

Product Name: AX1800 USB3.0 WiFi6 Adapter	Report No: FCC022022-05258RF1
Product Model: D1-X18	Security Classification: Open
Version: V1.0	Total Page: 126

TIRT Testing Report

Prepared By:	Checked By:	Approved By:	
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Stone Tang	Randy Lv	Daniel Chen	

RF TEST REPORT

FCC ID: 2A22E-WWYLD1-X18

According to

47 CFR FCC Part 15, Subpart C (Section 15.247)

ANSI C63.10:2013

Equipment : AX1800 USB3.0 WiFi6 Adapter
Model No. : D1-X18
Trademark : N/A
Product No. : 20220929017481
Micronet Union Technology(Chengdu) Co., Ltd
Applicant : Room 502, Building 5, N.O. 528, Yuefei Road, Shibantan Street, Xindu
District, Chengdu, Sichuan, China

- The test result referred exclusively to the presented test model /sample.
- Without written approval of TIRT Inc. the test report shall not reproduced except in full.
- Test Date: 2022.10.09-2022.11.09

Lab: Beijing TIRT Technology Service Co.,Ltd Shenzhen

Add: 101, 3 # Factory Building, Gongjin Electronics Shatin Community, Kengzi Street, Pingshan
District, Shenzhen, China
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Table of Contents

History of this test report.....	5
1. General Information	6
1.1 Applicant	6
1.2 Manufacturer.....	6
1.3 Factory.....	6
1.4 Basic Description of Equipment Under Test.....	6
1.5 Antenna Information.....	7
1.6 Antenna Information.....	7
1.7 Transmit Operating Mode	8
2. Summary of Test Results	9
2.1 Summary of Test Items	9
2.2 Application of Standard.....	9
2.3 Test Instruments	10
2.4 Test Mode	11
2.5 Test Condition	12
2.6 Duty Cycle of Test Signal	12
2.7 Measurement Uncertainty.....	17
2.8 Test Location.....	17
2.9 Deviation from Standards	17
2.10 Abnormalities from Standard Conditions.....	17
3. Test Procedure And Results	18
3.1 AC Power Line Conducted Emission	18
3.1.1 Limit.....	18
3.1.2 Test Peripherals.....	18
3.1.3 Test Procedure	18
3.1.4 Test Setup	19
3.1.5 Test Result.....	20
3.2 Radiated Emission and Band Edge	22
3.2.1 Limit.....	22
3.2.2 Test Peripherals.....	22
3.2.3 Test Procedure	22

3.2.4	Test Setup	24
3.2.5	Test Result.....	25
3.3	Spurious Emission at Antenna Port	47
3.3.1	Limit.....	47
3.3.2	Test Peripherals.....	47
3.3.3	Test Procedure	47
3.3.4	Test Setup	48
3.3.5	The Result	49
3.4	6dB Bandwidth.....	88
3.4.1	Limit.....	88
3.4.2	Test Peripherals.....	88
3.4.3	Test Procedure	88
3.4.4	Test Setup	89
3.4.5	Test Result.....	89
3.5	Maximum conducted output power	111
3.5.1	Limit.....	111
3.5.2	Test Peripherals.....	111
3.5.3	Test Procedure	111
3.5.4	Test Setup	111
3.5.5	Table of Parameters of Text Software Setting.....	112
3.5.6	The Result	113
3.6	Power Spectral Density.....	114
3.6.1	Limit.....	114
3.6.2	Test Peripherals.....	114
3.6.3	Test Procedure	114
3.6.4	Test Setup	115
3.6.5	The Result	116

History of this test report

Original Report Issue Date: 2022.11.14

- ☒ No additional attachment
- ☐ Additional attachments were issued following record

Attachment No.	Issue Date	Description

1. General Information

1.1 Applicant

Micronet Union Technology(Chengdu) Co., Ltd

Room 502, Building 5, N.O. 528, Yuefei Road, Shibantan Street, Xindu District, Chengdu, Sichuan, China

1.2 Manufacturer

Micronet Union Technology(Chengdu) Co., Ltd

Room 502, Building 5, N.O. 528, Yuefei Road, Shibantan Street, Xindu District, Chengdu, Sichuan, China

1.3 Factory

Micronet Union Technology(Chengdu) Co., Ltd

Room 502, Building 5, N.O. 528, Yuefei Road, Shibantan Street, Xindu District, Chengdu, Sichuan, China

1.4 Basic Description of Equipment Under Test

Items	Description	
Equipment Name	AX1800 USB3.0 WiFi6 Adapter	
Model Number	D1-X18	
Trademark	N/A	
Power Supply	5Vdc	
Operating Temperature	0℃-40℃	
EUT Stage	☐ Product Unit	☒ Final-Sample
Operating Band	2400~2483.5MHz	☒ IEEE 802.11b
		☒ IEEE 802.11g
		☒ IEEE 802.11n(20MHz)
		☒ IEEE 802.11n(40MHz)
Product Type	IEEE 802.11b: WLAN (1TX, 1RX) IEEE 802.11g: WLAN (1TX, 1RX) IEEE 802.11n: WLAN (2TX, 2RX)	
Nominal Bandwidth	20MHz / 40MHz	
Modulation	IEEE 802.11b: DSSS (DBPSK, DQPSK, CCK) IEEE 802.11g: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11n: OFDM (BPSK / QPSK / 16QAM / 64QAM)	
Data Rate (Mbps)	IEEE 802.11b mode : DSSS (1/2/5.5/11) IEEE 802.11g mode : OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n (20MHz) mode(MCS0~MCS7) IEEE 802.11n (40MHz) mode(MCS0~MCS7)	

Eleven channels are provided for 802.11b, 802.11g, 802.11n (20MHz):

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400MHz ~ 2483.5 MHz	01	2412MHz	07	2442MHz
	02	2417MHz	08	2447MHz
	03	2422MHz	09	2452MHz
	04	2427MHz	10	2457MHz
	05	2432MHz	11	2462MHz
	06	2437MHz	/	/

Seven channels are provided for 802.11n (40MHz):

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400MHz ~ 2483.5 MHz	03	2422 MHz	07	2442MHz
	04	2427MHz	08	2447MHz
	05	2432MHz	09	2452MHz
	06	2437MHz	/	/

1.5 Antenna Information

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	N/A	N/A	PCB	N/A	-0.36
2	N/A	N/A	PCB	N/A	-0.99

1.6 Description Of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

No.	Equipment	Model	Series No	Brand	FCC ID	Supplied by
1	Notebook	L450	/	Lenovo	Doc	/
2	Notebook adapter	ADLX90NCC3A	/	Lenovo	Doc	/

1.7 Transmit Operating Mode

Transmit Operating Mode						Transmit Multiple Antennas					
☒ Operating mode 1 (single antenna)						☒ 1TX					
☒ Operating mode 2 (multiple antenna, no beam forming)						☒ 2TX	☐	3TX	☐	4TX	
☐ Operating mode 3 (multiple antenna, with beam forming)						☐ 2TX	☐	3TX	☐	4TX	
☒ 802.11b	Operating mode	☒	1TX	☐	2TX	☐	3TX				
☒ 802.11g	Operating mode	☒	1TX	☐	2TX	☐	3TX				
☒ 802.11n(20MHz)	Operating mode	☐	1TX	☒	2TX	☐	3TX				
☒ 802.11n(40MHz)	Operating mode	☐	1TX	☒	2TX	☐	3TX				

Note:

802.11b, 1Mbps~11Mbps: 1TX1RX.

802.11g, 6Mbps~54Mbps: 1TX1RX.

802.11n20MHz/40MHz, MCS0~ MCS7: 2TX2RX.

2. Summary of Test Results

2.1 Summary of Test Items

47 CFR FCC Part 15, Subpart C (Section 15.247)			
Test item	FCC Clause	Results	Remarks
AC Power Conducted Emission	15.207	Pass	Meet the requirement of the limit
Radiated Emission and Band Edge Measurement	15.205/15.209 /15.247(d)	Pass	Meet the requirement of the limit
Spurious Emission at Antenna Port	15.247(d)	Pass	Meet the requirement of the limit
6dB Bandwidth	15.247(a)(2)	Pass	Meet the requirement of the limit
Conducted Power	15.247(b)	Pass	Meet the requirement of the limit
Power Spectral Density	15.247(e)	Pass	Meet the requirement of the limit
Antenna Requirements	15.203	Compliance	The EUT has 2 internal PCB antennas arrangement which was permanently attached
Note: NA denotes Not Applicable in this part			

2.2 Application of Standard

47 CFR FCC Part 15, Subpart C (Section 15.247)

KDB 558074 D01 15.247 Meas Guidance v05r02

KDB 662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10:2013

2.3 Test Instruments

No.	Equipment	Manufacturer	Type No.	Serial No.	Cal. date (yyyy/mm/dd)	Cal. Due date (yyyy/mm/dd)
1	EMI Receiver	Rohde&Schwarz	ESCI	100718	2021/11/10	2022/11/09
					2022/10/15	2023/10/14
2	AMN	Rohde&Schwarz	ENV216	100075	2021/11/10	2022/11/09
					2022/10/15	2023/10/14
3	AMN	Schwarzbeck	NSLK8127	#829	2021/11/10	2022/11/09
					2022/10/15	2023/10/14
4	ECSI RF IN RF Cable	Rohde&Schwarz	RP-X1	\	2021/11/10	2022/11/09
					2022/10/15	2023/10/14
5	ECSI RF IN RF Cable	Rohde&Schwarz	Sapre sm	\	2021/11/10	2022/11/09
					2022/10/15	2023/10/14
6	EMI Receiver	Rohde&Schwarz	ESR7	102013	2021/11/10	2022/11/09
					2022/10/15	2023/10/14
7	Spectrum analyzer	Rohde&Schwarz	FSV30	103741	2021/11/10	2022/11/09
					2022/10/18	2023/10/17
8	Spectrum analyzer	KEYSIGHT	N9010A	MY51440158	2021/11/10	2022/11/09
					2022/10/18	2023/10/17
9	Integral Antenna	Schwarzbeck	VULB9163	9163-868	2021/12/26	2022/12/25
					2022/10/21	2023/10/20
10	Integral Antenna	Schwarzbeck	BBHA 9120D	BBHA 9120D 1201	2021/11/10	2022/11/09
					2022/10/16	2023/10/15
11	Integral Antenna	Schwarzbeck	BBHA 9170	9170#685	2021/11/07	2022/11/06
					2022/10/15	2023/10/14
12	Preamplifier	CD Systems Inc	PAP-0303 6-30	85060000	2021/11/10	2022/11/09
					2022/10/16	2023/10/15
13	Preamplifier	Schwarzbeck	BBV9721	9721-019	2021/11/10	2022/11/09
					2022/10/16	2023/10/15
14	Preamplifier	emci	EMC0126 45SE	980417	2021/11/10	2022/11/09
					2022/10/17	2023/10/16
15	ECSI RF IN RF Cable	Rohde&Schwarz	AP-X1	\	2021/11/10	2022/11/09
					2022/10/17	2023/10/16
16	Spectrum Analyzer	Agilent	N9010A	MY52221119	2021/11/10	2022/11/09
					2022/10/18	2023/10/17
17	Power Collection Unit	Tonscend	JS0806-2	188060134	2021/09/13	2022/09/12
					2022/10/17	2023/10/16
18	Tonscend Test System	Tonscend	2.6.77.051 8	NA	NA	NA
19	Power Sensor	Agilent	U2021XA	MY54250019	2021/09/13	2022/09/12
					2022/10/18	2023/10/17

20	Power Sensor	Agilent	U2021XA	MY54250021	2021/09/13	2022/09/12
					2022/10/18	2023/10/17
21	Power Sensor	Agilent	U2021XA	MY54210040	2021/09/13	2022/09/12
					2022/10/18	2023/10/17
22	Power Sensor	Agilent	U2021XA	MY54260021	2021/09/13	2022/09/12
					2022/10/18	2023/10/17
23	Temp&Humidity Recorder	Anymetre	JR900	NA	2021/11/04	2022/11/03
					2022/10/17	2023/10/16
24	Temp&Humidity Chamber	ETOMA	NTH1100-30A	16080628	2021/09/02	2022/09/01
					2022/10/17	2023/10/16

2.4 Test Mode

Frequency Range : 2400~2483.5 MHz				
Test Items	Mode	Data Rate	Channel	Antenna
AC Power Conducted Emission	Simultaneous transmission	-	-	-
Radiated Emission and Band Edge Measurement	802.11b	1 Mbps	01/06/11	2
	802.11g	6Mbps	01/06/11	2
	802.11n(20MHz)	MCS0	01/06/11	1&2
	802.11n(40MHz)	MCS0	03/06/09	1&2
Spurious Emission at Antenna Port	802.11b	1 Mbps	01/06/11	1&2
	802.11g	6Mbps	01/06/11	1&2
	802.11n(20MHz)	MCS0	01/06/11	1&2
	802.11n(40MHz)	MCS0	03/06/09	1&2
6dB Bandwidth	802.11b	1 Mbps	01/06/11	1&2
	802.11g	6Mbps	01/06/11	1&2
	802.11n(20MHz)	MCS0	01/06/11	1&2
	802.11n(40MHz)	MCS0	03/06/09	1&2
Conducted Power	802.11b	1 Mbps	01/06/11	1&2
	802.11g	6Mbps	01/06/11	1&2
	802.11n(20MHz)	MCS0	01/06/11	1&2
	802.11n(40MHz)	MCS0	03/06/09	1&2
Power Spectral Density	802.11b	1 Mbps	01/06/11	1&2
	802.11g	6Mbps	01/06/11	1&2
	802.11n(20MHz)	MCS0	01/06/11	1&2
	802.11n(40MHz)	MCS0	03/06/09	1&2

2.5 Test Condition

Applicable to	Environmental conditions	Input Power	Tested by
AC Power Conducted Emission	25 °C, 52 % RH	DC 5V	Stone Tang
Radiated Emission and Band Edge Measurement	23 °C, 55 % RH	DC 5V	Stone Tang
Spurious Emission at Antenna Port	24.3 °C, 53 % RH	DC 5V	Stone Tang
6dB Bandwidth	24.3 °C, 53 % RH	DC 5V	Stone Tang
Conducted Power	24.3 °C, 53 % RH	DC 5V	Stone Tang
Power Spectral Density	24.3 °C, 53 % RH	DC 5V	Stone Tang

The applicant declare the operating environment of EUT as below:

Normal conditions: DC 5V, 15~35°C

2.6 Duty Cycle of Test Signal

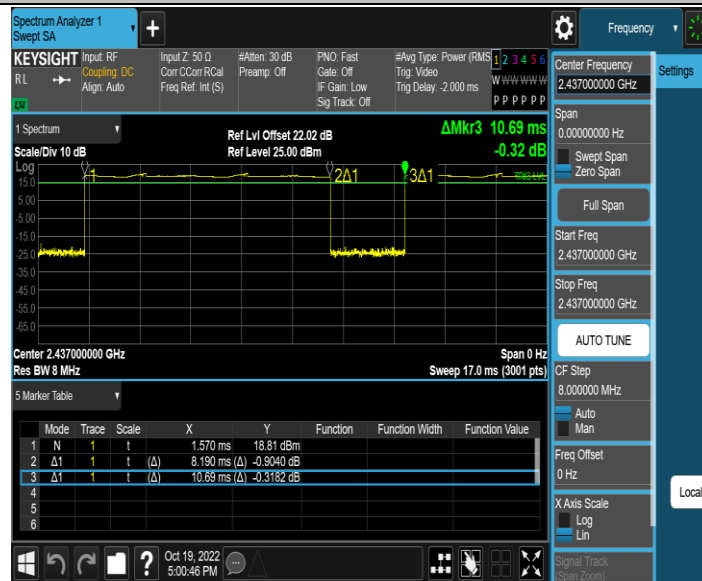
If duty cycle is $\geq 98\%$, duty factor is not required.

If duty cycle is $< 98\%$, duty factor shall be considered.

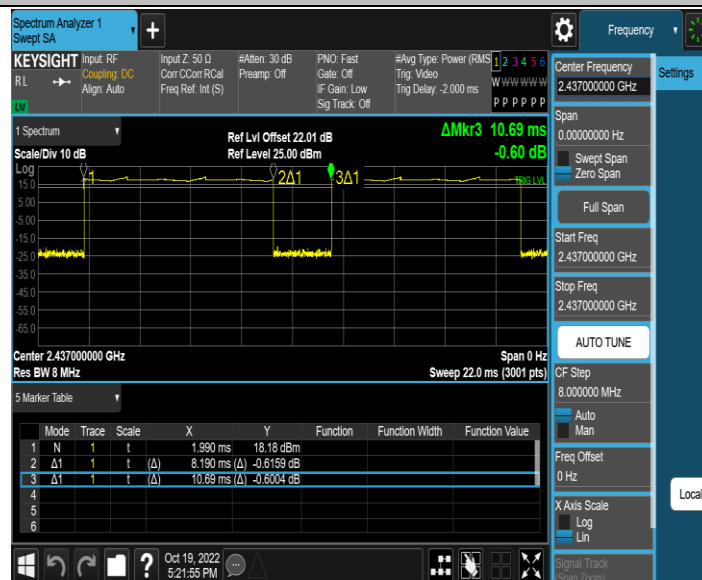
All the duty factor of other test mode have been considered.

