FCC 47 CFR PART 15 SUBPART E AND ANSI C63.10:2009 TEST REPORT

For

Panel PC

Model : VM-521

Trade Name : RuggON

Issued for

RuggON Corporation

3F., No.10, Ln. 181, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)

Issued by

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Issued Date: December 05, 2014

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	12/05/2014	Initial Issue	All Page 249	Michelle Chiu

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1. TEST REPORT CERTIFICATION

Applicant	：	RuggON Corporation
Address	：	3F., No.10, Ln. 181, Sec. 2, Jiuzong Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)
Equipment Under Test	：	Panel PC
Model	：	VM-521
Trade Name	：	RuggON
Tested Date	：	September 01 ~ November 25, 2014

APPLICABLE STANDARD	
Standard	**Test Result**
FCC Part 15 Subpart E AND ANSI C63.10:2009	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:

Sb. Lu
Sr. Engineer

Reviewed by:

Gundam Lin
Sr. Engineer

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2. EUT DESCRIPTION

Product Name	Panel PC
Model Number	VM-521
Identify Number	T140901D03
Received Date	September 01, 2014
Frequency Range	UNII Band 1:
	IEEE 802.11a, 802.11ac VHT20 : 5180 MHz ~ 5240 MHz
	IEEE 802.11ac VHT40 : 5190 MHz ~ 5230 MHz
	IEEE 802.11ac VHT80 : 5210 MHz
	UNII Band 2A:
	IEEE 802.11a, 802.11ac VHT20 : 5260 MHz ~ 5320 MHz
	IEEE 802.11ac VHT40 : 5270 MHz ~ 5310 MHz
	IEEE 802.11ac VHT80 : 5290 MHz
	UNII Band 2C:
	IEEE 802.11a, 802.11ac VHT20 : 5500 MHz ~ 5700 MHz
	IEEE 802.11ac VHT40 : 5510 MHz ~ 5670 MHz
	IEEE 802.11ac VHT80 : 5530 MHz
	UNII Band 3:
	IEEE 802.11a, 802.11ac VHT20 : 5745 MHz ~ 5825 MHz
	IEEE 802.11ac VHT40 : 5755 MHz ~ 5795 MHz
	IEEE 802.11ac VHT80 : 5775 MHz

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Transmit Power	UNII Band 1: IEEE 802.11a : 15.00 dBm (0.0316 W) IEEE 802.11ac VHT20 : 16.91 dBm (0.0.0491 W) IEEE 802.11ac VHT40 : 16.65 dBm (0.0462 W) IEEE 802.11ac VHT80 : 11.80 dBm (0.0151 W) UNII Band 2A: IEEE 802.11a : 15.22 dBm (0.0333W) IEEE 802.11ac VHT20 : 17.40 dBm (0.0550 W) IEEE 802.11ac VHT40 : 17.38 dBm (0.0547 W) IEEE 802.11ac VHT80 : 13.48 dBm (0.0223 W) UNII Band 2C: IEEE 802.11a : 15.34 dBm (0.0342 W) IEEE 802.11ac VHT20 : 17.06 dBm (0.0508 W) IEEE 802.11ac VHT40 : 17.02 dBm (0.0504 W) IEEE 802.11ac VHT80 : 12.32 dBm (0.0171 W) UNII Band 3: IEEE 802.11a : 15.08 dBm (0.0322 W) IEEE 802.11ac VHT20 : 16.94 dBm (0.0494 W) IEEE 802.11ac VHT40 : 17.11 dBm (0.0514 W) IEEE 802.11ac VHT80 : 17.24 dBm (0.0530 W)
Channel Spacing	IEEE 802.11a, 802.11ac VHT20 : 20MHz IEEE 802.11ac VHT40 : 40MHz IEEE 802.11ac VHT80 : 80MHz
Channel Number	IEEE 802.11a, 802.11ac VHT20 : 5150MHz ~ 5250MHz : 4 Channels 5250MHz ~ 5350MHz : 4 Channels 5500MHz ~ 5700MHz : 8 Channels 5725MHz ~ 5850MHz : 5 Channels IEEE 802.11ac VHT40 : 5150MHz ~ 5250MHz : 2 Channels 5250MHz ~ 5350MHz : 2 Channels 5500MHz ~ 5700MHz : 3 Channels 5725MHz ~ 5850MHz : 2 Channels IEEE 802.11ac VHT80 : 5150MHz ~ 5250MHz : 1 Channels 5250MHz ~ 5350MHz : 1 Channels 5500MHz ~ 5700MHz : 1 Channels 5725MHz ~ 5850MHz : 1 Channels

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Transmit Data Rate	IEEE 802.11a : up to 54 Mbps
	IEEE 802.11ac (VHT20,800ns GI) : up to 130 Mbps
	IEEE 802.11ac (VHT20,400ns GI) : up to 144.4 Mbps
	IEEE 802.11ac (VHT40,800ns GI) : up to 270 Mbps
	IEEE 802.11ac (VHT40,400ns GI) : up to 300 Mbps
	IEEE 802.11ac (VHT80,800ns GI) : up to 780 Mbps
	IEEE 802.11ac (VHT80,400ns GI) : up to 866.6 Mbps
Type of Modulation	IEEE 802.11a : OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac VHT20/VHT40 : OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac VHT80 : OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)
Antenna Type	Dipole Antenna × 2 (External), Antenna 1(Chain A), Antenna Gain : 5.5 dBi Antenna 2(Chain B), Antenna Gain : 5.5 dBi PIFA Antenna × 2 (Internal), Antenna 1(Chain A), Antenna Gain : 4.73 dBi Antenna 2(Chain B), Antenna Gain : 5.39 dBi
Power Rating	24Vdc / 48Vdc 7.5Vdc from Battery
Test Voltage	120Vac, 60Hz
DC Power Cable Type	Shielded cable, 3.1 m × 1 (Detachable)
I/O Port	Audio In Port × 1, Audio Out Port × 1, RJ-45 Port × 2, USB(RS232) Port × 1, Expansion Port × 1, Canbus Port × 2, COM Port × 2, DIO Port × 1, Power Port × 1

Remark :

1. *The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.*
2. *For more details, please refer to the User's manual of the EUT.*
3. *This submittal(s) (test report) is intended for FCC ID: 2ABTU-VM-521 filing to comply with Section 15.207, 15.209 and 15.407 of the FCC Part 15, Subpart E Rules.*

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3. DESCRIPTION OF TEST MODES

The EUT is an 802.11n transceiver in Panel PC form factor.

For IEEE 802.11a mode: (1TX / 1RX) : Chain A (Ant 1) transmit/receive.

For IEEE 802.11ac VHT20/VHT40/VHT80 mode (2TX / 2RX) :

Chain A (Ant 1) & Chain B (Ant 2) transmit/receive.

No.	Antenna Position	Antenna Type	Antenna Gain (dBi)		Test item	
			1	2	Spurious emissions	Conducted
1	External	Dipole	5.5	5.5	V	V
2	Internal	PIFA	4.73	5.39	V	

Conducted Emission / Radiated Emission Test (Below 1 GHz)

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

No.	Pre-Test Mode
1	TX Mode / External Antenna
2	TX Mode / Internal Antenna

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 / External Antenna TX Mode / Internal Antenna
	Conducted Emission	TX Mode / External Antenna

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

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Conducted / Radiated Emission Test (Above 1 GHz)

IEEE 802.11a, 802.11ac VHT20 mode

The EUT had been tested under operating condition.

There are three channels have been tested as following :

UNII Band 1:

Channel	Frequency (MHz)
Low	5180
Middle	5220
High	5240

UNII Band 2A:

Channel	Frequency (MHz)
Low	5260
Middle	5280
High	5320

UNII Band 2C:

Channel	Frequency (MHz)
Low	5500
Middle	5580
High	5700

UNII Band 3:

Channel	Frequency (MHz)
Low	5745
Middle	5785
High	5825

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

IEEE 802.11ac VHT20 mode : 6.5Mbps data rate (worst case) were chosen for full testing.

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IEEE 802.11ac VHT40 mode

The EUT had been tested under operating condition.

There are two or three channels have been tested as following :

UNII Band 1:

Channel	Frequency (MHz)
Low	5190
High	5230

UNII Band 2A:

Channel	Frequency (MHz)
Low	5270
High	5310

UNII Band 2C:

Channel	Frequency (MHz)
Low	5510
Moddle	5550
High	5670

UNII Band 3:

Channel	Frequency (MHz)
Low	5755
High	5795

IEEE 802.11ac VHT40 mode : 13.5Mbps data rate (worst case) were chosen for full testing.

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IEEE 802.11ac VHT80 mode

The EUT had been tested under operating condition.

There are one channels have been tested as following :

UNII Band 1:

Channel	Frequency (MHz)
Low	5210

UNII Band 2A:

Channel	Frequency (MHz)
Low	5290

UNII Band 2C:

Channel	Frequency (MHz)
Low	5530

UNII Band 3:

Channel	Frequency (MHz)
Low	5775

IEEE 802.11ac VHT80 mode : 29.3 Mbps data rate (worst case) were chosen for full testing.

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4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10: 2009 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. 989-1 Wen Shan Rd., Shang Shan Village,
Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C

The sites are constructed in conformance with the requirements of ANSI C63.10:2009 and CISPR 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4, CISPR 16-1-5.

5.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies 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
Japan	VCCI
Taiwan	BSMI
USA	FCC MRA

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

Remark: *FCC Designation Number TW1027.*

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5.3 MEASUREMENT UNCERTAINTY

The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4-2.

PARAMETER	UNCERTAINTY
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 30 to 1000 MHz	+/- 3.97
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 1 to 18GHz	+/- 3.58
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 18 to 26 GHz	+/- 3.59
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 26 to 40 GHz	+/- 3.81
Conducted Emission (Mains Terminals), 9kHz to 30MHz	+/- 2.48

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Consistent with industry standard (e.g. CISPR 22, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.

The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than U_{CISPR} which is 3.6dB and 5.2dB respectively. CCS values (called U_{Lab} in CISPR 16-4-2) is less than U_{CISPR} as shown in the table above. Therefore, MU need not be considered for compliance.

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6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Serial No.
1	Notebook PC	HP	ProBook 4421s	CNF03242PJ

Power Adapter :

No.	Manufacturer	Model No.	Power Input	Power Output
1	DELTA	ADP-60DH REV.B	100-240Vac, 1.5A, 50-60Hz	19Vdc 3.16A

No.	Signal Cable Description
1	Non-shielded RJ-45 cable, 12m × 1
2	Non-shielded AC power cable, 1.8m × 1

SETUP DIAGRAM FOR TESTS

EUT & peripherals setup diagram is shown in appendix setup photos.

EUT OPERATING CONDITION

1. EUT & peripherals setup diagram is shown in appendix setup photos.
2. Run “DRTU” Software
3. Select Test ->Select ContTx
4. TX Mode:

⇨ **Tx Data Rate:**

6 Mbps Bandwidth 20 (IEEE 802.11a mode)
6.5 Mbps Bandwidth 20 (IEEE 802.11ac VHT20 mode)
13.5 Mbps Bandwidth 40 (IEEE 802.11ac VHT40 mode)
29.3 Mbps Bandwidth 80 (IEEE 802.11ac VHT80 mode)

⇨ **Power control**

IEEE 802.11a Channel Low (5180MHz) ChainA Power set 15.5
IEEE 802.11a Channel Mid (5220MHz) ChainA Power set 19
IEEE 802.11a Channel High (5240MHz) ChainA Power set 19
IEEE 802.11a Channel Low (5260MHz) ChainA Power set 19
IEEE 802.11a Channel Mid (5280MHz) ChainA Power set 19
IEEE 802.11a Channel High (5320MHz) ChainA Power set 15
IEEE 802.11a Channel Low (5500MHz) ChainA Power set 18.5
IEEE 802.11a Channel Mid (5580MHz) ChainA Power set 19
IEEE 802.11a Channel High (5700MHz) ChainA Power set 19

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IEEE 802.11a Channel Low (5745MHz) ChainA Power set 19
IEEE 802.11a Channel Mid (5785MHz) ChainA Power set 19
IEEE 802.11a Channel High (5825MHz) ChainA Power set 19

IEEE 802. 11ac VHT20 Channel Low (5180MHz) ChainA/B Power set 15.5/15.5
IEEE 802. 11ac VHT20 Channel Mid (5220MHz) ChainA/B Power set 19/19
IEEE 802. 11ac VHT20 Channel High (5240MHz) ChainA/B Power set 19/19
IEEE 802. 11ac VHT20 Channel Low (5260MHz) ChainA/B Power set 19/19
IEEE 802. 11ac VHT20 Channel Mid (5280MHz) ChainA/B Power set 19/19
IEEE 802. 11ac VHT20 Channel High (5320MHz) ChainA/B Power set 15/15
IEEE 802. 11ac VHT20 Channel Low (5500MHz) ChainA/B Power set 17.5/17.5
IEEE 802. 11ac VHT20 Channel Mid (5580MHz) ChainA/B Power set 19/19
IEEE 802. 11ac VHT20 Channel High (5700MHz) ChainA/B Power set 19/19
IEEE 802. 11ac VHT20 Channel Low (5745MHz) ChainA/B Power set 19/19
IEEE 802. 11ac VHT20 Channel Mid (5785MHz) ChainA/B Power set 19/19
IEEE 802. 11ac VHT20 Channel High (5825MHz) ChainA/B Power set 19/19

IEEE 802.11ac VHT40 Channel Low (5190MHz) ChainA/B Power set 13.5/13.5
IEEE 802.11ac VHT40 Channel High (5230MHz) ChainA/B Power set 19/19
IEEE 802.11ac VHT40 Channel Low (5270MHz) ChainA/B Power set 19/19
IEEE 802.11ac VHT40 Channel High (5310MHz) ChainA/B Power set 14/14
IEEE 802.11ac VHT40 Channel Low (5510MHz) ChainA/B Power set 17.5/17.5
IEEE 802.11ac VHT40 Channel Mid (5550MHz) ChainA/B Power set 19/19
IEEE 802.11ac VHT40 Channel High (5670MHz) ChainA/B Power set 19/19
IEEE 802.11ac VHT40 Channel Low (5755MHz) ChainA/B Power set 19/19
IEEE 802.11ac VHT40 Channel High (5795MHz) ChainA/B Power set 19/19

IEEE 802.11ac VHT80 Channel Low (5210MHz) ChainA/B Power set 11.5/11.5
IEEE 802.11ac VHT80 Channel Low (5290MHz) ChainA/B Power set 12.5/12.5
IEEE 802.11ac VHT80 Channel Low (5530MHz) ChainA/B Power set 12.5/12.5
IEEE 802.11ac VHT80 Channel Low (5775MHz) ChainA/B Power set 19/19

5. All of the functions are under run.
6. Start test.

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7. FCC PART 15.407 REQUIREMENTS

7.1 26dB BANDWIDTH

LIMITS

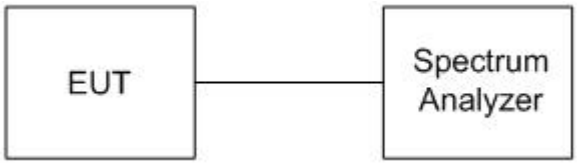
§ 15.303 (c), For purposes of this subpart, the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. 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 Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/10/2015

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 peak 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%.

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TEST RESULTS

IEEE 802.11a Mode

U-NII	Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)
Band 2A	Low	5260	33.72
	Middle	5280	37.72
	High	5320	25.45
Band 2C	Low	5500	35.51
	Middle	5580	35.06
	High	5700	36.28

IEEE 802.11ac VHT20 Mode (Two TX)

U-NII	Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	
			Chain A	Chain B
Band 2A	Low	5260	32.58	29.68
	Middle	5280	35.07	29.46
	High	5320	26.45	25.17
Band 2C	Low	5500	25.37	26.35
	Middle	5580	34.57	32.93
	High	5700	34.70	30.68

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IEEE 802.11ac VHT40 Mode (Two TX)

U-NII	Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	
			Chain A	Chain B
Band 2A	Low	5270	62.89	44.80
	High	5310	41.42	40.88
Band 2C	Low	5510	41.98	40.69
	Middle	5550	55.90	55.85
	High	5670	58.35	70.32

IEEE 802.11ac VHT80 Mode (Two TX)

U-NII	Channel	Channel Frequency (MHz)	26dB Bandwidth (MHz)	
			Chain A	Chain B
Band 2A	Low	5290	80.06	78.40
Band 2C	Low	5530	79.39	79.32

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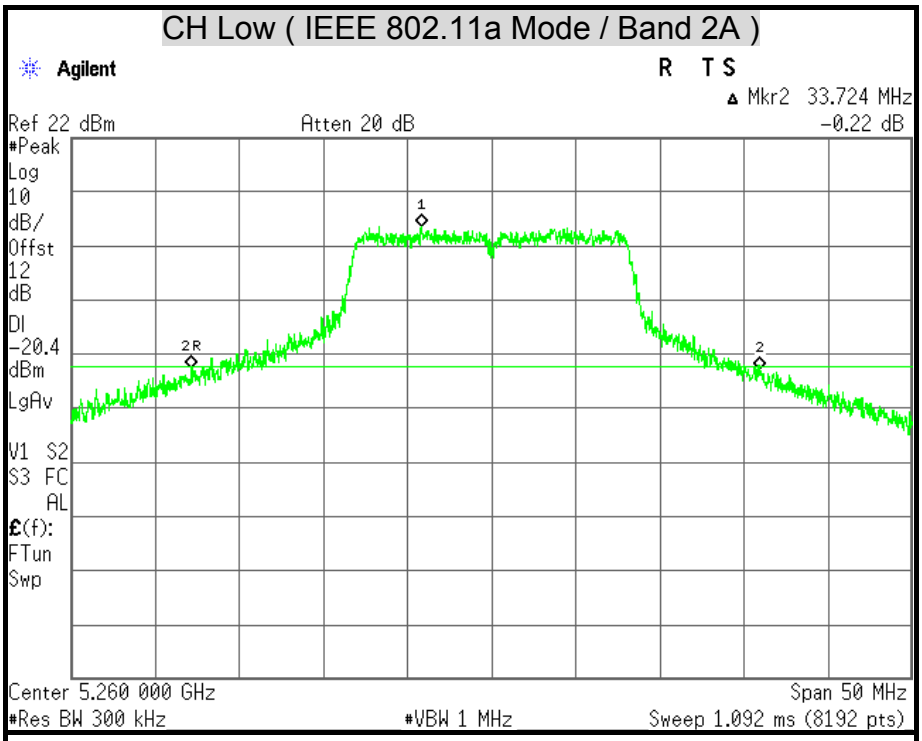
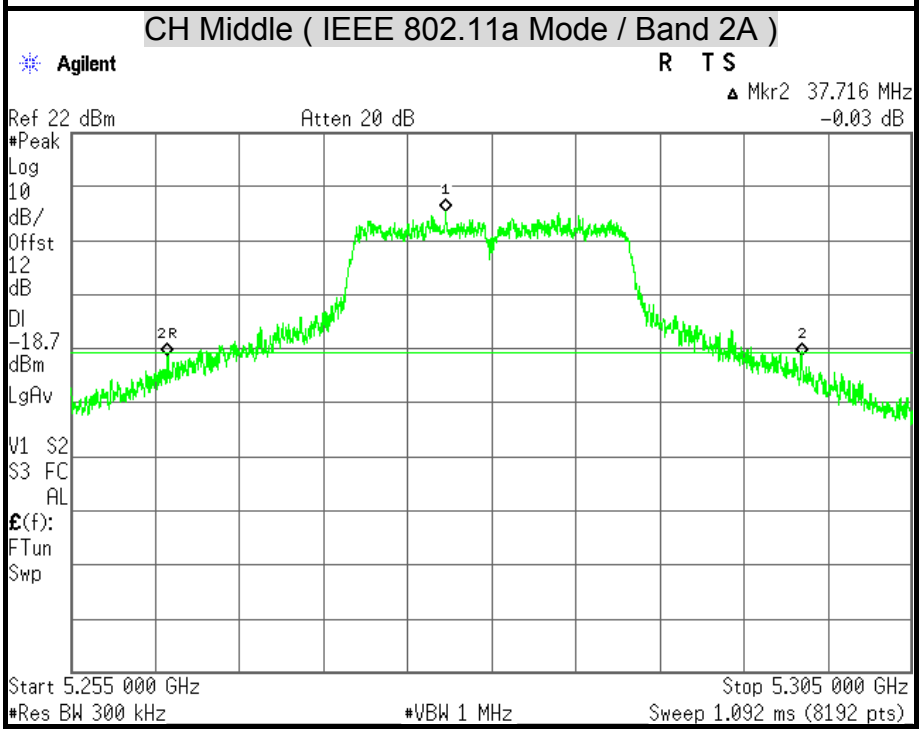
26dB BANDWIDTH

CH Low (IEEE 802.11a Mode / Band 2A)



CH Middle (IEEE 802.11a Mode / Band 2A)



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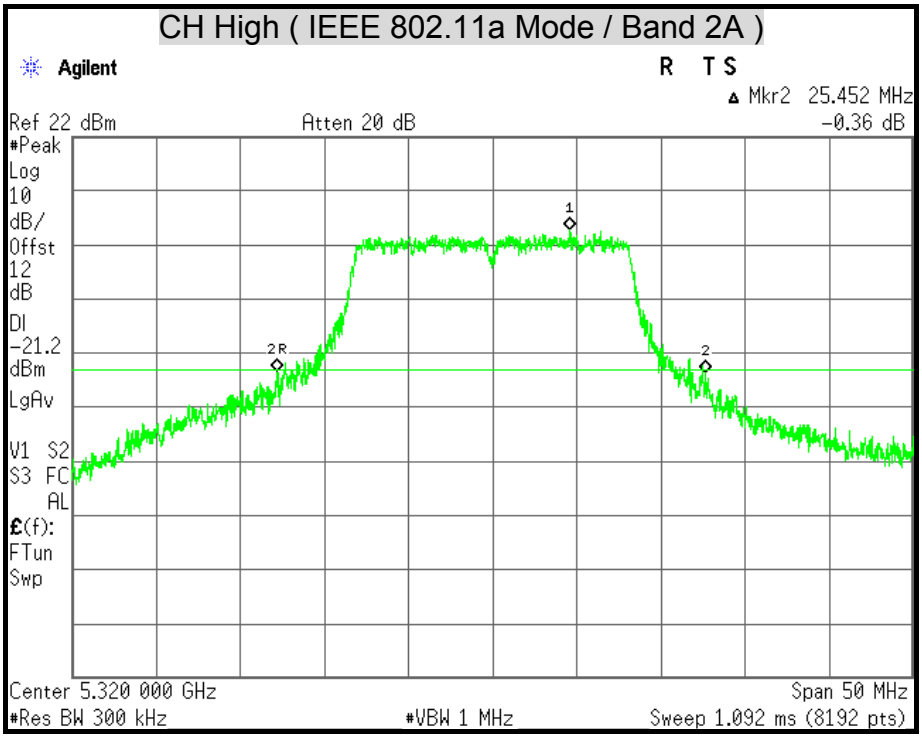
CH High (IEEE 802.11a Mode / Band 2A)



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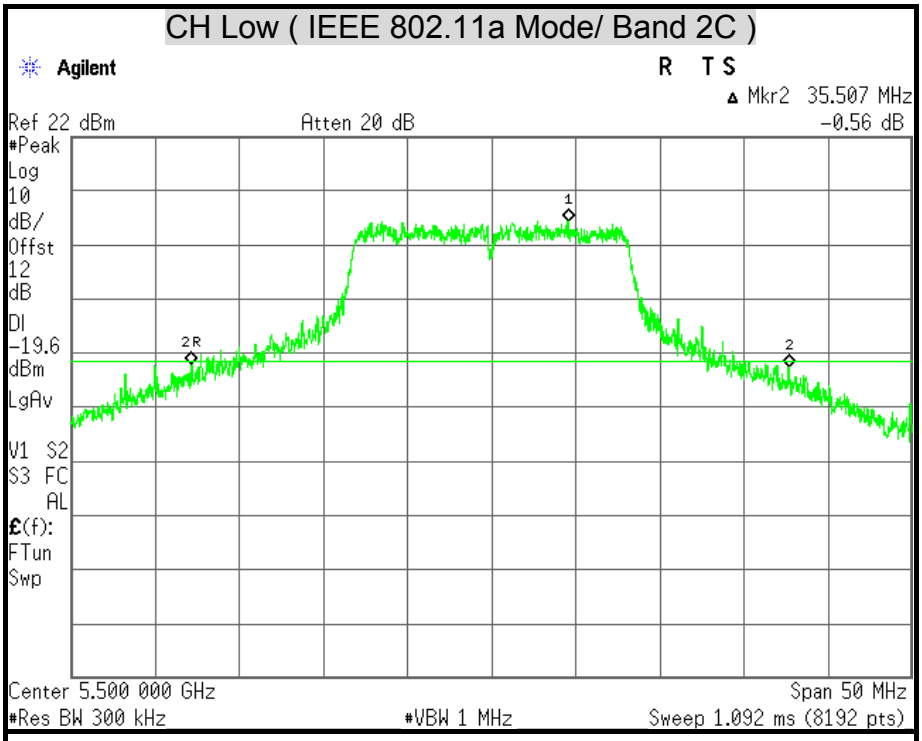
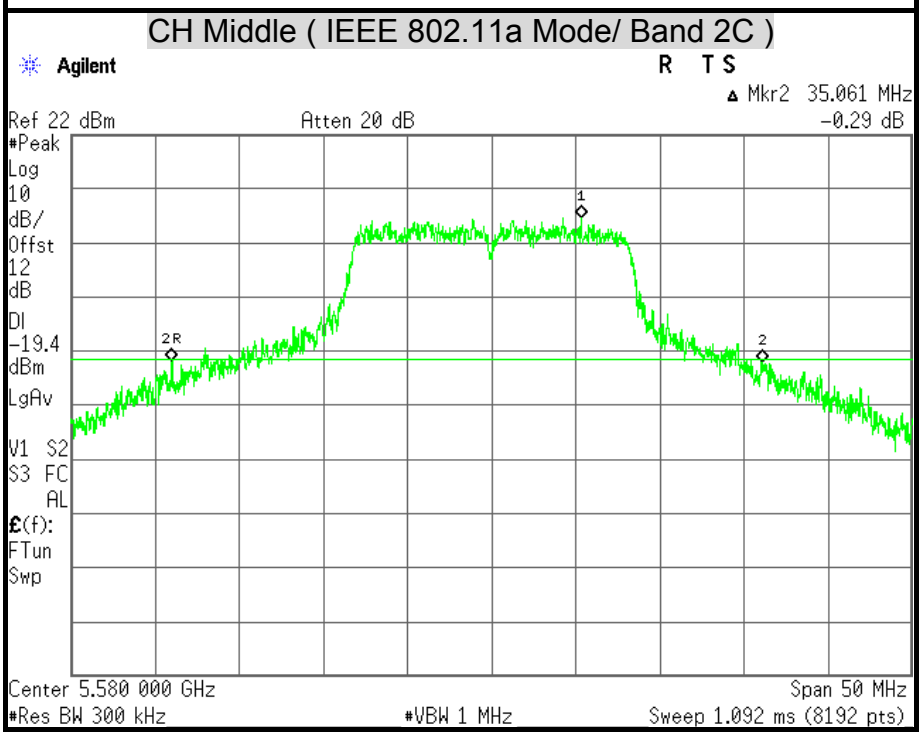
CH Low (IEEE 802.11a Mode/ Band 2C)



CH Middle (IEEE 802.11a Mode/ Band 2C)



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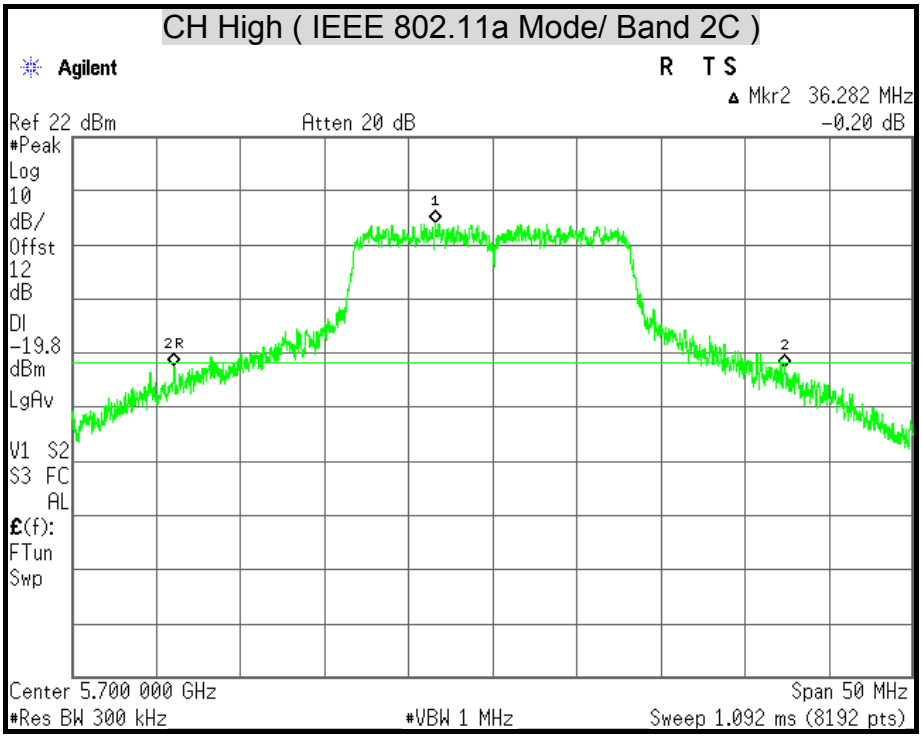
CH High (IEEE 802.11a Mode/ Band 2C)



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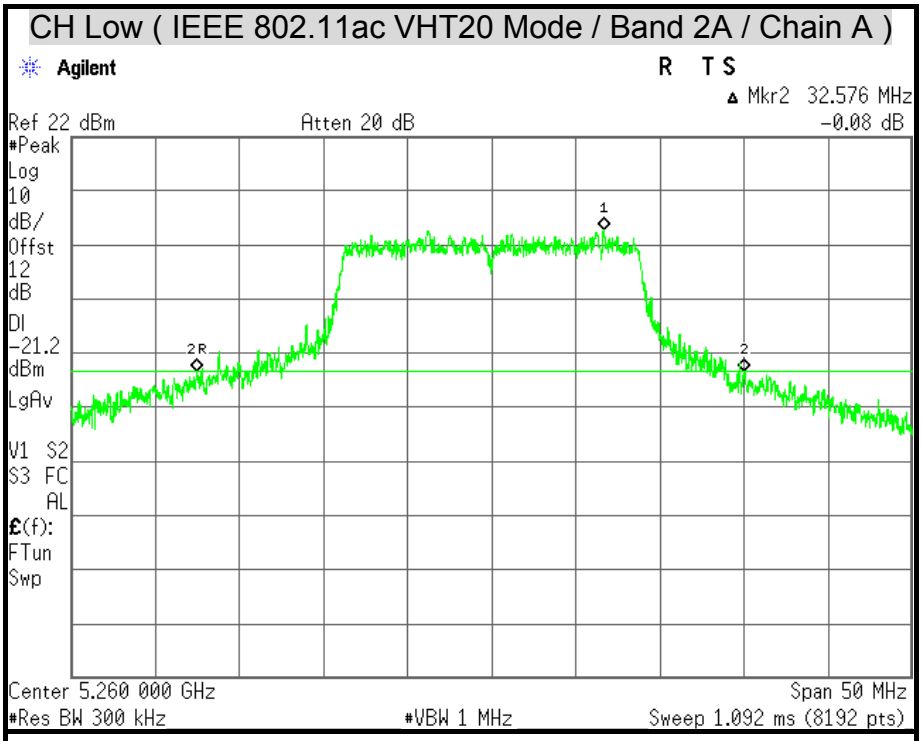
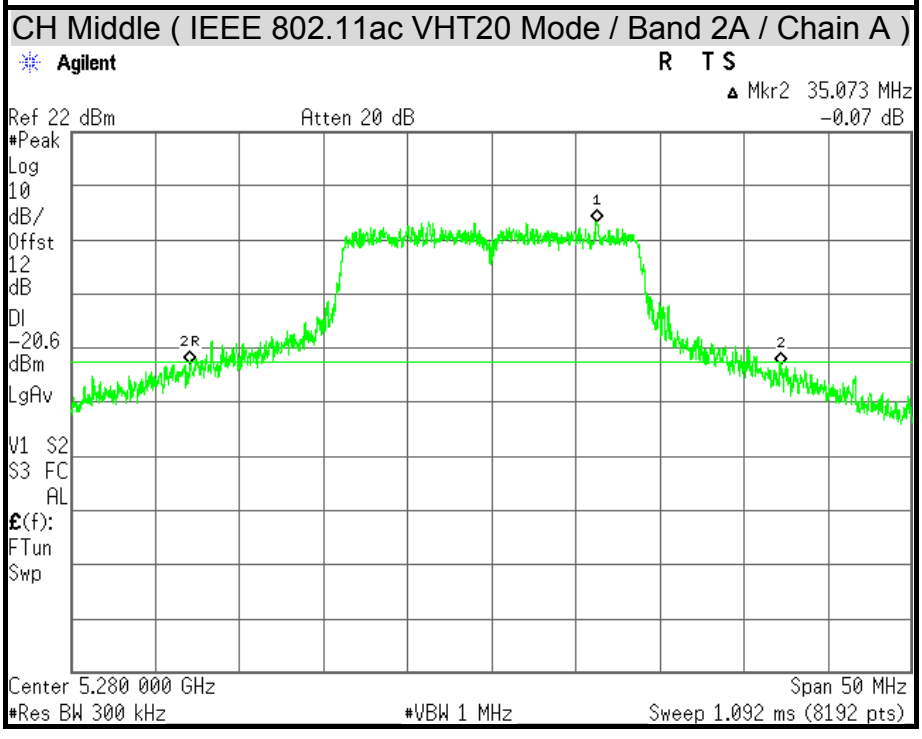
CH Low (IEEE 802.11ac VHT20 Mode / Band 2A / Chain A)



CH Middle (IEEE 802.11ac VHT20 Mode / Band 2A / Chain A)



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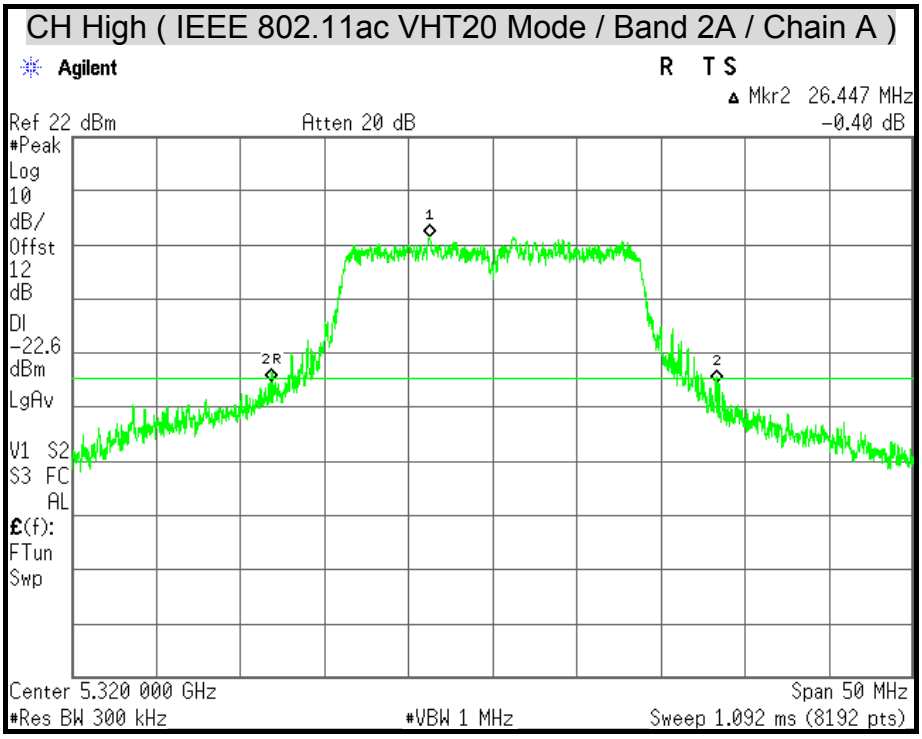
CH High (IEEE 802.11ac VHT20 Mode / Band 2A / Chain A)



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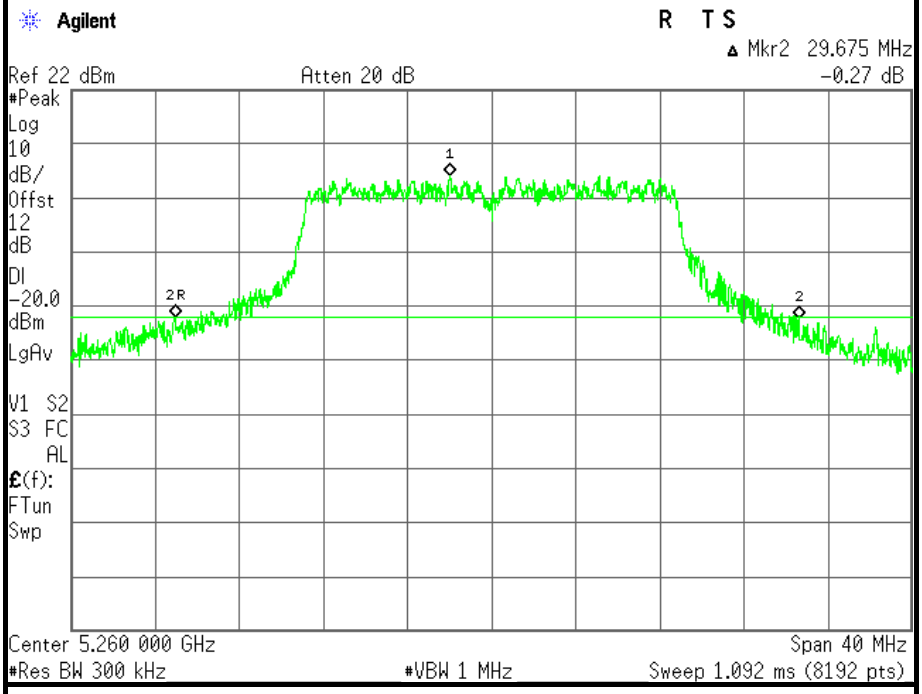
CH Low (IEEE 802.11ac VHT20 Mode / Band 2A / Chain B)



