CFR 47 FCC PART 15 SUBPART E
ISED RSS-247 ISSUE 2

CERTIFICATION TEST REPORT

For

Communication Module

MODEL NUMBER: 1CQ

FCC ID: VPYLB1CQ

IC: 772C-LB1CQ

REPORT NUMBER: 4788296310-4

ISSUE DATE: Jan. 31, 2019

Prepared for

Murata Manufacturing Co.,Ltd.

Prepared by

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Revision History

Rev.	Issue Date	Revisions	Revised By
--	1/31/2019	Initial Issue	

Summary of Test Results			
Clause	Test Items	FCC/IC Rules	Test Results
1	6dB/26dB Bandwidth	FCC 15.407 (a)&(e) RSS-247 Clause 6.2	PASS
2	99% Occupied Bandwidth	RSS-Gen Clause 6.6	PASS
3	Maximum Conducted Output Power	FCC 15.407 (a) RSS-247 Clause 6.2	PASS
4	Power Spectral Density	FCC 15.407 (a) RSS-247 Clause 6.2	PASS
5	Antenna Conducted Spurious Emission	FCC 15.407 (b) RSS-247 Clause 6.2	PASS
6	Radiated Bandedge and Spurious Emission	FCC 15.407 (a) FCC 15.209 FCC 15.205 RSS-247 Clause 6.2 RSS-GEN Clause 8.9	PASS
7	Conducted Emission Test For AC Power Port	FCC 15.207 RSS-GEN Clause 8.8	PASS
8	Antenna Requirement	FCC 15.203 RSS-GEN Clause 8.3	PASS
9	Dynamic Frequency Selection	FCC 15.407 (h) RSS-247 Clause 6.3	PASS
Remark: It is a slave device without radar detection.			

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1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name: Murata Manufacturing Co.,Ltd.
Address: 10-1, Higashikotari 1- chome,Nagaokakyo-shi,Kyoto 617-8555, Japan

Manufacturer Information

Company Name: Murata Manufacturing Co.,Ltd.
Address: 10-1, Higashikotari 1- chome,Nagaokakyo-shi,Kyoto 617-8555, Japan

EUT Description

EUT Name: Communication Module
Model: 1CQ
Sample ID 1468264
Sample Received Date: March 8, 2018
Date of Tested: March 8, 2018~Jan 31, 2019

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 FCC PART 15 SUBPART E	PASS
ISED RSS-247 Issue 2	PASS
ISED RSS-GEN Issue 5	PASS

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, CFR 47 FCC Part 2, CFR 47 FCC Part 15, KDB 789033 D02 v02r01, RSS-GEN Issue 5, RSS-247 Issue 2, KDB414788 D01 Radiated Test Site v01r01, KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02 and 905462 C Client Without DFS New Rules v01r02.

3. FACILITIES AND ACCREDITATIO

Accreditation Certificate	**A2LA (Certificate No.: 4102.01)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA. **FCC (FCC Designation No.: CN1187)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Delcaration of Conformity (DoC) and Certification rules **IC(Company No.: 21320)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with Industry Canada. The Company Number is 21320. **VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793. Facility Name: Chamber D, the VCCI registration No. is G-20019 and R-20004 Shielding Room B , the VCCI registration No. is C-20012 and T-20011

Note 1: All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China

Note 2: The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

Note 3: For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30MHz had been correlated to measurements performed on an OATS.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognize national standards.

4.2. MEASUREMENT UNCERTAINTY

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

Test Item	Uncertainty
Uncertainty for Conduction emission test	3.62dB
Uncertainty for Radiation Emission test(include Fundamental emission) (9KHz-30MHz)	2.2dB
Uncertainty for Radiation Emission test(include Fundamental emission) (30MHz-1GHz)	4.00dB
Uncertainty for Radiation Emission test (1GHz to 40GHz)(include Fundamental emission)	5.78dB(1-18GHz)
	5.23dB (18GHz-26Gz)
	5.64dB (26GHz-40Gz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

Product Name:	Communication Module	
Model No.:	1CQ	
Operating Frequency:	IEEE 802.11a/n/ac 20MHz:5180MHz to 5240MHz, 5260MHz to 5320MHz, 5500MHz to 5720MHz (ISED not include 5600MHz to 5640MHz), 5745MHz to 5825MHz IEEE 802.11n/ac 40MHz: 5190MHz to 5230MHz, 5270MHz to 5310MHz, 5510MHz to 5710MHz (ISED not include 5590MHz to 5630MHz), 5755MHz-5795MHz IEEE 802.11ac 80MHz: 5210MHz, 5290MHz, 5530MHz to 5690MHz (ISED not include 5610MHz), 5775MHz	
Type of Modulation:	IEEE for 802.11a/n: OFDM (BPSK, QPSK,16QAM, 64QAM) IEEE for 802.11ac: OFDM (BPSK, QPSK,16QAM, 64QAM, 256QAM)	
Sample Type:	Fixed production	
Test software of EUT:	Tera Term & QRCT	
Antenna Type:	PCB Antenna	
Antenna Gain:	Antenna 1:	0 dBi
	Antenna 2:	0 dBi
	Directional:	3.01 dBi
Adapter	VDD_3P3/SWREG_IN/VDD_FEM: Typ. DC3.3V, Max. DC3.5V, Min. DC3.1V VDDIO_GPIO0/1/VDDIO_Xtal: Typ. DC1.8V or DC3.3V, Max. DC3.46V, Min. DC1.71V	

Note:
1. Directional Gain = 10logN, N is the number of antennas;
2. The directional gain is used when the two antennas transmit at the same time.

5.2. CHANNEL LIST

20 MHz Bandwidth Channel frequencies		
Band	Channel	Frequency (MHz)
UNII-1	36	5180
	40	5200
	44	5220
	48	5240
UNII-2A	52	5260
	56	5280
	60	5300
	64	5320
UNII-2C	100	5500
	104	5520
	108	5540
	112	5560
	116	5580
	120	5600
	124	5620
	128	5640
	132	5660
	136	5680
	140	5700
	144	5720
UNII-3	149	5745
	153	5765
	157	5785
	161	5805
	165	5825

40 MHz Bandwidth Channel frequencies		
Band	Channel	Frequency (MHz)
UNII-1	38	5190
	46	5230
UNII-2	54	5270
	62	5310
UNII-2C	102	5510
	110	5550
	118	5590
	126	5630
	134	5670
	142	5710
UNII-3	151	5755
	159	5795

80 MHz Bandwidth Channel frequencies		
Band	Channel	Frequency (MHz)
UNII-1	42	5210
UNII-2A	58	5290
UNII-2C	106	5530
UNII-3	122	5610
	138	5690
	155	5775

Note: The frequency range of 5600MHz-5650MHz can’t be used in Canada.

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	5150-5250	PCB	0
	5250-5350	PCB	0
	5470-5725	PCB	0
	5725-5825	PCB	0

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
2	5150-5250	PCB	0
	5250-5350	PCB	0
	5470-5725	PCB	0
	5725-5825	PCB	0

Test Mode	Transmit and Receive Mode	Description
802.11a	2TX, 2RX	Antenna 1 or 2 can be can be used as transmitting/receiving antenna.
802.11n HT20	2TX, 2RX	Antenna 1 and 2 can be can be used as transmitting/receiving antenna.
802.11n HT40	2TX, 2RX	Antenna 1 and 2 can be can be used as transmitting/receiving antenna.
802.11ac HT20	2TX, 2RX	Antenna 1 and 2 can be can be used as transmitting/receiving antenna.
802.11ac HT40	2TX, 2RX	Antenna 1 and 2 can be can be used as transmitting/receiving antenna.
802.11ac HT80	2TX, 2RX	Antenna 1 and 2 can be can be used as transmitting/receiving antenna.

Note: 802.11a mode don't support MIMO mode, but the antenna1 and antenna2 can transmit at the same time at 802.11a mode during work.

5.4. TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests	
Relative Humidity	35 ~ 75%	
Atmospheric Pressure:	1025Pa	
Temperature	TN	18 ~ 35°C
Voltage	VL	VL VDD_3P3/SWREG_IN/VDD_FEM:DC3.1V VDDIO_GPIO0/1/VDDIO_Xtal:DC1.71V
	VN	VDD_3P3/SWREG_IN/VDD_FEM: DC3.3V VDDIO_GPIO0/1/VDDIO_Xtal: DC1.8V
	VH	VH VDD_3P3/SWREG_IN/VDD_FEM:DC3.5V VDDIO_GPIO0/1/VDDIO_Xtal:DC3,46V

Note: VL= Lower Extreme Test Voltage
VN= Nominal Voltage
VH= Upper Extreme Test Voltage
TN= Normal Temperature

5.5. WORST-CASE CONFIGURATIONS

IEE Std. 802.11	Modulation Technology	Modulation Type	Data Rate (Mbps)	Worst Case (Mbps)
a	OFDM	BPSK,QPSK,16QAM, 64QAM	54/48/36/24/18/12/9/6	6

802.11ac HT20/HT40/HT80									
Antenna	MCS	Modulation	HT20 Data Rate (Mbps)		HT40 Data Rate (Mbps)		HT80 Data Rate (Mbps)		Worst Case (Mbps)
			GI=800ns	GI=400ns	GI=800ns	GI=400ns	GI=800ns	GI=400ns	
2x2	0	BPSK	13	14.4	27	30	58.5	65	MCS0
	1	QPSK	26	28.9	54	60	117	130	MCS0
	2	QPSK	39	43.3	81	90	175.5	195	MCS0
	3	16-QAM	52	57.8	108	120	234	260	MCS0
	4	16-QAM	78	86.7	162	180	351	390	MCS0
	5	64-QAM	104	115.6	216	240	468	520	MCS0
	6	64-QAM	117	130.3	243	270	526.5	585	MCS0
	7	64-QAM	130	144.4	270	300	585	650	MCS0
	8	256-QAM	156	173.3	324	360	702	780	MCS0
	9	256-QAM	N/A	N/A	360	400	780	866.7	MCS0

Note:
1. EUT support for SISO and CDD MIMO Transmission, only 802.11n/ac supports CDD MIMO Mode, SISO mode sets the same power level as MIMO mode, so MIMO mode is the worst case.
2. The two antennas of the EUT can transmit at the same time during work at 11a Mode.
3. 11n HT20 mode set the same power level as 11ac HT20 mode, and 11n HT40 mode set the same power level as 11ac HT40 mode, besides the 11ac HT20 mode and 11ac HT40 mode were worse case, so only the 11ac HT20 mode and 11ac HT40 mode were tested in this report.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	P/N
1	Laptop	ThinkPad	E550c	N/A

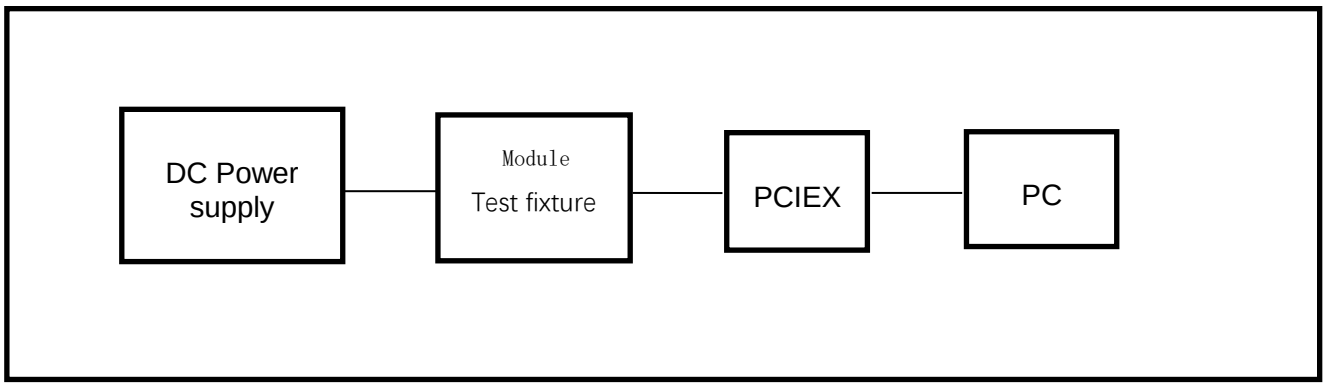
I/O CABLES

Item	Port	Connector Type	Cable Type	Cable Length(m)	Notes
1	USB	USB	Unshielded	0.5	/

TEST SETUP

The EUT can work in engineering mode with a software through a Laptop.

