FCC 47 CFR PART 15 SUBPART E: 2013 AND ANSI C63.10:2013 TEST REPORT

For

57 Inch TFT-LCD Display

Model: P650IVF01.0

Brand Name : AUO

Issued for

VIA Technologies, Inc.
8F, No.535, Zhongzheng Rd., Xindian Dist, New Taipei City 231, Taiwan(R.O.C)

Issued by

Compliance Certification Services Inc.
Tainan Lab.
No.8,Jiucengling, Xinhua Dist., Tainan City 712, Taiwan (R.O.C.)
TEL: 886-6-580-2201
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Issued Date: September 20, 2018

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	September 20, 2018	Initial Issue	ALL	Gina Lin
01	December 04, 2018	See the following note rev.01	ALL	Gina Lin

Note:

※ Rev.00 Issue Date: September 20, 2018
Original Report

※ Rev.01 Issue Date: December 04, 2018
Add 99% BANDWIDTH on page16.
Add FREQUENCY STABILITY on page148.
Update the limit in power and PSD.
Update BAND4 Spurious data.

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TITLE PAGE NO.

1. TEST REPORT CERTIFICATION

Applicant	:	**VIA Technologies, Inc.** 8F, No.535, Zhongzheng Rd., Xindian Dist, New Taipei City 231, Taiwan(R.O.C)
Manufacturer	:	**LWO Technology Co., Ltd.** No.18, Yongke S Rd.,YongKong Dist.,Tainan City 710, Taiwan(R.O.C.)
Equipment Under Test	:	57 Inch TFT-LCD Display
Model	:	P650IVF01.0
Brand	:	AUO
Date of Test	:	August 06, 2018 ~ September 13, 2018

APPLICABLE STANDARD	
Standard	**Test Result**
FCC 47 CFR PART 15 SUBPART E AND ANSI C63.10:2013	PASS

WE HEREBY CERTIFY THAT: The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by: ***Reviewed by:***

Jeter Wu
Assistant Manager

Eric Huang
Section Manager

2. EUT DESCRIPTION

Product Name	57 Inch TFT-LCD Display
Model Number	P650IVF01.0
Brand Name	AUO
Identify Number	T180801N06
Received Date	August 01, 2018
Frequency Range	IEEE 802.11a, 802.11n HT20 : 5180MHz ~ 5240MHz; 5745 ~ 5825MHz IEEE 802.11n HT40 : 5190MHz ~ 5230MHz; 5755 ~ 5795MHz IEEE 802.11ac VHT80 : 5210MHz; 5775MHz
Transmit Power	IEEE 802.11a : 20.63dBm IEEE 802.11n HT20 : 21.29dBm IEEE 802.11n HT40 : 20.38dBm IEEE 802.11ac VHT80 : 20.20dBm
Channel Spacing	IEEE 802.11a, 802.11n HT20 : 20MHz IEEE 802.11n HT40, 11ac VHT80 : 20MHz
Channel Number	IEEE 802.11a, 802.11n HT20 : 5180MHz ~ 5825MHz : 9 Channels IEEE 802.11n HT40 : 5190MHz ~ 5795MHz : 5 Channels IEEE 802.11ac VHT80 : 5210MHz ~ 5775MHz : 2 Channels
Transmit Data Rate	IEEE 802.11a : 54, 48 ,36, 24, 18, 12, 9, 6 Mbps IEEE 802.11n(HT20) : 130, 117, 104, 78, 52, 39, 26 13Mbps IEEE 802.11n(HT40) :300, 243, 216, 162, 108, 81, 54, 27 Mbps **IEEE 801.11ac** (HT20):156, 130, 117, 104, 78, 52, 39, 26, 13 Mbps (HT40):360, 270, 243, 216, 162, 108, 81, 54, 27 Mbps (HT80):866.7, 702, 585, 526.5, 468, 351, 234, 175.5, 117, 58.5 Mbps
Type of Modulation	IEEE 802. 11n HT20/11n HT40: BPSK, QPSK, 16QAM, 64QAM, and OFDM IEEE 802.11n HT20/40 : OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11 ac: BPSK, QPSK, 16QAM, 64QAM, 256QAM and OFDM

Antenna Type	**5GHz Antenna (1TX1RX)** Manufacture: WIFI-Link Technologies Inc. Type: PCB Model: WLDF-5024-07-07 Gain: 7 dBi
Power Rating	12Vdc; 2.5A(Powered from Adapter)
Test Voltage	120Vac, 60Hz
Firmware Version	V1.0
Software Version	V1.0

Power Adapter :

No.	Manufacturer	Model No.	Power Input	Power Output
1	MEAN WELL	GST160A24	100-240Vac, 50/60Hz, 2.0A	24Vdc, 6.67A, 160W

Remark :

1. Client consigns only one model sample to test (Model Number: P650IVF01.0).

2.The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.

3. For more details, please refer to the User's manual of the EUT.

*4. This submittal(s) (test report) is intended for FCC ID: **NCI-P650IVF01-0** filing to comply with Section 15.407, of the FCC Part 15, Subpart E Rules.*

Operation Frequency:

IEEE 802.11a, 802.11n HT20

UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII)			
CHANNEL	**MHz**	**CHANNEL**	**MHz**
36	5180	44	5220
40	5200	48	5240
149	5745	153	5765
157	5785	161	5805
165	5825		

IEEE 802.11n HT40

UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII)			
CHANNEL	**MHz**	**CHANNEL**	**MHz**
38	5190	42	5210
46	5230	151	5755
159	5795		

IEEE 802.11ac VHT80

UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII)			
CHANNEL	**MHz**	**CHANNEL**	**MHz**
42	5210	155	5775

3. DESCRIPTION OF TEST MODES

Conducted Emission / Radiated Emission Test (Below 1 GHz)

2. The following test modes were scanned during the preliminary test:

No.	Pre-Test Mode
1	TX Mode
2	Normal Operation Mode

2. After the preliminary scan, the following test mode was found to produce the highest emission level.

Final Test Mode		
Emission	Radiated Emission	TX Mode
	Conducted Emission	TX Mode
		Normal Operation Mode

Remark : *Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.*

Conducted / Radiated Emission Test (Above 1 GHz)

IEEE 802.11a, 802.11n HT20 mode / 5180MHz ~ 5240MHz; 5745MHz ~ 5825MHz

The EUT had been tested under operating condition.

There are three channels have been tested as following :

Channel	Frequency (MHz)
Low	5180
Middle	5200
High	5240

Channel	Frequency (MHz)
Low	5745
Middle	5785
High	5825

IEEE 802.11a mode : 6Mbps data rate (worst case) were chosen for full testing.

IEEE 802.11n HT20 mode : 13Mbps data rate (worst case) were chosen for full testing.

IEEE 802.11n HT40 mode / 5190MHz ~ 5230MHz; 5755MHz ~ 5795MHz

The EUT had been tested under operating condition.

There are three channels have been tested as following :

Channel	Frequency (MHz)
Low	5190
Middle	5210
High	5230

Channel	Frequency (MHz)
Low	5755
High	5795

IEEE 802.11n HT40 mode : 27Mbps data rate (worst case) were chosen for full testing.

IEEE 802.11ac VHT80 mode / 5210MHz; 5775MHz

The EUT had been tested under operating condition.

There are three channels have been tested as following :

Channel	Frequency (MHz)
Middle	5210

Channel	Frequency (MHz)
Middle	5775

IEEE 802.11n HT40 mode : 117Mbps data rate (worst case) were chosen for full testing.

4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10 and FCC CFR 47, 15.207, 15.209 and 15.407.

5. FACILITIES AND ACCREDITATION

5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

No.8,Jiucengling, Xinhua Dist., Tainan City 712, Taiwan (R.O.C.)

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

5.3 LABORATORY ACCREDITATIONS LISTINGS

The test facilities used to perform radiated and conducted emissions tests are accredited by Taiwan Accreditation Foundation for the specific scope of accreditation under Lab Code: 1109 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by TAF or any agency of the Government. In addition, the test facilities are listed with Federal Communications Commission (registration no: TW-1109).

5.4 TABLE OF ACCREDITATIONS AND LISTINGS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

Taiwan	TAF

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	Industry Canada
Germany	TUV NORD
Taiwan	BSMI
USA	FCC

Copies of granted accreditation certificates are available for downloading from our web site, http://www.ccsrf.com

5.5 MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

5.6 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Radiated Emission, 30 to 200 MHz Test Site : OATS-6	±3.21dB
Radiated Emission, 200 to 1000 MHz Test Site : OATS-6	±3.09dB
Radiated Emission, 1 to 8 GHz	± 2.65dB
Radiated Emission, 8 to 18 GHz	± 2.66dB
Radiated Emission, 18 to 26.5 GHz	± 2.65dB
Radiated Emission, 26 to 40 GHz	± 3.03dB
Power Line Conducted Emission	±1.91dB
Band Width	136.49kHz
Peak Output Power MU	±1.34dB
Band Edge MU	±0.30dBuV
Channel Separation MU	361.69Hz
Duty Cycle MU	0.064ms
Frequency Stability MU	0.223kHz

Uncertainty figures are valid to a confidence level of 95%, K=2

6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

For RF test

No.	Product	Manufacturer	Model No.	Certify No.	Signal cable
1.	Mouse(USB)	Lenovo	SM-8823	T3A002	Mouse cable, shd, 1.8m

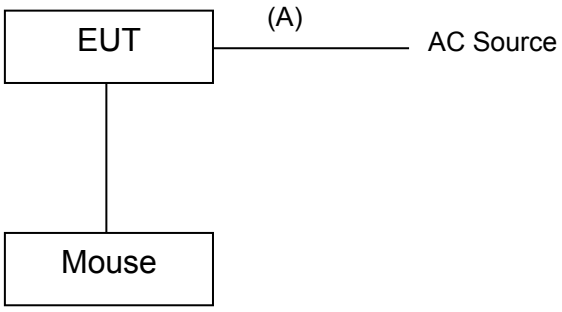
No.	Signal cable description	
A	Power	Unshielded, 1.6m, 1pcs.

For EMI test

No.	Product	Manufacturer	Model No.	Certify No.	Signal cable
1.	Mouse(USB)	Lenovo	SM-8823	T3A002	Mouse cable, shd, 1.8m

No.	Signal cable description	
A	AC IN	Unshielded, 1.6m, 1pcs.

SETUP DIAGRAM FOR TESTS



EUT OPERATING CONDITION

RF Setup

1. Set up all computers like the setup diagram.
2. The Test Program “MPTool” software was used for testing.

TX Mode:

⇒ Testing Item : Continous TX

⇒ Band : 5G

⇒ Bandwidth : 20M、40M、80M

⇒ Data Rate : OFDM 6M、MCS0、Nsss1 MCS0

Power control mode

Target Power: IEEE 802.11a Channel Low (5180MHz) = 41
IEEE 802.11a Channel Middle (5200MHz) = 40
IEEE 802.11a Channel High (5240MHz) = 39
IEEE 802.11a Channel Low (5745MHz) = 50
IEEE 802.11a Channel Middle (5785MHz) = 50
IEEE 802.11a Channel High (5825MHz) = 50

Target Power: IEEE 802.11n HT20 Channel Low (5180M Hz) = 41
IEEE 802.11n HT20 Channel Middle (5200MHz) =40
IEEE 802.11n HT20 Channel High (5240MHz) = 39
IEEE 802.11n HT20 Channel Low (5745MHz) = 50
IEEE 802.11n HT20 Channel Middle (5785MHz) = 50
IEEE 802.11n HT20 Channel High (5825MHz) = 50

Target Power: IEEE 802.11n HT40 Channel Low (5190MHz) = 47
IEEE 802.11n HT40 Channel High (5230MHz) = 46
IEEE 802.11n HT40 Channel Low (5755MHz) = 50
IEEE 802.11n HT40 Channel High (5795MHz) = 50

Target Power: IEEE 802.11ac HT80 Channel Middle (5210MHz) = 50
IEEE 802.11ac HT80 Channel Middle (5775MHz) = 50

RX Mode：

⇒ Testing Item : Packets Rx

3. All of the function are under run.
4. Start test.

7. FCC PART 15.407 REQUIREMENTS

7.1 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

MEASUREMENT EQUIPMENT USED

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/05/2018	07/04/2019
Power Meter	Anritsu	ML2487A	6K00003888	05/02/2018	05/01/2019
Power Sensor	Anritsu	MA2491A	033265	05/02/2018	05/01/2019
SMA Cable + 10dB Attenuator	CCS	SMA + 10dB Att	O6	01/22/2018	01/21/2019

TEST RESULTS

IEEE 802.11a mode

Channel	Channel Frequency (MHz)	99% Occupied Power Bandwidth (MHz)
Low	5180	16.57
Middle	5200	16.56
High	5240	16.56

Channel	Channel Frequency (MHz)	99% Occupied Power Bandwidth (MHz)
Low	5745	16.60
Middle	5785	16.62
High	5825	16.62

IEEE802.11n HT 20 MHz Mode

Channel	Channel Frequency (MHz)	99% Occupied Power Bandwidth (MHz)
Low	5180	17.72
Middle	5200	17.69
High	5240	17.71

Channel	Channel Frequency (MHz)	99% Occupied Power Bandwidth (MHz)
Low	5745	17.74
Middle	5785	17.72
High	5825	17.73

IEEE802.11n HT 40 MHz Mode

Channel	Channel Frequency (MHz)	99% Occupied Power Bandwidth (MHz)
Low	5190	36.49
High	5230	36.44

Channel	Channel Frequency (MHz)	99% Occupied Power Bandwidth (MHz)
Low	5755	36.49
High	5795	36.53

IEEE802.11ac VHT 80 MHz Mode

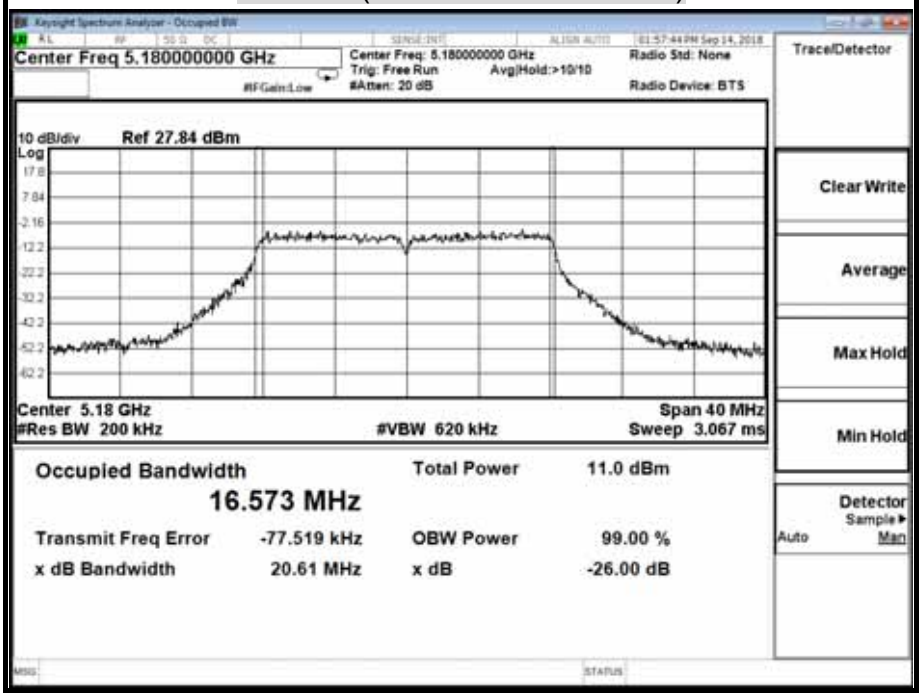
Channel	Channel Frequency (MHz)	99% Occupied Power Bandwidth (MHz)
Middle	5210	75.16

Channel	Channel Frequency (MHz)	99% Occupied Power Bandwidth (MHz)
Middle	5775	75.10

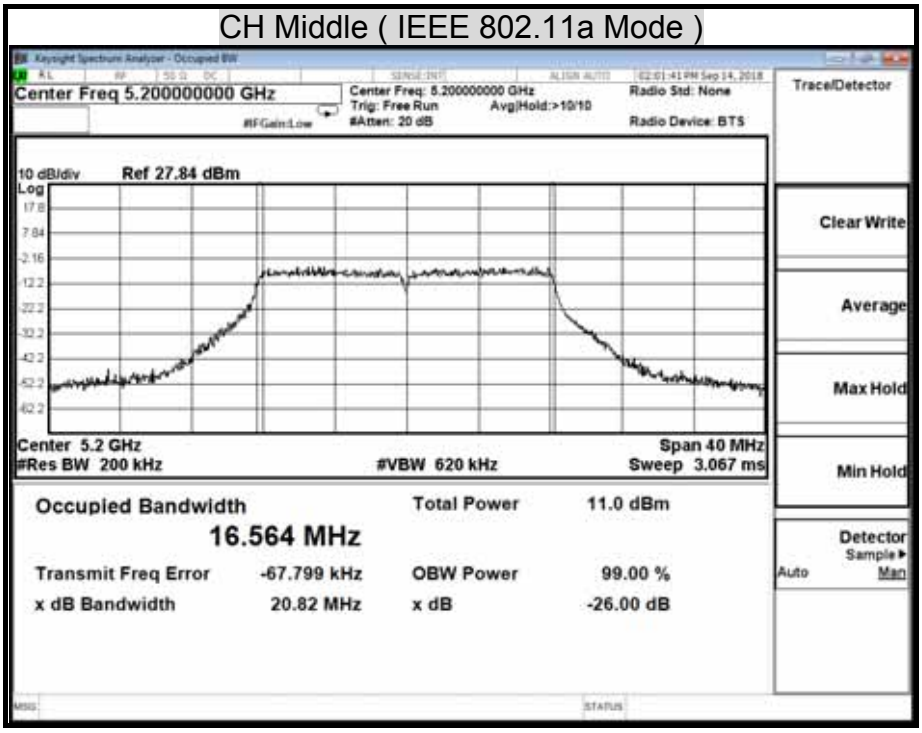
99% BANDWIDTH

Test Mode: IEEE 802.11a mode / 5150 ~ 5250MHz

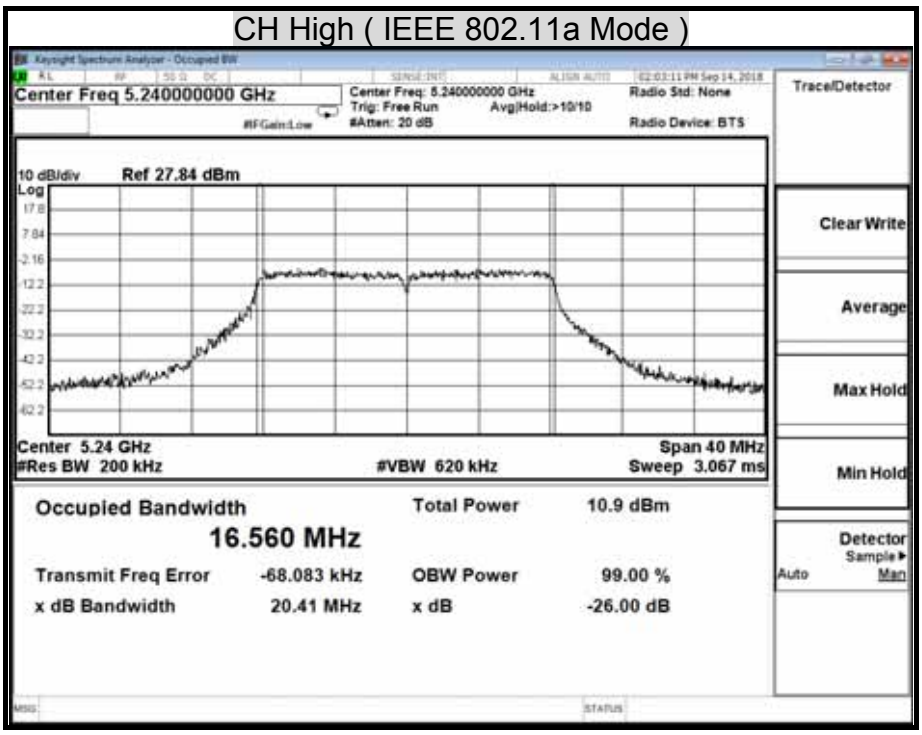
CH Low (IEEE 802.11a Mode)



CH Middle (IEEE 802.11a Mode)

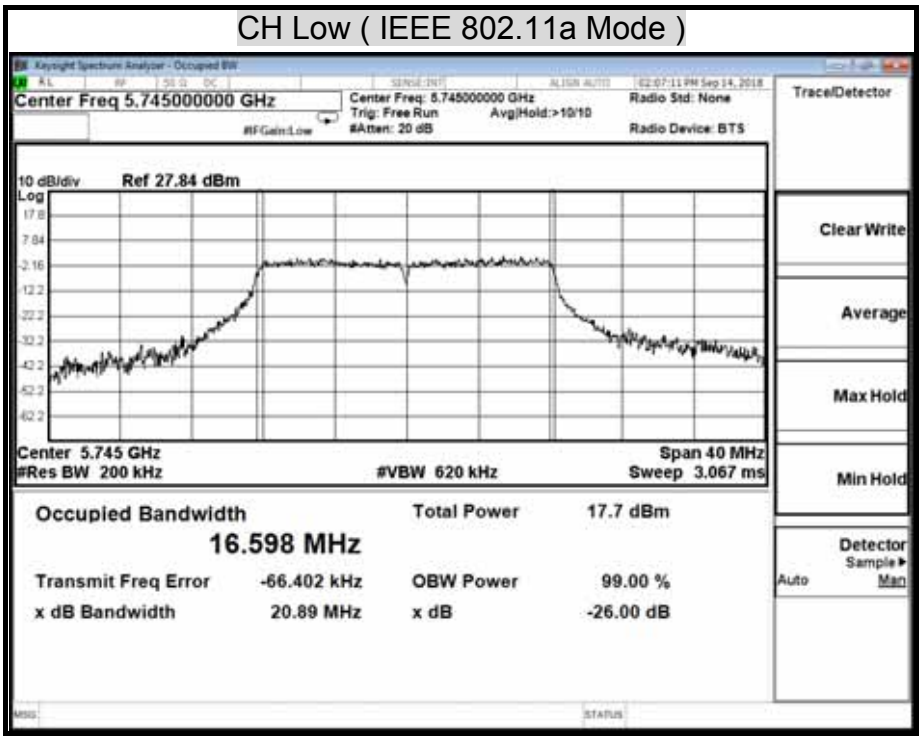


CH High (IEEE 802.11a Mode)

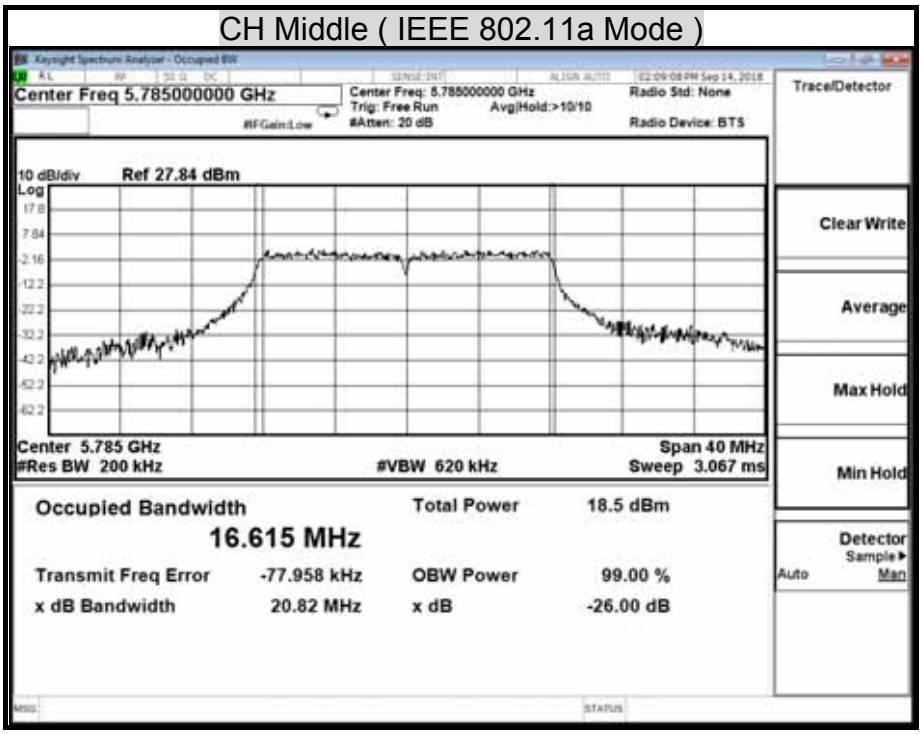


Test Mode: IEEE 802.11a mode / 5725 ~ 5850MHz

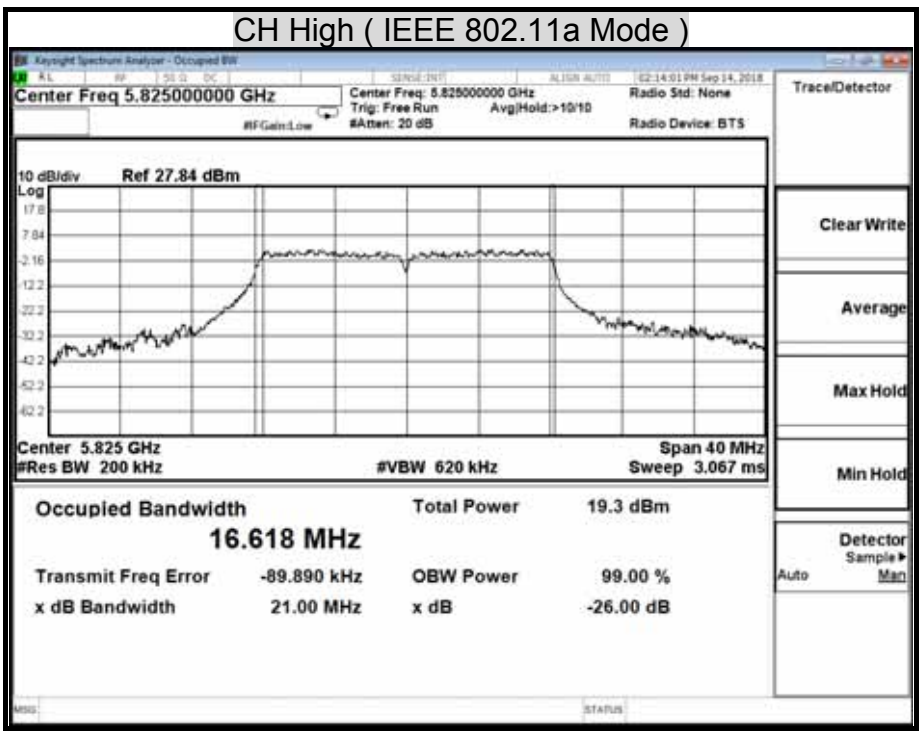
CH Low (IEEE 802.11a Mode)



CH Middle (IEEE 802.11a Mode)

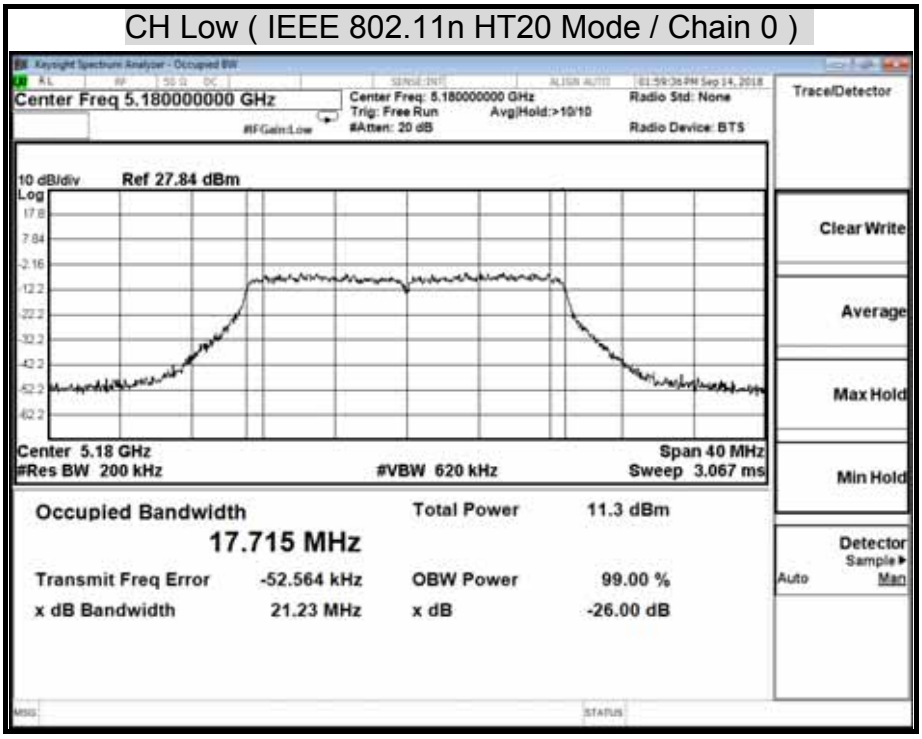


CH High (IEEE 802.11a Mode)

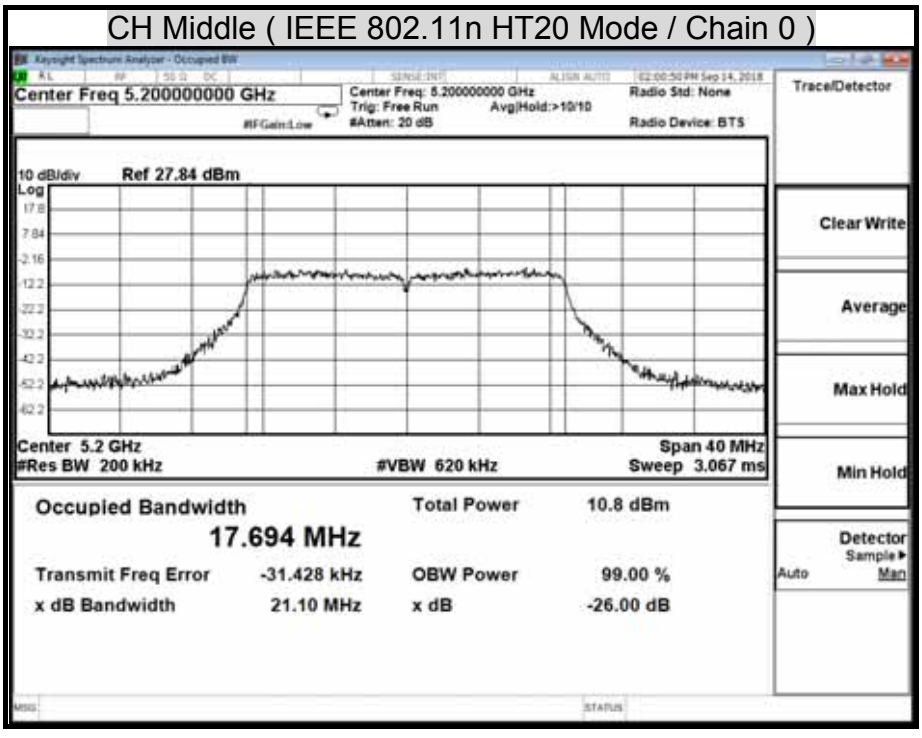


Test Mode: IEEE 802.11n HT 20 MHz mode / 5150 ~ 5250MHz

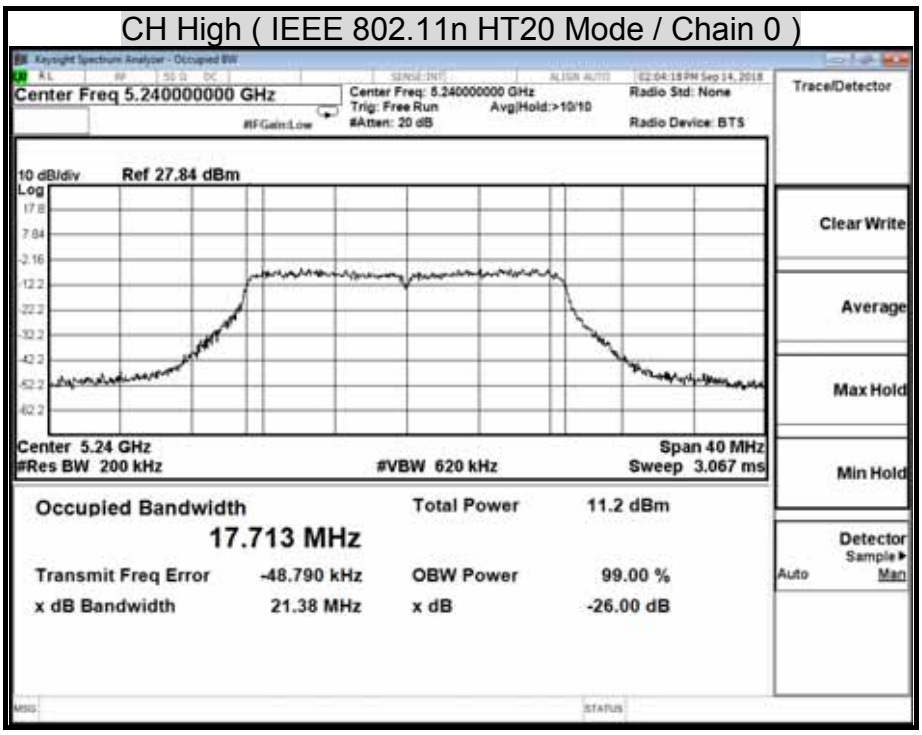
CH Low (IEEE 802.11n HT20 Mode / Chain 0)



CH Middle (IEEE 802.11n HT20 Mode / Chain 0)

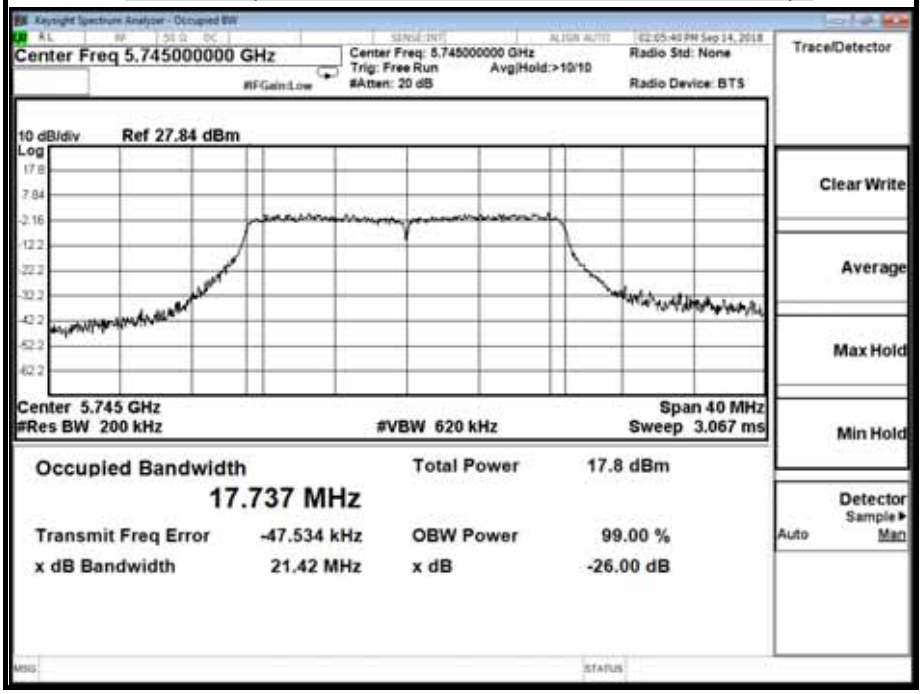


CH High (IEEE 802.11n HT20 Mode / Chain 0)

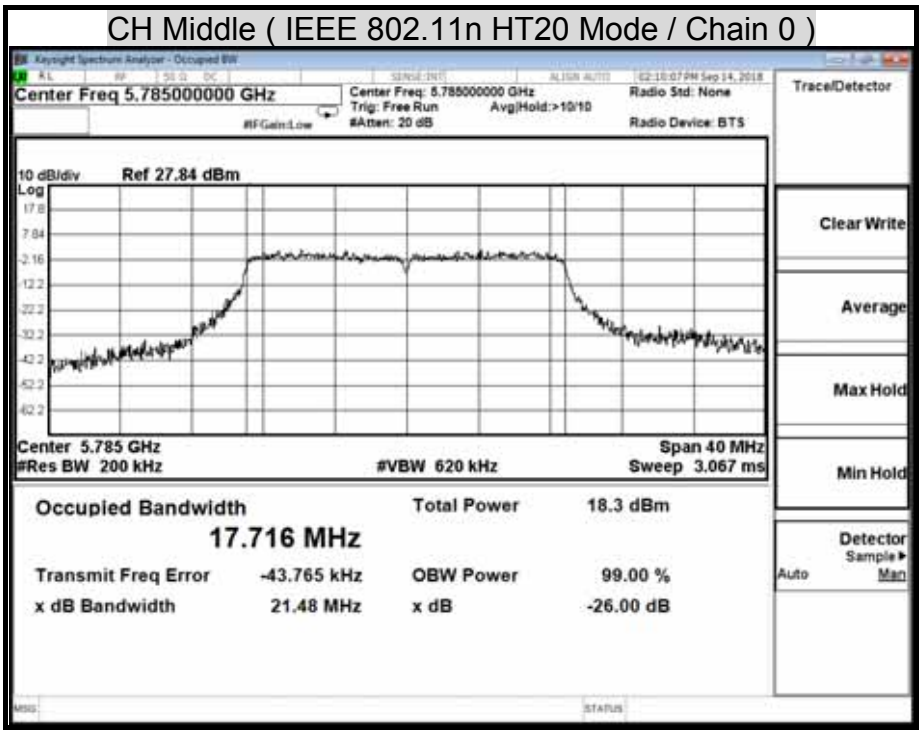


Test Mode: IEEE 802.11n HT 20 MHz mode / 5725 ~ 5850MHz

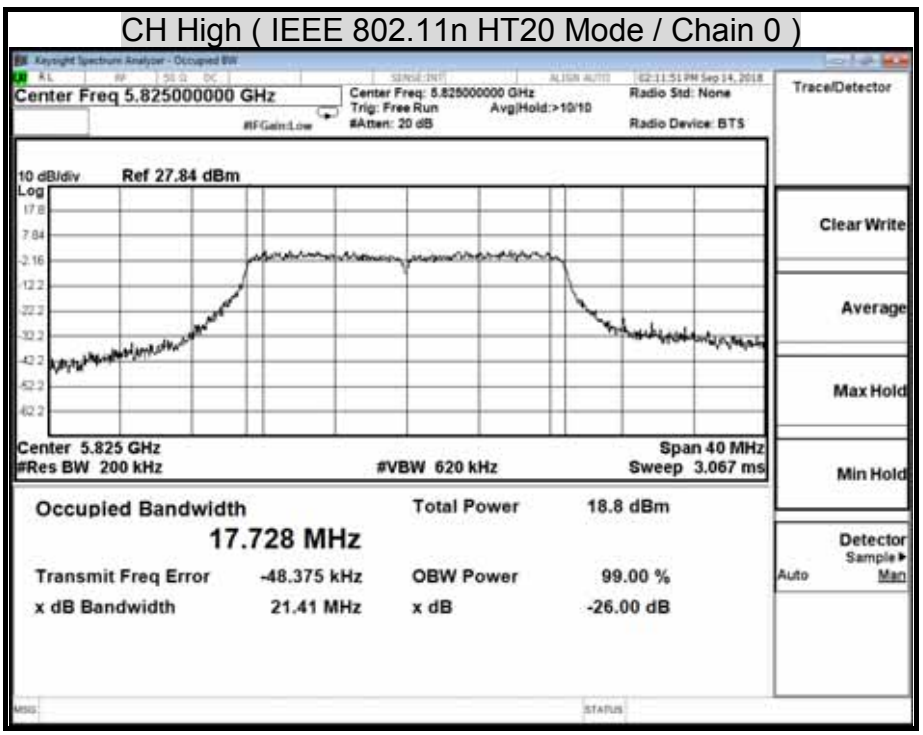
CH Low (IEEE 802.11n HT20 Mode / Chain 0)



CH Middle (IEEE 802.11n HT20 Mode / Chain 0)

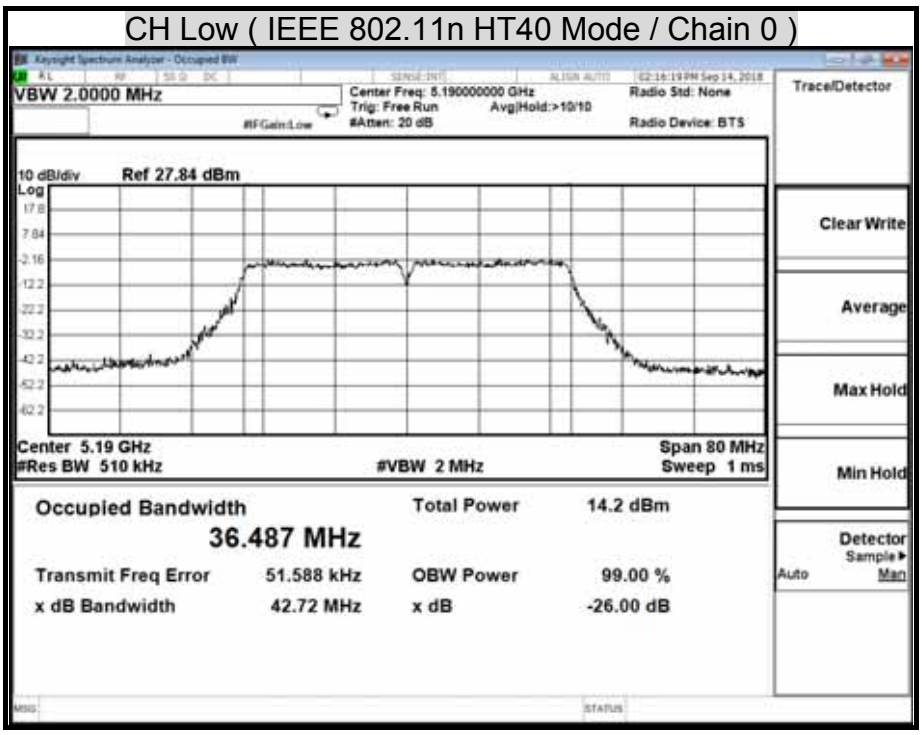


CH High (IEEE 802.11n HT20 Mode / Chain 0)

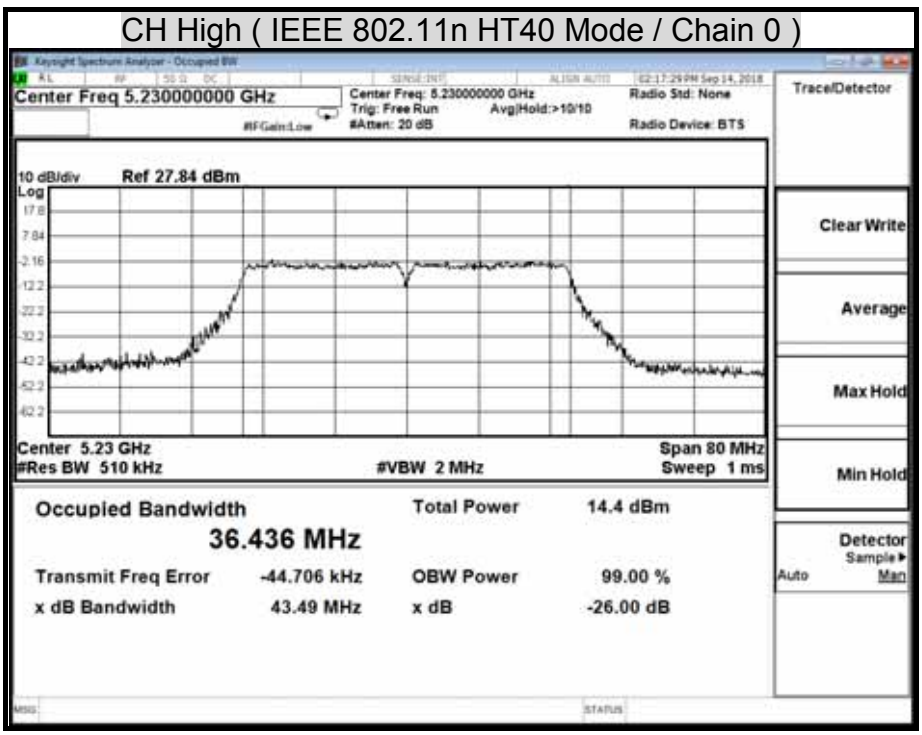


Test Mode: IEEE 802.11n HT 40 MHz mode / 5150 ~ 5250MHz

CH Low (IEEE 802.11n HT40 Mode / Chain 0)

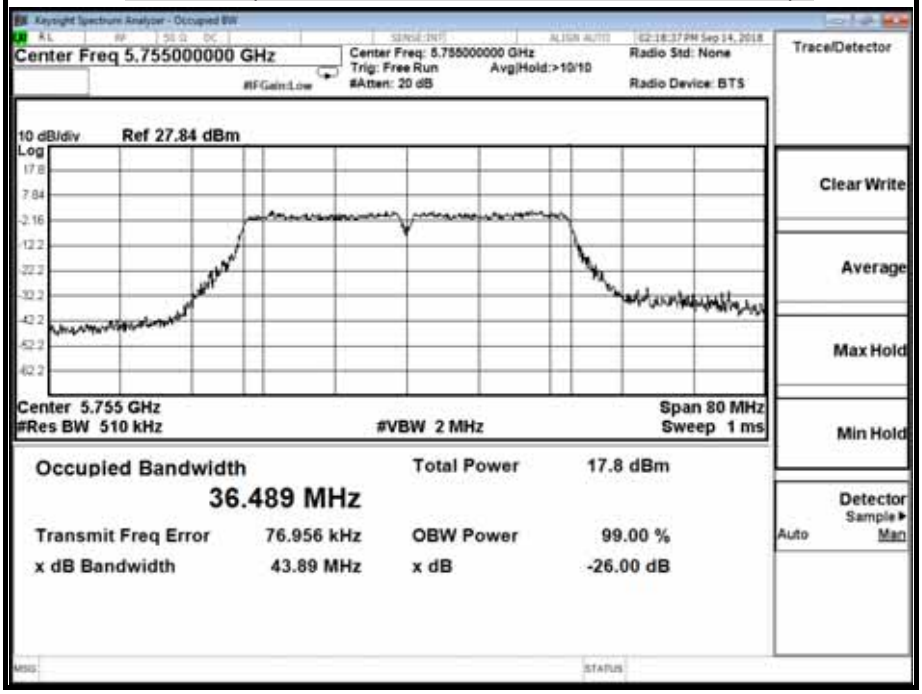


CH High (IEEE 802.11n HT40 Mode / Chain 0)

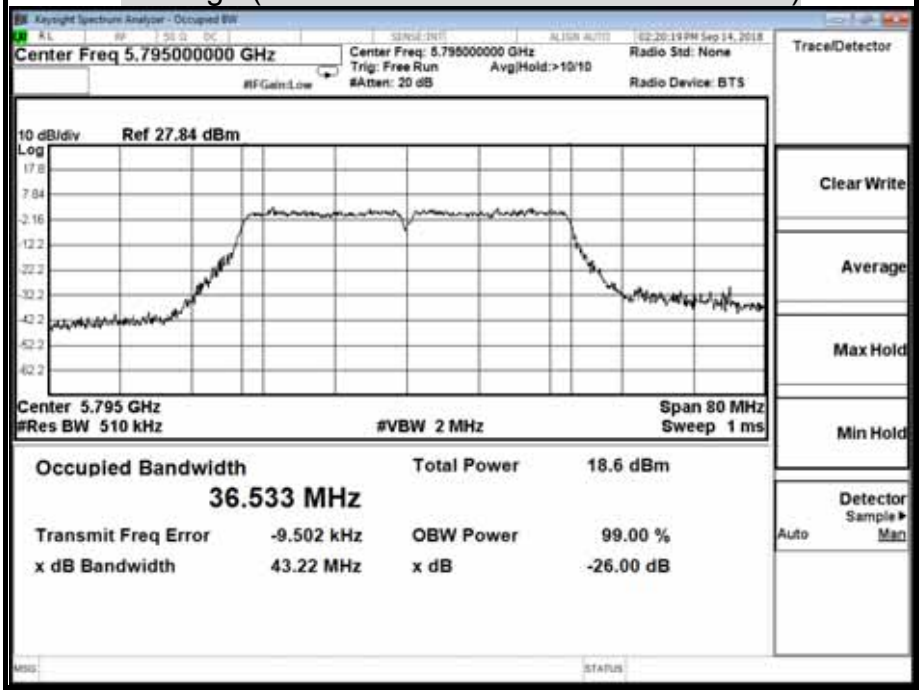


Test Mode: IEEE 802.11n HT 40 MHz mode / 5720 ~ 5850 MHz

CH Low (IEEE 802.11n HT40 Mode / Chain 0)

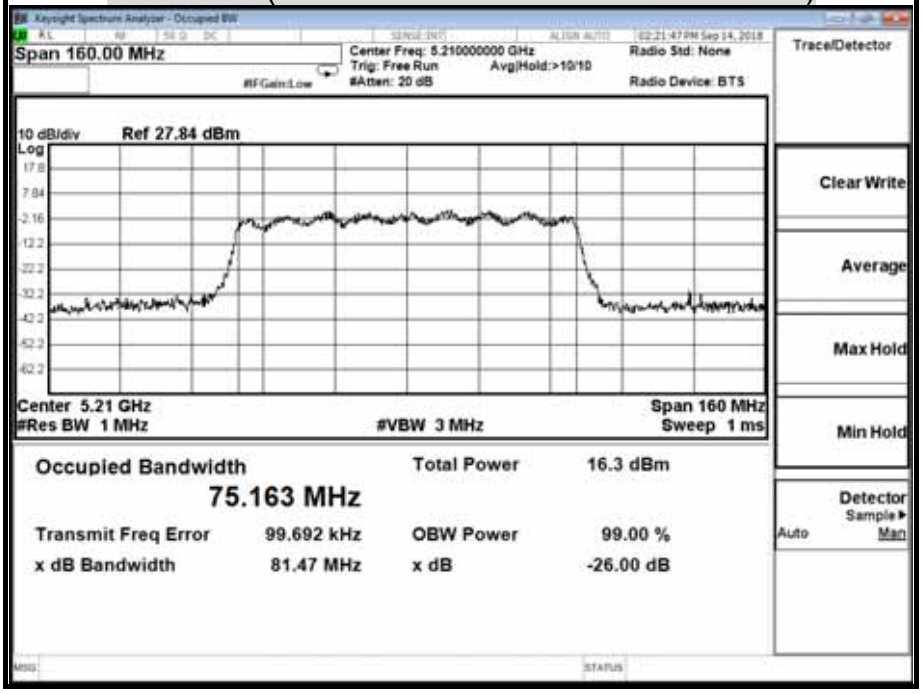


CH High (IEEE 802.11n HT40 Mode / Chain 0)



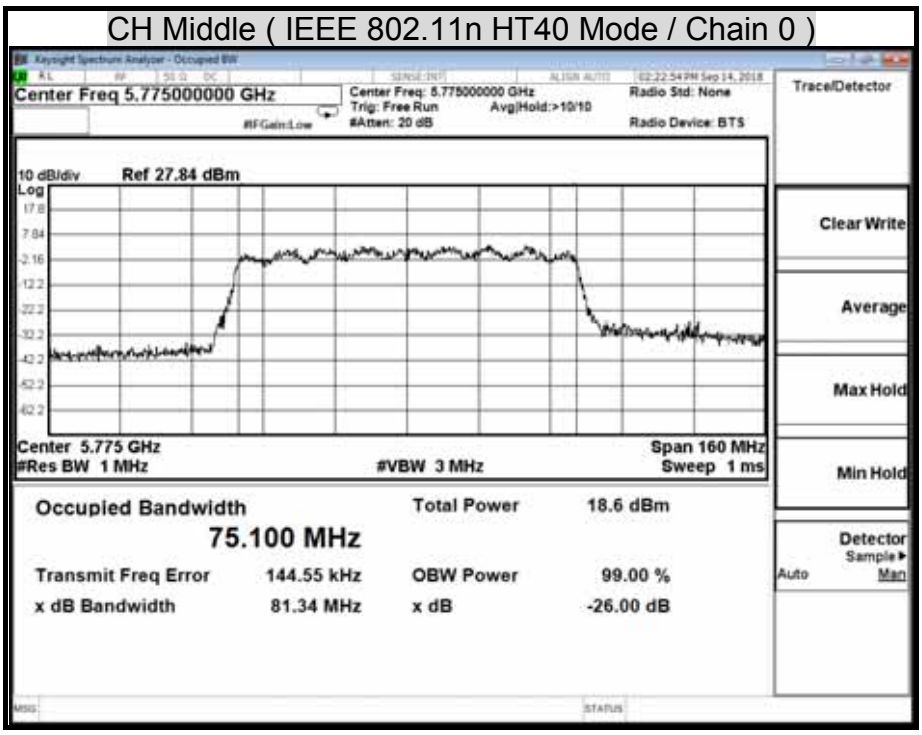
Test Mode: IEEE 802.11 ac VHT80 Mode / 5150 ~ 5250MHz

CH Middle (IEEE 802.11n HT40 Mode / Chain 0)



Test Mode: IEEE 802.11 ac VHT80 Mode / 5720 ~ 5850 MHz

CH Middle (IEEE 802.11n HT40 Mode / Chain 0)



7.2 26dB BANDWIDTH

LIMITS

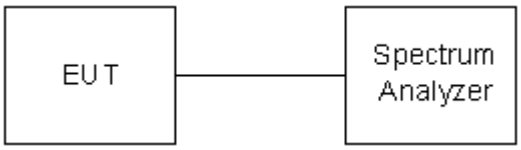
§ 15.303 (c) (2), For purposes of this subpart, the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth 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 EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/05/2018	07/04/2019
Power Meter	Anritsu	ML2487A	6K00003888	05/02/2018	05/01/2019
Power Sensor	Anritsu	MA2491A	033265	05/02/2018	05/01/2019
SMA Cable + 10dB Attenuator	CCS	SMA + 10dB Att	O6	01/22/2018	01/21/2019

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

TEST SETUP



TEST PROCEDURE

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. 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%.

