TEST REPORT

Report Number: 104626259MPK-008
Project Number: G104626259
Original Issue Date: August 27, 2021
Revision Date: August 19, 2022

Testing performed on the
Product Family: UbiHub (APAI, AP6)
Name of Equipment under test (EUT): UbiHub APAI
Model # UBH-H-AI

FCC ID: 2AECKUBH01

to

FCC Part 15, Subpart E
(DFS Report)

For

Ubicquia, Inc.

Test Performed by:	**Test Authorized by:**
Intertek	Ubicquia, Inc.
1365 Adams Court	401 East Las Olas Blvd
Menlo Park, CA 94025 USA	Suite 1750
	Fort Lauderdale, FL 33301 USA

Prepared by: _____ **Date:** August 19, 2022
Anderson Soungpanya

Reviewed by: _____ **Date:** August 19, 2022
Minh Ly

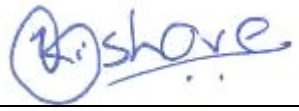
VERIFICATION OF COMPLIANCE
Report No. 104626259MPK-008

Verification is hereby issued to the named APPLICANT and is VALID ONLY for the equipment identified hereon for use under the rules and regulations listed below.

Equipment Under Test:	UbiHub APAI
Trade Name:	Ubicquia, Inc.
Model No.:	UBH-H-AI
Applicant:	Ubicquia, Inc.
Contact:	Shimon Goldstein
Address:	Ubicquia, Inc. 401 East Las Olas Blvd Suite 1750 Fort Lauderdale, FL 33301
Country	USA
Tel. Number:	(321) 430-5866
Email:	sgoldstein@ubicquia.com
Applicable Regulation:	FCC Part 15, Subpart E
Date of Test:	July 21 – 30, 2021

We attest to the accuracy of this report revision 1.0:

Anderson Soungpanya
EMC Senior Project Engineer



Krishna K Vemuri
EMC Manager

We attest to the accuracy of this report revision 1.1:

Anderson Soungpanya
EMC Senior Project Engineer

Minh Ly
EMC Team Leader

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1.0 Introduction

1.1 Summary of Tests

Dynamic Frequency Selection (DFS)		
Test	**Reference FCC**	**Result**
U-NII Detection Bandwidth	15.407(h)	Complies
Initial Channel Availability Check Time	15.407(h)	Complies
Channel Availability Check Time in Beginning	15.407(h)	Complies
Channel Availability Check Time at End	15.407(h)	Complies
In Service Monitoring – Channel Closing Transmission Time	15.407(h)	Complies
In Service Monitoring – Channel Closing Move Time	15.407(h)	Complies
In Service Monitoring – Non-Occupancy Period	15.407(h)	Complies
In Service Monitoring – Statistical Performance Check	15.407(h)	Complies

EUT receive date: July 19, 2021

EUT receive condition: The pre-production version of the EUT was received in good condition with no apparent damage. As declared by the Applicant, it is identical to the production units.

Test start date: July 21, 2021

Test completion date: July 30, 2021

The test results in this report pertain only to the item tested.

2.0 General Description

2.1 Product Description

Ubicquia, Inc. supplied the following description of the EUT:

UbiHub APAI/AP6, the streetlight audio video AI with edge processing applications, enables the next generation of IoT Smart City services with high-speed wireless internet access and lighting control capabilities worldwide.
The WiFi Access Point includes:

i. 2.4GHz 4x4 MIMO transceiver
ii. 5GHz 8x8 MIMO transceiver
iii. 12 integrated omni-directional antennas
iv. Mesh up to 4 units per ISP connection
v. Dynamic load balancing of mesh network

For more information, see user's manual provided by the manufacturer.

The information about the 5GHz radio, installed in the model UBH-H-AI, is presented below.

