TEST REPORT

Report Number: R13778670-E1

Applicant	:	iRobot Corporation 8 Crosby Drive Bedford, MA 01730, USA
Model	:	AXG-Y1
FCC ID	:	UFE-AXGY1
IC	:	6652A-AXGY1
EUT Description	:	Dual Band Radio Module This report covers the 5GHz WLAN testing.
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART E ISED RSS-247 ISSUE 2 ISED RSS-GEN ISSUE 5

Date Of Issue:
2021-06-07

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NVLAP TESTING

NVLAP Lab code: 200246-0

REPORT REVISION HISTORY

Ver.	Issue Date	Revisions	Revised By
1	2021-05-11	Initial Issue	Brian T. Kiewra
2	2021-05-18	Added Reference to R13778670-EP1 Photos Exhibit Added additional calibration notes to equipment tables	Cristian Melara
3	2021-06-07	Revised FW version	Cristian Melara

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: iRobot Corporation
8 Crosby Drive
Bedford, MA 01730, USA

EUT DESCRIPTION: Dual Band Radio Module

MODEL: AXG-Y1

SERIAL NUMBER: SS0040BWW, SS0040BHN, SS040B86, SS0040B59, SS0040BXP, SS0040BHN

DATE SAMPLE RECEIVED: 2020-05-04

DATE TESTED: 2020-05-08 to 2021-04-29

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart E	Complies
ISED RSS-247 Issue 2	Complies
ISED RSS-GEN Issue 5	Complies

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

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2. TEST RESULT SUMMARY

FCC Clause	ISED Clause	Requirement	Result	Comment
See Comment		Duty Cycle	Reporting purposes only	Per ANSI C63.10, Section 12.2.
See Comment	RSS-GEN 6.7	26dB BW/99% OBW	Reporting purposes only	Per ANSI C63.10 Sections 6.9.2 and 6.9.3
15.407 (e)	RSS-247 6.2.4.1	6 dB BW	Compliant	None.
15.407 (a) (1-4), (h) (1)	RSS-247 6.2	Output Power	Compliant	None.
15.407 (a) (1-3, 5)	RSS-247 6.2	PSD	Compliant	None.
15.209, 15.205, 15.407 (b)	RSS-GEN 8.9, 8.10, RSS-247 6.2	Radiated Emissions	Compliant	None.
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions	Compliant	None.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with;

- FCC CFR 47 Part 2
- FCC CFR 47 Part 15,
- FCC KDB 662911 D01 v02r01,
- FCC KDB 905462 D06 v02
- FCC KDB 789033 D02 v02r01,
- ANSI C63.10-2013,
- RSS-GEN Issue 5
- RSS-247 Issue 2
-

4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Drive, Research Triangle Park, North Carolina, USA and 2800 Perimeter Park Dr., Suite B, Morrisville, North Carolina, USA. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

12 Laboratory Dr.	2800 Perimeter Park Dr.
Site Code: 2180C	
☐ Chamber A RTP	☒ North Chamber
☒ Chamber C RTP	☒ South Chamber

The above test sites and facilities are covered under FCC Test Firm Registration # 703469. Chambers above are covered under Industry Canada company address and respective code.

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0

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5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	1.22%
RF output power, conducted	1.3 dB (PK) 0.45 dB (AV)
RF output power, radiated (SAC) <180 MHz	6.18 dB
RF output power, radiated (SAC) <180 MHz	3.23 dB
Power Spectral Density, conducted	2.47 dB
Unwanted Emissions, conducted	1.94 dB
All emissions, radiated	5.86 dB
Conducted Emissions (0.150-30MHz) - LISN	3.40 dB
Temperature	0.57°C
Humidity	3.39%
DC Supply voltages	1.70%
Time	3.39%

Uncertainty figures are valid to a confidence level of 95%.

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5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:
Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:
Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
36.5 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV

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6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a Dual band Radio module supporting 2.4GHz WLAN and 5GHz WLAN as well as BT and BLE. This report covers the 5GHz WLAN testing.

6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

PCB Antenna

5.2 GHz BAND (FCC/IC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.2 GHz band, 1TX			
5180-5240	802.11a	12.76	18.88
5180-5240	802.11n HT20	12.86	19.32
5190-5230	802.11n HT40	11.79	15.10
5210	802.11ac VHT80	11.80	15.14

5.3 GHz BAND (FCC/IC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.3 GHz band, 1TX			
5260 - 5320	802.11a	17.22	52.72
5260 - 5320	802.11n HT20	17.12	51.52
5270 - 5310	802.11n HT40	14.34	27.16
5290	802.11ac VHT80	11.78	15.07

5.6 GHz BAND (FCC/IC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.6 GHz band, 1TX			
5500-5720	802.11a	16.97	49.77
5500-5720	802.11n HT20	16.72	46.99
5510-5710	802.11n HT40	16.73	47.10
5530-5690	802.11ac VHT80	15.86	38.55

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5.8 GHz BAND (FCC/IC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.8 GHz band, 1TX			
5745-5825	802.11a	16.74	47.21
5745-5825	802.11n HT20	16.64	46.13
5755-5795	802.11n HT40	16.90	48.98
5775	802.11ac VHT80	15.39	34.56

External Antenna

5.2 GHz BAND (FCC/IC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.2 GHz band, 1TX			
5180-5240	802.11a	12.31	17.02
5180-5240	802.11n HT20	12.16	16.44
5190-5230	802.11n HT40	10.62	11.53
5210	802.11ac VHT80	10.82	12.08

5.3 GHz BAND (FCC/IC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.3 GHz band, 1TX			
5260 - 5320	802.11a	15.26	33.57
5260 - 5320	802.11n HT20	15.03	31.84
5270 - 5310	802.11n HT40	11.87	15.38
5290	802.11ac VHT80	10.04	10.09

5.6 GHz BAND (FCC/IC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.6 GHz band, 1TX			
5500-5720	802.11a	13.98	25.00
5500-5720	802.11n HT20	14.34	27.16
5510-5710	802.11n HT40	13.10	20.42
5530-5690	802.11ac VHT80	13.31	21.43

5.8 GHz BAND (FCC/IC)

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.8 GHz band, 1TX			
5745-5825	802.11a	14.62	28.97
5745-5825	802.11n HT20	14.36	27.29
5755-5795	802.11n HT40	14.68	29.38
5775	802.11ac VHT80	13.66	23.23

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6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PCB and a flexible external antennas for diversity, with a maximum gain of 4.31 dBi (PCB) and 6.37 dBi (external).

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was sextant-5.0.0_release
The test utility software used during testing was QRCT version: 4.0.00127.0.

6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power and PSD as worst-case scenario.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle and high channels.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that X orientation was worst-case orientation for the PCB antenna and Z orientation was worst-case orientation for the External antenna; therefore, all final radiated testing was performed with the EUT in X orientation for the PCB antenna and in Z orientation for the external antenna.

Conducted testing was performed using PCB antenna port as worst-case, with the exception of power and PSD which was done on both antenna ports.

Radiated and AC mains emissions testing were performed using both antennas.

Worst-case data rates as were:

802.11a mode: 6 Mbps
802.11n HT20mode: MCS0
802.11n HT40mode: MCS0
802.11ac VHT80 mode: MCS0

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6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Lenovo	T450	PC-OA2UQS	PD97265NGU
Laptop Charger	Lenovo	ADLX65NCC2A	11S36200284ZZ1005380J8	NA

I/O CABLES

I/O Cable List						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	Mains	1	Terminal	Single conductor	<3m	Provides DC power to PCB

TEST SETUP

Test software from a laptop exercised the radio in the EUT.

SETUP DIAGRAMS

Please refer to R13778670-EP1 for setup diagrams.

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7. MEASUREMENT METHOD

On Time and Duty Cycle: KDB 789033 D02 v02r01, Section B.

6 dB Emission BW: KDB 789033 D02 v02r01, Section C.2

26 dB Emission BW: KDB 789033 D02 v02r01, Section C.1

99% Occupied BW: KDB 789033 D02 v02r01, Section D.

Conducted Output Power: KDB 789033 D02 v02r01, Section E.3.b (Method PM-G)

Power Spectral Density: KDB 789033 D02 v02r01, Section F

Unwanted emissions in restricted bands: KDB 789033 D02 v02r01, Sections G.1, G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v02r01, Sections G.2, G.3, G.4, and G.5.

AC Power Line Conducted Emissions: ANSI C63.10-2013, Section 6.2.

General Radiated Emissions: ANSI C63.10-2013 Section 6.3-6.6, 6.10

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8. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report. Note – only calibrated equipment was used at time of test.:

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - North Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	1-18 GHz				
AT0069	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2019-05-15	2020-05-15
AT0069	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2020-05-26	2021-05-26
AT0072	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2020-04-27	2021-04-27
	18-40 GHz				
AT0076	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2019-11-07	2020-11-07
AT0077	Horn Antenna, 26-40GHz	ARA	MWH-2640/B	2019-11-07	2020-11-07
	Gain-Loss Chains				
N-SAC03	Gain-loss string: 1-18GHz	Various	Various	2020-03-15	2021-03-15
N-SAC04	Gain-loss string: 18-40GHz	Various	Various	2020-03-22	2021-03-22
	Receiver & Software				
SA0025	Spectrum Analyzer	Agilent	N9030A	2020-03-17	2021-03-17
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
	Additional Equipment used				
s/n 181474341	Environmental Meter	Fisher Scientific	15-077-963	2018-07-27	2020-07-27
76021	DC Regulated Power Supply	CircuitSpecialists.Com	CSI3005X5	N/A	N/A
76022	DC Regulated Power Supply	CircuitSpecialists.Com	CSI3005X5	N/A	N/A

NOTES:

1. For equipment listed above that was calibrated during the testing period, please note the equipment was used for testing after calibration.
2. For equipment listed above that has a calibration due date during the testing period, the testing was completed before the equipment expiration date.

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Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - South Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	0.009-30MHz	**(Loop Ant.)**			
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2019-08-08	2020-08-08
	30-1000 MHz				
AT0074	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2019-07-16	2020-07-16
	1-18 GHz				
AT0078	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2019-10-28	2020-10-28
	Gain-Loss Chains				
S-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2020-04-23	2021-04-23
S-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2020-04-23	2021-04-23
S-SAC03	Gain-loss string: 1-18GHz	Various	Various	2020-03-17, 2020-05-15	2021-03-17, 2021-05-15
	Receiver & Software				
SA0027	Spectrum Analyzer	Agilent	N9030A	2019-05-15	2020-05-31
SA0027	Spectrum Analyzer	Agilent	N9030A	2020-06-10	2021-06-10
197954 (In service @noon on 05/31/2020)	Spectrum Analyzer	Rohde & Schwarz	ESW44	2020-03-27	2021-03-27
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
	Additional Equipment used				
s/n 181474409	Environmental Meter	Fisher Scientific	15-077-963	2018-07-27	2020-07-27
76022	DC Regulated Power Supply	CircuitSpecialists.Com	CSI3005X5	N/A	N/A
76021	DC Regulated Power Supply	CircuitSpecialists.Com	CSI3005X5	N/A	N/A

NOTES:

1. For equipment listed above that was calibrated during the testing period, please note the equipment was used for testing after calibration.
2. For equipment listed above that has a calibration due date during the testing period, the testing was completed before the equipment expiration date.

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Test Equipment Used - Radiated Disturbance Emissions (E-field) – Chamber C

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	1-18 GHz				
AT0062	Horn Antenna	ETS-Lindgren	3117	2020-01-30	2021-01-30
	Gain-Loss Chains				
C-SAC02	Gain-loss string: 1-18GHz	Various	Various	2020-03-03	2021-03-03
C-SAC02 Path 7	Gain-loss string 1-7GHz	Various	Various	2020-04-03	2021-04-03
	Receiver & Software				
SA0018	Spectrum Analyzer	Agilent	PXA (N9030A)	2020-03-02	2021-03-02
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
	Additional Equipment used				
HI0085	Temp/Humid/Pressure Meter	EXTECH	SD700	2019-04-08	2020-04-08
HI0085	Temp/Humid/Pressure Meter	EXTECH	SD700	2020-04-20	2021-04-30
HPF012	Filter	Micro-Tronics	HPM18129	2020-02-19	2021-01-19

NOTES:

1. For equipment listed above that was calibrated during the testing period, please note the equipment was used for testing after calibration.
2. For equipment listed above that has a calibration due date during the testing period, the testing was completed before the equipment expiration date.

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Line Conducted Equipment List

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL087	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3W06143-240	2020-03-26	2021-03-26
s/n 161024885	Environmental Meter	Fisher Scientific	15-0770-963	2018-09-04	2020-09-04
LISN003	LISN, 50-ohm/50-uH, 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50-25-2-01-550V	2019-08-19	2020-08-19
75141 (PRE0101521)	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2019-08-20	2020-08-20
ATA222 (In service 03/26/2020)	Transient Limiter, 0.009-100MHz	Electro-Metrics	EM-7600	2020-03-26	2021-03-26
PS214	AC Power Source	Elgar	CW2501M (s/n 1523A02396)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5 June 15, 2019	NA	NA
76021	DC Power Supply	CircuitSpecialist.com	CSI3005X5	NA	NA
E3633A 0EM	DC Power Supply	Keysight	E3633A	NA	NA

NOTES:

1. For equipment listed above that was calibrated during the testing period, please note the equipment was used for testing after calibration.
2. For equipment listed above that has a calibration due date during the testing period, the testing was completed before the equipment expiration date.

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Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	Conducted Room 1				
72822 (PRE0100902)	Spectrum Analyzer	Agilent Technologies	E4446A	2020-01-02	2021-01-02
T177(PRE0079253)	Spectrum Analyzer	Agilent Technologies	E4446A	2020-04-30	2021-04-30
SA0025	Spectrum Analyzer	Agilent	N9030A	2021-04-01	2022-04-01
PWM004 (PRE0137346)	RF Power Meter	Keysight Technologies	N1911A	2019-08-23, 2020-07-31	2020-08-23, 2021-07-31
PWS004 (PRE0126443)	Peak and Avg Power Sensor, 50MHz to 6GHz	Keysight Technologies	E9323A	2019-08-23, 2020-08-12	2020-08-23, 2021-08-12
HI0090	Environmental Meter	Fisher Scientific	15-077-963	2019-06-17	2020-06-17
SN 181562858	Environmental Meter	Fisher Scientific	14-650-118	2018-09-04	2020-09-04
HI0091	Environmental Meter	Fisher Scientific	15-077-963	2020-06-26	2021-06-26
76022	DC Regulated Power Supply	CircuitSpecialists.Com	CSI3005X5	N/A	N/A
SOFTEMI	EMC Software	UL	Version 2020.3.11, Version 2020.04.17 Version 2020.5.18 Version 2020.9.1 Version 2021.04.28	NA	NA
72822 (PRE0100902)	Spectrum Analyzer	Agilent Technologies	E4446A	2020-01-02	2021-01-02
SA0027	Spectrum Analyzer	Keysight Technologies	N9030A	2020-06-10	2021-06-10
PWM002 (PRE0137344)	RF Power Meter	Keysight Technologies	N1911A	2019-08-23, 2020-07-31	2020-08-23, 2021-07-31
PWS002 (PRE0137348)	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2019-08-23	2020-08-23
PWM003 (PRE0137345)	RF Power Meter	Keysight Technologies	N1911A	2019-08-23, 2020-08-28	2020-08-23, 2021-08-28
PWS005 (PRE0126445)	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2020-05-26	2021-05-26
PWS011 (10082)	Wideband Power Sensor	Boonton	55006	2019-08-09, 2020-08-21	2020-08-09, 2021-08-21
SN 181474341	Environmental Meter	Fisher Scientific	15-077-963	2018-07-27	2020-07-27
HI0090	Environmental Meter	Fisher Scientific	15-077-963	2020-06-26	2021-06-26
30811	DC Regulated Power Supply	Tenma	72-6180A	N/A	N/A

NOTES:

1. For equipment listed above that was calibrated during the testing period, please note the equipment was used for testing after calibration.
2. For equipment listed above that has a calibration due date during the testing period, the testing was completed before the equipment expiration date.

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9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB) Power/PSD	Duty Cycle Correction Factor (dB) Radiated	1/B Minimum VBW (kHz)
802.11a 1TX	1.431	1.469	0.974	97.41%	0.11	0.23	0.699
802.11n HT20 1TX	1.340	1.378	0.972	97.24%	0.12	0.24	0.746
802.11n HT40 1TX	0.664	0.701	0.947	94.75%	0.23	0.47	1.507
802.11ac VHT80 1TX	0.331	0.368	0.900	90.02%	0.46	0.91	3.020

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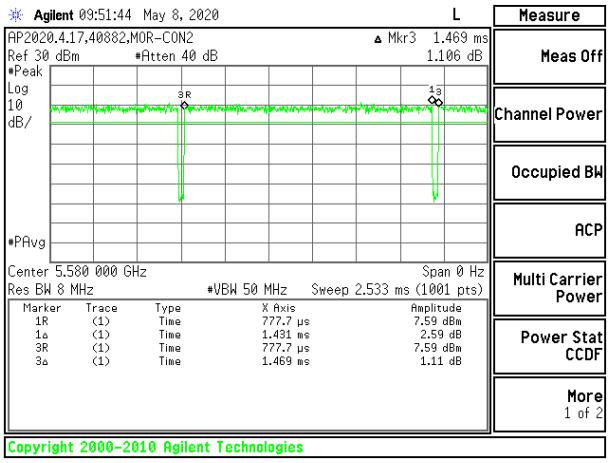
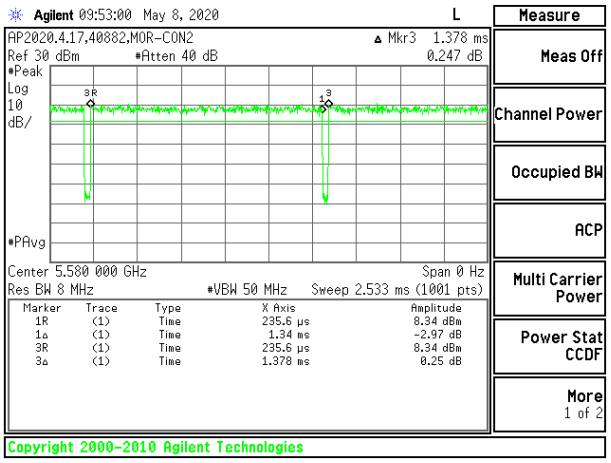
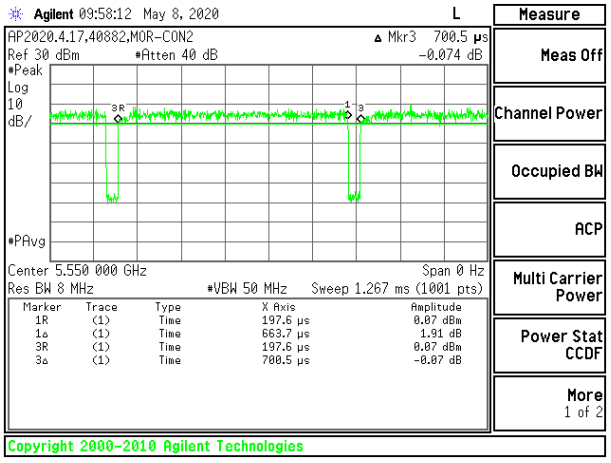
DUTY CYCLE PLOTS



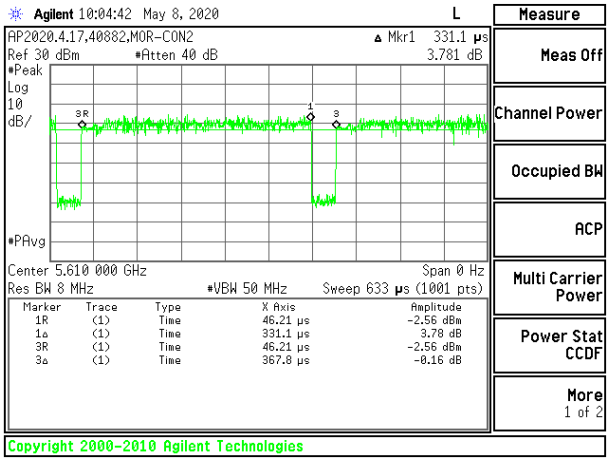
DUTY CYCLE 802.11a 1TX MODE



DUTY CYCLE 802.11n HT20 1TX MODE



DUTY CYCLE 802.11n HT40 1TX MODE



DUTY CYCLE 802.11ac VHT80 1TX MODE

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9.2. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

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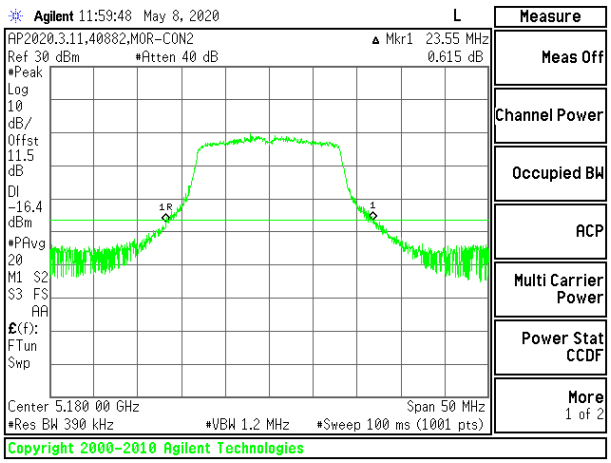
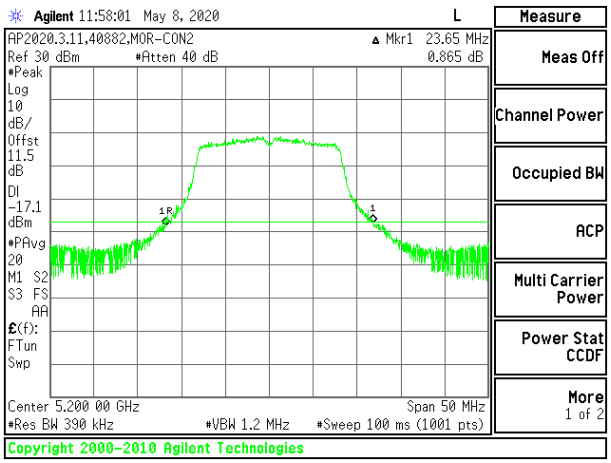
9.2.1. 802.11a MODE IN THE 5.2 GHz BAND

1TX PCB Antenna MODE

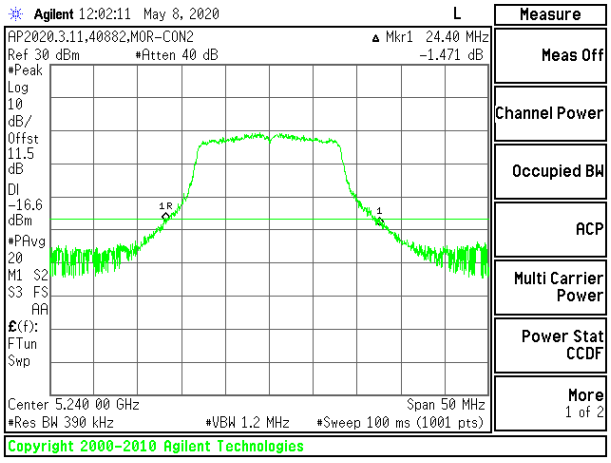
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5180	23.55
Mid	5200	23.65
High	5240	24.40



LOW CHANNEL



MID CHANNEL



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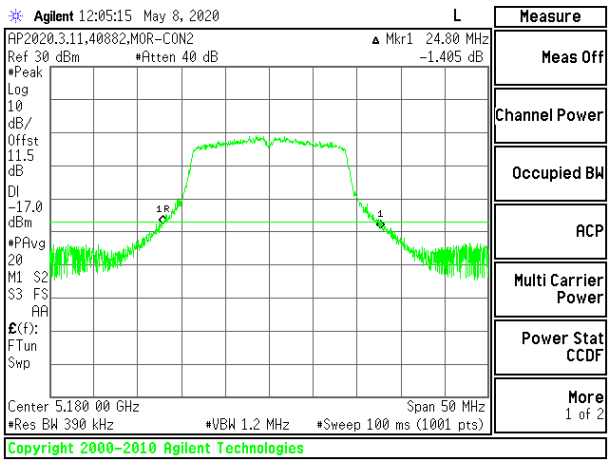
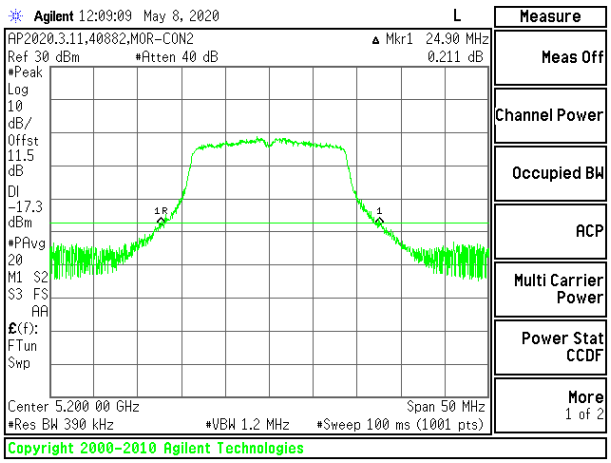
9.2.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

1TX PCB Antenna MODE

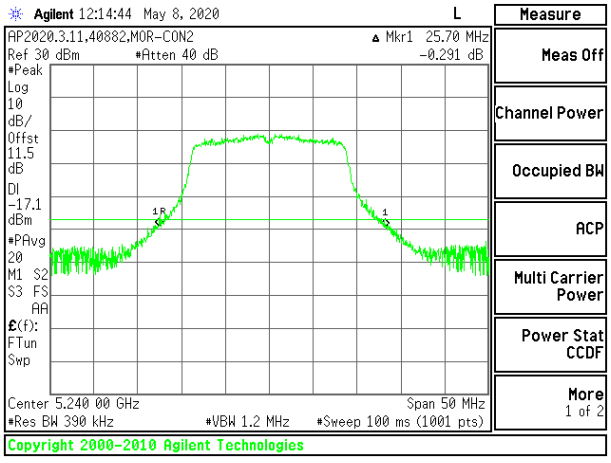
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5180	24.80
Mid	5200	24.90
High	5240	25.70



LOW CHANNEL



MID CHANNEL



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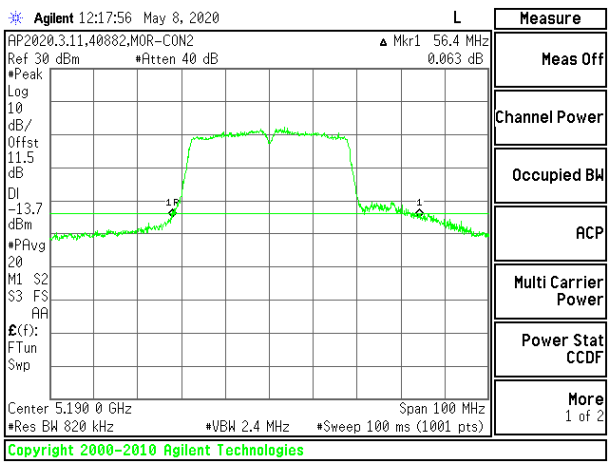
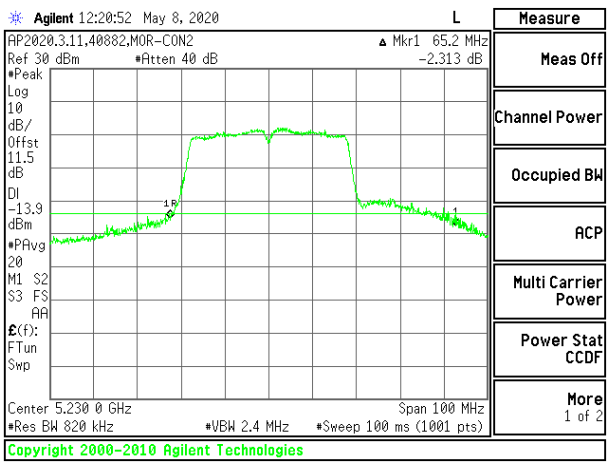
9.2.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

1TX PCB Antenna MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)
Low	5190	56.40
High	5230	65.20



LOW CHANNEL



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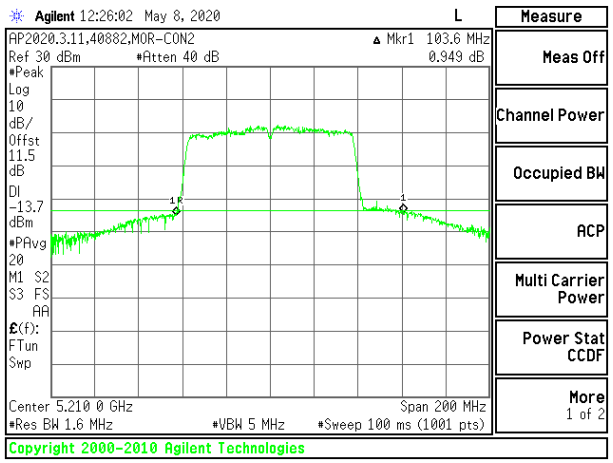
9.2.4. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

1TX PCB Antenna MODE

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Mid	5210	103.60



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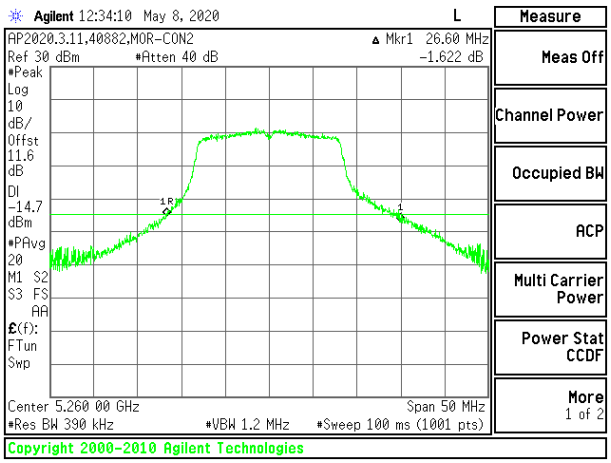
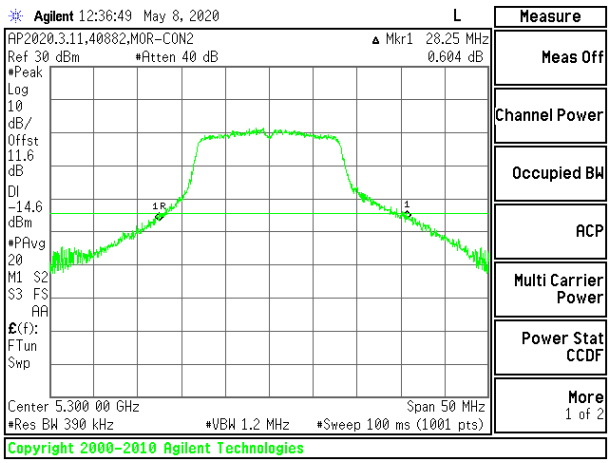
9.2.5. 802.11a MODE IN THE 5.3 GHz BAND

1TX PCB Antenna MODE

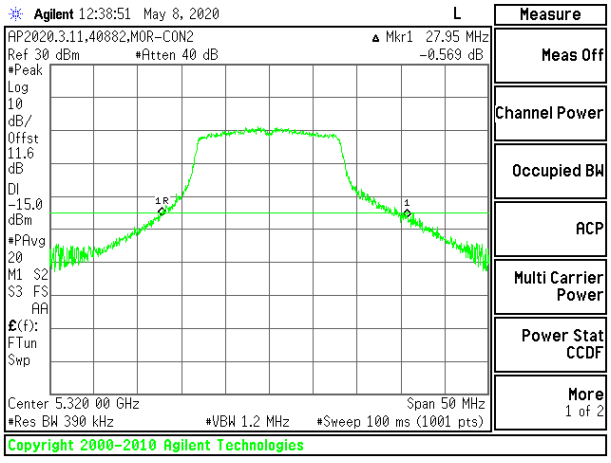
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5260	26.60
Mid	5300	28.25
High	5320	27.95



LOW CHANNEL



MID CHANNEL



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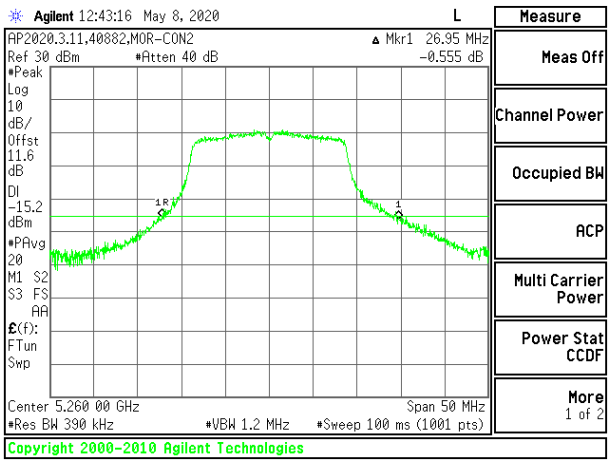
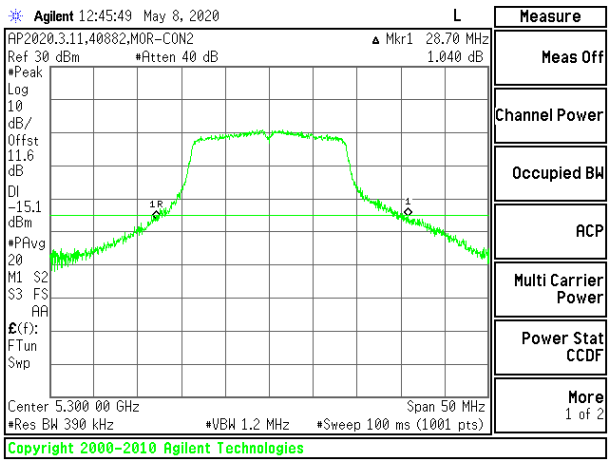
9.2.6. 802.11n HT20 MODE IN THE 5.3 GHz BAND

1TX PCB Antenna MODE

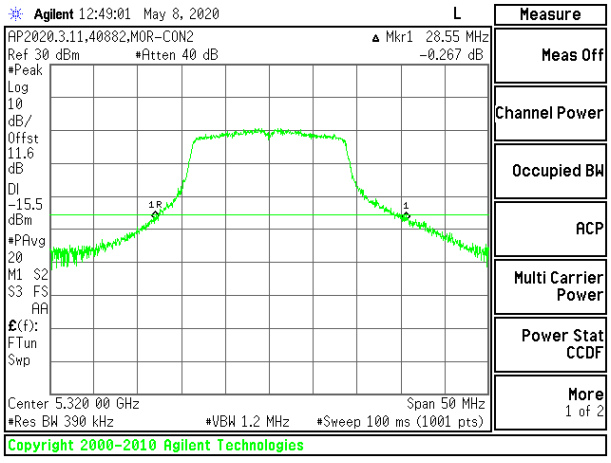
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5260	26.95
Mid	5300	28.70
High	5320	28.55



LOW CHANNEL



MID CHANNEL



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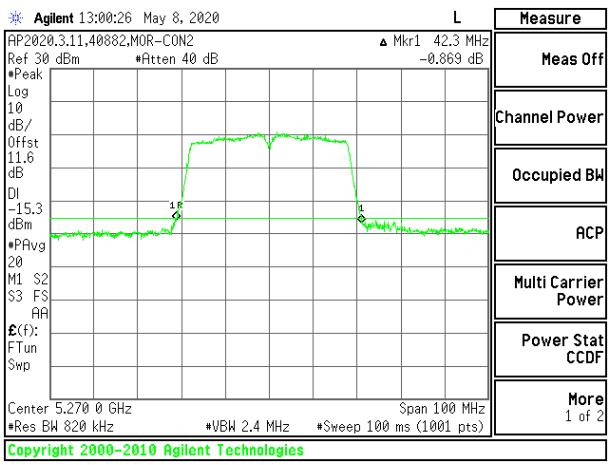
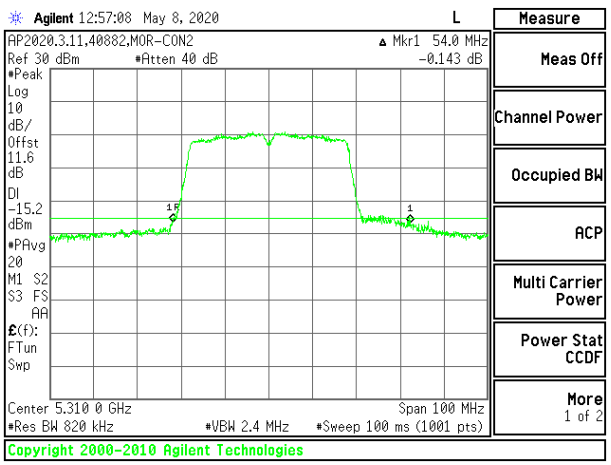
9.2.7. 802.11n HT40 MODE IN THE 5.3 GHz BAND

1TX PCB Antenna MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)
Low	5270	42.30
High	5310	54.00



LOW CHANNEL



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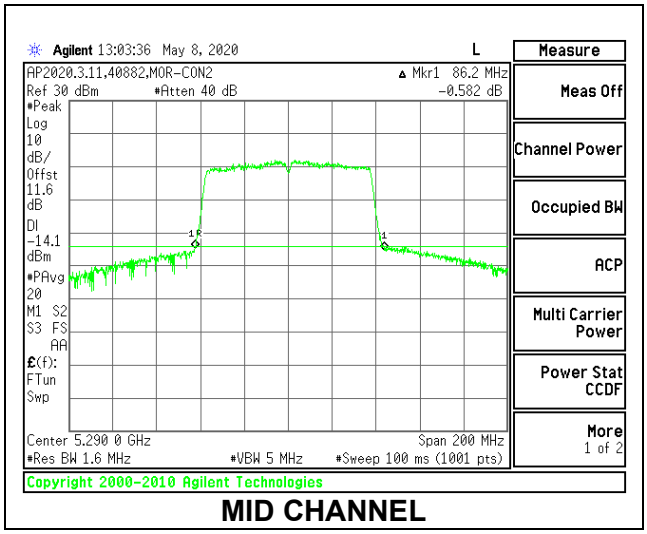
9.2.8. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND

1TX PCB Antenna MODE

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Mid	5290	86.20



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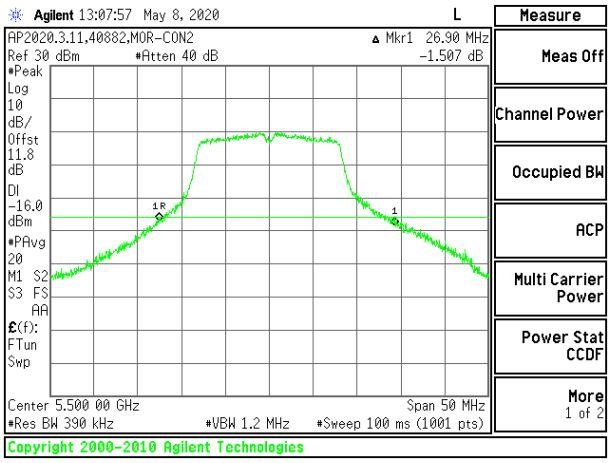
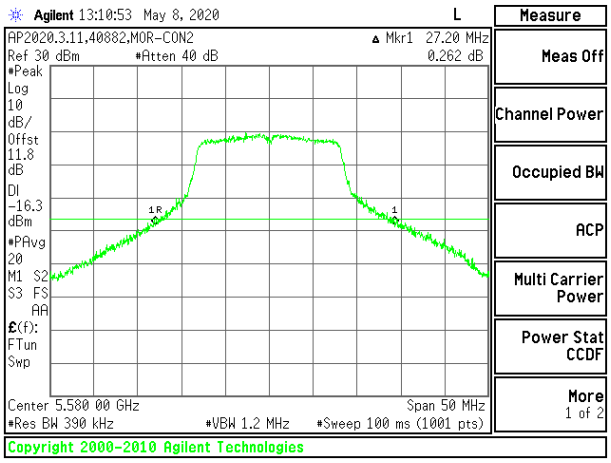
9.2.9. 802.11a MODE IN THE 5.6 GHz BAND

1TX PCB Antenna MODE

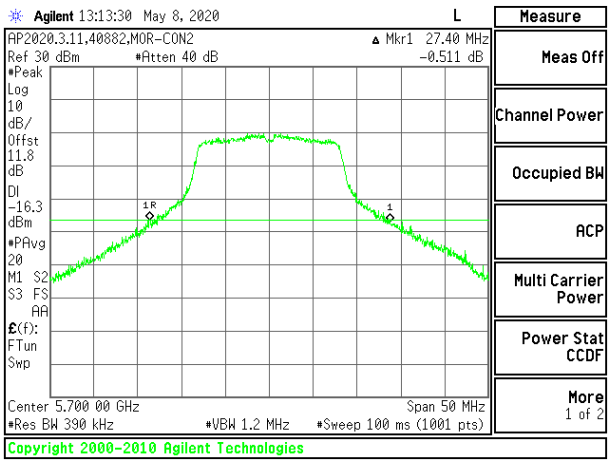
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5500	26.90
Mid	5580	27.20
High	5700	27.40
144	5720	26.55



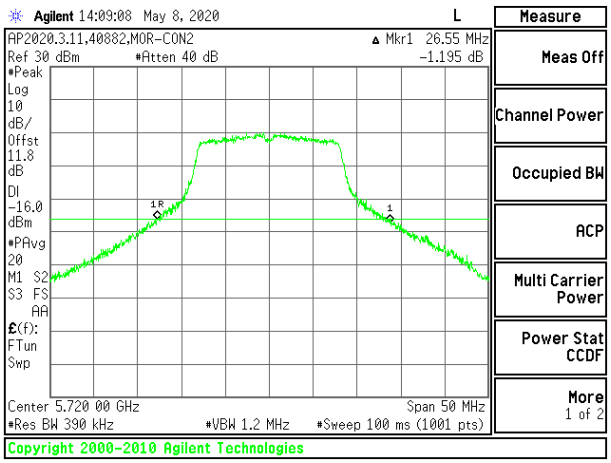
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



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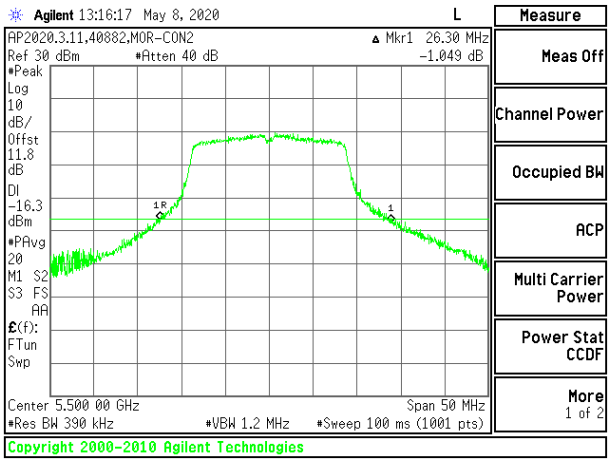
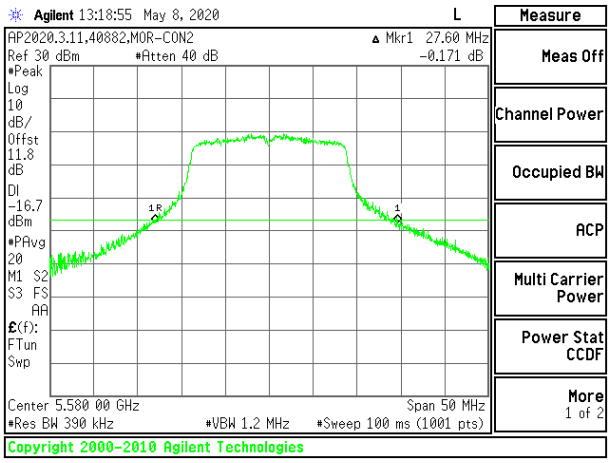
9.2.10. 802.11n HT20 MODE IN THE 5.6 GHz BAND

1TX PCB Antenna MODE

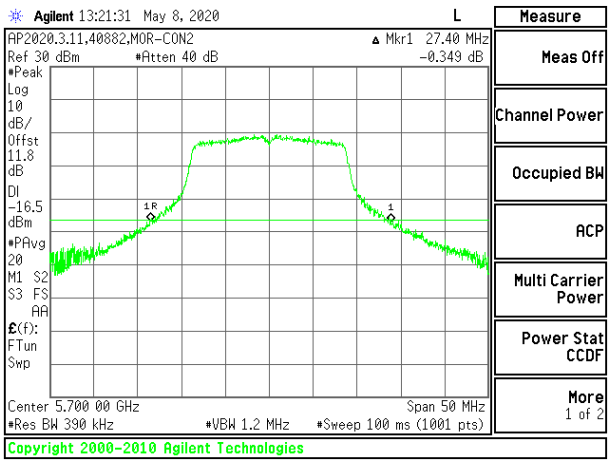
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5500	26.30
Mid	5580	27.60
High	5700	27.40
144	5720	27.65



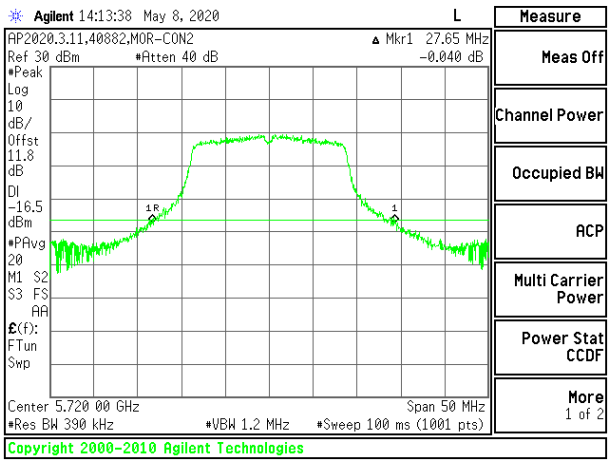
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



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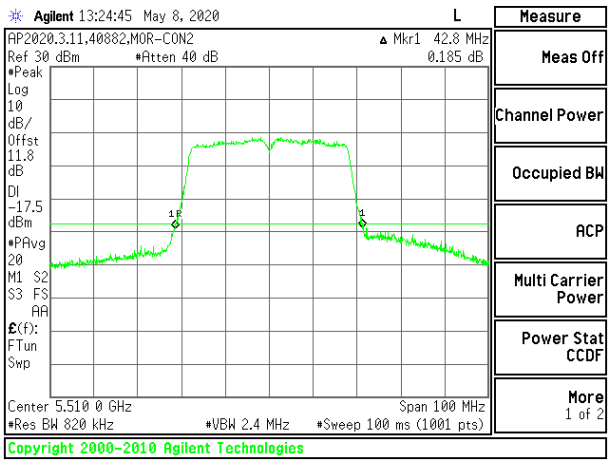
9.2.11. 802.11n HT40 MODE IN THE 5.6 GHz BAND

1TX PCB Antenna MODE

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5510	42.80
Mid	5550	42.50
High	5670	42.80
142	5710	42.60



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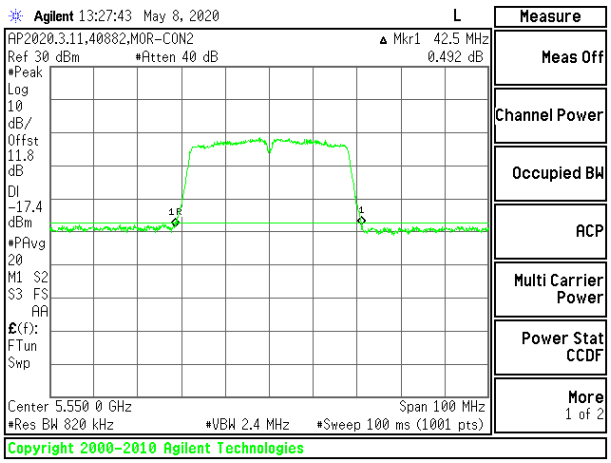

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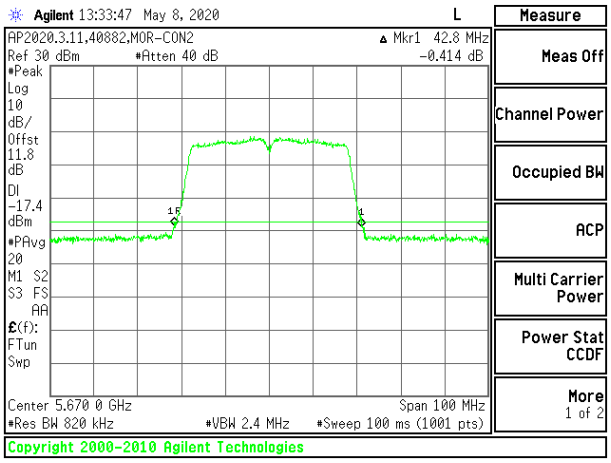

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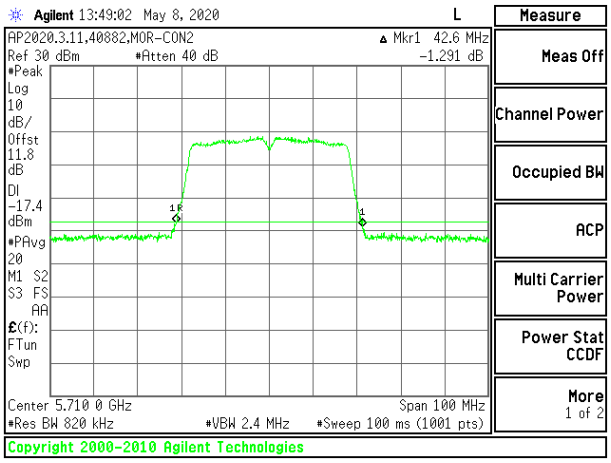

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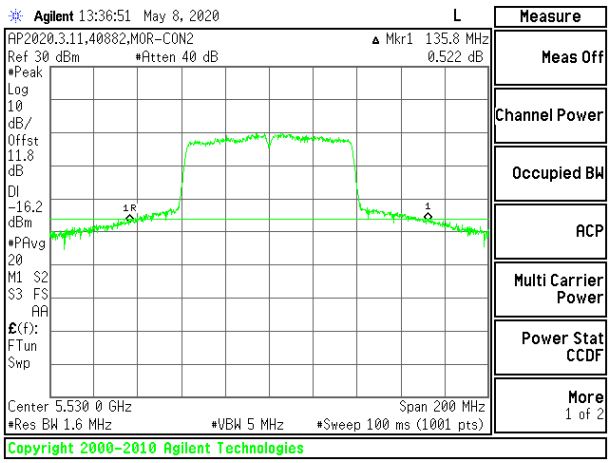
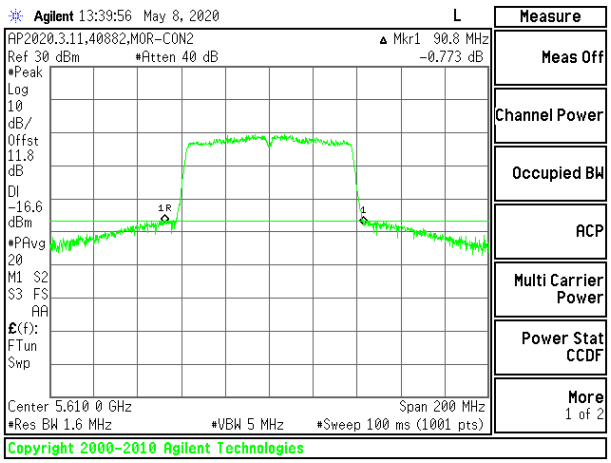
9.2.12. 802.11ac VHT80 MODE IN THE 5.6 GHz BAND

1TX PCB Antenna MODE

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5530	135.80
High	5610	90.80
138	5690	99.80



LOW CHANNEL



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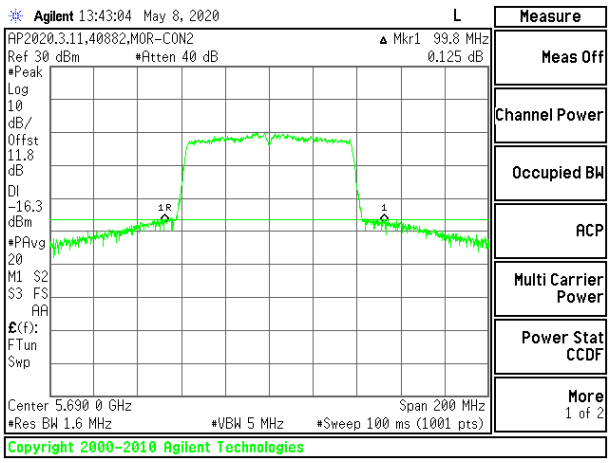

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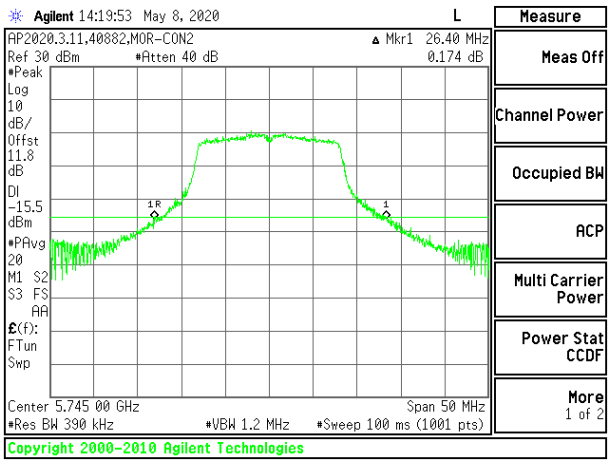
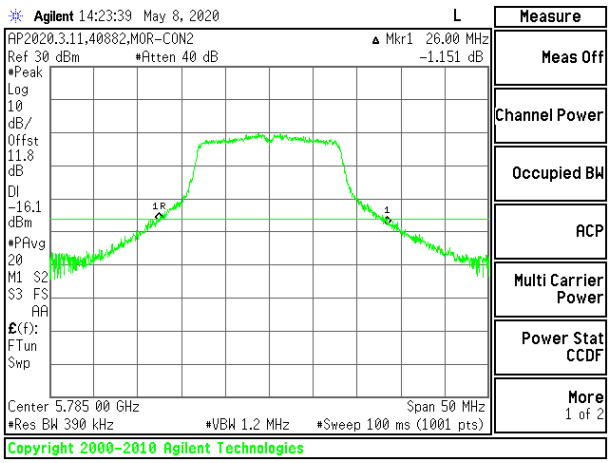
9.2.13. 802.11a MODE IN THE 5.8 GHz BAND

1TX PCB Antenna MODE

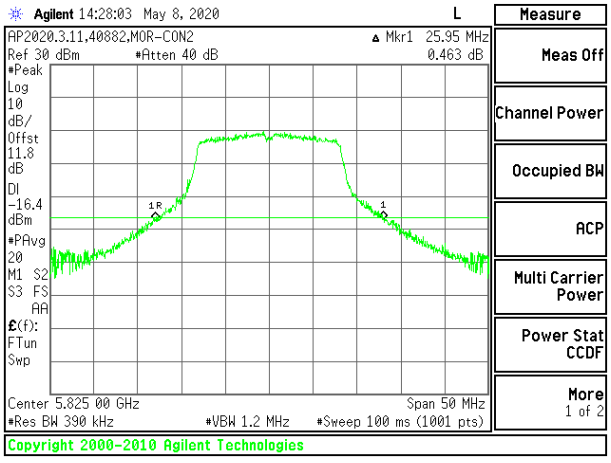
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5745	26.40
Mid	5785	26.00
High	5825	25.95



LOW CHANNEL



MID CHANNEL



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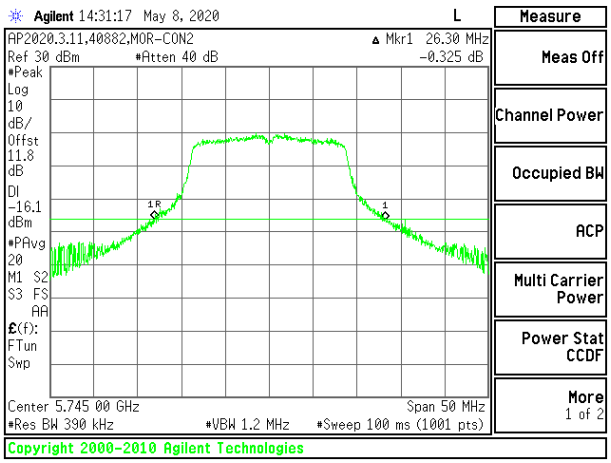
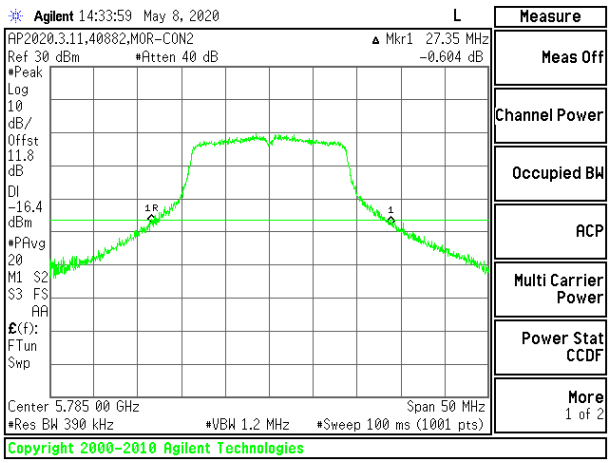
9.2.14. 802.11n HT20 MODE IN THE 5.8 GHz BAND

1TX PCB Antenna MODE

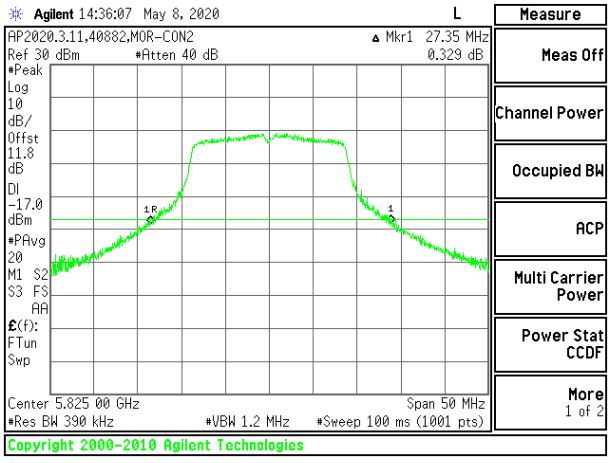
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5745	26.30
Mid	5785	27.35
High	5825	27.35



LOW CHANNEL



MID CHANNEL



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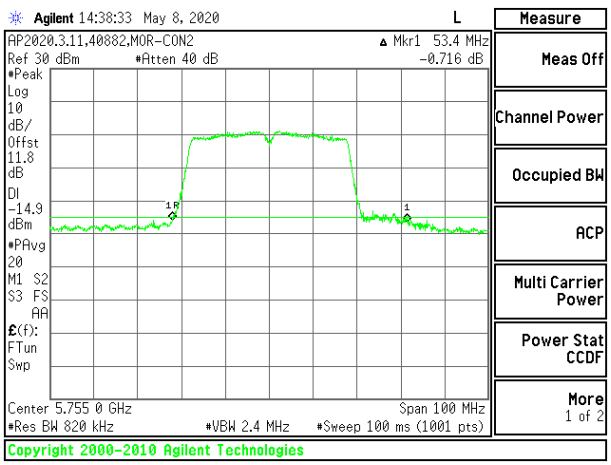
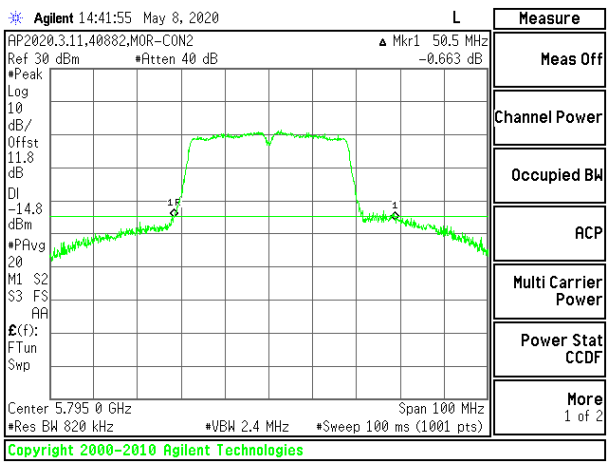
9.2.15. 802.11n HT40 MODE IN THE 5.8 GHz BAND

1TX PCB Antenna MODE

Channel	Frequency (MHz)	26dB Bandwidth (MHz)
Low	5755	53.40
High	5795	50.50



LOW CHANNEL



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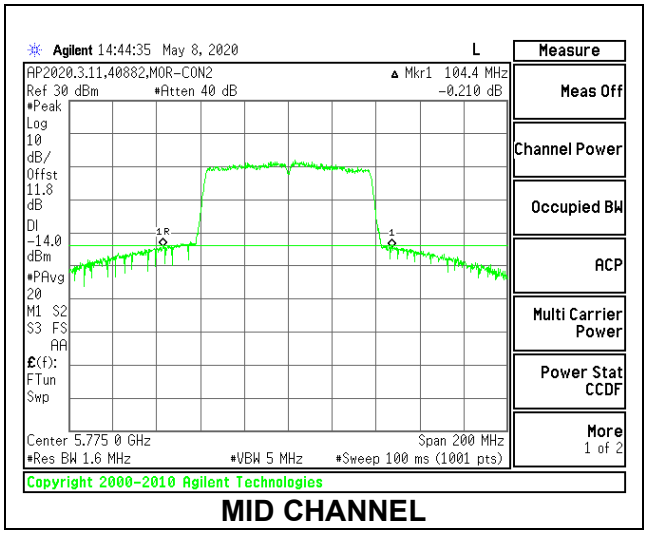
9.2.16. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

1TX PCB Antenna MODE

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Mid	5775	104.40



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9.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

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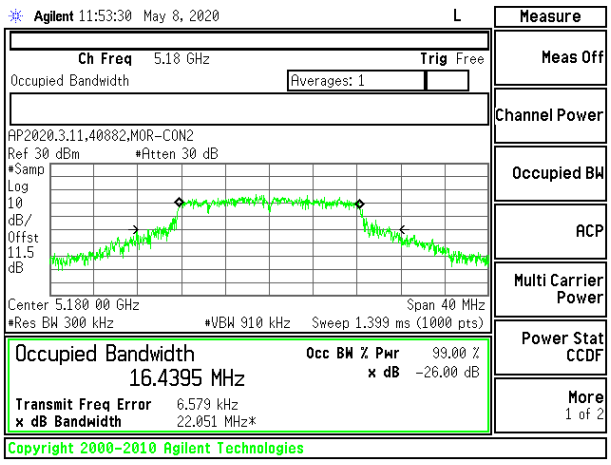
9.3.1. 802.11a MODE IN THE 5.2 GHz BAND

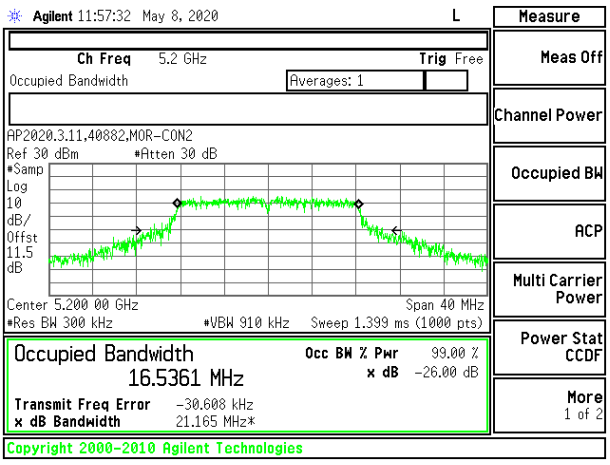
1TX PCB Antenna MODE

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5180	16.4390
Mid	5200	16.5360
High	5240	16.5220

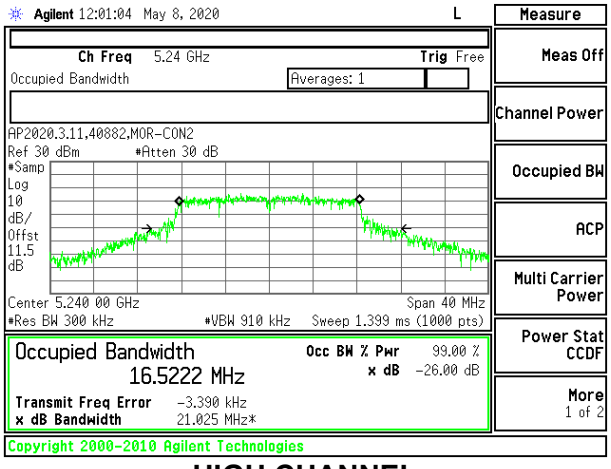
Note – The occupied bandwith of the above channels do not fall into the 5.3 GHz band (5240MHz+16.522MHz/2 = 5248.26 MHz).



LOW CHANNEL



MID CHANNEL



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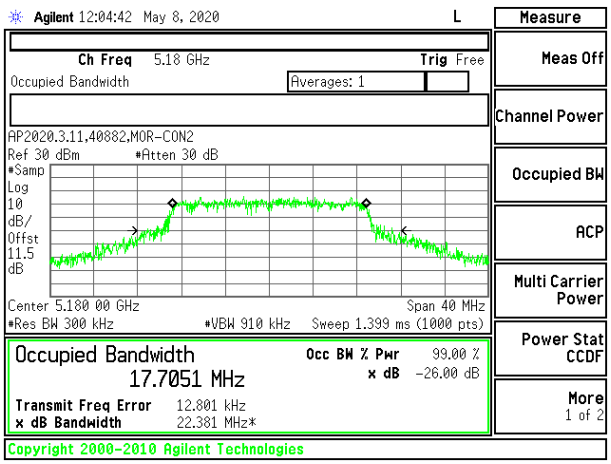
9.3.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

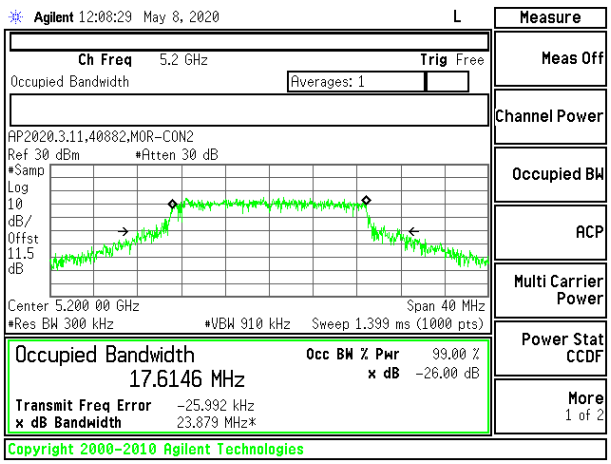
1TX PCB Antenna MODE

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5180	17.7050
Mid	5200	17.6150
High	5240	17.6880

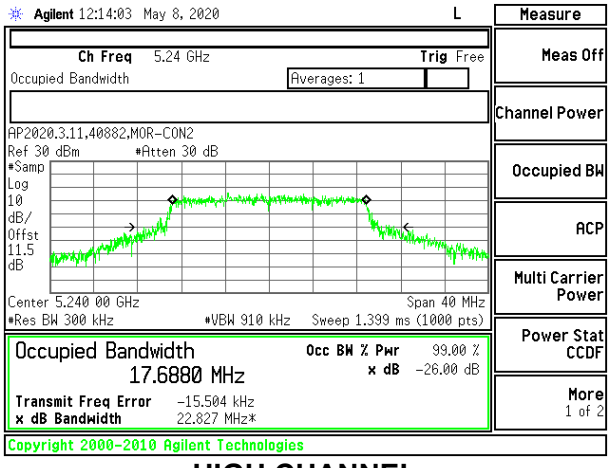
Note – The occupied bandwith of the above channels do not fall into the 5.3 GHz band (5240MHz+17.688MHz/2 = 5248.44 MHz).



LOW CHANNEL



MID CHANNEL



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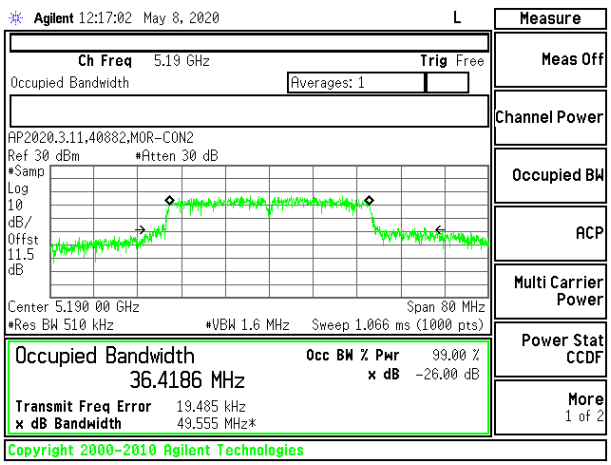
9.3.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

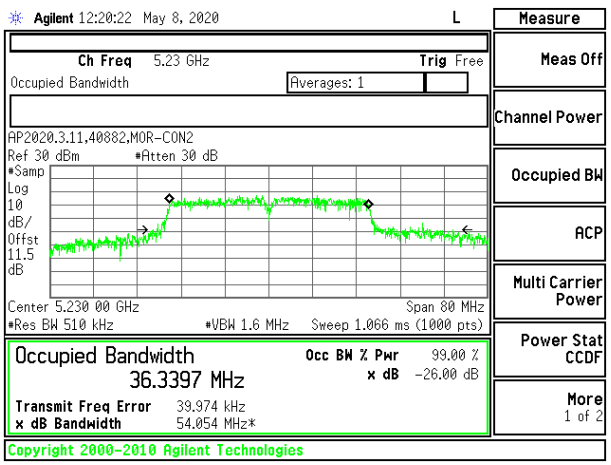
1TX PCB Antenna MODE

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5190	36.4190
High	5230	36.3400

Note – The occupied bandwith of the above channels do not fall into the 5.3 GHz band (5230MHz+36.34MHz/2 = 5248.17 MHz).



LOW CHANNEL



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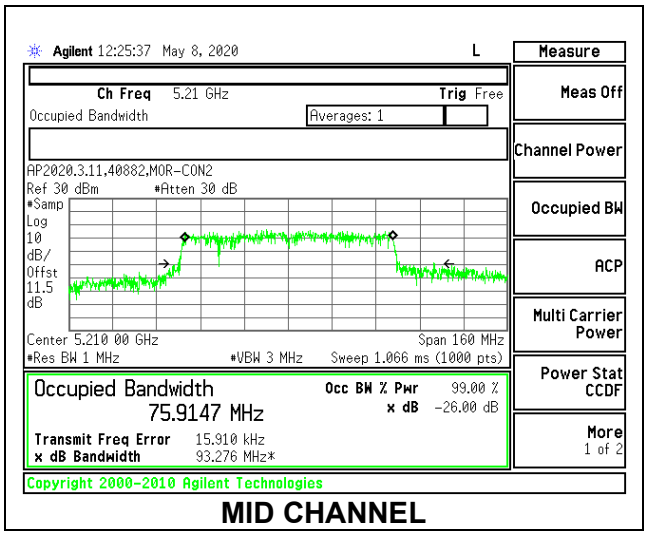
9.3.4. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

1TX PCB Antenna MODE

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Mid	5210	75.9150

Note – The occupied bandwith of the above channels do not fall into the 5.3 GHz band (5210MHz+75.915MHz/2 = 5247.96 MHz).



