

FCC DFS Test Report

FCC ID: SI5VRE3000

This report concerns: Class II Permissive Change

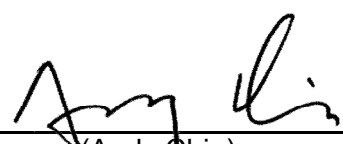
Type of device: Master Device

Project No. : 1807T004A
Equipment : Verizon 5G Home Wi-Fi Extender
Test Model : VRE3000
Series Model : N/A
Applicant : U-MEDIA Communications, Inc.
Address : 9F, No.1, Jin-shan 7th St. Hsinchu Taiwan

Date of Receipt : Aug. 03, 2018
Date of Test : Aug. 03, 2018 ~ Dec. 22, 2018
Issued Date : Dec. 24, 2018
Tested by : BTL Inc.

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BTL's laboratory quality assurance procedures are in compliance with the **ISO Guide 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

CONTENTS

REPORT ISSUED HISTORY	4
1 CERTIFICATION	5
2 GENERAL INFORMATION	6
2.1 DESCRIPTION OF EUT	6
2.2 DESCRIPTION OF ANTENNA PORT	9
2.3 EIRP POWER	10
2.4 MANUFACTURER STATEMENT	10
3 TECHNICAL REQUIREMENTS	11
3.1 APPLICABILITY	11
3.2 DFS DETECTION THRESHOLDS	12
3.3 RESPONSE REQUIREMENTS	12
4 RADAR TEST WAVEFORMS	13
4.1 SHORT PULSE RADAR TEST WAVEFORMS	13
4.2 LONG PULSE RADAR TEST WAVEFORM	14
4.3 FREQUENCY HOPPING RADAR TEST WAVEFORM	15
5 TEST PROCEDURES	16
5.1 MEASUREMENT SYSTEM	16
5.2 CALIBRATION OF DFS DETECTION THRESHOLD LEVEL	17
6 LIST OF MEASURING EQUIPMENTS	18
7 TEST RESULT	19
7.1 SUMMARY OF TEST RESULTS	19
7.2 TEST MODES	19
7.3 DFS DETECTION THRESHOLD LEVEL	19
7.4 RADAR WAVEFORM CALIBRATION RESULT	20
7.5 CHANNEL LOADING TEST RESULT	23
7.6 U-NII DETECTION BANDWIDTH	24
7.7 CHANNEL AVAILABILITY CHECK TIME	34
7.8 IN-SERVICE MONITORING FOR CHANNEL MOVE TIME, CHANNEL CLOSING TRANSMISSION TIME AND NON-OCCUPANCY PERIOD	40
7.9 SUCCESSFUL DETECTION RATE	46
7.10 STATISTICAL PERFORMANCE CHECK	52
8 EUT TEST PHOTO	124

REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue.	Sep. 18, 2018
R01	Revised report to address TCB's comments.	Oct. 31, 2018
R02	Revised report to address TCB's comments.	Dec. 24, 2018

1 CERTIFICATION

Equipment : Verizon 5G Home Wi-Fi Extender
Brand Name : Verizon
Test Model : VRE3000
Series Model : N/A
Applicant : U-MEDIA Communications, Inc.
Manufacturer : U-MEDIA Communications, Inc.
Address : No. 90, Kuang Fu Nth.Rd., Hsinchu Industrial Park, Hu Kou, Hsinchu, 303,
Taiwan
Date of Test : Aug. 03, 2018 ~ Dec. 22, 2018
Test Sample : Engineering Sample
Standard(s) : FCC Part15, Subpart E (§15.407)
FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02

The above equipment has been tested and found in compliance with the requirement of the relative standards by BTL Inc.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCCP-2-1807T004A) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).

Test results included in this report is only for the RLAN 5GHz DFS part.

2 GENERAL INFORMATION

2.1 DESCRIPTION OF EUT

Equipment	Verizon 5G Home Wi-Fi Extender				
Brand Name	Verizon				
Test Model	VRE3000				
Series Model	N/A				
Model Difference	N/A				
Product Specification	Operation Frequency	UNII-2A: 5260 MHz to 5320 MHz UNII-2C: 5500 MHz to 5700 MHz			
	Modulation Type	OFDM			
	RF Chips	The EUT contains two RF Chips which functions are as below			
		Chip	2.4 GHz	5 GHz	Chains
		MT7615N	NO	YES UNII-1 UNII-2A	4T4R
		MT7615DN	YES	YES UNII-2C UNII-3	2T2R
	Operation Mode	Master Device			
	Bridge or MESH Modes	No support.			

NOTE:

- (1) For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- (2) Channel List:

UNII-2A					
IEEE 802.11a IEEE 802.11n (HT20) IEEE 802.11ac (HT20)		IEEE 802.11n (HT40) IEEE 802.11ac (HT40)		IEEE 802.11ac (VHT80)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	54	5270	58	5290
56	5280	62	5310		
60	5300				
64	5320				

UNII-2C					
IEEE 802.11a IEEE 802.11n (HT20) IEEE 802.11ac (HT20)		IEEE 802.11n (HT40) IEEE 802.11ac (HT40)		IEEE 802.11ac (VHT80)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	102	5510	106	5530
104	5520	110	5550	122	5610
108	5540	118	5590	138	5690
112	5560	126	5630		
116	5580	134	5670		
120	5600				
124	5620				
128	5640				
132	5660				
136	5680				
140	5700				

(3) Table for Filed Antenna:

Group 1:

UNII-2A:

Ant.	Brand	Model	Type	Connector	Gain (dBi)
JC1	Galtronics	02102142-06808Ax	PCB	iPEX	3.4
JC3	Galtronics	02102142-06808Ax	PCB	iPEX	3.4
JC4	Galtronics	02102142-06808Ax	PCB	iPEX	3.4
JC5	Galtronics	02102142-06808Ax	PCB	iPEX	3.4

UNII-2C:

Ant.	Brand	Model	Type	Connector	Gain (dBi)
JC6	Galtronics	02102140-06808Ax	PCB	iPEX	3.5
JC7	Galtronics	02102140-06808Ax	PCB	iPEX	3.5

Group 2:

UNII-2A:

Ant.	Brand	Model	Type	Connector	Gain (dBi)
JC1	Galtronics	02102142-06808Cx	PCB	iPEX	3.1
JC3	Galtronics	02102142-06808Cx	PCB	iPEX	3.1
JC4	Galtronics	02102142-06808Cx	PCB	iPEX	3.1
JC5	Galtronics	02102142-06808Cx	PCB	iPEX	3.1

UNII-2C:

Ant.	Brand	Model	Type	Connector	Gain (dBi)
JC6	Galtronics	02102140-06808Bx	PCB	iPEX	2.8
JC7	Galtronics	02102140-06808Bx	PCB	iPEX	2.8

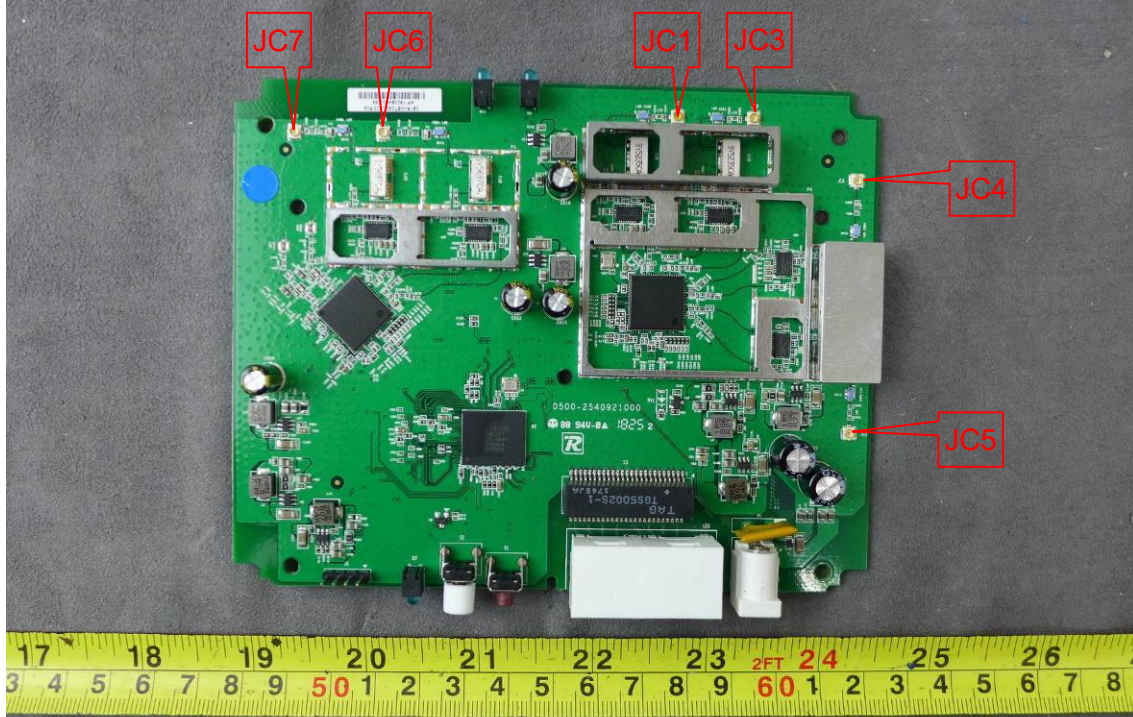
NOTE:

- (a) The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and receivers (UNII-2A: 4T4R, UNII-2C: 2T2R). 2.4 GHz and 5GHz can transmit simultaneously.

- (b) For UNII-2A:
All JC1, JC3, JC4 and JC5 can be used as transmitting/receiving antenna.
C1, JC3, JC4 and JC5 could transmit/receive simultaneously.
The C1 + JC3 + JC4 + JC5 generated the worst case, so it was selected to test and record in the report.
For UNII-2C:
All JC6 and JC7 can be used as transmitting/receiving antenna.
JC6 and JC7 could transmit/receive simultaneously.
The C6 + JC7 generated the worst case, so it was selected to test and record in the report.
- (c) The EUT UNII-2A (N mode & AC mode) is with beamforming function.
The UNII-2A beamforming gain is 4.46 dB.
The EUT UNII-2A (A mode) and UNII-2C does not support beamforming function.
- (d) For Conducted Output Power (CDD mode)
For **UNII-2A**:
For $N_{ANT} = 4 < 5$,
Direction gain = $G_{ANT} + 0 = 3.4 + 0 = 3.4$ dBi.
For **UNII-2C**:
For $N_{ANT} = 2 < 5$,
Direction gain = $G_{ANT} + 0 = 3.5 + 0 = 3.5$ dBi.
- (e) For Conducted Output Power (beamforming mode)
For **UNII-2A** (N mode & AC mode in beamforming mode):
Directional Gain = $G_{ANT} + 10\log(N_{ANT}/N_{SS}) = 3.4$ dBi + $10\log(4/1) = 9.42$ dBi.
For **UNII-2C**: does not support beamforming function.

