TEST REPORT

Reference No.	:	WTH22X02020563W-1
FCC ID	:	2AUZB-RAX1500
Applicant	:	SHENZHEN ZK TECHNOLOGY CO., LTD
Address	:	SHENZHEN CITY LONGGANG DISTRICT STREETS QINGLIN ROAD SHENZHEN CITY STUDENTS (LONGGANG) BUSINESS PA... CHINA
Manufacturer	:	The same as Applicant
Address	:	The same as Applicant
Product Name	:	Wireless Router
Model No.	:	RAX1500
Standards	:	FCC Part 15.407
Date of Receipt sample	:	2022-02-18
Date of Test	:	2022-02-18 to 2022-03-30
Date of Issue	:	2022-03-30
Test Report Form No.	:	WTX_Part 15_407W
Test Result	:	**Pass**

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of approver.

Prepared By:

Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road,
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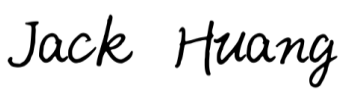
Tel.: +86-755-33663308 Fax.: +86-755-33663309 Email: sem@waltek.com.cn

Tested by:



Jack Huang

Approved by:

Silin Chen

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Report version

Version No.	Date of issue	Description
Rev.00	2022-03-30	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

General Description of EUT	
Product Name:	Wireless Router
Trade Name:	HNK
Model No.:	RAX1500
Adding Model(s):	/
Rated Voltage:	DC12V
Battery Capacity:	/
Power Adapter:	MODEL:APS-M012120100W-G INPUT: AC100-240, 50/60Hz, 0.35A Max OUTPUT:DC12V,1.0A
Note: The test data is gathered from a production sample, provided by the manufacturer.	

Technical Characteristics of EUT	
Support Standards:	802.11a, 802.11n(HT20) , 802.11n-HT40, 802.11ac-VHT80, 802.11ax-HE20, 802.11ax-HE40, 802.11ax-HE80
Frequency Range:	5150-5250MHz, 5725-5850MHz
RF Output Power:	5150-5250MHz: Antenna 0: 15.36dBm (Conducted) Antenna 1:15.69dBm (Conducted) 5725-5850MHz: Antenna 0: 15.13dBm (Conducted) Antenna 1: 14.78dBm (Conducted)
Type of Modulation:	QPSK, 16QAM, 64QAM, 256QAM, 1024QAM
Type of Antenna:	External Antenna
Antenna Gain:	5dBi
Note: The Antenna Gain is provided by the customer and can affect the validity of results.	

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.407: General technical requirements.
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
KDB789033 D02 v02r01: Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-Nii) Devices Part 15, Subparte.
KDB662911 D01 Multiple Transmitter Output v02r01: Emissions Testing of Transmitters with Multiple Outputs in the Same Band.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, KDB789033 D02 v02r01
The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

1.4 Table for parameters of Test Software setting

Run commands and follow the instructions given by the manufacturer, you can start to test.During testing Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Mode	Ant.	Test Frequency (MHz)												
		NCB: 20MHz												
		5180	5200	5240	5260	5300	5320	5500	5580	5700	5720	5745	5785	5825
802.11a 6Mbps	ANT 0	14	14	14	/	/	/	/	/	/	/	14	14	14
	ANT 1	16	16	16	/	/	/	/	/	/	/	17	17	17
802.11n-HT20 MCS0	ANT 0	14	14	14	/	/	/	/	/	/	/	14	14	14
	ANT 1	16	16	16	/	/	/	/	/	/	/	17	17	17
802.11ax-HE20 MCS0	ANT 0	14	14	14	/	/	/	/	/	/	/	14	14	14
	ANT 1	16	16	16	/	/	/	/	/	/	/	17	17	17
Mode	Ant.	NCB: 40MHz												
		5190	5230	5270	5310	5510	5550	5670	5710	5755	5795			
802.11n-HT40 MCS0	ANT 0	14	14	/	/	/	/	/	/	14	14			
	ANT 1	16	16	/	/	/	/	/	/	17	17			
802.11ax-HE40	ANT 0	14	14	/	/	/	/	/	/	14	14			

MCS0	ANT 1	16	16	/	/	/	/	/	/	17	17

Mode	Ant.	NCB: 80MHz					
		5210	5290	5530	5610	5690	5775
802.11ac-VH80 MCS0	ANT 0	14	/	/	/	/	14
	ANT 1	16	/	/	/	/	17
802.11ax-VE80 MCS0	ANT 0	14	/	/	/	/	14
	ANT 1	17	/	/	/	/	17

1.5 EUT Operating during test

EUT was programmed to be in continuously transmitting mode. During the test, EUT operation to normal function and programs under Android were executed.

1.6 Test Facility

Address of the test laboratory

Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Bao'an District, Shenzhen, P.R.C. (518101）

FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintain ed in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

1.7 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, with a duty cycle equal to 100%, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	802.11a	5180MHz,5200MHz,5240MHz, 5745MHz, 5785MHz,5825MHz
TM2	802.11n-HT20	5180MHz,5200MHz,5240MHz, 5745MHz, 5785MHz,5825MHz
TM3	802.11n-HT40	5190MHz,5230MHz, 5755MHz,5795MHz
TM4	802.11ax-HE20	5180MHz,5200MHz,5240MHz, 5745MHz, 5785MHz,5825MHz
TM5	802.11ax-HE40	5190MHz,5230MHz, 5755MHz,5795MHz
TM6	802.11ac-VH80	5210MHz, 5775 MHz
TM7	802.11ax-HE80	5210MHz, 5775 MHz
Note: All test modes (different data rate and different modulation) are performed, but only the worst case is recorded in this report.		

Test Conditions	
Temperature:	22~25 °C
Relative Humidity:	45~55 %.
ATM Pressure:	1019 mbar

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
DC Cable	1.54	Unshielded	Without Ferrite
RJ45 Cable	1.00	Unshielded	Without Ferrite

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
Notebook	Lenovo	E445	EB12648265

1.8 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	±0.42dB
Occupied Bandwidth	Conducted	±1.5%
Power Spectral Density	Conducted	±1.8dB
Conducted Spurious Emission	Conducted	±2.17dB
Conducted Emissions	Conducted	9-150kHz ±3.74dB
		0.15-30MHz ±3.34dB
Transmitter Spurious Emissions	Radiated	30-200MHz ±4.52dB
		0.2-1GHz ±5.56dB
		1-6GHz ±3.84dB
		6-18GHz ±3.92dB

1.9 Test Equipment List and Details

2021 Equipment Calibration List

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
SEMT-1075	Communication Tester	Rohde & Schwarz	CMW500	148650	2021-03-27	2022-03-26
SEMT-1063	GSM Tester	Rohde & Schwarz	CMU200	114403	2021-03-27	2022-03-26
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2021-03-27	2022-03-26
SEMT-1079	Spectrum Analyzer	Agilent	N9020A	US47140102	2021-03-27	2022-03-26
SEMT-1080	Signal Generator	Agilent	83752A	3610A01453	2021-03-27	2022-03-26
SEMT-1081	Vector Signal Generator	Agilent	N5182A	MY47070202	2021-03-27	2022-03-26
SEMT-1028	Power Divider	Weinschel	1506A	PM204	2021-03-27	2022-03-26
SEMT-C001	Cable	Zheng DI	LL142-07-07-10M(A)	/	/	/
SEMT-C002	Cable	Zheng DI	ZT40-2.92J-2.92J-6M	/	/	/
SEMT-C003	Cable	Zheng DI	ZT40-2.92J-2.92J-2.5M	/	/	/
SEMT-C004	Cable	Zheng DI	2M0RFC	/	/	/
SEMT-C005	Cable	Zheng DI	1M0RFC	/	/	/
SEMT-C006	Cable	Zheng DI	1M0RFC	/	/	/
☒Chamber A: Below 1GHz						
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2021-03-27	2022-03-26
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2021-03-27	2022-03-26
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2021-04-12	2022-04-11
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-19	2023-03-18
SEMT-1068	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2021-03-19	2023-03-18
☒Chamber A: Above 1GHz						
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2021-03-27	2022-03-26
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2021-03-27	2022-03-26
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2021-04-12	2022-04-11
SEMT-1042	Horn Antenna	ETS	3117	00086197	2021-03-19	2023-03-18
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2021-04-27	2023-04-26

SEMT-1169	Pre-amplifier	Direction Systems Inc.	PAP-2640	14145-14153	2021-04-27	2022-04-26
SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2021-03-27	2022-03-26
☐Chamber B:Below 1GHz						
SEMT-1068	Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-09	2023-04-08
SEMT-1067	Amplifier	Agilent	8447D	2944A10179	2021-04-12	2022-04-11
SEMT-1066	EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2021-05-06	2022-05-05
☐Chamber C:Below 1GHz						
SEMT-1319	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2021-12-03	2022-12-02
SEMT-1343	Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2021-05-28	2023-05-27
SEMT-1333	Amplifier	HP	8447F	2944A03869	2021-04-15	2022-04-14
☒Conducted Room 1#						
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2021-04-12	2022-04-11
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2021-04-15	2022-04-14
SEMT-1003	AC LISN	Schwarz beck	NSLK8126	8126-224	2021-04-12	2022-04-11
☐Conducted Room 2#						
SEMT-1334	EMI Test Receiver	Rohde & Schwarz	ESPI	101259	2021-04-12	2022-04-11
SEMT-1336	LISN	Rohde & Schwarz	ENV 216	100097	2021-04-12	2022-04-11

2022 Equipment Calibration List

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due. Date
SEMT-1075	Communication Tester	Rohde & Schwarz	CMW500	148650	2022-03-22	2023-03-21
SEMT-1063	GSM Tester	Rohde & Schwarz	CMU200	114403	2022-03-22	2023-03-21
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2022-03-25	2023-03-24
SEMT-1079	Spectrum Analyzer	Agilent	N9020A	US47140102	2022-03-22	2023-03-21
SEMT-1080	Signal Generator	Agilent	83752A	3610A01453	2022-03-22	2023-03-21
SEMT-1081	Vector Signal Generator	Agilent	N5182A	MY47070202	2022-03-22	2023-03-21
SEMT-1028	Power Divider	Weinschel	1506A	PM204	2022-03-22	2023-03-21
SEMT-C001	Cable	Zheng DI	LL142-07-07-10M(A)	/	/	/
SEMT-C002	Cable	Zheng DI	ZT40-2.92J-2.92J-6M	/	/	/
SEMT-C003	Cable	Zheng DI	ZT40-2.92J-2.92J-2.5M	/	/	/
SEMT-C004	Cable	Zheng DI	2M0RFC	/	/	/
SEMT-C005	Cable	Zheng DI	1M0RFC	/	/	/
SEMT-C006	Cable	Zheng DI	1M0RFC	/	/	/
☒Chamber A: Below 1GHz						
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2022-03-22	2023-03-21
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2022-03-21	2023-03-20
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2022-01-07	2023-01-06
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2021-03-20	2023-03-19
SEMT-1068	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2021-03-20	2023-03-19
☒Chamber A: Above 1GHz						
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2022-03-22	2023-03-21
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2022-03-21	2023-03-20
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2022-03-21	2023-03-20
SEMT-1042	Horn Antenna	ETS	3117	00086197	2021-03-19	2023-03-18
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2021-04-27	2023-04-26
SEMT-1169	Pre-amplifier	Direction Systems Inc.	PAP-2640	14145-14153	2021-04-27	2022-04-26

SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2022-03-22	2023-03-21
☐Chamber B:Below 1GHz						
SEMT-1068	Trilog Broadband Antenna	Schwarz beck	VULB9163(B)	9163-635	2021-04-09	2023-04-08
SEMT-1067	Amplifier	Agilent	8447D	2944A10179	2022-03-21	2023-03-20
SEMT-1066	EMI Test Receiver	Rohde & Schwarz	ESPI	101391	2022-03-25	2023-03-24
☐Chamber C:Below 1GHz						
SEMT-1319	EMI Test Receiver	Rohde & Schwarz	ESIB 26	100401	2022-01-07	2023-01-06
SEMT-1343	Trilog Broadband Antenna	Schwarz beck	VULB 9168	1194	2021-05-28	2023-05-27
SEMT-1333	Amplifier	HP	8447F	2944A03869	2022-03-21	2023-03-20
☒Conducted Room 1#						
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2022-03-21	2023-03-20
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2022-03-25	2023-03-24
SEMT-1003	AC LISN	Schwarz beck	NSLK8126	8126-224	2022-03-21	2023-03-20
☐Conducted Room 2#						
SEMT-1334	EMI Test Receiver	Rohde & Schwarz	ESPI	101259	2022-03-21	2023-03-20
SEMT-1336	LISN	Rohde & Schwarz	ENV 216	100097	2022-03-21	2023-03-20

Software List			
Description	**Manufacturer**	**Model**	**Version**
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1
EMI Test Software (Conducted Emission)*	Farad	EZ-EMC	RA-03A1

*Remark: indicates software version used in the compliance certification testing.

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§15.203; §15.405	Antenna Requirement	Compliant
15.407 (c)	Automatically Discontinue Transmission	Compliant
§15.207; §15.407(b)(6)	Conducted Emission	Compliant
§15.407(a)(1),(2)	Power Spectral Density	Compliant
§15.407(e)	Emission Bandwidth and Occupied Bandwidth	Compliant
§15.407(a)(1),(2)	Maximum Conducted Output Power	Compliant
§15.407(b)(1),(2),(3),(4)	Undesirable emission	Compliant
§15.205; §15.407(b)(1),(2),(3)	Radiated Emission	Compliant
§15.407(g)	Frequency Stability	Compliant
§15.407(h)	Dynamic Frequency Selection (DFS)	Compliant

N/A: Not applicable.

3. Antenna Requirement

3.1 Standard Applicable

According to FCC Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

3.2 Evaluation Information

This product has two permanently attached External antennas, fulfill the requirement of this section. And the signals at the antennas are completely uncorrelated.

4. Automatically Discontinue Transmission

4.1 Standard Applicable

According to FCC Part 15.407(c), the device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

4.2 Summary of Test Results

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

5. Power Spectral Density

5.1 Standard Applicable

Section 15.407(a) Power limits:

(1) For the band 5.15-5.25GHz.
(iv) For mobile and portable client devices in the 5.15-5.25GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250mW provided the maximum antenna gain does not exceed 6dBi. In addition, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

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

(3) For the band 5.725-5.85GHz, 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 30dBm in any 500kHz band. If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

5.2 Test Procedure

According to 789033 D02 v02r01 General UNII Test Procedures New Rules v02, the following is the measurement procedure.
For devices operating in the bands 5.15-5.25GHz, 5.25-5.35GHz, and 5.47-5.725GHz, the above procedures make use of 1MHz RBW to satisfy directly the 1MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85GHz, the rules specify a measurement bandwidth of 500kHz. Many spectrum analyzers do not have 500kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1MHz, or 500kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1MHz, or 500kHz). If

measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500kHz) and integrated over 1 MHz, or 500kHz bandwidth, the following adjustments to the procedures apply:

a) Set RBW ≥ 1/T, where T is defined in section II.B.l.a).
b) Set VBW ≥ 3 RBW.
c) If measurement bandwidth of Maximum PSD is specified in 500kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
d) If measurement bandwidth of Maximum PSD is specified in 1MHz, add 10log(1MHz/RBW) to the measured result, whereas RBW (< 1MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100kHz for the sections 5.c) and 5.d) above, since RBW=100kHZ is available on nearly all spectrum analyzers.

5.3 Summary of Test Results/Plots

Please refer to Appendix A

6. Emission Bandwidth and Occupied Bandwidth

6.1 Standard Applicable

According to 15.407(a) and (e):

(1) For the band 5.15-5.25GHz.
(iv) For mobile and portable client devices in the 5.15-5.25GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250mW provided the maximum antenna gain does not exceed 6dBi. In addition, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

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

(3) For the band 5.725-5.85GHz, 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 30dBm in any 500kHz band. If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

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

6.2 Test Procedure

According to 789033 D02 v02r0r section C&D, the following is the measurement procedure.

1. Emission Bandwidth (EBW)
a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.

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

2. Minimum Emission Bandwidth for the band 5.725-5.85GHz
Section 15.407(e) specifies the minimum 6dB emission bandwidth of at least 500KHz for the band 5.715-5.85GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
Note: The automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

D. 99 Percent Occupied Bandwidth
The 99-percent occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5 % of the total mean power of the given emission. Measurement of the 99-percent occupied bandwidth is required only as a condition for using the optional band-edge measurement techniques described in section II.G.3.d). Measurements of 99-percent occupied bandwidth may also optionally be used in lieu of the EBW to 789033 D02 v02r01 General UNII Test Procedures New Rules v01 define the minimum frequency range over which the spectrum is integrated when measuring maximum conducted output power as described in section II.E. However, the EBW must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with 15.407(a).

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

6.3 Summary of Test Results/Plots

Please refer to Appendix B

7. Maximum Conducted Output Power

7.1 Standard Applicable

Section 15.407(a) Power limits:

(1) For the band 5.15-5.25GHz.
(iv) For mobile and portable client devices in the 5.15-5.25GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250mW provided the maximum antenna gain does not exceed 6dBi. In addition, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

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

(3) For the band 5.725-5.85GHz, 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 30dBm in any 500kHz band. If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

7.2 Test Procedure

According to KDB789033 D02 v02r01 section E, the following is the measurement procedure.

(i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(ii) Set RBW = 1MHz.

(iii) Set VBW ≥ 3MHz.

(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)

(v) Sweep time = auto.

(vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.

(vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run”.

(viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

7.3 Summary of Test Results/Plots

Please refer to Appendix C

8. Radiated Spurious Emissions

8.1 Standard Applicable

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

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

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

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

(4) For transmitters operating in the 5.725-5.85GHz band:

(i) All emissions shall be limited to a level of −27dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10dBm/MHz at 25MHz above or below the band edge, and from 25MHz above or below the band edge increasing linearly to a level of 15.6dBm/MHz at 5MHz above or below the band edge, and from 5MHz above or below the band edge increasing linearly to a level of 27dBm/MHz at the band edge.

According to §15.407(b)(6), Unwanted emissions below 1GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

According to §15.407(b)(7), The provisions of §15.205 apply to intentional radiators operating under this section.

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If radiated measurements are performed, field strength is then converted to EIRP as follows:

EIRP = ((E*d)^2) / 30

where:

- E is the field strength in V/m;
- d is the measurement distance in meters;
- EIRP is the equivalent isotropically radiated power in watts.

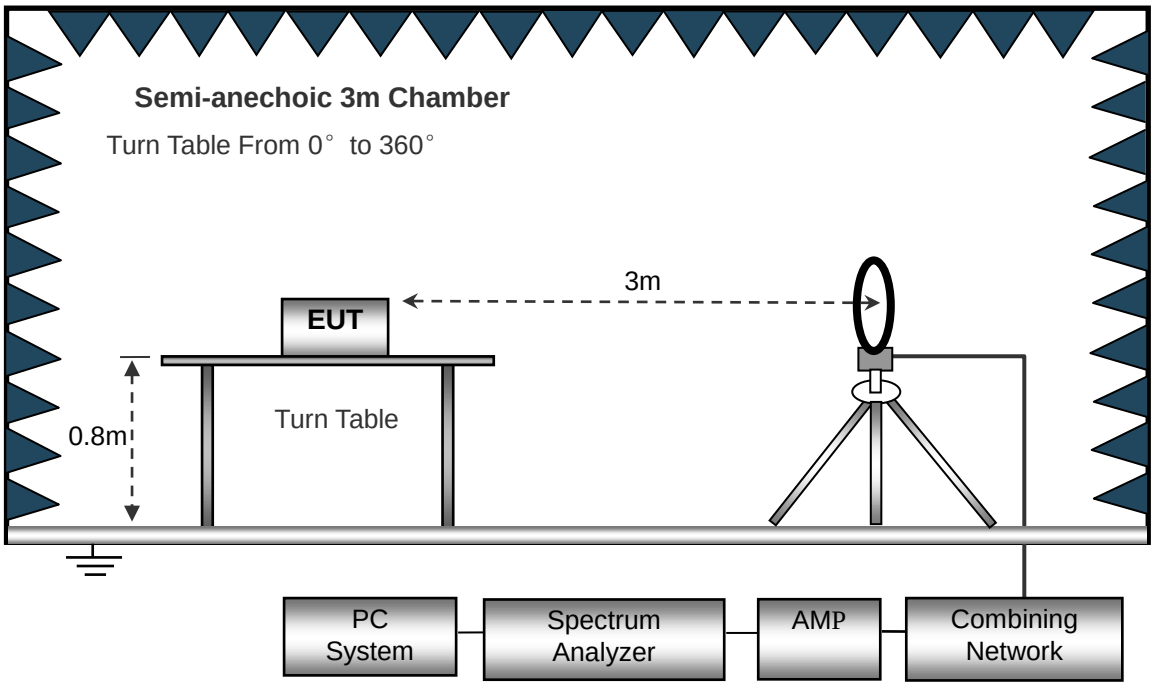
8.2 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.407(b)(6) and FCC Part 15.209 Limit..

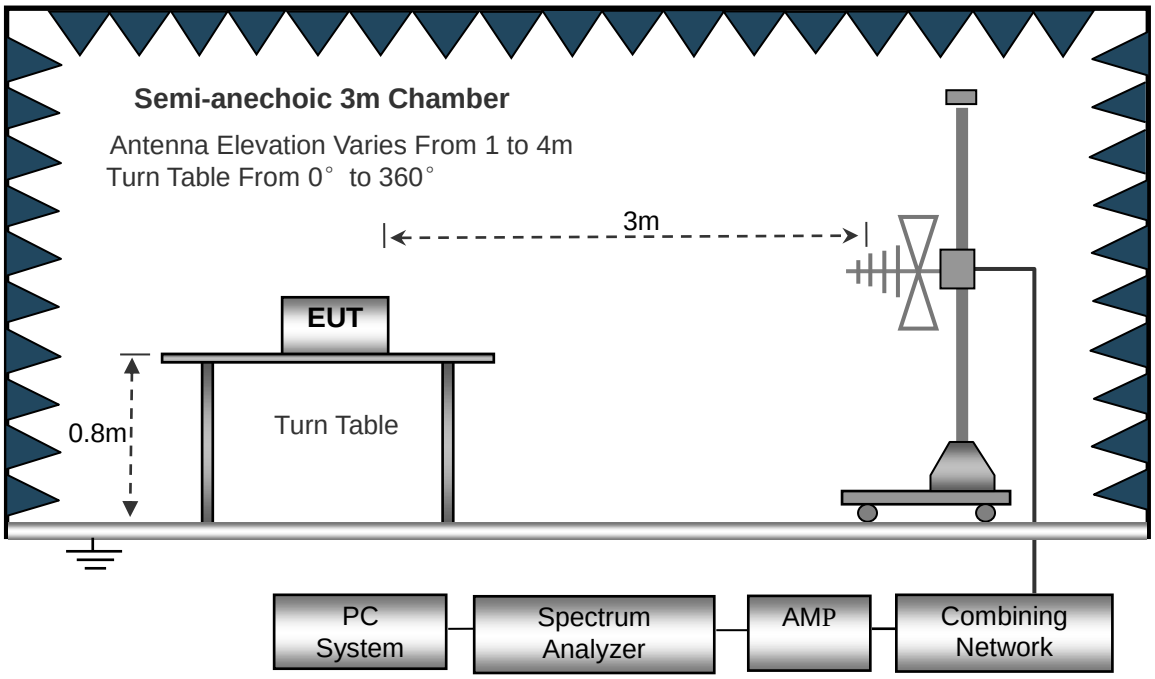
The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle.

The spacing between the peripherals was 10cm.

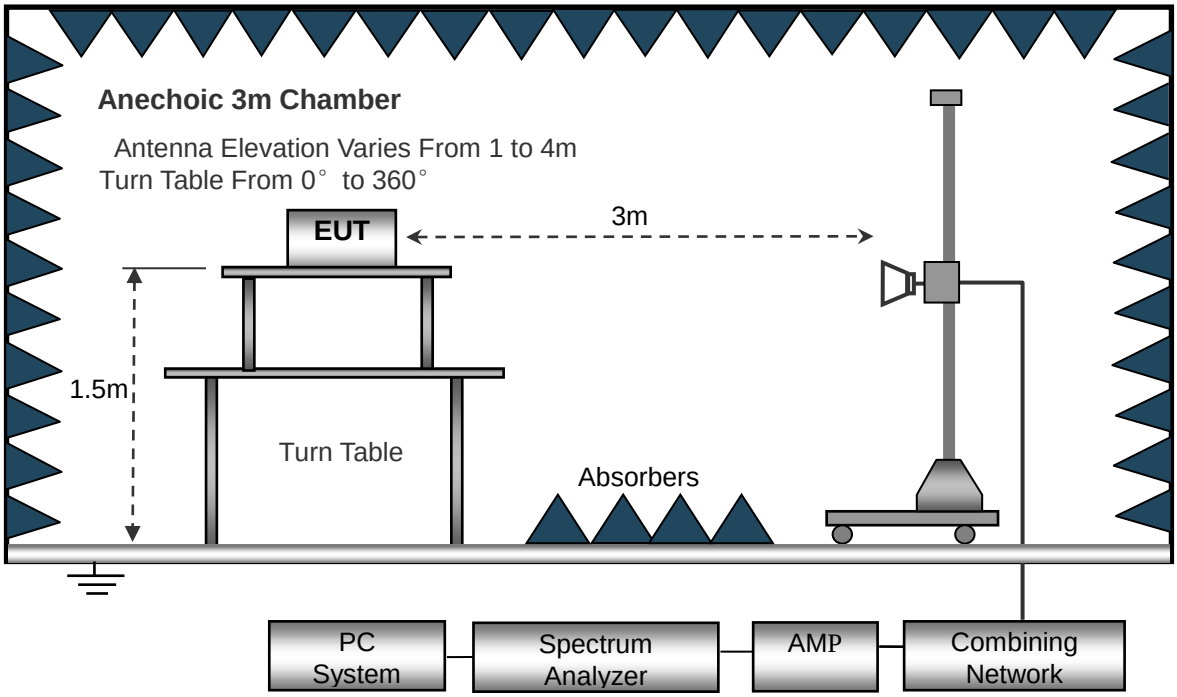
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1GHz.



8.3 Test Receiver Setup

During the radiated emission test for above 1GHz, the test receiver was set with the following configurations:

For peak detector:
RBW = 1000kHz, VBW = 3000kHz, Sweep Time = Auto

For average detector:
RBW = 1000kHz, VBW = 10Hz, Sweep Time = Auto

8.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Ant. Factor + Cable Loss – Ampl. Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – FCC Part 15 Limit

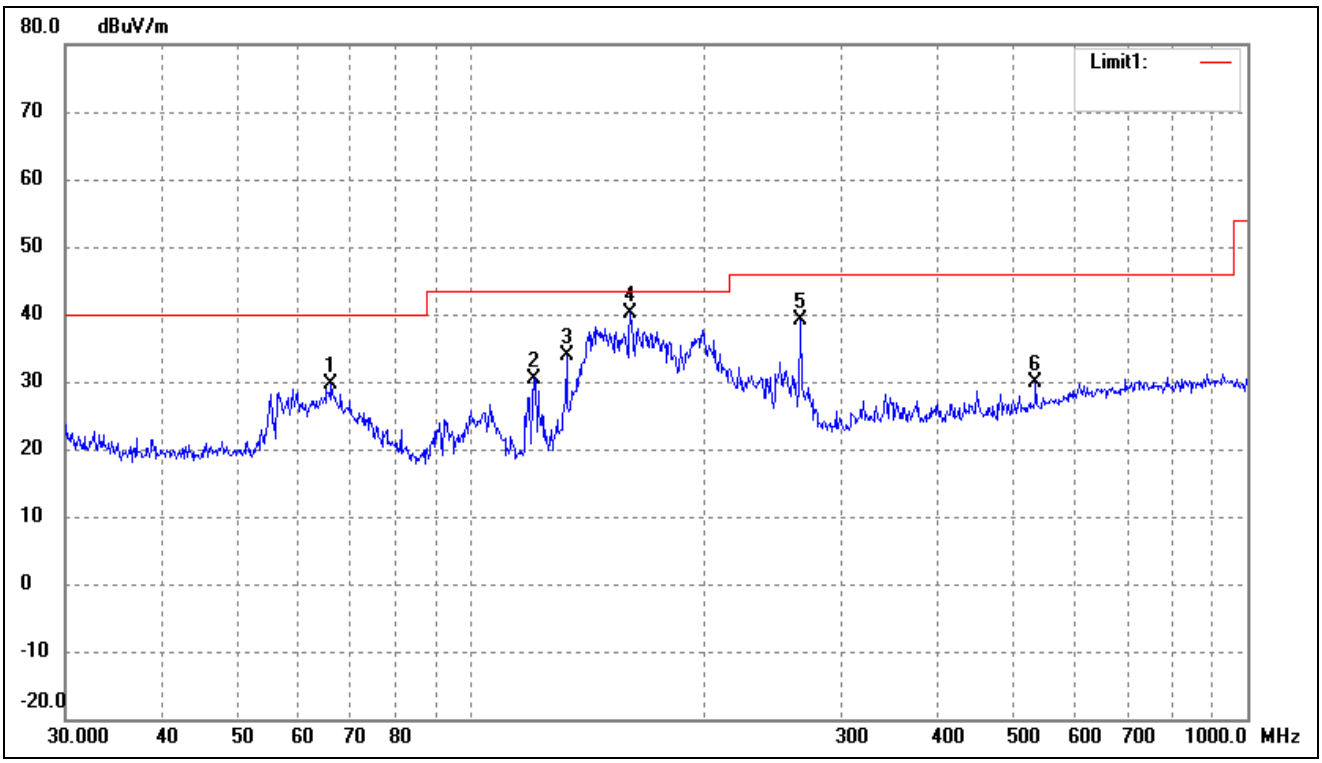
8.5 Summary of Test Results/Plots

Note: *this EUT was tested in 3 orthogonal positions and the worst case position data was reported.*

- Spurious Emission From 30MHz to 1GHz

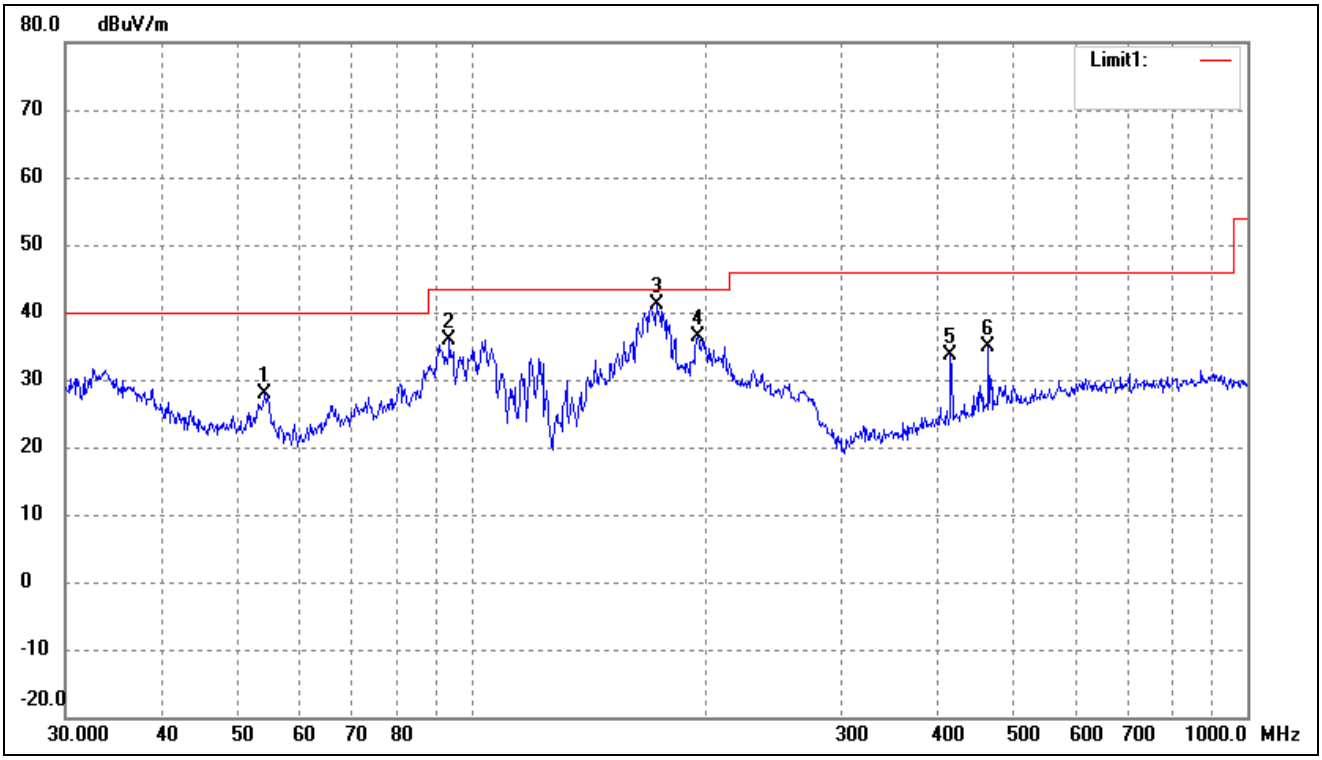
- Antenna 0(Worst case)
- 5150-5250MHz

802.11a(Worst case)			
Test Channel	5180MHz	Polarity:	Horizontal



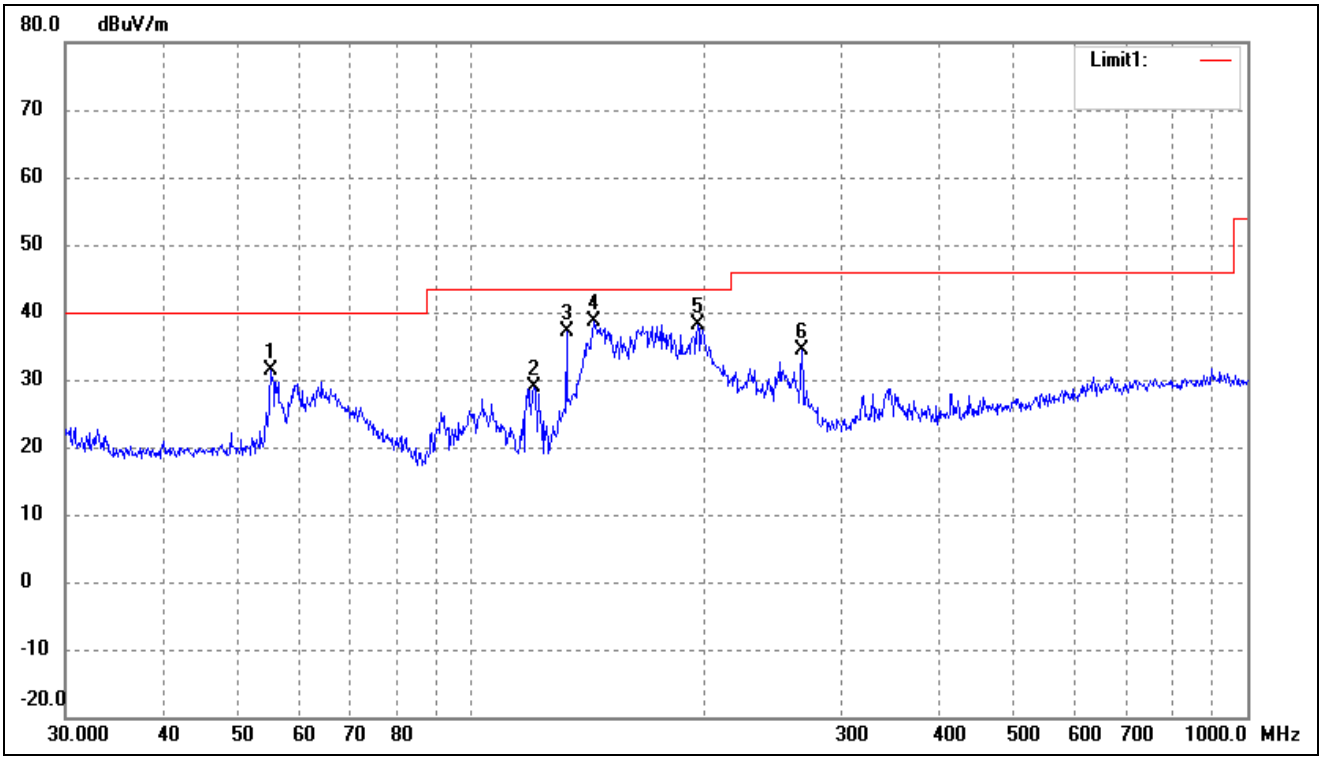
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	66.0342	39.06	-9.49	29.57	40.00	-10.43	-	-	peak
2	120.2766	40.06	-9.65	30.41	43.50	-13.09	-	-	peak
3	132.6850	45.52	-11.66	33.86	43.50	-9.64	-	-	peak
4	160.3457	52.34	-12.15	40.19	43.50	-3.31	-	-	peak
5	265.6757	46.89	-7.88	39.01	46.00	-6.99	-	-	peak
6	533.8321	30.58	-0.74	29.84	46.00	-16.16	-	-	peak

802.11a(Worst case)			
Test Channel	5180MHz	Polarity:	Vertical



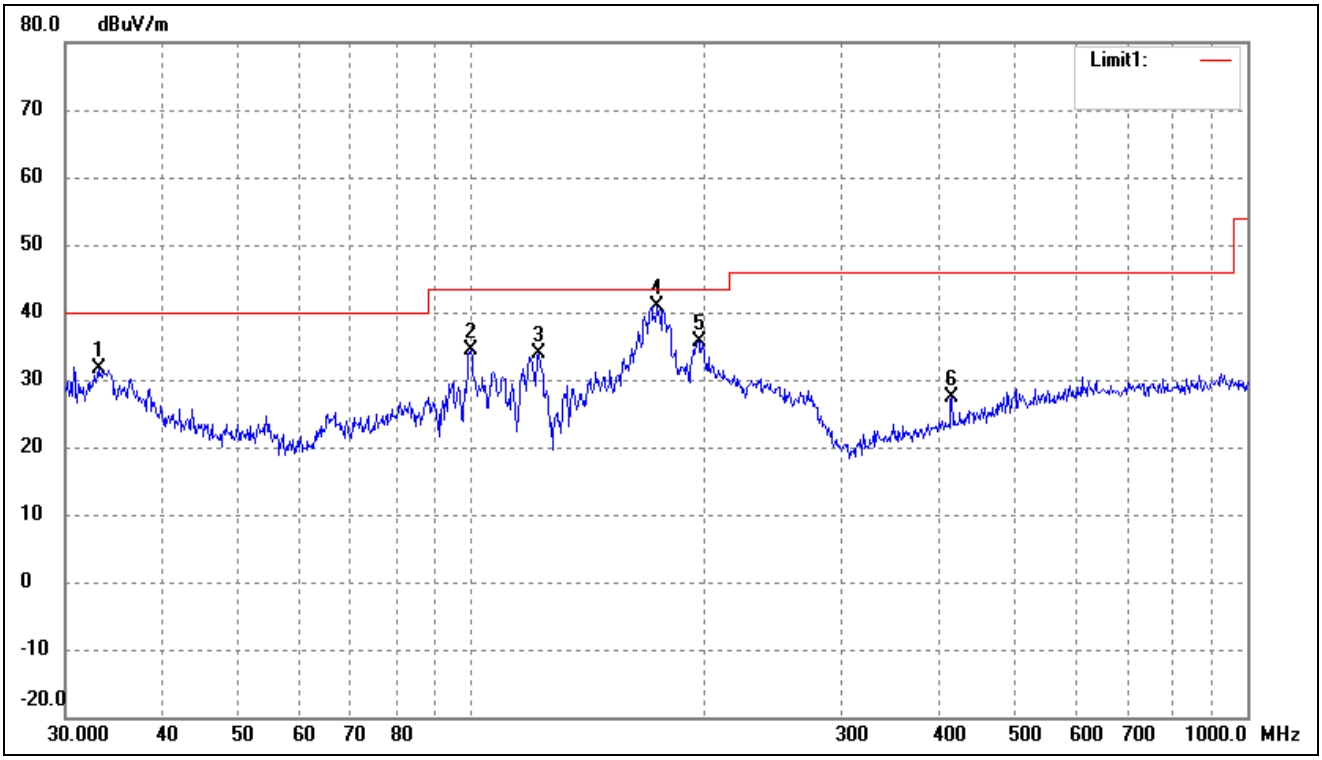
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	54.0711	35.37	-7.56	27.81	40.00	-12.19	-	-	peak
2	93.7685	45.79	-9.88	35.91	43.50	-7.59	-	-	peak
3	173.2051	52.83	-11.58	41.25	43.50	-2.25	-	-	peak
4	195.8220	46.24	-9.85	36.39	43.50	-7.11	-	-	peak
5	414.7223	37.20	-3.50	33.70	46.00	-12.30	-	-	peak
6	463.9696	37.05	-2.21	34.84	46.00	-11.16	-	-	peak

802.11a(Worst case)			
Test Channel	5200MHz	Polarity:	Horizontal



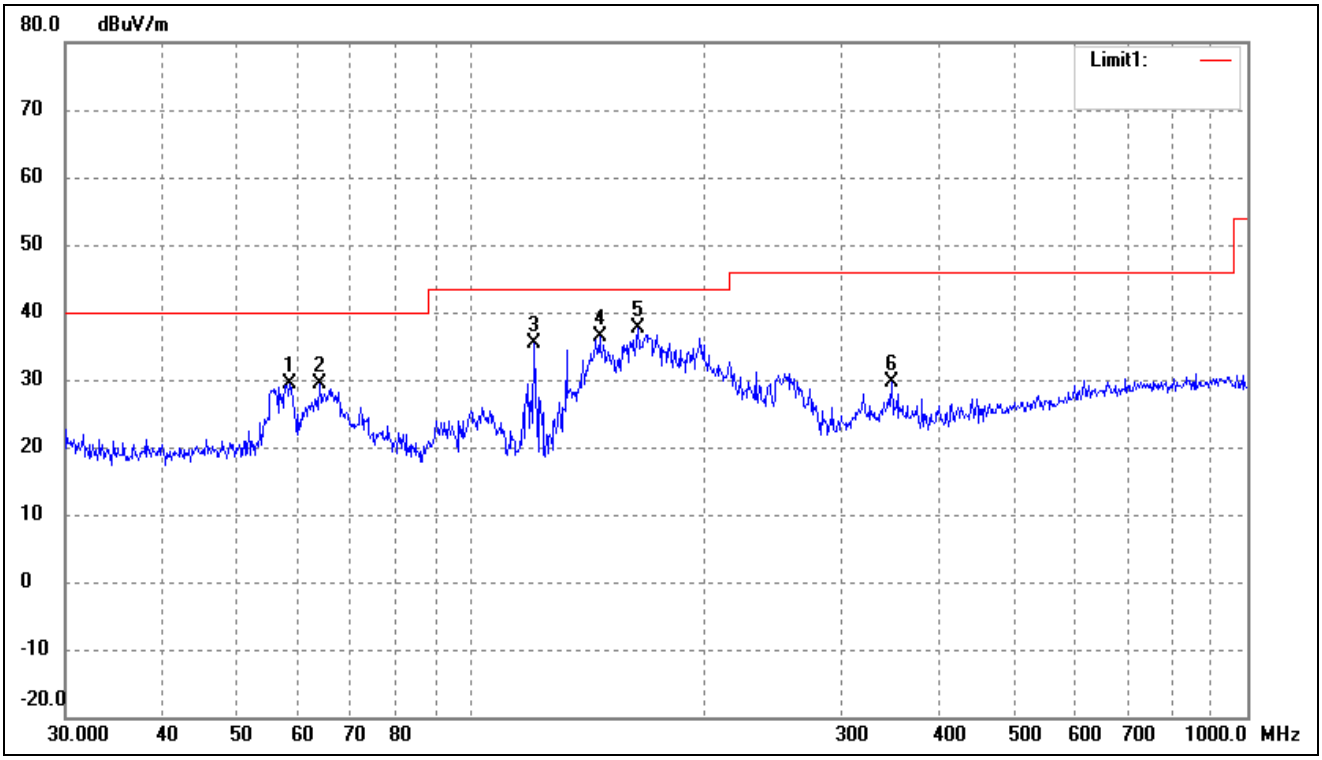
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	55.2207	39.23	-7.73	31.50	40.00	-8.50	-	-	peak
2	120.2766	38.61	-9.65	28.96	43.50	-14.54	-	-	peak
3	132.6850	48.88	-11.66	37.22	43.50	-6.28	-	-	peak
4	143.8295	51.06	-12.40	38.66	43.50	-4.84	-	-	peak
5	195.8220	47.99	-9.85	38.14	43.50	-5.36	-	-	peak
6	266.6089	42.22	-7.86	34.36	46.00	-11.64	-	-	peak

802.11a(Worst case)			
Test Channel	5200MHz	Polarity:	Vertical



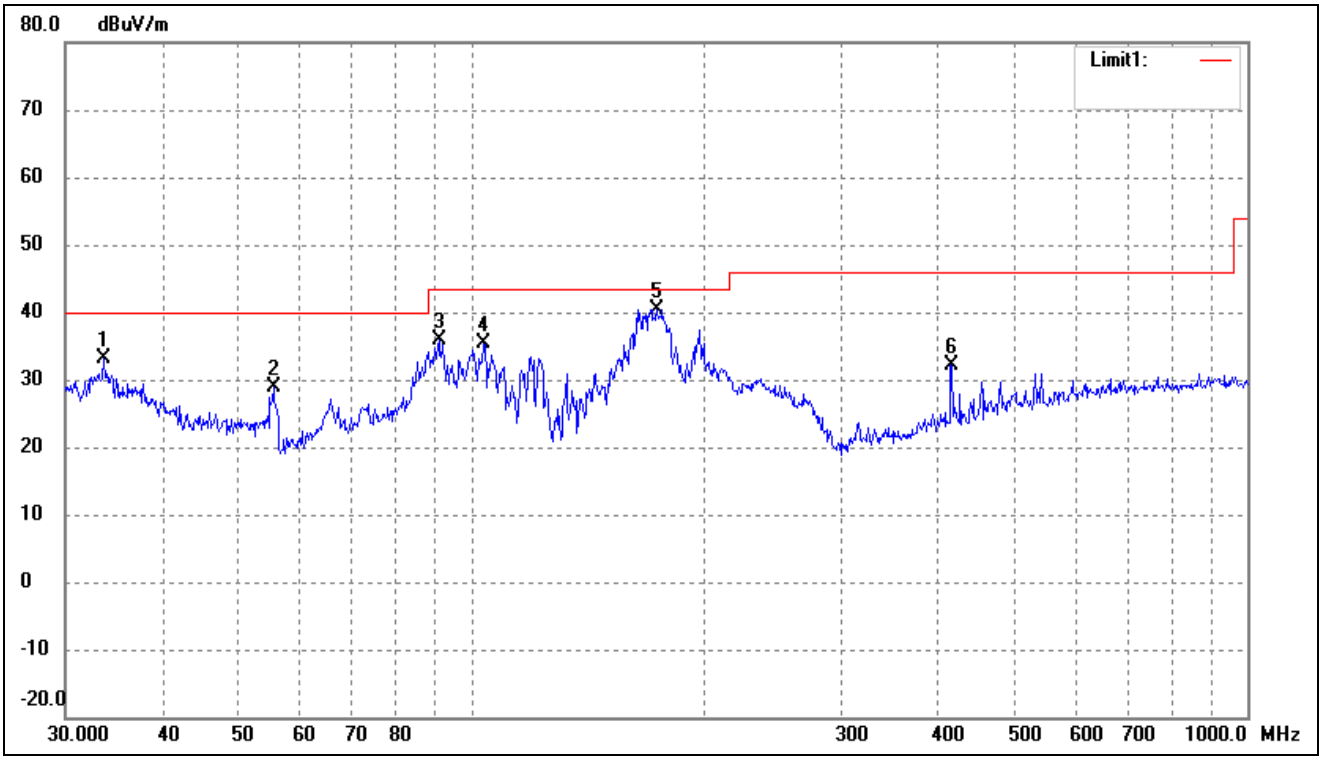
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	33.0950	40.24	-8.69	31.55	40.00	-8.45	-	-	peak
2	99.8777	43.03	-8.75	34.28	43.50	-9.22	-	-	peak
3	121.9755	43.90	-9.96	33.94	43.50	-9.56	-	-	peak
4	173.8135	52.37	-11.55	40.82	43.50	-2.68	-	-	peak
5	196.5098	45.52	-9.81	35.71	43.50	-7.79	-	-	peak
6	416.1791	30.87	-3.46	27.41	46.00	-18.59	-	-	peak