SETUP DIAGRAM FOR TESTS



5.7. MEASURING INSTRUMENT AND SOFTWARE USED

Conducted Emissions							
Used	Equipment	Manufactur	Model No.	Serial No.	Upper Cal.	Last Cal.	Next Cal.
☑	EMI Test Receiver	R&S	ESR3	101961	Dec.12,2017	Dec.10, 2018	Dec.10, 2019
☑	Two-Line V-Network	R&S	ENV216	101983	Dec.12,2017	Dec.10, 2018	Dec.10, 2019
Software							
Used	Description		Manufacturer	Name	Version		
☑	Test Software for Conducted disturbance		UL	Antenna port	Ver. 7.2		
Radiated Emissions							
Used	Equipment	Manufactur	Model No.	Serial No.	Upper Cal.	Last Cal.	Next Cal.
☑	MXE EMI Receiver	KESIGHT	N9038A	MY564000	Dec.12,2017	Dec.10, 2018	Dec.10, 2019
☑	Hybrid Log Periodic Antenna	TDK	HLP-3003C	130960	Jan.09, 2016	Sept. 17, 2018	Sept.17, 2021
☑	Preamplifier	HP	8447D	2944A0909	Dec.12,2017	Dec.10, 2018	Dec.10, 2019
☑	EMI Measurement Receiver	R&S	ESR26	101377	Dec.12,2017	Dec.10, 2018	Dec.10, 2019
☑	Horn Antenna	TDK	HRN-0118	130939	Jan. 09, 2016	Sept. 17, 2018	Sept.17, 2021
☑	High Gain Horn	Schwarzbe	BBHA-9170	691	Jan.06, 2016	Aug.11, 2018	Aug.11, 2019
☑	Preamplifier	TDK	PA-02-0118	TRS-305-00066	Dec.12,2017	Dec.10, 2018	Dec.10, 2019
☑	Preamplifier	TDK	PA-02-2	TRS-307-00003	Dec.12,2017	Dec.10, 2018	Dec.10, 2019
☑	Loop antenna	Schwarzbe	1519B	00008	Mar. 26,	Mar. 26, 2016	Mar. 26, 2019
Software							
Used	Description		Manufacturer	Name	Version		
☑	Test Software for Radiated disturbance		Farad	EZ-EMC	Ver. UL-3A1		
Other instruments							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Cal.	Last Cal.	Next Cal.
☑	Spectrum Analyzer	Keysight	N9030A	MY55410512	Dec.12,2017	Dec.10,2018	Dec.10,2019
☑	Power Sensor	Keysight	U2021XA	MY57030004	Dec.12,2017	Dec.10,2018	Dec.10,2019
☑	Power Meter	Keysight	N1911A	MY55416024	Dec.12,2017	Dec.11,2018	Dec.10,2019
☑	High Pass Filter	Wainwright	WHKX10-5850-6500-1800-40SS	4	Dec.12,2017	Dec.11,2018	Dec.10,2019
☑	Band Reject Filter	Wainwright	WRCJV20-5440-5470-5725-5755-60SS	1	Dec.12,2017	Dec.11,2018	Dec.10,2019

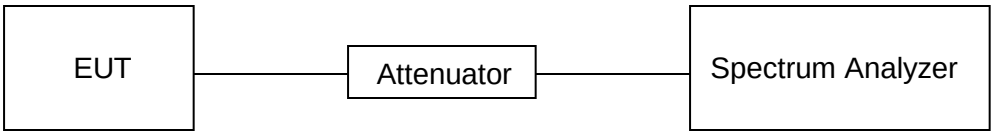
6. ANTENNA PORT TEST RESULTS

6.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

TEST SETUP



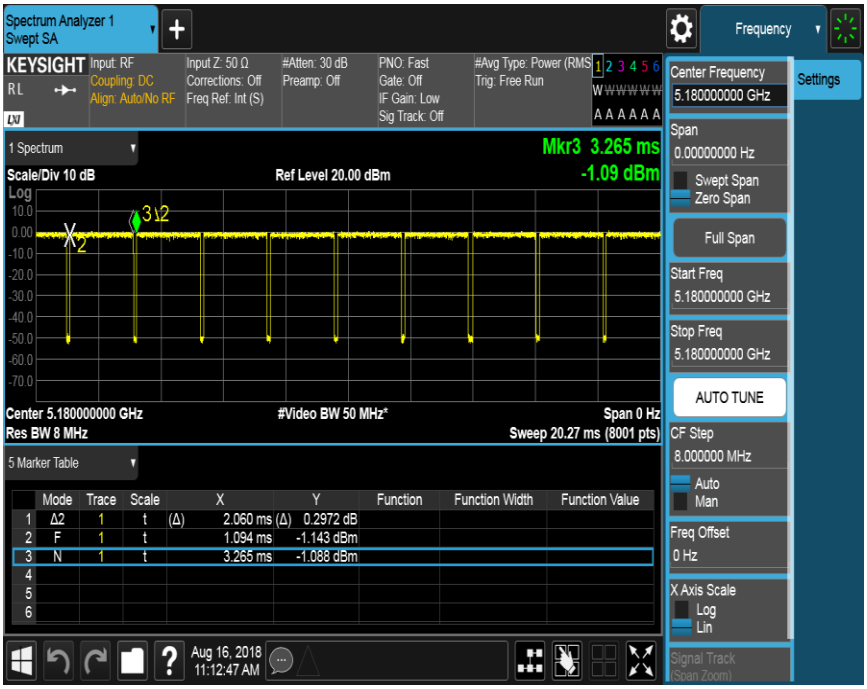
RESULTS

ANTENNA 1

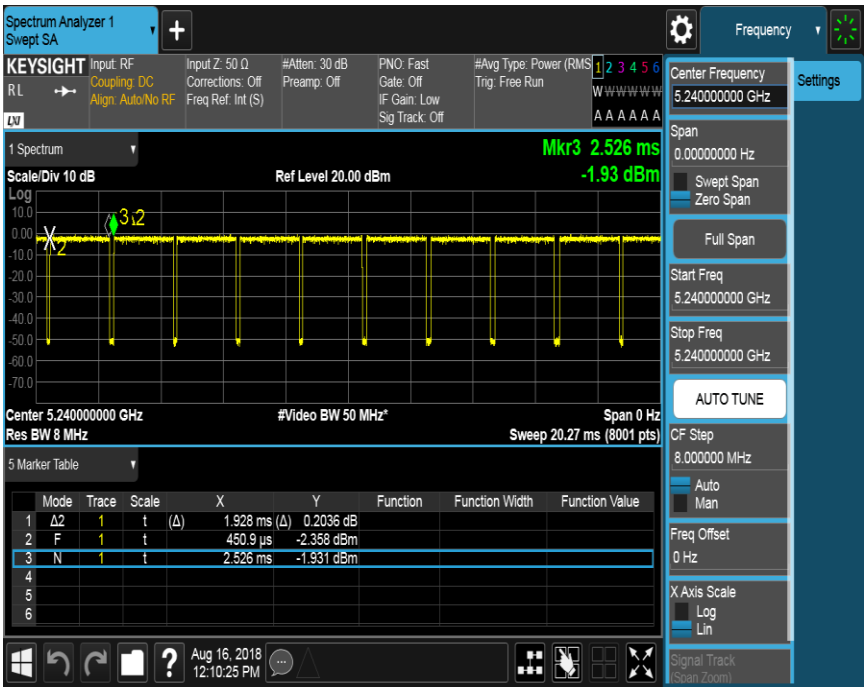
Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (KHz)	Final setting For VBW (KHz)
11a	2.060	2.171	0.9488	94.88	0.228	0.485	1
11ac HT20	1.928	2.0751	0.9291	92.91	0.319	0.519	1
11ac HT40	0.9475	1.0771	0.8797	87.97	0.557	1.055	2
11ac HT80	0.4585	0.5696	0.8050	80.50	0.942	2.181	2

Note:
1. Duty Cycle Correction Factor=10log (1/x).
2. Where: x is Duty Cycle (Linear)
3. Where: T is On Time
4. If that calculated VBW is not available on the analyzer then the next higher value should be used.
5. Antenna 1 and Antenna 2 has the same duty cycle, only Antenna 1 data show here.

