

TEST REPORT

Report No.: SHE19110012-02KE

Date: 2019-11-19

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Applicant : Toast, Inc.
Address of Applicant : 401 Park Drive, Suite 801, Boston, MA 02215, USA

Product Name : Data Processing machine
Model No. : TT200/TK200
Sample No. : E19110012-02#01
FCC ID : 2AMNG-TT200
ISED Number : 23177-TT200

Standards : FCC CFR47 Part 15, Subpart E
RSS-Gen (Issue 5, March 2019)
RSS-247 (Issue 2, February 2017)

Date of Receipt : 2019-11-12
Date of Test : 2019-11-12 ~ 2019-11-18
Date of Issue : 2019-11-19

Remark:

This report details the results of the testing carried out on one sample, the results contained in this report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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(Jennifer Zhou)

Reviewed by: Adrian Shi
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(Authorized signatory: Guoyou Chi)

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Revision Record			
Version	Date	Revisions	Revised By
1.0	2019-11-19	Original	--

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1 General Information

1.1 Testing Laboratory

Company Name	ICAS Testing Technology Services (Shanghai) Co., Ltd.
Address	155 Pingbei Rd, Minhang District, Shanghai, China
Telephone	0086 21-51682999
Fax	0086 21-54711112
Homepage	www.icasiso.com

1.2 Details of Application

Company Name	Toast, Inc.
Address	401 Park Drive, Suite 801, Boston, MA 02215, USA
Contact Person	Mr James H Barber
Telephone	(562) 546-2272
Email	jbarber@toasttab.com

1.3 Details of EUT

Product Name	Data Processing machine
Brand Name	Toast
Model No.	TT200/TK200
FCC ID	2AMNG-TT200
ISED Number	23177-TT200
Mode of Operation	WLAN 802.11a/n(HT20/40)/ac(HT20/40/80)
Frequency Range	Band I: 5150 MHz ~ 5250 MHz Band IV: 5725 MHz ~ 5850 MHz
Modulation Type	256QAM, 64QAM, 16QAM, BPSK, QPSK
Channel Bandwidth	802.11a: 20MHz; 802.11n: 20MHz, 40MHz; 802.11ac: 20MHz, 40MHz, 80MHz
Antenna Type	Internal Antenna
Antenna Gain	Band I: 2.29 dBi Band IV: 1.92 dBi
Extreme Temperature Range	0°C ~ +55°C
Test Voltage	AC 24V

Note(s):

1. This test report is for approval of PCB and speaker change based on the original test report No. I19D00071-SRD07 and I19D00071-SRD08.
2. The details product change please refer to the document 'Product Change Description'.
3. Only additional test required in the product change list in this report.

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4. The model TK200 is the same as TT200 except the attached base support, detail please refer to clause 5.1. So only tested model was TT200.

1.4 Test Methodology

47 CFR Part 15, Subpart E (11-1-19 Edition)	Unlicensed National Information Infrastructure Devices
KDB Publication 789033 D02 v02r01	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E
KDB Publication 662911 D01 v02r01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band (e.g., MIMO, Smart Antenna, etc)
RSS-Gen (Issue 5, March 2019)	General Requirements for Compliance of Radio Apparatus
RSS-247 (Issue 2, February 2017)	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

Note(s):

All test items were verified and recorded according to the standards and without any addition/deviation/exclusion during the test.

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2 Test Condition

2.1 Environmental conditions

Temperature (°C)	18-25
Humidity (%RH)	40-65
Barometric Pressure (mbar)	960-1060

2.2 Equipment List

Name of Equipment	Manufacturer	Model	Serial No.	Cal. Due Date
Spectrum Analyzer	Keysight	N9020B	MY59260184	2020-07-28
Spectrum Analyzer	Rohde & Schwarz	FSV40N	101450	2020-06-24
EMI Test Receiver	Rohde & Schwarz	ESPI3	100173	2020-06-19
EMI Test Receiver	Rohde & Schwarz	ESR 7	101911	2020-06-19
V-network	SCHWARZBECK	NSLK 8127	8127-902	2020-02-20
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	100687	2020-08-22
Broadband Antenna	SCHWARZBECK	VULB9163	9163-1037	2020-06-06
Horn Antenna-18G	SCHWARZBECK	BBHA9120D	9120D-1775	2020-06-06
Loop Antenna	SCHWARZBECK	FMZB 1513	N/A	2021-03-19
Horn Antenna-40G	YINGLIAN	LB-180400-KF	N/A	2020-07-26
EMC chamber 9*6*6 (L*W*H)	CHANGNING	966	N/A	2020-06-26
Shielded Enclosure 8*5*4 (L*W*H)	CHANGNING	854	N/A	2020-08-28
Test Software	BL	BL410_E	N/A	N/A

2.3 Measurement Uncertainty

Parameter	Frequency	Uncertainty
Antenna Port Conducted Emission	< 1GHz	± 1.5 dB
	> 1GHz	± 1.5 dB
Radiated Emission	30 MHz – 1 GHz	± 3 dB
	> 1GHz	± 3 dB

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3 Test Set-up and Operation Modes

3.1 Details of Test Mode

Using test software was control EUT work in continuous transmitter and receiver mode. Select test channel as below:

For 802.11a/n(HT20), 802.11ac(VHT20)

Band I (5150 – 5250 MHz)		Band IV (5725 – 5850 MHz)	
Channel	Frequency	Channel	Frequency
The lowest channel(CH36)	5180MHz	The lowest channel(CH149)	5745MHz
The middle channel(CH44)	5220MHz	The middle channel(CH157)	5785MHz
The highest channel(CH48)	5240MHz	The highest channel(CH165)	5825MHz

For 802.11n(HT40), 802.11ac(VHT40)

Band I (5150 – 5250 MHz)		Band IV (5725 – 5850 MHz)	
Channel	Frequency	Channel	Frequency
The lowest channel(CH38)	5190MHz	The lowest channel(CH151)	5755MHz
The highest channel(CH46)	5230MHz	The highest channel(CH159)	5795MHz

For 802.11ac(VHT80)

Band I (5150 – 5250 MHz)		Band IV (5725 – 5850 MHz)	
Channel	Frequency	Channel	Frequency
The lowest channel(CH42)	5210MHz	The lowest channel(CH155)	5775MHz

Through Pre-scan under all rate at lowest channel, the data rate as below table described is the worst case, so we choose these data rate for test.

Type	Data rate
802.11a	6Mbps
802.11n(HT20), 802.11ac(VHT20)	MCS0
802.11n(HT40), 802.11ac(VHT40)	MCS0
802.11ac(VHT80)	MCS0

The basic operation modes are:

- A. On
 - 1. WLAN mode
 - a. Transmitting
 - b. Receiving
- B. Standby

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C. Off

3.2 Special Accessories and Auxiliary Equipment

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	TP00083A	N/A

3.3 Support Software

Description	Manufacturer	Software Name
Software	/	RF Test Tool

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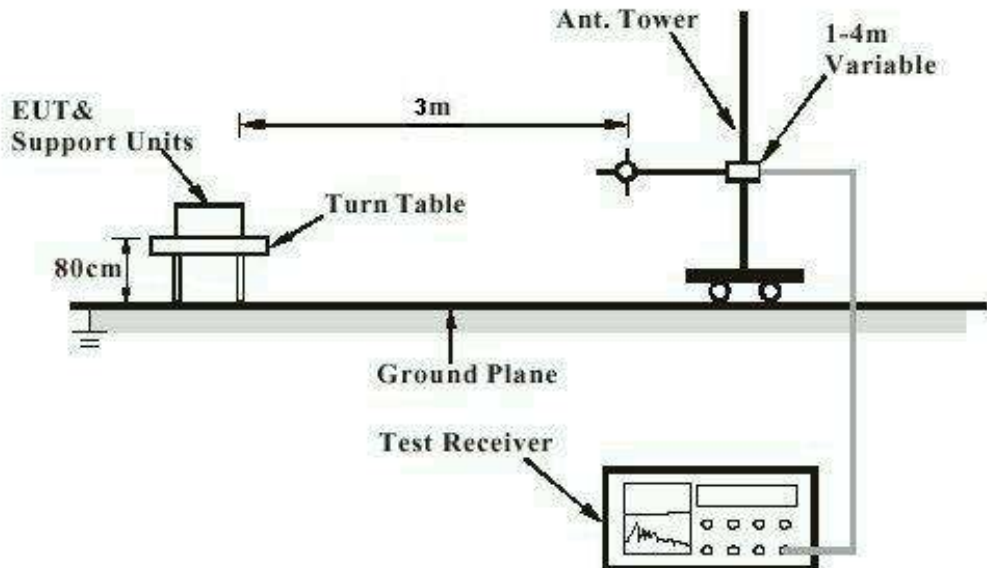
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3.4 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

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4 Test Results

4.1 Transmitter Requirement & Test Suites

4.1.1 Spurious Emission

RESULT:

PASS

Test standard	: FCC Part 15.407(b) RSS-247 6.2
Requirement	: ANSI C63.10-2013
Kind of test site	: 3m Semi-Anechoic Chamber

Test setup

Test Channel	: Low/Middle/High
Operation Mode	: A
Ambient temperature	: 25°C
Relative humidity	: 52%

Notes:

1. Test plots please refer to the annex document "EXHIBIT A of SHE19110012-02KE" and "EXHIBIT B of SHE19110012-02KE".
2. For 9 kHz ~ 30 MHz, the amplitude of spurious emissions that are attenuated by more than 20dB below the permissible. The value has no need to be reported.
3. The spurious above 18GHz is noise only and 20dB below the limit. The value has no need to be reported.
4. The EUT is working in the Normal link mode below 1 GHz.

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4.1.2 Band Edge (Restricted-band band-edge)

RESULT:

PASS

Test standard	: FCC Part 15.407(b) RSS-247 6.2
Requirement	: ANSI C63.10-2013, KDB 789033
Kind of test site	: 3m Semi-Anechoic Chamber

Test setup

Test Channel	: Low/Middle/High
Operation Mode	: A.1
Ambient temperature	: 25°C
Relative humidity	: 52%

For details refer to following test plot.

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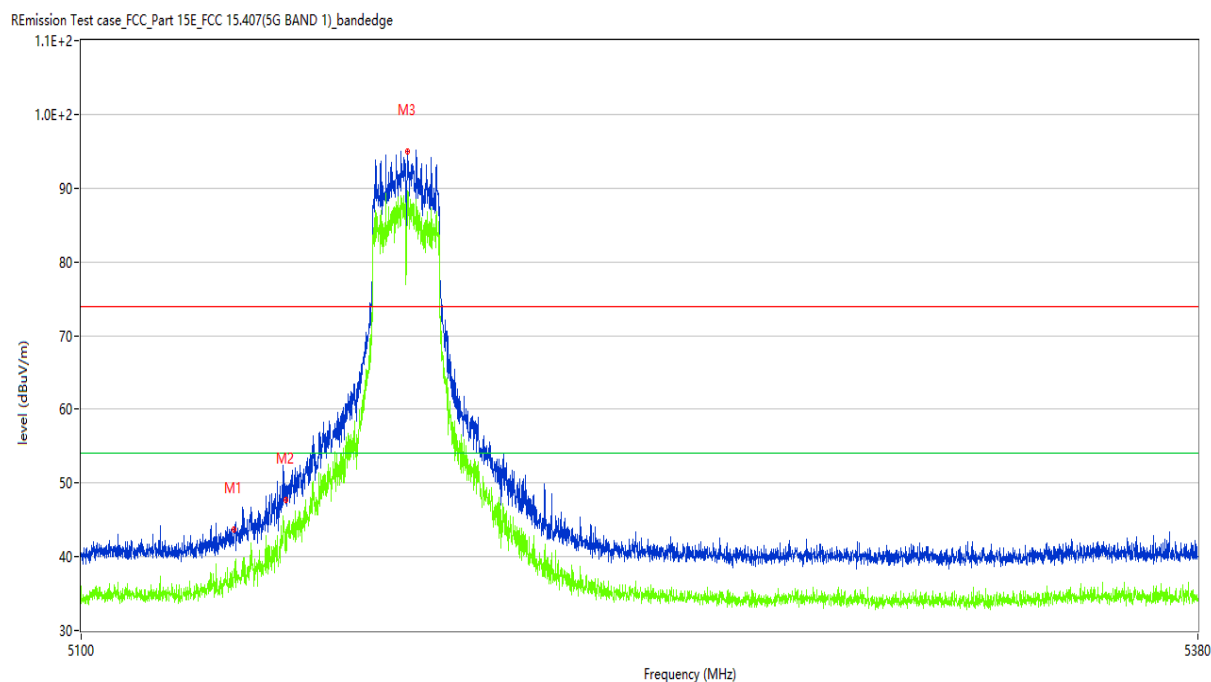
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Figure 1: Band Edge (Restricted-band band-edge), 802.11a, 5180MHz

Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5137.511	43.77	1.72	74.0	-30.23	Peak	220.00	100	Horizontal	Pass
1**	5137.511	37.03	1.72	54.0	-16.97	AV	220.00	100	Horizontal	Pass
2	5150.000	45.51	1.71	74.0	-28.49	Peak	230.99	100	H	Pass
2**	5150.000	40.23	1.71	54.0	-13.77	AV	230.99	100	H	Pass
3	5180.270	94.99	1.68	74.0	20.99	Peak	24.30	100	Horizontal	N/A
3**	5180.270	89.61	1.68	54.0	35.61	AV	24.30	100	Horizontal	N/A

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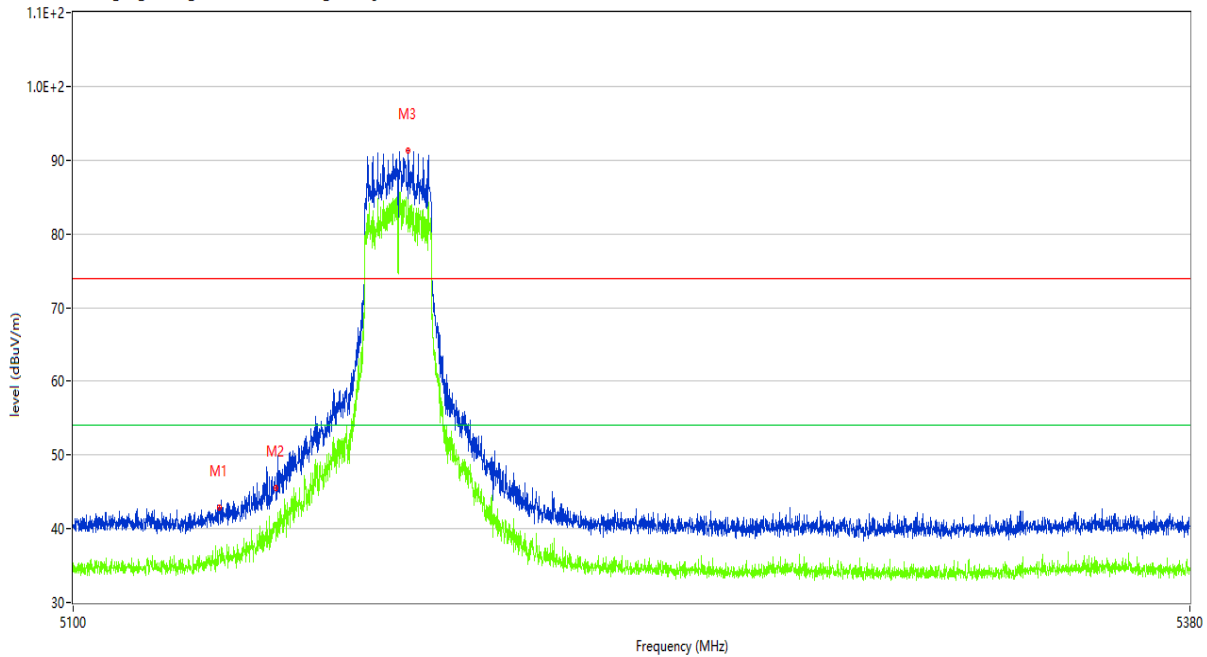
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Vertical

REmission Test case_FCC_Part 15E_FCC 15.407(5G BAND 1)_bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5135.831	42.84	1.72	74.0	-31.16	Peak	62.20	100	Vertical	Pass
1**	5135.831	37.25	1.72	54.0	-16.75	AV	62.20	100	Vertical	Pass
2	5150.000	43.72	1.71	74.0	-30.28	Peak	113.74	100	V	Pass
2**	5150.000	38.48	1.71	54.0	-15.52	AV	113.74	100	V	Pass
3	5182.439	91.34	1.68	74.0	17.34	Peak	93.80	100	Vertical	N/A
3**	5182.439	84.65	1.68	54.0	30.65	AV	93.80	100	Vertical	N/A

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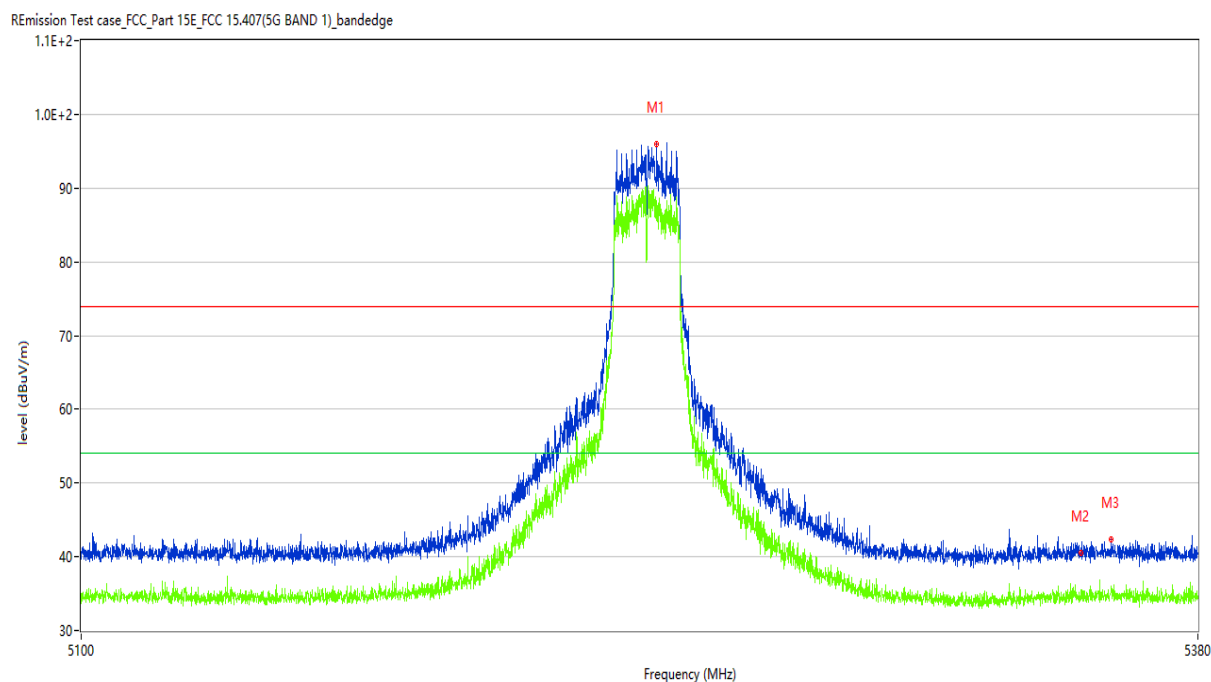
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Figure 2: Band Edge (Restricted-band band-edge), 802.11a, 5240MHz

Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5242.414	95.90	1.58	74.0	21.90	Peak	22.80	100	Horizontal	N/A
1**	5242.414	88.24	1.58	54.0	34.24	AV	22.80	100	Horizontal	N/A
2	5350.000	40.43	1.46	74.0	-33.57	Peak	126.27	100	H	Pass
2**	5350.000	34.12	1.46	54.0	-19.88	AV	126.27	100	H	Pass
3	5357.816	42.37	1.46	74.0	-31.63	Peak	213.30	100	Horizontal	Pass
3**	5357.816	35.74	1.46	54.0	-18.26	AV	213.30	100	Horizontal	Pass

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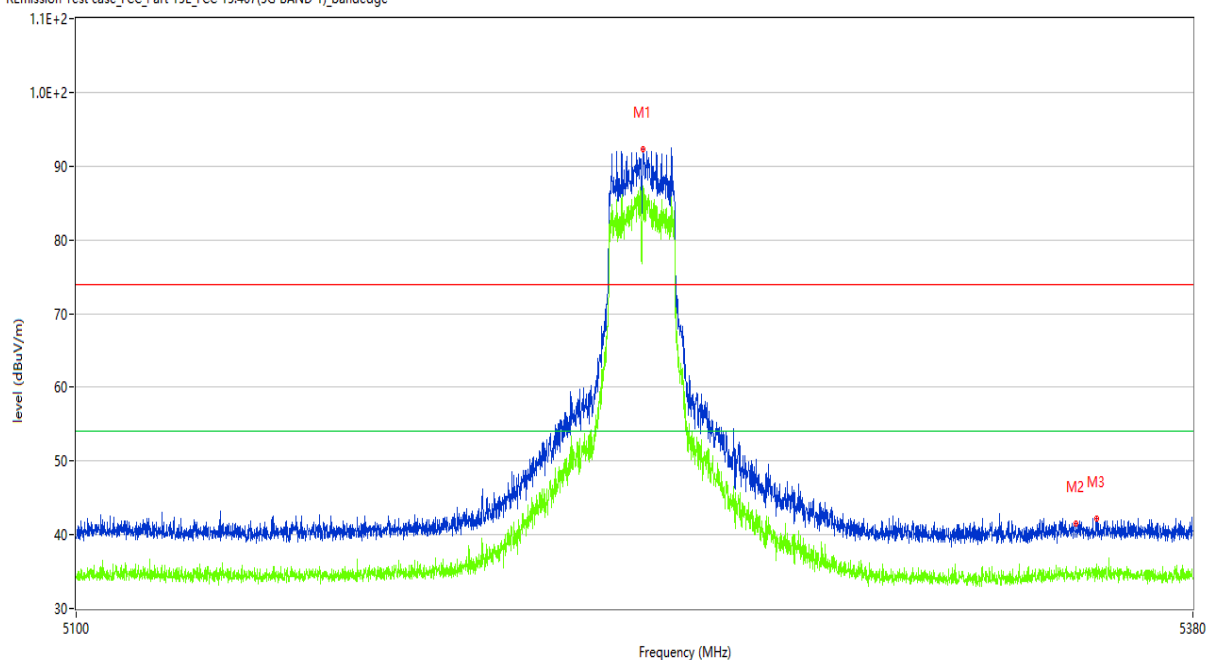
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REmission Test case_FCC_Part 15E_FCC 15.407(5G BAND 1)_bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5240.245	92.36	1.58	74.0	18.36	Peak	113.90	100	Vertical	N/A
1**	5240.245	87.21	1.58	54.0	33.21	AV	113.90	100	Vertical	N/A
2	5350.000	39.76	1.46	74.0	-34.24	Peak	286.20	100	V	Pass
2**	5350.000	35.06	1.46	54.0	-18.94	AV	286.20	100	V	Pass
3	5355.226	42.25	1.46	74.0	-31.75	Peak	332.80	100	Vertical	Pass
3**	5355.226	36.01	1.46	54.0	-17.99	AV	332.80	100	Vertical	Pass

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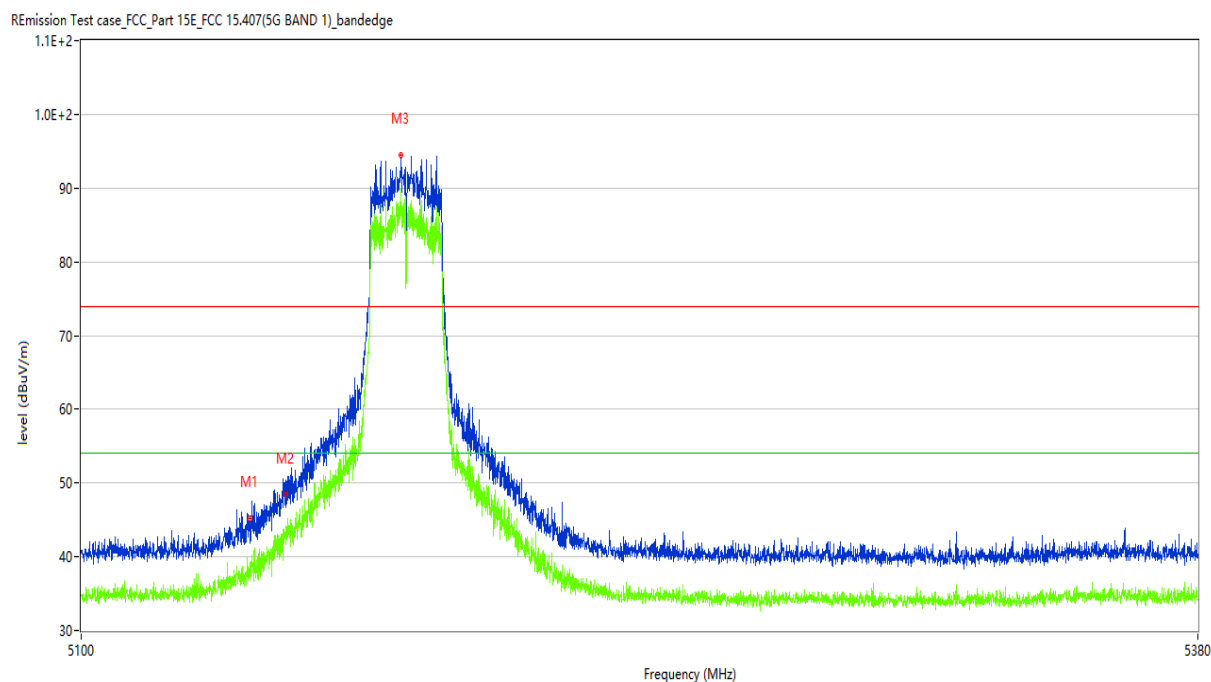
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Figure 3: Band Edge (Restricted-band band-edge), 802.11n(HT20), 5180MHz

Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5141.290	45.19	1.72	74.0	-28.81	Peak	37.10	100	Horizontal	Pass
1**	5141.290	36.91	1.72	54.0	-17.09	AV	37.10	100	Horizontal	Pass
2	5150.000	48.57	1.71	74.0	-25.43	Peak	20.40	100	H	Pass
2**	5150.000	42.67	1.71	54.0	-11.33	AV	20.40	100	H	Pass
3	5178.730	94.46	1.68	74.0	20.46	Peak	24.50	100	Horizontal	N/A
3**	5178.730	90.00	1.68	54.0	36.00	AV	24.50	100	Horizontal	N/A

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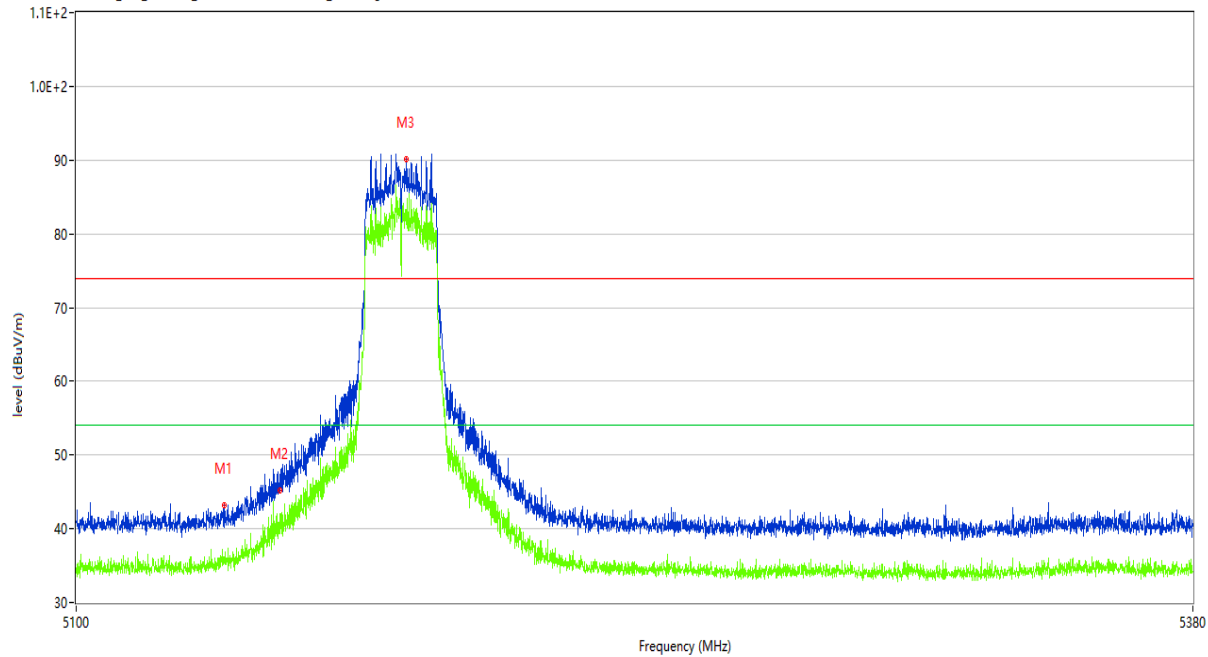
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REmission Test case_FCC_Part 15E_FCC 15.407(5G BAND 1)_bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5136.181	43.22	1.72	74.0	-30.78	Peak	95.70	100	Vertical	Pass
1**	5136.181	35.82	1.72	54.0	-18.18	AV	95.70	100	Vertical	Pass
2	5150.000	45.13	1.71	74.0	-28.87	Peak	93.61	100	V	Pass
2**	5150.000	39.64	1.71	54.0	-14.36	AV	93.61	100	V	Pass
3	5181.180	90.17	1.68	74.0	16.17	Peak	91.20	100	Vertical	N/A
3**	5181.180	83.20	1.68	54.0	29.20	AV	91.20	100	Vertical	N/A

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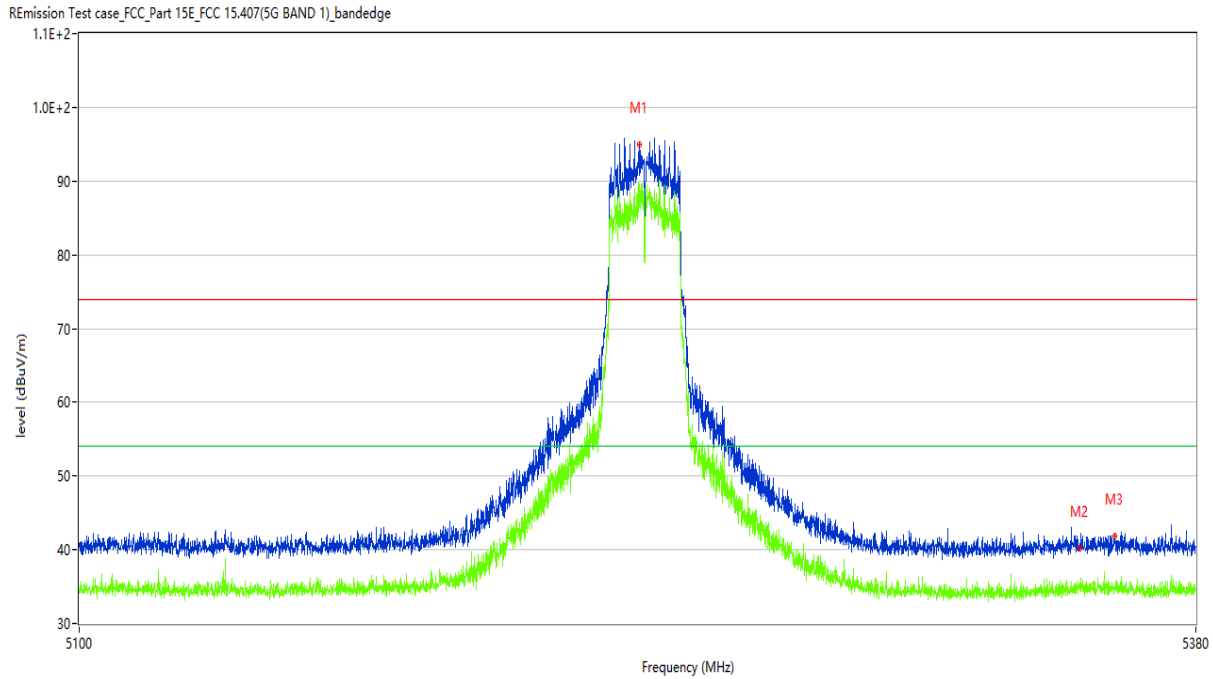
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Figure 4: Band Edge (Restricted-band band-edge), 802.11n(HT20), 5240MHz

Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5238.705	94.68	1.58	74.0	20.68	Peak	15.30	100	Horizontal	N/A
1**	5238.705	88.98	1.58	54.0	34.98	AV	15.30	100	Horizontal	N/A
2	5350.000	39.66	1.46	74.0	-34.34	Peak	60.10	100	H	Pass
2**	5350.000	34.91	1.46	54.0	-19.09	AV	60.10	100	H	Pass
3	5359.145	41.82	1.46	74.0	-32.18	Peak	51.20	100	Horizontal	Pass
3**	5359.145	34.86	1.46	54.0	-19.14	AV	51.20	100	Horizontal	Pass

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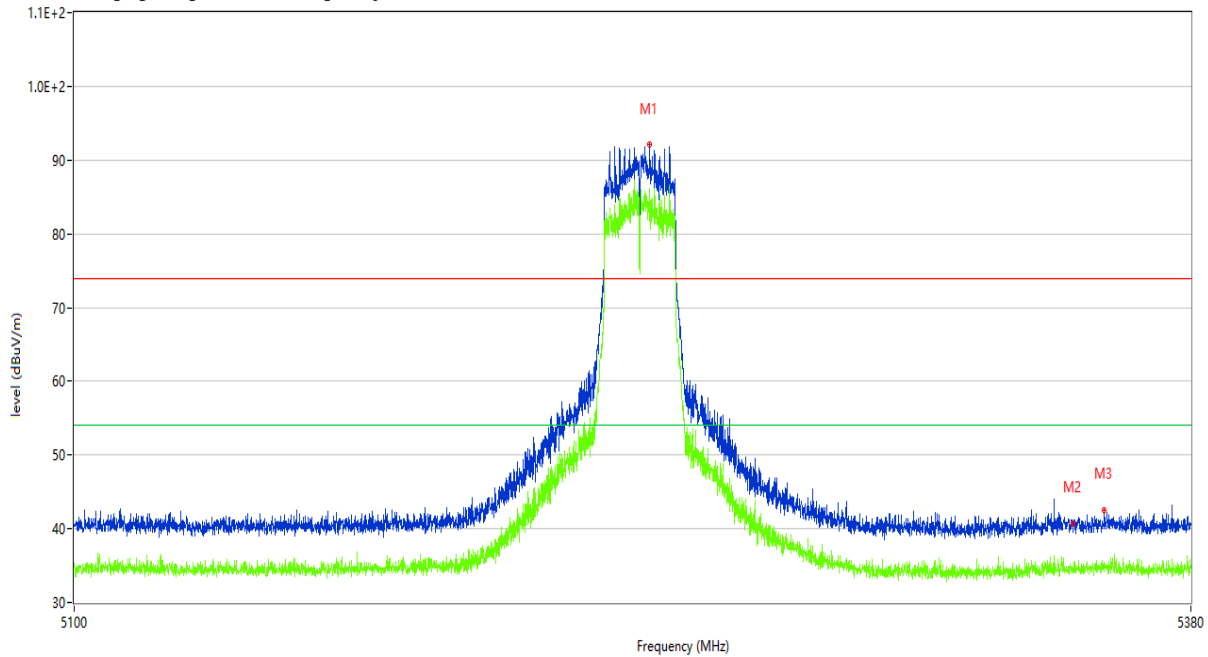
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No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5242.484	90.05	1.58	74.0	16.05	Peak	329.80	100	Vertical	N/A
1**	5242.484	83.47	1.58	54.0	29.47	AV	329.80	100	Vertical	N/A
2	5350.000	40.25	1.46	74.0	-33.75	Peak	321.90	100	V	Pass
2**	5350.000	34.57	1.46	54.0	-19.43	AV	321.90	100	V	Pass
3	5357.746	42.54	1.46	74.0	-31.46	Peak	176.50	100	Vertical	Pass
3**	5357.746	35.57	1.46	54.0	-18.43	AV	176.50	100	Vertical	Pass

