MEASUREMENT REPORT

FCC PART 15.407 / WLAN 802.11a/n/ac

FCC ID:	HD5-EDA51K0
Applicant:	Honeywell International Inc Honeywell Safety and Productivity Solutions
Application Type:	Certification
Product:	Mobile Computer
Model No.:	EDA51K-0
Brand Name:	Honeywell
FCC Classification:	Unlicensed National Information Infrastructure (NII)
FCC Rule Part(s):	Part15 Subpart E (Section 15.407)
Test Procedure(s):	ANSI C63.10-2013, KDB 789033 D02v02r01
Test Date:	October 20 ~ November 20, 2020

Reviewed By: (Jame Yuan)

Approved By: (Robin Wu)

TESTING LABORATORY CERTIFICATE #3628.01

The test results relate only to the samples tested.
This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in KDB 789033 D02v02r01. Test results reported herein relate only to the item(s) tested.

Revision History

Report No.	Version	Description	Issue Date	Note
2011RSU005-U4	Rev. 01	Initial Report	11-21-2020	Valid

CONTENTS

Description Page

1. General Information

1.1. Applicant

Honeywell International Inc
Honeywell Safety and Productivity Solutions
9680 Old Bailes Road, Fort Mill, SC 29707 United States

1.2. Manufacturer

Honeywell International Inc
Honeywell Safety and Productivity Solutions
9680 Old Bailes Road, Fort Mill, SC 29707 United States

1.3. Testing Facility

☒	**Test Site – MRT Suzhou Laboratory**	
	Laboratory Location (Suzhou – Wuzhong)	
	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China	
	Laboratory Location (Suzhou – SIP)	
	4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China	
	Laboratory Accreditations	
	A2LA: 3628.01	CNAS: L10551
	FCC: CN1166	ISED: CN0001
	VCCI: R-20025, G-20034, C-20020, T-20020	
☐	**Test Site – MRT Shenzhen Laboratory**	
	Laboratory Location (Shenzhen)	
	1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China	
	Laboratory Accreditations	
	A2LA: 3628.02	CNAS: L10551
	FCC: CN1284	ISED: CN0105
☐	**Test Site – MRT Taiwan Laboratory**	
	Laboratory Location (Taiwan)	
	No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)	
	Laboratory Accreditations	
	TAF: L3261-190725	
	FCC: 291082, TW3261	ISED: TW3261

2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name	Mobile Computer
Model No.	EDA51K-0
Qualcomm Chipset	
Wi-Fi Specification	802.11a/b/g/n/ac
Bluetooth Version	v4.2 dual mode
Antenna Delivery	1*T_x+ 1*R_x
NXP Chipset	
NFC Working Frequency	13.56MHz
Accessories	
USB Adapter	Model No.: ADS-12B-06 05010E Input Power: 100 - 240V ~ 50/60Hz, Max. 0.3A Output Power: 5VDC 2.0A
Rechargeable Li-ion Battery	Model No.: BAT-EDA50K Capacitance: 4000mAh/15.2Wh Rated Voltage: 3.8V

2.2. Product Specification Subjective to this Report

Frequency Range	For 802.11a/n-HT20/ac-VHT20: 5180~5240MHz, 5260~5320MHz, 5500~5720MHz, 5745~5825MHz For 802.11n-HT40/ac-VHT40: 5190~5230MHz, 5270~5310MHz, 5510~5710MHz, 5755~5795MHz For 802.11ac-VHT80: 5210MHz, 5290MHz, 5530MHz, 5610MHz, 5690MHz, 5775MHz
Type of Modulation	802.11a/n/ac: OFDM
Data Rate	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 150Mbps 802.11ac: up to 433.3Mbps
Antenna Type	FPC Antenna
Antenna Gain	-0.1dBi for 5180-5720MHz, 0.2dBi for 5745-5825MHz

Note 1: For other features of this EUT, test report will be issued separately.

Note 2: Antenna type and antenna gain are provided by the manufacturer.

2.3. Working Frequencies for this Report

802.11a /ac-VHT20

Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz	44	5220 MHz
48	5240 MHz	52	5260 MHz	56	5280 MHz
60	5300 MHz	64	5320 MHz	100	5500 MHz
104	5520 MHz	108	5540 MHz	112	5560 MHz
116	5580 MHz	120	5600 MHz	124	5620 MHz
128	5640 MHz	132	5660 MHz	136	5680 MHz
140	5700 MHz	144	5720 MHz	149	5745 MHz
153	5765 MHz	157	5785 MHz	161	5805 MHz
165	5825 MHz	--	--	--	--

802.11ac-VHT40

Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz	54	5270 MHz
62	5310 MHz	102	5510 MHz	110	5550 MHz
118	5590 MHz	126	5630 MHz	134	5670 MHz
142	5710 MHz	151	5755 MHz	159	5795 MHz

802.11ac-VHT80

Channel	Frequency	Channel	Frequency	Channel	Frequency
42	5210 MHz	58	5290 MHz	106	5530 MHz
122	5610 MHz	138	5690 MHz	155	5775 MHz

2.4. Test Mode

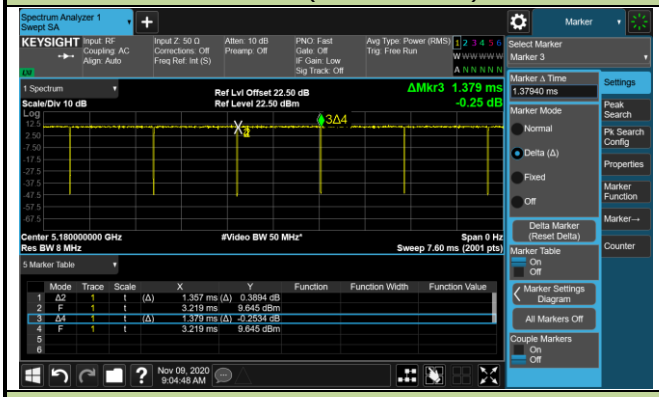
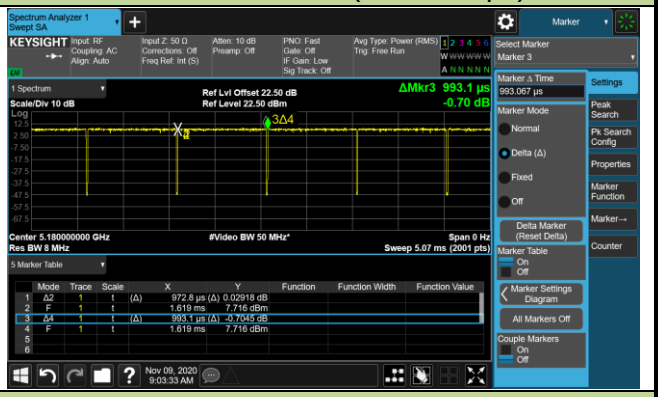
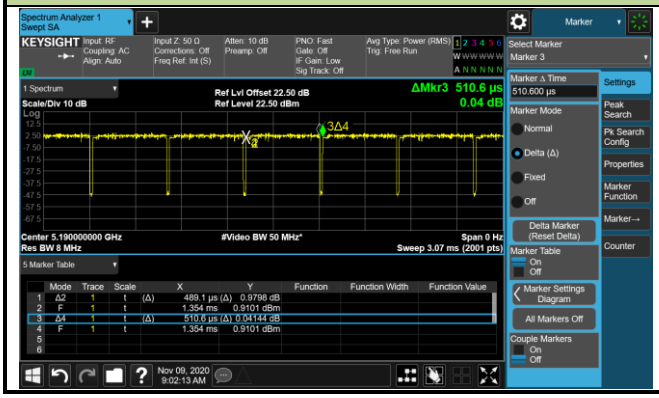
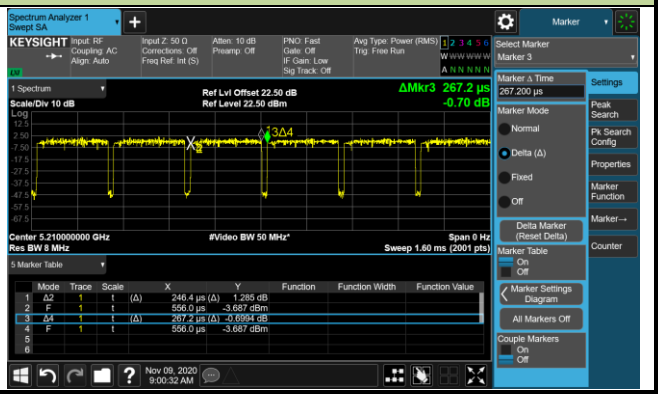
Test Mode	Mode 1: Transmit by 802.11a (6Mbps)
	Mode 2: Transmit by 802.11ac-VHT20 (MCS0)
	Mode 3: Transmit by 802.11ac-VHT40 (MCS0)
	Mode 4: Transmit by 802.11ac-VHT80 (MCS0)

Note: 802.11n and 802.11ac have same modulation type and same power parameter, so we only show 802.11ac test data in report.