TEST RESULTS

IEEE 802.11a Mode / 5150 ~ 5250MHz

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	Pass / Fail
Low	5180	20.63	PASS
Middle	5200	20.37	PASS
High	5240	20.41	PASS

IEEE 802.11a Mode / 5725 ~ 5850MHz

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	Pass / Fail
Low	5745	20.91	PASS
Middle	5785	20.68	PASS
High	5825	20.67	PASS

IEEE 802.11n HT20 Mode / 5150 ~ 5250MHz

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	Pass / Fail
		Chain 0	
Low	5180	21.42	PASS
Middle	5200	21.03	PASS
High	5240	21.18	PASS

IEEE 802.11n HT20 Mode / 5725 ~ 5850MHz

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	Pass / Fail
		Chain 0	
Low	5745	21.37	PASS
Middle	5785	21.38	PASS
High	5825	21.33	PASS

IEEE 802.11n HT40 Mode / 5150 ~ 5250MHz

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	Pass / Fail
		Chain 0	
Low	5190	43.88	PASS
High	5230	43.79	PASS

IEEE 802.11n HT40 Mode / 5725 ~ 5850MHz

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	Pass / Fail
		Chain 0	
Low	5755	43.52	PASS
High	5795	43.97	PASS

IEEE 802.11ac VHT80 Mode / 5150 ~ 5250MHz

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	Pass / Fail
		Chain 0	
Middle	5210	75.28	PASS

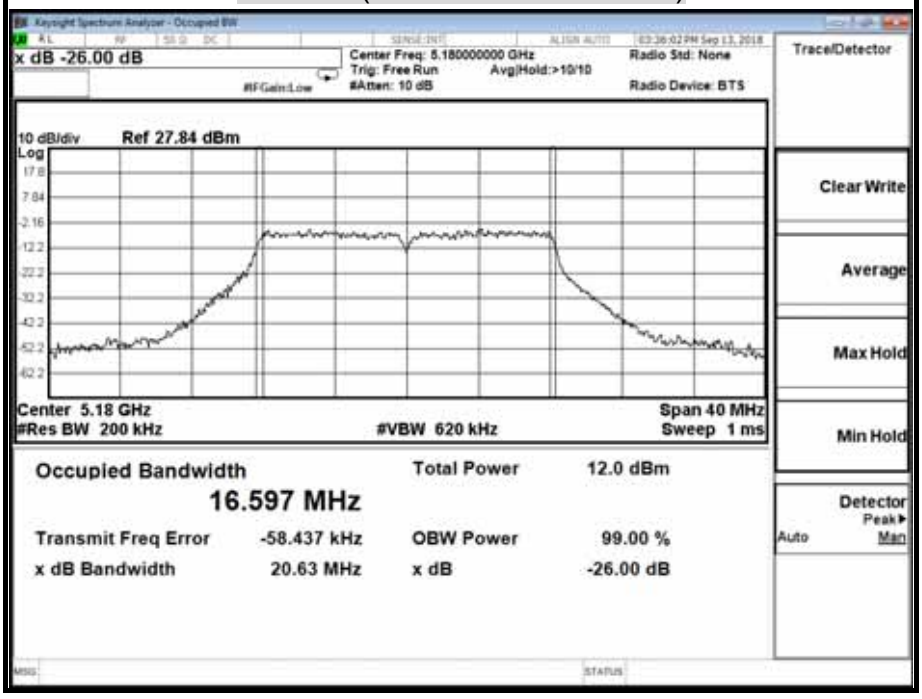
IEEE 802.11ac VHT80 Mode / 5725 ~ 5850MHz

Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	Pass / Fail
		Chain 0	
Middle	5775	81.48	PASS

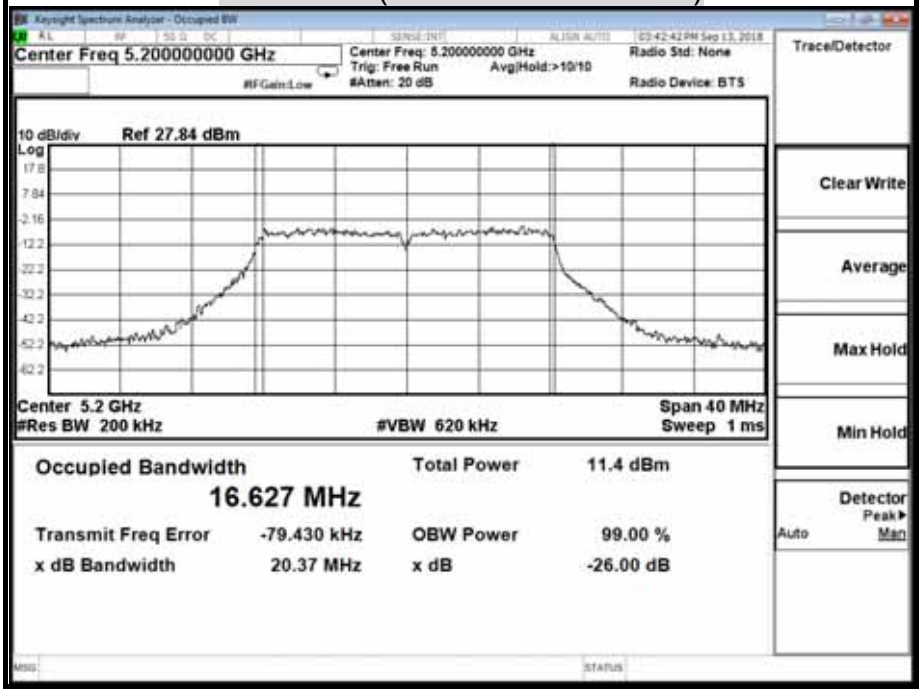
26dB BANDWIDTH

Test Mode: IEEE 802.11a mode / 5150 ~ 5250MHz

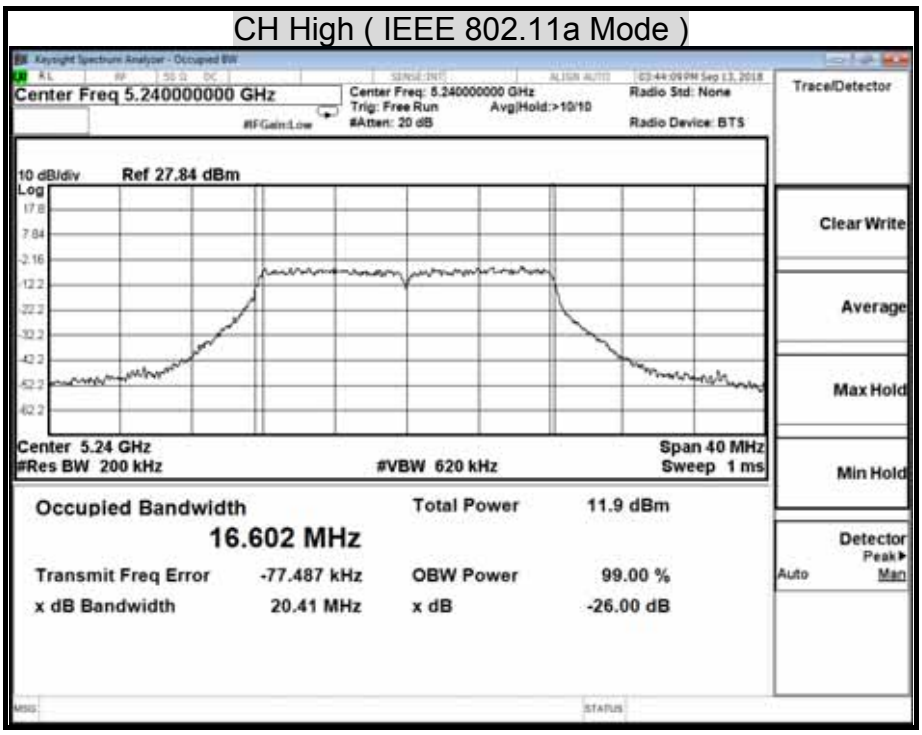
CH Low (IEEE 802.11a Mode)



CH Middle (IEEE 802.11a Mode)

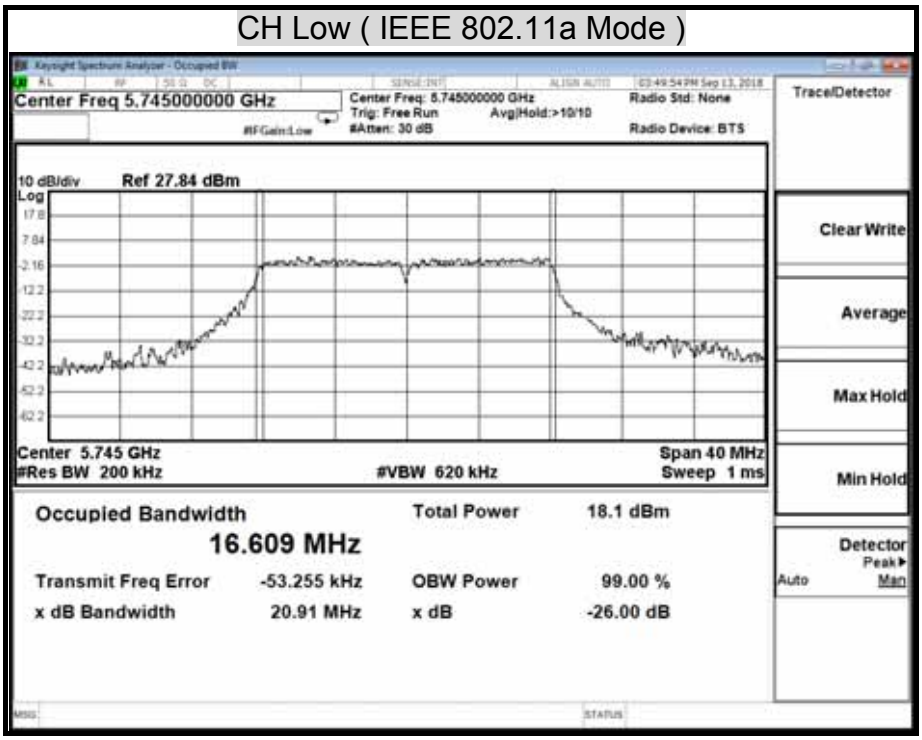


CH High (IEEE 802.11a Mode)

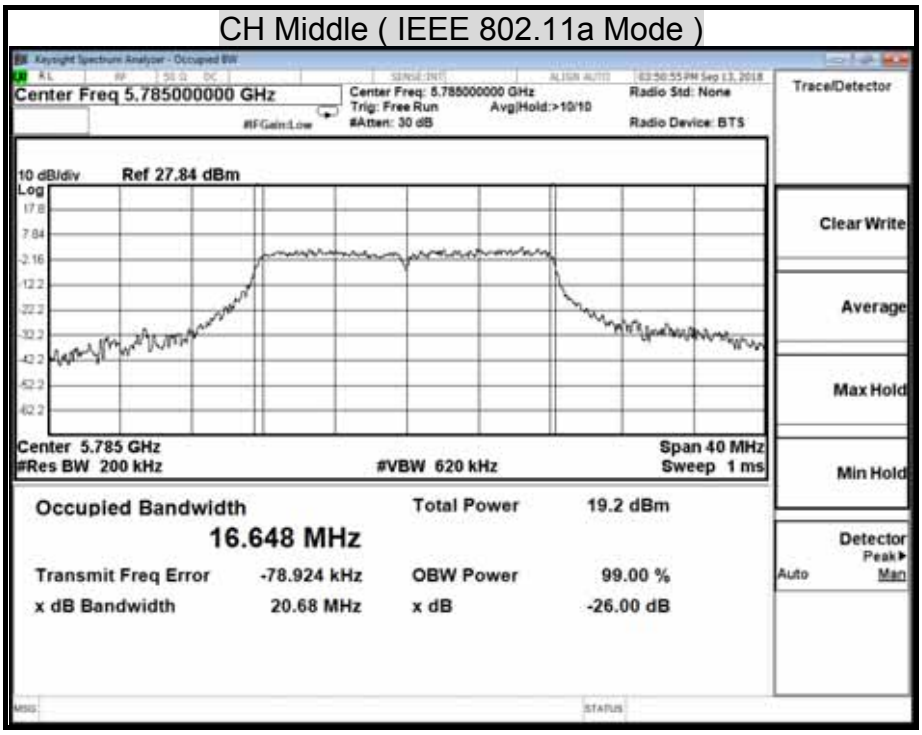


Test Mode: IEEE 802.11a mode / 5725 ~ 5850MHz

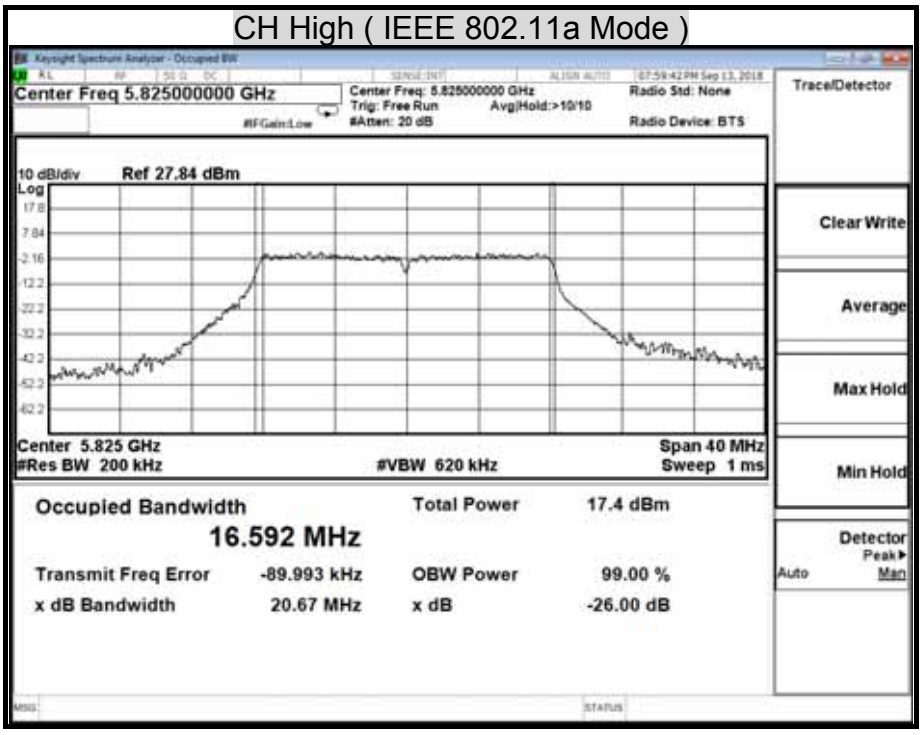
CH Low (IEEE 802.11a Mode)



CH Middle (IEEE 802.11a Mode)

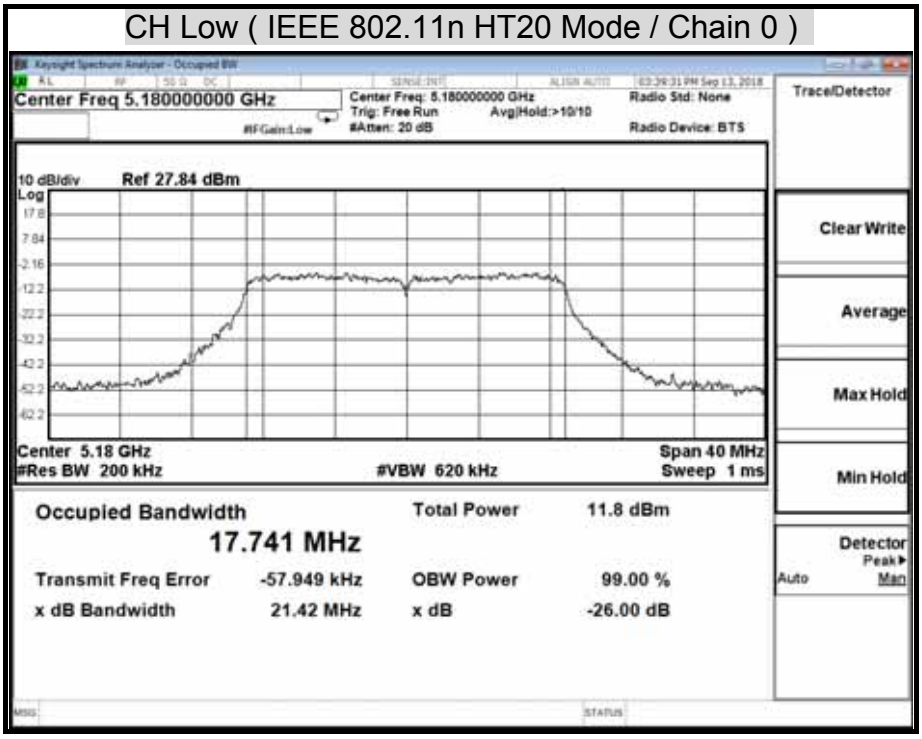


CH High (IEEE 802.11a Mode)

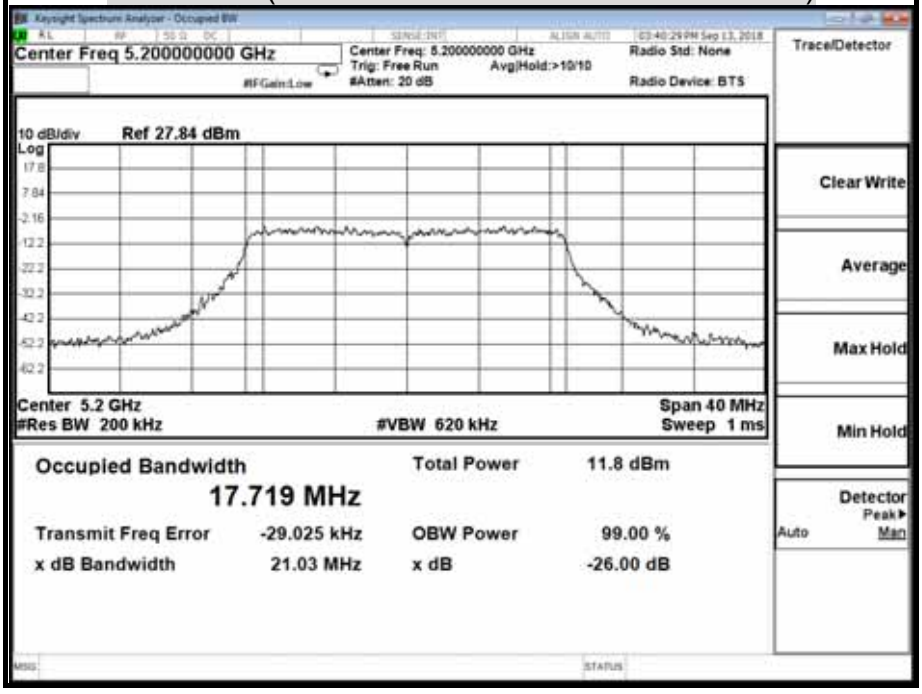


Test Mode: IEEE 802.11n HT 20 MHz mode / 5150 ~ 5250MHz

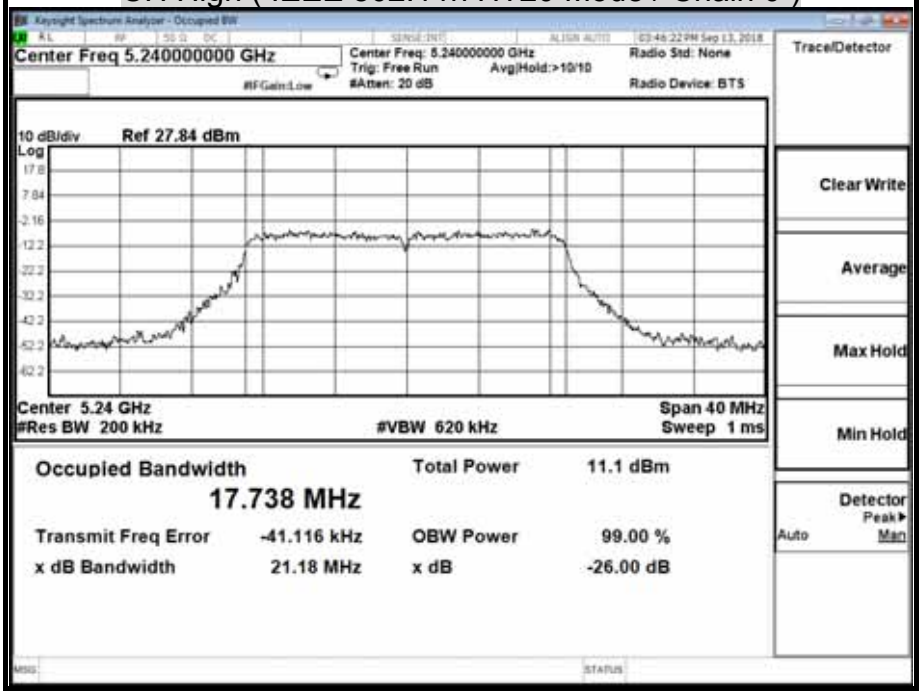
CH Low (IEEE 802.11n HT20 Mode / Chain 0)



CH Middle (IEEE 802.11n HT20 Mode / Chain 0)

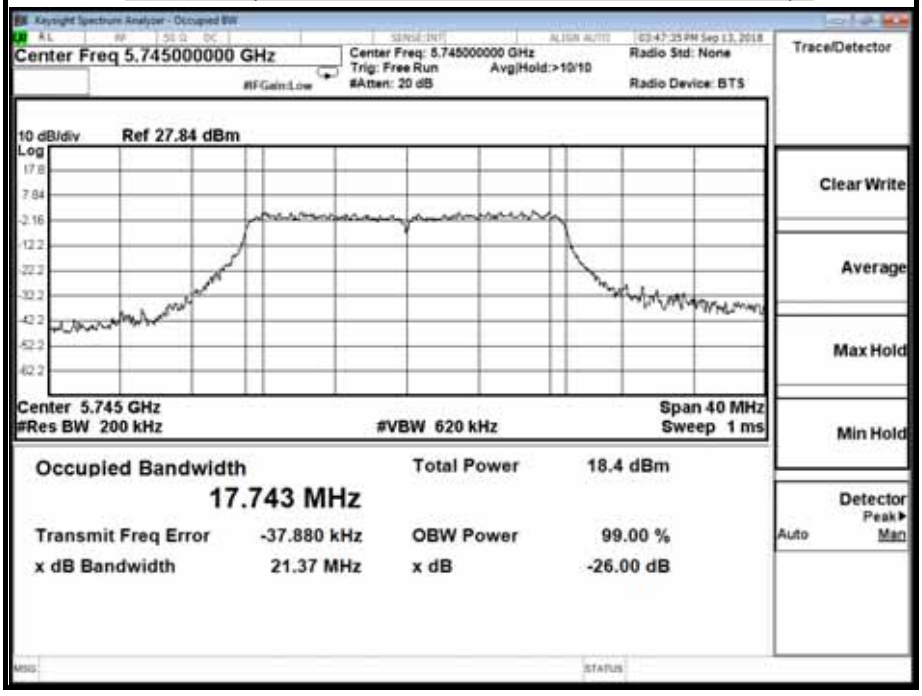


CH High (IEEE 802.11n HT20 Mode / Chain 0)

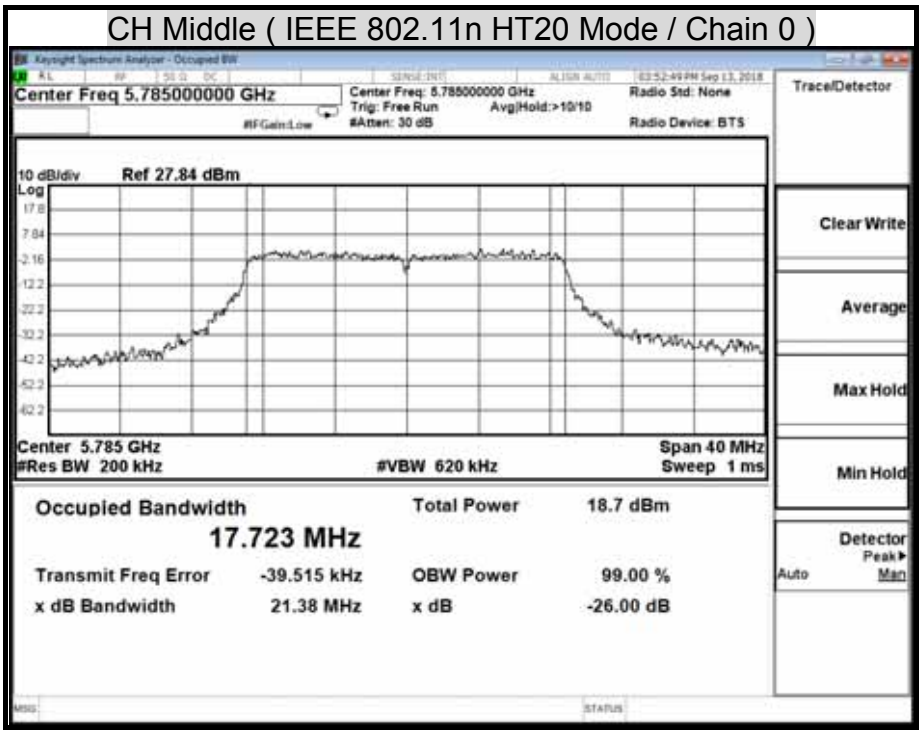


Test Mode: IEEE 802.11n HT 20 MHz mode / 5725 ~ 5850MHz

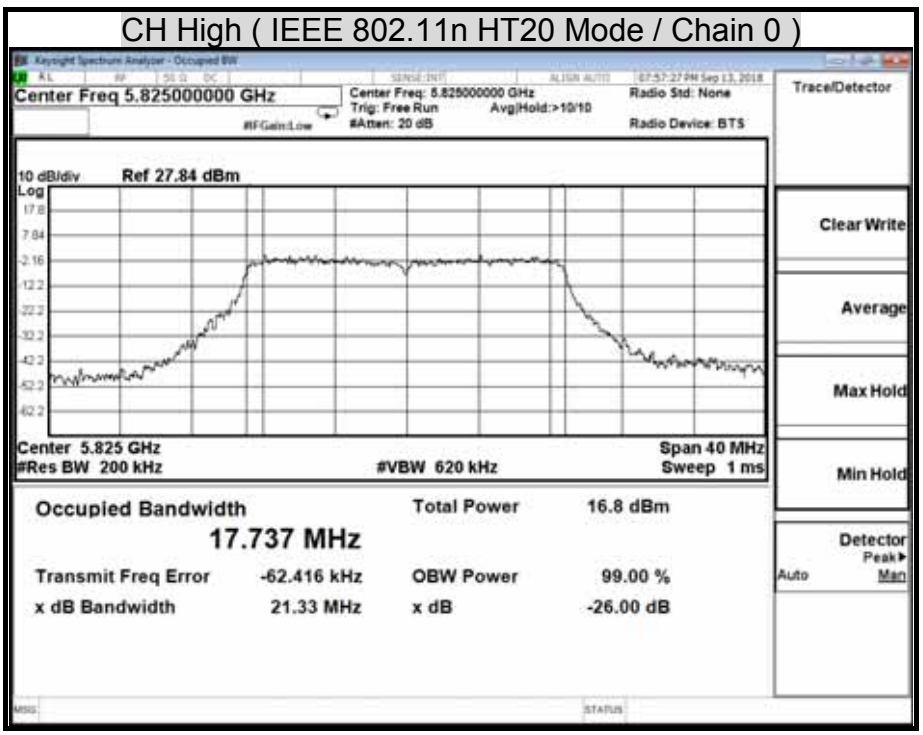
CH Low (IEEE 802.11n HT20 Mode / Chain 0)



CH Middle (IEEE 802.11n HT20 Mode / Chain 0)

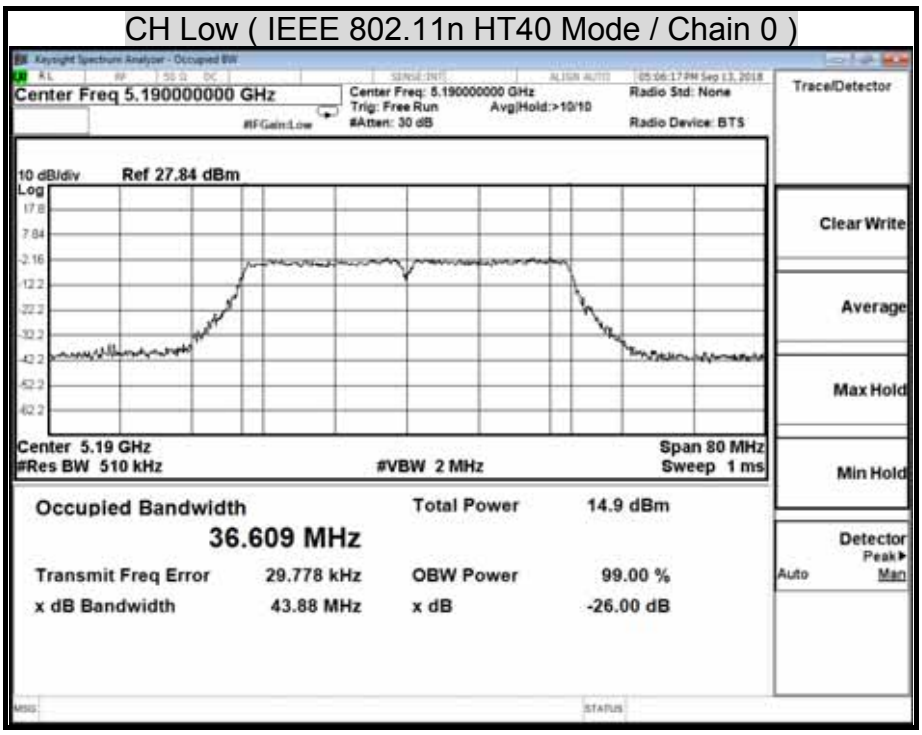


CH High (IEEE 802.11n HT20 Mode / Chain 0)

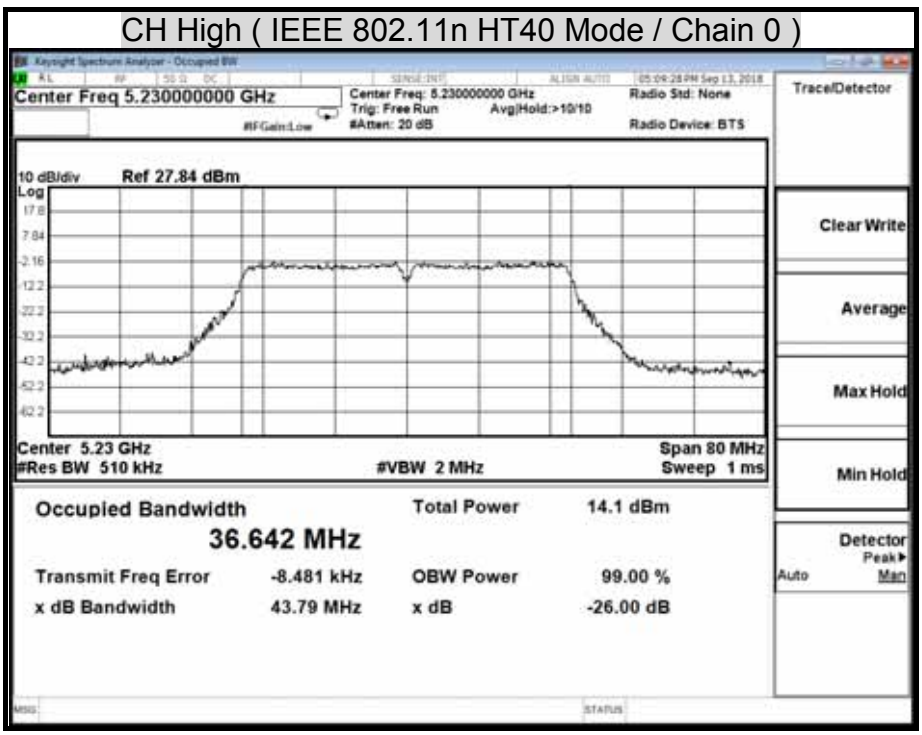


Test Mode: IEEE 802.11n HT 40 MHz mode / 5150 ~ 5250MHz

CH Low (IEEE 802.11n HT40 Mode / Chain 0)

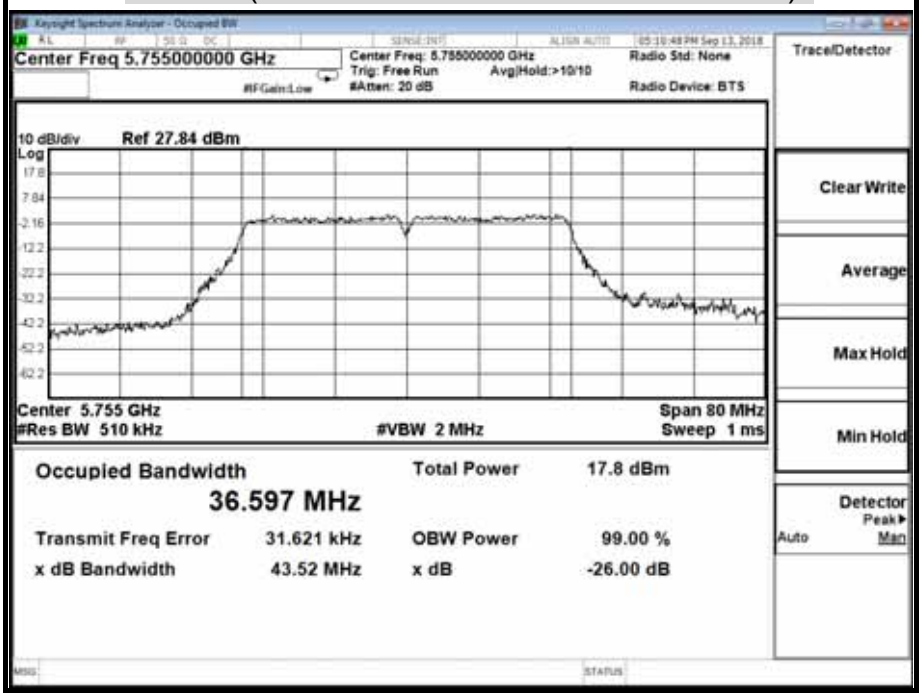


CH High (IEEE 802.11n HT40 Mode / Chain 0)

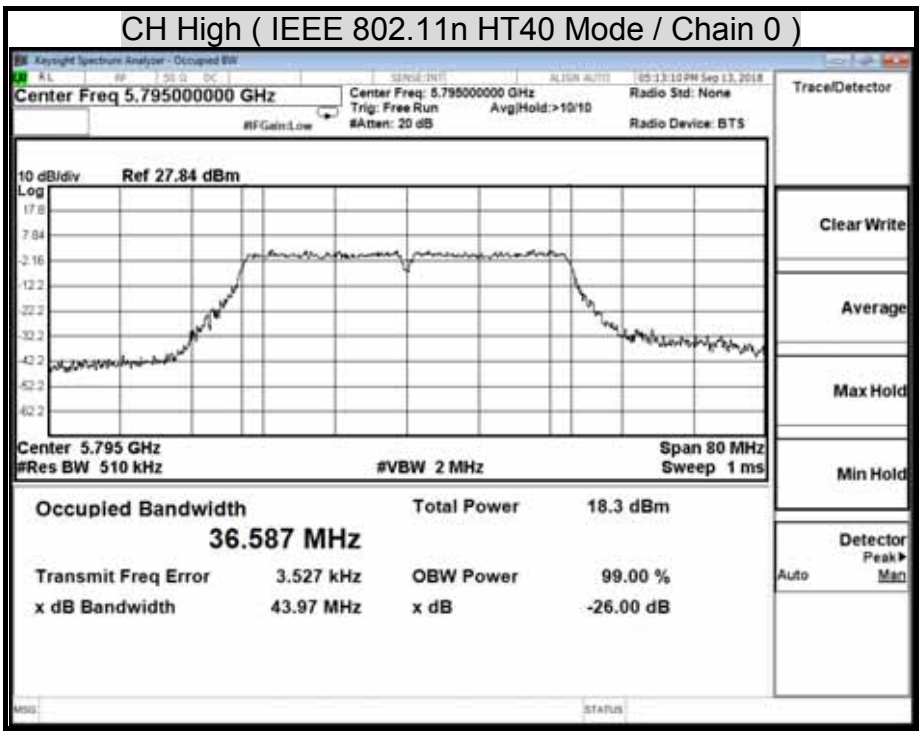


Test Mode: IEEE 802.11n HT 40 MHz mode / 5720 ~ 5850 MHz

CH Low (IEEE 802.11n HT40 Mode / Chain 0)

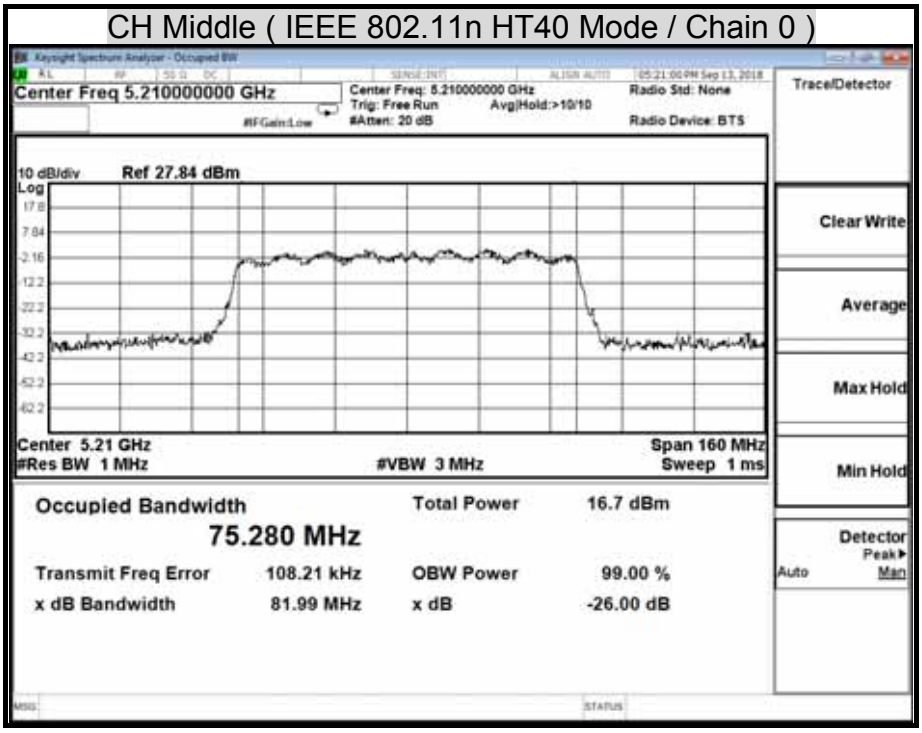


CH High (IEEE 802.11n HT40 Mode / Chain 0)



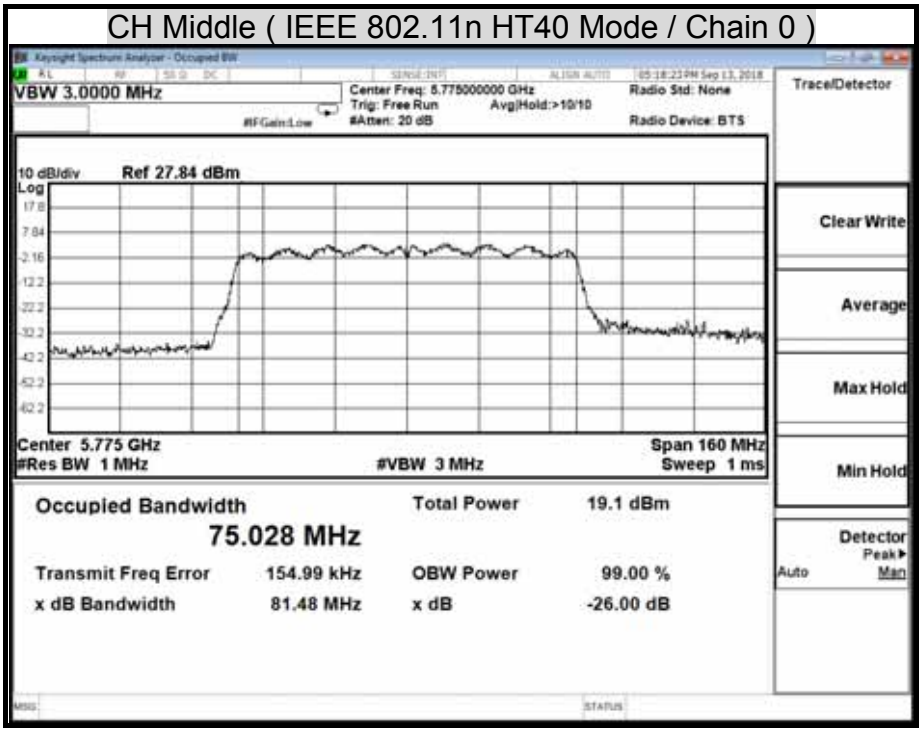
Test Mode: IEEE 802.11n HT 40 MHz mode / 5150 ~ 5250MHz

CH Middle (IEEE 802.11n HT40 Mode / Chain 0)



Test Mode: IEEE 802.11n HT 40 MHz mode / 5720 ~ 5850 MHz

CH Middle (IEEE 802.11n HT40 Mode / Chain 0)



7.3 6dB BANDWIDTH

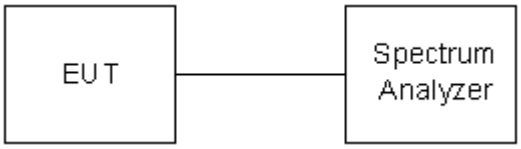
LIMIT

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

TEST EQUIPMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/05/2018	07/04/2019
Power Meter	Anritsu	ML2487A	6K00003888	05/02/2018	05/01/2019
Power Sensor	Anritsu	MA2491A	033265	05/02/2018	05/01/2019
SMA Cable + 10dB Attenuator	CCS	SMA + 10dB Att	O6	01/22/2018	01/21/2019

TEST SETUP



TEST PROCEDURE

1. Set resolution bandwidth (RBW) = 1-5 % of the emission bandwidth (EBW).
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission. Compare the resultant bandwidth with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is 1-5 %.

TEST RESULTS

IEEE 802.11a Mode / 5725 ~ 5850MHz

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	5745	16.54	>500	PASS
Middle	5785	16.53	>500	PASS
High	5825	16.58	>500	PASS

IEEE 802.11n HT20 Mode / 5725 ~ 5850MHz

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
		Chain 0		
Low	5745	17.83	>500	PASS
Middle	5785	17.79	>500	PASS
High	5825	17.79	>500	PASS

IEEE 802.11n HT40 Mode / 5725 ~ 5850MHz

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
		Chain 0		
Low	5755	36.57	>500	PASS
High	5795	36.54	>500	PASS

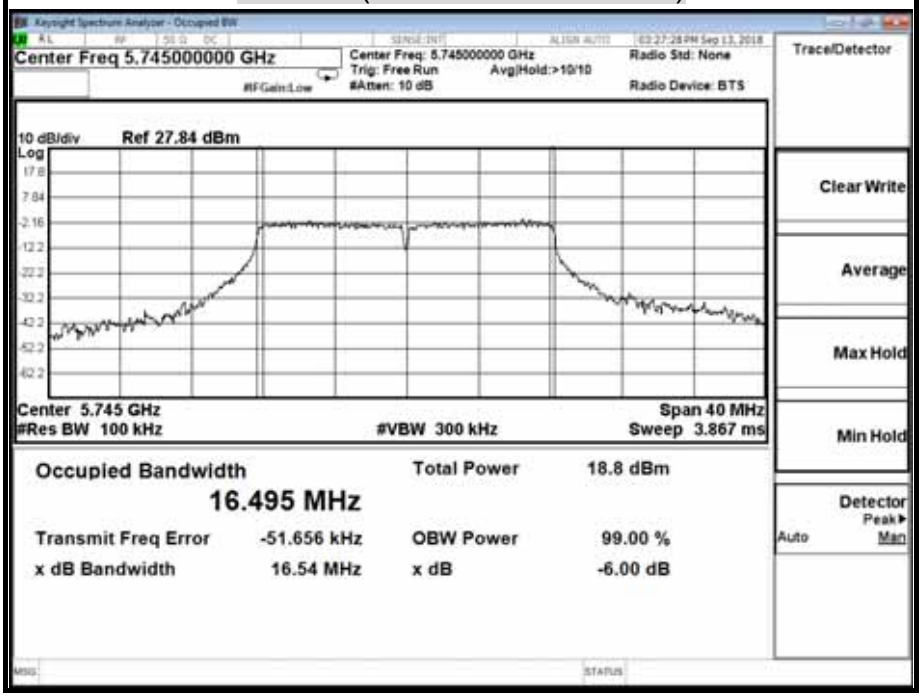
IEEE 802.11ac VHT80 Mode / 5150 ~ 5250MHz

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
		Chain 0		
Middle	5775	75.31	>500	PASS

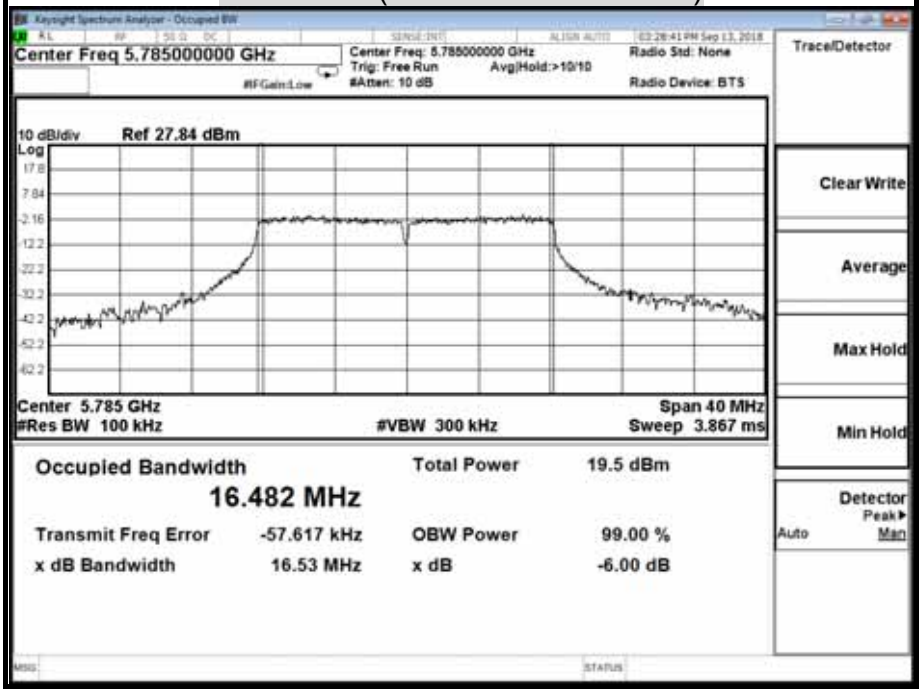
6dB BANDWIDTH

Test Mode: IEEE 802.11a mode / 5725 ~ 5850MHz

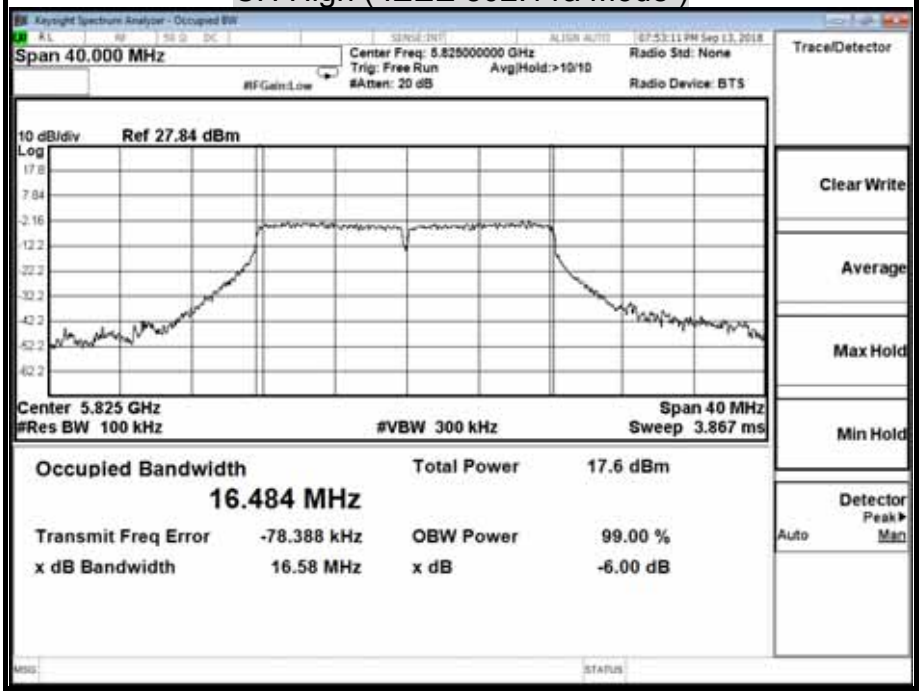
CH Low (IEEE 802.11a Mode)



CH Middle (IEEE 802.11a Mode)

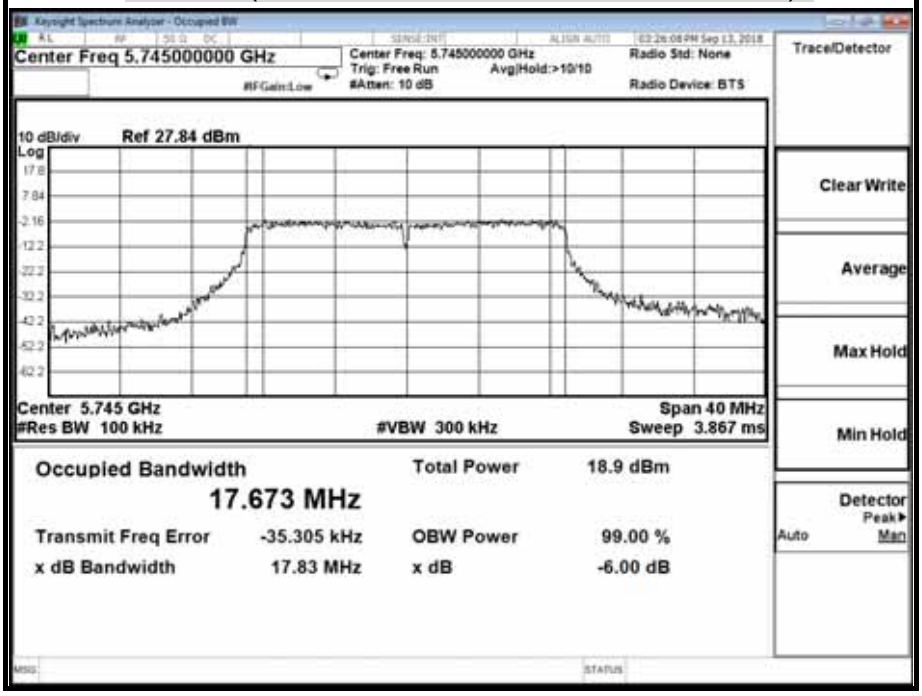


CH High (IEEE 802.11a Mode)

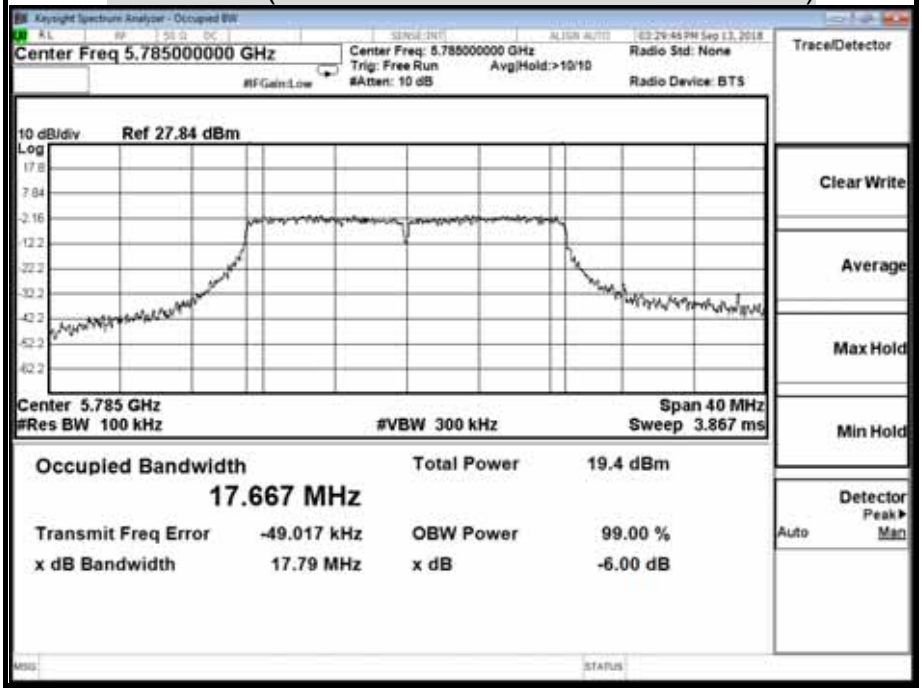


Test Mode: IEEE 802.11n HT 20 MHz mode / 5725 ~ 5850MHz

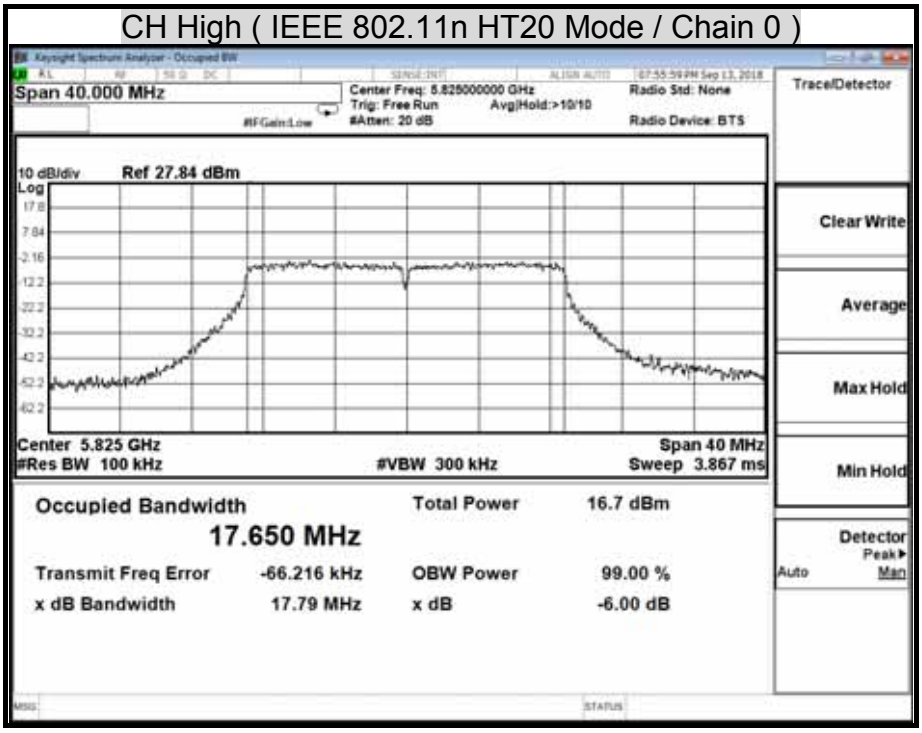
CH Low (IEEE 802.11n HT20 Mode / Chain 0)



