

RF TEST REPORT

FCC ID: 2A49R-UN12S

Test Report No.....: RF231108004-05-001

Product(s) Name.....: MINI PC

Model(s).....: UN1245, UN1260, UN1265, UN1270, UN1290, GD50, GD60,
GD70, GD90

Trade Mark.....: N/A

Applicant.....: MICRO COMPUTER (HK) TECH LIMITED

Address.....: RM 18, 28/F, Shui On Centre, 6-8 Harbour Road, WaterfRont, Wan
Chai, HK

Receipt Date.....: 2023.11.24

Test Date.....: 2024.02.19~2024.04.29

Issued Date.....: 2024.04.29

Standards.....: 47 CFR FCC Part 15, Subpart C(Section 15.247);
ANSI C63.10:2013

Testing Laboratory.....: Shenzhen Haiyun Standard Technical Co., Ltd.

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History of this test report

Original Report Issue Date: 2024.04.29

☐ No additional attachment

☒ Additional attachments were issued following record

Attachment No.	Issue Date	Description
RF200317E01	2020.09.17	Module report FCC ID: RAS-MT7921
RF231108004-05-001	2024.04.29	Compared to the original report of the module, this module is used for MINI PC with no change in antenna type and reduced gain. Therefore, the maximum conducted power and radiated emission and band edge and AC power conducted emission were tested with reference to the original report, while the rest remained unchanged.

1. General Information

1.1 Applicant

MICRO COMPUTER (HK) TECH LIMITED

RM 18, 28/F, Shui On Centre, 6-8 Harbour Road, Waterfront, Wan Chai, HK, China

1.2 Manufacturer

MICRO COMPUTER (HK) TECH LIMITED

RM 18, 28/F, Shui On Centre, 6-8 Harbour Road, Waterfront, Wan Chai, HK, China

1.3 Basic Description of Equipment Under Test

Product No.	POC231108004-S002	
Equipment Name	MINI PC	
Model Name	UN1245, UN1260, UN1265, UN1270, UN1290, GD50, GD60, GD70, GD90	
Test Model	UN1265	
Model Difference	Only the appearance color and model name are difference	
Trade Mark	N/A	
Power Supply	DC 19V from adapter	
Adapter Information	Model: YHY-19004730 Input: 100-240V~, 50/60Hz 2.0A Output: 19V===4.73A, 90W	
Operate temperature	0°C-45°C	
EUT Stage	○ Product Unit	● Final-Sample
Operating Band and Conducted Output Power (Max power)	2400MHz ~ 2483.5MHz	● IEEE 802.11b: 21.83dBm(0.152W)
Product Type	IEEE 802.11b: WLAN (MIMO) IEEE 802.11g: WLAN(MIMO) IEEE 802.11n: WLAN(MIMO) IEEE 802.11ax: WLAN (MIMO)	
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) IEEE 802.11ax: OFDMA (BPSK / QPSK / 16QAM / 64QAM)	
Data Rate (Mbps)	IEEE 802.11b mode: 1/2/5.5/11 IEEE 802.11g mode: 6/9/12/18/24/36/48/54 IEEE 802.11n mode: up to 300 IEEE 802.11ax mode: up to 573.5	
Antenna gain	Ant1: 2.86dBi, Ant2: 1.26dBi	
Antenna type	PIFA Antenna	

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

Note: For 802.11ax mode only support full RU mode.

1.4 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					
☒ 802.11ax(20MHz)	Operating mode	☐ 1TX	☒ 2TX	☐ 3TX					
☒ 802.11ax(40MHz)	Operating mode	☐ 1TX	☒ 2TX	☐ 3TX					

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)	Note2	Meet the requirement of the limit
6dB Bandwidth	15.247(a)(2)	Note2	Meet the requirement of the limit
Maximum Conducted Power	15.247(b)	Pass	Meet the requirement of the limit
Power Spectral Density	15.247(e)	Note2	Meet the requirement of the limit
Antenna Requirements	15.203	Compliance	Note1
Note:1. The EUT has 2 PIFA antennas arrangement which was permanently attached. 2. For test data, please refer to the report RF200317E01.			

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

Radiated Emissions						
No.	Equipment	Manufacturer	Type No.	Serial No.	Cal. date (yyyy/mm/dd)	Cal. Due date (yyyy/mm/dd)
1	Test receiver	Rohde&Schwarz	ESU	100184	2024/4/24	2025/4/23
2	Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D- 1273	2024/4/20	2025/4/19
3	Low frequency amplifier	Unknown	LNA 0920N	2014	2024/4/24	2025/4/23
4	High frequency amplifier	Schwarzbeck	BBV 9718	284	2024/4/24	2025/4/23
5	Loop Antenna	Schwarzbeck	FMZB1519 B	00029	2023/7/16	2024/7/15
6	Log periodic antenna	Schwarzbeck	VULB 9168	1151	2024/4/20	2025/4/19
7	Horn Antenna	Schwarzbeck	BBHA 9120 D	9120D- 1273	2024/4/20	2025/4/19
8	Horn Antenna	Schwarzbeck	BBHA 9170	9170#685	2023/7/16	2024/7/15
9	Temp&Humidity Recorder	Meideshi	JR900	/	2024/4/24	2025/4/23
10	RF cable(966 chamber)9kHz- 1GHz	Unknown	Unknown	Unknown	2024/4/24	2025/4/23
11	RF cable(966 chamber)1GHz- 18GHz	Unknown	Unknown	Unknown	2024/4/24	2025/4/23
12	RF cable(966 chamber)18GHz -40GHz	Unknown	Unknown	Unknown	2024/4/24	2025/4/23
13	Test software	Farad Technology Co., Ltd	EZ-EMC Ver.TW-03A2			
Conducted Emission						
1	Test receiver	Rohde&Schwarz	ESCI	100718	2024/4/24	2025/4/23
2	LISN	Rohde&Schwarz	ENV216	100075	2024/4/24	2025/4/23
3	Pulse limiter	Rohde&Schwarz	ESH3-Z2	102299	2024/4/24	2025/4/23
4	RF cable (9kHz-30MHz)	Unknown	Unknown	Unknown	2024/4/24	2025/4/23
5	Test software	Farad Technology Co., Ltd	EZ-EMC Ver.TW-03A2			
RF Conducted Emission						
1	MXA Signal Analyzer	Keysight	N9021B	MY600801 69	2024/4/20	2025/4/19
2	RF Control Unit	dsusoft	JS0806-2	21G806044 9	2024/4/20	2025/4/19
3	power supply unit	dsusoft	JS0806- 4ADC	N/A	2024/4/20	2025/4/19
4	VXG Signal Generator	Keysight	M9384B	MY612707 87	2024/4/20	2025/4/19
5	EXG Analog Signal Generator	Keysight	N5173B	MY591012 82	2024/4/20	2025/4/19
6	Test software	dsusoft	JS1120-3 Ver.3.2.22.0			

2.4 Test Mode

Test Items	Mode	Data Rate	Channel
Radiated Emission and Band Edge Measurement	802.11B-CDD	1Mbps	01/06/11
	802.11G-CDD	6Mbps	01/06/11
	802.11N20MIMO	MCS0	01/06/11
	802.11N40MIMO	MCS0	03/06/09
	802.11AX20MIMO	MCS0	01/06/11
	802.11AX40MIMO	MCS0	03/06/09
Maximum Conducted Power	802.11B-CDD	1Mbps	01/06/11
	802.11G-CDD	6Mbps	01/06/11
	802.11N20MIMO	MCS0	01/06/11
	802.11N40MIMO	MCS0	03/06/09
	802.11AX20MIMO	MCS0	01/06/11
	802.11AX40MIMO	MCS0	03/06/09
AC Power Conducted Emission	802.11B-CDD	1Mbps	11

Note: For AC Power Conducted Emission and Radiated Emission below 1GHz, only worst case was recorded.

2.5 Test Condition

Applicable to	Environmental conditions	Input Power	Tested by
AC Power Conducted Emission	23.7°C, 49% RH	AC 120V/60Hz	Freedom Zhuo
Radiated Emission and Band Edge Measurement	24.2°C, 49% RH	AC 120V/60Hz	Freedom Zhuo
Maximum Conducted Power	23.5°C, 50% RH	DC 19V	Albert Fan

Note: Adapter supply voltage AC 120V/60Hz.

The applicant declare the operating environment of EUT as below:

Normal conditions: 19V DC, 0~45°C

2.6 Duty Cycle of Test Signal

Test result: PASS

Note: For test data, please refer to the report RF200317E01.

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	±143.88kHz
Power Spectral Density	±0.743dB
Conducted Spurious Emission	±1.328dB
RF power conducted	±0.384dB
Conducted emission(9kHz~30MHz) AC main	±2.72dB
Radiated emission(9kHz~30MHz)	±2.66dB
Radiated emission (30MHz~1GHz)	±4.62dB
Radiated emission (1GHz~18GHz)	±4.86dB
Radiated emission (18GHz~40GHz)	±3.80dB

2.8 Test Location

Company:	Shenzhen Haiyun Standard Technical CO., Ltd.
Address:	No. 110-113, 115, 116, Block B, Jinyuan Business Building, Bao'an District, Shenzhen, China
CNAS Registration Number:	CNAS L18252
CAB identifier	CN0145
A2LA Certificate Number	6823.01
Telephone:	0755-26024411

2.9 SUPPORT UNITS

Support Equipment				
No.	Equipment	Model Name	Manufacturer	Remarks
1	Flat Panel Monitor	S2721QS	DELL	/
2	USB Disk1	/	Kingston	/
3	USB Disk2	/	Kingston	/
4	USB Disk3	/	Kingston	/
5	Earphone	/	/	/
6	Mouse	DOK-680U	LENOVO	701E8328
7	Keyboard	SK-8827	LENOVO	21R1ADL
8	Printer	MJPMYTJHT01	Xiaomi	/

2.10 Description of Support Units

None

2.11 Deviation from Standards

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(μ V)	Average Level dB(μ V)
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.

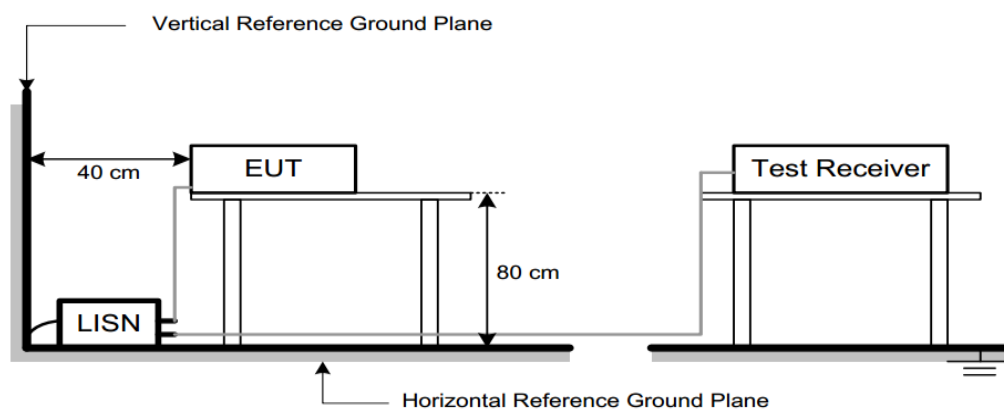
3.1.2 Test Procedure

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.

3.1.3 Test Setup



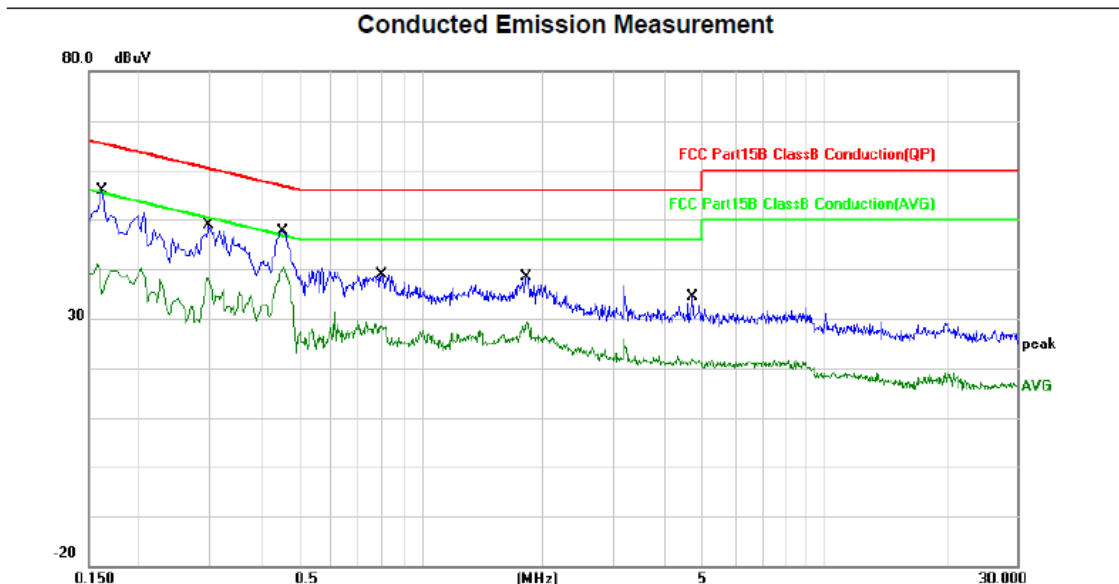
3.1.4 Test Result

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

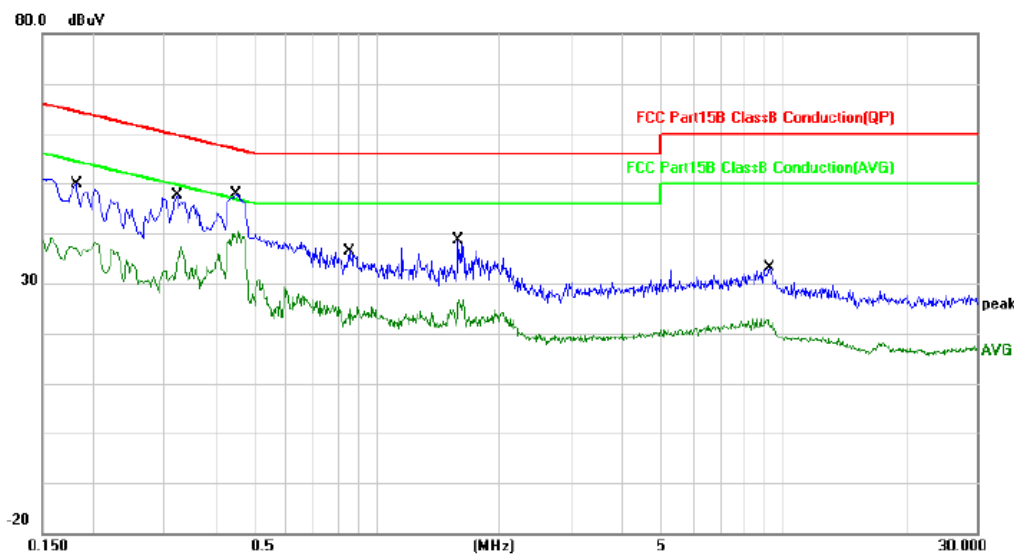
We only recorded the data of the worst mode. Please see the following:

150kHz~30MHz	Worst Case Operating Mode: 11B-CDD Channel 11
Line	



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.1620	28.30	20.09	48.39	65.36	-16.97	QP	
2		0.1620	17.00	20.09	37.09	55.36	-18.27	AVG	
3		0.2980	23.48	20.11	43.59	60.30	-16.71	QP	
4		0.2980	12.43	20.11	32.54	50.30	-17.76	AVG	
5		0.4540	25.68	20.28	45.96	56.80	-10.84	QP	
6 *		0.4540	19.38	20.28	39.66	46.80	-7.14	AVG	
7		0.7980	14.97	20.28	35.25	56.00	-20.75	QP	
8		0.7980	7.09	20.28	27.37	46.00	-18.63	AVG	
9		1.8260	11.72	20.11	31.83	56.00	-24.17	QP	
10		1.8260	6.56	20.11	26.67	46.00	-19.33	AVG	
11		4.7180	8.32	20.02	28.34	56.00	-27.66	QP	
12		4.7180	1.70	20.02	21.72	46.00	-24.28	AVG	

Conducted Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1820	25.16	20.29	45.45	64.39	-18.94	QP	
2		0.1820	16.36	20.29	36.65	54.39	-17.74	AVG	
3		0.3220	22.24	19.99	42.23	59.66	-17.43	QP	
4		0.3220	11.28	19.99	31.27	49.66	-18.39	AVG	
5		0.4500	25.30	20.14	45.44	56.88	-11.44	QP	
6	*	0.4500	19.30	20.14	39.44	46.88	-7.44	AVG	
7		0.8540	11.06	20.10	31.16	56.00	-24.84	QP	
8		0.8540	2.60	20.10	22.70	46.00	-23.30	AVG	
9		1.5860	6.34	20.32	26.66	56.00	-29.34	QP	
10		1.5860	1.16	20.32	21.48	46.00	-24.52	AVG	
11		9.2980	5.80	20.13	25.93	60.00	-34.07	QP	
12		9.2980	0.56	20.13	20.69	50.00	-29.31	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 $\text{dB}\mu\text{V} = 20 \log \text{Emission level } \mu\text{V/m}$

(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 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 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)
- 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)
- 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.