802.11a(Worst case)			
Test Channel	5240MHz	Polarity:	Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	58.4074	37.69	-8.19	29.50	40.00	-10.50	-	-	peak
2	63.7588	38.42	-9.08	29.34	40.00	-10.66	-	-	peak
3	120.6991	45.21	-9.72	35.49	43.50	-8.01	-	-	peak
4	146.3735	48.80	-12.48	36.32	43.50	-7.18	-	-	peak
5	163.7550	49.58	-12.00	37.58	43.50	-5.92	-	-	peak
6	348.0274	35.02	-5.46	29.56	46.00	-16.44	-	-	peak

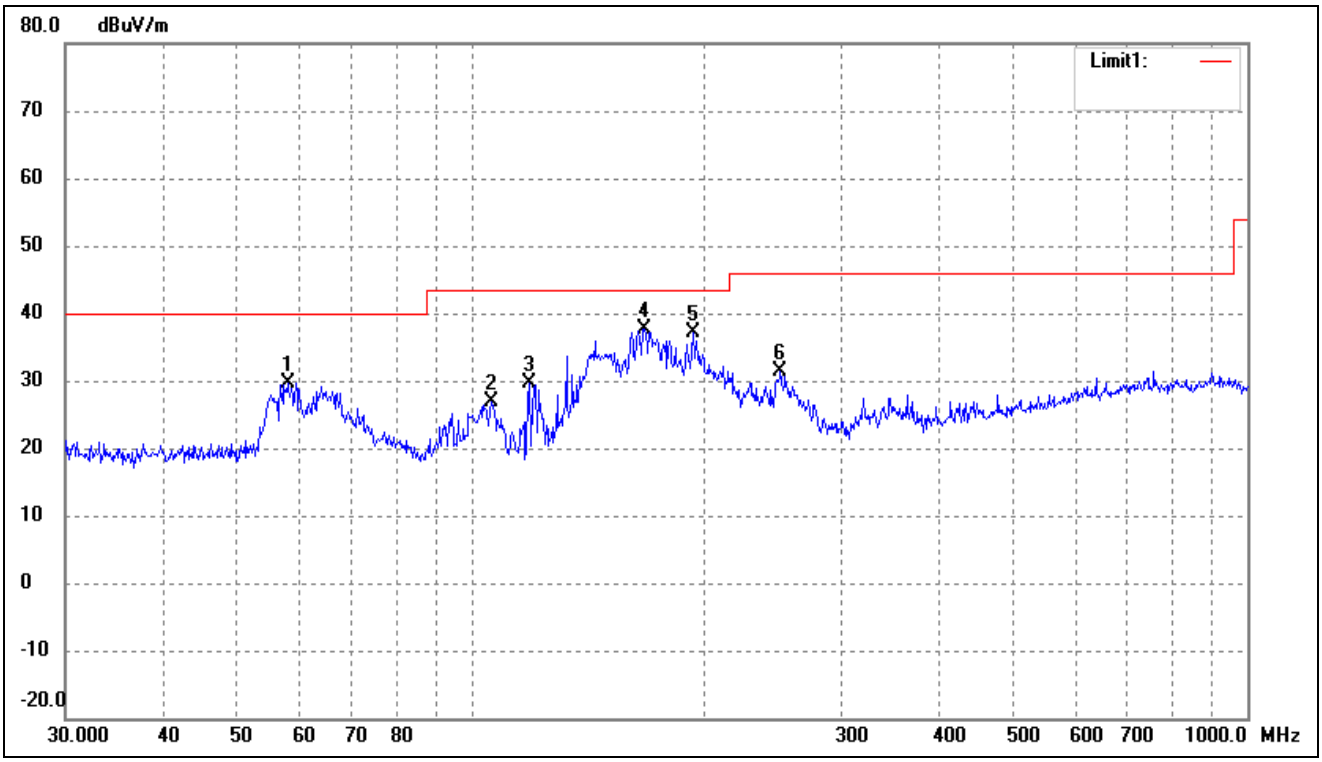
802.11a(Worst case)			
Test Channel	5240MHz	Polarity:	Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	33.5624	41.73	-8.58	33.15	40.00	-6.85	-	-	peak
2	55.6094	36.65	-7.78	28.87	40.00	-11.13	-	-	peak
3	90.8554	46.18	-10.42	35.76	43.50	-7.74	-	-	peak
4	103.8055	44.28	-8.79	35.49	43.50	-8.01	-	-	peak
5	173.2051	52.05	-11.58	40.47	43.50	-3.03	-	-	peak
6	416.1791	35.66	-3.46	32.20	46.00	-13.80	-	-	peak

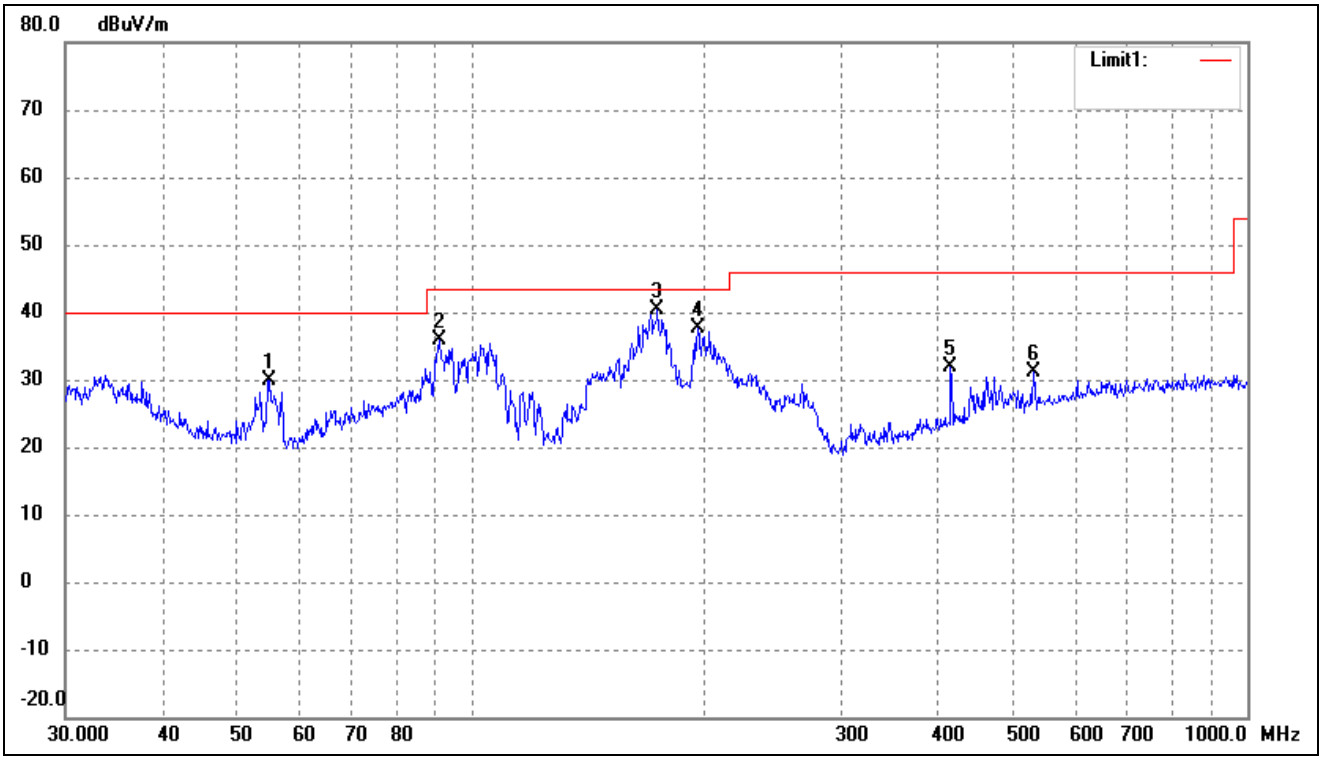
➢ 5725-5850MHz

802.11a(worst case)			
Test Channel	5745MHz	Polarity:	Horizontal



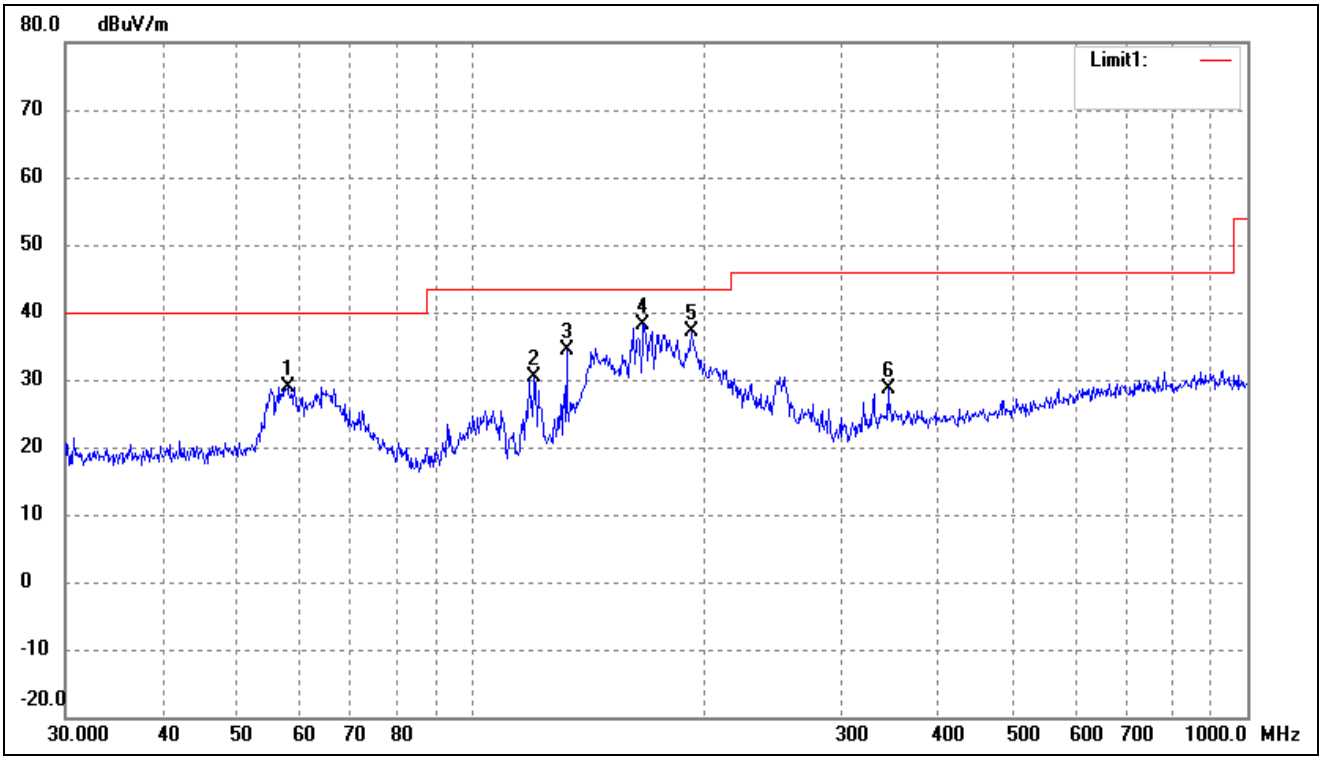
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	57.9993	37.82	-8.13	29.69	40.00	-10.31	-	-	peak
2	106.0126	35.63	-8.82	26.81	43.50	-16.69	-	-	peak
3	119.0180	39.06	-9.53	29.53	43.50	-13.97	-	-	peak
4	167.2368	49.55	-11.85	37.70	43.50	-5.80	-	-	peak
5	193.0945	46.99	-9.93	37.06	43.50	-6.44	-	-	peak
6	250.3012	39.79	-8.31	31.48	46.00	-14.52	-	-	peak

802.11a(worst case)			
Test Channel	5745MHz	Polarity:	Vertical



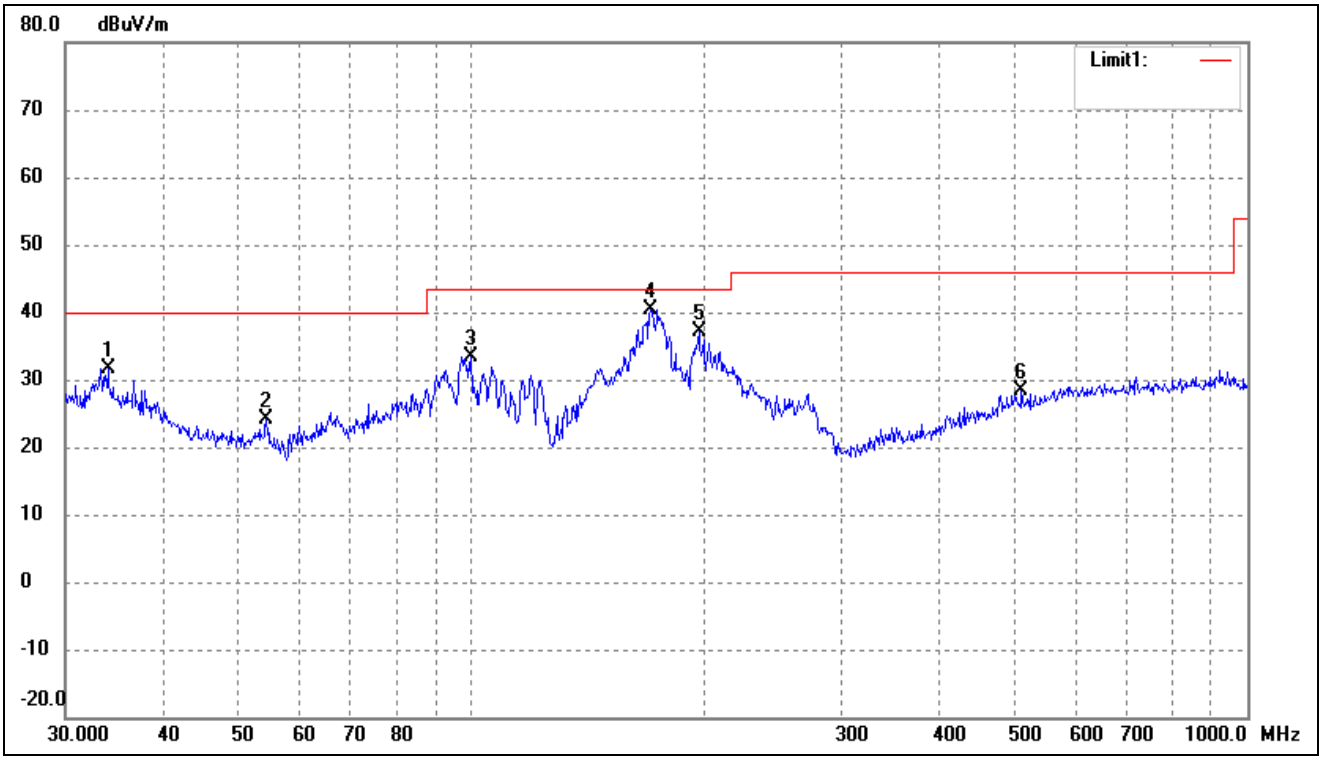
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	55.0274	37.46	-7.69	29.77	40.00	-10.23	-	-	peak
2	91.1746	46.17	-10.36	35.81	43.50	-7.69	-	-	peak
3	173.8135	51.83	-11.55	40.28	43.50	-3.22	-	-	peak
4	195.8220	47.58	-9.85	37.73	43.50	-5.77	-	-	peak
5	414.7223	35.50	-3.50	32.00	46.00	-14.00	-	-	peak
6	530.1014	31.90	-0.80	31.10	46.00	-14.90	-	-	peak

802.11a(worst case)			
Test Channel	5785MHz	Polarity:	Horizontal



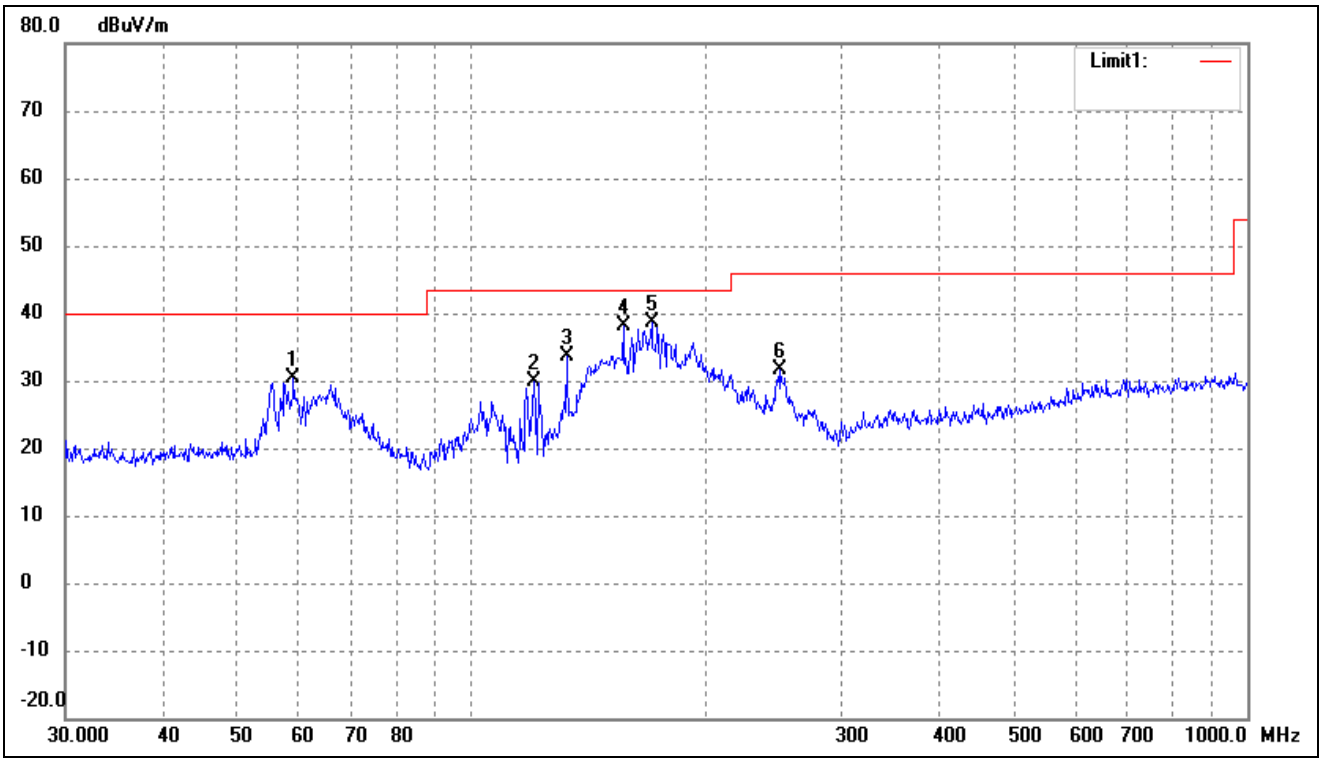
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	57.9993	37.08	-8.13	28.95	40.00	-11.05	-	-	peak
2	120.6991	40.14	-9.72	30.42	43.50	-13.08	-	-	peak
3	132.6850	46.12	-11.66	34.46	43.50	-9.04	-	-	peak
4	166.6514	49.93	-11.87	38.06	43.50	-5.44	-	-	peak
5	192.4186	47.09	-9.96	37.13	43.50	-6.37	-	-	peak
6	344.3855	34.25	-5.57	28.68	46.00	-17.32	-	-	peak

802.11a(worst case)			
Test Channel	5785MHz	Polarity:	Vertical



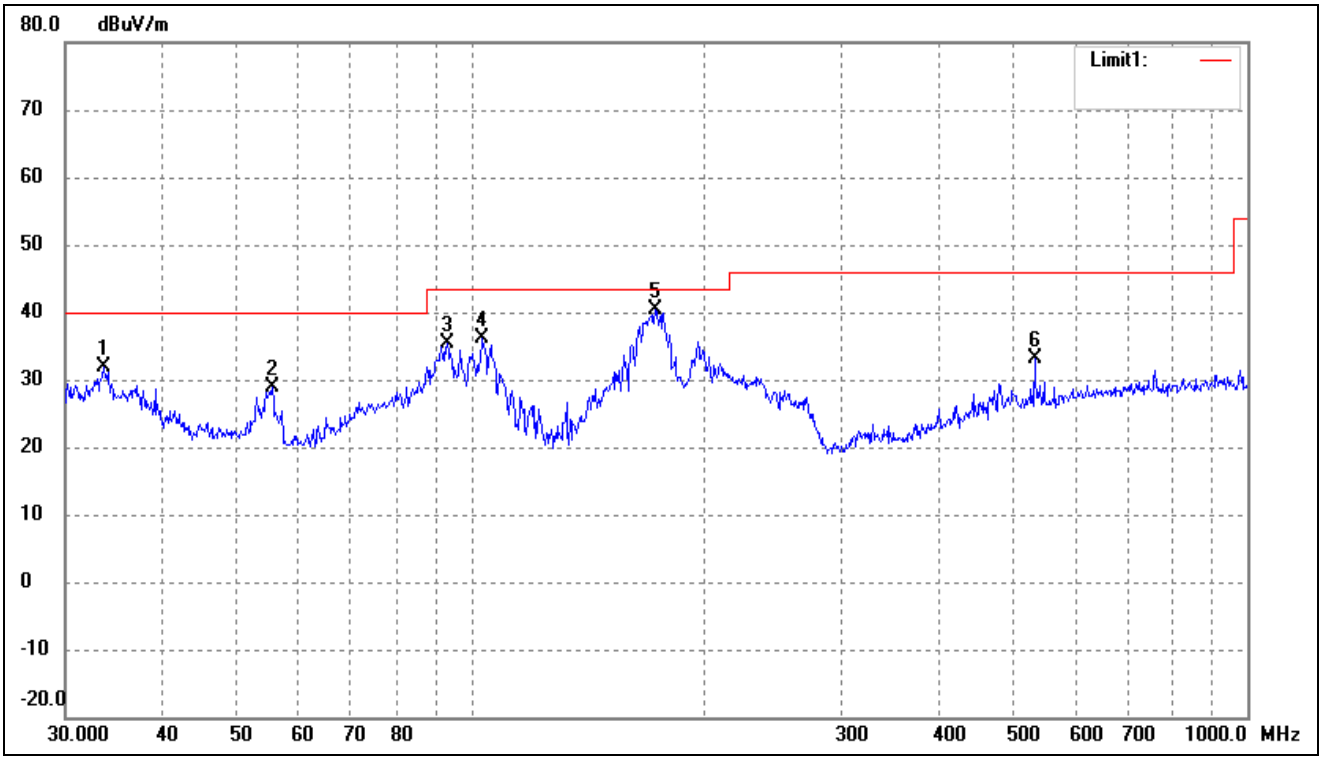
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	34.0365	40.19	-8.46	31.73	40.00	-8.27	-	-	peak
2	54.4516	31.67	-7.62	24.05	40.00	-15.95	-	-	peak
3	99.8777	42.12	-8.75	33.37	43.50	-10.13	-	-	peak
4	170.1948	52.17	-11.72	40.45	43.50	-3.05	-	-	peak
5	196.5098	46.89	-9.81	37.08	43.50	-6.42	-	-	peak
6	511.8352	29.60	-1.11	28.49	46.00	-17.51	-	-	peak

802.11a(worst case)			
Test Channel	5825MHz	Polarity:	Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	59.0251	38.62	-8.28	30.34	40.00	-9.66	-	-	peak
2	120.6991	39.62	-9.72	29.90	43.50	-13.60	-	-	peak
3	132.6850	45.30	-11.66	33.64	43.50	-9.86	-	-	peak
4	157.0074	50.44	-12.29	38.15	43.50	-5.35	-	-	peak
5	170.7926	50.26	-11.69	38.57	43.50	-4.93	-	-	peak
6	250.3012	39.89	-8.31	31.58	46.00	-14.42	-	-	peak

802.11a(worst case)			
Test Channel	5825MHz	Polarity:	Vertical



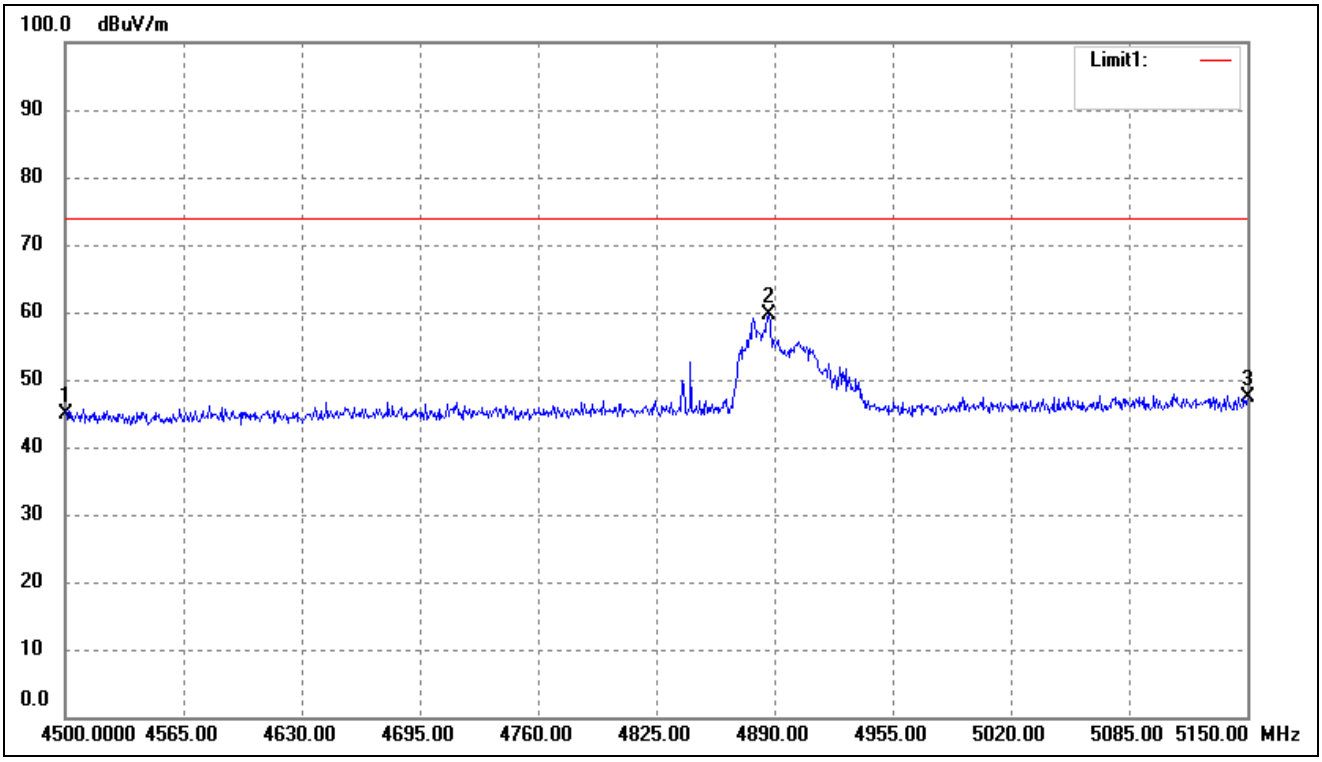
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	33.5624	40.46	-8.58	31.88	40.00	-8.12	-	-	peak
2	55.4147	36.72	-7.75	28.97	40.00	-11.03	-	-	peak
3	93.1132	45.42	-10.00	35.42	43.50	-8.08	-	-	peak
4	103.4421	44.87	-8.78	36.09	43.50	-7.41	-	-	peak
5	172.5988	51.95	-11.61	40.34	43.50	-3.16	-	-	peak
6	531.9635	34.01	-0.77	33.24	46.00	-12.76	-	-	peak

Remark: '-'Means' the test Degree and Height are not recorded by the test software and only show the worst case in the test report.

- Spurious Emission above 1GHz

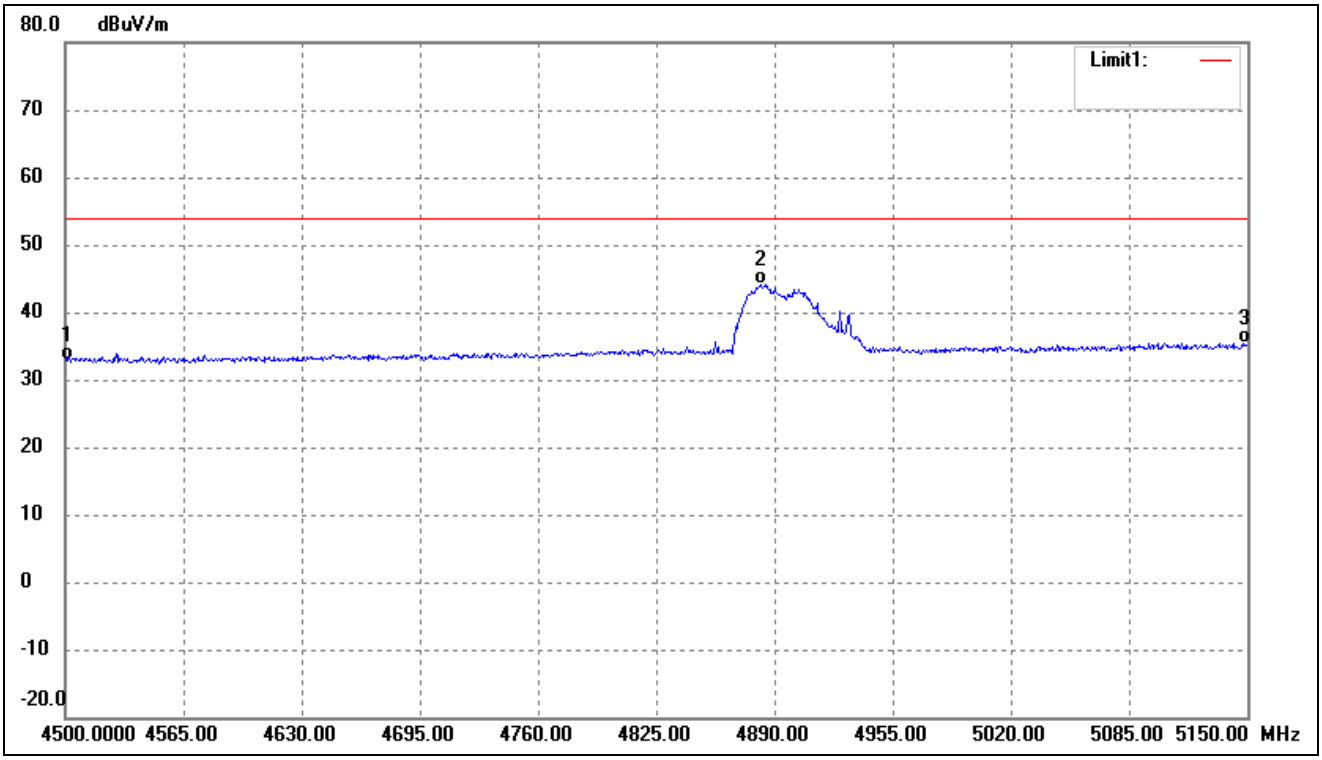
- Antenna 0(worst case)

802.11a- Restricted Bandedge (worst case)			
Test Channel	band 4.50-5.15GHz	Polarity:	Horizontal (worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	4500.000	51.87	-6.92	44.95	74.00	-29.05	-	-	peak
2	4886.750	65.47	-5.90	59.57	74.00	-14.43	-	-	peak
3	5150.000	52.59	-5.33	47.26	74.00	-26.74	-	-	peak

802.11a- Restricted Bandedge (worst case)			
Test Channel	band 4.50-5.15GHz	Polarity:	Horizontal (worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	4500.000	39.89	-6.92	32.97	54.00	-21.03	-	-	AVG
2	4882.200	50.07	-5.92	44.15	54.00	-9.85	-	-	AVG
3	5150.000	40.63	-5.33	35.30	54.00	-18.70	-	-	AVG

Note: The Restricted Bandedge was tested in Horizontal /Vertical and the worst case position data was reported.

Remark: '-'Means' the test Degree and Height is not recorded by the test software and only show the worst case in the test report.

- For the frequency band 5.15-5.25GHz, 5.725-5.850GHz (802.11a)

- Antenna 0(worst case)
- Harmonics And Spurious Emissions

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5180MHz)							
10360	57.68	7.11	64.79	74.00	-9.21	H	PK
15540	34.44	8.22	42.66	54.00	-11.34	H	AV
10360	57.32	7.11	64.43	74.00	-9.57	V	PK
15540	38.62	8.22	46.84	54.00	-7.16	V	AV
Middle Channel (5200MHz)							
10400	55.74	7.22	62.96	74.00	-11.04	H	PK
15600	34.06	8.67	42.73	54.00	-11.27	H	AV
10400	54.45	7.22	61.67	74.00	-12.33	V	PK
15600	40.01	8.67	48.68	54.00	-5.32	V	AV
High Channel (5240MHz)							
10480	55.50	7.69	63.19	74.00	-10.81	H	PK
15720	37.75	8.93	46.68	54.00	-7.32	H	AV
10480	57.84	7.69	65.53	74.00	-8.47	V	PK
15720	37.95	8.93	46.88	54.00	-7.12	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5745MHz)							
11490	55.31	9.45	64.76	74.00	-9.24	H	PK
17235	32.71	10.36	43.07	54.00	-10.93	H	AV
11490	54.64	9.45	64.09	74.00	-9.91	V	PK
17235	37.30	10.36	47.66	54.00	-6.34	V	AV
Middle Channel (5785MHz)							
11570	59.00	9.62	68.62	74.00	-5.38	H	PK
17355	34.81	10.67	45.48	54.00	-8.52	H	AV
11570	57.11	9.62	66.73	74.00	-7.27	V	PK
17355	33.57	10.67	44.24	54.00	-9.76	V	AV
High Channel (5825MHz)							
11650	57.73	9.84	67.57	74.00	-6.43	H	PK
17475	34.48	10.95	45.43	54.00	-8.57	H	AV
11650	54.03	9.84	63.87	74.00	-10.13	V	PK
17475	36.43	10.95	47.38	54.00	-6.62	V	AV

- Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-35.92	-27
Highest	Above 5350	-44.46	-27
Note: the data just list the worst cases			

- Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5715	-40.14	-27
	5715 to 5725	-41.60	-17
Highest	5850 to 5860	-40.39	-17
	Above 5860	-42.62	-27
Note: the data just list the worst cases			

- For the frequency band 5.15-5.25GHz5.725-5.850GHz (802.11n HT20)
- Harmonics And Spurious Emissions

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5180MHz)							
10360	56.80	7.11	63.91	74.00	-10.09	H	PK
15540	38.75	8.22	46.97	54.00	-7.03	H	AV
10360	60.80	7.11	67.91	74.00	-6.09	V	PK
15540	38.20	8.22	46.42	54.00	-7.58	V	AV
Middle Channel (5200MHz)							
10400	55.77	7.22	62.99	74.00	-11.01	H	PK
15600	38.60	8.67	47.27	54.00	-6.73	H	AV
10400	58.07	7.22	65.29	74.00	-8.71	V	PK
15600	35.62	8.67	44.29	54.00	-9.71	V	AV
High Channel (5240MHz)							
10480	55.23	7.69	62.92	74.00	-11.08	H	PK
15720	36.50	8.93	45.43	54.00	-8.57	H	AV
10480	60.62	7.69	68.31	74.00	-5.69	V	PK
15720	39.36	8.93	48.29	54.00	-5.71	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5745MHz)							
11490	56.37	9.45	65.82	74.00	-8.18	H	PK
17235	35.35	10.36	45.71	54.00	-8.29	H	AV
11490	56.62	9.45	66.07	74.00	-7.93	V	PK
17235	34.83	10.36	45.19	54.00	-8.81	V	AV
Middle Channel (5785MHz)							
11570	56.42	9.62	66.04	74.00	-7.96	H	PK
17355	35.79	10.67	46.46	54.00	-7.54	H	AV
11570	56.61	9.62	66.23	74.00	-7.77	V	PK
17355	37.88	10.67	48.55	54.00	-5.45	V	AV
High Channel (5825MHz)							
11650	54.44	9.84	64.28	74.00	-9.72	H	PK
17475	36.40	10.95	47.35	54.00	-6.65	H	AV
11650	57.16	9.84	67.00	74.00	-7.00	V	PK
17475	35.80	10.95	46.75	54.00	-7.25	V	AV

- Out of Band edge 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-29.07	-27
Highest	Above 5350	-37.50	-27
Note: the data just list the worst cases.			

- Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5715	-45.07	-27
	5715 to 5725	-35.21	-17
Highest	5850 to 5860	-40.84	-17
	Above 5860	-40.90	-27
Note: the data just list the worst cases.			

Note: this EUT was tested in the low, high channel and the worst case position data was reported.

- For the frequency band 5.15-5.25GHz, 5.725-5.850GHz (802.11ax HE20)
- Harmonics And Spurious Emissions

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5180MHz)							
10360	55.97	7.11	63.08	74.00	-10.92	H	PK
15540	36.80	8.22	45.02	54.00	-8.98	H	AV
10360	56.32	7.11	63.43	74.00	-10.57	V	PK
15540	39.74	8.22	47.96	54.00	-6.04	V	AV
Middle Channel (5200MHz)							
10400	58.40	7.22	65.62	74.00	-8.38	H	PK
15600	36.80	8.67	45.47	54.00	-8.53	H	AV
10400	57.55	7.22	64.77	74.00	-9.23	V	PK
15600	36.53	8.67	45.20	54.00	-8.80	V	AV
High Channel (5240MHz)							
10480	54.26	7.69	61.95	74.00	-12.05	H	PK
15720	37.76	8.93	46.69	54.00	-7.31	H	AV
10480	58.34	7.69	66.03	74.00	-7.97	V	PK
15720	37.47	8.93	46.40	54.00	-7.60	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5745MHz)							
11490	58.34	9.45	67.79	74.00	-6.21	H	PK
17235	35.36	10.36	45.72	54.00	-8.28	H	AV
11490	54.54	9.45	63.99	74.00	-10.01	V	PK
17235	34.34	10.36	44.70	54.00	-9.30	V	AV
Middle Channel (5785MHz)							
11570	56.63	9.62	66.25	74.00	-7.75	H	PK
17355	36.36	10.67	47.03	54.00	-6.97	H	AV
11570	54.65	9.62	64.27	74.00	-9.73	V	PK
17355	35.30	10.67	45.97	54.00	-8.03	V	AV
High Channel (5825MHz)							
11650	55.20	9.84	65.04	74.00	-8.96	H	PK
17475	35.16	10.95	46.11	54.00	-7.89	H	AV
11650	57.68	9.84	67.52	74.00	-6.48	V	PK
17475	35.37	10.95	46.32	54.00	-7.68	V	AV

- Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-32.93	-27
Highest	Above 5350	-40.26	-27
Note: the data just list the worst cases.			

- Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5715	-46.19	-27
	5715 to 5725	-35.63	-17
Highest	5850 to 5860	-34.46	-17
	Above 5860	-43.34	-27
Note: the data just list the worst cases.			

- For the frequency band 5.15-5.25GHz, 5.725-5.850GHz (802.11n HT40)
- Harmonics And Spurious Emissions

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5190MHz)							
10380	56.63	7.25	63.88	74.00	-10.12	H	PK
15570	37.67	8.33	46.00	54.00	-8.00	H	AV
10380	58.57	7.25	65.82	74.00	-8.18	H	PK
15570	39.03	8.33	47.36	54.00	-6.64	H	AV
High Channel (5230MHz)							
10460	56.76	7.54	64.30	74.00	-9.70	H	PK
15690	37.71	8.86	46.57	54.00	-7.43	H	AV
10460	58.24	7.54	65.78	74.00	-8.22	H	PK
15690	37.34	8.86	46.20	54.00	-7.80	H	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5755MHz)							
11510	56.30	9.65	65.95	74.00	-8.05	H	PK
17265	36.34	10.87	47.21	54.00	-6.79	H	AV
11510	56.74	9.65	66.39	74.00	-7.61	H	PK
17265	36.67	10.87	47.54	54.00	-6.46	H	AV
High Channel (5795MHz)							
11590	56.56	9.81	66.37	74.00	-7.63	H	PK
17385	32.63	10.89	43.52	54.00	-10.48	H	AV
11590	57.86	9.81	67.67	74.00	-6.33	H	PK
17385	36.23	10.89	47.12	54.00	-6.88	H	AV

- Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-37.41	-27
Highest	Above 5350	-41.45	-27
Note: the data just list the worst cases.			

- Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5715	-40.58	-27
	5715 to 5725	-39.02	-17
Highest	5850 to 5860	-43.63	-17
	Above 5860	-42.83	-27
Note: the data just list the worst cases.			

- For the frequency band 5.15-5.25GHz, 5.725-5.850GHz (802.11ax HT40)
- Harmonics And Spurious Emissions

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5190MHz)							
10380	56.57	7.25	63.82	74.00	-10.18	H	PK
15570	38.56	8.33	46.89	54.00	-7.11	H	AV
10380	58.93	7.25	66.18	74.00	-7.82	V	PK
15570	37.47	8.33	45.80	54.00	-8.20	V	AV
High Channel (5230MHz)							
10460	58.76	7.54	66.30	74.00	-7.70	H	PK
15690	38.02	8.86	46.88	54.00	-7.12	H	AV
10460	60.90	7.54	68.44	74.00	-5.56	V	PK
15690	37.01	8.86	45.87	54.00	-8.13	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5755MHz)							
11510	53.95	9.65	63.60	74.00	-10.40	H	PK
17265	34.49	10.87	45.36	54.00	-8.64	H	AV
11510	56.11	9.65	65.76	74.00	-8.24	V	PK
17265	37.23	10.87	48.10	54.00	-5.90	V	AV
High Channel (5795MHz)							
11590	56.78	9.81	66.59	74.00	-7.41	H	PK
17385	33.48	10.89	44.37	54.00	-9.63	H	AV
11590	56.22	9.81	66.03	74.00	-7.97	V	PK
17385	35.68	10.89	46.57	54.00	-7.43	V	AV

- Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-35.86	-27
Highest	Above 5350	-40.93	-27
Note: the data just list the worst cases			

- Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5715	-39.18	-27
	5715 to 5725	-37.43	-17
Highest	5850 to 5860	-42.57	-17
	Above 5860	-44.11	-27
Note: the data just list the worst cases			

- For the frequency band 5.15-5.25GHz, 5.725-5.850GHz (802.11ac VH80)
- Harmonics And Spurious Emissions

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
5210MHz							
10420	59.55	7.33	66.88	74.00	-7.12	H	PK
15630	36.74	8.75	45.49	54.00	-8.51	H	AV
10420	57.47	7.33	64.80	74.00	-9.20	V	PK
15630	36.73	8.75	45.48	54.00	-8.52	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
5775MHz							
11550	54.35	9.54	63.89	74.00	-10.11	H	PK
17325	35.25	10.59	45.84	54.00	-8.16	H	AV
11550	58.35	9.54	67.89	74.00	-6.11	V	PK
17325	34.60	10.59	45.19	54.00	-8.81	V	AV

- Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-35.85	-27
Highest	Above 5350	-33.04	-27
Note: the data just list the worst cases			

- Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5715	-46.13	-27
	5715 to 5725	-31.58	-17
Highest	5850 to 5860	-30.99	-17
	Above 5860	-39.69	-27
Note: the data just list the worst cases			

- For the frequency band 5.15-5.25GHz, 5.725-5.850GHz (802.11ax HE80)
- Harmonics And Spurious Emissions

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
5210MHz							
10420	59.28	7.33	66.61	74.00	-7.39	H	PK
15630	34.96	8.75	43.71	54.00	-10.29	H	AV
10420	58.30	7.33	65.63	74.00	-8.37	V	PK
15630	36.28	8.75	45.03	54.00	-8.97	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
5775MHz							
11550	54.48	9.54	64.02	74.00	-9.98	H	PK
17325	37.93	10.59	48.52	54.00	-5.48	H	AV
11550	55.51	9.54	65.05	74.00	-8.95	V	PK
17325	35.09	10.59	45.68	54.00	-8.32	V	AV

- Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-34.32	-27
Highest	Above 5350	-30.88	-27
Note: the data just list the worst cases			

- Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5715	-42.88	-27
	5715 to 5725	-29.43	-17
Highest	5850 to 5860	-30.75	-17
	Above 5860	-40.49	-27
Note: the data just list the worst cases			

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

9. Frequency Stability

9.1 Standard Applicable

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

9.2 Test Procedure

According to §2.1055, the following test procedure was performed.
The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.
The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode.

9.3 Summary of Test Results/Plots

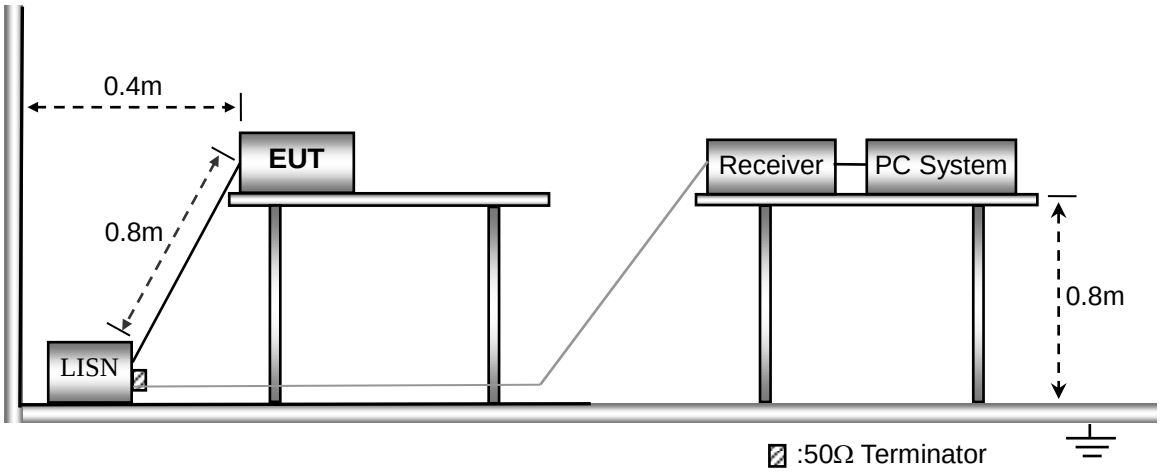
Please refer to Appendix D

10 Conducted Emissions

10.1 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle.
The spacing between the peripherals was 10cm.