CH Middle (IEEE 802.11n HT20 Mode / Chain 0)

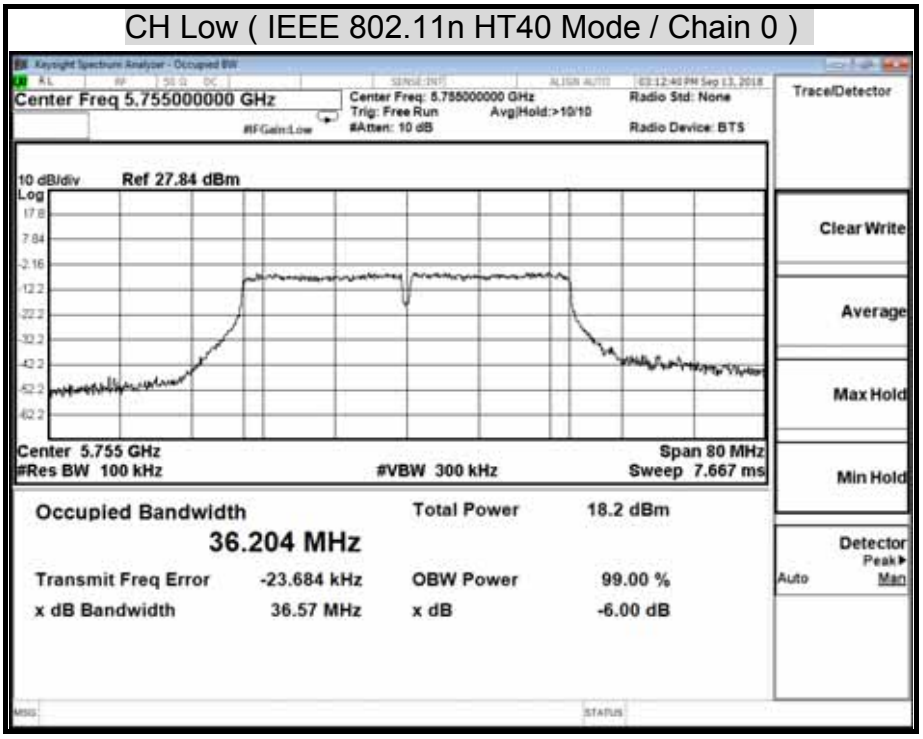


CH High (IEEE 802.11n HT20 Mode / Chain 0)

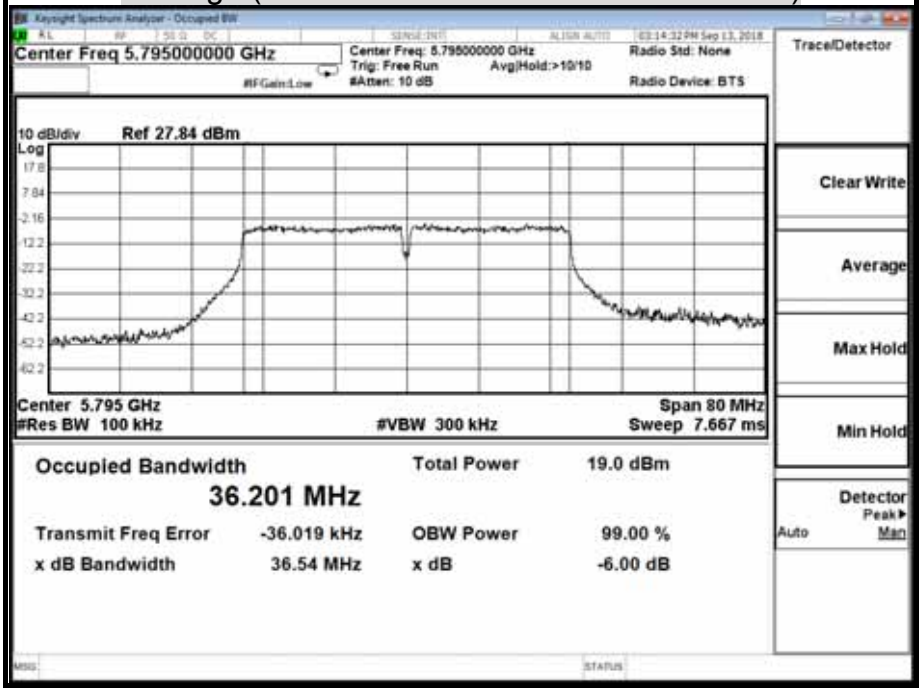


Test Mode: IEEE 802.11n HT 40 MHz mode / 5720 ~ 5850 MHz

CH Low (IEEE 802.11n HT40 Mode / Chain 0)

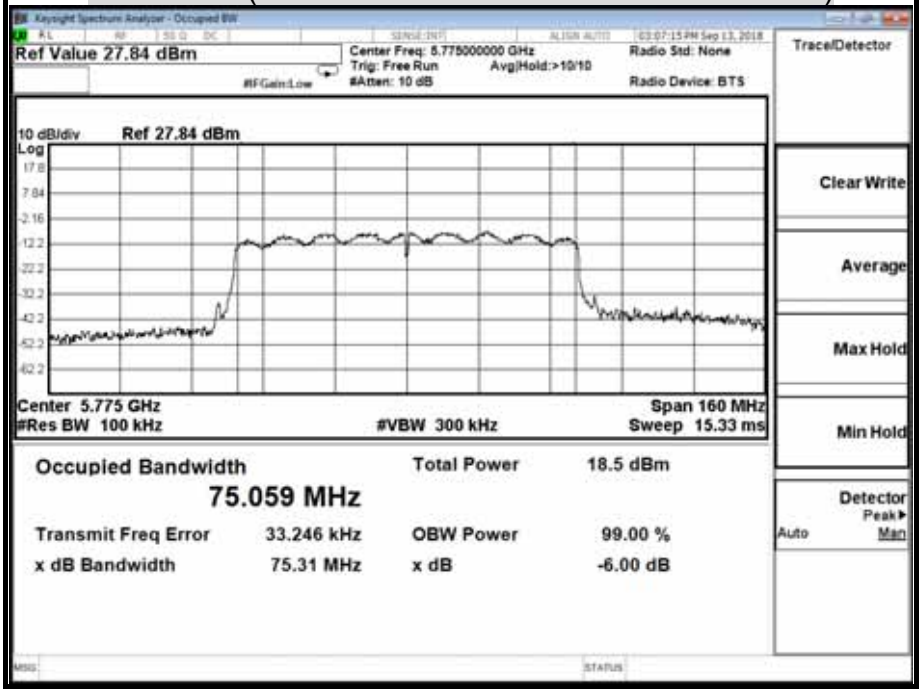


CH High (IEEE 802.11n HT40 Mode / Chain 0)



Test Mode: IEEE 802.11ac VHT 80 MHz mode / 5725 ~ 5850MHz

CH Middle (IEEE 802.11ac VHT80 Mode / Chain 0)



7.4 MAXIMUM CONDUCTED OUTPUT POWER

LIMITS

§ 15.407(a)

(1) For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15 – 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15 – 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/05/2018	07/04/2019
Power Meter	Anritsu	ML2487A	6K00003888	05/02/2018	05/01/2019
Power Sensor	Anritsu	MA2491A	033265	05/02/2018	05/01/2019
SMA Cable + 10dB Attenuator	CCS	SMA + 10dB Att	O6	01/22/2018	01/21/2019

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

TEST SETUP

TEST PROCEDURE

1. Set span to encompass the entire 26-dB emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.
2. Set RBW = 1 MHz.
3. Set VBW ≥ 3 MHz.
4. Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
5. Sweep time = auto.
6. Detector = RMS (*i.e.*, power averaging), if available. Otherwise, use sample detector mode.
7. If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (*i.e.,* with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run”.
8. Trace average at least 100 traces in power averaging (*i.e.,* RMS) mode.
9. Compute power by integrating the spectrum across the 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

TEST RESULTS

IEEE 802.11a Mode / 5150 ~ 5250MHz

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
Low	5180	13.37	29.00	PASS
Middle	5200	13.21	29.00	PASS
High	5240	13.15	29.00	PASS

IEEE 802.11a Mode / 5725 ~ 5850MHz

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
Low	5745	19.91	29.00	PASS
Middle	5785	20.63	29.00	PASS
High	5825	20.59	29.00	PASS

Remark:

1. *At finial test to get the worst-case emission at 6Mbps.*
2. *The cable assembly insertion loss of 11.7dB (including 10 dB pad and 1.7 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

IEEE 802.11n HT20 Mode / 5150 ~ 5250MHz

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
		Chain 0		
Low	5180	13.64	29.00	PASS
Middle	5200	13.73	29.00	PASS
High	5240	13.59	29.00	PASS

IEEE 802.11n HT20 Mode / 5725 ~ 5850MHz

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
		Chain 0		
Low	5745	20.25	29.00	PASS
Middle	5785	21.16	29.00	PASS
High	5825	21.29	29.00	PASS

Remark:

1. *At finial test to get the worst-case emission at 13Mbps.*
2. *The cable assembly insertion loss of 11.7dB (including 10 dB pad and 1.7 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

IEEE 802.11n HT40 Mode / 5150 ~ 5250 MHz

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
		Chain 0		
Low	5190	15.97	29.00	PASS
High	5230	16.12	29.00	PASS

IEEE 802.11n HT40 Mode / 5725 ~ 5850 MHz

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
		Chain 0		
Low	5755	19.81	29.00	PASS
High	5795	20.38	29.00	PASS

Remark:

1. *At finial test to get the worst-case emission at 27Mbps.*
2. *The cable assembly insertion loss of 11.7dB (including 10 dB pad and 1.7 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

IEEE 802.11ac VHT80 Mode / 5150 ~ 5250 MHz

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
		Chain 0		
Middle	5210	17.59	29.00	PASS

IEEE 802.11ac VHT80 Mode / 5725 ~ 5850 MHz

Channel	Channel Frequency (MHz)	Peak Power (dBm)	Peak Power Limit (dBm)	Pass / Fail
		Chain 0		
Middle	5775	20.09	29.00	PASS

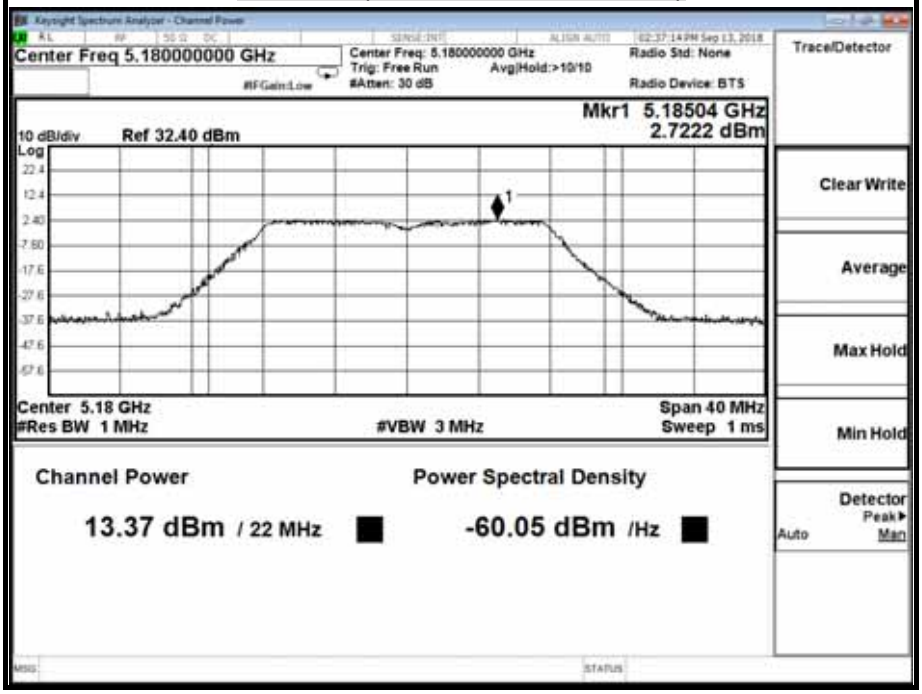
Remark:

1. *At finial test to get the worst-case emission at 117Mbps.*
2. *The cable assembly insertion loss of 11.7dB (including 10 dB pad and 1.7 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

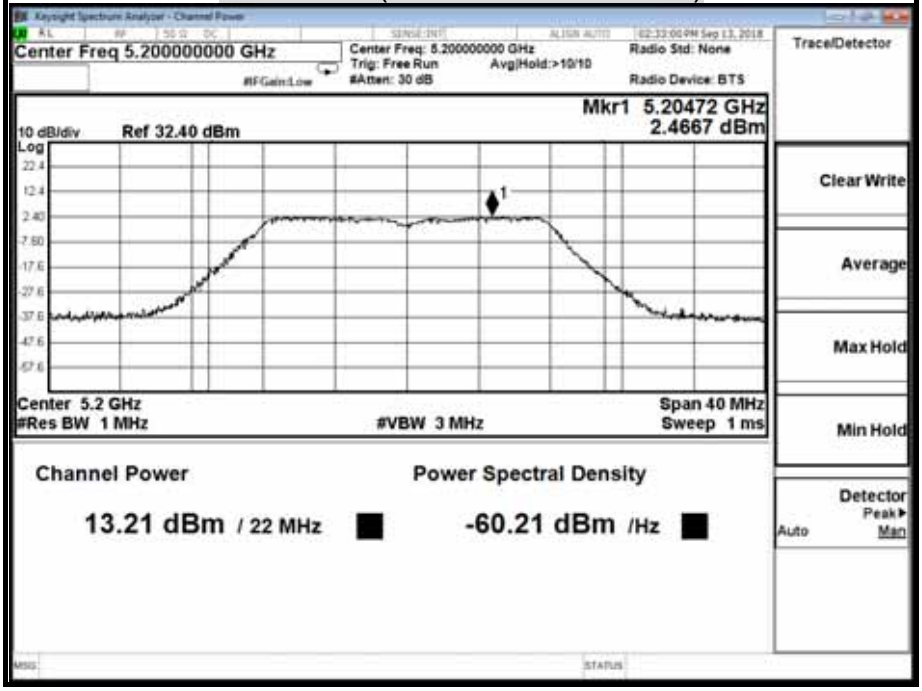
MAXIMUM CONDUCTED OUTPUT POWER

Test Mode: IEEE 802.11a mode / 5150 ~ 5250MHz

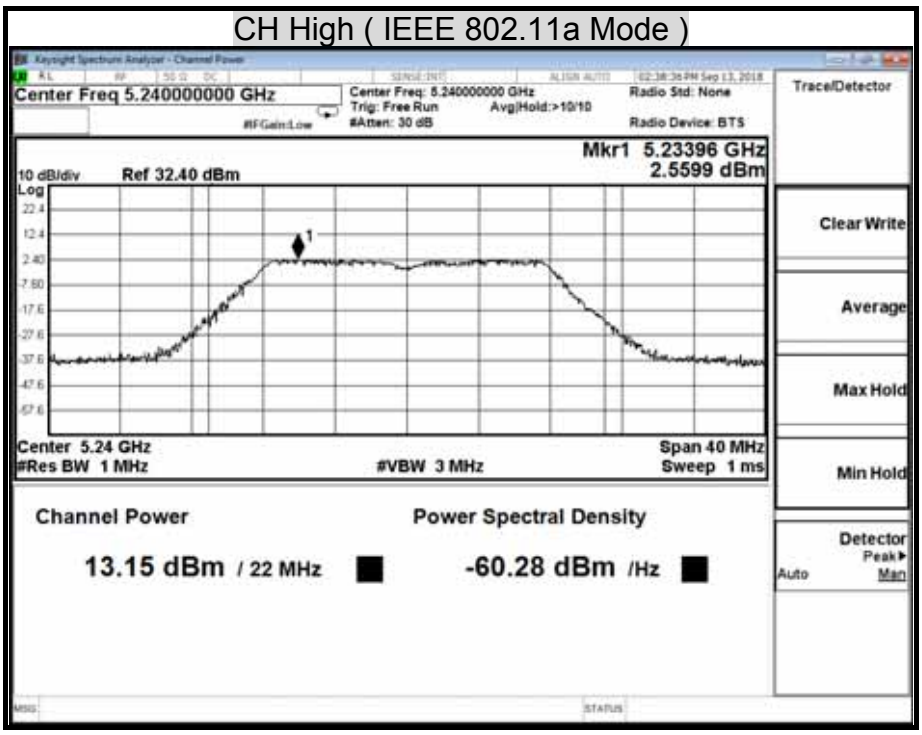
CH Low (IEEE 802.11a Mode)



CH Middle (IEEE 802.11a Mode)

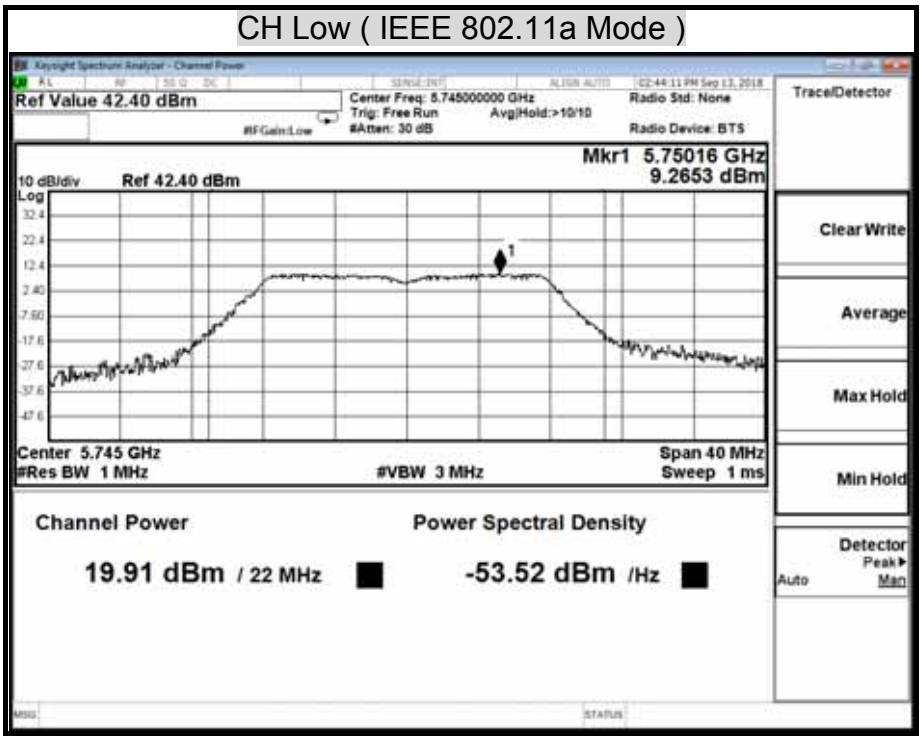


CH High (IEEE 802.11a Mode)

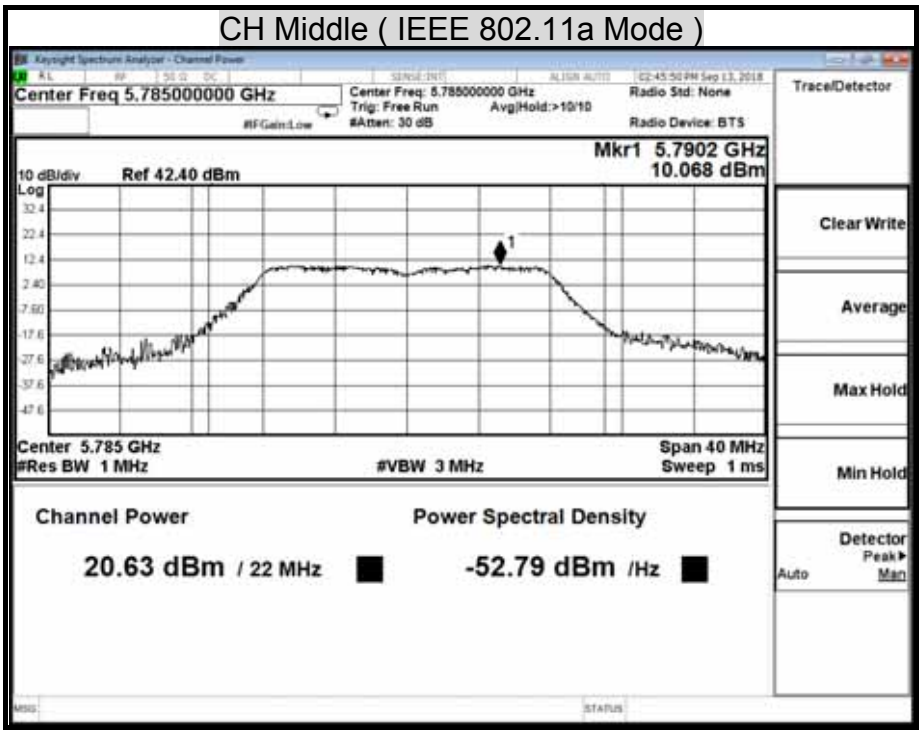


Test Mode: IEEE 802.11a mode / 5725 ~ 5850MHz

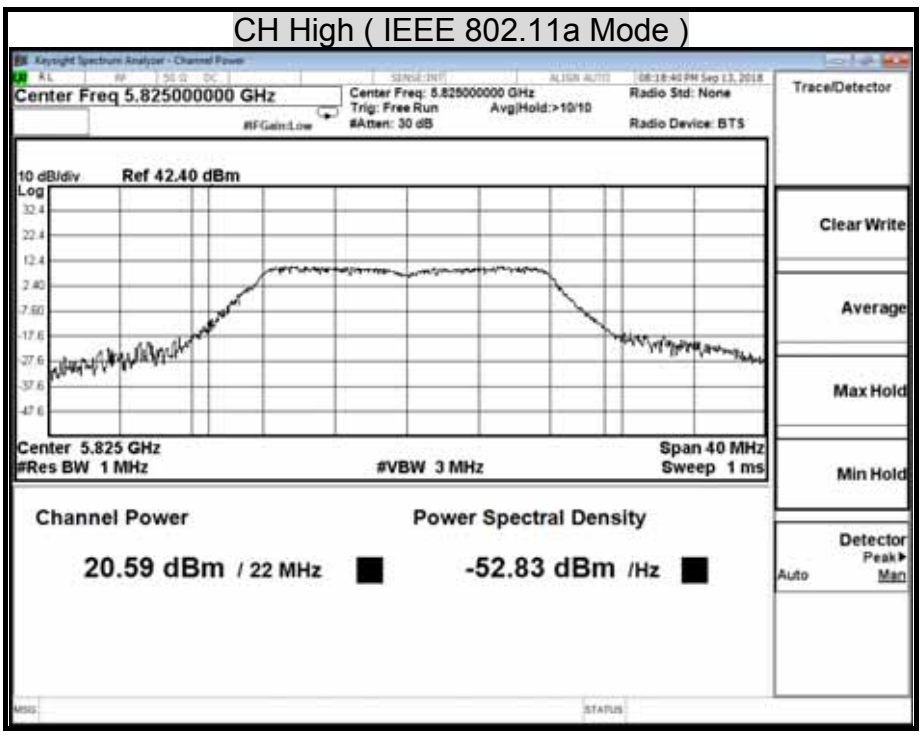
CH Low (IEEE 802.11a Mode)



CH Middle (IEEE 802.11a Mode)

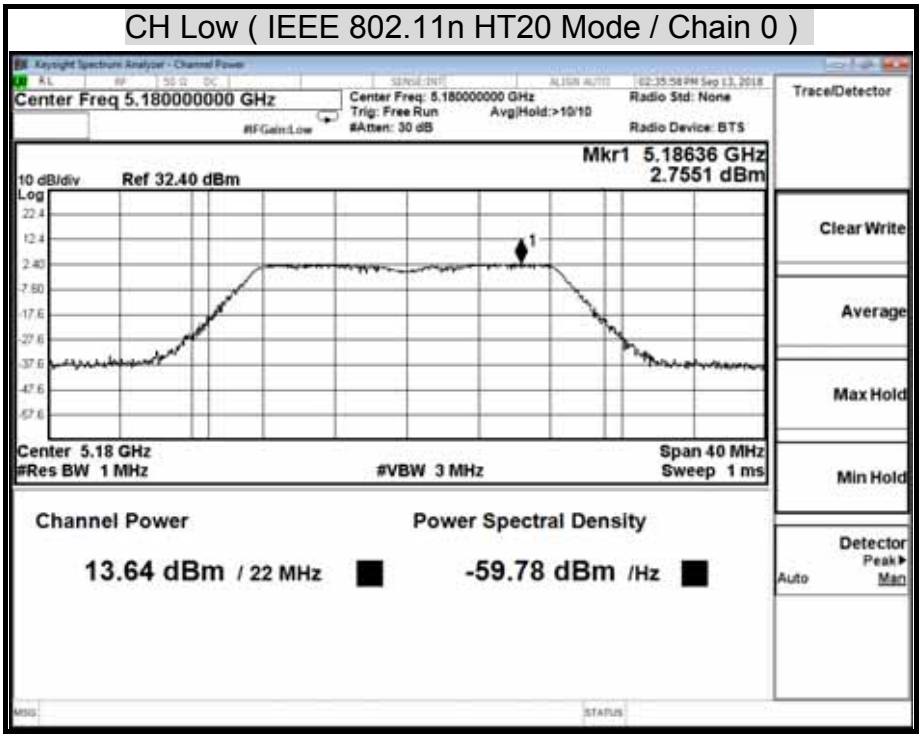


CH High (IEEE 802.11a Mode)

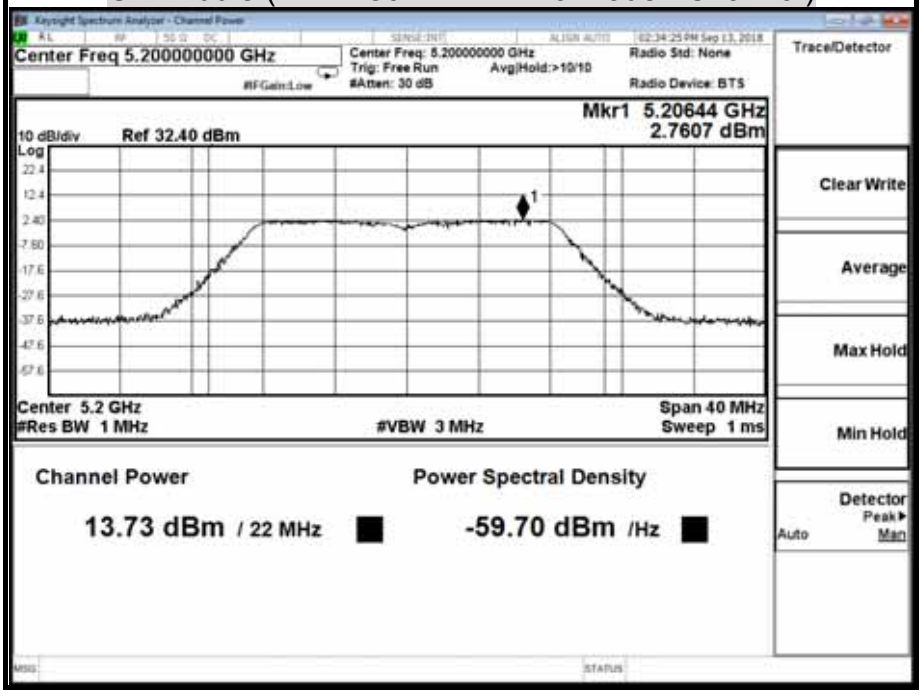


Test Mode: IEEE 802.11n HT 20 MHz mode / 5150 ~ 5250MHz

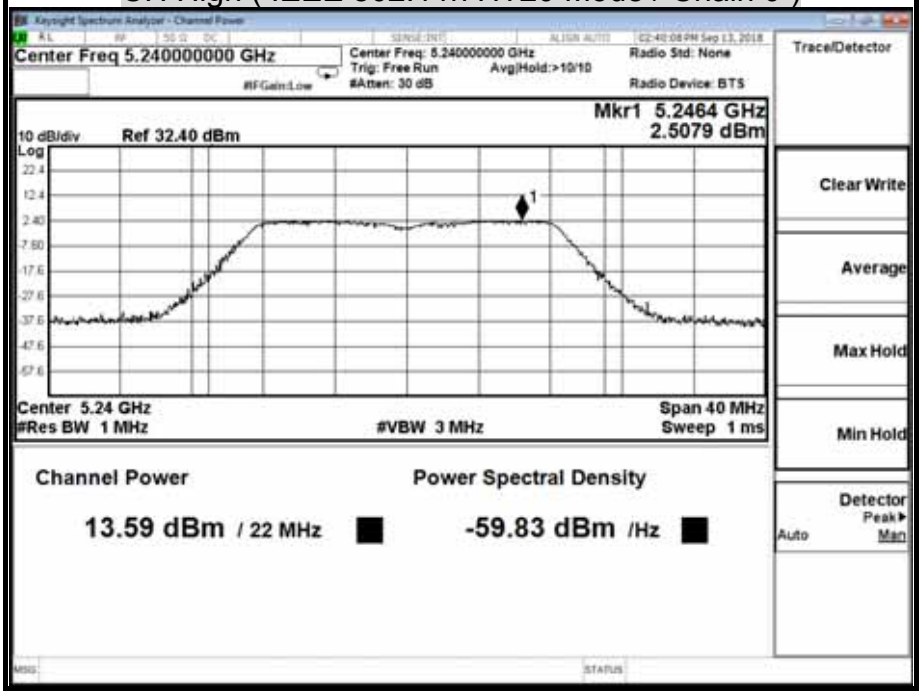
CH Low (IEEE 802.11n HT20 Mode / Chain 0)



CH Middle (IEEE 802.11n HT20 Mode / Chain 0)

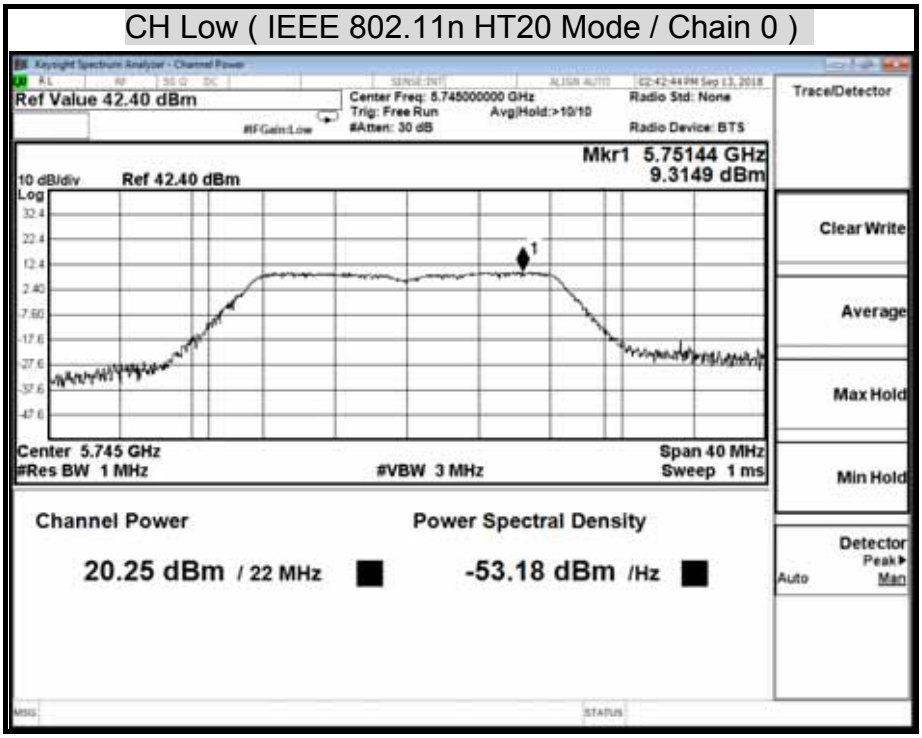


CH High (IEEE 802.11n HT20 Mode / Chain 0)

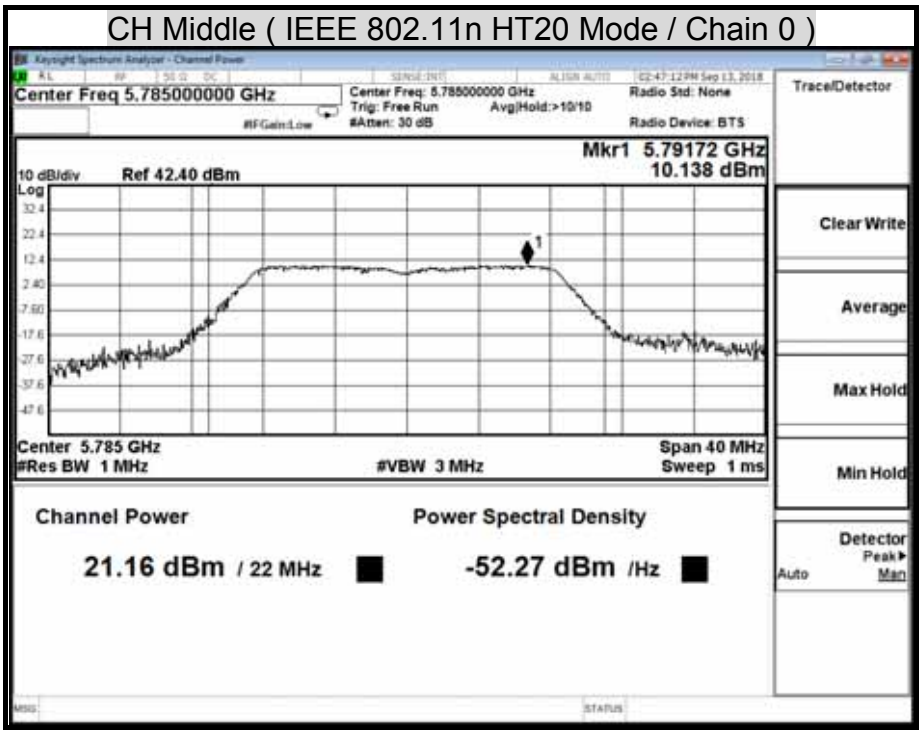


Test Mode: IEEE 802.11n HT 20 MHz mode / 5725 ~ 5850MHz

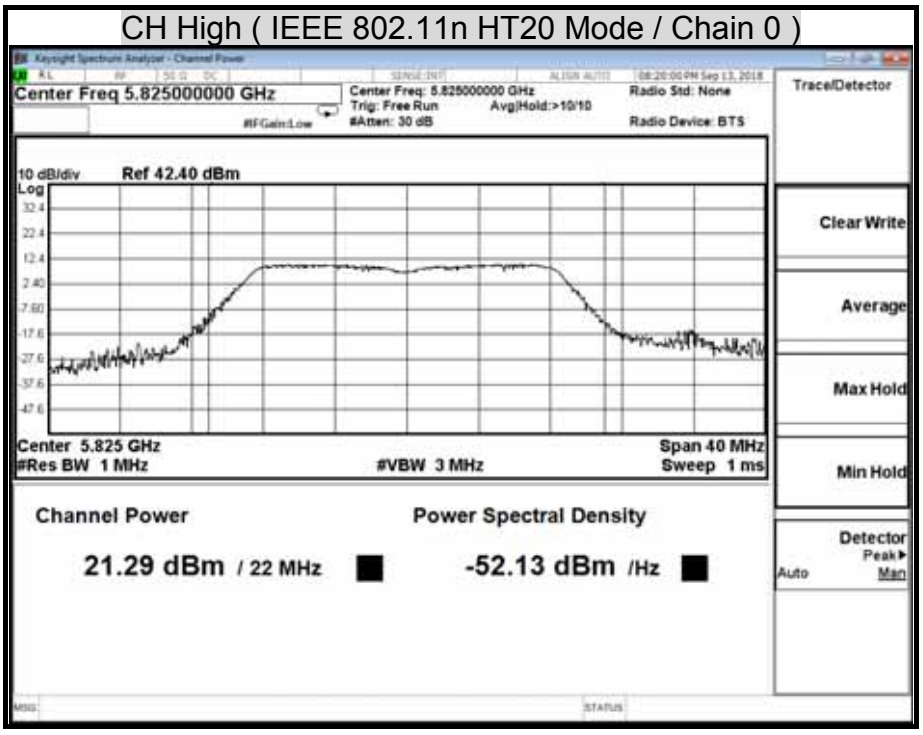
CH Low (IEEE 802.11n HT20 Mode / Chain 0)



CH Middle (IEEE 802.11n HT20 Mode / Chain 0)

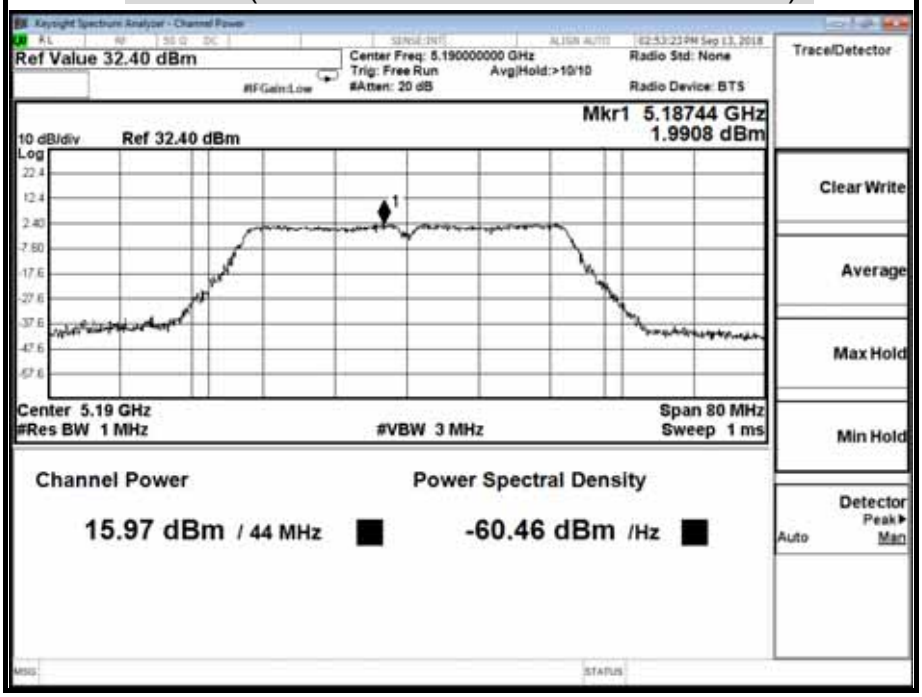


CH High (IEEE 802.11n HT20 Mode / Chain 0)

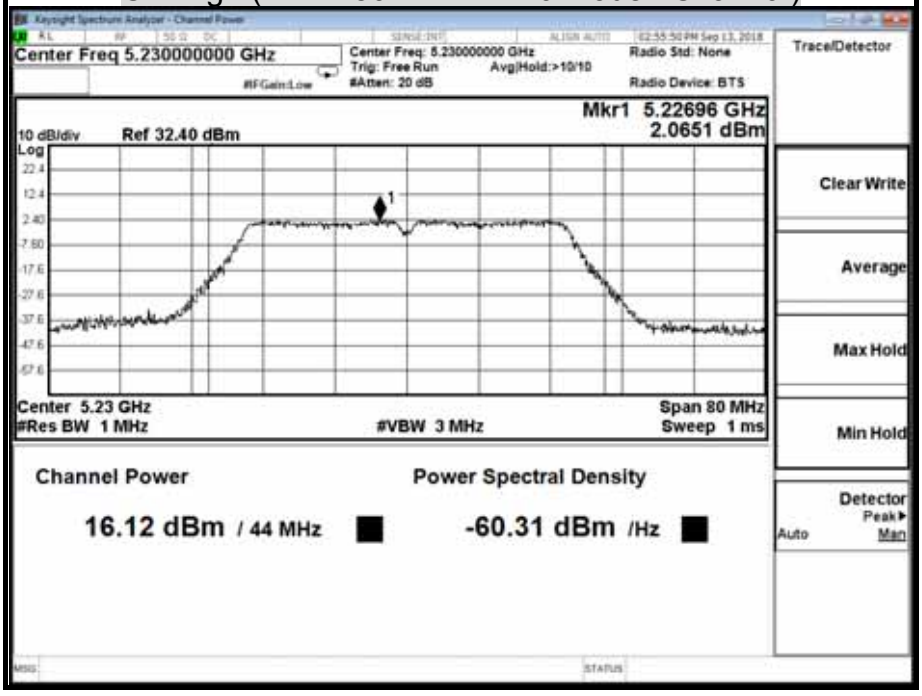


Test Mode: IEEE 802.11n HT 40 MHz mode / 5150 ~ 5250MHz

CH Low (IEEE 802.11n HT40 Mode / Chain 0)

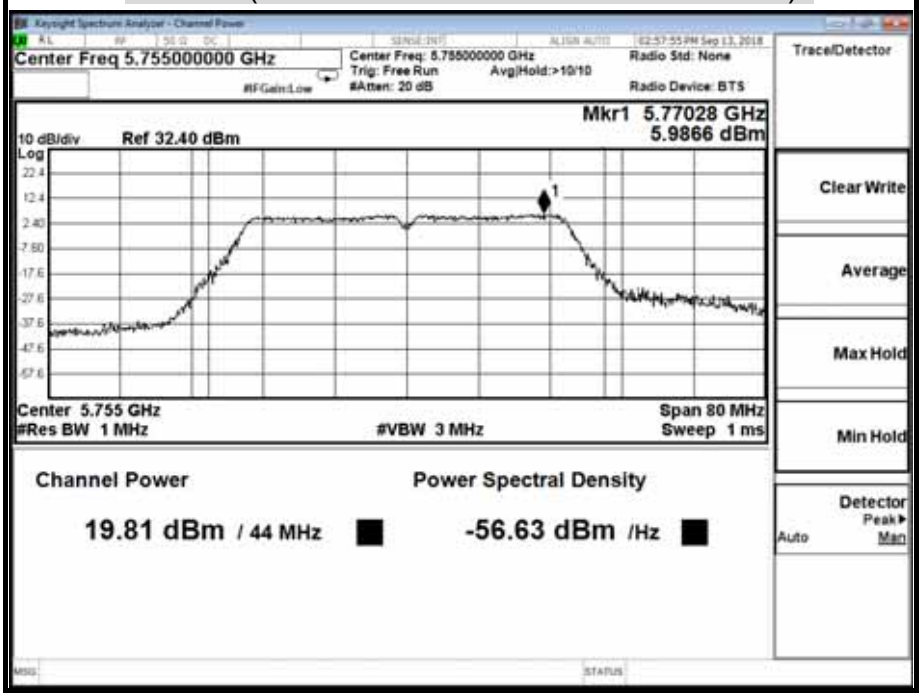


CH High (IEEE 802.11n HT40 Mode / Chain 0)

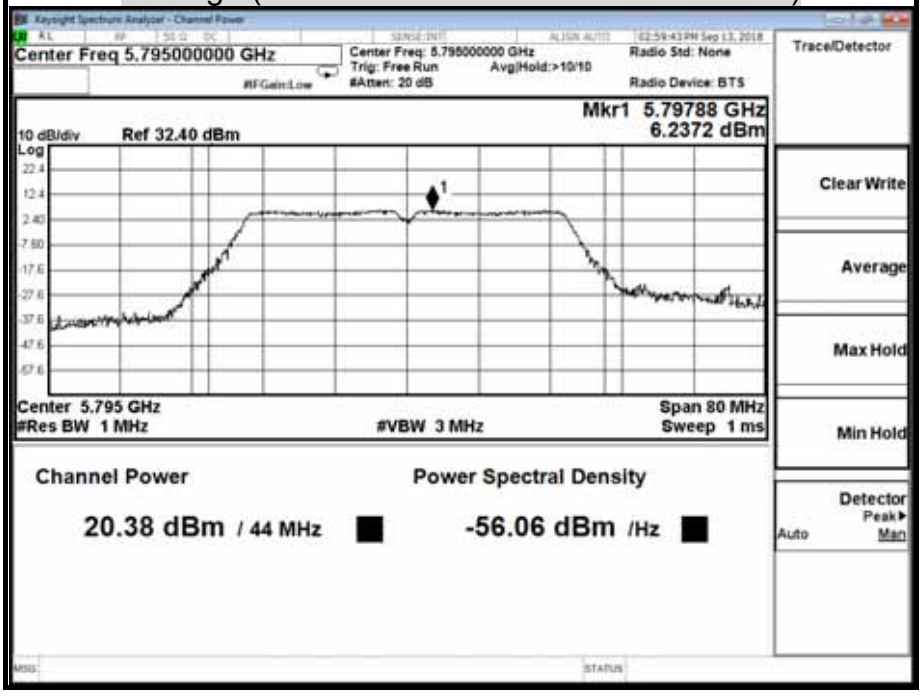


Test Mode: IEEE 802.11n HT 40 MHz mode / 5725 ~ 5850 MHz

CH Low (IEEE 802.11n HT40 Mode / Chain 0)

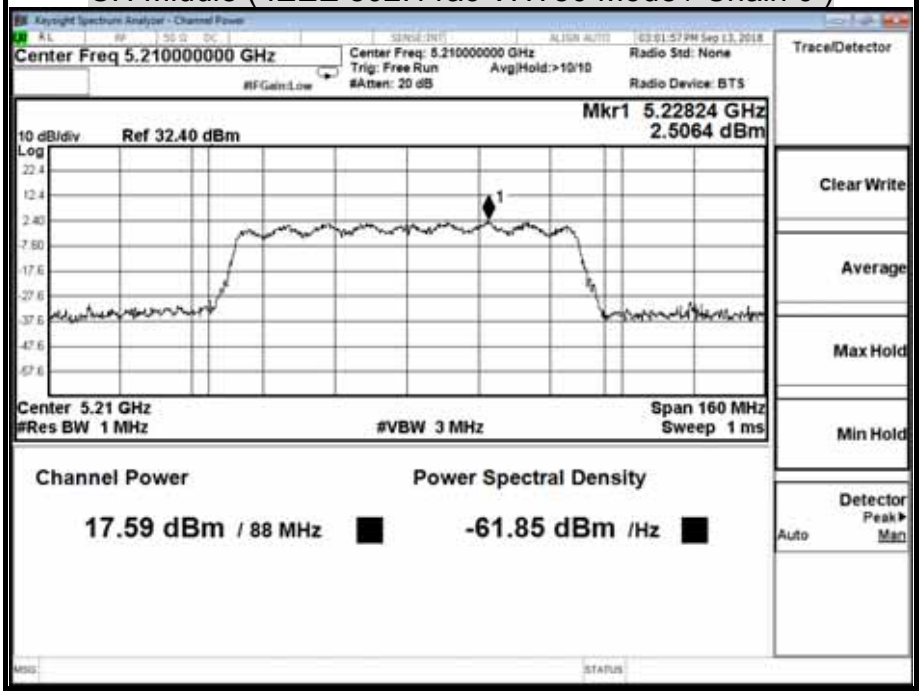


CH High (IEEE 802.11n HT40 Mode / Chain 0)



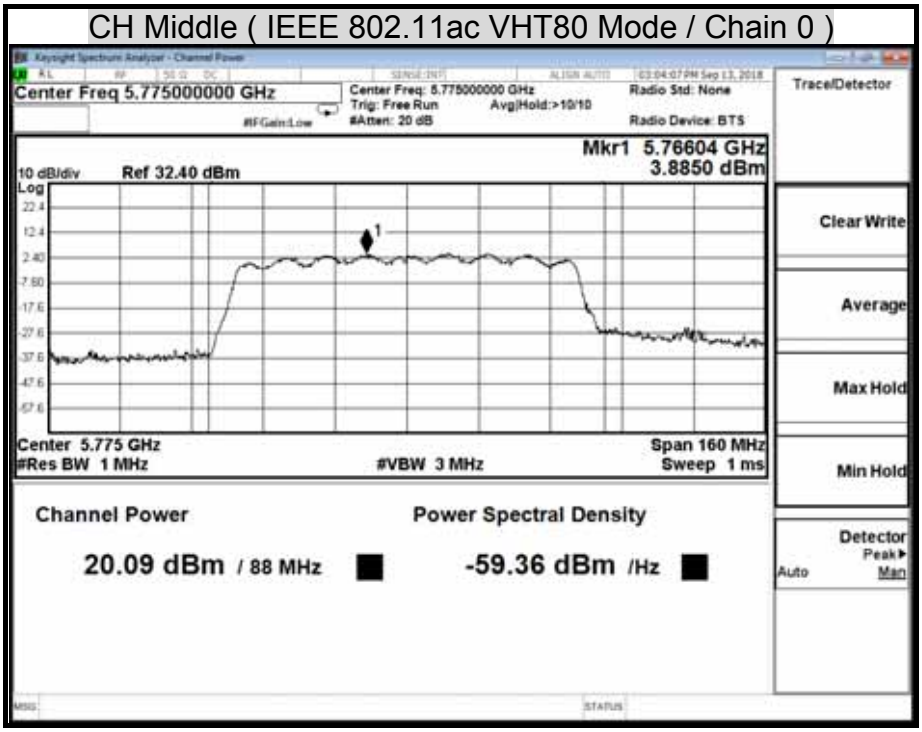
Test Mode: IEEE 802.11ac VHT 80 MHz mode / 5150 ~ 5250MHz

CH Middle (IEEE 802.11ac VHT80 Mode / Chain 0)



Test Mode: IEEE 802.11ac VHT 80 MHz mode / 5725 ~ 5850MHz

CH Middle (IEEE 802.11ac VHT80 Mode / Chain 0)



7.5 PEAK POWER SPECTRAL DENSITY

LIMITS

§ 15.407 (a)

(1) For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15 – 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15 – 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/05/2018	07/04/2019
Power Meter	Anritsu	ML2487A	6K00003888	05/02/2018	05/01/2019
Power Sensor	Anritsu	MA2491A	033265	05/02/2018	05/01/2019
SMA Cable + 10dB Attenuator	CCS	SMA + 10dB Att	O6	01/22/2018	01/21/2019

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

TEST SETUP

TEST PROCEDURE

1. Set span to encompass the entire 26-dB emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.
2. Set RBW = 1 MHz.
3. Set VBW ≥ 3 MHz.
4. Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)
5. Sweep time = auto.
6. Detector = RMS (*i.e.*, power averaging), if available. Otherwise, use sample detector mode.
7. If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (*i.e.,* with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run”.
8. Trace average at least 100 traces in power averaging (*i.e.,* RMS) mode.
9. Use the peak search function on the instrument to find the peak of the spectrum.

