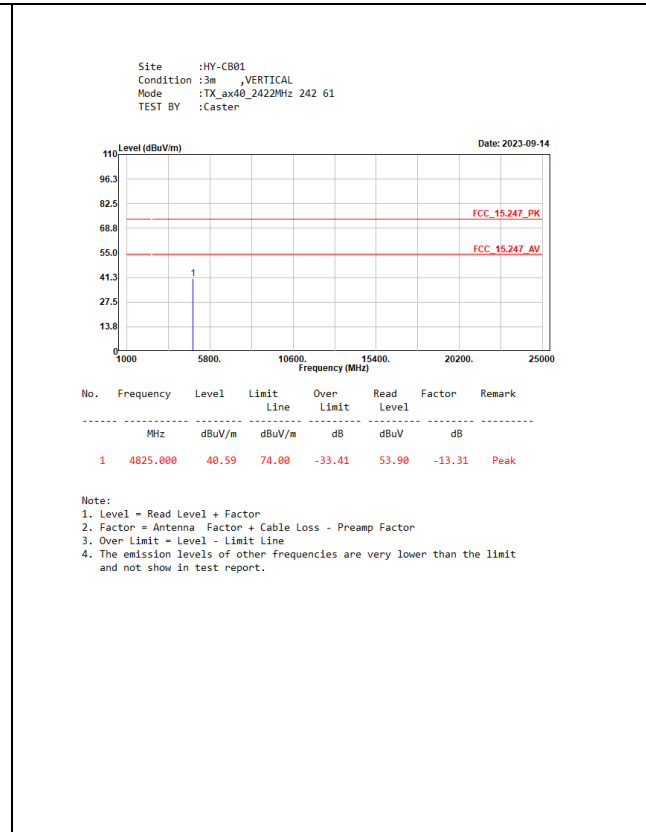
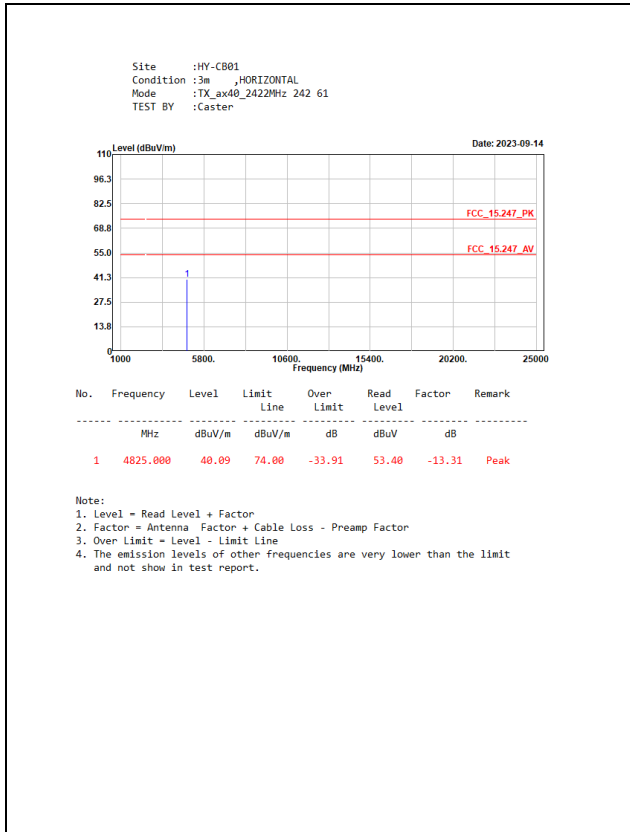


Partial RU-MIMO

<p>Site :HY-CB01 Condition :3m ,HORIZONTAL Mode :TX_ax20_2412MHz 26 0 TEST BY :Caster</p> <p style="text-align: right;">Date: 2023-09-14</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Frequency</th> <th>Level</th> <th>Limit</th> <th>Over</th> <th>Read</th> <th>Factor</th> <th>Remark</th> </tr> <tr> <th></th> <th>MHz</th> <th>dBuV/m</th> <th>dBuV/m</th> <th>dB</th> <th>dBuV</th> <th>dB</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4807.000</td> <td>40.07</td> <td>74.00</td> <td>-33.93</td> <td>53.58</td> <td>-13.51</td> <td>Peak</td> </tr> </tbody> </table> <p>Note: 1. Level = Read Level + Factor 2. Factor = Antenna Factor + Cable Loss - Preamp Factor 3. Over Limit = Level - Limit Line 4. The emission levels of other frequencies are very lower than the limit and not show in test report.</p>	No.	Frequency	Level	Limit	Over	Read	Factor	Remark		MHz	dBuV/m	dBuV/m	dB	dBuV	dB		1	4807.000	40.07	74.00	-33.93	53.58	-13.51	Peak	<p>Site :HY-CB01 Condition :3m ,VERTICAL Mode :TX_ax20_2412MHz 26 0 TEST BY :Caster</p> <p style="text-align: right;">Date: 2023-09-14</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Frequency</th> <th>Level</th> <th>Limit</th> <th>Over</th> <th>Read</th> <th>Factor</th> <th>Remark</th> </tr> <tr> <th></th> <th>MHz</th> <th>dBuV/m</th> <th>dBuV/m</th> <th>dB</th> <th>dBuV</th> <th>dB</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4807.000</td> <td>40.06</td> <td>74.00</td> <td>-33.94</td> <td>53.57</td> <td>-13.51</td> <td>Peak</td> </tr> </tbody> </table> <p>Note: 1. Level = Read Level + Factor 2. Factor = Antenna Factor + Cable Loss - Preamp Factor 3. Over Limit = Level - Limit Line 4. The emission levels of other frequencies are very lower than the limit and not show in test report.</p>	No.	Frequency	Level	Limit	Over	Read	Factor	Remark		MHz	dBuV/m	dBuV/m	dB	dBuV	dB		1	4807.000	40.06	74.00	-33.94	53.57	-13.51	Peak
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<p>Site :HY-CB01 Condition :3m ,HORIZONTAL Mode :TX_ax20_2412MHz 52 37 TEST BY :Caster</p> <p style="text-align: right;">Date: 2023-09-14</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Frequency</th> <th>Level</th> <th>Limit</th> <th>Over</th> <th>Read</th> <th>Factor</th> <th>Remark</th> </tr> <tr> <th></th> <th>MHz</th> <th>dBuV/m</th> <th>dBuV/m</th> <th>dB</th> <th>dBuV</th> <th>dB</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4809.000</td> <td>39.89</td> <td>74.00</td> <td>-34.11</td> <td>53.38</td> <td>-13.49</td> <td>Peak</td> </tr> </tbody> </table> <p>Note: 1. Level = Read Level + Factor 2. Factor = Antenna Factor + Cable Loss - Preamp Factor 3. Over Limit = Level - Limit Line 4. The emission levels of other frequencies are very lower than the limit and not show in test report.</p>	No.	Frequency	Level	Limit	Over	Read	Factor	Remark		MHz	dBuV/m	dBuV/m	dB	dBuV	dB		1	4809.000	39.89	74.00	-34.11	53.38	-13.49	Peak	<p>Site :HY-CB01 Condition :3m ,VERTICAL Mode :TX_ax20_2412MHz 52 37 TEST BY :Caster</p> <p style="text-align: right;">Date: 2023-09-14</p> <table border="1"> <thead> <tr> <th>No.</th> <th>Frequency</th> <th>Level</th> <th>Limit</th> <th>Over</th> <th>Read</th> <th>Factor</th> <th>Remark</th> </tr> <tr> <th></th> <th>MHz</th> <th>dBuV/m</th> <th>dBuV/m</th> <th>dB</th> <th>dBuV</th> <th>dB</th> <th></th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4809.000</td> <td>40.85</td> <td>74.00</td> <td>-33.15</td> <td>54.34</td> <td>-13.49</td> <td>Peak</td> </tr> </tbody> </table> <p>Note: 1. Level = Read Level + Factor 2. Factor = Antenna Factor + Cable Loss - Preamp Factor 3. Over Limit = Level - Limit Line 4. The emission levels of other frequencies are very lower than the limit and not show in test report.</p>	No.	Frequency	Level	Limit	Over	Read	Factor	Remark		MHz	dBuV/m	dBuV/m	dB	dBuV	dB		1	4809.000	40.85	74.00	-33.15	54.34	-13.49	Peak
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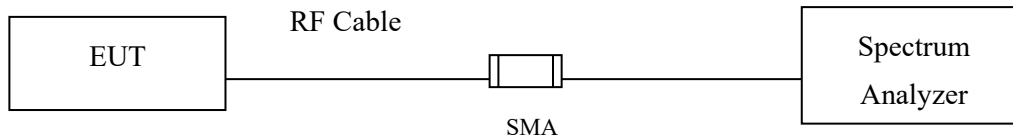




5. RF Antenna Conducted Test

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

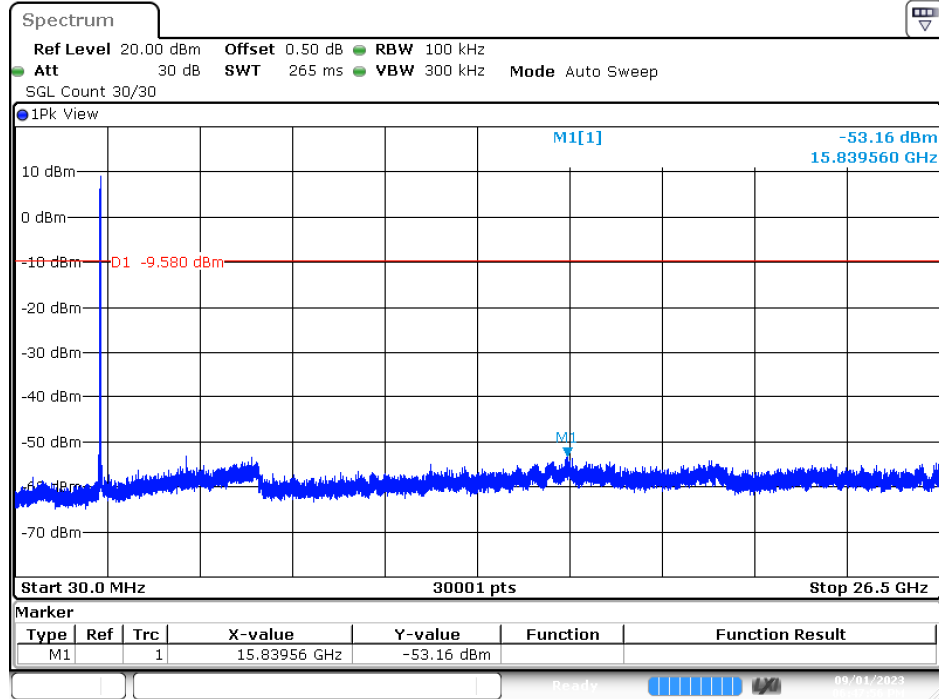
The EUT was tested according to C63.10:2013 Section 11.11 for compliance to FCC 47CFR 15.247 requirements.

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

5.4. Test Result of RF Antenna Conducted Test

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 Test Item : RF antenna conducted test
 Test Mode : Transmit (802.11b)-SISO A
 Test Date : 2023/09/01

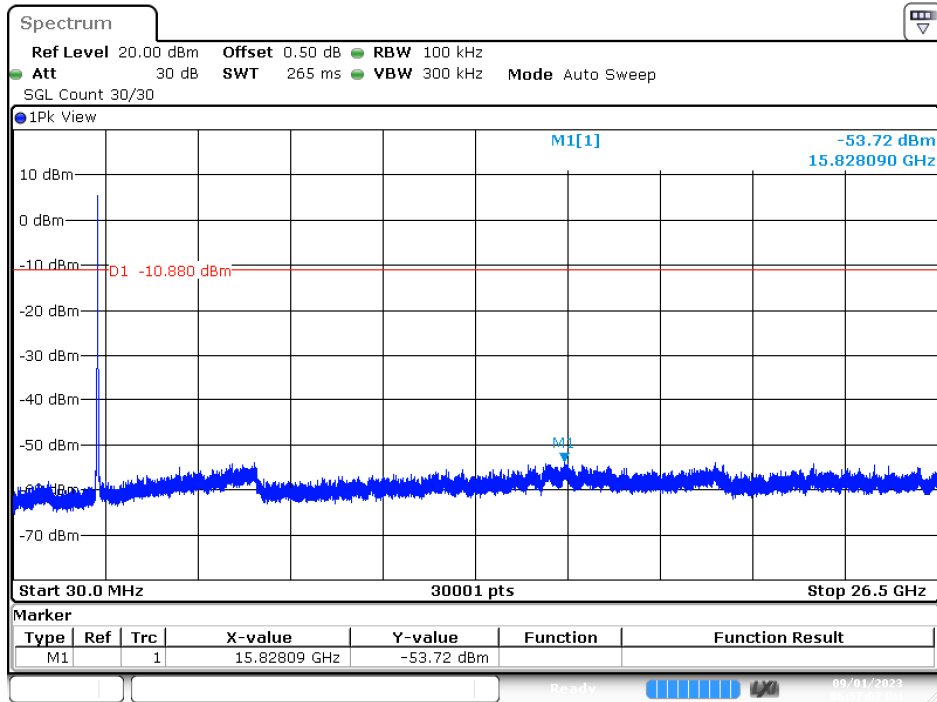
Channel 11:



Date: 1.SEP.2023 18:47:57

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 Test Mode : Transmit (802.11g)-SISO A
 Test Date : 2023/09/01

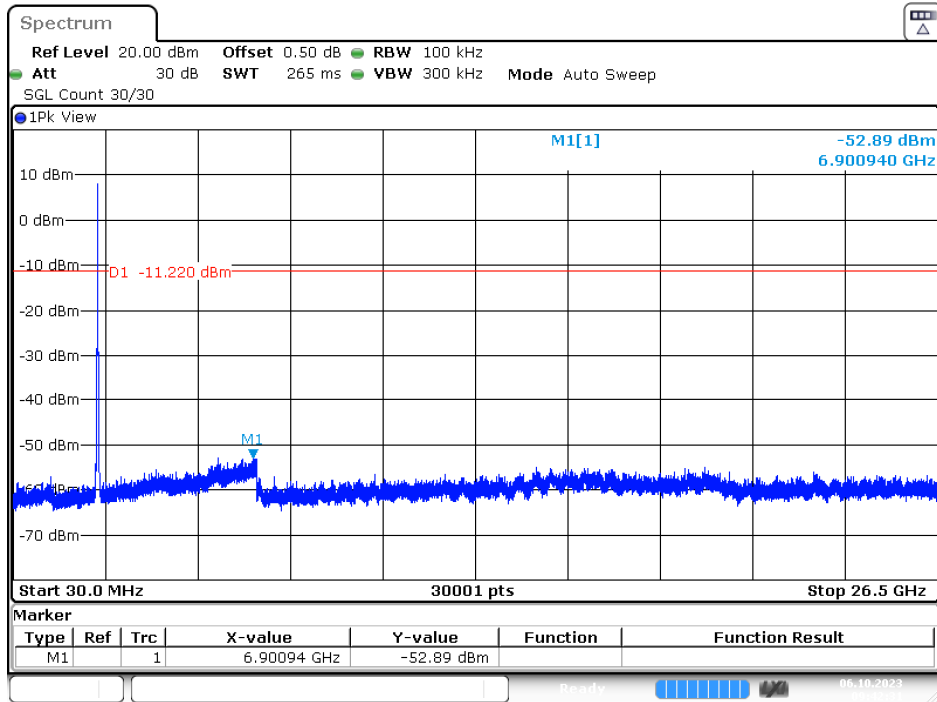
Channel 07:



Date: 1.SEP.2023 18:57:08

Product : Notebook Computer
 Test Item : RF Antenna Conducted Spurious
 Test Mode : Transmit (802.11ax-20 MHz)-SISO A
 Test Date : 2023/10/06

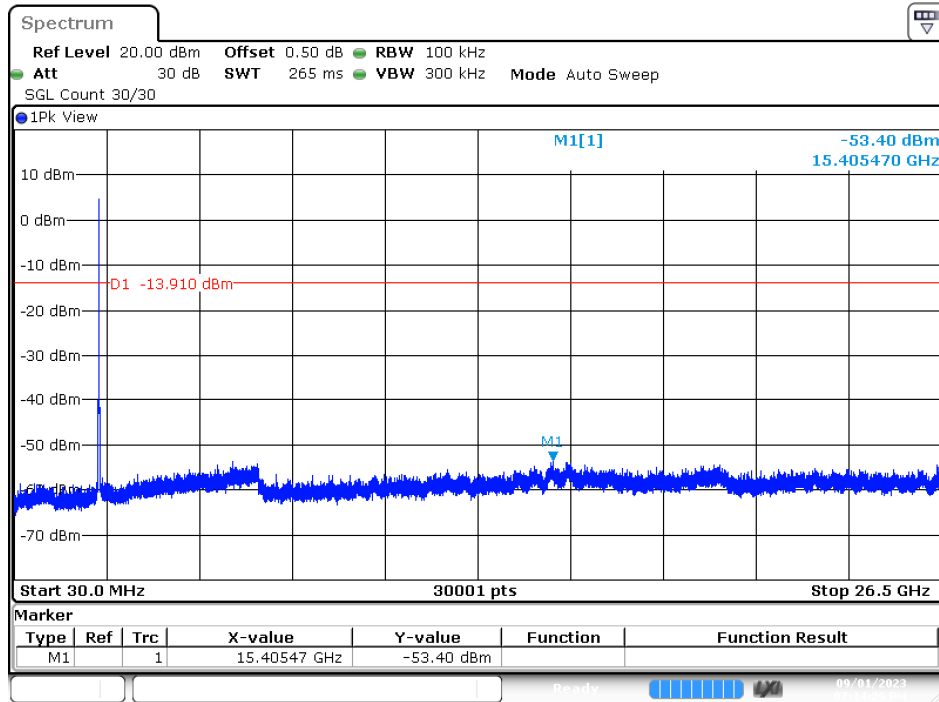
Channel 07:



Date: 6.OCT.2023 09:42:31

Product : Notebook Computer
 Test Item : RF Antenna Conducted Spurious
 Test Mode : Transmit (802.11ax-20 MHz)-MIMO
 Test Date : 2023/09/01

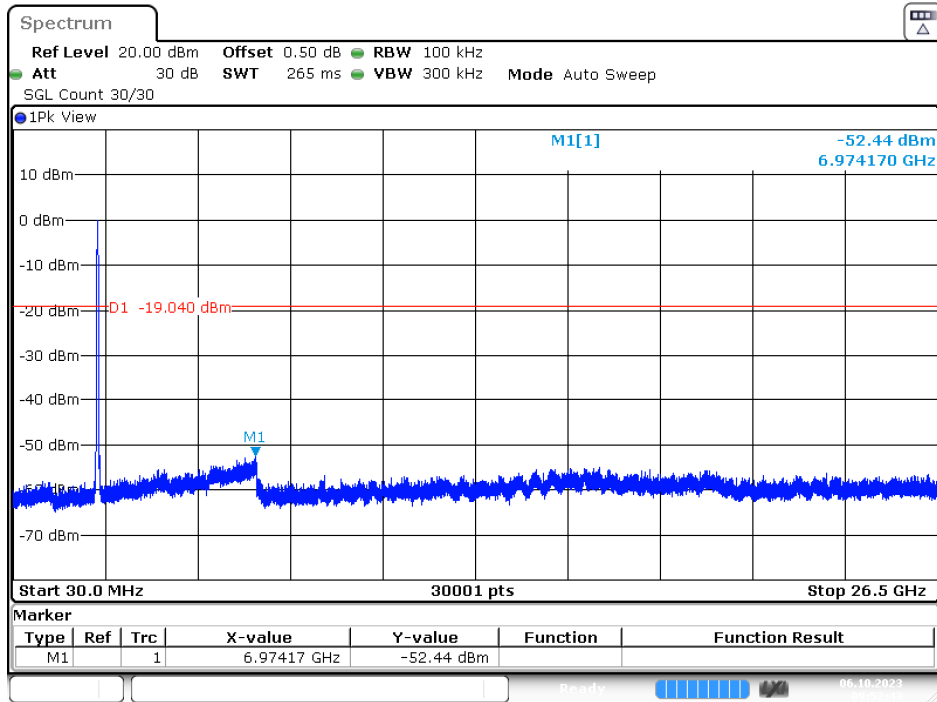
Channel 07:



Date: 1.SEP.2023 19:14:30

Product : Notebook Computer
 Test Item : RF Antenna Conducted Spurious
 Test Mode : Transmit (802.11ax-40 MHz)-SISO A
 Test Date : 2023/10/06

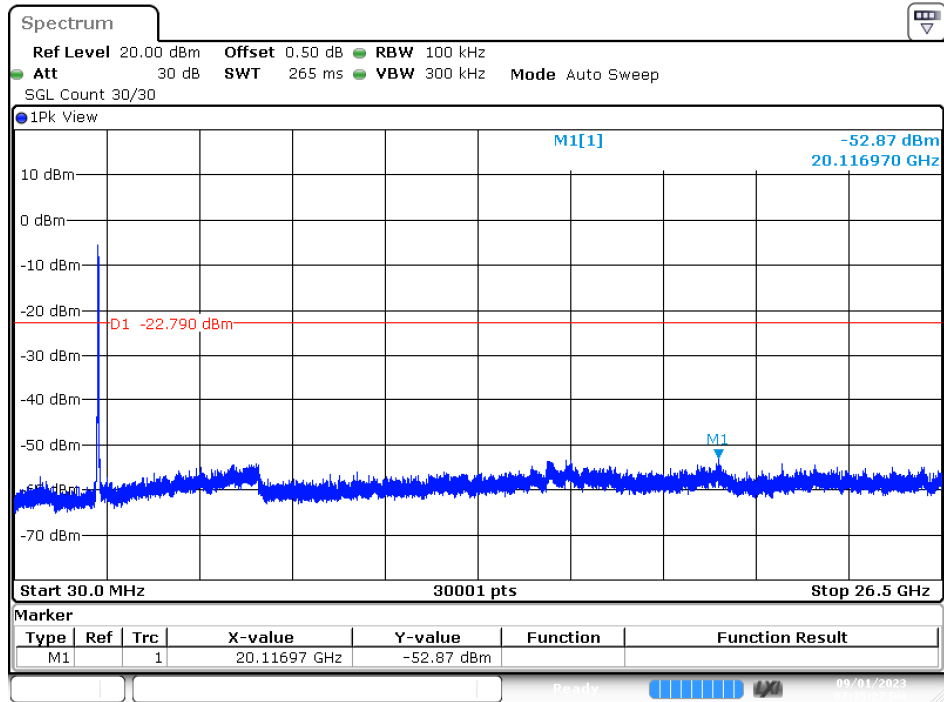
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 Test Date : 2023/09/01

Channel 03:

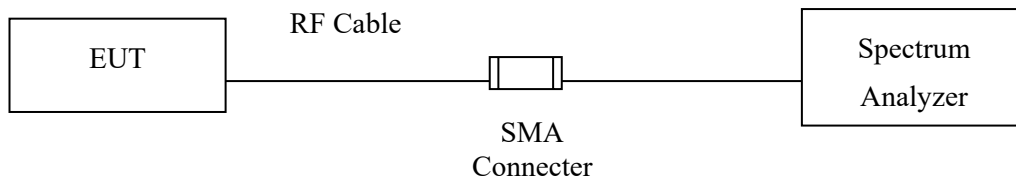


Date: 1.SEP.2023 19:35:27

6. Band Edge

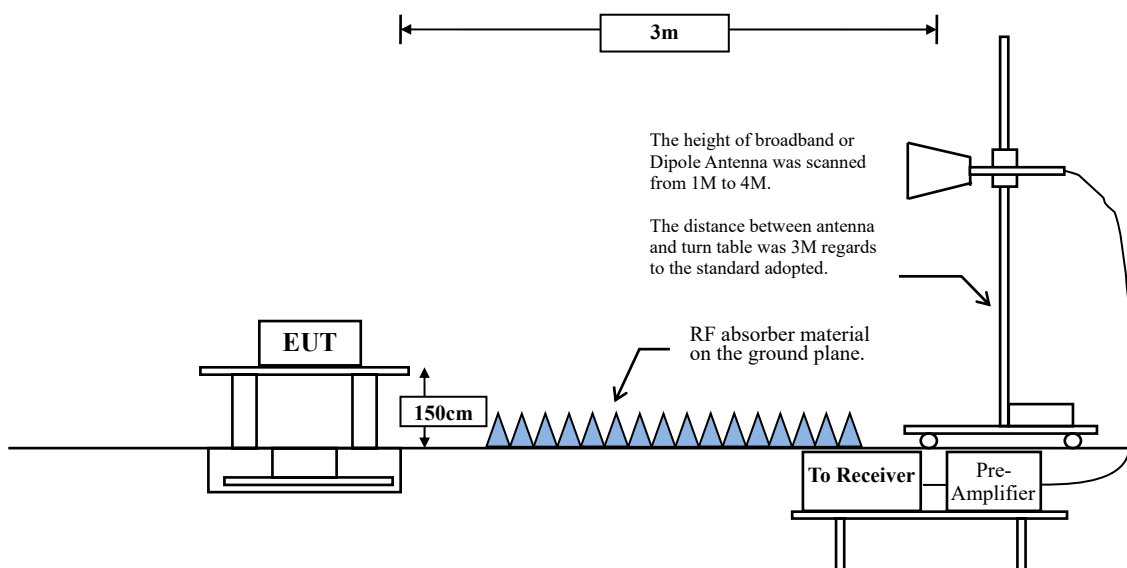
6.1. Test Setup

RF Conducted Measurement



RF Radiated Measurement:

Above 1 GHz



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 = 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

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11b	99.05	8.3400	120	10
802.11g	97.43	2.0850	480	500
802.11ax-20 MHz	98.35	2.5942	385	10
802.11ax-40 MHz	98.31	3.9610	252	10

SISO B

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11b	99.21	8.3380	120	10
802.11g	97.38	2.0800	481	500
802.11ax-20 MHz	98.51	3.9750	252	10
802.11ax-40 MHz	98.51	3.9750	252	10

MIMO

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11ax-20 MHz	98.51	3.9700	252	10
802.11ax-40 MHz	98.76	3.9800	251	10

SISO A

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11ax-20 MHz (Partial RU)	97.73	2.5800	388	500
802.11ax-40 MHz (Partial RU)	98.10	2.5800	388	10

SISO B

2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11ax-20 MHz (Partial RU)	98.48	2.5900	386	10
802.11ax-40 MHz (Partial RU)	98.10	2.5800	388	10

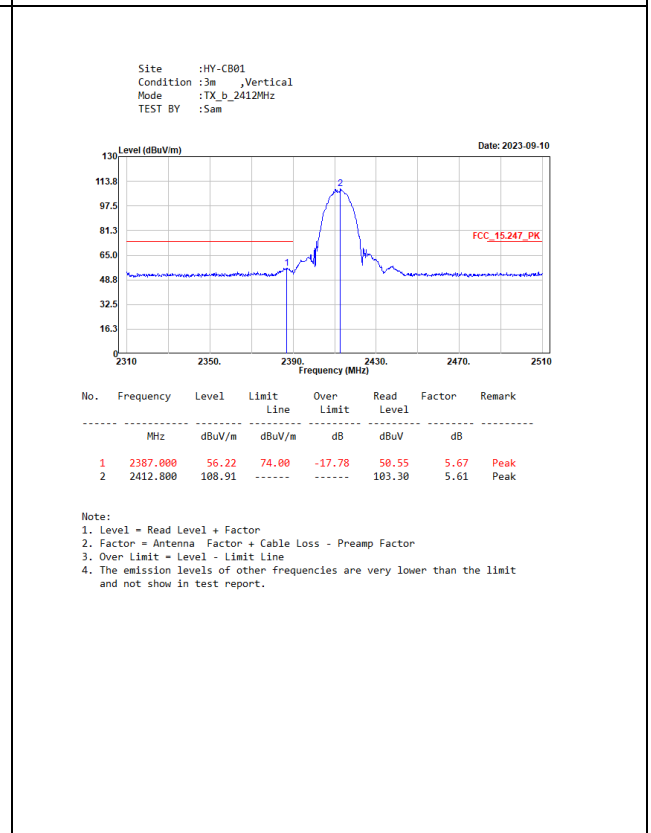
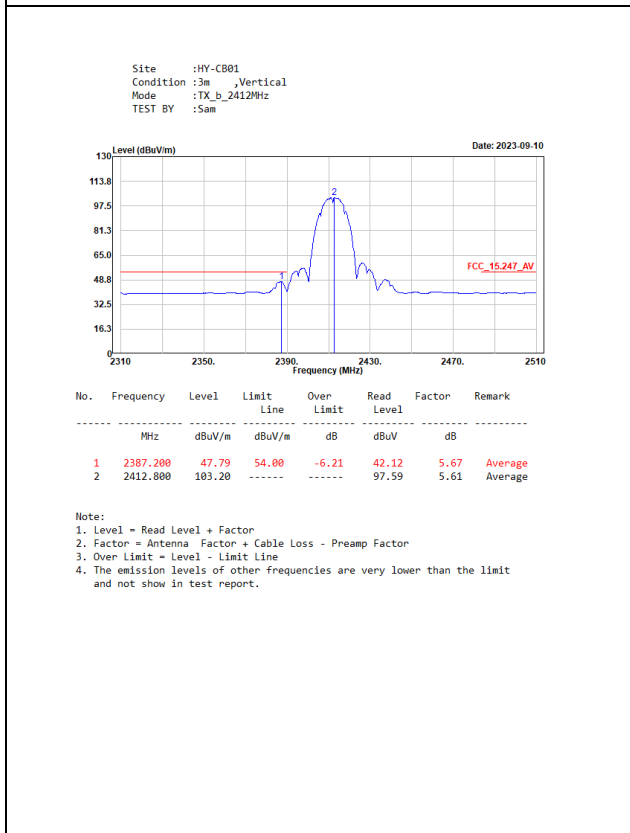
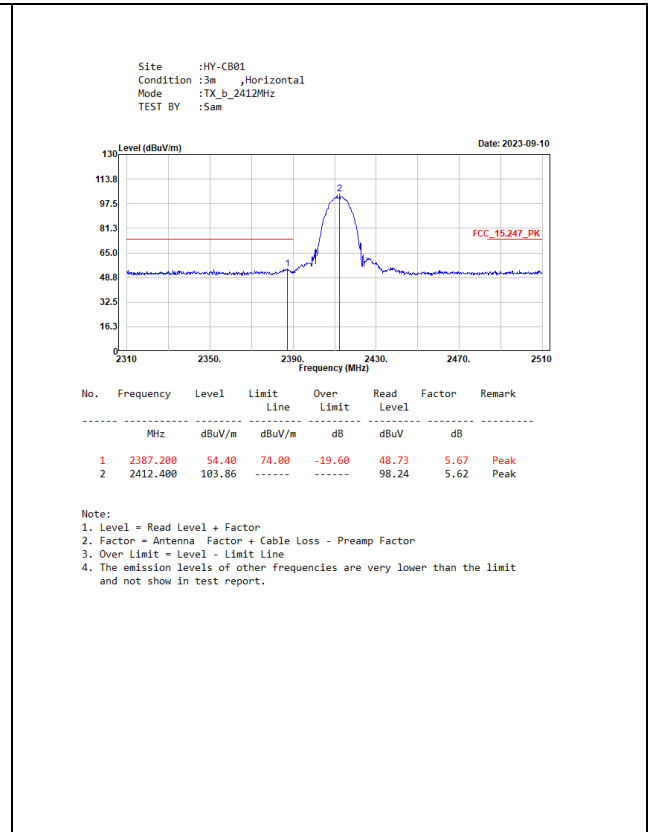
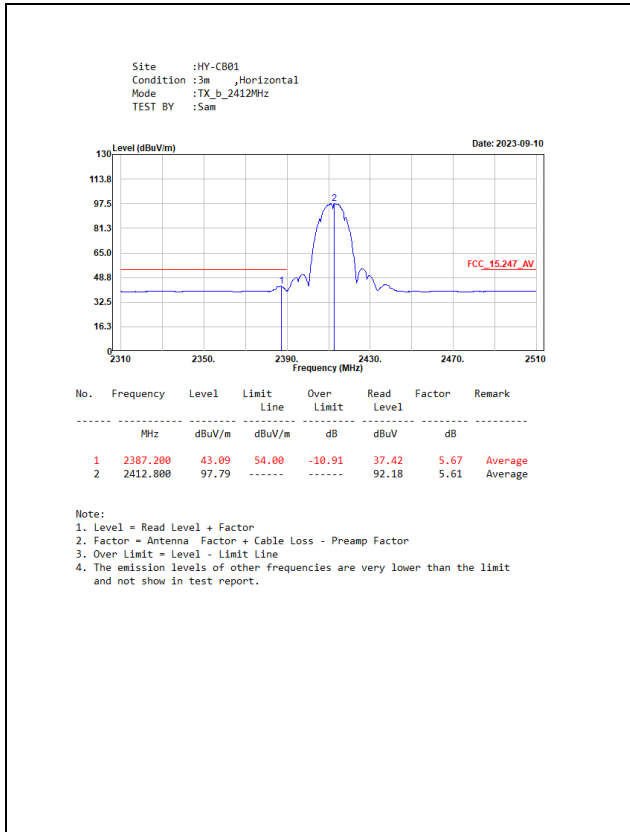
MIMO

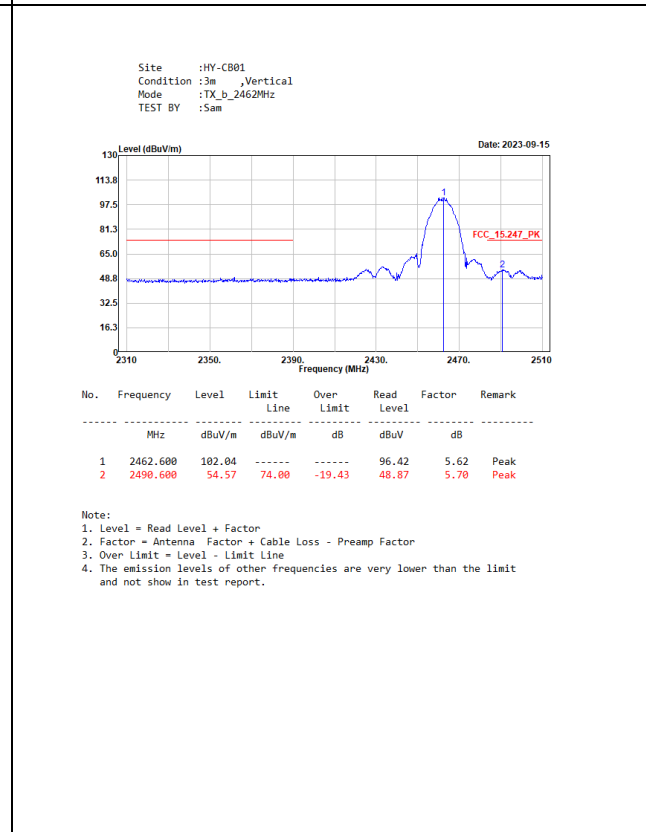
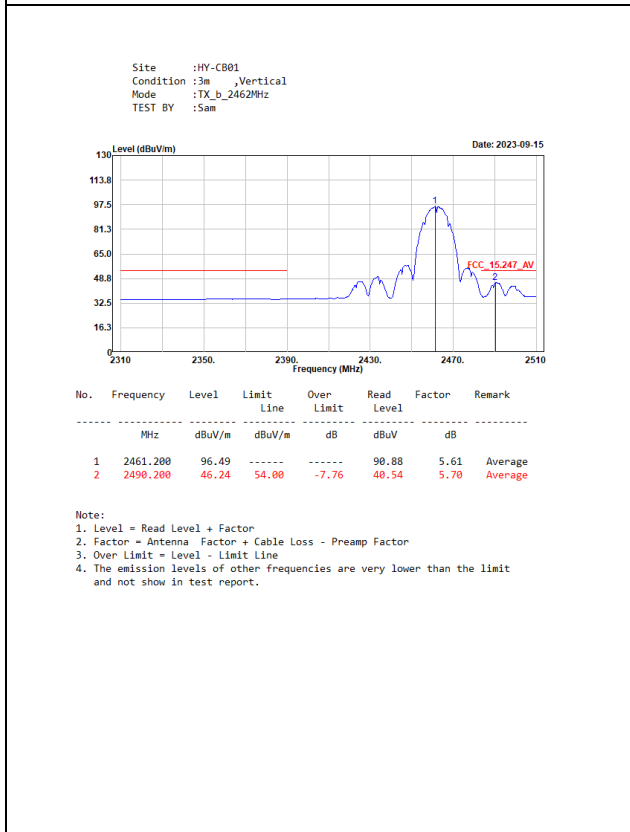
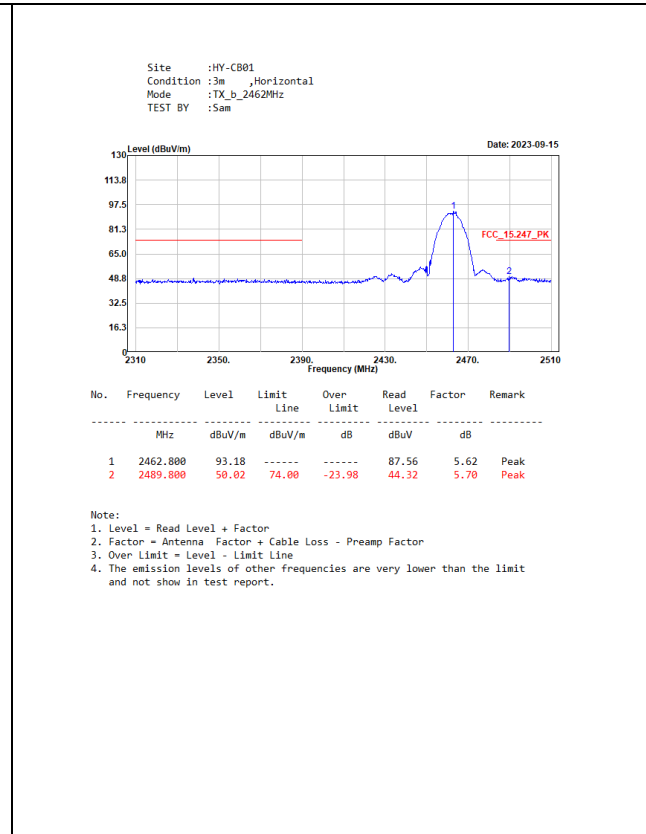
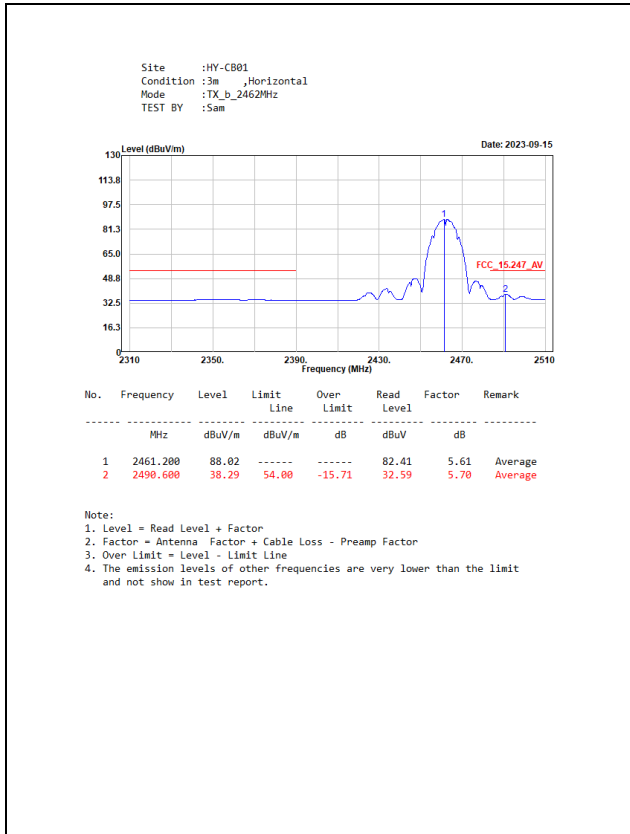
2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11ax-20 MHz (Partial RU)	98.35	2.5942	385	10
802.11ax-40 MHz (Partial RU)	97.81	2.5942	385	500

