MEASUREMENT REPORT

FCC PART 15.407/ RSS-247WLAN

FCC ID:	VPYLBEE59B1LV
IC:	772C-LBEE59B1LV
APPLICANT:	Murata Manufacturing Co., Ltd.
Application Type:	Certification
Product:	Communication Module
Model No.:	Type1LV
FCC Classification:	Unlicensed National Information Infrastructure (NII)
FCC Rule Part(s):	Part15 Subpart E (Section 15.407)
IC Rule(s):	RSS-247 Issue 2, RSS-GEN Issue 5
Test Procedure(s):	ANSI C63.10-2013, KDB 789033 D02v02r01
Test Date:	January 09 ~ March 25, 2019

Reviewed By: (Kevin Guo)

Approved By: (Robin Wu)

ACCREDITED
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
1901WSU002-U2	Rev. 01	Initial Report	03-28-2019	Valid

CONTENTS

§2.1033 General Information

Applicant:	Murata Manufacturing Co., Ltd.
Applicant Address:	10-1, Higashikotari 1-chome, Nagaokakyo-shi, Kyoto 617-8555, Japan
Manufacturer:	Murata Manufacturing Co., Ltd.
Manufacturer Address:	10-1, Higashikotari 1-chome, Nagaokakyo-shi, Kyoto 617-8555, Japan
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
FCC Registration No.:	893164
IC Registration No.:	11384A-1
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ Engineering

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd.,Suzhou, China.

- **MRT facility is a FCC registered (MRT Reg. No. 893164) test facility with the site description report on file and has met all the requirements specified in ANSI C63.4-2014.**
- **MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.**
- **MRT facility is a VCCI registered (R-20025, G-20034, C-20020, T-20020) test laboratory with the site description on file at VCCI Council.**
- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LACert. No.3628.01) in EMC, Telecommunications, Radio and SAR testing.**


Accredited Laboratory

A2LA has accredited

MRT TECHNOLOGY (SUZHOU) CO., LTD.

Suzhou, Jiangsu, People's Republic of China

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

Presented this 24th day of July 2018.

President and CEO
For the Accreditation Council
Certificate Number 3628.01
Valid to August 31, 2020

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

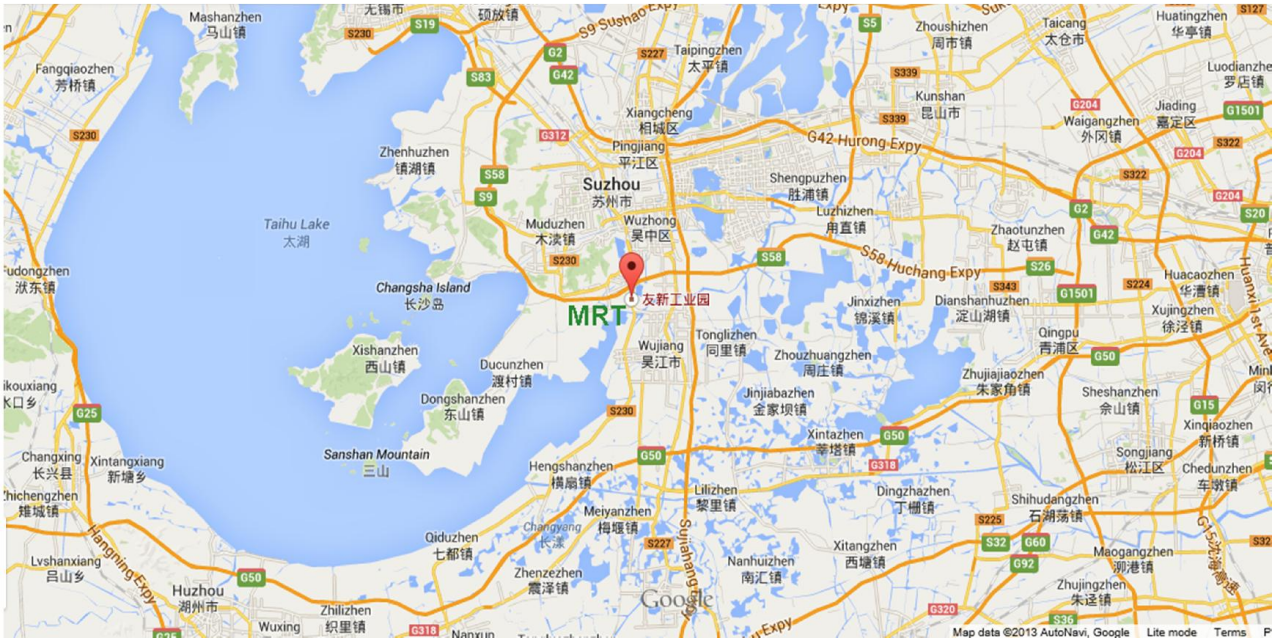
1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The measurement facility compliant with the test site requirements specified in ANSI C63.4-2014.



2. PRODUCT INFORMATION

2.1. Feature of Equipment under Test

Product Name:	Communication Module
Model No.:	Type1LV
Brand Name:	Murata
Work Voltage	DC 3.3V
Wi-Fi Specification	802.11 a/b/g/n/ac
Bluetooth Specification	BR / EDR / LE 1Mbps / LE 2Mbps

Note: Work voltage of test fixture is DC 5V.

2.2. Product Specification Subjective to this Report

Frequency Range:	For 802.11a/n-HT20/ac-VHT20: 5180~5320MHz, 5500~5720MHz, 5745~5825MHz
Type of Modulation:	802.11a/n/ac: OFDM
Data Rate:	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 72.2Mbps 802.11ac: up to 86.7Mbps
Antenna Type:	PCB Antenna
Antenna Gain:	2.0dBi

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

2.3. Operation Frequency / Channel list

802.11a/n-HT20/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	--	--	--	--

Note: The device can't operate in 5600~5650 MHz band in Canada (The frequency of blue font).

2.4. Test Mode

Test Mode	Mode 1: Transmit by 802.11a
	Mode 2: Transmit by 802.11n-HT20
	Mode 3: Transmit by 802.11ac-VHT20

2.5. Description of Test Software

The test utility software used during testing was “Tera Term”, and the version was “v4.78”.

Power Parameter Value:

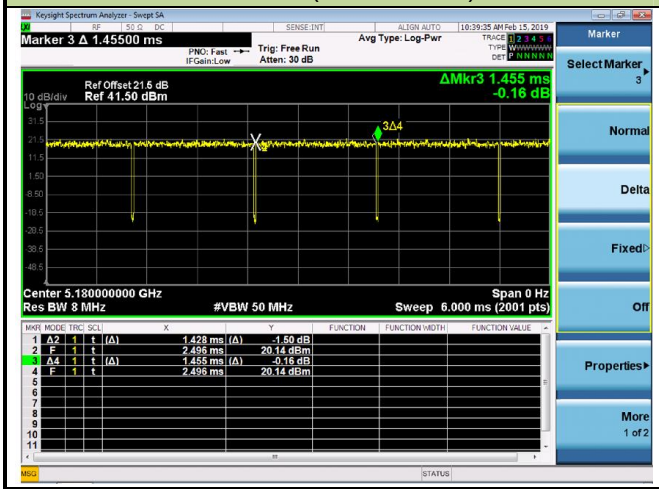
Test Channel No.	Test Frequency (MHz)	Power Parameter Value		
		802.11a	802.11n-HT20	802.11ac-VHT20
36	5180	72	71	72
44	5220	72	71	72
48	5240	72	72	72
52	5260	72	72	72
56	5280	72	72	72
60	5300	72	72	72
64	5320	72	72	72
100	5500	71	71	71
116	5580	72	72	72
120	5600	72	72	72
140	5700	72	72	72
144	5720	73	72	73
149	5745	78	77	78
157	5785	78	78	78
165	5825	78	78	78

2.6. Device Capabilities

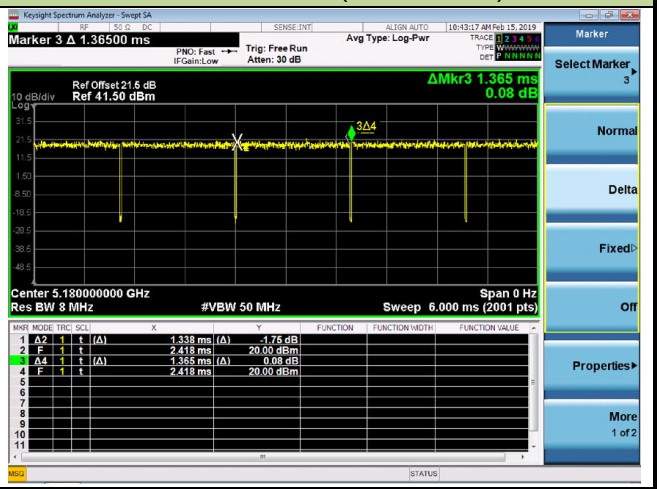
This device contains the following capabilities:
2.4GHz WLAN (DTS), 5GHz WLAN (UNII), Bluetooth BR/EDR/LE 1Mbps/LE 2Mbps (DSS/DTS) 5GHz (NII) operation is possible in 20MHz channel bandwidth. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = average. 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	98.14%
802.11n-HT20	98.02%
802.11ac-VHT20	98.03%

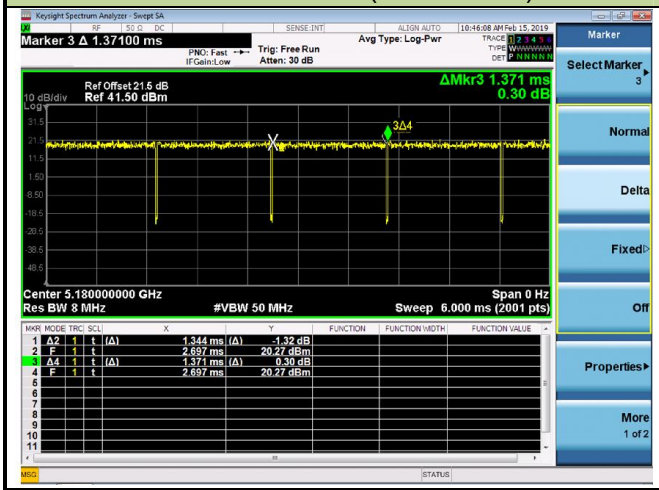
802.11a (T = 1.43ms)



802.11n-HT20 (T = 1.34ms)



802.11ac-VHT20 (T = 1.34ms)



2.7. Test Configuration

The **Communication Module** was tested per the guidance of KDB 789033 D02v02r01. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

2.8. EMI Suppression Device(s)/Modifications

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

2.9. 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 device is 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.

RSP-100 Issue 11 Section 3

The manufacturer, importer or distributor shall meet the labelling requirements set out in this section for every unit:

(i) prior to marketing in Canada, for products manufactured in Canada

(ii) prior to importation into Canada, for imported products

For information regarding the e-labelling option, see Notice 2014–DRS1003. The label for the certified product represents the manufacturer's or importer's compliance with Innovation, Science and Economic Development Canada's (ISED) regulatory requirements.

Please see attachment for IC label and label location.

3. DESCRIPTION OF TEST

3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013), and the guidance provided in KDB 789033 D02v02r01 were used in the measurement of the device.

Deviation from measurement procedure…….....None

3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an 8'x4'x4' shielded enclosure. A 1m x 2m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground-plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the receiver and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The receiver was scanned from 150kHz to 30MHz. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 9kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or data exchange speed, or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions are used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

An extension cord was used to connect to a single LISN which powered by EUT. The extension cord was calibrated with LISN, the impedance and insertion loss are compliance with the requirements as stated in ANSI C63.10-2013.