Applicant	Ubicquia, Inc.			
Model No.	UBH-H-AI			
FCC ID	2AECKUBH01			
Rated RF Output	802.11a: 16.14dBm (U-NII 2A); 15.98dBm (U-NII 2C) 802.11n 20MHz: 16.17dBm (U-NII 2A); 16.24dBm (U-NII 2C) 802.11n 40MHz: 16.27dBm (U-NII 2A); 16.29dBm (U-NII 2C) 802.11ac 80MHz: 12.67dBm (U-NII 2A); 15.02dBm (U-NII 2C)			
Master or Client Device	Master			
Frequency Range	U-NII 2A: 5250 – 5350 MHz U-NII 2C: 5470 – 5725 MHz			
Operating Mode	Master with DFS detection capabilities			
Type of modulation	802.11b - CCK 802.11a/g - OFDM 802.11n/ac - OFDM MCS0 – MCS9 (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM) 802.11ax – OFDM MCS0 – MCS11 (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM)			
Antenna(s) & Gain	5GHz Band uses internal Antennas, 8x8 MIMO (See Appendix B for Antenna Specifications)			
	Antenna 1	4.2 dBi	Antenna 5	4.2 dBi
	Antenna 2	5.7 dBi	Antenna 6	5.7 dBi
	Antenna 3	4.4 dBi	Antenna 7	4.4 dBi
	Antenna 4	3.9 dBi	Antenna 8	3.9 dBi
Manufacturer Name & Address	Ubicquia, Inc. 401 East Las Olas Blvd Suite 1750 Fort Lauderdale, FL 33301 USA			

2.2 Related Submittal(s) Grants

None.

2.3 Test Methodology

Antenna conducted measurements were performed according to the FCC documents “Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E” (789033 D02 General U-NII Test Procedures New Rules v01r04 & 905462 D02 UNII DFS Compliance Procedures New Rules v02).

Both AC mains line-conducted and radiated emissions measurements were performed according to the procedures in ANSI C63.4. Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the **"Data Sheet"** of this Application.

All other measurements were made in accordance with the procedures in part 2 of CFR 47.

2.4 Test Facility

The test site used to collect the radiated data is site 1 (10-m semi-anechoic chamber). This test facility and site measurement data have been fully placed on file with the FCC, IC and A2LA accredited.

2.5 Measurement Uncertainty

Compliance with the limits was based on the results of the measurements and doesn’t take into account the measurement uncertainty.

Estimated Measurement Uncertainty

Measurement	Expanded Uncertainty (k=2)
	1 GHz – 6 GHz
Dynamic Frequency Selection (Radiated Measurement)	1.5 dB

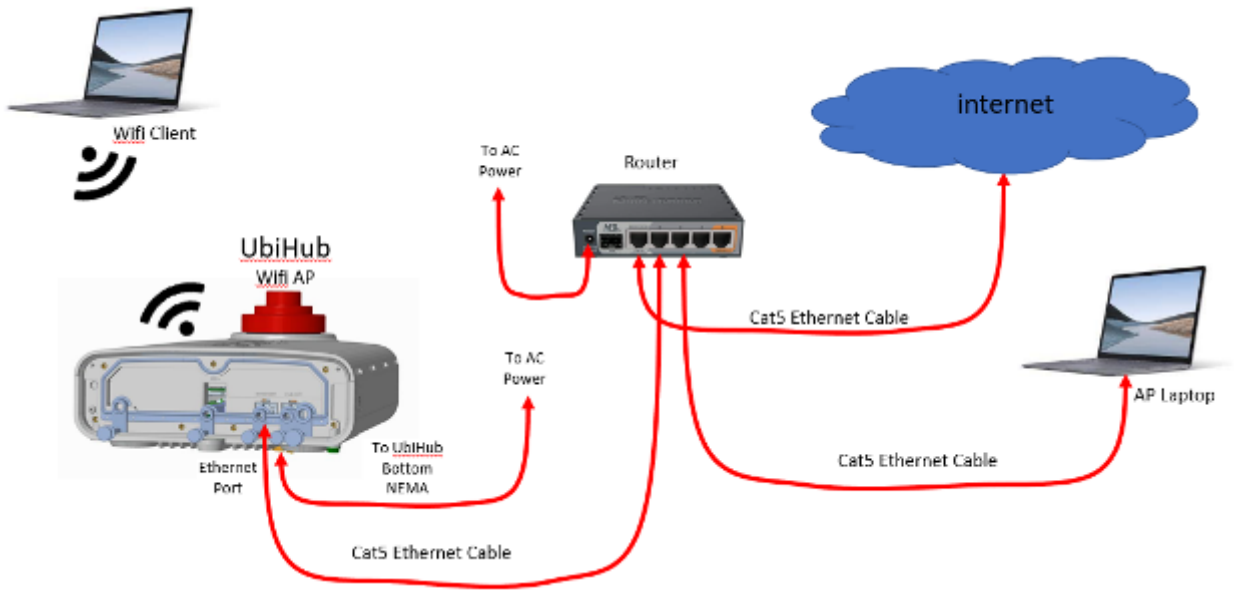
3.0 System Test Configuration

3.1 Equipment Under Test

Equipment Under Test			
Description	**Manufacturer**	**Model Number**	**Serial Number**
Access Point	Ubicquia, Inc.	UBH-H-AI	2105UBH000240