Test Mode	Antenna	Channel	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	Duty Factor
11B	Ant1	2437	8.19	10.69	76.61	1.16
	Ant2	2437	8.19	10.69	76.61	1.16
11G	Ant1	2437	1.36	3.86	35.23	4.53
	Ant2	2437	1.36	3.86	35.23	4.53
11N20MIMO	Ant1	2437	1.14	3.65	31.23	5.05
	Ant2	2437	1.14	3.64	31.32	5.04
11N40MIMO	Ant1	2437	0.63	3.13	20.13	6.96
	Ant2	2437	0.64	3.14	20.38	6.91

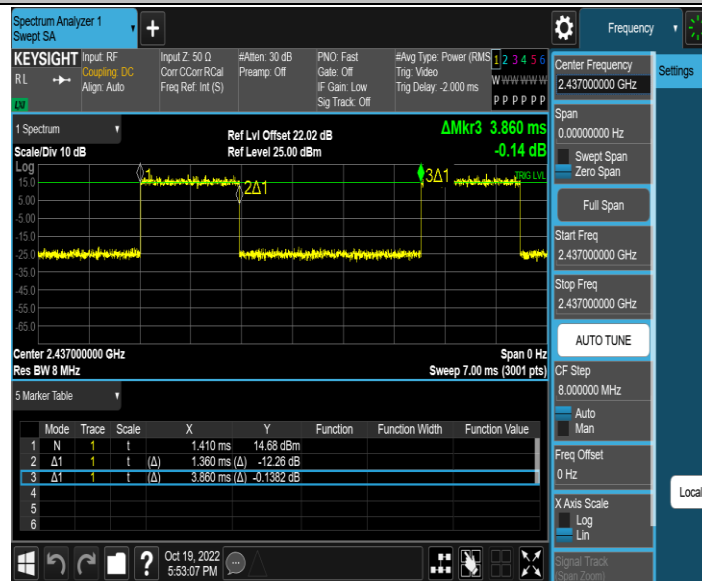
11B_Ant1_2437



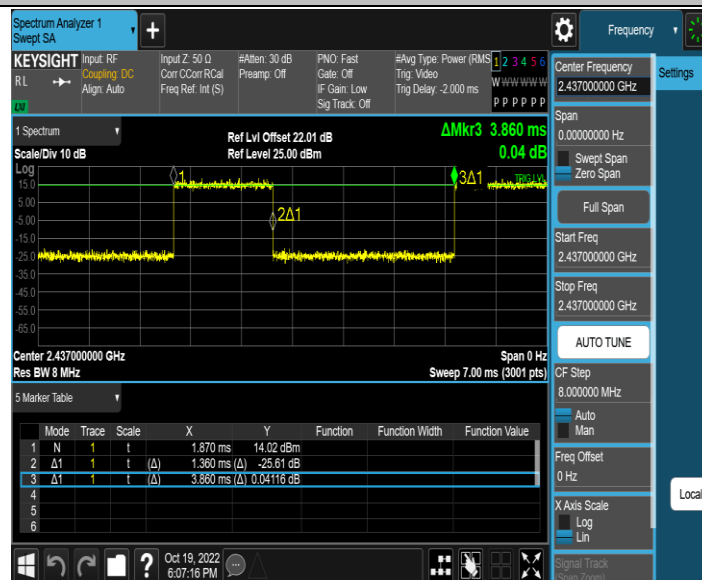
11B_Ant2_2437



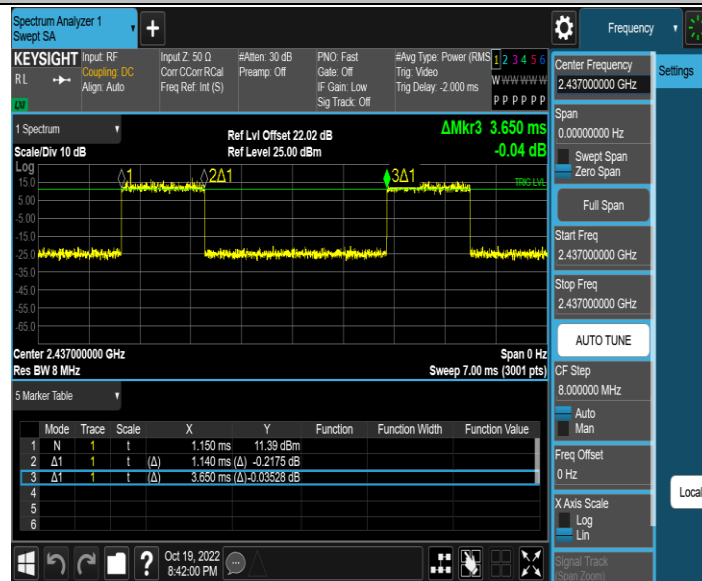
11G_Ant1_2437



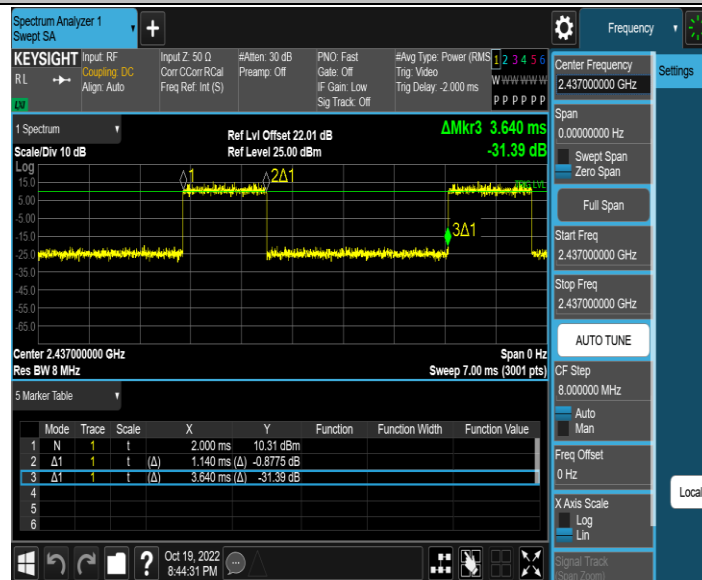
11G_Ant2_2437



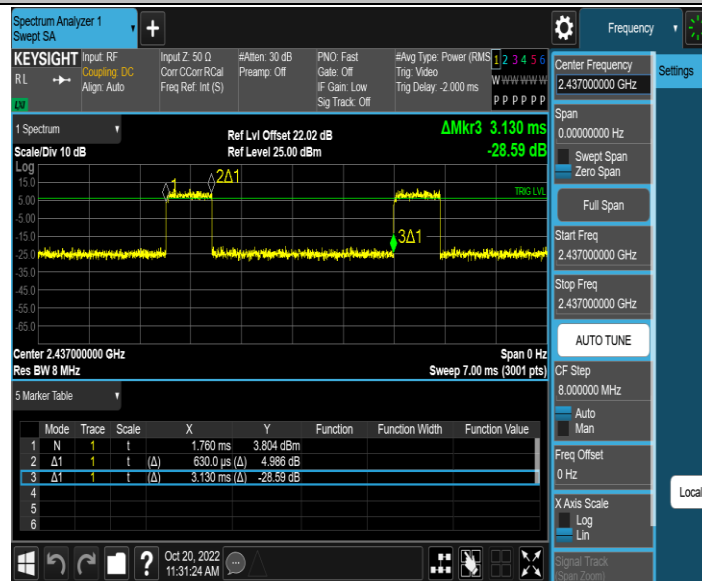
11N20MIMO_Ant1_2437



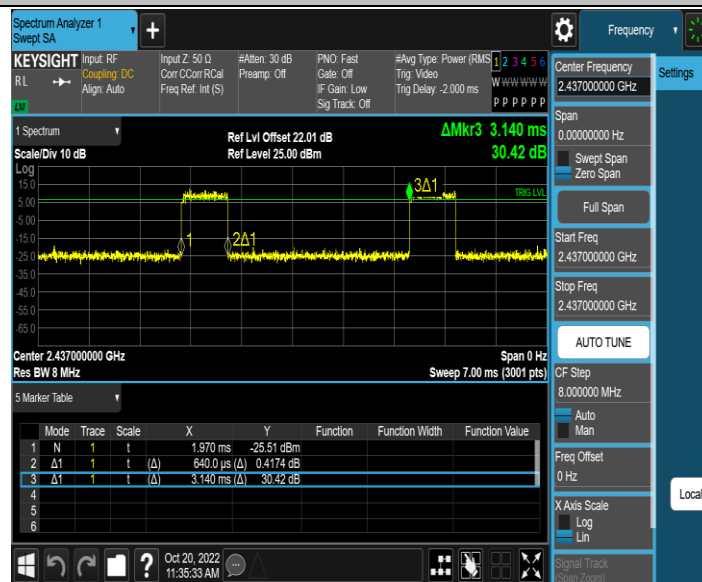
11N20MIMO_Ant2_2437



11N40MIMO_Ant1_2437



11N40MIMO_Ant2_2437



2.7 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

Uncertainty	
Parameter	Uncertainty
Occupied Channel Bandwidth	± 142.12 KHz
RF power conducted	± 0.74 dB
RF power radiated	± 3.25 dB
Spurious emissions, conducted	± 1.78 dB
Spurious emissions, radiated (9KHz~30MHz)	± 2.56 dB
Spurious emissions, radiated (30MHz~1GHz)	± 4.6 dB
Spurious emissions, radiated (Above 1GHz)	± 4.9 dB
Conduction Emissions(150kHz~30MHz)	± 3.1 dB
Humidity	$\pm 4.6\%$
Temperature	$\pm 0.7^{\circ}\text{C}$
Time	$\pm 1.25\%$

2.8 Test Location

Company:	Beijing TIRT Technology Service Co.,Ltd Shenzhen
Address:	101, 3 # Factory Building, Gongjin Electronics Shatin Community, Kengzi Street, Pingshan District, Shenzhen, China
CNAS Registration Number:	CNAS L14158
A2LA Registration Number:	6049.01
FCC Designation Number:	CN1309
Test Firm Registration Number:	825524
Telephone:	+86-0755-27087573

2.9 Deviation from Standards

None

2.10 Abnormalities from Standard Conditions

None

3. Test Procedure And Results

3.1 AC Power Line Conducted Emission

3.1.1 Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

3.1.2 Test Peripherals

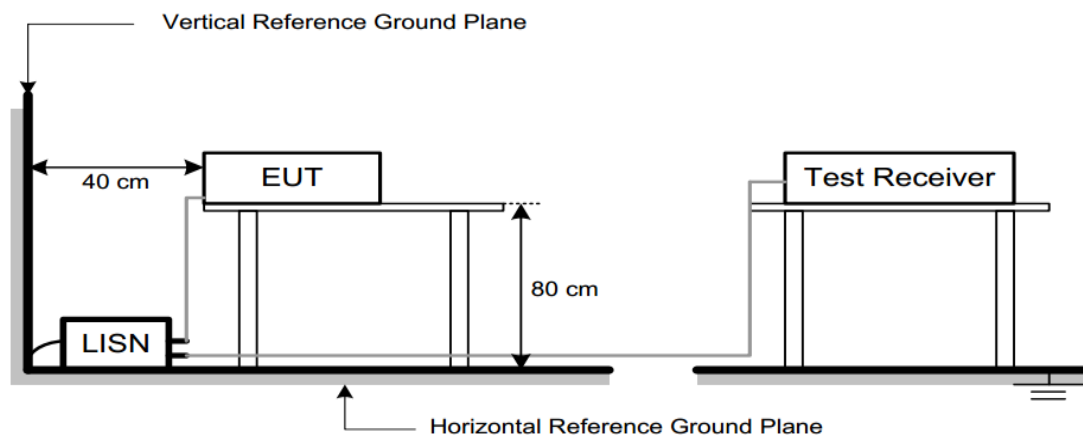
Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Record PC	Lenovo	M4500T	NA
2	Control PC	Lenovo	M4500T	NA

3.1.3 Test Procedure

Test Method	
☒ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☐ Lowest, Middle and Highest Channel	☐ Lowest and Highest Channel
Environmental conditions	
☒ Normal	☐ Normal and Extreme
Note: ● : Test ○ : No Test	

- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

3.1.4 Test Setup



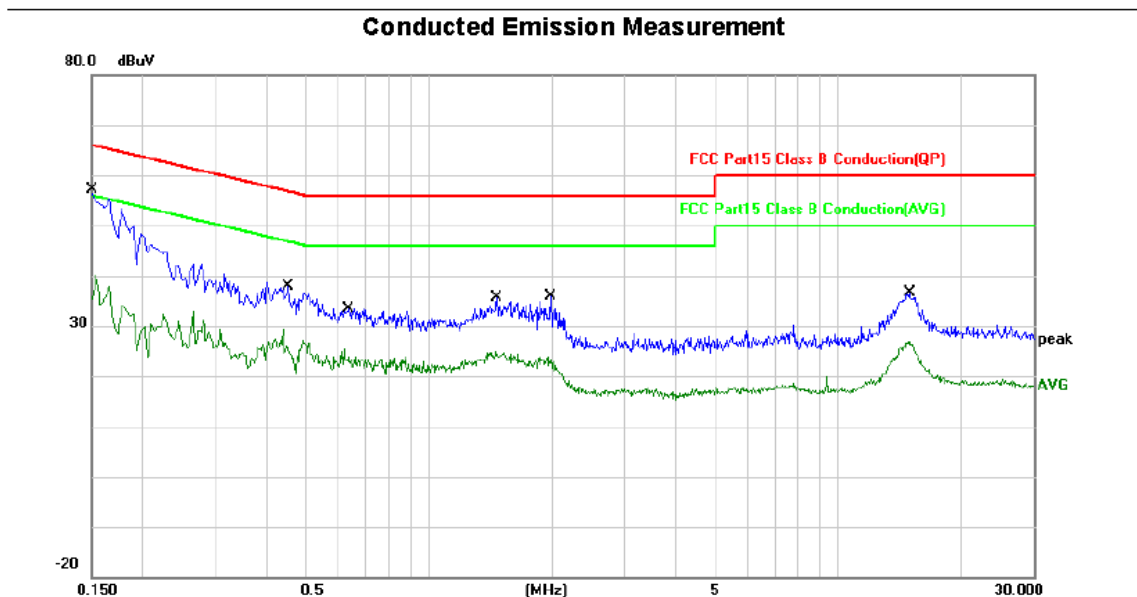
3.1.5 Test Result

Note:

1. Correct Factor = LISN Factor + Cable Loss + Pulse Limiter Factor, the value was added to Original Receiver Reading by the software automatically.
2. Measurement = Reading + Correct Factor.
3. Over = Measurement - Limit

150kHz~30MHz	Worst Case Operating Mode: Simultaneous transmission
--------------	--

Line



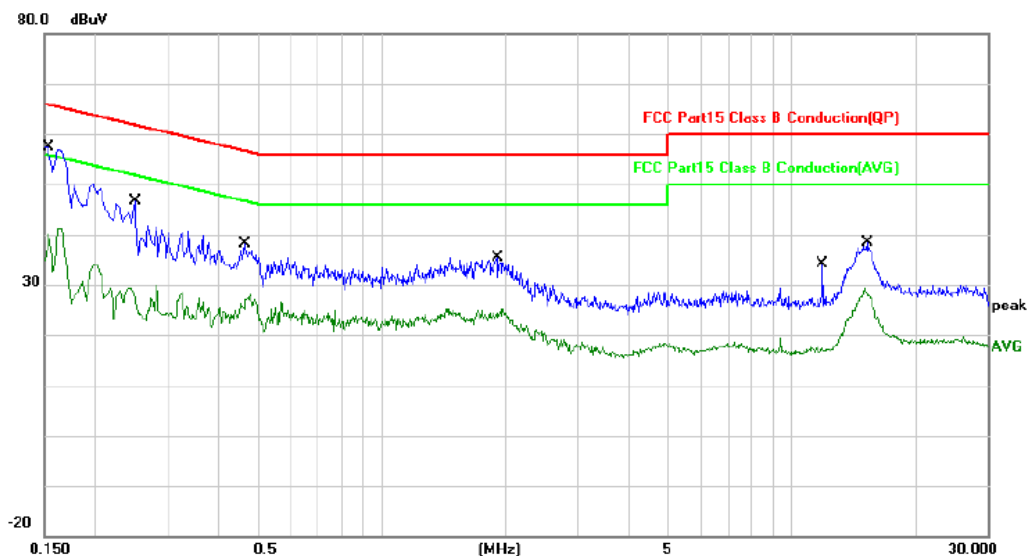
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1500	34.01	19.49	53.50	66.00	-12.50	QP	
2		0.1500	16.61	19.49	36.10	56.00	-19.90	AVG	
3		0.4540	12.33	19.53	31.86	56.80	-24.94	QP	
4		0.4540	4.63	19.53	24.16	46.80	-22.64	AVG	
5		0.6380	10.31	19.55	29.86	56.00	-26.14	QP	
6		0.6380	3.57	19.55	23.12	46.00	-22.88	AVG	
7		1.4700	9.26	19.80	29.06	56.00	-26.94	QP	
8		1.4700	4.12	19.80	23.92	46.00	-22.08	AVG	
9		1.9900	7.28	20.06	27.34	56.00	-28.66	QP	
10		1.9900	2.21	20.06	22.27	46.00	-23.73	AVG	
11		14.9820	8.84	21.67	30.51	60.00	-29.49	QP	
12		14.9820	3.05	21.67	24.72	50.00	-25.28	AVG	

150kHz~30MHz

Worst Case Operating Mode: Simultaneous transmission

Neutral

Conducted Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1	*	0.1540	35.31	19.70	55.01	65.78	-10.77	QP	
2		0.1540	17.64	19.70	37.34	55.78	-18.44	AVG	
3		0.2500	20.34	19.89	40.03	61.76	-21.73	QP	
4		0.2500	8.51	19.89	28.20	51.76	-23.56	AVG	
5		0.4620	14.40	19.73	34.13	56.66	-22.53	QP	
6		0.4620	6.39	19.73	26.12	46.66	-20.54	AVG	
7		1.9140	9.89	20.25	30.14	56.00	-25.86	QP	
8		1.9140	4.47	20.25	24.72	46.00	-21.28	AVG	
9		11.9020	-0.10	21.22	21.12	60.00	-38.88	QP	
10		11.9020	-4.73	21.22	16.49	50.00	-33.51	AVG	
11		15.2500	10.86	21.64	32.50	60.00	-27.50	QP	
12		15.2500	5.69	21.64	27.33	50.00	-22.67	AVG	

3.2 Radiated Emission and Band Edge

3.2.1 Limit

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

Frequency (MHz)	Distance Meters(m)	Field Strength Limit	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V})/\text{m}$
0.009 – 0.49	300	2400/F(kHz)	-
0.490 – 1.705	30	24000/F(kHz)	-
1.705 – 30	30	30	-
30~88	3	100	40.0
88~216	3	150	43.5
216~960	3	200	46.0
960~1000	3	500	54.0
Above 1000	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

Note: (1) Emission level $\text{dB}\mu\text{V} = 20 \log$ Emission level $\mu\text{V/m}$

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

3.2.2 Test Peripherals

Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Record PC	Lenovo	M4500T	NA
2	Control PC	Lenovo	M4500T	NA

3.2.3 Test Procedure

Test Method	
☐ Conducted Measurement	☒ Radiated Measurement
Test Channels	
☒ Lowest, Middle and Highest Channel	☐ Lowest and Highest Channel
Environmental conditions	
☒ Normal	☐ Normal and Extreme
Note: ☒ : Test ☐ : No Test	

a) The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1 GHz)