2.5. Duty Cycle

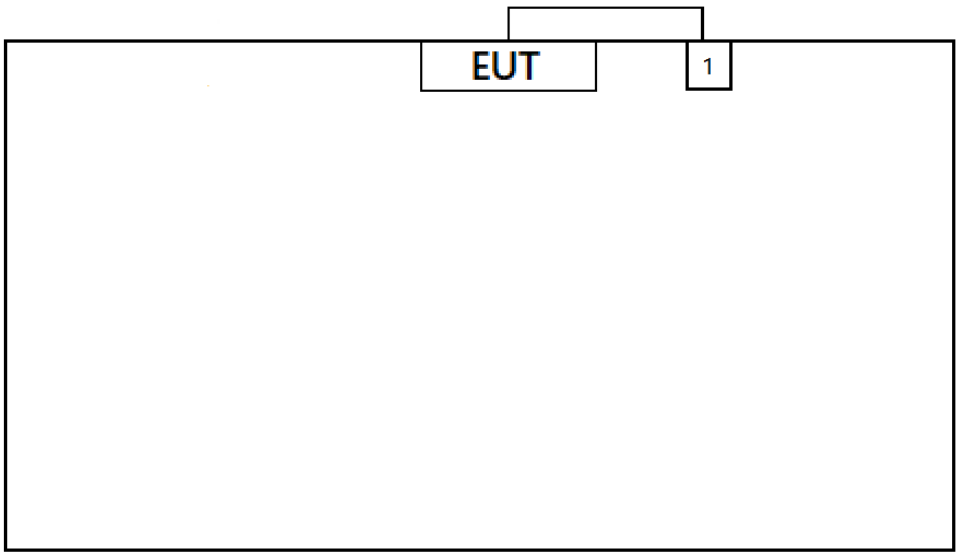
5GHz (NII) operation is possible in 20MHz, 40MHzand 80MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Test Mode	Duty Cycle
802.11a	98.40%
802.11ac-VHT20	97.96%
802.11ac-VHT40	95.79%
802.11ac-VHT80	92.22%

Duty Cycle (T = Transmission Duration)	
802.11a (T =1.357ms)	802.11ac-VHT20 (T = 972.8μs)
	
802.11ac-VHT40 (T = 489.1μs)	802.11ac-VHT80 (T = 246.4μs)
	

2.6. Description of Test Configuration and Software

The device was tested per the guidance ANSI C63.10: 2013 that was used to reference the appropriate EUT setup for radiated spurious emissions and AC line conducted emission testing.



Product		Manufacturer	Model No.
1	Adapter	Shenzhen Honor Electronic Co., Ltd	ADS-12B-06 05010E

Note 1: The test utility software used during testing was “QRCT”, and the version was 3.0.268.0.

Note 2: Detail power setting refer to operation description.

2.7. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

2.8. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the devices so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

2.9. Test Environment Condition

Ambient Temperature	15 ~ 35 °C
Relative Humidity	20 ~ 75 %RH

3. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached 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."

- The antenna of the device is **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The unit complies with the requirement of §15.203.

4. TEST EQUIPMENT CALIBRATION DATE

Conducted Emission - (WZ-SR2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06185	1 year	2021/01/18
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2021/09/09
Thermal Hygrometer	testo	608-H1	MRTSUE06404	1 year	2021/07/26
Shielding Room	MIX-BEP	Chamber-SR2	MRTSUE06215	N/A	N/A

Conducted Emission - (SIP-SR2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06613	1 year	2021/07/02
Two-Line V-Network	R&S	ENV216	MRTSUE06003	1 year	2021/09/09
Thermal Hygrometer	testo	608-H1	MRTSUE06621	1 year	2020/12/29

Radiated Emission - (WZ-AC1)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2021/01/18
PXA Signal Analyzer	Keysight	N9030B	MRTSUE06395	1 year	2021/08/30
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2021/11/08
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2021/08/08
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2021/09/27
Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06597	1 year	2020/12/17
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2021/11/14
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2021/06/11
Thermal Hygrometer	testo	608-H1	MRTSUE06403	1 year	2021/07/26
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2021/04/30

Radiated Emission - (WZ-AC2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
MXE EMI Receiver	Keysight	N9038A	MRTSUE06125	1 year	2021/07/02
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2021/11/08
Bilog Period Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2021/05/26
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2021/10/25
Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06597	1 year	2020/12/17
Broadband Coaxial Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2021/11/14
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2021/06/11
Thermal Hygrometer	Minggao	ETH529	MRTSUE06170	1 year	2020/12/15
Anechoic Chamber	RIKEN	Chamber-AC2	MRTSUE06213	1 year	2021/04/30

Radiated Emission - (SIP-AC1)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06612	1 year	2021/07/02
EXA Signal Analyzer	Keysight	N9010B	MRTSUE06559	1 year	2021/07/23
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2021/11/08
Bilog Period Antenna	Schwarzbeck	VULB9168	MRTSUE06645	1 year	2021/08/30
Double Ridged Horn Antenna	R&S	HF907	MRTSUE06610	1 year	2021/08/30
Preamplifier	EMCI	EMC051845SE	MRTSUE06600	1 year	2021/11/09
Thermal Hygrometer	testo	608-H1	MRTSUE06620	1 year	2020/12/29
Anechoic Chamber	RIKEN	SIP-AC1	MRTSUE06554	1 year	2020/12/25

Radiated Emission - (SIP-AC2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06613	1 year	2021/07/02
MXA Signal Analyzer	Keysight	N9020B	MRTSUE06604	1 year	2021/09/26
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2021/11/08
Bilog Period Antenna	Schwarzbeck	VULB9168	MRTSUE06646	1 year	2021/08/30
Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06648	1 year	2020/12/17
Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06599	1 year	2020/12/17
Preamplifier	EMCI	EMC051845SE	MRTSUE06644	1 year	2021/11/09
Preamplifier	EMCI	EMC184045SE	MRTSUE06602	1 year	2021/10/21
Thermal Hygrometer	testo	608-H1	MRTSUE06624	1 year	2020/12/29
Anechoic Chamber	RIKEN	SIP-AC2	MRTSUE06781	1 year	2020/12/25

Radiated Emission - (SIP-AC3)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06612	1 year	2021/07/02
EXA Signal Analyzer	Keysight	N9010B	MRTSUE06559	1 year	2021/07/23
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2021/11/08
Bilog Period Antenna	Schwarzbeck	VULB9168	MRTSUE06647	1 year	2021/08/08
Double Ridged Horn Antenna	R&S	HF907	MRTSUE06611	1 year	2021/09/13
Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06598	1 year	2020/12/17
Preamplifier	EMCI	EMC012645SE	MRTSUE06642	1 year	2021/01/16
Preamplifier	EMCI	EMC184045SE	MRTSUE06641	1 year	2021/01/16
Thermal Hygrometer	testo	608-H1	MRTSUE06622	1 year	2020/12/29
Anechoic Chamber	RIKEN	SIP-AC3	MRTSUE06782	1 year	2020/12/25

Conducted Test Equipment - (WZ-SR5)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EXA Signal Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2021/04/14
EXA Signal Analyzer	Keysight	N9010B	MRTSUE06607	1 year	2021/01/08
Signal Analyzer	R&S	FSV40	MRTSUE06218	1 year	2021/04/14
Power Meter	Agilent	U2021XA	MRTSUE06030	1 year	2021/10/22
USB wideband power sensor	Keysight	U2021XA	MRTSUE06446	1 year	2021/08/30
USB wideband power sensor	Keysight	U2021XA	MRTSUE06447	1 year	2021/08/08
Bluetooth Test Set	Anritsu	MT8852B-042	MRTSUE06389	1 year	2021/06/11
Audio Analyzer	Agilent	U8903B	MRTSUE06143	1 year	2021/06/11
Modulation Analyzer	HP	HP8901A	MRTSUE06098	1 year	2021/09/26
Wideband Radio Communication Tester	R&S	CMW 500	MRTSUE06243	1 year	2021/10/20
DC Power Supply	GWINSTEK	DPS-3303C	MRTSUE06064	N/A	N/A
Attenuator	MVE	20dB	MRTSUE06547	1 year	2021/05/20
Attenuator	MVE	6dB	MRTSUE06532	1 year	2021/05/20
Attenuator	MVE	10dB	MRTSUE06540	1 year	2021/05/20
Temperature & Humidity Chamber	BAOYT	BYH-150CL	MRTSUE06051	1 year	2021/10/21
Thermal Hygrometer	testo	608-H1	MRTSUE06401	1 year	2021/07/26

Conducted Test Equipment - (SIP-SR5)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Signal Analyzer	R&S	FSV40	MRTSUE06218	1 year	2021/04/14
PXA Signal Analyzer	Keysight	N9030B	MRTSUE06395	1 year	2021/08/30
USB wideband power sensor	Agilent	U2021XA	MRTSUE06595	1 year	2021/09/26
USB wideband power sensor	Agilent	U2021XA	MRTSUE06596	1 year	2021/09/26
Wideband Radio Communication Tester	R&S	CMW 500	MRTSUE06243	1 year	2021/10/20
Attenuator	MVE	20dB	MRTSUE06547	1 year	2021/05/20
Attenuator	MVE	6dB	MRTSUE06532	1 year	2021/05/20
Attenuator	MVE	10dB	MRTSUE06540	1 year	2021/05/20
Bluetooth Test Set	Anritsu	MT8852B-042	MRTSUE06389	1 year	2021/06/11
Temperature Chamber	BAOYT	BYG-408CS	MRTSUE06847	1 year	2021/03/31
Thermal Hygrometer	testo	622	MRTSUE06629	1 year	2020/12/30

