

Test Report

FCC ID: 2AR9I-ZGV300

Product Name:	iTalkBB Chinese TV
Trademark:	iTalkBB
Model Name :	IBT-ZGV300
Prepared For :	Beijing Net263 Network Technology LTD.
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Test Date:	Jan. 11~24, 2019
Date of Report :	Feb. 21, 2019
Report No.:	BCTC-YLH190200006E

VERIFICATION OF COMPLIANCE

Applicant's name..... **Beijing Net263 Network Technology LTD.**

Address 16th Floor, JIANDA Building, No.14 Dongtucheng Road,
Chaoyang District, Beijing, 100103, China

Manufacture's Name **Beijing Net263 Network Technology LTD.**

Address 16th Floor, JIANDA Building, No.14 Dongtucheng Road,
Chaoyang District, Beijing, 100103, China

Product description

Product name..... iTalkBB Chinese TV

Model Name: IBT-ZGV300

FCC Part15.407, ANSI C63.10-2013

Standards

KDB 789033 D02 General UNII Test Procedures New Rules v02r01

KDB 662911 D01 Multiple Transmitter Output v02r01

This device described above has been tested by BCTC, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Test Result

Pass

Prepared by(Engineer): Amou Zhang



Reviewer(Supervisor): Eric Yang




Approved(Manager): Carson Zhang



Test Report Declaration

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1. TEST SUMMARY

Test Items	Test Requirement	Result
Conducted Emissions	15.207	PASS
Radiated Emissions	15.407(b), 15.209	PASS
26dB bandwidth and 99%dB Bandwidth	15.403(i) 15.407(e)	PASS
Minimum 6 dB bandwidth	15.407(e)	PASS
Power density	15.407 (a)	PASS
Maximum Peak Output Power	15.407 (a)	PASS
Emissions from out of band	15.407 (b)	PASS
Transmission in case of Absence of Information	15.407(c)	PASS
Frequency Stability	15.407(g)	PASS
Antenna Requirement	15.203	PASS

NOTE:

(1) "N/A" denotes test is not applicable in this Test Report

(2) For all test, the setup authorization of the prototype testing software comes from the customer. (including output power and other parameters)

2.GENERAL PRODUCT INFORMATION

2.1. Product Function

Refer to Technical Construction Form and User Manual.

2.2. Description of Device (EUT)

Product Name:	iTalkBB Chinese TV
Model No.:	IBT-ZGV300
Trade Name:	iTalkBB
Operation Frequency:	5180-5240 5745-5825MHz(5G 802.11a/ac(HT20)) 5190-5230, 5755-5795MHz(802.11n/ac(HT40)) 5210, 5775MHz(802.11ac(HT80))
Channel numbers:	See channel list
Modulation technology:	64QAM, 16QAM, QPSK, BPSK for OFDM
Data Rate	802.11 a: 6,9,12,18,24,36,48,54Mbps; 802.11n(HT40):MCS0-MCS15; 802.11AC: NSS1,MCS0-MCS9,NSS2,MCS0-MCS9;
Antenna Type:	Internal Antenna
Antenna gain:	Antenna A: 2.0dBi Antenna B: 2.0dBi
PowerSource:	DC 12V from Adapter
Adapter Information:	Manufacturer: SHENZHEN FRECOM ELECTRONICS CO., LTD Model: F12L19-120100SPAU Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 12V/1A

Channel List for 802.11a/ac(20)			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220
40	5200	48	5240

Channel List for 802.11a/ac(20)			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	161	5805
153	5765	165	5825
157	5785		

Channel List for 802.11n/ac(40)			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	46	5230



Channel List for 802.11n/ac(40)			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
151	5755	159	5795

Channel List for 802.11ac(80)	
Channel	Frequency (MHz)
42	5210

Channel List for 802.11ac(80)	
Channel	Frequency (MHz)
155	5775

2.3. Independent Operation Modes

The basic operation modes are:

These is Digital Transmission system (DTS) and have modulation OFDM, DSSS, DBPSK, DQPSK, CCK, 16QAM, 64QAM. According exploratory test, EUT will have maximum output power in those data rate (802.11a/n: MCS0), so those data rate were used for all test. The equipment enables high-speed access without wires to network assets. This adapter uses the IEEE 802.11 protocol to enable wireless communications between the host and Wireless router.

802.11a/n/ac(20)

Frequency	Band 1	Band 4
Low	5180MHz	5745MHz
Middle	5200MHz	5785MHz
High	5240MHz	5825MHz

802.11n/ac(40)

Frequency	Band 1	Band 4
Low	5190MHz	5755MHz
Middle	-	-
High	5230MHz	5795MHz

802.11ac(80)

Frequency	Band 1	Band 4
	5210MHz	5775MHz

Note1: Directional Gain=2dBi+10log(2)=5.01dBi

2.4. Test Sites

2.4.1. Test Facilities

Lab Qualifications : FCC Registration No.: 712850
 IC Registered No.: 23583

2.5. List of Test and Measurement Instruments

Radiation Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4407B	MY45109572	2018.06.20	2019.06.20
2	Test Receiver (9kHz-7GHz)	R&S	ESR7	101154	2018.06.20	2019.06.20
3	Bilog Antenna (30MHz-3GHz)	SCHWARZBEC K	VULB9163	VULB9163-942	2018.06.23	2019.06.23
4	Horn Antenna (1GHz-18GHz)	SCHWARZBEC K	BBHA9120D	1541	2018.06.23	2019.06.22
5	Horn Antenna (18GHz-40GHz)	SCHWARZBEC K	BBHA9170	822	2018.08.06	2019.08.06
6	Amplifier (9KHz-6GHz)	SCHWARZBEC K	BBV9744	9744-0037	2018.06.20	2019.06.20
7	Amplifier (0.5GHz-18GHz)	SCHWARZBEC K	BBV9718	9718-309	2018.06.20	2019.06.20
8	Amplifier (18GHz-40GHz)	MITEQ	TTA1840-35-H G	2034381	2018.08.06	2019.08.06
9	Loop Antenna (9KHz-30MHz)	SCHWARZBEC K	FMZB1519B	014	2018.06.23	2019.06.23
10	RF cables1 (9kHz-30MHz)	Huber+Suhnar	9kHz-30MHz	B1702988-0008	2018.02.12	2019.02.12
11	RF cables2 (30MHz-1GHz)	Huber+Suhnar	30MHz-1GHz	1486150	2018.03.27	2019.03.27
12	RF cables3 (1GHz-40GHz)	Huber+Suhnar	1GHz-40GHz	1607106	2018.06.19	2019.06.19
13	Power Metter	Keysight	E4419	\	2018.04.15	2019.04.15
14	Power Sensor (AV)	Keysight	E9 300A	\	2018.04.15	2019.04.15
15	Signal Analyzer 20kHz-26.5GHz	KEYSIGHT	N9020A	MY49100060	2018.08.14	2019.08.13
16	Test Receiver 9kHz-40GHz	R&S	FSP40	100550	2018.06.13	2019.06.12
17	D.C. Power Supply	LongWei	TPR-6405D	\	\	\
18	Software	Frad	EZ-EMC	FA-03A2 RE	\	\

Conduction Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Test Receiver	R&S	ESR3	102075	2018.06.20	2019.06.20
2	LISN	SCHWARZBEC K	NSLK8127	8127739	2018.06.19	2019.06.19
3	LISN	R&S	ENV216	101375	2018.06.20	2019.06.20
4	RF cables	Huber+Suhnar	9kHz-30MHz	B1702988-0008	2018.02.12	2019.02.12
5	Software	Frad	EZ-EMC	EMC-CON 3A1	\	\

3. TEST SET-UP AND OPERATION MODES

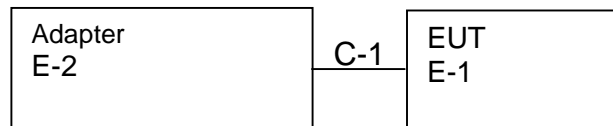
3.1. Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

Test SW Version: WLAN Test

3.2. Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators



(EUT: iTalkBB Chinese TV)

3.3. Auxiliary Equipment

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	iTalkBB Chinese TV	iTalkBB	IBT-ZGV300	N/A	EUT
E-2	Adapter	N/A	F12L19-120100SPAU	N/A	N/A

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	1.2 M	DC cable unshielded

Equipment Description	Manufacturer	Model	Calibration Due Date
Notebook	Lenovo	Lenovo G475	GB14477457

3.4. Countermeasures to Achieve EMC Compliance

None.

4. EMISSION TEST RESULTS

4.1. Conducted Emission Measurement

POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quasi -peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

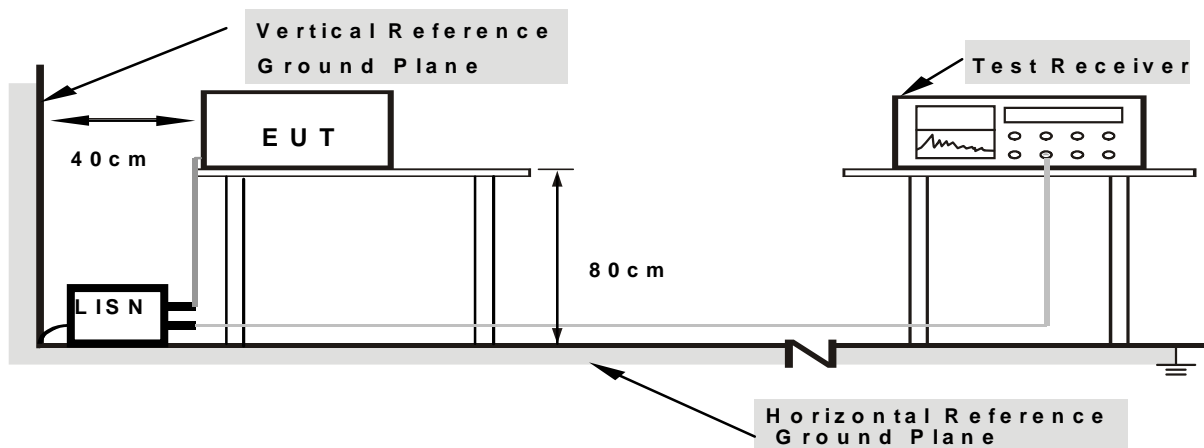
4.1.1. TEST PROCEDURE

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.2. DEVIATION FROM TEST STANDARD

No deviation

4.1.3. TEST SETUP



- Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

4.1.4. EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

We pretest all adapter's emission, only the adapter 1's data was worst and the data was recording in the report.

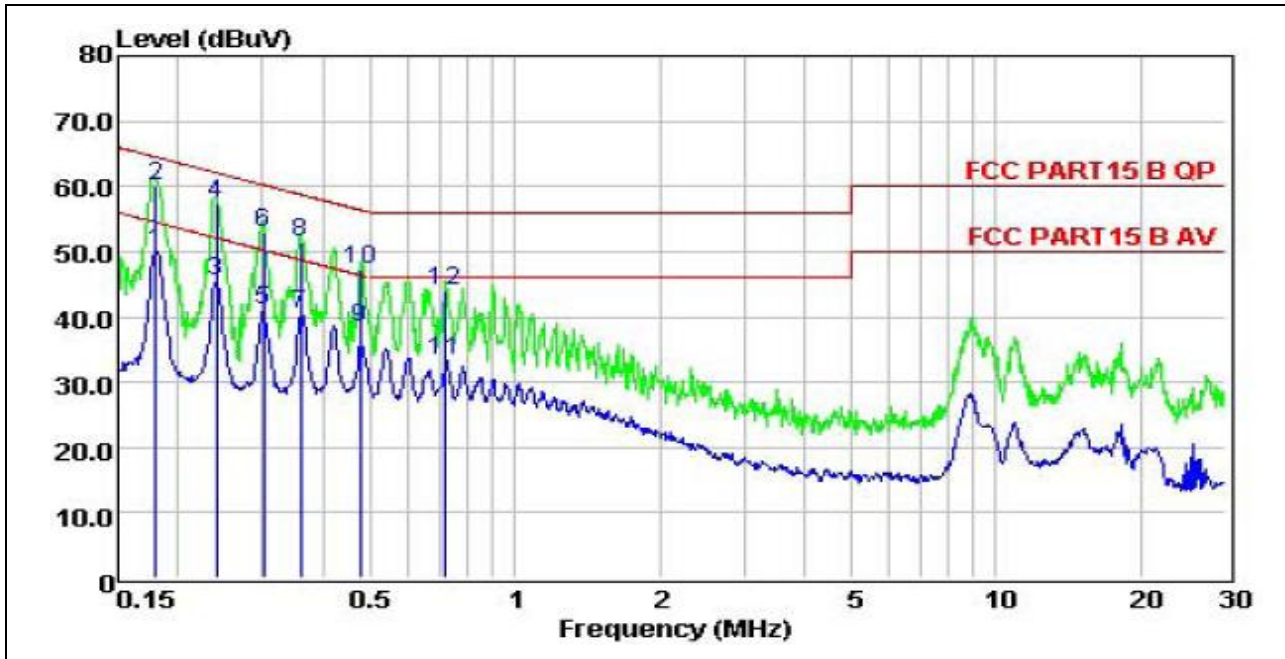
The data only show the worst mode.

If peak level comply with Quasi-Peak limit, then the Quasi-Peak level is deemed to comply with Quasi-Peak limit.

We pretest AC 120V and AC 240V, the worst voltage was AC 120V and the data recording in the report.

4.1.5. TEST RESULTS

Temperature:	24 °C	Relative Humidity:	48%
Pressure:	101KPa	Phase :	L
Test Voltage :	AC 120V, 60Hz	Test Mode:	Transmitting 802.11ac20 mode for Antenna B

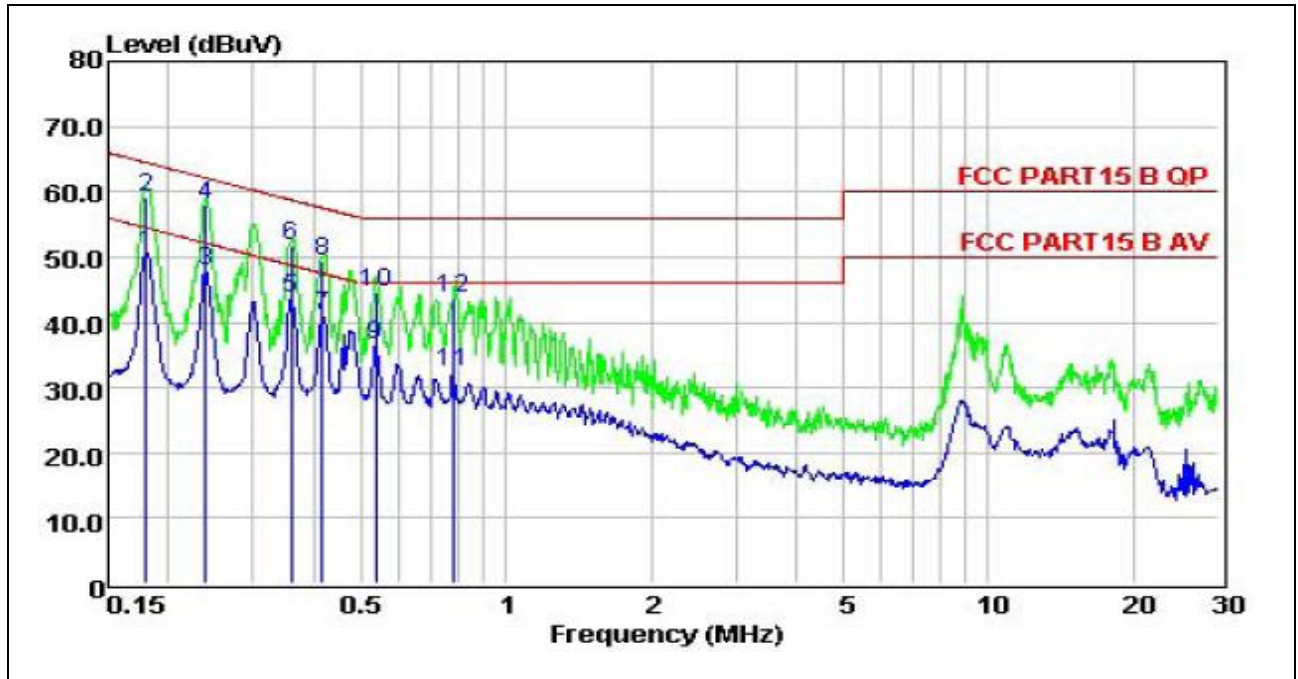


Remark:

Remark: Factor = Insertion Loss + Cable Loss, Result=Reading + Factor, Margin=Result – Limit.

	Freq	Level	LISN	Limit	Over	
	MHz	dBuV	Factor	Line	Limit	Remark
			dB	dBuV	dB	
1	0.18	50.04	9.66	54.50	-4.46	Average
2	0.18	60.20	9.66	64.50	-4.30	QP
3	0.24	45.56	9.63	52.08	-6.52	Average
4	0.24	57.40	9.63	62.08	-4.68	QP
5	0.30	40.95	9.61	50.24	-9.29	Average
6	0.30	52.80	9.61	60.24	-7.44	QP
7	0.36	40.57	9.60	48.74	-8.17	Average
8	0.36	51.40	9.60	58.74	-7.34	QP
9	0.48	38.22	9.58	46.36	-8.14	Average
10	0.48	47.20	9.58	56.36	-9.16	QP
11	0.72	33.19	9.61	46.00	-12.81	Average
12	0.72	43.90	9.61	56.00	-12.10	QP

Temperature:	24 °C	Relative Humidity:	48%
Pressure:	101KPa	Phase :	L
Test Voltage :	AC 120V, 60Hz	Test Mode:	Transmitting 802.11ac20 mode for Antenna B



Remark:

Remark: Factor = Insertion Loss + Cable Loss, Result=Reading + Factor, Margin=Result – Limit.

	Freq	Level	LISN	Limit	Over	Remark
	MHz	dBuV	Factor	Line	Limit	
			dB	dBuV	dB	
1	0.18	50.61	9.53	54.50	-3.89	Average
2	0.18	59.20	9.53	64.50	-5.30	QP
3	0.24	47.90	9.57	52.13	-4.23	Average
4	0.24	58.10	9.57	62.13	-4.03	QP
5	0.36	43.68	9.58	48.74	-5.06	Average
6	0.36	51.60	9.58	58.74	-7.14	QP
7	0.42	40.91	9.59	47.51	-6.60	Average
8	0.42	49.40	9.59	57.51	-8.11	QP
9	0.54	36.48	9.59	46.00	-9.52	Average
10	0.54	44.60	9.59	56.00	-11.40	QP
11	0.78	32.38	9.60	46.00	-13.62	Average
12	0.78	43.80	9.60	56.00	-12.20	QP

Note:

We tested at 802.11b/802.11a/802.11ac/802.11ac40/802.11ac80/802.11n (40M) mode at the antenna single and antenna combination, and recorded the worst data at 802.11a mode of Antenna B in the report.

4.2. Radiated Emission Measurement

4.2.1. Radiated Emission Limits (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/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

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.2.2. TEST PROCEDURE

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 40GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 1.5 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.
- g. For the radiated emission test above 1GHz:
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.
The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

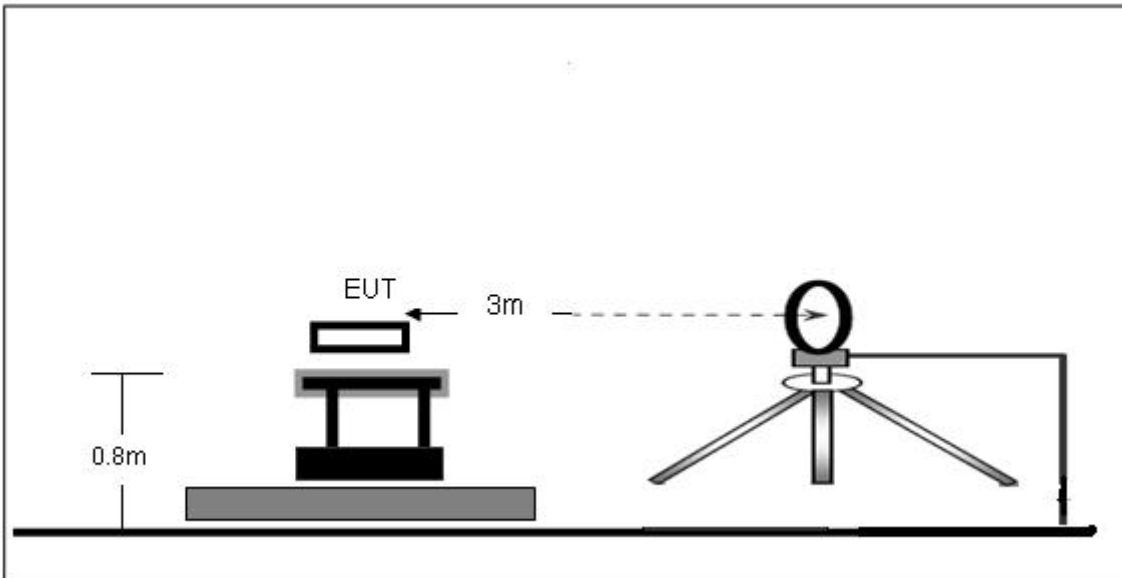
We pretest AC 120V and AC 240V, the worst voltage was AC 120V and the data recording in the report.