TEST RESULTS

IEEE 802.11a Mode / 5150 ~ 5250 MHz

Channel	Channel Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)	Pass / Fail
Low	5180	2.72	16.00	-13.28	PASS
Middle	5200	2.47		-13.53	PASS
High	5240	2.56		-13.44	PASS

IEEE 802.11a Mode / 5725 ~ 5850 MHz

Channel	Channel Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)	Pass / Fail
Low	5745	5.79	29.00	-23.21	PASS
Middle	5785	6.70		-22.30	PASS
High	5825	6.58		-22.42	PASS

Remark:

1. *At finial test to get the worst-case emission at 6Mbps.*
2. *The cable assembly insertion loss of 11.7dB (including 10 dB pad and 1.7 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

IEEE 802.11n HT20 Mode / 5150 ~ 5250 MHz

Channel	Channel Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)	Pass / Fail
		Chain 0			
Low	5180	2.76	16.00	-13.24	PASS
Middle	5200	2.76		-13.24	PASS
High	5240	2.51		-13.49	PASS

IEEE 802.11n HT20 Mode / 5725 ~ 5850 MHz

Channel	Channel Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)	Pass / Fail
		Chain 0			
Low	5745	5.64	29.00	-23.36	PASS
Middle	5785	6.44		-22.56	PASS
High	5825	6.71		-22.29	PASS

Remark:

1. *At finial test to get the worst-case emission at 13Mbps*
2. *The cable assembly insertion loss of 11.7dB (including 10 dB pad and 1.7 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

IEEE 802.11n HT40 Mode / 5150 ~ 5250 MHz

Channel	Channel Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)	Pass / Fail
		Chain 0			
Low	5190	1.99	16.00	-14.01	PASS
High	5230	2.07		-13.93	PASS

IEEE 802.11n HT40 Mode / 5725 ~ 5850 MHz

Channel	Channel Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)	Pass / Fail
		Chain 0			
Low	5755	1.98	29.00	-27.02	PASS
High	5795	2.69		-26.31	PASS

Remark:

1. At finial test to get the worst-case emission at 27Mbps
2. The cable assembly insertion loss of 11.7dB (including 10 dB pad and 1.7 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11ac VHT80 Mode / 5150 ~ 5250 MHz

Channel	Channel Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)	Pass / Fail
		Chain 0			
Middle	5210	2.51	16.00	-13.49	PASS

IEEE 802.11ac VHT80 Mode / 5150 ~ 5250 MHz

Channel	Channel Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)	Pass / Fail
		Chain 0			
Middle	5775	0.25	29.00	-28.75	PASS

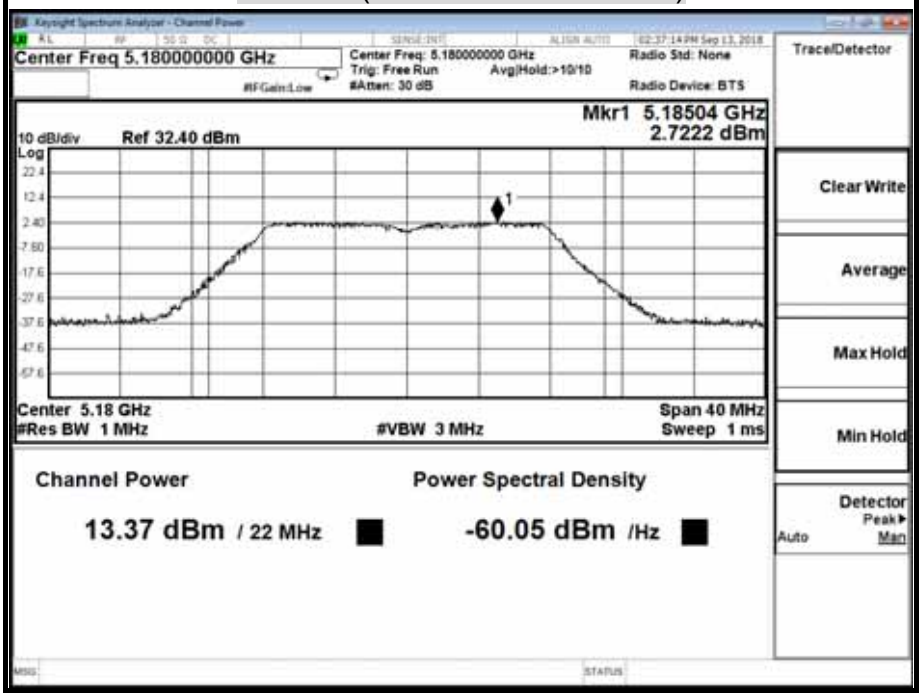
Remark:

1. At finial test to get the worst-case emission at 117Mbps
2. The cable assembly insertion loss of 11.7dB (including 10 dB pad and 1.7 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

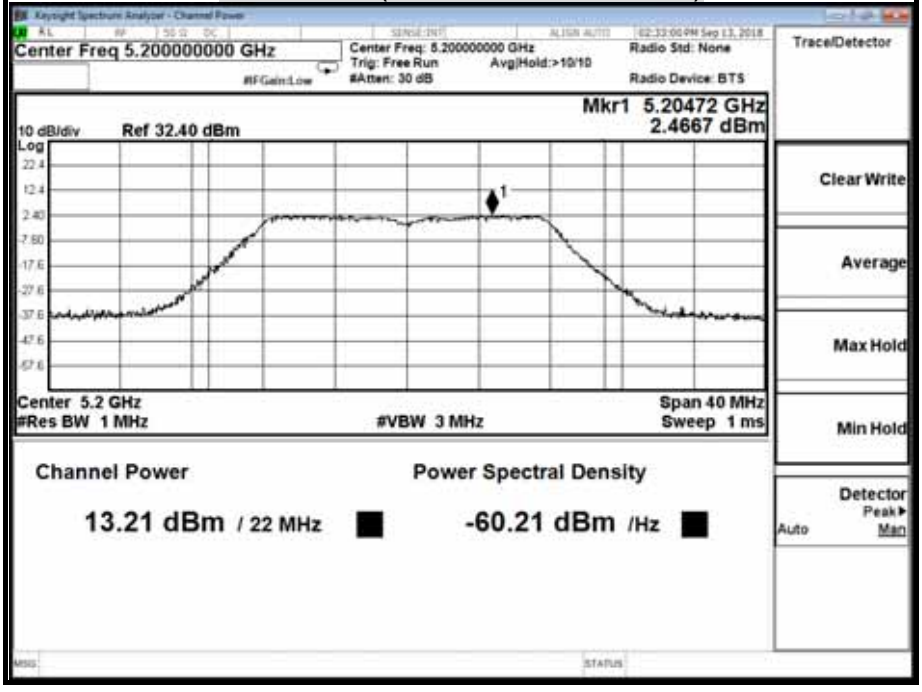
PEAK POWER SPECTRAL DENSITY

Test Mode: IEEE 802.11a mode / 5150 ~ 5250MHz

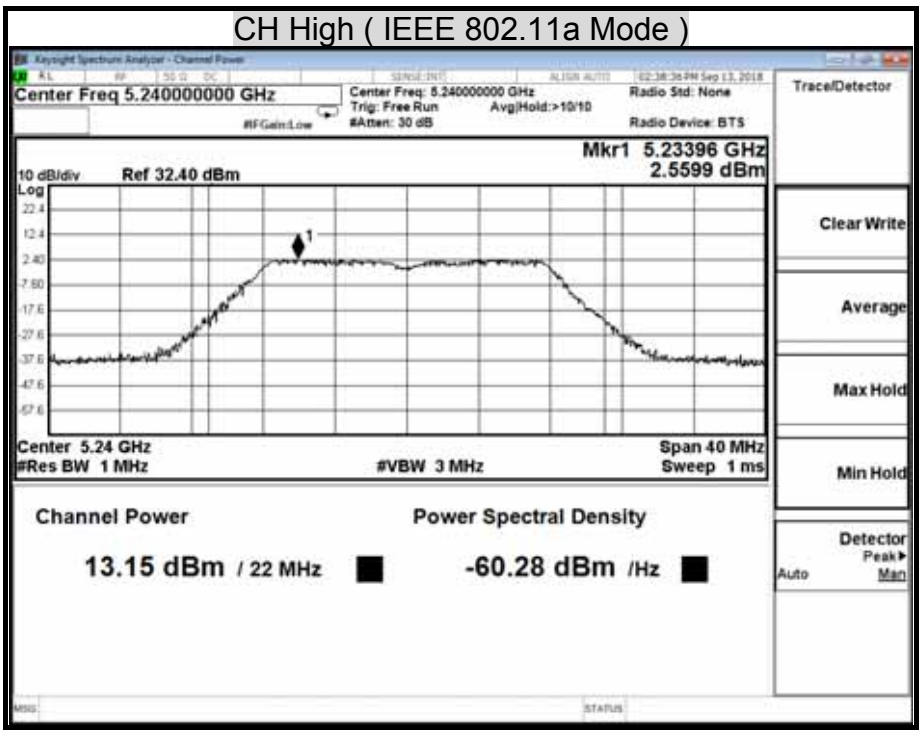
CH Low (IEEE 802.11a Mode)



CH Middle (IEEE 802.11a Mode)

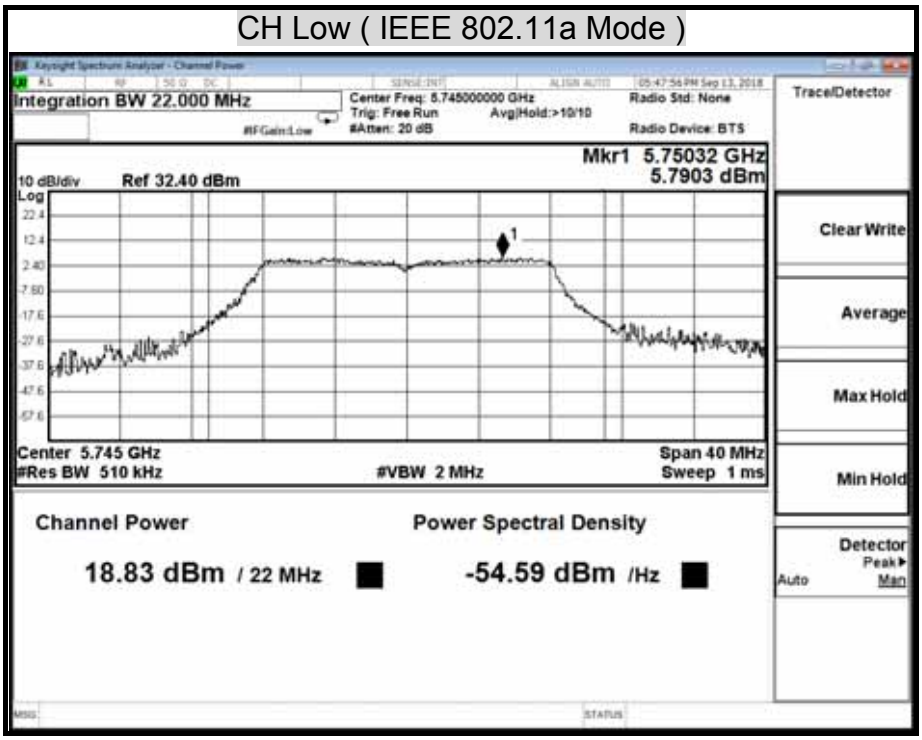


CH High (IEEE 802.11a Mode)

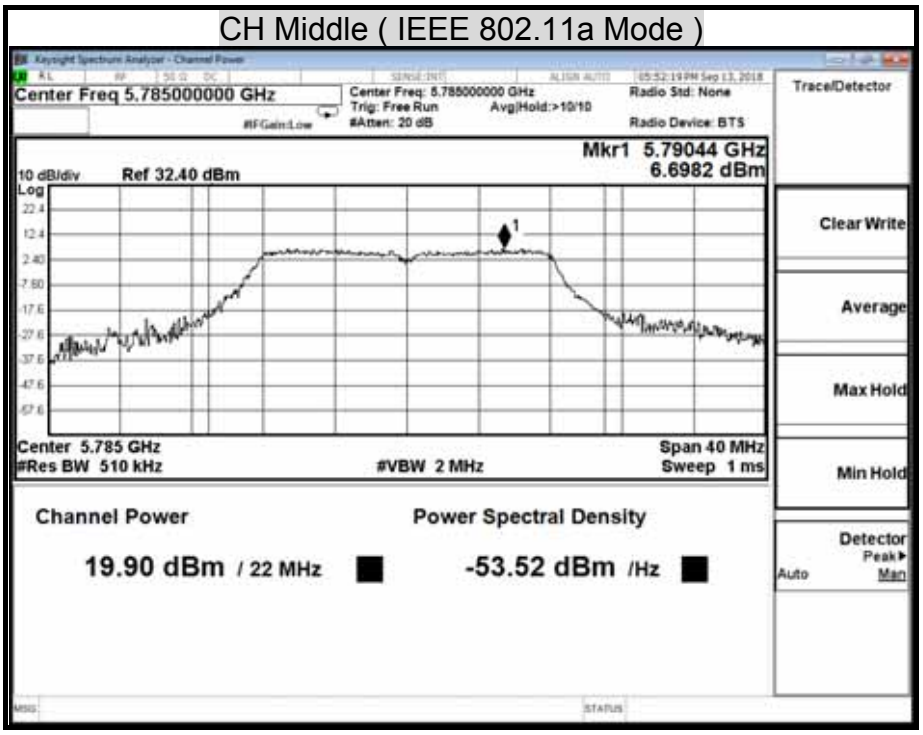


Test Mode: IEEE 802.11a mode / 5725 ~ 5850MHz

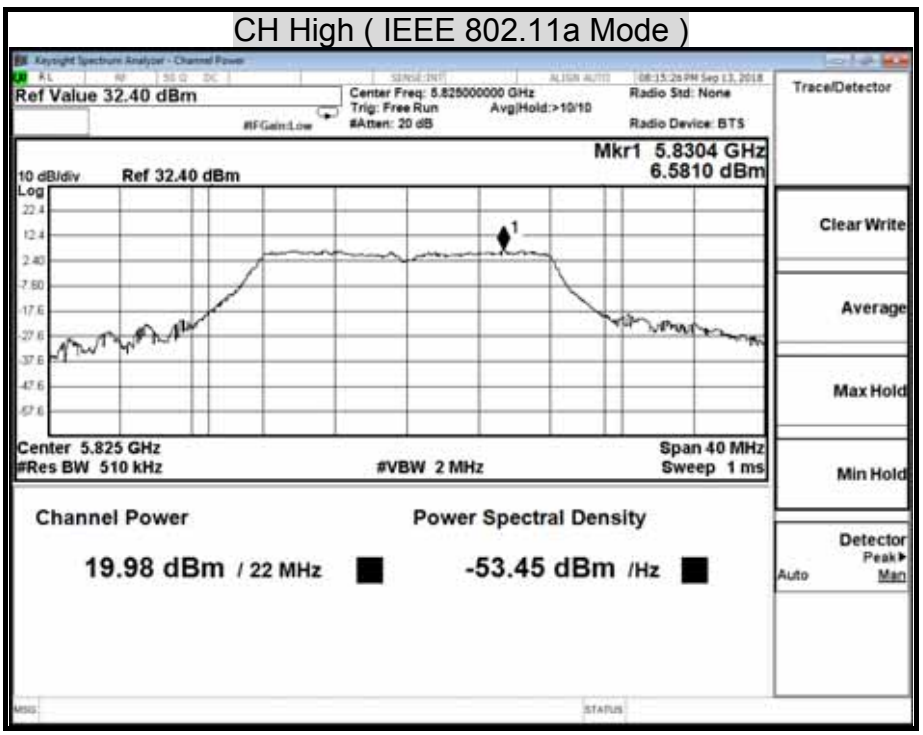
CH Low (IEEE 802.11a Mode)



CH Middle (IEEE 802.11a Mode)

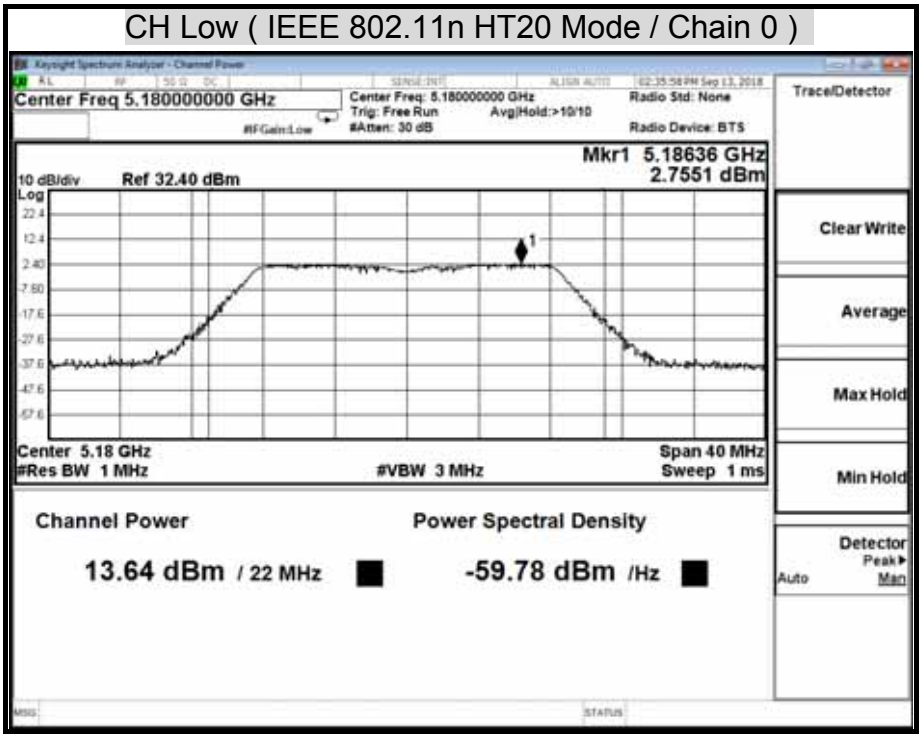


CH High (IEEE 802.11a Mode)

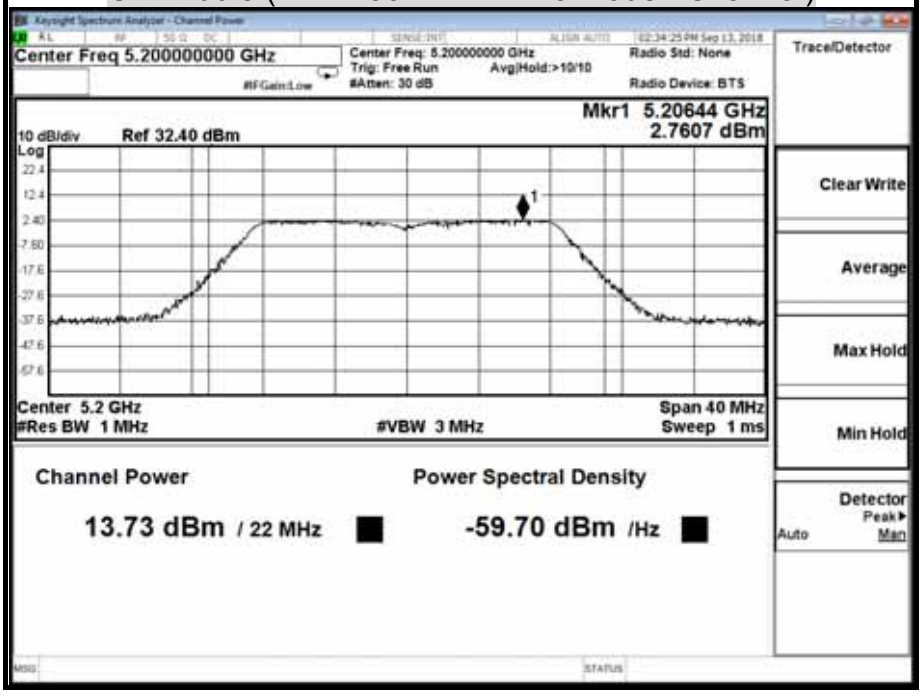


Test Mode: IEEE 802.11n HT 20 MHz mode / 5150 ~ 5250MHz

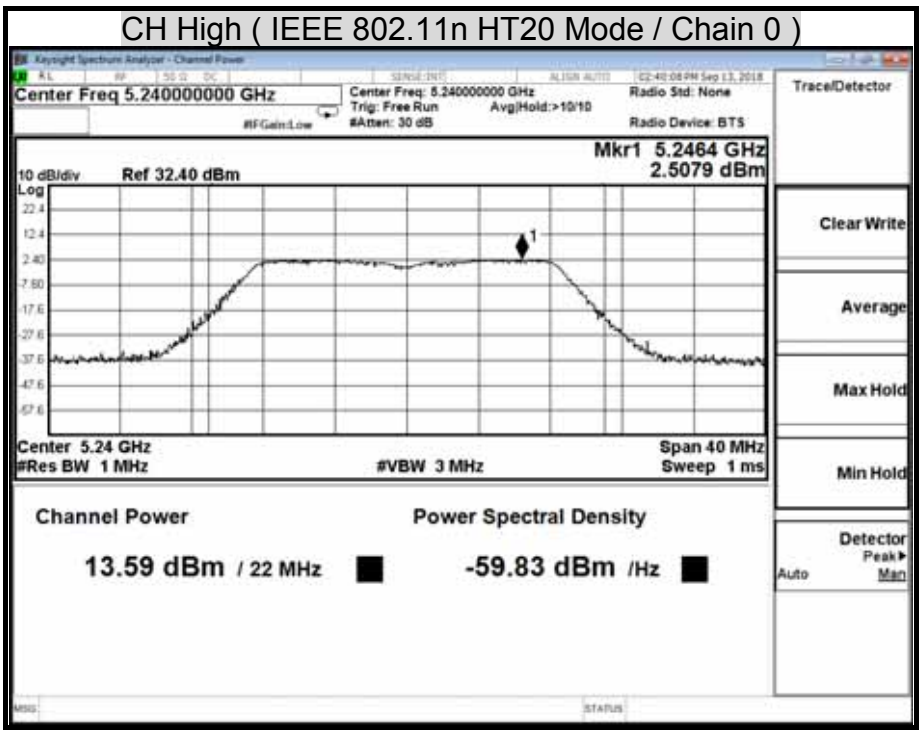
CH Low (IEEE 802.11n HT20 Mode / Chain 0)



CH Middle (IEEE 802.11n HT20 Mode / Chain 0)

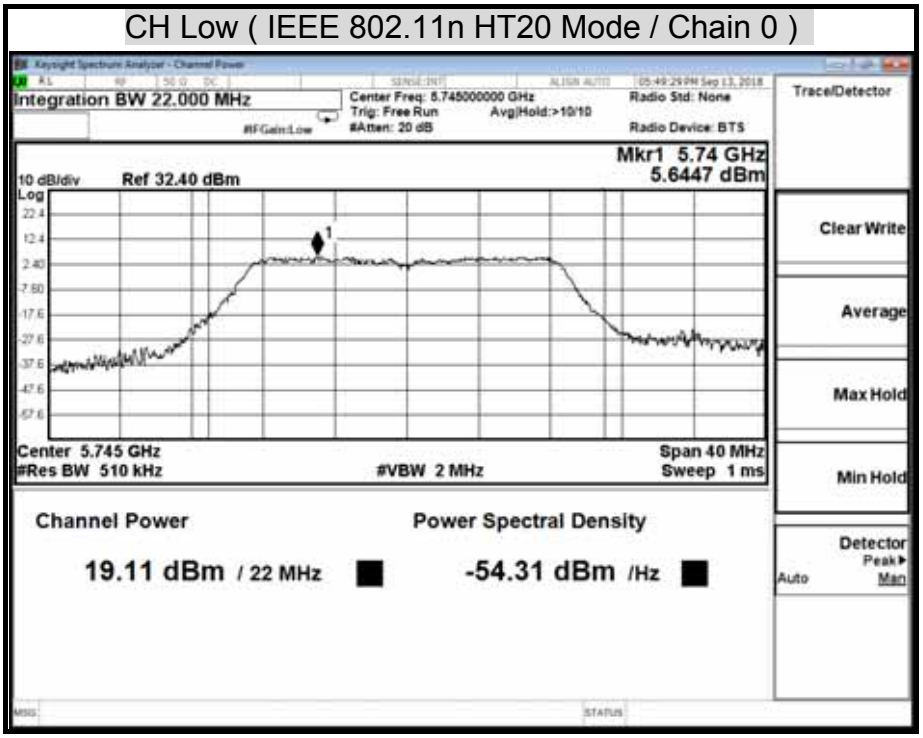


CH High (IEEE 802.11n HT20 Mode / Chain 0)

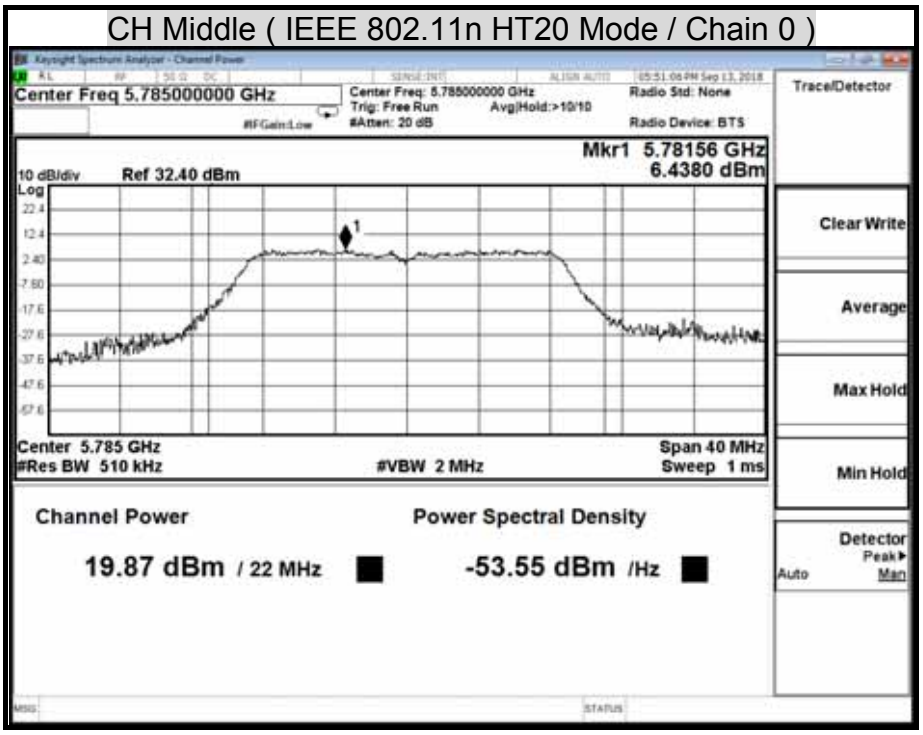


Test Mode: IEEE 802.11n HT 20 MHz mode / 5725 ~ 5850MHz

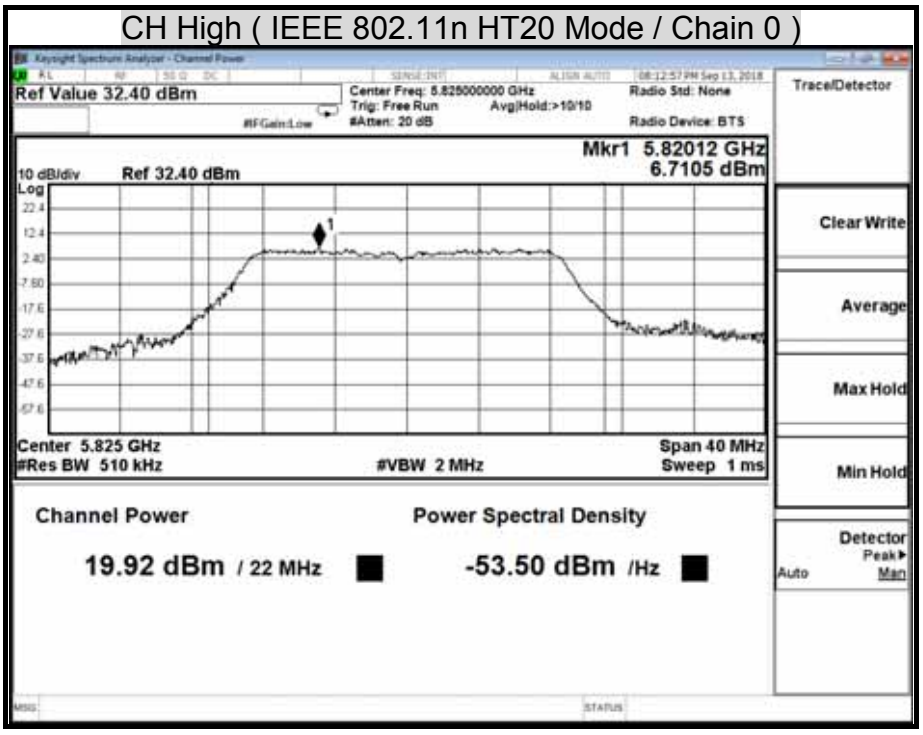
CH Low (IEEE 802.11n HT20 Mode / Chain 0)



CH Middle (IEEE 802.11n HT20 Mode / Chain 0)

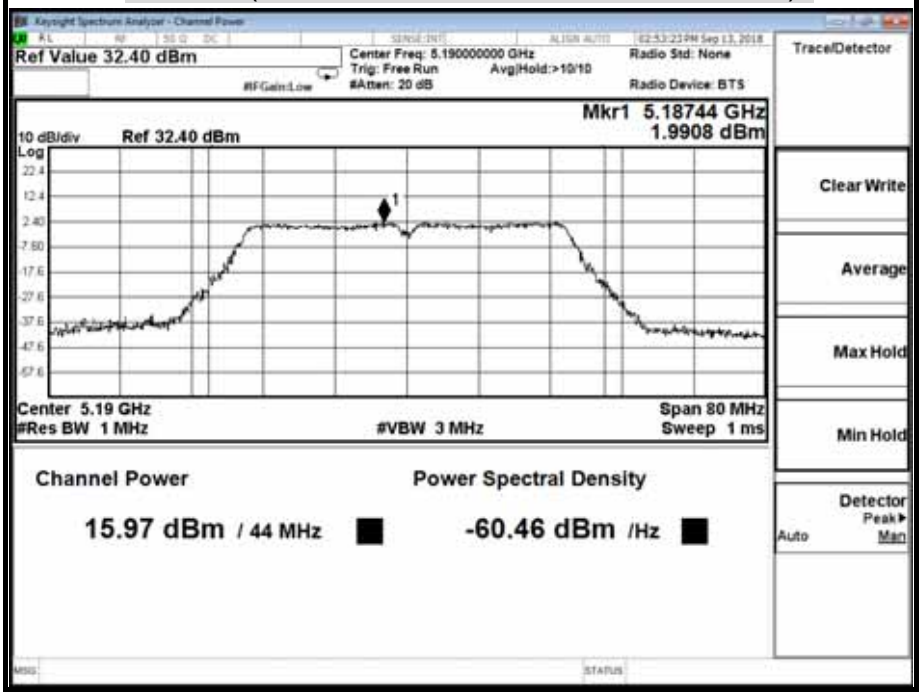


CH High (IEEE 802.11n HT20 Mode / Chain 0)

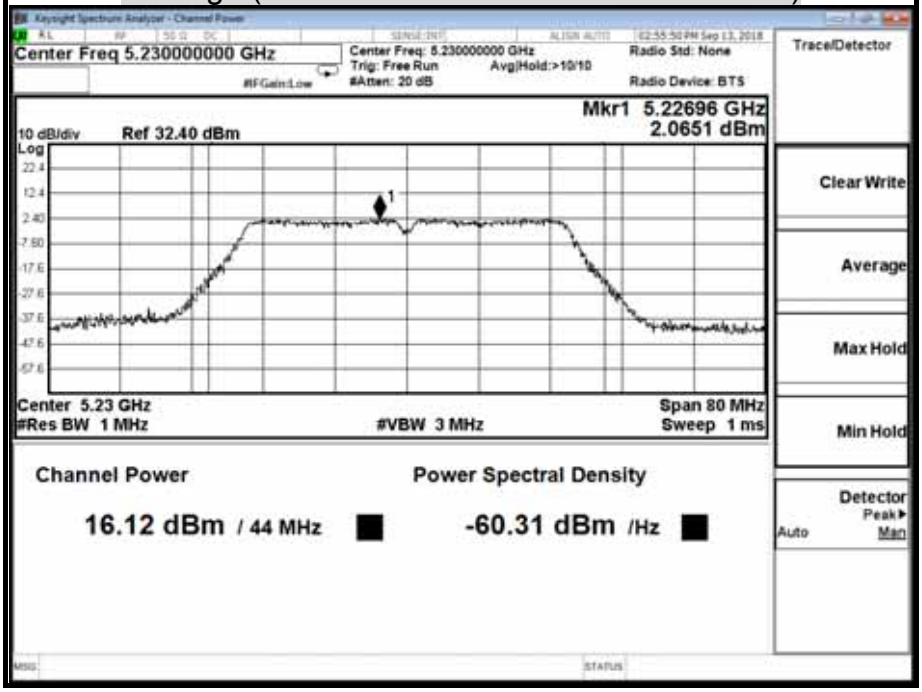


Test Mode: IEEE 802.11n HT 40 MHz mode / 5150 ~ 5250MHz

CH Low (IEEE 802.11n HT40 Mode / Chain 0)

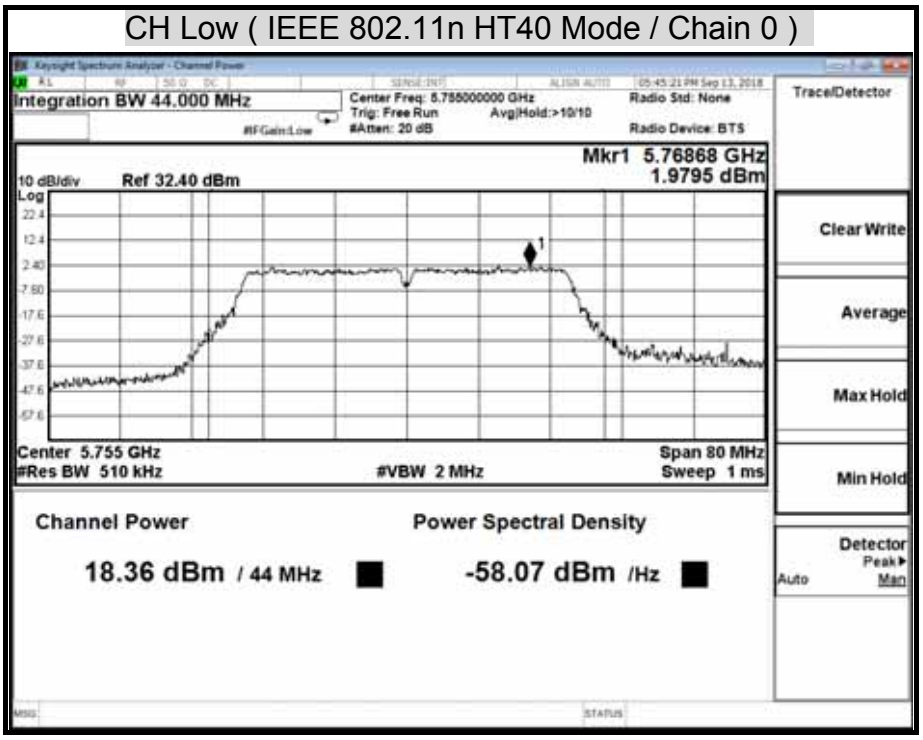


CH High (IEEE 802.11n HT40 Mode / Chain 0)

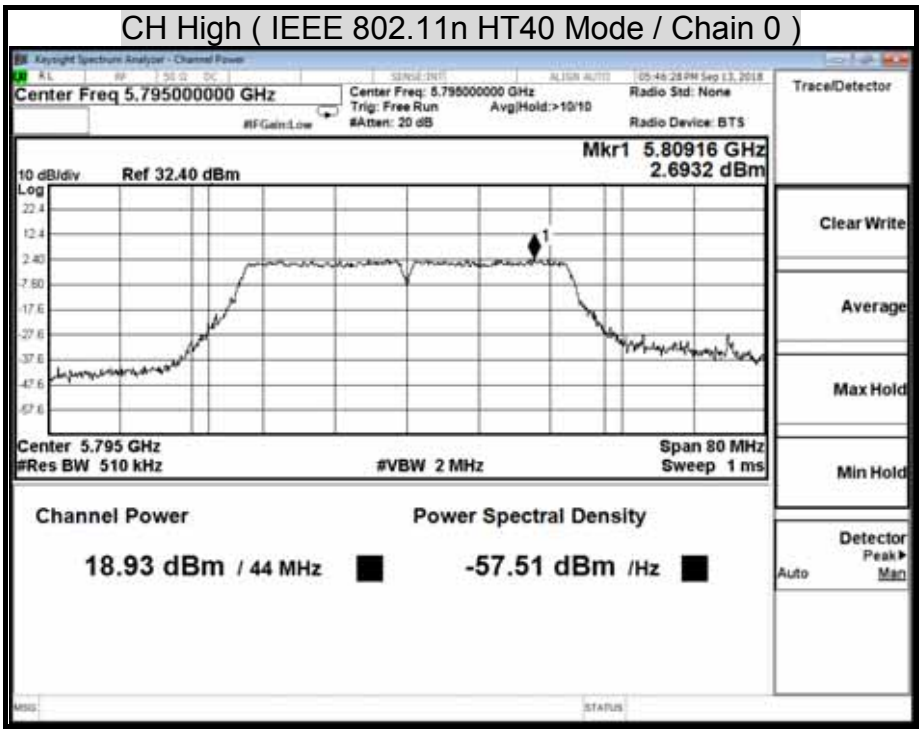


Test Mode: IEEE 802.11n HT 40 MHz mode / 5725 ~ 5850 MHz

CH Low (IEEE 802.11n HT40 Mode / Chain 0)



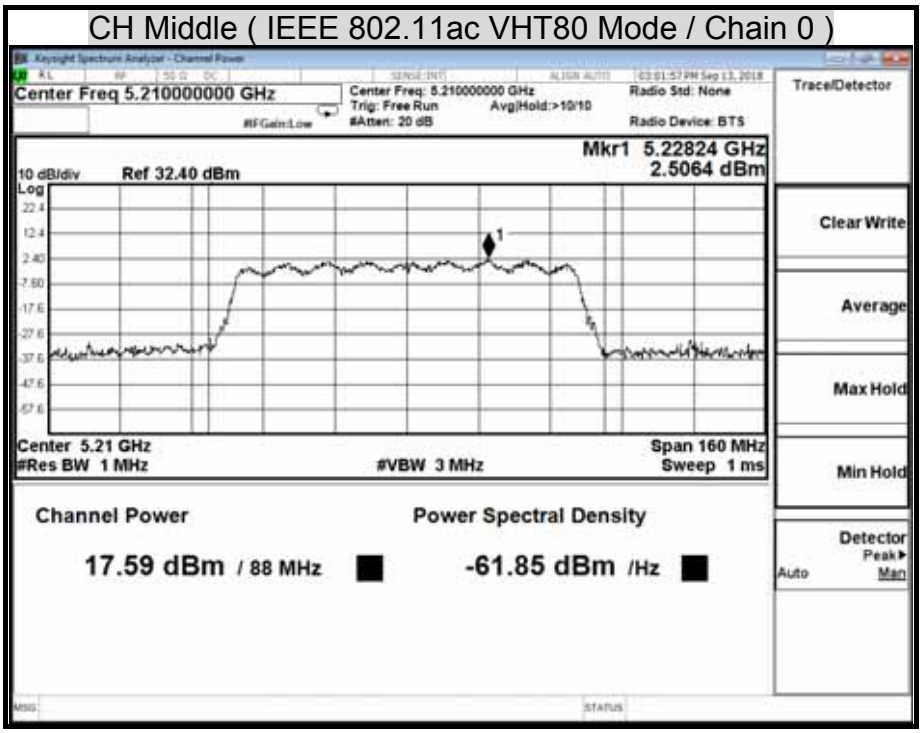
CH High (IEEE 802.11n HT40 Mode / Chain 0)



‘

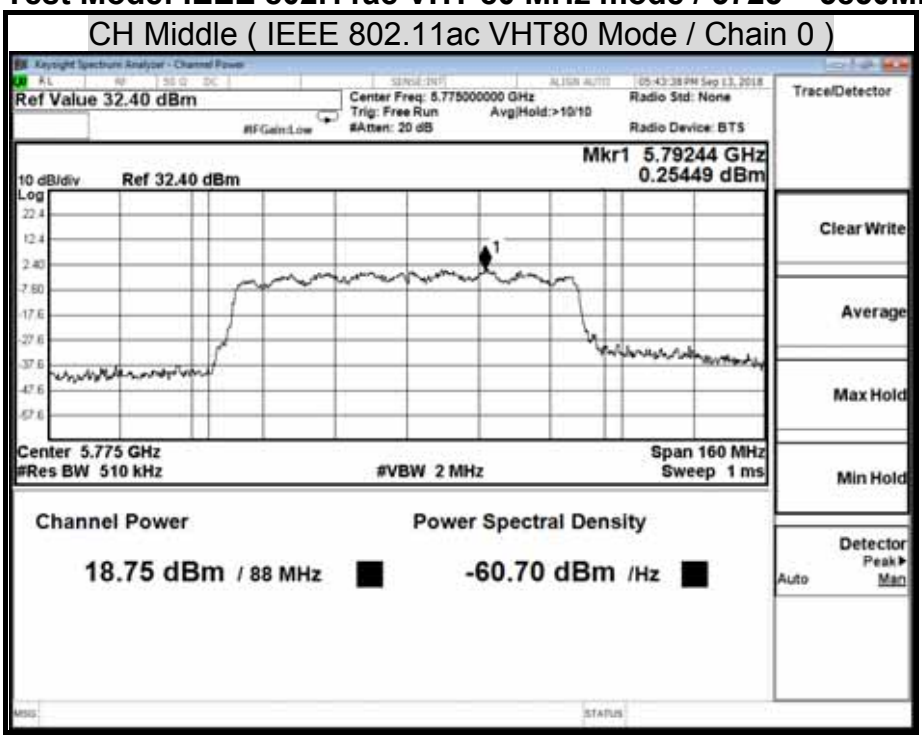
Test Mode: IEEE 802.11ac VHT 80 MHz mode / 5150 ~ 5250MHz

CH Middle (IEEE 802.11ac VHT80 Mode / Chain 0)



Test Mode: IEEE 802.11ac VHT 80 MHz mode / 5725 ~ 5850MHz

CH Middle (IEEE 802.11ac VHT80 Mode / Chain 0)



7.6 DUTY CYCLE

LIMIT

Nil (No dedicated limit specified in the Rules)

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/05/2018	07/04/2019
Power Meter	Anritsu	ML2487A	6K00003888	05/02/2018	05/01/2019
Power Sensor	Anritsu	MA2491A	033265	05/02/2018	05/01/2019
SMA Cable + 10dB Attenuator	CCS	SMA + 10dB Att	O6	01/22/2018	01/21/2019

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

TEST SETUP

TEST PROCEDURE

a) Place the EUT on the table and set it in transmitting mode.

b) Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

c) The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value. Set VBW ≥ RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if T ≤ 16.7 microseconds.)

TEST RESULTS

No non-compliance noted.

TEST DATA

	us	Times	Ton	Total Ton time(ms)
Ton1	100000.000	1	100000.000	100.000
Ton2		0	0.000	
Ton3		0	0.000	
Tp				100.000

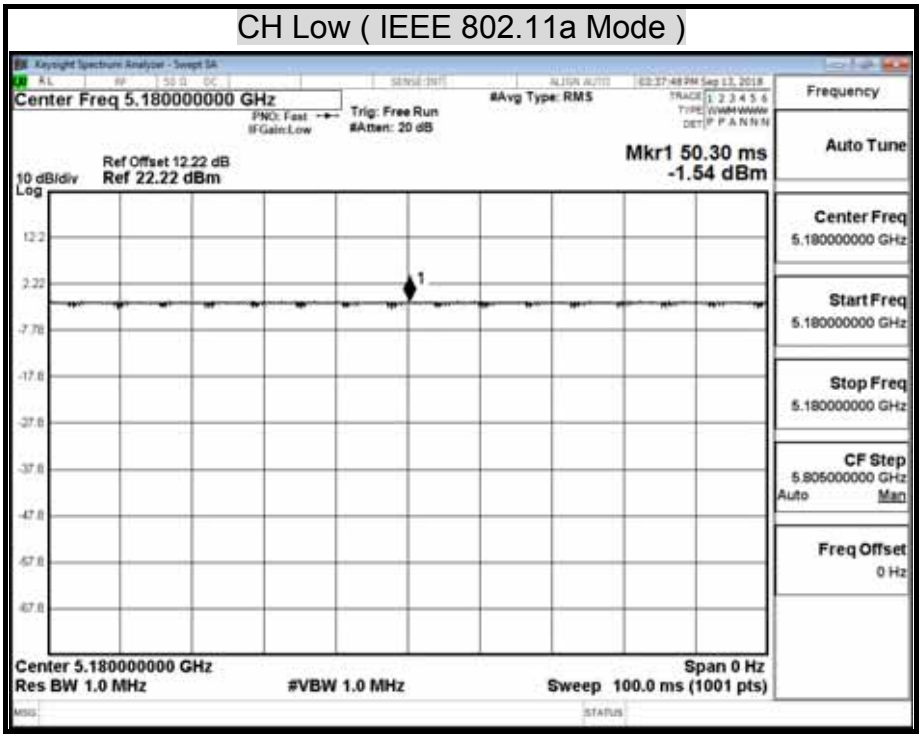
Ton	100.000		
Tp(Ton+Toff)	100.000		
Duty Cycle	1.000	100	%
Duty Factor	0.000		

TEST PLOT

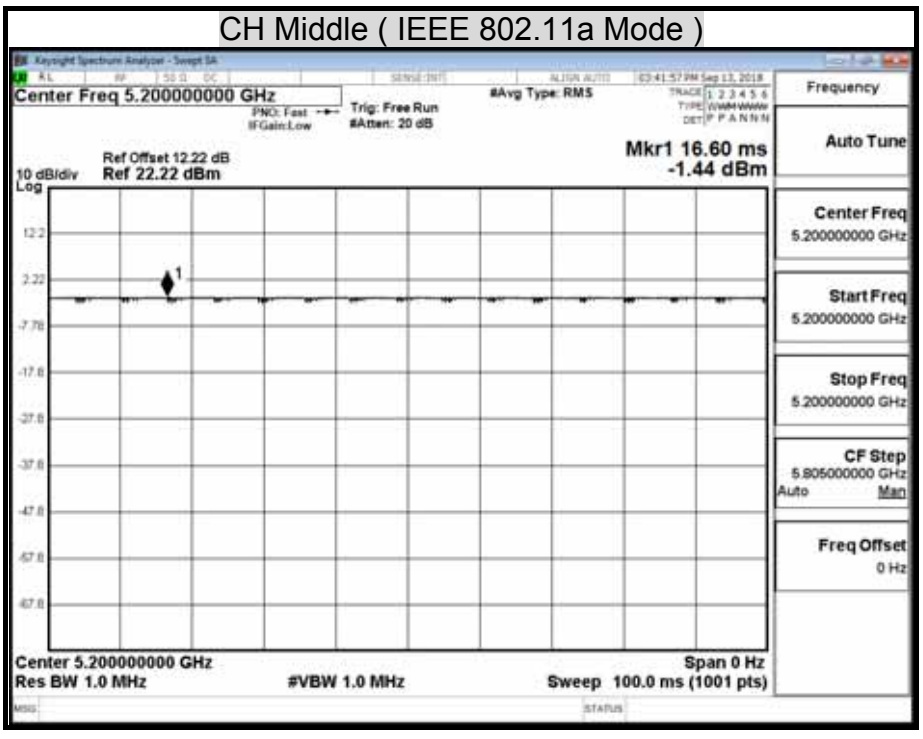
Duty Cycle

Test Mode: IEEE 802.11a mode / 5150 ~ 5250MHz

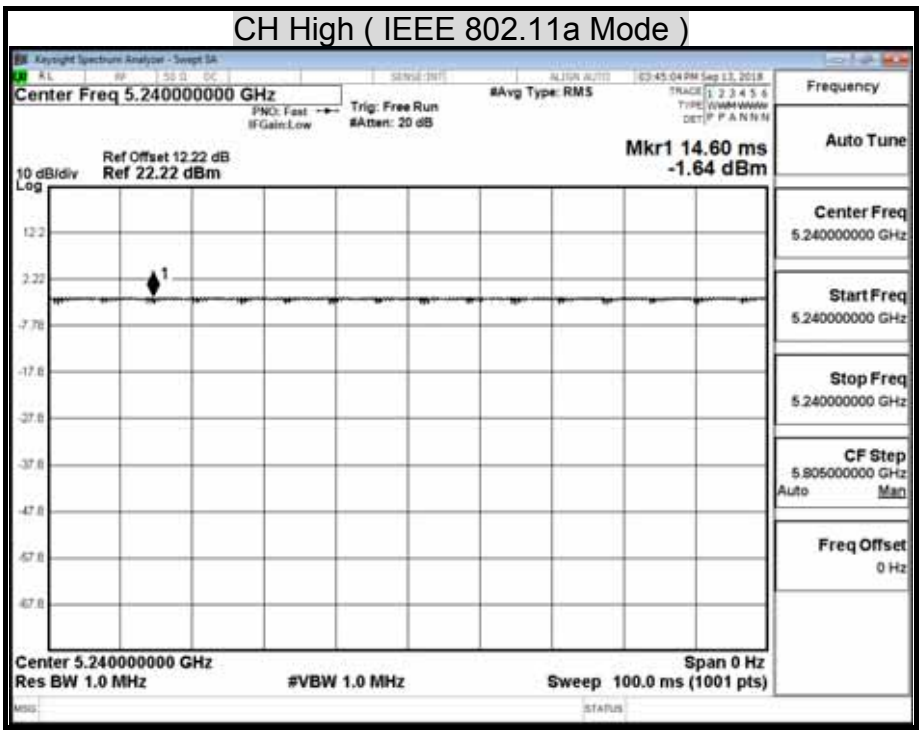
CH Low (IEEE 802.11a Mode)



CH Middle (IEEE 802.11a Mode)

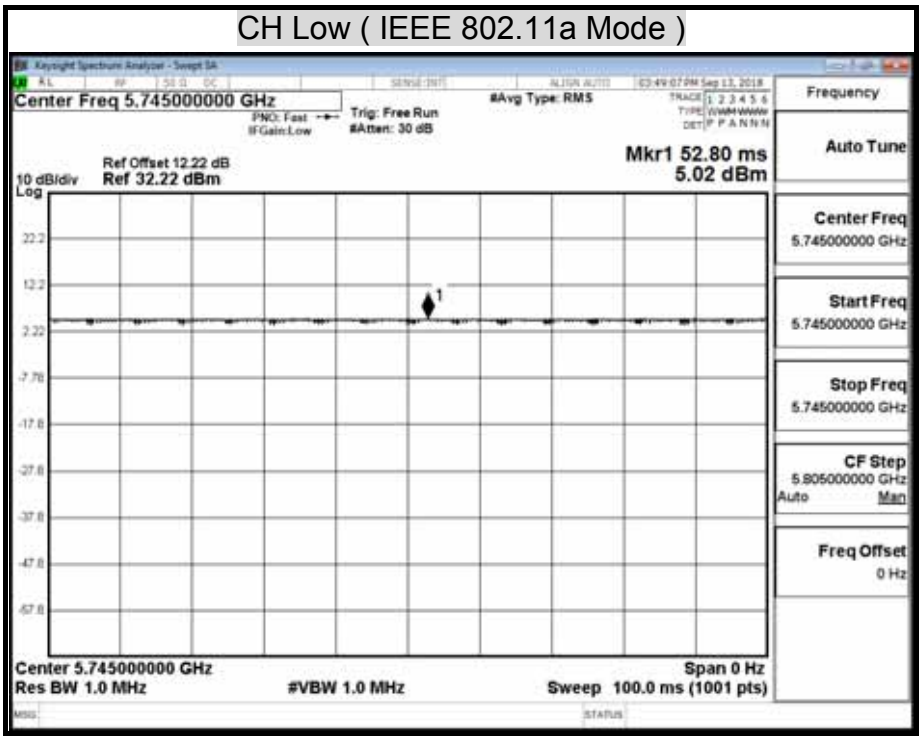


CH High (IEEE 802.11a Mode)

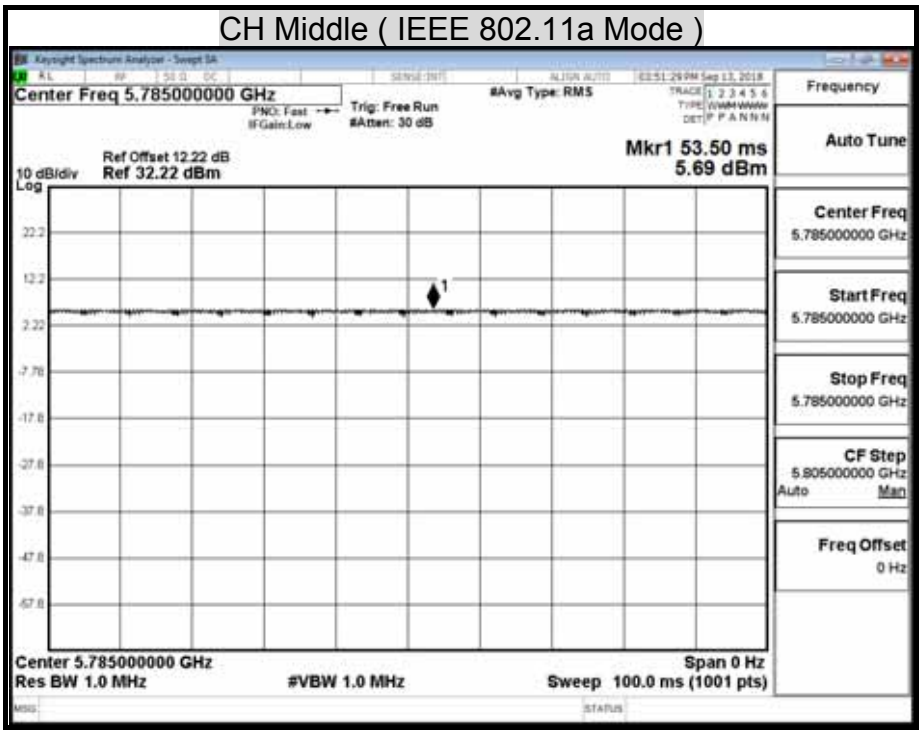


Test Mode: IEEE 802.11a mode / 5725 ~ 5850MHz

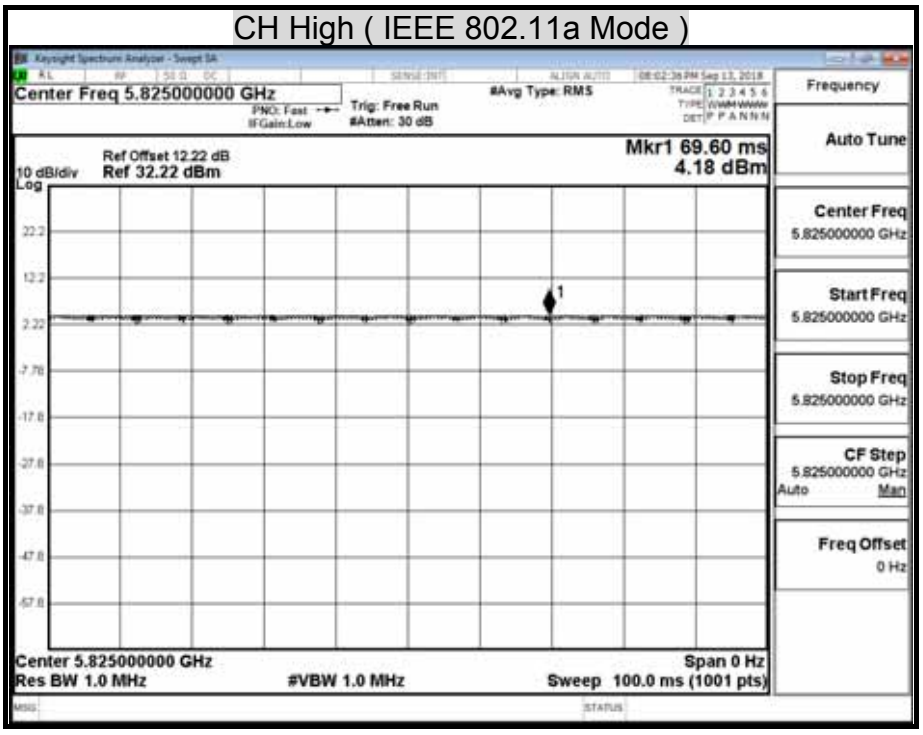
CH Low (IEEE 802.11a Mode)



CH Middle (IEEE 802.11a Mode)

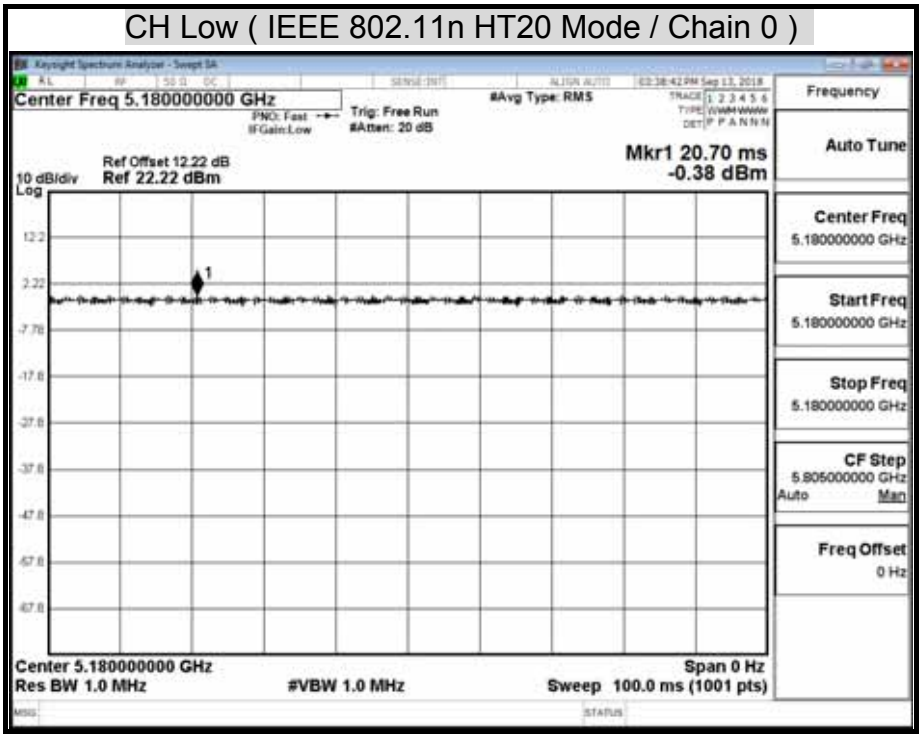


CH High (IEEE 802.11a Mode)