Software	Version	Function
EMI Software	V3	EMI Test Software

5. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

AC Conducted Emission Measurement
Measurement Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz~150kHz: 3.74dB 150kHz~30MHz: 3.44dB
Radiated Disturbance
Measurement Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): Horizontal: 30MHz~300MHz: 5.04dB 300MHz~1GHz: 4.95dB 1GHz~40GHz: 6.40dB Vertical: 30MHz~300MHz: 5.24dB 300MHz~1GHz: 6.03dB 1GHz~40GHz: 6.40dB
Spurious Emissions, Conducted
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.78dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.13dB
Power Spectrum Density
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.15dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.28%

6. TEST RESULT

6.1. Summary

FCC Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.407(a)	26dB Bandwidth	N/A	Conducted	Pass	Section 6.2
15.407(e)	6dB Bandwidth	≥ 500kHz		Pass	Section 6.3
15.407(a)(1)(iv), (2), (3)	Maximum Conducted Output Power	U-NII-1: ≤250mW U-NII-2: ≤250mW or 11dBm +10log10B U-NII-3: ≤1W		Pass	Section 6.4
15.407(h)(1)	Transmit Power Control	≤24dBm		N/A	Section 6.5
15.407(a)(1)(iv), (2), (3), (12)	Power Spectral Density	U-NII-1& U-NII-2: ≤11dBm/MHz U-NII-3: ≤30dBm/500kHz		Pass	Section 6.6
15.407(g)	Frequency Stability	N/A		Pass	Section 6.7
15.407(b)(1), (2), (3), (4)(i)	Undesirable Emissions	≤ -27dBm/MHz EIRP Detail see section 6.9	Radiated	Pass	Section 6.8 Section 6.9
15.205, 15.209 15.407(b)(5), (6), (7)	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in15.209		Pass	
15.207	AC Conducted Emissions 150kHz-30MHz	< FCC 15.207 limits	Line Conducted	Pass	Section 6.10

Notes:

1) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
2) All modes of operation and data rates were investigated. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst case emissions.
3) “N/A” means that the test item is not applicable, and the details refer to relevant section.

6.2. Emission Bandwidth Measurement

6.2.1.Test Limit

N/A

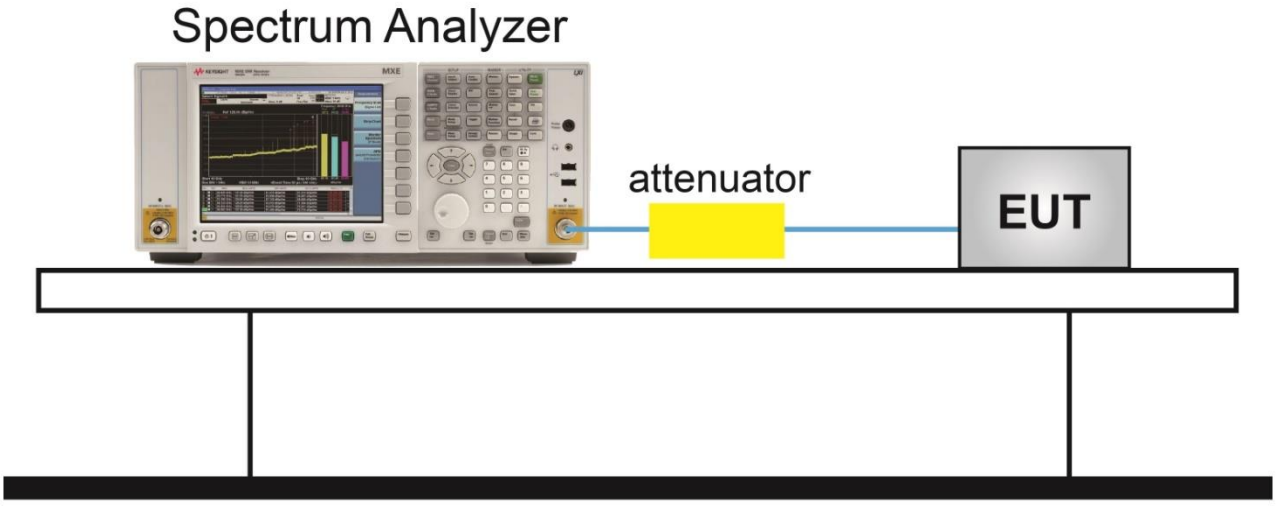
6.2.2.Test Procedure Used

KDB 789033 D02v02r01 -Section C.1

6.2.3.Test Setting

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

6.2.4.Test Setup



6.2.5.Test Result

Product	Mobile Computer	Test Engineer	Chase Zhu
Test Site	SIP-SR5	Test Date	2020/10/26 ~ 2020/11/08

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)
802.11a	6Mbps	36	5180	22.07
802.11a	6Mbps	44	5220	21.97
802.11a	6Mbps	48	5240	21.37
802.11a	6Mbps	52	5260	21.73
802.11a	6Mbps	60	5300	22.01
802.11a	6Mbps	64	5320	22.28
802.11a	6Mbps	100	5500	21.88
802.11a	6Mbps	120	5600	21.69
802.11a	6Mbps	140	5700	21.75
802.11a	6Mbps	144	5720	21.88
802.11a	6Mbps	149	5745	21.25
802.11a	6Mbps	157	5785	21.70
802.11a	6Mbps	165	5825	21.61
802.11ac-VHT20	MCS0	36	5180	22.24
802.11ac-VHT20	MCS0	44	5220	22.15
802.11ac-VHT20	MCS0	48	5240	21.89
802.11ac-VHT20	MCS0	52	5260	22.10
802.11ac-VHT20	MCS0	60	5300	22.19
802.11ac-VHT20	MCS0	64	5320	22.22
802.11ac-VHT20	MCS0	100	5500	22.19
802.11ac-VHT20	MCS0	120	5600	21.98
802.11ac-VHT20	MCS0	140	5700	21.88
802.11ac-VHT20	MCS0	144	5720	21.97
802.11ac-VHT20	MCS0	149	5745	21.51
802.11ac-VHT20	MCS0	157	5785	21.58
802.11ac-VHT20	MCS0	165	5825	21.70

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)
802.11ac-VHT40	MCS0	38	5190	42.02
802.11ac-VHT40	MCS0	46	5230	42.36
802.11ac-VHT40	MCS0	54	5270	42.38
802.11ac-VHT40	MCS0	62	5310	42.29
802.11ac-VHT40	MCS0	102	5510	42.01
802.11ac-VHT40	MCS0	118	5590	42.29
802.11ac-VHT40	MCS0	134	5670	42.45
802.11ac-VHT40	MCS0	142	5710	42.23
802.11ac-VHT40	MCS0	151	5755	41.39
802.11ac-VHT40	MCS0	159	5795	41.65
802.11ac-VHT80	MCS0	42	5210	84.30
802.11ac-VHT80	MCS0	58	5290	83.70
802.11ac-VHT80	MCS0	106	5530	84.53
802.11ac-VHT80	MCS0	112	5610	83.51
802.11ac-VHT80	MCS0	138	5690	84.08
802.11ac-VHT80	MCS0	155	5775	83.25

802.11a 26dB Bandwidth	
Channel 36 (5180MHz)	Channel 44 (5220MHz)
	
Channel 48 (5240MHz)	Channel 52 (5260MHz)
	
Channel 60 (5300MHz)	Channel 64 (5320MHz)
	

802.11a 26dB Bandwidth

Channel 100 (5500MHz)

Channel 120 (5600MHz)

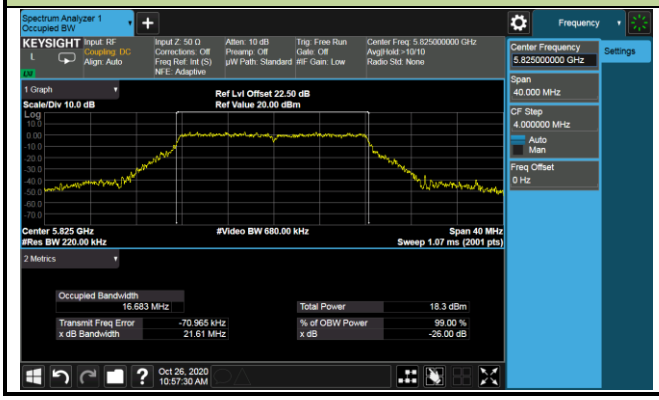
Channel 140 (5700MHz)