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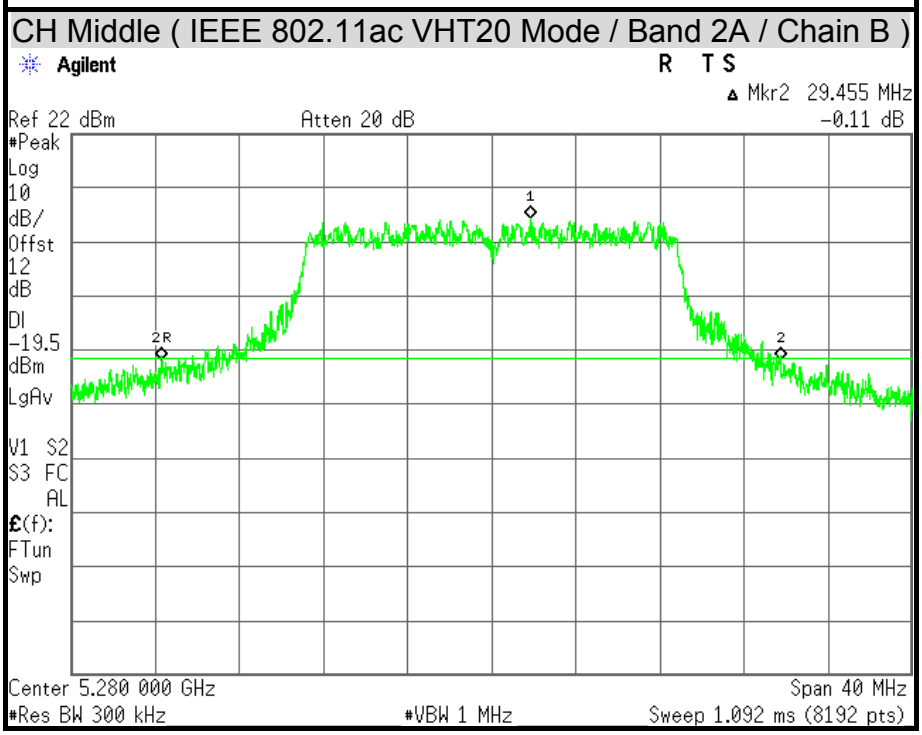

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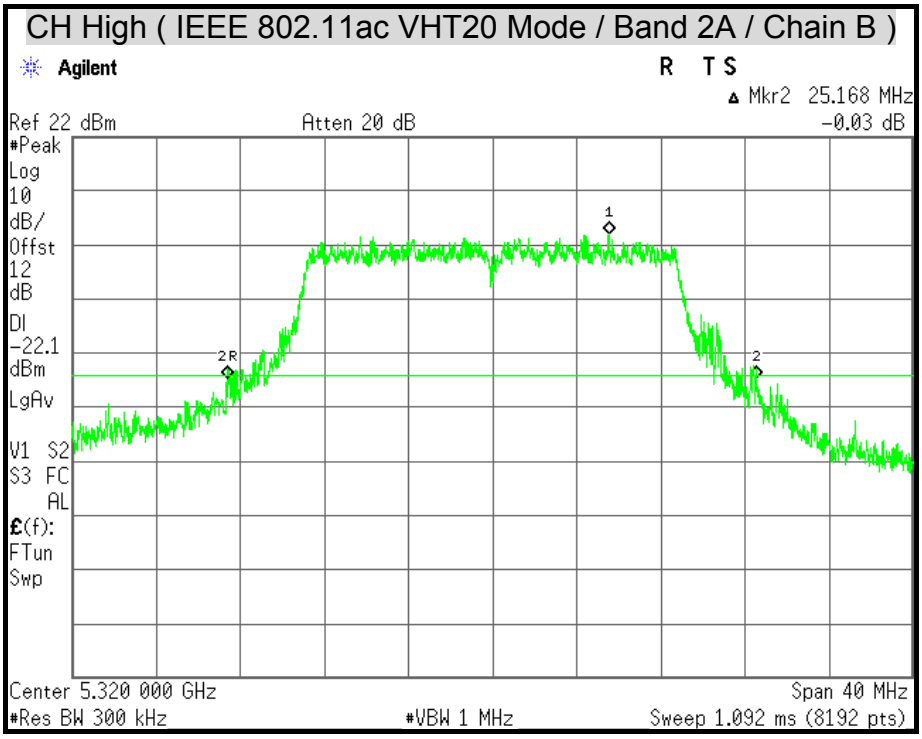
CH High (IEEE 802.11ac VHT20 Mode / Band 2A / Chain B)



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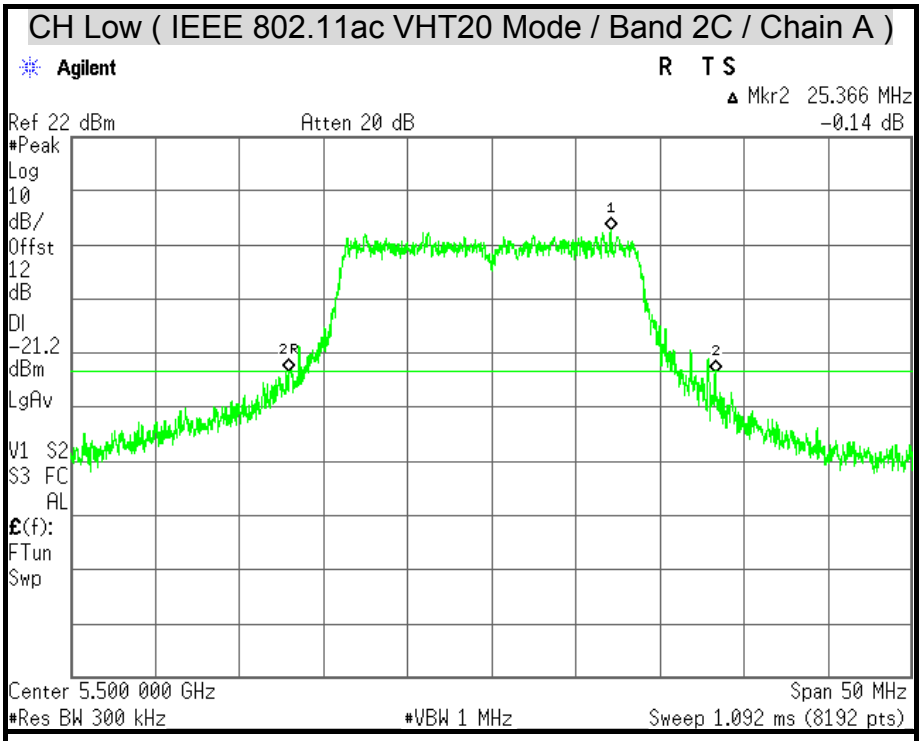
CH Low (IEEE 802.11ac VHT20 Mode / Band 2C / Chain A)



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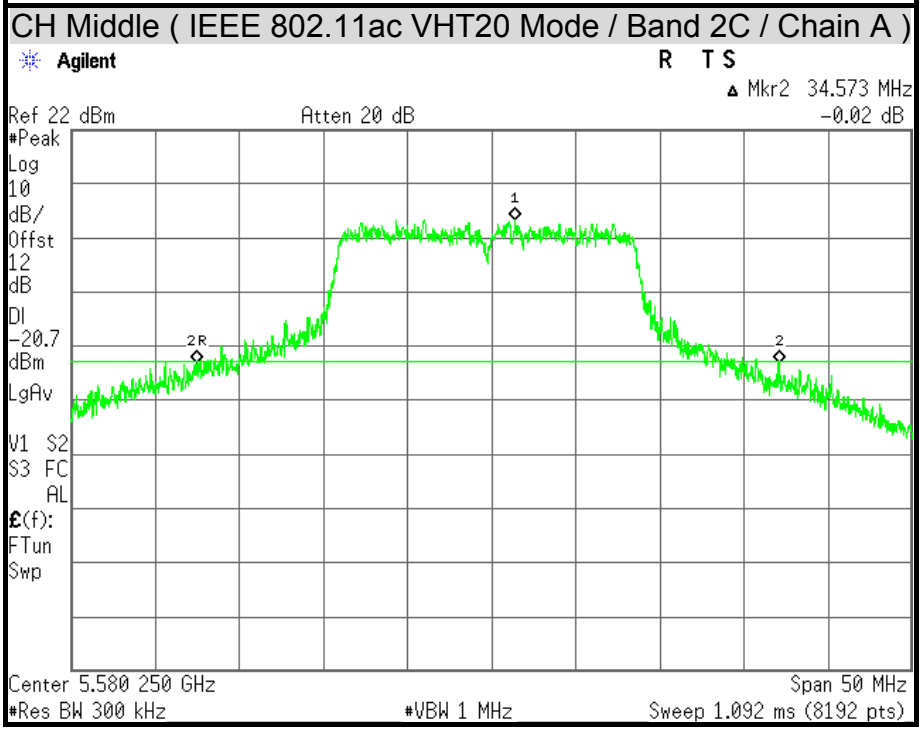

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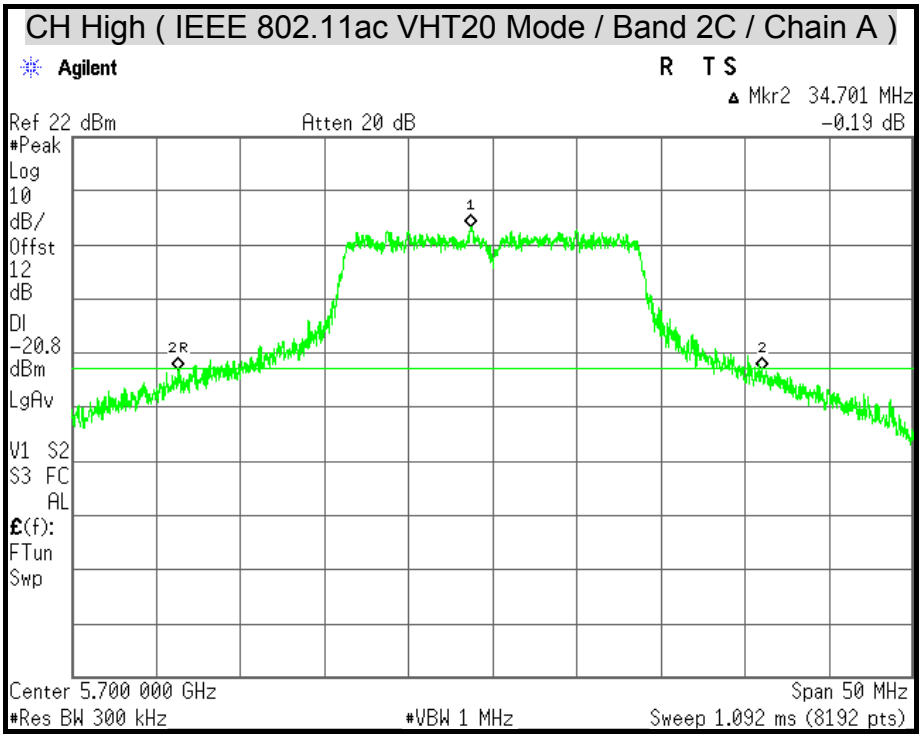
CH High (IEEE 802.11ac VHT20 Mode / Band 2C / Chain A)



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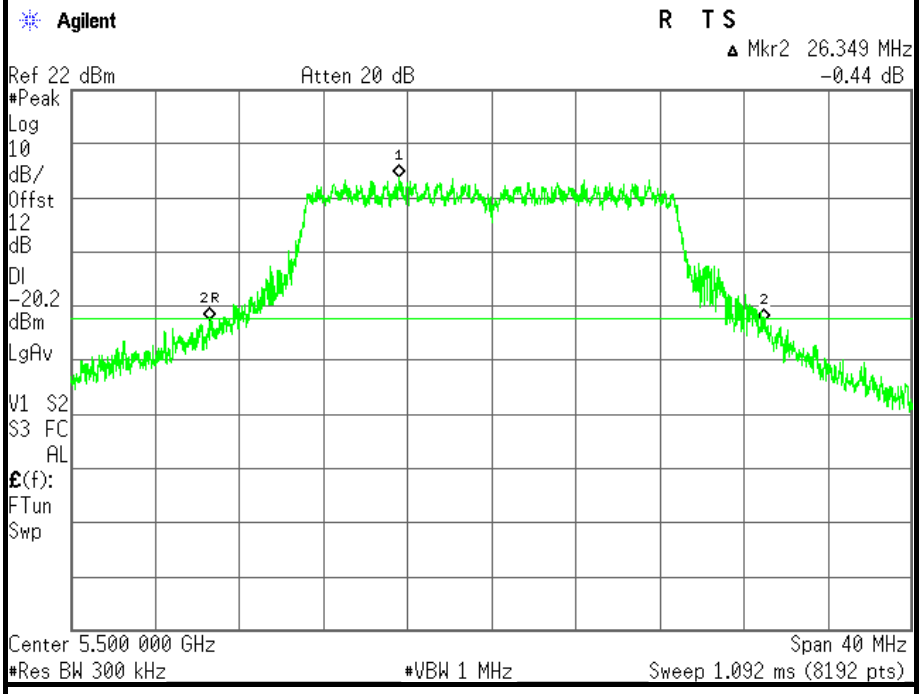

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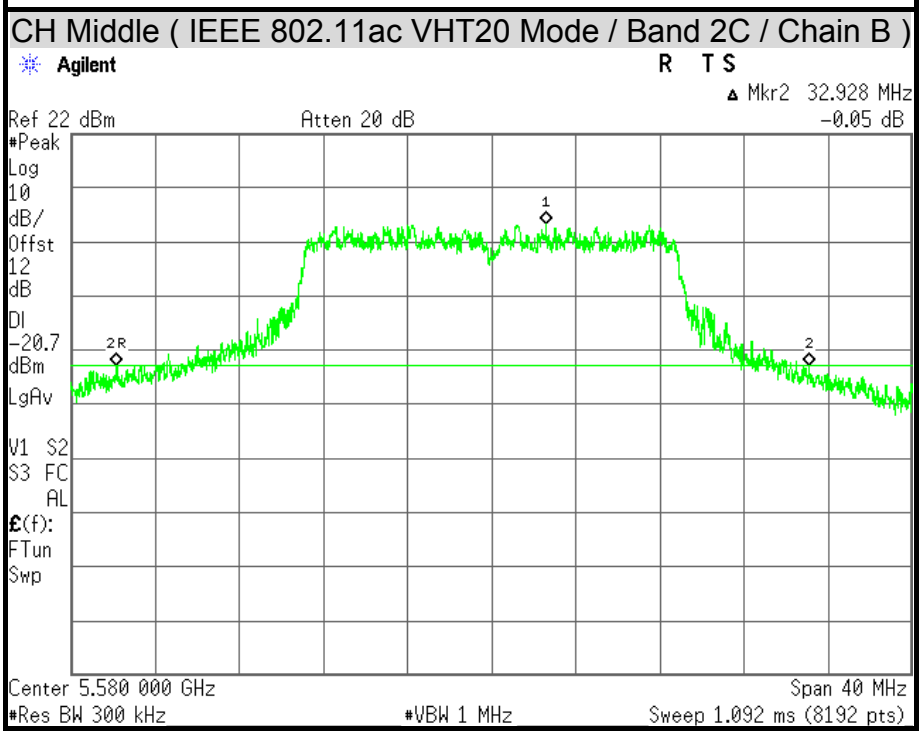

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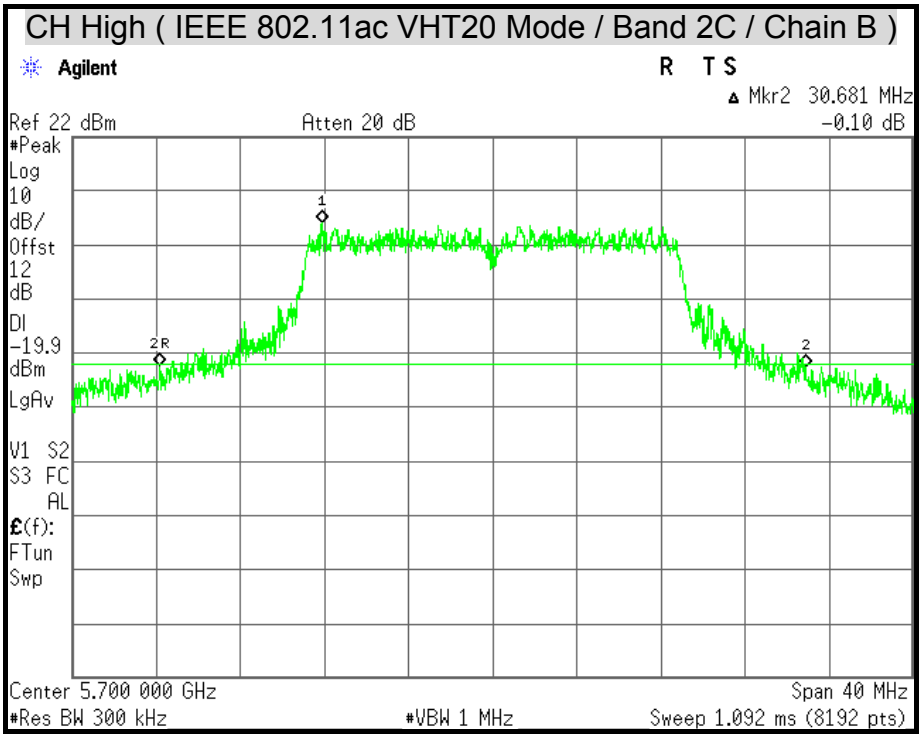

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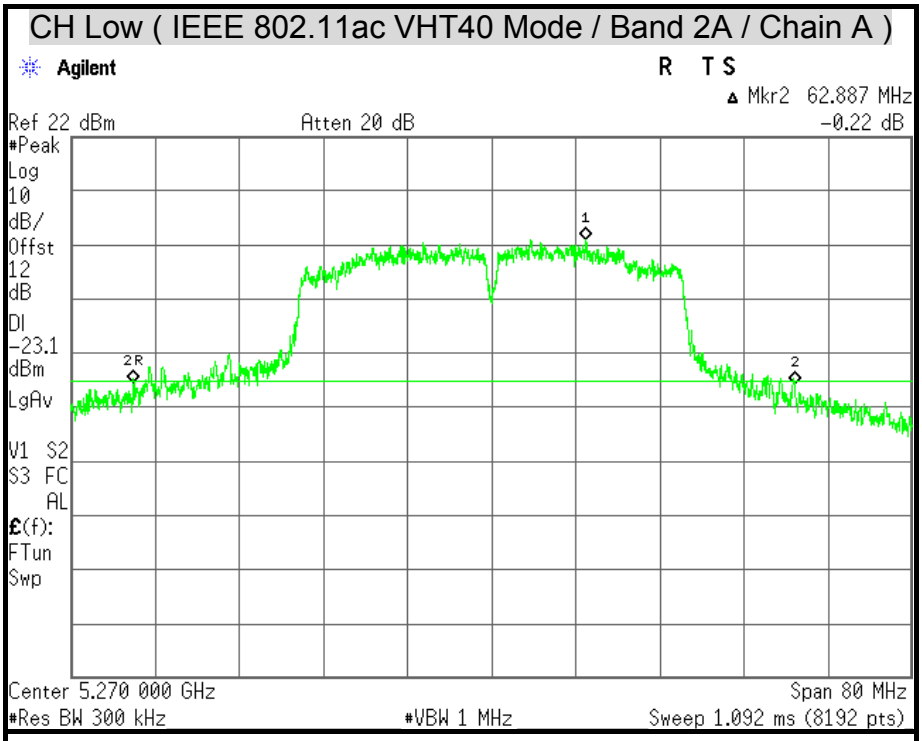
CH Low (IEEE 802.11ac VHT40 Mode / Band 2A / Chain A)



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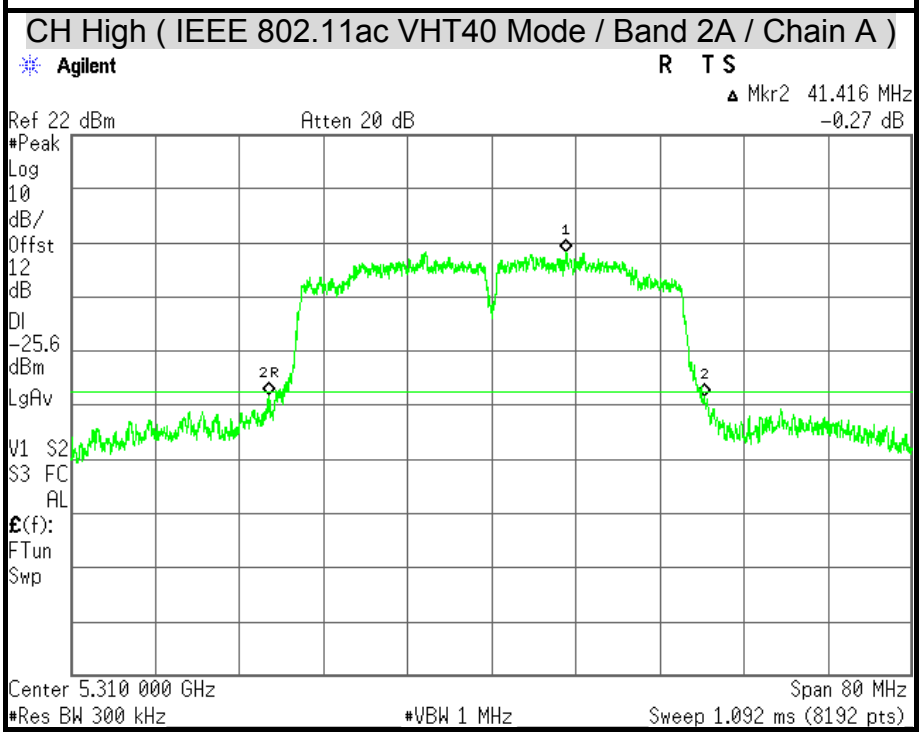

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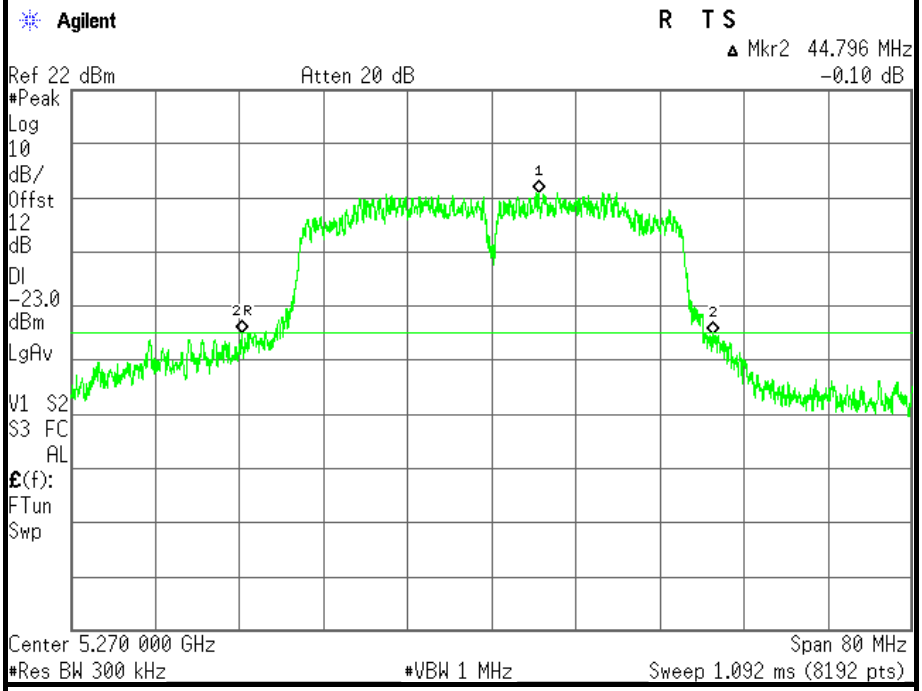
CH Low (IEEE 802.11ac VHT40 Mode / Band 2A / Chain B)



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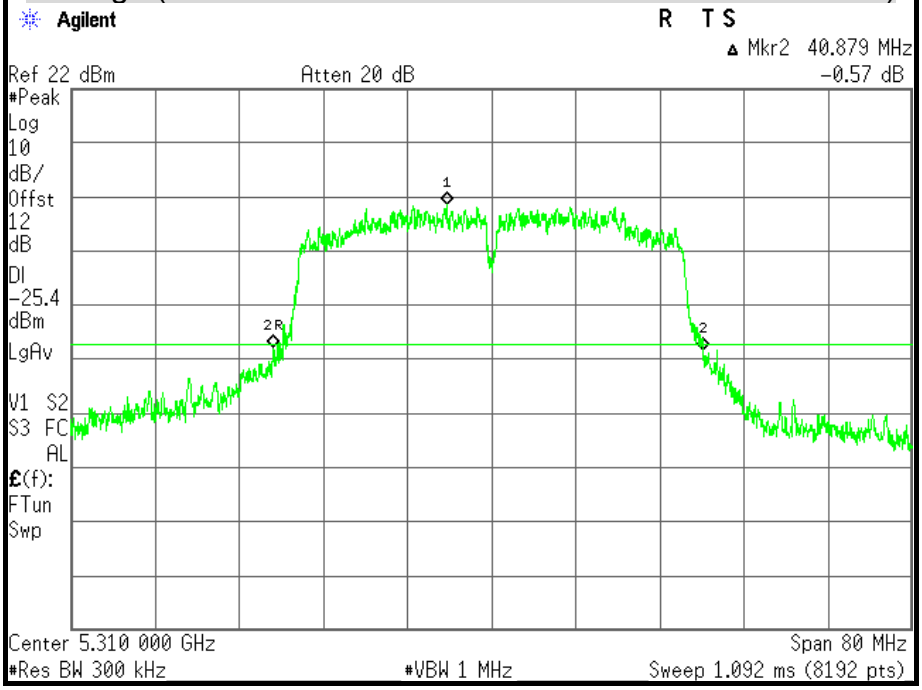

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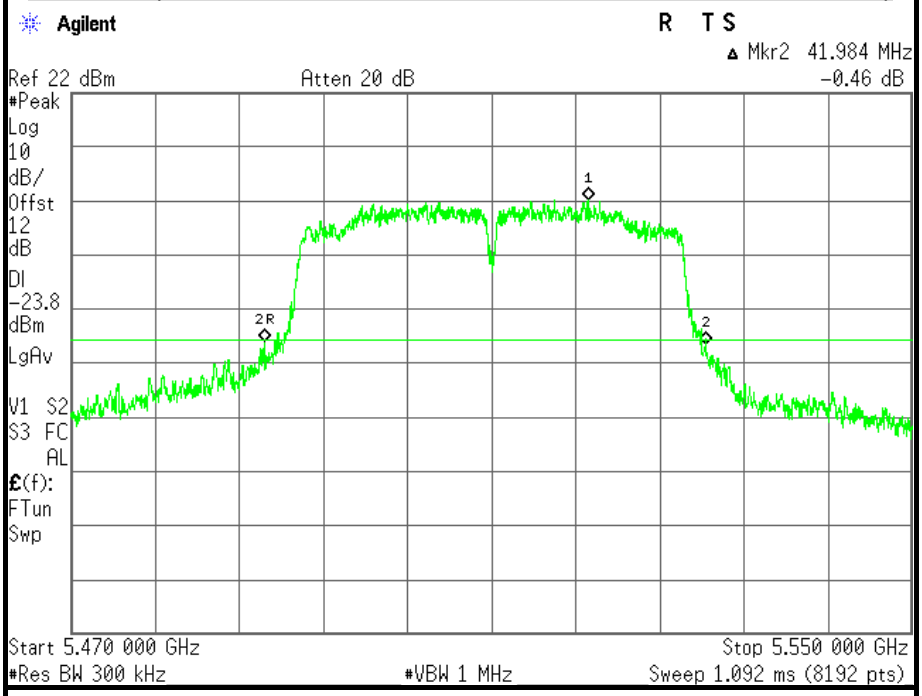
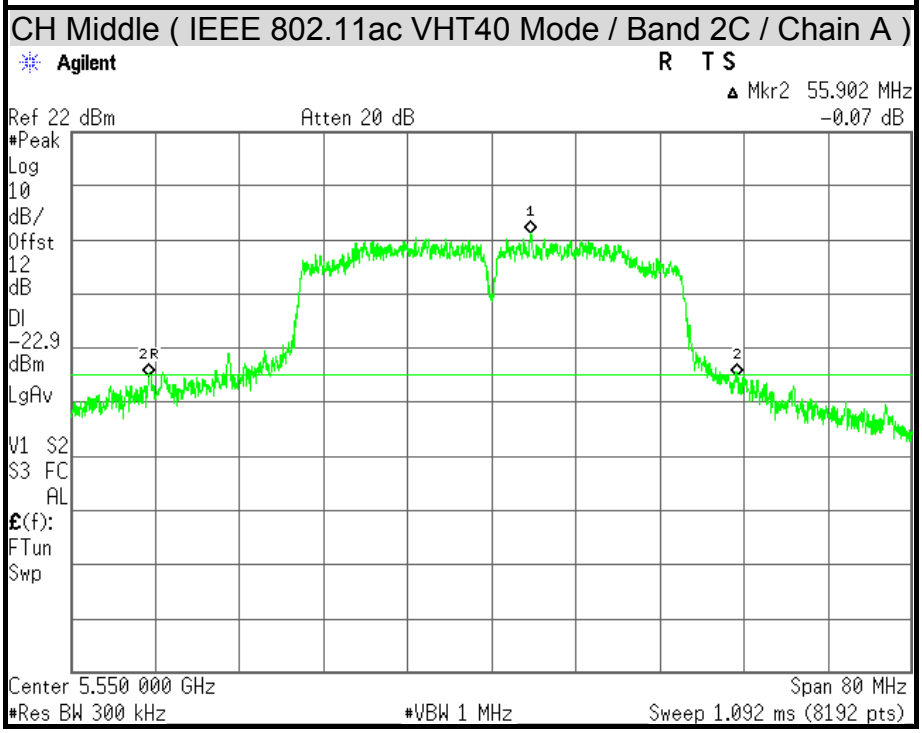
CH Low (IEEE 802.11ac VHT40 Mode / Band 2C / Chain A)



CH Middle (IEEE 802.11ac VHT40 Mode / Band 2C / Chain A)



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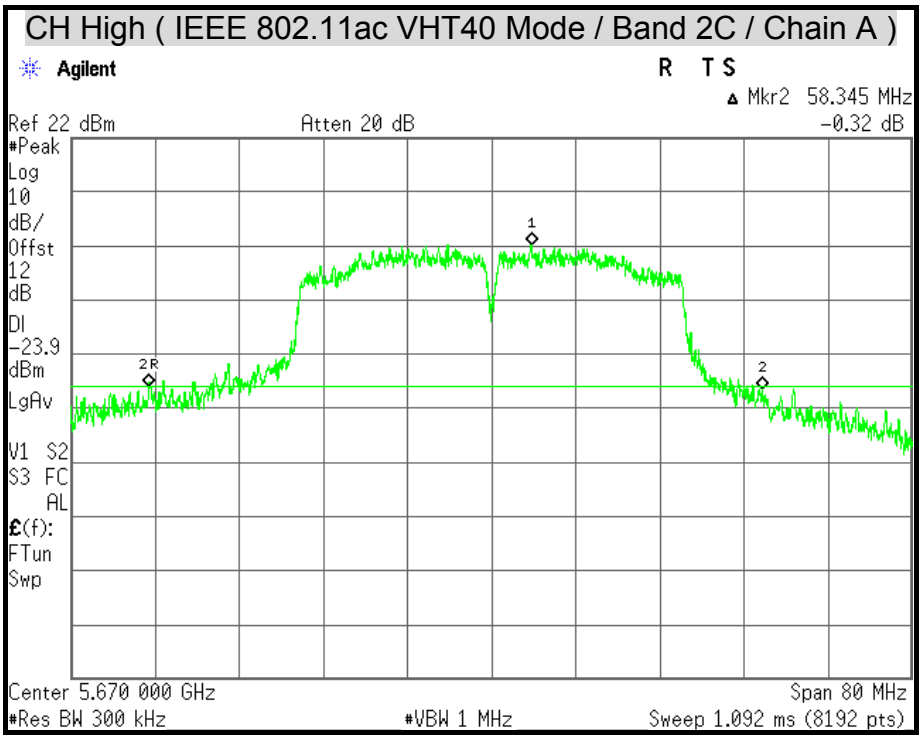
CH High (IEEE 802.11ac VHT40 Mode / Band 2C / Chain A)



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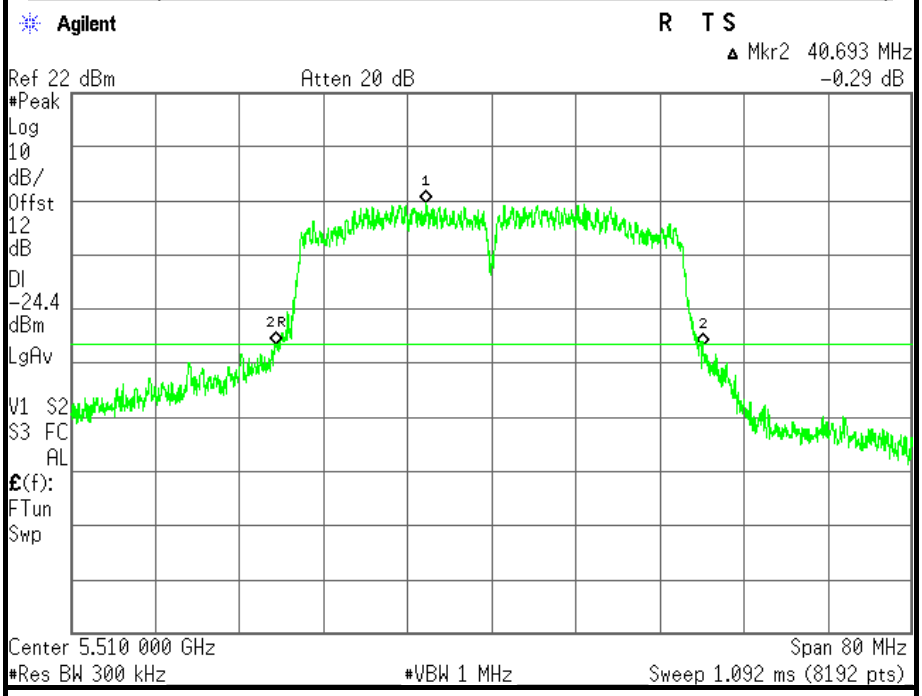
CH Low (IEEE 802.11ac VHT40 Mode / Band 2C / Chain B)



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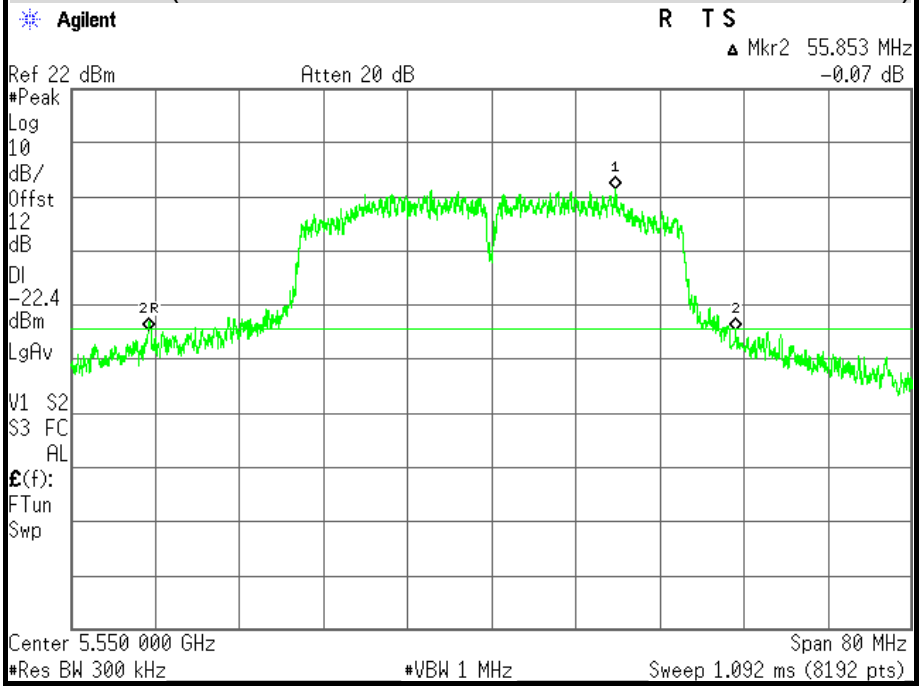

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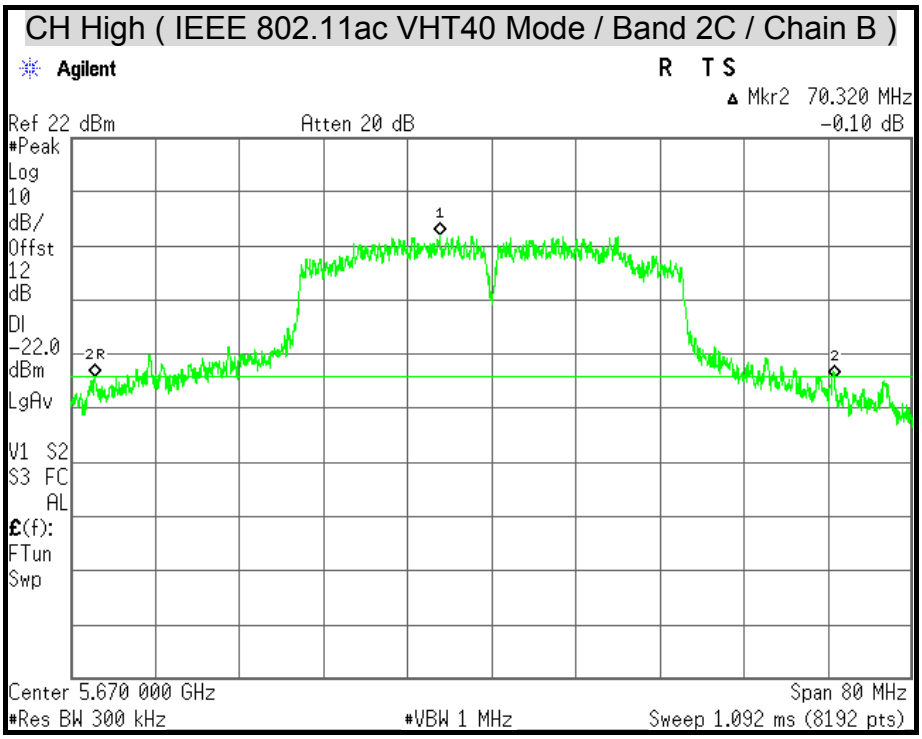