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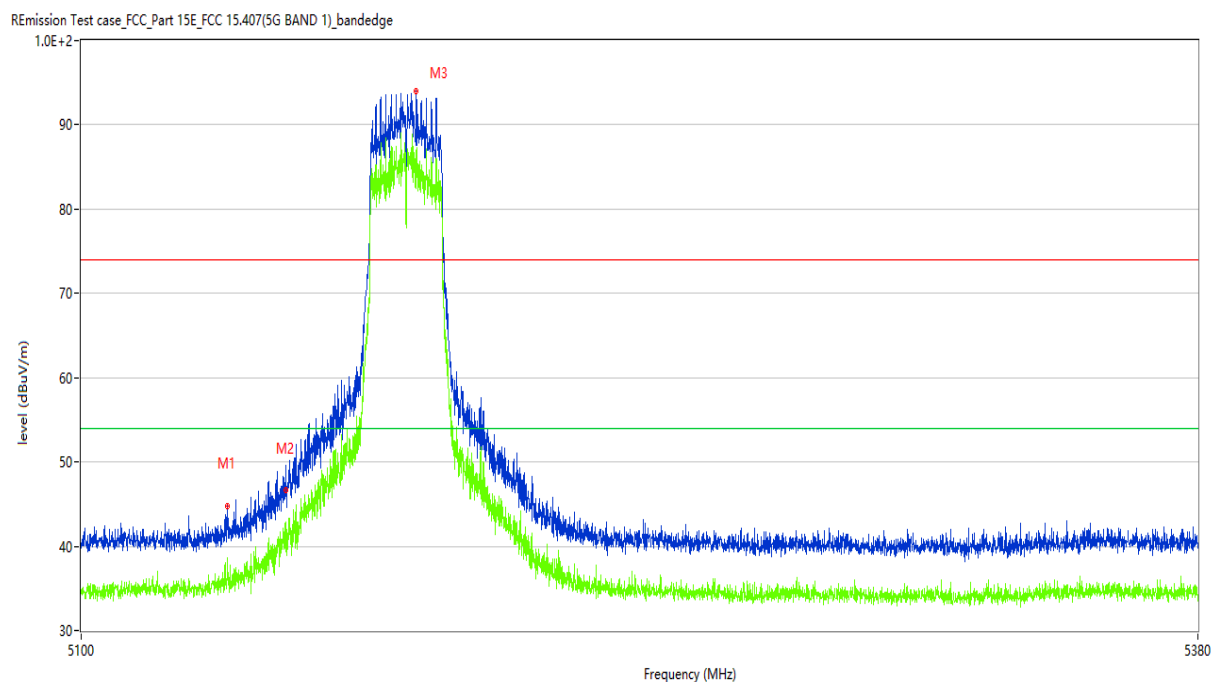
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Figure 5: Band Edge (Restricted-band band-edge), 802.11ac(VHT20), 5180MHz

Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5135.901	44.76	1.72	74.0	-29.24	Peak	11.60	100	Horizontal	Pass
1**	5135.901	37.89	1.72	54.0	-16.11	AV	11.60	100	Horizontal	Pass
2	5150.000	46.69	1.71	74.0	-27.31	Peak	13.13	100	H	Pass
2**	5150.000	40.95	1.71	54.0	-13.05	AV	13.13	100	H	Pass
3	5182.439	93.94	1.68	74.0	19.94	Peak	16.10	100	Horizontal	N/A
3**	5182.439	86.75	1.68	54.0	32.75	AV	16.10	100	Horizontal	N/A

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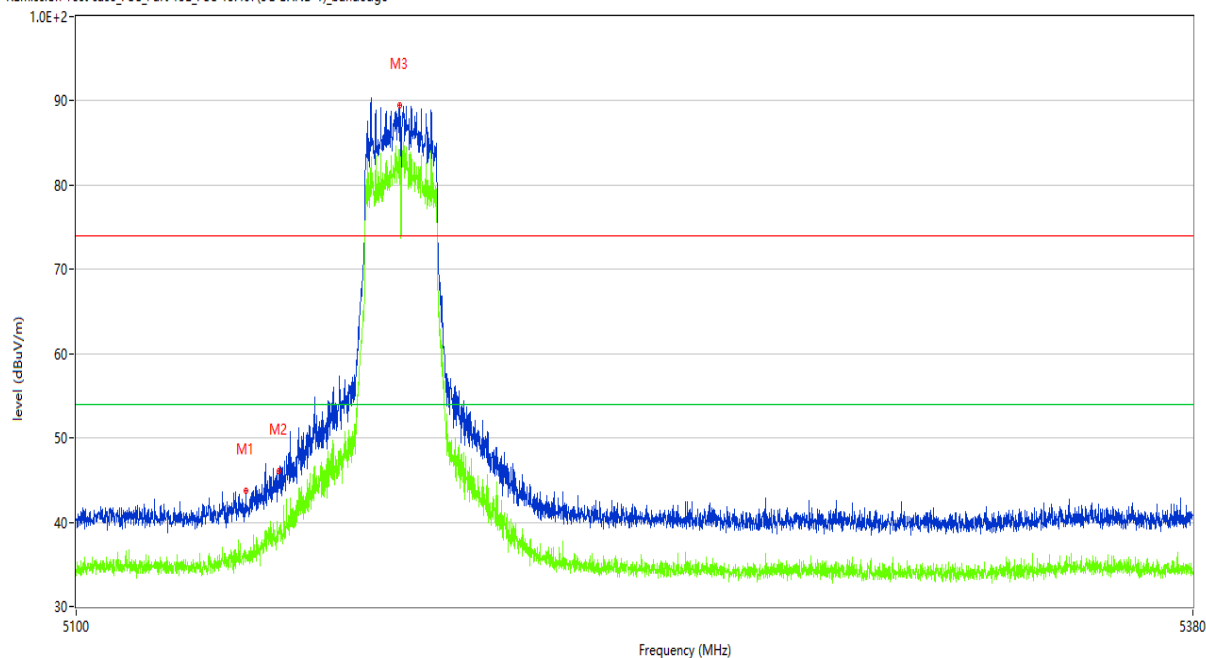
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REmission Test case_FCC_Part 15E_FCC 15.407(5G BAND 1)_bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5141.570	43.76	1.72	74.0	-30.24	Peak	343.90	100	Vertical	Pass
1**	5141.570	36.47	1.72	54.0	-17.53	AV	343.90	100	Vertical	Pass
2	5150.000	45.74	1.71	74.0	-28.26	Peak	339.40	100	V	Pass
2**	5150.000	39.48	1.71	54.0	-14.52	AV	339.40	100	V	Pass
3	5179.640	89.51	1.68	74.0	15.51	Peak	339.10	100	Vertical	N/A
3**	5179.640	84.17	1.68	54.0	30.17	AV	339.10	100	Vertical	N/A

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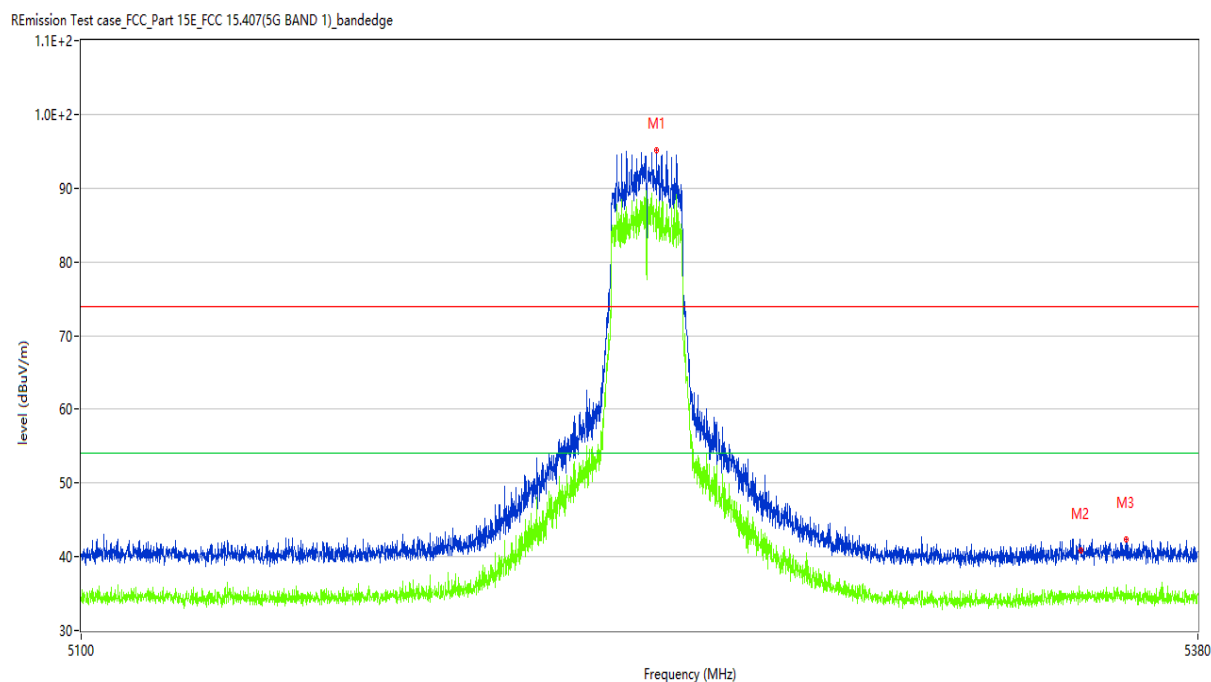
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Figure 6: Band Edge (Restricted-band band-edge), 802.11ac(VHT20), 5240MHz

Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5242.414	95.10	1.58	74.0	21.10	Peak	24.30	100	Horizontal	N/A
1**	5242.414	87.18	1.58	54.0	33.18	AV	24.30	100	Horizontal	N/A
2	5350.000	40.33	1.46	74.0	-33.67	Peak	134.77	100	H	Pass
2**	5350.000	34.49	1.46	54.0	-19.51	AV	134.77	100	H	Pass
3	5361.525	42.40	1.46	74.0	-31.60	Peak	101.80	100	Horizontal	Pass
3**	5361.525	36.22	1.46	54.0	-17.78	AV	101.80	100	Horizontal	Pass

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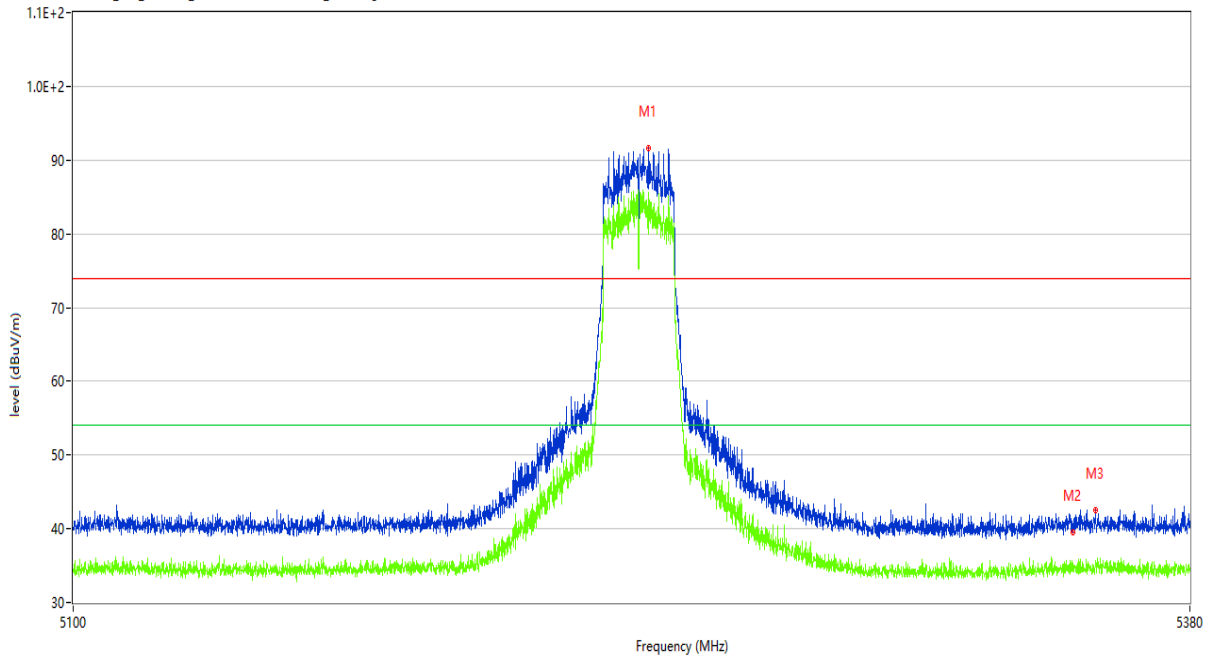
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Vertical

REmission Test case_FCC_Part 15E_FCC 15.407(5G BAND 1)_bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5242.414	89.47	1.58	74.0	15.47	Peak	345.10	100	Vertical	N/A
1**	5242.414	81.75	1.58	54.0	27.75	AV	345.10	100	Vertical	N/A
2	5350.000	39.10	1.46	74.0	-34.90	Peak	293.00	100	V	Pass
2**	5350.000	33.72	1.46	54.0	-20.28	AV	293.00	100	V	Pass
3	5355.716	42.60	1.46	74.0	-31.40	Peak	254.20	100	Vertical	Pass
3**	5355.716	35.67	1.46	54.0	-18.33	AV	254.20	100	Vertical	Pass

TEST REPORT

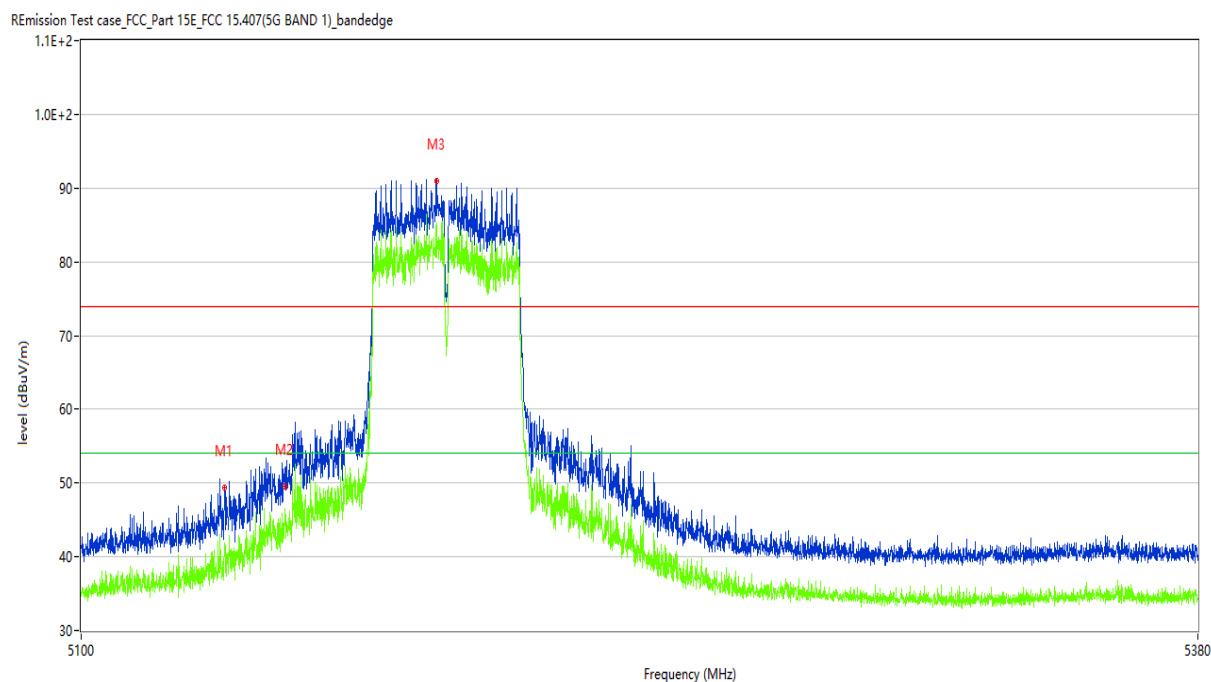
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Figure 7: Band Edge (Restricted-band band-edge), 802.11n(HT40), 5190MHz

Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5135.201	47.88	1.72	74.0	-26.12	Peak	202.90	100	Horizontal	Pass
1**	5135.201	39.77	1.72	54.0	-14.23	AV	202.90	100	Horizontal	Pass
2	5150.000	45.65	1.71	74.0	-28.35	Peak	339.34	100	H	Pass
2**	5150.000	39.06	1.71	54.0	-14.94	AV	339.34	100	H	Pass
3	5187.478	85.10	1.67	74.0	11.10	Peak	341.70	100	Horizontal	N/A
3**	5187.478	78.82	1.67	54.0	24.82	AV	341.70	100	Horizontal	N/A

TEST REPORT

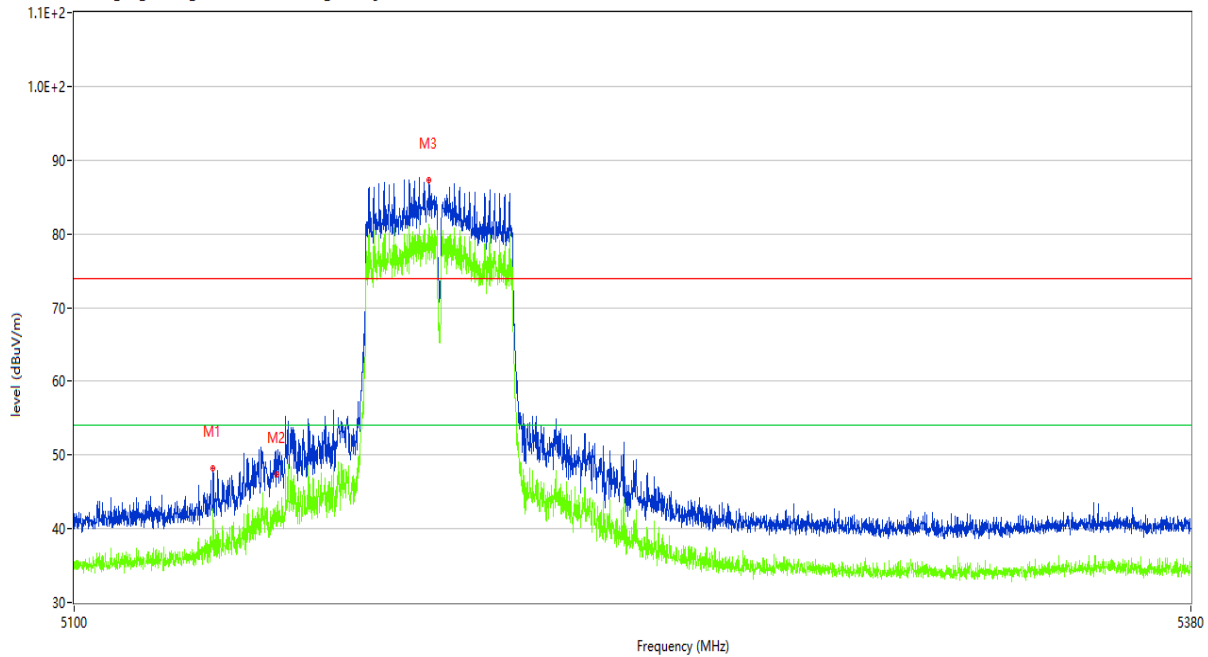
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Vertical

