



FCC TEST REPORT

**Test report
On Behalf of
ComNav Technology Ltd.
For
R550 Data Collector**

Model No.: R550

FCC ID: 2ACHB-R550

Prepared for : ComNav Technology Ltd.
Building 2, No.618, Chengliu Middle Rd. Jiading district. Shanghai, China

Prepared By : Shenzhen HUAKE Testing Technology Co., Ltd.
1F, B2 Building, JunfengZhongchengZhizao Innovation Park, Fuhai Street,
Bao'an District, Shenzhen City, China

Date of Test: Jun. 05, 2020 -- Jul. 20, 2020

Date of Report: Jul. 20, 2020

Report Number: HK2007011614-7E

**TEST RESULT CERTIFICATION**

Applicant's name.....: ComNav Technology Ltd.
Address.....: Building 2, No.618, Chengliu Middle Rd. Jiading district. Shanghai, China
Manufacturer's Name.....: ComNav Technology Ltd.
Address.....: Building 2, No.618, Chengliu Middle Rd. Jiading district. Shanghai, China

Product description

Trade Mark.....: 
By ComNav Technology Ltd.

Product name.....: R550 Data Collector

Model and/or type reference: R550

Standards.....: FCC 47 CFR Part 15 Subpart E

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Date of Test.....:

Date (s) of performance of tests.....: Jun. 05, 2020 -- Jul. 13, 2020

Date of Issue: Jul. 13, 2020

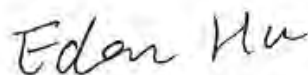
Test Result.....: **Pass**

Testing Engineer :



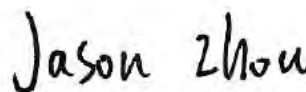
(Gary Qian)

Technical Manager :



(Eden Hu)

Authorized Signatory :



(Jason Zhou)



Table of Contents

Page

1.GENERAL INFORMATION	4
1.1 TEST RESULTS	4
1.2 TEST FACILITY.....	4
1.3 MEASUREMENT EQUIPMENT USED.....	4
1.4 MEASUREMENT UNCERTAINTY	6
2 GENERAL DESCRIPTION	7
2.1 EUT DESCRIPTION	7
2.2 DUTY CYCLES	8
2.3 EUT CONFIGURATION.....	8
2.4 DESCRIPTION OF TEST SETUP	8
2.5 GENERAL TEST PROCEDURES	9
2.6 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS	9
2.7 DESCRIPTION OF TEST MODES	10
2.8 ANTENNA DESCRIPTION	10
3.SETUP OF EQUIPMENT UNDER TEST	11
3.1 SETUP CONFIGURATION OF EUT	11
3.2 SUPPORT EQUIPMENT	11
4 TEST REQUIREMENTS AND RESULTS	12
4.1 26 DB EMISSION BANDWIDTH	12
4.2 -6dB BANDWIDTH.....	16
4.3 MAXIMUM CONDUCTED OUTPUT POWER	20
4.4 BAND EDGES MEASUREMENT	22
4.5 POWER SPECTRAL DENSITY	27
4.6 FREQUENCY STABILITY MEASUREMENT	34
4.7 RADIATED UNDESIRABLE EMISSION.....	37
4.8 POWERLINE CONDUCTED EMISSIONS	51
7 PHOTOS OF TEST SETUP	54
8 PHOTOS OF THE EUT	56



1. GENERAL INFORMATION

1.1 TEST RESULTS

Requirement	CFR 47 Section	Result
Antenna requirement	§15.203	PASS
AC Power Line Conducted Emission	§15.207	PASS
Maximum Conducted Output Power	§15.407(a)	PASS
26dB Emission Bandwidth & 99% Occupied Bandwidth	§15.407(a)	PASS
6 dB bandwidth	15.407 (e)	PASS
Power Spectral Density	§15.407(a)	PASS
Band edge	§15.407(b)	PASS
Radiated Emission	§15.407(a)	PASS
Frequency Stability	§15.407(g)	PASS

Note: 1. PASS: Test item meets the requirement.

2. Fail: Test item does not meet the requirement.

3. N/A: Test case does not apply to the test object.

4. The test result judgment is decided by the limit of test standard.

1.2 TEST FACILITY

Test Firm : Shenzhen HUAKE Testing Technology Co., Ltd.

Address 1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China

1.3 MEASUREMENT EQUIPMENT USED

The measuring equipment, which was utilized in performing the tests documented here in, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

Conducted Emissions Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-048	2019-12-26	2020-12-25
Spectrum analyzer	R&S	FSP40	HKE-025	2019-12-26	2020-12-25
Power meter	Agilent	E4419B	HKE-085	2019-12-26	2020-12-25
Power Sensor	Agilent	E9300A	HKE-086	2019-12-26	2020-12-25
Power SPLITTER	Mini-Circuits	ZN2PD-9G	HKE-125	N.C.R	N.C.R
programmable power	Agilent	E3634A	HKE-091	N.C.R	N.C.R
Temperature and humidity	Boyang	HTC-1	HKE-079	2019-12-26	2020-12-25



977 Chamber					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Spectrum analyzer	Agilent	N9020A	HKE-048	2019-12-26	2020-12-25
Spectrum analyzer	R&S	FSP40	HKE-025	2019-12-26	2020-12-25
Spectrum analyzer	Agilent	N9020A	HKE-089	2019-12-26	2020-12-25
Receiver	R&S	ESCI 7	HKE-010	2019-12-26	2020-12-25
Preamplifier	EMCI	EMC051845SE	HKE-015	2019-12-26	2020-12-25
Preamplifier	Agilent	83051A	HKE-016	2019-12-26	2020-12-25
Broadband antenna	Schwarzbeck	VULB 9163	HKE-012	2019-12-26	2020-12-25
Horn antenna	Schwarzbeck	9120D	HKE-013	2019-12-26	2020-12-25
Loop antenna	Schwarzbeck	FMZB 1519 B	HKE-014	2019-12-26	2020-12-25
High gain antenna	Schwarzbeck	LB-180400KF	HKE-054	2019-12-26	2020-12-25
Position controller	Taiwan MF	MF7802	HKE-011	N.C.R	N.C.R
Antenna tower	Taiwan MF	CTERG23	HKE-120	N.C.R	N.C.R
Controller	Taiwan MF	CT100	HKE-121	N.C.R	N.C.R
Test Software			EZ-EMC		

Conducted Emission					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Receiver	R&S	ESCI 7	HKE-010	2019-12-26	2020-12-25
LISN	R&S	ENV216	HKE-002	2019-12-26	2020-12-25
LISN	ENV216	R&S	HKE-059	2019-12-26	2020-12-25
ISN	Schwarzbeck	ISN CAT5 8158	HKE-062	2019-12-26	2020-12-25
Test Software	EZ-EMC				

Remark: Each piece of equipment is scheduled for calibration once a year.



1.4 Measurement Uncertainty

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated in accordance with TR 100 028-1 [2] and shall correspond to an expansion factor(coverage factor) $k = 1,96$ or $k = 2$ (which provide confidence levels of respectively 95% and 95,45% in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian)).

Table 6 is based on such expansion factors.

Table6:Maximummeasurementuncertainty

Parameter	UNCERTAINTY
Radio frequency	$\pm 0.8 \times 10^{-7}$
RF power, conducted	0.2054
Maximum frequency deviation:	1.3%
-within 300Hz and 6 kHz of audio frequency	
-within 6 kHz and 25 kHz of audio frequency	0.65 dB
Adjacent channel power	0.2054
Conducted spurious emission of transmitter, valid up to 6 GHz	0.2892
Conducted emission of receivers	+1.2/-1.1 dB
Radiated emission of transmitter, valid up to 6 GHz	± 3.94 dB
Radiated emission of receiver, valid up to 6 GHz	± 3.94 dB
RF level uncertainty for a given BER	± 0.3 dB
Temperature	0.1979
Humidity	± 1 %



2 GENERAL DESCRIPTION

2.1 EUT DESCRIPTION

Equipment	R550 Data Collector			
Model Name	R550			
Serial No.	N/A			
Trade Mark	 By ComNav Technology Ltd.			
FCC ID	2ACHB-R550			
Hardware Version:	Main board: SD55-D3_Main board_P3 8400347FA30			
Software Version:	V1.3			
Frequency Range :	Band	Mode	Operation frequency	Channels
	Band I UNII-1	IEEE802.11 n HT20	5180-5240MHz	4
		IEEE802.11 n HT40	5190-5230MHz	2
		IEEE802.11 ac HT20	5180-5240MHz	4
		IEEE802.11 ac HT40	5190-5230MHz	2
	BAND III UNII-3	IEEE802.11 n HT20	5745-5825 MHz	5
		IEEE802.11 n HT40	5755-5795 MHz	2
		IEEE802.11 ac HT20	5745-5825 MHz	5
		IEEE802.11 ac HT40	5755-5795 MHz	2
Antenna Type	FPC Antenna			
Antenna Gain	-3.1dBi			
Power Source	DC 3.8V from battery			

Note: the product can not transmit 802.11ac HT80 mode

Data Rate(s) Tested:

6.5/7.2, 13/14.4, 19.5/21.7, 26/28.9, 39/43.3, 52/57.8, 58.5/65, 65/72.2 (n – 20MHz)

13.5/15, 27/30, 40.5/45, 54/60, 81/90, 108/120, 121.5/135, 135/150 (n – 40MHz BW)

Frequency of Channels during testing

Band 1		Band 3	
CH.	Frequency (MHz)	CH.	Frequency (MHz)
36	5180	149	5745
40	5200	153	5765
44	5220	157	5785
48	5240	161	5805
		165	5825

802.11a(20MHz) /802.11n(20MHz) /802.11ac (20MHz) Frequency / Channel Operations



Band 1		Band 3	
CH.	Frequency (MHz)	CH.	Frequency (MHz)
38	5190	151	5755
46	5230	159	5795

802.11n / 802.11ac (40MHz BW) Frequency / Channel Operations

Worst Case Configuration: transmitting 5.2GHz mode

Description	5 GHz Emission
Channel	36
Operating Frequency (MHz)	5180
Data Rate (Mbps)	MCS0
Mode	UNII

2.2 Duty Cycles

5GHz NII operation is possible in 20MHz, and 40MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = peak per the guidance of Section B2)b) of ANSI C63.10-2013 and KDB 789033 D02 v02r01. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Duty Cycles(%)	
Mode/Band	
A(HT20)	98.89
N(HT20)	98.32
N(HT40)	98.24
AC(HT20)	99.28
AC(HT40)	99.31

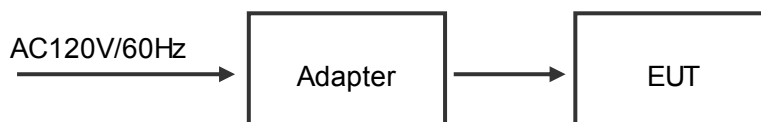
2.3 EUT CONFIGURATION

The EUT configuration for testing is installed for RF field strength measurement to meet the Commissions requirement, and is operated in a manner intended to generate the maximum emission in a continuous normal application.

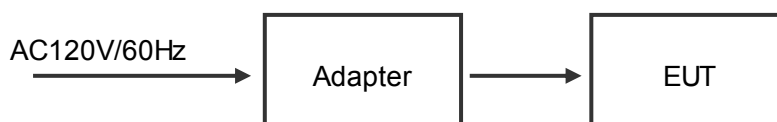
The EUT is operated in the engineering mode to fix the Tx frequency for the purposes of measurement. According to its specifications, the EUT must comply with the requirements of Section 15.407 under the FCC Rules Part 15 Subpart E.

2.4 DESCRIPTION OF TEST SETUP

Operation of EUT during conducted testing:



Operation of EUT during Radiation and Above1GHz Radiation testing:





2.5 GENERAL TEST PROCEDURES

Conducted Emissions

The EUT is placed on the turn table, which is positioned at 0.8 m above the ground plane. According to the requirements in Section 13.3 of ANSI C63.10:2013, the conducted emission from the EUT is measured in the frequency range between 0.15 MHz and 30 MHz, using the CISPR Quasi-Peak detector mode.

Radiated Emissions

Under 1 GHz:

The EUT is placed on a turn table, which is 0.8m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.10:2013.

Above 1 GHz:

The EUT is placed on a turn table, which is 1.5m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.10:2013.

2.6 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.50 - 5.15
0.495 - 0.505 ⁽¹⁾	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960.0 - 1240	7.25 - 7.75
4.125 - 4.128	25.50 - 25.67	1300 - 1427	8.025 - 8.500
4.17725 - 4.17775	37.50 - 38.25	1435.0 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73.00 - 74.60	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.80 - 75.20	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108.00 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.90 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500.0	17.7 - 21.4
8.37625 - 8.38675	156.70 - 156.90	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.1700	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.20	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358.0	36.43 - 36.5 ⁽²⁾
12.57675 - 12.57725	322.0 - 335.4	3600 - 4400	
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

2.7 DESCRIPTION OF TEST MODES

Description	Modulation Technology	Modulation Type
26dB Bandwidth and 99% bandwidth	OFDM	BPSK
6dB Bandwidth	OFDM	BPSK
Maximum conducted output power	OFDM	BPSK
Band edges measurement	OFDM	BPSK
Peak Power Spectral Density	OFDM	BPSK
Radiated undesirable emission	OFDM	BPSK
Power line conducted emission	OFDM	BPSK

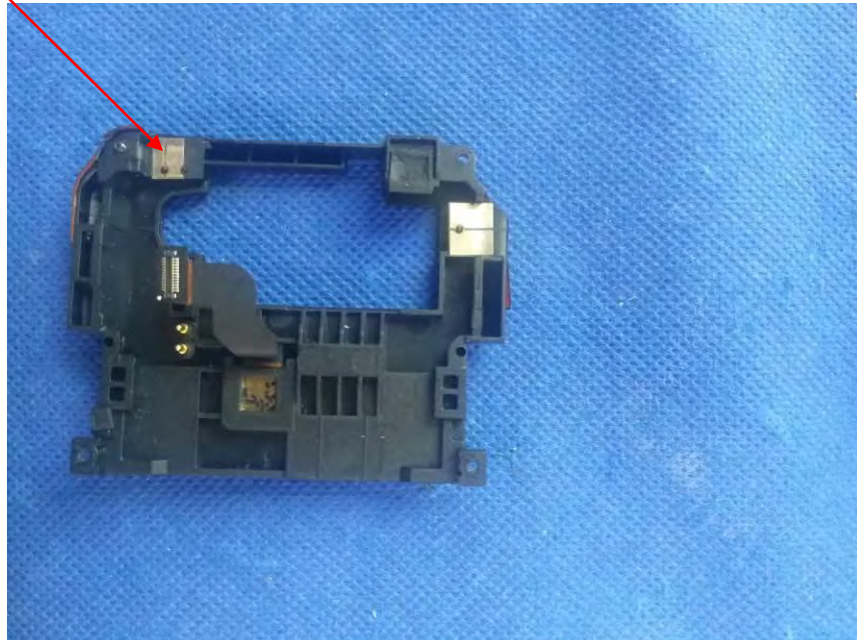
2.8 ANTENNA DESCRIPTION

an intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached or an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section”

* the antenna of this EUT is a unique (FPC Antenna for WiFi).

* the EUT complies with the requirement of 15.203.

