RF TEST REPORT

Applicant	ZTE Corporation
FCC ID	SRQ-ZTEMF971V
Product	LTE Ufi
Brand	MF971V
Model	MF971V
Report No.	R1808A0375-R5
Issue Date	September 19, 2018

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 15E (2018)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Peng Tao

Performed by: Peng Tao

Kai Xu

Approved by: Kai Xu

TA Technology (Shanghai) Co., Ltd.

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TABLE OF CONTENT

Summary of measurement results

Number	Summary of measurements of results	Clause in FCC rules	Verdict
1	Average conducted output power	15.407(a)	PASS
2	Occupied bandwidth	15.407(e)	PASS
3	Frequency stability	15.407(g)	PASS
4	Maximum power spectral density	15.407(a)	PASS
5	Unwanted Emissions	15.407(b)	PASS
6	Conducted Emissions	15.207	PASS
Date of Testing: August 16, 2018 ~ September 17, 2018			

1. Test Laboratory

1.1. Notes of the test report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2. Test facility

CNAS (accreditation number: L2264)

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

IC (recognition number is 8510A)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

VCCI (recognition number is C-4595, T-2154, R-4113, G-10766)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

1.3. Testing Location

Company:	TA Technology (Shanghai) Co., Ltd.
Address:	No.145, Jintang Rd, Tangzhen Industry Park, Pudong
City:	Shanghai
Post code:	201201
Country:	P. R. China
Contact:	Xu Kai
Telephone:	+86-021-50791141/2/3
Fax:	+86-021-50791141/2/3-8000
Website:	http://www.ta-shanghai.com
E-mail:	xukai@ta-shanghai.com

2. General Description of Equipment under Test

Client Information

Applicant	ZTE Corporation
Applicant address	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China
Manufacturer	ZTE Corporation
Manufacturer address	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

General information

EUT Description		
Model	MF971V	
IMEI	869626020917268	
Hardware Version	drnA	
Software Version	BD_MF971VV1.0.0B05	
Power Supply	Battery/AC adapter	
Antenna Type	Internal Antenna	
Antenna Gain	Antenna 1 5150MHz: 0.91dBi 5200MHz: 0.97 dBi 5250MHz: 1.25 dBi 5750MHz: 1.35 dBi 5800MHz: 1.25 dBi 5850MHz: 1.18 dBi	Antenna 2 5150MHz: 1.21 dBi 5200MHz: 1.35 dBi 5250MHz: 0.94 dBi 5750MHz: 1.49 dBi 5800MHz: 1.32 dBi 5850MHz: 1.58 dBi
additional beamforming gain	NA	
Test Mode(s)	U-NII-1(5150MHz-5250MHz) U-NII-3(5725MHz-5850MHz)	
Modulation Type	802.11a/n (HT20/HT40): OFDM 802.11ac (VHT20/VHT40/VHT80): OFDM	
Max. Conducted Power	16.36 dBm	
Operating Frequency Range(s)	U-NII-1: 5150-5250MHz U-NII-3: 5725-5850MHz	
Operating temperature range:	-10 ° C to 55° C	
Operating voltage range:	3.5 to 4.3 V	
State AC voltage:	3.8V	

EUT Accessory	
Adapter 1	Manufacturer: SHENZHEN RUIJING INDUSTRIAL CO LTD Model: STC-A51A-Z
Adapter 2	Manufacturer: Jiangsu Chenyang Electron Co., Ltd. Model: STC-A51A-Z
Battery	Manufacturer: Zhongshan Tianmao Battery Co.,Ltd Model: Li3820T43P3h715345
USB Cable	98cm Cable, Shielded
Note: The information of the EUT is declared by the manufacturer.	

3. Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC CFR47 Part 15E (2018) Unlicensed National Information Infrastructure Devices

ANSI C63.10 (2013)

KDB 789033 D02 General UNII Test Procedures New Rules v02r01

KDB 662911 D01 Multiple Transmitter Output v02r01

4. Test Configuration

Test Mode

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the worst case was recorded.

In order to find the worst case condition, Pre-tests are needed at the presence of different data rate. Preliminary tests have been done on all the configuration for confirming worst case. Data rate below means worst-case rate of each test item.

Worst-case data rates are shown as following table.

Band	Data Rate		
	Antenna 1	**Antenna 2**	**MIMO**
802.11a	6 Mbps	6 Mbps	/
802.11n HT20	/	/	MCS0
802.11n HT40	/	/	MCS0
802.11ac VHT20	/	/	MCS0
802.11ac VHT40	/	/	MCS0
802.11ac VHT80	/	/	MCS0

The worst case Antenna mode for each of the following tests for Wi-Fi:

Test Cases	Antenna 1	Antenna 2	MIMO
Average conducted output power	802.11a	802.11a	802.11n HT20/40 802.11ac VHT20/40/80
Occupied bandwidth	802.11a	--	802.11n HT20/40 802.11ac VHT20/40/80
Frequency stability	802.11a	--	--
Power Spectral Density	802.11a	802.11a	802.11n HT20/40 802.11ac VHT20/40/80
Unwanted Emissions	802.11a	--	802.11n HT20/40 802.11ac VHT20/40/80
Conducted Emissions	802.11a	--	802.11n HT20/40 802.11ac VHT20/40/80
Note：“O”: test all bands			

According to RF Output power results in chapter 5.1, MIMO Antenna 1 was selected as the worst antenna for 802.11n HT20/40, 802.11ac VHT20/40/80. SISO Antenna 1 was selected as the worst SISO antenna for 802.11a.

Wireless Technology and Frequency Range

Wireless Technology		Bandwidth	Channel	Frequency
Wi-Fi	U-NII-1	20 MHz	36	5180MHz
			40	5200MHz
			44	5220MHz
			48	5240MHz
		40 MHz	38	5190MHz
			46	5230MHz
		80 MHz	42	5210MHz
	U-NII-3	20 MHz	149	5745MHz
			153	5765MHz
			157	5785MHz
			161	5805MHz
			165	5825MHz
		40 MHz	151	5755MHz
			159	5795MHz
		80 MHz	155	5775MHz
Does this device support TPC Function? ☐Yes ☒No				
Does this device support TDWR Band? ☐Yes ☒No				

5. Test Case Results

5.1. Occupied Bandwidth

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable.

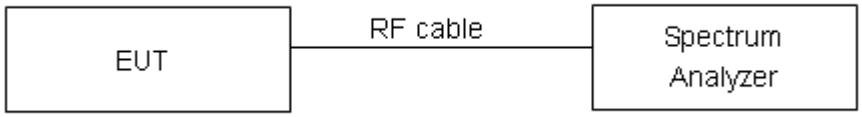
For U-NII-1/U-NII-2A/U-NII-2C, set RBW ≈1% OCB kHz, VBW ≥ 3 × RBW, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 26 dB relative to the maximum level measured in the fundamental emission.

For U-NII-3, Set RBW = 100 kHz, VBW ≥ 3 × RBW, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

Use the 99 % power bandwidth function of the instrument

Test Setup



Limits

Rule FCC Part §15.407(e)

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 936 Hz.

Test Results:

U-NII-1

SISO Antenna 1

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11a	5180	16.227	19.72	PASS
	5200	16.223	19.49	PASS
	5240	16.240	18.48	PASS

MIMO Antenna 1

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11n HT20	5180	17.388	19.70	PASS
	5200	17.412	19.87	PASS
	5240	17.405	19.37	PASS
802.11n HT40	5190	35.727	39.87	PASS
	5230	35.868	43.60	PASS
802.11ac VHT20	5180	17.398	19.72	PASS
	5200	17.402	19.82	PASS
	5240	17.413	19.77	PASS
802.11ac VHT40	5190	35.825	40.71	PASS
	5230	35.845	42.76	PASS
802.11ac VHT80	5210	75.072	82.46	PASS

U-NII-3

SISO Antenna 1

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 6 dB bandwidth (MHz)	Limit (kHz)	Conclusion
802.11a	5745	16.239	15.35	500	PASS
	5785	16.219	15.34	500	PASS
	5825	16.234	15.29	500	PASS

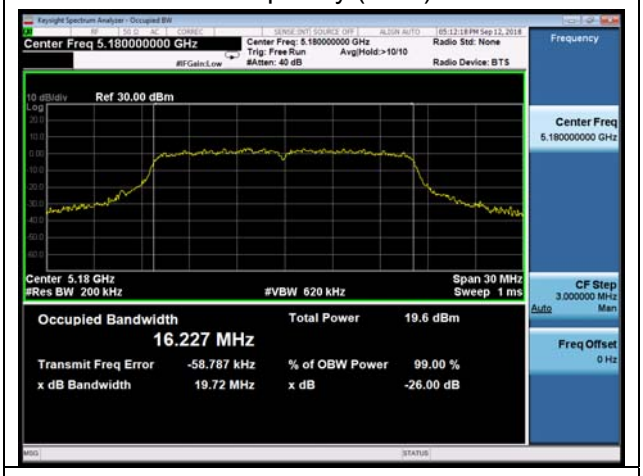
MIMO Antenna 1

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 6 dB bandwidth (MHz)	Limit (kHz)	Conclusion
802.11n HT20	5745	17.387	14.15	500	PASS
	5785	17.385	15.11	500	PASS
	5825	17.381	15.13	500	PASS
802.11n HT40	5755	35.797	35.07	500	PASS
	5795	35.751	33.91	500	PASS
802.11ac VHT20	5745	17.379	14.73	500	PASS
	5785	17.368	15.39	500	PASS
	5825	17.383	14.22	500	PASS
802.11ac VHT40	5755	35.837	35.14	500	PASS
	5795	35.782	35.14	500	PASS
802.11ac VHT80	5775	74.964	73.89	500	PASS

SISO Antenna 1

U-NII-1, 802.11a

Carrier frequency (MHz): 5180



U-NII-1, 802.11a

Carrier frequency (MHz): 5200

U-NII-1, 802.11a

Carrier frequency (MHz):5240

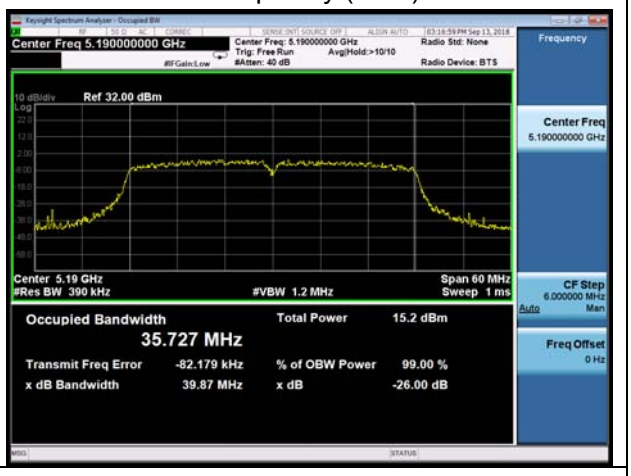
MIMO Antenna 1

U-NII-1, 802.11n HT20

Carrier frequency (MHz): 5180

U-NII-1, 802.11n HT40

Carrier frequency (MHz): 5190



U-NII-1, 802.11n HT20

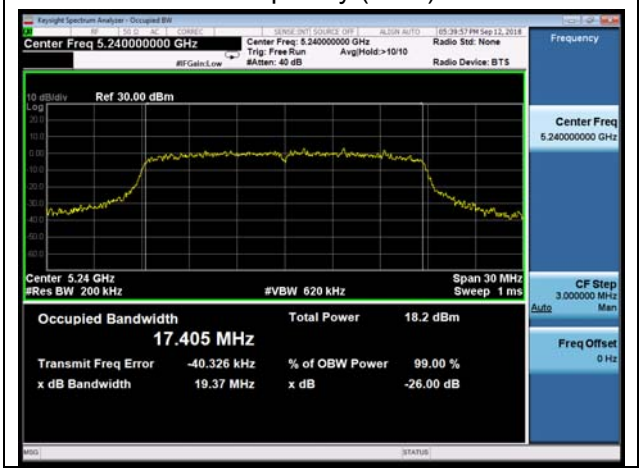
Carrier frequency (MHz): 5200

U-NII-1, 802.11n HT40

Carrier frequency (MHz): 5230

U-NII-1, 802.11n HT20

Carrier frequency (MHz):5240



U-NII-1, 802.11ac VHT20
Carrier frequency (MHz): 5180

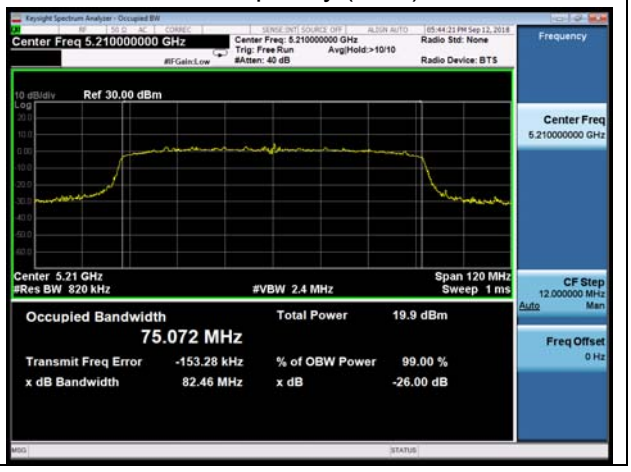
U-NII-1, 802.11ac VHT40
Carrier frequency (MHz): 5190

U-NII-1, 802.11ac VHT20
Carrier frequency (MHz): 5200

U-NII-1, 802.11ac VHT40
Carrier frequency (MHz): 5230

U-NII-1, 802.11ac VHT20
Carrier frequency (MHz):5240

U-NII-1, 802.11ac VHT80
Carrier frequency (MHz): 5210

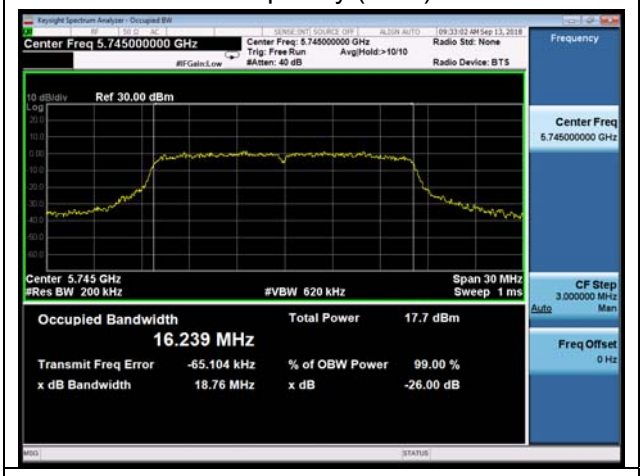


99% bandwidth

SISO Antenna 1

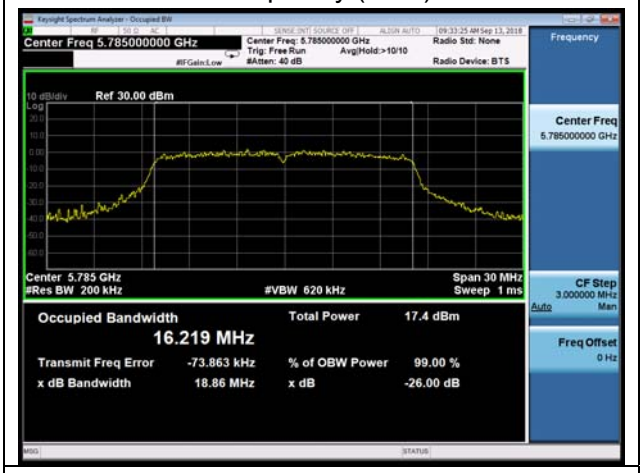
U-NII-3, 802.11a

Carrier frequency (MHz): 5745



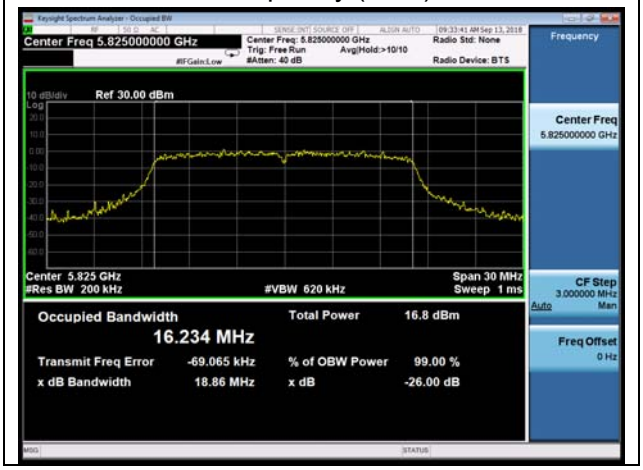
U-NII-3, 802.11a

Carrier frequency (MHz): 5785



U-NII-3, 802.11a

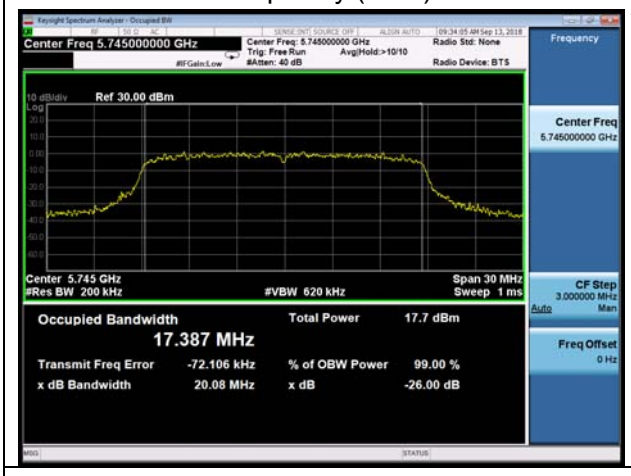
Carrier frequency (MHz): 5825



MIMO Antenna 1

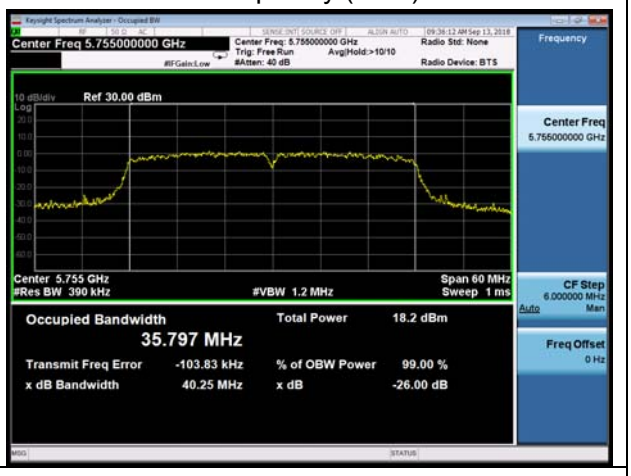
U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5745



U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5755

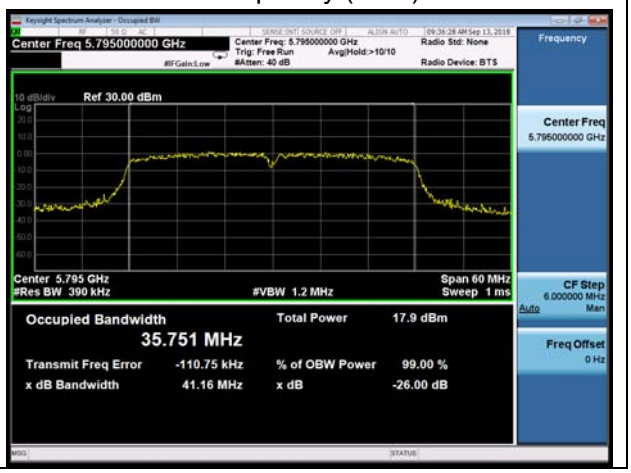


U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5785

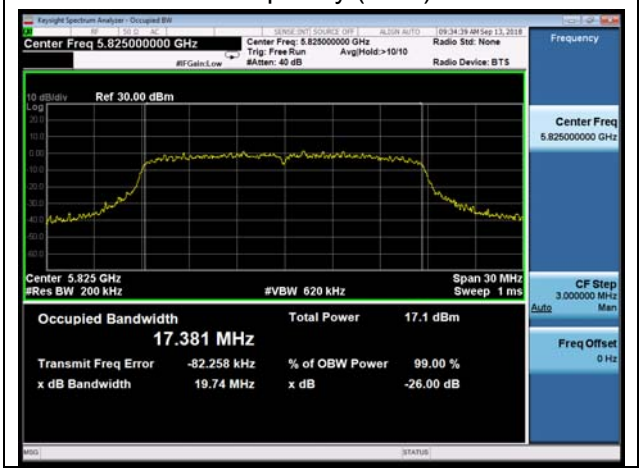
U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5795

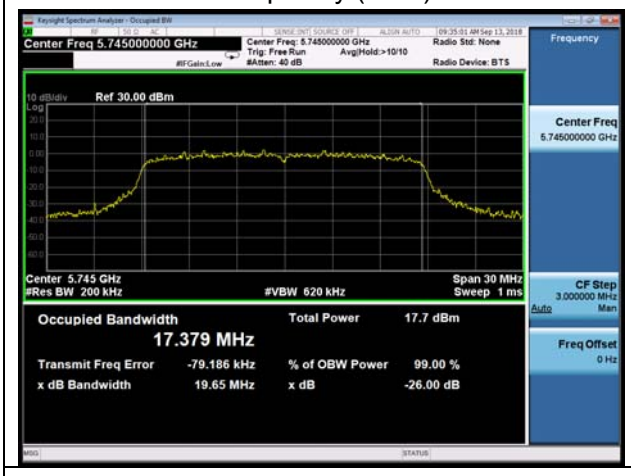


U-NII-3, 802.11n HT20

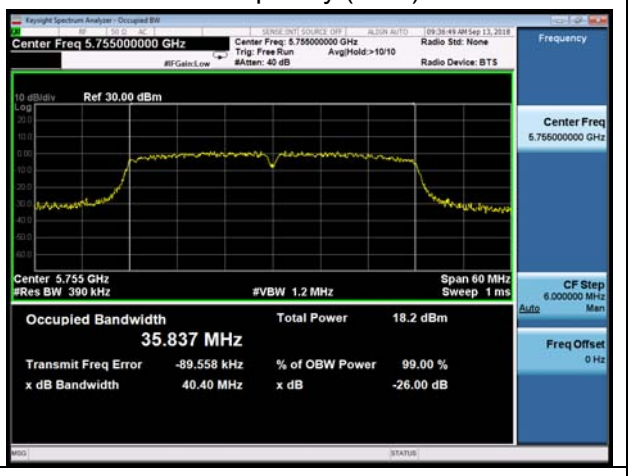
Carrier frequency (MHz): 5825



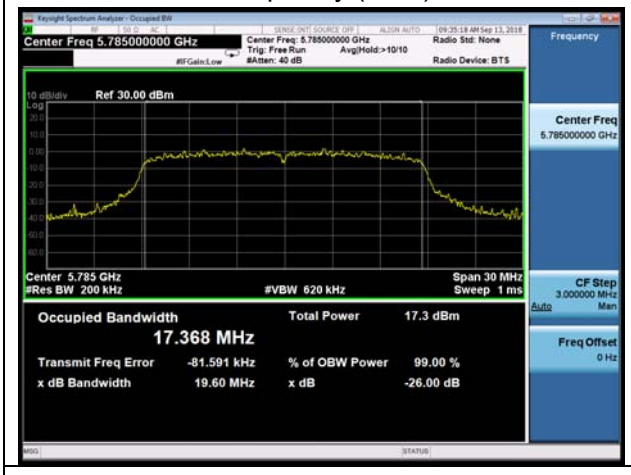
U-NII-3, 802.11ac VHT20
Carrier frequency (MHz): 5745



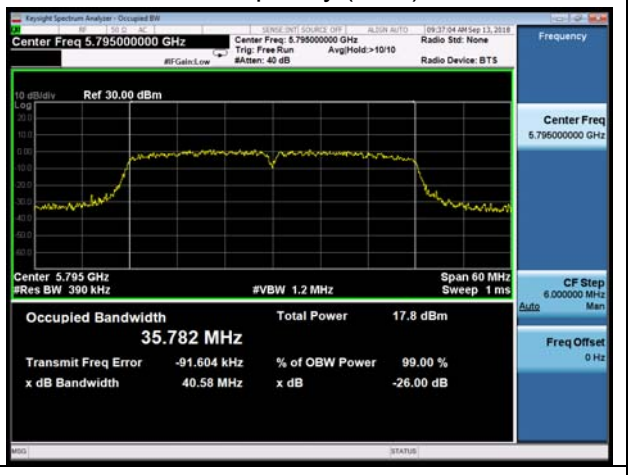
U-NII-3, 802.11ac VHT40
Carrier frequency (MHz): 5755



U-NII-3, 802.11ac VHT20
Carrier frequency (MHz): 5785



U-NII-3, 802.11ac VHT40
Carrier frequency (MHz): 5795



U-NII-3, 802.11ac VHT20
Carrier frequency (MHz): 5825

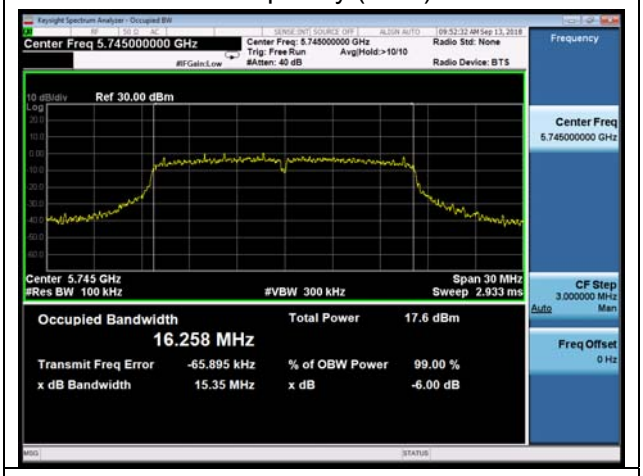
U-NII-3, 802.11ac VHT80
Carrier frequency (MHz): 5775