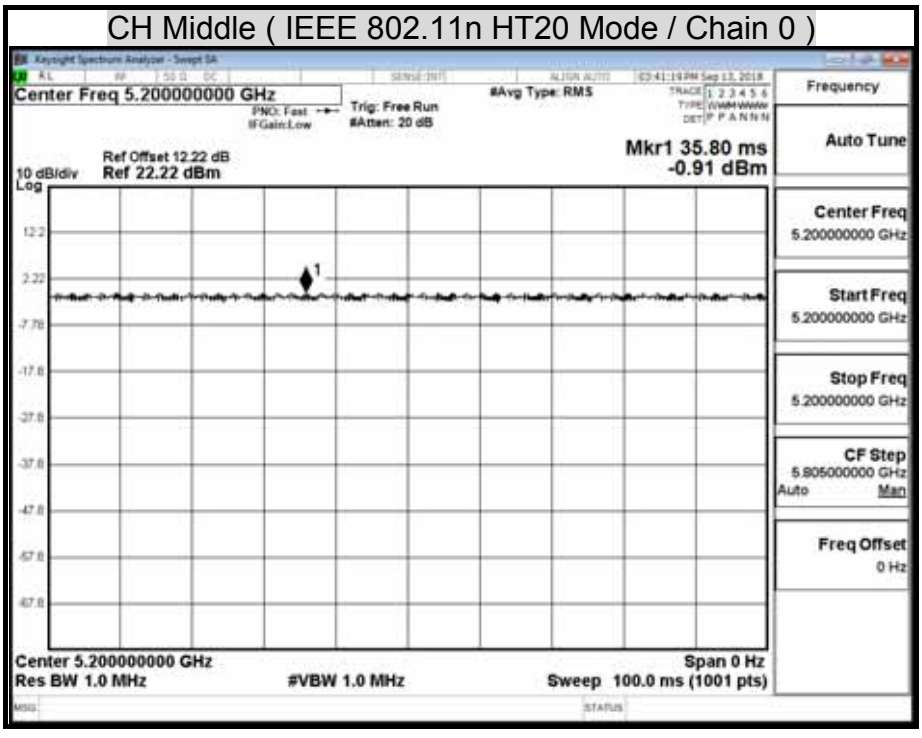


Test Mode: IEEE 802.11n HT 20 MHz mode / 5150 ~ 5250MHz

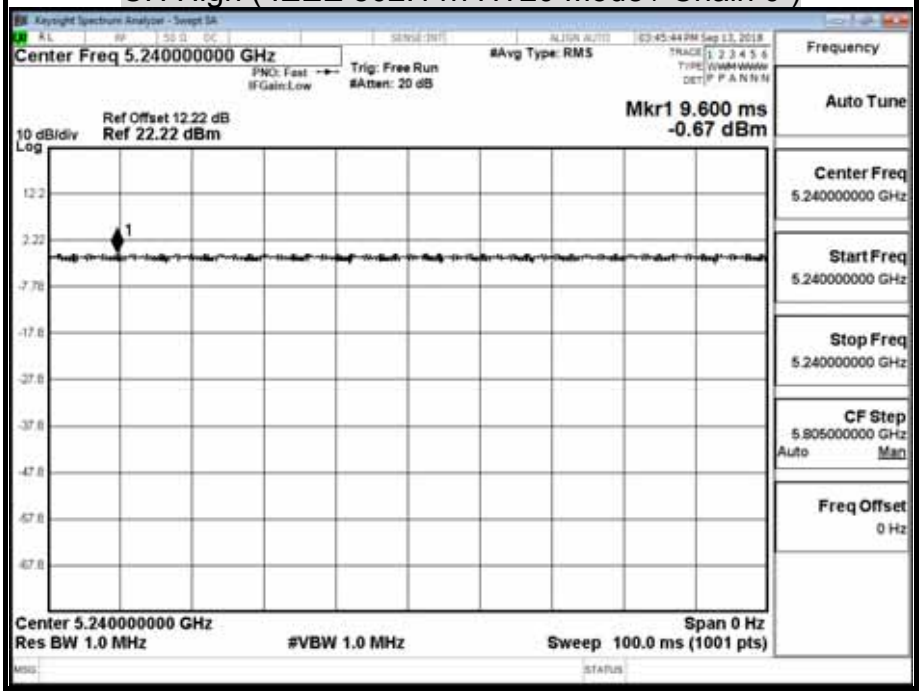
CH Low (IEEE 802.11n HT20 Mode / Chain 0)



CH Middle (IEEE 802.11n HT20 Mode / Chain 0)

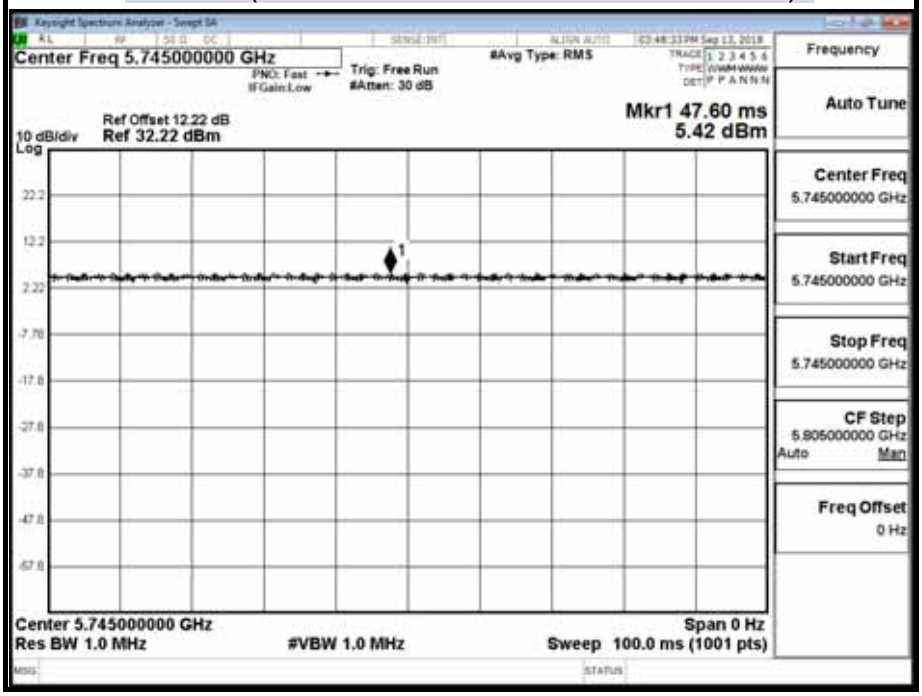


CH High (IEEE 802.11n HT20 Mode / Chain 0)

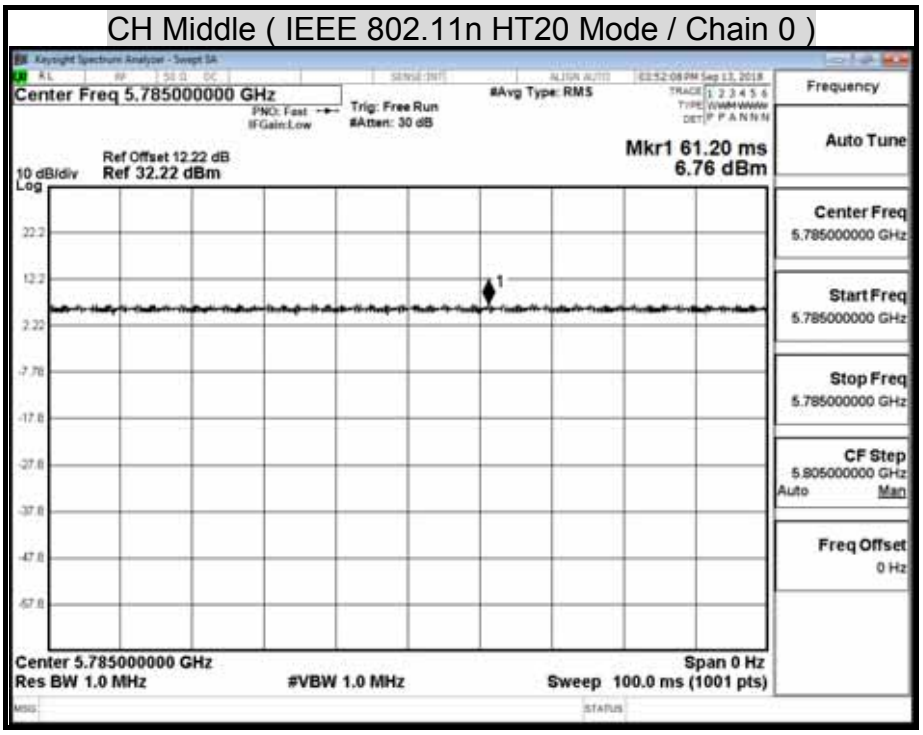


Test Mode: IEEE 802.11n HT 20 MHz mode / 5725 ~ 5850MHz

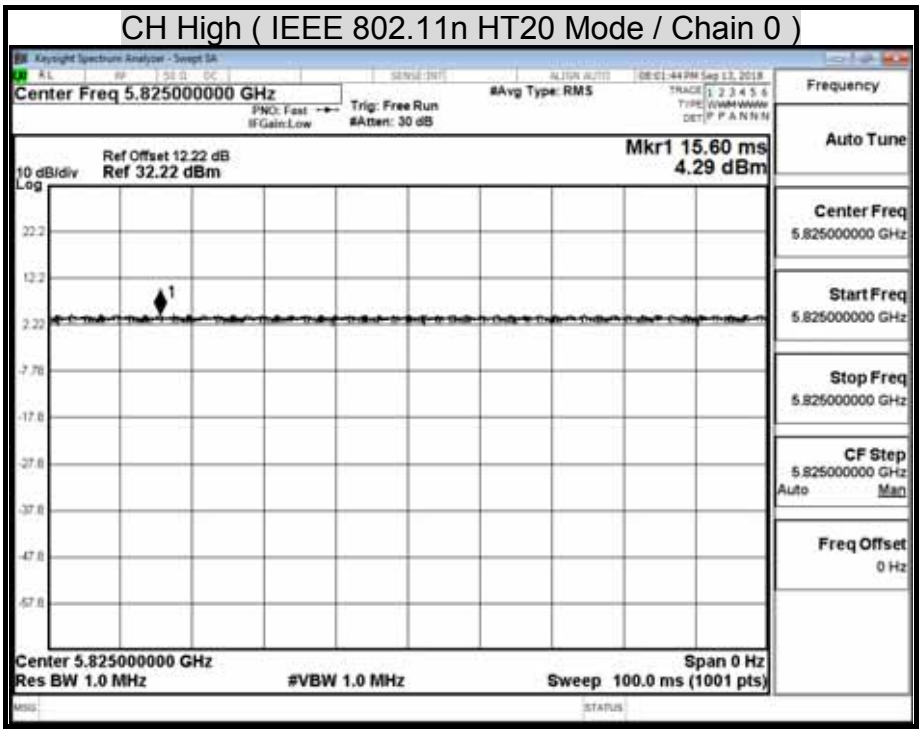
CH Low (IEEE 802.11n HT20 Mode / Chain 0)



CH Middle (IEEE 802.11n HT20 Mode / Chain 0)

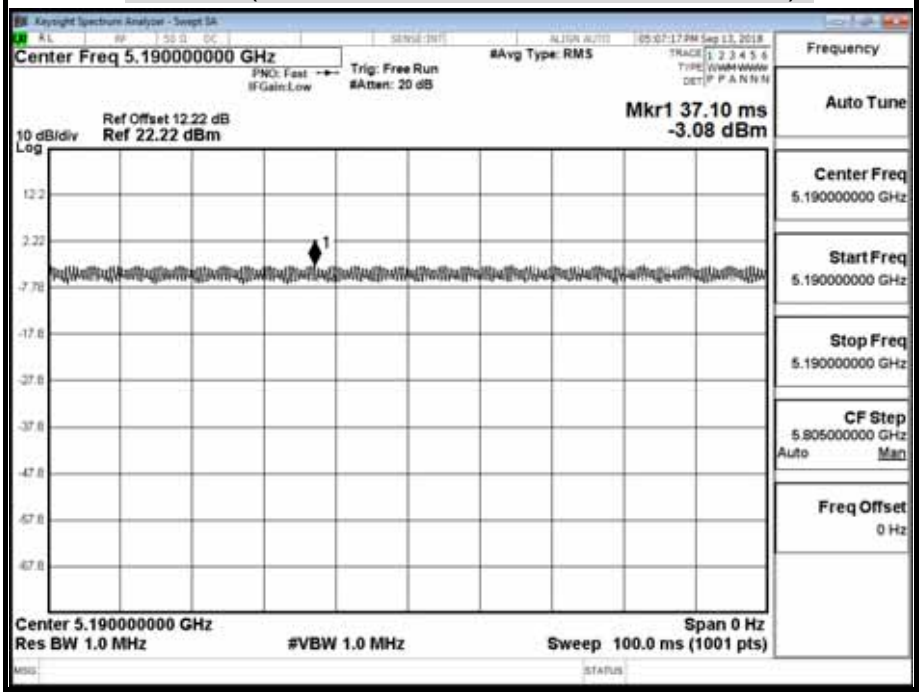


CH High (IEEE 802.11n HT20 Mode / Chain 0)

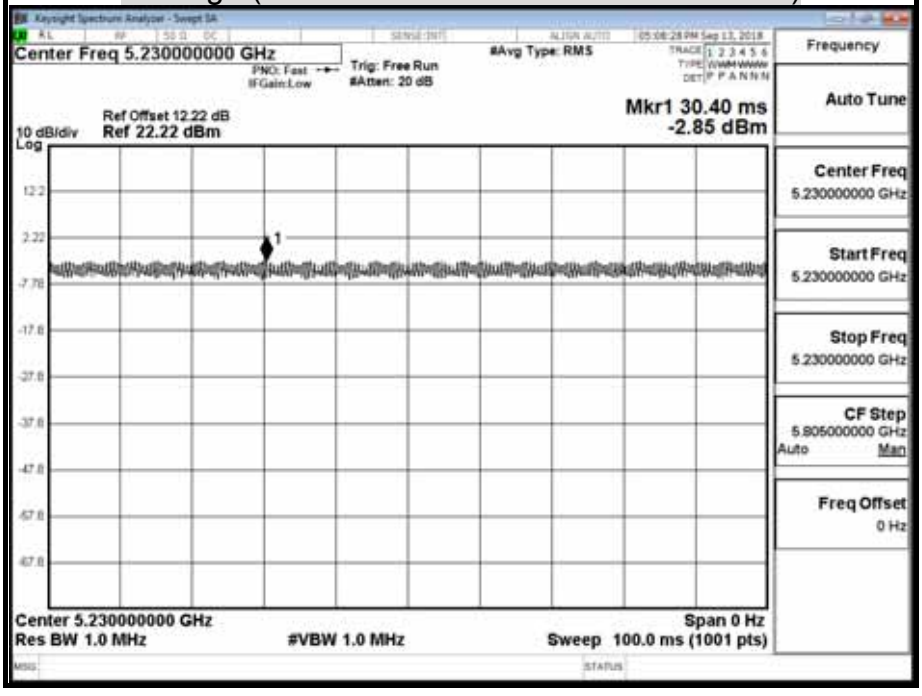


Test Mode: IEEE 802.11n HT 40 MHz mode / 5150 ~ 5250MHz

CH Low (IEEE 802.11n HT40 Mode / Chain 0)

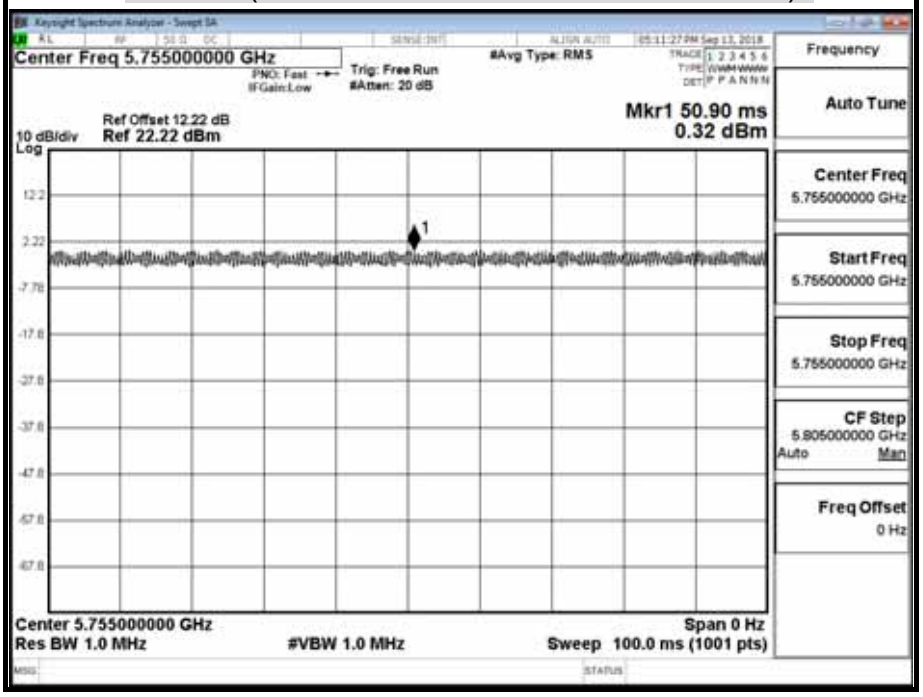


CH High (IEEE 802.11n HT40 Mode / Chain 0)

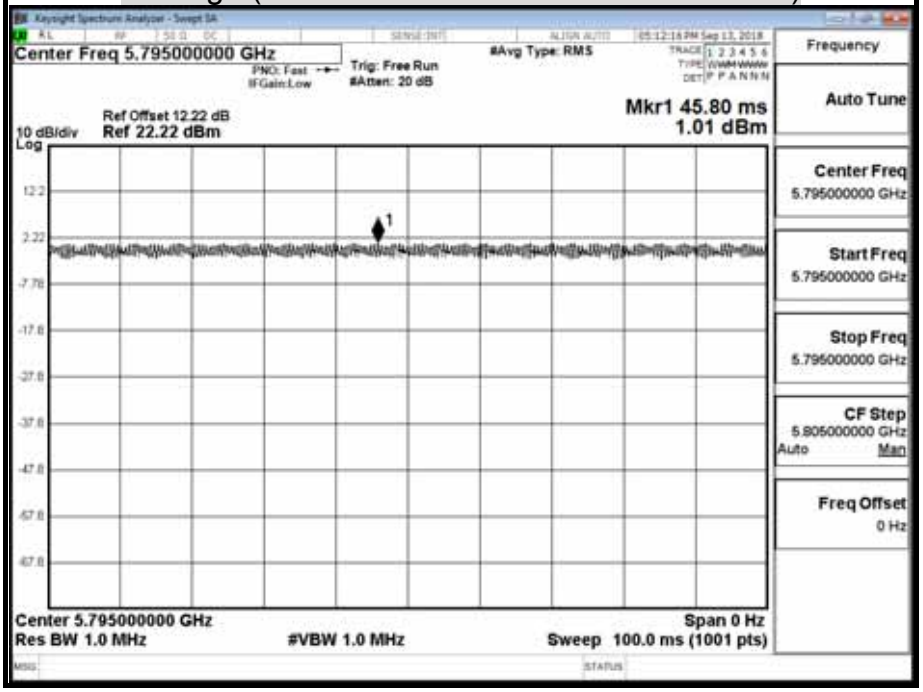


Test Mode: IEEE 802.11n HT 40 MHz mode / 5725 ~ 5850 MHz

CH Low (IEEE 802.11n HT40 Mode / Chain 0)



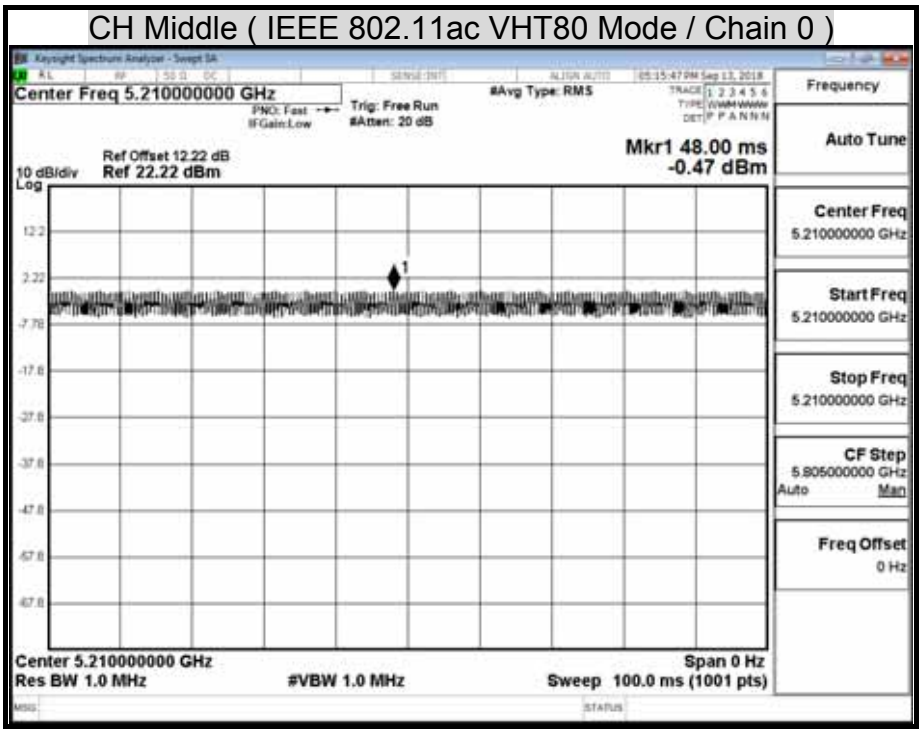
CH High (IEEE 802.11n HT40 Mode / Chain 0)



‘

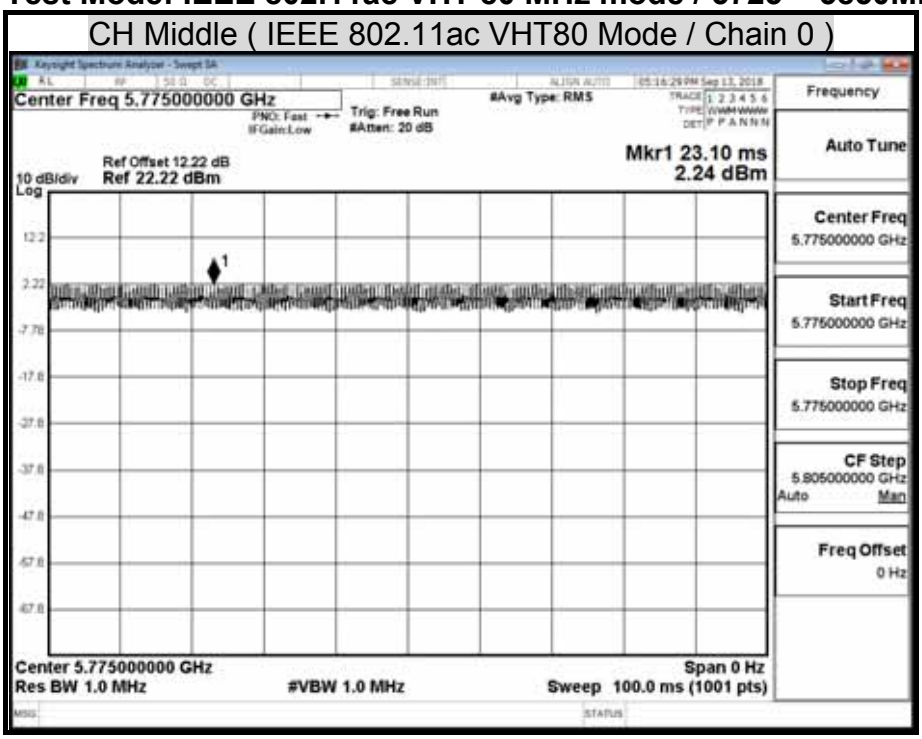
Test Mode: IEEE 802.11ac VHT 80 MHz mode / 5150 ~ 5250MHz

CH Middle (IEEE 802.11ac VHT80 Mode / Chain 0)



Test Mode: IEEE 802.11ac VHT 80 MHz mode / 5725 ~ 5850MHz

CH Middle (IEEE 802.11ac VHT80 Mode / Chain 0)



7.7 CONDUCTED SPURIOUS EMISSION

LIMITS

§ 15.407 (b): Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following 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.

(2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(3) For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

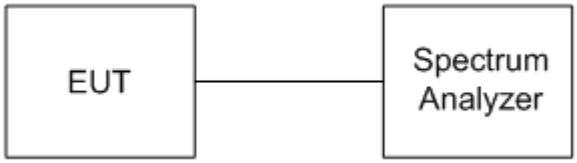
The provisions of § 15.205 apply to intentional radiators operating under this section.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/05/2018	07/04/2019
Power Meter	Anritsu	ML2487A	6K00003888	05/02/2018	05/01/2019
Power Sensor	Anritsu	MA2491A	033265	05/02/2018	05/01/2019
SMA Cable + 10dB Attenuator	CCS	SMA + 10dB Att	O6	01/22/2018	01/21/2019

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

TEST SETUP



TEST PROCEDURE

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation of measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1MHz. The video bandwidth is set to 1MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements are made.

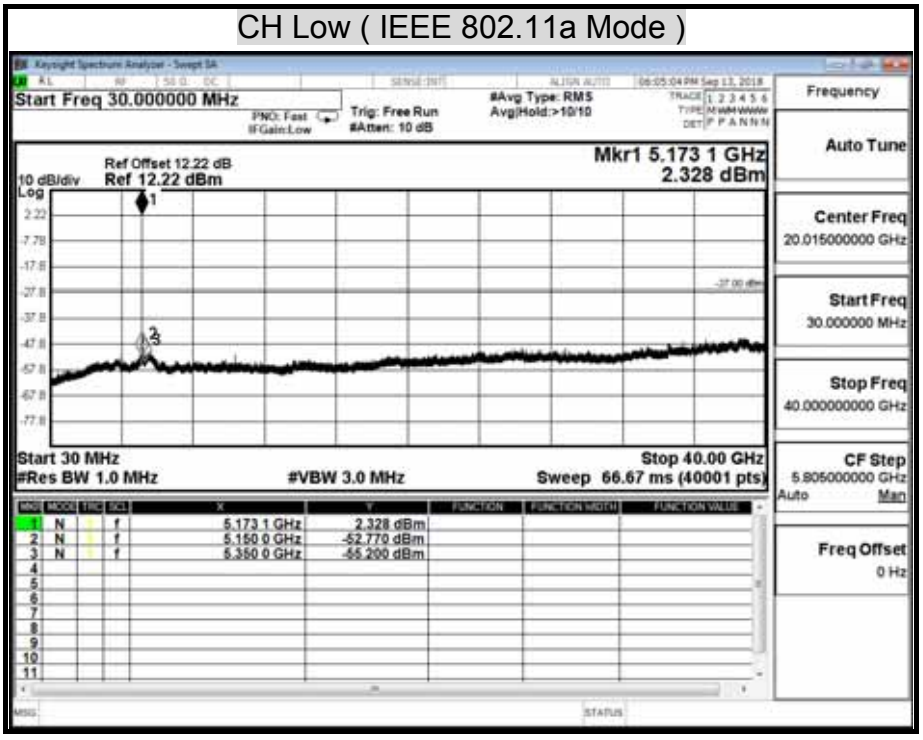
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

TEST RESULTS

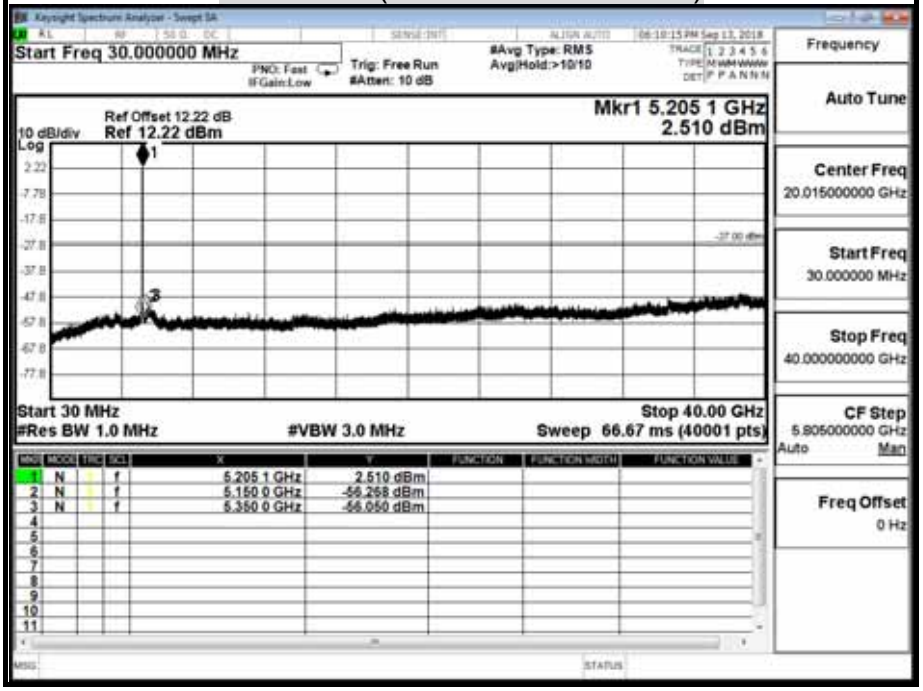
OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT

Test Mode: IEEE 802.11a mode / 5150 ~ 5250MHz

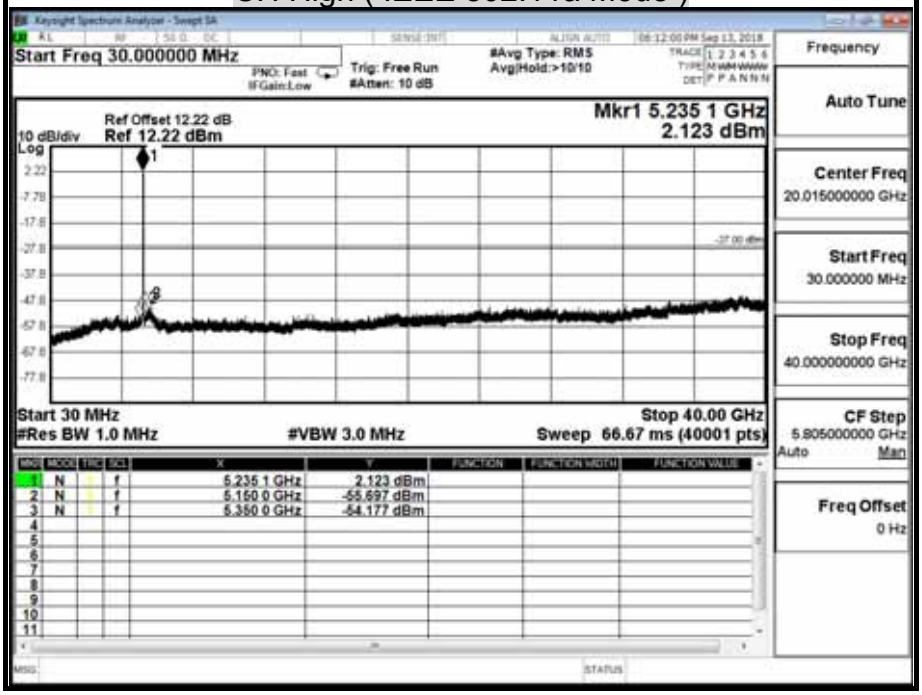
CH Low (IEEE 802.11a Mode)



CH Middle (IEEE 802.11a Mode)

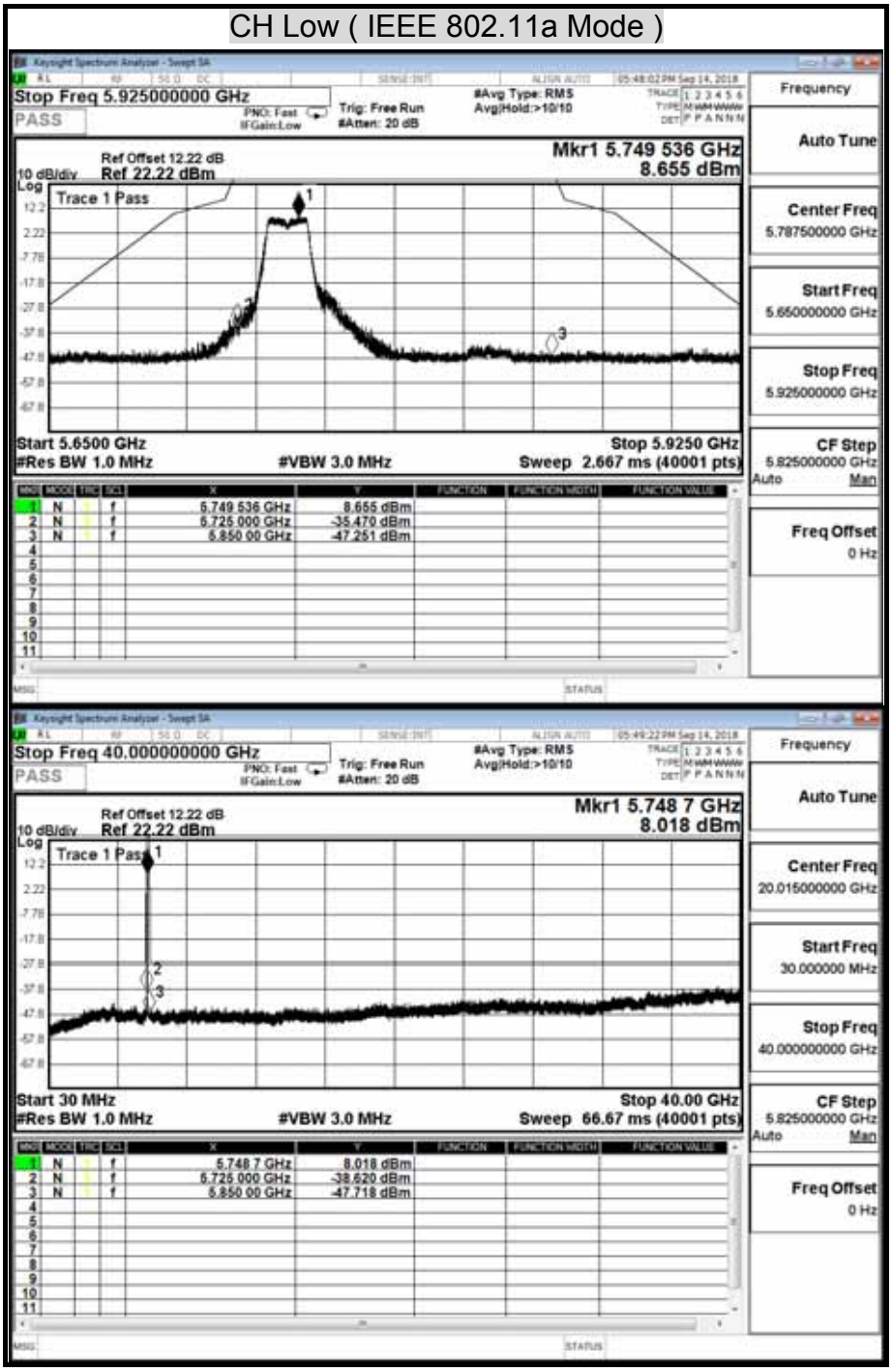


CH High (IEEE 802.11a Mode)

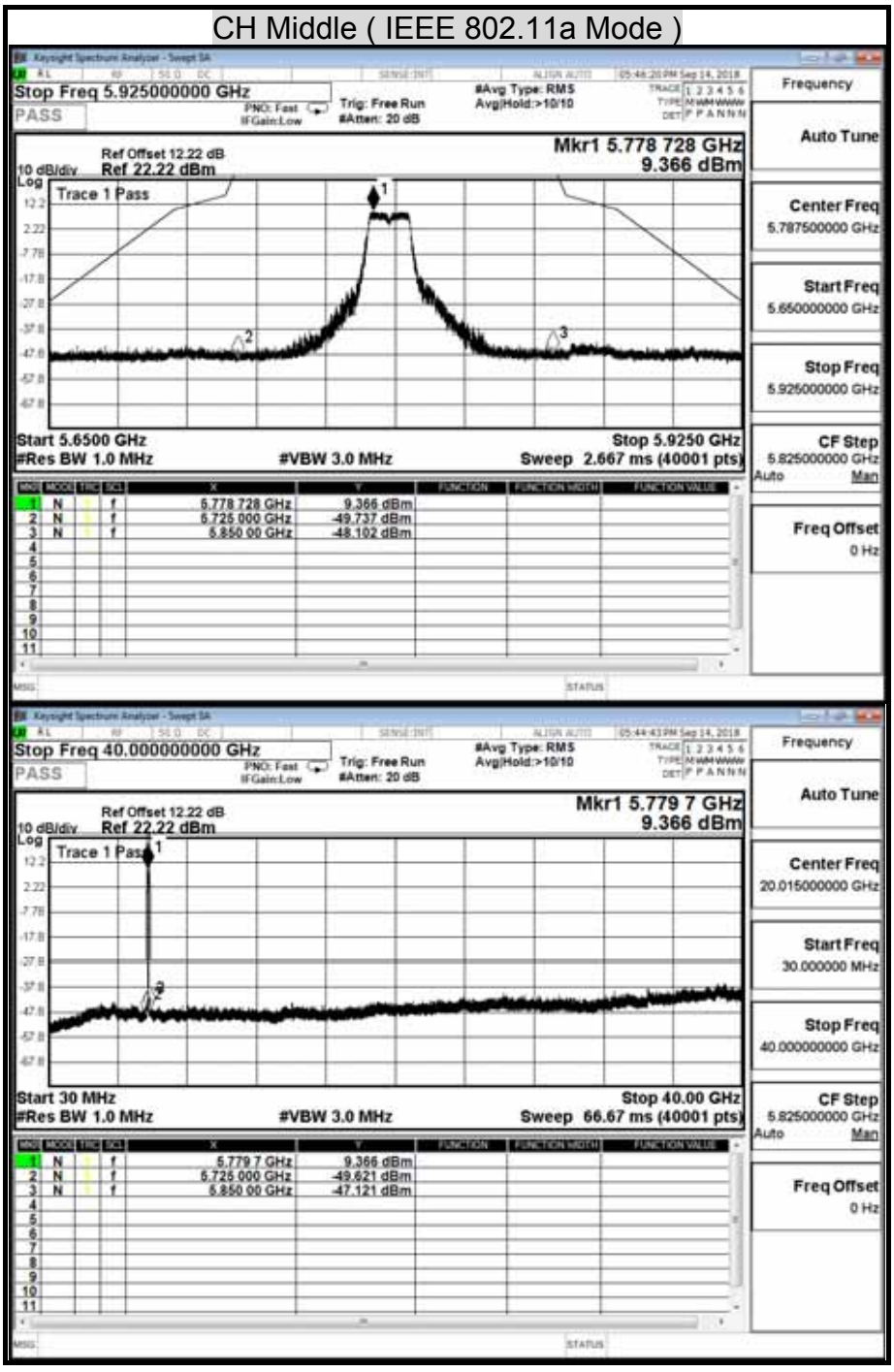


Test Mode: IEEE 802.11a mode / 5725 ~ 5850MHz

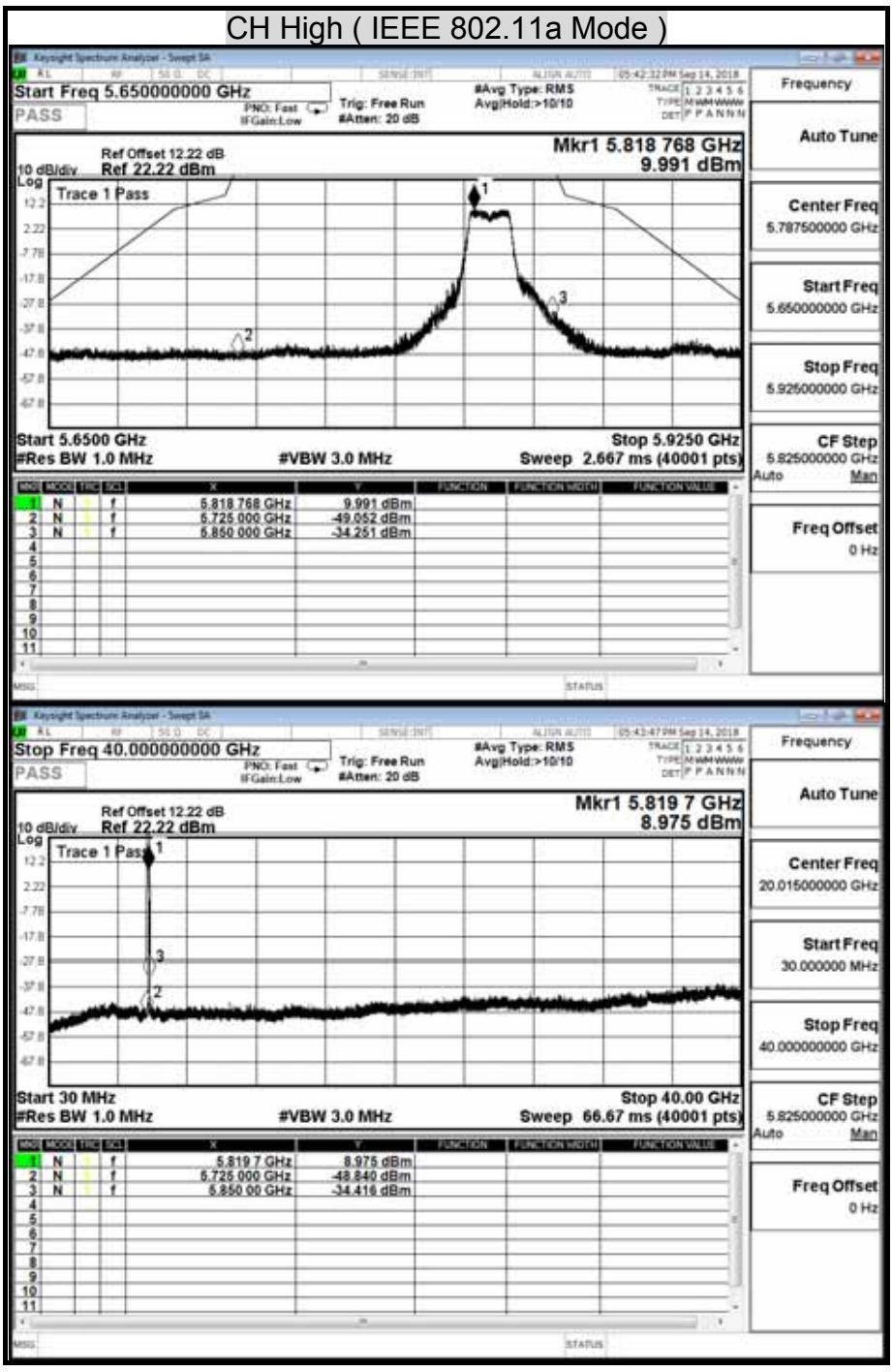
CH Low (IEEE 802.11a Mode)



CH Middle (IEEE 802.11a Mode)

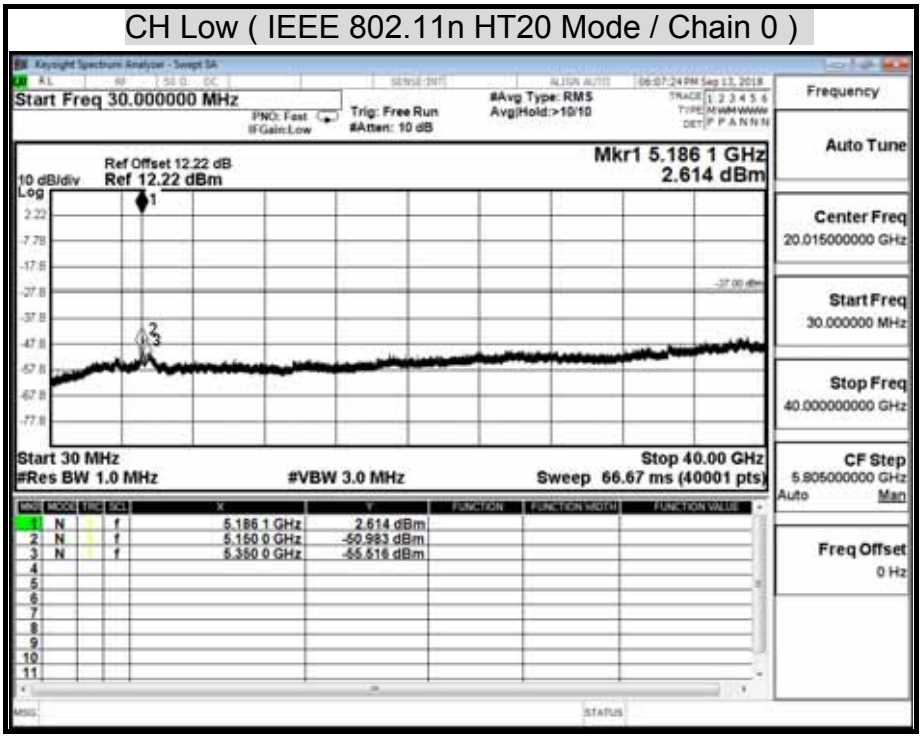


CH High (IEEE 802.11a Mode)

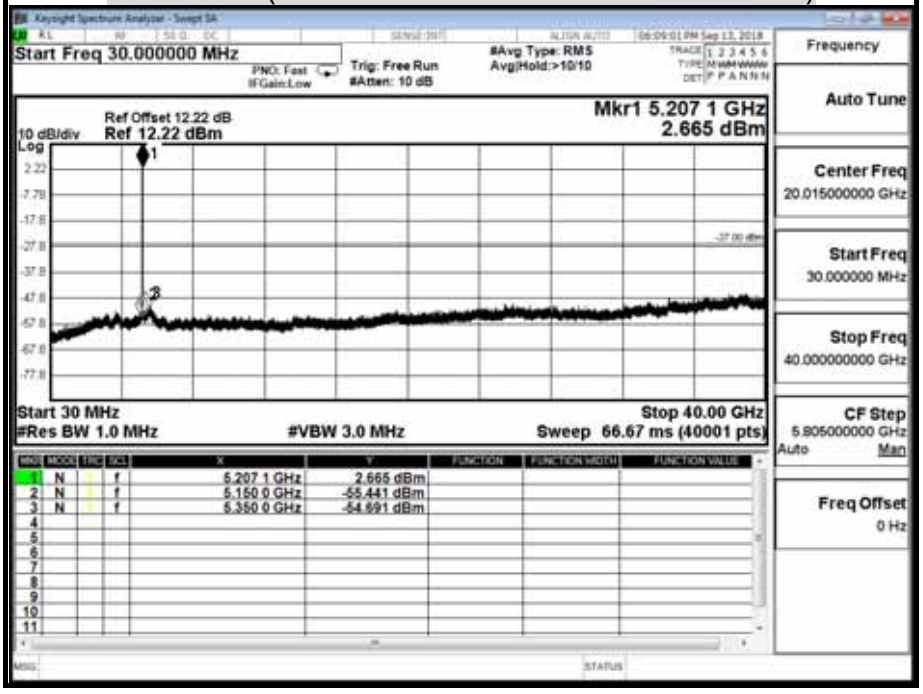


Test Mode: IEEE 802.11n HT 20 MHz mode / 5150 ~ 5250MHz

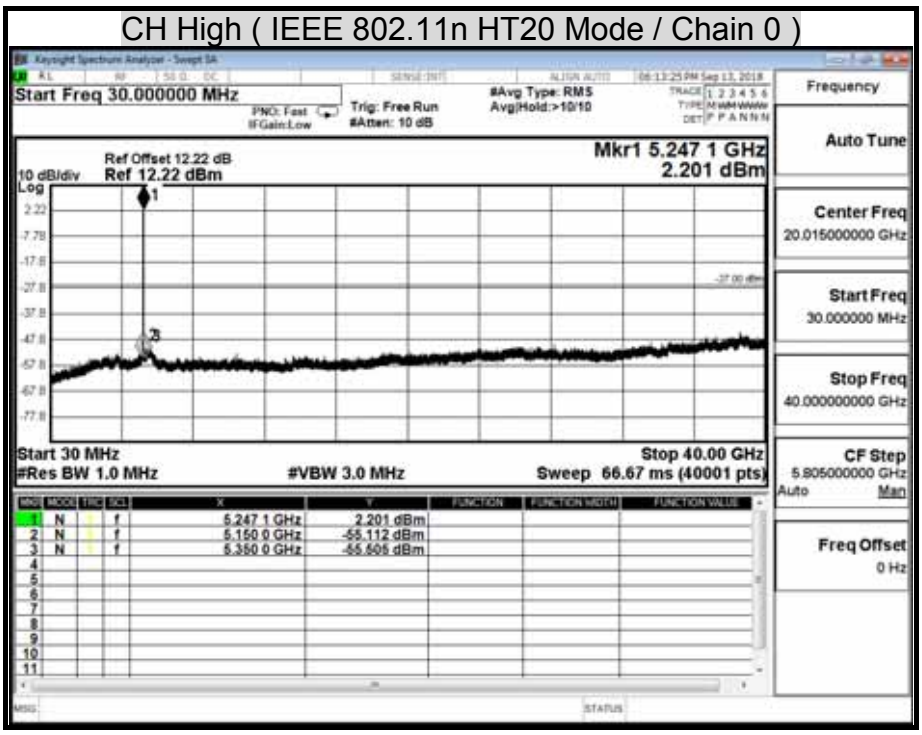
CH Low (IEEE 802.11n HT20 Mode / Chain 0)



CH Middle (IEEE 802.11n HT20 Mode / Chain 0)

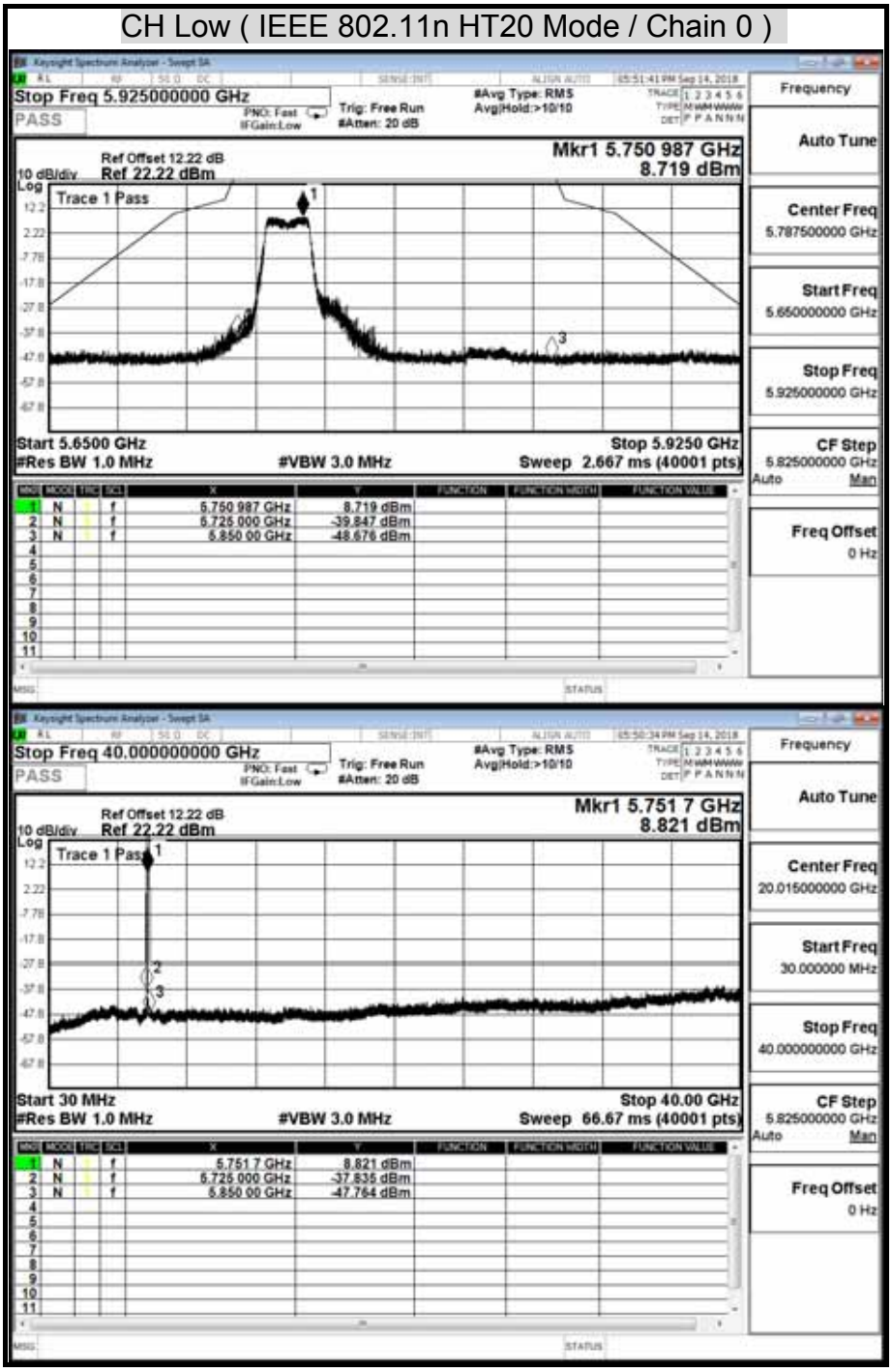


CH High (IEEE 802.11n HT20 Mode / Chain 0)