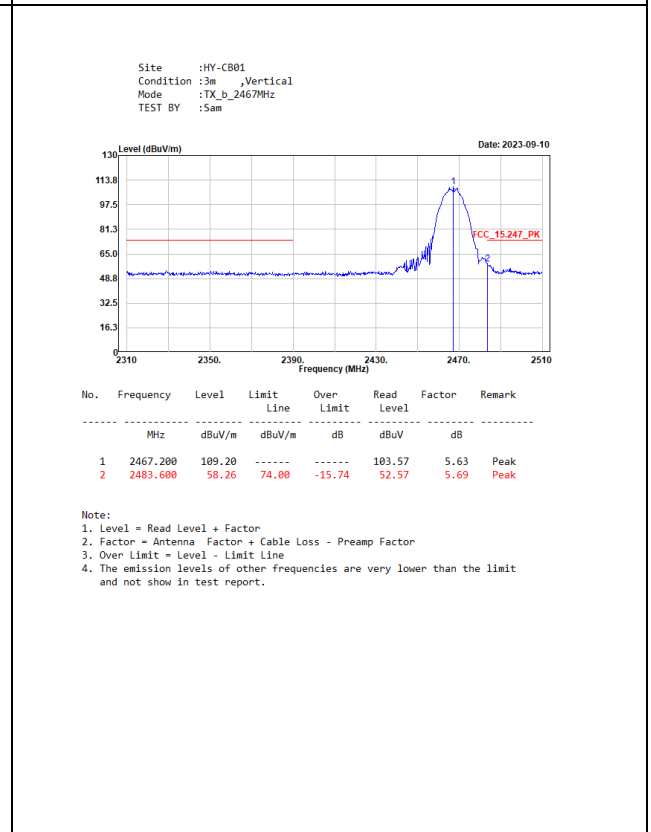
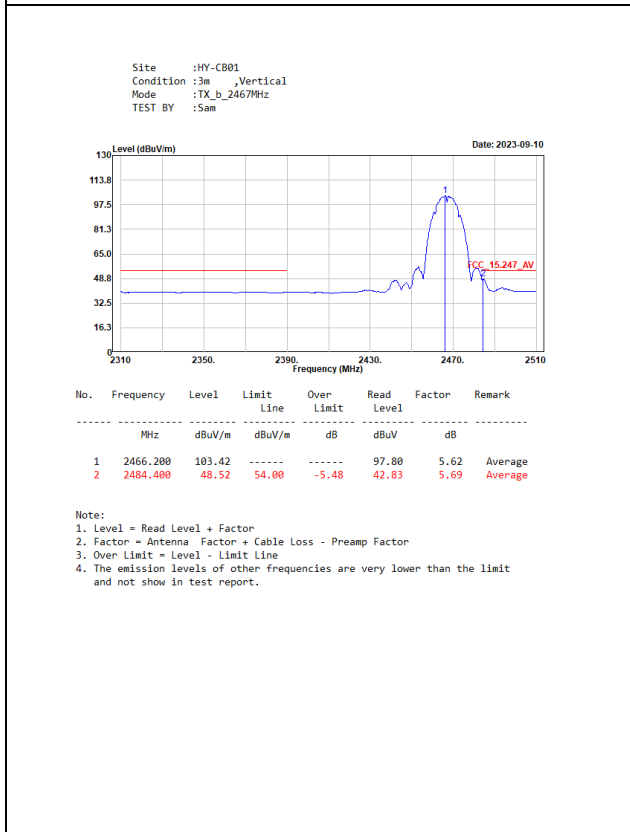
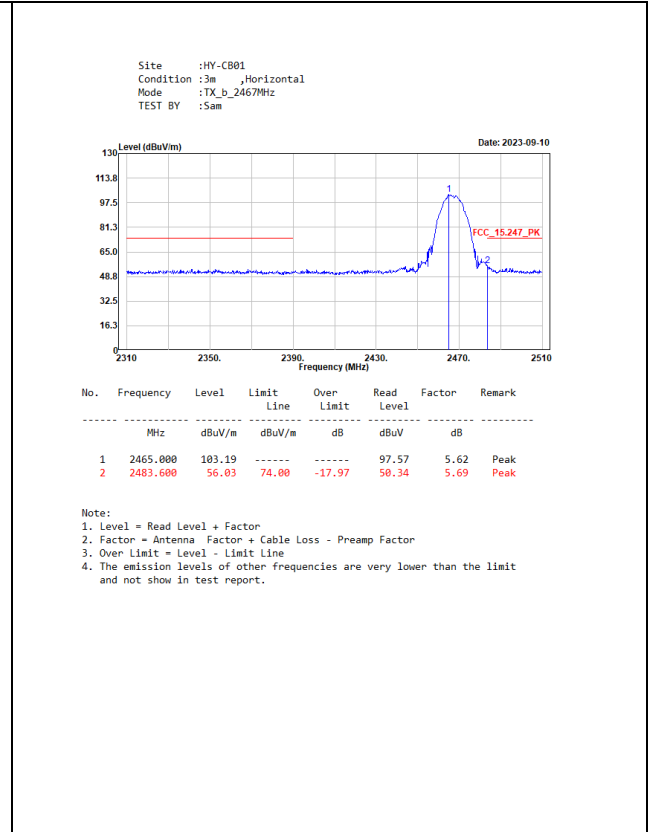
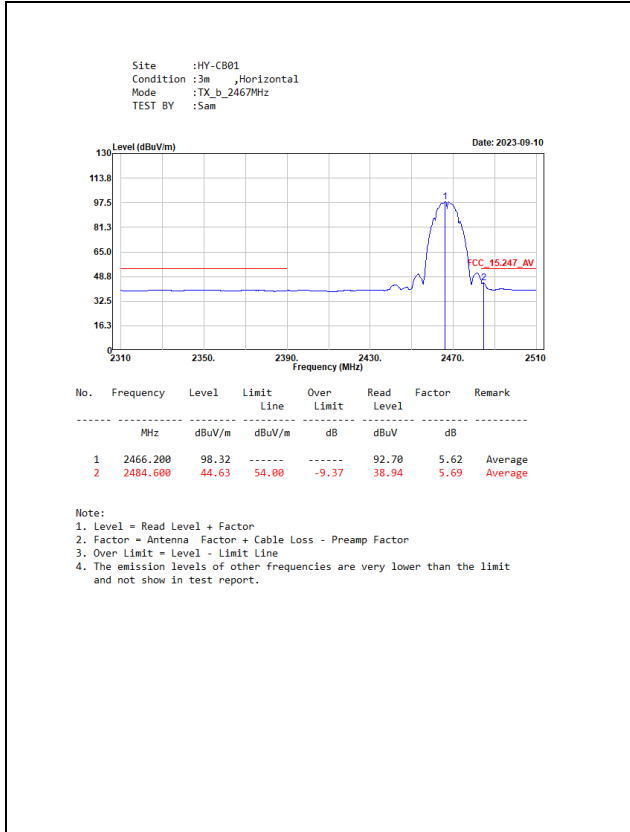
Note: Duty Cycle Refer to Section 9.

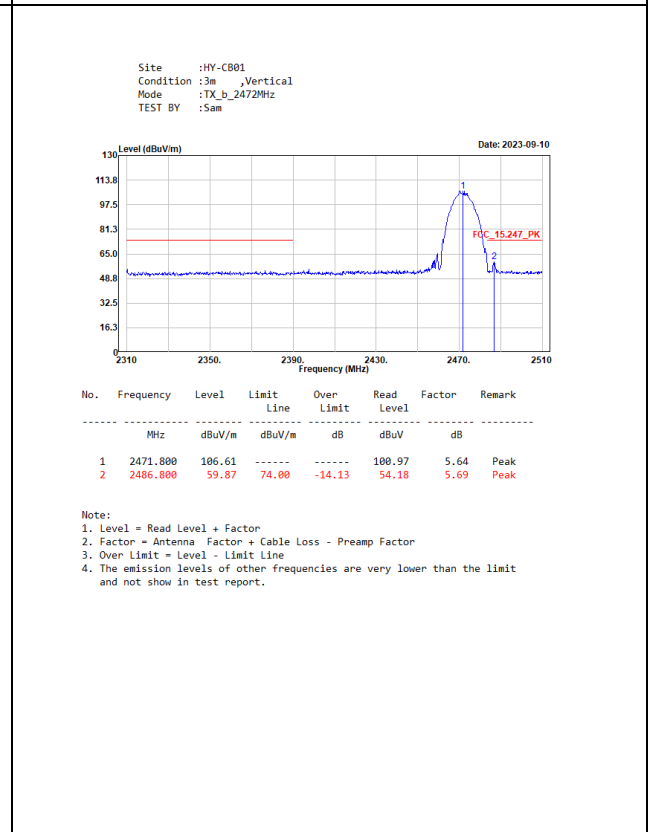
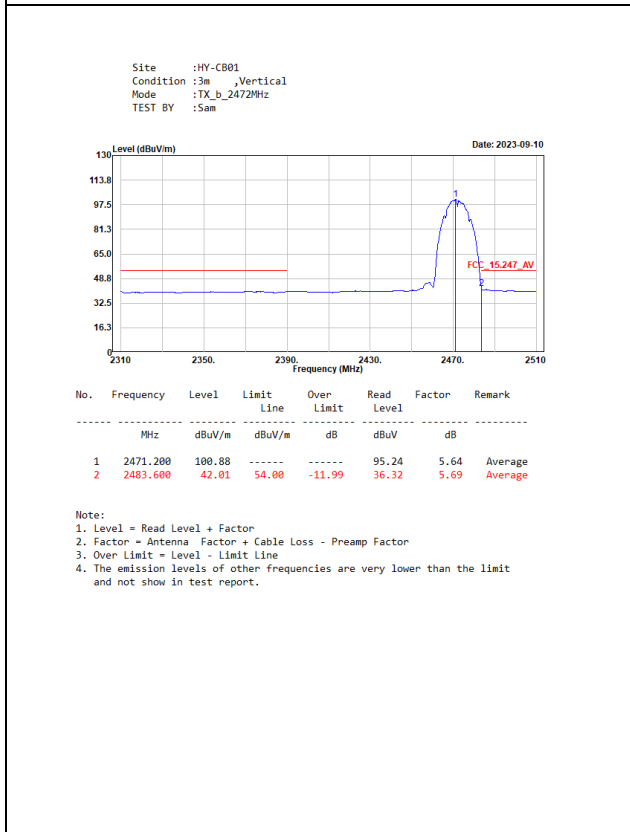
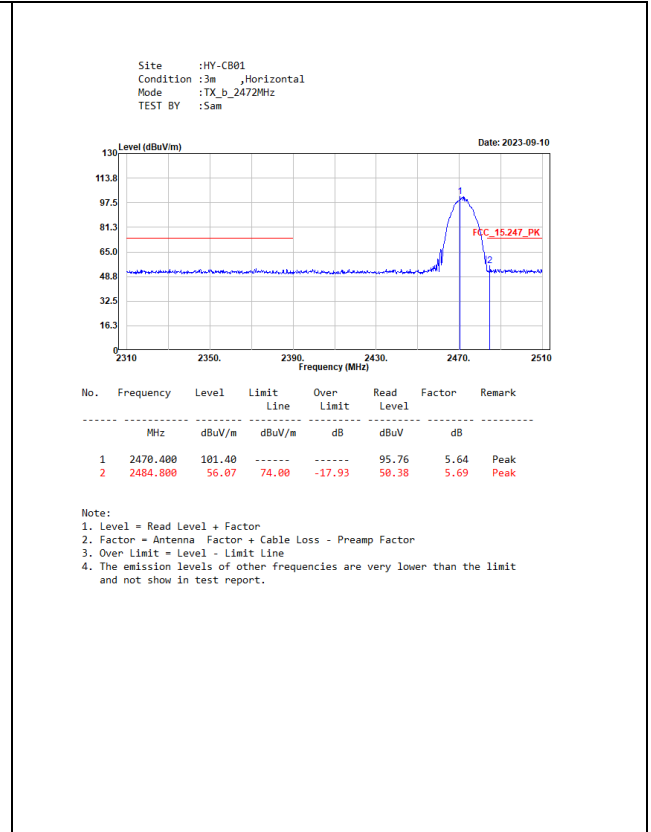
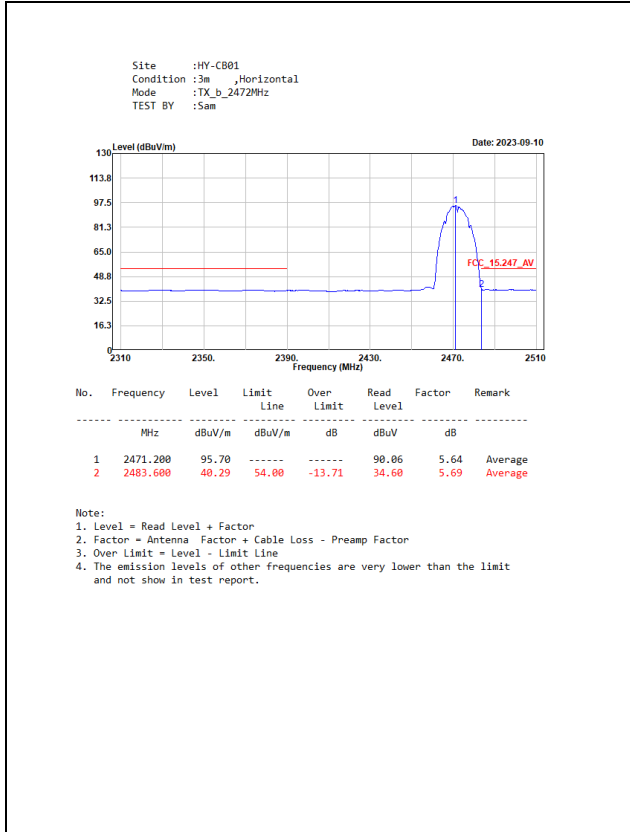
6.4. Test Result of Band Edge

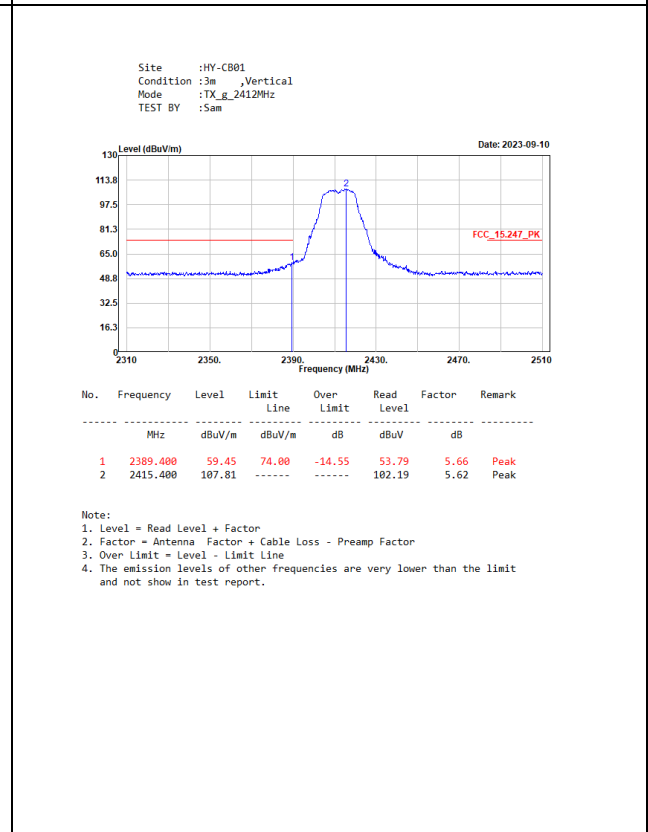
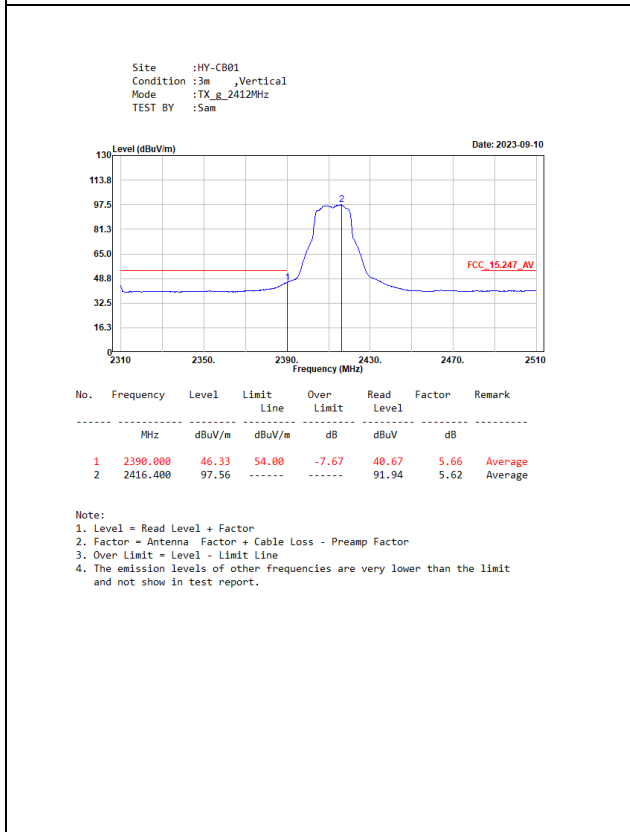
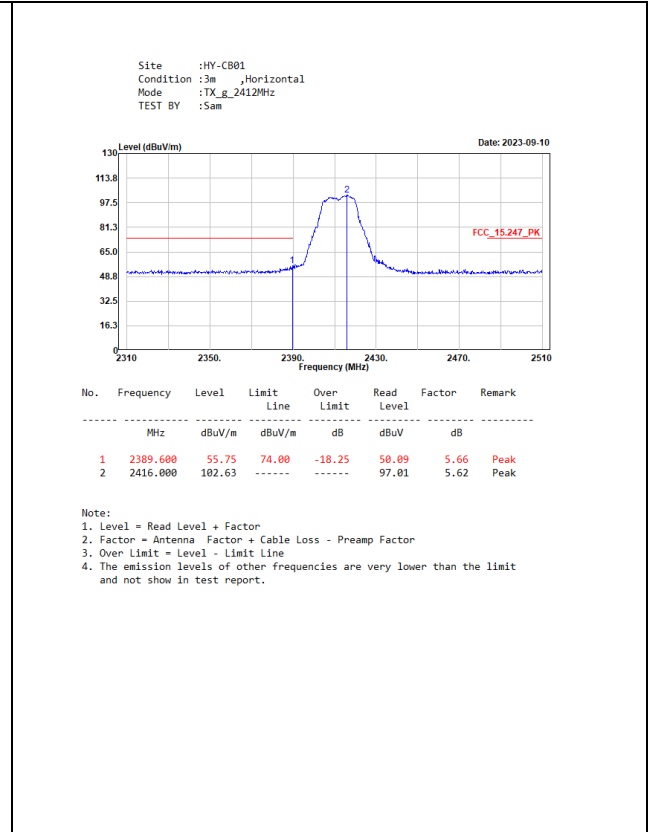
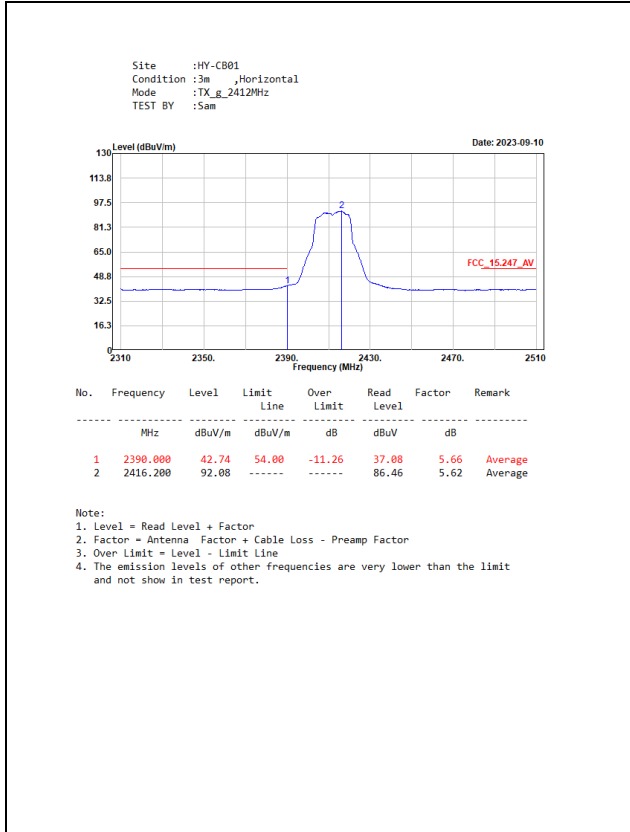
SISO A

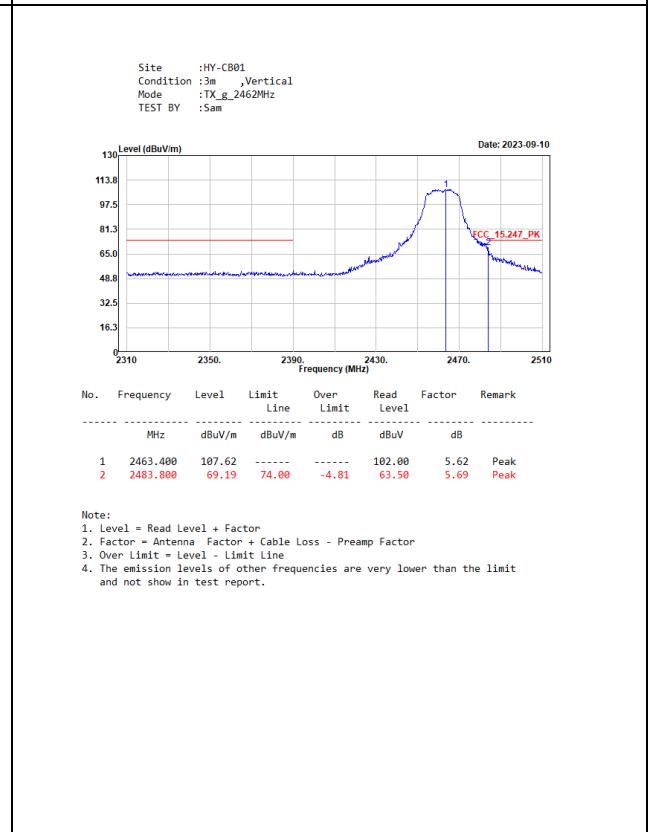
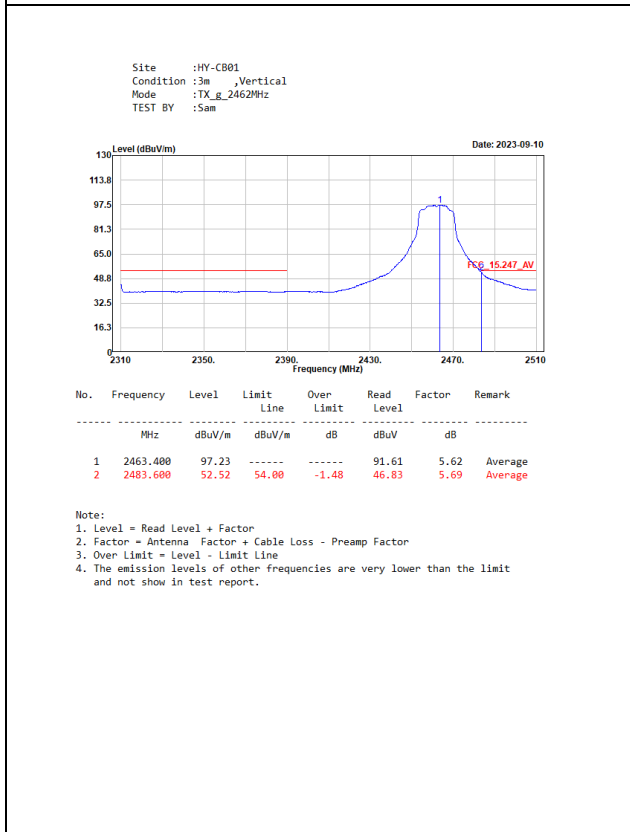
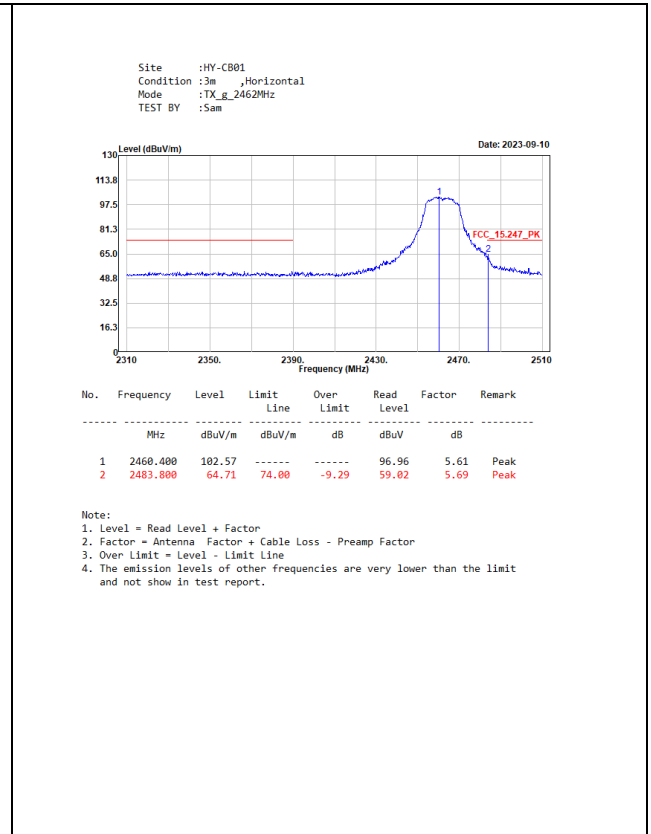
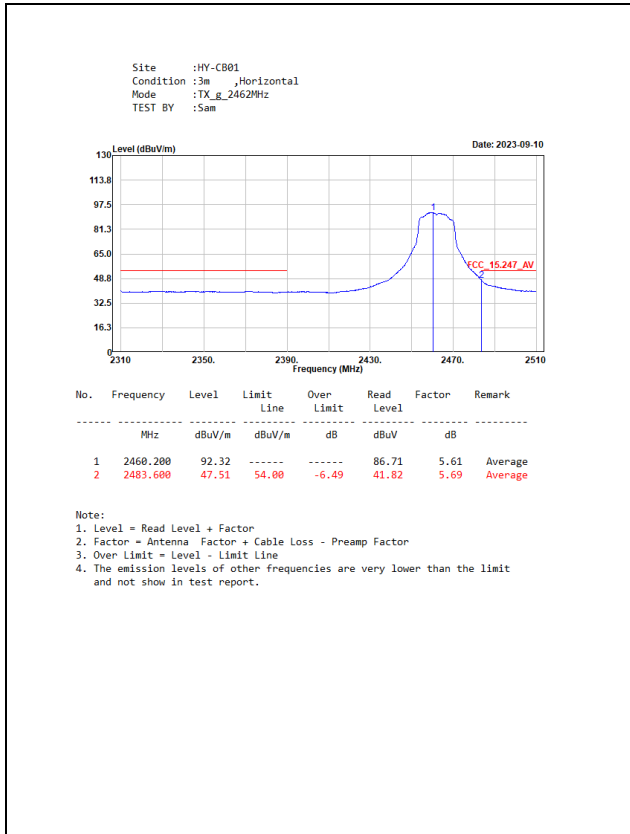


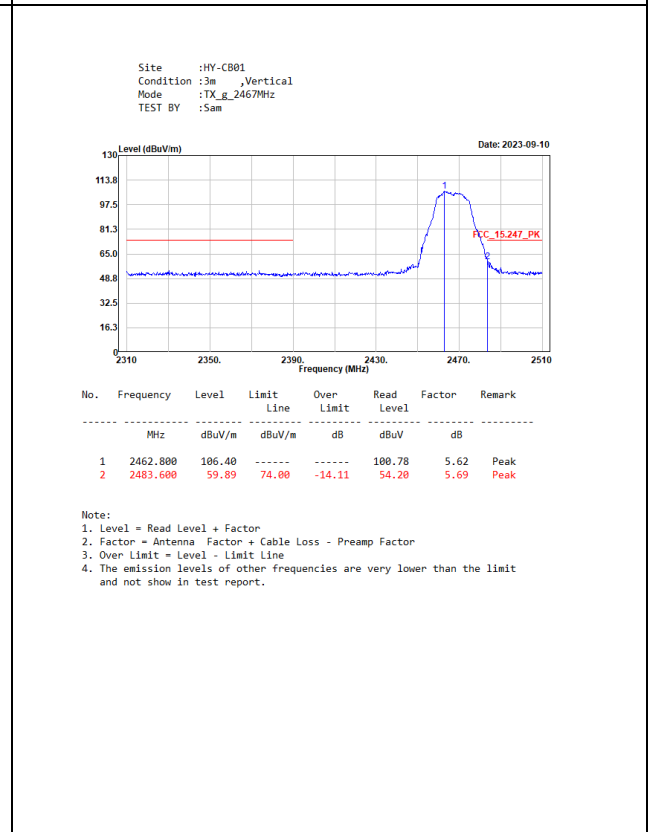
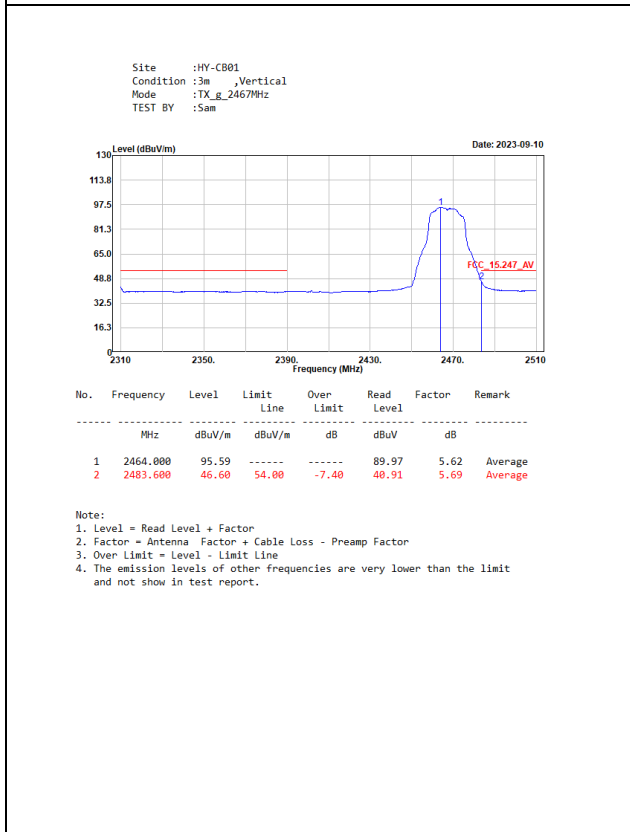
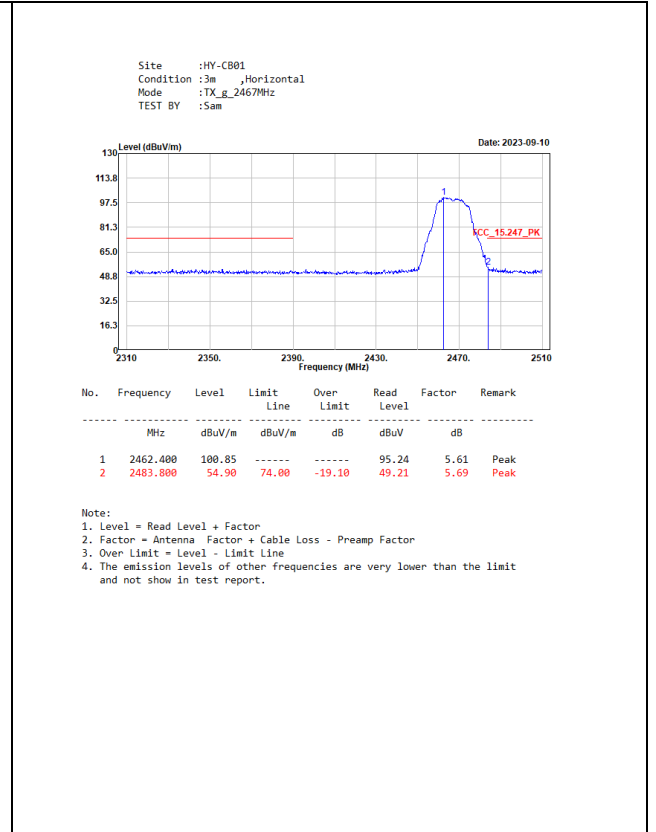
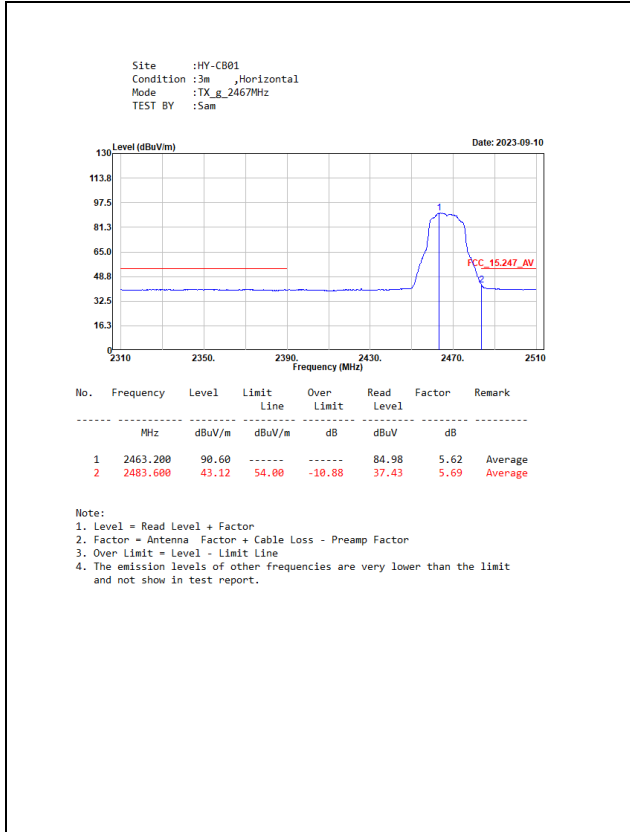


