

NCC Test Report

Report No.: NCC_RF_SL20051802-SAG-006_5G Rev_4.0

Product: Portable Handset

Test Model (host): SM-A102U1

Series Model: N/A

Received Date: 07/14/2020

Test Date: 07/22/2019~09/11/2020

Issued Date: 04/28/2021

Applicant: Samsung Electronics Co., Ltd.

Address: 129, Samsung-ro, Yeongtong-gu, Suwon-si Gyeonggi-do, 16677, Korea

Manufacturer: Samsung Electronics Co., Ltd.

Address: 129, Samsung-ro, Yeongtong-gu, Suwon-si Gyeonggi-do, 16677, Korea

Issued By: Bureau Veritas Consumer Products Services, Inc.

Lab Address: 775 Montague Expressway, Milpitas, CA 95035, USA

Test Location (1): 775 Montague Expressway, Milpitas, CA 95035, USA

**FCC Registration /
Designation Number:** 540430

ISED# / CAB identifier: 4842D



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Table of Contents

Release Control Record	4
1 Certificate of Conformity.....	5
2 Summary of Test Results	6
2.1 Measurement Uncertainty	6
2.2 Modification Record	6
3 General Information.....	7
3.1 General Description of EUT	7
3.2 General Description of Antenna	8
3.3 Description of Operation Modes.....	9
3.3.1 Test Mode Applicability and Tested Channel Detail	11
3.4 Description of Support Units	13
3.4.1 Configuration of System under Test	13
3.5 General Description of Applied Standard	13
4 Test Types and Results	14
4.1 Antenna Requirement	14
4.2 Radiated Emission and Bandedge Measurement.....	15
4.2.1 Limits of Radiated Emission Measurement	15
4.2.2 Test Instruments	16
4.2.3 Test Procedure	16
4.2.4 Deviation from Test Standard	17
4.2.5 Test Setup.....	18
4.2.6 EUT Operating Condition	19
4.2.7 Test Results	20
4.3 Conducted Emission Measurement	52
4.3.1 Limits of Conducted Emission Measurement	52
4.3.2 Test Instruments	52
4.3.3 Test Procedures.....	53
4.3.4 Deviation from Test Standard	53
4.3.5 Test Setup.....	53
4.3.6 EUT Operating Conditions.....	53
4.3.7 Test Results	54
4.4 Transmit Power Measurement	56
4.4.1 Limits of Transmit Power Measurement	56
4.4.2 Test Setup.....	57
4.4.3 Test Instruments	57
4.4.4 Test Procedure	57
4.4.5 Deviation from Test Standard	58
4.4.6 EUT Operating Condition	58
4.4.7 Test Results	59
4.5 26dB Bandwidth & 6dB Bandwidth Measurement	61
4.5.1 Test Setup.....	61
4.5.2 Test Instruments	61
4.5.3 Test Procedure	61
4.5.4 Test Results	62
4.6 Peak Power Spectral Density Measurement	85
4.6.1 Limits of Peak Power Spectral Density Measurement	85
4.6.2 Test Setup.....	85
4.6.3 Test Instruments	85
4.6.4 Test Procedure	85
4.6.5 Deviation from Test Standard	85
4.6.6 EUT Operating Condition	86
4.6.7 Test Results	86
4.7 Frequency Stability Measurement.....	109

4.7.1	Limits of Frequency Stability Measurement	109
4.7.2	Test Setup.....	109
4.7.3	Test Instruments	109
4.7.4	Test Procedure	109
4.7.5	Deviation from Test Standard	109
4.7.6	EUT Operating Condition	109
4.7.7	Test Results	110
4.8	Dynamic Frequency Selection	111
4.8.1	Test Limits and Radar Signal Parameters	112
4.8.2	Test instruments	115
4.8.3	EUT Information	115
4.8.4	Description of support units	115
4.8.5	Test Procedure	116
4.8.6	Calibration of DFS Detection Threshold Level	117
4.8.7	Deviation from Test Standard	117
4.8.8	Test Setup Configuration	118
4.8.9	List of Measurements	118
4.8.10	Test Results	119
5	Pictures of Test Arrangements.....	121
	Appendix – Information on the Testing Laboratories	122

Release Control Record

Issue No.	Description	Date Issued
NCC_RF_SL20051802-SAG-006_5G	Original release	09/21/2020
NCC_RF_SL20051802-SAG-006_5G Rev_1.0	Update standard to latest version	12/11/2020
NCC_RF_SL20051802-SAG-006_5G Rev_2.0	Update per review	03/24/2021
NCC_RF_SL20051802-SAG-006_5G Rev_3.0	Update per review	04/06/2021
NCC_RF_SL20051802-SAG-006_5G Rev_4.0	Correction Antenna gain spec	04/28/2021

1 Certificate of Conformity

Product: Portable Handset

Brand: Samsung

Test Model (host): SM-A102U1

Series Model: N/A

Sample Status: Engineering Sample

Applicant: Samsung Electronics Co., Ltd.

Test Date: 07/22/2019~09/11/2020

Standard: LP0002:2020

789033 D02 General U-NII Test Procedures New Rules v02r01

The above equipment has been tested by **Bureau Veritas Consumer Products Services, Inc. Milpitas Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : Deon Dai , **Date:** 04/28/2021
Deon Dai / Test Engineer

Approved by : Gary Chou , **Date:** 04/28/2021
Gary Chou / Engineer Reviewer

2 Summary of Test Results

LP0002:2020			
LP0002 Clause	Test Item	Result	Remarks
3.2	Antenna Requirement	Pass	Antenna connector is U.FL. (The device is professionally installed)
3.3	AC Power Conducted Emissions	Pass	Meet the requirement of limit.
5.7.4.5 5.7.4.6	Radiated Emissions & Band Edge Measurement*	Pass	Meet the requirement of limit.
5.7.3.1 (2) (A) 5.7.3.2 (1) 5.7.3.3 (1)	Max Average Transmit Power	Pass	Meet the requirement of limit.
5.7.2.3 5.7.5	26 & 6 dB Emission Bandwidth	-	Meet the requirement of limit. Reference only.
5.7.3.1 (2) (B) 5.7.3.2 (2) 5.7.3.3 (2)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
5.6.5.2	Frequency Stability	Pass	Meet the requirement of limit.
5.7.7.2	Dynamic Frequency Selection	Pass	Meet the requirement of limit.

Note: The device don't have TPC function.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	3.51dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	3.73dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	4.64dB
	6GHz ~ 18GHz	4.82dB
	18GHz ~ 40GHz	4.91dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Portable Handset
Brand	Samsung
Test Model (host)	SM-A102U1
Status of EUT	Engineering Sample
Power Supply Rating	Input:100-240V 50/60Hz, Output: 5V 1.55A
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 1200Mbps 802.11ac: up to 3466.4Mbps
Operating Frequency	5150 ~ 5350MHz, 5470 ~ 5725MHz, 5745~5825MHz
Number of Channel	802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5260~5320MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5500~5700MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 11 802.11n (HT40), 802.11ac (VHT40): 5 802.11ac (VHT80): 2 5745~5825MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1

3.2 General Description of Antenna

Antenna manufacturer	Ethertronics, Inc.
Antenna model	SM-A102U SUB Antenna
Antenna Type	LDS Type / Samsung/ LT31261
Antenna Gain	5150 MHz: Max: -0.7 dBi 5290 MHz: Max: 2.5 dBi 5430 MHz: Max: 2.4 dBi 5570 MHz: Max: -0.1 dBi 5710 MHz: Max: 0.0 dBi 5850 MHz: Max: 0.3 dBi
Antenna Connector	N/A

Note:

1. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.3 Description of Operation Modes

FOR 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

FOR 5260 ~ 5320MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
58	5290MHz

FOR 5500 ~ 5700MHz

11 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz		

5 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz		

2 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530MHz	122	5610 MHz

FOR 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.3.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE $\geq$ 1G	RE<1G	PLC	APCM	
A	√	√	√	√	Powered by adapter
B	-	√	√	-	Powered by POE

Where **RE $\geq$ 1G**: Radiated Emission above 1GHz **RE<1G**: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

NOTE:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.
2. "-" means no effect.

Radiated Emission Test (Above 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
-	802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
-	802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
-	802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6
-	802.11ac (VHT20)		52 to 64	52, 60, 64	OFDM	BPSK	6.5
-	802.11ac (VHT40)		54 to 62	54, 62	OFDM	BPSK	13.5
-	802.11ac (VHT80)		58	58	OFDM	BPSK	29.3
-	802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	BPSK	6
-	802.11ac (VHT20)		100 to 140	100, 116, 140	OFDM	BPSK	6.5
-	802.11ac (VHT40)		102 to 134	102, 110, 134	OFDM	BPSK	13.5
-	802.11ac (VHT80)		106 to 138	106, 138	OFDM	BPSK	29.3
-	802.11a	5745 ~ 5825	149 to 165	147, 157, 165	OFDM	BPSK	6
-	802.11ac (VHT20)		149 to 165	147, 157, 165	OFDM	BPSK	13.5
-	802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	29.3
-	802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

Radiated Emission Test (Below 1GHz):

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11a	5180-5320	36 to 64	62	OFDM	BPSK	6

Power Line Conducted Emission Test:

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11a	5180-5320	36 to 64	62	OFDM	BPSK	6
-	802.11a	5500-5700	100 to 140	140	OFDM	BPSK	6

Antenna Port Conducted Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
-	802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
-	802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
-	802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
-	802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6
-	802.11ac (VHT20)		52 to 64	52, 60, 64	OFDM	BPSK	6.5
-	802.11ac (VHT40)		54 to 62	54, 62	OFDM	BPSK	13.5
-	802.11ac (VHT80)		58	58	OFDM	BPSK	29.3
-	802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	BPSK	6
-	802.11ac (VHT20)		100 to 140	100, 116, 140	OFDM	BPSK	6.5
-	802.11ac (VHT40)		102 to 134	102, 110, 134	OFDM	BPSK	13.5
-	802.11ac (VHT80)		106 to 138	106, 138	OFDM	BPSK	29.3
-	802.11a	5745 ~ 5825	149 to 165	147,157,165	OFDM	BPSK	6
-	802.11ac (VHT20)		149 to 165	147,157,165	OFDM	BPSK	13.5
-	802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	29.3
-	802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested By
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Deon Dai
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Deon Dai
PLC	25deg. C, 68%RH	120Vac, 60Hz	Deon Dai
APCM	21deg. C, 60%RH	120Vac, 60Hz	Deon Dai

3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	AC Adapter	Samsung	EP-TA50JBE	R37MARAHJ04DK3	N/A	Provide by customer
B.						

ID	Description	Brand	Model No.	Qty.	Length (ft)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB Cable (Type C)	MycableMart	FE-USB-C A-02	1	2	N0	0	Provide by customer

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

LP0002 :2020

KDB 789033 D02 General UNII Test Procedure New Rules v02r01

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

4 Test Types and Results

4.1 Antenna Requirement

Spec	Requirement	Applicable
LP0002, 2.2	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. Antenna requirement must meet at least one of the following: a) Antenna must be permanently attached to the device. b) The antenna must use a unique type of connector to attach to the device. c) Device must be professionally installed. The installer shall be responsible for ensuring that the correct antenna is employed by the device.	☒
Remark	The antennas of the EUT are permanently attached.	
Result	☒ PASS ☐ FAIL	

4.2 Radiated Emission and Bandedge Measurement

4.2.1 Limits of Radiated Emission Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK:74 (dBuV/m)	AV:54 (dBuV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBuV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	☐ 15.407(b)(4)(i)	PK:-27 (dBm/MHz) ^{*1} PK:10 (dBm/MHz) ^{*2} PK:15.6 (dBm/MHz) ^{*3} PK:27 (dBm/MHz) ^{*4}	PK: 68.2(dBuV/m) ^{*1} PK:105.2 (dBuV/m) ^{*2} PK: 110.8(dBuV/m) ^{*3} PK:122.2 (dBuV/m) ^{*4}
	☒ 15.407(b)(4)(ii)	Emission limits in section 15.247(d)	
^{*1} beyond 75 MHz or more above of the band edge.		^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.	
^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.		^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.	