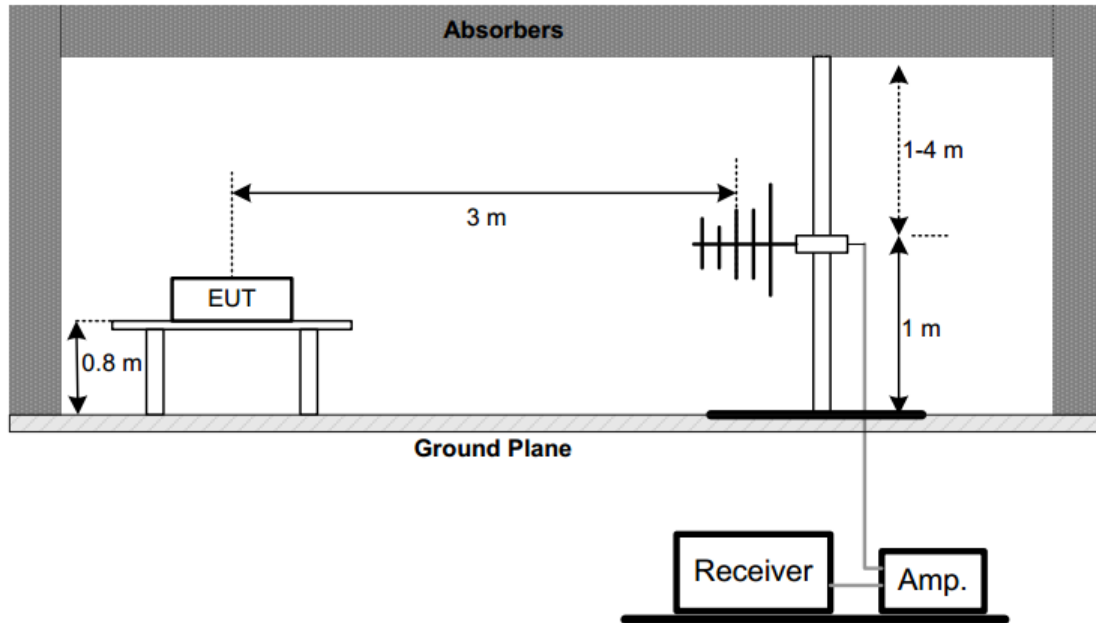
b) The measuring distance of 3 m or 1.5m shall be used for measurements. The EUT was placed

on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)

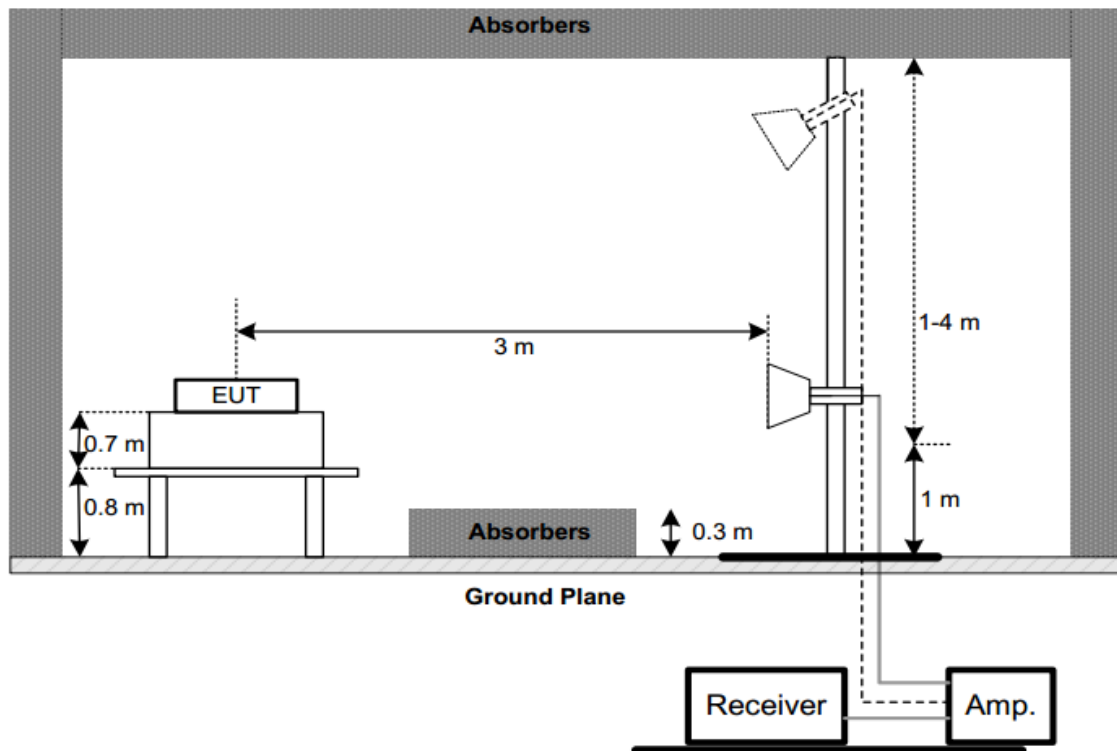
- c) The height of the equipment or of the substitution antenna shall be 0.8m or 1.5m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
- e) The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.
- f) The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- g) All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform. (below 1 GHz)
- h) All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (above 1 GHz)
- i) For the actual test configuration, please refer to the related Item -EUT Test Photos.

3.2.4 Test Setup

(A) Radiated Emission Test Set-Up Frequency 30 MHz-1000 MHz



(B) Radiated Emission Test Set-Up Frequency Above 1 GHz



3.2.5 Test Result

1) Radiated emission: 9KHz-30MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

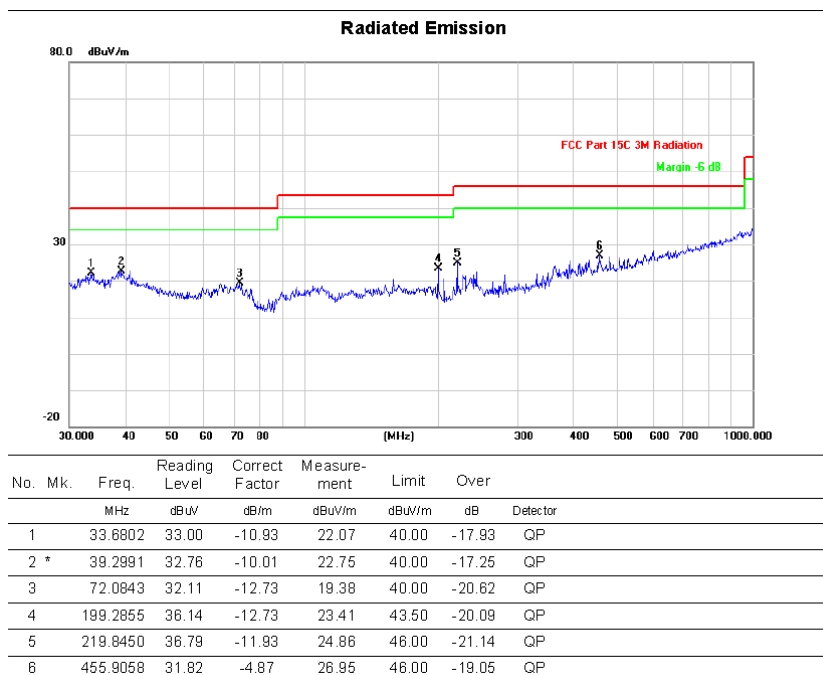
2) Radiated emission: 30MHz-1G

Note:

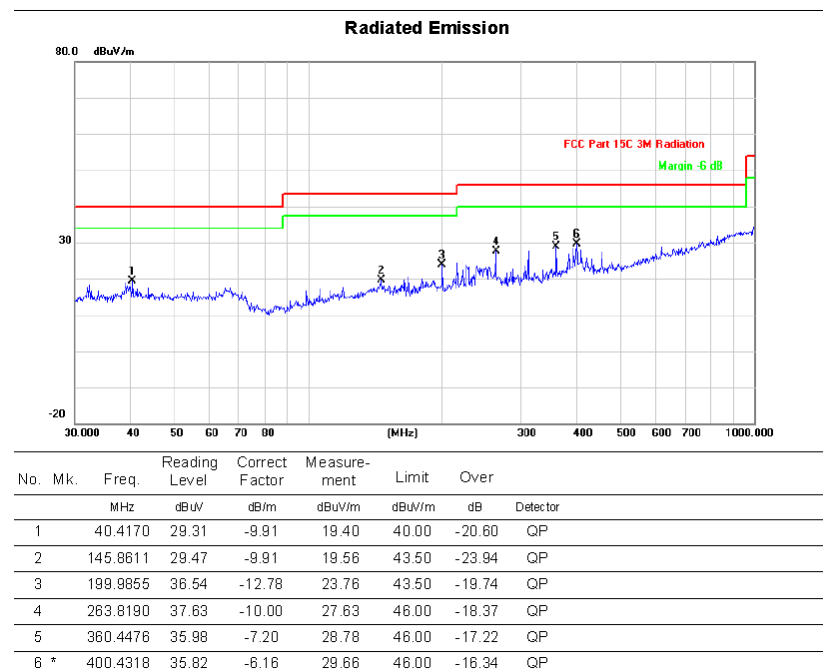
1. Measurement = Reading + Correct Factor.
2. Over = Measurement - Limit

Below 1G (30MHz~1GHz)	Test mode: 11B	Test Channel: 1
-----------------------	----------------	-----------------

VERTICAL



HORIZONTAL



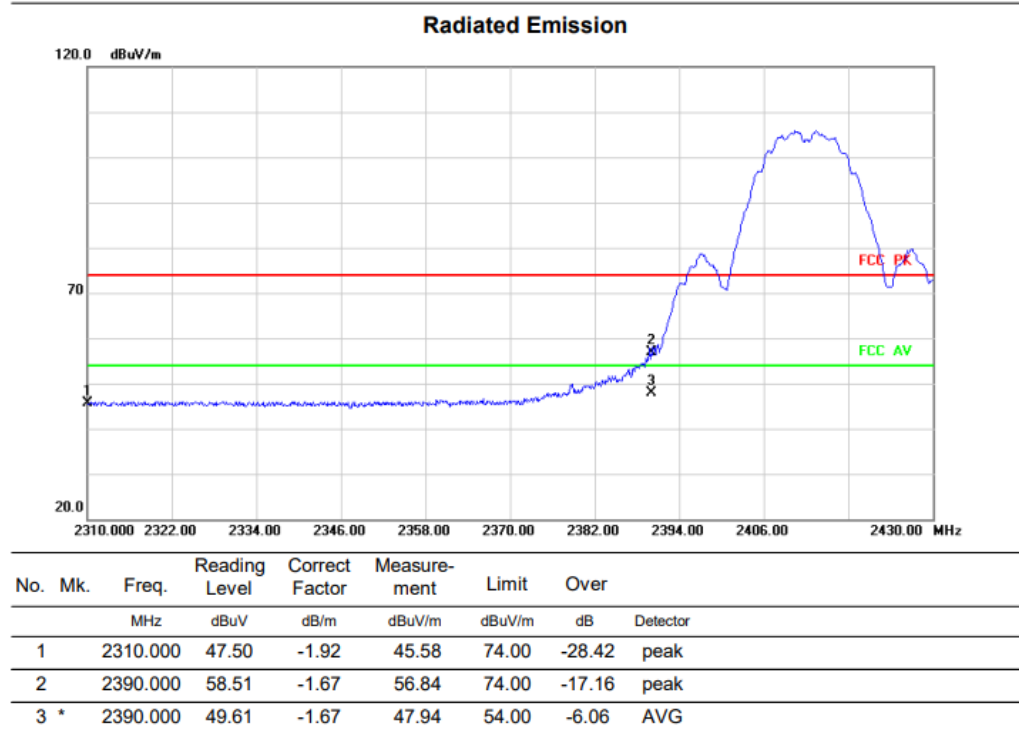
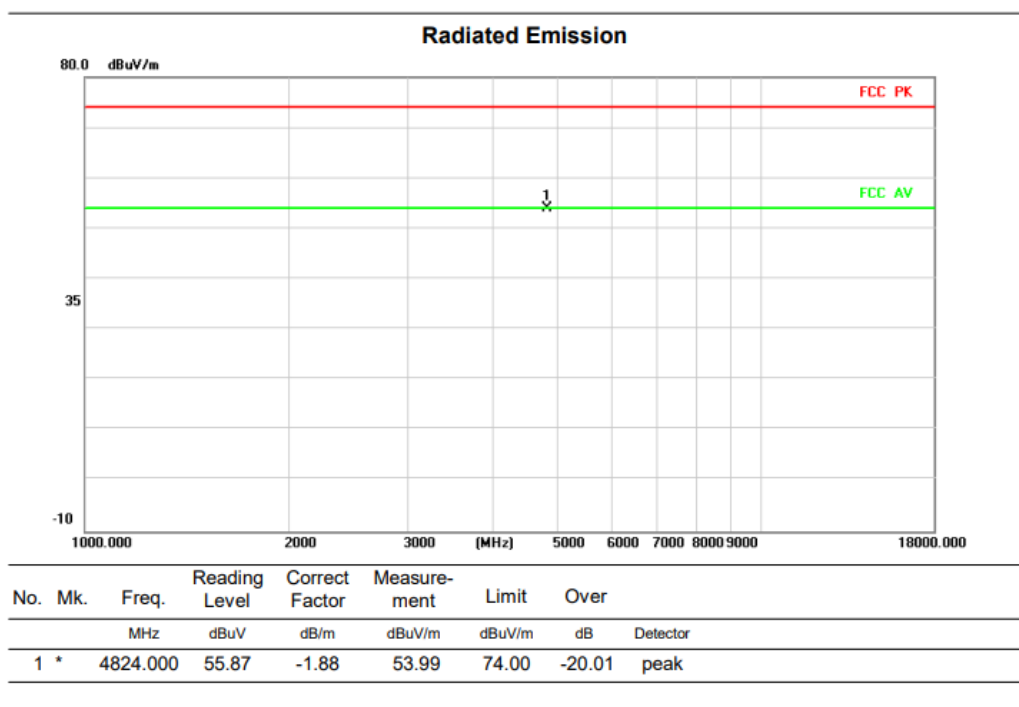
3) Radiated emission: Above 1G

Note:

1. Measurement = Reading + Correct Factor.
2. Over = Measurement – Limit

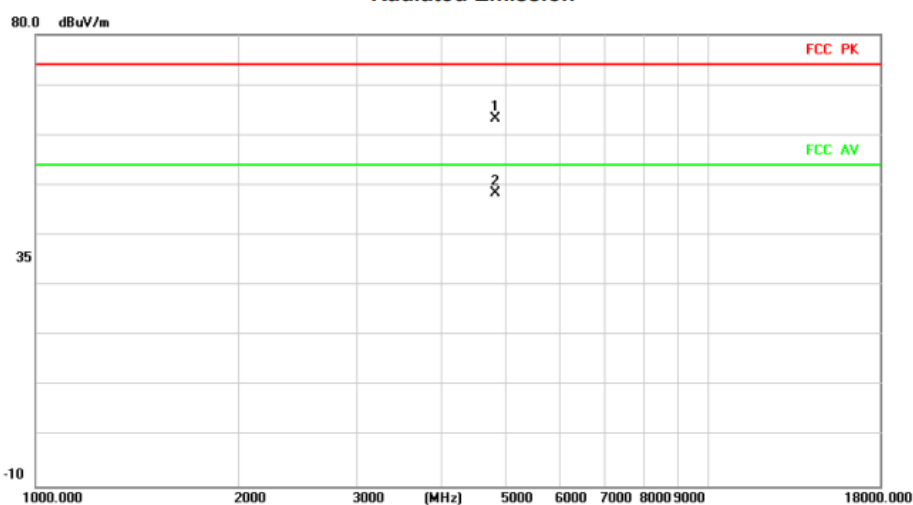
Above 1G (1GHz~26.5GHz)	Test mode:11B	Test Channel:1
-------------------------	---------------	----------------

VERTICAL



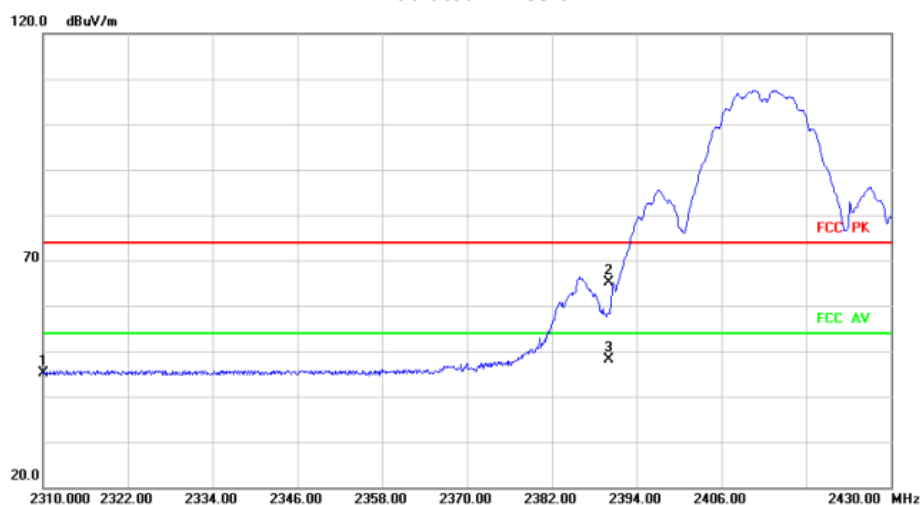
HORIZONTALA

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		4824.000	65.22	-1.88	63.34	74.00	-10.66 peak
2 *		4824.000	50.24	-1.88	48.36	54.00	-5.64 AVG

Radiated Emission



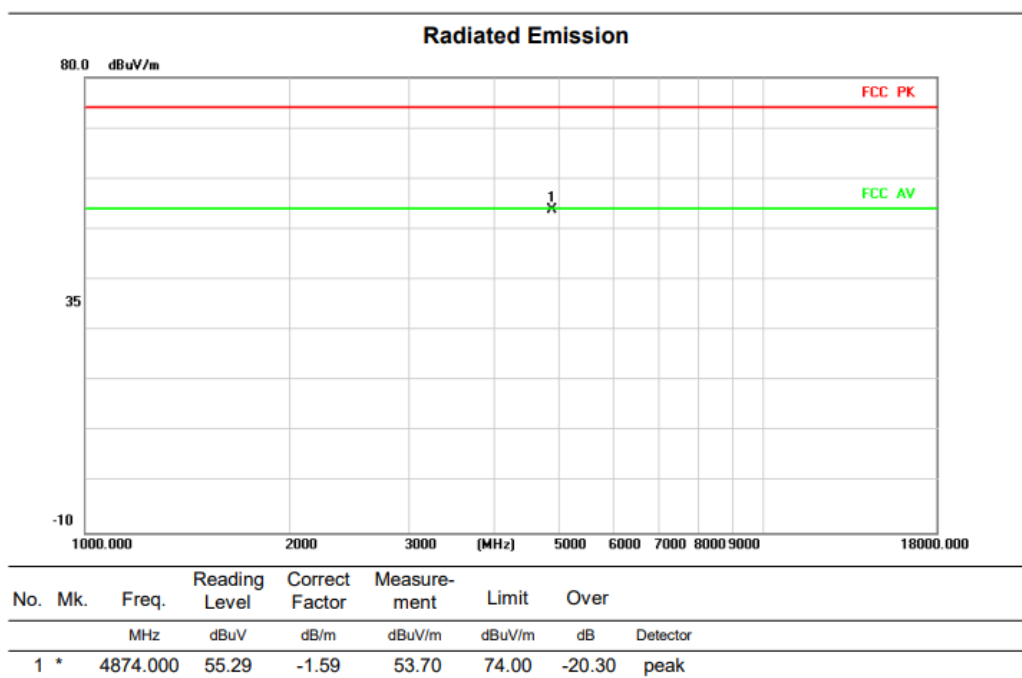
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		2310.000	47.04	-1.92	45.12	74.00	-28.88 peak
2		2390.000	66.78	-1.67	65.11	74.00	-8.89 peak
3 *		2390.000	49.80	-1.67	48.13	54.00	-5.87 AVG