3.2 Support Equipment and description

Description	Manufacturer	Model No./ Part No.
Laptop	HP	15-dy2021nr
Laptop	HP	15-dy2021nr
Ethernet Router	Mikrotik	RB7601GS



3.3 Justification

The following modes were selected for final measurements:
OFDM, 6MB/s – for 802.11a
OFDM, MCS0 – for 802.11n 20MHz
OFDM, MCS8 – for 802.11ac 40MHz
OFDM, MCS10 – for 802.11ax 80MHz

The UbiHub Family of products supports 2 different Model Names: UbiHub APAI and UbiHub AP6

AP6: The AP6 Model (UBH-H-WI) supports full WiFi6 (802.11ax) 5Ghz 8x8 configuration, as well as 2.4Ghz 4x4 configuration, and LTE backhaul (via LTE Module: EG25-G or EP06-A).

APAI: The APAI Model (UBH-H-AI) supports identical AP6 functionality (hardware and software), but in addition supports audio/video street traffic analytics via an AI plug-in daughterboard.

Ubicquia has provided the superset APAI model (worst-case) for DFS testing since the AP6 model is identical but simply removes the AI board plug-in functionality.

3.4 Mode of Operation During Test

The EUT (UbiHub APAI/AP6) operating in AP functionality with a Client PC with 802.11ax capability connecting to the AP via wifi. The AP has access to the ethernet via the backhaul Ethernet port available on the AP.

The Client run video player (VLC) streams YouTube video to verify continuous data stream from the ethernet to the AP and over wifi link to the client. The EUT (UbiHub APAI/AP6) is introduced with Radar pulses (per DFS certification requirement) and checked to make sure the EUT detected the Radar and switch channel.

The above test is repeated for number of modes, frequencies, bandwidth and modulations.

3.5 Modifications required for Compliance

No other modifications were made during compliance testing in order to bring the product into compliance

3.6 Additions, deviations and exclusions from standards

No additions, deviations or exclusion have been made from standard.

4.0 Dynamic Frequency Selection (DFS)

4.1 Requirement

Applicability of DFS Requirements Prior to Use of a Channel

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

Applicability of DFS requirements during normal operation

Requirement	Operational Mode	
	Master Device or Client with Radar Detection	Client With Radar Detection
DFS Detection Threshold	Yes	Not Required
Channel Closing Transmission Time	Yes	Yes
Channel Move Time	Yes	Yes
U-NII Detection Bandwidth	Yes	Not Required

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check 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.		

4.1.1 DFS Detection Thresholds for Master or Client Devices with DFS Detection

Maximum Transmit Power	Values (See Notes 1, 2, and 3)
EIRP ≥ 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	

Parameter	Value
Non-Occupancy Period	Minimum 30 minutes
Channel Availability Check Time	60 Seconds
Channel Move Time	10 seconds (see note 1)
Channel Closing Transmission Time	200 ms + an aggregate of 60 ms over remaining 10 Second period. (see note 1 and 2)
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. (see note 3)
Note 1: *Channel Move Time* and the *Channel Closing Transmission Time* should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst. **Note 2:** The *Channel Closing Transmission Time* is comprised of 200 milliseconds starting at the beginning of the *Channel Move Time* plus any additional intermittent control signals required to facilitate a *Channel* 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 *U-NII Detection Bandwidth* 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.	

4.1.2 Test Waveform

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	$\text{Roundup}\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot 10^6}{\text{PRI}_{\mu\text{sec}}}\right)\right\}$	60.00%	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.

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	1355.0	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	1139.0	878
20	1113.6	898
21	1089.3	918
22	1066.1	938
23	326.2	3066

The aggregate is the average of the percentage of successful detections of Short Pulse Radar Types 1-4. For example, the following table indicates how to compute the aggregate of percentage of successful detections.