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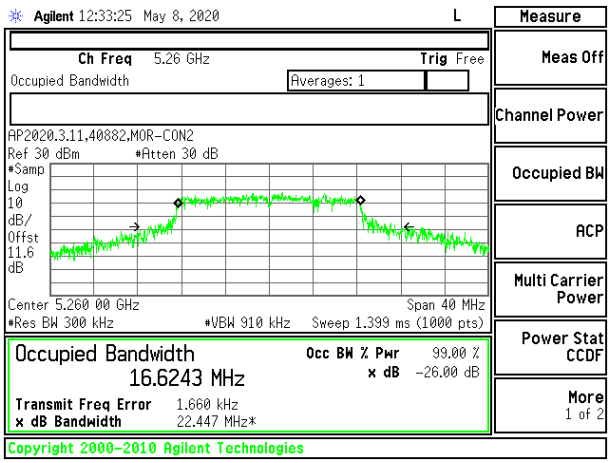
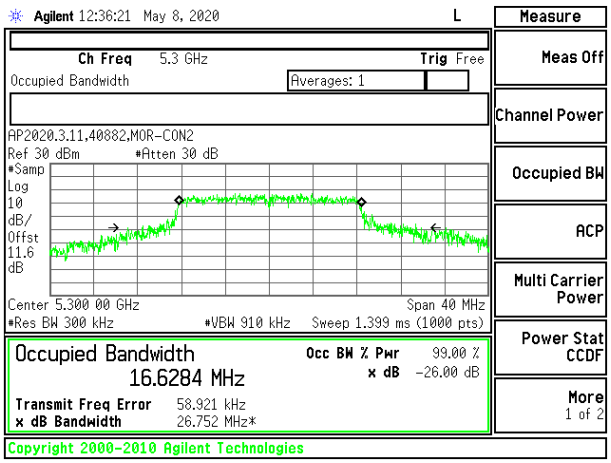
9.3.5. 802.11a MODE IN THE 5.3 GHz BAND

1TX PCB Antenna MODE

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5260	16.6243
Mid	5300	16.6284
High	5320	16.7284



LOW CHANNEL



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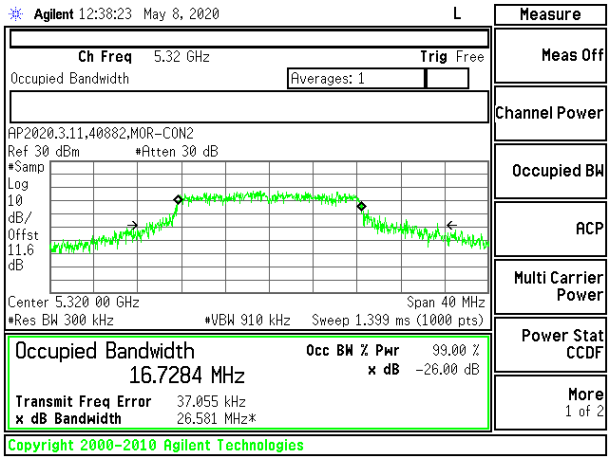

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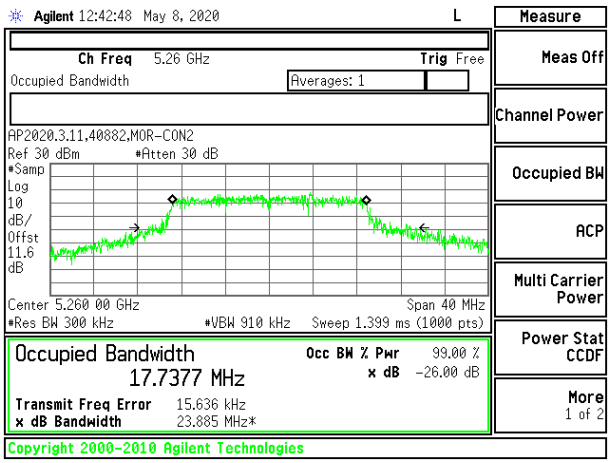
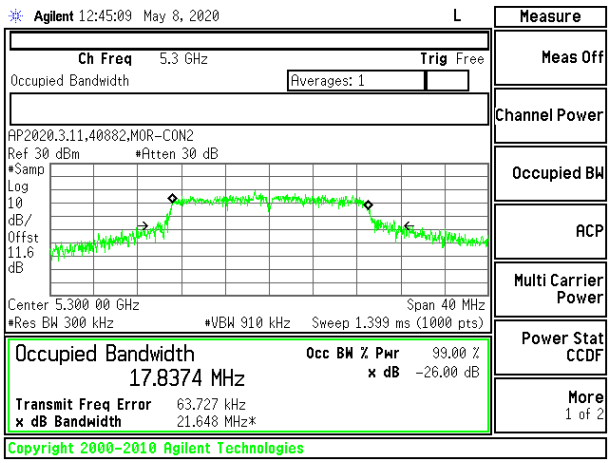
9.3.6. 802.11n HT20 MODE IN THE 5.3 GHz BAND

1TX PCB Antenna MODE

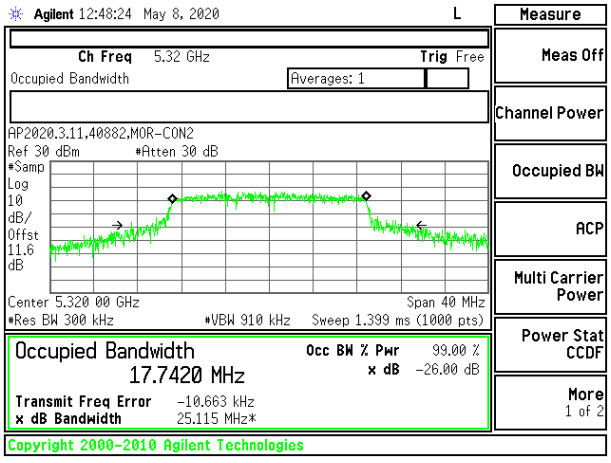
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5260	17.7380
Mid	5300	17.8370
High	5320	17.7420



LOW CHANNEL



MID CHANNEL



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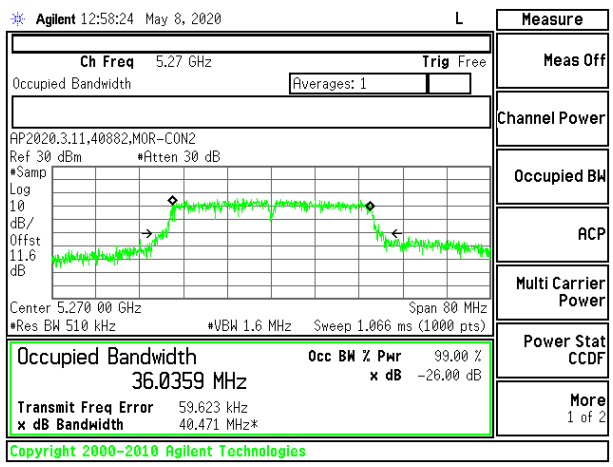
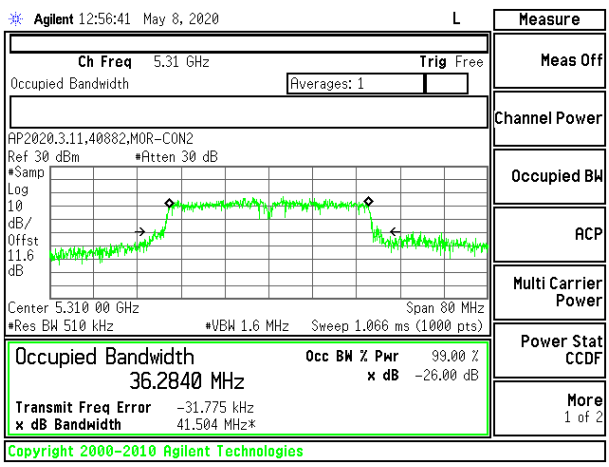
9.3.7. 802.11n HT40 MODE IN THE 5.3 GHz BAND

1TX PCB Antenna MODE

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5270	36.0360
High	5310	36.2840



LOW CHANNEL



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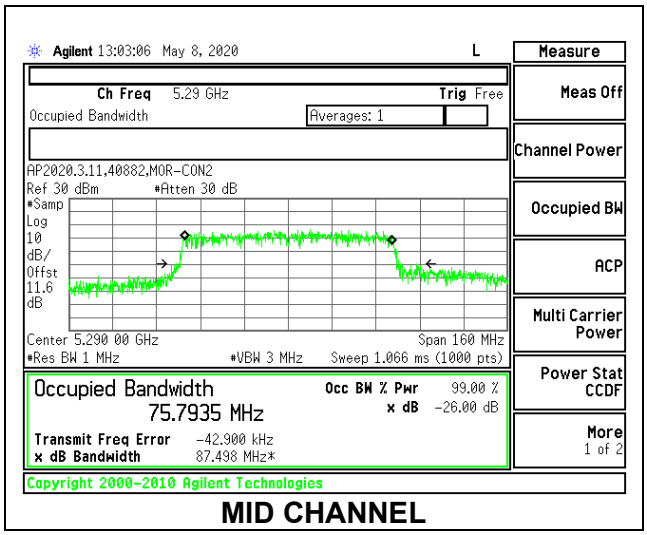
9.3.8. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND

1TX PCB Antenna MODE

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Mid	5290	75.7930



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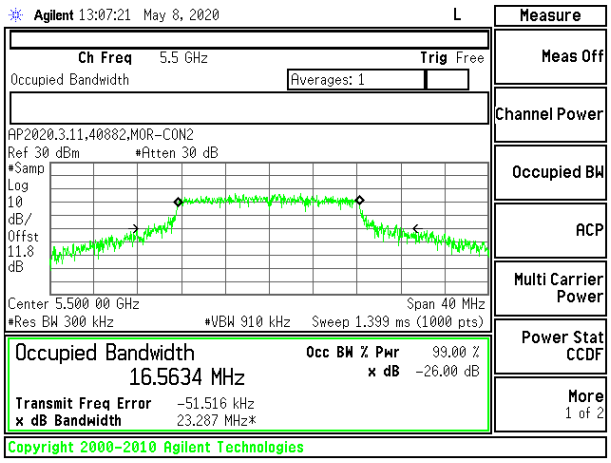
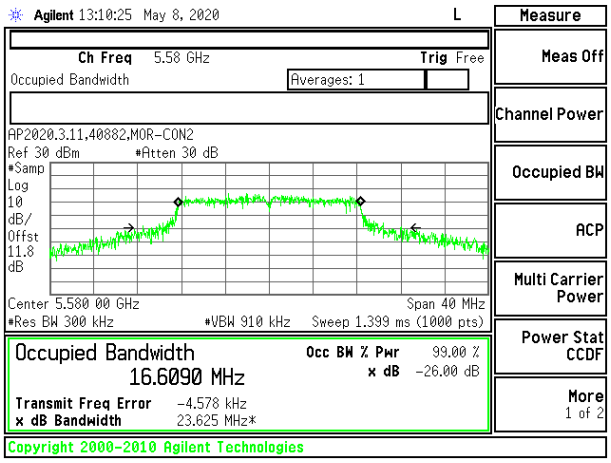
9.3.9. 802.11a MODE IN THE 5.6 GHz BAND

1TX PCB Antenna MODE

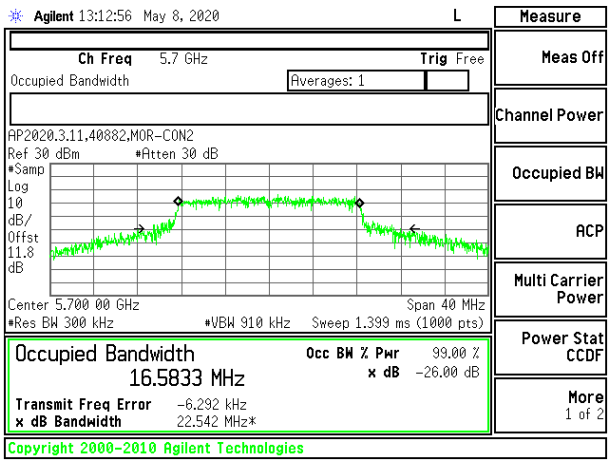
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5500	16.5630
Mid	5580	16.6090
High	5700	16.5830
144	5720	16.5730



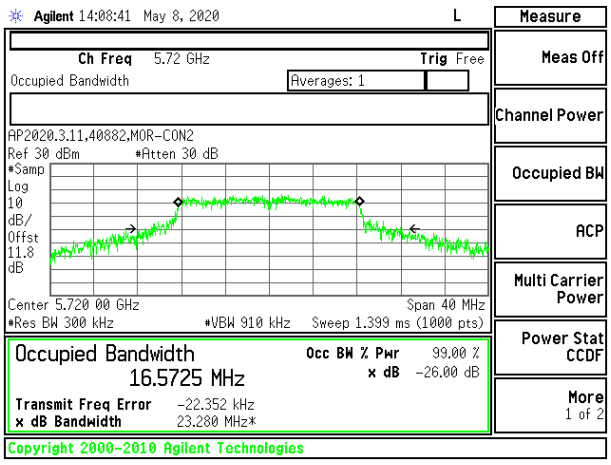
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



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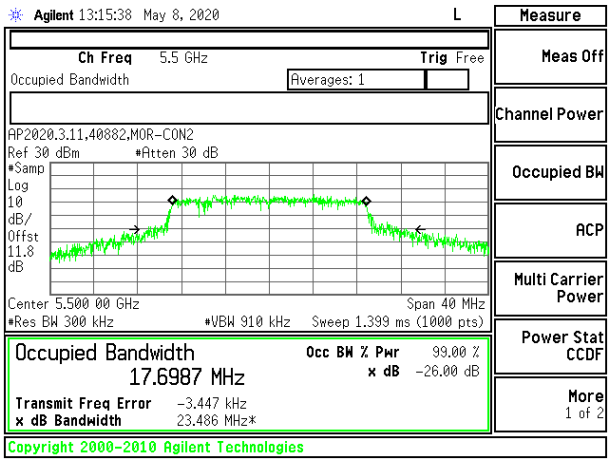
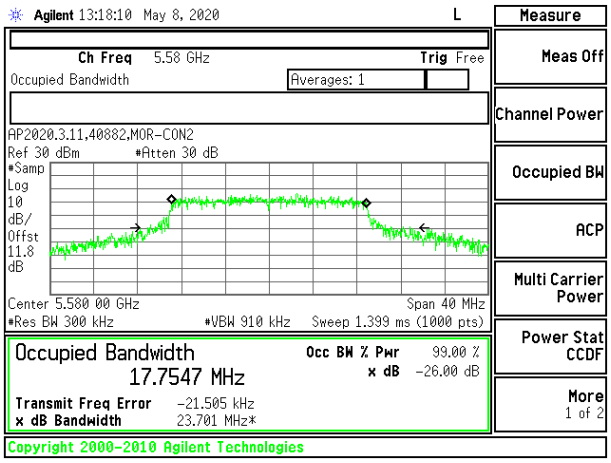
9.3.10. 802.11n HT20 MODE IN THE 5.6 GHz BAND

1TX PCB Antenna MODE

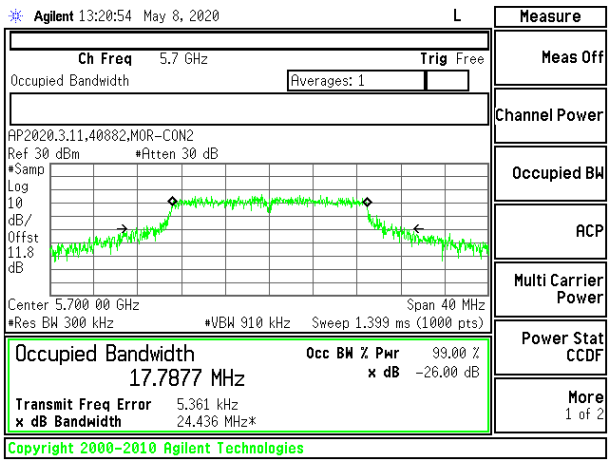
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5500	17.6990
Mid	5580	17.7550
High	5700	17.7880
144	5720	17.7930



LOW CHANNEL



MID CHANNEL



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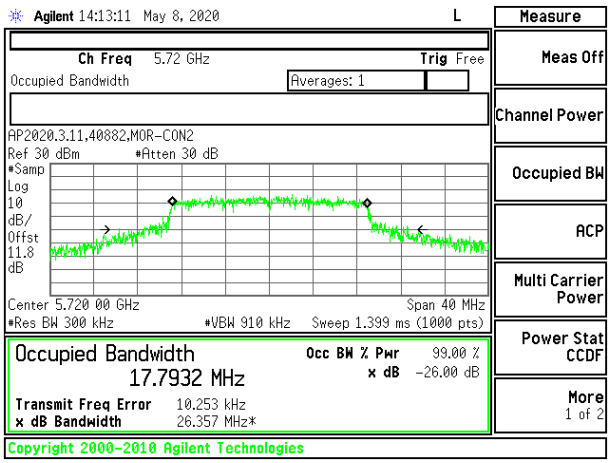

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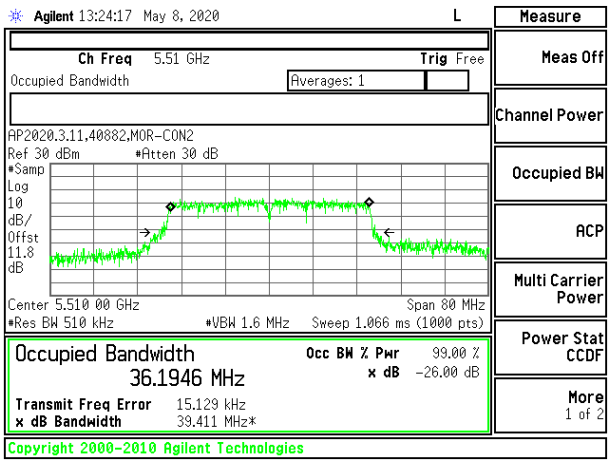
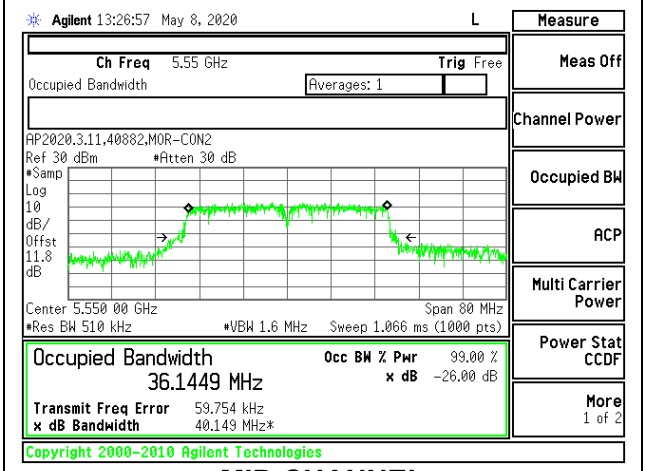
9.3.11. 802.11n HT40 MODE IN THE 5.6 GHz BAND

1TX PCB Antenna MODE

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5510	36.1950
Mid	5550	36.1450
High	5670	36.1300
142	5710	36.1730



LOW CHANNEL



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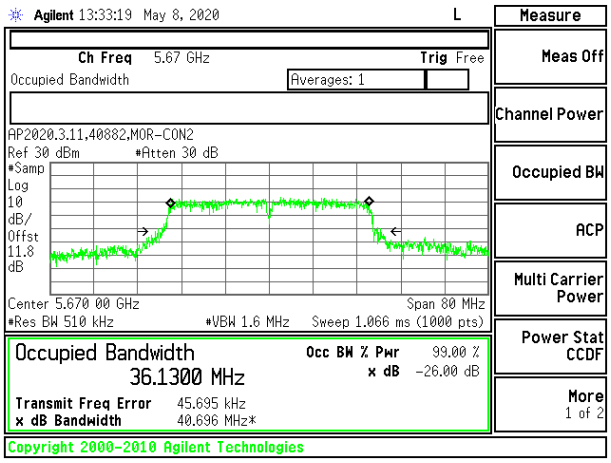

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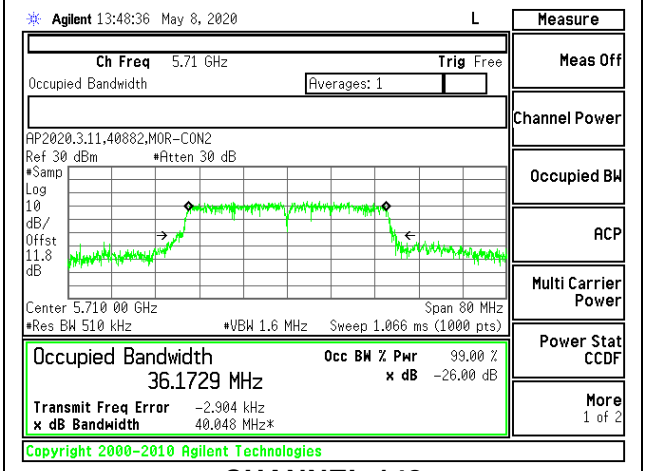

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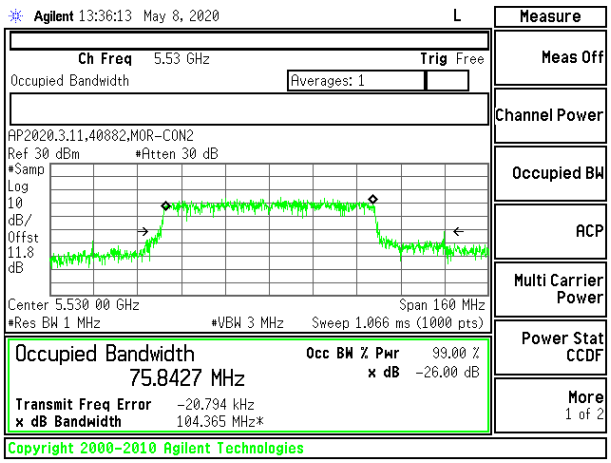
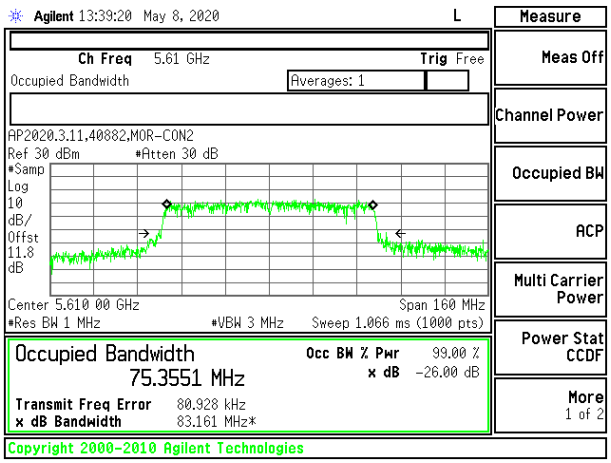
9.3.12. 802.11ac VHT80 MODE IN THE 5.6 GHz BAND

1TX PCB Antenna MODE

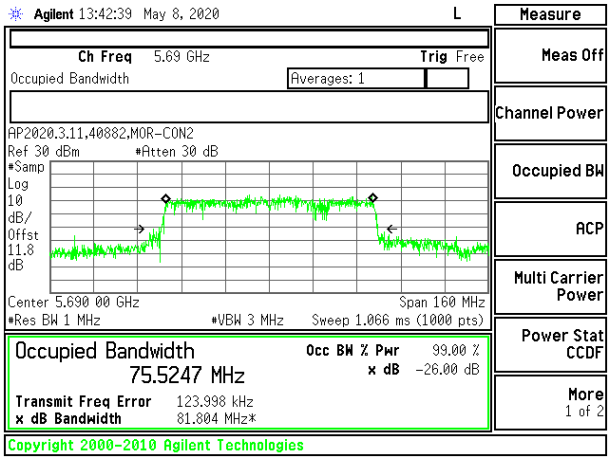
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5530	75.8430
High	5610	75.3550
138	5690	75.5250



LOW CHANNEL



HIGH CHANNEL



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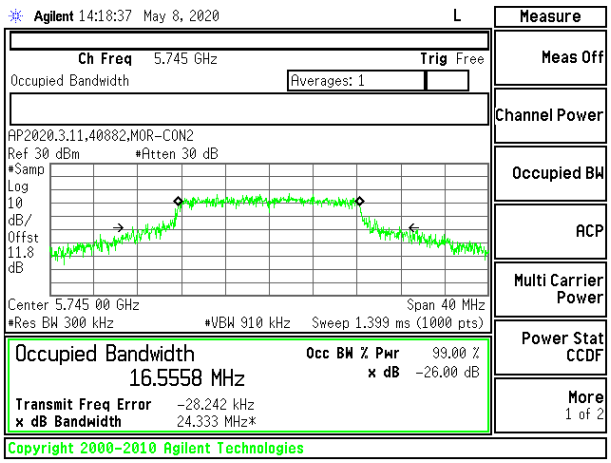
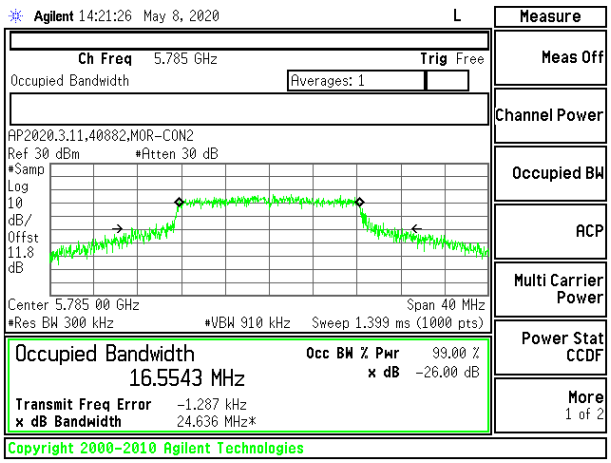
9.3.13. 802.11a MODE IN THE 5.8 GHz BAND

1TX PCB Antenna MODE

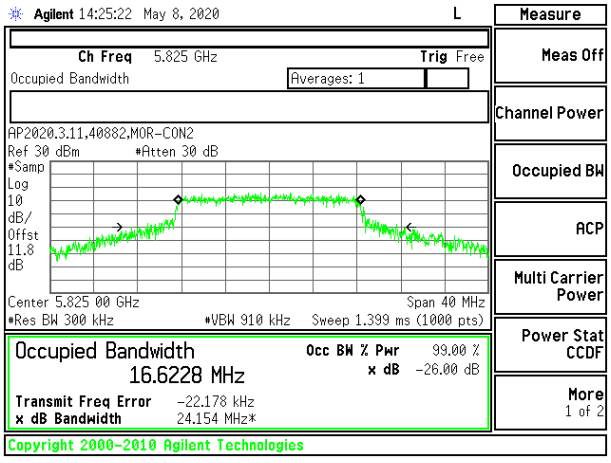
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	16.5560
Mid	5785	16.5540
High	5825	16.6230



LOW CHANNEL



MID CHANNEL



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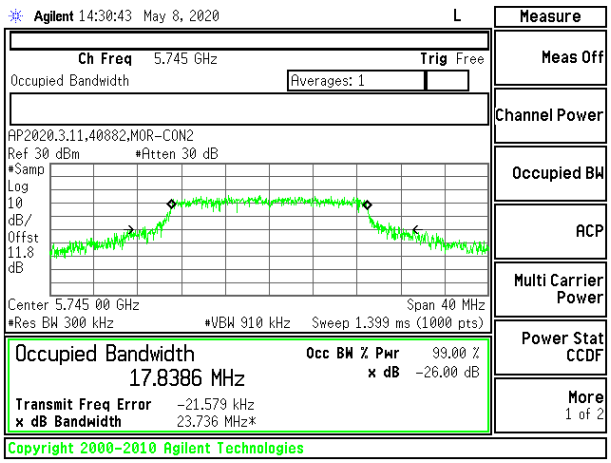
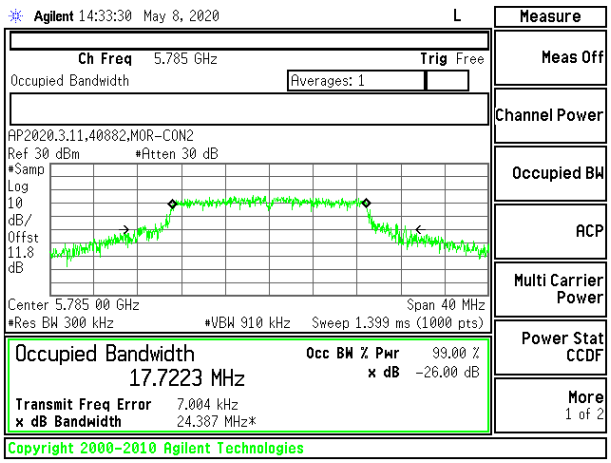
9.3.14. 802.11n HT20 MODE IN THE 5.8 GHz BAND

1TX PCB Antenna MODE

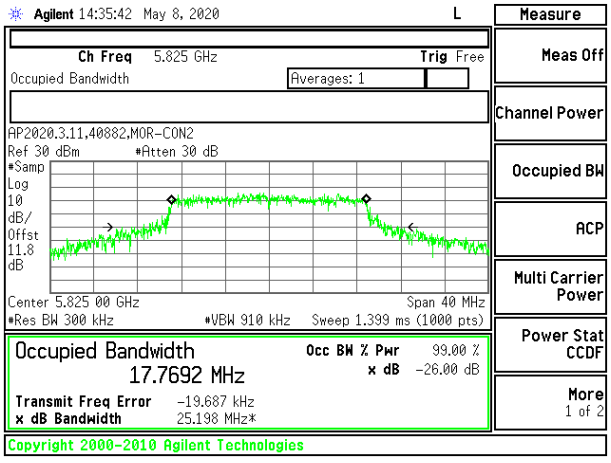
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5745	17.8390
Mid	5785	17.7220
High	5825	17.7690



LOW CHANNEL



MID CHANNEL



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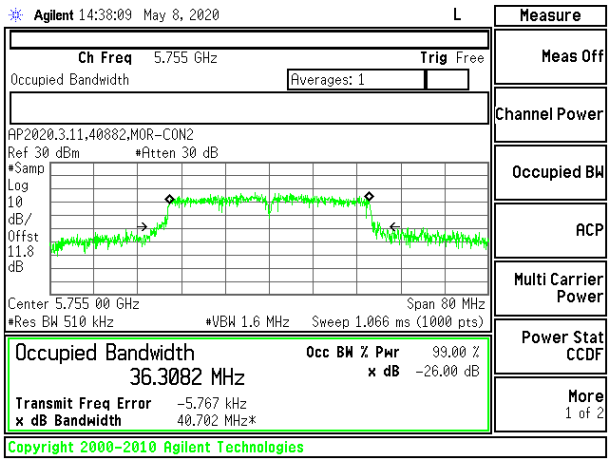
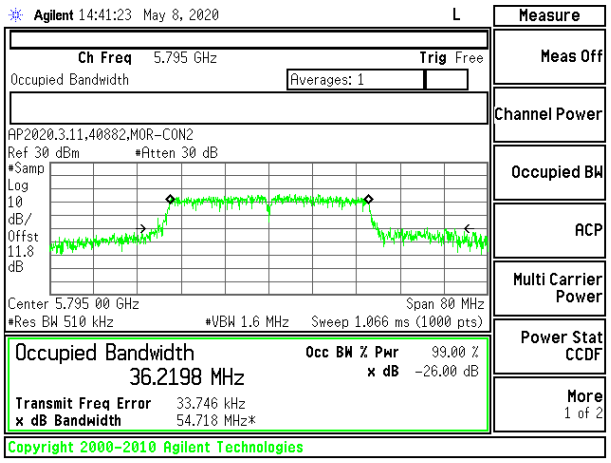
9.3.15. 802.11n HT40 MODE IN THE 5.8 GHz BAND

1TX PCB Antenna MODE

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5755	36.3080
High	5795	36.2200



LOW CHANNEL



HIGH CHANNEL

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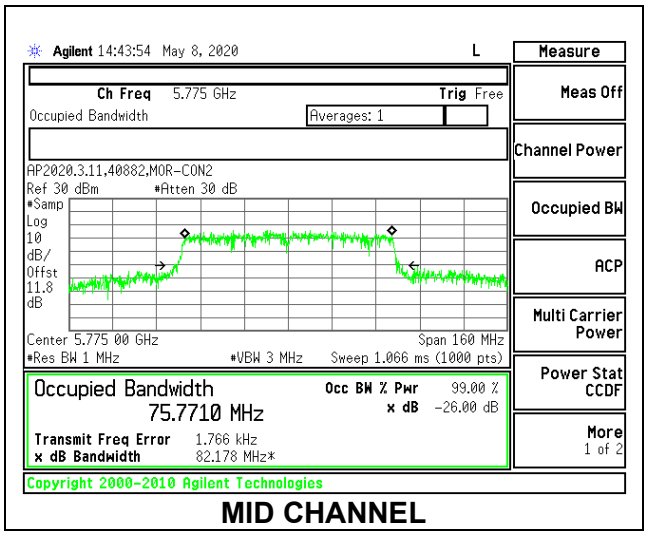
9.3.16. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

1TX PCB Antenna MODE

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Mid	5775	75.7710



MID CHANNEL

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9.4. 6 dB BANDWIDTH

LIMITS

FCC §15.407 (e)
RSS-247 6.2.4.1

The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

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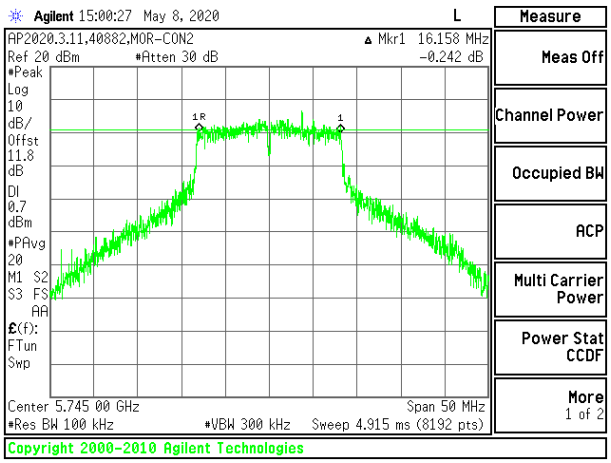
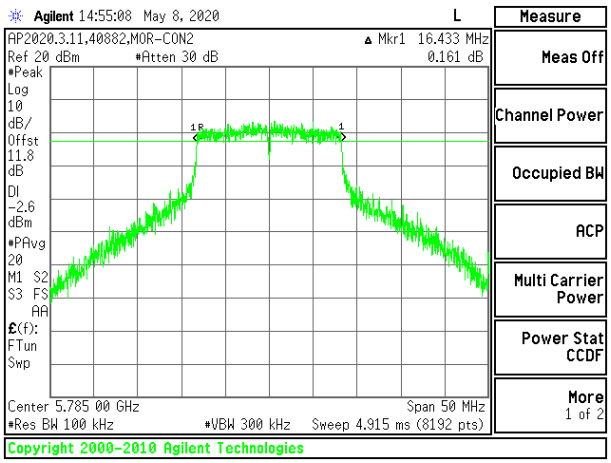
9.4.1. 802.11a MODE IN THE 5.8 GHz BAND

1TX PCB Antenna MODE

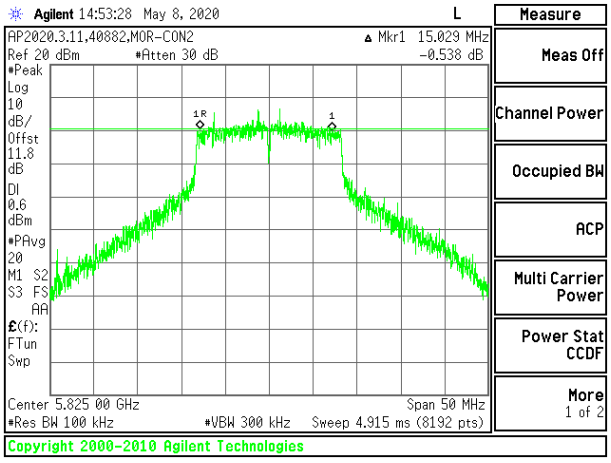
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	16.1580	0.5
Mid	5785	16.4330	0.5
High	5825	15.0290	0.5
144	5720	12.2880	0.5



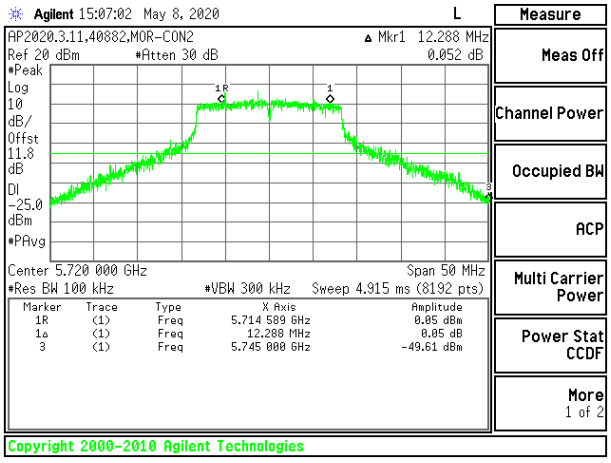
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



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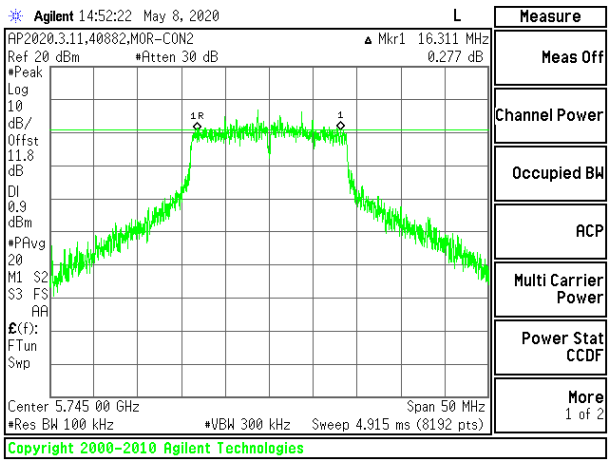
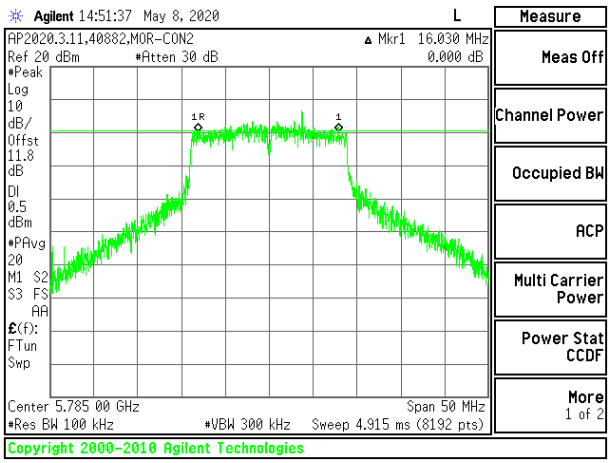
9.4.2. 802.11n HT20 MODE IN THE 5.8 GHz BAND

1TX PCB Antenna MODE

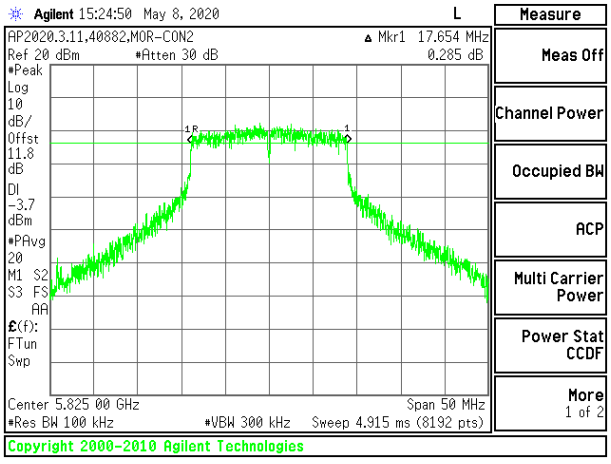
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	16.3110	0.5
Mid	5785	16.0300	0.5
High	5825	17.6540	0.5
144	5720	17.5800	0.5



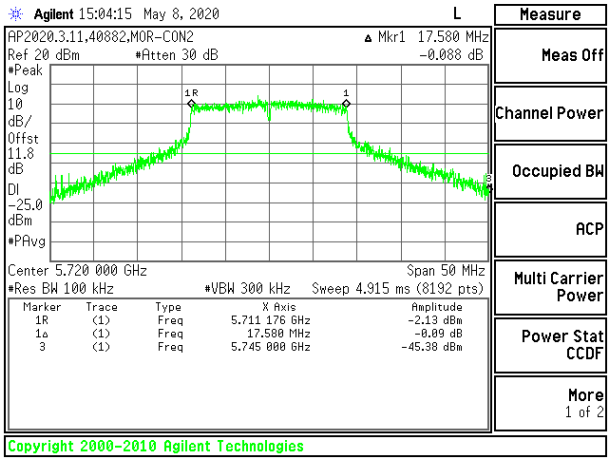
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



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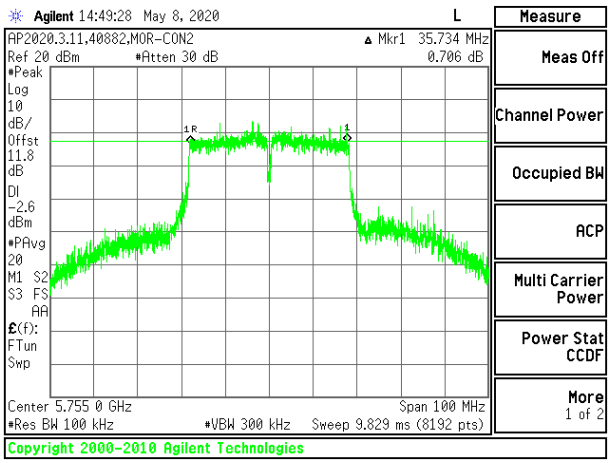
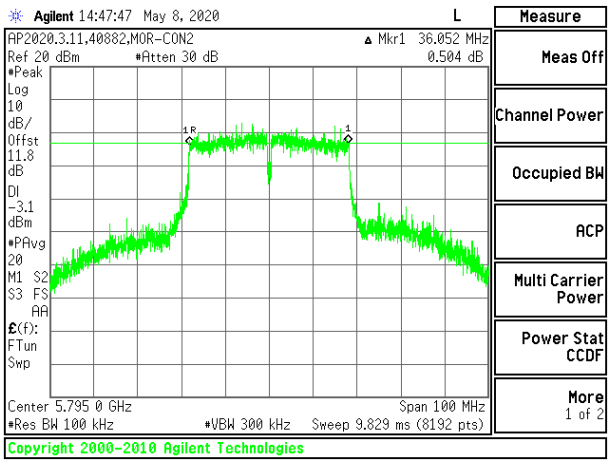
9.4.3. 802.11n HT40 MODE IN THE 5.8 GHz BAND

1TX PCB Antenna MODE

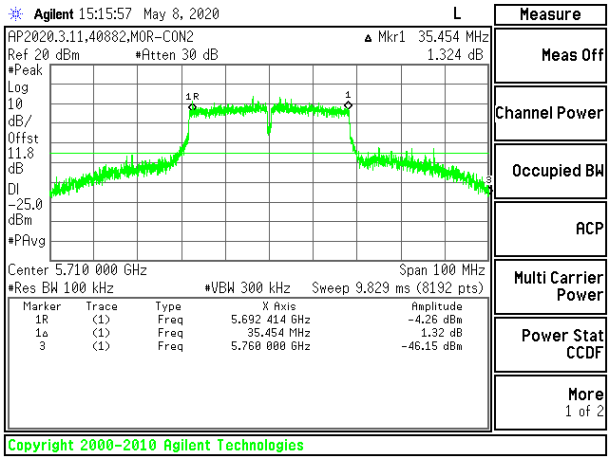
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5755	35.7340	0.5
High	5795	36.0520	0.5
142	5710	35.4540	0.5



LOW CHANNEL



HIGH CHANNEL



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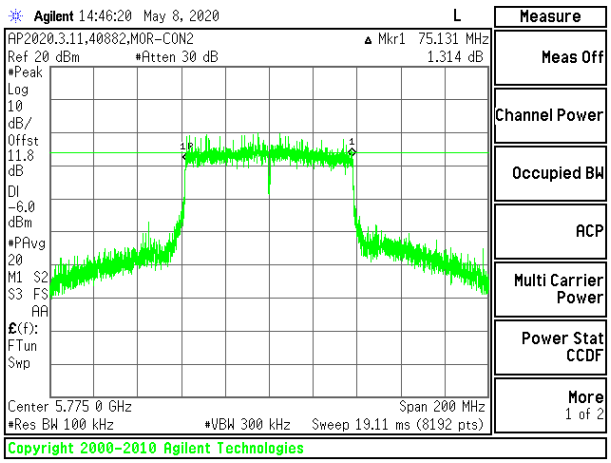
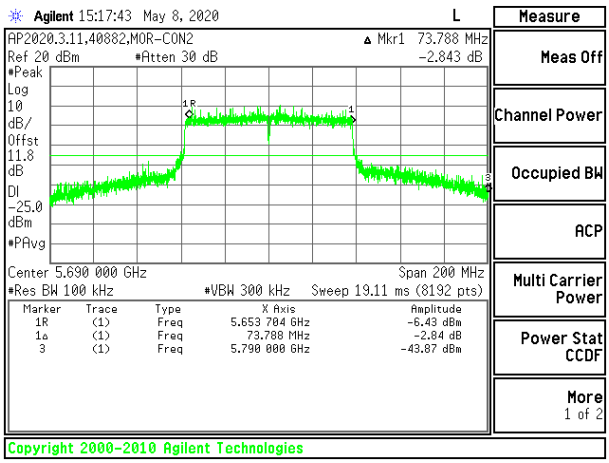
9.4.4. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

1TX PCB Antenna MODE

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Mid	5775	75.1310	0.5
138	5690	73.7880	0.5



MID CHANNEL



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9.5. OUTPUT POWER AND PSD

LIMITS

FCC §15.407

Band 5.15–5.25 GHz
(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.