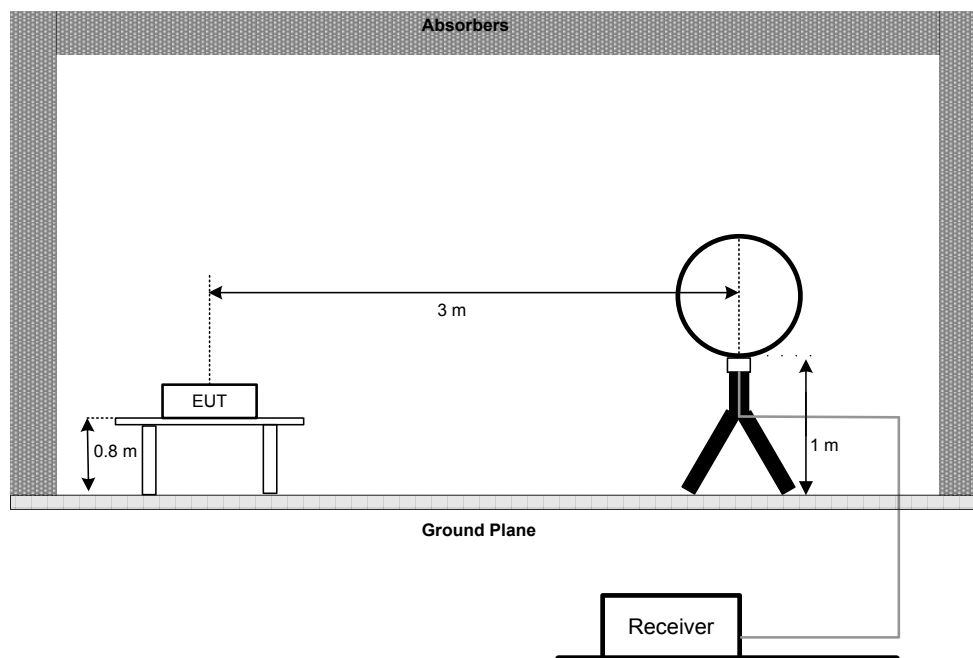
The following table is the setting of the receiver:

Spectrum Parameters	Setting
Start ~ Stop Frequency	9 kHz~150 kHz for RBW 200 Hz
Start ~ Stop Frequency	0.15 MHz~30 MHz for RBW 9 kHz
Start ~ Stop Frequency	30 MHz~1000 MHz for RBW 100 kHz

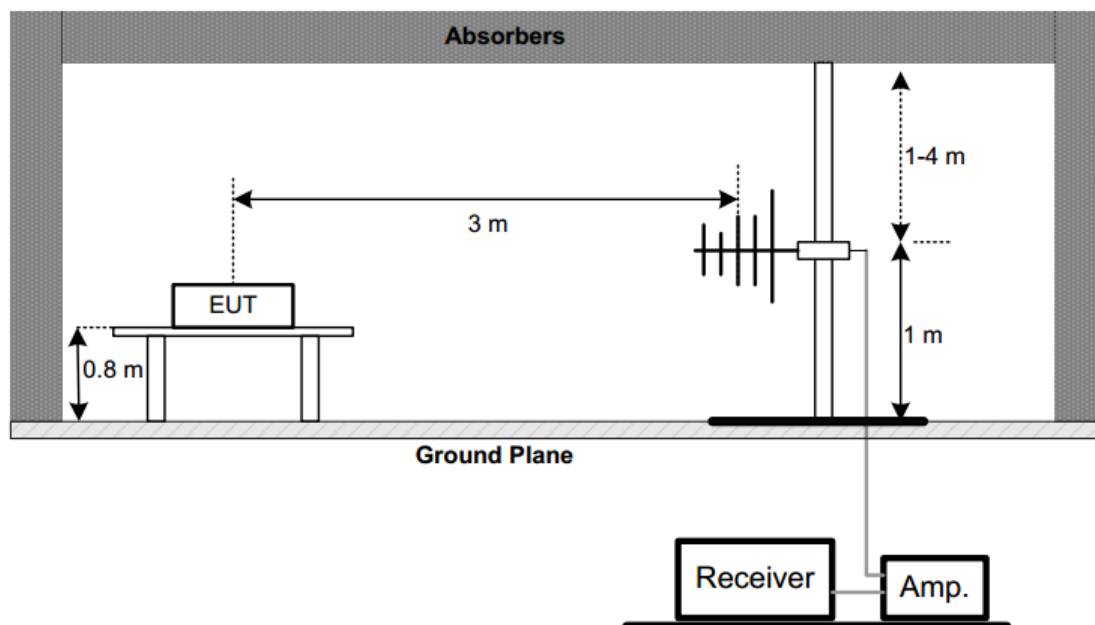
Spectrum Parameters	Setting
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW (Emission in restricted band)	1 MHz / 3 MHz for PK value 1 MHz / 1/T Hz for AVG value

3.2.3 Test Setup

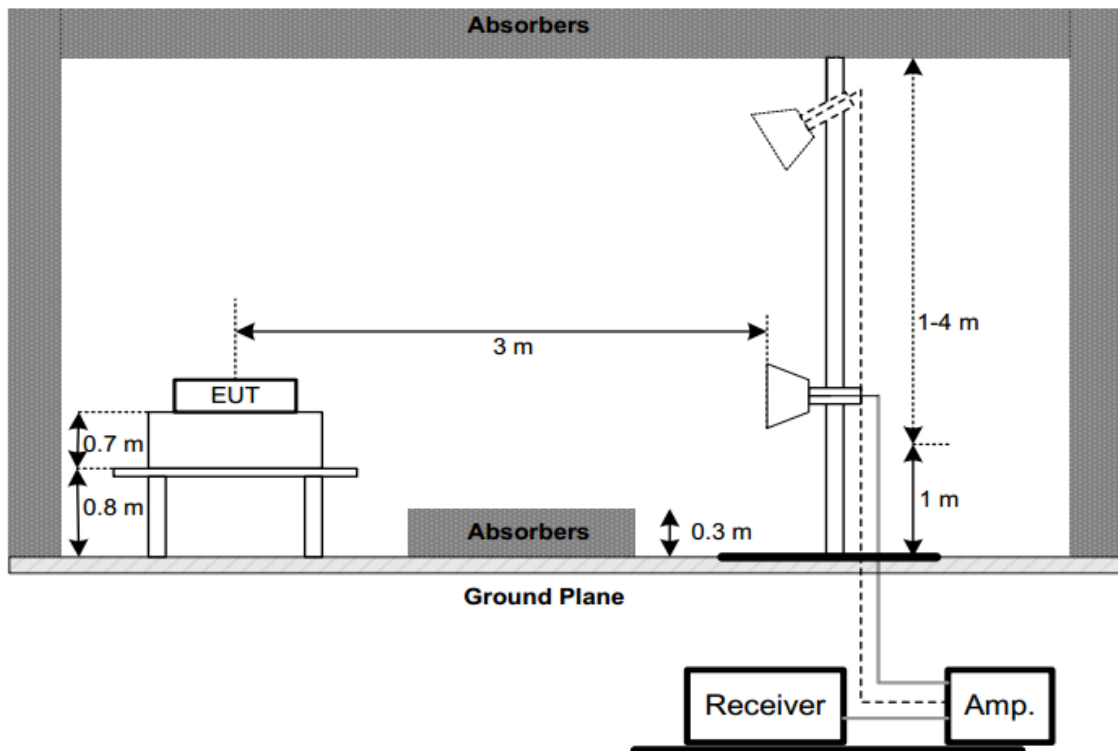
(A) Radiated Emission Test Set-Up Frequency Below 30MHz



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



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



3.2.4 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 recorded in this report.

2) Radiated emission: 30MHz-1G

Note:

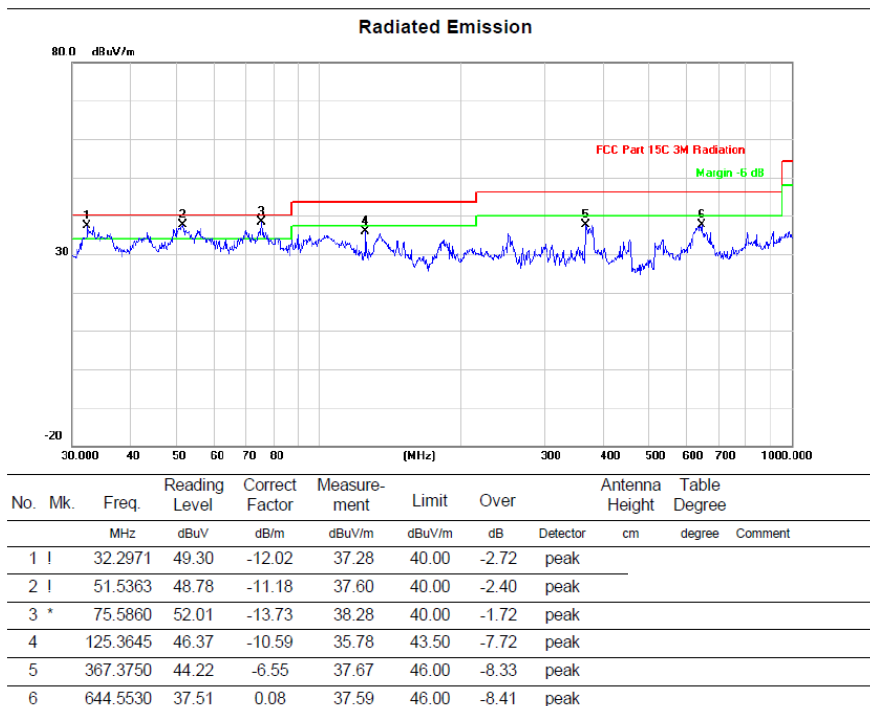
1. Measurement = Reading + Correct Factor.
2. Over = Measurement – Limit

We only recorded the data of the worst mode. Please see the following:

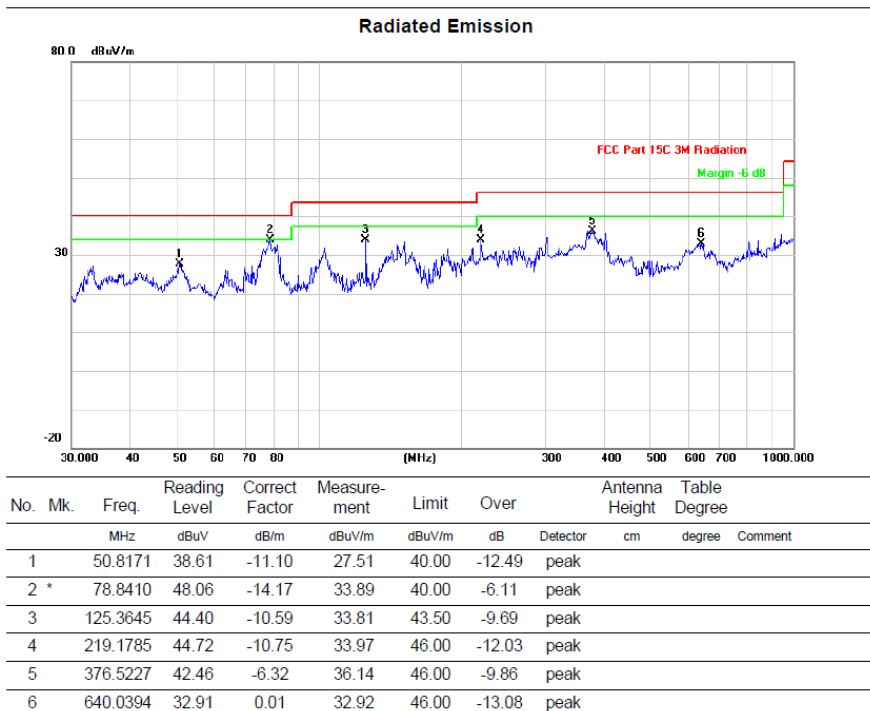
Below 1G (30MHz~1GHz)

Worst Case Operating Mode: 11B-CDD Channel 11

VERTICAL



HORIZONTAL



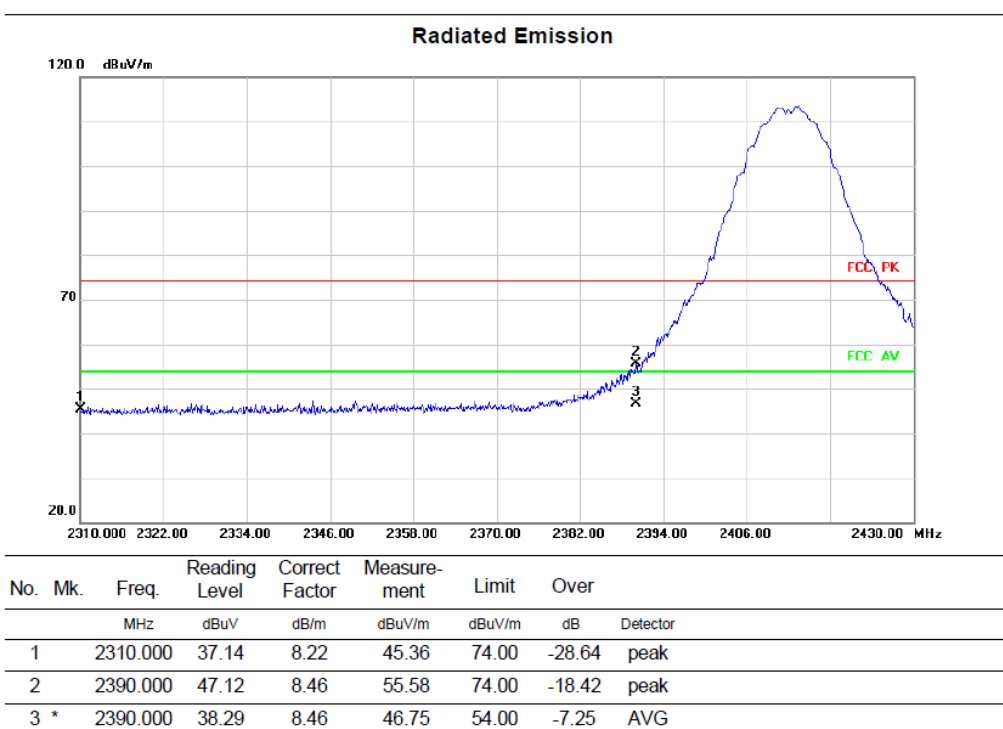
3) Radiated emission: Above 1G

Note:

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

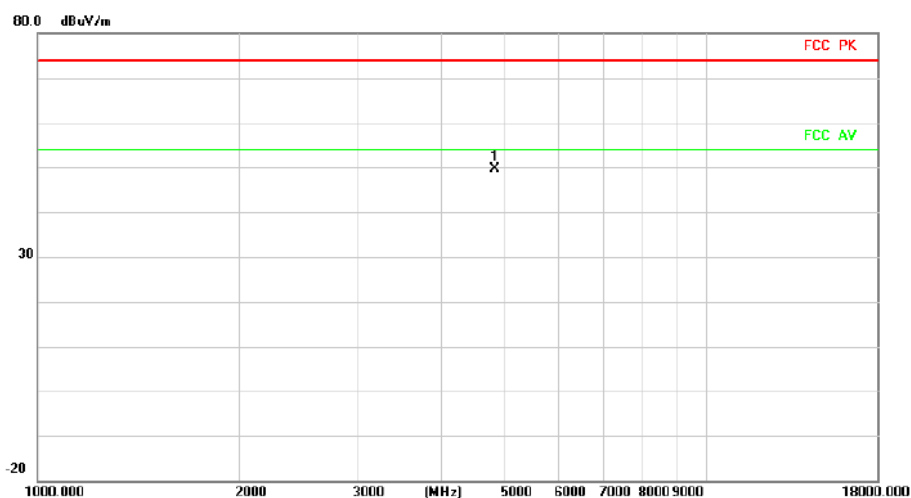
Above 1G (1GHz~18GHz)	Test mode:11B-CDD	Test Channel:1
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VERTICAL



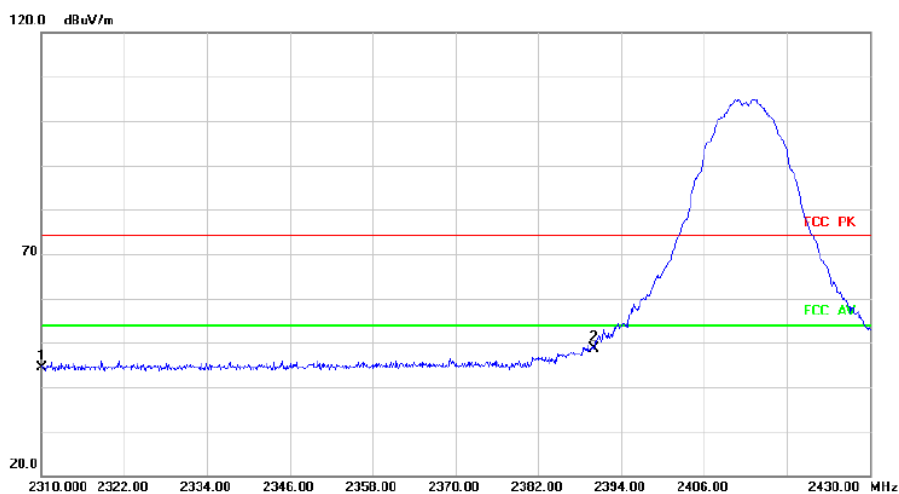
HORIZONTALA

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	*	4824.000	33.85	15.82	49.67	74.00	-24.33 peak