2.2 DESCRIPTION OF ANTENNA PORT

Frequency	Antenna Port
UNII-2A	JC1, JC3, JC4 and JC5
UNII-2C	JC6 and JC7



2.3 EIRP POWER

Test Mode	UNII-2A
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CCD Mode

Frequency (MHz)	Maximum Conducted Power (dBm)	Antenna Gain (dBi)	Maximum EIRP Power (dBm)	Maximum EIRP Power (mW)	Remark
5260 to 5320	17.82	3.4	21.22	132.4342	NOTE (1)

Beamforming Mode

Frequency (MHz)	Maximum Conducted Power (dBm)	Antenna Gain (dBi)	Beamforming Gain (dB)	Maximum EIRP Power (dBm)	Maximum EIRP Power (mW)	Remark
5260 to 5320	13.09	9.42	4.46	26.97	497.7371	NOTE (1)

Test Mode	UNII-2C
-----------	---------

Frequency (MHz)	Maximum Conducted Power (dBm)	Antenna Gain (dBi)	Maximum EIRP Power (dBm)	Maximum EIRP Power (mW)	Remark
5500 to 5700	21.67	3.5	25.17	328.8516	NOTE (1)

NOTE:

- (1) EIRP Power (dBm) = Conducted Power (dBm) + Antenna Gain (dBi).
 Power (mW) = $1 \text{ mW} * 10^{(\text{dBm} / 10)}$.

2.4 MANUFACTURER STATEMENT

Manufacturer statement confirming that information regarding the parameters of the detected Radar Waveforms is not available to the end user.

The manufacturer is permitted to select the first channel either manually or randomly. The manufacturer may also block DFS channels from use.

The intention of the uniform spreading is to provide, on aggregate, a uniform loading of the spectrum. The UUT using the bands 5250 to 5350MHz and 5470 to 5600 MHz channels so that the probability of selecting a given channel shall be the same for channels. The UUT will select channel by random mode and remember this channel when detect radar signal, so that will select unused channel by random mode.

3 TECHNICAL REQUIREMENTS

3.1 APPLICABILITY

According to FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02, the following tables are applicable.

Table 1: Applicability of DFS Requirements Prior to Use of a Channel

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
<i>Non-Occupancy Period</i>	Yes	Not required	Yes
<i>DFS Detection Threshold</i>	Yes	Not required	Yes
<i>Channel Availability Check Time</i>	Yes	Not required	Not required
<i>U-NII Detection Bandwidth</i>	Yes	Not required	Yes

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode	
	Master Device or Client with Radar Detection	Client Without Radar Detection
<i>DFS Detection Threshold</i>	Yes	Not required
<i>Channel Closing Transmission Time</i>	Yes	Yes
<i>Channel Move Time</i>	Yes	Yes
<i>U-NII Detection Bandwidth</i>	Yes	Not required

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
<i>U-NII Detection Bandwidth and Statistical Performance Check</i>	All BW modes must be tested	Not required
<i>Channel Move Time and Channel Closing Transmission Time</i>	Test using widest BW mode available	Test using the widest BW mode available for the link
<i>All other tests</i>	Any single BW mode	Not required

Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.

3.2 DFS DETECTION THRESHOLDS

According to FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02, the following table is required.

Table 3: DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection

Maximum Transmit Power	Value (See Notes 1, 2, and 3)
EIRP $\geq$ 200 milliwatt	-64 dBm
EIRP $<$ 200 milliwatt and power spectral density $<$ 10 dBm/MHz	-62 dBm
EIRP $<$ 200 milliwatt that do not meet the power spectral density requirement	-64 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna. Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response. Note3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.	

3.3 RESPONSE REQUIREMENTS

According to FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02, the following table is required.

Table 4: DFS Response Requirement Values

Parameter	Value
<i>Non-occupancy period</i>	Minimum 30 minutes
<i>Channel Availability Check Time</i>	60 seconds
<i>Channel Move Time</i>	10 seconds See Note 1.
<i>Channel Closing Transmission Time</i>	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
<i>U-NII Detection Bandwidth</i>	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.
Note 1: <i>Channel Move Time</i> and the <i>Channel Closing Transmission Time</i> should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst. Note 2: The <i>Channel Closing Transmission Time</i> is comprised of 200 milliseconds starting at the beginning of the <i>Channel Move Time</i> plus any additional intermittent control signals required to facilitate a <i>Channel</i> move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions. Note 3: During the <i>U-NII Detection Bandwidth</i> detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.	

4 RADAR TEST WAVEFORMS

According to FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02, the following parameters are required.

This section provides the parameters for required test waveforms, minimum percentage of successful detections, and the minimum number of trials that must be used for determining DFS conformance. Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

4.1 SHORT PULSE RADAR TEST WAVEFORMS

Table 5 – Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (μsec)	PRI (μsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	Roundup $\left\{ \left(\frac{1}{360} \right) \cdot \left(\frac{19 \cdot 10^6}{\text{PRI}_{\mu\text{sec}}} \right) \right\}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 μsec, with a minimum increment of 1 μsec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. If more than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. If more than 30 waveforms are used for Short Pulse Radar Type 1, then each additional waveform is generated with Test B and must also be unique and not repeated from the previous waveforms in Tests A or B.

Table 5a - Pulse Repetition Intervals Values for Test A

Pulse Repetition Frequency Number	Pulse Repetition Frequency (Pulses Per Second)	Pulse Repetition Interval (Microseconds)
1	1930.5	518
2	1858.7	538
3	1792.1	558
4	1730.1	578
5	1672.2	598
6	1618.1	618
7	1567.4	638
8	1519.8	658
9	1474.9	678
10	1432.7	698
11	1392.8	718
12	1355	738
13	1319.3	758
14	1285.3	778
15	1253.1	798
16	1222.5	818
17	1193.3	838
18	1165.6	858
19	1139	878
20	1113.6	898
21	1089.3	918
22	1066.1	938
23	326.2	3066

4.2 LONG PULSE RADAR TEST WAVEFORM

Table 6 – Long Pulse Radar Test Waveform

Radar Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Number of Pulses per <i>Burst</i>	Number of <i>Bursts</i>	Minimum Percentage of Successful Detection	Minimum Number of Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

The parameters for this waveform are randomly chosen. Thirty unique waveforms are required for the Long Pulse Radar Type waveforms. If more than 30 waveforms are used for the Long Pulse Radar Type waveforms, then each additional waveform must also be unique and not repeated from the previous waveforms.

4.3 FREQUENCY HOPPING RADAR TEST WAVEFORM

Table 7 – Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (μsec)	PRI (μsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Number of Trials
6	1	333	9	0.333	300	70%	30

For the Frequency Hopping Radar Type, the same *Burst* parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected from the hopping sequence defined by the following algorithm: ⁴

The first frequency in a hopping sequence is selected randomly from the group of 475 integer frequencies from 5250 – 5724 MHz. Next, the frequency that was just chosen is removed from the group and a frequency is randomly selected from the remaining 474 frequencies in the group. This process continues until all 475 frequencies are chosen for the set. For selection of a random frequency, the frequencies remaining within the group are always treated as equally likely.

5 TEST PROCEDURES

The test procedures follow the descriptions of the FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02, section 7.

The conducted test procedure and setup are used for this testing.

5.1 MEASUREMENT SYSTEM

1. Master device and client device are set up by conduction method as the following configuration.
2. The client device is connected to notebook and to access an IP address on wireless connection with the master device.
3. Then the master device is connected to another notebook to access an IP address.
4. Finally, let the two IP addresses run traffic with each other through the Run flow software "Lan test" to reach 17% channel loading as below.

The following test setup is used for this testing.

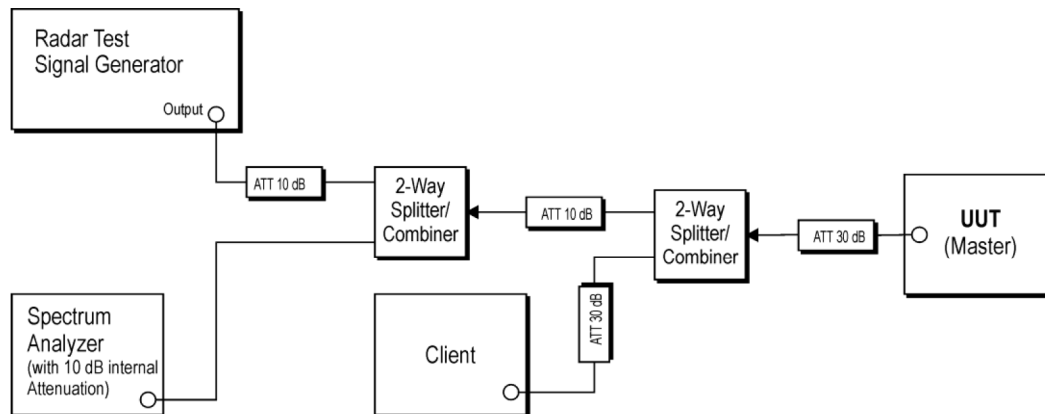


Figure 2: Example Conducted Setup where UUT is a Master and Radar Test Waveforms are injected into the Master