WIFI ANTENNA





3.SETUP OF EQUIPMENT UNDER TEST

3.1 SETUP CONFIGURATION OF EUT

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

3.2 SUPPORT EQUIPMENT

Description	Information	Manufacturer	Remark	Certificate
Adapter	MODEL:KA1801A-0902000DE INPUT:100-240V ~50/60Hz 0.55A max OUTPUT:9V 2000mA	Shenzhen Keyu Power Supply Technology Co.,Ltd	Provide by applicant	SDOC
/	/	/	/	/

Remark:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



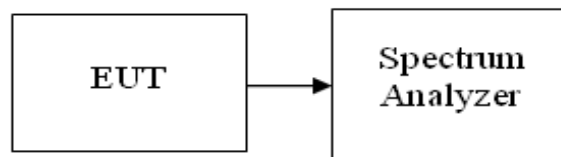
4 TEST REQUIREMENTS AND RESULTS

4.1 26 DB EMISSION BANDWIDTH

LIMIT

According to §15.403(i), for purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Compliance with the emissions limits is based on the use of measurement instrumentation employing a peak detector function with an instrument resolutions bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

TEST CONFIGURATION



TEST PROCEDURE

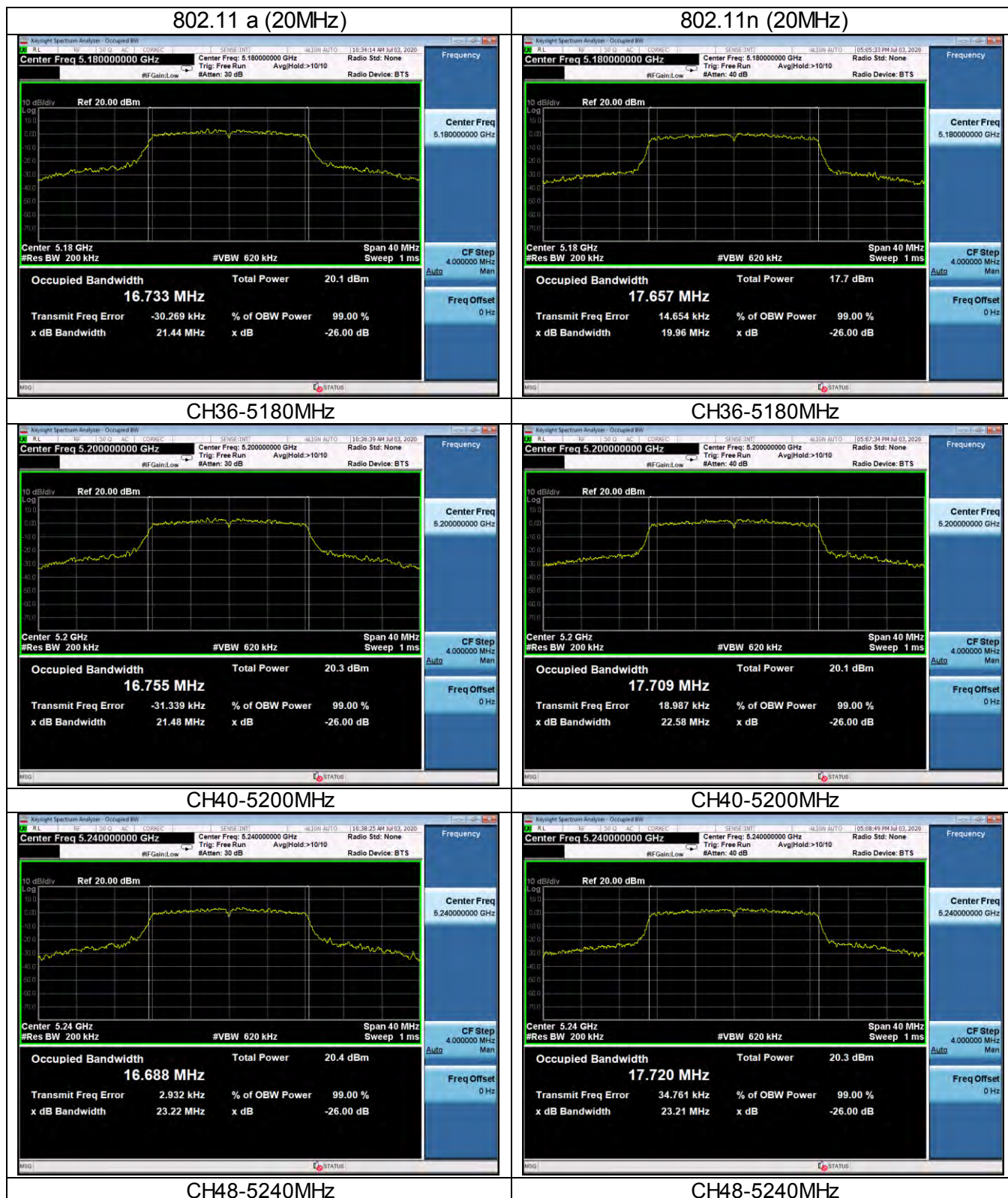
1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low-loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzers RBW = approximately 1% of the emission bandwidth, VBW > RBW, Detector = Peak, Span > 26 dB bandwidth, and Sweep = auto, Trace mode = max hold.
4. 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%.
5. Repeat until all the rest channels were investigated.

TEST RESULTS

BAND	802.11 Mode	Channel No.	Frequency [MHz]	26dB Bandwidth [MHz]
BAND 1	a (20MHz)	36	5180	21.44
		40	5200	21.48
		48	5240	23.22
	n (20MHz)	36	5180	19.96
		40	5200	22.58
		48	5240	23.21
	n (40MHz)	38	5190	39.27
		46	5230	39.11
	ac (20MHz)	36	5180	19.44
		40	5200	19.32
		48	5240	19.48
	ac(40MHz)	38	5190	39.00
		46	5230	39.21

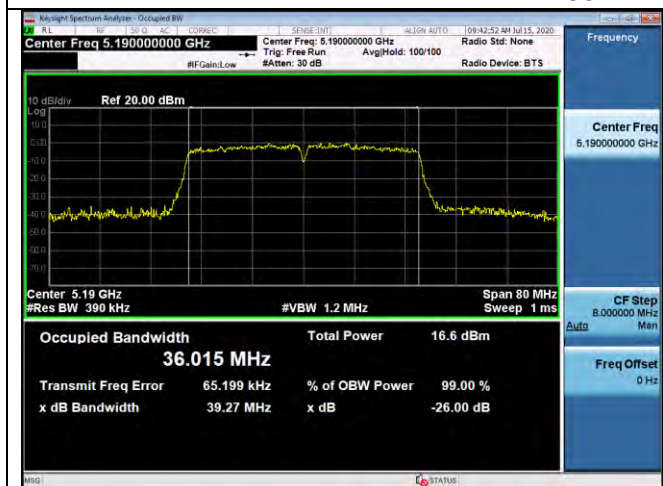


Test plots as follows:





802.11 n (40MHz)



CH38-5190 MHz



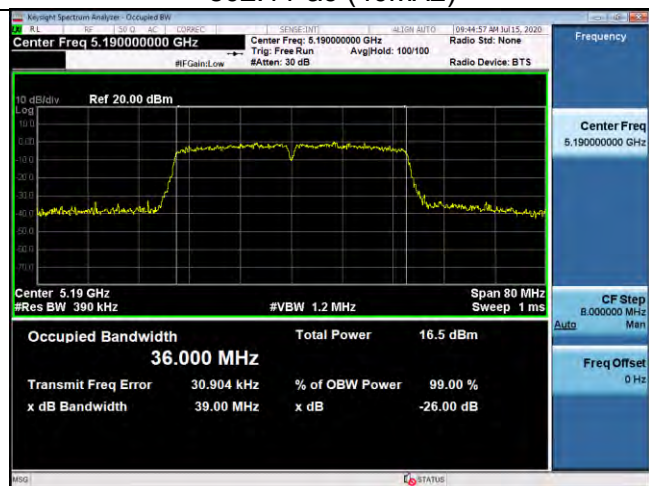
CH46-5230 MHz

802.11 ac (20MHz)

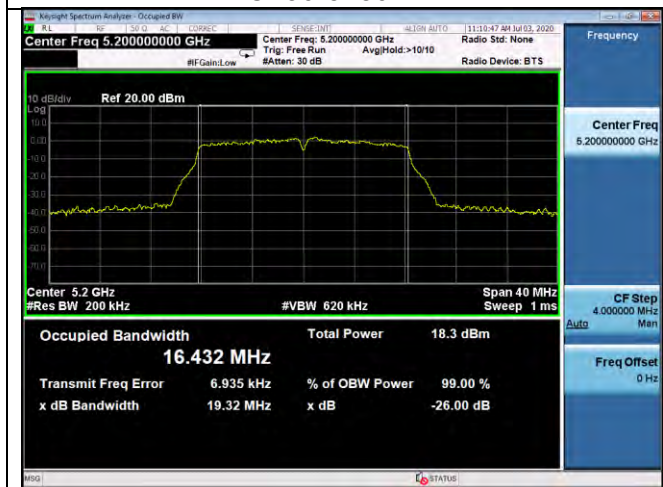


CH36-5180MHz

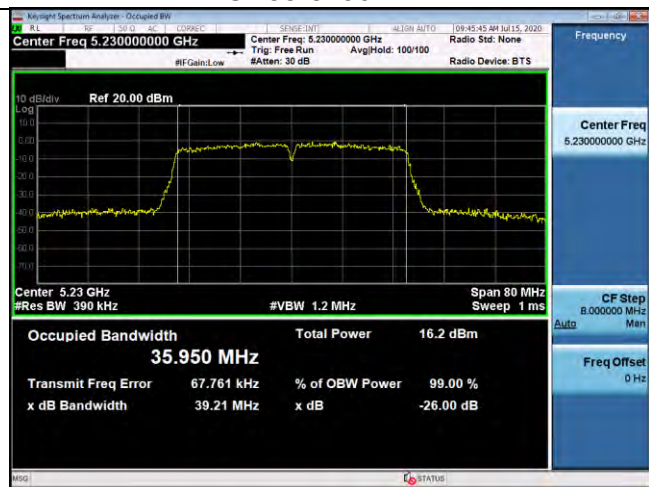
802.11 ac (40MHz)



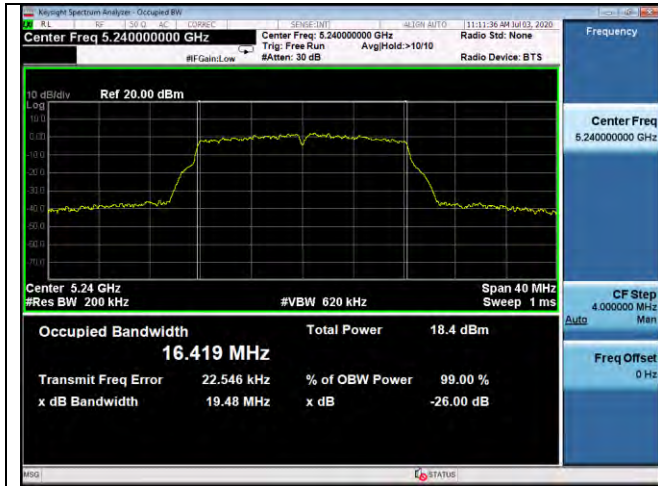
CH38-5190 MHz



CH40-5200MHz



CH46-5230 MHz



CH48-5240MHz

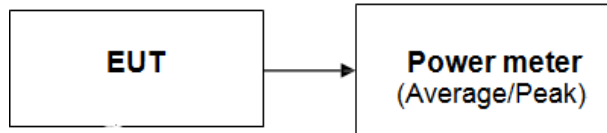


4.2 -6dB Bandwidth

LIMIT

In the 5.725 – 5.850GHz band, the 6dB bandwidth must be ≥ 500 kHz.

EST CONFIGURATION



The EUT was connected to a spectrum analyzer through a 50 Ω RF cable.

TEST PROCEDURE

1. KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C
2. Set to the maximum power setting and enable the EUT transmit continuously.
3. Make the measurement with the spectrum analyzer's resolution bandwidth RBW = 1% EBW, VBW $\geq$ 3RBW, In order to make an accurate measurement.
4. Measure and record the results in the test report.

TEST RESULTS

BAND	802.11 Mode	Channel No.	Frequency [MHz]	-6db Bandwidth [MHz]
BAND 3	a (20MHz)	149	5745	16.45
		157	5785	16.48
		165	5825	16.51
	n (20MHz)	149	5745	17.64
		157	5785	17.52
		165	5825	17.67
	n (40MHz)	151	5755	36.36
		159	5795	36.37
	ac (20MHz)	149	5745	17.58
		157	5785	17.69
		165	5825	17.68
	ac(40MHz)	151	5755	36.38
		159	5795	36.40
Limit	≥ 500 kHz			
Result	PASS			

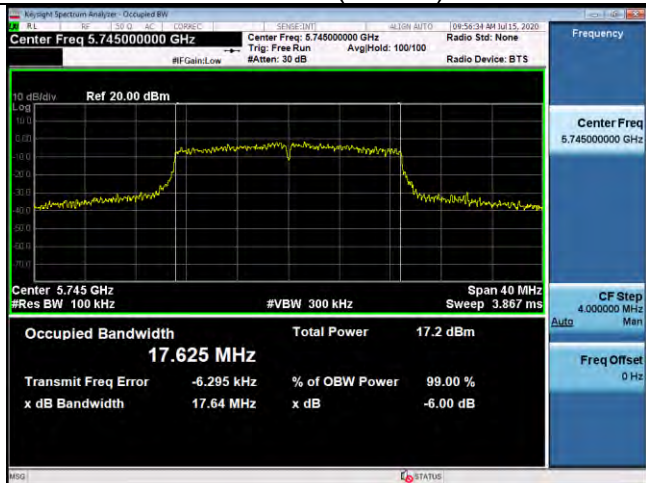


Test plots as follows:

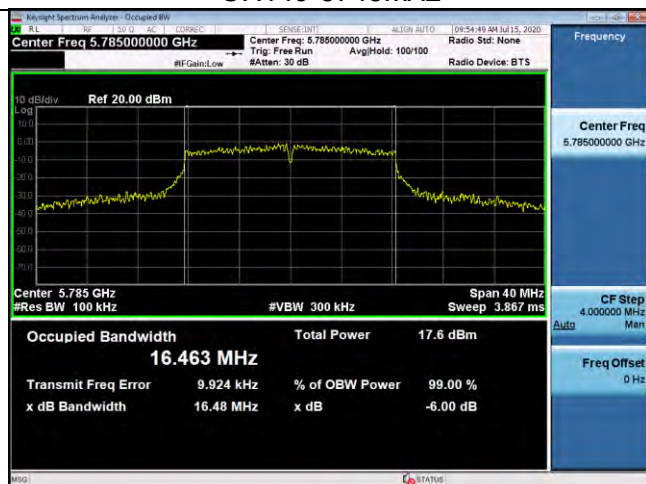
802.11 a (20MHz)