Above 1G (1GHz~26.5GHz)

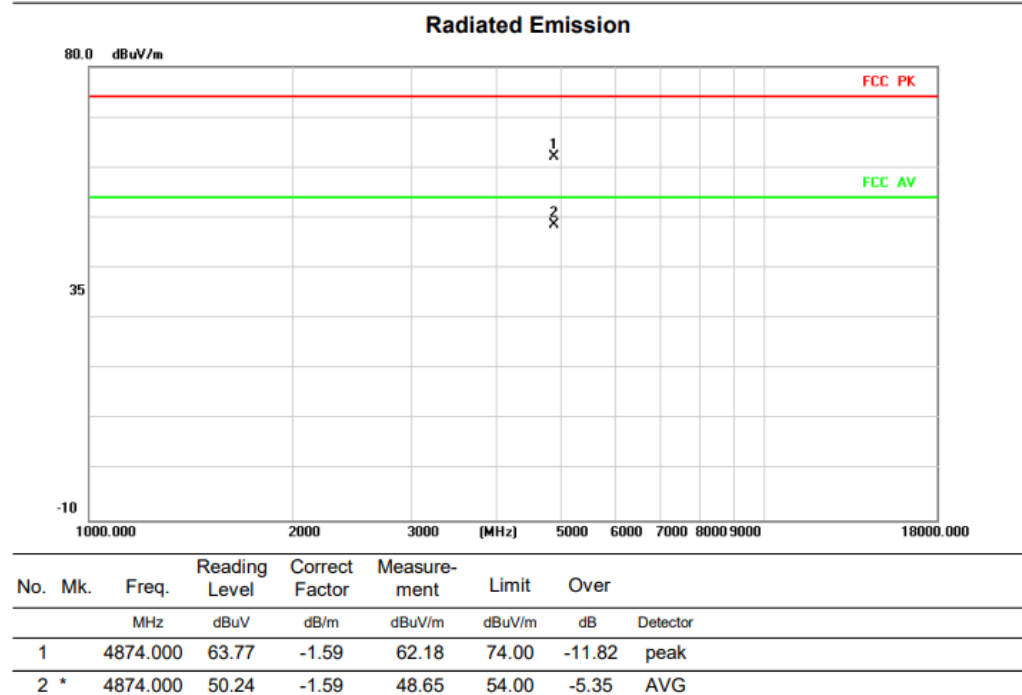
Test mode: 11B

Test Channel:6

VERTICAL



HORIZONTAL



Above 1G (1GHz~26.5GHz)

Test mode: 11B

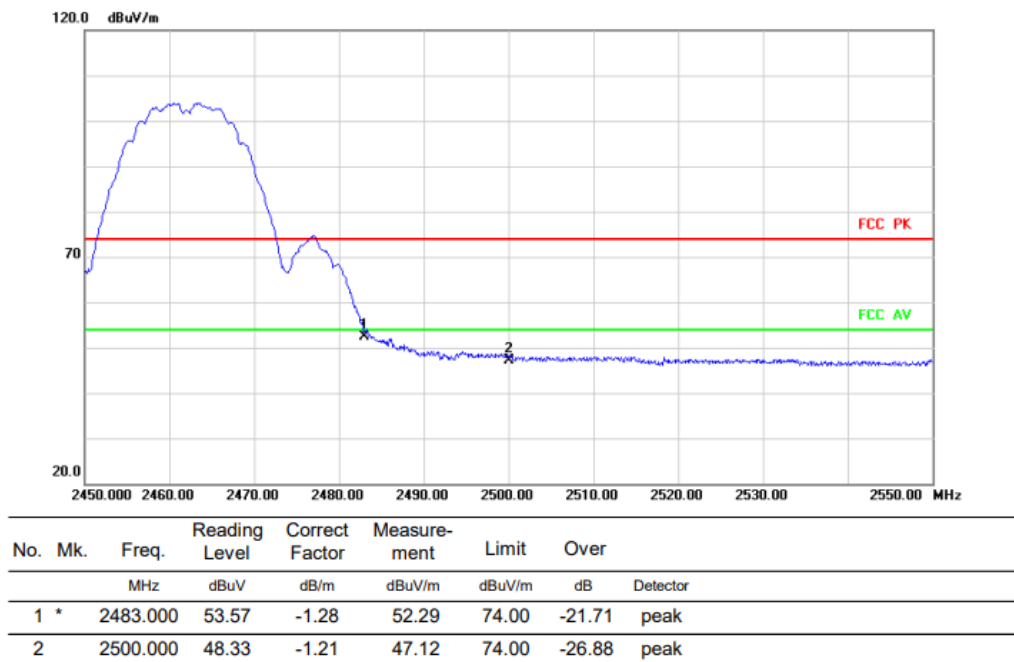
Test Channel:11

VERTICAL

Radiated Emission



Radiated Emission

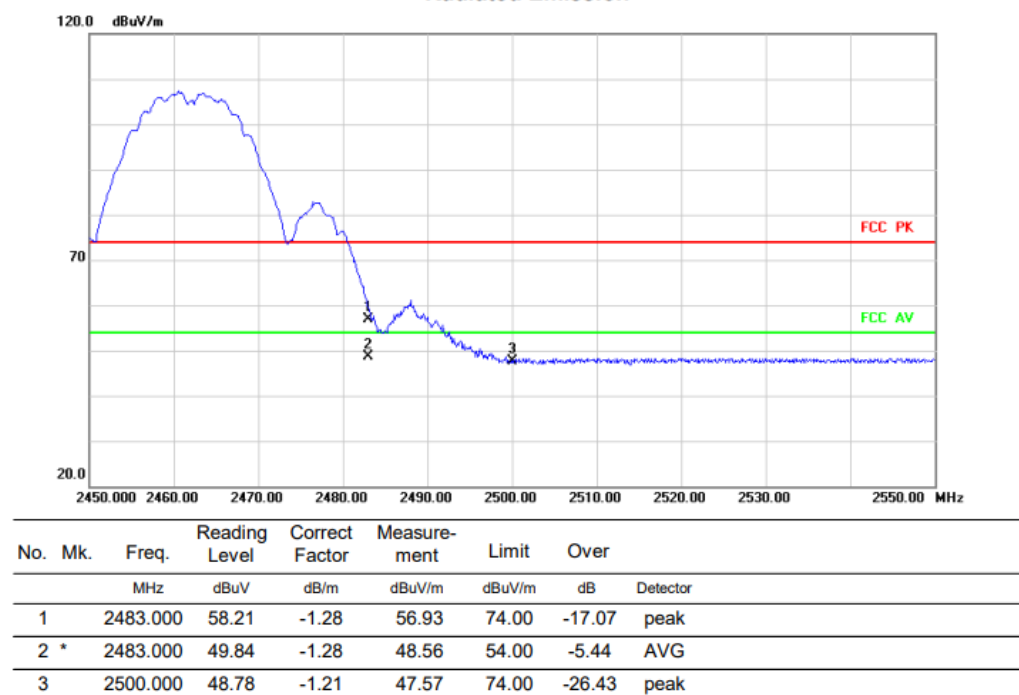


HORIZONTALA

Radiated Emission



Radiated Emission

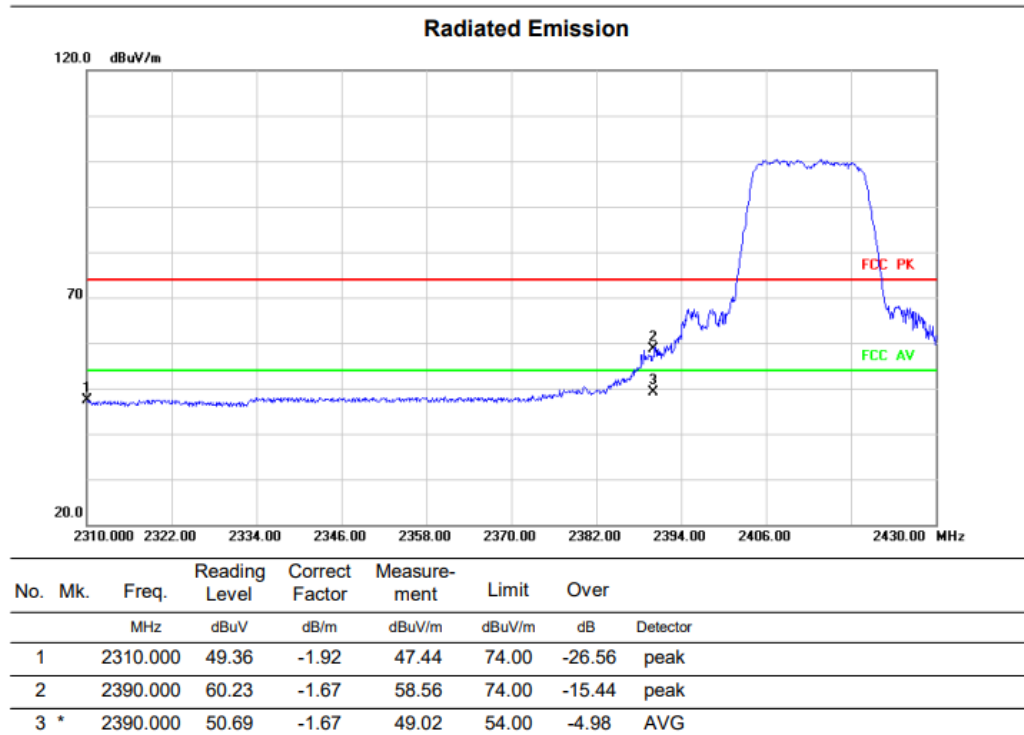
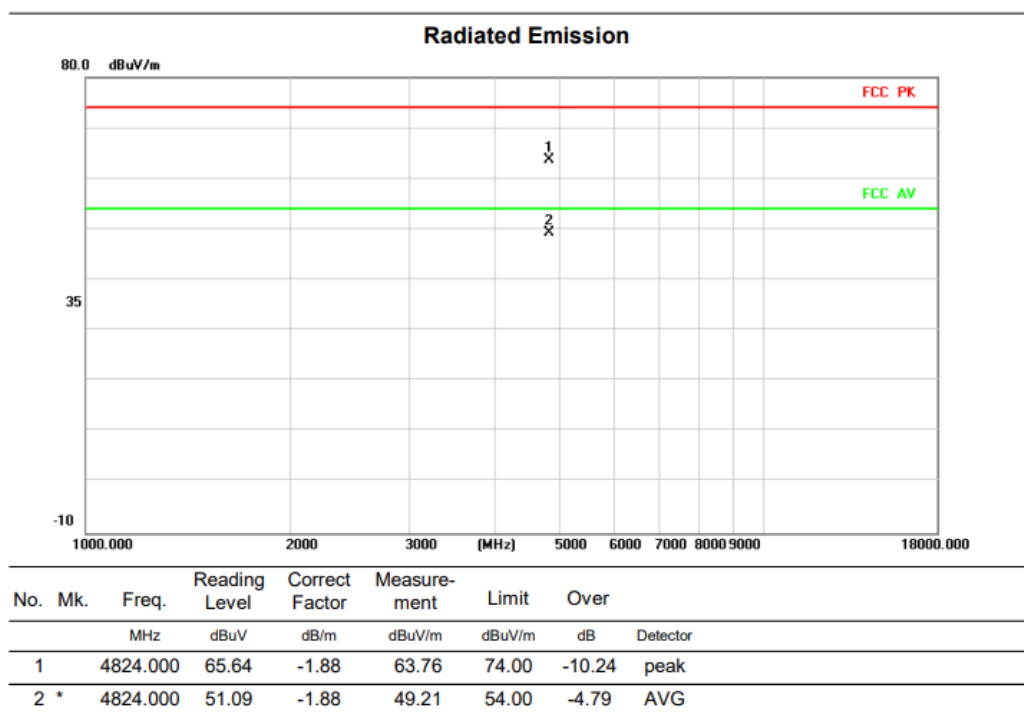


Above 1G (1GHz~26.5GHz)

Test mode: 11G

Test Channel:1

VERTICAL

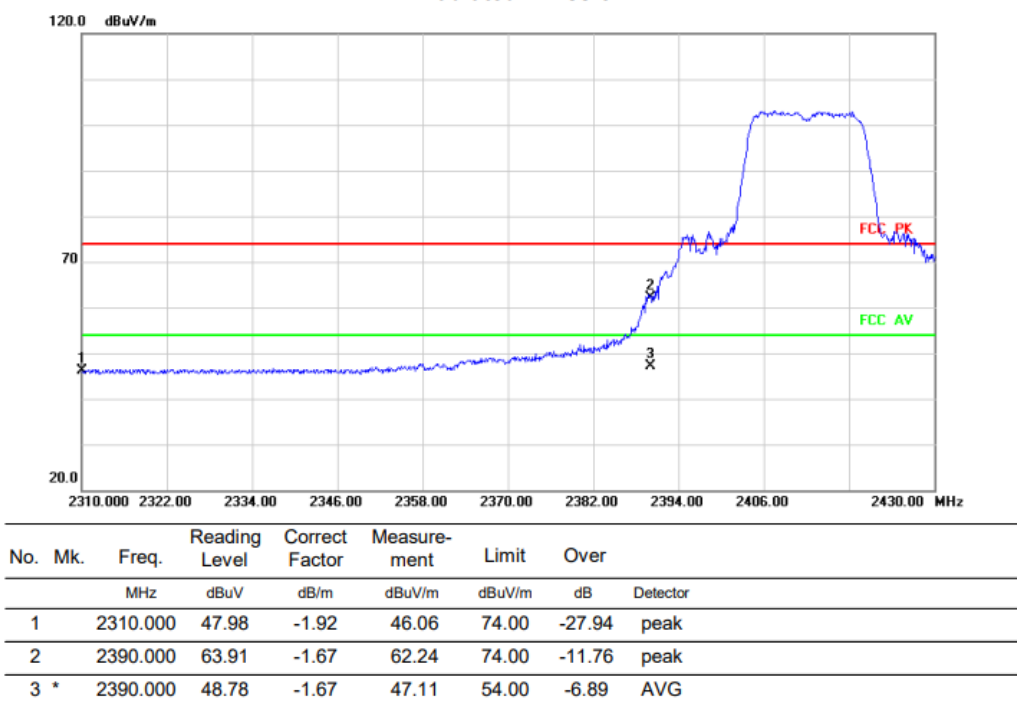


HORIZONTALA

Radiated Emission



Radiated Emission

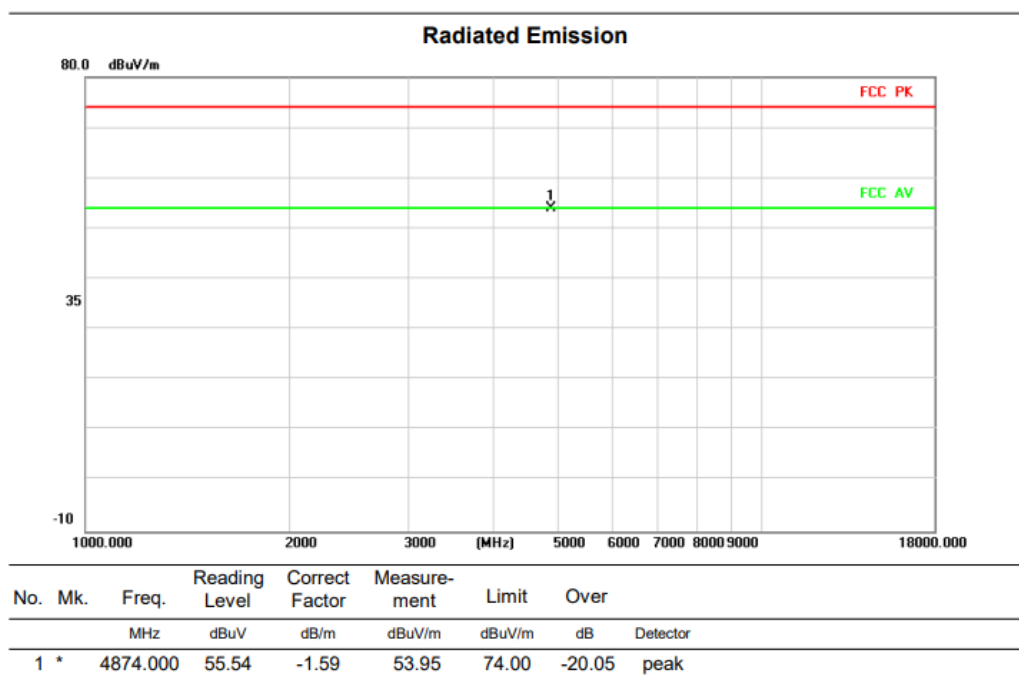


Above 1G (1GHz~26.5GHz)