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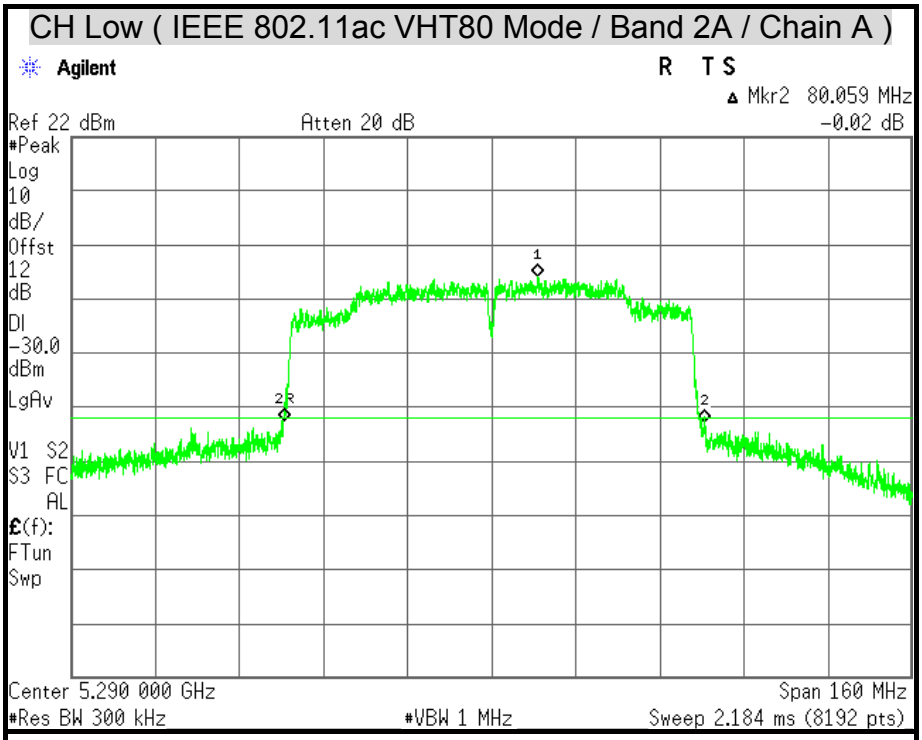
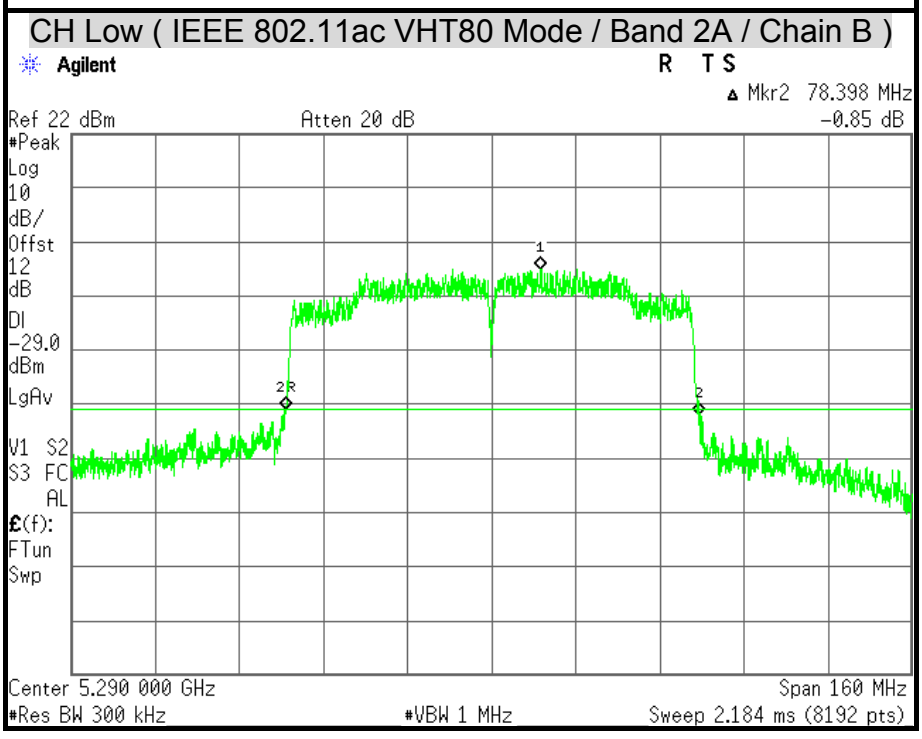
CH Low (IEEE 802.11ac VHT80 Mode / Band 2A / Chain A)



CH Low (IEEE 802.11ac VHT80 Mode / Band 2A / Chain B)



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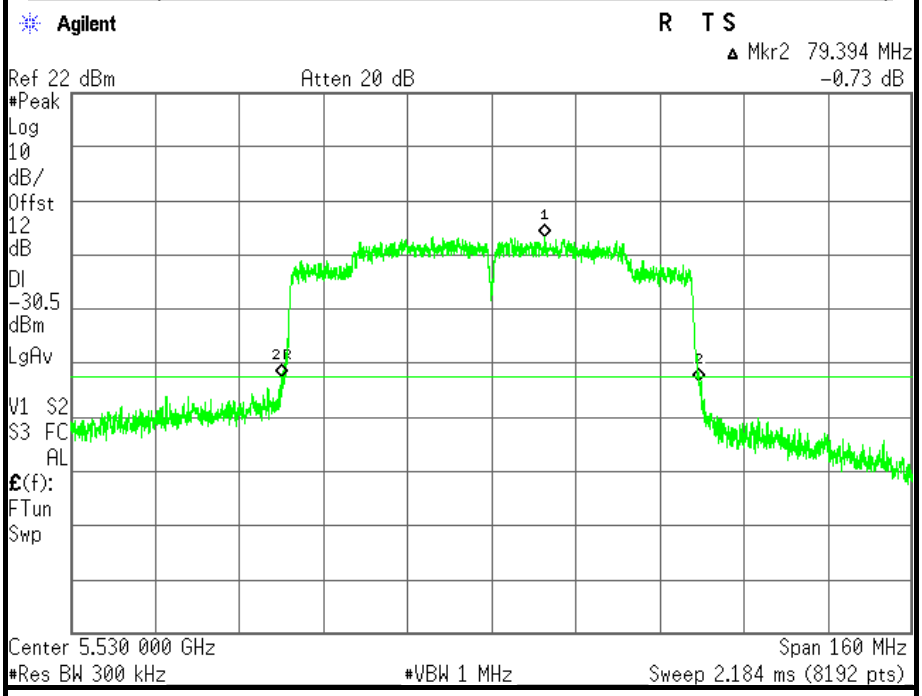
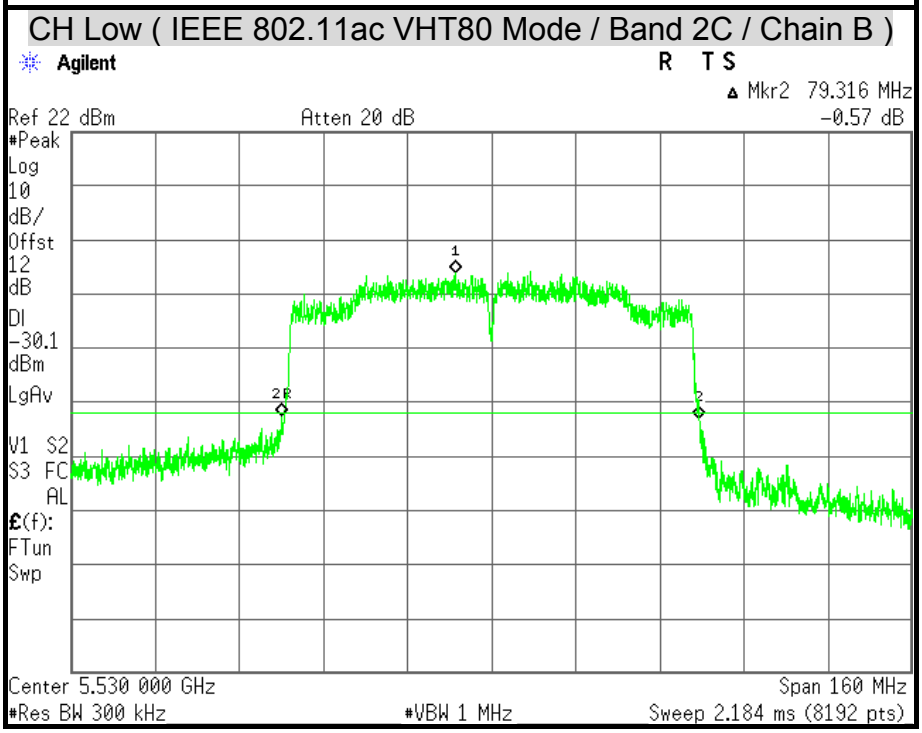
CH Low (IEEE 802.11ac VHT80 Mode / Band 2C / Chain A)



CH Low (IEEE 802.11ac VHT80 Mode / Band 2C / Chain B)



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7.2 6dB BANDWIDTH

LIMITS

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

TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/10/2015

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

TEST SETUP

TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100kHz, VBW = 300kHz, Sweep = auto.
4. Mark the peak frequency and –6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

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TEST RESULTS

IEEE 802.11a Mode

U-NII	Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)
Band 3	Low	5745	16.35
	Middle	5785	16.33
	High	5825	15.84

IEEE 802.11ac VHT20 Mode (Two TX)

U-NII	Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	
			Chain A	Chain B
Band 3	Low	5745	17.57	16.63
	Middle	5785	17.57	17.33
	High	5825	17.56	17.57

IEEE 802.11ac VHT40 Mode (Two TX)

U-NII	Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	
			Chain A	Chain B
Band 3	Low	5755	31.33	32.54
	High	5795	35.06	33.80

IEEE 802.11ac VHT80 Mode (Two TX)

U-NII	Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	
			Chain A	Chain B
Band 3	Low	5775	75.09	72.55

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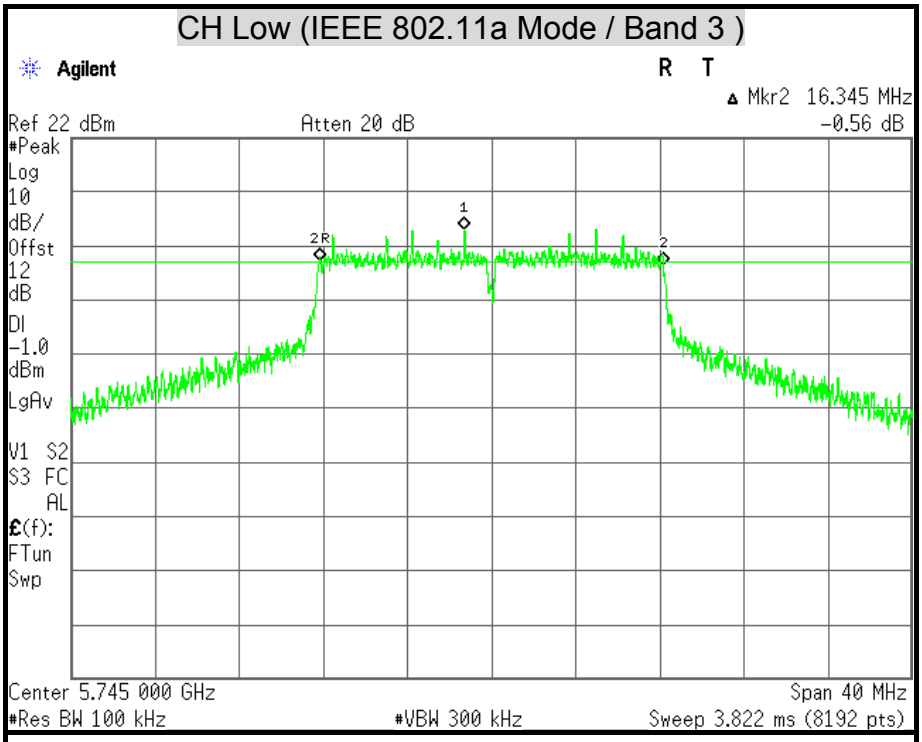
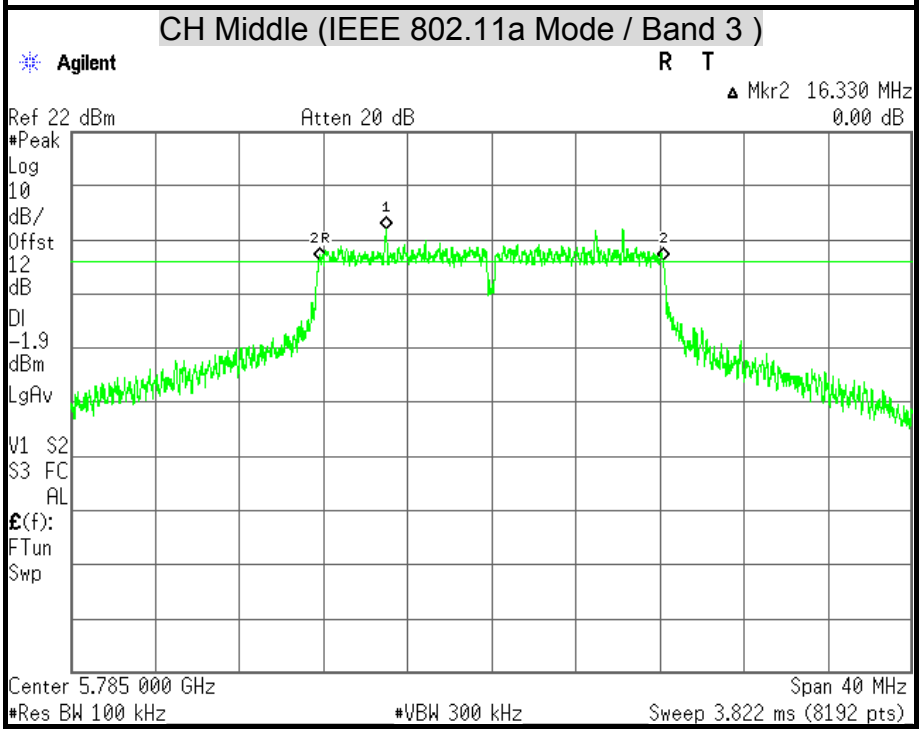
6dB BANDWIDTH

CH Low (IEEE 802.11a Mode / Band 3)



CH Middle (IEEE 802.11a Mode / Band 3)



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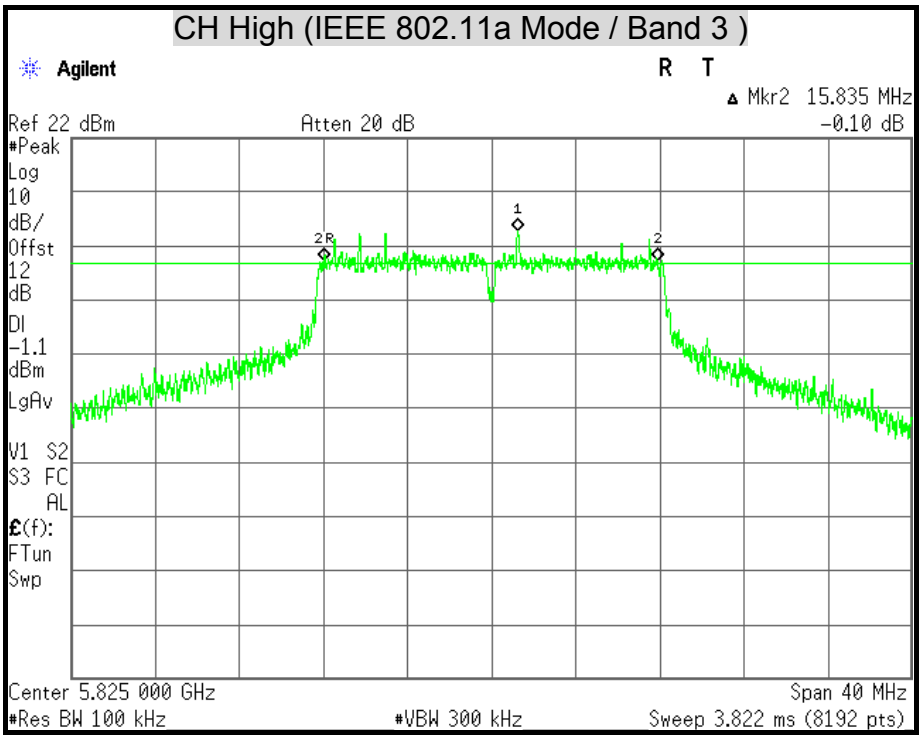
CH High (IEEE 802.11a Mode / Band 3)



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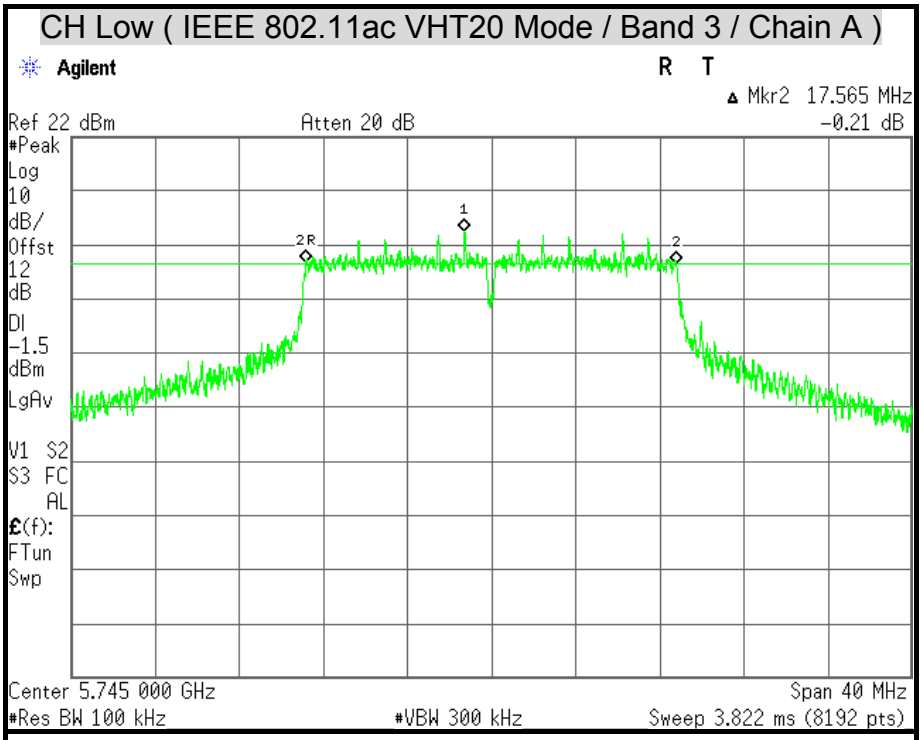
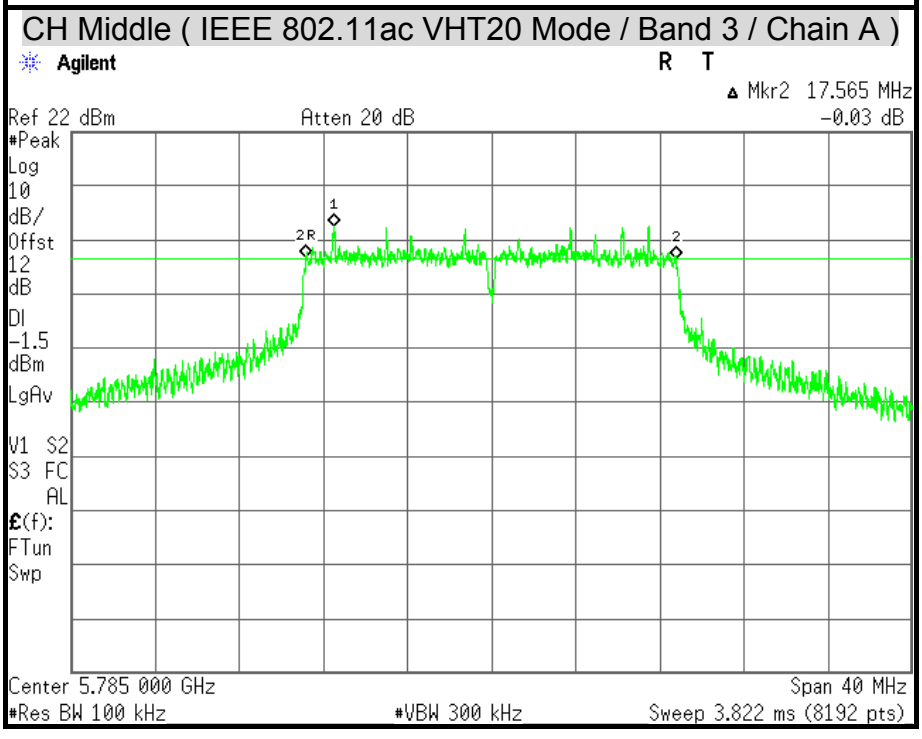
CH Low (IEEE 802.11ac VHT20 Mode / Band 3 / Chain A)



CH Middle (IEEE 802.11ac VHT20 Mode / Band 3 / Chain A)



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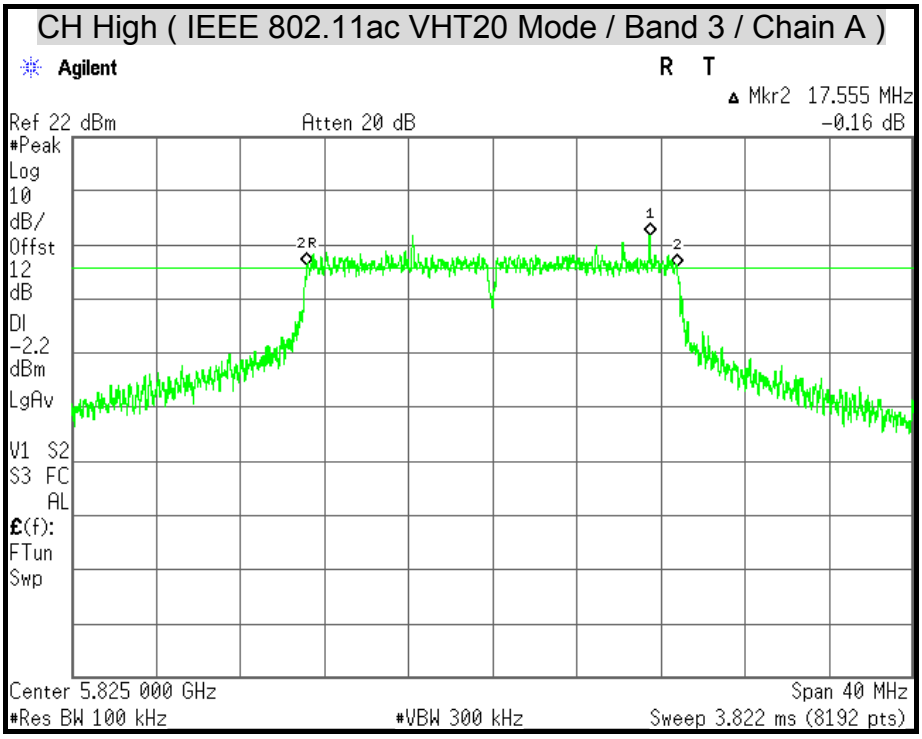
CH High (IEEE 802.11ac VHT20 Mode / Band 3 / Chain A)



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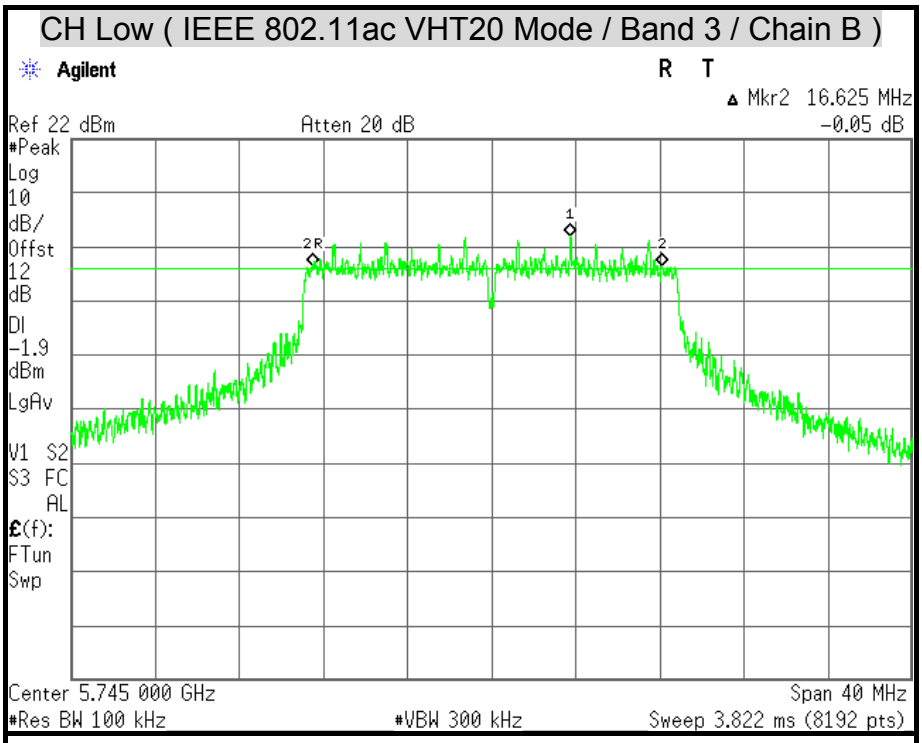
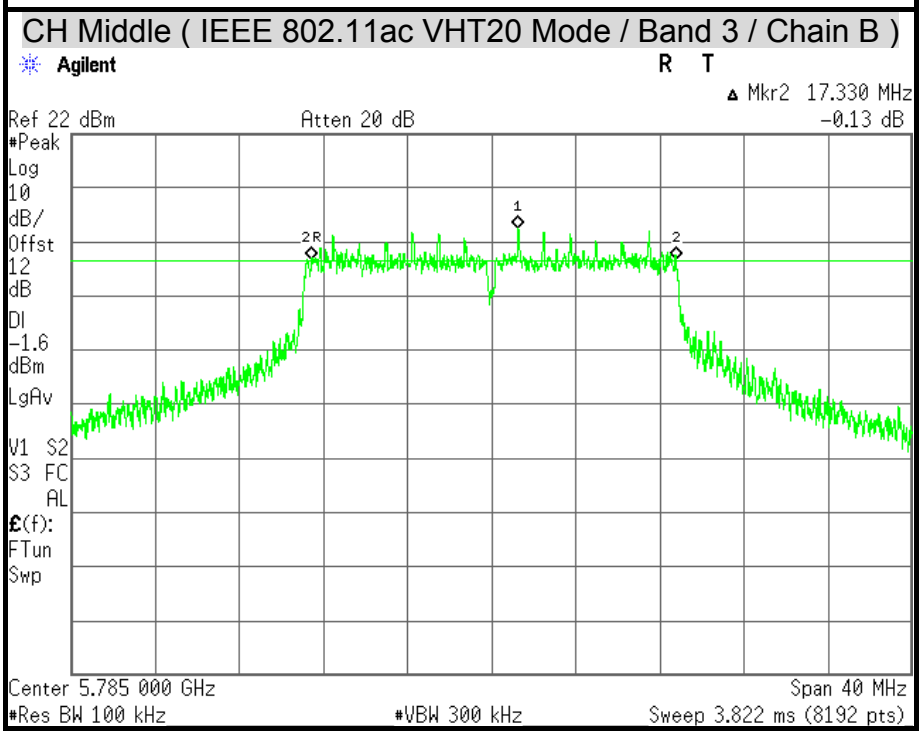
CH Low (IEEE 802.11ac VHT20 Mode / Band 3 / Chain B)



CH Middle (IEEE 802.11ac VHT20 Mode / Band 3 / Chain B)



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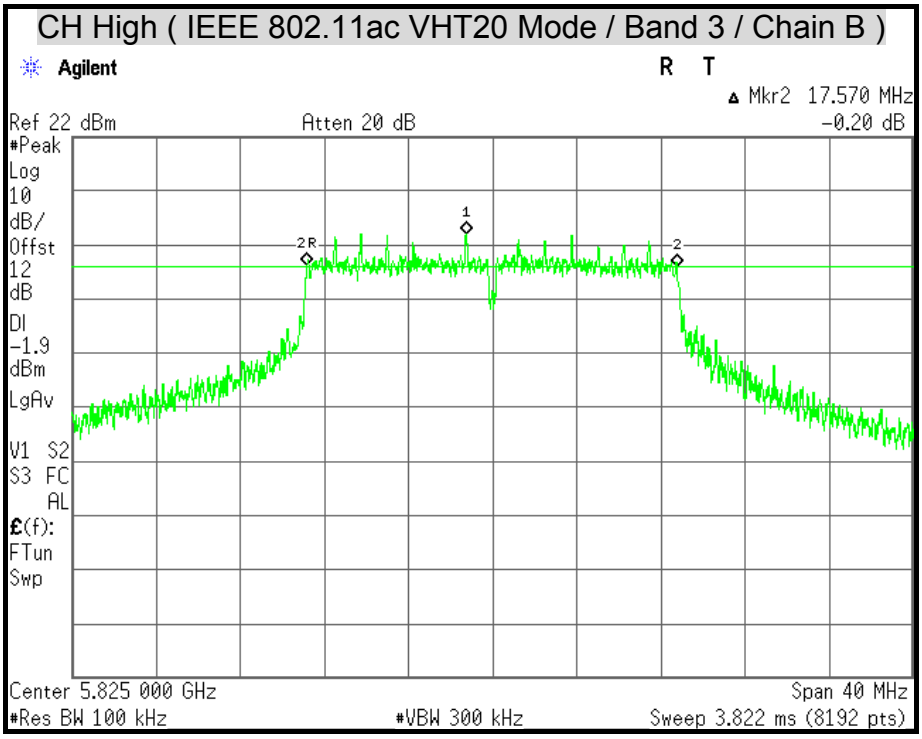
CH High (IEEE 802.11ac VHT20 Mode / Band 3 / Chain B)



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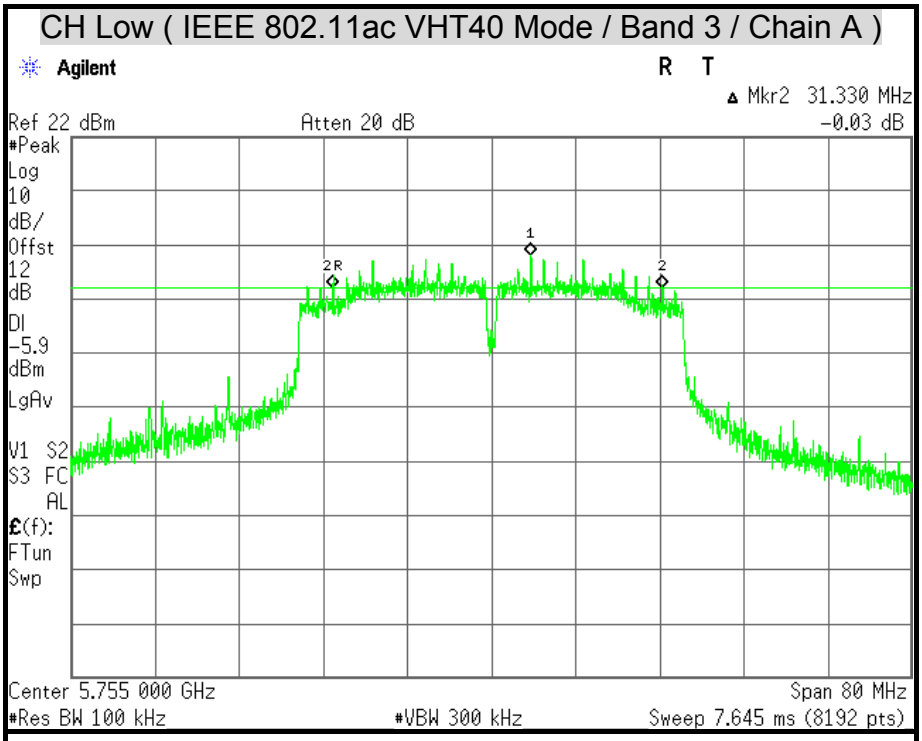
CH Low (IEEE 802.11ac VHT40 Mode / Band 3 / Chain A)



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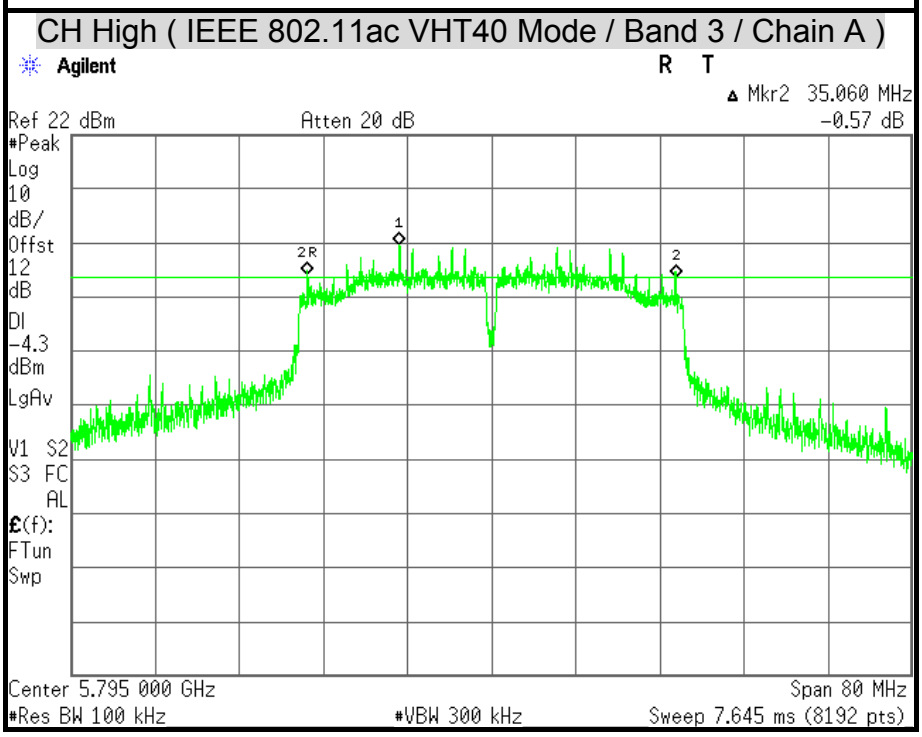

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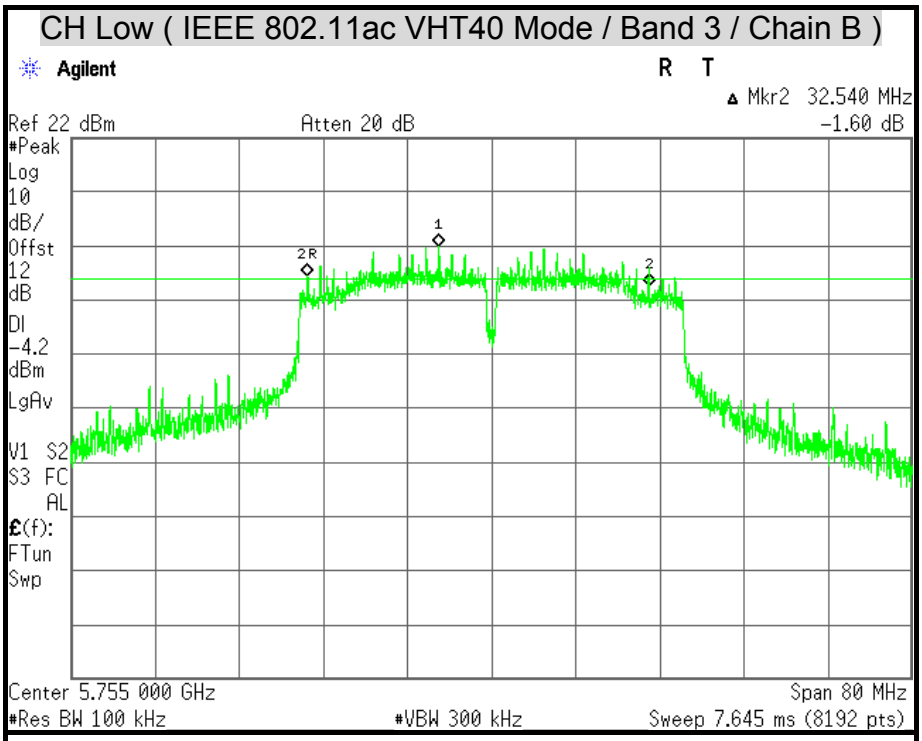
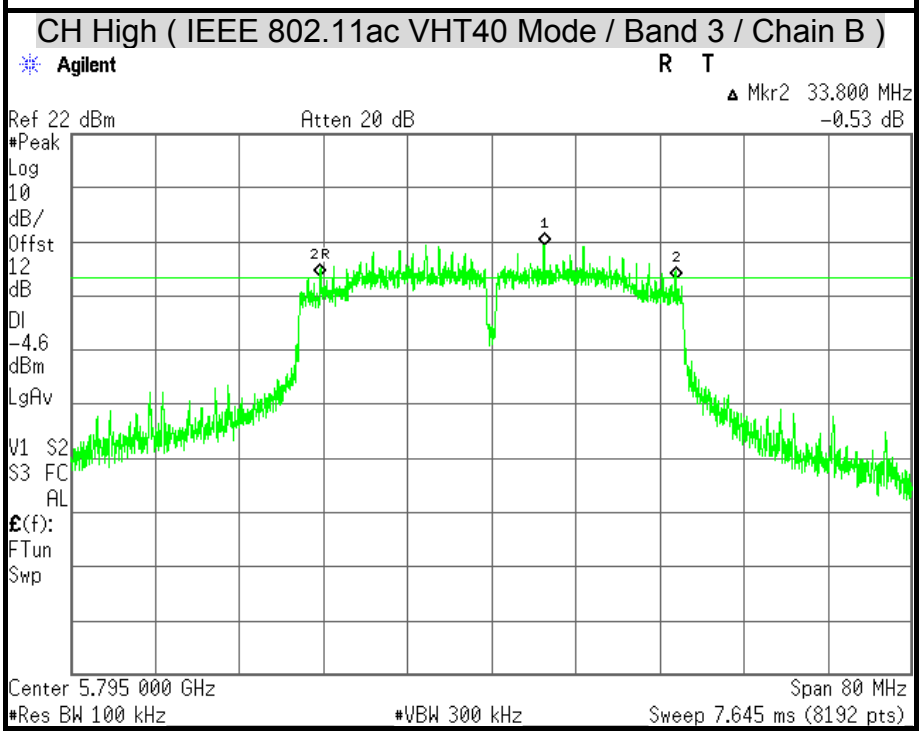
CH Low (IEEE 802.11ac VHT40 Mode / Band 3 / Chain B)



CH High (IEEE 802.11ac VHT40 Mode / Band 3 / Chain B)



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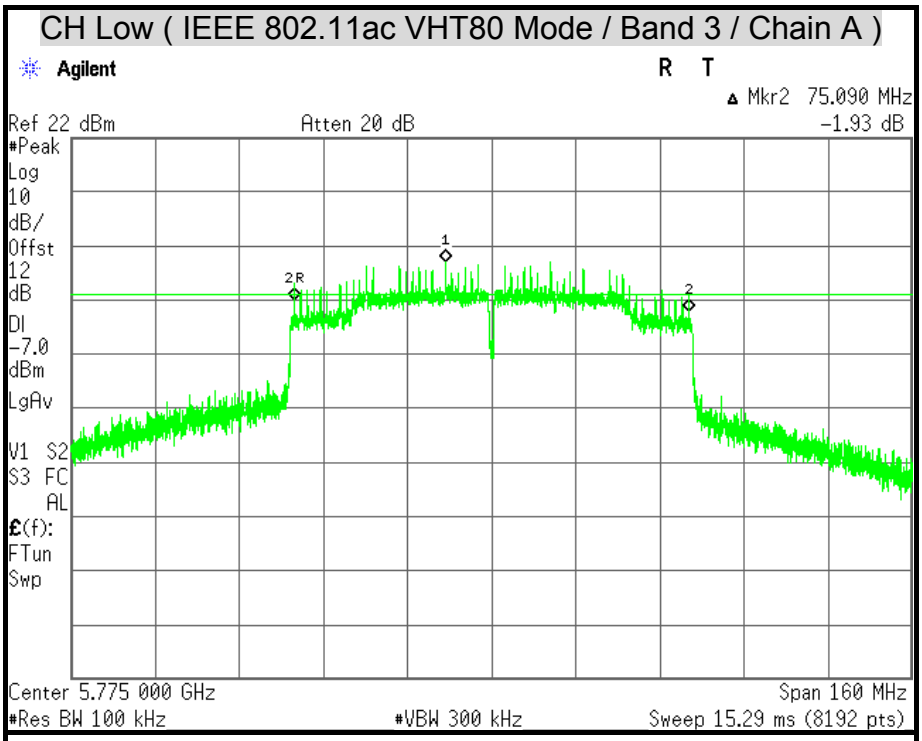
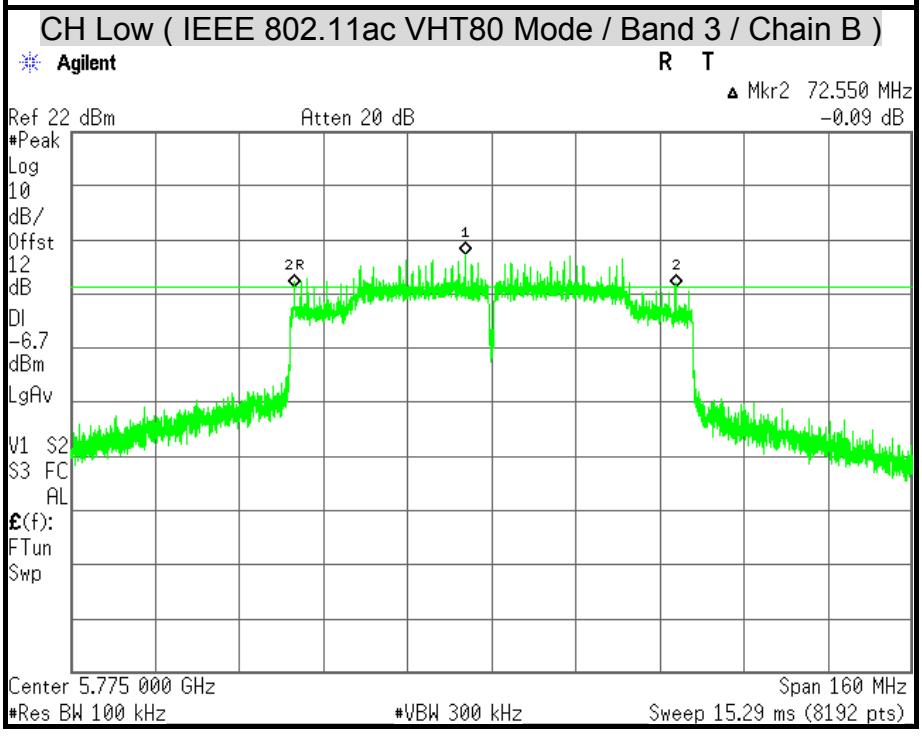
CH Low (IEEE 802.11ac VHT80 Mode / Band 3 / Chain A)



CH Low (IEEE 802.11ac VHT80 Mode / Band 3 / Chain B)



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7.3 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 1W 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 1W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6dBi 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 6dBi.