Radiated Emission



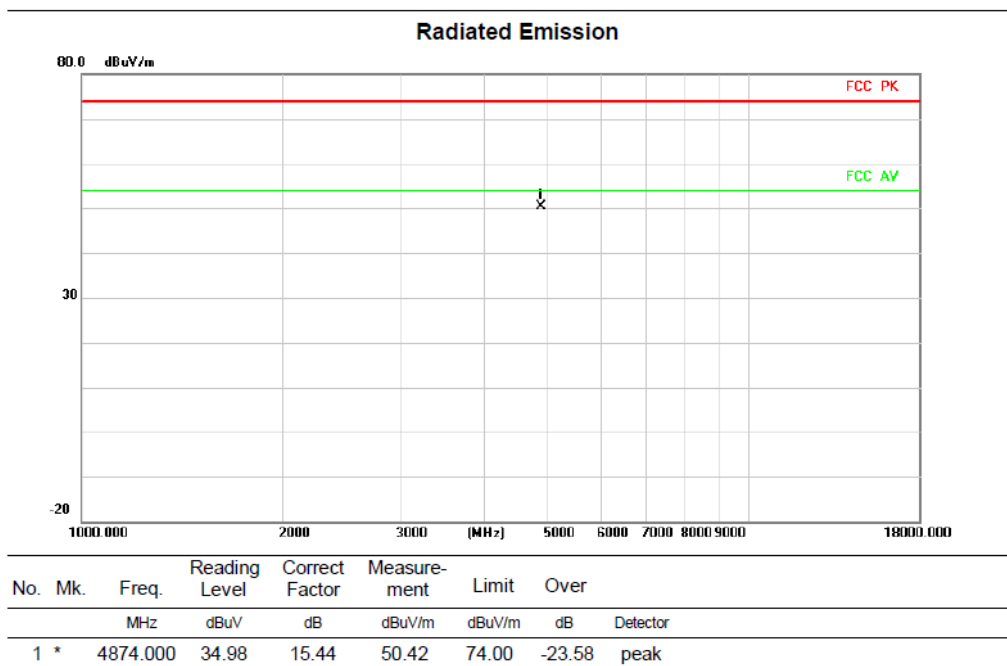
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1		2310.000	36.05	8.22	44.27	74.00	-29.73 peak
2	*	2390.000	40.25	8.46	48.71	74.00	-25.29 peak

Above 1G (1GHz~18GHz)

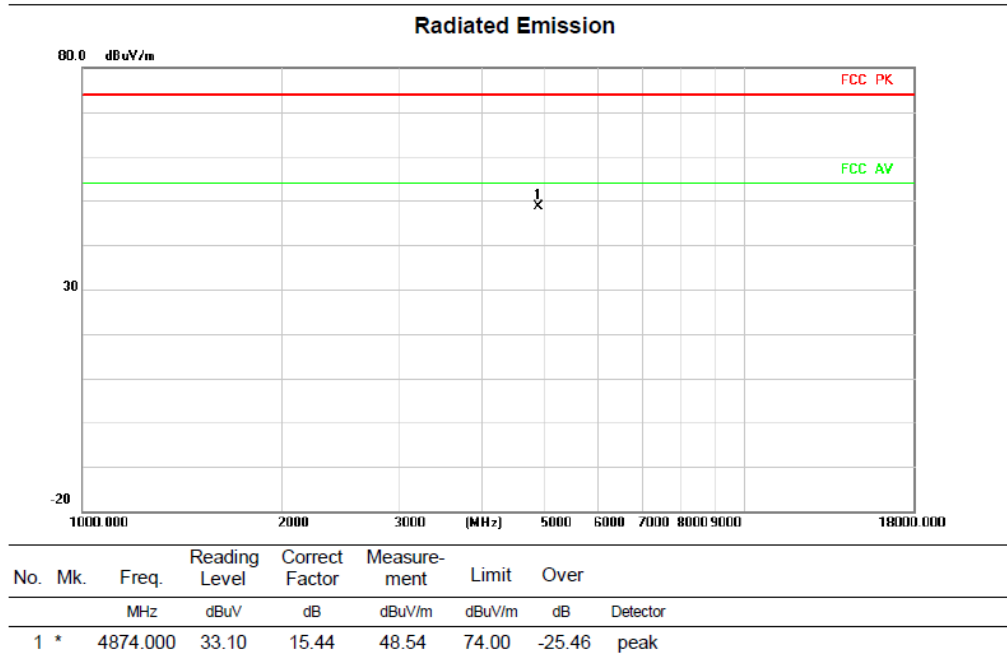
Test mode:11B-CDD

Test Channel:6

VERTICAL



HORIZONTAL



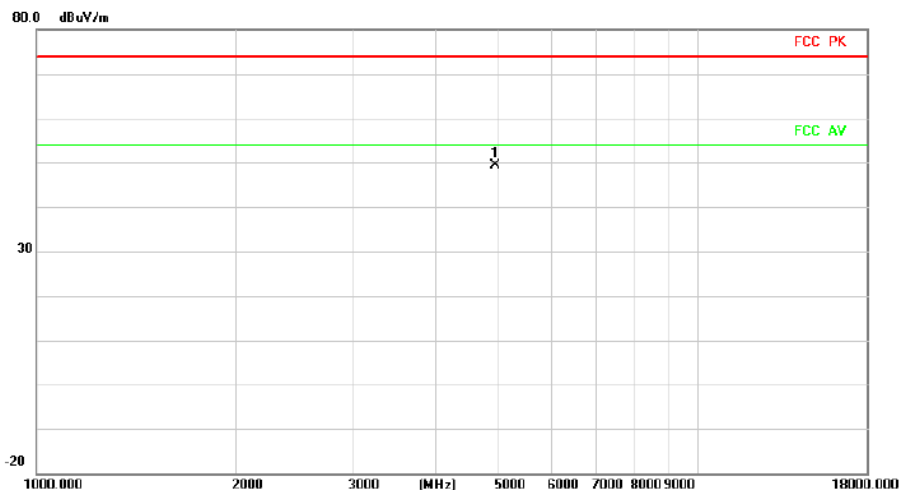
Above 1G (1GHz~18GHz)

Test mode: 11B-CDD

Test Channel:11

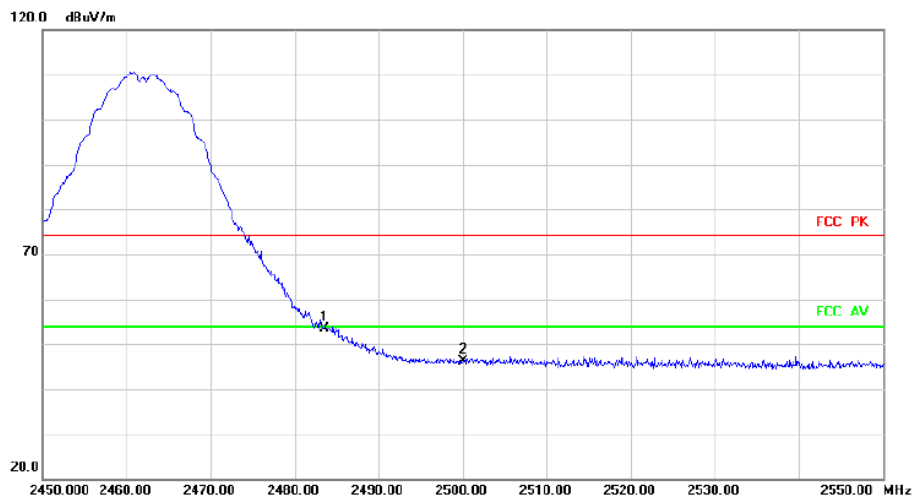
VERTICAL

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB Detector
1	*	4924.000	34.17	15.10	49.27	74.00	-24.73 peak

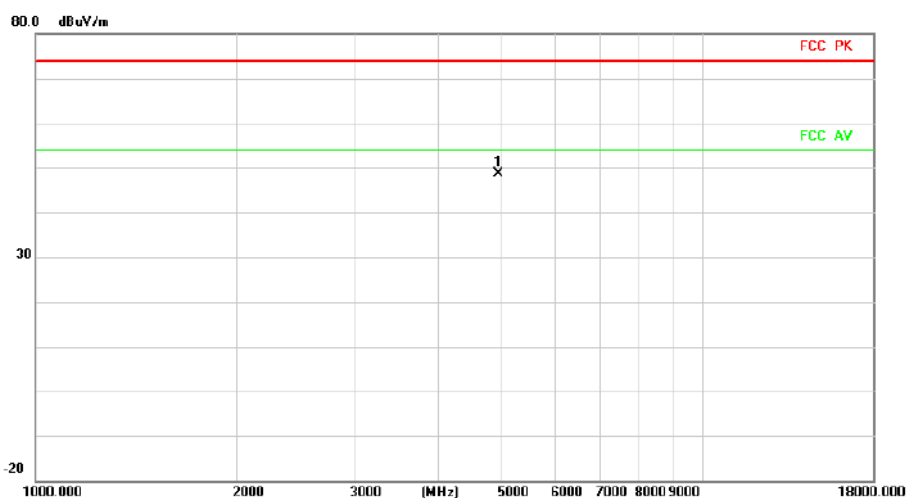
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1	*	2483.500	44.28	9.10	53.38	74.00	-20.62 peak
2		2500.000	36.83	9.26	46.09	74.00	-27.91 peak

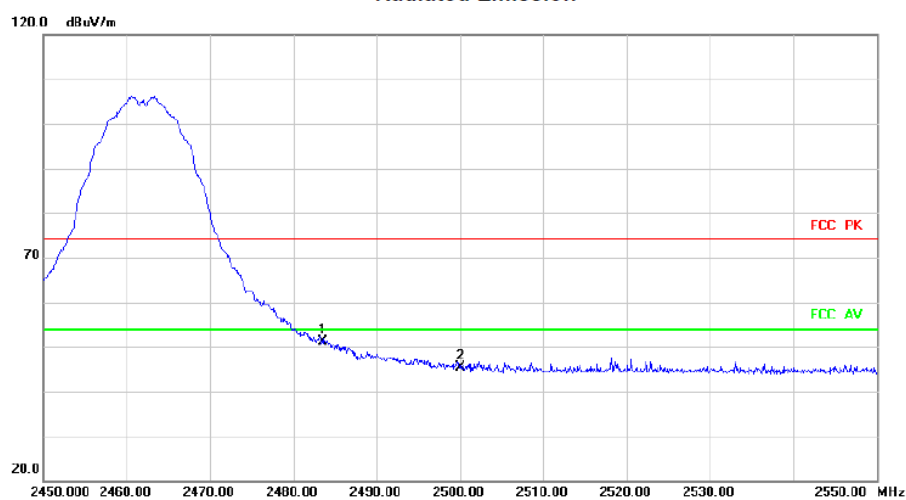
HORIZONTALA

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	*	4924.000	33.65	15.10	48.75	74.00	-25.25
							peak

Radiated Emission



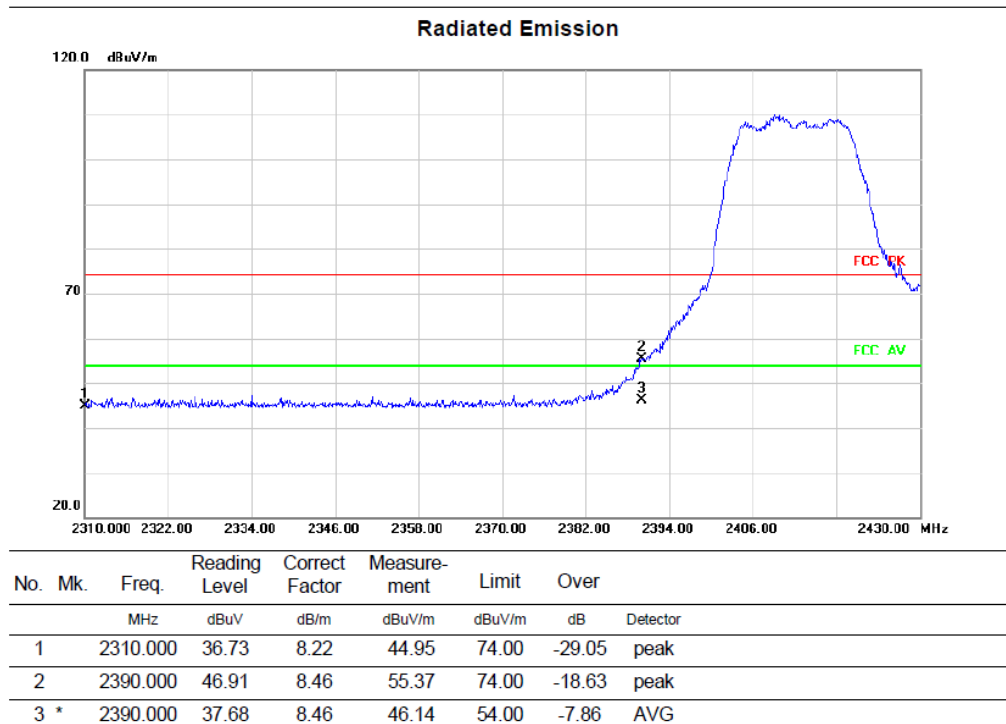
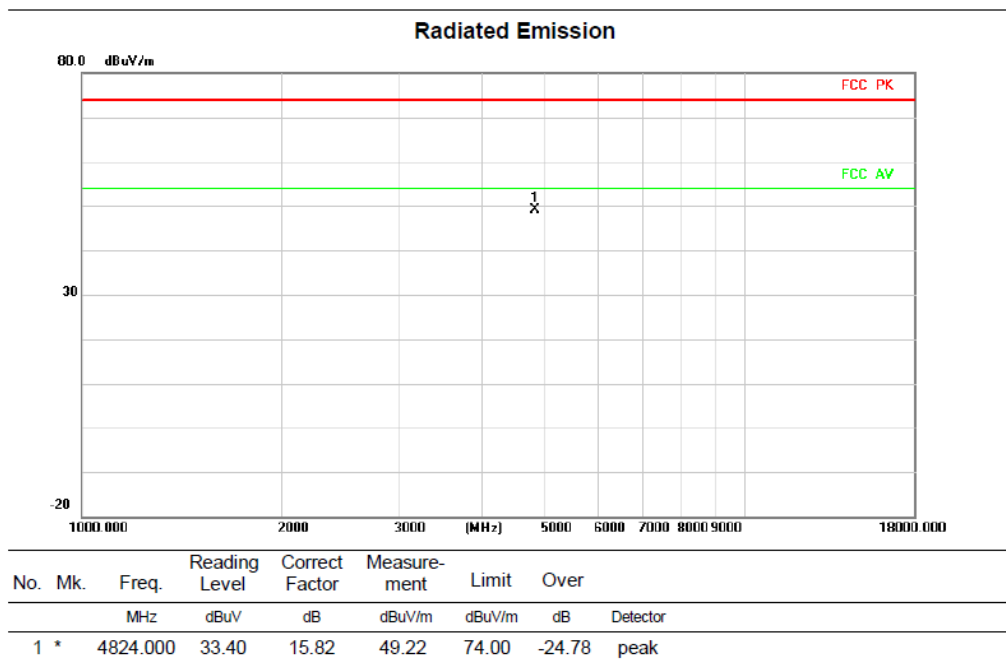
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1	*	2483.500	42.05	9.10	51.15	74.00	-22.85
							peak
2		2500.000	36.14	9.26	45.40	74.00	-28.60
							peak

Above 1G (1GHz~18GHz)

Test mode:11G-CDD

Test Channel:1

VERTICAL



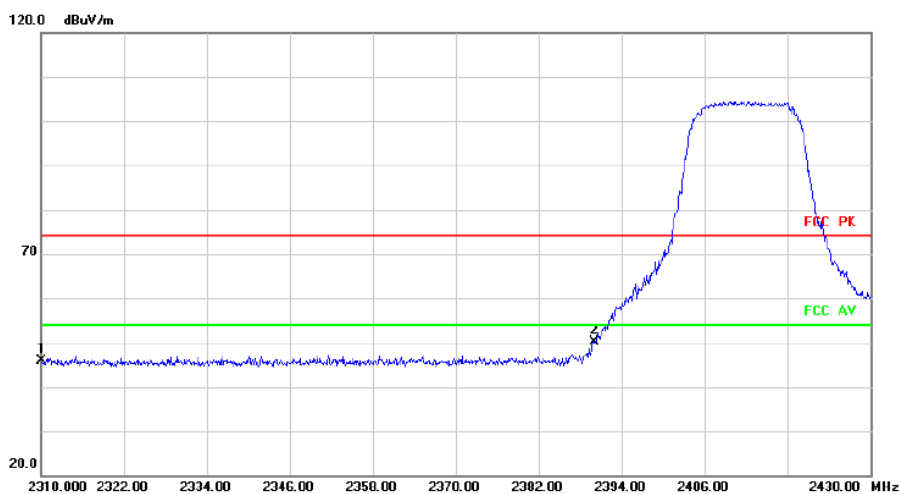
HORIZONTALA

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	*	4824.000	33.11	15.82	48.93	74.00	-25.07 peak

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1		2310.000	45.74	0.19	45.93	74.00	-28.07 peak
2	*	2390.000	49.61	0.41	50.02	74.00	-23.98 peak

Above 1G (1GHz~18GHz)

