

# FCC Test Report

Product Name	WiFi SOM Module
Model No	MS-01
FCC ID	VGXMS01

Applicant	JLT Mobile Computers
Address	Isbjörnsvägen 3, SE-35245, Växjö, Sweden

Date of Receipt	Apr. 07, 2021
Issued Date	Apr. 19, 2021
Report No.	2140155R-E3032110123
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

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Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

# Test Report

Issued Date: Apr. 19, 2021

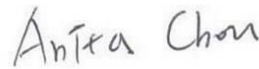
Report No.: 2140155R-E3032110123



Product Name	WiFi SOM Module
Applicant	JLT Mobile Computers
Address	Isbjörnsvägen 3, SE-35245, Växjö, Sweden
Manufacturer	JLT Mobile Computers
Model No.	MS-01
FCC ID.	VGXMS01
EUT Rated Voltage	DC 3.3V
EUT Test Voltage	DC 3.3V
Trade Name	JLT Mobile
Applicable Standard	FCC CFR Title 47 Part 15 Subpart E ANSI C63.4: 2014, ANSI C63.10: 2013 KDB Publication 789033
Test Result	Complied

Documented By

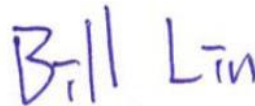
:



( Senior Engineering Adm. Specialist / Anita Chou )

Tested By

:



( Senior Engineer / Bill Lin )

Approved By

:



( Director / Vincent Lin )

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## **Revision History**

Report No.	Version	Description	Issued Date
2140155R-E3032110123	V1.0	Initial issue of report.	2021-04-19

## 1. GENERAL INFORMATION

### 1.1. EUT Description

Product Name	WiFi SOM Module
Trade Name	JLT Mobile
FCC ID.	VGXMS01
Model No.	MS-01
Frequency Range	802.11a/n-20MHz: 5180-5320MHz, 5500-5700MHz, 5745-5825MHz 802.11n-40MHz: 5190-5310, 5510-5670MHz, 5755-5795MHz 802.11ac-20MHz: 5720, 802.11ac-40MHz: 5710 802.11ac-80MHz: 5210-5290MHz, 5530-5690MHz, 5775MHz
Number of Channels	802.11a/n-20MHz: 24; 802.11n-40MHz: 11 802.11ac-20MHz: 1, 802.11ac-40MHz: 1, 802.11ac-80MHz: 6
Data Rate	802.11a: 6 - 54Mbps 802.11n: up to 300Mbps 802.11ac-80MHz: up to 866.7Mbps
Channel Control	Auto
Type of Modulation	802.11a/n/ac: OFDM, BPSK, QPSK, 16QAM, 64QAM, 256QAM
Antenna type	PIFA Antenna
Antenna Gain	Refer to the table “Antenna List”

#### Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	WSI	WSI-9909	PIFA	2.3dBi for 5150-5250MHz 2.3dBi for 5250-5350MHz 1.3dBi for 5470-5725MHz 2.2dBi for 5725-5850MHz

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

## 802.11a/n-20MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 36:	5180 MHz	Channel 40:	5200 MHz	Channel 44:	5220 MHz	Channel 48:	5240 MHz
Channel 52:	5260 MHz	Channel 56:	5280 MHz	Channel 60:	5300 MHz	Channel 64:	5320 MHz
Channel 100:	5500 MHz	Channel 104:	5520 MHz	Channel 108:	5540 MHz	Channel 112:	5560 MHz
Channel 116:	5580 MHz	Channel 120:	5600 MHz	Channel 124:	5620 MHz	Channel 128:	5640 MHz
Channel 132:	5660 MHz	Channel 136:	5680 MHz	Channel 140:	5700 MHz	Channel 149:	5745 MHz
Channel 153:	5765 MHz	Channel 157:	5785 MHz	Channel 161:	5805 MHz	Channel 165:	5825 MHz

## 802.11n-40MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 38:	5190 MHz	Channel 46:	5230 MHz	Channel 54:	5270 MHz	Channel 62:	5310 MHz
Channel 102:	5510 MHz	Channel 110:	5550 MHz	Channel 118:	5590 MHz	Channel 126:	5630 MHz
Channel 134:	5670 MHz	Channel 151:	5755 MHz	Channel 159:	5795 MHz		

## 802.11ac-20MHz Center Working Frequency of Each Channel:

Channel	Frequency
Channel 144:	5720 MHz

## 802.11ac-40MHz Center Working Frequency of Each Channel:

Channel	Frequency
Channel 142:	5710 MHz

## 802.11ac-80MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 42:	5210 MHz	Channel 58:	5290 MHz	Channel 106:	5530 MHz	Channel 122:	5610 MHz
Channel 138:	5690 MHz	Channel 155:	5775 MHz				

## Note:

1. This device is an WiFi SOM Module with a built-in WLAN (802.11a/b/g/n/ac) with Bluetooth transceiver, this report for 5GHz WLAN.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report.
4. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance of transmitter with Part 15 Subpart E for Unlicensed National Information Infrastructure devices.
5. This is to request a Class II permissive change for FCC ID: VGXMS01, originally granted on 03/19/2021.

The major change filed under this application is:

Change #1: Addition a PIFA antenna, antenna type is different with the original application.

This report is based on FCC ID :2ABTU-MS01. Addition of low gain new antenna.

Test Mode	Mode 4: Transmit (802.11ac-20BW)
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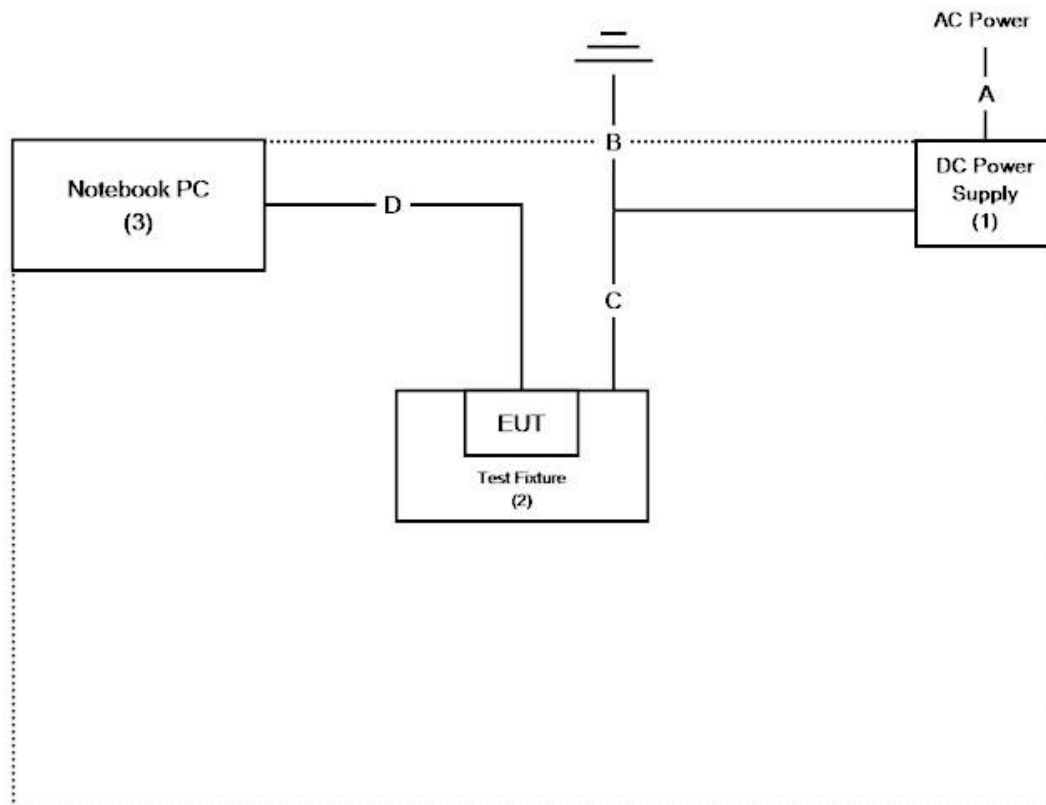
## 1.2. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 DC Power Supply	Topward	6303D	743450	Non-Shielded, 1.8m
2 Test Fixture	RuggON	JLT6012A	N/A	N/A
3 Notebook PC	DELL	Latitude E5440	HG26TZ1	Non-Shielded, 0.8m