REmission Test case_FCC_Part 15E_FCC 15.407(5G BAND 1)_bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5134.011	46.15	1.73	74.0	-27.85	Peak	0.00	100	Vertical	Pass
1**	5134.011	38.81	1.73	54.0	-15.19	AV	0.00	100	Vertical	Pass
2	5150.000	47.43	1.71	74.0	-26.57	Peak	91.62	100	V	Pass
2**	5150.000	41.83	1.71	54.0	-12.17	AV	91.62	100	V	Pass
3	5187.408	86.78	1.67	74.0	12.78	Peak	96.80	100	Vertical	N/A
3**	5187.408	81.35	1.67	54.0	27.35	AV	96.80	100	Vertical	N/A

TEST REPORT

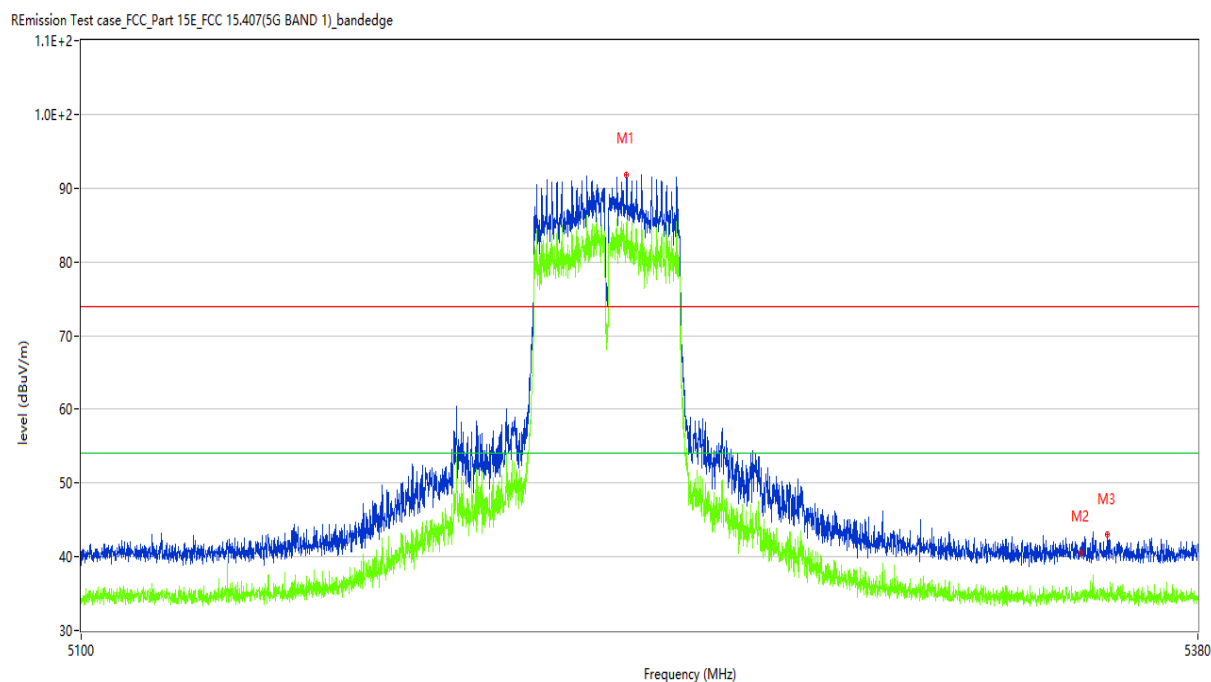
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Figure 8: Band Edge (Restricted-band band-edge), 802.11n(HT40), 5230MHz

Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5234.926	91.77	1.59	74.0	17.77	Peak	25.00	100	Horizontal	N/A
1**	5234.926	85.13	1.59	54.0	31.13	AV	25.00	100	Horizontal	N/A
2	5350.000	40.67	1.46	74.0	-33.33	Peak	72.31	100	H	Pass
2**	5350.000	34.07	1.46	54.0	-19.93	AV	72.31	100	H	Pass
3	5356.836	42.95	1.46	74.0	-31.05	Peak	25.00	100	Horizontal	Pass
3**	5356.836	35.19	1.46	54.0	-18.81	AV	25.00	100	Horizontal	Pass

TEST REPORT

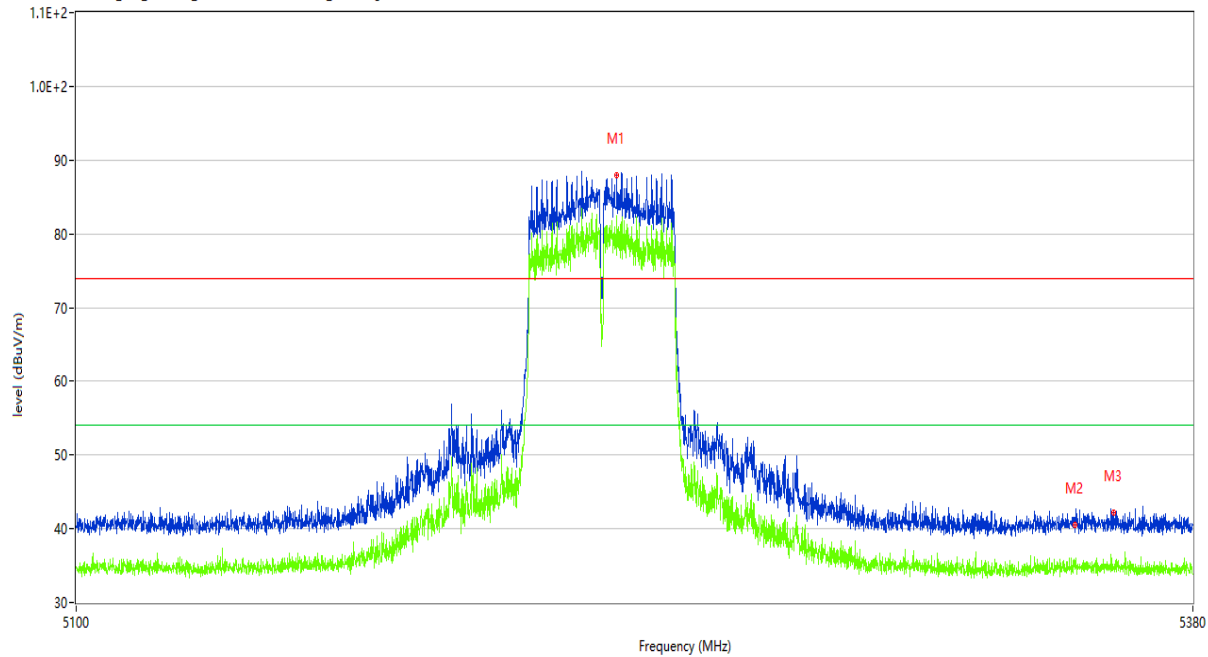
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Vertical

REmission Test case_FCC_Part 15E_FCC 15.407(5G BAND 1)_bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5233.667	85.08	1.59	74.0	11.08	Peak	349.50	100	Vertical	N/A
1**	5233.667	78.51	1.59	54.0	24.51	AV	349.50	100	Vertical	N/A
2	5350.000	40.05	1.46	74.0	-33.95	Peak	336.21	100	V	Pass
2**	5350.000	34.08	1.46	54.0	-19.92	AV	336.21	100	V	Pass
3	5359.565	42.27	1.46	74.0	-31.73	Peak	336.10	100	Vertical	Pass
3**	5359.565	34.92	1.46	54.0	-19.08	AV	336.10	100	Vertical	Pass

TEST REPORT

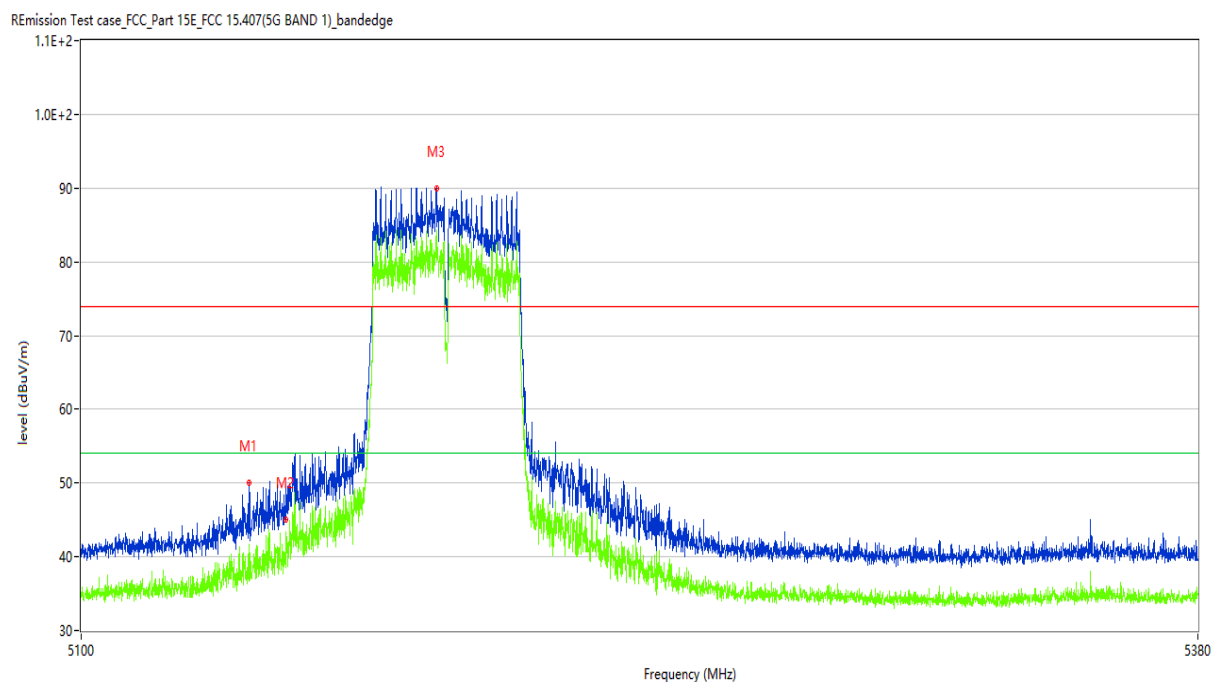
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Figure 9: Band Edge (Restricted-band band-edge), 802.11ac(VHT40), 5190MHz

Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5141.150	50.12	1.72	74.0	-23.88	Peak	17.90	100	Horizontal	Pass
1**	5141.150	41.77	1.72	54.0	-12.23	AV	17.90	100	Horizontal	Pass
2	5150.000	43.20	1.71	74.0	-30.80	Peak	228.97	100	H	Pass
2**	5150.000	37.02	1.71	54.0	-16.98	AV	228.97	100	H	Pass
3	5187.478	89.90	1.67	74.0	15.90	Peak	22.00	100	Horizontal	N/A
3**	5187.478	84.27	1.67	54.0	30.27	AV	22.00	100	Horizontal	N/A

TEST REPORT

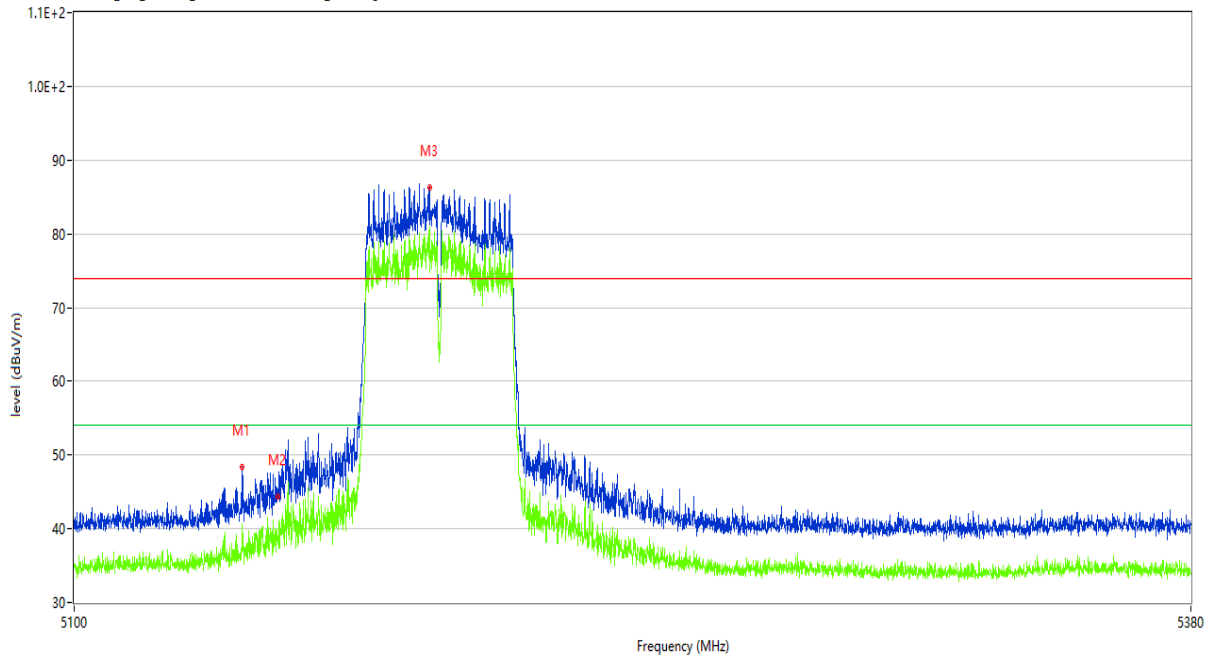
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Vertical

REmission Test case_FCC_Part 15E_FCC 15.407(5G BAND 1)_bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5141.220	48.36	1.72	74.0	-25.64	Peak	338.00	100	Vertical	Pass
1**	5141.220	40.66	1.72	54.0	-13.34	AV	338.00	100	Vertical	Pass
2	5150.000	44.34	1.71	74.0	-29.66	Peak	89.91	100	V	Pass
2**	5150.000	37.65	1.71	54.0	-16.35	AV	89.91	100	V	Pass
3	5187.478	86.29	1.67	74.0	12.29	Peak	92.00	100	Vertical	N/A
3**	5187.478	80.78	1.67	54.0	26.78	AV	92.00	100	Vertical	N/A

TEST REPORT

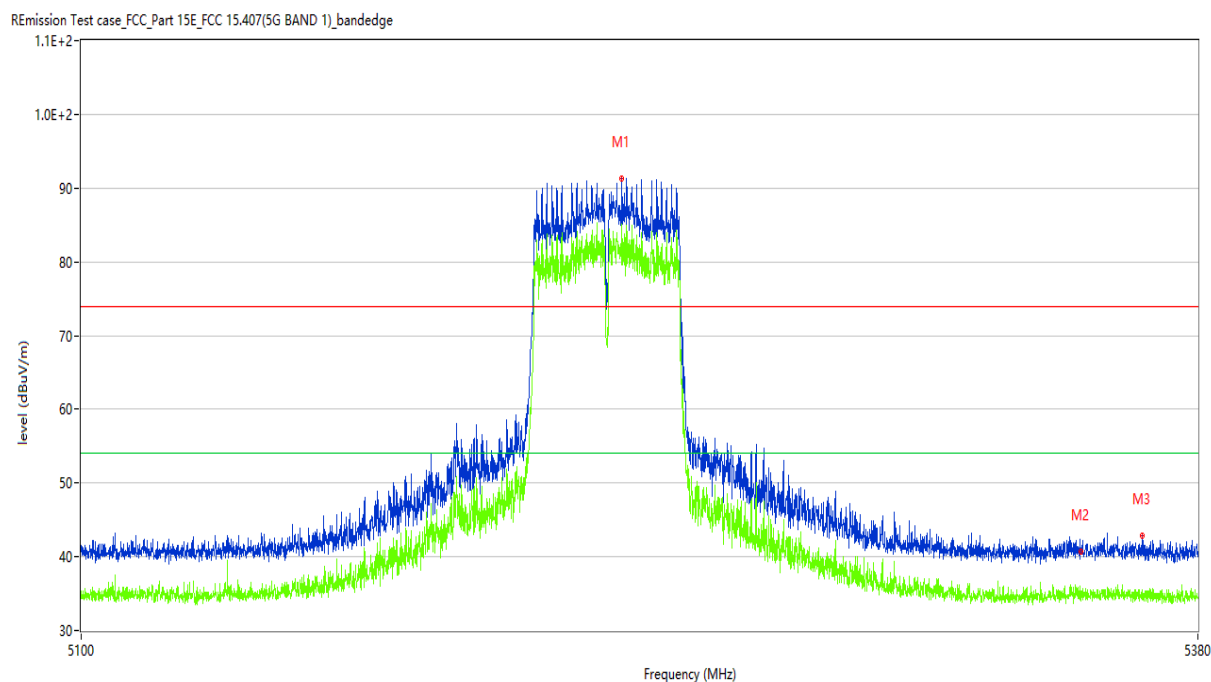
Report No.: SHE19110012-02KE

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Figure 10: Band Edge (Restricted-band band-edge), 802.11ac(VHT40), 5230MHz

Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5233.737	91.22	1.59	74.0	17.22	Peak	29.10	100	Horizontal	N/A
1**	5233.737	85.06	1.59	54.0	31.06	AV	29.10	100	Horizontal	N/A
2	5350.000	40.73	1.46	74.0	-33.27	Peak	68.26	100	H	Pass
2**	5350.000	34.38	1.46	54.0	-19.62	AV	68.26	100	H	Pass
3	5365.794	42.80	1.46	74.0	-31.20	Peak	7.20	100	Horizontal	Pass
3**	5365.794	35.53	1.46	54.0	-18.47	AV	7.20	100	Horizontal	Pass