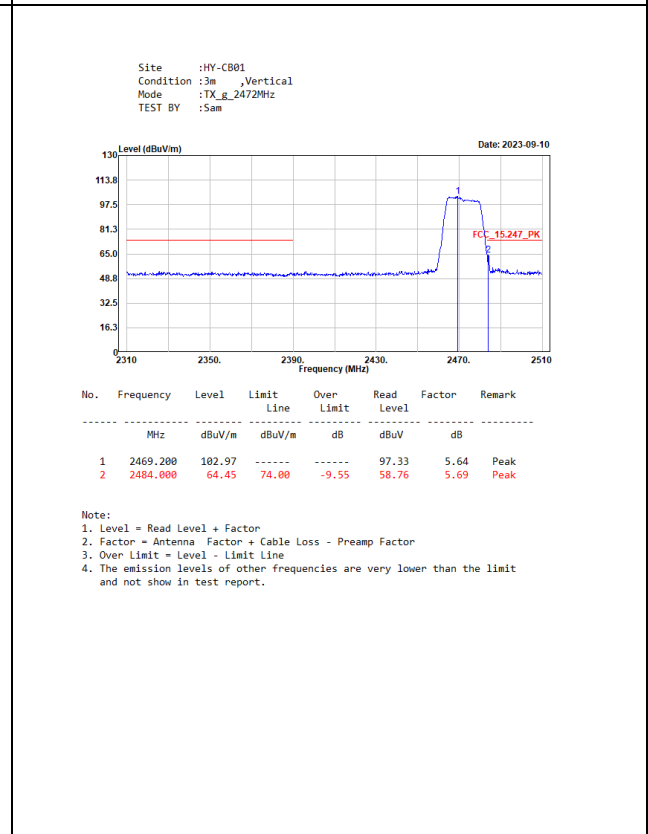
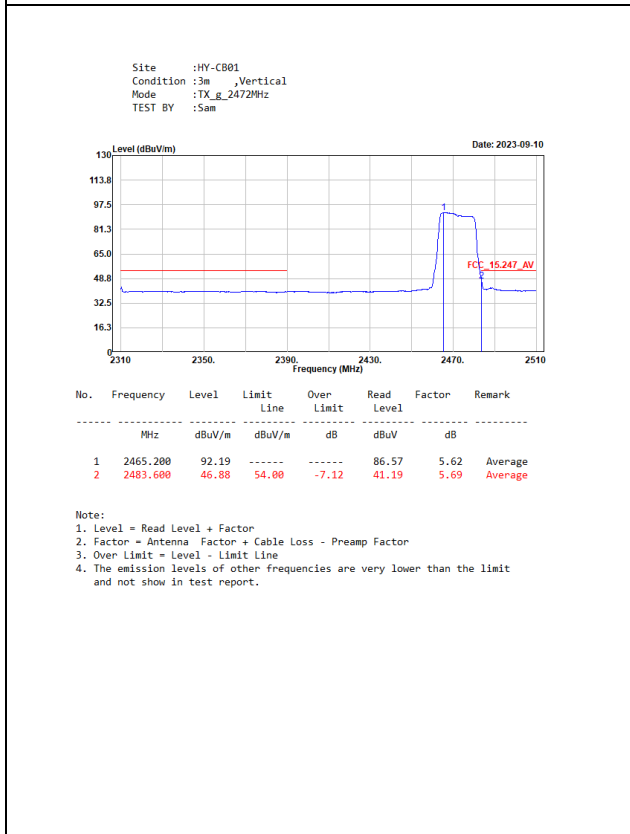
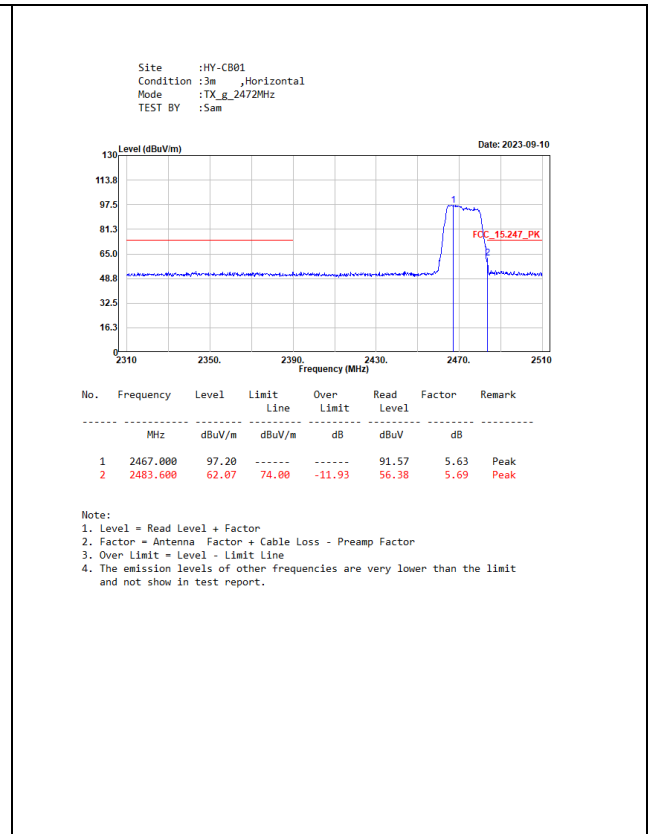
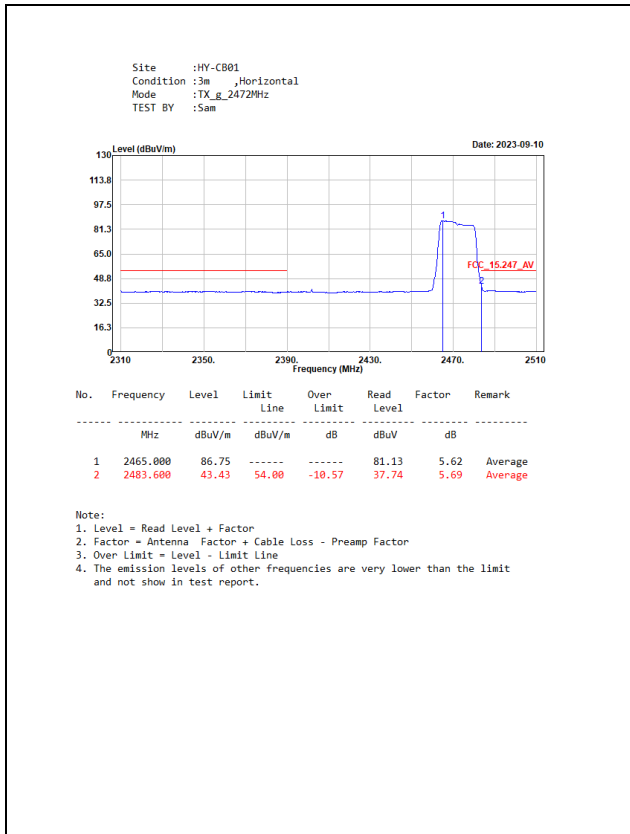


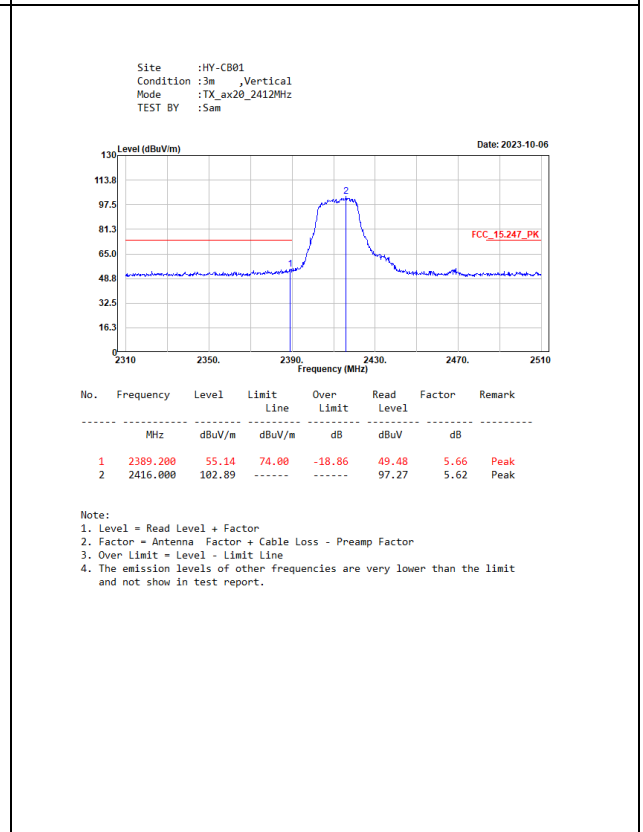
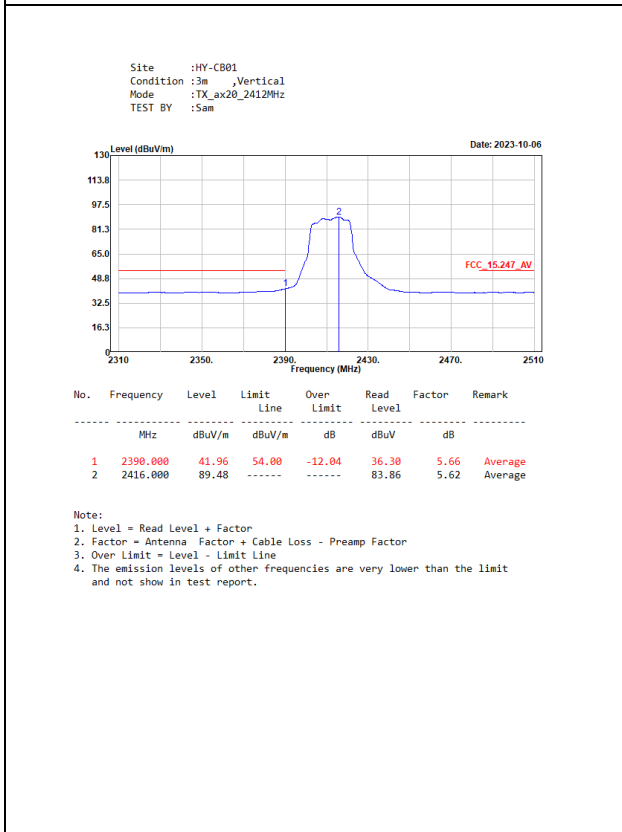
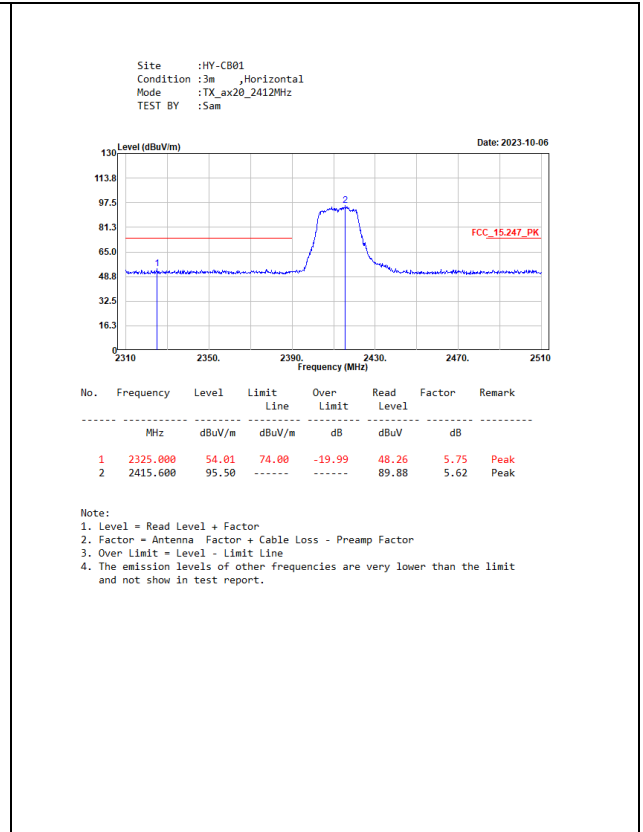
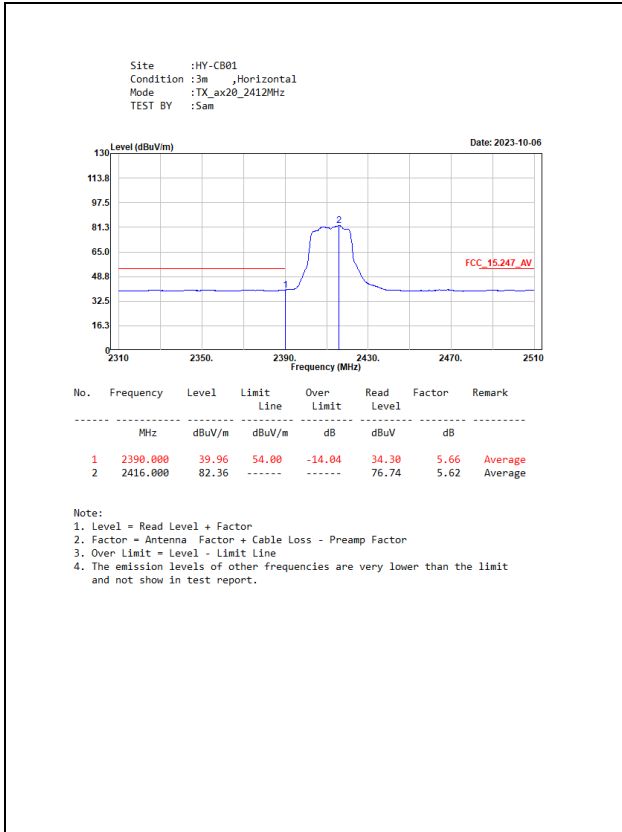


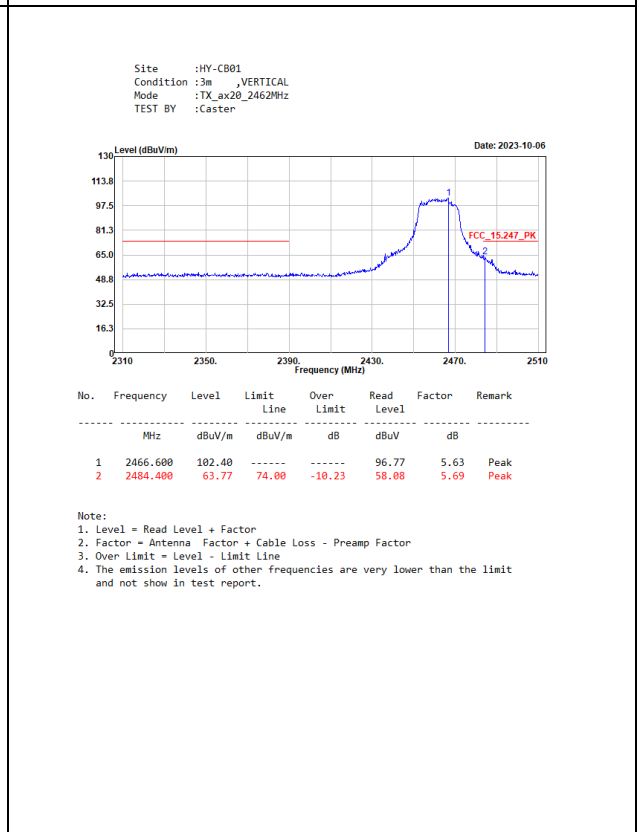
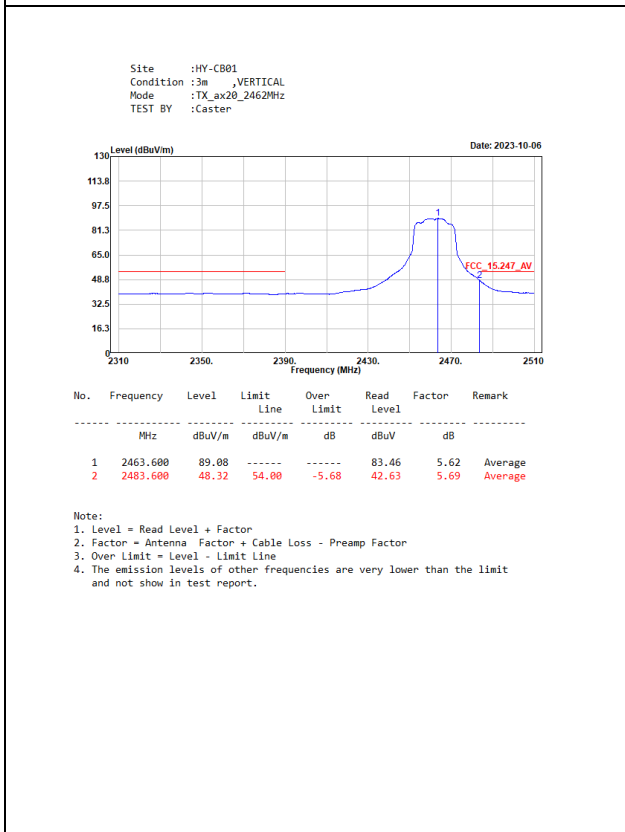
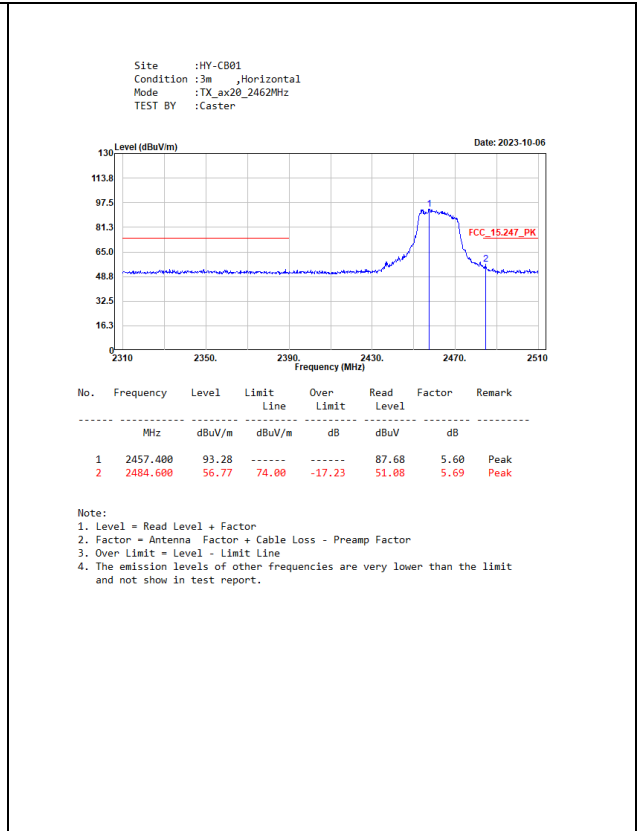
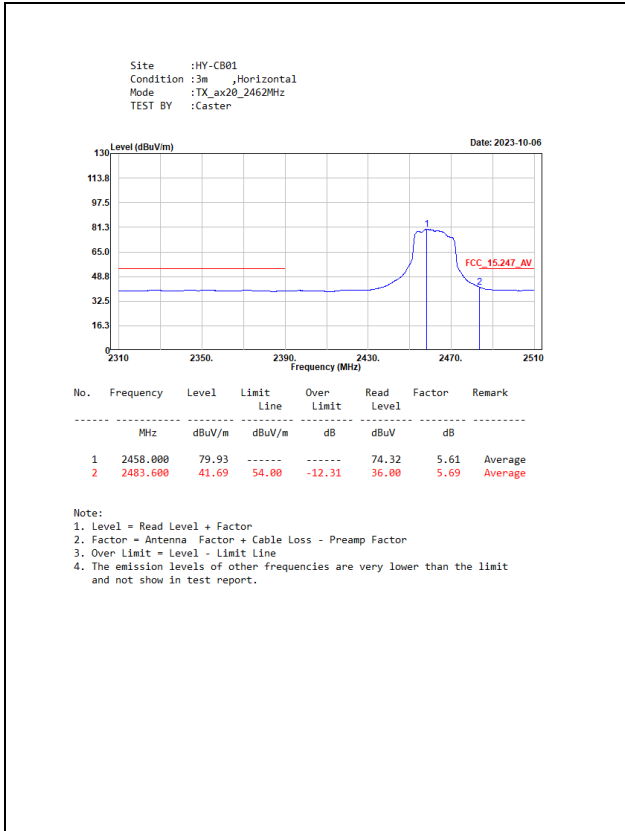


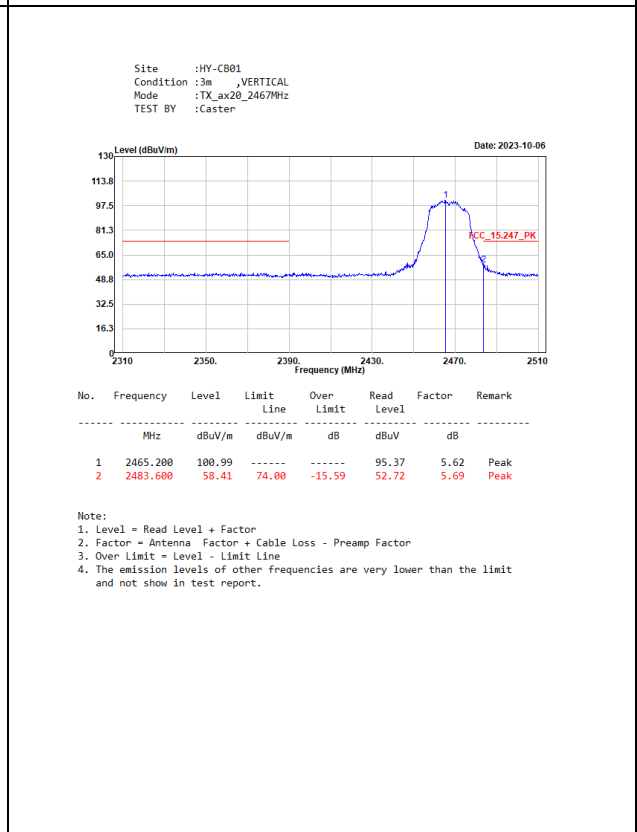
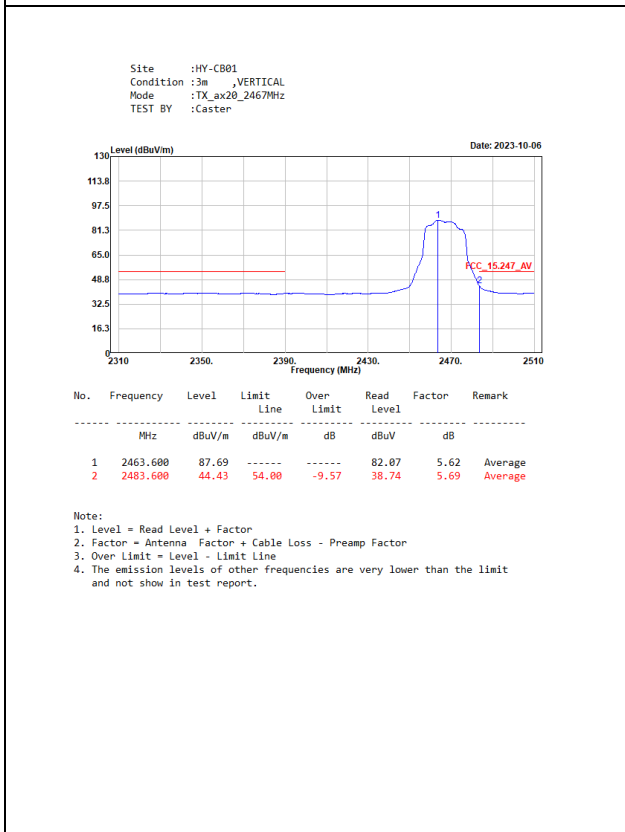
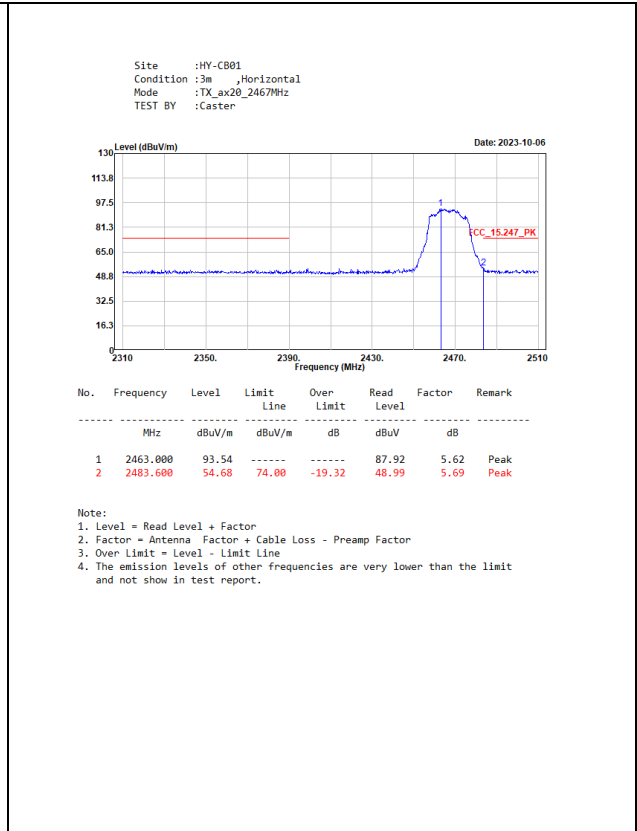
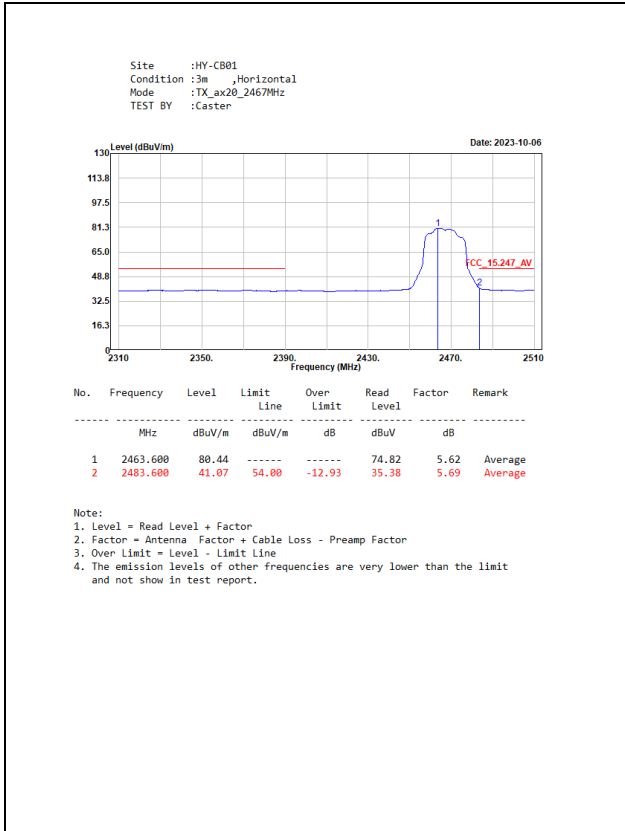


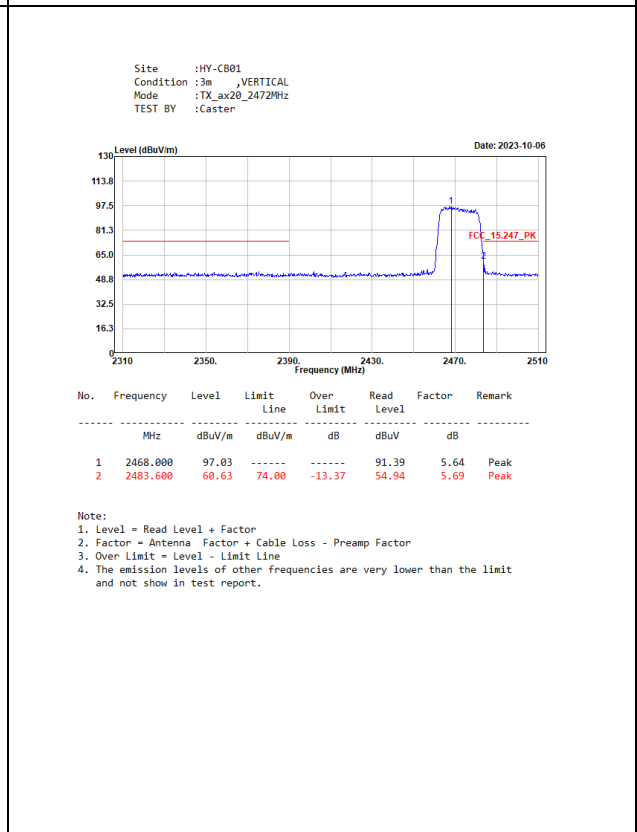
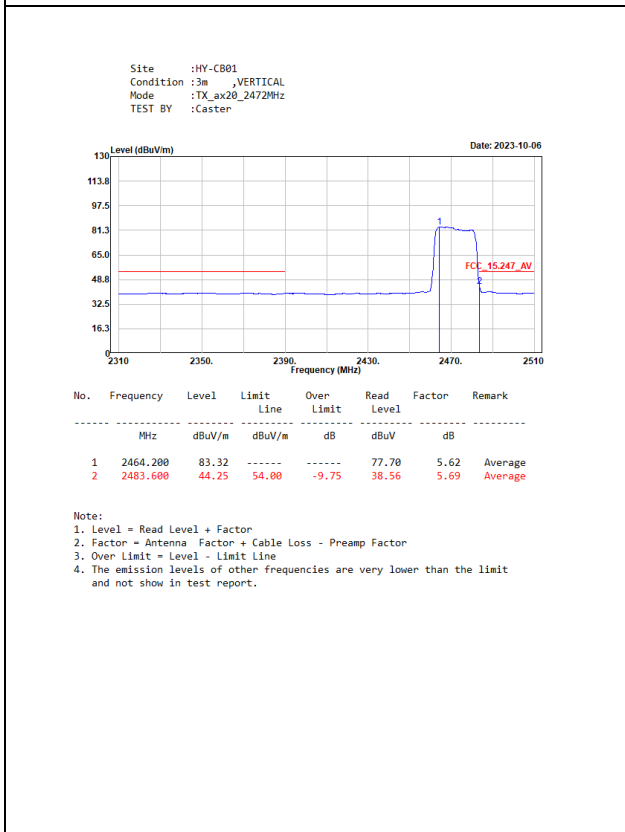
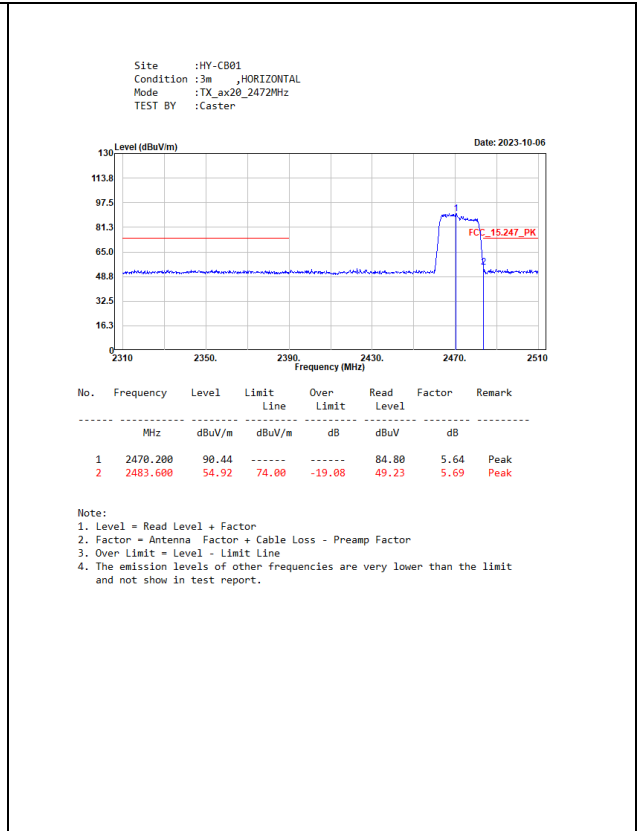
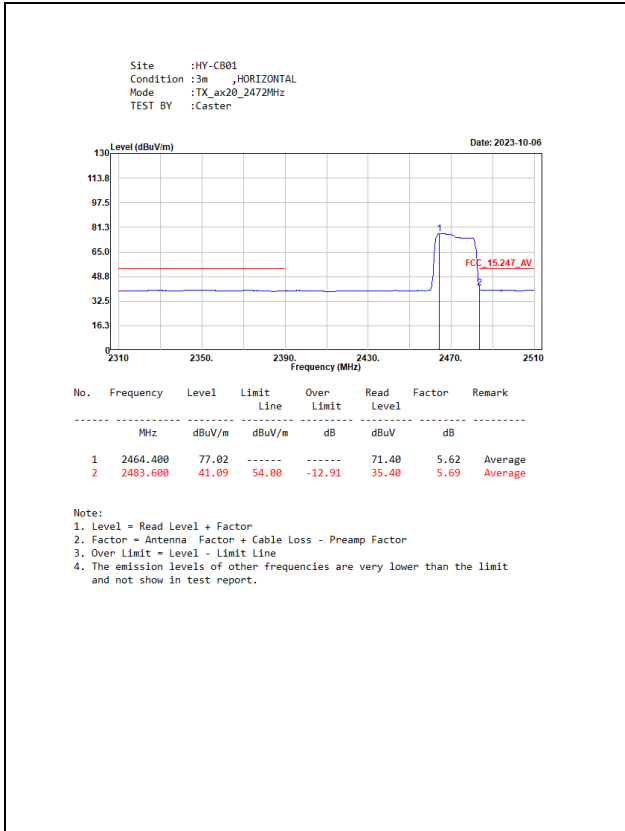


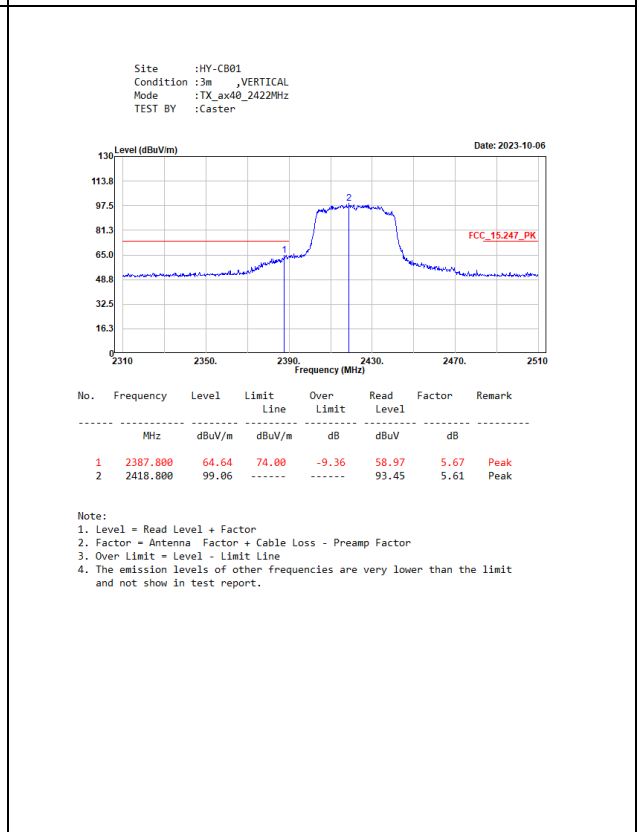
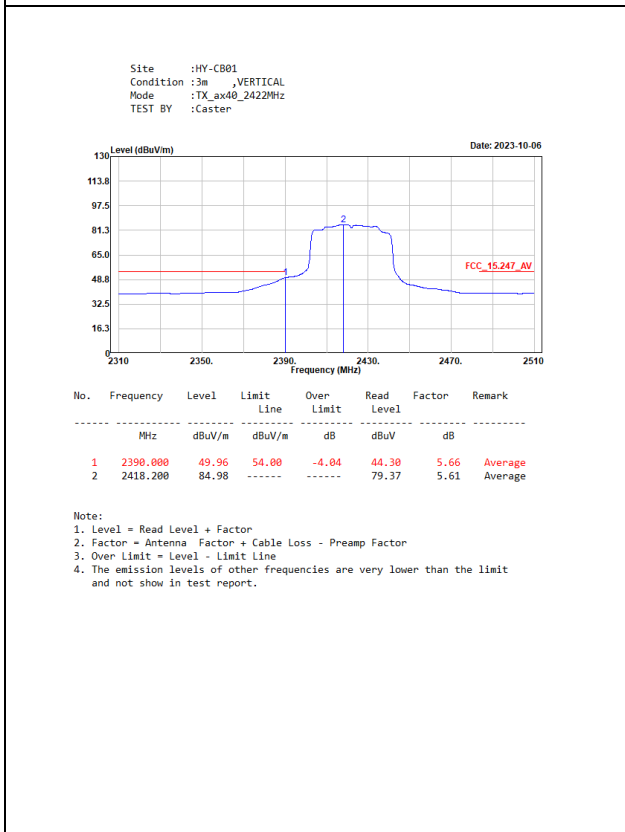
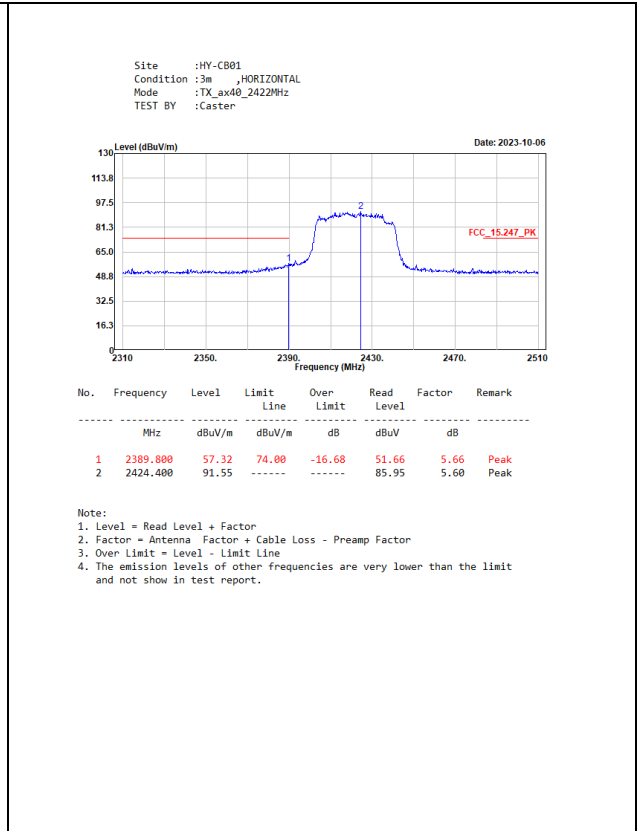
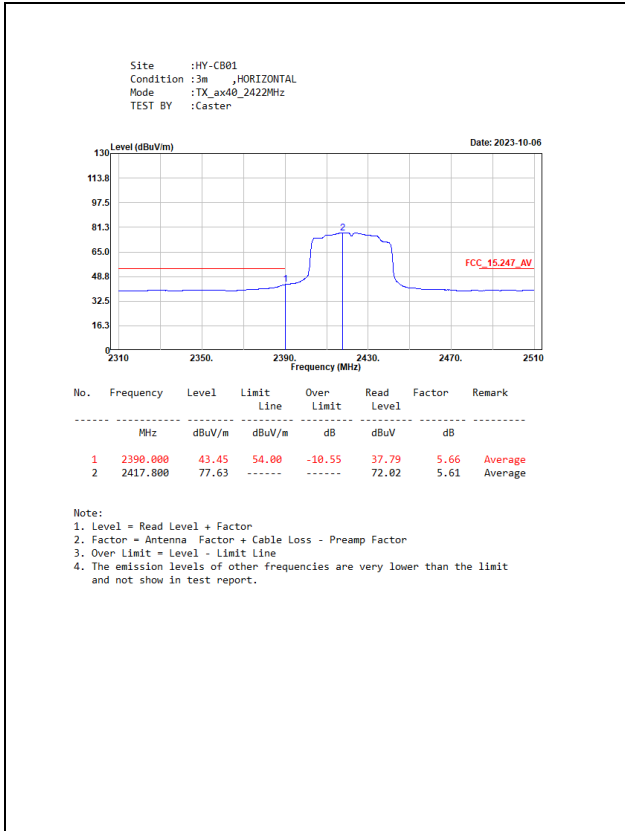