3.3. Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. A MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.
For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up for frequencies below 1GHz was placed on top of the 0.8 meter high, 1 x 1.5 meter table; and test set-up for frequencies 1-40GHz was placed on top of the 1.5 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.
Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. According to 3dB Beam-Width of horn antenna, the horn antenna should be always directed to the EUT when rising height.

4. TEST EQUIPMENT CALIBRATION DATE

Conducted Emissions - SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06185	1 year	2019/04/20
Two-Line V-Network	R&S	ENV 216	MRTSUE06002	1 year	2019/06/15
Two-Line V-Network	R&S	ENV 216	MRTSUE06003	1 year	2019/06/15
Thermohygrometer	Testo	608-H1	MRTSUE06404	1 year	2019/08/15
Shielding Anechoic Chamber	Mikebang	Chamber-SR2	MRTSUE06214	N/A	N/A

Conducted Test Equipment - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EXA Signal Analyzer	KEYSIGHT	N9010B	MRTSUE06452	1 year	2019/07/20
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2019/04/20
USB wideband power sensor	KEYSIGHT	U2021XA	MRTSUE06446	1 year	2019/07/20
Attenuator	MVE	MVE2211-10	MRTSUE06800	1 year	2019/07/10
Temperature & Humidity Chamber	BAOYT	BYH-150CL	MRTSUE06051	1 year	2019/12/06
Thermohygrometer	testo	608-H1	MRTSUE06401	1 year	2019/08/15

Radiated Emissions - AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2019/08/14
PXA Signal Analyzer	Keysight	9030B	MRTSUE06395	1 year	2019/09/14
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2019/11/20
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2019/04/12
Broadband Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2019/10/20
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06024	1 year	2019/12/17
Broadband Coaxial Preamplifier	Agilent	83017A	MRTSUE06076	1 year	2019/11/16
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2019/06/12
Digital Thermometer & Hygrometer	Testo	608-H1	MRTSUE06403	1 year	2019/08/15
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06213	1 year	2019/05/02

Radiated Emissions - AC2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Keysight	N9038A	MRTSUE06125	1 year	2019/08/14
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2019/11/09
Bilog Period Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2019/10/20
Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06171	1 year	2019/11/09
Broadband Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06024	1 year	2019/12/17
Broadband Coaxial Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2019/11/16
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2019/06/13
Temperature/Humidity Meter	Minggao	ETH529	MRTSUE06170	1 year	2019/12/13
Anechoic Chamber	RIKEN	Chamber-AC2	MRTSUE06213	1 year	2019/05/02

Software	Version	Function
e3	V 8.3.5	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 - SR2
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 150kHz~30MHz: 3.46dB
Radiated Emission Measurement- AC1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz ~ 1GHz: 4.18dB 1GHz ~ 25GHz: 4.76dB
Radiated Emission Measurement - AC2
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz ~ 1GHz: 3.86dB 1GHz ~ 25GHz: 4.33dB
Frequency Stability - TR3
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.78dB
Output Power, Transmit Power Control - TR3
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.13dB
Power Spectrum Density-TR3
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.15dB
Occupied Bandwidth - TR3
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.28%

6. TEST RESULT

6.1. Summary

Company Name: **Murata Manufacturing Co., Ltd.**

FCC ID: **VPYLBEE59B1LV**

IC: **772C-LBEE59B1LV**

FCC Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.407(a)	26dB Bandwidth	N/A	Conducted	Pass	Section6.2
15.407(e)	6dB Bandwidth	≥ 500kHz		Pass	Section 6.3
15.407(a)(1)(iv) (2),(3)	Maximum Conducted Output Power	Refer to Section 6.4		Pass	Section 6.4
15.407(h)(1)	Transmit Power Control	≤24 dBm		N/A	Section 6.5
15.407(a)(1)(iv) , (2), (3)	Peak Power Spectral Density	Refer to Section 6.6		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	Detail see Section 6.8	Radiated	Pass	Section 6.8&6.9
15.205, 15.209 15.407(b)(4), (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	N/A	Section 6.10

RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
RSS-247§6.2	99% Bandwidth	N/A	Conducted	Pass	Section 6.2
RSS-247§6.2.4	6dB Bandwidth	>500kHz		Pass	Section 6.3
RSS-247 §6.2.1, §6.2.2, §6.2.3, §6.2.4	Max Conducted Output Power	Refer to Section 6.4		Pass	Section 6.4
	Maximum E.I.R.P				
RSS-247 §6.2.2,§6.2.3	Transmit Power Control	≤ 24 dBm		N/A	Section 6.5
RSS-247 §6.2.1, §6.2.2, §6.2.3, §6.2.4	Peak Power Spectral Density	Refer to Section 6.6		Pass	Section 6.6
RSS-Gen [8.11]	Frequency Stability	N/A		Pass	Section 6.7
RSS-247 §6.2.1, §6.2.2, §6.2.3, §6.2.4	Out-of-Band Emissions	Detail see section 6.8	Radiated	Pass	Section 6.8 & 6.9
RSS-247 §6.2.1, §6.2.2, §6.2.3, §6.2.4	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in RSS-Gen [8.9]		Pass	
RSS-Gen [8.8]	AC Conducted Emissions 150kHz - 30MHz	< RSS-Gen [8.8] limits	Line Conducted	N/A	Section 6.10

Notes:

1) All channels, modes, and modulations/data rates were investigated among all UNII bands. 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.
2) 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.
3) N/A means Not Applicable.

6.2. 26dB Bandwidth Measurement

6.2.1.Test Limit

N/A

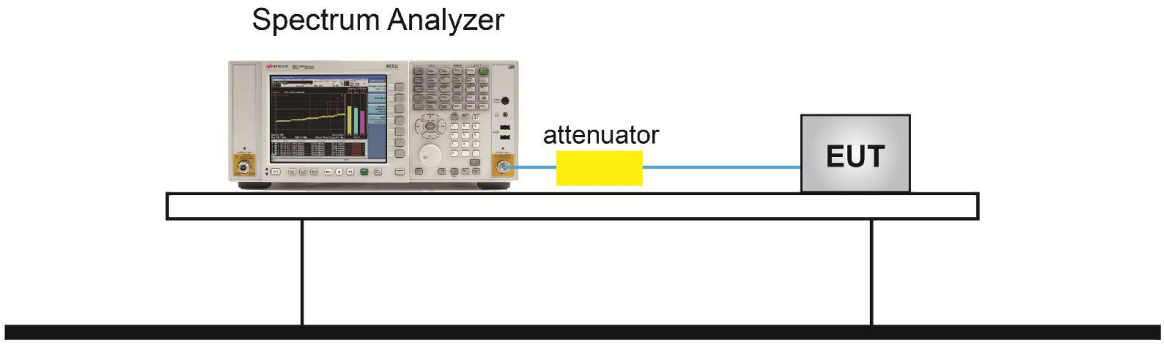
6.2.2.Test Procedure used

KDB 789033 D02v02r01 – Section C.1

6.2.3.Test Setting

1. The analyzers' automatic bandwidth measurement capability was used to perform the 26dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 26. The automatic bandwidth measurement function also has the capability of simultaneously measuring the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediated power nulls in the fundamental emission.
2. RBW = approximately 1% of the emission bandwidth.
3. VBW ≥ 3 × RBW.
4. Detector = Peak.
5. Trace mode = max hold.

6.2.4.Test Setup



6.2.5.Test Result

Product	Communication Module	Temperature	24°C
Test Engineer	Dandy Li	Relative Humidity	53%
Test Site	TR3	Test Date	2019/02/14

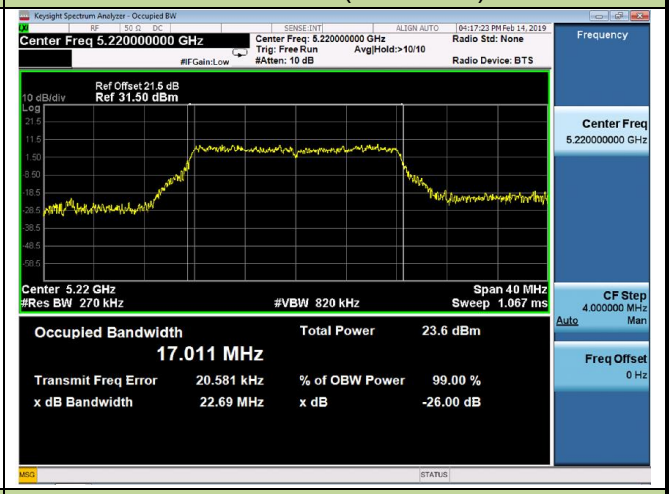
Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
802.11a	6Mbps	36	5180	29.47	16.97
802.11a	6Mbps	44	5220	22.69	17.01
802.11a	6Mbps	48	5240	21.45	17.17
802.11a	6Mbps	52	5260	21.51	17.00
802.11a	6Mbps	60	5300	29.36	17.17
802.11a	6Mbps	64	5320	24.95	17.27
802.11a	6Mbps	100	5500	22.47	17.06
802.11a	6Mbps	116	5580	29.81	17.05
802.11a	6Mbps	120	5600	30.64	17.35
802.11a	6Mbps	140	5700	30.15	17.16
802.11a	6Mbps	144	5720	21.66	17.24
802.11a	6Mbps	149	5745	29.97	17.25
802.11a	6Mbps	157	5785	37.83	17.18
802.11a	6Mbps	165	5825	35.13	17.35
802.11n-HT20	MCS0	36	5180	31.01	18.12
802.11n-HT20	MCS0	44	5220	21.63	18.08
802.11n-HT20	MCS0	48	5240	29.66	18.05
802.11n-HT20	MCS0	52	5260	30.52	18.02
802.11n-HT20	MCS0	60	5300	30.91	18.25
802.11n-HT20	MCS0	64	5320	30.93	18.23
802.11n-HT20	MCS0	100	5500	39.81	18.06
802.11n-HT20	MCS0	116	5580	39.88	18.61
802.11n-HT20	MCS0	120	5600	39.00	18.38
802.11n-HT20	MCS0	140	5700	30.63	18.11
802.11n-HT20	MCS0	144	5720	30.87	18.22
802.11n-HT20	MCS0	149	5745	30.69	18.22
802.11n-HT20	MCS0	157	5785	38.79	18.27
802.11n-HT20	MCS0	165	5825	39.64	18.42

Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
802.11ac-VHT20	MCS0	36	5180	21.47	18.06
802.11ac-VHT20	MCS0	44	5220	30.60	18.24
802.11ac-VHT20	MCS0	48	5240	30.30	18.16
802.11ac-VHT20	MCS0	52	5260	29.44	18.03
802.11ac-VHT20	MCS0	60	5300	29.96	18.16
802.11ac-VHT20	MCS0	64	5320	28.54	18.02
802.11ac-VHT20	MCS0	100	5500	30.71	18.05
802.11ac-VHT20	MCS0	116	5580	40.00	18.46
802.11ac-VHT20	MCS0	120	5600	30.82	18.27
802.11ac-VHT20	MCS0	140	5700	38.28	18.34
802.11ac-VHT20	MCS0	144	5720	29.64	18.17
802.11ac-VHT20	MCS0	149	5745	39.76	18.67
802.11ac-VHT20	MCS0	157	5785	36.26	18.17
802.11ac-VHT20	MCS0	165	5825	39.64	18.37