Minimum 6 dB bandwidth

SISO Antenna 1

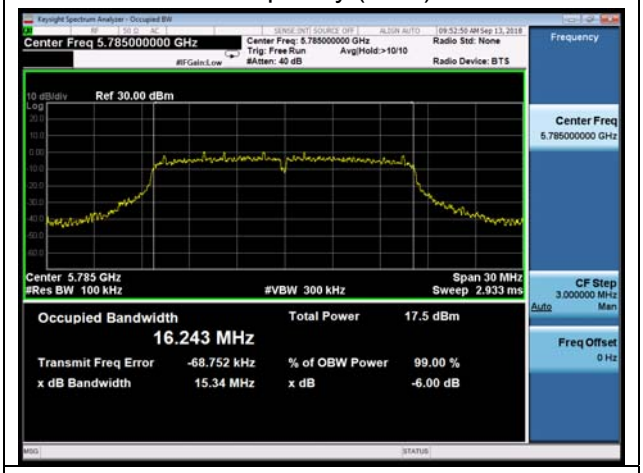
U-NII-3, 802.11a

Carrier frequency (MHz): 5745



U-NII-3, 802.11a

Carrier frequency (MHz): 5785



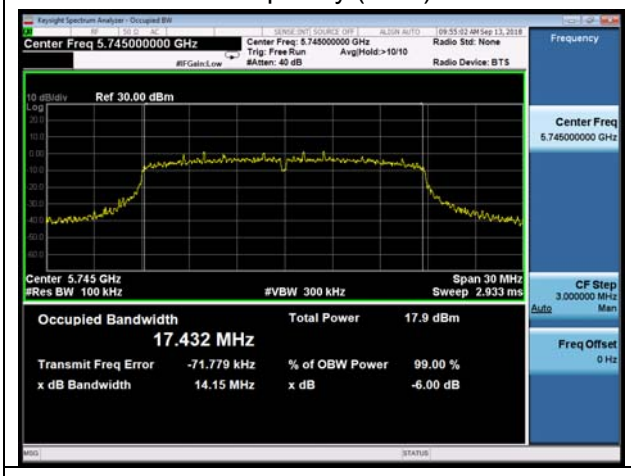
U-NII-3, 802.11a

Carrier frequency (MHz): 5825

MIMO Antenna 1

U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5745



U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5755

U-NII-3, 802.11n HT20

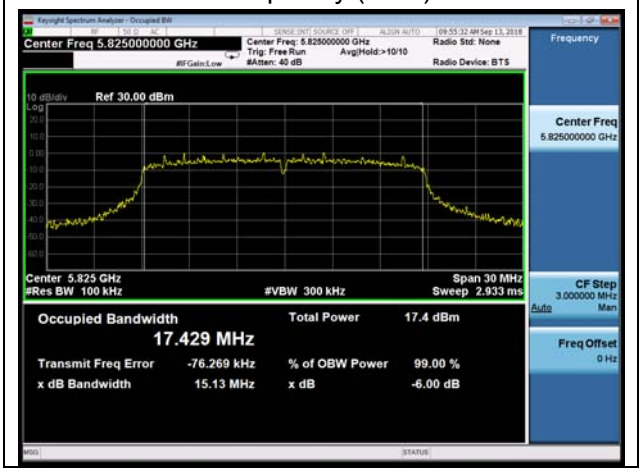
Carrier frequency (MHz): 5785

U-NII-3, 802.11n HT40

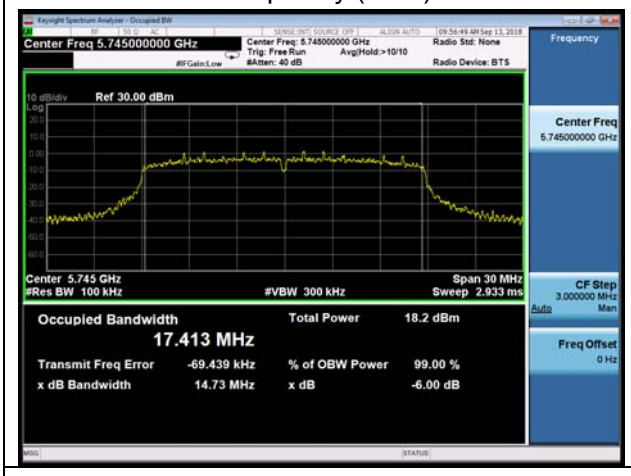
Carrier frequency (MHz): 5795

U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5825



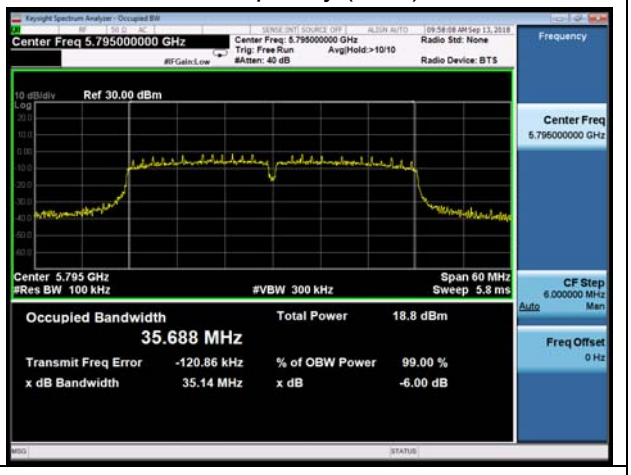
U-NII-3, 802.11ac VHT20
Carrier frequency (MHz): 5745



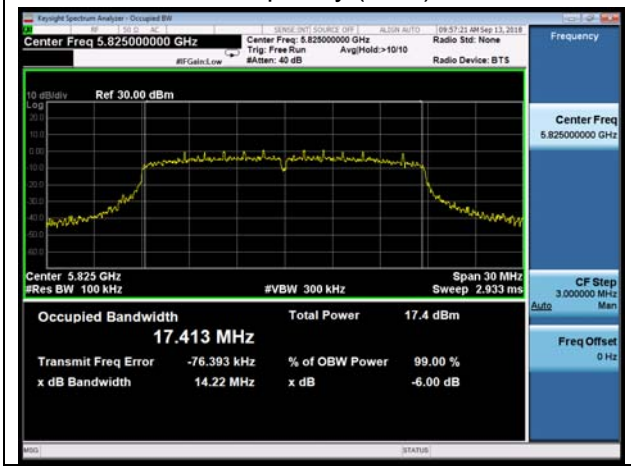
U-NII-3, 802.11ac VHT40
Carrier frequency (MHz): 5755

U-NII-3, 802.11ac VHT20
Carrier frequency (MHz): 5785

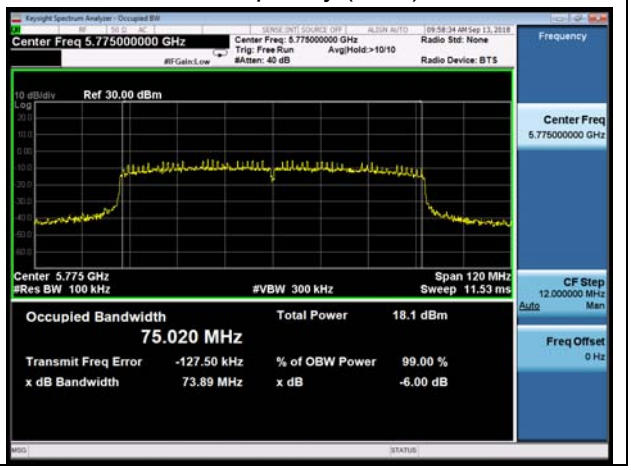
U-NII-3, 802.11ac VHT40
Carrier frequency (MHz): 5795



U-NII-3, 802.11ac VHT20
Carrier frequency (MHz): 5825



U-NII-3, 802.11ac VHT80
Carrier frequency (MHz): 5775



5.2. Average Power Output –Conducted

Ambient condition

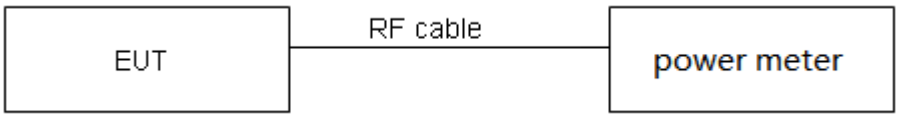
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

During the process of the testing, The EUT was connected to the average power meter through an external attenuator and a known loss cable. The EUT is max power transmission with proper modulation. We use Maximum average Conducted Output Power Level Method in KDB789033 for this test

The conducted Power is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically.

Test Setup



Limits

Rule FCC Part 15.407(a)(1)(2)(3)
(1) 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. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density 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, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density 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. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. 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 or maximum power spectral density. 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 and maximum power spectral density 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 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, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) 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 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3)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, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 0.44 dB.

Test Results

Band	T_{on} (ms)	$T_{(on+off)}$ (ms)	Duty cycle	Duty cycle correction Factor(dB)
802.11a	2.06	2.16	0.96	0.20
802.11n HT20	1.92	2.02	0.95	0.21
802.11n HT40	0.95	1.04	0.91	0.42
802.11ac VHT20	1.93	2.02	0.95	0.21
802.11ac VHT40	0.95	1.04	0.91	0.40
802.11ac VHT80	0.46	0.56	0.83	0.79
Note: when Duty cycle>0.98, Duty cycle correction Factor not required.				

SISO Antenna 1

U-NII-1

Network Standards	Channel/ Frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	Limit (dBm)	Conclusion
802.11a	36/5180	12.59	12.79	30	PASS
	40/5200	12.53	12.73	30	PASS
	48/5240	12.49	12.69	30	PASS
Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor					

U-NII-3

Network Standards	Channel/ Frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	Limit (dBm)	Conclusion
802.11a	149/5745	12.64	12.84	30	PASS
	157/5785	12.63	12.83	30	PASS
	165/5825	12.82	13.02	30	PASS
Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor					

SISO Antenna2

U-NII-1

Network Standards	Channel/ Frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	Limit (dBm)	Conclusion
802.11a	36/5180	11.99	12.19	30	PASS
	40/5200	11.97	12.17	30	PASS
	48/5240	12.03	12.23	30	PASS
Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor					

U-NII-3

Network Standards	Channel/ Frequency (MHz)	Average Power Measured (dBm)	Average Power with duty factor (dBm)	Limit (dBm)	Conclusion
802.11a	149/5745	11.86	12.06	30	PASS
	157/5785	11.96	12.16	30	PASS
	165/5825	12.07	12.27	30	PASS
Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor					

MIMO

U-NII-1

Network Standards	Channel/ Frequency (MHz)	MIMO Antenna 1		MIMO Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11n HT20	36/5180	12.64	12.85	12.21	12.42	15.65	30.00	PASS
	44/5220	12.69	12.90	12.18	12.39	15.66	30.00	PASS
	48/5240	12.73	12.94	12.23	12.44	15.71	30.00	PASS
802.11n HT40	38/5190	10.12	10.54	9.71	10.13	13.35	30.00	PASS
	46/5230	12.54	12.96	12.15	12.57	15.78	30.00	PASS
802.11ac VHT20	36/5180	12.62	12.83	12.25	12.46	15.66	30.00	PASS
	44/5220	12.68	12.89	12.14	12.35	15.64	30.00	PASS
	48/5240	12.58	12.79	12.26	12.47	15.64	30.00	PASS
802.11ac VHT40	38/5190	13.09	13.49	12.56	12.96	16.24	30.00	PASS
	46/5230	13.11	13.51	12.64	13.04	16.29	30.00	PASS
802.11ac VHT80	42/5210	11.55	12.34	11.04	11.83	15.10	30.00	PASS

Note: 1. Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor

2. For Total Power, according to KDB 662911 D01 Multiple Transmitter Output v02r01 1),

The Total Power $=10\log(10^{(\text{Power antenna1 in dBm}/10)}+10^{(\text{Power antenna2 in dBm}/10)})$

3. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain,

Directional gain = G_{ANT} + Array Gain, N_{ss}=1.

For power measurements on IEEE 802.11 devices,

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 $N_{ANT} \geq 5$.

So directional gain = G_{ANT} + Array Gain = G_{ANT} <6dBi. So the power limt is 30dBm.

U-NII-3

Network Standards	Channel/ Frequency (MHz)	MIMO Antenna 1		MIMO Antenna 2		Total Power (dBm)	Limit (dBm)	Conclusion
		Average Power Measured (dBm)	Average Power with duty factor (dBm)	Average Power Measured (dBm)	Average Power with duty factor (dBm)			
802.11n HT20	149/5745	12.87	13.08	12.19	12.40	15.77	30.00	PASS
	157/5785	12.77	12.98	12.23	12.44	15.73	30.00	PASS
	165/5825	13.02	13.23	12.32	12.53	15.91	30.00	PASS
802.11n HT40	151/5755	13.29	13.71	12.55	12.97	16.36	30.00	PASS
	159/5795	13.16	13.58	12.63	13.05	16.33	30.00	PASS
802.11ac VHT20	149/5745	12.89	13.10	12.14	12.35	15.75	30.00	PASS
	157/5785	12.83	13.04	12.25	12.46	15.77	30.00	PASS
	165/5825	12.96	13.17	12.21	12.42	15.82	30.00	PASS
802.11ac VHT40	151/5755	13.19	13.59	12.58	12.98	16.31	30.00	PASS
	159/5795	13.14	13.54	12.53	12.93	16.26	30.00	PASS
802.11ac VHT80	155/5775	11.58	12.37	10.92	11.71	15.06	30.00	PASS

Note: 1. Note: Average Power with duty factor = Average Power Measured +Duty cycle correction factor

2. For Total Power, according to KDB 662911 D01 Multiple Transmitter Output v02r01 1),

The Total Power $=10\log(10^{(\text{Power antenna1 in dBm}/10)}+10^{(\text{Power antenna2 in dBm}/10)}$

3. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain,

Directional gain = G_{ANT} + Array Gain, N_{ss}=1.

For power measurements on IEEE 802.11 devices,

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 $N_{ANT} \geq 5$.

So directional gain = G_{ANT} + Array Gain =<6dBi. So the power limt is 30dBm.

5.3. Frequency Stability

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

1. Frequency stability with respect to ambient temperature

a) Supply the EUT with a nominal ac voltage or install a new or fully charged battery in the EUT. If possible, a dummy load shall be connected to the EUT because an antenna near the metallic walls of an environmental test chamber could affect the output frequency of the EUT. If the EUT is equipped with a permanently attached, adjustable-length antenna, then the EUT shall be placed in the center of the chamber with the antenna adjusted to the shortest length possible. Turn ON the EUT and tune it to one of the number of frequencies shown in 5.6.

b) Couple the unlicensed wireless device output to the measuring instrument by connecting an antenna to the measuring instrument with a suitable length of coaxial cable and placing the measuring antenna near the EUT (e.g., 15 cm away), or by connecting a dummy load to the measuring instrument, through an attenuator if necessary.

c) Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).

d) Turn the EUT OFF and place it inside the environmental temperature chamber. For devices that have oscillator heaters, energize only the heater circuit.

e) Set the temperature control on the chamber to the highest specified in the regulatory requirements for the type of device and allow the oscillator heater and the chamber temperature to stabilize.

f) While maintaining a constant temperature inside the environmental chamber, turn the EUT ON and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.

g) Measure the frequency at each of frequencies specified in 5.6.

h) Switch OFF the EUT but do not switch OFF the oscillator heater.

i) Lower the chamber temperature by not more that 10 C, and allow the temperature inside the chamber to stabilize.

j) Repeat step f) through step i) down to the lowest specified temperature.

2. Frequency stability when varying supply voltage

Unless otherwise specified, these tests shall be made at ambient room temperature (+15 C to +25 C). An antenna shall be connected to the antenna output terminals of the EUT if possible. If the EUT is equipped with or uses an adjustable-length antenna, then it shall be fully extended.

a) Supply the EUT with nominal voltage or install a new or fully charged battery in the EUT. Turn ON the EUT and couple its output to a frequency counter or other frequency-measuring instrument.

b) Tune the EUT to one of the number of frequencies required in 5.6. Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument but is strong enough to allow measurement of the operating or fundamental frequency of the EUT).
c) Measure the frequency at each of the frequencies specified in 5.6.
d) Repeat the above procedure at 85% and 115% of the nominal supply voltage.

Limit

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 936Hz

Test Results

SISO Antenna 1

Voltage (V)	Temperature (°C)	U-NII-1 Test Results			
		5200MHz			
		1min	2min	5min	10min
3.8	-10	5200.000841	5199.992713	5199.983685	5199.980919
3.8	0	5200.010600	5199.990560	5199.975252	5199.977469
3.8	10	5200.008513	5199.984150	5199.972019	5199.975182
3.8	20	5200.003699	5199.979312	5199.970874	5199.967927
3.8	30	5200.000141	5199.973421	5199.961796	5199.960984
3.8	40	5199.999770	5199.970695	5199.956200	5199.951437
3.8	50	5199.990457	5199.967831	5199.953356	5199.947302
3.8	55	5199.981231	5199.967455	5199.945511	5199.940877
3.5	20	5199.974400	5199.958622	5199.939138	5199.932539
4.3	20	5199.970958	5199.956127	5199.933743	5199.931947
MHz		-0.029042	-0.043873	-0.066257	-0.068053
PPM		-5.584905	-8.437200	-12.741801	-13.087077

Voltage (V)	Temperature (°C)	U-NII-3 Test Results			
		5785MHz			
		1min	2min	5min	10min
3.8	-10	5784.992747	5784.984787	5784.979956	5784.978598
3.8	0	5784.990032	5784.983672	5784.972002	5784.974098
3.8	10	5784.988153	5784.978045	5784.965916	5784.973915
3.8	20	5784.980017	5784.968879	5784.957298	5784.965692
3.8	30	5784.972796	5784.959849	5784.954988	5784.958985
3.8	40	5784.970484	5784.954051	5784.947821	5784.958686
3.8	50	5784.962985	5784.950839	5784.943897	5784.952774
3.8	55	5784.961661	5784.949069	5784.937314	5784.945314
3.5	20	5784.958955	5784.940217	5784.931138	5784.939187
4.3	20	5784.958705	5784.933897	5784.925806	5784.935922
MHz		-0.041295	-0.066103	-0.074194	-0.064078
PPM		-7.138326	-11.426667	-12.825169	-11.076644

5.4. Power Spectral Density

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

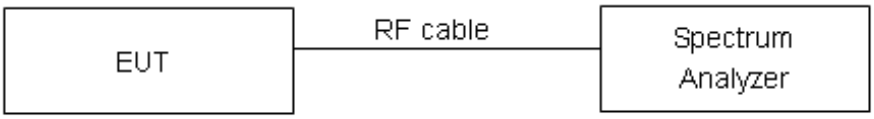
The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable.

Set RBW = 500 kHz, VBW =1.5MHz for the band 5.725-5.85 GHz

Set RBW = 1 MHz, VBW =3MHz for the band 5.150-5.250 GHz

The conducted PSD is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically.

Test setup



Limits

Rule FCC Part 15.407(a)(1)/ Part 15.407(a)(2) / Part 15.407(a)(3)
For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density 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 power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density 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 power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmittingantennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Frequency Bands/MHz	Limits
5150-5250	17/MHz
5.25-5.35 GHz and 5.47-5.725 GHz	11dBm/MHz
5725-5850	30dBm/500kHz

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U= 0.75dB.

Test Results:

Note: Power Spectral Density =Read Value+Duty cycle correction factor

SISO Antenna 1

U-NII-1

Network Standards	Channel Number	Read Value (dBm /MHz)	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	36	0.97	1.16	17	PASS
	40	1.16	1.35	17	PASS
	48	1.39	1.59	17	PASS

U-NII-3

Network Standards	Channel Number	Read Value (dBm/500kHz)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Conclusion
802.11a	149	-0.96	-0.77	30	PASS
	157	-1.31	-1.12	30	PASS
	165	-1.48	-1.28	30	PASS

SISO Antenna 2

U-NII-1

Network Standards	Channel Number	Read Value (dBm /MHz)	Power Spectral Density (dBm /MHz)	Limit (dBm /MHz)	Conclusion
802.11a	36	0.93	1.13	17	PASS
	40	0.87	1.07	17	PASS
	48	0.65	0.85	17	PASS

U-NII-3

Network Standards	Channel Number	Read Value (dBm/500kHz)	Power Spectral Density (dBm/500kHz)	Limit (dBm/500kHz)	Conclusion
802.11a	149	-1.95	-1.76	30	PASS
	157	-1.82	-1.62	30	PASS
	165	-2.30	-2.10	30	PASS

MIMO

U-NII-1

Network Standards	Channel/ Frequency (MHz)	Power Spectral Density					Limit (dBm /MHz)	Conclusion
		Antenna 1		Antenna 2		Total Power (dBm /MHz)		
		Read Value (dBm/MHz)	PSD (dBm /MHz)	Read Value (dBm/MHz)	PSD (dBm /MHz)			
802.11n HT20	36/5180	1.46	1.67	1.09	1.30	4.50	17.00	PASS
	40/5200	0.96	1.17	0.80	1.01	4.10	17.00	PASS
	48/5240	1.33	1.54	1.04	1.25	4.41	17.00	PASS
802.11n HT40	38/5190	-5.03	-4.61	-5.24	-4.83	-1.71	17.00	PASS
	46/5230	-1.12	-0.71	-1.82	-1.40	1.97	17.00	PASS
802.11ac VHT20	36/5180	1.56	1.77	0.64	0.85	4.34	17.00	PASS
	40/5200	1.39	1.60	0.69	0.90	4.28	17.00	PASS
	48/5240	1.24	1.45	0.68	0.89	4.19	17.00	PASS
802.11ac VHT40	38/5190	-1.23	-0.83	-2.00	-1.60	1.81	17.00	PASS
	46/5230	-3.55	-3.15	-1.91	-1.51	0.75	17.00	PASS
802.11ac VHT80	42/5210	-6.26	-5.47	-6.66	-5.87	-2.66	17.00	PASS

Note: 1. Power Spectral Density =Read Value+Duty cycle correction factor

2. For Total PSD, according to KDB 662911 D01 Multiple Transmitter Output v02r01 2)a),the power spectral density=10log(10(PSD antenna1 in dBm/10)+10(PSD antenna2 in dBm/10)

3. Direction gain calculation according to KDB662911 D01 Multiple Transmitter Output v02r01 F) 2) f) (ii), so direction gain = max(Gant1,Gant2) = <6dBi. So the PSD limt is 17dBm.

U-NII-3

Network Standards	Channel/ Frequency (MHz)	Power Spectral Density					Limit (dBm/ 500kHz)	Conclusion
		Antenna 1		Antenna 2		Total Power (dBm/ 500kHz)		
		Read Value (dBm/ 500kHz)	PSD (dBm/ 500kHz)	Read Value (dBm/ 500kHz)	PSD (dBm/ 500kHz)			
802.11n HT20	149/5745	-0.93	-0.72	-2.27	-2.06	1.67	30.00	PASS
	157/5785	-1.56	-1.35	-1.90	-1.68	1.50	30.00	PASS
	165/5825	-1.79	-1.58	-2.11	-1.89	1.28	30.00	PASS
802.11n HT40	151/5755	-4.06	-3.64	-4.62	-4.20	-0.90	30.00	PASS
	159/5795	-4.20	-3.78	-4.95	-4.53	-1.13	30.00	PASS
802.11ac VHT20	149/5745	-0.81	-0.59	-1.67	-1.45	2.01	30.00	PASS
	157/5785	-1.78	-1.57	-1.82	-1.61	1.42	30.00	PASS
	165/5825	-1.42	-1.20	-2.20	-1.99	1.43	30.00	PASS
802.11ac VHT40	151/5755	-4.32	-3.92	-4.68	-4.28	-1.08	30.00	PASS
	159/5795	-4.16	-3.76	-4.76	-4.35	-1.04	30.00	PASS
802.11ac VHT80	155/5775	-8.41	-7.63	-9.32	-8.54	-5.05	30.00	PASS

Note: 1. Power Spectral Density =Read Value+Duty cycle correction factor

2. For Total PSD, according to KDB 662911 D01 Multiple Transmitter Output v02r01 2)a),the power spectral density=10log(10(PSD antenna1 in dBm/10)+10(PSD antenna2 in dBm/10)

3. Direction gain calculation according to KDB662911 D01 Multiple Transmitter Output v02r01 F) 2) f) (ii), so direction gain = max(Gant1,Gant2) = <6dBi. So the PSD limt is 30dBm.