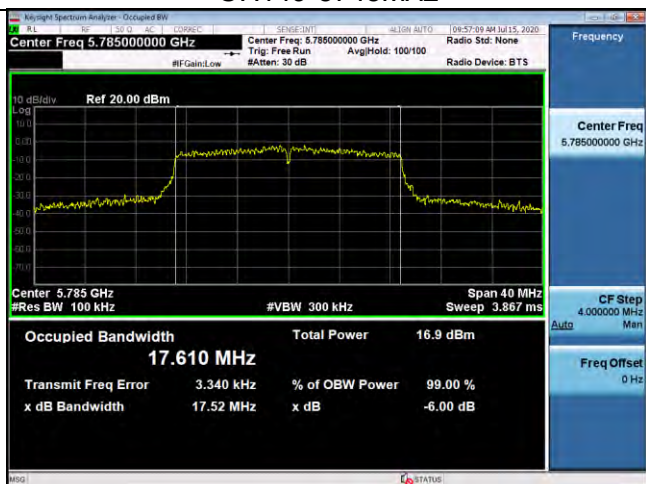
802.11 n (20MHz)



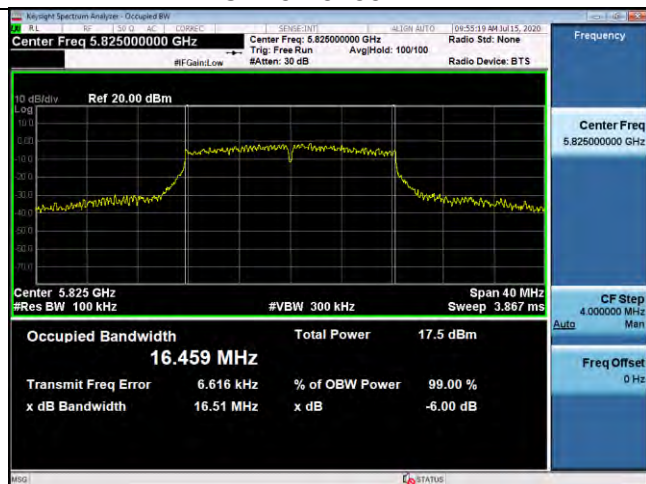
CH149-5745MHz



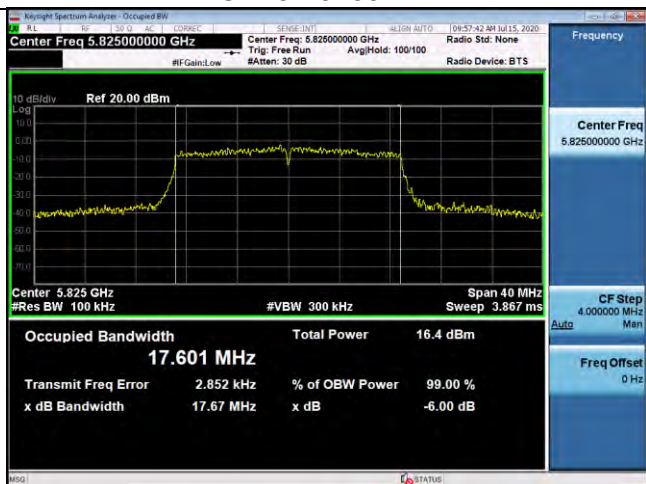
CH149-5745MHz



CH157-5785MHz



CH157-5785MHz



CH165-5825MHz

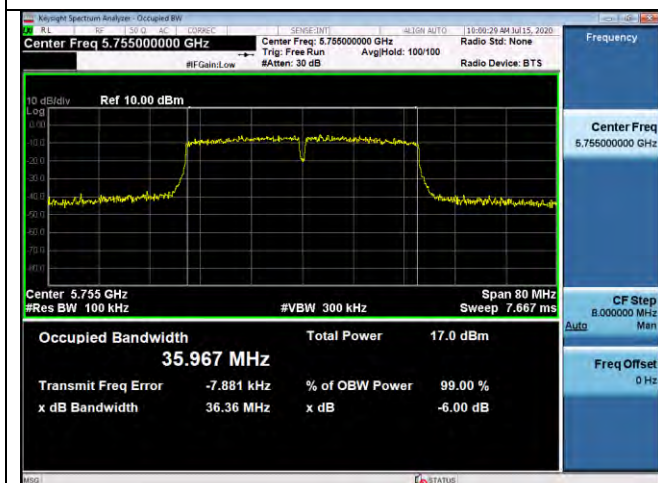


CH165-5825MHz

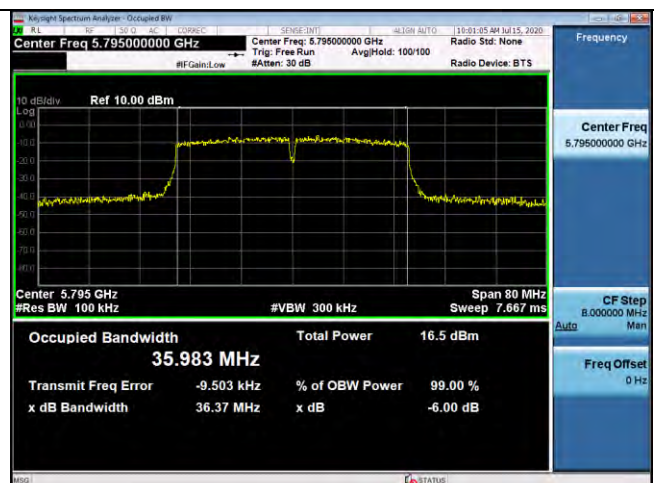




802.11 n (40MHz)



CH151-5755 MHz



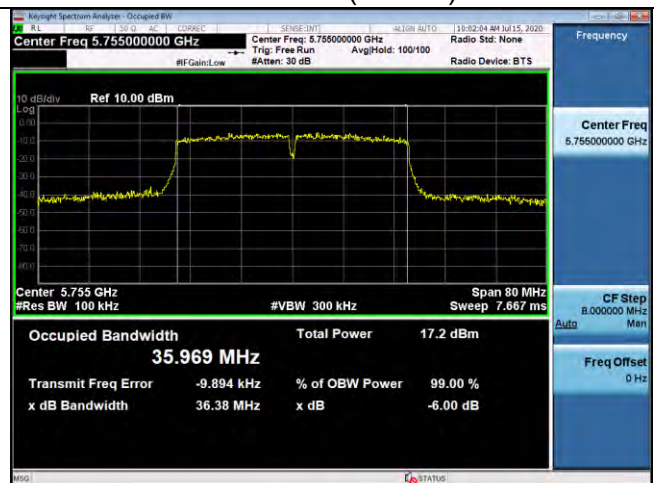
CH159-5795 MHz

802.11 ac (20MHz)

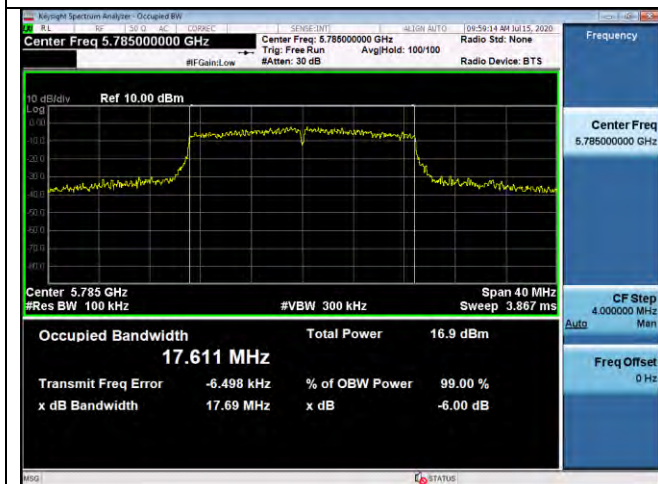


CH149-5745MHz

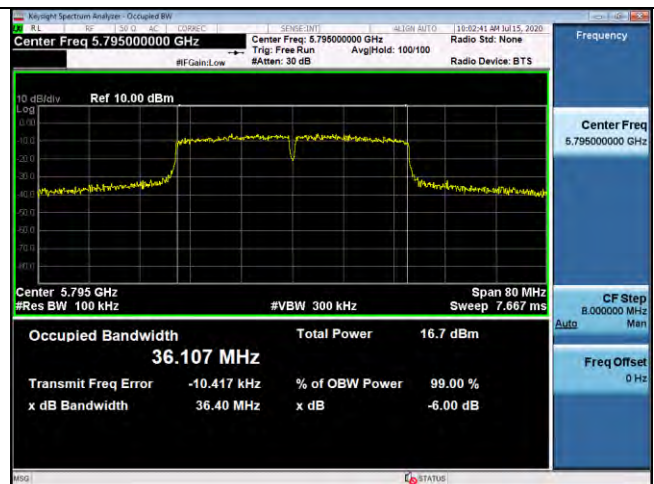
802.11 ac (40MHz)



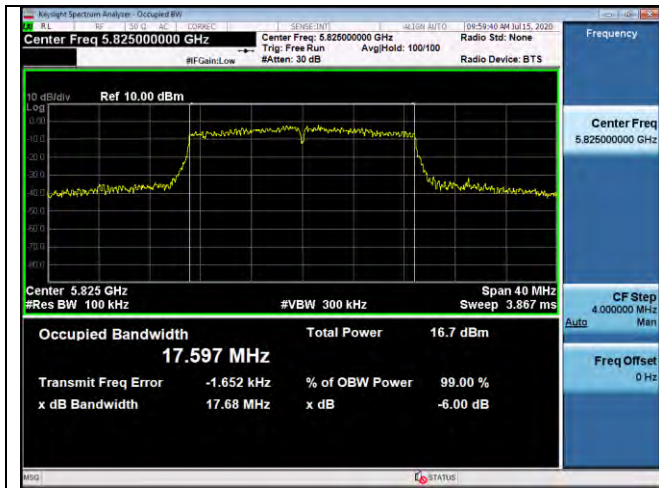
CH151-5755 MHz



CH157-5785MHz



CH159-5795 MHz



CH165-5825MHz



4.3 MAXIMUM CONDUCTED OUTPUT POWER

LIMIT

According to §15.407(a),

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi.

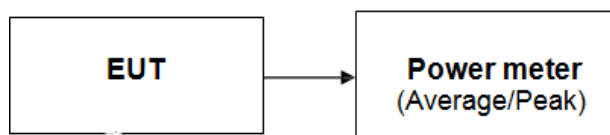
For the 5.25-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250mW or 11dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz.

If transmitting antennas of directional gain greater than 6dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W

The peak power shall not exceed the limit as follow:

TEST CONFIGURATION



The EUT was connected to a spectrum analyzer through a 50Ω RF cable.

TEST PROCEDURE

The testing follows Method PM of FCC KDB789033 D02 General UNII Test Procedures New Rules v02r01.

Method PM (Measurement using an RF peak power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.

TEST RESULTS

BAND	802.11 Mode	Channel No.	Frequency [MHz]	Conducted Power [dBm]	Limit [dBm]
BAND 1	a (20MHz)	36	5180	8.38	23.98
		40	5200	8.78	23.98
		48	5240	8.71	23.98
	n (20MHz)	36	5180	7.27	23.98
		40	5200	7.25	23.98
		48	5240	7.16	23.98
	n (40MHz)	38	5190	6.93	23.98
		46	5230	6.62	23.98



	ac (20MHz)	36	5180	5.35	23.98
		40	5200	7.41	23.98
		48	5240	7.24	23.98
	ac(40MHz)	38	5190	6.03	23.98
		46	5230	6.64	23.98

BAND	802.11 Mode	Channel No.	Frequency [MHz]	Conducted Power [dBm]	Limit [dBm]
BAND 3	a (20MHz)	149	5745	10.53	30.00
		157	5785	10.11	30.00
		165	5825	10.21	30.00
	n (20MHz)	149	5745	9.15	30.00
		157	5785	9.70	30.00
		165	5825	9.21	30.00
	n (40MHz)	151	5755	9.87	30.00
		159	5795	8.41	30.00
	ac (20MHz)	149	5745	9.25	30.00
		157	5785	8.41	30.00
		165	5825	7.24	30.00
	ac(40MHz)	151	5755	7.03	30.00
		159	5795	8.64	30.00

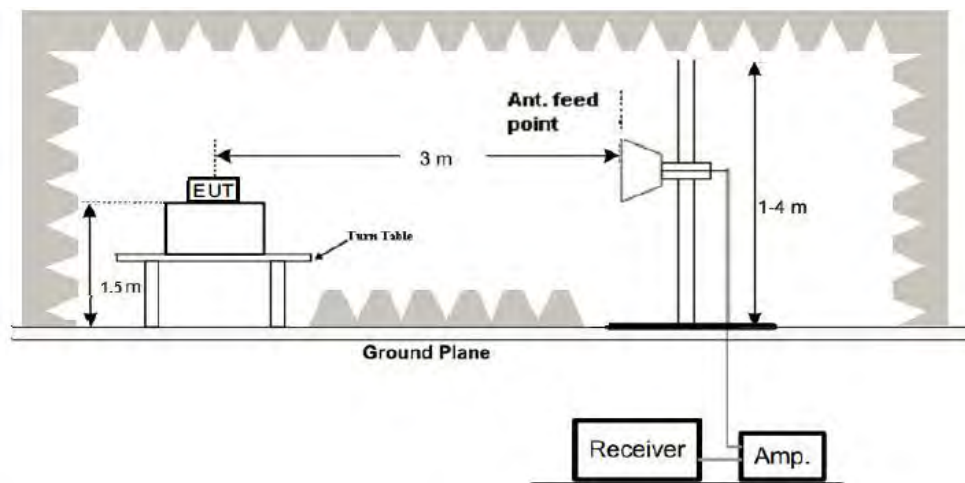
4.4 BAND EDGES MEASUREMENT

LIMIT

According to §15.407(b),

- (1) The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.
- (2) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency block edges as the design of the equipment permits.

TEST CONFIGURATION



TESTPROCEDURE

1. The EUT is placed on a turntable, which is 1.5m above the ground plane.
2. The turntable shall be rotated for 360degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to findout highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - (a) PEAK: RBW=1,VBW=3MHz / Sweep=AUTO
 - (b) AVERAGE: RBW=1MHz / Sweep=AUTO

VBW=10Hz,whenduty cycle is no less than 98 percent.

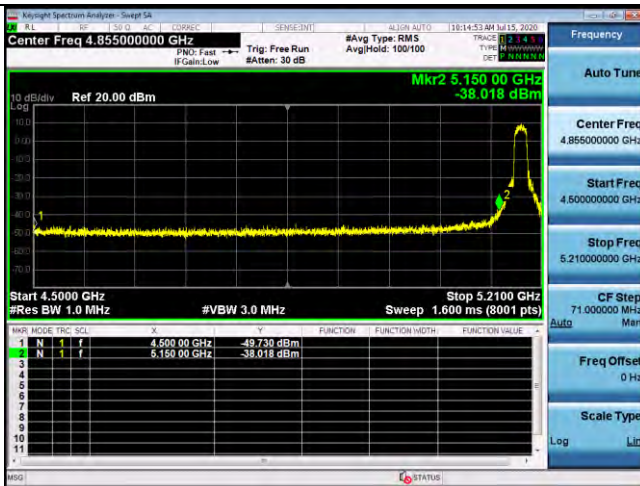
VBW $\geq 1/T$, when duty cycle is less than98 percent, where is the minimum transmissiondurationoverwhichthetransmitterisonandistransmittingatitsmaximun power control level for the tested mode of operation.