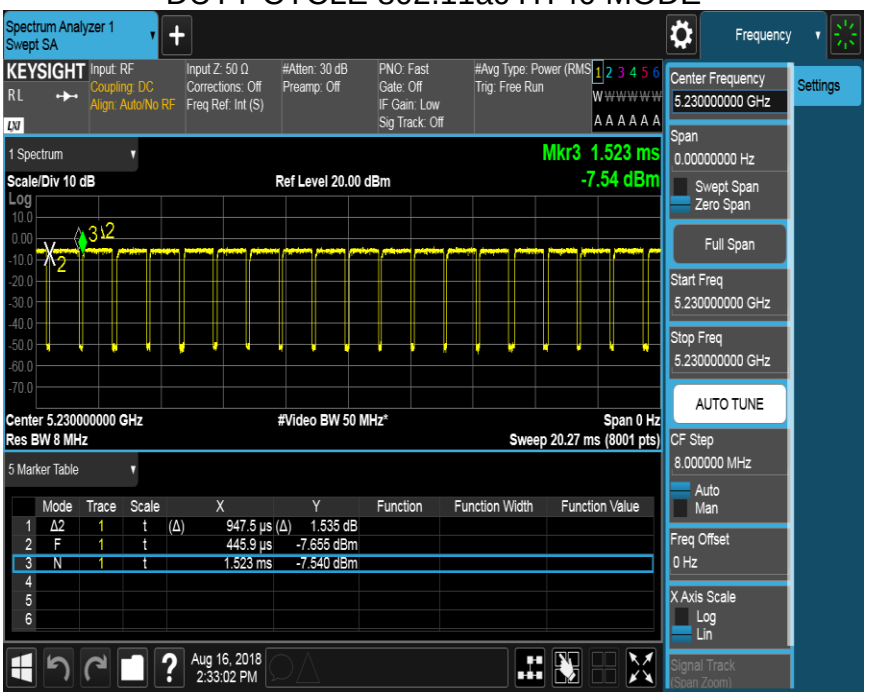
DUTY CYCLE 802.11a MODE



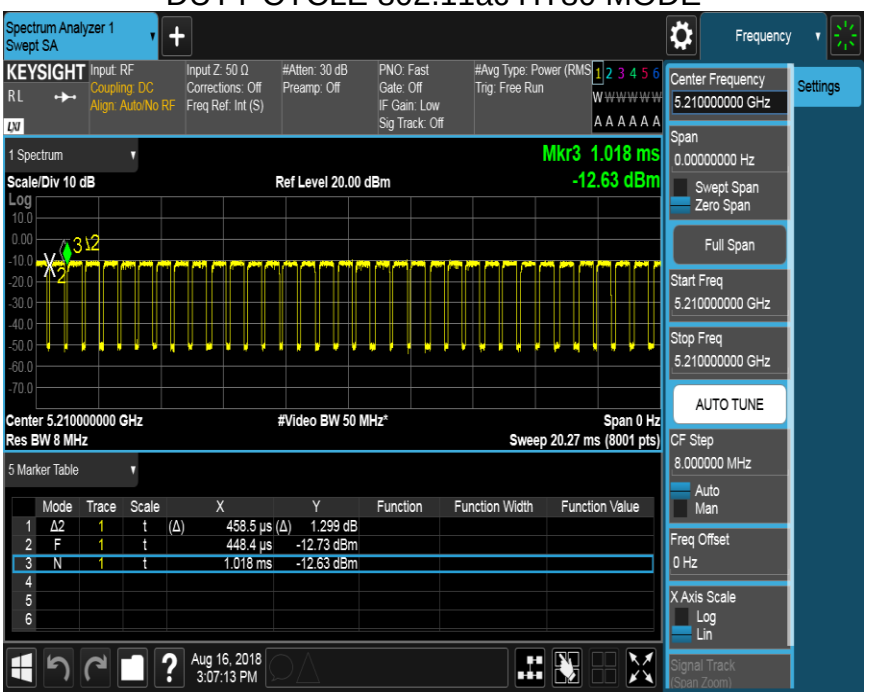
DUTY CYCLE 802.11ac HT20 MODE



DUTY CYCLE 802.11ac HT40 MODE



DUTY CYCLE 802.11ac HT80 MODE



6.2. 6dB/26dB/99% OCCUPIED BANDWIDTH

LIMITS

CFR 47 FCC Part15, Subpart E ISED RSS-247		
Test Item	Limit	Frequency Range (MHz)
Bandwidth	26 dB Bandwidth	5150-5250
	26 dB Bandwidth	5250-5350
	26 dB Bandwidth	For FCC:5470-5725 For IC:5470-5600 5650-5725
	Minimum 500kHz 6dB Bandwidth	5725-5850

ISED RSS-247 ISSUE 2		
RSS-Gen Clause 6.6	99% Occupied Bandwidth	For reporting purposes only.

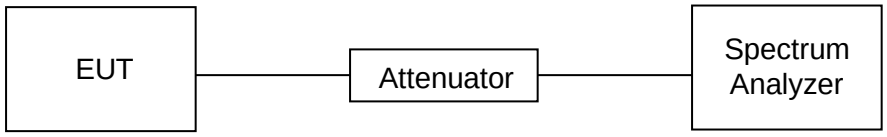
TEST PROCEDUREC

Connect the UUT to the spectrum analyzer and use the following settings:

Center Frequency	The center frequency of the channel under test
Detector	Peak
RBW	For 6dB Bandwidth: RBW=100kHz For 26dB Bandwidth: approximately 1% of the emission bandwidth. For 99dB Occupied Bandwidth: approximately 1%~5% of the emission bandwidth.
VBW	For 6dB Bandwidth : VBW=300kHz For 26dB Bandwidth : >3RBW For 99% Occupied Bandwidth: >3RBW
Trace	Max hold
Sweep	Auto couple

Allow the trace to stabilize and 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 6dB/26dB&99% Occupied Bandwidth relative to the maximum level measured in the fundamental emission.

TEST SETUP



RESULTS

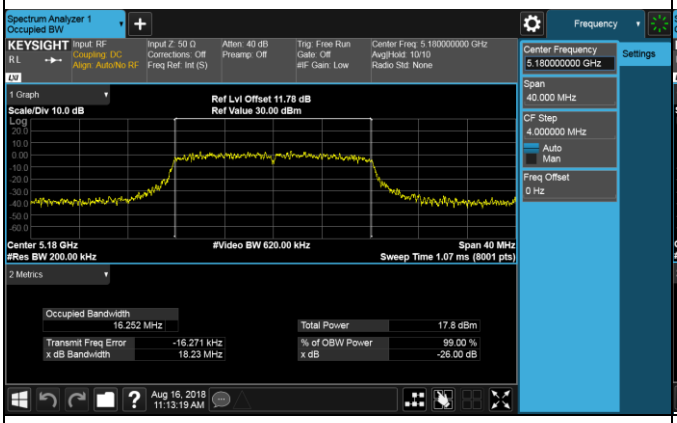
ANTENNA 1 (WORST-CASE CONFIGURATION)

6.2.1. 802.11a MODE

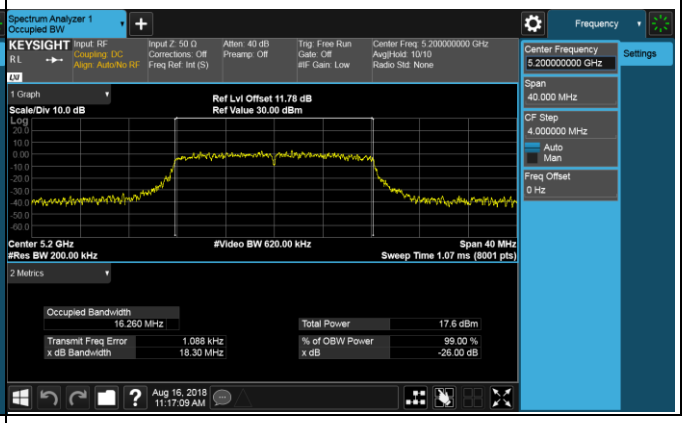
6.2.1.1. UNII-1 BAND

Channel	Frequency (MHz)	26 dB BW (MHz)	99% BW (MHz)
36	5180	18.23	16.252
40	5200	18.30	16.260
48	5240	18.32	16.289

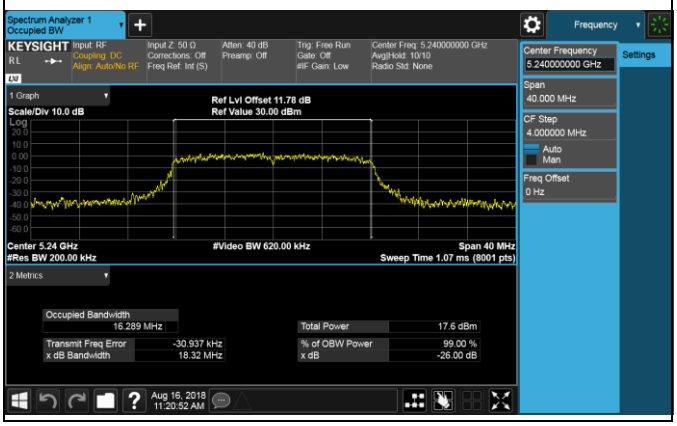
CHANNEL 36



CHANNEL 40



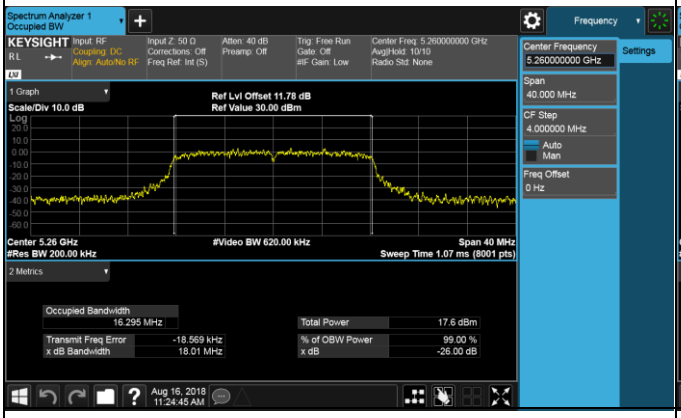
CHANNEL 48



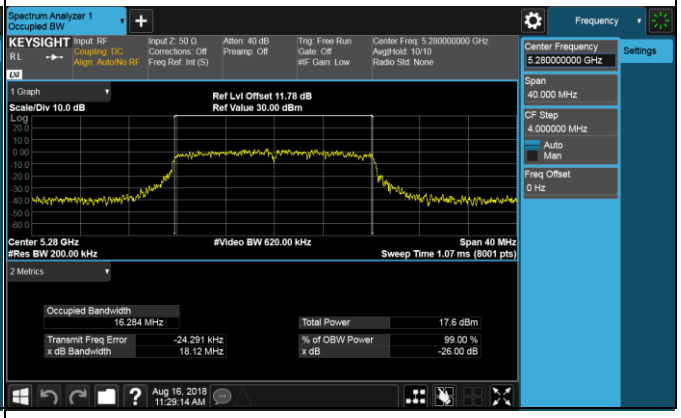
6.2.1.1. UNII-2A BAND

Channel	Frequency (MHz)	26 dB BW (MHz)	99% BW (MHz)
52	5260	18.01	16.295
56	5280	18.12	16.284
64	5320	18.42	16.267