4.2.3. DEVIATION FROM TEST STANDARD

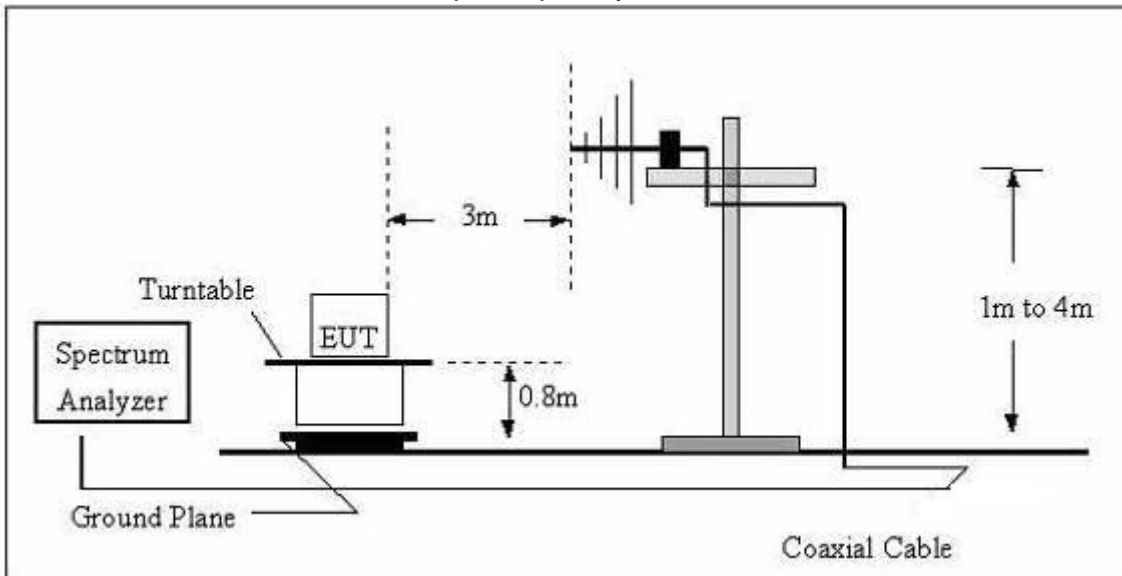
No deviation

4.2.4. TEST SETUP

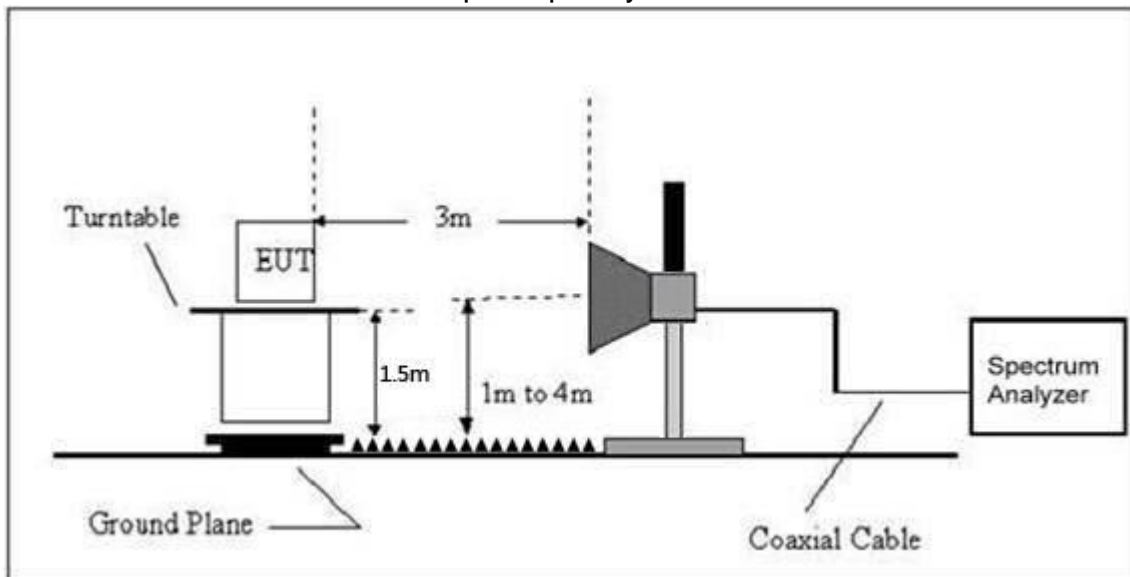
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



4.2.5. EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

We pretest all adapter's emission, only the adapter 1's data was worst and the data was recording in the report.

The data only show the worst mode.

Radiated Spurious Emission (Below 30MHz)

Temperature :	22 °C	Relative Humidity :	48%
Pressure :	101KPa	Polarization :	---
Test Voltage :	AC 120V, 60Hz		
Test Mode :	TX		

Freq. (MHz)	Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	State P/F
--	--	--	--	PASS
--	--	--	--	PASS

Note:

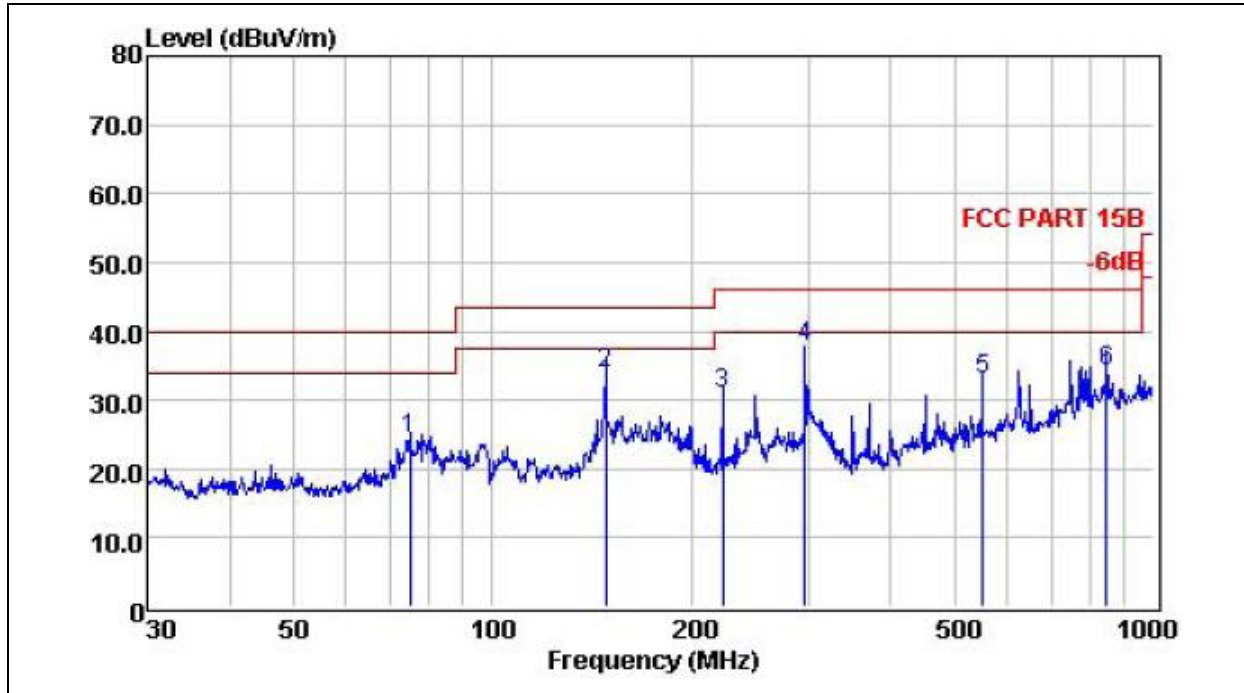
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance}/\text{test distance})$ (dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.

Radiated Spurious Emission (Between 30MHz – 1GHz)

Temperature :	22 °C	Relative Humidity :	48%
Pressure :	101KPa	Polarization :	Horizontal
Test Voltage :	AC 120V, 60Hz		
Test Mode : (Worst)	Transmitting 802.11ac20 mode for Antenna B		



Remark:

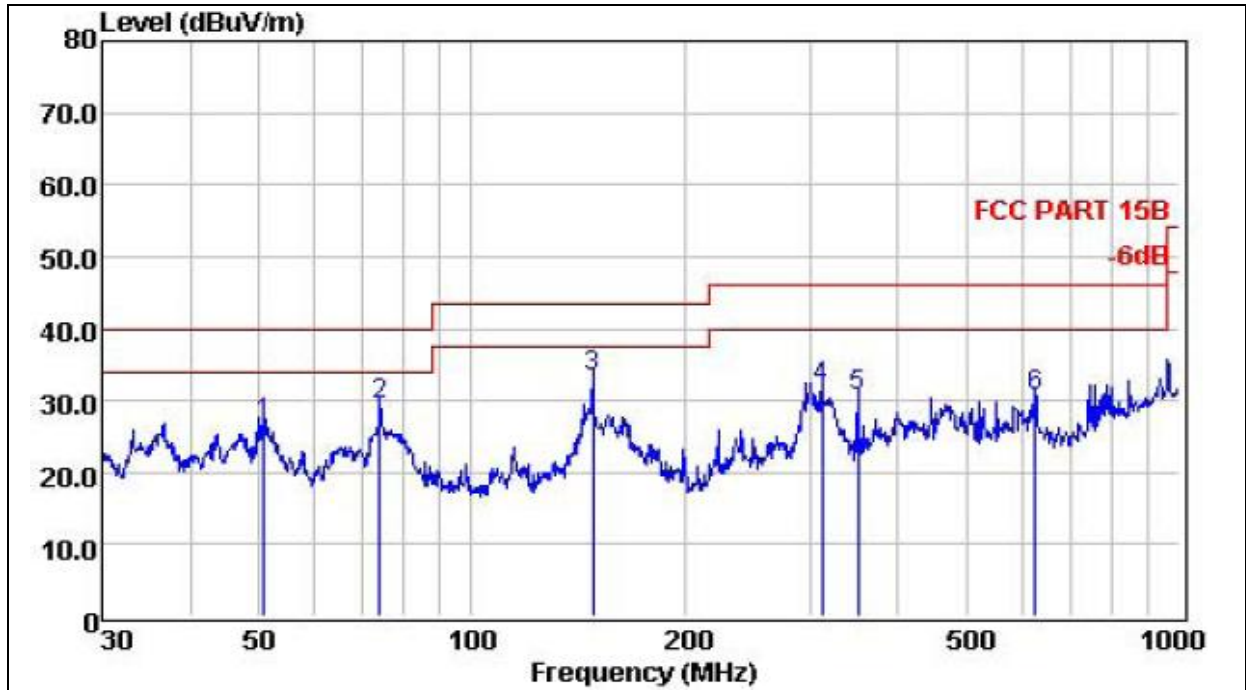
$$\text{Absolute Level} = \text{Reading Level} + \text{Factor}$$

$$\text{Margin} = \text{Absolute Level} - \text{Limit}$$

$$\text{Factor} = \text{Ant. Factor} + \text{Cable Loss} - \text{Pre-amplifier}$$

	Read	Antenna	Cable	Limit	Over		
Freq	Level	Factor	Loss	Line	Limit	Remark	
MHz	dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	74.92	11.33	12.95	0.15	24.43	40.00	-15.57 QP
2	148.44	18.27	15.42	0.23	33.92	43.50	-9.58 QP
3	222.95	18.83	11.64	0.40	30.87	46.00	-15.13 QP
4	297.22	24.14	12.85	0.64	37.63	46.00	-8.37 QP
5	550.95	14.44	17.54	1.16	33.14	46.00	-12.86 QP
6	851.04	10.66	21.89	1.52	34.07	46.00	-11.93 QP

Temperature :	22 °C	Relative Humidity :	48%
Pressure :	101KPa	Polarization :	Vertical
Test Voltage :	AC 120V, 60Hz		
Test Mode : (Worst)	Transmitting 802.11ac20 mode for Antenna B		



Remark:

Absolute Level= Reading Level+ Factor, Margin= Absolute Level – Limit

Factor=Ant. Factor + Cable Loss – Pre-amplifier

	Freq	ReadAntenna	Cable	Limit	Over			
	MHz	Level	Factor	Loss	Level	Line	Limit	
		dBuV	dB/m	dB	dBuV/m	dBuV/m	dB	
1	50.76	13.74	12.92	0.12	26.78	40.00	-13.22	QP
2	74.14	17.69	11.51	0.14	29.34	40.00	-10.66	QP
3	148.44	17.58	15.42	0.23	33.23	43.50	-10.27	QP
4	312.18	18.02	13.09	0.68	31.79	46.00	-14.21	QP
5	351.71	16.19	13.67	0.78	30.64	46.00	-15.36	QP
6	625.08	12.02	17.38	1.15	30.55	46.00	-15.45	QP

Note: We tested at 802.11b/802.11a/802.11ac/802.11ac40/802.11ac80/802.11n (40M) mode at the antenna single and antenna combination.and recored the worst dataat 802.11ac 20 mode of Antenna B in the report.

Above 1 GHz Test Results:

Record the worst test data for Antenna B in report.

802.11aMode (5180MHz)
Horizontal:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
10360.00	60.24	-3.54	56.70	74.00	-17.30	PK
10360.00	48.14	-3.54	44.60	54.00	-9.40	AV
15540.00	58.57	-0.93	57.64	74.00	-16.36	PK
15540.00	45.39	-0.93	44.46	54.00	-9.54	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
10360.00	62.28	-3.78	58.50	74.00	-15.50	PK
10360.00	48.22	-3.78	44.44	54.00	-9.56	AV
15540.00	58.29	-0.99	57.30	74.00	-16.70	PK
15540.00	49.12	-0.99	48.13	54.00	-5.87	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

802.11aMode (5745MHz)
Horizontal:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
11370.00	60.88	-3.64	57.24	74.00	-16.76	PK
11370.00	48.03	-3.64	44.39	54.00	-9.61	AV
17540.00	58.17	-0.95	57.22	74.00	-16.78	PK
17540.00	45.38	-0.95	44.43	54.00	-9.57	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
11370.00	62.11	-3.64	58.47	74.00	-15.53	PK
11370.00	48.09	-3.64	44.45	54.00	-9.55	AV
17540.00	58.71	-0.95	57.76	74.00	-16.24	PK
17540.00	49.92	-0.95	48.97	54.00	-5.03	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

802.11aMode (5200MHz)
Horizontal:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
15720.00	60.84	-3.51	57.33	74.00	-16.67	PK
15720.00	50.39	-3.51	46.88	54.00	-7.12	AV
25450.00	56.19	-0.82	55.37	74.00	-18.63	PK
25450.00	46.08	-0.82	45.26	54.00	-8.74	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
10480.00	59.56	-3.51	56.05	74.00	-17.95	PK
10480.00	50.15	-3.51	46.64	54.00	-7.36	AV
25950.00	57.04	-0.82	56.22	74.00	-17.78	PK
25950.00	47.33	-0.82	46.51	54.00	-7.49	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

802.11aMode (5785MHz)
Horizontal:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
16720.00	60.67	-3.79	56.88	74.00	-17.12	PK
16720.00	50.13	-3.79	46.34	54.00	-7.66	AV
27450.00	56.06	-0.89	55.17	74.00	-18.83	PK
27450.00	46.37	-0.89	45.48	54.00	-8.52	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
16720.00	59.22	-3.79	55.43	74.00	-18.57	PK
16720.00	50.17	-3.79	46.38	54.00	-7.62	AV
27450.00	57.27	-0.89	56.38	74.00	-17.62	PK
27450.00	47.38	-0.89	46.49	54.00	-7.51	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

802.11aMode (5240MHz)
Horizontal:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
10360.00	61.05	-3.43	57.62	74.00	-16.38	PK
10360.00	51.24	-3.43	47.81	54.00	-6.19	AV
15540.00	57.35	-0.75	56.60	74.00	-17.40	PK
15540.00	48.07	-0.75	47.32	54.00	-6.68	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
10360.00	61.32	-3.43	57.89	74.00	-16.11	PK
10360.00	51.31	-3.43	47.88	54.00	-6.12	AV
15540.00	58.05	-0.75	57.30	74.00	-16.70	PK
15540.00	48.32	-0.75	47.57	54.00	-6.43	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

802.11aMode (5825MHz)
Horizontal:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
12360.00	61.35	-3.58	57.77	74.00	-16.23	PK
12360.00	21.27	-3.58	17.69	54.00	-36.31	AV
13540.00	57.39	-0.79	56.60	74.00	-17.40	PK
13540.00	48.04	-0.79	47.25	54.00	-6.75	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
12360.00	61.02	-3.58	57.44	74.00	-16.56	PK
12360.00	51.01	-3.58	47.43	54.00	-6.57	AV
13540.00	58.14	-0.79	57.35	74.00	-16.65	PK
13540.00	47.15	-0.79	46.36	54.00	-7.64	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Record the worst test data for Combination of Antenna A and Antenna B in the report.

802.11ac 20M Mode (5180MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
10360.00	61.87	-3.64	58.23	74.00	-15.77	PK
10360.00	52.06	-3.64	48.42	54.00	-5.58	AV
15540.00	58.88	-0.95	57.93	74.00	-16.07	PK
15540.00	47.47	-0.95	46.52	54.00	-7.48	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
10360.00	61.42	-3.64	57.78	74.00	-16.22	PK
10360.00	52.14	-3.64	48.50	54.00	-5.50	AV
15540.00	58.08	-0.95	57.13	74.00	-16.87	PK
15540.00	47.68	-0.95	46.73	54.00	-7.27	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

802.11ac 20M Mode (5745MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
25440.00	61.91	-3.32	58.59	74.00	-15.41	PK
25440.00	52.81	-3.32	49.49	54.00	-4.51	AV
55124.00	57.99	-0.67	57.32	74.00	-16.68	PK
55124.00	47.05	-0.67	46.38	54.00	-7.62	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
25440.00	61.66	-3.32	58.34	74.00	-15.66	PK
25440.00	52.17	-3.32	48.85	54.00	-5.15	AV
55124.00	58.09	-0.67	57.42	74.00	-16.58	PK
55124.00	47.31	-0.67	46.64	54.00	-7.36	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

802.11ac 20M Mode (5200MHz)
Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
10400.00	59.14	-3.51	55.63	74.00	-18.37	PK
10400.00	49.87	-3.51	46.36	54.00	-7.64	AV
15600.00	55.26	-0.82	54.44	74.00	-19.56	PK
15600.00	46.52	-0.82	45.70	54.00	-8.30	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
10400.00	59.87	-3.51	56.36	74.00	-17.64	PK
10400.00	49.99	-3.51	46.48	54.00	-7.52	AV
15600.00	55.32	-0.82	54.50	74.00	-19.50	PK
15600.00	46.3	-0.82	45.48	54.00	-8.52	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

802.11ac 20M Mode (5785MHz)
Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
20100.00	59.15	-3.23	55.92	74.00	-18.08	PK
20100.00	50.05	-3.23	46.82	54.00	-7.18	AV
35600.00	56.31	-1.25	55.06	74.00	-18.94	PK
35600.00	47.03	-1.25	45.78	54.00	-8.22	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
20100.00	59.36	-3.99	55.37	74.00	-18.63	PK
20100.00	50.24	-3.99	46.25	54.00	-7.75	AV
35600.00	56.28	-1.25	55.03	74.00	-18.97	PK
35600.00	47.14	-1.25	45.89	54.00	-8.11	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

802.11ac 20M Mode (5240MHz)
Horizontal:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
10480.00	59.36	-3.43	55.93	74.00	-18.07	PK
10480.00	51.01	-3.43	47.58	54.00	-6.42	AV
15720.00	56.37	-0.75	55.62	74.00	-18.38	PK
15720.00	48.24	-0.75	47.49	54.00	-6.51	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
10480.00	59.51	-3.43	56.08	74.00	-17.92	PK
10480.00	51.24	-3.43	47.81	54.00	-6.19	AV
15720.00	56.35	-0.75	55.60	74.00	-18.40	PK
15720.00	48.05	-0.75	47.30	54.00	-6.70	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

802.11ac 20M Mode (5825MHz)
Horizontal:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
11570.00	59.65	-3.31	56.34	74.00	-17.66	PK
11570.00	50.32	-3.31	47.01	54.00	-6.99	AV
16820.00	56.69	-0.81	55.88	74.00	-18.12	PK
16820.00	47.84	-0.81	47.03	54.00	-6.97	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
11570.00	59.81	-3.31	56.50	74.00	-17.50	PK
11570.00	50.08	-3.31	46.77	54.00	-7.23	AV
16820.00	56.18	-0.81	55.37	74.00	-18.63	PK
16820.00	47.35	-0.81	46.54	54.00	-7.46	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Record the worst test data for Combination of Antenna A and Antenna B in the report.
 802.11ac 40M Mode (5190MHz)
 Horizontal:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
10380.00	59.12	-3.64	55.48	74.00	-18.52	PK
10380.00	50.05	-3.64	46.41	54.00	-7.59	AV
15570.00	56.34	-0.95	55.39	74.00	-18.61	PK
15570.00	47.29	-0.95	46.34	54.00	-7.66	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
10380.00	59.68	-3.64	56.04	74.00	-17.96	PK
10380.00	50.09	-3.64	46.45	54.00	-7.55	AV
15570.00	55.97	-0.95	55.02	74.00	-18.98	PK
15570.00	46.84	-0.95	45.89	54.00	-8.11	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

802.11ac 40M Mode (5755MHz)

Horizontal:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
11380.00	60.07	-3.71	56.36	74.00	-17.64	PK
11380.00	50.34	-3.71	46.63	54.00	-7.37	AV
15270.00	56.91	-0.92	55.99	74.00	-18.01	PK
15270.00	47.02	-0.92	46.10	54.00	-7.90	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

Vertical:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
11380.00	60.33	-3.71	56.62	74.00	-17.38	PK
11380.00	50.25	-3.71	46.54	54.00	-7.46	AV
15270.00	57.01	-0.92	56.09	74.00	-17.91	PK
15270.00	47.24	-0.92	46.32	54.00	-7.68	AV
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit						

802.11ac 40M Mode (5230MHz)
Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
10460.00	60.71	-3.51	57.20	74.00	-16.80	PK
10460.00	50.14	-3.51	46.63	54.00	-7.37	AV
15690.00	58.32	-0.82	57.50	74.00	-16.50	PK
15690.00	47.39	-0.82	46.57	54.00	-7.43	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
10460.00	60.37	-3.51	56.86	74.00	-17.14	PK
10460.00	50.64	-3.51	47.13	54.00	-6.87	AV
15690.00	58.19	-0.82	57.37	74.00	-16.63	PK
15690.00	47.18	-0.82	46.36	54.00	-7.64	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

802.11ac 40M Mode (5795MHz)
Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
11260.00	60.14	-3.48	56.66	74.00	-17.34	PK
11260.00	50.17	-3.48	46.69	54.00	-7.31	AV
15610.00	58.27	-0.78	57.49	74.00	-16.51	PK
15610.00	47.31	-0.78	46.53	54.00	-7.47	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
11260.00	60.37	-3.48	56.89	74.00	-17.11	PK
11260.00	50.67	-3.48	47.19	54.00	-6.81	AV
15610.00	58.24	-0.78	57.46	74.00	-16.54	PK
15610.00	47.31	-0.78	46.53	54.00	-7.47	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Record the worst test data for Combination of Antenna A and Antenna B in the report.