Test mode: 11G-CDD

Test Channel:6

VERTICAL



HORIZONTAL



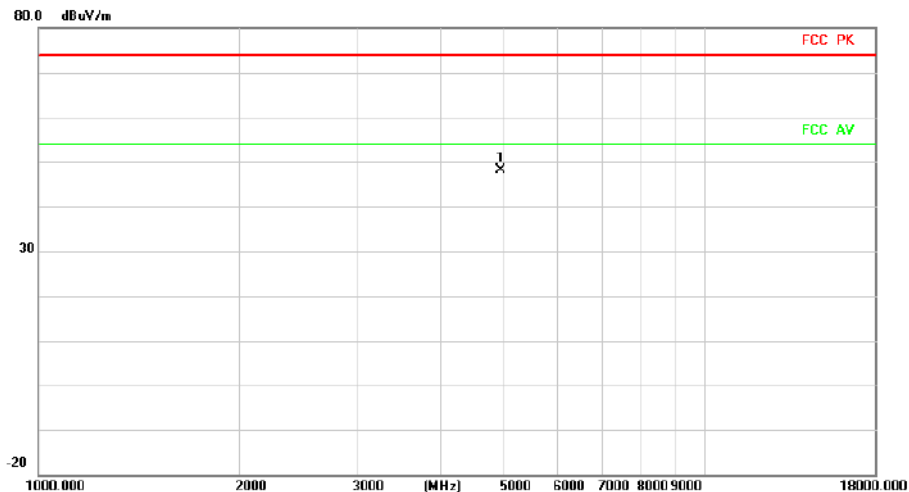
Above 1G (1GHz~18GHz)

Test mode: 11G-CDD

Test Channel:11

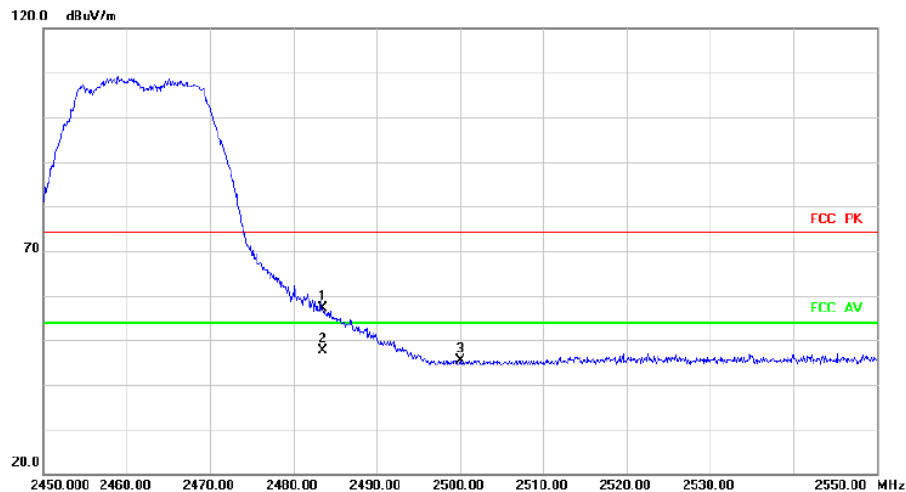
VERTICAL

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	*	4924.000	33.05	15.10	48.15	74.00	-25.85 peak

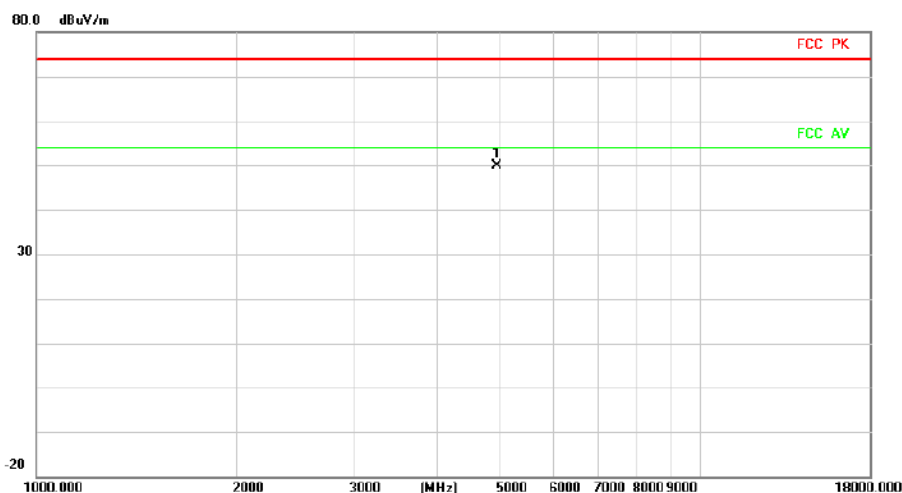
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1		2483.500	47.96	9.10	57.06	74.00	-16.94 peak
2	*	2483.500	38.47	9.10	47.57	54.00	-6.43 AVG
3		2500.000	36.22	9.26	45.48	74.00	-28.52 peak

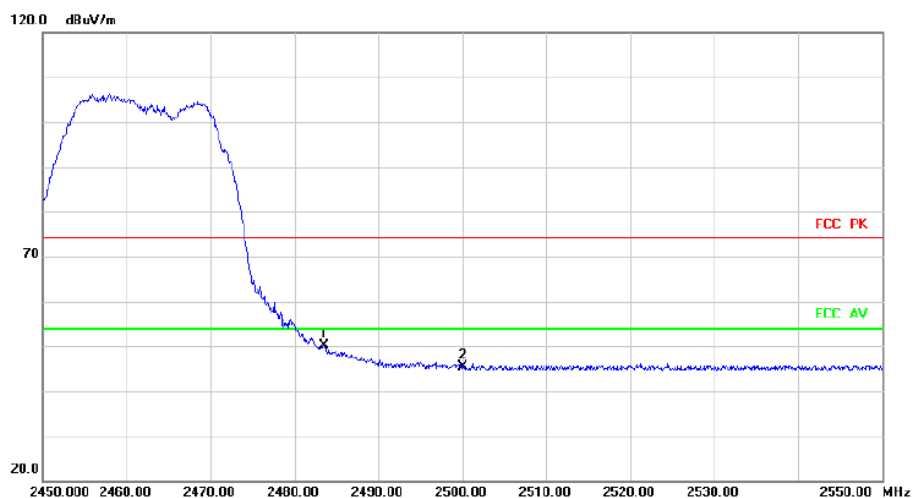
HORIZONTALA

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	*	4924.000	34.68	15.10	49.78	74.00	-24.22 peak

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1	*	2483.500	41.10	9.10	50.20	74.00	-23.80 peak
2		2500.000	36.15	9.26	45.41	74.00	-28.59 peak

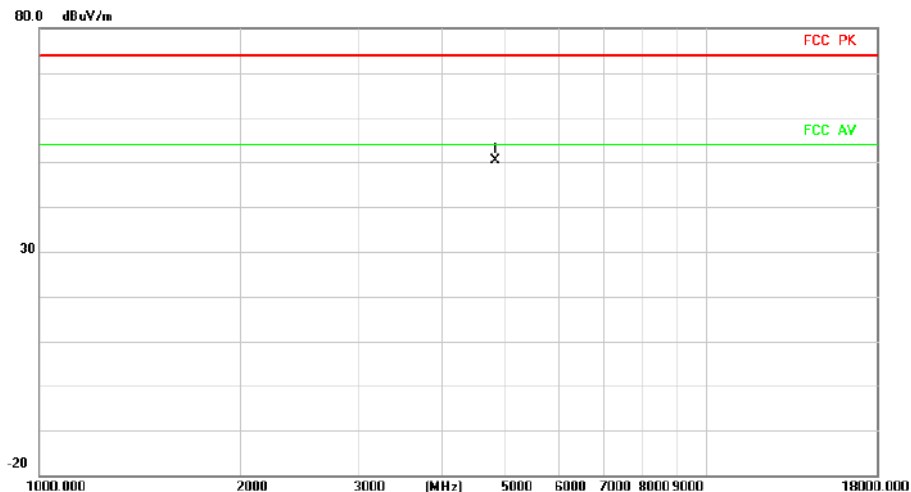
Above 1G (1GHz~18GHz)

Test mode: 11N20MIMO

Test Channel:1

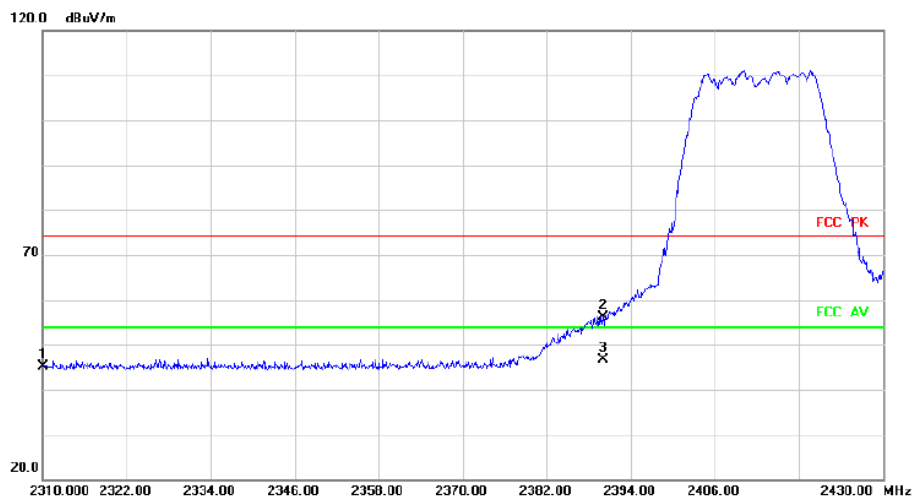
VERTICAL

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	*	4824.000	34.45	15.82	50.27	74.00	-23.73 peak

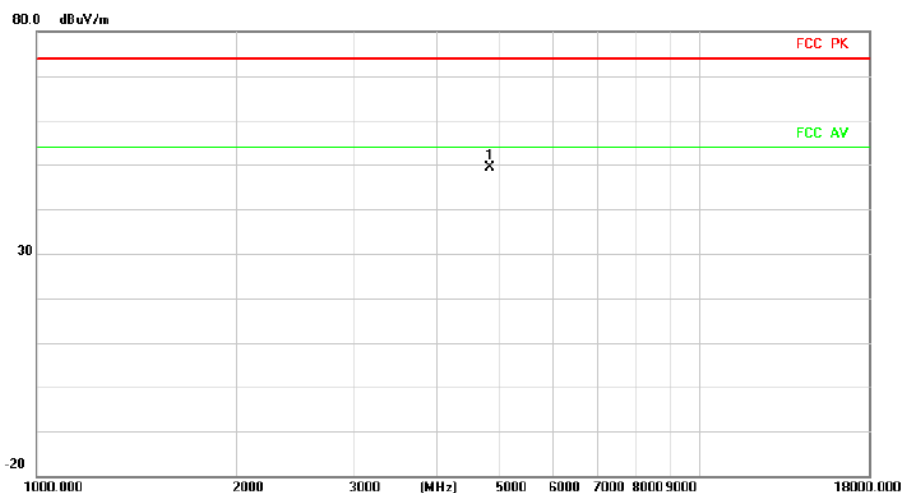
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1		2310.000	36.91	8.22	45.13	74.00	-28.87 peak
2		2390.000	47.71	8.46	56.17	74.00	-17.83 peak
3	*	2390.000	38.22	8.46	46.68	54.00	-7.32 AVG

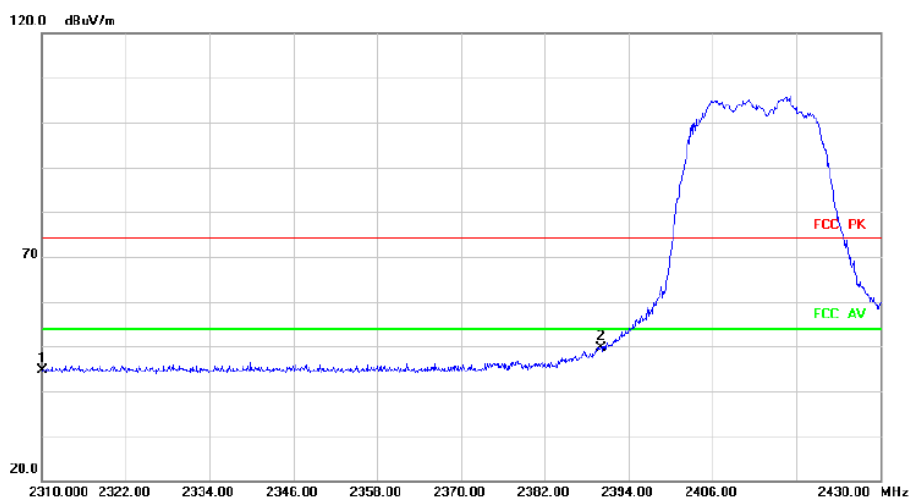
HORIZONTALA

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	*	4824.000	33.56	15.82	49.38	74.00	-24.62 peak

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1		2310.000	36.53	8.22	44.75	74.00	-29.25 peak
2	*	2390.000	41.20	8.46	49.66	74.00	-24.34 peak

Above 1G (1GHz~18GHz)

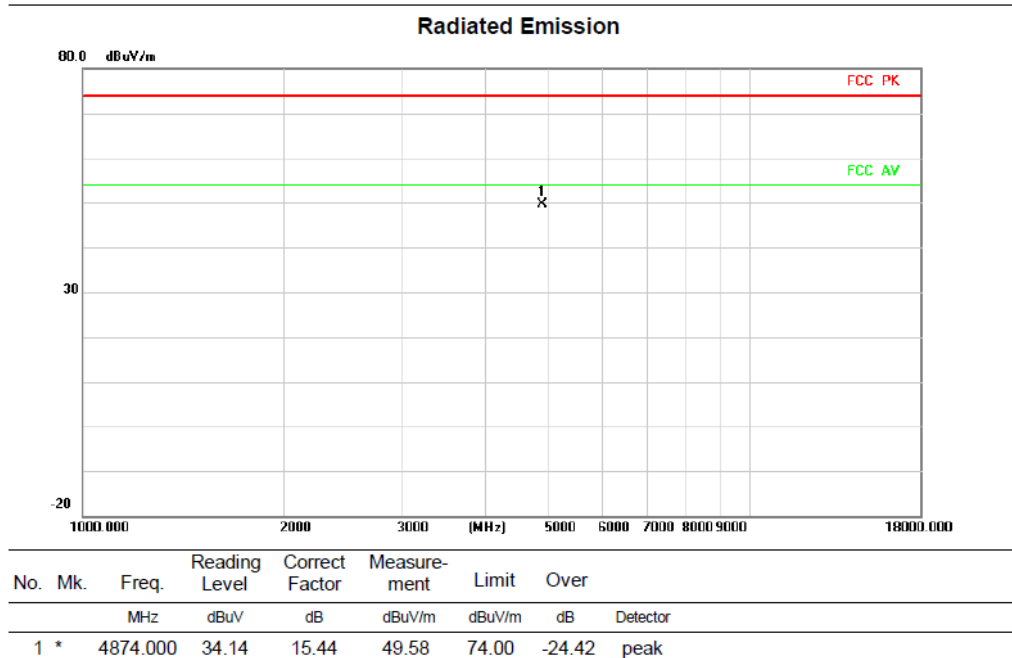
Test mode: 11N20MIMO

Test Channel:6

VERTICAL



HORIZONTAL



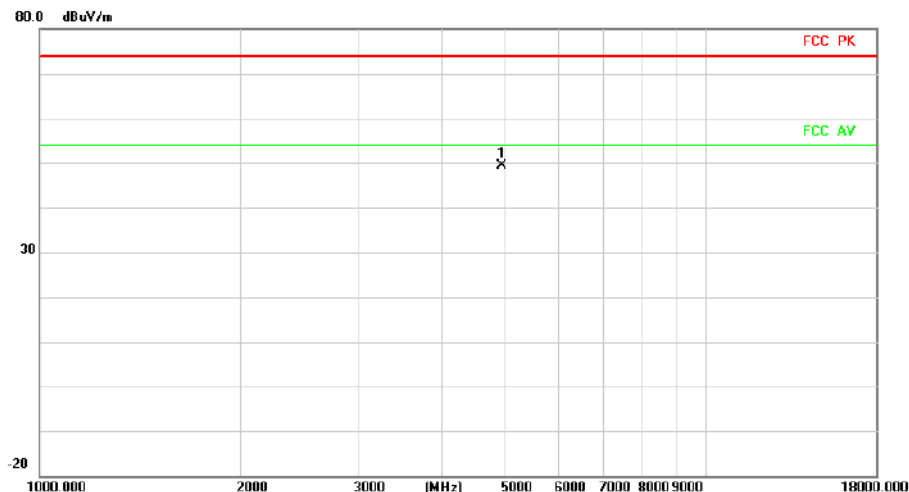
Above 1G (1GHz~18GHz)

Test mode: 11N20MIMO

Test Channel:11

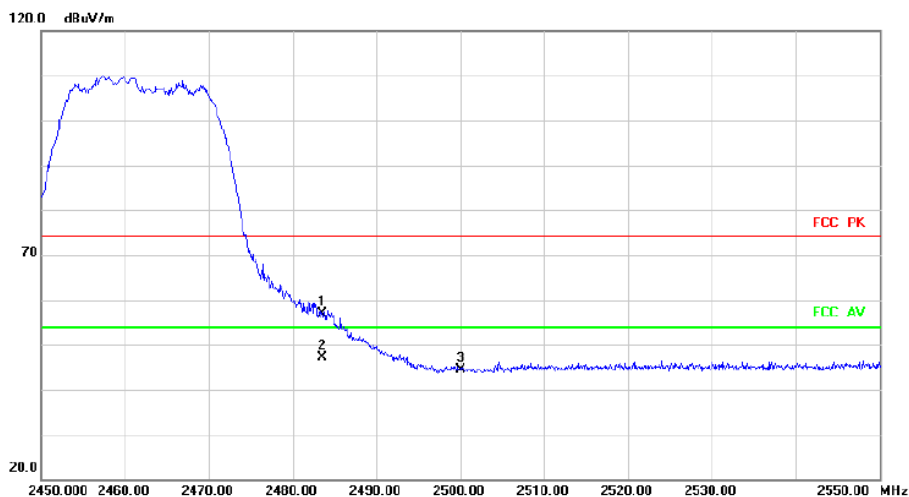
VERTICAL

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	*	4924.000	34.40	15.10	49.50	74.00	-24.50	peak