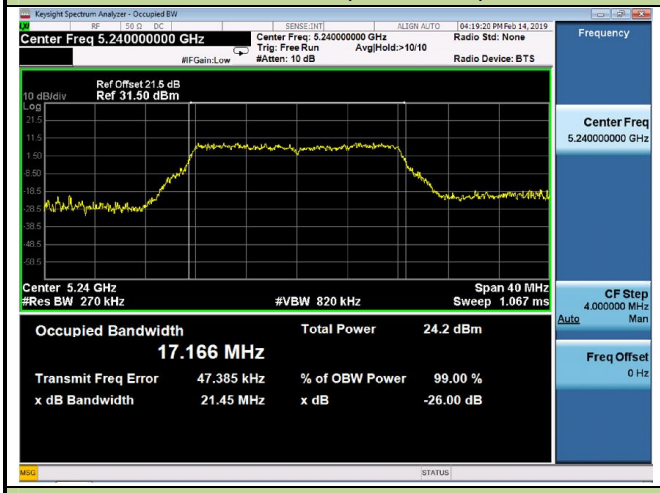
802.11a 26dB Bandwidth & 99% Bandwidth

Channel 36 (5180MHz)

Channel 44 (5220MHz)

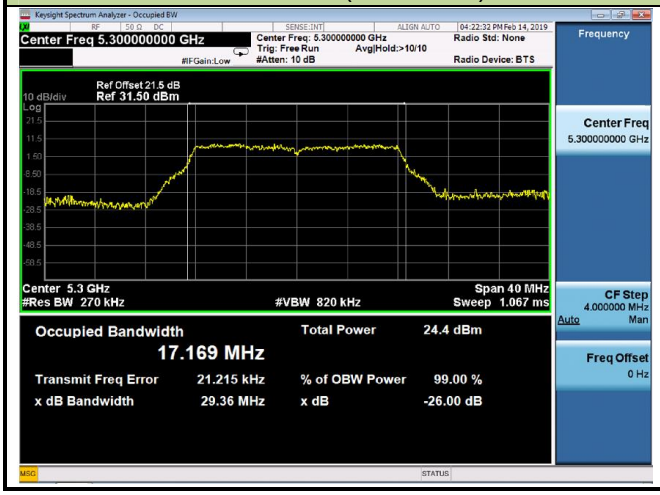


Channel 48 (5240MHz)

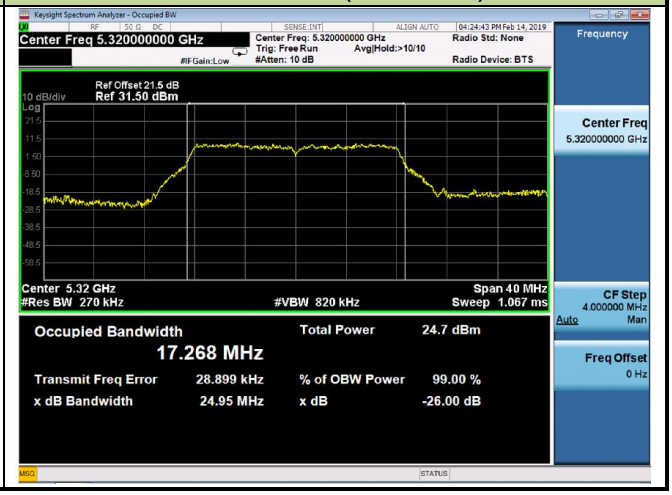


Channel 52 (5260MHz)

Channel 60 (5300MHz)

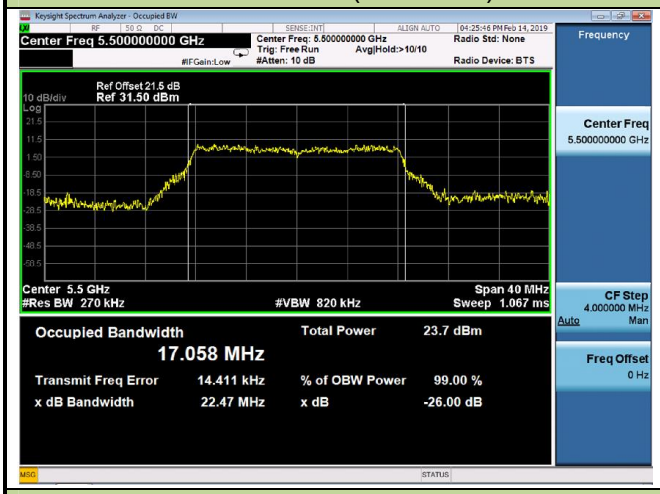


Channel 64 (5320MHz)

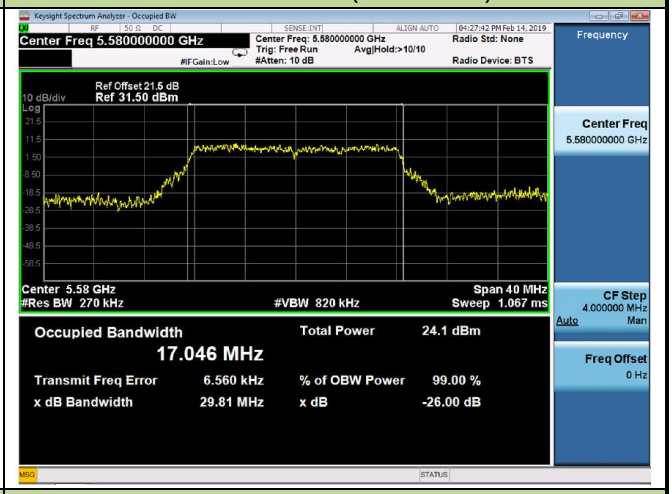


802.11a 26dB Bandwidth & 99% Bandwidth

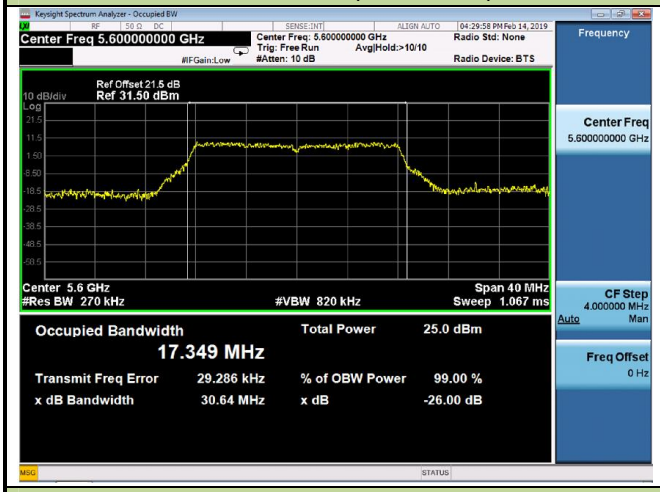
Channel 100 (5500MHz)



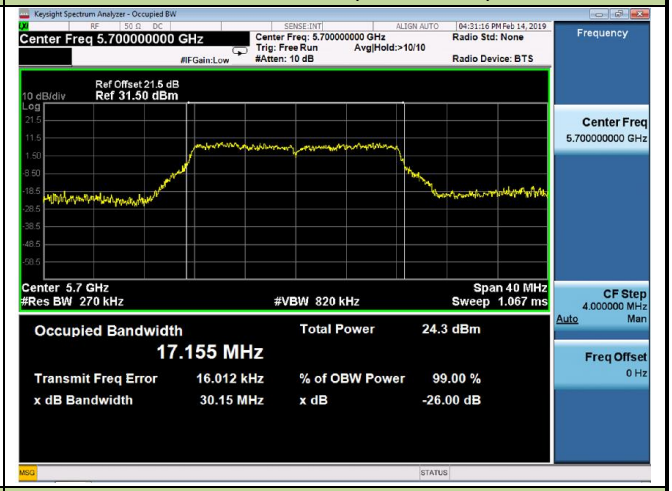
Channel 116 (5580MHz)



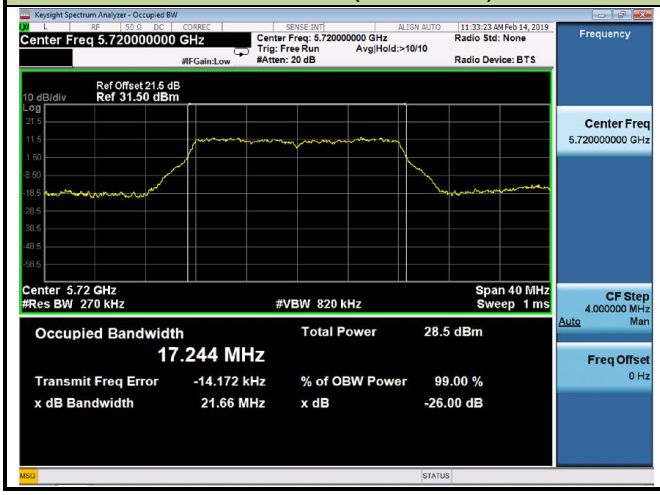
Channel 120 (5600MHz)



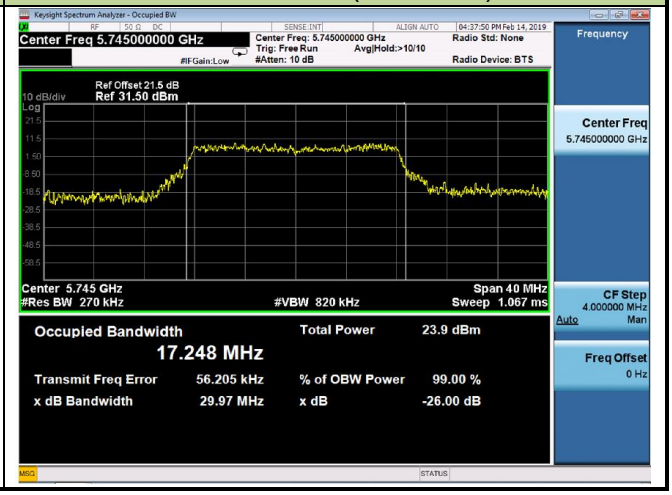
Channel 140 (5700MHz)

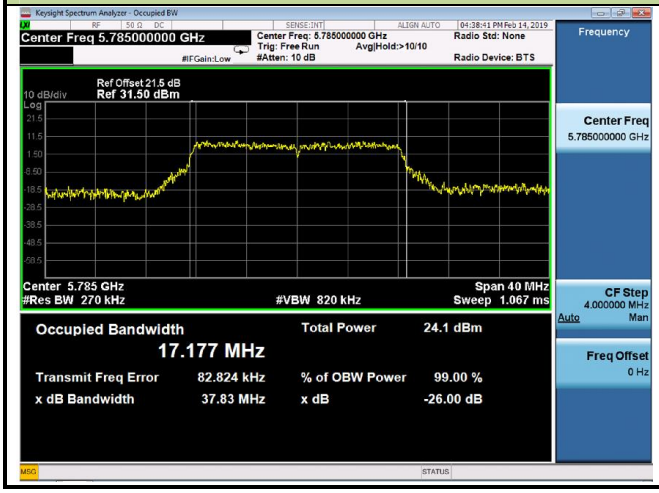
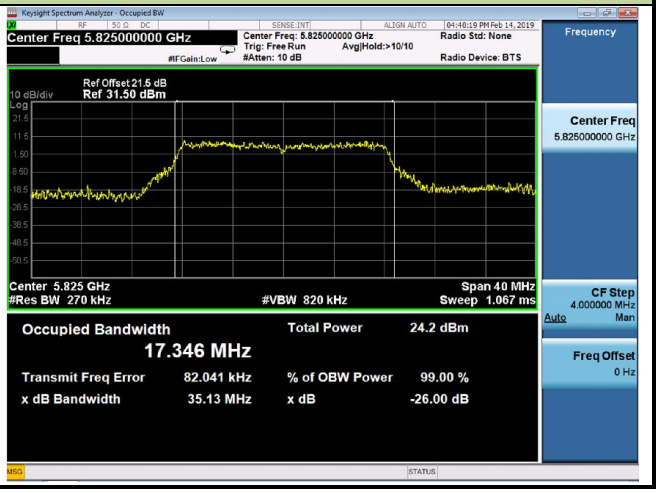


