



RF TEST REPORT

Applicant Alcatel-Lucent Shanghai Bell CO. Ltd.

FCC ID 2ADZRHA030WB

Product 7368 Intelligent Services Access Manager CPE

Brand NOKIA

Model HA-030W-B

Report No. RBA1712-0148RF04R1

Issue Date March 22, 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.

Handwritten signature of Xianqing Li.

Performed by: Xianqing Li

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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: December 18, 2017 ~ March 7, 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.
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2. General Description of Equipment under Test

Client Information

Applicant	Alcatel-Lucent Shanghai Bell CO. Ltd.
Applicant address	388-389#, Ningqiao Road, Pudong Jinqiao, Shanghai, P.R. China
Manufacturer	TAICANG T&W ELECTRONICS CO.,LTD
Manufacturer address	89# Jiang Nan RD, Lu Du, Taicang, Jiangsu, China

General information

EUT Description	
Model	HA-030W-B
SN	/
Hardware Version	PEM2
Software Version	Null
Power Supply	AC adapter
Antenna Type	Internal Antenna
Antenna Gain	Antenna 1: 4.0 dBi Antenna 2: 4.0 dBi Antenna 3: 4.0 dBi Antenna 4: 4.0 dBi
Directional Gain	10.02 dBi
additional beamforming gain	6 dB
Test Mode(s)	U-NII-1(5150MHz-5250MHz) U-NII-3(5725MHz-5850MHz)
Modulation Type	802.11a/n (HT20/HT40) : OFDM 802.11ac (HT20.HT40/HT80): OFDM
Max. Conducted Power	29.50dBm
Operating Frequency Range(s)	U-NII-1: 5150-5250MHz U-NII-3: 5725-5850MHz
EUT Accessory	
Adapter 1	Manufacturer: Dongguan Shilong Fuhua Electronic Co., Ltd Model: 1AF31249AAAA
Adapter 2	Manufacturer: RUIDE Model: RD1202000-C55-80MG

Note: The information of the EUT is declared by the manufacturer.

2. There is more than one Adapter, each one should be applied throughout the compliance test respectively, and however, only the worst case (Adapter 1 for Radiated Emission, Adapter 2 for Conducted Emission) will be recorded in this report.

**EUT Configuration**

No.	Name	Model/Code No.	Edition	Serial No. or Quantity
1	EMA-HA-030W-B	3FE47429AA	PEM2	PEM 1
2	EMA-HA-030W-B	3FE47429AB	PEM2	PEM 1
3	Power adapter	1AF31249AAAA	A/0	UE171030GWAD01 - R 1
4	Power adapter	RD1202000-C55-80MG	A/0	PEM 1

ONT Mnemonic	Kit Code	EMA Code	Part Description	Power Adapter	
HA-030W-B	3FE47357AA	3FE47429AA	Wi-Fi Access Point and range extender, 3xGE UNI, 3x3 11n+4x4 11ac, US plug	1AF31249 AAAA	RD1202000-C55-80MG
HA-030W-B	3FE47357AB	3FE47429AB	Wi-Fi Access Point and range extender, 3xGE UNI, 3x3 11n+4x4 11ac, Telmex spec		

Auxiliary Equipment

No.	Name	Brand name	Model	ASB code	Valid Until
1	SmartBits 600B	Sprint	DE7853	-	No Cal. Required
2	PC	HP	N.A	-	No Cal. Required
3	PC	DELL	N.A	-	No Cal. Required
4	PC	Thinkpad	N.A	-	No Cal. Required

Ports

No.	Port name	Number	Shielded or unshielded	Cable type (optic, twisted pair, etc.)	Max. Cable length
1	AC port	1	Unshielded	-	-
2	GE	4	Unshielded	-	-



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 v02

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 stand-up position (Z 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	Antenna 3	Antenna 4
802.11a	6	6	6	6
802.11n HT20	MCS0	MCS0	MCS0	MCS0
802.11n HT40	MCS0	MCS0	MCS0	MCS0
802.11ac HT20	MCS0	MCS0	MCS0	MCS0
802.11ac HT40	MCS0	MCS0	MCS0	MCS0
802.11ac HT80	MCS0	MCS0	MCS0	MCS0

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

Test Cases	MIMO Antenna 1	MIMO Antenna 2	MIMO Antenna 3	MIMO Antenna 4
Average conducted output power	O	O	O	O
Occupied bandwidth	O	O	O	O
Frequency stability	O	O	O	O
Power Spectral Density	O	O	O	O
Unwanted Emissions	O	O	O	O
Conducted Emissions	O	O	O	O
Note: "O": test all bands				



Wireless Technology and Frequency Range

Wireless Technology	Bandwidth	Channel	Frequency	
Wi-Fi	U-NII-1	20 MHz	36	
			40	
			44	
			48	
		40 MHz	38	
			46	
	U-NII-3	80 MHz	42	
		20 MHz	149	
			157	
			165	
		40 MHz	151	
			159	
		80 MHz	155	
Does this device support TPC Function? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				
Does this device support TDWR Band? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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.

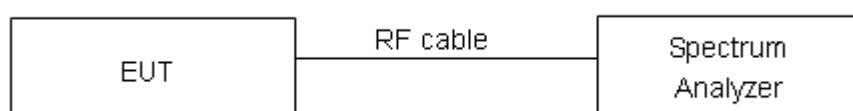
For U-NII-1, set RBW \approx 1% OCB kHz, VBW \geq 3 \times RBW, measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 26 dB relative to the maximum level measured in the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

For U-NII-3, Set RBW = 100 kHz, VBW \geq 3 \times 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**

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 26 dB bandwidth (MHz)	Conclusion
802.11a	5180	16.779	21.38	PASS
	5200	16.768	21.25	PASS
	5240	16.728	21.22	PASS
802.11n HT20	5180	18.067	28.90	PASS
	5200	19.959	30.00	PASS
	5240	21.182	30.00	PASS
802.11n HT40	5190	36.326	40.03	PASS
	5230	40.026	60.00	PASS
802.11ac HT20	5180	18.093	29.77	PASS
	5200	20.733	30.00	PASS
	5240	20.472	30.00	PASS
802.11ac HT40	5190	36.306	39.95	PASS
	5230	39.271	60.00	PASS
802.11ac HT80	5210	74.997	81.27	PASS

U-NII-3

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Minimum 6 dB bandwidth (MHz)	Limit (kHz)	Conclusion
802.11a	5745	18.135	16.39	500	PASS
	5785	19.371	16.36	500	PASS
	5825	21.662	16.32	500	PASS
802.11n HT20	5745	18.291	17.62	500	PASS
	5785	18.197	17.60	500	PASS
	5825	19.334	17.63	500	PASS
802.11n HT40	5755	36.732	36.35	500	PASS
	5795	37.221	36.42	500	PASS
802.11ac HT20	5745	18.356	17.64	500	PASS
	5785	18.643	17.59	500	PASS
	5825	20.040	17.59	500	PASS
802.11ac HT40	5755	36.811	36.38	500	PASS
	5795	37.378	36.41	500	PASS
802.11ac HT80	5775	76.054	75.83	500	PASS



U-NII-1

U-NII-1, 802.11a

Carrier frequency (MHz): 5180



U-NII-1, 802.11n HT20

Carrier frequency (MHz): 5180



U-NII-1, 802.11a

Carrier frequency (MHz): 5200



U-NII-1, 802.11n HT20

Carrier frequency (MHz): 5200



U-NII-1, 802.11a

Carrier frequency (MHz): 5240



U-NII-1, 802.11n HT20

Carrier frequency (MHz): 5240





U-NII-1, 802.11n HT40

Carrier frequency (MHz): 5190



U-NII-1, 802.11ac HT20

Carrier frequency (MHz): 5180



U-NII-1, 802.11n HT40

Carrier frequency (MHz): 5230



U-NII-1, 802.11ac HT20

Carrier frequency (MHz): 5200



U-NII-1, 802.11ac HT20

Carrier frequency (MHz): 5240





U-NII-1, 802.11ac HT40

Carrier frequency (MHz): 5190



U-NII-1, 802.11ac HT80

Carrier frequency (MHz): 5210



U-NII-1, 802.11ac HT40

Carrier frequency (MHz): 5230

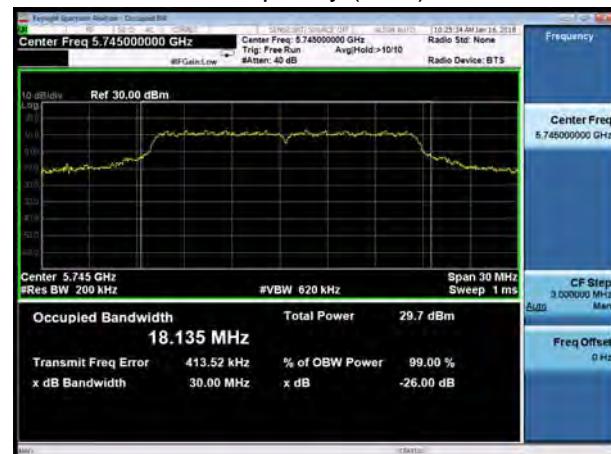




U-NII-3 99% bandwidth

U-NII-3, 802.11a

Carrier frequency (MHz): 5745



U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5745



U-NII-3, 802.11a

Carrier frequency (MHz): 5785



U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5785



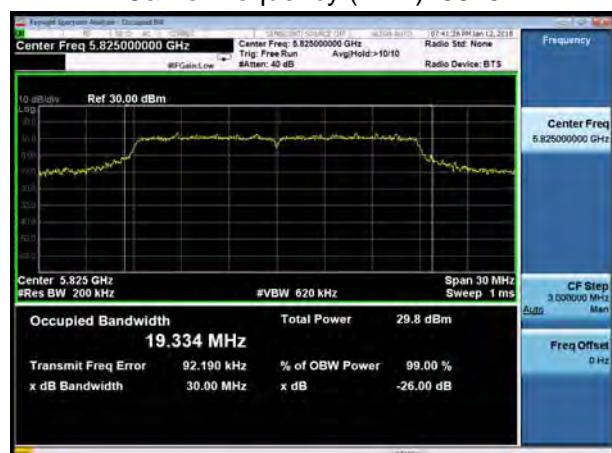
U-NII-3, 802.11a

Carrier frequency (MHz): 5825



U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5825





U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5755



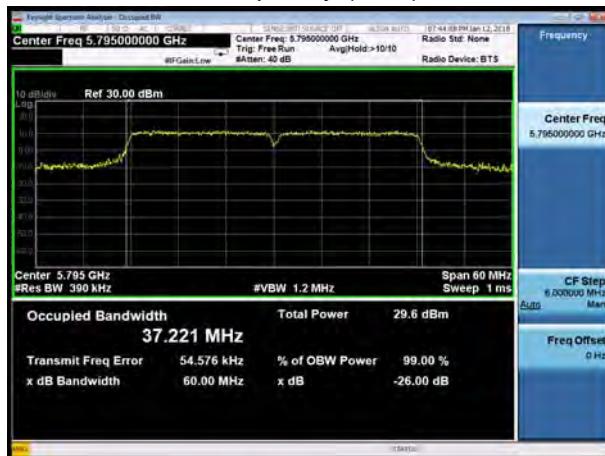
U-NII-3, 802.11ac HT20

Carrier frequency (MHz): 5745



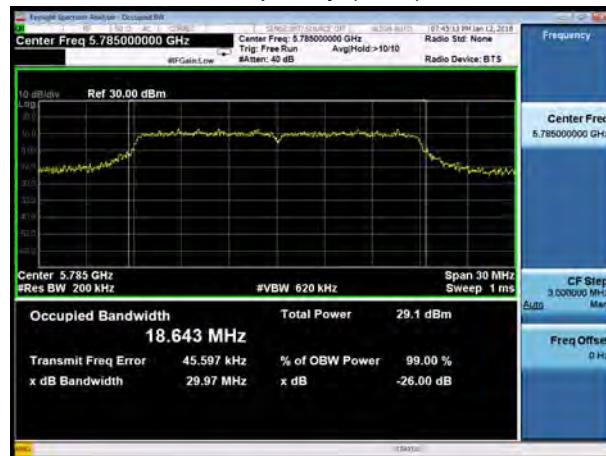
U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5795



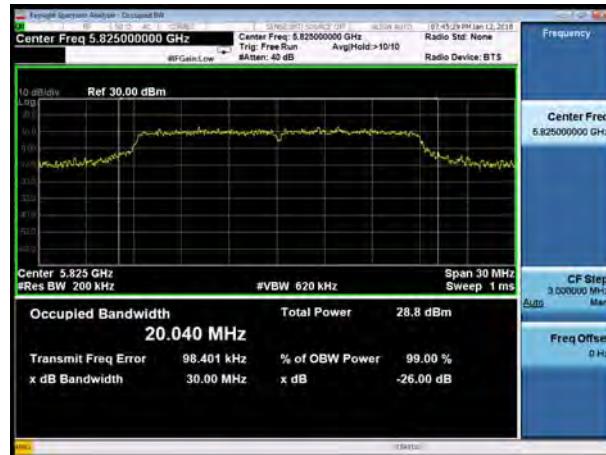
U-NII-3, 802.11ac HT20

Carrier frequency (MHz): 5785



U-NII-3, 802.11ac HT20

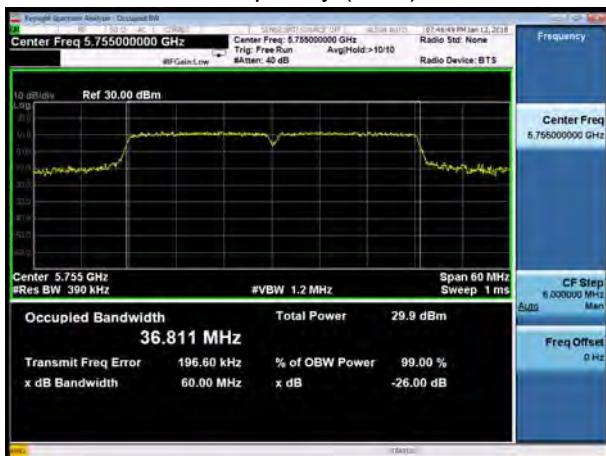
Carrier frequency (MHz): 5825





U-NII-3, 802.11ac HT40

Carrier frequency (MHz): 5755



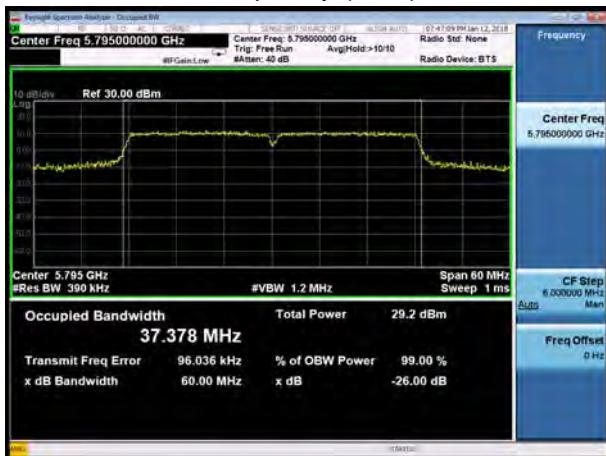
U-NII-3, 802.11ac HT80

Carrier frequency (MHz): 5775



U-NII-3, 802.11ac HT40

Carrier frequency (MHz): 5795





U-NII-3 Minimum 6 dB bandwidth

U-NII-3, 802.11a

Carrier frequency (MHz): 5745



U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5745



U-NII-3, 802.11a

Carrier frequency (MHz): 5785



U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5785



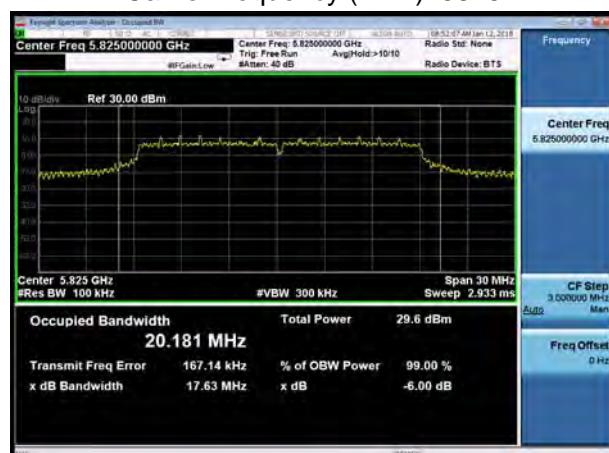
U-NII-3, 802.11a

Carrier frequency (MHz): 5825



U-NII-3, 802.11n HT20

Carrier frequency (MHz): 5825





U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5755



U-NII-3, 802.11ac HT20

Carrier frequency (MHz): 5745



U-NII-3, 802.11n HT40

Carrier frequency (MHz): 5795



U-NII-3, 802.11ac HT20

Carrier frequency (MHz): 5785



U-NII-3, 802.11ac HT20

Carrier frequency (MHz): 5825





U-NII-3, 802.11ac HT40

Carrier frequency (MHz): 5755



U-NII-3, 802.11ac HT80

Carrier frequency (MHz): 5775



U-NII-3, 802.11ac HT40

Carrier frequency (MHz): 5795





5.2. Average Power Output –Conducted

Ambient condition

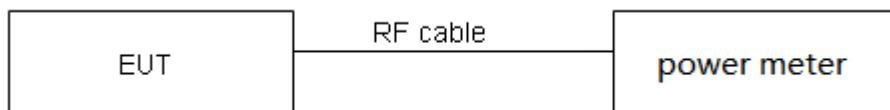
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

During the process of the testing, The EUT was connected to 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)

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.

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.

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	2.17	0.95	0.21
802.11n HT20	1.92	2.02	0.95	0.23
802.11n HT40	0.94	1.04	0.90	0.44
802.11ac HT20	1.93	1.97	0.98	NA
802.11ac HT40	0.95	0.98	0.97	0.13
802.11ac HT80	0.95	0.98	0.97	0.14

Note: when Duty cycle>0.98, Duty cycle correction Factor not required.

**Test results****U-NII-1****MIMO without Beamforming**

Network Standards	Channel/ Frequency (MHz)	Output Power										Limit (dBm)	Conclusion		
		Antenna 1		Antenna 2		Antenna 3		Antenna 4							
		Read Value (dBm)	Output Power (dBm)												
802.11a	36/5180	18.61	18.82	17.95	18.16	18.28	18.49	17.65	17.86	24.37	30.00	PASS			
	40/5200	18.53	18.74	17.63	17.84	18.10	18.31	17.42	17.63	24.18	30.00	PASS			
	48/5240	18.17	18.38	17.84	18.05	18.28	18.49	17.71	17.92	24.24	30.00	PASS			
802.11n HT20	36/5180	18.82	19.05	18.01	18.24	18.53	18.76	17.45	17.68	24.48	30.00	PASS			
	40/5200	16.30	16.53	16.20	16.43	16.37	16.60	15.32	15.55	22.32	30.00	PASS			
	48/5240	18.08	18.31	17.75	17.98	18.20	18.43	17.34	17.57	24.11	30.00	PASS			
802.11n HT40	38/5190	15.03	15.48	14.81	15.26	14.55	15.00	13.83	14.28	21.05	30.00	PASS			
	46/5230	21.19	21.64	20.75	21.20	21.21	21.66	20.64	21.09	27.43	30.00	PASS			
802.11ac HT20	36/5180	18.65	18.65	17.91	17.91	18.26	18.26	17.29	17.29	24.08	30.00	PASS			
	40/5200	18.67	18.67	17.72	17.72	18.32	18.32	17.30	17.30	24.06	30.00	PASS			
	48/5240	18.26	18.26	17.86	17.86	18.21	18.21	17.67	17.67	24.03	30.00	PASS			
802.11ac HT40	38/5190	17.88	18.02	16.55	16.69	17.64	17.78	16.61	16.75	23.38	30.00	PASS			
	46/5230	21.59	21.73	21.11	21.25	21.49	21.63	20.94	21.08	27.45	30.00	PASS			
802.11ac HT80	42/5210	17.48	17.62	16.93	17.07	17.07	17.21	16.24	16.38	23.12	30.00	PASS			

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

The Total Power = $10\log(10^{(\text{Power antenna1 in dBm}/10)} + 10^{(\text{Power antenna2 in dBm}/10)} + 10^{(\text{Power antenna3 in dBm}/10)} + 10^{(\text{PSD antenna4 in dBm}/10)})$.

2. The manufacturer declared the transmitter output signals is CDD mode And $N_{ss}=1$. According to KDB 662911 D01

Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain, Directional gain = $G_{ANT} + \text{Array Gain}$,

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 = $G_{ANT} + \text{Array Gain} = 4+0=4$ dBi < 6dBi. So the power limit is 30dBm.