Signal Cable Type	Signal cable Description
A Power Cable	Shielded, 1.8m
B GND Cable	Non-shielded, 2m
C Power Cable	Shielded, 2.2m
D Type-C to USB Cable	Shielded, 1m

## 1.3. Configuration of tested System





#### **1.4. EUT Exercise Software**

1. Setup the EUT as shown in Section 1..
2. Execute software “QRCT3 version 3.0.303.0” on the Notebook PC.
3. Configure the test mode, the test channel, and the data rate.
4. Press “OK” to start the continuous Transmit.
5. Verify that the EUT works properly.

## 1.5. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
Radiated Emission	Temperature (°C)	10~40 °C	19.5 °C
	Humidity (%RH)	10~90 %	61.2 %
Conductive	Temperature (°C)	10~40 °C	22 °C
	Humidity (%RH)	10~90 %	55 %

**USA : FCC Registration Number: TW0023**

**Canada : IC Registration Number: 25880**

Site Description : Accredited by TAF  
Accredited Number: 3023

Test Laboratory : DEKRA Testing and Certification Co., Ltd  
Address : No.159, Sec. 2, Wenhua 1st Rd., Linkou Dist.,  
New Taipei City 24457, Taiwan, R.O.C.

Phone number : 886-2-2602-7968  
Fax number : 866-2-2602-3286  
Email address : [info.tw@dekra.com](mailto:info.tw@dekra.com)  
Website : <http://www.dekra.com.tw>

## 1.6. List of Test Equipment

### For Conducted measurements /ASR2

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Spectrum Analyzer	R&S	FSV30	103466	2020.12.28	2021.12.27
X	Peak Power Analyzer	KEYSIGHT	8900B	MY51000539	2020.05.13	2021.05.12
X	Power Sensor	KEYSIGHT	N1923A	MY59240002	2020.05.22	2021.05.21
X	Power Sensor	KEYSIGHT	N1923A	MY59240003	2020.05.22	2021.05.21

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : DEKRA Conduction Test System V9.0.5.

### For Radiated measurements /ACB1

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Data	Due. Data
X	Loop Antenna	AMETEK	HLA6121	49611	2021.03.16	2022.03.15
X	Bi-Log Antenna	SCHWARZBECK	VULB9168	9168-953	2021.01.29	2022.01.28
X	Horn Antenna	ETS-Lindgren	3117	00203800	2020.12.22	2021.12.21
	Horn Antenna	Com-Power	AH-840	101087	2020.06.08	2021.06.07
X	Pre-Amplifier	EMCI	EMC001330	980316	2020.06.23	2021.06.22
X	Pre-Amplifier	EMCI	EMC051835SE	980311	2020.06.23	2021.06.22
X	Pre-Amplifier	EMCI	EMC05820SE	980310	2020.06.24	2021.06.23
X	Pre-Amplifier	EMCI	EMC184045SE	980314	2020.06.10	2021.06.09
	Filter	MICRO TRONICS	BRM50702	G251	2020.09.17	2021.09.16
X	Filter	MICRO TRONICS	BRM50716	G188	2020.09.17	2021.09.16
	EMI Test Receiver	R&S	ESR7	101602	2021.02.25	2022.02.24
X	Spectrum Analyzer	R&S	FSV40	101148	2020.03.16	2021.03.15
X	Coaxial Cable	SUHNER	SUCOFLEX 106	RF002	2020.07.03	2021.07.02
X	Mircoflex Cable	HUBER SUHNER	SUCOFLEX 102	MY3381/2	2020.06.10	2021.06.09

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with “X” are used to measure the final test results.
3. Test Software version : DEKRA Testing System V2.0.

## 1.7. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document, and is described in each test chapter of this report.

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

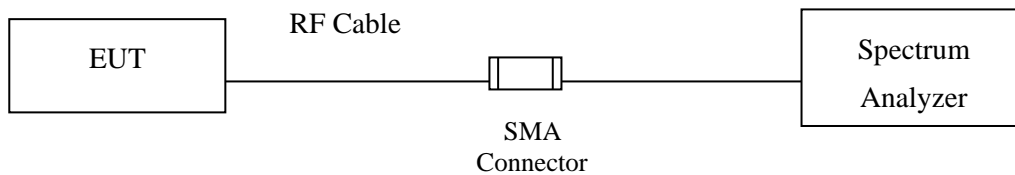
Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test item	Uncertainty	
	Power Meter	Spectrum Analyzer
Maximun conducted output power	$\pm 0.91$ dB	$\pm 2.53$ dB
Radiated Emission	Under 1GHz	Above 1GHz
	$\pm 4.06$ dB	$\pm 3.73$ dB

## 2. Maximun conducted output power

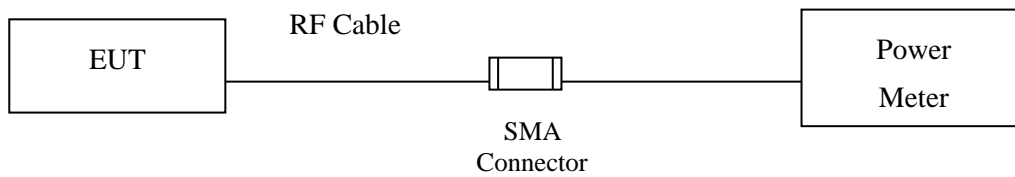
### 2.1. Test Setup

#### 99% Occupied Bandwidth

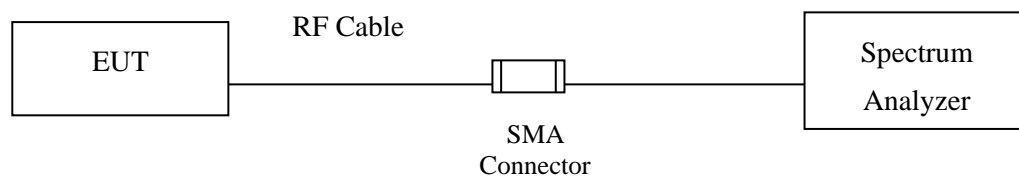


#### Conduction Power Measurement

##### Conduction Power Measurement (for 802.11an)



##### Conduction Power Measurement (for 802.11ac)



## 2.2. Limits

For the band 5.15-5.25 GHz,

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W, provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or  $11 \text{ dBm} + 10 \log B$ , where B is the 99% emission bandwidth in megahertz. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point UNII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

### 2.3. Test Procedure

As an alternative to FCC KDB-789033, the EUT maximum conducted output power was measured with an average power meter employing a video bandwidth greater the 6dB BW of the emission under test. Maximum conducted output power was read directly from the meter across all data rates, and across three channels within each sub-band. Special care was used to make sure that the EUT was transmitting in continuous mode. This method exceeds the limitations of FCC KDB-789033, and provides more accurate measurements.