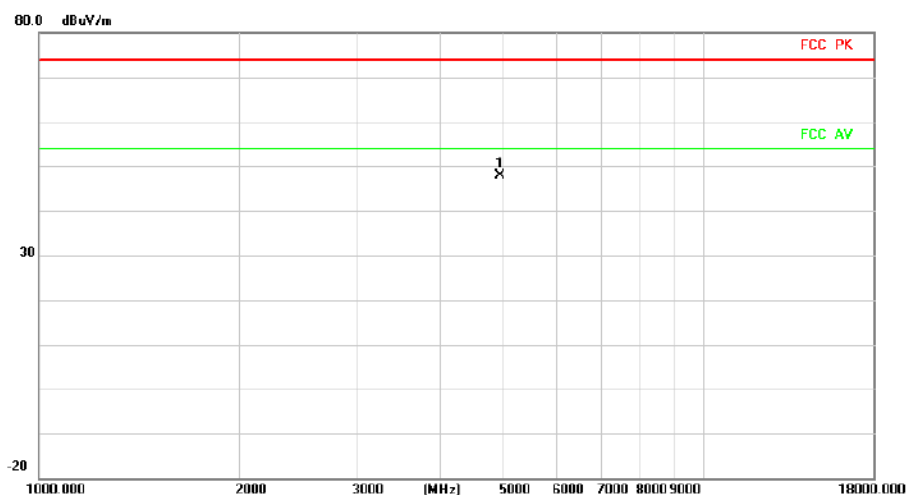
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2483.500	47.81	9.10	56.91	74.00	-17.09	peak
2	*	2483.500	38.13	9.10	47.23	54.00	-6.77	AVG
3		2500.000	35.11	9.26	44.37	74.00	-29.63	peak

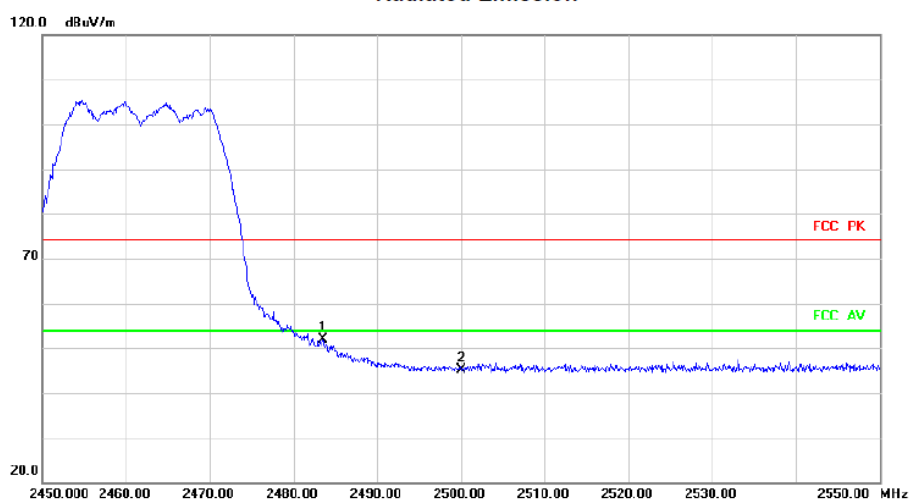
HORIZONTALA

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	*	4924.000	32.76	15.10	47.86	74.00	-26.14 peak

Radiated Emission



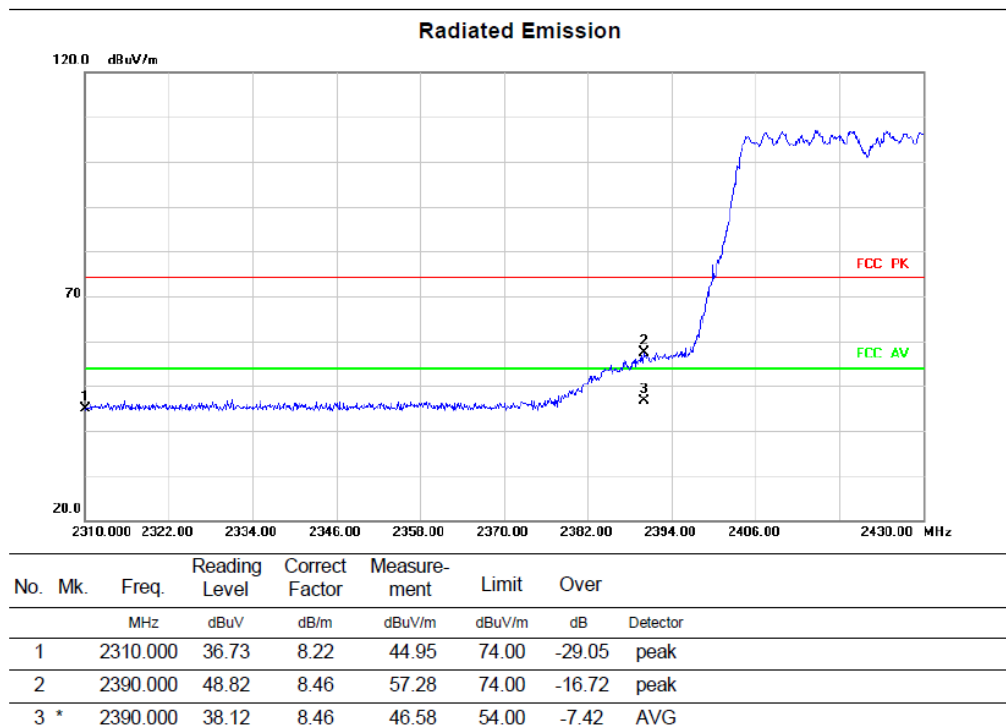
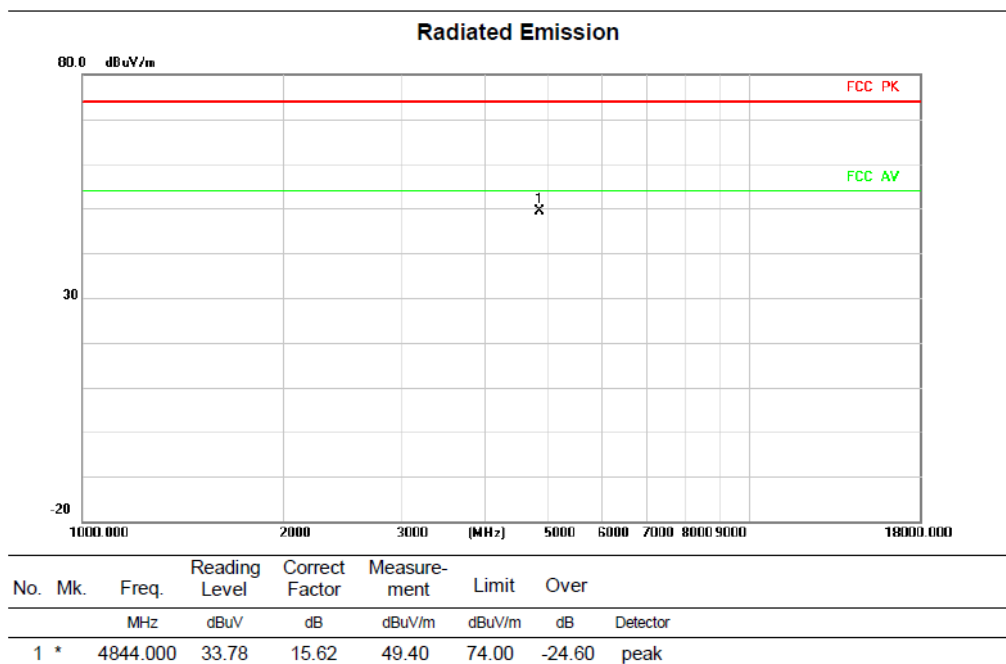
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1	*	2483.500	42.75	9.10	51.85	74.00	-22.15 peak
2		2500.000	35.94	9.26	45.20	74.00	-28.80 peak

Above 1G (1GHz~18GHz)

Test mode: 11N40MIMO

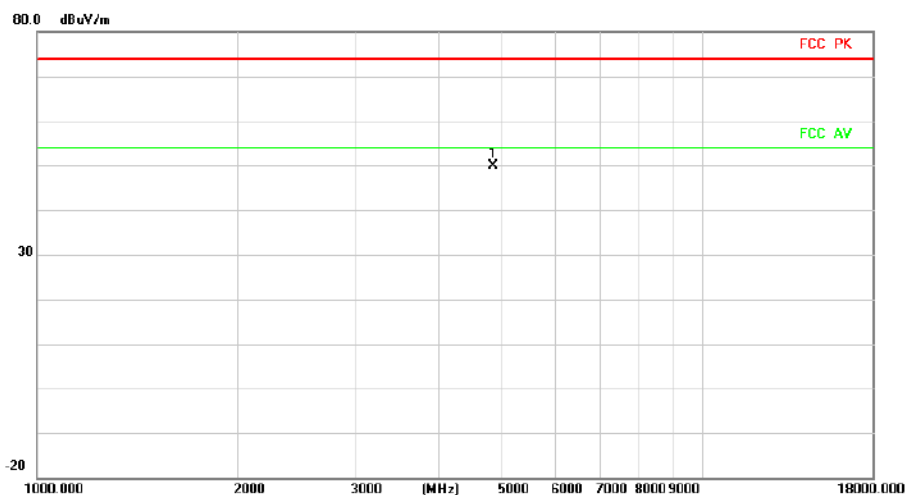
Test Channel:3

VERTICAL



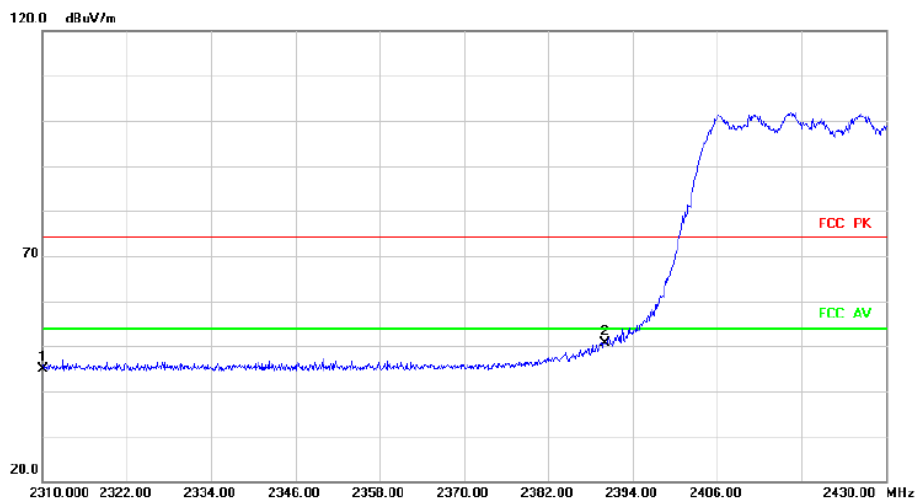
HORIZONTALA

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	*	4844.000	34.14	15.62	49.76	74.00	-24.24 peak

Radiated Emission



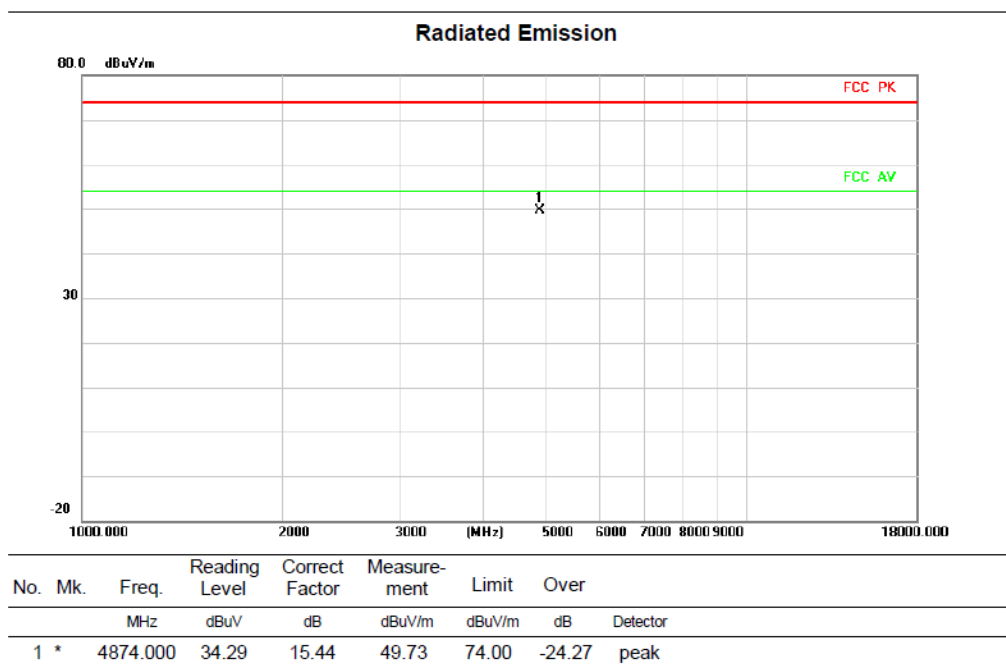
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1		2310.000	36.78	8.22	45.00	74.00	-29.00 peak
2	*	2390.000	42.20	8.46	50.66	74.00	-23.34 peak

Above 1G (1GHz~18GHz)