Bands 5.25-5.35 GHz and 5.47-5.725 GHz
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.

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.

RSS-247

Band 5.15-5.25 GHz
The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10B, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

Band 5.25-5.35 GHz
The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

Bands 5.47-5.6 GHz and 5.65-5.725 GHz

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The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

Band 5.725-5.85 GHz
The maximum conducted output power shall not exceed 1 W. The 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 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 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.

TEST PROCEDURE

The measurement method used for output power is KDB 789033 D02 v02r01, Section E.3.b (Method PM-G).

The measurement method used for power spectral density is KDB 789033 D02 v02r01, Section F

DIRECTIONAL ANTENNA GAIN

For 1 TX:
There is only one transmitter output therefore the directional gain is equal to the antenna gain.

Note – For the 5.3/5.6GHz bands, where directional gain is less than 6dBi and conducted power meets the applicable limit, EIRP is considered compliant. Where antenna gain is greater than 6dBi, the limits are reduced to ensure that both conducted power and EIRP limits are compliant.

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9.5.1. RESULTS – PCB Antenna

Note - For the 5.3 and 5.6 GHz bands, the EUT EIRP value is less than 500 mW (27 dBm) and therefore does not require TPC.

9.5.2. 802.11a MODE IN THE 5.2 GHz BAND

1TX PCB Antenna MODE (FCC) MOBILE

Test Engineer:	40882
Test Date:	2020-06-27, 2020-09-11

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5180	4.31	24.00	11.00
Mid	5200	4.31	24.00	11.00
High	5240	4.31	24.00	11.00

Duty Cycle CF (dB)	0.11	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	12.580	12.58	24.00	-11.42
Mid	5200	12.620	12.62	24.00	-11.38
High	5240	12.760	12.76	24.00	-11.24

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5180	2.61	2.72	11.00	-8.28
Mid	5200	2.61	2.72	11.00	-8.28
High	5240	3.33	3.44	11.00	-7.56

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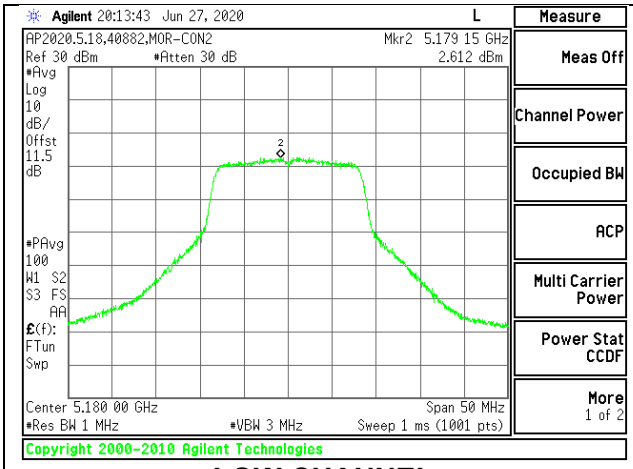

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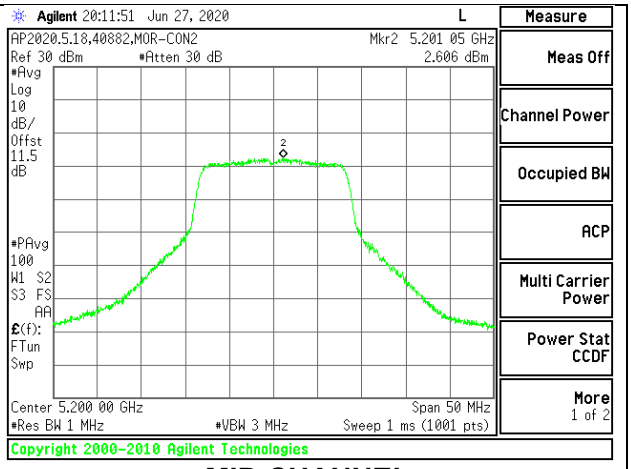

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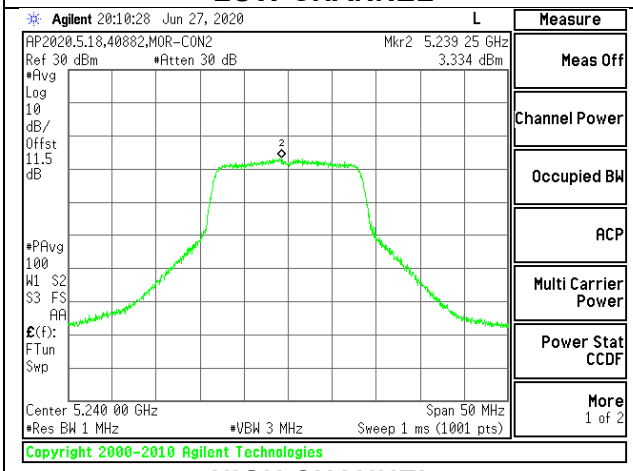

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1TX PCB Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-06-27, 2020-09-11

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	EIRP Power Limit (dBm)	Power Limit (dBm)	EIRP PSD Limit (dBm/1MHz)	PSD Limit (dBm/1MHz)
Low	5180	16.440	4.31	22.16	17.85	10.00	5.69
Mid	5200	16.536	4.31	22.18	17.87	10.00	5.69
High	5240	16.522	4.31	22.18	17.87	10.00	5.69

Duty Cycle CF (dB)	0.11	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	12.580	12.58	17.85	-5.27
Mid	5200	12.620	12.62	17.87	-5.25
High	5240	12.760	12.76	17.87	-5.11

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5180	2.612	2.72	5.69	-2.97
Mid	5200	2.606	2.72	5.69	-2.97
High	5240	3.334	3.44	5.69	-2.25

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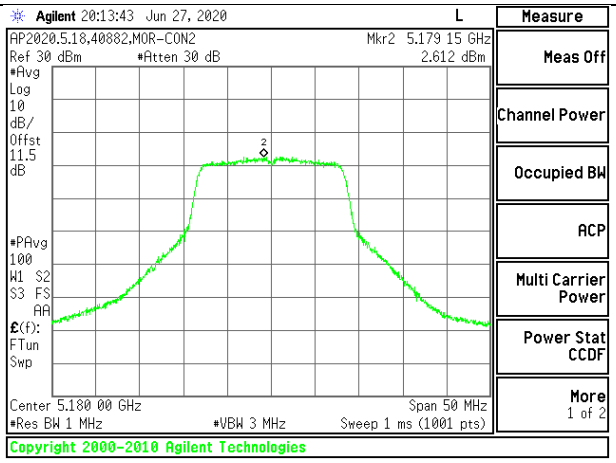

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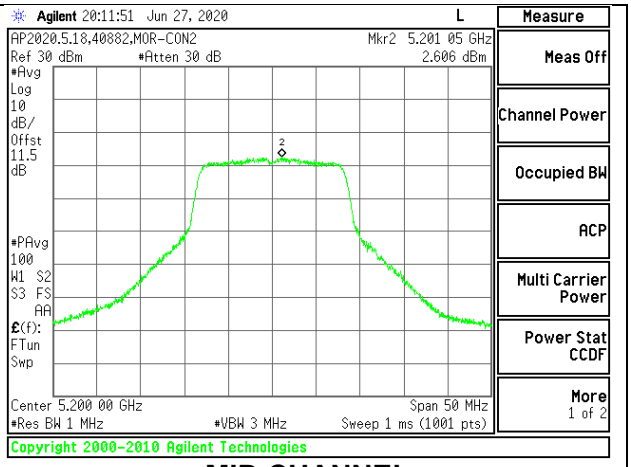

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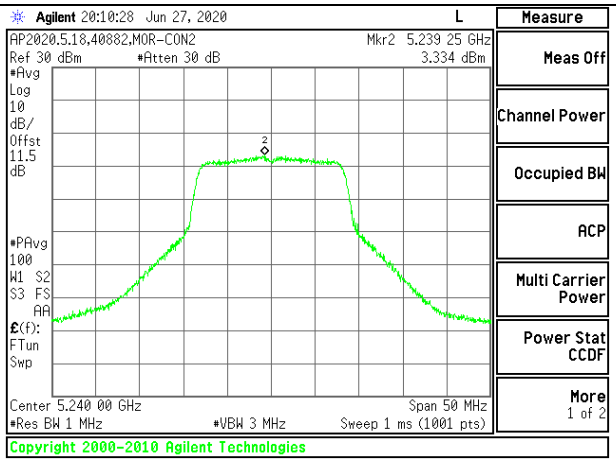

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9.5.3. 802.11n HT20 MODE IN THE 5.2 GHz BAND

1TX PCB Antenna MODE (FCC) MOBILE

Test Engineer:	40882
Test Date:	2020-06-27, 2020-09-11

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5180	4.31	24.00	11.00
Mid	5200	4.31	24.00	11.00
High	5240	4.31	24.00	11.00

Duty Cycle CF (dB)	0.12	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	11.270	11.27	24.00	-12.73
Mid	5200	12.540	12.54	24.00	-11.46
High	5240	12.860	12.86	24.00	-11.14

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5180	2.216	2.34	11.00	-8.66
Mid	5200	2.404	2.52	11.00	-8.48
High	5240	3.068	3.19	11.00	-7.81

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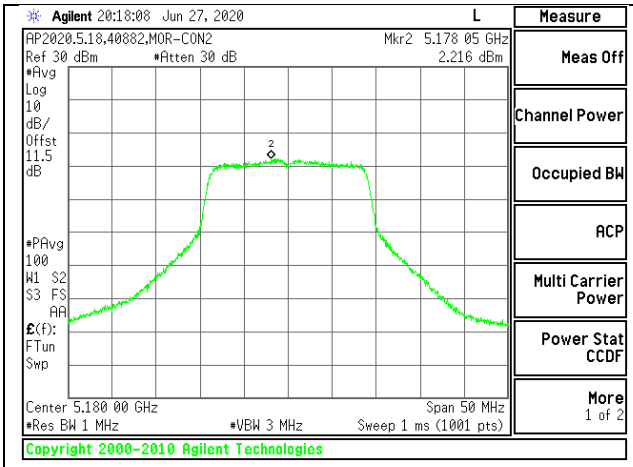

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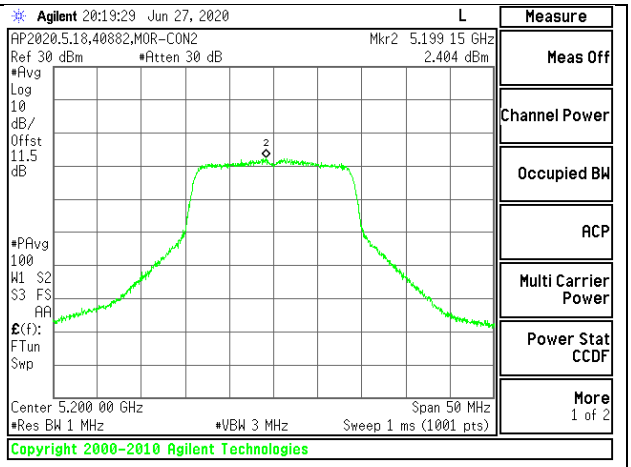

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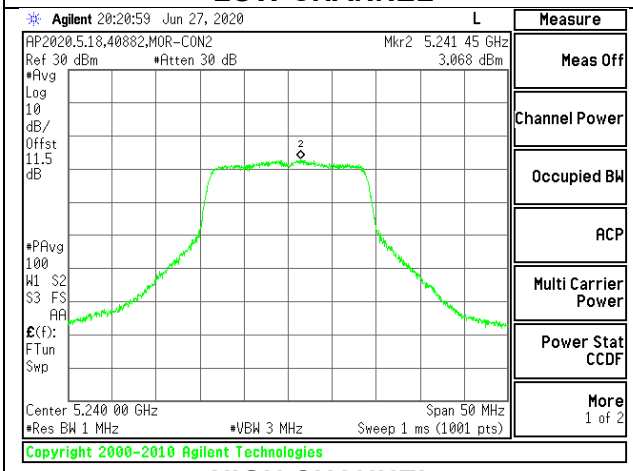

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1TX PCB Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-06-27, 2020-09-11

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	EIRP Power Limit (dBm)	Power Limit (dBm)	EIRP PSD Limit (dBm/1MHz)	PSD Limit (dBm/1MHz)
Low	5180	17.705	4.31	22.48	18.17	10.00	5.69
Mid	5200	17.615	4.31	22.46	18.15	10.00	5.69
High	5240	17.688	4.31	22.48	18.17	10.00	5.69

Duty Cycle CF (dB)	0.12	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	11.270	11.27	18.17	-6.90
Mid	5200	12.540	12.54	18.15	-5.61
High	5240	12.860	12.86	18.17	-5.31

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5180	2.216	2.34	5.69	-3.35
Mid	5200	2.404	2.52	5.69	-3.17
High	5240	3.068	3.19	5.69	-2.50

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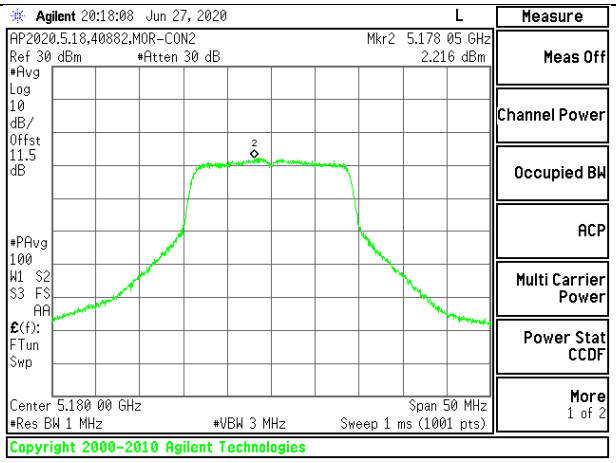

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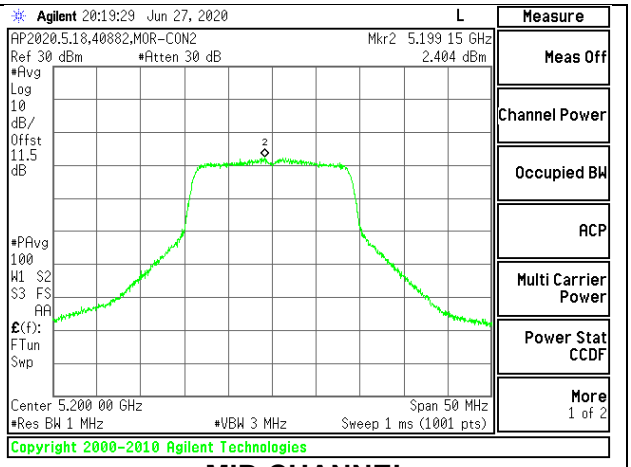

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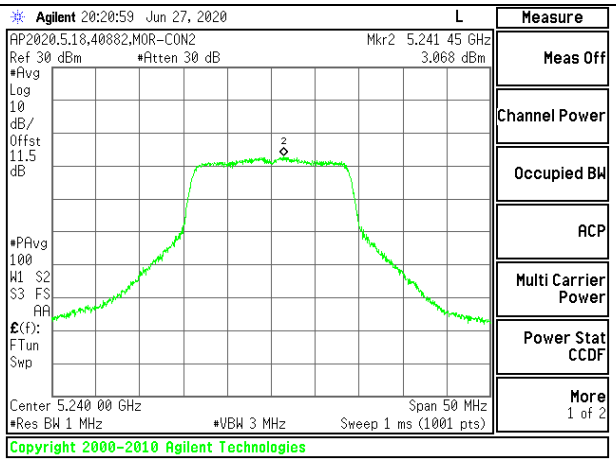

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9.5.4. 802.11n HT40 MODE IN THE 5.2 GHz BAND

1TX PCB Antenna MODE (FCC) MOBILE

Test Engineer:	40882
Test Date:	2020-06-27

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5190	4.31	24.00	11.00
High	5230	4.31	24.00	11.00

Duty Cycle CF (dB)	0.23	**Included in Calculations of Corr'd Power & PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	11.23	11.23	24.00	-12.77
High	5230	11.79	11.79	24.00	-12.21

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5190	2.560	2.79	11.00	-8.21
High	5230	2.972	3.20	11.00	-7.80

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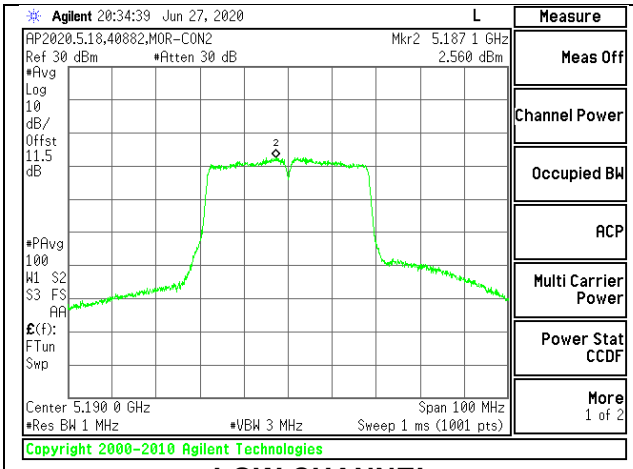

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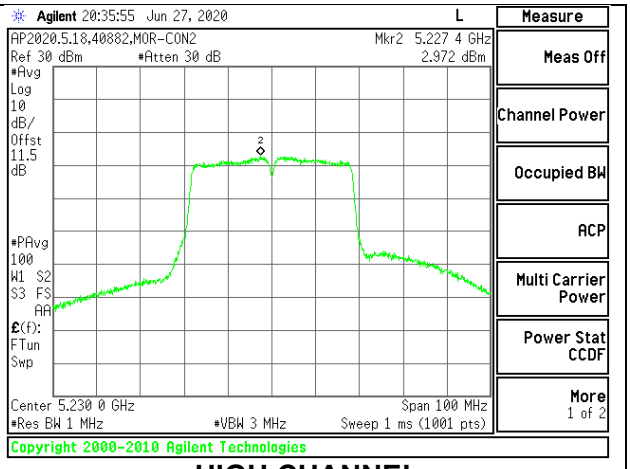

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1TX PCB Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-06-27

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	EIRP Power Limit (dBm)	Power Limit (dBm)	EIRP PSD Limit (dBm/1MHz)	PSD Limit (dBm/1MHz)
Low	5190	36.419	4.31	23.00	18.69	10.00	5.69
High	5230	36.340	4.31	23.00	18.69	10.00	5.69

Duty Cycle CF (dB)	0.23	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	11.23	11.23	18.69	-7.46
High	5230	11.79	11.79	18.69	-6.90

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5190	2.560	2.79	5.69	-2.90
High	5230	2.972	3.20	5.69	-2.49

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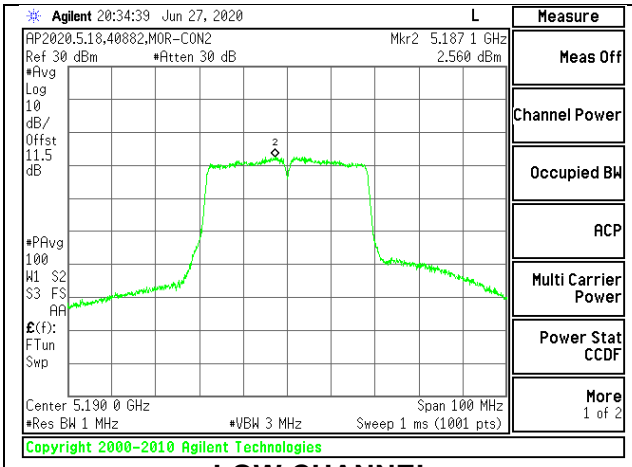

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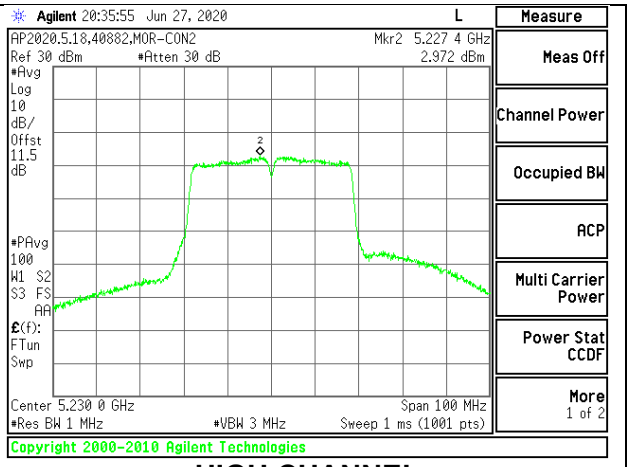

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9.5.5. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

1TX PCB Antenna MODE (FCC) MOBILE

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Mid	5210	4.31	24.00	11.00

Duty Cycle CF (dB)	0.46	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5210	11.80	11.80	24.00	-12.20

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Mid	5210	-0.14	0.32	11.00	-10.68

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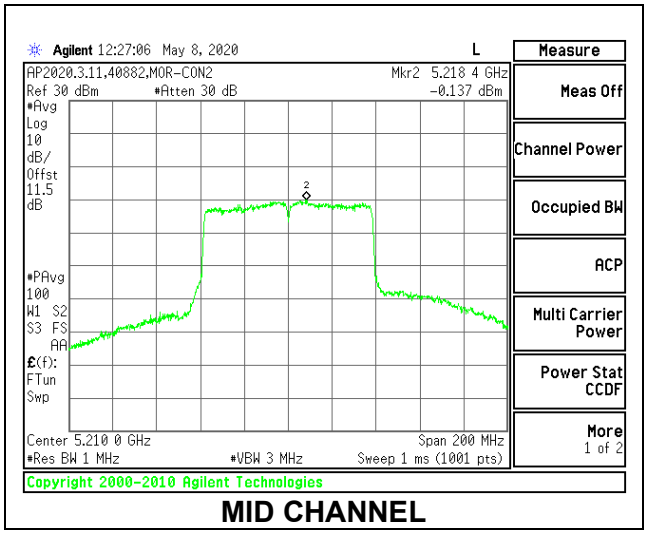

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1TX PCB Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	EIRP Power Limit (dBm)	Power Limit (dBm)	EIRP PSD Limit (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)
Mid	5210	75.915	4.31	23.00	18.69	10.00	5.69

Duty Cycle CF (dB)	0.46	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5210	11.800	11.800	18.69	-6.89

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Mid	5210	-0.137	0.32	5.69	-5.37

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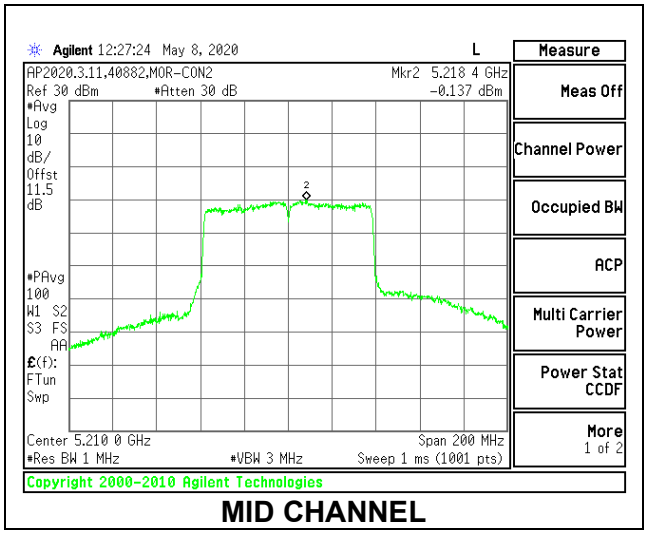

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9.5.6. 802.11a MODE IN THE 5.3 GHz BAND

1TX PCB Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5260	26.60	4.31	24.00	11.00
Mid	5300	28.25	4.31	24.00	11.00
High	5320	27.95	4.31	24.00	11.00

Duty Cycle CF (dB)	0.11	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	16.84	16.84	24.00	-7.16
Mid	5300	17.14	17.14	24.00	-6.86
High	5320	17.22	17.22	24.00	-6.78

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5260	6.841	6.95	11.00	-4.05
Mid	5300	7.436	7.55	11.00	-3.45
High	5320	7.023	7.13	11.00	-3.87

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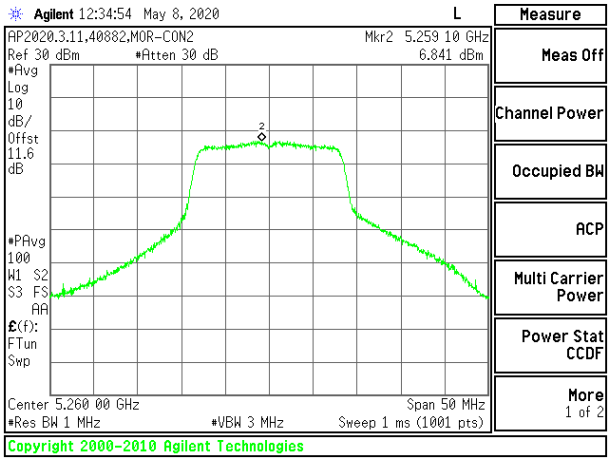

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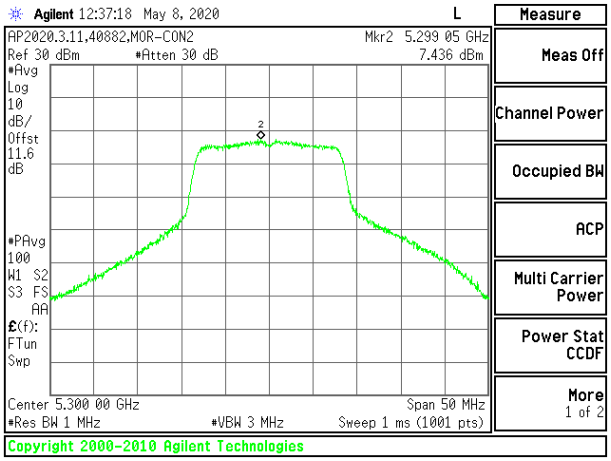

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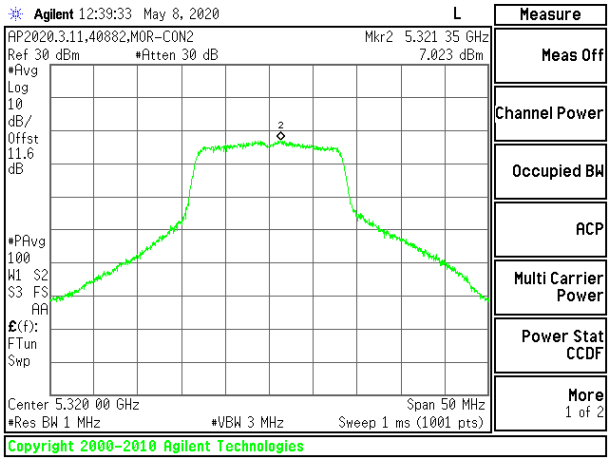

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1TX PCB Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5260	16.624	4.31	23.21	11.00
Mid	5300	16.628	4.31	23.21	11.00
High	5320	16.728	4.31	23.23	11.00

Duty Cycle CF (dB)	0.11	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	16.84	16.84	23.21	-6.37
Mid	5300	17.14	17.14	23.21	-6.07
High	5320	17.22	17.22	23.23	-6.01

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5260	6.841	6.95	11.00	-4.05
Mid	5300	7.436	7.55	11.00	-3.45
High	5320	7.023	7.13	11.00	-3.87

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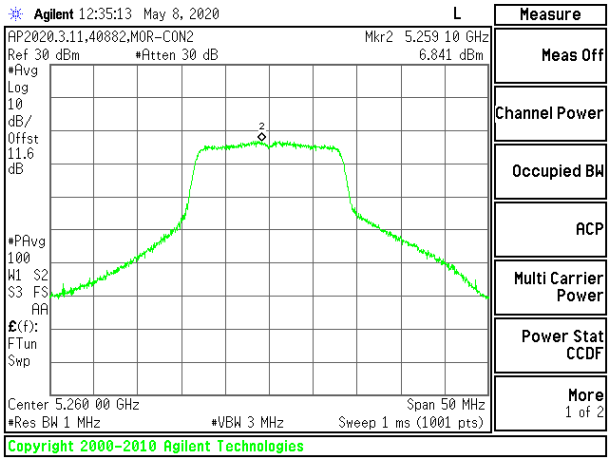

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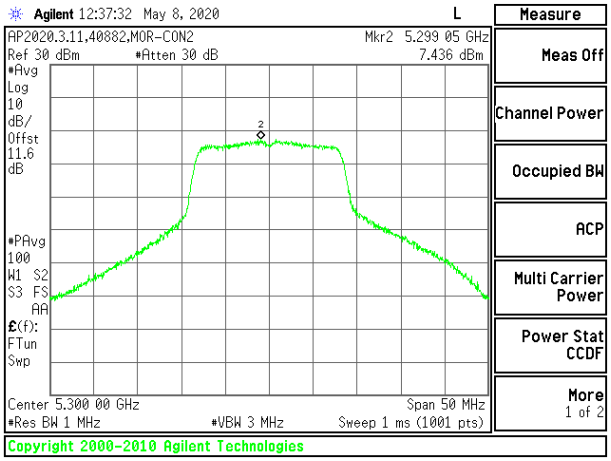

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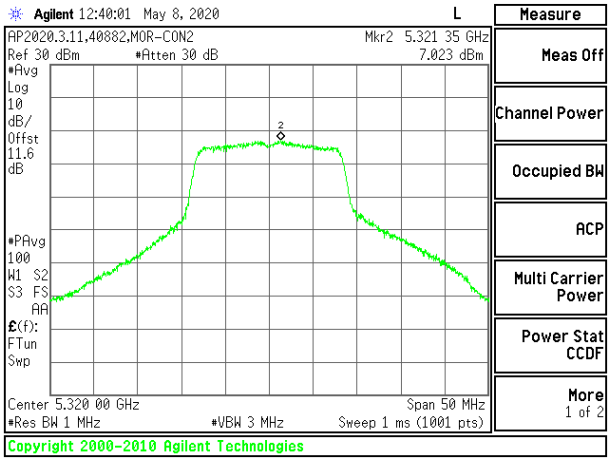

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9.5.7. 802.11n HT20 MODE IN THE 5.3 GHz BAND

1TX PCB Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5260	26.95	4.31	24.00	11.00
Mid	5300	28.70	4.31	24.00	11.00
High	5320	28.55	4.31	24.00	11.00

Duty Cycle CF (dB)	0.12	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	16.77	16.77	24.00	-7.23
Mid	5300	17.12	17.12	24.00	-6.88
High	5320	16.97	16.97	24.00	-7.03

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5260	6.822	6.94	11.00	-4.06
Mid	5300	6.820	6.94	11.00	-4.06
High	5320	6.835	6.96	11.00	-4.05

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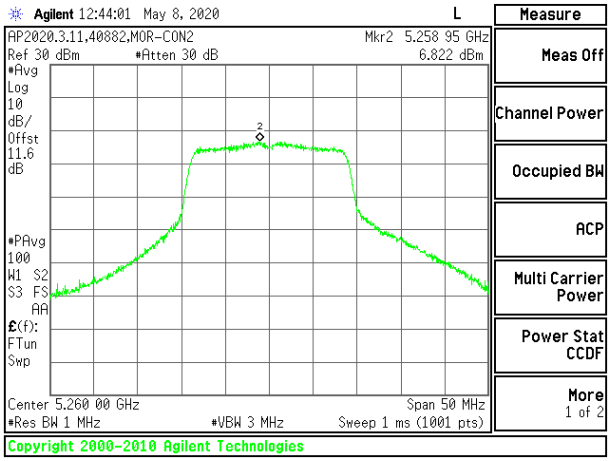

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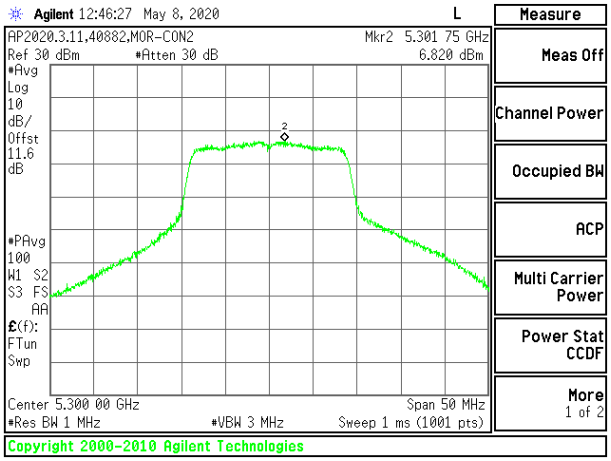

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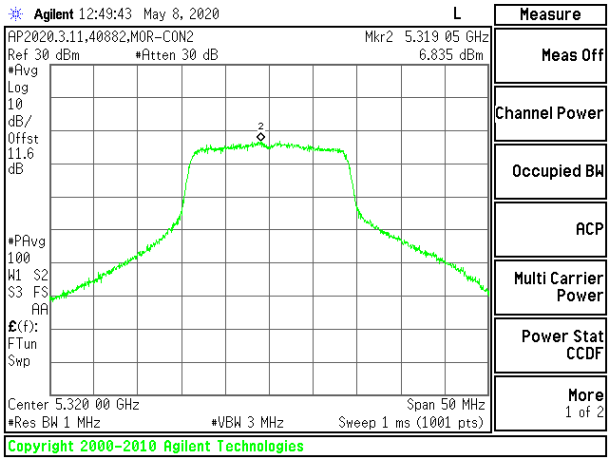

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1TX PCB Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5260	17.738	4.31	23.49	11.00
Mid	5300	17.837	4.31	23.51	11.00
High	5320	17.742	4.31	23.49	11.00

Duty Cycle CF (dB)	0.12	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	16.77	16.77	23.49	-6.72
Mid	5300	17.12	17.12	23.51	-6.39
High	5320	16.97	16.97	23.49	-6.52

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5260	6.822	6.94	11.00	-4.06
Mid	5300	6.820	6.94	11.00	-4.06
High	5320	6.835	6.96	11.00	-4.05

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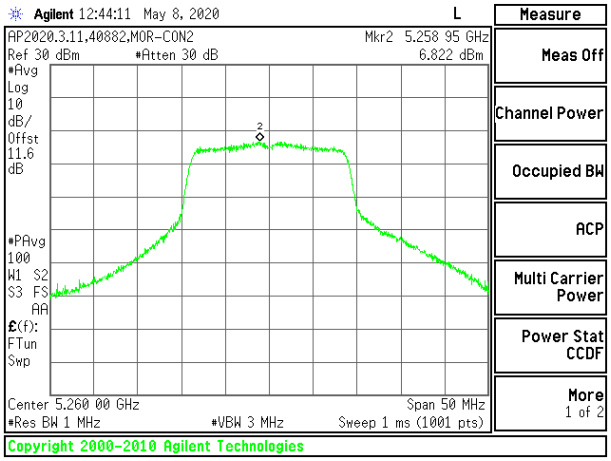

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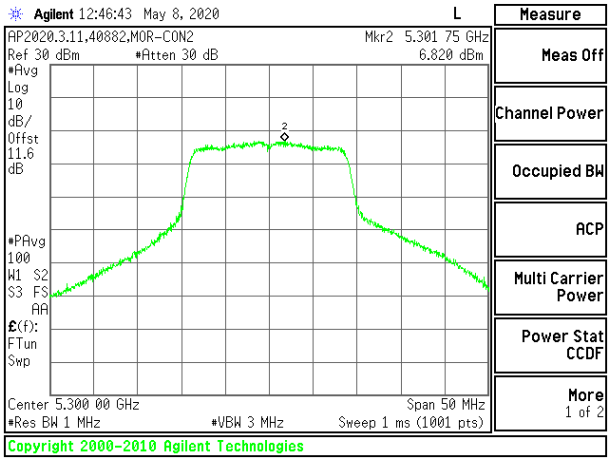

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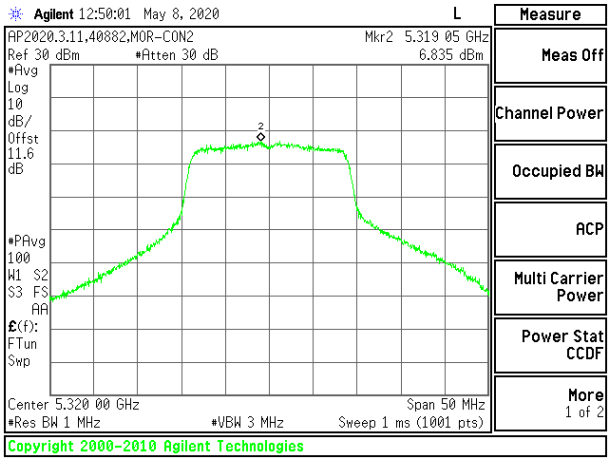

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9.5.8. 802.11n HT40 MODE IN THE 5.3 GHz BAND