U-NII-3

MIMO without Beamforming

Network Standards	Channel/ Frequency (MHz)	Output Power										Limit (dBm)	Conclusion		
		Antenna 1		Antenna 2		Antenna 3		Antenna 4							
		Read Value (dBm)	Output Power (dBm)												
802.11a	149/5745	23.67	23.88	23.42	23.63	22.90	23.11	22.17	22.38	29.31	30.00	PASS			
	157/5785	23.49	23.70	23.32	23.53	22.68	22.89	22.27	22.48	29.20	30.00	PASS			
	165/5825	23.38	23.59	23.09	23.30	22.77	22.98	22.58	22.79	29.20	30.00	PASS			
802.11n HT20	149/5745	23.52	23.75	22.44	22.67	22.02	22.25	21.28	21.51	28.64	30.00	PASS			
	157/5785	23.43	23.66	23.33	23.56	22.66	22.89	22.22	22.45	29.19	30.00	PASS			
	165/5825	23.55	23.78	23.79	24.02	22.84	23.07	22.74	22.97	29.50	30.00	PASS			
802.11n HT40	151/5755	22.29	22.74	22.12	22.57	22.45	22.90	21.47	21.92	28.57	30.00	PASS			
	159/5795	22.67	23.12	22.39	22.84	22.75	23.20	21.86	22.31	28.91	30.00	PASS			
802.11ac HT20	149/5745	23.51	23.51	22.65	22.65	22.01	22.01	21.63	21.63	28.53	30.00	PASS			
	157/5785	23.53	23.53	23.40	23.40	22.59	22.59	22.28	22.28	29.00	30.00	PASS			
	165/5825	23.57	23.57	23.46	23.46	22.69	22.69	22.66	22.66	29.14	30.00	PASS			
802.11ac HT40	151/5755	22.97	23.11	22.40	22.54	22.69	22.83	21.87	22.01	28.67	30.00	PASS			
	159/5795	22.77	22.91	22.58	22.72	22.72	22.86	22.11	22.25	28.72	30.00	PASS			
802.11ac HT80	155/5775	22.04	22.18	21.94	22.08	21.95	22.09	21.75	21.89	28.09	30.00	PASS			

Note: 1. For Total Power, according to KDB 662911 D01 Multiple Transmitter Output v02r01 1),
The Total Power = $10\log(10^{(\text{Power antenna1 in dBm}/10)} + 10^{(\text{Power antenna2 in dBm}/10)} + 10^{(\text{Power antenna3 in dBm}/10)} + 10^{(\text{Power antenna4 in dBm}/10)})$.
2. The manufacturer declared the transmitter output signals is CDD mode And N_{ss}=1. 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,
For power measurements on IEEE 802.11 devices,
Array Gain = 0 dB (i.e., no array gain) for N_{ANT} ≤ 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} ≥ 5.
So directional gain = G_{ANT} + Array Gain = 4+0=4 dBi<6dBi. So the power limit is 30dBm.



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MIMO with Beamforming

Network Standards	Channel/ Frequency (MHz)	Output Power										Limit (dBm)	Conclusion		
		Antenna 1		Antenna 2		Antenna 3		Antenna 4							
		Read Value (dBm)	Output Power (dBm)												
802.11n HT20	36/5180	18.46	18.69	17.31	17.54	18.53	18.76	17.24	17.47	24.18	25.98	PASS			
	40/5200	18.11	18.34	17.19	17.42	18.17	18.40	17.02	17.25	23.90	25.98	PASS			
	48/5240	17.94	18.17	17.45	17.68	18.31	18.54	17.19	17.42	23.99	25.98	PASS			
802.11n HT40	38/5190	20.31	20.76	19.11	19.56	19.50	19.95	18.72	19.17	25.93	25.98	PASS			
	46/5230	19.63	20.08	19.19	19.64	19.73	20.18	19.09	19.54	25.89	25.98	PASS			
802.11ac HT20	36/5180	17.61	17.61	17.42	17.42	18.08	18.08	16.87	16.87	23.54	25.98	PASS			
	40/5200	18.28	18.28	17.34	17.34	18.04	18.04	17.11	17.11	23.74	25.98	PASS			
	48/5240	17.93	17.93	17.51	17.51	18.05	18.05	17.36	17.36	23.74	25.98	PASS			
802.11ac HT40	38/5190	20.33	20.47	19.28	19.42	19.98	20.12	19.06	19.20	25.86	25.98	PASS			
	46/5230	19.80	19.94	19.45	19.59	19.87	20.01	19.31	19.45	25.78	25.98	PASS			
802.11ac HT80	42/5210	19.94	20.08	19.33	19.47	19.41	19.55	18.72	18.86	25.54	25.98	PASS			

Note: 1. For Total Power, according to KDB 662911 D01 Multiple Transmitter Output v02r01 1),
The Total Power = $10\log(10^{(\text{Power antenna1 in dBm}/10)} + 10^{(\text{Power antenna2 in dBm}/10)} + 10^{(\text{Power antenna3 in dBm}/10)} + 10^{(\text{PSD antenna4 in dBm}/10)})$.

2. Direction gain calculation according to KDB662911 D01 Multiple Transmitter Output v02r01 F) 2) e) (i), If all antennas have the same gain, directional gain = GANT + 10 log(NANT/NSS)=4+10log(4/1)=10.02>6 dBi. So the power limit=30-(directional gain-6 dBi)=30-(10.02-6)=25.98 dBm.



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MIMO with Beamforming

Network Standards	Channel/ Frequency (MHz)	Output Power										Limit (dBm)	Conclusion		
		Antenna 1		Antenna 2		Antenna 3		Antenna 4							
		Read Value (dBm)	Output Power (dBm)												
802.11n HT20	149/5745	19.63	19.86	19.62	19.85	19.51	19.74	18.64	18.87	25.62	25.98	PASS			
	157/5785	19.76	19.99	19.78	20.01	19.76	19.99	18.81	19.04	25.80	25.98	PASS			
	165/5825	19.70	19.93	19.61	19.84	19.39	19.62	18.90	19.13	25.66	25.98	PASS			
802.11n HT40	151/5755	19.26	19.71	19.22	19.67	19.71	20.16	18.81	19.26	25.74	25.98	PASS			
	159/5795	19.40	19.85	19.15	19.60	19.64	20.09	18.78	19.23	25.73	25.98	PASS			
802.11ac HT20	149/5745	19.65	19.65	19.66	19.66	19.79	19.79	18.77	18.77	25.51	25.98	PASS			
	157/5785	19.66	19.66	19.65	19.65	19.77	19.77	18.87	18.87	25.52	25.98	PASS			
	165/5825	19.81	19.81	19.64	19.64	19.61	19.61	18.82	18.82	25.51	25.98	PASS			
802.11ac HT40	151/5755	19.58	19.72	19.58	19.72	19.47	19.61	18.84	18.98	25.54	25.98	PASS			
	159/5795	19.60	19.74	19.54	19.68	19.54	19.68	18.90	19.04	25.57	25.98	PASS			
802.11ac HT80	155/5775	19.28	19.42	19.26	19.40	19.13	19.27	18.46	18.60	25.21	25.98	PASS			

Note: 1. For Total Power, according to KDB 662911 D01 Multiple Transmitter Output v02r01 1),
The Total Power = $10\log(10^{(\text{Power antenna1 in dBm}/10)} + 10^{(\text{Power antenna2 in dBm}/10)} + 10^{(\text{Power antenna3 in dBm}/10)} + 10^{(\text{Power antenna4 in dBm}/10)})$.

2. Direction gain calculation according to KDB662911 D01 Multiple Transmitter Output v02r01 F) 2) e) (i), If all antennas have the same gain, directional gain = GANT + 10 log(NANT/NSS)=4+10log(4/1)=10.02>6 dBi. So the power limit=30-(directional gain-6 dBi)=30-(10.02-6)=25.98 dBm.



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 than 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 $k = 2$, $U = 936\text{Hz}$



Test Results

Voltage (V)	Temperature (°C)	U-NII-1 Test Results			
		5200MHz			
		1min	2min	5min	10min
12	-20	5199.997502	5199.993261	5199.985059	5199.982938
12	-10	5200.001106	5199.987446	5199.980274	5199.976304
12	0	5200.000095	5199.985562	5199.970942	5199.968559
12	10	5199.996109	5199.983594	5199.965812	5199.959597
12	20	5199.990647	5199.97896	5199.956915	5199.950832
12	30	5199.989139	5199.973689	5199.952134	5199.949671
12	40	5199.984635	5199.966926	5199.947932	5199.948853
12	50	5199.975293	5199.962228	5199.941996	5199.947692
10.2	20	5199.969414	5199.956608	5199.940632	5199.943189
13.8	20	5199.968863	5199.95567	5199.939728	5199.938771
MHz		-0.031137219	-0.044329818	-0.060271583	-0.061228703
PPM		-5.987926693	-8.52496506	-11.59068908	-11.77475052

Voltage (V)	Temperature (°C)	U-NII-3 Test Results			
		5785MHz			
		1min	2min	5min	10min
12	-20	5784.99667	5784.990456	5784.981587	5784.976913
12	-10	5784.990582	5784.986245	5784.979691	5784.976098
12	0	5784.985479	5784.984671	5784.976149	5784.972778
12	10	5784.975511	5784.977206	5784.970385	5784.971088
12	20	5784.966127	5784.97056	5784.969733	5784.961242
12	30	5784.959831	5784.960746	5784.963615	5784.95718
12	40	5784.956327	5784.951477	5784.962077	5784.949226
12	50	5784.949497	5784.95064	5784.95585	5784.943344
10.2	20	5784.942953	5784.94589	5784.948871	5784.933513
13.8	20	5784.93789	5784.945689	5784.946467	5784.933238
MHz		-0.062110064	-0.054310829	-0.053533372	-0.066762293
PPM		-10.73639823	-9.388215892	-9.253823981	-11.54058654



5.4. Power Spectral Density

Ambient condition

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

Method of Measurement

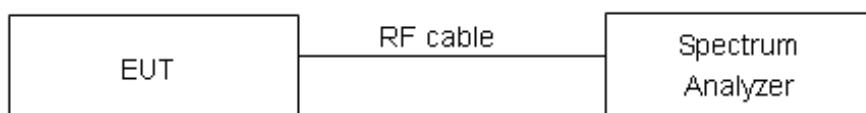
The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable.

Set RBW = 510 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 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.

Frequency Bands/MHz	Limits
5150-5250	17MHz
5725-5850	30dBm/500kHz



Measurement Uncertainty

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

**Test Results:****U-NII-1****MIMO without Beamforming**

Network Standards	Channel/Frequency (MHz)	Power Spectral Density								Limit (dBm/MHz)	Conclusion		
		Antenna 1		Antenna 2		Antenna 3		Antenna 4					
		Read Value (dBm/MHz)	PSD (dBm/MHz)	Read Value (dBm/MHz)	PSD (dBm/MHz)	Read Value (dBm/MHz)	PSD (dBm/MHz)	Read Value (dBm/MHz)	PSD (dBm/MHz)				
802.11a	36/5180	6.71	6.92	6.72	6.94	7.42	7.63	5.38	5.59	12.85	12.98 PASS		
	40/5200	6.76	6.97	6.53	6.75	7.26	7.47	5.47	5.68	12.79	12.98 PASS		
	48/5240	6.43	6.65	6.66	6.88	7.11	7.32	5.45	5.66	12.69	12.98 PASS		
802.11n HT20	36/5180	6.63	6.86	6.81	7.04	7.40	7.63	5.47	5.70	12.88	12.98 PASS		
	40/5200	4.40	4.63	3.41	3.64	3.07	3.30	3.68	3.91	9.92	12.98 PASS		
	48/5240	6.32	6.55	6.49	6.72	7.21	7.44	5.48	5.71	12.67	12.98 PASS		
802.11n HT40	38/5190	0.47	0.92	0.17	0.62	0.36	0.81	-0.84	-0.39	6.54	12.98 PASS		
	46/5230	6.83	7.29	5.90	6.36	6.06	6.52	4.84	5.30	12.44	12.98 PASS		
802.11ac HT20	36/5180	6.74	6.74	6.83	6.83	7.30	7.30	5.50	5.50	12.66	12.98 PASS		
	40/5200	6.53	6.53	6.53	6.53	7.07	7.07	5.48	5.48	12.46	12.98 PASS		
	48/5240	6.20	6.20	6.62	6.62	7.27	7.27	5.59	5.59	12.49	12.98 PASS		
802.11ac HT40	38/5190	3.25	3.39	2.44	2.58	2.73	2.87	2.21	2.35	8.84	12.98 PASS		
	46/5230	7.13	7.27	6.35	6.49	6.34	6.48	5.04	5.18	12.44	12.98 PASS		
802.11ac HT80	42/5210	0.703	0.85	-0.26	-0.11	0.43	0.58	-0.32	-0.17	6.33	12.98 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= $10\log(10^{(PSD_{antenna1} \text{ in dBm}/10)} + 10^{(PSD_{antenna2} \text{ in dBm}/10)} + 10^{(PSD_{antenna3} \text{ in dBm}/10)} + 10^{(PSD_{antenna4} \text{ in dBm}/10)})$ 3. The manufacturer declared the transmitter output signals is CDD mode And $Nss=1$. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain, Directional gain = GANT + Array Gain, For PSD measurements on all devices,Array Gain= $10\log(Nant/Nss)dB$,so directional gain=GANT+Array Gain= $4+10\log(4/1)=10.02>6$ dBi. So the PSD limit is $17-(\text{directional gain}-6 \text{ dBi})=17-(10.02-6)=12.98 \text{ dBm}$.



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MIMO without Beamforming

Network Standards	Channel/Frequency (MHz)	Power Spectral Density								Total Power (dBm/MHz)	Limit (dBm/MHz)	Conclusion			
		Antenna 1		Antenna 2		Antenna 3		Antenna 4							
		Read Value (dBm/MHz)	PSD (dBm/MHz)	Read Value (dBm/MHz)	PSD (dBm/MHz)	Read Value (dBm/MHz)	PSD (dBm/MHz)	Read Value (dBm/MHz)	PSD (dBm/MHz)						
802.11a	149/5745	9.66	9.88	9.80	10.02	8.83	9.05	8.80	9.01	15.53	25.98	PASS			
	157/5785	9.48	9.70	9.88	10.09	8.84	9.06	8.79	9.00	15.51	25.98	PASS			
	165/5825	9.41	9.63	9.50	9.71	8.76	8.97	9.17	9.38	15.45	25.98	PASS			
802.11n HT20	149/5745	9.51	9.74	9.42	9.65	9.19	9.42	8.04	8.27	15.33	25.98	PASS			
	157/5785	9.39	9.62	9.45	9.68	8.70	8.93	8.65	8.88	15.31	25.98	PASS			
	165/5825	9.62	9.85	9.79	10.02	9.09	9.32	9.15	9.38	15.67	25.98	PASS			
802.11n HT40	151/5755	5.02	5.47	4.76	5.21	5.34	5.79	4.74	5.19	11.45	25.98	PASS			
	159/5795	5.49	5.95	4.99	5.45	5.65	6.10	5.53	5.99	11.90	25.98	PASS			
802.11ac HT20	149/5745	9.06	9.06	9.34	9.34	8.95	8.95	8.18	8.18	14.92	25.98	PASS			
	157/5785	9.35	9.35	9.50	9.50	8.64	8.64	8.47	8.47	15.03	25.98	PASS			
	165/5825	9.30	9.30	9.61	9.61	8.67	8.67	8.78	8.78	15.13	25.98	PASS			
802.11ac HT40	151/5755	5.46	5.60	4.92	5.06	5.48	5.62	4.90	5.04	11.36	25.98	PASS			
	159/5795	5.44	5.58	5.60	5.74	5.73	5.88	5.97	6.11	11.85	25.98	PASS			
802.11ac HT80	155/5775	1.71	1.85	1.53	1.68	1.30	1.44	0.62	0.77	7.47	25.98	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= $10\log(10^{(\text{PSD antenna1 in dBm}/10)} + 10^{(\text{PSD antenna2 in dBm}/10)} + 10^{(\text{PSD antenna3 in dBm}/10)} + 10^{(\text{PSD antenna4 in dBm}/10)})$

3. The manufacturer declared the transmitter output signals is CDD mode And Nss=1. According to KDB 662911 D01 Multiple Transmitter Output v02r01 2)f)(i): If all antennas have the same gain, Directional gain = GANT + Array Gain, For PSD measurements on all devices,Array Gain= $10\log(N_{\text{ant}}/N_{\text{ss}})\text{dB}$,so directional gain=GANT+Array Gain=4+ $10\log(4/1)=10.02>6\text{ dBi}$. So the PSD limit is $30-(\text{directional gain}-6\text{ dBi})=30-(10.02-6)=25.98\text{ dBm}$.



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MIMO with Beamforming

Network Standards	Channel/ Frequency (MHz)	Power Spectral Density								Total Power (dBm /MHz)	Limit (dBm /MHz)	Conclusion			
		ANT1		ANT2		ANT3		ANT 4							
		Read Value (dBm /MHz)	PSD (dBm /MHz)												
802.11n HT20	36/5180	6.87	7.10	6.21	6.44	6.91	7.14	5.82	6.05	12.73	12.98	PASS			
	40/5200	6.88	7.11	6.07	6.30	6.78	7.01	5.80	6.03	12.66	12.98	PASS			
	48/5240	6.60	6.83	6.37	6.60	6.96	7.19	6.10	6.33	12.77	12.98	PASS			
802.11n HT40	38/5190	5.82	6.27	4.89	5.35	5.17	5.62	4.39	4.84	11.57	12.98	PASS			
	46/5230	5.38	5.83	5.27	5.72	3.75	4.21	4.86	5.32	11.33	12.98	PASS			
802.11ac HT20	36/5180	6.91	6.91	6.14	6.14	6.70	6.70	5.58	5.58	12.38	12.98	PASS			
	40/5200	6.73	6.73	6.41	6.41	6.65	6.65	5.76	5.76	12.42	12.98	PASS			
	48/5240	6.90	6.90	6.69	6.69	6.95	6.95	6.07	6.07	12.69	12.98	PASS			
802.11ac HT40	38/5190	6.03	6.17	5.08	5.23	5.58	5.72	4.78	4.93	11.56	12.98	PASS			
	46/5230	5.58	5.72	5.46	5.61	5.37	5.51	4.98	5.12	11.52	12.98	PASS			
802.11ac HT80	42/5210	3.71	3.85	3.11	3.25	3.05	3.19	2.46	2.60	9.27	12.98	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= $10\log(10^{(\text{PSD antenna1 in dBm}/10)} + 10^{(\text{PSD antenna2 in dBm}/10)} + 10^{(\text{PSD antenna3 in dBm}/10)} + 10^{(\text{PSD antenna4 in dBm}/10)})$
 3. Direction gain calculation according to KDB662911 D01 Multiple Transmitter Output v02r01 F) 2) e) (i).If all antennas have the same gain, directional gain = GANT + 10 log(NANT/NSS)=4+10log(4/1)=10.02>6 dBi.
 So the PSD limit is 17-(directional gain-6 dBi) =17-(10.02-6) =12.98 dBm.



U-NII-3

MIMO with Beamforming

Network Standards	Channel/Frequency (MHz)	Power Spectral Density								Total Power (dBm/500kHz)	Limit (dBm/500kHz)	Conclusion			
		Antenna 1		Antenna 2		Antenna 3		Antenna 4							
		Read Value (dBm/500kHz)	PSD (dBm/500kHz)												
802.11n HT20	149/5745	5.27	5.50	5.43	5.66	5.24	5.47	4.81	5.04	11.44	25.98	PASS			
	157/5785	5.42	5.65	5.47	5.70	5.46	5.69	4.98	5.21	11.59	25.98	PASS			
	165/5825	5.42	5.65	5.46	5.69	4.90	5.13	5.32	5.55	11.53	25.98	PASS			
802.11n HT40	151/5755	2.19	2.65	2.04	2.49	2.80	3.25	2.27	2.73	8.81	25.98	PASS			
	159/5795	2.74	3.20	2.19	2.64	2.47	2.92	2.57	3.02	8.97	25.98	PASS			
802.11ac HT20	149/5745	5.34	5.34	5.52	5.52	5.55	5.55	4.82	4.82	11.34	25.98	PASS			
	157/5785	5.26	5.26	5.41	5.41	5.27	5.27	5.38	5.38	11.35	25.98	PASS			
	165/5825	5.51	5.51	5.46	5.46	5.25	5.25	5.63	5.63	11.48	25.98	PASS			
802.11ac HT40	151/5755	2.32	2.47	2.12	2.26	2.75	2.89	1.46	1.61	8.35	25.98	PASS			
	159/5795	2.49	2.63	2.34	2.49	2.60	2.74	2.70	2.84	8.70	25.98	PASS			
802.11ac HT80	155/5775	-0.98	-0.83	-1.11	-0.96	-1.12	-0.98	-1.42	-1.28	5.01	25.98	PASS			

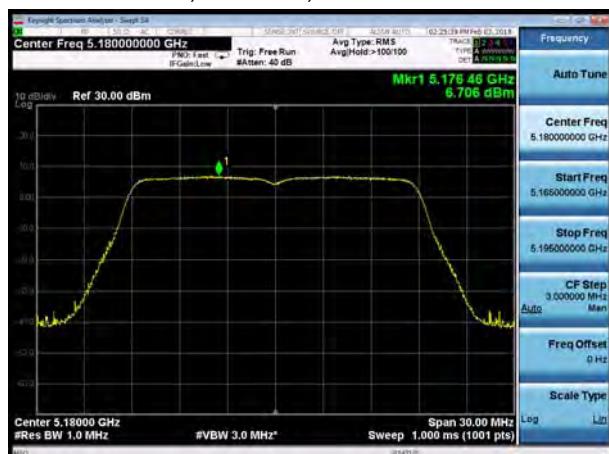
Note: 1. Power Spectral Density =Read Value+Duty cycle correction factor
2. For Total PSD, according to KDB 662911 D01 Multiple Transmitter Output v02r01 2)a),the power spectral density= $10\log(10^{(PSD_{antenna1} \text{ in dBm}/10)} + 10^{(PSD_{antenna2} \text{ in dBm}/10)} + 10^{(PSD_{antenna3} \text{ in dBm}/10)} + 10^{(PSD_{antenna4} \text{ in dBm}/10)})$
3. Direction gain calculation according to KDB662911 D01 Multiple Transmitter Output v02r01 F) 2) e) (i),If all antennas have the same gain, directional gain = GANT + 10 log(NANT/NSS)=4+10log(4/1)=10.02>6 dBi. So the PSD limit is 30-(directional gain-6 dBi) =30-(10.02-6) =25.98 dBm.