Channel 144 (5720MHz)



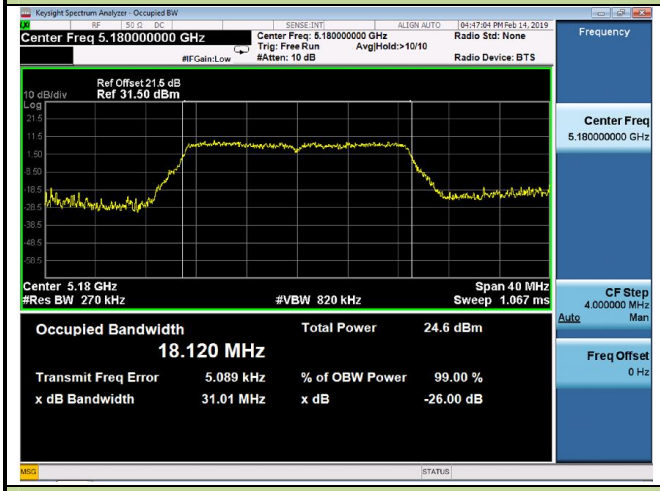
Channel 149 (5745MHz)



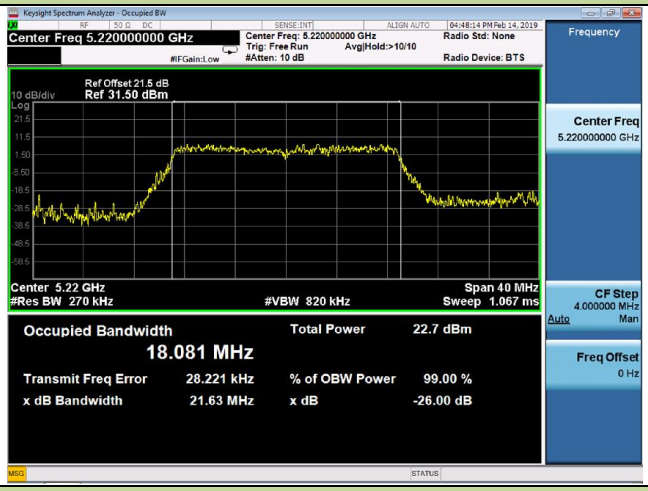
802.11a 26dB Bandwidth & 99% Bandwidth	
Channel 157 (5785MHz)	Channel 165 (5825MHz)
	

802.11n-HT20 26dB Bandwidth & 99% Bandwidth

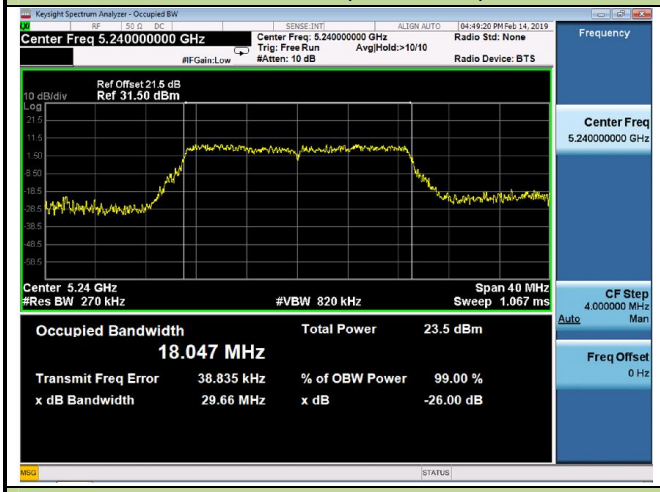
Channel 36 (5180MHz)



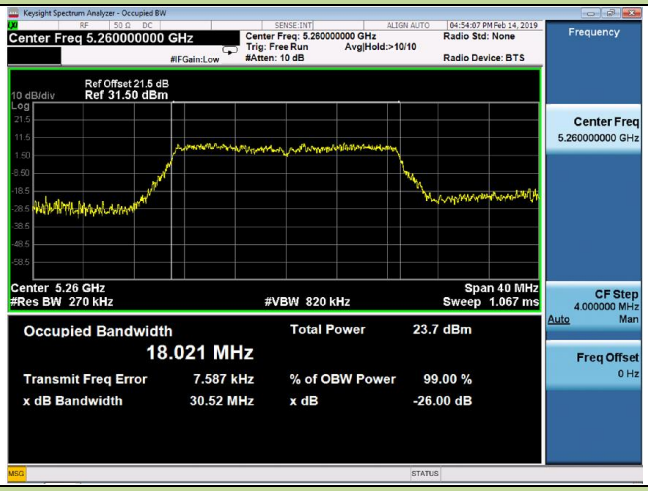
Channel 44 (5220MHz)



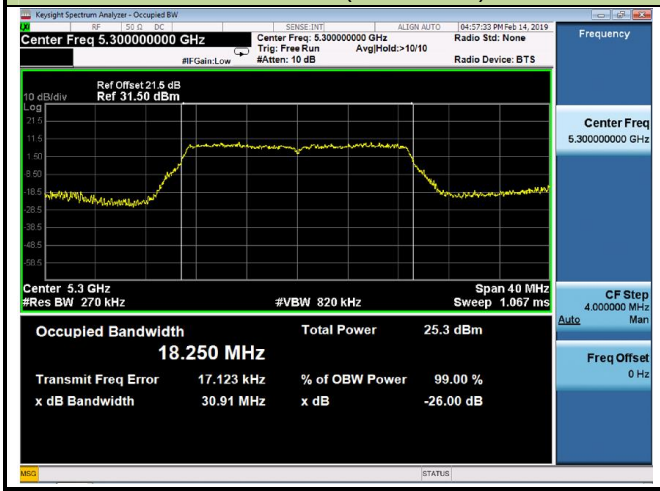
Channel 48 (5240MHz)



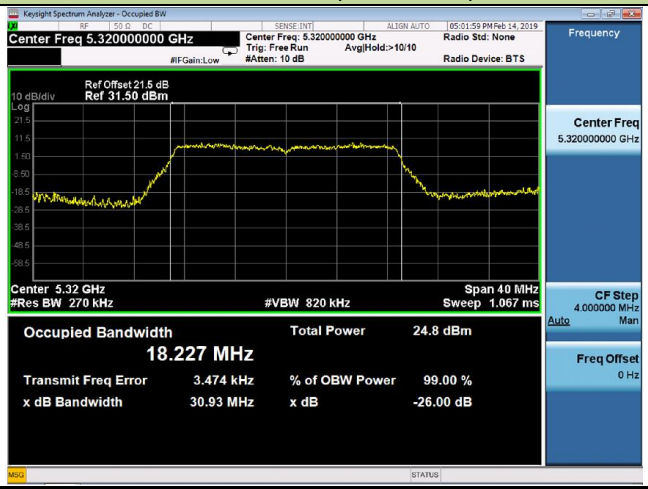
Channel 52 (5260MHz)



Channel 60 (5300MHz)

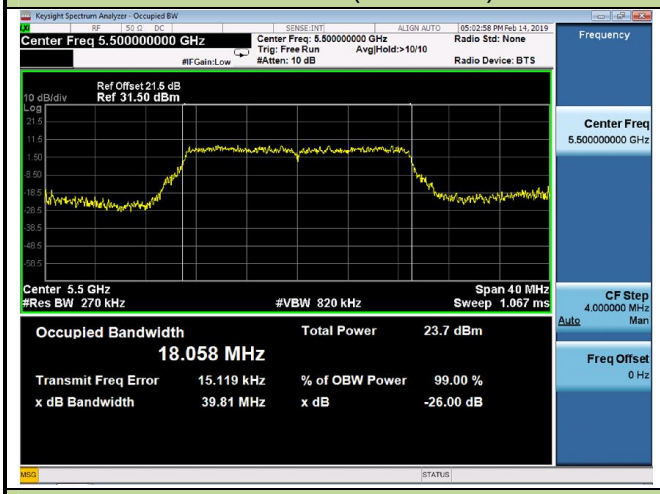


Channel 64 (5320MHz)



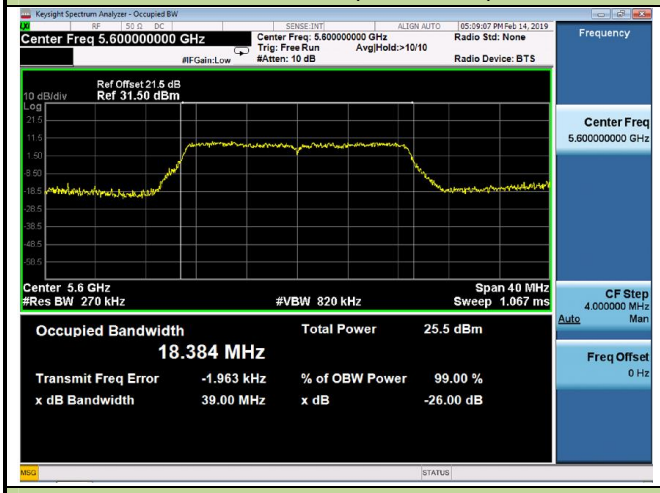
802.11n-HT20 26dB Bandwidth & 99% Bandwidth

Channel 100 (5500MHz)

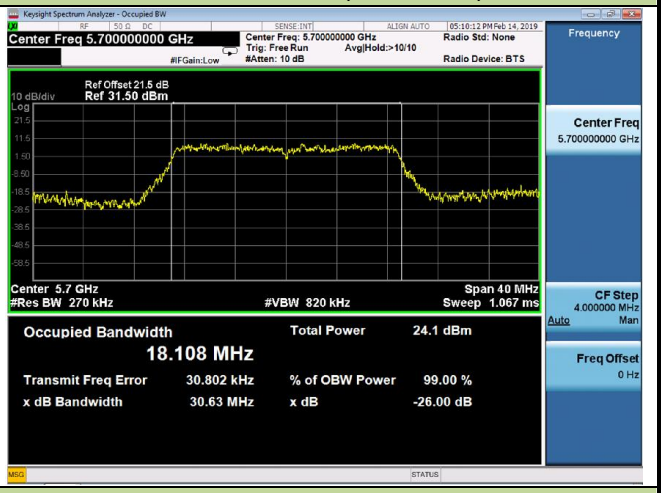


Channel 116 (5580MHz)

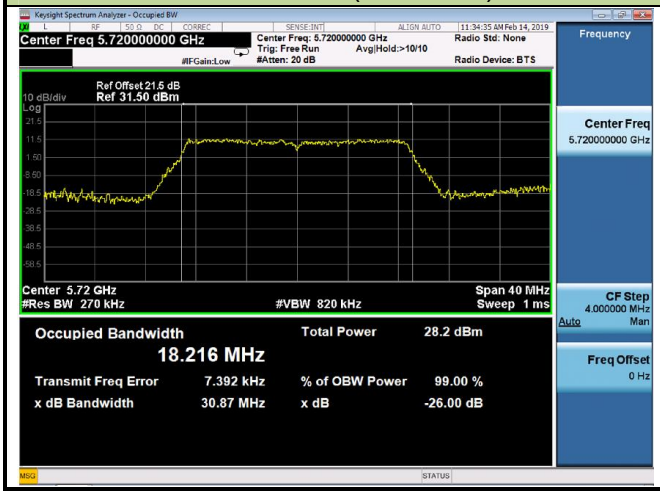
Channel 120 (5600MHz)