802.11an (BW  $\leq$  40MHz) Maximum conducted output power using KDB 789033 section E)3)b) Method PM-G (Measurement using a gated RF average power meter)

Note: the power meter have a video bandwidth that is greater than or equal to the measurement bandwidth, (Anritsu/ MA2411B video bandwidth: 65MHz)

802.11ac (BW=80MHz) Maximum conducted output power using KDB 789033 section E)2)b) Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep).

When transmitted signals consist of two or more non-contiguous spectrum segments (e.g., 80+80 MHz mode) or when a single spectrum segment of a transmission crosses the boundary between two adjacent U-NII bands, KDB 644545 D03 section D) procedure is used for measurements.

## 2.4. Test Result of Maximum conducted output power

Product : WiFi SOM Module  
 Test Item : Maximum conducted output power  
 Test Mode : Mode 4: Transmit (802.11ac-20BW)  
 Test Date : 2021/04/14

### Chain A

Cable loss=3dB			Maximum conducted output power							
Channel No.	Frequency (MHz)		Data Rate (Mbps)							
			7.2	14.4	21.7	28.9	43.3	57.8	65	72.2
			Measurement Level (dBm)							
44	5220		15.09	15.02	14.97	14.94	14.86	14.81	14.74	14.68
60	5300		15.36	15.3	15.27	15.23	15.18	15.1	15.05	14.96
116	5580		15.54	15.5	15.43	15.35	15.28	15.19	15.1	15.01
157	5785		15.69	15.64	15.56	15.51	15.42	15.37	15.3	15.2

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

### Chain B

Cable loss=3dB			Maximum conducted output power							
Channel No.	Frequency (MHz)		Data Rate (Mbps)							
			7.2	14.4	21.7	28.9	43.3	57.8	65	72.2
			Measurement Level (dBm)							
44	5220		17.93	17.84	17.77	17.67	17.63	17.53	17.5	17.4
60	5300		18.18	18.14	18.09	18.02	17.92	17.85	17.78	17.72
116	5580		18.35	18.31	18.27	18.2	18.17	18.13	18.07	18.01
157	5785		17.93	17.85	17.75	17.71	17.65	17.57	17.49	17.46

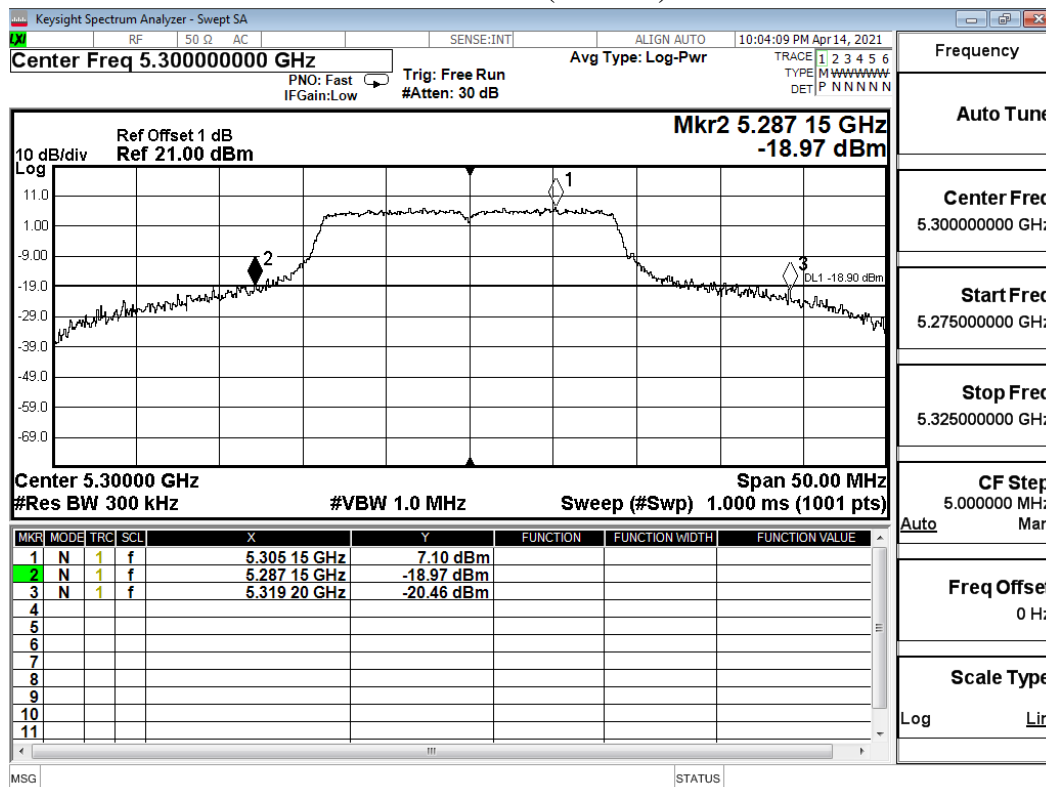
Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

### Maximum conducted output power Measurement:

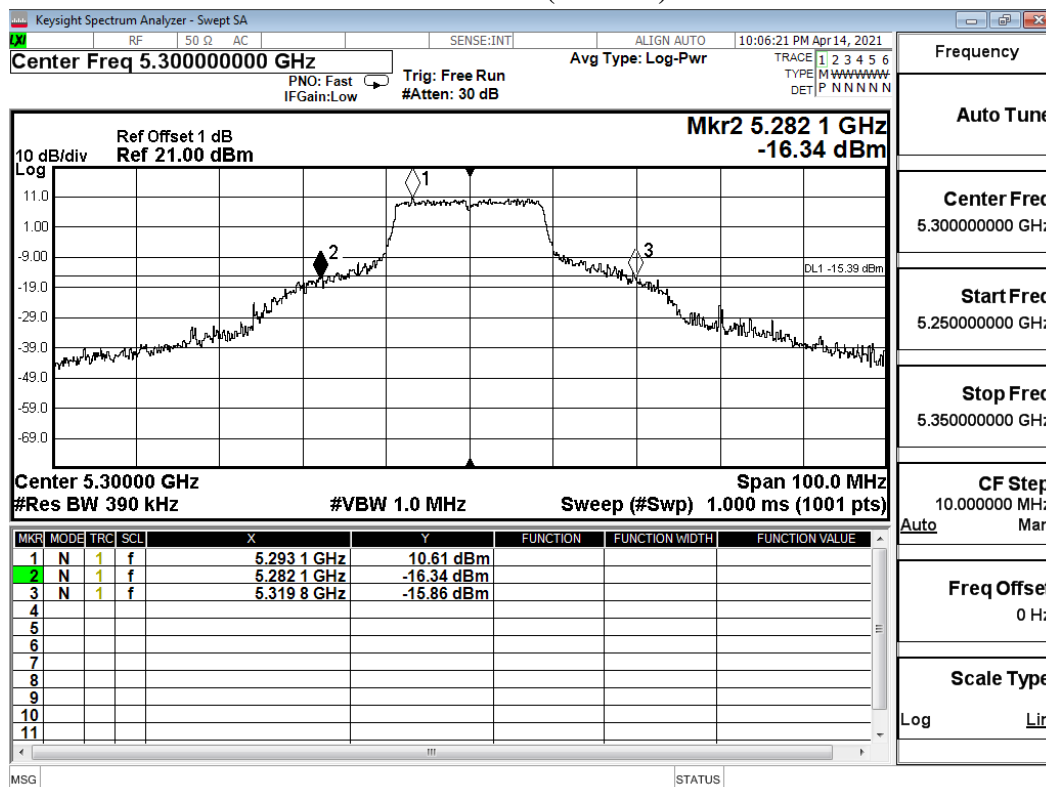
Channel No	Frequency Range	26dB Bandwidth	Chain A Power	Chain B Power	Output Power	Output Power Limit		Result
	(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	dBm+10log(BW)	
44	5220	--	15.09	17.93	19.75	24	--	Pass
60	5300	32.05	15.36	18.18	20.01	24	26.06	Pass
116	5580	24.85	15.54	18.35	20.18	24	24.95	Pass
157	5785	--	15.69	17.93	19.96	30	--	Pass