Note:

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \text{ } \mu\text{V/m, where P is the eirp (Watts).}$$

4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
EMI Receiver Rohde & Schwarz	ESW 44	100179	08/30/2019	08/30/2020
Biconilog Antenna Sunol	JB1	A030702	03/09/2018	03/09/2020
Horn Antenna ETS-Lindgren	3117	218554	12/20/2019	12/20/2020
Pre-Amplifier RF-Lambda	RAMP00M50GA	17032300048	06/18/2019	06/18/2020

4.2.3 Test Procedure

For Radiated emission below 30MHz

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

- The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

For Band edge Measurement

789033 D02 General U-NII Test Procedures New Rules v02r01, II.F. Method SA-1

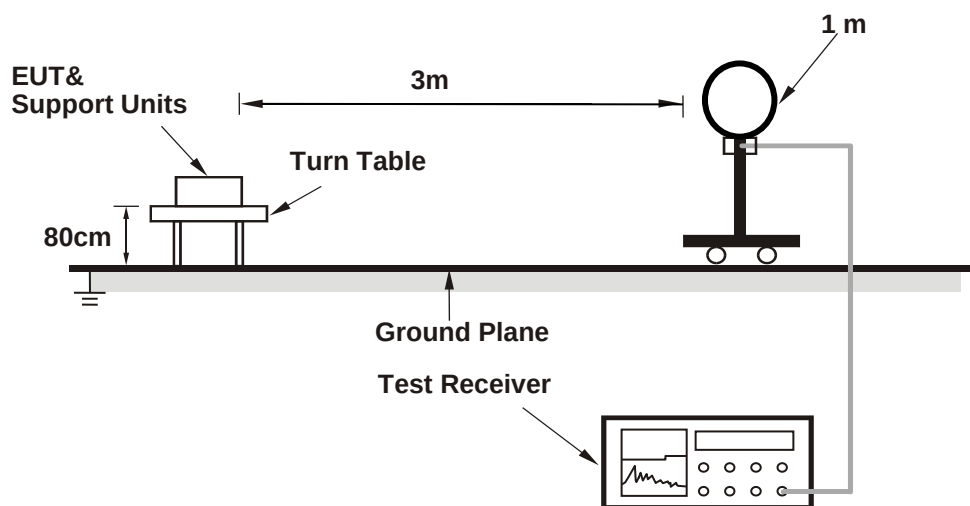
1. For average emissions measurements, follow the procedures described in section II.G.6., "Procedures for Average Unwanted Emissions Measurements above 1000 MHz", except for the following changes:
2. Set RBW=100 kHz
3. Set VBW=300 kHz
4. Perform a band-power integration across the 1 MHz bandwidth in which the band-edge emission level is to be measured.

4.2.4 Deviation from Test Standard

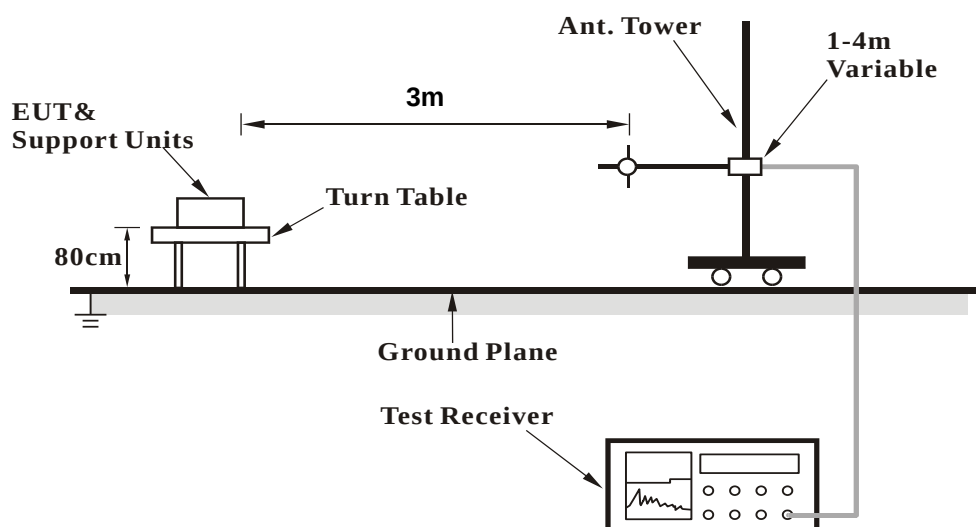
No deviation.

4.2.5 Test Setup

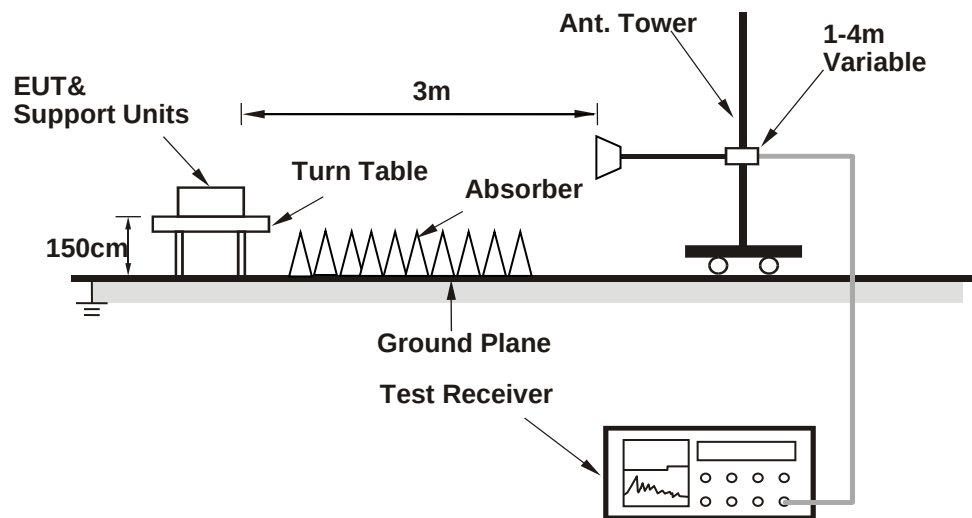
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT Operating Condition

- Placed the EUT on the testing table.
- Prepared notebooks to act as communication partner and placed it outside of testing area.
- The communication partner connected with EUT via a USB cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- The necessary accessories enable the system in full functions.

4.2.7 Test Results

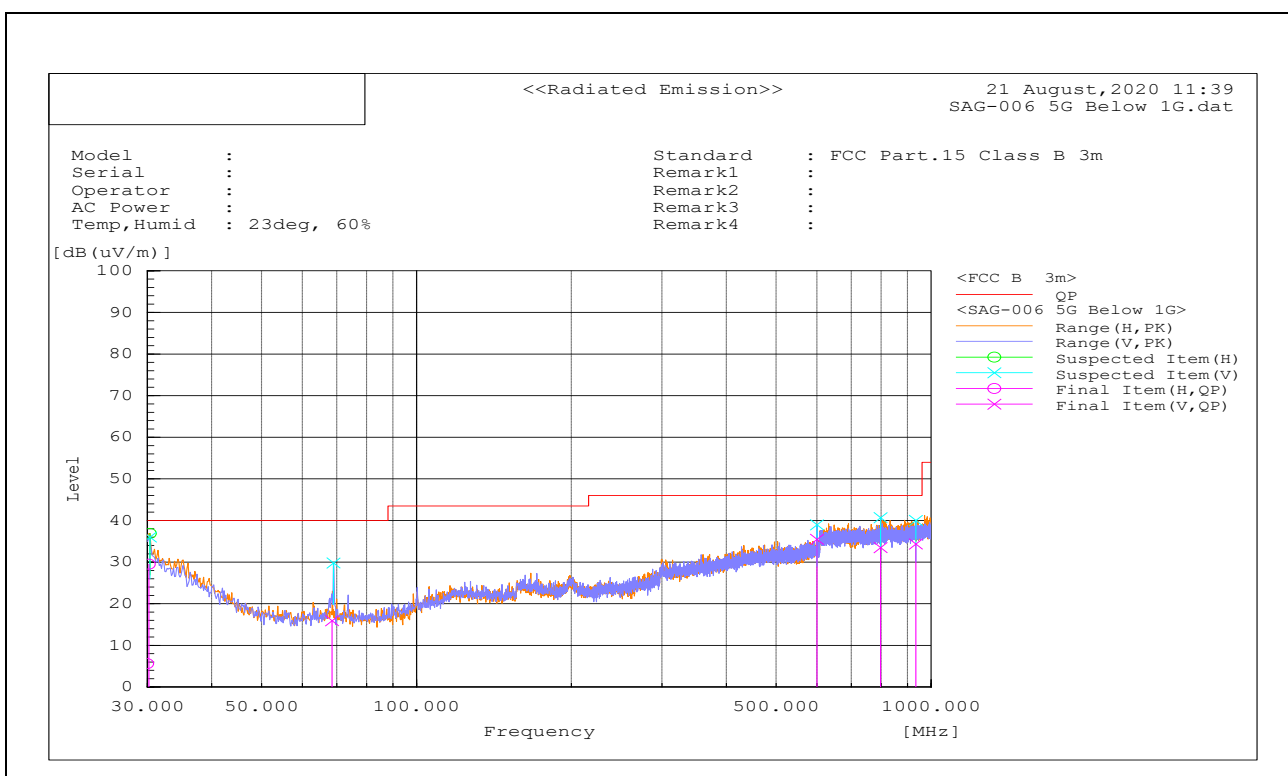
Below 1GHz Worst-Case Data:

CHANNEL	802.11n Channel 62	DETECTOR FUNCTION	Quasi Peak
FREQUENCY RANGE	30MHz – 1GHz		

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m										
No.	Frequency (MHz)	Polarization (H/V)	Reading QP [dB(uV)]	Factor [dB(1/m)]	Level QP [dB(uV/m)]	Limit\QP dB(uV/m)	Margin QP [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	30.209	H	2.7	26.8	29.5	40	-10.5	Pass	99	Pass
2	30.962	H	4.9	26.8	31.7	40	-8.3	Pass	357	Pass
3	68.525	V	2.9	13	15.9	40	-24.1	Pass	154	Pass
4	599.995	V	8.8	26.7	35.5	46	-10.5	Pass	298	Pass
5	797.591	V	4	29.5	33.5	46	-12.5	Pass	306	Pass
6	933.748	V	3.5	30.9	34.4	46	-11.6	Pass	146	Pass

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB (1/m)).
2. Factor (dB (1/m)) = Antenna Factor (AF) (dB (1/m)) + Cable Loss (dB)
3. Margin = Level (dBuV/m) - Limit value (dBuV/m)



Above 1GHz Test Data:

1GHz-40GHz – 802.11a – 5180MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	1272.485	V	40.8	54.2	-9.7	31.1	44.5	54	74	-22.9	-29.5	258	356	Pass
2	7730.486	V	28.6	41.9	4.4	33	46.3	54	74	-21	-27.7	102	262.3	Pass
3	10359.28	H	25.7	39.3	8.4	34.1	47.7	54	74	-19.9	-26.3	232	47.1	Pass

1GHz-40GHz – 802.11a – 5200MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	3277.47	H	37.1	50.5	-4.2	32.9	46.4	54	74	-21.1	-27.6	187	0	Pass
2	3805.18	H	36.3	49.5	-2.9	33.4	46.6	54	74	-20.6	-27.4	208	2.7	Pass
3	10399.14	V	25.6	39.3	8.5	34.1	47.8	54	74	-19.9	-26.2	222	276.7	Pass

1GHz-40GHz – 802.11a – 5240MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	1630.01	V	38.7	52	-9.8	28.9	42.2	54	74	-25.1	-31.8	229	239.4	Pass
2	2377.89	H	37.4	50.4	-5.9	31.5	44.5	54	74	-22.5	-29.5	136	136	Pass
3	10479.95	V	25.6	39.9	8.7	34.3	48.6	54	74	-19.7	-25.4	194	170.4	Pass

1GHz-40GHz – 802.11ac – 5180MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	2138.69	V	38.4	52.2	-6.5	31.9	45.7	54	74	-22.1	-28.3	308	57.3	Pass
2	3177.08	H	36.3	49.5	-4.5	31.8	45	54	74	-22.2	-29	100	205.7	Pass
3	10358.39	H	26.6	40.3	8.4	35	48.7	54	74	-19	-25.3	380	123	Pass

1GHz-40GHz – 802.11ac – 5200MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	2800.95	H	37.9	51.5	-5.2	32.7	46.3	54	74	-21.3	-27.7	308	87.4	Pass
2	10399.17	H	26.4	39.7	8.5	34.9	48.2	54	74	-19.1	-25.8	358	35.7	Pass
3	10995.82	V	26.1	39.5	8.7	34.8	48.2	54	74	-19.2	-25.8	287	296.4	Pass

1GHz-40GHz – 802.11ac – 5240MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	1203.06	V	39.3	52.5	-10.1	29.2	42.4	54	74	-24.8	-31.6	373	316.4	Pass
2	3822.42	H	36.6	49.5	-2.9	33.7	46.6	54	74	-20.3	-27.4	129	279.6	Pass
3	10479.50	V	26.2	39.3	8.7	34.9	48	54	74	-19.1	-26	372	286.5	Pass

1GHz-40GHz – 802.11ac -40M – 5190MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	1204.88	V	39.1	53.1	-10.1	29	43	54	74	-25	-31	380	266	Pass
2	1919.69	V	38.8	51.8	-6.3	32.5	45.5	54	74	-21.5	-28.5	358	342.8	Pass
3	10378.59	H	26.5	39.9	8.4	34.9	48.3	54	74	-19.1	-25.7	337	88.3	Pass

1GHz-40GHz – 802.11ac -40M – 5230MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	2801.48	H	38	51.2	-5.2	32.8	46	54	74	-21.2	-28	330	95.4	Pass
2	3821.27	V	36.8	50	-2.9	33.9	47.1	54	74	-20.1	-26.9	315	198.7	Pass
3	10460.60	V	25.5	38.8	8.7	34.2	47.5	54	74	-19.8	-26.5	208	44.2	Pass

1GHz-40GHz – 802.11a – 5260MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	1254.99	H	40.1	53.1	-9.7	30.4	43.4	54	74	-23.6	-30.6	230	109.7	Pass
2	6455.36	H	30.6	43.6	1.7	32.3	45.3	54	74	-21.7	-28.7	122	204.6	Pass
3	10517.93	V	25.6	39.2	8.8	34.4	48	54	74	-19.6	-26	230	69.1	Pass