TEST REPORT

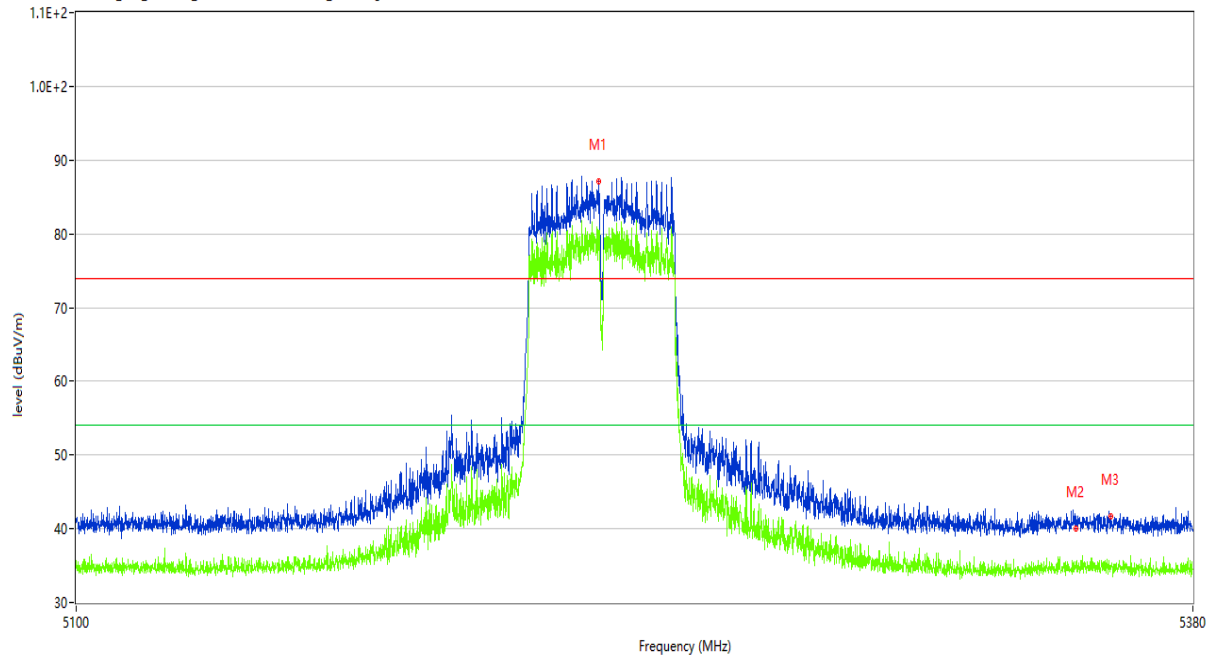
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Vertical

REmission Test case_FCC_Part 15E_FCC 15.407(5G BAND 1)_bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5229.048	87.15	1.60	74.0	13.15	Peak	87.90	100	Vertical	N/A
1**	5229.048	80.37	1.60	54.0	26.37	AV	87.90	100	Vertical	N/A
2	5350.000	39.79	1.46	74.0	-34.21	Peak	273.58	100	V	Pass
2**	5350.000	33.64	1.46	54.0	-20.36	AV	273.58	100	V	Pass
3	5358.935	41.70	1.46	74.0	-32.30	Peak	272.50	100	Vertical	Pass
3**	5358.935	34.18	1.46	54.0	-19.82	AV	272.50	100	Vertical	Pass

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Figure 11: Band Edge (Restricted-band band-edge), 802.11ac(VHT80), 5210MHz

Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5143.739	45.77	1.72	74.0	-28.23	Peak	220.40	100	Horizontal	Pass
1**	5143.739	39.54	1.72	54.0	-14.46	AV	220.40	100	Horizontal	Pass
2	5150.000	42.16	1.71	74.0	-31.84	Peak	247.50	100	H	Pass
2**	5150.000	35.86	1.71	54.0	-18.14	AV	247.50	100	H	Pass
3	5207.423	83.32	1.65	74.0	9.32	Peak	215.90	100	Horizontal	N/A
3**	5207.423	78.34	1.65	54.0	24.34	AV	215.90	100	Horizontal	N/A
4	5350.000	40.68	1.46	74.0	-33.32	Peak	60.28	100	H	Pass
4**	5350.000	34.74	1.46	54.0	-19.26	AV	60.28	100	H	Pass
5	5372.582	43.42	1.46	74.0	-30.58	Peak	54.70	100	Horizontal	Pass
5**	5372.582	35.38	1.46	54.0	-18.62	AV	54.70	100	Horizontal	Pass

TEST REPORT

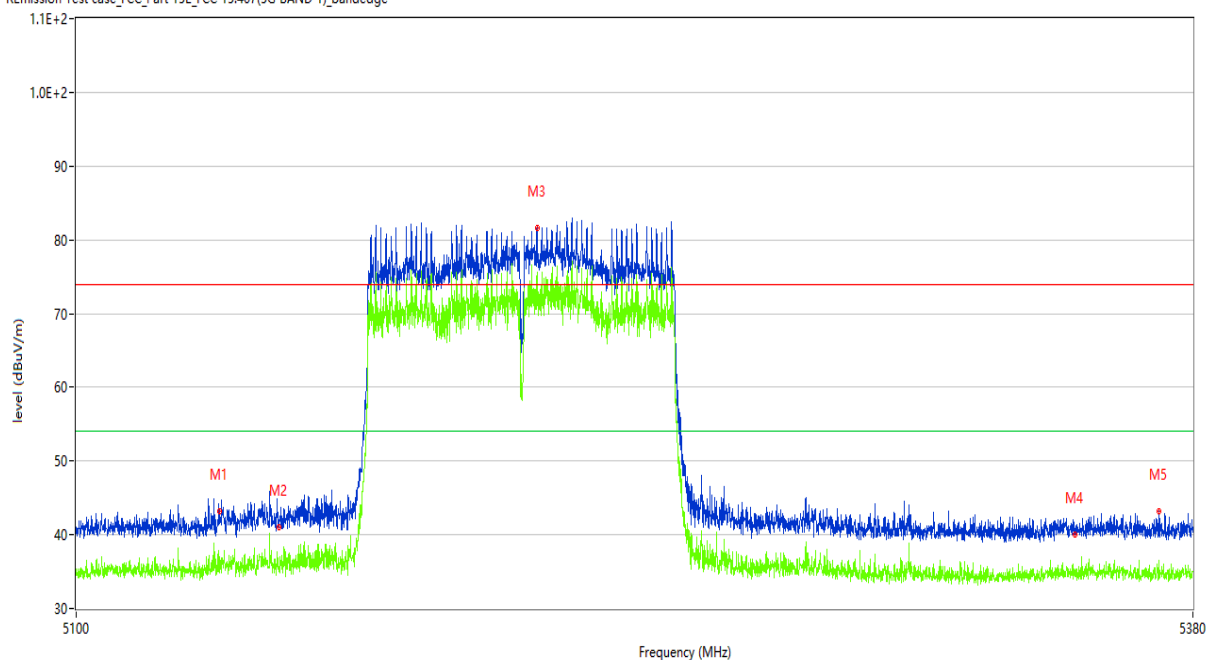
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Vertical

REmission Test case_FCC_Part 15E_FCC 15.407(5G BAND 1)_bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5135.061	43.22	1.72	74.0	-30.78	Peak	1.20	100	Vertical	Pass
1**	5135.061	36.57	1.72	54.0	-17.43	AV	1.20	100	Vertical	Pass
2	5150.000	40.57	1.71	74.0	-33.43	Peak	0.56	100	V	Pass
2**	5150.000	34.68	1.71	54.0	-19.32	AV	0.56	100	V	Pass
3	5213.722	81.65	1.63	74.0	7.65	Peak	93.50	100	Vertical	N/A
3**	5213.722	75.55	1.63	54.0	21.55	AV	93.50	100	Vertical	N/A
4	5350.000	40.10	1.46	74.0	-33.90	Peak	68.54	100	V	Pass
4**	5350.000	34.49	1.46	54.0	-19.51	AV	68.54	100	V	Pass
5	5371.182	43.22	1.46	74.0	-30.78	Peak	111.00	100	Vertical	Pass
5**	5371.182	36.47	1.46	54.0	-17.53	AV	111.00	100	Vertical	Pass

TEST REPORT

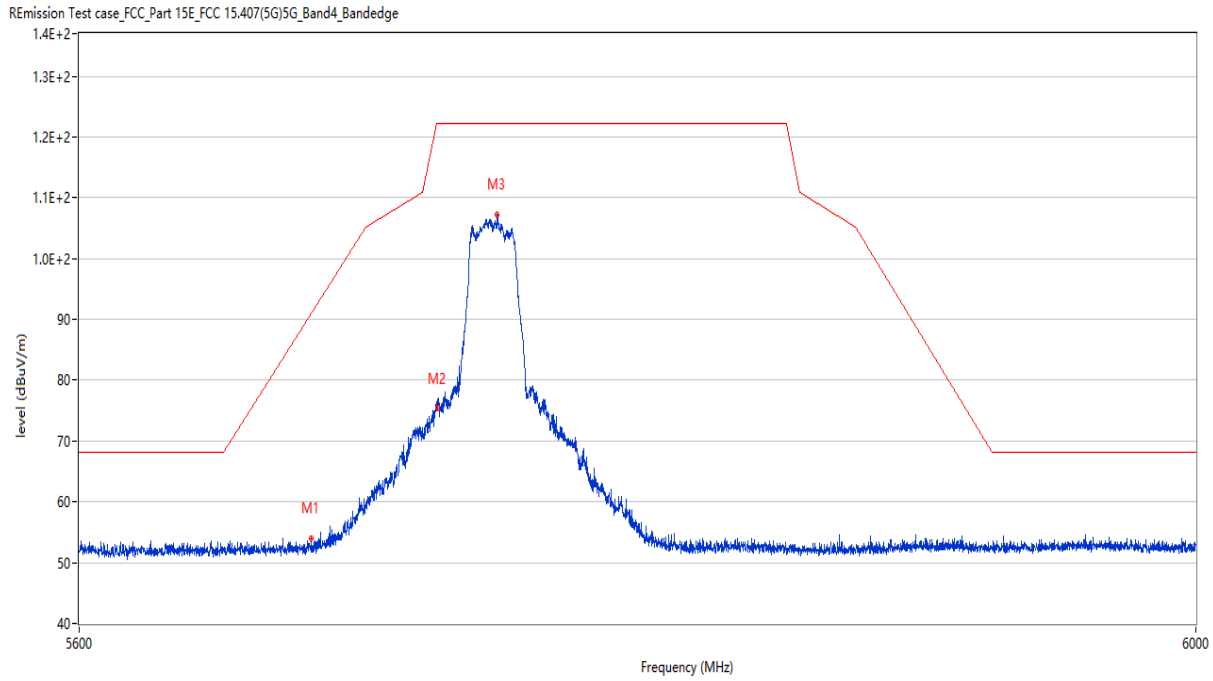
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Figure 12: Band Edge (Restricted-band band-edge), 802.11a, 5745MHz

Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5680.980	53.94	2.14	91.2	-37.26	Peak	12.30	100	Horizontal	Pass
2	5725.000	75.37	2.16	122.2	-46.83	Peak	60.40	100	H	Pass
3	5746.563	107.22	2.16	122.2	-14.98	Peak	52.20	100	Horizontal	Pass

TEST REPORT

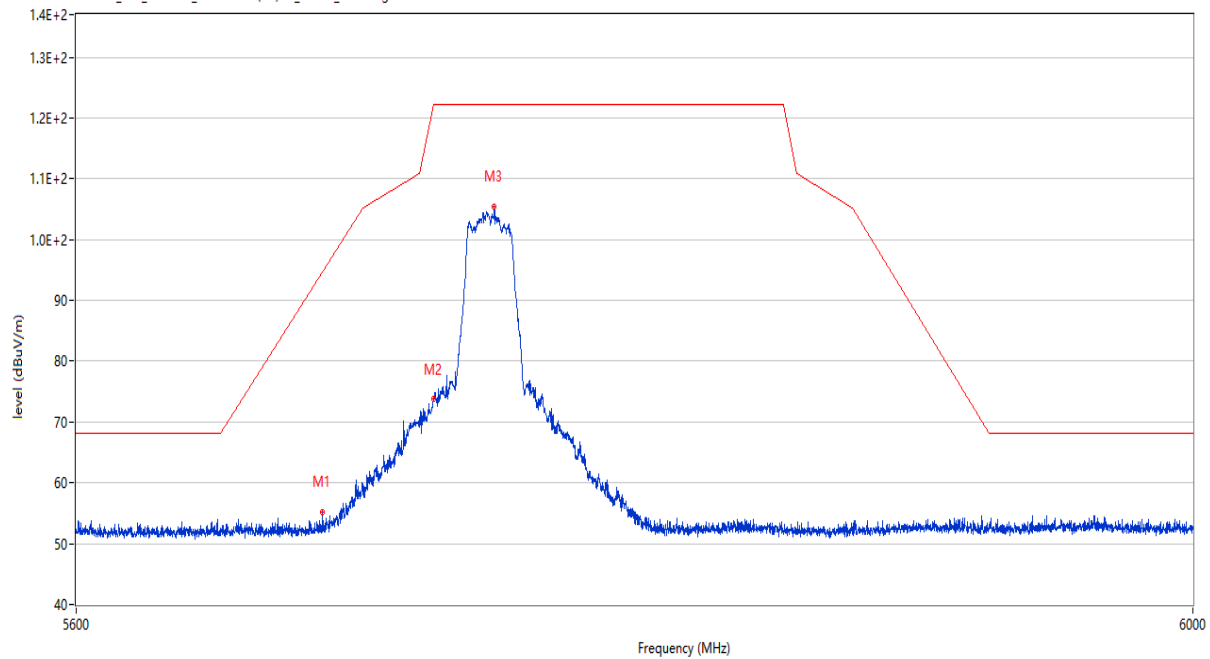
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Vertical

REmission Test case_FCC_Part 15E_FCC 15.407(5G)5G_Band4_Bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5685.779	55.13	2.15	94.7	-39.57	Peak	109.50	100	Vertical	Pass
2	5725.000	73.75	2.16	122.2	-48.45	Peak	101.89	100	V	Pass
3	5746.563	105.41	2.16	122.2	-16.79	Peak	100.50	100	Vertical	Pass

TEST REPORT

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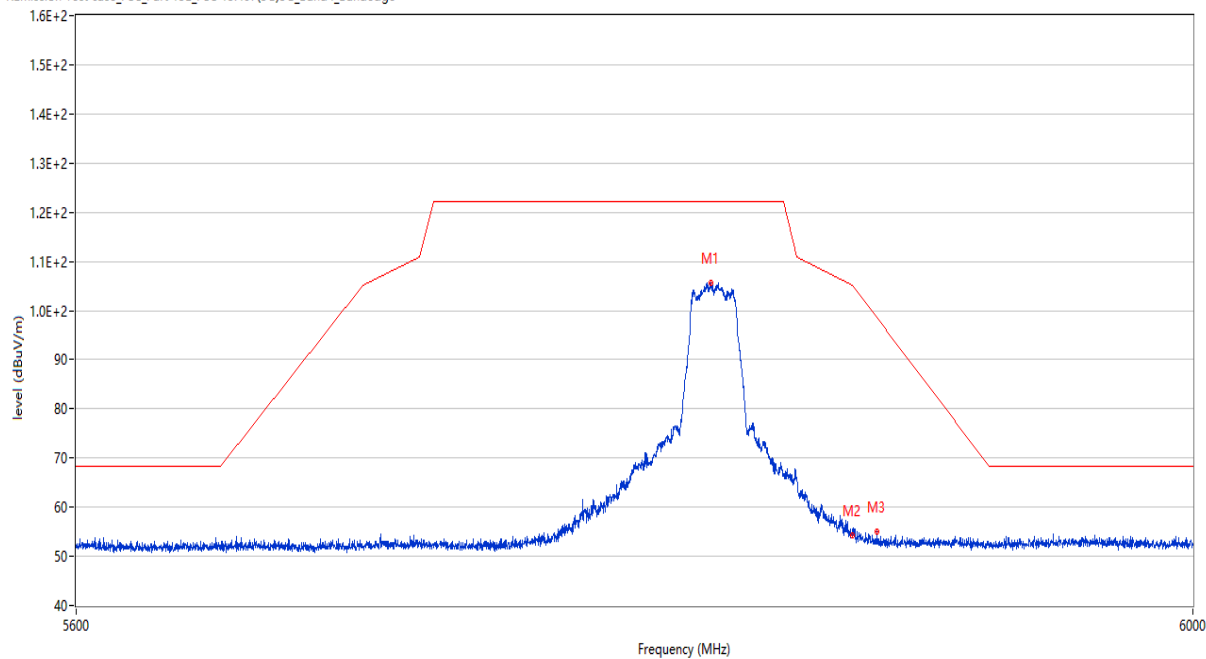
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Figure 13: Band Edge (Restricted-band band-edge), 802.11a, 5825MHz

Horizontal

REmission Test case_FCC_Part 15E_FCC 15.407(5G)5G_Band4_Bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5823.944	105.64	2.16	122.2	-16.56	Peak	53.20	100	Horizontal	Pass
2	5875.000	54.37	2.16	105.2	-50.83	Peak	131.71	100	H	Pass
3	5884.029	55.10	2.16	98.5	-43.40	Peak	164.50	100	Horizontal	Pass

TEST REPORT

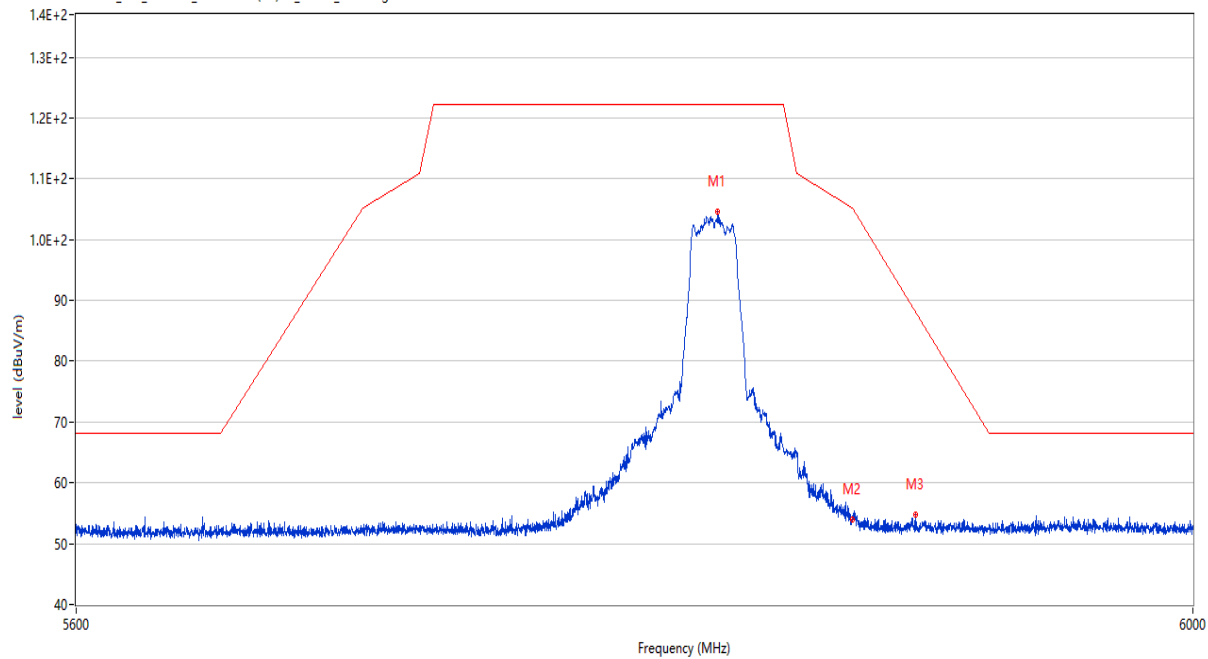
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Vertical