SISO Antenna 1

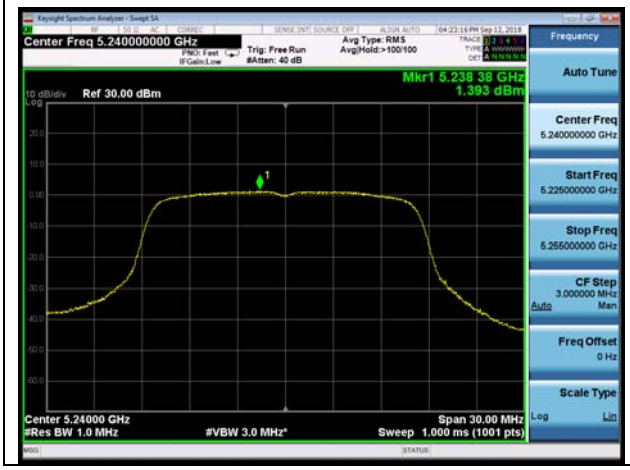
U-NII-1, 802.11a, Channel No.: 36

U-NII-3, 802.11a, Channel No.: 149

U-NII-1, 802.11a, Channel No.: 40

U-NII-3, 802.11a, Channel No.: 157

U-NII-1, 802.11a, Channel No.: 48



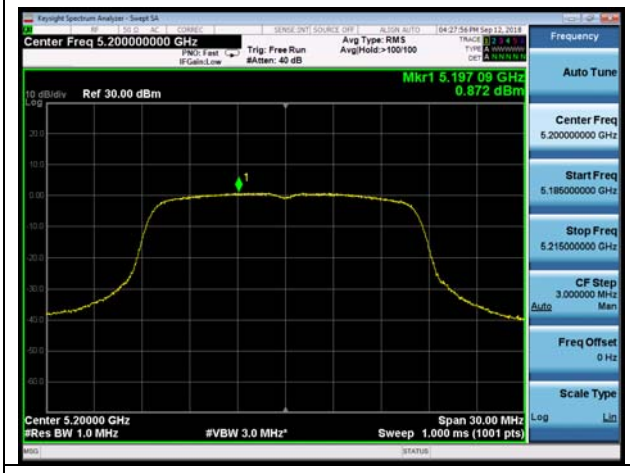
U-NII-3, 802.11a, Channel No.: 165

SISO Antenna 2

U-NII-1, 802.11a, Channel No.: 36

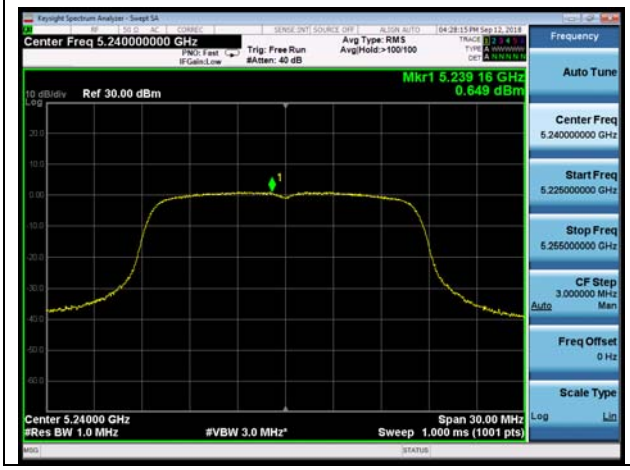
U-NII-3, 802.11a, Channel No.: 149

U-NII-1, 802.11a, Channel No.: 40



U-NII-3, 802.11a, Channel No.: 157

U-NII-1, 802.11a, Channel No.: 48



U-NII-3, 802.11a, Channel No.: 165

MIMO Antenna 1

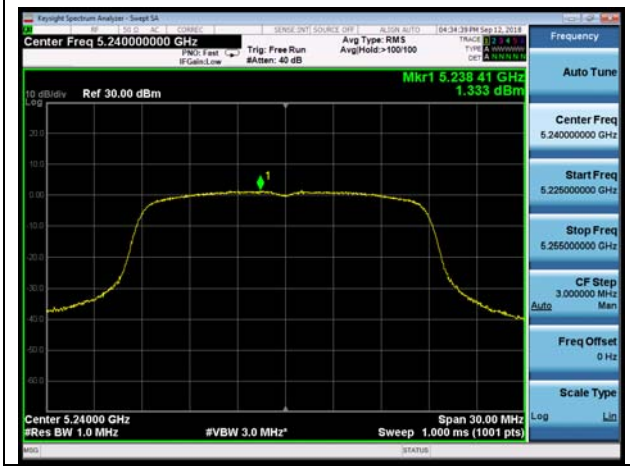
U-NII-1, 802.11n HT20, Channel No.: 36

U-NII-1, 802.11n HT40, Channel No.: 38

U-NII-1, 802.11n HT20, Channel No.: 40

U-NII-1, 802.11n HT40, Channel No.: 46

U-NII-1, 802.11n HT20, Channel No.: 48



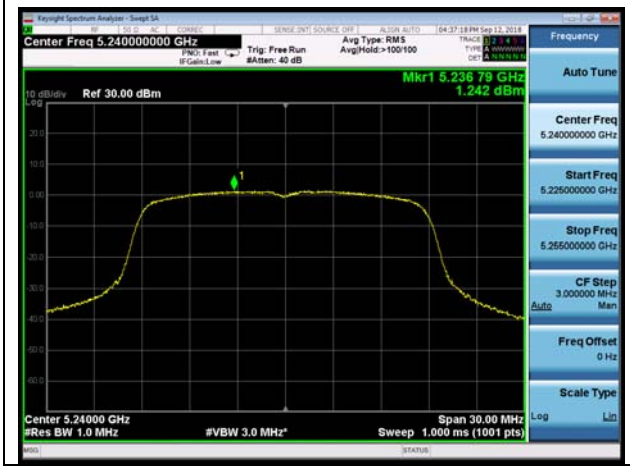
U-NII-1, 802.11ac VHT20, Channel No.: 36

U-NII-1, 802.11ac VHT40, Channel No.: 38

U-NII-1, 802.11ac VHT20, Channel No.: 40

U-NII-1, 802.11ac VHT40, Channel No.: 46

U-NII-1, 802.11ac VHT20, Channel No.: 48



U-NII-1, 802.11ac VHT80, Channel No.: 42

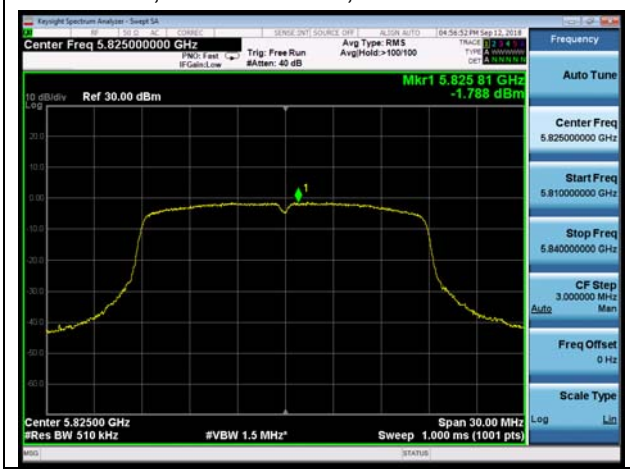
U-NII-3, 802.11n HT20, Channel No.: 149

U-NII-3, 802.11n HT40, Channel No.: 151

U-NII-3, 802.11n HT20, Channel No.: 157

U-NII-3, 802.11n HT40, Channel No.: 159

U-NII-3, 802.11n HT20, Channel No.: 165



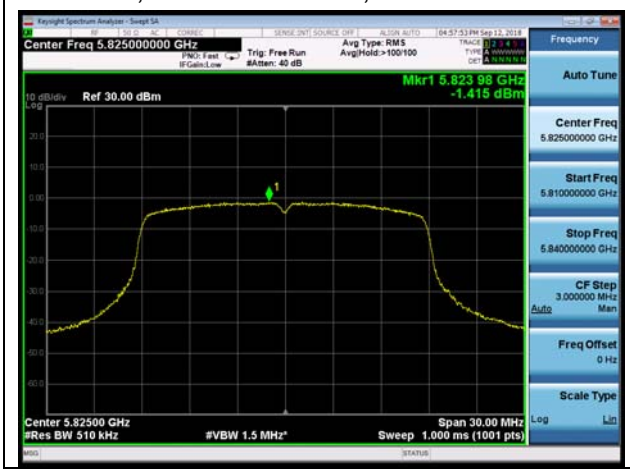
U-NII-3, 802.11ac VHT20, Channel No.: 149

U-NII-3, 802.11ac VHT40, Channel No.: 151

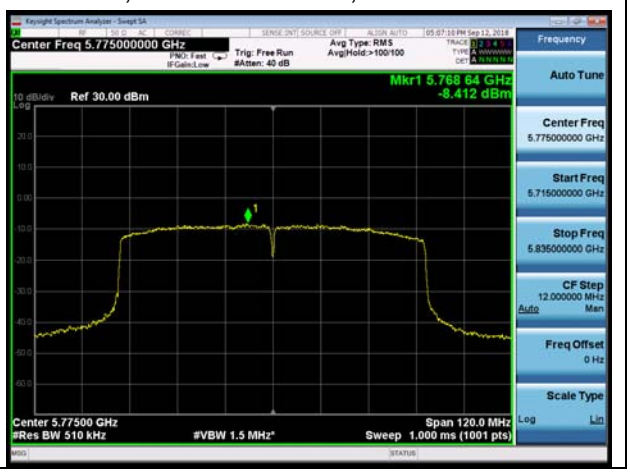
U-NII-3, 802.11ac VHT20, Channel No.: 157

U-NII-3, 802.11ac VHT40, Channel No.: 159

U-NII-3, 802.11ac VHT20, Channel No.: 165



U-NII-3, 802.11ac VHT80, Channel No.: 155



MIMO Antenna 2

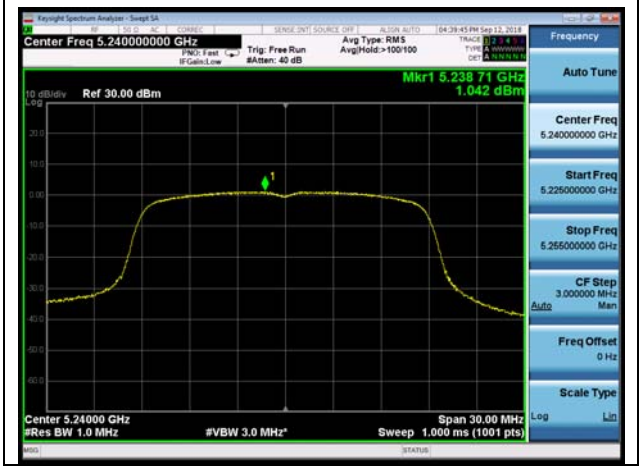
U-NII-1, 802.11n HT20, Channel No.: 36

U-NII-1, 802.11n HT40, Channel No.: 38

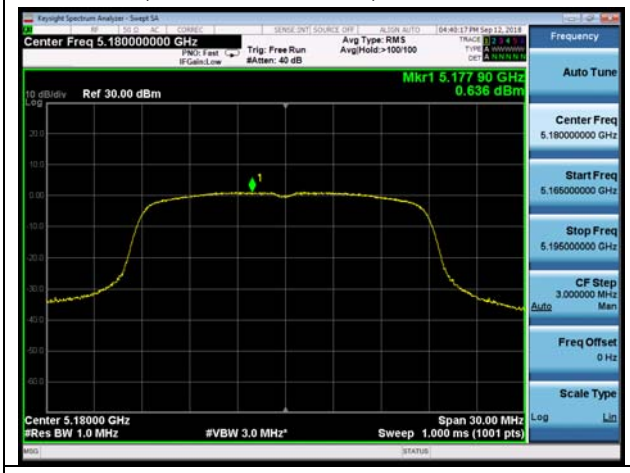
U-NII-1, 802.11n HT20, Channel No.: 40

U-NII-1, 802.11n HT40, Channel No.: 46

U-NII-1, 802.11n HT20, Channel No.: 48



U-NII-1, 802.11ac VHT20, Channel No.: 36

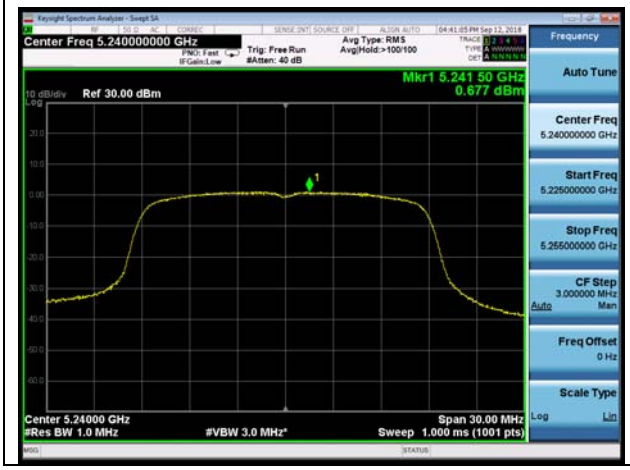


U-NII-1, 802.11ac VHT40, Channel No.: 38

U-NII-1, 802.11ac VHT20, Channel No.: 40

U-NII-1, 802.11ac VHT40, Channel No.: 46

U-NII-1, 802.11ac VHT20, Channel No.: 48



U-NII-1, 802.11ac VHT80, Channel No.: 42

U-NII-3, 802.11n HT20, Channel No.: 149

U-NII-3, 802.11n HT40, Channel No.: 151

U-NII-3, 802.11n HT20, Channel No.: 157

U-NII-3, 802.11n HT40, Channel No.: 159

U-NII-3, 802.11n HT20, Channel No.: 165

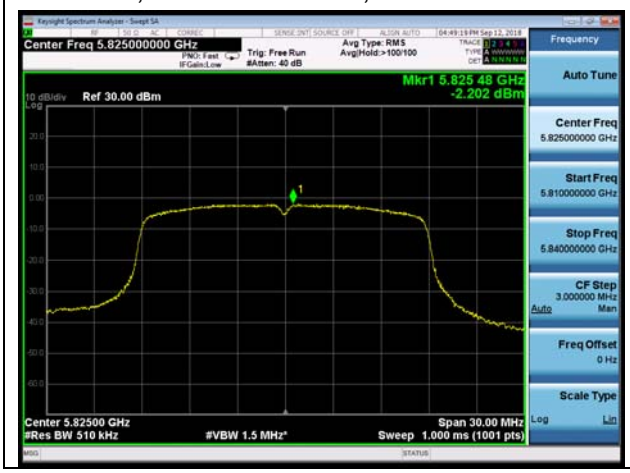
U-NII-3, 802.11ac VHT20, Channel No.: 149

U-NII-3, 802.11ac VHT40, Channel No.: 151

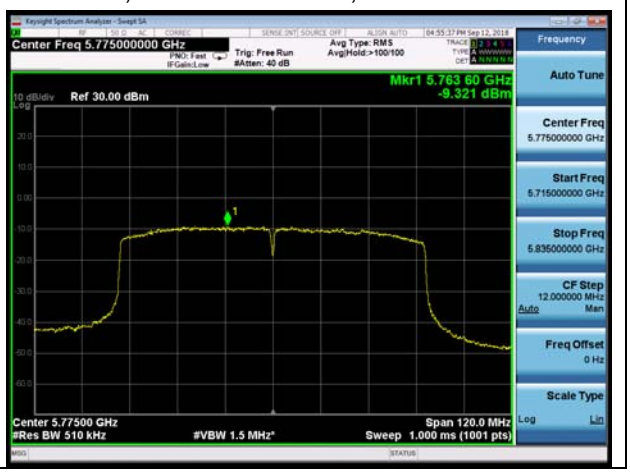
U-NII-3, 802.11ac VHT20, Channel No.: 157

U-NII-3, 802.11ac VHT40, Channel No.: 159

U-NII-3, 802.11ac VHT20, Channel No.: 165



U-NII-3, 802.11ac VHT80, Channel No.: 155



5.5. Unwanted Emission

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The test set-up was made in accordance to the general provisions of ANSI C63.10-2013. The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna. The radiated emissions measurements were made in a typical installation configuration.
Sweep the whole frequency band range from 9kHz to the 10th harmonic of the carrier, and the emissions less than 20 dB below the permissible value are reported.

During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turntable shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.
Set the spectrum analyzer in the following:
Below 1GHz (detector: Peak and Quasi-Peak)
RBW=100kHz / VBW=300kHz / Sweep=AUTO
Above 1GHz (detector: Peak):
I) Peak emission levels are measured by setting the instrument as follows:
1) RBW = 1 MHz.
2) VBW ≥ [3 × RBW]
3) Detector = peak.
4) Sweep time = auto.
5) Trace mode = max hold.
6) Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, then the time required for the trace to stabilize will increase by a factor of approximately 1 / D, where D is the duty cycle.

II) Average emission levels are measured by setting the instrument as follows:
a) RBW = 1 MHz.
b) VBW ≥ [3 × RBW].
c) Detector = RMS (power averaging), if [span / (# of points in sweep)] ≤ RBW / 2. Satisfying this condition can require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, then the detector mode shall be set to peak.
d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.)

e) Sweep time = auto.

f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of 1 / D, where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)

g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:

1) If power averaging (rms) mode was used in the preceding step e), then the correction factor is [10 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.

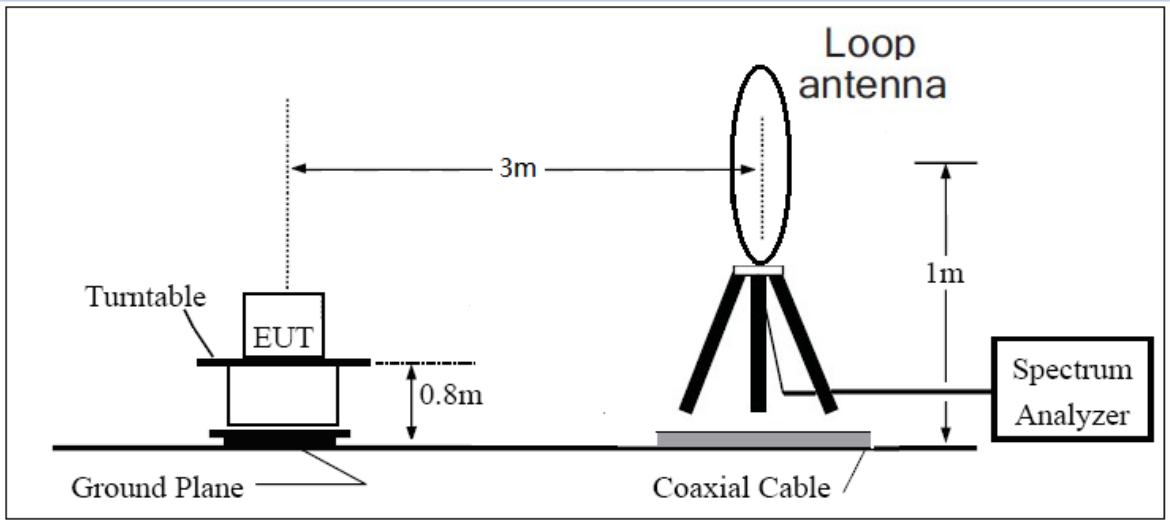
2) If linear voltage averaging mode was used in the preceding step e), then the correction factor is [20 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB shall be added to the measured emission levels.

3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

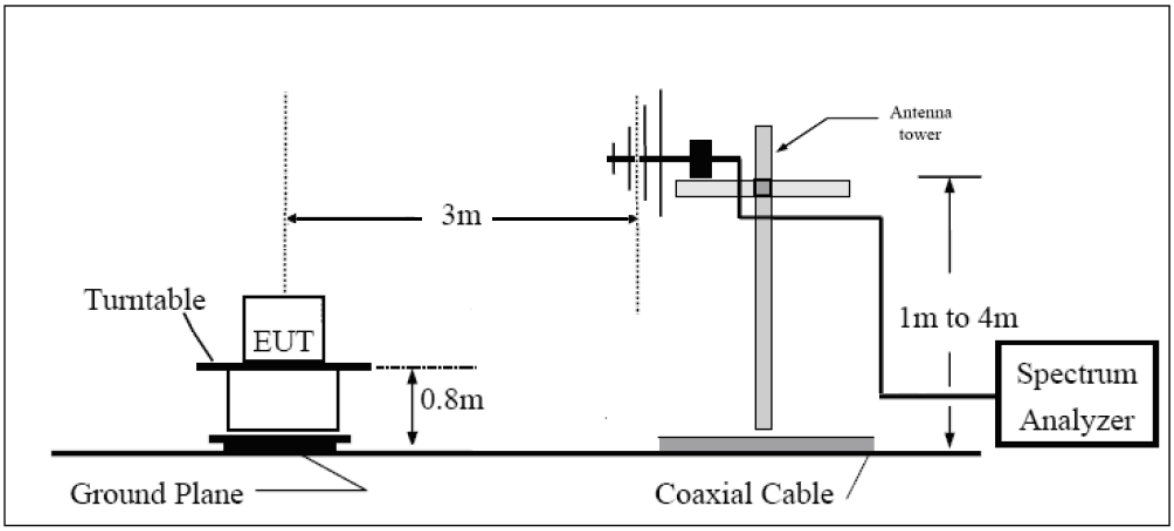
The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the antenna is vertical.

The test is in transmitting mode.

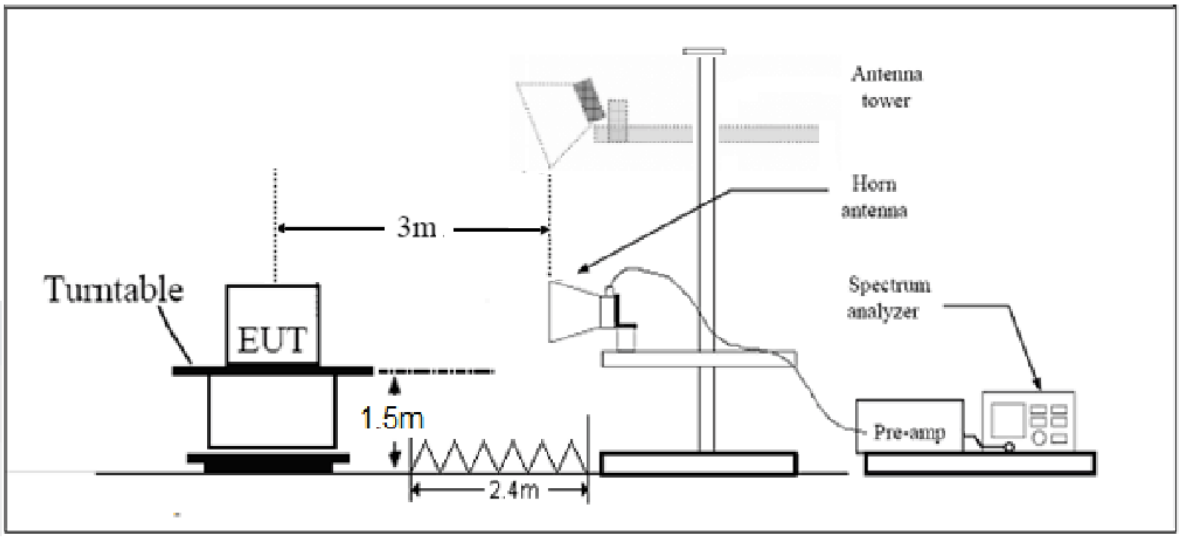
9KHz~~~30MHz



30MHz~~~ 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m

Limits

(1) For transmitters operating in the 5725-5850 MHz 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.

(2) 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(68.2dBμV/m).

(3) 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(68.2dBμV/m).

(4) 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(68.2dBμV/m).

Note: the following formula is used to convert the EIRP to field strength

§1、E[dBμV/m] = EIRP[dBm] - 20 log(d[meters]) + 104.77, where E = field strength and

d = distance at which field strength limit is specified in the rules;

§2、E[dBμV/m] = EIRP[dBm] + 95.2, for d = 3 meters

(5) Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table.

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
0.009–0.490	2400/F(kHz)	/
0.490–1.705	24000/F(kHz)	/
1.705–30.0	30	/
30-88	100	40
88-216	150	43.5
216-960	200	46
Above960	500	54

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	[2]
13.36 - 13.41			

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor *k* = 1.96.

Frequency	Uncertainty
9KHz-30MHz	3.55 dB
30MHz-200MHz	4.19 dB
200MHz-1GHz	3.63 dB
1GHz-26.5G	3.68 dB
26.5G-40GHz	4.76dB

Test Results:

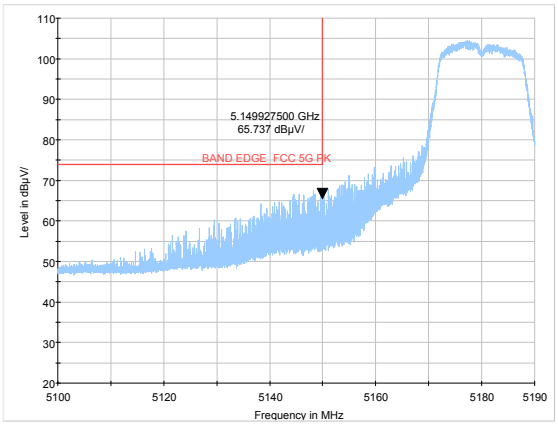
The modulation and bandwidth are similar for 802.11n mode for 20MHz/40MHz and 802.11ac mode for V20MHz/V40MHz, therefore investigated worst case to representative mode in test report.

The signal beyond the limit is carrier.