Duty Cycles(%)	
Mode/Band	
A(HT20)	98.89
N(HT20)	98.32
N(HT40)	98.24
AC(HT20)	99.28
AC(HT40)	99.31

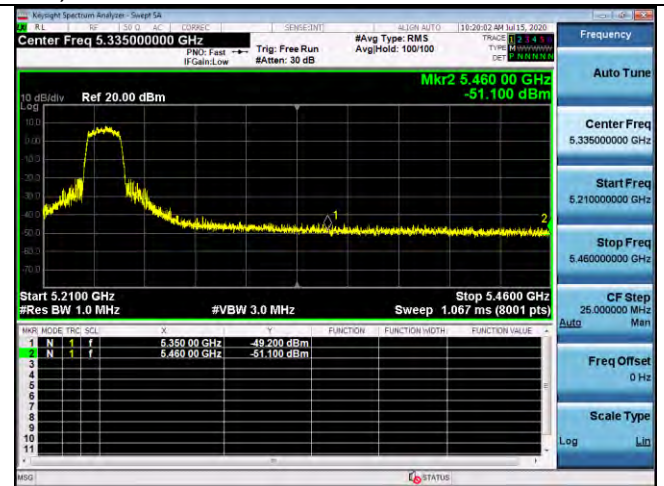
**TESTRESULTS**

Band 1

IEEE802.11a(HT20) mode

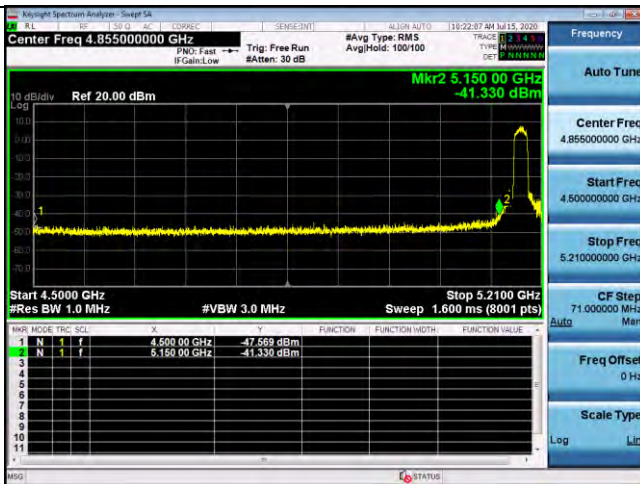


Left—5180 MHz

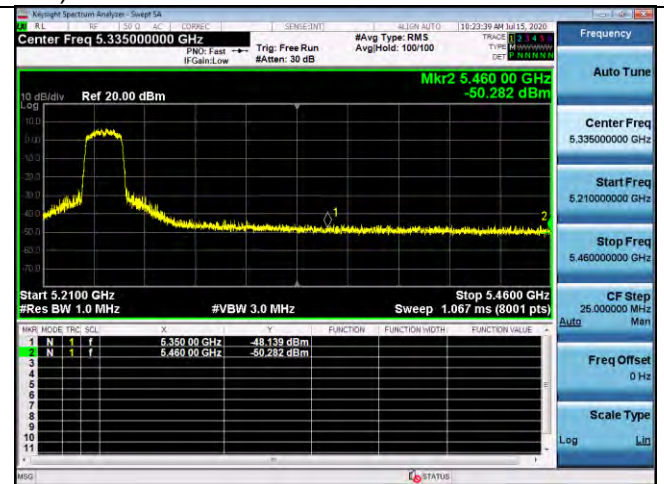


Right--5240 MHz

IEEE802.11n(HT20) mode

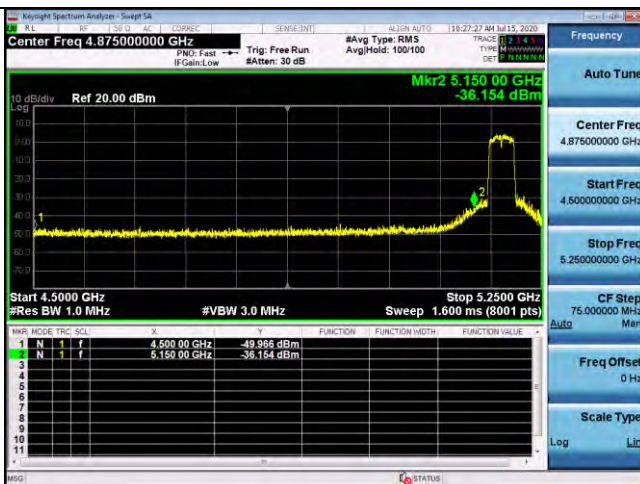


Left—5180 MHz

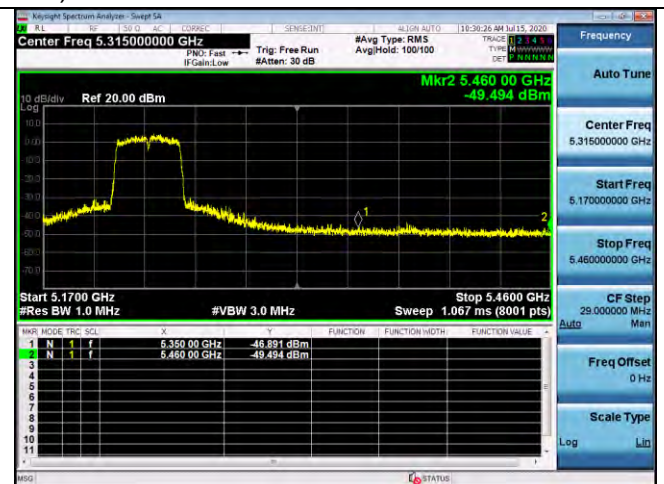


Right--5240 MHz

IEEE802.11n(HT40) mode



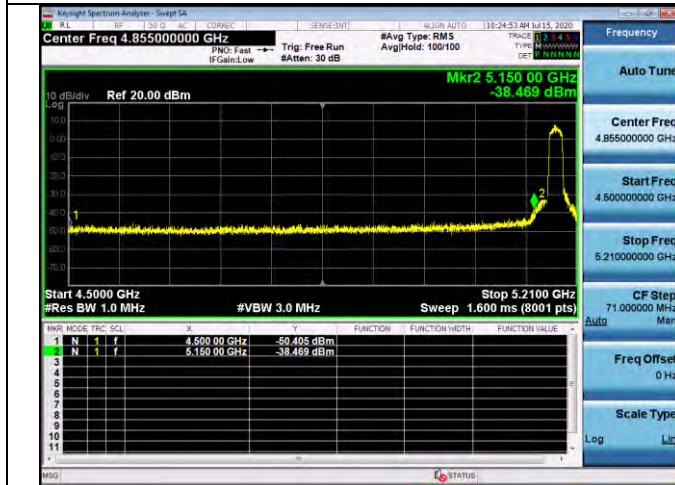
Left--5190 MHz



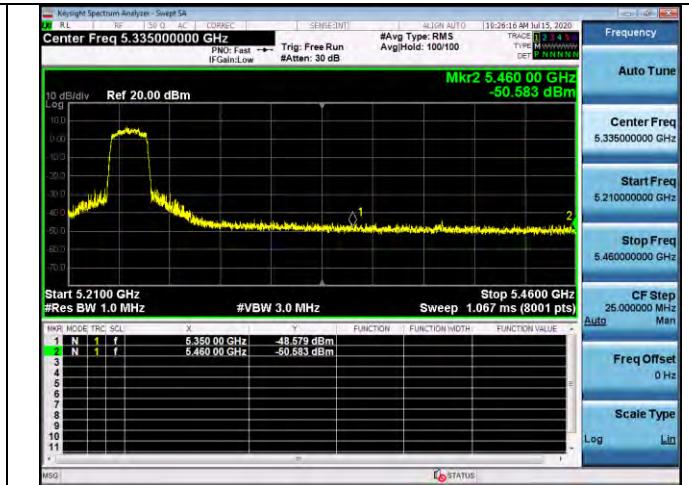
Right--5230 MHz



Band1--IEEE802.11ac(HT20) mode

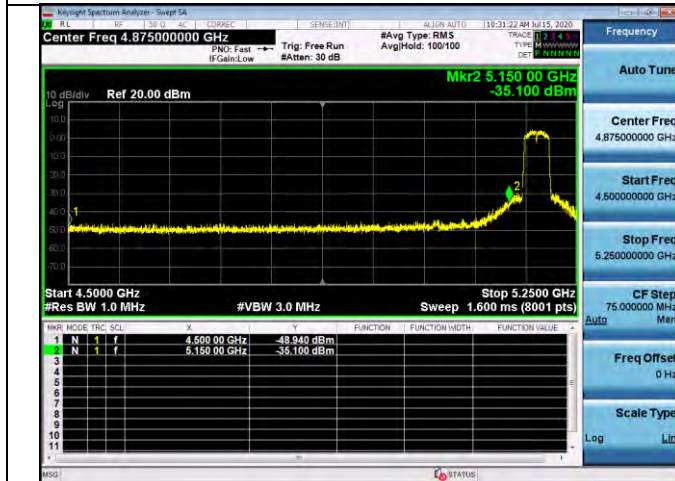


Left--5190 MHz

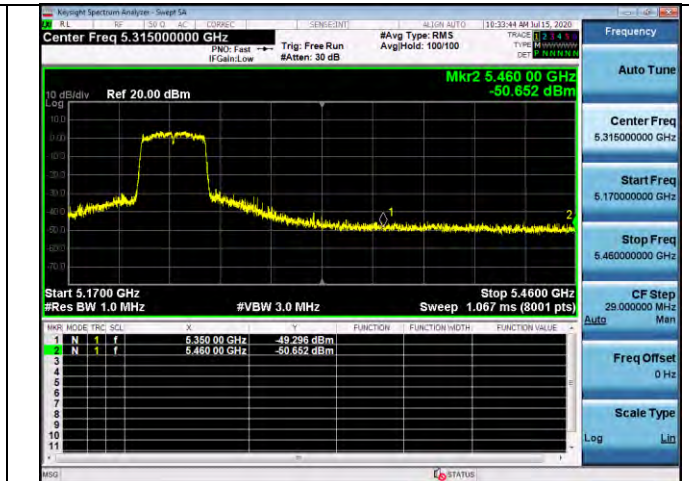


Right--5230 MHz

Band1--IEEE802.11ac(HT40) mode



Left--5190 MHz

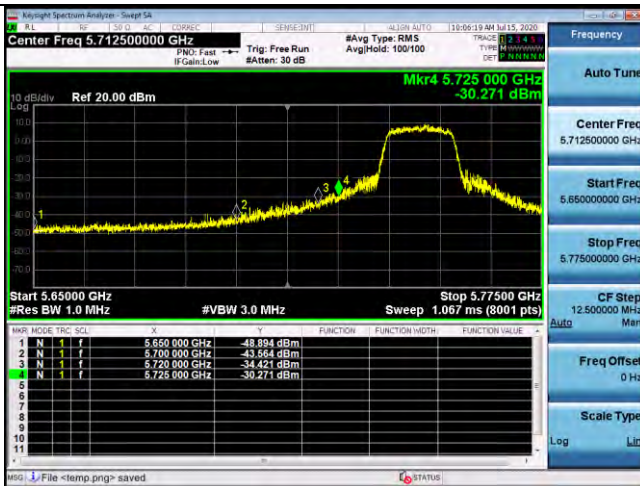


Right--5230 MHz

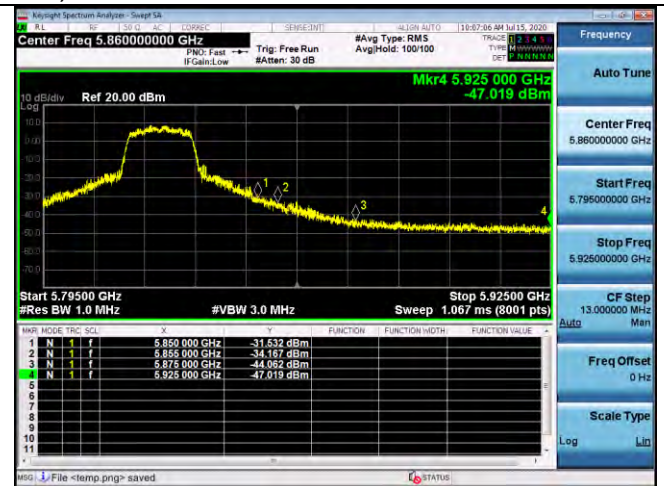


Band 3

IEEE802.11a(HT20) mode

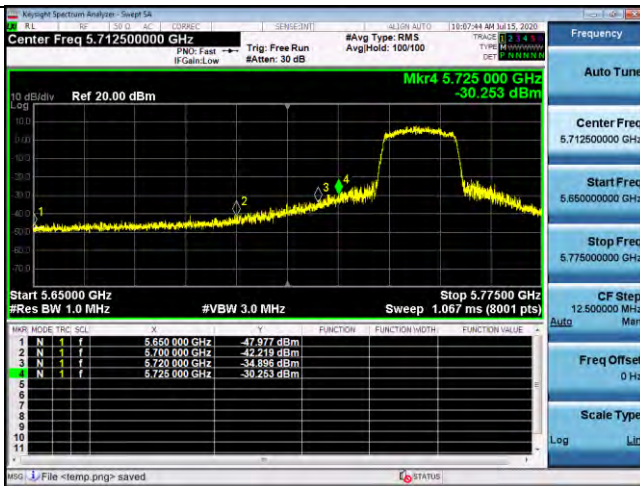


Left--5745 MHz

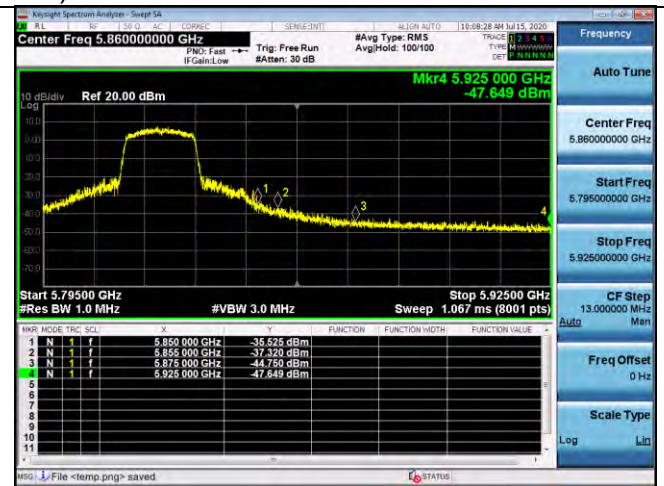


Right--5825 MHz

IEEE802.11n(HT20) mode

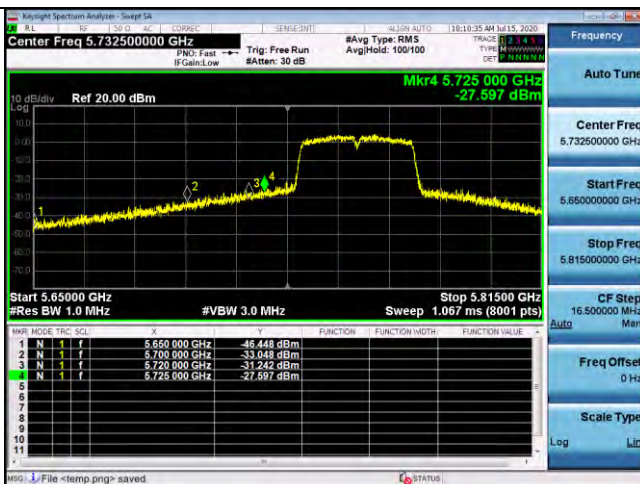


Left--5755 MHz



Right--5895 MHz

IEEE802.11n(HT40) mode



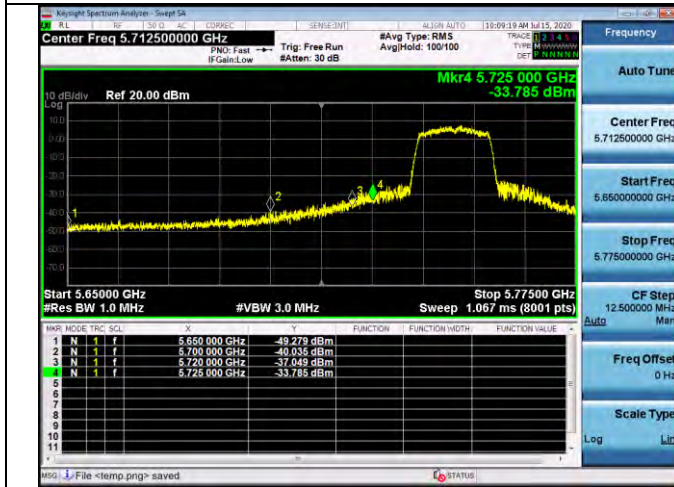
Left--5190 MHz



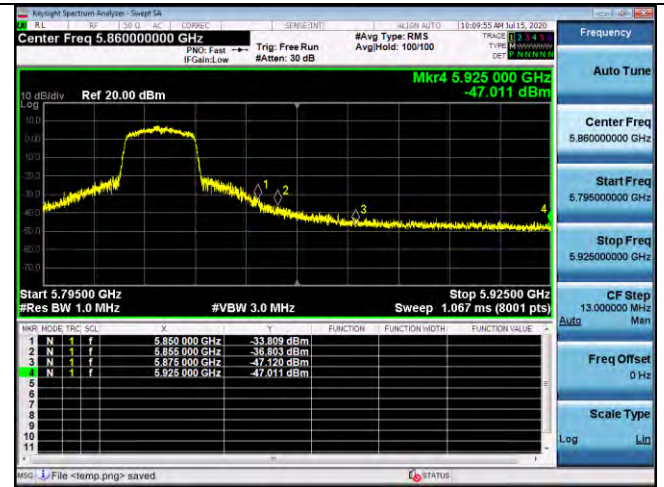
Right--5230 MHz



Band1--IEEE802.11ac(HT20) mode



Left--5745 MHz



Right--5825 MHz

Band1--IEEE802.11ac(HT40) mode



Left--5755 MHz



Right--5895 MHz



4.5 POWER SPECTRAL DENSITY

LIMIT

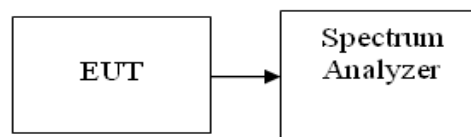
According to §15.407(a),

For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band.

For the 5.25-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band

If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST CONFIGURATION



TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 1MHz, VBW = 3MHz, Span must be greater than 26dB bandwidth, adjust as necessary, Sweep= auto, Detector RMS
3. Record the max. reading.

TEST RESULTS

BAND	802.11 Mode	Channel No.	Frequency [MHz]	Measured Power Spectral Density [dBm/MHz]	Power Spectral Density Limit [dBm/MHz]
BAND 1	a (20MHz)	36	5180	9.040	11
		40	5200	9.329	11
		48	5240	8.821	11
	n (20MHz)	36	5180	7.355	11
		40	5200	8.001	11
		48	5240	7.268	11
	n (40MHz)	38	5190	4.694	11
		46	5230	3.505	11
	ac (20MHz)	36	5180	8.078	11
		40	5200	7.814	11
		48	5240	7.327	11
	ac(40MHz)	38	5190	3.56	11
		46	5230	3.636	11

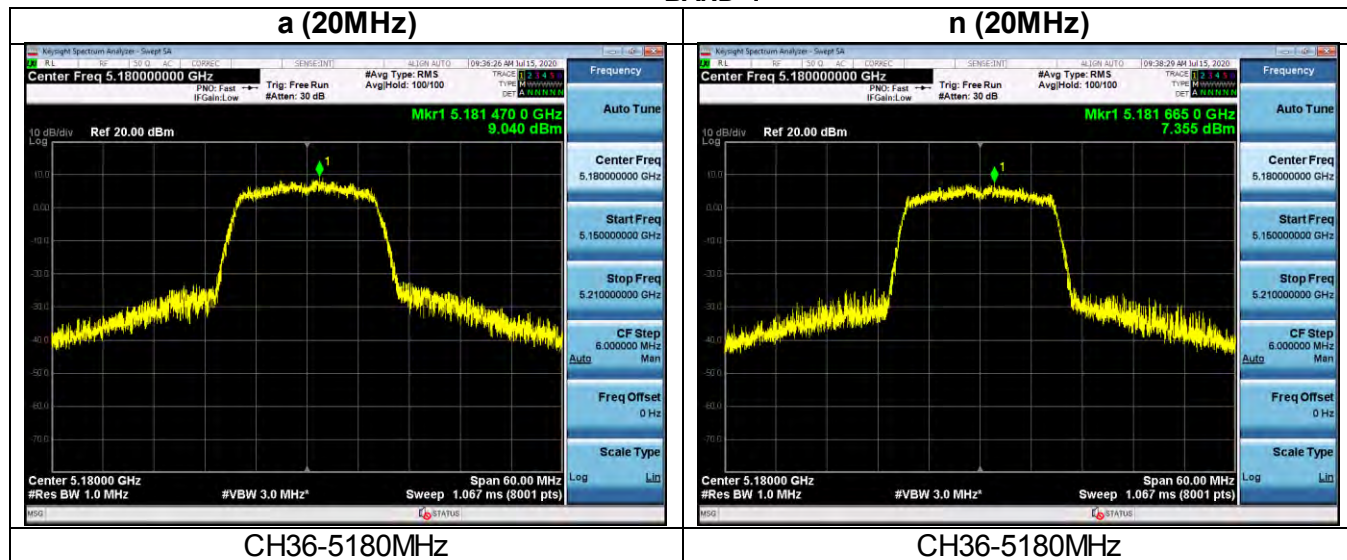


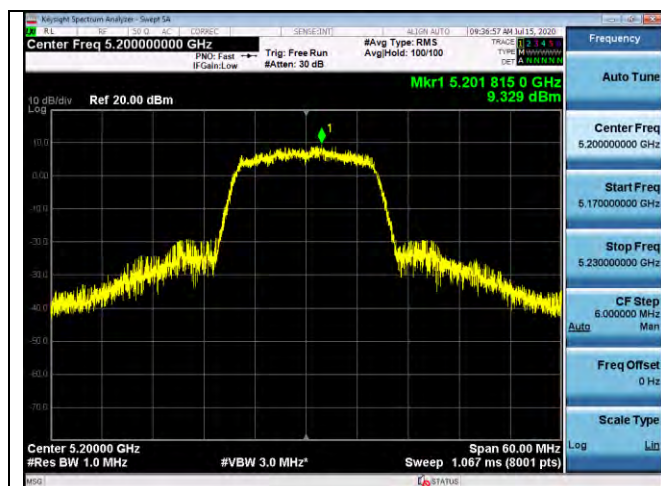
BAND	802.11 Mode	Channel No.	Frequency [MHz]	Measured PSD[dBm/510KHz]	Covert PSD [dBm/500KHz]	Limit [dBm/500KHz]
BAND 3	a (20MHz)	149	5745	6.053	5.967	30
		157	5785	5.687	5.601	30
		165	5825	4.614	4.528	30
	n (20MHz)	149	5745	5.548	5.462	30
		157	5785	5.358	5.272	30
		165	5825	4.915	4.829	30
	n (40MHz)	151	5755	3.018	2.932	30
		159	5795	2.310	2.224	30
	ac (20MHz)	149	5745	4.869	4.783	30
		157	5785	4.419	4.333	30
		165	5825	4.411	4.325	30
	ac (40MHz)	151	5755	2.695	2.609	30
		159	5795	2.788	2.702	30

Note: Covert PSD [dBm/500KHz]= PSD[dBm/510KHz]+10*log(500/510)

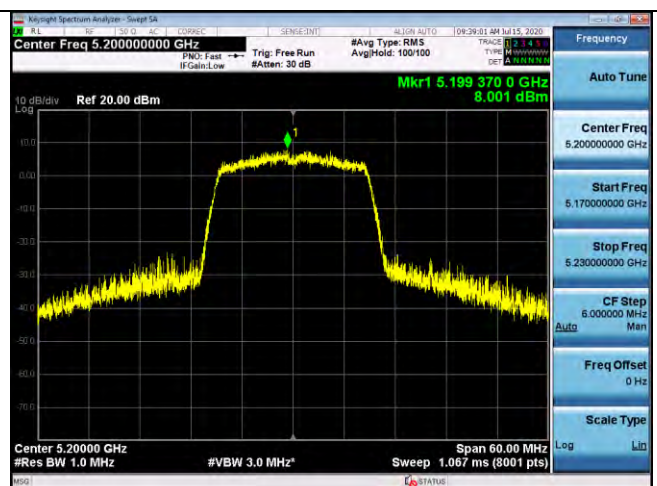
Test plots as follows:

BAND 1

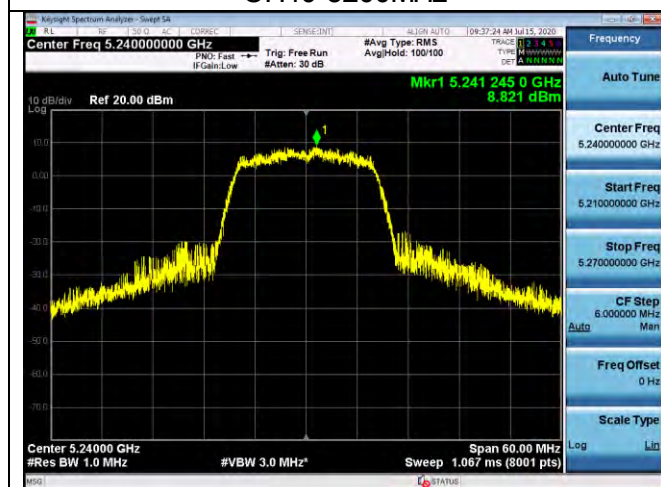




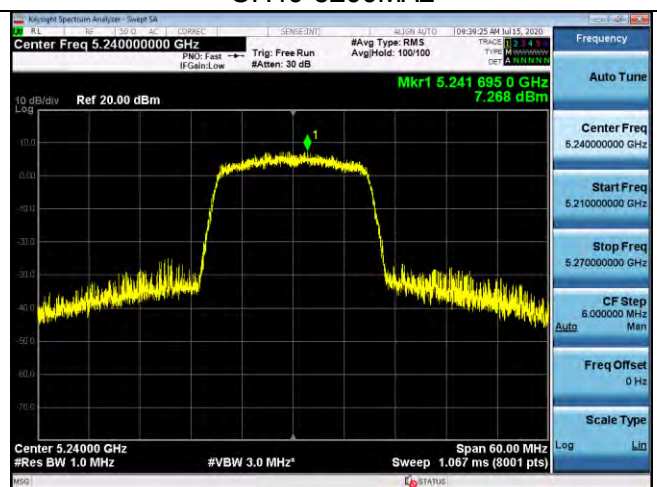
CH40-5200MHz



CH40-5200MHz

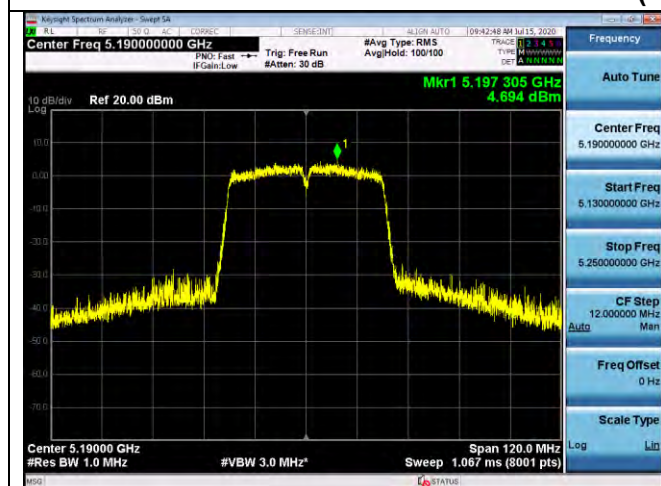


CH38-5190MHz

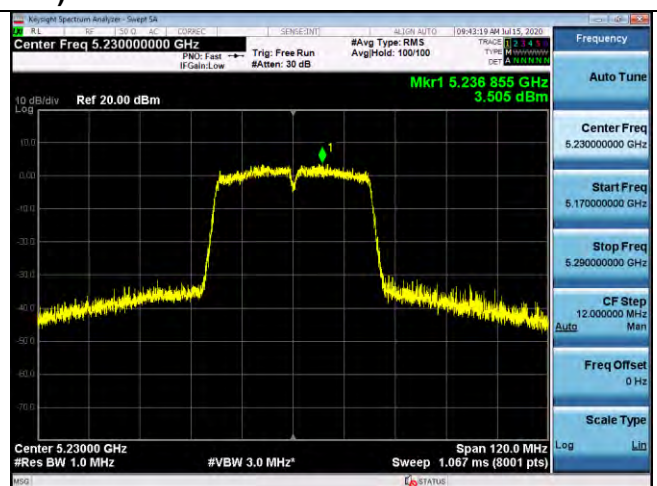


CH38-5190MHz

n (40MHz)



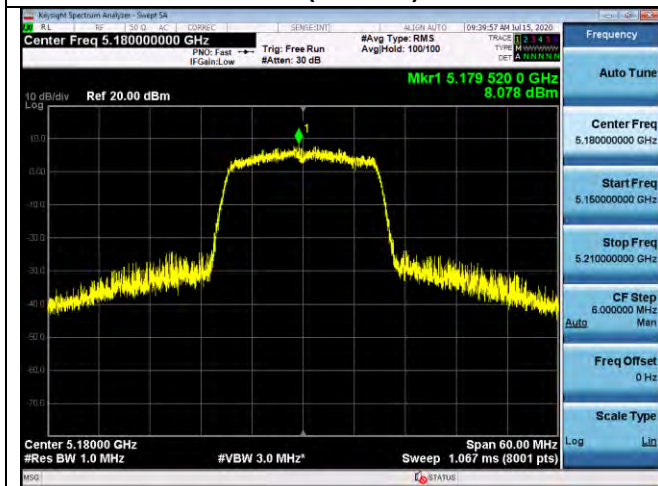
CH38-5190MHz



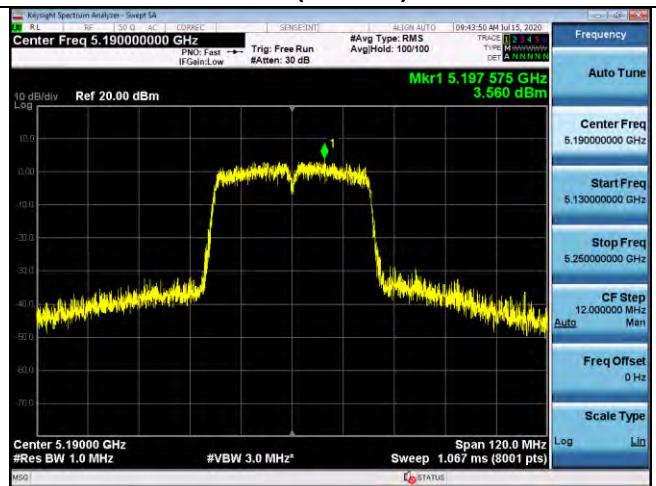
CH46-5230MHz



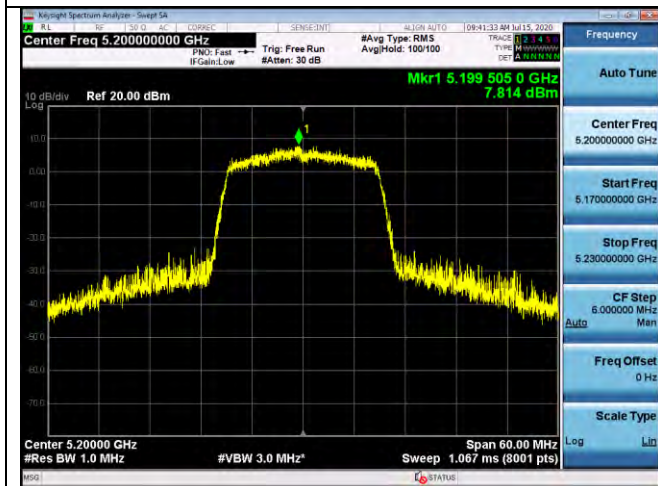
ac (20MHz)