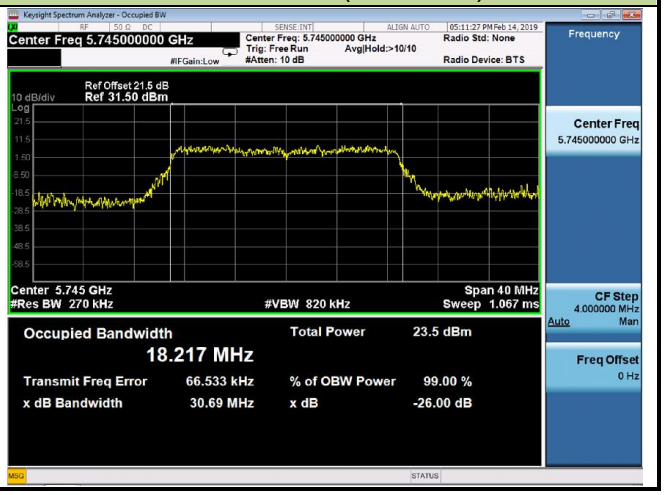
Channel 140 (5700MHz)

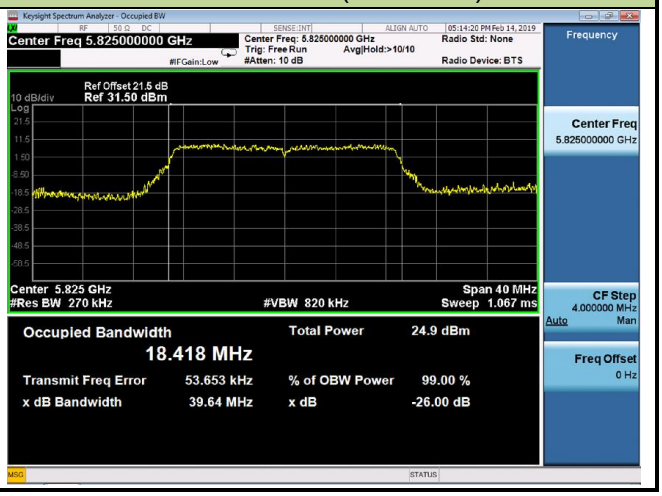


Channel 144 (5720MHz)



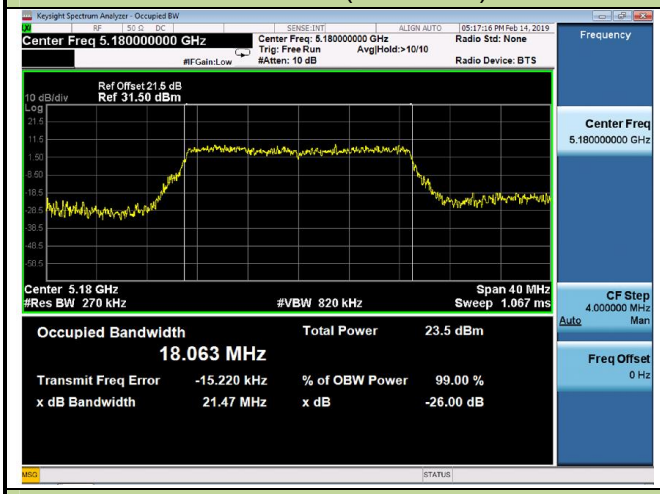
Channel 149 (5745MHz)



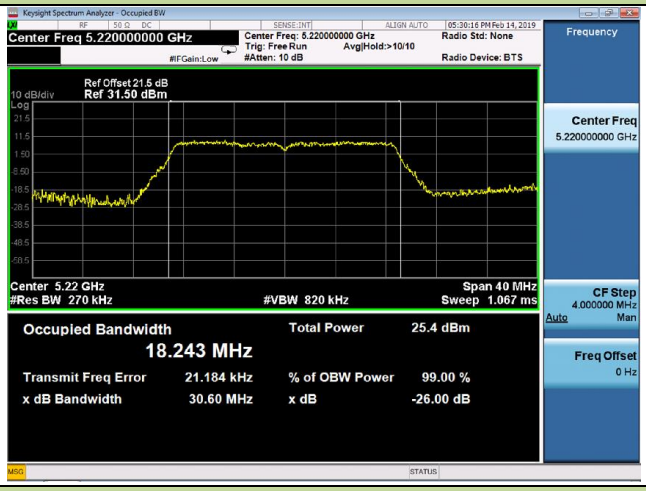
802.11n-HT20 26dB Bandwidth & 99% Bandwidth	
Channel 157 (5785MHz)	Channel 165 (5825MHz)
	

802.11ac-VHT20 26dB Bandwidth & 99% Bandwidth

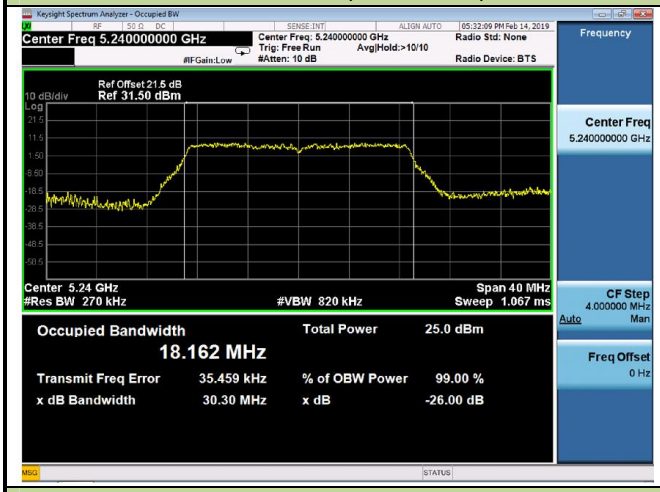
Channel 36 (5180MHz)



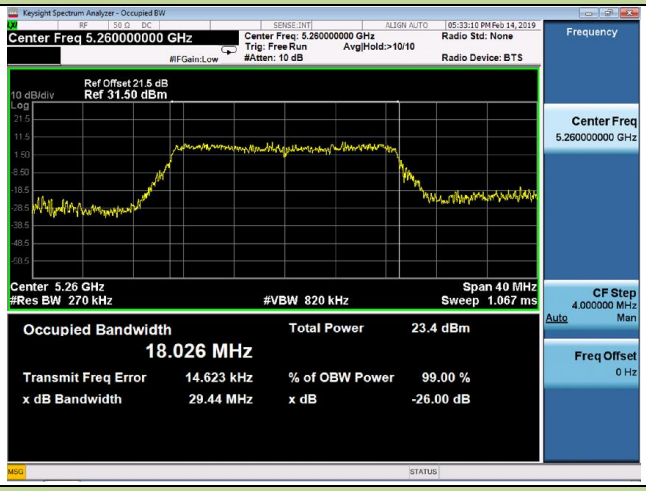
Channel 44 (5220MHz)



Channel 48 (5240MHz)

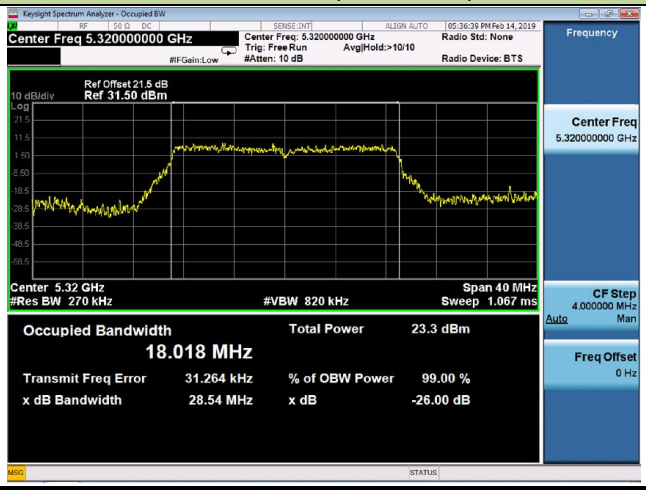


Channel 52 (5260MHz)



Channel 60 (5300MHz)

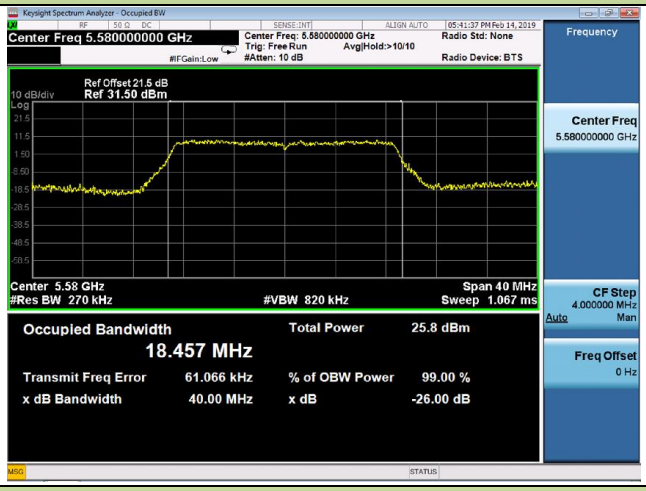
Channel 64 (5320MHz)



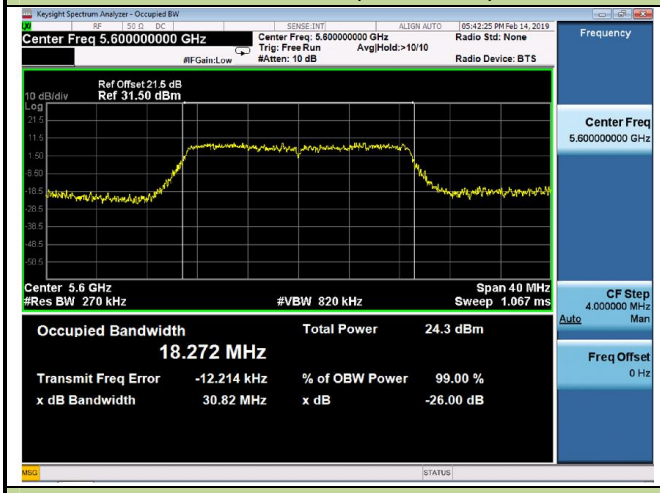
802.11ac-VHT20 26dB Bandwidth & 99% Bandwidth

Channel 100 (5500MHz)

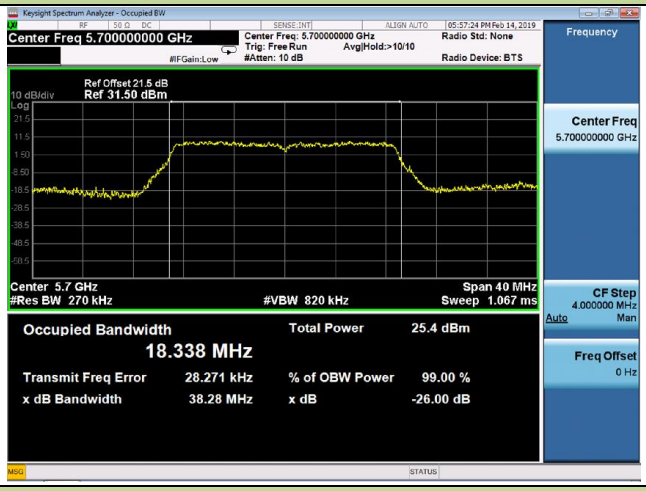
Channel 116 (5580MHz)



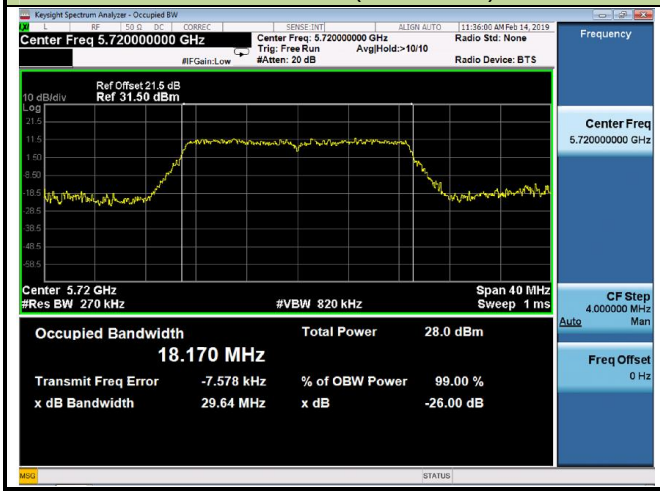
Channel 120 (5600MHz)