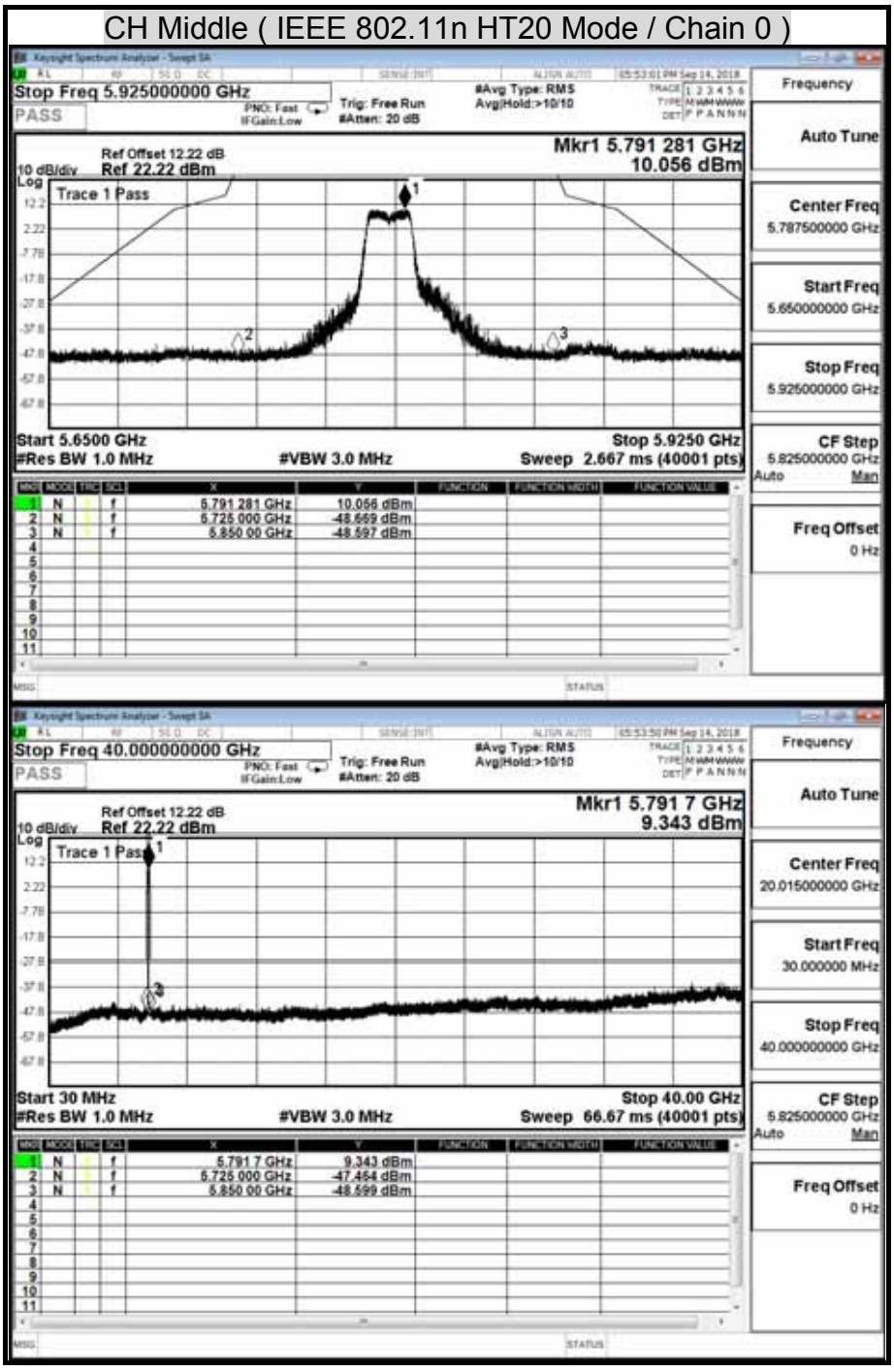


Test Mode: IEEE 802.11n HT 20 MHz mode / 5725 ~ 5850MHz

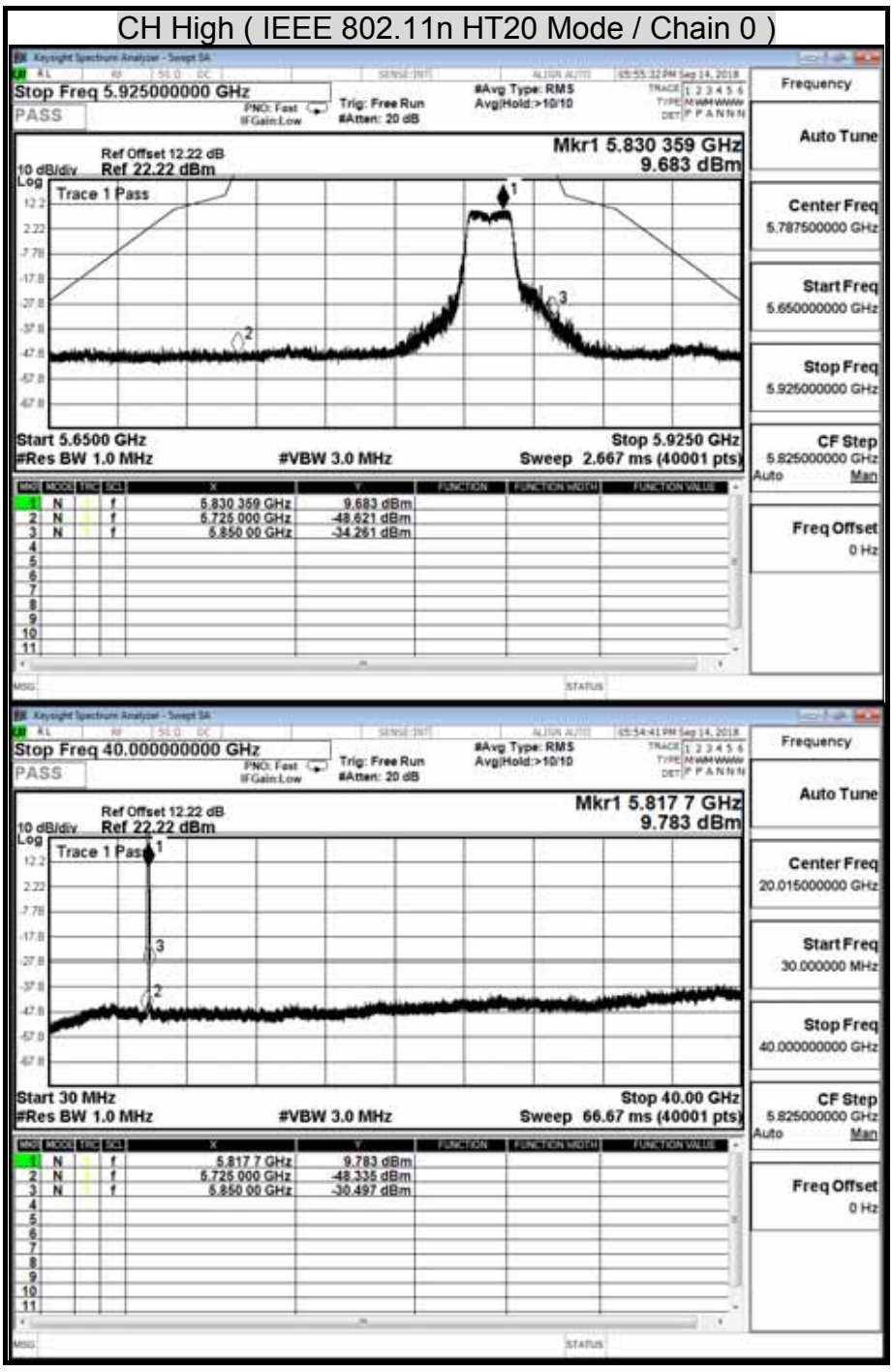
CH Low (IEEE 802.11n HT20 Mode / Chain 0)



CH Middle (IEEE 802.11n HT20 Mode / Chain 0)

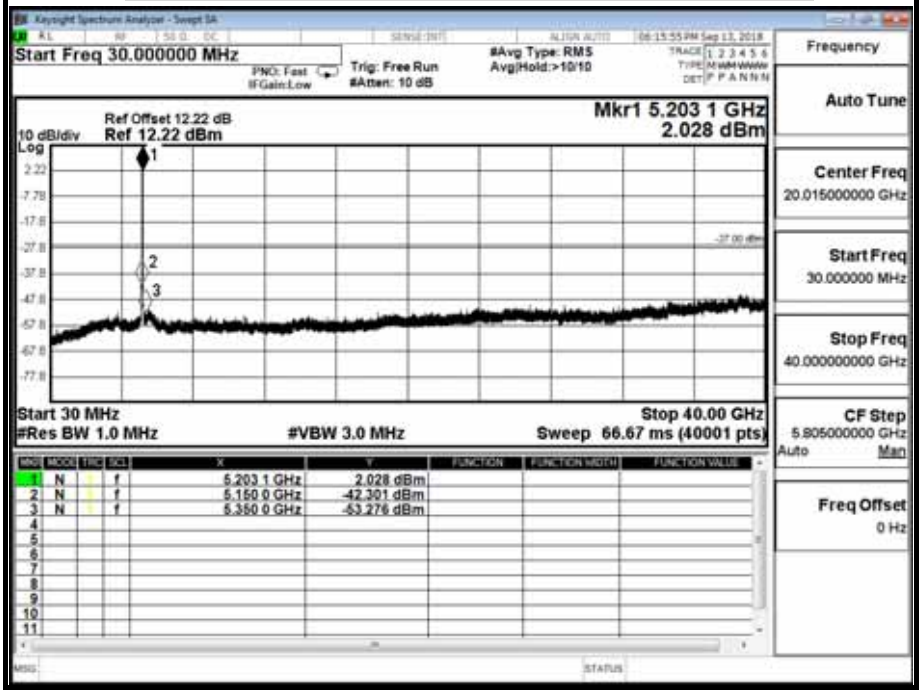


CH High (IEEE 802.11n HT20 Mode / Chain 0)

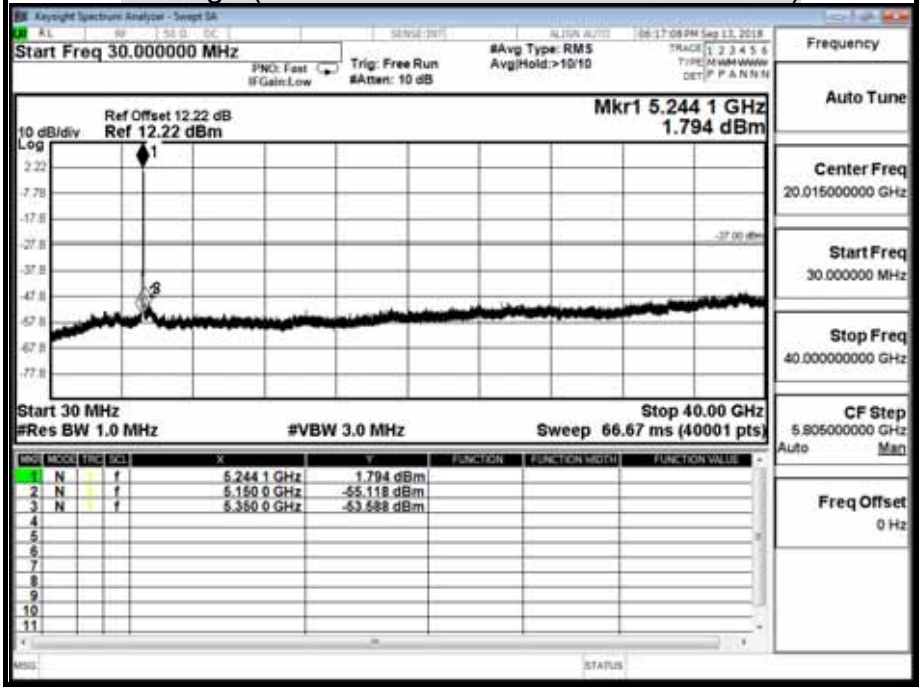


Test Mode: IEEE 802.11n HT 40 MHz mode / 5150 ~ 5250MHz

CH Low (IEEE 802.11n HT40 Mode / Chain 0)

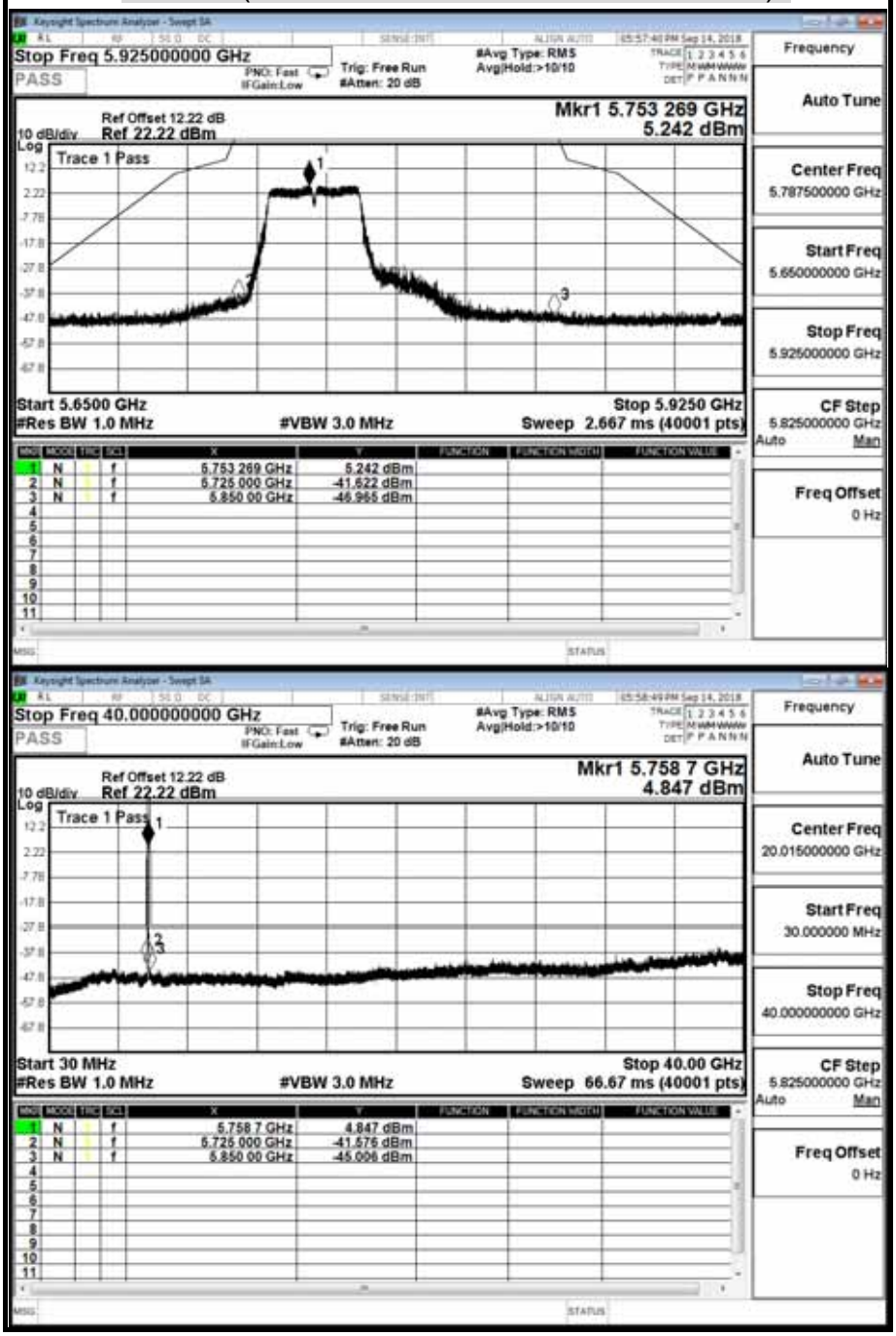


CH High (IEEE 802.11n HT40 Mode / Chain 0)

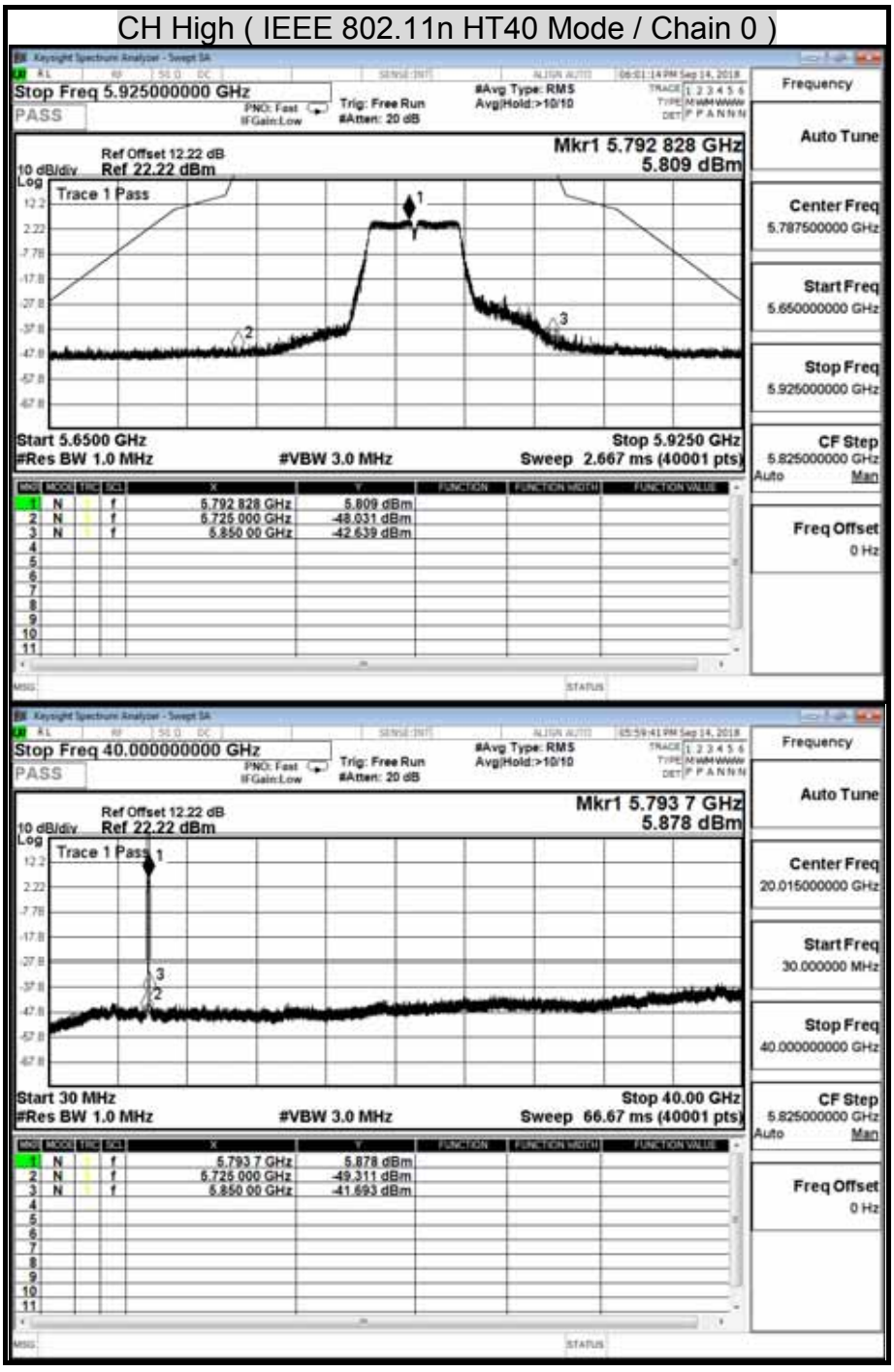


Test Mode: IEEE 802.11n HT 40 MHz mode / 5725 ~ 5850 MHz

CH Low (IEEE 802.11n HT40 Mode / Chain 0)

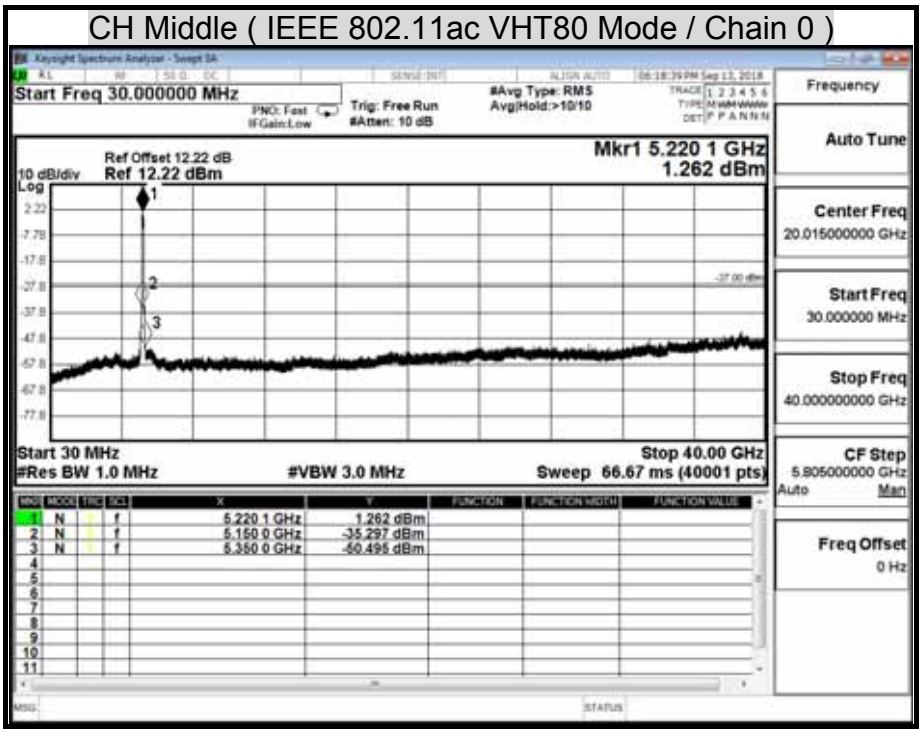


CH High (IEEE 802.11n HT40 Mode / Chain 0)



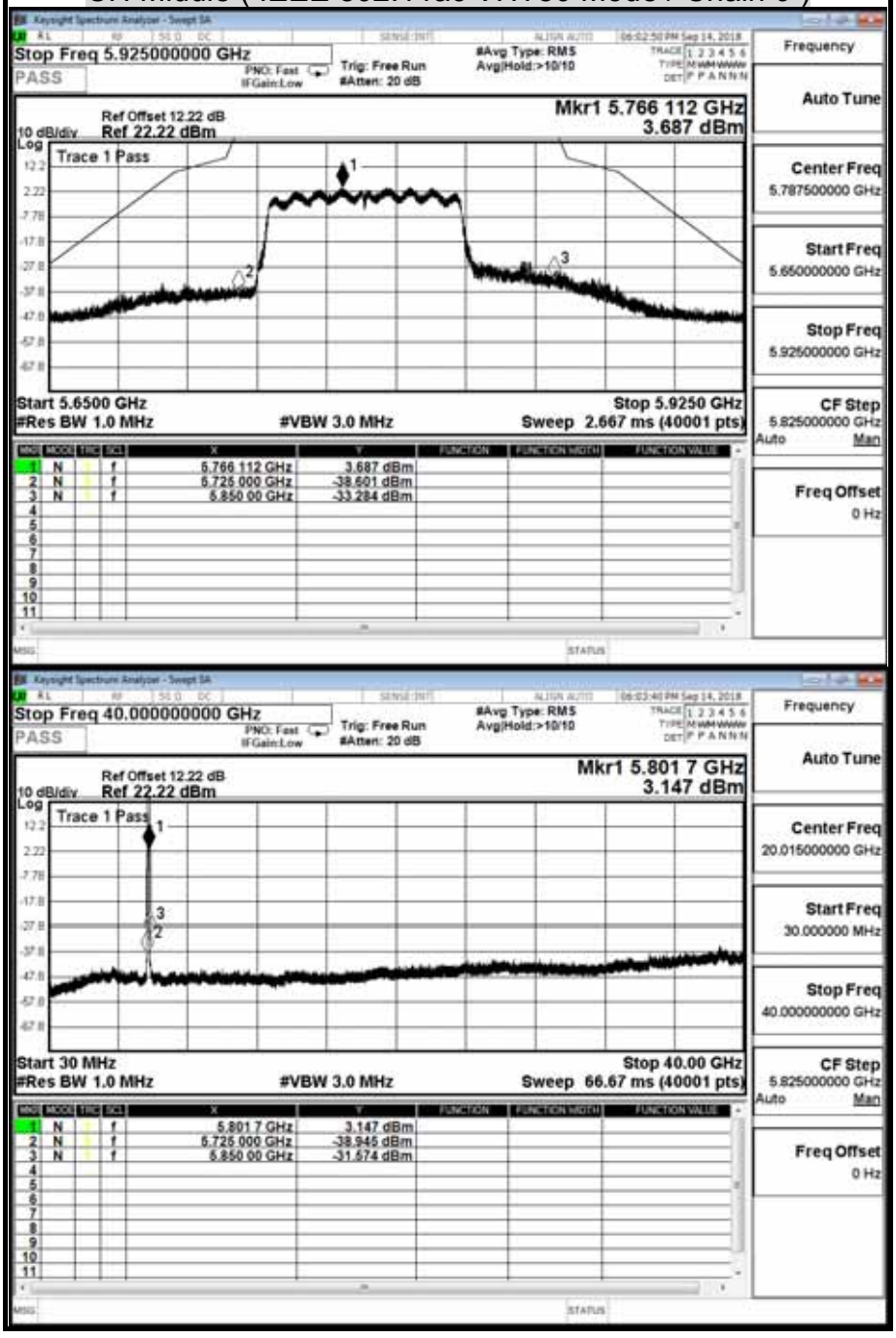
Test Mode: IEEE 802.11ac VHT 80 MHz mode / 5150 ~ 5250MHz

CH Middle (IEEE 802.11ac VHT80 Mode / Chain 0)



Test Mode: IEEE 802.11ac VHT 80 MHz mode / 5725 ~ 5850MHz

CH Middle (IEEE 802.11ac VHT80 Mode / Chain 0)



7.8 RADIATED EMISSION

LIMITS

(1) According to § 15.205 (a) 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	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 -1710	10.6 -12.7
6.26775 - 6.26825	108 -121.94	1718.8 - 1722.2	13.25 -13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 – 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 -16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3338	36.43 - 36.5
12.57675 - 12.57725	322 -335.4	3600 - 4400	([2])
13.36 - 13.41			

Remark:

1. *[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.*
2. *[2] Above 38.6*

(2) According to § 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown is 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.

(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 :

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(KHz)	300
0.490 – 1.705	24000/F(KHz)	30
1.705 – 30.0	30	30
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

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) According to § 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

(5) § 15.407 (b): Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(a) 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.

(b) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

(c) For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(d) For transmitters operating in the 5.725-5.85 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

TEST EQUIPMENT

The following test equipments are utilized in making the measurements contained in this report.

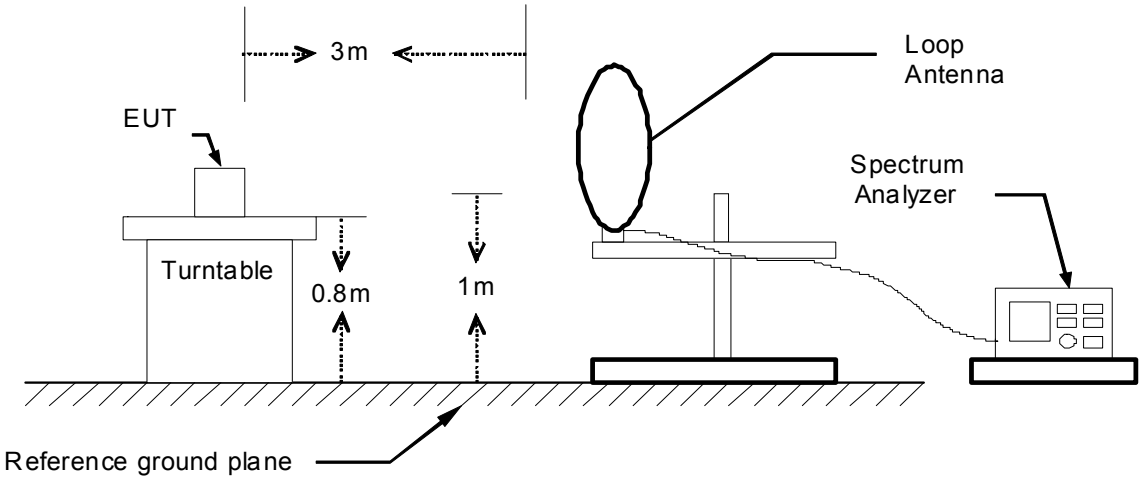
Chamber Room # 966					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Active Loop Antenna	ETS-LINDREN	6502	8905-2356	07/20/2017	07/19/2019
Amplifier	HP	8447F	2443A01671	01/22/2018	01/21/2019
Bi-Log Antenna	Sunol	JB1	A070506-2	02/09/2018	02/08/2019
Cable	Rosnol+Suhner	SUCOFLEX 104PEA	SN25737 /4PEA	01/27/2018	01/26/2019
Double Ridged Guide Horn Antenna	ETS-LINDGREN	3116	00078900	03/20/2017	03/19/2019
EMI Test Receiver	R&S	ESCI	100960	10/31/2017	10/30/2018
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/05/2018	07/04/2019
Hi-Pass Filter	MICRO-TRONICS	BRM50702-01	018	01/22/2018	01/21/2019
Horn Antenna	Com-Power	AH-118	071032	04/19/2018	04/18/2019
Pre-Amplifier	EMCI	EMC012645	980098	01/22/2018	01/21/2019

Remark: *1. Each piece of equipment is scheduled for calibration once a year.*
2. N.C.R = No Calibration Request.

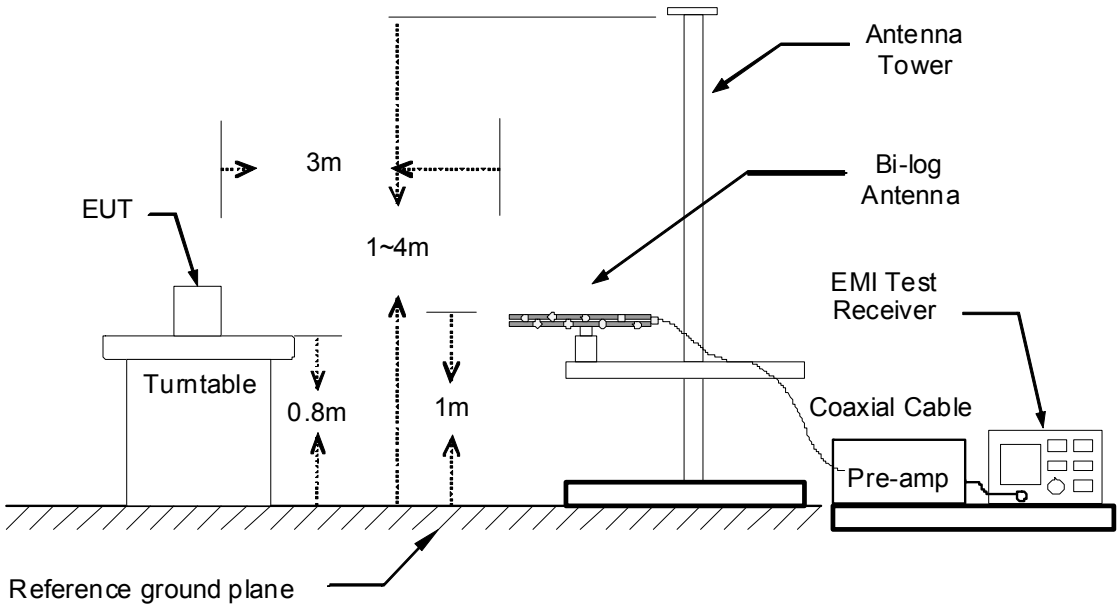
TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission from below 1GHz.

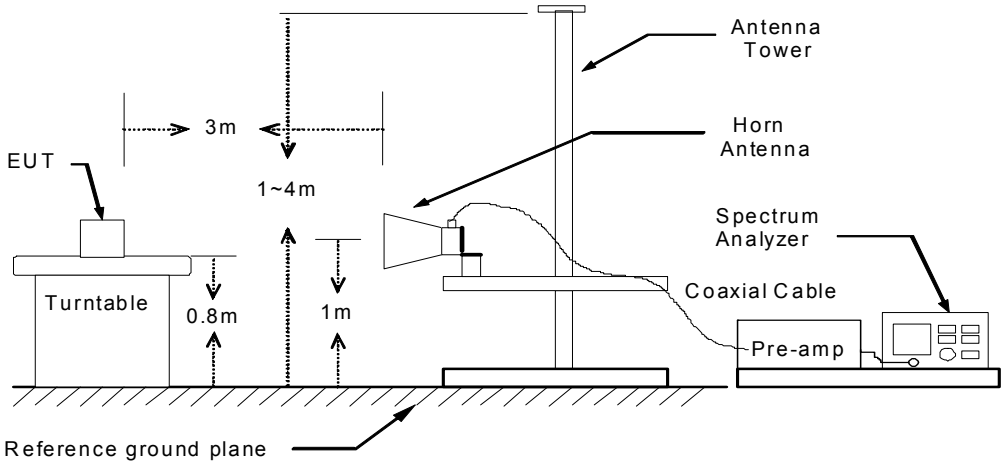
9kHz ~ 30MHz



30MHz ~ 1GHz



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



TEST PROCEDURE

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. While measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. While measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna.
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Remark：

1. *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.*
2. *The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.*
3. *The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.*

TEST RESULTS

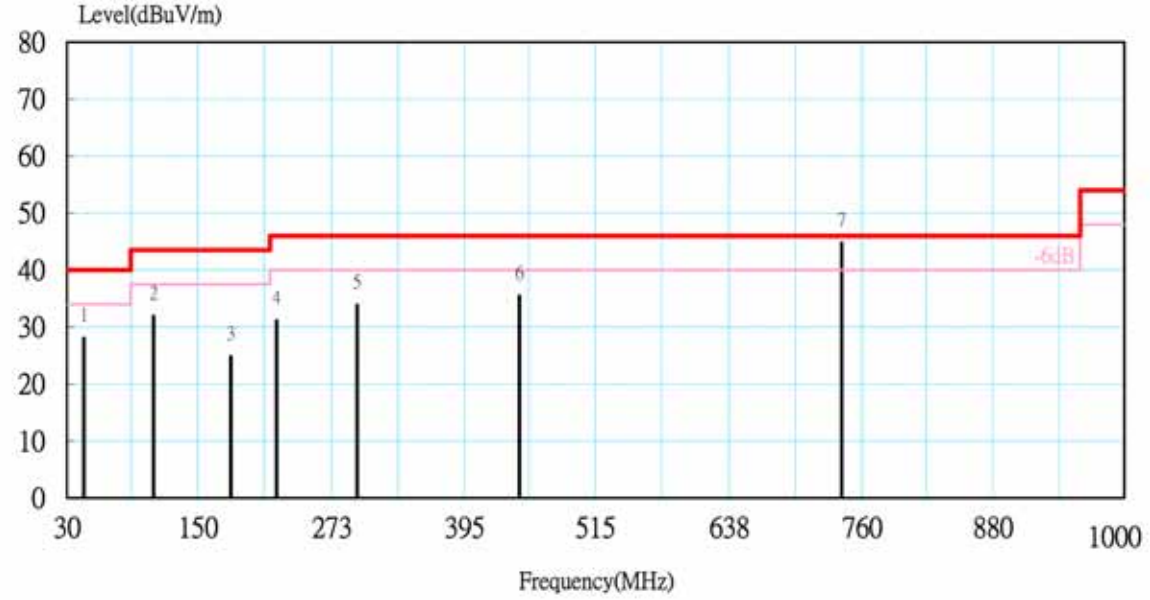
Below 1 GHz (9kHz ~ 30MHz)

No emission found between lowest internal used/generated frequency to 30MHz.

Below 1 GHz (30MHz ~ 1GHz)

Model No.	P650IVF01.0	Test Mode	TX
Environmental Conditions	25.8°C, 55% RH	Resolution Bandwidth	120 kHz
Antenna Pole	Vertical	Antenna Distance	10m
Detector Function:	Quasi-peak.	Tested By	Ted Huang

(The chart below shows the highest readings taken from the final data.)

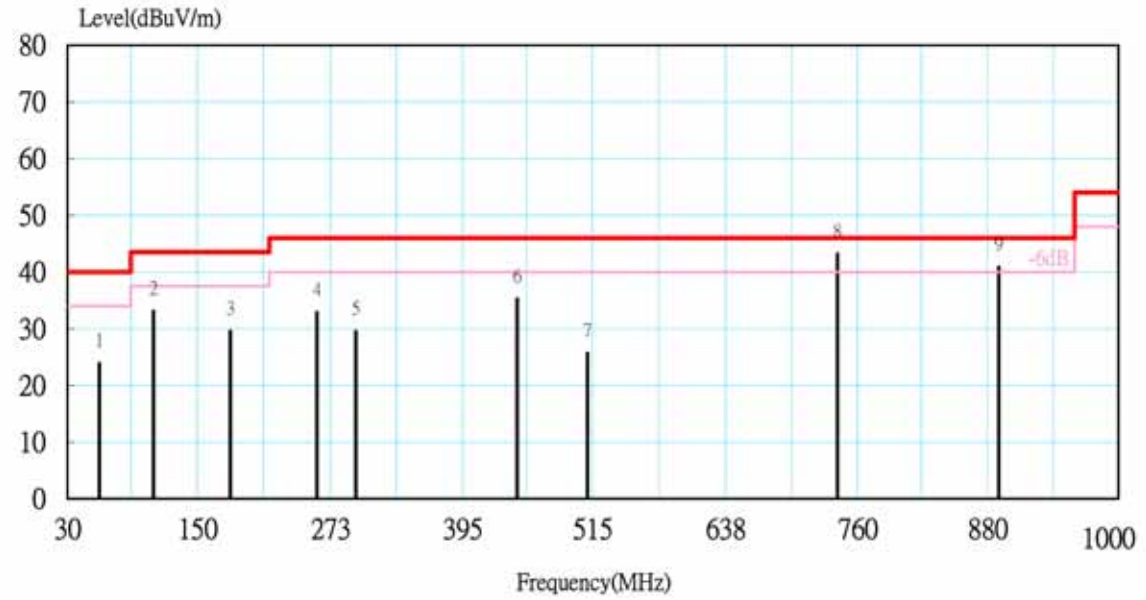


No.	Freq-Uency (MHz)	Meter Reading at 3 m Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission at 3 m Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector Mode PK/QP
1	45.58	15.95	11.21	0.95	28.11	40.00	**-11.89**	QP
2	109.84	17.46	12.96	1.53	31.95	43.50	**-11.55**	QP
3	180.12	11.25	11.51	2.12	24.88	43.50	**-18.62**	QP
4	222.60	15.80	12.94	2.43	31.17	46.00	**-14.83**	QP
5	296.40	17.00	13.89	3.01	33.90	46.00	**-12.10**	QP
6	445.06	14.24	16.96	4.30	35.50	46.00	**-10.50**	QP
7	741.75	18.42	20.67	5.72	44.81	46.00	**-1.19**	QP

Note: 1. QP= Quasi-peak Reading.
2. The other emission levels were very low against the limit

Model No.	P650IVF01.0	Test Mode	TX
Environmental Conditions	25.8°C, 55% RH	Resolution Bandwidth	120 kHz
Antenna Pole	Horizontal	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested By	Ted Huang

(The chart below shows the highest readings taken from the final data.)



No.	Freq-Uency (MHz)	Meter Reading at 3 m Level (dBµV)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission at 3 m Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Detector Mode PK/QP
1	59.48	14.90	7.94	1.09	23.93	40.00	**-16.07**	QP
2	109.29	18.80	12.81	1.52	33.14	43.50	**-10.36**	QP
3	180.49	15.96	11.52	2.12	29.61	43.50	**-13.89**	QP
4	260.97	17.35	12.83	2.74	32.91	46.00	**-13.09**	QP
5	296.78	12.66	13.90	3.01	29.58	46.00	**-16.42**	QP
6	445.04	14.05	16.96	4.30	35.31	46.00	**-10.69**	QP
7	510.98	2.77	18.14	4.80	25.71	46.00	**-20.29**	QP

Note: 1. QP= Quasi-peak Reading.
2. The other emission levels were very low against the limit

Above 1 GHz

Model	P650IVF01.0	Test By	Ted Huang
TEMP & Humidity	26.2℃, 66%	Test Date	2018/09/13
Test Mode	Lower Sub-Band IEEE 802.11a TX / CH Low		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1199.96	69.29	25.24	2.04	45.27	0.30	51.61	74.00	-22.39	P
*	1199.96	64.52	25.24	2.04	45.27	0.30	46.84	54.00	-7.16	A
*	1599.89	73.82	27.28	2.39	44.96	0.30	58.84	74.00	-15.16	P
*	1599.89	66.39	27.28	2.39	44.96	0.30	51.40	54.00	-2.60	A
	10359.65	53.97	38.54	6.96	42.47	0.50	57.51	74.00	-16.49	P
	10359.65	42.66	38.54	6.96	42.47	0.50	46.20	54.00	-7.80	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1200.01	69.97	25.24	2.04	45.27	0.30	52.29	74.00	-21.71	P
*	1200.01	65.52	25.24	2.04	45.27	0.30	47.84	54.00	-6.16	A
*	1600.19	69.40	27.28	2.39	44.96	0.30	54.42	74.00	-19.58	P
*	1600.19	59.74	27.28	2.39	44.96	0.30	44.76	54.00	-9.24	A
	10359.73	54.07	38.54	6.96	42.47	0.50	57.61	74.00	-16.39	P
	10359.73	42.98	38.54	6.96	42.47	0.50	46.52	54.00	-7.48	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*
6. ** means: the frequency is under 15.205 restricted bands.*

Model	P650IVF01.0	Test By	Ted Huang
TEMP & Humidity	26.2℃, 66%	Test Date	2018/09/13
Test Mode	Lower Sub-Band IEEE 802.11a TX / CH Middle		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1200.03	69.42	25.24	2.04	45.27	0.30	51.74	74.00	-22.26	P
*	1200.03	64.85	25.24	2.04	45.27	0.30	47.17	54.00	-6.83	A
*	1599.96	74.23	27.28	2.39	44.96	0.30	59.24	74.00	-14.76	P
*	1599.96	66.62	27.28	2.39	44.96	0.30	51.63	54.00	-2.37	A
	10399.32	52.86	38.56	6.97	42.47	0.50	56.42	74.00	-17.58	P
	10399.32	42.46	38.56	6.97	42.47	0.50	46.01	54.00	-7.99	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1199.97	70.12	25.24	2.04	45.27	0.30	52.44	74.00	-21.56	P
*	1199.97	65.86	25.24	2.04	45.27	0.30	48.18	54.00	-5.82	A
*	1600.12	69.52	27.28	2.39	44.96	0.30	54.54	74.00	-19.46	P
*	1600.12	59.78	27.28	2.39	44.96	0.30	44.80	54.00	-9.20	A
	10399.93	53.44	38.56	6.97	42.47	0.50	57.00	74.00	-17.00	P
	10399.93	43.28	38.56	6.97	42.47	0.50	46.84	54.00	-7.16	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*
6. ** means: the frequency is under 15.205 restricted bands.*

Model	P650IVF01.0	Test By	Ted Huang
TEMP & Humidity	26.2℃, 66%	Test Date	2018/09/13
Test Mode	Lower Sub-Band IEEE 802.11a TX / CH High		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1200.04	69.72	25.24	2.04	45.27	0.30	52.04	74.00	-21.96	P
*	1200.04	64.82	25.24	2.04	45.27	0.30	47.14	54.00	-6.86	A
*	1600.04	73.56	27.28	2.39	44.96	0.30	58.57	74.00	-15.43	P
*	1600.04	66.22	27.28	2.39	44.96	0.30	51.23	54.00	-2.77	A
	10480.03	55.36	38.59	6.98	42.48	0.50	58.95	74.00	-15.05	P
	10480.03	44.58	38.59	6.98	42.48	0.50	48.18	54.00	-5.82	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1199.95	69.45	25.24	2.04	45.27	0.30	51.77	74.00	-22.23	P
*	1199.95	64.78	25.24	2.04	45.27	0.30	47.10	54.00	-6.90	A
*	1600.22	69.68	27.28	2.39	44.96	0.30	54.70	74.00	-19.30	P
*	1600.22	59.85	27.28	2.39	44.96	0.30	44.87	54.00	-9.13	A
	10480.64	55.49	38.59	6.98	42.48	0.50	59.08	74.00	-14.92	P
	10480.64	44.78	38.59	6.98	42.48	0.50	48.38	54.00	-5.62	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*
6. ** means: the frequency is under 15.205 restricted bands.*

Model	P650IVF01.0	Test By	Ted Huang
TEMP & Humidity	26.2℃, 66%	Test Date	2018/09/13
Test Mode	Higher Sub-Band IEEE 802.11a TX / CH Low		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1199.94	69.38	25.24	2.04	45.27	0.30	51.70	74.00	-22.30	P
*	1199.94	64.64	25.24	2.04	45.27	0.30	46.96	54.00	-7.04	A
*	1599.95	74.25	27.28	2.39	44.96	0.30	59.26	74.00	-14.74	P
*	1599.95	66.76	27.28	2.39	44.96	0.30	51.77	54.00	-2.23	A
*	11490.65	53.25	40.18	7.39	42.10	0.60	59.32	74.00	-14.68	P
*	11490.65	42.36	40.18	7.39	42.10	0.60	48.43	54.00	-5.57	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1200.01	70.25	25.24	2.04	45.27	0.30	52.57	74.00	-21.43	P
*	1200.01	65.86	25.24	2.04	45.27	0.30	48.18	54.00	-5.82	A
*	1600.14	69.76	27.28	2.39	44.96	0.30	54.78	74.00	-19.22	P
*	1600.14	59.93	27.28	2.39	44.96	0.30	44.95	54.00	-9.05	A
*	11490.25	53.62	40.17	7.39	42.10	0.60	59.69	74.00	-14.31	P
*	11490.25	42.58	40.17	7.39	42.10	0.60	48.65	54.00	-5.35	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*
6. ** means: the frequency is under 15.205 restricted bands.*

Model	P650IVF01.0	Test By	Ted Huang
TEMP & Humidity	26.2℃, 66%	Test Date	2018/09/13
Test Mode	Higher Sub-Band IEEE 802.11a TX / CH Middle		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1200.04	69.54	25.24	2.04	45.27	0.30	51.86	74.00	-22.14	P
*	1200.04	64.96	25.24	2.04	45.27	0.30	47.28	54.00	-6.72	A
*	1599.98	74.56	27.28	2.39	44.96	0.30	59.57	74.00	-14.43	P
*	1599.98	66.72	27.28	2.39	44.96	0.30	51.73	54.00	-2.27	A
*	11570.43	53.84	40.27	7.45	42.03	0.60	60.13	74.00	-13.87	P
*	11570.43	42.68	40.27	7.45	42.03	0.60	48.98	54.00	-5.02	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1199.95	70.42	25.24	2.04	45.27	0.30	52.74	74.00	-21.26	P
*	1199.95	66.14	25.24	2.04	45.27	0.30	48.46	54.00	-5.54	A
*	1600.12	69.45	27.28	2.39	44.96	0.30	54.47	74.00	-19.53	P
*	1600.12	59.82	27.28	2.39	44.96	0.30	44.84	54.00	-9.16	A
*	11568.89	54.52	40.27	7.45	42.03	0.60	60.81	74.00	-13.19	P
*	11568.89	43.06	40.27	7.45	42.03	0.60	49.35	54.00	-4.65	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*
6. ** means: the frequency is under 15.205 restricted bands.*

Model	P650IVF01.0	Test By	Ted Huang
TEMP & Humidity	26.2℃, 66%	Test Date	2018/09/13
Test Mode	Higher Sub-Band IEEE 802.11a TX / CH High		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1200.01	69.85	25.24	2.04	45.27	0.30	52.17	74.00	-21.83	P
*	1200.01	64.96	25.24	2.04	45.27	0.30	47.28	54.00	-6.72	A
*	1600.05	73.68	27.28	2.39	44.96	0.30	58.69	74.00	-15.31	P
*	1600.05	66.45	27.28	2.39	44.96	0.30	51.46	54.00	-2.54	A
*	11645.20	54.13	40.35	7.51	41.97	0.60	60.61	74.00	-13.39	P
*	11645.20	42.95	40.35	7.51	41.97	0.60	49.44	54.00	-4.56	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1199.98	69.65	25.24	2.04	45.27	0.30	51.97	74.00	-22.03	P
*	1199.98	64.85	25.24	2.04	45.27	0.30	47.17	54.00	-6.83	A
*	1600.24	69.45	27.28	2.39	44.96	0.30	54.47	74.00	-19.53	P
*	1600.24	59.72	27.28	2.39	44.96	0.30	44.74	54.00	-9.26	A
*	11653.36	54.35	40.35	7.51	41.96	0.60	60.86	74.00	-13.14	P
*	11653.36	43.68	40.35	7.51	41.96	0.60	50.19	54.00	-3.81	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*
6. ** means: the frequency is under 15.205 restricted bands.*

Model	P650IVF01.0	Test By	Ted Huang
TEMP & Humidity	26.2℃, 66%	Test Date	2018/09/13
Test Mode	Lower Sub-Band IEEE 802.11n HT20 TX / CH Low		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1200.05	69.85	25.24	2.04	45.27	0.30	52.17	74.00	-21.83	P
*	1200.05	65.17	25.24	2.04	45.27	0.30	47.49	54.00	-6.51	A
*	1599.98	73.75	27.28	2.39	44.96	0.30	58.76	74.00	-15.24	P
*	1599.98	66.58	27.28	2.39	44.96	0.30	51.59	54.00	-2.41	A
	10359.79	53.87	38.54	6.96	42.47	0.50	57.41	74.00	-16.59	P
	10359.79	42.59	38.54	6.96	42.47	0.50	46.13	54.00	-7.87	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1199.98	69.68	25.24	2.04	45.27	0.30	52.00	74.00	-22.00	P
*	1199.98	64.96	25.24	2.04	45.27	0.30	47.28	54.00	-6.72	A
*	1600.14	69.56	27.28	2.39	44.96	0.30	54.58	74.00	-19.42	P
*	1600.14	59.78	27.28	2.39	44.96	0.30	44.80	54.00	-9.20	A
	10359.90	53.78	38.54	6.96	42.47	0.50	57.32	74.00	-16.68	P
	10359.90	43.04	38.54	6.96	42.47	0.50	46.58	54.00	-7.42	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*
6. ** means: the frequency is under 15.205 restricted bands.*

Model	P650IVF01.0	Test By	Ted Huang
TEMP & Humidity	26.2℃, 66%	Test Date	2018/09/13
Test Mode	Lower Sub-Band IEEE 802.11n HT20 TX / CH Middle		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1199.97	69.46	25.24	2.04	45.27	0.30	51.78	74.00	-22.22	P
*	1199.97	64.68	25.24	2.04	45.27	0.30	47.00	54.00	-7.00	A
*	1599.95	73.82	27.28	2.39	44.96	0.30	58.84	74.00	-15.16	P
*	1599.95	66.52	27.28	2.39	44.96	0.30	51.53	54.00	-2.47	A
	10399.57	53.14	38.56	6.97	42.47	0.50	56.69	74.00	-17.31	P
	10399.57	42.26	38.56	6.97	42.47	0.50	45.81	54.00	-8.19	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1200.00	70.24	25.24	2.04	45.27	0.30	52.56	74.00	-21.44	P
*	1200.00	65.75	25.24	2.04	45.27	0.30	48.07	54.00	-5.93	A
*	1600.19	69.68	27.28	2.39	44.96	0.30	54.70	74.00	-19.30	P
*	1600.19	59.88	27.28	2.39	44.96	0.30	44.90	54.00	-9.10	A
	10400.04	53.45	38.56	6.97	42.47	0.50	57.01	74.00	-16.99	P
	10400.04	42.76	38.56	6.97	42.47	0.50	46.31	54.00	-7.69	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*
6. ** means: the frequency is under 15.205 restricted bands.*

Model	P650IVF01.0	Test By	Ted Huang
TEMP & Humidity	26.2℃, 66%	Test Date	2018/09/13
Test Mode	Lower Sub-Band IEEE 802.11n HT20 TX / CH High		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1199.94	69.58	25.24	2.04	45.27	0.30	51.90	74.00	-22.10	P
*	1199.94	65.21	25.24	2.04	45.27	0.30	47.53	54.00	-6.47	A
*	1599.97	74.42	27.28	2.39	44.96	0.30	59.43	74.00	-14.57	P
*	1599.97	66.78	27.28	2.39	44.96	0.30	51.79	54.00	-2.21	A
	10480.58	55.35	38.59	6.98	42.48	0.50	58.95	74.00	-15.05	P
	10480.58	44.16	38.59	6.98	42.48	0.50	47.75	54.00	-6.25	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1200.03	70.42	25.24	2.04	45.27	0.30	52.74	74.00	-21.26	P
*	1200.03	66.07	25.24	2.04	45.27	0.30	48.39	54.00	-5.61	A
*	1600.08	69.68	27.28	2.39	44.96	0.30	54.69	74.00	-19.31	P
*	1600.08	59.92	27.28	2.39	44.96	0.30	44.93	54.00	-9.07	A
	10479.26	55.68	38.59	6.98	42.48	0.50	59.27	74.00	-14.73	P
	10479.26	45.25	38.59	6.98	42.48	0.50	48.84	54.00	-5.16	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*
6. ** means: the frequency is under 15.205 restricted bands.*

Model	P650IVF01.0	Test By	Ted Huang
TEMP & Humidity	26.2℃, 66%	Test Date	2018/09/13
Test Mode	Higher Sub-Band IEEE 802.11n HT20 TX / CH Low		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1200.03	69.42	25.24	2.04	45.27	0.30	51.74	74.00	-22.26	P
*	1200.03	64.85	25.24	2.04	45.27	0.30	47.17	54.00	-6.83	A
*	1599.96	74.23	27.28	2.39	44.96	0.30	59.24	74.00	-14.76	P
*	1599.96	66.62	27.28	2.39	44.96	0.30	51.63	54.00	-2.37	A
*	11488.81	53.46	40.17	7.39	42.10	0.60	59.52	74.00	-14.48	P
*	11488.81	42.43	40.17	7.39	42.10	0.60	48.49	54.00	-5.51	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1199.97	70.12	25.24	2.04	45.27	0.30	52.44	74.00	-21.56	P
*	1199.97	65.86	25.24	2.04	45.27	0.30	48.18	54.00	-5.82	A
*	1600.12	69.52	27.28	2.39	44.96	0.30	54.54	74.00	-19.46	P
*	1600.12	59.78	27.28	2.39	44.96	0.30	44.80	54.00	-9.20	A
*	11489.93	53.95	40.17	7.39	42.10	0.60	60.02	74.00	-13.98	P
*	11489.93	42.85	40.17	7.39	42.10	0.60	48.92	54.00	-5.08	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*
6. ** means: the frequency is under 15.205 restricted bands.*