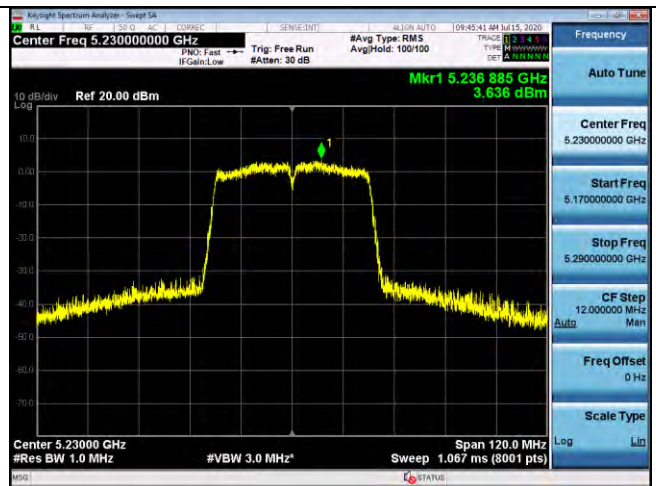
ac (40MHz)



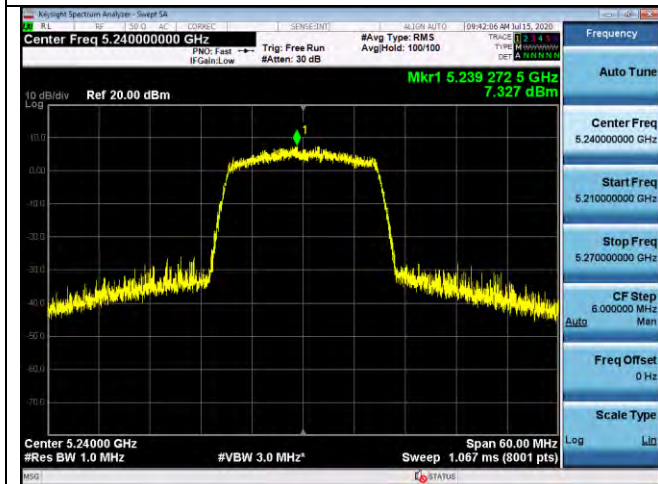
CH36-5180MHz



CH38-5190MHz



CH40-5200MHz



CH46-5230MHz

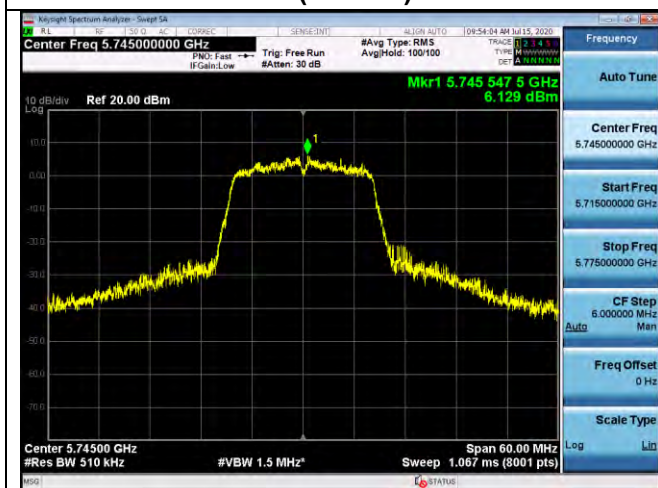


CH48-5240MHz



BAND 3

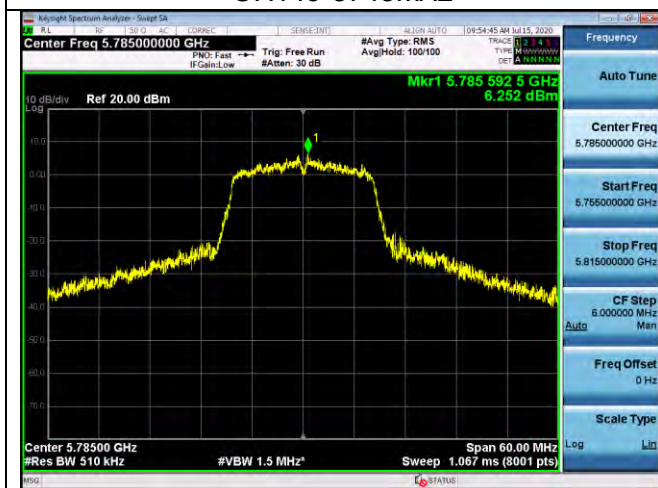
a (20MHz)



n (20MHz)



CH149-5745MHz



CH149-5745MHz



CH157-5785MHz



CH157-5785MHz



CH65-5825MHz

CH65-5825MHz



n (40MHz)



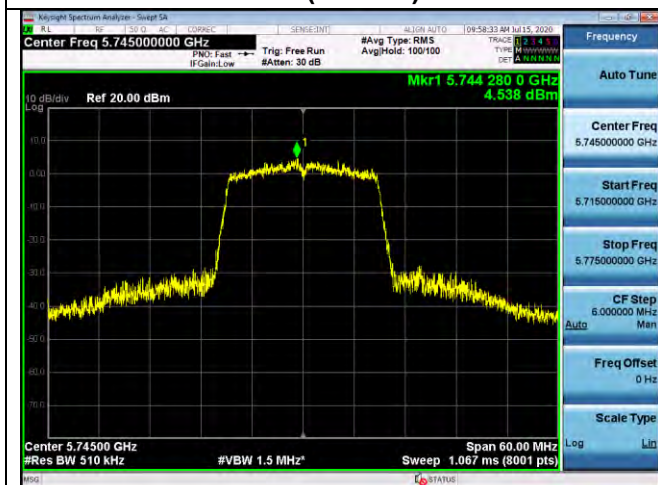
CH151-5755MHz



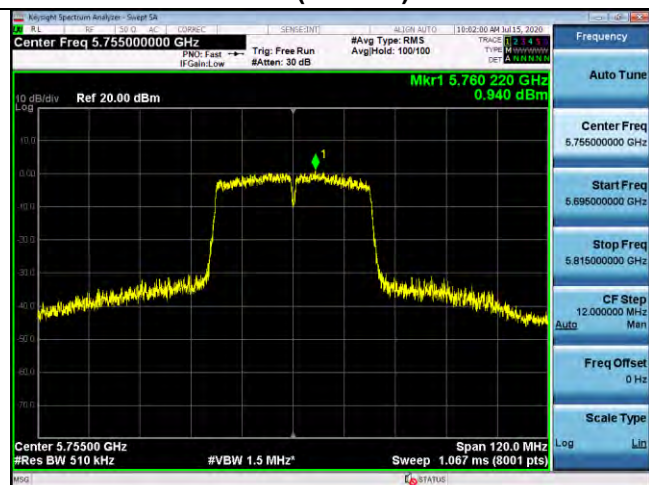
CH159-5795MHz



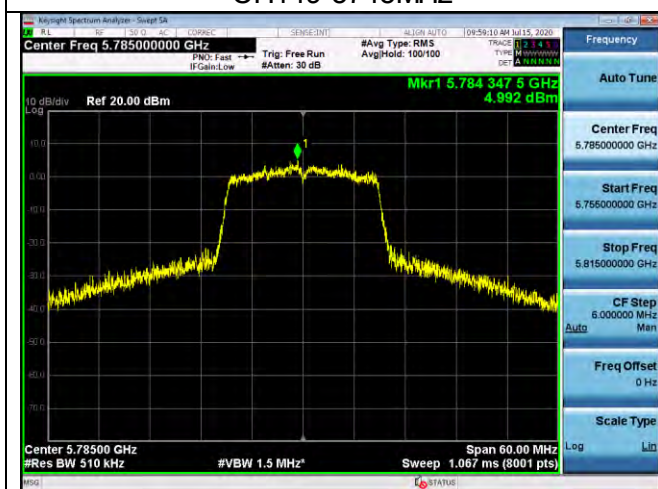
ac (20MHz)



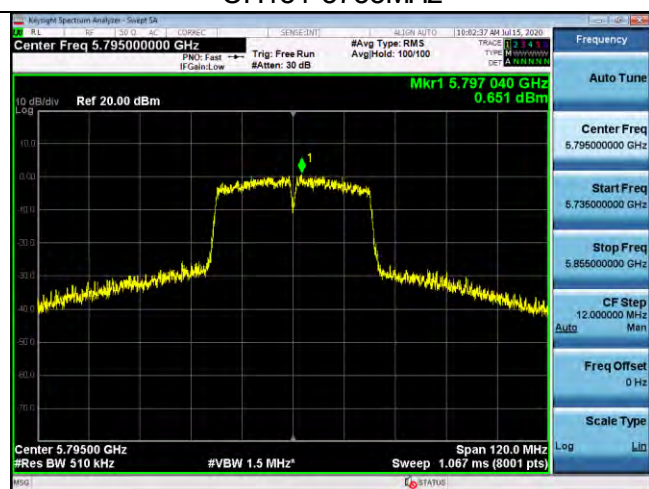
ac (40MHz)



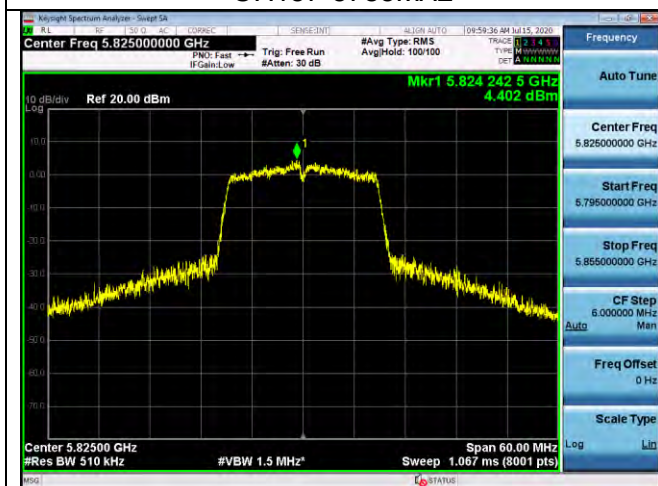
CH149-5745MHz



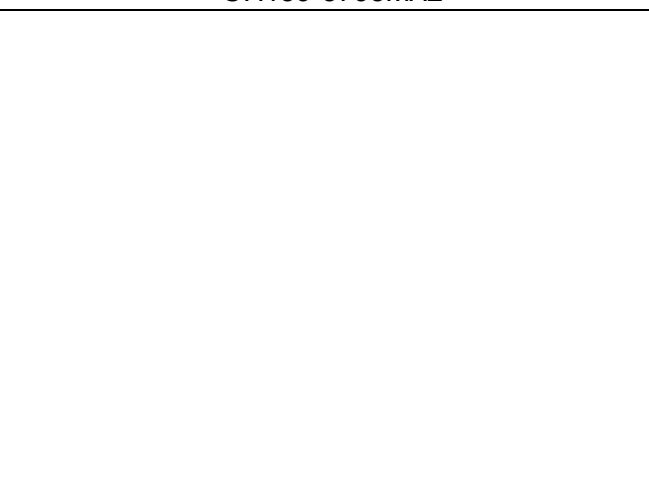
CH151-5755MHz



CH157-5785MHz



CH159-5795MHz



CH65-5825MHz

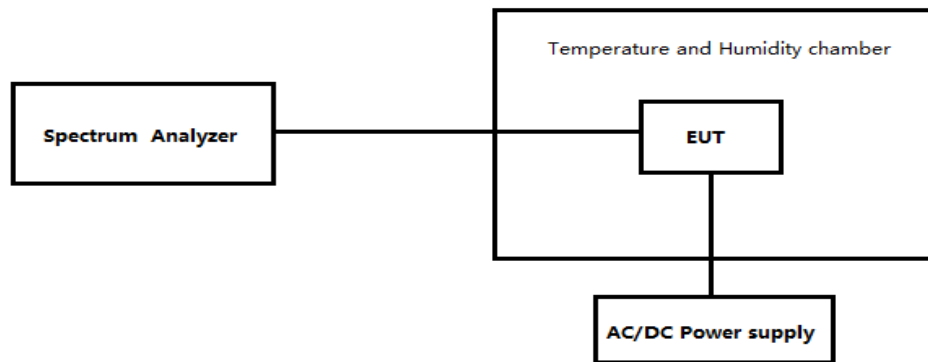


4.6 FREQUENCY STABILITY MEASUREMENT

LIMIT

According to §15.407(g), 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.