1GHz-40GHz – 802.11a – 5280MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	2123.08	H	38	51.5	-6.5	31.5	45	54	74	-22.5	-29	330	140.3	Pass
2	3820.20	V	37.3	54.4	-2.9	34.4	51.5	54	74	-19.6	-22.5	100	189.4	Pass
3	10559.25	H	24.9	38.6	8.7	33.6	47.3	54	74	-20.4	-26.7	351	92.1	Pass

1GHz-40GHz – 802.11a – 5320MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	1271.85	V	40.9	54.3	-9.7	31.2	44.6	54	74	-22.8	-29.4	201	340.6	Pass
2	1629.95	V	39.2	52.5	-9.8	29.4	42.7	54	74	-24.6	-31.3	244	184.3	Pass
3	10639.98	H	31.1	43.1	8.6	39.7	51.7	54	74	-14.3	-22.3	208	133.9	Pass

1GHz-40GHz – 802.11ac – 5260MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	1798.57	V	39.3	52.4	-7.9	31.4	44.5	54	74	-22.6	-29.5	280	73.7	Pass
2	2122.99	V	38.3	51.4	-6.5	31.8	44.9	54	74	-22.2	-29.1	358	89.6	Pass
3	10519.29	V	26.1	39.3	8.8	34.9	48.1	54	74	-19.1	-25.9	315	355.8	Pass

1GHz-40GHz – 802.11ac – 5280MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	3668.57	H	36.5	49.5	-3.8	32.7	45.7	54	74	-21.3	-28.3	301	325.2	Pass
2	4415.62	H	34.8	48.2	-3.1	31.7	45.1	54	74	-22.3	-28.9	129	241.2	Pass
3	10559.08	H	24.7	38.3	8.7	33.4	47	54	74	-20.6	-27	258	7.5	Pass

1GHz-40GHz – 802.11ac – 5320MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	2802.07	H	37.8	50.9	-5.2	32.6	45.7	54	74	-21.4	-28.3	399	355.1	Pass
2	3090.61	V	37.1	50.2	-4.7	32.4	45.5	54	74	-21.6	-28.5	322	0	Pass
3	10640.25	H	25.4	38.9	8.6	34	47.5	54	74	-20	-26.5	344	3.3	Pass

1GHz-40GHz – 802.11ac -40M – 5270MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	3413.52	V	36.9	50.2	-3.9	33	46.3	54	74	-21	-27.7	380	0.1	Pass
2	6438.90	H	30.7	44.2	1.6	32.3	45.8	54	74	-21.7	-28.2	258	44.2	Pass
3	10540.48	H	25.8	39.5	8.7	34.5	48.2	54	74	-19.5	-25.8	358	0	Pass

1GHz-40GHz – 802.11ac -40M – 5310MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequenc y (MHz)	Polarizat ion (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK dB(uV/m)	Limit AV dB(uV/ m)	Limit PK [dB(uV/ m)	Margin AV [dB]	Margin PK [dB]	Heig ht (cm)	Angle (Deg)	Pass/ Fail
1	2393.72	H	38.1	51.3	-5.8	32.3	45.5	54	74	-21.7	-28.5	308	92.8	Pass
2	7816.11	H	28.4	41.6	4.7	33.1	46.3	54	74	-20.9	-27.7	344	354.1	Pass
3	10619.72	V	25.7	39.7	8.7	34.4	48.4	54	74	-19.6	-25.6	351	22.5	Pass

1GHz-40GHz – 802.11a – 5500MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequenc y (MHz)	Polarizat ion (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK dB(uV/m)	Limit AV dB(uV/ m)	Limit PK [dB(uV/ m)	Margin AV [dB]	Margin PK [dB]	Heig ht (cm)	Angle (Deg)	Pass/ Fail
1	1986.43	H	37.6	51.3	-6	31.6	45.3	54	74	-22.4	-28.7	359	341.1	Pass
2	3310.95	V	36	49.3	-4	32	45.3	54	74	-22	-28.7	400	220.5	Pass
3	10999.81	H	25.8	39.3	8.7	34.5	48	54	74	-19.5	-26	400	274.1	Pass

1GHz-40GHz – 802.11a – 5580MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequenc y (MHz)	Polarizat ion (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK dB(uV/m)	Limit AV dB(uV/ m)	Limit PK [dB(uV/ m)	Margin AV [dB]	Margin PK [dB]	Heig ht (cm)	Angle (Deg)	Pass/ Fail
1	2545.14	V	38.2	51.7	-5.2	33	46.5	54	74	-21	-27.5	308	123.2	Pass
2	3668.49	V	36.7	49.7	-3.8	32.9	45.9	54	74	-21.1	-28.1	395	278.1	Pass
3	11159.69	V	25.5	39.4	8.7	34.2	48.1	54	74	-19.8	-25.9	373	184.2	Pass

1GHz-40GHz – 802.11a – 5700MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequenc y (MHz)	Polarizat ion (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK dB(uV/m)	Limit AV dB(uV/ m)	Limit PK [dB(uV/ m)	Margin AV [dB]	Margin PK [dB]	Heig ht (cm)	Angle (Deg)	Pass/ Fail
1	2699.97	V	37.9	51.2	-5	32.9	46.2	54	74	-21.1	-27.8	373	281.9	Pass
2	8259.25	H	27.8	41.4	5.4	33.2	46.8	54	74	-20.8	-27.2	387	59.8	Pass
3	11400.45	H	24.5	38	8.9	33.4	46.9	54	74	-20.6	-27.1	280	67.4	Pass

1GHz-40GHz – 802.11ac – 5500MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequenc y (MHz)	Polarizat ion (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK dB(uV/m)	Limit AV dB(uV/ m)	Limit PK [dB(uV/ m)	Margin AV [dB]	Margin PK [dB]	Heig ht (cm)	Angle (Deg)	Pass/ Fail
1	1120.01	V	41.7	53.3	-11.1	30.6	42.2	54	74	-23.4	-31.8	115	260.7	Pass
2	2818.34	H	37.8	51	-5.2	32.6	45.8	54	74	-21.4	-28.2	330	20.7	Pass
3	10999.99	H	29.6	43.3	8.7	38.3	52	54	74	-15.7	-22	100	175.8	Pass

1GHz-40GHz – 802.11ac – 5580MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequenc y (MHz)	Polarizat ion (H/V)	Reading AV [dB(μV)]	Reading PK [dB(μV)]	Factor [dB(1/m)]	Level AV [dB(μV/m)]	Level PK dB(μV/m))	Limit AV dB(μV/ m)	Limit PK [dB(μV/ m)	Margin AV [dB]	Margin PK [dB]	Heig ht (cm)	Angle (Deg)	Pass/ Fail
1	1918.39	H	38.1	51.4	-6.3	31.8	45.1	54	74	-22.2	-28.9	265	163.1	Pass
2	8733.55	V	26.9	39.8	5.2	32.1	45	54	74	-21.9	-29	387	79.4	Pass
3	11159.05	V	25.6	39.2	8.7	34.3	47.9	54	74	-19.7	-26.1	373	59.9	Pass

1GHz-40GHz – 802.11ac – 5700MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequenc y (MHz)	Polarizat ion (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK dB(uV/m)	Limit AV dB(uV/ m)	Limit PK [dB(uV/ m)	Margin AV [dB]	Margin PK [dB]	Heig ht (cm)	Angle (Deg)	Pass/ Fail
1	3260.91	H	37.1	50.5	-4.2	32.9	46.3	54	74	-21.1	-27.7	344	313.8	Pass
2	11400.79	H	24.2	38.2	8.9	33.1	47.1	54	74	-20.9	-26.9	208	210.6	Pass
3	13886.23	V	24.2	37.7	10.8	35	48.5	54	74	-19	-25.5	400	296.3	Pass

1GHz-40GHz – 802.11ac -40M – 5510MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequenc y (MHz)	Polarizat ion (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK dB(uV/m)	Limit AV dB(uV/ m)	Limit PK [dB(uV/ m)	Margin AV [dB]	Margin PK [dB]	Heig ht (cm)	Angle (Deg)	Pass/ Fail
1	2393.757	H	44.9	57.9	-9.8	35.1	48.1	54	74	-18.9	-25.9	117	0	Pass
2	11019.735	V	37.4	47.7	3.7	41.1	51.4	54	74	-12.9	-22.6	147	307.1	Pass
3	16529.49	H	37.1	47.7	10.2	47.3	57.9	54	74	-6.7	-16.1	223	137.9	Pass

1GHz-40GHz – 802.11ac -40M – 5550MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequenc y (MHz)	Polarizat ion (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK dB(uV/m)	Limit AV dB(uV/ m)	Limit PK [dB(uV/ m)	Margin AV [dB]	Margin PK [dB]	Heig ht (cm)	Angle (Deg)	Pass/ Fail
1	2388.805	H	44.3	55.3	-9.8	34.5	45.5	54	74	-19.5	-28.5	399	354.4	Pass
2	11098.97	H	37	48.5	3.7	40.7	52.2	54	74	-13.3	-21.8	223	312.5	Pass
3	16648.62	V	35.1	48	10.7	45.8	58.7	54	74	-8.2	-15.3	132	331.8	Pass

1GHz-40GHz – 802.11ac -40M – 5670MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequenc y (MHz)	Polarizat ion (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK dB(uV/m)	Limit AV dB(uV/ m)	Limit PK [dB(uV/ m)	Margin AV [dB]	Margin PK [dB]	Heig ht (cm)	Angle (Deg)	Pass/ Fail
1	2389.687	V	44.3	58	-9.8	34.5	48.2	54	74	-19.5	-25.8	268	220.9	Pass
2	11339.776	H	36	48.8	3.8	39.8	52.6	54	74	-14.2	-21.4	208	106.4	Pass
3	17009.89	H	35.4	46.7	11.3	46.7	58	54	74	-7.3	-16	329	91.3	Pass

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB (1/m)).
2. Factor (dB (1/m)) = Antenna Factor (AF) (dB (1/m)) + Cable Loss (dB)
3. Margin = Level (dBuV/m) - Limit value (dBuV/m)

1GHz-40GHz – 802.11a – 5745MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequenc y (MHz)	Polarizat ion (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK dB(uV/m))	Limit AV dB(uV/ m)	Limit PK [dB(uV/ m)	Margin AV [dB]	Margin PK [dB]	Heig ht (cm)	Angle (Deg)	Pass/ Fail
1	5746.967	H	39.5	51.1	-5	34.5	46.1	54	74	-19.5	-27.9	238	263.1	Pass
2	7660.092	V	42.9	49.1	-0.9	42	48.2	54	74	-12	-25.8	177	251.8	Pass
3	15427.77	V	27.9	39.8	9.1	37	48.9	54	74	-17	-25.1	268	24.2	Pass

1GHz-40GHz – 802.11a – 5785MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequenc y (MHz)	Polarizat ion (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK dB(uV/m)	Limit AV dB(uV/ m)	Limit PK [dB(uV/ m)	Margin AV [dB]	Margin PK [dB]	Heig ht (cm)	Angle (Deg)	Pass/ Fail
1	5786.217	H	41.2	52.1	-4.9	36.3	47.2	54	74	-17.7	-26.8	100	283.1	Pass
2	7713.367	H	46.8	51	-0.7	46.1	50.3	54	74	-7.9	-23.7	100	301.9	Pass
3	10499.28	V	30.8	42.4	2.7	33.5	45.1	54	74	-20.5	-28.9	103	56.9	Pass

1GHz-40GHz – 802.11a - 5825MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequenc y (MHz)	Polarizat ion (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK dB(uV/m)	Limit AV dB(uV/ m)	Limit PK [dB(uV/ m)	Margin AV [dB]	Margin PK [dB]	Heig ht (cm)	Angle (Deg)	Pass/ Fail
1	5821.508	H	40.1	51	-4.8	35.3	46.2	54	74	-18.7	-27.8	117	244.9	Pass
2	7766.754	H	49	52.5	-0.5	48.5	52	54	74	-5.5	-22	253	317.8	Pass
3	13514.06	V	31.7	42.6	4.6	36.3	47.2	54	74	-17.7	-26.8	268	3.3	Pass

1GHz-40GHz – 802.11ac – 5745MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequenc y (MHz)	Polarizat ion (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK dB(uV/m)	Limit AV dB(uV/ m)	Limit PK [dB(uV/ m)	Margin AV [dB]	Margin PK [dB]	Heig ht (cm)	Angle (Deg)	Pass/ Fail
1	5740.956	H	40.3	52	-5	35.3	47	54	74	-18.7	-27	132	0	Pass
2	7660.074	V	43.4	49.2	-0.9	42.5	48.3	54	74	-11.5	-25.7	103	359.9	Pass
3	11760.388	V	31.2	41.9	3.6	34.8	45.5	54	74	-19.2	-28.5	320	185.4	Pass