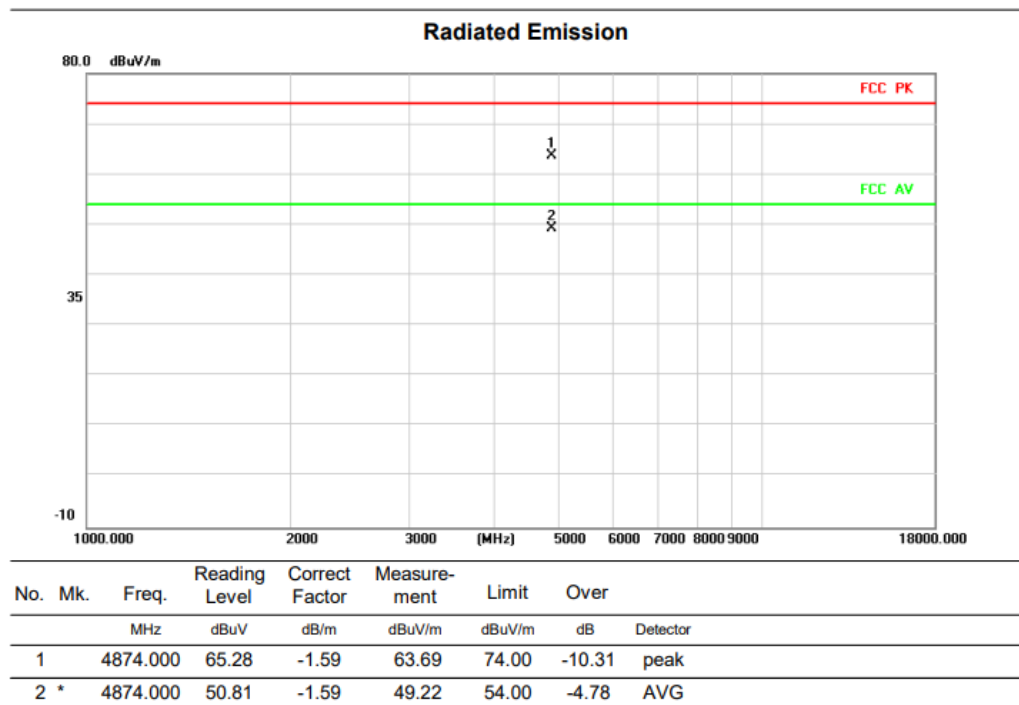
Test mode: 11G

Test Channel:6

VERTICAL



HORIZONTAL



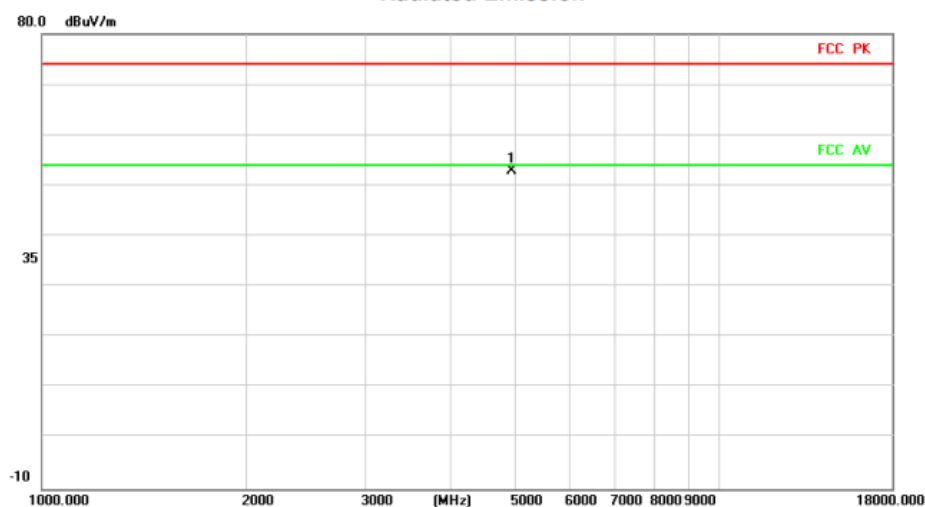
Above 1G (1GHz~26.5GHz)

Test mode: 11G

Test Channel:11

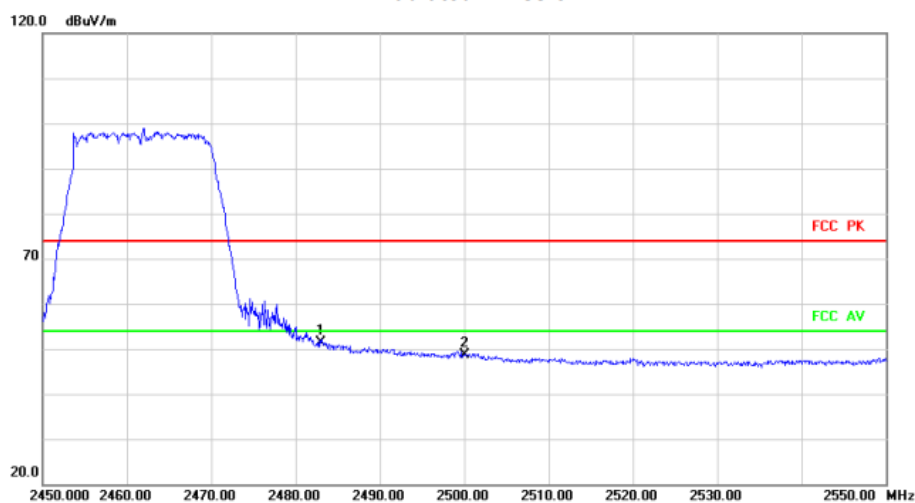
VERTICAL

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1	*	4924.000	54.13	-1.30	52.83	74.00	-21.17 peak

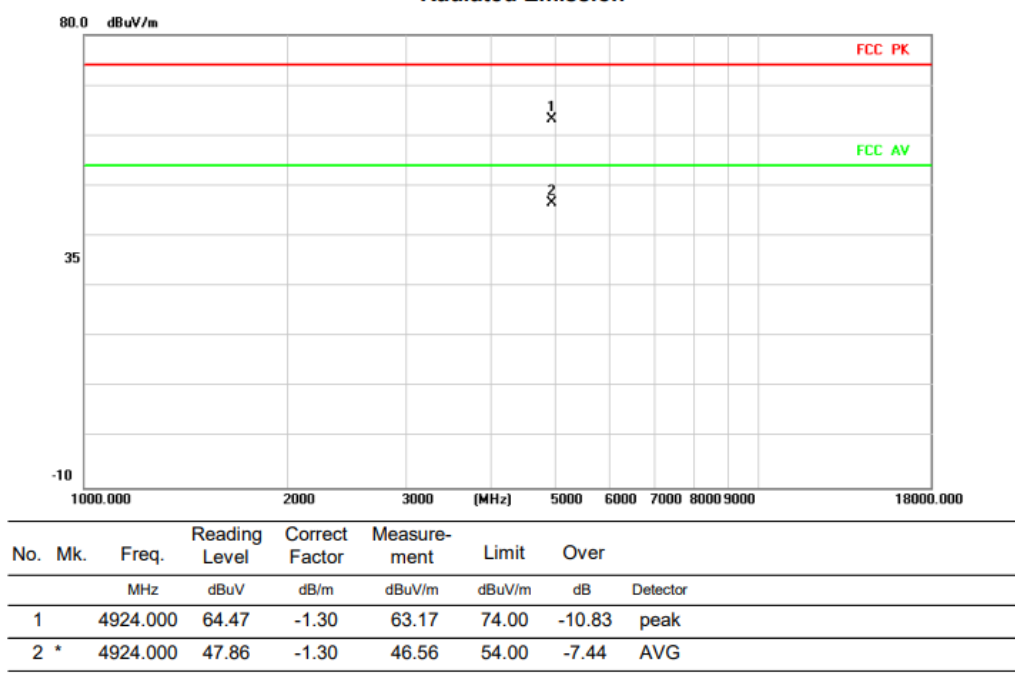
Radiated Emission



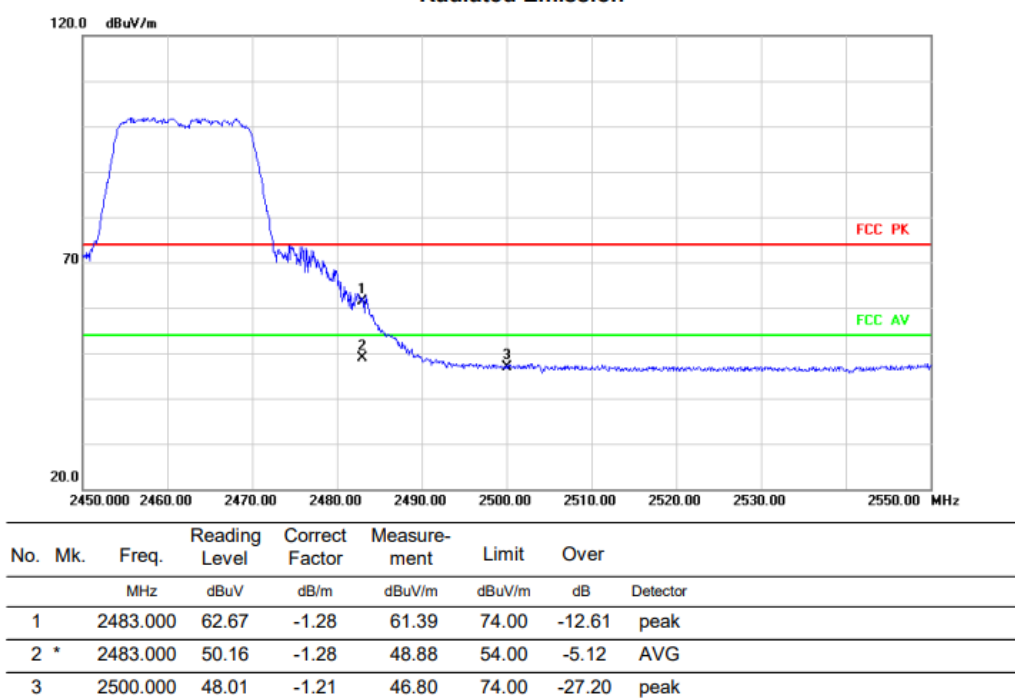
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1	*	2483.000	52.77	-1.28	51.49	74.00	-22.51 peak
2		2500.000	49.80	-1.21	48.59	74.00	-25.41 peak

HORIZONTALA

Radiated Emission



Radiated Emission



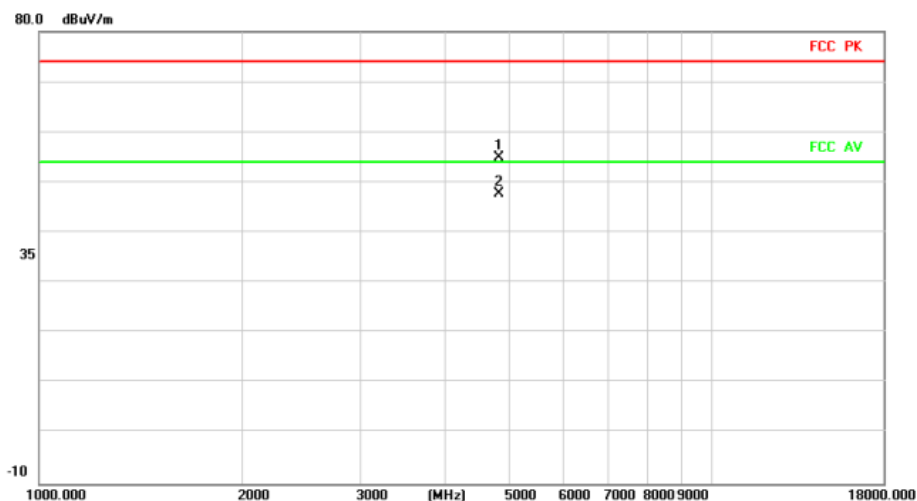
Above 1G (1GHz~26.5GHz)

Test mode: 11N20MIMO

Test Channel:1

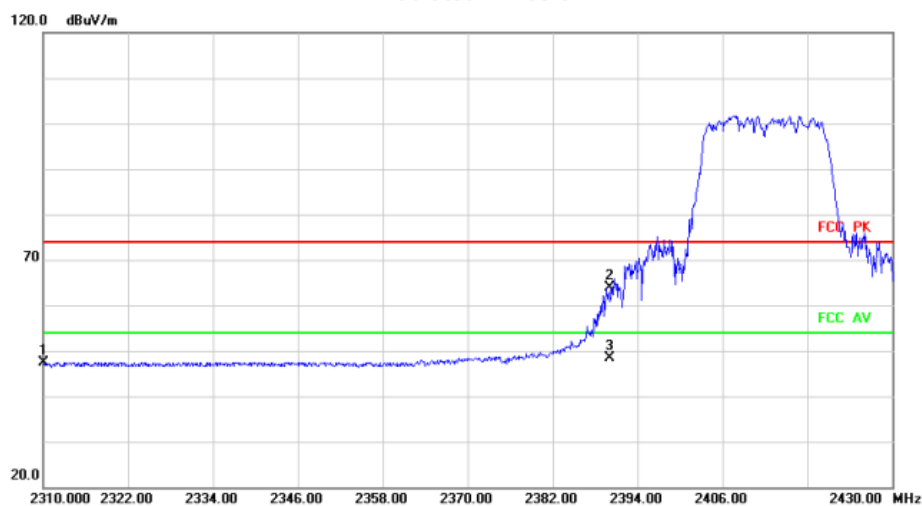
VERTICAL

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1		4824.000	56.85	-1.88	54.97	74.00	-19.03 peak
2 *		4824.000	49.53	-1.88	47.65	54.00	-6.35 AVG

Radiated Emission



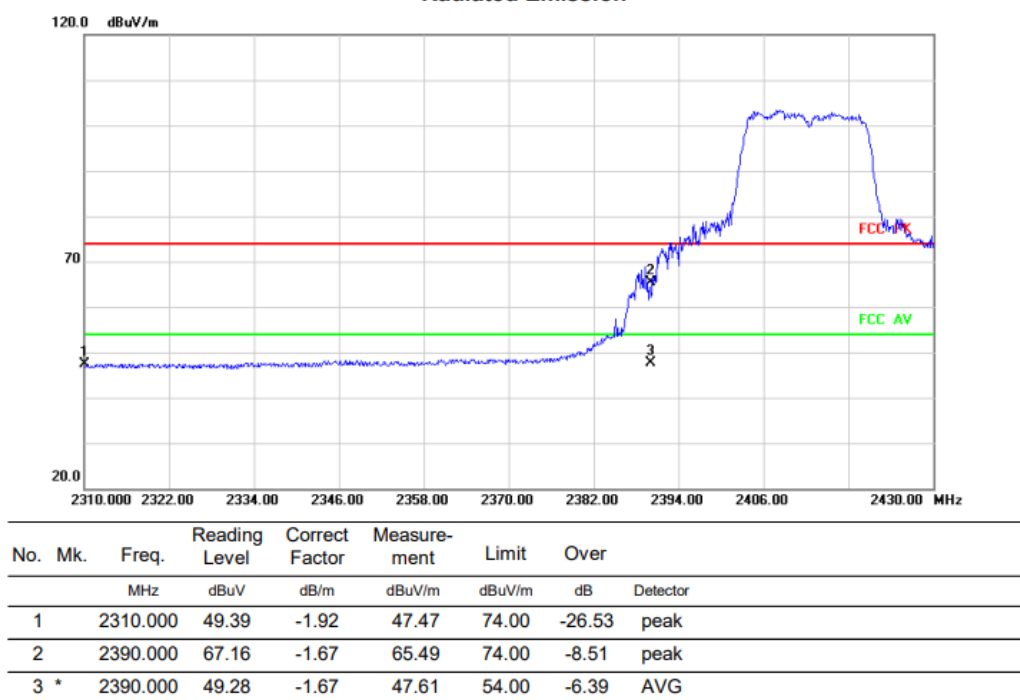
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1		2310.000	49.18	-1.92	47.26	74.00	-26.74 peak
2		2390.000	65.63	-1.67	63.96	74.00	-10.04 peak
3 *		2390.000	50.17	-1.67	48.50	54.00	-5.50 AVG

HORIZONTALA

Radiated Emission



Radiated Emission

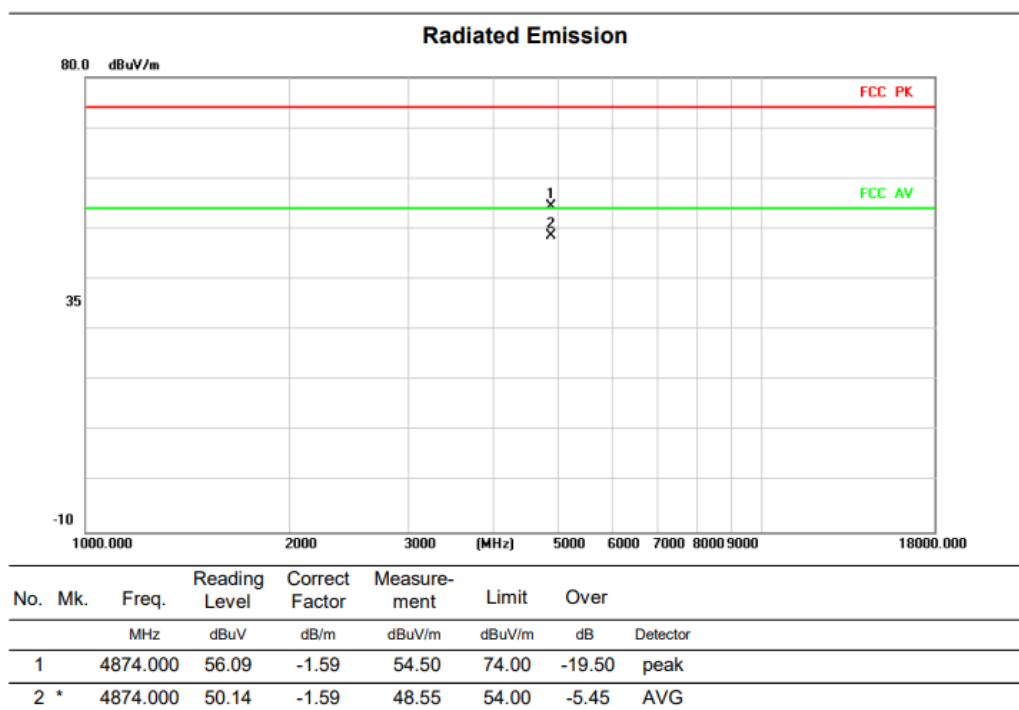


Above 1G (1GHz~26.5GHz)