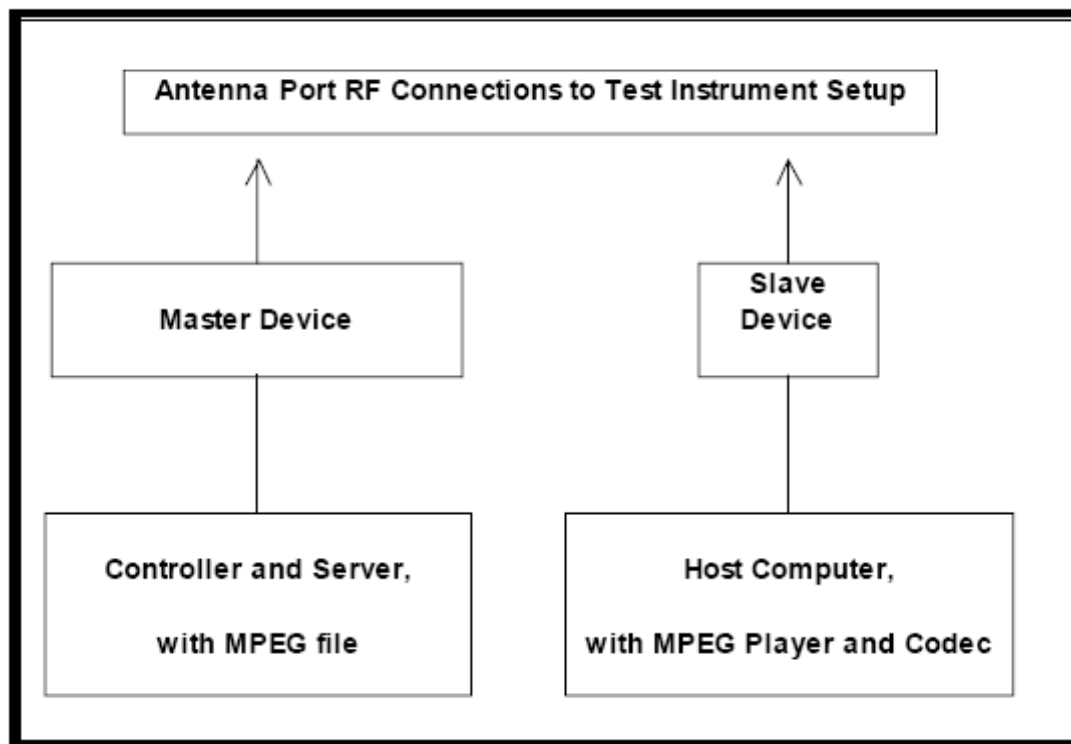
5.2 CALIBRATION OF DFS DETECTION THRESHOLD LEVEL

A 50 ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected in place of the master device and the signal generator is set to CW mode. The amplitude of the signal generator is adjusted to yield a level of -64 dBm as measured on the spectrum analyzer.

Without changing any of the instrument settings, the spectrum analyzer is reconnected to the Common port of the Spectrum Analyzer Combiner/Divider. Measure the amplitude and calculate the difference from -64 dBm. Adjust the Reference Level Offset of the spectrum analyzer to this difference.

The spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device. The interference detection threshold may be varied from the calibrated value of -64 dBm and the spectrum analyzer will still indicate the level as received by the Master Device. Set the signal generator to produce a radar waveform, trigger a burst manually and measure the level on the spectrum analyzer. Readjust the amplitude of the signal generator as required so that the peak level of the waveform is at a displayed level equal to the required or desired interference detection threshold. Separate signal generator amplitude settings are determined as required for each radar type.

The output power range and antenna gain had been taken into account.



6 LIST OF MEASURING EQUIPMENTS

Dynamic Frequency Selection (DFS)					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	Keysight	N9010A	MY54200240	Aug. 26, 2019
2	MXG Vector Signal Generator	Agilent	N5182B	MY51350711	May 28, 2019
3	10dB Attenuators	Mini-Circuits	VAT-10+	N/A	May 14, 2019
4	10dB Attenuators	Mini-Circuits	VAT-10+	N/A	May 14, 2019
5	30dB Attenuators	Mini-Circuits	VAT-30+	N/A	May 14, 2019
6	30dB Attenuators	Mini-Circuits	VAT-30+	N/A	May 14, 2019
7	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	N/A	May 14, 2019
8	POWER SPLITTER	Mini-Circuits	ZFRSC-123-S+	N/A	May 14, 2019

Remark: "N/A" denotes no model name, no serial no. or no calibration specified.
All calibration period of equipment list is one year.

7 TEST RESULT

7.1 SUMMARY OF TEST RESULTS

FCC Part15, Subpart E (§15.407)				
FCC Clause No	Description	Test Result	Judgement	Remark
§15.407(h)(2)	U-NII Detection Bandwidth	7.6	Pass	-----
§15.407(h)(2)	Initial Channel Availability Check Time	7.7	Pass	-----
§15.407(h)(2)	Radar Burst at the Beginning of the Channel Availability Check Time	7.7	Pass	-----
§15.407(h)(2)	Radar Burst at the End of the Channel Availability Check Time	7.7	Pass	-----
§15.407(h)(2)	In-Service Monitoring for Channel Move Time	7.8	Pass	-----
§15.407(h)(2)	In-Service Monitoring for Channel Closing Transmission Time	7.8	Pass	-----
§15.407(h)(2)	In-Service Monitoring for Non-Occupancy Period	7.8	Pass	-----
§15.407(h)(2)	Statistical Performance Check	7.9 7.10	Pass	-----
§15.407(h)(2)	Uniform Spreading	2.4	Pass	-----

7.2 TEST MODES

Test Mode	Description
1	Master with injection at the Master

NOTE: The EUT contains two RF Chips. Band UNII-2A is controlled by MT7615N; band UNII-2C is controlled by MT7615DN.

7.3 DFS DETECTION THRESHOLD LEVEL

For band UNII-2A:

The maximum transmit power is < 200 milliwatt and the power spectral density is < 10 dBm/MHz, so the DFS detection threshold level is -64 dBm + 3.4 dBi = -60.6 dBm that had been taken into account the output power range and antenna gain.

For band UNII-2C:

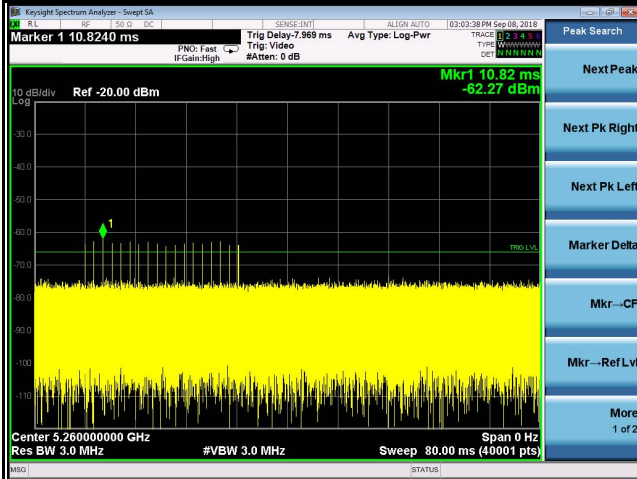
The maximum transmit power is < 200 milliwatt and the power spectral density is < 10 dBm/MHz, so the DFS detection threshold level is -64 dBm + 3.5 dBi = -60.5 dBm that had been taken into account the output power range and antenna gain.