10.2 Basic Test Setup Block Diagram



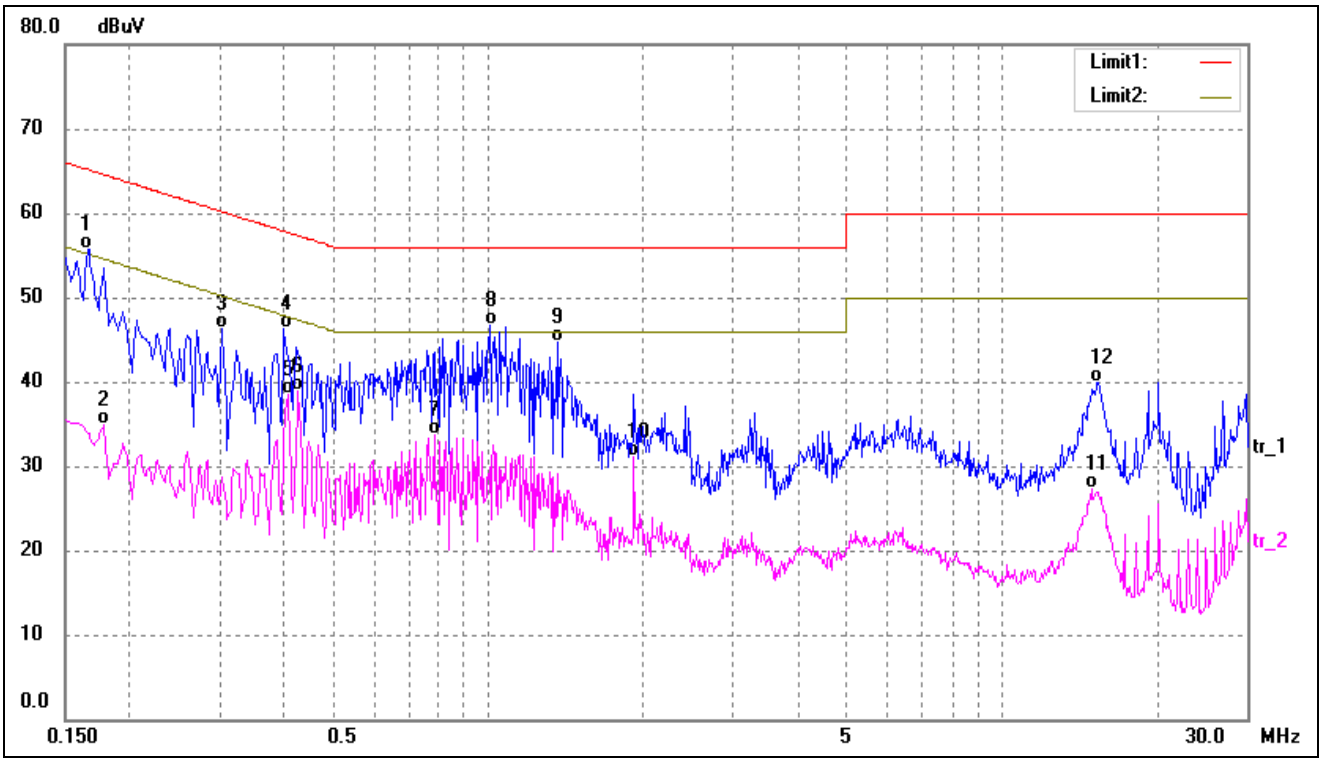
10.3 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency 150kHz
Stop Frequency 30MHz
Sweep Speed ..... Auto
IF Bandwidth..... 10kHz
Quasi-Peak Adapter Bandwidth 9kHz
Quasi-Peak Adapter Mode ..... Normal

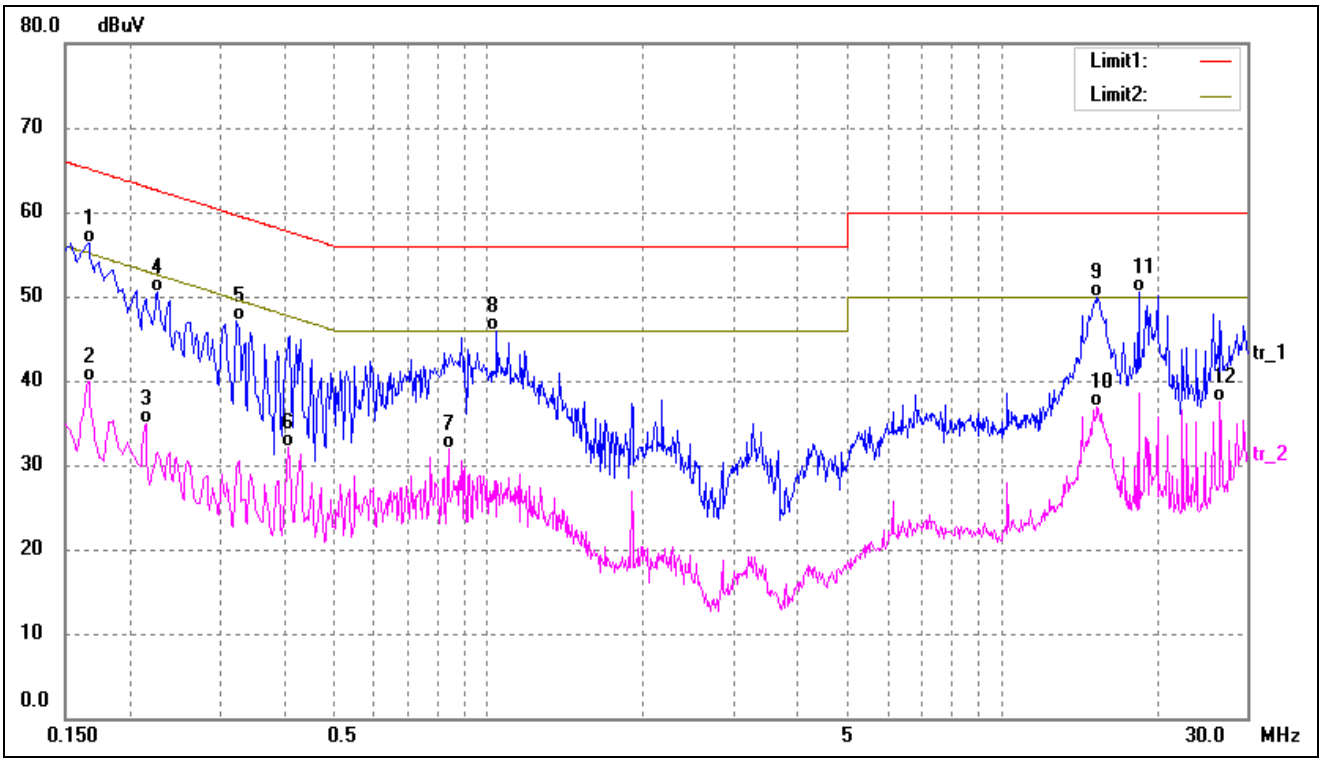
10.4 Summary of Test Results/Plots

Test Mode	Communication	AC120V 60Hz	Polarity:	Neutral



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	
1	0.1660	45.41	10.37	55.78	65.15	-9.37	QP
2	0.1780	24.53	10.37	34.90	54.57	-19.67	AVG
3	0.3020	35.93	10.34	46.27	60.19	-13.92	QP
4	0.3980	36.09	10.29	46.38	57.89	-11.51	QP
5	0.4060	28.24	10.29	38.53	47.73	-9.20	AVG
6*	0.4260	28.62	10.28	38.90	47.33	-8.43	AVG
7	0.7860	23.35	10.43	33.78	46.00	-12.22	AVG
8	1.0100	36.18	10.56	46.74	56.00	-9.26	QP
9	1.3619	34.23	10.41	44.64	56.00	-11.36	QP
10	1.9260	20.87	10.16	31.03	46.00	-14.97	AVG
11	14.9100	17.24	10.15	27.39	50.00	-22.61	AVG
12	15.4140	29.76	10.16	39.92	60.00	-20.08	QP

Test Mode	Communication	AC120V 60Hz	Polarity:	Line



No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	
1*	0.1660	45.97	10.37	56.34	65.15	-8.81	QP
2	0.1660	29.59	10.37	39.96	55.15	-15.19	AVG
3	0.2140	24.44	10.37	34.81	53.04	-18.23	AVG
4	0.2260	40.08	10.36	50.44	62.59	-12.15	QP
5	0.3220	36.69	10.33	47.02	59.65	-12.63	QP
6	0.4060	21.79	10.29	32.08	47.73	-15.65	AVG
7	0.8380	21.50	10.46	31.96	46.00	-14.04	AVG
8	1.0420	35.34	10.54	45.88	56.00	-10.12	QP
9	15.3060	39.80	10.16	49.96	60.00	-10.04	QP
10	15.3700	26.73	10.16	36.89	50.00	-13.11	AVG
11	18.4300	40.30	10.22	50.52	60.00	-9.48	QP
12	26.6220	27.33	10.22	37.55	50.00	-12.45	AVG

APPENDIX SUMMARY

Project No.	WTH22X02020563W	Test Engineer	Gala
Start date	2022/3/8	Finish date	2022/3/8
Temperature	23℃	Humidity	45%
RF specifications	U-NII		

APPENDIX	Description of Test Item	Result
A	Power Spectral Density	Compliant
B	Emission Bandwidth and Occupied Bandwidth	Compliant
C	Maximum Conducted Output Power	Compliant
D	Frequency Stability	Compliant

APPENDIX A

Power Spectral Density					
U-NII-1:5150-5250MHz					
Operating mode	Test Channel	ANT 0 dBm/MHz	ANT 1 dBm/MHz	Total dBm/MHz	Limit (dBm/MHz)
802.11a	5180	5.812	6.116	/	11
	5200	6.161	5.441	/	11
	5240	5.718	5.520	/	11
802.11n-HT20	5180	3.598	3.659	6.639	11
	5200	3.793	3.636	6.726	11
	5240	4.189	3.932	7.073	11
802.11n-HT40	5190	-0.670	-0.667	2.342	11
	5230	-0.641	-0.808	2.287	11
802.11ac-HT80	5210	-4.210	-4.852	-1.509	11
802.11n-AX20	5180	2.129	1.881	5.017	11
	5200	1.588	1.983	4.800	11
	5240	2.045	2.163	5.115	11
802.11n-AX40	5190	-2.540	-2.756	0.364	11
	5230	-2.664	-3.187	0.093	11
802.11ac-AX80	5210	-5.925	-5.840	-2.872	11

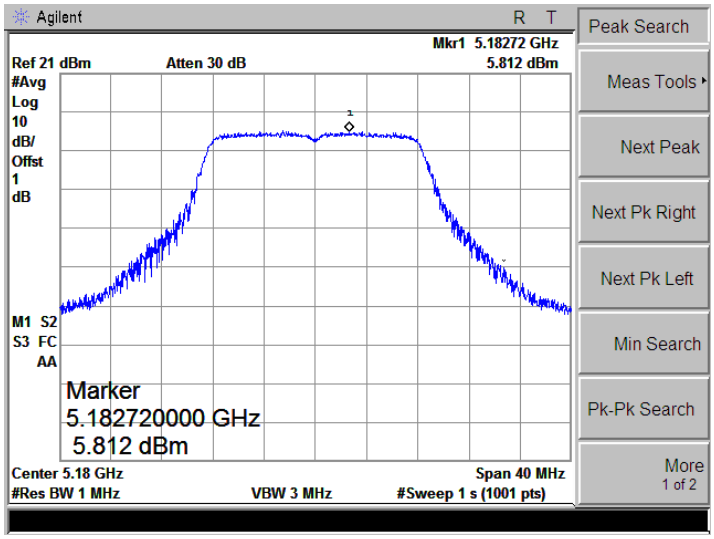
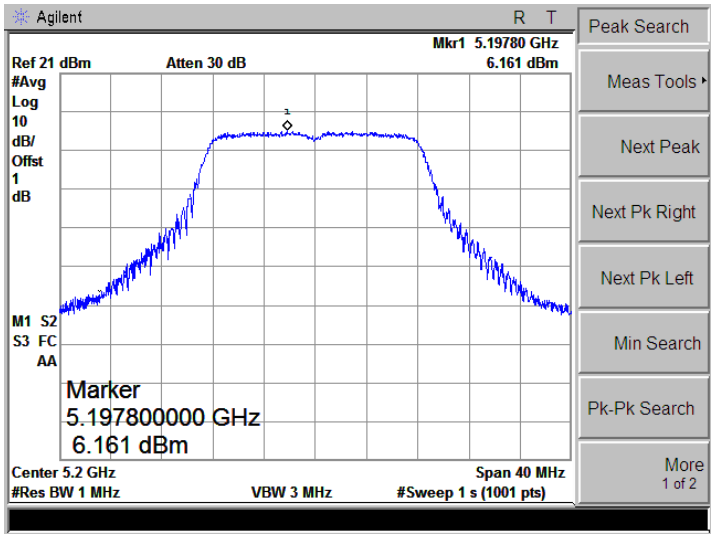
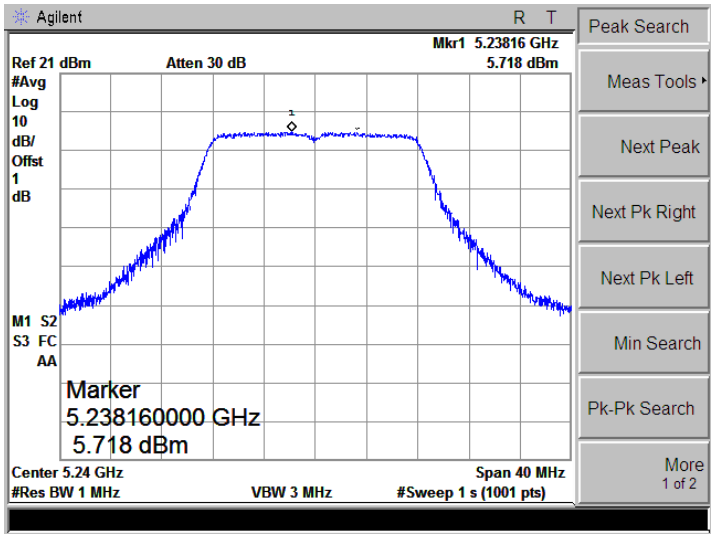
Power Spectral Density							
U-NII-3: 5725-5850MHz							
Operating mode	Test Channel	ANT 0 dBm/300kHz	ANT 1 dBm/300kHz	Factor	ANT 0 dBm/500kHz*	ANT 1 dBm/500kHz*	Limit dBm/500kHz
802.11a	5745	0.633	0.386	2.22	2.853	2.606	30
	5785	0.376	-0.096	2.22	2.596	2.124	30
	5825	0.371	-0.026	2.22	2.591	2.194	30
*Note: Factor=10log(500kHz/300kHz)=2.22							
*Note: Maximum PSD=PSD(dBm/300kHz)+10log(500kHz/300kHz)							

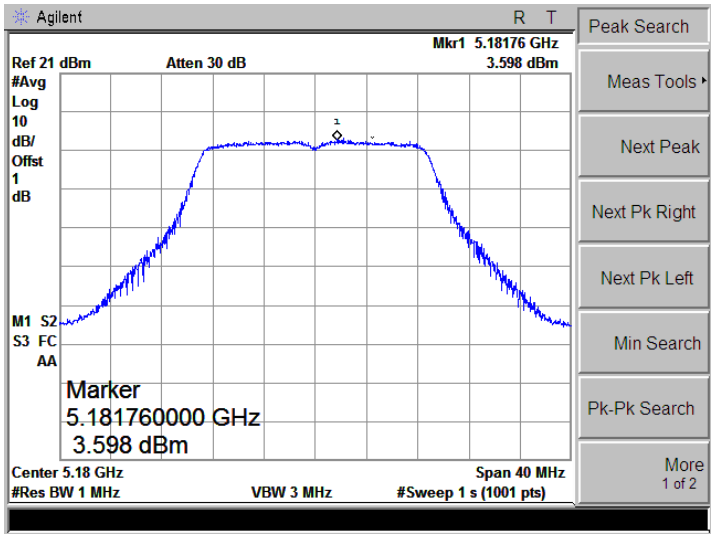
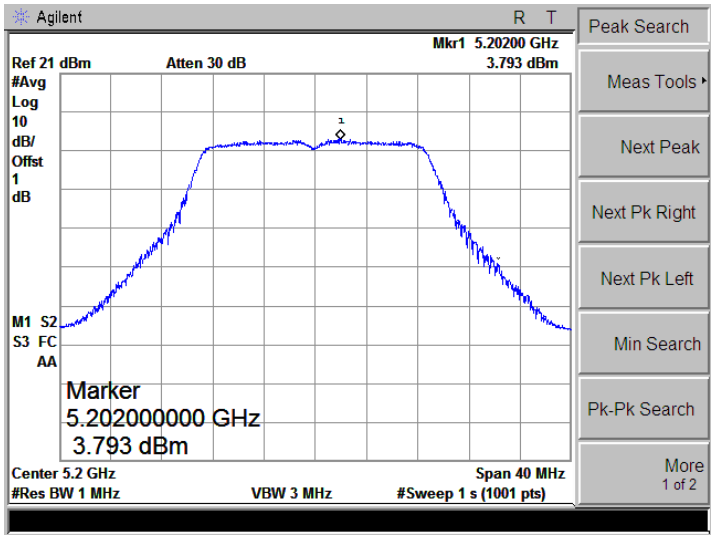
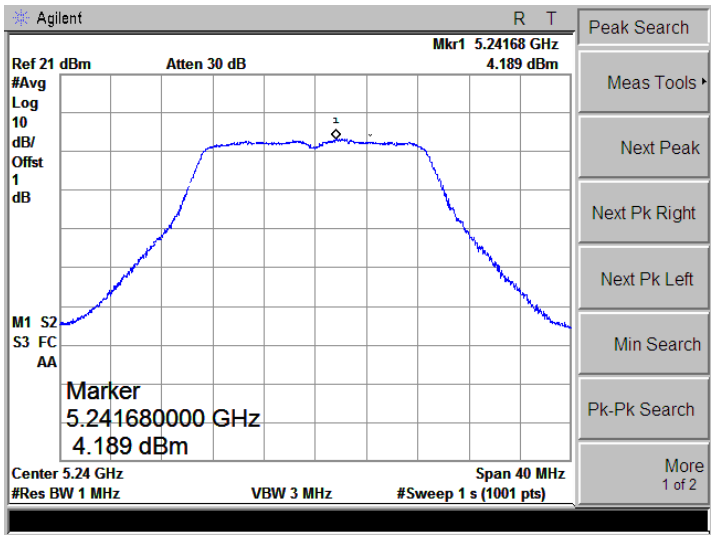
Power Spectral Density						
U-NII-3: 5725-5850MHz						
Operating mode	Test Channel	ANT 0 dBm/300kHz	ANT 1 dBm/300kHz	Factor	Total dBm/500kHz*	Limit dBm/500kHz
802.11n-HT20	5745	-1.359	-1.462	2.22	3.820	30
	5785	-1.510	-2.020	2.22	3.473	30
	5825	-1.653	-2.182	2.22	3.321	30

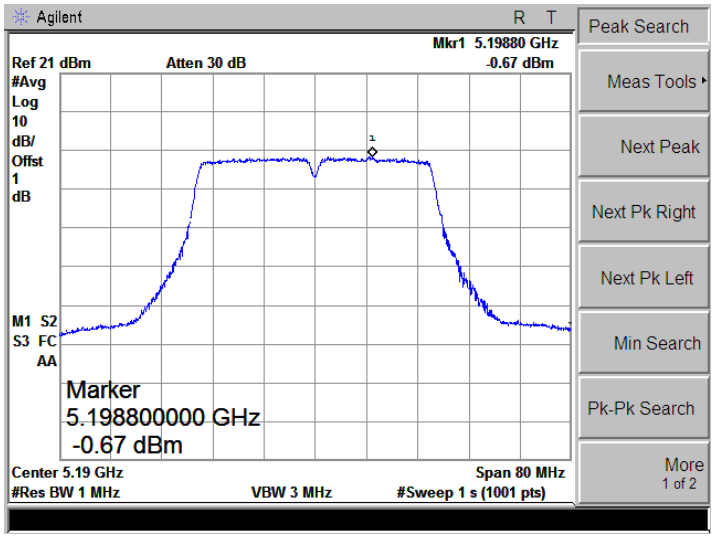
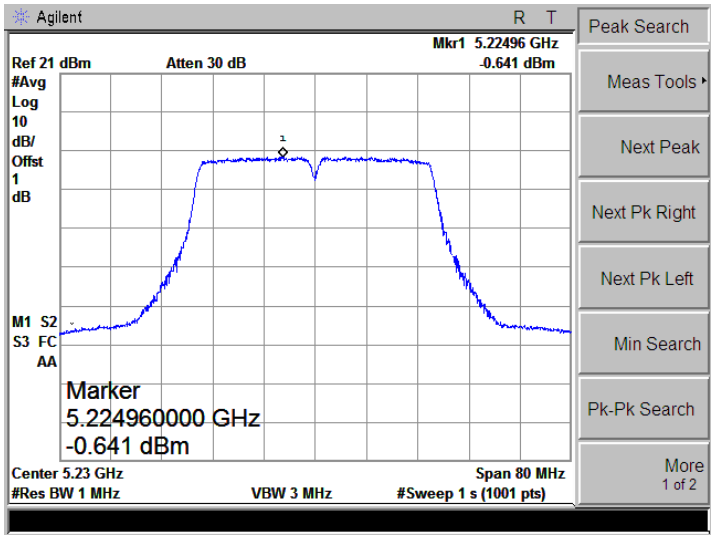
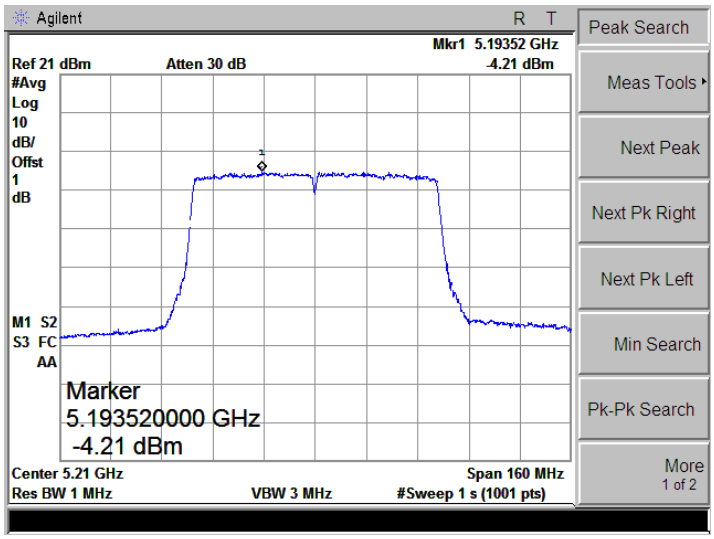
802.11n HT40	5755	-5.481	-5.278	2.22	-0.148	30
	5795	-6.557	-5.792	2.22	-0.927	30
802.11ac VH80	5775	-10.140	-10.520	2.22	-5.096	30
802.11n-AX20	5745	-1.681	-1.681	2.22	3.549	30
	5785	-2.616	-2.616	2.22	2.614	30
	5825	-2.418	-2.418	2.22	2.812	30
802.11n AX40	5755	-6.365	-6.365	2.22	-1.135	30
	5795	-7.150	-7.150	2.22	-1.920	30
802.11ac AX80	5775	-9.309	-9.309	2.22	-4.079	30
*Note: Factor=10log(500kHz/300kHz)=2.22 *Note: Maximum PSD=PSD(dBm/300kHz)+10log(500kHz/300kHz)						

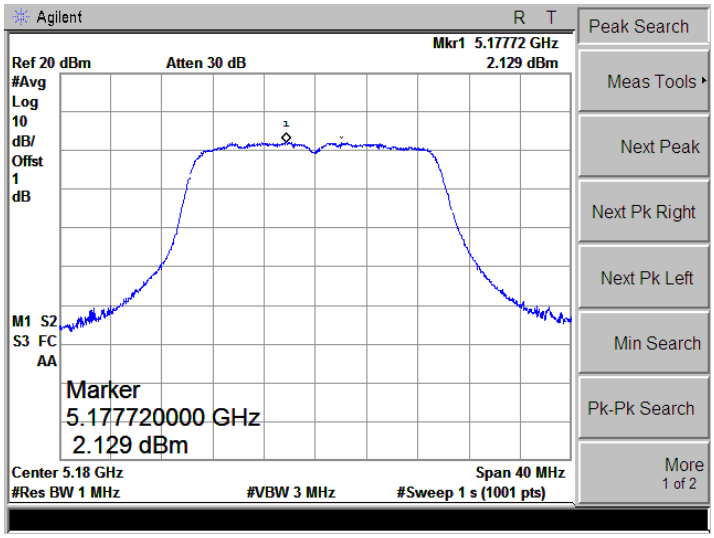
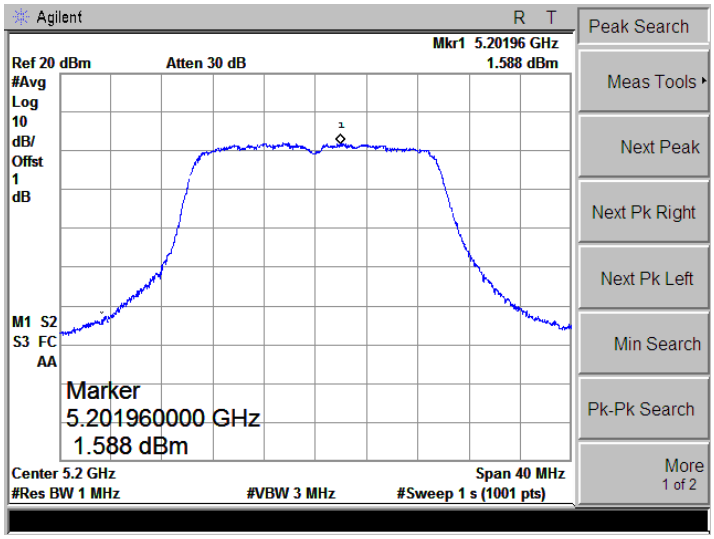
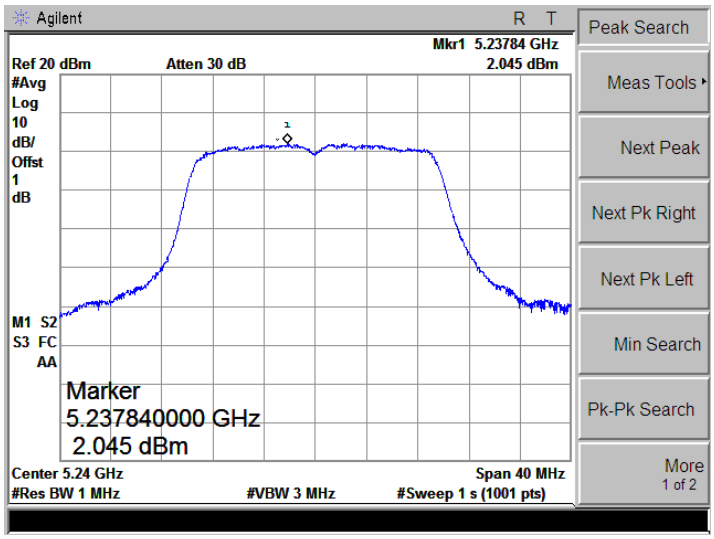
ANT 0

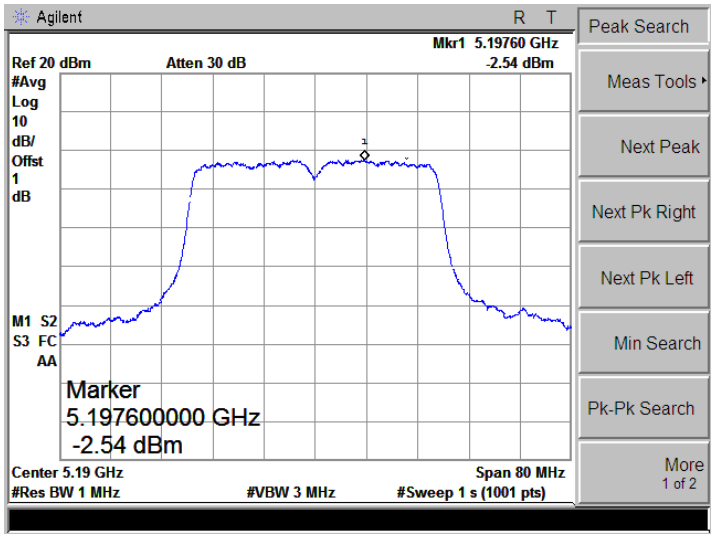
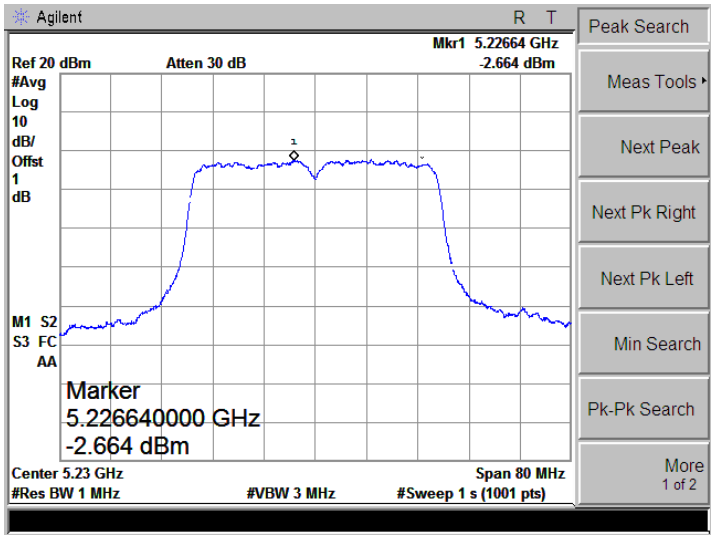
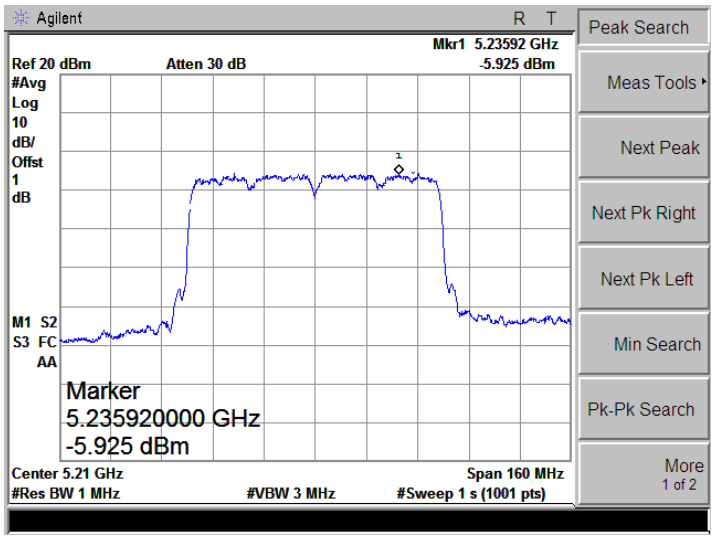
5150-5250MHz

802.11a-Low	
802.11a-Middle	
802.11a-High	

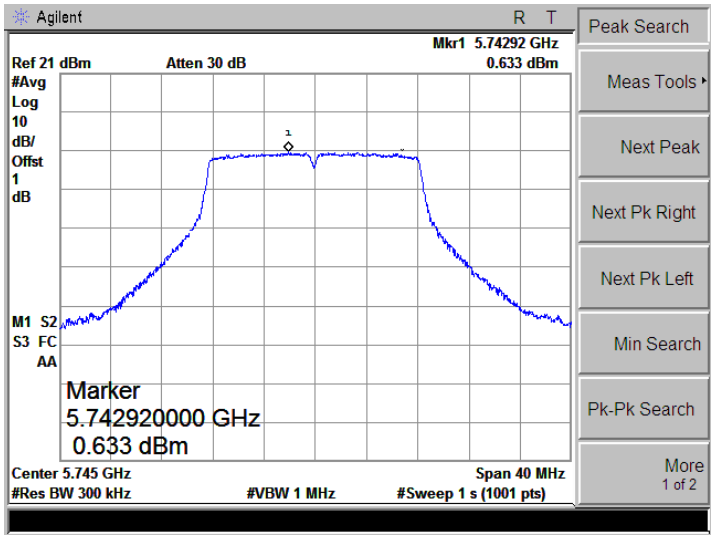
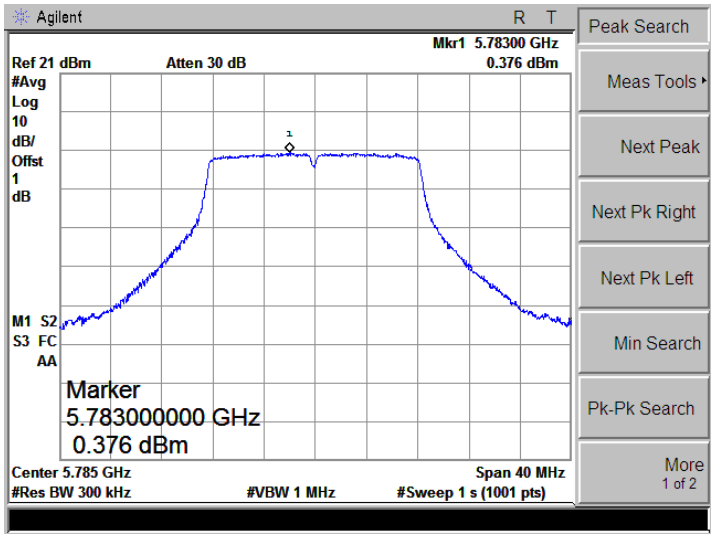
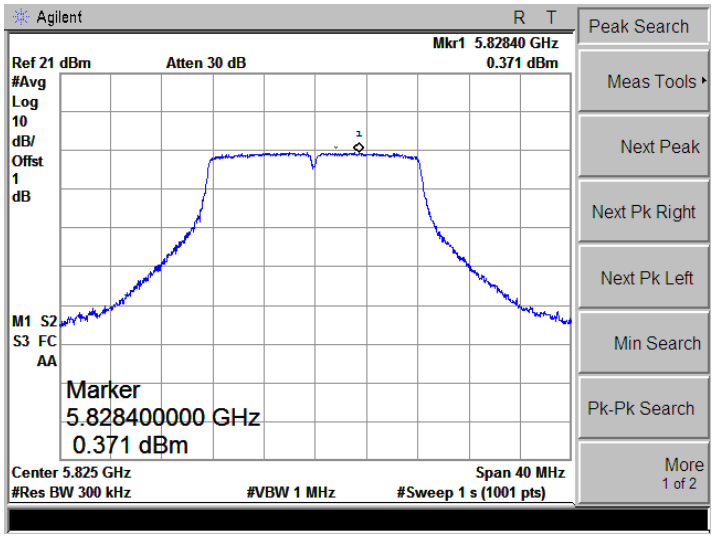
802.11n-HT20-Low	
802.11n-HT20-Middle	
802.11n-HT20-High	

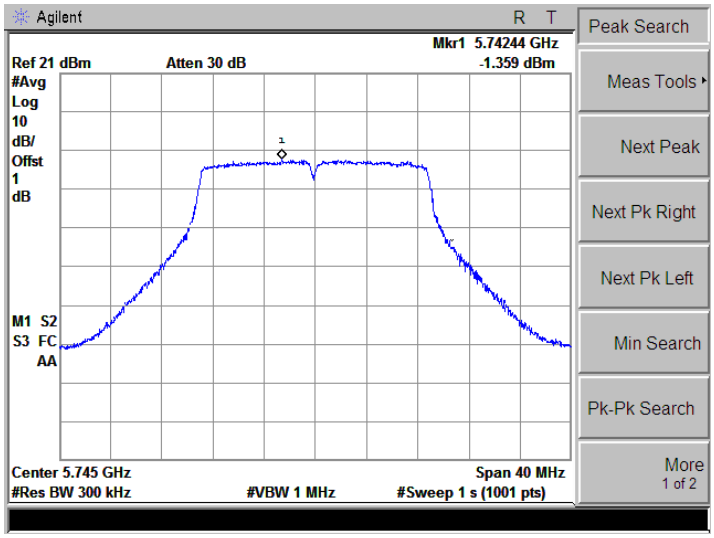
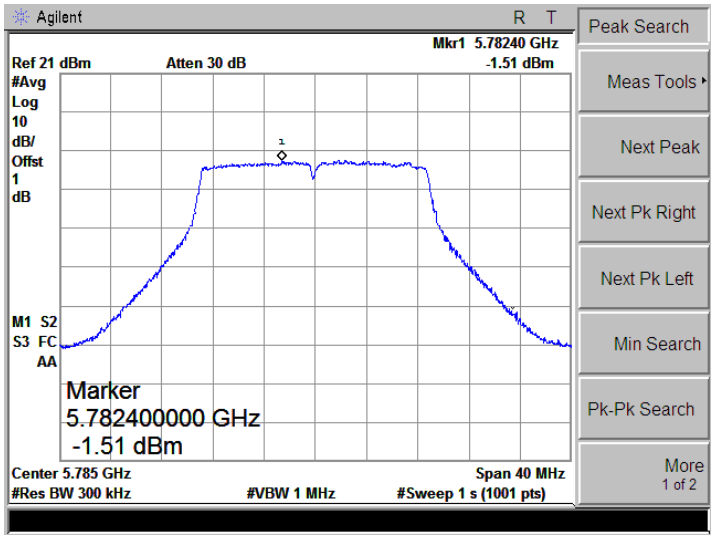
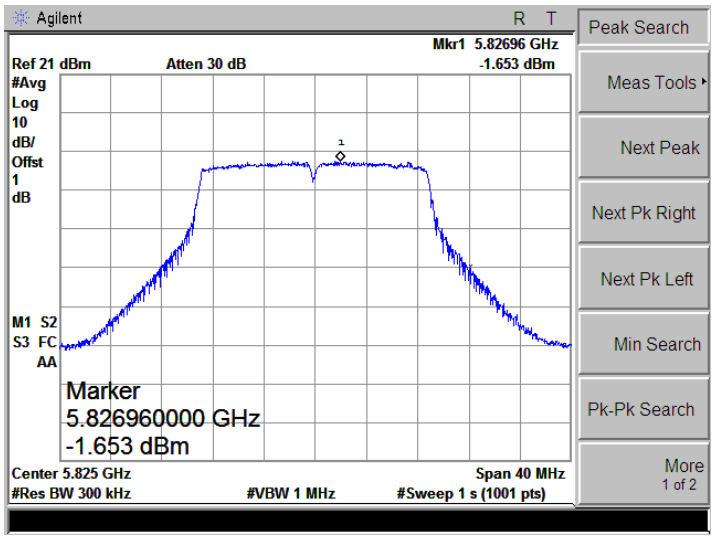
802.11n-HT40-Low	
802.11n-HT40-High	
802.11ac-HT80	

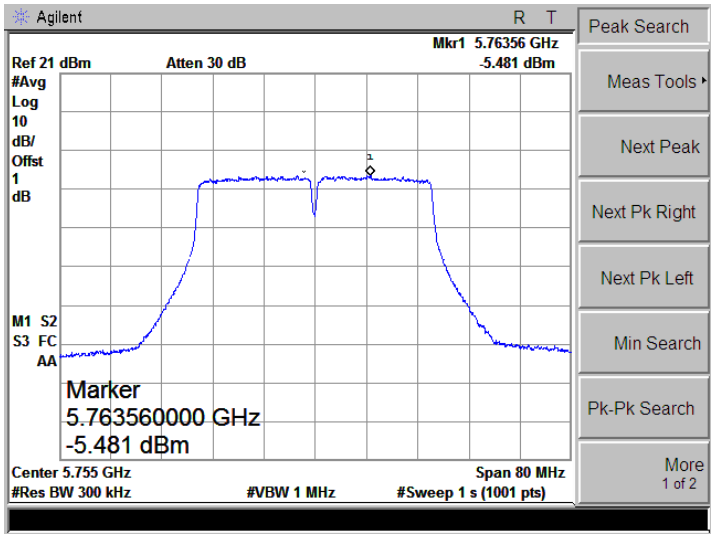
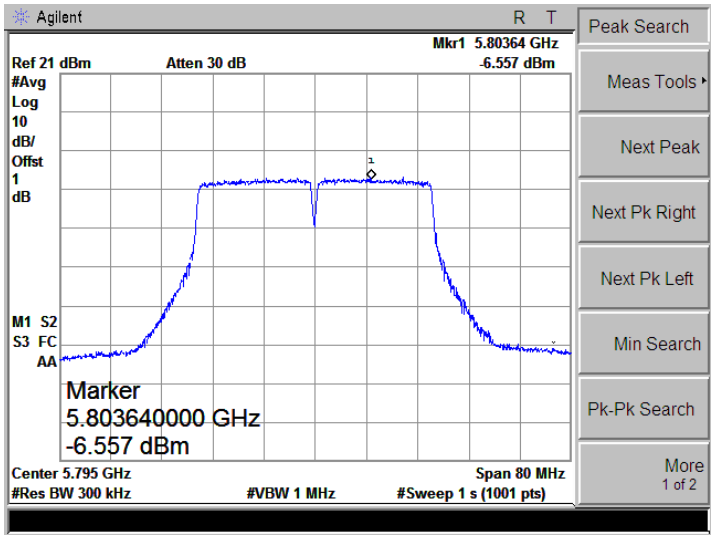
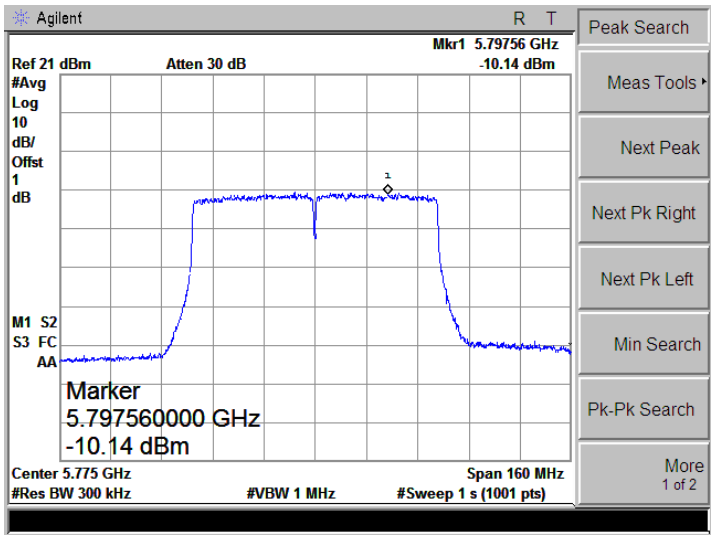
802.11n-AX20-Low	
802.11n-AX20-Middle	
802.11n-AX20-High	

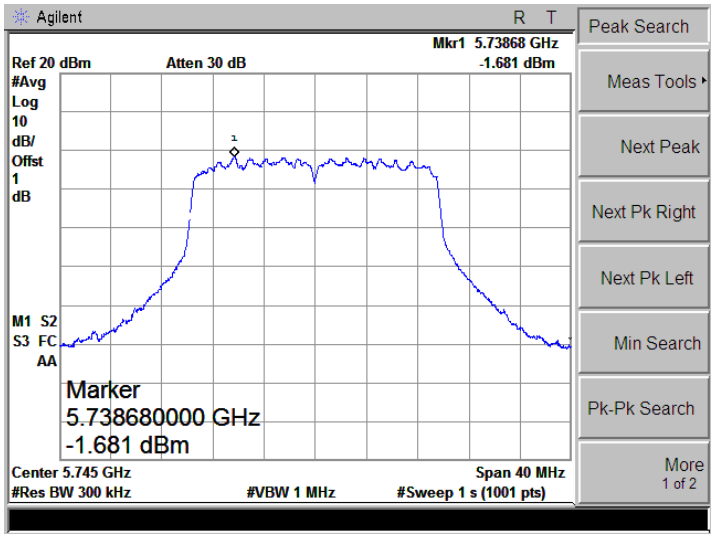
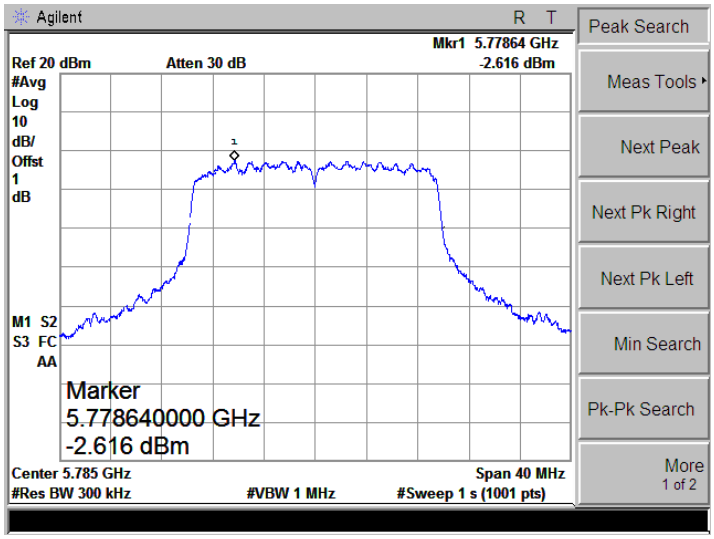
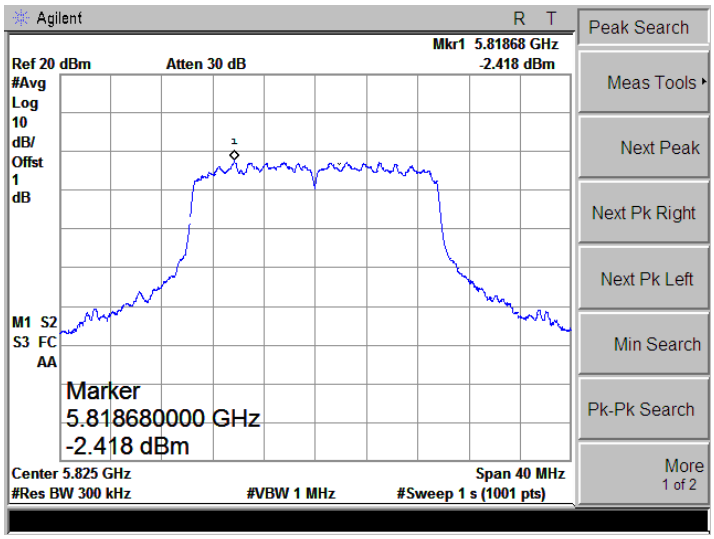
802.11n-AX40-Low	
802.11n-AX40-High	
802.11ac-AX80	

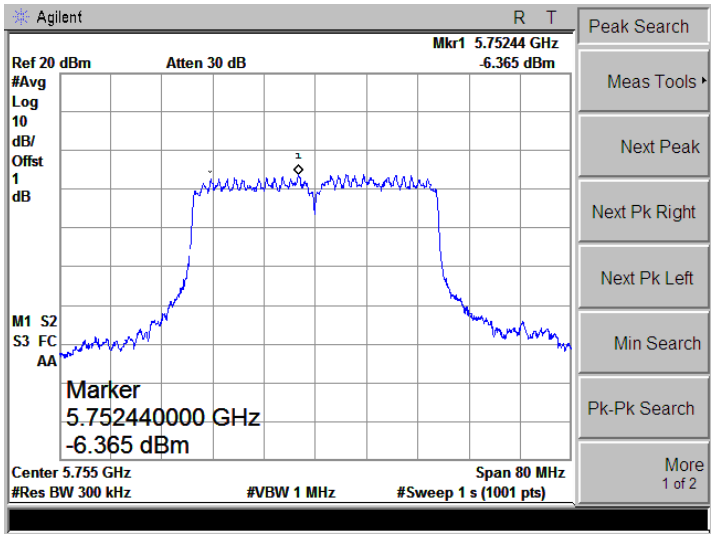
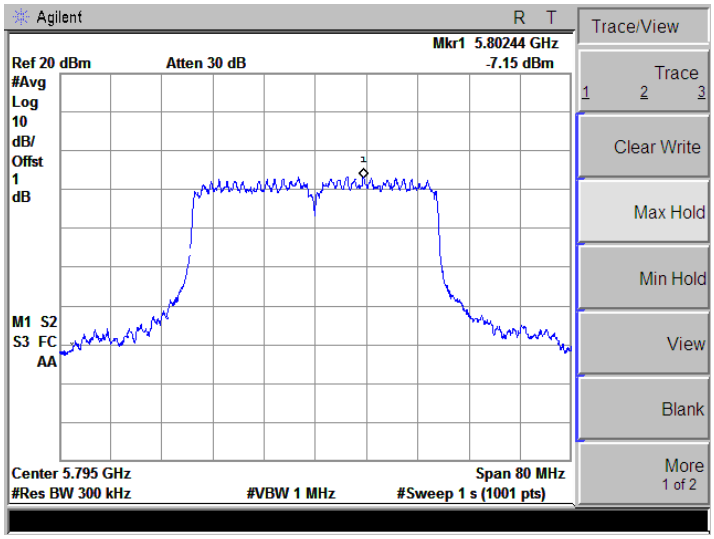
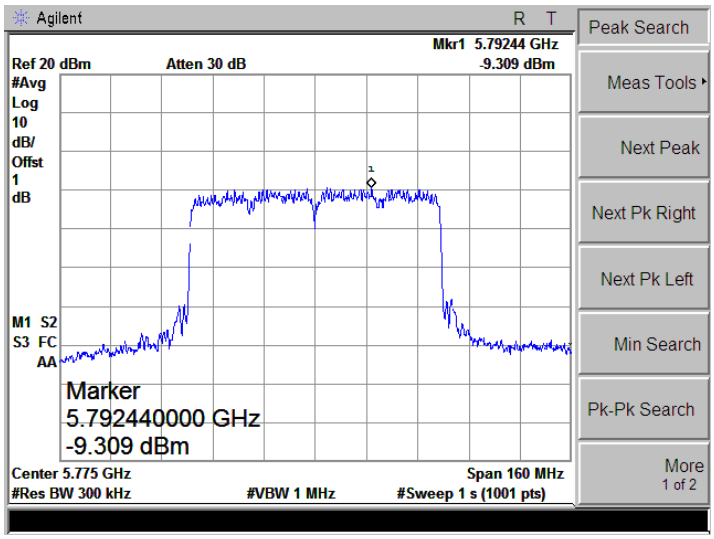
5725-5850MHz