Radar Type	Number of Trials	Number of Successful Detections	Minimum Percentage of Successful Detection
1	35	29	82.9%
2	30	18	60.0%
3	30	27	90.0%
4	50	44	88.0%
Aggregate (82.9% + 60% + 90% + 88%)/4 = 80.2%			

Long Pulse Radar Test Waveform

Radar Type	Pulse Width (µsec)	Chrip Width (MHz)	PRI (µsec)	Number of Pulses per Burst	Number of Burst	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 test signal. If more than 30 waveforms are used for the Long Pulse radar test signal, then each additional waveform must also be unique and not repeated from the previous waveforms.

1. The transmission period for the Long Pulse Radar test signal is 12 seconds.

2. There are a total of 8 to 20 *Bursts* in the 12 second period, with the number of *Bursts* being randomly chosen. This number is *Burst Count*.

3. Each *Burst* consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each *Burst* within the 12 second sequence may have a different number of pulses.

4. The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a *Burst* will have the same pulse width. Pulses in different *Bursts* may have different pulse widths.
5. Each pulse has a linear frequency modulated chirp between 5 and 20 MHz, with the chirp width being randomly chosen. Each pulse within a *transmission period* will have the same chirp width. The chirp is centered on the pulse. For example, with a radar frequency of 5300 MHz and a 20 MHz chirped signal, the chirp starts at 5290 MHz and ends at 5310 MHz.

6. If more than one pulse is present in a *Burst*, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a *Burst*, the random time interval between the first and second pulses is chosen independently of the random time interval between the second and third pulses.

7. The 12 second transmission period is divided into even intervals. The number of intervals is equal to *Burst Count*. Each interval is of length (12,000,000 / *Burst Count*) microseconds. Each interval contains one *Burst*. The start time for the *Burst*, relative to the beginning of the interval, is between 1 and [(12,000,000 / *Burst Count*) – (Total *Burst* Length) + (One Random PRI Interval)] microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each *Burst* is chosen randomly.

A representative example of a Long Pulse Radar Type waveform:

1) The total test waveform length is 12 seconds.

2) Eight (8) *Bursts* are randomly generated for the *Burst Count*.

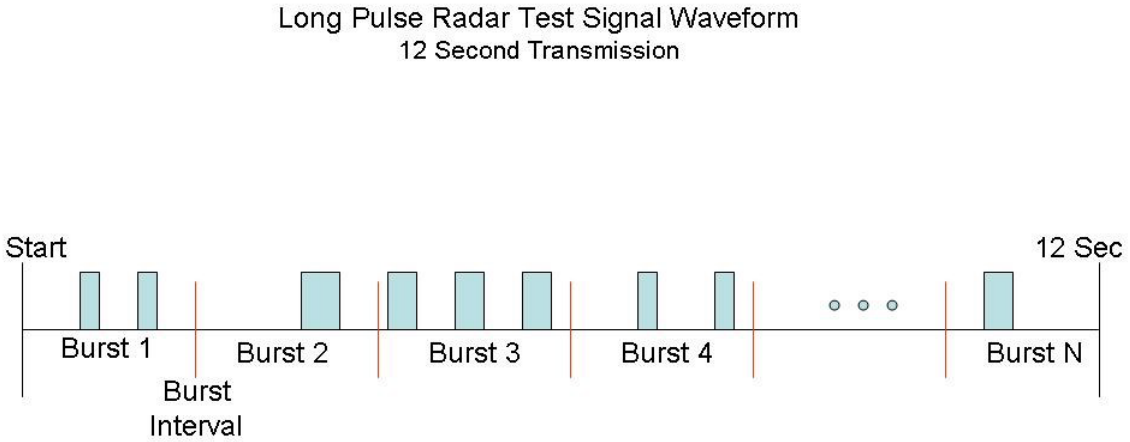
3) *Burst* 1 has 2 randomly generated pulses.

4) The pulse width (for both pulses) is randomly selected to be 75 microseconds.

5) The PRI is randomly selected to be at 1213 microseconds.

6) *Bursts* 2 through 8 are generated using steps 3 – 5.