7.4 RADAR WAVEFORM CALIBRATION RESULT

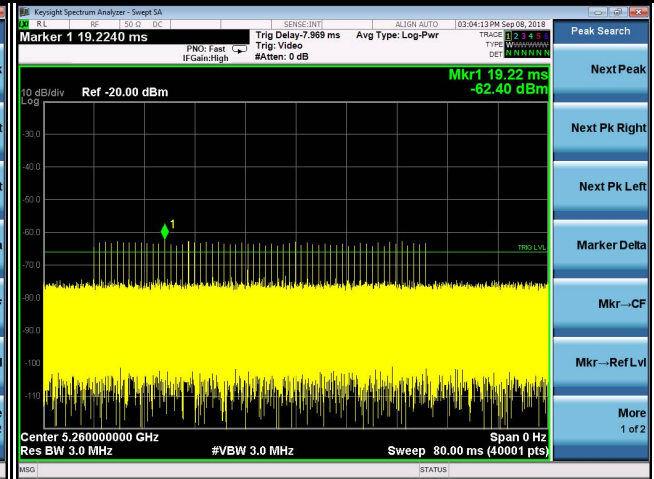
For UII-2A

Calibrated DFS Detection Threshold Level Plot

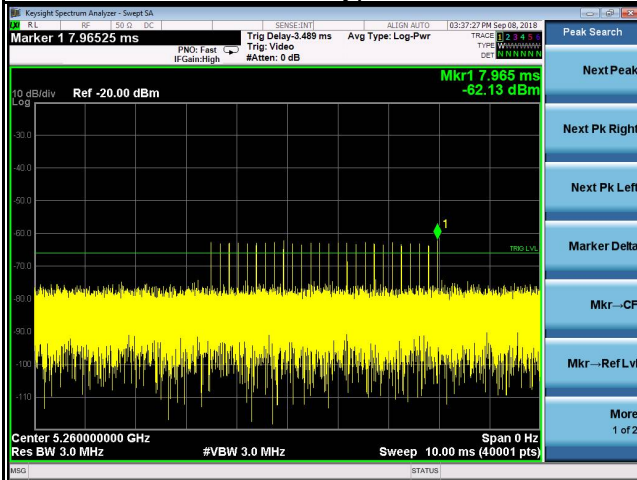
Radar Type 0



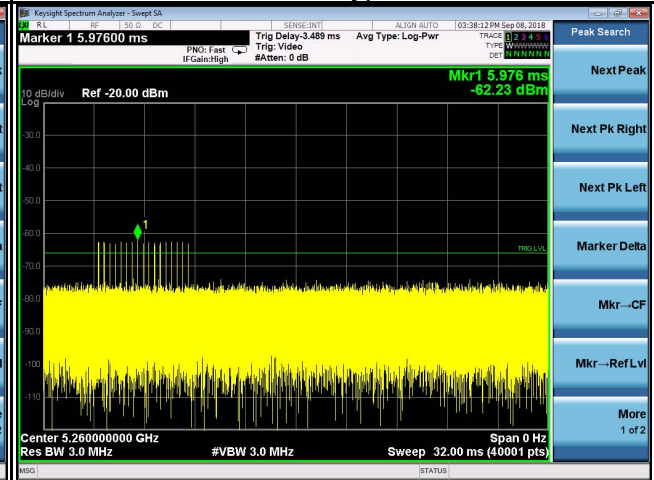
Radar Type 1



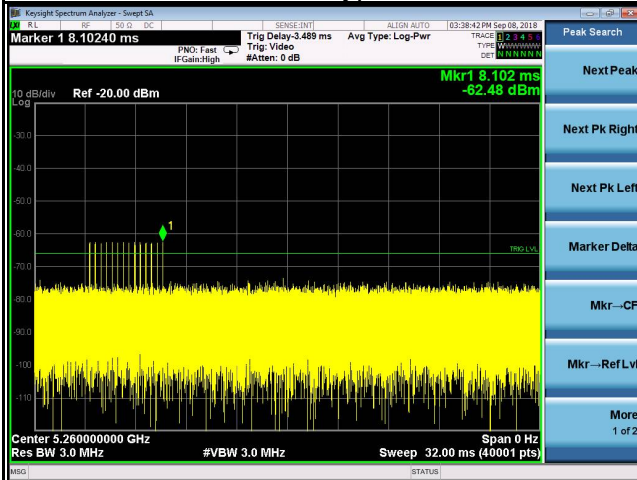
Radar Type 2



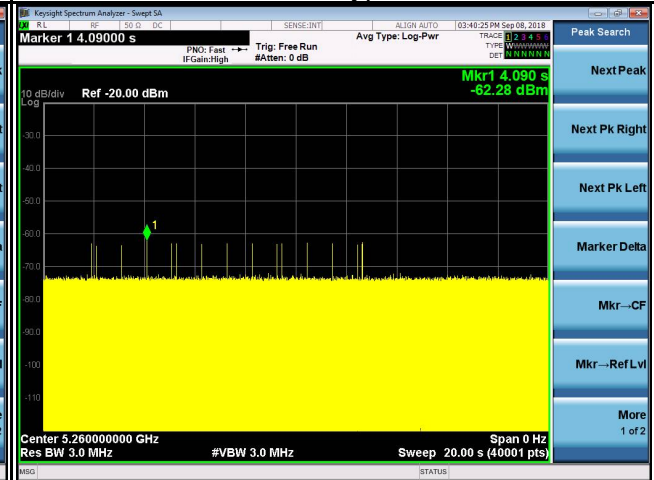
Radar Type 3



Radar Type 4

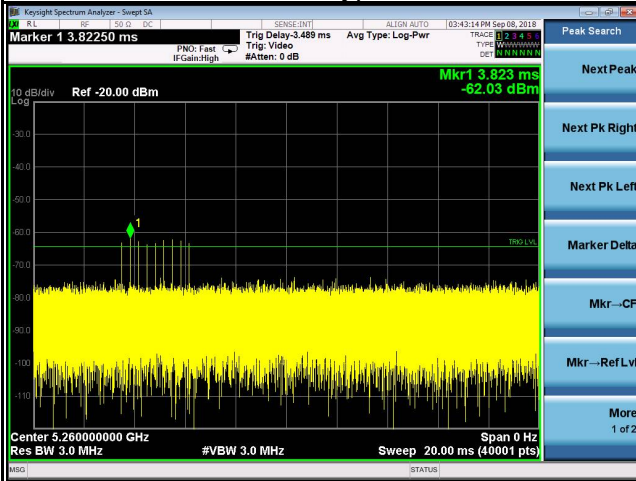


Radar Type 5



Calibrated DFS Detection Threshold Level Plot

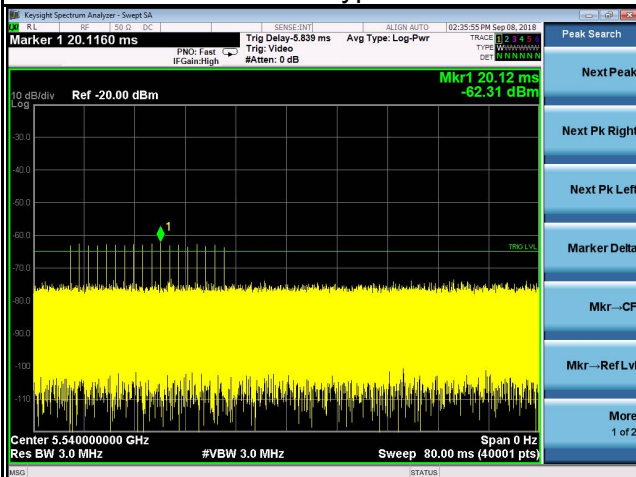
Radar Type 6



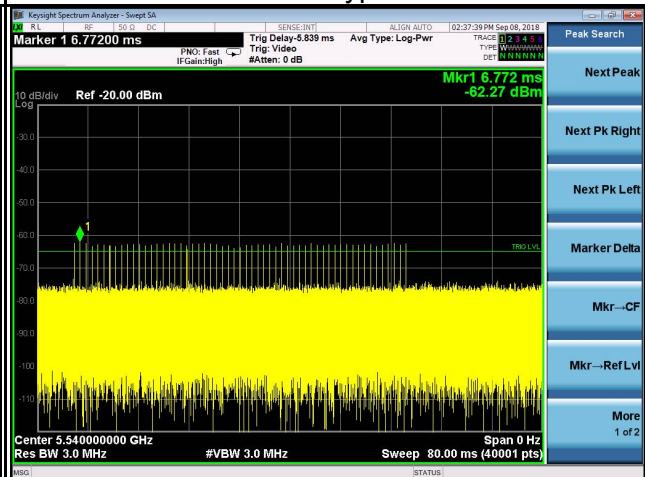
For UII-2C

Calibrated DFS Detection Threshold Level Plot

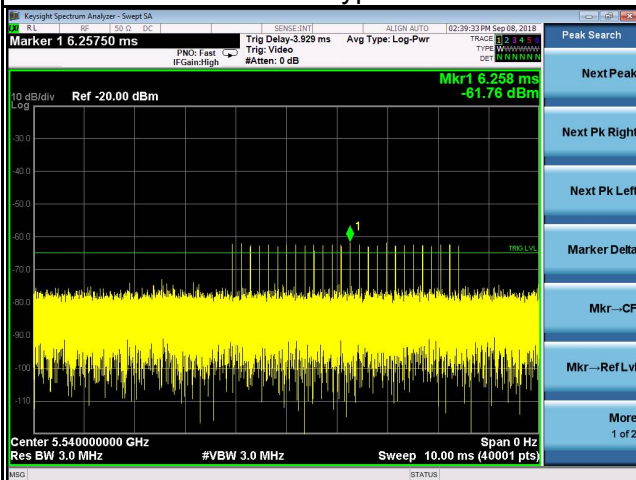
Radar Type 0



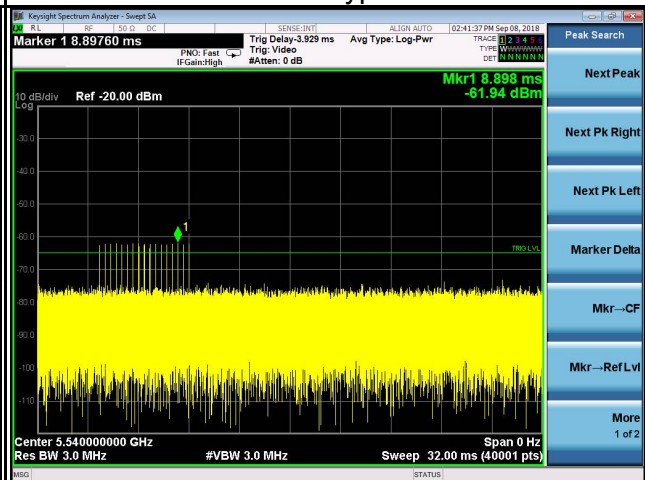
Radar Type 1



Radar Type 2

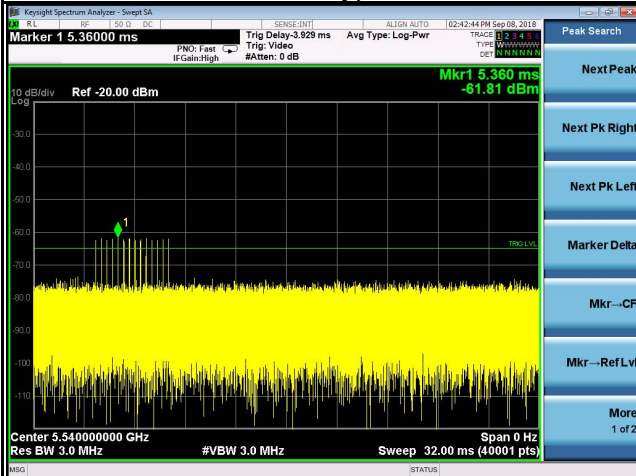


Radar Type 3

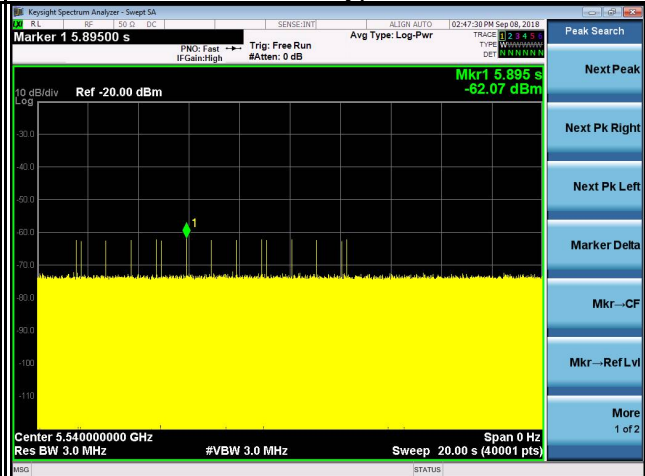


Calibrated DFS Detection Threshold Level Plot

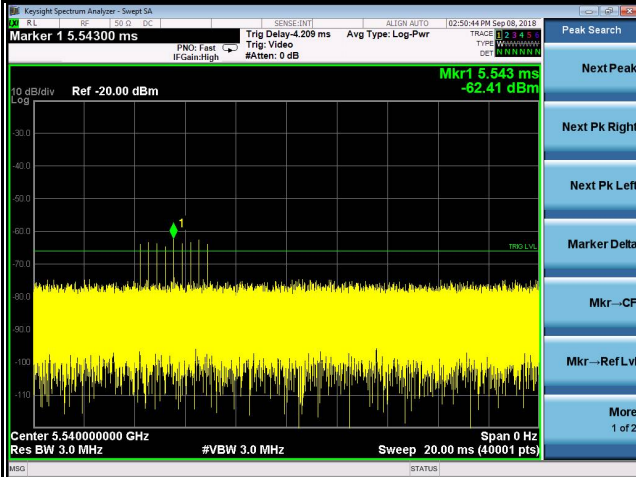
Radar Type 4



Radar Type 5

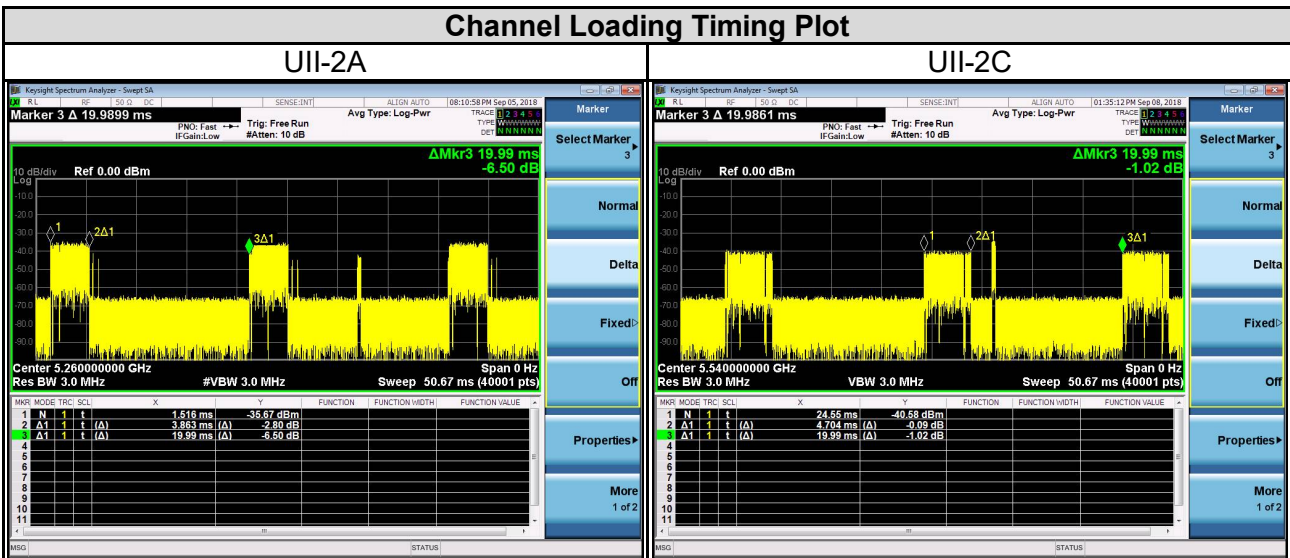


Radar Type 6



7.5 CHANNEL LOADING TEST RESULT

Timing plots are required with calculations demonstrating a minimum channel loading of approximately 17 % or greater. For example, channel loading can be estimated by setting the spectrum analyzer for zero span and approximate the Time On / (Time On + Off Time). This can be done with any appropriate channel BW and modulation type.



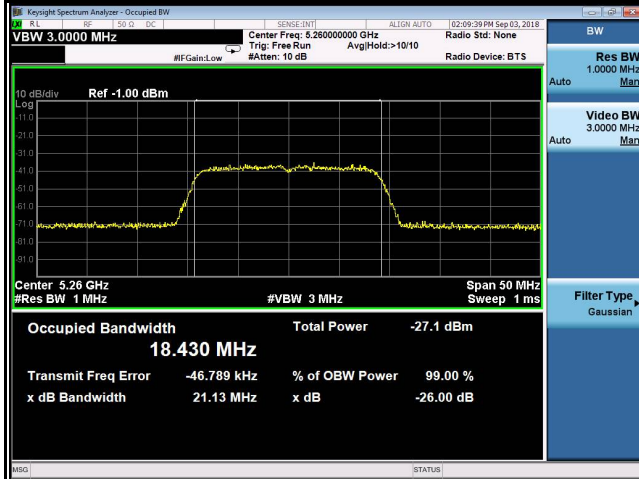