MIMO without Beamforming

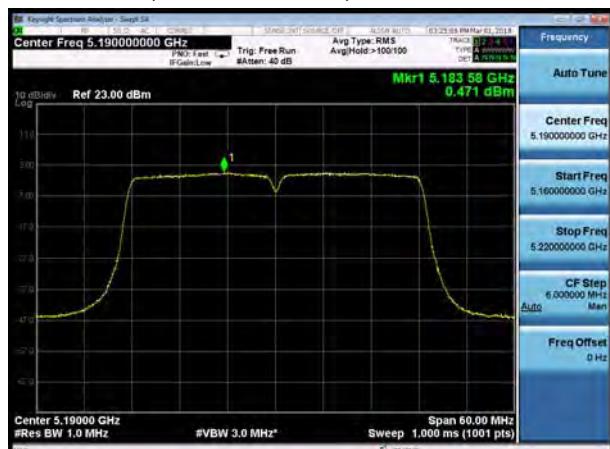
Antenna 1

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

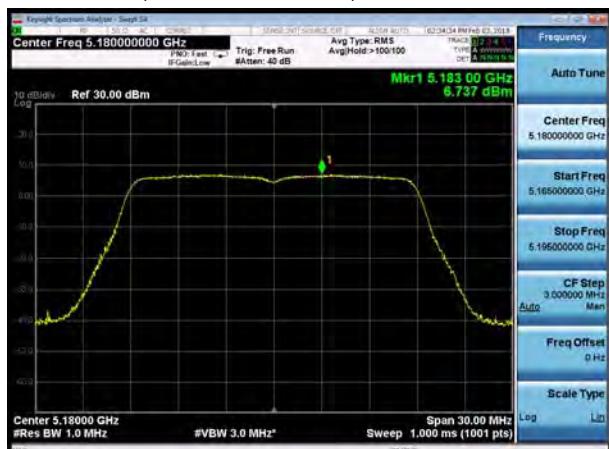




U-NII-1, 802.11n HT40, Channel No.: 38



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



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



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

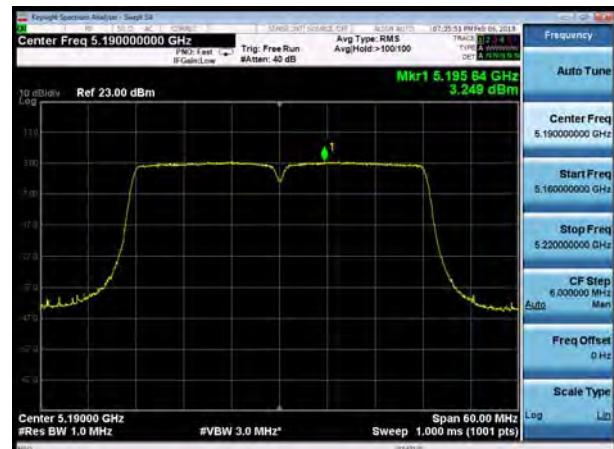


U-NII-1, 802.11ac HT20, Channel No.: 48





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



U-NII-1, 802.11ac HT80, Channel No.: 42



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





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



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



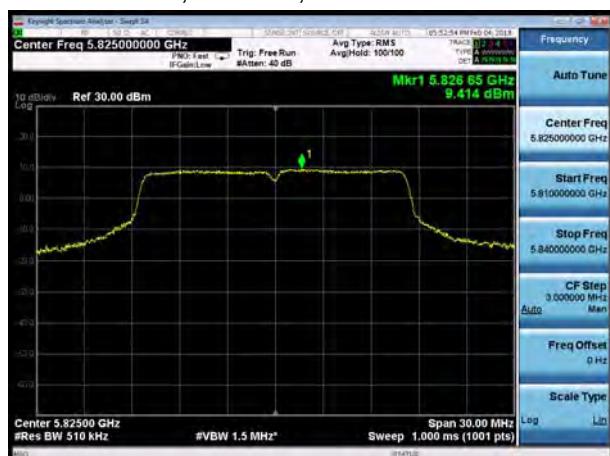
U-NII-3, 802.11a, Channel No.: 157



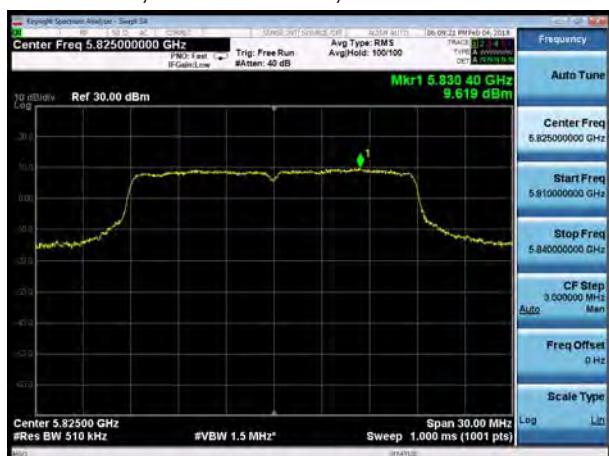
U-NII-3, 802.11n HT20, Channel No.: 157



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

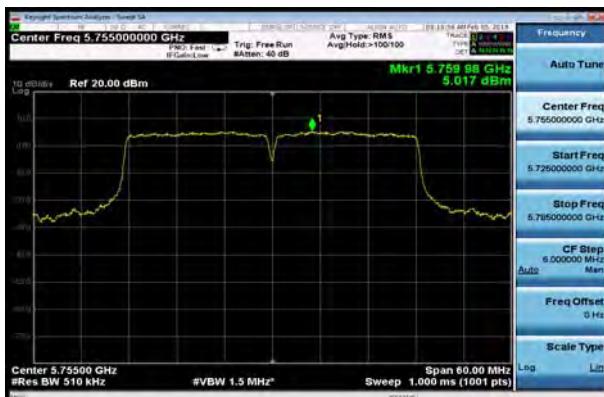


U-NII-3, 802.11n HT20, Channel No.: 165

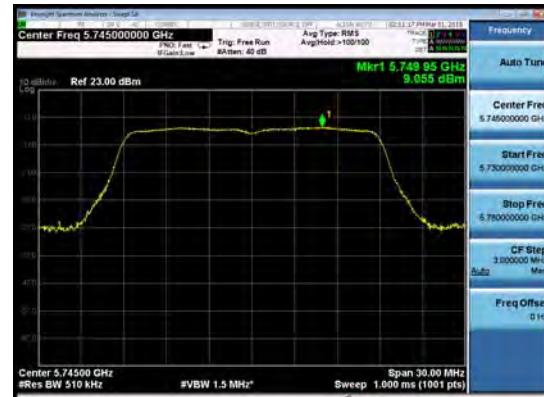




U-NII-3, 802.11n HT40, Channel No.: 151



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



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



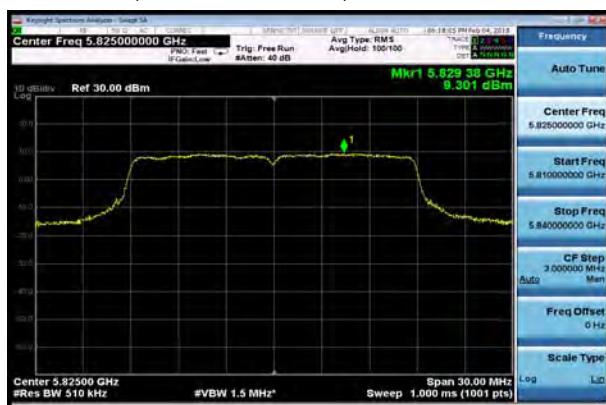
U-NII-3, 802.11ac HT20, Channel No.: 157



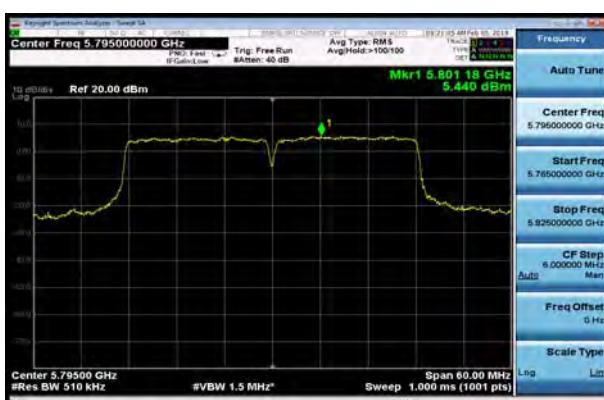
U-NII-3, 802.11ac HT40, Channel No.: 151



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



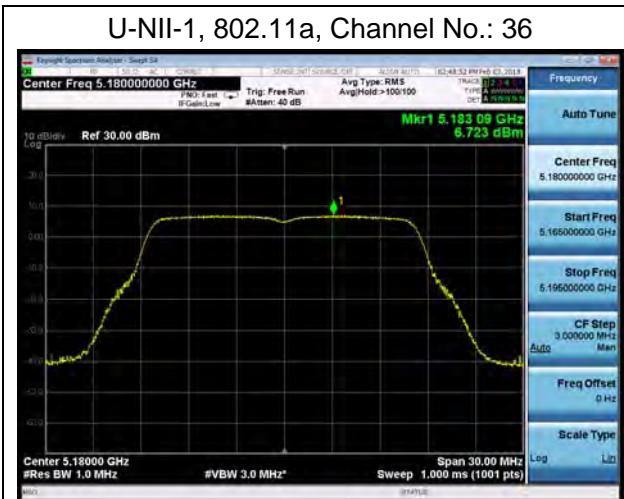
U-NII-3, 802.11ac HT40, Channel No.: 159



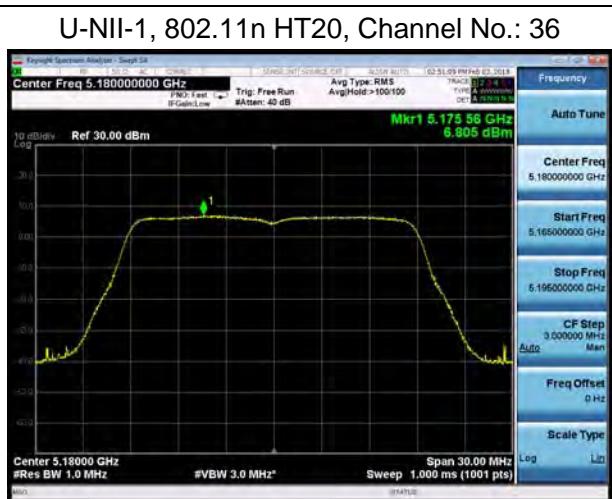
U-NII-3, 802.11ac HT80, Channel No.: 155



Antenna 2



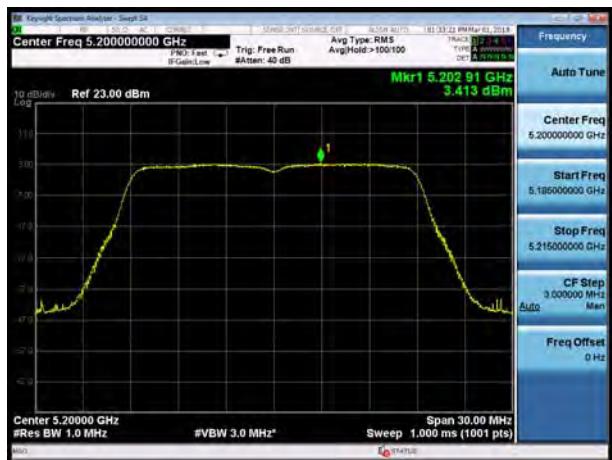
U-NII-1, 802.11a, Channel No.: 40



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



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



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

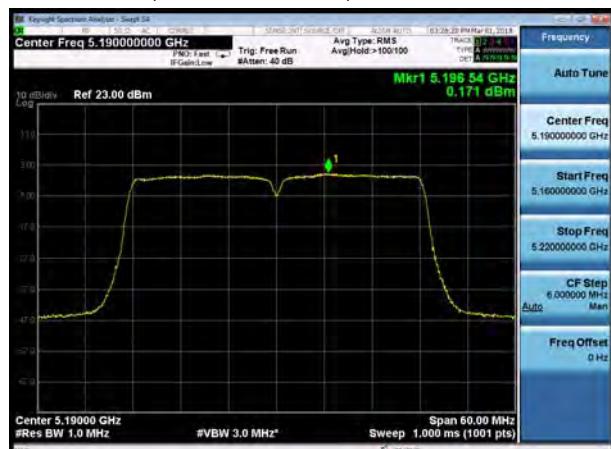


Analyst - Script 54

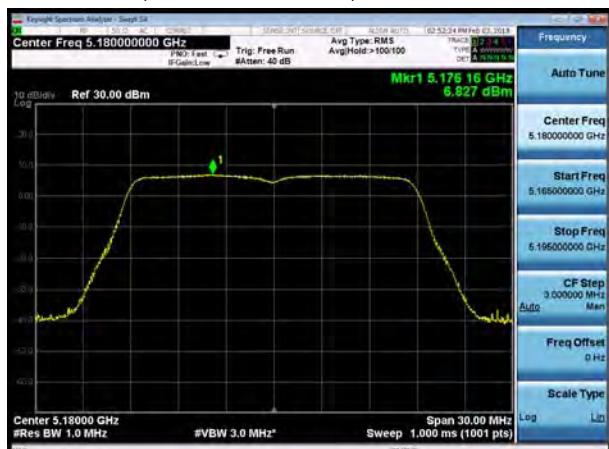




U-NII-1, 802.11n HT40, Channel No.: 38



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



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



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

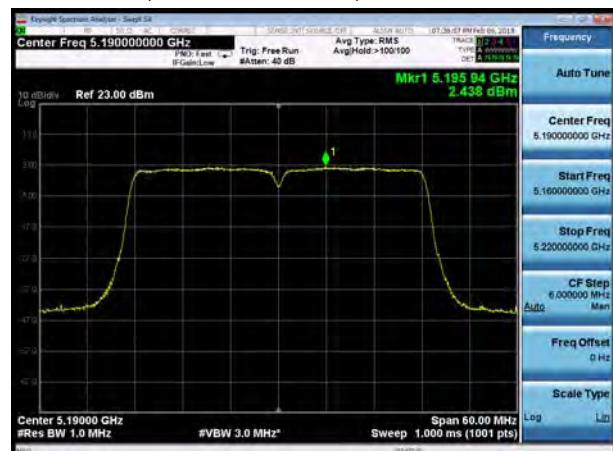


U-NII-1, 802.11ac HT20, Channel No.: 48





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



U-NII-1, 802.11ac HT80, Channel No.: 42



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





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



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



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



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



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

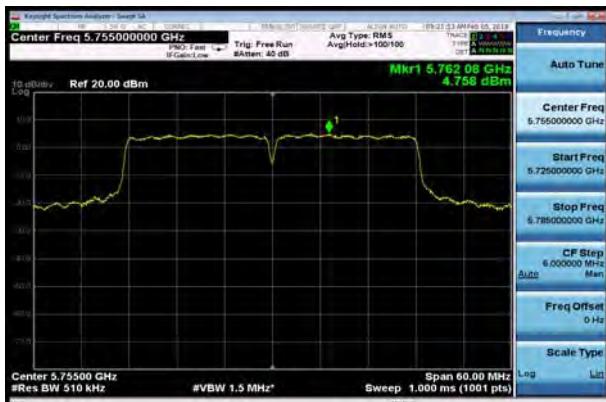


U-NII-3, 802.11n HT20, Channel No.: 165





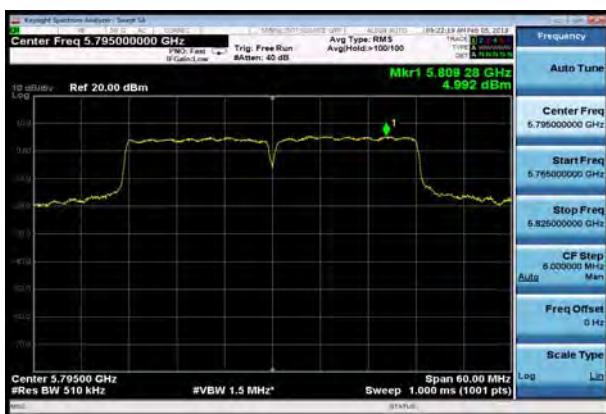
U-NII-3, 802.11n HT40, Channel No.: 151



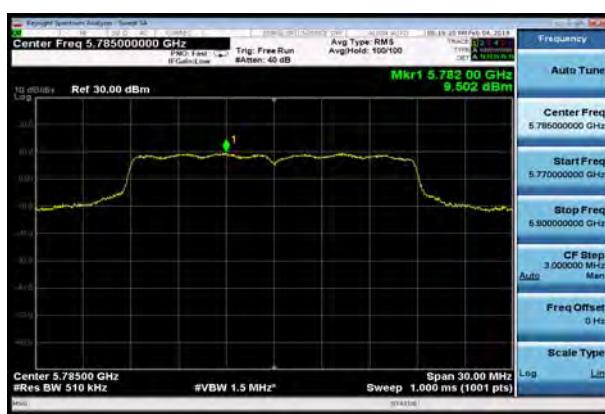
U-NII-3, 802.11ac HT20, Channel No.: 149



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



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



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



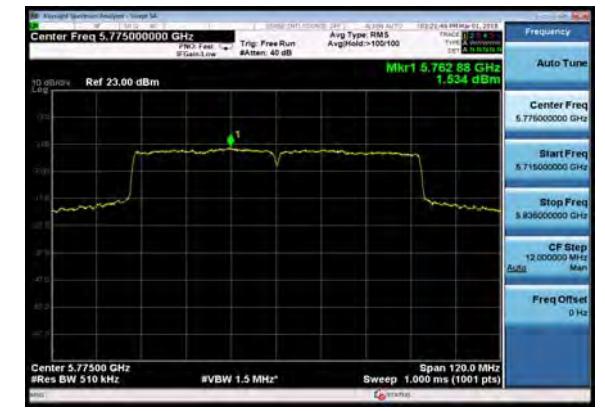
U-NII-3, 802.11ac HT20, Channel No.: 165



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



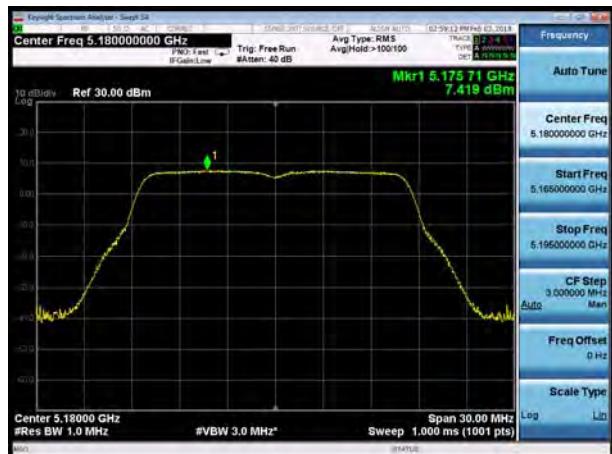
U-NII-3, 802.11ac HT80, Channel No.: 155