1GHz-40GHz – 802.11ac – 5785MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequenc y (MHz)	Polarizat ion (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK dB(uV/m)	Limit AV dB(uV/ m)	Limit PK [dB(uV/ m)	Margin AV [dB]	Margin PK [dB]	Heig ht (cm)	Angle (Deg)	Pass/ Fail
1	5782.295	H	39.1	50.7	-4.9	34.2	45.8	54	74	-19.8	-28.2	100	0	Pass
2	7713.364	H	47.7	51.6	-0.7	47	50.9	54	74	-7	-23.1	103	319.7	Pass
3	15606.68	V	27.7	39.6	9.4	37.1	49	54	74	-16.9	-25	177	226.4	Pass

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB (1/m)).
2. Factor (dB (1/m)) = Antenna Factor (AF) (dB (1/m)) + Cable Loss (dB)
3. Margin = Level (dBuV/m) - Limit value (dBuV/m)

1GHz-40GHz – 802.11ac – 5825MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequenc y (MHz)	Polarizat ion (H/V)	Reading AV [dB(μV)]	Reading PK [dB(μV)]	Factor [dB(1/m)]	Level AV [dB(μV/m)]	Level PK dB(μV/m)	Limit AV dB(μV/m)	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Heig ht (cm)	Angle (Deg)	Pass/ Fail
1	7766.676	H	51	54.4	-0.5	50.5	53.9	54	74	-3.5	-20.1	238	304.6	Pass
2	7766.66	V	48.2	52.3	-0.5	47.7	51.8	54	74	-6.3	-22.2	208	170.9	Pass
3	15739.92	H	27	39	9.3	36.3	48.3	54	74	-17.7	-25.7	275	28.7	Pass

1GHz-40GHz – 802.11ac -40M – 5755MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequenc y (MHz)	Polarizat ion (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK dB(uV/m)	Limit AV dB(uV/ m)	Limit PK [dB(uV/ m)	Margin AV [dB]	Margin PK [dB]	Heig ht (cm)	Angle (Deg)	Pass/ Fail
1	7673.325	V	45.6	50.4	-0.8	44.8	49.6	54	74	-9.2	-24.4	101.8	314.6	Pass
2	7673.346	H	49.4	52.5	-0.8	48.6	51.7	54	74	-5.4	-22.3	136.7	341.9	Pass
3	13091.72	V	31.2	42.6	4.8	36	47.4	54	74	-18	-26.6	182.6	12	Pass

1GHz-40GHz – 802.11ac -40M – 5795MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequenc y (MHz)	Polarizat ion (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK dB(uV/m)	Limit AV dB(uV/ m)	Limit PK [dB(uV/ m)	Margin AV [dB]	Margin PK [dB]	Heig ht (cm)	Angle (Deg)	Pass/ Fail
1	7726.687	V	45.6	50.2	-0.6	45	49.6	54	74	-9	-24.4	196.2	337.5	Pass
2	7726.737	H	49.6	52.7	-0.6	49	52.1	54	74	-5	-21.9	107.6	342.9	Pass
3	12321.12	H	29.6	42	4.4	34	46.4	54	74	-20	-27.6	182.6	98.5	Pass

1GHz-40GHz – 802.11ac -80M – 5210 MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequenc y (MHz)	Polarizat ion (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK dB(uV/m)	Limit AV dB(uV/ m)	Limit PK [dB(uV/ m)]	Margin AV [dB]	Margin PK [dB]	Heig ht (cm)	Angle (Deg)	Pass/ Fail
1	2140.03	H	38.1	51.6	-6.5	31.6	45.1	54	74	-22.4	-28.9	351	112.5	Pass
2	3668.27	V	36.7	50.1	-3.8	32.9	46.3	54	74	-21.1	-27.7	394	24.5	Pass
3	10419.60	H	26	39.1	8.6	34.6	47.7	54	74	-19.4	-26.3	316	110.9	Pass

1GHz-40GHz – 802.11ac -80M – 5290 MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequenc y (MHz)	Polarizat ion (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK dB(uV/m)	Limit AV dB(uV/ m)	Limit PK [dB(uV/ m)]	Margin AV [dB]	Margin PK [dB]	Heig ht (cm)	Angle (Deg)	Pass/ Fail
1	1918.65	H	38.1	51.5	-6.3	31.8	45.2	54	74	-22.2	-28.8	100	153	Pass
2	4656.05	V	35.6	48.8	-2.7	32.9	46.1	54	74	-21.1	-27.9	344	45.9	Pass
3	10581.89	V	25.7	39.2	8.7	34.4	47.9	54	74	-19.6	-26.1	351	325.2	Pass

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB (1/m)).
2. Factor (dB (1/m)) = Antenna Factor (AF) (dB (1/m)) + Cable Loss (dB)
3. Margin = Level (dBuV/m) - Limit value (dBuV/m)

1GHz-40GHz – 802.11ac -80M – 5530 MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	2817.73	H	37.8	50.6	-5.2	32.6	45.4	54	74	-21.4	-28.6	308	173.2	Pass
2	6558.55	V	31	45.2	1.8	32.8	47	54	74	-21.2	-27	380	139	Pass
3	11059.64	H	25.8	39.1	8.7	34.5	47.8	54	74	-19.5	-26.2	358	54.2	Pass

1GHz-40GHz – 802.11ac -80M – 5610 MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	1272.95	V	40.4	54.3	-9.7	30.7	44.6	54	74	-23.3	-29.4	237	155.7	Pass
2	2445.62	H	37.2	51.4	-5.6	31.6	45.8	54	74	-22.4	-28.2	358	45.4	Pass
3	11219.80	H	25.4	39.1	8.7	34.1	47.8	54	74	-19.9	-26.2	322	72.6	Pass

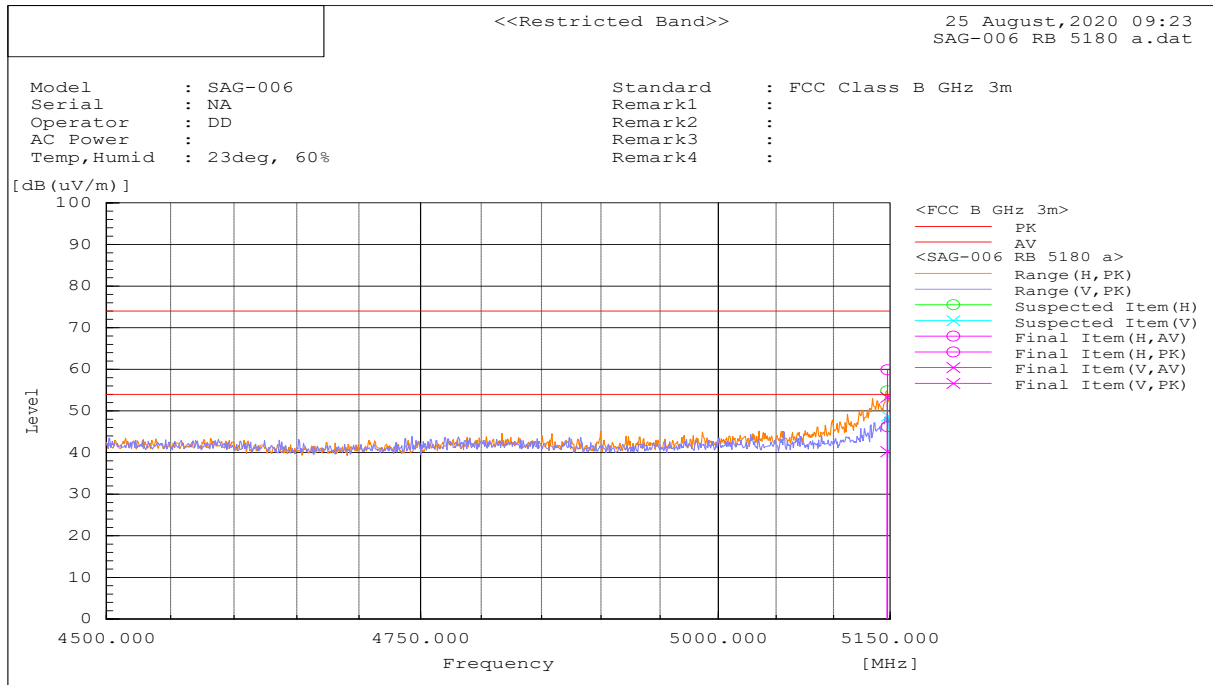
1GHz-40GHz – 802.11ac -80M – 5775 MHz

Antenna Polarity & Test Distance: Vertical and Horizontal at 3m														
No	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	3123.333	H	37.2	50.5	-4.6	32.6	45.9	54	74	-21.4	-28.1	351	161.1	Pass
2	7171.222	V	30.1	43.6	2.9	33	46.5	54	74	-21	-27.5	387	178.3	Pass
3	11549.516	H	25.3	38.6	9.1	34.4	47.7	54	74	-19.6	-26.3	380	55.4	Pass

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB (1/m)).
2. Factor (dB (1/m)) = Antenna Factor (AF) (dB (1/m)) + Cable Loss (dB)
3. Margin = Level (dBuV/m) - Limit value (dBuV/m)

Restricted Band (802.11a_5180MHz)



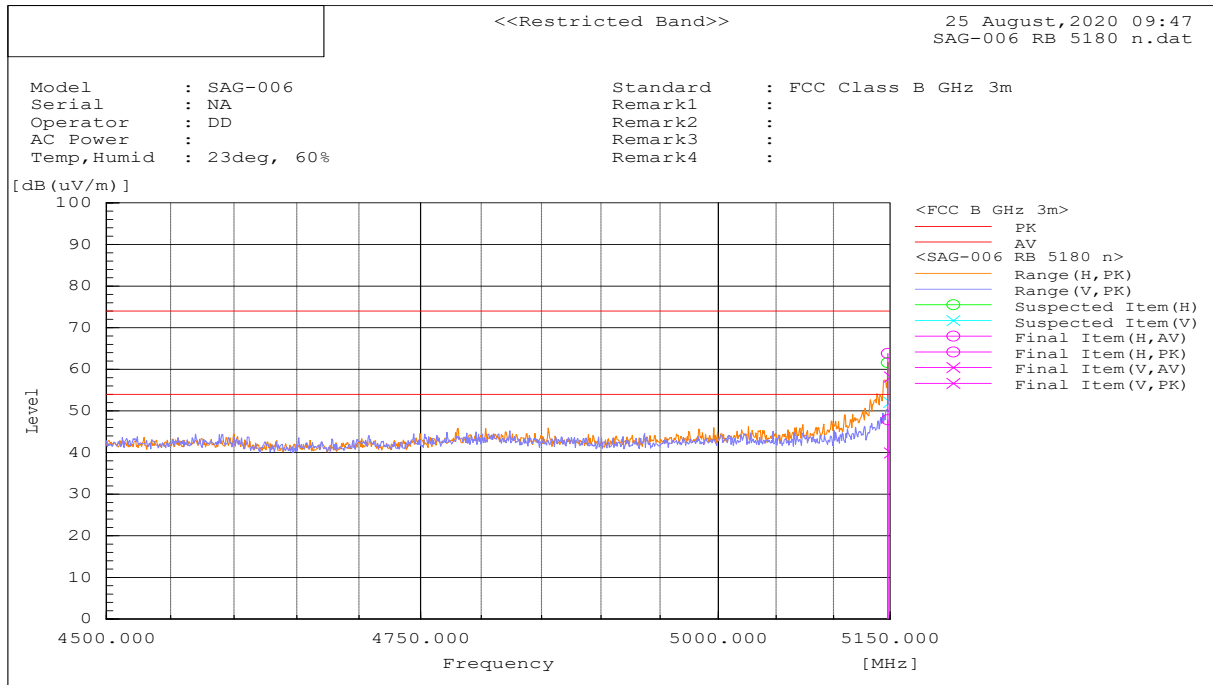
Antenna Polarity & Test Distance: Vertical and Horizontal at 3m

No.	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	5147.59	H	47.9	61.6	-1.7	46.2	59.9	54	74	-7.8	-14.1	137	162.6	Pass
2	5147.44	V	41.9	55	-1.7	40.2	53.3	54	74	-13.8	-20.7	100	105.4	Pass

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) –Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value (dBuV/m)

Restricted Band (802.11ac_5180MHz)