802.11ac 80M Mode (5210MHz)

Horizontal:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
10420.00	60.91	-3.43	57.48	74.00	-16.52	PK
10420.00	51.43	-3.43	48.00	54.00	-6.00	AV
15630.00	56.31	-0.75	55.56	74.00	-18.44	PK
15630.00	47.75	-0.75	47.00	54.00	-7.00	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
10420.00	60.51	-3.43	57.08	74.00	-16.92	PK
10420.00	49.87	-3.43	46.44	54.00	-7.56	AV
15630.00	58.44	-0.75	57.69	74.00	-16.31	PK
15630.00	46.93	-0.75	46.18	54.00	-7.82	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

802.11ac 80M Mode (5755MHz)

Horizontal:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
12640.00	60.87	-3.33	57.54	74.00	-16.46	PK
12640.00	51.42	-3.33	48.09	54.00	-5.91	AV
17530.00	56.34	-0.69	55.65	74.00	-18.35	PK
17530.00	47.77	-0.69	47.08	54.00	-6.92	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
12640.00	60.75	-3.33	57.42	74.00	-16.58	PK
12640.00	49.71	-3.33	46.38	54.00	-7.62	AV
17530.00	58.82	-0.69	58.13	74.00	-15.87	PK
17530.00	46.77	-0.69	46.08	54.00	-7.92	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Record the worst test data for Combination of Antenna A and Antenna B in the report.

802.11n 40M Mode (5190MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
11490.00	59.44	-3.64	55.80	74.00	-18.20	PK
11490.00	49.43	-3.64	45.79	54.00	-8.21	AV
17235.00	56.27	-0.95	55.32	74.00	-18.68	PK
17235.00	48.32	-0.95	47.37	54.00	-6.63	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
11490.00	60.34	-3.64	56.70	74.00	-17.30	PK
11490.00	50.15	-3.64	46.51	54.00	-7.49	AV
17235.00	58.46	-0.95	57.51	74.00	-16.49	PK
17235.00	46.58	-0.95	45.63	54.00	-8.37	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

802.11n 40M Mode (5755MHz)

Horizontal:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
11480.00	59.17	-3.45	55.72	74.00	-18.28	PK
11480.00	49.44	-3.45	45.99	54.00	-8.01	AV
17237.00	56.26	-0.96	55.30	74.00	-18.70	PK
17237.00	48.38	-0.96	47.42	54.00	-6.58	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

Frequency (MHz)	Reading Result (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
11480.00	60.33	-3.45	56.88	74.00	-17.12	PK
11480.00	50.09	-3.45	46.64	54.00	-7.36	AV
17237.00	58.45	-0.96	57.49	74.00	-16.51	PK
17237.00	46.94	-0.96	45.98	54.00	-8.02	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

802.11n 40M Mode (5230MHz)

Horizontal:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
11650.00	59.04	-3.43	55.61	74.00	-18.39	PK
11650.00	50.43	-3.43	47.00	54.00	-7.00	AV
17475.00	56.85	-0.75	56.10	74.00	-17.90	PK
17475.00	45.47	-0.75	44.72	54.00	-9.28	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
11650.00	59.31	-3.43	55.88	74.00	-18.12	PK
11650.00	48.47	-3.43	45.04	54.00	-8.96	AV
17475.00	58.62	-0.75	57.87	74.00	-16.13	PK
17475.00	45.17	-0.75	44.42	54.00	-9.58	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

802.11n 40M Mode (5795MHz)

Horizontal:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
16650.00	59.02	-3.12	55.59	74	-18.41	PK
16650.00	50.41	-3.12	46.98	54	-7.02	AV
19475.00	56.83	-0.55	56.08	74	-17.92	PK
19475.00	45.43	-0.55	44.68	54	-9.32	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Vertical:

Frequency (MHz)	Reading Result (dB μ V)	Factor (dB)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Detector Type
16650.00	59.87	-3.12	56.44	74	-17.56	PK
16650.00	48.42	-3.12	44.99	54	-9.01	AV
19475.00	58.47	-0.55	57.72	74	-16.28	PK
19475.00	45.05	-0.55	44.3	54	-9.7	AV

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin= Absolute Level – Limit

Remark:

(1) Measuring frequencies from 1 GHz to the 40 GHz.

(2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.

(3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.

(4) Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.

(6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.

5. BAND EDGE COMPLIANCE TEST

5.1. Limits

(1) 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.

(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

5.2. TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

5.3. Test Data

PASS

Please see data as below:

REMARKS:

Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m)

Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) - Pre-amplifier

Margin value = Limit value - Emission level.

802.11a, worst case at AntennaB

Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Preamplifier (dB)	Correction Factor (dB/m)
5150	50.41	PK	H	68.20	17.79	56.16	27.49	3.32	36.22	-5.41
5150	40.64	AV	H	54.00	13.36	46.37	27.49	3.32	36.22	-5.41
5350	49.17	PK	H	68.20	19.03	55.41	27.45	3.38	36.34	-5.51
5350	40.53	AV	H	54.00	13.47	46.34	27.45	3.38	36.34	-5.51

Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Preamplifier (dB)	Correction Factor (dB/m)
5150	50.11	PK	V	68.20	18.09	56.16	27.49	3.32	36.22	-5.41
5150	40.18	AV	V	54.00	13.82	46.37	27.49	3.32	36.22	-5.41
5350	49.04	PK	V	68.20	19.16	55.41	27.45	3.38	36.34	-5.51
5350	40.36	AV	V	54.00	13.64	46.34	27.45	3.38	36.34	-5.51

802.11ac 20 Combined Antenna A and Antenna B

Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Preamplifier (dB)	Correction Factor (dB/m)
5150	50.75	PK	H	68.20	17.45	56.16	27.49	3.32	36.22	-5.41
5150	40.96	AV	H	54.00	13.04	46.37	27.49	3.32	36.22	-5.41
5350	49.9	PK	H	68.20	18.3	55.41	27.45	3.38	36.34	-5.51
5350	40.83	AV	H	54.00	13.17	46.34	27.45	3.38	36.34	-5.51

Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Preamplifier (dB)	Correction Factor (dB/m)
5150	50.75	PK	V	68.20	17.45	56.16	27.49	3.32	36.22	-5.41
5150	40.96	AV	V	54.00	13.04	46.37	27.49	3.32	36.22	-5.41
5350	49.9	PK	V	68.20	18.3	55.41	27.45	3.38	36.34	-5.51
5350	40.83	AV	V	54.00	13.17	46.34	27.45	3.38	36.34	-5.51

802.11ac 40 Combined Antenna A and Antenna B

Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Preamplifier (dB)	Correction Factor (dB/m)
5150	50.88	PK	H	68.20	17.32	56.16	27.49	3.32	36.22	-5.41
5150	40.44	AV	H	54.00	13.56	46.37	27.49	3.32	36.22	-5.41
5350	49.19	PK	H	68.20	19.01	55.41	27.45	3.38	36.34	-5.51
5350	40.47	AV	H	54.00	13.53	46.34	27.45	3.38	36.34	-5.51

Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Preamplifier (dB)	Correction Factor (dB/m)
5150	50.81	PK	V	68.20	17.39	56.16	27.49	3.32	36.22	-5.41
5150	40	AV	V	54.00	14	46.37	27.49	3.32	36.22	-5.41
5350	49.1	PK	V	68.20	19.1	55.41	27.45	3.38	36.34	-5.51
5350	40.33	AV	V	54.00	13.67	46.34	27.45	3.38	36.34	-5.51

802.11ac 80 Combined Antenna A and Antenna B

Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Preamplifier (dB)	Correction Factor (dB/m)
5150	49.58	PK	H	68.20	18.62	56.16	27.49	3.32	36.22	-5.41
5150	41.69	AV	H	54.00	12.31	46.37	27.49	3.32	36.22	-5.41
5350	50.51	PK	H	68.20	17.69	55.41	27.45	3.38	36.34	-5.51
5350	41.09	AV	H	54.00	12.91	46.34	27.45	3.38	36.34	-5.51

Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Preamplifier (dB)	Correction Factor (dB/m)
5150	49.82	PK	V	68.20	18.38	56.16	27.49	3.32	36.22	-5.41
5150	50.18	AV	V	54.00	3.82	46.37	27.49	3.32	36.22	-5.41
5350	50.37	PK	V	68.20	17.83	55.41	27.45	3.38	36.34	-5.51
5350	41.22	AV	V	54.00	12.78	46.34	27.45	3.38	36.34	-5.51

802.11n 40 Combined Antenna A and Antenna B

Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Preamplifier (dB)	Correction Factor (dB/m)
5150	52.32	PK	H	68.20	15.88	56.16	27.49	3.32	36.22	-5.41
5150	42.36	AV	H	54.00	11.64	46.37	27.49	3.32	36.22	-5.41
5350	52.02	PK	H	68.20	16.18	55.41	27.45	3.38	36.34	-5.51
5350	42.34	AV	H	54.00	11.66	46.34	27.45	3.38	36.34	-5.51

Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Preamplifier (dB)	Correction Factor (dB/m)
5150	52.35	PK	V	68.20	15.85	56.16	27.49	3.32	36.22	-5.41
5150	42.15	AV	V	54.00	11.85	46.37	27.49	3.32	36.22	-5.41
5350	52.06	PK	V	68.20	16.14	55.41	27.45	3.38	36.34	-5.51
5350	42.31	AV	V	54.00	11.69	46.34	27.45	3.38	36.34	-5.51

802.11a, worst case at AntennaB

Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Preamplifier (dB)	Correction Factor (dB/m)
5725	51.03	PK	V	122.3	71.27	56.16	27.49	3.32	36.66	-5.85
5725	40.75	AV	V	---	---	46.37	27.49	3.32	36.66	-5.85
5745	92.48	PK	V	---	---	55.41	27.45	3.38	36.84	-6.01
5745	90.17	AV	V	---	---	46.34	27.45	3.38	36.84	-6.01
5725	50.69	PK	H	122.3	71.61	56.16	27.49	3.32	36.66	-5.85
5725	40.41	AV	H	---	---	56.16	27.49	3.32	36.66	-5.85
5745	91.68	PK	H	---	---	56.16	27.49	3.32	36.84	-6.01
5745	88.62	AV	H	---	---	56.16	27.49	3.32	36.84	-6.01

Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Preamplifier (dB)	Correction Factor (dB/m)
5825	90.85	PK	V	---	---	56.16	27.49	3.32	36.66	-5.85
5825	89.36	AV	V	---	---	46.37	27.49	3.32	36.66	-5.85
5850	50.79	PK	V	122.3	71.51	55.41	27.45	3.38	36.84	-6.01
5850	39.83	AV	V	---	---	46.34	27.45	3.38	36.84	-6.01
5825	91.24	PK	H	---	---	56.16	27.49	3.32	36.66	-5.85
5825	88.65	AV	H	---	---	56.16	27.49	3.32	36.66	-5.85
5850	49.29	PK	H	122.3	73.01	56.16	27.49	3.32	36.84	-6.01
5850	39.92	AV	H	---	---	56.16	27.49	3.32	36.84	-6.01

802.11ac 20 Combined Antenna A and Antenna B

Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Preamplifier (dB)	Correction Factor (dB/m)
5725	51.95	PK	V	122.3	70.35	56.16	27.49	3.32	36.66	-5.85
5725	40.41	AV	V	---	---	46.37	27.49	3.32	36.66	-5.85
5745	92.05	PK	V	---	---	55.41	27.45	3.38	36.84	-6.01
5745	90.34	AV	V	---	---	46.34	27.45	3.38	36.84	-6.01
5725	50.82	PK	H	122.3	71.48	56.16	27.49	3.32	36.66	-5.85
5725	40.43	AV	H	---	---	56.16	27.49	3.32	36.66	-5.85
5745	91.61	PK	H	---	---	56.16	27.49	3.32	36.84	-6.01
5745	88.65	AV	H	---	---	56.16	27.49	3.32	36.84	-6.01

Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Preamplifier (dB)	Correction Factor (dB/m)
5825	90.02	PK	V	---	---	56.16	27.49	3.32	36.66	-5.85
5825	89.15	AV	V	---	---	46.37	27.49	3.32	36.66	-5.85
5850	50.19	PK	V	122.3	72.11	55.41	27.45	3.38	36.84	-6.01
5850	39.91	AV	V	---	---	46.34	27.45	3.38	36.84	-6.01
5825	91.33	PK	H	---	---	56.16	27.49	3.32	36.66	-5.85
5825	88.47	AV	H	---	---	56.16	27.49	3.32	36.66	-5.85
5850	49.32	PK	H	122.3	72.98	56.16	27.49	3.32	36.84	-6.01
5850	39.53	AV	H	---	---	56.16	27.49	3.32	36.84	-6.01

802.11ac 40 Combined Antenna A and Antenna B

Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Preamplifier (dB)	Correction Factor (dB/m)
5725	51.52	PK	V	122.3	70.78	56.16	27.49	3.32	36.66	-5.85
5725	40.05	AV	V	---	---	46.37	27.49	3.32	36.66	-5.85
5755	92.11	PK	V	---	---	55.41	27.45	3.38	36.84	-6.01
5755	90.35	AV	V	---	---	46.34	27.45	3.38	36.84	-6.01
5725	50.69	PK	H	122.3	71.61	56.16	27.49	3.32	36.66	-5.85
5725	40.42	AV	H	---	---	56.16	27.49	3.32	36.66	-5.85
5755	91.65	PK	H	---	---	56.16	27.49	3.32	36.84	-6.01
5755	88.18	AV	H	---	---	56.16	27.49	3.32	36.84	-6.01

Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Preamplifier (dB)	Correction Factor (dB/m)
5795	90.56	PK	V	---	---	56.16	27.49	3.32	36.66	-5.85
5795	89.34	AV	V	---	---	46.37	27.49	3.32	36.66	-5.85
5850	50.26	PK	V	122.3	72.04	55.41	27.45	3.38	36.84	-6.01
5850	39.94	AV	V	---	---	46.34	27.45	3.38	36.84	-6.01
5795	91.39	PK	H	---	---	56.16	27.49	3.32	36.66	-5.85
5795	88.41	AV	H	---	---	56.16	27.49	3.32	36.66	-5.85
5850	49.37	PK	H	122.3	72.93	56.16	27.49	3.32	36.84	-6.01
5850	39.55	AV	H	---	---	56.16	27.49	3.32	36.84	-6.01

802.11ac 80 Combined Antenna A and Antenna B

Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Preamplifier (dB)	Correction Factor (dB/m)
5700	51.35	PK	V	122.3	70.95	56.16	27.49	3.32	36.66	-5.85
5700	40.05	AV	V	---	---	46.37	27.49	3.32	36.66	-5.85
5775	92.74	PK	V	---	---	55.41	27.45	3.38	36.84	-6.01
5775	90.35	AV	V	---	---	46.34	27.45	3.38	36.84	-6.01
5700	50.82	PK	H	122.3	71.48	56.16	27.49	3.32	36.66	-5.85
5700	40.55	AV	H	---	---	56.16	27.49	3.32	36.66	-5.85
5775	91.18	PK	H	---	---	56.16	27.49	3.32	36.84	-6.01
5775	88.32	AV	H	---	---	56.16	27.49	3.32	36.84	-6.01

802.11n 40 Combined Antenna A and Antenna B

Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Preamplifier (dB)	Correction Factor (dB/m)
5725	51.68	PK	V	122.3	70.62	56.16	27.49	3.32	36.66	-5.85
5725	40.16	AV	V	---	---	46.37	27.49	3.32	36.66	-5.85
5755	92.18	PK	V	---	---	55.41	27.45	3.38	36.84	-6.01
5755	90.57	AV	V	---	---	46.34	27.45	3.38	36.84	-6.01
5725	50.71	PK	H	122.3	71.59	56.16	27.49	3.32	36.66	-5.85
5725	40.48	AV	H	---	---	56.16	27.49	3.32	36.66	-5.85
5755	91.64	PK	H	---	---	56.16	27.49	3.32	36.84	-6.01
5755	88.38	AV	H	---	---	56.16	27.49	3.32	36.84	-6.01



Frequency (MHz)	Emission Level (dBuV/m)	Detector Mode	ANT Pol	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Preamplifier (dB)	Correction Factor (dB/m)
5795	90.58	PK	V	---	---	56.16	27.49	3.32	36.66	-5.85
5795	89.37	AV	V	---	---	46.37	27.49	3.32	36.66	-5.85
5850	50.57	PK	V	122.3	71.73	55.41	27.45	3.38	36.84	-6.01
5850	39.84	AV	V	---	---	46.34	27.45	3.38	36.84	-6.01
5795	91.42	PK	H	---	---	56.16	27.49	3.32	36.66	-5.85
5795	88.46	AV	H	---	---	56.16	27.49	3.32	36.66	-5.85
5850	49.55	PK	H	122.3	72.75	56.16	27.49	3.32	36.84	-6.01
5850	39.51	AV	H	---	---	56.16	27.49	3.32	36.84	-6.01

6. 26DB AND 99% BANDWIDTH TEST

6.1. Applied procedures / limit

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

6.2. TEST PROCEDURE

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set $VBW \geq 3 \cdot RBW$
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

6.3. Test result

26dB bandwidth

	Frequency (MHz)	26dB Bandwidth (MHz)		99% Bandwidth (MHz)	
		ANT A	ANT B	ANT A	ANT B
802.11a	5180	19.69	19.44	16.53	16.48
	5200	19.50	19.36	16.49	16.51
	5240	19.46	19.22	16.50	16.48
802.11ac (20M)	5180	19.80	19.92	17.49	17.50
	5200	19.80	19.75	17.49	17.50
	5240	19.81	19.88	17.49	17.49
802.11ac (40M)	5190	39.40	39.60	36.04	36.12
	5224	39.60	39.33	36.06	36.04
802.11ac (80M)	5210	80.11	78.82	75.10	75.11
802.11n (40M)	5190	39.20	39.44	36.03	36.08
	5224	39.38	39.32	36.07	36.08

	Frequency (MHz)	26dB Bandwidth (MHz)		99% Bandwidth (MHz)	
		ANT A	ANT B	ANT A	ANT B
802.11a	5745	21.28	19.05	16.53	16.43
	5785	20.42	19.32	16.50	16.44
	5825	23.49	19.13	16.60	16.44
802.11ac (20M)	5745	19.48	19.33	17.60	17.55
	5785	19.48	19.36	17.60	17.55
	5825	20.41	19.35	17.63	17.55
802.11ac (40M)	5755	38.70	38.66	35.98	35.87
	5795	38.38	35.17	35.96	35.89
802.11ac (80M)	5775	86.43	78.09	75.08	74.94
802.11n (40M)	5755	38.74	38.63	35.95	35.88
	5795	38.69	38.66	35.95	35.96

ANT A 802.11a



ANT A 802.11ac (20M)



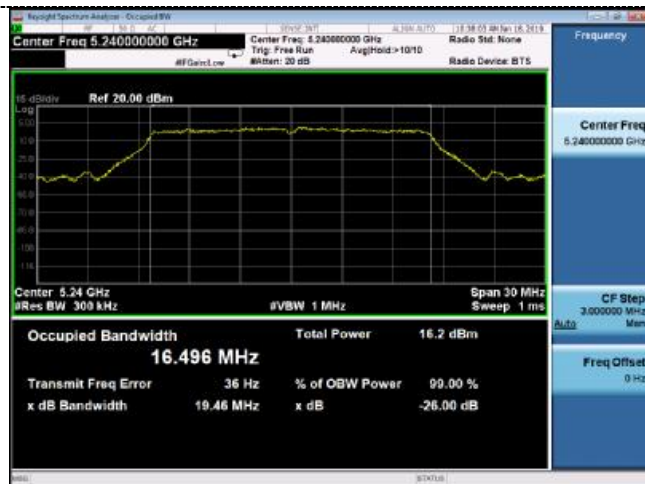
5180



5180



5200



5200



5240

5240



ANT A 802.11ac (40M)



5190

ANT A 802.11ac (80M)