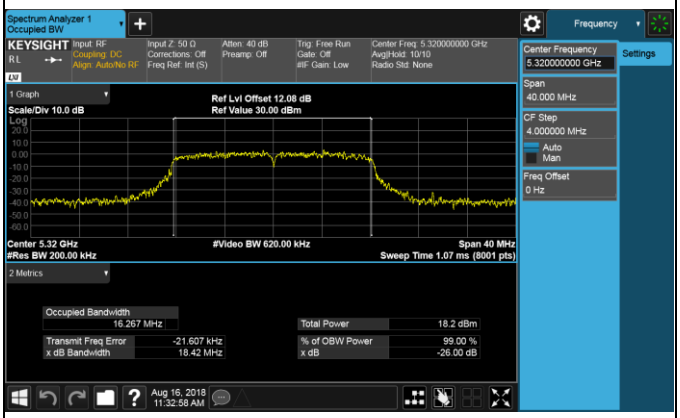
CHANNEL 52



CHANNEL 56



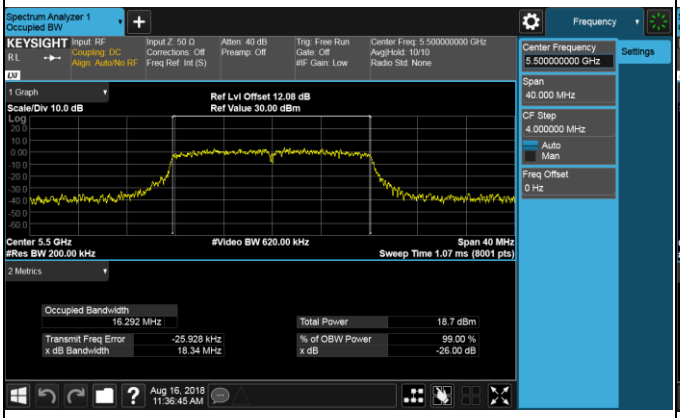
CHANNEL 64



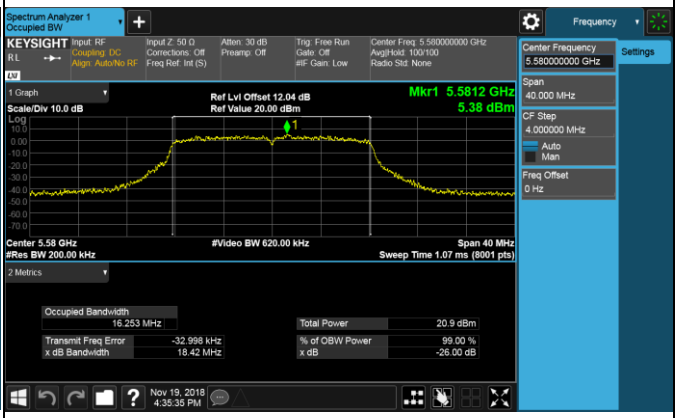
6.2.1.2. UNII-2C BAND

Channel	Frequency (MHz)	26 dB BW(MHz)	99% BW(MHz)
100	5500	18.34	16.292
116	5580	18.42	16.253
140	5700	18.30	16.235
144	5720	19.46	17.389

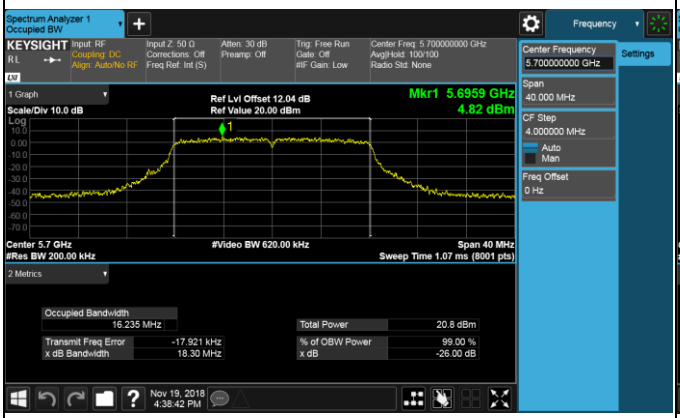
CHANNEL 100



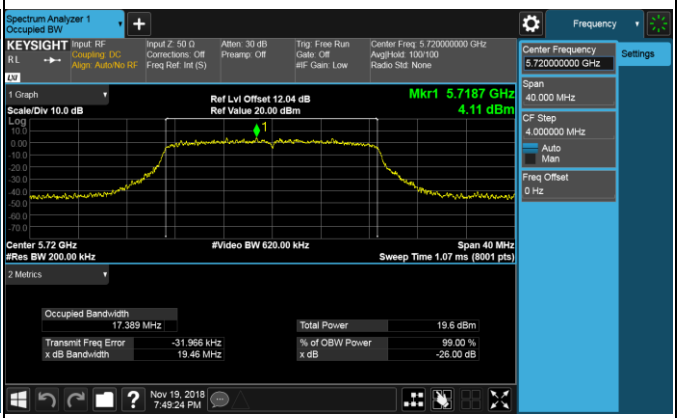
CHANNEL 116



CHANNEL 140



CHANNEL 144

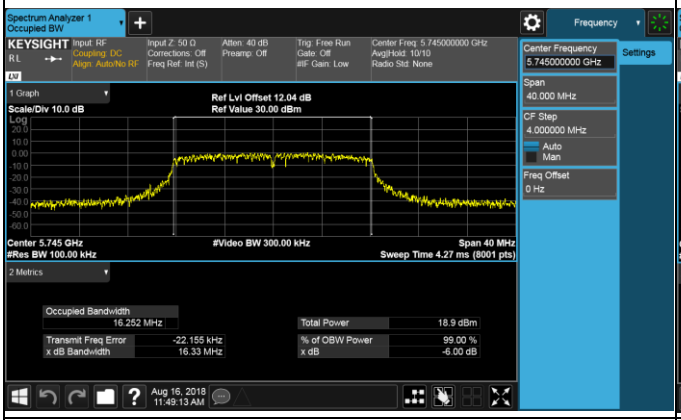


6.2.1.3. UNII-3 BAND

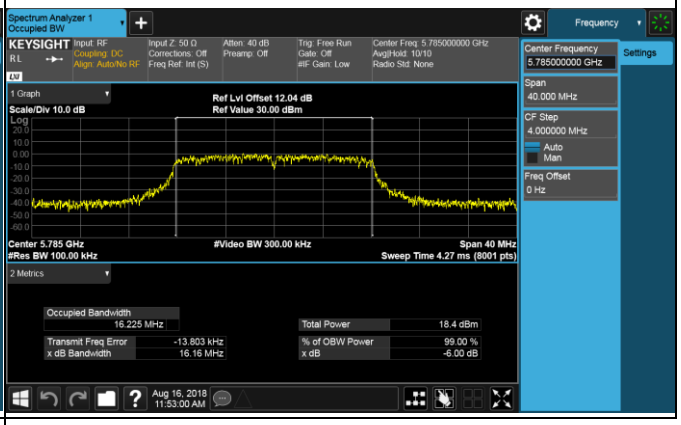
Channel	Frequency (MHz)	6 dB BW (MHz)	99% BW (MHz)	Limit (KHz)	Result
149	5745	16.33	16.230	500	PASS
157	5785	16.16	16.242	500	PASS
165	5825	14.65	16.239	500	PASS

6 dB BW

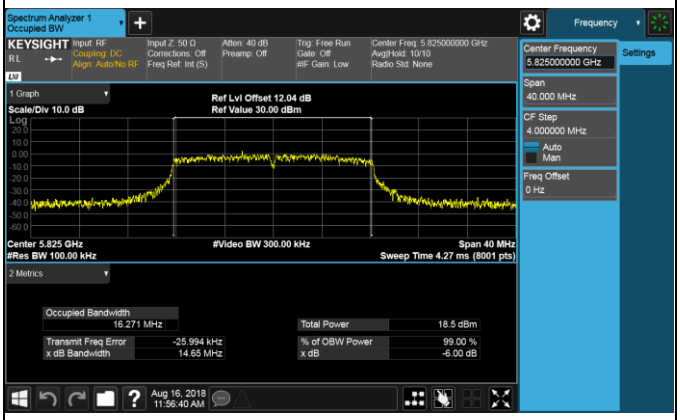
CHANNEL 149



CHANNEL 157



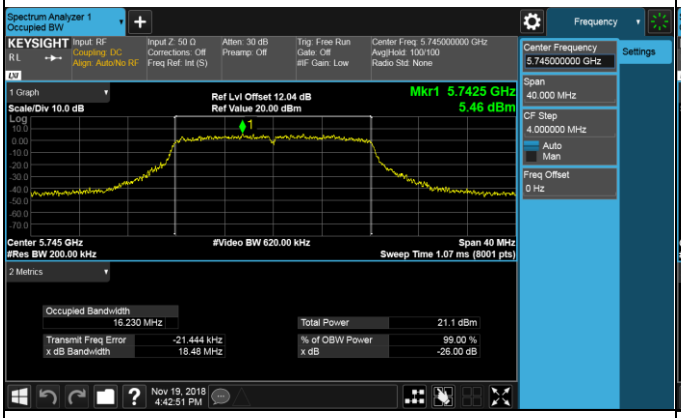
CHANNEL 165



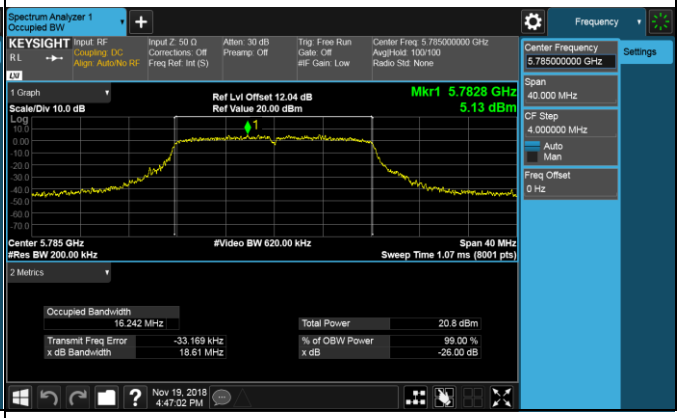
Channel	Frequency (MHz)	99% BW
149	5745	16.230
157	5785	16.242
165	5825	16.239