(III) For fixed point-to-point access points 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. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. 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.

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

(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.

§ KDB 662911 : For power measurements on IEEE 802.11 devices

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Power Meter	ANRITSU	ML2495A	1149001	12/06/2014
Power Sensor	ANRITSU	MA2411B	1126148	12/06/2014

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

TEST SETUP

TEST PROCEDURE

The transmitter output is connected to the power meter. The power meter is set to the power detection.

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TEST RESULTS

The power shall not exceeded the limit as follows:

IEEE 802.11a Mode / UNII Band 2A

Channel	Channel Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log B (dB)	11dBm + 10 Log B (dBm)	Maximum Conducted Output Power Limit (dBm)
Low	5260	33.72	15.27939	26.27939	24
Middle	5280	37.72	15.76526	26.76526	24
High	5320	25.45	14.05688	25.05688	24

IEEE 802.11a Mode / UNII Band 2C

Channel	Channel Frequency (MHz)	26dB Bandwidth (B) (MHz)	10 Log B (dB)	11dBm + 10 Log B (dBm)	Maximum Conducted Output Power Limit (dBm)
Low	5500	35.51	15.50314	26.50314	24
Middle	5580	35.06	15.44824	26.44824	24
High	5700	36.28	15.59691	26.59691	24

IEEE 802.11ac VHT20 Mode/ UNII Band 2A (Two TX)

Channel	Channel Frequency (MHz)	26dB Bandwidth (B) (MHz)		10 Log B (dB)		11dBm + 10 Log B (dBm)		Maximum Conducted Output Power Limit (dBm)
		Chain A	Chain B	Chain A	Chain B	Chain A	Chain B	
Low	5260	32.58	29.68	15.12898	14.72391	26.12898	25.72391	24
Middle	5280	35.07	29.46	15.44973	14.69159	26.44973	25.69159	24
High	5320	26.45	25.17	14.22376	14.00849	25.22376	25.00849	24

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IEEE 802.11ac VHT20 Mode/ UNII Band 2C (Two TX)

Channel	Channel Frequency (MHz)	26dB Bandwidth (B) (MHz)		10 Log B (dB)		11dBm + 10 Log B (dBm)		Maximum Conducted Output Power Limit (dBm)
		Chain A	Chain B	Chain A	Chain B	Chain A	Chain B	
Low	5500	25.37	26.35	14.04252	14.20764	25.04252	25.20764	24
Middle	5580	34.57	32.93	15.38737	15.17565	26.38737	26.17565	24
High	5700	34.70	30.68	15.40342	14.86870	26.40342	25.86870	24

IEEE 802.11ac VHT40 Mode/ UNII Band 2A (Two TX)

Channel	Channel Frequency (MHz)	26dB Bandwidth (B) (MHz)		10 Log B (dB)		11dBm + 10 Log B (dBm)		Maximum Conducted Output Power Limit (dBm)
		Chain A	Chain B	Chain A	Chain B	Chain A	Chain B	
Low	5270	62.89	44.80	17.98561	16.51239	28.98561	27.51239	24
High	5310	41.42	40.88	16.17168	16.11500	27.17168	27.11500	24

IEEE 802.11ac VHT40 Mode/ UNII Band 2C (Two TX)

Channel	Channel Frequency (MHz)	26dB Bandwidth (B) (MHz)		10 Log B (dB)		11dBm + 10 Log B (dBm)		Maximum Conducted Output Power Limit (dBm)
		Chain A	Chain B	Chain A	Chain B	Chain A	Chain B	
Low	5510	41.98	40.69	16.23084	16.09520	27.23084	27.09520	24
Middle	5550	55.90	55.85	17.47427	17.47047	28.47427	28.47047	24
High	5670	58.35	70.32	17.66004	18.47079	28.66004	29.47079	24

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IEEE 802.11ac VHT80 Mode/ UNII Band 2A (Two TX)

Channel	Channel Frequency (MHz)	26dB Bandwidth (B) (MHz)		10 Log B (dB)		11dBm + 10 Log B (dBm)		Maximum Conducted Output Power Limit (dBm)
		Chain A	Chain B	Chain A	Chain B	Chain A	Chain B	
Low	5290	80.06	78.40	19.03410	18.94305	30.03410	29.94305	24

IEEE 802.11ac VHT80 Mode/ UNII Band 2C (Two TX)

Channel	Channel Frequency (MHz)	26dB Bandwidth (B) (MHz)		10 Log B (dB)		11dBm + 10 Log B (dBm)		Maximum Conducted Output Power Limit (dBm)
		Chain A	Chain B	Chain A	Chain B	Chain A	Chain B	
Low	5530	79.39	79.32	18.99788	18.99361	29.99788	29.99361	24

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IEEE 802.11a Mode / UNII Band 1

Channel	Channel Frequency (MHz)	Power		Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	5180	12.10	0.0162	24	0.25	PASS
Middle	5220	14.60	0.0288	24	0.25	PASS
High	5240	15.00	0.0316	24	0.25	PASS

Remark:

1. At finial test to get the worst-case emission at 6 Mbps.
2. The cable assembly insertion loss of 12dB (including 10 dB pad and 2dB cable) was Entered as an offset in the power meter to allow for direct reading of power.

IEEE 802.11ac VHT20 Mode / UNII Band 1 (Two TX)

Channel	Channel Frequency (MHz)	Power (dBm)		Power Total		Power Limit		Pass / Fail
		Chain A	Chain B	(dBm)	(W)	(dBm)	(W)	
Low	5180	10.98	10.30	13.66	0.0232	24	0.25	PASS
Middle	5220	13.32	13.50	16.42	0.0439	24	0.25	PASS
High	5240	13.55	14.22	16.91	0.0491	24	0.25	PASS

Remark:

1. At finial test to get the worst-case emission at 6.5 Mbps.
2. The cable assembly insertion loss of 12dB (including 10 dB pad and 2dB cable) was Entered as an offset in the power meter to allow for direct reading of power.
3. Array gain = 0 dB for $N_{ANT} \leq 4$, power limit do not reduce.
4. Total peak power = Chain A + Chain B.

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IEEE 802.11ac VHT40 Mode / UNII Band 1 (Two TX)

Channel	Channel Frequency (MHz)	Power (dBm)		Power Total		Power Limit		Pass / Fail
		Chain A	Chain B	(dBm)	(W)	(dBm)	(W)	
Low	5190	9.25	8.47	11.89	0.0155	24	0.25	PASS
High	5230	13.61	13.66	16.65	0.0462	24	0.25	PASS

Remark:

1. *At finial test to get the worst-case emission at 13.5 Mbps.*
2. *The cable assembly insertion loss of 12dB (including 10 dB pad and 2dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*
3. *Array gain = 0 dB for $N_{ANT} \leq 4$, power limit do not reduce.*
4. *Total peak power = Chain A + Chain B.*

IEEE 802.11ac VHT80 Mode / UNII Band 1 (Two TX)

Channel	Channel Frequency (MHz)	Power (dBm)		Power Total		Power Limit		Pass / Fail
		Chain A	Chain B	(dBm)	(W)	(dBm)	(W)	
Low	5210	8.80	8.78	11.80	0.0151	24	0.25	PASS

Remark:

1. *At finial test to get the worst-case emission at 29.3 Mbps.*
2. *The cable assembly insertion loss of 12dB (including 10 dB pad and 2dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*
3. *Array gain = 0 dB for $N_{ANT} \leq 4$, power limit do not reduce.*
4. *Total peak power = Chain A + Chain B.*

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IEEE 802.11a Mode / UNII Band 2A

Channel	Channel Frequency (MHz)	Power		Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	5260	14.98	0.0315	24	0.25	PASS
Middle	5280	15.22	0.0333	24	0.25	PASS
High	5320	13.41	0.0219	24	0.25	PASS

Remark:

1. *At finial test to get the worst-case emission at 6 Mbps.*
2. *The cable assembly insertion loss of 12dB (including 10 dB pad and 2dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*

IEEE 802.11ac VHT20 Mode / UNII Band 2A (Two TX)

Channel	Channel Frequency (MHz)	Power (dBm)		Power Total		Power Limit		Pass / Fail
		Chain A	Chain B	(dBm)	(W)	(dBm)	(W)	
Low	5260	13.82	14.42	17.14	0.0518	24	0.25	PASS
Middle	5280	14.01	14.73	17.40	0.0550	24	0.25	PASS
High	5320	12.35	12.50	15.44	0.0350	24	0.25	PASS

Remark:

1. *At finial test to get the worst-case emission at 6.5 Mbps.*
2. *The cable assembly insertion loss of 12dB (including 10 dB pad and 2dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*
3. *Array gain = 0 dB for $N_{ANT} \leq 4$, power limit do not reduce.*
4. *Total peak power = Chain A + Chain B.*

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IEEE 802.11ac VHT40 Mode / UNII Band 2A (Two TX)

Channel	Channel Frequency (MHz)	Power (dBm)		Power Total		Power Limit		Pass / Fail
		Chain A	Chain B	(dBm)	(W)	(dBm)	(W)	
Low	5270	14.02	14.70	17.38	0.0547	24	0.25	PASS
High	5310	11.53	11.45	14.50	0.0282	24	0.25	PASS

Remark:

1. *At finial test to get the worst-case emission at 13.5 Mbps.*
2. *The cable assembly insertion loss of 12dB (including 10 dB pad and 2dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*
3. *Array gain = 0 dB for $N_{ANT} \leq 4$, power limit do not reduce.*
4. *Total peak power = Chain A + Chain B.*

IEEE 802.11ac VHT80 Mode / UNII Band 2A (Two TX)

Channel	Channel Frequency (MHz)	Power (dBm)		Power Total		Power Limit		Pass / Fail
		Chain A	Chain B	(dBm)	(W)	(dBm)	(W)	
High	5290	10.24	10.68	13.48	0.0223	24	0.25	PASS

Remark:

1. *At finial test to get the worst-case emission at 29.3 Mbps.*
2. *The cable assembly insertion loss of 12dB (including 10 dB pad and 2dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*
3. *Array gain = 0 dB for $N_{ANT} \leq 4$, power limit do not reduce.*
4. *Total peak power = Chain A + Chain B.*

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IEEE 802.11a Mode / UNII Band 2C

Channel	Channel Frequency (MHz)	Power		Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	5500	15.34	0.0342	24	0.25	PASS
Middle	5580	15.06	0.0321	24	0.25	PASS
High	5700	14.94	0.0312	24	0.25	PASS

Remark:

1. *At finial test to get the worst-case emission at 6 Mbps.*
2. *The cable assembly insertion loss of 12dB (including 10 dB pad and 2dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*
3. *The maximum antenna gain for the MIMO mode is -2.95dBi which is less than 6dBi, the limit should be 0.2512W.*

IEEE 802.11ac VHT20 Mode / UNII Band 2C (Two TX)

Channel	Channel Frequency (MHz)	Power (dBm)		Power Total		Power Limit		Pass / Fail
		Chain A	Chain B	(dBm)	(W)	(dBm)	(W)	
Low	5500	12.53	13.86	16.26	0.0423	24	0.25	PASS
Middle	5580	14.00	13.41	16.73	0.0471	24	0.25	PASS
High	5700	13.41	14.61	17.06	0.0508	24	0.25	PASS

Remark:

1. *At finial test to get the worst-case emission at 6.5 Mbps.*
2. *The cable assembly insertion loss of 12dB (including 10 dB pad and 2dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*
3. *Array gain = 0 dB for $N_{ANT} \leq 4$, power limit do not reduce.*
4. *Total peak power = Chain A + Chain B.*

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IEEE 802.11ac VHT40 Mode / UNII Band 2C (Two TX)

Channel	Channel Frequency (MHz)	Power (dBm)		Power Total		Power Limit		Pass / Fail
		Chain A	Chain B	(dBm)	(W)	(dBm)	(W)	
Low	5510	13.47	13.41	16.45	0.0442	24	0.25	PASS
Middle	5550	14.06	13.96	17.02	0.0504	24	0.25	PASS
High	5670	13.51	14.45	17.02	0.0504	24	0.25	PASS

Remark:

1. *At finial test to get the worst-case emission at 13.5 Mbps.*
2. *The cable assembly insertion loss of 12dB (including 10 dB pad and 2dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*
3. *Array gain = 0 dB for $N_{ANT} \leq 4$, power limit do not reduce.*
4. *Total peak power = Chain A + Chain B.*

IEEE 802.11ac VHT80 Mode / UNII Band 2C (Two TX)

Channel	Channel Frequency (MHz)	Power (dBm)		Power Total		Power Limit		Pass / Fail
		Chain A	Chain B	(dBm)	(W)	(dBm)	(W)	
Low	5530	9.29	9.33	12.32	0.0171	24	0.25	PASS

Remark:

1. *At finial test to get the worst-case emission at 29.3 Mbps.*
2. *The cable assembly insertion loss of 12dB (including 10 dB pad and 2dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*
3. *Array gain = 0 dB for $N_{ANT} \leq 4$, power limit do not reduce.*
4. *Total peak power = Chain A + Chain B.*

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IEEE 802.11a Mode / UNII Band 3

Channel	Channel Frequency (MHz)	Power		Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	5745	15.01	0.0317	30	1	PASS
Middle	5785	15.08	0.0322	30	1	PASS
High	5825	14.48	0.0281	30	1	PASS

Remark:

1. *At finial test to get the worst-case emission at 6 Mbps.*
2. *The cable assembly insertion loss of 12dB (including 10 dB pad and 2dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*
3. *The maximum antenna gain for the MIMO mode is -2.95dBi which is less than 6dBi, the limit should be 1W.*

IEEE 802.11ac VHT20 Mode / UNII Band 3 (Two TX)

Channel	Channel Frequency (MHz)	Power (dBm)		Power Total		Power Limit		Pass / Fail
		Chain A	Chain B	(dBm)	(W)	(dBm)	(W)	
Low	5745	13.62	14.38	17.03	0.0505	30	1	PASS
Middle	5785	13.81	14.05	16.94	0.0494	30	1	PASS
High	5825	12.90	13.88	16.43	0.0440	30	1	PASS

Remark:

1. *At finial test to get the worst-case emission at 6.5 Mbps.*
2. *The cable assembly insertion loss of 12dB (including 10 dB pad and 2dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*
3. *Array gain = 0 dB for $N_{ANT} \leq 4$, power limit do not reduce.*
4. *Total peak power = Chain A + Chain B.*

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IEEE 802.11ac VHT40 Mode / UNII Band 3 (Two TX)

Channel	Channel Frequency (MHz)	Power (dBm)		Power Total		Power Limit		Pass / Fail
		Chain A	Chain B	(dBm)	(W)	(dBm)	(W)	
Low	5755	13.79	14.39	17.11	0.0514	30	1	PASS
High	5795	13.95	14.00	16.99	0.0500	30	1	PASS

Remark:

1. *At finial test to get the worst-case emission at 13.5 Mbps.*
2. *The cable assembly insertion loss of 12dB (including 10 dB pad and 2dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*
3. *Array gain = 0 dB for $N_{ANT} \leq 4$, power limit do not reduce.*
4. *Total peak power = Chain A + Chain B.*

IEEE 802.11ac VHT80 Mode / UNII Band 3 (Two TX)

Channel	Channel Frequency (MHz)	Power (dBm)		Power Total		Power Limit		Pass / Fail
		Chain A	Chain B	(dBm)	(W)	(dBm)	(W)	
Low	5775	14.30	14.16	17.24	0.0530	30	1	PASS

Remark:

1. *At finial test to get the worst-case emission at 29.3 Mbps.*
2. *The cable assembly insertion loss of 12dB (including 10 dB pad and 2dB cable) was Entered as an offset in the power meter to allow for direct reading of power.*
3. *Array gain = 0 dB for $N_{ANT} \leq 4$, power limit do not reduce.*
4. *Total peak power = Chain A + Chain B.*

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7.4 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 6dBi. 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 6dBi.

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

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(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 Due
Spectrum Analyzer	Agilent	E4446A	MY43360132	06/10/2015

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

TEST SETUP

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TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
   Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 1MHz, VBW = 3MHz, Span = Sweep= AUTO
3. Record the max. reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.

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TEST RESULTS

IEEE 802.11a Mode

U-NII	Channel	Channel Frequency (MHz)	PPSD (dBm)	Minimum Limit (dBm/MHz)	Pass / Fail
Band 1	Low	5180	-0.49	8.49	PASS
	Middle	5220	3.32	8.49	PASS
	High	5240	3.54	8.49	PASS
Band 2A	Low	5260	3.85	8.49	PASS
	Middle	5280	4.01	8.49	PASS
	High	5320	1.96	8.49	PASS
Band 2C	Low	5500	3.29	8.49	PASS
	Middle	5580	4.17	8.49	PASS
	High	5700	3.64	8.49	PASS

Remark:

1. *At finial test to get the worst-case emission at 6Mbps.*
2. *The cable assembly insertion loss of 12 dB (including 10 dB pad and 2 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*

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IEEE 802.11ac VHT20 Mode (Two TX)

U-NII	Channel	Channel Frequency (MHz)	PPSD (dBm)		PSD Total (dBm)	Minimum Limit (dBm)	Pass / Fail
			Chain A	Chain B			
Band 1	Low	5180	-0.92	-2.37	1.43	8.49	PASS
	Middle	5220	1.43	1.01	4.24	8.49	PASS
	High	5240	2.24	1.23	4.77	8.49	PASS
Band 2A	Low	5260	2.11	2.33	5.23	8.49	PASS
	Middle	5280	2.54	2.35	5.46	8.49	PASS
	High	5320	0.97	-0.37	3.36	8.49	PASS
Band 2C	Low	5500	1.47	1.64	4.57	8.49	PASS
	Middle	5580	2.39	1.18	4.84	8.49	PASS
	High	5700	1.56	1.99	4.79	8.49	PASS

Remark:

1. *At finial test to get the worst-case emission at 6.5Mbps.*
2. *The cable assembly insertion loss of 12 dB (including 10 dB pad and 2 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*
3. *The maximum antenna gain for the MIMO mode is 8.51dBi which is less than 6dBi, the limit should be 8.49dBm.*
4. *Total power spectral density = Chain A + Chain B.*

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IEEE 802.11ac VHT40 Mode (Two TX)

U-NII	Channel	Channel Frequency (MHz)	PPSD (dBm)		PSD Total (dBm)	Minimum Limit (dBm)	Pass / Fail
			Chain A	Chain B			
Band 1	Low	5190	-4.67	-5.86	-2.21	8.49	PASS
	High	5230	-0.93	0.81	3.04	8.49	PASS
Band 2A	Low	5270	0.01	0.94	3.51	8.49	PASS
	High	5310	-2.95	-1.55	0.82	8.49	PASS
Band 2C	Low	5510	-1.26	-0.86	1.95	8.49	PASS
	Middle	5550	-0.74	0.47	2.92	8.49	PASS
	High	5670	-0.18	0.01	2.93	8.49	PASS

Remark:

1. *At finial test to get the worst-case emission at 13.5Mbps.*
2. *The cable assembly insertion loss of 12 dB (including 10 dB pad and 2 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*
3. *The maximum antenna gain for the MIMO mode is 8.51dBi which is less than 6dBi, the limit should be 8.49dBm.*
4. *Total power spectral density = Chain A + Chain B.*

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IEEE 802.11ac VHT80 Mode (Two TX)

U-NII	Channel	Channel Frequency (MHz)	PPSD (dBm)		PSD Total (dBm)	Minimum Limit (dBm)	Pass / Fail
			Chain A	Chain B			
Band 1	Low	5210	-8.20	-8.70	-5.43	8.49	PASS
Band 2A	Low	5290	-6.95	-6.59	-3.76	8.49	PASS
Band 2C	Low	5530	-7.97	-8.12	-5.03	8.49	PASS

Remark:

1. *At finial test to get the worst-case emission at 29.3Mbps.*
2. *The cable assembly insertion loss of 12 dB (including 10 dB pad and 2 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*
3. *The maximum antenna gain for the MIMO mode is 8.51dBi which is less than 6dBi, the limit should be 8.49dBm.*
4. *Total power spectral density = Chain A + Chain B.*

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IEEE 802.11a Mode

U-NII	Channel	Channel Frequency (MHz)	PPSD (dBm)	PSD Total (dBm)	Minimum Limit (dBm/500kHz)	Pass / Fail
Band 3	Low	5745	1.52	1.52	30	PASS
	Middle	5785	1.24	1.24	30	PASS
	High	5825	0.56	0.56	30	PASS

Remark:

1. At finial test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 12 dB (including 10 dB pad and 2 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

IEEE 802.11ac VHT20 Mode (Two TX)

U-NII	Channel	Channel Frequency (MHz)	PPSD (dBm)		PSD Total (dBm)	Minimum Limit (dBm/500kHz)	Pass / Fail
			Chain A	Chain B			
Band 3	Low	5745	-0.08	-1.01	2.49	27.49	PASS
	Middle	5785	-1.33	0.77	2.86	27.49	PASS
	High	5825	-0.44	-0.14	2.72	27.49	PASS

Remark:

1. At finial test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 12 dB (including 10 dB pad and 2 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.
3. The maximum antenna gain for the MIMO mode is 8.51dBi which is less than 6dBi, the limit should be 27.49dBm.
4. Total power spectral density = Chain A + Chain B.

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IEEE 802.11ac VHT40 Mode (Two TX)

U-NII	Channel	Channel Frequency (MHz)	PPSD (dBm)		PSD Total (dBm)	Minimum Limit (dBm/500kHz)	Pass / Fail
			Chain A	Chain B			
Band 3	Low	5755	-3.31	-2.67	0.03	27.49	PASS
	High	5795	-3.93	-1.84	0.25	27.49	PASS

Remark:

1. *At finial test to get the worst-case emission at 13.5Mbps.*
2. *The cable assembly insertion loss of 12 dB (including 10 dB pad and 2 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*
3. *The maximum antenna gain for the MIMO mode is 8.51dBi which is less than 6dBi, the limit should be 27.49dBm.*
4. *Total power spectral density = Chain A + Chain B.*

IEEE 802.11ac VHT80 Mode (Two TX)

U-NII	Channel	Channel Frequency (MHz)	PPSD (dBm)		PSD Total (dBm)	Minimum Limit (dBm/500kHz)	Pass / Fail
			Chain A	Chain B			
Band 3	Low	5775	-5.97	-5.16	-2.54	27.49	PASS

Remark:

1. *At finial test to get the worst-case emission at 13.5Mbps.*
2. *The cable assembly insertion loss of 12 dB (including 10 dB pad and 2 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.*
3. *The maximum antenna gain for the MIMO mode is 8.51dBi which is less than 6dBi, the limit should be 27.49dBm.*
4. *Total power spectral density = Chain A + Chain B.*

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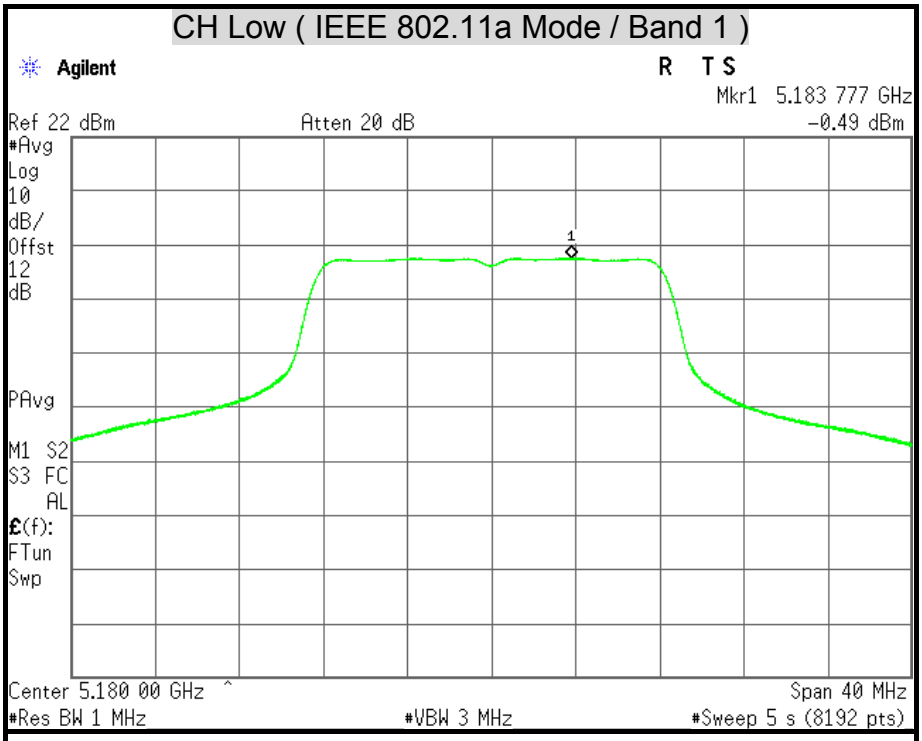
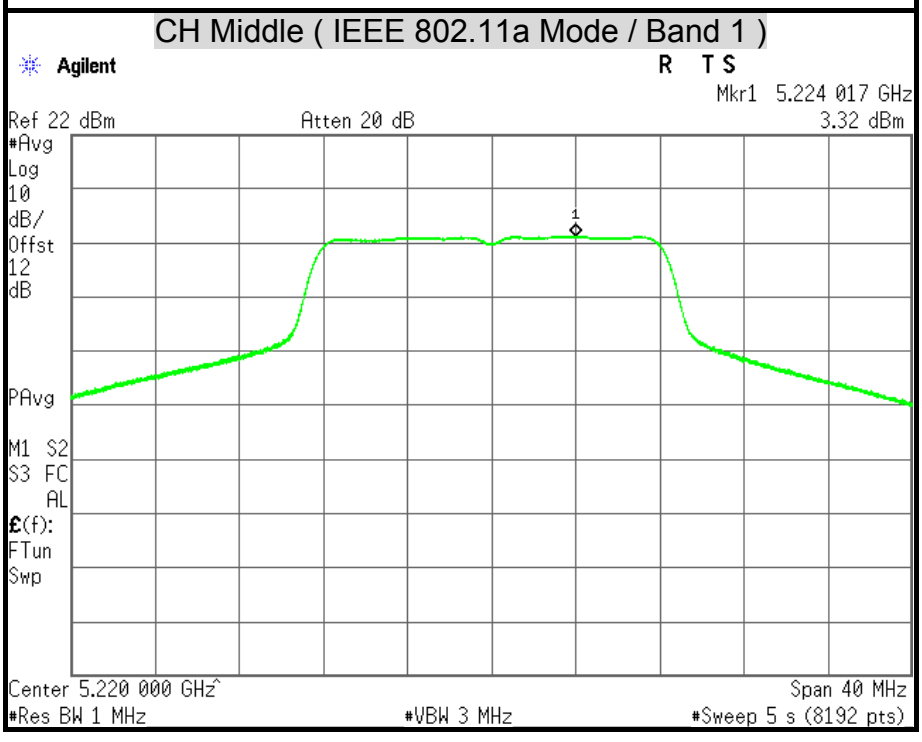
POWER SPECTRAL DENSITY

CH Low (IEEE 802.11a Mode / Band 1)



CH Middle (IEEE 802.11a Mode / Band 1)



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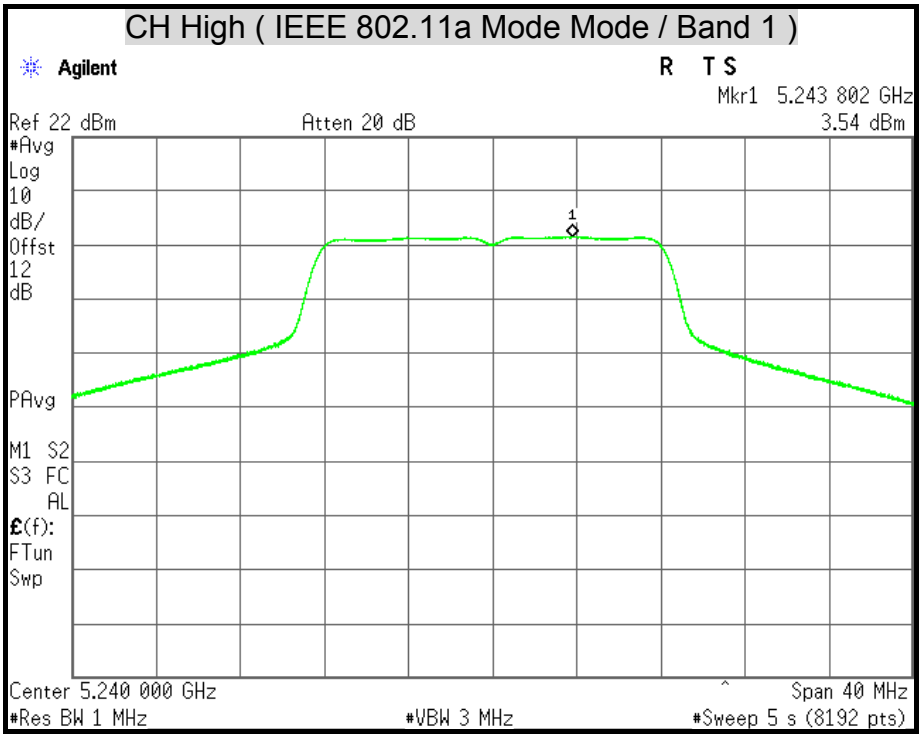
CH High (IEEE 802.11a Mode Mode / Band 1)



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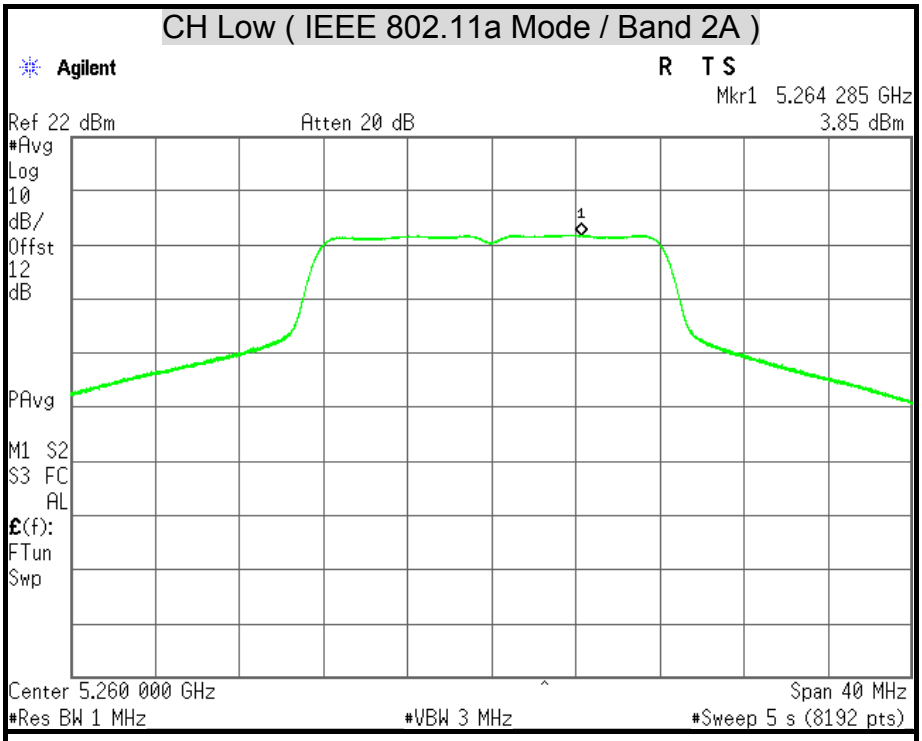
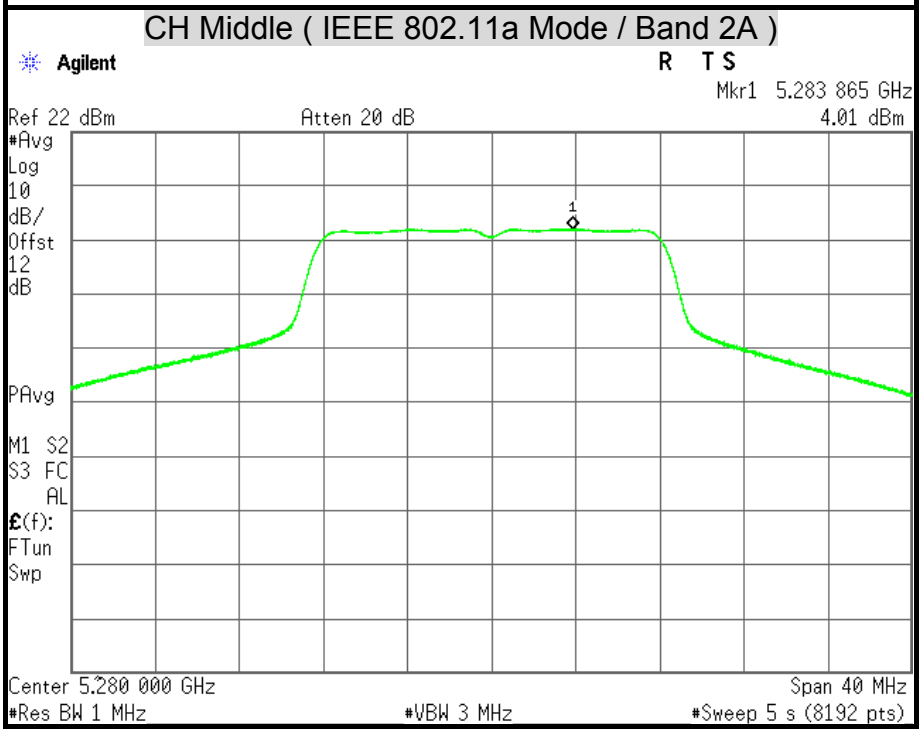
CH Low (IEEE 802.11a Mode / Band 2A)



CH Middle (IEEE 802.11a Mode / Band 2A)