Test Mode	Single Time On (ms)	Number of Time On	Total Time On (ms)	Time On + Off Time (ms)	Channel Loading Ratio (%)	Required Ratio (%)
UII-2A	3.863	1	3.863	19.99	19.32	≥ 17%
UII-2C	4.704	1	4.704	19.99	23.53	≥ 17%

7.6 U-NII DETECTION BANDWIDTH

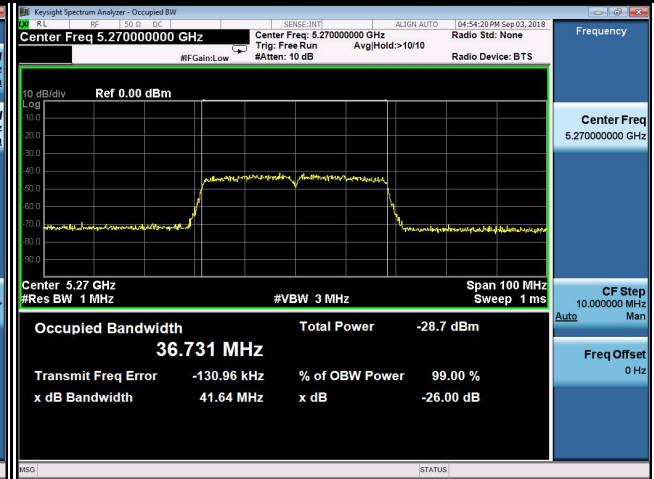
For UII-2A

99 % Power Bandwidth Plot

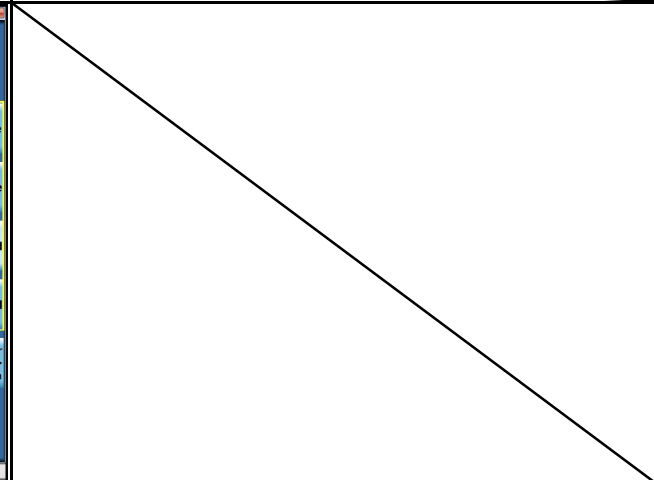
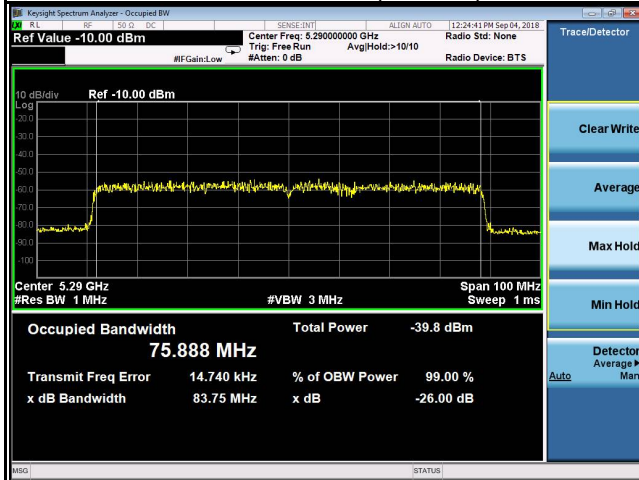
IEEE 802.11a



IEEE 802.11n (HT40)



IEEE 802.11ac (VHT80)



Test Mode	IEEE 802.11a										
Detection Bandwith test tranmission	20 MHz										
EUT FREQUENCY	5260 MHz										
EUT power bandwith	18.43 MHz										
Detection Bandwith limit(100%of EUT 99% Power bandwith)	18.43 MHz										
Detection Bandwith(5270(FH)-5250(FL))	20 MHz										
Test Result	PASS										
	DFS Detection Trials (1=Detection, 0= No Detection)										
Radar Freq (MHz)	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5249	0	0	0	0	0	0	0	0	0	0	0
5250(FL)	1	1	1	1	1	1	1	1	1	1	100
5251	1	1	1	1	1	1	1	1	1	1	100
5252	1	1	1	1	1	1	1	1	1	1	100
5253	1	1	1	1	1	1	1	1	1	1	100
5254	1	1	1	1	1	1	1	1	1	1	100
5255	1	1	1	1	1	1	1	1	1	1	100
5256	1	1	1	1	1	1	1	1	1	1	100
5257	1	1	1	1	1	1	1	1	1	1	100
5258	1	1	1	1	1	1	1	1	1	1	100
5259	1	1	1	1	1	1	1	1	1	1	100
5260	1	1	1	1	1	1	1	1	1	1	100
5261	1	1	1	1	1	1	1	1	1	1	100
5262	1	1	1	1	1	1	1	1	1	1	100
5263	1	1	1	1	1	1	1	1	1	1	100
5264	1	1	1	1	1	1	1	1	1	1	100
5265	1	1	1	1	1	1	1	1	1	1	100
5266	1	1	1	1	1	1	1	1	1	1	100
5267	1	1	1	1	1	1	1	1	1	1	100
5268	1	1	1	1	1	1	1	1	1	1	100
5269	1	1	1	1	1	1	1	1	1	1	100
5270(FH)	1	1	1	1	1	1	1	1	1	1	100
5271	0	0	0	0	0	0	0	0	0	0	0