99% BW

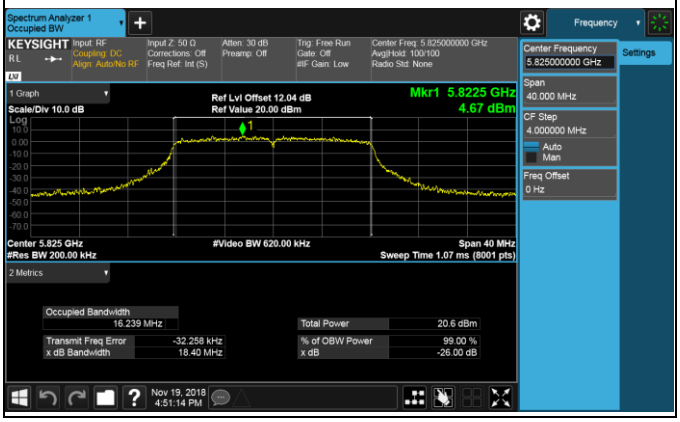
CHANNEL 149



CHANNEL 157



CHANNEL 165

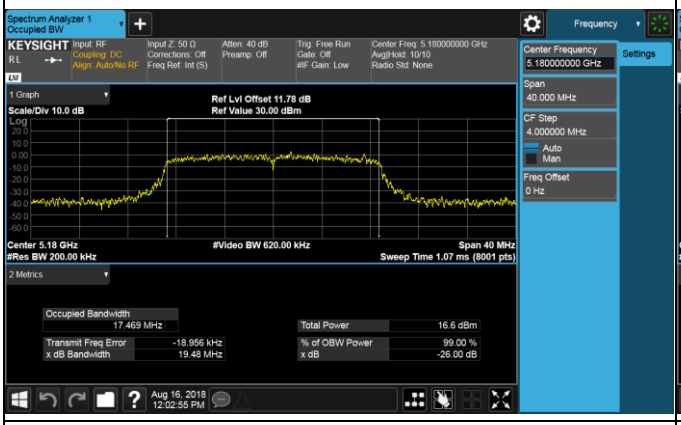


6.2.2. 802.11ac HT20 MODE

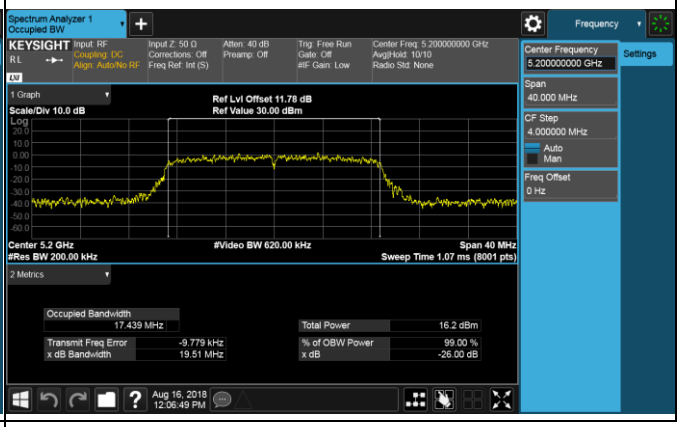
6.2.2.1. UNII-1 BAND

Channel	Frequency (MHz)	26 dB BW (MHz)	99% BW (MHz)
36	5180	19.48	17.469
40	5200	19.51	17.439
48	5240	19.95	17.477

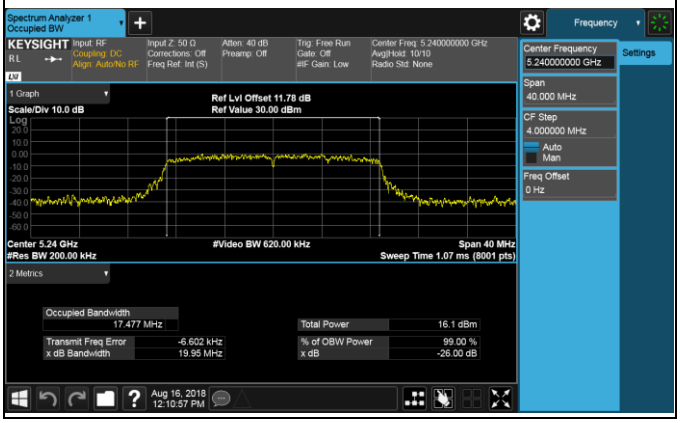
CHANNEL 36



CHANNEL 40



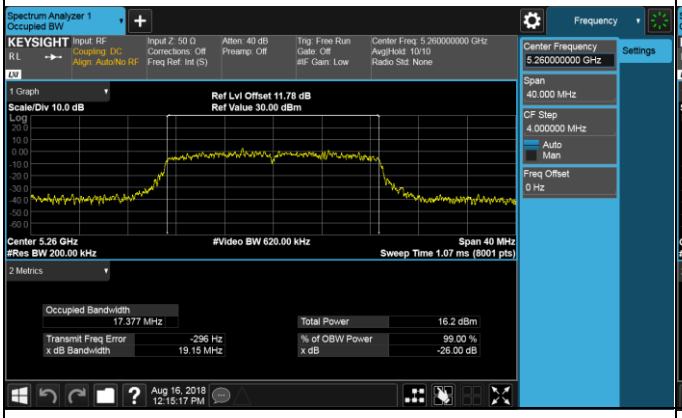
CHANNEL 48



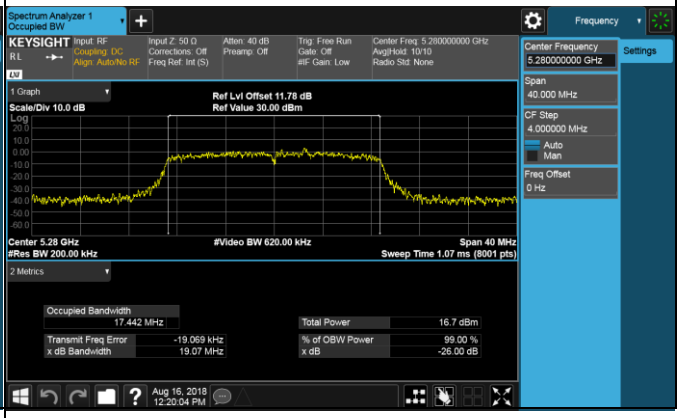
6.2.2.2. UNII-2A BAND

Channel	Frequency (MHz)	26 dB BW (MHz)	99% BW (MHz)
52	5260	19.15	17.377
56	5280	19.07	17.442
64	5320	19.47	17.458

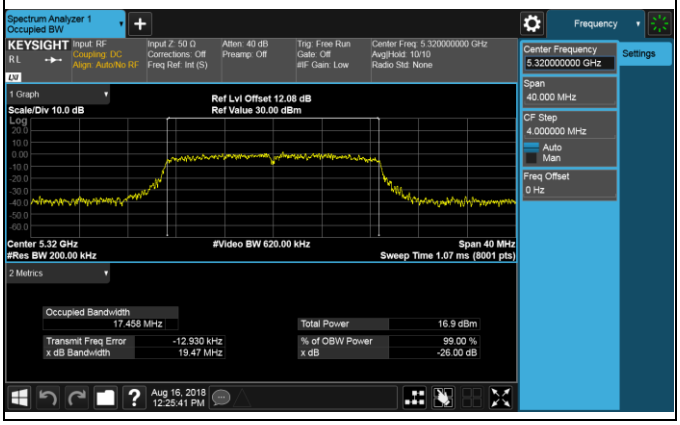
CHANNEL 52



CHANNEL 56



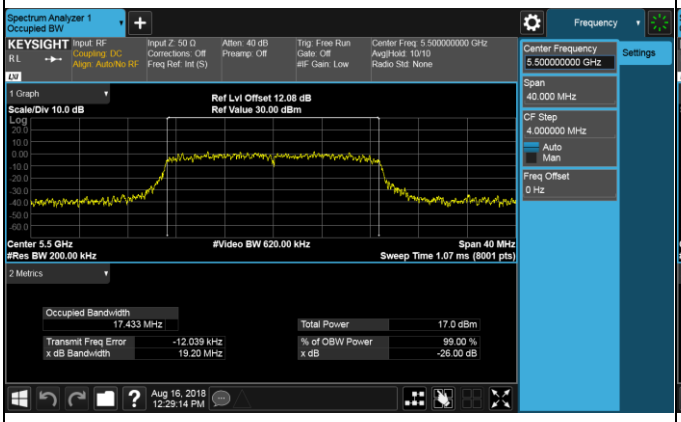
CHANNEL 64



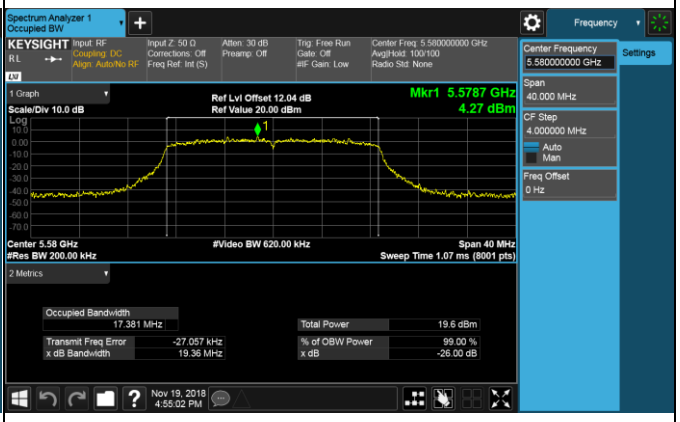
6.2.2.3. UNII-2C BAND

Channel	Frequency (MHz)	26 dB BW (MHz)	99% BW (MHz)
100	5500	19.20	17.433
116	5580	19.36	17.381
140	5700	19.62	17.384
144	5720	19.37	17.390

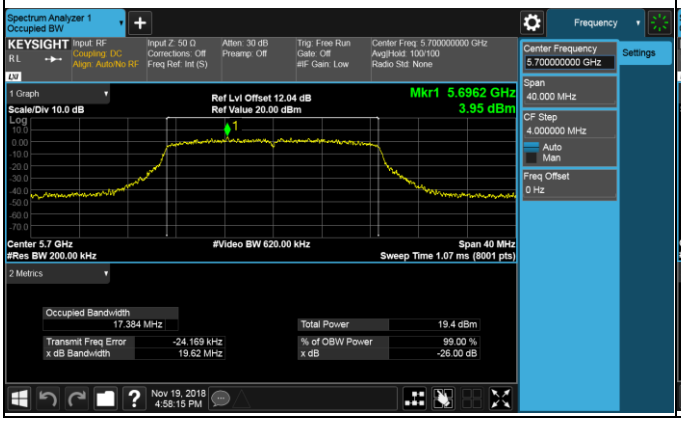
CHANNEL 100



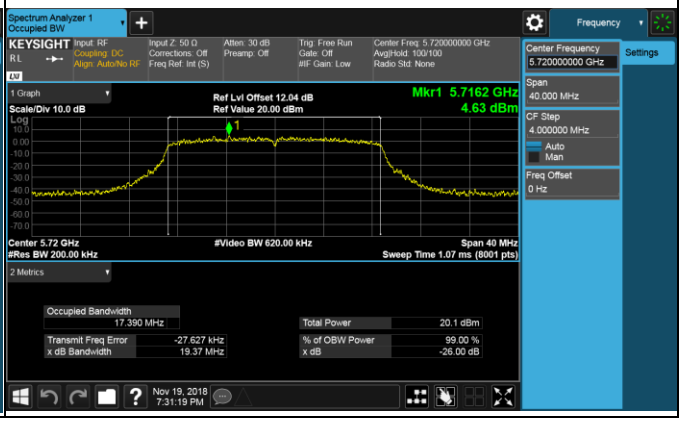
CHANNEL 116



CHANNEL 140



CHANNEL 144



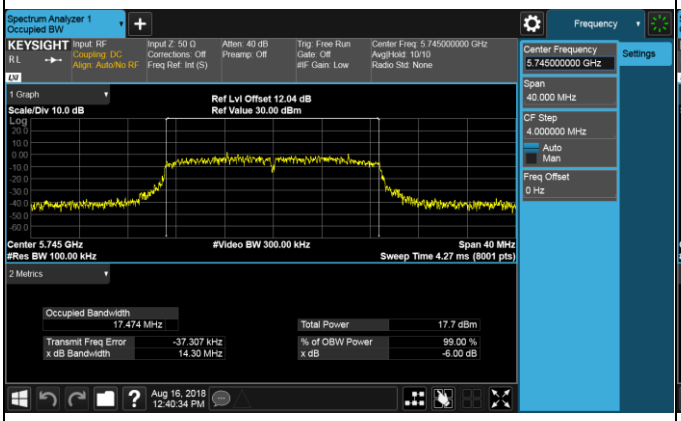
6.2.2.4. UNII-3 BAND

Channel	Frequency (MHz)	6 dB BW (MHz)	Limit (KHz)	Result
149	5745	14.3	500	PASS
157	5785	15.97	500	PASS
165	5825	15.97	500	PASS