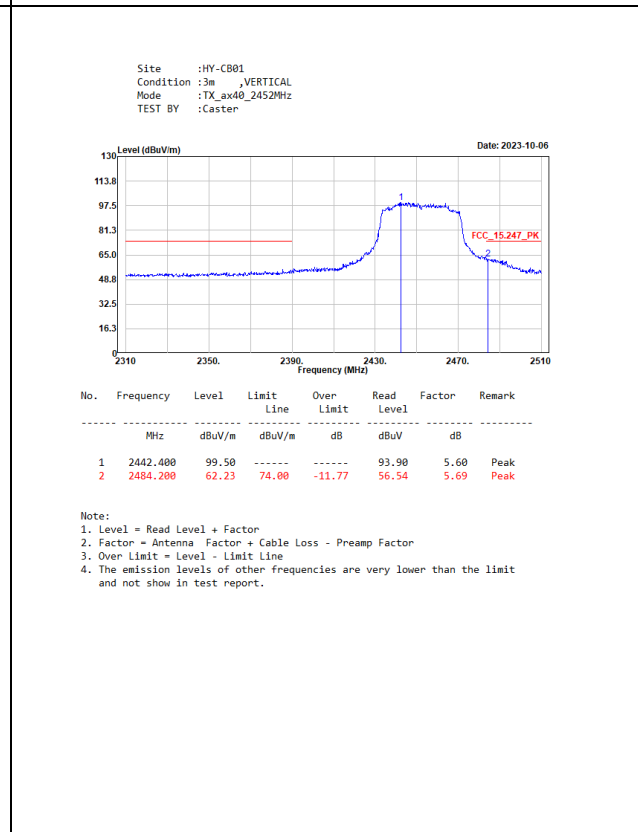
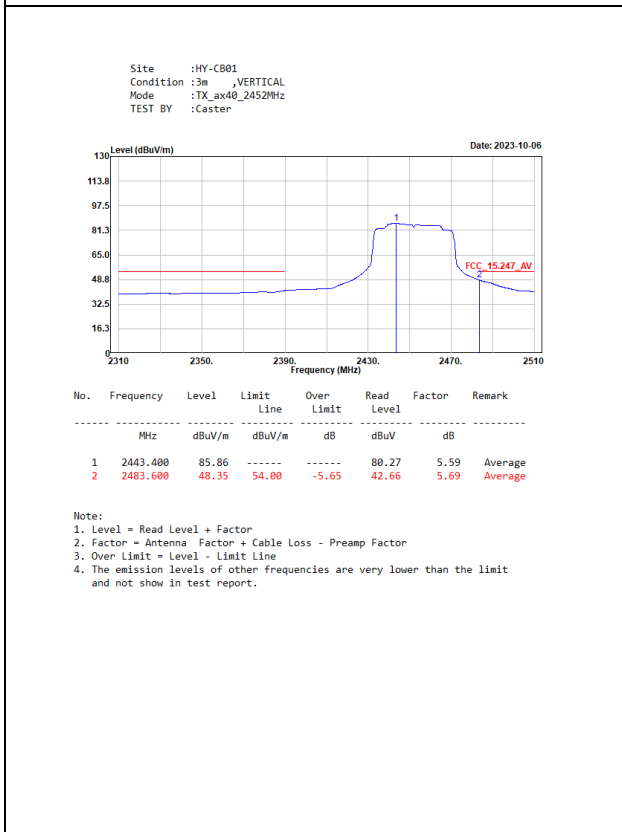
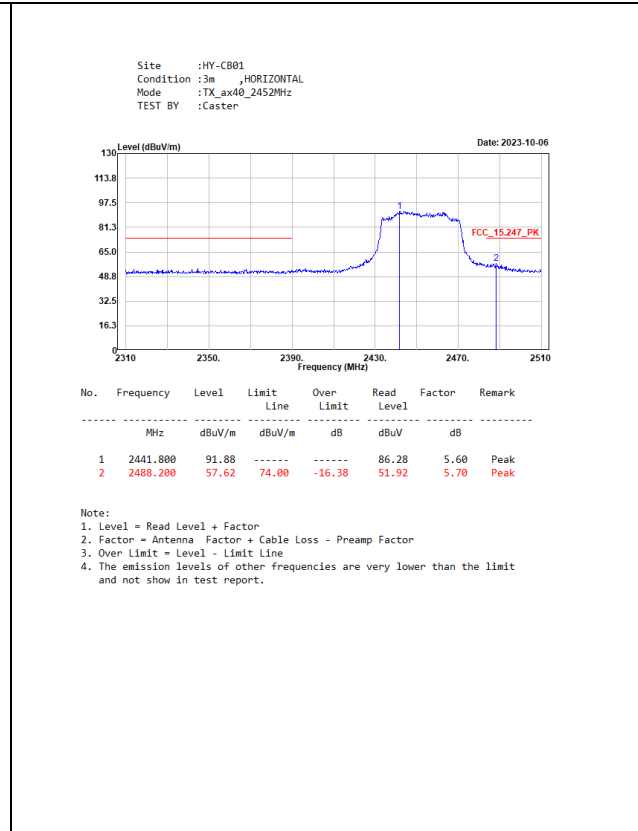
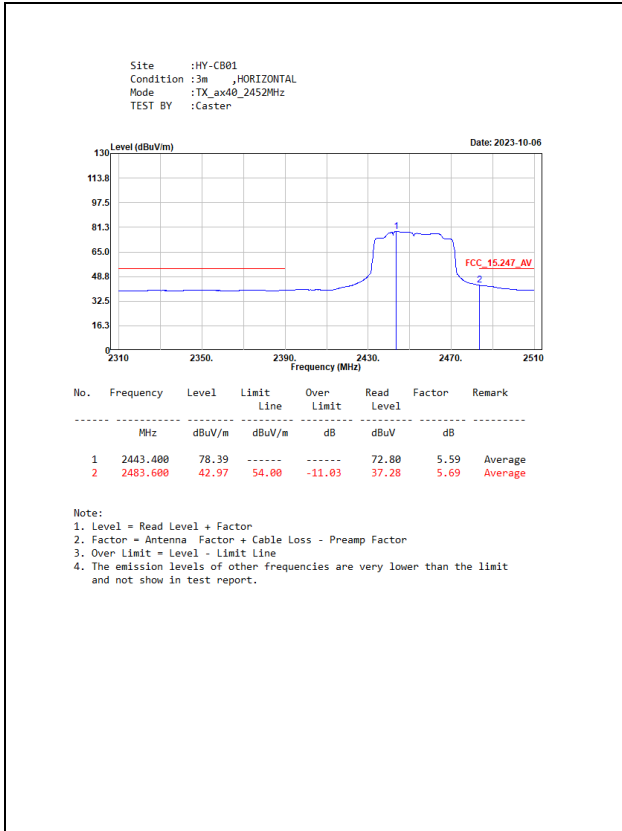


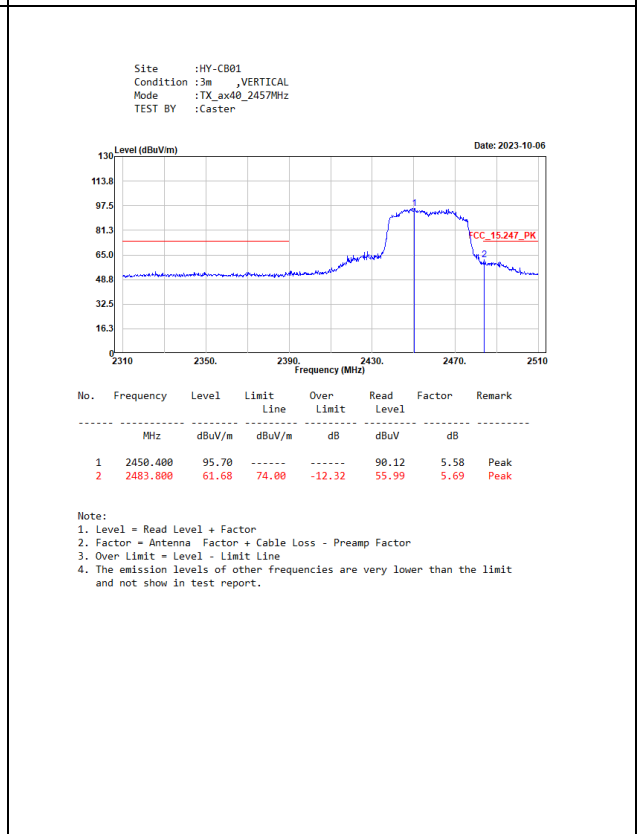
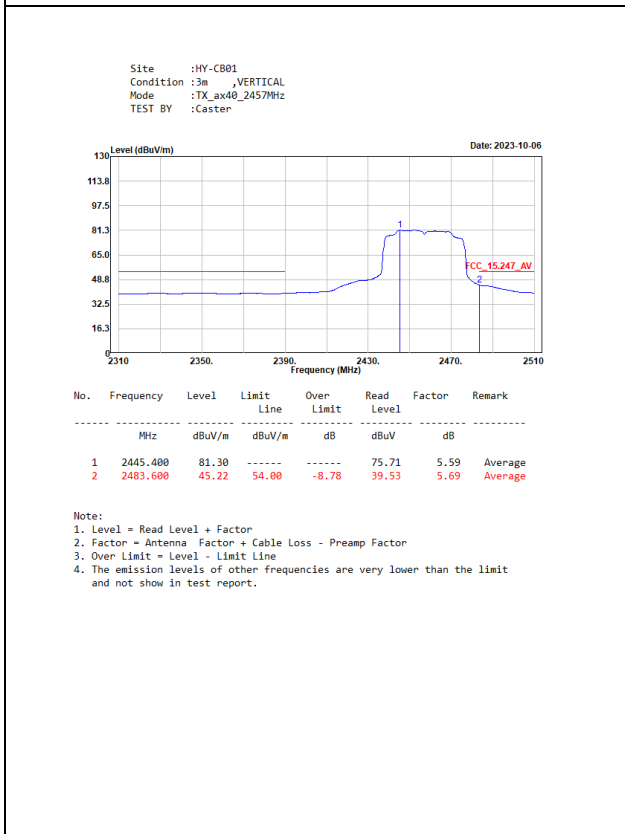
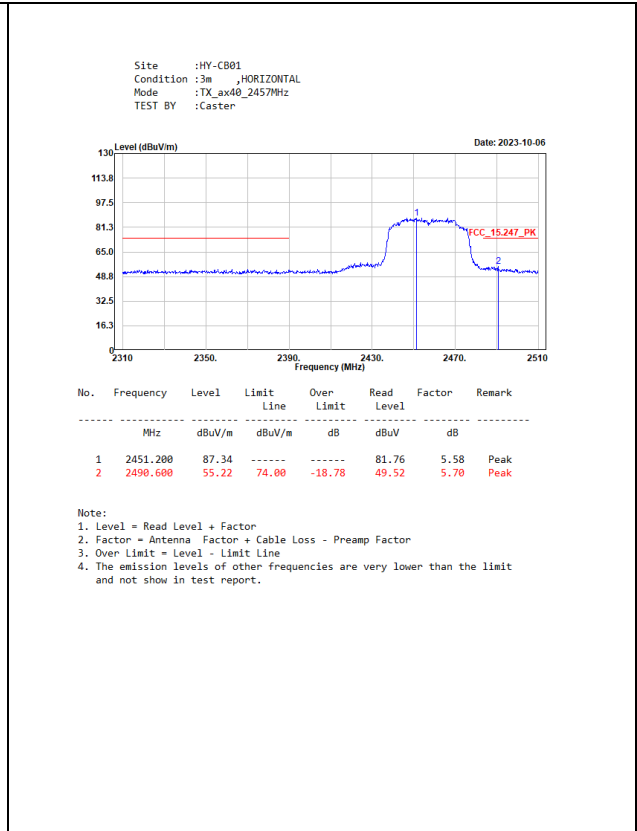
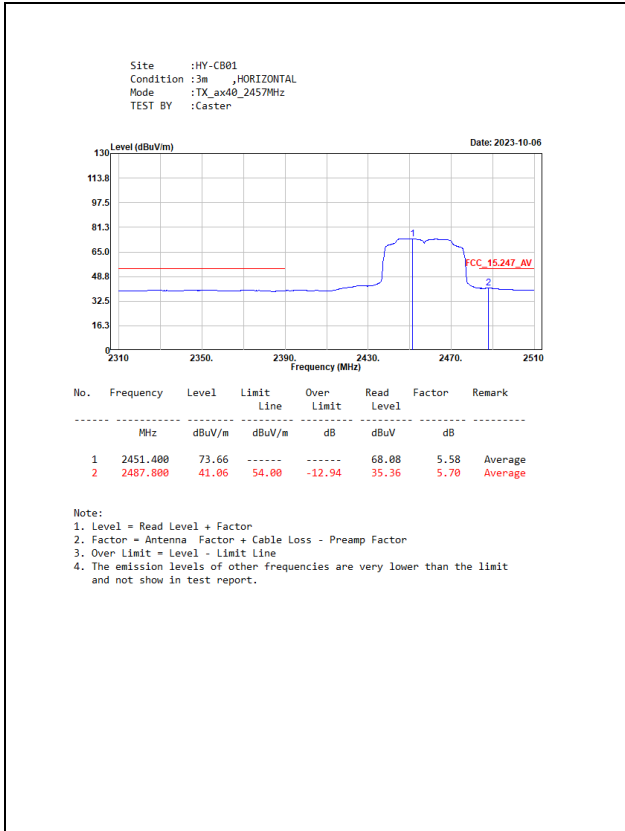


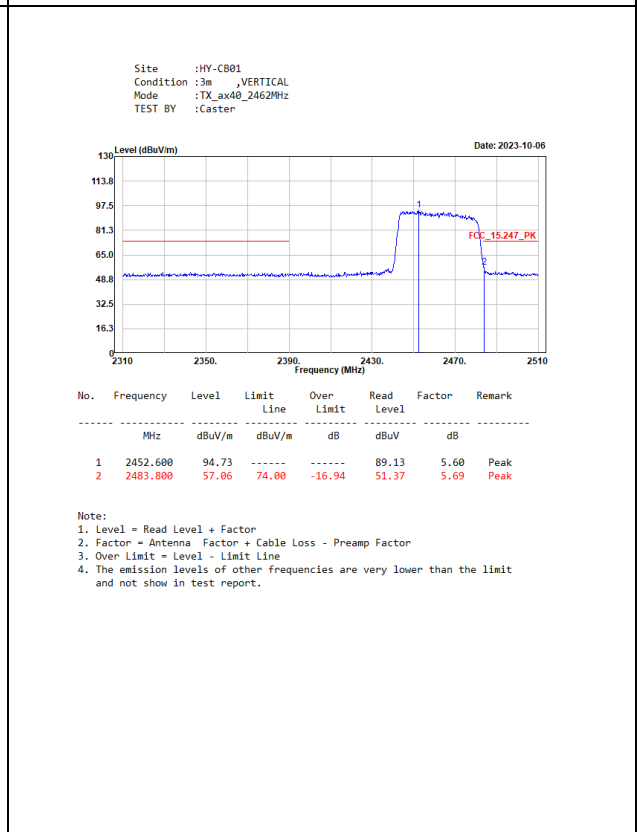
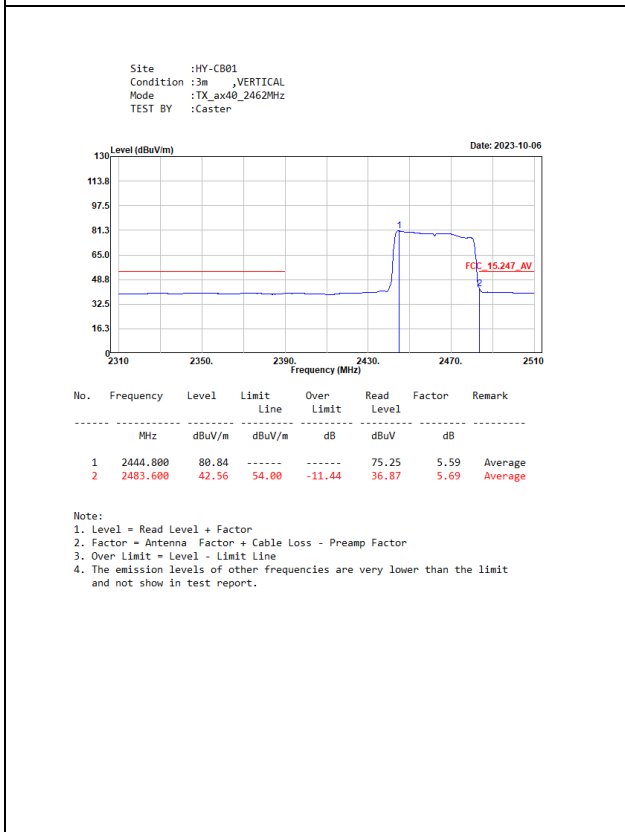
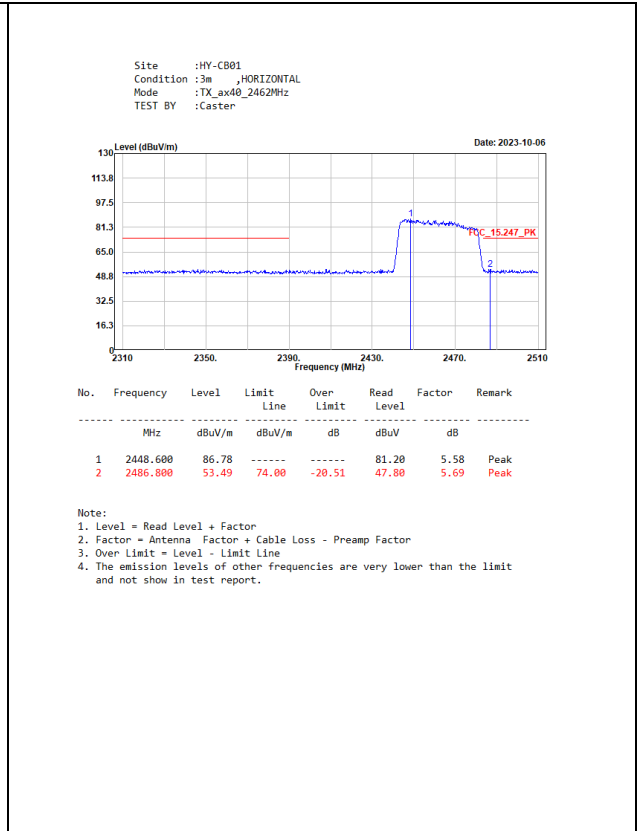
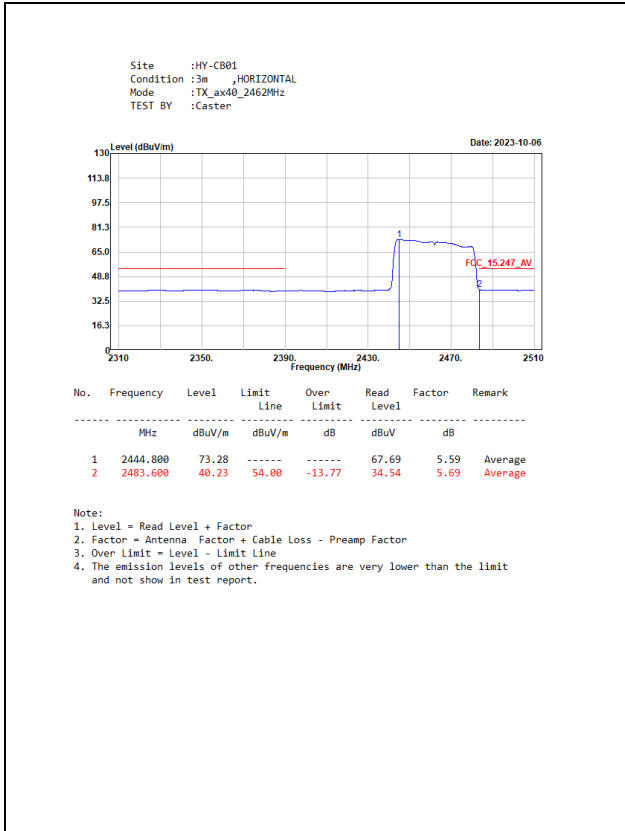




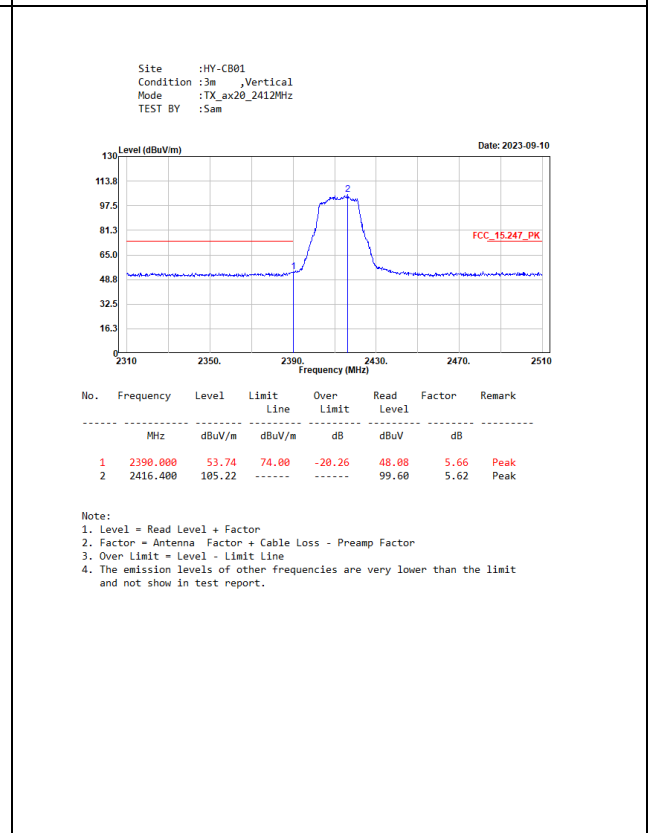
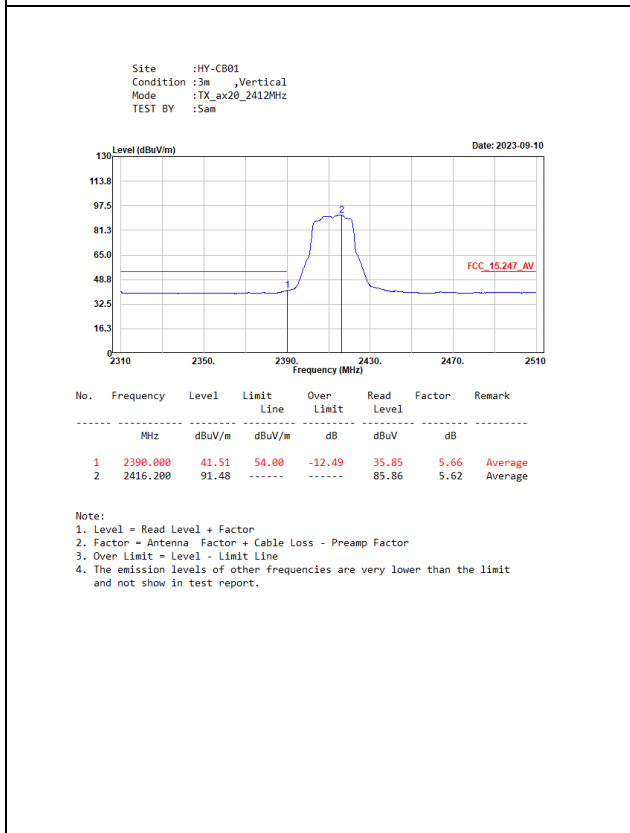
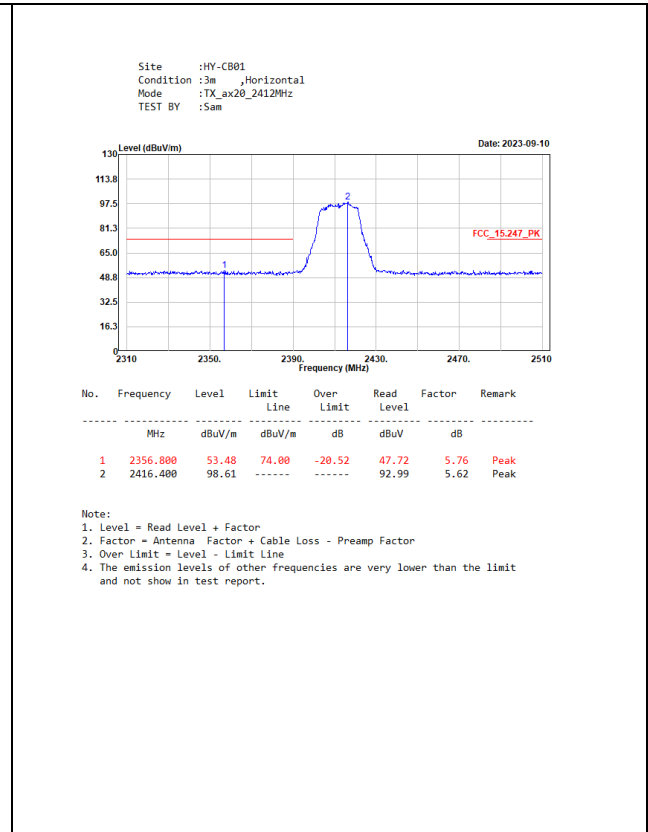
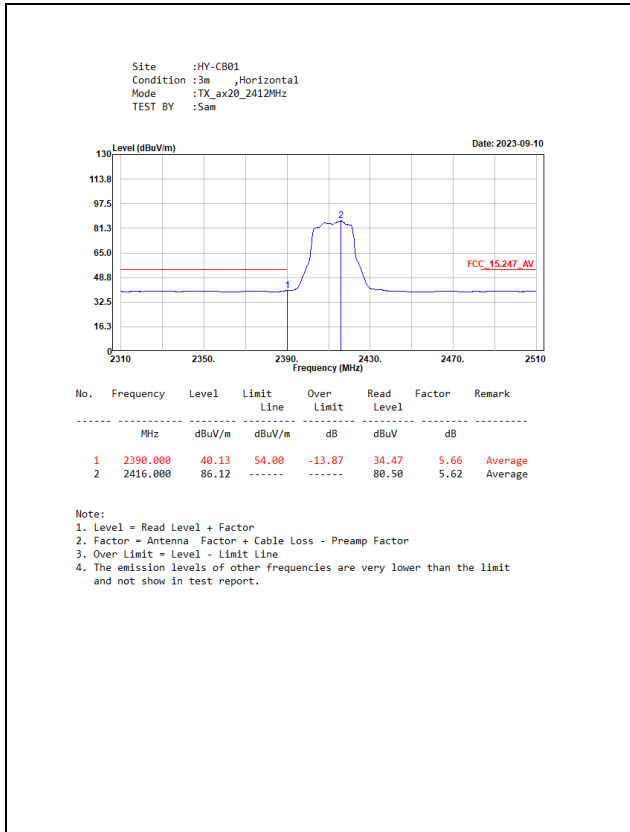


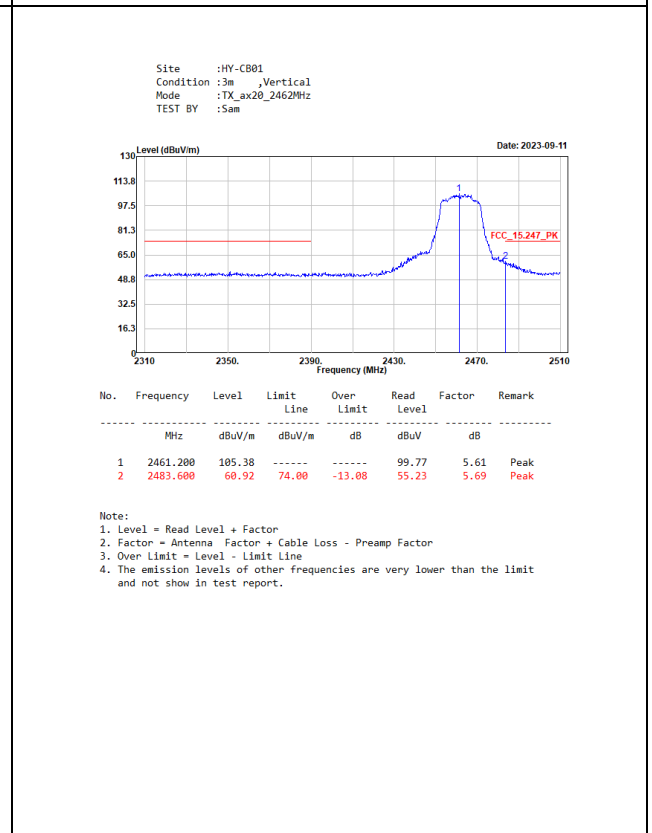
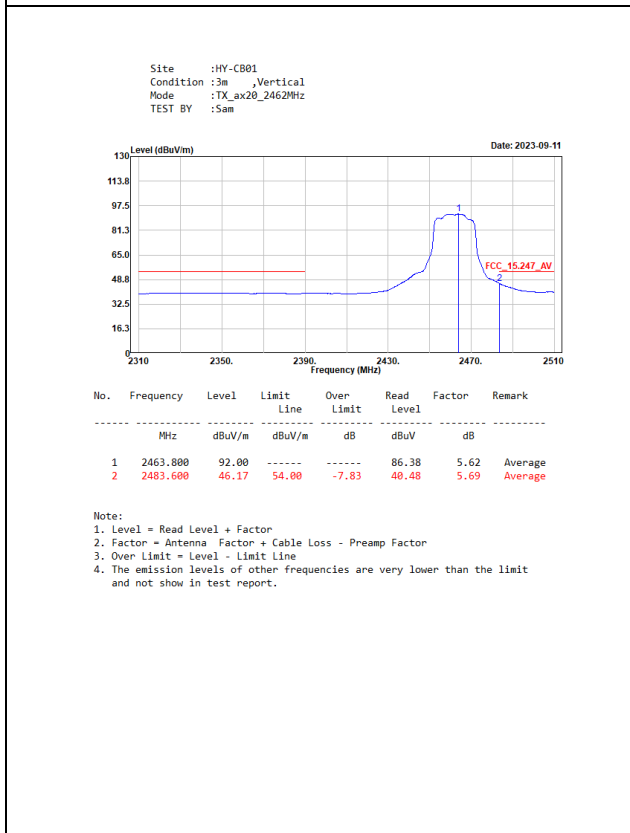
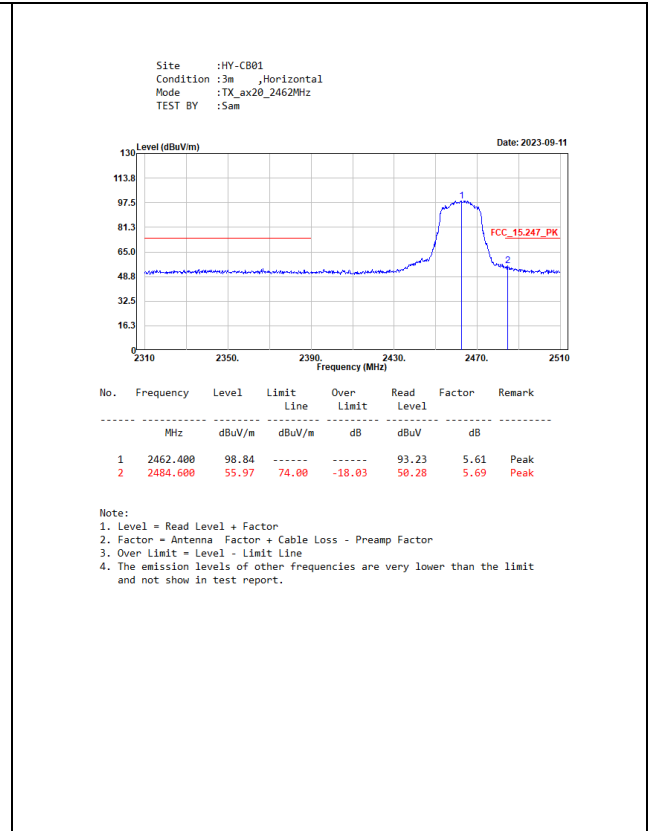
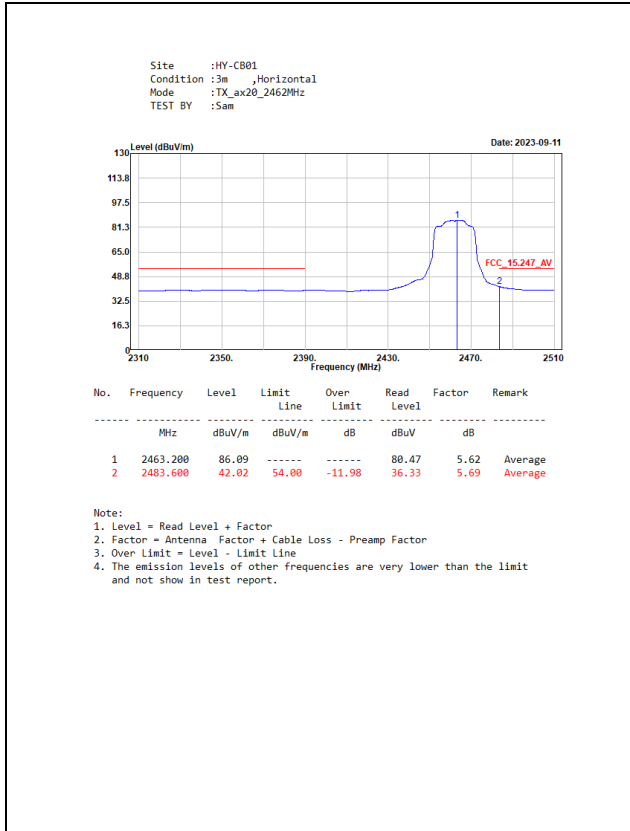


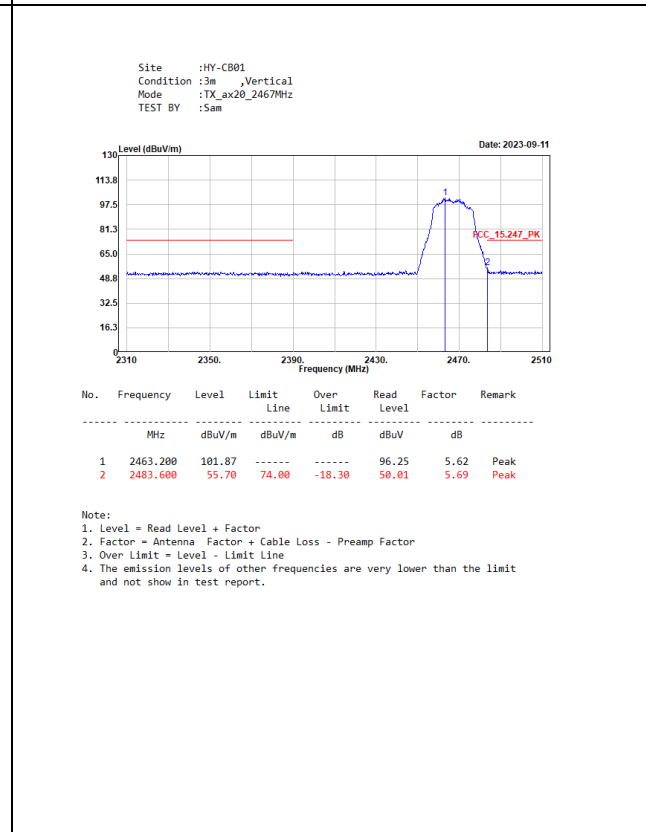
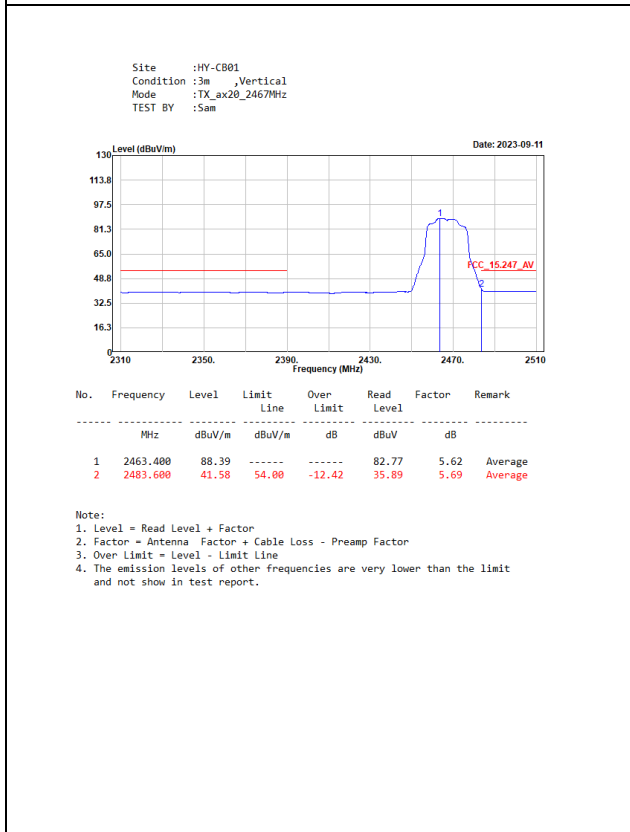
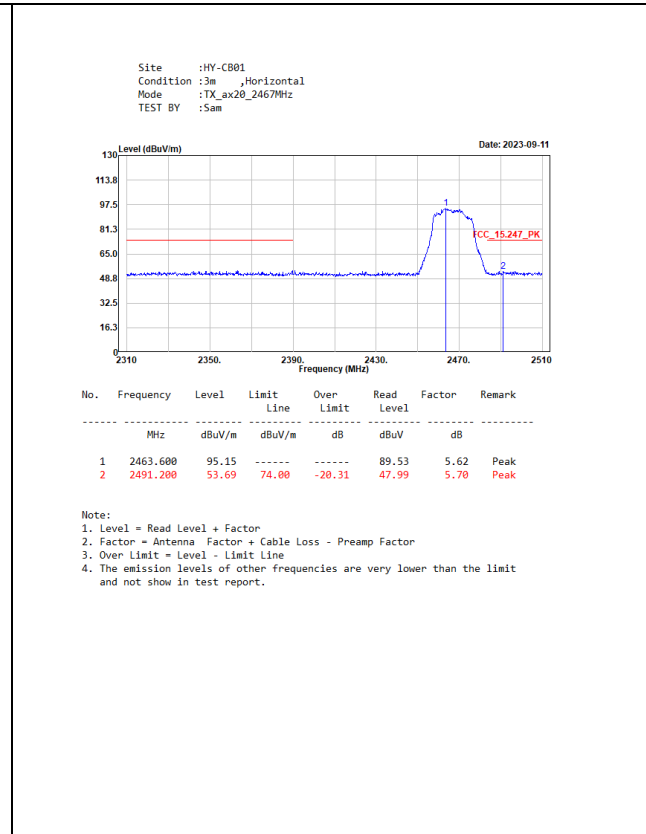
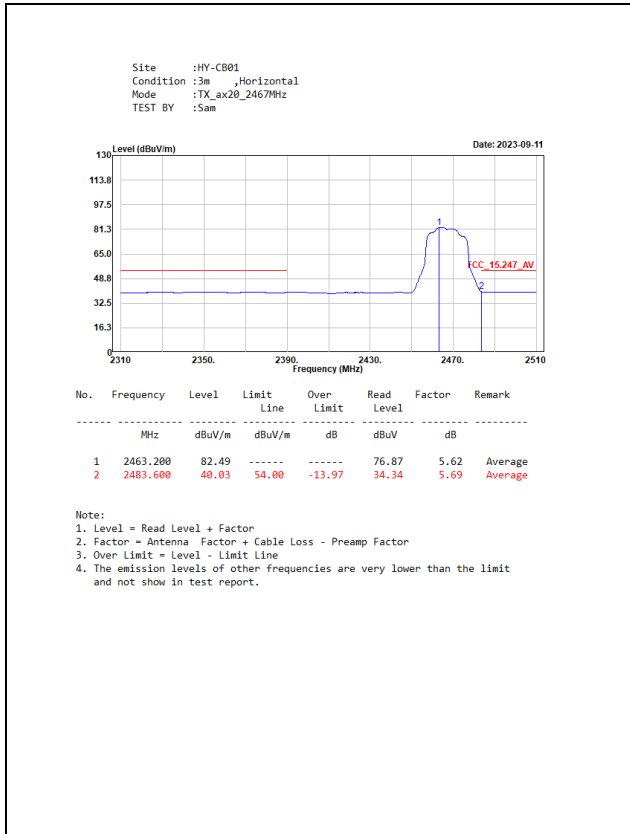