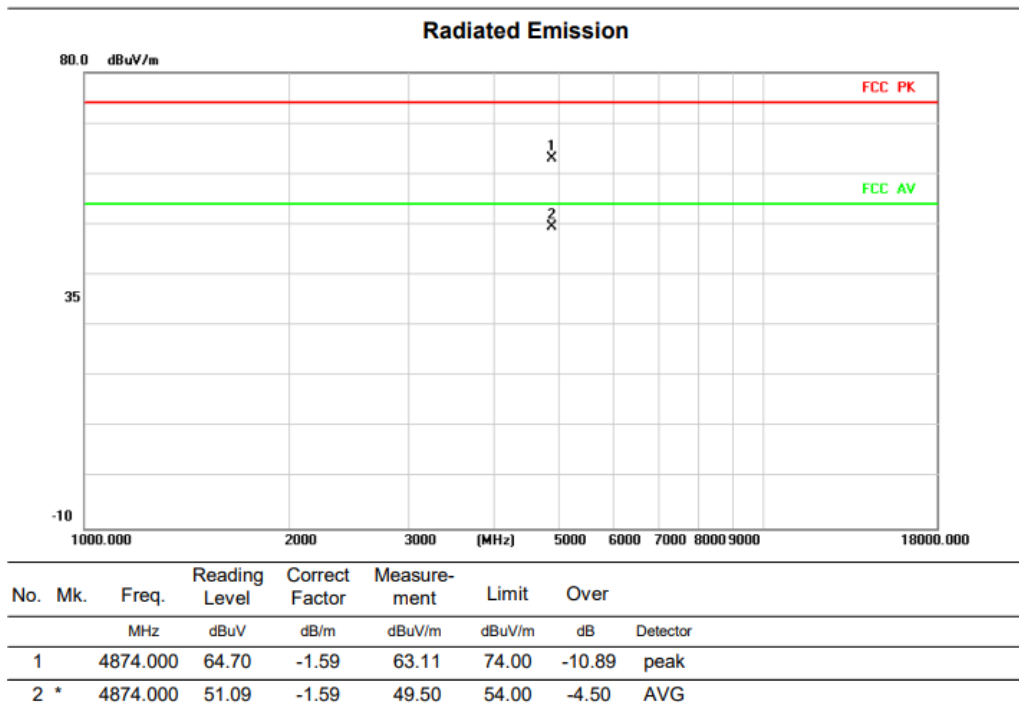
Test mode: 11N20MIMO

Test Channel:6

VERTICAL



HORIZONTAL

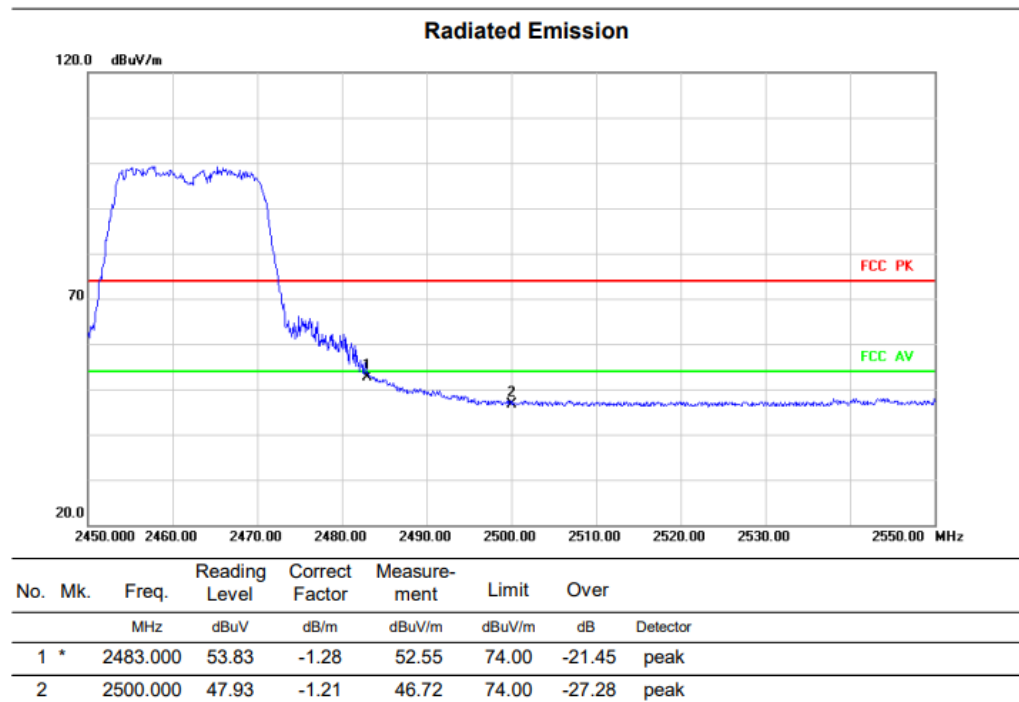
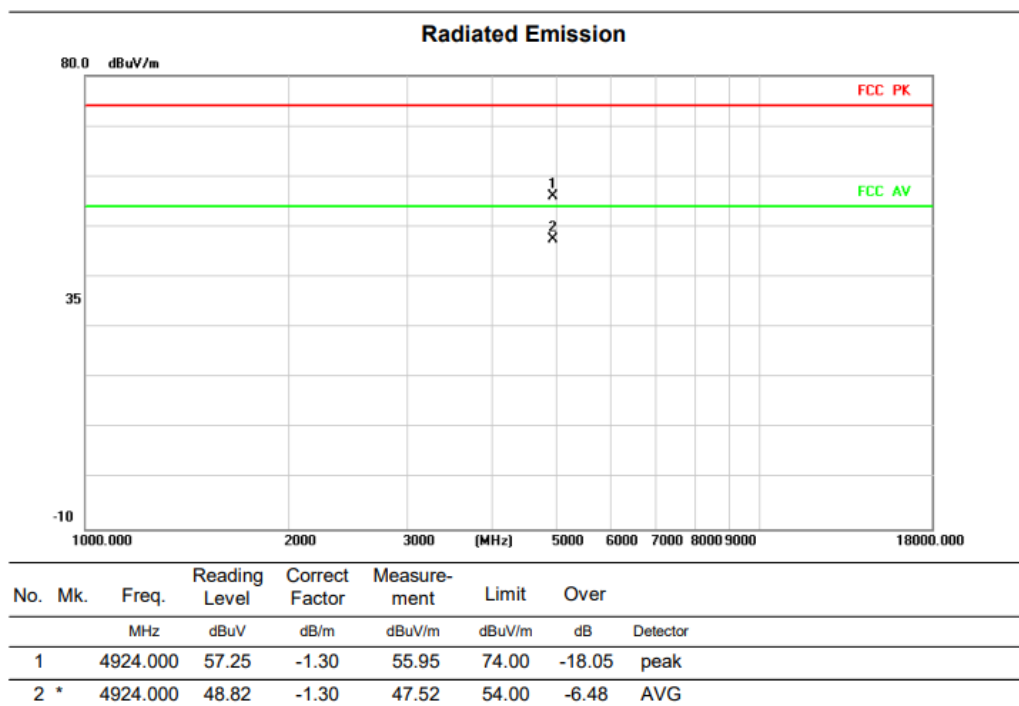


Above 1G (1GHz~26.5GHz)

Test mode: 11N20MIMO

Test Channel:11

VERTICAL

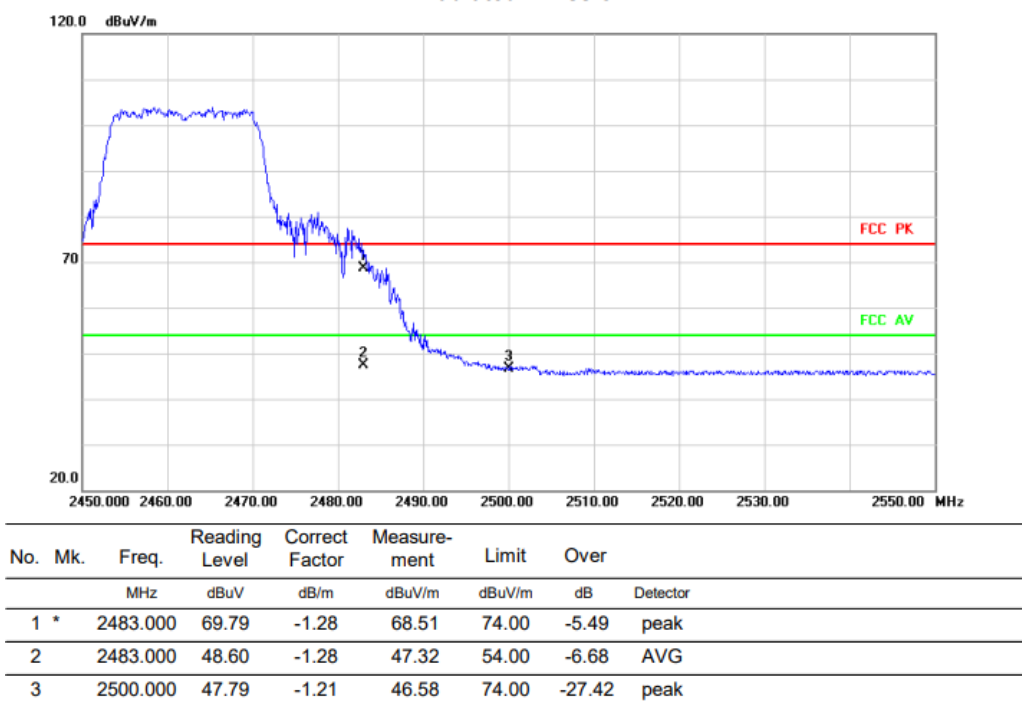


HORIZONTALA

Radiated Emission



Radiated Emission



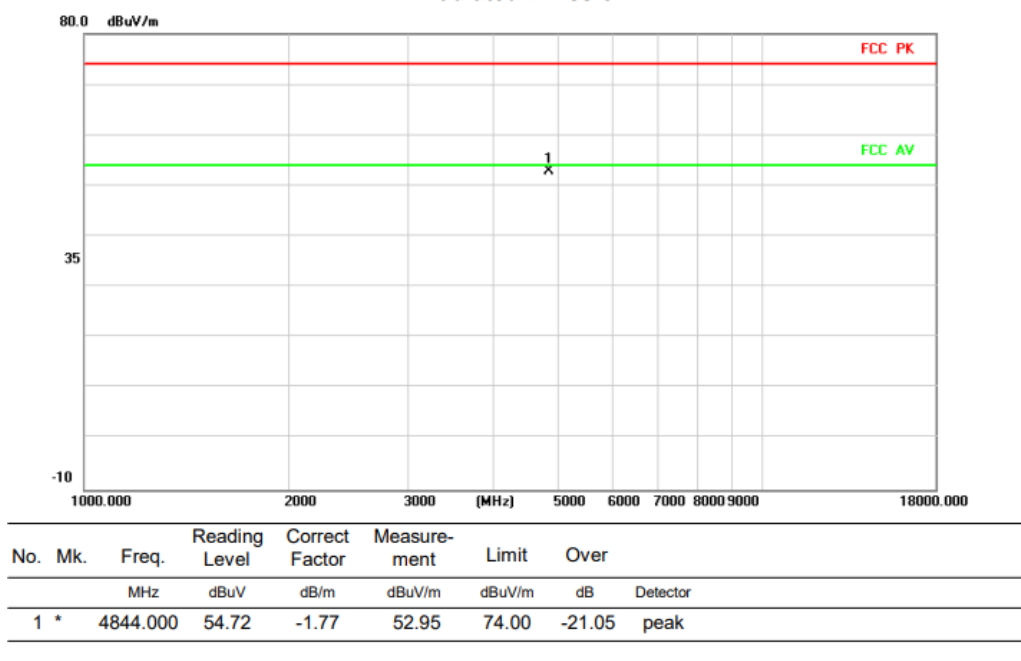
Above 1G (1GHz~26.5GHz)

Test mode: 11N40MIMO

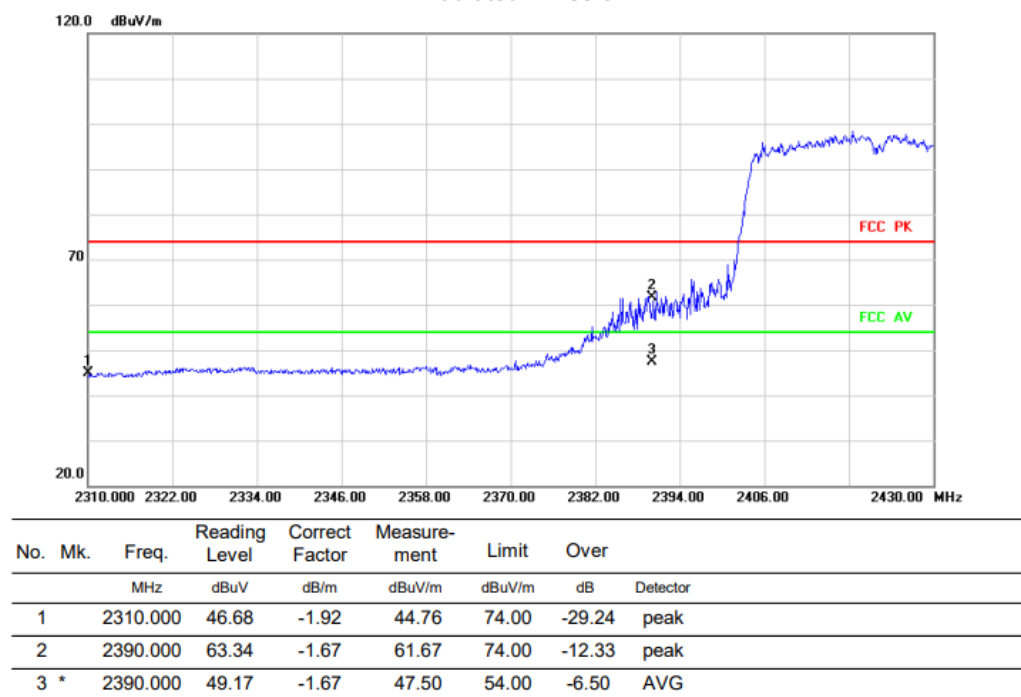
Test Channel:3

VERTICAL

Radiated Emission



Radiated Emission

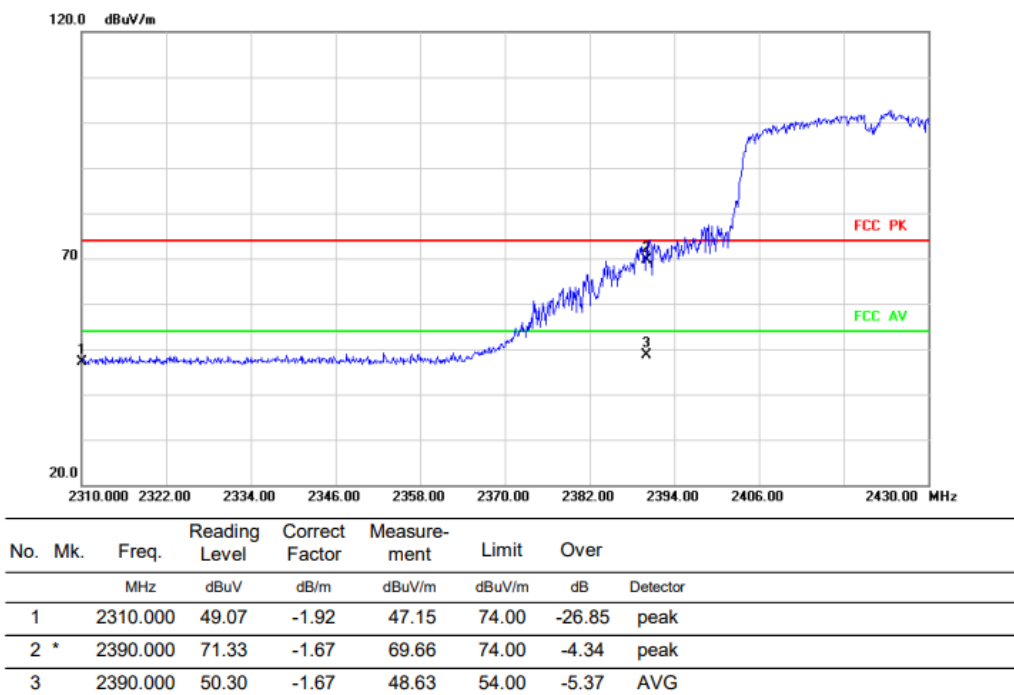


HORIZONTALA

Radiated Emission



Radiated Emission

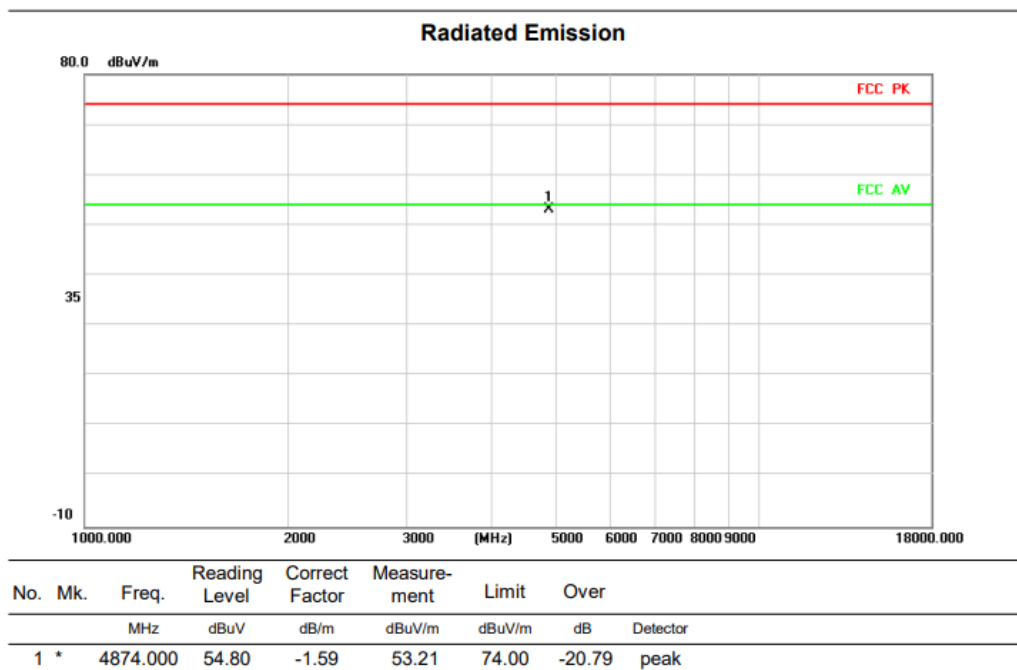


Above 1G (1GHz~26.5GHz)