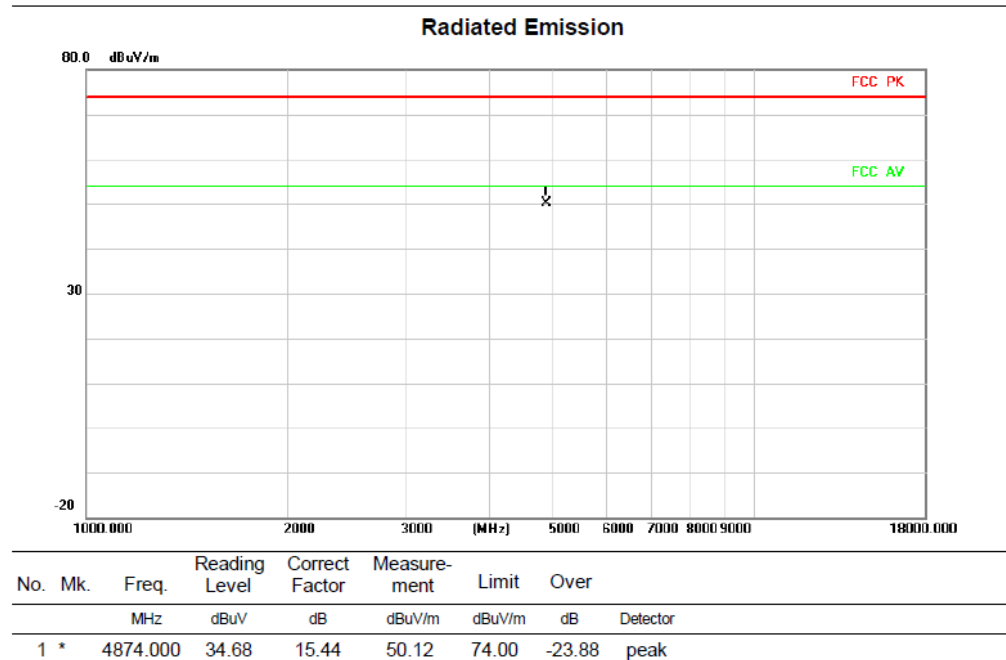
Test mode: 11N40MIMO

Test Channel:6

VERTICAL



HORIZONTAL

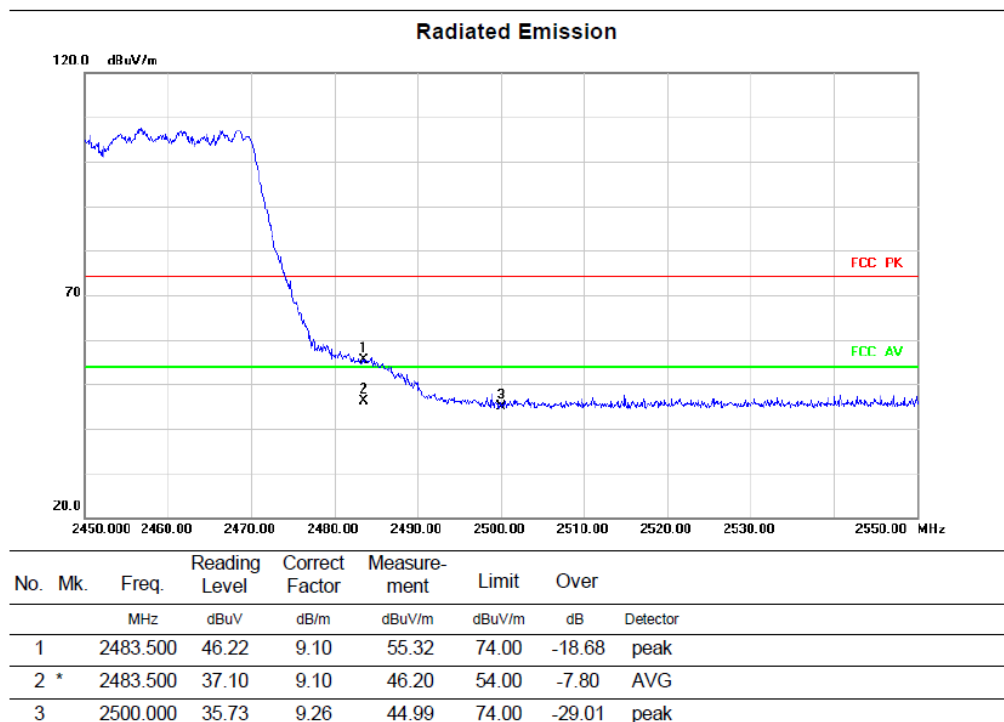
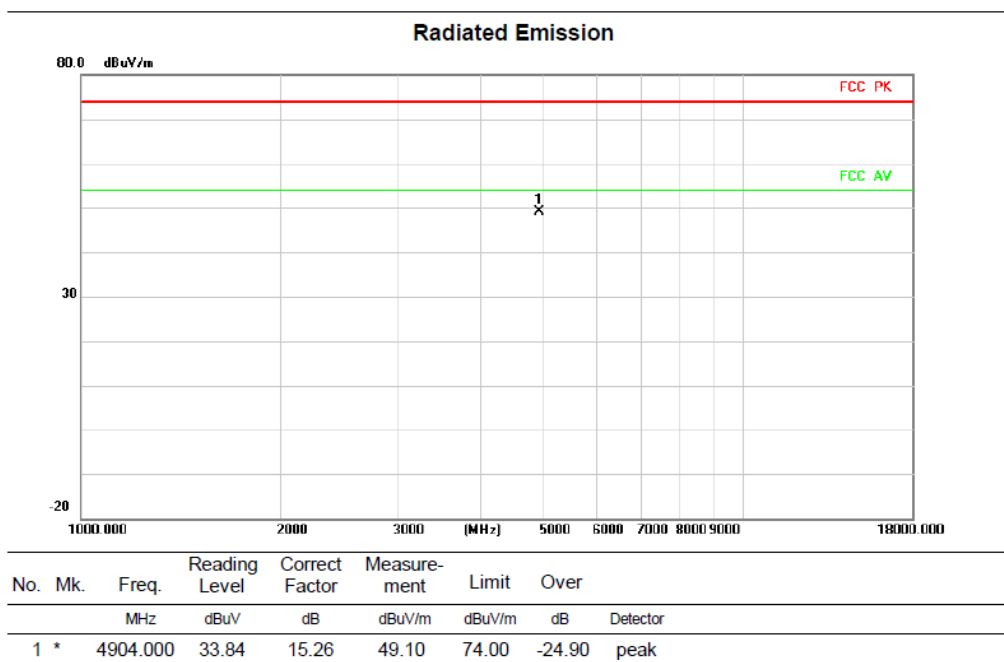


Above 1G (1GHz~18GHz)

Test mode: 11N40MIMO

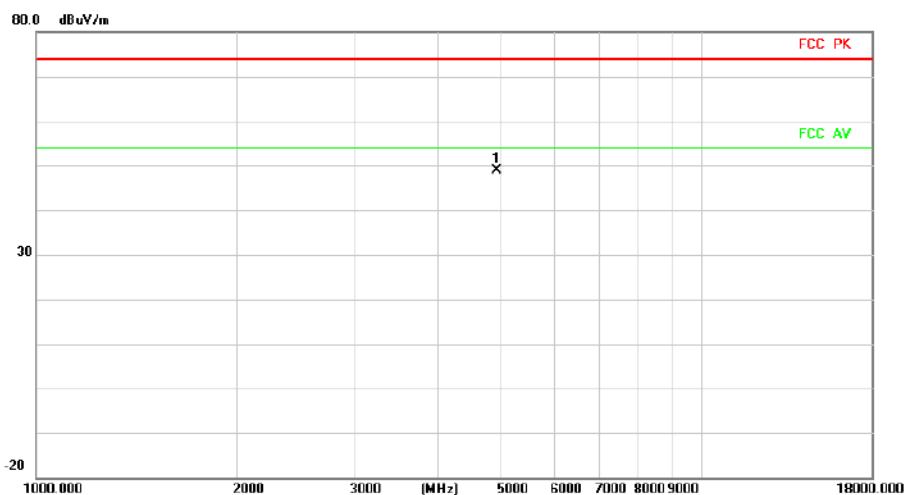
Test Channel:9

VERTICAL



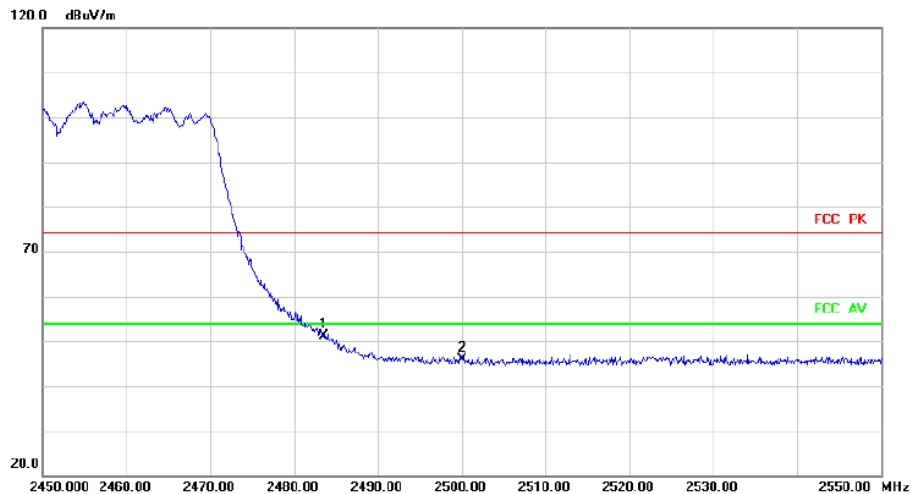
HORIZONTAL

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	*	4904.000	33.72	15.26	48.98	74.00	-25.02 peak

Radiated Emission



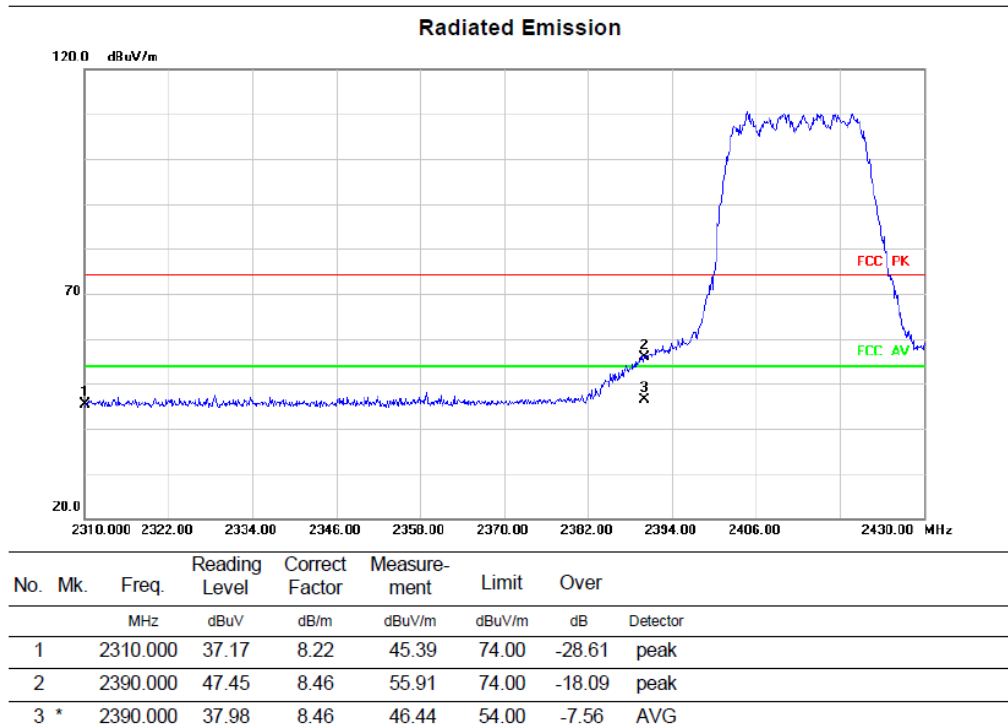
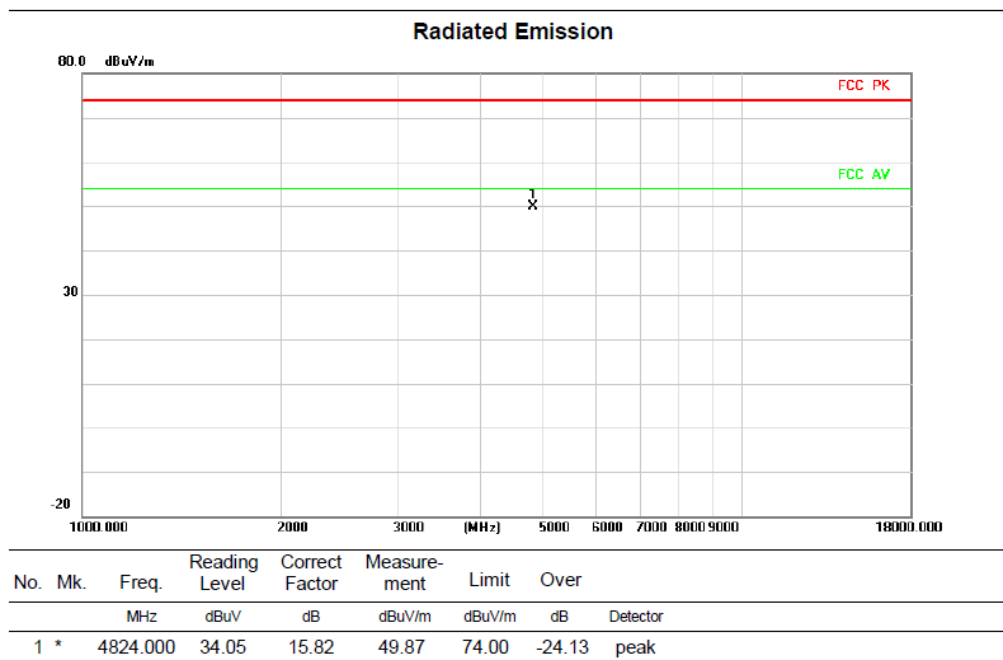
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1	*	2483.500	41.95	9.10	51.05	74.00	-22.95 peak
2		2500.000	36.59	9.26	45.85	74.00	-28.15 peak

Above 1G (1GHz~18GHz)

Test mode: 11AX20MIMO

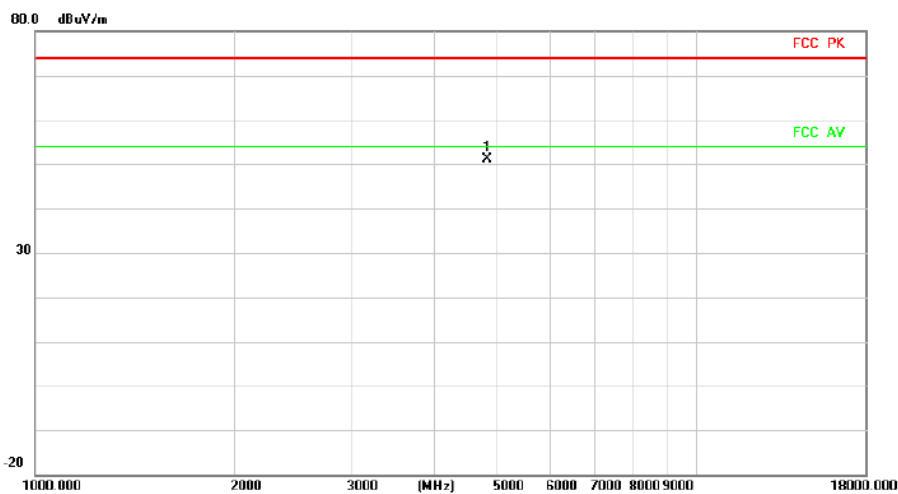
Test Channel:1

VERTICAL



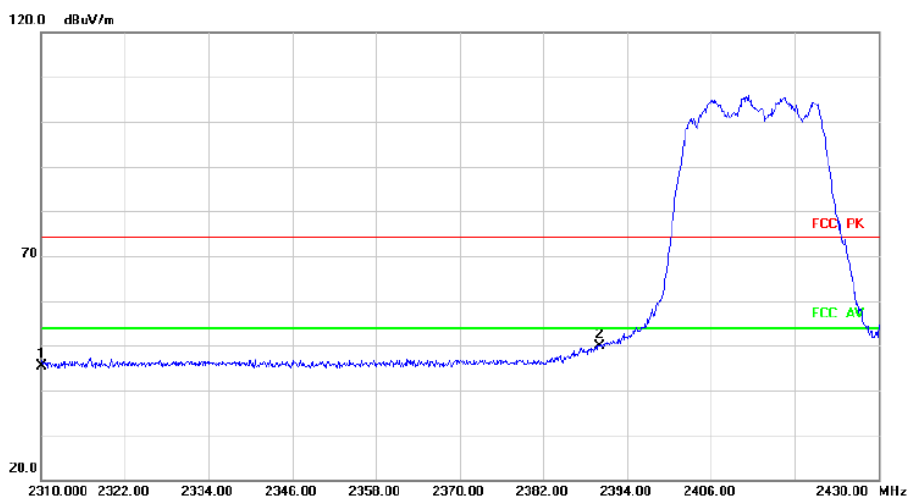
HORIZONTALA

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	*	4824.000	35.19	15.82	51.01	74.00	-22.99 peak

Radiated Emission



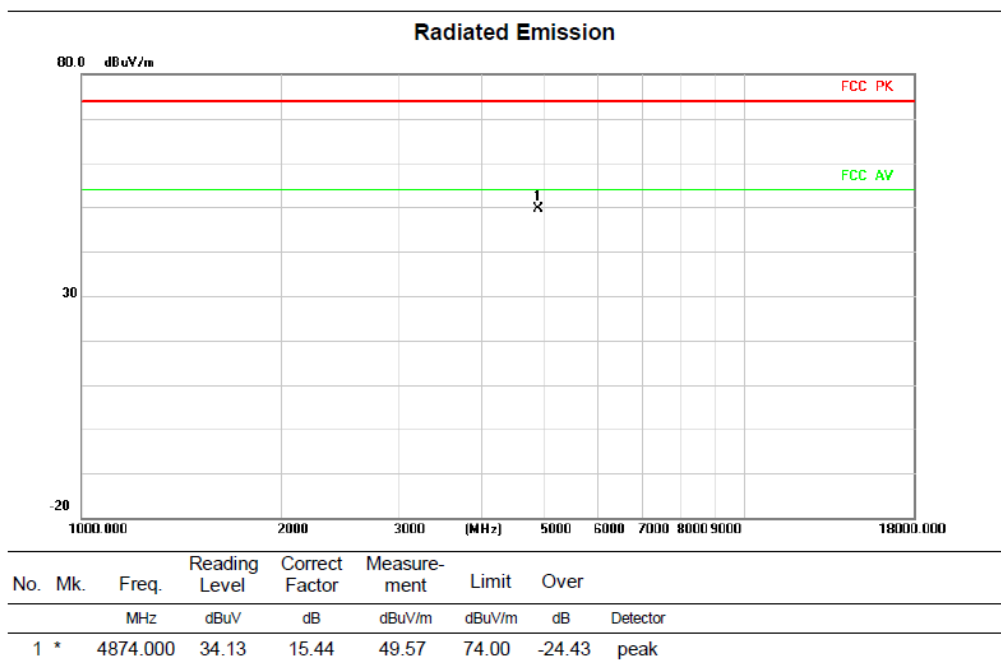
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1		2310.000	37.24	8.22	45.46	74.00	-28.54 peak
2	*	2390.000	41.47	8.46	49.93	74.00	-24.07 peak

Above 1G (1GHz~18GHz)