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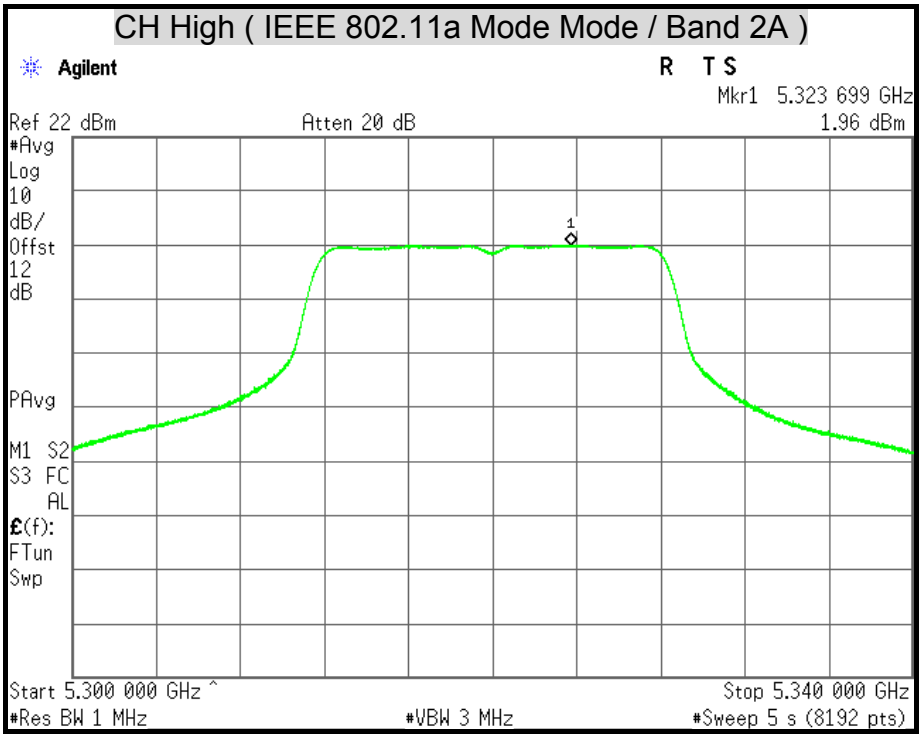
CH High (IEEE 802.11a Mode Mode / Band 2A)



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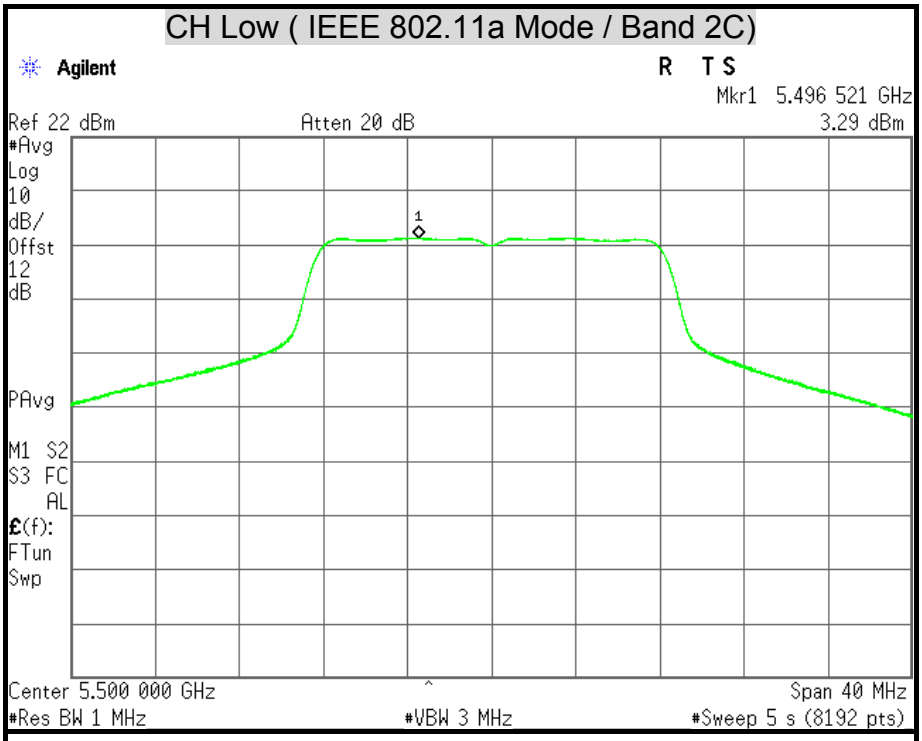
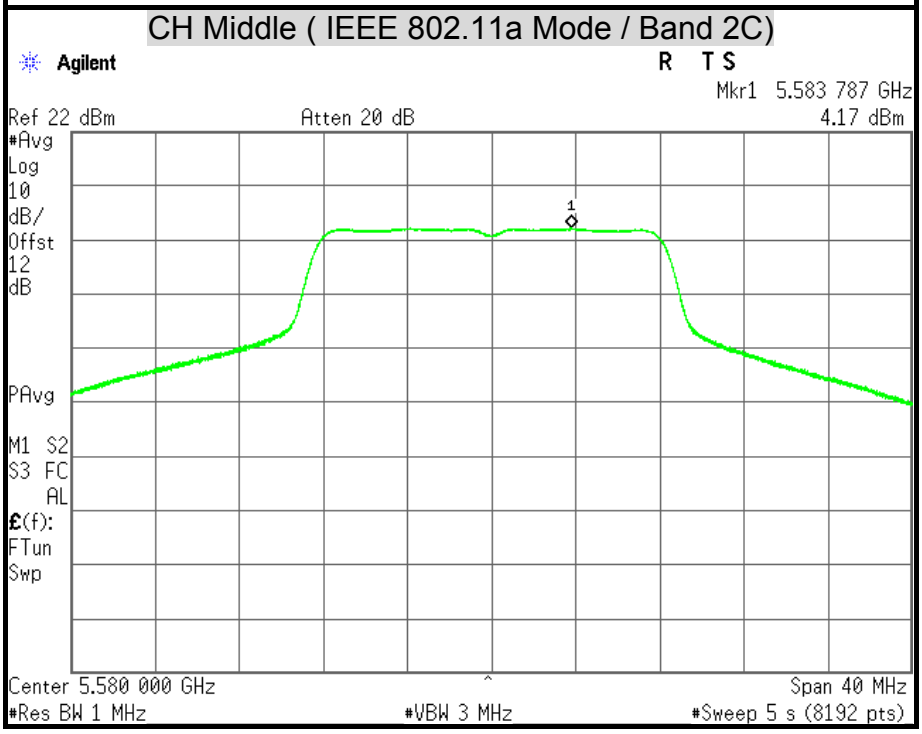
CH Low (IEEE 802.11a Mode / Band 2C)



CH Middle (IEEE 802.11a Mode / Band 2C)



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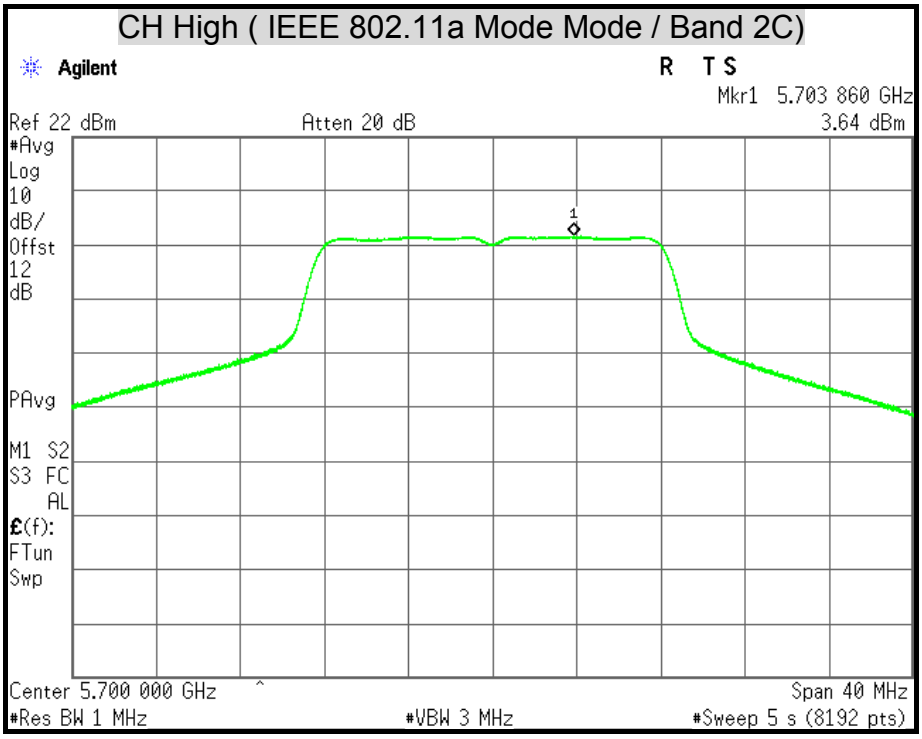
CH High (IEEE 802.11a Mode Mode / Band 2C)



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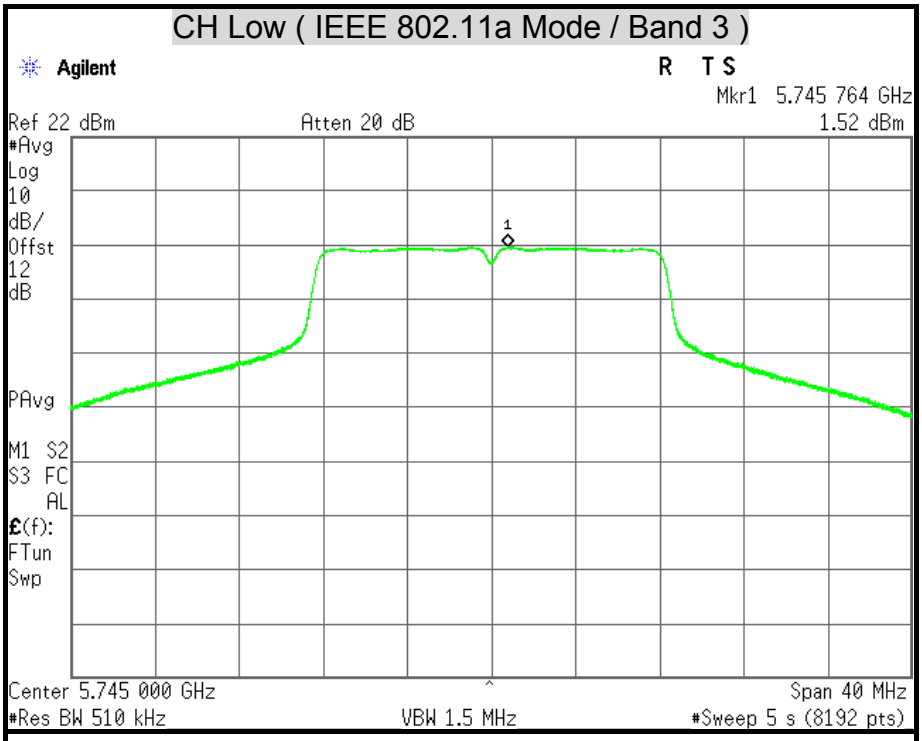
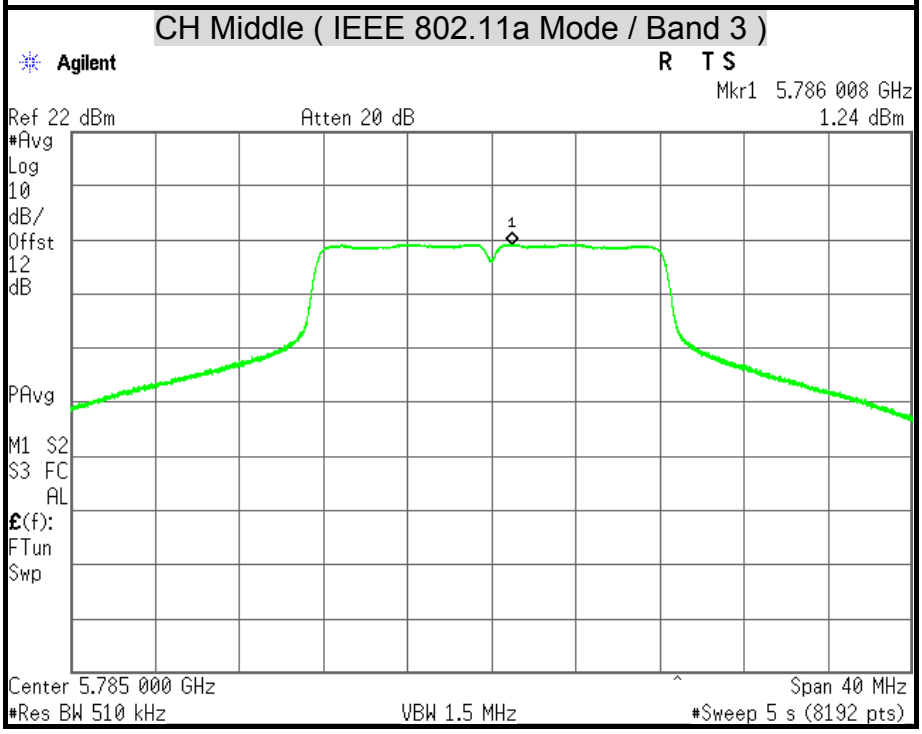
CH Low (IEEE 802.11a Mode / Band 3)



CH Middle (IEEE 802.11a Mode / Band 3)



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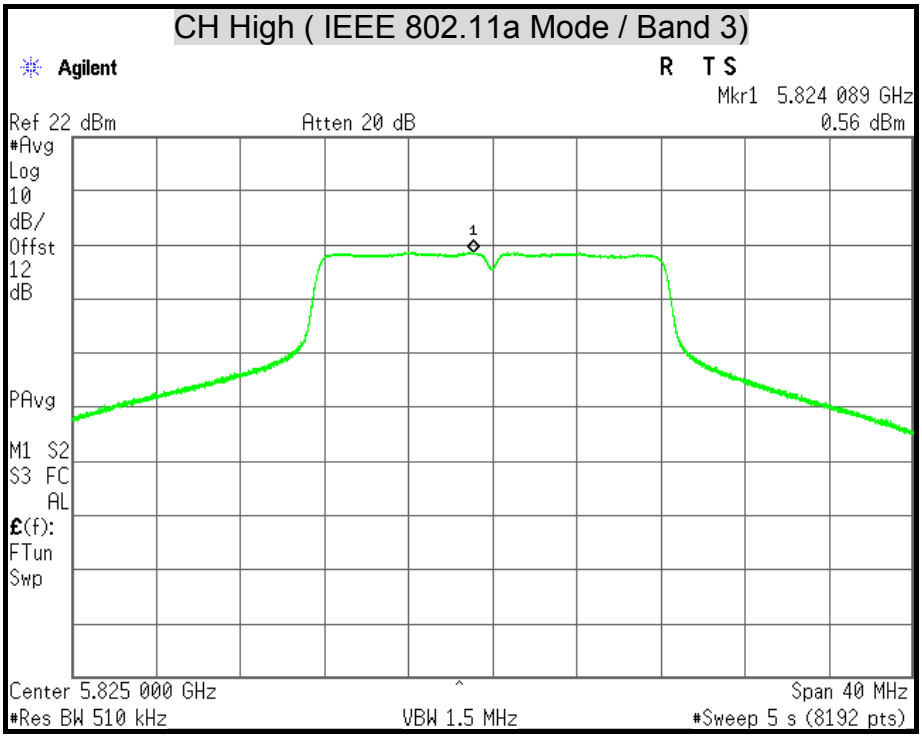
CH High (IEEE 802.11a Mode / Band 3)



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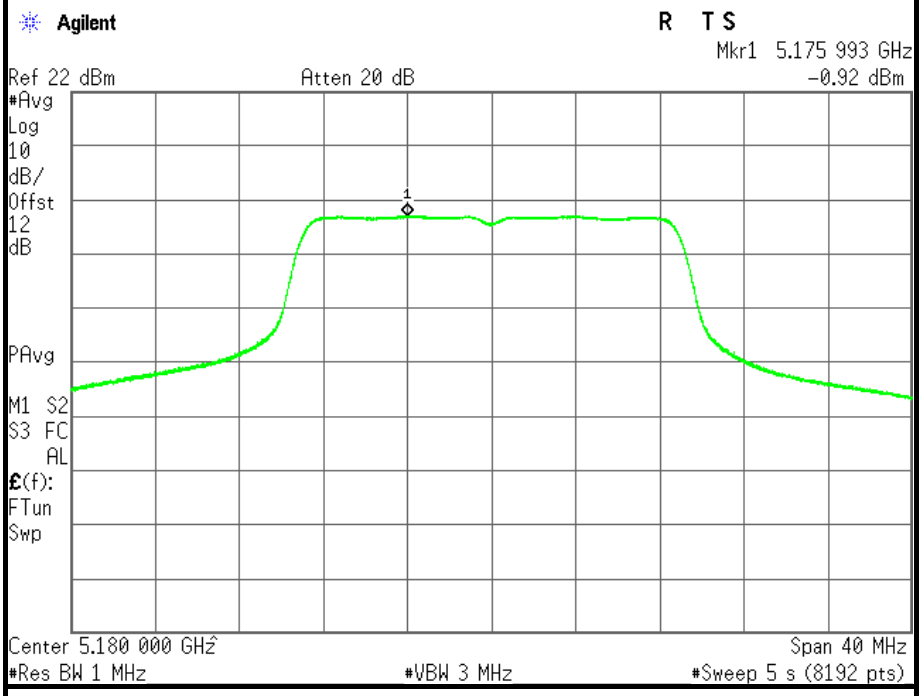
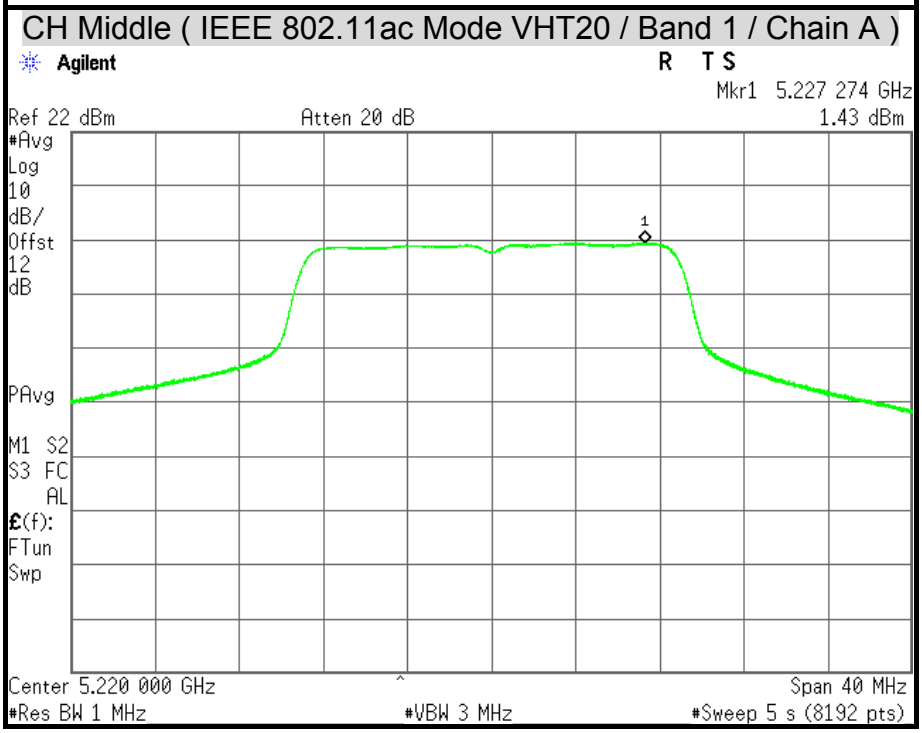
CH Low (IEEE 802.11ac Mode VHT20 / Band 1 / Chain A)



CH Middle (IEEE 802.11ac Mode VHT20 / Band 1 / Chain A)



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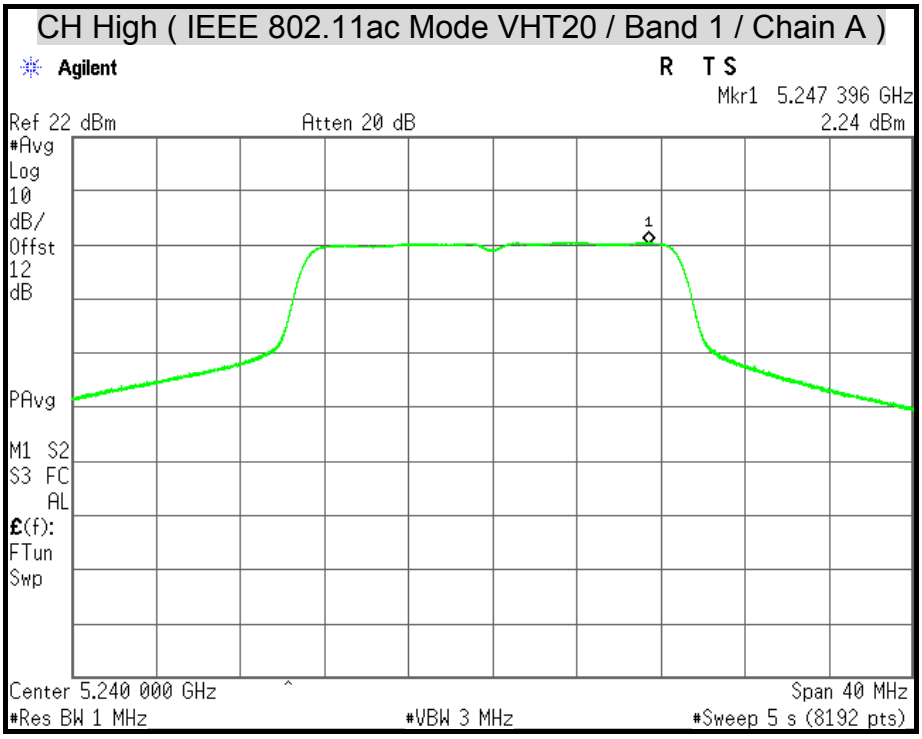
CH High (IEEE 802.11ac Mode VHT20 / Band 1 / Chain A)



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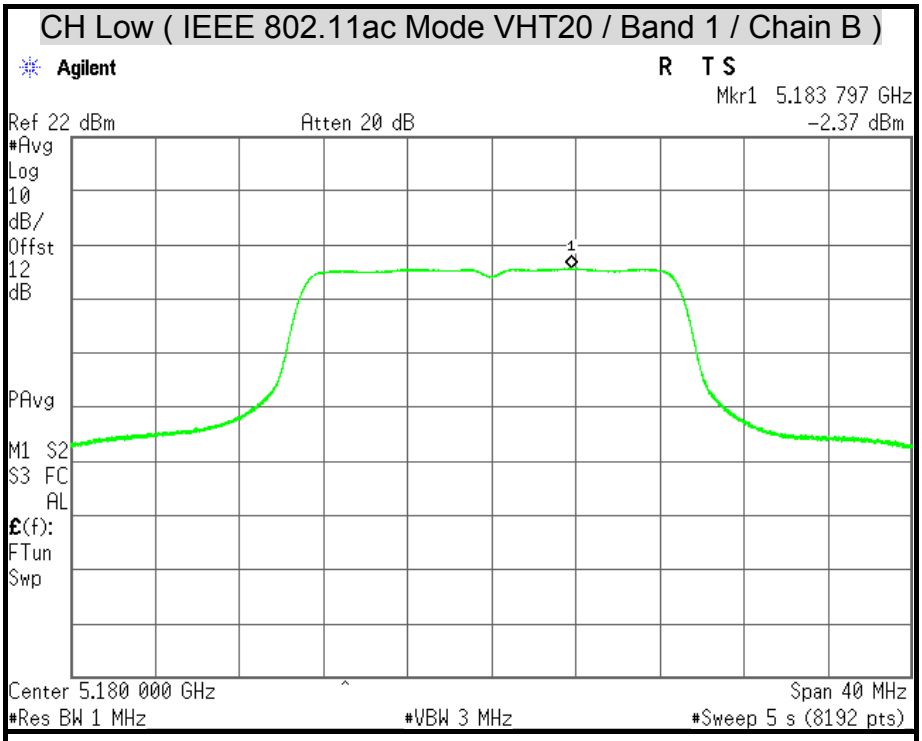
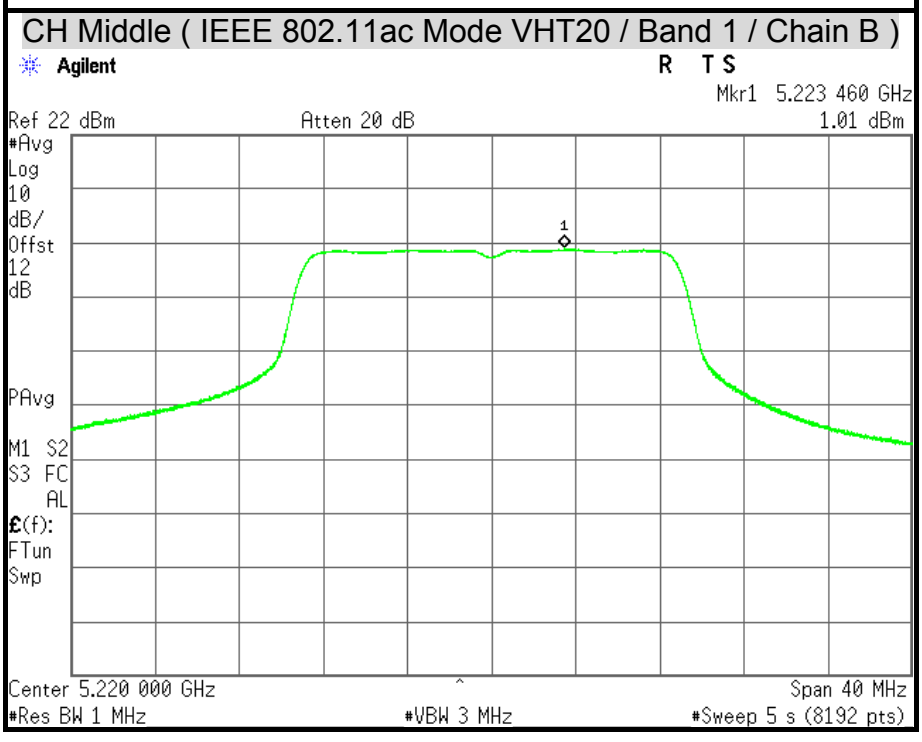
CH Low (IEEE 802.11ac Mode VHT20 / Band 1 / Chain B)



CH Middle (IEEE 802.11ac Mode VHT20 / Band 1 / Chain B)



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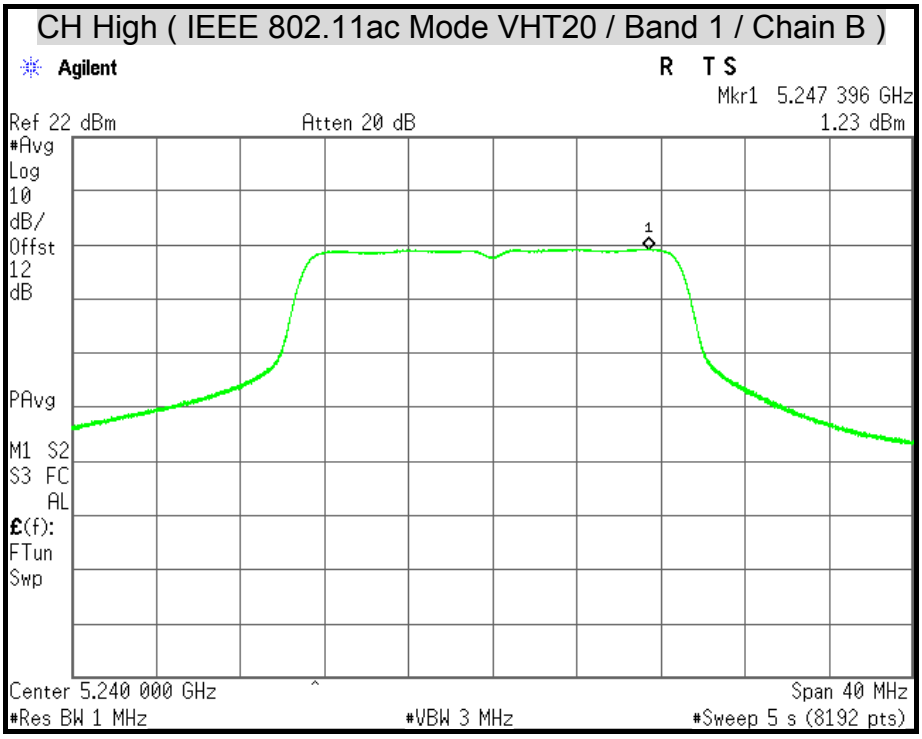
CH High (IEEE 802.11ac Mode VHT20 / Band 1 / Chain B)



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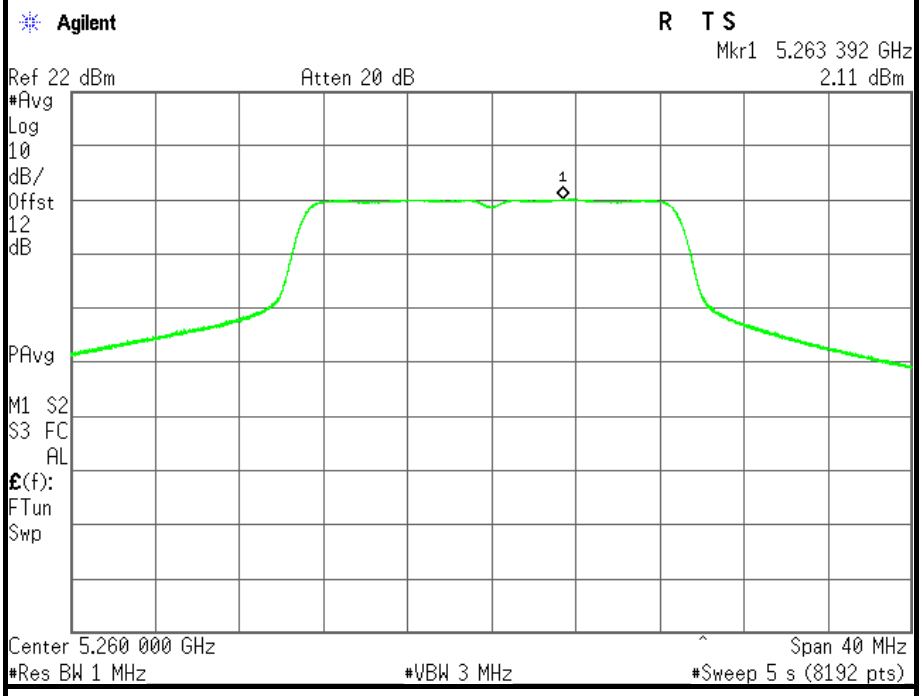
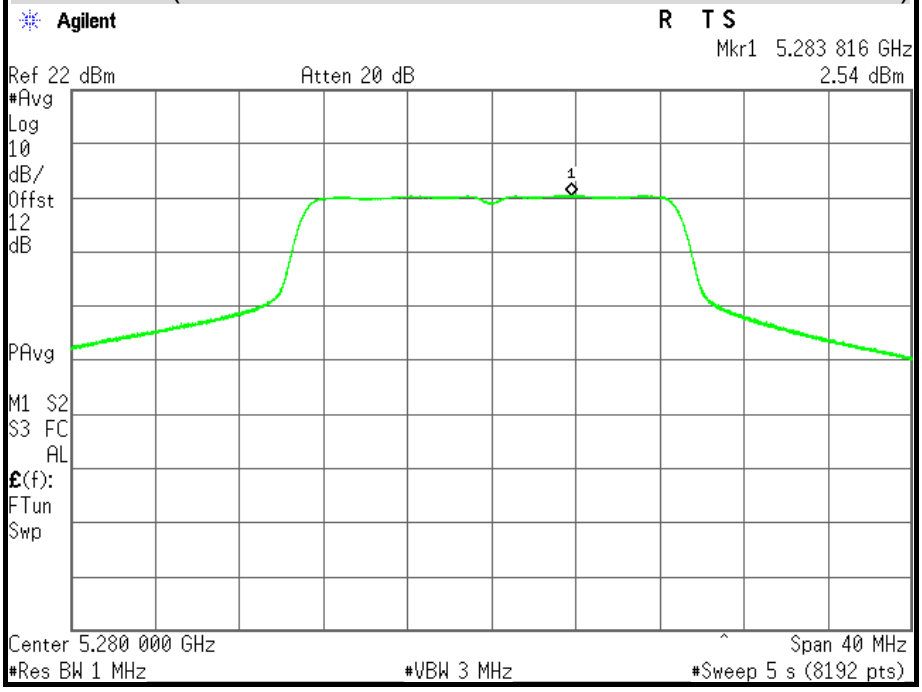
CH Low (IEEE 802.11ac Mode VHT20 / Band 2A / Chain A)



CH Middle (IEEE 802.11ac Mode VHT20 / Band 2A / Chain A)



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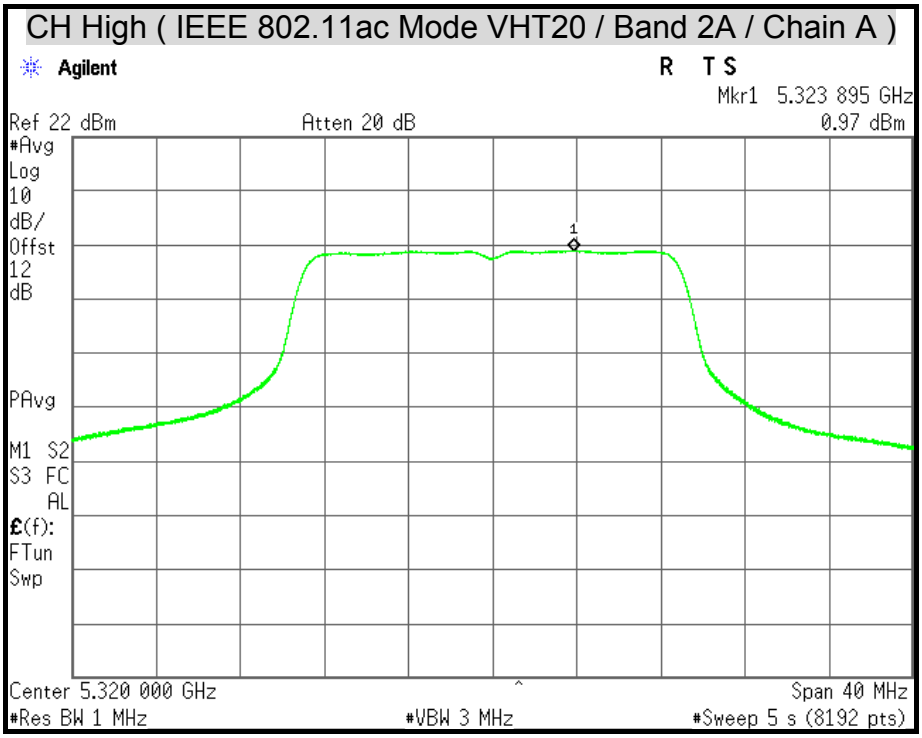
CH High (IEEE 802.11ac Mode VHT20 / Band 2A / Chain A)



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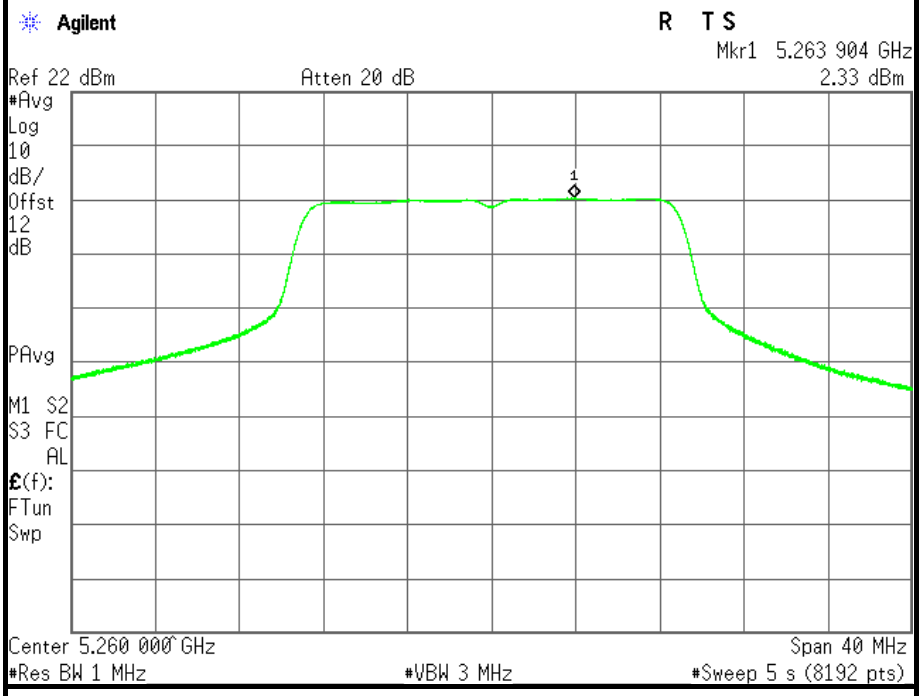
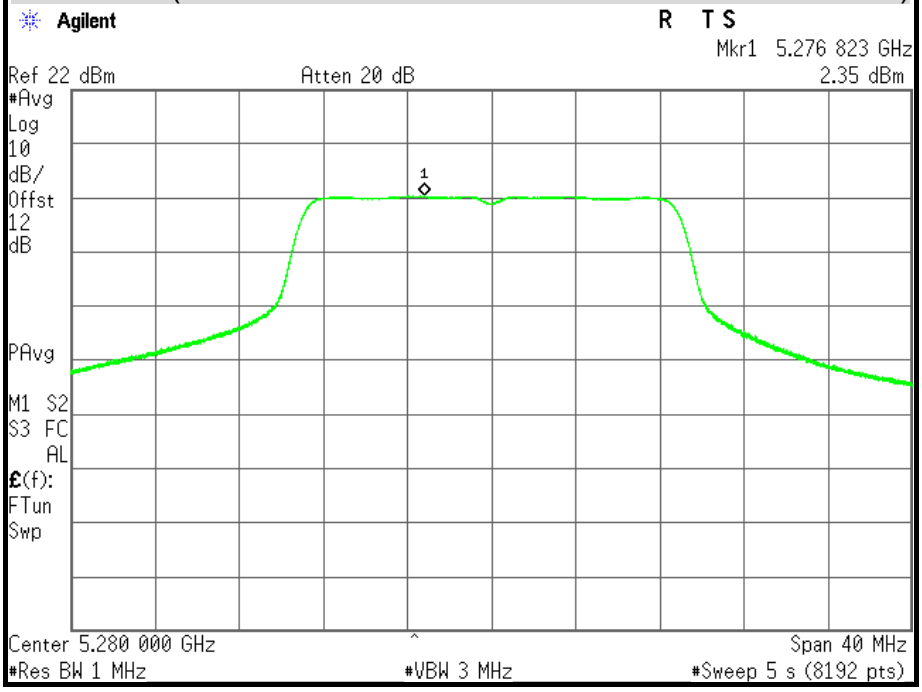
CH Low (IEEE 802.11ac Mode VHT20 / Band 2A / Chain B)