Model	P650IVF01.0	Test By	Ted Huang
TEMP & Humidity	26.2℃, 66%	Test Date	2018/09/13
Test Mode	Higher Sub-Band IEEE 802.11n HT20 TX / CH Middle		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1200.04	69.72	25.24	2.04	45.27	0.30	52.04	74.00	-21.96	P
*	1200.04	64.82	25.24	2.04	45.27	0.30	47.14	54.00	-6.86	A
*	1600.04	73.56	27.28	2.39	44.96	0.30	58.57	74.00	-15.43	P
*	1600.04	66.22	27.28	2.39	44.96	0.30	51.23	54.00	-2.77	A
*	11570.71	53.58	40.27	7.45	42.03	0.60	59.88	74.00	-14.12	P
*	11570.71	42.89	40.27	7.45	42.03	0.60	49.18	54.00	-4.82	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1199.95	69.45	25.24	2.04	45.27	0.30	51.77	74.00	-22.23	P
*	1199.95	64.78	25.24	2.04	45.27	0.30	47.10	54.00	-6.90	A
*	1600.22	69.68	27.28	2.39	44.96	0.30	54.70	74.00	-19.30	P
*	1600.22	59.85	27.28	2.39	44.96	0.30	44.87	54.00	-9.13	A
*	11571.03	54.25	40.27	7.45	42.03	0.60	60.55	74.00	-13.45	P
*	11571.03	42.85	40.27	7.45	42.03	0.60	49.14	54.00	-4.86	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*
6. ** means: the frequency is under 15.205 restricted bands.*

Model	P650IVF01.0	Test By	Ted Huang
TEMP & Humidity	26.2℃, 66%	Test Date	2018/09/13
Test Mode	Higher Sub-Band IEEE 802.11n HT20 TX / CH High		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1199.96	69.29	25.24	2.04	45.27	0.30	51.61	74.00	-22.39	P
*	1199.96	64.52	25.24	2.04	45.27	0.30	46.84	54.00	-7.16	A
*	1599.89	73.82	27.28	2.39	44.96	0.30	58.84	74.00	-15.16	P
*	1599.89	66.39	27.28	2.39	44.96	0.30	51.40	54.00	-2.60	A
*	11652.02	54.13	40.35	7.51	41.96	0.60	60.63	74.00	-13.37	P
*	11652.02	43.26	40.35	7.51	41.96	0.60	49.76	54.00	-4.24	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1200.01	69.97	25.24	2.04	45.27	0.30	52.29	74.00	-21.71	P
*	1200.01	65.52	25.24	2.04	45.27	0.30	47.84	54.00	-6.16	A
*	1600.19	69.40	27.28	2.39	44.96	0.30	54.42	74.00	-19.58	P
*	1600.19	59.74	27.28	2.39	44.96	0.30	44.76	54.00	-9.24	A
*	11646.26	54.55	40.35	7.51	41.96	0.60	61.04	74.00	-12.96	P
*	11646.26	42.86	40.35	7.51	41.96	0.60	49.35	54.00	-4.65	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*
6. ** means: the frequency is under 15.205 restricted bands.*

Model	P650IVF01.0	Test By	Ted Huang
TEMP & Humidity	26.2℃, 66%	Test Date	2018/09/13
Test Mode	Lower Sub-Band IEEE 802.11n HT40 TX / CH Low		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1200.04	69.58	25.24	2.04	45.27	0.30	51.90	74.00	-22.10	P
*	1200.04	64.72	25.24	2.04	45.27	0.30	47.04	54.00	-6.96	A
*	1599.98	74.55	27.28	2.39	44.96	0.30	59.56	74.00	-14.44	P
*	1599.98	66.62	27.28	2.39	44.96	0.30	51.63	54.00	-2.37	A
	10380.45	53.23	38.55	6.97	42.47	0.50	56.77	74.00	-17.23	P
	10380.45	42.49	38.55	6.97	42.47	0.50	46.03	54.00	-7.97	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1199.98	70.23	25.24	2.04	45.27	0.30	52.55	74.00	-21.45	P
*	1199.98	65.96	25.24	2.04	45.27	0.30	48.28	54.00	-5.72	A
*	1600.12	69.52	27.28	2.39	44.96	0.30	54.54	74.00	-19.46	P
*	1600.12	59.78	27.28	2.39	44.96	0.30	44.80	54.00	-9.20	A
	10381.22	53.68	38.55	6.97	42.47	0.50	57.23	74.00	-16.77	P
	10381.22	43.54	38.55	6.97	42.47	0.50	47.09	54.00	-6.91	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*
6. ** means: the frequency is under 15.205 restricted bands.*

Model	P650IVF01.0	Test By	Ted Huang
TEMP & Humidity	26.2℃, 66%	Test Date	2018/09/13
Test Mode	Lower Sub-Band IEEE 802.11n HT40 TX / CH High		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1200.02	69.54	25.24	2.04	45.27	0.30	51.86	74.00	-22.14	P
*	1200.02	64.62	25.24	2.04	45.27	0.30	46.94	54.00	-7.06	A
*	1600.02	73.45	27.28	2.39	44.96	0.30	58.46	74.00	-15.54	P
*	1600.02	66.08	27.28	2.39	44.96	0.30	51.09	54.00	-2.91	A
	10459.62	53.58	38.58	6.98	42.48	0.50	57.17	74.00	-16.83	P
	10459.62	42.68	38.58	6.98	42.48	0.50	46.27	54.00	-7.73	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1199.98	69.58	25.24	2.04	45.27	0.30	51.90	74.00	-22.10	P
*	1199.98	64.86	25.24	2.04	45.27	0.30	47.18	54.00	-6.82	A
*	1600.16	69.76	27.28	2.39	44.96	0.30	54.78	74.00	-19.22	P
*	1600.16	59.96	27.28	2.39	44.96	0.30	44.98	54.00	-9.02	A
	10459.42	54.16	38.58	6.98	42.48	0.50	57.74	74.00	-16.26	P
	10459.42	43.08	38.58	6.98	42.48	0.50	46.67	54.00	-7.33	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*
6. ** means: the frequency is under 15.205 restricted bands.*

Model	P650IVF01.0	Test By	Ted Huang
TEMP & Humidity	26.2℃, 66%	Test Date	2018/09/13
Test Mode	Higher Sub-Band IEEE 802.11n HT40 TX / CH Low		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1199.94	69.58	25.24	2.04	45.27	0.30	51.90	74.00	-22.10	P
*	1199.94	65.21	25.24	2.04	45.27	0.30	47.53	54.00	-6.47	A
*	1599.97	74.42	27.28	2.39	44.96	0.30	59.43	74.00	-14.57	P
*	1599.97	66.78	27.28	2.39	44.96	0.30	51.79	54.00	-2.21	A
*	11511.32	53.12	40.21	7.41	42.08	0.60	59.26	74.00	-14.74	P
*	11511.32	42.61	40.21	7.41	42.08	0.60	48.75	54.00	-5.25	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1200.03	70.42	25.24	2.04	45.27	0.30	52.74	74.00	-21.26	P
*	1200.03	66.07	25.24	2.04	45.27	0.30	48.39	54.00	-5.61	A
*	1600.08	69.68	27.28	2.39	44.96	0.30	54.69	74.00	-19.31	P
*	1600.08	59.92	27.28	2.39	44.96	0.30	44.93	54.00	-9.07	A
*	11509.73	53.68	40.21	7.41	42.08	0.60	59.82	74.00	-14.18	P
*	11509.73	43.13	40.21	7.41	42.08	0.60	49.26	54.00	-4.74	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*
6. ** means: the frequency is under 15.205 restricted bands.*

Model	P650IVF01.0	Test By	Ted Huang
TEMP & Humidity	26.2℃, 66%	Test Date	2018/09/13
Test Mode	Higher Sub-Band IEEE 802.11n HT40 TX / CH High		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1200.05	69.85	25.24	2.04	45.27	0.30	52.17	74.00	-21.83	P
*	1200.05	65.17	25.24	2.04	45.27	0.30	47.49	54.00	-6.51	A
*	1599.98	73.75	27.28	2.39	44.96	0.30	58.76	74.00	-15.24	P
*	1599.98	66.58	27.28	2.39	44.96	0.30	51.59	54.00	-2.41	A
*	11590.84	54.05	40.29	7.47	42.01	0.60	60.39	74.00	-13.61	P
*	11590.84	43.15	40.29	7.47	42.01	0.60	49.49	54.00	-4.51	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1199.98	69.68	25.24	2.04	45.27	0.30	52.00	74.00	-22.00	P
*	1199.98	64.96	25.24	2.04	45.27	0.30	47.28	54.00	-6.72	A
*	1600.14	69.56	27.28	2.39	44.96	0.30	54.58	74.00	-19.42	P
*	1600.14	59.78	27.28	2.39	44.96	0.30	44.80	54.00	-9.20	A
*	11591.14	54.46	40.29	7.47	42.01	0.60	60.80	74.00	-13.20	P
*	11591.14	43.68	40.29	7.47	42.01	0.60	50.03	54.00	-3.97	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*
6. ** means: the frequency is under 15.205 restricted bands.*

Model	P650IVF01.0	Test By	Ted Huang
TEMP & Humidity	26.2℃, 66%	Test Date	2018/09/13
Test Mode	Lower Sub-Band IEEE 802.11ac VHT80 TX / CH Middle		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1200.01	69.54	25.24	2.04	45.27	0.30	51.86	74.00	-22.14	P
*	1200.01	64.76	25.24	2.04	45.27	0.30	47.08	54.00	-6.92	A
*	1599.87	73.65	27.28	2.39	44.96	0.30	58.66	74.00	-15.34	P
*	1599.87	66.21	27.28	2.39	44.96	0.30	51.22	54.00	-2.78	A
	10419.82	53.39	38.57	6.97	42.47	0.50	56.95	74.00	-17.05	P
	10419.82	42.89	38.57	6.97	42.47	0.50	46.45	54.00	-7.55	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1200.01	70.14	25.24	2.04	45.27	0.30	52.46	74.00	-21.54	P
*	1200.01	65.86	25.24	2.04	45.27	0.30	48.18	54.00	-5.82	A
*	1600.19	69.48	27.28	2.39	44.96	0.30	54.50	74.00	-19.50	P
*	1600.19	59.65	27.28	2.39	44.96	0.30	44.67	54.00	-9.33	A
	10419.62	54.33	38.57	6.97	42.47	0.50	57.89	74.00	-16.11	P
	10419.62	43.27	38.57	6.97	42.47	0.50	46.83	54.00	-7.17	A

REMARK:

1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*
6. ** means: the frequency is under 15.205 restricted bands.*

Model	P650IVF01.0	Test By	Ted Huang
TEMP & Humidity	26.2℃, 66%	Test Date	2018/09/13
Test Mode	Higher Sub-Band IEEE 802.11ac VHT80 TX / CH Middle		

	Measurement Distance at 3m Horizontal polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1200.02	69.54	25.24	2.04	45.27	0.30	51.86	74.00	-22.14	P
*	1200.02	64.62	25.24	2.04	45.27	0.30	46.94	54.00	-7.06	A
*	1600.02	73.45	27.28	2.39	44.96	0.30	58.46	74.00	-15.54	P
*	1600.02	66.08	27.28	2.39	44.96	0.30	51.09	54.00	-2.91	A
*	11549.18	53.68	40.25	7.44	42.05	0.60	59.92	74.00	-14.08	P
*	11549.18	42.87	40.25	7.44	42.05	0.60	49.11	54.00	-4.89	A

	Measurement Distance at 3m Vertical polarity									
	Freq.	Reading	AF	Cable Loss	Pre-amp	Filter	Level	Limit	Margin	Mark
	(MHz)	(dBμV)	(dB/m)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)
*	1199.98	69.58	25.24	2.04	45.27	0.30	51.90	74.00	-22.10	P
*	1199.98	64.86	25.24	2.04	45.27	0.30	47.18	54.00	-6.82	A
*	1600.16	69.76	27.28	2.39	44.96	0.30	54.78	74.00	-19.22	P
*	1600.16	59.96	27.28	2.39	44.96	0.30	44.98	54.00	-9.02	A
*	11548.65	54.24	40.25	7.44	42.05	0.60	60.47	74.00	-13.53	P
*	11548.65	43.55	40.25	7.44	42.05	0.60	49.78	54.00	-4.22	A

REMARK:

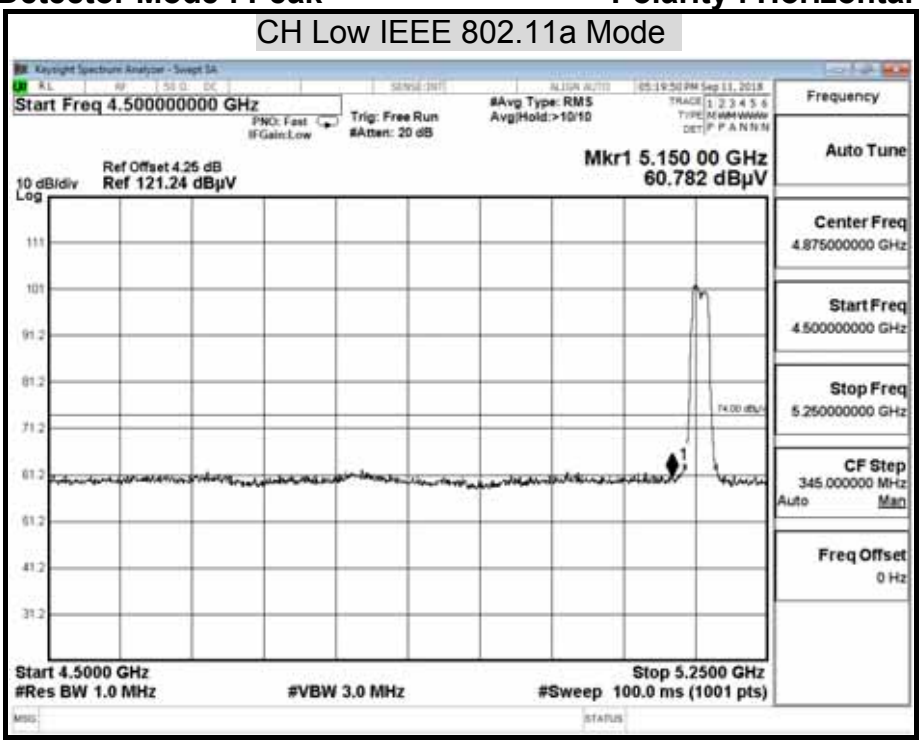
1. *AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss*
2. *Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz*
3. *The result basic equation calculation is as follow:*
   Level = Reading + AF + Cable – Preamp + Filter , Margin = Level-Limit
4. *The other emission levels were 20dB below the limit*
5. *The test limit distance is 3M limit.*
6. ** means: the frequency is under 15.205 restricted bands.*

Restricted Band Edges

Higher Sub-Band

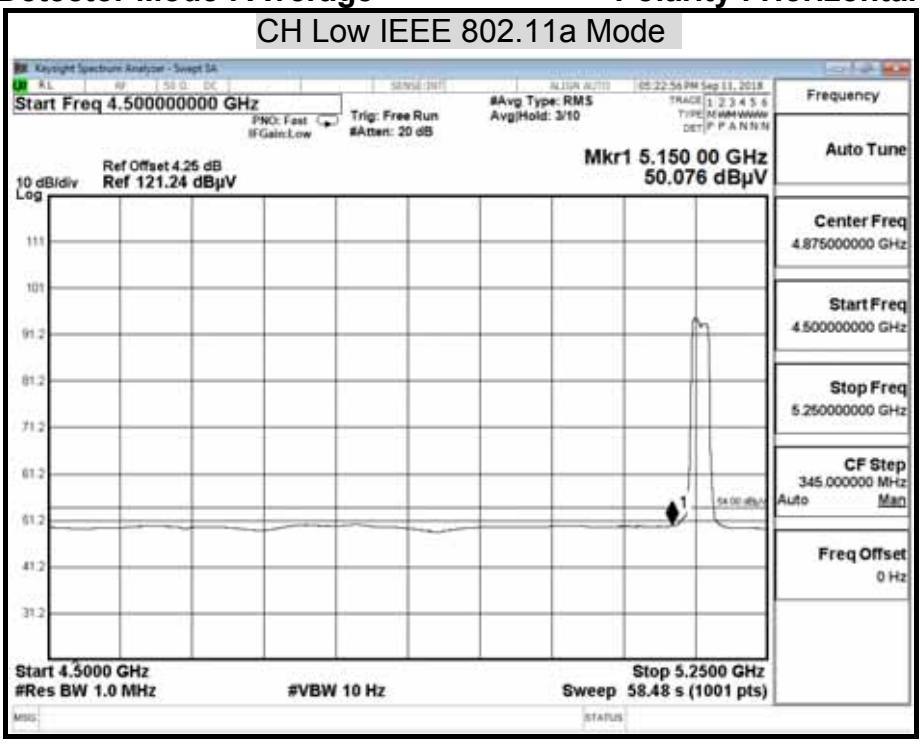
Detector Mode : Peak **Polarity : Horizontal**

CH Low IEEE 802.11a Mode



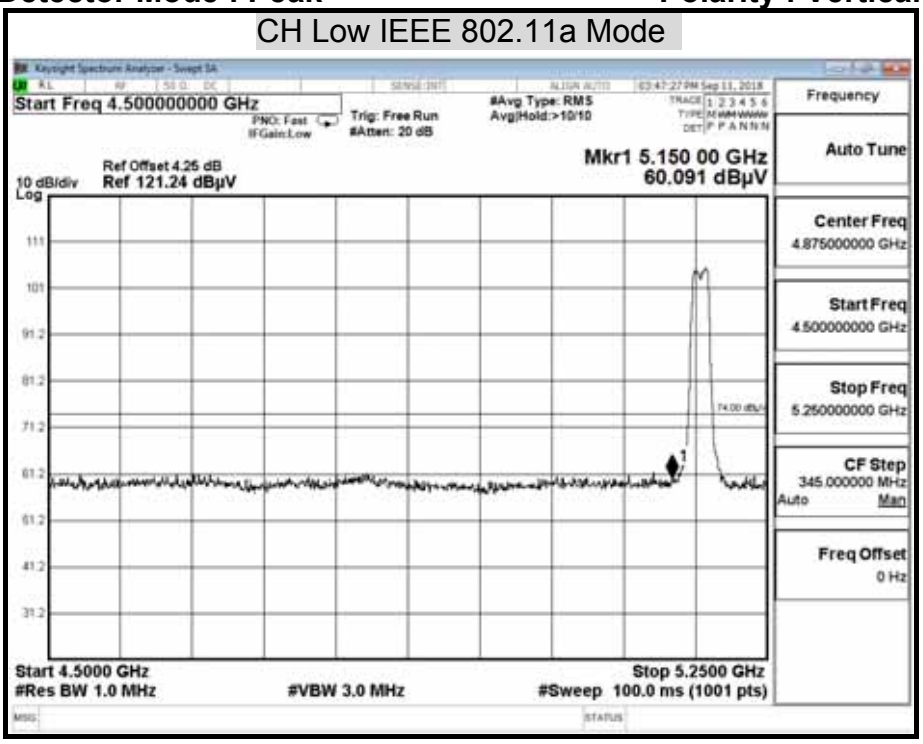
Detector Mode : Average **Polarity : Horizontal**

CH Low IEEE 802.11a Mode



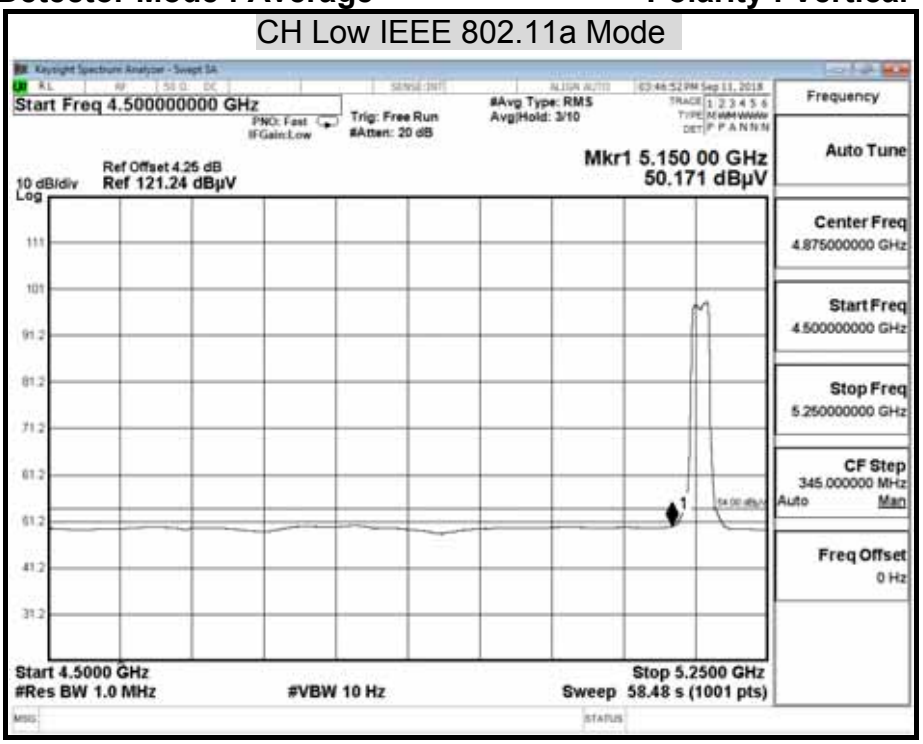
Detector Mode : Peak **Polarity : Vertical**

CH Low IEEE 802.11a Mode



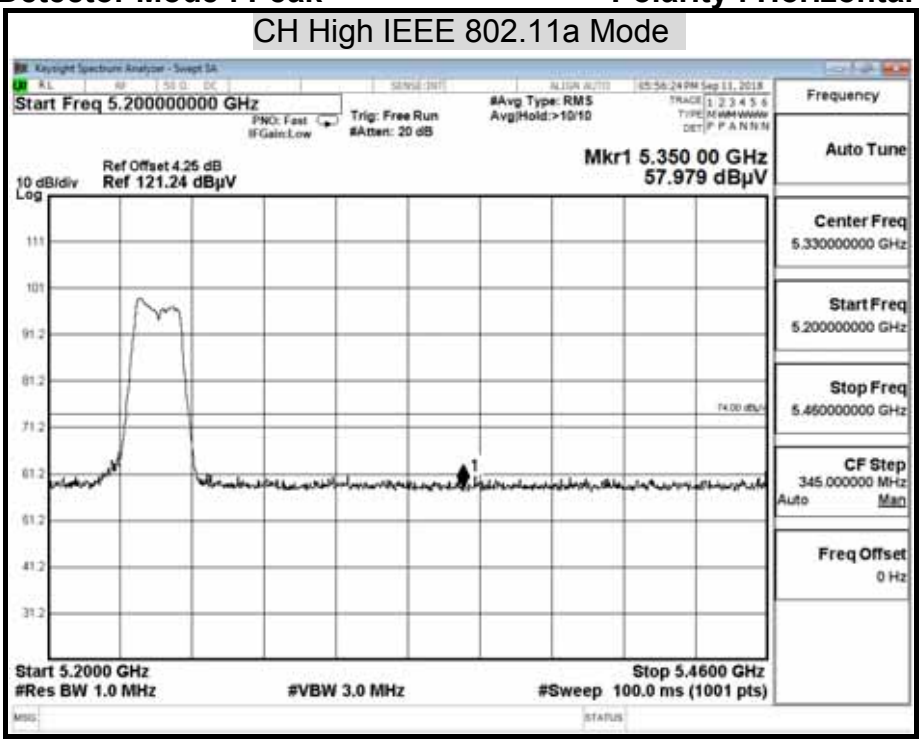
Detector Mode : Average **Polarity : Vertical**

CH Low IEEE 802.11a Mode



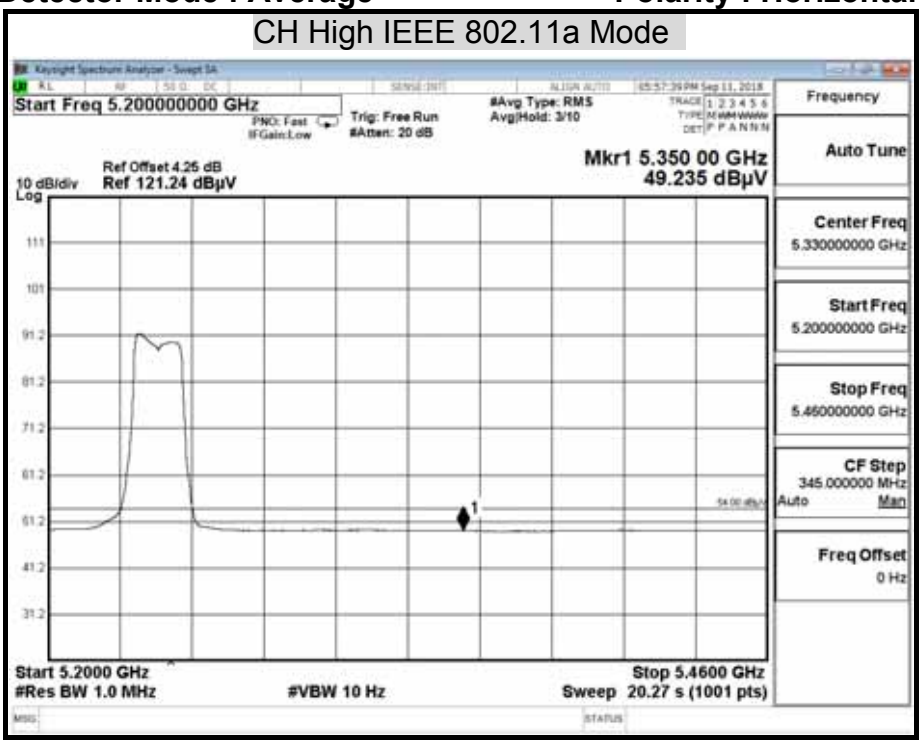
Detector Mode : Peak **Polarity : Horizontal**

CH High IEEE 802.11a Mode



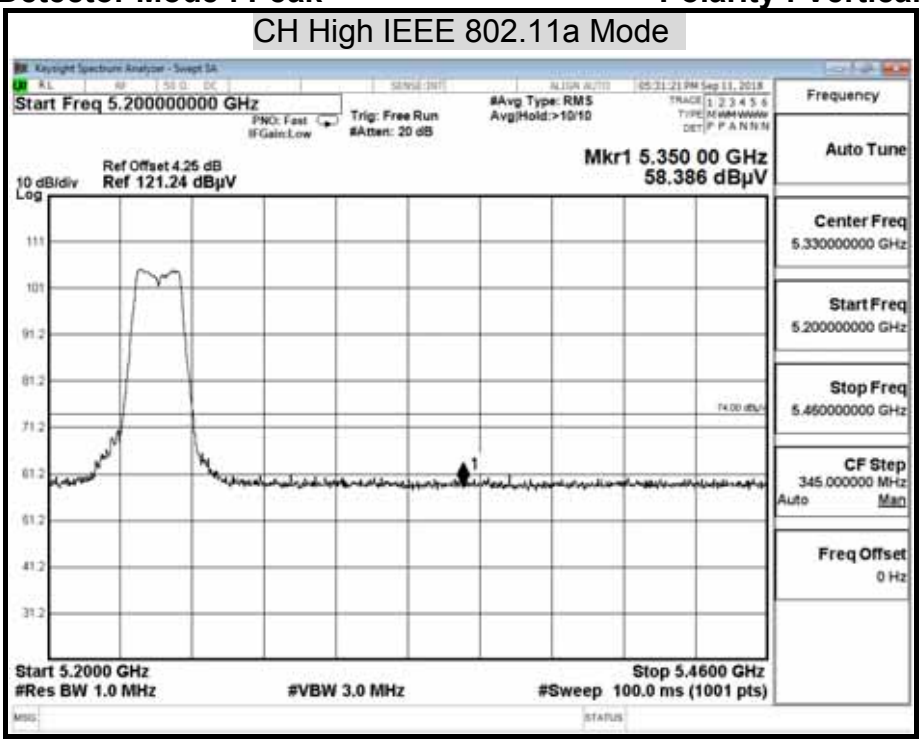
Detector Mode : Average **Polarity : Horizontal**

CH High IEEE 802.11a Mode



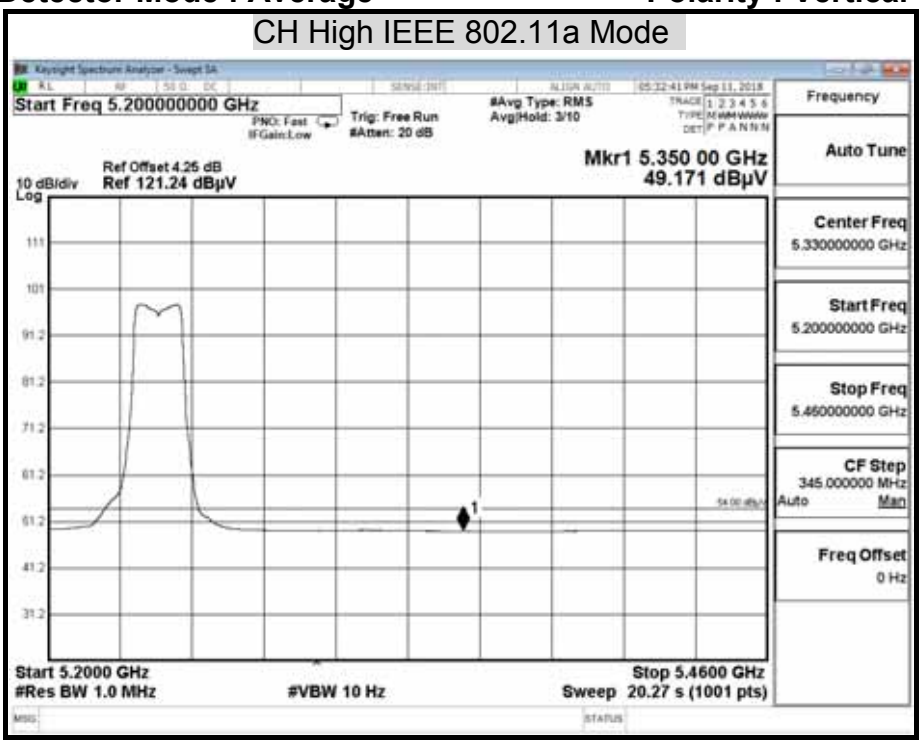
Detector Mode : Peak **Polarity : Vertical**

CH High IEEE 802.11a Mode



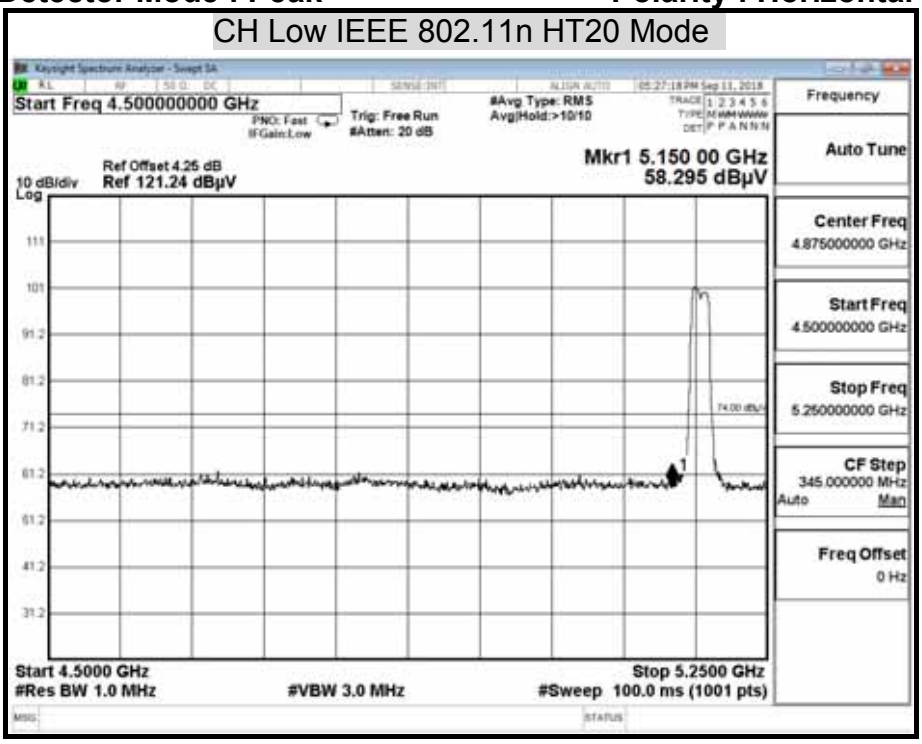
Detector Mode : Average **Polarity : Vertical**

CH High IEEE 802.11a Mode



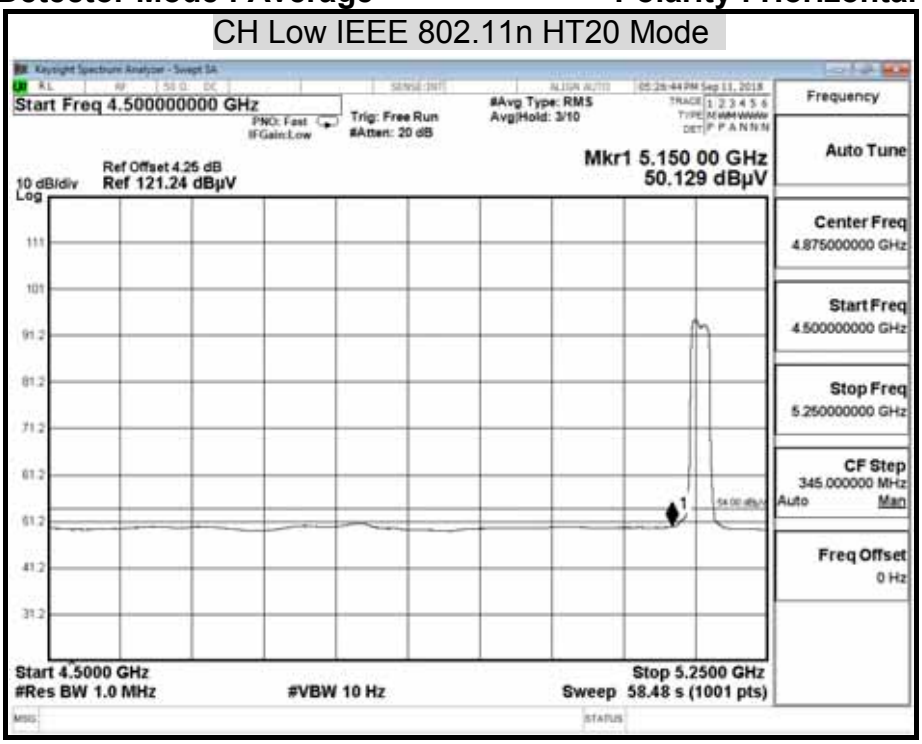
Detector Mode : Peak **Polarity : Horizontal**

CH Low IEEE 802.11n HT20 Mode



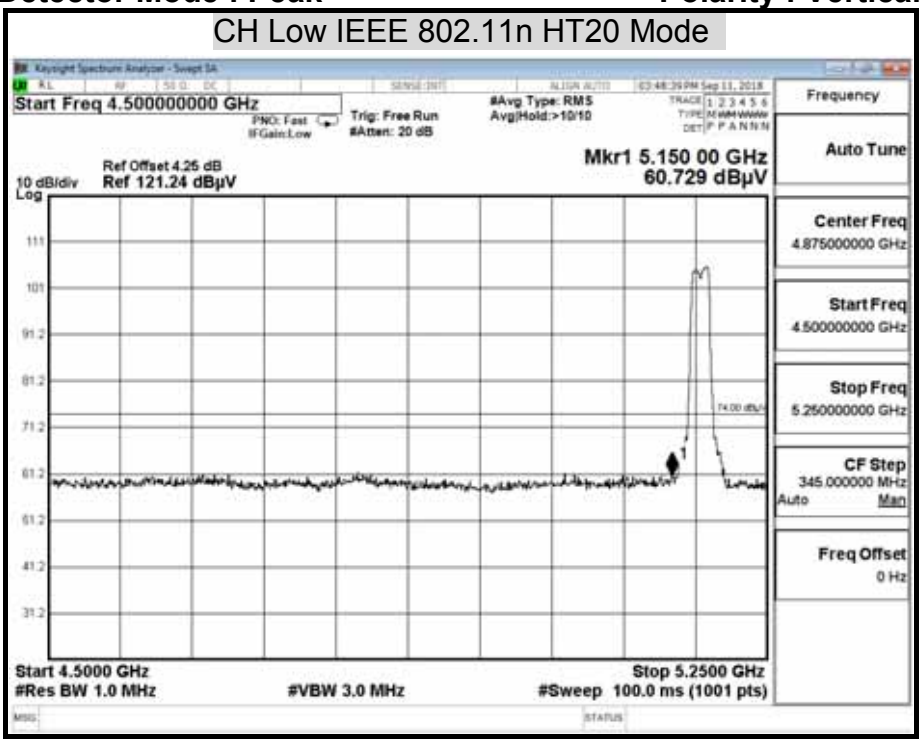
Detector Mode : Average **Polarity : Horizontal**

CH Low IEEE 802.11n HT20 Mode



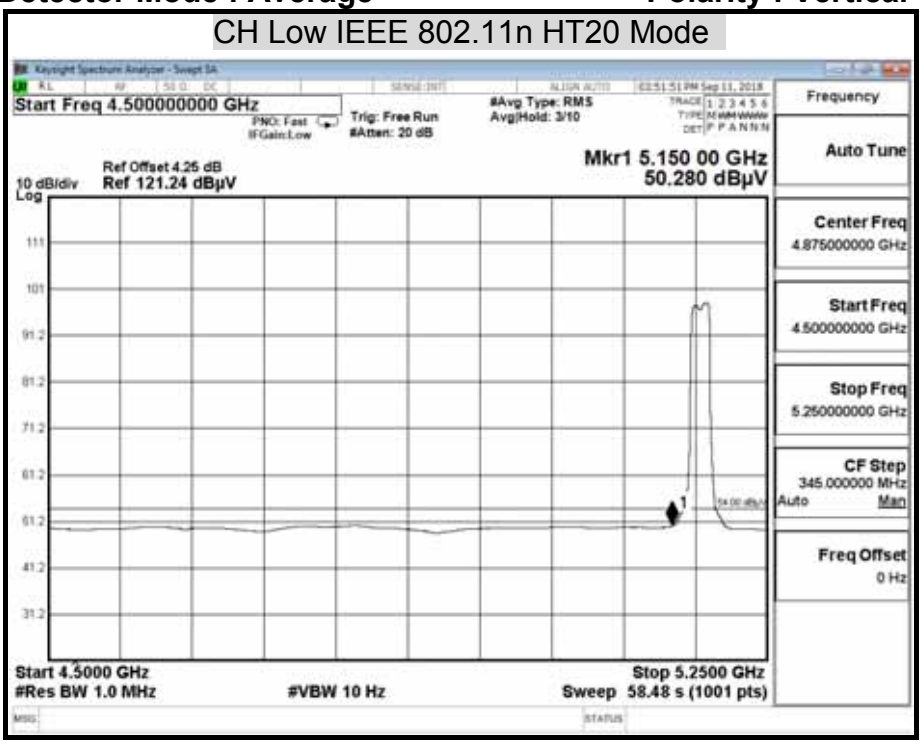
Detector Mode : Peak **Polarity : Vertical**

CH Low IEEE 802.11n HT20 Mode



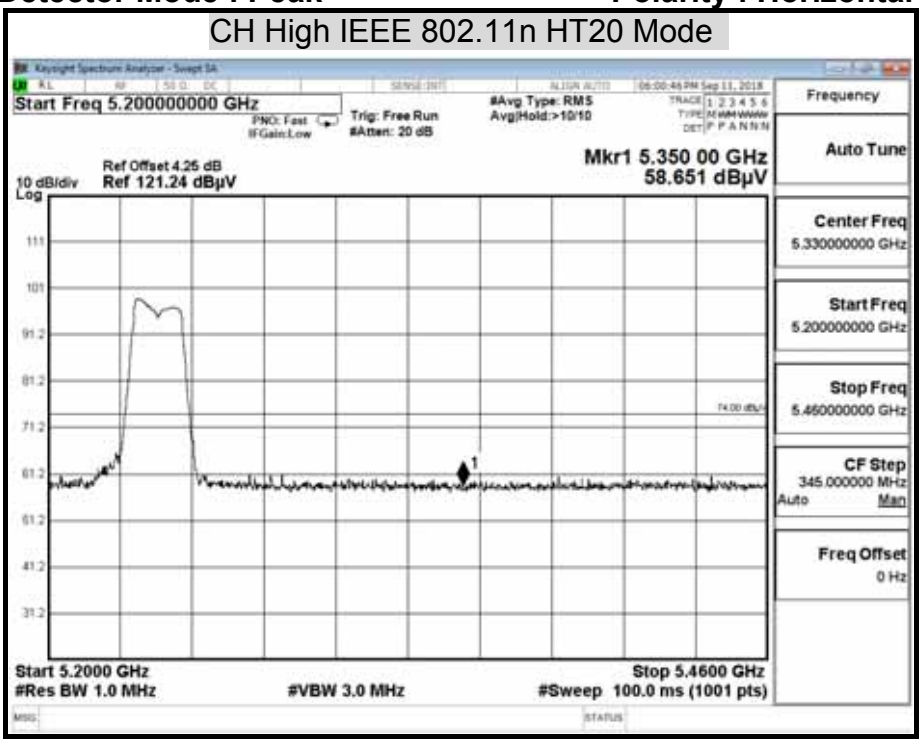
Detector Mode : Average **Polarity : Vertical**

CH Low IEEE 802.11n HT20 Mode



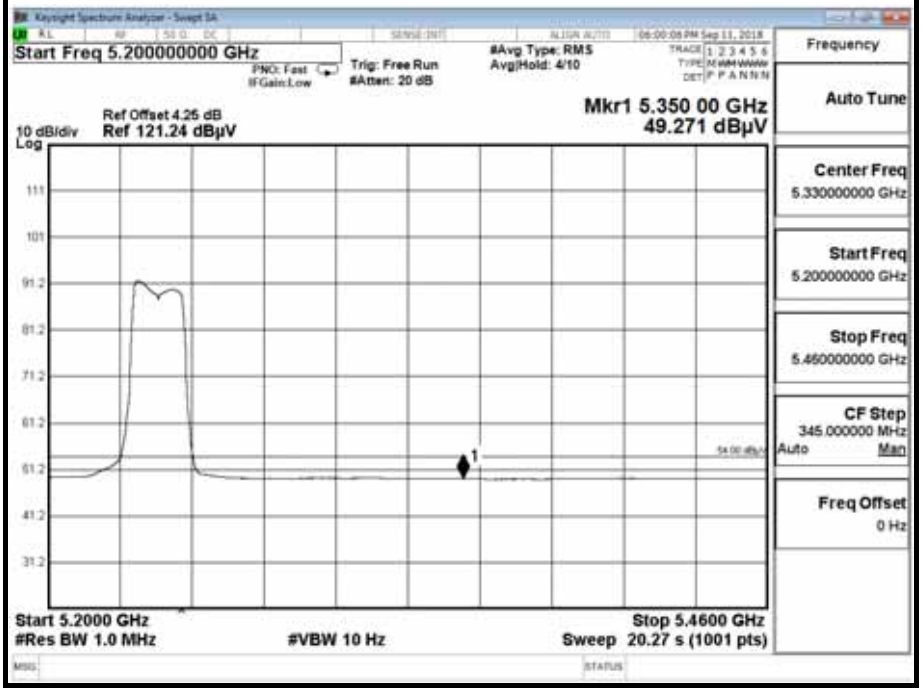
Detector Mode : Peak **Polarity : Horizontal**

CH High IEEE 802.11n HT20 Mode



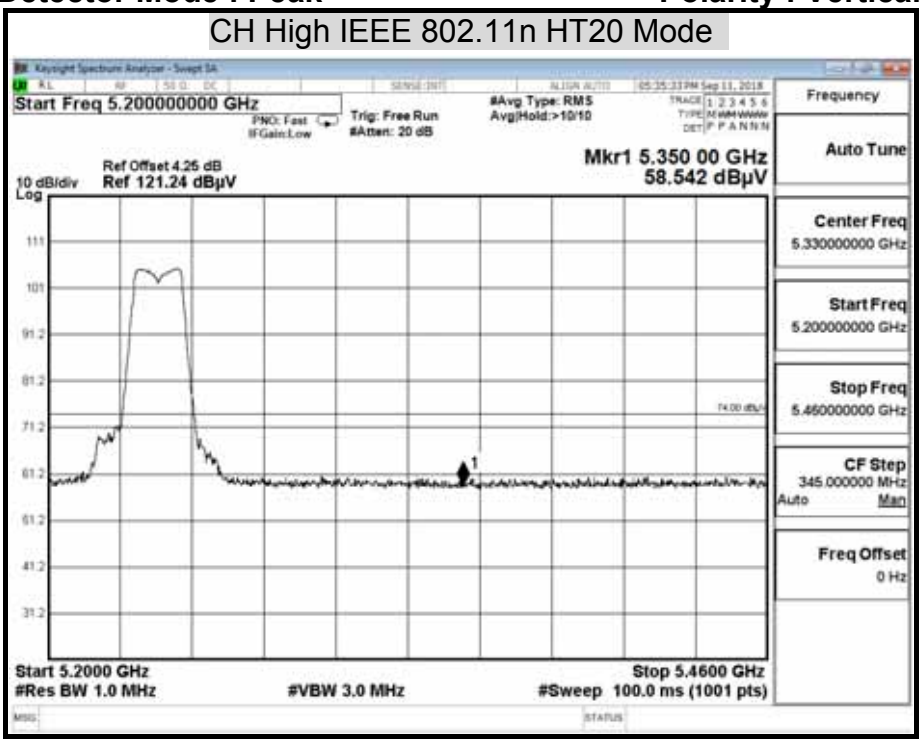
Detector Mode : Average **Polarity : Horizontal**

CH High IEEE 802.11n HT20 Mode



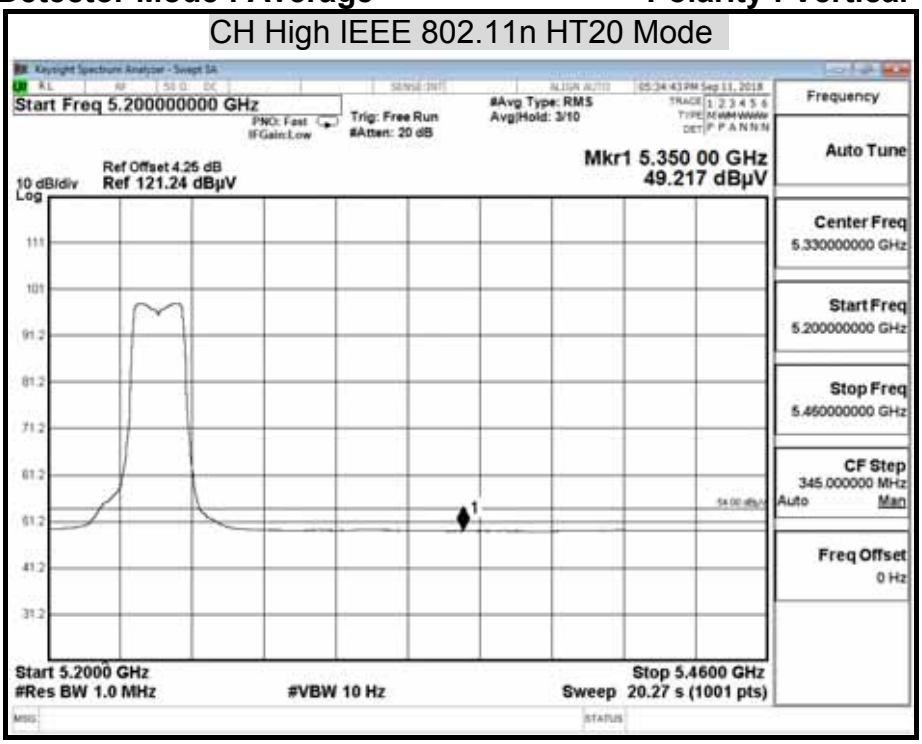
Detector Mode : Peak **Polarity : Vertical**

CH High IEEE 802.11n HT20 Mode



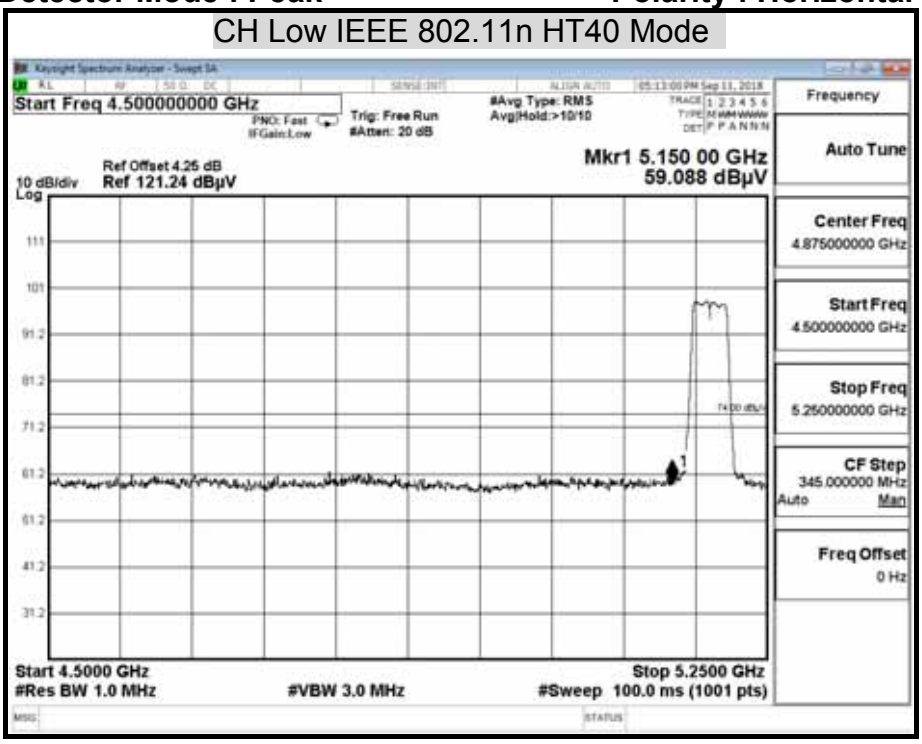
Detector Mode : Average **Polarity : Vertical**

CH High IEEE 802.11n HT20 Mode



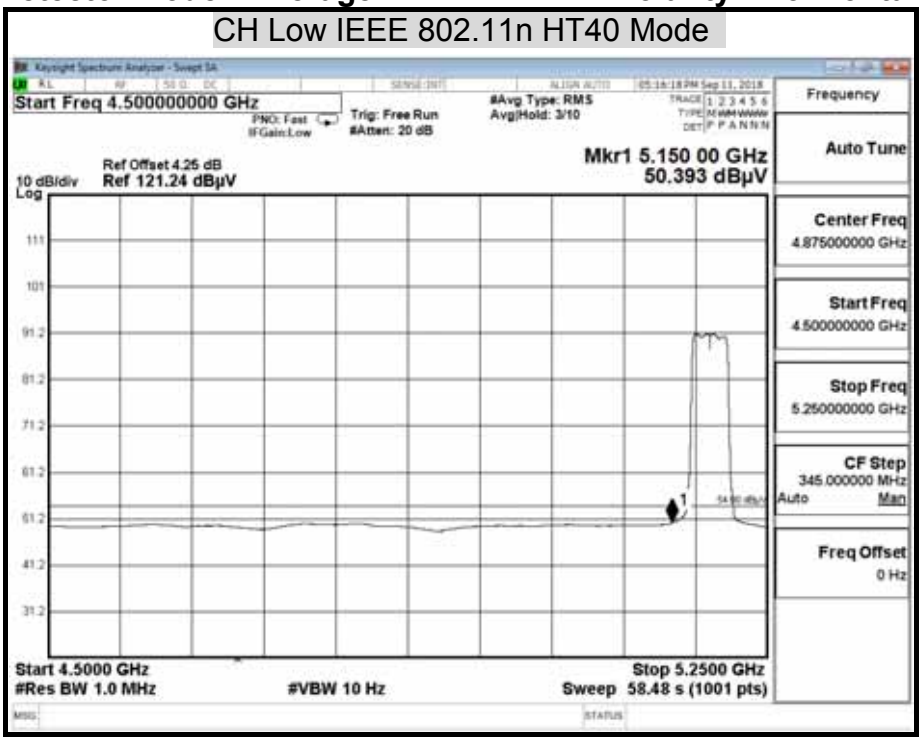
Detector Mode : Peak **Polarity : Horizontal**

CH Low IEEE 802.11n HT40 Mode



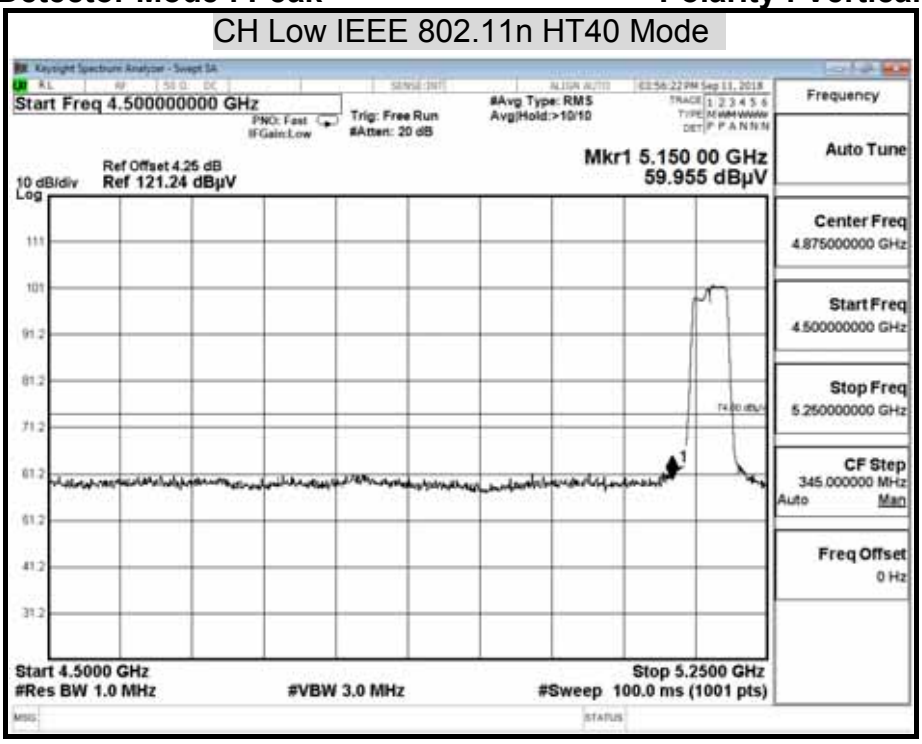
Detector Mode : Average **Polarity : Horizontal**