5210



5224

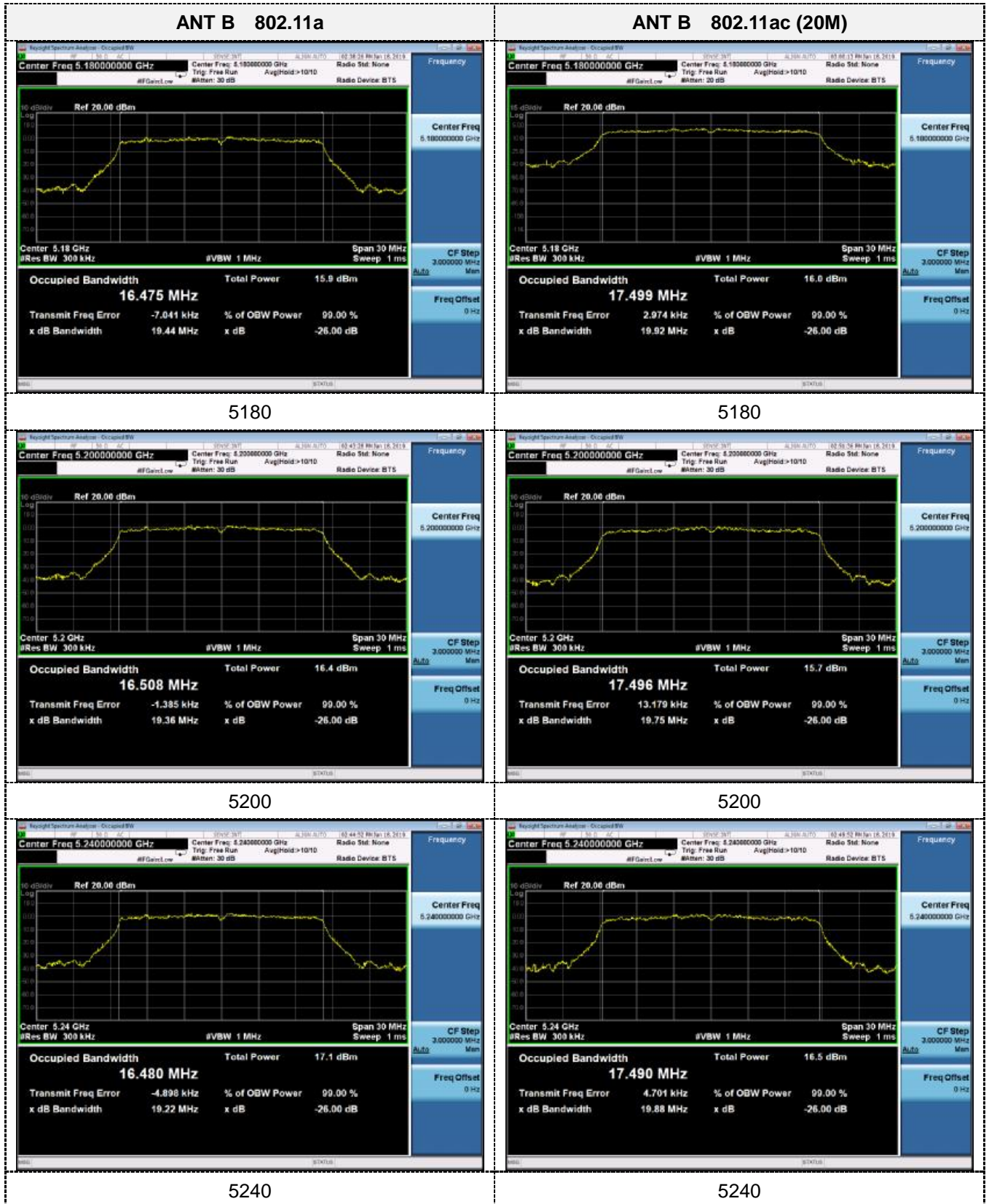
ANT A 802.11n (40M)

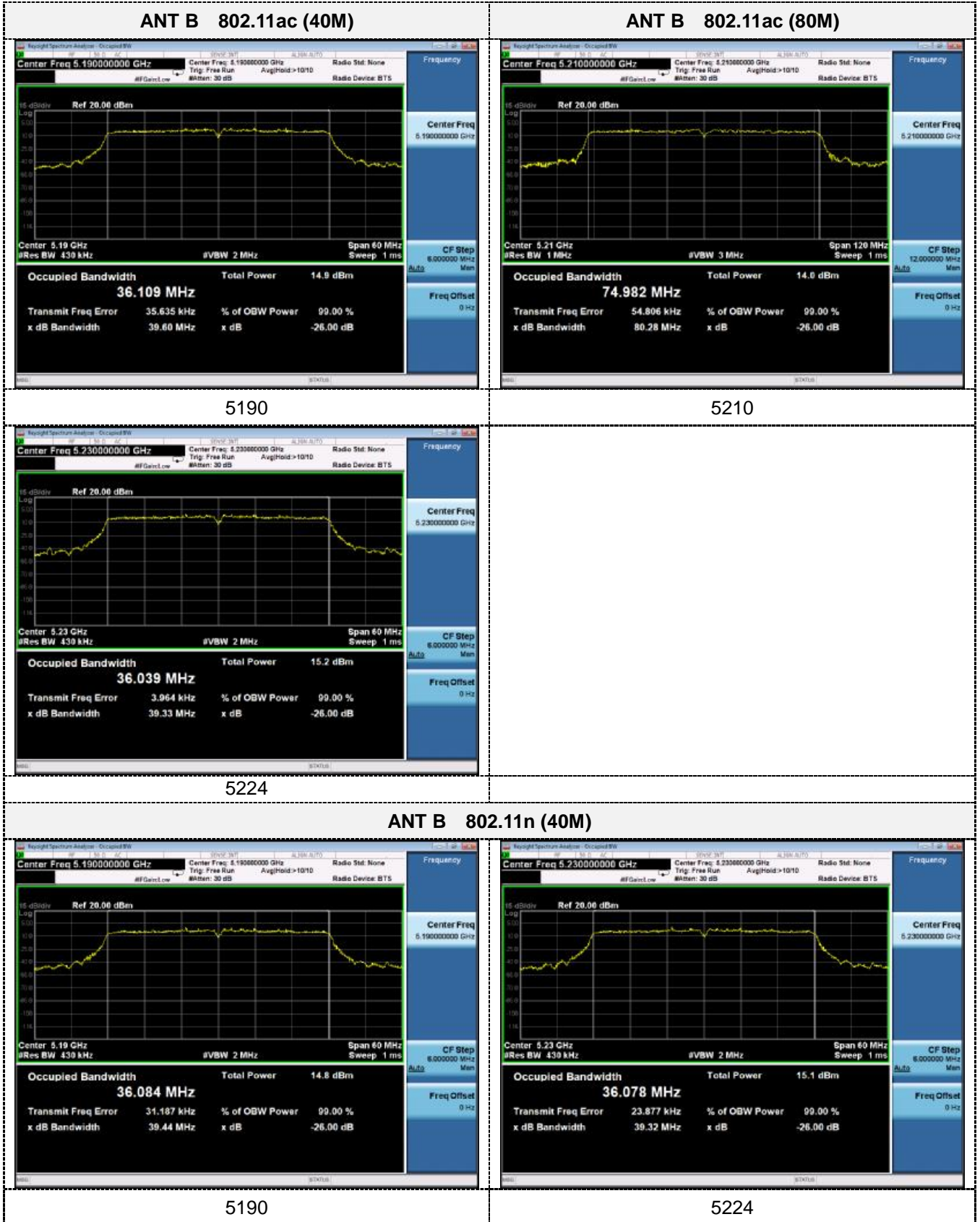


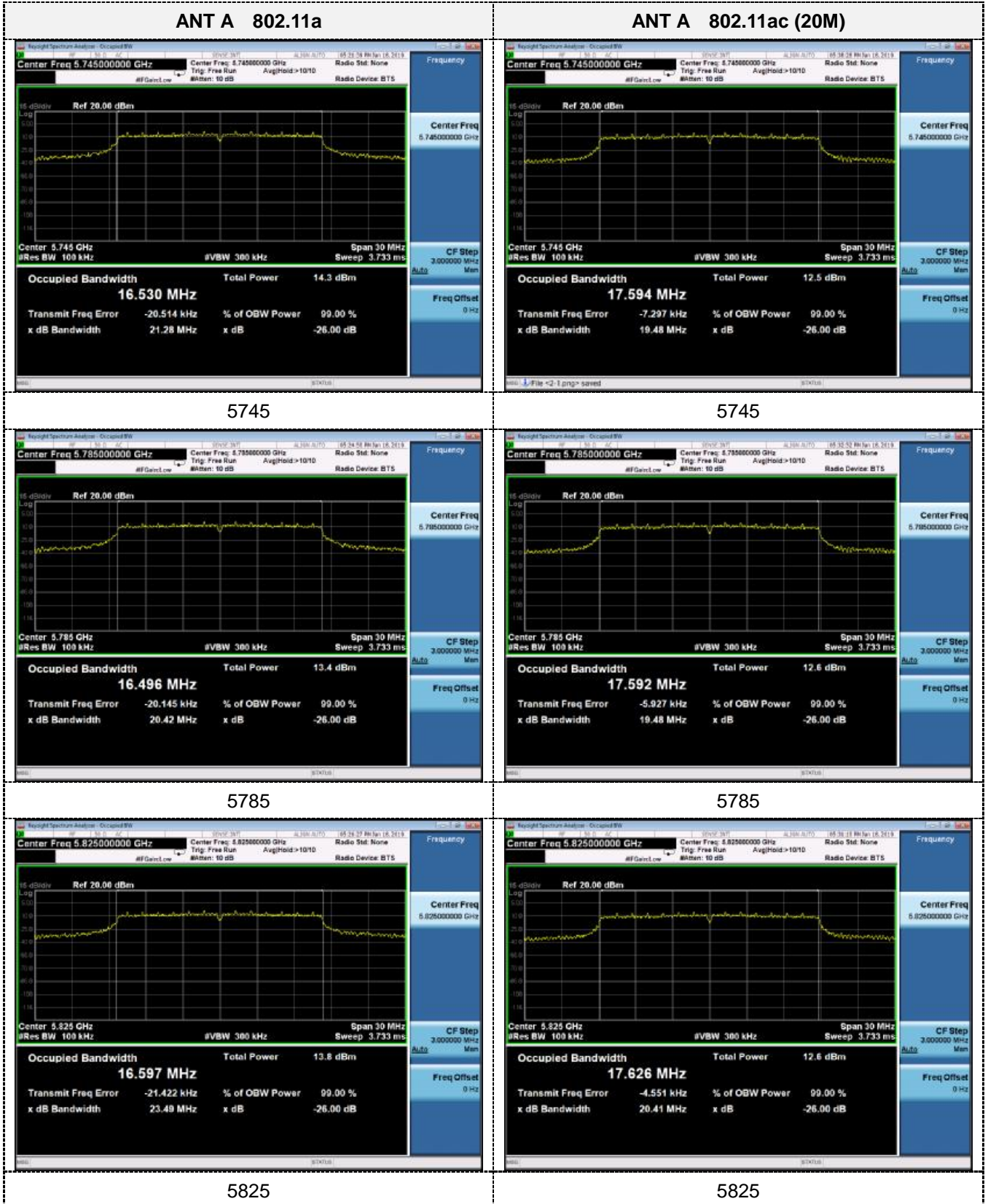
5190



5224





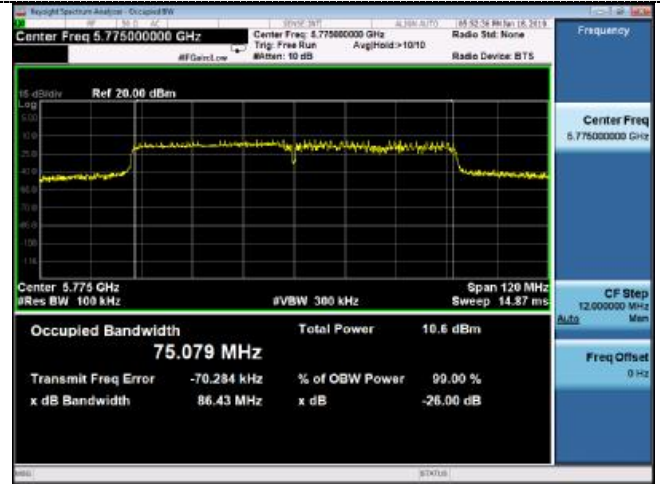


ANT A 802.11ac (40M)

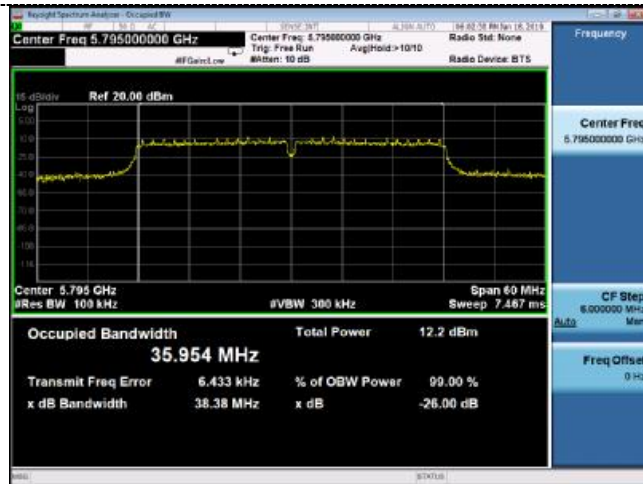


5755

ANT A 802.11ac (80M)



5775



5795

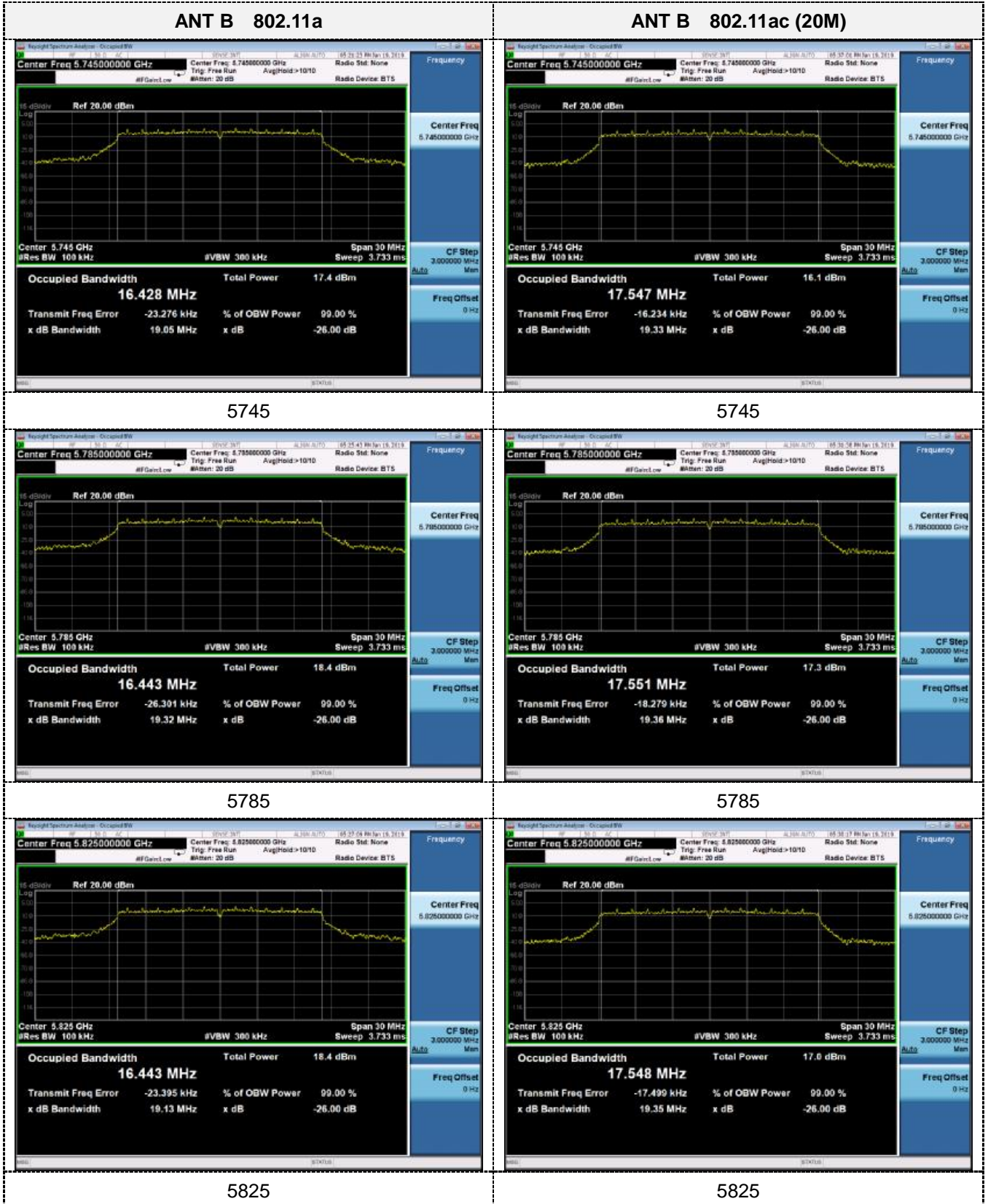
ANT A 802.11n (40M)



5755



5795

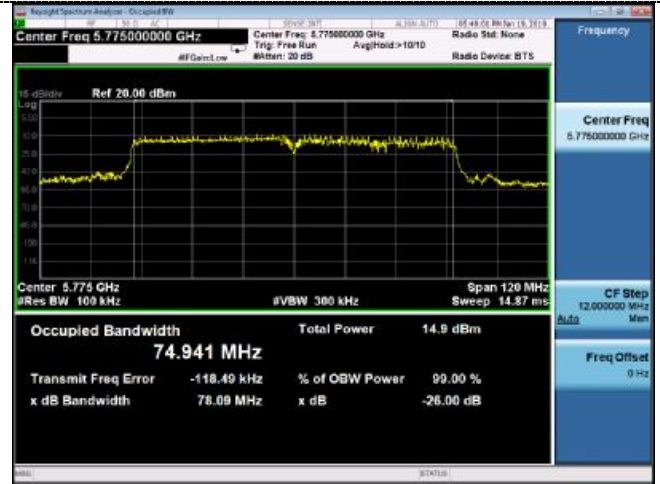


ANT B 802.11ac (40M)



5755

ANT B 802.11ac (80M)



5775



5795

ANT B 802.11n (40M)



5755



5795

7. MINIMUM 6 DB BANDWIDTH

7.1. Applied procedures / limit

According to FCC §15.407(e)

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

7.2. TEST PROCEDURE

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) 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.

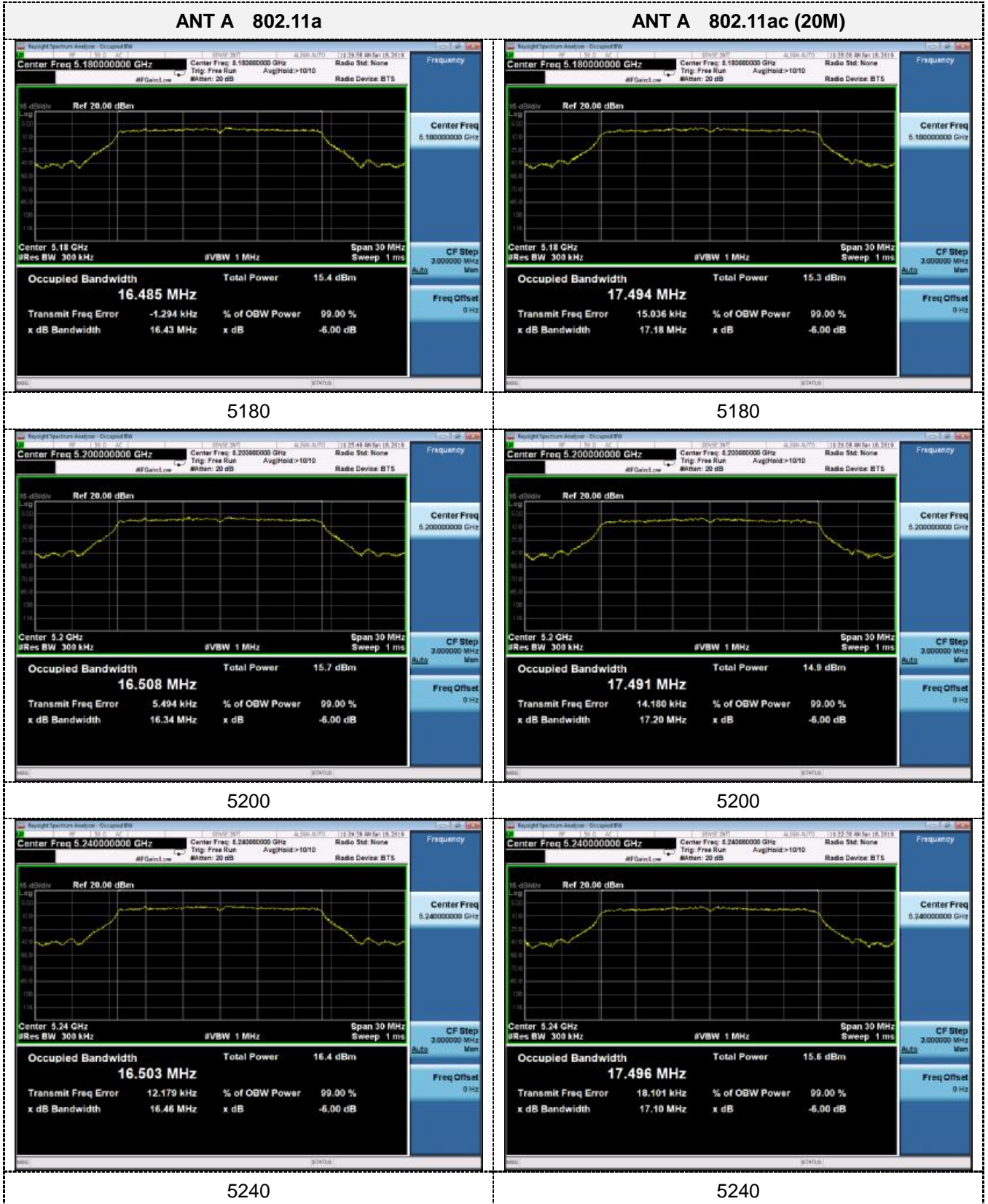
7.3. Test result

6dB bandwith

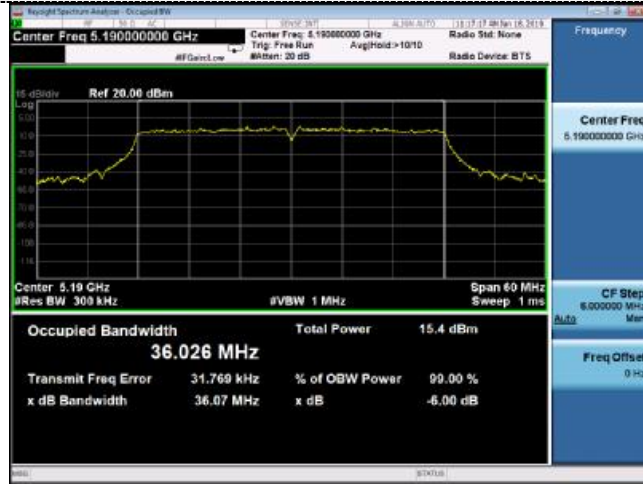
6dB bandwidth

	Frequency (MHz)	6dB Bandwidth (MHz)		99% Bandwidth (MHz)	
		ANT A	ANT B	ANT A	ANT B
802.11a	5180	16.43	16.44	16.49	16.51
	5200	16.34	16.45	16.51	16.49
	5240	16.46	16.36	16.50	16.50
802.11ac (20M)	5180	17.18	17.13	17.49	17.50
	5200	17.20	17.19	17.49	17.50
	5240	17.10	17.14	17.50	17.49
802.11ac (40M)	5190	36.07	36.19	36.03	36.02
	5230	35.79	36.04	35.99	36.00
802.11ac (80M)	5210	75.44	75.55	75.06	75.11
802.11n (40M)	5190	36.05	35.47	36.00	35.99
	5230	35.89	35.83	36.02	36.01