802.11a-Low	
802.11a-Middle	
802.11a-High	

802.11n-HT20-Low	
802.11n-HT20-Middle	
802.11n-HT20-High	

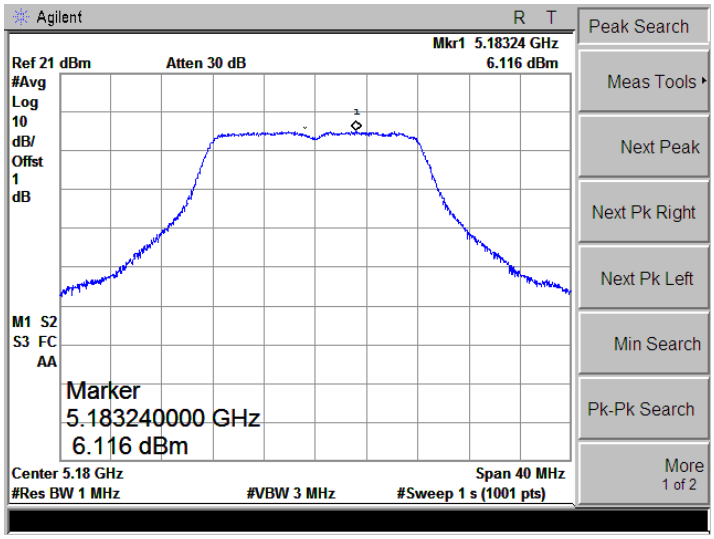
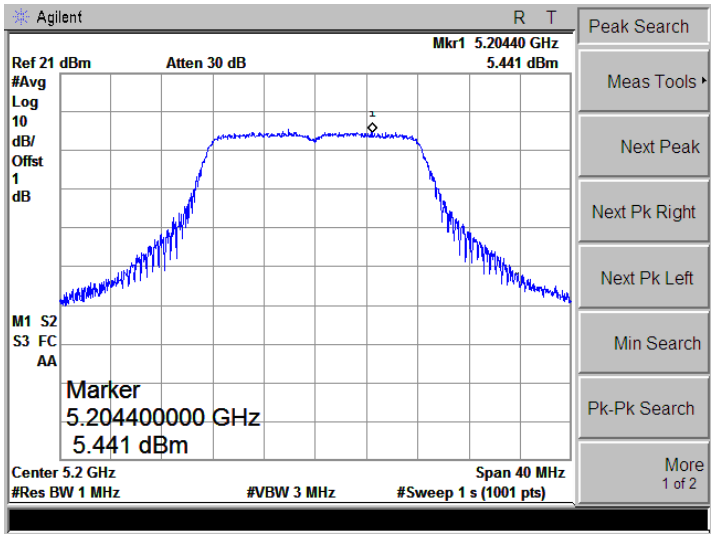
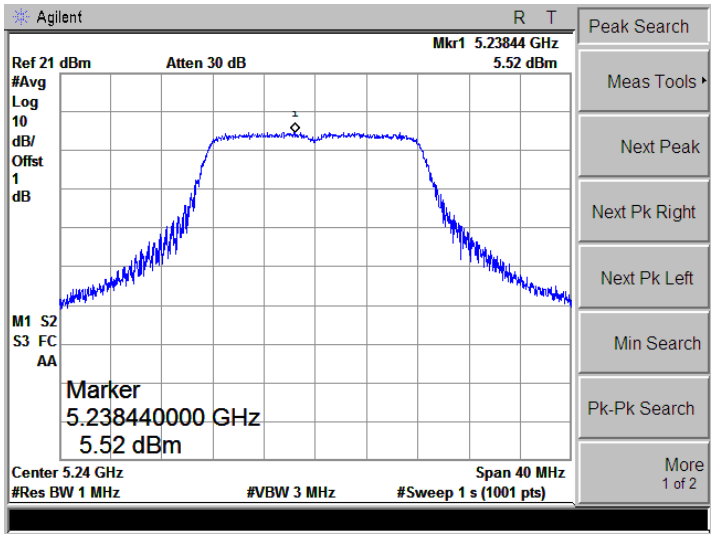
802.11n-HT40-Low	
802.11n-HT40-High	
802.11ac-HT80	

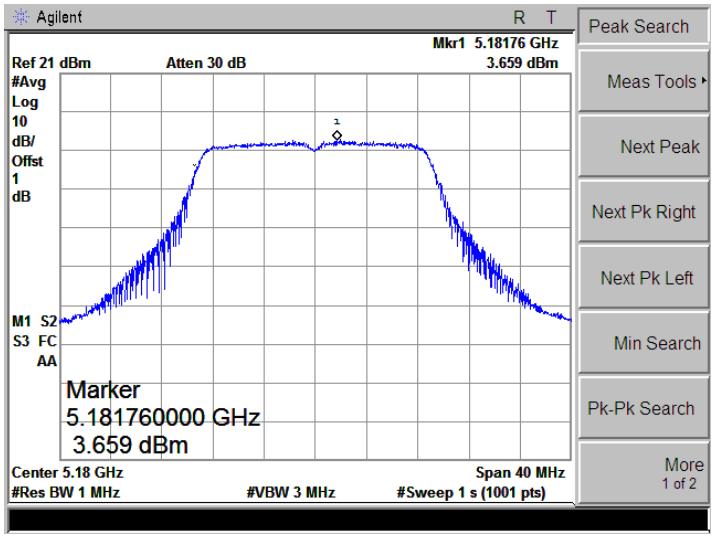
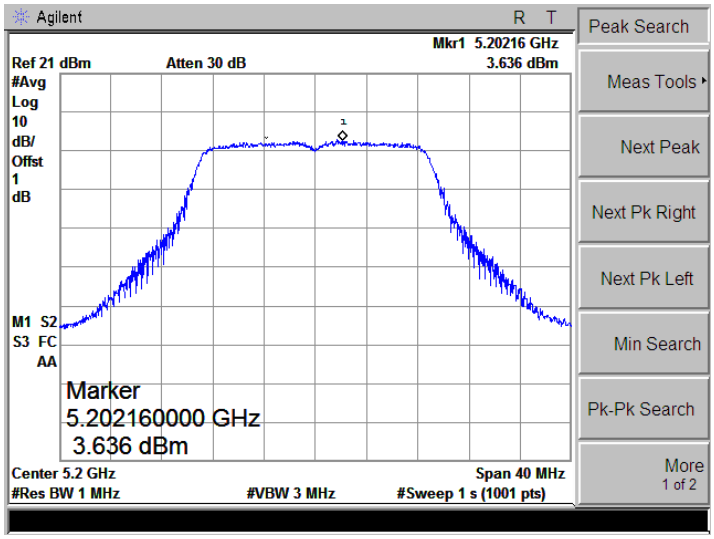
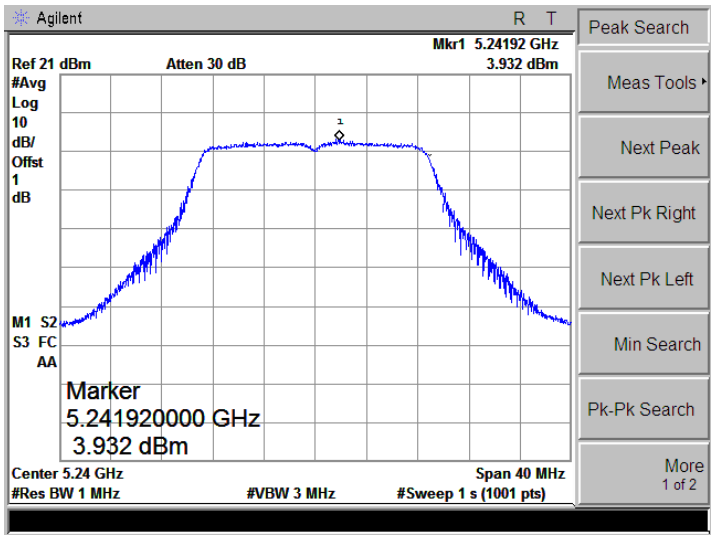
802.11n-AX20-Low	
802.11n-AX20-Middle	
802.11n-AX20-High	

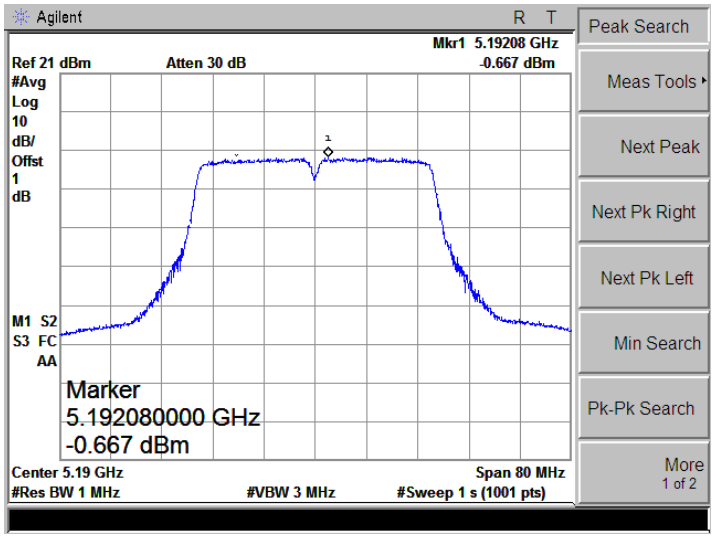
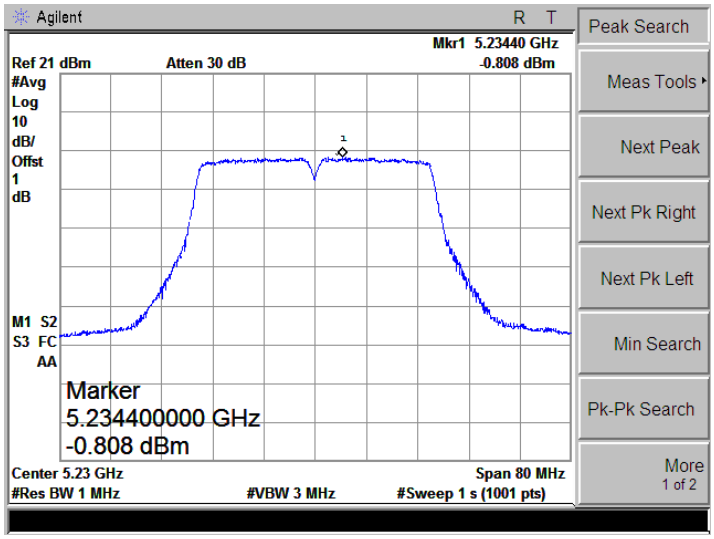
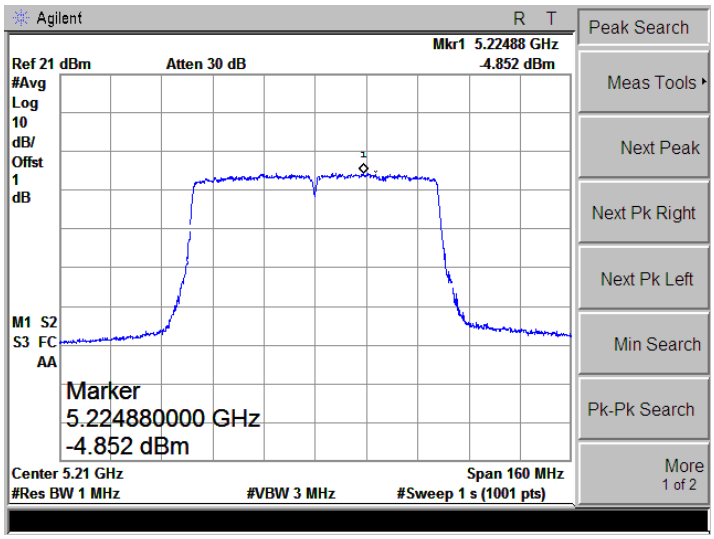
802.11n-AX40-Low	
802.11n-AX40-High	
802.11ac-AX80	

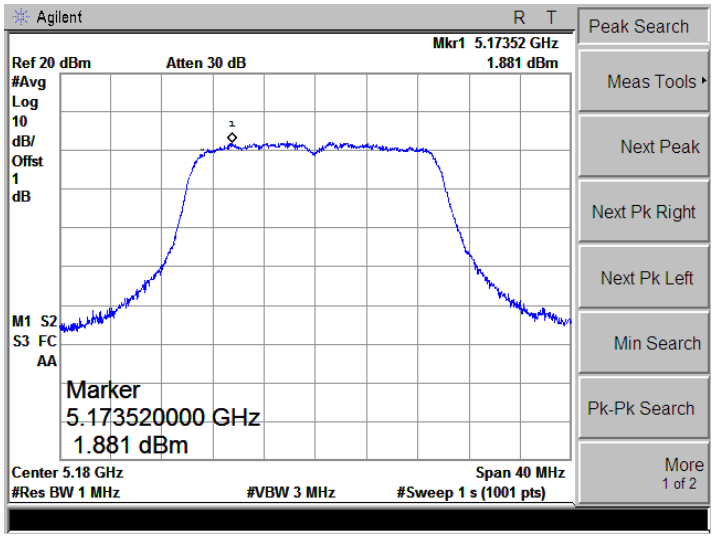
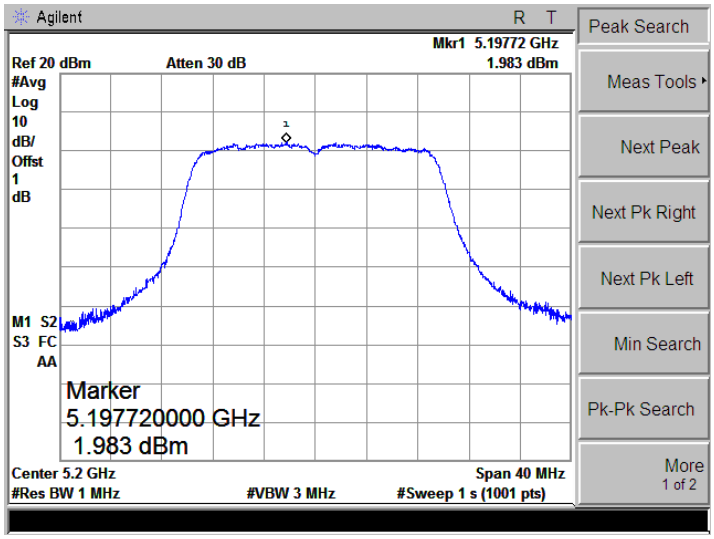
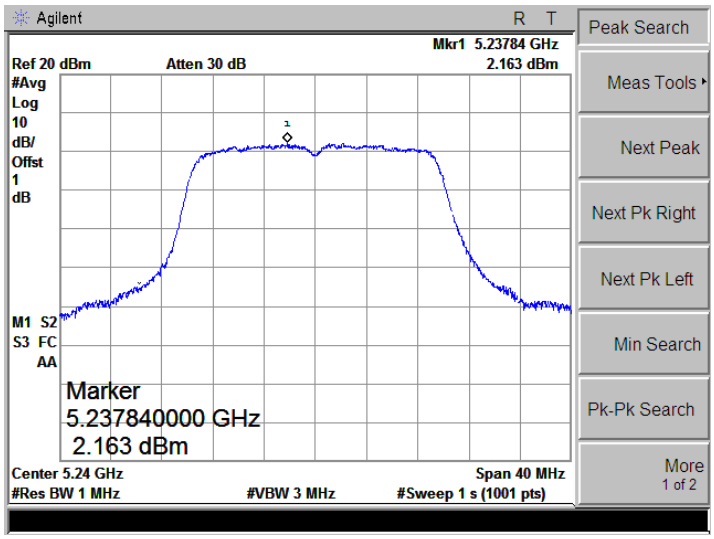
ANT 1

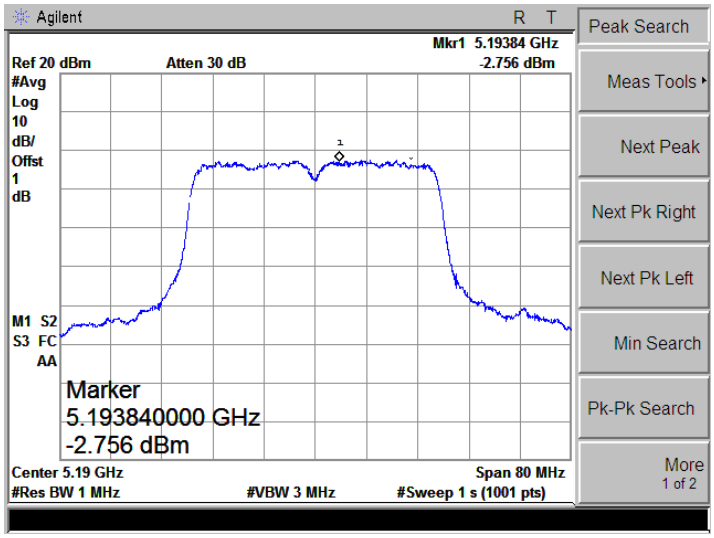
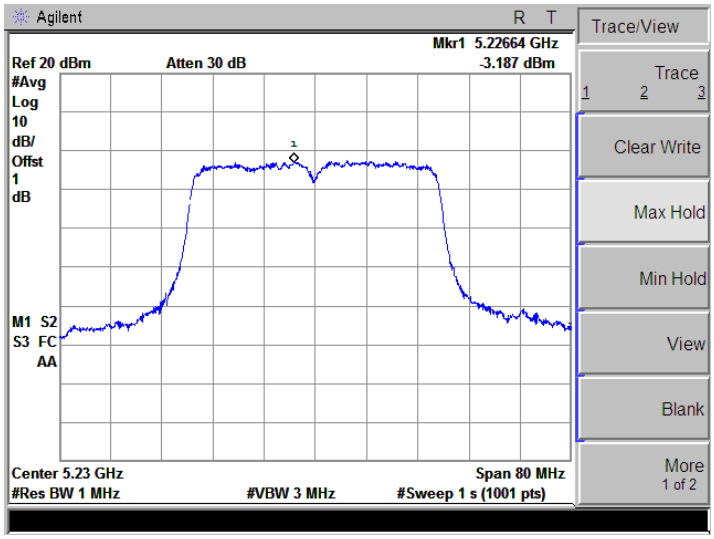
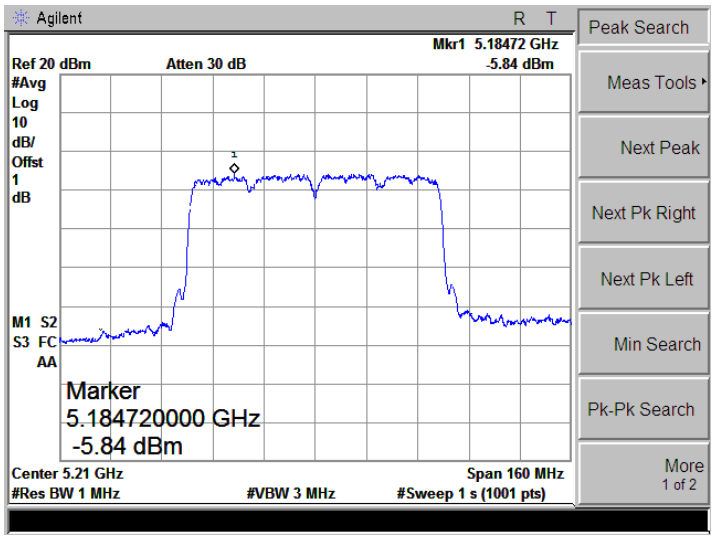
5150-5250MHz

802.11a-Low	
802.11a-Middle	
802.11a-High	

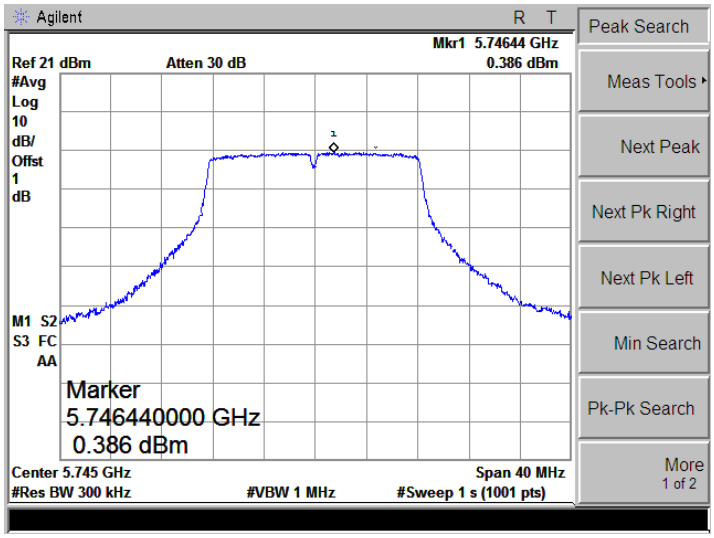
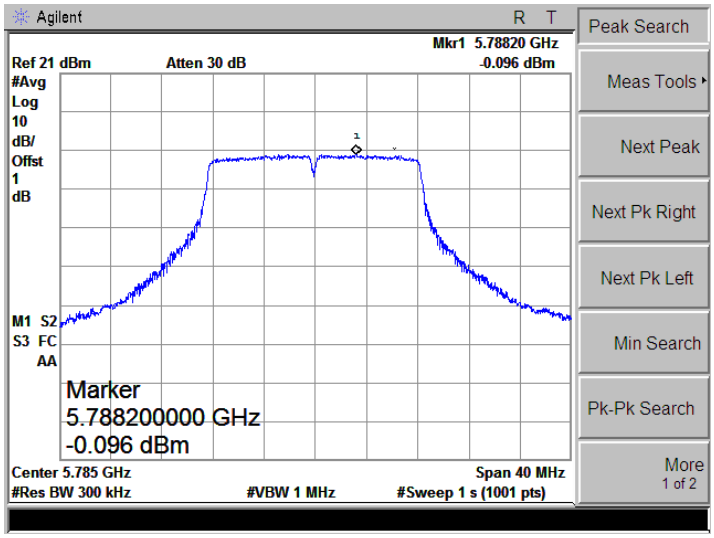
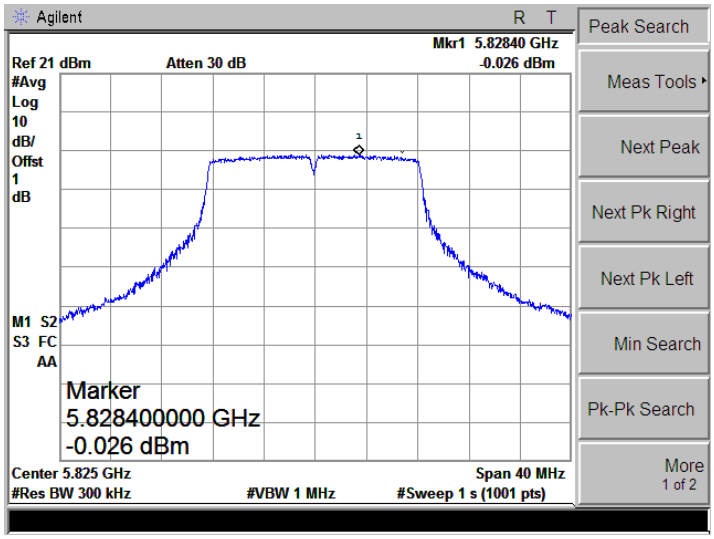
802.11n-HT20-Low	
802.11n-HT20-Middle	
802.11n-HT20-High	

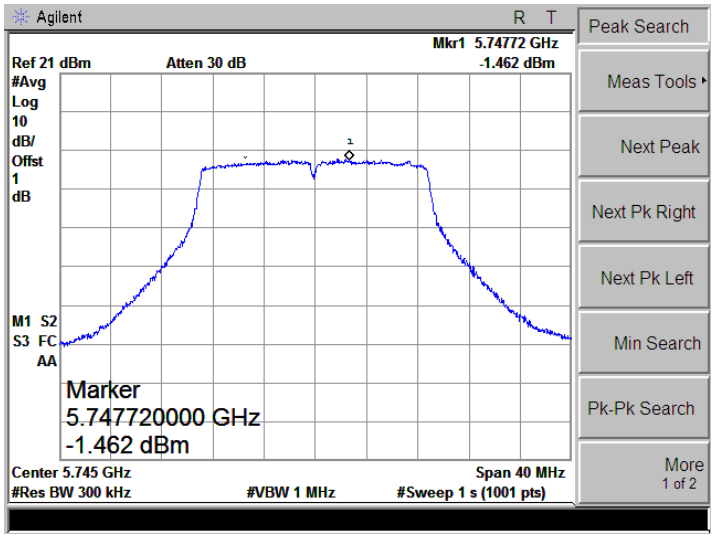
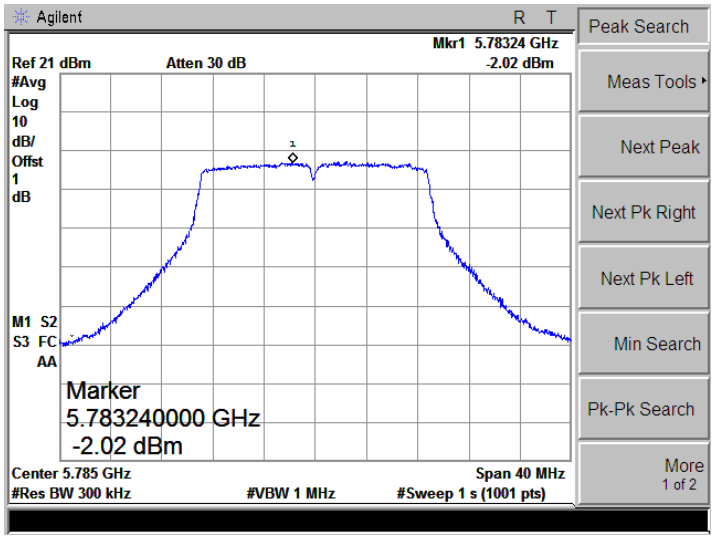
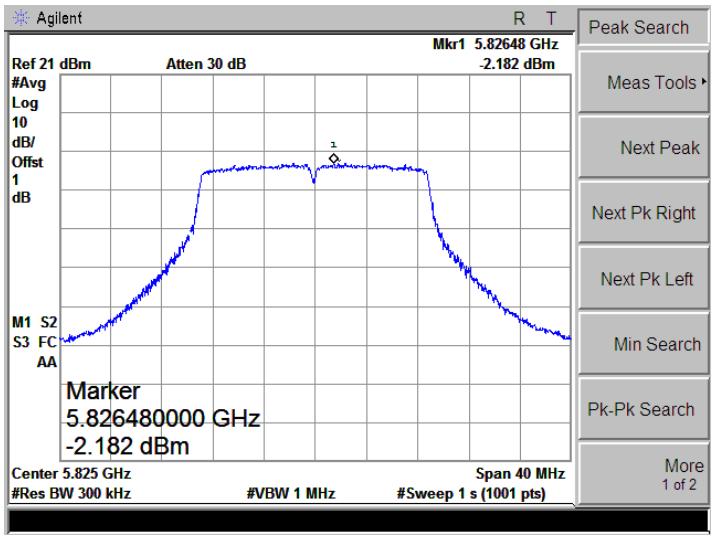
802.11n-HT40-Low	
802.11n-HT40-High	
802.11ac-HT80	

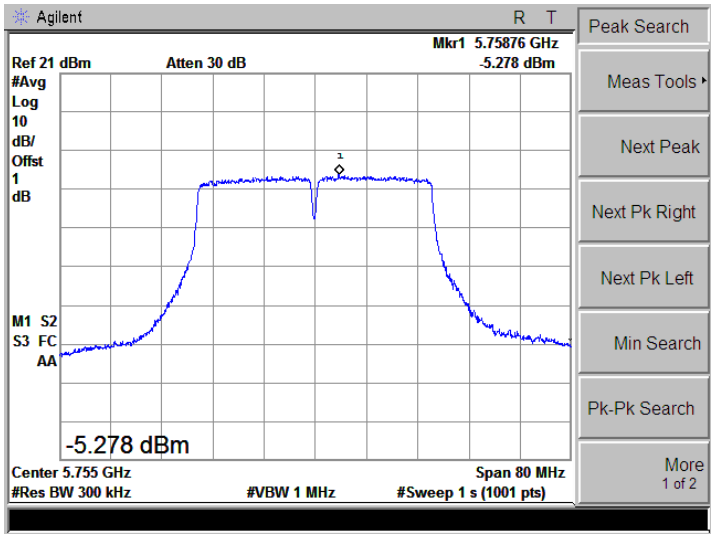
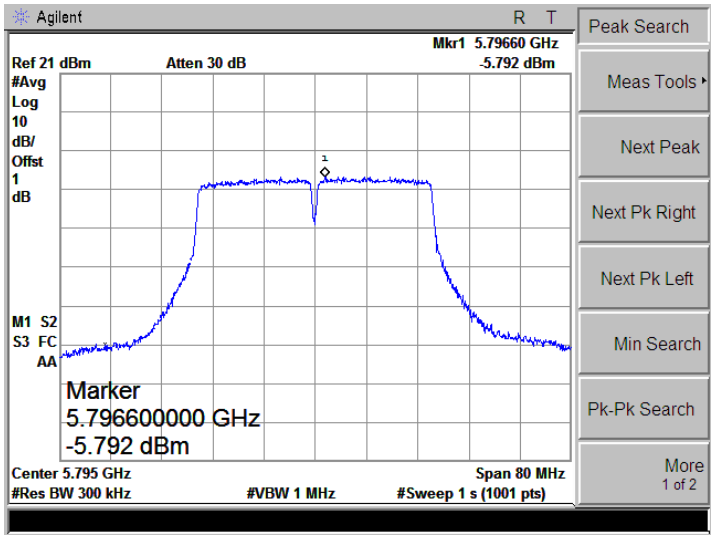
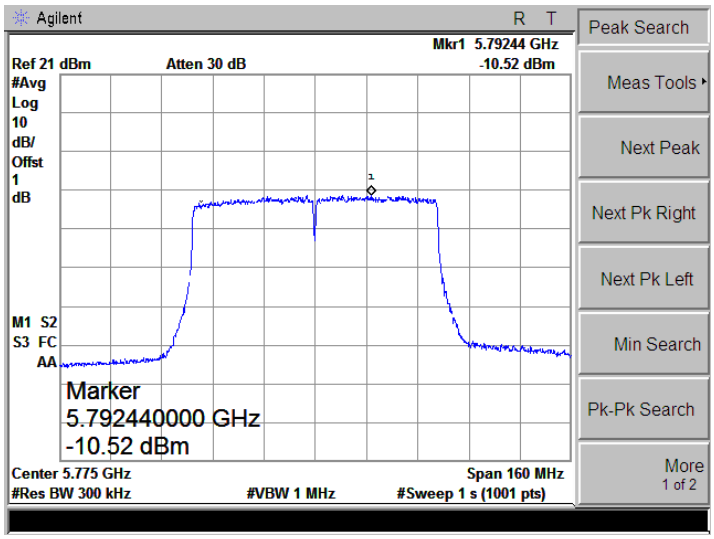
802.11n-AX20-Low	
802.11n-AX20-Middle	
802.11n-AX20-High	

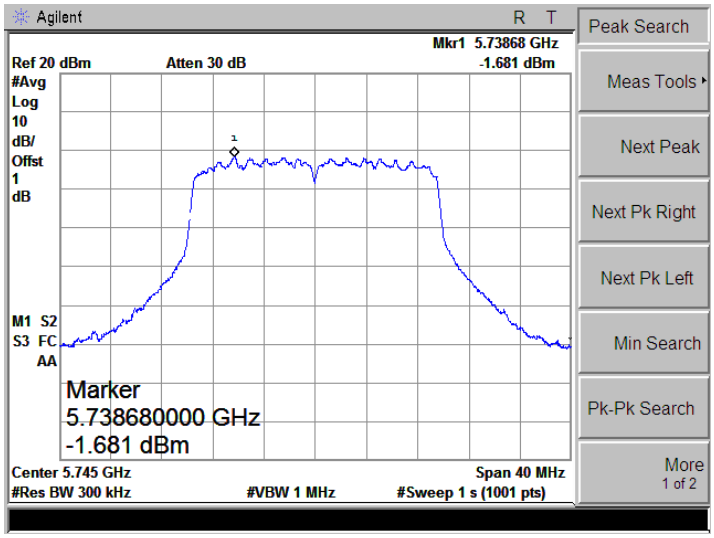
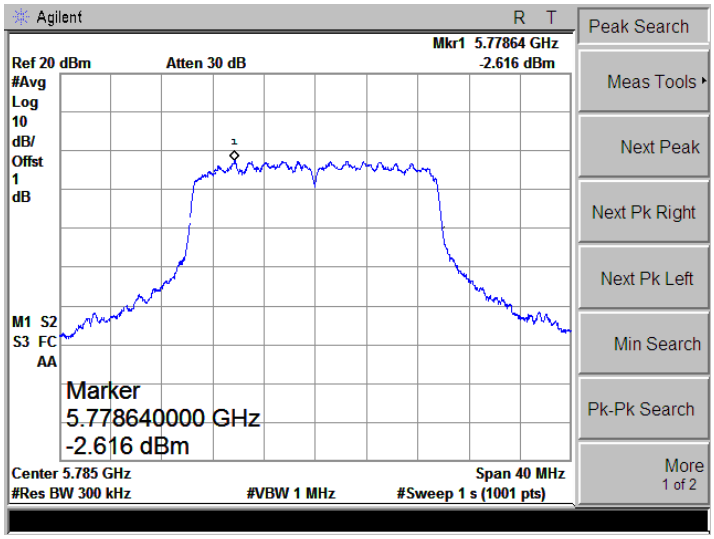
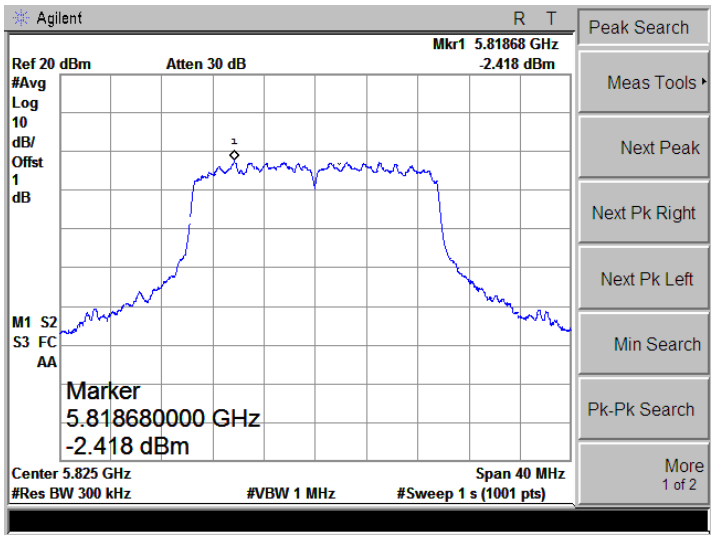
802.11n-AX40-Low	
802.11n-AX40-High	
802.11ac-AX80	

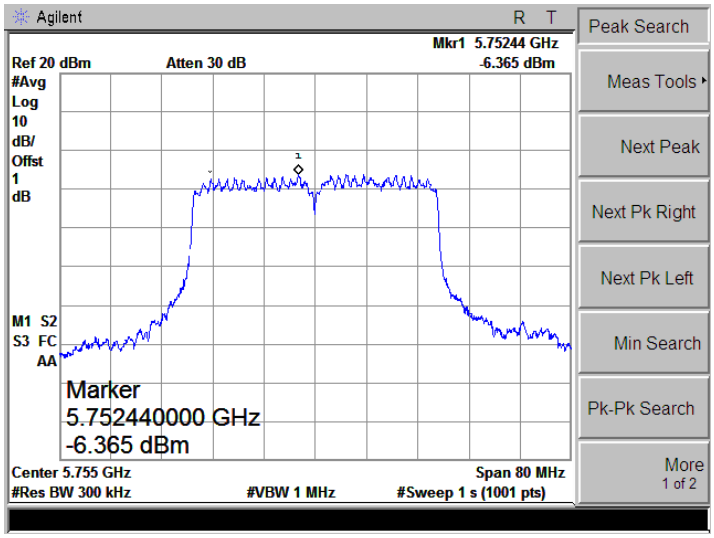
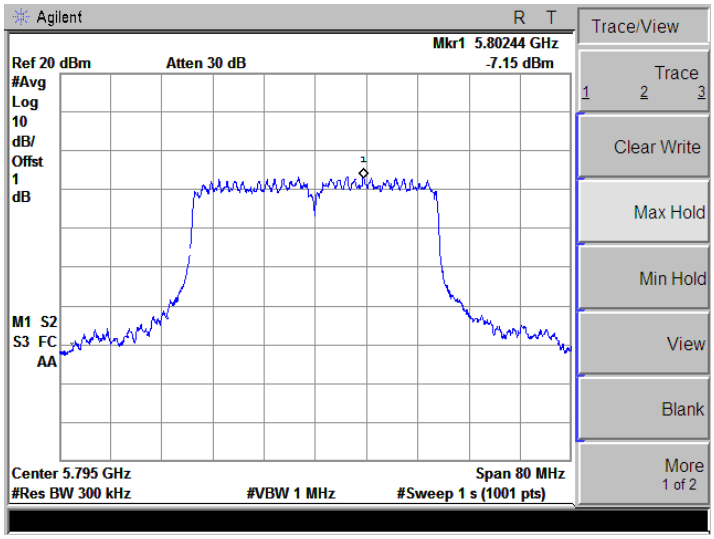
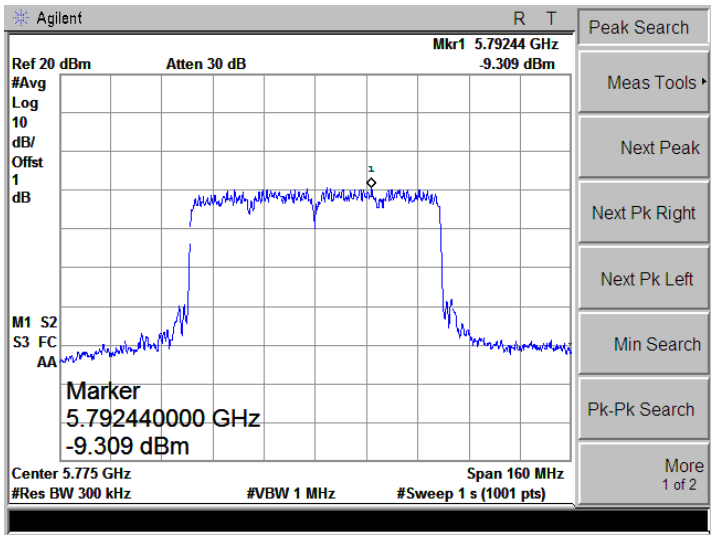
5725-5850MHz

802.11a-Low	
802.11a-Middle	
802.11a-High	

802.11n-HT20-Low	
802.11n-HT20-Middle	
802.11n-HT20-High	

802.11n-HT40-Low	
802.11n-HT40-High	
802.11ac-HT80	

802.11n-AX20-Low	
802.11n-AX20-Middle	
802.11n-AX20-High	

802.11n-AX40-Low	
802.11n-AX40-High	
802.11ac-AX80	

APPENDIX B

Emission Bandwidth and Occupied Bandwidth

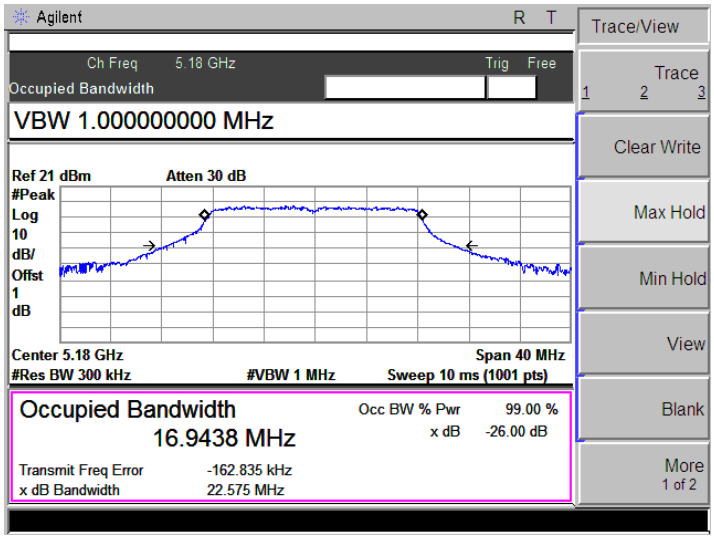
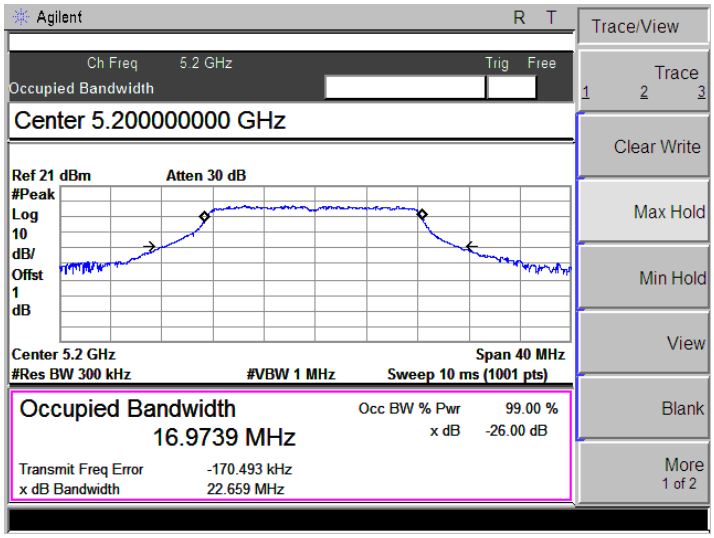
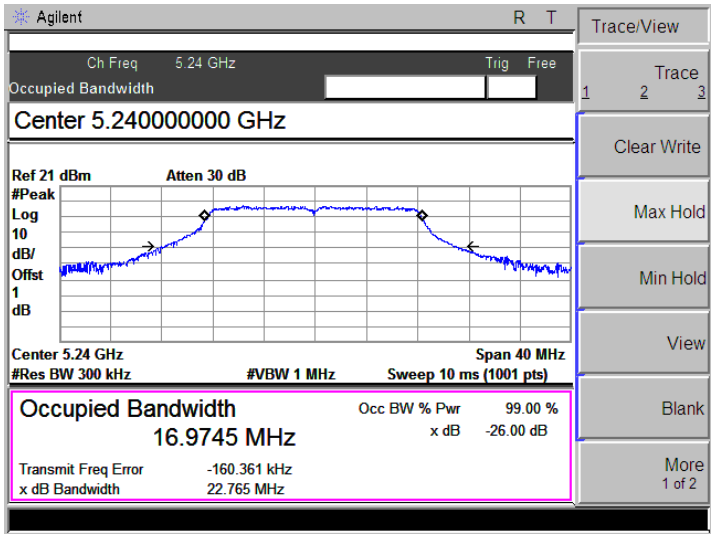
U-NII-1:5150-5250MHz						
Test Mode	**Test Channel MHz**	**ANT 0**		**ANT 1**		**Result**
		26 dB Bandwidth MHz	**99% Bandwidth MHz**	**26 dB Bandwidth MHz**	**99% Bandwidth MHz**	
802.11a	5180	22.575	16.9438	29.195	18.1414	Pass
	5200	22.659	16.9739	22.815	17.0070	Pass
	5240	22.765	16.9745	22.800	17.0084	Pass
802.11n-HT20	5180	24.151	18.1415	24.086	18.1072	Pass
	5200	24.128	18.2312	23.862	18.0788	Pass
	5240	23.861	18.1601	24.205	18.1461	Pass
802.11n-HT40	5190	43.041	36.2948	42.763	36.2878	Pass
	5230	43.267	36.3069	42.766	36.2765	Pass
802.11ac-HT80	5210	84.779	75.7306	84.997	75.7082	Pass
802.11n-AX20	5180	23.308	19.0305	23.406	19.0225	Pass
	5200	23.263	19.0297	23.444	19.0373	Pass
	5240	23.380	19.0316	23.259	19.0231	Pass
802.11n-AX40	5190	42.596	37.8178	42.354	37.8094	Pass
	5230	42.851	37.8185	42.570	37.8074	Pass
802.11ac-AX80	5210	81.814	76.7991	81.804	76.7313	Pass

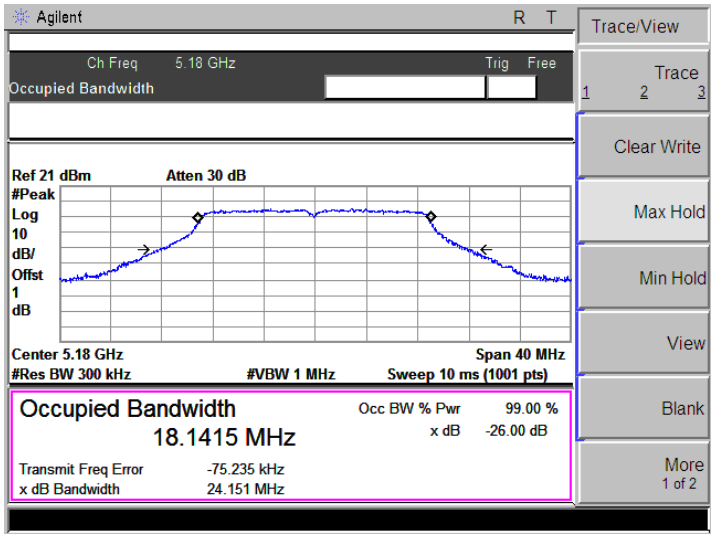
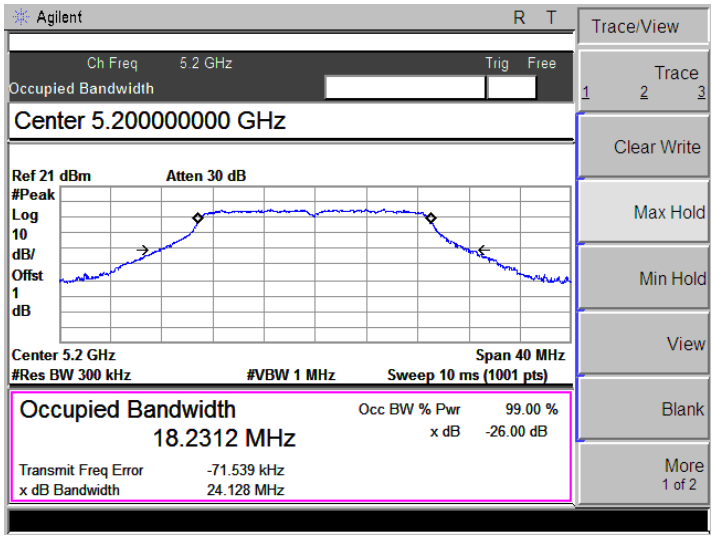
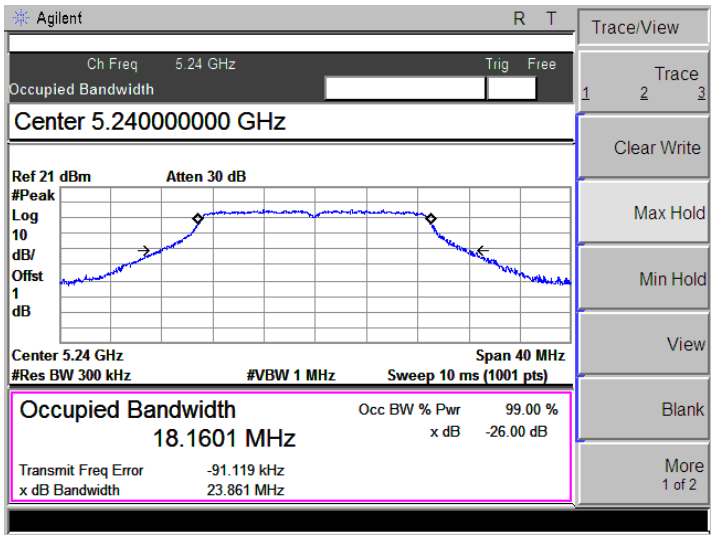
U-NII-3: 5725-5850MHz						
Test Mode	**Test Channel MHz**	**ANT 0**		**ANT 1**		**Limit kHz**
		6 dB Bandwidth MHz	**99% Bandwidth MHz**	**6 dB Bandwidth MHz**	**99% Bandwidth MHz**	
802.11a	5745	16.308	17.0167	16.340	17.0958	≥500
	5785	16.346	17.0046	16.346	17.1053	≥500
	5825	16.342	16.9878	16.330	16.9801	≥500
802.11n-HT20	5745	17.456	18.1388	17.544	18.1141	≥500
	5785	17.510	18.1223	17.560	18.1624	≥500
	5825	17.535	18.1758	17.560	18.1733	≥500
802.11n-HT40	5755	36.341	36.3243	36.107	36.3151	≥500
	5795	36.300	36.3388	36.355	36.3440	≥500
802.11ac-HT80	5775	75.336	75.7455	75.523	75.8244	≥500