CH Middle (IEEE 802.11ac Mode VHT20 / Band 2A / Chain B)



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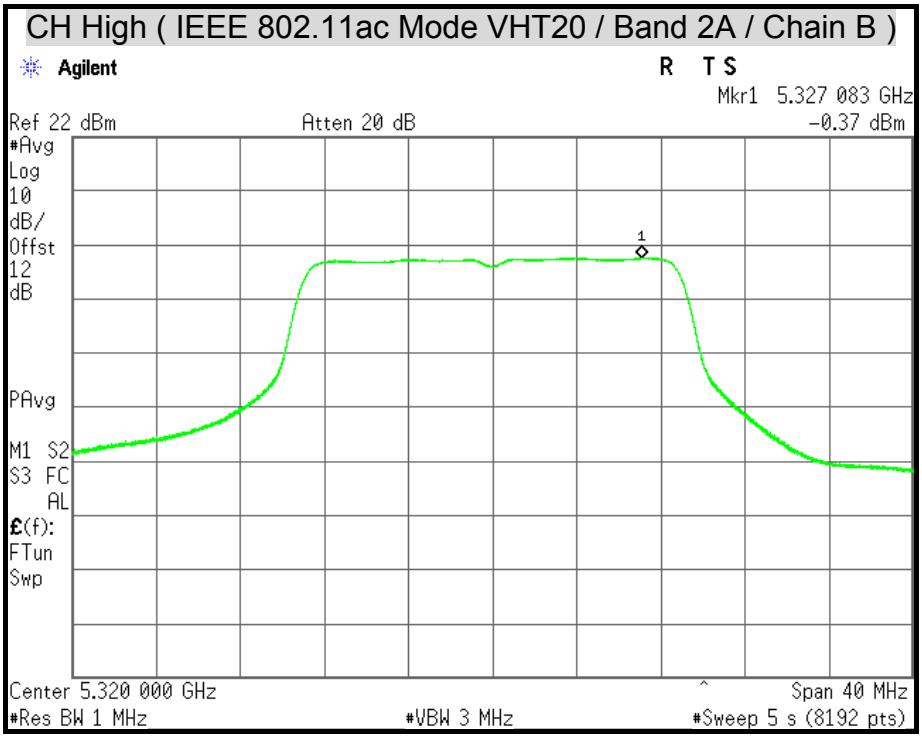
CH High (IEEE 802.11ac Mode VHT20 / Band 2A / Chain B)



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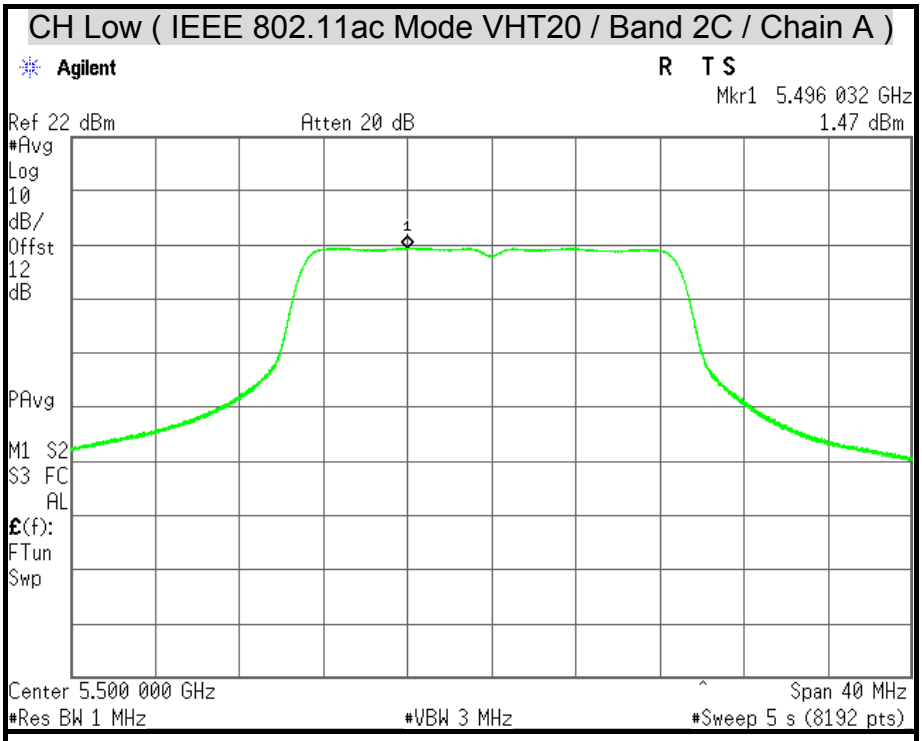
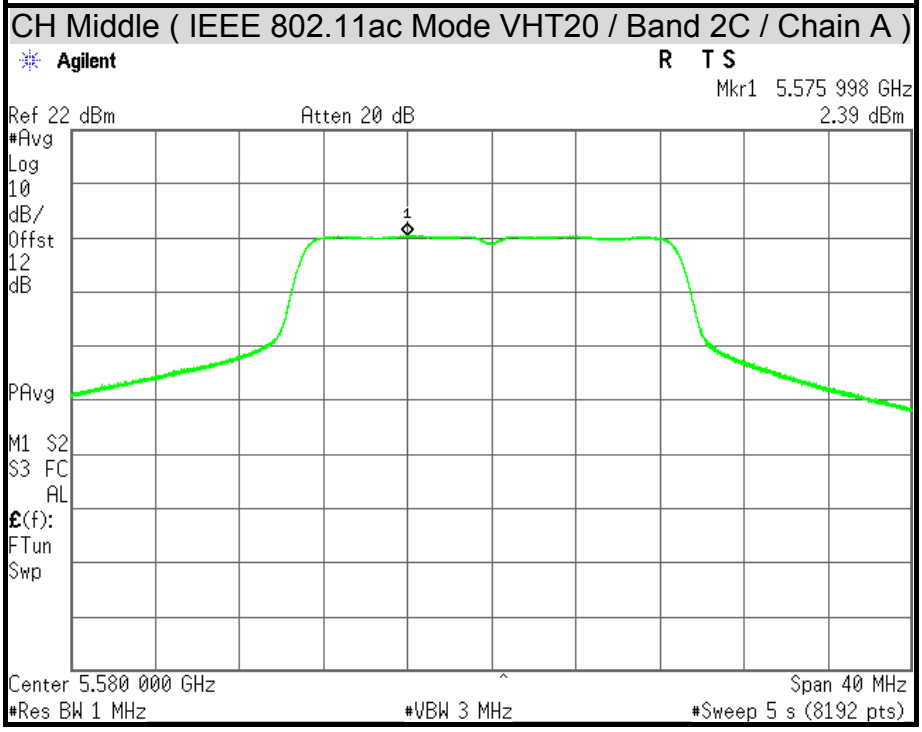
CH Low (IEEE 802.11ac Mode VHT20 / Band 2C / Chain A)



CH Middle (IEEE 802.11ac Mode VHT20 / Band 2C / Chain A)



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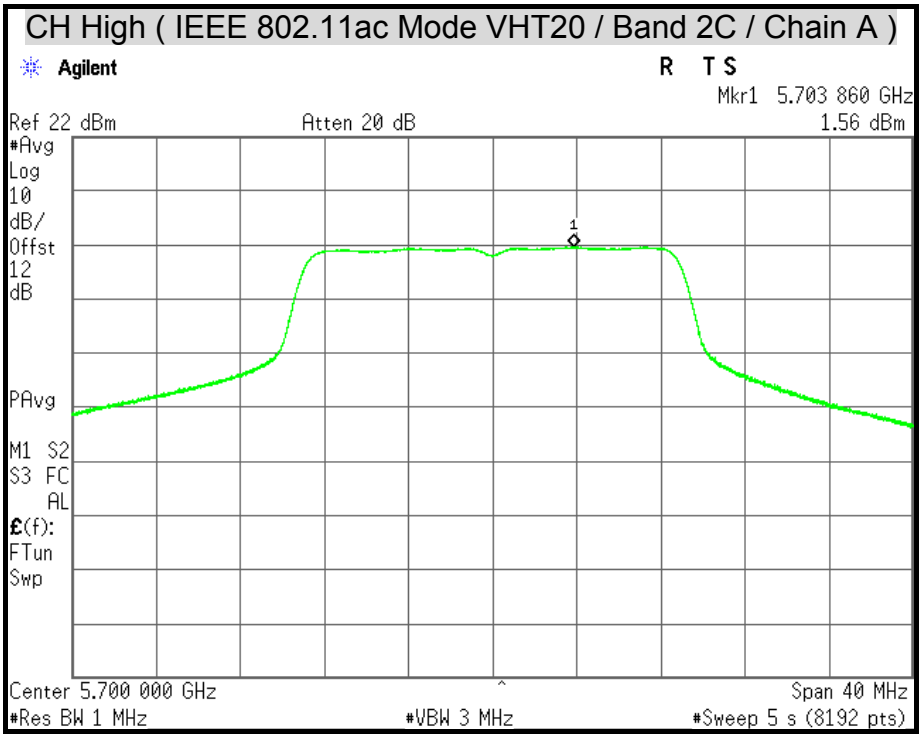
CH High (IEEE 802.11ac Mode VHT20 / Band 2C / Chain A)



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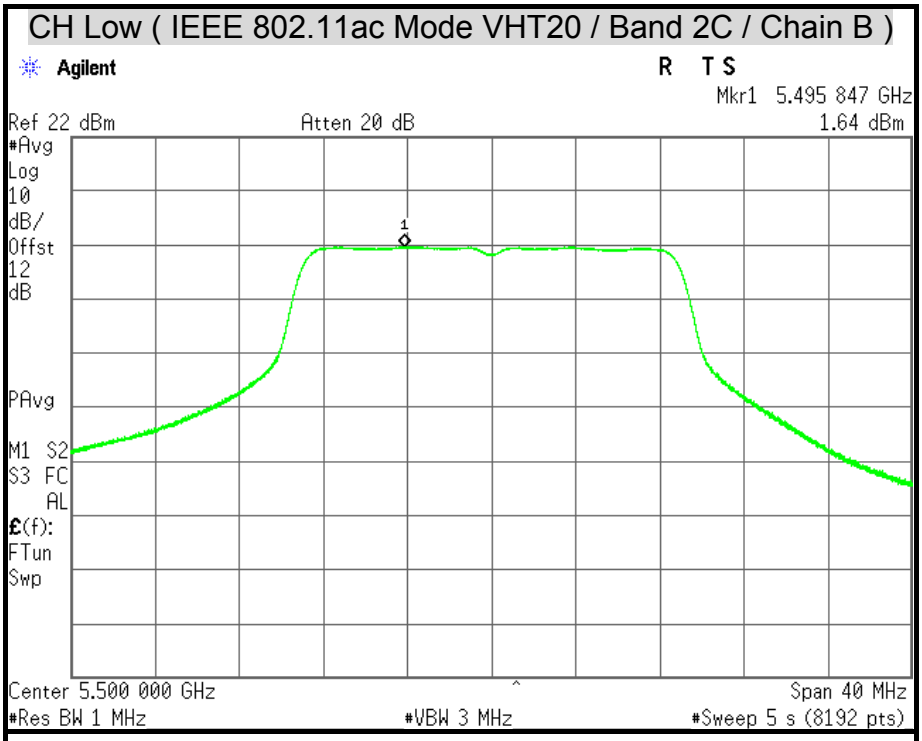
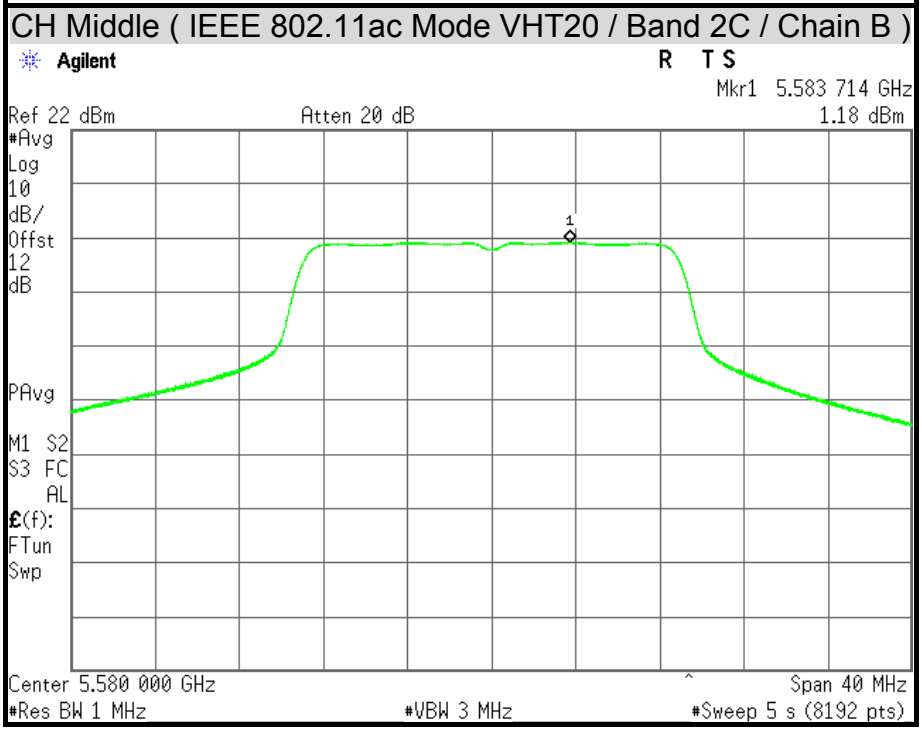
CH Low (IEEE 802.11ac Mode VHT20 / Band 2C / Chain B)



CH Middle (IEEE 802.11ac Mode VHT20 / Band 2C / Chain B)



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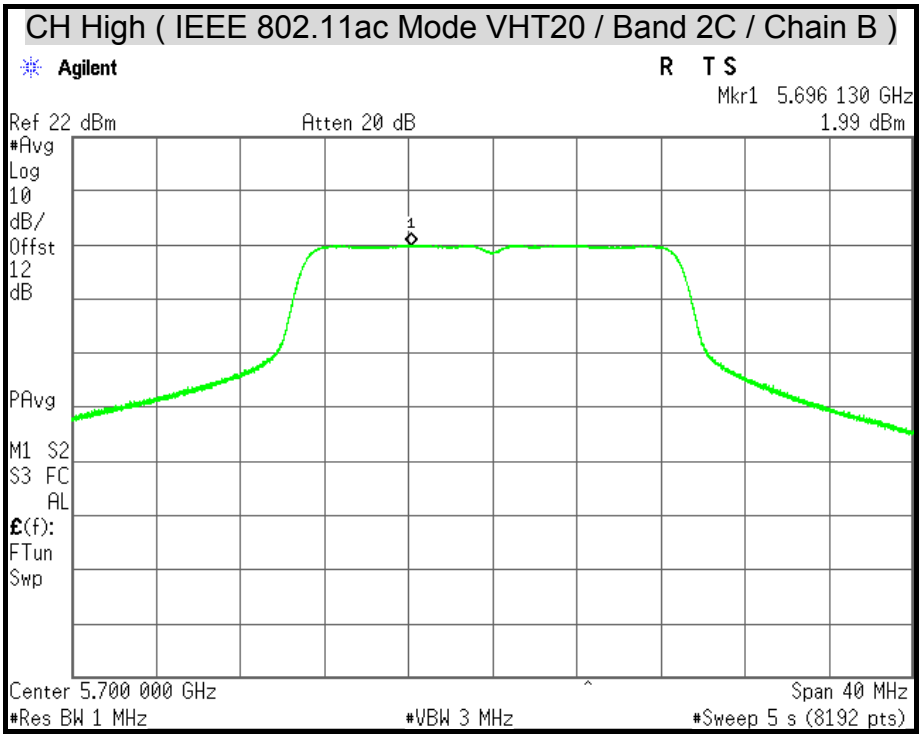
CH High (IEEE 802.11ac Mode VHT20 / Band 2C / Chain B)



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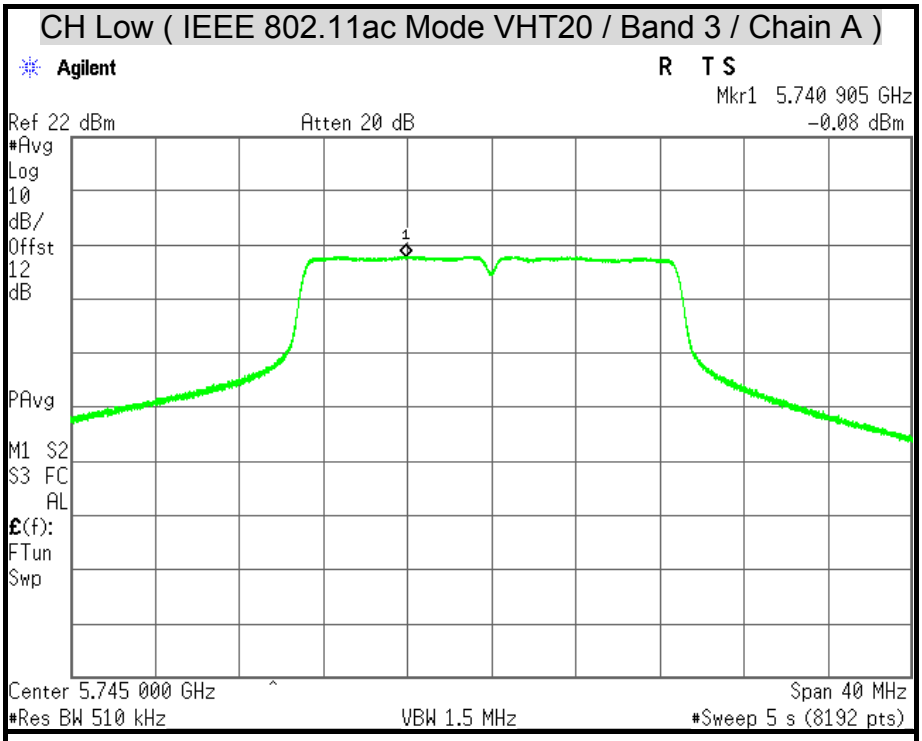
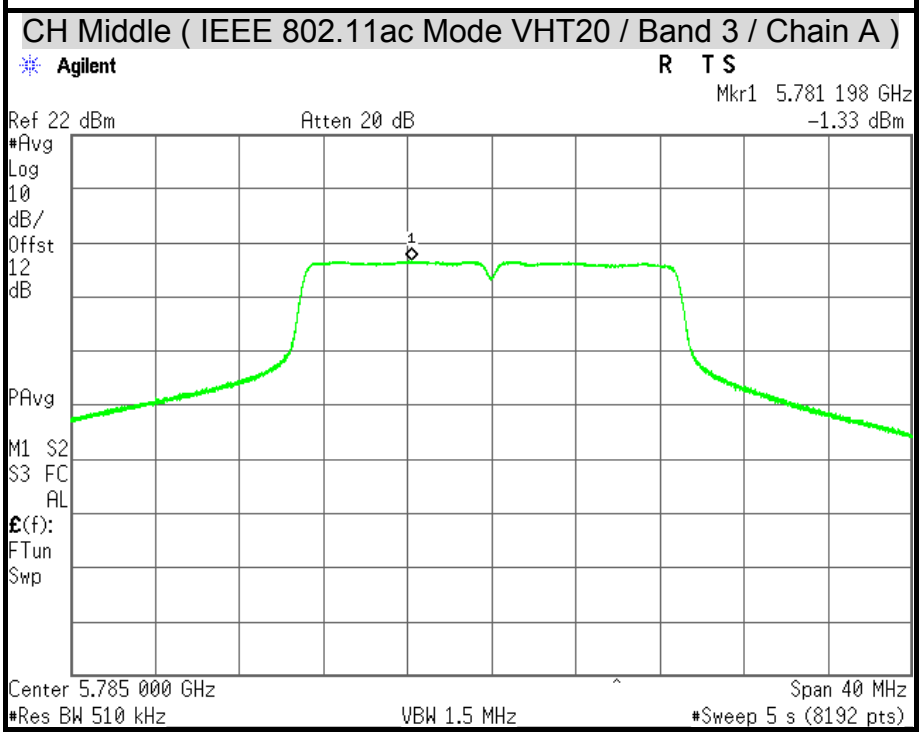
CH Low (IEEE 802.11ac Mode VHT20 / Band 3 / Chain A)



CH Middle (IEEE 802.11ac Mode VHT20 / Band 3 / Chain A)



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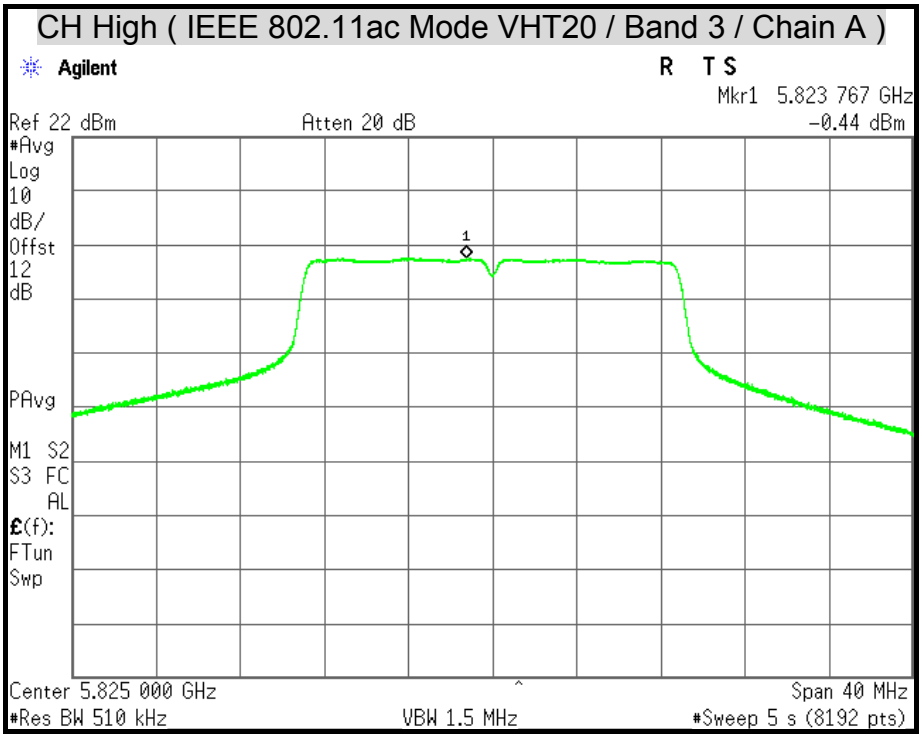
CH High (IEEE 802.11ac Mode VHT20 / Band 3 / Chain A)



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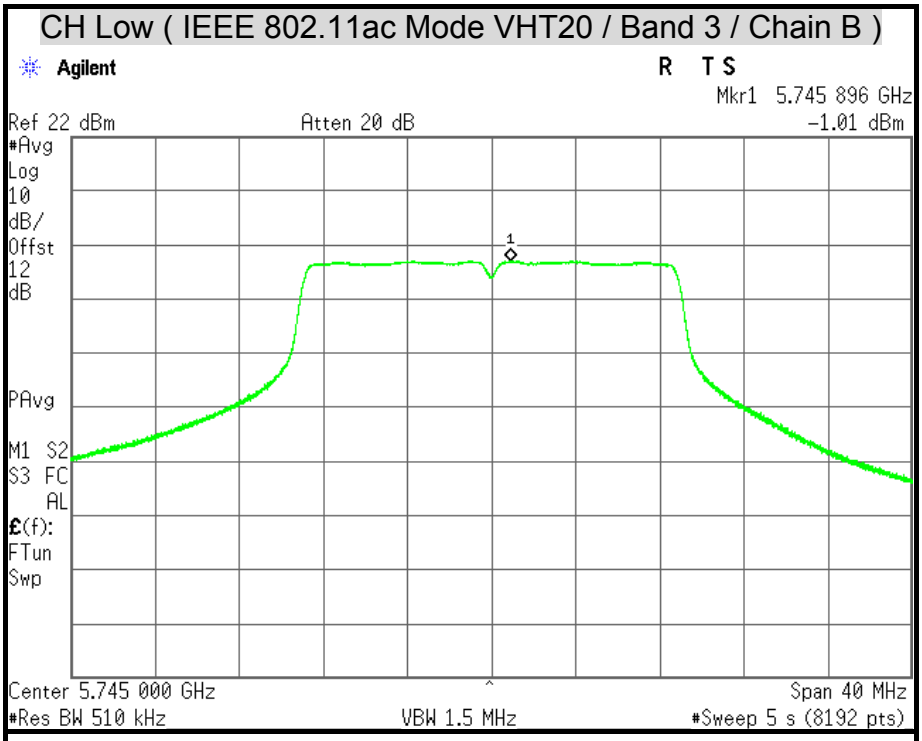
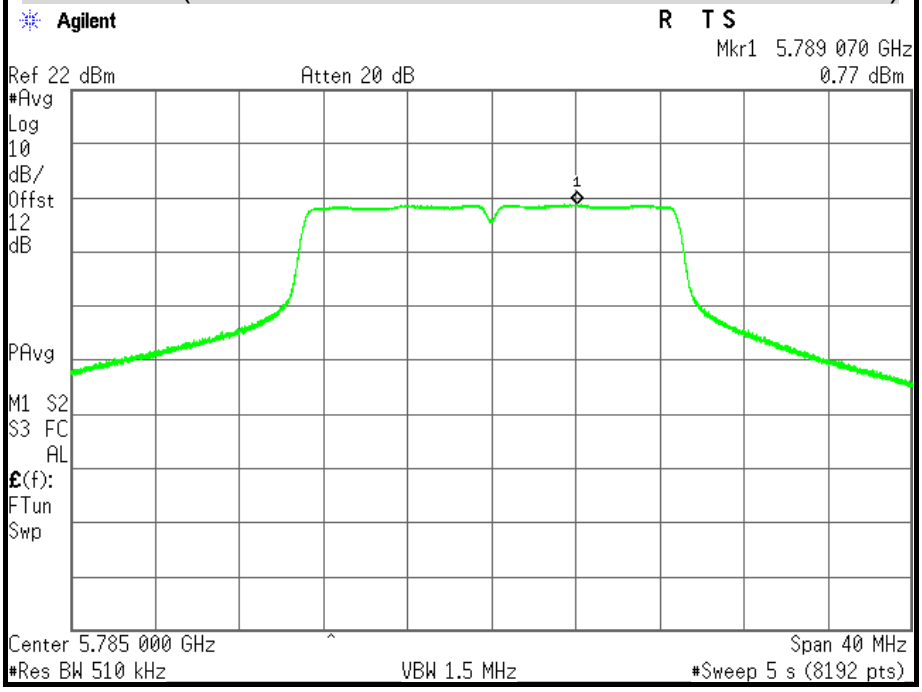
CH Low (IEEE 802.11ac Mode VHT20 / Band 3 / Chain B)



CH Middle (IEEE 802.11ac Mode VHT20 / Band 3 / Chain B)



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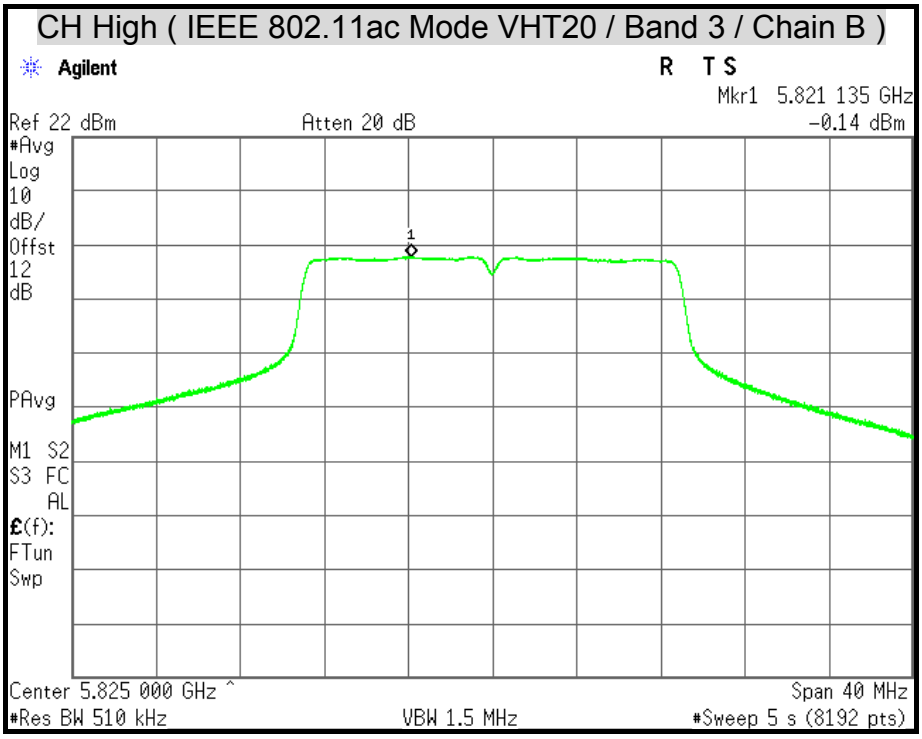
CH High (IEEE 802.11ac Mode VHT20 / Band 3 / Chain B)



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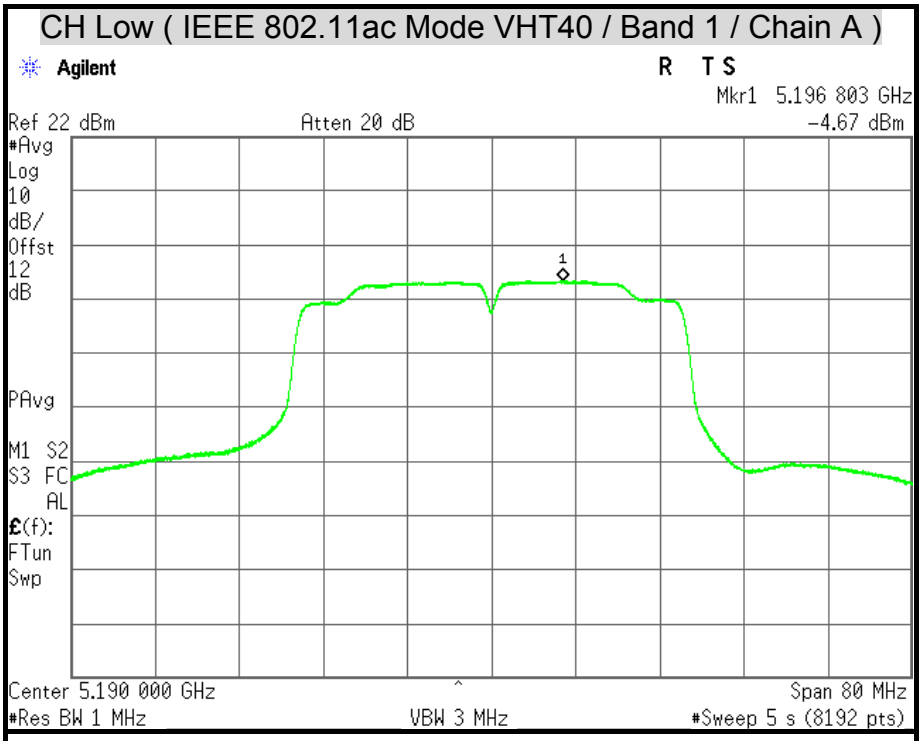
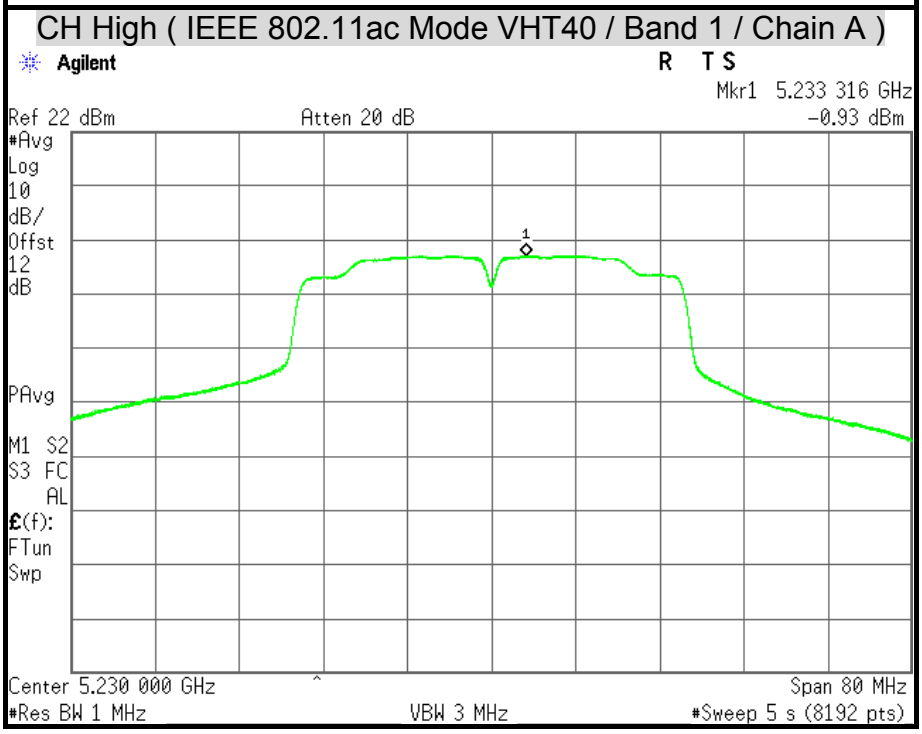
CH Low (IEEE 802.11ac Mode VHT40 / Band 1 / Chain A)



CH High (IEEE 802.11ac Mode VHT40 / Band 1 / Chain A)



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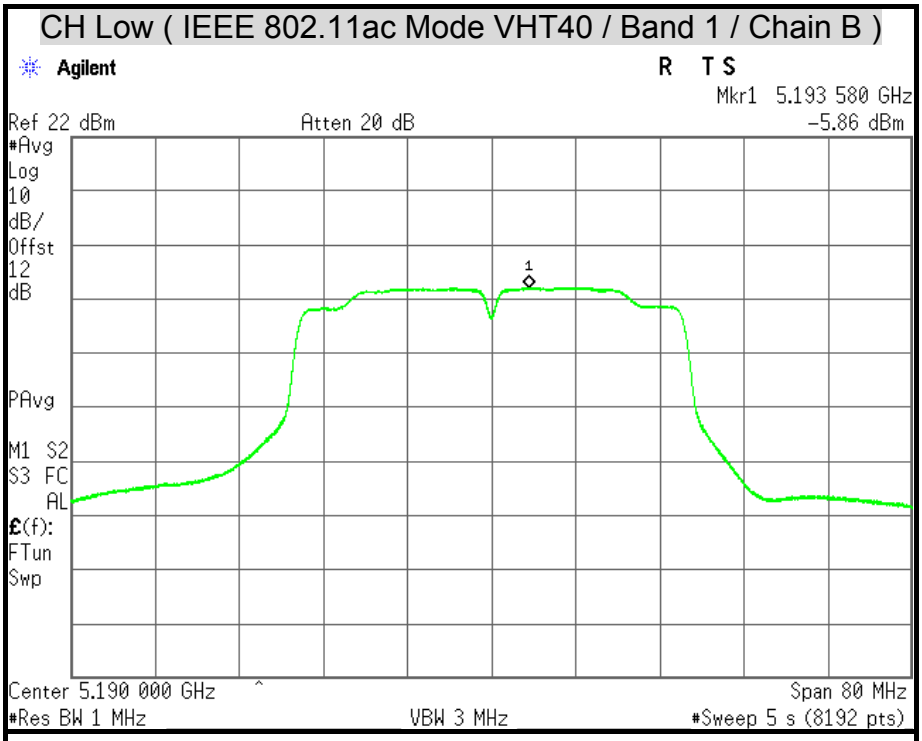
CH Low (IEEE 802.11ac Mode VHT40 / Band 1 / Chain B)



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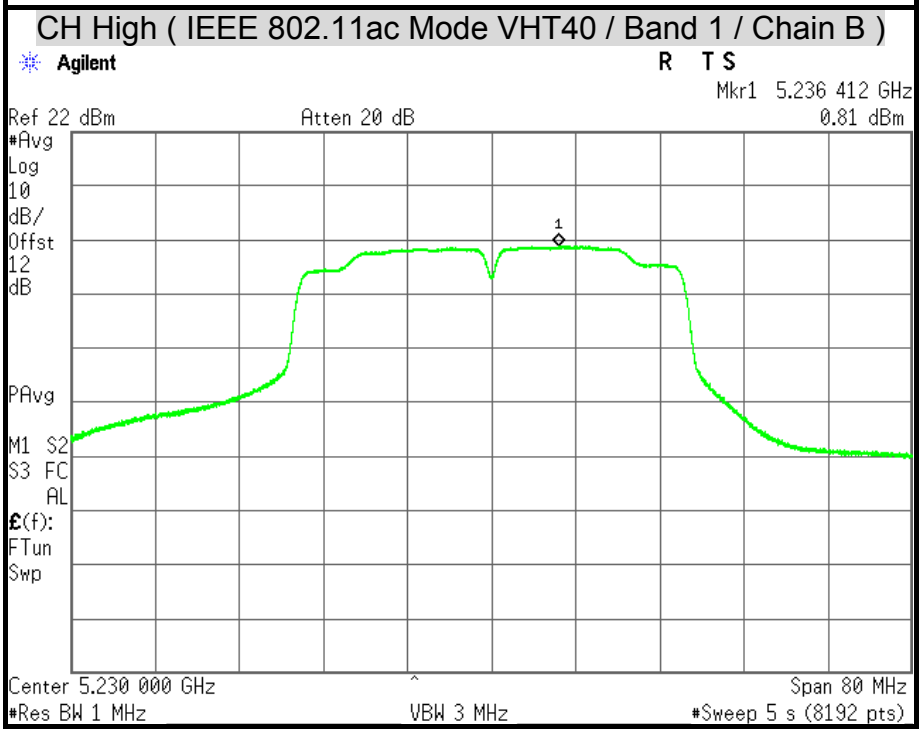