Antenna 3

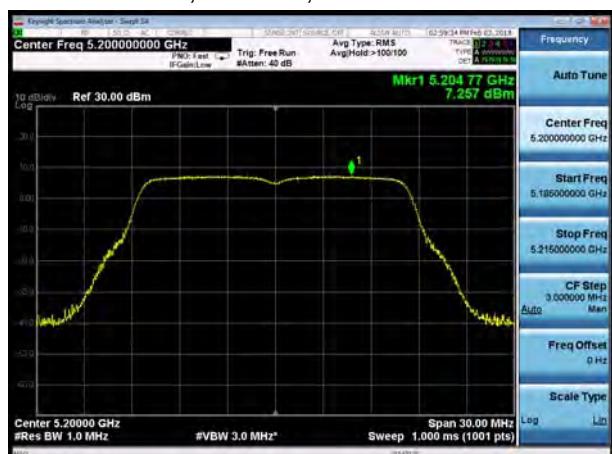
U-NII-1, 802.11a, Channel No.: 36



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



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



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



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

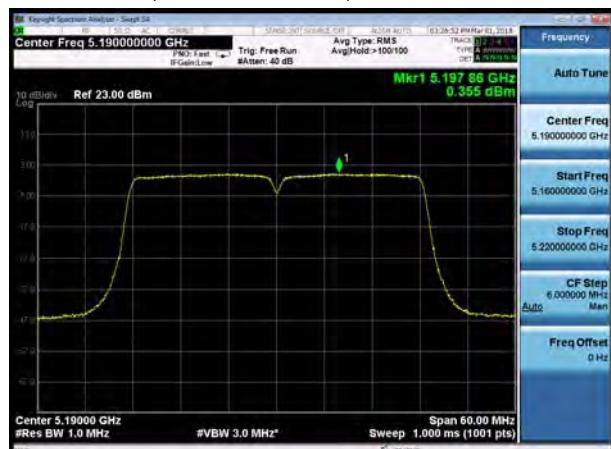


U-NII-1, 802.11n HT20, Channel No.: 48

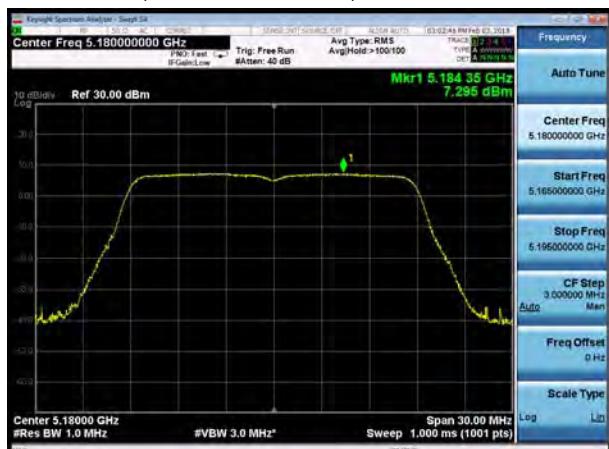




U-NII-1, 802.11n HT40, Channel No.: 38



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



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



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

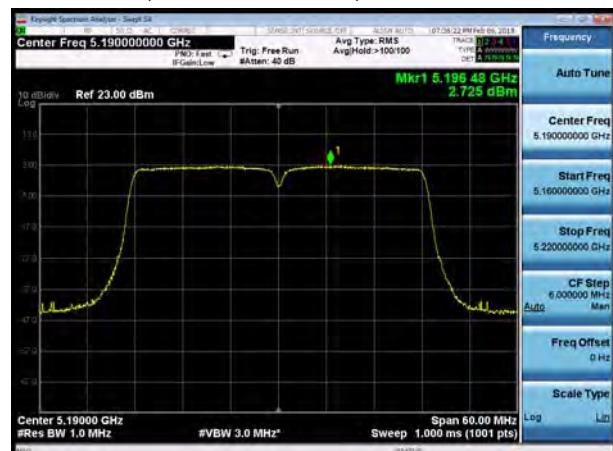


U-NII-1, 802.11ac HT20, Channel No.: 48





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



U-NII-1, 802.11ac HT80, Channel No.: 42



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





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



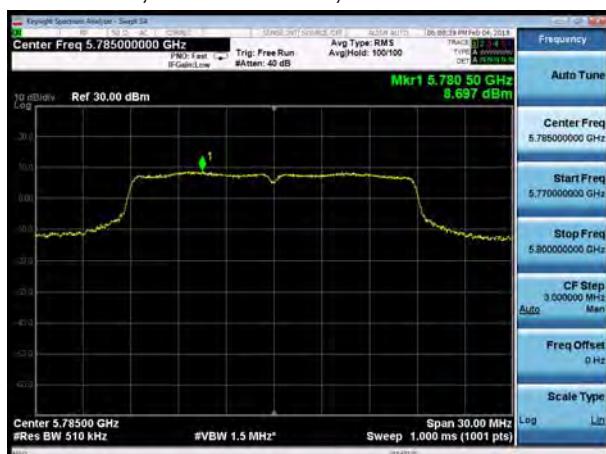
U-NII-3, 802.11n HT20, Channel No.: 149



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



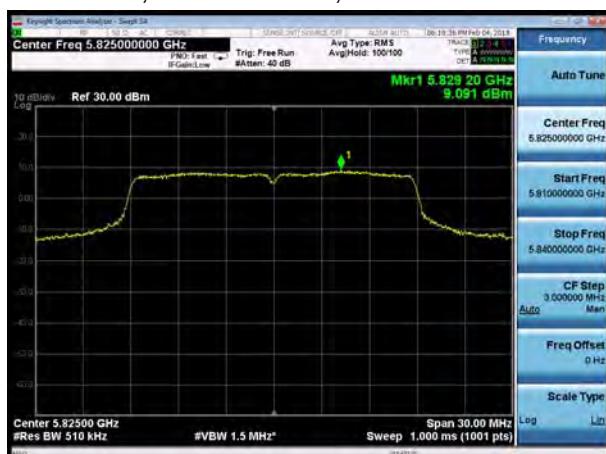
U-NII-3, 802.11n HT20, Channel No.: 157



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



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





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



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



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



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



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



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



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



U-NII-3, 802.11ac HT80, Channel No.: 155





Antenna 4

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



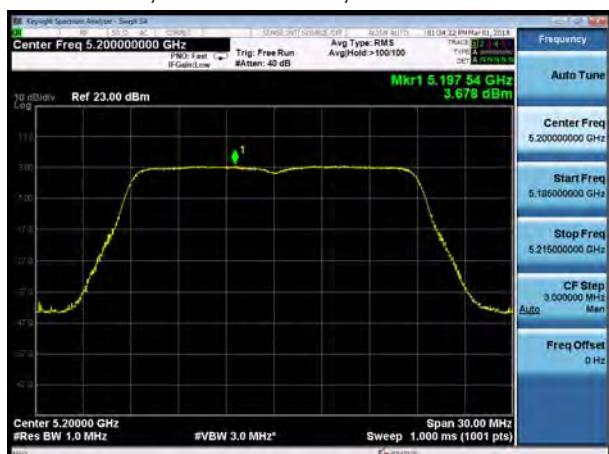
U-NII-1, 802.11n HT20, Channel No.: 36



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



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



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



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

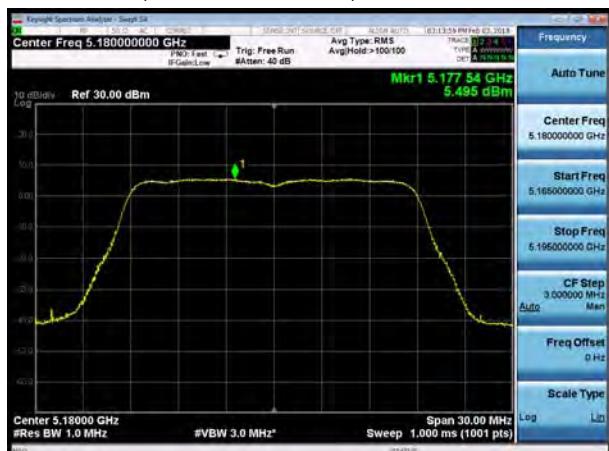




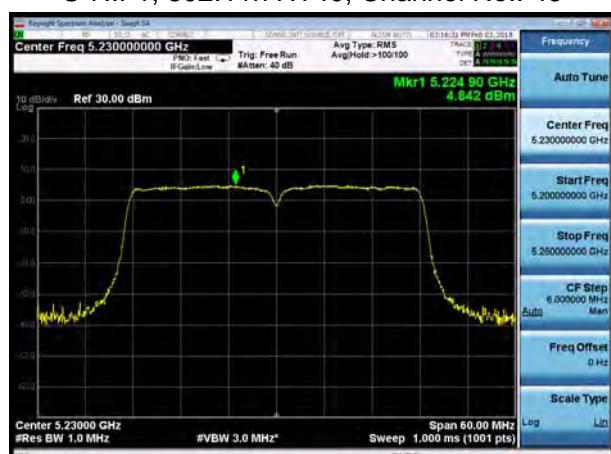
U-NII-1, 802.11n HT40, Channel No.: 38



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



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



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

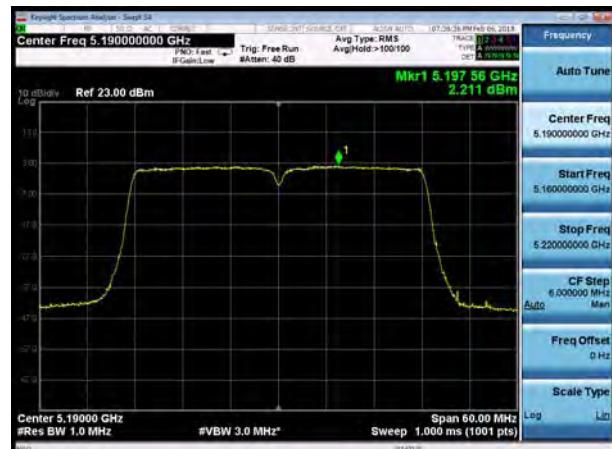


U-NII-1, 802.11ac HT20, Channel No.: 48

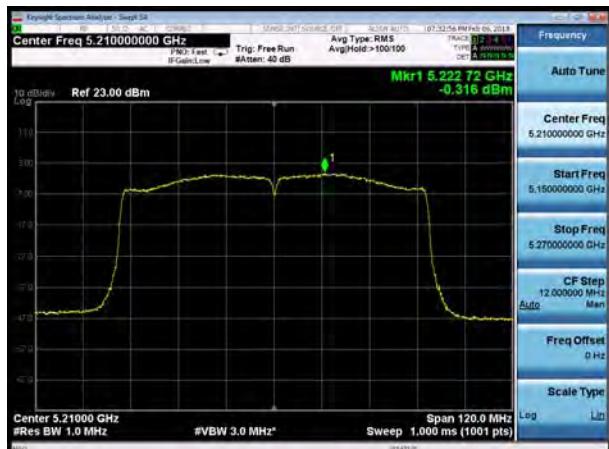




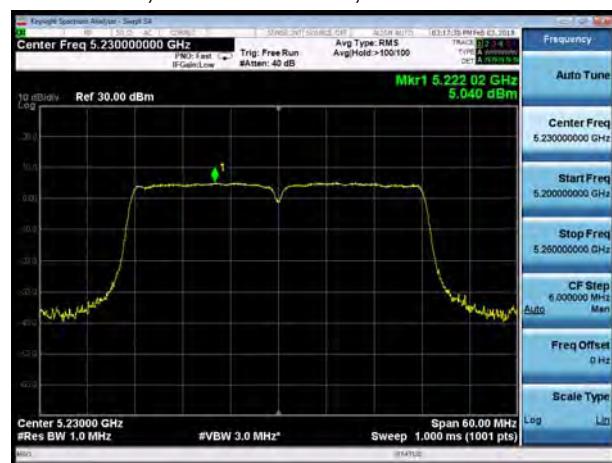
U-NII-1, 802.11ac HT40, Channel No.: 38



U-NII-1, 802.11ac HT80, Channel No.: 42

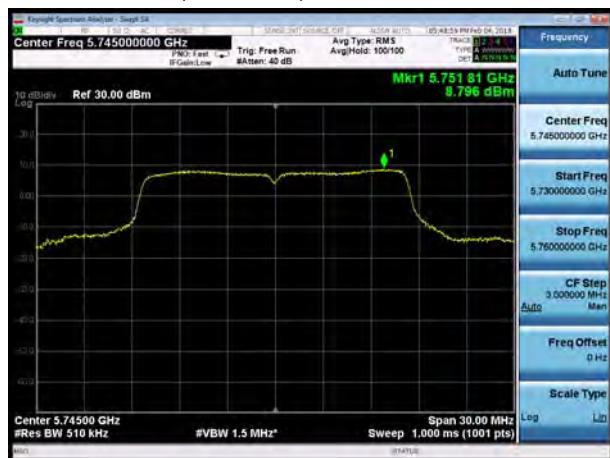


U-NII-1, 802.11ac HT40, Channel No.: 46

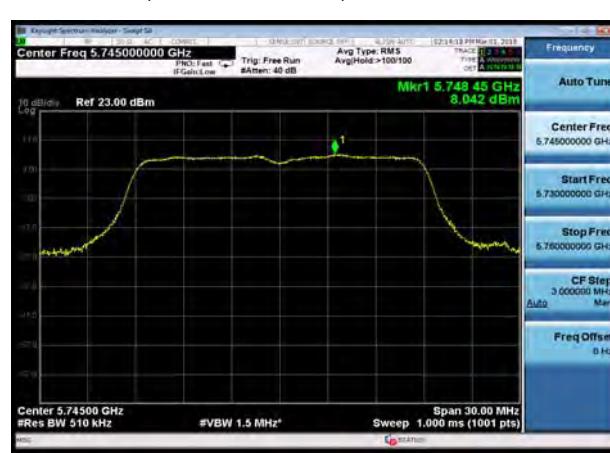




U-NII-3, 802.11a, Channel No.: 149



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



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



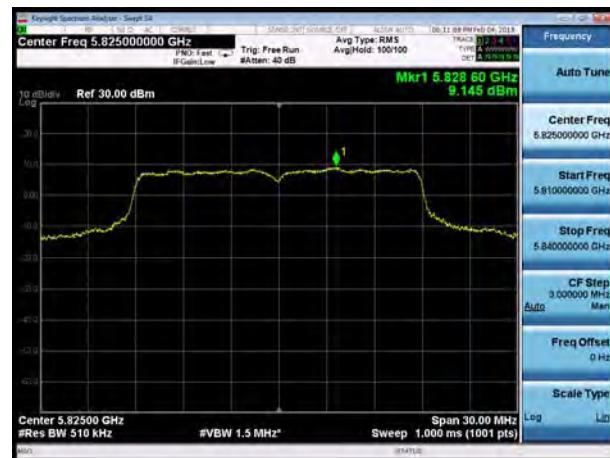
U-NII-3, 802.11n HT20, Channel No.: 157



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



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





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



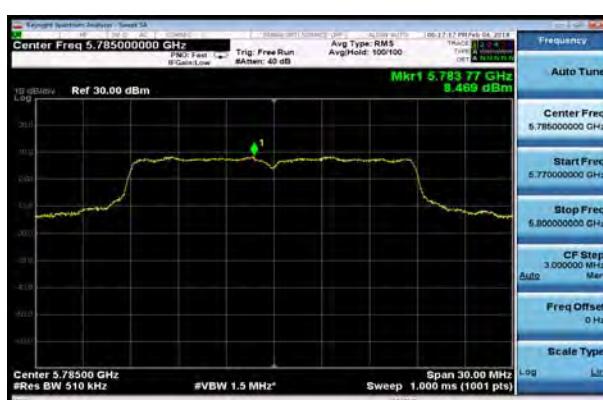
U-NII-3, 802.11ac HT20, Channel No.: 149



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



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



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



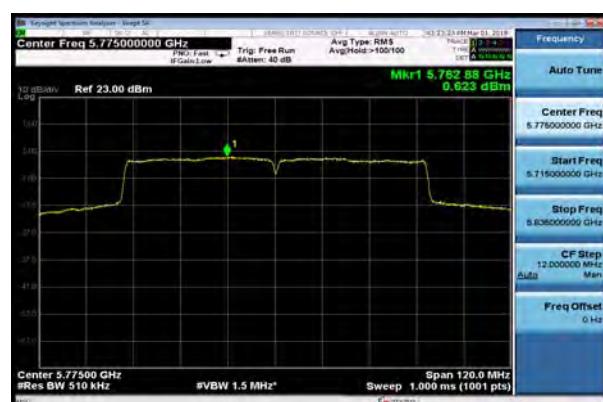
U-NII-3, 802.11ac HT20, Channel No.: 165