Test Mode	IEEE 802.11n (HT40)										
Detection Bandwidth test transmission	40 MHz										
EUT FREQUENCY	5270 MHz										
EUT power bandwidth	36.731 MHz										
Detection Bandwidth limit(100% of EUT 99% Power bandwidth)	36.731 MHz										
Detection Bandwidth(5289(FH)-5251(FL))	38 MHz										
Test Result	PASS										
	DFS Detection Trials (1=Detection, 0= No Detection)										
Radar Freq (MHz)	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5249	0	0	0	0	0	0	0	0	0	0	0
5250	0	1	0	0	1	0	0	1	0	1	40
5251(FL)	1	1	1	1	1	1	1	1	1	1	100
5252	1	1	1	1	1	1	1	1	1	1	100
5253	1	1	1	1	1	1	1	1	1	1	100
5254	1	1	1	1	1	1	1	1	1	1	100
5255	1	1	1	1	1	1	1	1	1	1	100
5256	1	1	1	1	1	1	1	1	1	1	100
5257	1	1	1	1	1	1	1	1	1	1	100
5258	1	1	1	1	1	1	1	1	1	1	100
5259	1	1	1	1	1	1	1	1	1	1	100
5260	1	1	1	1	1	1	1	1	1	1	100
5261	1	1	1	1	1	1	1	1	1	1	100
5262	1	1	1	1	1	1	1	1	1	1	100
5263	1	1	1	1	1	1	1	1	1	1	100
5264	1	1	1	1	1	1	1	1	1	1	100
5265	1	1	1	1	1	1	1	1	1	1	100
5266	1	1	1	1	1	1	1	1	1	1	100
5267	1	1	1	1	1	1	1	1	1	1	100
5268	1	1	1	1	1	1	1	1	1	1	100
5269	1	1	1	1	1	1	1	1	1	1	100
5270	1	1	1	1	1	1	1	1	1	1	100
5271	1	1	1	1	1	1	1	1	1	1	100
5272	1	1	1	1	1	1	1	1	1	1	100
5273	1	1	1	1	1	1	1	1	1	1	100
5274	1	1	1	1	1	1	1	1	1	1	100
5275	1	1	1	1	1	1	1	1	1	1	100
5276	1	1	1	1	1	1	1	1	1	1	100
5277	1	1	1	1	1	1	1	1	1	1	100
5278	1	1	1	1	1	1	1	1	1	1	100
5279	1	1	1	1	1	1	1	1	1	1	100
5280	1	1	1	1	1	1	1	1	1	1	100
5281	1	1	1	1	1	1	1	1	1	1	100
5282	1	1	1	1	1	1	1	1	1	1	100
5283	1	1	1	1	1	1	1	1	1	1	100
5284	1	1	1	1	1	1	1	1	1	1	100
5285	1	1	1	1	1	1	1	1	1	1	100
5286	1	1	1	1	1	1	1	1	1	1	100
5287	1	1	1	1	1	1	1	1	1	1	100
5288	1	1	1	1	1	1	1	1	1	1	100
5289(FH)	1	1	1	1	1	1	1	1	1	1	100
5290	0	0	1	0	0	0	1	0	1	0	30
5291	0	0	0	0	0	0	0	0	0	0	0

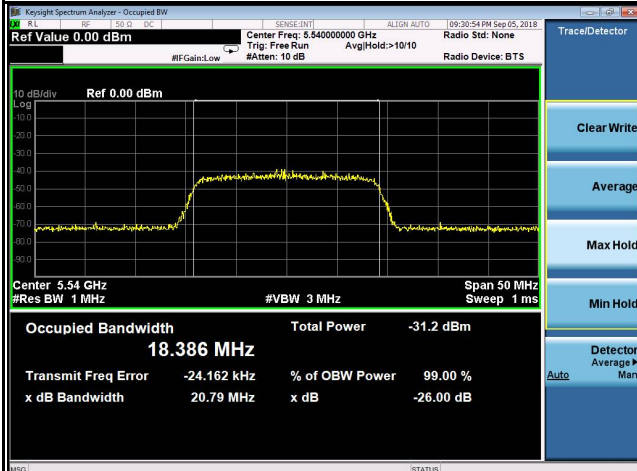
Test Mode	IEEE 802.11ac (VHT80)										
Detection Bandwith test tranmission	80 MHz										
EUT FREQUENCY	5290 MHz										
EUT power bandwith	75.888 MHz										
Detection Bandwith limit(100%of EUT 99% Power bandwith)	75.888 MHz										
Detection Bandwith(5330(FH)-5250(FL))	80 MHz										
Test Result	PASS										
	DFS Detection Trials (1=Detection, 0= No Detection)										Detection Rate (%)
Radar Freq (MHz)	1	2	3	4	5	6	7	8	9	10	
5249	0	0	0	0	0	0	0	0	0	0	0
5250(FL)	1	1	1	1	1	1	1	1	1	1	100
5251	1	1	1	1	1	1	1	1	1	1	100
5252	1	1	1	1	1	1	1	1	1	1	100
5253	1	1	1	1	1	1	1	1	1	1	100
5254	1	1	1	1	1	1	1	1	1	1	100
5255	1	1	1	1	1	1	1	1	1	1	100
5256	1	1	1	1	1	1	1	1	1	1	100
5257	1	1	1	1	1	1	1	1	1	1	100
5258	1	1	1	1	1	1	1	1	1	1	100
5259	1	1	1	1	1	1	1	1	1	1	100
5260	1	1	1	1	1	1	1	1	1	1	100
5261	1	1	1	1	1	1	1	1	1	1	100
5262	1	1	1	1	1	1	1	1	1	1	100
5263	1	1	1	1	1	1	1	1	1	1	100
5264	1	1	1	1	1	1	1	1	1	1	100
5265	1	1	1	1	1	1	1	1	1	1	100
5266	1	1	1	1	1	1	1	1	1	1	100
5267	1	1	1	1	1	1	1	1	1	1	100
5268	1	1	1	1	1	1	1	1	1	1	100
5269	1	1	1	1	1	1	1	1	1	1	100
5270	1	1	1	1	1	1	1	1	1	1	100
5271	1	1	1	1	1	1	1	1	1	1	100
5272	1	1	1	1	1	1	1	1	1	1	100
5273	1	1	1	1	1	1	1	1	1	1	100
5274	1	1	1	1	1	1	1	1	1	1	100
5275	1	1	1	1	1	1	1	1	1	1	100
5276	1	1	1	1	1	1	1	1	1	1	100
5277	1	1	1	1	1	1	1	1	1	1	100
5278	1	1	1	1	1	1	1	1	1	1	100
5279	1	1	1	1	1	1	1	1	1	1	100
5280	1	1	1	1	1	1	1	1	1	1	100
5281	1	1	1	1	1	1	1	1	1	1	100
5282	1	1	1	1	1	1	1	1	1	1	100
5283	1	1	1	1	1	1	1	1	1	1	100
5284	1	1	1	1	1	1	1	1	1	1	100
5285	1	1	1	1	1	1	1	1	1	1	100
5286	1	1	1	1	1	1	1	1	1	1	100
5287	1	1	1	1	1	1	1	1	1	1	100
5288	1	1	1	1	1	1	1	1	1	1	100
5289	1	1	1	1	1	1	1	1	1	1	100
5290	1	1	1	1	1	1	1	1	1	1	100
5291	1	1	1	1	1	1	1	1	1	1	100
5292	1	1	1	1	1	1	1	1	1	1	100
5293	1	1	1	1	1	1	1	1	1	1	100
5294	1	1	1	1	1	1	1	1	1	1	100
5295	1	1	1	1	1	1	1	1	1	1	100
5296	1	1	1	1	1	1	1	1	1	1	100
5297	1	1	1	1	1	1	1	1	1	1	100
5298	1	1	1	1	1	1	1	1	1	1	100
5299	1	1	1	1	1	1	1	1	1	1	100
5300	1	1	1	1	1	1	1	1	1	1	100
5301	1	1	1	1	1	1	1	1	1	1	100
5302	1	1	1	1	1	1	1	1	1	1	100
5303	1	1	1	1	1	1	1	1	1	1	100
5304	1	1	1	1	1	1	1	1	1	1	100
5305	1	1	1	1	1	1	1	1	1	1	100
5306	1	1	1	1	1	1	1	1	1	1	100
5307	1	1	1	1	1	1	1	1	1	1	100
5308	1	1	1	1	1	1	1	1	1	1	100
5309	1	1	1	1	1	1	1	1	1	1	100
5310	1	1	1	1	1	1	1	1	1	1	100

Test Mode	IEEE 802.11ac (VHT80)										
5311	1	1	1	1	1	1	1	1	1	1	100
5312	1	1	1	1	1	1	1	1	1	1	100
5313	1	1	1	1	1	1	1	1	1	1	100
5314	1	1	1	1	1	1	1	1	1	1	100
5315	1	1	1	1	1	1	1	1	1	1	100
5316	1	1	1	1	1	1	1	1	1	1	100
5317	1	1	1	1	1	1	1	1	1	1	100
5318	1	1	1	1	1	1	1	1	1	1	100
5319	1	1	1	1	1	1	1	1	1	1	100
5320	1	1	1	1	1	1	1	1	1	1	100
5321	1	1	1	1	1	1	1	1	1	1	100
5322	1	1	1	1	1	1	1	1	1	1	100
5323	1	1	1	1	1	1	1	1	1	1	100
5324	1	1	1	1	1	1	1	1	1	1	100
5325	1	1	1	1	1	1	1	1	1	1	100
5326	1	1	1	1	1	1	1	1	1	1	100
5327	1	1	1	1	1	1	1	1	1	1	100
5328	1	1	1	1	1	1	1	1	1	1	100
5329	1	1	1	1	1	1	1	1	1	1	100
5330(FH)	1	1	1	1	1	1	1	1	1	1	100
5331	0	0	0	0	0	0	0	0	0	0	0

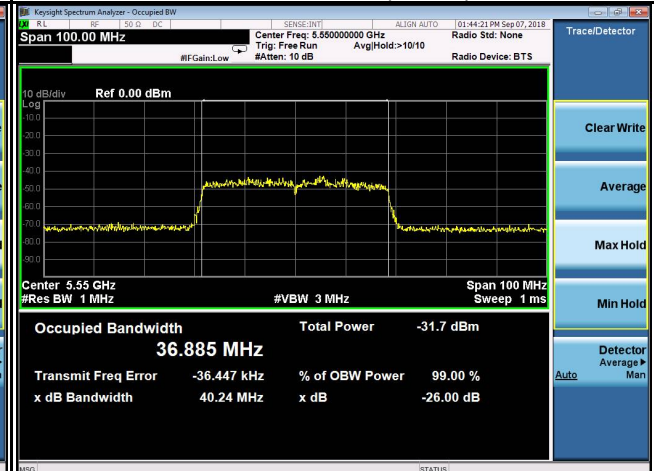
For UII-2C

99 % Power Bandwidth Plot

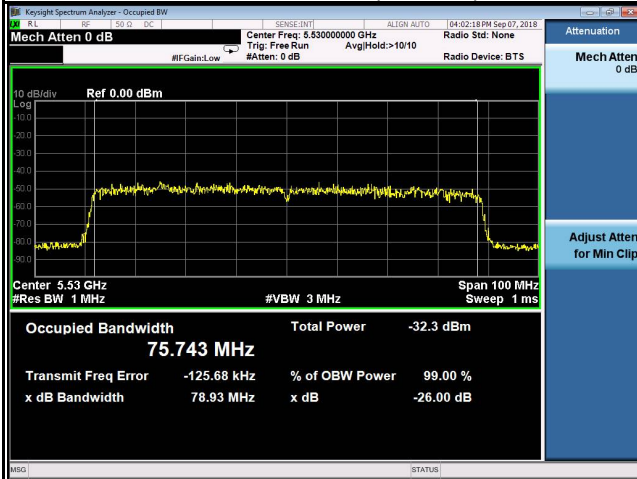
IEEE 802.11a



IEEE 802.11n (HT40)