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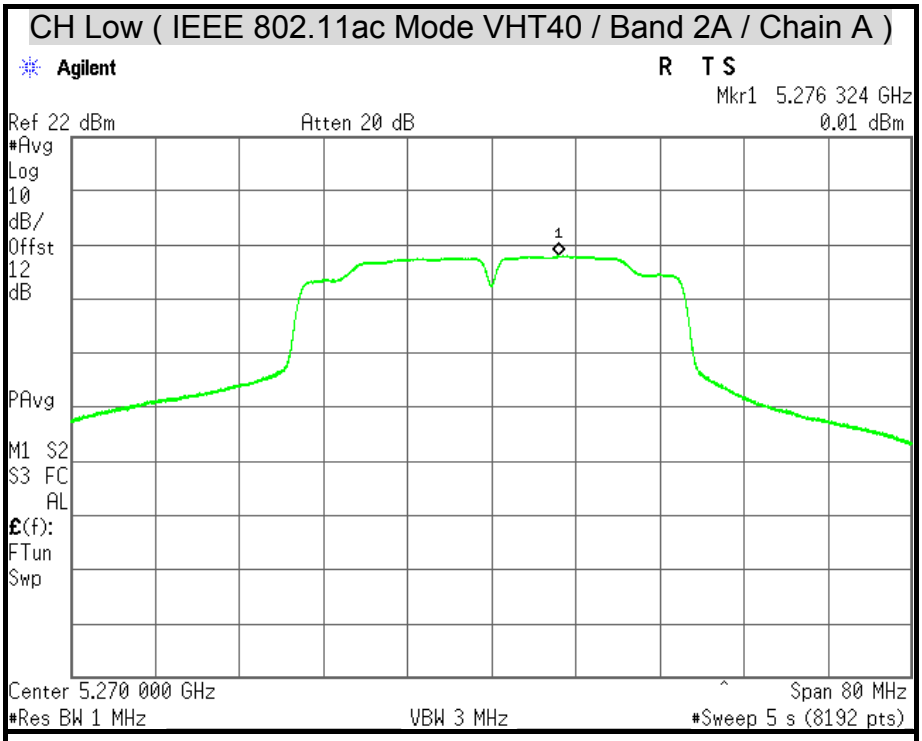
CH Low (IEEE 802.11ac Mode VHT40 / Band 2A / Chain A)



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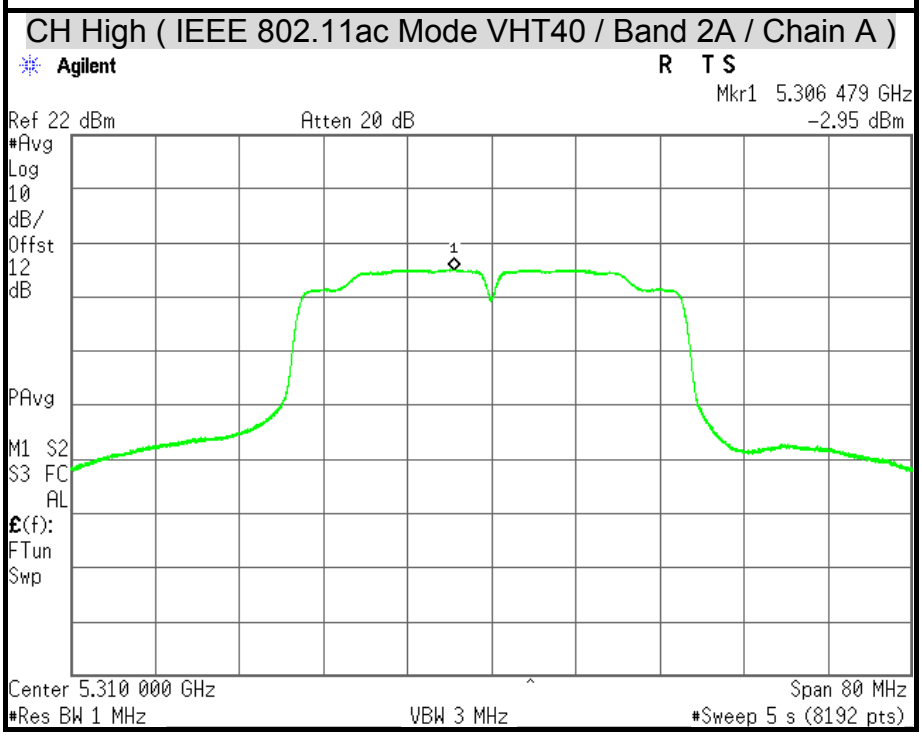

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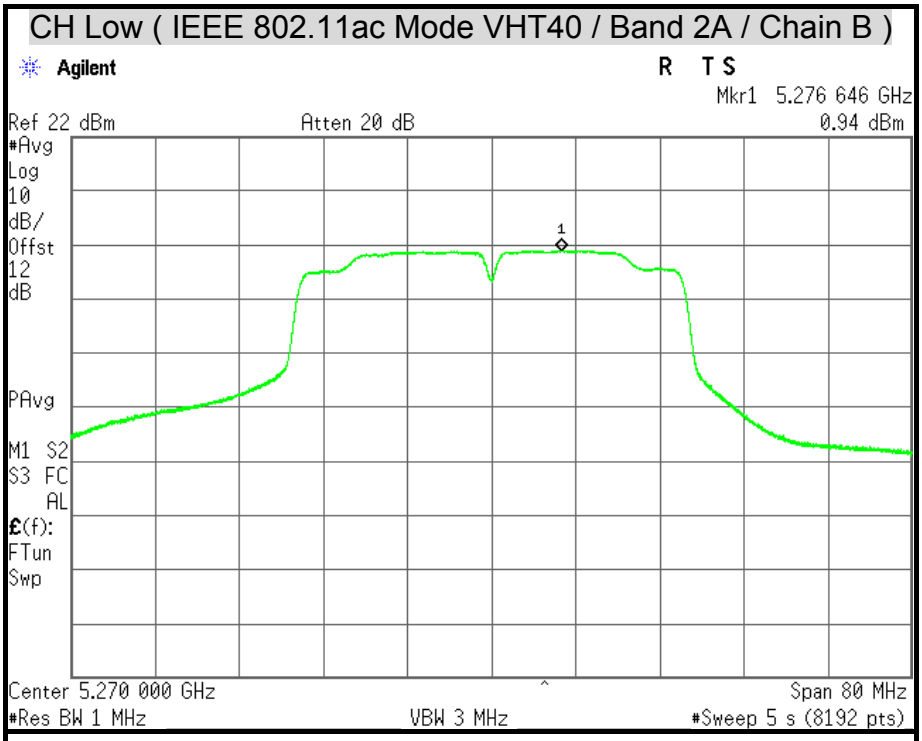

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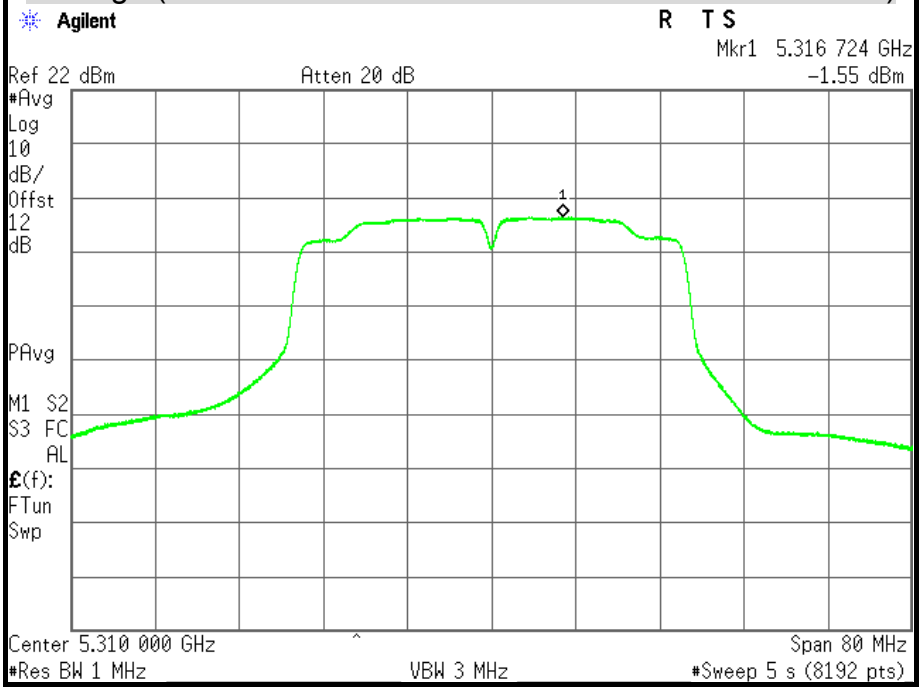

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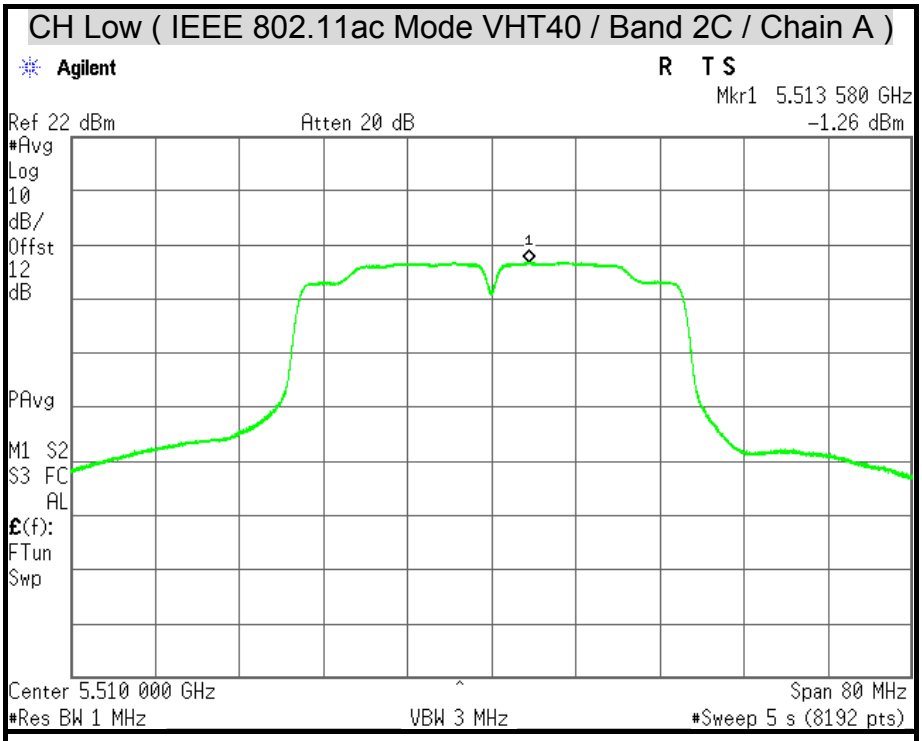
CH Low (IEEE 802.11ac Mode VHT40 / Band 2C / Chain A)



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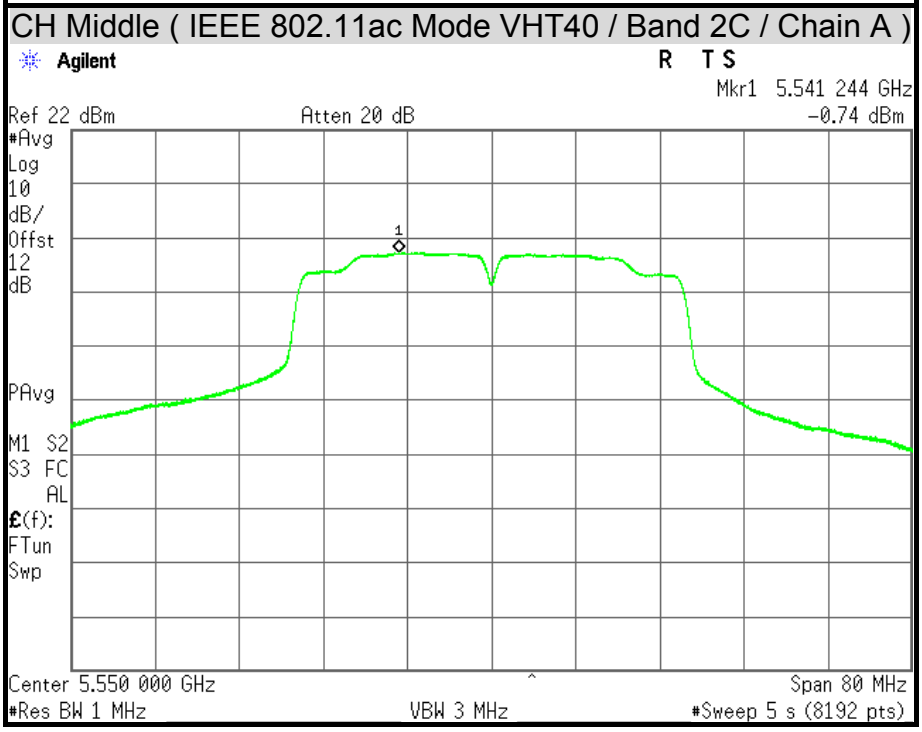

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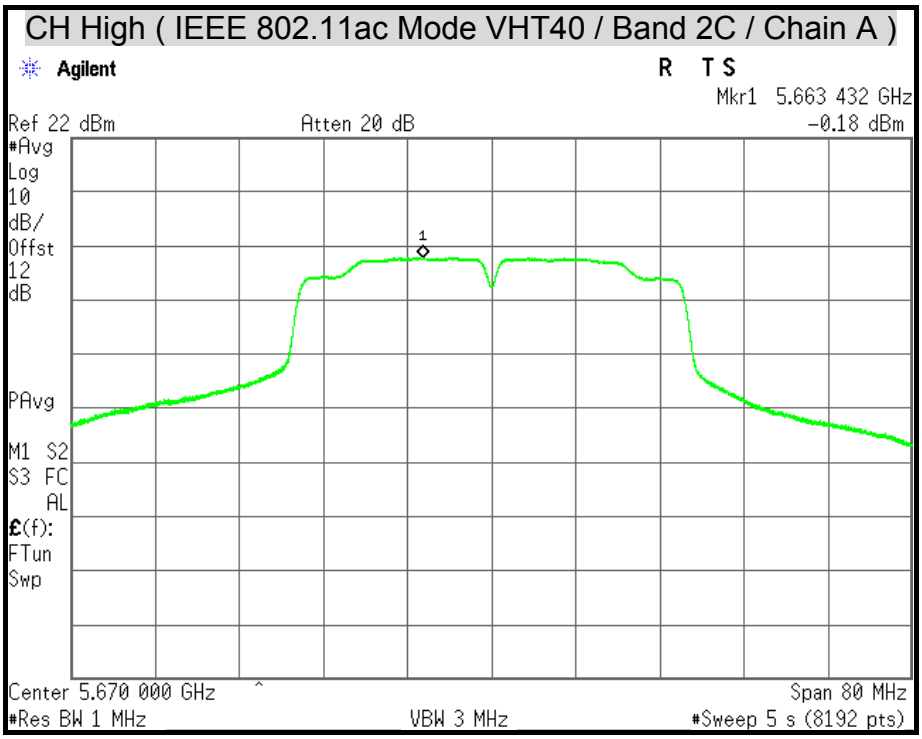

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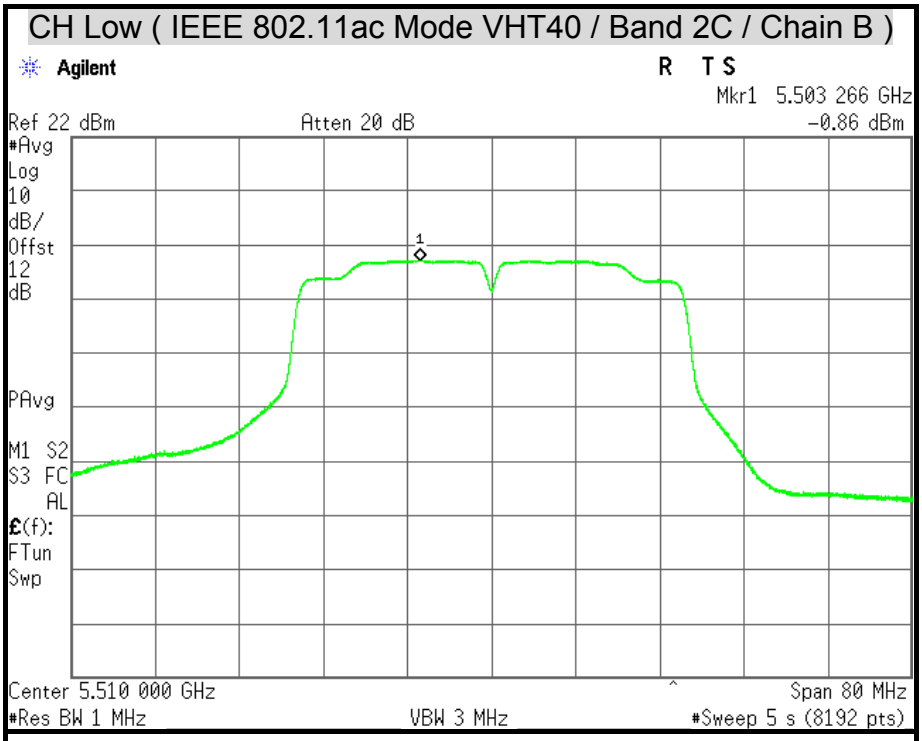

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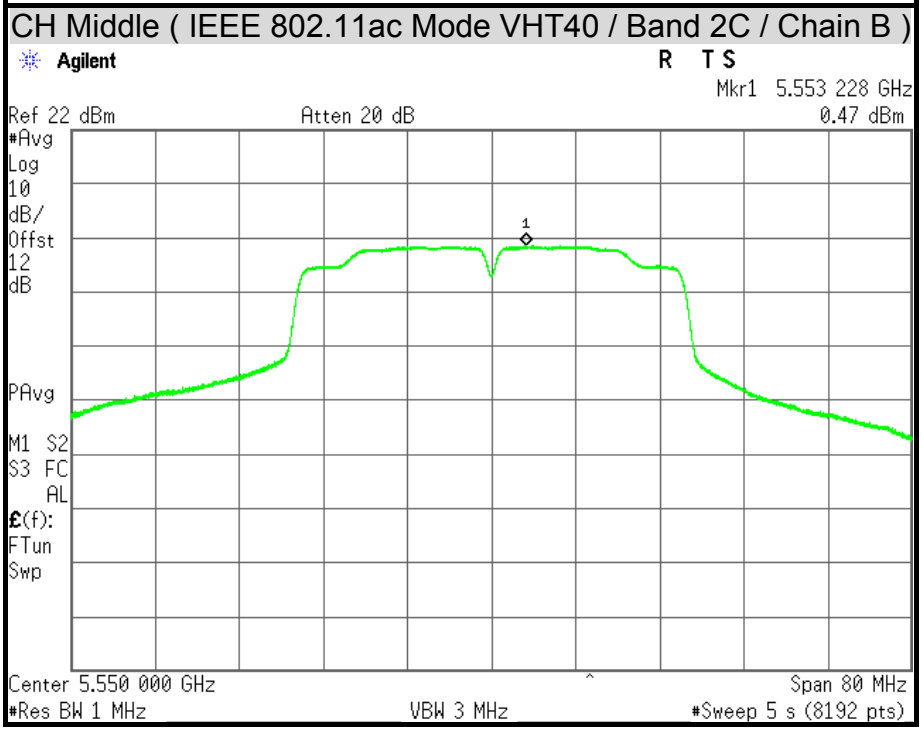

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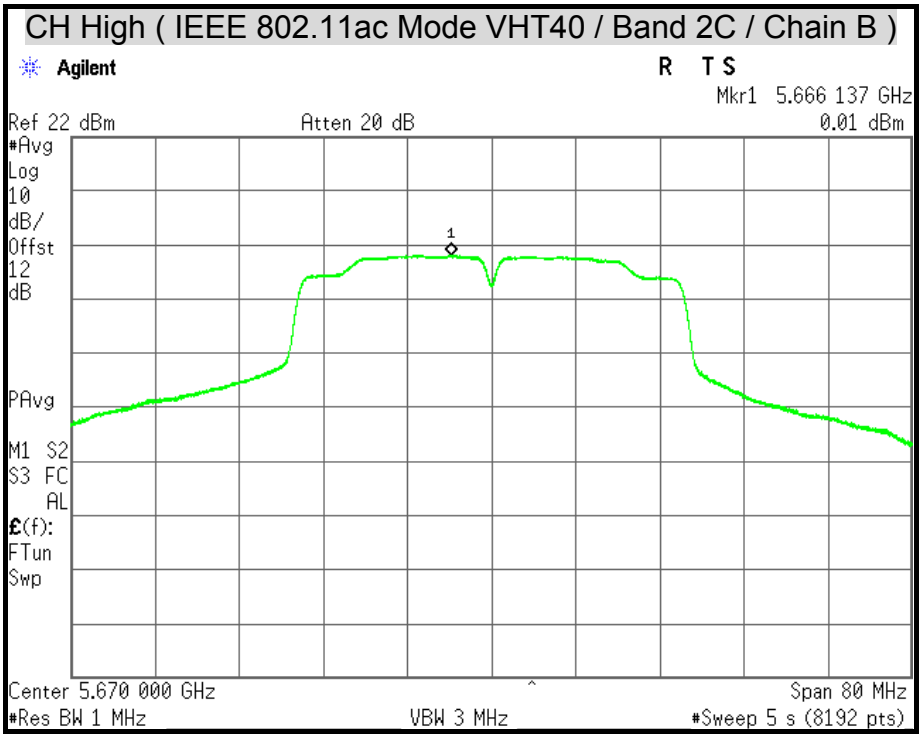

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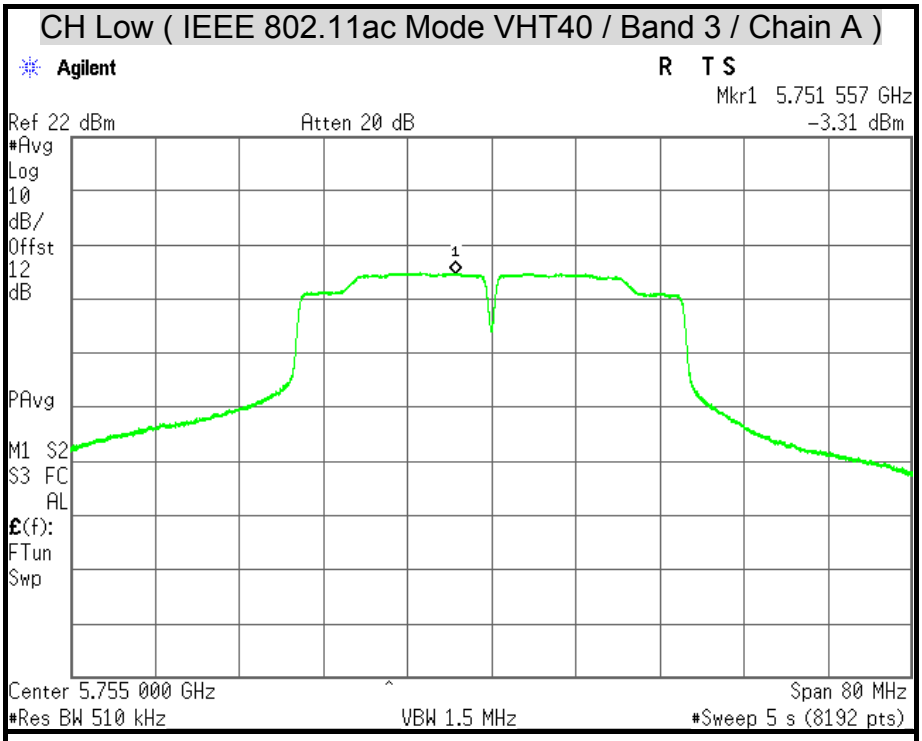
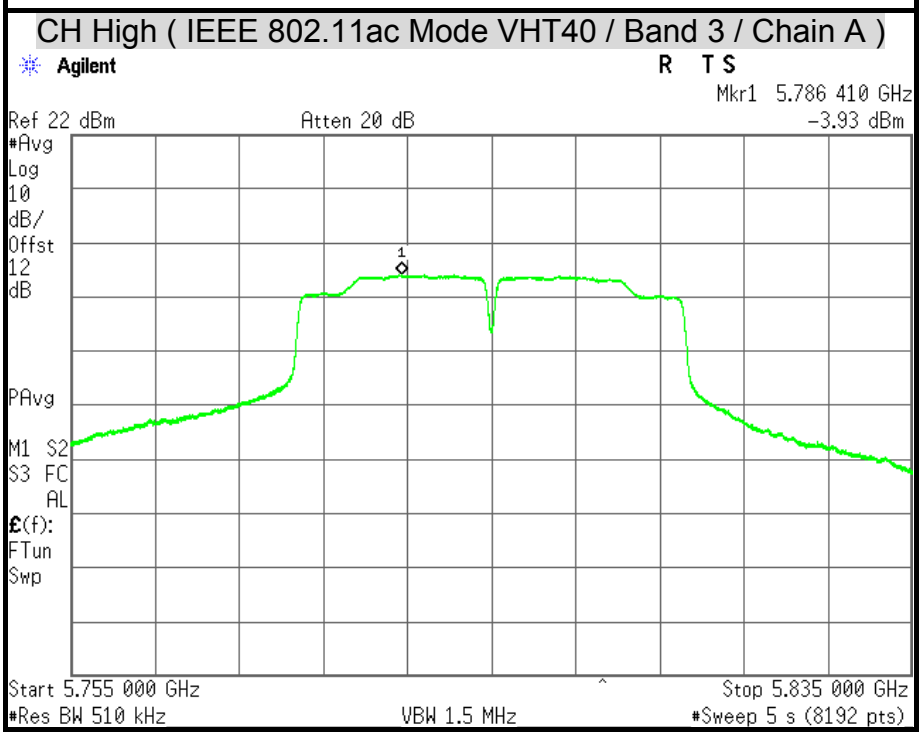
CH Low (IEEE 802.11ac Mode VHT40 / Band 3 / Chain A)



CH High (IEEE 802.11ac Mode VHT40 / Band 3 / Chain A)



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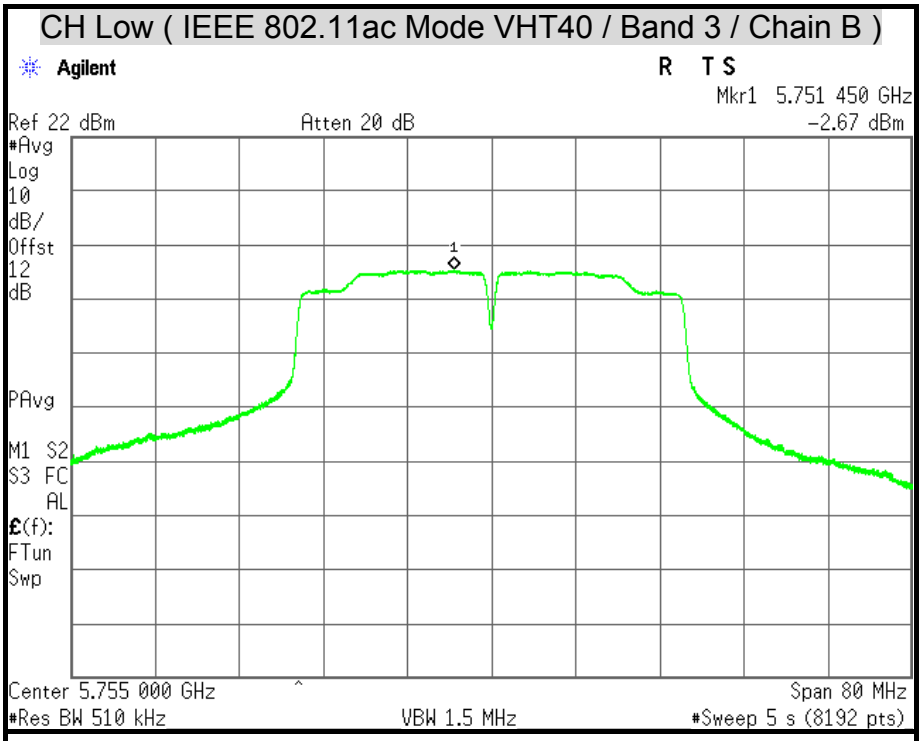
CH Low (IEEE 802.11ac Mode VHT40 / Band 3 / Chain B)



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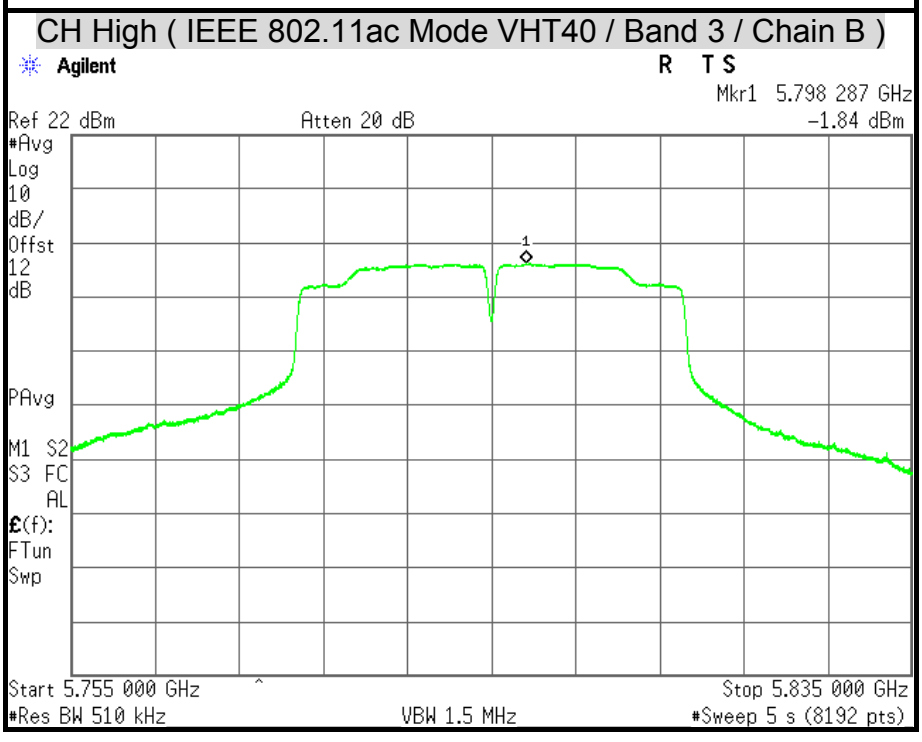

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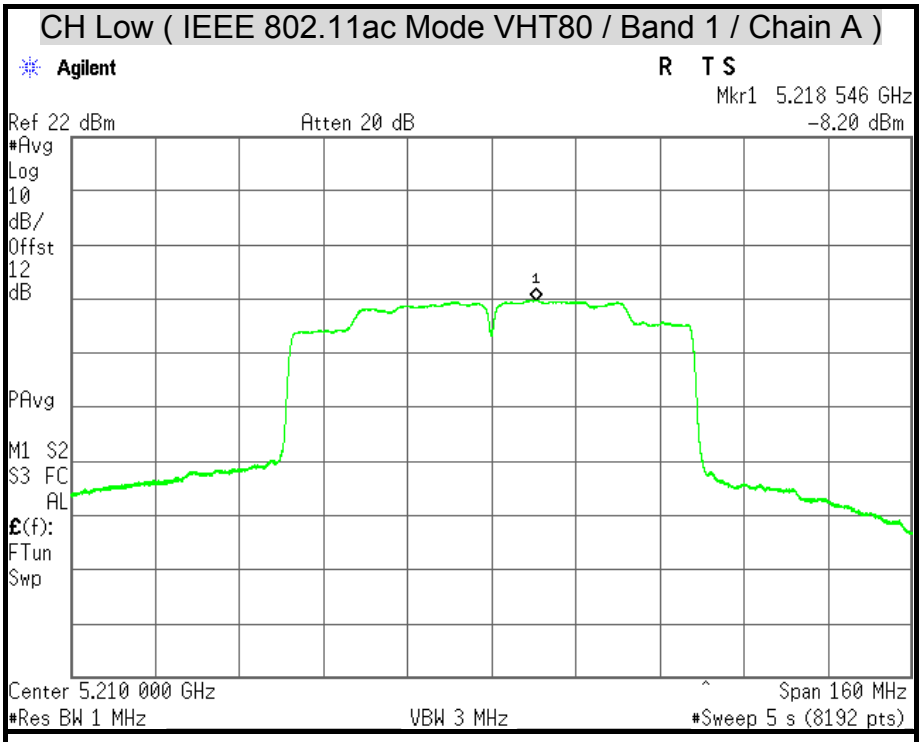
CH Low (IEEE 802.11ac Mode VHT80 / Band 1 / Chain A)



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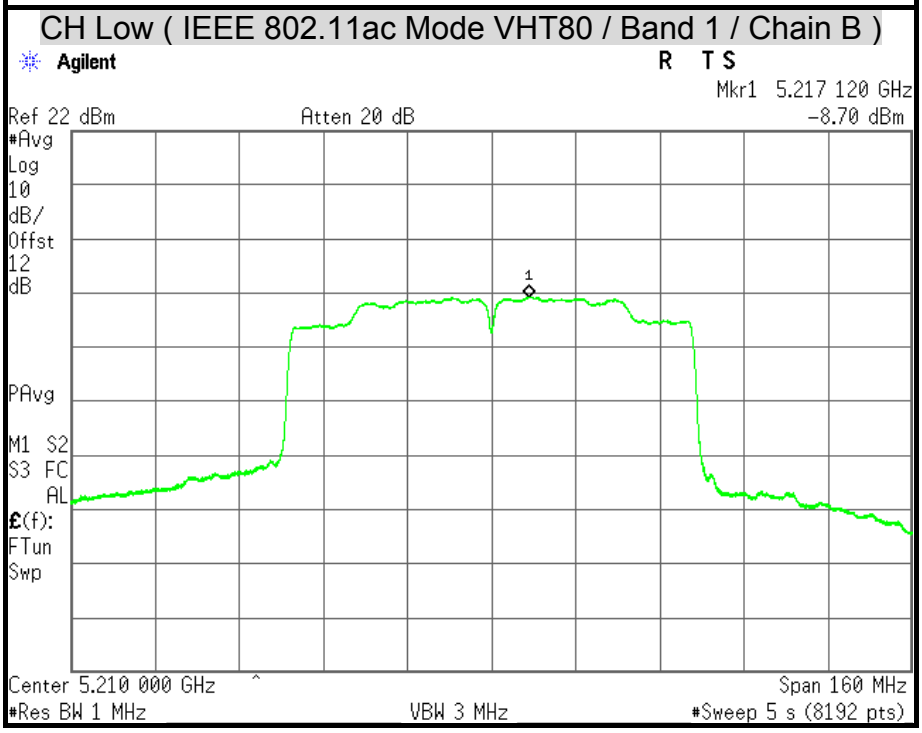

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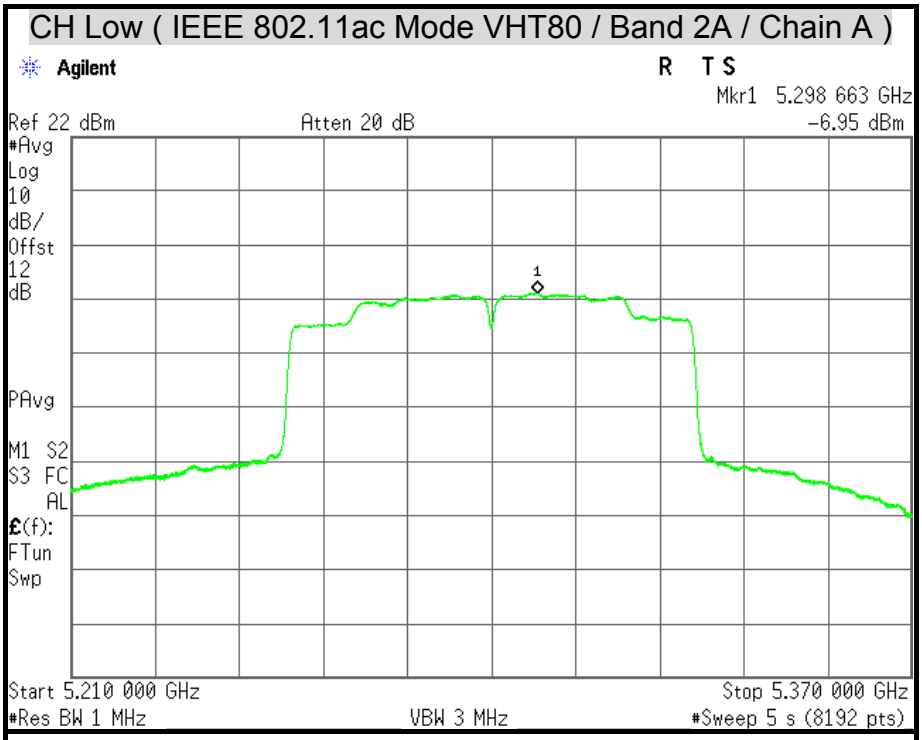
CH Low (IEEE 802.11ac Mode VHT80 / Band 2A / Chain A)



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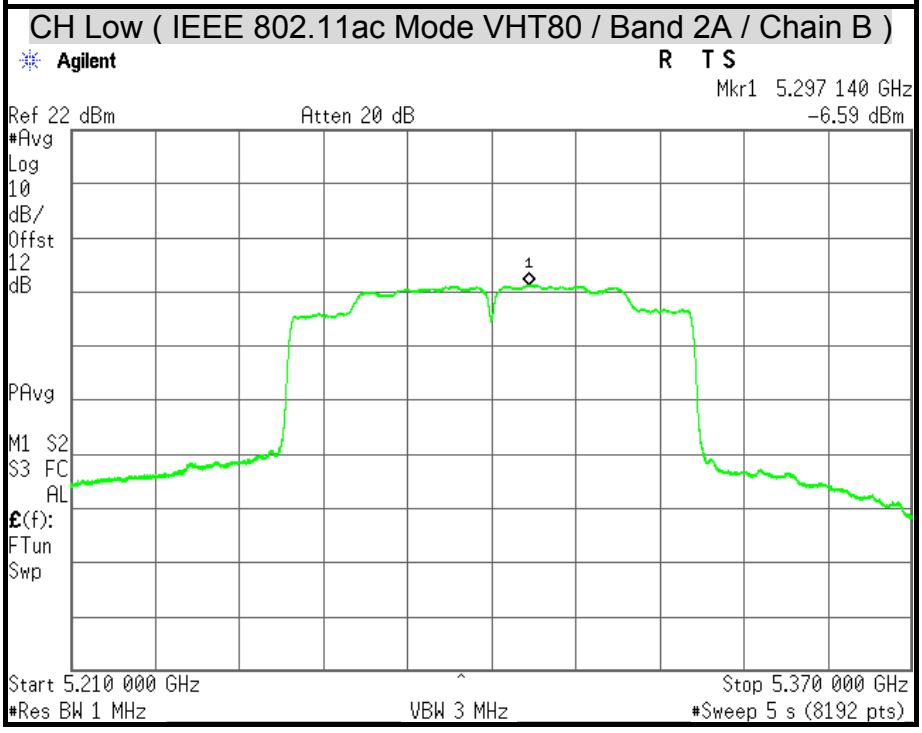