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



U-NII-3, 802.11ac HT80, Channel No.: 155

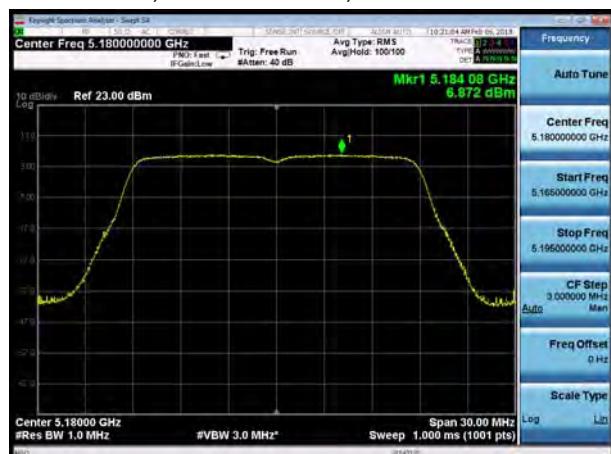




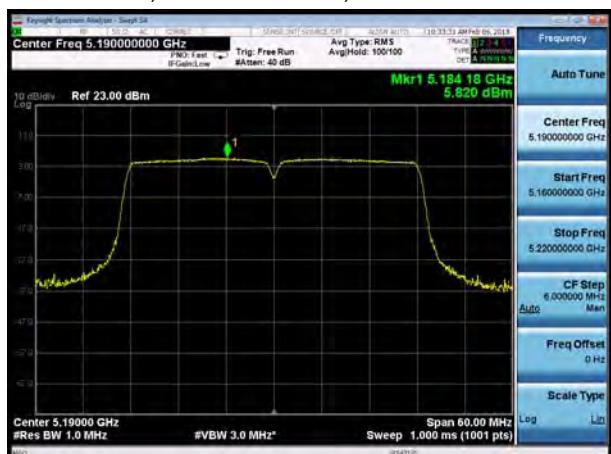
MIMO with Beamforming

Antenna 1

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



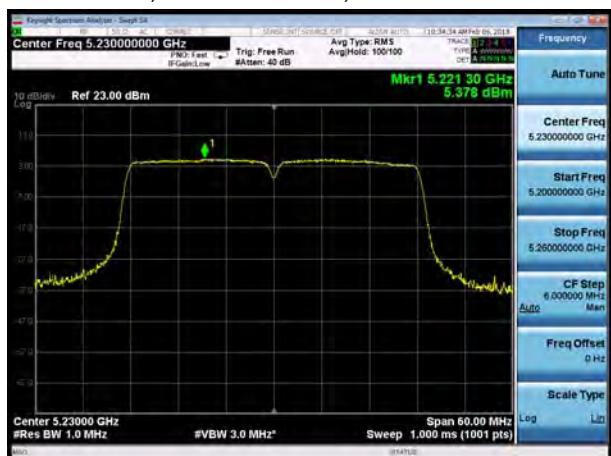
U-NII-1, 802.11n HT40, Channel No.: 38



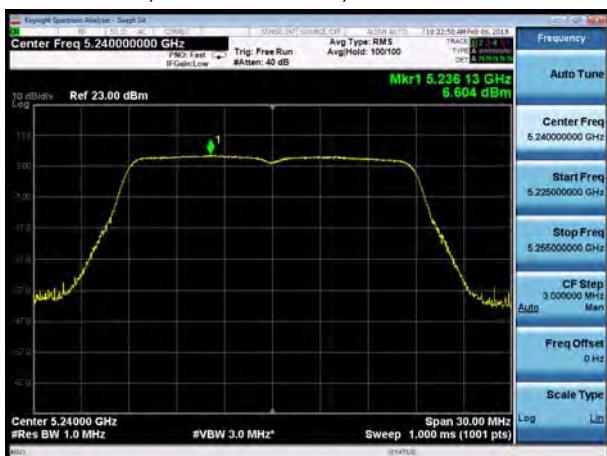
U-NII-1, 802.11n HT20, Channel No.: 40



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



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

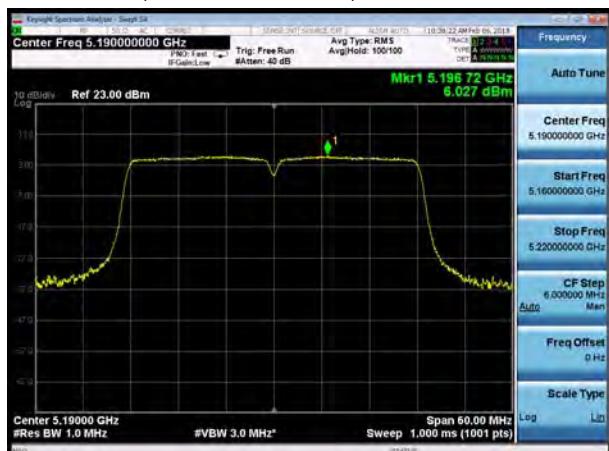




U-NII-1, 802.11ac HT20, Channel No.: 36



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



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



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



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

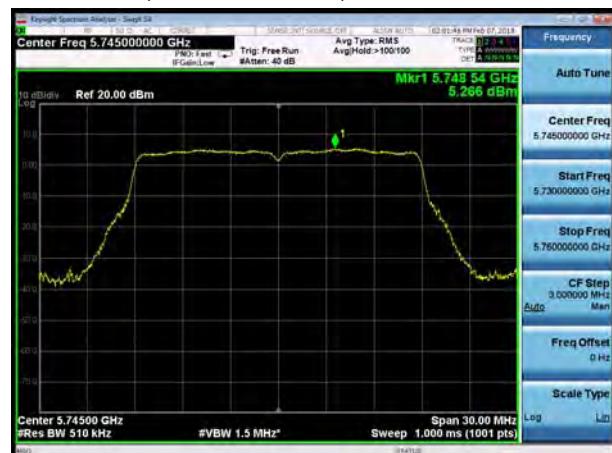


U-NII-1, 802.11ac HT80, Channel No.: 42

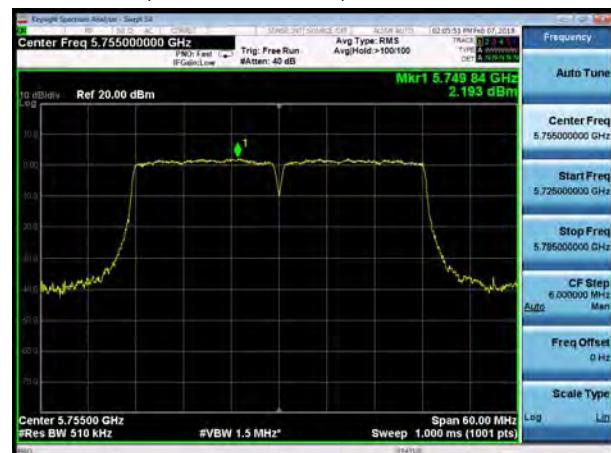




U-NII-3, 802.11n HT20, Channel No.: 149



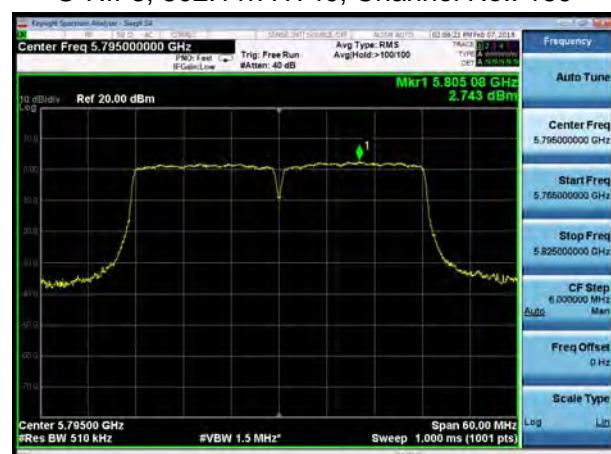
U-NII-3, 802.11n HT40, Channel No.: 151



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



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

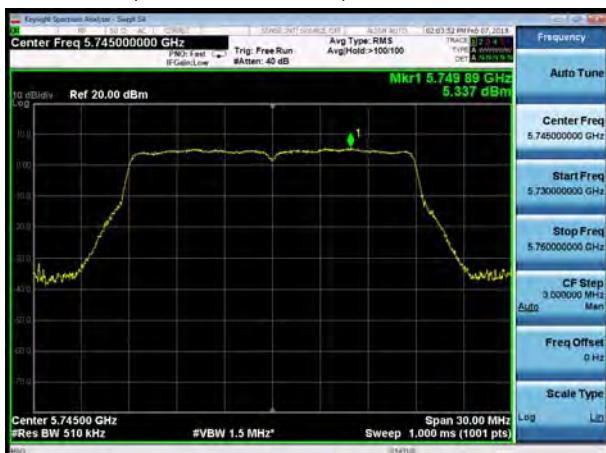


U-NII-3, 802.11n HT20, Channel No.: 165

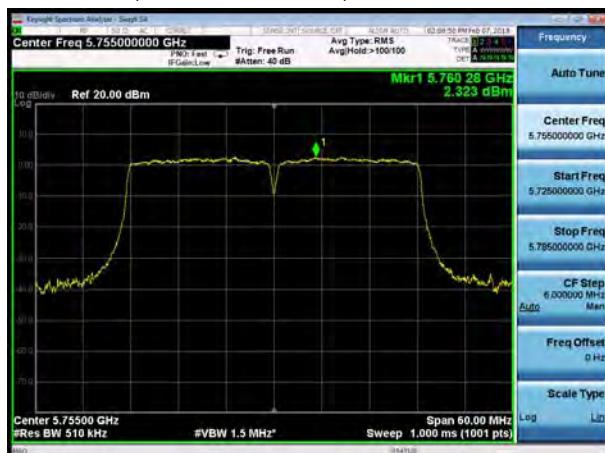




U-NII-3, 802.11ac HT20, Channel No.: 149



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



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



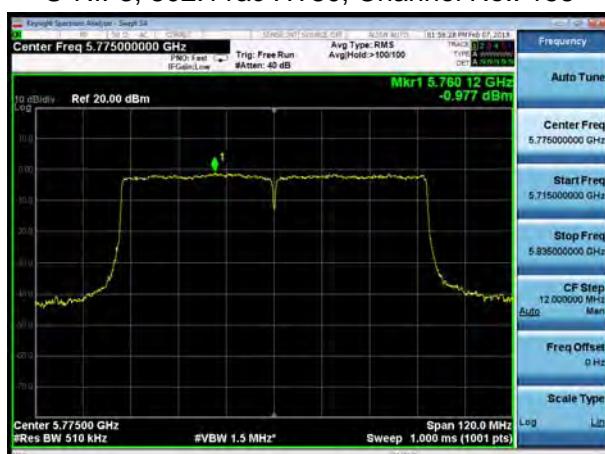
U-NII-3, 802.11ac HT40, Channel No.: 159



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



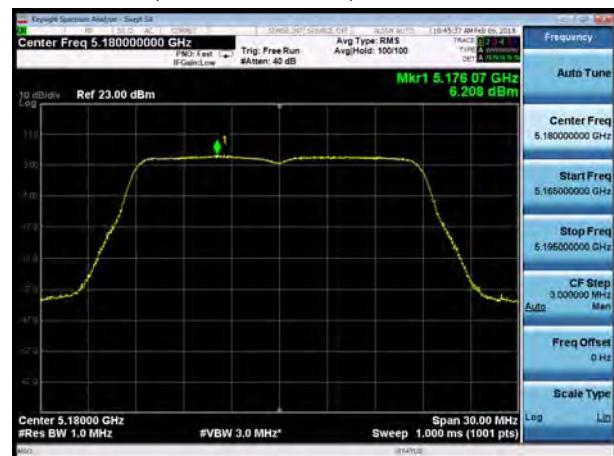
U-NII-3, 802.11ac HT80, Channel No.: 155



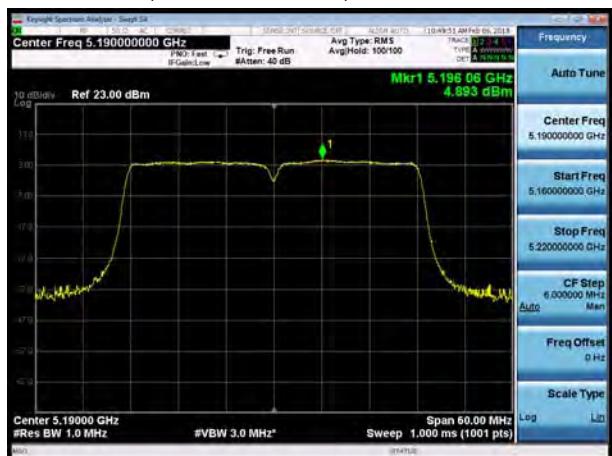


Antenna 2

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

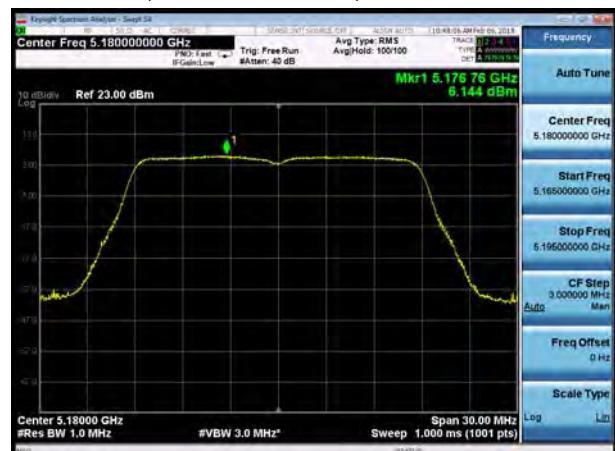


U-NII-1, 802.11n HT20, Channel No.: 48

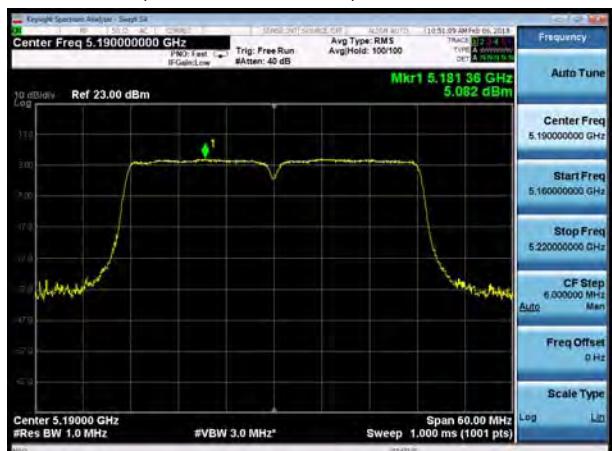




U-NII-1, 802.11ac HT20, Channel No.: 36



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



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



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



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



U-NII-1, 802.11ac HT80, Channel No.: 42

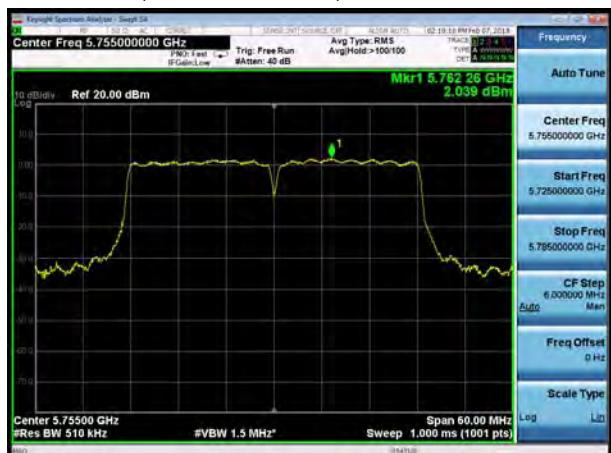




U-NII-3, 802.11n HT20, Channel No.: 149



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 HT20, Channel No.: 149



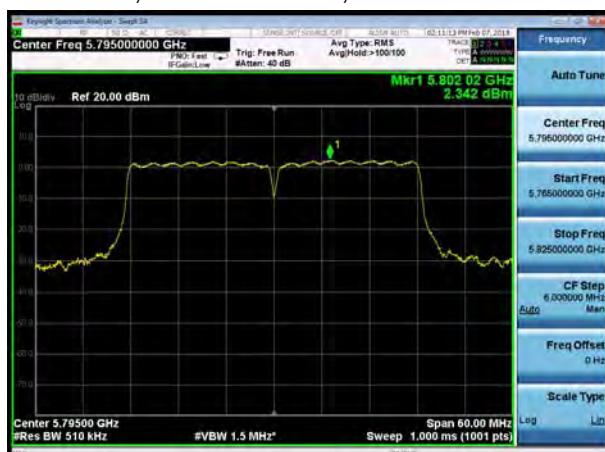
U-NII-3, 802.11ac HT40, Channel No.: 151



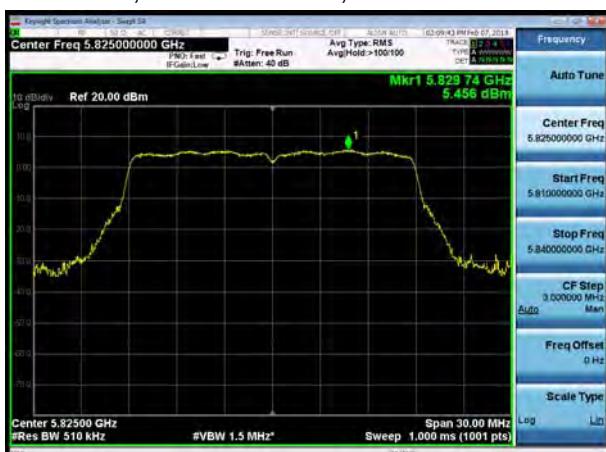
U-NII-3, 802.11ac HT20, Channel No.: 157



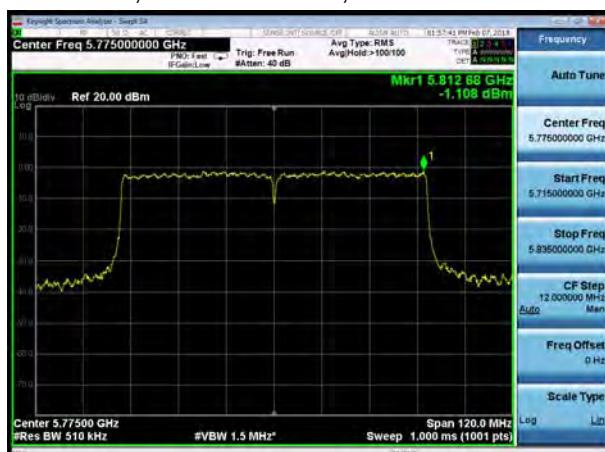
U-NII-3, 802.11ac HT40, Channel No.: 159



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



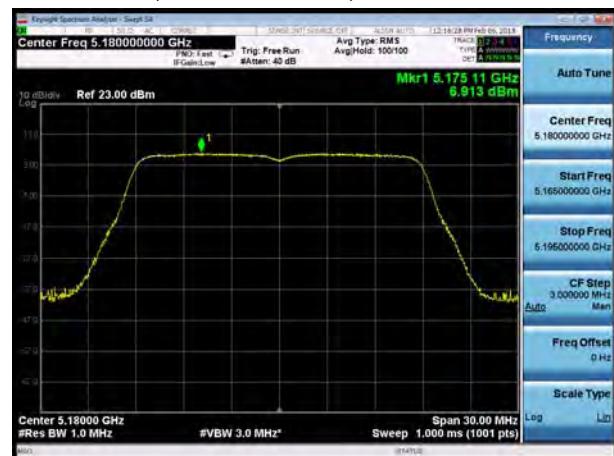
U-NII-3, 802.11ac HT80, Channel No.: 155