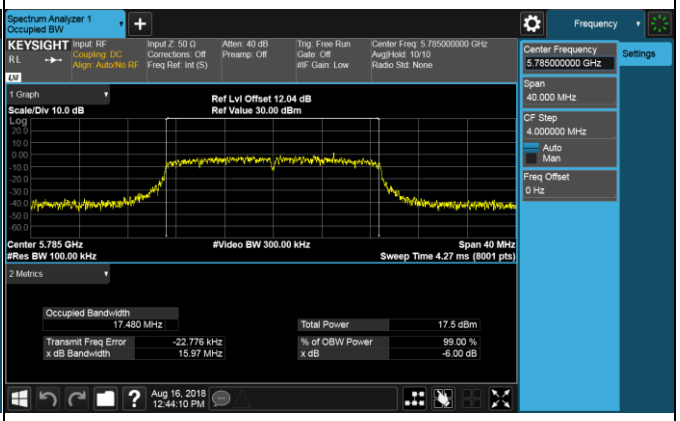
Channel	Frequency (MHz)	99% BW (MHz)
149	5745	17.395
157	5785	17.407
165	5825	17.397

6 dB BW

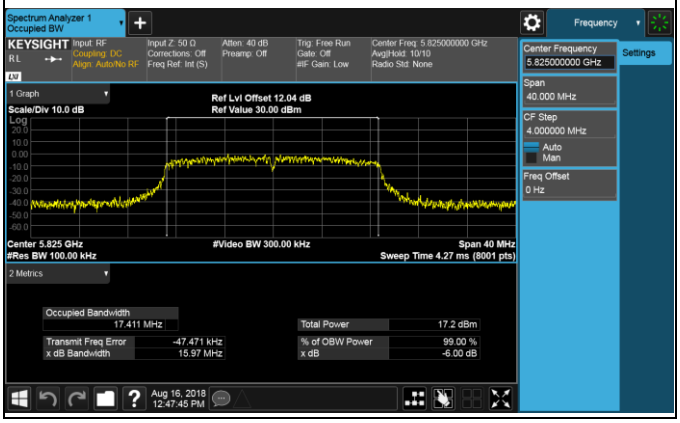
CHANNEL 149



CHANNEL 157

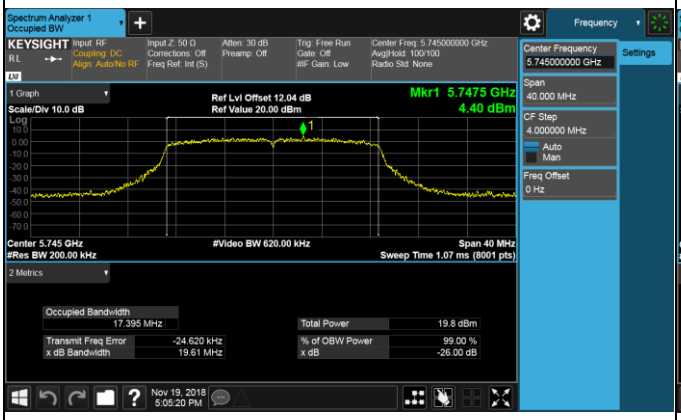


CHANNEL 165

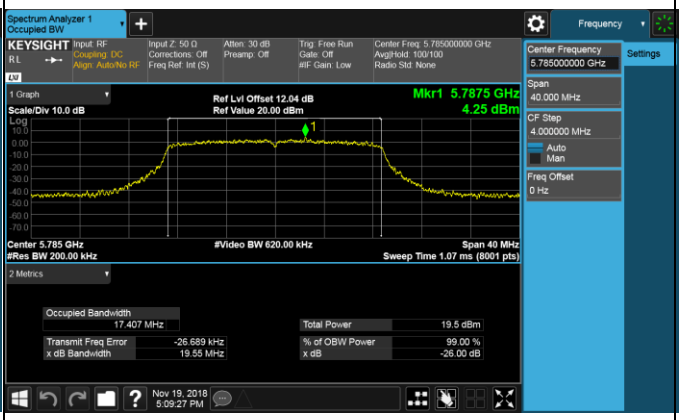


99% BW

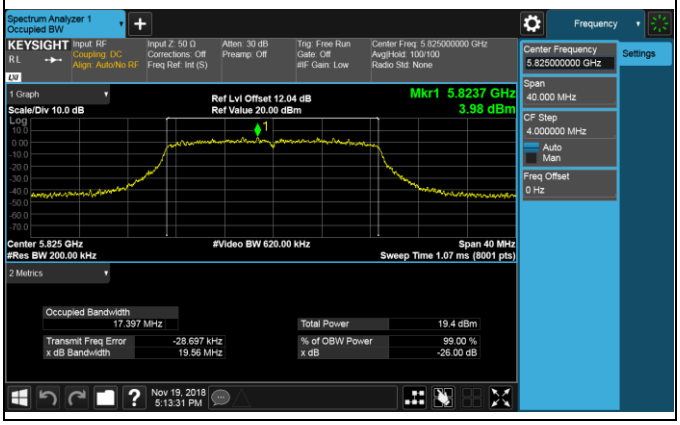
CHANNEL 149



CHANNEL 157



CHANNEL 165

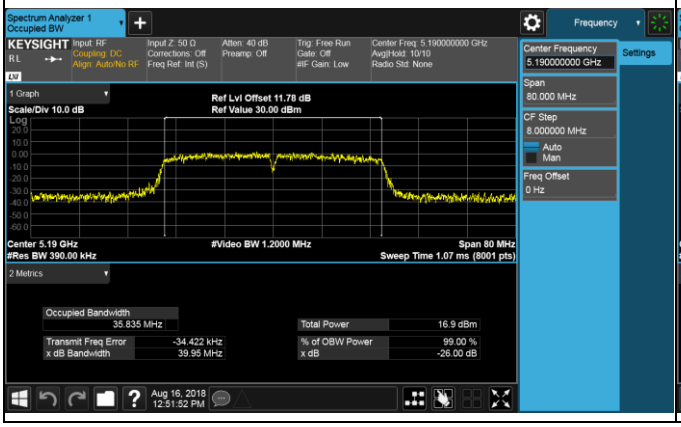


6.2.3. 802.11ac HT40 MODE

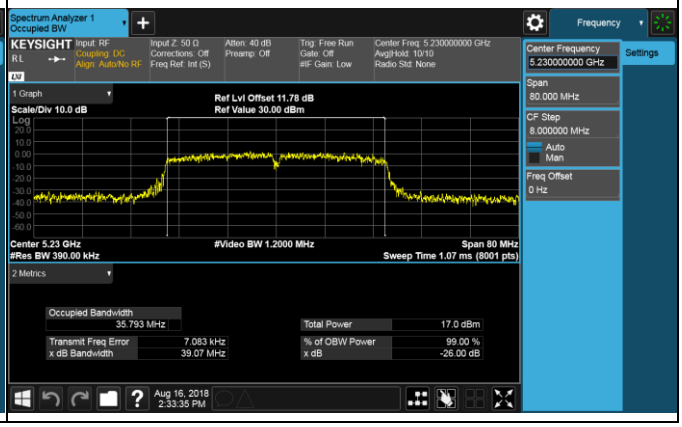
6.2.3.1. UNII-1 BAND

Channel	Frequency (MHz)	26 dB BW (MHz)	99% BW (MHz)
38	5190	39.95	35.835
46	5230	39.07	35.793

CHANNEL 38

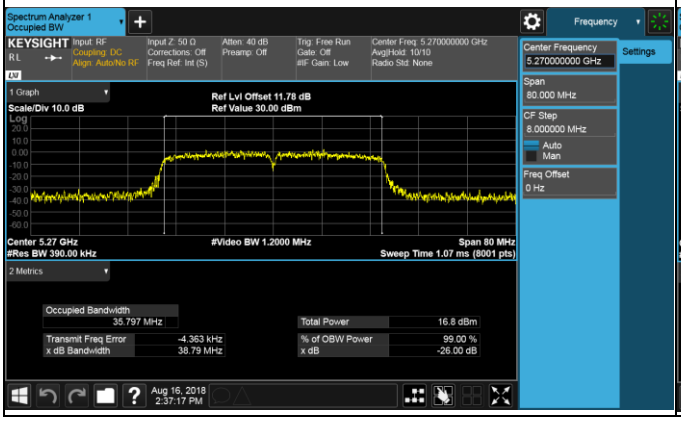
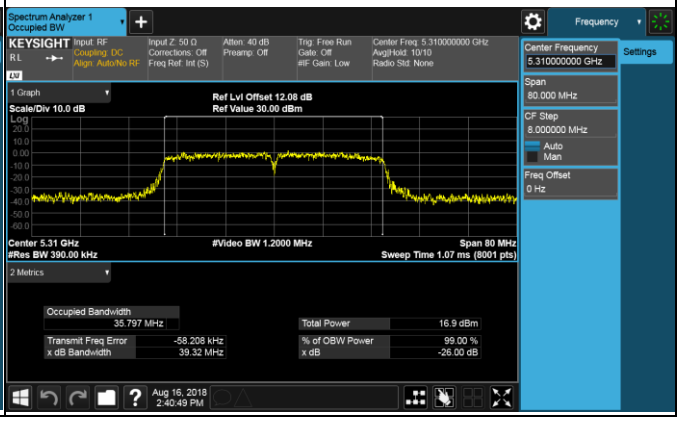


CHANNEL 46



6.2.3.2. UNII-2A BAND

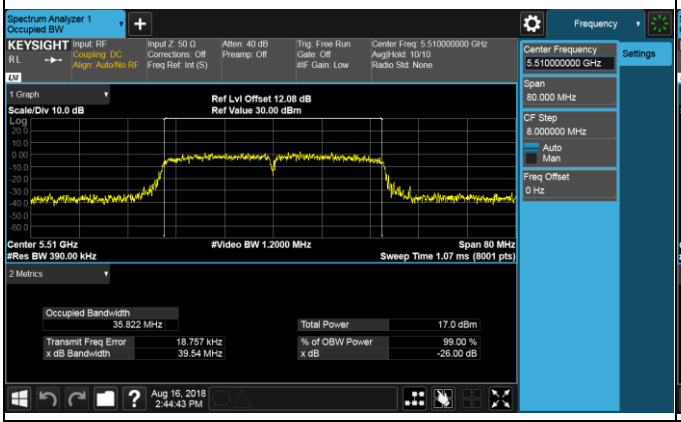
Channel	Frequency (MHz)	26 dB BW (MHz)	99% BW (MHz)
54	5270	38.79	35.797
62	5310	39.32	35.797