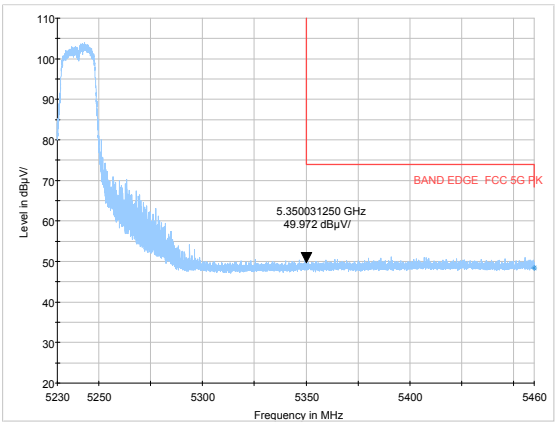
U-NII-1

SISO Antenna 1

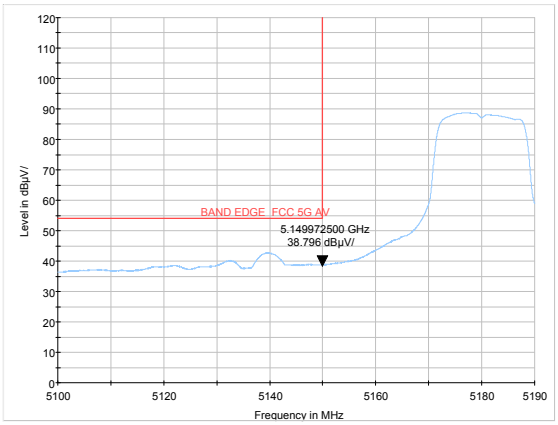
802.11a-Channel 36: Peak



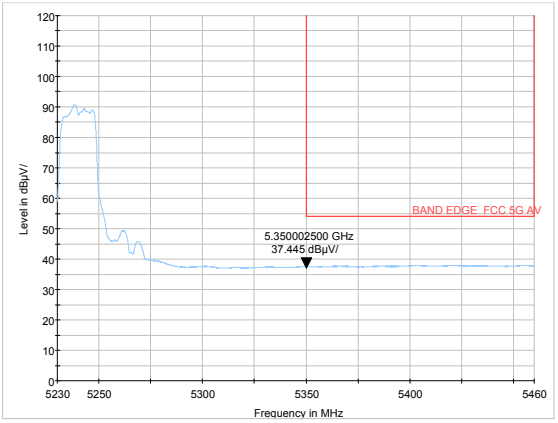
802.11a-Channel 48: Peak



802.11a-Channel 36: Average

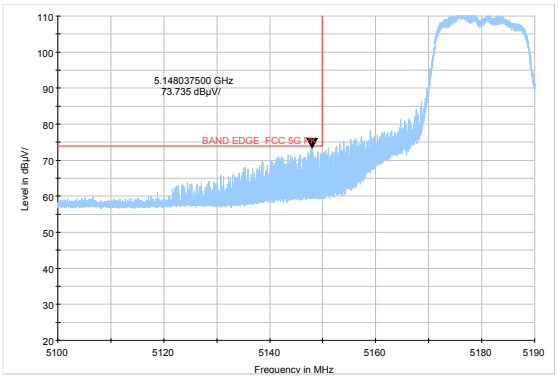


802.11a-Channel 48: Average

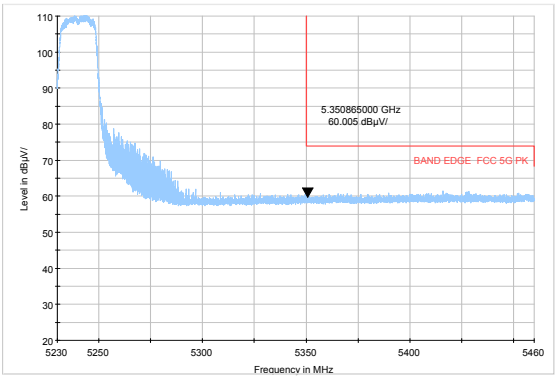


MIMO

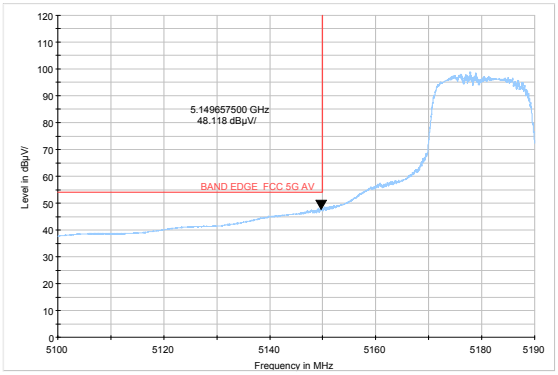
802.11n HT20-Channel 36: Peak



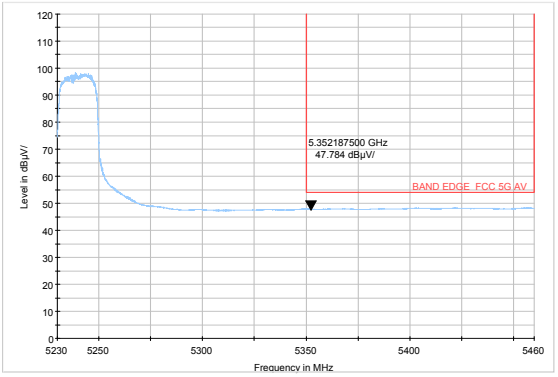
802.11n HT20-Channel 48: Peak



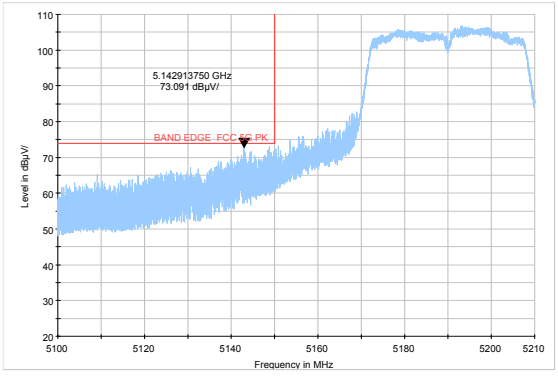
802.11n HT20-Channel 36: Average



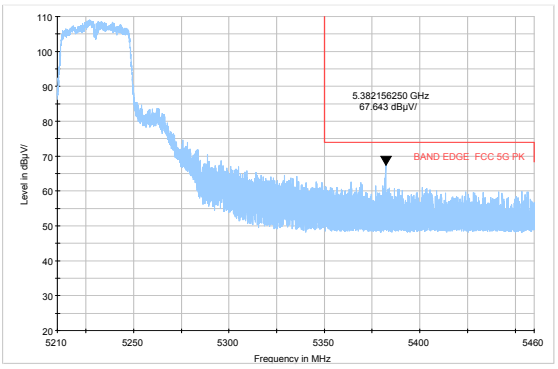
802.11n HT20-Channel 48: Average



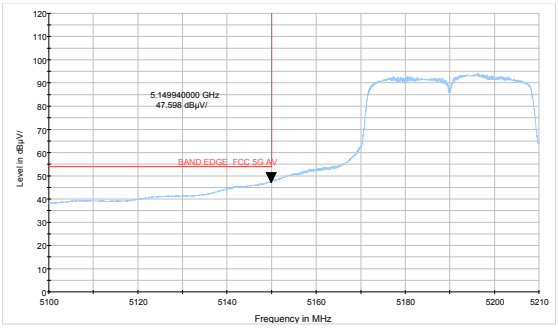
802.11n HT40-Channel 38: Peak



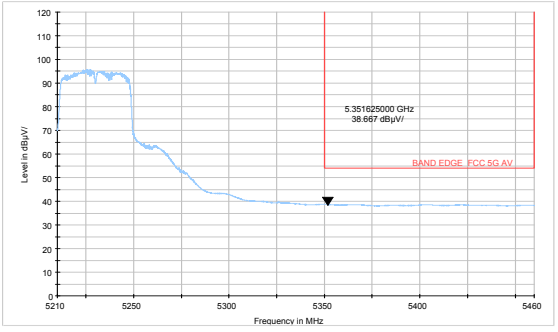
802.11n HT40-Channel 46: Peak



802.11n HT40-Channel 38: Average



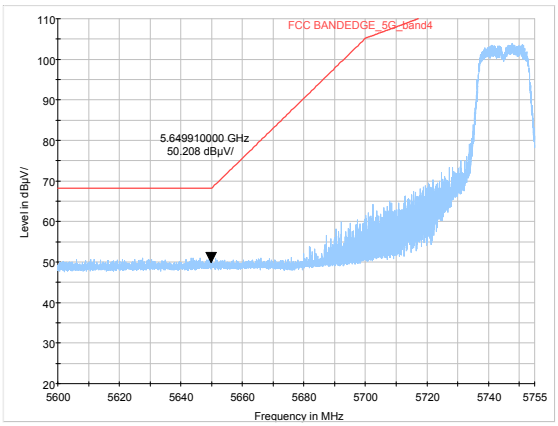
802.11n HT40-Channel 46: Average



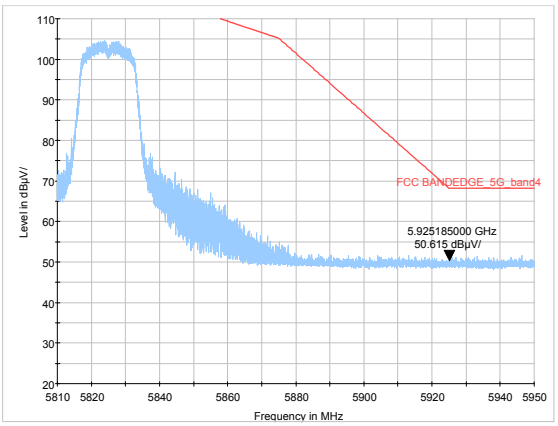
U-NII-3

SISO Antenna 1

802.11a-Channel 149: Peak

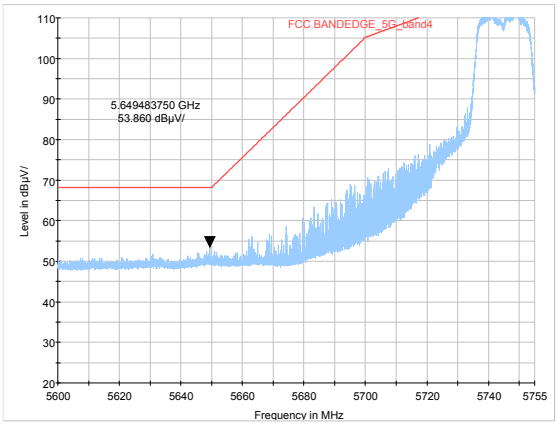


802.11a-Channel 165: Peak

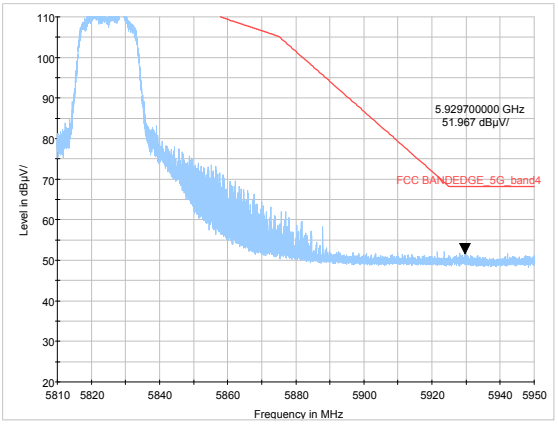


MIMO

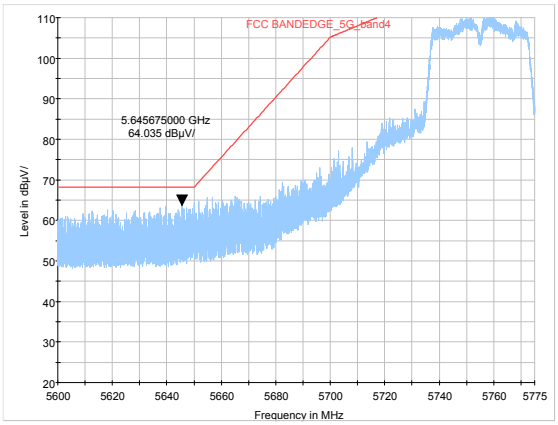
802.11n HT20-Channel 149: Peak



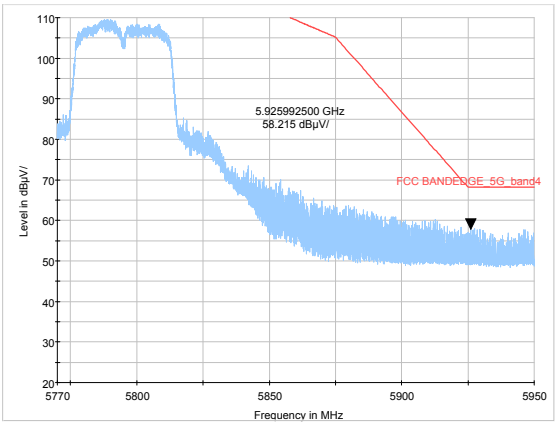
802.11n HT20-Channel 165: Peak



802.11n HT40-Channel 151: Peak



802.11n HT40-Channel 159: Peak



Result of RE

Test result

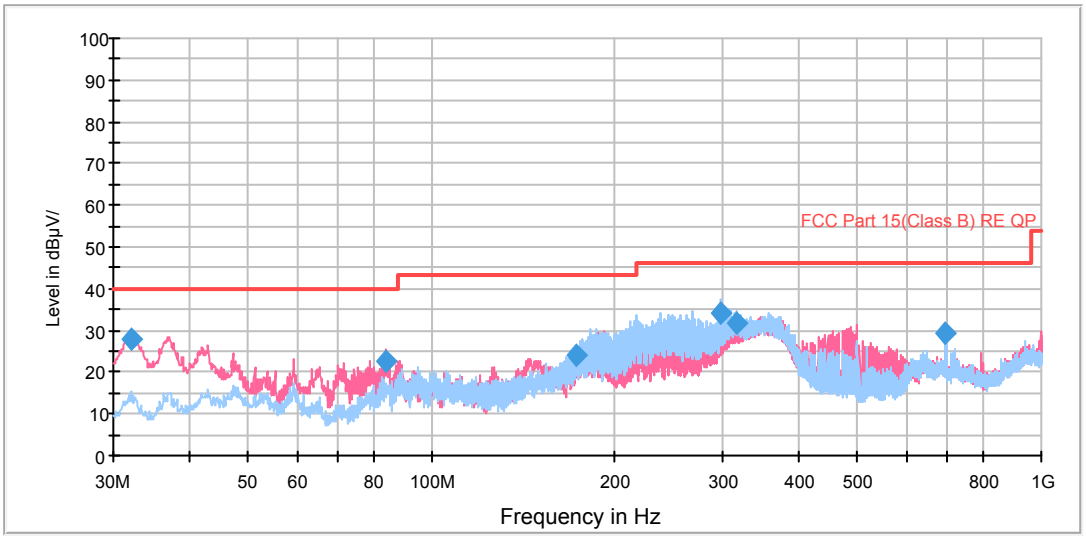
Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the Emissions in the frequency band 9kHz-30MHz and 18GHz-40GHz are more than 20dB below the limit are not reported.

After the pretest, MIMO was selected as the worst antenna. SISO Antenna 1 was selected as the worst SISO antenna.

During the test, the Radiates Emission from 30MHz to 1GHz was performed in all modes with all channels, 802.11n (HT20) CH165 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

Continuous TX mode:

RE 30M-1GHz QP



Radiates Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
32.061097	27.7	46.7	100.0	V	256.0	-19.0	12.3	40.0
83.945412	22.4	47.5	100.0	V	310.0	-25.1	17.6	40.0
172.759472	24.2	52.2	200.0	H	298.0	-28.0	19.3	43.5
298.743500	34.3	57.0	100.0	H	238.0	-22.7	11.7	46.0
315.392750	31.8	54.3	100.0	H	228.0	-22.5	14.2	46.0
697.013750	29.4	44.4	100.0	H	276.0	-15.0	16.6	46.0

Remark: 1. Quasi-Peak = Reading value + Correction factor

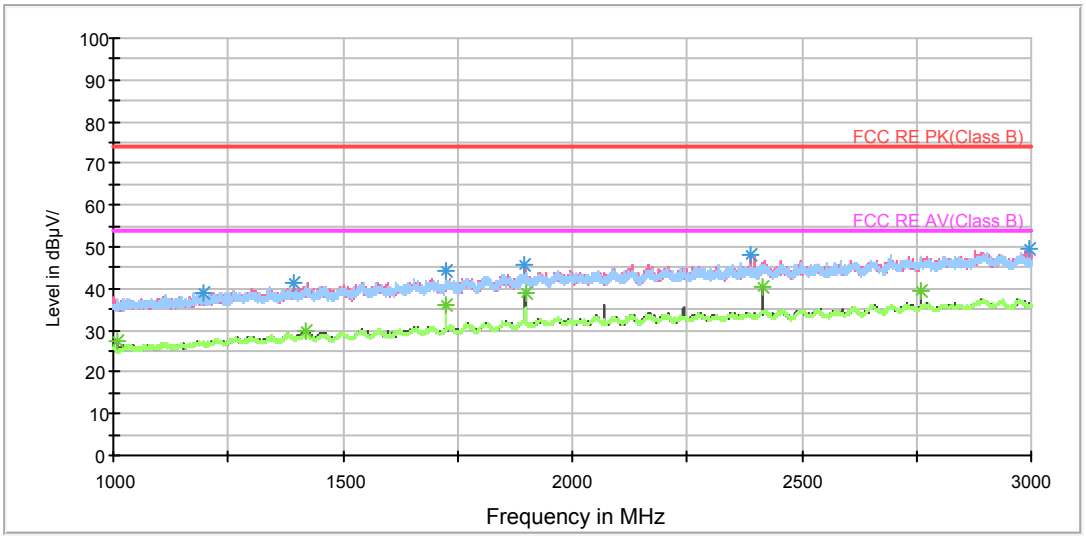
2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)

3. Margin = Limit – Quasi-Peak

SISO Antenna 1

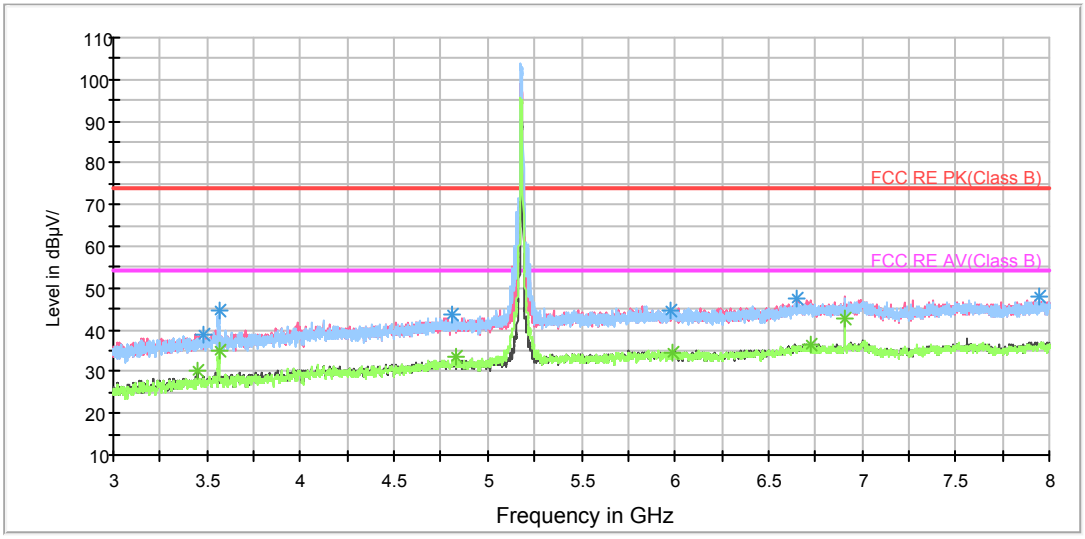
802.11a CH36

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

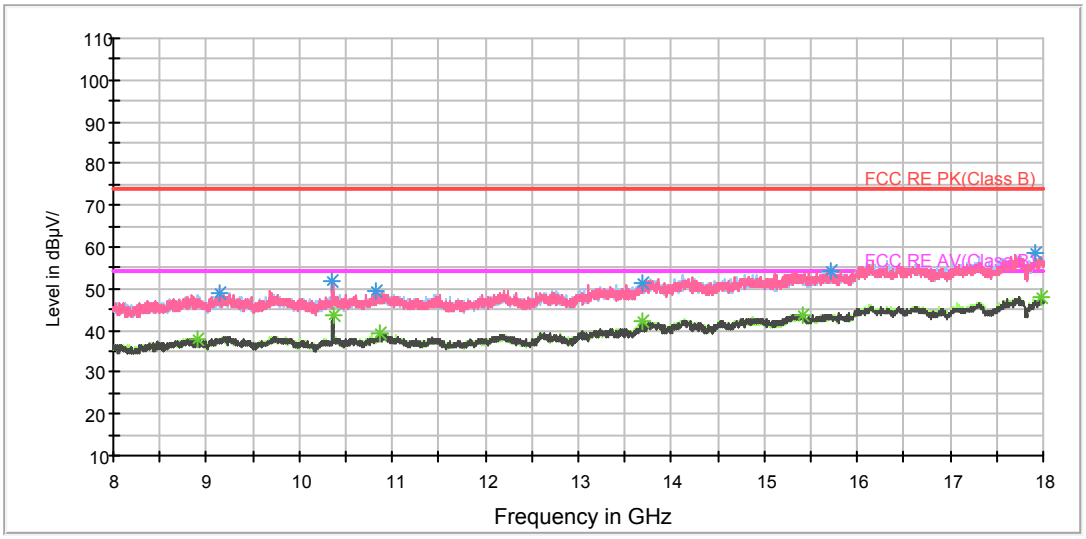
RE 3-18GHz PK+AV



Note: The signal beyond the limit is carrier.

Radiates Emission from 3GHz to 8GHz

RE 3-18GHz PK+AV



Radiates Emission from 8GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3479.375000	39.0	100.0	H	171.0	40.8	-1.8	35.0	74
3563.750000	44.7	100.0	H	326.0	46.2	-1.5	29.3	74
4806.875000	43.5	100.0	V	272.0	42.1	1.4	30.5	74
6651.250000	47.7	100.0	V	66.0	42.5	5.2	26.3	74
7945.625000	48.0	200.0	H	328.0	41.9	6.1	26.0	74
5975.000000	44.6	100.0	V	166.0	40.9	3.7	29.4	74

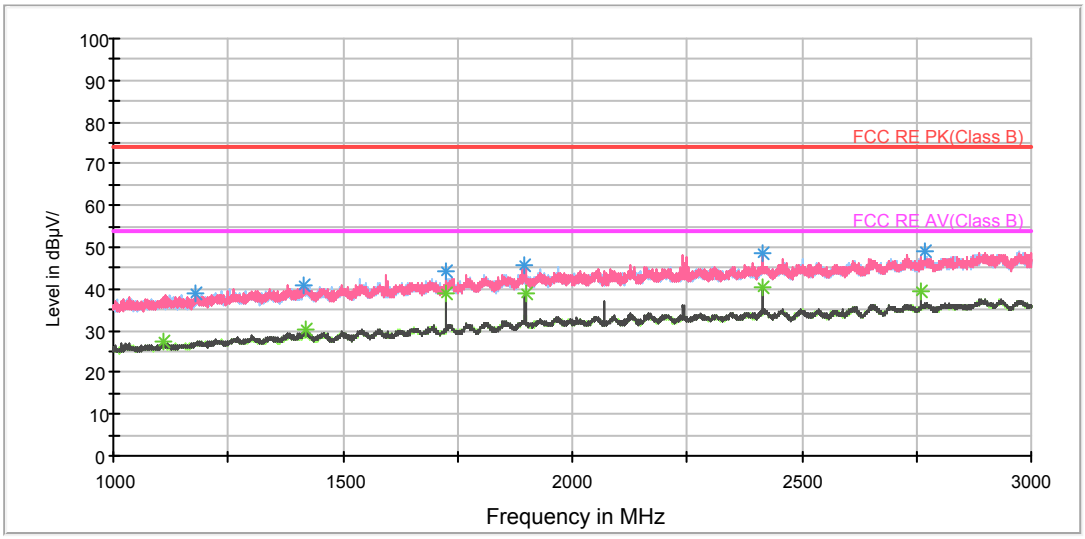
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3449.375000	30.0	200.0	V	173.0	31.9	-1.9	24.0	54
3563.750000	34.9	100.0	H	326.0	36.4	-1.5	19.1	54
4827.500000	33.4	200.0	H	299.0	32.0	1.4	20.6	54
6720.625000	36.5	100.0	V	205.0	31.2	5.3	17.5	54
6906.875000	42.6	100.0	H	43.0	37.2	5.4	11.4	54
5986.250000	34.6	200.0	V	0.0	30.8	3.8	19.4	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

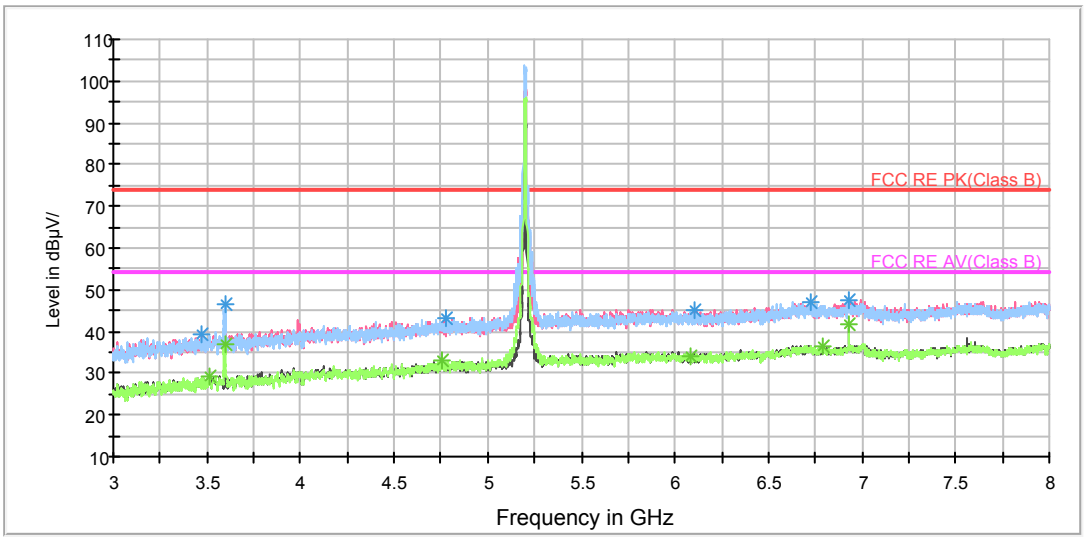
802.11a CH40

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

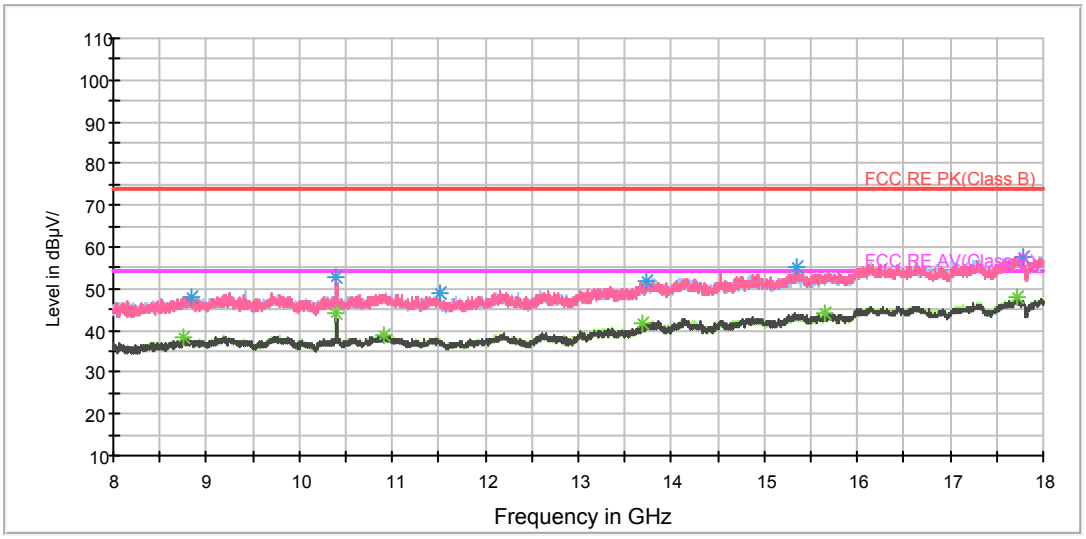
RE 3-18GHz PK+AV



Note: The signal beyond the limit is carrier.