1TX PCB Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5270	42.30	4.31	24.00	11.00
High	5310	54.00	4.31	24.00	11.00

Duty Cycle CF (dB)	0.23	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5270	14.04	14.04	24.00	-9.96
High	5310	14.34	14.34	24.00	-9.66

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5270	3.124	3.35	11.00	-7.65
High	5310	3.398	3.63	11.00	-7.37

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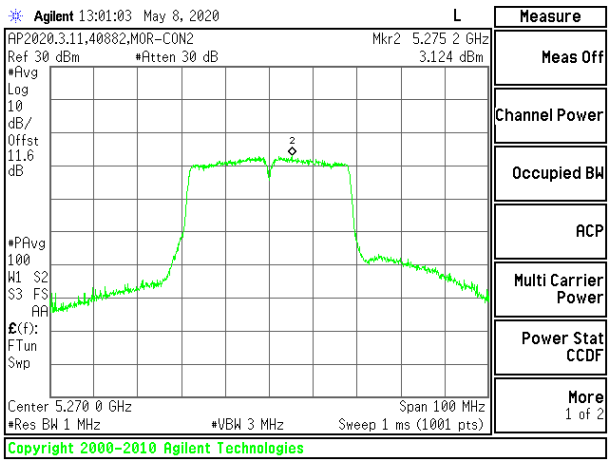

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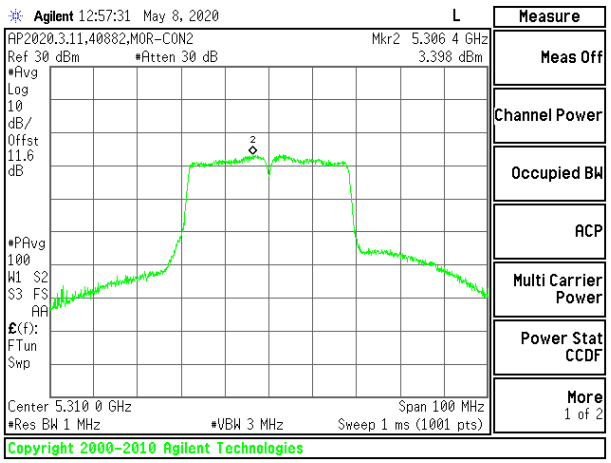

HIGH CHANNEL

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1TX PCB Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5270	36.036	4.31	24.00	11.00
High	5310	36.284	4.31	24.00	11.00

Duty Cycle CF (dB)	0.23	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5270	14.04	14.04	24.00	-9.96
High	5310	14.34	14.34	24.00	-9.66

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5270	3.124	3.35	11.00	-7.65
High	5310	3.398	3.63	11.00	-7.37

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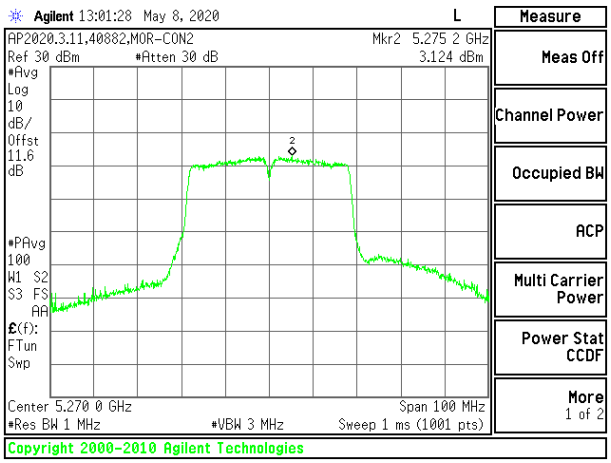

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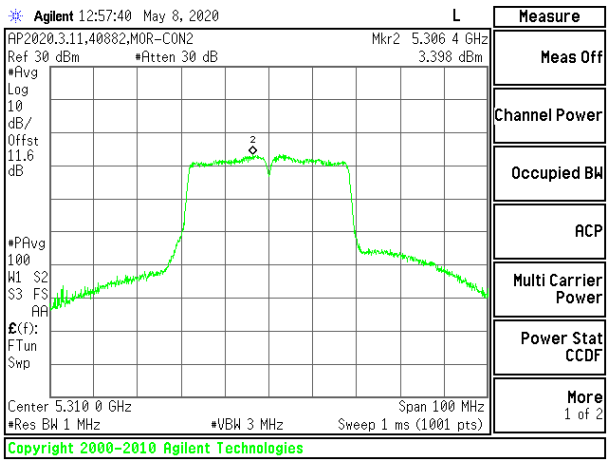

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9.5.9. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND

1TX PCB Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Mid	5290	86.20	4.31	24.00	11.00

Duty Cycle CF (dB)	0.46	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5290	11.78	11.78	24.00	-12.22

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Mid	5290	-0.440	0.02	11.00	-10.98

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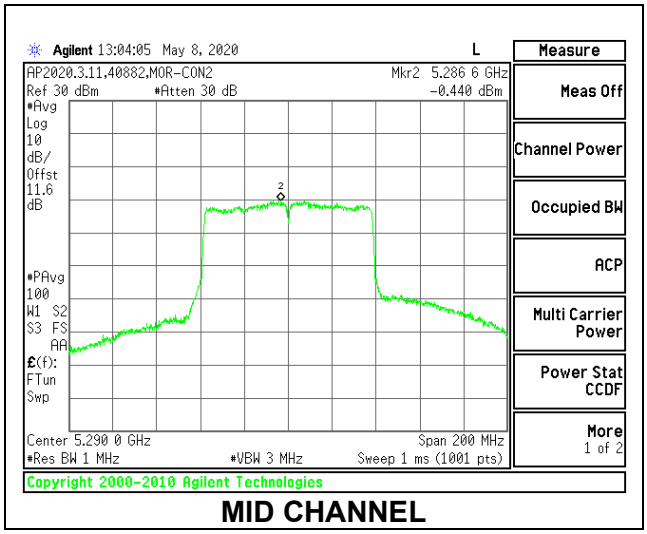

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1TX PCB Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Mid	5290	75.794	4.31	24.00	11.00

Duty Cycle CF (dB)	0.46	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5290	11.78	11.78	24.00	-12.22

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Mid	5290	-0.440	0.02	11.00	-10.98

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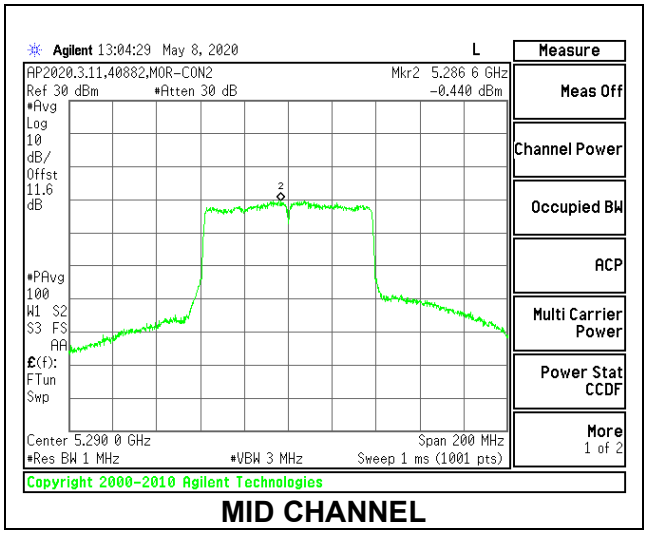

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9.5.10. 802.11a MODE IN THE 5.6 GHz BAND

1TX PCB Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5500	26.90	4.31	24.00	11.00
Mid	5580	27.20	4.31	24.00	11.00
High	5700	27.40	4.31	24.00	11.00
144	5720	26.55	4.31	24.00	11.00

Duty Cycle CF (dB)	0.11	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	16.97	16.97	24.00	-7.03
Mid	5580	16.85	16.85	24.00	-7.15
High	5700	16.45	16.45	24.00	-7.55
144	5720	16.50	16.50	24.00	-7.50

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5500	5.96	6.07	11.00	-4.93
Mid	5580	5.42	5.53	11.00	-5.47
High	5700	5.79	5.90	11.00	-5.11
144	5720	6.16	6.27	11.00	-4.73

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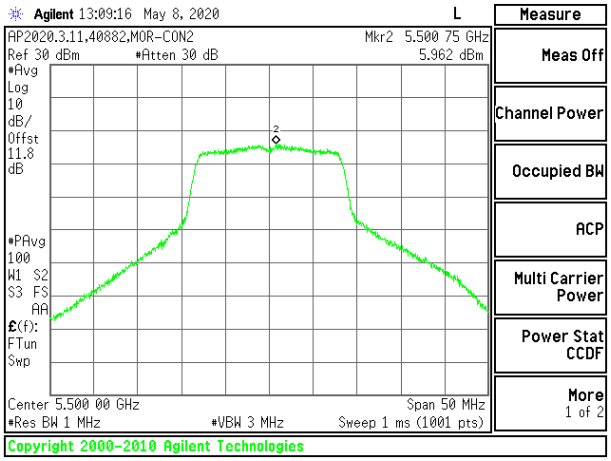

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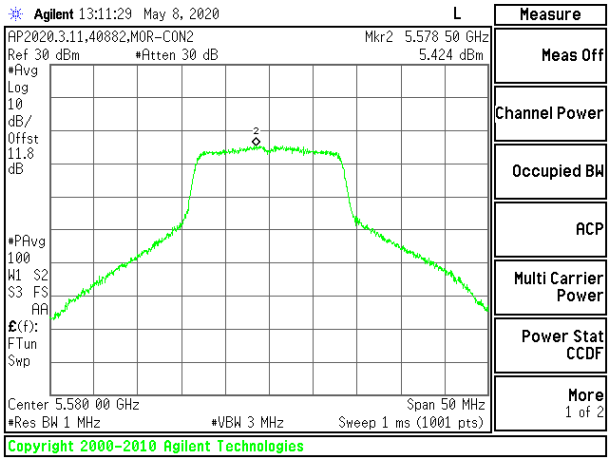

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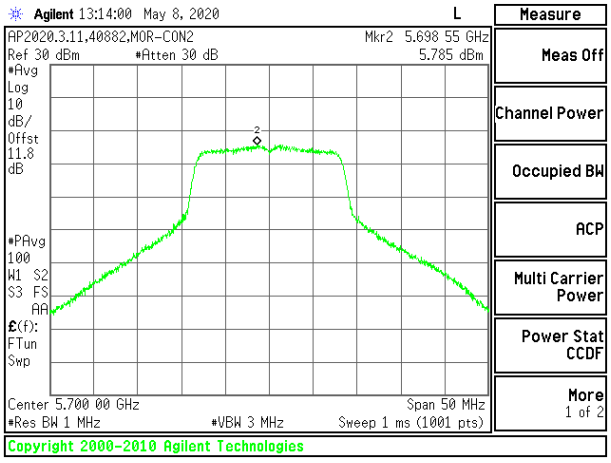

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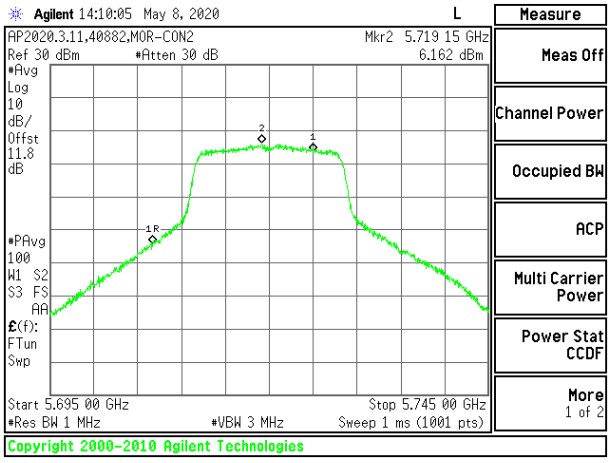

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1TX PCB Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5500	16.56	4.31	23.19	11.00
Mid	5580	16.61	4.31	23.20	11.00
High	5700	16.58	4.31	23.20	11.00
144	5720	16.57	4.31	23.19	11.00

Duty Cycle CF (dB)	0.11	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	16.97	16.97	23.19	-6.22
Mid	5580	16.85	16.85	23.20	-6.35
High	5700	16.45	16.45	23.20	-6.75
144	5720	16.50	16.50	23.19	-6.69

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5500	5.96	6.07	11.00	-4.93
Mid	5580	5.42	5.53	11.00	-5.47
High	5700	5.79	5.90	11.00	-5.11
144	5720	6.16	6.27	11.00	-4.73

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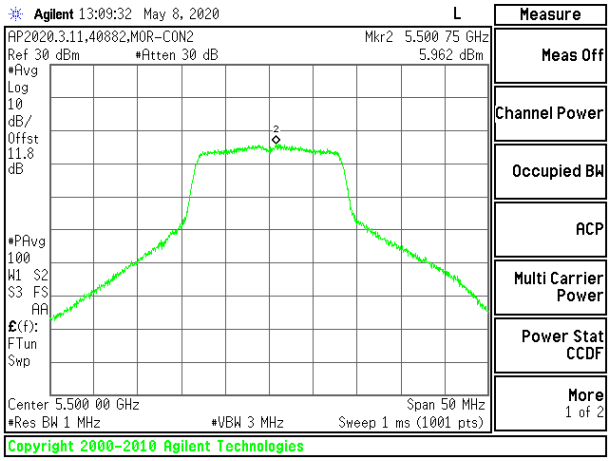

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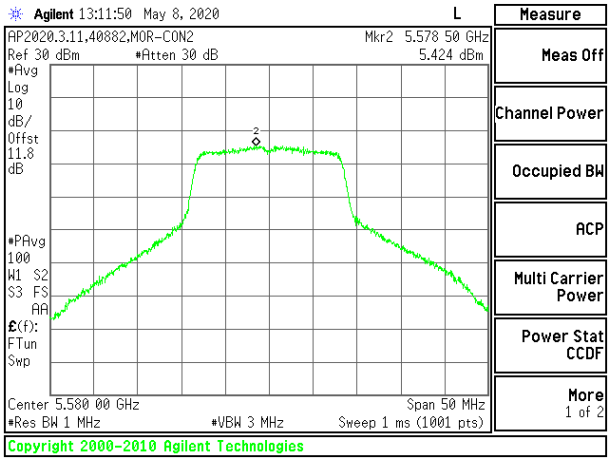

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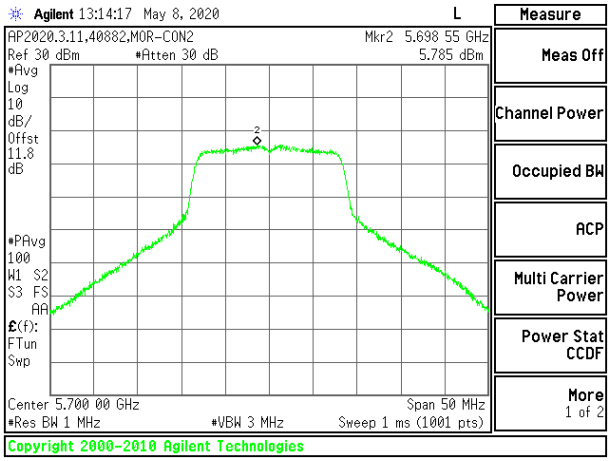

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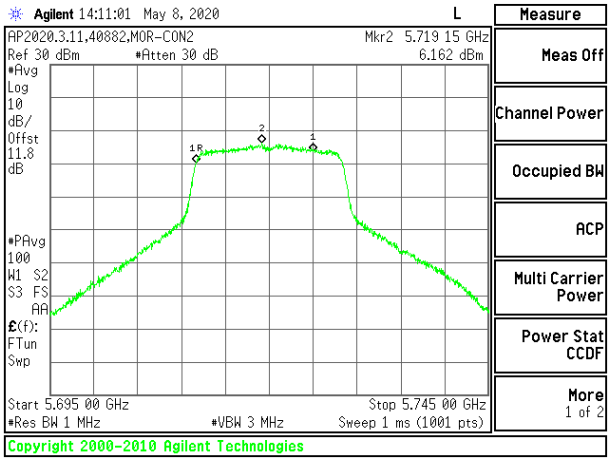

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9.5.11. 802.11n HT20 MODE IN THE 5.6 GHz BAND

1TX PCB Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5500	26.30	4.31	24.00	11.00
Mid	5580	27.60	4.31	24.00	11.00
High	5700	27.40	4.31	24.00	11.00
144	5720	27.65	4.31	24.00	11.00

Duty Cycle CF (dB)	0.12	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	16.72	16.72	24.00	-7.28
Mid	5580	16.69	16.69	24.00	-7.31
High	5700	16.30	16.30	24.00	-7.70
144	5720	16.41	16.41	24.00	-7.59

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5500	5.28	5.40	11.00	-5.60
Mid	5580	5.33	5.45	11.00	-5.55
High	5700	5.76	5.88	11.00	-5.13
144	5720	5.90	6.02	11.00	-4.98

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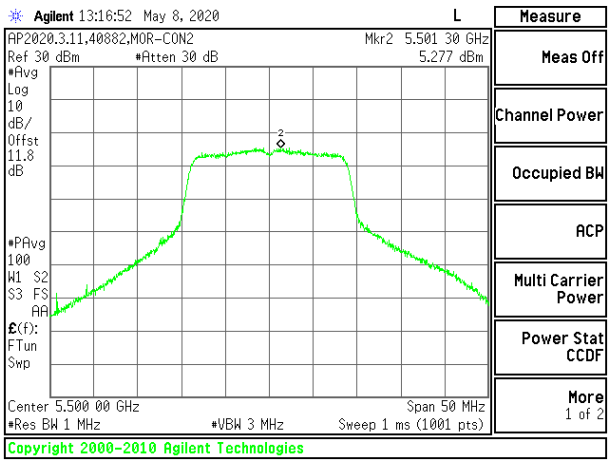
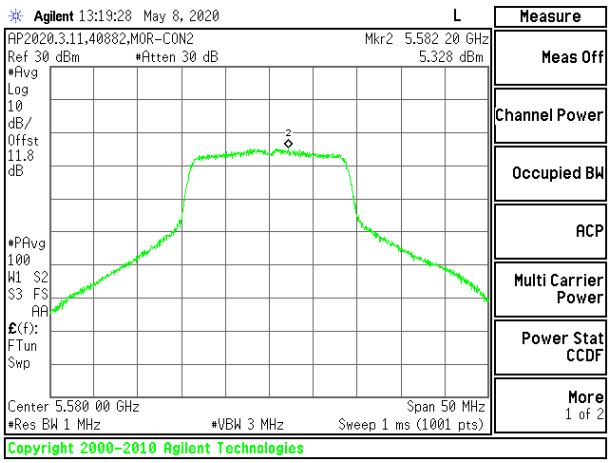


LOW CHANNEL



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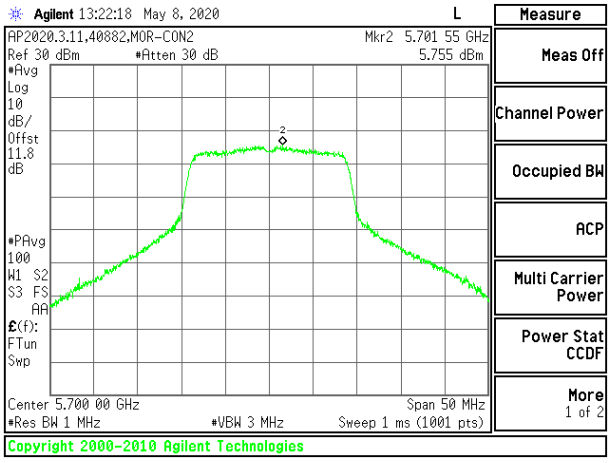
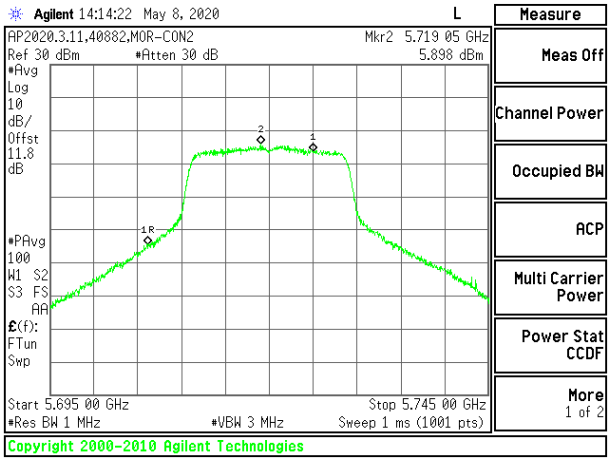


HIGH CHANNEL



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1TX PCB Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5500	17.70	4.31	23.48	11.00
Mid	5580	17.75	4.31	23.49	11.00
High	5700	17.79	4.31	23.50	11.00
144	5720	17.79	4.31	23.50	11.00

Duty Cycle CF (dB)	0.12	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	16.72	16.72	23.48	-6.76
Mid	5580	16.69	16.69	23.49	-6.80
High	5700	16.30	16.30	23.50	-7.20
144	5720	16.41	16.41	23.50	-7.09

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5500	5.28	5.40	11.00	-5.60
Mid	5580	5.33	5.45	11.00	-5.55
High	5700	5.76	5.88	11.00	-5.13
144	5720	5.90	6.02	11.00	-4.98

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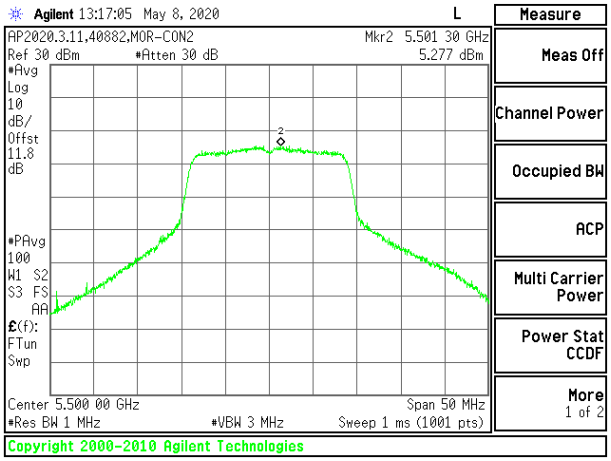
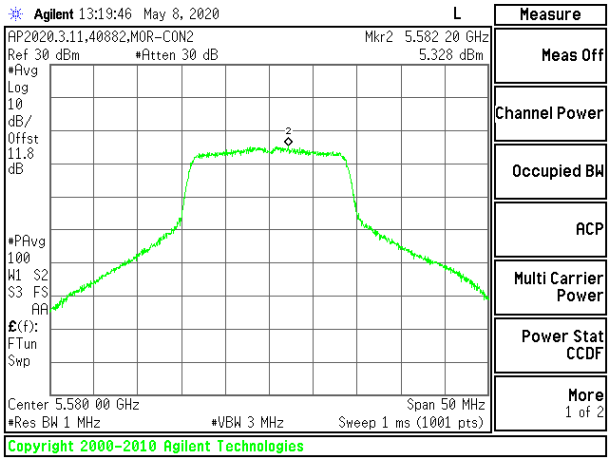


LOW CHANNEL



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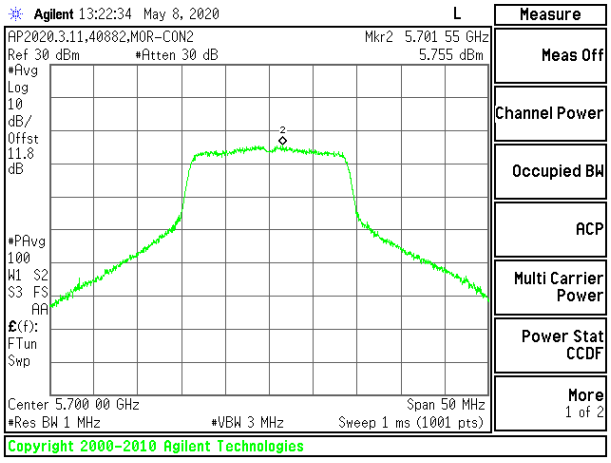
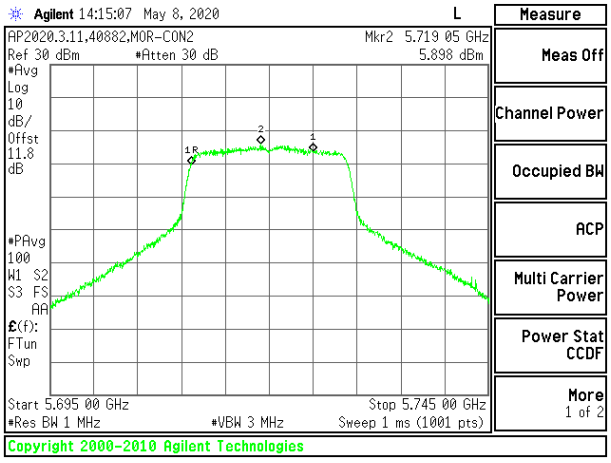


HIGH CHANNEL



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9.5.12. 802.11n HT40 MODE IN THE 5.6 GHz BAND

1TX PCB Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5510	42.80	4.31	24.00	11.00
Mid	5550	42.50	4.31	24.00	11.00
High	5670	42.80	4.31	24.00	11.00
142	5710	42.60	4.31	24.00	11.00

Duty Cycle CF (dB)	0.23	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5510	15.84	15.84	24.00	-8.16
Mid	5550	15.48	15.48	24.00	-8.52
High	5670	16.63	16.63	24.00	-7.37
142	5710	16.73	16.73	24.00	-7.27

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5510	1.12	1.35	11.00	-9.65
Mid	5550	0.95	1.18	11.00	-9.83
High	5670	0.96	1.19	11.00	-9.81
142	5710	1.11	1.34	11.00	-9.66

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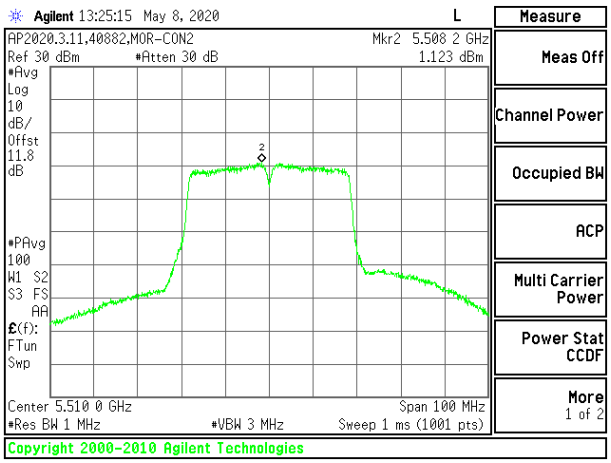
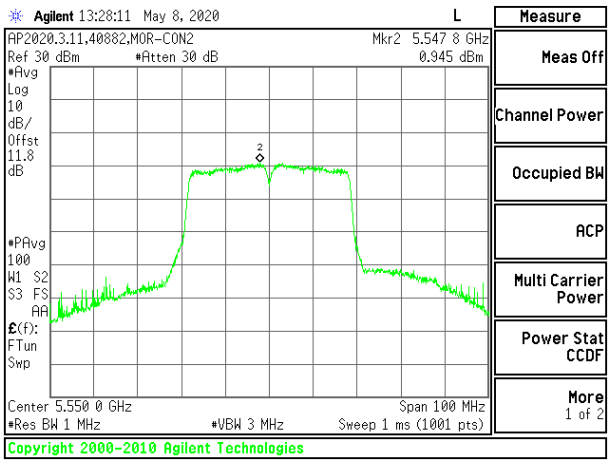


LOW CHANNEL



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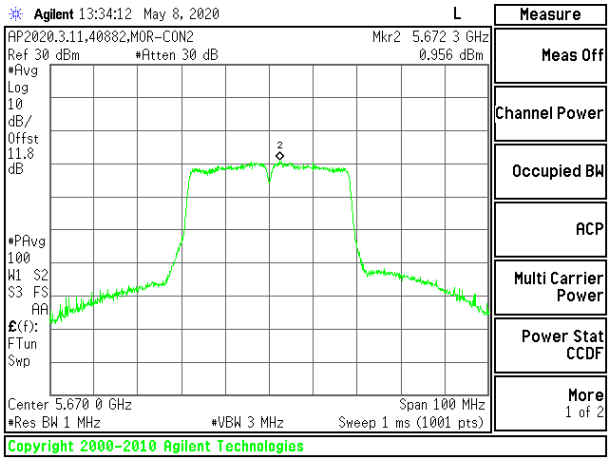
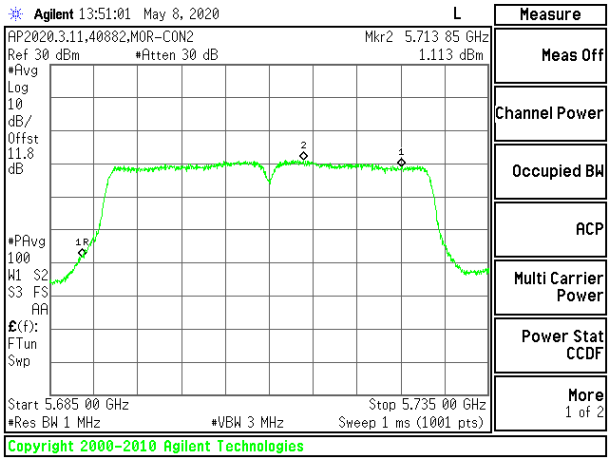


HIGH CHANNEL



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1TX PCB Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5510	36.19	4.31	24.00	11.00
Mid	5550	36.14	4.31	24.00	11.00
High	5670	36.13	4.31	24.00	11.00
142	5710	36.17	4.31	24.00	11.00

Duty Cycle CF (dB)	0.23	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5510	15.84	15.84	24.00	-8.16
Mid	5550	15.48	15.48	24.00	-8.52
High	5670	16.63	16.63	24.00	-7.37
142	5710	16.73	16.73	24.00	-7.27

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5510	1.12	1.35	11.00	-9.65
Mid	5550	0.95	1.18	11.00	-9.83
High	5670	0.96	1.19	11.00	-9.81
142	5710	1.11	1.34	11.00	-9.66

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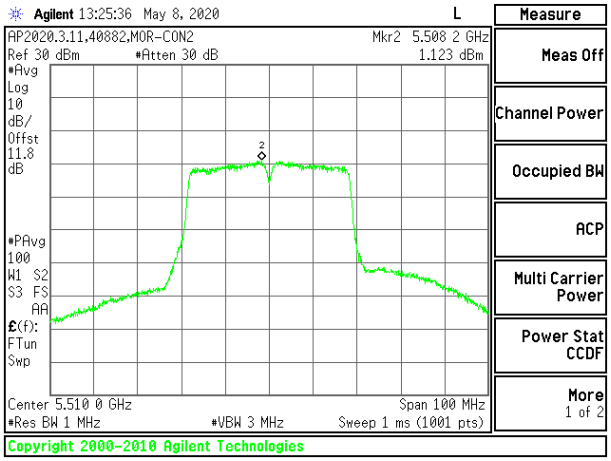

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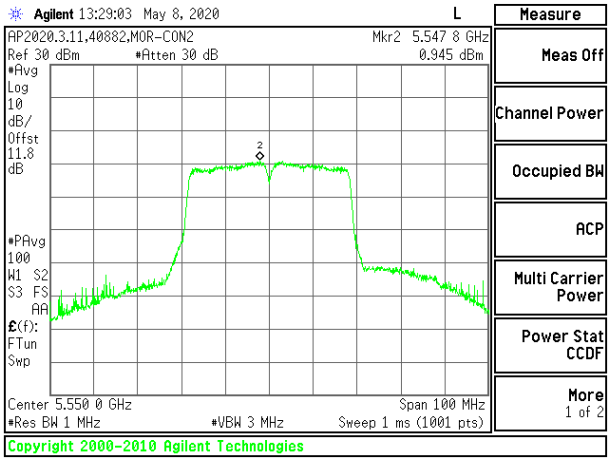
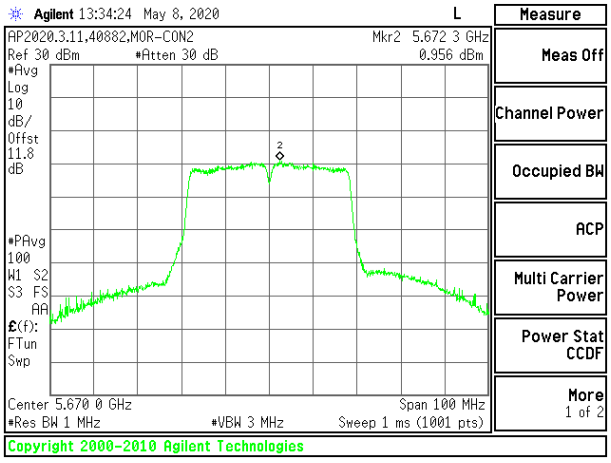


MID CHANNEL



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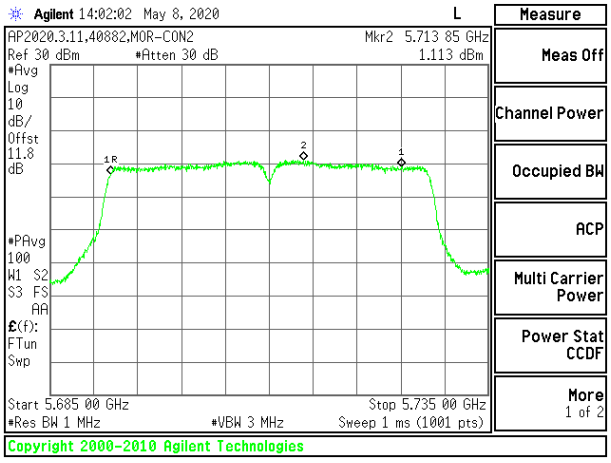

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9.5.13. 802.11ac VHT80 MODE IN THE 5.6 GHz BAND

1TX PCB Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5530	135.80	4.31	24.00	11.00
High	5610	90.80	4.31	24.00	11.00
138	5690	99.90	4.31	24.00	11.00

Duty Cycle CF (dB)	0.46	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5530	14.53	14.53	24.00	-9.47
High	5610	15.53	15.53	24.00	-8.47
138	5690	15.86	15.86	24.00	-8.14

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5530	-2.60	-2.14	11.00	-13.14
High	5610	-3.26	-2.80	11.00	-13.80
138	5690	-2.63	-2.17	11.00	-13.17

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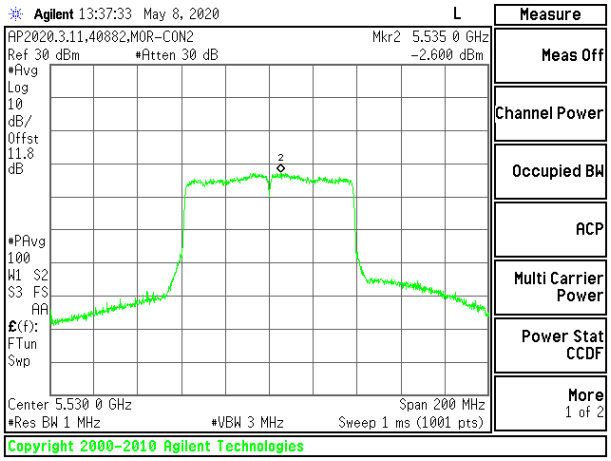

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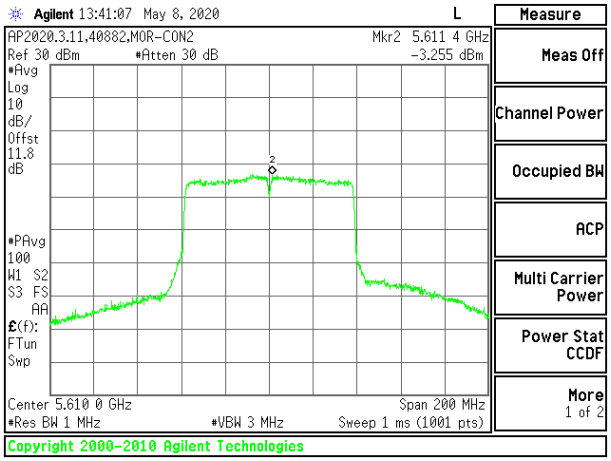

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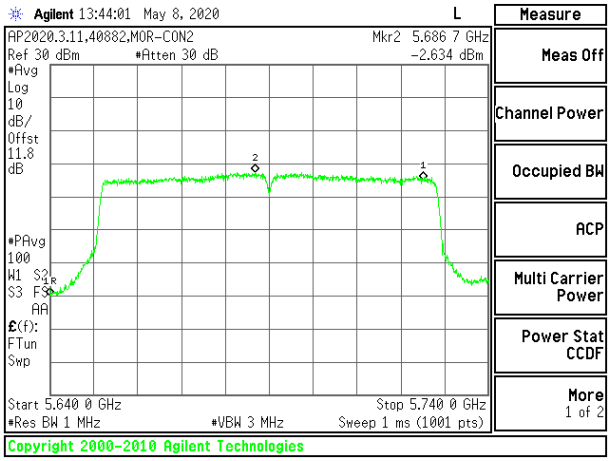

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1TX PCB Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5530	75.84	4.31	24.00	11.00
High	5610	75.36	4.31	24.00	11.00
138	5690	75.52	4.31	24.00	11.00

Duty Cycle CF (dB)	0.46	**Included in Calculations of Corr'd Power & PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5530	14.53	14.53	24.00	-9.47
High	5610	15.53	15.53	24.00	-8.47
138	5690	15.86	15.86	24.00	-8.14

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5530	-2.60	-2.14	11.00	-13.14
High	5610	-3.26	-2.80	11.00	-13.80
138	5690	-2.63	-2.17	11.00	-13.17

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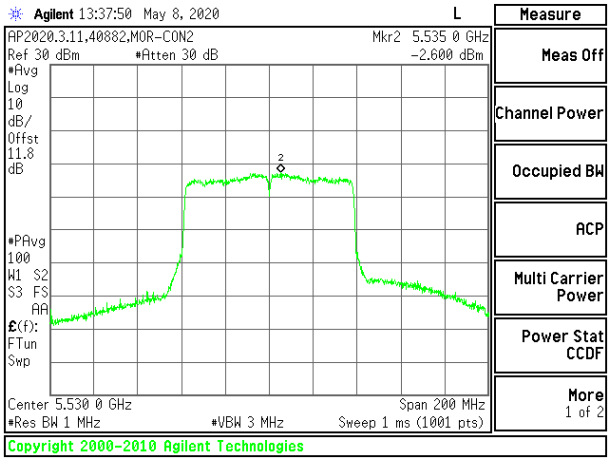