CHANNEL 54	CHANNEL 62
	

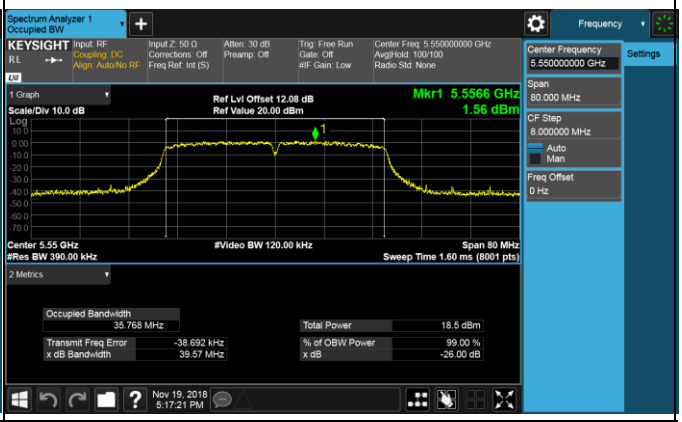
6.2.3.3. UNII-2C BAND

Channel	Frequency (MHz)	26 dB BW (MHz)	99% BW (MHz)
102	5510	39.54	35.822
110	5550	39.57	35.768
134	5670	39.84	35.711
142	5710	39.15	35.731

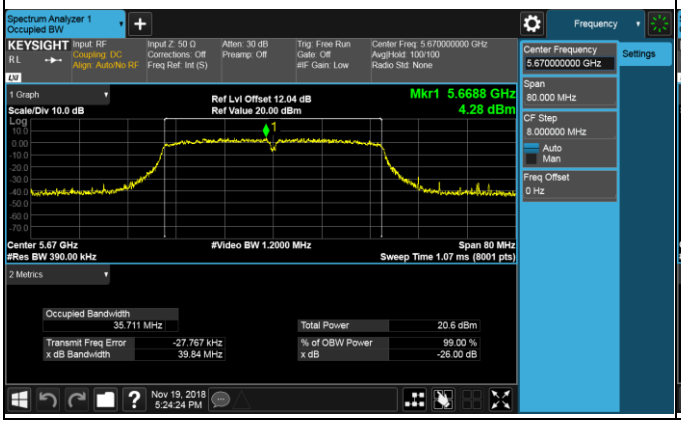
CHANNEL 102



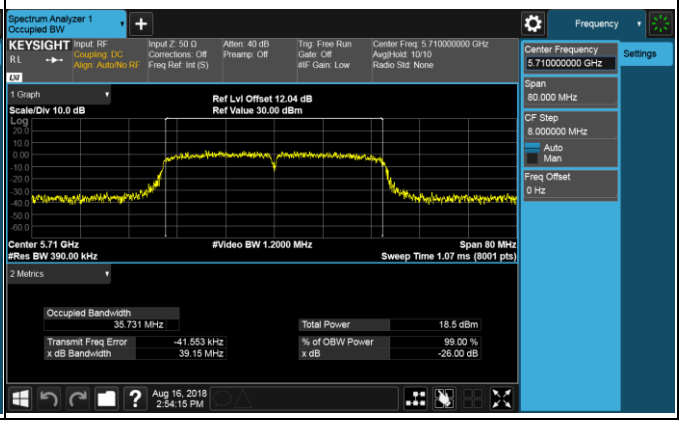
CHANNEL 110



CHANNEL 134



CHANNEL 142



6.2.3.4. UNII-3 BAND

Channel	Frequency (MHz)	6 dB BW (MHz)	Limit (KHz)	Result
151	5755	35.00	500	PASS
159	5795	33.90	500	PASS

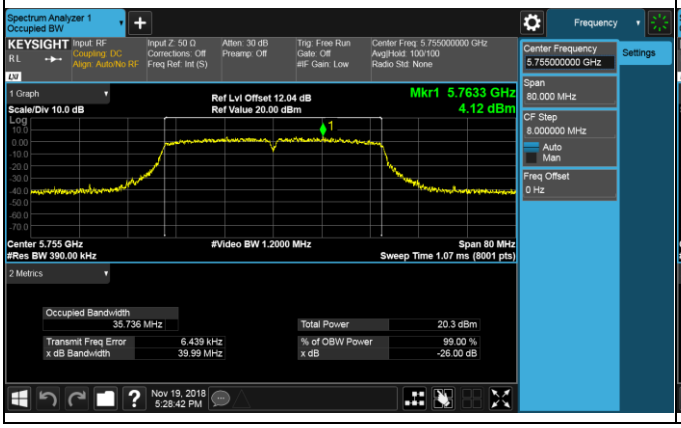
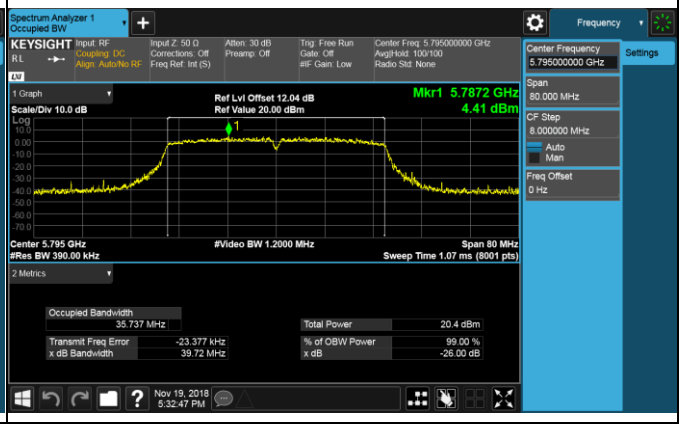
Channel	Frequency (MHz)	99% BW (MHz)
151	5755	35.736
159	5795	35.737

6 dB BW

CHANNEL 151

CHANNEL 159

99% BW

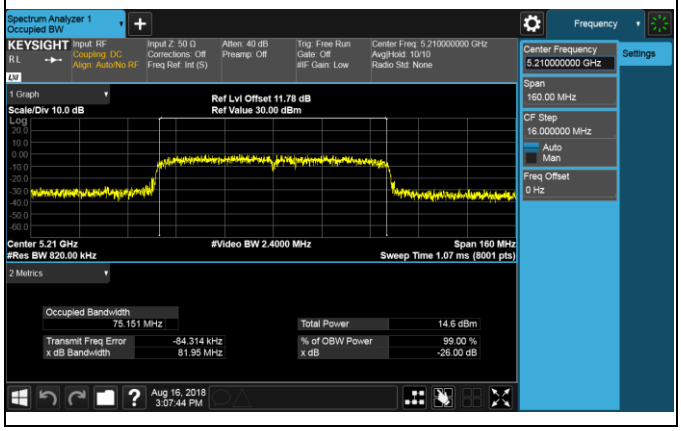
CHANNEL 151	CHANNEL 159
	

6.2.4. 802.11ac HT80 MODE

6.2.4.1. UNII-1 BAND

Channel	Frequency (MHz)	26 dB BW (MHz)	99% BW (MHz)
42	5210	81.95	75.151

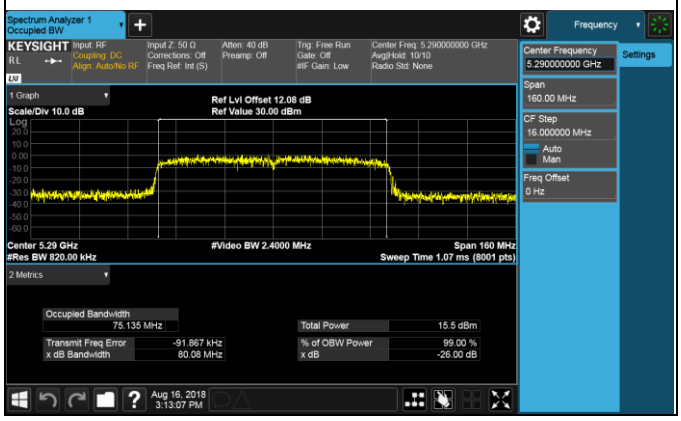
CHANNEL 42



6.2.4.2. UNII-2A BAND

Channel	Frequency (MHz)	26 dB BW (MHz)	99% BW (MHz)
58	5290	80.08	75.135

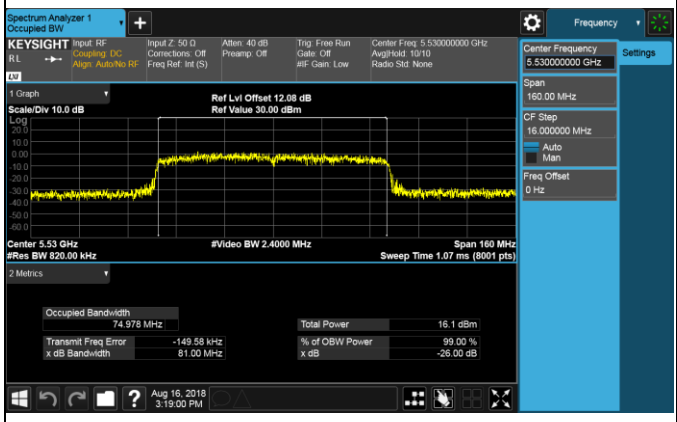
CHANNEL 58



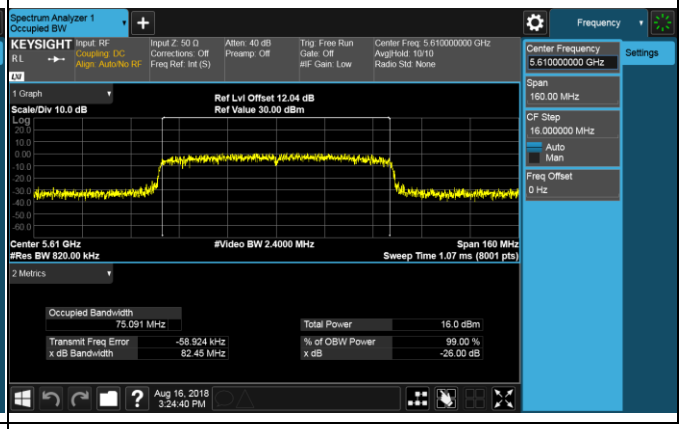
6.2.4.3. UNII-2C BAND

Channel	Frequency (MHz)	26 dB BW (MHz)	99% BW (MHz)
106	5530	81.00	74.978
122	5610	82.45	75.091
138	5690	80.55	74.972