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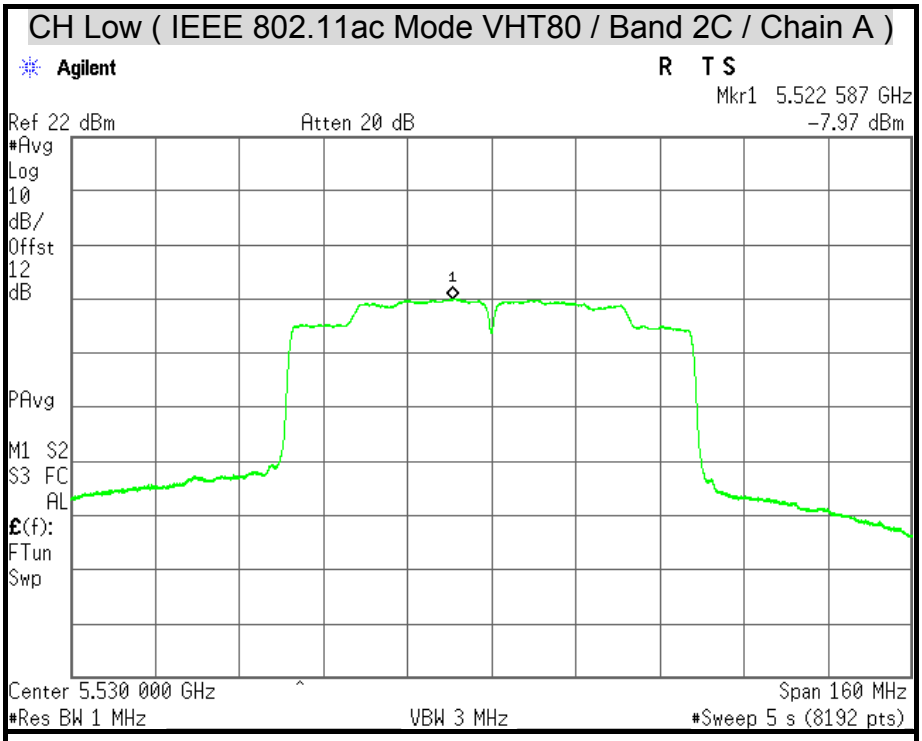
CH Low (IEEE 802.11ac Mode VHT80 / Band 2C / Chain A)



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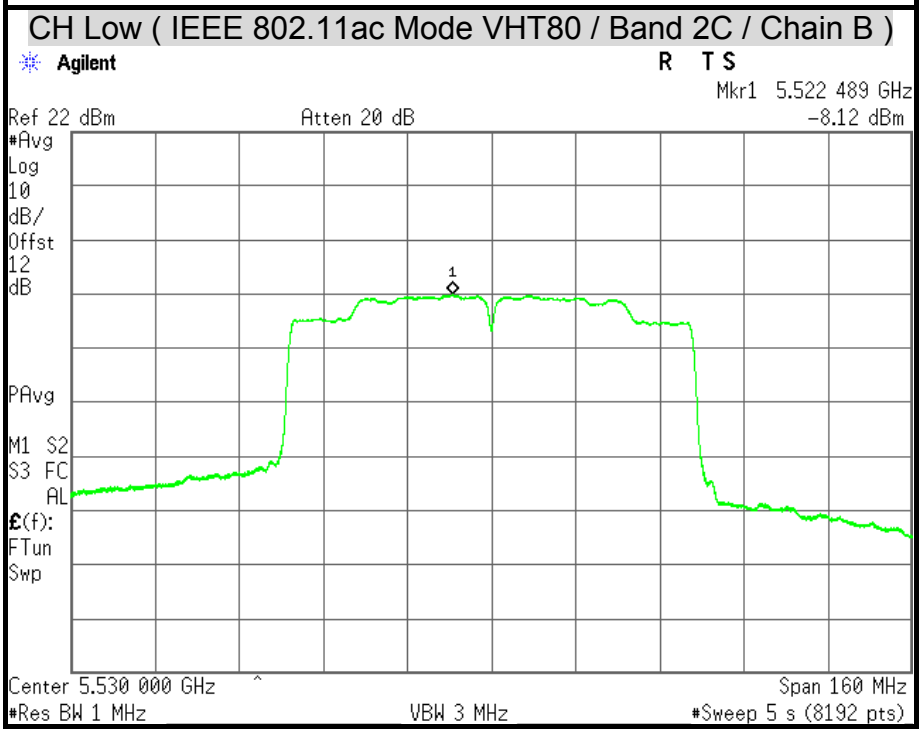

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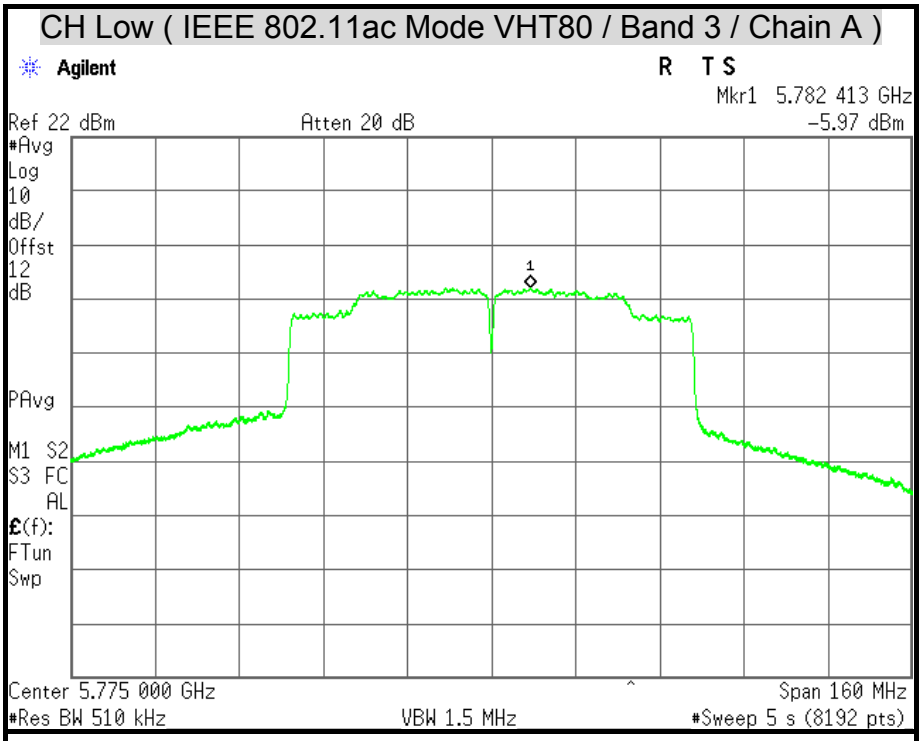
CH Low (IEEE 802.11ac Mode VHT80 / Band 3 / Chain A)



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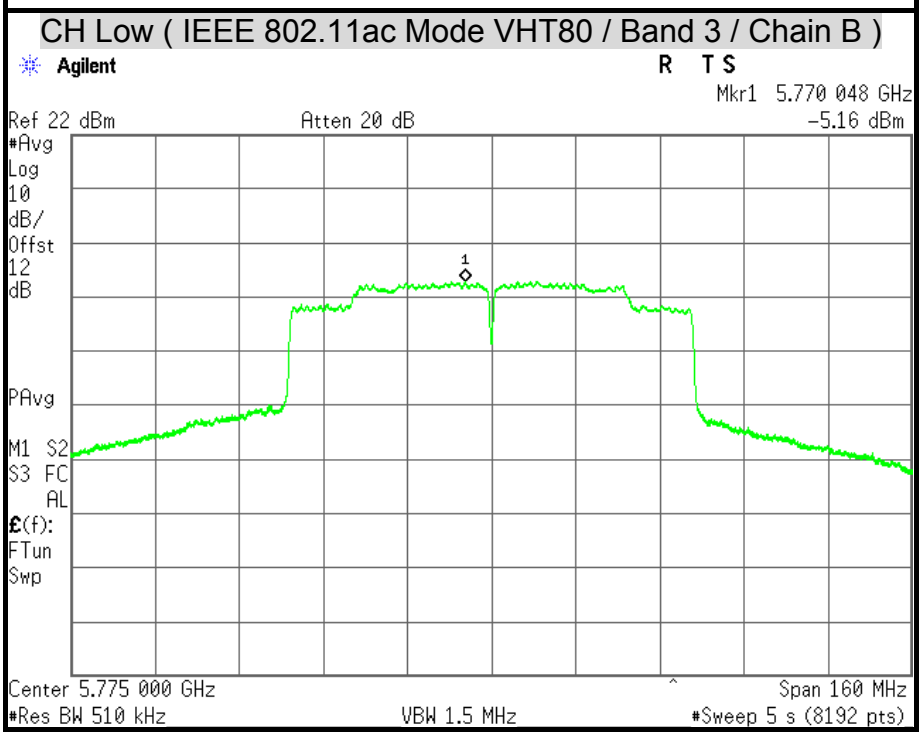

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7.5 RADIATED EMISSION

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

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(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.

TEST EQUIPMENT

Radiated Emission / 966Chamber_B

Name of Equipment	Manufacture	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY46180323	04/15/2015
EMI Test Receiver	ROHDE & SCHWARZ	ESCS 30	835418/008	10/14/2015
Bi-log Antenna	SCHWARZBECK	VULB 9168	9168-250	08/21/2015
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-778	08/19/2015
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00078733	12/05/2014
Horn Antenna	COM-POWER	AH-840	03077	12/18/2014
Pre-Amplifier	Agilent	8447D	2944A10052	07/15/2015
Pre-Amplifier	Agilent	8449B	3008A01916	07/15/2015
LOOP Antenna	EMCO	6502	8905-2356	09/23/2015
Notch Filters Band Reject	Micro-Tronics	BRM05702-01	026	N.C.R.
Band Reject Filter	Micro-Tronics	BRC50703-01	004	N.C.R.
Band Reject Filter	Micro-Tronics	BRC50704-01	004	N.C.R.
Band Reject Filter	Micro-Tronics	BRC50705-01	007	N.C.R.

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

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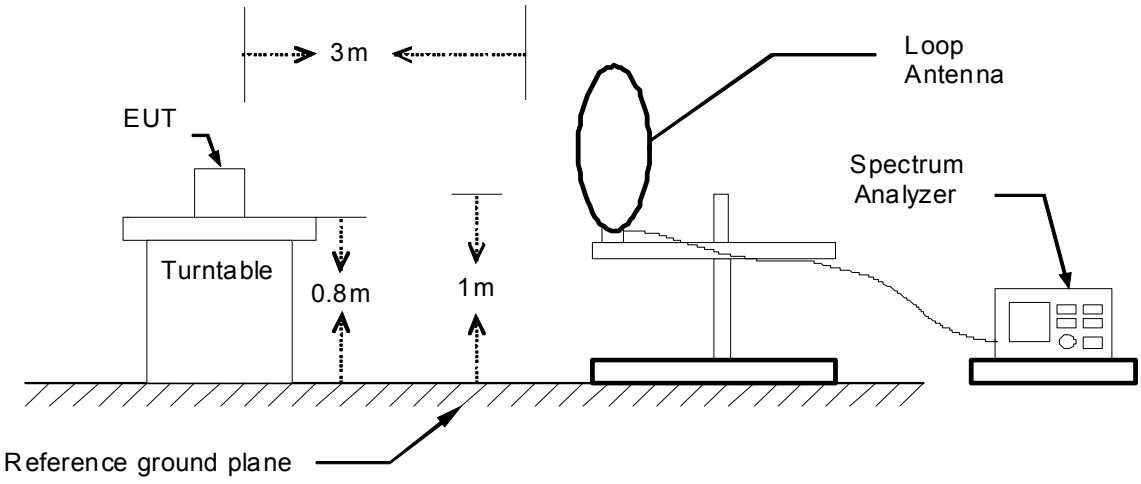
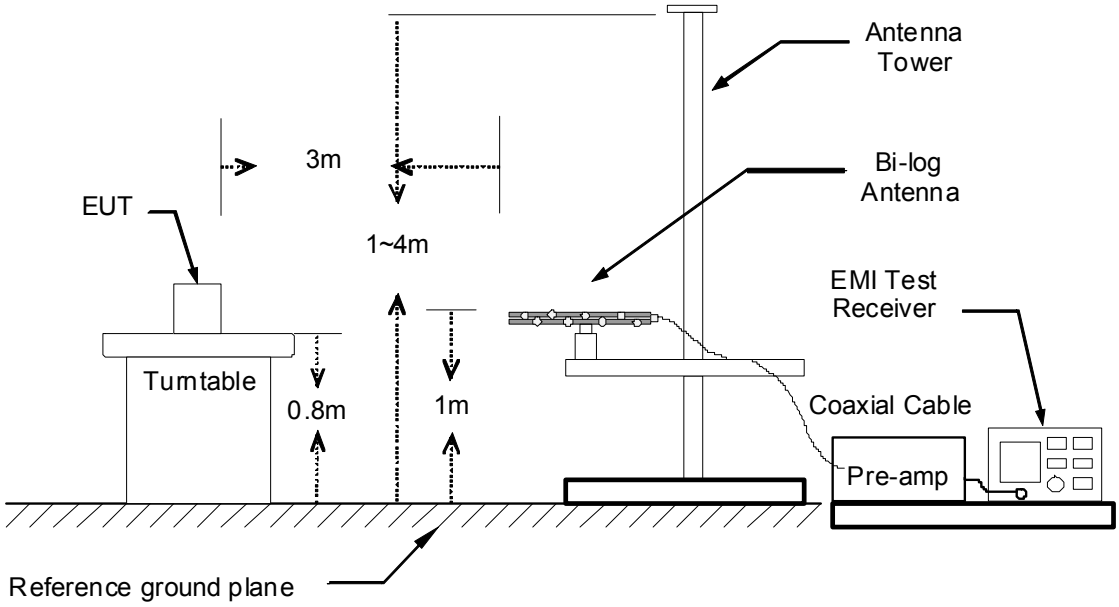
TEST SETUP

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

9kHz ~ 30MHz



30MHz ~ 1GHz



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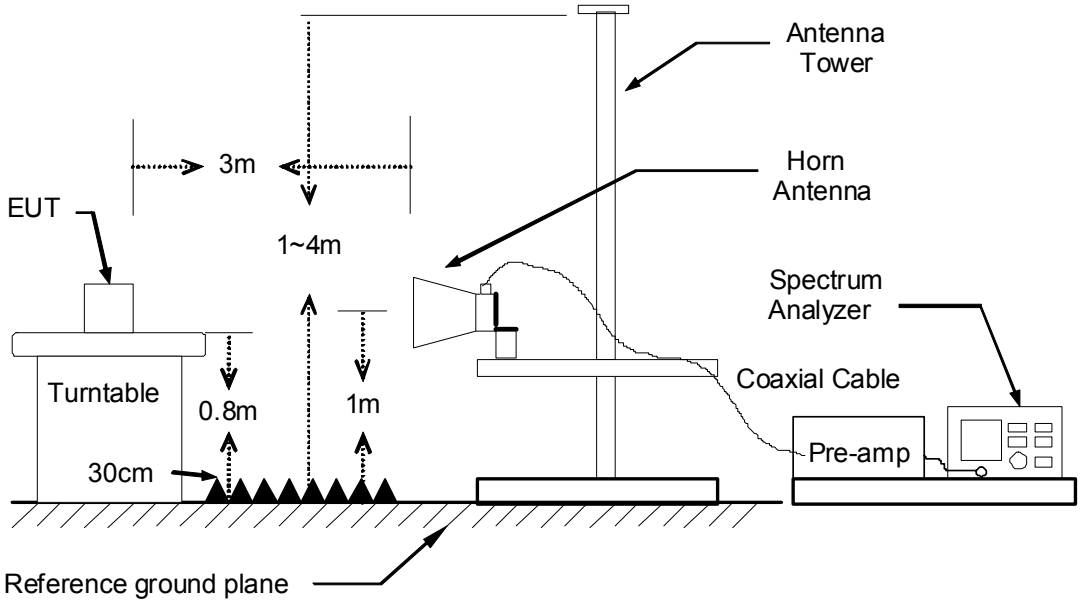
The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



TEST PROCEDURE

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground. 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.*

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TEST RESULTS

Below 1 GHz (9kHz ~ 30MHz)

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

Below 1 GHz (30MHz ~ 1GHz)

Product Name	Panel PC	Test By	Davis Tseng
Test Model	VM-521	Test Date	2014/11/20
Test Mode	TX Mode / External Antenna	Temp. & Humidity	24.5°C, 33%

966 Chamber_B at 3Meter / Horizontal						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
89.17	55.32	-19.55	35.77	43.50	-7.73	Peak
183.26	48.10	-14.60	33.50	43.50	-10.00	Peak
259.89	44.43	-12.88	31.56	46.00	-14.44	Peak
324.88	42.25	-10.98	31.27	46.00	-14.73	Peak
600.36	38.83	-5.82	33.01	46.00	-12.99	Peak
649.83	37.91	-5.36	32.55	46.00	-13.45	Peak

966 Chamber_B at 3Meter / Vertical						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
32.91	49.30	-15.08	34.22	40.00	-5.78	Peak
89.17	54.05	-19.55	34.51	43.50	-8.99	Peak
183.26	53.41	-14.60	38.81	43.50	-4.69	Peak
423.82	39.25	-9.02	30.23	46.00	-15.77	Peak
600.36	44.01	-5.82	38.19	46.00	-7.81	Peak
943.74	31.50	-0.19	31.31	46.00	-14.69	Peak

Remark:

1. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.*
2. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – PreAmp.Gain (dB)*
4. *Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)*
5. *Margin (dB) = Remark result (dBuV/m) - Quasi-peak limit (dBuV/m).*

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Product Name	Panel PC	Test By	Rex Chiu
Test Model	VM-521	Test Date	2014/11/10
Test Mode	TX Mode / Internal Antenna	Temp. & Humidity	26°C, 52%

966 Chamber_B at 3Meter / Horizontal						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
87.23	55.70	-19.28	36.42	40.00	-3.58	QP
173.56	52.41	-14.02	38.39	43.50	-5.11	Peak
324.88	44.43	-10.98	33.45	46.00	-12.55	Peak
365.62	43.31	-10.20	33.11	46.00	-12.89	Peak
482.99	39.09	-8.06	31.03	46.00	-14.97	Peak
600.36	39.29	-5.82	33.47	46.00	-12.53	Peak

966 Chamber_B at 3Meter / Vertical						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
32.91	50.60	-15.08	35.52	40.00	-4.48	QP
74.62	51.83	-17.06	34.77	40.00	-5.23	Peak
86.26	55.28	-19.15	36.12	40.00	-3.88	Peak
172.59	52.57	-13.95	38.62	43.50	-4.88	Peak
600.36	47.10	-5.82	41.28	46.00	-4.72	Peak
974.78	30.82	0.24	31.06	54.00	-22.94	Peak

Remark:

1. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.*
2. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
3. *Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – PreAmp.Gain (dB)*
4. *Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)*
5. *Margin (dB) = Remark result (dBuV/m) - Quasi-peak limit (dBuV/m).*

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Above 1 GHz

Product Name	Panel PC	Test By	Audi Chang
Test Model	VM-521	Test Date	2014/11/19
Test Mode	UNII Band 1/ IEEE 802.11a TX / CH Low / External Antenna	Temp. & Humidity	25°C, 50%

966 Chamber_B at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1705.00	47.45	---	-0.11	47.34	---	74.00	54.00	-6.66	Peak
2190.00	43.12	---	3.00	46.13	---	74.00	54.00	-7.87	Peak
4445.00	40.18	---	8.58	48.75	---	74.00	54.00	-5.25	Peak
6048.00	39.03	---	12.75	51.78	---	74.00	54.00	-2.22	Peak
7296.00	38.22	---	13.29	51.50	---	74.00	54.00	-2.50	Peak
8916.00	36.68	---	15.21	51.90	---	74.00	54.00	-2.10	Peak

966 Chamber_B at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1965.00	42.37	---	2.31	44.67	---	74.00	54.00	-9.33	Peak
3200.00	42.60	---	5.13	47.73	---	74.00	54.00	-6.27	Peak
4575.00	40.69	---	8.81	49.50	---	74.00	54.00	-4.50	Peak
6072.00	38.07	---	12.74	50.81	---	74.00	54.00	-3.19	Peak
6828.00	38.13	---	13.55	51.67	---	74.00	54.00	-2.33	Peak
8244.00	37.21	---	14.85	52.06	---	74.00	54.00	-1.94	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

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Product Name	Panel PC	Test By	Audi Chang
Test Model	VM-521	Test Date	2014/11/19
Test Mode	UNII Band 1/ IEEE 802.11a TX / CH Middle / External Antenna	Temp. & Humidity	25°C, 50%

966 Chamber_B at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2095.00	43.42	---	2.82	46.24	---	74.00	54.00	-7.76	Peak
3205.00	42.16	---	5.13	47.30	---	74.00	54.00	-6.70	Peak
3880.00	41.68	---	6.18	47.85	---	74.00	54.00	-6.15	Peak
6048.00	38.43	---	12.75	51.18	---	74.00	54.00	-2.82	Peak
7080.00	38.13	---	13.86	51.99	---	74.00	54.00	-2.01	Peak
8736.00	37.01	---	15.35	52.36	---	74.00	54.00	-1.64	Peak

966 Chamber_B at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2250.00	42.13	---	3.12	45.25	---	74.00	54.00	-8.75	Peak
3150.00	42.14	---	5.04	47.19	---	74.00	54.00	-6.81	Peak
3775.00	41.93	---	6.03	47.95	---	74.00	54.00	-6.05	Peak
6048.00	38.57	---	12.75	51.32	---	74.00	54.00	-2.68	Peak
7032.00	38.31	---	13.99	52.29	---	74.00	54.00	-1.71	Peak
8280.00	36.70	---	14.94	51.65	---	74.00	54.00	-2.35	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

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Product Name	Panel PC	Test By	Audi Chang
Test Model	VM-521	Test Date	2014/11/19
Test Mode	UNII Band 1/ IEEE 802.11a TX / CH High / External Antenna	Temp. & Humidity	25°C, 50%

966 Chamber_B at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1750.00	46.24	---	0.31	46.55	---	74.00	54.00	-7.45	Peak
3220.00	42.37	---	5.16	47.53	---	74.00	54.00	-6.47	Peak
4560.00	39.97	---	8.82	48.79	---	74.00	54.00	-5.21	Peak
6084.00	38.75	---	12.73	51.48	---	74.00	54.00	-2.52	Peak
7128.00	38.66	---	13.73	52.39	---	74.00	54.00	-1.61	Peak
8208.00	37.63	---	14.75	52.38	---	74.00	54.00	-1.62	Peak

966 Chamber_B at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2810.00	42.60	---	4.34	46.94	---	74.00	54.00	-7.06	Peak
3635.00	41.43	---	5.82	47.26	---	74.00	54.00	-6.74	Peak
4455.00	39.81	---	8.62	48.44	---	74.00	54.00	-5.56	Peak
6216.00	38.08	---	12.67	50.76	---	74.00	54.00	-3.24	Peak
7848.00	37.68	---	13.76	51.44	---	74.00	54.00	-2.56	Peak
8976.00	36.82	---	15.17	51.99	---	74.00	54.00	-2.01	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

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Product Name	Panel PC	Test By	Audi Chang
Test Model	VM-521	Test Date	2014/11/19
Test Mode	UNII Band 1/ IEEE 802.11ac VHT20 TX / CH Low / External Antenna	Temp. & Humidity	25°C, 50%

966 Chamber_B at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1630.00	46.53	---	-0.80	45.72	---	74.00	54.00	-8.28	Peak
2860.00	42.59	---	4.46	47.05	---	74.00	54.00	-6.95	Peak
3330.00	42.23	---	5.34	47.57	---	74.00	54.00	-6.43	Peak
6036.00	38.01	---	12.75	50.77	---	74.00	54.00	-3.23	Peak
7704.00	37.99	---	13.34	51.34	---	74.00	54.00	-2.66	Peak
8400.00	37.09	---	15.26	52.35	---	74.00	54.00	-1.65	Peak

966 Chamber_B at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1970.00	43.28	---	2.35	45.63	---	74.00	54.00	-8.37	Peak
3200.00	42.39	---	5.13	47.52	---	74.00	54.00	-6.48	Peak
4535.00	40.02	---	8.83	48.86	---	74.00	54.00	-5.14	Peak
6132.00	38.81	---	12.71	51.53	---	74.00	54.00	-2.47	Peak
6768.00	38.32	---	13.36	51.68	---	74.00	54.00	-2.32	Peak
7740.00	38.07	---	13.45	51.52	---	74.00	54.00	-2.48	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

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Product Name	Panel PC	Test By	Audi Chang
Test Model	VM-521	Test Date	2014/11/19
Test Mode	UNII Band 1/ IEEE 802.11ac VHT20 TX / CH Middle / External Antenna	Temp. & Humidity	25°C, 50%

966 Chamber_B at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1750.00	45.93	---	0.31	46.24	---	74.00	54.00	-7.76	Peak
3055.00	42.10	---	4.88	46.98	---	74.00	54.00	-7.02	Peak
4140.00	40.06	---	7.05	47.11	---	74.00	54.00	-6.89	Peak
6132.00	38.80	---	12.71	51.51	---	74.00	54.00	-2.49	Peak
7308.00	38.30	---	13.26	51.56	---	74.00	54.00	-2.44	Peak
8832.00	37.22	---	15.28	52.50	---	74.00	54.00	-1.50	Peak

966 Chamber_B at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2560.00	42.21	---	3.75	45.96	---	74.00	54.00	-8.04	Peak
3240.00	42.29	---	5.19	47.48	---	74.00	54.00	-6.52	Peak
4155.00	40.65	---	7.12	47.77	---	74.00	54.00	-6.23	Peak
6048.00	39.47	---	12.75	52.21	---	74.00	54.00	-1.79	Peak
6948.00	38.42	---	13.91	52.33	---	74.00	54.00	-1.67	Peak
8316.00	36.70	---	15.04	51.74	---	74.00	54.00	-2.26	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

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Product Name	Panel PC	Test By	Audi Chang
Test Model	VM-521	Test Date	2014/11/19
Test Mode	UNII Band 1/ IEEE 802.11ac VHT20 TX / CH High / External Antenna	Temp. & Humidity	25°C, 50%

966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2535.00	41.80	---	3.69	45.50	---	74.00	54.00	-8.50	Peak
3330.00	41.75	---	5.34	47.09	---	74.00	54.00	-6.91	Peak
4010.00	41.70	---	6.40	48.10	---	74.00	54.00	-5.90	Peak
6072.00	38.08	---	12.74	50.82	---	74.00	54.00	-3.18	Peak
6996.00	38.40	---	14.06	52.46	---	74.00	54.00	-1.54	Peak
8448.00	36.62	---	15.39	52.01	---	74.00	54.00	-1.99	Peak

966 Chamber_B at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2305.00	42.29	---	3.23	45.52	---	74.00	54.00	-8.48	Peak
3110.00	41.71	---	4.97	46.68	---	74.00	54.00	-7.32	Peak
4120.00	40.32	---	6.95	47.27	---	74.00	54.00	-6.73	Peak
6192.00	38.10	---	12.69	50.78	---	74.00	54.00	-3.22	Peak
6900.00	38.60	---	13.77	52.36	---	74.00	54.00	-1.64	Peak
8136.00	38.03	---	14.56	52.59	---	74.00	54.00	-1.41	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

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Product Name	Panel PC	Test By	Audi Chang
Test Model	VM-521	Test Date	2014/11/19
Test Mode	UNII Band 1/ IEEE 802.11ac VHT40 TX / CH Low / External Antenna	Temp. & Humidity	25°C, 50%

966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1785.00	46.99	---	0.63	47.63	---	74.00	54.00	-6.37	Peak
3460.00	41.27	---	5.56	46.83	---	74.00	54.00	-7.17	Peak
4480.00	40.18	---	8.75	48.93	---	74.00	54.00	-5.07	Peak
6000.00	38.40	---	12.77	51.17	---	74.00	54.00	-2.83	Peak
7572.00	38.24	---	12.96	51.19	---	74.00	54.00	-2.81	Peak
8340.00	36.10	---	15.10	51.20	---	74.00	54.00	-2.80	Peak

966 Chamber_B at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1975.00	42.03	---	2.40	44.43	---	74.00	54.00	-9.57	Peak
2780.00	42.44	---	4.27	46.71	---	74.00	54.00	-7.29	Peak
3780.00	41.99	---	6.03	48.02	---	74.00	54.00	-5.98	Peak
6108.00	38.76	---	12.72	51.48	---	74.00	54.00	-2.52	Peak
6768.00	37.80	---	13.36	51.17	---	74.00	54.00	-2.83	Peak
7728.00	39.04	---	13.41	52.45	---	74.00	54.00	-1.55	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

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Product Name	Panel PC	Test By	Audi Chang
Test Model	VM-521	Test Date	2014/11/19
Test Mode	UNII Band 1/ IEEE 802.11ac VHT40 TX / CH High / External Antenna	Temp. & Humidity	25°C, 50%

966 Chamber_B at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2015.00	42.71	---	2.66	45.37	---	74.00	54.00	-8.63	Peak
2660.00	42.62	---	3.99	46.61	---	74.00	54.00	-7.39	Peak
3710.00	41.20	---	5.93	47.14	---	74.00	54.00	-6.86	Peak
6228.00	38.04	---	12.67	50.71	---	74.00	54.00	-3.29	Peak
7476.00	39.78	---	12.81	52.60	---	74.00	54.00	-1.40	Peak
8976.00	37.29	---	15.17	52.46	---	74.00	54.00	-1.54	Peak

966 Chamber_B at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1910.00	42.88	---	1.79	44.68	---	74.00	54.00	-9.32	Peak
3190.00	42.88	---	5.11	47.99	---	74.00	54.00	-6.01	Peak
3835.00	41.42	---	6.11	47.53	---	74.00	54.00	-6.47	Peak
6072.00	38.65	---	12.74	51.39	---	74.00	54.00	-2.61	Peak
7836.00	38.74	---	13.72	52.47	---	74.00	54.00	-1.53	Peak
8988.00	37.36	---	15.16	52.52	---	74.00	54.00	-1.48	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

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Product Name	Panel PC	Test By	Audi Chang
Test Model	VM-521	Test Date	2014/11/19
Test Mode	UNII Band 1/ IEEE 802.11ac VHT80 TX / CH Low / External Antenna	Temp. & Humidity	25°C, 50%

966 Chamber_B at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2310.00	42.91	---	3.24	46.15	---	74.00	54.00	-7.85	Peak
3235.00	42.60	---	5.18	47.78	---	74.00	54.00	-6.22	Peak
3970.00	41.24	---	6.31	47.55	---	74.00	54.00	-6.45	Peak
6108.00	38.87	---	12.72	51.60	---	74.00	54.00	-2.40	Peak
7308.00	38.89	---	13.26	52.14	---	74.00	54.00	-1.86	Peak
8220.00	37.70	---	14.79	52.48	---	74.00	54.00	-1.52	Peak

966 Chamber_B at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2235.00	42.23	---	3.09	45.32	---	74.00	54.00	-8.68	Peak
3215.00	41.55	---	5.15	46.70	---	74.00	54.00	-7.30	Peak
4580.00	40.31	---	8.81	49.12	---	74.00	54.00	-4.88	Peak
6156.00	38.79	---	12.70	51.49	---	74.00	54.00	-2.51	Peak
7572.00	38.50	---	12.96	51.46	---	74.00	54.00	-2.54	Peak
9048.00	37.15	---	15.23	52.38	---	74.00	54.00	-1.62	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

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Product Name	Panel PC	Test By	Audi Chang
Test Model	VM-521	Test Date	2014/11/19
Test Mode	UNII Band 2A / IEEE 802.11a TX / CH Low / External Antenna	Temp. & Humidity	25°C, 50%

966 Chamber_B at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1665.00	45.03	---	-0.48	44.55	---	74.00	54.00	-9.45	Peak
1795.00	44.43	---	0.73	45.16	---	74.00	54.00	-8.84	Peak
3065.00	41.79	---	4.90	46.69	---	74.00	54.00	-7.31	Peak
6120.00	38.21	---	12.72	50.93	---	74.00	54.00	-3.07	Peak
6984.00	38.43	---	14.02	52.46	---	74.00	54.00	-1.54	Peak
8160.00	37.46	---	14.63	52.09	---	74.00	54.00	-1.91	Peak

966 Chamber_B at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2205.00	42.03	---	3.03	45.06	---	74.00	54.00	-8.94	Peak
3065.00	42.37	---	4.90	47.27	---	74.00	54.00	-6.73	Peak
4430.00	40.00	---	8.50	48.50	---	74.00	54.00	-5.50	Peak
6216.00	37.73	---	12.67	50.40	---	74.00	54.00	-3.60	Peak
7812.00	38.01	---	13.65	51.66	---	74.00	54.00	-2.34	Peak
9096.00	36.97	---	15.31	52.28	---	74.00	54.00	-1.72	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

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Product Name	Panel PC	Test By	Audi Chang
Test Model	VM-521	Test Date	2014/11/19
Test Mode	UNII Band 2A / IEEE 802.11a TX / CH Middle / External Antenna	Temp. & Humidity	25°C, 50%

966 Chamber_B at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1715.00	47.75	---	-0.01	47.73	---	74.00	54.00	-6.27	Peak
1835.00	45.41	---	1.10	46.51	---	74.00	54.00	-7.49	Peak
3330.00	42.10	---	5.34	47.45	---	74.00	54.00	-6.55	Peak
6180.00	37.99	---	12.69	50.68	---	74.00	54.00	-3.32	Peak
7260.00	38.14	---	13.38	51.52	---	74.00	54.00	-2.48	Peak
7992.00	37.43	---	14.18	51.61	---	74.00	54.00	-2.39	Peak

966 Chamber_B at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2950.00	42.49	---	4.67	47.16	---	74.00	54.00	-6.84	Peak
3130.00	43.32	---	5.01	48.33	---	74.00	54.00	-5.67	Peak
3865.00	41.59	---	6.16	47.75	---	74.00	54.00	-6.25	Peak
6240.00	38.29	---	12.66	50.95	---	74.00	54.00	-3.05	Peak
7956.00	37.71	---	14.07	51.78	---	74.00	54.00	-2.22	Peak
9072.00	36.71	---	15.27	51.98	---	74.00	54.00	-2.02	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

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Product Name	Panel PC	Test By	Audi Chang
Test Model	VM-521	Test Date	2014/11/19
Test Mode	UNII Band 2A / IEEE 802.11a TX / CH High / External Antenna	Temp. & Humidity	25°C, 50%

966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1600.00	47.14	---	-1.08	46.05	---	74.00	54.00	-7.95	Peak
2390.00	42.13	---	3.39	45.52	---	74.00	54.00	-8.48	Peak
3225.00	41.74	---	5.17	46.91	---	74.00	54.00	-7.09	Peak
6024.00	38.03	---	12.76	50.79	---	74.00	54.00	-3.21	Peak
7188.00	38.84	---	13.57	52.41	---	74.00	54.00	-1.59	Peak
8400.00	36.92	---	15.26	52.18	---	74.00	54.00	-1.82	Peak

966 Chamber_B at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2320.00	42.36	---	3.26	45.62	---	74.00	54.00	-8.38	Peak
3110.00	42.41	---	4.97	47.39	---	74.00	54.00	-6.61	Peak
3695.00	41.48	---	5.91	47.39	---	74.00	54.00	-6.61	Peak
6108.00	38.01	---	12.72	50.73	---	74.00	54.00	-3.27	Peak
7476.00	39.24	---	12.81	52.05	---	74.00	54.00	-1.95	Peak
8448.00	37.16	---	15.39	52.55	---	74.00	54.00	-1.45	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

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Product Name	Panel PC	Test By	Audi Chang
Test Model	VM-521	Test Date	2014/11/19
Test Mode	UNII Band 2A / IEEE 802.11ac VHT20 TX / CH Low / External Antenna	Temp. & Humidity	25°C, 50%

966 Chamber_B at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1710.00	46.87	---	-0.06	46.81	---	74.00	54.00	-7.19	Peak
2030.00	43.24	---	2.69	45.93	---	74.00	54.00	-8.07	Peak
3140.00	42.60	---	5.03	47.63	---	74.00	54.00	-6.37	Peak
6000.00	38.11	---	12.77	50.88	---	74.00	54.00	-3.12	Peak
8100.00	37.74	---	14.47	52.21	---	74.00	54.00	-1.79	Peak
9144.00	36.97	---	15.38	52.35	---	74.00	54.00	-1.65	Peak

966 Chamber_B at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2050.00	42.10	---	2.73	44.83	---	74.00	54.00	-9.17	Peak
2410.00	42.59	---	3.43	46.03	---	74.00	54.00	-7.97	Peak
3240.00	42.21	---	5.19	47.40	---	74.00	54.00	-6.60	Peak
6108.00	38.91	---	12.72	51.63	---	74.00	54.00	-2.37	Peak
7704.00	37.97	---	13.34	51.31	---	74.00	54.00	-2.69	Peak
8856.00	36.94	---	15.26	52.20	---	74.00	54.00	-1.80	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

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Product Name	Panel PC	Test By	Audi Chang
Test Model	VM-521	Test Date	2014/11/19
Test Mode	UNII Band 2A / IEEE 802.11ac VHT20 TX / CH Middle / External Antenna	Temp. & Humidity	25°C, 50%

966 Chamber_B at 3Meter / Horizontal

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1600.00	45.33	---	-1.08	44.25	---	74.00	54.00	-9.75	Peak
2590.00	42.18	---	3.82	46.00	---	74.00	54.00	-8.00	Peak
3885.00	42.00	---	6.18	48.19	---	74.00	54.00	-5.81	Peak
6132.00	38.57	---	12.71	51.28	---	74.00	54.00	-2.72	Peak
6924.00	38.48	---	13.84	52.32	---	74.00	54.00	-1.68	Peak
8412.00	36.92	---	15.30	52.21	---	74.00	54.00	-1.79	Peak

966 Chamber_B at 3Meter / Vertical

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
2335.00	42.27	---	3.29	45.56	---	74.00	54.00	-8.44	Peak
3330.00	41.54	---	5.34	46.89	---	74.00	54.00	-7.11	Peak
4485.00	39.64	---	8.78	48.41	---	74.00	54.00	-5.59	Peak
6132.00	38.44	---	12.71	51.15	---	74.00	54.00	-2.85	Peak
7248.00	38.71	---	13.42	52.13	---	74.00	54.00	-1.87	Peak
8376.00	37.25	---	15.20	52.45	---	74.00	54.00	-1.55	Peak

Remark:

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Average test would be performed if the peak result were greater than the average limit.*
3. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
5. *Result = Reading + Correction Factor*
   Margin = Result – Limit
   Remark Peak = Result(PK) – Limit(AV)
   Remark AVG = Result(AV) – Limit(AV)

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