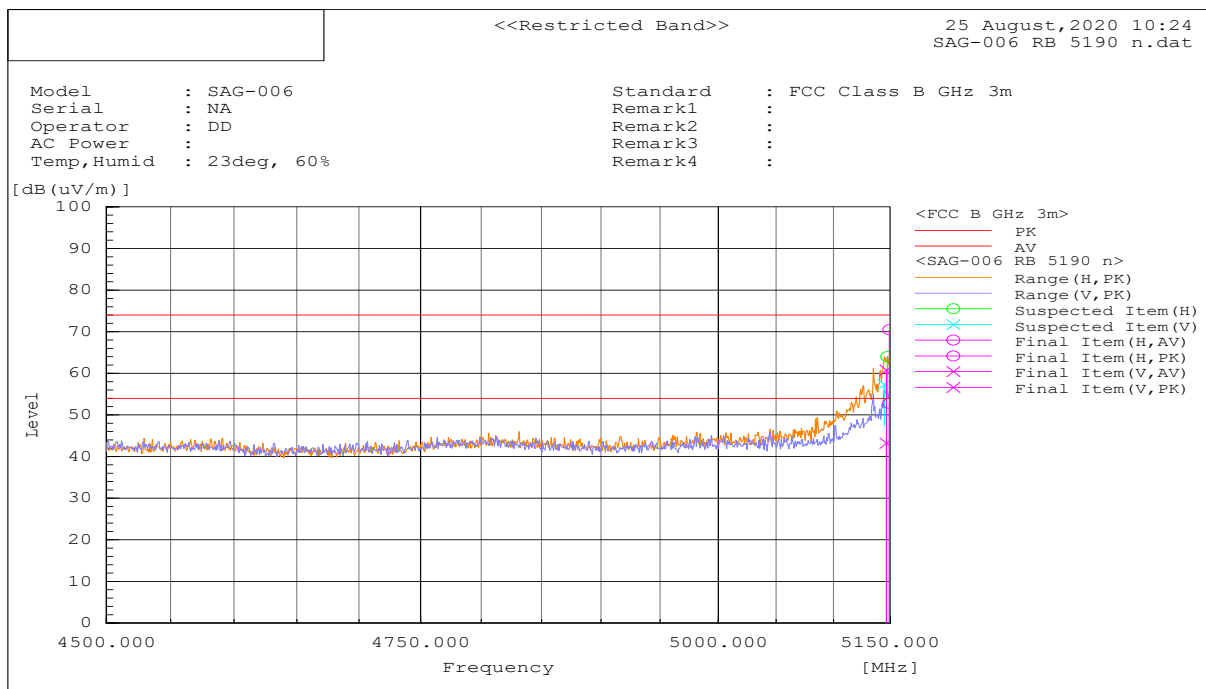
Antenna Polarity & Test Distance: Vertical and Horizontal at 3m

No.	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	5147.95	H	49.6	65.5	-1.7	47.9	63.8	54	74	-6.1	-10.2	115	157.2	Pass
2	5150.58	V	41.6	59.9	-1.7	39.9	58.2	54	74	-14.1	-15.8	115	110.2	Pass

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) - Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value (dBuV/m)

Restricted Band (802.11ac_5190MHz)



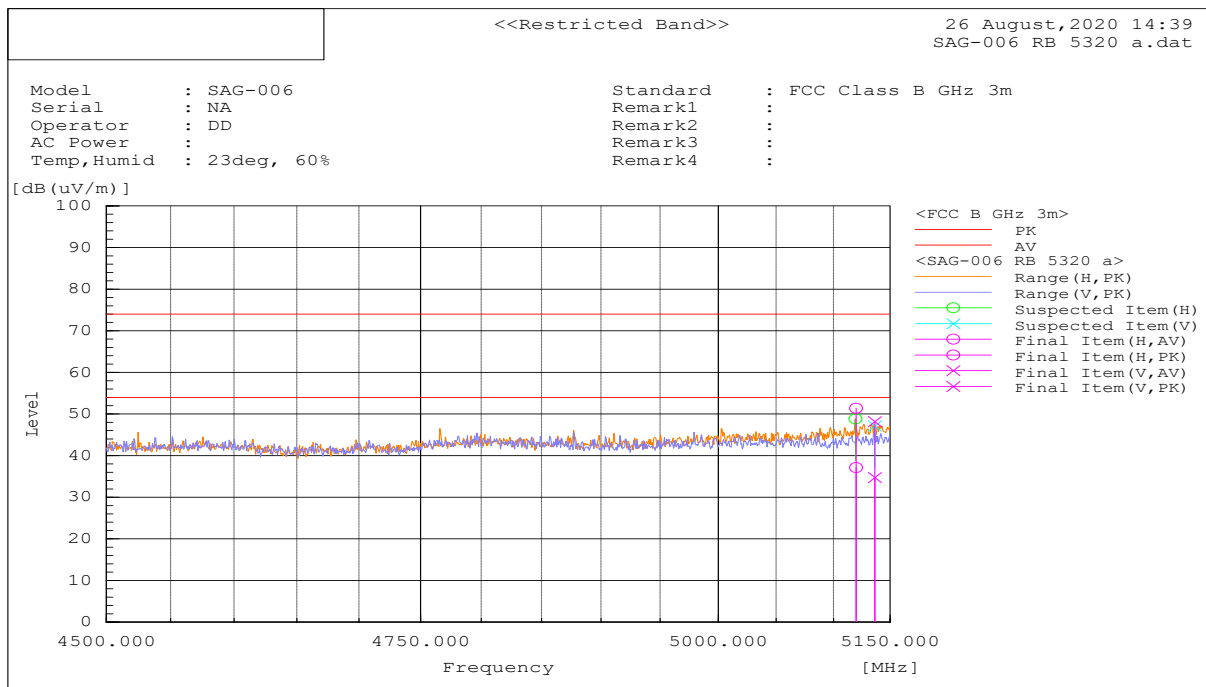
Antenna Polarity & Test Distance: Vertical and Horizontal at 3m

No.	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	5146.62	V	44.9	62.5	-1.7	43.2	60.8	54	74	-10.8	-13.2	100	123	Pass
2	5149.28	H	54.5	72.2	-1.7	52.8	70.5	54	74	-1.2	-3.5	115	173	Pass

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) –Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value (dBuV/m)

Restricted Band (802.11a_5320MHz)



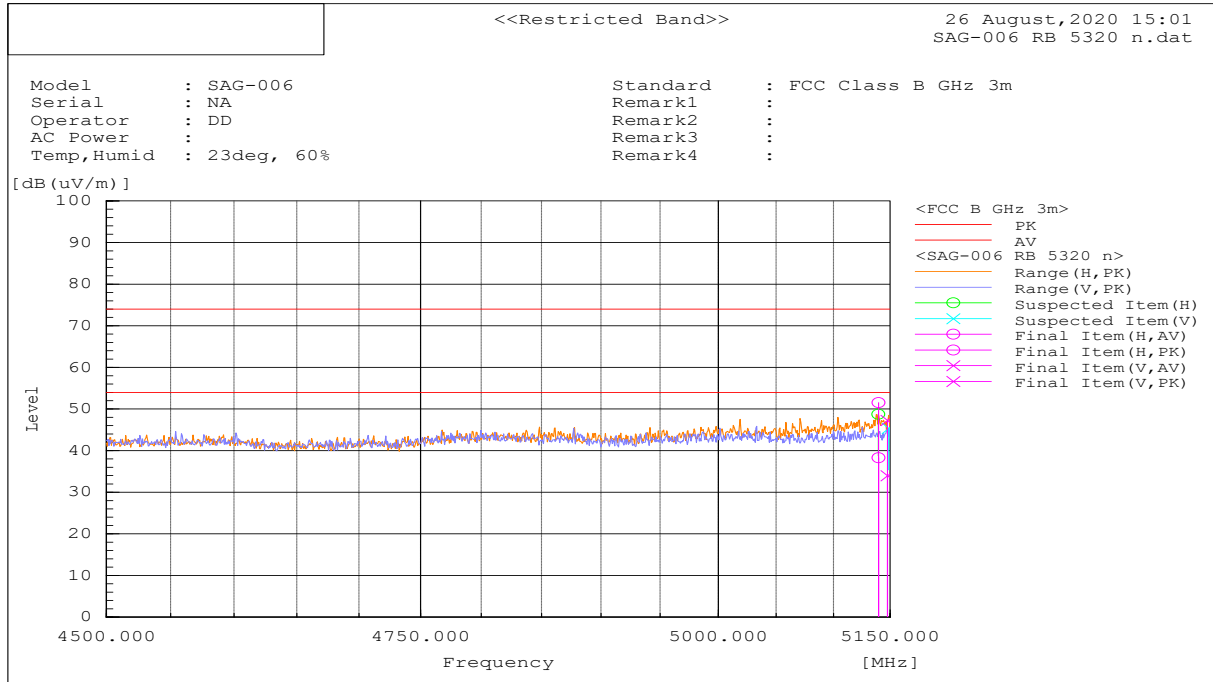
Antenna Polarity & Test Distance: Vertical and Horizontal at 3m

No.	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	5119.89	H	39	53.3	-1.9	37.1	51.4	54	74	-16.9	-22.6	158	179.9	Pass
2	5136.46	V	36.6	50	-1.8	34.8	48.2	54	74	-19.2	-25.8	102	276.6	Pass

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) -Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value (dBuV/m)

Restricted Band (802.11ac_5320MHz)



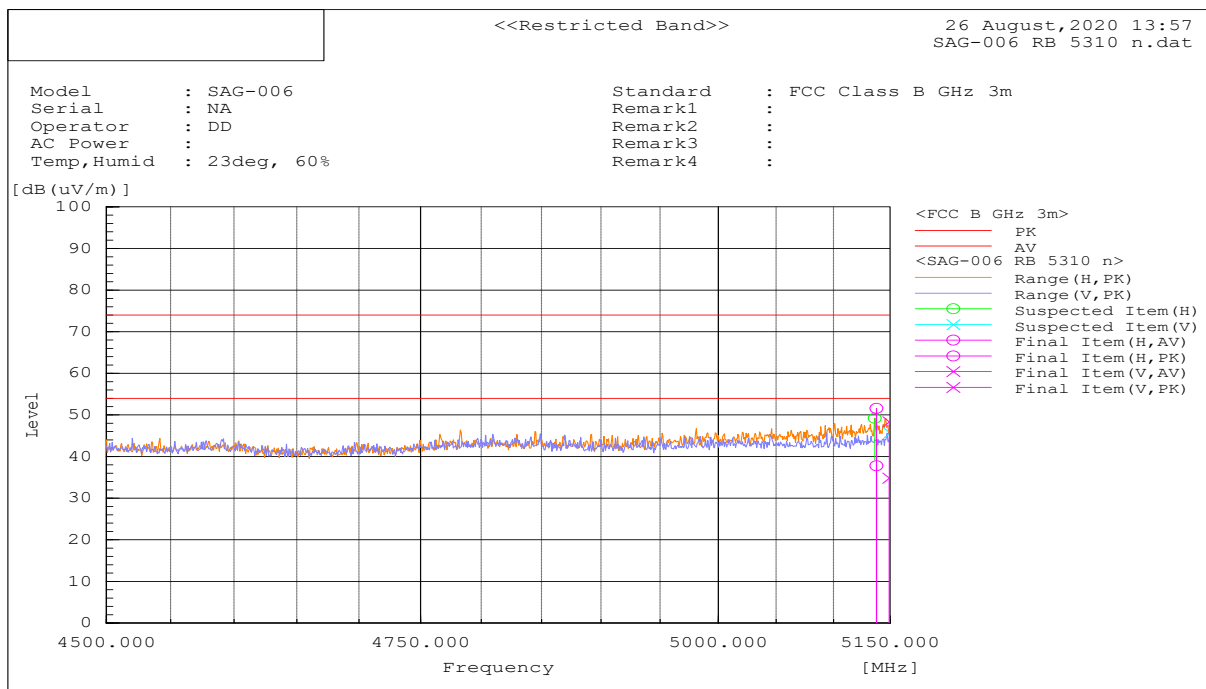
Antenna Polarity & Test Distance: Vertical and Horizontal at 3m

No.	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	5139.64	H	40.1	53.3	-1.8	38.3	51.5	54	74	-15.7	-22.5	100	181.1	Pass
2	5147.67	V	35.7	48.9	-1.7	34	47.2	54	74	-20	-26.8	102	262.2	Pass

REMARKS:

- Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
- Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) -Preamplifier Gain (dB)
- Margin = Level (dBuV/m) - Limit value (dBuV/m)

Restricted Band (802.11ac_5310MHz)



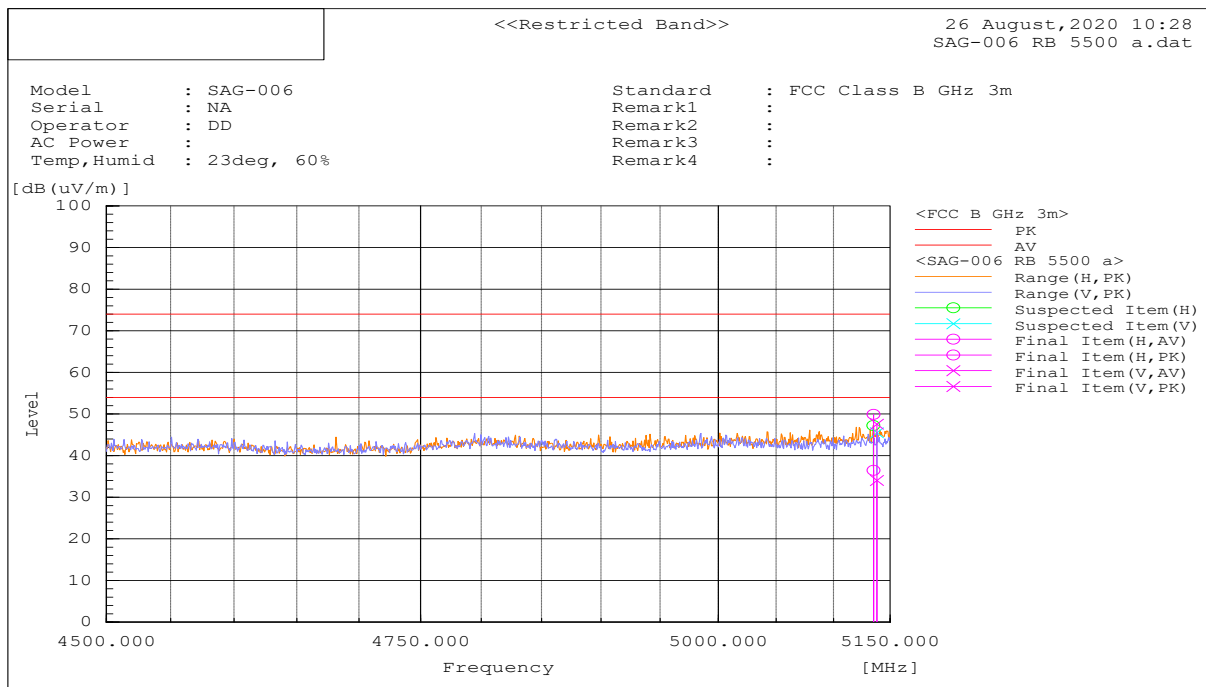
Antenna Polarity & Test Distance: Vertical and Horizontal at 3m