	Frequency (MHz)	6dB Bandwidth (MHz)		99% Bandwidth (MHz)	
		ANT A	ANT B	ANT A	ANT B
802.11a	5745	16.05	16.28	16.52	16.43
	5785	16.05	16.04	16.50	16.44
	5825	23.49	15.82	16.60	16.44
802.11ac (20M)	5745	19.48	16.90	17.60	17.55
	5785	19.48	16.88	17.60	17.55
	5825	20.41	16.93	17.63	17.55
802.11ac (40M)	5755	38.70	35.35	35.98	35.86
	5795	38.38	35.17	35.96	35.89
802.11ac (80M)	5775	86.43	75.11	75.08	74.94
802.11n (40M)	5755	38.74	35.17	35.95	35.87
	5795	38.69	35.19	35.95	35.90

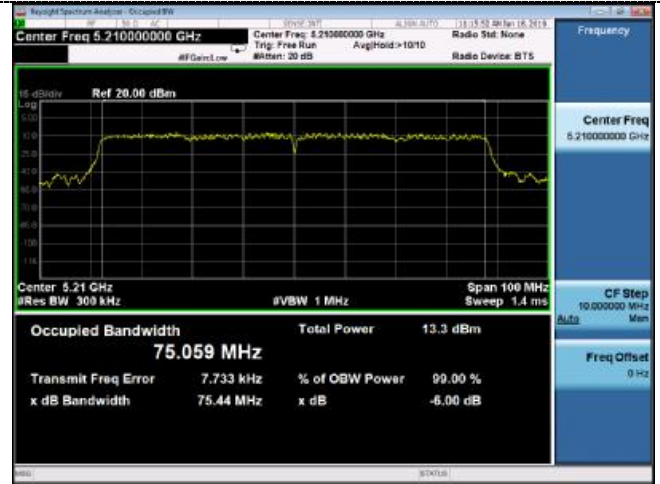


ANT A 802.11ac (40M)



5190

ANT A 802.11ac (80M)



5210



5230

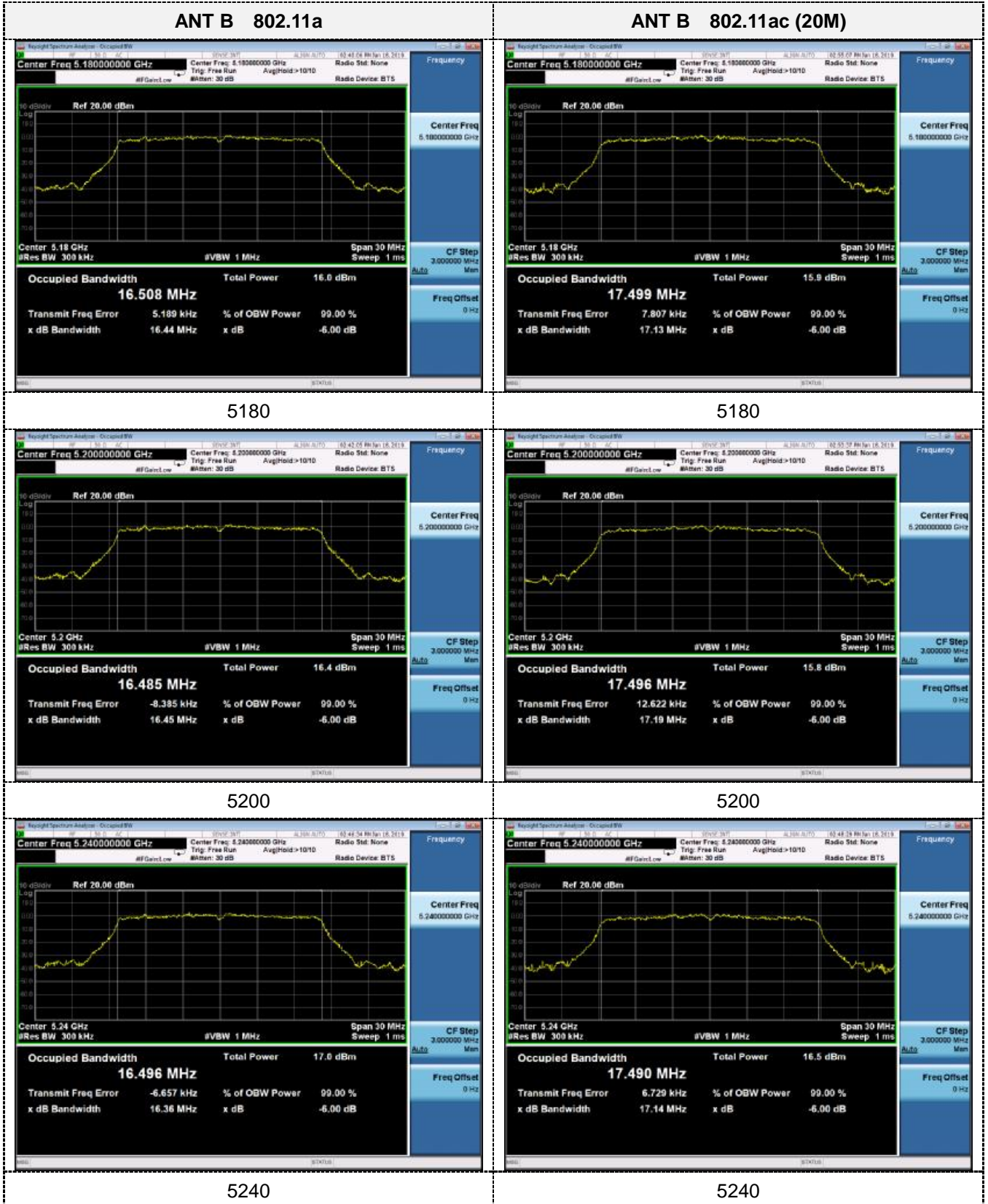
ANT A 802.11n (40M)



5190

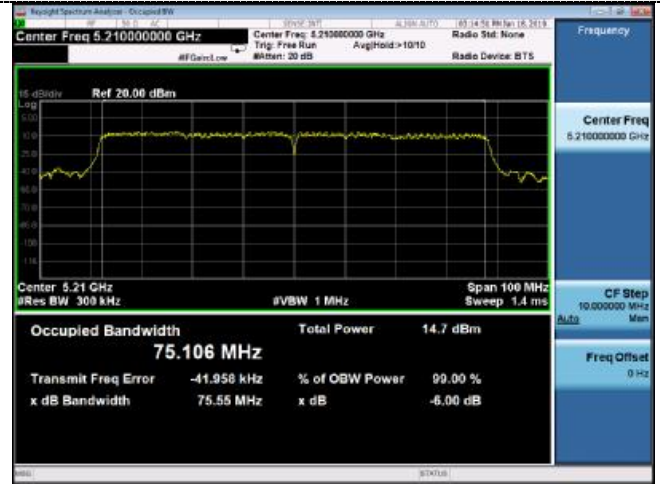


5230

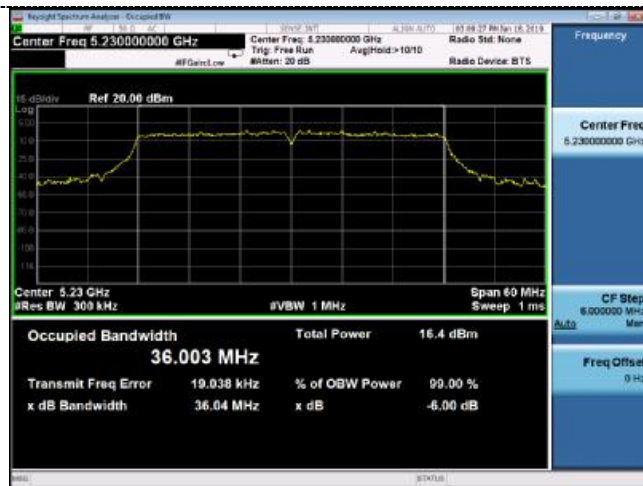


ANT B 802.11ac (40M)


5190

ANT B 802.11ac (80M)


5210



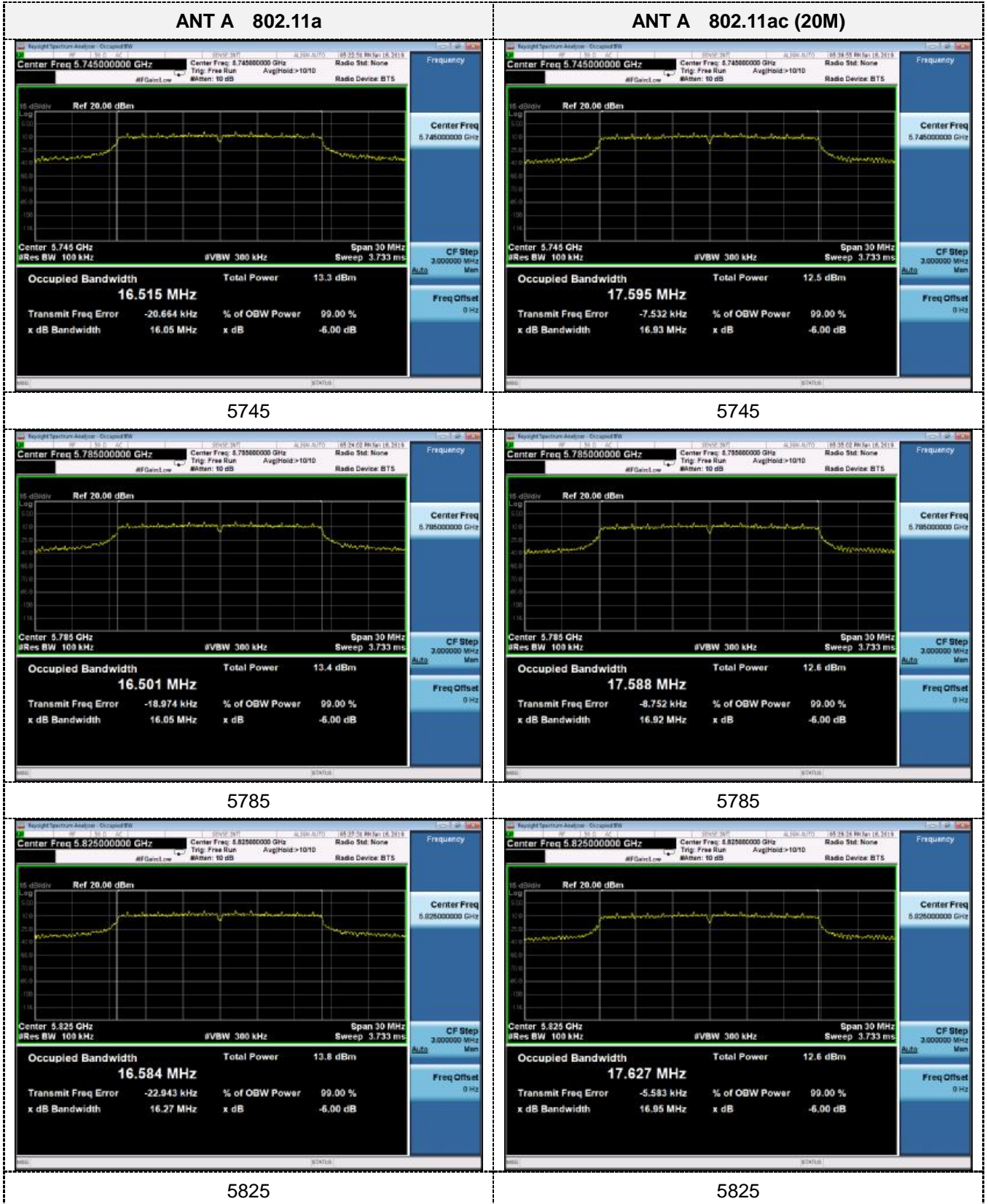
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ANT B 802.11n (40M)


5190



5230

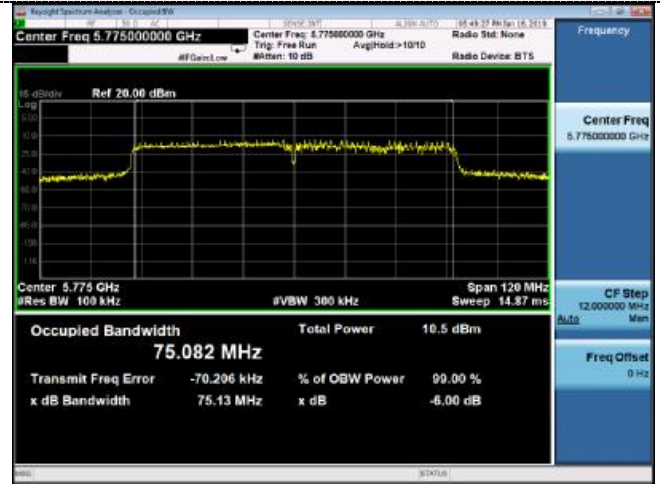


ANT A 802.11ac (40M)



5755

ANT A 802.11ac (80M)



5775

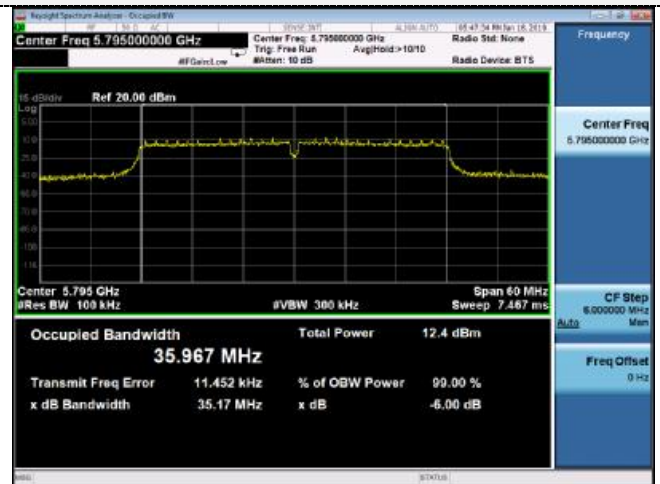


5795

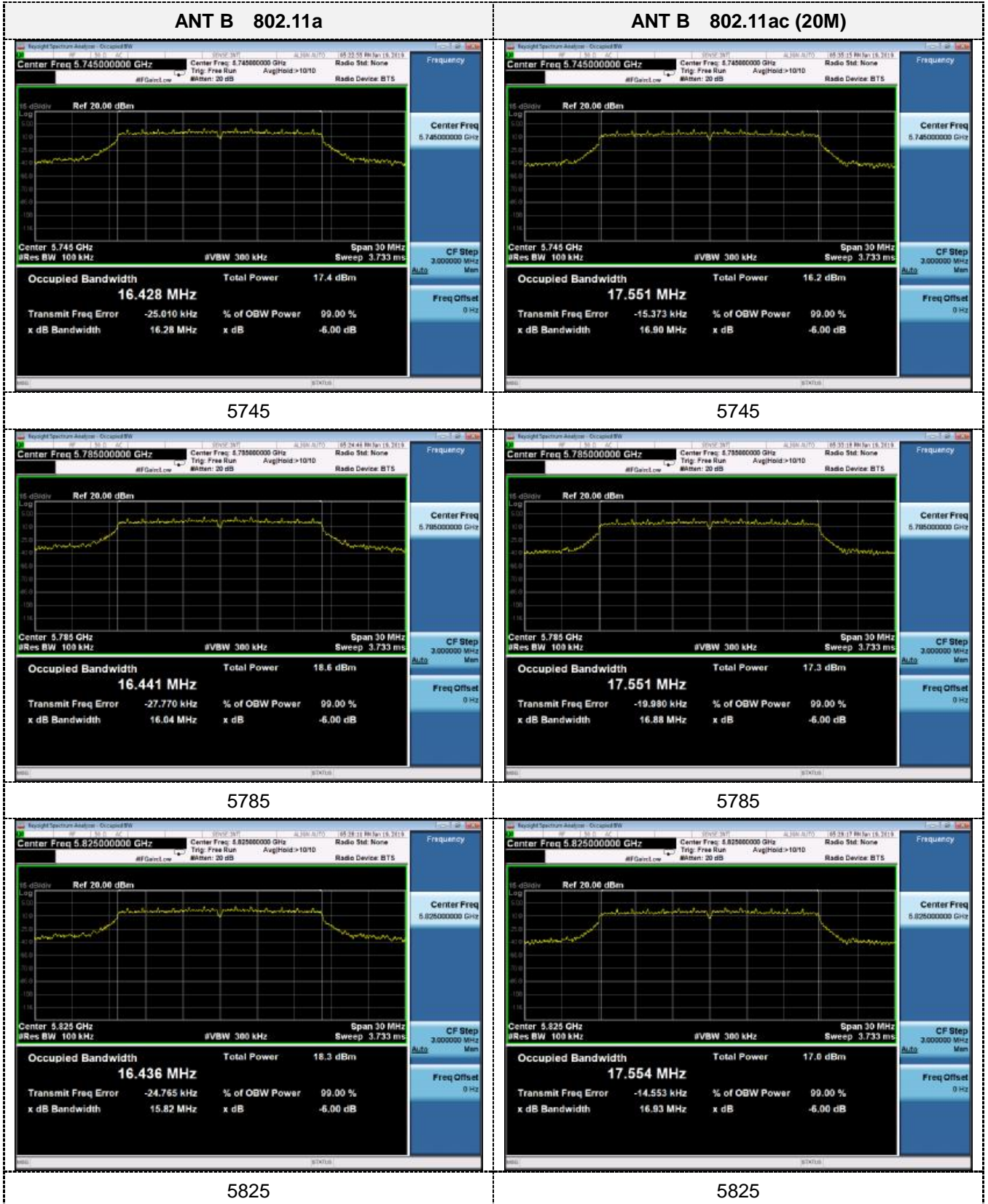
ANT A 802.11n (40M)



5755



5795

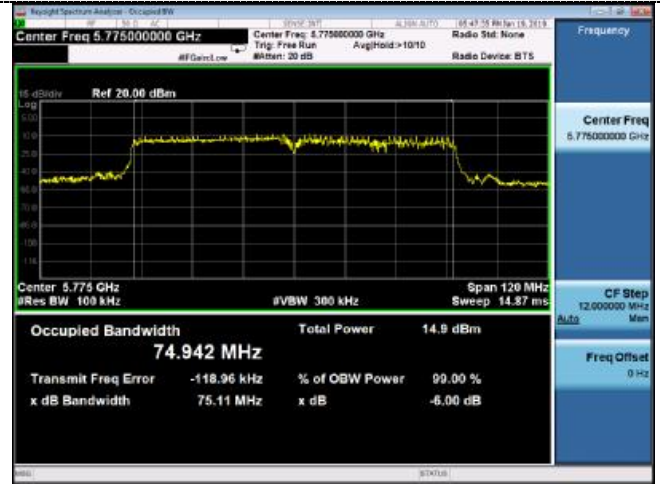


ANT B 802.11ac (40M)



5755

ANT B 802.11ac (80M)



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ANT B 802.11n (40M)



5755



5795

8. OUTPUT POWER TEST

8.1. Limits

For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

8.2. Test setup

1. The maximum average conducted output power can be measured using Method PM-G (Measurement using a gated RF average power meter):
2. Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.
 - a. The Transmitter output (antenna port) was connected to the power meter.
 - b. Turn on the EUT and power meter and then record the power value.
 - c. Repeat above procedures on all channels needed to be tested.

8.3. Test result

	Frequency (MHz)	Average Output Power(dBm)		Total Output Power(dBm)	FCC Limit (dBm)	Result
		ANT A	ANT B			
802.11a	5180	16.34	16.51	/	24	Pass
	5200	15.54	15.30	/	24	Pass
	5240	15.05	15.11	/	24	Pass
802.11ac (20M)	5180	14.85	14.65	17.76	24	Pass
	5220	14.33	14.29	17.32	24	Pass
	5240	14.60	14.55	17.59	24	Pass
802.11ac (40M)	5190	14.15	14.67	17.43	24	Pass
	5230	14.31	14.00	17.17	24	Pass
802.11ac (80M)	5210	14.35	14.05	17.21	24	Pass
802.11n (40M)Hz)	5190	14.68	14.91	17.81	24	Pass
	5230	14.44	14.50	17.48	24	Pass

	Frequency (MHz)	Average Output Power(dBm)		Total Output Power(dBm)	FCC Limit (dBm)	Result
		ANT A	ANT B			
802.11a	5745	16.77	16.84	/	30	Pass
	5785	16.05	16.37	/	30	Pass
	5825	16.21	16.32	/	30	Pass
802.11ac (20M)	5745	15.09	15.11	18.11	30	Pass
	5785	15.20	15.34	18.28	30	Pass
	5825	15.16	15.28	18.23	30	Pass
802.11ac (40M)	5755	14.87	14.95	17.92	30	Pass
	5795	14.35	14.47	17.42	30	Pass
802.11ac (80M)	5775	14.66	14.25	17.47	30	Pass
802.11n (40M)Hz)	5755	14.11	14.26	17.20	30	Pass
	5795	14.09	14.05	17.08	30	Pass

Note:

- 1) Measured output power at difference data rate for each mode and recorded worst case for each mode.
- 2). Test results including cable loss;
- 3). IEEE 802.11n HT40/IEEE 802.11ac VHT20/IEEE 802.11ac VHT40/IEEE 802.11ac VHT80mode the ANT A and ANT B can TX and RX at the same time;
- 4). Directional gain= $G_{ANT} + 10\log(N) \text{dbi} = 2.0 + 10\log(2) = 5.01 \text{dbi}$;
- 5). For power test the duty cycle is 100% in continuous transmitting mode.
- 6). TX means Transmitter; RX means Receive.

9. PEAK POWER SPECTRAL DENSITY TEST

9.1. Limits

In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

In addition, the maximum power spectral density shall not exceed 30 dBm in any 500 kHz band.