7) Each *Burst* is contained in even intervals of 1,500,000 microseconds. The starting location for Pulse 1, *Burst* 1 is randomly generated (1 to 1,500,000 minus the total *Burst* 1 length + 1 random PRI interval) at the 325,001 microsecond step. *Bursts* 2 through 8 randomly fall in successive 1,500,000 microsecond intervals (i.e. *Burst* 2 falls in the 1,500,001 – 3,000,000 microsecond range).



Graphical Representation of a Long Pulse Radar Type Waveform

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

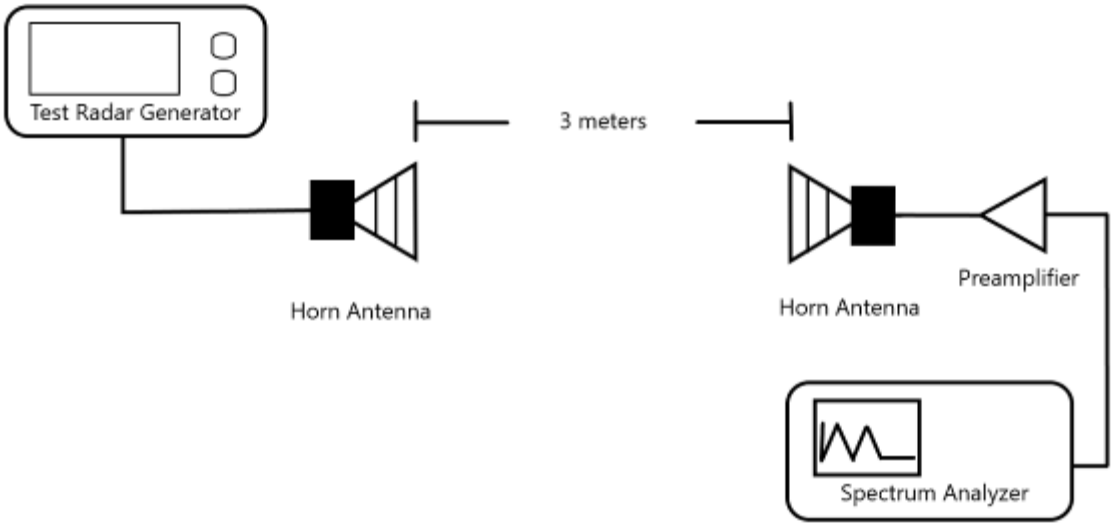
For the Frequency Hopping Radar Type, the same *Burst* parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected from the hopping sequence defined by the following algorithm:

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.

4.2 DFS Waveform Calibration

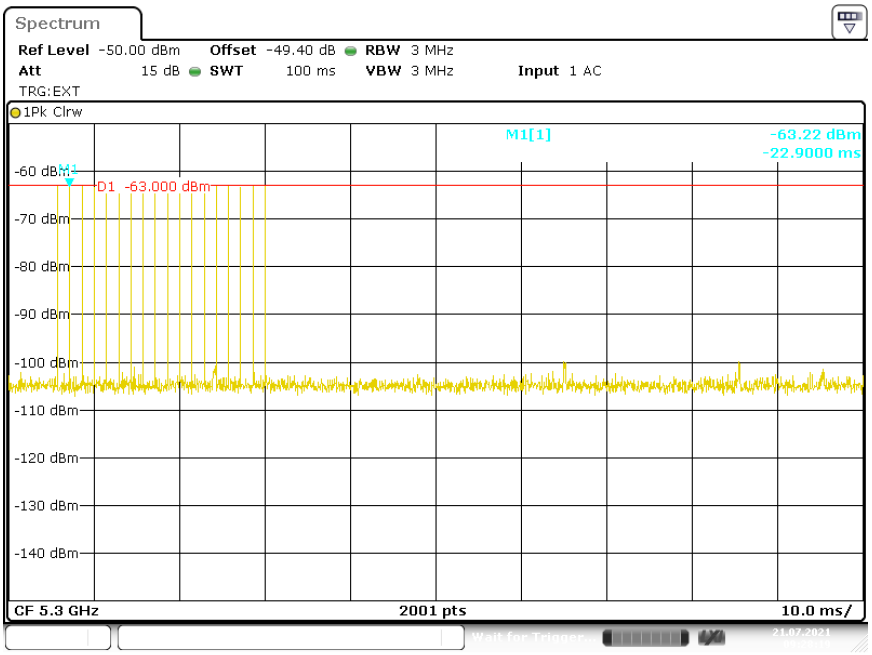
4.2.1 Calibration Procedure

The radar calibration was setup as pictured below. Each FCC radar (types 0-6) were generated from the a signal generator and measured using a spectrum analyzer. The spectrum analyzer's resolution bandwidth was set to 3 MHz and the video bandwidth was set to 3 MHz with peak detection. The span was set to zero span and the timing was adjusted to capture the wave form. The DFS signal was calibrated to a field strength of -63 dBm (-64 dBm +1, represented by red line in plots). Plots for the radar calibration is presented in section 4.3.2. The Antennas were setup in vertical polarization.