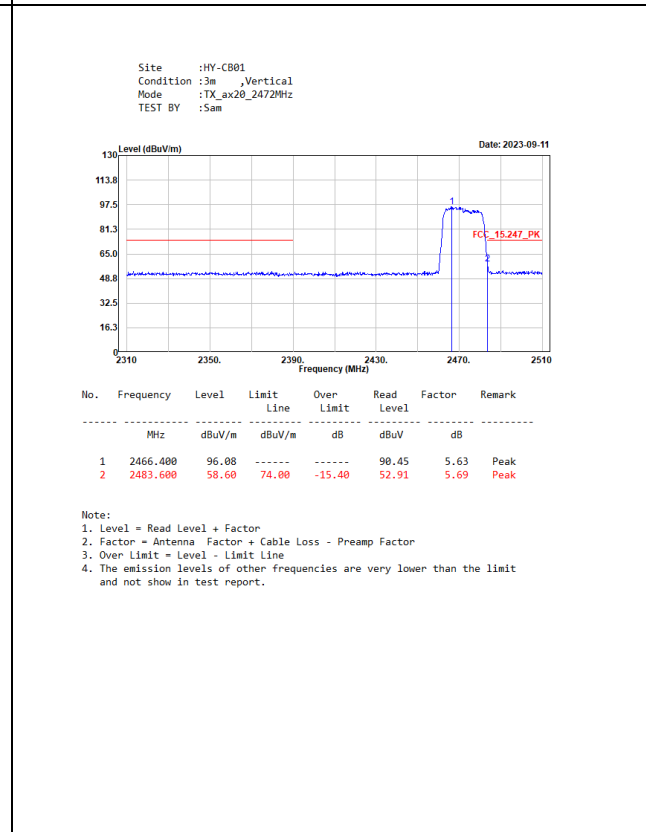
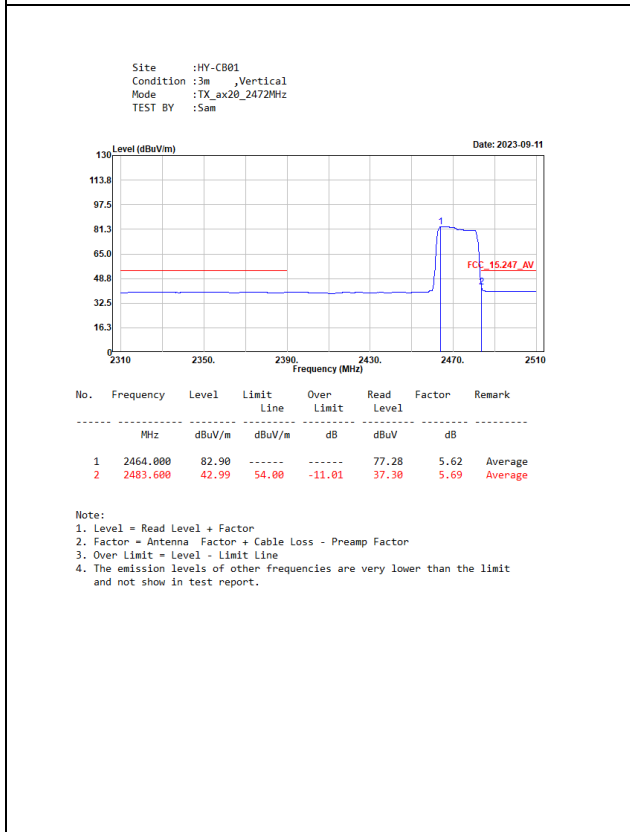
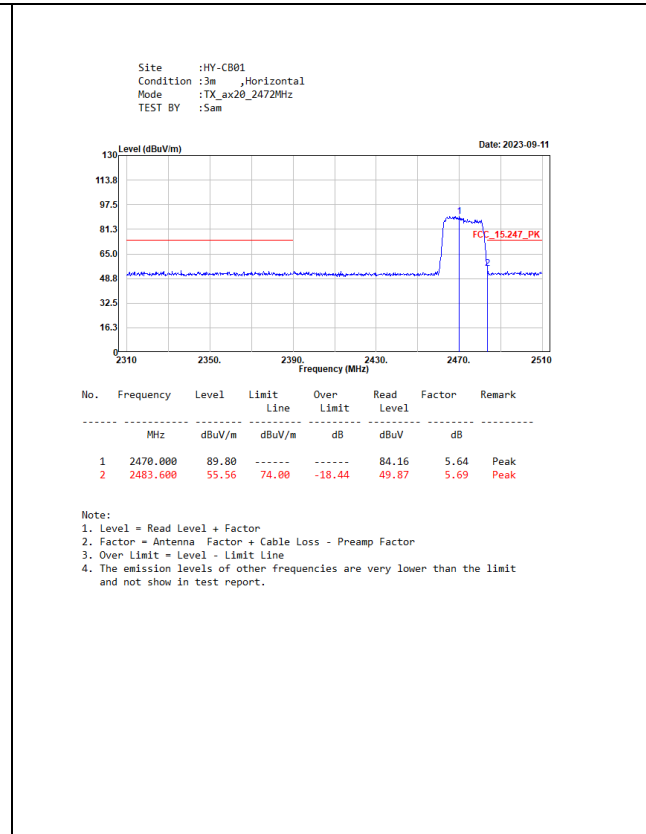
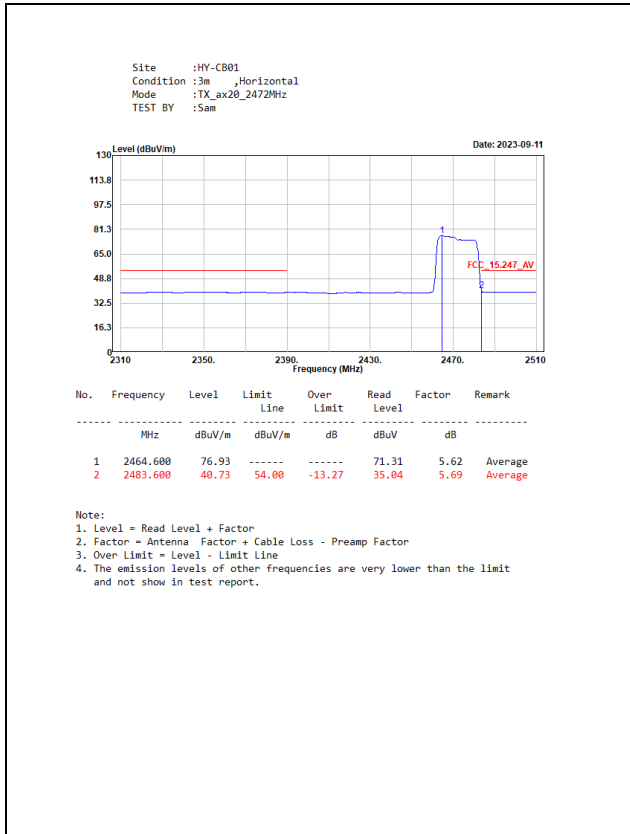


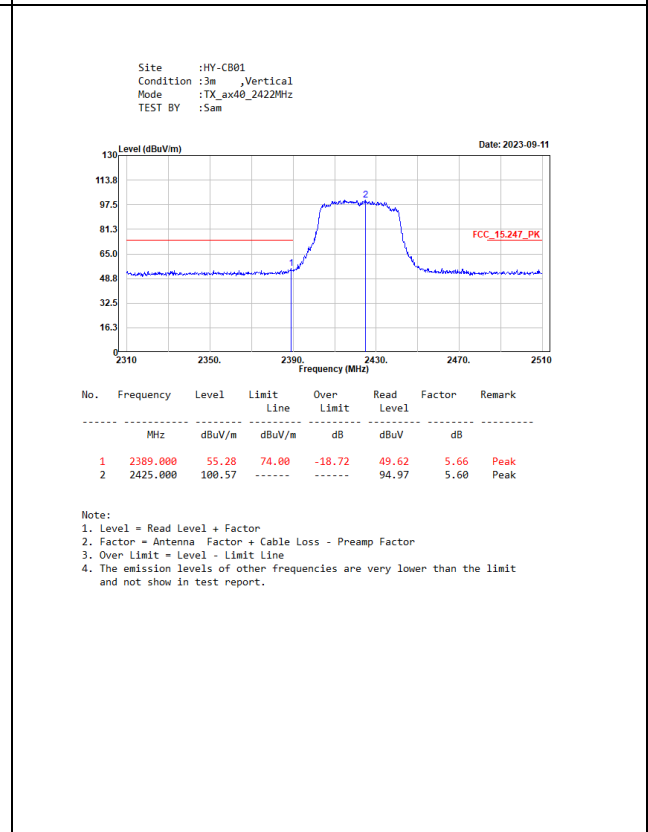
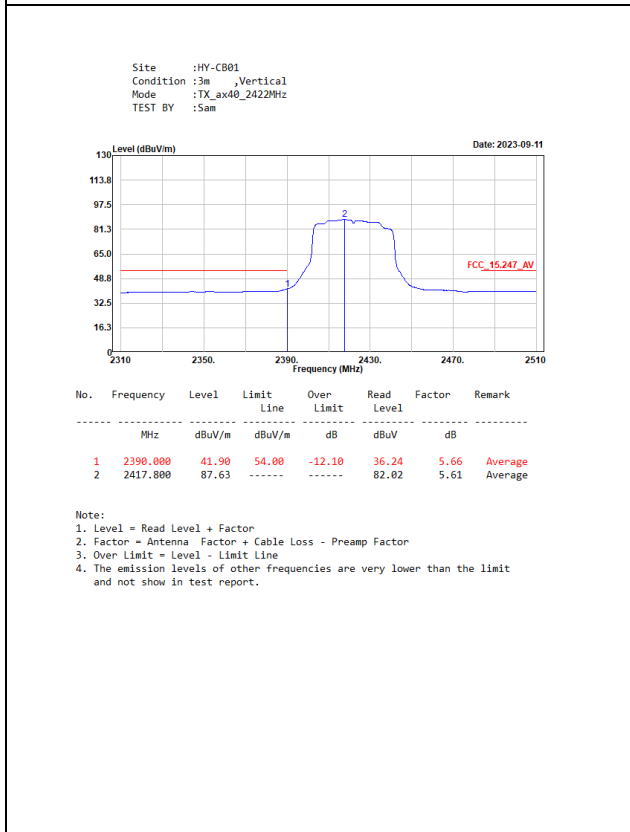
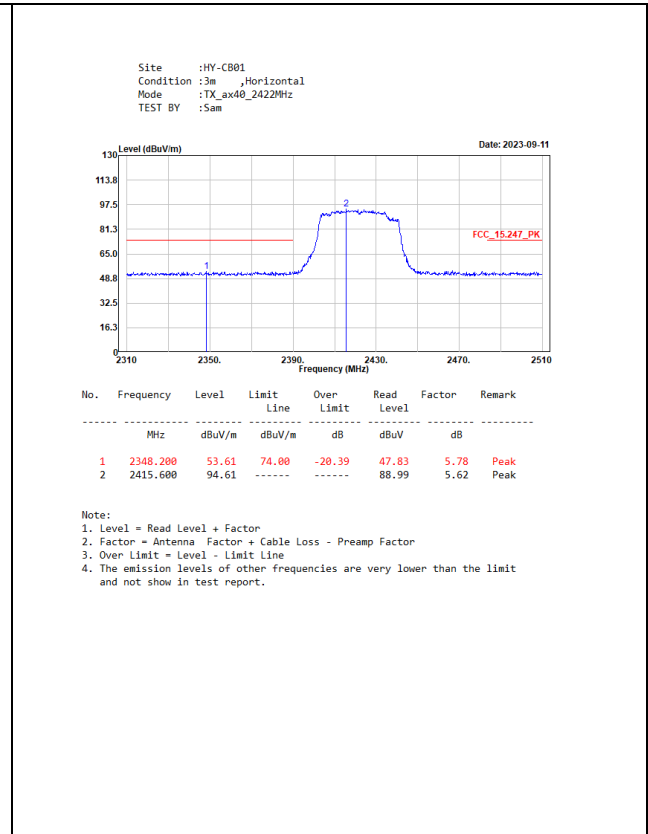
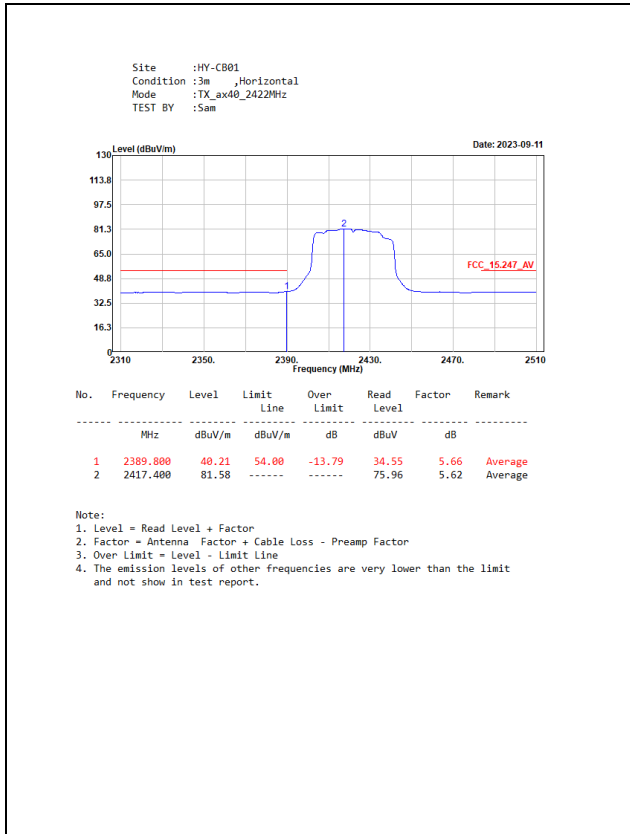
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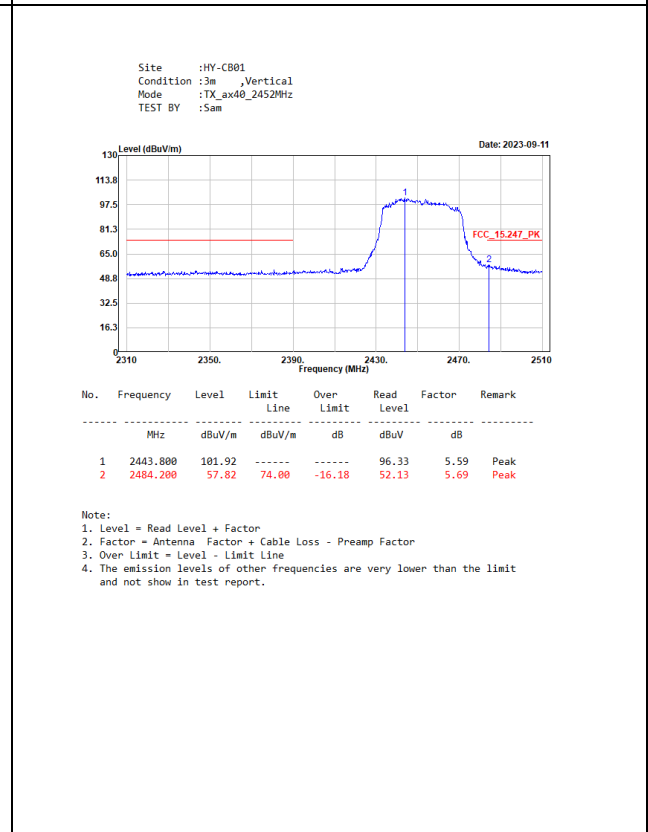
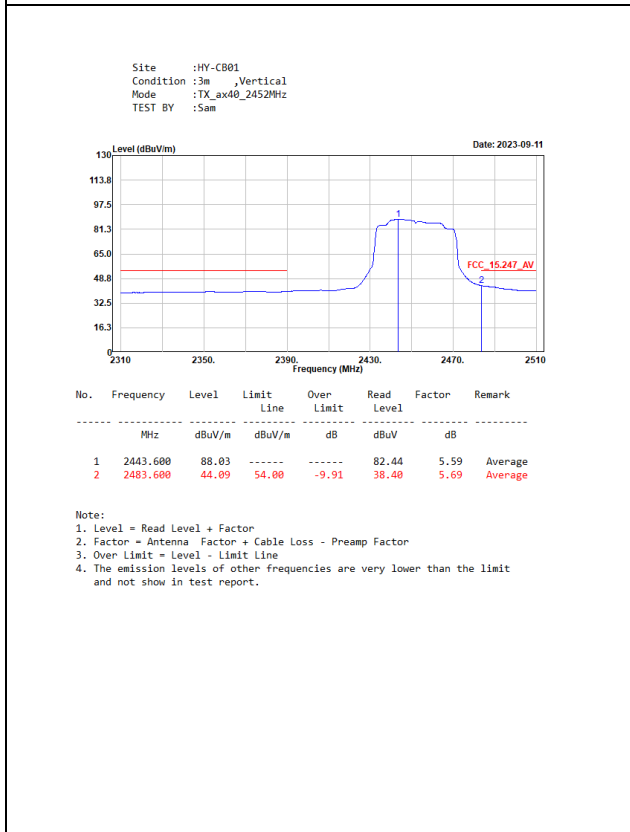
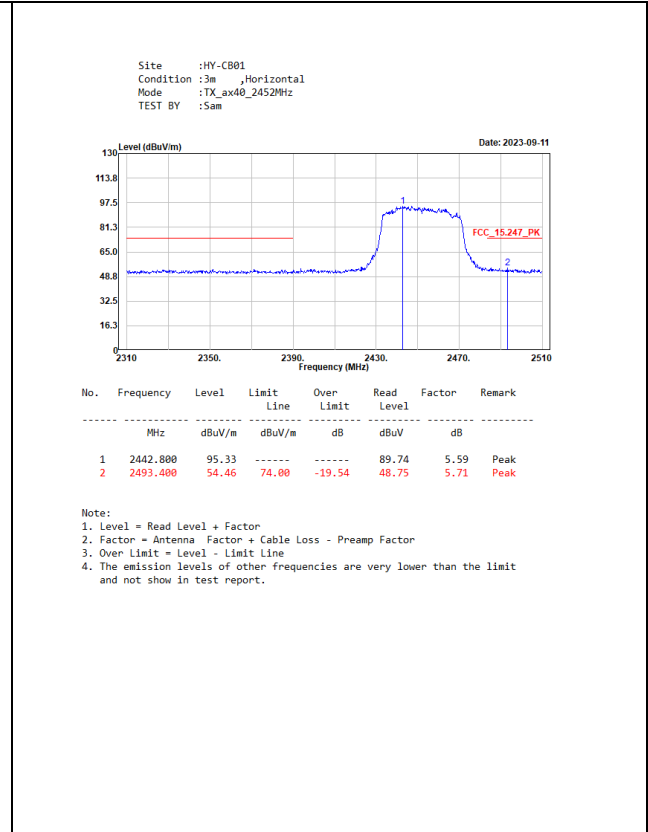
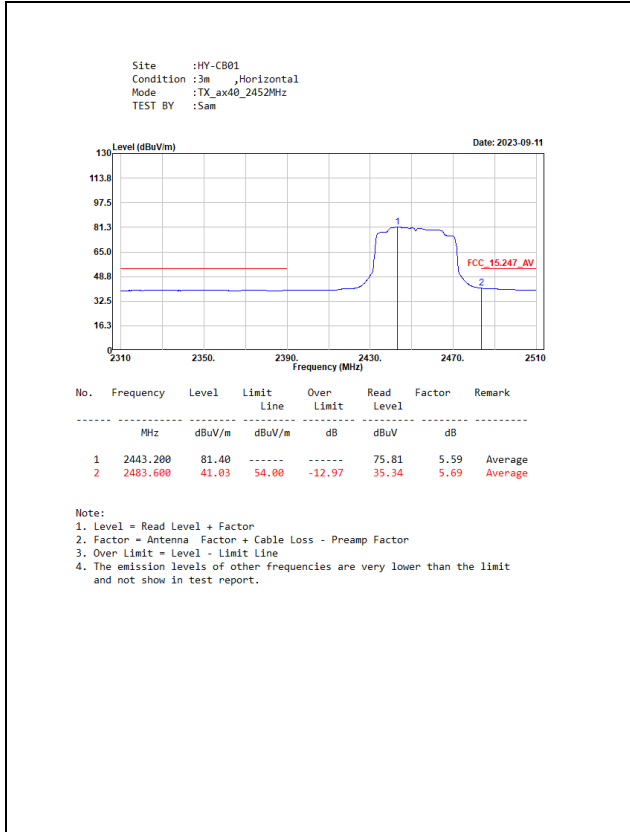


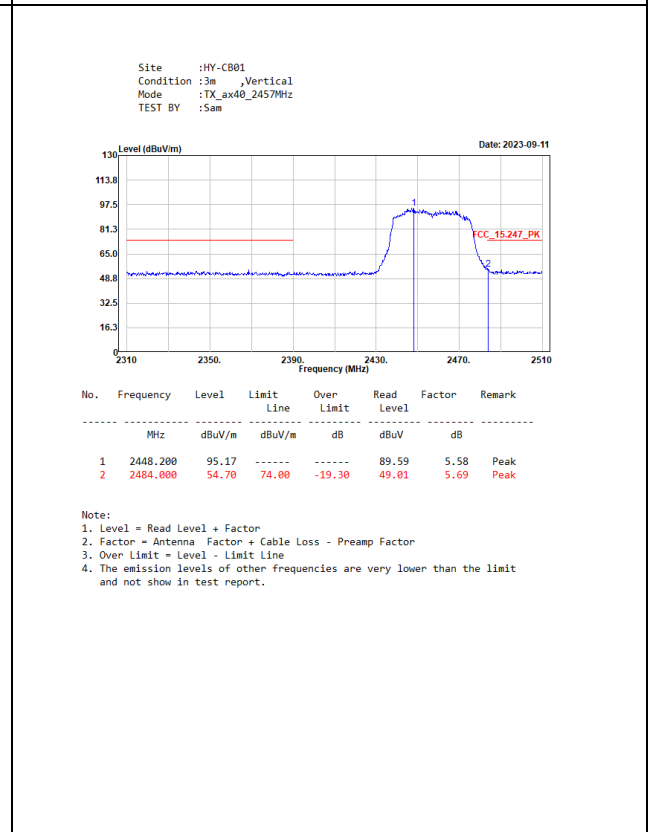
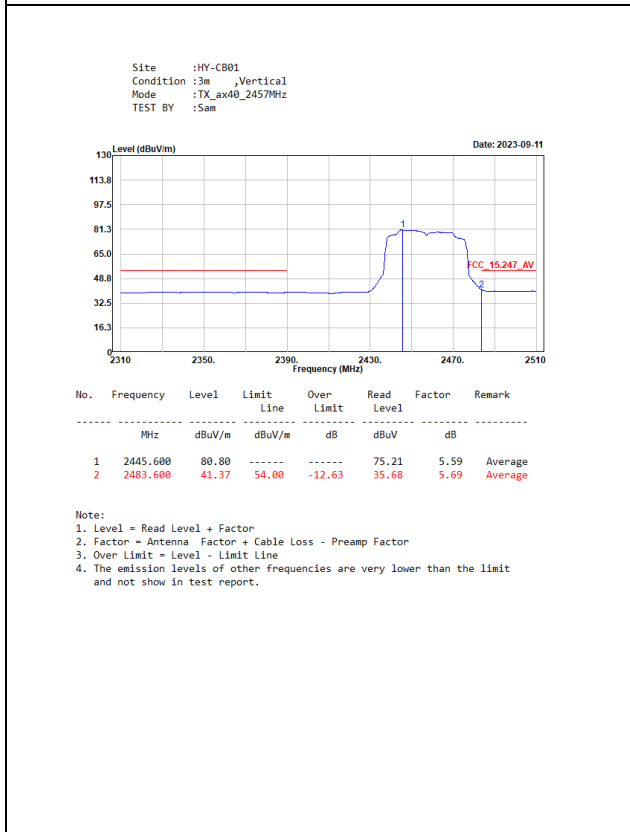
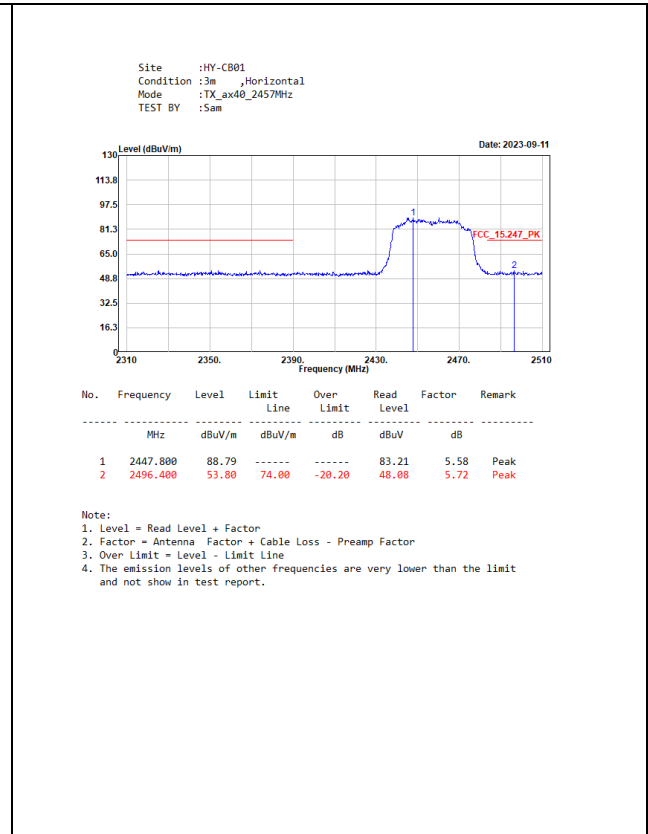
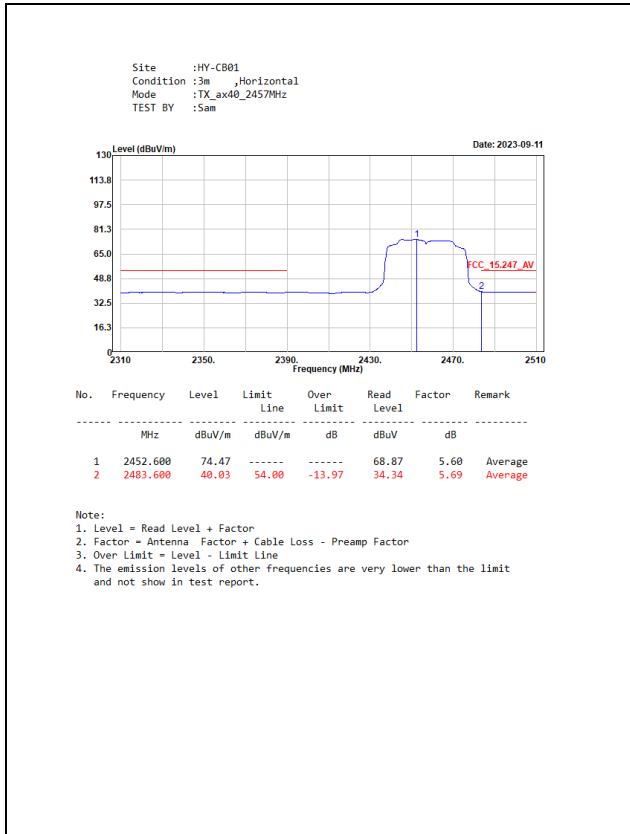


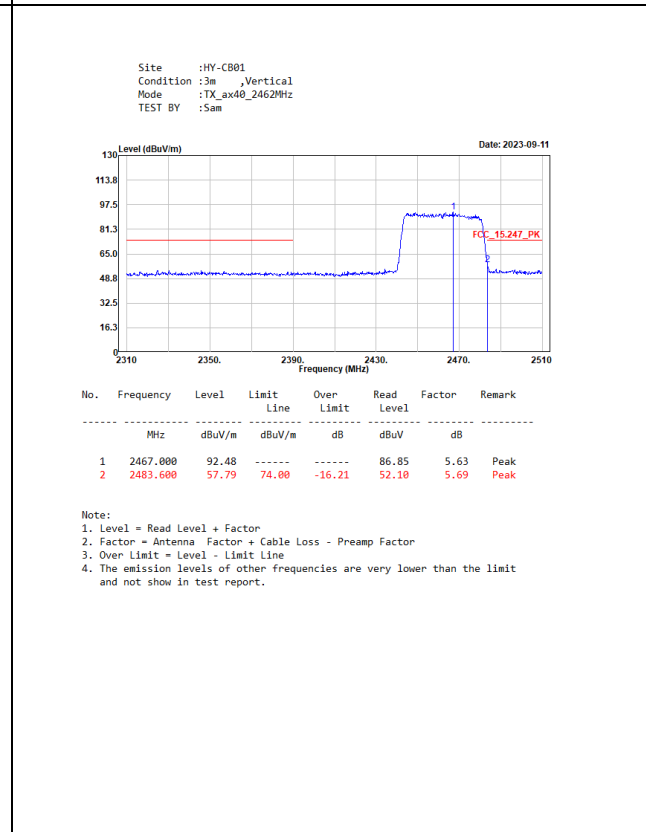
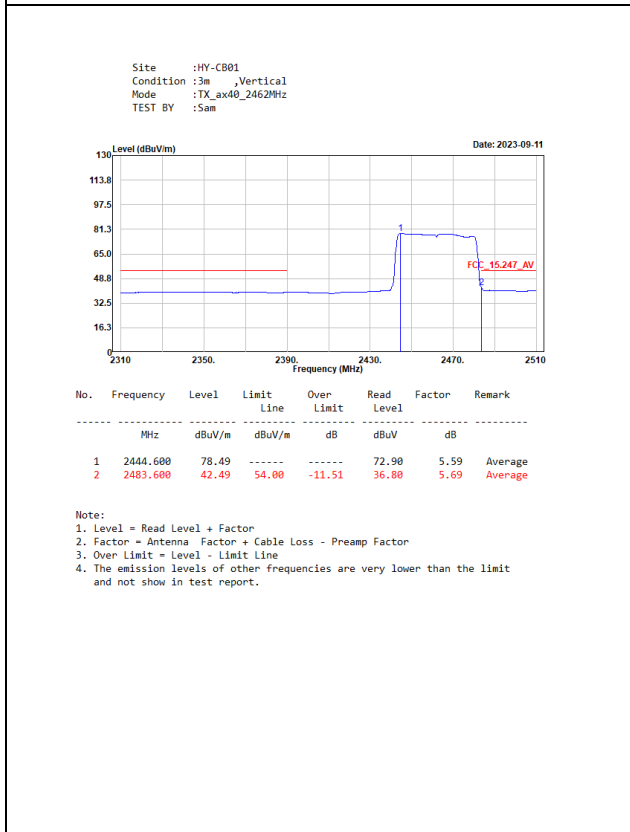
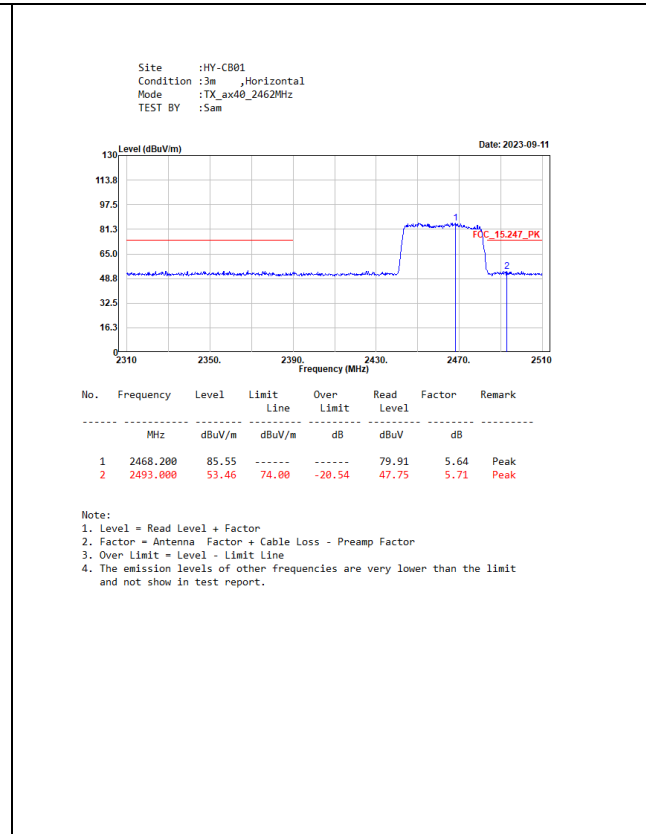
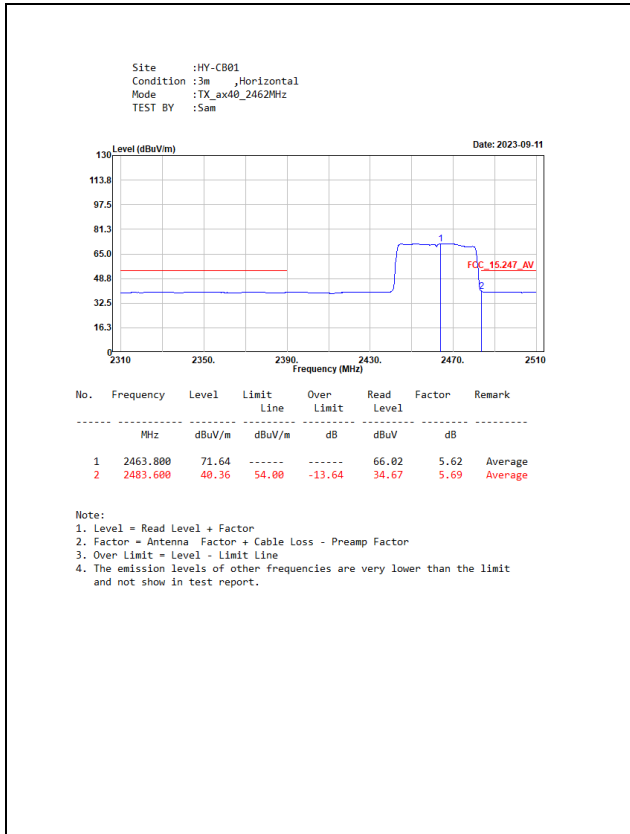




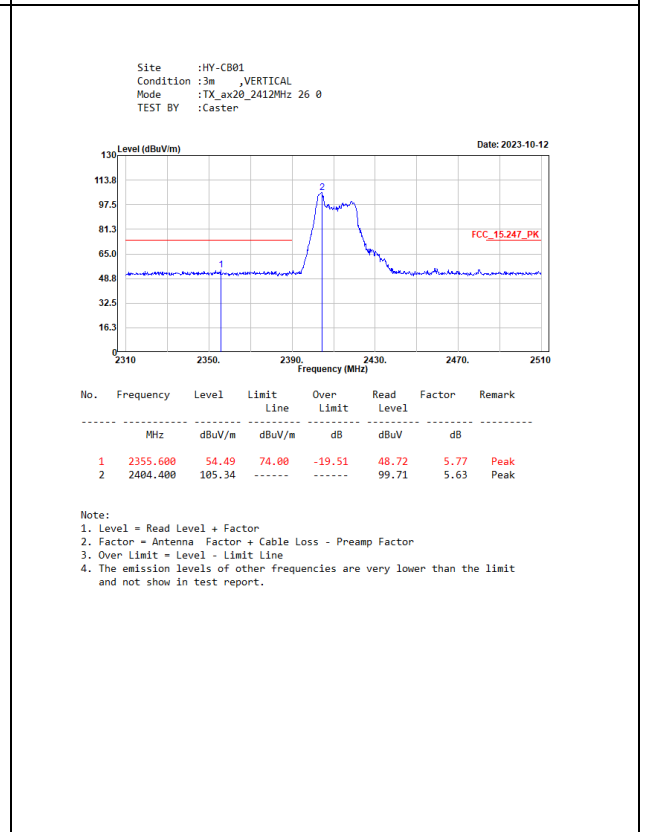
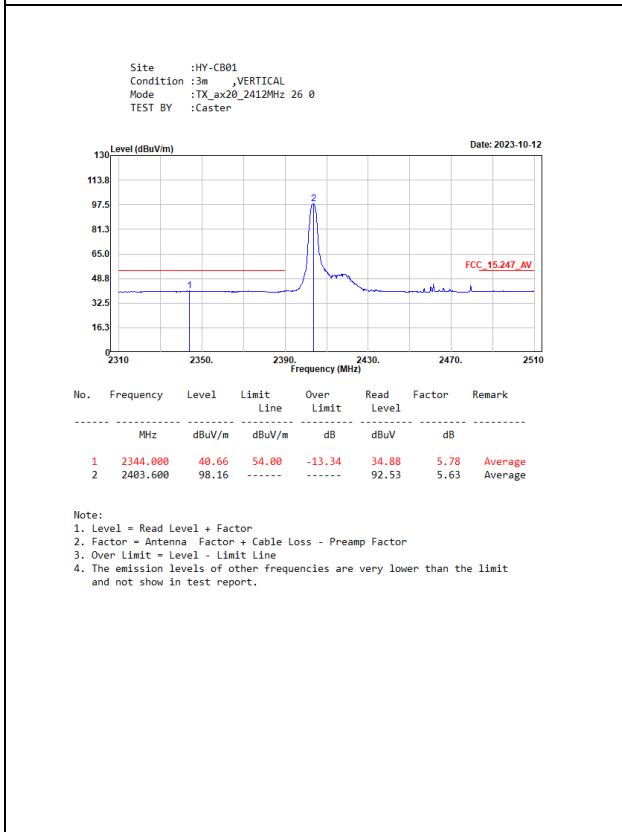
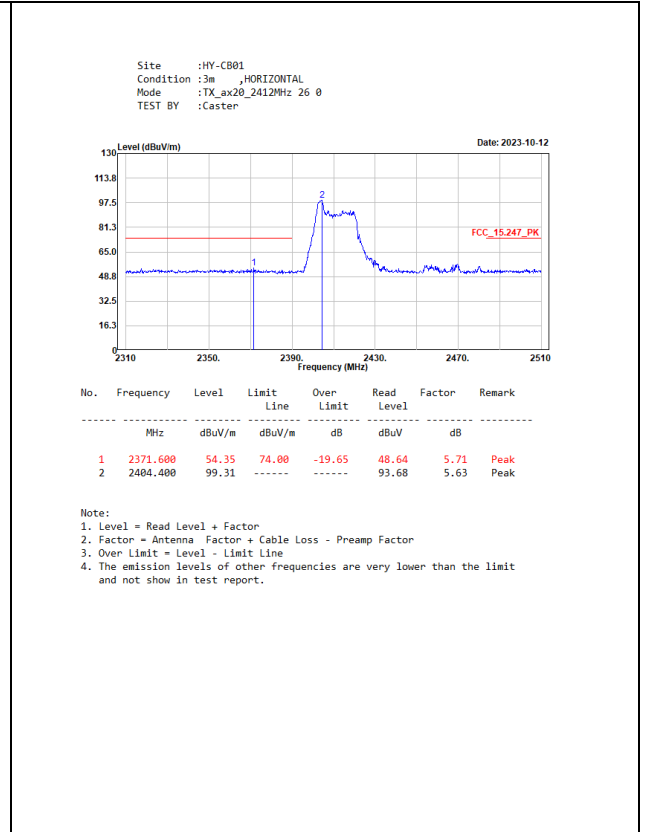
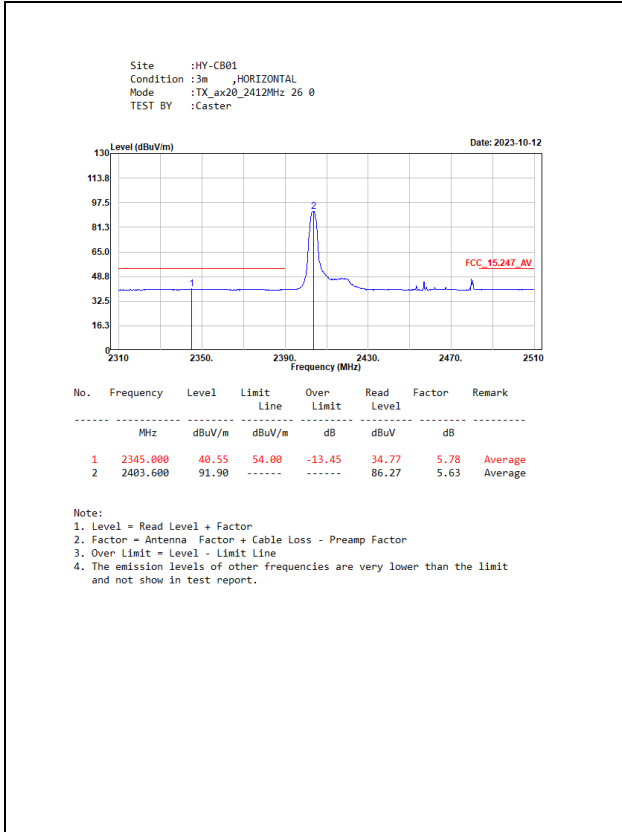