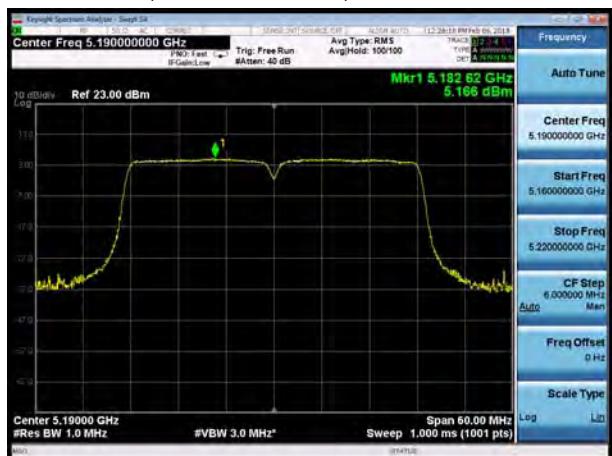


Antenna 3

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



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



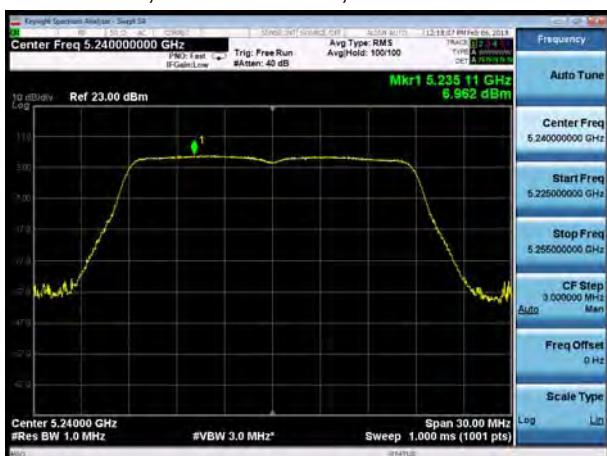
U-NII-1, 802.11n HT20, Channel No.: 40



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

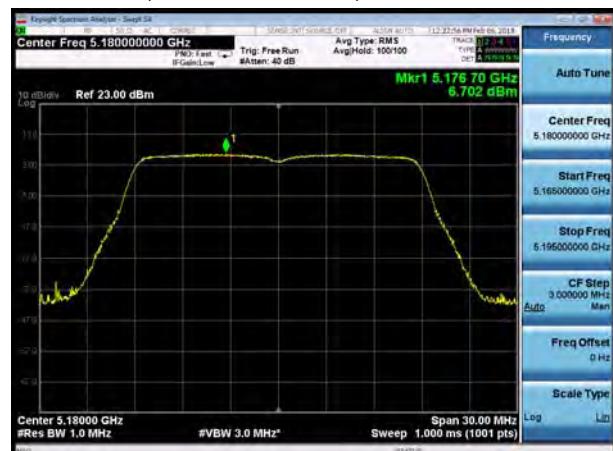


U-NII-1, 802.11n HT20, Channel No.: 48

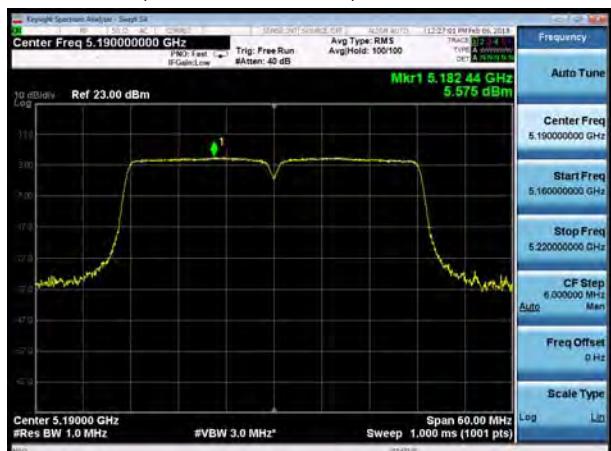




U-NII-1, 802.11ac HT20, Channel No.: 36



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



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



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



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



U-NII-1, 802.11ac HT80, Channel No.: 42

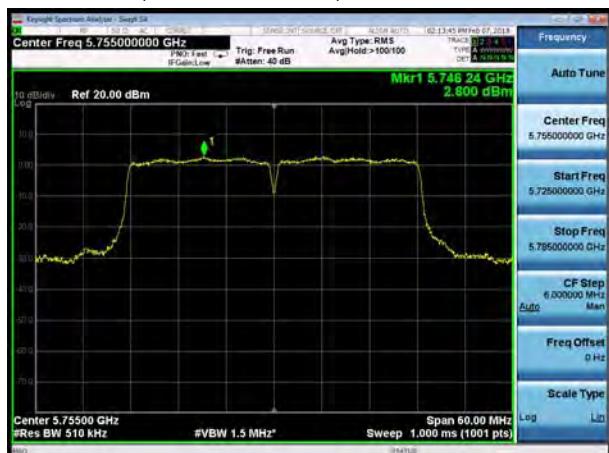




U-NII-3, 802.11n HT20, Channel No.: 149



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 HT20, Channel No.: 149



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



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



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



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



U-NII-3, 802.11ac HT80, Channel No.: 155



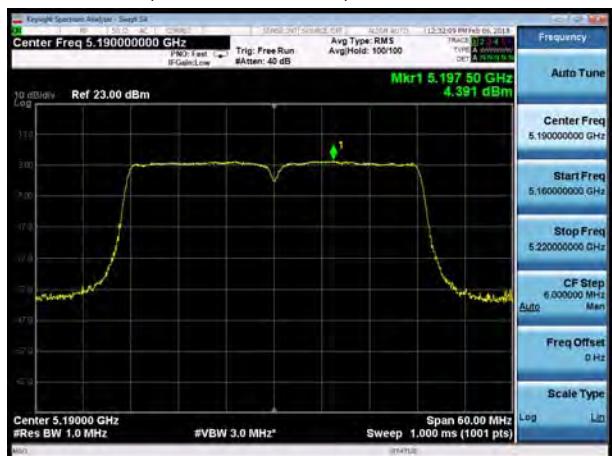


Antenna 4

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

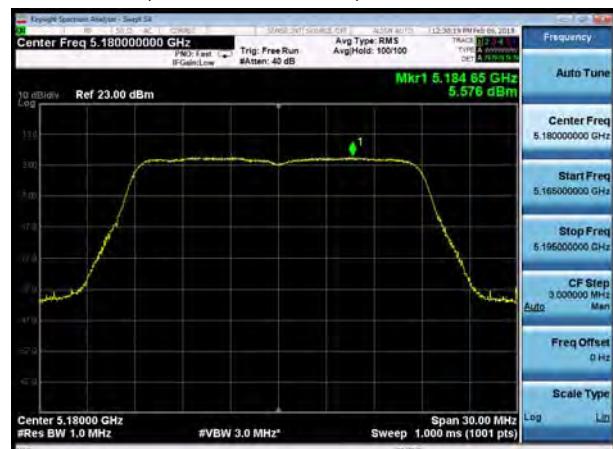


U-NII-1, 802.11n HT20, Channel No.: 48

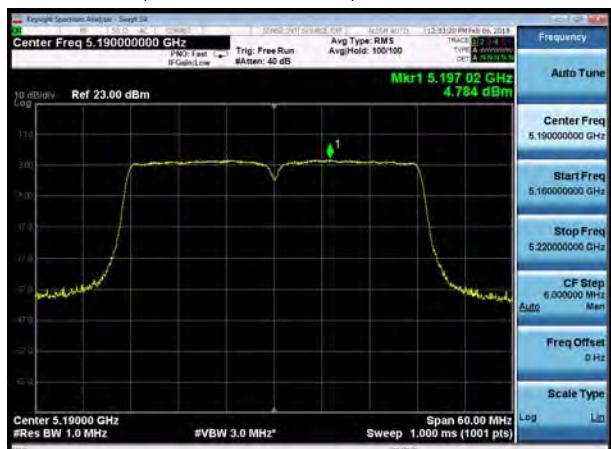




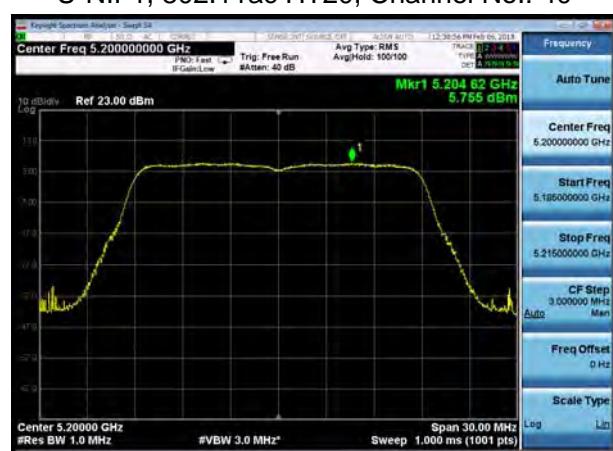
U-NII-1, 802.11ac HT20, Channel No.: 36



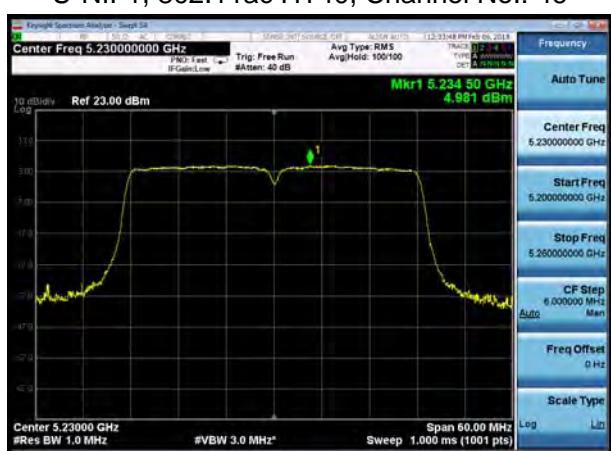
U-NII-1, 802.11ac HT40, Channel No.: 38



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



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



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

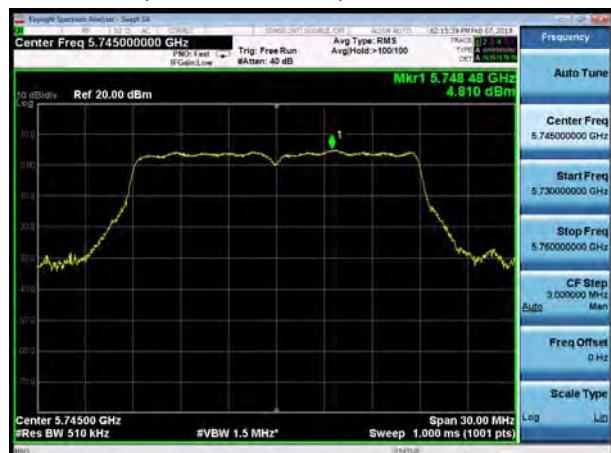


U-NII-1, 802.11ac HT80, Channel No.: 42

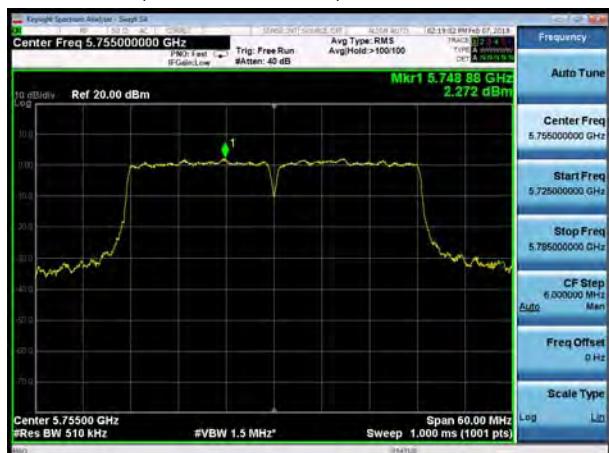




U-NII-3, 802.11n HT20, Channel No.: 149



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 HT20, Channel No.: 149



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



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



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



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



U-NII-3, 802.11ac HT80, 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 $\geq [3 \times \text{RBW}]$
- 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 $\geq [3 \times \text{RBW}]$.
- c) Detector = RMS (power averaging), if $[\text{span} / (\# \text{ of points in sweep})] \leq \text{RBW} / 2$. 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.)

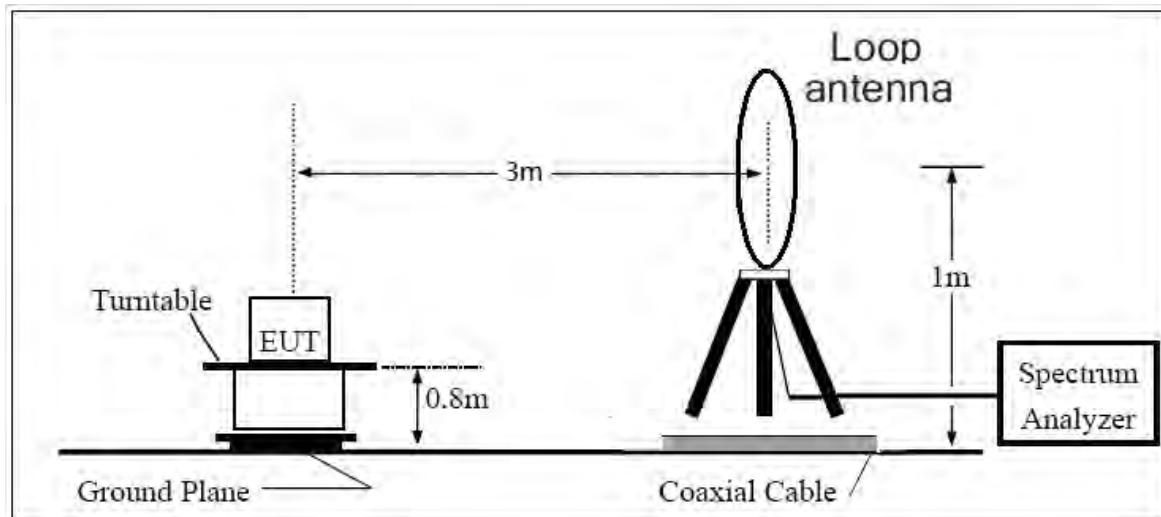


- e) Sweep time = auto.
- f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of $1 / D$, where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall 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.

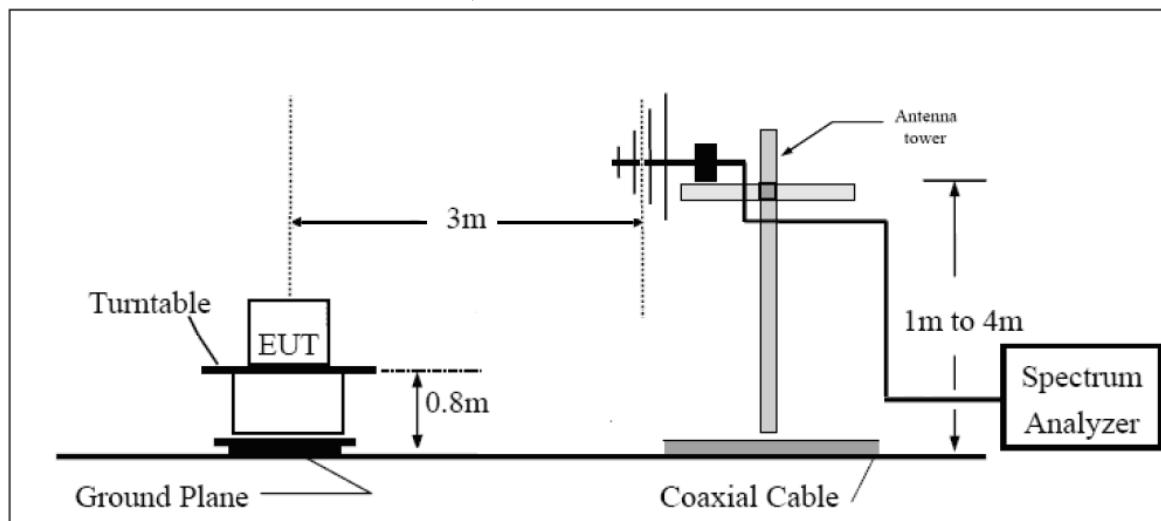
The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the antenna is vertical.

The test is in transmitting mode.

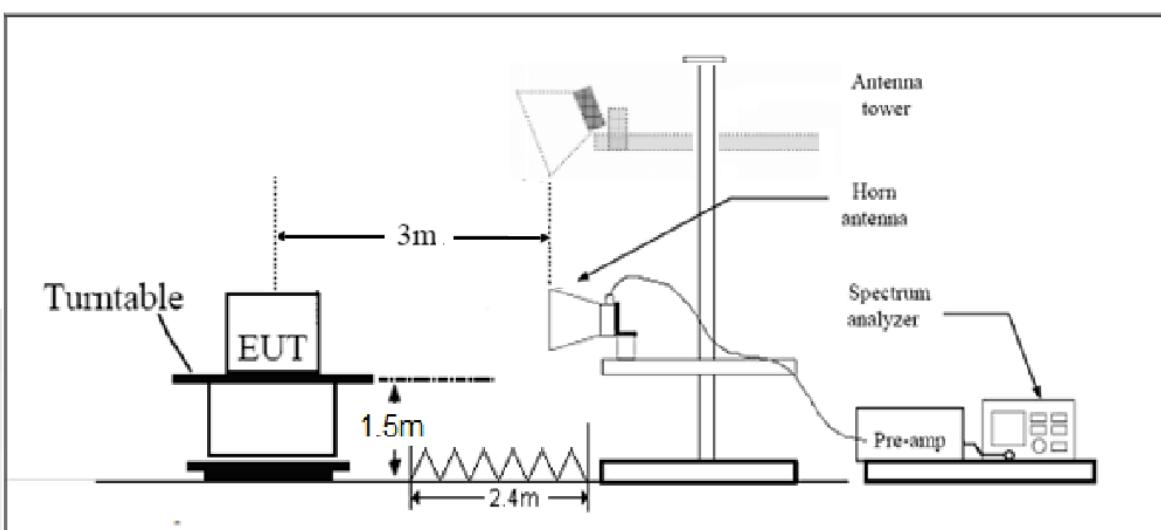
9KHz~~~30MHz



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(68.2dB μ V/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(68.2dB μ V/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(68.2dB μ V/m).

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

§1、 $E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] - 20 \log(d[\text{meters}]) + 104.77$, where E = field strength and

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

§2、 $E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2$, 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

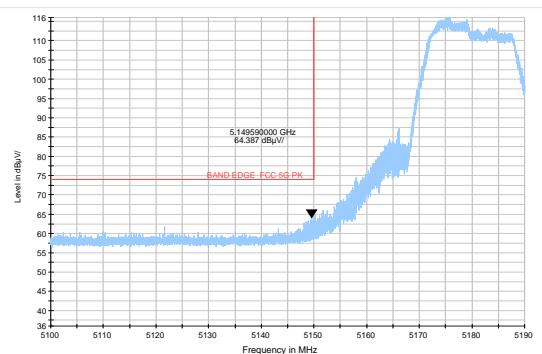
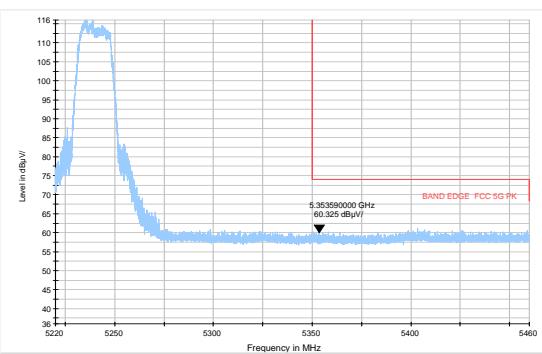
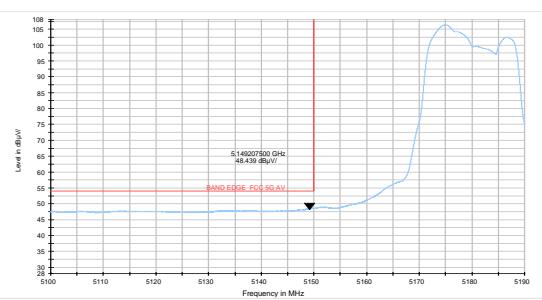
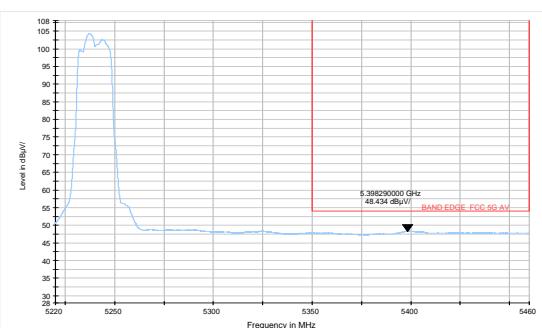
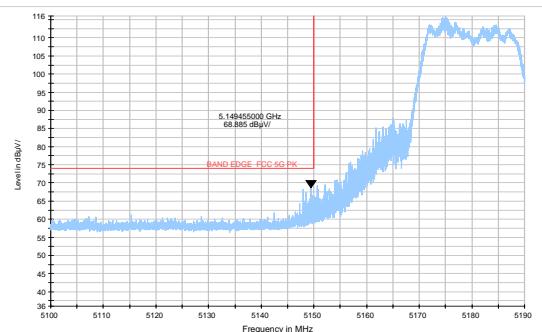
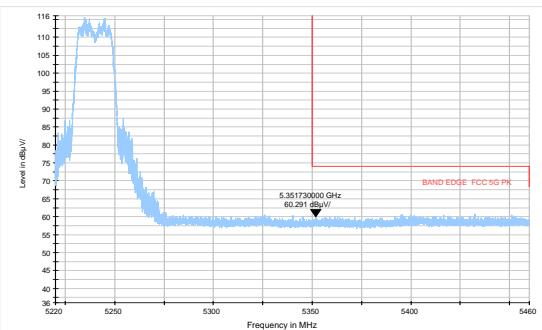
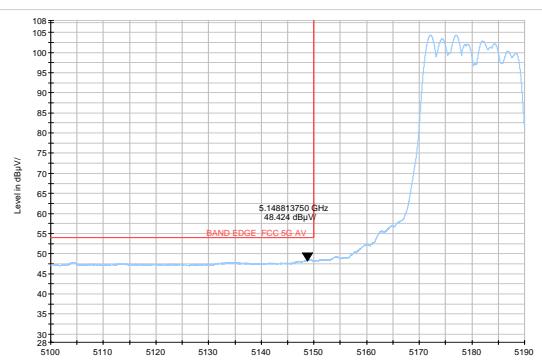
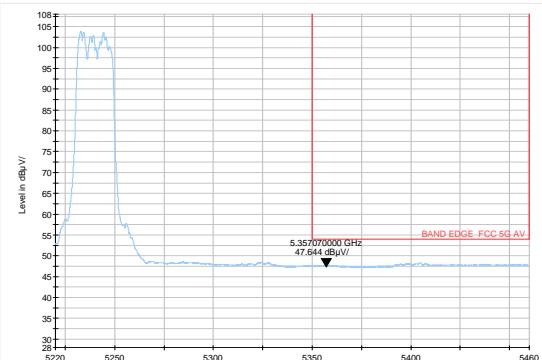


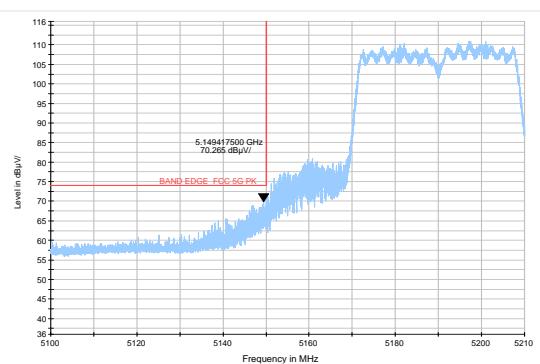
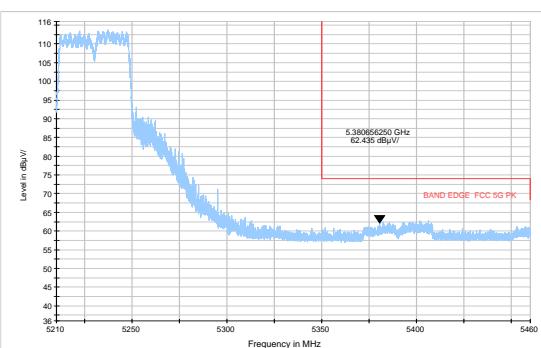
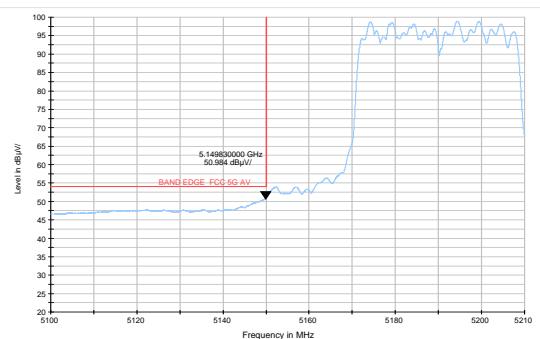
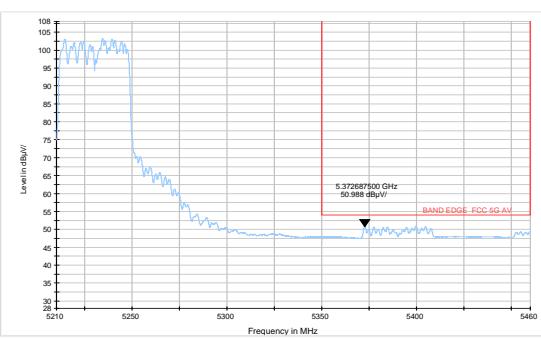
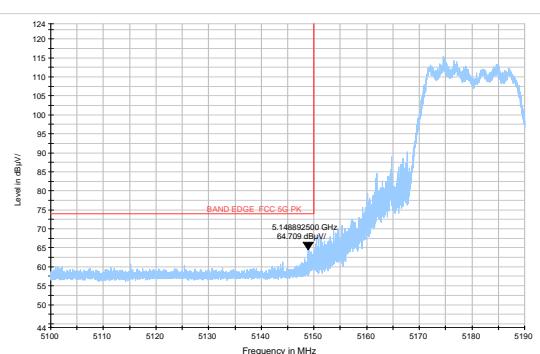
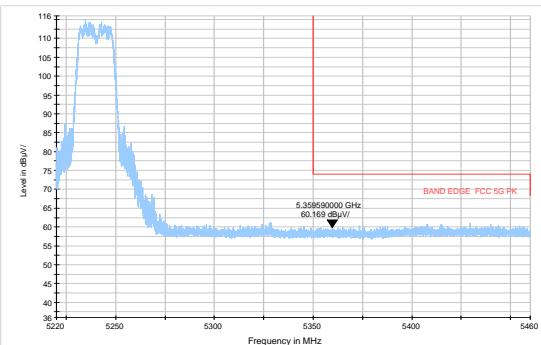
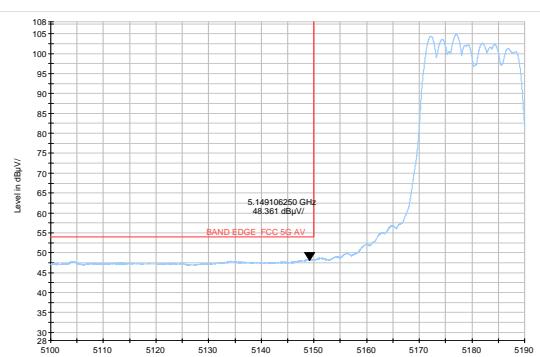
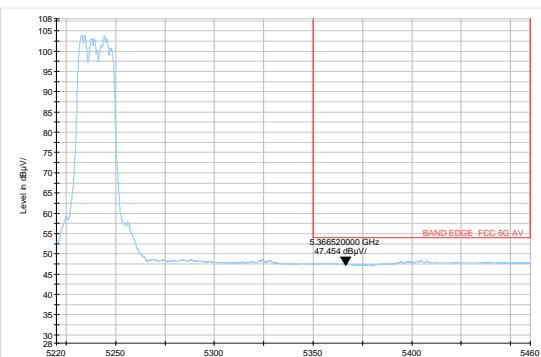
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 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			