REmission Test case_FCC_Part 15E_FCC 15.407(5G)5G_Band4_Bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5826.443	104.57	2.16	122.2	-17.63	Peak	21.30	100	Vertical	Pass
2	5875.000	54.27	2.16	105.2	-50.93	Peak	109.61	100	V	Pass
3	5898.025	54.80	2.16	88.1	-33.30	Peak	93.10	100	Vertical	Pass

TEST REPORT

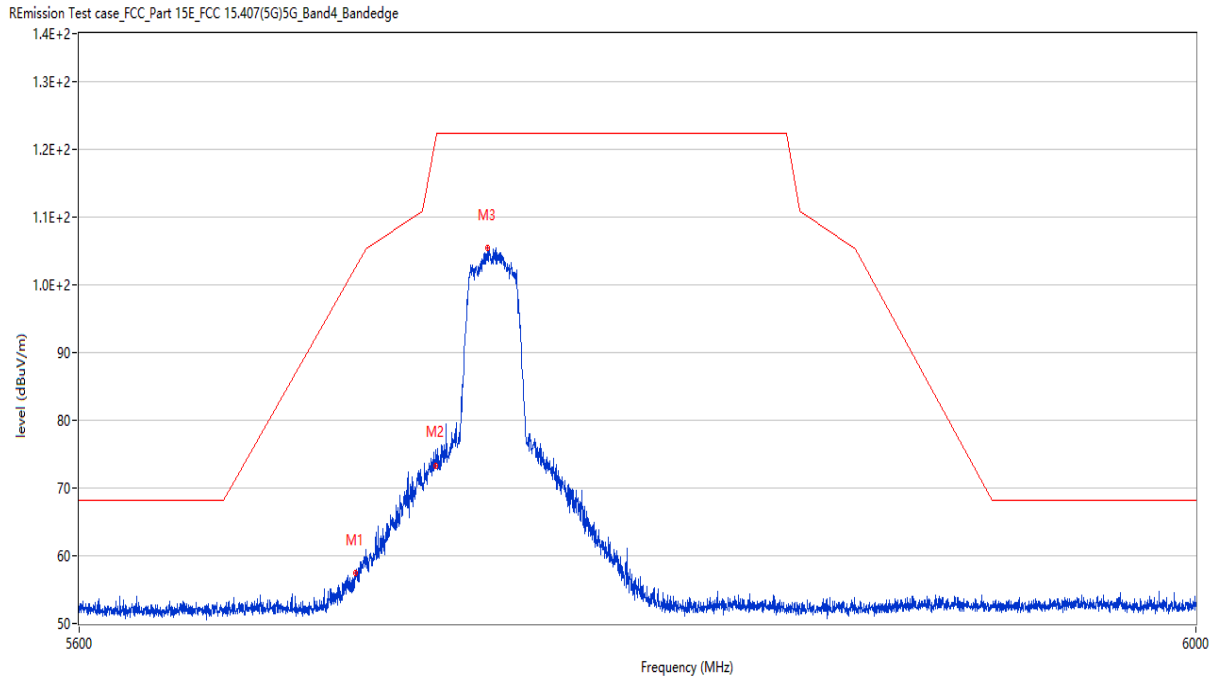
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Figure 14: Band Edge (Restricted-band band-edge), 802.11n(HT20), 5745MHz

Horizontal



No.	Frequency (MHz)	Results (dBUV/m)	Factor (dB)	Limit (dBUV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5696.476	57.42	2.16	102.6	-45.18	Peak	220.70	100	Horizontal	Pass
2	5725.000	73.43	2.16	122.2	-48.77	Peak	129.77	100	H	Pass
3	5743.064	105.38	2.16	122.2	-16.82	Peak	51.30	100	Horizontal	Pass

TEST REPORT

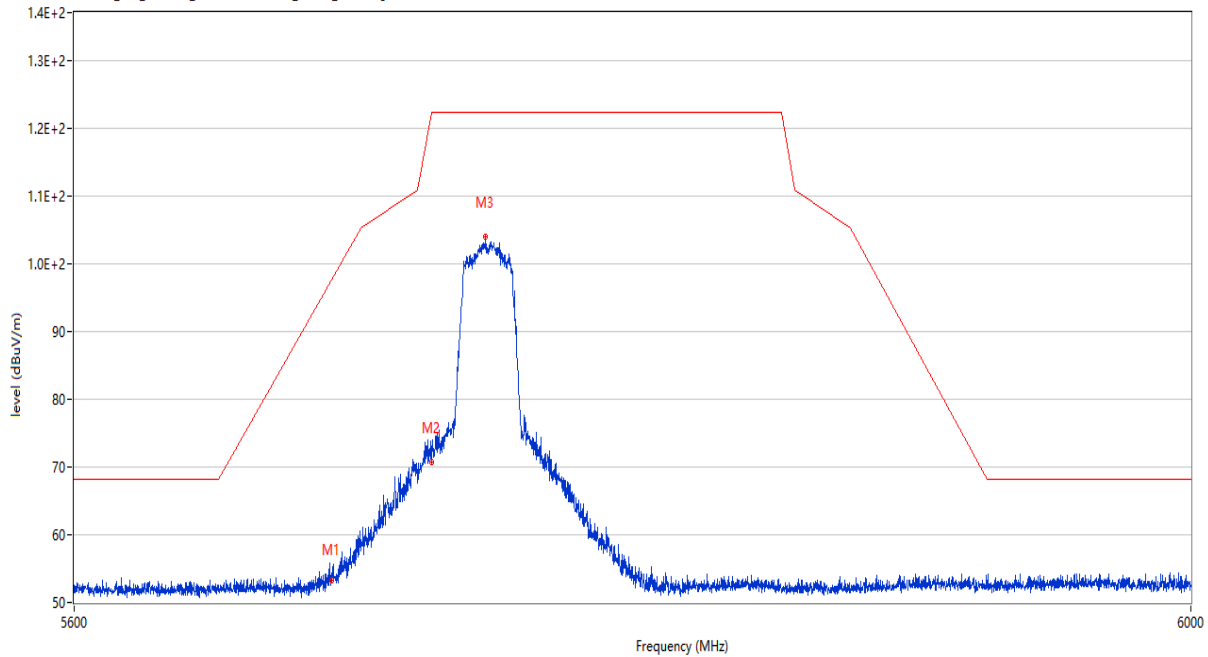
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Vertical

REmission Test case_FCC_Part 15E_FCC 15.407(5G)5G_Band4_Bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5689.678	53.22	2.15	97.6	-44.38	Peak	9.00	100	Vertical	Pass
2	5725.000	71.14	2.16	122.2	-51.06	Peak	116.09	100	V	Pass
3	5744.064	104.02	2.16	122.2	-18.18	Peak	115.40	100	Vertical	Pass

TEST REPORT

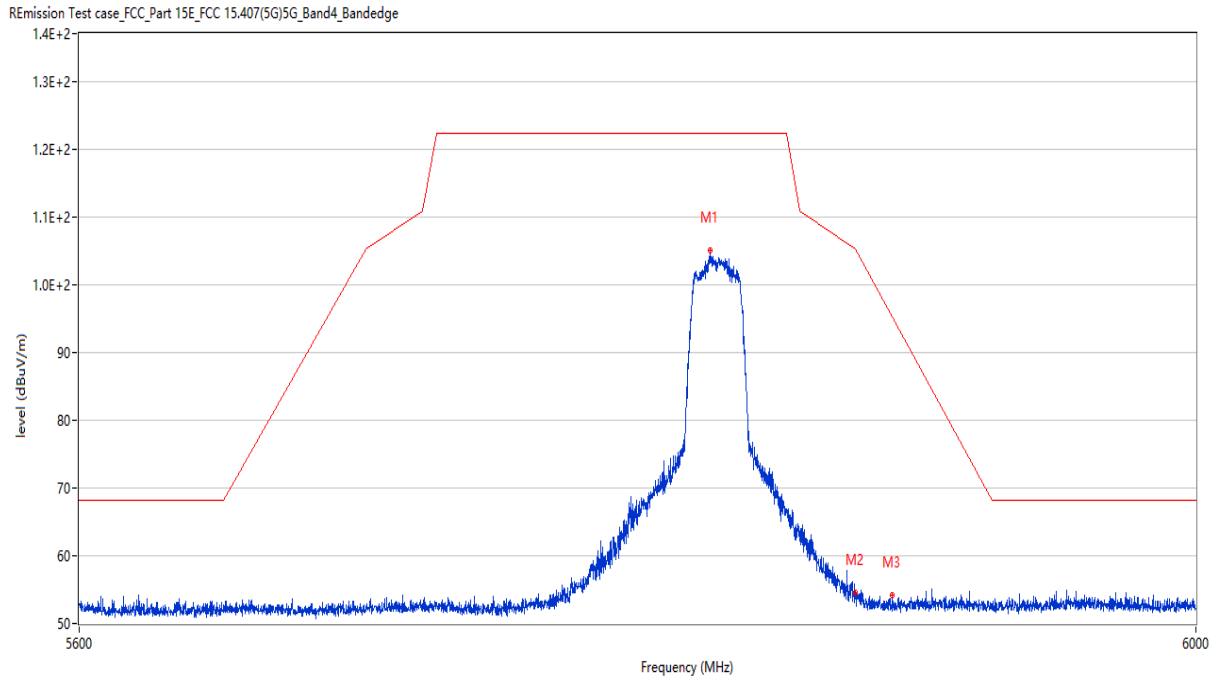
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Figure 15: Band Edge (Restricted-band band-edge), 802.11n(HT20), 5825MHz

Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5822.744	104.96	2.16	122.2	-17.24	Peak	51.40	100	Horizontal	Pass
2	5875.000	54.52	2.16	105.2	-50.68	Peak	105.67	100	H	Pass
3	5888.628	54.13	2.16	95.1	-40.97	Peak	16.10	100	Horizontal	Pass

TEST REPORT

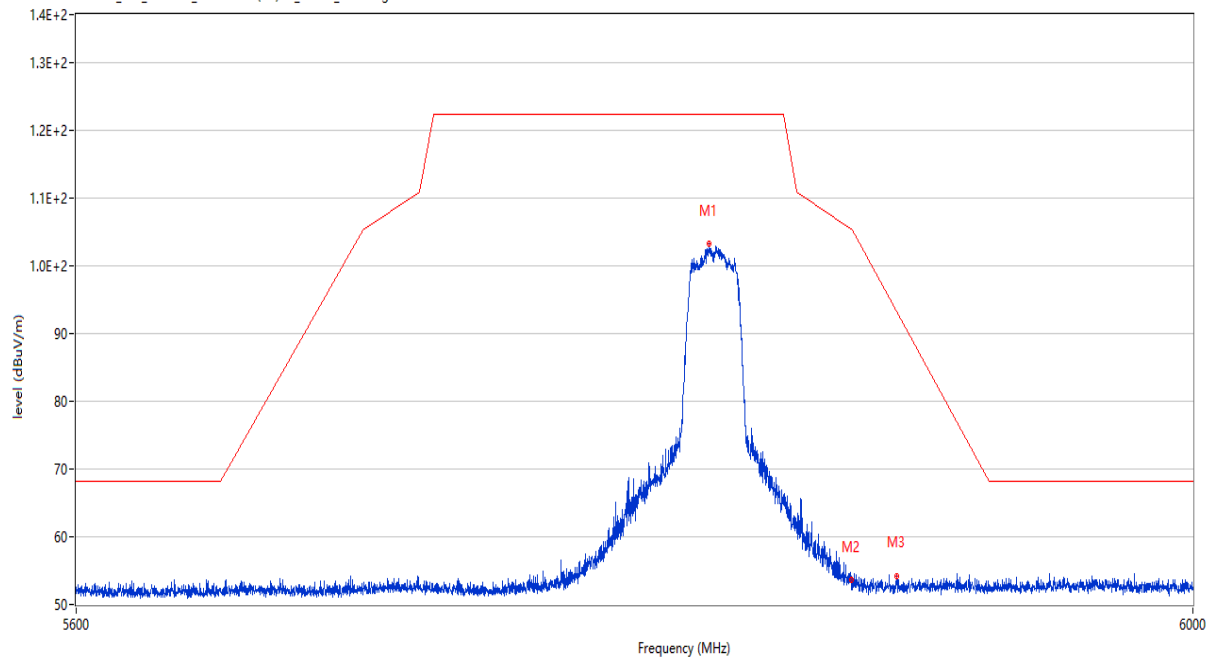
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Vertical

REmission Test case_FCC_Part 15E_FCC 15.407(5G)5G_Band4_Bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5823.144	103.15	2.16	122.2	-19.05	Peak	115.00	100	Vertical	Pass
2	5875.000	53.41	2.16	105.2	-51.79	Peak	92.20	100	V	Pass
3	5891.127	54.24	2.16	93.2	-38.96	Peak	211.00	100	Vertical	Pass

TEST REPORT

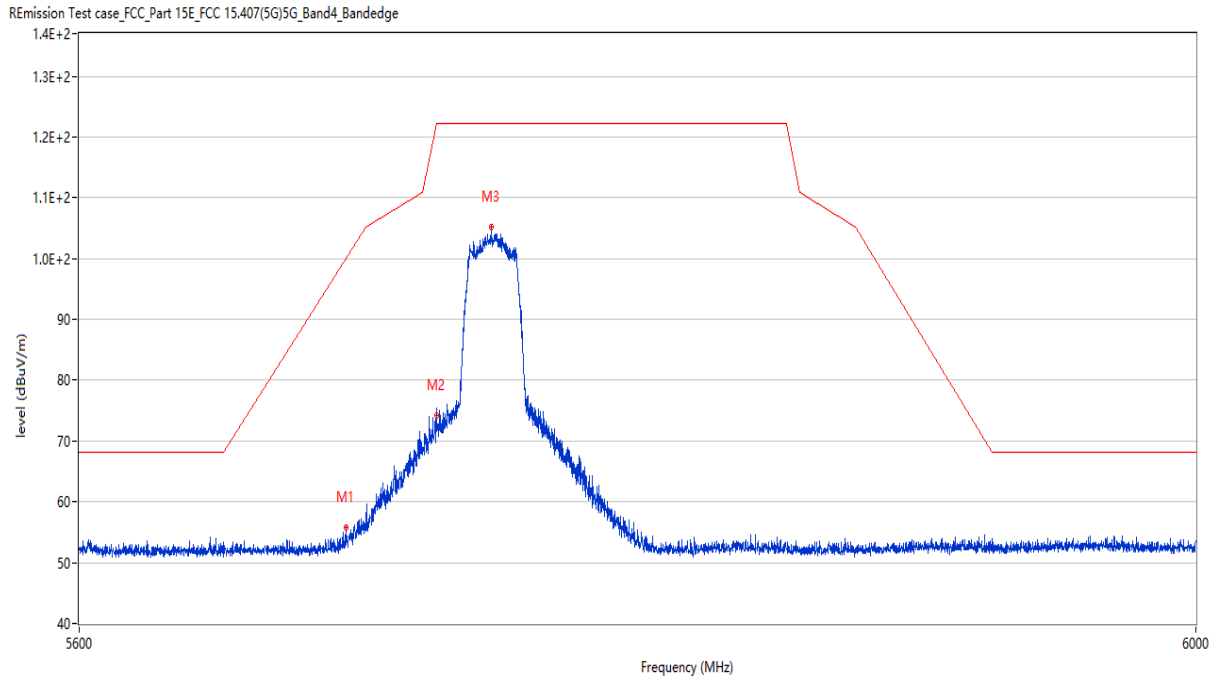
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Figure 16: Band Edge (Restricted-band band-edge), 802.11ac(VHT20), 5745MHz

Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5692.977	55.83	2.15	100.0	-44.17	Peak	21.00	100	Horizontal	Pass
2	5725.000	74.28	2.16	122.2	-47.92	Peak	58.99	100	H	Pass
3	5744.364	105.24	2.16	122.2	-16.96	Peak	51.90	100	Horizontal	Pass

TEST REPORT

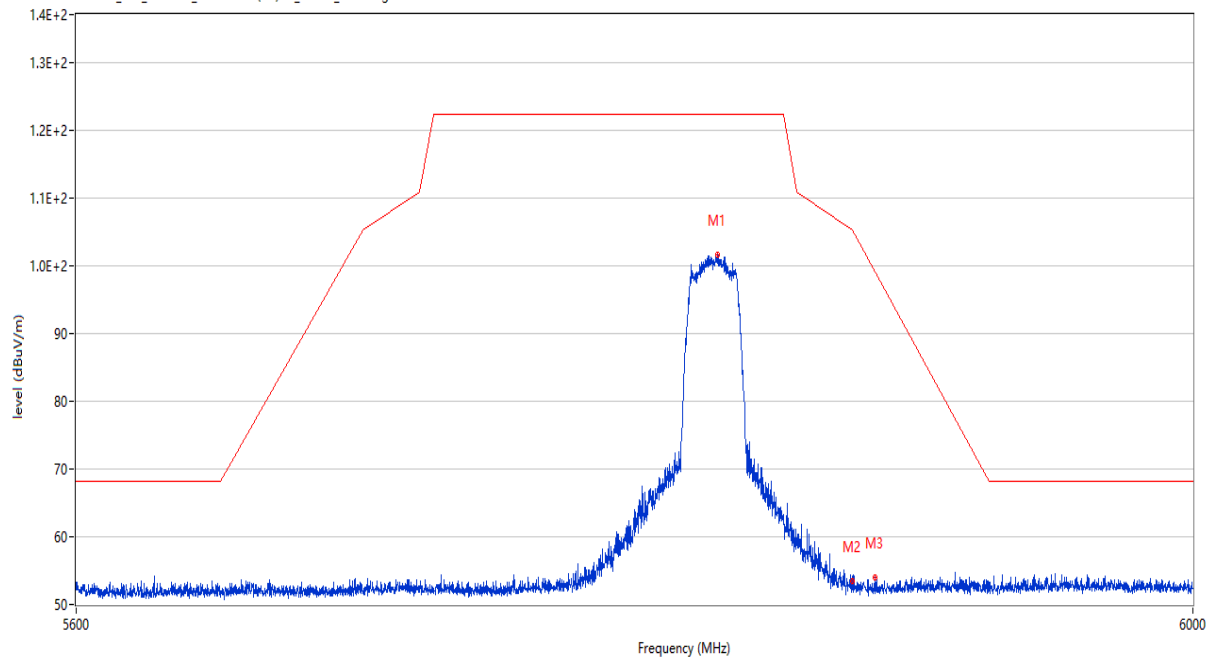
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Vertical

REmission Test case_FCC_Part 15E_FCC 15.407(5G)5G_Band4_Bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5826.243	101.64	2.16	122.2	-20.56	Peak	92.80	100	Vertical	Pass
2	5875.000	53.16	2.16	105.2	-52.04	Peak	42.26	100	V	Pass
3	5883.429	54.02	2.16	98.9	-44.88	Peak	132.60	100	Vertical	Pass