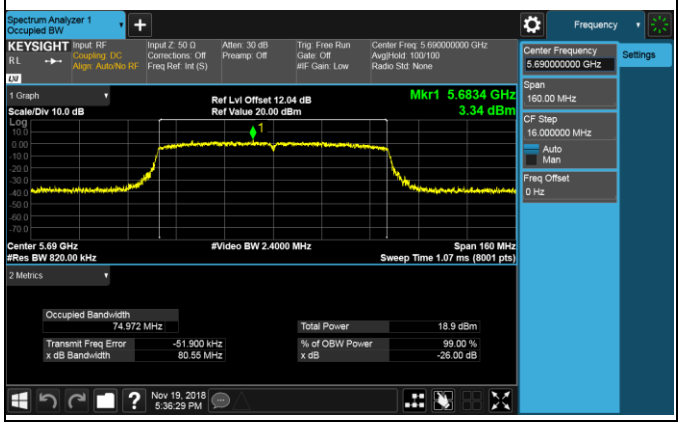
CHANNEL 106



CHANNEL 122



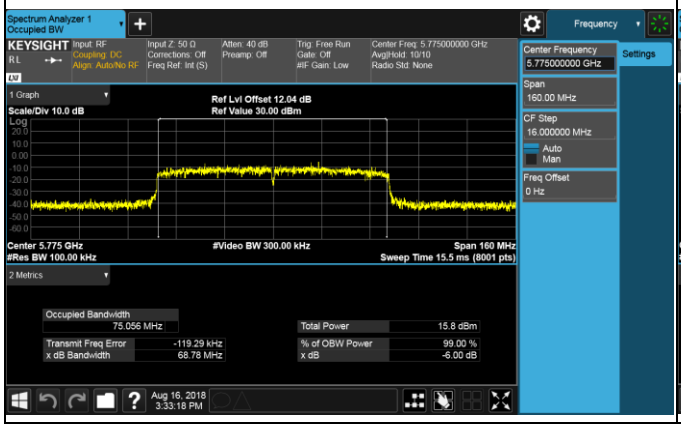
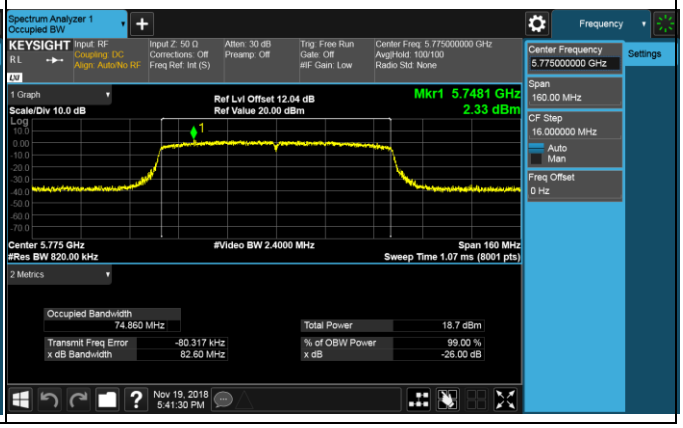
CHANNEL 138



6.2.4.4. UNII-3 BAND

Channel	Frequency (MHz)	6 dB BW (MHz)	Limit (KHz)	Result
155	5775	68.78	500	PASS

Channel	Frequency (MHz)	99% BW (MHz)
155	5775	74.860

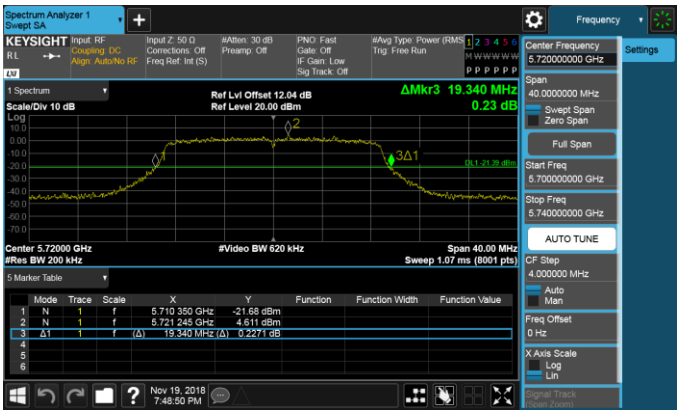
6 dB BW	99% BW
CHANNEL 155	**CHANNEL 155**
	

6.2.5. STRADDLE CHANNEL falls in UNII-2A band 26dB bandwidth

Mode	FREQUENCY	Channel	Min 26 dB BW (MHz))	Power limit (dBm)	RESULT
802.11a	5720	144	14.425	21.59	PASS
802.11ac HT20	5720	142	14.650	21.66	PASS
802.11ac HT40	5710	138	34.72	25.41	PASS
Note: All the modes and antenna ports had been tested, MIMO mode Antenna 1 is the worst data recorded in the report.					

802.11a

802.11ac HT20



802.11ac HT40

6.3. MAXIMUM CONDUCTED AVERAGE OUTPUT POWER

LIMITS

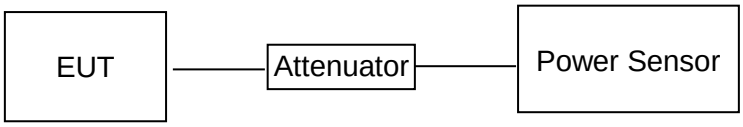
CFR 47 FCC Part15, Subpart E ISED RSS-247		
Test Item	Limit	Frequency Range (MHz)
Conducted Output Power	For FCC client devices :250mW (24dBm)	5150-5250
	For RSS:e.i.r.p. power: not exceed 200 mW(23dBm) or 10 + 10 log10 B, B is the 99% emission bandwidth in megahertz	
	250mW (24dBm) For RSS: conducted output power: not exceed 250 mW(24dBm) or 11 + 10 log10 B, B is the 99% emission bandwidth in megahertz	5250-5350
	250mW (24dBm) For RSS: conducted output power: not exceed 250 mW(24dBm) or 11 + 10 log10 B, B is the 99% emission bandwidth in megahertz	For FCC:5470-5725 For IC:5470-5600 5650-5725
	1 Watt (30dBm)	5725-5850

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

TEST PROCEDURE

Refer to KDB 789033 D02 General UNII Test Procedures New Rules v02r01
Measurement using an RF average power meter.
Connect the EUT to the a broadband average RF power meter, the power meter shall have a video bandwidth that is greater than or equal to the bandwidth and shall utilize a fast-responding diode detector.

TEST SETUP



RESULTS

6.3.1. UNII-1 BAND

Mode	Frequency (MHz)	Antenna	CONDUCTED POWER (dBm)		Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
			Single	Total			
a	5180	1	14.3	17.13	24	20.14	23
		2	13.94				
	5200	1	14.36	17.13	24	20.14	23
		2	13.87				
	5240	1	14.39	17.16	24	20.17	23
		2	13.90				
ac HT20	5180	1	13.55	16.34	24	19.35	23
		2	13.10				
	5200	1	13.29	16.02	24	19.03	23
		2	12.72				
	5240	1	13.15	15.91	24	18.92	23
		2	12.63				
ac HT40	5190	1	13.42	16.29	24	19.30	23
		2	13.12				
	5230	1	12.89	15.40	24	18.41	23
		2	11.82				
ac HT80	5210	1	10.42	13.54	24	16.55	23
		2	10.64				

Note: 1. The test results had already included the duty cycle correction factor.
2.The EUT only support SISO mode for a, all the antenna had been tested, but only the worst data recorded in the report.

6.3.2. UNII-2A BAND

Mode	Frequency (MHz)	Antenna	CONDUCTED POWER (dBm)		Limit (dBm)	EIPR (dBm)	EIRP Limit (dBm)
			Single	Total			
a	5260	1	14.32	17.13	24	20.14	24
		2	13.91				
	5280	1	14.60	17.52	24	20.53	24
		2	14.42				
	5320	1	14.59	17.41	24	20.42	24
		2	14.20				
ac HT20	5260	1	13.18	16.01	24	19.02	24
		2	12.81				
	5300	1	13.40	16.18	24	19.19	24
		2	12.93				
	5320	1	13.34	16.14	24	19.15	24
		2	12.91				
ac HT40	5270	1	12.77	15.67	24	18.68	24
		2	12.55				
	5310	1	12.80	15.80	24	18.81	24
		2	12.79				
ac HT80	5290	1	11.40	14.15	24	17.16	24
		2	10.87				

Note: 1. The test results had already included the duty cycle correction factor.
2.The EUT only support SISO mode for a, all the antenna had been tested, but only the worst data recorded in the report.

6.3.3. UNII-2C BAND

Mode	Frequency (MHz)	Antenna	CONDUCTED POWER (dBm)		Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
			Single	Total			
a	5500	1	14.33	17.16	24	20.17	24
		2	13.96				
	5580	1	14.21	17.21	24	20.22	24
		2	14.20				
	5700	1	14.42	17.23	24	20.24	24
		2	14.01				
	5720	1	14.40	17.18	21.59	20.19	21.59
		2	13.92				
ac HT20	5500	1	13.45	16.02	24	19.03	24
		2	12.51				
	5580	1	13.29	16.09	24	19.10	24
		2	12.86				
	5700	1	13.08	15.84	24	18.85	24
		2	12.56				
	5720	1	13.13	15.86	21.66	18.87	21.66
		2	12.54				
ac HT40	5510	1	12.62	15.75	24	18.76	24
		2	12.86				
	5590	1	13.36	16.35	24	19.36	24
		2	13.33				
	5670	1	13.41	16.21	24	19.22	24
		2	12.98				
	5710	1	13.48	16.27	25.41	19.28	25.41
		2	13.01				
ac HT80	5530	1	11.46	14.07	24	17.08	24
		2	10.62				
	5610	1	11.26	13.88	24	16.89	24
		2	10.44				
	5690	1	11.02	13.88	24	16.89	24
		2	10.67				

Note:
1. The test results had already included the duty cycle correction factor.
2.The EUT only support SISO mode for a, all the antenna had been tested, but only the worst data recorded in the report.

6.3.1. UNII-3 BAND

Mode	Frequency (MHz)	Antenna	CONDUCTED POWER (dBm)		Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)
			Single	Total			
a	5745	1	14.48	17.29	30	20.30	30
		2	14.08				
	5785	1	14.19	16.96	30	19.97	30
		2	13.70				
	5825	1	14.09	16.88	30	19.89	30
		2	13.64				
ac HT20	5745	1	13.33	16.04	30	19.05	30
		2	12.71				
	5785	1	13.06	15.83	30	18.84	30
		2	12.57				
	5825	1	12.93	15.71	30	18.72	30
		2	12.45				
ac HT40	5755	1	12.66	15.78	30	18.79	30
		2	12.87				
	5795	1	13.34	16.13	30	19.14	30
		2	12.89				
ac HT80	5775	1	10.84	13.97	30	16.98	30
		2	11.08				

Note: 1. The test results had already included the duty cycle correction factor.
2.The EUT only support SISO mode for a, all the antenna had been tested, but only the worst data recorded in the report.