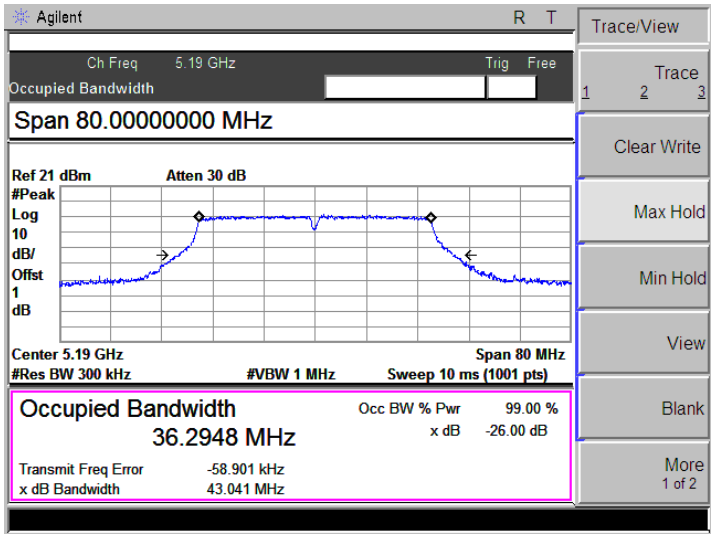
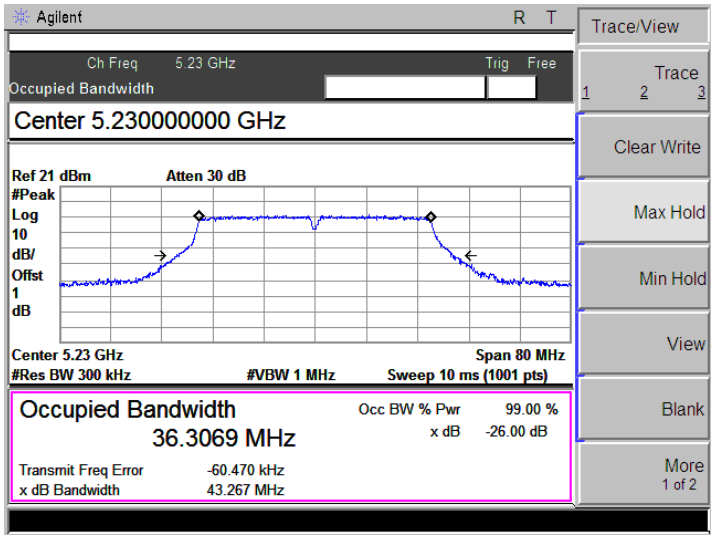
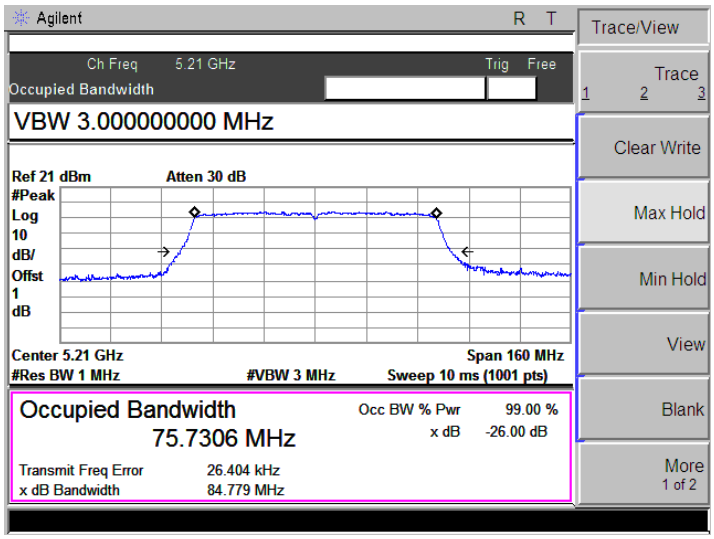
802.11n-AX20	5180	18.402	19.0140	18.398	19.0143	Pass
	5200	18.403	19.0265	18.393	19.0288	Pass
	5240	18.830	19.0092	18.830	19.0054	Pass
802.11n-AX40	5190	37.999	37.8035	37.726	37.8061	Pass
	5230	37.848	37.8100	37.844	37.7964	Pass
802.11ac-AX80	5210	76.440	76.7256	76.467	76.7308	Pass

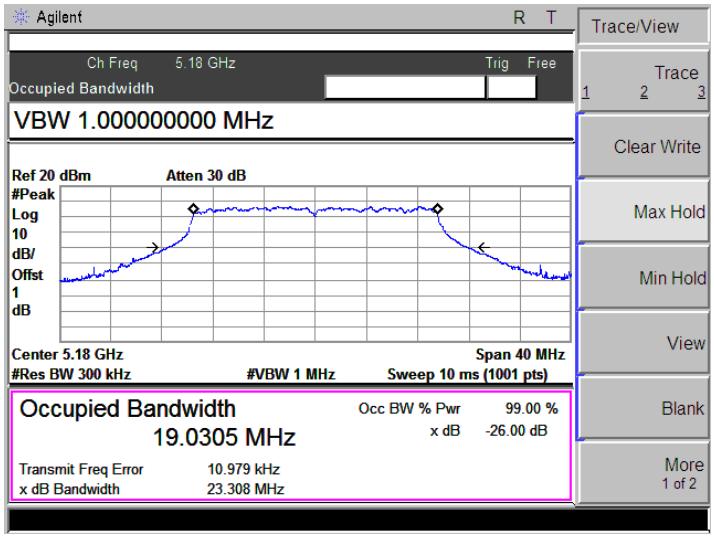
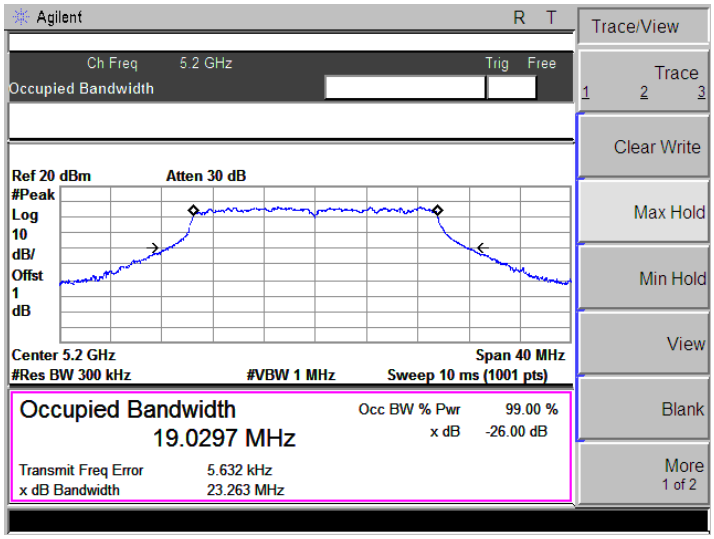
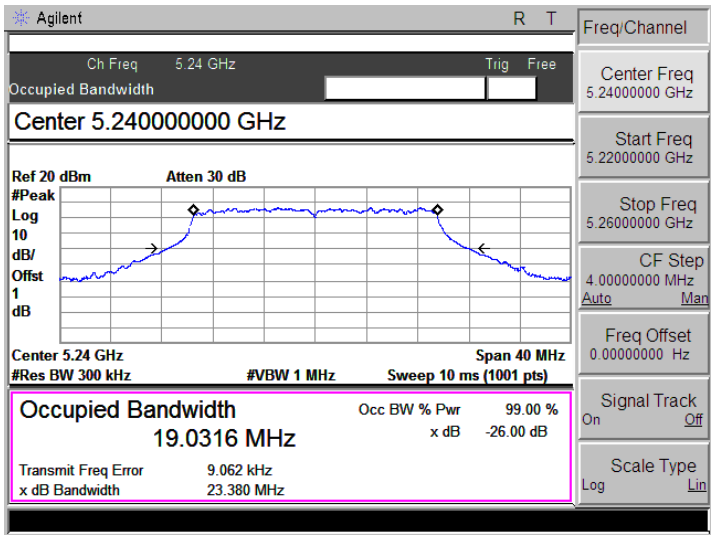
ANT 0

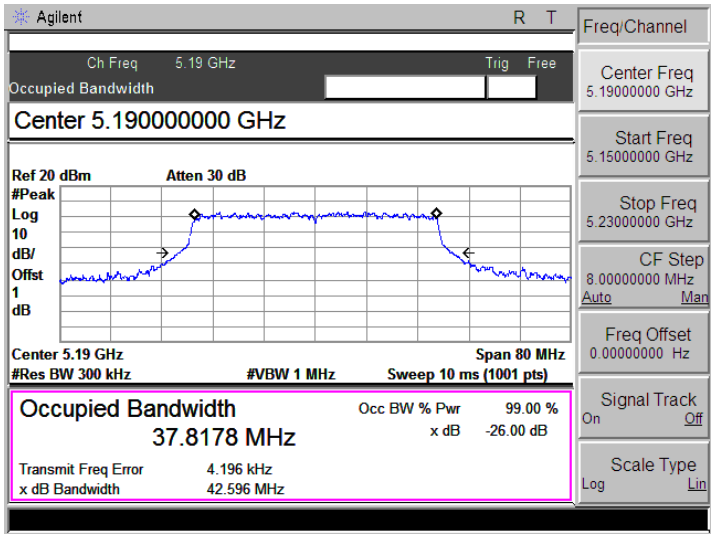
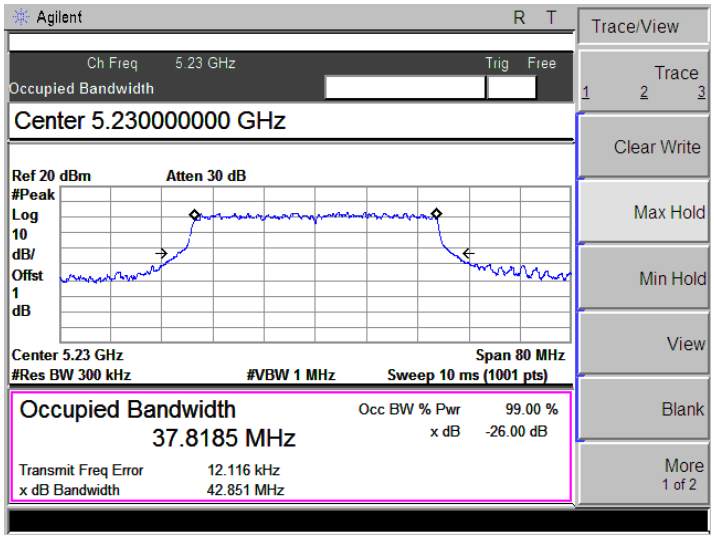
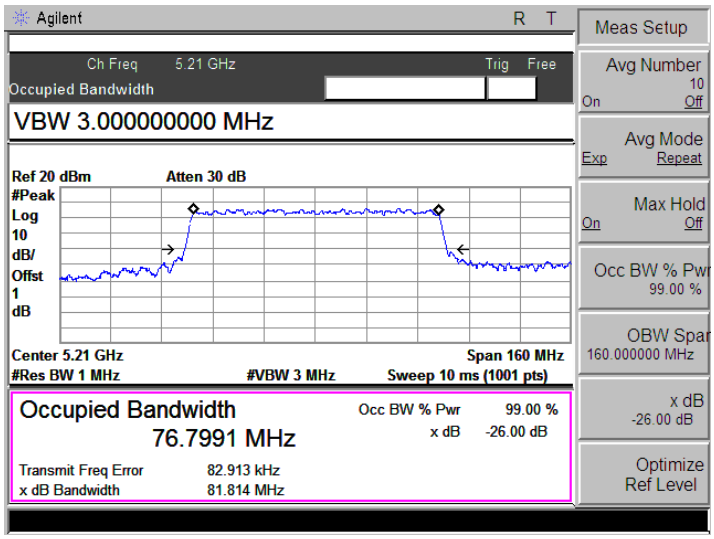
5150-5250MHz

802.11a-Low	
802.11a-Middle	
802.11a-High	

802.11n-HT20-Low	
802.11n-HT20-Middle	
802.11n-HT20-High	

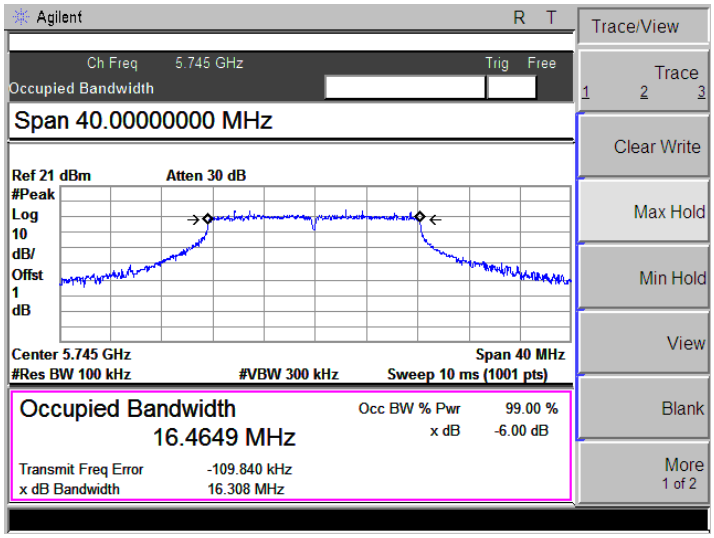
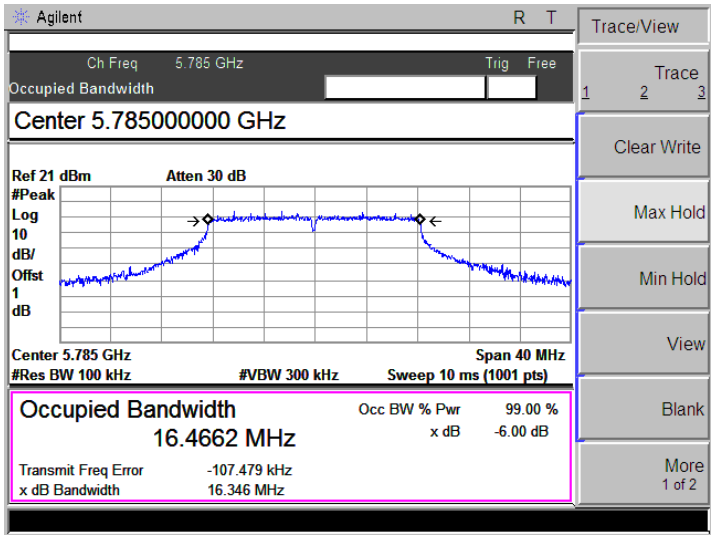
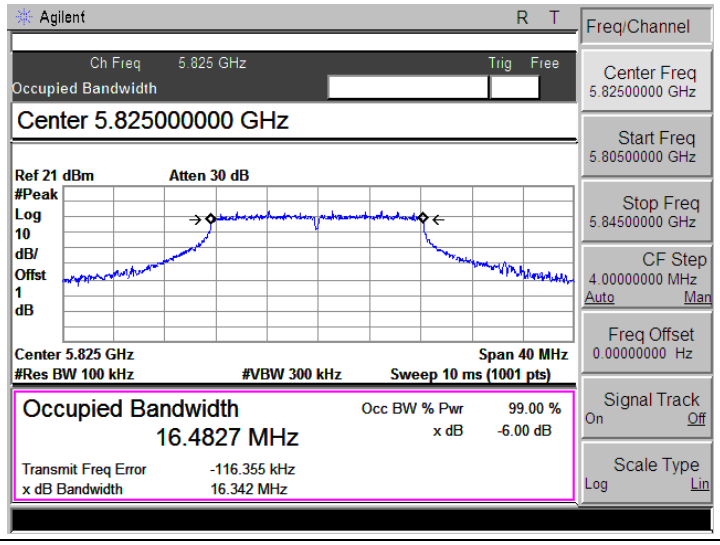
802.11n-HT40-Low	
802.11n-HT40-High	
802.11ac-HT80	

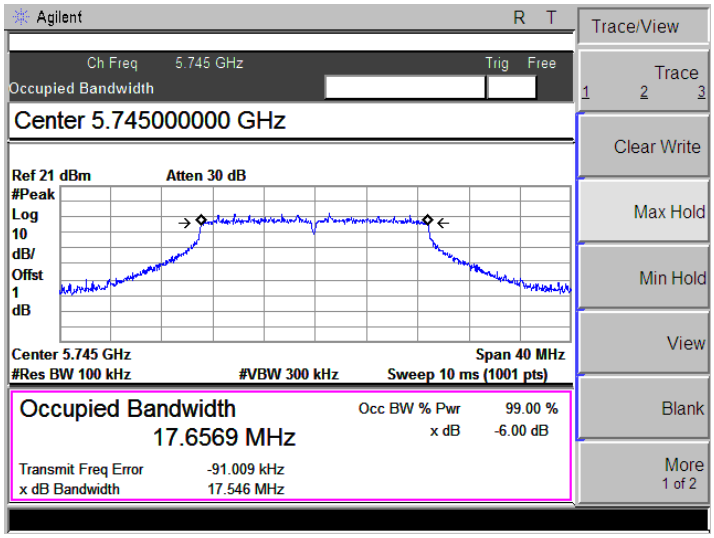
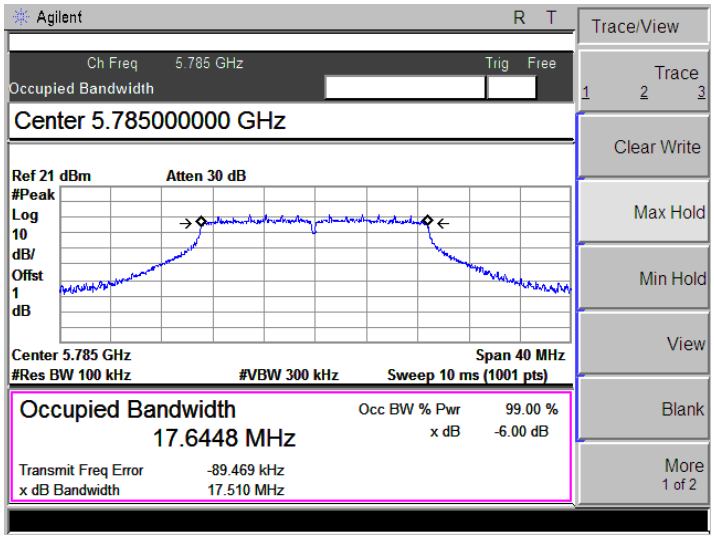
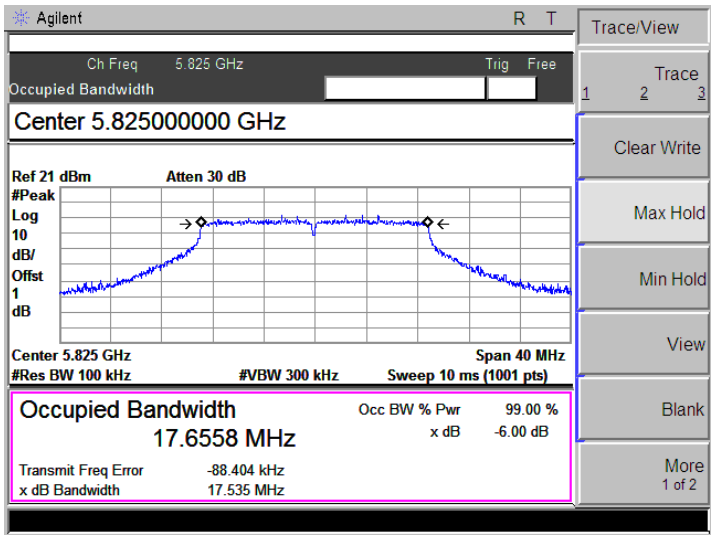
802.11n-AX20-Low	
802.11n-AX20-Middle	
802.11n-AX20-High	

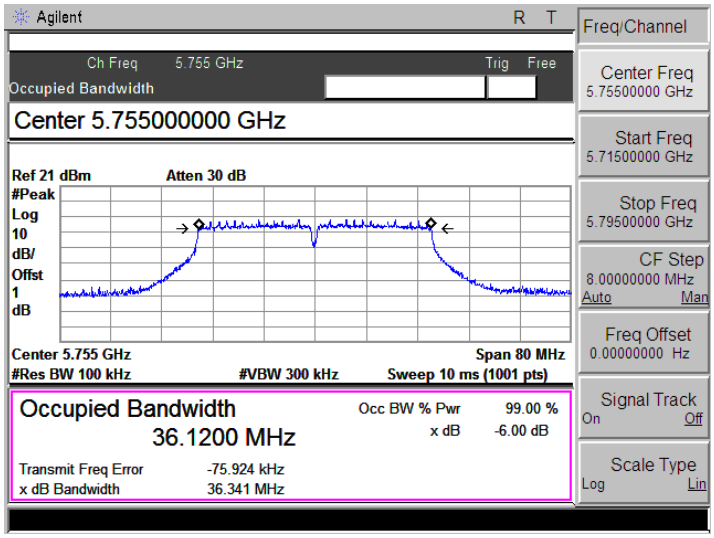
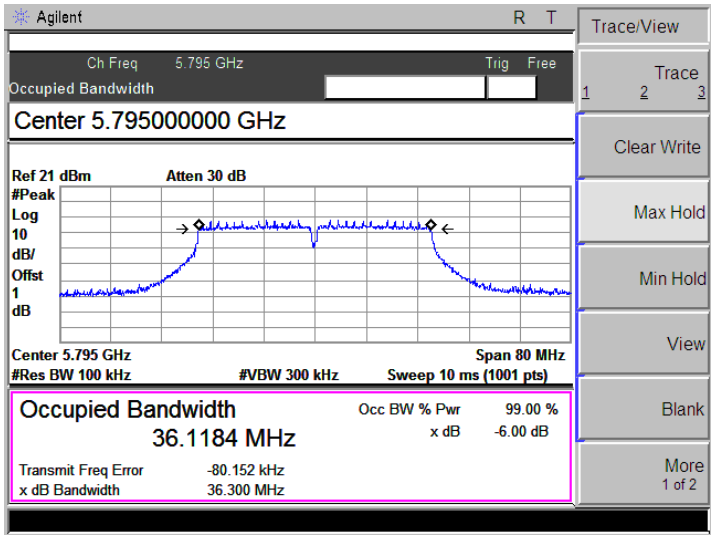
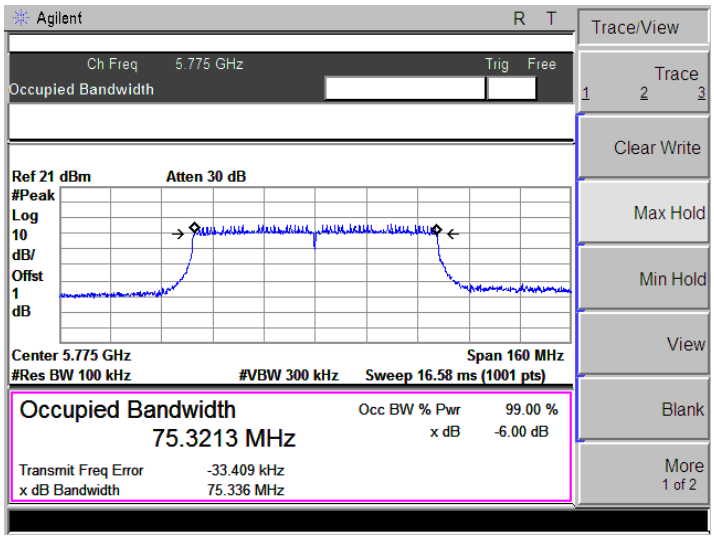
802.11n-AX40-Low	
802.11n-AX40-High	
802.11ac-AX80	

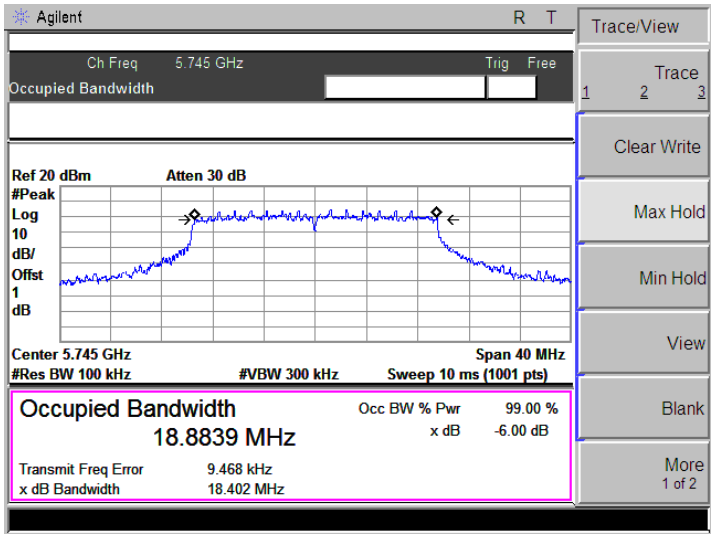
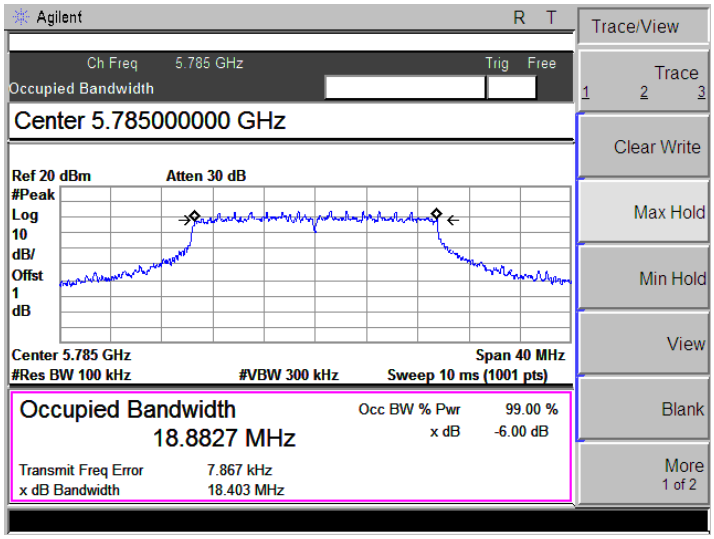
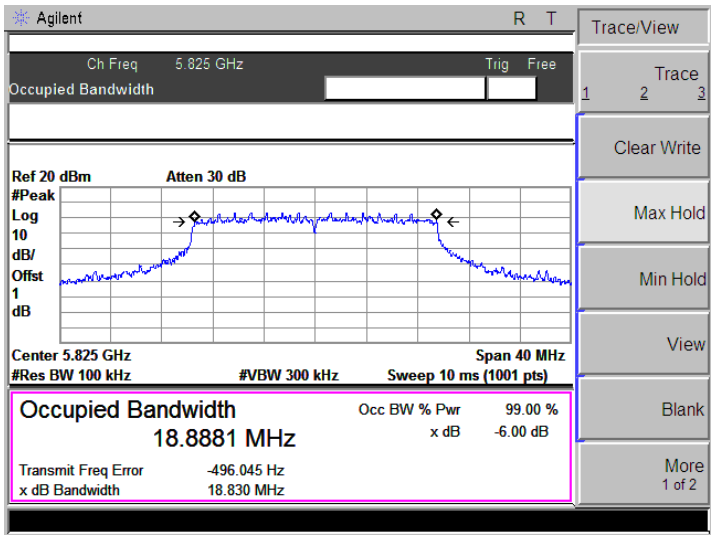
5725-5850MHz

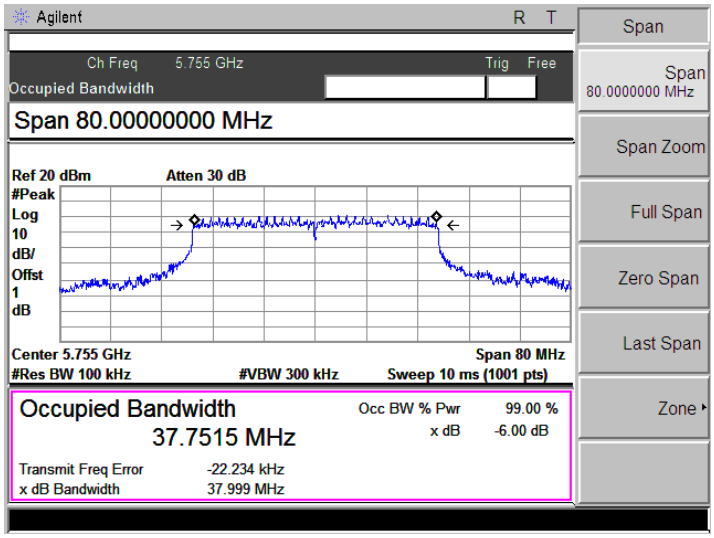
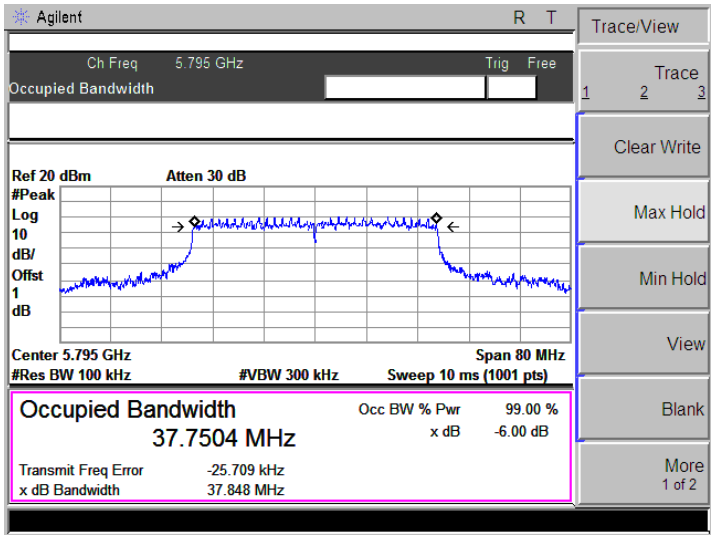
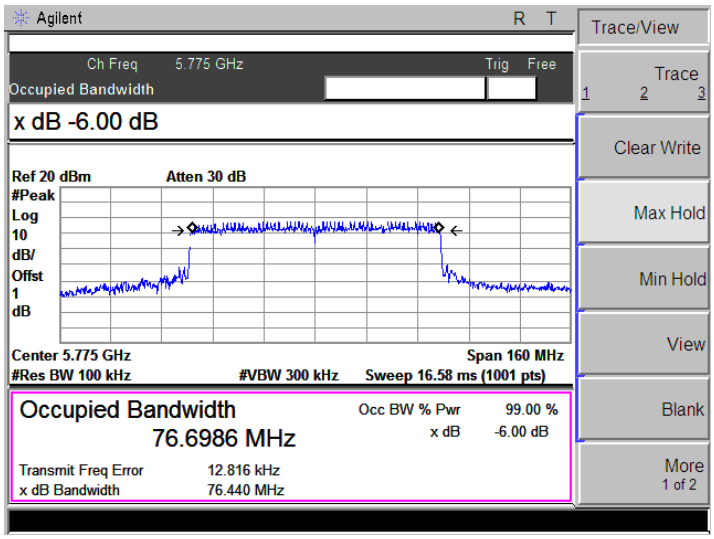
6DB

802.11a-Low	
802.11a-Middle	
802.11a-High	

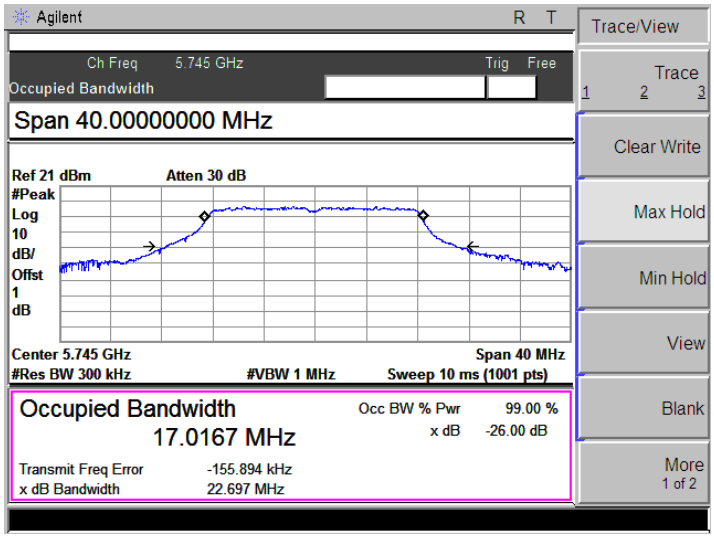
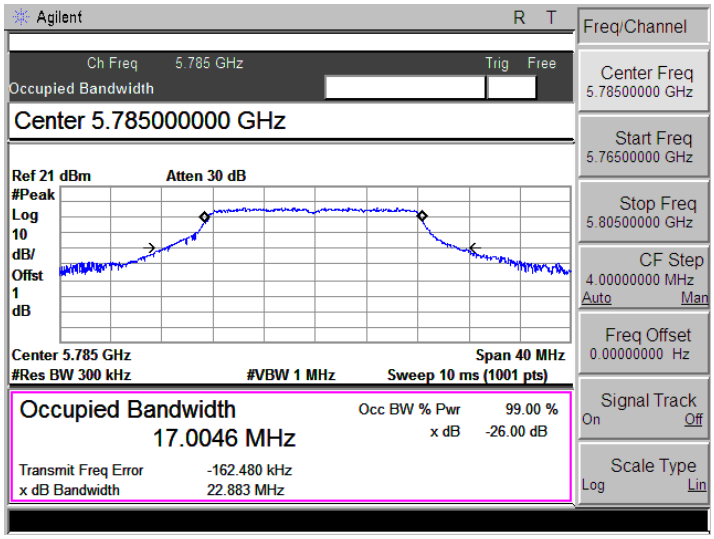
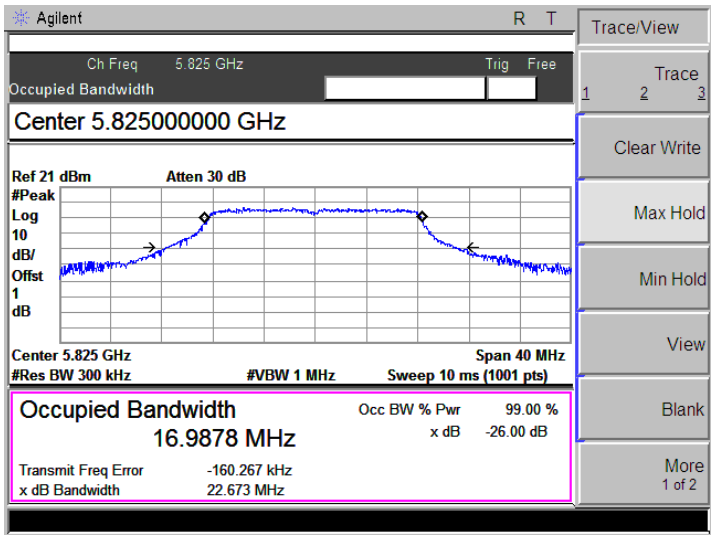
802.11n-HT20-Low	
802.11n-HT20-Middle	
802.11n-HT20-High	

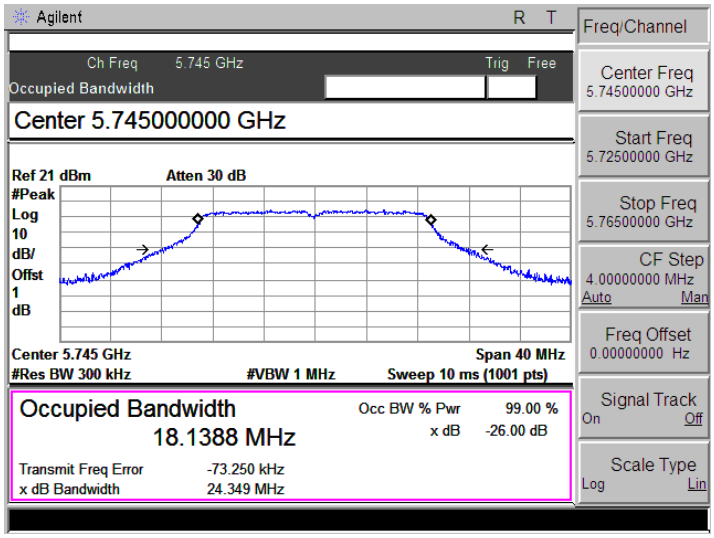
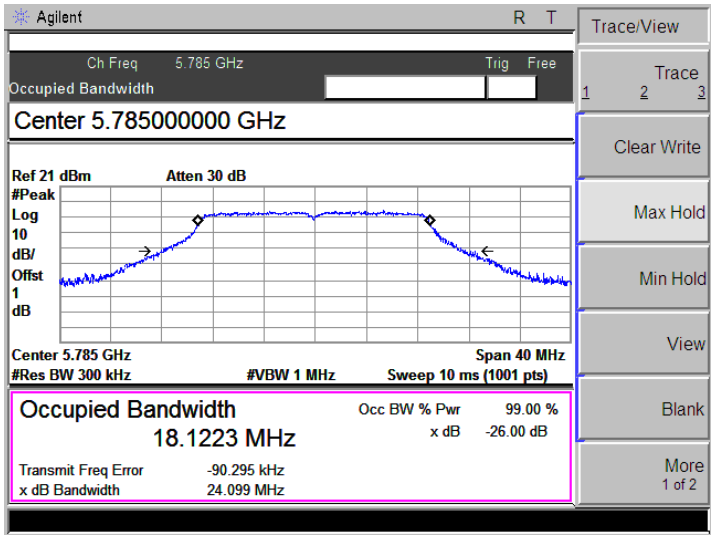
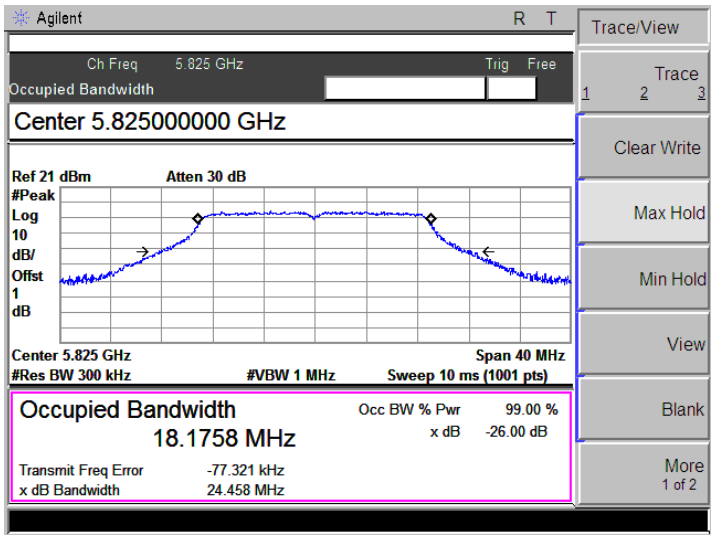
802.11n-HT40-Low	
802.11n-HT40-High	
802.11ac-HT80	

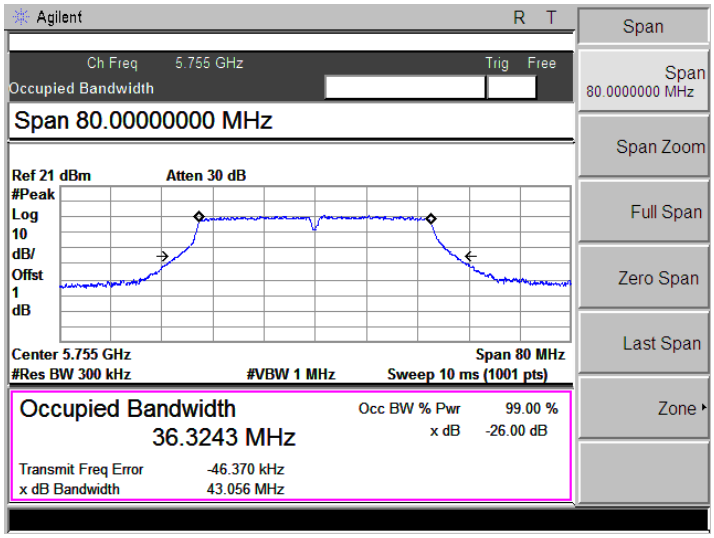
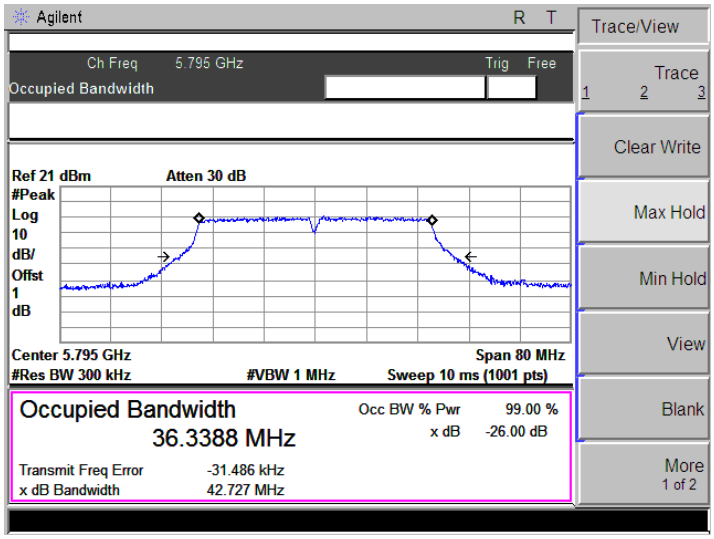
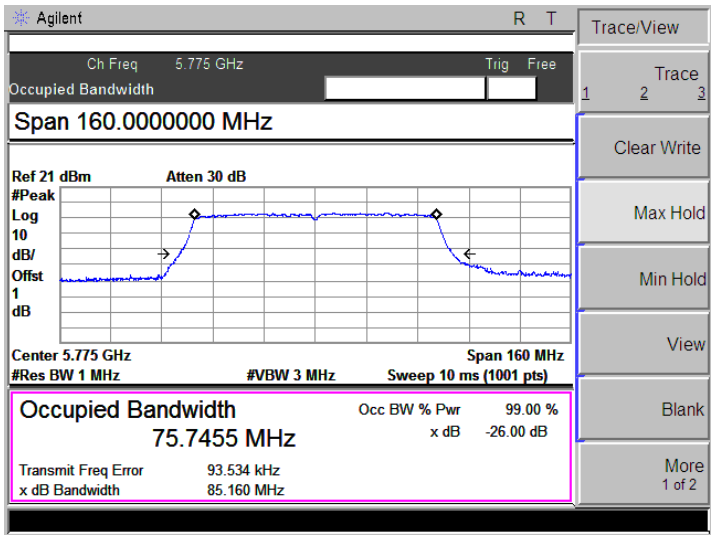
802.11n-AX20-Low	
802.11n-AX20-Middle	
802.11n-AX20-High	

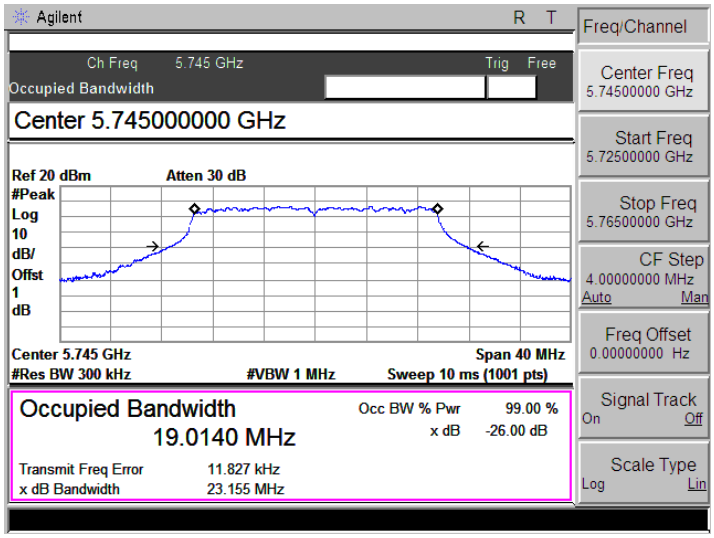
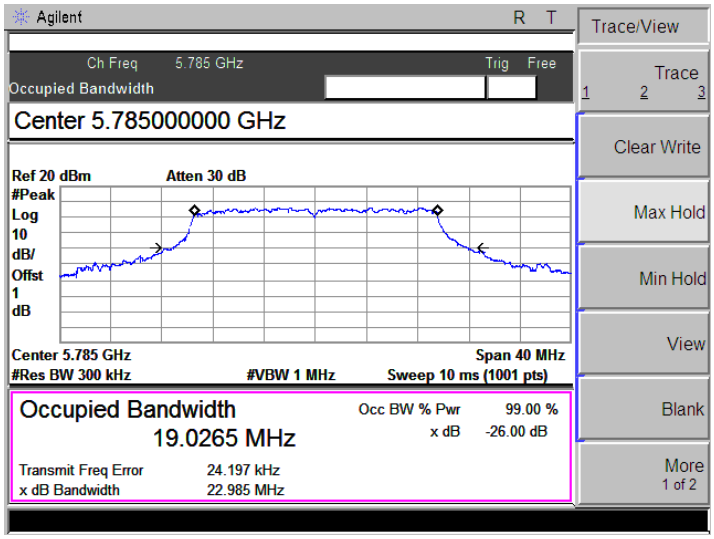
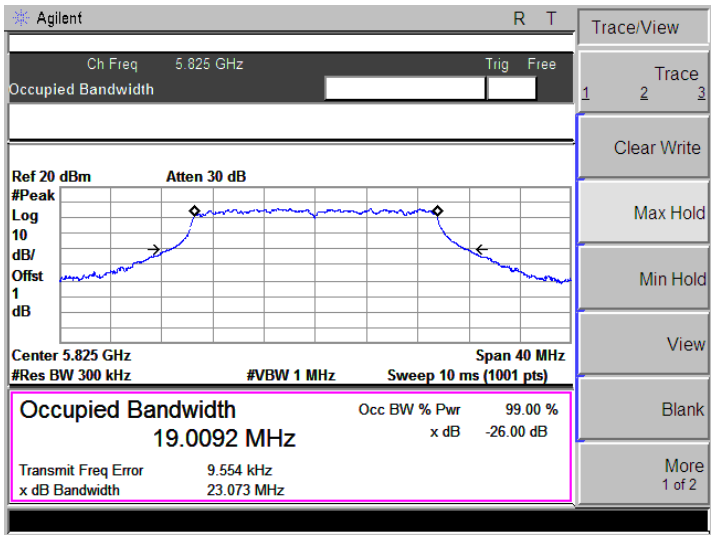
802.11n-AX40-Low	
802.11n-AX40-High	
802.11ac-AX80	