TEST REPORT

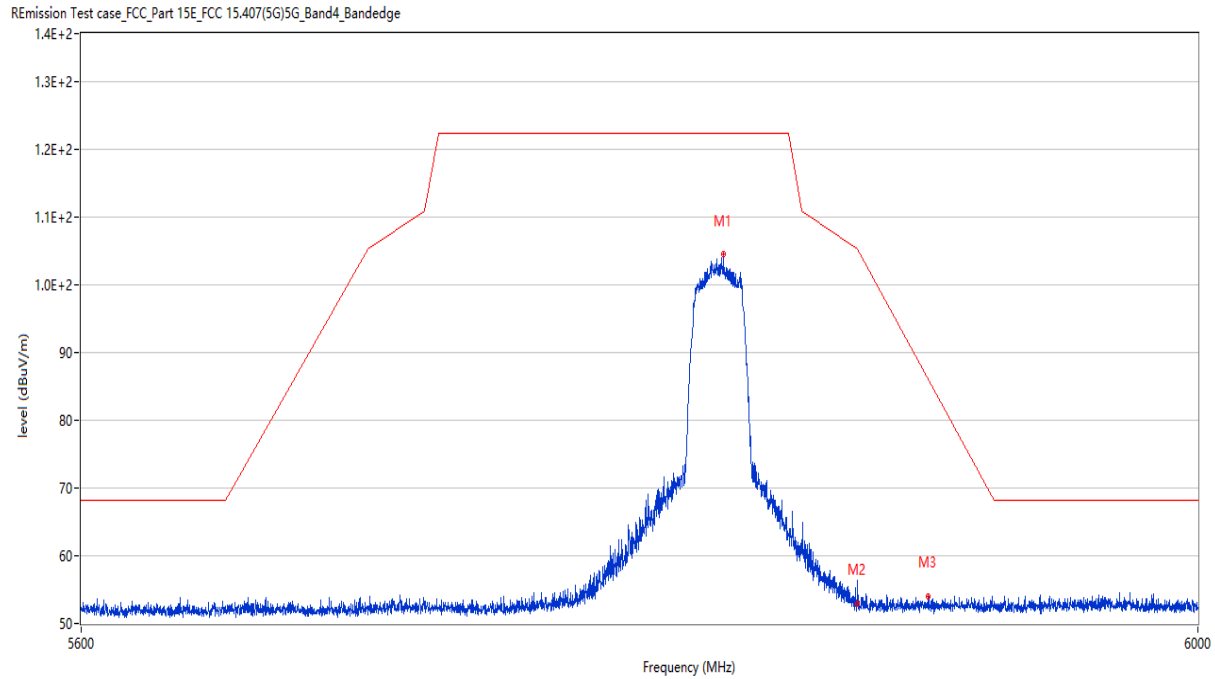
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Figure 17: Band Edge (Restricted-band band-edge), 802.11ac(VHT20), 5825MHz

Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5826.643	104.40	2.16	122.2	-17.80	Peak	50.30	100	Horizontal	Pass
2	5875.000	52.81	2.16	105.2	-52.39	Peak	93.80	100	H	Pass
3	5900.725	54.01	2.16	86.1	-32.09	Peak	294.80	100	Horizontal	Pass

TEST REPORT

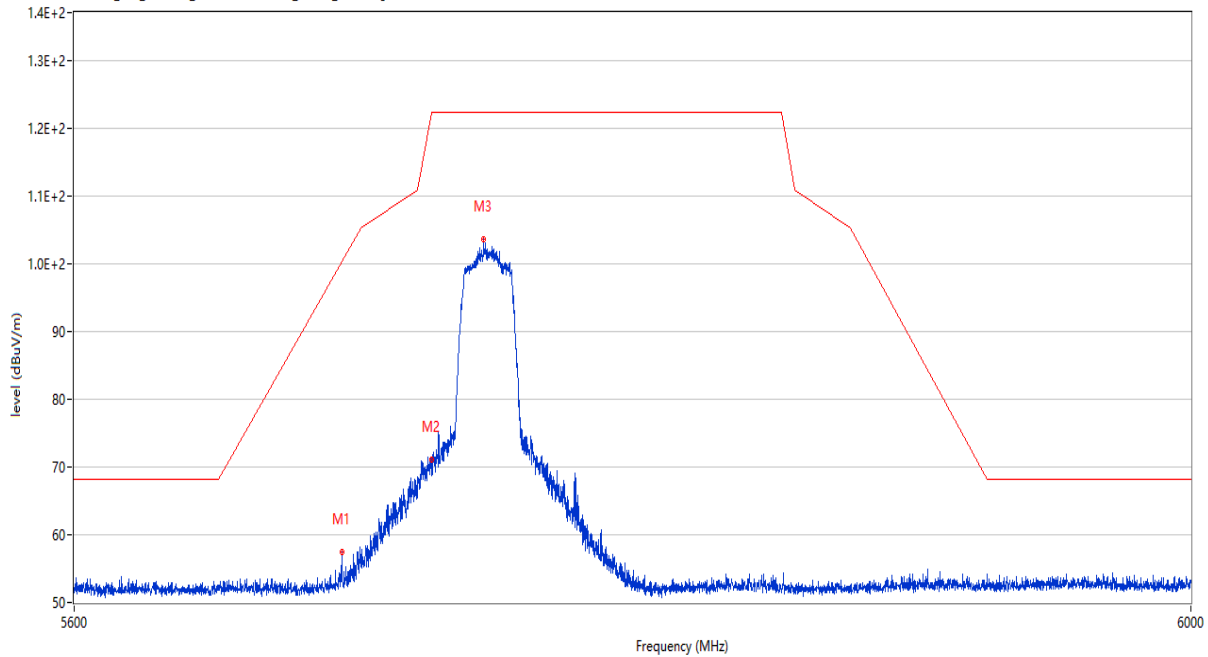
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Vertical

REmission Test case_FCC_Part 15E_FCC 15.407(5G)5G_Band4_Bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5693.477	57.43	2.15	100.4	-42.97	Peak	113.90	100	Vertical	Pass
2	5725.000	70.69	2.16	122.2	-51.51	Peak	115.30	100	V	Pass
3	5743.464	103.53	2.16	122.2	-18.67	Peak	109.50	100	Vertical	Pass

TEST REPORT

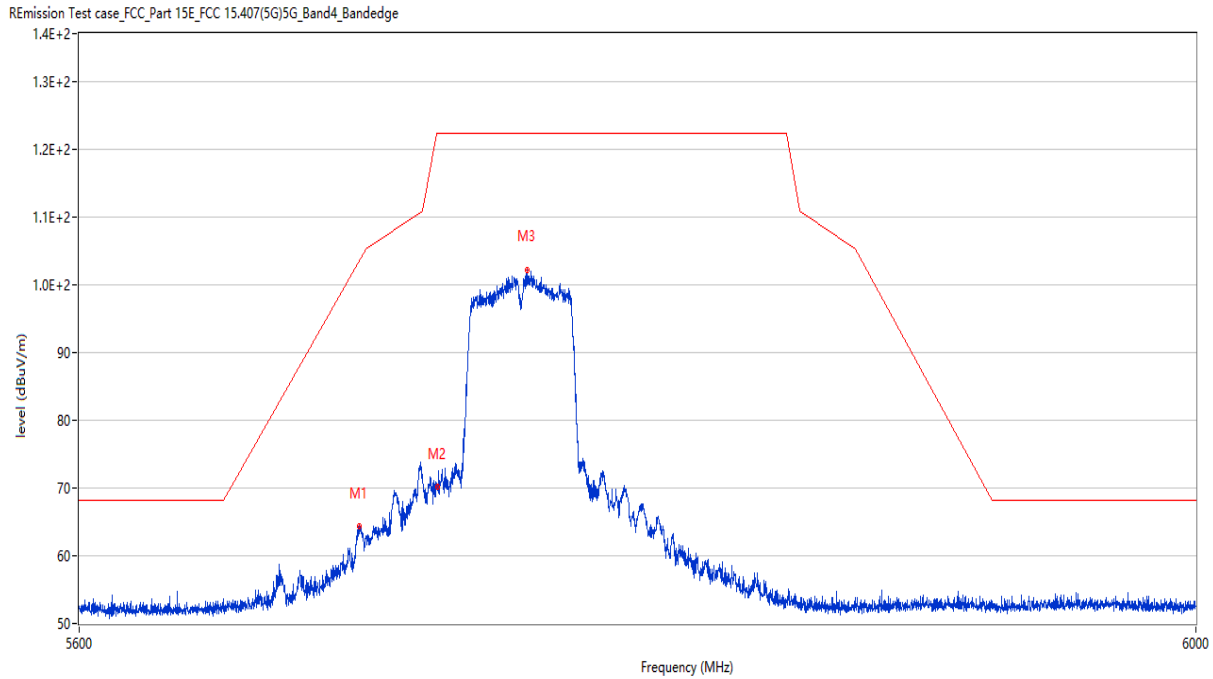
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Figure 18: Band Edge (Restricted-band band-edge), 802.11n(HT40), 5755MHz

Horizontal



No.	Frequency (MHz)	Results (dBUV/m)	Factor (dB)	Limit (dBUV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5697.776	64.26	2.16	103.6	-39.34	Peak	57.80	100	Horizontal	Pass
2	5725.000	70.11	2.16	122.2	-52.09	Peak	113.70	100	H	Pass
3	5757.261	102.14	2.16	122.2	-20.06	Peak	57.80	100	Horizontal	Pass

TEST REPORT

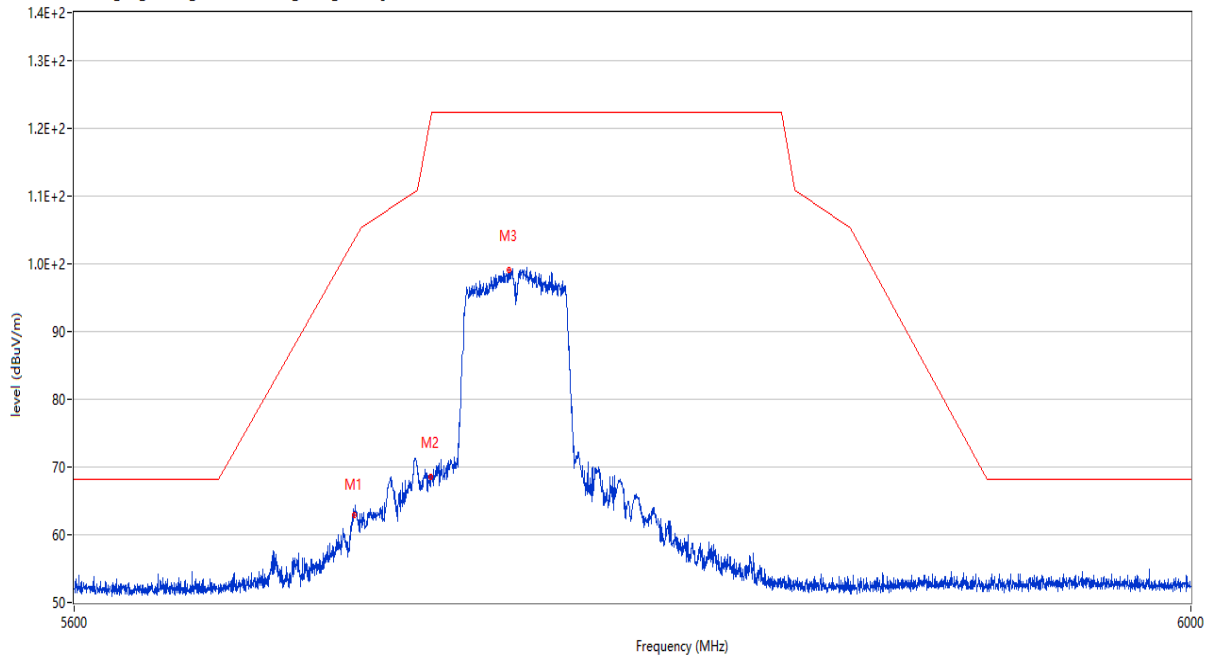
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Vertical

REmission Test case_FCC_Part 15E_FCC 15.407(5G)5G_Band4_Bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5697.876	56.16	2.16	103.6	-47.44	Peak	183.90	100	Vertical	Pass
2	5725.000	62.89	2.16	122.2	-59.31	Peak	141.66	100	V	Pass
3	5752.562	99.02	2.16	122.2	-23.18	Peak	95.00	100	Vertical	Pass

TEST REPORT

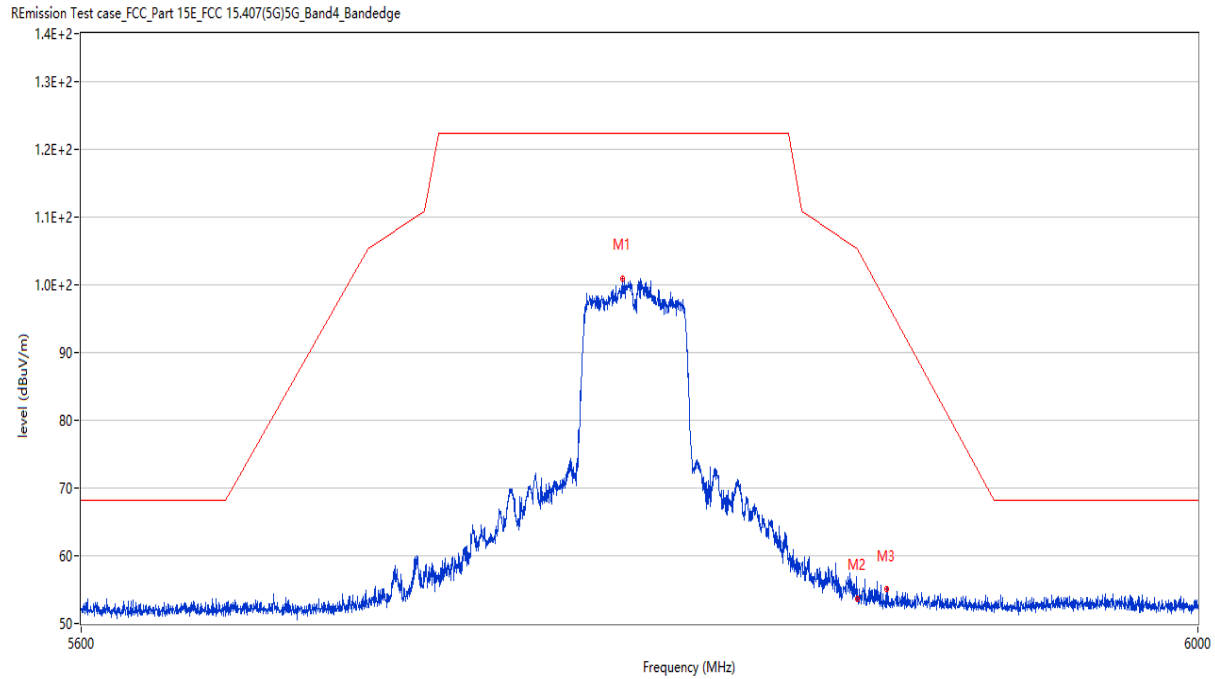
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Figure 19: Band Edge (Restricted-band band-edge), 802.11n(HT40), 5795MHz

Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5790.352	100.79	2.16	122.2	-21.41	Peak	54.00	100	Horizontal	Pass
2	5875.000	53.71	2.16	105.2	-51.49	Peak	154.27	100	H	Pass
3	5885.629	55.01	2.16	97.3	-42.29	Peak	173.10	100	Horizontal	Pass

TEST REPORT

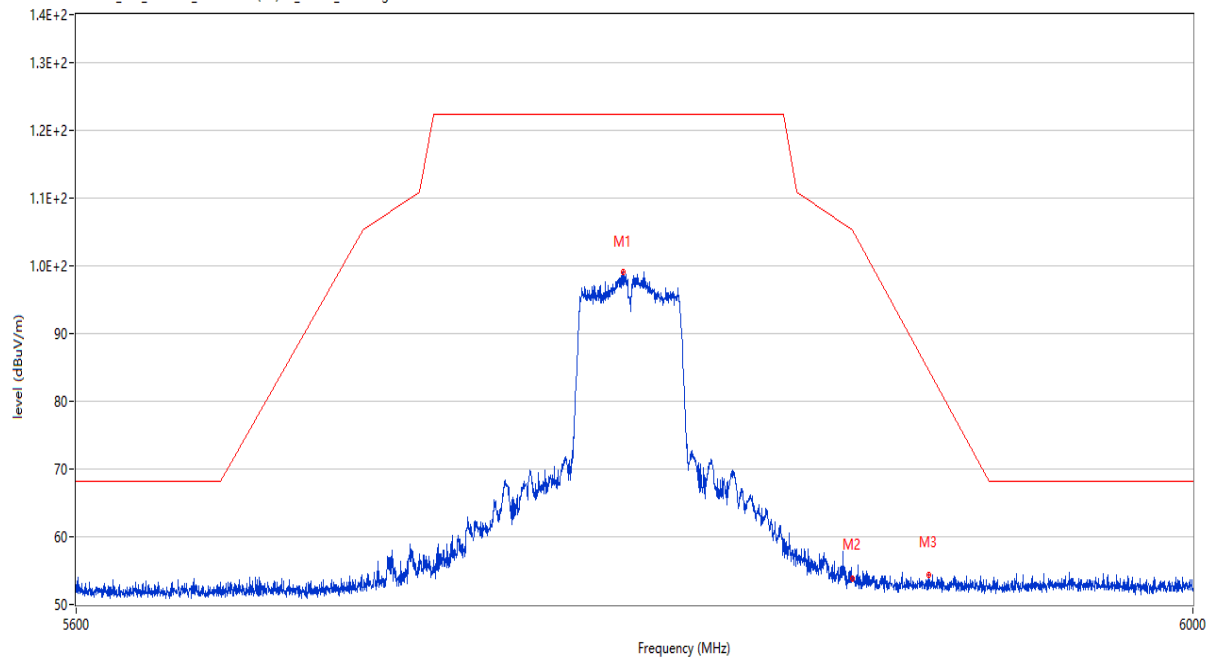
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Vertical

REmission Test case_FCC_Part 15E_FCC 15.407(5G)5G_Band4_Bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5792.552	99.11	2.16	122.2	-23.09	Peak	115.00	100	Vertical	Pass
2	5875.000	54.03	2.16	105.2	-51.17	Peak	41.25	100	V	Pass
3	5902.824	54.32	2.17	84.6	-30.28	Peak	132.90	100	Vertical	Pass