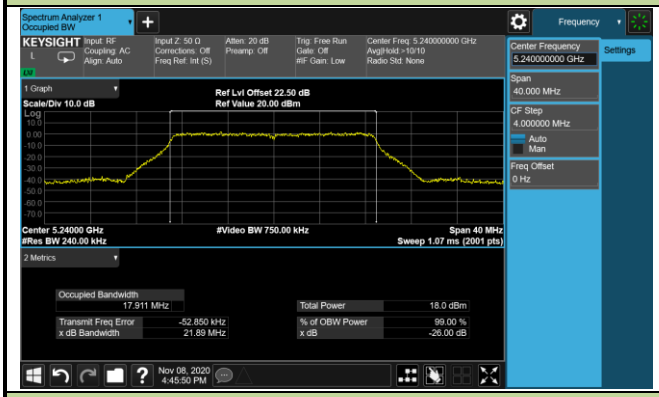
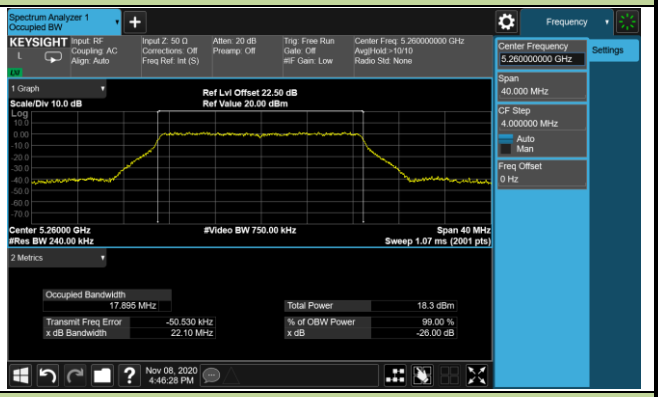
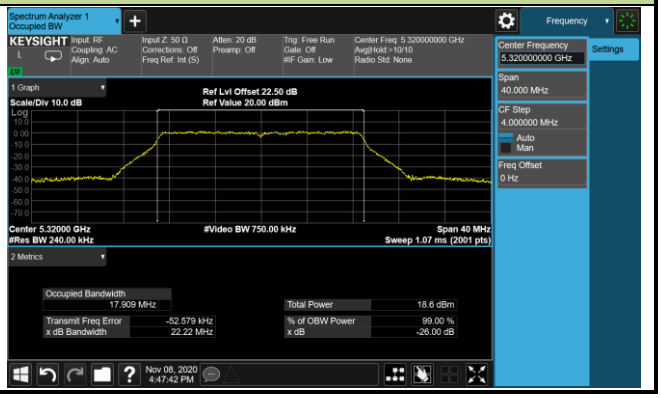
Channel 144 (5720MHz)

Channel 149 (5745MHz)

Channel 157 (5785MHz)

Channel 165 (5825MHz)



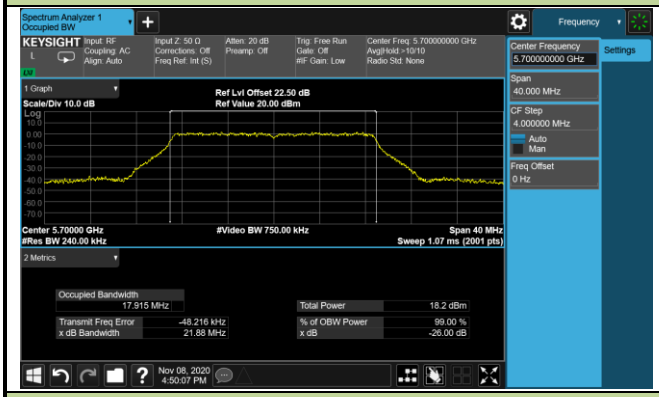
802.11ac-VHT20 26dB Bandwidth	
Channel 36 (5180MHz)	Channel 44 (5220MHz)
	
Channel 48 (5240MHz)	Channel 52 (5260MHz)
	
Channel 60 (5300MHz)	Channel 64 (5320MHz)
	

802.11ac-VHT20 26dB Bandwidth

Channel 100 (5500MHz)

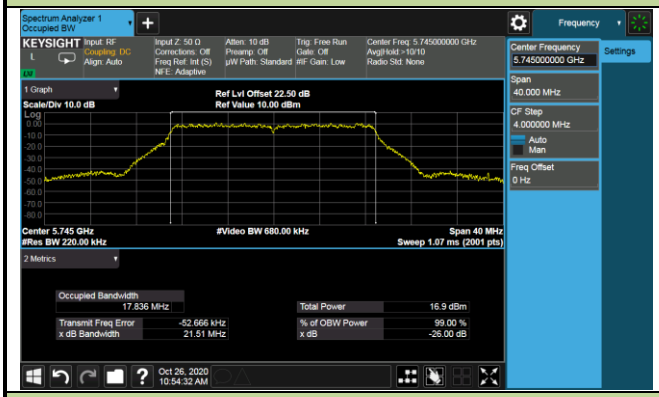
Channel 120 (5600MHz)

Channel 140 (5700MHz)

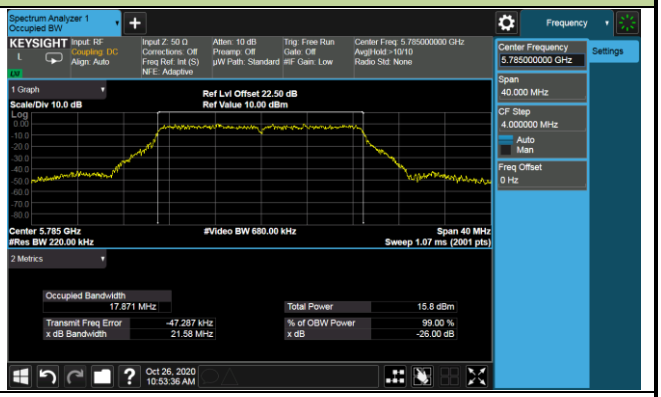


Channel 144 (5720MHz)

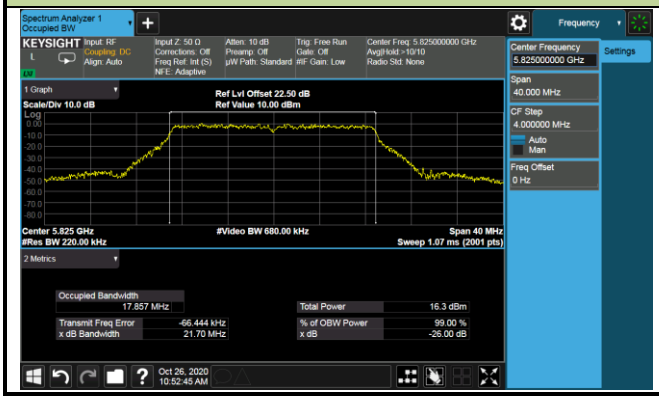
Channel 149 (5745MHz)

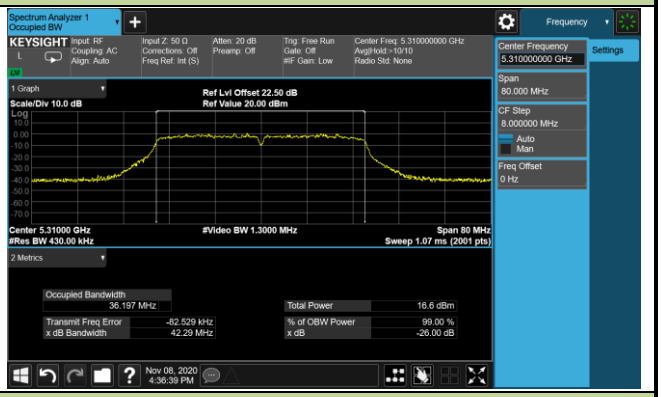
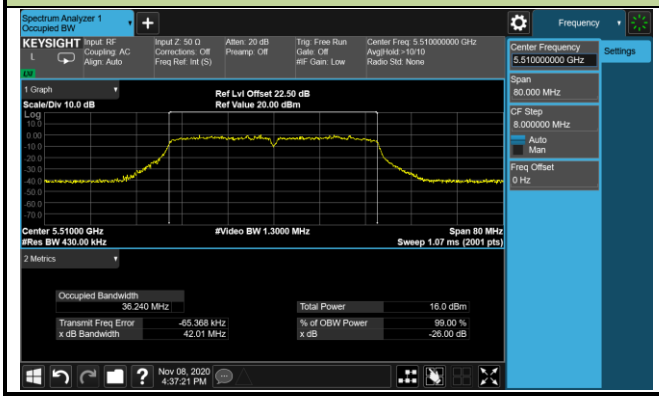
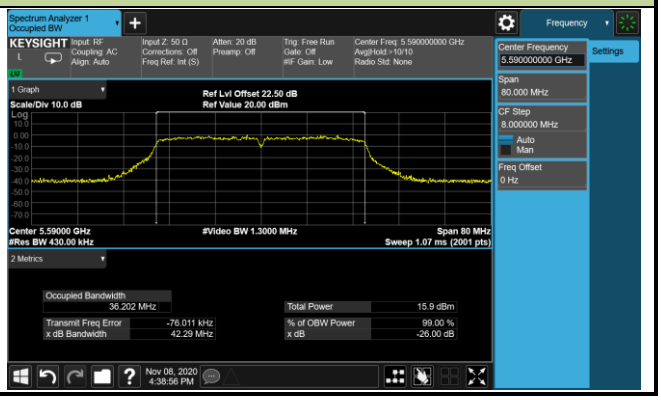


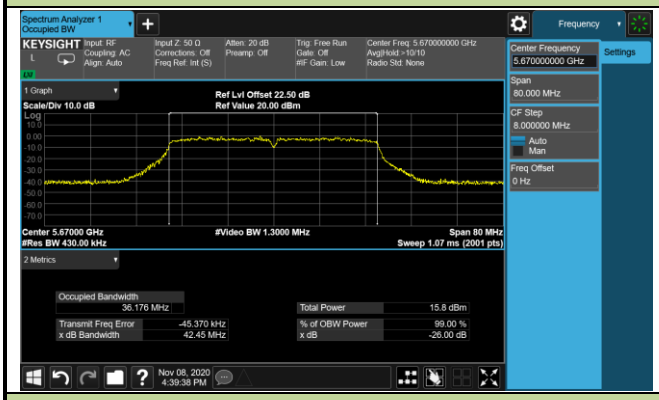
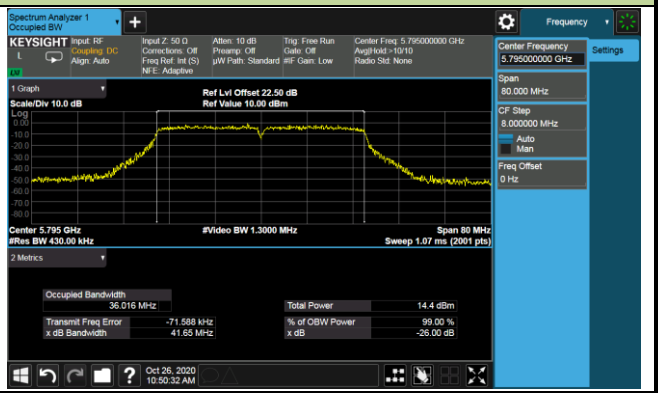
Channel 157 (5785MHz)