9.2. Test setup

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to
Spectrum.
4. For U-NII1, U-NII-2A, U-NII-2C Band:
Set RBW=1MHz, VBW=3MHz, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
For U-NII-3 Band:
Set RBW=510 kHz, VBW=3*RBW, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
5. Use the cursor on spectrum to peak search the highest level of trace
6. Record the max. reading and add $10 \log(1/\text{duty cycle})$.

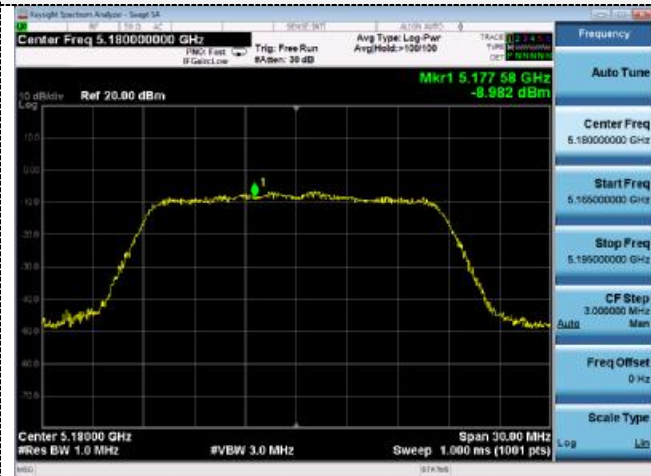
9.3. Test data

Test data as below

	Frequency (MHz)	Reading Level (dBm)		PSD (dBm)		FCC Limit (dBm)	Result
		ANT A	ANT B	ANT A	ANT B		
802.11a	5180	-8.98	-4.75	-8.98	-4.75	11.00	Pass
	5220	-6.66	-5.33	-6.66	-5.33	11.00	Pass
	5240	-6.73	-4.64	-6.73	-4.64	11.00	Pass
802.11ac (20M)	5180	-7.09	-4.94	-2.87		11.00	Pass
	5220	-6.89	-4.83	-2.73		11.00	Pass
	5240	-6.75	-5.26	-2.93		11.00	Pass
802.11ac (40M)	5190	-10.34	-8.04	-6.03		11.00	Pass
	5230	-10.10	-8.22	-6.05		11.00	Pass
802.11ac (80M)	5210	-14.05	-10.98	-9.24		11.00	Pass
802.11n (40MHz)	5190	-10.83	-8.06	-6.22		11.00	Pass
	5230	-10.46	-7.93	-6.00		11.00	Pass

	Frequency (MHz)	Reading Level (dBm)		PSD (dBm)		FCC Limit (dBm)	Result
		ANT A	ANT B	ANT A	ANT B		
802.11a	5745	-10.00	-5.36	-10.00	-5.36	30.00	Pass
	5785	-10.64	-4.08	-10.64	-4.08	30.00	Pass
	5825	-9.99	-3.20	-9.99	-3.20	30.00	Pass
802.11ac (20M)	5745	-9.90	-3.77	-2.82		30.00	Pass
	5785	-9.78	-3.79	-2.81		30.00	Pass
	5825	-9.77	-3.51	-2.59		30.00	Pass
802.11ac (40M)	5755	-4.32	-5.97	-2.06		30.00	Pass
	5795	-3.96	-5.72	-1.74		30.00	Pass
802.11ac (80M)	5775	-7.42	-9.21	-5.21		30.00	Pass
802.11n (40MHz)	5755	-5.52	-6.10	-2.79		30.00	Pass
	5795	-5.86	-5.81	-2.82		30.00	Pass

ANT A 802.11a

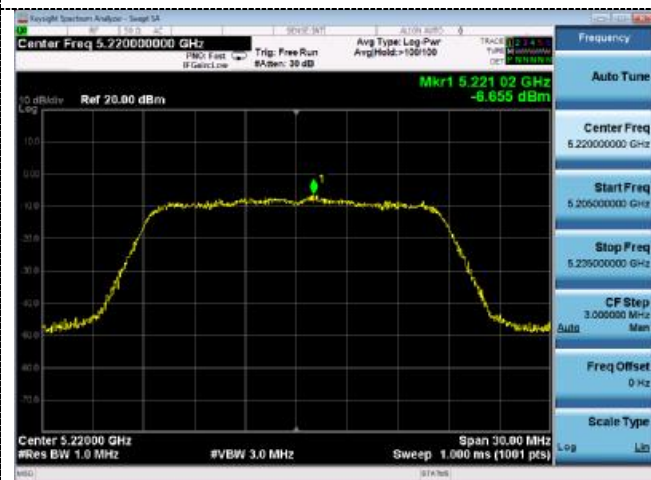


5180

ANT A 802.11ac (20M)



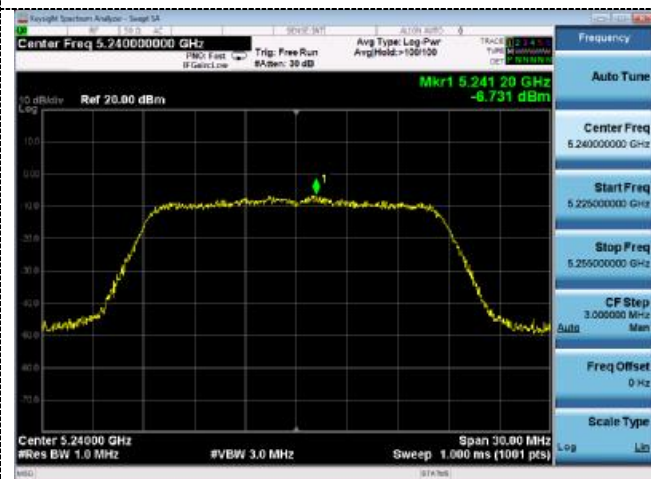
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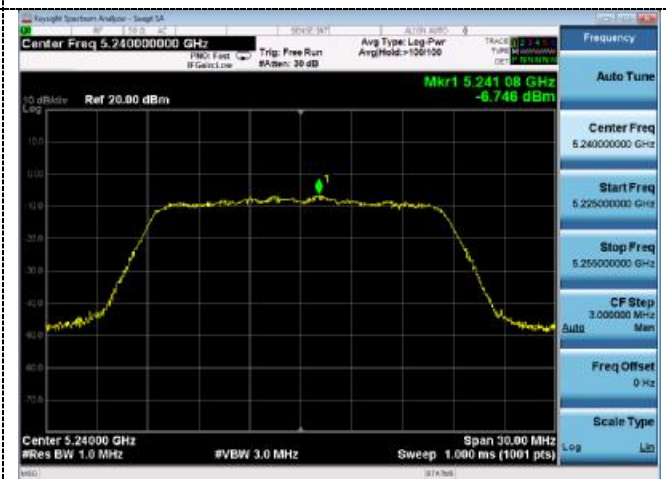
5200



5200

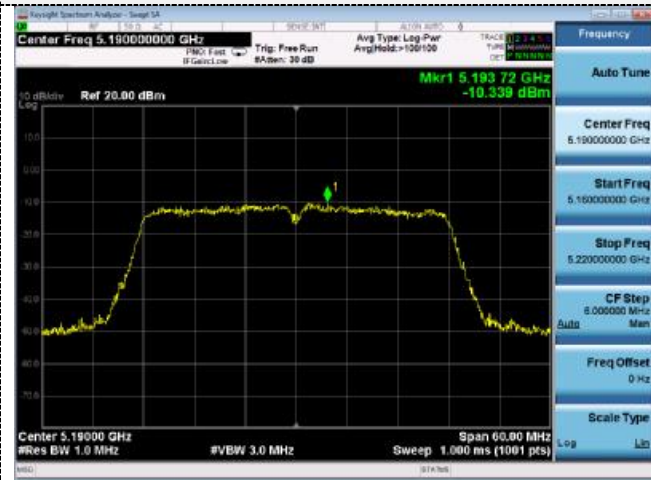


5240



5240

ANT A 802.11ac (40M)

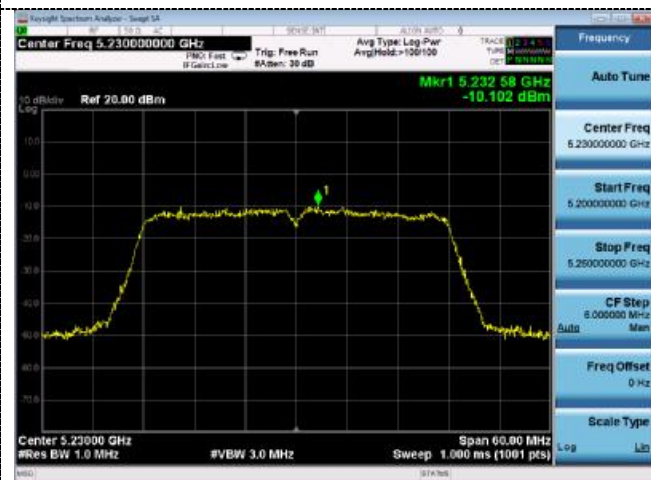


5190

ANT A 802.11ac (80M)



5210

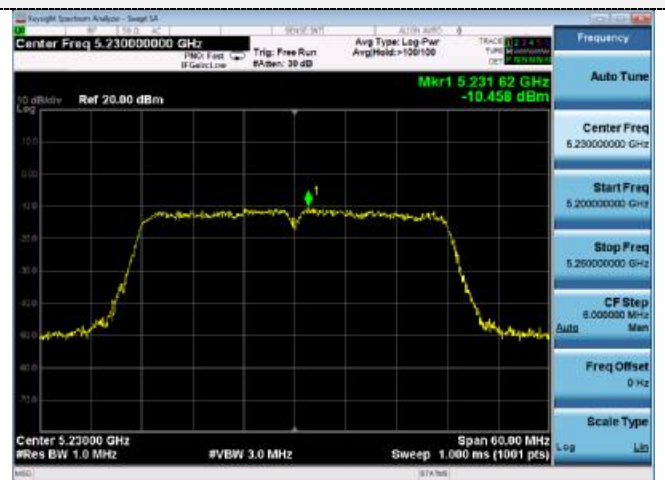


5230

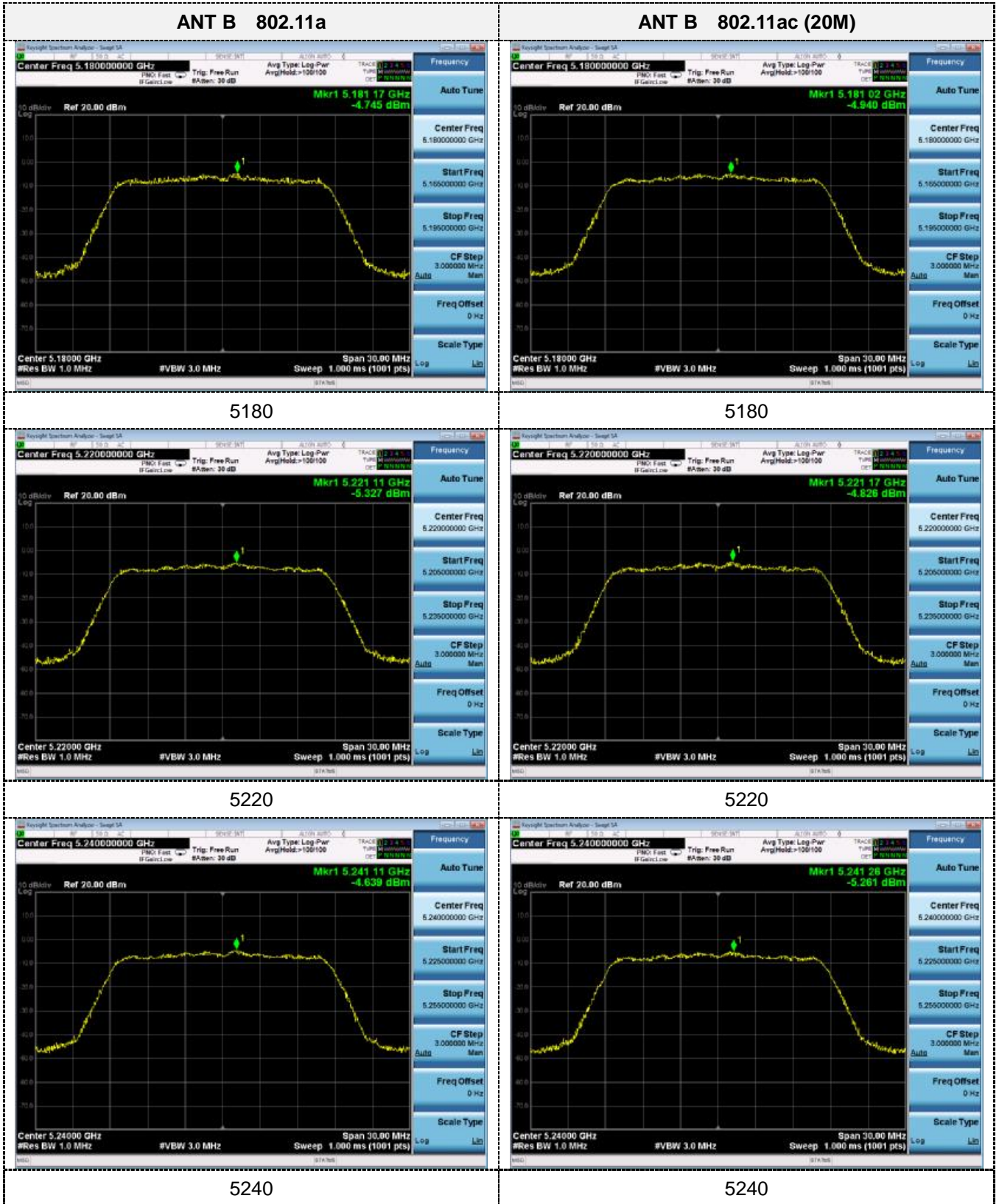
ANT A 802.11n (40M)



5190

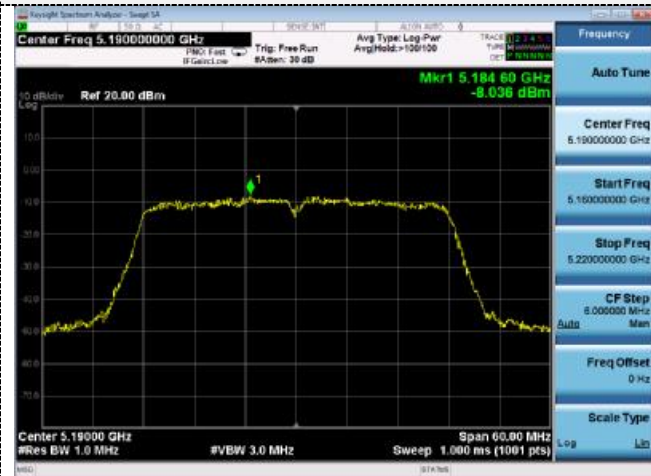


5230





ANT B 802.11ac (40M)

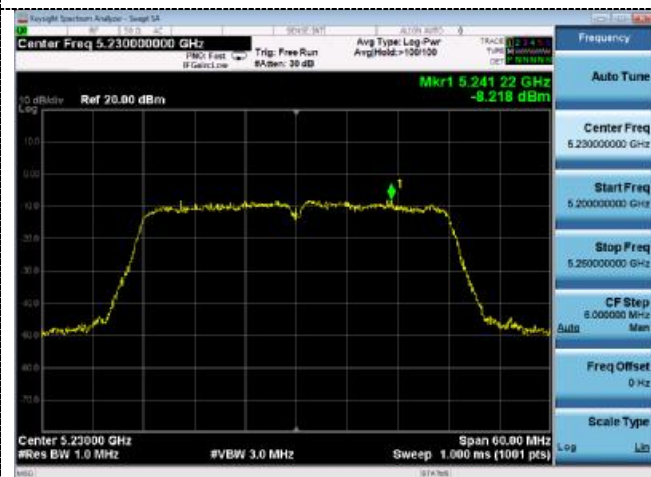


5190

ANT B 802.11ac (80M)



5210

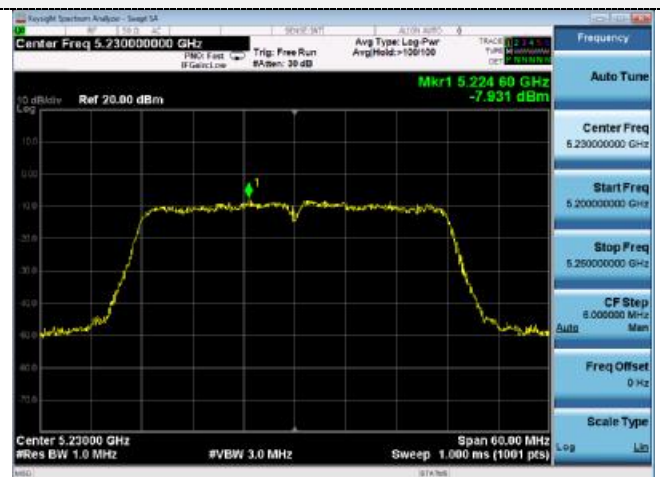


5230

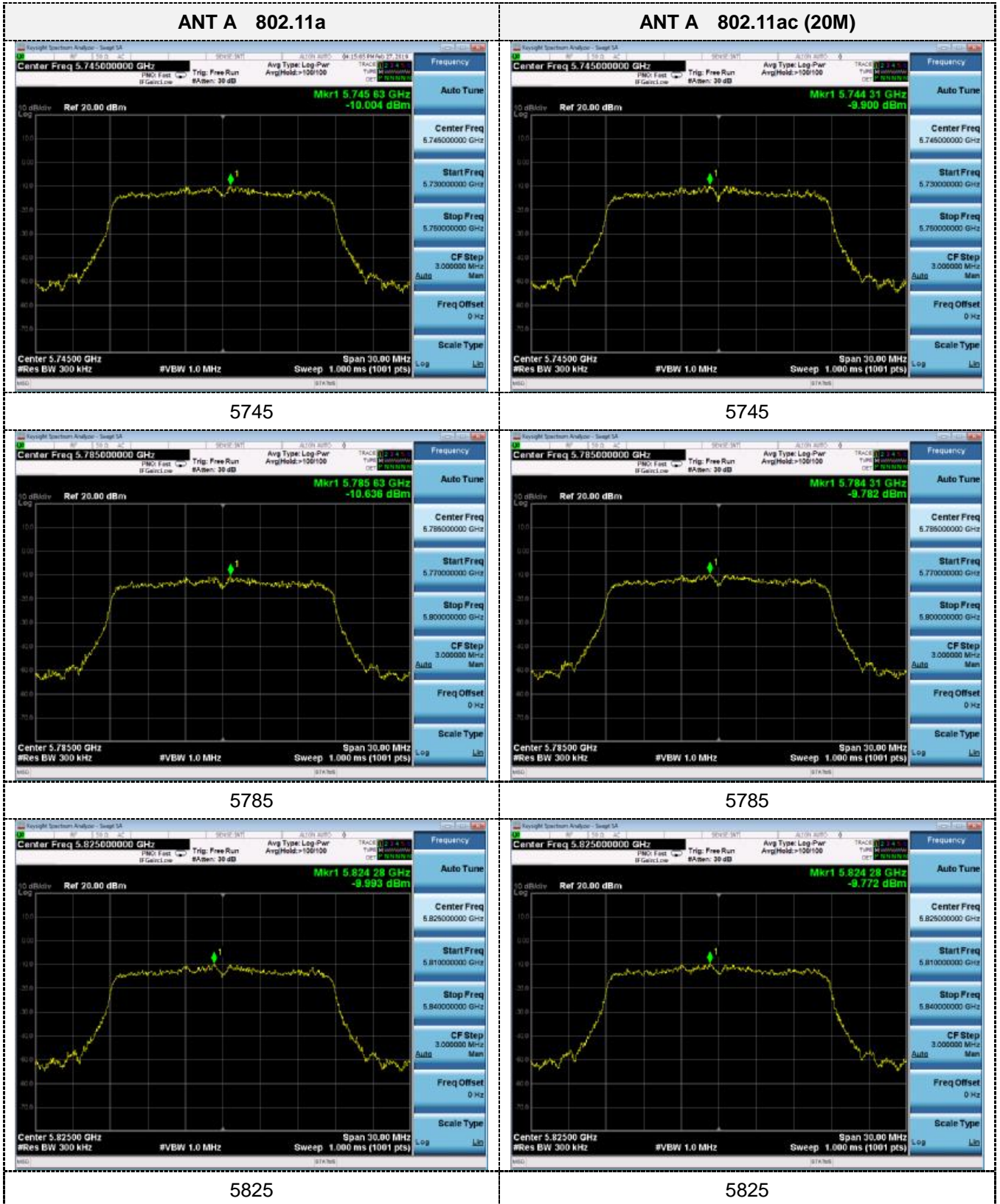
ANT B 802.11n (40M)



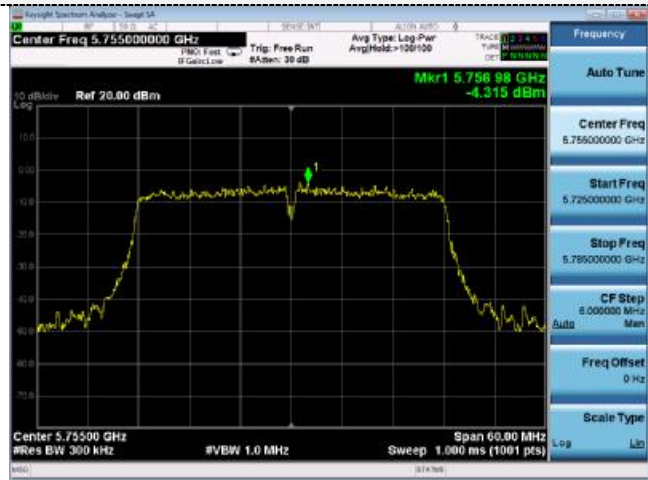
5190



5230



ANT A 802.11ac (40M)



5755

ANT A 802.11ac (80M)