IEEE 802.11ac (VHT80)



Test Mode		IEEE 802.11a										
Detection Bandwith test tranmission		20 MHz										
EUT FREQUENCY		5540 MHz										
EUT power bandwith		18.386 MHz										
Detection Bandwith limit(100%of EUT 99% Power bandwith)		18.386 MHz										
Detection Bandwith(5550(FH)-5530(FL))		20 MHz										
Test Result												
		DFS Detection Trials (1=Detection, 0= No Detection)										
Radar Freq (MHz)		1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5529		0	0	0	0	0	0	0	0	0	0	0
5530(FL)		1	1	1	1	1	1	1	1	1	1	100
5531		1	1	1	1	1	1	1	1	1	1	100
5532		1	1	1	1	1	1	1	1	1	1	100
5533		1	1	1	1	1	1	1	1	1	1	100
5534		1	1	1	1	1	1	1	1	1	1	100
5535		1	1	1	1	1	1	1	1	1	1	100
5536		1	1	1	1	1	1	1	1	1	1	100
5537		1	1	1	1	1	1	1	1	1	1	100
5538		1	1	1	1	1	1	1	1	1	1	100
5539		1	1	1	1	1	1	1	1	1	1	100
5540		1	1	1	1	1	1	1	1	1	1	100
5541		1	1	1	1	1	1	1	1	1	1	100
5542		1	1	1	1	1	1	1	1	1	1	100
5543		1	1	1	1	1	1	1	1	1	1	100
5544		1	1	1	1	1	1	1	1	1	1	100
5545		1	1	1	1	1	1	1	1	1	1	100
5546		1	1	1	1	1	1	1	1	1	1	100
5547		1	1	1	1	1	1	1	1	1	1	100
5548		1	1	1	1	1	1	1	1	1	1	100
5549		1	1	1	1	1	1	1	1	1	1	100
5550(FH)		1	1	1	1	1	1	1	1	1	1	100
5551		0	0	0	0	0	0	0	0	0	0	0

Test Mode	IEEE 802.11n (HT40)										
Detection Bandwidth test transmission	40 MHz										
EUT FREQUENCY	5550 MHz										
EUT power bandwidth	36.885 MHz										
Detection Bandwidth limit(100%of EUT 99% Power bandwidth)	36.885 MHz										
Detection Bandwidth(5569(FH)-5531(FL))	38 MHz										
Test Result	PASS										
	DFS Detection Trials (1=Detection, 0= No Detection)										
Radar Freq (MHz)	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5529	0	0	0	0	0	0	0	0	0	0	0
5530	0	1	0	1	0	1	0	0	1	0	40
5531(FL)	1	1	1	1	1	1	1	1	1	1	100
5532	1	1	1	1	1	1	1	1	1	1	100
5533	1	1	1	1	1	1	1	1	1	1	100
5534	1	1	1	1	1	1	1	1	1	1	100
5535	1	1	1	1	1	1	1	1	1	1	100
5536	1	1	1	1	1	1	1	1	1	1	100
5537	1	1	1	1	1	1	1	1	1	1	100
5538	1	1	1	1	1	1	1	1	1	1	100
5539	1	1	1	1	1	1	1	1	1	1	100
5540	1	1	1	1	1	1	1	1	1	1	100
5541	1	1	1	1	1	1	1	1	1	1	100
5542	1	1	1	1	1	1	1	1	1	1	100
5543	1	1	1	1	1	1	1	1	1	1	100
5544	1	1	1	1	1	1	1	1	1	1	100
5545	1	1	1	1	1	1	1	1	1	1	100
5546	1	1	1	1	1	1	1	1	1	1	100
5547	1	1	1	1	1	1	1	1	1	1	100
5548	1	1	1	1	1	1	1	1	1	1	100
5549	1	1	1	1	1	1	1	1	1	1	100
5550	1	1	1	1	1	1	1	1	1	1	100
5551	1	1	1	1	1	1	1	1	1	1	100
5552	1	1	1	1	1	1	1	1	1	1	100
5553	1	1	1	1	1	1	1	1	1	1	100
5554	1	1	1	1	1	1	1	1	1	1	100
5555	1	1	1	1	1	1	1	1	1	1	100
5556	1	1	1	1	1	1	1	1	1	1	100
5557	1	1	1	1	1	1	1	1	1	1	100
5558	1	1	1	1	1	1	1	1	1	1	100
5559	1	1	1	1	1	1	1	1	1	1	100
5560	1	1	1	1	1	1	1	1	1	1	100
5561	1	1	1	1	1	1	1	1	1	1	100
5562	1	1	1	1	1	1	1	1	1	1	100
5563	1	1	1	1	1	1	1	1	1	1	100
5564	1	1	1	1	1	1	1	1	1	1	100
5565	1	1	1	1	1	1	1	1	1	1	100
5566	1	1	1	1	1	1	1	1	1	1	100
5567	1	1	1	1	1	1	1	1	1	1	100
5568	1	1	1	1	1	1	1	1	1	1	100
5569(FH)	1	1	1	1	1	1	1	1	1	1	100
5570	0	1	0	0	1	1	0	0	1	0	40
5571	0	0	0	0	0	0	0	0	0	0	0

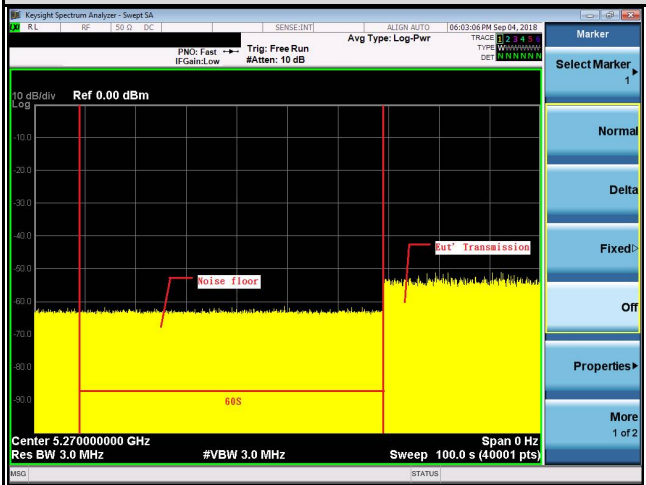
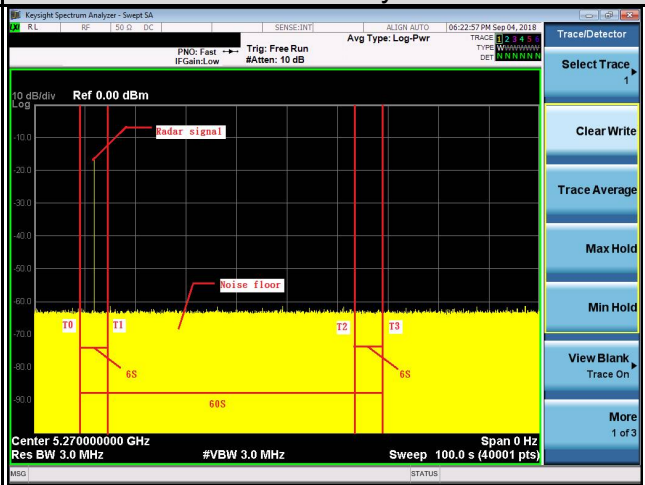
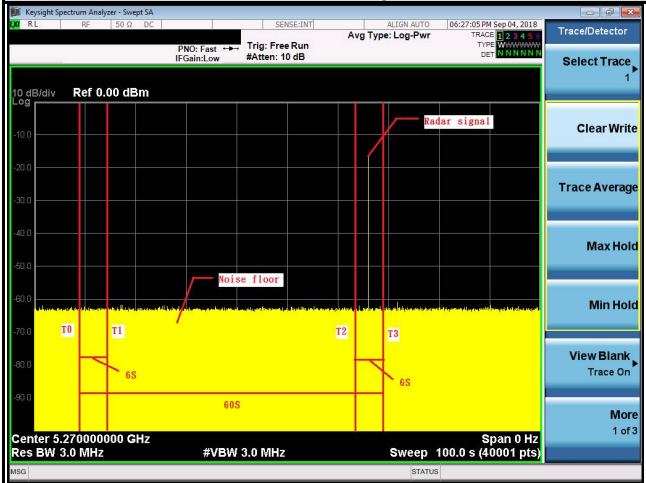
Test Mode	IEEE 802.11ac (VHT80)										
Detection Bandwith test tranmission	80 MHz										
EUT FREQUENCY	5530 MHz										
EUT power bandwith	75.743 MHz										
Detection Bandwith limit(100%of EUT 99% Power bandwith)	75.743 MHz										
Detection Bandwith(5570(FH)-5490(FL))	80 MHz										
Test Result	PASS										
	DFS Detection Trials (1=Detection, 0= No Detection)										Detection Rate (%)
Radar Freq (MHz)	1	2	3	4	5	6	7	8	9	10	
5489	0	0	0	0	0	0	0	0	0	0	0
5490(FL)	1	1	1	1	1	1	1	1	1	1	100
5491	1	1	1	1	1	1	1	1	1	1	100
5492	1	1	1	1	1	1	1	1	1	1	100
5493	1	1	1	1	1	1	1	1	1	1	100
5494	1	1	1	1	1	1	1	1	1	1	100
5495	1	1	1	1	1	1	1	1	1	1	100
5496	1	1	1	1	1	1	1	1	1	1	100
5497	1	1	1	1	1	1	1	1	1	1	100
5498	1	1	1	1	1	1	1	1	1	1	100
5499	1	1	1	1	1	1	1	1	1	1	100
5500	1	1	1	1	1	1	1	1	1	1	100
5501	1	1	1	1	1	1	1	1	1	1	100
5502	1	1	1	1	1	1	1	1	1	1	100
5503	1	1	1	1	1	1	1	1	1	1	100
5504	1	1	1	1	1	1	1	1	1	1	100
5505	1	1	1	1	1	1	1	1	1	1	100
5506	1	1	1	1	1	1	1	1	1	1	100
5507	1	1	1	1	1	1	1	1	1	1	100
5508	1	1	1	1	1	1	1	1	1	1	100
5509	1	1	1	1	1	1	1	1	1	1	100
5510	1	1	1	1	1	1	1	1	1	1	100
5511	1	1	1	1	1	1	1	1	1	1	100
5512	1	1	1	1	1	1	1	1	1	1	100
5513	1	1	1	1	1	1	1	1	1	1	100
5514	1	1	1	1	1	1	1	1	1	1	100
5515	1	1	1	1	1	1	1	1	1	1	100
5516	1	1	1	1	1	1	1	1	1	1	100
5517	1	1	1	1	1	1	1	1	1	1	100
5518	1	1	1	1	1	1	1	1	1	1	100
5519	1	1	1	1	1	1	1	1	1	1	100
5520	1	1	1	1	1	1	1	1	1	1	100
5521	1	1	1	1	1	1	1	1	1	1	100
5522	1	1	1	1	1	1	1	1	1	1	100
5523	1	1	1	1	1	1	1	1	1	1	100
5524	1	1	1	1	1	1	1	1	1	1	100
5525	1	1	1	1	1	1	1	1	1	1	100
5526	1	1	1	1	1	1	1	1	1	1	100
5527	1	1	1	1	1	1	1	1	1	1	100
5528	1	1	1	1	1	1	1	1	1	1	100
5529	1	1	1	1	1	1	1	1	1	1	100
5530	1	1	1	1	1	1	1	1	1	1	100
5531	1	1	1	1	1	1	1	1	1	1	100
5532	1	1	1	1	1	1	1	1	1	1	100
5533	1	1	1	1	1	1	1	1	1	1	100
5534	1	1	1	1	1	1	1	1	1	1	100
5535	1	1	1	1	1	1	1	1	1	1	100
5536	1	1	1	1	1	1	1	1	1	1	100
5537	1	1	1	1	1	1	1	1	1	1	100
5538	1	1	1	1	1	1	1	1	1	1	100
5539	1	1	1	1	1	1	1	1	1	1	100
5540	1	1	1	1	1	1	1	1	1	1	100
5541	1	1	1	1	1	1	1	1	1	1	100
5542	1	1	1	1	1	1	1	1	1	1	100
5543	1	1	1	1	1	1	1	1	1	1	100
5544	1	1	1	1	1	1	1	1	1	1	100
5545	1	1	1	1	1	1	1	1	1	1	100
5546	1	1	1	1	1	1	1	1	1	1	100
5547	1	1	1	1	1	1	1	1	1	1	100
5548	1	1	1	1	1	1	1	1	1	1	100
5549	1	1	1	1	1	1	1	1	1	1	100
5550	1	1	1	1	1	1	1	1	1	1	100