No.	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	5137.82	H	39.6	53.4	-1.8	37.8	51.6	54	74	-16.2	-22.4	129	163.8	Pass
2	5149.35	V	36.5	50	-1.7	34.8	48.3	54	74	-19.2	-25.7	102	284.4	Pass

REMARKS:

1. Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
2. Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) –Preamplifier Gain (dB)
3. Margin = Level (dBuV/m) - Limit value (dBuV/m)

Restricted Band (802.11a_5500MHz)



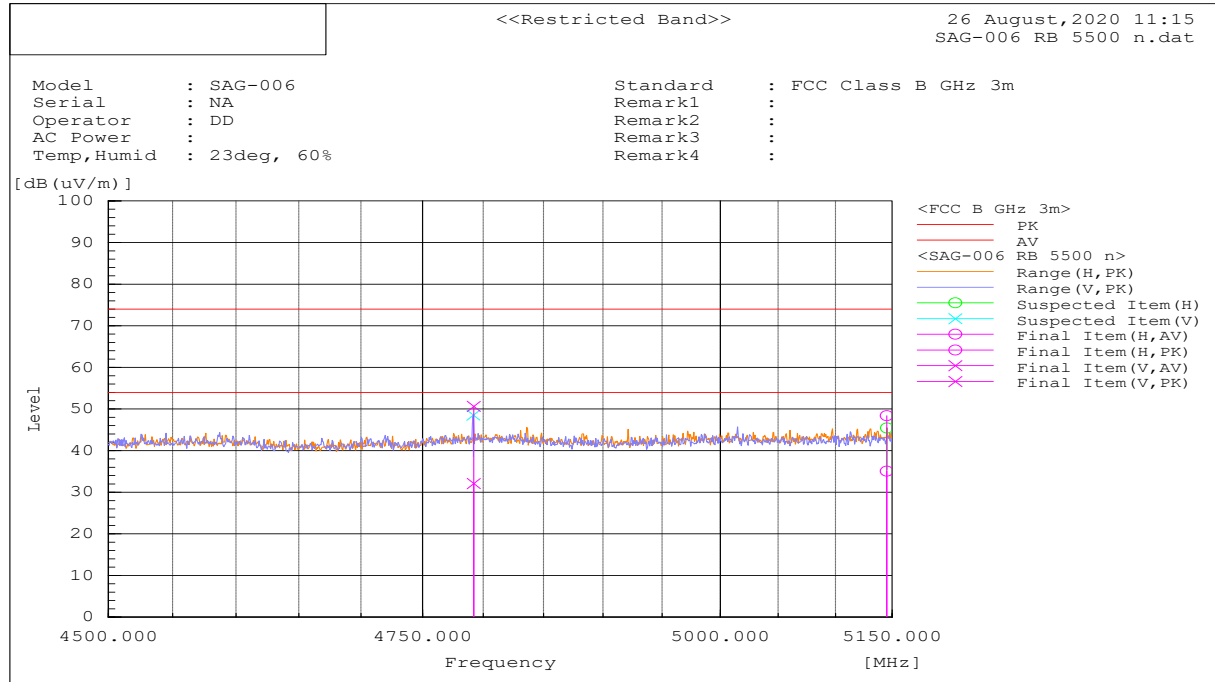
Antenna Polarity & Test Distance: Vertical and Horizontal at 3m

No.	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	5135.37	H	38.2	51.7	-1.8	36.4	49.9	54	74	-17.6	-24.1	130	182.4	Pass
2	5138.25	V	35.8	49.4	-1.8	34	47.6	54	74	-20	-26.4	100	275.3	Pass

REMARKS:

- Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
- Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) –Preamplifier Gain (dB)
- Margin = Level (dBuV/m) - Limit value (dBuV/m)

Restricted Band (802.11ac_5500MHz)



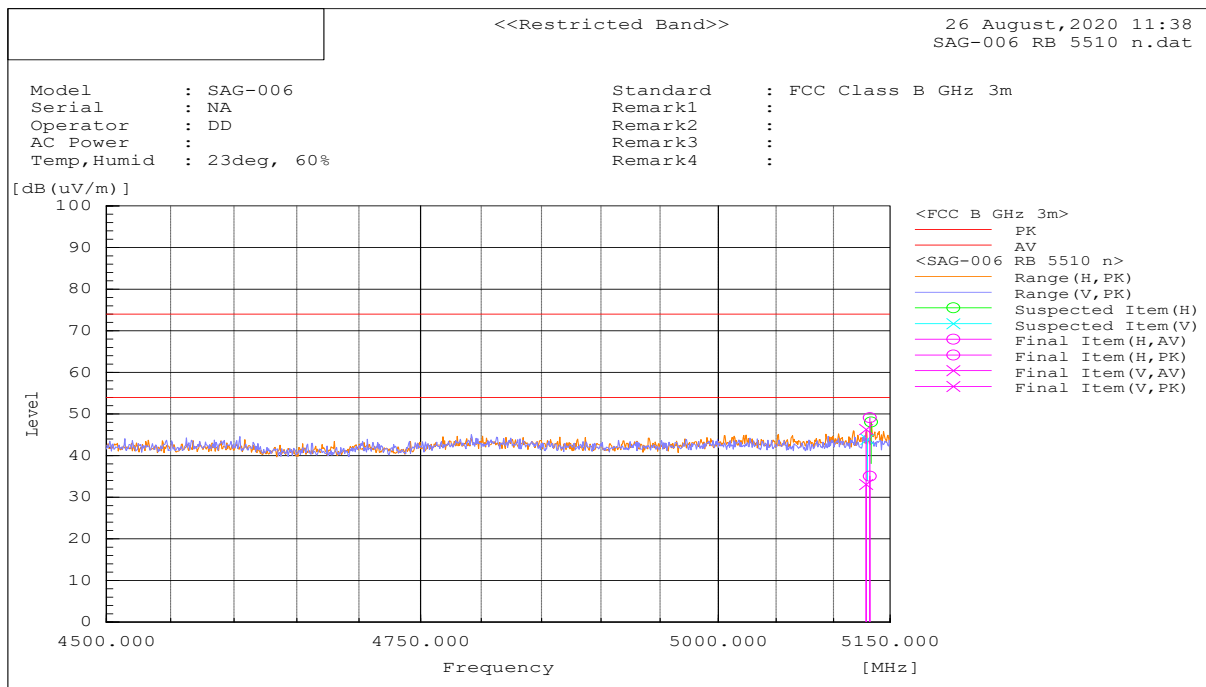
Antenna Polarity & Test Distance: Vertical and Horizontal at 3m

No.	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	4792.03	V	34	52.6	-1.9	32.1	50.7	54	74	-21.9	-23.3	100	215.6	Pass
2	5145.19	H	36.8	50.1	-1.7	35.1	48.4	54	74	-18.9	-25.6	100	176.4	Pass

REMARKS:

- Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
- Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) –Preamplifier Gain (dB)
- Margin = Level (dBuV/m) - Limit value (dBuV/m)

Restricted Band (802.11ac_5510MHz)



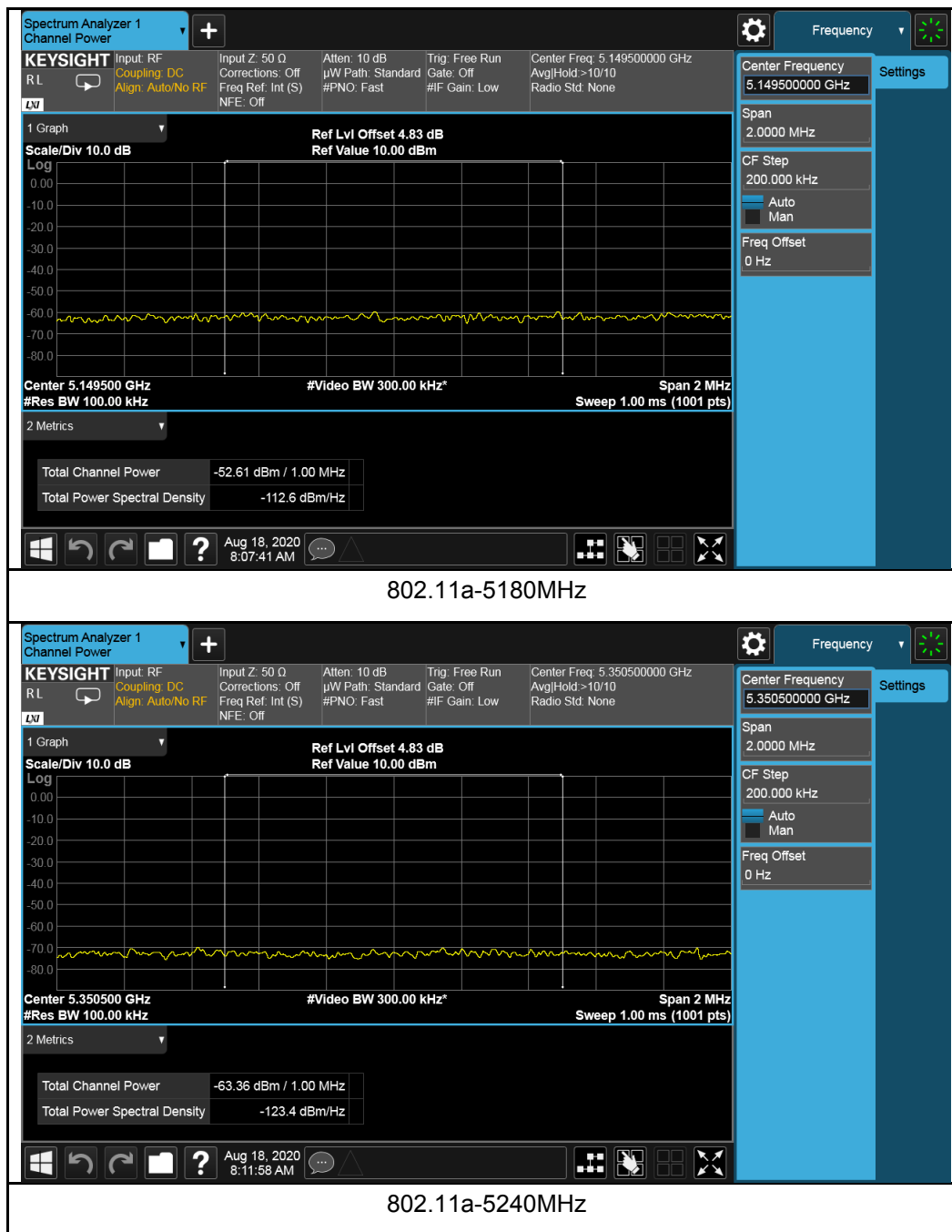
Antenna Polarity & Test Distance: Vertical and Horizontal at 3m

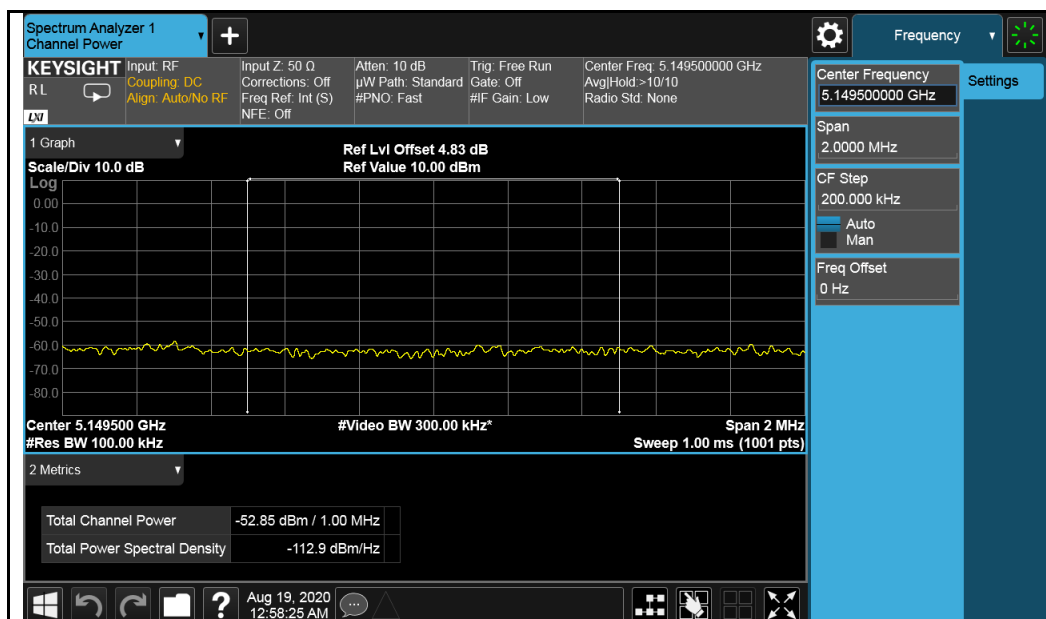
No.	Frequency (MHz)	Polarization (H/V)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	Factor [dB(1/m)]	Level AV [dB(uV/m)]	Level PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height (cm)	Angle (Deg)	Pass/Fail
1	5128.76	V	34.9	48.1	-1.8	33.1	46.3	54	74	-20.9	-27.7	179	297.7	Pass
2	5132.07	H	36.9	50.9	-1.8	35.1	49.1	54	74	-18.9	-24.9	129	180.3	Pass