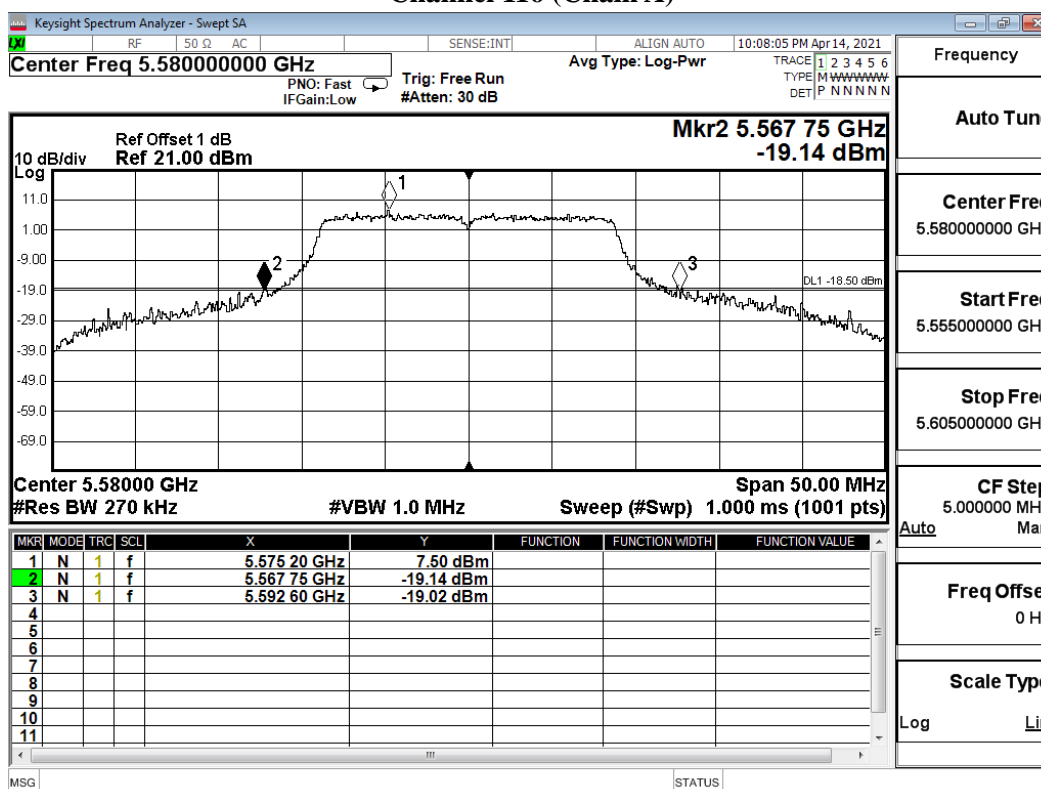
### 26dB Occupied Bandwidth: Channel 60 (Chain A)



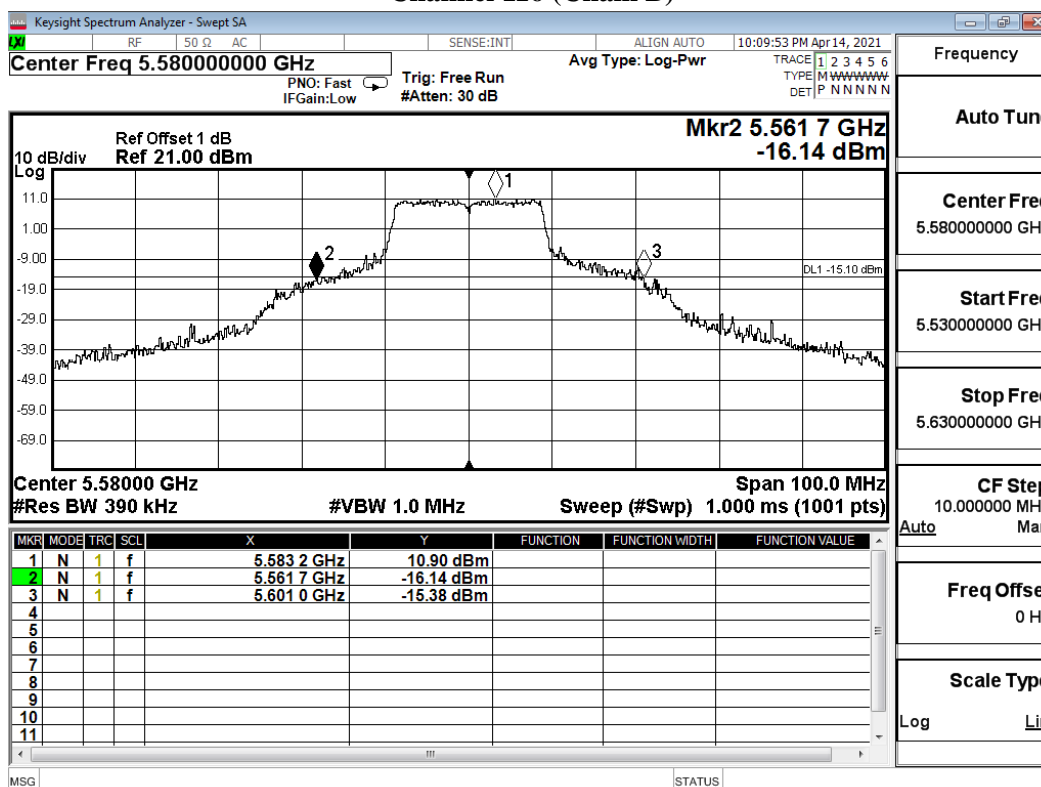
### Channel 60 (Chain B)



## Channel 116 (Chain A)



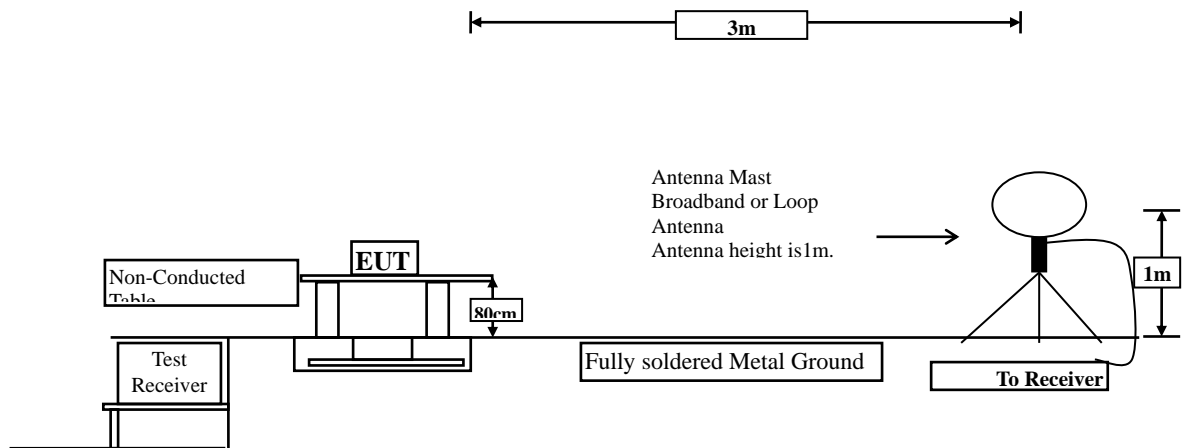
## Channel 116 (Chain B)