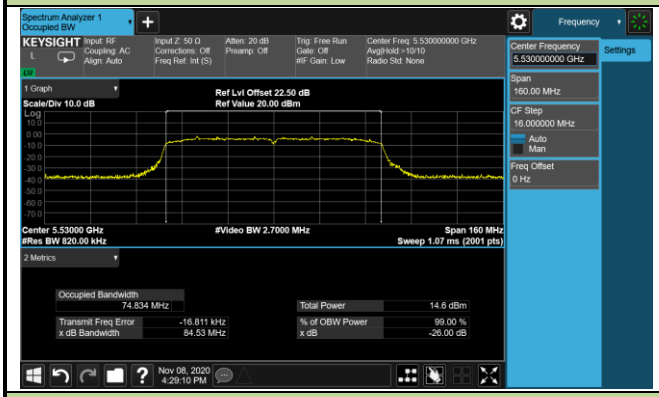
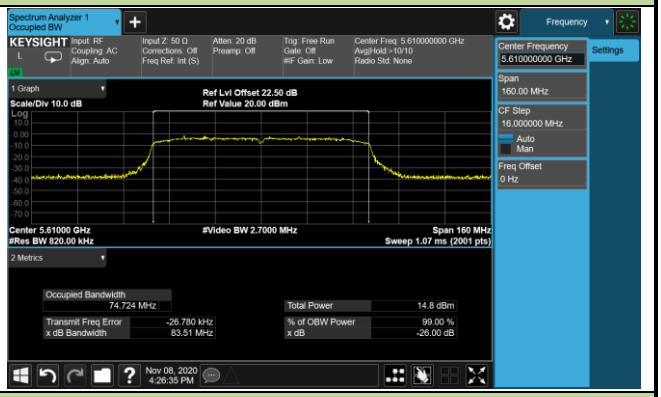
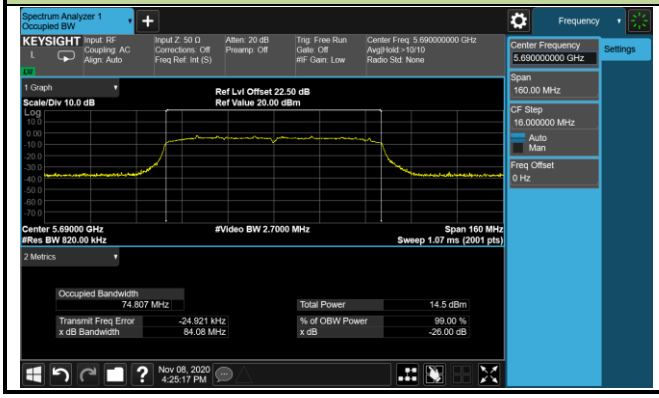


Channel 165 (5825MHz)



802.11ac-VHT40 26dB Bandwidth	
Channel 38 (5190MHz)	Channel 46 (5230MHz)
	
Channel 54 (5270MHz)	Channel 62 (5310MHz)
	
Channel 102 (5510MHz)	Channel 118 (5590MHz)
	

802.11ac-VHT40 26dB Bandwidth	
Channel 134 (5670MHz)	Channel 142 (5710MHz)
	
Channel 151 (5755MHz)	Channel 159 (5795MHz)
	

802.11ac-VHT80 26dB Bandwidth	
Channel 42 (5210MHz)	Channel 58 (5290MHz)
	
Channel 106 (5530MHz)	Channel 122 (5610MHz)
	
Channel 138(5690MHz)	Channel 155 (5775MHz)
	

6.3. 6dB Bandwidth Measurement

6.3.1.Test Limit

The minimum 6dBbandwidth shall be at least 500 kHz.

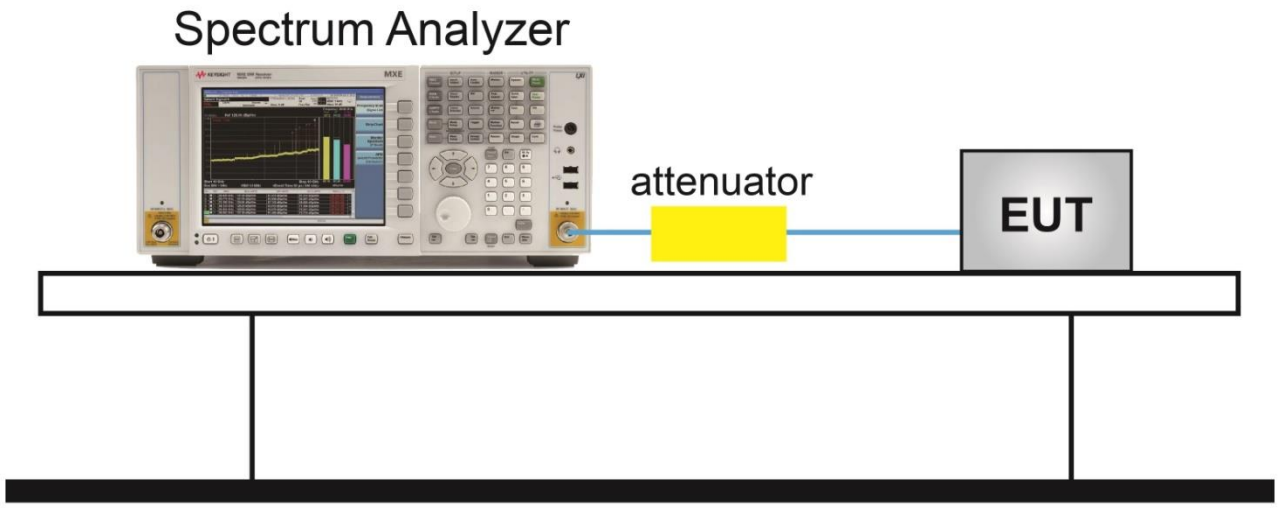
6.3.2.Test Procedure Used

KDB 789033 D02v02r01 - Section C.2

6.3.3.Test Setting

1. Set center frequency to the nominal EUT channel center frequency.
2. RBW = 100 kHz.
3. VBW≥ 3 × RBW.
4. Detector = Peak.
5. Trace mode = Max hold.
6. Sweep = Auto couple.
7. Allow the trace to stabilize.
8. 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.

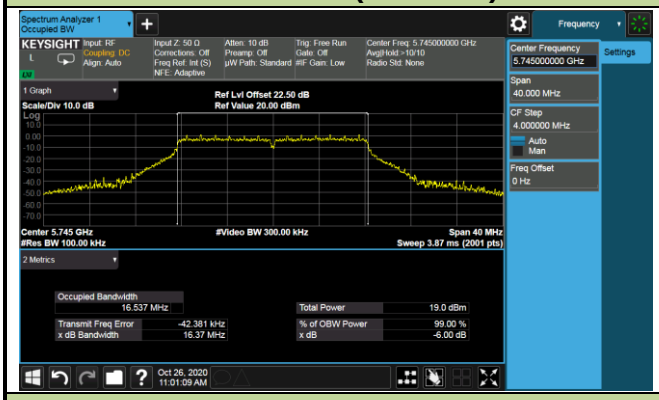
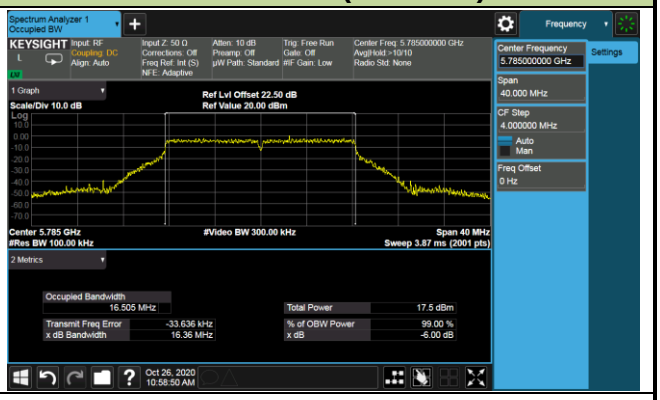
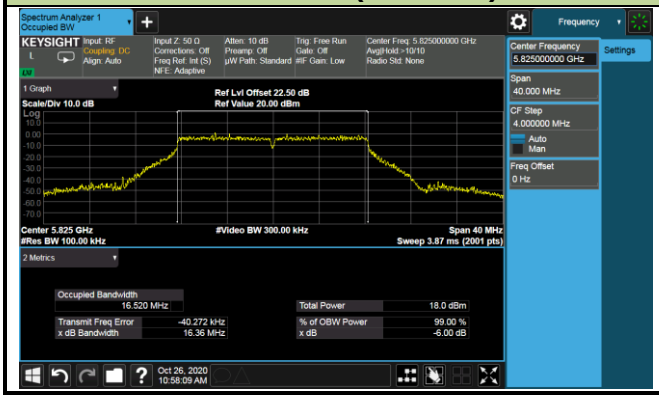
6.3.4.Test Setup