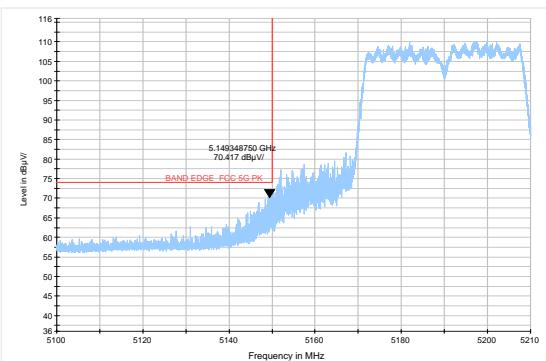
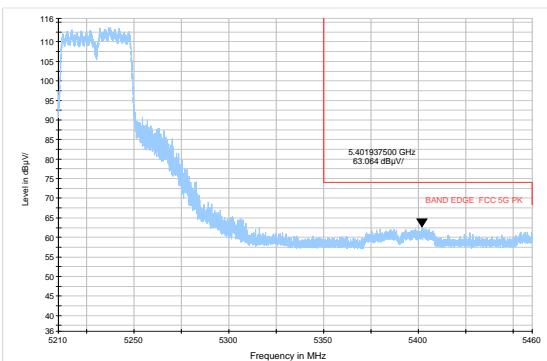
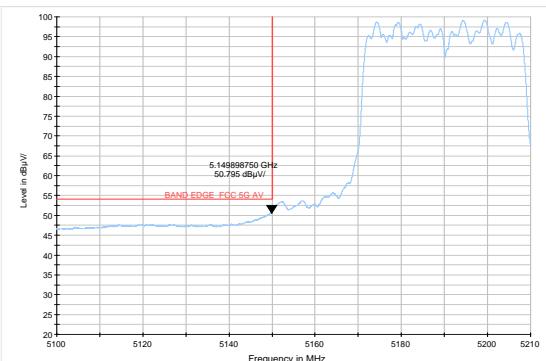
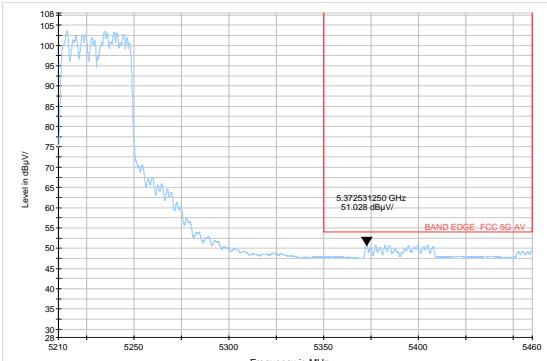
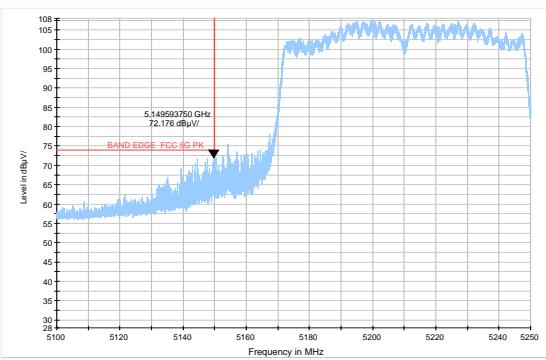
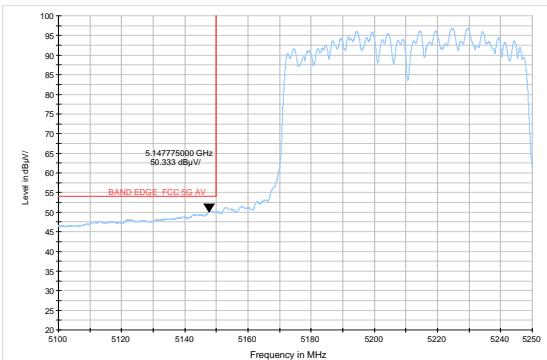
Measurement Uncertainty

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 signal beyond the limit is carrier.****U-NII-1****802.11a-Channel 36: Peak****802.11a-Channel 48: Peak****802.11a-Channel 36: Average****802.11a-Channel 48: Average****802.11n HT20-Channel 36: Peak****802.11n HT20-Channel 48: Peak****802.11n HT20-Channel 36: Average****802.11n HT20-Channel 48: Average**

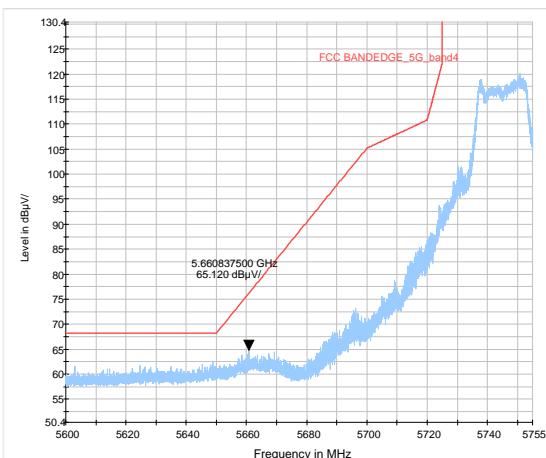
**802.11n HT40-Channel 38: Peak****802.11n HT40-Channel 46: Peak****802.11n HT40-Channel 38: Average****802.11n HT40-Channel 46: Average****802.11ac HT20 -Channel 36: Peak****802.11ac HT20 -Channel 48: Peak****802.11ac HT20-Channel 36: Average****802.11ac HT20 -Channel 48: Average**

**802.11ac HT40-Channel 38: Peak****802.11ac HT40-Channel 46: Peak****802.11ac HT40-Channel 38: Average****802.11ac HT40-Channel 46: Average****802.11ac HT80 –Channel 42: Peak****802.11ac HT80- Channel 42: Average**

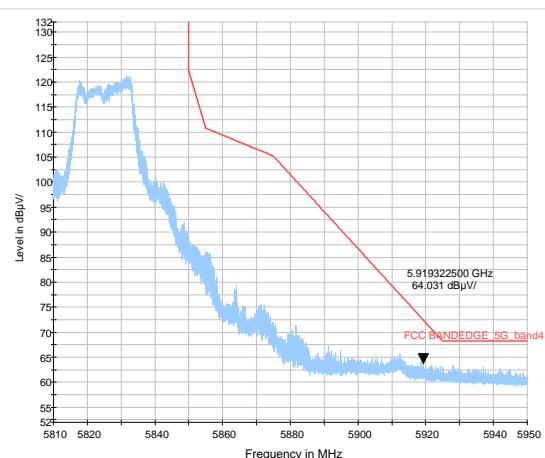


U-NII-3

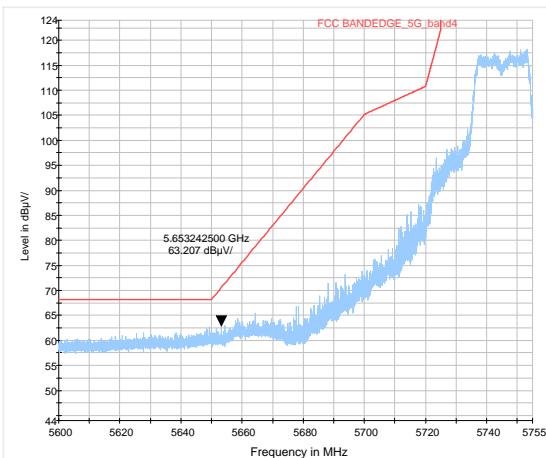
802.11a-Channel 149: Peak



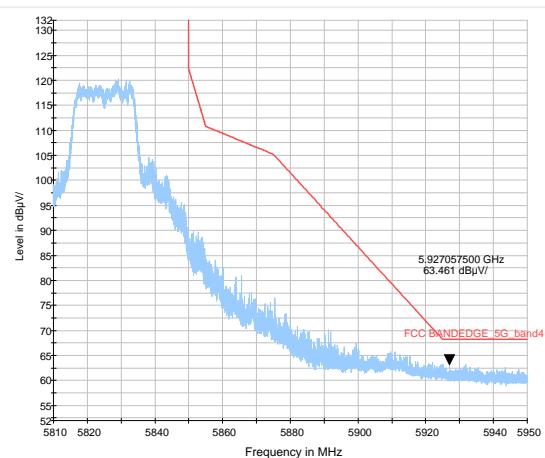
802.11a-Channel 165: Peak



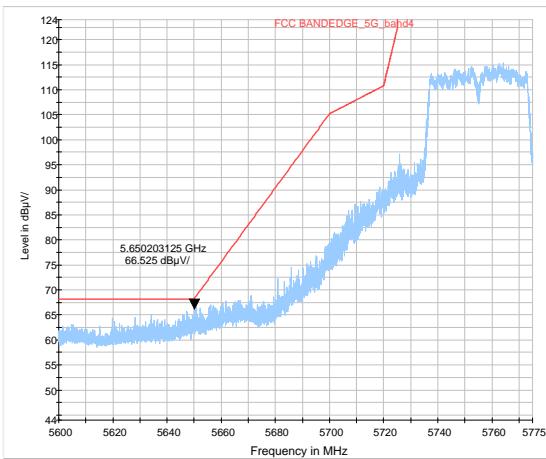
802.11n HT20-Channel 149: Peak



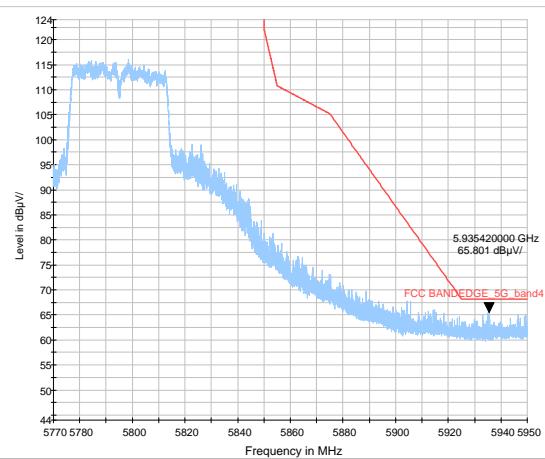
802.11n HT20-Channel 165: Peak

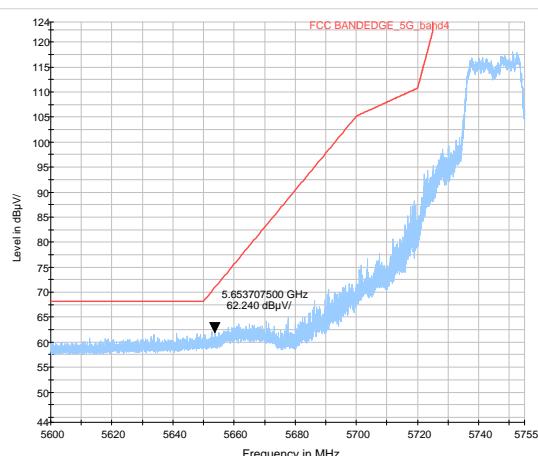
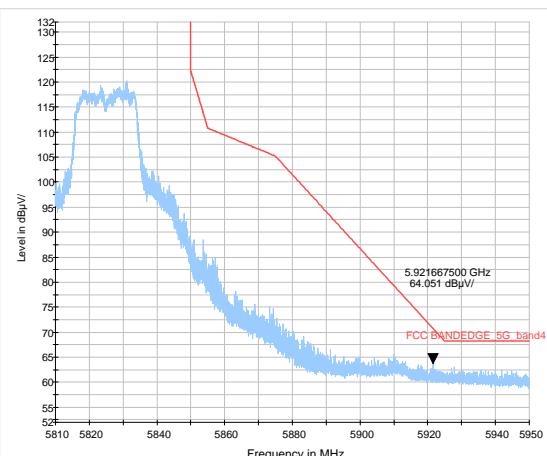
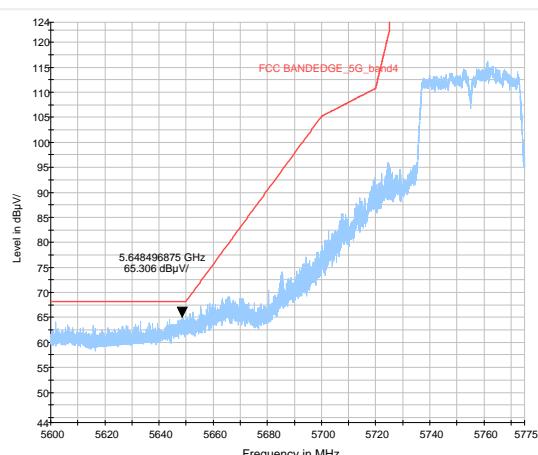
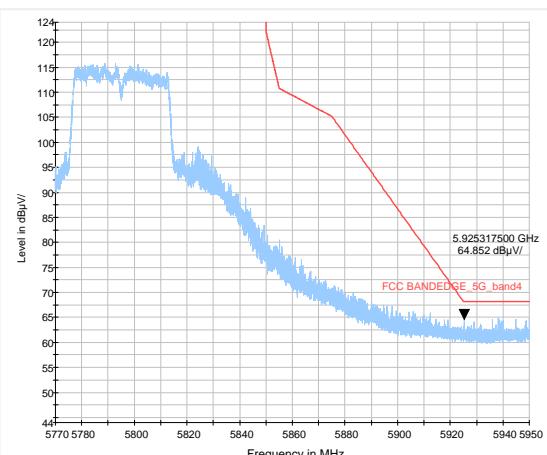
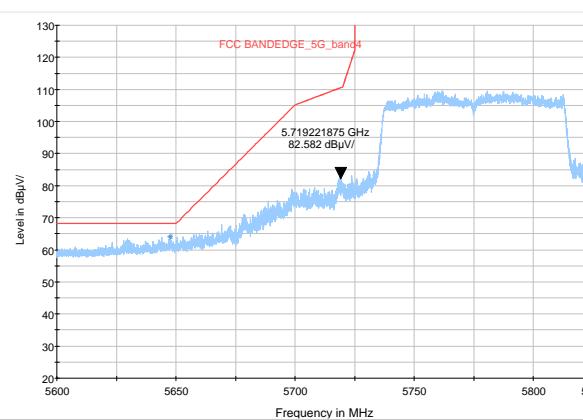


802.11n HT40-Channel 151: Peak



802.11n HT40-Channel 159: Peak



**802.11ac HT20-Channel 149: Peak****802.11ac HT20-Channel 165: Peak****802.11ac HT40-Channel 151: Peak****802.11ac HT40-Channel 159: Peak****802.11ac HT80- Channel 155: Peak**

**Result of RE****Test result**

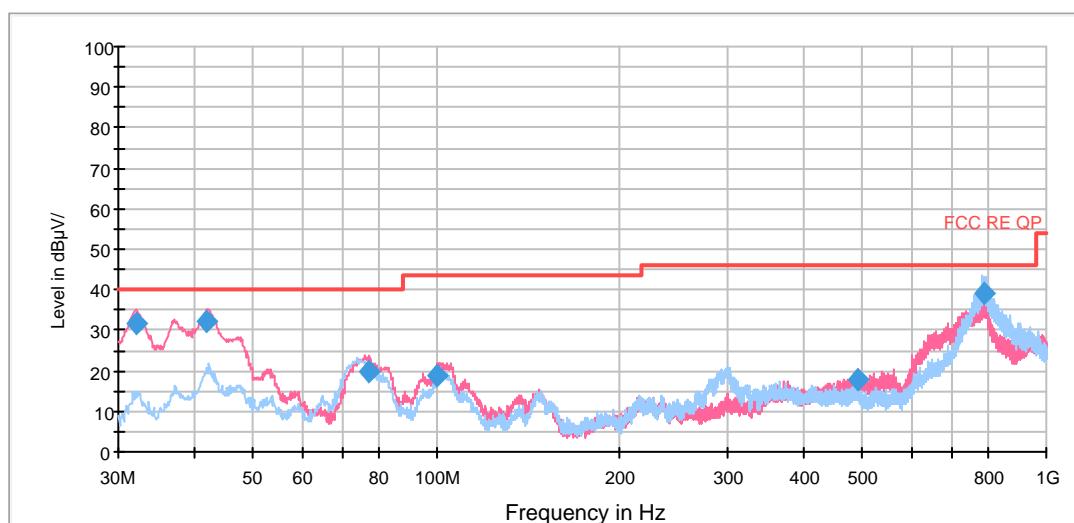
Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, and 9KHz-30MHz, the emissions more than 20 dB below the permissible value are not reported.

After the pre test, Antenna 1 was selected as the worst antenna.

During the test, the Radiates Emission from 30MHz to 1GHz was performed in all modes with all channels, 802.11n (HT40), Channel 38 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)
32.141097	31.8	50.9	100.0	V	317.0	-19.1	8.2	40.0
41.977794	32.0	50.1	100.0	V	34.0	-18.1	8.0	40.0
77.376175	20.0	46.7	100.0	V	149.0	-26.7	20.0	40.0
100.393240	19.0	43.0	100.0	V	33.0	-24.0	24.5	43.5
489.992750	17.6	37.4	100.0	V	295.0	-19.8	28.4	46.0
787.882250	39.0	55.6	121.0	H	73.0	-16.6	7.0	46.0

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

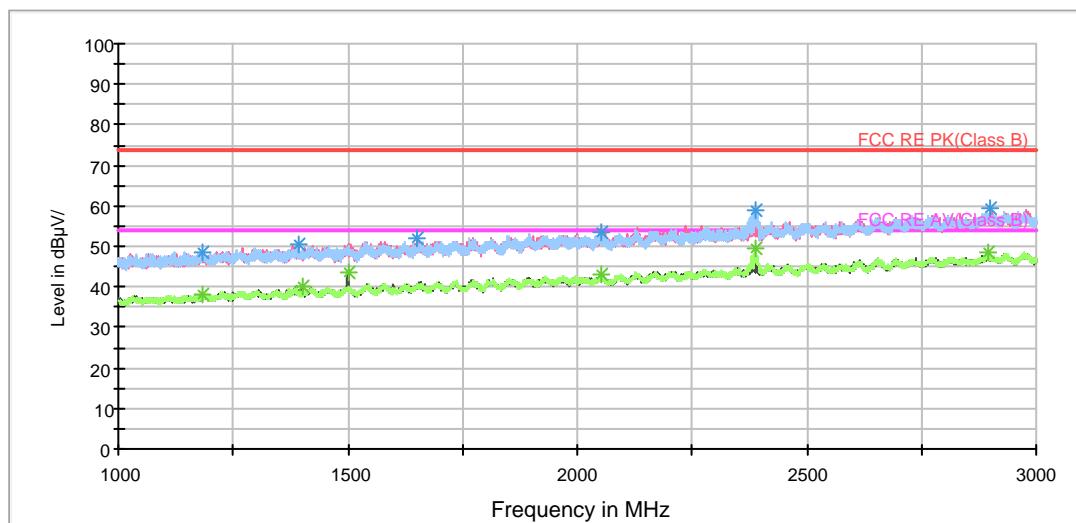
2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)

3. Margin = Limit – Quasi-Peak



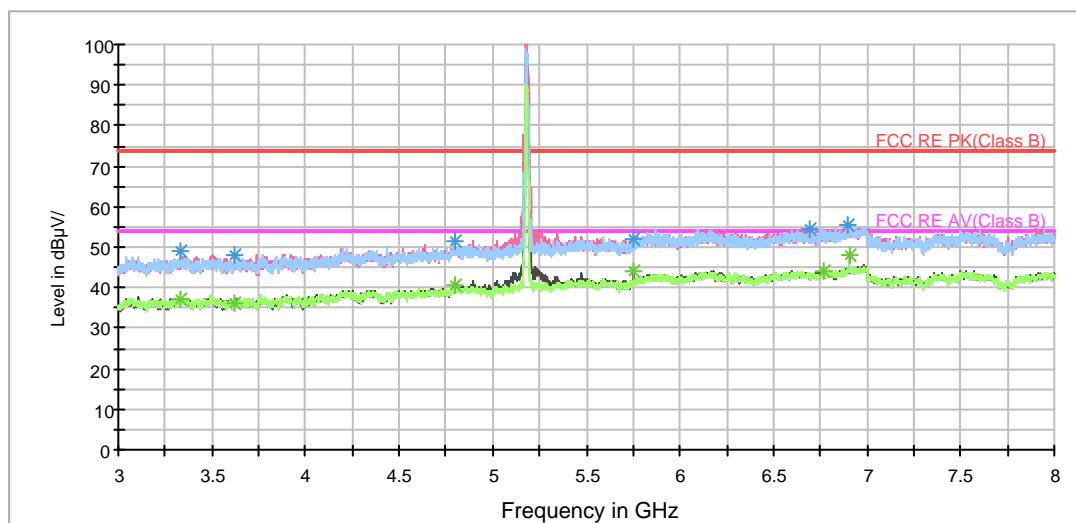
802.11a CH36

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV

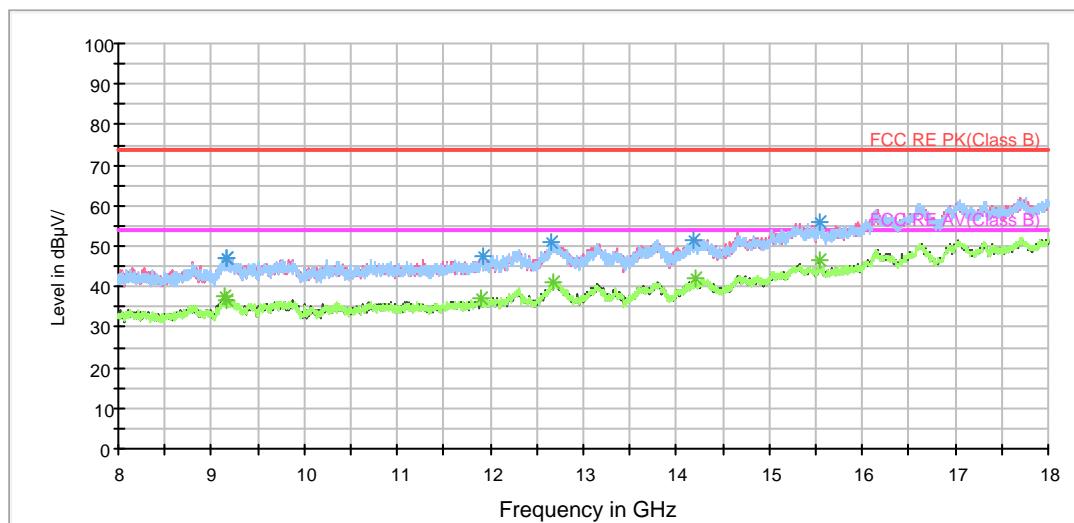


Note: The signal beyond the limit is carrier.