Radiates Emission from 3GHz to 8GHz

RE 3-18GHz PK+AV



Radiates Emission from 8GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3476.250000	39.1	200.0	V	69.0	40.9	-1.8	34.9	74
3597.500000	46.6	100.0	H	326.0	48.1	-1.5	27.4	74
4772.500000	43.3	200.0	V	235.0	42.0	1.3	30.7	74
6730.625000	47.1	100.0	H	126.0	41.7	5.4	26.9	74
6933.750000	47.6	100.0	V	284.0	42.2	5.4	26.4	74
6101.250000	45.0	100.0	V	177.0	41.1	3.9	29.0	74

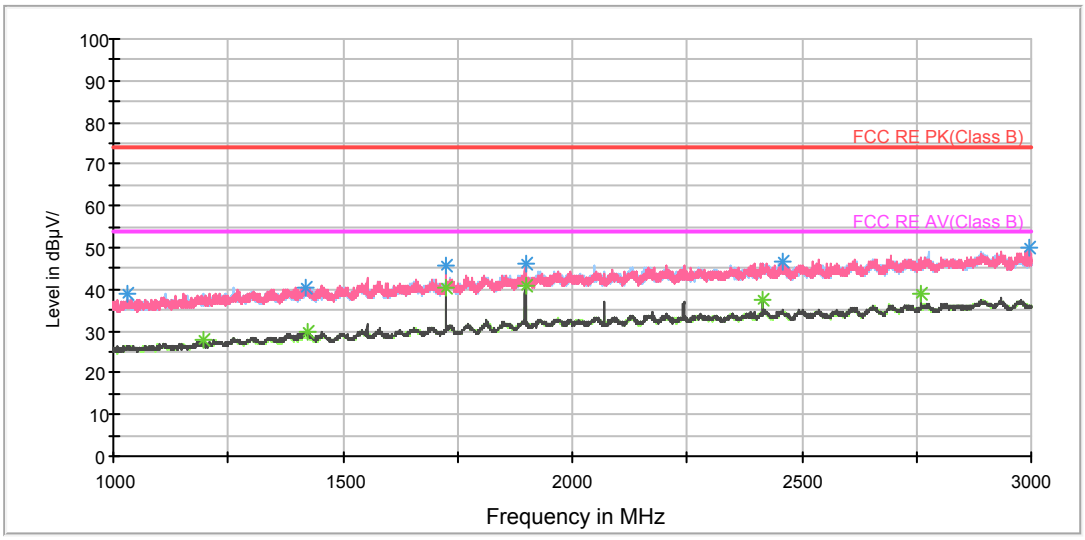
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3513.125000	29.1	200.0	H	282.0	30.8	-1.7	24.9	54
3596.250000	36.9	100.0	H	326.0	38.4	-1.5	17.1	54
4752.500000	33.1	100.0	H	174.0	31.8	1.3	20.9	54
6791.250000	36.6	200.0	H	351.0	31.2	5.4	17.4	54
6933.750000	41.7	100.0	H	0.0	36.3	5.4	12.3	54
6086.250000	34.3	200.0	V	156.0	30.4	3.9	19.7	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

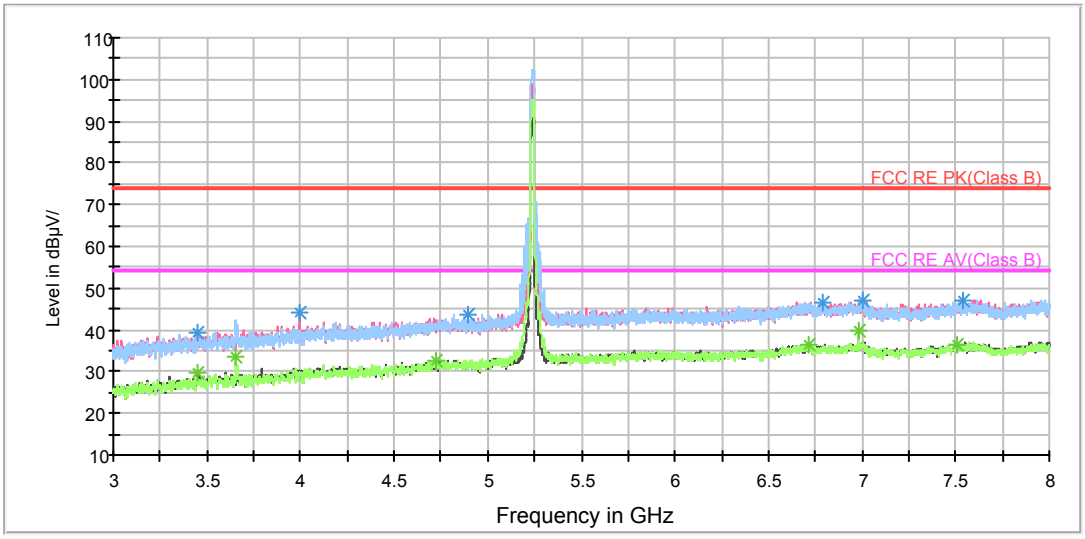
802.11a CH48

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

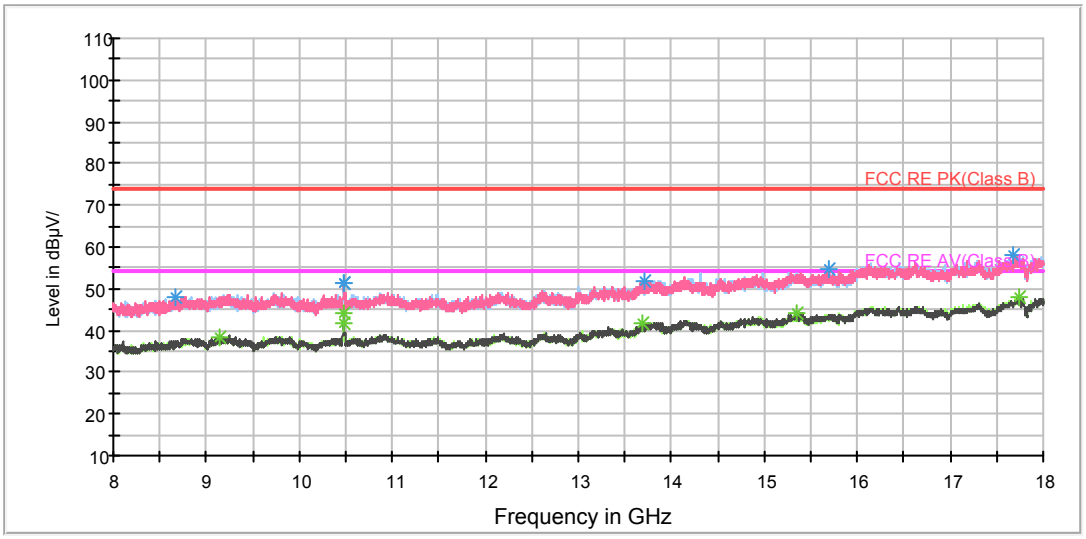
RE 3-18GHz PK+AV



Note: The signal beyond the limit is carrier.

Radiates Emission from 3GHz to 8GHz

RE 3-18GHz PK+AV



Radiates Emission from 8GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3446.875000	39.3	100.0	V	322.0	41.2	-1.9	34.7	74
3996.875000	44.3	100.0	V	352.0	44.6	-0.3	29.7	74
4892.500000	43.8	200.0	H	340.0	42.3	1.5	30.2	74
6785.000000	46.8	200.0	V	18.0	41.4	5.4	27.2	74
7535.625000	47.2	100.0	H	186.0	41.5	5.7	26.8	74
7008.750000	47.0	100.0	H	124.0	41.5	5.5	27.0	74

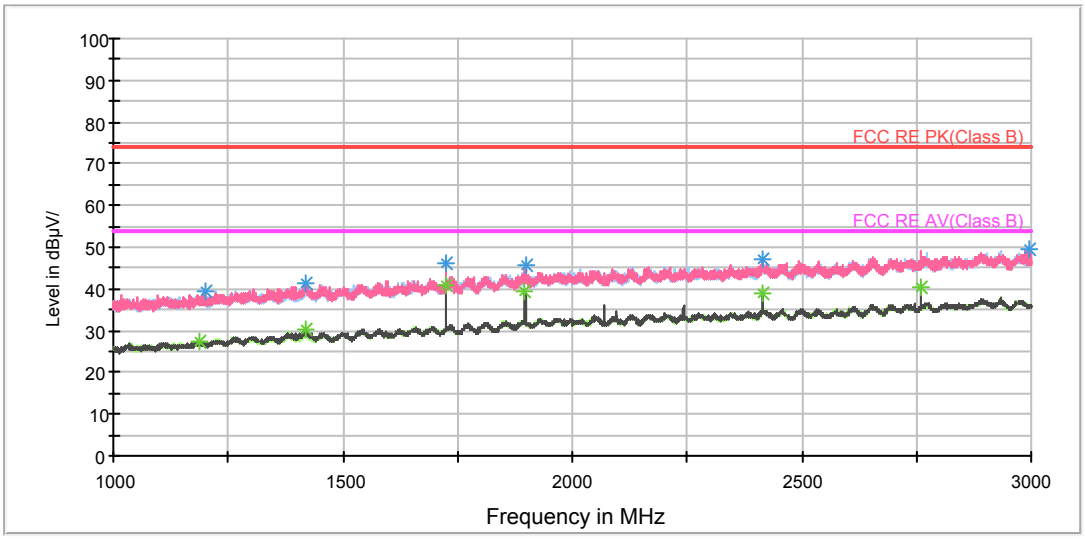
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3450.000000	29.9	100.0	V	284.0	31.8	-1.9	24.1	54
3652.500000	33.4	200.0	H	311.0	34.8	-1.4	20.6	54
4719.375000	32.8	200.0	H	321.0	31.6	1.2	21.2	54
6716.250000	36.6	200.0	H	350.0	31.3	5.3	17.4	54
6986.875000	39.9	100.0	V	293.0	34.4	5.5	14.1	54
7506.250000	36.2	100.0	V	224.0	30.6	5.6	17.8	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

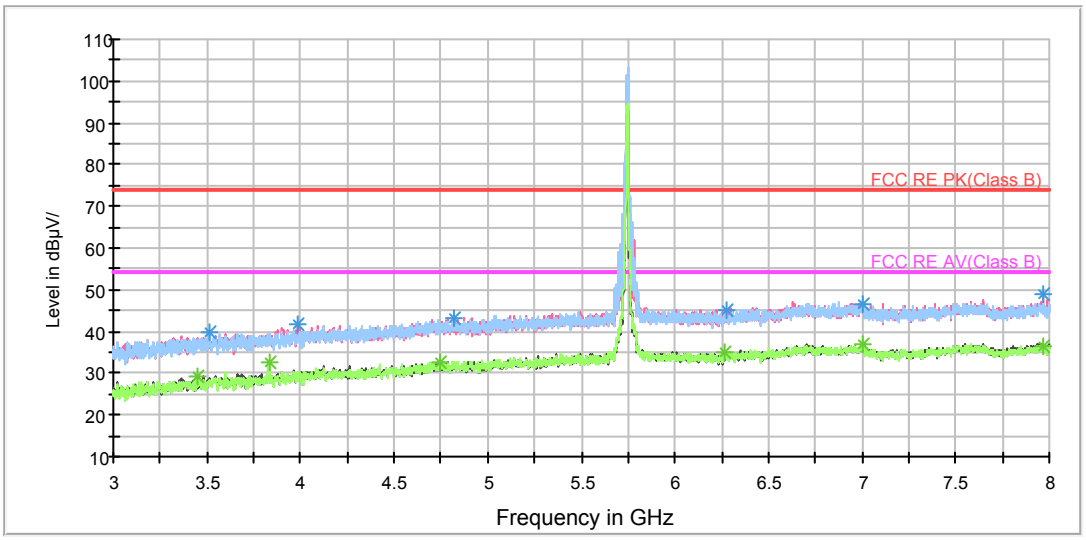
802.11a CH149

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

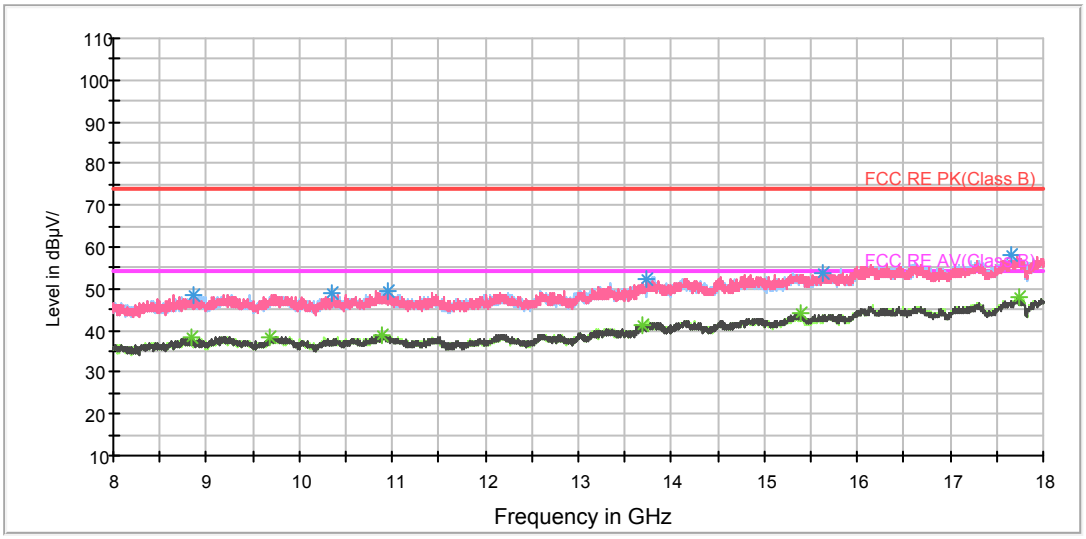
RE 3-18GHz PK+AV



Note: The signal beyond the limit is carrier.

Radiates Emission from 3GHz to 8GHz

RE 3-18GHz PK+AV



Radiates Emission from 8GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3515.000000	39.7	100.0	H	68.0	41.3	-1.6	34.3	74
3985.000000	41.7	100.0	V	347.0	42.1	-0.4	32.3	74
4820.625000	43.4	100.0	H	1.0	42.0	1.4	30.6	74
7971.250000	49.0	100.0	V	56.0	42.9	6.1	25.0	74
6272.500000	45.1	100.0	V	338.0	40.8	4.3	28.9	74
7003.750000	46.7	200.0	V	351.0	41.2	5.5	27.3	74

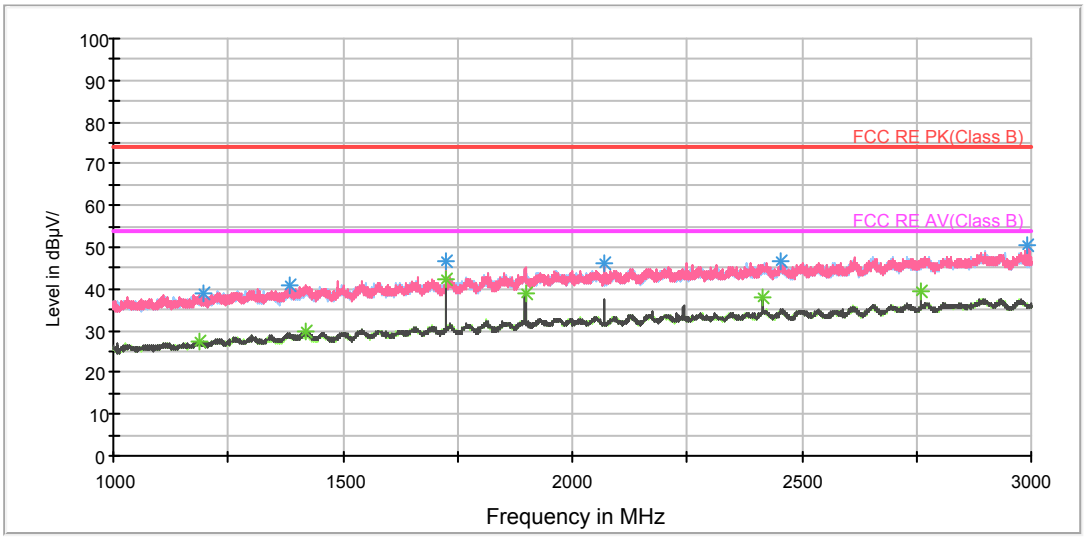
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
8836.250000	38.3	100.0	V	196.0	31.1	7.2	15.7	54
9675.000000	38.5	200.0	V	341.0	31.0	7.5	15.5	54
10887.500000	39.1	200.0	H	150.0	30.3	8.8	14.9	54
13692.500000	41.4	100.0	H	25.0	29.3	12.1	12.6	54
15391.250000	44.3	200.0	V	102.0	30.1	14.2	9.7	54
17738.750000	47.9	200.0	H	23.0	29.3	18.6	6.1	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

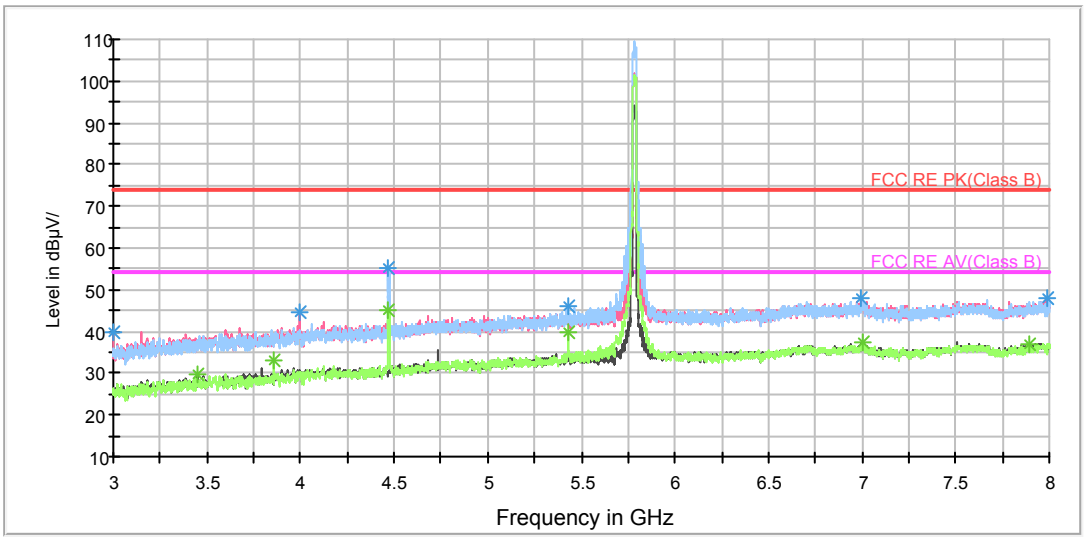
802.11a CH157

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

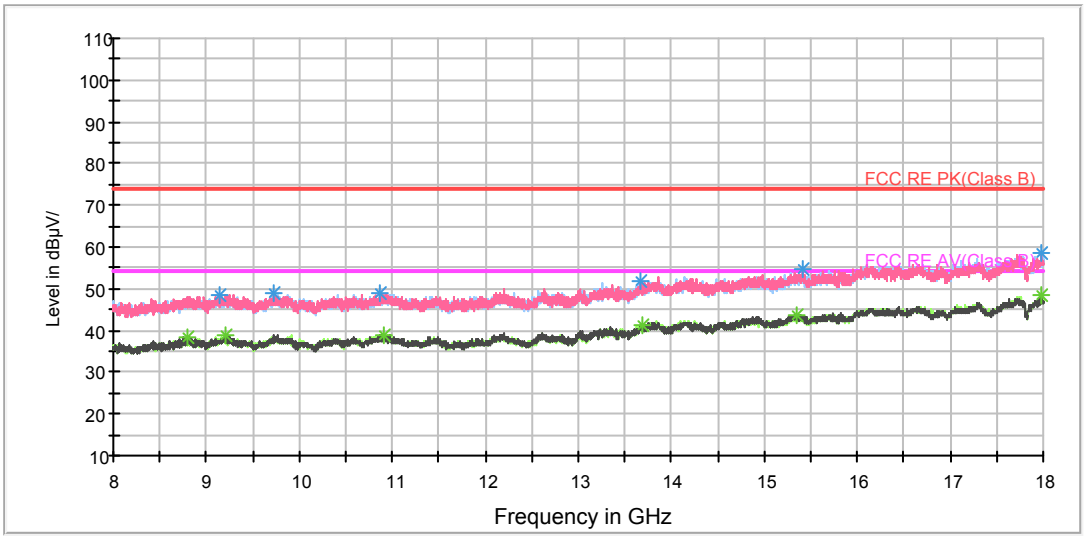
RE 3-18GHz PK+AV



Note: The signal beyond the limit is carrier.

Radiates Emission from 3GHz to 8GHz

RE 3-18GHz PK+AV



Radiates Emission from 8GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3000.000000	40.0	200.0	V	14.0	43.7	-3.7	34.0	74
3991.250000	44.5	100.0	V	275.0	44.8	-0.3	29.5	74
4471.875000	55.2	100.0	H	338.0	54.6	0.6	18.8	74
5433.125000	46.0	100.0	H	304.0	43.3	2.7	28.0	74
6994.375000	47.8	200.0	V	112.0	42.3	5.5	26.2	74
7993.125000	47.9	100.0	V	0.0	41.9	6.0	26.1	74

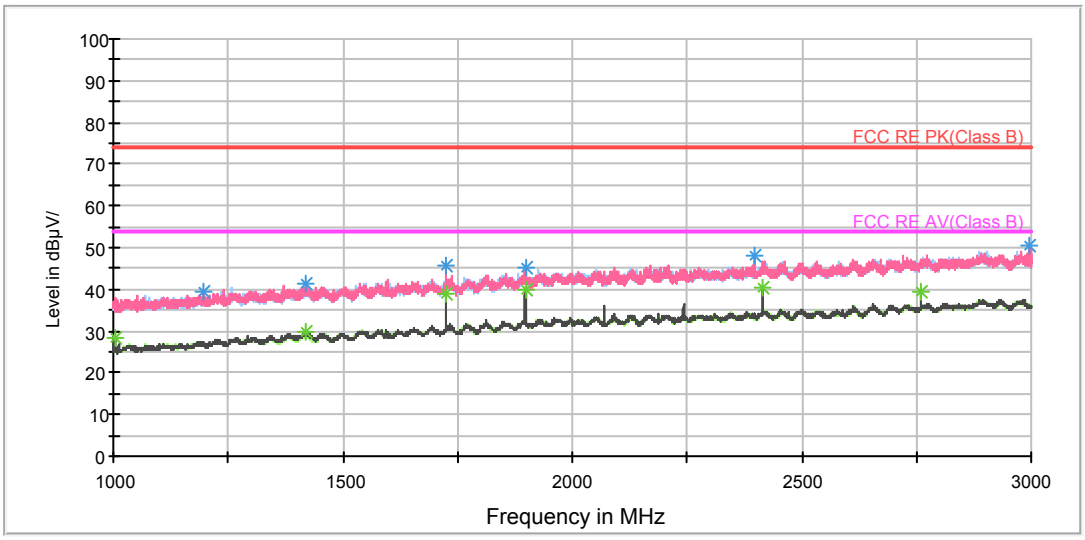
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3450.000000	29.9	100.0	V	115.0	31.8	-1.9	24.1	54
3856.250000	32.9	100.0	H	315.0	33.8	-0.9	21.1	54
4471.250000	45.1	100.0	H	338.0	44.5	0.6	8.9	54
5433.125000	39.7	100.0	H	304.0	37.0	2.7	14.3	54
7002.500000	37.6	100.0	H	0.0	32.1	5.5	16.4	54
7893.125000	36.9	200.0	V	24.0	30.8	6.1	17.1	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

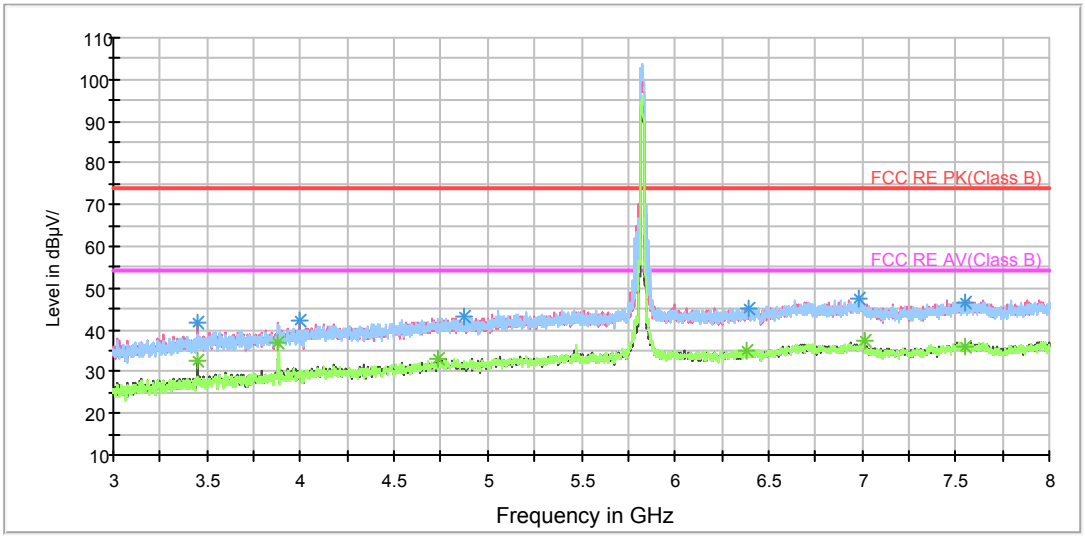
802.11a CH165

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

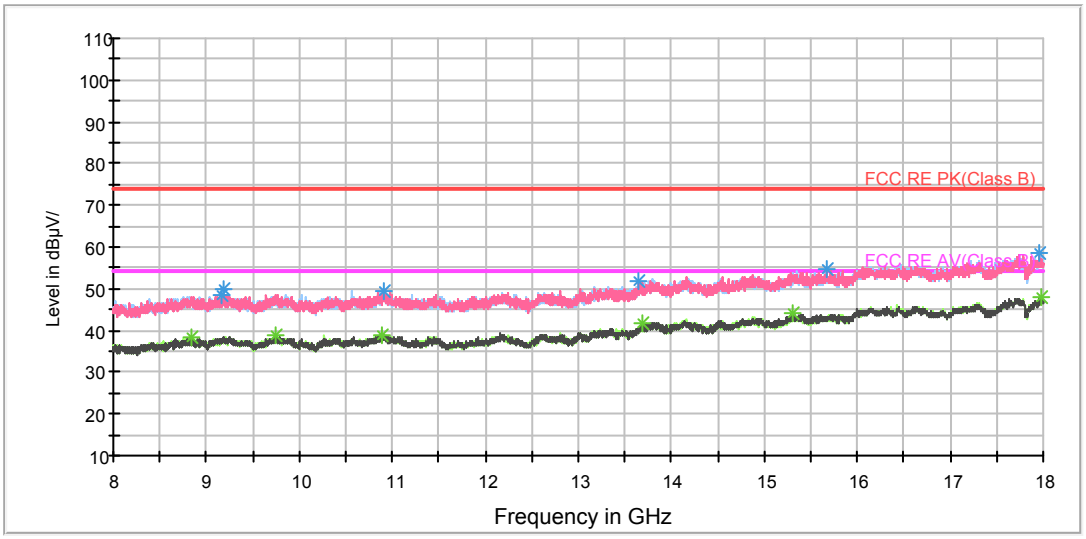
RE 3-18GHz PK+AV



Note: The signal beyond the limit is carrier.