6.3.5.Test Result

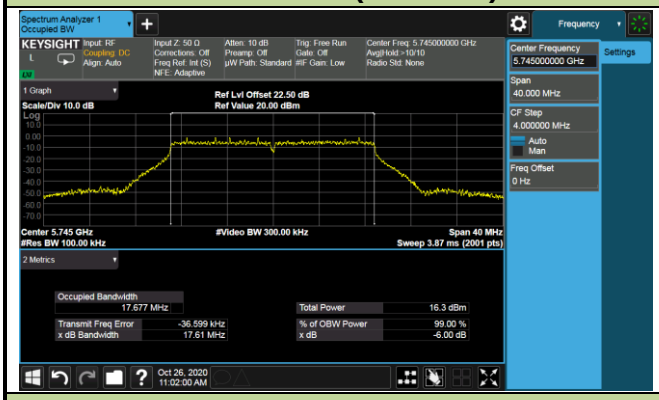
Product	Mobile Computer	Test Engineer	Chase Zhu
Test Site	SIP-SR5	Test Date	2020/10/26

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
802.11a	6Mbps	149	5745	16.37	≥ 0.5	Pass
802.11a	6Mbps	157	5785	16.36	≥ 0.5	Pass
802.11a	6Mbps	165	5825	16.36	≥ 0.5	Pass
802.11ac-VHT20	MCS0	149	5745	17.61	≥ 0.5	Pass
802.11ac-VHT20	MCS0	157	5785	17.61	≥ 0.5	Pass
802.11ac-VHT20	MCS0	165	5825	17.58	≥ 0.5	Pass
802.11ac-VHT40	MCS0	151	5755	35.17	≥ 0.5	Pass
802.11ac-VHT40	MCS0	159	5795	35.19	≥ 0.5	Pass
802.11ac-VHT80	MCS0	155	5775	72.64	≥ 0.5	Pass

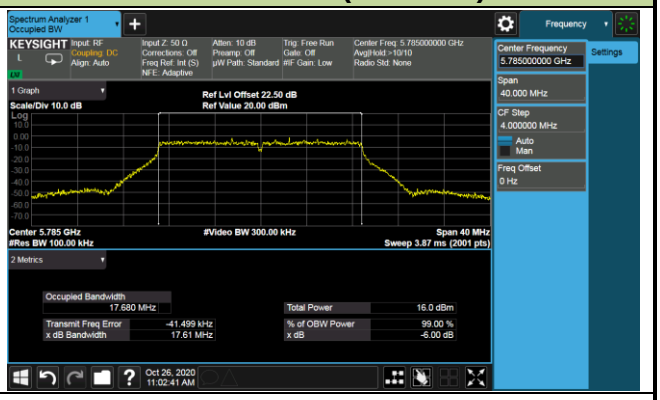
802.11a 6dB Bandwidth	
Channel 149 (5745MHz)	**Channel 157 (5785MHz)**
	
Channel 165 (5825MHz)	
	

802.11ac-VHT20 6dB Bandwidth

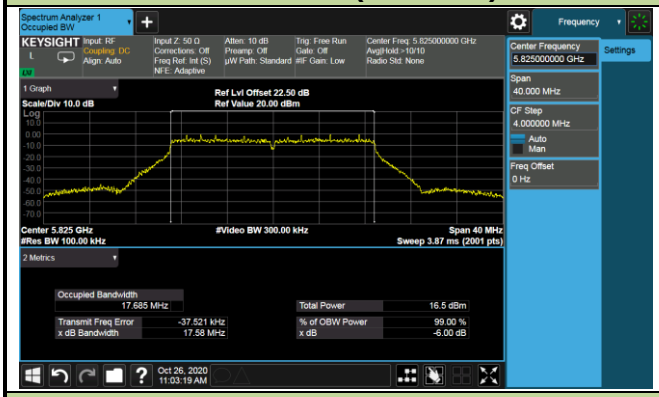
Channel 149 (5745MHz)



Channel 157 (5785MHz)

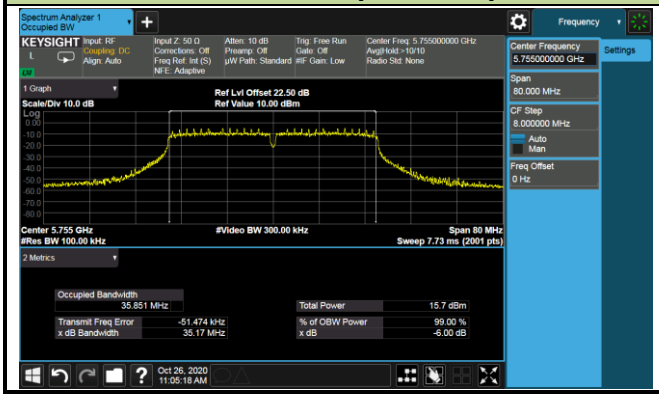


Channel 165 (5825MHz)

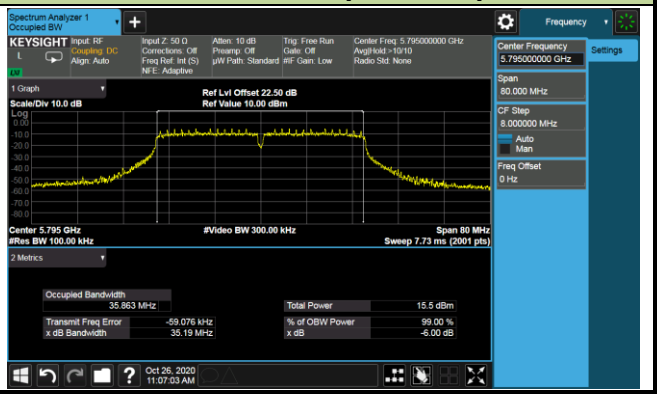


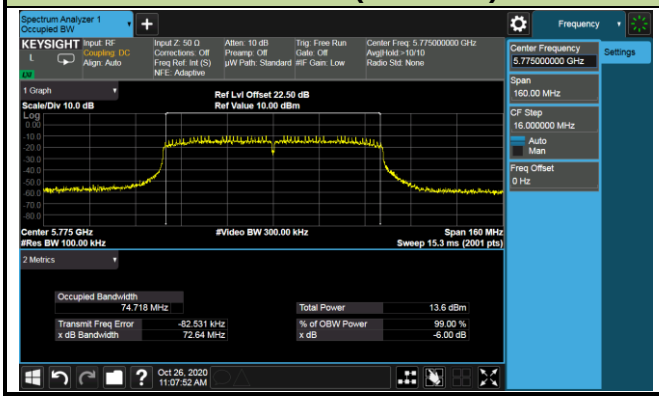
802.11ac-VHT40 6dB Bandwidth

Channel 151 (5755MHz)



Channel 159 (5795MHz)



802.11ac-VHT80 6dB Bandwidth	
Channel 155 (5775MHz)	
	

6.4. Output Power Measurement

6.4.1.Test Limit

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

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm).

If transmitting antennas of directional gain greater than 6dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

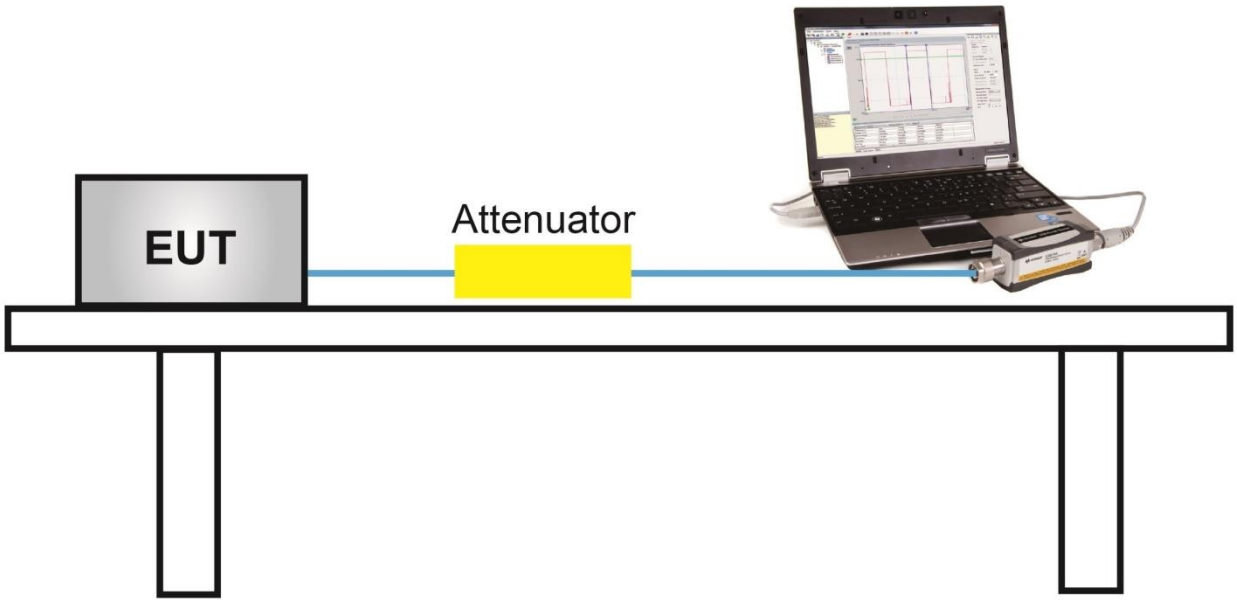
6.4.2.Test Procedure Used

KDB 789033D02v02r01- Section E)3)b) Method PM-G

6.4.3.Test Setting

Average power measurements were perform only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.