REMARKS:

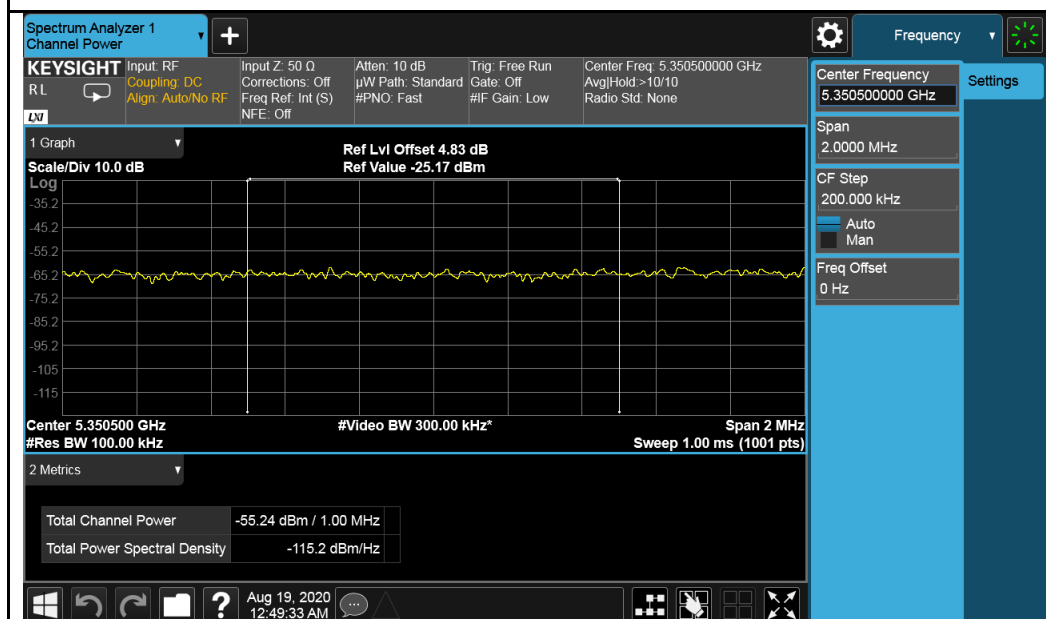
- Level (dBuV) = Reading (dBuV) + Factor (dB(1/m)).
- Factor (dB(1/m)) = Antenna Factor(AF) (dB(1/m)) + Cable Loss (dB) –Preamplifier Gain (dB)
- Margin = Level (dBuV/m) - Limit value (dBuV/m)

Band Edge Test Plots for U-NII-1 Band:

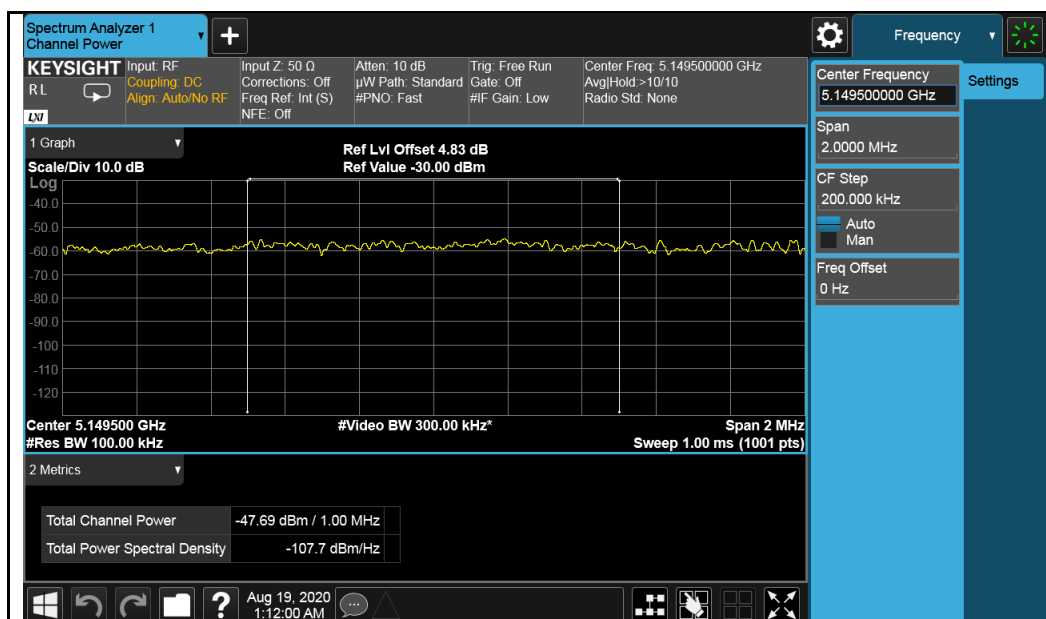




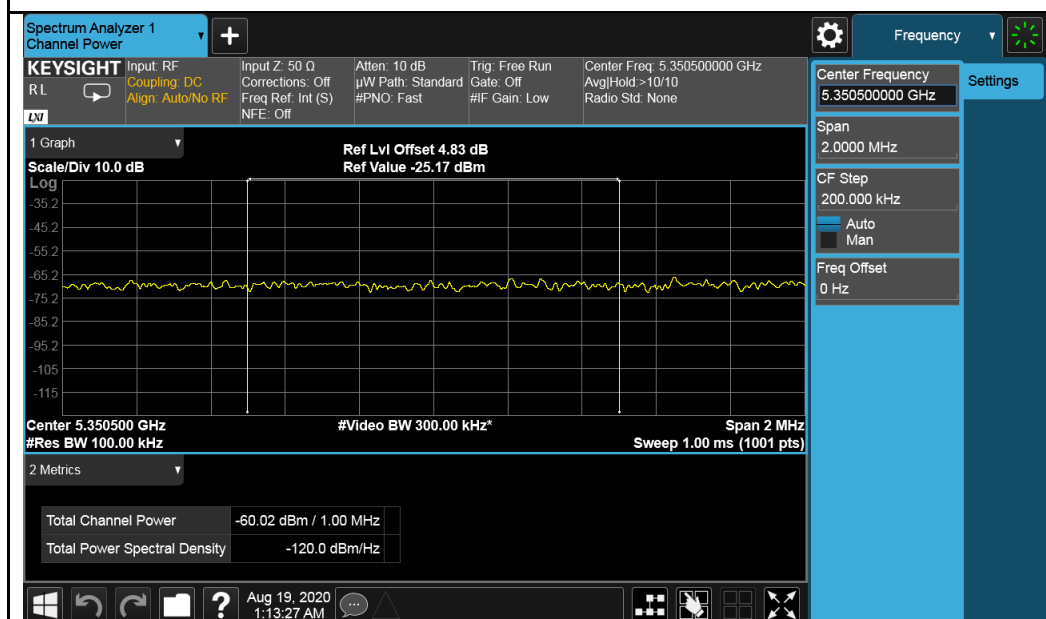
802.11n-HT20-5180MHz



802.11n-HT20-5240MHz

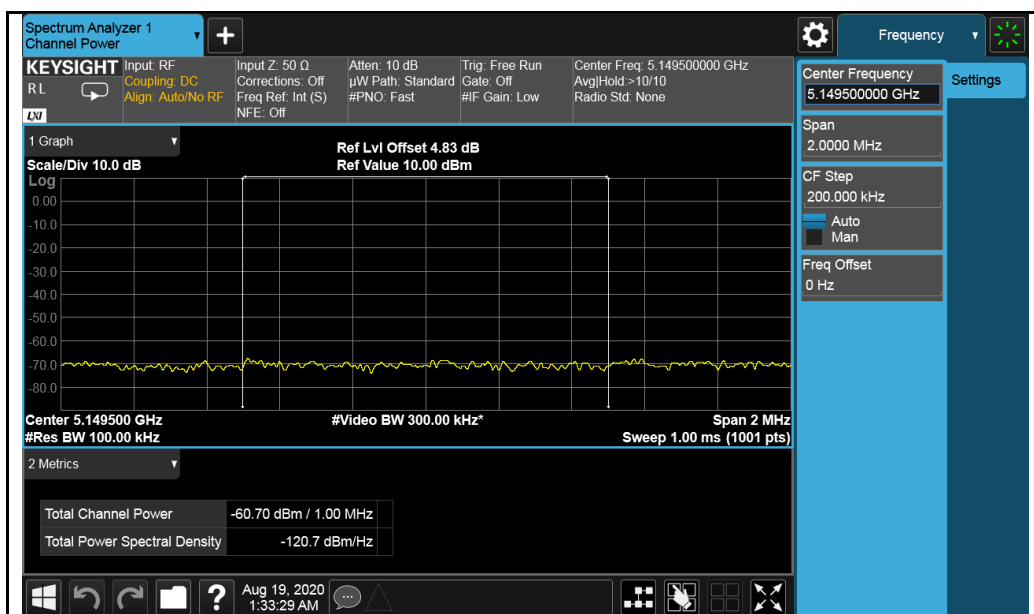


802.11n-HT40-5190MHz

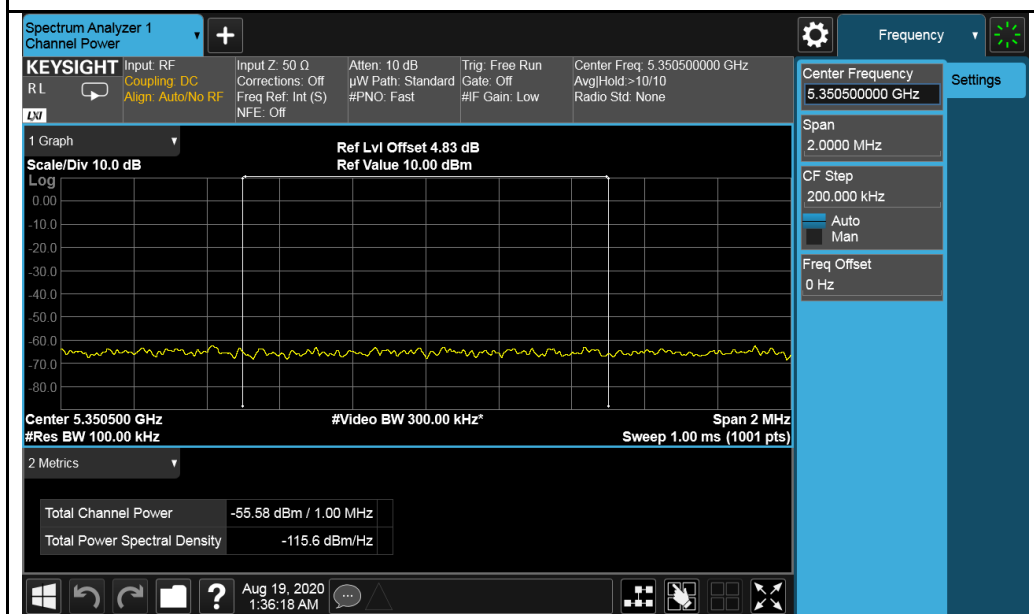


802.11n-HT40-5310MHz

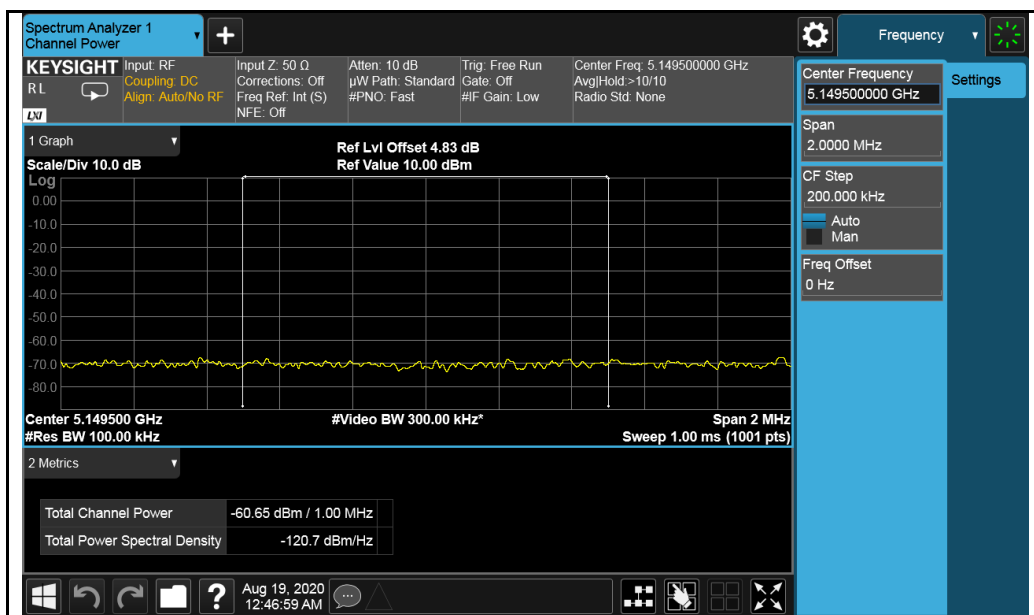
Test Plots for U-NII-2A:



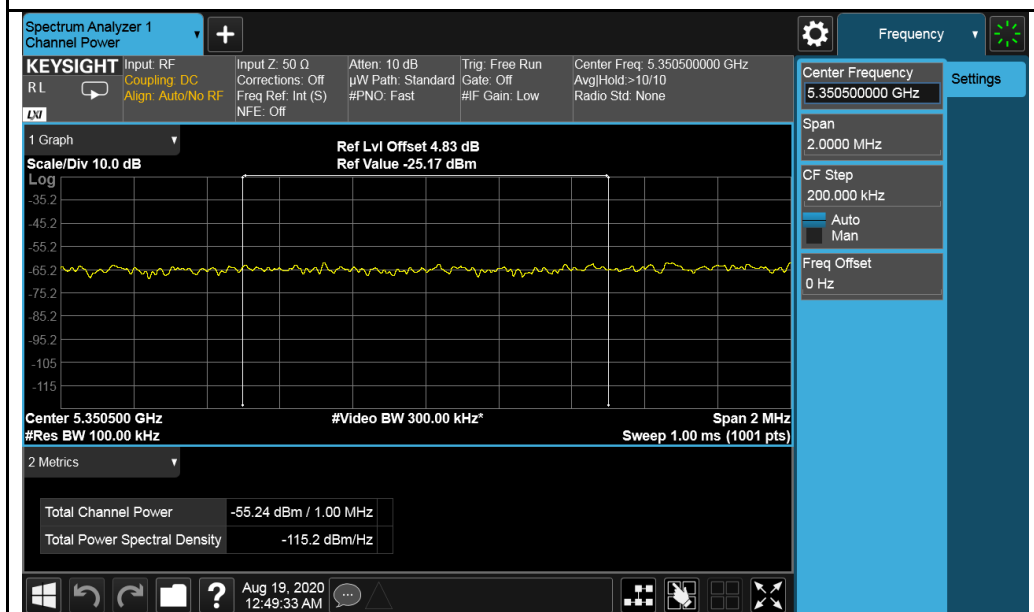
802.11a-5260MHz



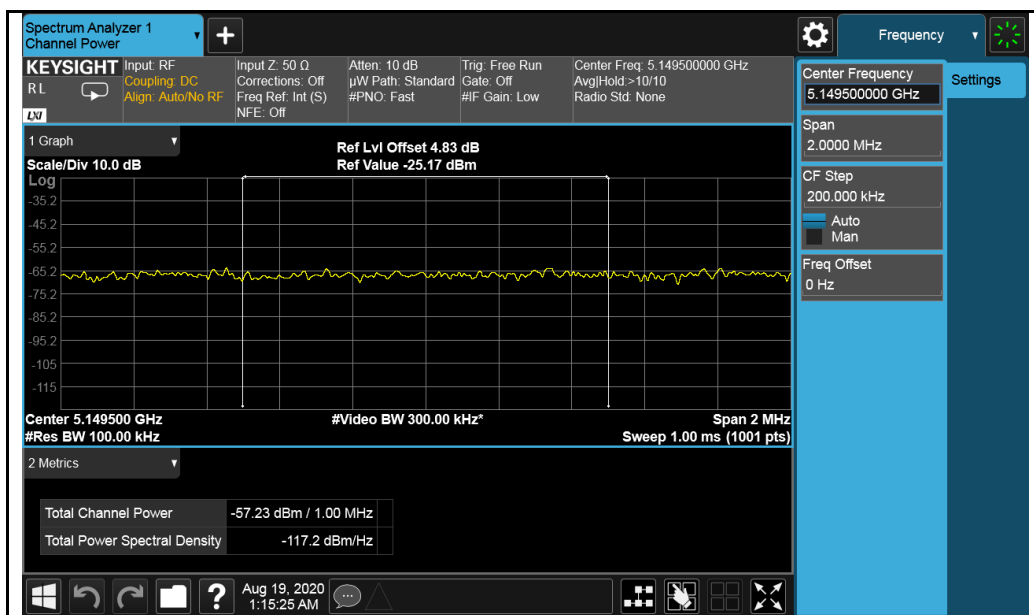
802.11a-5320MHz



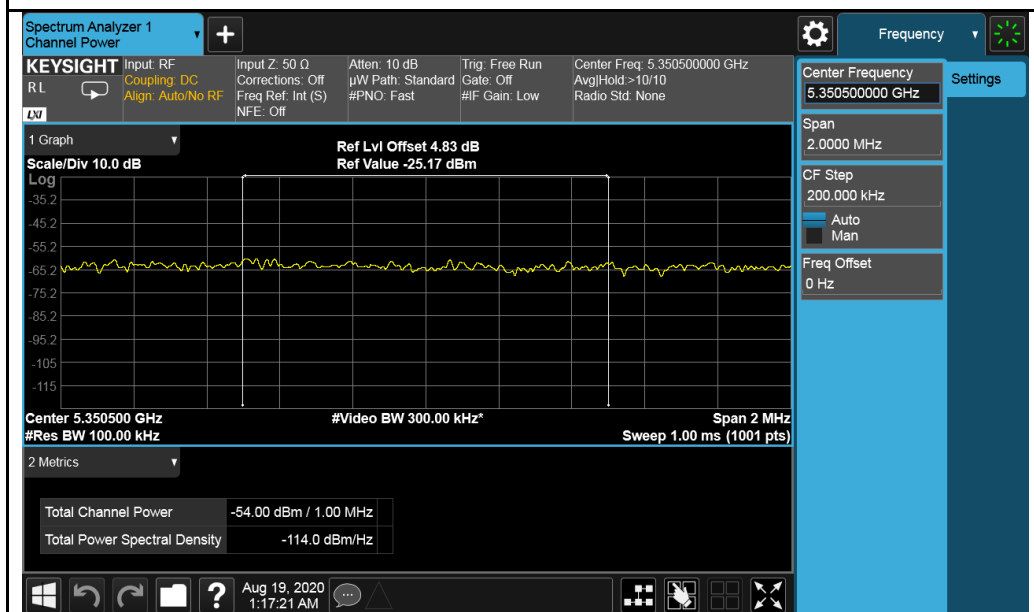
802.11n-HT20-5260MHz



802.11n-HT20-5320MHz

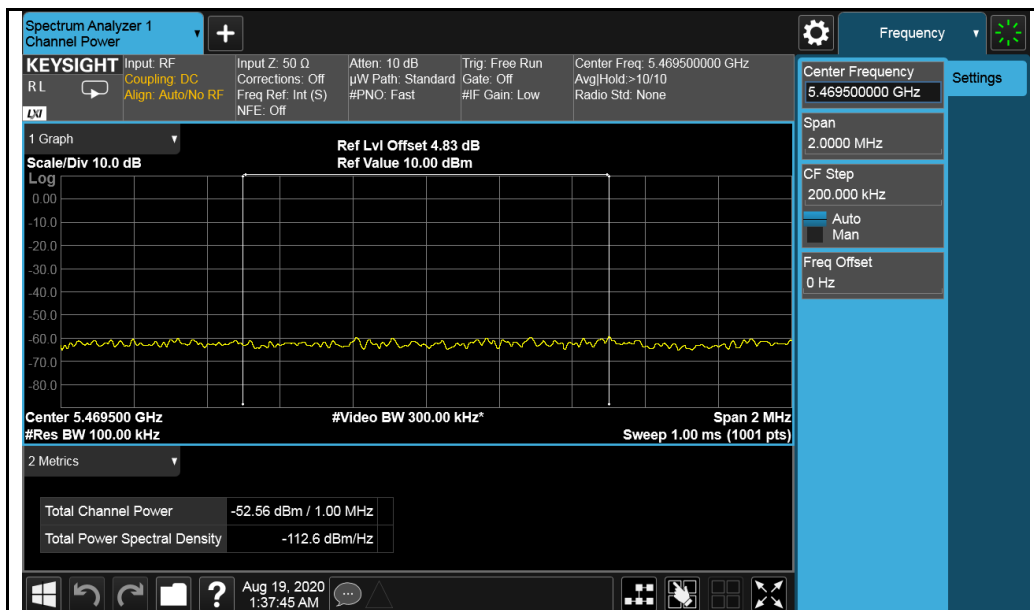


802.11n-HT40-5270MHz

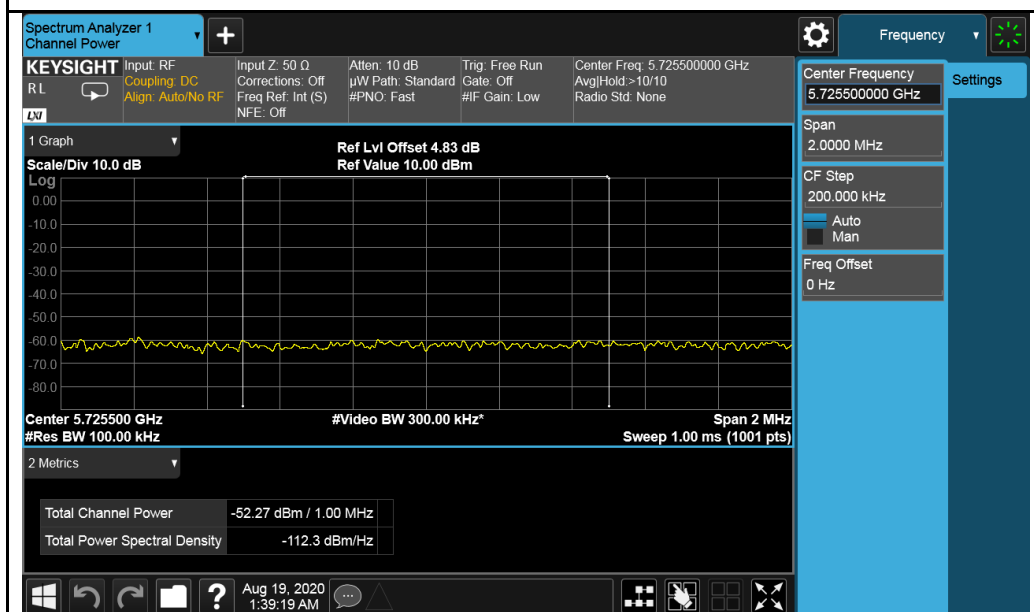


802.11n-HT40-5310MHz

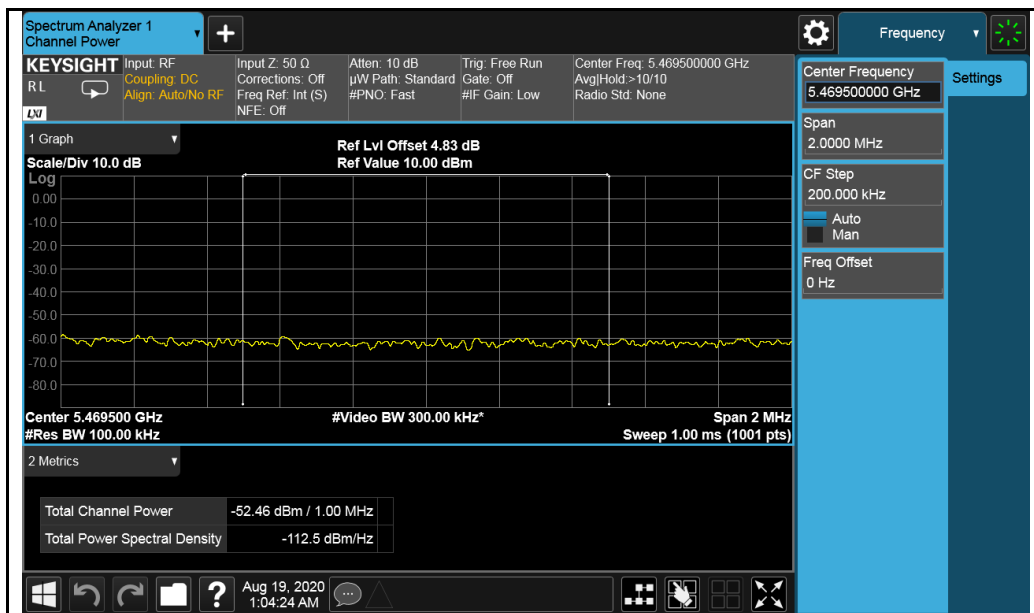
Test Plots for U-NII-2C:



802.11a-5500MHz



802.11a-5700MHz



802.11n-HT20-5500MHz



802.11n-HT20-5700MHz