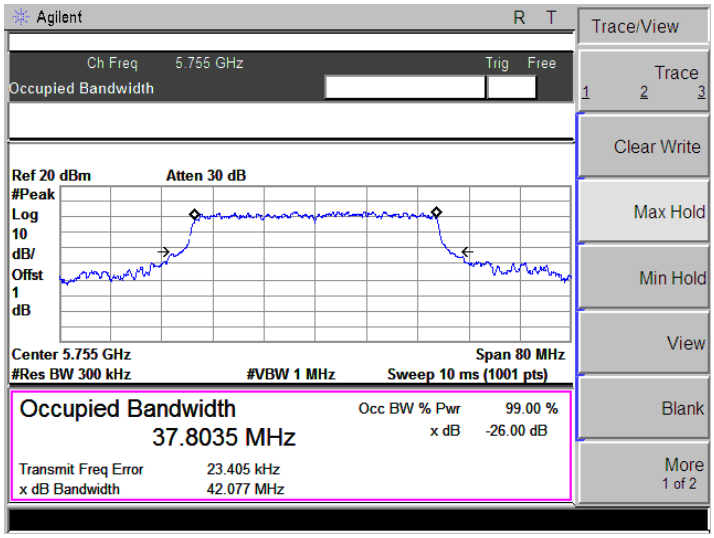
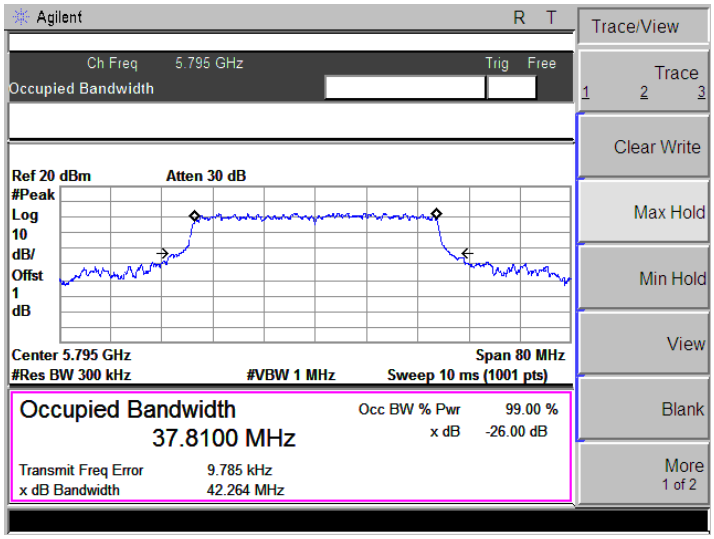
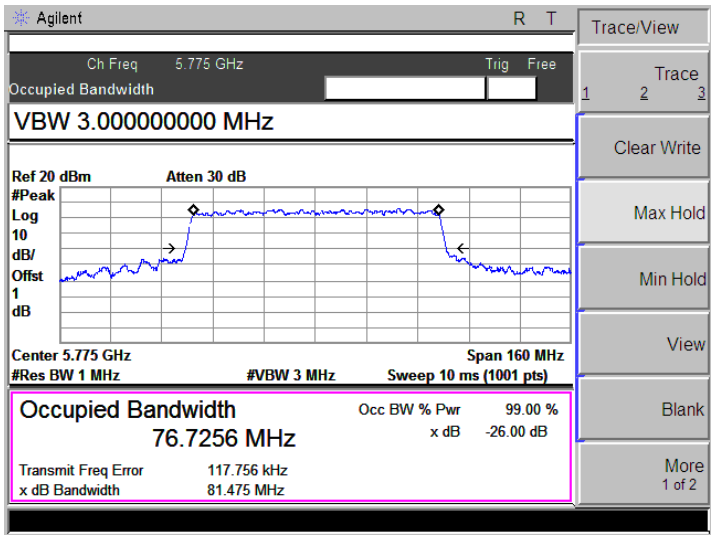
99%

802.11a-Low	
802.11a-Middle	
802.11a-High	

802.11n-HT20-Low	
802.11n-HT20-Middle	
802.11n-HT20-High	

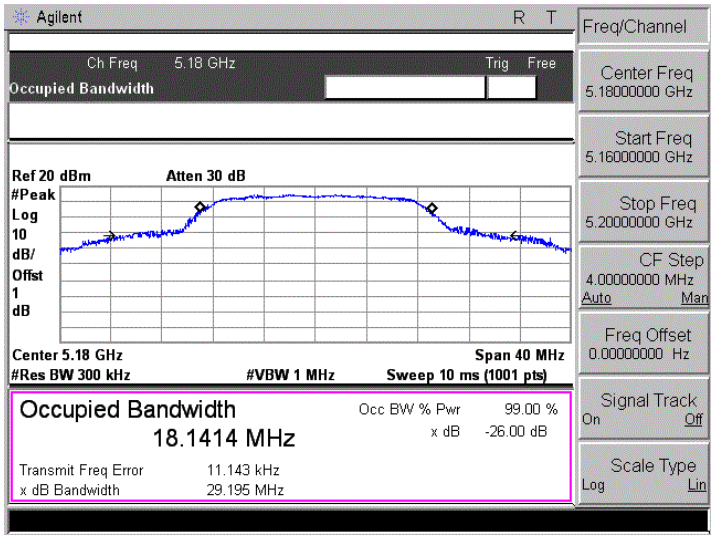
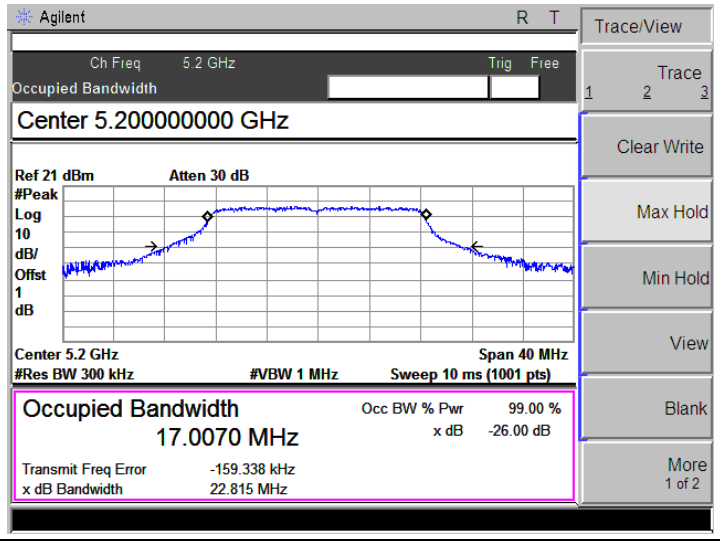
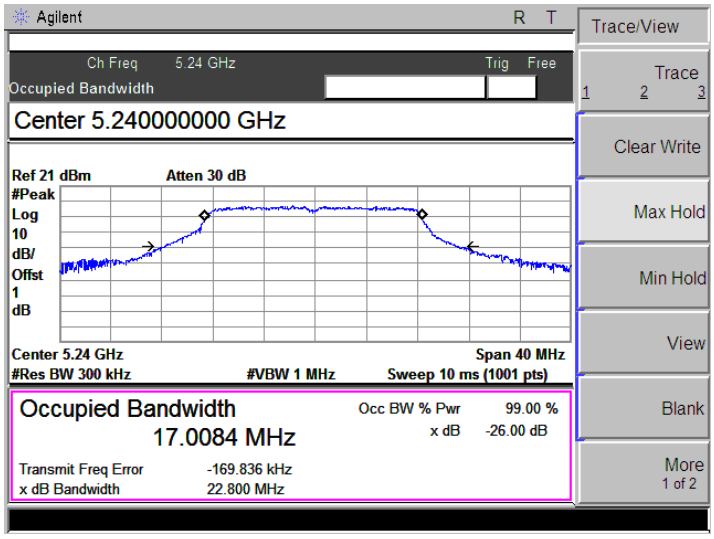
802.11n-HT40-Low	
802.11n-HT40-High	
802.11ac-HT80	

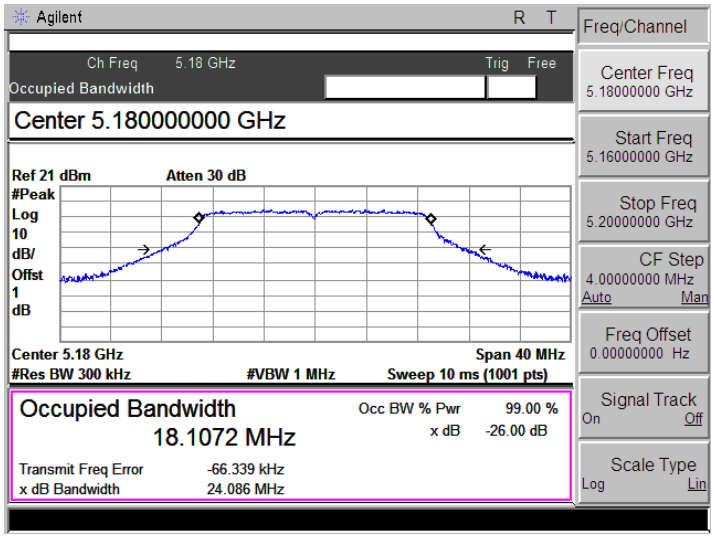
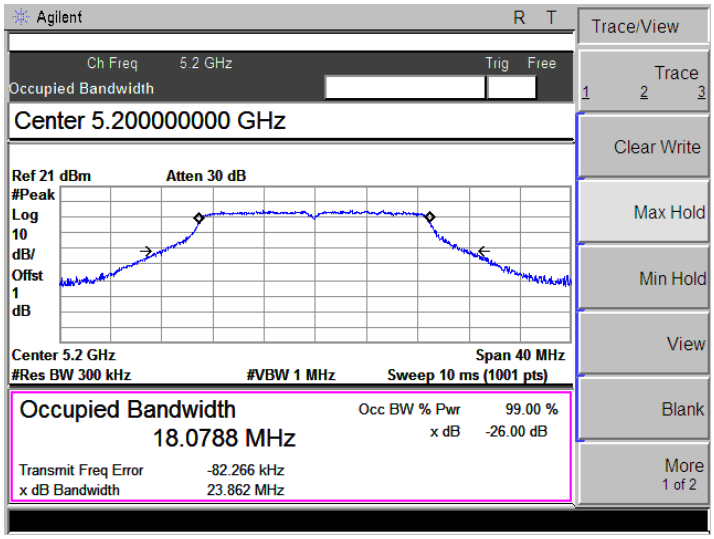
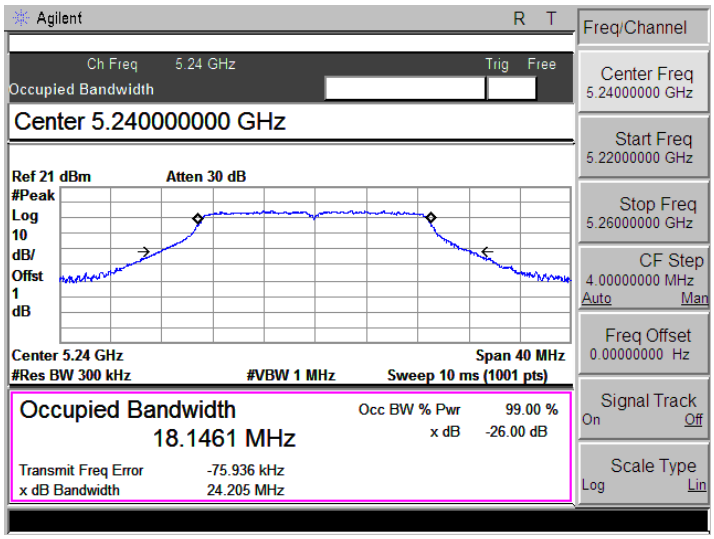
802.11n-AX20-Low	
802.11n-AX20-Middle	
802.11n-AX20-High	

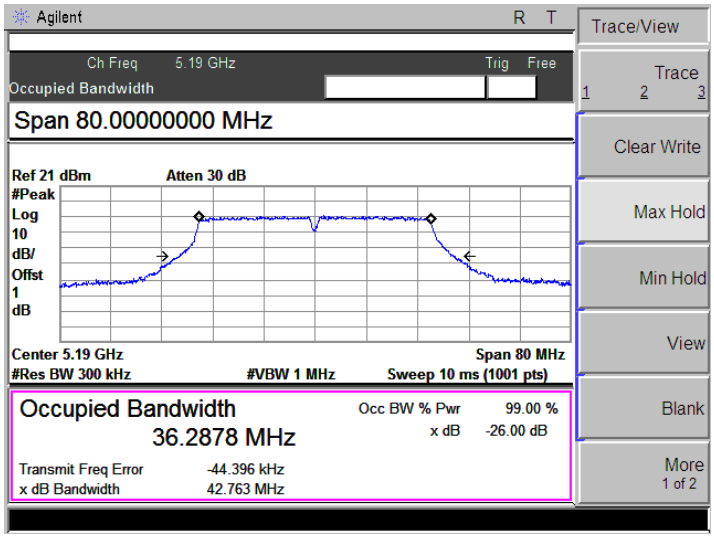
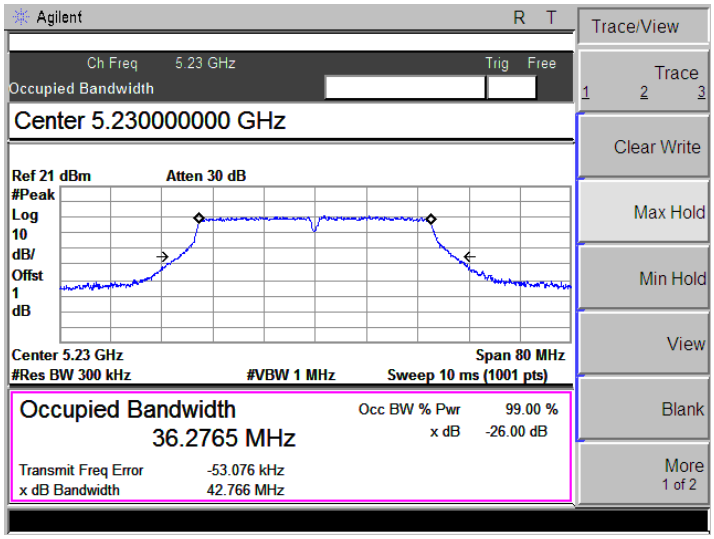
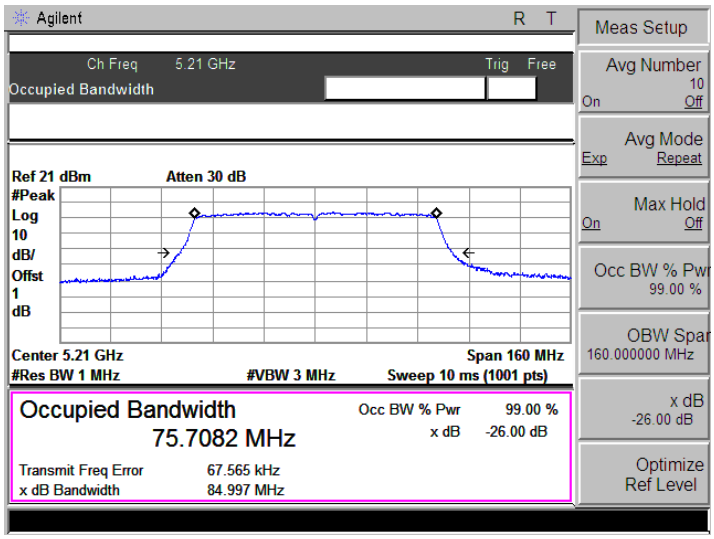
802.11n-AX40-Low	
802.11n-AX40-High	
802.11ac-AX80	

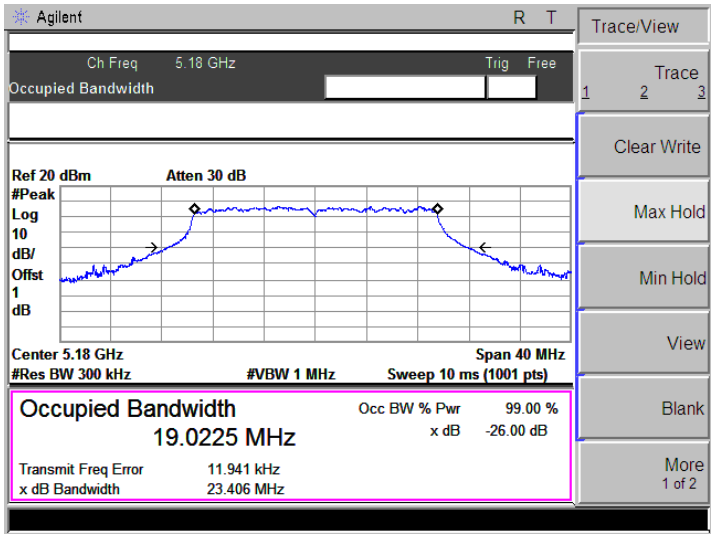
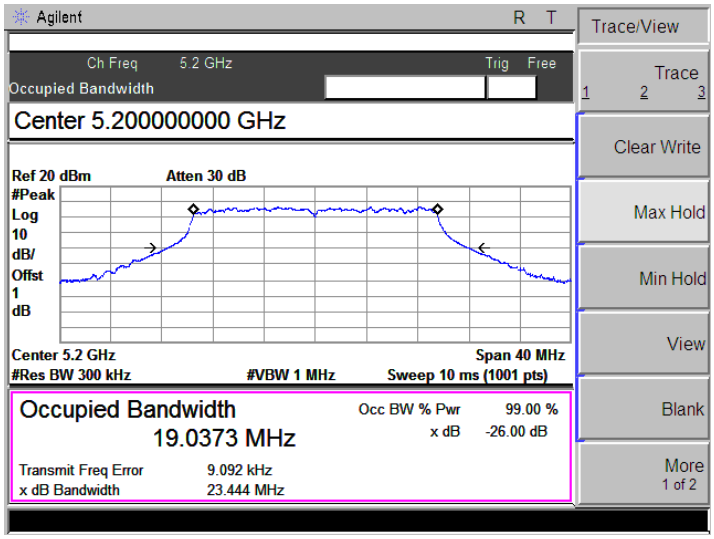
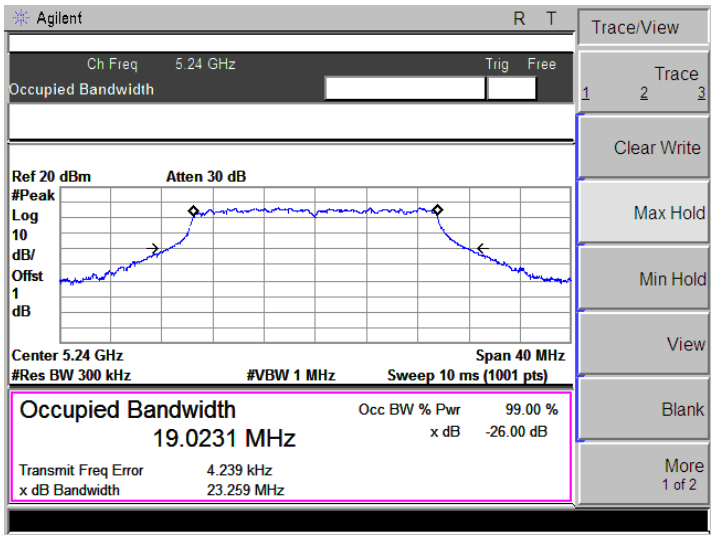
ANT 1

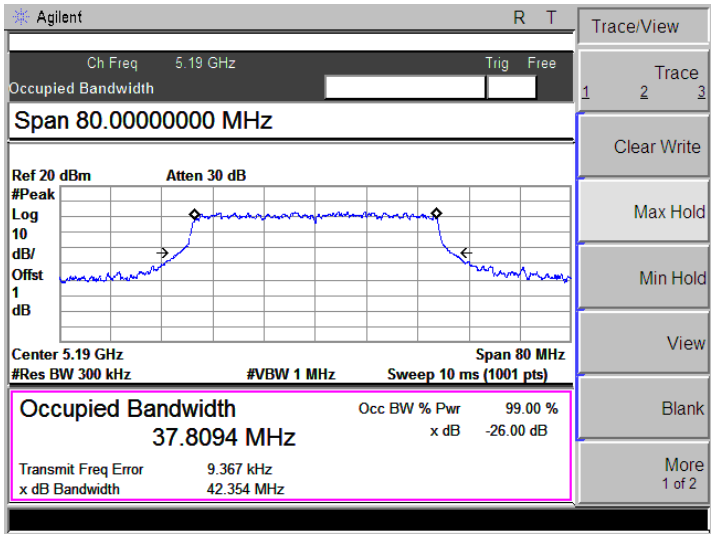
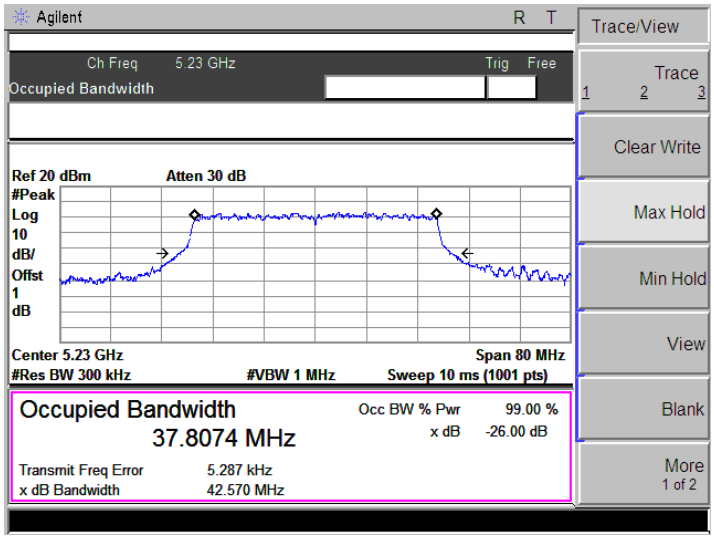
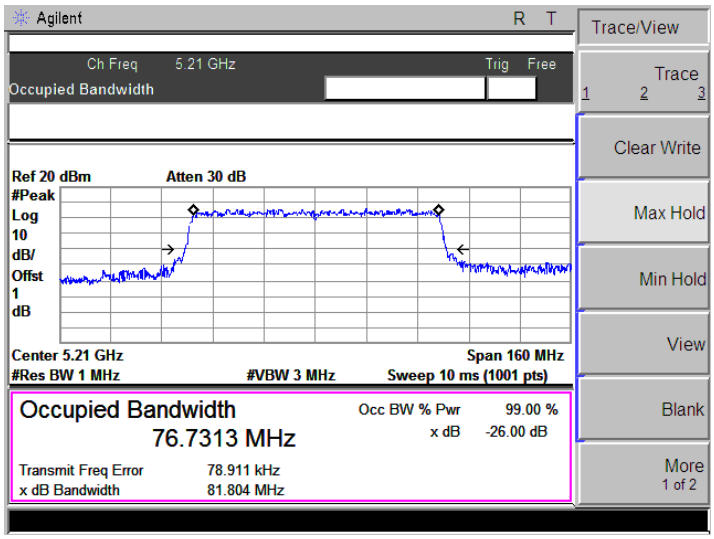
5150-5250MHz

802.11a-Low	
802.11a-Middle	
802.11a-High	

802.11n-HT20-Low	
802.11n-HT20-Middle	
802.11n-HT20-High	

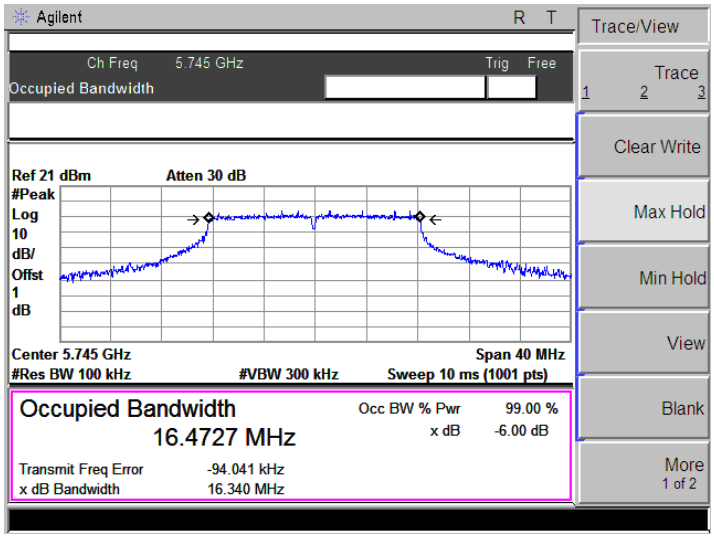
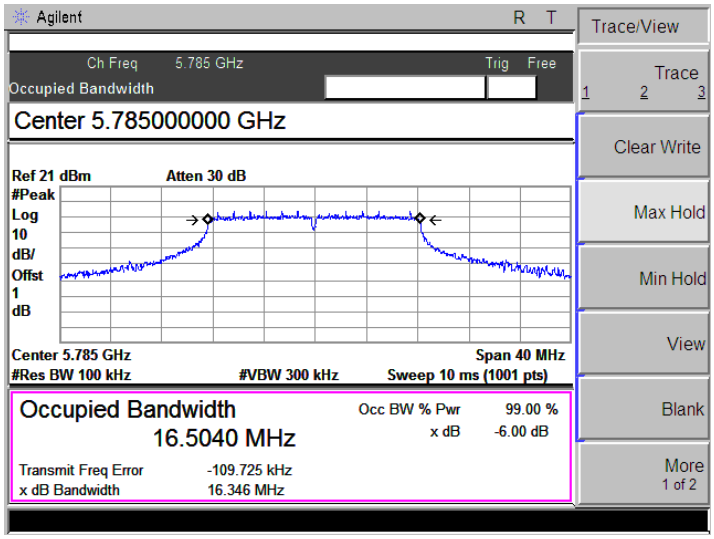
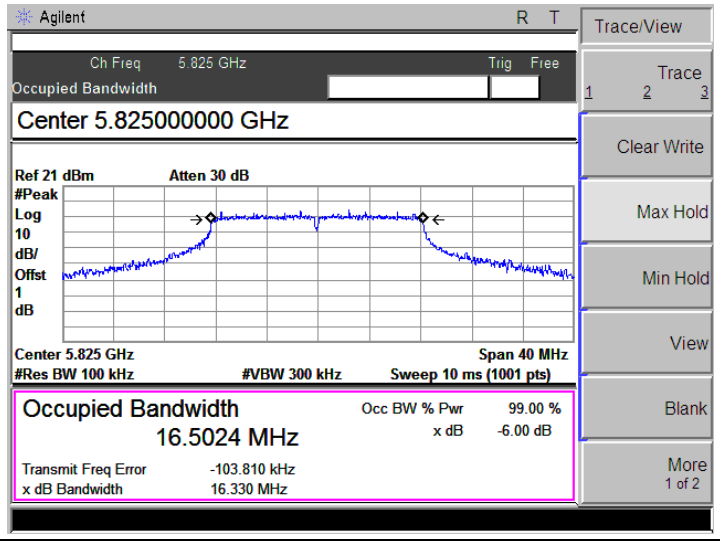
802.11n-HT40-Low	
802.11n-HT40-High	
802.11ac-HT80	

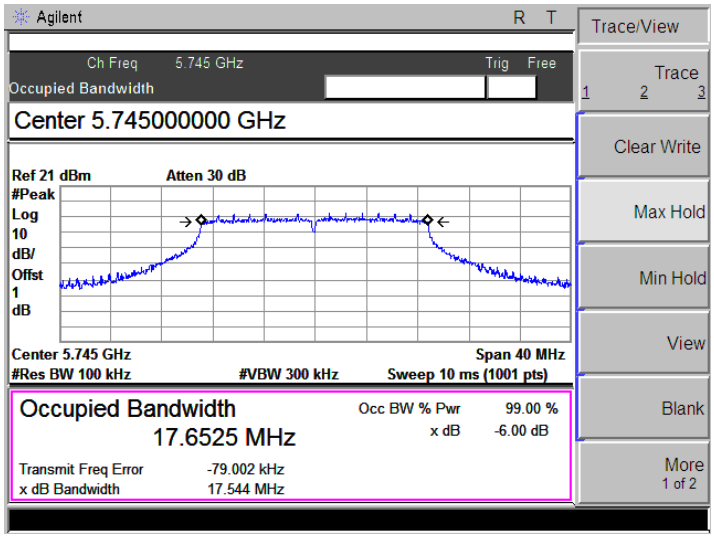
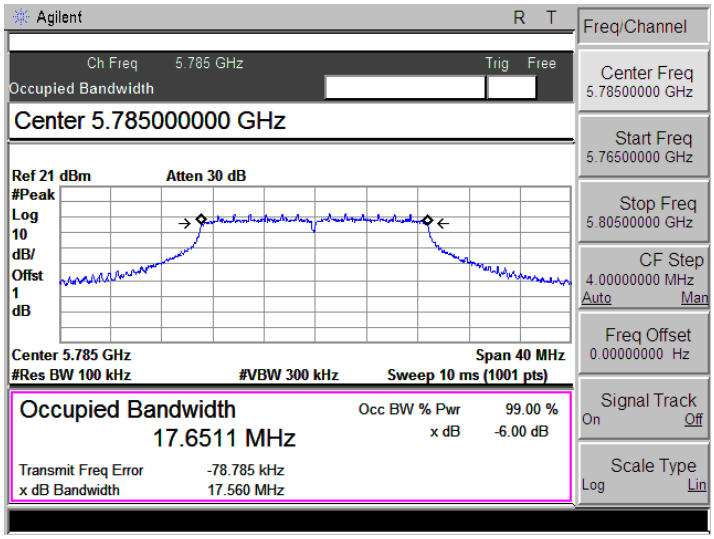
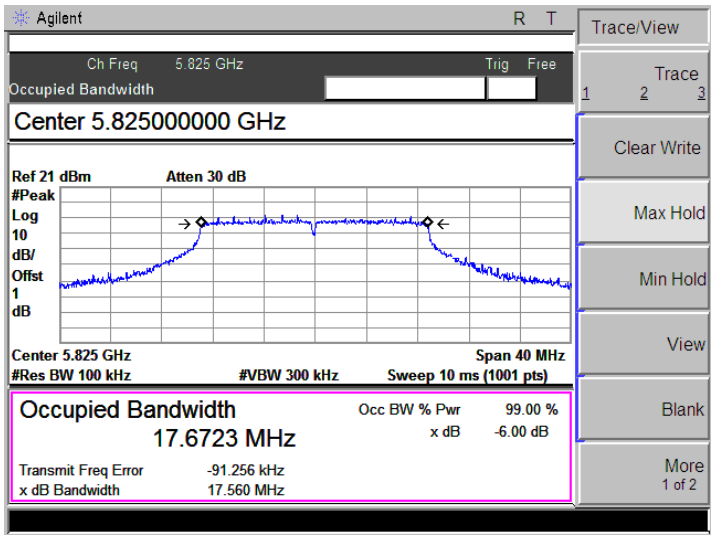
802.11n-AX20-Low	
802.11n-AX20-Middle	
802.11n-AX20-High	

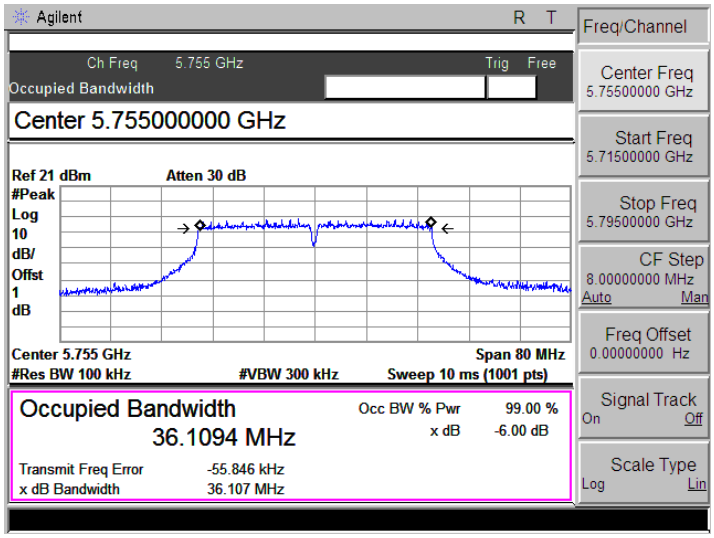
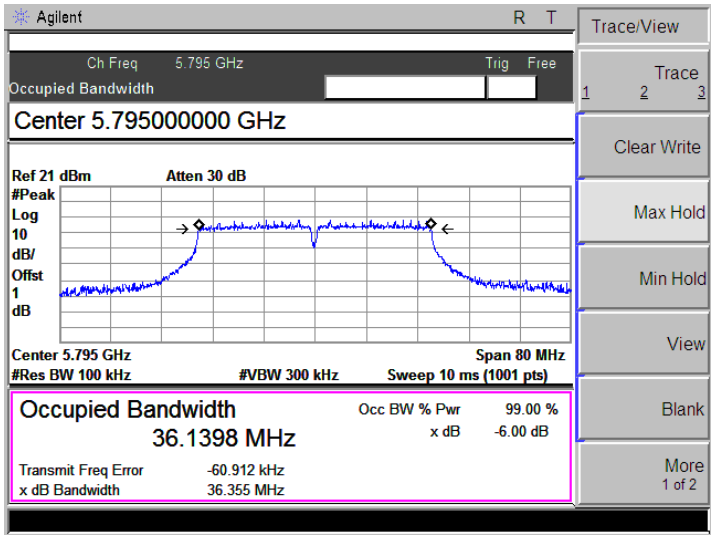
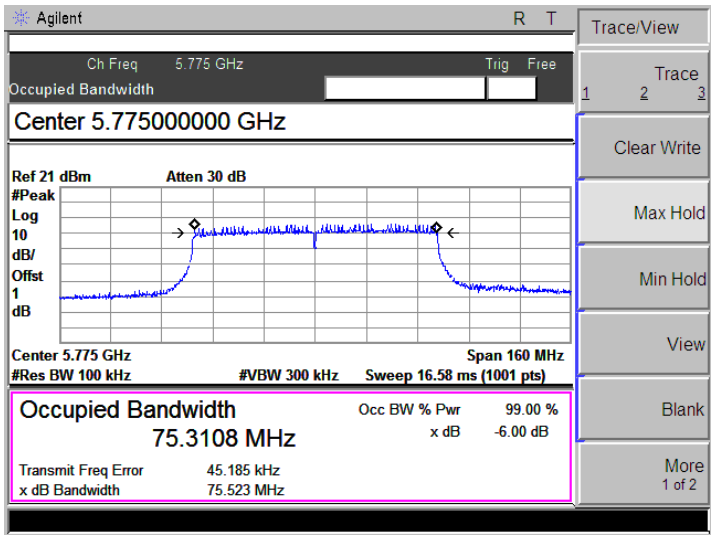
802.11n-AX40-Low	
802.11n-AX40-High	
802.11ac-AX80	

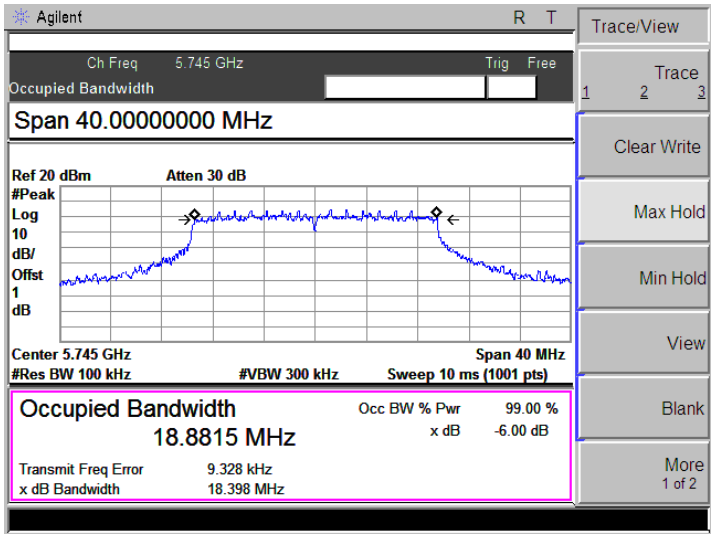
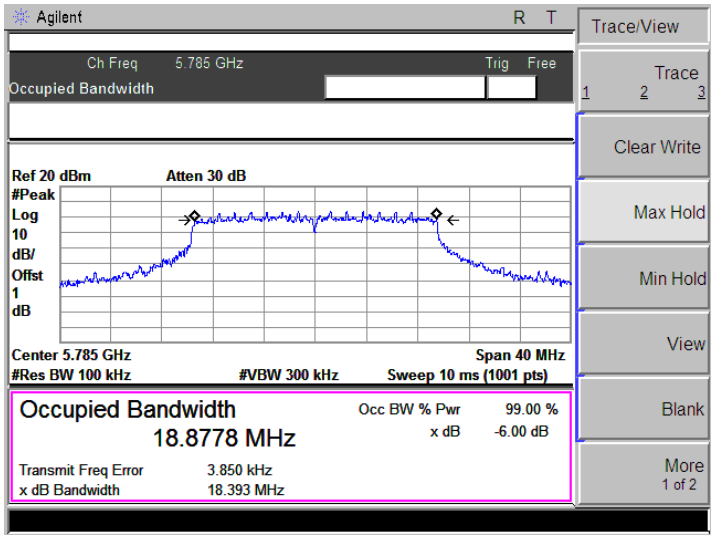
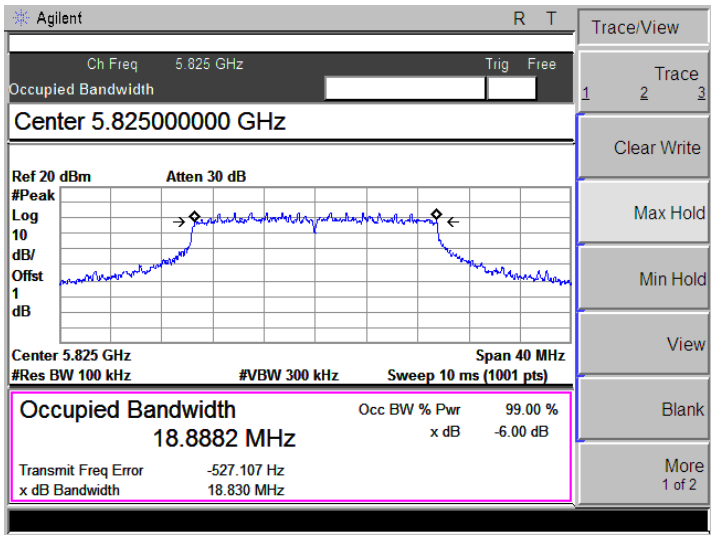
5725-5850MHz

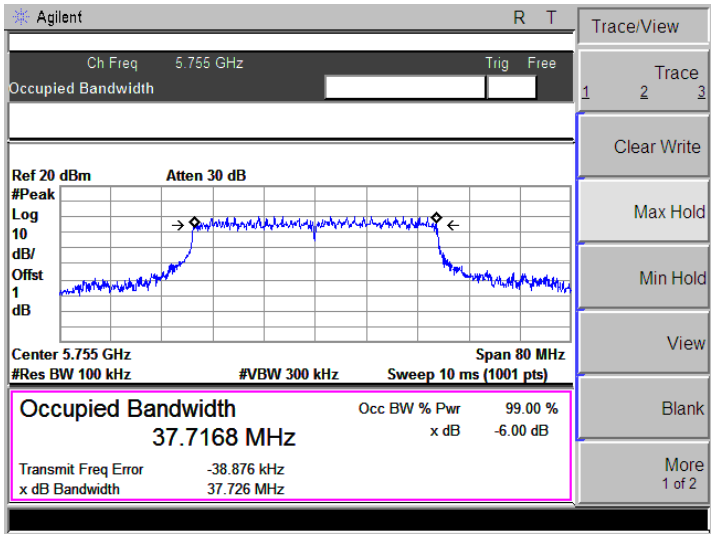
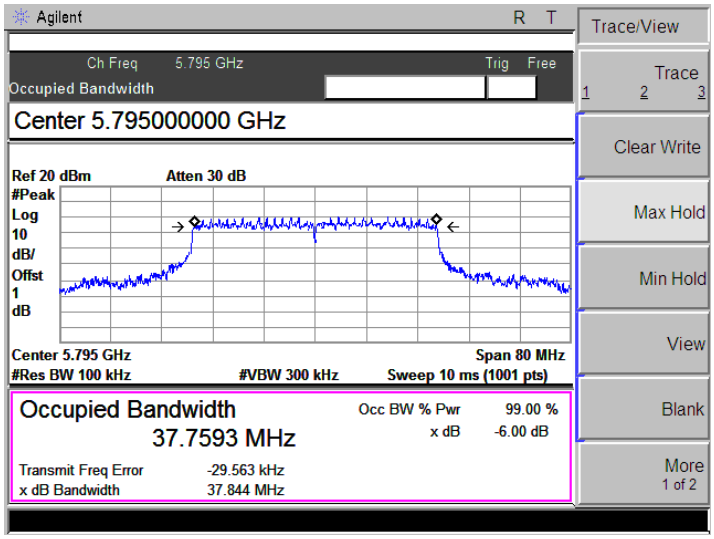
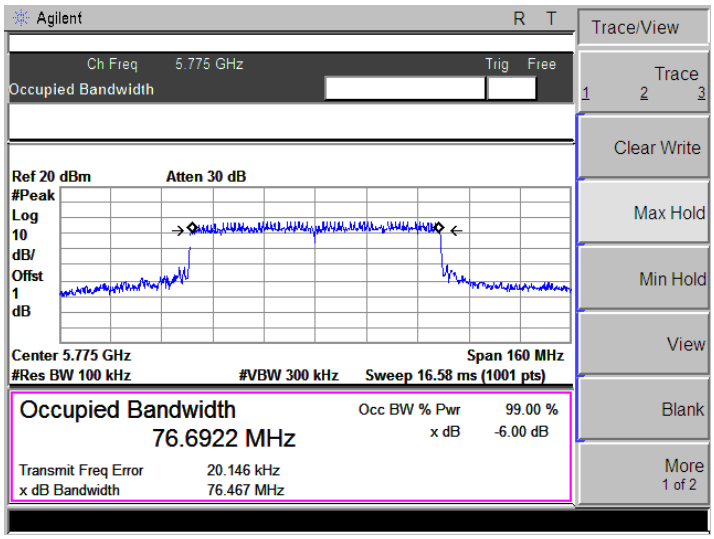
6DB