Radiates Emission from 3GHz to 8GHz

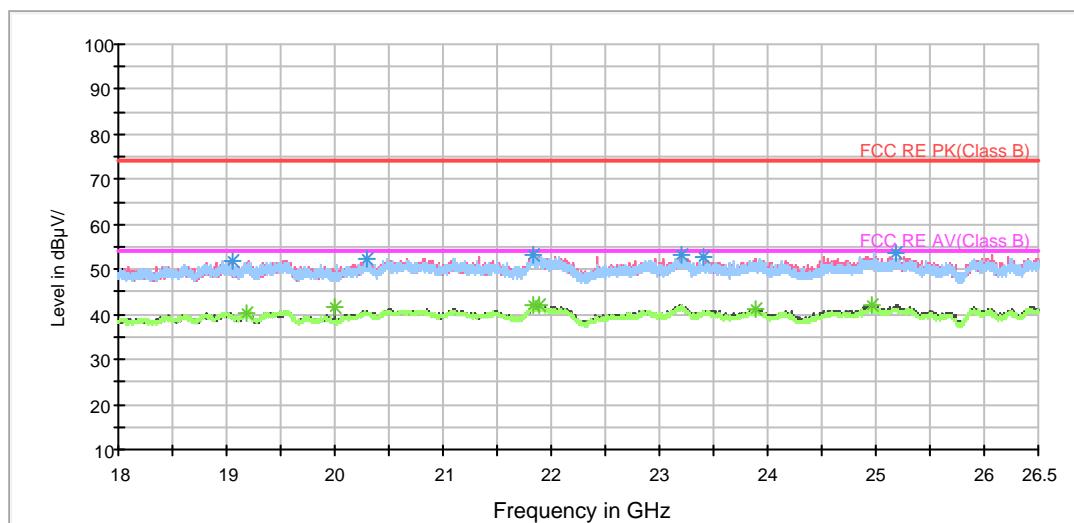


RE 3-18GHz PK+AV



Radiates Emission from 8GHz to 18GHz

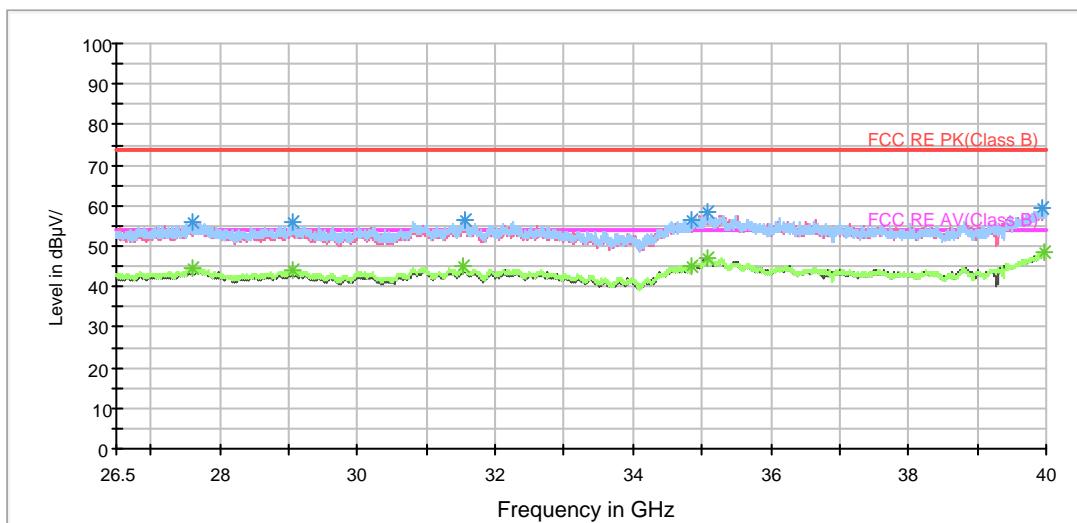
BELL_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz



BELL RE 26.5-40GHz PK+AV



Radiates Emission from 26.5GHz to 40GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3328.750000	48.8	200.0	H	37.0	41.0	7.8	25.2	74
3621.875000	48.1	200.0	V	306.0	40.1	8.0	25.9	74
4793.750000	51.3	200.0	H	205.0	40.1	11.2	22.7	74
5754.375000	51.7	200.0	H	0.0	38.1	13.6	22.3	74
6689.375000	54.6	200.0	V	256.0	39.3	15.3	19.4	74
6892.500000	55.4	200.0	H	329.0	39.2	16.2	18.6	74

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

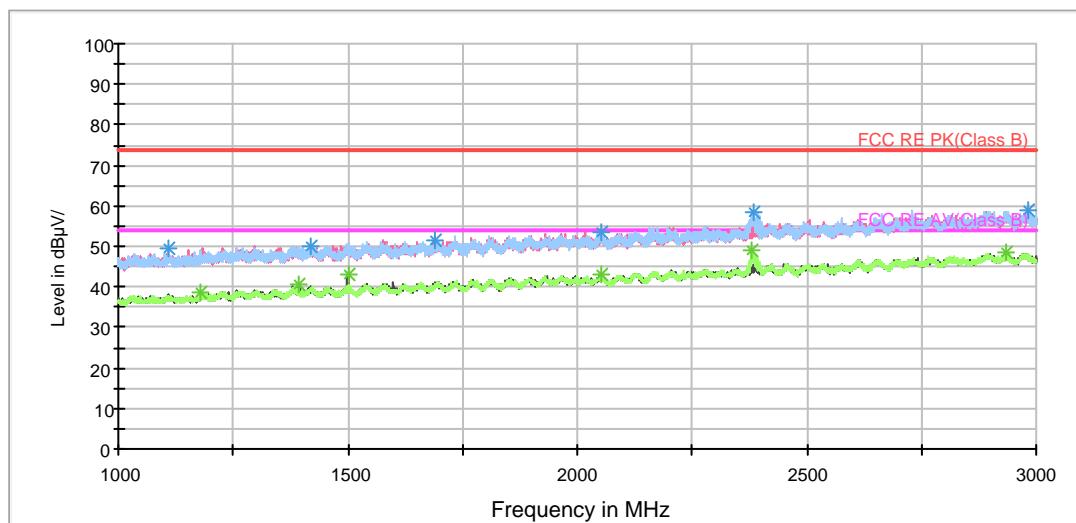
Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3328.750000	37.2	200.0	H	37.0	29.4	7.8	16.8	54
3621.875000	36.3	200.0	V	306.0	28.3	8.0	17.7	54
4793.750000	40.6	200.0	H	205.0	29.4	11.2	13.4	54
5755.625000	44.0	200.0	V	216.0	30.4	13.6	10.0	54
6770.000000	44.2	200.0	V	240.0	28.7	15.5	9.8	54
6906.875000	48.0	200.0	V	264.0	31.7	16.3	6.0	54

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



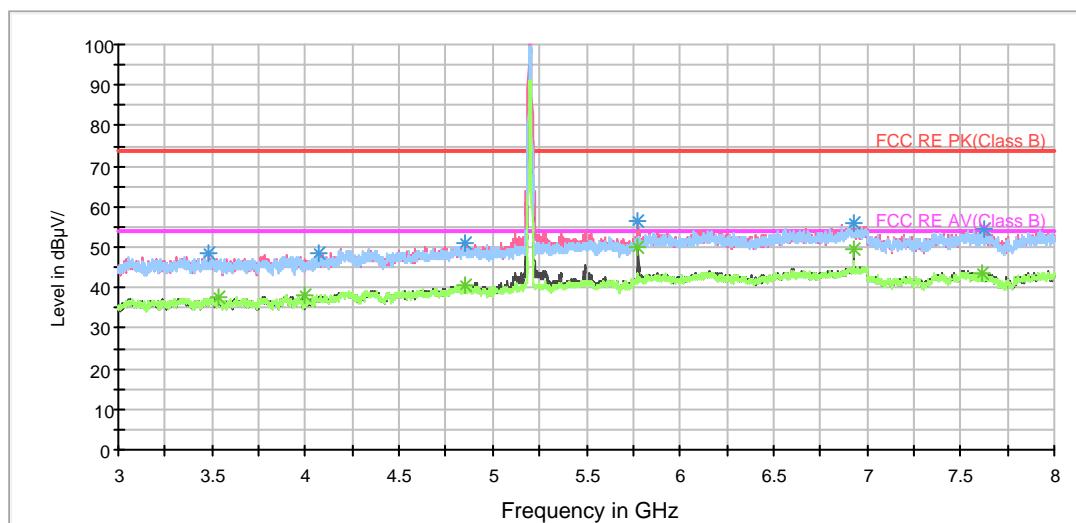
802.11a CH40

RE 1G-3GHz PK+AV



Radiates Emission from 1GHz to 3GHz

RE 3-18GHz PK+AV

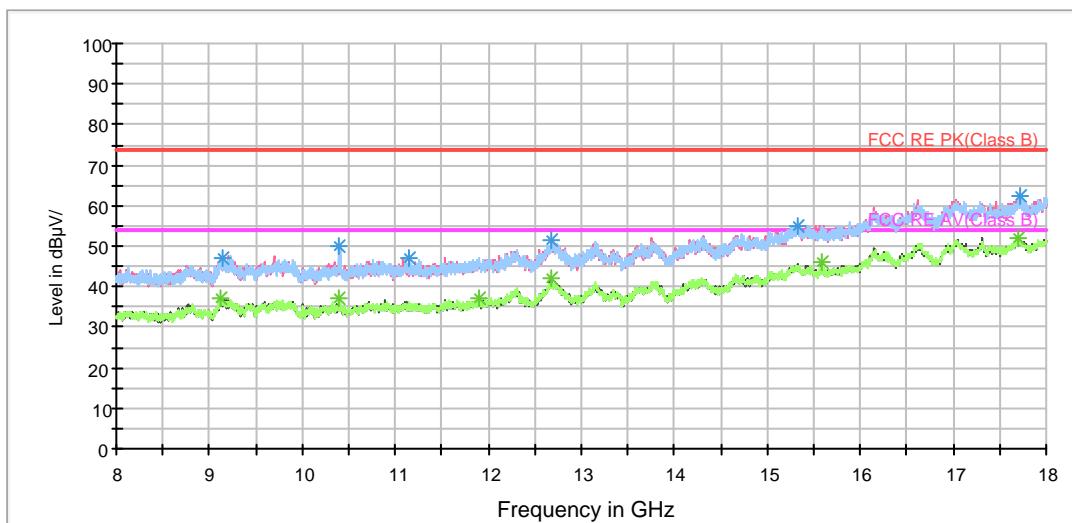


Note: The signal beyond the limit is carrier.

Radiates Emission from 3GHz to 8GHz

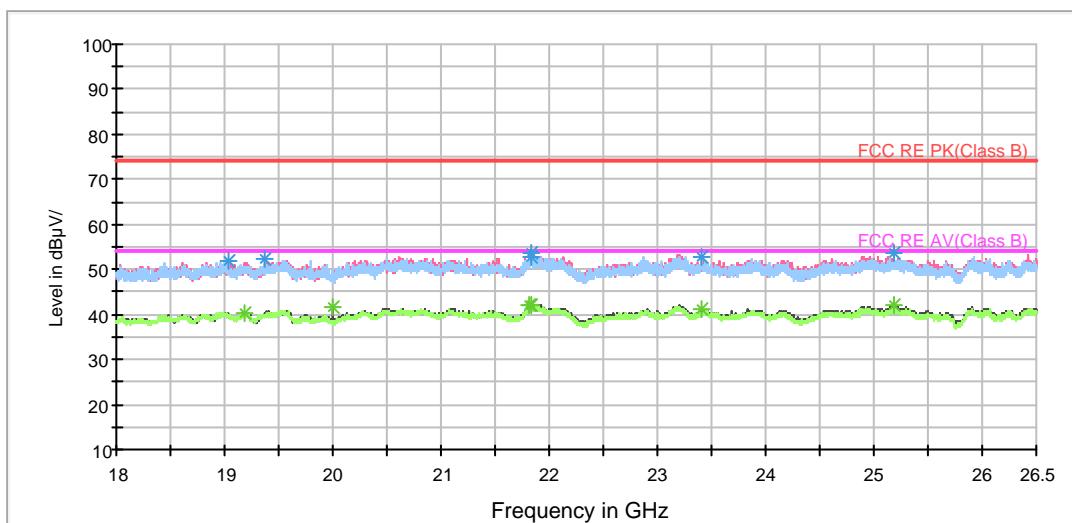


RE 3-18GHz PK+AV



Radiates Emission from 8GHz to 18GHz

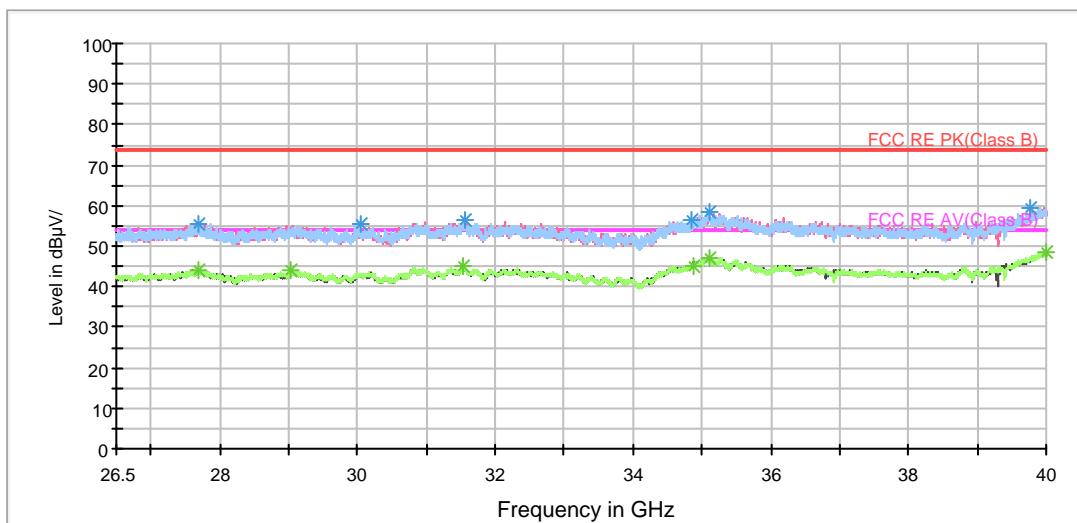
BELL_RE 18-26.5GHz PK+AV



Radiates Emission from 18GHz to 26.5GHz



BELL RE 26.5-40GHz PK+AV



Radiates Emission from 26.5GHz to 40GHz

Frequency (MHz)	Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3486.875000	48.5	200.0	V	319.0	40.5	8.0	25.5	74
4075.000000	48.4	200.0	H	0.0	39.3	9.1	25.6	74
4847.500000	50.9	200.0	H	0.0	39.3	11.6	23.1	74
5778.125000	56.3	200.0	V	36.0	42.4	13.9	17.7	74
6933.125000	56.2	200.0	V	327.0	40.0	16.2	17.8	74
7620.625000	54.5	200.0	H	246.0	37.7	16.8	19.5	74

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

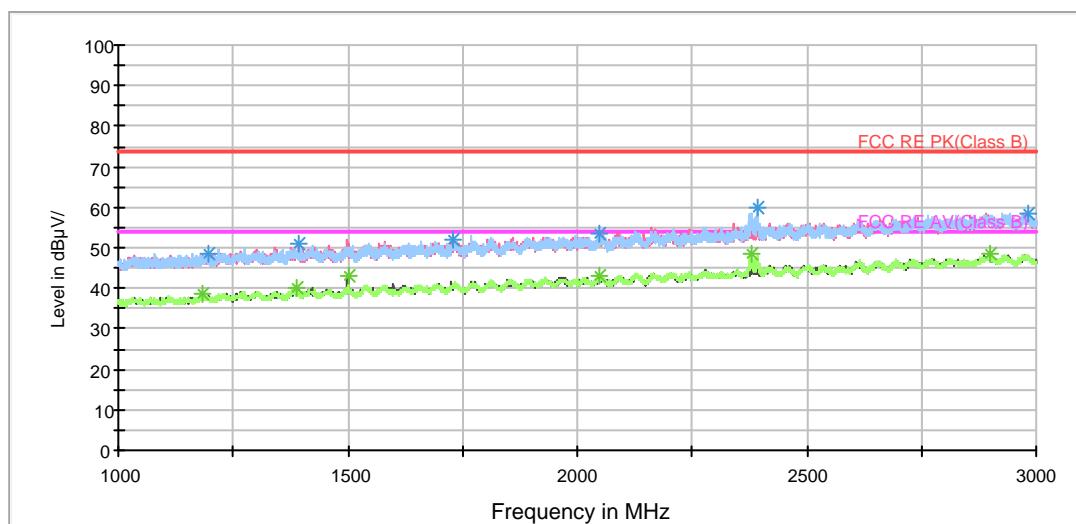
Frequency (MHz)	Average (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Reading value (dBuV/m)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3532.500000	37.6	200.0	H	191.0	29.7	7.9	16.4	54
4000.000000	38.3	200.0	H	43.0	29.4	8.9	15.7	54
4848.125000	40.4	200.0	H	182.0	28.8	11.6	13.6	54
5778.125000	49.8	200.0	V	36.0	35.9	13.9	4.2	54
6933.750000	49.7	200.0	V	288.0	33.5	16.2	4.3	54
7611.250000	43.3	200.0	V	311.0	26.4	16.9	10.7	54

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



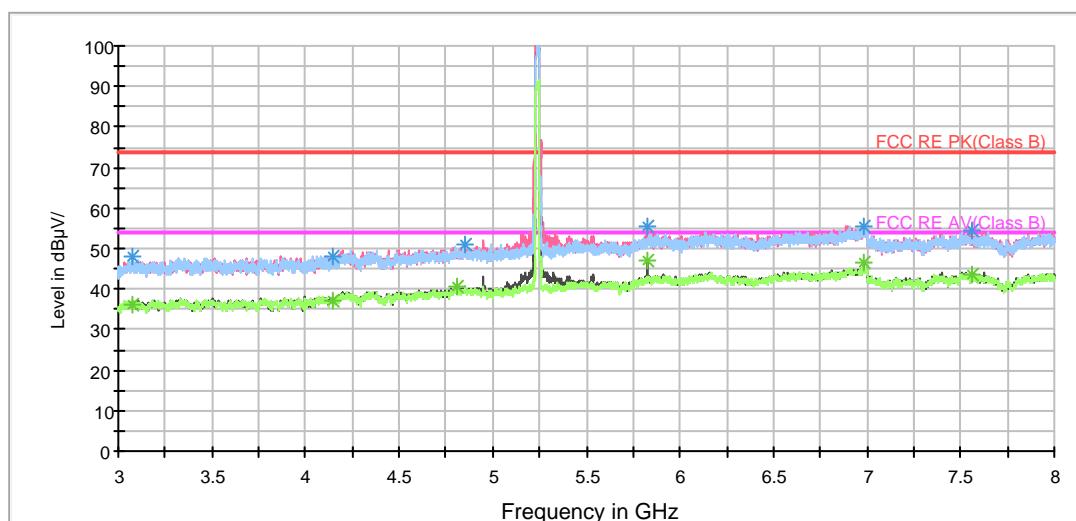
802.11a CH48

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