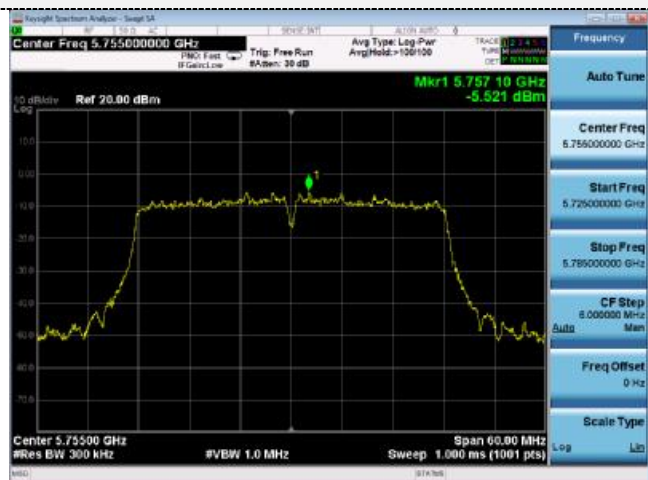


5775

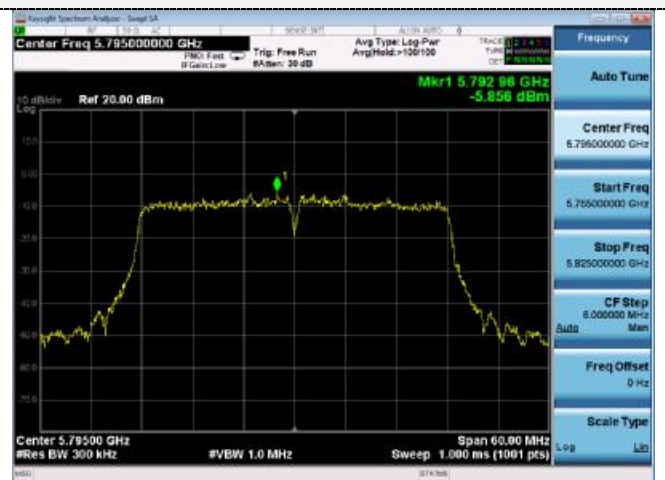


5795

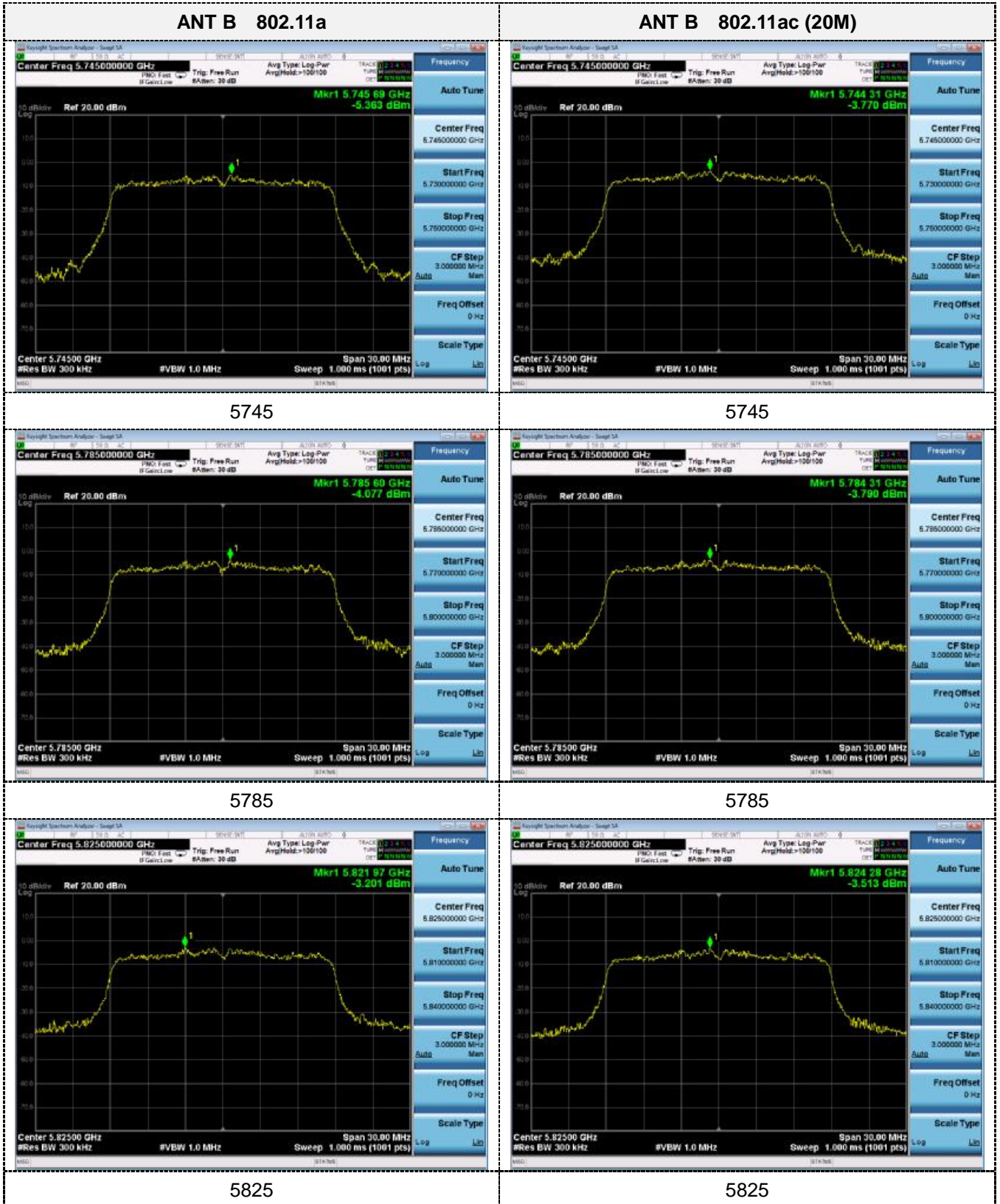
ANT A 802.11n (40M)



5755



5795



ANT B 802.11ac (40M)



5755

ANT B 802.11ac (80M)



5775



5795

ANT B 802.11n (40M)



5755



5795

10. DUTY CYCLE TEST SIGNAL

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle.

All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

Formula:

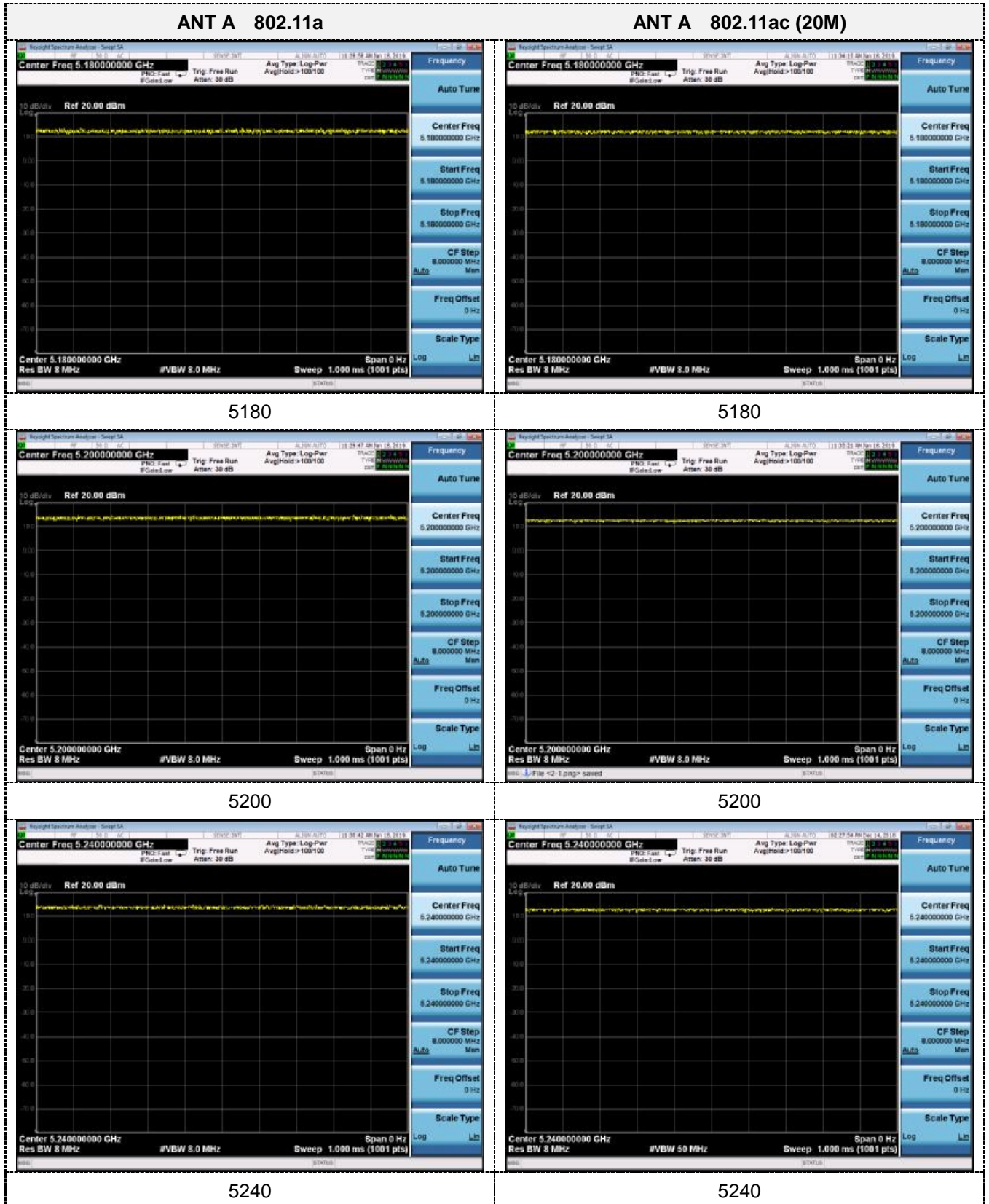
$$\text{Duty Cycle} = \text{Ton} / (\text{Ton} + \text{Toff})$$

Measurement Procedure:

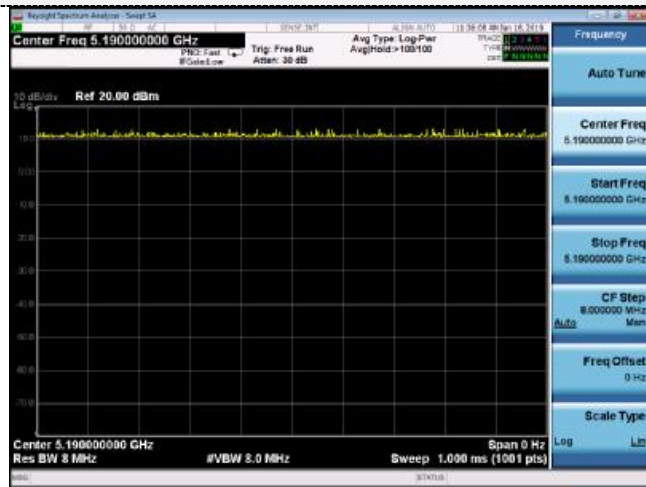
1. Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

Duty Cycle:

Operation Mode	Duty Cycle	Duty Fator (dB) $10 * \log (1/ \text{Duty cycle})$
802.11a	100%	0
802.11ac(20M)	100%	0
802.11ac(40M)	100%	0
802.11ac(80M)	100%	0
802.11n(40M)	100%	0

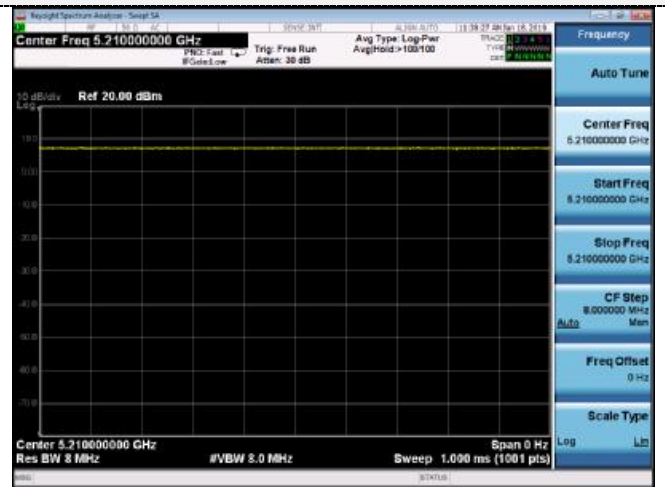


ANT A 802.11ac (40M)



5190

ANT A 802.11ac (80M)

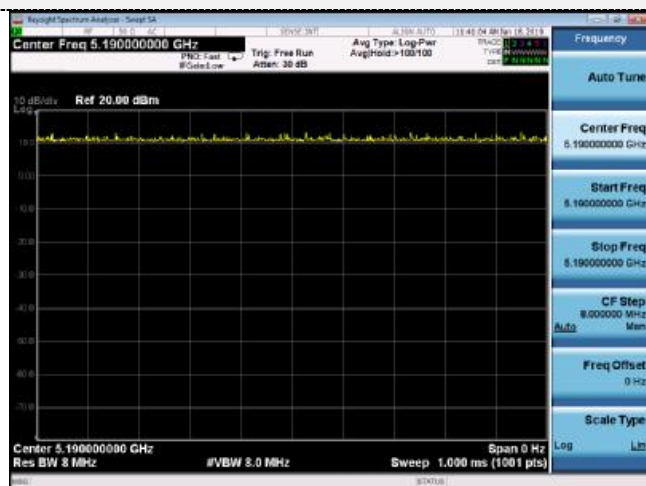


5210

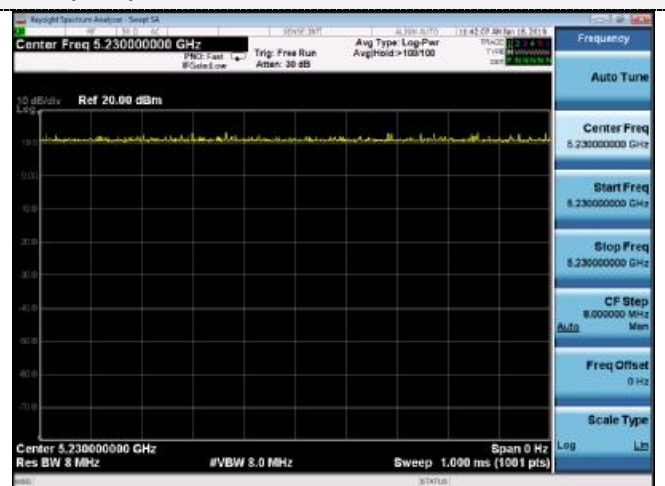


5230

ANT A 802.11n (40M)

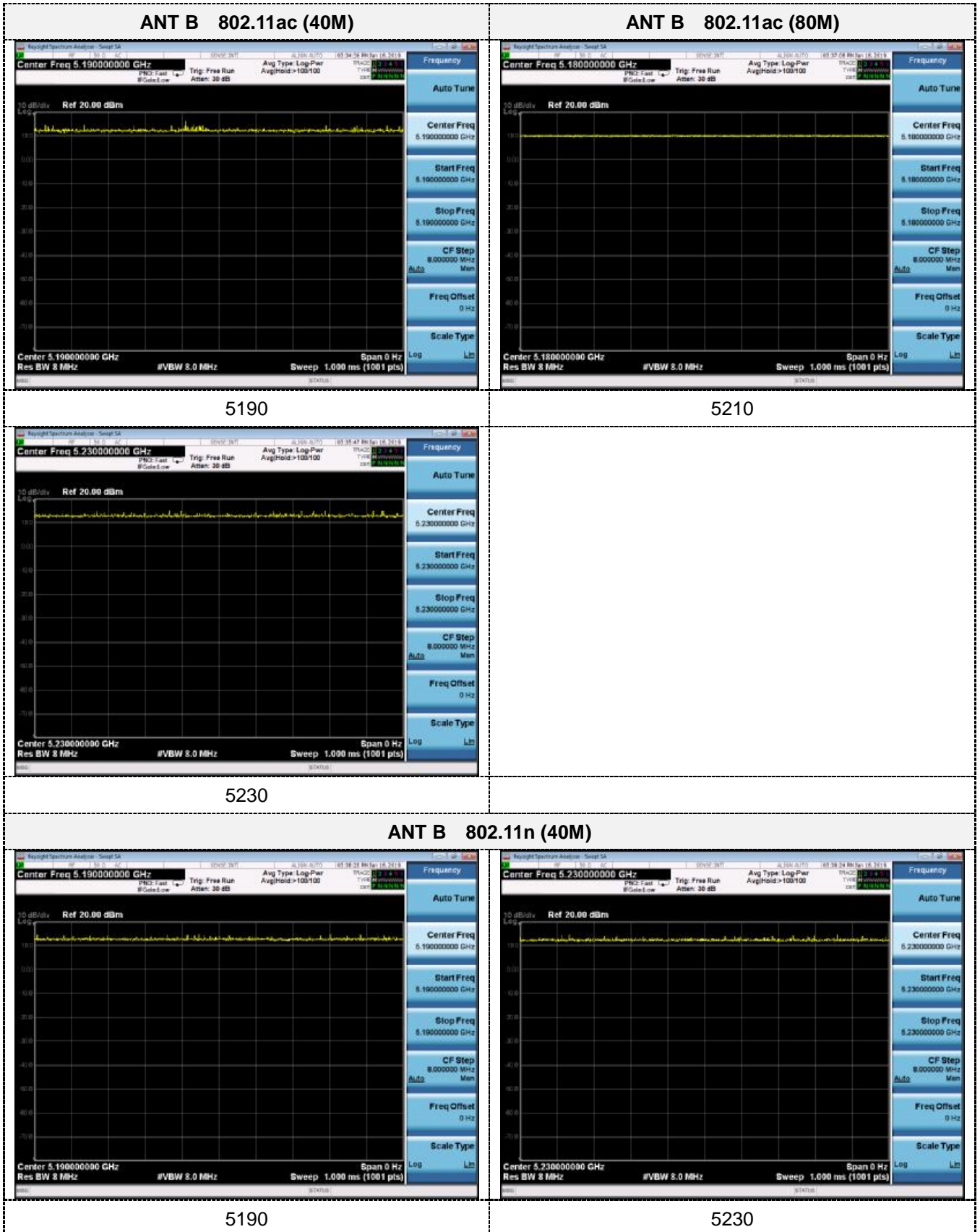


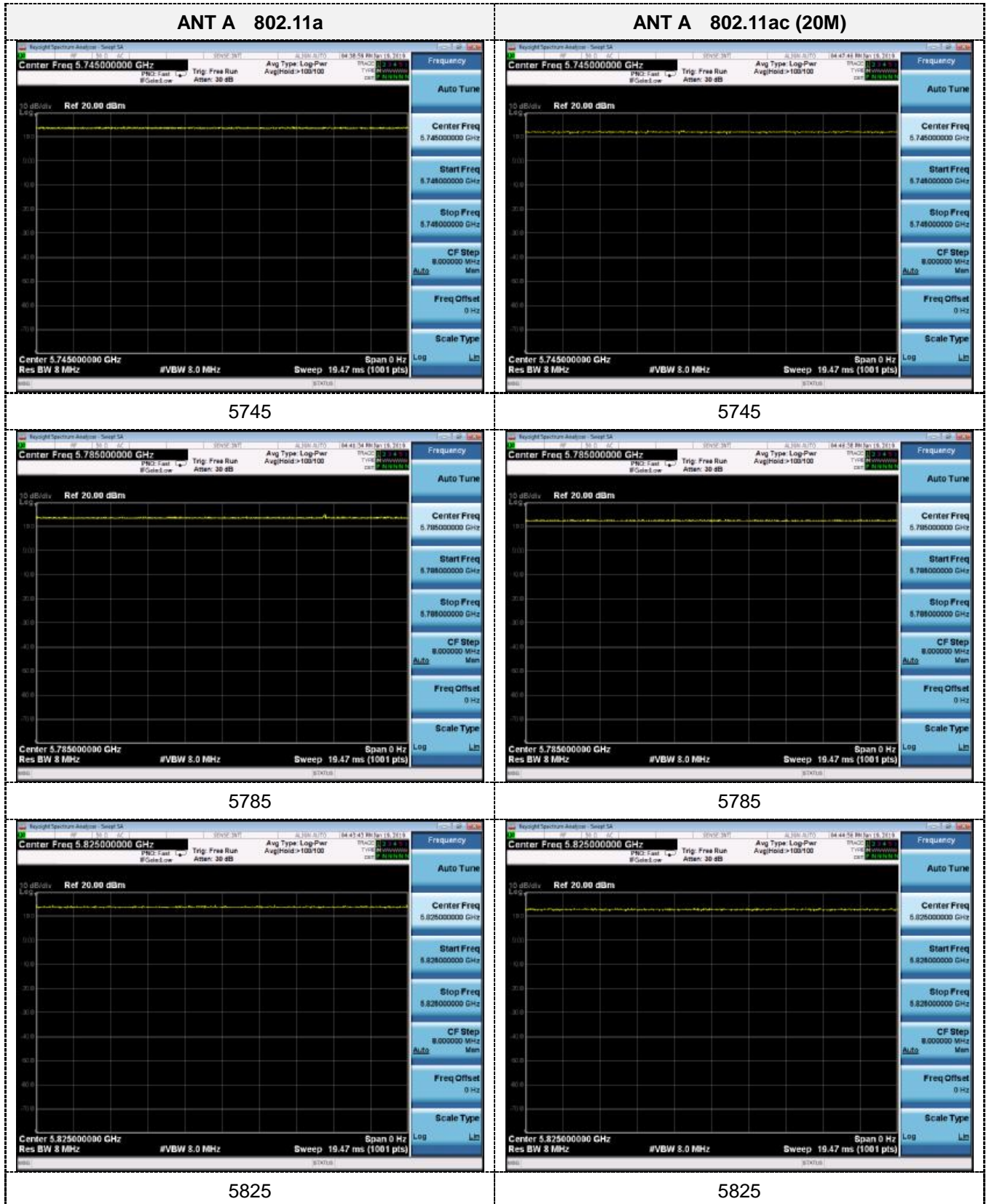
5190



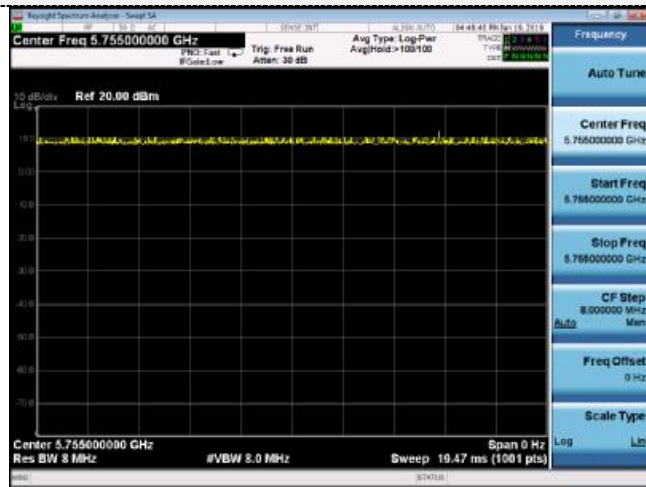
5230





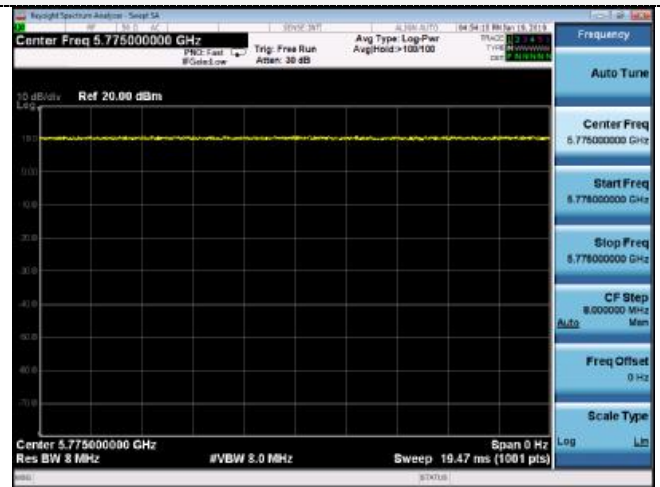


ANT A 802.11ac (40M)