4.2.2 Calibration Results

Radar Type 0 Calibration at 5300



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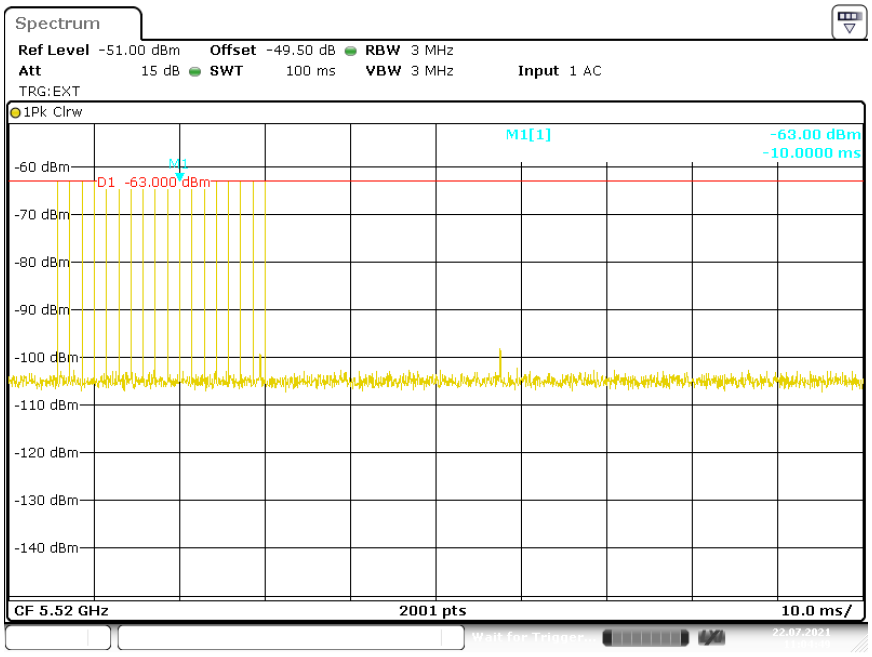
Radar Type 0 Calibration at 5520



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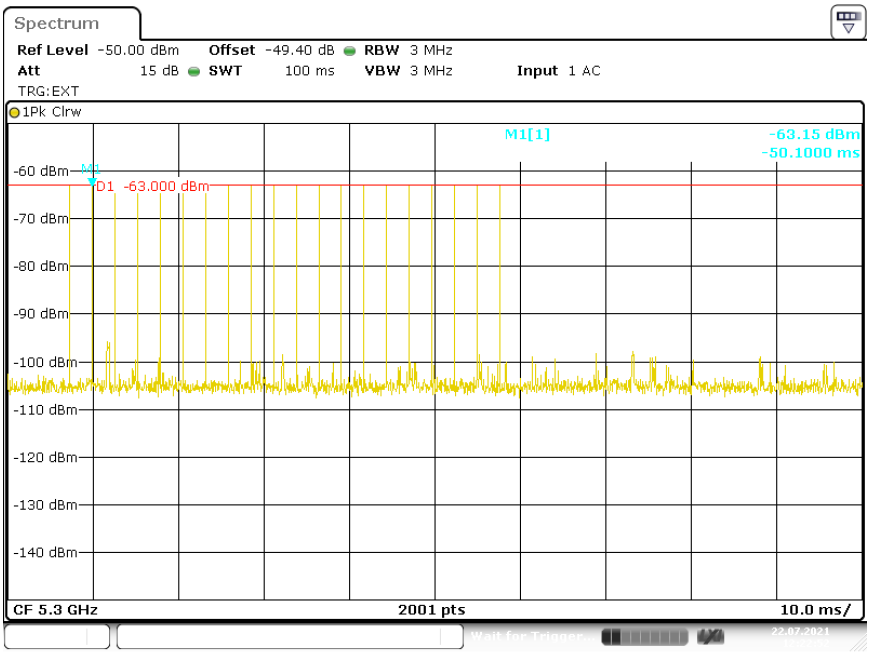
Radar Type 1A Calibration at 5300