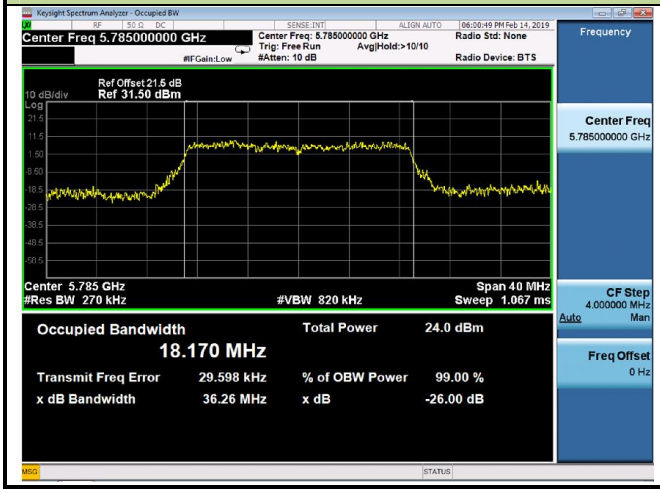
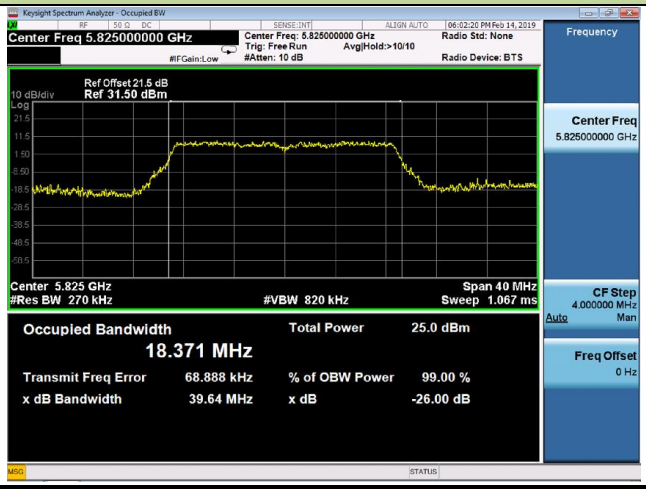
Channel 140 (5700MHz)



Channel 144 (5720MHz)



Channel 149 (5745MHz)

802.11ac-VHT20 26dB Bandwidth & 99% Bandwidth	
Channel 157 (5785MHz)	Channel 165 (5825MHz)
	

6.3. 6dB Bandwidth Measurement

6.3.1.Test Limit

The minimum 6dBbandwidth shall be at least 500 kHz.

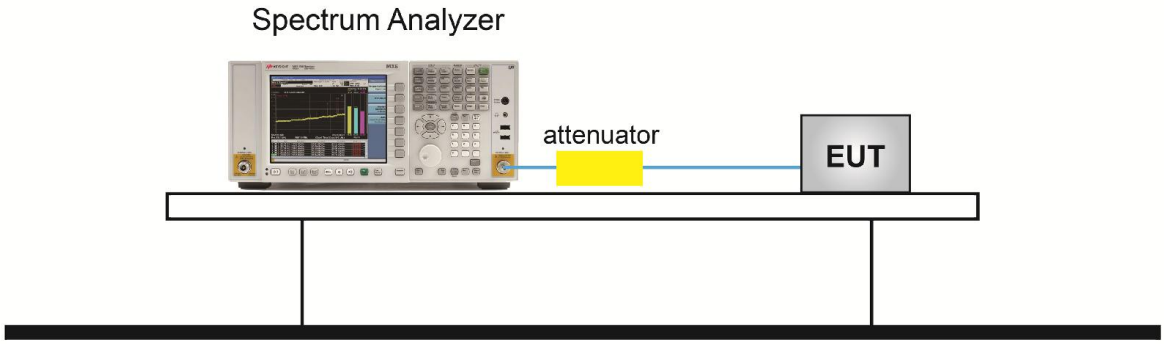
6.3.2.Test Procedure used

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.

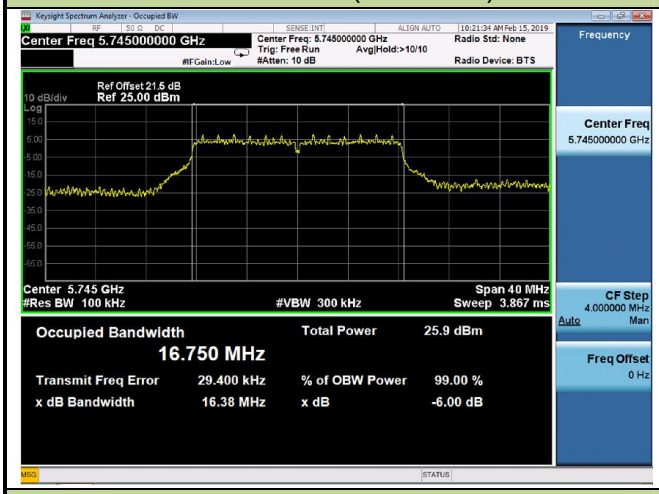
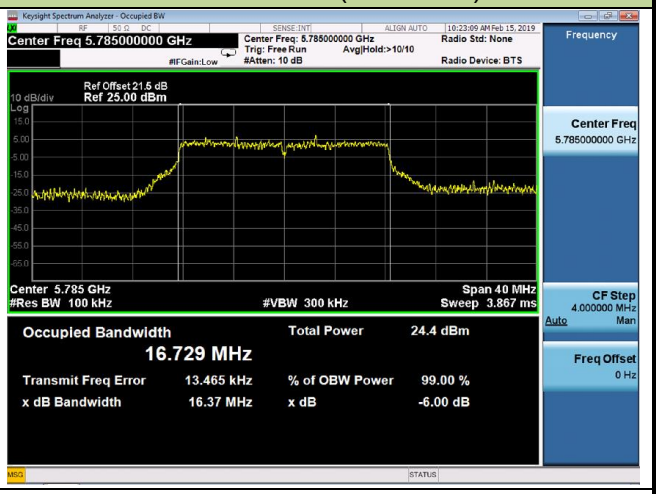
6.3.4.Test Setup

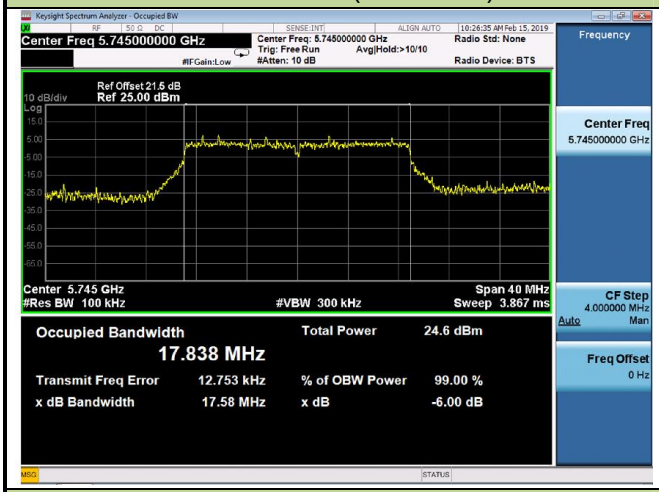
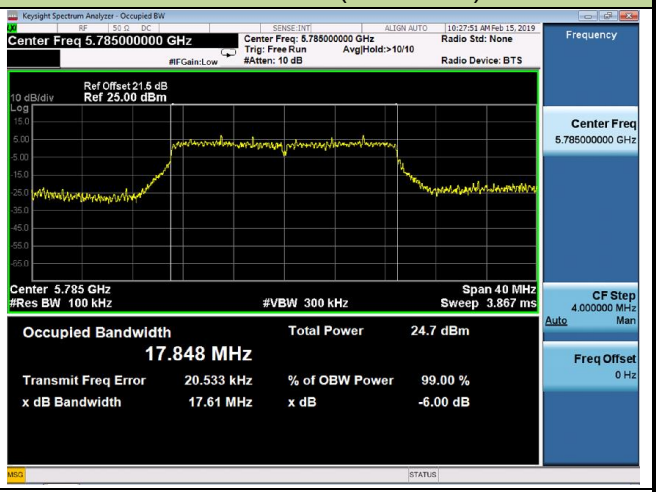


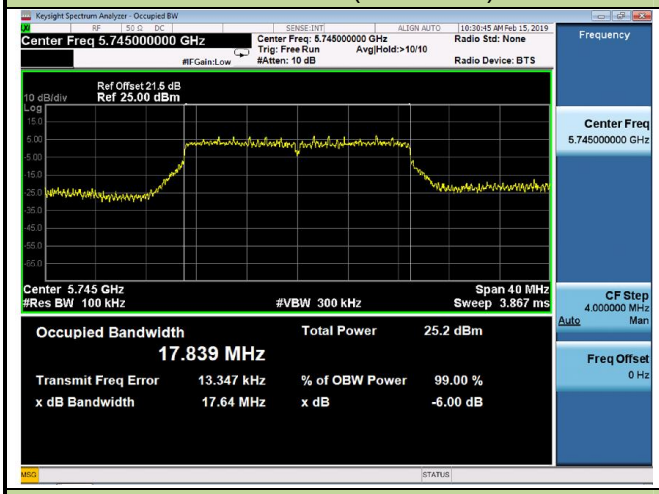
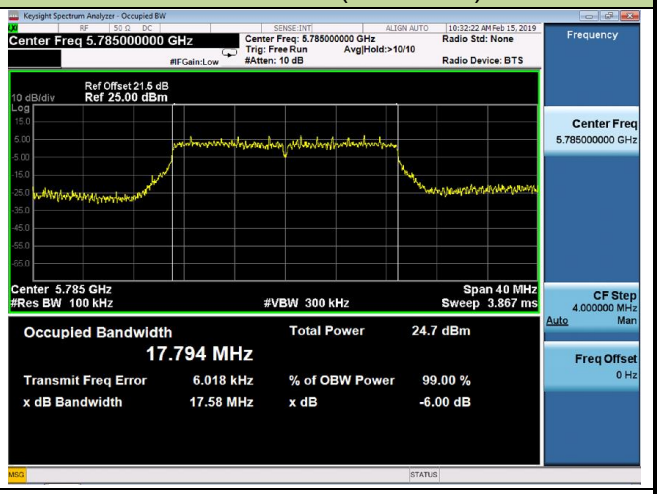
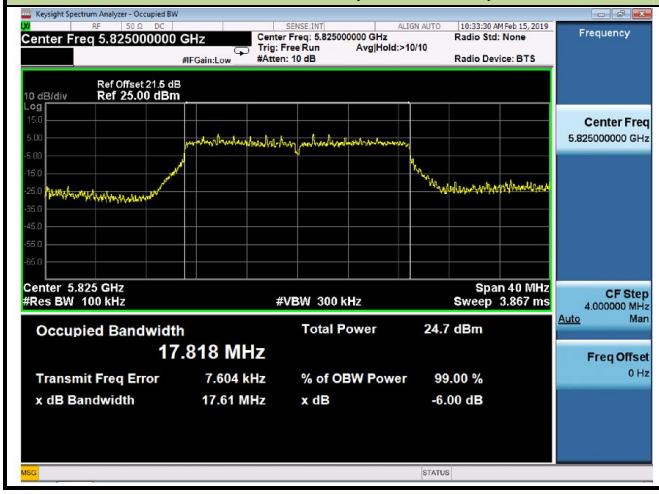
6.3.5.Test Result

Product	Communication Module	Temperature	24°C
Test Engineer	Dandy Li	Relative Humidity	53%
Test Site	TR3	Test Date	2019/02/15

Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
802.11a	6Mbps	149	5745	16.38	≥ 0.5	Pass
802.11a	6Mbps	157	5785	16.37	≥ 0.5	Pass
802.11a	6Mbps	165	5825	16.49	≥ 0.5	Pass
802.11n-HT20	MCS0	149	5745	17.58	≥ 0.5	Pass
802.11n-HT20	MCS0	157	5785	17.61	≥ 0.5	Pass
802.11n-HT20	MCS0	165	5825	17.62	≥ 0.5	Pass
802.11ac-VHT20	MCS0	149	5745	17.64	≥ 0.5	Pass
802.11ac-VHT20	MCS0	157	5785	17.58	≥ 0.5	Pass
802.11ac-VHT20	MCS0	165	5825	17.61	≥ 0.5	Pass

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

802.11n-HT20 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)	
	

6.4. Output Power Measurement

6.4.1.Test Limit

For FCC

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 250mW or 11dBm + 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.