Radiates Emission from 3GHz to 8GHz

RE 3-18GHz PK+AV



Radiates Emission from 8GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3448.750000	42.0	200.0	V	304.0	43.9	-1.9	32.0	74
3998.750000	42.1	100.0	V	302.0	42.4	-0.3	31.9	74
4878.750000	43.1	100.0	H	252.0	41.6	1.5	30.9	74
6986.875000	47.7	200.0	V	145.0	42.2	5.5	26.3	74
6396.875000	45.0	200.0	H	236.0	40.4	4.6	29.0	74
7551.875000	46.6	200.0	V	0.0	40.9	5.7	27.4	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

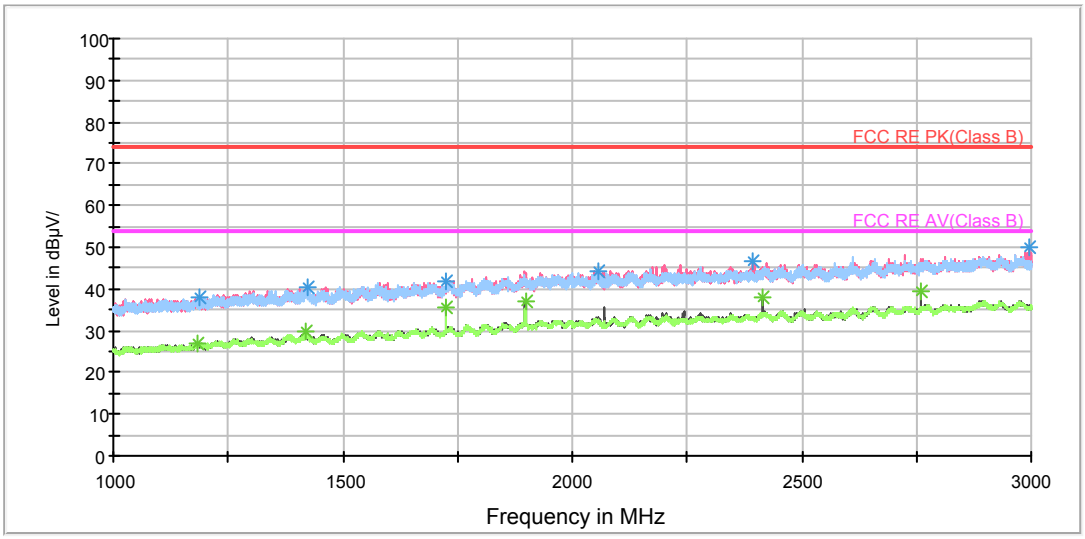
Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3449.375000	32.4	200.0	V	304.0	34.3	-1.9	21.6	54
3883.125000	37.1	100.0	H	316.0	37.9	-0.8	16.9	54
4739.375000	33.1	100.0	V	194.0	31.8	1.3	20.9	54
7011.875000	37.2	100.0	V	140.0	31.7	5.5	16.8	54
6384.375000	35.0	200.0	H	306.0	30.5	4.5	19.0	54
7551.875000	36.1	100.0	V	273.0	30.4	5.7	17.9	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

MIMO Antenna 1

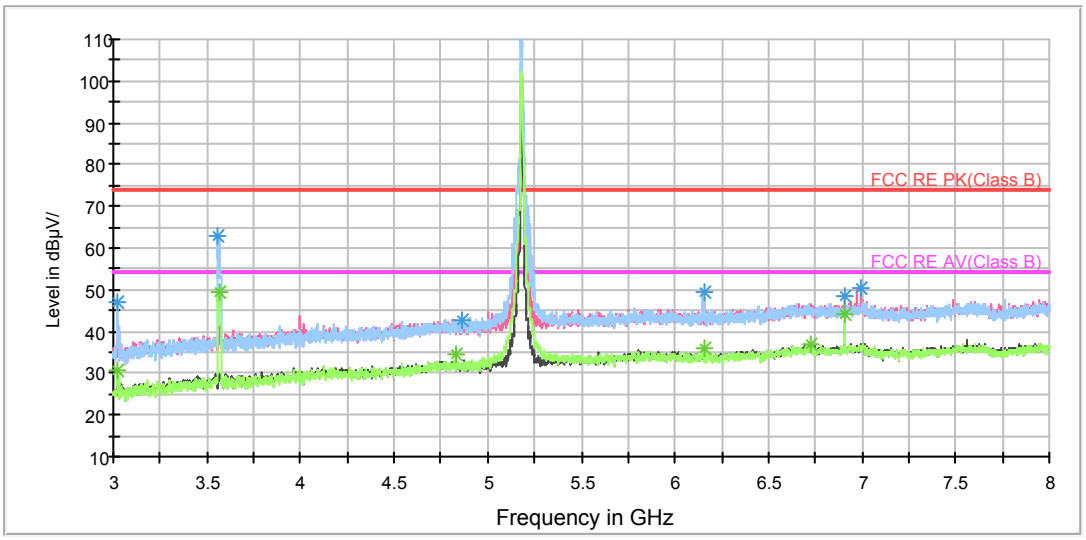
802.11n (HT20) CH36

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

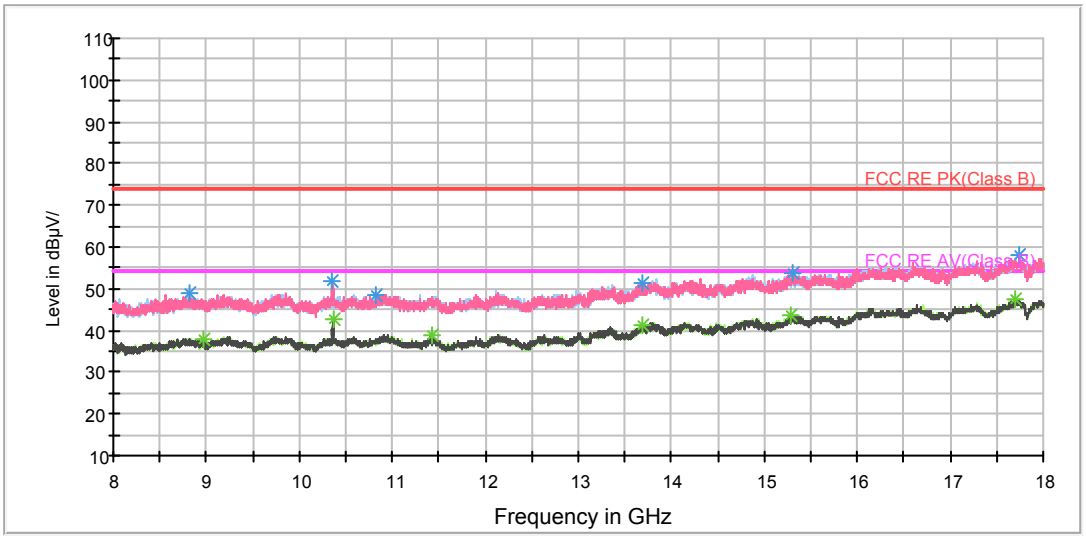
RE 3-18GHz PK+AV



Note: The signal beyond the limit is carrier.

Radiates Emission from 3GHz to 8GHz

RE 3-18GHz PK+AV



Radiates Emission from 8GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3022.500000	47.0	100.0	H	326.0	50.6	-3.6	27.0	74
3559.375000	63.0	100.0	H	338.0	64.5	-1.5	11.0	74
4861.250000	42.8	100.0	V	0.0	41.3	1.5	31.2	74
6153.125000	49.4	200.0	H	327.0	45.4	4.0	24.6	74
6906.875000	48.6	200.0	V	339.0	43.2	5.4	25.4	74
6995.000000	50.4	100.0	V	107.0	44.9	5.5	23.6	74

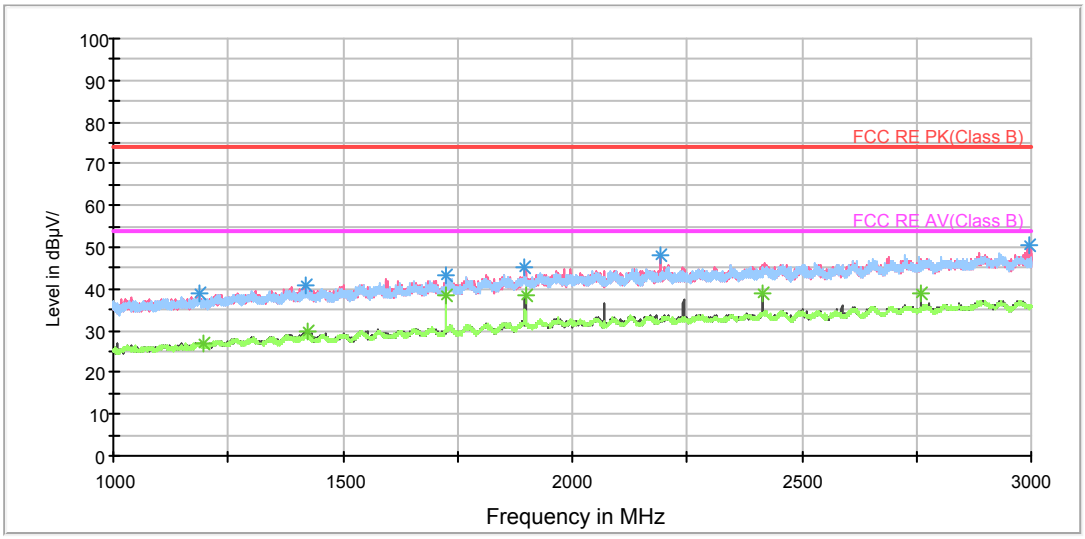
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3023.750000	30.7	100.0	H	326.0	34.3	-3.6	23.3	54
3562.500000	49.6	100.0	H	4.0	51.1	-1.5	4.4	54
4828.125000	34.8	100.0	H	315.0	33.4	1.4	19.2	54
6157.500000	35.8	100.0	H	315.0	31.8	4.0	18.2	54
6730.625000	36.8	200.0	V	25.0	31.4	5.4	17.2	54
6906.875000	44.2	100.0	H	338.0	38.8	5.4	9.8	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

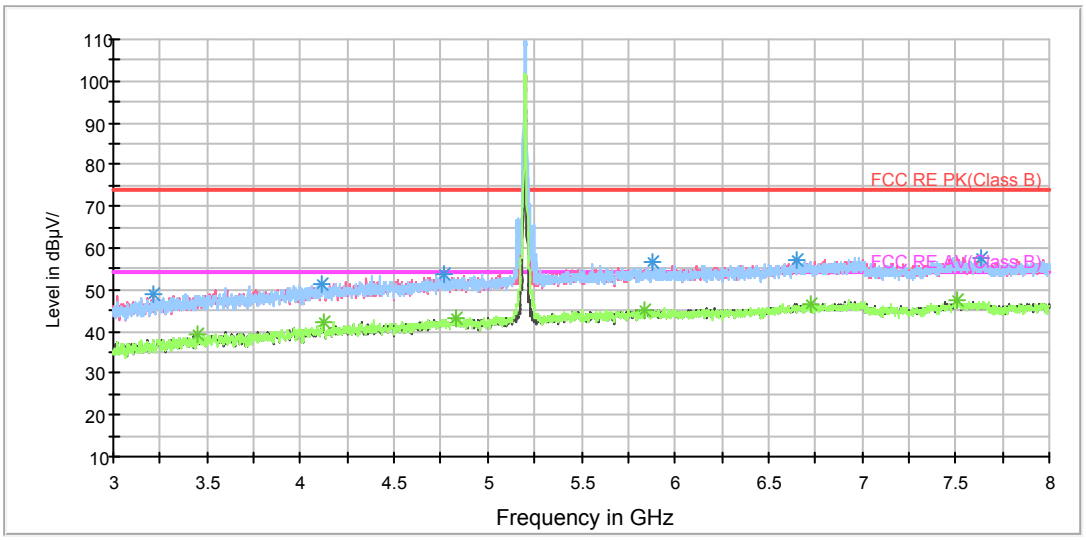
802.11n (HT20) CH40

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

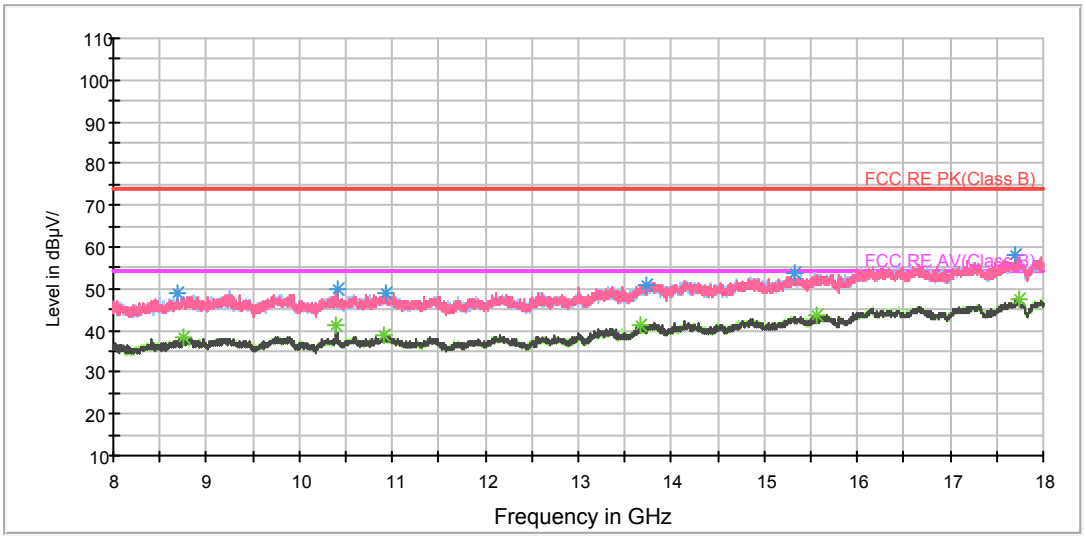
RE 3-18GHz PK+AV



Note: The signal beyond the limit is carrier.

Radiates Emission from 3GHz to 8GHz

RE 3-18GHz PK+AV



Radiates Emission from 8GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3216.875000	49.1	200.0	V	1.0	41.9	7.2	24.9	74
4118.750000	51.3	200.0	H	0.0	41.2	10.1	22.7	74
4771.875000	53.8	200.0	H	242.0	42.5	11.3	20.2	74
5877.500000	56.4	200.0	H	9.0	42.7	13.7	17.6	74
6649.375000	56.9	100.0	V	0.0	41.7	15.2	17.1	74
7631.250000	57.8	200.0	H	271.0	41.9	15.9	16.2	74

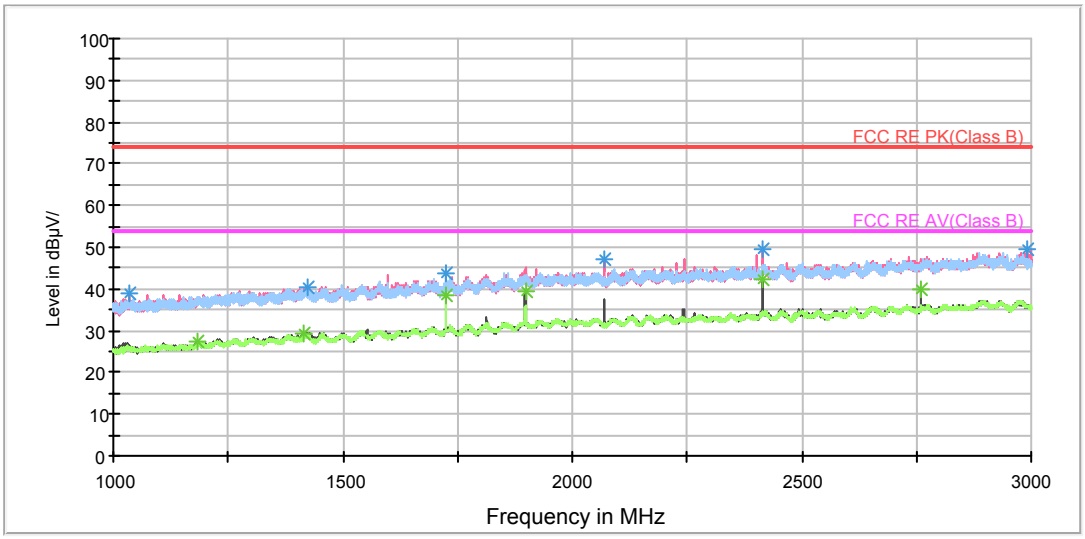
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3445.625000	39.4	200.0	V	139.0	31.3	8.1	14.6	54
4125.625000	42.3	200.0	V	1.0	32.2	10.1	11.7	54
4826.250000	43.4	100.0	V	276.0	32.0	11.4	10.6	54
5838.750000	45.0	200.0	V	273.0	31.4	13.6	9.0	54
6726.250000	46.6	100.0	V	266.0	31.2	15.4	7.4	54
7511.250000	47.4	200.0	H	201.0	31.8	15.6	6.6	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

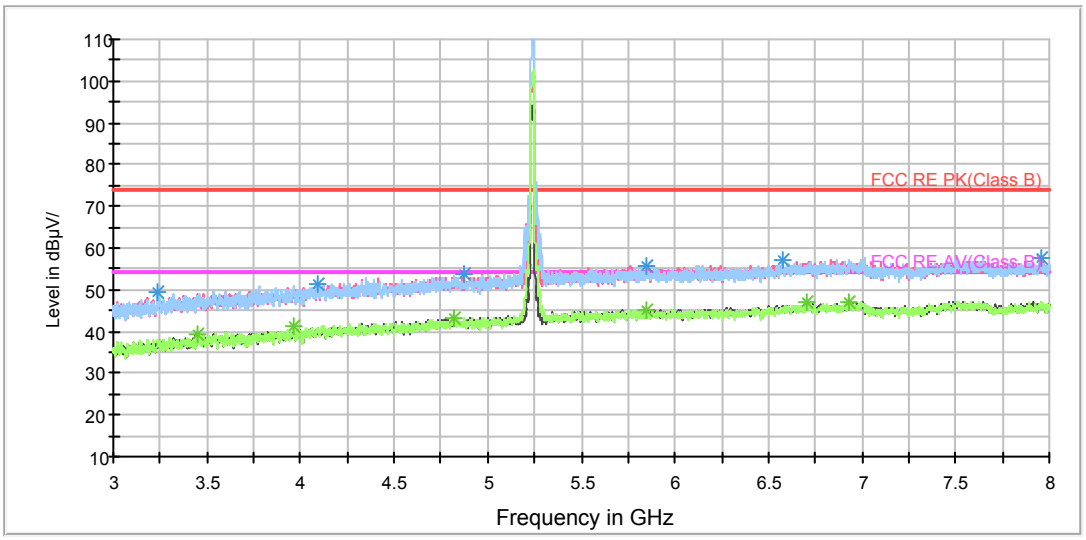
802.11n (HT20) CH48

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

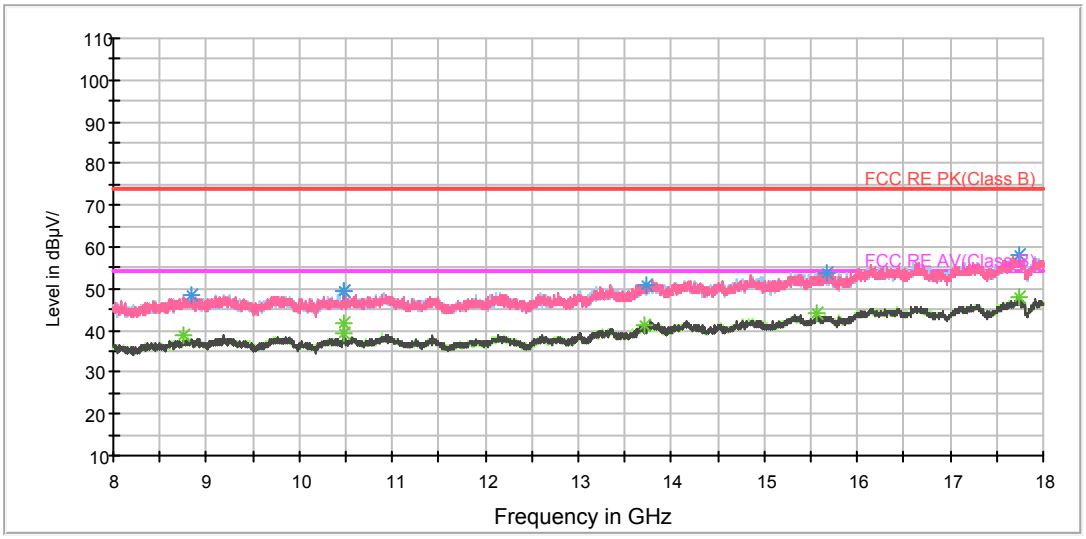
RE 3-18GHz PK+AV



Note: The signal beyond the limit is carrier.

Radiates Emission from 3GHz to 8GHz

RE 3-18GHz PK+AV



Radiates Emission from 8GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3236.875000	49.7	200.0	H	0.0	42.4	7.3	24.3	74
4091.875000	51.5	200.0	H	315.0	41.5	10.0	22.5	74
4876.250000	53.6	200.0	V	63.0	42.1	11.5	20.4	74
5844.375000	55.9	100.0	V	204.0	42.3	13.6	18.1	74
6573.750000	57.1	100.0	V	34.0	42.1	15.0	16.9	74
7957.500000	57.7	200.0	V	102.0	41.6	16.1	16.3	74

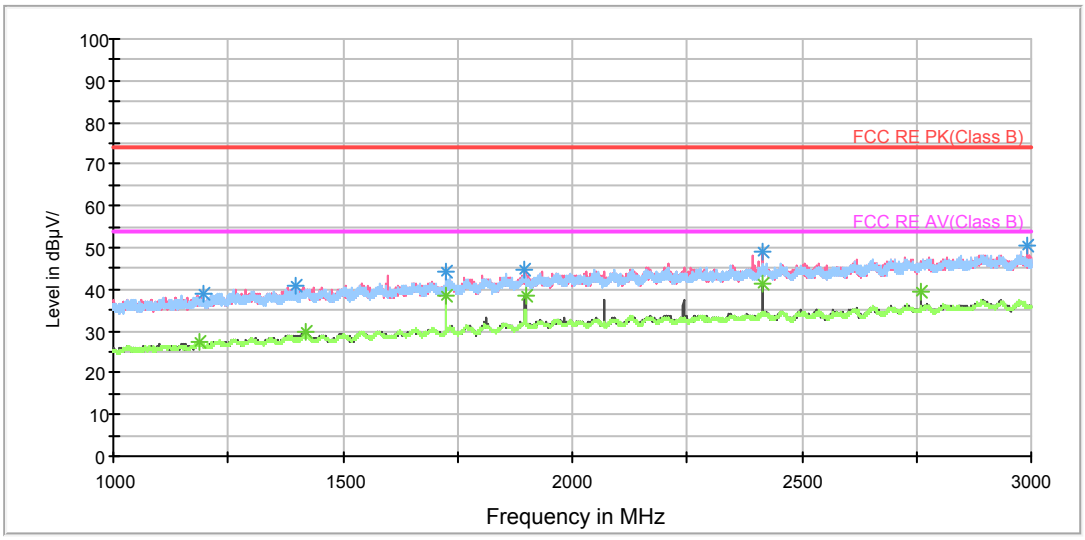
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3445.625000	39.4	100.0	V	166.0	31.3	8.1	14.6	54
3965.625000	41.4	100.0	H	108.0	31.8	9.6	12.6	54
4825.000000	43.4	100.0	H	30.0	32.0	11.4	10.6	54
5850.000000	45.1	200.0	V	151.0	31.5	13.6	8.9	54
6703.125000	46.9	100.0	H	0.0	31.6	15.3	7.1	54
6930.000000	47.2	200.0	V	0.0	31.8	15.4	6.8	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

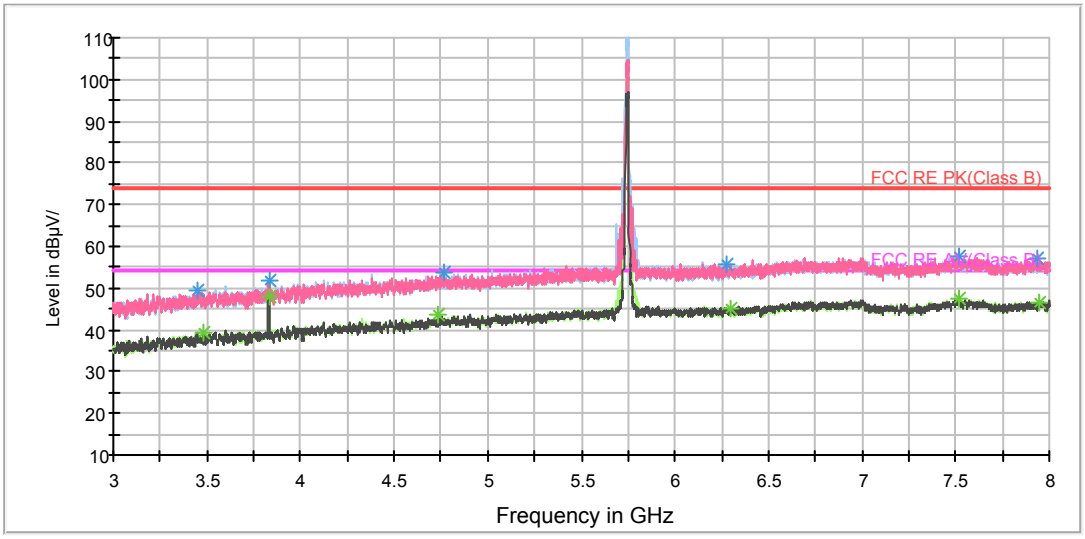
802.11n (HT20) CH149

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

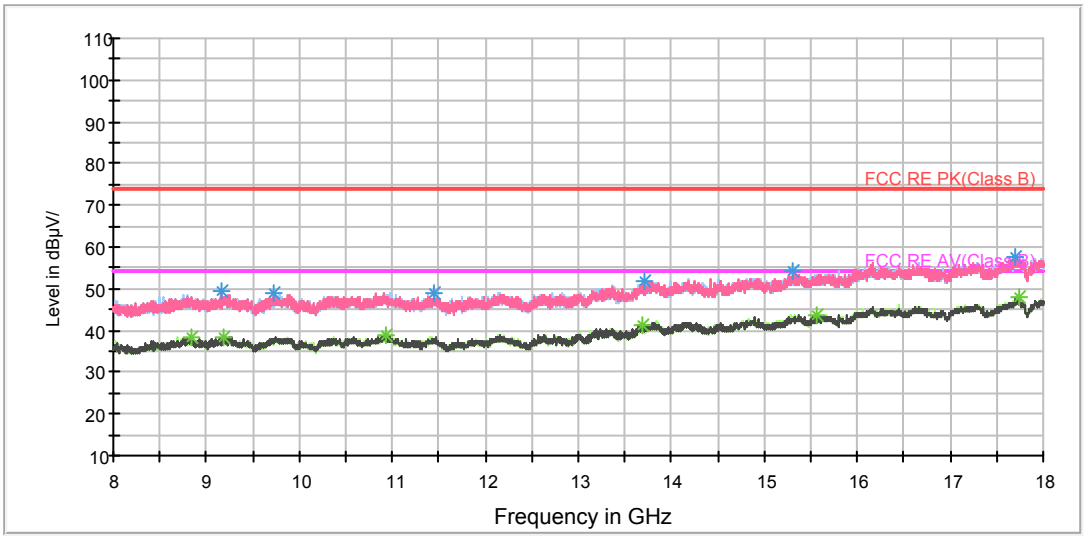
RE 3-18GHz PK+AV



Note: The signal beyond the limit is carrier.