CH Low IEEE 802.11n HT40 Mode



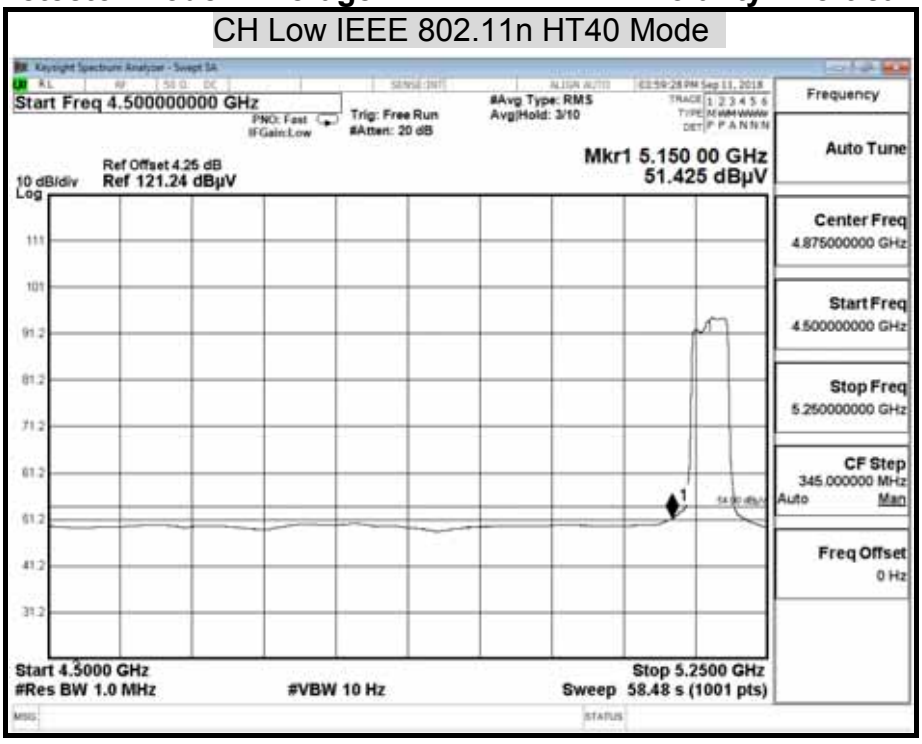
Detector Mode : Peak **Polarity : Vertical**

CH Low IEEE 802.11n HT40 Mode



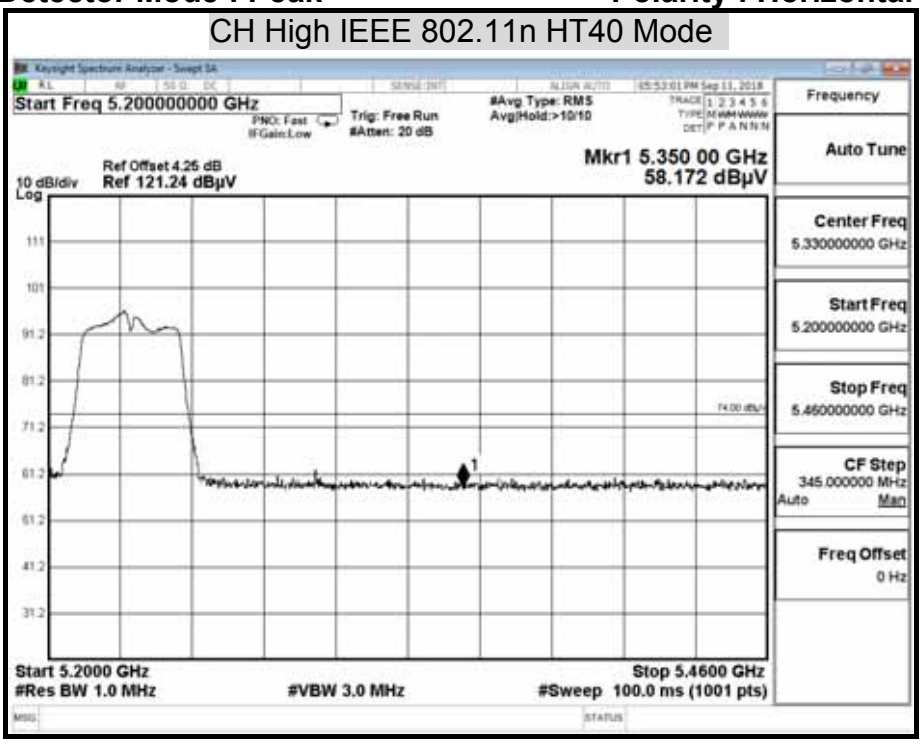
Detector Mode : Average **Polarity : Vertical**

CH Low IEEE 802.11n HT40 Mode



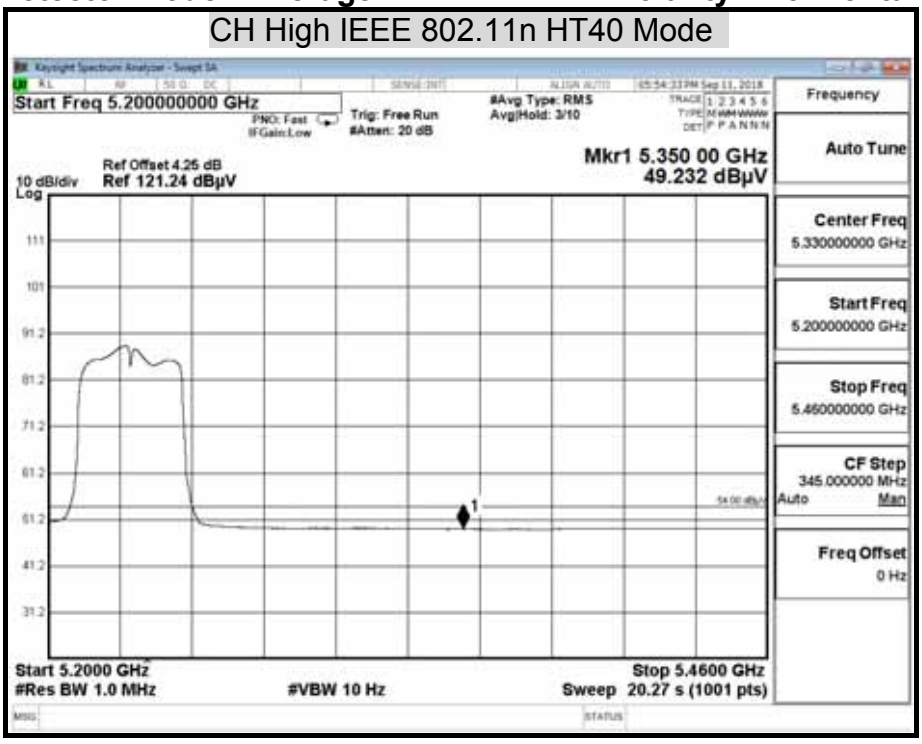
Detector Mode : Peak **Polarity : Horizontal**

CH High IEEE 802.11n HT40 Mode



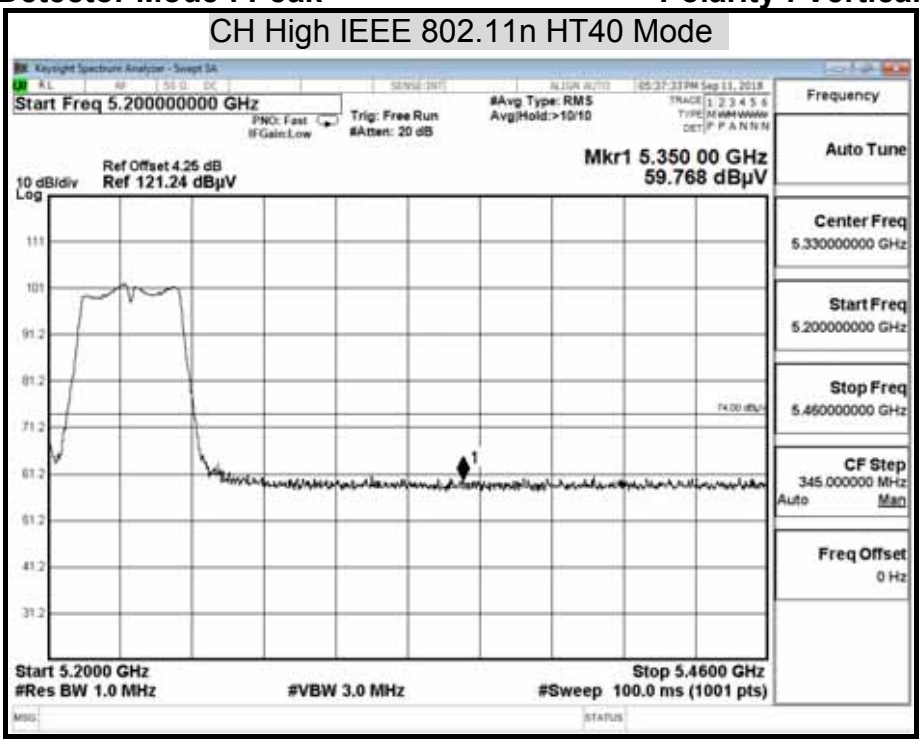
Detector Mode : Average **Polarity : Horizontal**

CH High IEEE 802.11n HT40 Mode



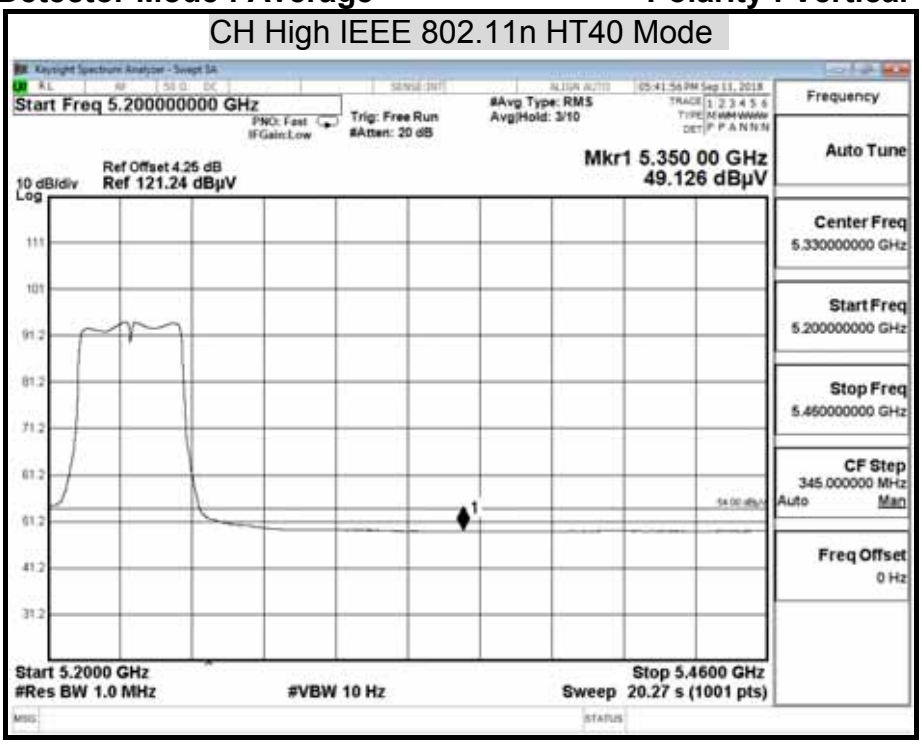
Detector Mode : Peak **Polarity : Vertical**

CH High IEEE 802.11n HT40 Mode



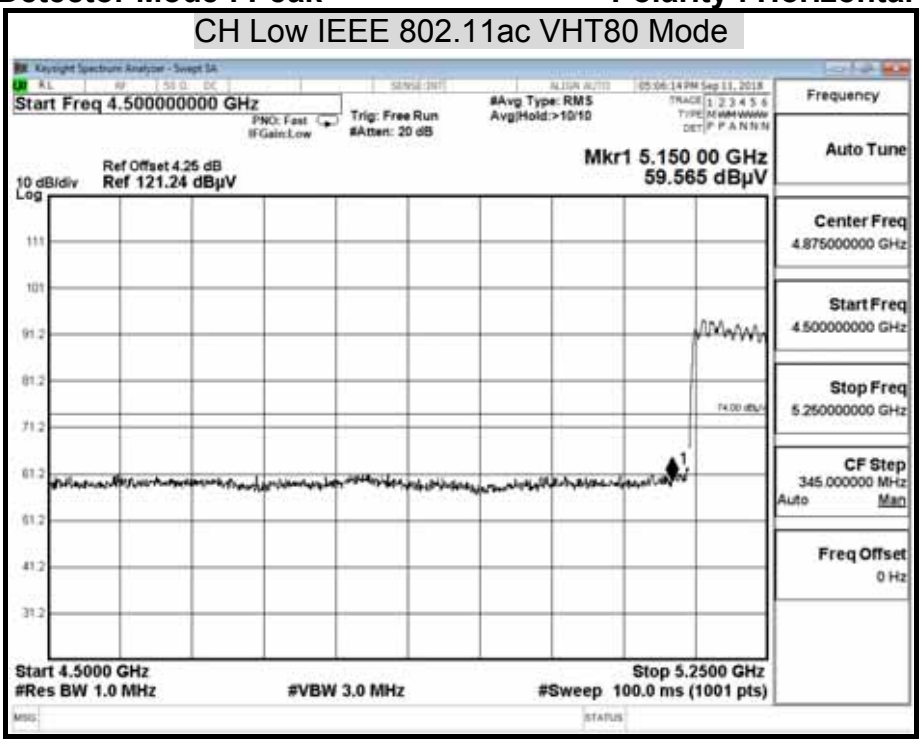
Detector Mode : Average **Polarity : Vertical**

CH High IEEE 802.11n HT40 Mode



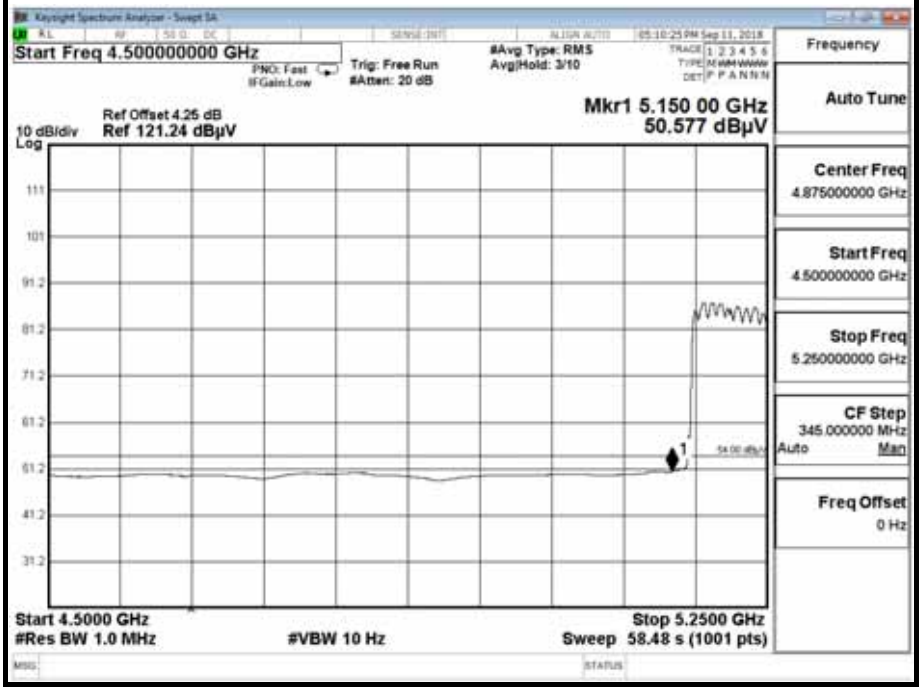
Detector Mode : Peak **Polarity : Horizontal**

CH Low IEEE 802.11ac VHT80 Mode



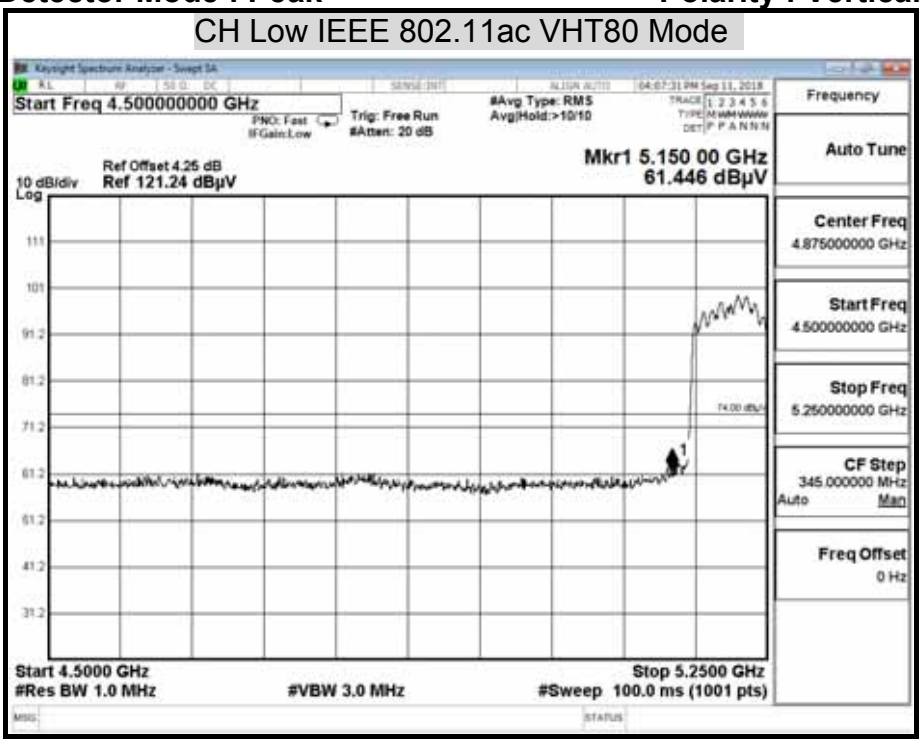
Detector Mode : Average **Polarity : Horizontal**

CH Low IEEE 802.11ac VHT80 Mode



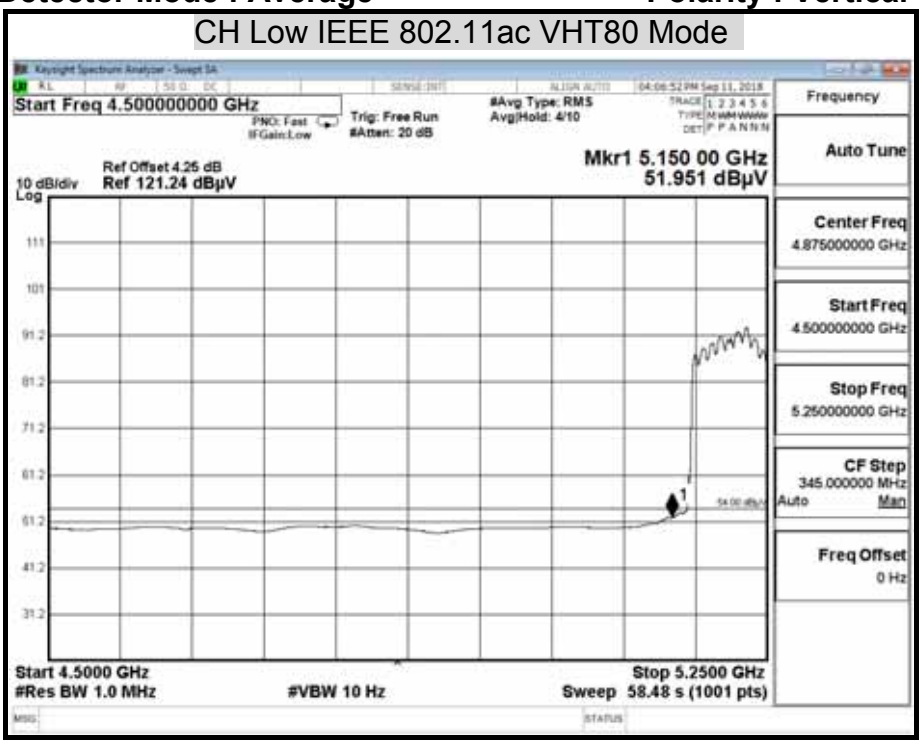
Detector Mode : Peak **Polarity : Vertical**

CH Low IEEE 802.11ac VHT80 Mode



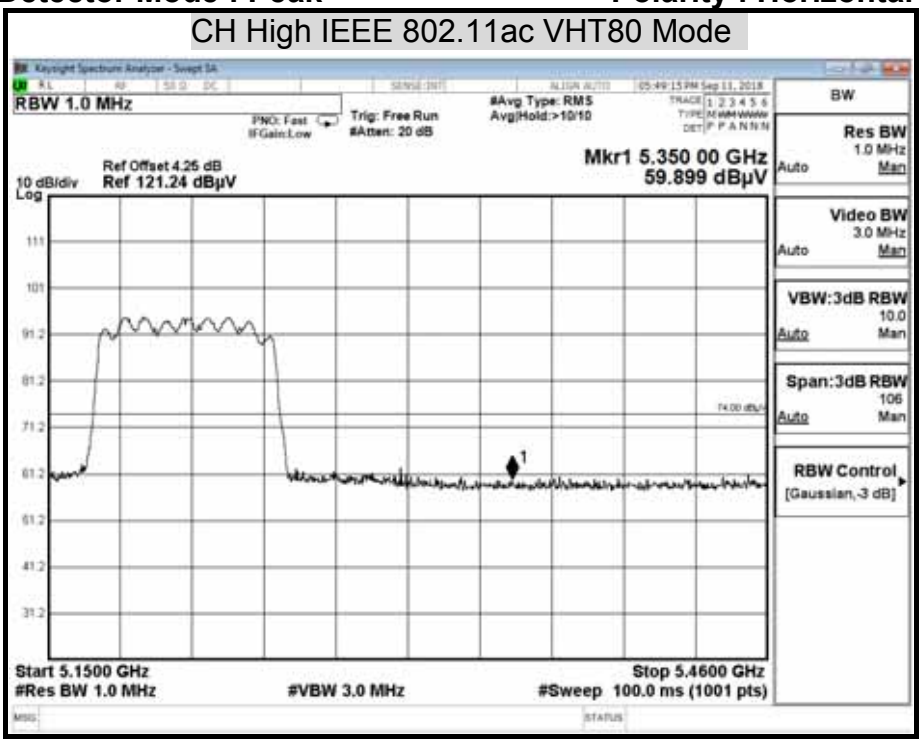
Detector Mode : Average **Polarity : Vertical**

CH Low IEEE 802.11ac VHT80 Mode



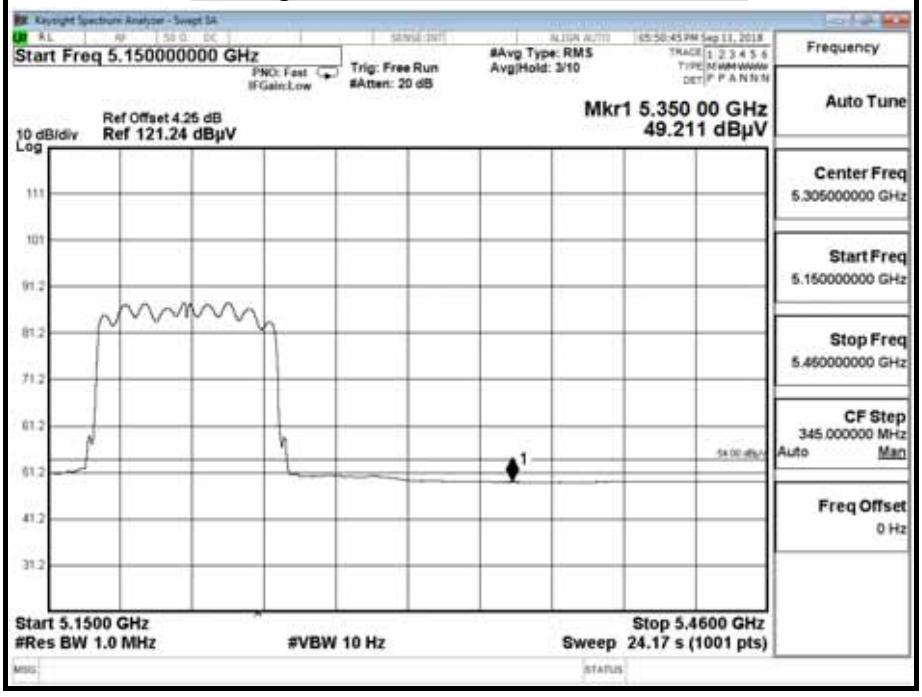
Detector Mode : Peak **Polarity : Horizontal**

CH High IEEE 802.11ac VHT80 Mode



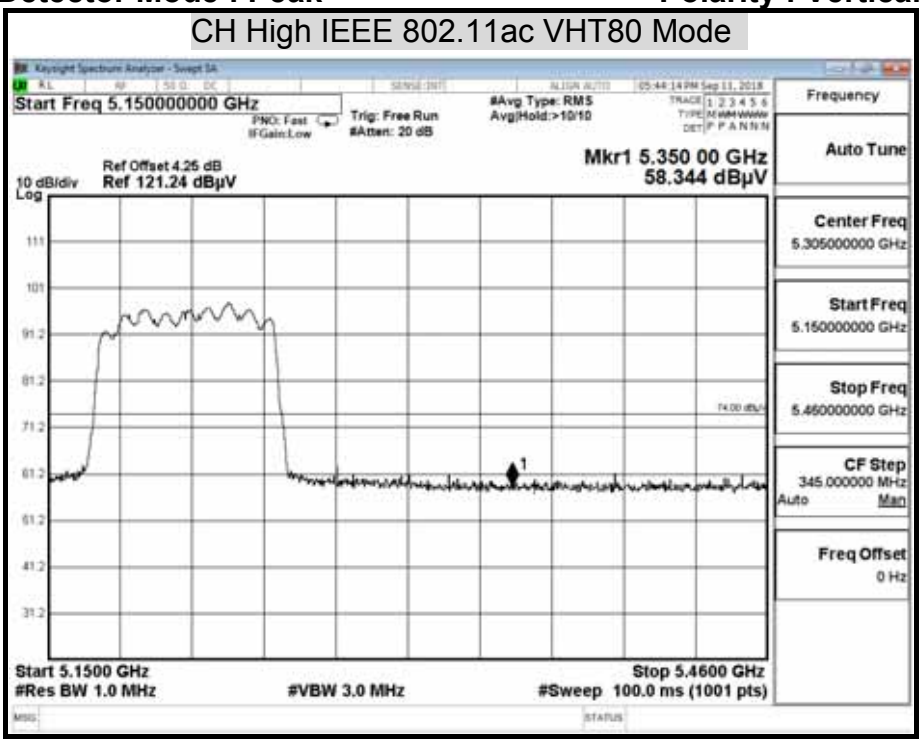
Detector Mode : Average **Polarity : Horizontal**

CH High IEEE 802.11ac VHT80 Mode



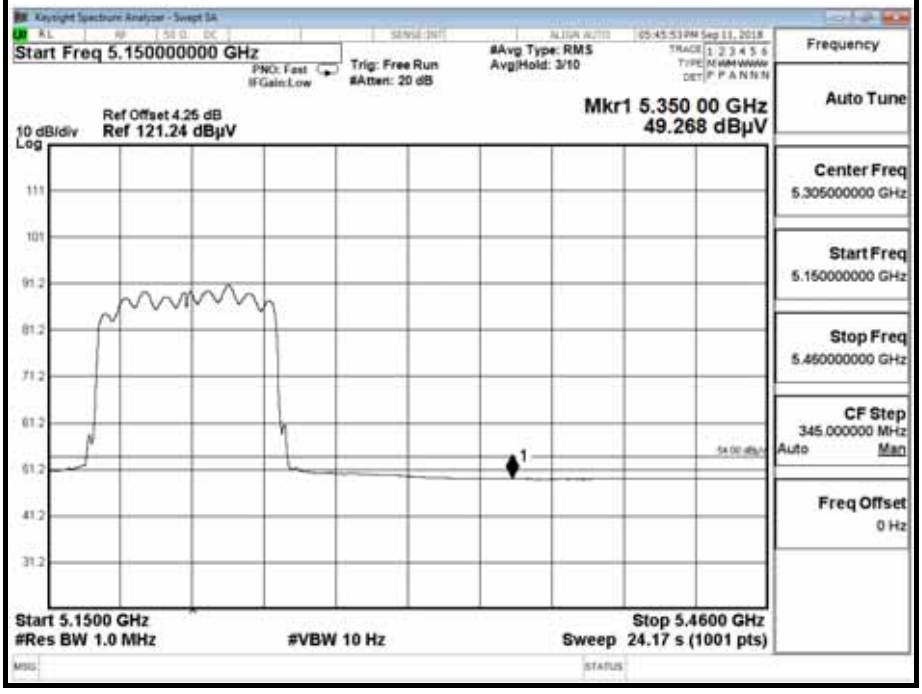
Detector Mode : Peak **Polarity : Vertical**

CH High IEEE 802.11ac VHT80 Mode



Detector Mode : Average **Polarity : Vertical**

CH High IEEE 802.11ac VHT80 Mode



7.9 CONDUCTED EMISSION

LIMITS

§ 15.207 (a) Except as shown in paragraph (b) and (c) 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 μH/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.

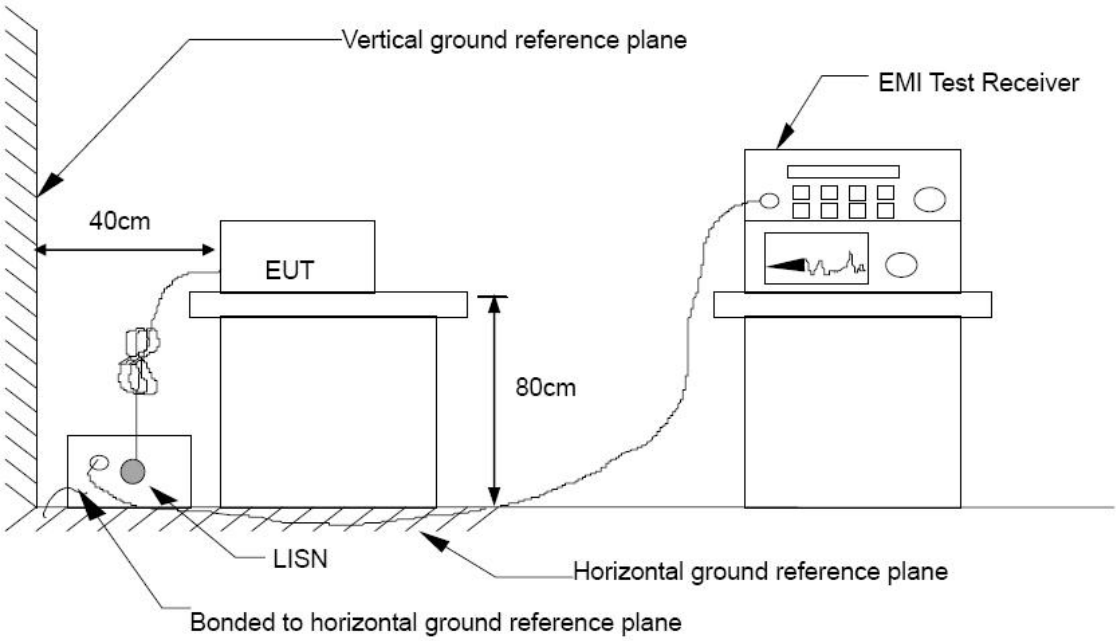
Frequency Range (MHz)	Conducted Limit (dBμv)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5.00	56	46
5.00 - 30.0	60	50

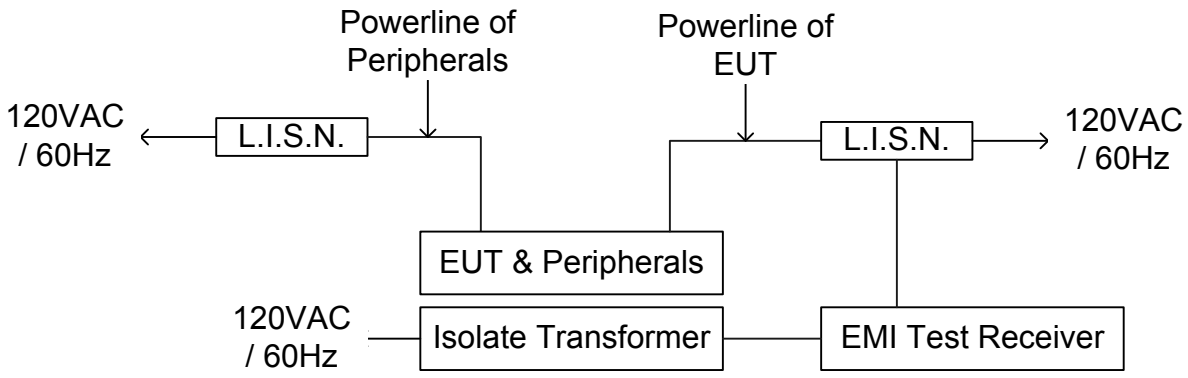
TEST EQUIPMENT

Conducted Emission room #1					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
BNC Coaxial Cable	CCS	BNC50	11	01/24/2018	01/23/2019
EMI Test Receiver	R&S	ESCS 30	100348	01/31/2018	01/30/2019
LISN	SCHWARZBECK	NNLK8130	8130124	12/01/2017	11/30/2018
LISN	FCC	FCC-LISN-50-32-2	08009	05/24/2018	05/23/2019
Pulse Limiter	R&S	ESH3-Z2	100116	01/24/2018	01/23/2019
Test S/W	e-3 (5.04211j)				

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

TEST SETUP





TEST PROCEDURE

The basic test procedure was in accordance with ANSI C63.4:2009.

The test procedure is performed in a 4m × 3m × 2.4m (L×W×H) shielded room.

The EUT along with its peripherals were placed on a 1.0m (W) × 1.5m (L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.

The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.

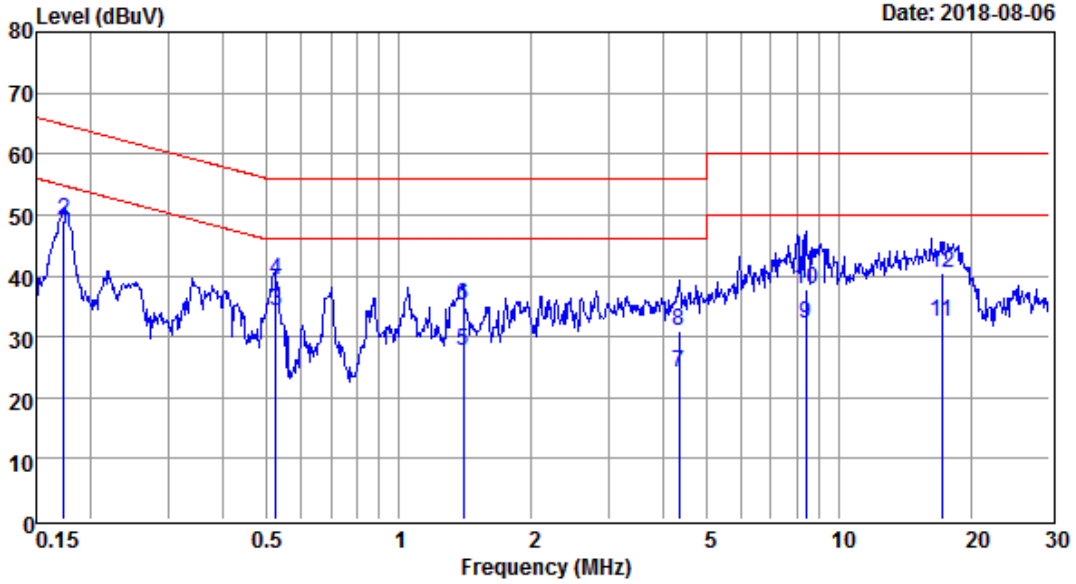
The EUT was located so that the distance between the boundary of the EUT and the closest surface of the LISN is 0.8 m. Where a mains flexible cord was provided by the manufacturer shall be 1 m long, or if in excess of 1 m, the excess cable was folded back and forth as far as possible so as to form a bundle not exceeding 0.4 m in length.

TEST RESULTS

Model No.	P650IVF01.0	Test Mode	Normal Operation
Environmental Conditions	26°C, 60% RH	Resolution Bandwidth	9 kHz
Tested by	Weici Lo		

LINE

(The chart below shows the highest readings taken from the final data.)



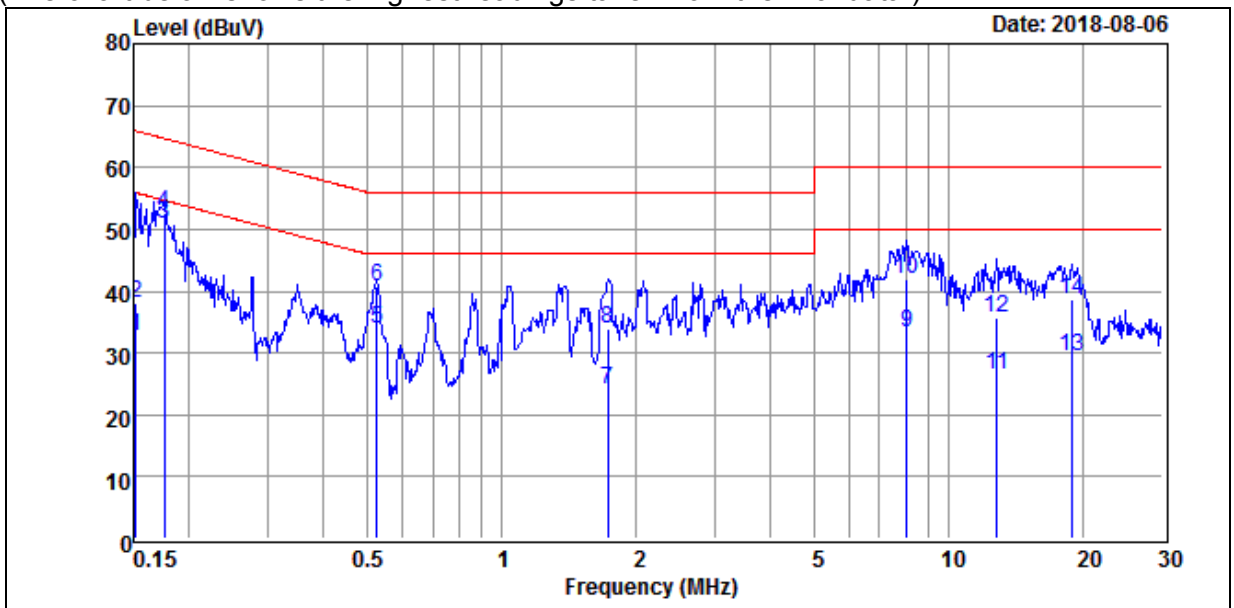
Freq MHz	Reading Level dBuV	LISN Factor dB	Cable Lose dB	Result dBuV	Limit dBuV	Over Limit dBuV	Detector
0.17	38.73	8.66	0.05	47.44	54.81	-7.37	Average
0.17	40.42	8.66	0.05	49.13	64.81	-15.68	QP
0.53	25.22	8.79	0.09	34.10	46.00	-11.90	Average
0.53	30.26	8.79	0.09	39.14	56.00	-16.86	QP
1.40	18.76	8.86	0.12	27.74	46.00	-18.26	Average
1.40	26.20	8.86	0.12	35.18	56.00	-20.82	QP
4.34	15.06	8.97	0.16	24.19	46.00	-21.81	Average
4.34	21.68	8.97	0.16	30.81	56.00	-25.19	QP
8.41	22.84	9.11	0.22	32.17	50.00	-17.83	Average
8.41	28.43	9.11	0.22	37.76	60.00	-22.24	QP
17.11	22.74	9.41	0.29	32.44	50.00	-17.56	Average
17.11	30.79	9.41	0.29	40.49	60.00	-19.51	QP

REMARKS： 1. Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB)
2. Over Limit (dBuV) = Measured Level (dBuV) – Limits (dBuV)

Model No.	P650IVF01.0	Test Mode	Normal Operation
Environmental Conditions	26°C, 60% RH	Resolution Bandwidth	9 kHz
Tested by	Weici Lo		

NEUTRAL

(The chart below shows the highest readings taken from the final data.)



Freq MHz	Reading Level dBuV	LISN Factor dB	Cable Lose dB	Result dBuV	Limit dBuV	Over Limit dBuV	Detector
0.15	24.04	8.67	0.05	32.76	55.91	-23.15	Average
0.15	29.36	8.67	0.05	38.08	65.91	-27.83	QP
0.18	42.10	8.68	0.05	50.83	54.68	-3.85	Average
0.18	43.96	8.68	0.05	52.69	64.68	-11.99	QP
0.53	24.91	8.80	0.09	33.80	46.00	-12.20	Average
0.53	31.74	8.80	0.09	40.63	56.00	-15.37	QP
1.73	14.96	8.89	0.13	23.98	46.00	-22.02	Average
1.73	24.84	8.89	0.13	33.86	56.00	-22.14	QP
8.06	24.05	9.11	0.22	33.38	50.00	-16.62	Average
8.06	32.57	9.11	0.22	41.90	60.00	-18.10	QP
12.78	17.05	9.28	0.26	26.59	50.00	-23.41	Average
12.78	26.10	9.28	0.26	35.64	60.00	-24.36	QP
18.92	19.81	9.46	0.29	29.56	50.00	-20.44	Average
18.92	28.83	9.46	0.29	38.58	60.00	-21.42	QP

REMARKS： 1. Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB)
2. Over Limit (dBuV) = Measured Level (dBuV) – Limits (dBuV)

7.10 FREQUENCY STABILITY

LIMITS

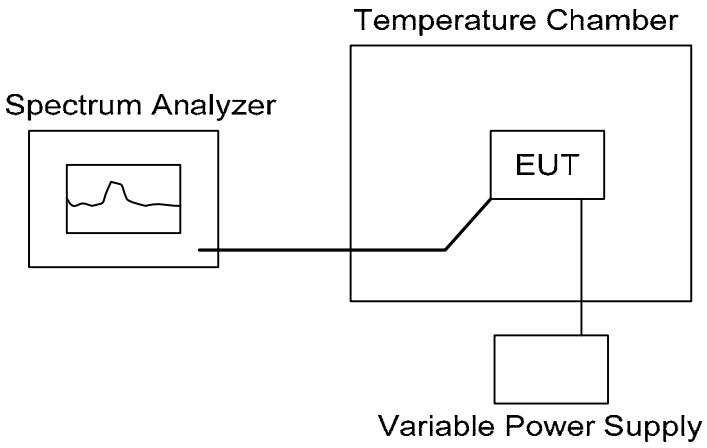
§ 15.407 (g) manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY54430216	07/05/2018	07/04/2019
Power Meter	Anritsu	ML2487A	6K00003888	05/02/2018	05/01/2019
Power Sensor	Anritsu	MA2491A	033265	05/02/2018	05/01/2019
SMA Cable + 10dB Attenuator	CCS	SMA + 10dB Att	O6	01/22/2018	01/21/2019

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

TEST SETUP



TEST PROCEDURE

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20℃ operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -20℃. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10℃ increased per stage until the highest temperature of +50℃ reached.

TEST RESULTS

Test mode: IEEE 802.11a mode / 5150 ~ 5250 MHz

CH Low / Operating Frequency: 5180 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
50	120	5180.007450	5150-5250	PASS
40		5180.008360	5150~5250	
30		5180.007930	5150~5250	
20		5180.007880	5150~5250	
10		5180.007740	5150~5250	
0		5180.008360	5150~5250	
-10		5180.008490	5150~5250	
-20		5180.009630	5150~5250	
20	108	5180.007520	5150~5250	PASS
	120	5180.007790	5150~5250	
	132	5180.008360	5150~5250	

CH Middle / Operating Frequency: 5200 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
50	120	5200.008930	5150~5250	PASS
40		5200.009840	5150~5250	
30		5200.009460	5150~5250	
20		5200.007160	5150~5250	
10		5200.008330	5150~5250	
0		5200.008840	5150~5250	
-10		5200.008990	5150~5250	
-20		5200.009460	5150~5250	
20	108	5200.010250	5150~5250	PASS
	120	5200.009460	5150~5250	
	132	5200.008440	5150~5250	

CH High / Operating Frequency: 5240 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
50	120	5240.009690	5150~5250	PASS
40		5240.008410	5150~5250	
30		5240.008010	5150~5250	
20		5240.008330	5150~5250	
10		5240.008490	5150~5250	
0		5240.009320	5150~5250	
-10		5240.007820	5150~5250	
-20		5240.007690	5150~5250	
20	108	5240.008160	5150~5250	PASS
	120	5240.008830	5150~5250	
	132	5240.009450	5150~5250	

Test mode: IEEE 802.11a mode / 5725 ~ 5850 MHz

CH Low / Operating Frequency: 5745 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
50	120	5180.007930	5725~5850	PASS
40		5180.008360	5725~5850	
30		5180.008490	5725~5850	
20		5180.009460	5725~5850	
10		5180.010460	5725~5850	
0		5180.009850	5725~5850	
-10		5180.009930	5725~5850	
-20		5180.009250	5725~5850	
20	108	5180.009360	5725~5850	PASS
	120	5180.009460	5725~5850	
	132	5180.009420	5725~5850	

CH Middle / Operating Frequency: 5785 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
50	120	5200.008450	5725~5850	PASS
40		5200.007890	5725~5850	
30		5200.007920	5725~5850	
20		5200.007450	5725~5850	
10		5200.007190	5725~5850	
0		5200.007240	5725~5850	
-10		5200.007330	5725~5850	
-20		5200.007190	5725~5850	
20	108	5200.007820	5725~5850	PASS
	120	5200.007930	5725~5850	
	132	5200.007710	5725~5850	

CH High / Operating Frequency: 5825 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
50	120	5240.008460	5725~5850	PASS
40		5240.008860	5725~5850	
30		5240.009470	5725~5850	
20		5240.008150	5725~5850	
10		5240.007710	5725~5850	
0		5240.007190	5725~5850	
-10		5240.007820	5725~5850	
-20		5240.009300	5725~5850	
20	108	5240.007360	5725~5850	PASS
	120	5240.008450	5725~5850	
	132	5240.008850	5725~5850	

IEEE 802.11n HT20 mode / 5150 ~ 5250 MHz

CH Low / Operating Frequency: 5180 MHz				
Environment Temperature (°C)	**Voltage (V)**	**Measured Frequency (MHz)**	**Limit Range**	**Test Result**
50	120	5190.009360	5150~5250	PASS
40		5190.009540	5150~5250	
30		5190.008440	5150~5250	
20		5190.008480	5150~5250	
10		5190.009340	5150~5250	
0		5190.010250	5150~5250	
-10		5190.010490	5150~5250	
-20		5190.011060	5150~5250	
20	108	5190.009350	5150~5250	PASS
	120	5190.008940	5150~5250	
	132	5190.009850	5150~5250	

CH Middle / Operating Frequency: 5200 MHz				
Environment Temperature (°C)	**Voltage (V)**	**Measured Frequency (MHz)**	**Limit Range**	**Test Result**
50	120	5230.009460	5150~5250	PASS
40		5230.009770	5150~5250	
30		5230.009810	5150~5250	
20		5230.010470	5150~5250	
10		5230.008460	5150~5250	
0		5230.008580	5150~5250	
-10		5230.008870	5150~5250	
-20		5230.007490	5150~5250	
20	108	5230.008440	5150~5250	PASS
	120	5230.009010	5150~5250	
	132	5230.009740	5150~5250	

CH High / Operating Frequency: 5240 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
50	120	5210.007210	5150~5250	PASS
40		5210.007930	5150~5250	
30		5210.008440	5150~5250	
20		5210.009040	5150~5250	
10		5210.009770	5150~5250	
0		5210.009460	5150~5250	
-10		5210.008450	5150~5250	
-20		5210.008860	5150~5250	
20	108	5210.009360	5150~5250	PASS
	120	5210.009980	5150~5250	
	132	5210.010440	5150~5250	

IEEE 802.11n HT20 mode / 5725 ~ 5850 MHz

CH Low / Operating Frequency: 5745 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
50	120	5745.007450	5725~5850	PASS
40		5745.008460	5725~5850	
30		5745.008130	5725~5850	
20		5745.009350	5725~5850	
10		5745.009950	5725~5850	
0		5745.008460	5725~5850	
-10		5745.010360	5725~5850	
-20		5745.009810	5725~5850	
20	108	5745.007820	5725~5850	PASS
	120	5745.009880	5725~5850	
	132	5745.009940	5725~5850	

CH Middle / Operating Frequency: 5785 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
50	120	5785.008460	5725~5850	PASS
40		5785.008230	5725~5850	
30		5785.009360	5725~5850	
20		5785.009050	5725~5850	
10		5785.009450	5725~5850	
0		5785.008930	5725~5850	
-10		5785.009750	5725~5850	
-20		5785.009460	5725~5850	
20	108	5785.008840	5725~5850	PASS
	120	5785.009830	5725~5850	
	132	5785.009310	5725~5850	

CH High / Operating Frequency: 5825 MHz				
Environment Temperature (°C)	Voltage (V)	Measured Frequency (MHz)	Limit Range	Test Result
50	120	5825.008420	5725~5850	PASS
40		5825.009040	5725~5850	
30		5825.007900	5725~5850	
20		5825.010450	5725~5850	
10		5825.008460	5725~5850	
0		5825.008040	5725~5850	
-10		5825.007930	5725~5850	
-20		5825.007430	5725~5850	
20	108	5825.007730	5725~5850	PASS
	120	5825.008660	5725~5850	
	132	5825.009080	5725~5850	

IEEE 802.11n HT40 mode / 5150 ~ 5250 MHz

CH Low / Operating Frequency: 5190 MHz				
Environment Temperature (°C)	**Voltage (V)**	**Measured Frequency (MHz)**	**Limit Range**	**Test Result**
50	120	5745.008460	5150~5250	PASS
40		5745.008830	5150~5250	
30		5745.008300	5150~5250	
20		5745.008360	5150~5250	
10		5745.009050	5150~5250	
0		5745.009250	5150~5250	
-10		5745.009980	5150~5250	
-20		5745.009910	5150~5250	
20	108	5745.008130	5150~5250	PASS
	120	5745.008790	5150~5250	
	132	5745.009010	5150~5250	

CH High / Operating Frequency: 5230 MHz				
Environment Temperature (°C)	**Voltage (V)**	**Measured Frequency (MHz)**	**Limit Range**	**Test Result**
50	120	5785.007930	5150~5250	PASS
40		5785.008840	5150~5250	
30		5785.009310	5150~5250	
20		5785.008460	5150~5250	
10		5785.008160	5150~5250	
0		5785.008690	5150~5250	
-10		5785.007460	5150~5250	
-20		5785.009250	5150~5250	
20	108	5785.009820	5150~5250	PASS
	120	5785.009150	5150~5250	
	132	5785.010030	5150~5250	

IEEE 802.11n HT40 mode / 5725 ~ 5850 MHz

CH Low / Operating Frequency: 5755 MHz				
Environment Temperature (°C)	**Voltage (V)**	**Measured Frequency (MHz)**	**Limit Range**	**Test Result**
50	120	5825.007320	5725~5850	PASS
40		5825.008790	5725~5850	
30		5825.008830	5725~5850	
20		5825.009360	5725~5850	
10		5825.009480	5725~5850	
0		5825.009180	5725~5850	
-10		5825.008490	5725~5850	
-20		5825.008530	5725~5850	
20	108	5825.008460	5725~5850	PASS
	120	5825.008490	5725~5850	
	132	5825.008440	5725~5850	

CH High / Operating Frequency: 5795 MHz				
Environment Temperature (°C)	**Voltage (V)**	**Measured Frequency (MHz)**	**Limit Range**	**Test Result**
50	120	5755.007930	5725~5850	PASS
40		5755.008490	5725~5850	
30		5755.009350	5725~5850	
20		5755.008420	5725~5850	
10		5755.007910	5725~5850	
0		5755.007360	5725~5850	
-10		5755.008460	5725~5850	
-20		5755.007950	5725~5850	
20	108	5755.007810	5725~5850	PASS
	120	5755.007220	5725~5850	
	132	5755.008390	5725~5850	

IEEE 802.11ac VHT80 mode / 5150 ~ 5250 MHz

CH Middle / Operating Frequency: 5210 MHz				
Environment Temperature (°C)	**Voltage (V)**	**Measured Frequency (MHz)**	**Limit Range**	**Test Result**
50	120	5795.008640	5150~5250	PASS
40		5795.009050	5150~5250	
30		5795.008770	5150~5250	
20		5795.008460	5150~5250	
10		5795.008830	5150~5250	
0		5795.009450	5150~5250	
-10		5795.009010	5150~5250	
-20		5795.008910	5150~5250	
20	108	5795.008840	5150~5250	PASS
	120	5795.008970	5150~5250	
	132	5795.009010	5150~5250	

IEEE 802.11ac VHT80 mode / 5725 ~ 5850 MHz

CH Middle / Operating Frequency: 5210 MHz				
Environment Temperature (°C)	**Voltage (V)**	**Measured Frequency (MHz)**	**Limit Range**	**Test Result**
50	120	5775.007630	5725~5850	PASS
40		5775.009540	5725~5850	
30		5775.007250	5725~5850	
20		5775.008460	5725~5850	
10		5775.010240	5725~5850	
0		5775.010490	5725~5850	
-10		5775.010560	5725~5850	
-20		5775.009140	5725~5850	
20	108	5775.008490	5725~5850	PASS
	120	5775.008750	5725~5850	
	132	5775.009120	5725~5850	