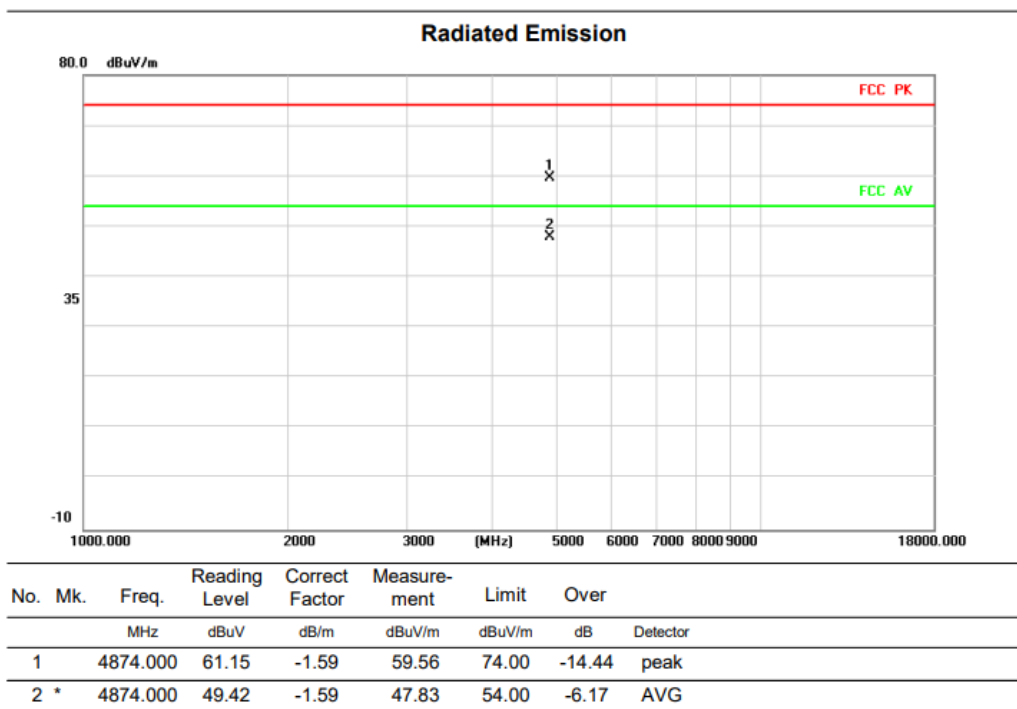
Test mode: 11N40MIMO

Test Channel:6

VERTICAL



HORIZONTAL

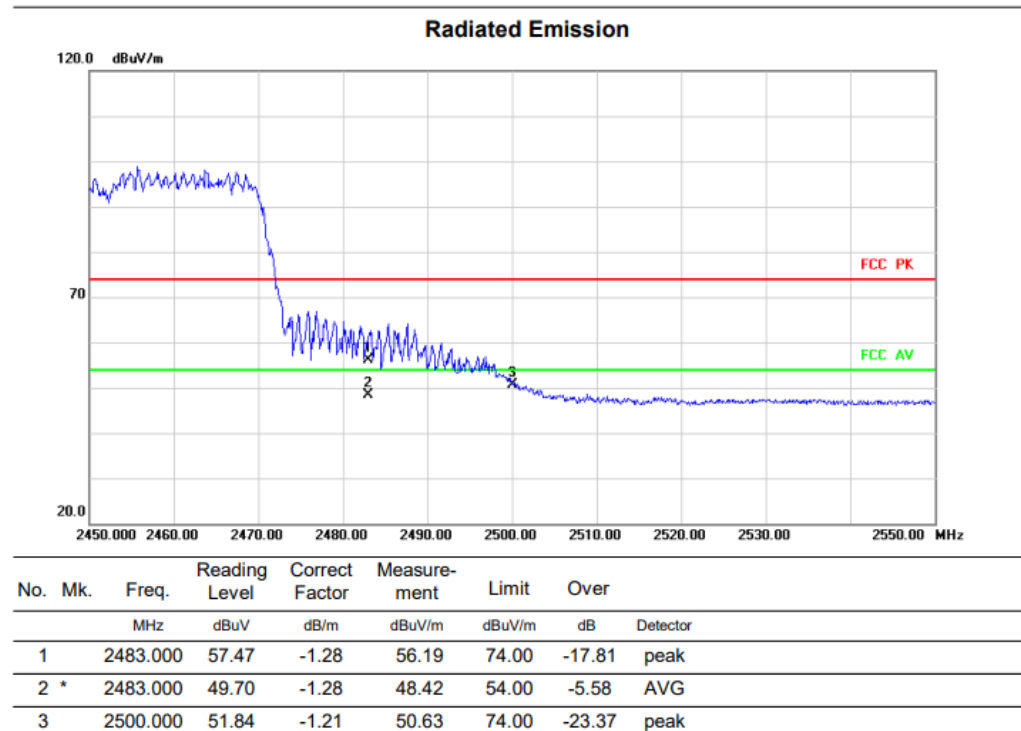
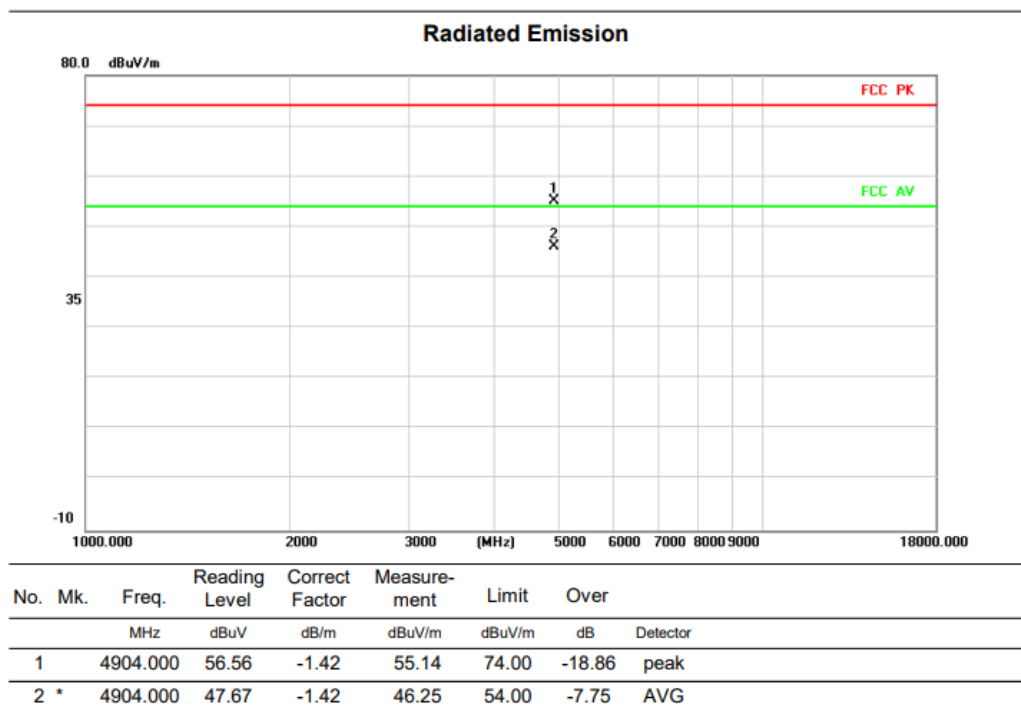


Above 1G (1GHz~26.5GHz)

Test mode: 11N40MIMO

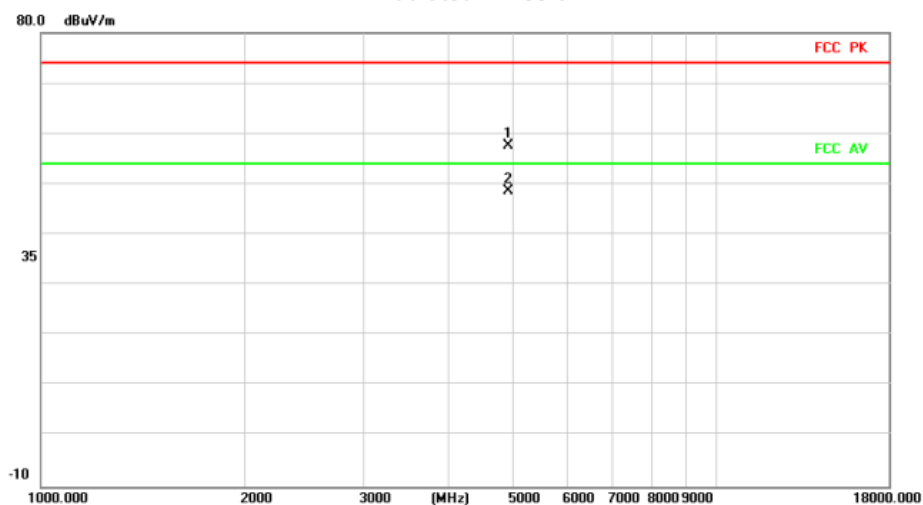
Test Channel:9

VERTICAL



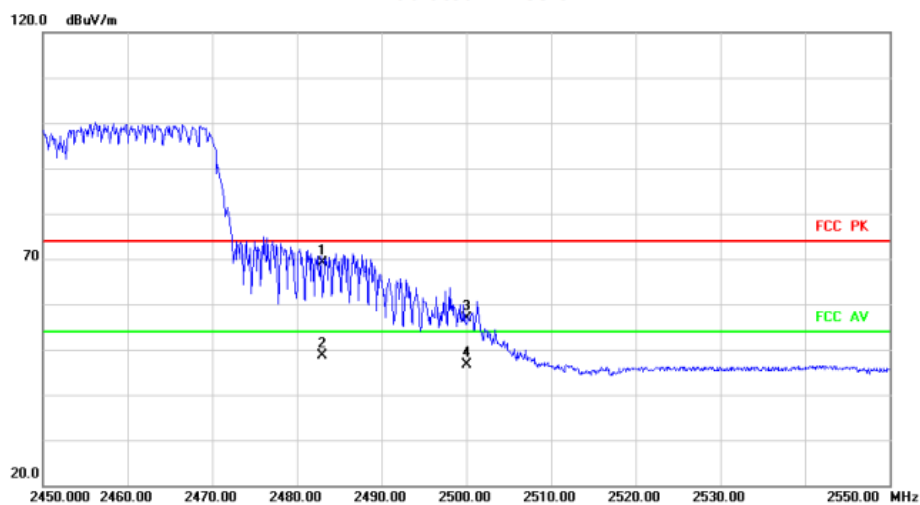
HORIZONTALA

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1		4904.000	59.11	-1.42	57.69	74.00	-16.31 peak
2 *		4904.000	50.08	-1.42	48.66	54.00	-5.34 AVG

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1 *		2483.000	70.31	-1.28	69.03	74.00	-4.97 peak
2		2483.000	49.91	-1.28	48.63	54.00	-5.37 AVG
3		2500.000	57.98	-1.21	56.77	74.00	-17.23 peak
4		2500.000	47.73	-1.21	46.52	54.00	-7.48 AVG

3.3 Spurious Emission at Antenna Port

3.3.1 Limit

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 a radiated measurement, provided the transmitter demonstrates compliance with the peak Output Power limits. If the transmitter complies with the Output Power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

3.3.2 Test Peripherals

Support Equipment				
No.	Equipment	Brand Name	Model Name	Remarks
1	Record PC	Lenovo	M4500T	NA
2	Control PC	Lenovo	M4500T	NA

3.3.3 Test Procedure

Test Method	
☒ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☒ Lowest, Middle and Highest Channel	☐ Lowest and Highest Channel
Environmental conditions	
☒ Normal	☐ Normal and Extreme
Note: ☒ : Test ☐ : No Test	

a) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.

b) Spectrum Setting as below:

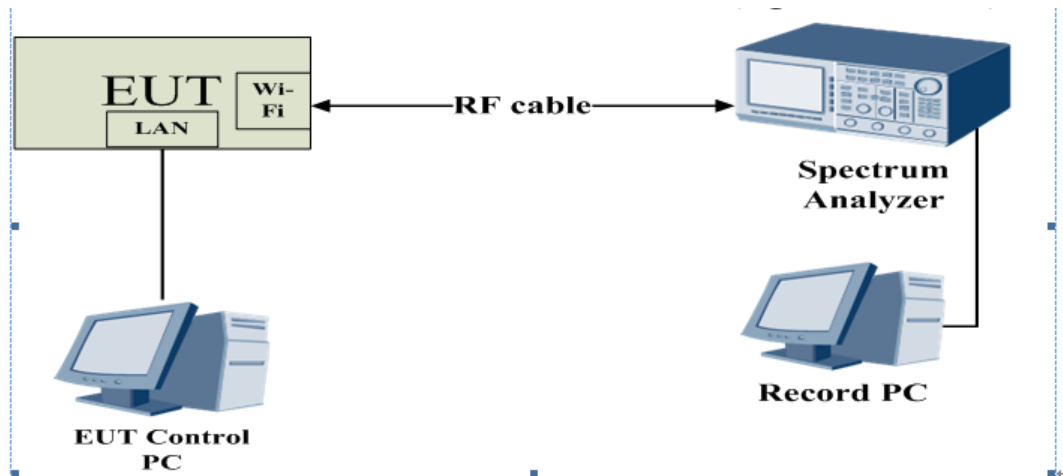
Centre Frequency	The centre frequency of the channel under test
RBW	100 kHz
VBW	300 kHz
Frequency span	2 x Nominal Channel Bandwidth
Detector Mode	Peak
Trace Mode	Max Hold
Sweep Time	Auto Couple

c) Allow trace to full stabilize.

d) Use the peak marker function to determine the maximum power level in any 100kHz band

segment within the fundamental EBW.

3.3.4 Test Setup



3.3.5 The Result

3.3.5.1. Conducted Spurious Emission

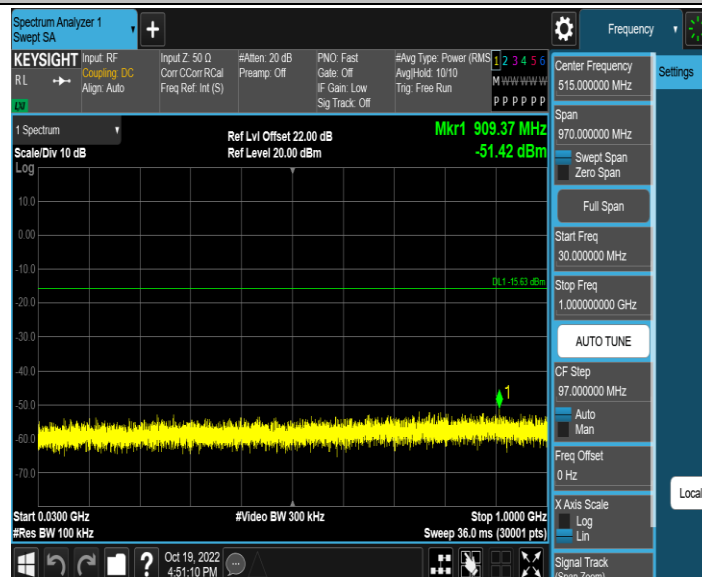
TestMode	Antenna	Channel	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	Reference	4.37	4.37	---	PASS
			30~1000	4.37	-51.42	≤-15.63	PASS
			1000~26500	4.37	-39.12	≤-15.63	PASS
	Ant2	2412	Reference	5.53	5.53	---	PASS
			30~1000	5.53	-51.65	≤-14.47	PASS
			1000~26500	5.53	-38.99	≤-14.47	PASS
	Ant1	2437	Reference	5.51	5.51	---	PASS
			30~1000	5.51	-51.78	≤-14.49	PASS
			1000~26500	5.51	-38.86	≤-14.49	PASS
	Ant2	2437	Reference	4.98	4.98	---	PASS
			30~1000	4.98	-50.97	≤-15.02	PASS
			1000~26500	4.98	-39.46	≤-15.02	PASS
	Ant1	2462	Reference	4.60	4.60	---	PASS
			30~1000	4.60	-51.44	≤-15.4	PASS
			1000~26500	4.60	-39.28	≤-15.4	PASS
	Ant2	2462	Reference	3.05	3.05	---	PASS
			30~1000	3.05	-51.72	≤-16.95	PASS
			1000~26500	3.05	-39.18	≤-16.95	PASS
11G	Ant1	2412	Reference	-1.15	-1.15	---	PASS
			30~1000	-1.15	-51.44	≤-21.15	PASS
			1000~26500	-1.15	-39.72	≤-21.15	PASS
	Ant2	2412	Reference	-2.33	-2.33	---	PASS
			30~1000	-2.33	-50.71	≤-22.33	PASS
			1000~26500	-2.33	-39.29	≤-22.33	PASS
	Ant1	2437	Reference	-2.80	-2.80	---	PASS
			30~1000	-2.80	-51.9	≤-22.8	PASS
			1000~26500	-2.80	-38.3	≤-22.8	PASS
	Ant2	2437	Reference	-3.29	-3.29	---	PASS
			30~1000	-3.29	-51.24	≤-23.29	PASS
			1000~26500	-3.29	-39.5	≤-23.29	PASS
	Ant1	2462	Reference	-3.28	-3.28	---	PASS
			30~1000	-3.28	-51.38	≤-23.28	PASS
			1000~26500	-3.28	-39.26	≤-23.28	PASS
	Ant2	2462	Reference	-3.31	-3.31	---	PASS
			30~1000	-3.31	-51.55	≤-23.31	PASS
			1000~26500	-3.31	-38.89	≤-23.31	PASS
11N20MIMO	Ant1	2412	Reference	-5.34	-5.34	---	PASS
			30~1000	-5.34	-51.75	≤-25.34	PASS

			1000~26500	-5.34	-38.87	≤ -25.34	PASS
	Ant2	2412	Reference	-5.50	-5.50	---	PASS
			30~1000	-5.50	-51.01	≤ -25.5	PASS
			1000~26500	-5.50	-39.43	≤ -25.5	PASS
	Ant1	2437	Reference	-5.67	-5.67	---	PASS
			30~1000	-5.67	-51.01	≤ -25.67	PASS
			1000~26500	-5.67	-39.24	≤ -25.67	PASS
	Ant2	2437	Reference	-6.44	-6.44	---	PASS
			30~1000	-6.44	-51.24	≤ -26.44	PASS
			1000~26500	-6.44	-39.6	≤ -26.44	PASS
	Ant1	2462	Reference	-5.92	-5.92	---	PASS
			30~1000	-5.92	-50.8	≤ -25.92	PASS
			1000~26500	-5.92	-39.21	≤ -25.92	PASS
11N40MIMO	Ant1	2422	Reference	-8.33	-8.33	---	PASS
			30~1000	-8.33	-51.07	≤ -28.33	PASS
			1000~26500	-8.33	-38.46	≤ -28.33	PASS
	Ant2	2422	Reference	-8.45	-8.45	---	PASS
			30~1000	-8.45	-50.81	≤ -28.45	PASS
			1000~26500	-8.45	-38.15	≤ -28.45	PASS
	Ant2	2422	Reference	-7.19	-7.19	---	PASS
			30~1000	-7.19	-52.02	≤ -27.19	PASS
			1000~26500	-7.19	-39.55	≤ -27.19	PASS
	Ant1	2437	Reference	-6.28	-6.28	---	PASS
			30~1000	-6.28	-50.81	≤ -26.28	PASS
			1000~26500	-6.28	-38.68	≤ -26.28	PASS
	Ant2	2437	Reference	-7.31	-7.31	---	PASS
			30~1000	-7.31	-50.57	≤ -27.31	PASS
			1000~26500	-7.31	-39.23	≤ -27.31	PASS
	Ant1	2452	Reference	-9.48	-9.48	---	PASS
			30~1000	-9.48	-50.73	≤ -29.48	PASS
			1000~26500	-9.48	-38.83	≤ -29.48	PASS
	Ant2	2452	Reference	-6.04	-6.04	---	PASS
			30~1000	-6.04	-51.84	≤ -26.04	PASS
			1000~26500	-6.04	-38.94	≤ -26.04	PASS