Radiates Emission from 3GHz to 8GHz

RE 3-18GHz PK+AV



Radiates Emission from 8GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3445.000000	49.5	200.0	H	11.0	41.4	8.1	24.5	74
3830.000000	51.9	100.0	V	60.0	42.9	9.0	22.1	74
4770.625000	53.7	200.0	H	31.0	42.4	11.3	20.3	74
6272.500000	55.7	200.0	H	31.0	41.4	14.3	18.3	74
7519.375000	57.6	100.0	H	148.0	41.9	15.7	16.4	74
7940.000000	57.3	200.0	H	215.0	41.2	16.1	16.7	74

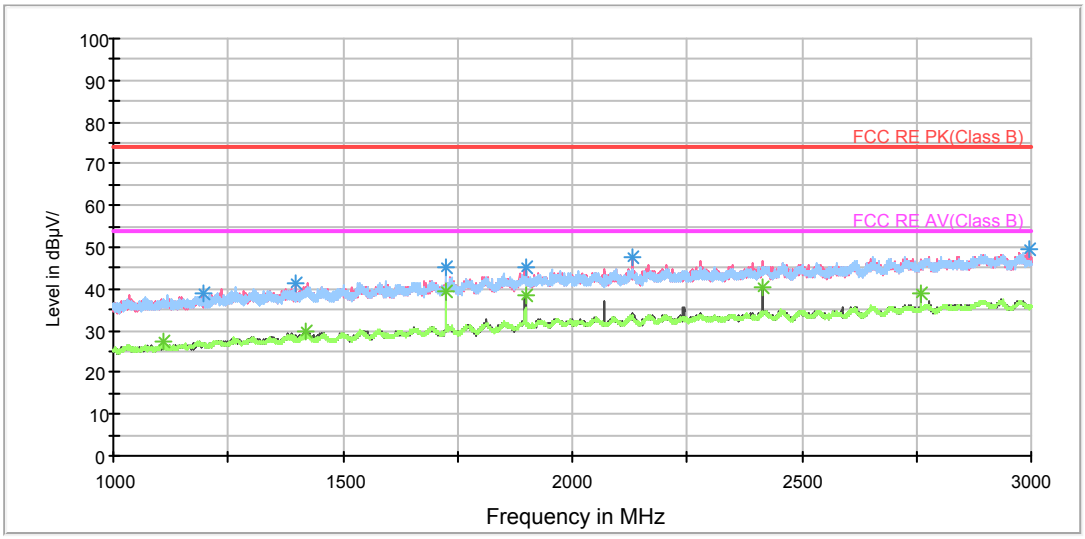
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3478.125000	39.2	100.0	H	137.0	31.0	8.2	14.8	54
3830.000000	48.2	100.0	V	60.0	39.2	9.0	5.8	54
4738.125000	43.5	100.0	H	262.0	32.2	11.3	10.5	54
6296.250000	45.3	200.0	H	316.0	31.0	14.3	8.7	54
7516.250000	47.5	100.0	V	223.0	31.9	15.6	6.5	54
7941.250000	46.6	100.0	H	351.0	30.5	16.1	7.4	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

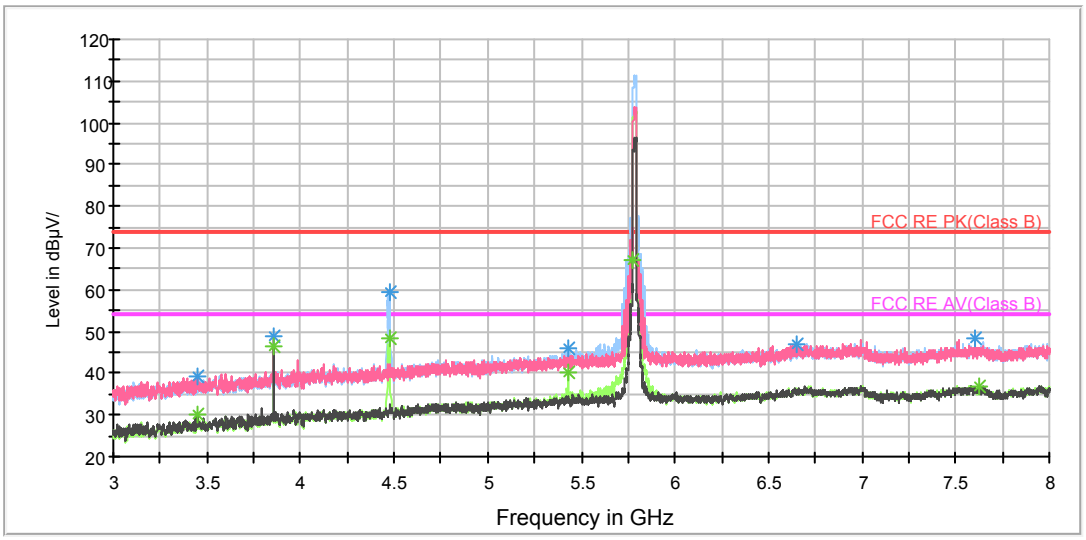
802.11n (HT20) CH157

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

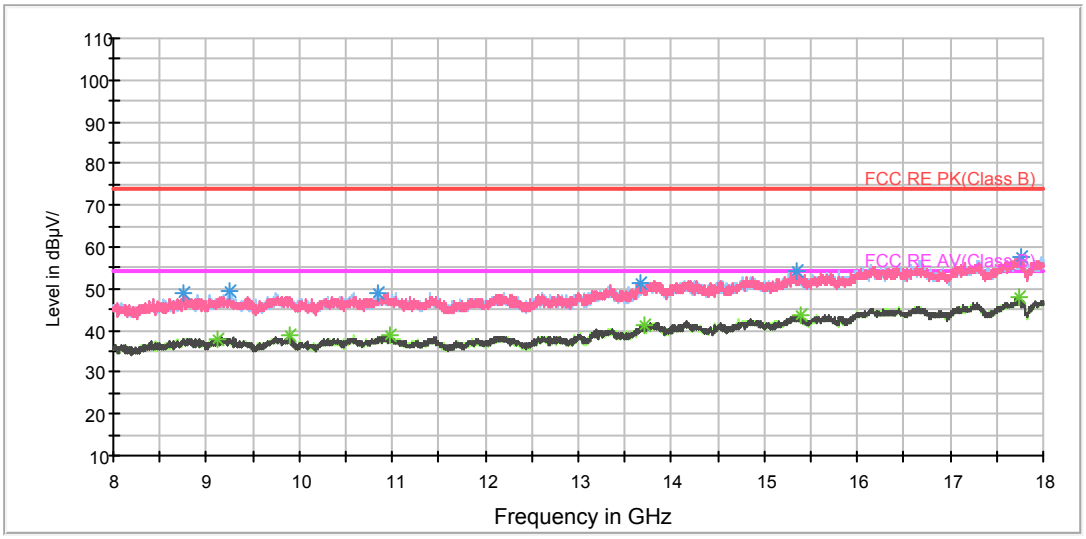
RE 3-18GHz PK+AV



Note: The signal beyond the limit is carrier.

Radiates Emission from 3GHz to 8GHz

RE 3-18GHz PK+AV



Radiates Emission from 8GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3446.875000	39.1	200.0	V	131.0	41.0	-1.9	34.9	74
3856.250000	49.1	100.0	V	51.0	50.0	-0.9	24.9	74
4476.250000	59.6	100.0	H	359.0	59.0	0.6	14.4	74
5432.500000	46.0	100.0	H	0.0	43.3	2.7	28.0	74
6645.625000	47.0	100.0	V	101.0	41.8	5.2	27.0	74
7604.375000	48.2	100.0	V	91.0	42.4	5.8	25.8	74

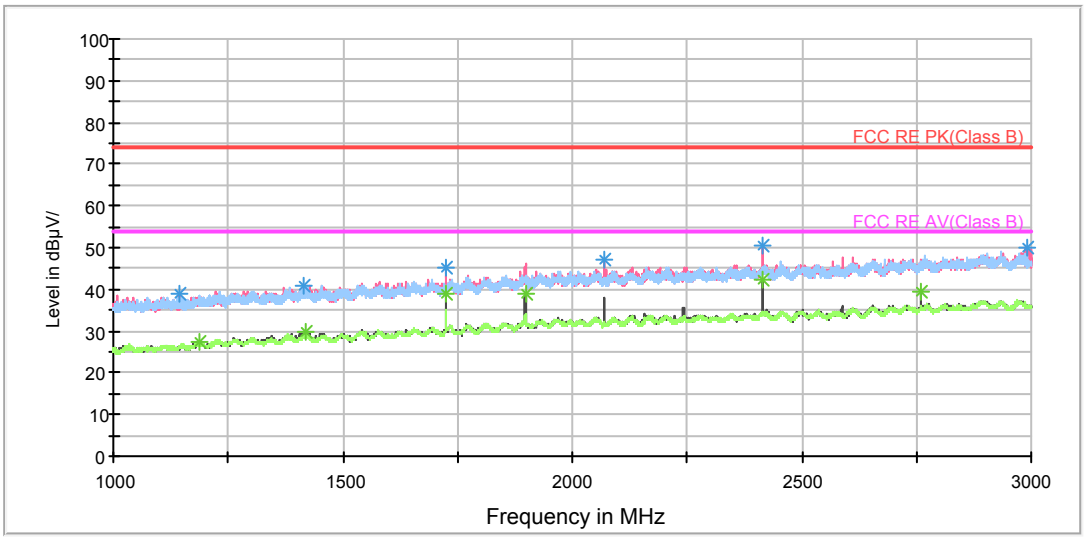
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3449.375000	30.1	100.0	V	110.0	32.0	-1.9	23.9	54
3856.250000	46.3	100.0	H	89.0	47.2	-0.9	7.7	54
4475.625000	48.4	100.0	H	359.0	47.8	0.6	5.6	54
5433.125000	40.0	100.0	H	0.0	37.3	2.7	14.0	54
7625.625000	36.9	200.0	H	304.0	31.0	5.9	17.1	54
9117.500000	38.1	100.0	H	312.0	30.9	7.2	15.9	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

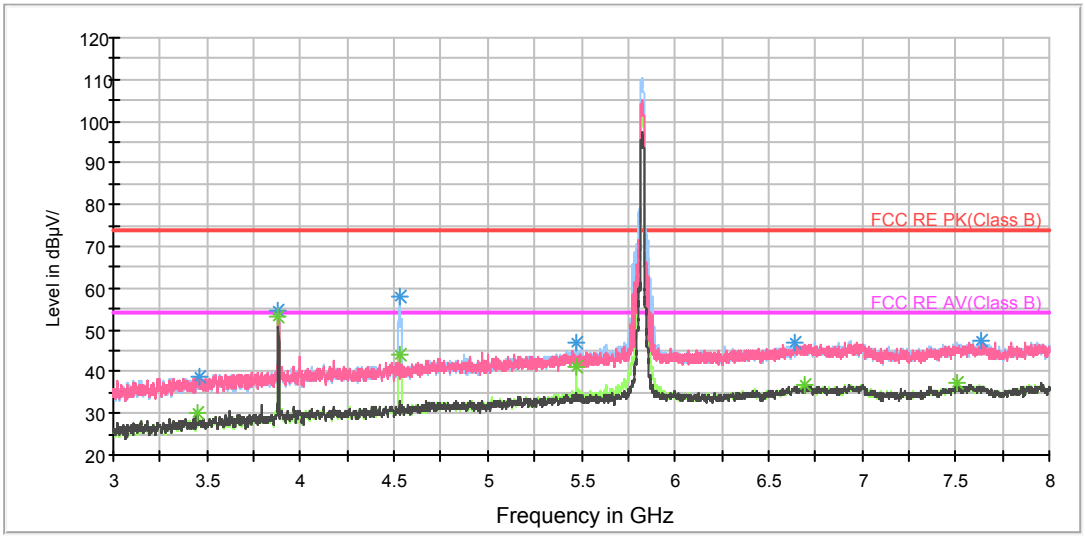
802.11n (HT20) CH165

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

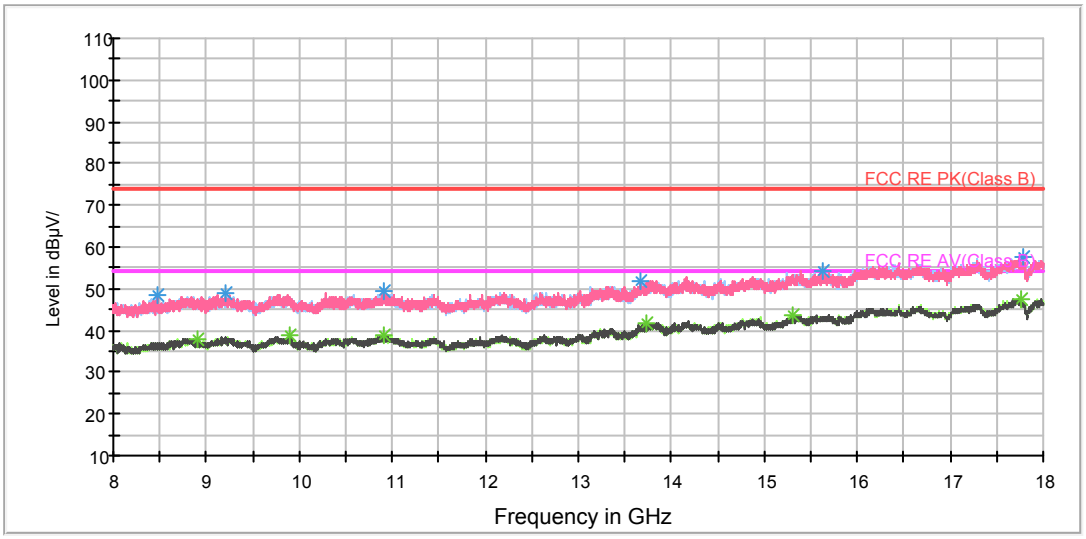
RE 3-18GHz PK+AV



Note: The signal beyond the limit is carrier.

Radiates Emission from 3GHz to 8GHz

RE 3-18GHz PK+AV



Radiates Emission from 8GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3461.875000	38.9	100.0	V	284.0	40.8	-1.9	35.1	74
3883.125000	54.8	200.0	H	76.0	55.6	-0.8	19.2	74
4535.625000	57.8	100.0	H	348.0	57.1	0.7	16.2	74
5473.125000	46.7	100.0	H	348.0	43.9	2.8	27.3	74
6644.375000	46.9	200.0	V	322.0	41.7	5.2	27.1	74
7640.000000	47.6	100.0	V	194.0	41.7	5.9	26.4	74

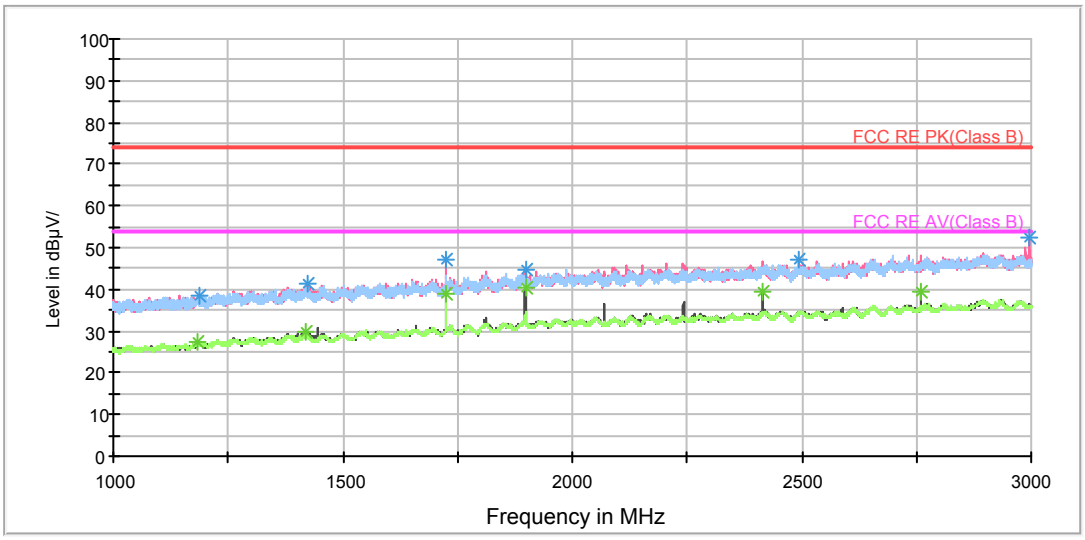
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3449.375000	30.1	100.0	V	106.0	32.0	-1.9	23.9	54
3883.125000	53.2	200.0	H	76.0	54.0	-0.8	0.8	54
4532.500000	44.1	100.0	H	348.0	43.4	0.7	9.9	54
5473.125000	41.0	100.0	H	348.0	38.2	2.8	13.0	54
6697.500000	36.8	200.0	V	225.0	31.5	5.3	17.2	54
7511.250000	37.2	200.0	H	67.0	31.6	5.6	16.8	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

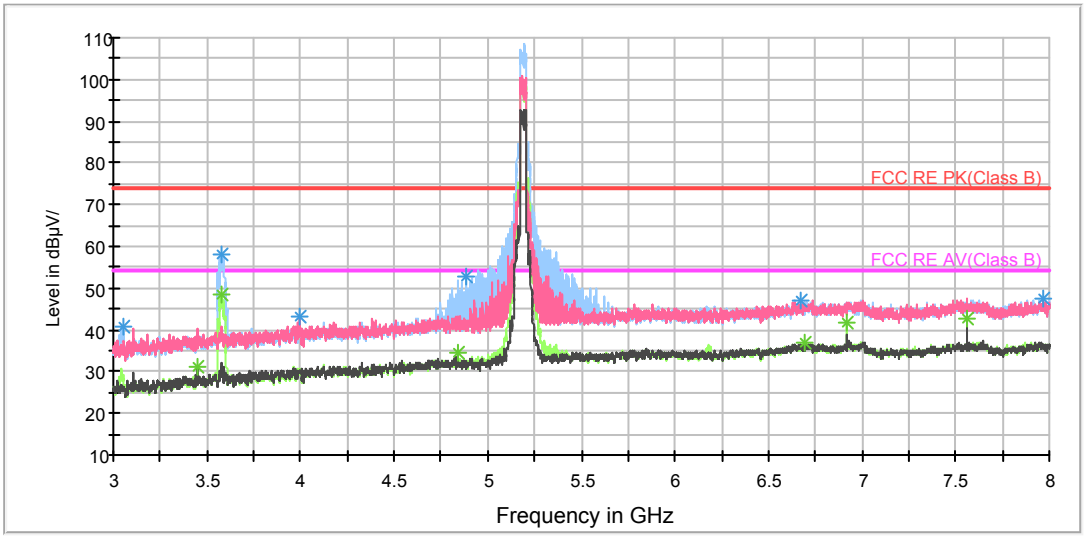
802.11n (HT40) CH38

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

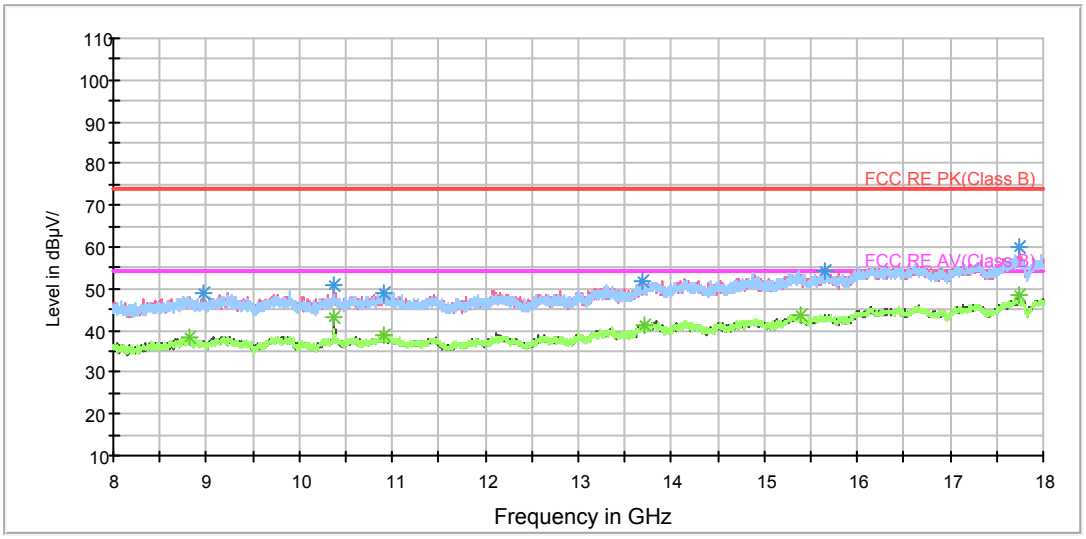
RE 3-18GHz PK+AV



Note: The signal beyond the limit is carrier.