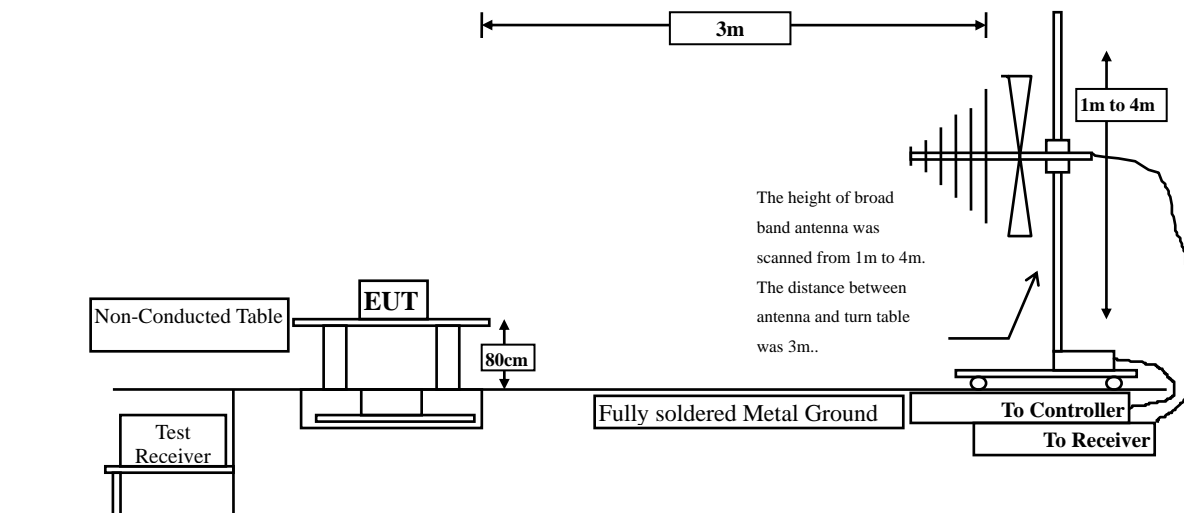
### 3. Radiated Emission

#### 3.1. Test Setup

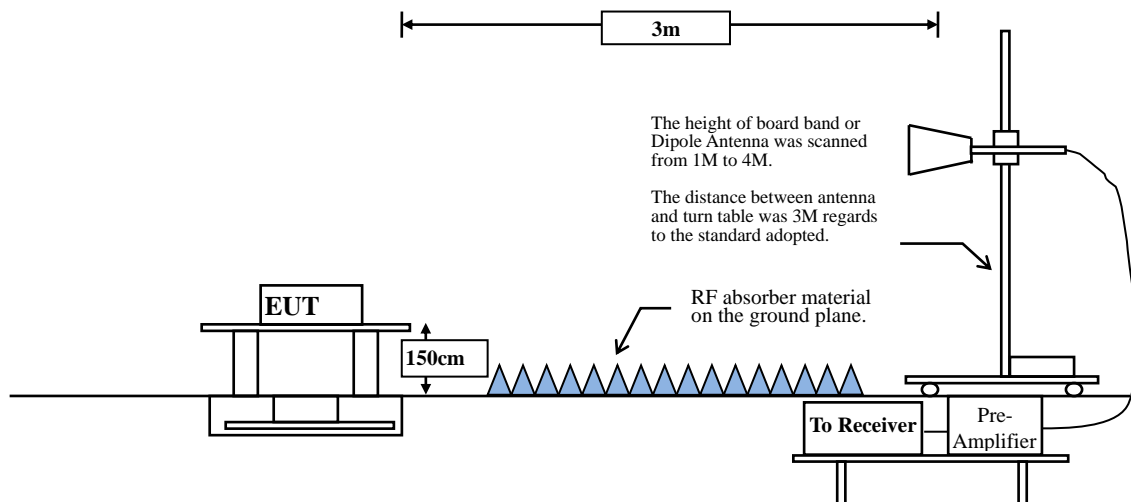
##### Radiated Emission Under 30MHz



##### Radiated Emission Below 1GHz



##### Radiated Emission Above 1GHz



### 3.2. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

<b>FCC Part 15 Subpart C Paragraph 15.209(a) Limits</b>		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remarks: E field strength (dBμV/m) = 20 log E field strength (uV/m)

- For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- For transmitters operating in the 5.725-5.85 GHz band:  
All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
- For transmitters operating within the 5.925-7.125 GHz band: Any emissions outside of the 5.925-7.125 GHz band must not exceed an e.i.r.p. of -27 dBm/MHz.

Based on ANSI C63.10-2013 Section 12.7.3 d) provides the conversion formula between field strength and EIRP, if distance is 3m, -27dBm is equivalent to 68.22dBuV/m.

### 3.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested according to FCC KDB-789033 test procedure for compliance to FCC 47CFR 15. 407 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna. The measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

**RBW and VBW Parameter setting:**

According to KDB 789033 section II.G.5 Procedure for Unwanted Maximum Emissions  
Measurements above 1000 MHz.

RBW = 1MHz.

VBW  $\geq$  3MHz.

According to KDB 789033 section II.G.6 Procedures for Average Unwanted Emissions  
Measurements above 1000 MHz.

RBW = 1MHz.

VBW = 10Hz, when duty cycle  $\geq$  98 %

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

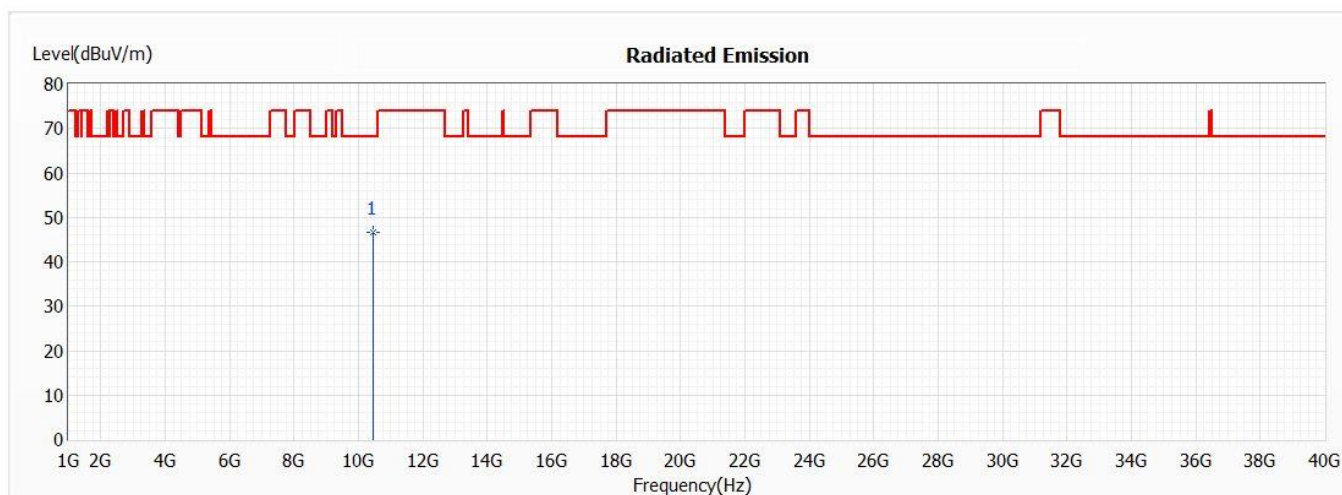
( T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

5GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11ac20	89.18	0.9565	1045	2k

### 3.4. Test Result of Radiated Emission

Product : WiFi SOM Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Mode : Mode 4: Transmit (802.11ac-20BW) (5220MHz)  
 Test Date : 2021/4/13

#### Horizontal



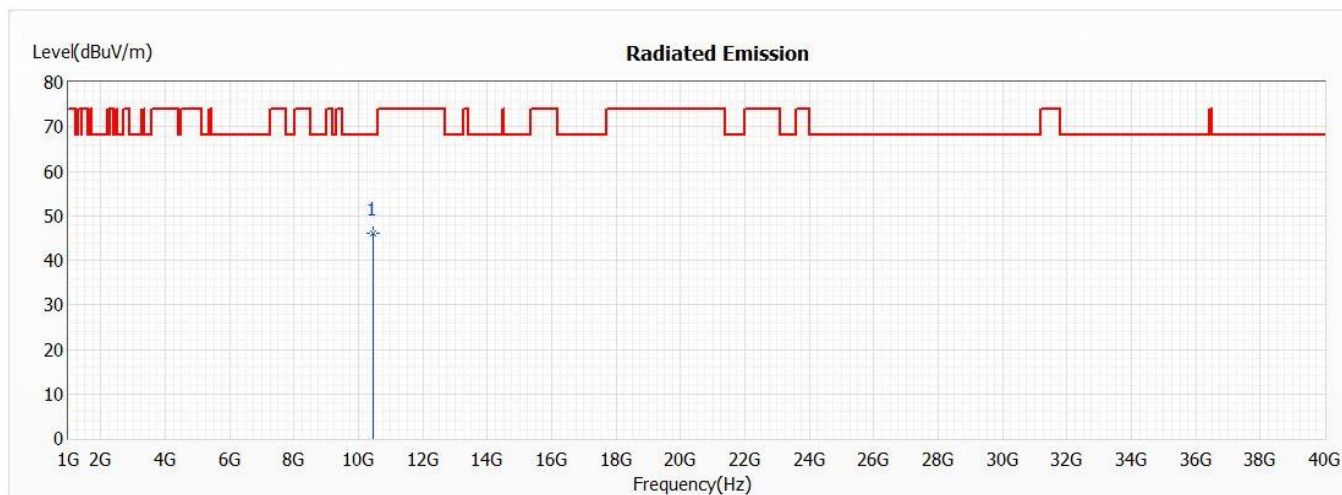
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	10440.000	46.66	68.22	-21.56	41.89	4.77	PK

#### Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WiFi SOM Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Mode : Mode 4: Transmit (802.11ac-20BW) (5220MHz)  
 Test Date : 2021/4/13

### Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	10440.000	46.13	68.22	-22.09	41.36	4.77	PK

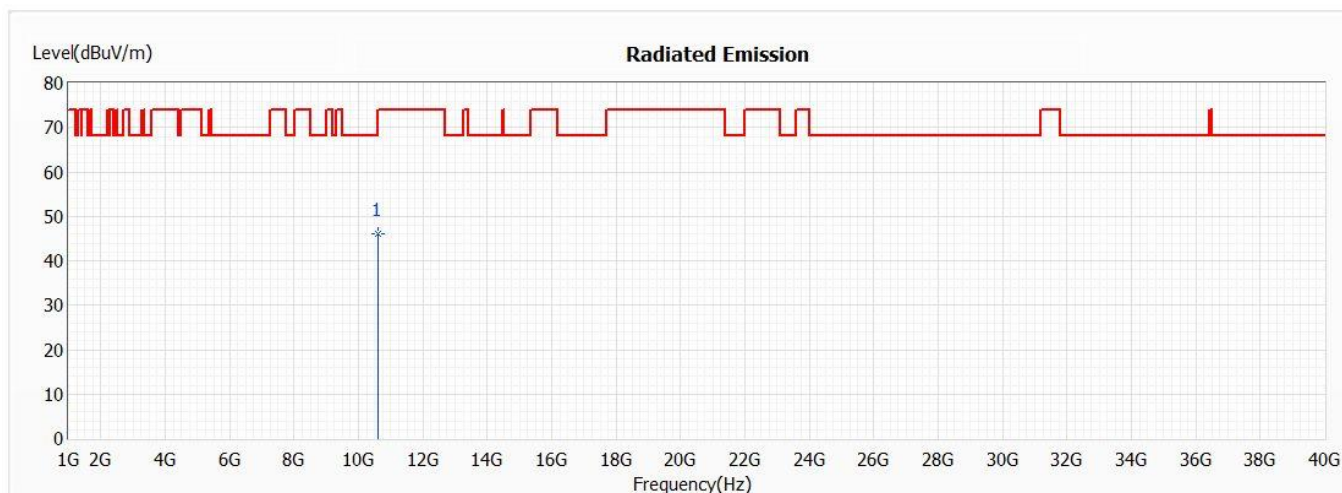
### Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product : WiFi SOM Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Mode : Mode 4: Transmit (802.11ac-20BW) (5300MHz)  
 Test Date : 2021/4/13

## Horizontal



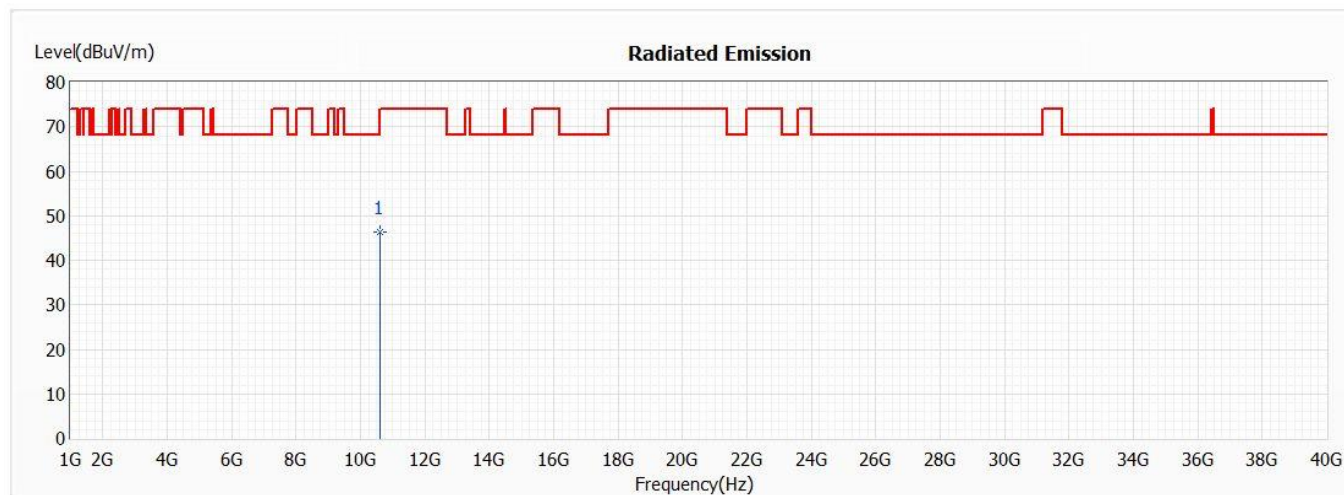
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	10600.000	46.13	68.22	-22.09	41.01	5.12	PK

## Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WiFi SOM Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Mode : Mode 4: Transmit (802.11ac-20BW) (5300MHz)  
 Test Date : 2021/4/13

## Vertical



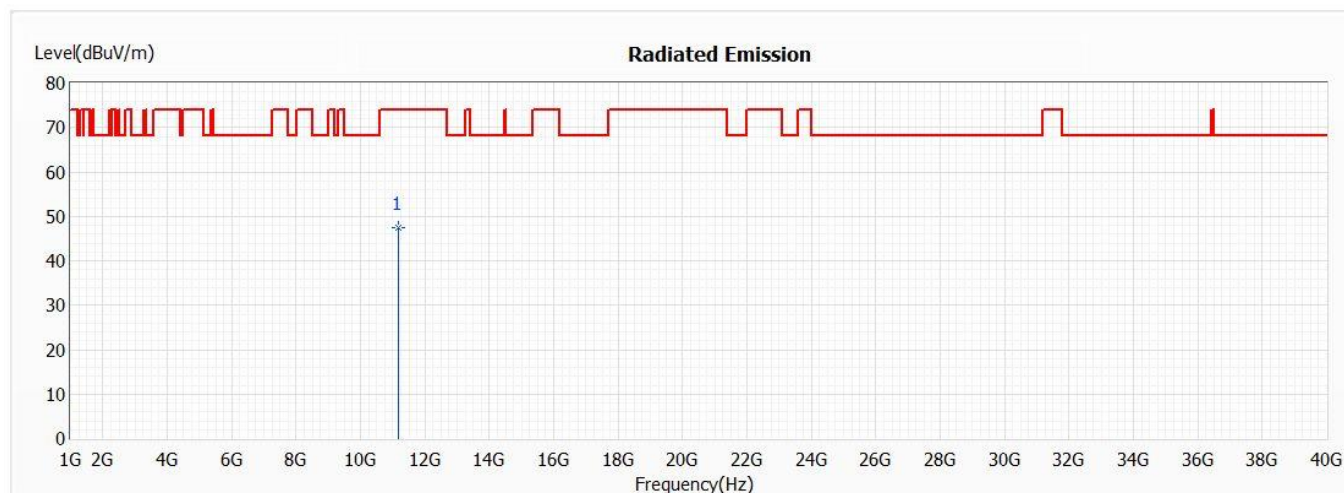
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	10600.000	46.35	68.22	-21.87	41.23	5.12	PK

## Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WiFi SOM Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Mode : Mode 4: Transmit (802.11ac-20BW) (5580MHz)  
 Test Date : 2021/4/13

## Horizontal



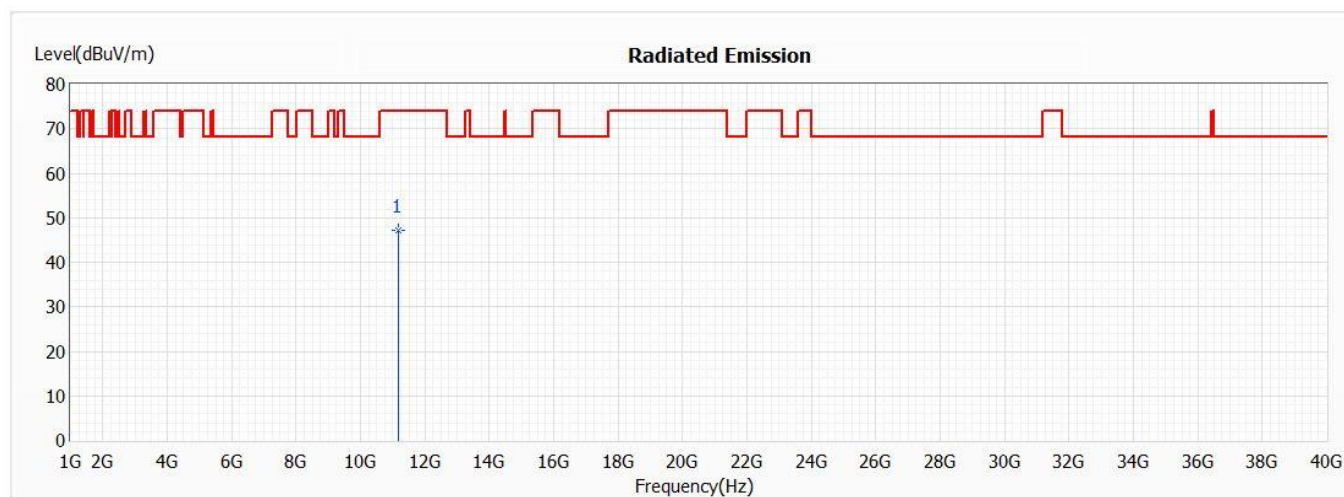
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	11160.000	47.43	74.00	-26.57	41.93	5.50	PK

## Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WiFi SOM Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Mode : Mode 4: Transmit (802.11ac-20BW) (5580MHz)  
 Test Date : 2021/4/13

## Vertical



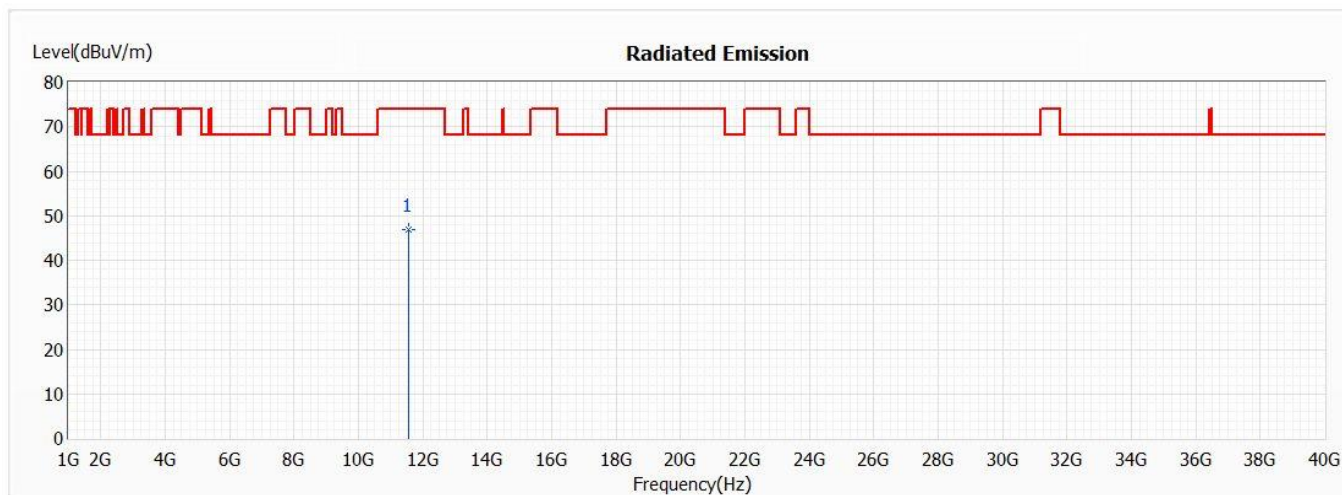
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	11160.000	47.15	74.00	-26.85	41.65	5.50	PK

## Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WiFi SOM Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Mode : Mode 4: Transmit (802.11ac-20BW) (5785MHz)  
 Test Date : 2021/4/13