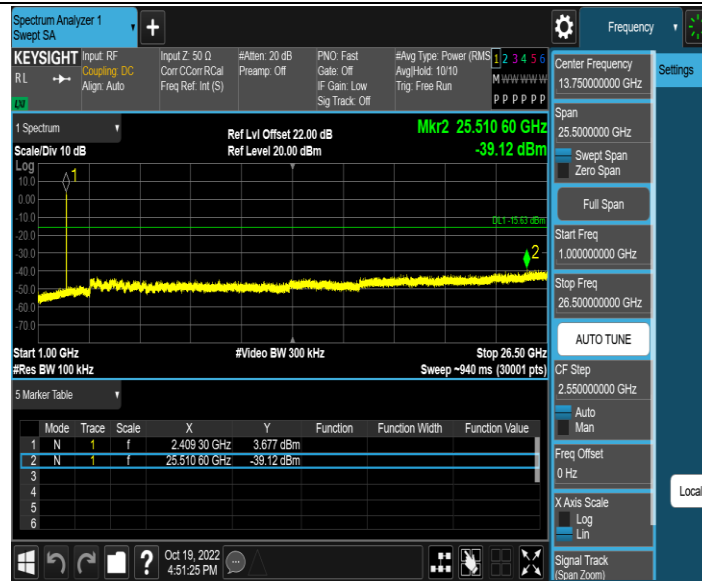
11B_Ant1_2412_0-Reference



11B_Ant1_2412_30-1000



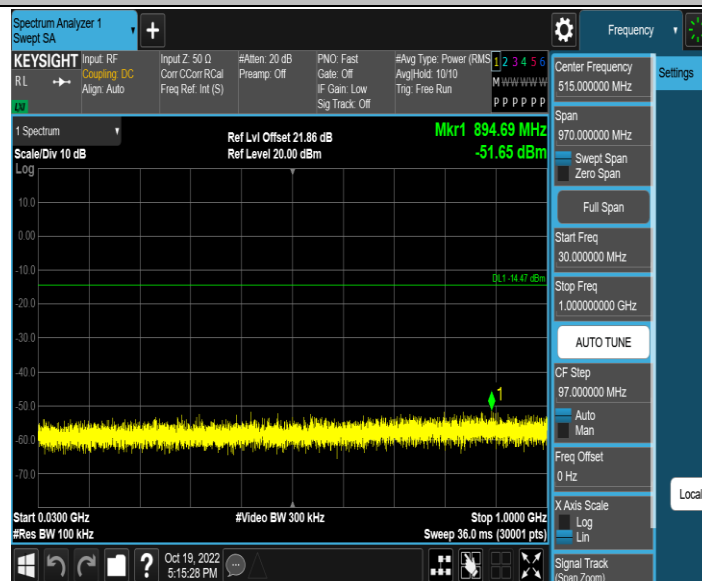
11B_Ant1_2412_1000-26500



11B_Ant2_2412_0~Reference



11B_Ant2_2412_30~1000



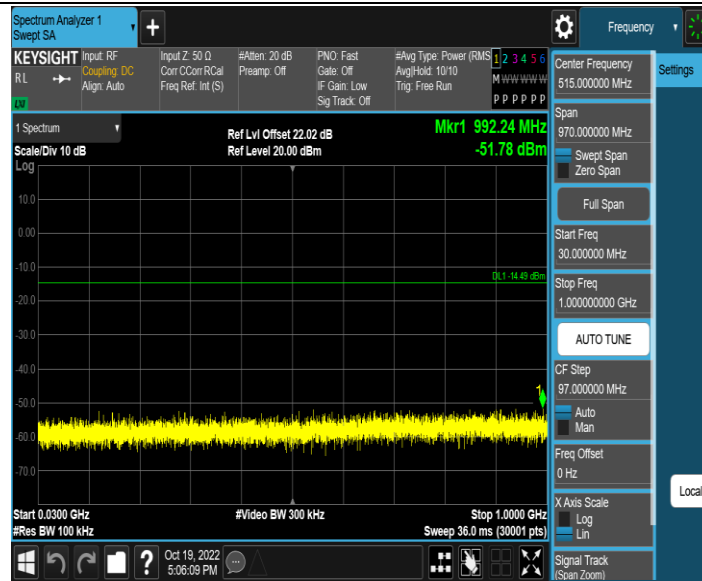
11B_Ant2_2412_1000~26500



11B_Ant1_2437_0~Reference



11B_Ant1_2437_30~1000



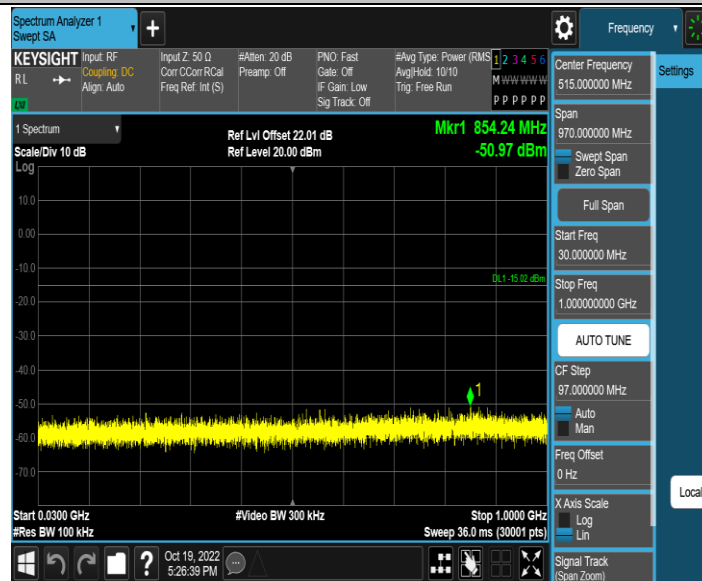
11B_Ant1_2437_1000~26500



11B_Ant2_2437_0~Reference



11B_Ant2_2437_30-1000



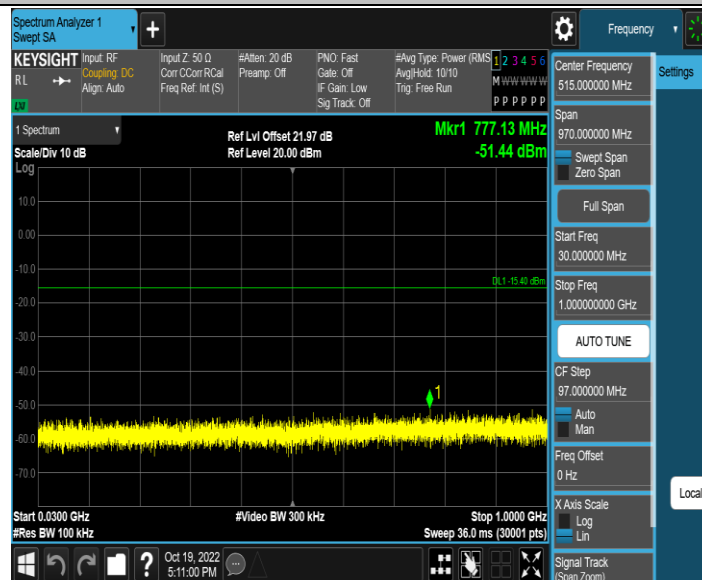
11B_Ant2_2437_1000-26500



11B_Ant1_2462_0-Reference



11B_Ant1_2462_30~1000



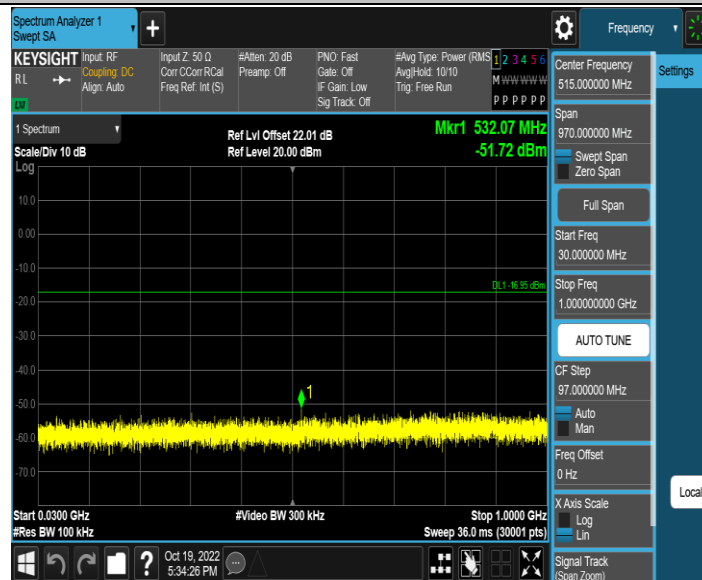
11B_Ant1_2462_1000~26500



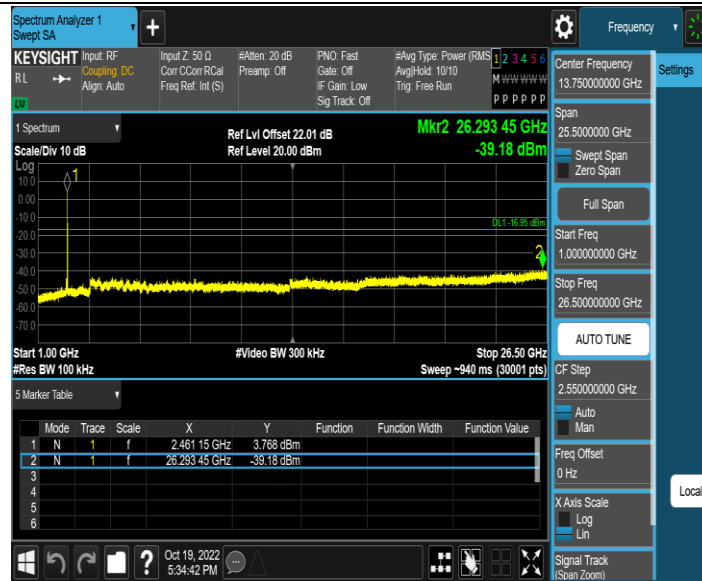
11B_Ant2_2462_0~Reference



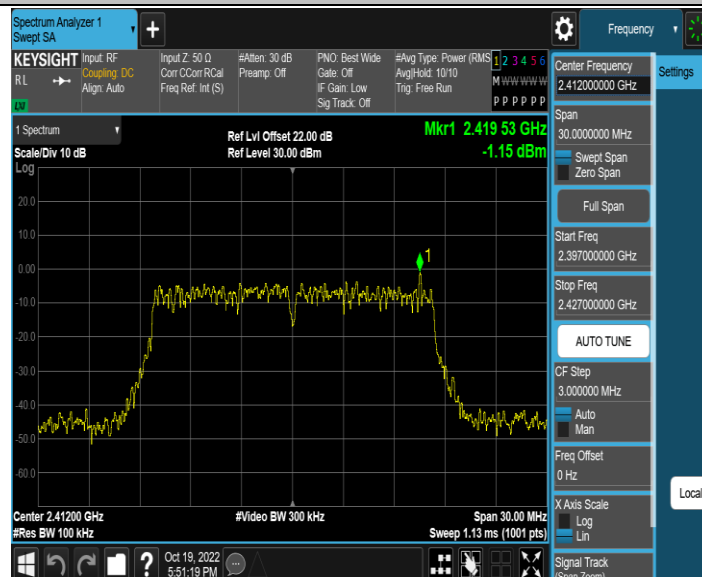
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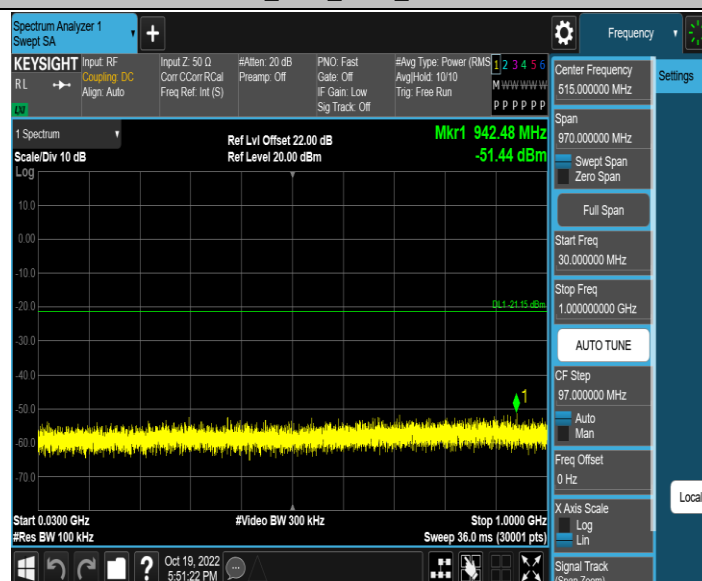
11B_Ant2_2462_1000~26500



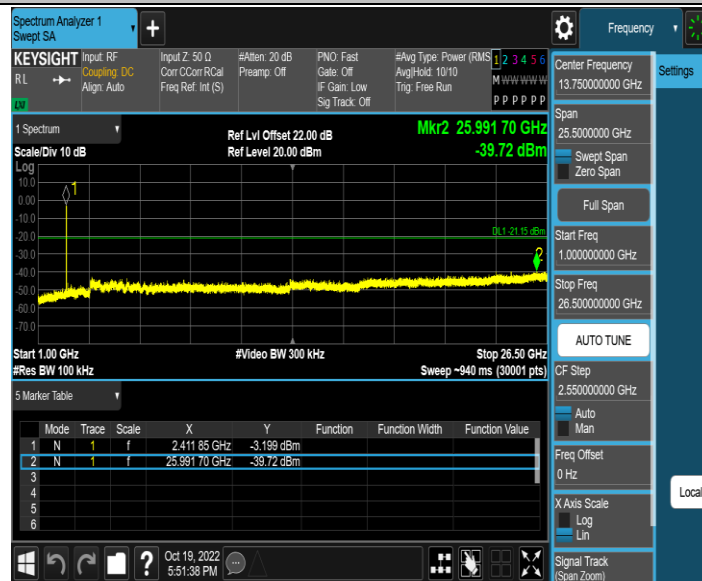
11G_Ant1_2412_0~Reference



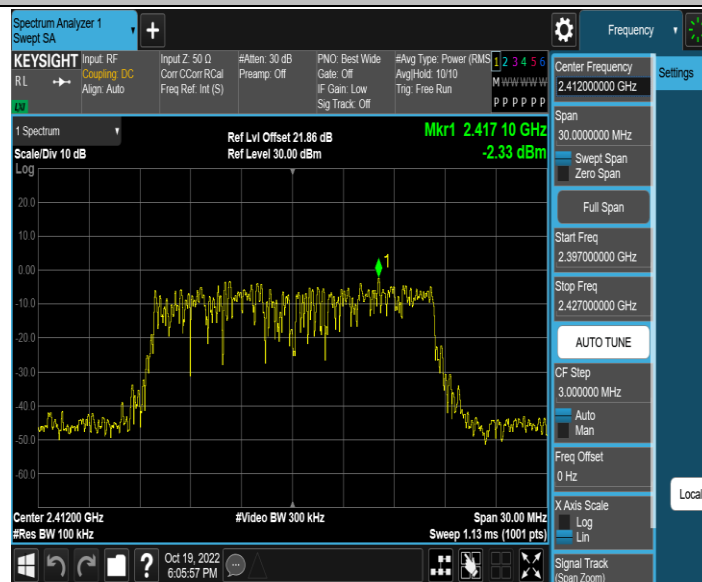
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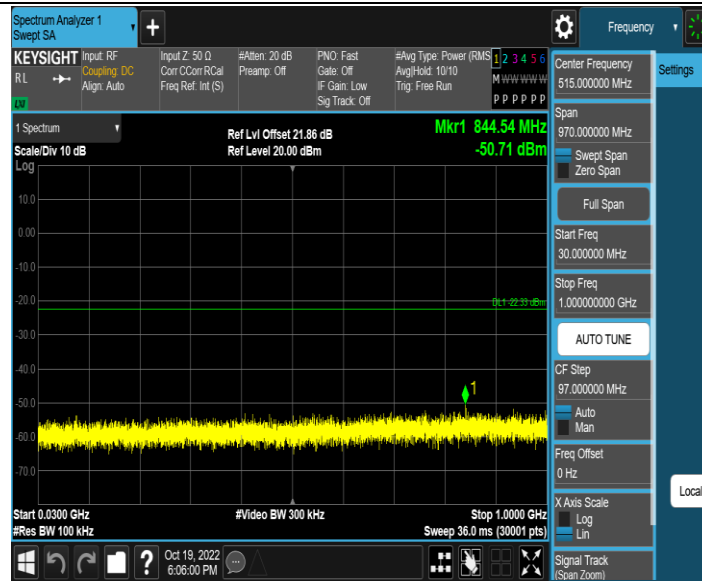
11G_Ant1_2412_1000~26500



11G_Ant2_2412_0~Reference



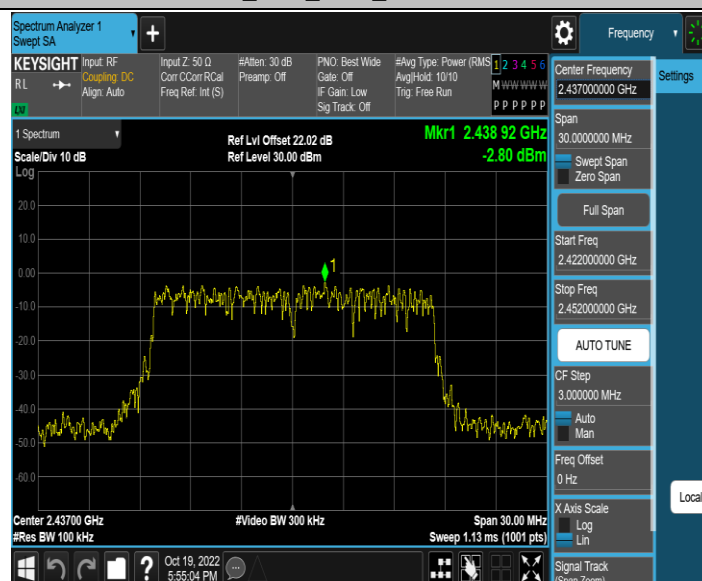
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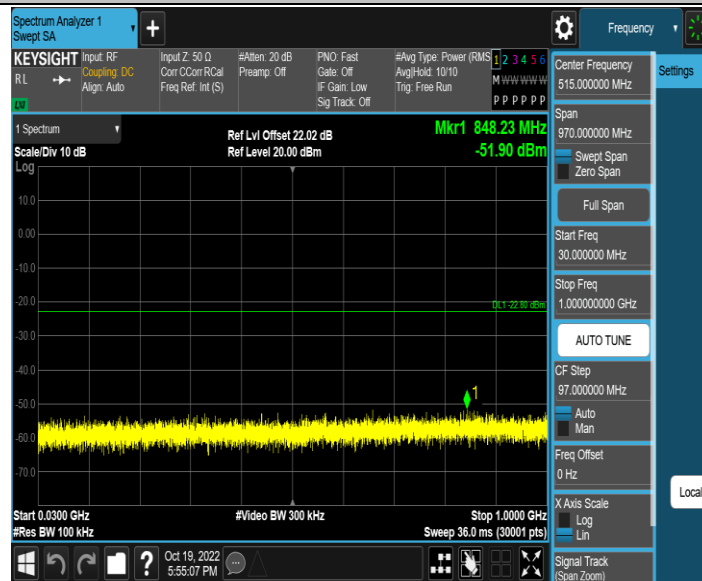
11G_Ant2_2412_1000~26500



11G_Ant1_2437_0-Reference



11G_Ant1_2437_30~1000



11G_Ant1_2437_1000~26500



11G_Ant2_2437_0~Reference