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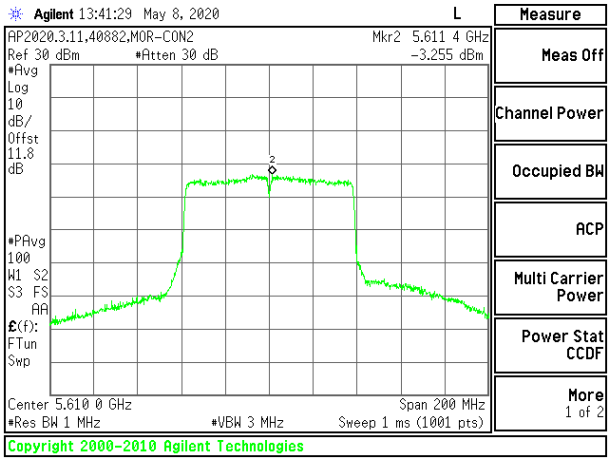

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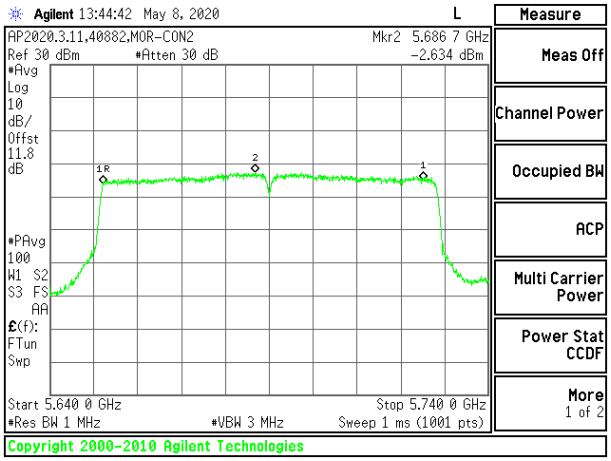

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9.5.14. 802.11a MODE IN THE 5.8 GHz BAND

1TX PCB Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 500KHz)
Low	5745	4.31	30.00	30.00
Mid	5785	4.31	30.00	30.00
High	5825	4.31	30.00	30.00
144	5720	4.31	30.00	30.00

Duty Cycle CF (dB)	0.11	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	16.741	16.741	30.00	-13.26
Mid	5785	16.284	16.284	30.00	-13.72
High	5825	15.613	15.613	30.00	-14.39
144	5720	16.500	16.500	30.00	-13.50

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 500KHz)	Total Corr'd PSD (dBm/ 500KHz)	PSD Limit (dBm/ 500KHz)	PSD Margin (dB)
Low	5745	3.393	3.503	30.00	-26.50
Mid	5785	3.258	3.368	30.00	-26.63
High	5825	3.094	3.204	30.00	-26.80
144	5720	1.834	1.944	30.00	-28.06

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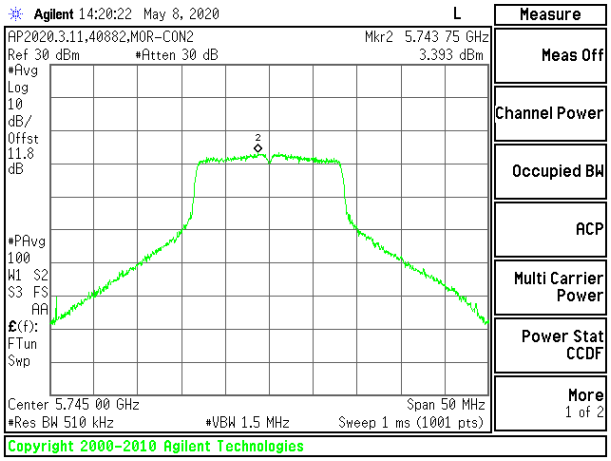

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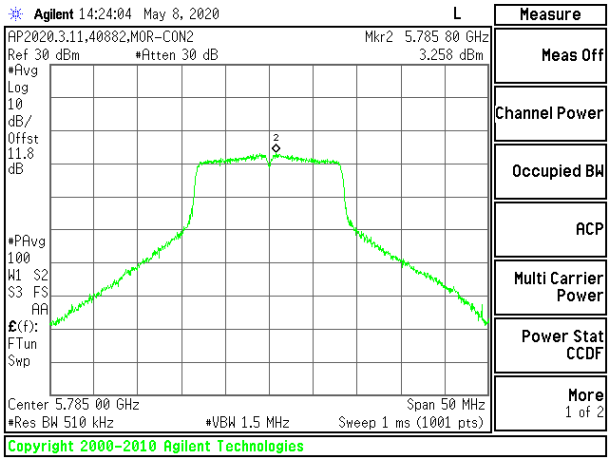

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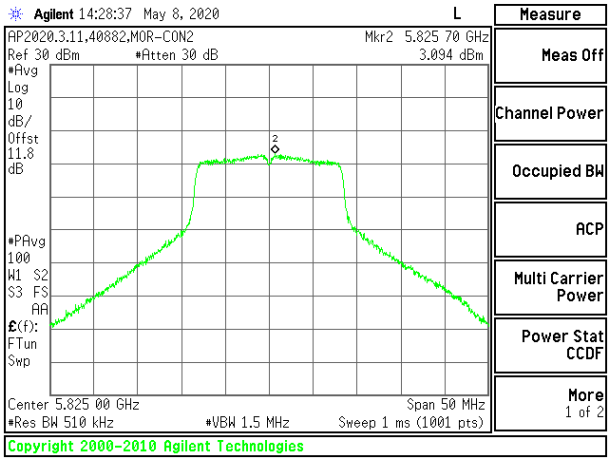

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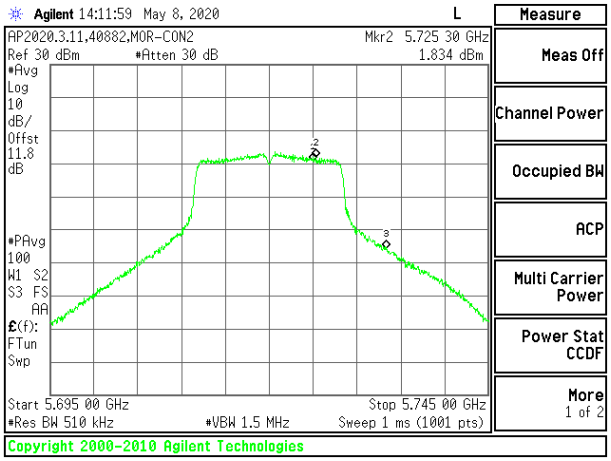

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1TX PCB Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 500KHz)
Low	5745	4.31	30.00	30.00
Mid	5785	4.31	30.00	30.00
High	5825	4.31	30.00	30.00
144	5720	4.31	30.00	30.00

Duty Cycle CF (dB)	0.11	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	16.741	16.741	30.00	-13.26
Mid	5785	16.284	16.284	30.00	-13.72
High	5825	15.613	15.613	30.00	-14.39
144	5720	16.500	16.500	30.00	-13.50

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 500KHz)	Total Corr'd PSD (dBm/ 500KHz)	PSD Limit (dBm/ 500KHz)	PSD Margin (dB)
Low	5745	3.393	3.503	30.00	-26.50
Mid	5785	3.258	3.368	30.00	-26.63
High	5825	3.094	3.204	30.00	-26.80
144	5720	1.834	1.944	30.00	-28.06

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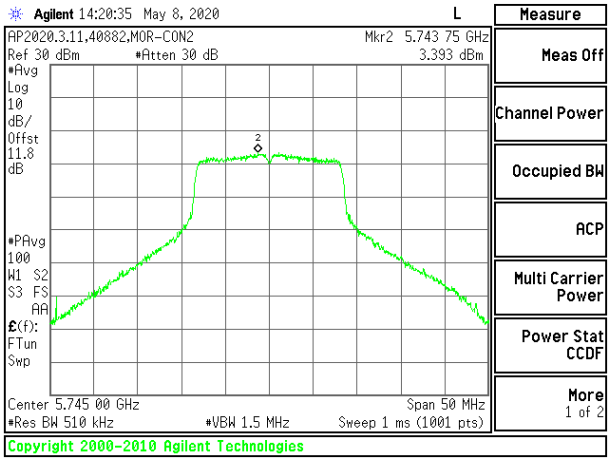
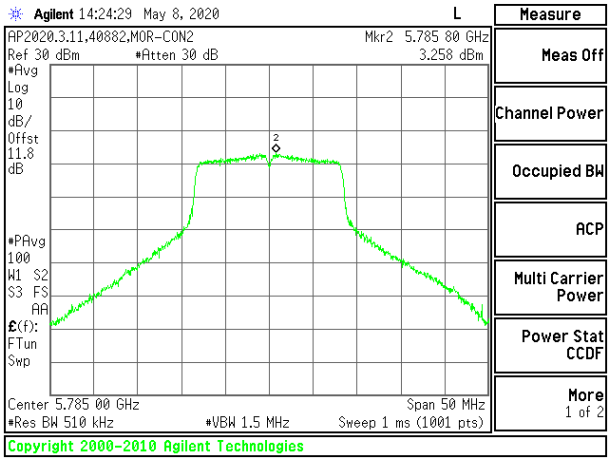
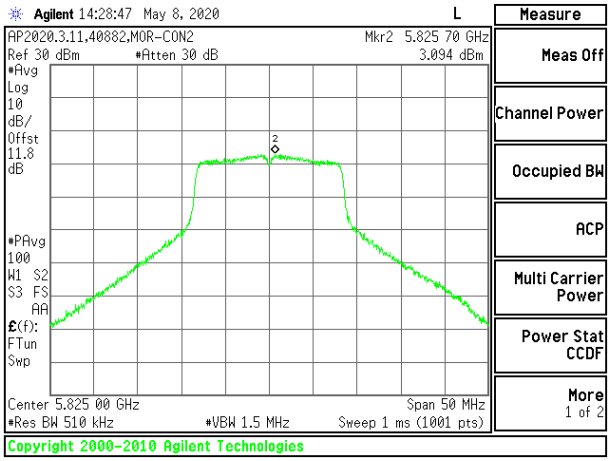


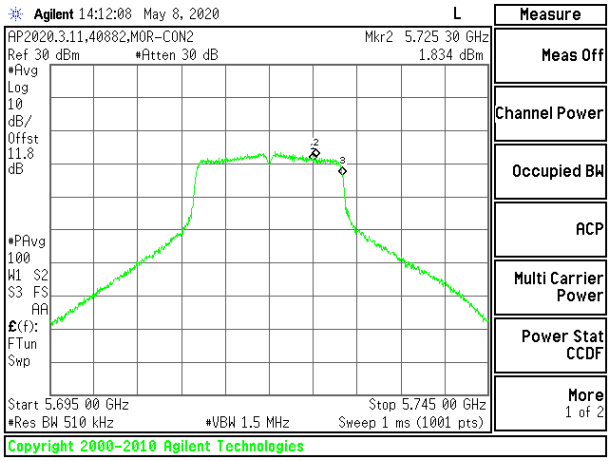
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



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9.5.15. 802.11n HT20 MODE IN THE 5.8 GHz BAND

1TX PCB Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 500KHz)
Low	5745	4.31	30.00	30.00
Mid	5785	4.31	30.00	30.00
High	5825	4.31	30.00	30.00
144	5720	4.31	30.00	30.00

Duty Cycle CF (dB)	0.12	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	16.641	16.641	30.00	-13.36
Mid	5785	16.239	16.239	30.00	-13.76
High	5825	15.655	15.655	30.00	-14.35
144	5720	16.410	16.410	30.00	-13.59

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 500KHz)	Total Corr'd PSD (dBm/ 500KHz)	PSD Limit (dBm/ 500KHz)	PSD Margin (dB)
Low	5745	2.808	2.928	30.00	-27.07
Mid	5785	2.632	2.752	30.00	-27.25
High	5825	2.469	2.589	30.00	-27.41
144	5720	1.356	1.476	30.00	-28.52

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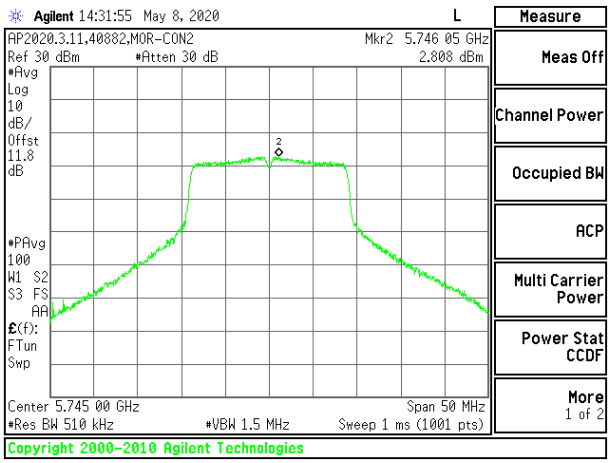
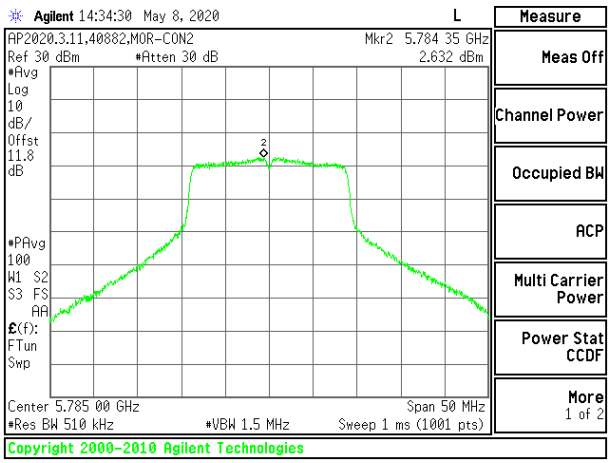


LOW CHANNEL



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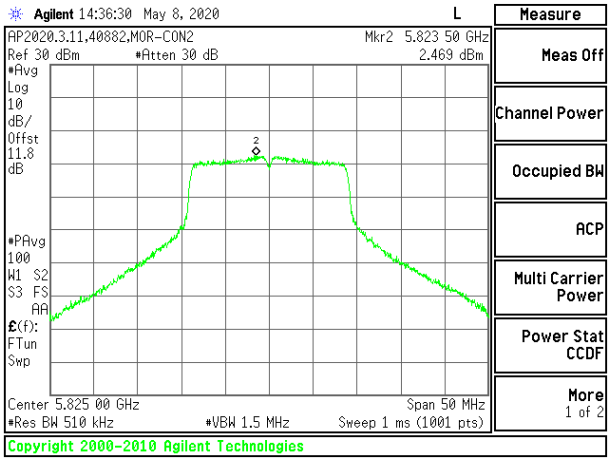

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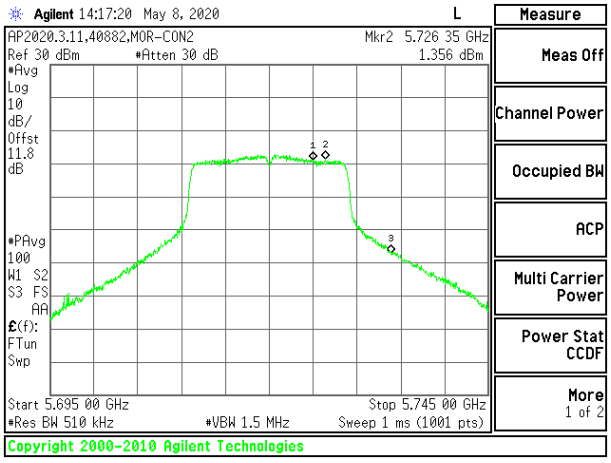

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1TX PCB Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 500KHz)
Low	5745	4.31	30.00	30.00
Mid	5785	4.31	30.00	30.00
High	5825	4.31	30.00	30.00
144	5720	4.31	30.00	30.00

Duty Cycle CF (dB)	0.12	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	16.641	16.641	30.00	-13.36
Mid	5785	16.239	16.239	30.00	-13.76
High	5825	15.655	15.655	30.00	-14.35
144	5720	16.410	16.410	30.00	-13.59

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 500KHz)	Total Corr'd PSD (dBm/ 500KHz)	PSD Limit (dBm/ 500KHz)	PSD Margin (dB)
Low	5745	2.808	2.928	30.00	-27.07
Mid	5785	2.632	2.752	30.00	-27.25
High	5825	2.469	2.589	30.00	-27.41
144	5720	1.356	1.476	30.00	-28.52

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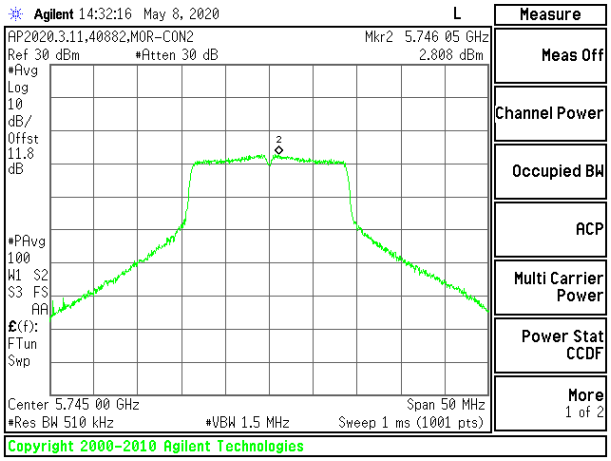
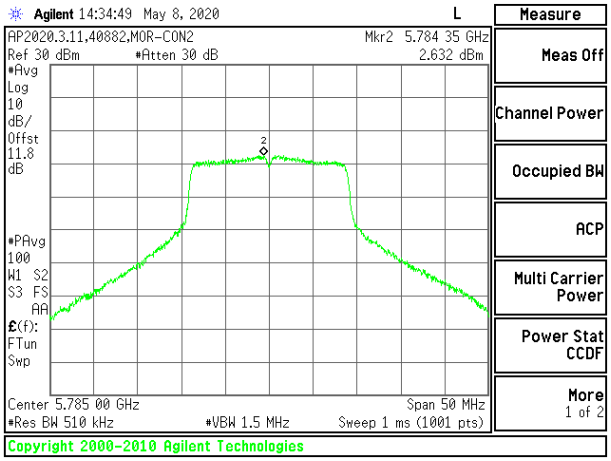
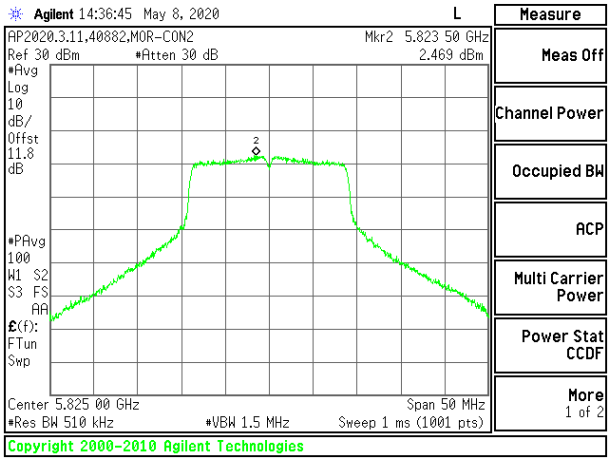


LOW CHANNEL



MID CHANNEL



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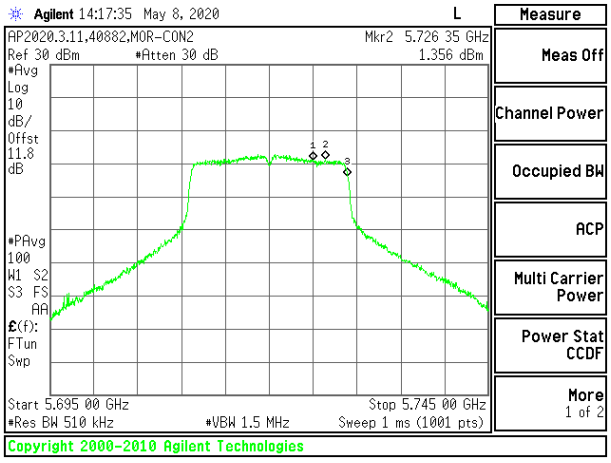

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9.5.16. 802.11n HT40 MODE IN THE 5.8 GHz BAND

1TX PCB Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 500KHz)
Low	5755	4.31	30.00	30.00
High	5795	4.31	30.00	30.00
142	5710	4.31	30.00	30.00

Duty Cycle CF (dB)	0.23	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5755	16.904	16.904	30.00	-13.10
High	5795	16.409	16.409	30.00	-13.59
142	5710	16.730	16.730	30.00	-13.27

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5755	0.871	1.101	30.00	-28.90
High	5795	0.727	0.957	30.00	-29.04
142	5710	-3.530	-3.300	30.00	-33.30

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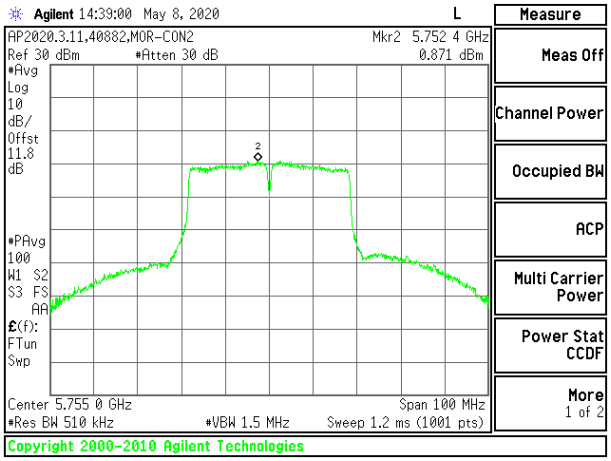
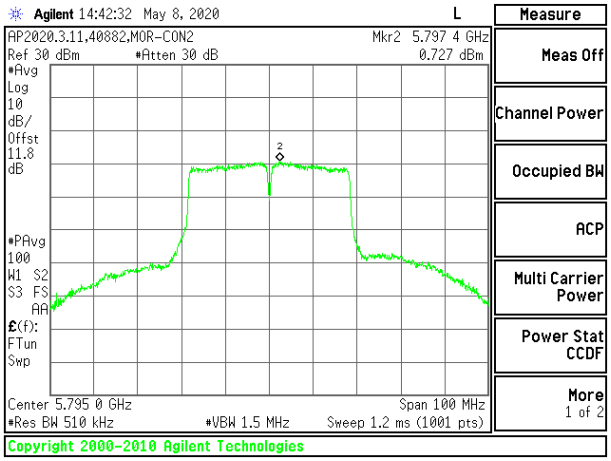


LOW CHANNEL



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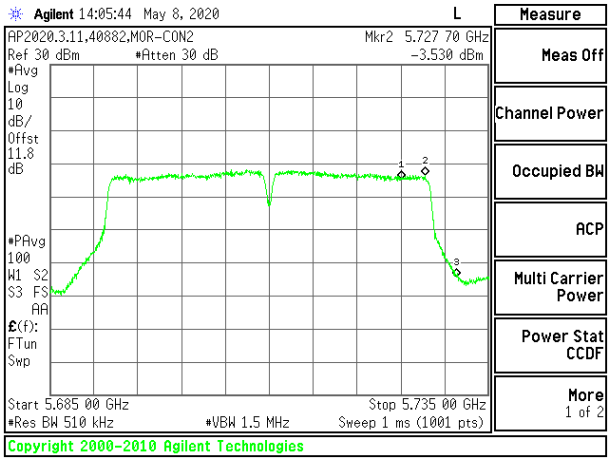

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1TX PCB Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 500KHz)
Low	5755	4.31	30.00	30.00
High	5795	4.31	30.00	30.00
142	5710	4.31	30.00	30.00

Duty Cycle CF (dB)	0.23	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5755	16.904	16.904	30.00	-13.10
High	5795	16.409	16.409	30.00	-13.59
142	5710	16.730	16.730	30.00	-13.27

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5755	0.871	1.101	30.00	-28.90
High	5795	0.727	0.957	30.00	-29.04
142	5710	-3.530	-3.300	30.00	-33.30

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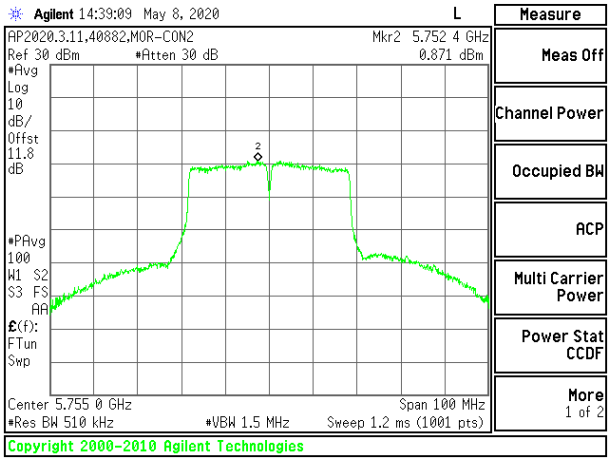

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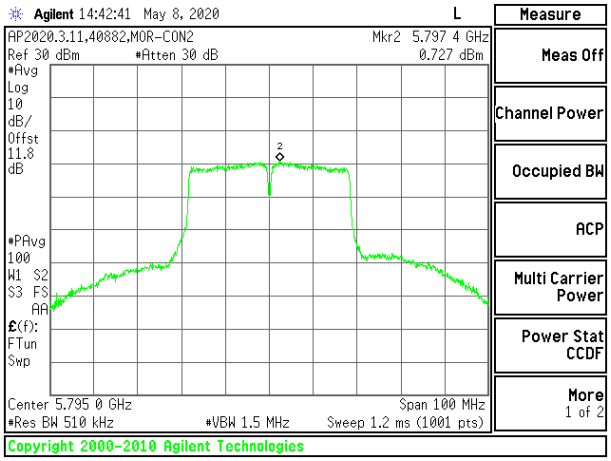

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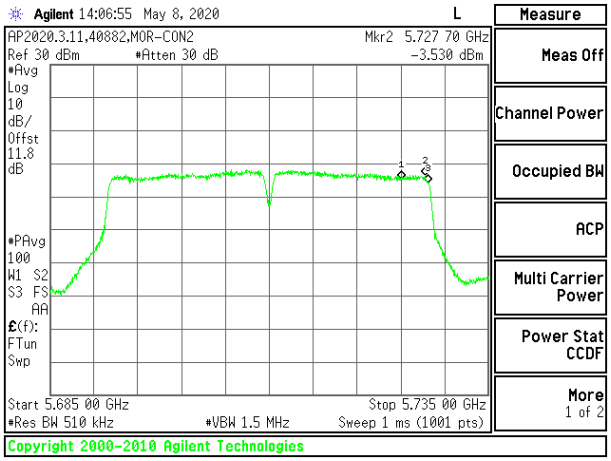

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9.5.17. 802.11ac VHT80 MODE IN THE 5.8 GHz BAND

1TX PCB Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 500KHz)
Mid	5775	4.31	30.00	30.00
138	5690	4.31	30.00	30.00

Duty Cycle CF (dB)	0.46	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5775	15.386	15.386	30.00	-14.61
138	5690	15.860	15.860	30.00	-14.14

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 500KHz)	Total Corr'd PSD (dBm/ 500KHz)	PSD Limit (dBm/ 500KHz)	PSD Margin (dB)
Mid	5775	-3.688	-3.228	30.00	-33.23
138	5690	-6.822	-6.362	30.00	-36.36

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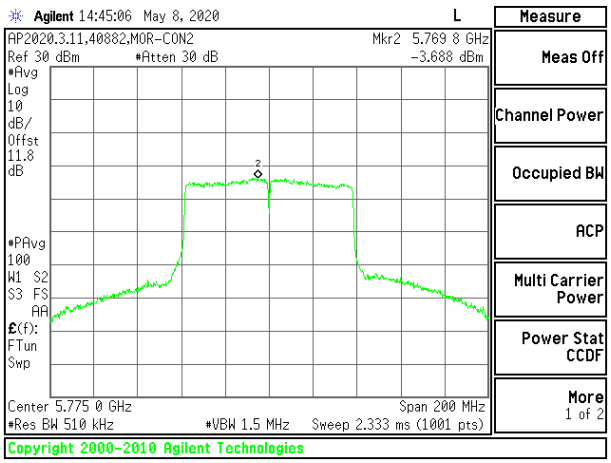

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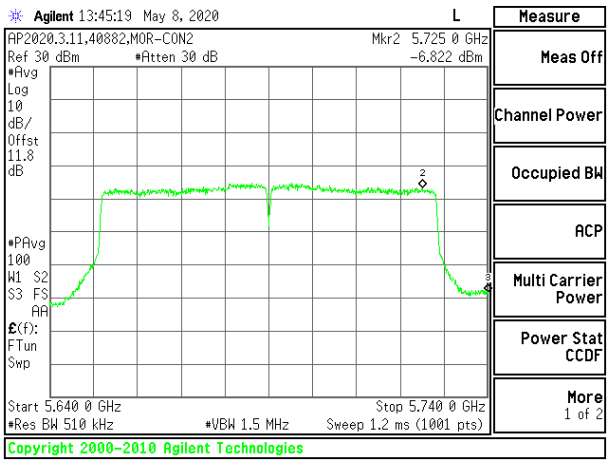

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1TX PCB Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-05-08 & 2020-06-24

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 500KHz)
Mid	5775	4.31	30.00	30.00
138	5690	4.31	30.00	30.00

Duty Cycle CF (dB)	0.46	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5775	15.386	15.386	30.00	-14.61
138	5690	15.860	15.860	30.00	-14.14

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 500KHz)	Total Corr'd PSD (dBm/ 500KHz)	PSD Limit (dBm/ 500KHz)	PSD Margin (dB)
Mid	5775	-3.688	-3.228	30.00	-33.23
138	5690	-6.822	-6.362	30.00	-36.36

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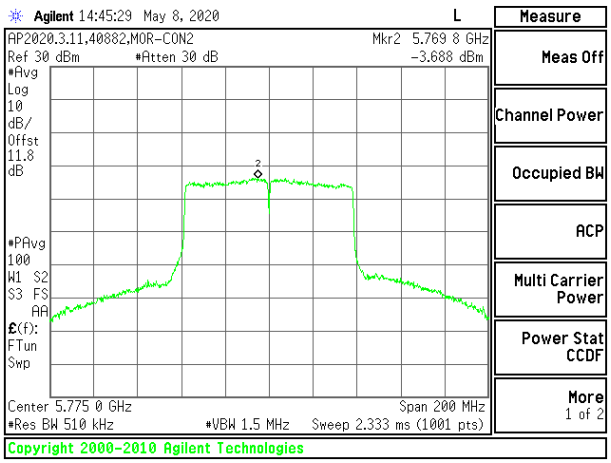

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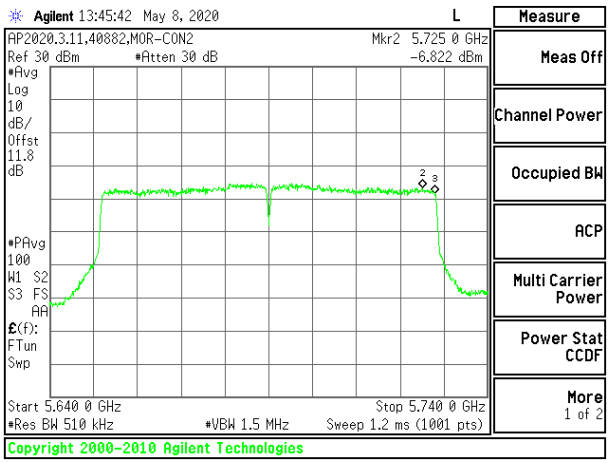

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9.5.18. RESULTS – External Antenna

Note – For the 5.3 and 5.6 GHz bands, the EUT EIRP value is less than 500 mW (27 dBm) and therefore does not require TPC.

9.5.19. 802.11a MODE IN THE 5.2 GHz BAND

1TX External Antenna MODE (FCC) MOBILE

Test Engineer:	40882
Test Date:	2020-06-27, 2020-09-10

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5180	6.37	23.63	10.63
Mid	5200	6.37	23.63	10.63
High	5240	6.37	23.63	10.63

Duty Cycle CF (dB)	0.11	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	12.31	12.31	23.63	-11.32
Mid	5200	11.98	11.98	23.63	-11.65
High	5240	12.00	12.00	23.63	-11.63

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5180	1.497	1.61	10.63	-9.02
Mid	5200	1.264	1.37	10.63	-9.26
High	5240	0.813	0.92	10.63	-9.71

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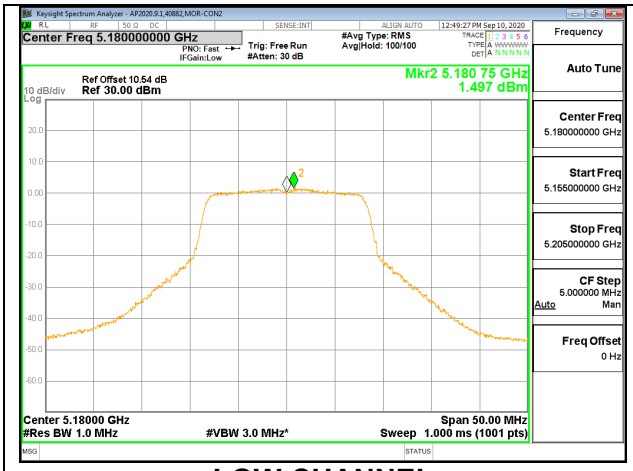

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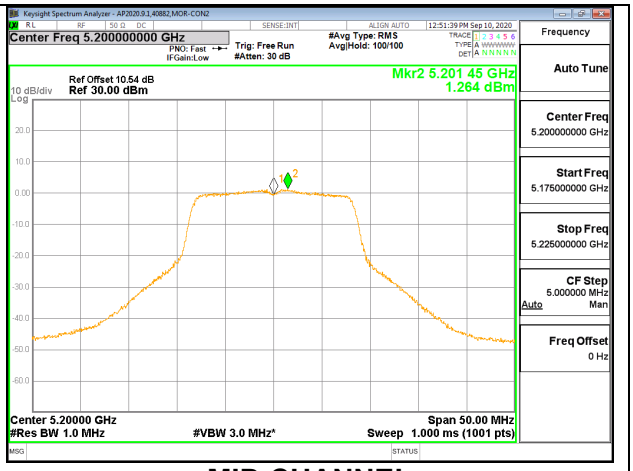

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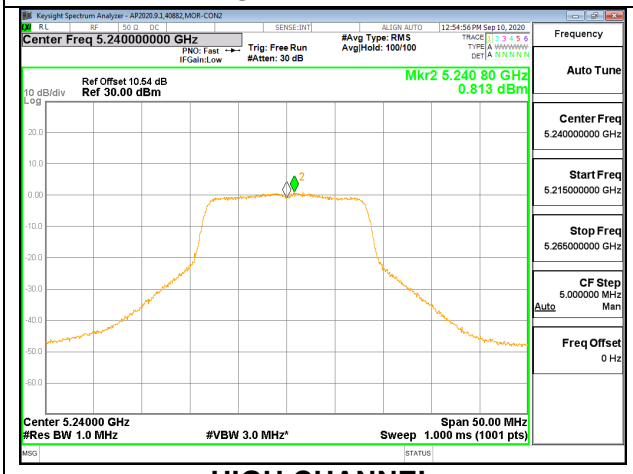

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1TX External Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-06-27, 2020-09-10

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	EIRP Power Limit (dBm)	Power Limit (dBm)	EIRP PSD Limit (dBm/1MHz)	PSD Limit (dBm/1MHz)
Low	5180	16.440	6.37	22.16	15.79	10.00	3.63
Mid	5200	16.536	6.37	22.18	15.81	10.00	3.63
High	5240	16.522	6.37	22.18	15.81	10.00	3.63

Duty Cycle CF (dB)	0.11	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	12.31	12.31	15.79	-3.48
Mid	5200	11.98	11.98	15.81	-3.83
High	5240	12.00	12.00	15.81	-3.81

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5180	1.497	1.61	3.63	-2.02
Mid	5200	1.264	1.37	3.63	-2.26
High	5240	0.813	0.92	3.63	-2.71

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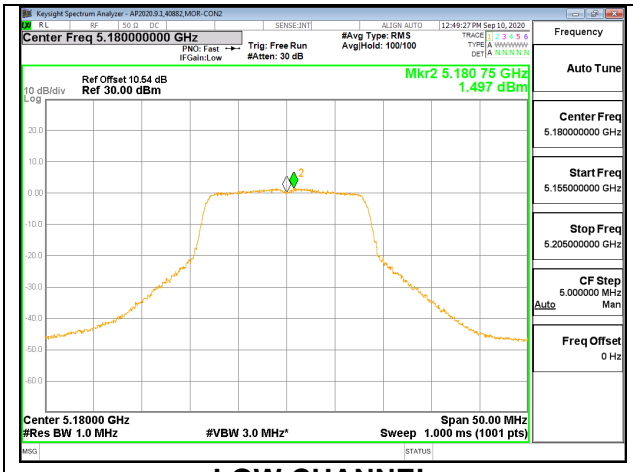

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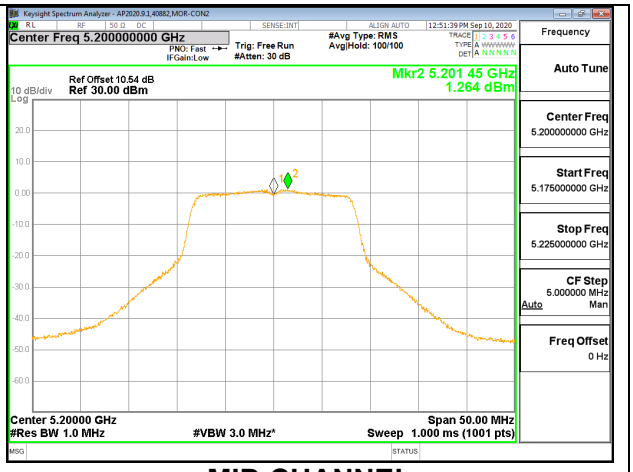

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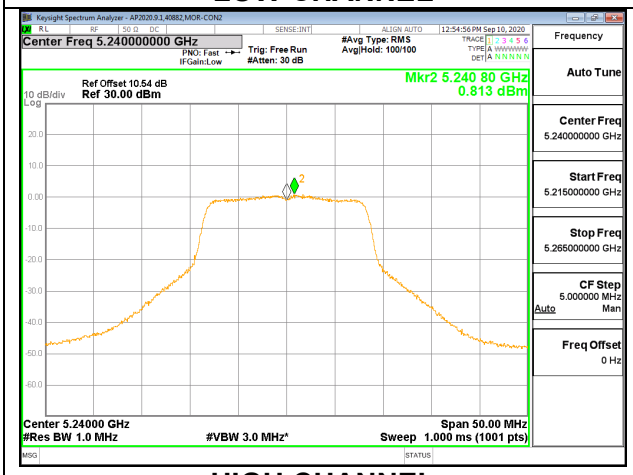