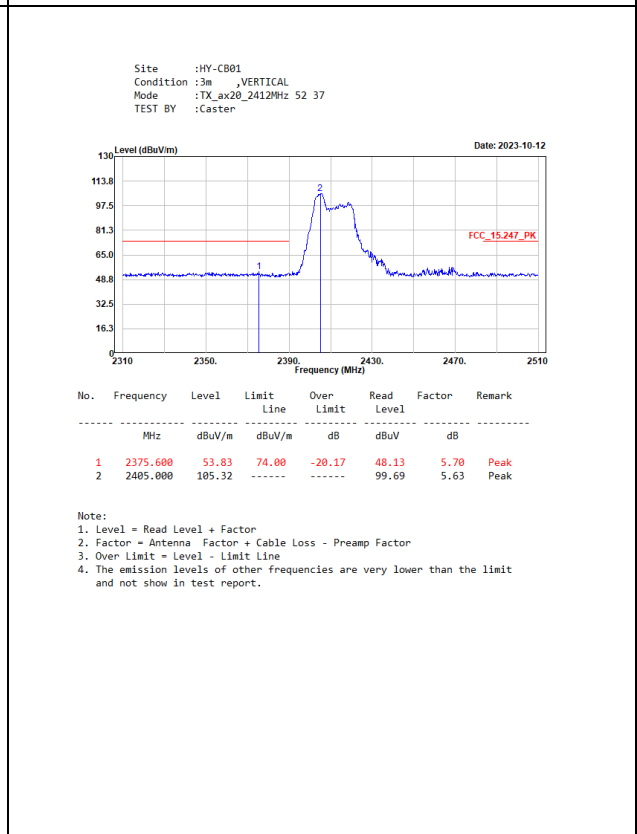
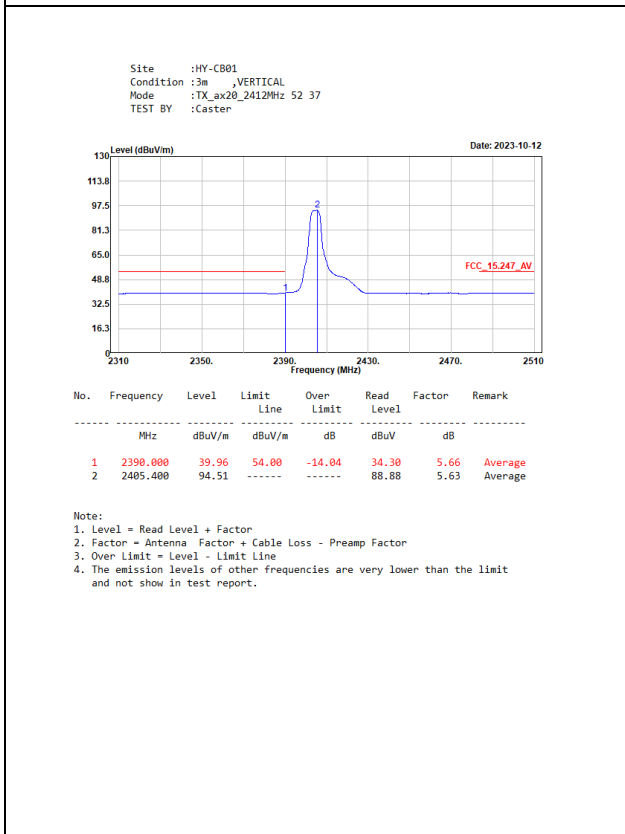
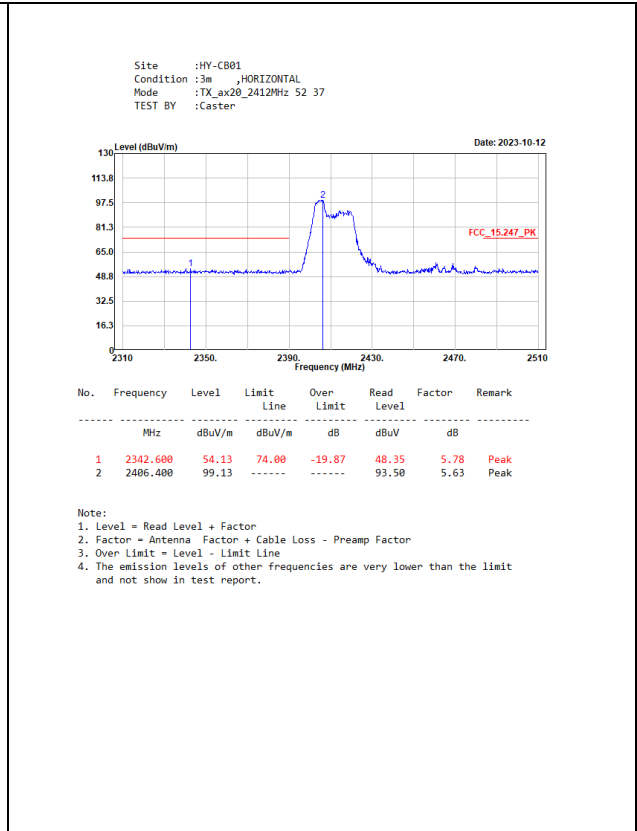
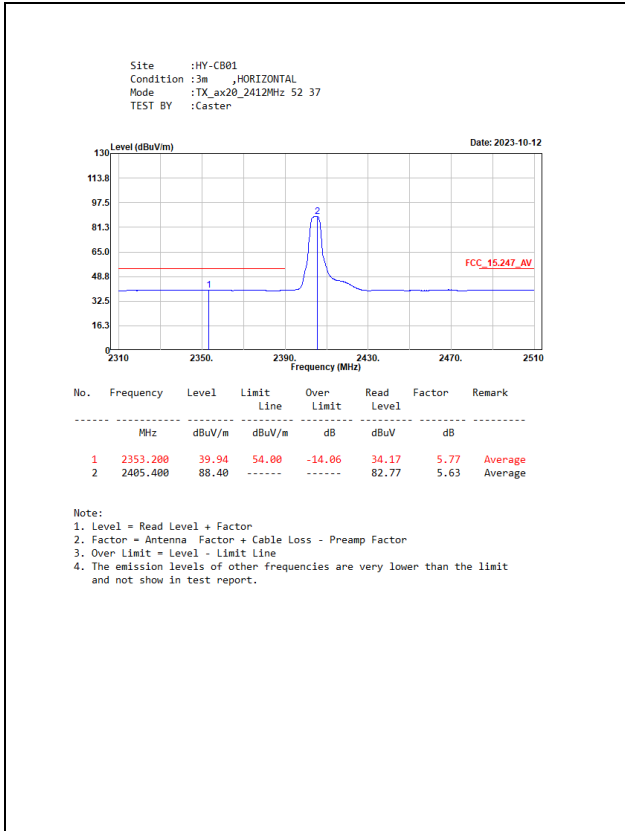


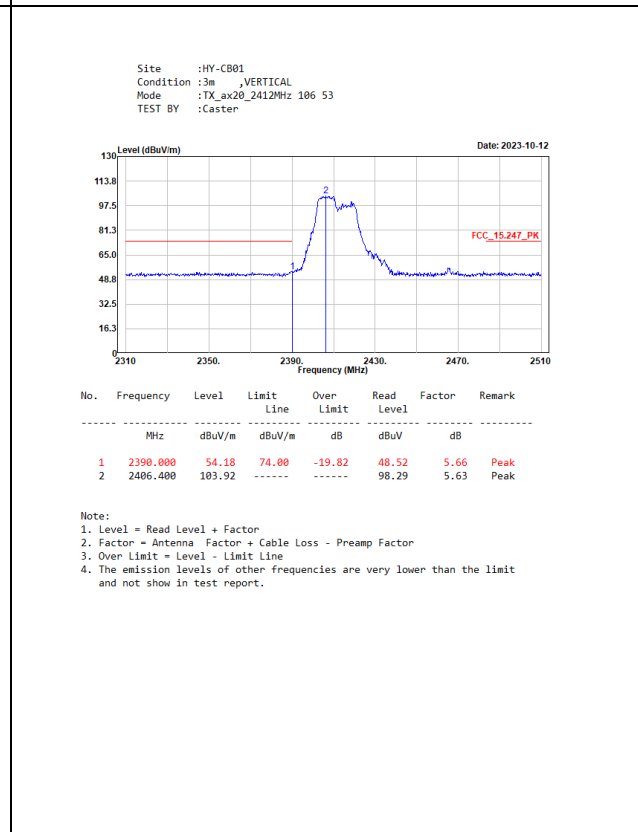
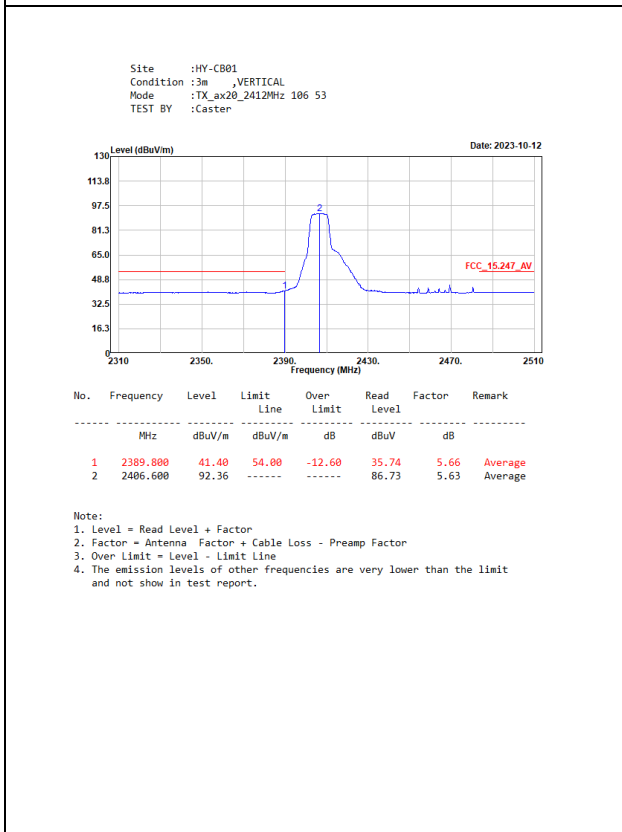
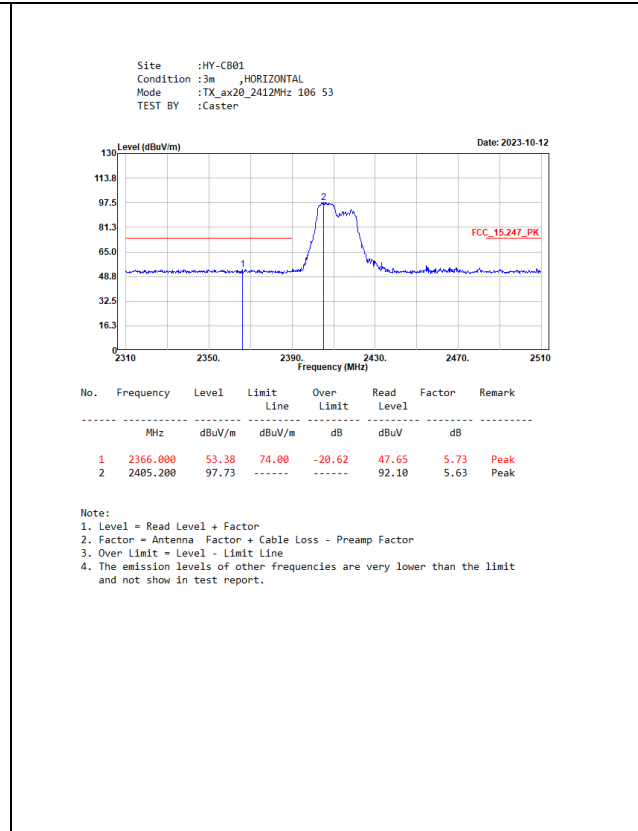
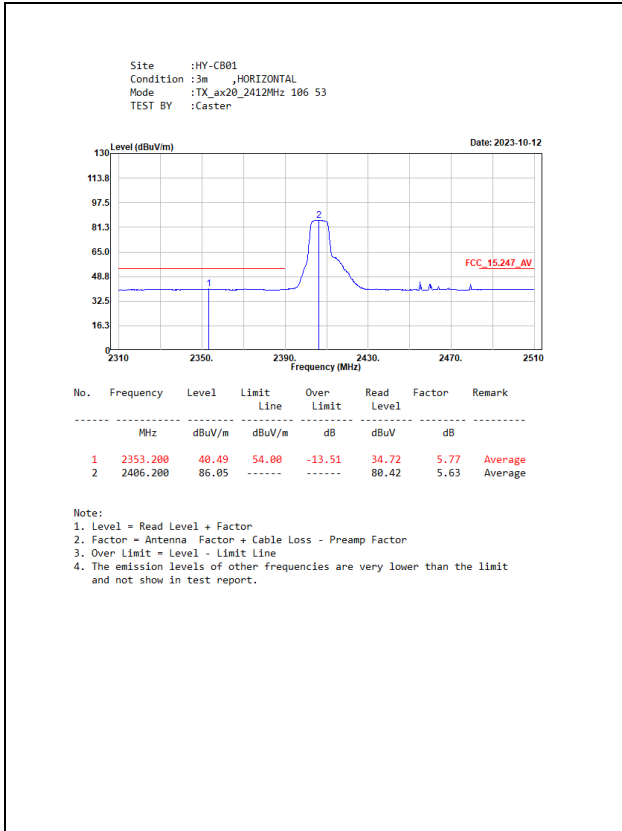


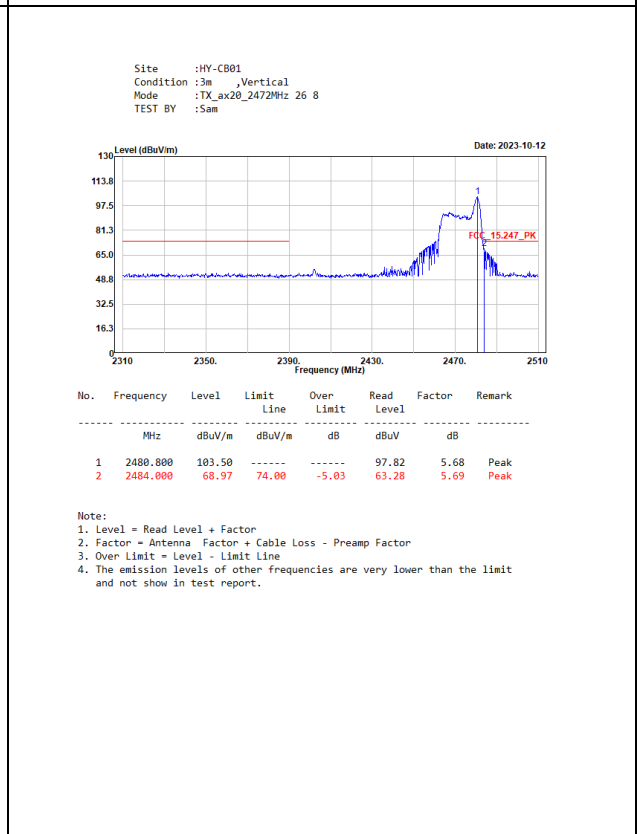
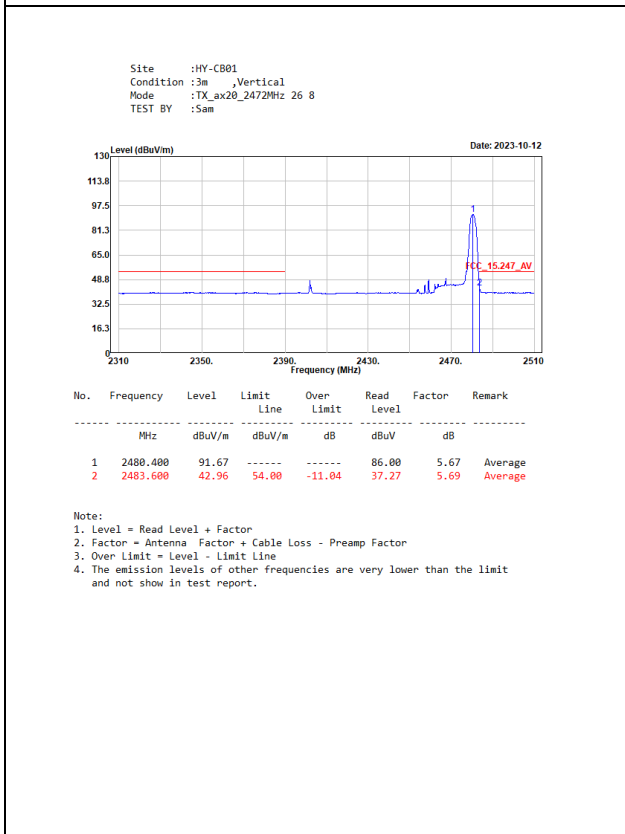
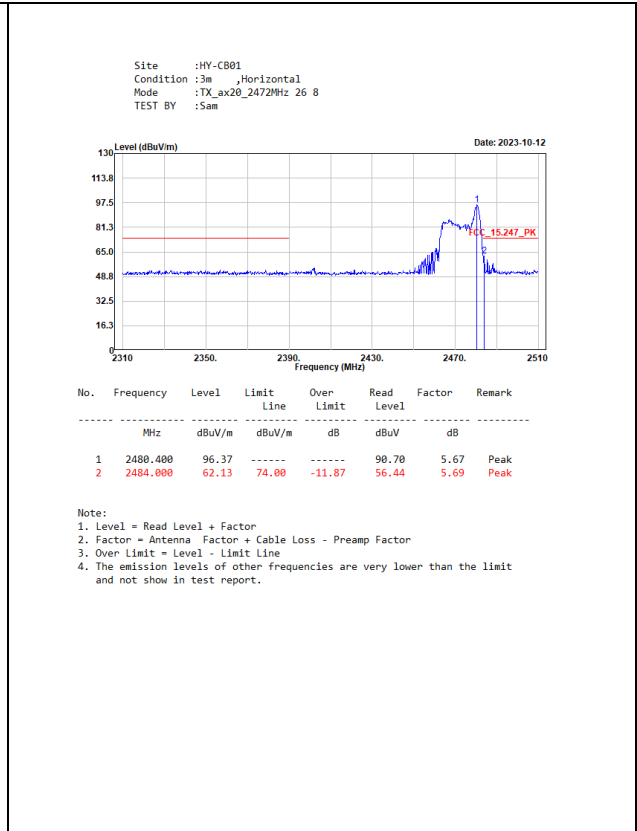
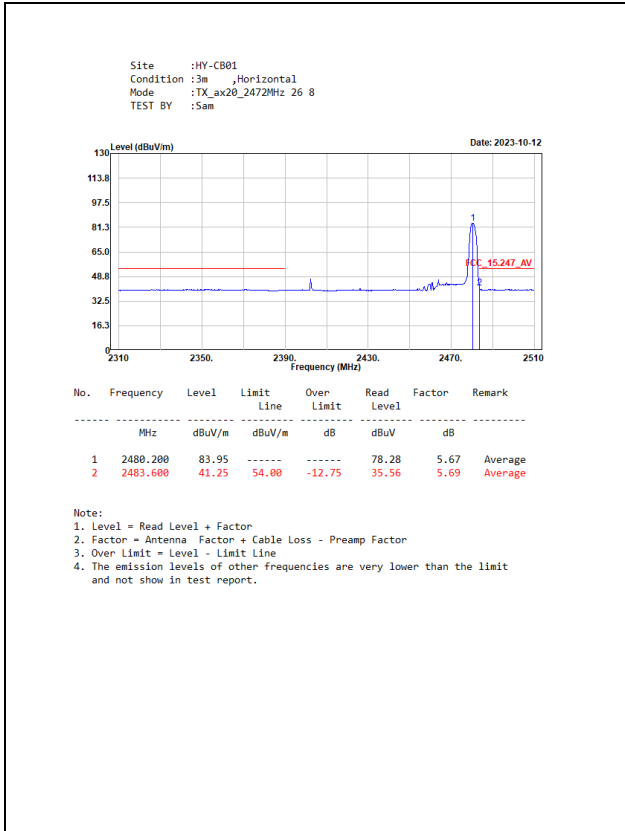


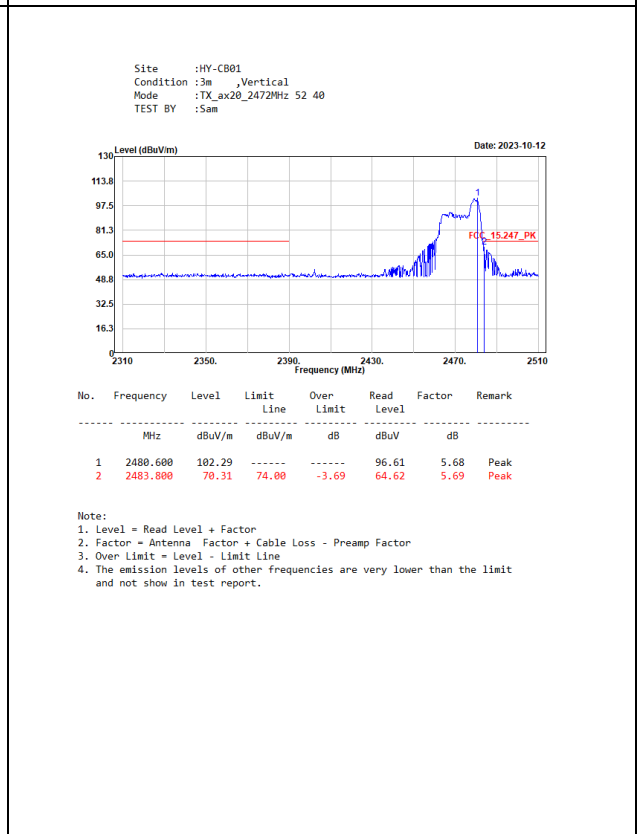
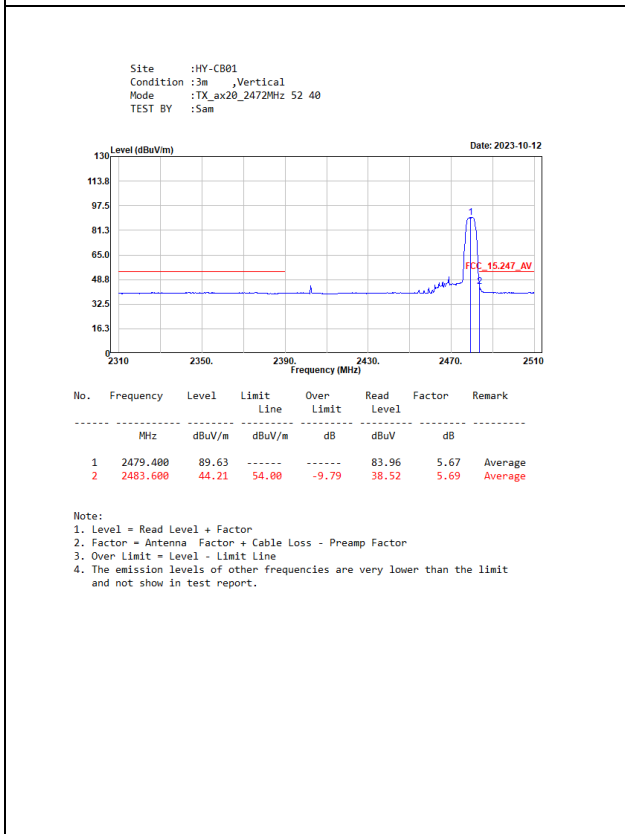
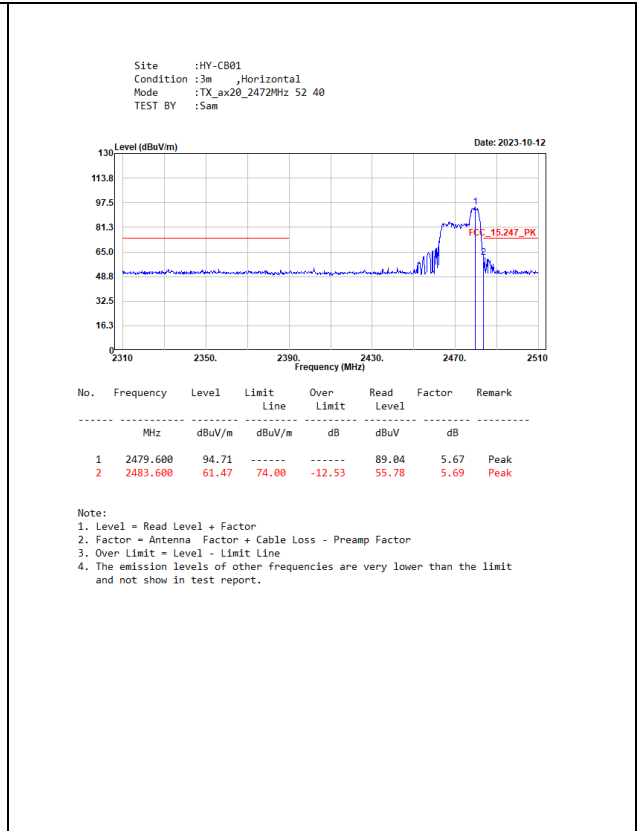
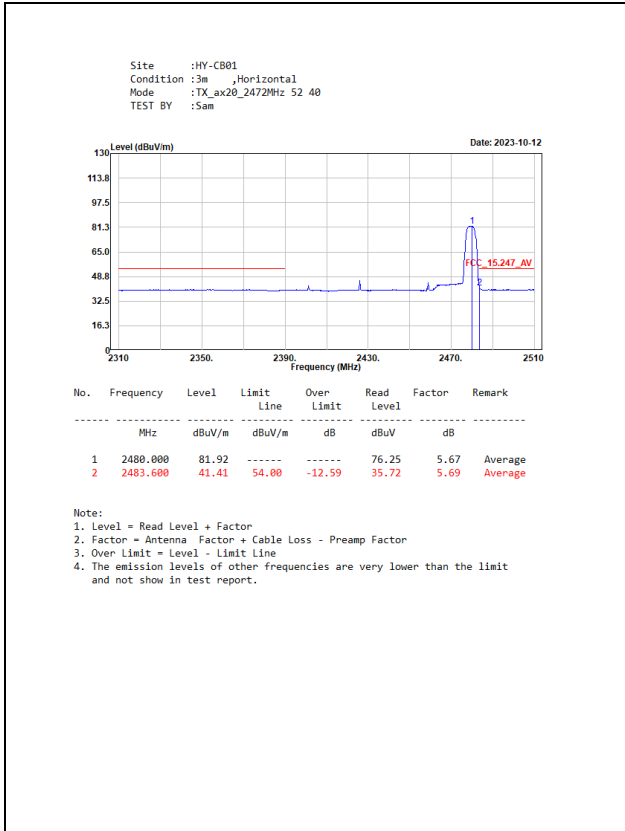
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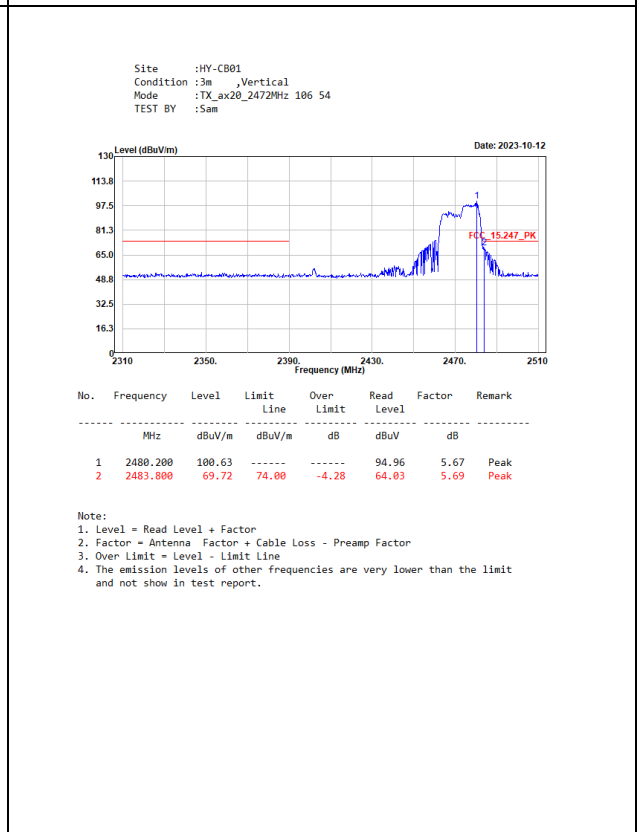
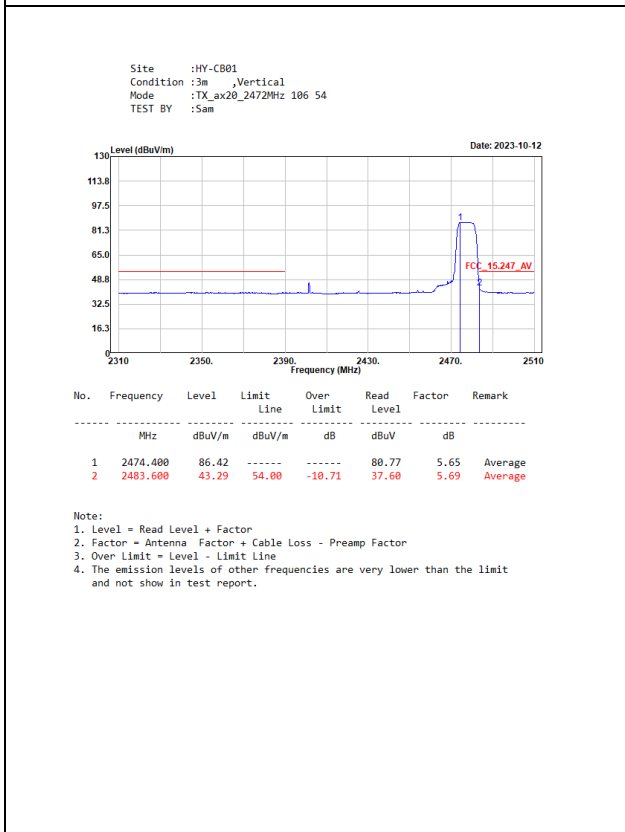
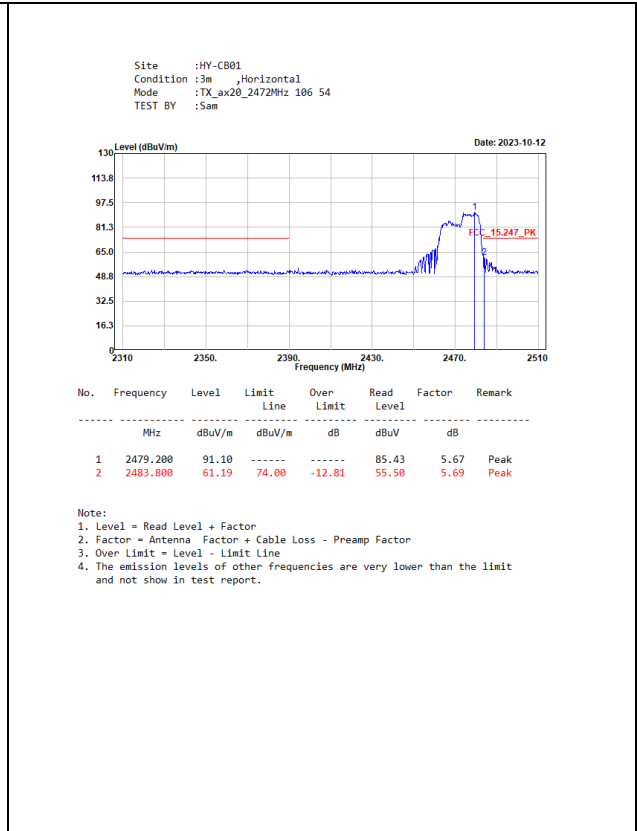
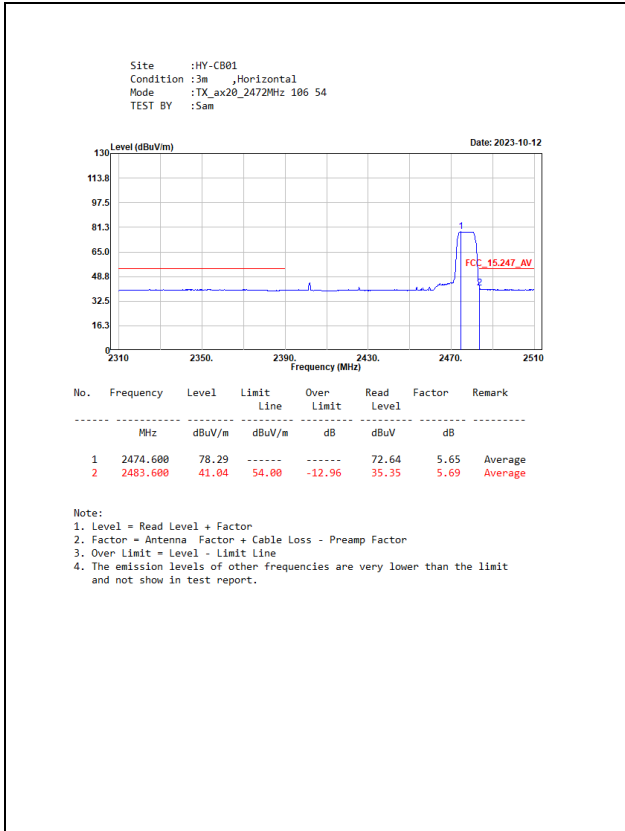