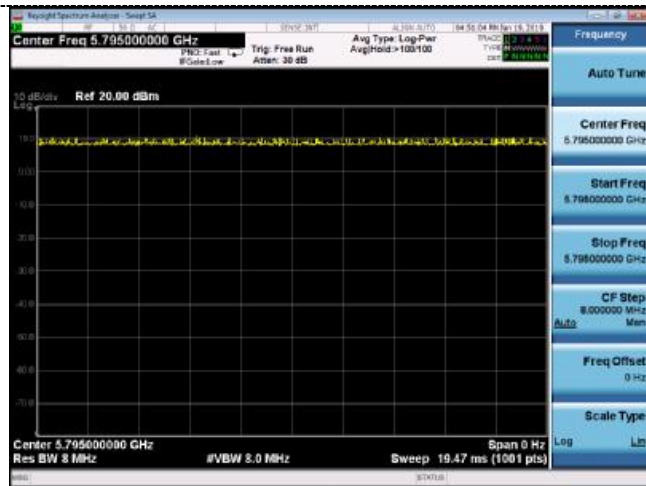


5755

ANT A 802.11ac (80M)

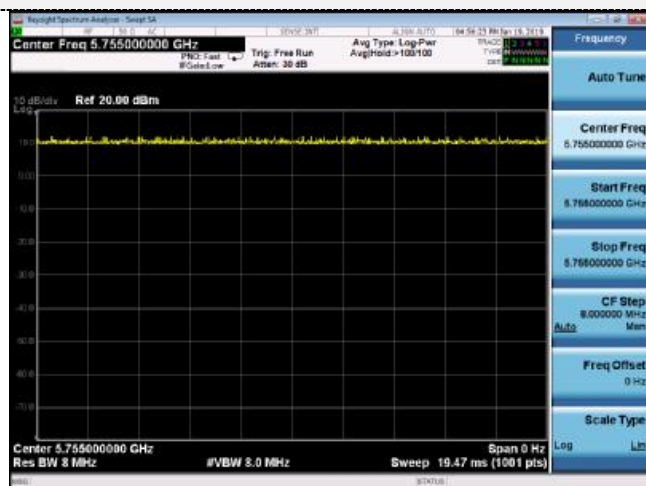


5775

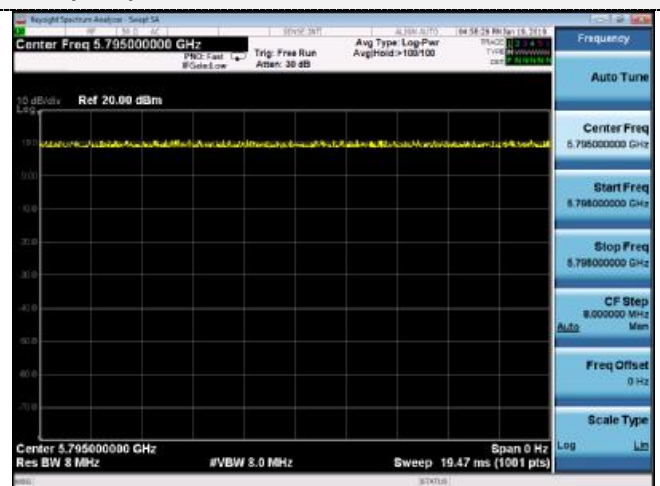


5795

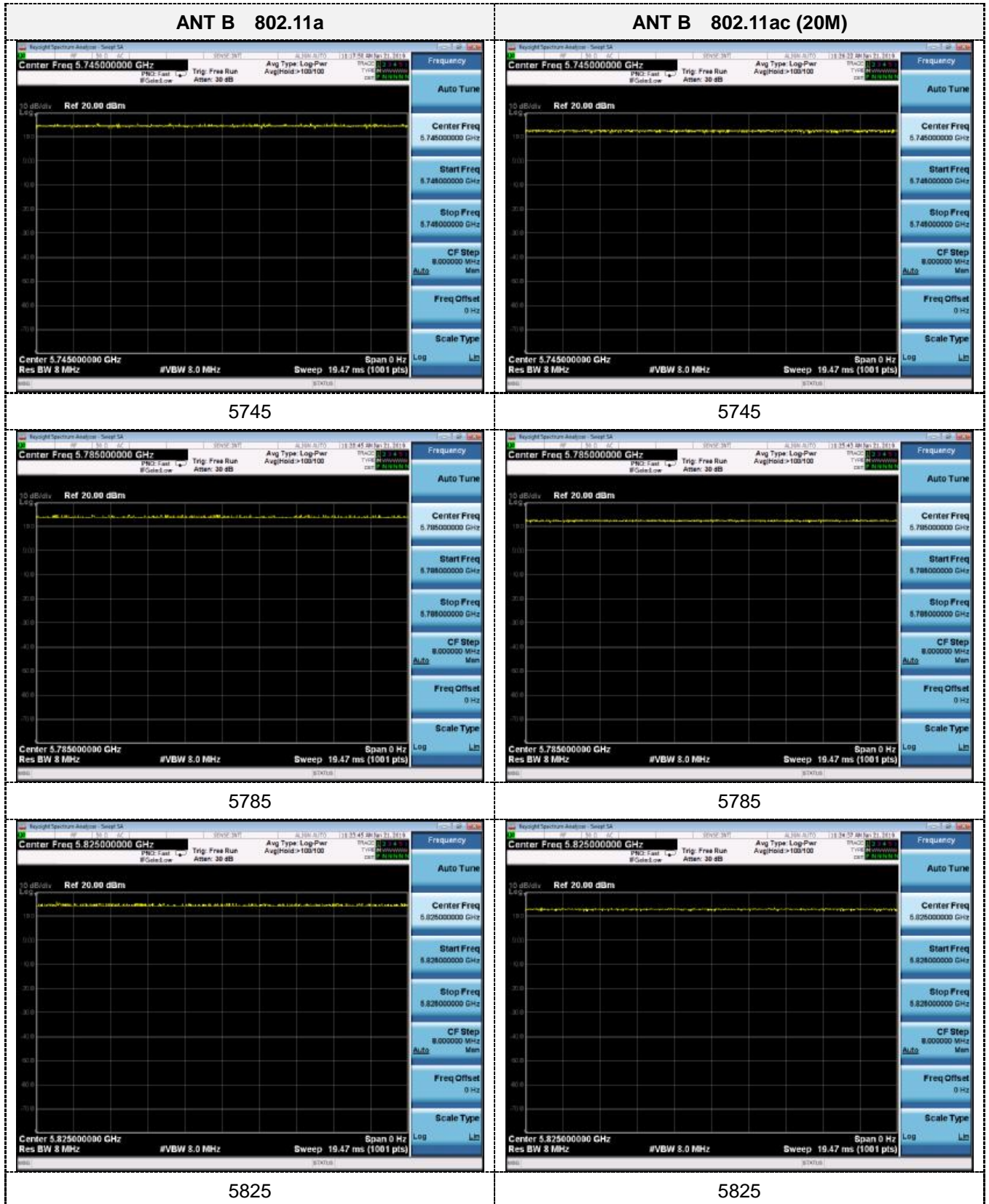
ANT A 802.11n (40M)



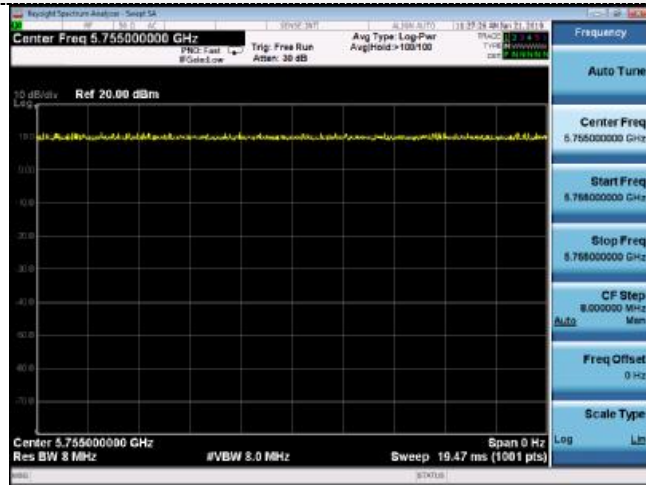
5755



5795

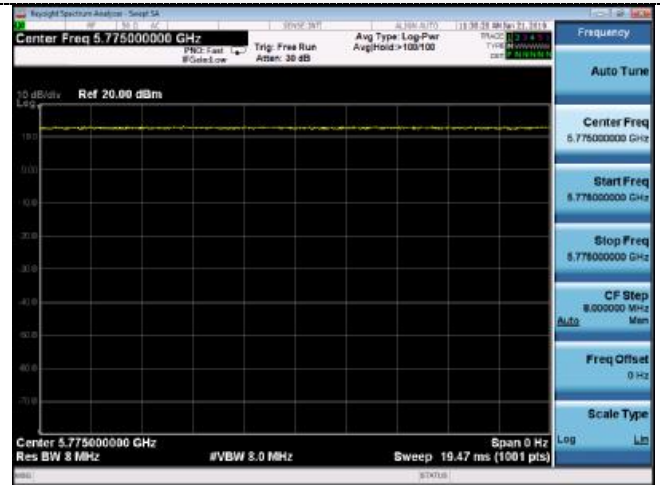


ANT B 802.11ac (40M)

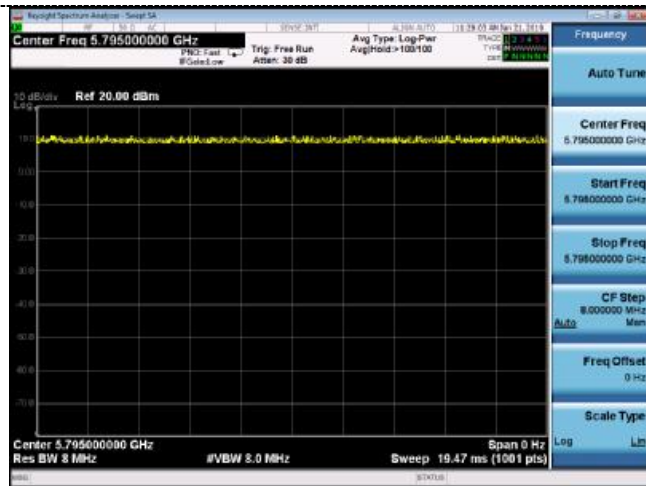


5755

ANT B 802.11ac (80M)



5775



5795

ANT B 802.11n (40M)



5755



5795

11. FREQUENCY STABILITY

11.1. Limits

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 user's manual.

11.2. Test setup

1. The EUT was placed inside temperature chamber and powered and powered by nominal DC voltage.
2. Set EUT as normal operation.
3. Turn the EUT on and couple its output to spectrum.
4. Turn the EUT off and set the chamber to the highest temperature specified.
5. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT and measure the operating frequency.
6. Repeat step with the temperature chamber set to the lowest temperature.

11.3. Test Result

PASS

12. TRANSMISSION IN THE ABSENCE OF DATA

12.1. Limits

According to §15.407(c)

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

12.2. Test result

No non-compliance noted:

Refer to the theory of operation.

13. ANTENNA REQUIREMENT

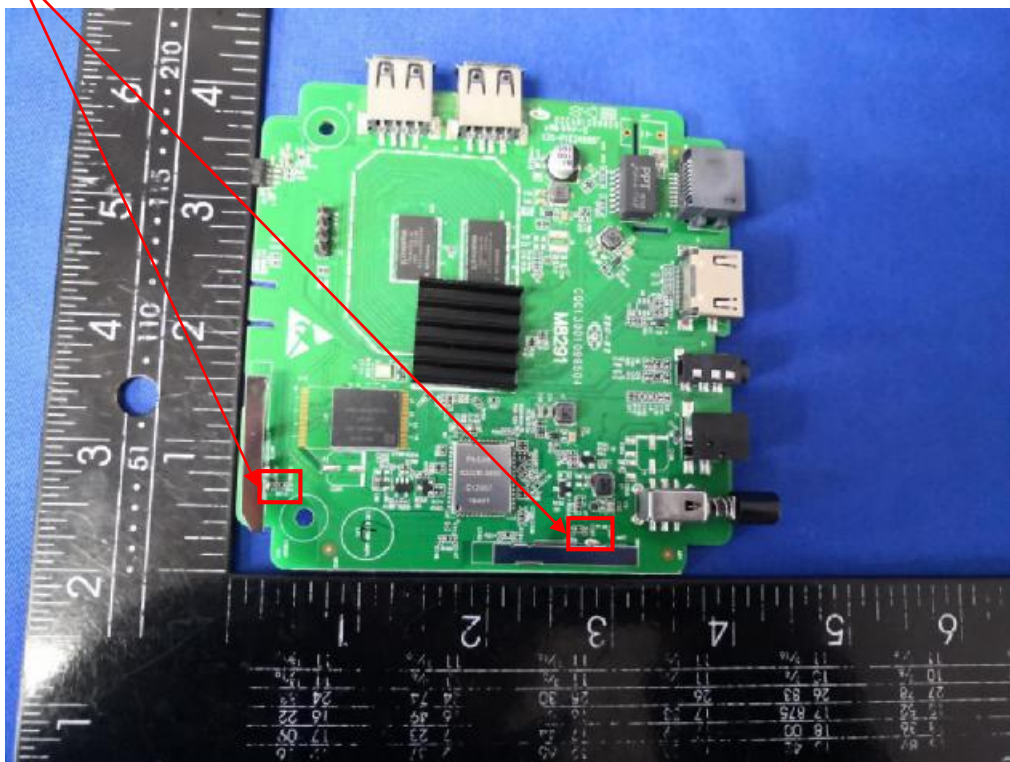
13.1. STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: 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 Connected Construction

The antenna used in this product is an External Antenna, The directional gains of antenna used for transmitting is 2dBi

WIFI ANTENNA:

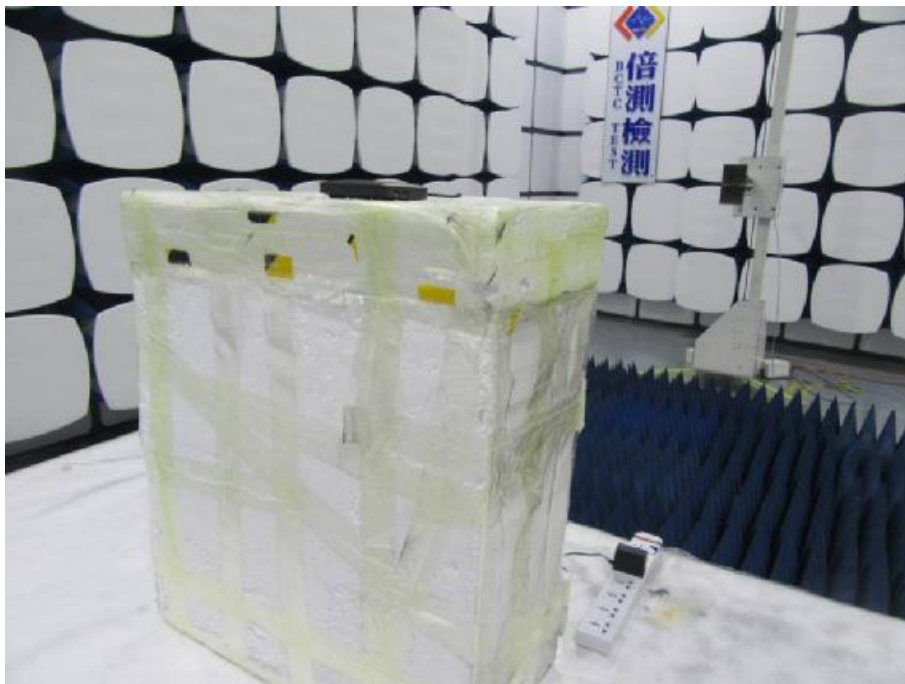
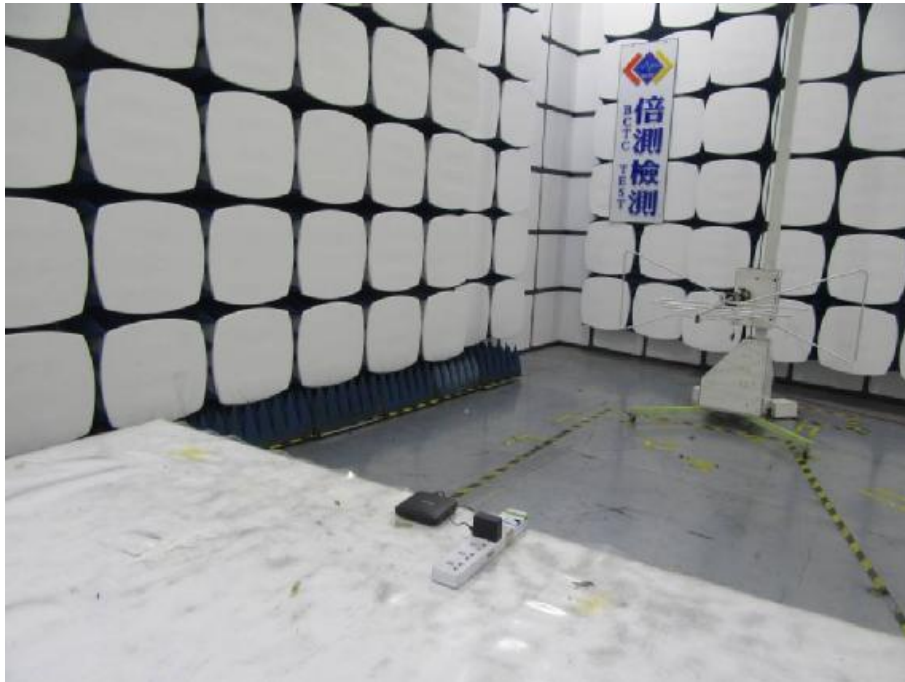


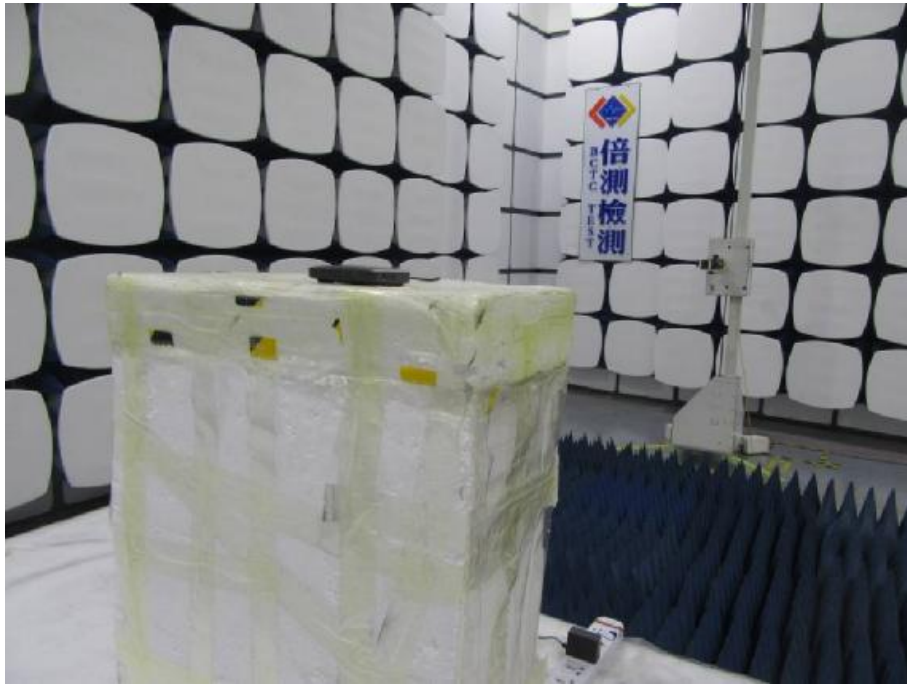
14. PHOTOGRAPHS OF TEST SET-UP

Conducted Emission



Radiated Emission Test





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