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9.5.20. 802.11n HT20 MODE IN THE 5.2 GHz BAND

1TX External Antenna MODE (FCC) MOBILE

Test Engineer:	40882
Test Date:	2020-06-27, 2020-09-10

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5180	6.37	23.63	10.63
Mid	5200	6.37	23.63	10.63
High	5240	6.37	23.63	10.63

Duty Cycle CF (dB)	0.12	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	12.16	12.16	23.63	-11.47
Mid	5200	11.99	11.99	23.63	-11.64
High	5240	12.01	12.01	23.63	-11.62

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5180	1.403	1.52	10.63	-9.11
Mid	5200	0.896	1.02	10.63	-9.61
High	5240	0.488	0.61	10.63	-10.02

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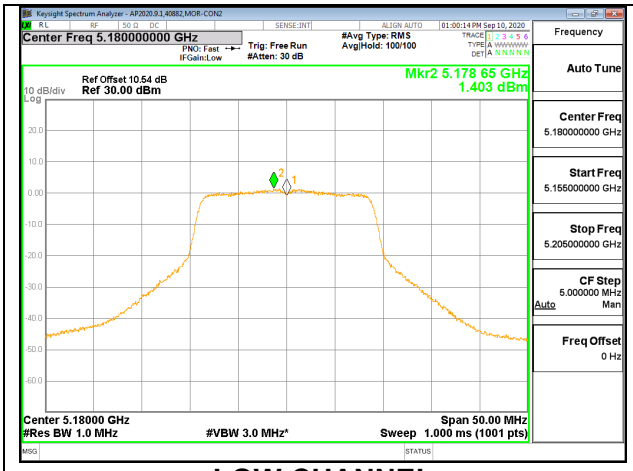

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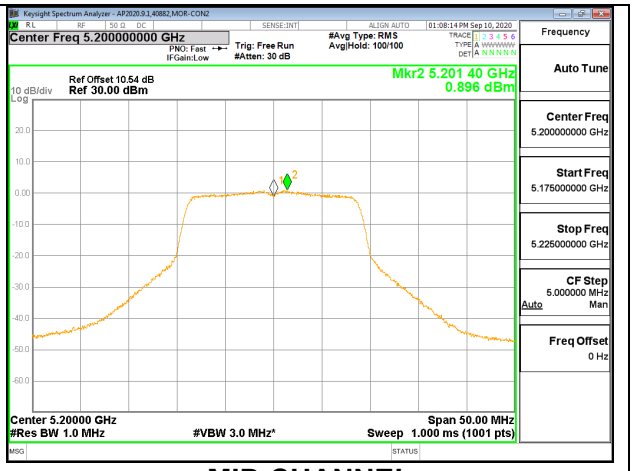

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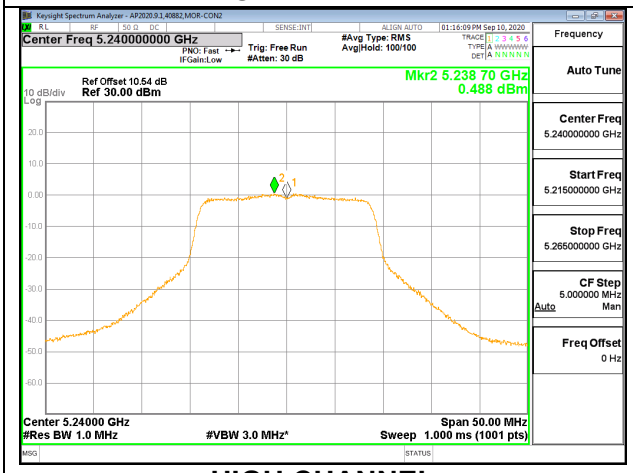

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1TX External Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-06-27, 2020-09-10

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	EIRP Power Limit (dBm)	Power Limit (dBm)	EIRP PSD Limit (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)
Low	5180	17.705	6.37	22.48	16.11	10.00	3.63
Mid	5200	17.615	6.37	22.46	16.09	10.00	3.63
High	5240	17.688	6.37	22.48	16.11	10.00	3.63

Duty Cycle CF (dB)	0.12	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	12.16	12.16	16.11	-3.95
Mid	5200	11.99	11.99	16.09	-4.10
High	5240	12.01	12.01	16.11	-4.10

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5180	1.403	1.52	3.63	-2.11
Mid	5200	0.896	1.02	3.63	-2.61
High	5240	0.488	0.61	3.63	-3.02

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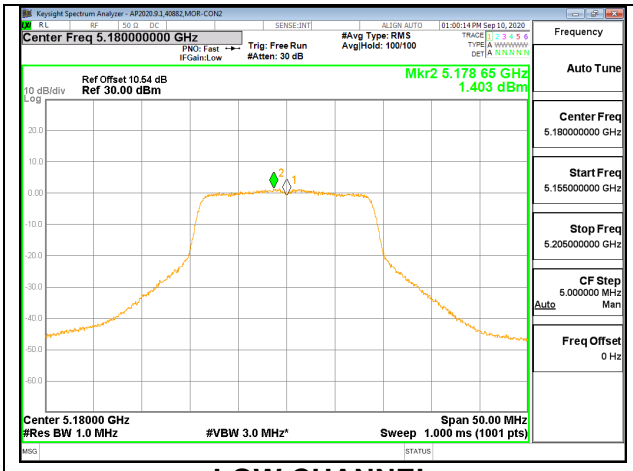

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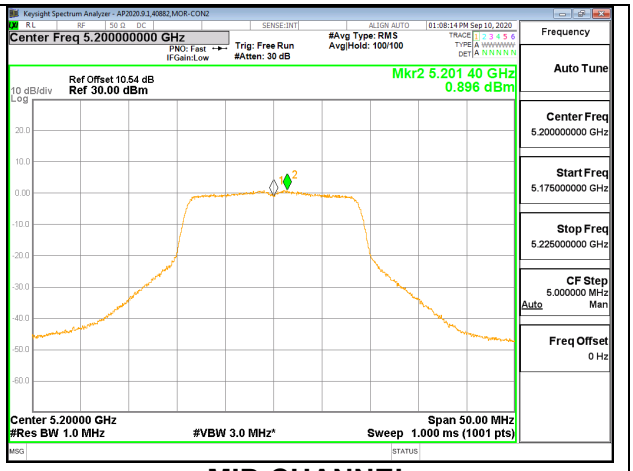

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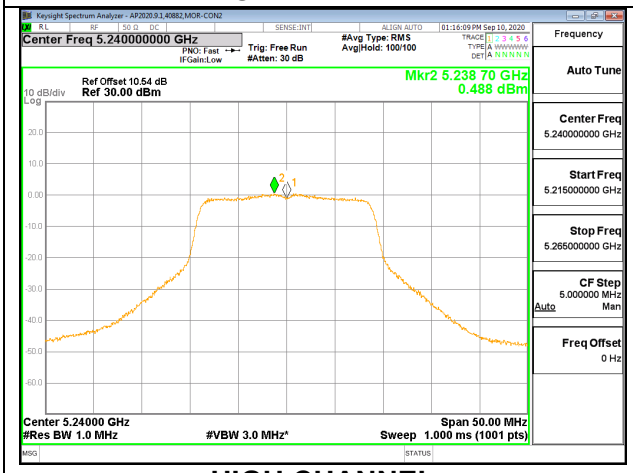

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9.5.21. 802.11n HT40 MODE IN THE 5.2 GHz BAND

1TX External Antenna MODE (FCC) MOBILE

Test Engineer:	40882
Test Date:	2020-06-27, 2020-09-10

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5190	6.37	23.63	10.63
High	5230	6.37	23.63	10.63

Duty Cycle CF (dB)	0.23	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	10.62	10.62	23.63	-13.01
High	5230	10.59	10.59	23.63	-13.04

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5190	-2.601	-2.37	10.63	-13.00
High	5230	-2.748	-2.52	10.63	-13.15

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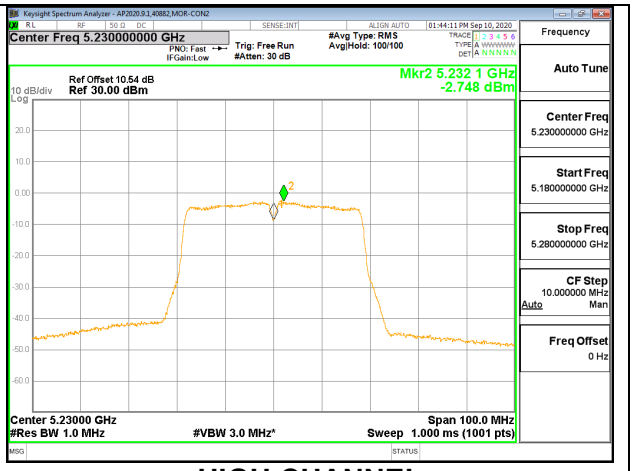

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1TX External Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-06-27, 2020-09-10

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	EIRP Power Limit (dBm)	Power Limit (dBm)	EIRP PSD Limit (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)
Low	5190	36.419	6.37	23.00	16.63	10.00	3.63
High	5230	36.340	6.37	23.00	16.63	10.00	3.63

Duty Cycle CF (dB)	0.23	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	10.620	10.62	16.63	-6.01
High	5230	10.590	10.59	16.63	-6.04

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5190	-2.601	-2.37	3.63	-6.00
High	5230	-2.748	-2.52	3.63	-6.15

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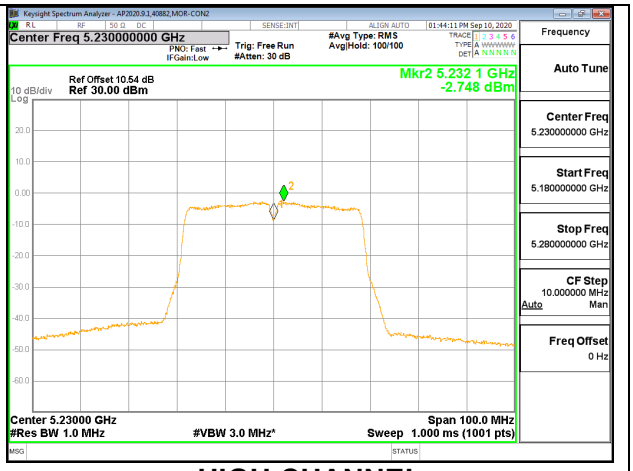

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9.5.22. 802.11ac VHT80 MODE IN THE 5.2 GHz BAND

1TX External Antenna MODE (FCC) MOBILE

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-10

Antenna Gain and Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Mid	5210	6.37	23.63	10.63

Duty Cycle CF (dB)	0.46	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5210	10.82	10.82	23.63	-12.81

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Mid	5210	-5.273	-4.81	10.63	-15.44

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1TX External Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-10

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	EIRP Power Limit (dBm)	Power Limit (dBm)	EIRP PSD Limit (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)
Mid	5210	75.915	6.37	23.00	16.63	10.00	3.63

Duty Cycle CF (dB)	0.46	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5210	10.820	10.82	16.63	-5.81

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Mid	5210	-5.273	-4.81	3.63	-8.44

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9.5.23. 802.11a MODE IN THE 5.3 GHz BAND

1TX External Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-10

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5260	26.60	6.37	23.63	10.63
Mid	5300	28.25	6.37	23.63	10.63
High	5320	27.95	6.37	23.63	10.63

Duty Cycle CF (dB)	0.11	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	15.26	15.26	23.63	-8.37
Mid	5300	15.09	15.09	23.63	-8.54
High	5320	15.10	15.10	23.63	-8.53

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5260	4.989	5.10	10.63	-5.53
Mid	5300	4.185	4.30	10.63	-6.34
High	5320	4.000	4.11	10.63	-6.52

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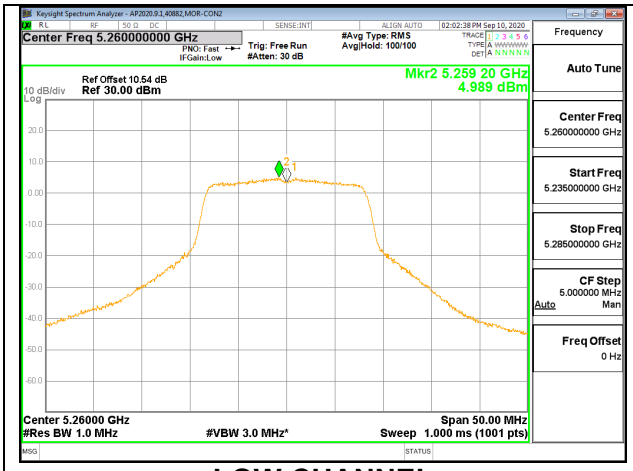

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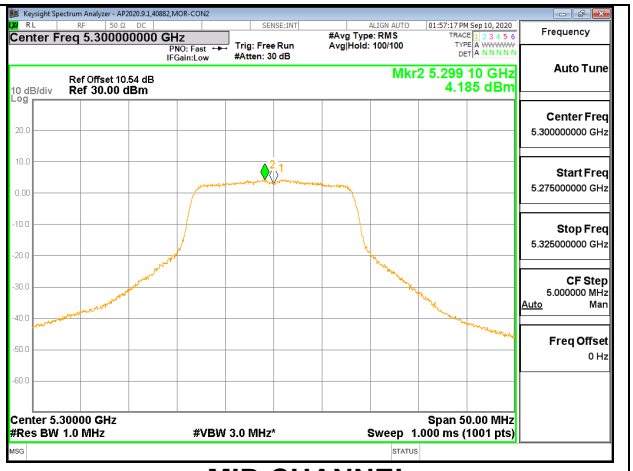

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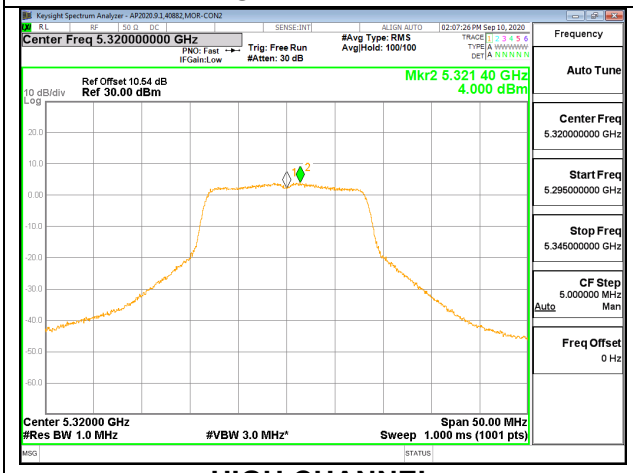

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1TX External Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-10

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5260	16.624	6.37	22.84	11.00
Mid	5300	16.628	6.37	22.84	11.00
High	5320	16.728	6.37	22.86	11.00

Duty Cycle CF (dB)	0.11	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	15.26	15.26	22.84	-7.58
Mid	5300	15.09	15.09	22.84	-7.75
High	5320	15.10	15.10	22.86	-7.76

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5260	4.989	5.10	11.00	-5.90
Mid	5300	4.185	4.30	11.00	-6.71
High	5320	4.000	4.11	11.00	-6.89

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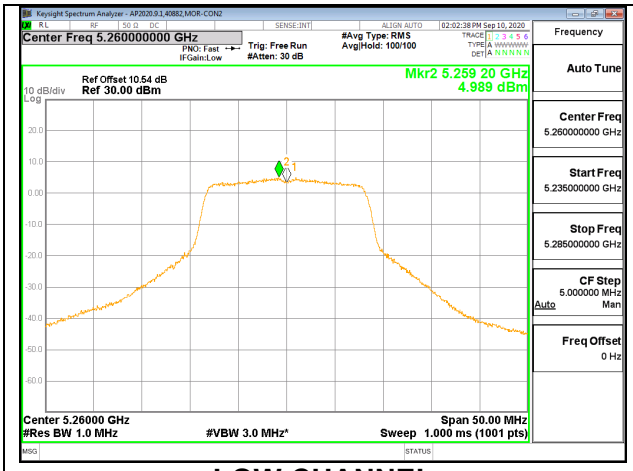

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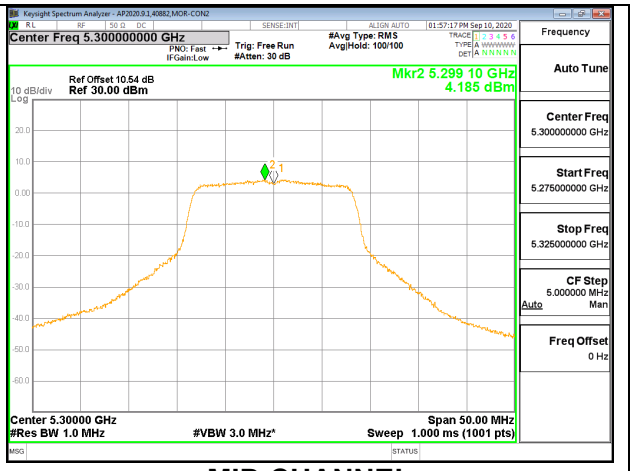

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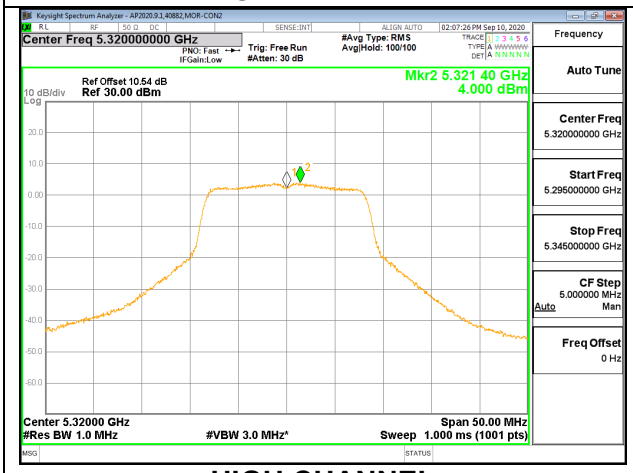

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9.5.24. 802.11n HT20 MODE IN THE 5.3 GHz BAND

1TX External Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-10

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5260	26.95	6.37	23.63	10.63
Mid	5300	28.70	6.37	23.63	10.63
High	5320	28.55	6.37	23.63	10.63

Duty Cycle CF (dB)	0.12	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	14.93	14.93	23.63	-8.70
Mid	5300	15.03	15.03	23.63	-8.60
High	5320	14.62	14.62	23.63	-9.01

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5260	4.237	4.36	10.63	-6.27
Mid	5300	3.962	4.08	10.63	-6.55
High	5320	3.661	3.78	10.63	-6.85

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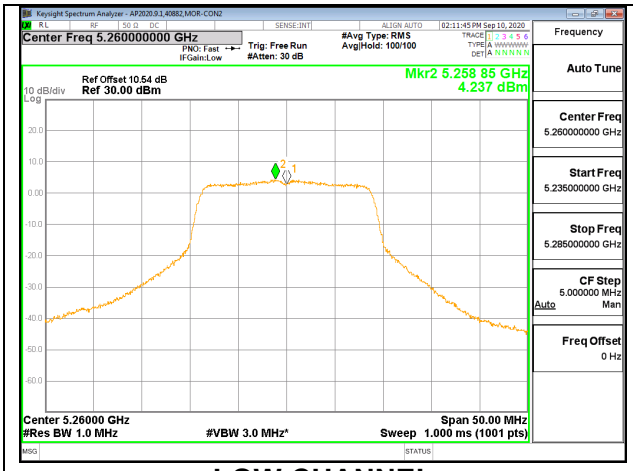

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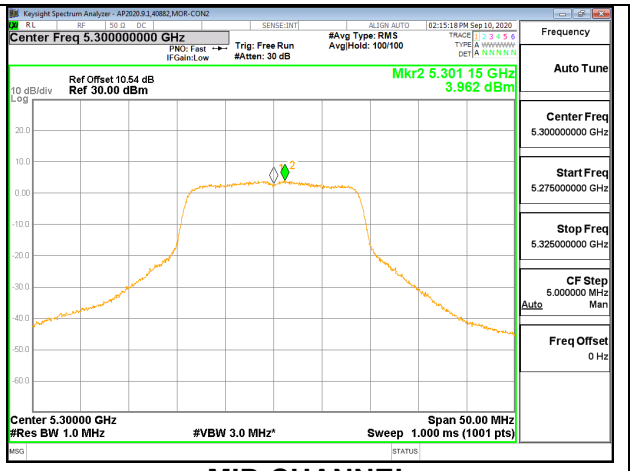

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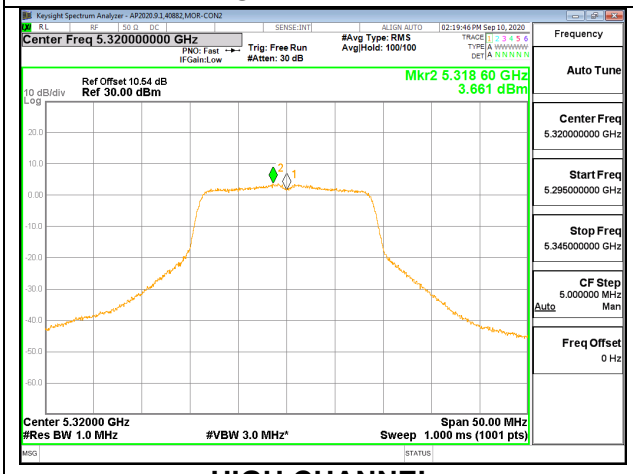

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1TX External Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-10

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5260	17.738	6.37	23.12	11.00
Mid	5300	17.837	6.37	23.14	11.00
High	5320	17.742	6.37	23.12	11.00

Duty Cycle CF (dB)	0.12	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	14.93	14.93	23.12	-8.19
Mid	5300	15.03	15.03	23.14	-8.11
High	5320	14.62	14.62	23.12	-8.50

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5260	4.237	4.36	11.00	-6.64
Mid	5300	3.962	4.08	11.00	-6.92
High	5320	3.661	3.78	11.00	-7.22

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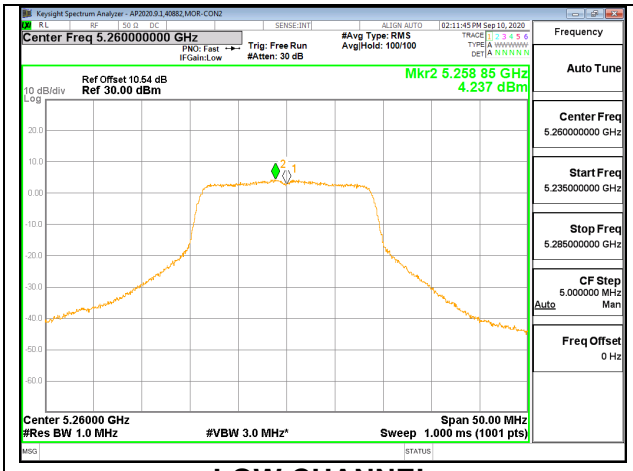

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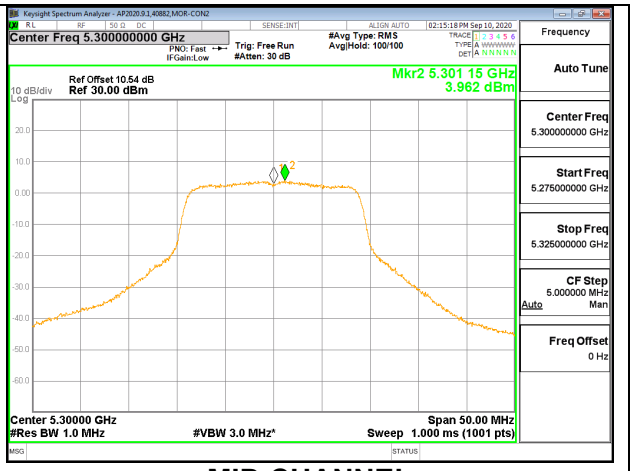

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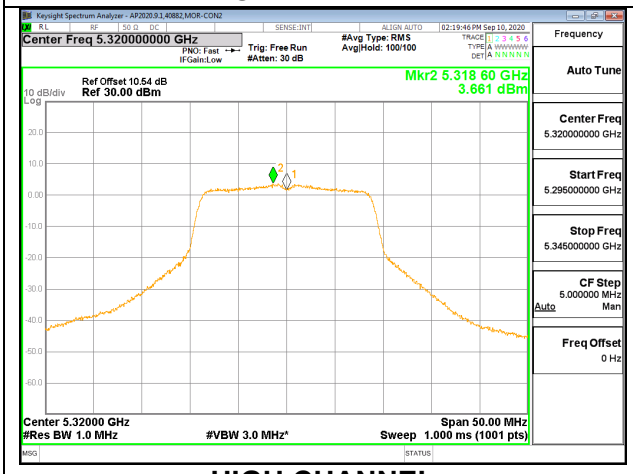

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9.5.25. 802.11n HT40 MODE IN THE 5.3 GHz BAND

1TX External Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-10

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5270	42.30	6.37	23.63	10.63
High	5310	54.00	6.37	23.63	10.63

Duty Cycle CF (dB)	0.23	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5270	11.67	11.67	23.63	-11.96
High	5310	11.87	11.87	23.63	-11.76

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5270	-1.126	-0.90	10.63	-11.53
High	5310	-1.540	-1.31	10.63	-11.94

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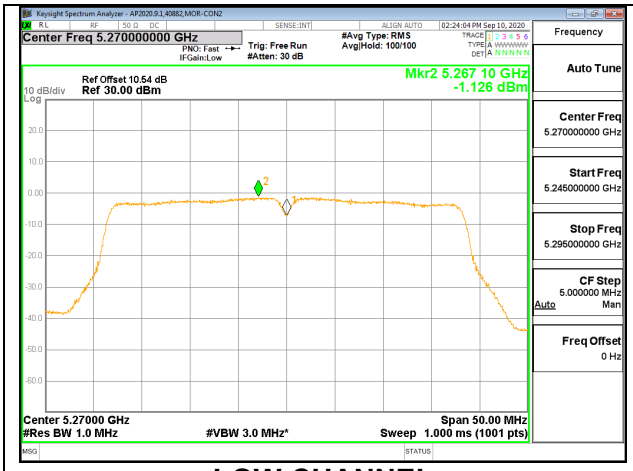

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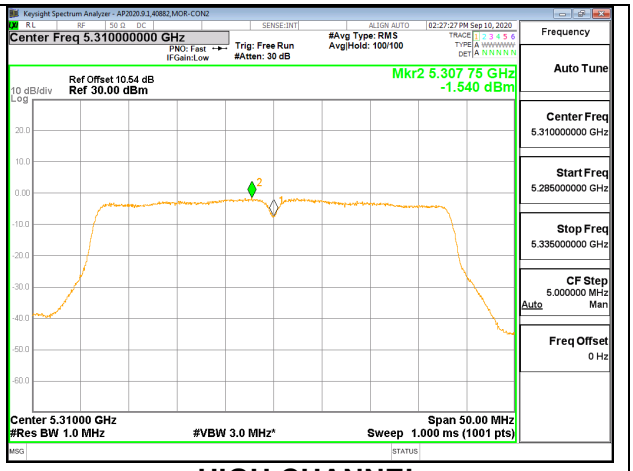

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1TX External Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-10

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Low	5270	36.036	6.37	23.63	11.00
High	5310	36.284	6.37	23.63	11.00

Duty Cycle CF (dB)	0.23	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5270	11.67	11.67	23.63	-11.96
High	5310	11.87	11.87	23.63	-11.76

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Low	5270	-1.126	-0.90	11.00	-11.90
High	5310	-1.540	-1.31	11.00	-12.31

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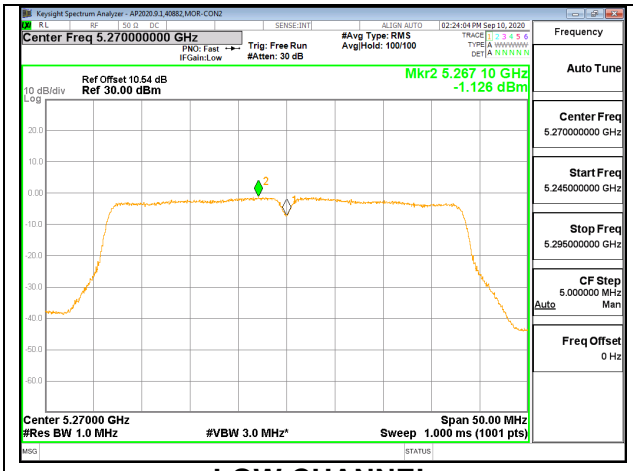

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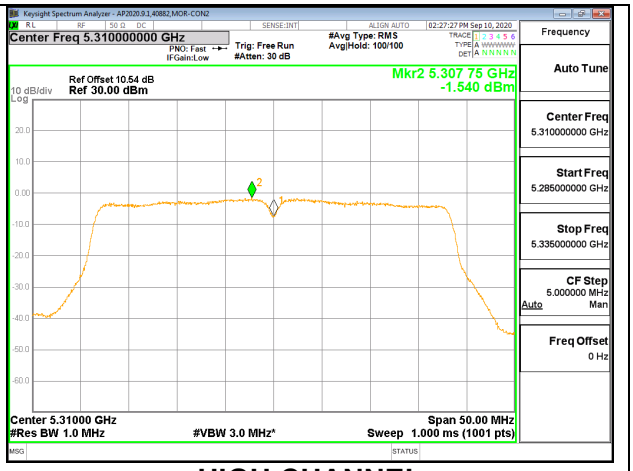

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9.5.26. 802.11ac VHT80 MODE IN THE 5.3 GHz BAND

1TX External Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-10

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Mid	5290	86.20	6.37	23.63	10.63

Duty Cycle CF (dB)	0.46	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5290	10.04	10.04	23.63	-13.59

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Mid	5290	-7.117	-6.66	10.63	-17.29

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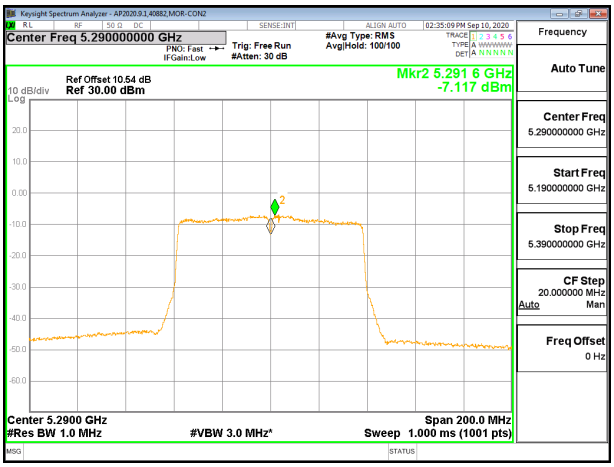

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1TX External Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-10

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/1MHz)
Mid	5290	75.794	6.37	23.63	11.00

Duty Cycle CF (dB)	0.46	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Mid	5290	10.04	10.04	23.63	-13.59

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/1MHz)	Total Corr'd PSD (dBm/1MHz)	PSD Limit (dBm/1MHz)	PSD Margin (dB)
Mid	5290	-7.117	-6.66	11.00	-17.66

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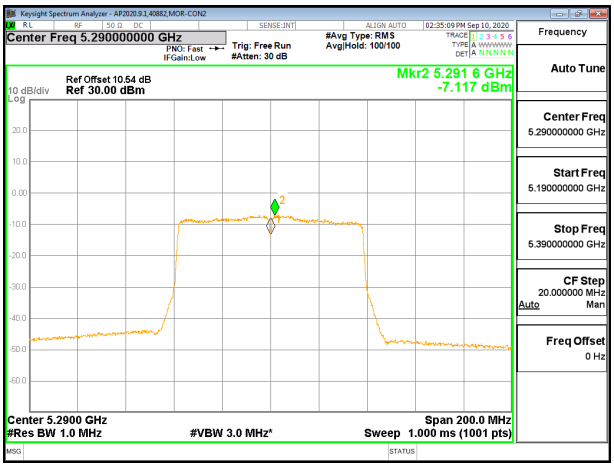

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9.5.27. 802.11a MODE IN THE 5.6 GHz BAND

1TX External Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-11, 2021-04-29

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5500	26.90	6.37	23.63	10.63
Mid	5580	27.20	6.37	23.63	10.63
High	5700	27.40	6.37	23.63	10.63
144	5720	26.55	6.37	23.63	10.63

Duty Cycle CF (dB)	0.11	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	13.70	13.70	23.63	-9.93
Mid	5580	13.66	13.66	23.63	-9.97
High	5700	13.98	13.98	23.63	-9.65
144	5720	13.69	13.69	23.63	-9.94

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5500	2.77	2.88	10.63	-7.75
Mid	5580	3.31	3.42	10.63	-7.21
High	5700	3.87	3.98	10.63	-6.65
144	5720	3.06	3.17	10.63	-7.47

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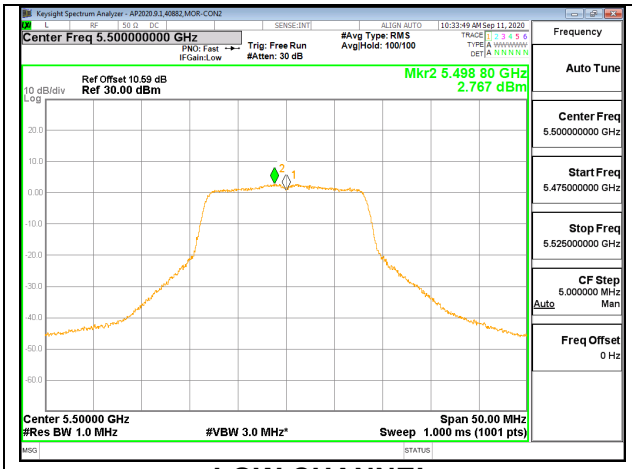

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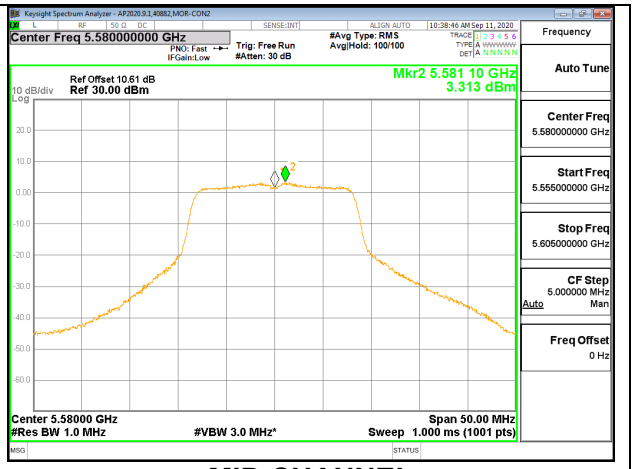

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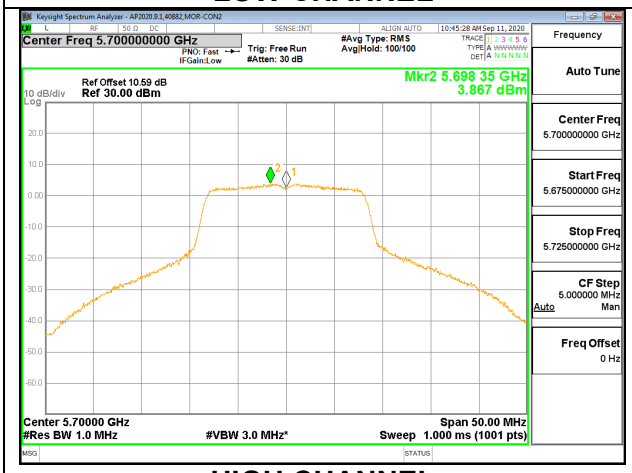

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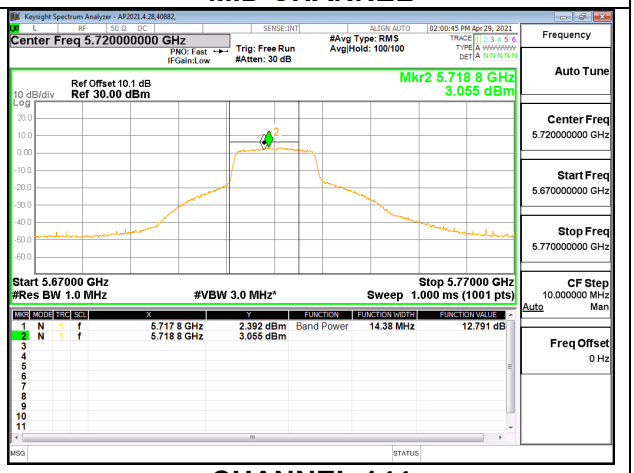

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1TX External Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-11, 2021-04-29

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5500	16.563	6.37	22.82	10.63
Mid	5580	16.609	6.37	22.83	10.63
High	5700	16.583	6.37	22.83	10.63
144	5720	16.573	6.37	22.82	10.63

Duty Cycle CF (dB)	0.11	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	13.70	13.70	22.82	-9.12
Mid	5580	13.66	13.66	22.83	-9.17
High	5700	13.98	13.98	22.83	-8.85
144	5720	13.69	13.69	22.82	-9.13

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5500	2.77	2.88	10.63	-7.75
Mid	5580	3.31	3.42	10.63	-7.21
High	5700	3.87	3.98	10.63	-6.65
144	5720	3.06	3.17	10.63	-7.47

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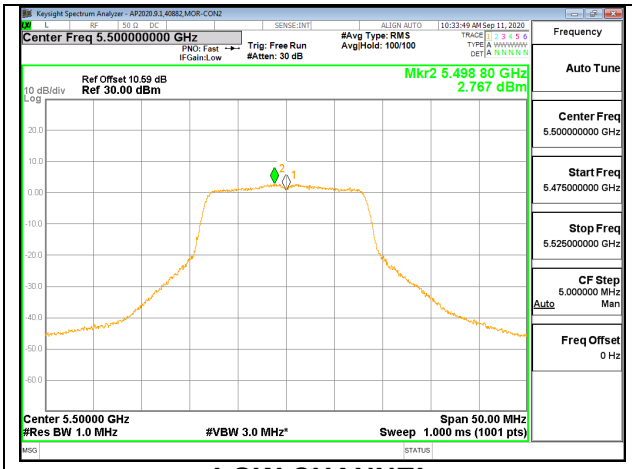