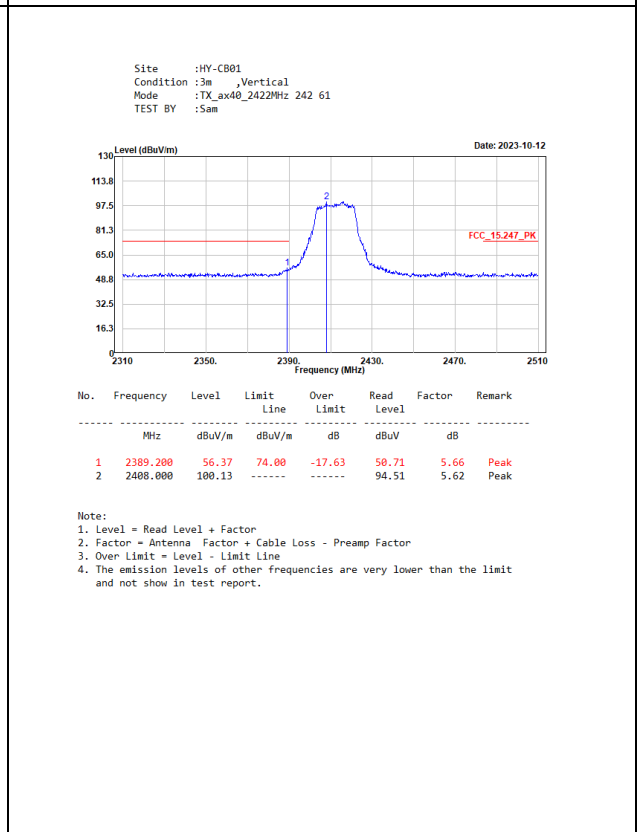
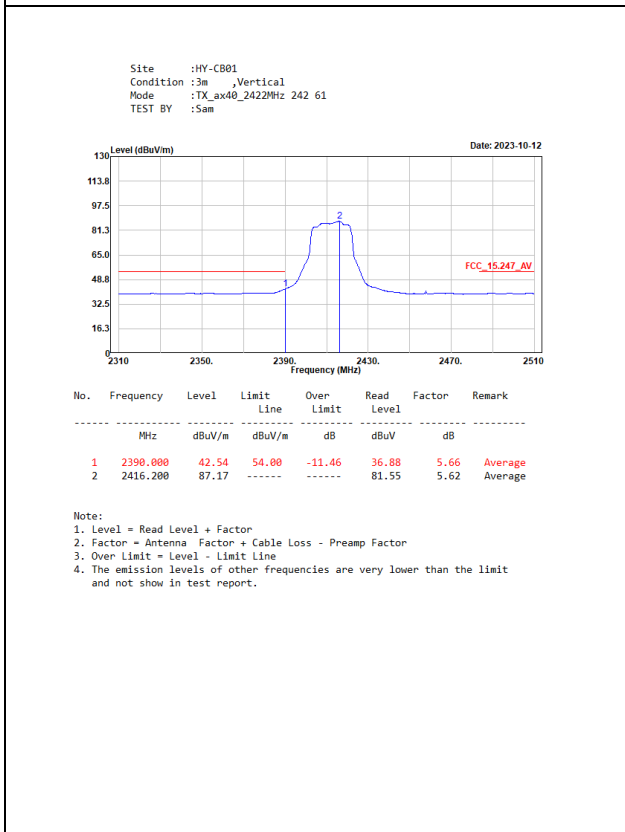
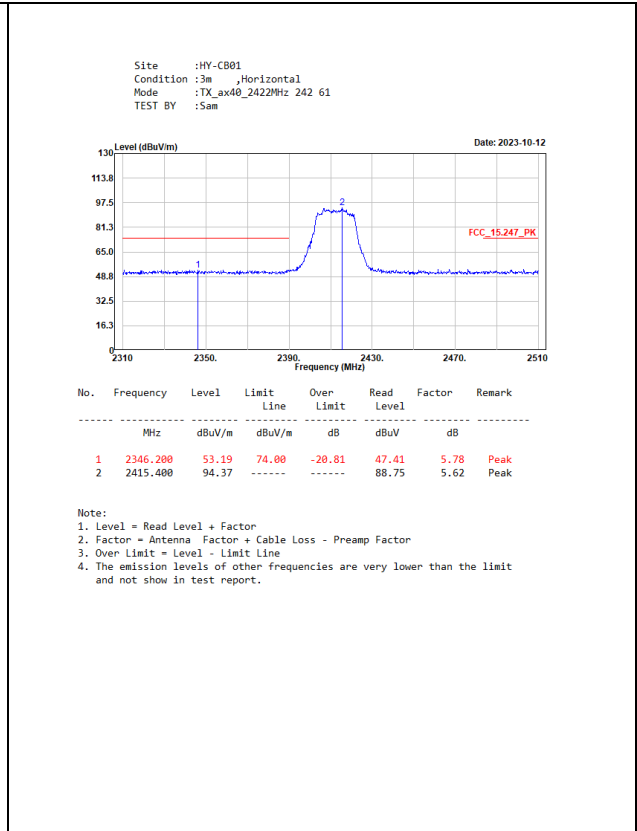
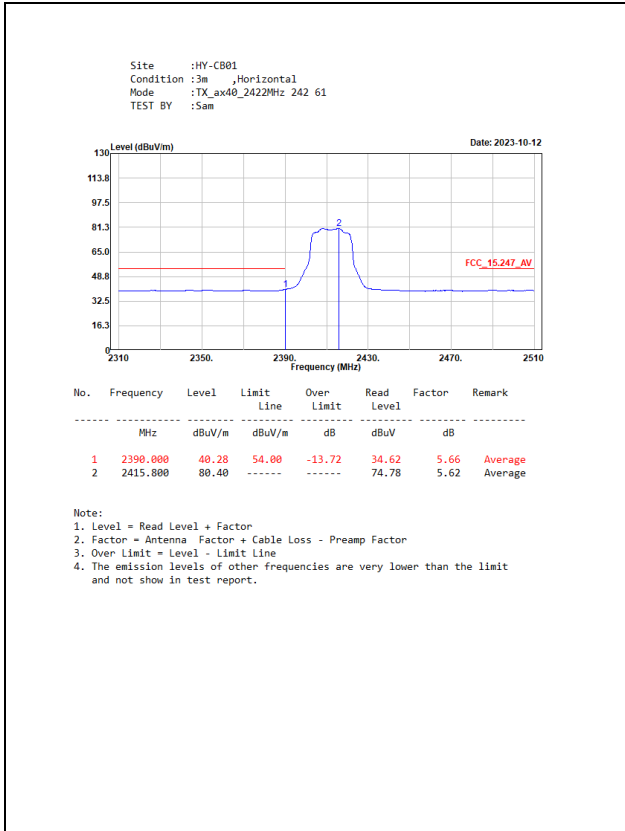


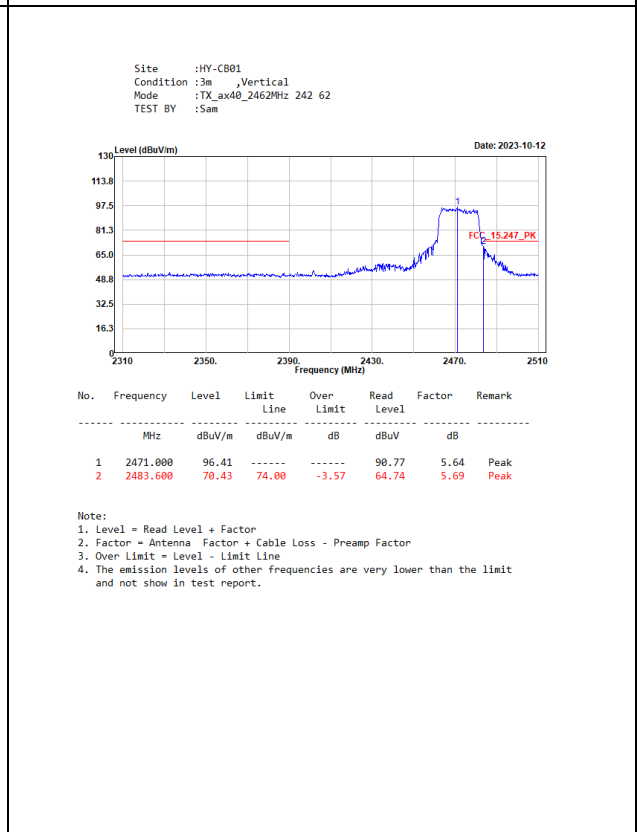
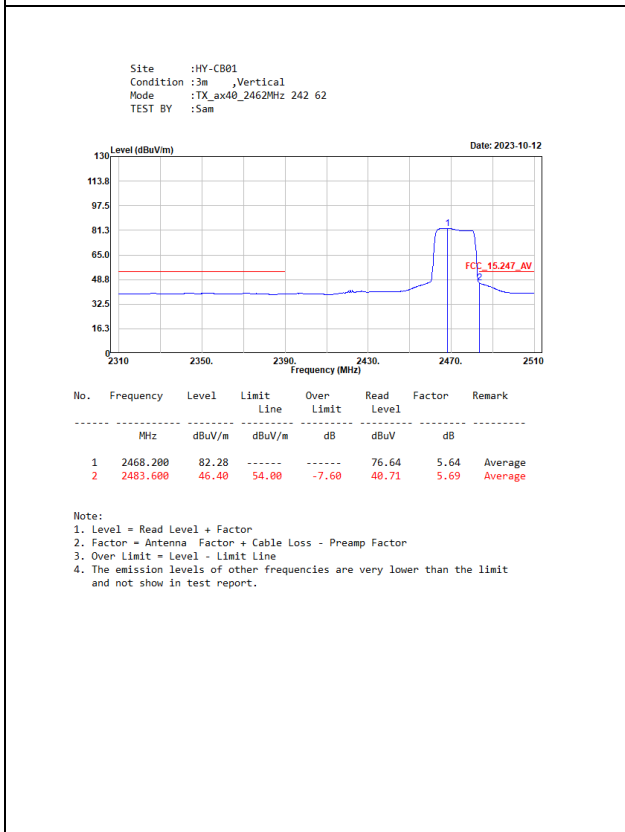
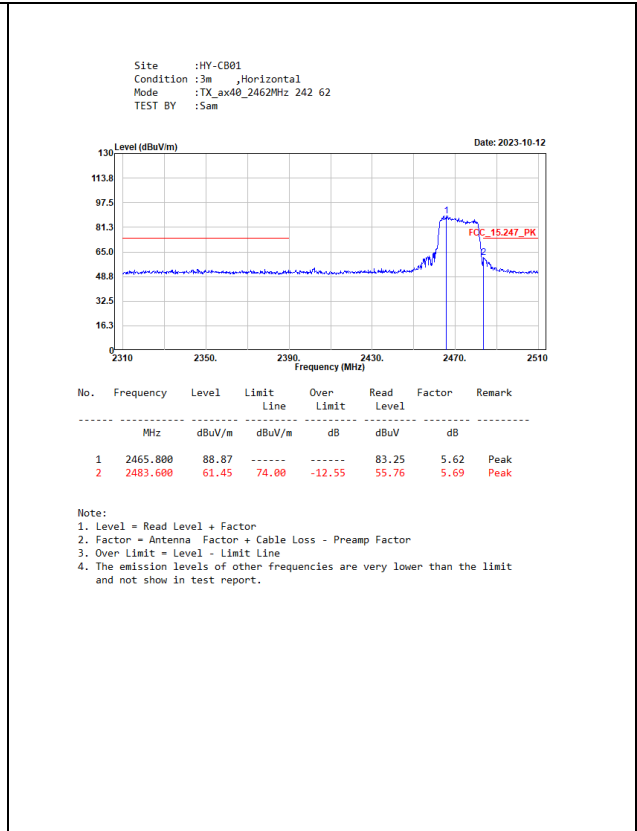
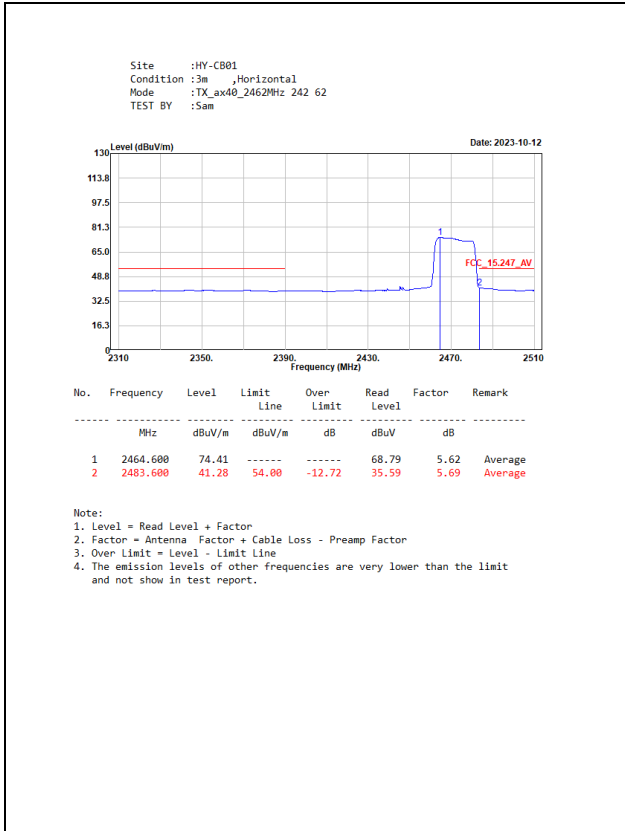




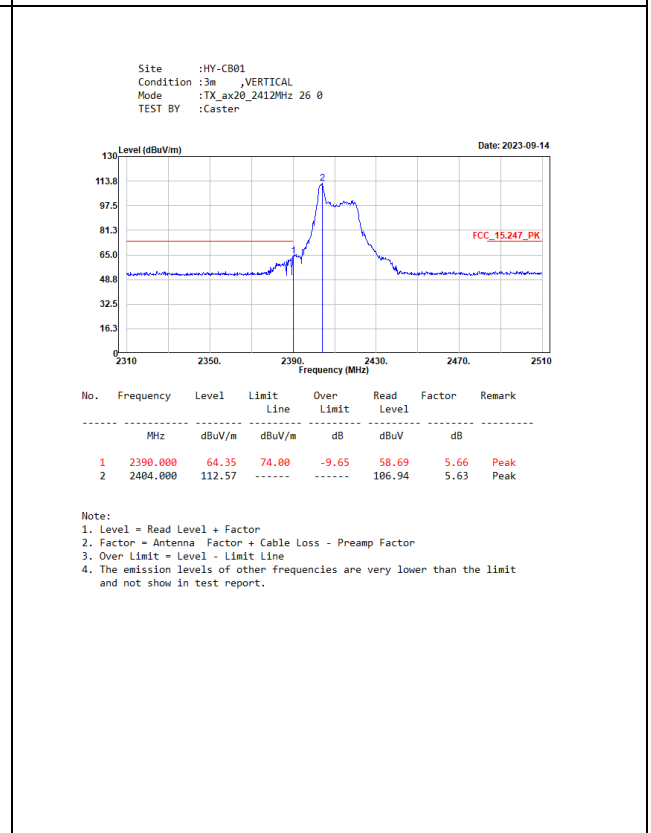
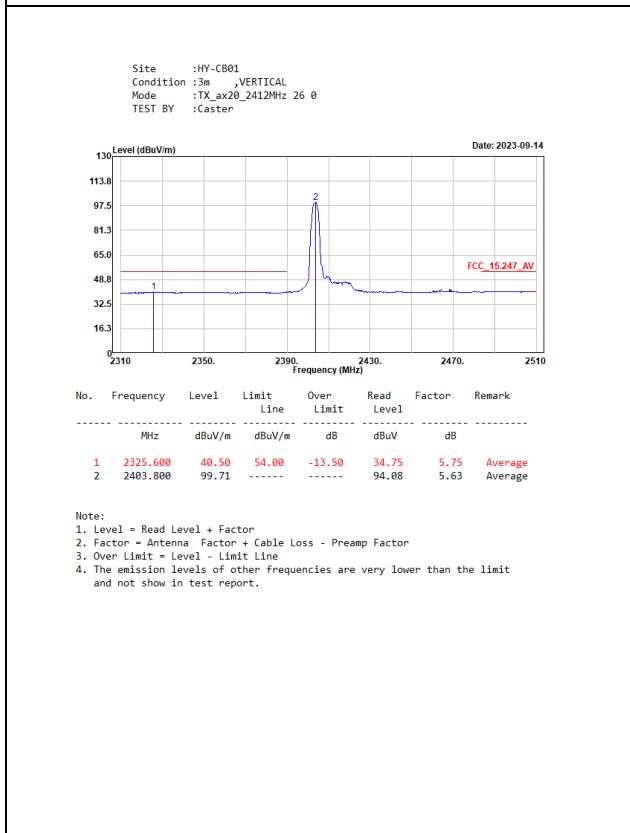
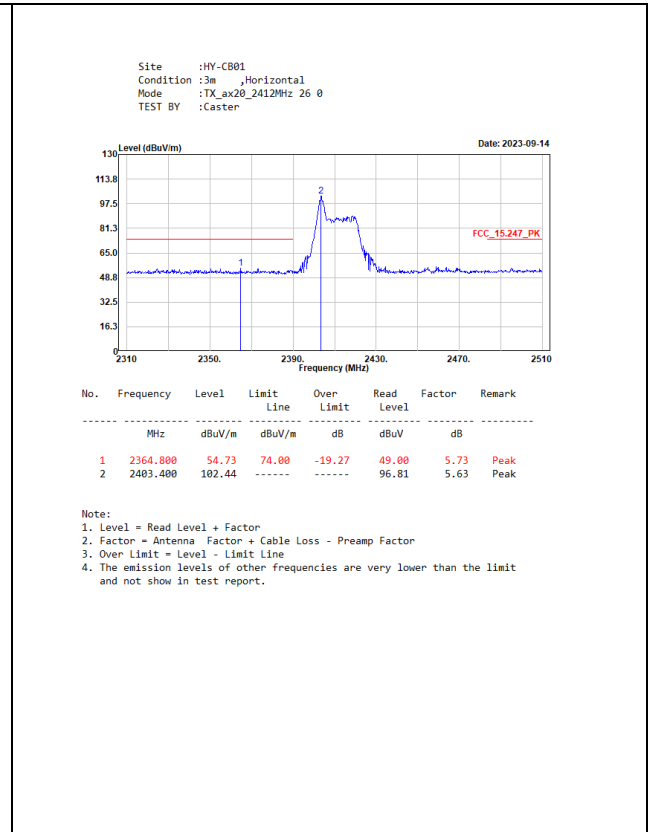
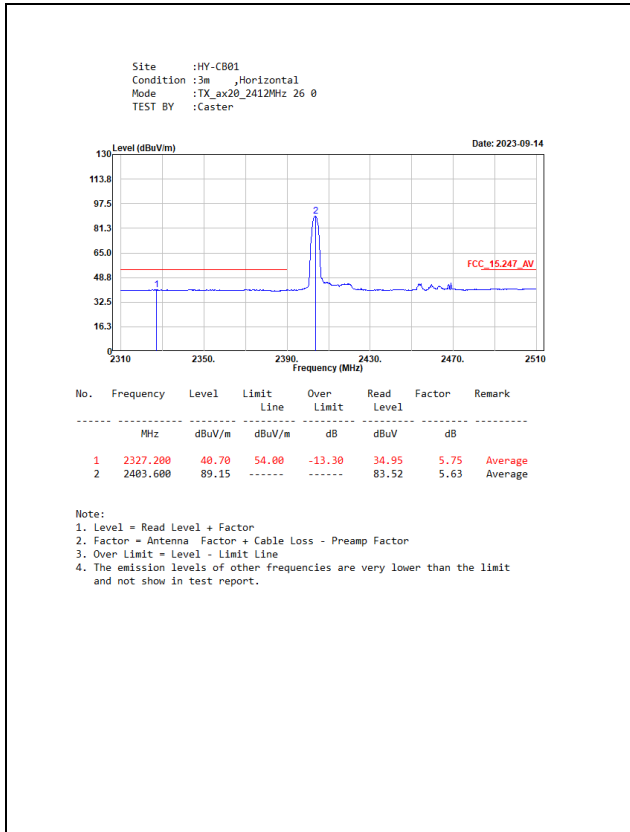


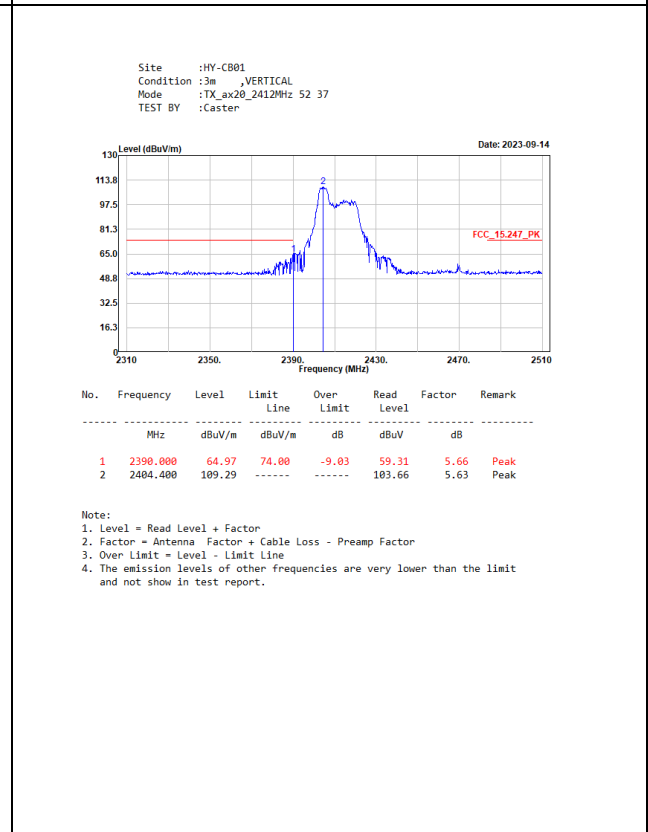
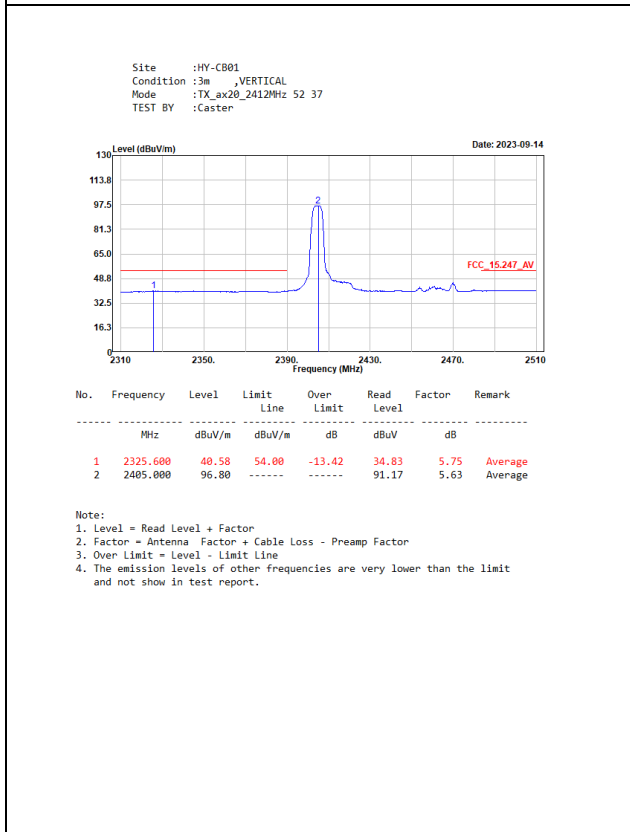
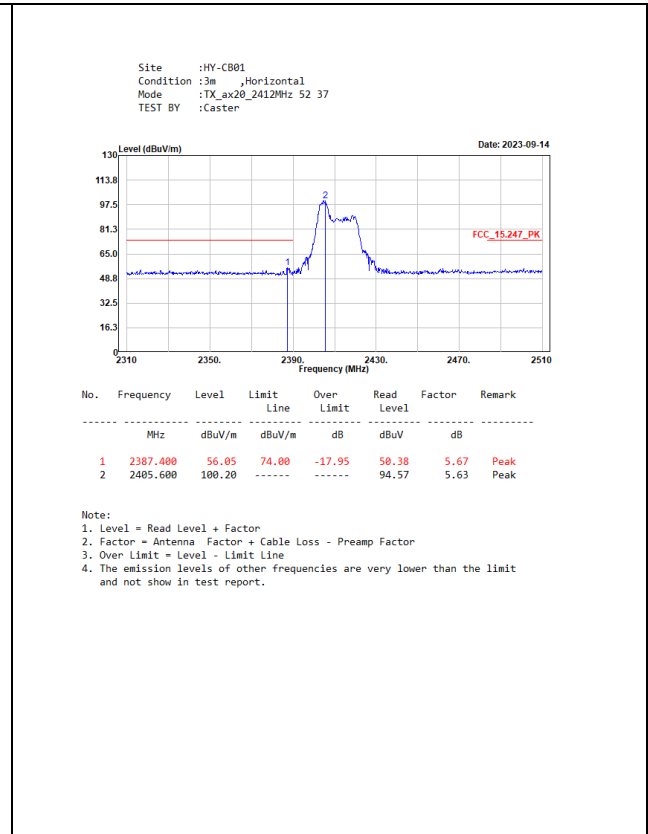
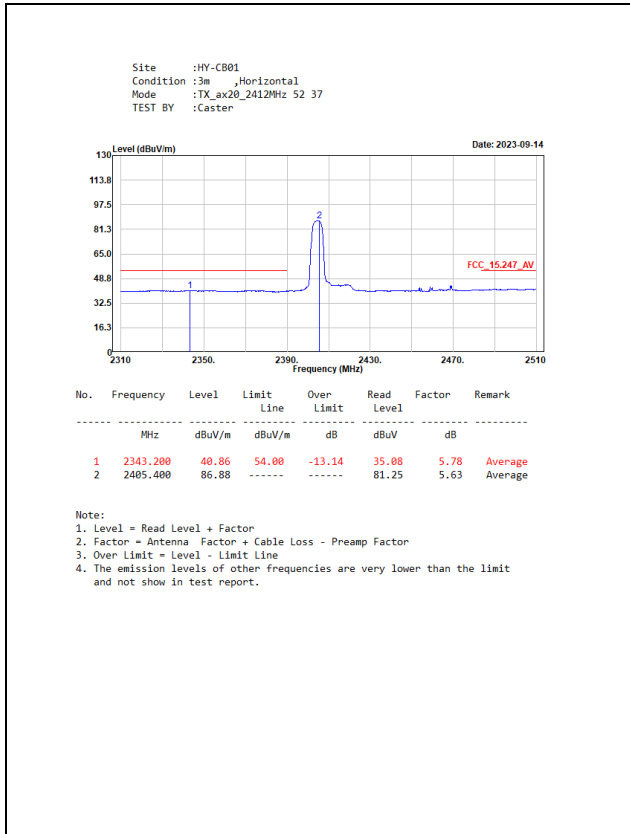


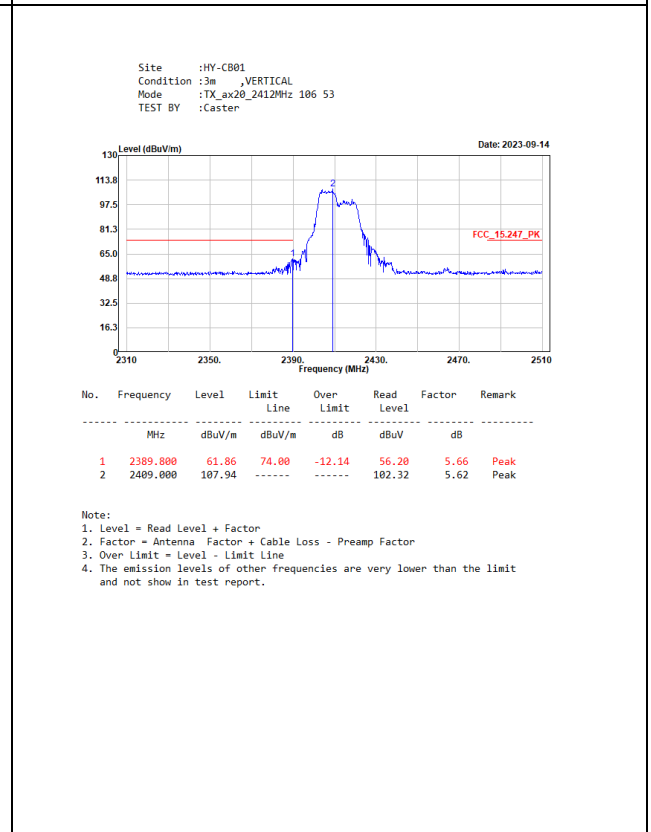
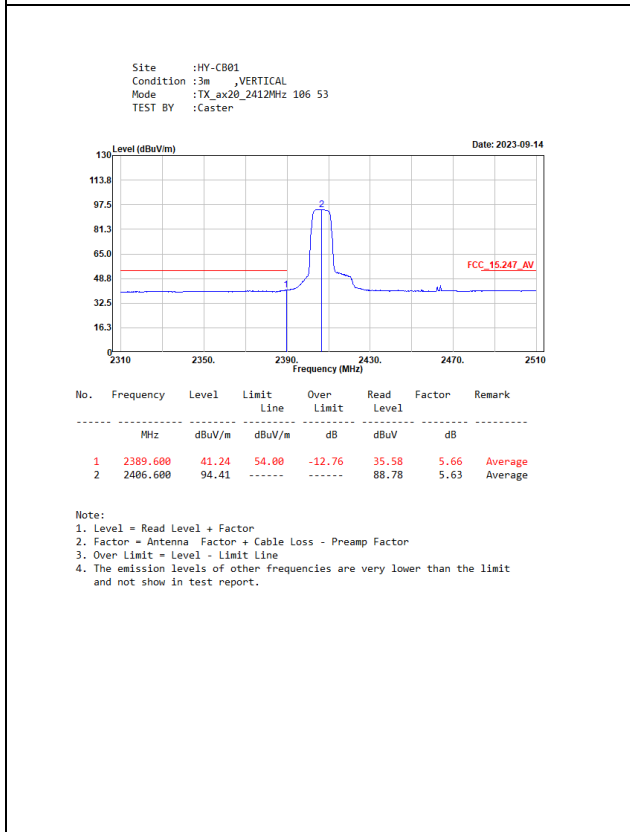
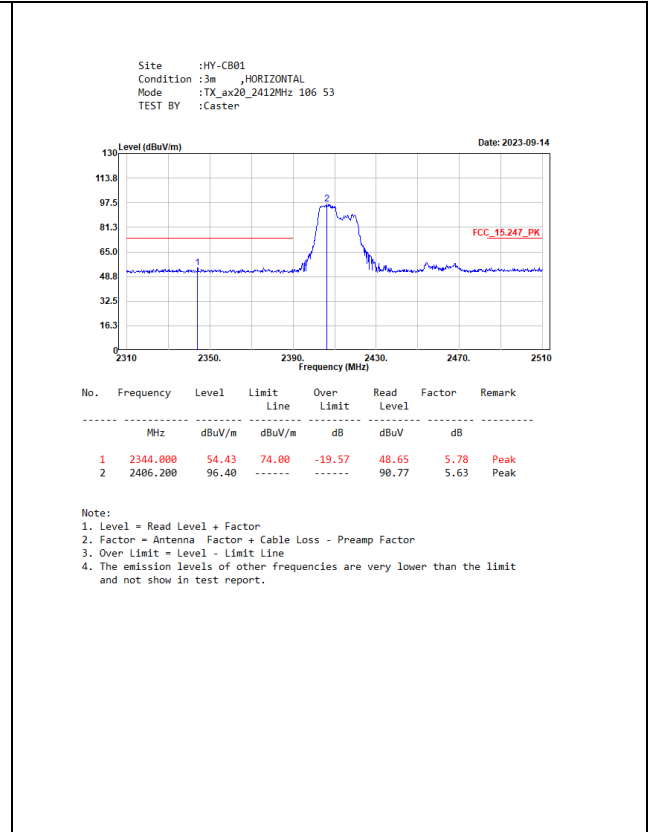
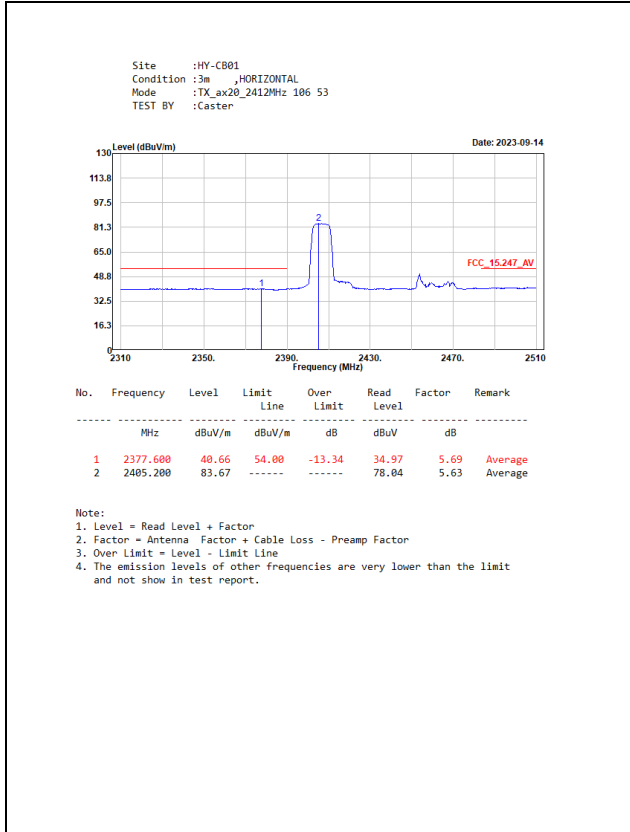


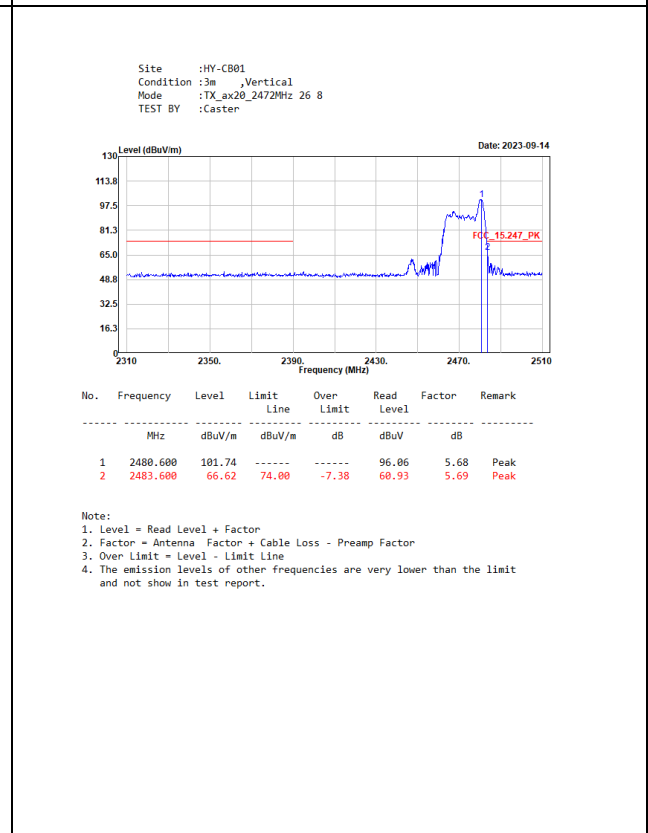
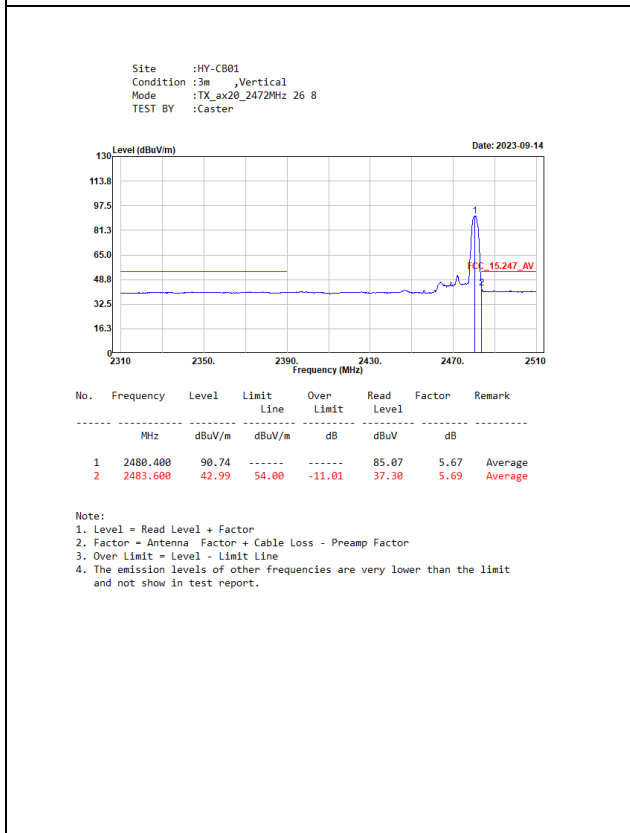
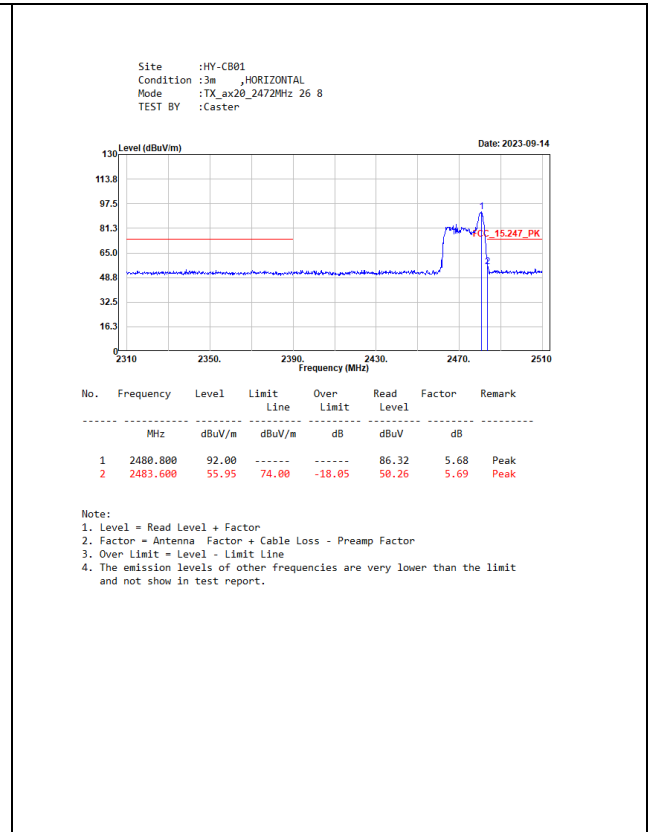
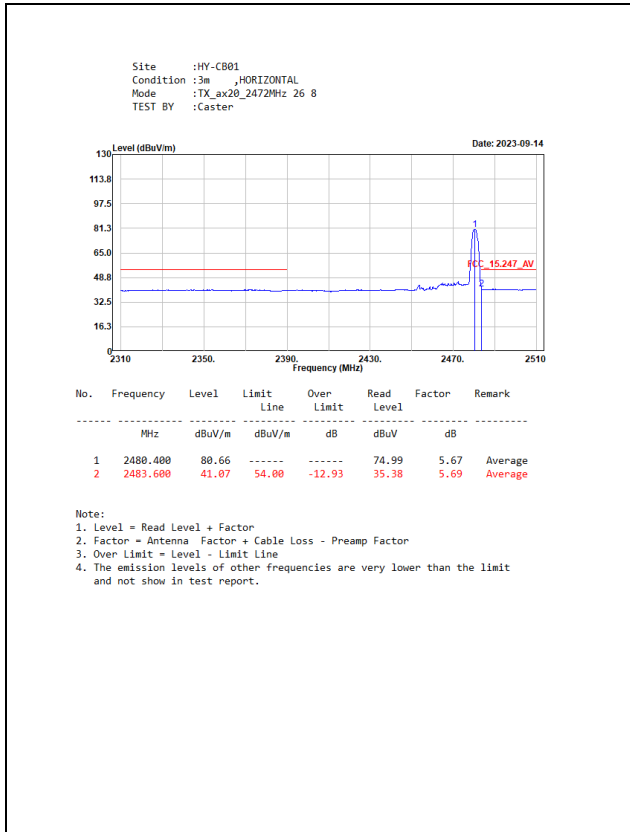