802.11a-Low	
802.11a-Middle	
802.11a-High	

802.11n-HT20-Low	
802.11n-HT20-Middle	
802.11n-HT20-High	

802.11n-HT40-Low	
802.11n-HT40-High	
802.11ac-HT80	

802.11n-AX20-Low	
802.11n-AX20-Middle	
802.11n-AX20-High	

802.11n-AX40-Low	
802.11n-AX40-High	
802.11ac-AX80	

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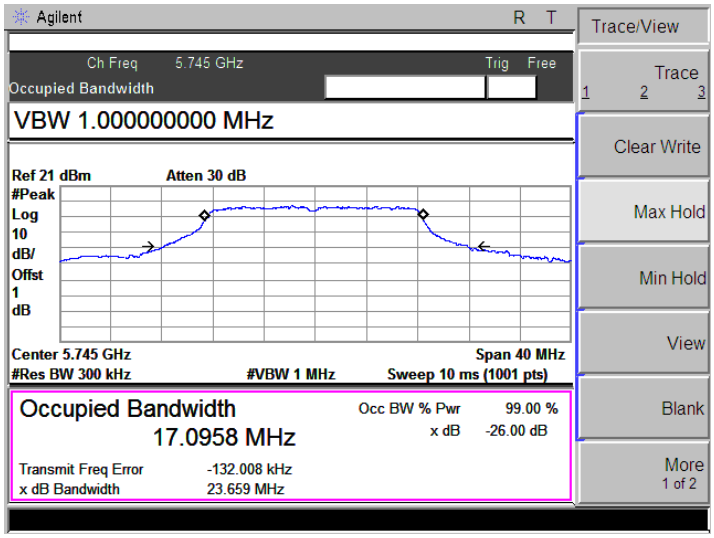
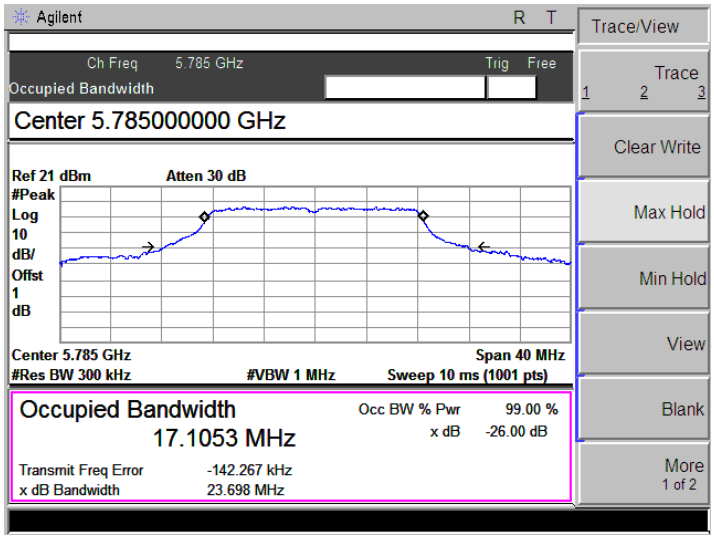
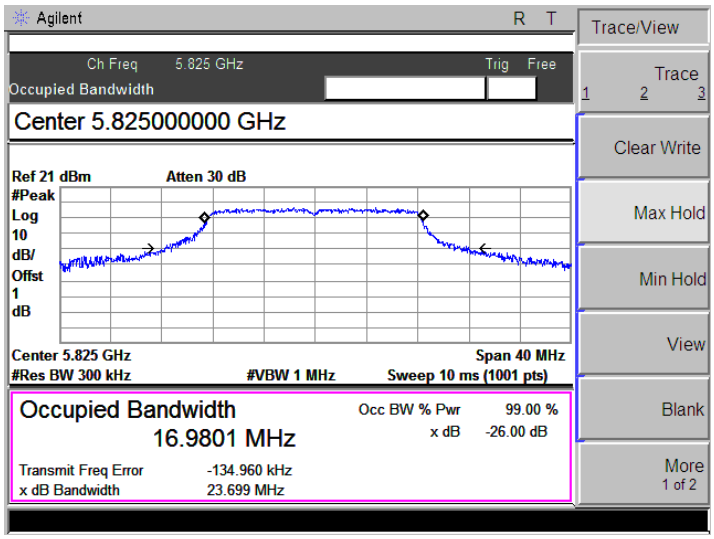
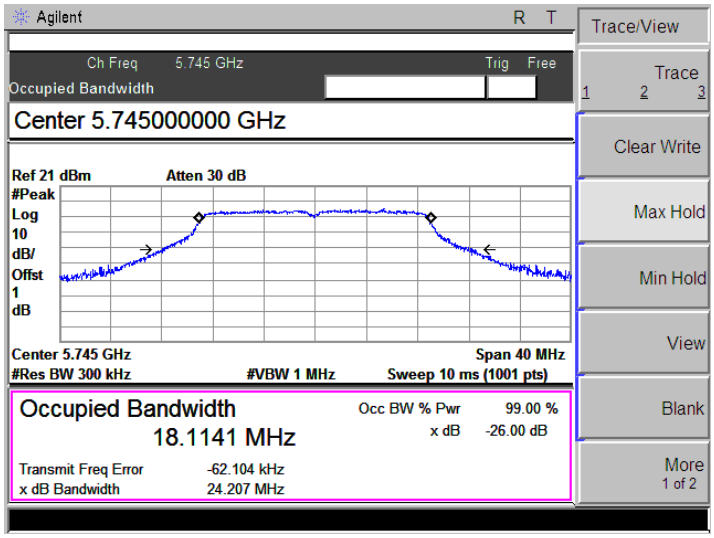
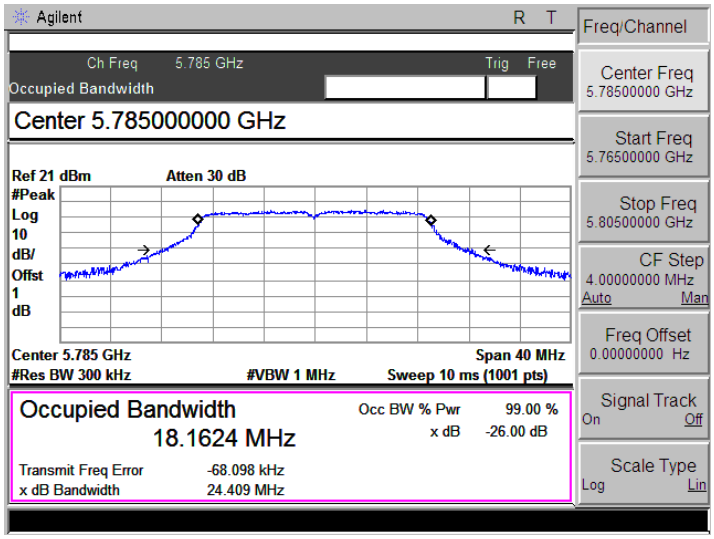
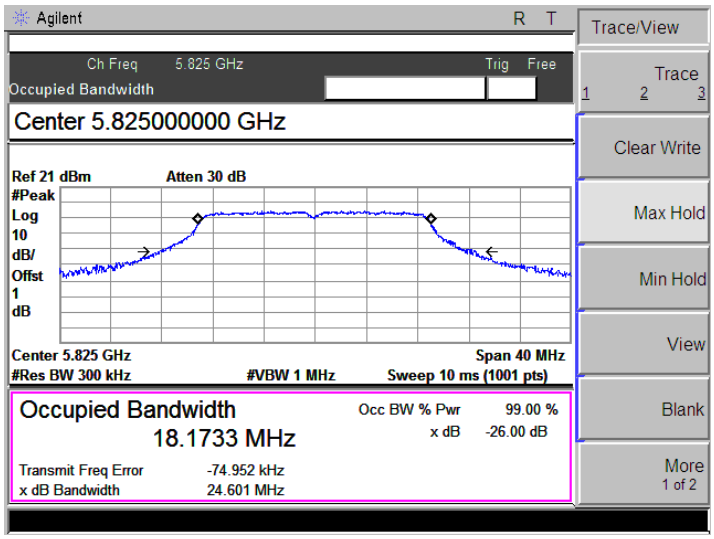
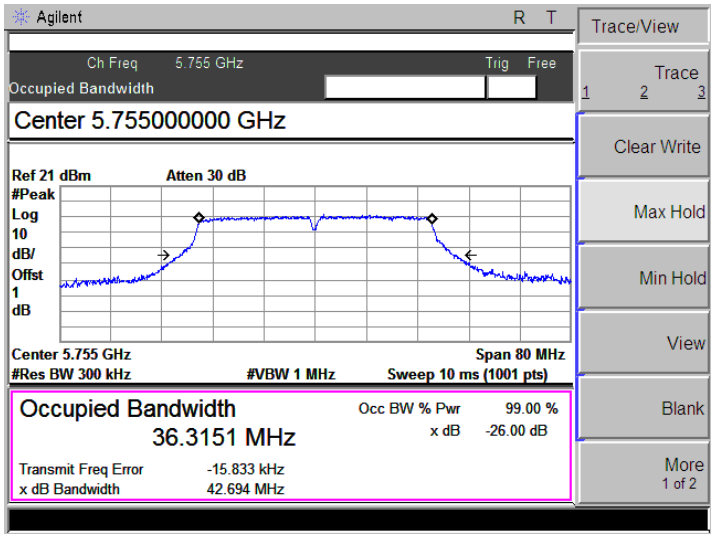
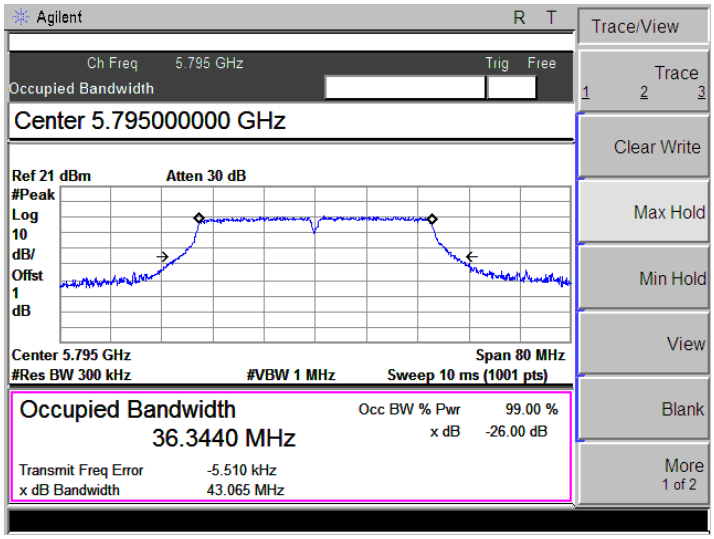
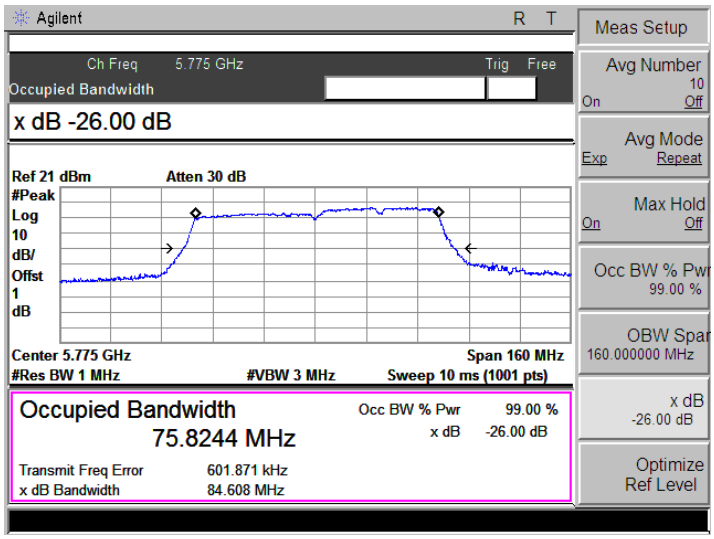
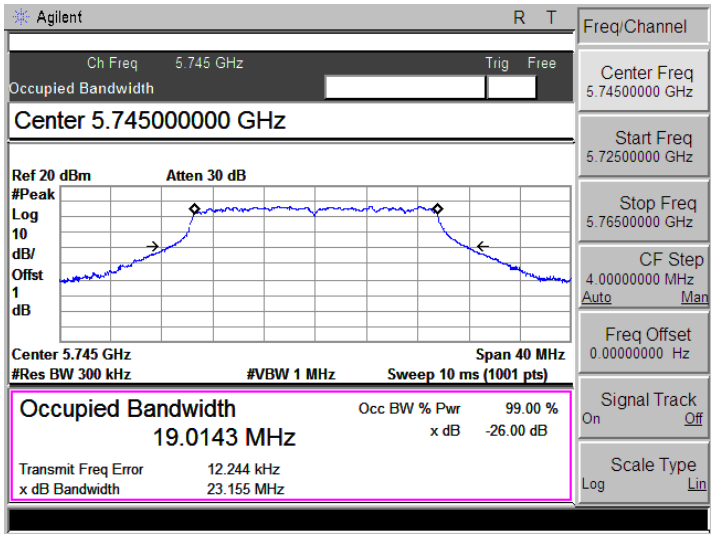
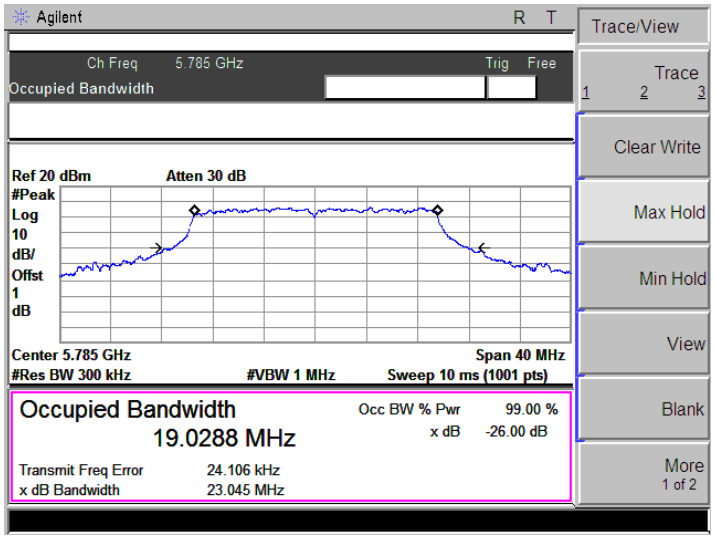
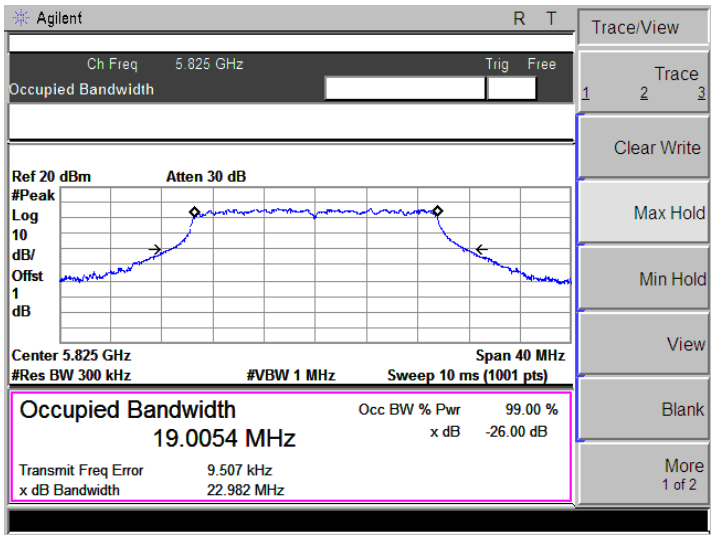
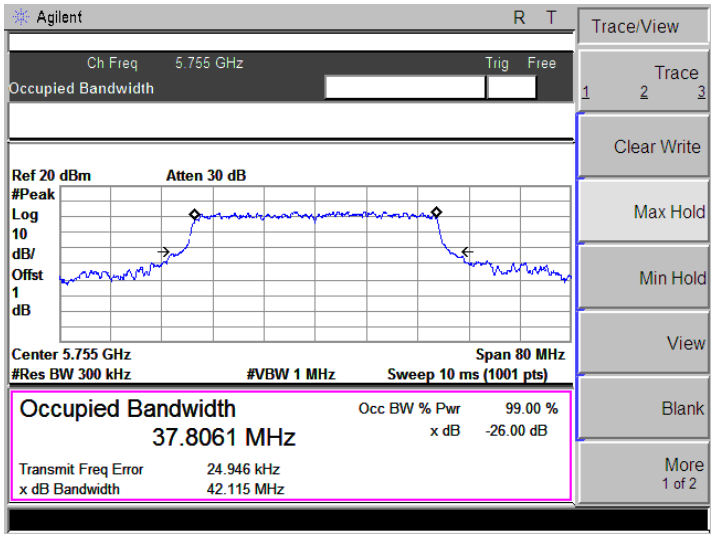
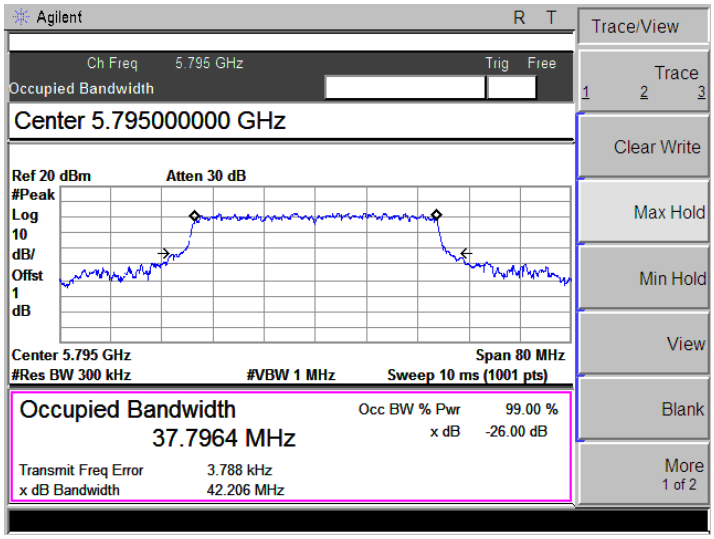
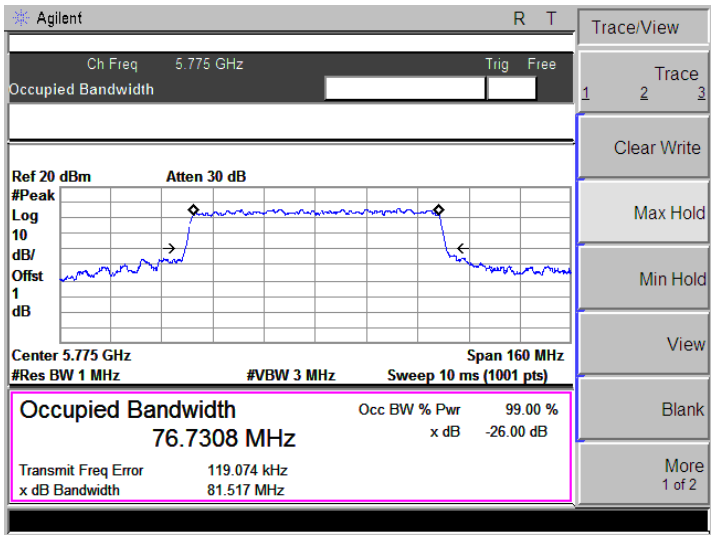
802.11a-Low	
802.11a-Middle	
802.11a-High	

802.11n-HT20-Low	
802.11n-HT20-Middle	
802.11n-HT20-High	

802.11n-HT40-Low	
802.11n-HT40-High	
802.11ac-HT80	

802.11n-AX20-Low	
802.11n-AX20-Middle	
802.11n-AX20-High	

802.11n-AX40-Low	
802.11n-AX40-High	
802.11ac-AX80	

APPENDIX C

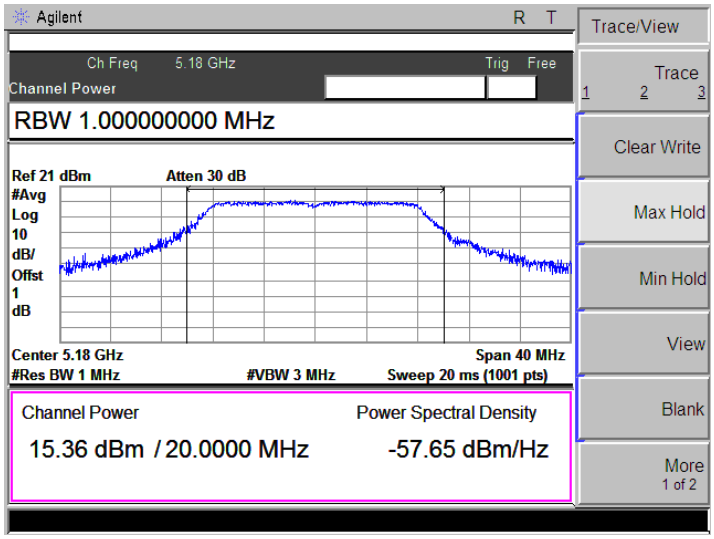
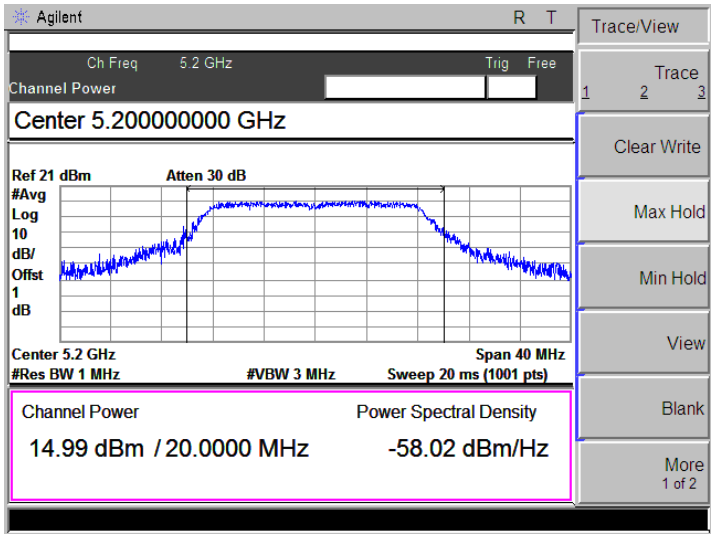
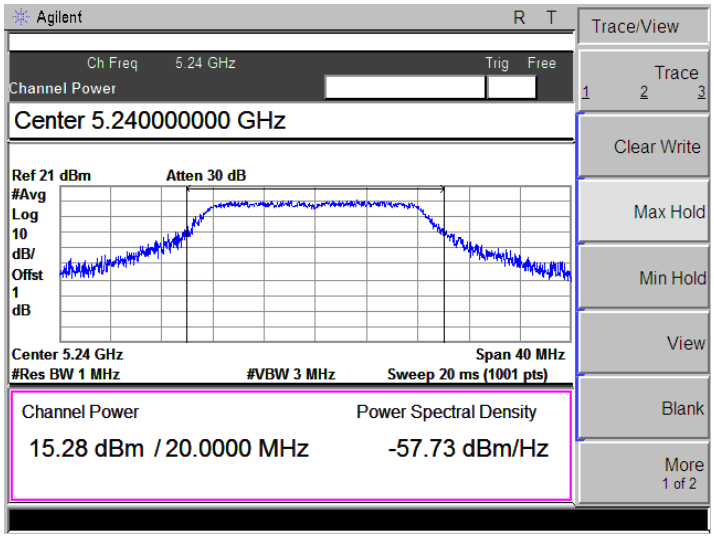
Maximum Conducted Output Power

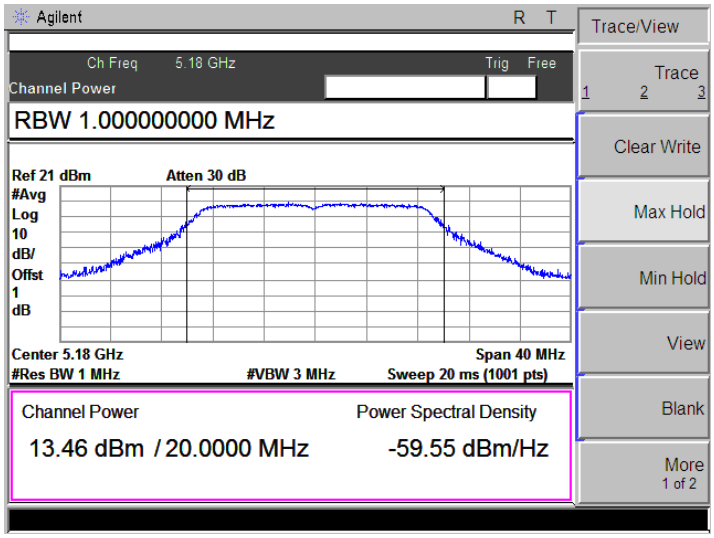
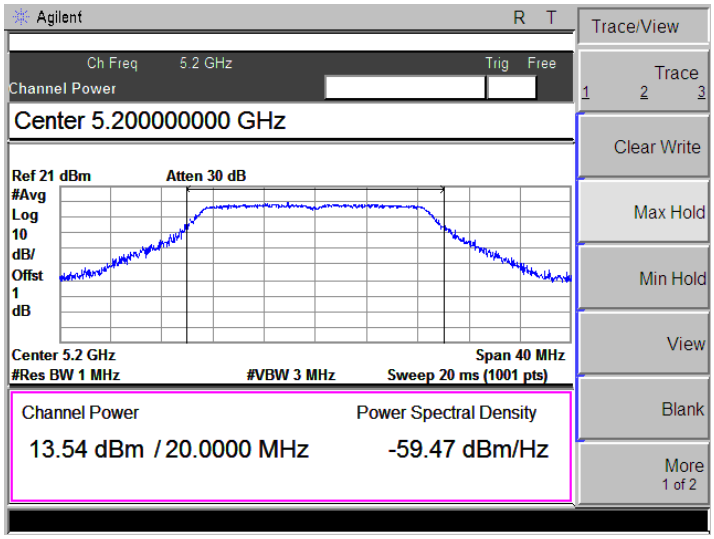
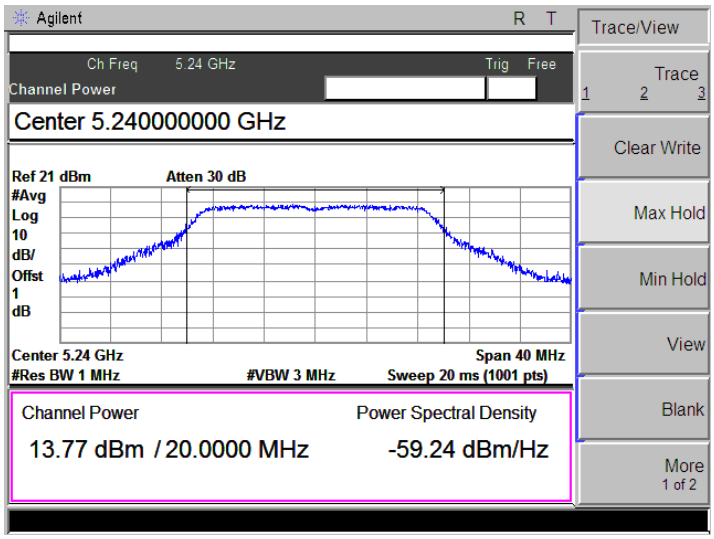
U-NII-1:5150-5250MHz					
Test mode	Frequency MHz	Output Power dBm		Total dBm	Limit dBm
		ANT 0	ANT 1		
802.11a	5180	15.36	15.53	/	23.98
	5200	14.99	15.69	/	23.98
	5240	15.28	15.66	/	23.98
802.11n-HT20	5180	13.46	14.35	16.94	23.98
	5200	13.54	13.77	16.67	23.98
	5240	13.77	13.49	16.64	23.98
802.11n-HT40	5190	12.49	12.26	15.39	23.98
	5230	12.37	12.25	15.32	23.98
802.11ac VH80	5210	11.20	11.54	14.38	23.98
802.11n-AX20	5180	12.89	12.03	15.49	23.98
	5200	12.86	11.98	15.45	23.98
	5240	12.93	11.55	15.30	23.98
802.11n-AX40	5190	10.89	10.67	13.79	23.98
	5230	11.39	9.94	13.74	23.98
802.11ac AX80	5210	9.54	9.64	12.60	23.98

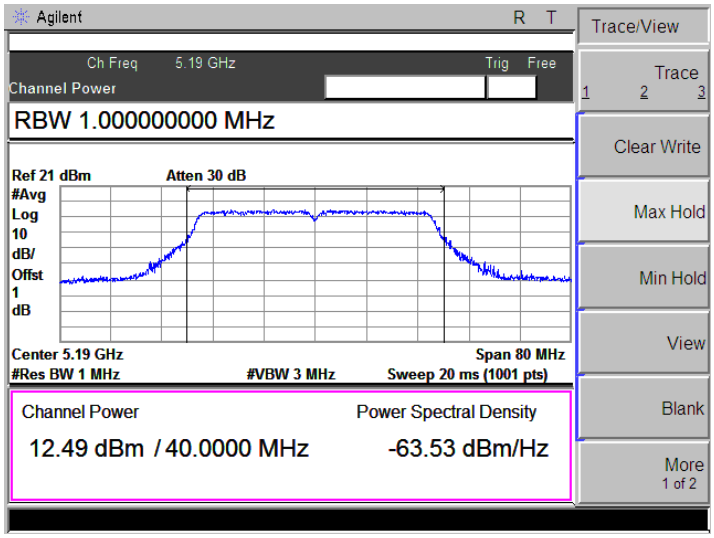
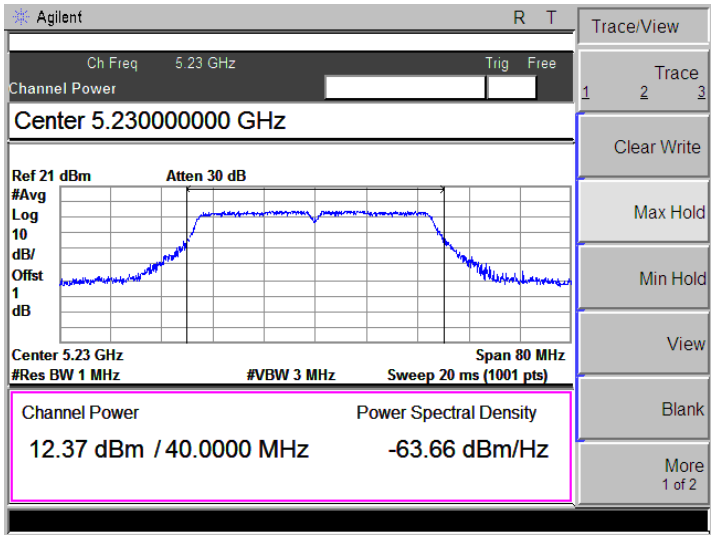
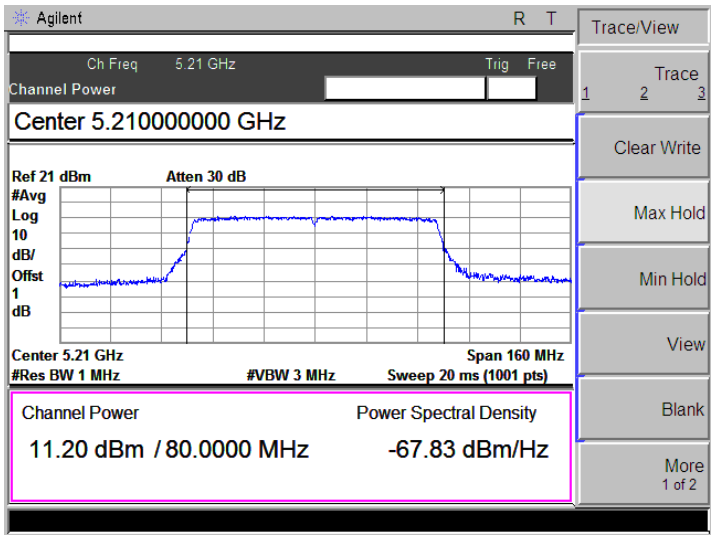
U-NII-3: 5725-5850MHz					
Test mode	Frequency MHz	Output Power dBm		Total dBm	Limit dBm
		ANT 0	ANT 1		
802.11a	5745	15.13	14.78	/	30
	5785	15.12	14.19	/	30
	5825	14.84	14.12	/	30
802.11n-HT20	5745	13.04	12.42	15.75	30
	5785	12.89	12.20	15.57	30
	5825	12.54	11.58	15.10	30
802.11n-HT40	5755	11.70	11.56	14.64	30
	5795	11.39	10.96	14.19	30
802.11ac VH80	5775	11.38	10.41	13.93	30
802.11n-AX20	5745	11.88	12.04	14.97	23.98
	5785	11.46	11.37	14.43	23.98
	5825	11.23	11.27	14.26	23.98
802.11n-AX40	5755	10.14	10.13	13.15	23.98
	5795	10.01	9.90	12.97	23.98
802.11ac AX80	5775	9.99	9.75	12.88	23.98

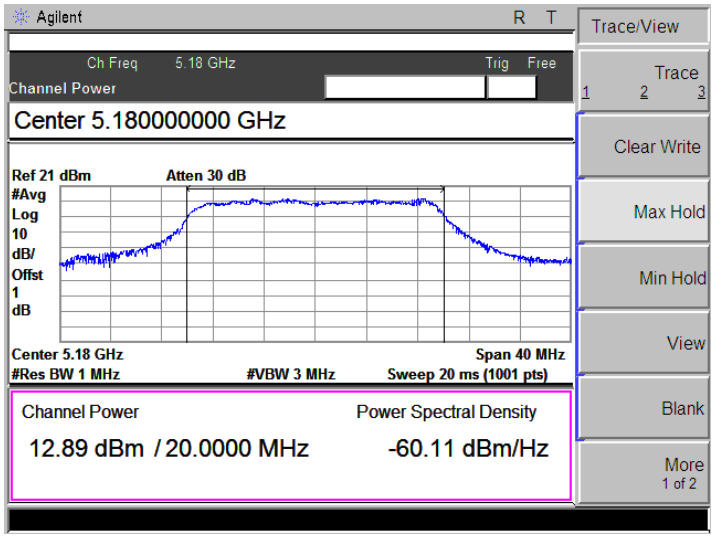
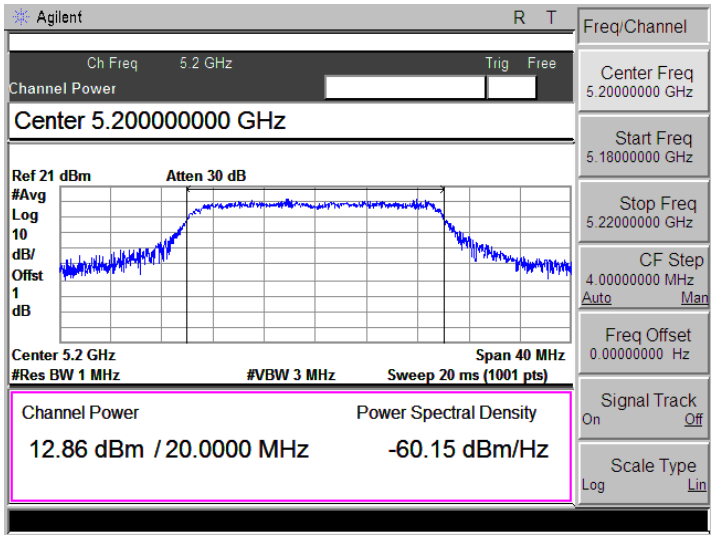
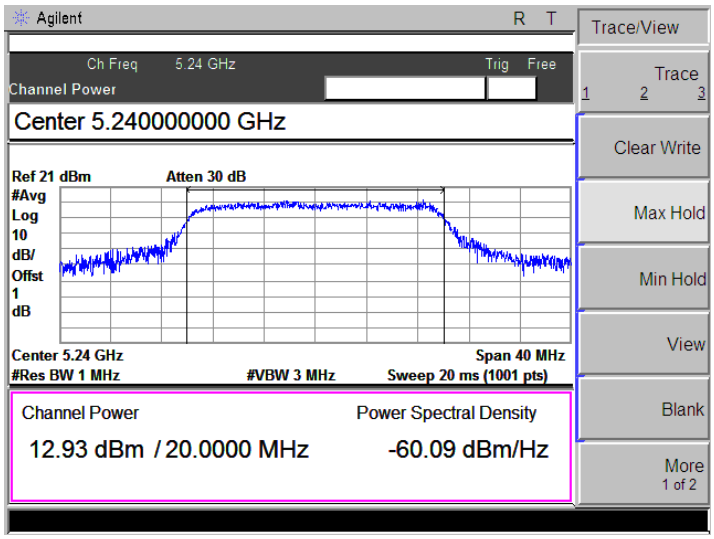
ANT 0

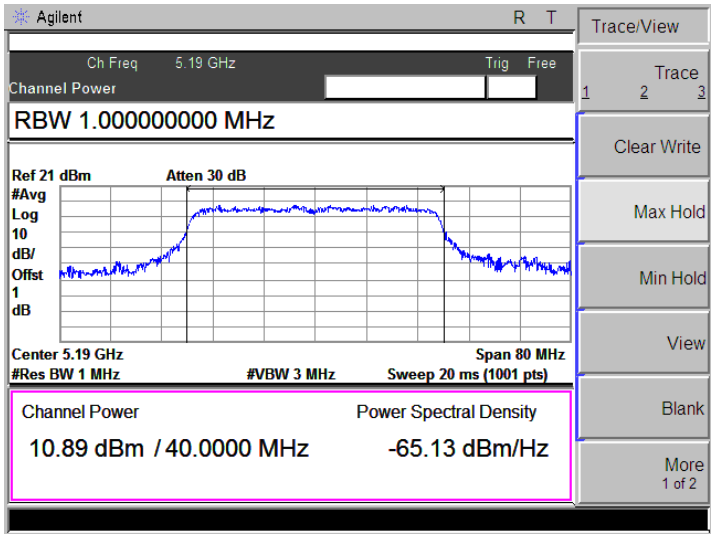
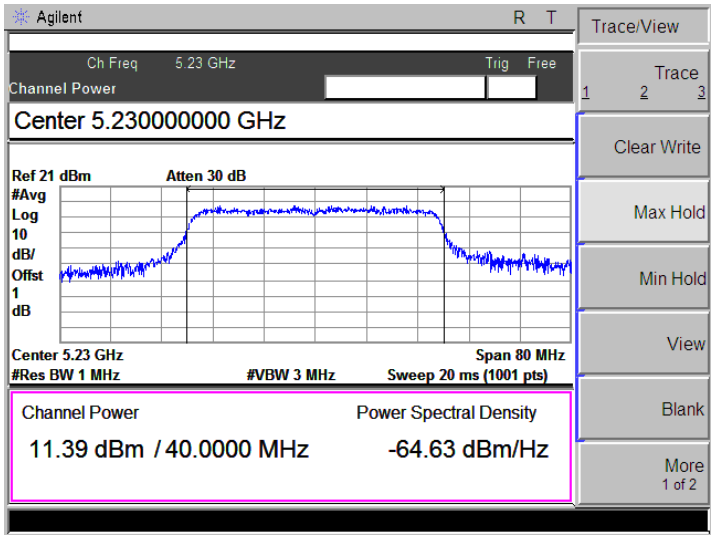
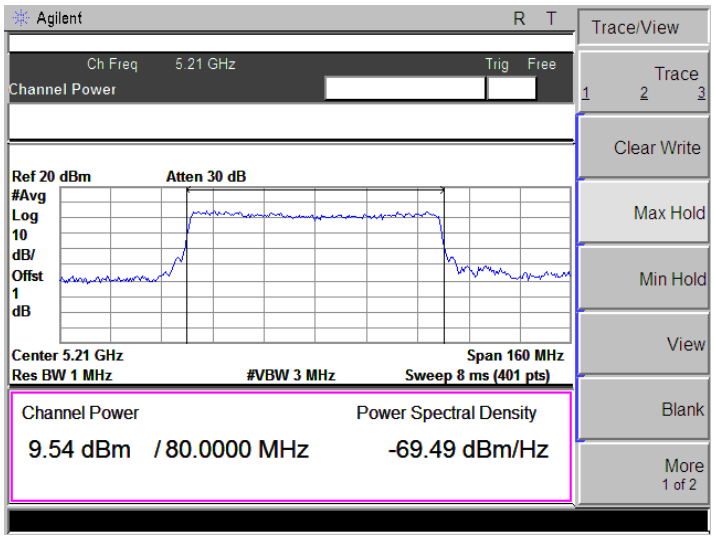
5150-5250MHz

802.11a-Low	
802.11a-Middle	
802.11a-High	

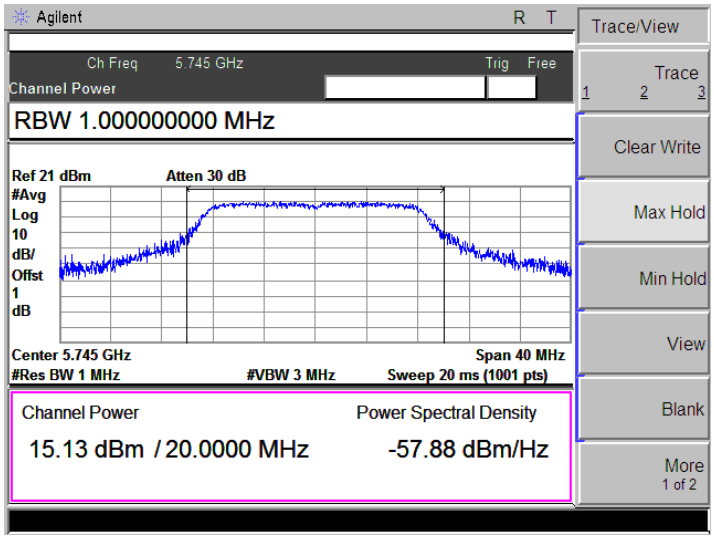
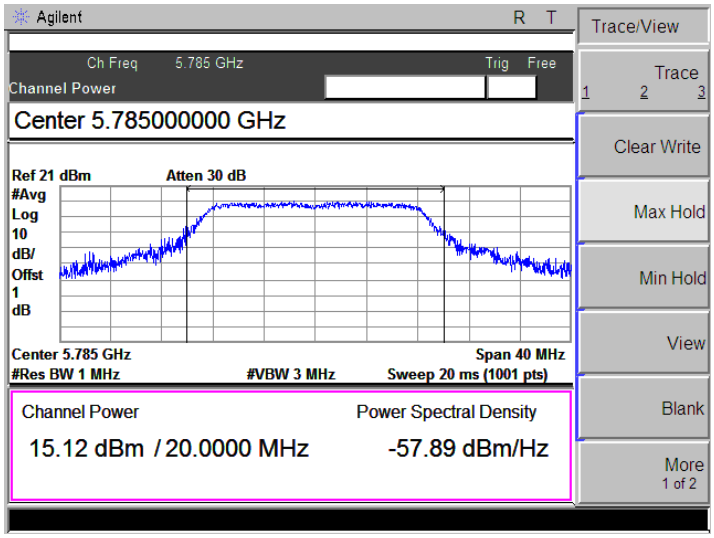
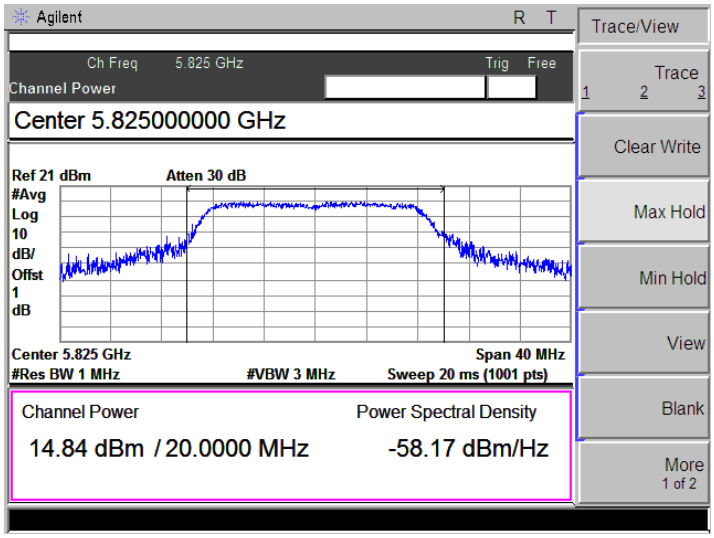
802.11n-HT20-Low	
802.11n-HT20-Middle	
802.11n-HT20-High	

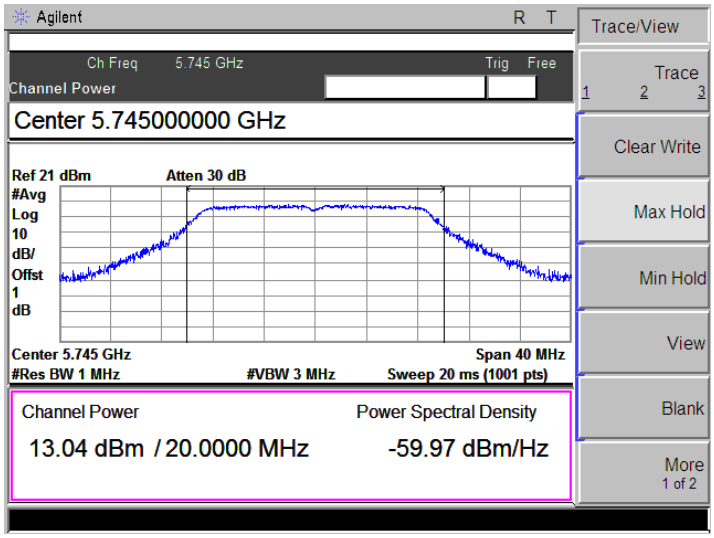
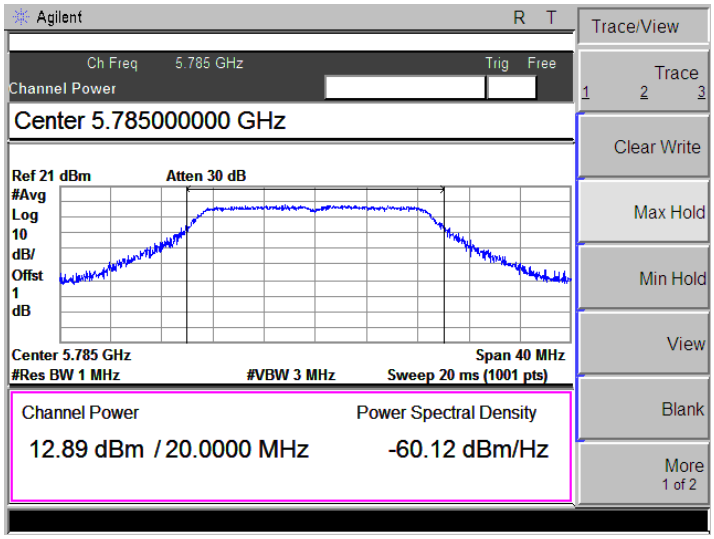
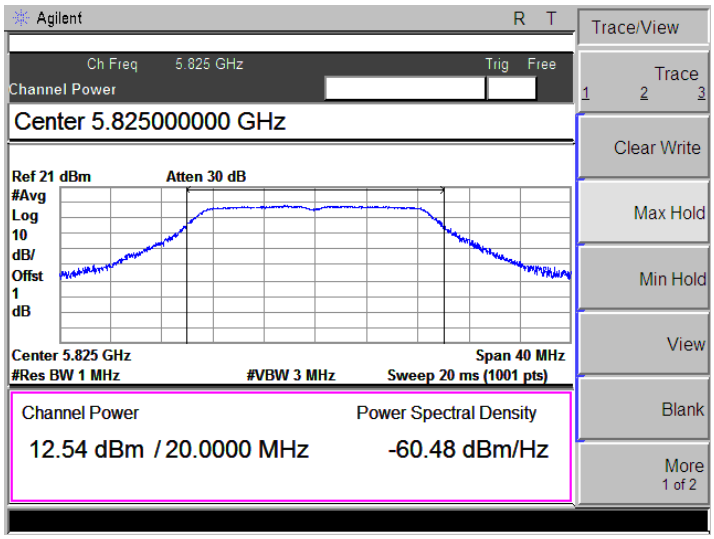
802.11n-HT40-Low	
802.11n-HT40-High	
802.11ac-HT80	

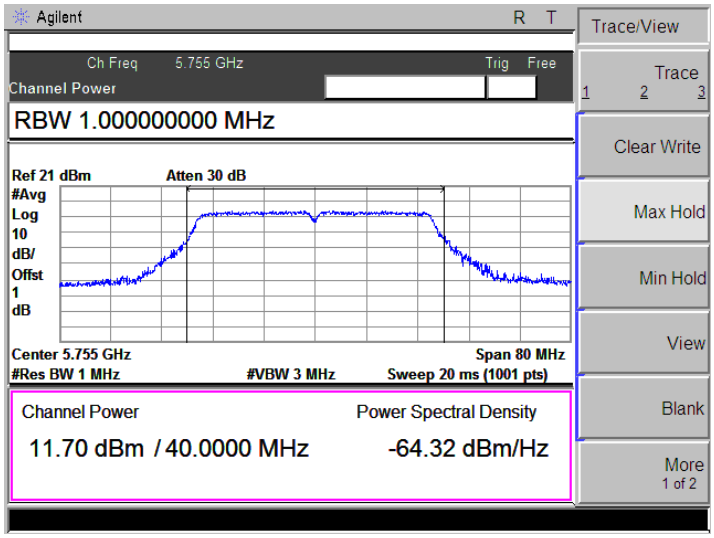
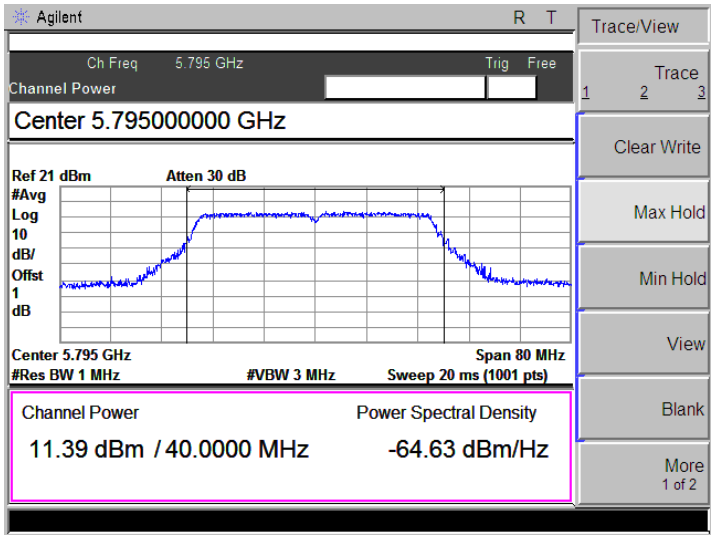
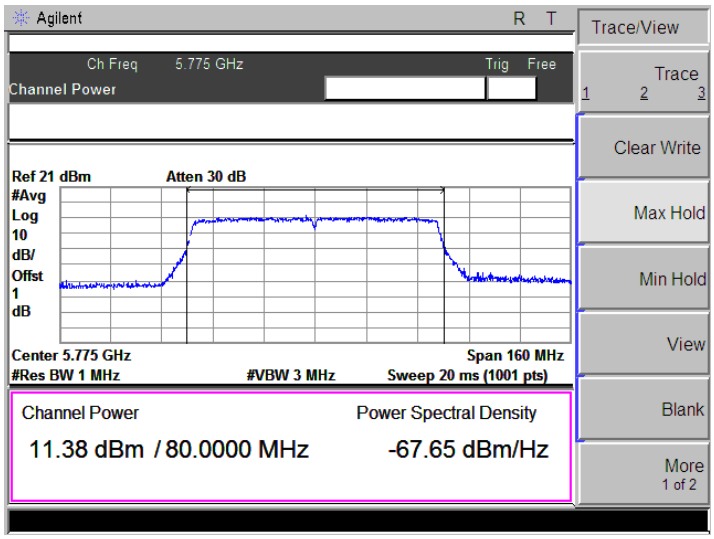
802.11n-AX20-Low	
802.11n-AX20-Middle	
802.11n-AX20-High	