Additional Requirement for IC

For the band 5.15-5.25 GHz, the maximum e.i.r.p. shall not exceed 200mW (23.01dBm) or 10 + 10 $\log_{10}$ B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power shall not exceed 250mW (23.98dBm) or 11 + 10 $\log_{10}$ B, dBm, whichever power is less. The maximum e.i.r.p. shall not exceed 1.0 W (30dBm) or 17 + 10 $\log_{10}$ B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.

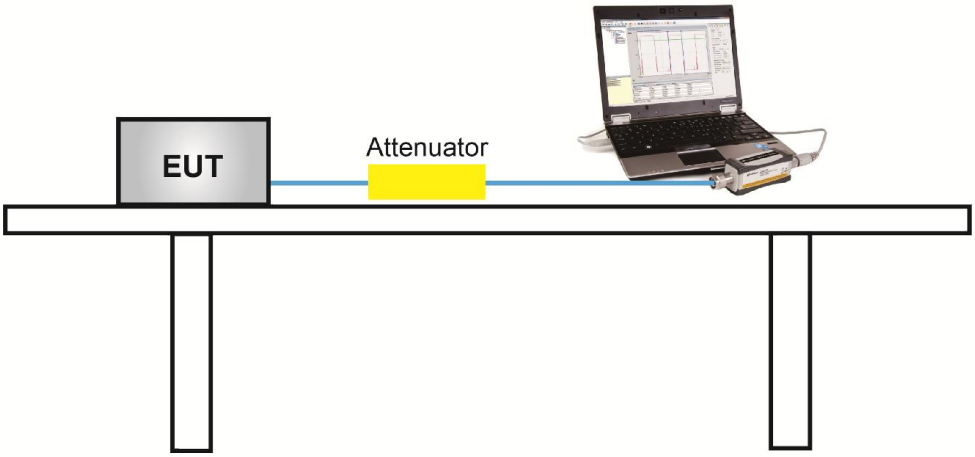
6.4.2.Test Procedure Used

KDB 789033 D02v02r01 - 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. The trace was averaged over 100 traces to obtain the final measured average power.

6.4.4.Test Setup



6.4.5.Test Result

Power output test was verified over all data rates of each mode shown as below, and then choose the maximum power output (Gray Marker) for final test of each channel.

Test Mode	Bandwidth	Channel	Frequency (MHz)	Data Rate / MCS	Average Power (dBm)
802.11a	20	36	5180	6Mbps	17.91
				24Mbps	17.65
				54Mbps	17.24
802.11n	20	36	5180	MCS0	17.61
				MCS4	17.23
				MCS7	17.01
802.11ac	20	36	5180	MCS0	17.87
				MCS4	17.59
				MCS9	17.20

Product	Communication Module	Temperature	23°C
Test Engineer	Dandy Li	Relative Humidity	54%
Test Site	TR3	Test Date	2019/01/10

Test Mode	Data Rate / MCS	Channel No.	Freq. (MHz)	Average Power (dBm)	FCC Average Power Limit (dBm)	IC Average Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)	Result
11a	6Mbps	36	5180	17.91	≤ 23.98	--	19.91	≤ 22.30	Pass
11a	6Mbps	44	5220	17.85	≤ 23.98	--	19.85	≤ 22.30	Pass
11a	6Mbps	48	5240	17.82	≤ 23.98	--	19.82	≤ 22.30	Pass
11a	6Mbps	52	5260	17.88	≤ 23.98	≤ 23.30	19.88	≤ 29.30	Pass
11a	6Mbps	60	5300	17.81	≤ 23.98	≤ 23.30	19.81	≤ 29.30	Pass
11a	6Mbps	64	5320	17.82	≤ 23.98	≤ 23.30	19.82	≤ 29.30	Pass
11a	6Mbps	100	5500	17.86	≤ 23.98	≤ 23.31	19.86	≤ 29.10	Pass
11a	6Mbps	116	5580	17.79	≤ 23.98	≤ 23.31	19.79	≤ 29.10	Pass
11a	6Mbps	120	5600	17.74	≤ 23.98	--	--	--	Pass
11a	6Mbps	140	5700	17.56	≤ 23.98	≤ 23.31	19.56	≤ 29.10	Pass
11a	6Mbps	144	5720	17.89	≤ 23.98	≤ 23.31	19.89	≤ 29.10	Pass
11a	6Mbps	149	5745	17.92	≤ 30.00	≤ 30.00	--	--	Pass
11a	6Mbps	157	5785	17.79	≤ 30.00	≤ 30.00	--	--	Pass
11a	6Mbps	165	5825	17.76	≤ 30.00	≤ 30.00	--	--	Pass
11n-HT20	MCS0	36	5180	17.61	≤ 23.98	--	19.61	≤ 22.56	Pass
11n-HT20	MCS0	44	5220	17.56	≤ 23.98	--	19.56	≤ 22.56	Pass
11n-HT20	MCS0	48	5240	17.90	≤ 23.98	--	19.90	≤ 22.56	Pass
11n-HT20	MCS0	52	5260	17.82	≤ 23.98	≤ 23.55	19.82	≤ 29.55	Pass
11n-HT20	MCS0	60	5300	17.79	≤ 23.98	≤ 23.55	19.79	≤ 29.55	Pass
11n-HT20	MCS0	64	5320	17.76	≤ 23.98	≤ 23.55	19.76	≤ 29.55	Pass
11n-HT20	MCS0	100	5500	17.81	≤ 23.98	≤ 23.57	19.81	≤ 29.57	Pass
11n-HT20	MCS0	116	5580	17.82	≤ 23.98	≤ 23.57	19.82	≤ 29.57	Pass
11n-HT20	MCS0	120	5600	17.86	≤ 23.98	--	--	--	Pass
11n-HT20	MCS0	140	5700	17.68	≤ 23.98	≤ 23.57	19.68	≤ 29.57	Pass
11n-HT20	MCS0	144	5720	17.54	≤ 23.98	≤ 23.57	19.54	≤ 29.57	Pass
11n-HT20	MCS0	149	5745	17.81	≤ 30.00	≤ 30.00	--	--	Pass
11n-HT20	MCS0	157	5785	17.76	≤ 30.00	≤ 30.00	--	--	Pass
11n-HT20	MCS0	165	5825	17.80	≤ 30.00	≤ 30.00	--	--	Pass

Test Mode	Data Rate / MCS	Channel No.	Freq. (MHz)	Average Power (dBm)	FCC Average Power Limit (dBm)	IC Average Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)	Result
11ac-VHT20	MCS0	36	5180	17.87	≤ 23.98	--	19.87	≤ 22.57	Pass
11ac-VHT20	MCS0	44	5220	17.71	≤ 23.98	--	19.71	≤ 22.57	Pass
11ac-VHT20	MCS0	48	5240	17.87	≤ 23.98	--	19.87	≤ 22.57	Pass
11ac-VHT20	MCS0	52	5260	17.74	≤ 23.98	≤ 23.55	19.74	≤ 29.55	Pass
11ac-VHT20	MCS0	60	5300	17.79	≤ 23.98	≤ 23.55	19.79	≤ 29.55	Pass
11ac-VHT20	MCS0	64	5320	17.73	≤ 23.98	≤ 23.55	19.73	≤ 29.55	Pass
11ac-VHT20	MCS0	100	5500	17.70	≤ 23.98	≤ 23.56	19.70	≤ 29.56	Pass
11ac-VHT20	MCS0	116	5580	17.80	≤ 23.98	≤ 23.56	19.80	≤ 29.56	Pass
11ac-VHT20	MCS0	120	5600	17.89	≤ 23.98	--	--	--	Pass
11ac-VHT20	MCS0	140	5700	17.52	≤ 23.98	≤ 23.56	19.52	≤ 29.56	Pass
11ac-VHT20	MCS0	144	5720	17.80	≤ 23.98	≤ 23.56	19.80	≤ 29.56	Pass
11ac-VHT20	MCS0	149	5745	17.87	≤ 30.00	≤ 30.00	--	--	Pass
11ac-VHT20	MCS0	157	5785	17.74	≤ 30.00	≤ 30.00	--	--	Pass
11ac-VHT20	MCS0	165	5825	17.81	≤ 30.00	≤ 30.00	--	--	Pass

Note 1: EIRP (dBm) = Average Power(dBm) + Antenna Gain(dBi)

Note 2: Antenna Gain refers to section 2.2 of this report.

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 30dBm.

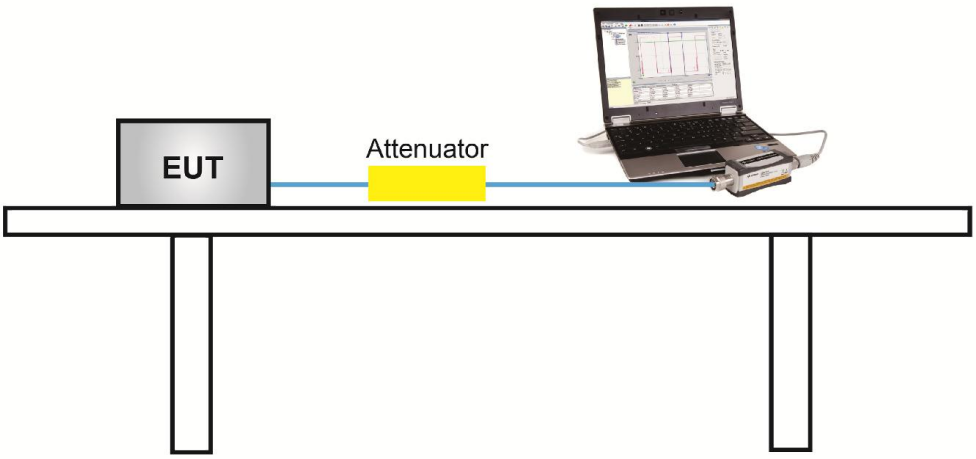
6.5.2.Test Procedure Used

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. The trace was averaged over 100 traces to obtain the final measured average power.

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 500mW.

6.6. Power Spectral Density Measurement

6.6.1.Test Limit

For FCC

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

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

Additional Requirement for IC

For the band 5.15-5.25 GHz, the e.i.r.p. spectral density shall not exceed 10dBm in any 1.0 MHz band.