TEST CONFIGURATION



TEST PROCEDURE

1. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
2. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
3. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

TEST RESULTS

The report only shows the test results in the worst test mode:

MODE	CH.	FRE.	CH.	FRE.
802.11a(HT20)	36	5180 MHz	149	5745 MHz
802.11n(HT20)	36	5180 MHz	149	5745 MHz
802.11n(HT40)	46	5230 MHz	151	5755 MHz
802.11ac(HT20)	36	5180 MHz	149	5745 MHz
802.11ac(HT40)	46	5230 MHz	151	5755 MHz



BAND 1
802.11a(HT20)-CH36

Temperature (°C)	Voltage (V)	Freq.(MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)
25	V _{min}	5180	5180	5180.015	0.015
25	V _{max}	5180	5180	5180.031	0.031
25	V _{nor}	5180	5180	5180.007	0.007
-10	V _{nor}	5180	5180	5180.010	0.010
40	V _{nor}	5180	5180	5180.003	0.003

802.11n(HT20)-CH36

Temperature (°C)	Voltage (V)	Freq.(MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)
25	V _{min}	5180	5180.018	0.018	3.425
25	V _{max}	5180	5180.030	0.030	5.857
25	V _{nor}	5180	5180.024	0.024	4.689
-10	V _{nor}	5180	5180.027	0.027	5.291
40	V _{nor}	5180	5180.034	0.034	6.519

802.11n(HT40)-CH46

Temperature (°C)	Voltage (V)	Freq.(MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)
25	V _{min}	5230	5230.015	0.015	2.822
25	V _{max}	5230	5230.014	0.014	2.669
25	V _{nor}	5230	5230.007	0.007	1.422
-10	V _{nor}	5230	5230.035	0.035	6.768
40	V _{nor}	5230	5230.017	0.017	3.200

802.11ac(HT20)-CH36

Temperature (°C)	Voltage (V)	Freq.(MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)
25	V _{min}	5180	5180.031	0.031	6.011
25	V _{max}	5180	5180.033	0.033	6.407
25	V _{nor}	5180	5180.010	0.010	1.971
-10	V _{nor}	5180	5180.031	0.031	6.080
40	V _{nor}	5180	5180.016	0.016	3.124

802.11ac(HT40)-CH46

Temperature (°C)	Voltage (V)	Freq.(MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)
25	V _{min}	5230	5230.029	0.029	5.572
25	V _{max}	5230	5230.015	0.015	2.942
25	V _{nor}	5230	5230.019	0.019	3.652
-10	V _{nor}	5230	5230.016	0.016	3.088
40	V _{nor}	5230	5230.017	0.017	3.217



BAND 3
802.11a(HT20)- CH149

Temperature (°C)	Voltage (V)	Freq.(MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)
25	V _{min}	5745	5745.025	0.025	4.403
25	V _{max}	5745	5745.002	0.002	0.328
25	V _{nor}	5745	5745.007	0.007	1.236
-10	V _{nor}	5745	5745.038	0.038	6.593
40	V _{nor}	5745	5745.008	0.008	1.390

802.11n(HT20)- CH149

Temperature (°C)	Voltage (V)	Freq.(MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)
25	V _{min}	5745	5745.019	0.019	3.261
25	V _{max}	5745	5745.024	0.024	4.203
25	V _{nor}	5745	5745.032	0.032	5.585
-10	V _{nor}	5745	5745.029	0.029	4.999
40	V _{nor}	5745	5745.018	0.018	3.151

802.11n(HT40)-CH151

Temperature (°C)	Voltage (V)	Freq.(MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)
25	V _{min}	5755	5755.013	0.013	2.342
25	V _{max}	5755	5755.021	0.021	3.652
25	V _{nor}	5755	5755.021	0.021	3.708
-10	V _{nor}	5755	5755.019	0.019	3.275
40	V _{nor}	5755	5755.028	0.028	4.895

802.11ac(HT20)- CH149

Temperature (°C)	Voltage (V)	Freq.(MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)
25	V _{min}	5745	5745.010	0.010	1.727
25	V _{max}	5745	5745.023	0.023	4.017
25	V _{nor}	5745	5745.038	0.038	6.553
-10	V _{nor}	5745	5745.026	0.026	4.612
40	V _{nor}	5745	5745.007	0.007	1.206

802.11ac(HT40)- CH151

Temperature (°C)	Voltage (V)	Freq.(MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)
25	V _{min}	5755	5755.013	0.013	2.344
25	V _{max}	5755	5755.013	0.013	2.342
25	V _{nor}	5755	5755.028	0.028	4.855
-10	V _{nor}	5755	5755.006	0.006	1.128
40	V _{nor}	5755	5755.006	0.006	1.097



4.7 RADIATED UNDESIRABLE EMISSION

LIMIT

Radiated emissions from 9 kHz to 25 GHz were measured according to the methods defined in ANSI C63.10-2013. The EUT was placed above the ground plane, 0.8 meter for frequency below 1 GHz and 1.5 meter for frequency above 1 GHz. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

1. For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27 dBm/MHz.

For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

For transmitters operating in the 5470-5600 MHz and 5650-5725 MHz band: all emissions outside of the 5470-5600 MHz and 5650-5725 MHz band shall not exceed an EIRP of -27 dBm/MHz.

2. KDB789033v02r01G)2)c) As specified in 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in 15.407(b)(4)). However, an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit.
3. According to §15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

FREQUENCIES(MHz)	FIELD STRENGTH (microvolt/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

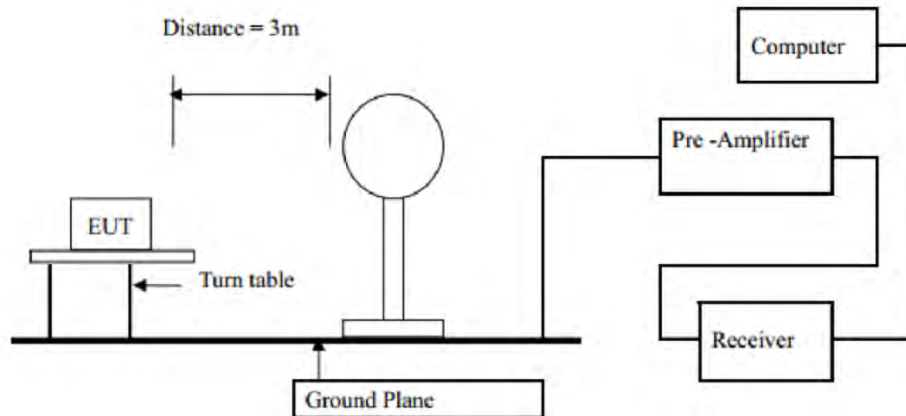
Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

4. In the emission table above, the tighter limit applies at the band edges.

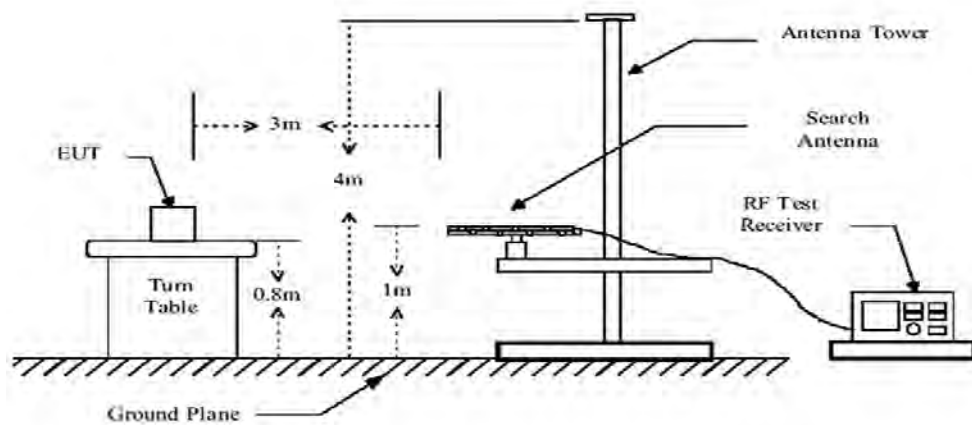
Frequency (MHz)	Field Strength(μV/mat	Field Strength(dBμV/mat
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Test Configuration

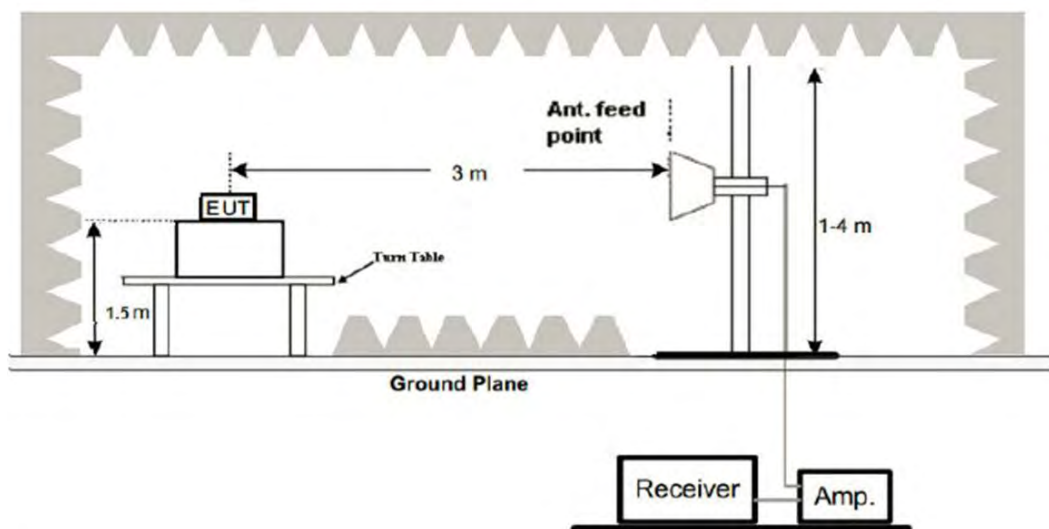
Below 30MHz



Below 1GHz



Above 1 GHz





TESTPROCEDURE

1. The EUT is placed on a turntable above ground plane, which is 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz.
2. The turntable shall be rotated for 360degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

Below 1GHz:

RBW=100kHz/ VBW=300kHz / Sweep=AUTO

Above 1GHz:

(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO

(b) AVERAGE: RBW=1MHz / Sweep=AUTO

VBW=10Hz, when duty cycle is no less than 98 percent.

VBW $\geq 1/T$, when duty cycle is less than 98 percent, where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

7. Repeat above procedures until the measurements for all frequencies are complete.

TES TRESULTS

Harmonics and Spurious Emissions

Frequency Range (9 kHz-30MHz)

Frequency (MHz)	Level@3m (dB μ V/m)	Limit@3m (dB μ V/m)
--	--	--
--	--	--
--	--	--
--	--	--

Note: 1. Emission Level=Reading+ Cable loss-Antenna factor-Amp factor

2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement



Test Results

radiated emission 30MHz – 1Ghz:

Horizontal

Test Graph



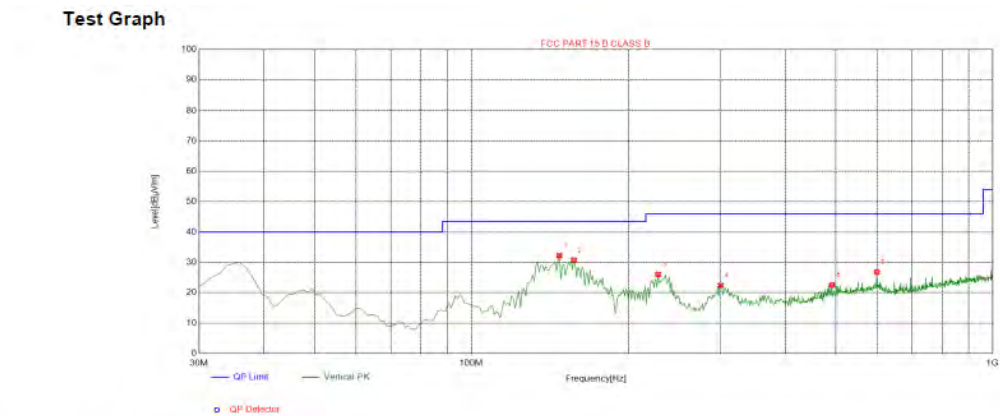
Suspected List

Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	132.9229	-18.75	49.16	30.41	43.50	13.09	100	28	Horizontal
2	150.4004	-18.91	49.28	30.37	43.50	13.13	100	35	Horizontal
3	232.9329	-14.18	47.39	33.21	46.00	12.79	100	282	Horizontal
4	361.1011	-11.31	42.76	31.45	46.00	14.55	100	94	Horizontal
5	482.4725	-8.47	31.86	23.39	46.00	22.61	100	237	Horizontal
6	744.6346	-3.94	29.82	25.88	46.00	20.12	100	305	Horizontal

Remark: Margin = Limit – Level

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

Level=Test receiver reading + correction factor

**Vertical****Suspected List**

Suspected List									
NO.	Freq. [MHz]	Factor [dB]	Reading [dBμV/m]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	147.4875	-19.00	51.22	32.22	43.50	11.28	100	202	Vertical
2	157.1972	-18.42	49.16	30.74	43.50	12.76	100	202	Vertical
3	228.0781	-14.37	40.40	26.03	46.00	19.97	100	166	Vertical
4	300.9009	-12.72	35.15	22.43	46.00	23.57	100	3	Vertical
5	492.1822	-8.50	31.05	22.55	46.00	23.45	100	137	Vertical
6	599.9600	-6.11	32.90	26.79	46.00	19.21	100	47	Vertical

Remark: Margin = Limit – Level

Correction Factor= Antenna Factor + Cable loss – Pre-amplifier

Level=Test receiver reading + correction factor

**Above 1 GHz**

Note: The test results only show the worst test results of mode 802.11n (HT20)/(HT40)

TEST MODE	BW	TEST CH.	TEST FRE.(MHz)
BAND1 -- 802.11n	20	36	5180
		40	5200
		48	5240
	40	38	5190
		46	5230
BAND 3-- 802.11n	20	149	5745
		157	5785
		165	5825
	40	151	5755
		159	5795

NOTE: The test result only shows the result of harmonics, because no waveform was found except for the background waveform

Operation Mode: Band 1 -IEEE 802.11n(HT20) Low Channel

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	10360.17	37.47	10.64	48.11	74.00	-25.89			peak
2	15542.00	30.24	12.29	42.53	74.00	-31.47			peak
N/A									

Vertical

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	10360.17	36.38	10.64	47.02	74.00	-26.98			peak
2	15542.00	34.35	12.29	46.64	74.00	-27.36			peak
N/A									

Operation Mode: Band 1 - IEEE 802.11n(HT20) Mid Channel

Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (deg.)	Remark
1	10400.44	37.10	10.64	47.74	74.00	-26.26			peak
2	15600.19	30.83	12.29	43.12	74.00	-30.88			peak
N/A									

Vertical

Operation Mode: Band 3 -IEEE 802.11n(HT20) high Channel

Horizontal

[illegible]

Vertical

[illegible]

Operation Mode: Band 3 -IEEE 802.11n(HT40) low Channel

Horizontal

[illegible]

Vertical

[illegible]

Operation Mode: Band 3 -IEEE 802.11n(HT40) high Channel

Horizontal

[illegible]

Vertical

[illegible]

Radiated Band Edge Test:

Operation Mode: Band 1-- 802.11n20 Mode - CH Low

Horizontal

Frequency	Reading	Factor	Emission level	Limits	Margin	Detector type
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
5150	53.28	-2.49	50.79	74.00	-23.21	PK
5150	/	-2.49	/	54.00	/	AV
Remark: Factor= Antenna Factor + Cable loss – Pre-amplifier						

Vertical:

Frequency	Reading	Factor	Emission level	Limits	Margin	Detector type
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
5150	48.09	-2.49	45.60	74.00	-28.40	PK
5150	/	-2.49	/	54.00	/	AV
Remark: Factor= Antenna Factor + Cable loss – Pre-amplifier						

Operation Mode: Band 1-- 802.11n20 Mode - CH high

Horizontal

Frequency	Reading	Factor	Emission level	Limits	Margin	Detector type
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
5350	49.51	-2.49	47.02	74.00	-26.98	PK
5350	/	-2.49	/	54.00	/	AV
Remark: Factor= Antenna Factor + Cable loss – Pre-amplifier						

Vertical:

Frequency	Reading	Factor	Emission level	Limits	Margin	Detector type
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
5350	51.41	-2.49	48.92	74.00	-25.08	PK
5350	/	-2.49	/	54.00	/	AV