6.4.4.Test Setup



6.4.5.Test Result

Output power test was verified over all data rates of each mode shown as below table, and then choose the maximum output power (gray marker) for final test of each channel.

Test Mode	Bandwidth	Channel No.	Frequency (MHz)	Data Rate/ MCS	Average Power (dBm)
802.11a	20	36	5180	6Mbps	13.60
				24Mbps	13.54
				54Mbps	13.47
802.11ac	20	36	5180	MCS0	11.72
				MCS4	11.66
				MCS8	11.61
802.11ac	40	38	5190	MCS0	9.81
				MCS4	9.77
				MCS9	9.71
802.11ac	80	42	5210	MCS0	7.69
				MCS4	7.65
				MCS9	7.61

Product	Mobile Computer	Test Engineer	Chase Zhu
Test Site	SIP-SR5	Test Date	2020/10/26 ~ 2020/11/09

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Average Power (dBm)	Average Power Limit (dBm)	Result
11a	6Mbps	36	5180	13.60	≤ 30.00	Pass
11a	6Mbps	44	5220	13.79	≤ 30.00	Pass
11a	6Mbps	48	5240	13.89	≤ 30.00	Pass
11a	6Mbps	52	5260	13.88	≤ 23.98	Pass
11a	6Mbps	60	5300	13.91	≤ 23.98	Pass
11a	6Mbps	64	5320	13.97	≤ 23.98	Pass
11a	6Mbps	100	5500	13.62	≤ 23.98	Pass
11a	6Mbps	120	5600	13.97	≤ 23.98	Pass
11a	6Mbps	140	5700	13.70	≤ 23.98	Pass
11a	6Mbps	144	5720	14.04	≤ 23.98	Pass
11a	6Mbps	149	5745	12.37	≤ 30.00	Pass
11a	6Mbps	157	5785	12.12	≤ 30.00	Pass
11a	6Mbps	165	5825	12.84	≤ 30.00	Pass
11ac-VHT20	MCS0	36	5180	11.72	≤ 30.00	Pass
11ac-VHT20	MCS0	44	5220	11.89	≤ 30.00	Pass
11ac-VHT20	MCS0	48	5240	11.94	≤ 30.00	Pass
11ac-VHT20	MCS0	52	5260	11.82	≤ 23.98	Pass
11ac-VHT20	MCS0	60	5300	11.90	≤ 23.98	Pass
11ac-VHT20	MCS0	64	5320	11.95	≤ 23.98	Pass
11ac-VHT20	MCS0	100	5500	11.60	≤ 23.98	Pass
11ac-VHT20	MCS0	120	5600	11.65	≤ 23.98	Pass
11ac-VHT20	MCS0	140	5700	11.74	≤ 23.98	Pass
11ac-VHT20	MCS0	144	5720	11.66	≤ 23.98	Pass
11ac-VHT20	MCS0	149	5745	11.03	≤ 30.00	Pass
11ac-VHT20	MCS0	157	5785	10.71	≤ 30.00	Pass
11ac-VHT20	MCS0	165	5825	11.08	≤ 30.00	Pass

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Average Power (dBm)	Average Power Limit(dBm)	Result
11ac-VHT40	MCS0	38	5190	9.81	≤ 30.00	Pass
11ac-VHT40	MCS0	46	5230	9.98	≤ 30.00	Pass
11ac-VHT40	MCS0	54	5270	9.85	≤ 23.98	Pass
11ac-VHT40	MCS0	62	5310	10.09	≤ 23.98	Pass
11ac-VHT40	MCS0	102	5510	9.86	≤ 23.98	Pass
11ac-VHT40	MCS0	118	5590	9.56	≤ 23.98	Pass
11ac-VHT40	MCS0	134	5670	9.69	≤ 23.98	Pass
11ac-VHT40	MCS0	142	5710	9.68	≤ 23.98	Pass
11ac-VHT40	MCS0	151	5755	8.95	≤ 30.00	Pass
11ac-VHT40	MCS0	159	5795	8.87	≤ 30.00	Pass
11ac-VHT80	MCS0	42	5210	7.69	≤ 30.00	Pass
11ac-VHT80	MCS0	58	5290	7.75	≤ 23.98	Pass
11ac-VHT80	MCS0	106	5530	7.87	≤ 23.98	Pass
11ac-VHT80	MCS0	112	5610	7.93	≤ 23.98	Pass
11ac-VHT80	MCS0	138	5690	7.60	≤ 23.98	Pass
11ac-VHT80	MCS0	155	5775	6.56	≤ 30.00	Pass

6.5. Transmit Power Control

6.5.1.Test Limit

The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm.

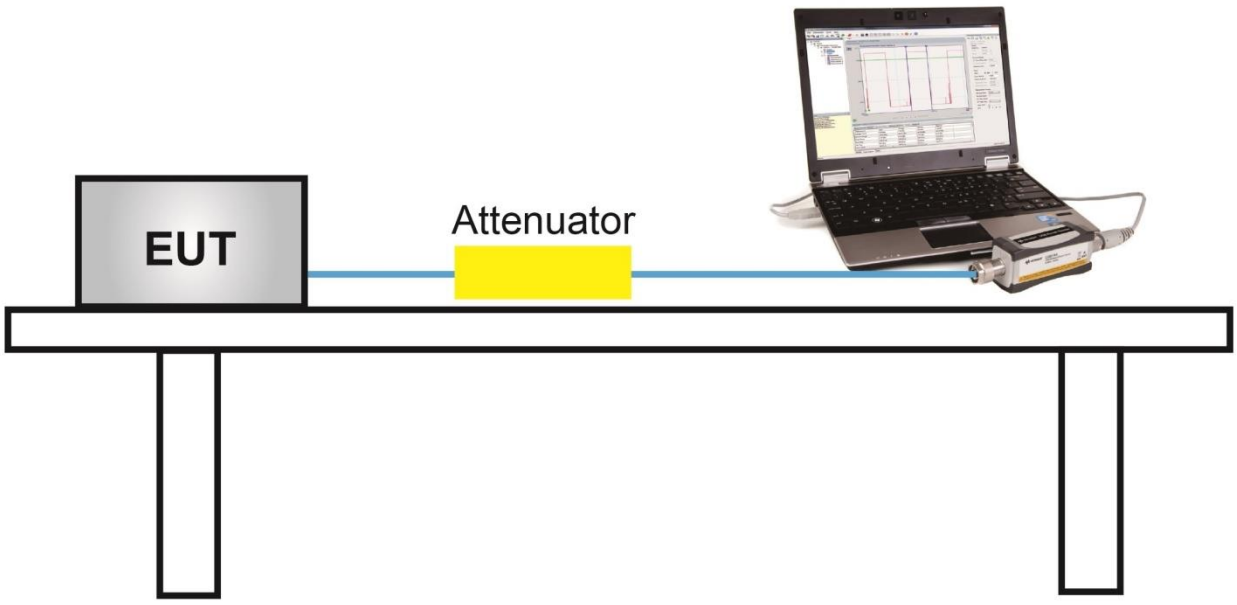
6.5.2.Test Procedure Used

KDB 789033 D02v01- Section E)3)b) Method PM-G

6.5.3.Test Setting

Average power measurements were perform only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.

6.5.4.Test Setup



6.5.5.Test Result

A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

6.6. Power Spectral Density Measurement

6.6.1.Test Limit

For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

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

6.6.2.Test Procedure Used

KDB 789033 D02v02r01 - Section F

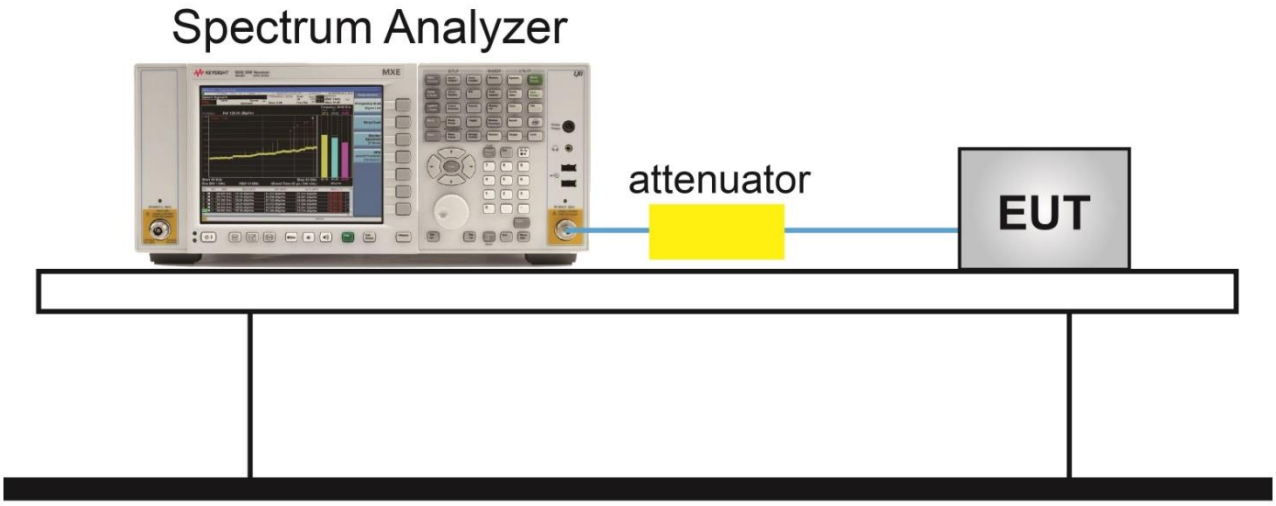
6.6.3.Test Setting

1. Analyzer was set to the center frequency of the UNII channel under investigation
2. Span was set to encompass the entire 26dB EBW of the signal.
3. RBW = 1MHz

   If measurement bandwidth of Maximum PSD is specified in 500 kHz, RBW = 510kHz
4. VBW = 3MHz

   If measurement bandwidth of Maximum PSD is specified in 500 kHz, VBW = 1.5MHz
5. Number of sweep points ≥ 2 × (span / RBW)
6. Detector = Power averaging (Average)
7. Trace average at least 100 traces in power averaging (rms) mode
8. Sweep time = Auto
9. Trigger = Free run
10. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
11. Add 10*log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add 10*log(1/0.25) = 6 dB if the duty cycle is 25 percent.