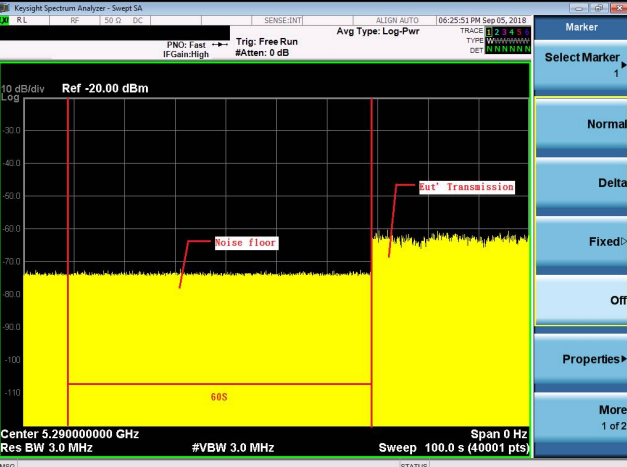
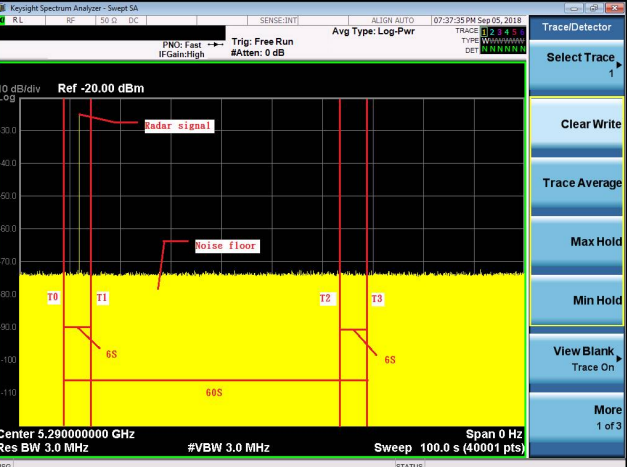
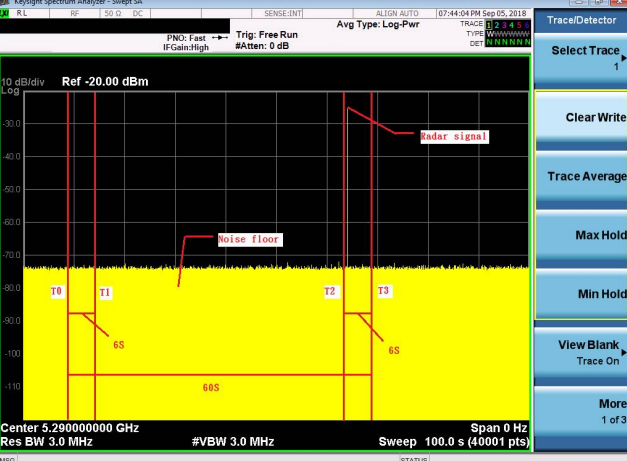
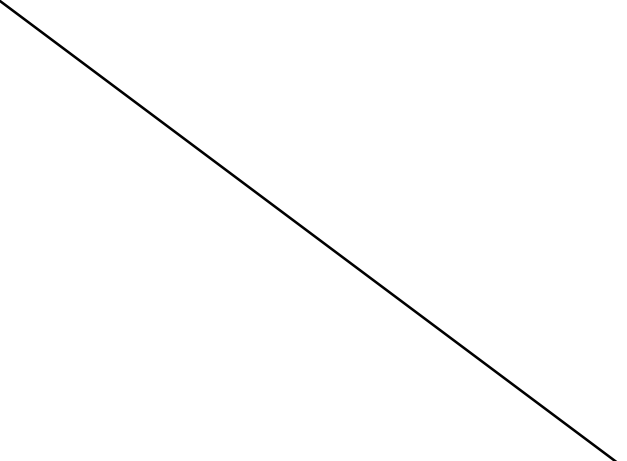
Test Mode	IEEE 802.11ac (VHT80)										
5551	1	1	1	1	1	1	1	1	1	1	100
5552	1	1	1	1	1	1	1	1	1	1	100
5553	1	1	1	1	1	1	1	1	1	1	100
5554	1	1	1	1	1	1	1	1	1	1	100
5555	1	1	1	1	1	1	1	1	1	1	100
5556	1	1	1	1	1	1	1	1	1	1	100
5557	1	1	1	1	1	1	1	1	1	1	100
5558	1	1	1	1	1	1	1	1	1	1	100
5559	1	1	1	1	1	1	1	1	1	1	100
5560	1	1	1	1	1	1	1	1	1	1	100
5561	1	1	1	1	1	1	1	1	1	1	100
5562	1	1	1	1	1	1	1	1	1	1	100
5563	1	1	1	1	1	1	1	1	1	1	100
5564	1	1	1	1	1	1	1	1	1	1	100
5565	1	1	1	1	1	1	1	1	1	1	100
5566	1	1	1	1	1	1	1	1	1	1	100
5567	1	1	1	1	1	1	1	1	1	1	100
5568	1	1	1	1	1	1	1	1	1	1	100
5569	1	1	1	1	1	1	1	1	1	1	100
5570(FH)	1	1	1	1	1	1	1	1	1	1	100
5571	0	0	0	0	0	0	0	0	0	0	0

7.7 CHANNEL AVAILABILITY CHECK TIME

For UII-2A

Bandwidth	20 MHz
Initial Channel Availability Check Time	Radar Burst at the Beginning of the Channel Availability Check Time
The Channel Availability Check time is equal to 60 seconds.	T0: The end of power-up sequence. T1: T0 + 6 seconds. As visual indicated, a single Radar Burst was commenced within the 6 second window (T0 to T1) and successful detected. During the measurement window no UUT transmissions occurred.
Radar Burst at the End of the Channel Availability Check Time	
T0: The end of power-up sequence. T2: T0 + 54 seconds. T3: T2 + 6 seconds. As visual indicated, a single Radar Burst was commenced within the 6 second window (T2 to T3) and successful detected. During the measurement window no UUT transmissions occurred.	

Bandwidth	40 MHz
Initial Channel Availability Check Time	Radar Burst at the Beginning of the Channel Availability Check Time
 Center 5.270000000 GHz Res BW 3.0 MHz #VBW 3.0 MHz Sweep 100.0 s (40001 pts)	 Center 5.270000000 GHz Res BW 3.0 MHz #VBW 3.0 MHz Sweep 100.0 s (40001 pts)
The Channel Availability Check time is equal to 60 seconds.	T0: The end of power-up sequence. T1: T0 + 6 seconds. As visual indicated, a single Radar Burst was commenced within the 6 second window (T0 to T1) and successful detected. During the measurement window no UUT transmissions occurred.
Radar Burst at the End of the Channel Availability Check Time	
 Center 5.270000000 GHz Res BW 3.0 MHz #VBW 3.0 MHz Sweep 100.0 s (40001 pts)	
T0: The end of power-up sequence. T2: T0 + 54 seconds. T3: T2 + 6 seconds. As visual indicated, a single Radar Burst was commenced within the 6 second window (T2 to T3) and successful detected. During the measurement window no UUT transmissions occurred.	

Bandwidth	80 MHz
Initial Channel Availability Check Time 	Radar Burst at the Beginning of the Channel Availability Check Time 
The Channel Availability Check time is equal to 60 seconds.	T0: The end of power-up sequence. T1: T0 + 6 seconds. As visual indicated, a single Radar Burst was commenced within the 6 second window (T0 to T1) and successful detected. During the measurement window no UUT transmissions occurred.
Radar Burst at the End of the Channel Availability Check Time 	
T0: The end of power-up sequence. T2: T0 + 54 seconds. T3: T2 + 6 seconds. As visual indicated, a single Radar Burst was commenced within the 6 second window (T2 to T3) and successful detected. During the measurement window no UUT transmissions occurred.	