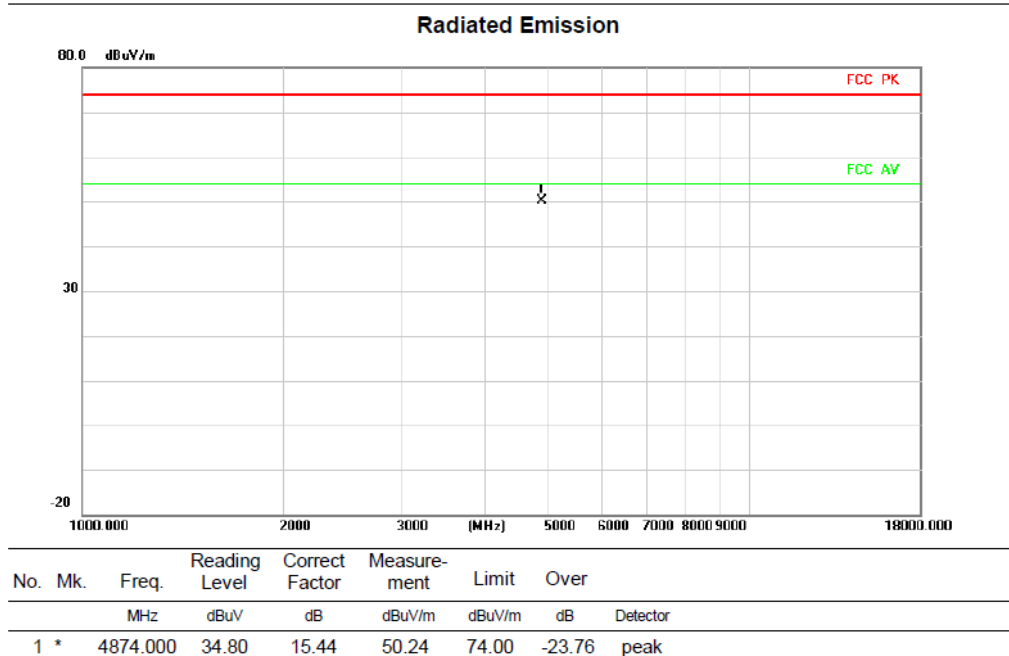
Test mode: 11AX20MIMO

Test Channel:6

VERTICAL



HORIZONTAL



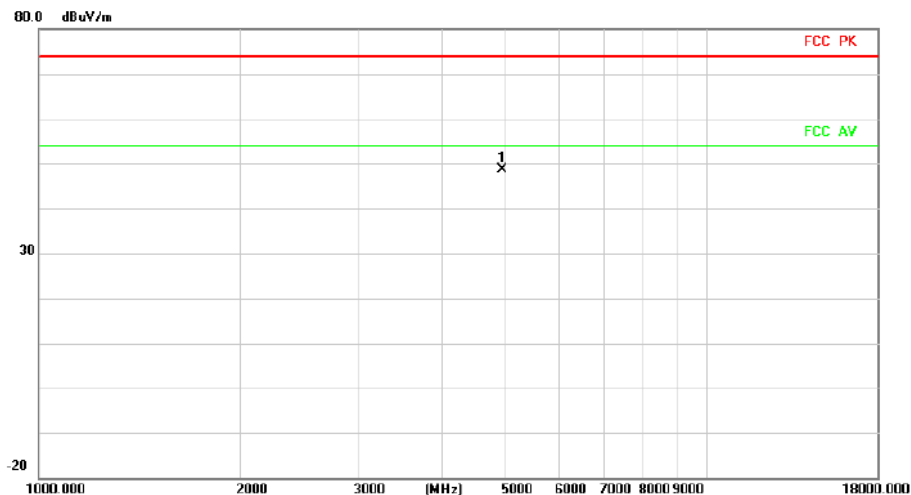
Above 1G (1GHz~18GHz)

Test mode: 11AX20MIMO

Test Channel:11

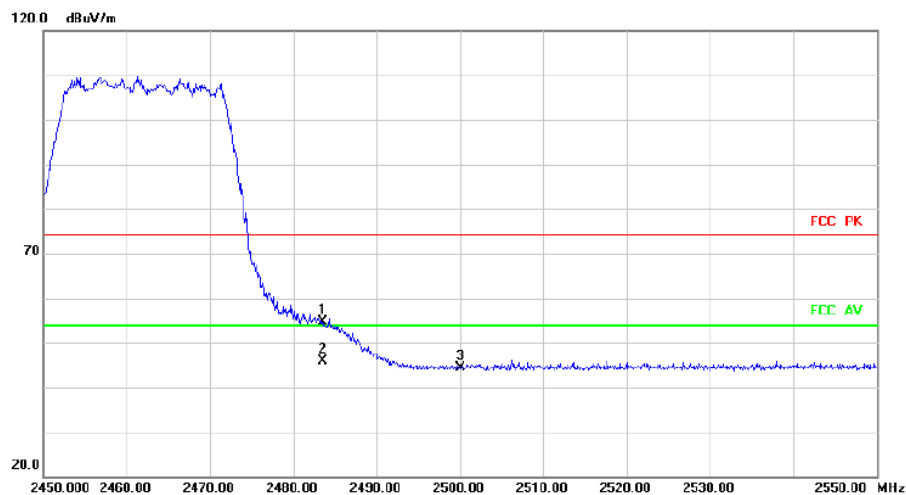
VERTICAL

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	*	4924.000	33.41	15.10	48.51	74.00	-25.49 peak

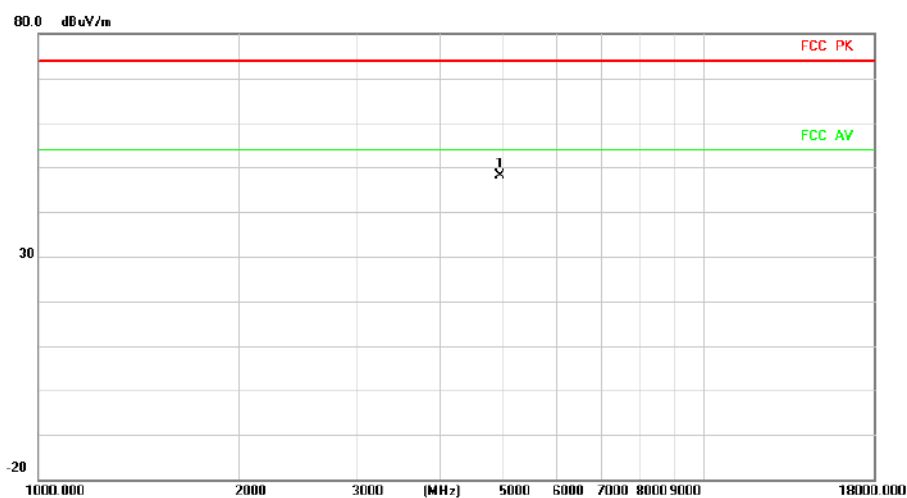
Radiated Emission



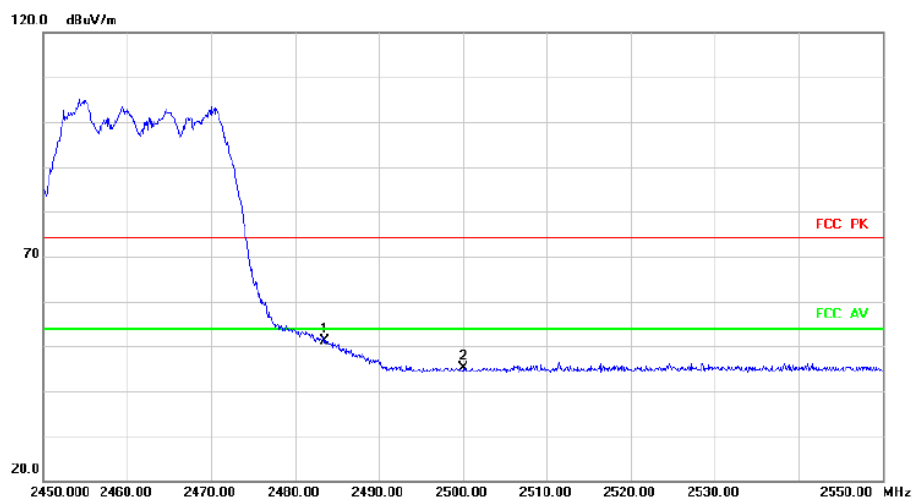
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1		2483.500	45.57	9.10	54.67	74.00	-19.33 peak
2	*	2483.500	36.84	9.10	45.94	54.00	-8.06 AVG
3		2500.000	35.22	9.26	44.48	74.00	-29.52 peak

HORIZONTALA

Radiated Emission



Radiated Emission



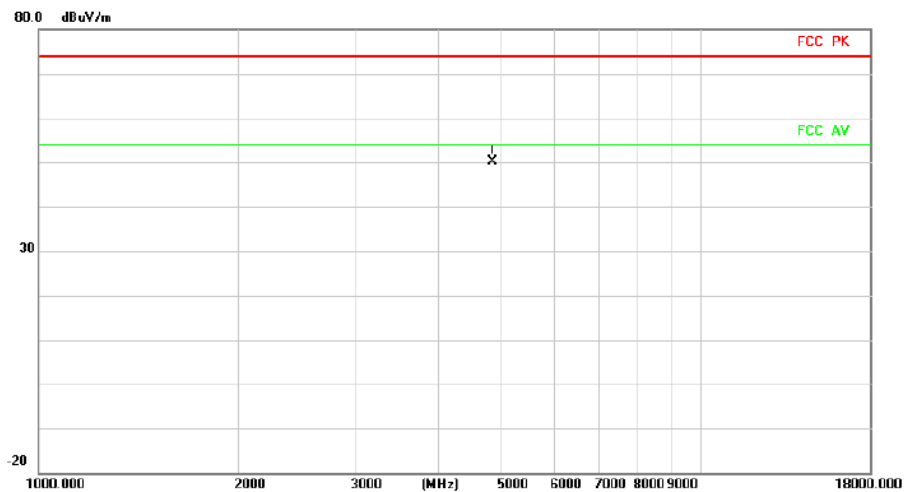
Above 1G (1GHz~18GHz)

Test mode: 11AX40MIMO

Test Channel:3

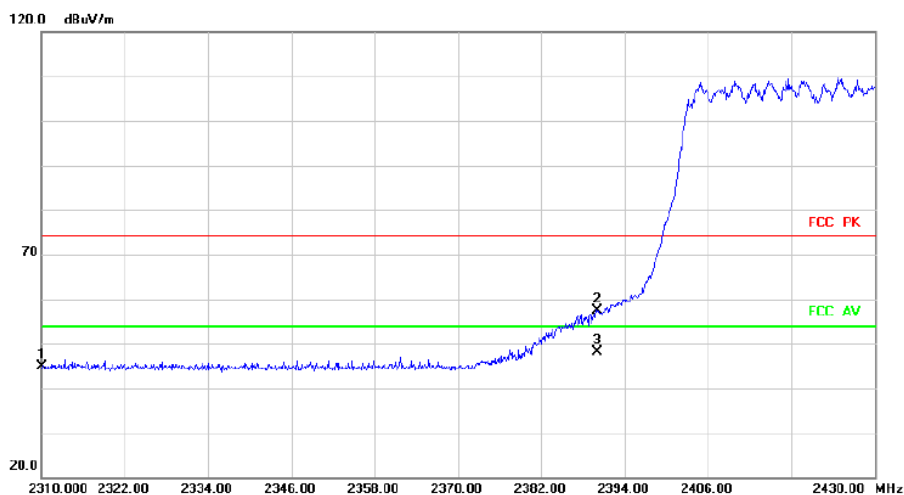
VERTICAL

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	*	4844.000	34.59	15.62	50.21	74.00	-23.79 peak

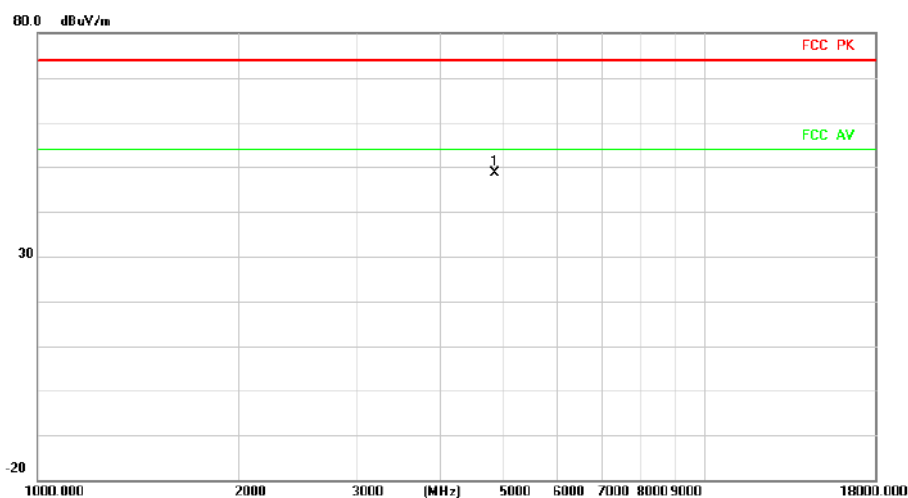
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1		2310.000	36.68	8.22	44.90	74.00	-29.10 peak
2		2390.000	48.96	8.46	57.42	74.00	-16.58 peak
3	*	2390.000	39.78	8.46	48.24	54.00	-5.76 AVG

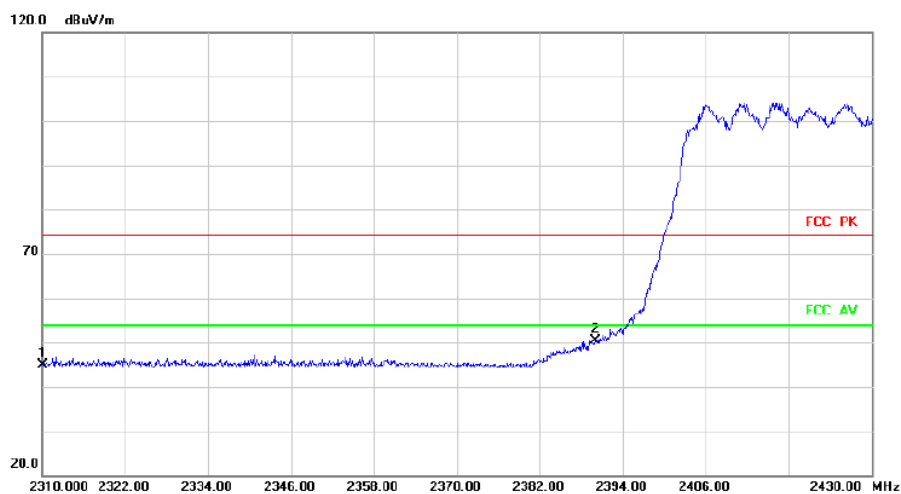
HORIZONTALA

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	*	4844.000	33.04	15.62	48.66	74.00	-25.34 peak

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1		2310.000	36.58	8.22	44.80	74.00	-29.20 peak
2	*	2390.000	41.84	8.46	50.30	74.00	-23.70 peak

Above 1G (1GHz~18GHz)

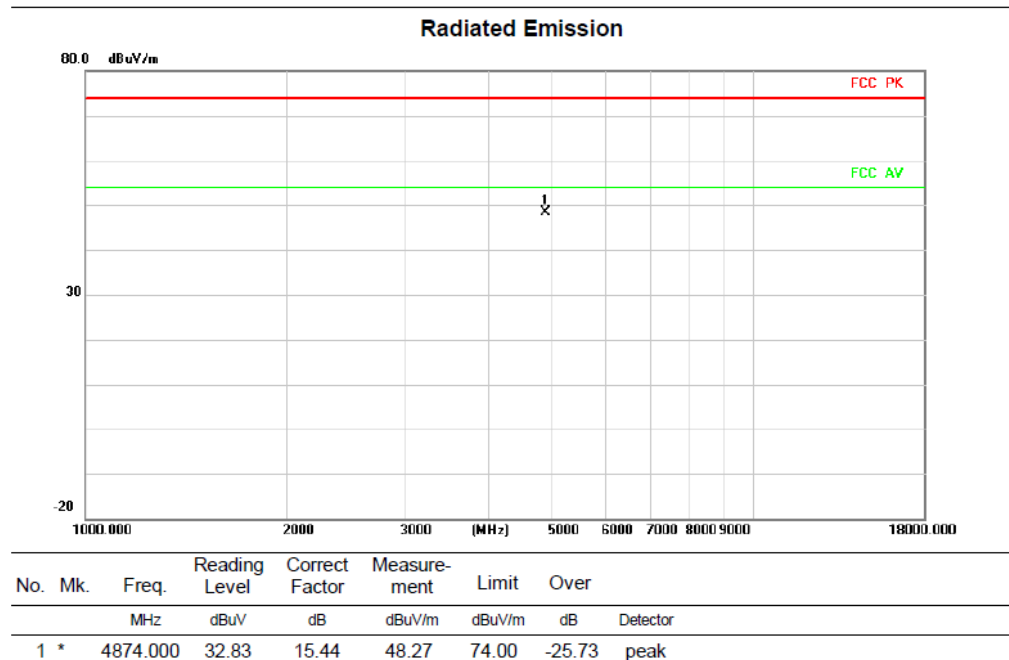
Test mode: 11AX40MIMO

Test Channel:6

VERTICAL



HORIZONTAL



Above 1G (1GHz~18GHz)

Test mode: 11AX40MIMO

Test Channel:9

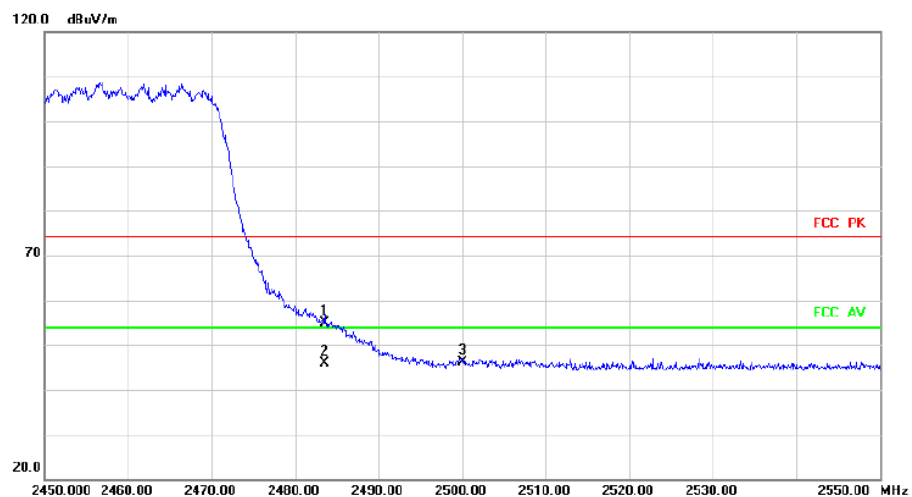
VERTICAL

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	*	4904.000	32.92	15.26	48.18	74.00	-25.82 peak