Remark: Factor= Antenna Factor + Cable loss – Pre-amplifier



Operation Mode: BAND 3-- 802.11 n20 Mode - CH low

Horizontal

Frequency	Meter Reading	Factor	Emission level	Limits	Margin	Detector Type
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
5650	54.62	-2.06	52.56	68.2	-15.64	PK
5650	38.15	-2.06	36.09	48.2	-12.11	AV
5700	85.25	-1.96	83.29	105.2	-21.91	PK
5700	63.48	-1.96	61.52	85.2	-23.68	AV
5720	89.84	-2.87	86.97	110.8	-23.83	PK
5720	66.76	-2.87	63.89	90.8	-26.91	AV
5725	108.95	-2.14	106.81	122.2	-15.39	PK
5725	86.52	-2.14	84.38	102.2	-17.82	AV

Vertical:

Frequency	Meter Reading	Factor	Emission level	Limits	Margin	Detector Type
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
5650	58.69	-2.06	56.63	68.2	-11.57	PK
5650	34.13	-2.06	32.07	48.2	-16.13	AV
5700	84.89	-1.96	82.93	105.2	-22.27	PK
5700	63.62	-1.96	61.66	85.2	-23.54	AV
5720	89.94	-2.87	87.07	110.8	-23.73	PK
5720	64.64	-2.87	61.77	90.8	-29.03	AV
5725	106.41	-2.14	104.27	122.2	-17.93	PK
5725	84.49	-2.14	82.35	102.2	-19.85	AV

Operation Mode: BAND 3-- 802.11 n20 Mode - CH high

Horizontal

Frequency	Meter Reading	Factor	Emission level	Limits	Margin	Detector Type
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
5850	104.46	-1.97	102.49	122.20	-19.71	PK
5850	87.65	-1.97	85.68	102.20	-16.52	AV
5855	86.80	-2.13	84.67	110.80	-26.13	PK
5855	66.61	-2.13	64.48	90.80	-26.32	AV
5785	83.39	-2.65	80.74	105.20	-24.46	PK
5785	60.11	-2.65	57.46	85.20	-27.74	AV
5925	54.56	-2.28	52.28	68.20	-15.92	PK
5925	33.24	-2.28	30.96	48.20	-17.24	AV



Vertical:

Frequency	Meter Reading	Factor	Emission level	Limits	Margin	Detector Type
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
5850	104.91	-1.97	102.94	122.20	-19.26	PK
5850	88.41	-1.97	86.44	102.20	-15.76	AV
5855	89.79	-2.13	87.66	110.80	-23.14	PK
5855	66.65	-2.13	64.52	90.80	-26.28	AV
5785	85.73	-2.65	83.08	105.20	-22.12	PK
5785	64.03	-2.65	61.38	85.20	-23.82	AV
5925	57.38	-2.28	55.10	68.20	-13.10	PK
5925	36.79	-2.28	34.51	48.20	-13.69	AV

Operation Mode: BAND 3-- 802.11 n40 Mode - CH low

Horizontal

Frequency	Meter Reading	Factor	Emission level	Limits	Margin	Detector Type
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
5650	53.91	-1.97	51.94	68.2	-16.26	PK
5650	38.87	-1.97	36.90	48.2	-11.30	AV
5700	85.51	-2.13	83.38	105.2	-21.82	PK
5700	61.58	-2.13	59.45	85.2	-25.75	AV
5720	90.12	-2.65	87.47	110.8	-23.33	PK
5720	69.80	-2.65	67.15	90.8	-23.65	AV
5725	106.40	-2.28	104.12	122.2	-18.08	PK
5725	84.00	-2.28	81.72	102.2	-20.48	AV

Vertical:

Frequency	Meter Reading	Factor	Emission level	Limits	Margin	Detector Type
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
5650	55.88	-1.97	53.91	68.2	-14.29	PK
5650	33.41	-1.97	31.44	48.2	-16.76	AV
5700	84.70	-2.13	82.57	105.2	-22.63	PK
5700	63.39	-2.13	61.26	85.2	-23.94	AV
5720	88.33	-2.65	85.68	110.8	-25.12	PK
5720	66.09	-2.65	63.44	90.8	-27.36	AV
5725	107.19	-2.28	104.91	122.2	-17.29	PK
5725	84.82	-2.28	82.54	102.2	-19.66	AV



Operation Mode: BAND 3-- 802.11 n40 Mode - CH high

Horizontal

Frequency	Meter Reading	Factor	Emission level	Limits	Margin	Detector Type
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
5850	108.63	-1.97	106.66	122.20	-15.54	PK
5850	86.40	-1.97	84.43	102.20	-17.77	AV
5855	88.74	-2.13	86.61	110.80	-24.19	PK
5855	64.79	-2.13	62.66	90.80	-28.14	AV
5785	85.96	-2.65	83.31	105.20	-21.89	PK
5785	62.11	-2.65	59.46	85.20	-25.74	AV
5925	57.85	-2.28	55.57	68.20	-12.63	PK
5925	33.20	-2.28	30.92	48.20	-17.28	AV

Vertical:

Frequency	Meter Reading	Factor	Emission level	Limits	Margin	Detector Type
(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
5850	107.65	-1.97	105.68	122.20	-16.52	PK
5850	88.53	-1.97	86.56	102.20	-15.64	AV
5855	88.18	-2.13	86.05	110.80	-24.75	PK
5855	69.43	-2.13	67.30	90.80	-23.50	AV
5785	82.23	-2.65	79.58	105.20	-25.62	PK
5785	63.46	-2.65	60.81	85.20	-24.39	AV
5925	54.13	-2.28	51.85	68.20	-16.35	PK
5925	33.91	-2.28	31.63	48.20	-16.57	AV



4.8 POWERLINE CONDUCTED EMISSIONS

LIMIT

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

* Decreases with the logarithm of the frequency.

TEST CONFIGURATION

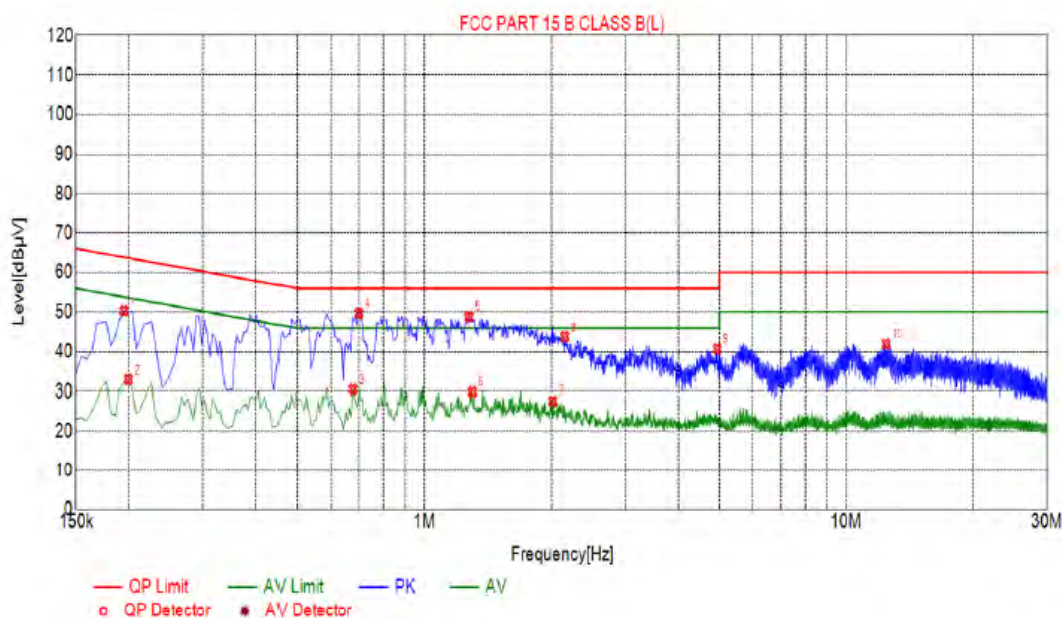
See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

TEST RESULTS

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

**TestData****Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)****Suspected List**

NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.1950	50.28	10.03	63.82	13.54	40.25	PK	L
2	0.1995	32.92	10.03	53.63	20.71	22.89	AV	L
3	0.6765	30.55	10.05	46.00	15.45	20.50	AV	L
4	0.6990	49.78	10.05	56.00	6.22	39.73	PK	L
5	1.2750	48.88	10.09	56.00	7.12	38.79	PK	L
6	1.2975	29.89	10.10	46.00	16.11	19.79	AV	L
7	2.0130	27.67	10.15	46.00	18.33	17.52	AV	L
8	2.1525	43.79	10.16	56.00	12.21	33.63	PK	L
9	4.9425	40.66	10.26	56.00	15.34	30.40	PK	L
10	12.4395	41.98	9.98	60.00	18.02	32.00	PK	L

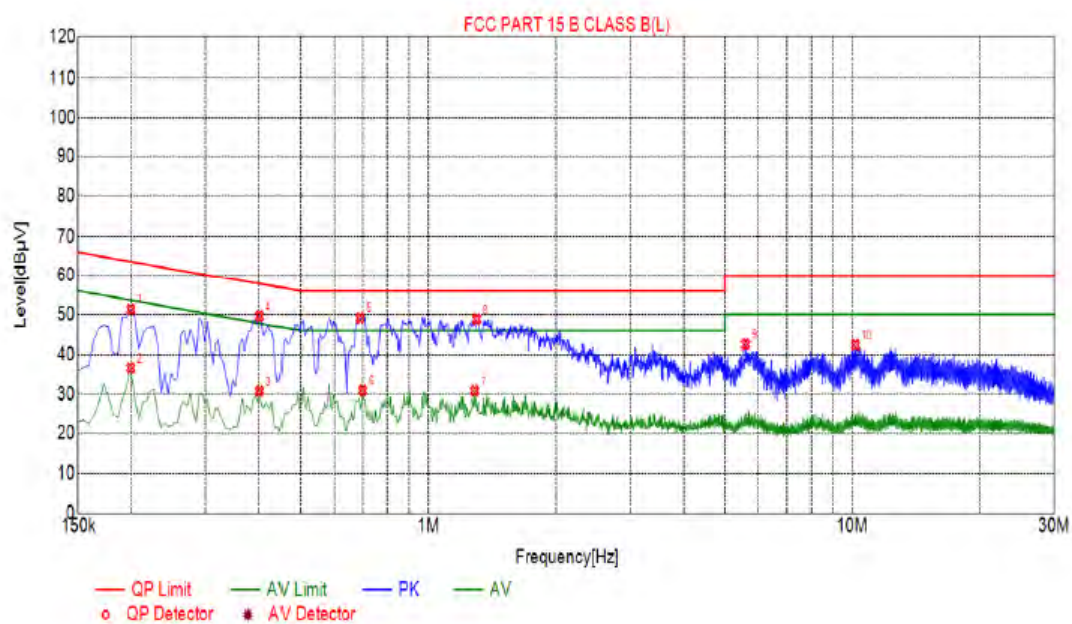
Remark: Margin = Limit – Level

Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor



Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)



Suspected List								
NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.1995	51.27	10.03	63.63	12.36	41.24	PK	L
2	0.1995	36.62	10.03	53.63	17.01	26.59	AV	L
3	0.4020	30.75	10.04	47.81	17.06	20.71	AV	L
4	0.4020	49.60	10.04	57.81	8.21	39.56	PK	L
5	0.6900	49.15	10.05	56.00	6.85	39.10	PK	L
6	0.6990	30.88	10.05	46.00	15.12	20.83	AV	L
7	1.2840	30.82	10.09	46.00	15.18	20.73	AV	L
8	1.2975	48.83	10.10	56.00	7.17	38.73	PK	L
9	5.6085	42.63	10.25	60.00	17.37	32.38	PK	L
10	10.1805	42.43	10.06	60.00	17.57	32.37	PK	L

Remark: Margin = Limit – Level

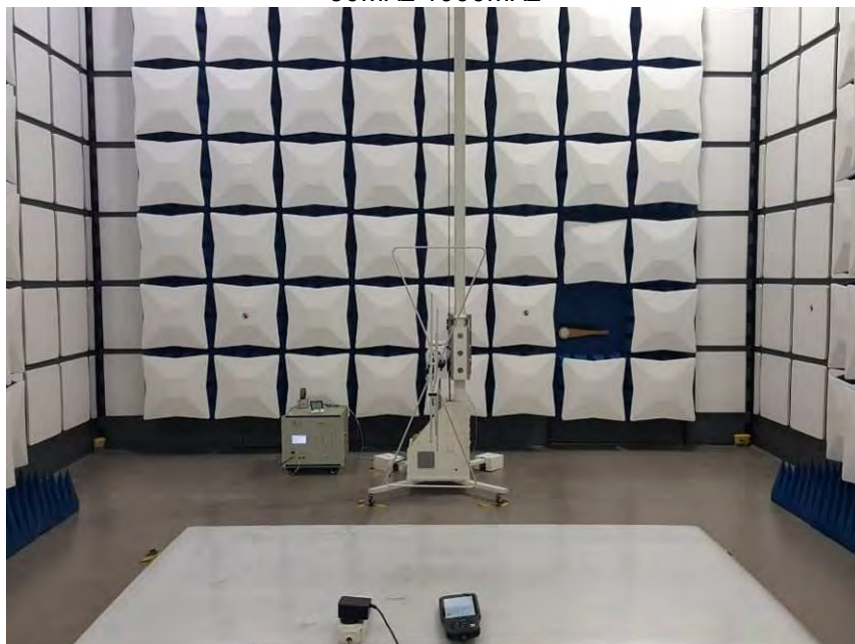
Correction factor = Cable lose + LISN insertion loss

Level=Test receiver reading + correction factor

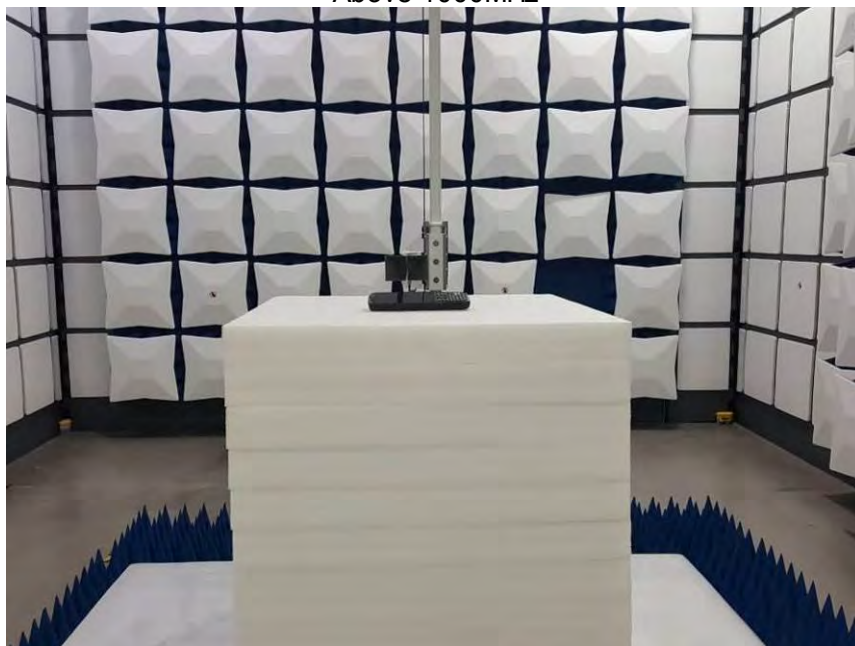


7 PHOTOS OF TEST SETUP

30MHz-1000MHz



Above 1000MHz





Conducted Emission





8 PHOTOS OF THE EUT

Please refer to the report No.: HK2007011614-8E

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