Radiates Emission from 3GHz to 8GHz

RE 3-18GHz PK+AV



Radiates Emission from 8GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3055.625000	40.9	100.0	H	0.0	44.5	-3.6	33.1	74
3580.625000	57.9	100.0	H	45.0	59.4	-1.5	16.1	74
3992.500000	43.4	100.0	V	18.0	43.7	-0.3	30.6	74
4880.625000	52.8	100.0	H	0.0	51.3	1.5	21.2	74
6673.125000	47.1	100.0	H	273.0	41.8	5.3	26.9	74
7968.750000	47.5	100.0	V	125.0	41.4	6.1	26.5	74

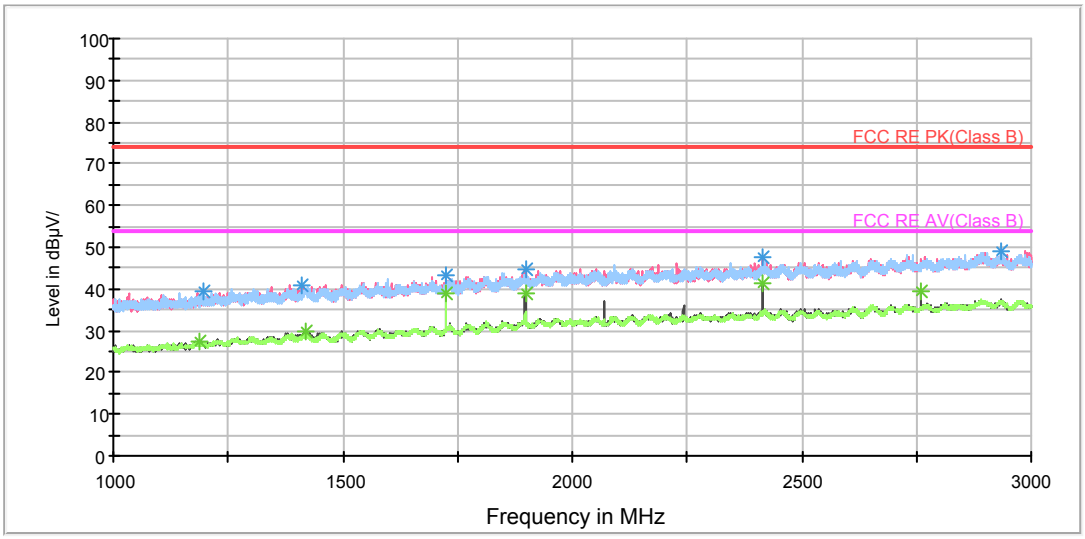
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3449.375000	31.3	100.0	V	116.0	33.2	-1.9	22.7	54
3579.375000	48.2	100.0	H	45.0	49.7	-1.5	5.8	54
4838.125000	34.7	100.0	H	0.0	33.3	1.4	19.3	54
6698.125000	37.0	100.0	V	145.0	31.7	5.3	17.0	54
6920.000000	41.7	100.0	H	0.0	36.3	5.4	12.3	54
7561.875000	42.6	200.0	V	126.0	36.8	5.8	11.4	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

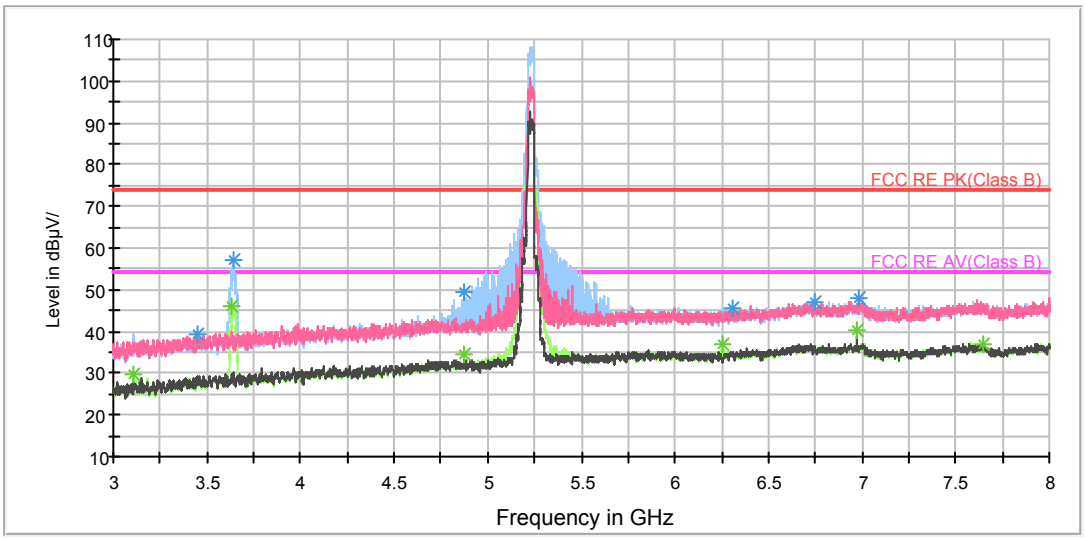
802.11n (HT40) CH46

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

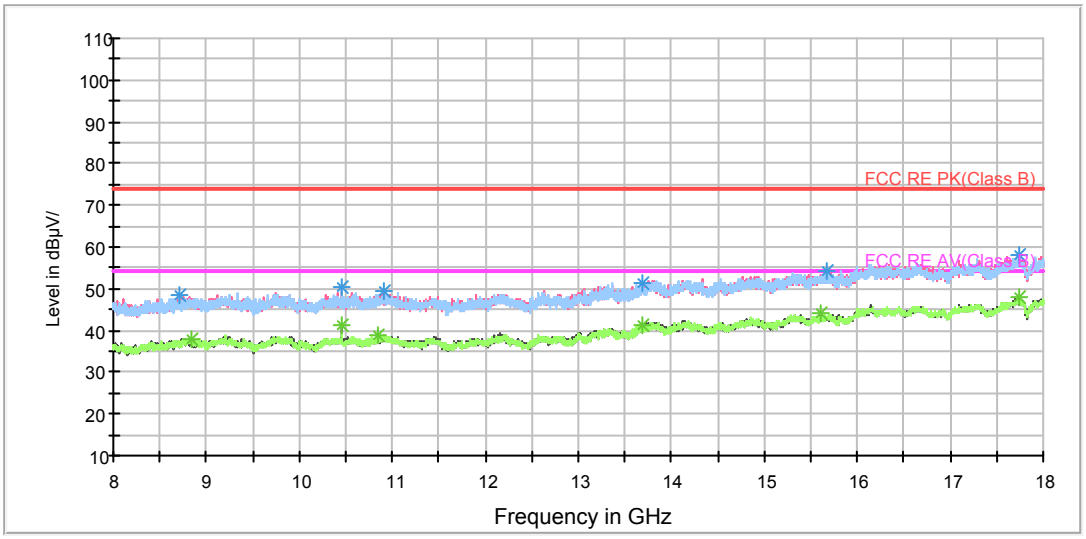
RE 3-18GHz PK+AV



Note: The signal beyond the limit is carrier.

Radiates Emission from 3GHz to 8GHz

RE 3-18GHz PK+AV



Radiates Emission from 8GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3445.625000	39.2	100.0	H	350.0	41.1	-1.9	34.8	74
3643.125000	56.9	100.0	H	21.0	58.3	-1.4	17.1	74
4878.125000	49.6	100.0	H	0.0	48.1	1.5	24.4	74
6311.875000	45.8	100.0	H	198.0	41.4	4.4	28.2	74
6749.375000	47.0	100.0	V	0.0	41.6	5.4	27.0	74
6985.000000	48.0	100.0	V	113.0	42.5	5.5	26.0	74

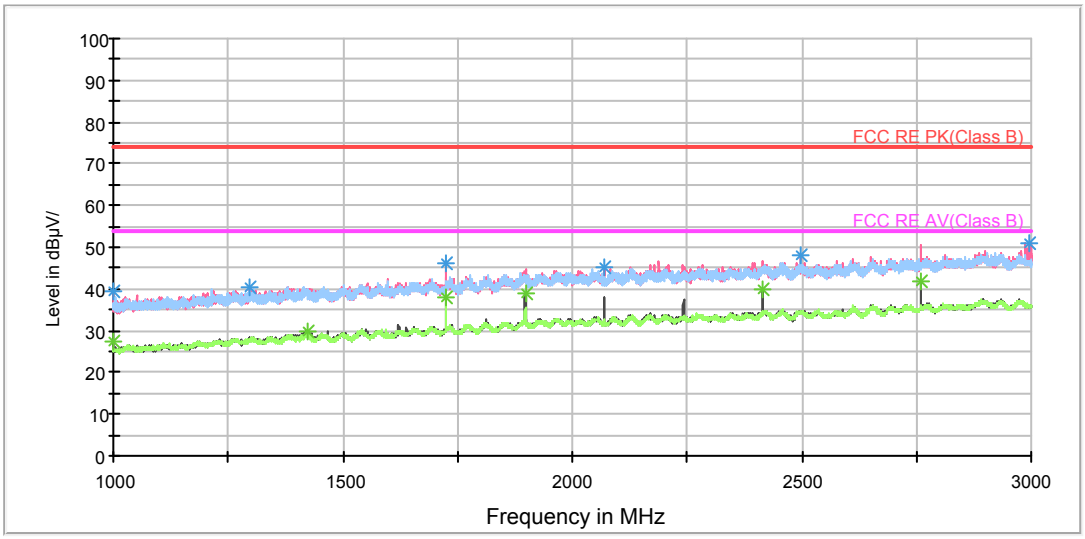
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3103.125000	29.6	100.0	H	0.0	33.0	-3.4	24.4	54
3635.625000	46.0	100.0	H	44.0	47.4	-1.4	8.0	54
4878.125000	34.3	100.0	H	0.0	32.8	1.5	19.7	54
6255.625000	36.7	100.0	H	44.0	32.5	4.2	17.3	54
6973.750000	40.2	100.0	H	9.0	34.7	5.5	13.8	54
7645.000000	36.9	100.0	V	182.0	31.0	5.9	17.1	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

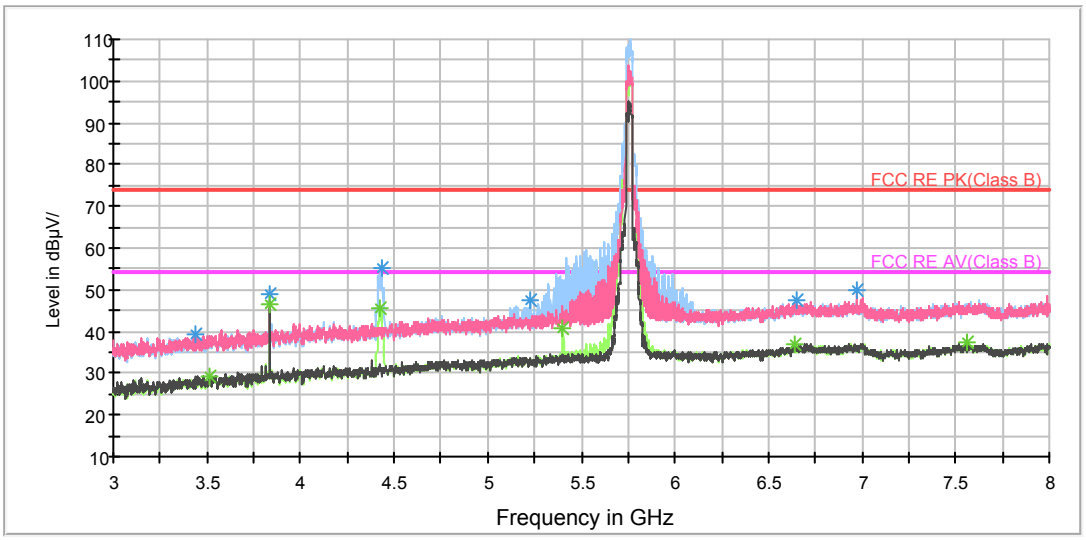
802.11n (HT40) CH151

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

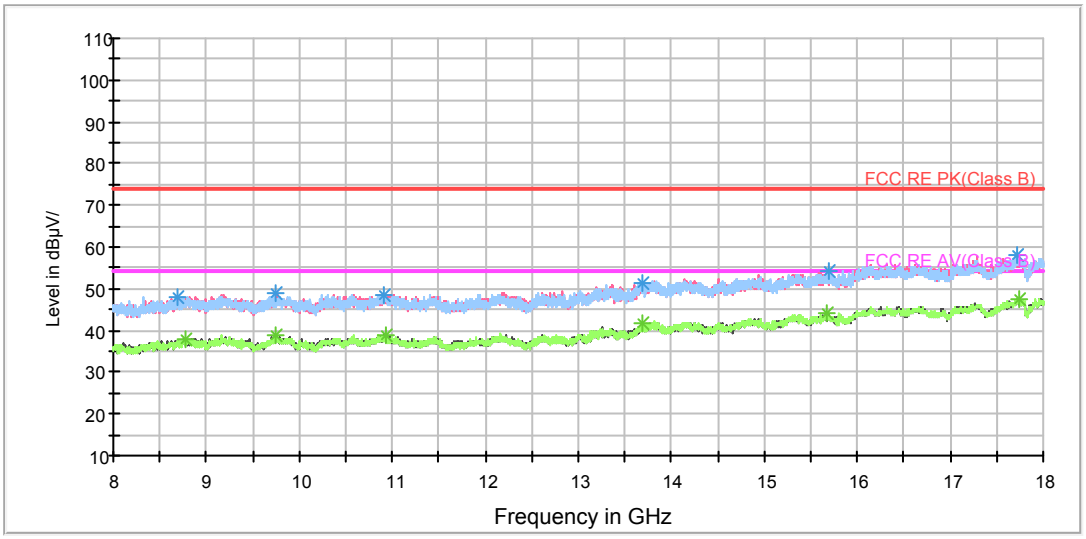
RE 3-18GHz PK+AV



Note: The signal beyond the limit is carrier.

Radiates Emission from 3GHz to 8GHz

RE 3-18GHz PK+AV



Radiates Emission from 8GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3441.875000	39.3	200.0	H	18.0	41.3	-2.0	34.7	74
3836.250000	49.0	100.0	H	77.0	50.0	-1.0	25.0	74
4431.875000	55.3	100.0	H	0.0	54.7	0.6	18.7	74
5231.250000	47.4	100.0	H	0.0	45.4	2.0	26.6	74
6645.625000	47.6	200.0	H	135.0	42.4	5.2	26.4	74
6975.625000	49.8	200.0	V	110.0	44.3	5.5	24.2	74

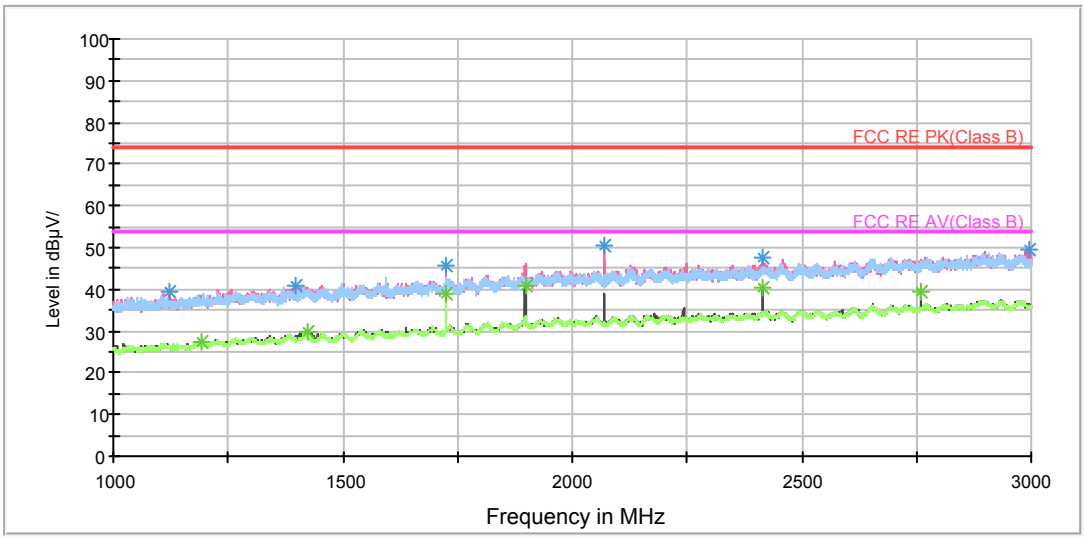
Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3511.875000	29.4	100.0	V	113.0	31.1	-1.7	24.6	54
3836.250000	46.6	100.0	H	77.0	47.6	-1.0	7.4	54
4427.500000	45.4	100.0	H	0.0	44.8	0.6	8.6	54
5403.125000	40.7	100.0	H	0.0	38.1	2.6	13.3	54
6637.500000	36.7	100.0	V	103.0	31.5	5.2	17.3	54
7561.250000	37.5	100.0	V	123.0	31.8	5.7	16.5	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

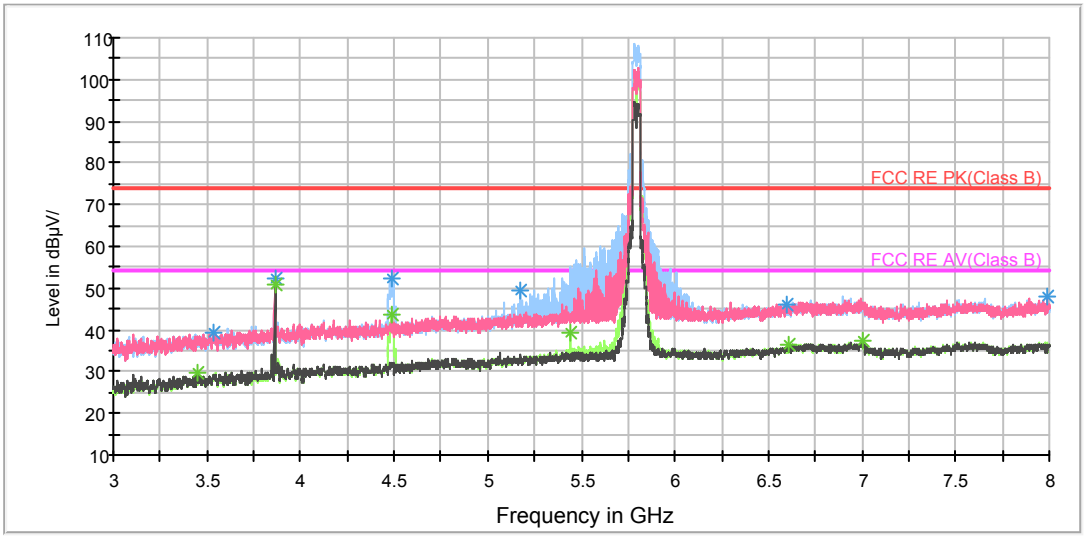
802.11n (HT40) CH159

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

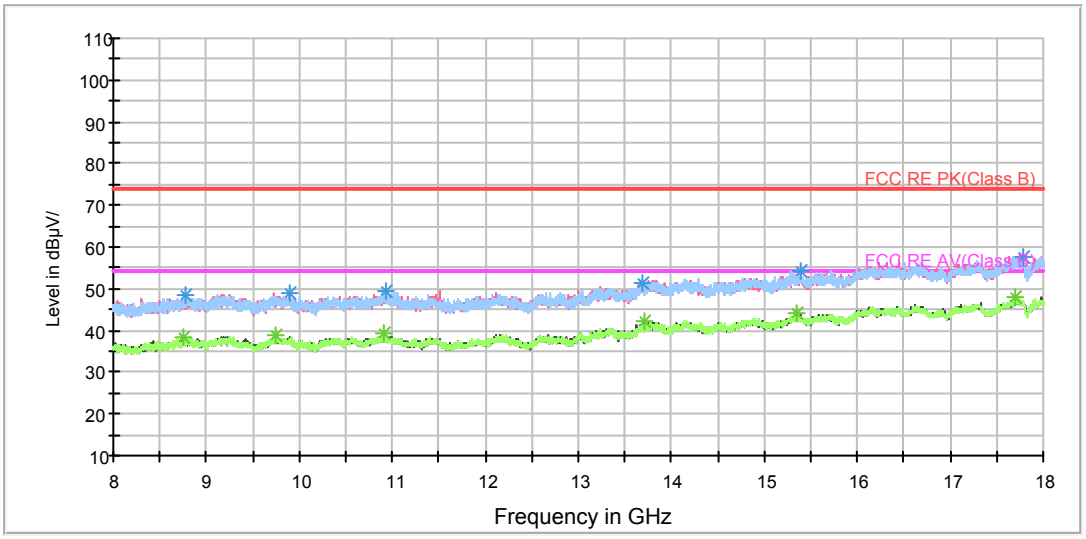
RE 3-18GHz PK+AV



Note: The signal beyond the limit is carrier.

Radiates Emission from 3GHz to 8GHz

RE 3-18GHz PK+AV



Radiates Emission from 8GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3531.250000	39.3	100.0	V	87.0	40.9	-1.6	34.7	74
3863.750000	52.3	100.0	V	57.0	53.2	-0.9	21.7	74
4485.000000	52.2	100.0	H	0.0	51.6	0.6	21.8	74
5171.250000	49.2	200.0	H	26.0	47.3	1.9	24.8	74
6593.125000	46.1	100.0	V	126.0	41.0	5.1	27.9	74
7985.625000	48.1	100.0	V	263.0	42.0	6.1	25.9	74

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3450.000000	29.5	100.0	V	116.0	31.4	-1.9	24.5	54
3863.125000	50.8	100.0	V	57.0	51.7	-0.9	3.2	54
4490.000000	43.5	100.0	H	348.0	42.9	0.6	10.5	54
5443.125000	39.1	100.0	H	0.0	36.4	2.7	14.9	54
6606.250000	36.3	200.0	V	118.0	31.2	5.1	17.7	54
7007.500000	37.2	100.0	V	48.0	31.7	5.5	16.8	54

Remark: 1. Correction Factor = Antenna factor+ Insertion loss (cable loss + amplifier gain)

5.6. Conducted Emission

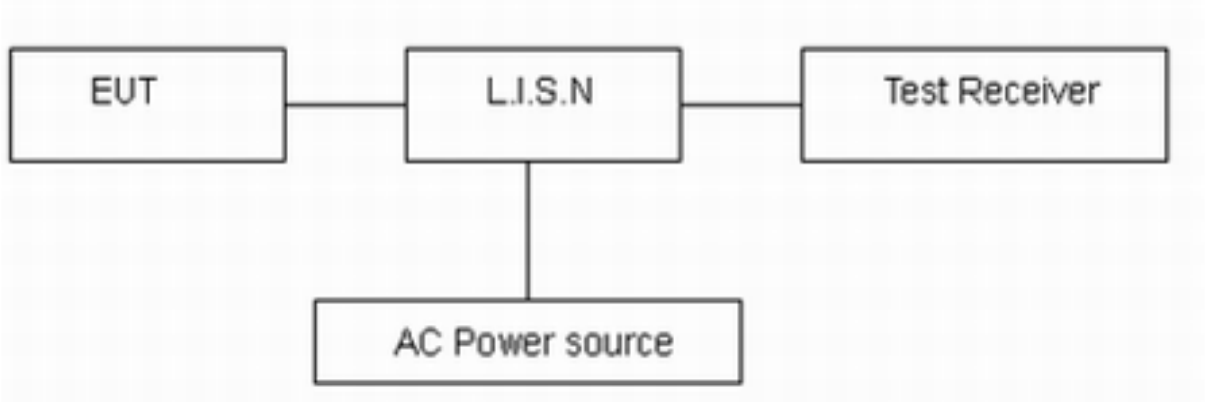
Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

The EUT IS placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.10-2013.Connect the AC power line of the EUT to the LISN Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9kHz, VBW is set to 30kHz The measurement result should include both L line and N line.
The test is in transmitting mode.

Test Setup



Note: AC Power source is used to change the voltage 110V/60Hz.

Limits

Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46*
0.5 - 5	56	46
5 - 30	60	50
*: Decreases with the logarithm of the frequency.		

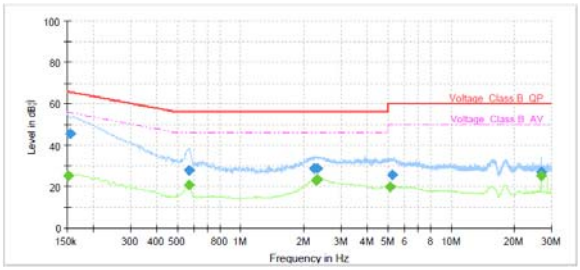
Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96, U= 2.69 dB.

Test Results:

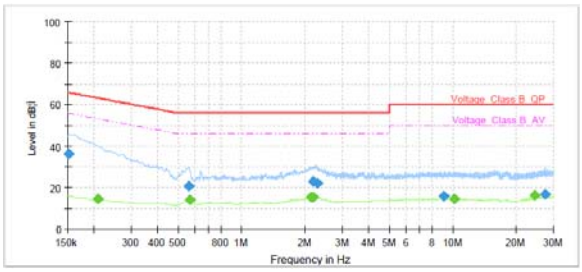
Following plots, Blue trace uses the peak detection and Green trace uses the average detection. During the test, the Conducted Emission was performed in all modes with all channels, 802.11n (HT20) CH165 are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

L Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.152250	---	25.24	55.88	30.63	1000.0	9.000	L1	ON	19.0
0.154500	45.57	---	65.75	20.18	1000.0	9.000	L1	ON	19.1
0.566250	---	20.73	46.00	25.27	1000.0	9.000	L1	ON	19.3
0.568500	27.83	---	56.00	28.17	1000.0	9.000	L1	ON	19.3
2.242500	28.54	---	56.00	27.46	1000.0	9.000	L1	ON	19.1
2.294250	---	23.17	46.00	22.83	1000.0	9.000	L1	ON	19.0
2.316750	28.63	---	56.00	27.37	1000.0	9.000	L1	ON	19.0
2.319000	---	23.28	46.00	22.72	1000.0	9.000	L1	ON	19.0
5.113500	---	19.83	50.00	30.17	1000.0	9.000	L1	ON	19.1
5.219250	25.82	---	60.00	34.18	1000.0	9.000	L1	ON	19.1
26.623500	---	25.21	50.00	24.79	1000.0	9.000	L1	ON	20.0
26.623500	26.85	---	60.00	33.15	1000.0	9.000	L1	ON	20.0

N Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.152250	36.41	---	65.88	29.46	1000.0	9.000	N	ON	19.1
0.208499	---	14.40	53.27	38.86	1000.0	9.000	N	ON	19.2
0.559500	21.01	---	56.00	34.99	1000.0	9.000	N	ON	19.3
0.568500	---	14.07	46.00	31.93	1000.0	9.000	N	ON	19.3
2.123248	---	15.27	46.00	30.73	1000.0	9.000	N	ON	19.1
2.170496	---	15.60	46.00	30.40	1000.0	9.000	N	ON	19.1
2.186246	22.83	---	56.00	33.17	1000.0	9.000	N	ON	19.1
2.285250	22.00	---	56.00	34.00	1000.0	9.000	N	ON	19.0
9.044225	15.75	---	60.00	44.25	1000.0	9.000	N	ON	19.3
10.126477	---	14.49	50.00	35.51	1000.0	9.000	N	ON	19.4
24.350514	---	16.34	50.00	33.66	1000.0	9.000	N	ON	19.6
27.480287	16.62	---	60.00	43.38	1000.0	9.000	N	ON	19.8

6. Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Date
Spectrum Analyzer	R&S	FSV40	15195-01-00	2018-05-20	2019-05-19
EMI Test Receiver	R&S	ESCI	100948	2018-05-20	2019-05-19
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2017-09-26	2019-09-25
TRILOG Broadband Antenna	SCHWARZBECK	VULB 9163	9163-201	2017-11-18	2019-11-17
Double Ridged Waveguide Horn Antenna	R&S	HF907	100126	2018-07-07	2020-07-06
Standard Gain Horn	ETS-Lindgren	3160-09	00102643	2018-06-20	2020-06-19
Standard Gain Horn	STEATITE	QSH-SL-26-40 -K-15	16779	2017-07-20	2019-07-19
Broadband Horn Antenna	SCHWARZBECK	BBHA 9120D	430	2018-07-07	2020-07-06
EMI Test Receiver	R&S	ESR	101667	2018-05-20	2019-05-19
LISN	R&S	ENV216	101171	2016-12-16	2019-12-15
Spectrum Analyzer	KEYSIGHT	N9020A	MY54420163	2017-12-17	2018-12-16
RF Cable	Agilent	SMA 15cm	0001	/	/
TEMPERATURE CHAMBER	WEISS	VT4002	582261194500 10	2017-12-17	2018-12-16
AV Power Meter	R&S	NRP	104306	2018-05-20	2019-05-19
Power Probe	R&S	NRP-Z21	104799	2018-05-20	2019-05-19
DC Power Supply	GWINSTEK	GPS-3030D	GEP882653	2018-05-20	2020-05-19
Software	R&S	EMC32	9.26.0	/	/

*******END OF REPORT *******