### Horizontal



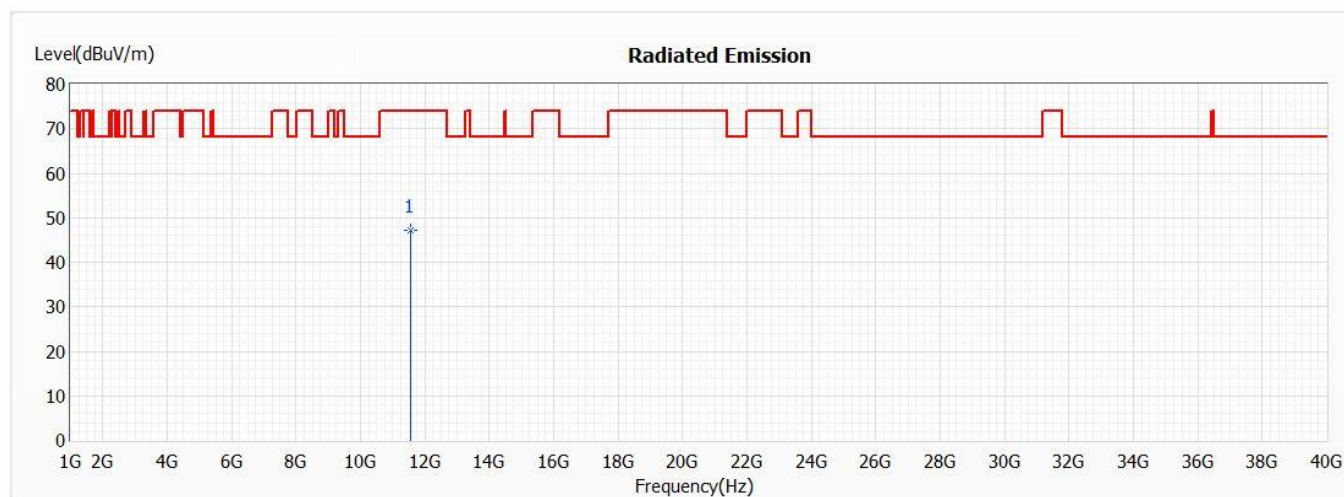
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	11570.000	46.88	74.00	-27.12	40.73	6.15	PK

### Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : WiFi SOM Module  
 Test Item : Harmonic Radiated Emission Data  
 Test Mode : Mode 4: Transmit (802.11ac-20BW) (5785MHz)  
 Test Date : 2021/4/13

## Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	11570.000	47.08	74.00	-26.92	40.93	6.15	PK

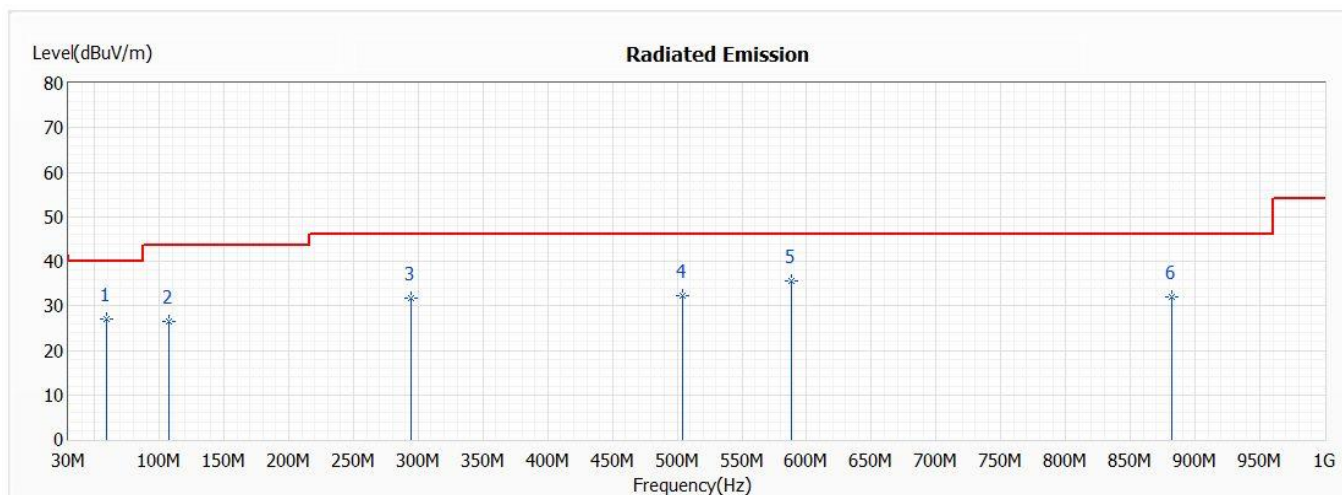
## Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.



Product : WiFi SOM Module  
 Test Item : General Radiated Emission  
 Test Mode : Mode 4: Transmit (802.11ac-20BW) (5785MHz)  
 Test Date : 2021/4/13

## Horizontal

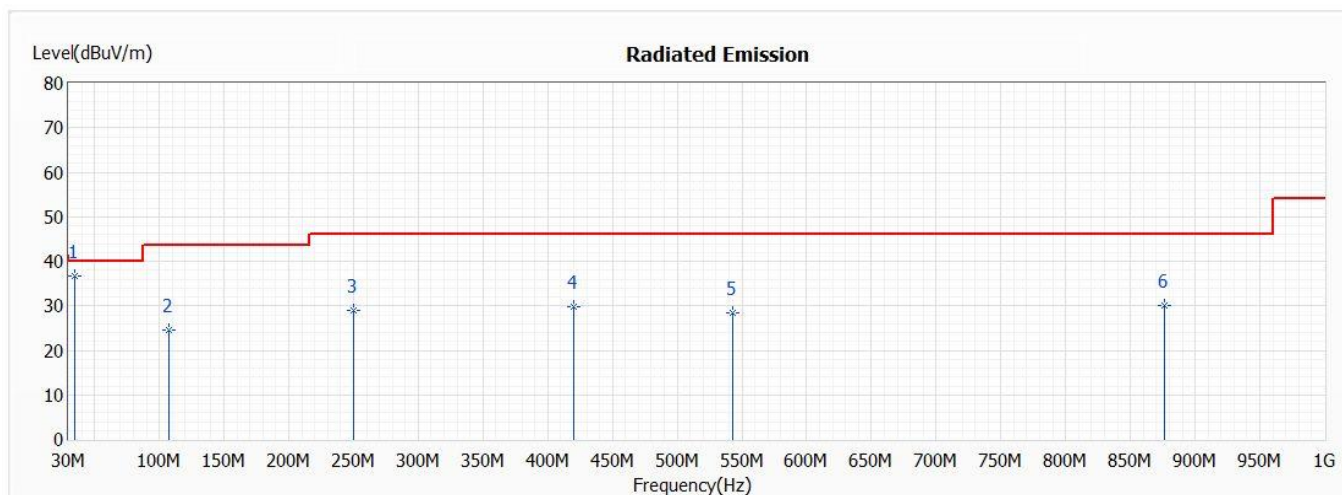


### Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product : WiFi SOM Module  
 Test Item : General Radiated Emission  
 Test Mode : Mode 4: Transmit (802.11ac-20BW) (5785MHz)  
 Test Date : 2021/4/13

## Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	34.850	36.59	40.00	-3.41	47.78	-11.19	QP
2	107.600	24.42	43.50	-19.08	38.38	-13.96	QP
3	250.190	28.96	46.00	-17.04	40.25	-11.29	QP
4	419.940	29.74	46.00	-16.26	36.91	-7.17	QP
5	543.130	28.39	46.00	-17.61	32.90	-4.51	QP
6	875.840	30.16	46.00	-15.84	29.96	0.20	QP

## Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.



#### **4. EMI Reduction Method During Compliance Testing**

No modification was made during testing.