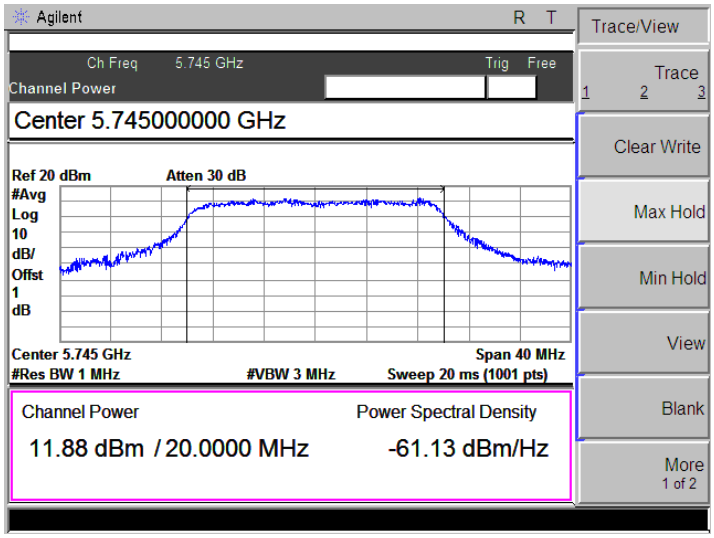
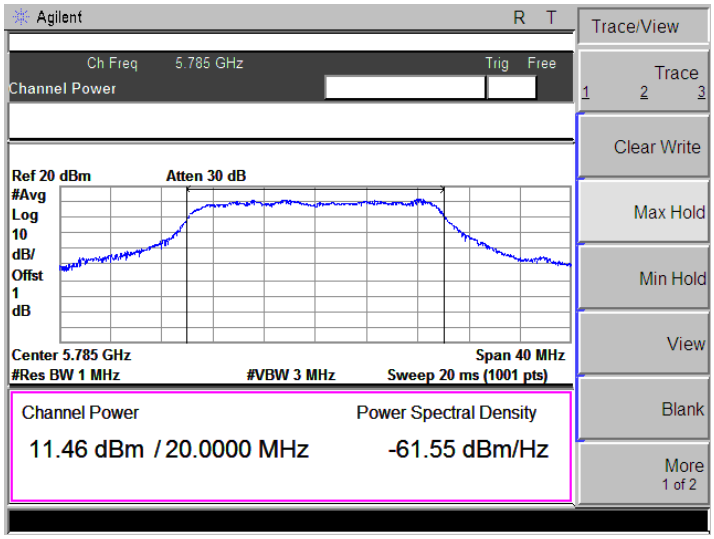
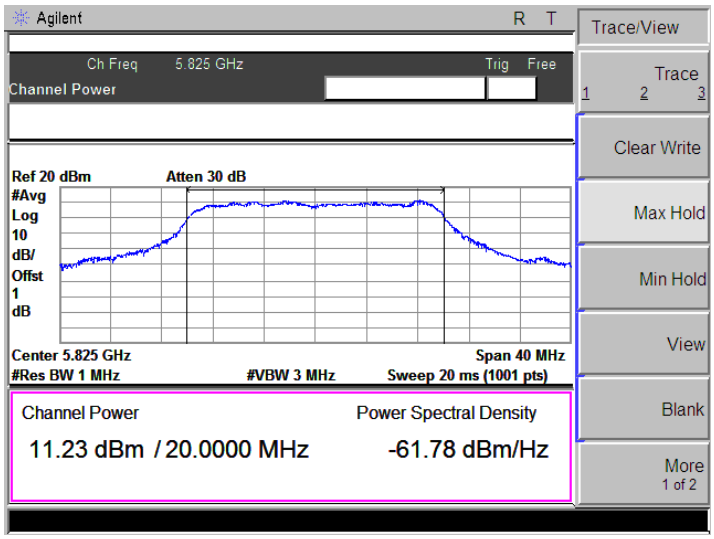
802.11n-AX40-Low	
802.11n-AX40-High	
802.11ac-AX80	

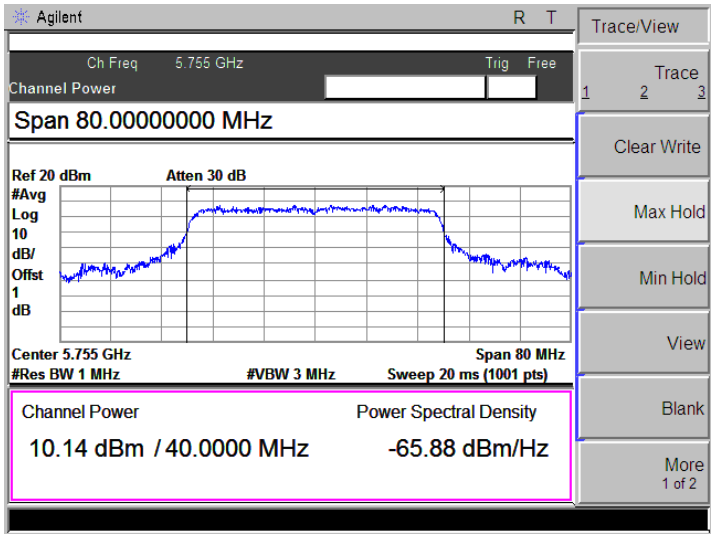
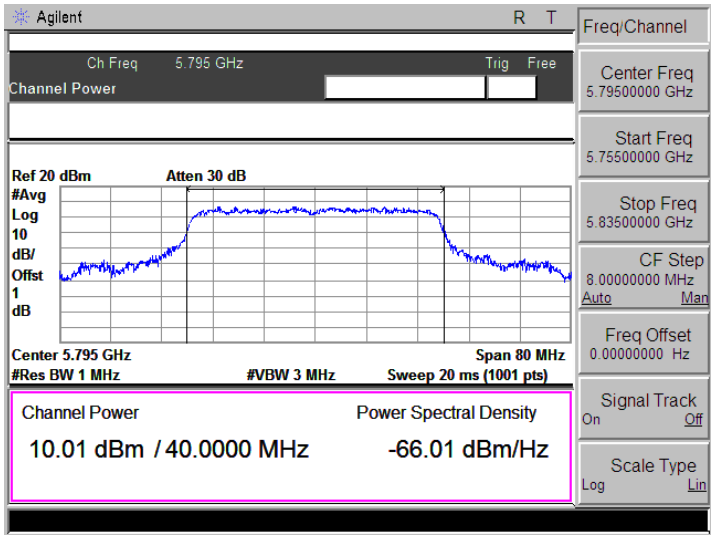
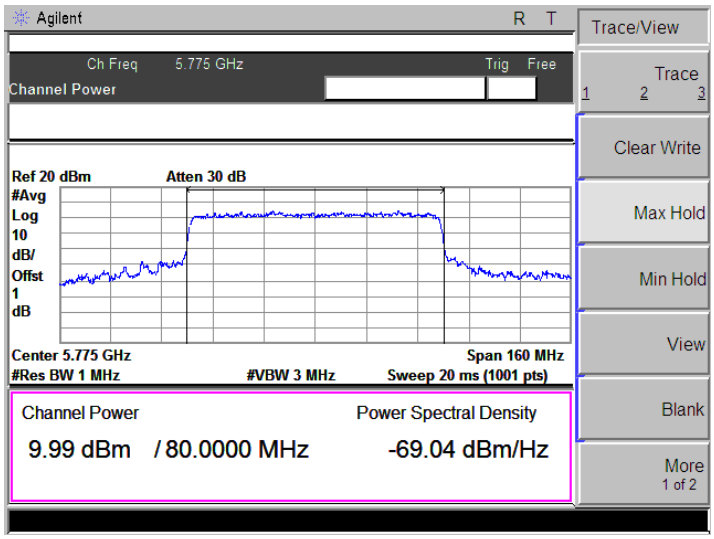
5725-5850MHz

802.11a-Low	
802.11a-Middle	
802.11a-High	

802.11n-HT20-Low	
802.11n-HT20-Middle	
802.11n-HT20-High	

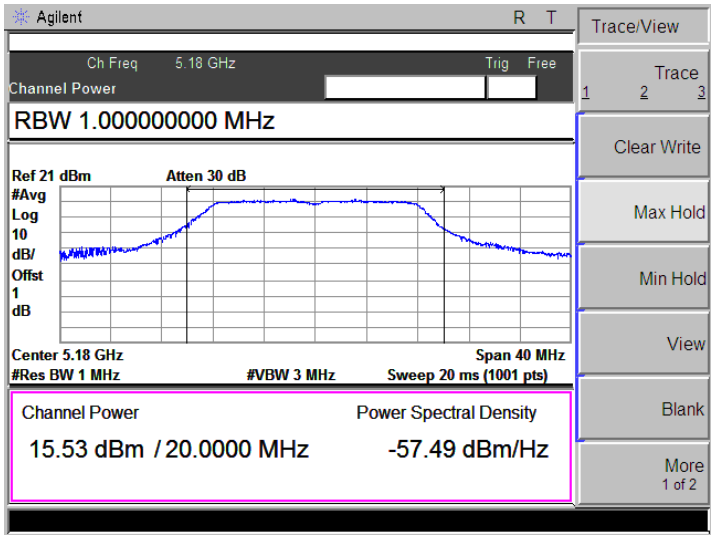
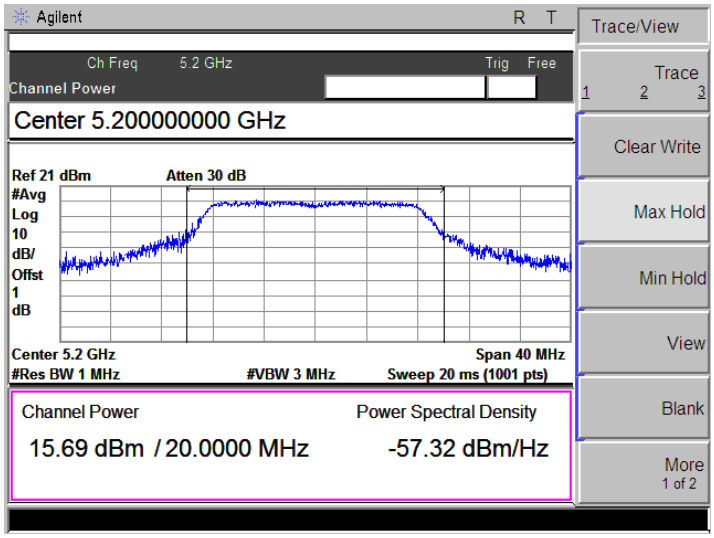
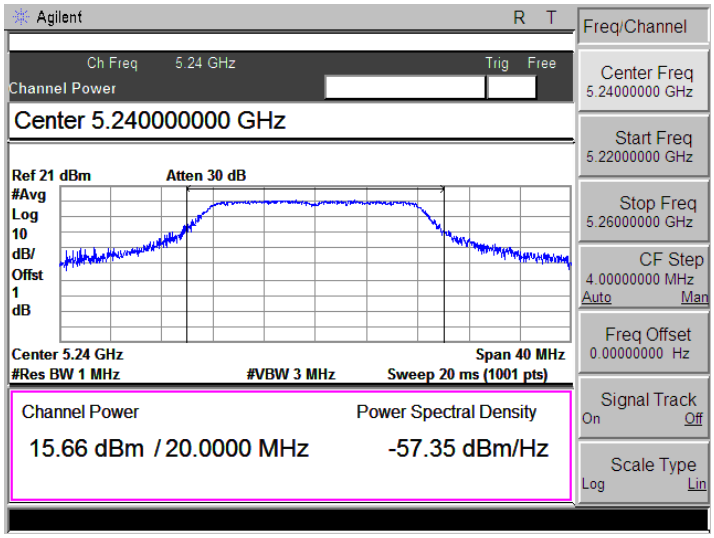
802.11n-HT40-Low	
802.11n-HT40-High	
802.11ac-HT80	

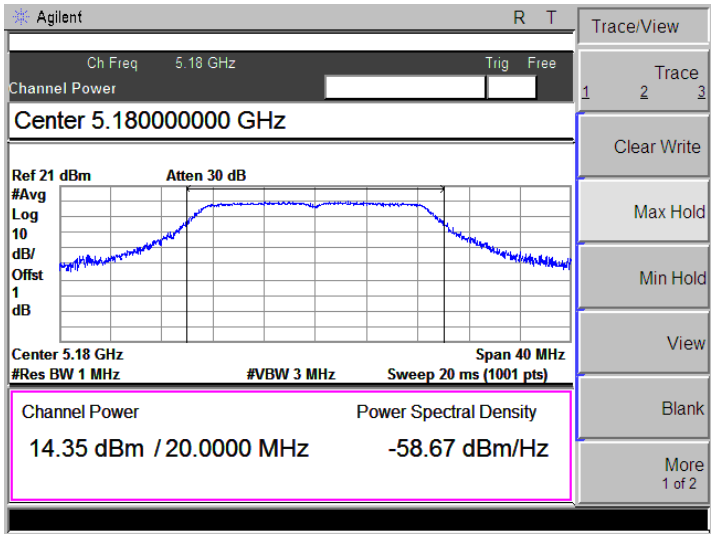
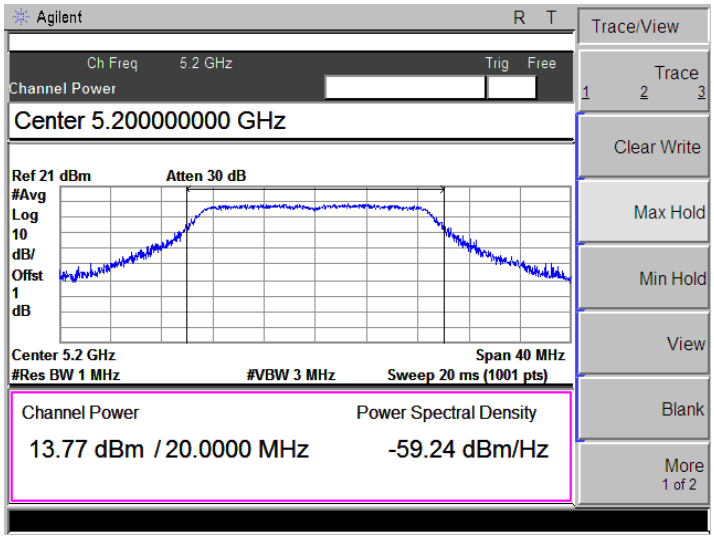
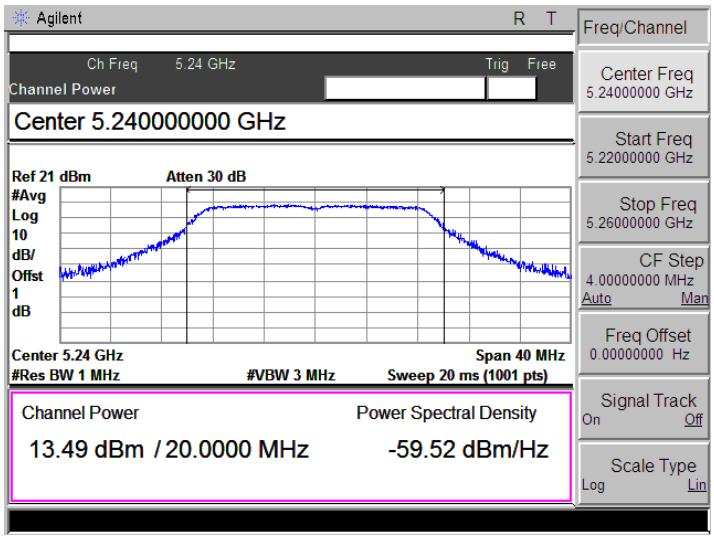
802.11n-AX20-Low	
802.11n-AX20-Middle	
802.11n-AX20-High	

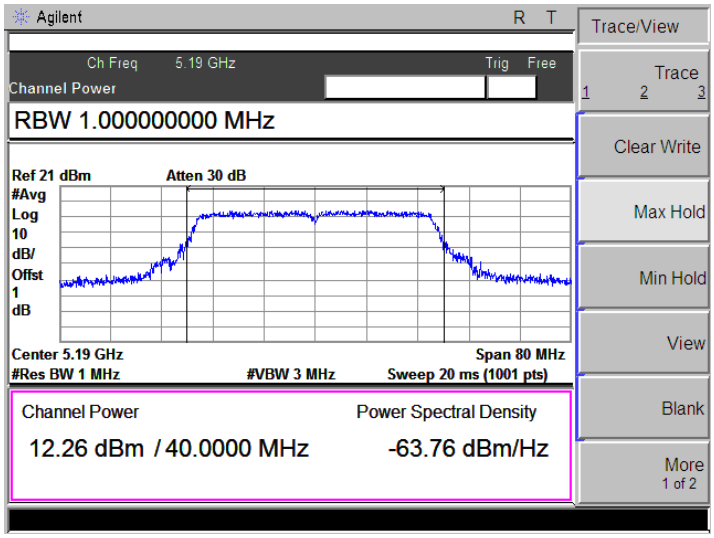
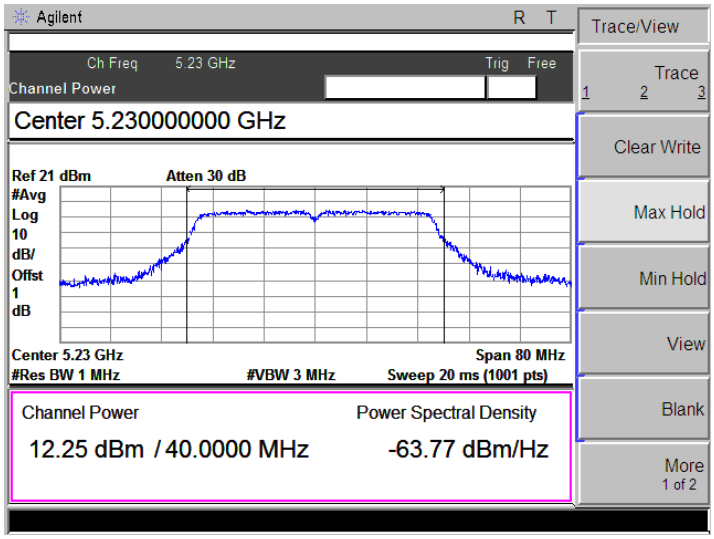
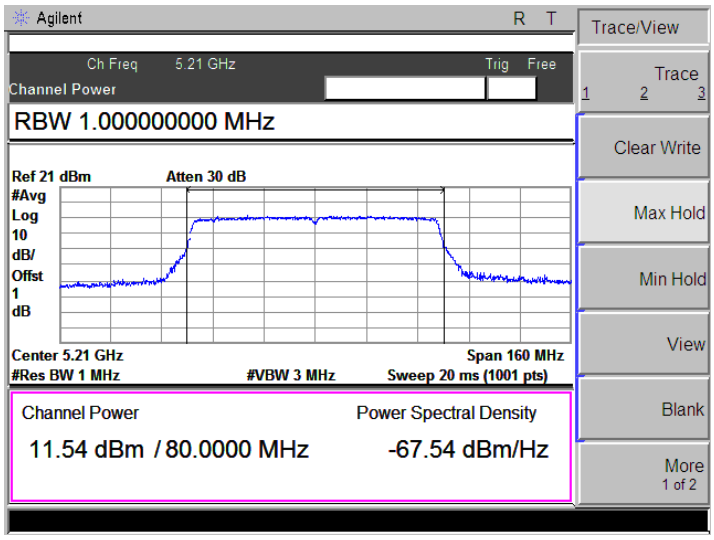
802.11n-AX40-Low	
802.11n-AX40-High	
802.11ac-AX80	

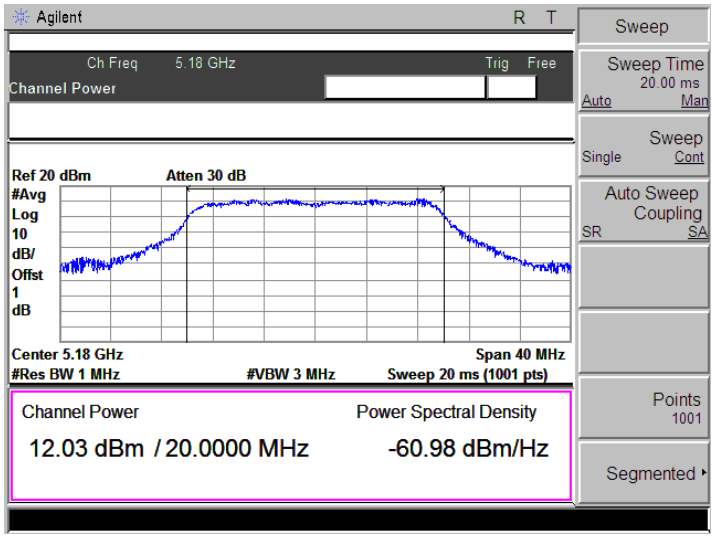
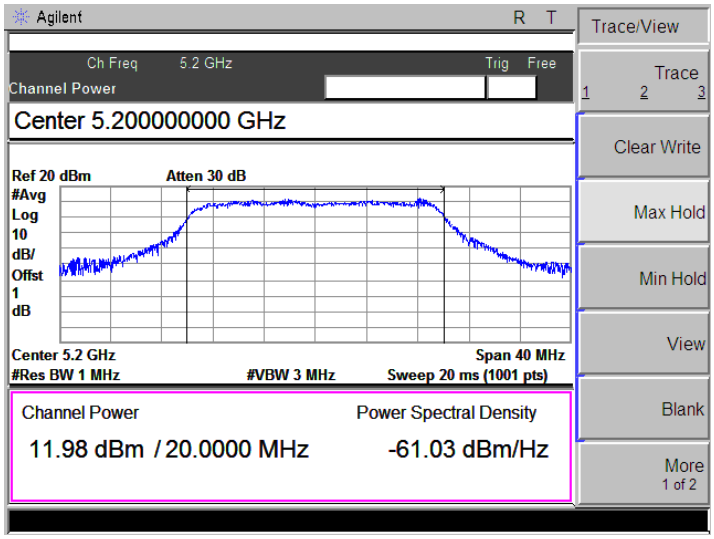
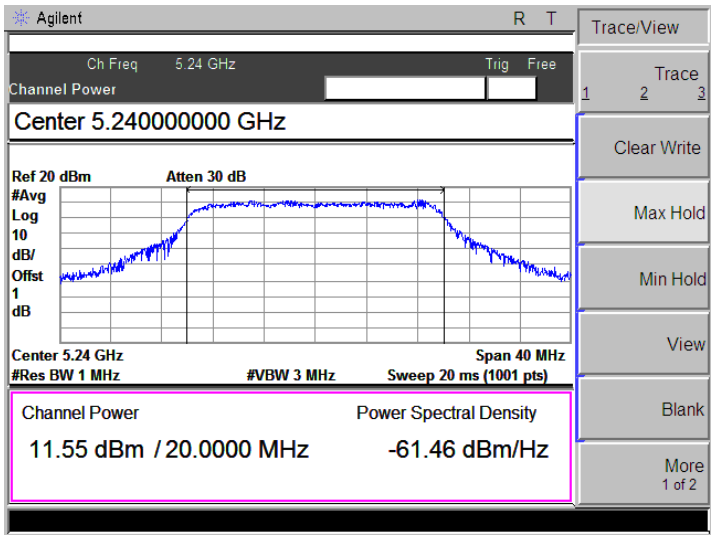
ANT 1

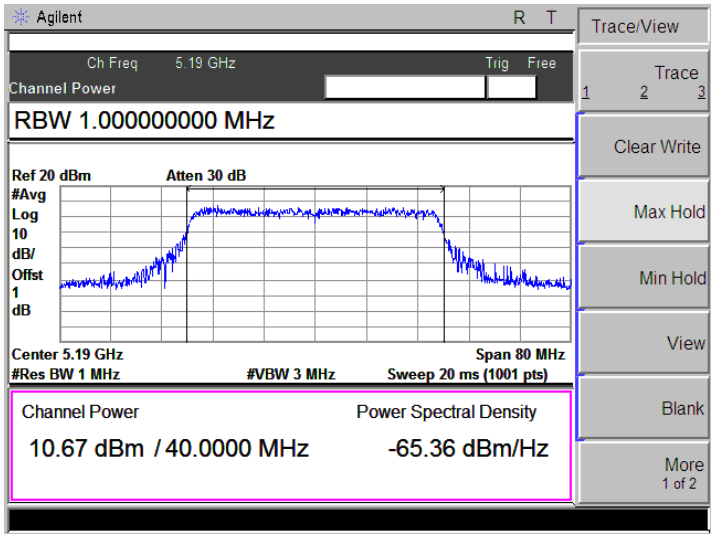
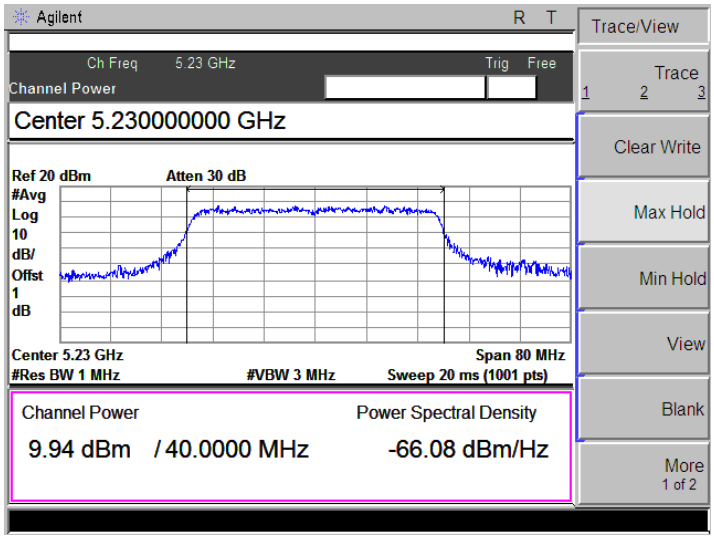
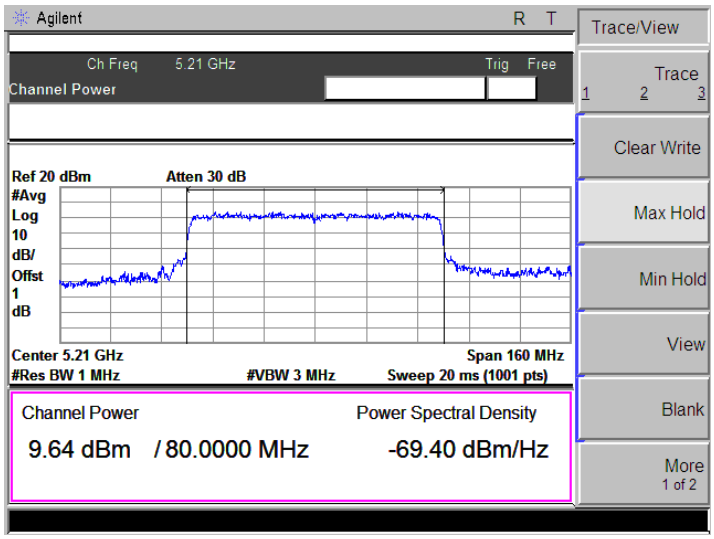
5150-5250MHz

802.11a-Low	
802.11a-Middle	
802.11a-High	

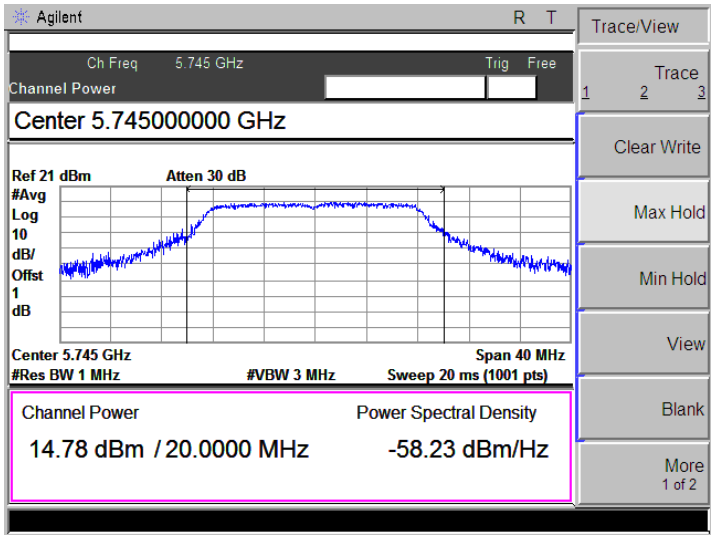
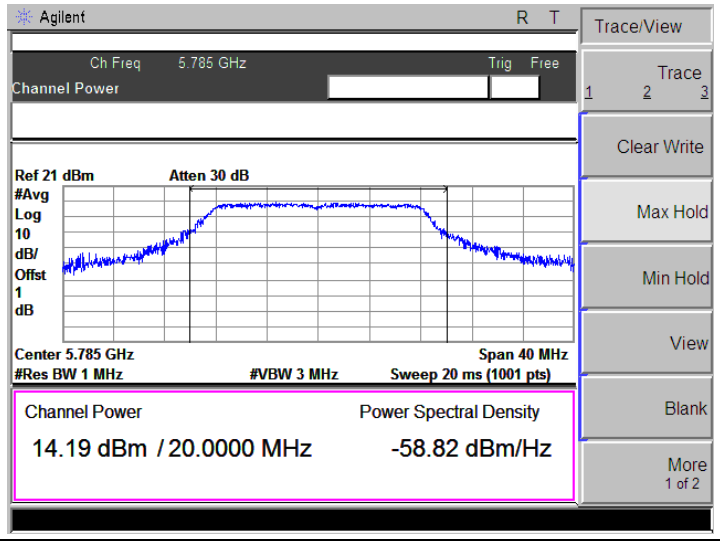
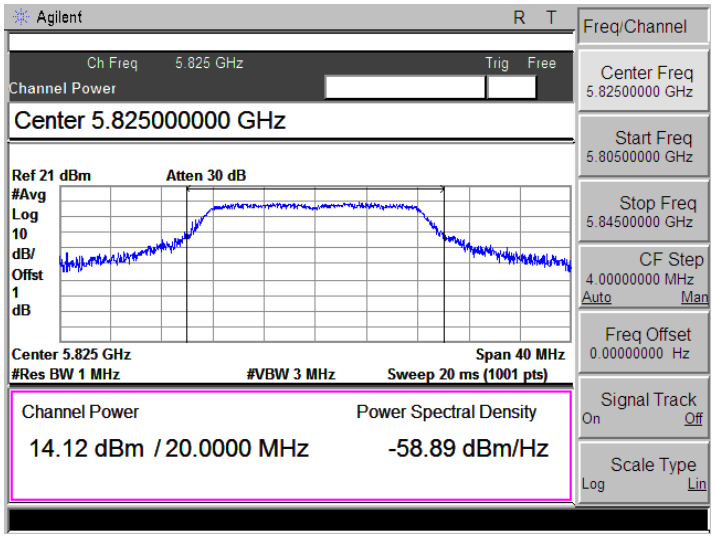
802.11n-HT20-Low	
802.11n-HT20-Middle	
802.11n-HT20-High	

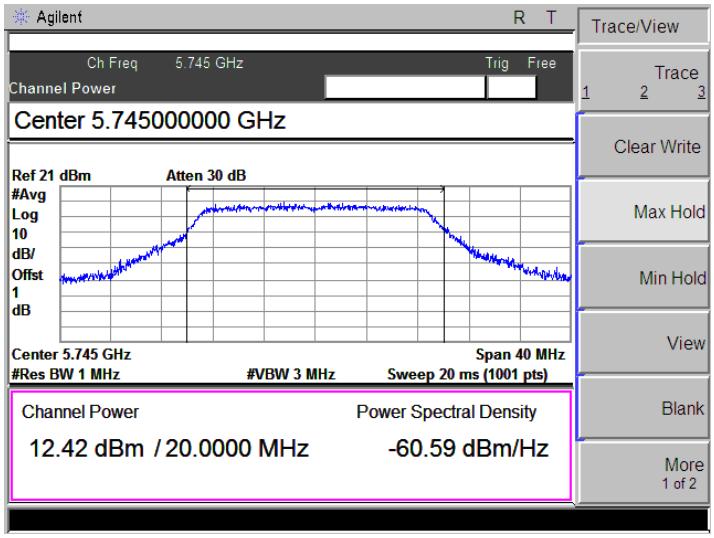
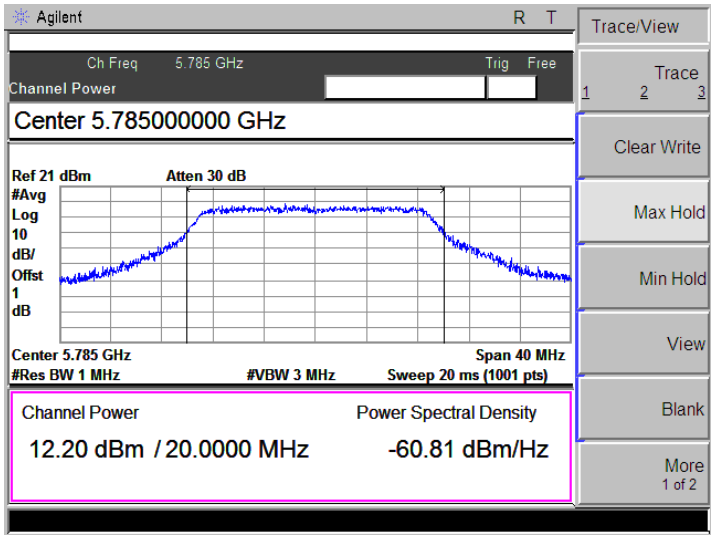
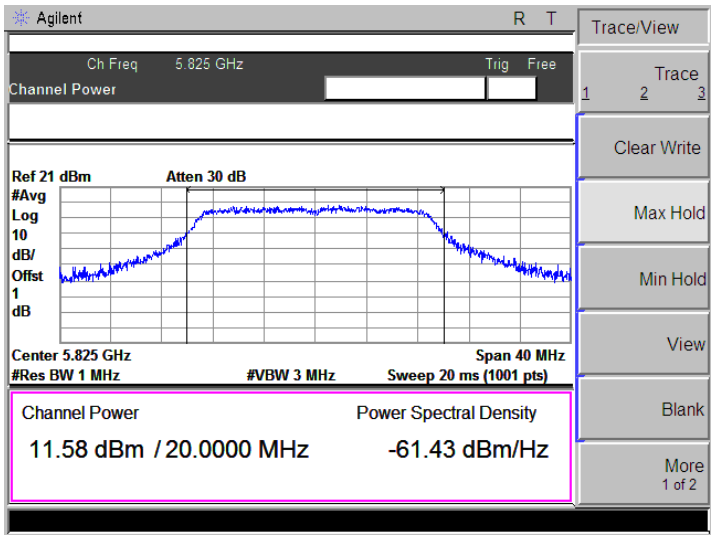
802.11n-HT40-Low	
802.11n-HT40-High	
802.11ac-HT80	

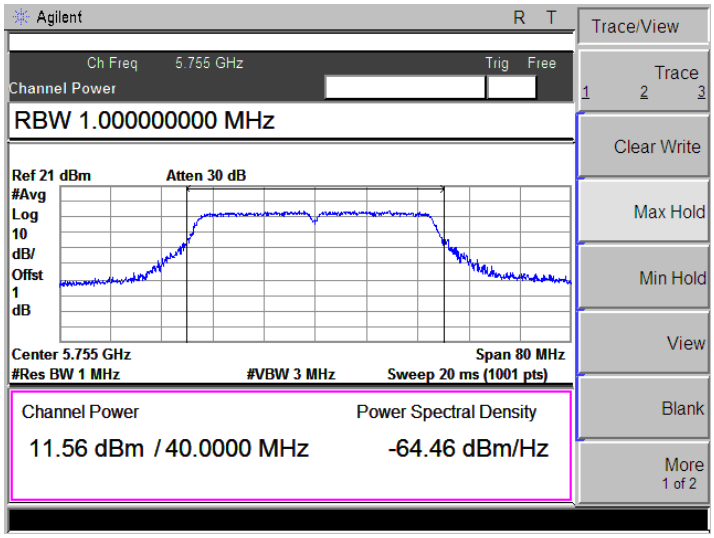
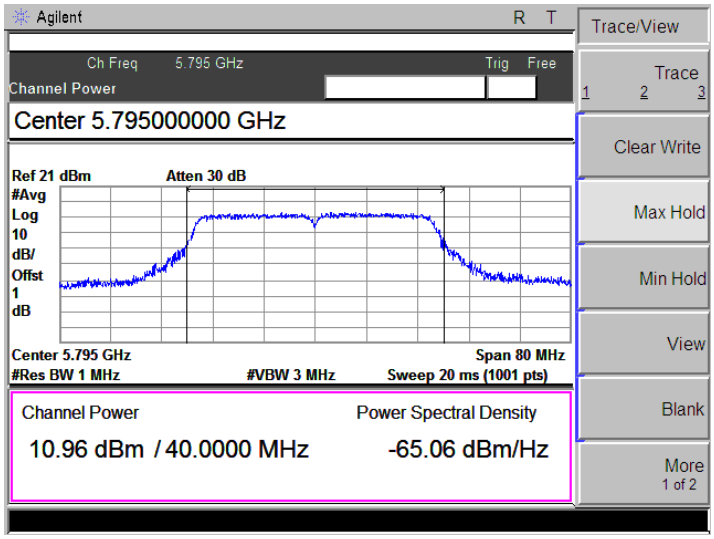
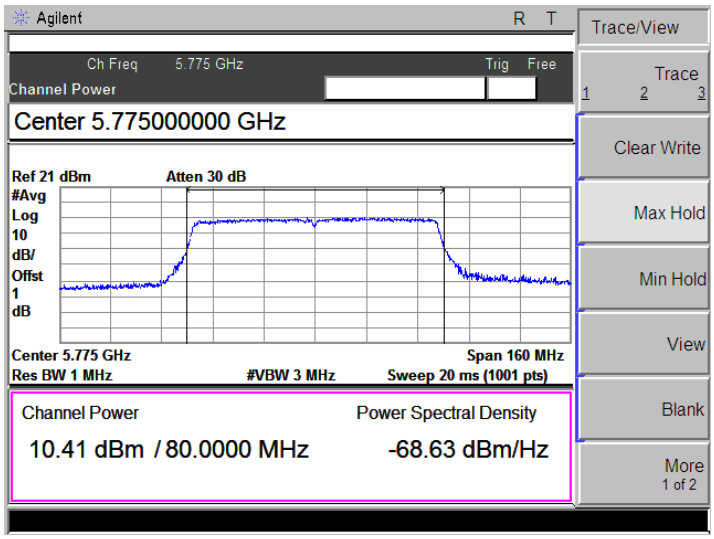
802.11n-AX20-Low	
802.11n-AX20-Middle	
802.11n-AX20-High	

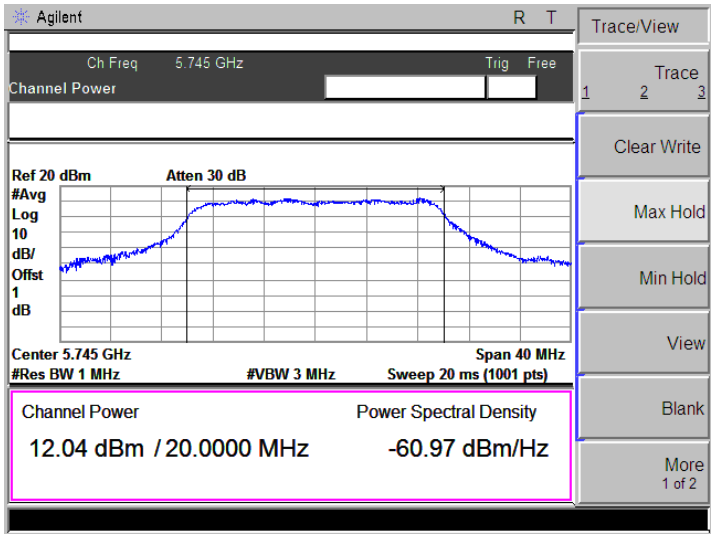
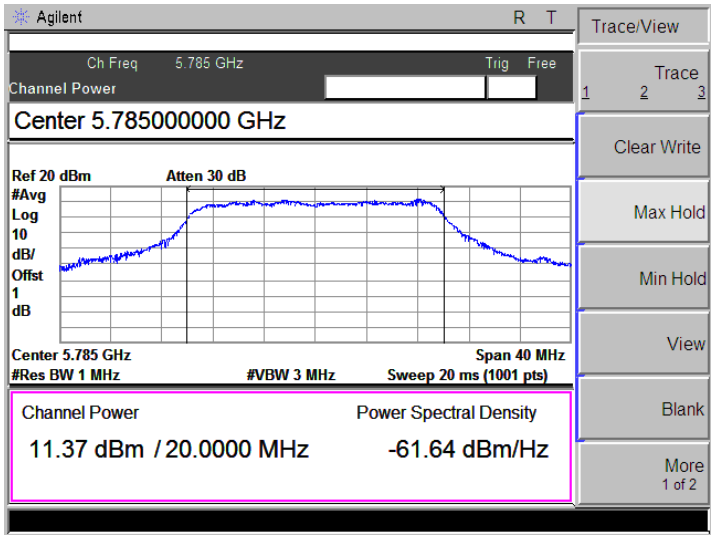
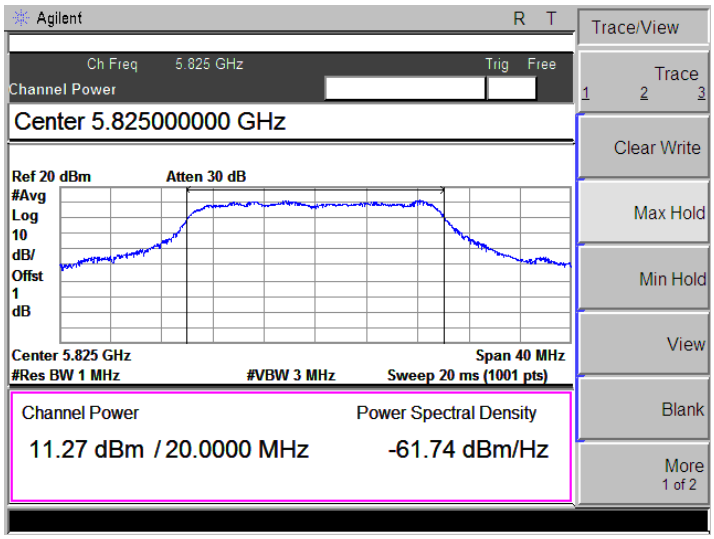
802.11n-AX40-Low	
802.11n-AX40-High	
802.11ac-AX80	

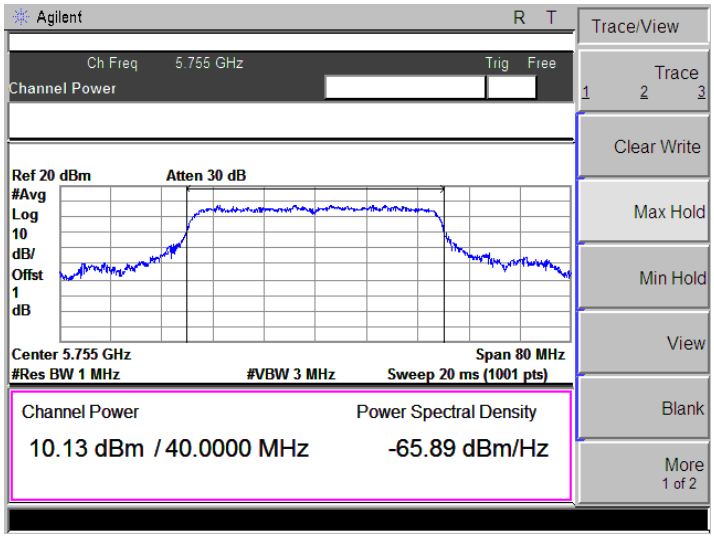
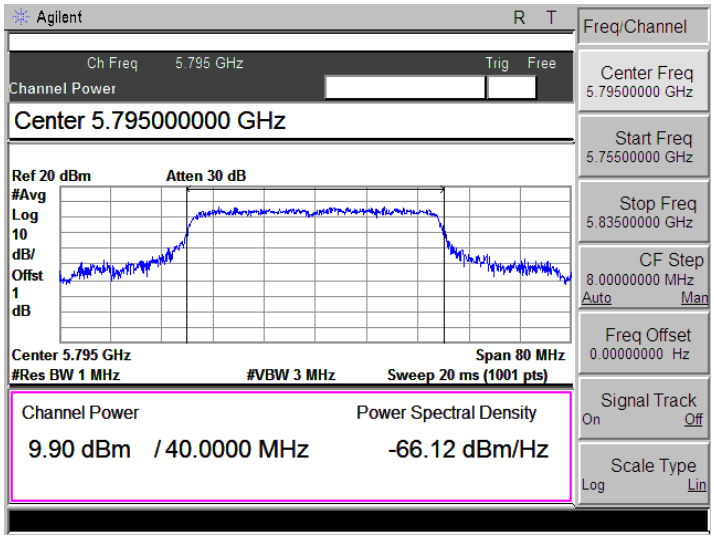
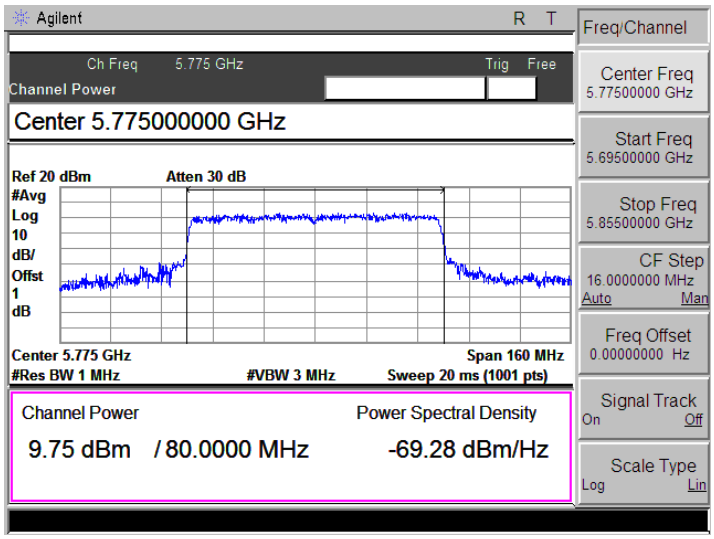
5725-5850MHz

802.11a-Low	
802.11a-Middle	
802.11a-High	

802.11n-HT20-Low	
802.11n-HT20-Middle	
802.11n-HT20-High	

802.11n-HT40-Low	
802.11n-HT40-High	
802.11ac-HT80	

802.11n-AX20-Low	
802.11n-AX20-Middle	
802.11n-AX20-High	

802.11n-AX40-Low	
802.11n-AX40-High	
802.11ac-AX80	

APPENDIX D

Frequency Stability

Antenna 0

U-NII-1:5150-5250MHz worst case at 802.11a middle channel				
Voltage(%)	Power(VDC)	TEMP(℃)	Freq.Dev(Hz)	Deviation
100%	12	-30	1491	0.2590
100%		-20	1290	0.2241
100%		-10	1452	0.2523
100%		0	1341	0.2330
100%		+10	1223	0.2126
100%		+20	1503	0.2612
100%		+30	1040	0.1808
100%		+40	1572	0.2732
100%		+50	1334	0.2318
Low Battery power	13.8	+20	1553	0.2699
High Battery power	10.2	+20	1490	0.2589

U-NII-1: 5250-5350MHz worst case at 802.11a middle channel				
Voltage(%)	Power(VDC)	TEMP(℃)	Freq.Dev(Hz)	Deviation
100%	12	-30	1502	0.2610
100%		-20	1300	0.2258
100%		-10	1444	0.2510
100%		0	1353	0.2351
100%		+10	1213	0.2107
100%		+20	1514	0.2631
100%		+30	1049	0.1823
100%		+40	1557	0.2706
100%		+50	1337	0.2324
Low Battery power	13.8	+20	1567	0.2723
High Battery power	10.2	+20	1503	0.2611

Antenna 1

U-NII-1: 5470-5725MHz worst case at 802.11a middle channel				
Voltage(%)	Power(VDC)	TEMP(℃)	Freq.Dev(Hz)	Deviation
100%	12	-30	1493	0.2594
100%		-20	1297	0.2254
100%		-10	1455	0.2529
100%		0	1351	0.2347
100%		+10	1223	0.2125
100%		+20	1498	0.2604
100%		+30	1045	0.1815
100%		+40	1568	0.2725
100%		+50	1326	0.2304
Low Battery power	13.8	+20	1561	0.2712
High Battery power	10.2	+20	1493	0.2595

U-NII-1:5725-5850MHz worst case at 802.11a middle channel				
Voltage(%)	Power(VDC)	TEMP(℃)	Freq.Dev(Hz)	Deviation
100%	12	-30	1491	0.2591
100%		-20	1289	0.2240
100%		-10	1454	0.2526
100%		0	1347	0.2340
100%		+10	1211	0.2105
100%		+20	1505	0.2615
100%		+30	1042	0.1811
100%		+40	1568	0.2725
100%		+50	1328	0.2307
Low Battery power	13.8	+20	1565	0.2719
High Battery power	10.2	+20	1492	0.2592

APPENDIX PHOTOGRAPHS

Please refer to "ANNEX"

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