6.6.2.Test Procedure Used

KDB 789033 D02v02r01- Section F

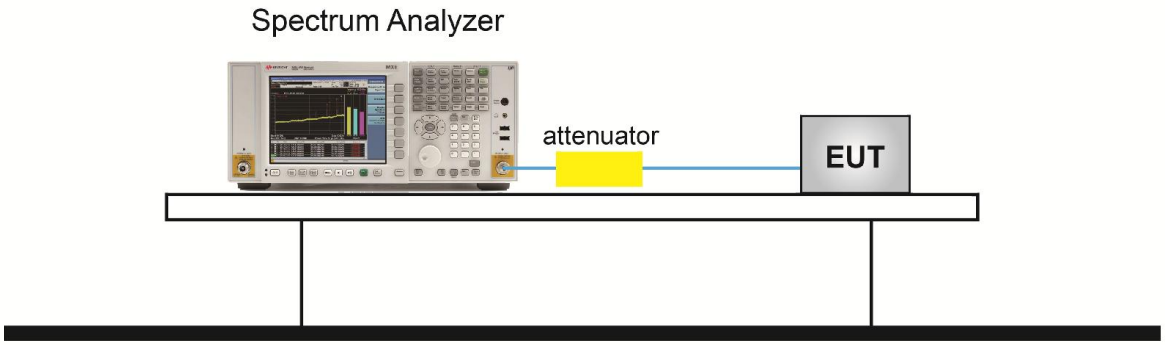
6.6.3.Test Setting

1. Analyzer was set to the center frequency of the UNII channel under investigation
2. Span was set to encompass the entire 26dB OBW of the signal.
3. RBW = 1MHz, if measurement bandwidth of Maximum PSD is specified in 500 kHz, RBW = 100 kHz
4. VBW = 3MHz
5. Number of sweep points ≥ 2 × (span / RBW)
6. Detector = power averaging (RMS)
7. Sweep time = auto
8. Trigger = free run
9. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
10. 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.

11. When the measurement bandwidth of Maximum PSD is specified in 500 kHz, add a constant factor 10*log(500kHz/100kHz) = 6.99 dB to the measured result

6.6.4.Test Setup



6.6.5.Test Result

Product	Communication Module	Temperature	23°C
Test Engineer	Dandy Li	Relative Humidity	54%
Test Site	TR3	Test Date	2019/02/15
Test Item	Power Spectral Density (UNII-Band 1)		

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	PSD (dBm/ MHz)	Duty Cycle (%)	Total PSD (dBm/MHz)	PSD Limit (dBm/MHz)	EIRP PSD (dBm/MHz)	EIRP PSD Limit (dBm/MHz)	Result
11a	6Mbps	36	5180	6.98	98.14	6.98	≤ 11.00	8.98	≤ 10.00	Pass
11a	6Mbps	44	5220	7.80	98.14	7.80	≤ 11.00	9.80	≤ 10.00	Pass
11a	6Mbps	48	5240	7.38	98.14	7.38	≤ 11.00	9.38	≤ 10.00	Pass
11n-HT20	MCS0	36	5180	6.86	98.02	6.86	≤ 11.00	8.86	≤ 10.00	Pass
11n-HT20	MCS0	44	5220	7.15	98.02	7.15	≤ 11.00	9.15	≤ 10.00	Pass
11n-HT20	MCS0	48	5240	7.04	98.02	7.04	≤ 11.00	9.04	≤ 10.00	Pass
11ac-VHT20	MCS0	36	5180	7.27	98.03	7.27	≤ 11.00	9.27	≤ 10.00	Pass
11ac-VHT20	MCS0	44	5220	7.23	98.03	7.23	≤ 11.00	9.23	≤ 10.00	Pass
11ac-VHT20	MCS0	48	5240	7.20	98.03	7.20	≤ 11.00	9.20	≤ 10.00	Pass

Note 1: When EUT duty cycle ≥ 98%, Total PSD (dBm/MHz) = PSD (dBm/MHz)

Note 2: EIRP PSD (dBm/MHz) = Total PSD (dBm/ MHz) + Antenna Gain(dBi), Antenna Gain = 2dBi

Product	Communication Module	Temperature	23°C
Test Engineer	Dandy Li	Relative Humidity	54%
Test Site	TR3	Test Date	2019/02/15
Test Item	Power Spectral Density (UNII-2A & UNII-2C)		

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	PSD (dBm/MHz)	Duty Cycle (%)	Total PSD (dBm/MHz)	PSD Limit (dBm/MHz)	Result
11a	6Mbps	52	5260	7.19	98.14	7.19	≤ 11.00	Pass
11a	6Mbps	60	5300	7.29	98.14	7.29	≤ 11.00	Pass
11a	6Mbps	64	5320	7.39	98.14	7.39	≤ 11.00	Pass
11a	6Mbps	100	5500	7.30	98.14	7.30	≤ 11.00	Pass
11a	6Mbps	116	5580	8.01	98.14	8.01	≤ 11.00	Pass
11a	6Mbps	120	5600	7.96	98.14	7.96	≤ 11.00	Pass
11a	6Mbps	140	5700	7.76	98.14	7.76	≤ 11.00	Pass
11a	6Mbps	144	5720	7.85	98.14	7.85	≤ 11.00	Pass
11n-HT20	MCS0	52	5260	7.05	98.02	7.05	≤ 11.00	Pass
11n-HT20	MCS0	60	5300	7.02	98.02	7.02	≤ 11.00	Pass
11n-HT20	MCS0	64	5320	6.96	98.02	6.96	≤ 11.00	Pass
11n-HT20	MCS0	100	5500	7.07	98.02	7.07	≤ 11.00	Pass
11n-HT20	MCS0	116	5580	8.35	98.02	8.35	≤ 11.00	Pass
11n-HT20	MCS0	120	5600	7.09	98.02	7.09	≤ 11.00	Pass
11n-HT20	MCS0	140	5700	7.20	98.02	7.20	≤ 11.00	Pass
11n-HT20	MCS0	144	5720	6.57	98.02	6.57	≤ 11.00	Pass
11ac-VHT20	MCS0	52	5260	7.22	98.03	7.22	≤ 11.00	Pass
11ac-VHT20	MCS0	60	5300	7.32	98.03	7.32	≤ 11.00	Pass
11ac-VHT20	MCS0	64	5320	7.05	98.03	7.05	≤ 11.00	Pass
11ac-VHT20	MCS0	100	5500	7.17	98.03	7.17	≤ 11.00	Pass
11ac-VHT20	MCS0	116	5580	7.66	98.03	7.66	≤ 11.00	Pass
11ac-VHT20	MCS0	120	5600	7.73	98.03	7.73	≤ 11.00	Pass
11ac-VHT20	MCS0	140	5700	7.24	98.03	7.24	≤ 11.00	Pass
11ac-VHT20	MCS0	144	5720	7.53	98.03	7.53	≤ 11.00	Pass

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

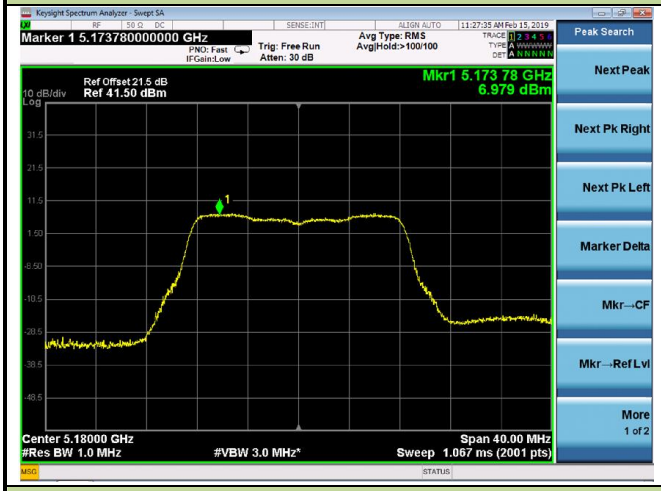
Product	Communication Module	Temperature	23°C
Test Engineer	Dandy Li	Relative Humidity	54%
Test Site	TR3	Test Date	2019/02/15
Test Item	Power Spectral Density (UNII-Band 3)		

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	PSD (dBm/ 100kHz)	Duty Cycle (%)	Total PSD(dBm/ 500kHz)	Limit (dBm/ 500kHz)	Result
11a	6Mbps	149	5745	-1.58	98.14	5.41	≤ 30.00	Pass
11a	6Mbps	157	5785	-1.48	98.14	5.51	≤ 30.00	Pass
11a	6Mbps	165	5825	-1.86	98.14	5.13	≤ 30.00	Pass
11n-HT20	MCS0	149	5745	-2.12	98.02	4.87	≤ 30.00	Pass
11n-HT20	MCS0	157	5785	-2.02	98.02	4.97	≤ 30.00	Pass
11n-HT20	MCS0	165	5825	-1.51	98.02	5.48	≤ 30.00	Pass
11ac-VHT20	MCS0	149	5745	-1.49	98.03	5.50	≤ 30.00	Pass
11ac-VHT20	MCS0	157	5785	-1.71	98.03	5.28	≤ 30.00	Pass
11ac-VHT20	MCS0	165	5825	-1.96	98.03	5.03	≤ 30.00	Pass

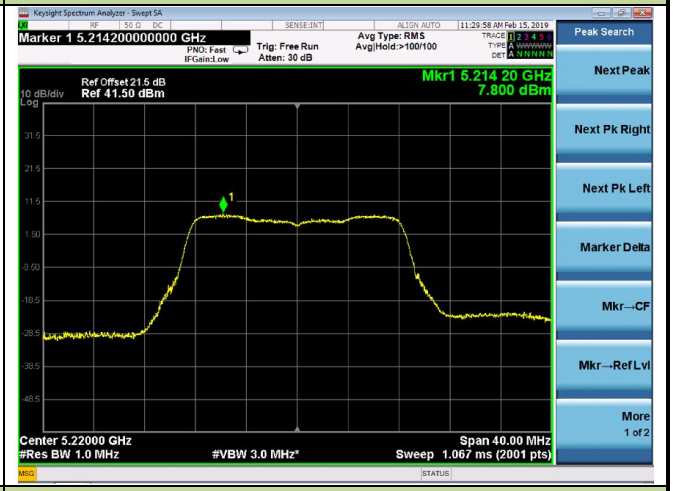
Note 1: When EUT duty cycle ≥ 98%, Total PSD (dBm/500kHz) = PSD (dBm/100kHz) + Constant Factor.

802.11a Power Spectral Density

Channel 36 (5180MHz)



Channel 44 (5220MHz)

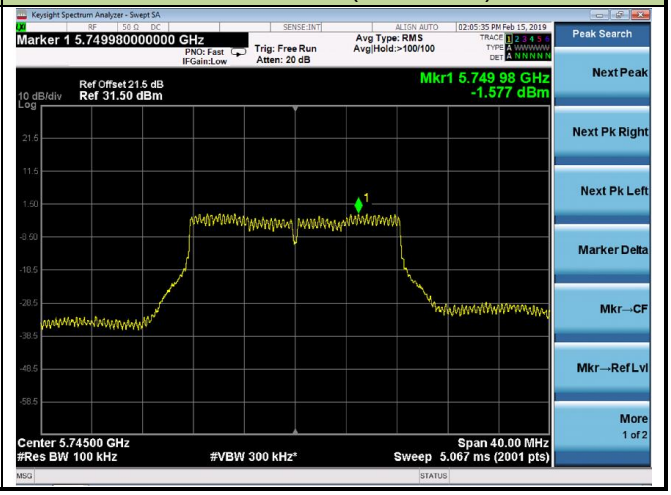


Channel 48 (5240MHz)

Channel 52 (5260MHz)

Channel 60 (5300MHz)

Channel 64 (5320MHz)

802.11a Power Spectral Density	
Channel 100 (5500MHz)	Channel 116 (5580MHz)
	
Channel 120 (5600MHz)	Channel 140 (5700MHz)
	
Channel 144 (5720MHz)	Channel 149 (5745MHz)
	

802.11a Power Spectral Density	
Channel 157 (5785MHz)	Channel 165 (5825MHz)