6.6.4.Test Setup



6.6.5.Test Result

Product	Mobile Computer	Test Engineer	Chase Zhu
Test Site	SIP-SR5	Test Date	2020/11/09
Test Item	Power Spectral Density (NII-1 & NII-2A & NII-2C)		

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	PSD (dBm/MHz)	Duty Cycle (%)	Final PSD (dBm/MHz)	PSD Limit (dBm/MHz)	Result
11a	6Mbps	36	5180	2.00	98.40	2.00	≤ 11.00	Pass
11a	6Mbps	44	5220	2.14	98.40	2.14	≤ 11.00	Pass
11a	6Mbps	48	5240	1.93	98.40	1.93	≤ 11.00	Pass
11a	6Mbps	52	5260	2.06	98.40	2.06	≤ 11.00	Pass
11a	6Mbps	60	5300	1.95	98.40	1.95	≤ 11.00	Pass
11a	6Mbps	64	5320	2.01	98.40	2.01	≤ 11.00	Pass
11a	6Mbps	100	5500	1.37	98.40	1.37	≤ 11.00	Pass
11a	6Mbps	120	5600	2.80	98.40	2.80	≤ 11.00	Pass
11a	6Mbps	140	5700	2.48	98.40	2.48	≤ 11.00	Pass
11a	6Mbps	144	5720	2.91	98.40	2.91	≤ 11.00	Pass
11ac-VHT20	MCS0	36	5180	0.38	97.96	0.47	≤ 11.00	Pass
11ac-VHT20	MCS0	44	5220	0.76	97.96	0.85	≤ 11.00	Pass
11ac-VHT20	MCS0	48	5240	0.50	97.96	0.59	≤ 11.00	Pass
11ac-VHT20	MCS0	52	5260	0.40	97.96	0.49	≤ 11.00	Pass
11ac-VHT20	MCS0	60	5300	0.65	97.96	0.74	≤ 11.00	Pass
11ac-VHT20	MCS0	64	5320	0.61	97.96	0.70	≤ 11.00	Pass
11ac-VHT20	MCS0	100	5500	-0.08	97.96	0.01	≤ 11.00	Pass
11ac-VHT20	MCS0	120	5600	0.13	97.96	0.22	≤ 11.00	Pass
11ac-VHT20	MCS0	140	5700	0.19	97.96	0.28	≤ 11.00	Pass
11ac-VHT20	MCS0	144	5720	0.24	97.96	0.32	≤ 11.00	Pass

Note: When EUT duty cycle ≥ 98%, Final PSD (dBm/MHz) = PSD (dBm/MHz)

When EUT duty cycle < 98%, Final PSD (dBm/MHz) = PSD (dBm/MHz) + 10*log (1/Duty Cycle)

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	PSD (dBm/MHz)	Duty Cycle (%)	Final PSD (dBm/MHz)	PSD Limit (dBm/MHz)	Result
11ac-VHT40	MCS0	38	5190	-4.34	95.79	-4.15	≤ 11.00	Pass
11ac-VHT40	MCS0	46	5230	-4.70	95.79	-4.51	≤ 11.00	Pass
11ac-VHT40	MCS0	54	5270	-3.81	95.79	-3.62	≤ 11.00	Pass
11ac-VHT40	MCS0	62	5310	-4.39	95.79	-4.20	≤ 11.00	Pass
11ac-VHT40	MCS0	102	5510	-4.53	95.79	-4.34	≤ 11.00	Pass
11ac-VHT40	MCS0	118	5590	-4.73	95.79	-4.54	≤ 11.00	Pass
11ac-VHT40	MCS0	134	5670	-5.12	95.79	-4.93	≤ 11.00	Pass
11ac-VHT40	MCS0	142	5710	-5.06	95.79	-4.87	≤ 11.00	Pass
11ac-VHT80	MCS0	42	5210	-9.66	92.22	-9.31	≤ 11.00	Pass
11ac-VHT80	MCS0	58	5290	-9.31	92.22	-8.96	≤ 11.00	Pass
11ac-VHT80	MCS0	106	5530	-9.86	92.22	-9.50	≤ 11.00	Pass
11ac-VHT80	MCS0	122	5610	-9.63	92.22	-9.28	≤ 11.00	Pass
11ac-VHT80	MCS0	138	5690	-10.20	92.22	-9.84	≤ 11.00	Pass

Note: When EUT duty cycle ≥ 98%, Final PSD (dBm/MHz) = PSD (dBm/MHz)

When EUT duty cycle < 98%, Final PSD (dBm/MHz) = PSD (dBm/MHz) + 10*log (1/Duty Cycle)

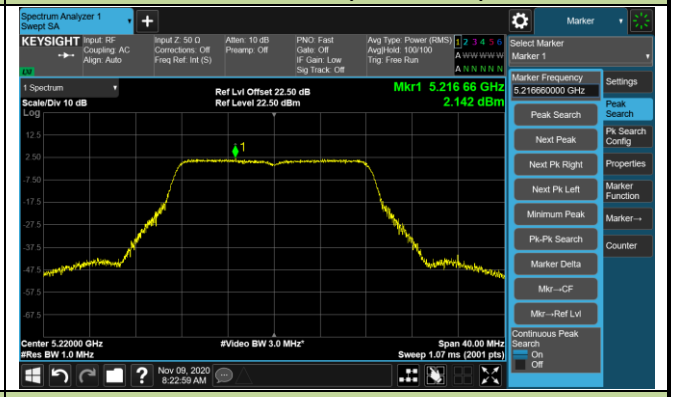
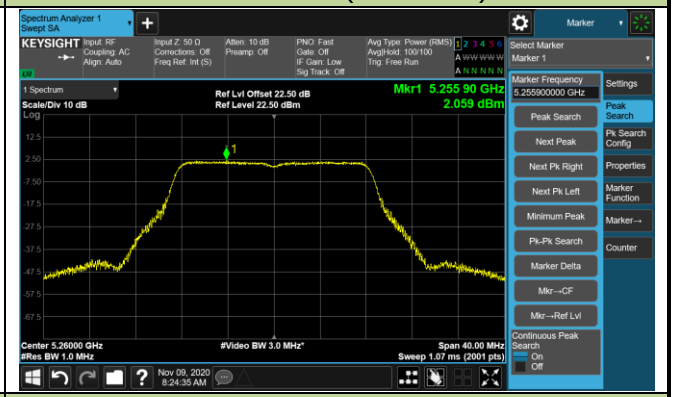
Product	Mobile Computer	Test Engineer	Chase Zhu
Test Site	SIP-SR5	Test Date	2020/10/26
Test Item	Power Spectral Density (NII-3)		

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	PSD (dBm/ 500kHz)	Duty Cycle (%)	Final PSD (dBm/ 500kHz)	Limit (dBm/ 500kHz)	Result
11a	6Mbps	149	5745	-1.10	98.34	-1.10	≤ 30.00	Pass
11a	6Mbps	157	5785	-1.55	98.34	-1.55	≤ 30.00	Pass
11a	6Mbps	165	5825	-0.92	98.34	-0.92	≤ 30.00	Pass
11ac-VHT20	MCS0	149	5745	-2.95	97.70	-2.85	≤ 30.00	Pass
11ac-VHT20	MCS0	157	5785	-3.51	97.70	-3.41	≤ 30.00	Pass
11ac-VHT20	MCS0	165	5825	-3.21	97.70	-3.11	≤ 30.00	Pass
11ac-VHT40	MCS0	151	5755	-7.54	95.79	-7.35	≤ 30.00	Pass
11ac-VHT40	MCS0	159	5795	-7.69	95.79	-7.50	≤ 30.00	Pass
11ac-VHT80	MCS0	155	5775	-13.45	91.62	-13.07	≤ 30.00	Pass

Note:

When EUT duty cycle > 98%, Final PSD (dBm / 500kHz) = PSD (dBm / 500kHz).

When EUT duty cycle < 98%, Final PSD (dBm / 500kHz) = PSD (dBm / 500kHz) + 10*log(1/Duty cycle)

802.11a Power Spectral Density	
Channel 36 (5180MHz)	Channel 44 (5220MHz)
	
Channel 48 (5240MHz)	Channel 52 (5260MHz)
	
Channel 60 (5300MHz)	Channel 64 (5320MHz)