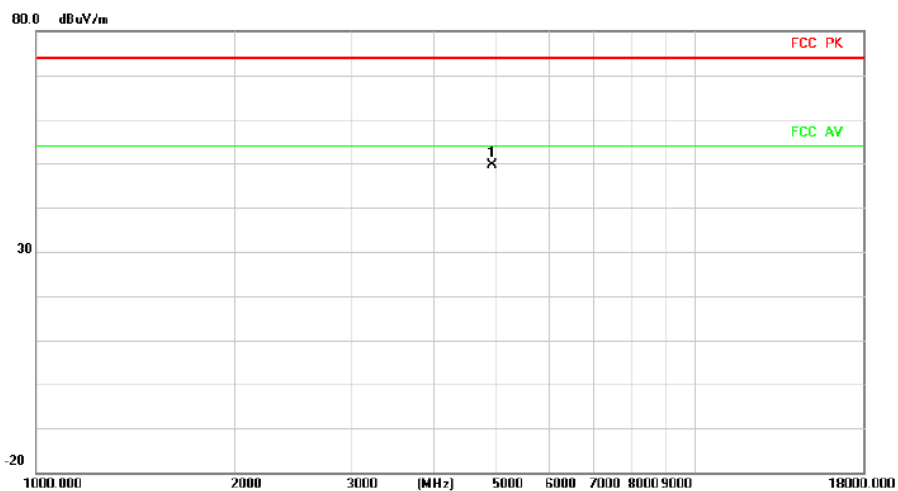
Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1		2483.500	45.71	9.10	54.81	74.00	-19.19 peak
2	*	2483.500	36.85	9.10	45.95	54.00	-8.05 AVG
3		2500.000	36.91	9.26	46.17	74.00	-27.83 peak

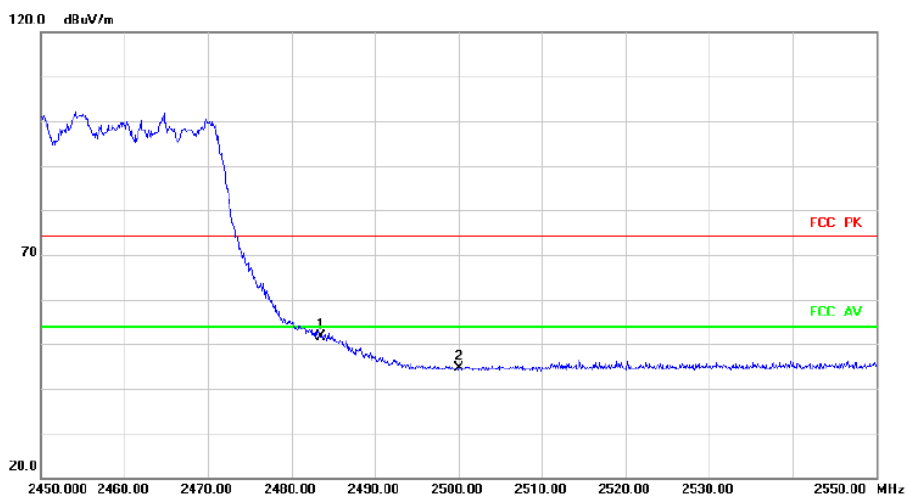
HORIZONTALA

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	*	4904.000	34.31	15.26	49.57	74.00	-24.43 peak

Radiated Emission



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1	*	2483.500	42.54	9.10	51.64	74.00	-22.36 peak
2		2500.000	35.31	9.26	44.57	74.00	-29.43 peak

The high frequency, which started from 18GHz to 25GHz, was pre-scanned and the result which was 20dB lower than the limit line was not recorded in this report.

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 Procedure

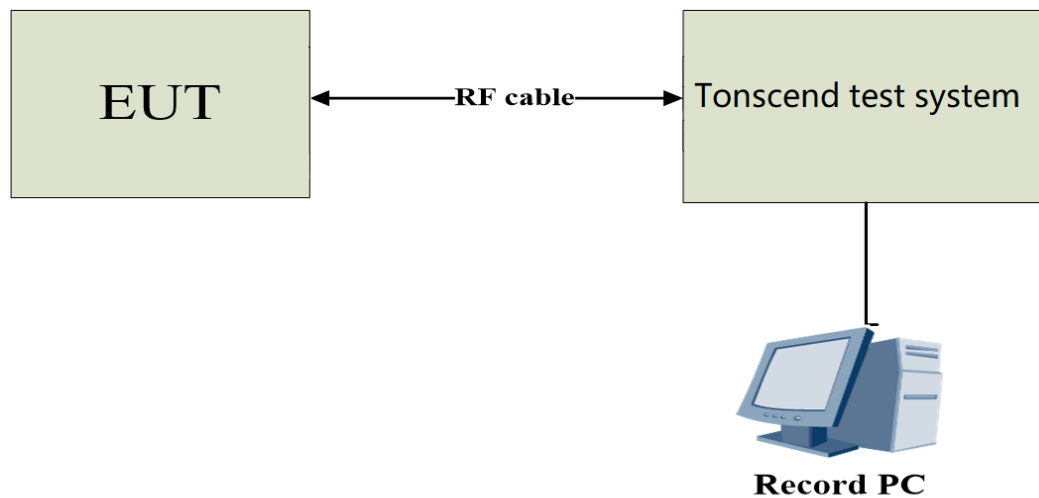
Test Method	
☒ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☒ Lowest, Middle and Highest Channel	☐ Lowest and Highest Channel
Environmental conditions	
☒ Normal	☐ Normal and Extreme
Note: ☒ : Test ☐ : No Test	

a) The EUT was directly connected to the tonscond test system 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
Spectrum Parameters	Setting
Start Frequency	30 MHz
Stop Frequency	26.5 GHz
RBW	100 kHz
VBW	300 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.3.3 Test Setup



3.3.4 The Result

3.3.4.1 Conducted Spurious Emission

Test result: PASS

Note: For test data, please refer to the report RF200317E01.

3.3.4.2 Band edge

Test result: PASS

Note: For test data, please refer to the report RF200317E01.

3.4 6dB Bandwidth

3.4.1 Limit

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

3.4.2 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 connected to the tonscond test system, and the spectrum analyser is set as follow:

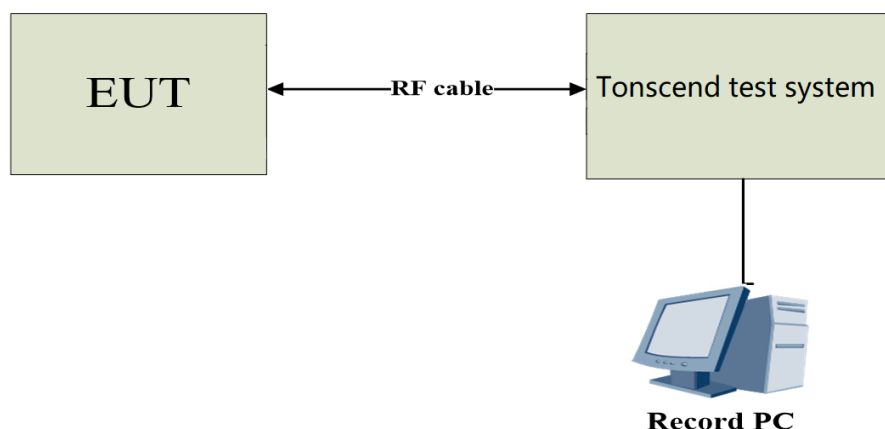
Centre Frequency	The centre frequency of the channel under test
RBW	100kHz
VBW	300kHz
Frequency span	2x Nominal Channel Bandwidth
Detector Mode	Peak
Trace Mode	Max Hold
Sweep Time	Auto Couple

b) Wait for the trace to stabilize then find the peak value of the trace and place the analyser marker on this peak.

c) Use the -6dB bandwidth function of the spectrum analyser to measure the 6dB Bandwidth of the EUT. This value shall be recorded.

d) Make sure that the power envelope is sufficiently above the noise floor of the analyser to avoid the noise signals left and right from the power envelope being taken into account by this measurement.

3.4.3 Test Setup





3.4.4 Test Result

Test result: PASS

Note: For test data, please refer to the report RF200317E01.

3.5 Maximum conducted output power

3.5.1 Limit

For systems using digital modulation in the 2400~2483.5MHz, The Maximum output Power shall not exceed 1W(30dBm)

3.5.2 Test Procedure

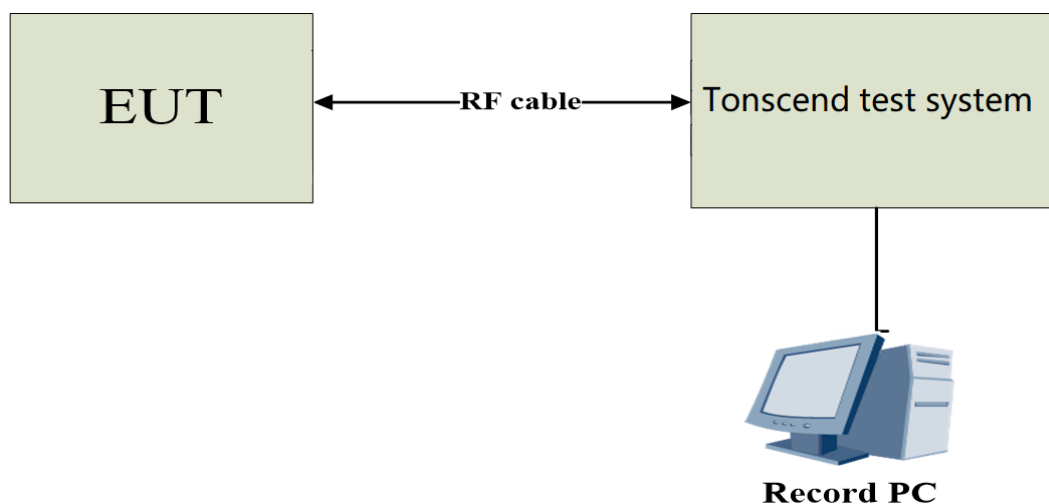
Test Method	
☒ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☒ Lowest, Middle and Highest Channel	☐ Lowest and Highest Channel
Environmental conditions	
☒ Normal	☐ Normal and Extreme
Note: ☒ : Test ☐ : No Test	

- The EUT was directly connected to the tonscend test system and antenna output port as show in the block diagram below.
- The maximum conducted output power was performed in accordance with method 11.9.2.3 (for average power) of ANSI C63.10-2013 and FCC KDB 662911 D01 v02r01 Multiple Transmitter Output.

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
 Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;
 Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

3.5.3 Test Setup



3.5.4 Table of Parameters of Text Software Setting

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Test Software	cmd.exe		
Frequency (MHz)	2412	2437	2462
IEEE 802.11b	Default	Default	Default
IEEE 802.11g	Default	Default	Default
IEEE 802.11n (20MHz)	Default	Default	Default
IEEE 802.11ax (20MHz)	Default	Default	Default
Frequency (MHz)	2422	2437	2452
IEEE 802.11n (40MHz)	Default	Default	Default
IEEE 802.11ax (40MHz)	Default	Default	Default

3.5.5 The Result

Test Mode	Antenna	Frequency[MHz]	Maximum conducted output Power [dBm]	Limit [dBm]	Verdict
11B-CDD	Ant1	2412	18.91	≤30.00	PASS
	Ant2	2412	18.59	≤30.00	PASS
	total	2412	21.77	≤30.00	PASS
	Ant1	2437	19.02	≤30.00	PASS
	Ant2	2437	18.40	≤30.00	PASS
	total	2437	21.73	≤30.00	PASS
	Ant1	2462	18.98	≤30.00	PASS
	Ant2	2462	18.64	≤30.00	PASS
	total	2462	21.83	≤30.00	PASS
11G-CDD	Ant1	2412	16.85	≤30.00	PASS
	Ant2	2412	16.51	≤30.00	PASS
	total	2412	19.69	≤30.00	PASS
	Ant1	2437	16.74	≤30.00	PASS
	Ant2	2437	16.39	≤30.00	PASS
	total	2437	19.58	≤30.00	PASS
	Ant1	2462	16.78	≤30.00	PASS
	Ant2	2462	16.32	≤30.00	PASS
	total	2462	19.57	≤30.00	PASS
11N20MIMO	Ant1	2412	16.92	≤30.00	PASS
	Ant2	2412	16.56	≤30.00	PASS
	total	2412	19.75	≤30.00	PASS
	Ant1	2437	17.03	≤30.00	PASS
	Ant2	2437	16.54	≤30.00	PASS
	total	2437	19.80	≤30.00	PASS
	Ant1	2462	16.95	≤30.00	PASS
	Ant2	2462	16.50	≤30.00	PASS
	total	2462	19.74	≤30.00	PASS
11N40MIMO	Ant1	2422	15.01	≤30.00	PASS
	Ant2	2422	14.64	≤30.00	PASS
	total	2422	17.84	≤30.00	PASS
	Ant1	2437	14.73	≤30.00	PASS
	Ant2	2437	14.54	≤30.00	PASS
	total	2437	17.65	≤30.00	PASS
	Ant1	2452	15.13	≤30.00	PASS
	Ant2	2452	14.50	≤30.00	PASS
	total	2452	17.84	≤30.00	PASS

11AX20MIMO	Ant1	2412	15.88	≤ 30.00	PASS
	Ant2	2412	15.55	≤ 30.00	PASS
	total	2412	18.73	≤ 30.00	PASS
	Ant1	2437	15.87	≤ 30.00	PASS
	Ant2	2437	15.62	≤ 30.00	PASS
	total	2437	18.76	≤ 30.00	PASS
	Ant1	2462	15.95	≤ 30.00	PASS
	Ant2	2462	15.58	≤ 30.00	PASS
	total	2462	18.78	≤ 30.00	PASS
11AX40MIMO	Ant1	2422	14.82	≤ 30.00	PASS
	Ant2	2422	14.58	≤ 30.00	PASS
	total	2422	17.72	≤ 30.00	PASS
	Ant1	2437	14.97	≤ 30.00	PASS
	Ant2	2437	14.54	≤ 30.00	PASS
	total	2437	17.77	≤ 30.00	PASS
	Ant1	2452	14.81	≤ 30.00	PASS
	Ant2	2452	14.51	≤ 30.00	PASS
	total	2452	17.67	≤ 30.00	PASS

Note: The duty cycle factor and line loss are compensated in the average conducted output power.

3.6 Power Spectral Density

3.6.1 Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmitting.

3.6.2 Test Procedure

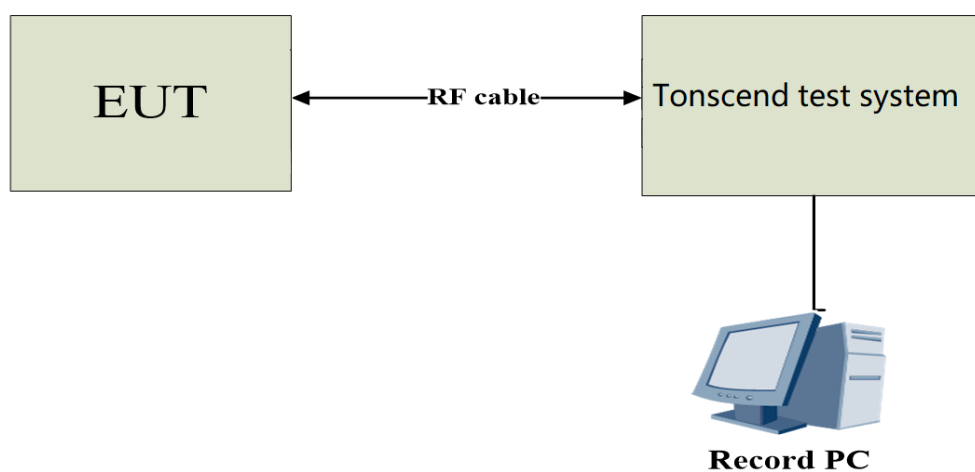
Test Method	
☒ Conducted Measurement	☐ Radiated Measurement
Test Channels	
☒ Lowest, Middle and Highest Channel	☐ Lowest and Highest Channel
Environmental conditions	
☒ Normal	☐ Normal and Extreme
Note: ● : Test ○ : No Test	

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

b) Spectrum analyser settings as following:

Spectrum Parameters	Setting
Span Frequency	1.5 times the DTS bandwidth
RBW	3 kHz
VBW	10 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.6.3 Test Setup





3.6.4 The Result

Test result: PASS

Note: For test data, please refer to the report RF200317E01.

Statement

1. The report is invalid without the official seal or special seal of Shenzhen Haiyun Standard Technology Co., Ltd. (hereinafter referred to as the unit).
2. The report is invalid without the signature of the approver.
3. The report is invalid if altered arbitrarily.
4. The report shall not be partially copied without the written approval of the unit.
5. The reported test results are only valid for the tested samples.
6. If there is any objection to the test report, it shall be submitted to the test unit within 15 days from the date of receiving the report, and the overdue shall not be accepted.

Shenzhen Haiyun Standard Technology Co., Ltd.

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Tel: 0755-26024411

Email: service@hy-lab.cn

End of Test Report