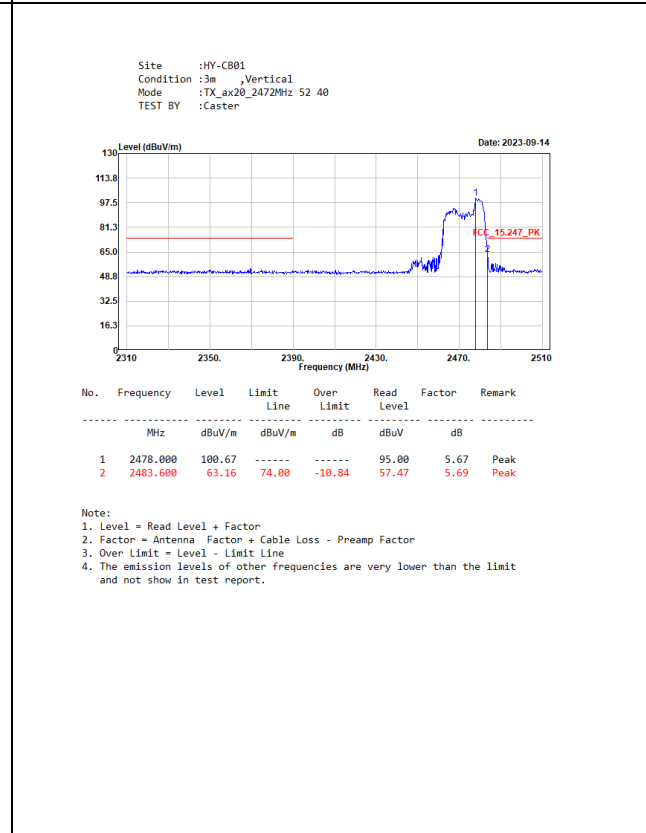
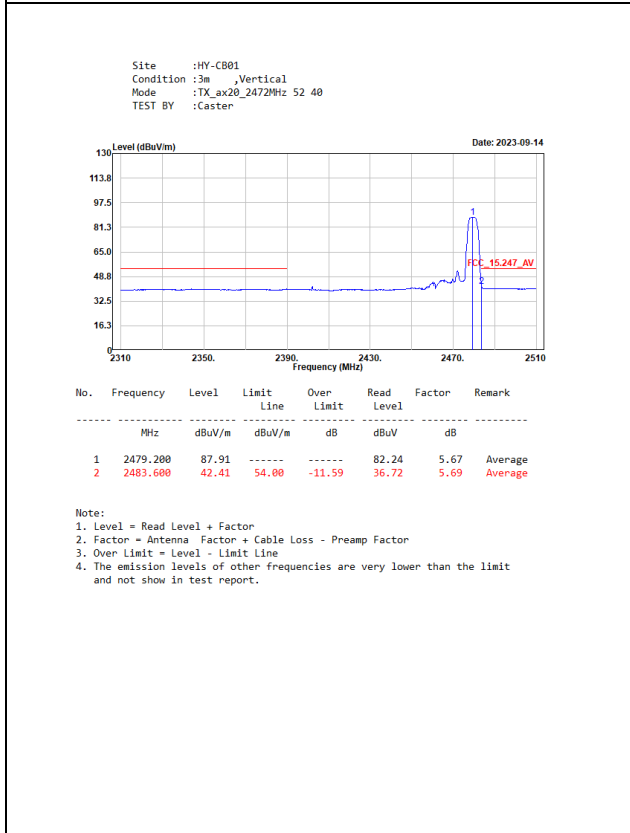
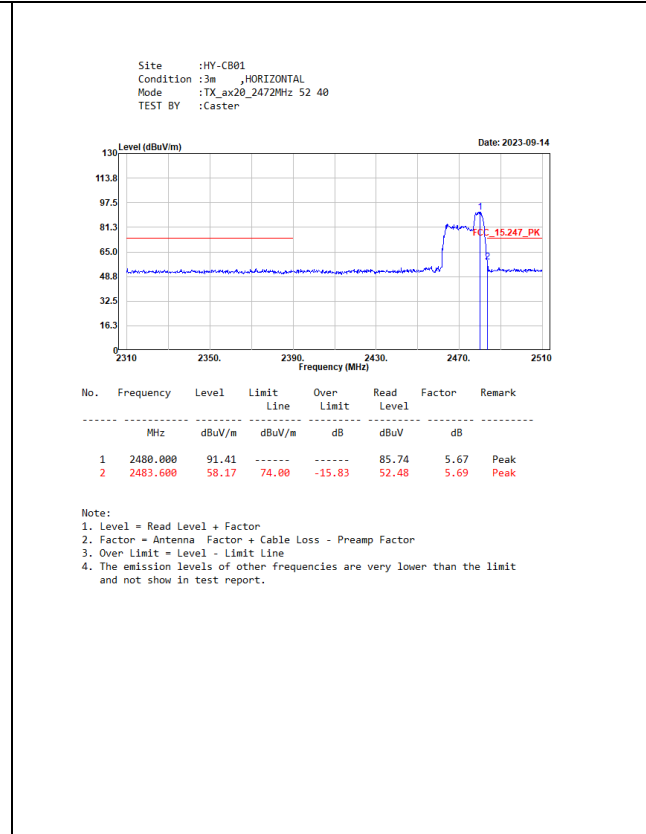
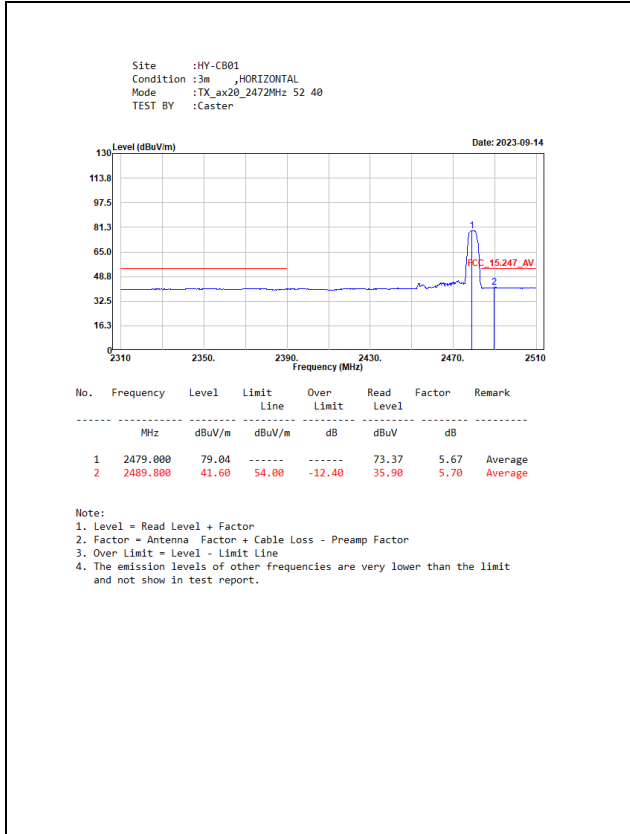
Partial RU-MIMO

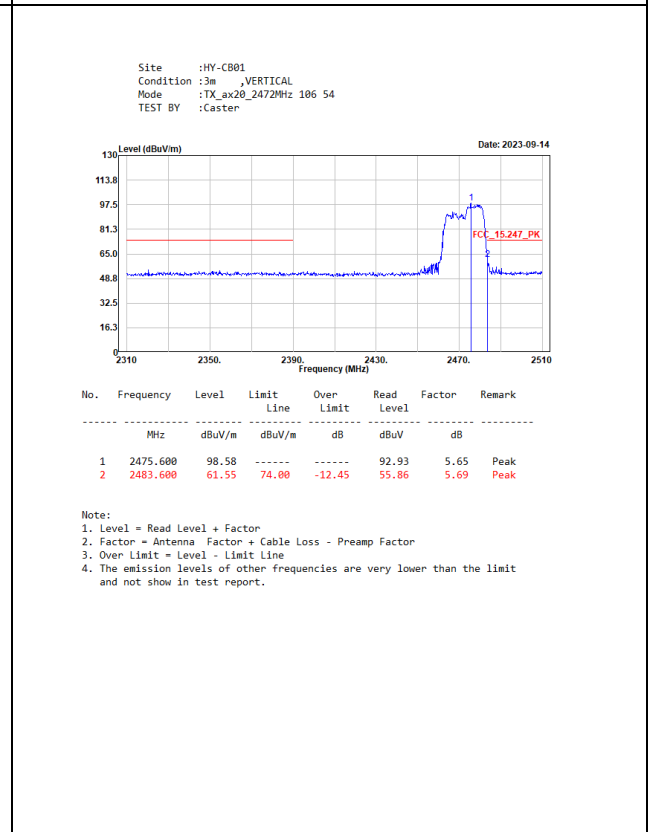
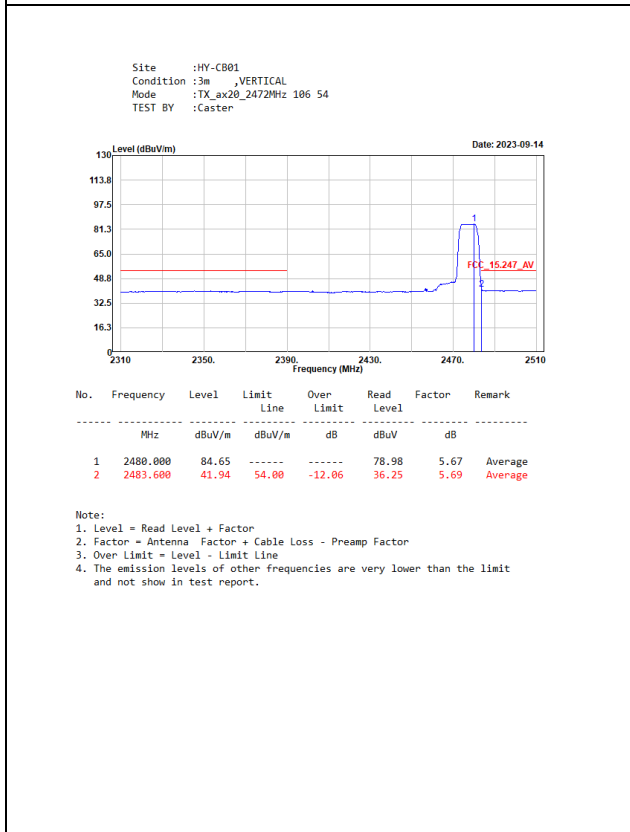
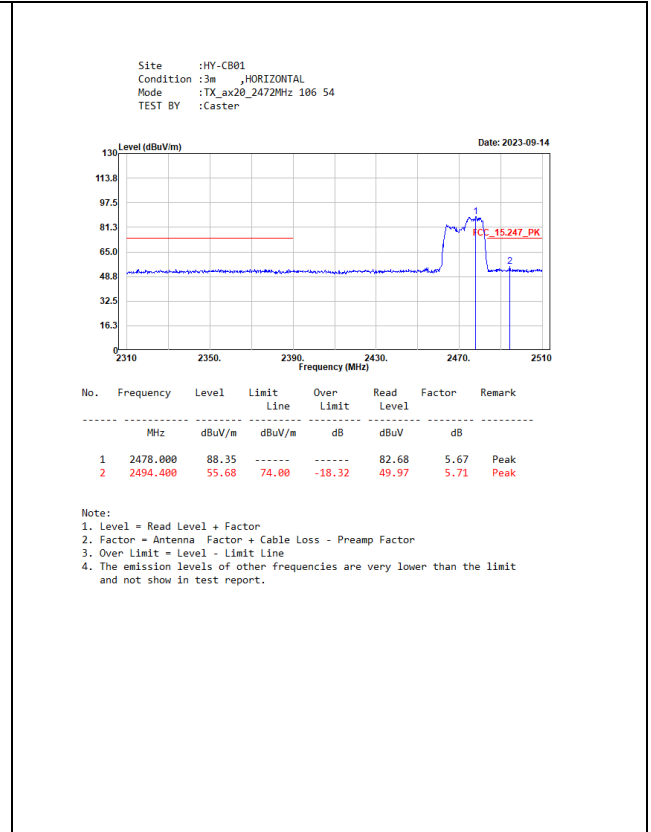
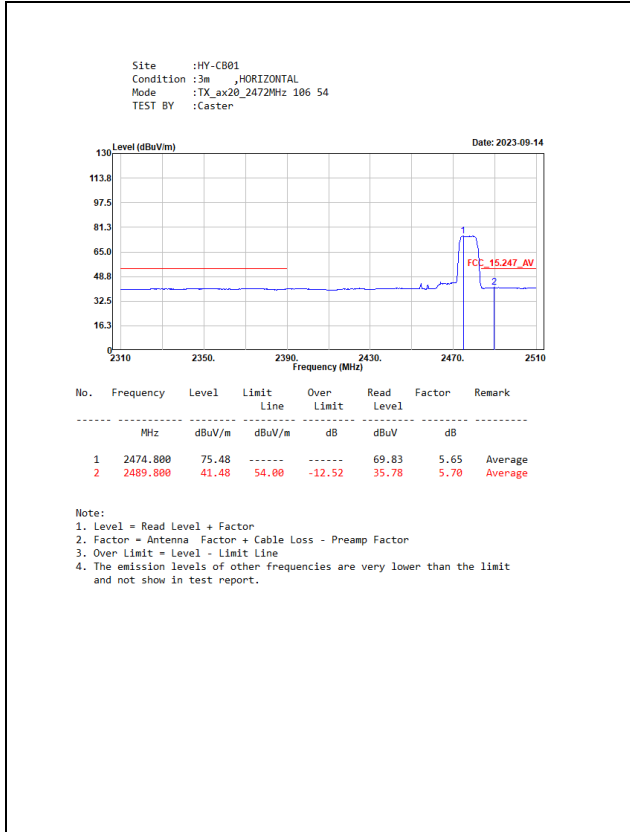


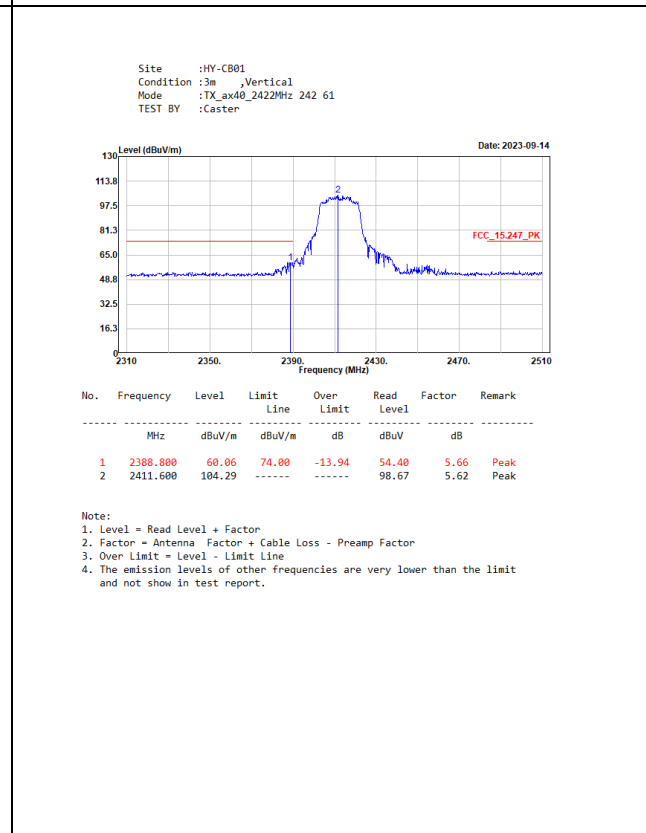
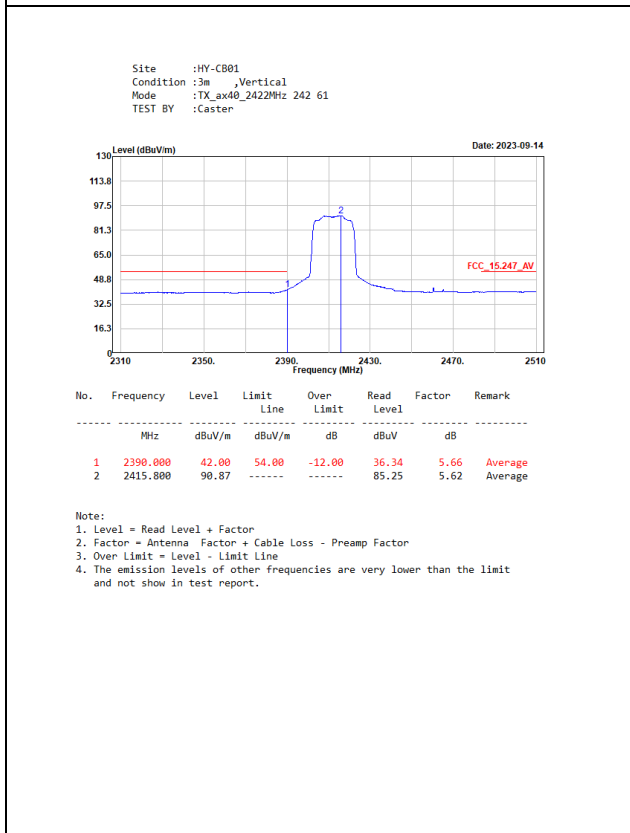
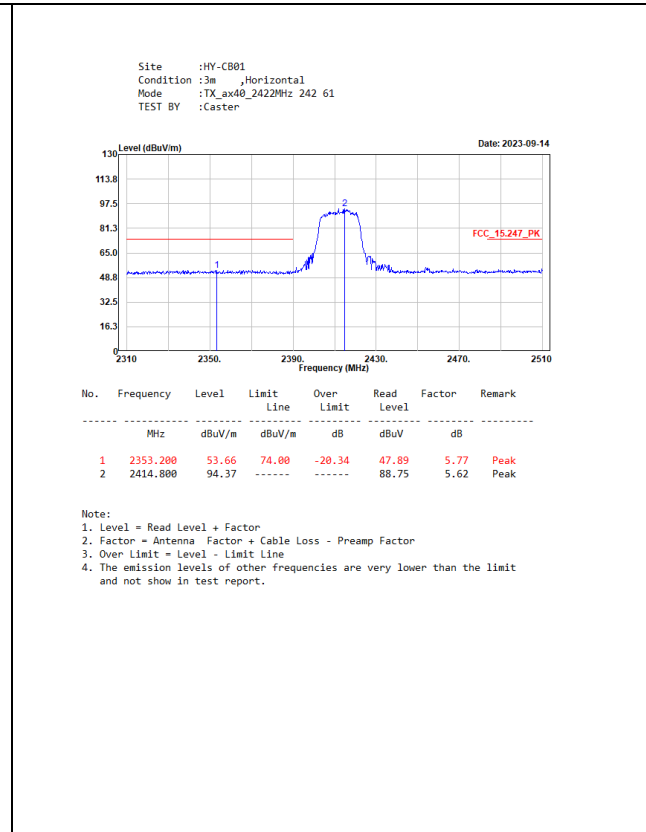
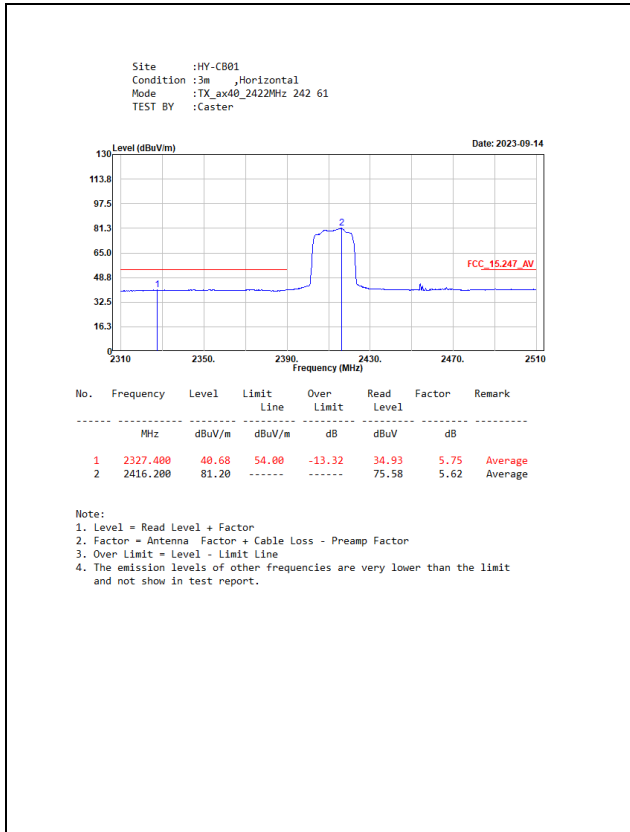


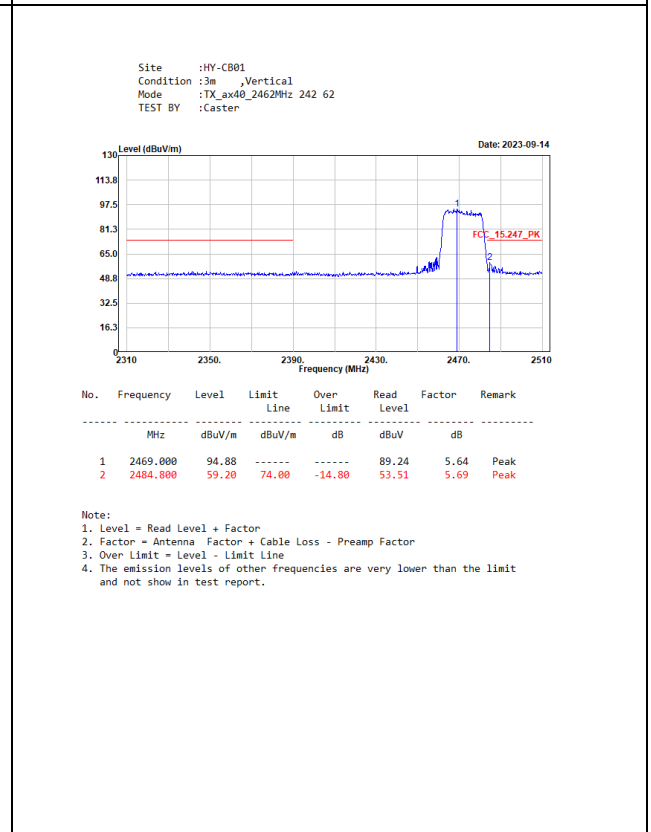
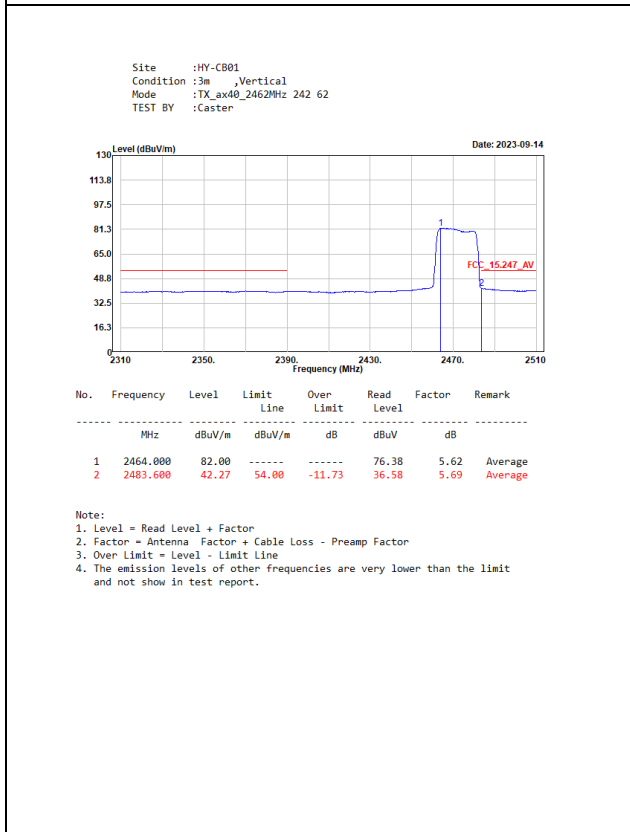
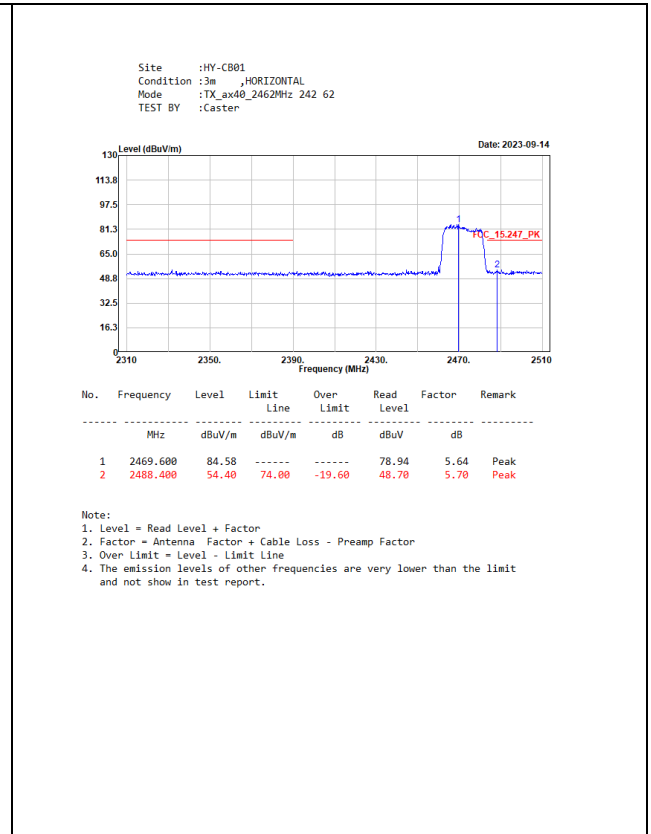
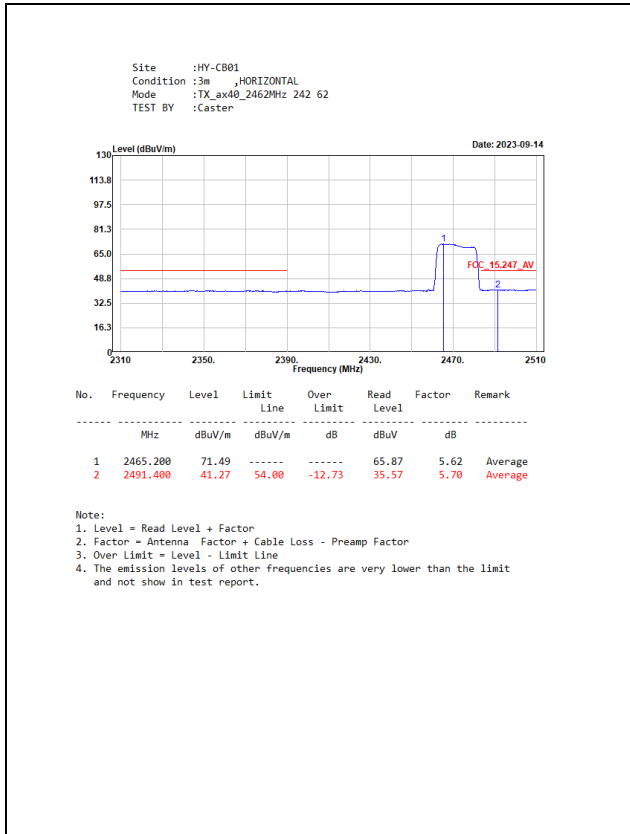








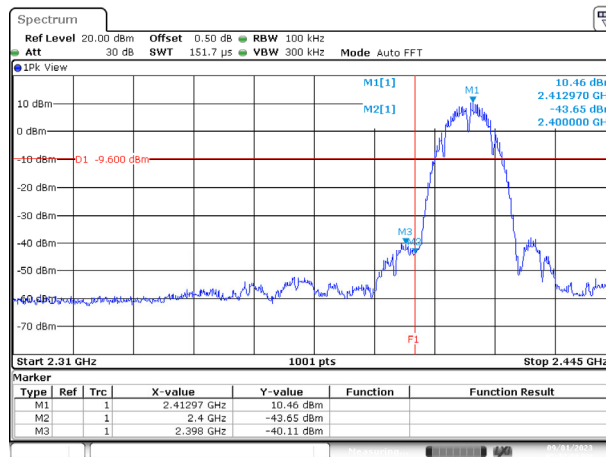




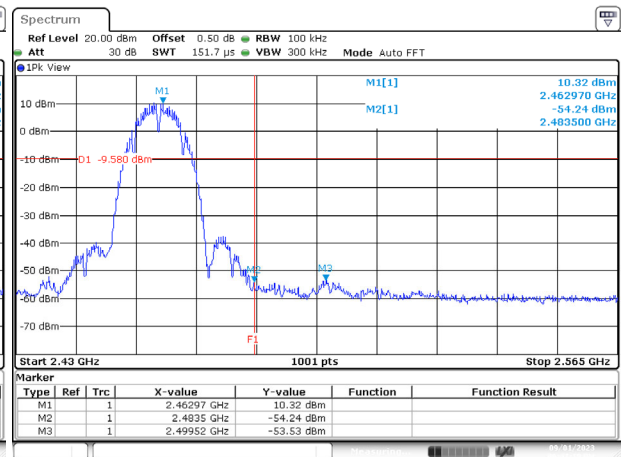
Product : Notebook Computer
 Test Item : Band Edge
 Test Mode : Transmit (802.11b)-SISO A
 Test Date : 2023/09/01

Measurement Level	Result
Δ (dB)	
> 20	PASS

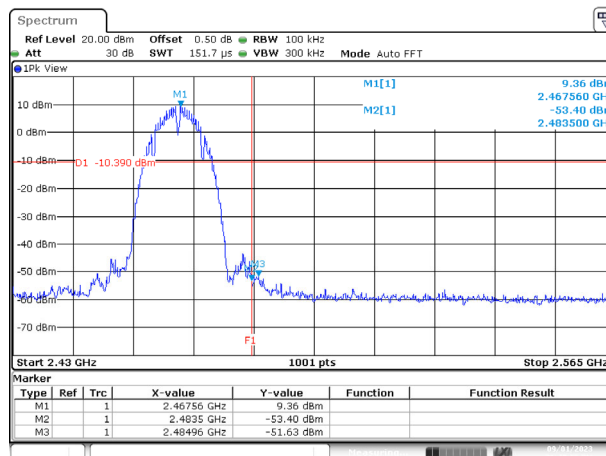
Channel 01



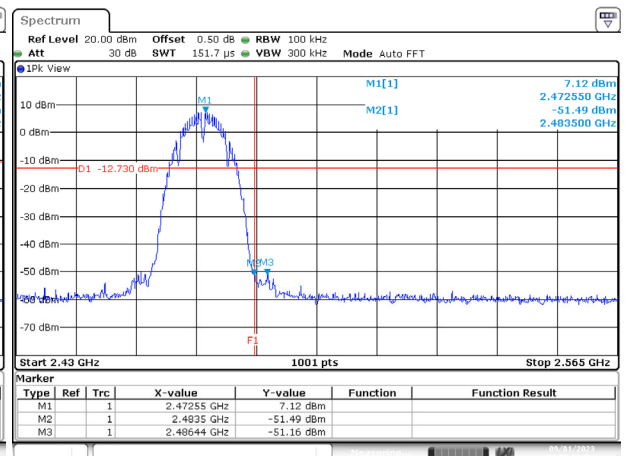
Channel 11



Channel 12



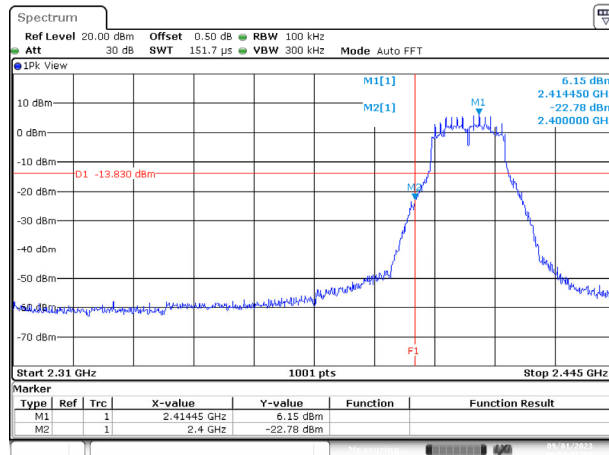
Channel 13



Product : Notebook Computer
 Test Item : Band Edge
 Test Mode : Transmit (802.11g)-SISO A
 Test Date : 2023/09/01

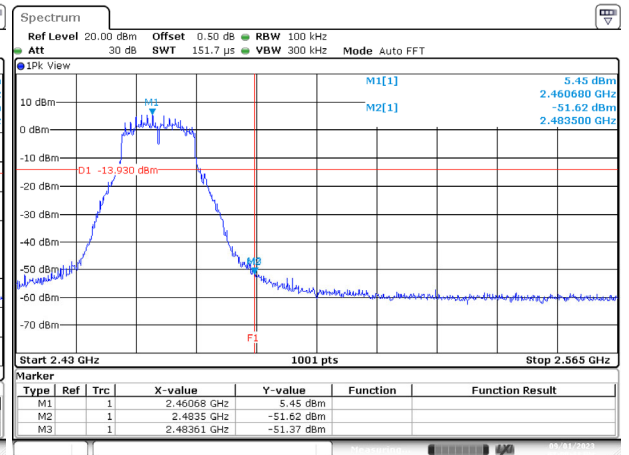
Measurement Level	Result
Δ (dB)	
> 20	PASS

Channel 01



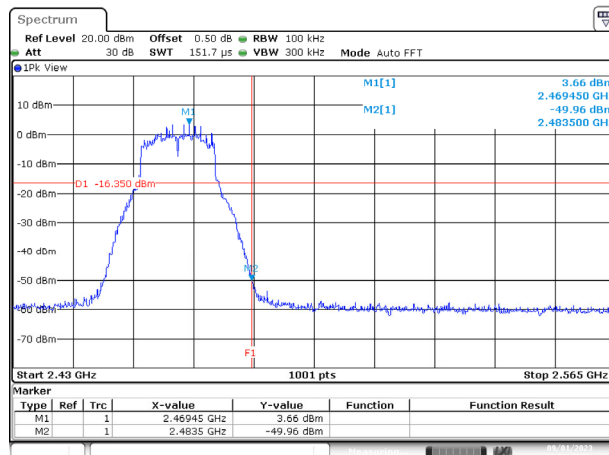
Date: 1.SEP.2023 18:54:37

Channel 11



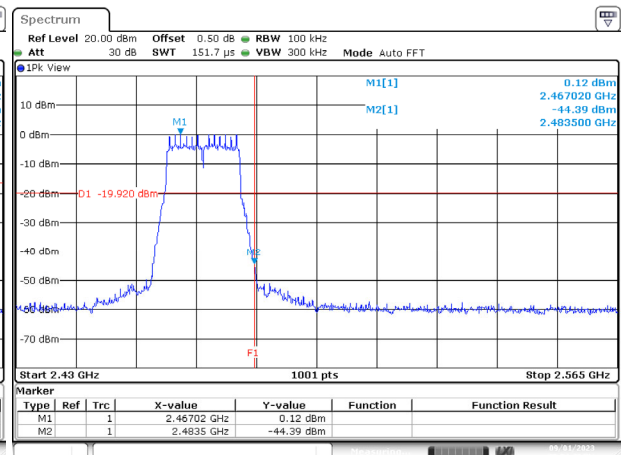
Date: 1.SEP.2023 19:00:41

Channel 12



Date: 1.SEP.2023 19:02:38

Channel 13

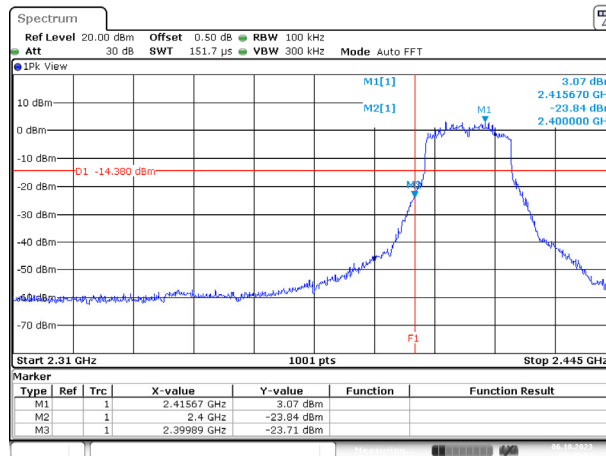


Date: 1.SEP.2023 19:04:43

Product : Notebook Computer
 Test Item : Band Edge
 Test Mode : Transmit (802.11ax-20 MHz)-SISO A
 Test Date : 2023/10/06

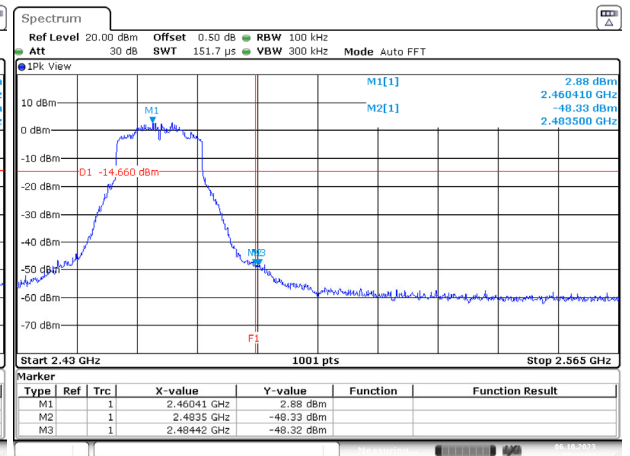
Measurement Level	Result
Δ (dB)	
> 20	PASS

Channel 01



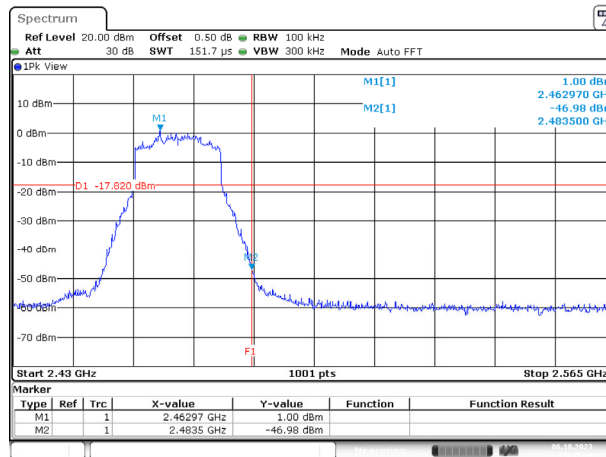
Date: 6.OCT.2023 09:40:04

Channel 11



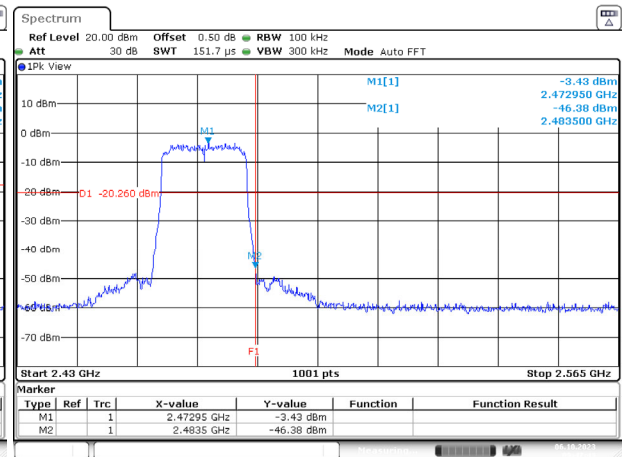
Date: 6.OCT.2023 09:43:54

Channel 12



Date: 6.OCT.2023 09:45:49

Channel 13



Date: 6.OCT.2023 09:47:44