TEST REPORT

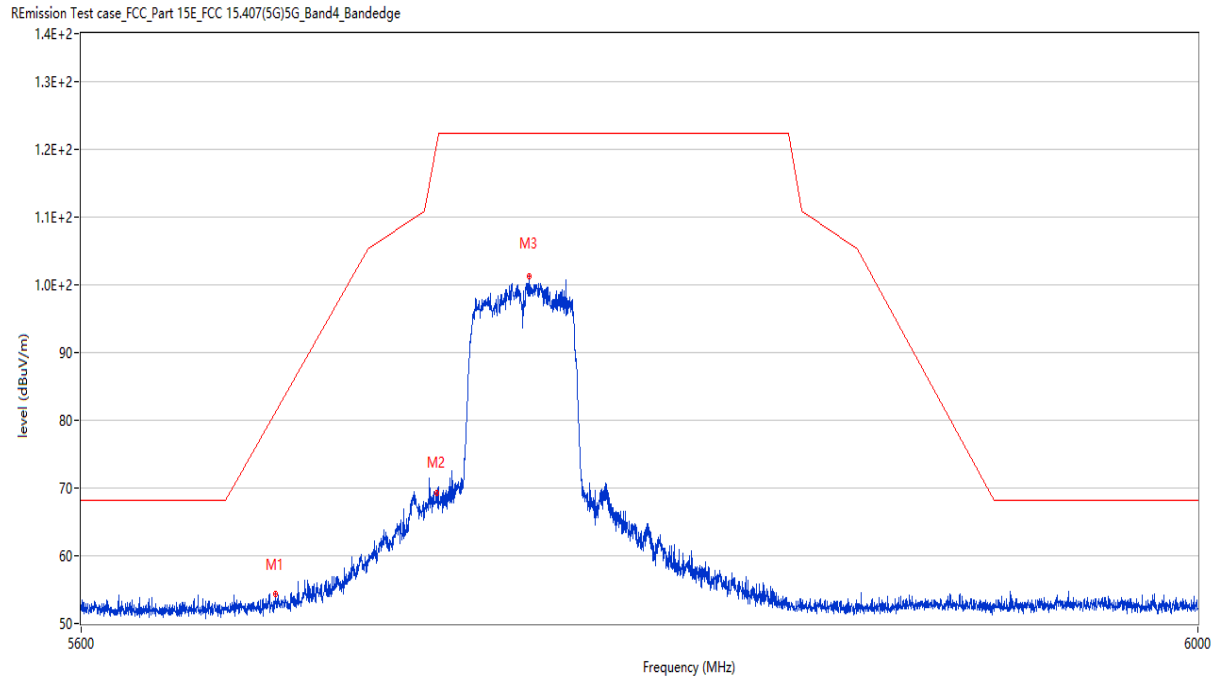
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Figure 20: Band Edge (Restricted-band band-edge), 802.11ac(VHT40), 5755MHz

Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5667.583	54.30	2.13	81.2	-26.90	Peak	22.80	100	Horizontal	Pass
2	5725.000	69.55	2.16	122.2	-52.65	Peak	58.21	100	H	Pass
3	5757.061	101.21	2.16	122.2	-20.99	Peak	59.70	100	Horizontal	Pass

TEST REPORT

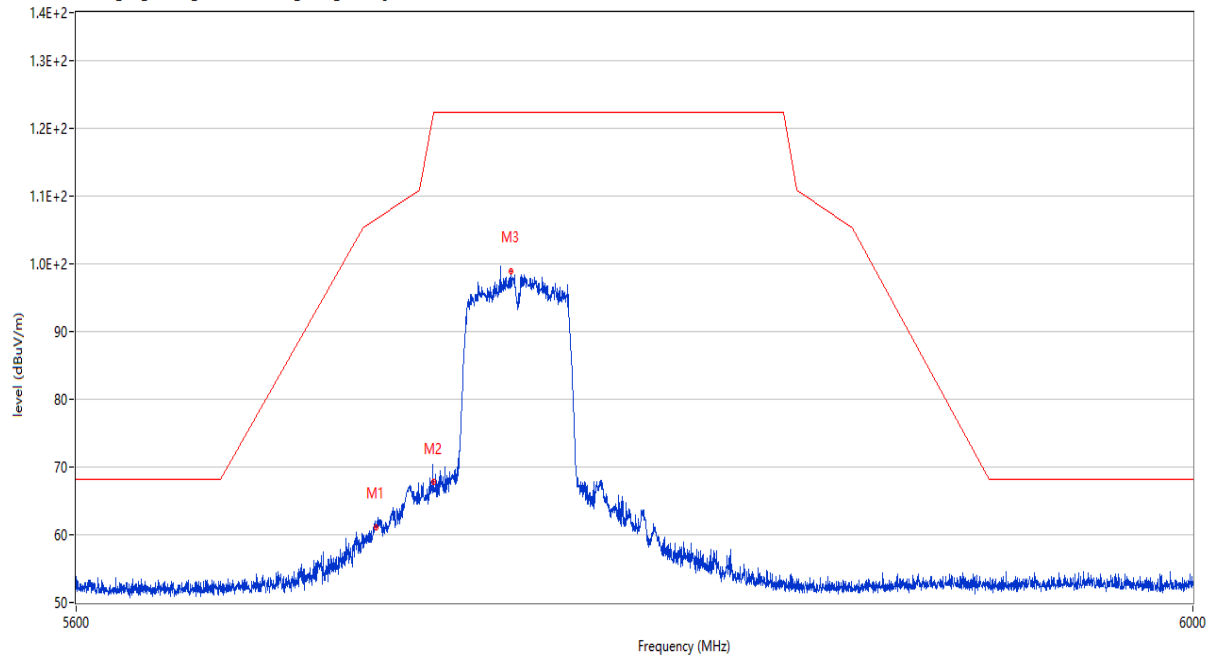
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Vertical

REmission Test case_FCC_Part 15E_FCC 15.407(5G)5G_Band4_Bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5704.674	54.80	2.16	106.5	-51.70	Peak	359.30	100	Vertical	Pass
2	5725.000	57.97	2.16	122.2	-64.23	Peak	334.36	100	V	Pass
3	5752.562	98.80	2.16	122.2	-23.40	Peak	105.00	100	Vertical	Pass

TEST REPORT

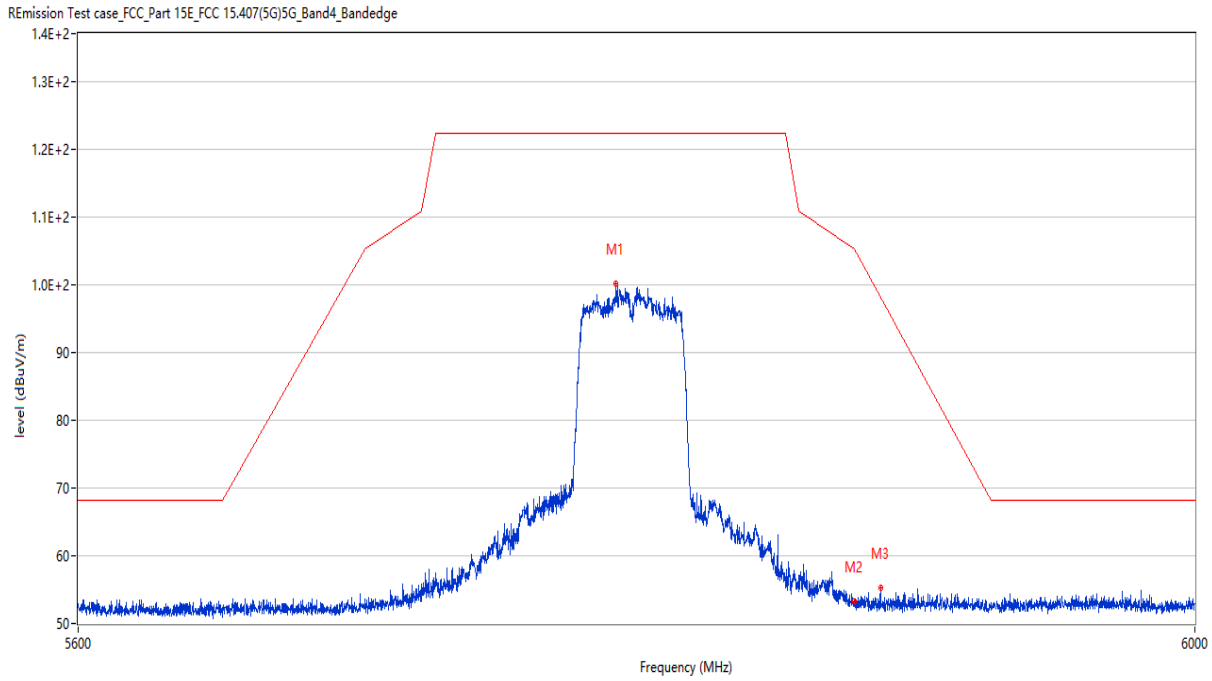
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Figure 21: Band Edge (Restricted-band band-edge), 802.11ac(VHT40), 5795MHz

Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5789.253	100.21	2.16	122.2	-21.99	Peak	63.40	100	Horizontal	Pass
2	5875.000	53.14	2.16	105.2	-52.06	Peak	48.88	100	H	Pass
3	5884.729	55.31	2.16	98.0	-42.69	Peak	164.30	100	Horizontal	Pass

TEST REPORT

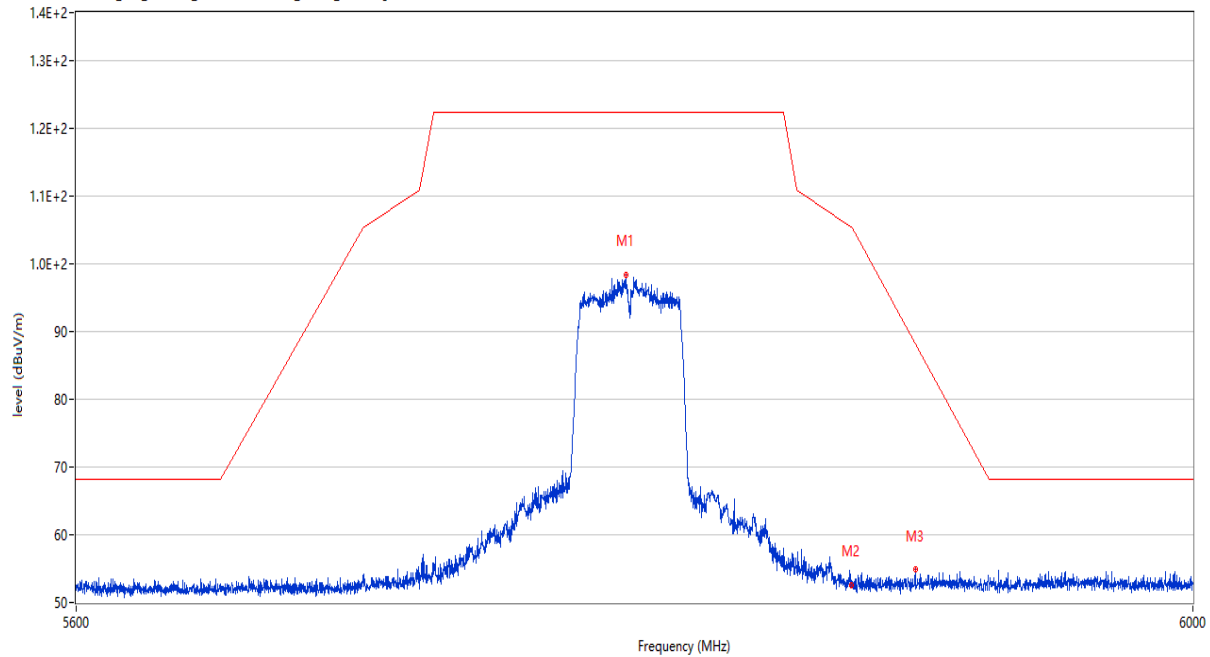
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Vertical

REmission Test case_FCC_Part 15E_FCC 15.407(5G)5G_Band4_Bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5793.352	98.32	2.16	122.2	-23.88	Peak	97.20	100	Vertical	Pass
2	5875.000	52.63	2.16	105.2	-52.57	Peak	105.24	100	V	Pass
3	5897.926	54.83	2.16	88.2	-33.37	Peak	101.30	100	Vertical	Pass

TEST REPORT

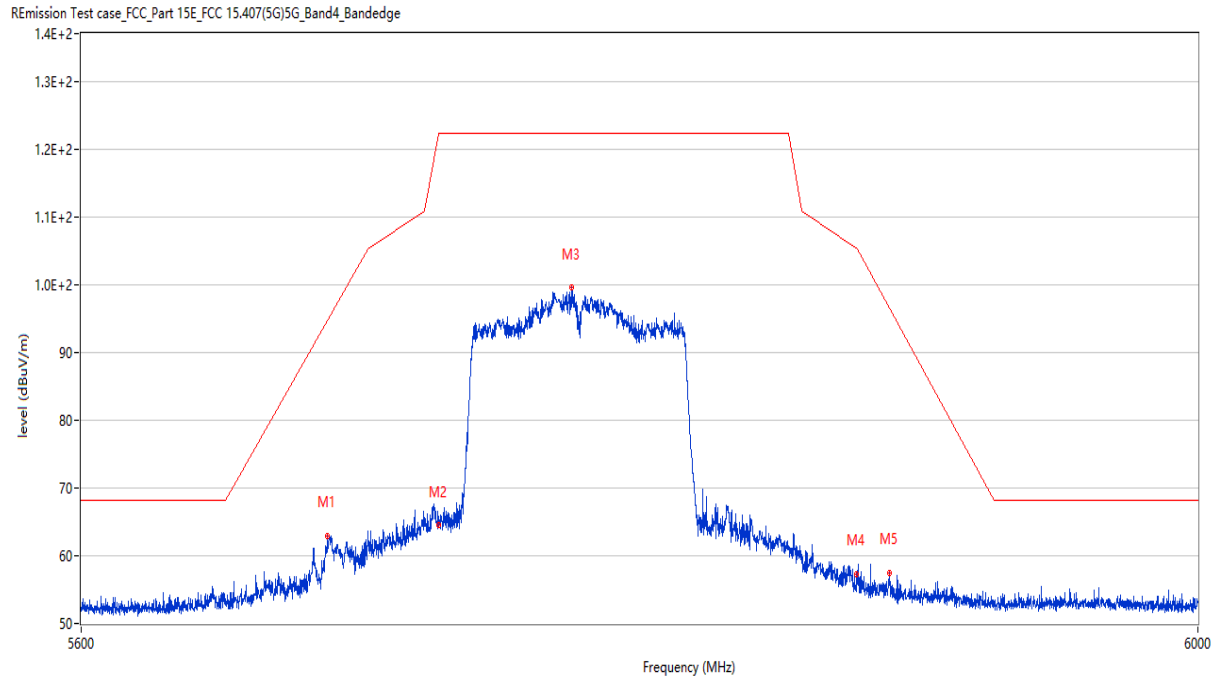
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Figure 22: Band Edge (Restricted-band band-edge), 802.11ac(VHT80), 5775MHz

Horizontal



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5685.979	62.97	2.15	94.9	-31.93	Peak	58.10	100	Horizontal	Pass
2	5725.000	64.44	2.16	122.2	-57.76	Peak	50.84	100	H	Pass
3	5772.357	99.55	2.16	122.2	-22.65	Peak	158.50	100	Horizontal	Pass
4	5875.000	57.11	2.16	105.2	-48.09	Peak	108.61	100	H	Pass
5	5886.628	57.53	2.16	96.6	-39.07	Peak	75.60	100	Horizontal	Pass

TEST REPORT

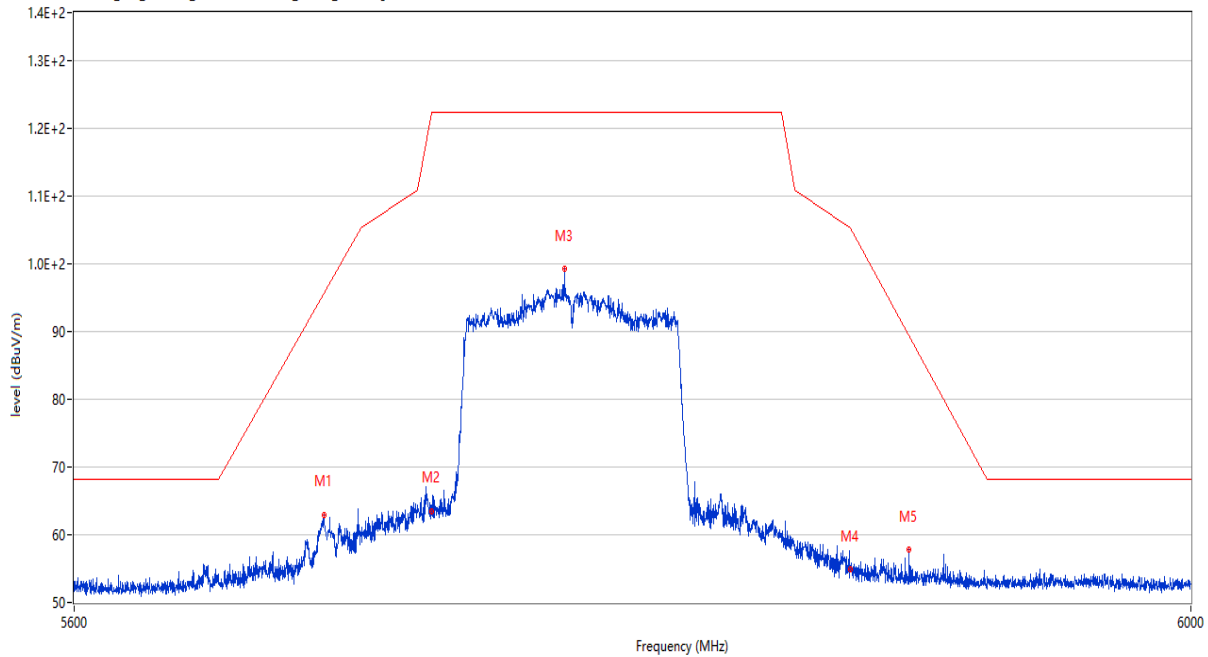
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Vertical

REmission Test case_FCC_Part 15E_FCC 15.407(5G)5G_Band4_Bandedge



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	5687.178	62.90	2.15	95.7	-32.80	Peak	110.90	100	Vertical	Pass
2	5725.000	63.70	2.16	122.2	-58.50	Peak	112.30	100	V	Pass
3	5772.157	99.16	2.16	122.2	-23.04	Peak	110.90	100	Vertical	Pass
4	5875.000	54.85	2.16	105.2	-50.35	Peak	89.37	100	V	Pass
5	5896.326	57.80	2.16	89.4	-31.60	Peak	79.70	100	Vertical	Pass

End of the report