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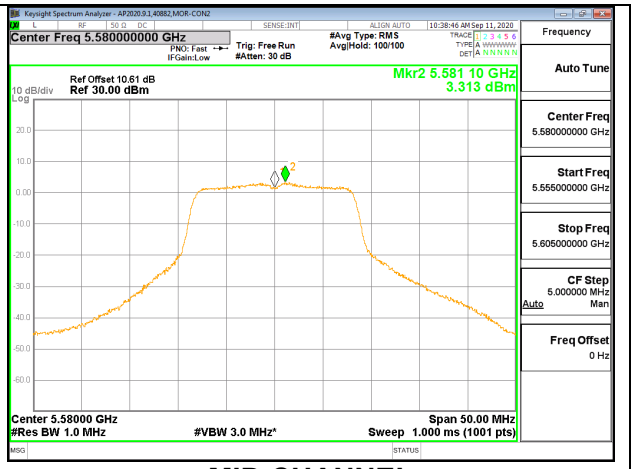

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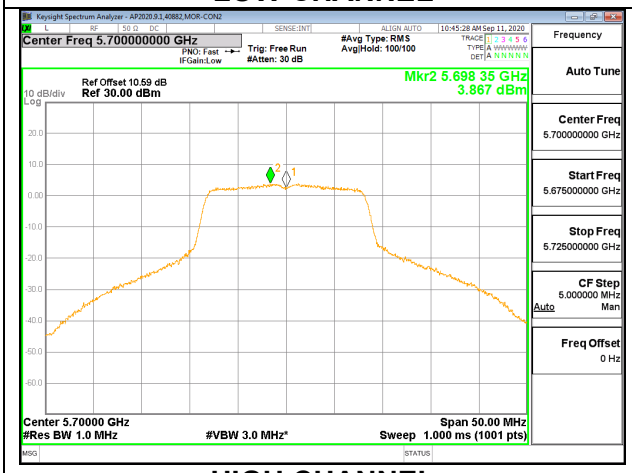

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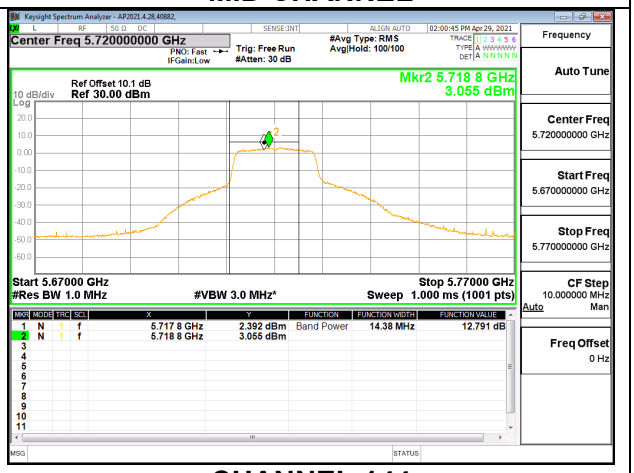

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9.5.28. 802.11n HT20 MODE IN THE 5.6 GHz BAND

1TX External Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-11, 2021-04-29

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5500	26.30	6.37	23.63	10.63
Mid	5580	27.60	6.37	23.63	10.63
High	5700	27.40	6.37	23.63	10.63
144	5720	27.65	6.37	23.63	10.63

Duty Cycle CF (dB)	0.12	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	13.43	13.43	23.63	-10.20
Mid	5580	13.63	13.63	23.63	-10.00
High	5700	13.76	13.76	23.63	-9.87
144	5720	14.34	14.34	23.63	-9.29

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5500	2.23	2.35	10.63	-8.28
Mid	5580	3.01	3.13	10.63	-7.50
High	5700	3.45	3.57	10.63	-7.06
144	5720	2.76	2.88	10.63	-7.75

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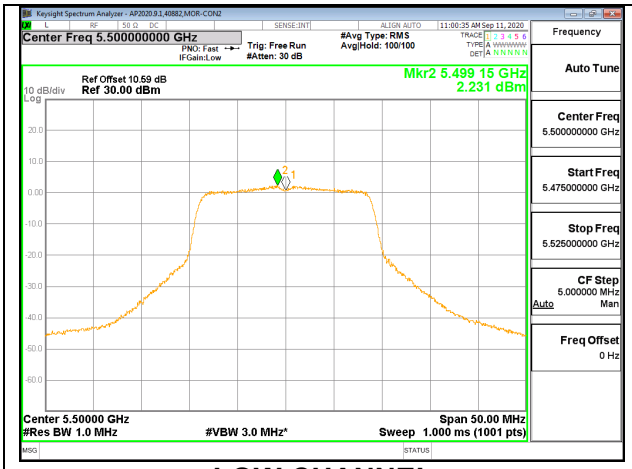

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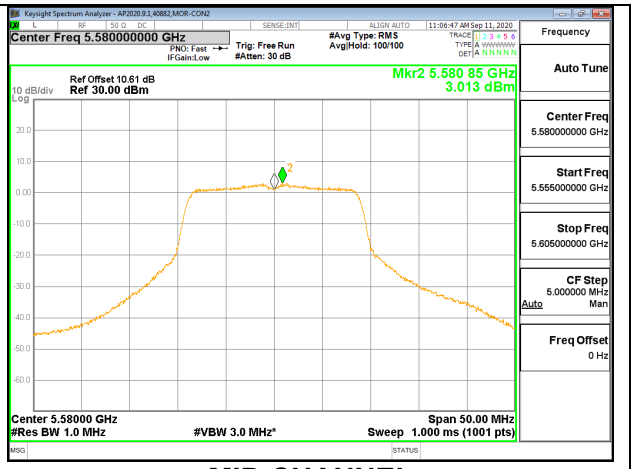

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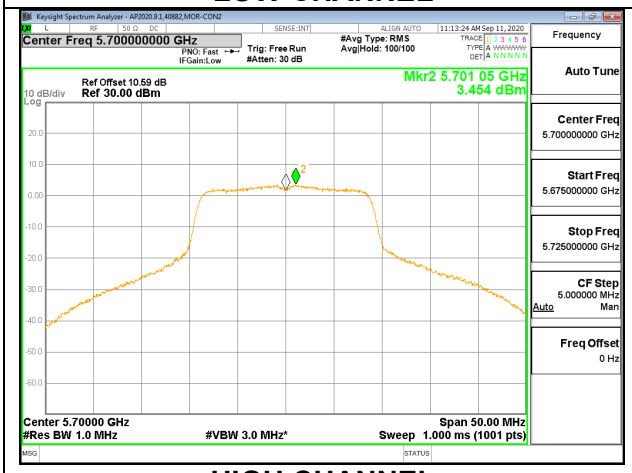

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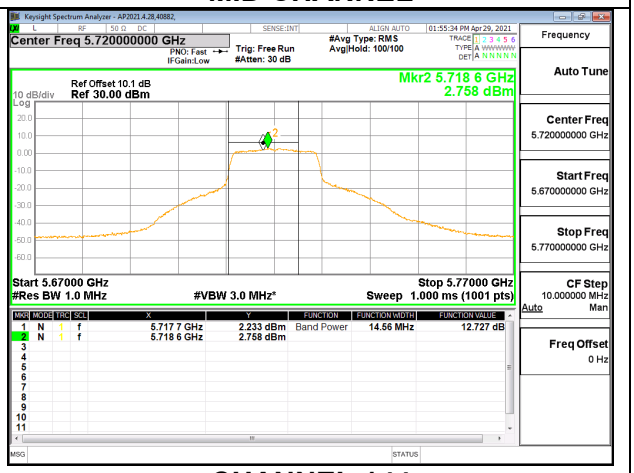

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1TX External Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-11, 2021-04-29

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5500	17.699	6.37	23.11	10.63
Mid	5580	17.755	6.37	23.12	10.63
High	5700	17.788	6.37	23.13	10.63
144	5720	17.793	6.37	23.13	10.63

Duty Cycle CF (dB)	0.12	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	13.43	13.43	23.11	-9.68
Mid	5580	13.63	13.63	23.12	-9.49
High	5700	13.76	13.76	23.13	-9.37
144	5720	14.34	14.34	23.13	-8.79

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5500	2.23	2.35	10.63	-8.28
Mid	5580	3.01	3.13	10.63	-7.50
High	5700	3.45	3.57	10.63	-7.06
144	5720	2.76	2.88	10.63	-7.75

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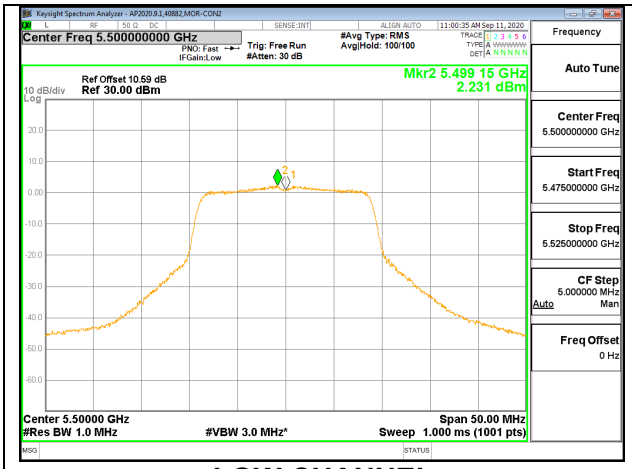

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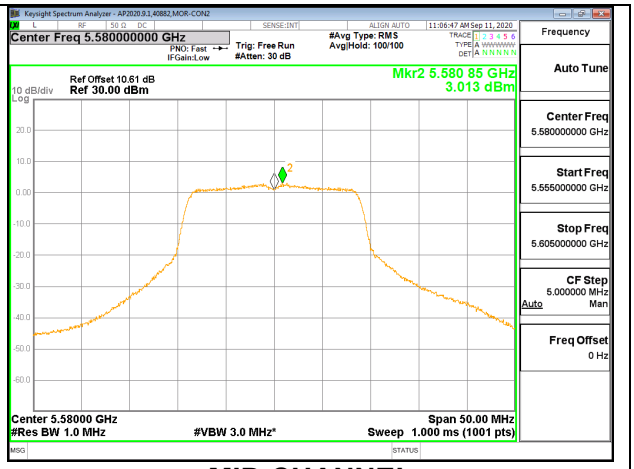

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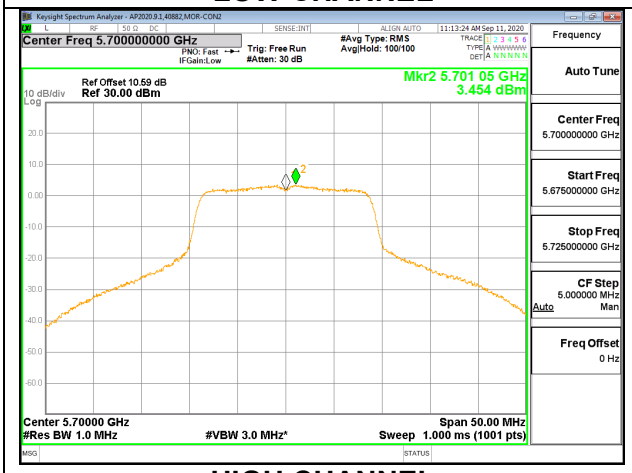

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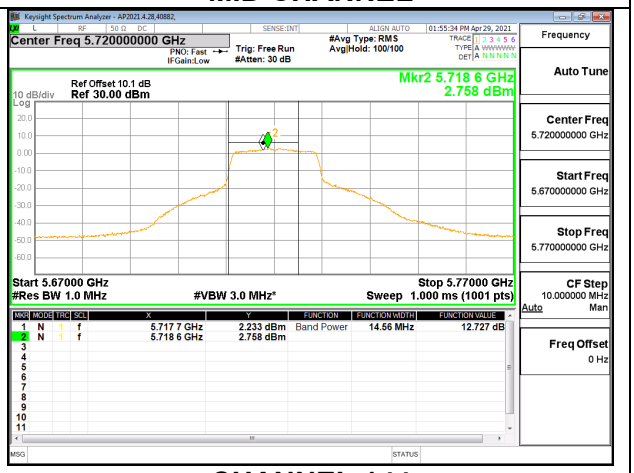

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9.5.29. 802.11n HT40 MODE IN THE 5.6 GHz BAND

1TX External Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-11, 2021-04-29

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5510	42.80	6.37	23.63	10.63
Mid	5550	42.50	6.37	23.63	10.63
High	5670	42.80	6.37	23.63	10.63
142	5710	42.60	6.37	23.63	10.63

Duty Cycle CF (dB)	0.23	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5510	12.61	12.61	23.63	-11.02
Mid	5550	12.49	12.49	23.63	-11.14
High	5670	12.68	12.68	23.63	-10.95
142	5710	13.10	13.10	23.63	-10.53

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5510	-1.14	-0.91	10.63	-11.54
Mid	5550	-0.61	-0.38	10.63	-11.01
High	5670	1.25	1.48	10.63	-9.15
142	5710	-0.17	0.06	10.63	-10.57

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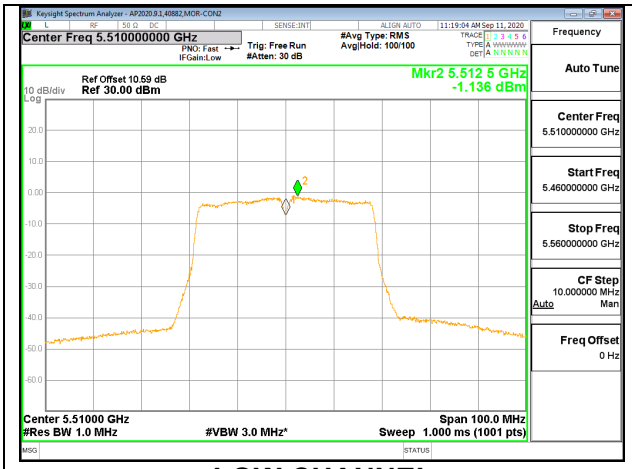

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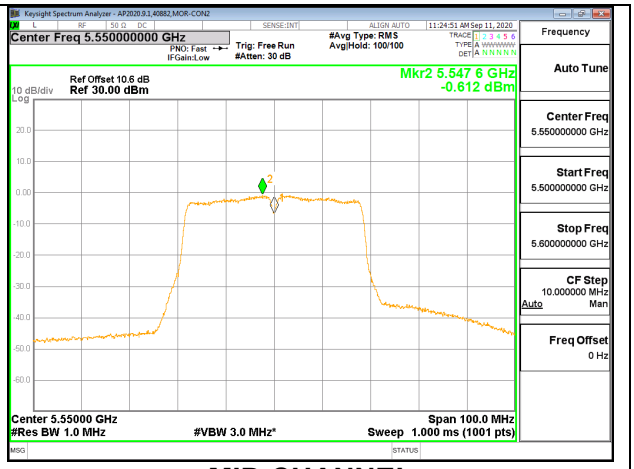

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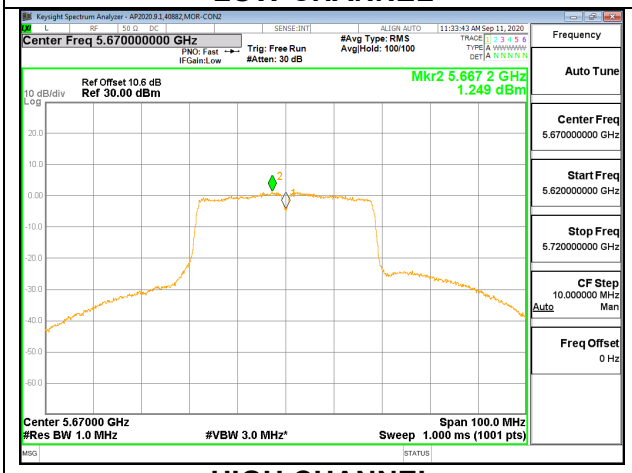
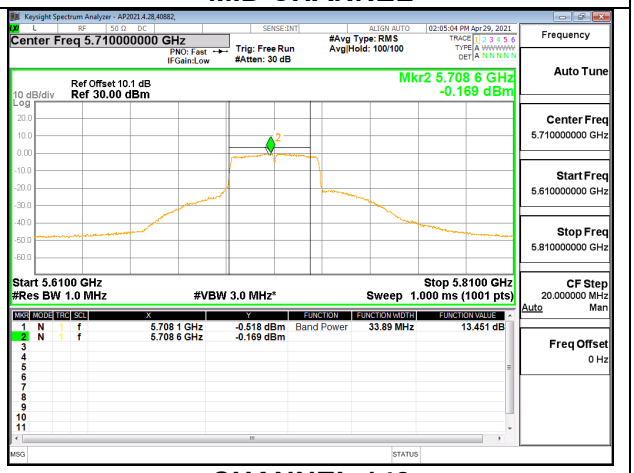


HIGH CHANNEL



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1TX External Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-11, 2021-04-29

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5510	36.195	6.37	23.63	10.63
Mid	5550	36.145	6.37	23.63	10.63
High	5670	36.130	6.37	23.63	10.63
142	5710	36.173	6.37	23.63	10.63

Duty Cycle CF (dB)	0.23	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5510	12.61	12.61	23.63	-11.02
Mid	5550	12.49	12.49	23.63	-11.14
High	5670	12.68	12.68	23.63	-10.95
142	5710	13.10	13.10	23.63	-10.53

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5510	-1.14	-0.91	10.63	-11.54
Mid	5550	-0.61	-0.38	10.63	-11.01
High	5670	1.25	1.48	10.63	-9.15
142	5710	-0.17	0.06	10.63	-10.57

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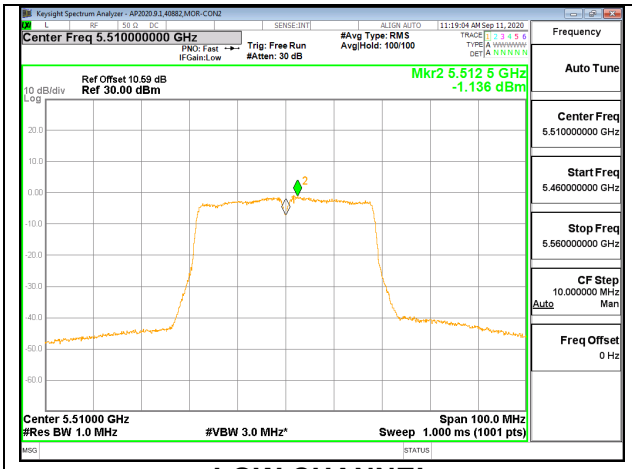

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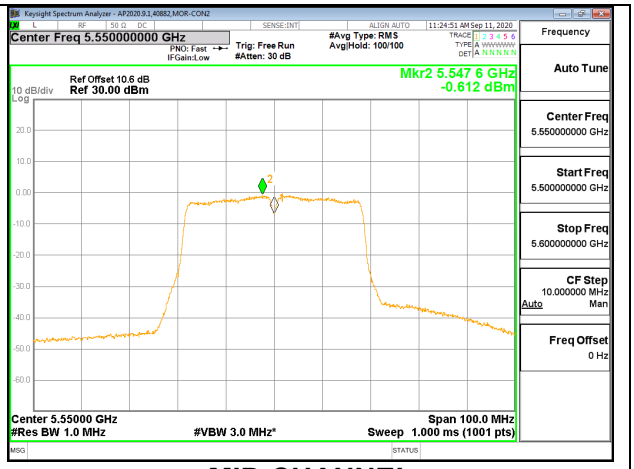

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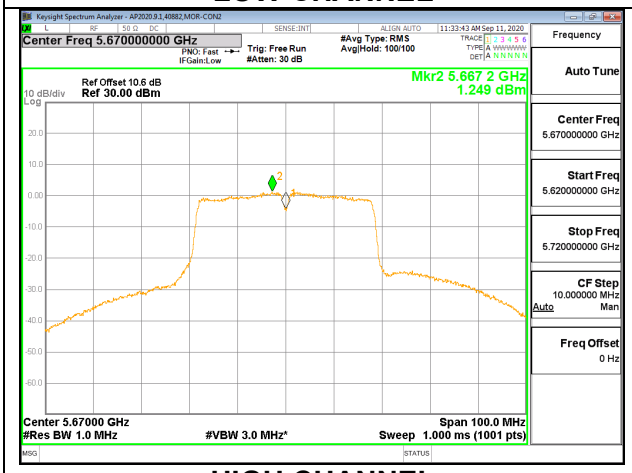

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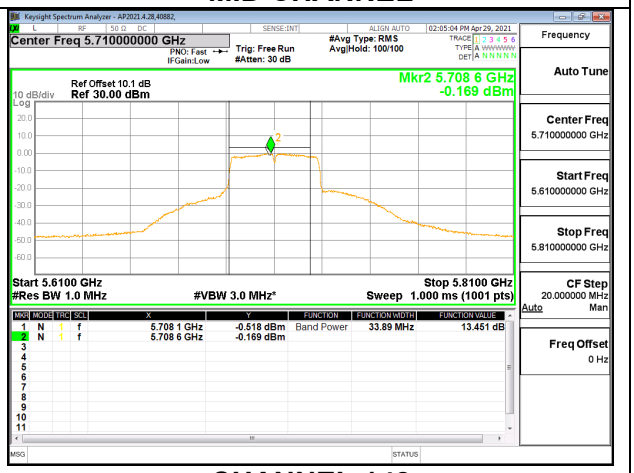

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9.5.30. 802.11ac VHT80 MODE IN THE 5.6 GHz BAND

1TX External Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-11, 2021-04-29

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5530	135.80	6.37	23.63	10.63
High	5610	90.80	6.37	23.63	10.63
138	5690	99.80	6.37	23.63	10.63

Duty Cycle CF (dB)	0.46	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5530	11.49	11.49	23.63	-12.14
High	5610	12.81	12.81	23.63	-10.82
138	5690	13.31	13.31	23.63	-10.32

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5530	-5.50	-5.04	10.63	-15.67
High	5610	-3.83	-3.37	10.63	-14.00
138	5690	-4.23	-3.77	10.63	-14.40

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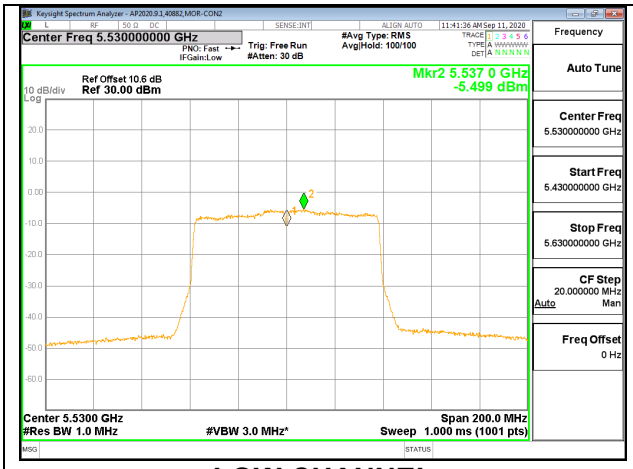
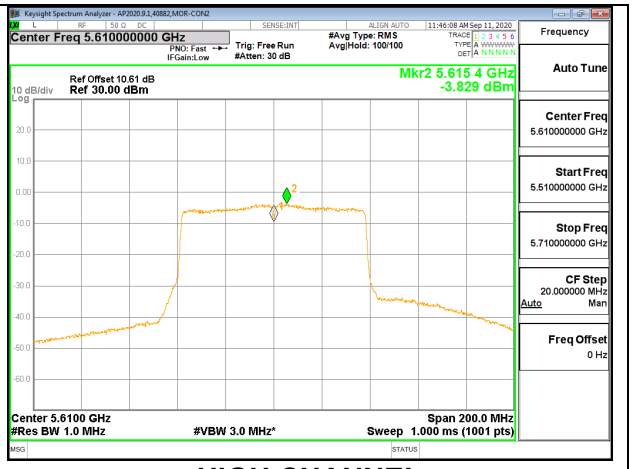


LOW CHANNEL



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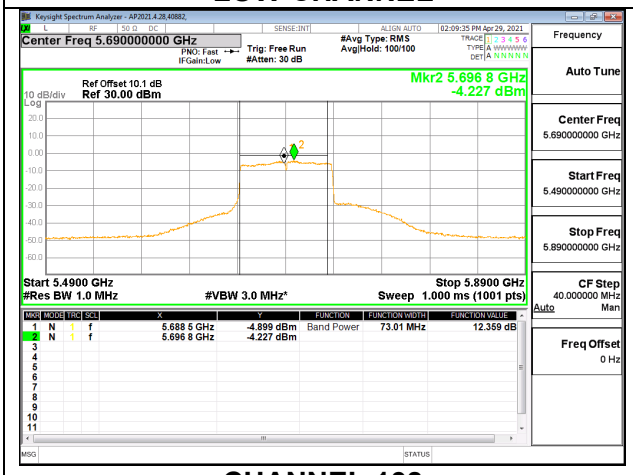

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1TX External Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-11, 2021-04-29

Bandwidth, Antenna Gain, and Limits

Channel	Frequency (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 1MHz)
Low	5530	75.843	6.37	23.63	10.63
High	5610	75.355	6.37	23.63	10.63
138	5690	75.525	6.37	23.63	10.63

Duty Cycle CF (dB)	0.46	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5530	11.49	11.49	23.63	-12.14
High	5610	12.81	12.81	23.63	-10.82
138	5690	13.31	13.31	23.63	-10.32

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 1MHz)	Total Corr'd PSD (dBm/ 1MHz)	PSD Limit (dBm/ 1MHz)	PSD Margin (dB)
Low	5530	-5.50	-5.04	10.63	-15.67
High	5610	-3.83	-3.37	10.63	-14.00
138	5690	-4.23	-3.77	10.63	-14.40

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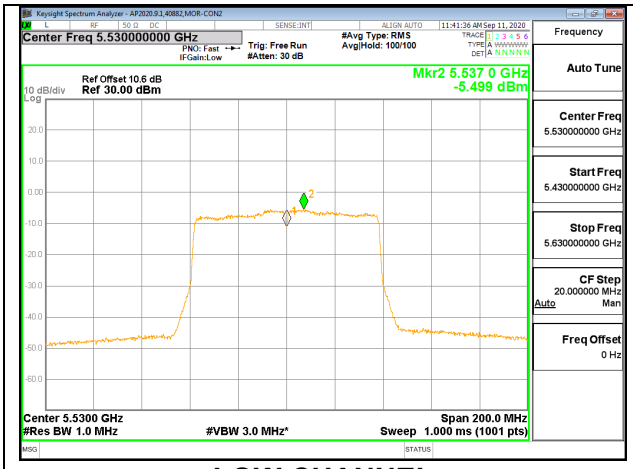

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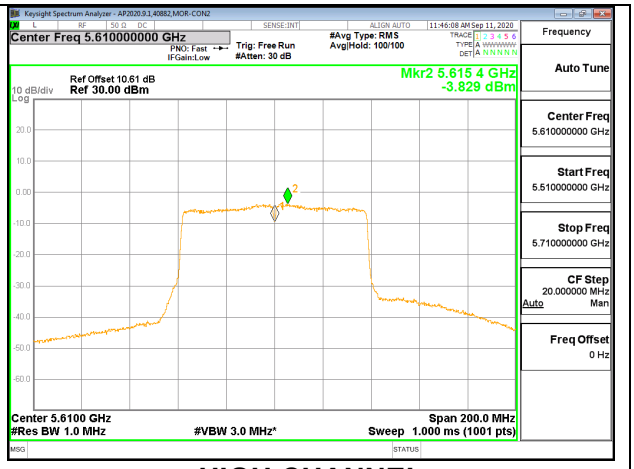
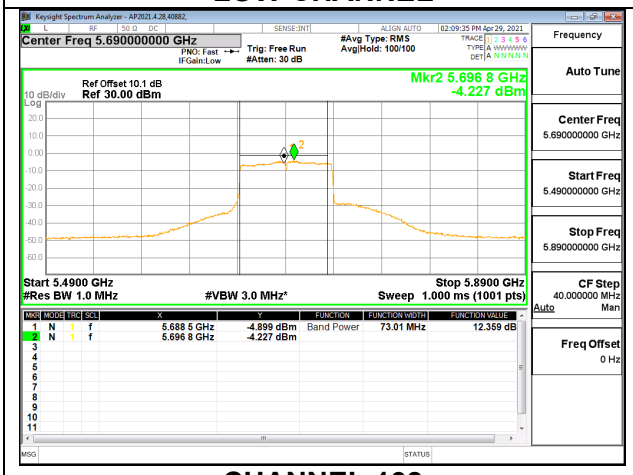


HIGH CHANNEL



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9.5.31. 802.11a MODE IN THE 5.8 GHz BAND

1TX External Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-11, 2021-04-29

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 500KHz)
Low	5745	6.37	29.63	29.63
Mid	5785	6.37	29.63	29.63
High	5825	6.37	29.63	29.63
144	5720	6.37	29.63	29.63

Duty Cycle CF (dB)	0.11	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	14.617	14.617	29.63	-15.01
Mid	5785	14.486	14.486	29.63	-15.14
High	5825	14.107	14.107	29.63	-15.52
144	5720	13.690	13.690	29.63	-15.94

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 500KHz)	Total Corr'd PSD (dBm/ 500KHz)	PSD Limit (dBm/ 500KHz)	PSD Margin (dB)
Low	5745	1.743	1.853	29.63	-27.78
Mid	5785	2.126	2.236	29.63	-27.39
High	5825	1.784	1.894	29.63	-27.74
144	5720	-0.981	-0.871	29.63	-30.50

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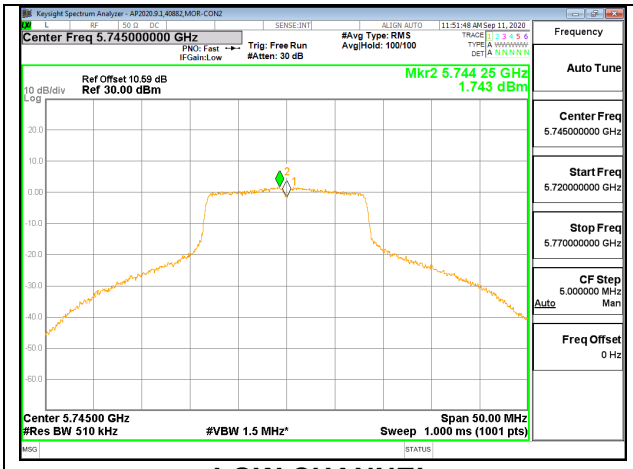

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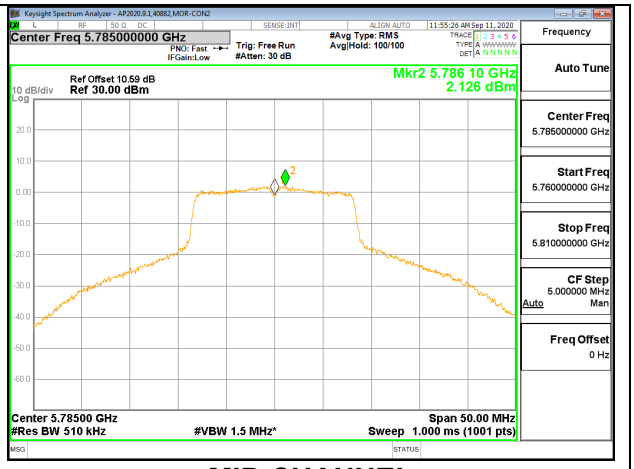

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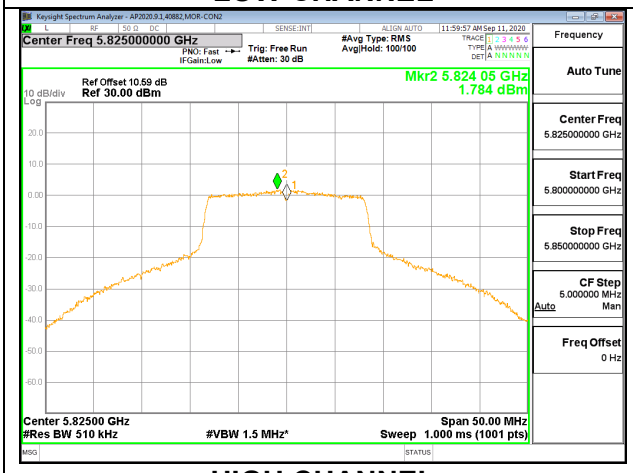

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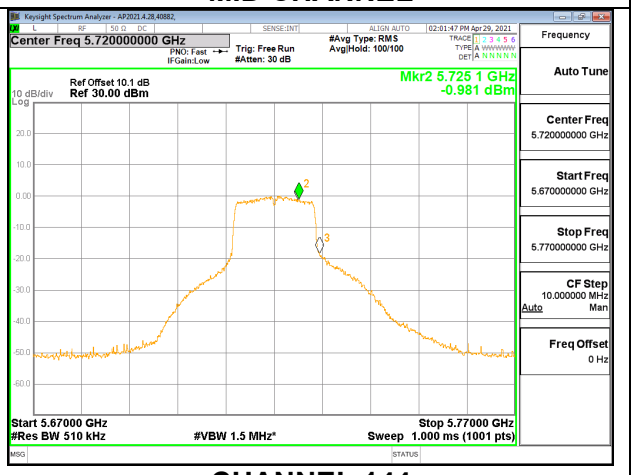

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1TX External Antenna MODE (IC)

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-11, 2021-04-29

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 500KHz)
Low	5745	6.37	29.63	29.63
Mid	5785	6.37	29.63	29.63
High	5825	6.37	29.63	29.63
144	5720	6.37	29.63	29.63

Duty Cycle CF (dB)	0.11	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	14.617	14.617	29.63	-15.01
Mid	5785	14.486	14.486	29.63	-15.14
High	5825	14.107	14.107	29.63	-15.52
144	5720	13.690	13.690	29.63	-15.94

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 500KHz)	Total Corr'd PSD (dBm/ 500KHz)	PSD Limit (dBm/ 500KHz)	PSD Margin (dB)
Low	5745	1.743	1.853	29.63	-27.78
Mid	5785	2.126	2.236	29.63	-27.39
High	5825	1.784	1.894	29.63	-27.74
144	5720	-0.981	-0.871	29.63	-30.50

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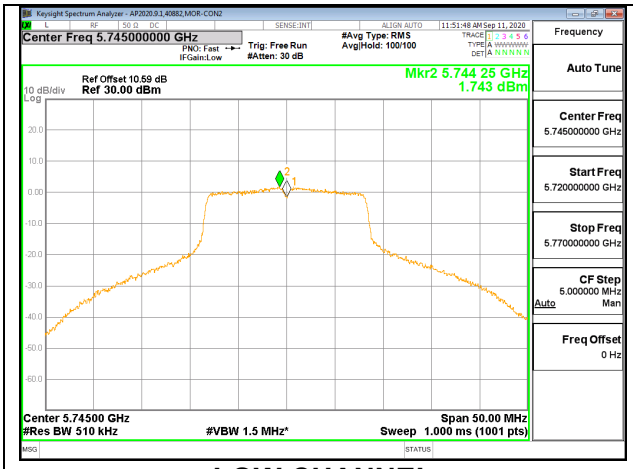
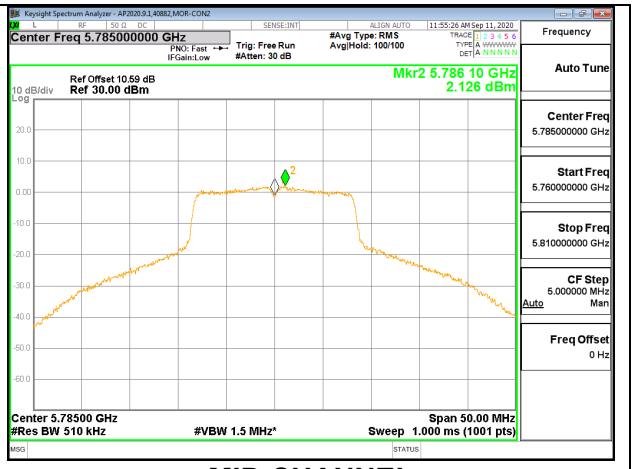


LOW CHANNEL



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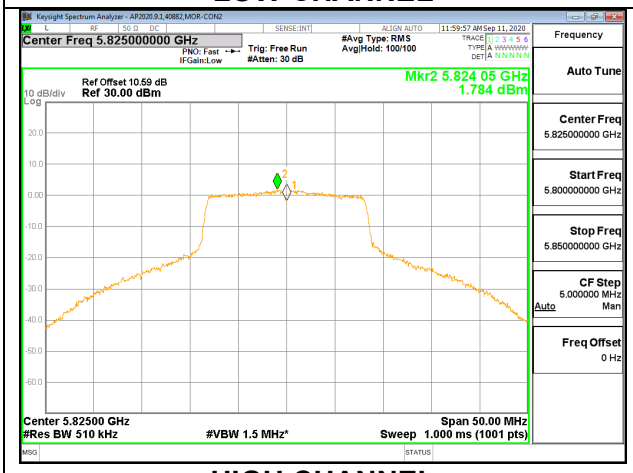

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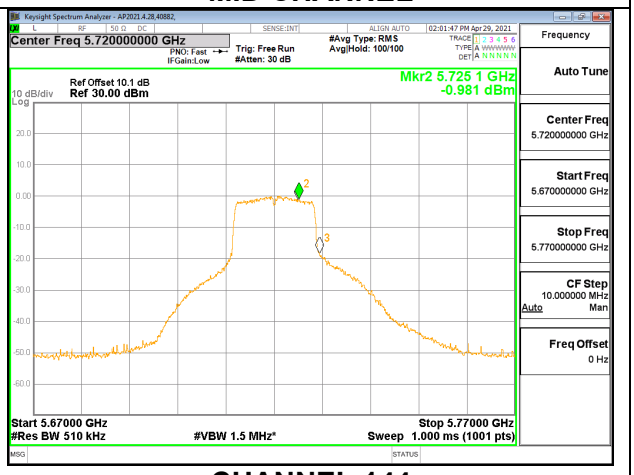

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9.5.32. 802.11n HT20 MODE IN THE 5.8 GHz BAND

1TX External Antenna MODE (FCC)

Test Engineer:	40882
Test Date:	2020-06-24, 2020-09-11, 2021-04-29

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm/ 500KHz)
Low	5745	6.37	29.63	29.63
Mid	5785	6.37	29.63	29.63
High	5825	6.37	29.63	29.63
144	5720	6.37	29.63	29.63

Duty Cycle CF (dB)	0.12	**Included in Calculations of Corr'd PSD**

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	14.359	14.359	29.63	-15.27
Mid	5785	14.273	14.273	29.63	-15.36
High	5825	14.346	14.346	29.63	-15.28
144	5720	14.340	14.340	29.63	-15.29

PSD Results

Channel	Frequency (MHz)	Meas PSD (dBm/ 500KHz)	Total Corr'd PSD (dBm/ 500KHz)	PSD Limit (dBm/ 500KHz)	PSD Margin (dB)
Low	5745	1.441	1.561	29.63	-28.07
Mid	5785	1.908	2.028	29.63	-27.60
High	5825	1.409	1.529	29.63	-28.10
144	5720	-1.539	-1.419	29.63	-31.05

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