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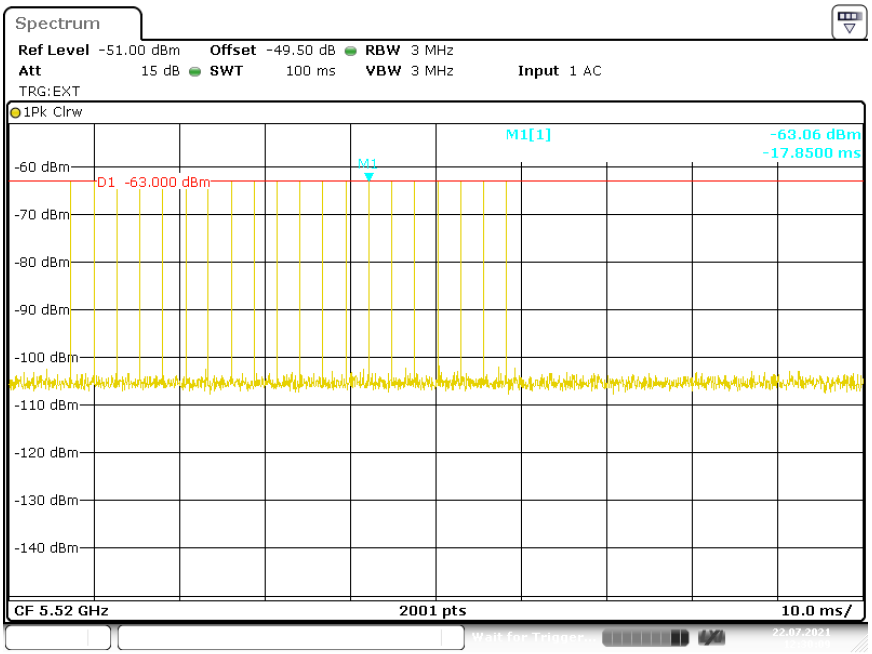
Radar Type 1A Calibration at 5520



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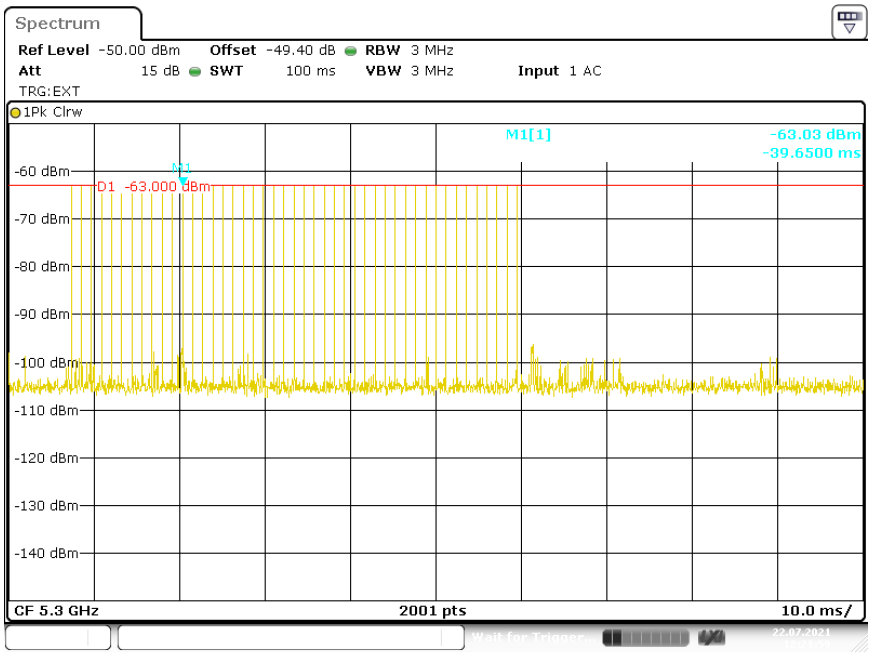
Radar Type 1B Calibration at 5300



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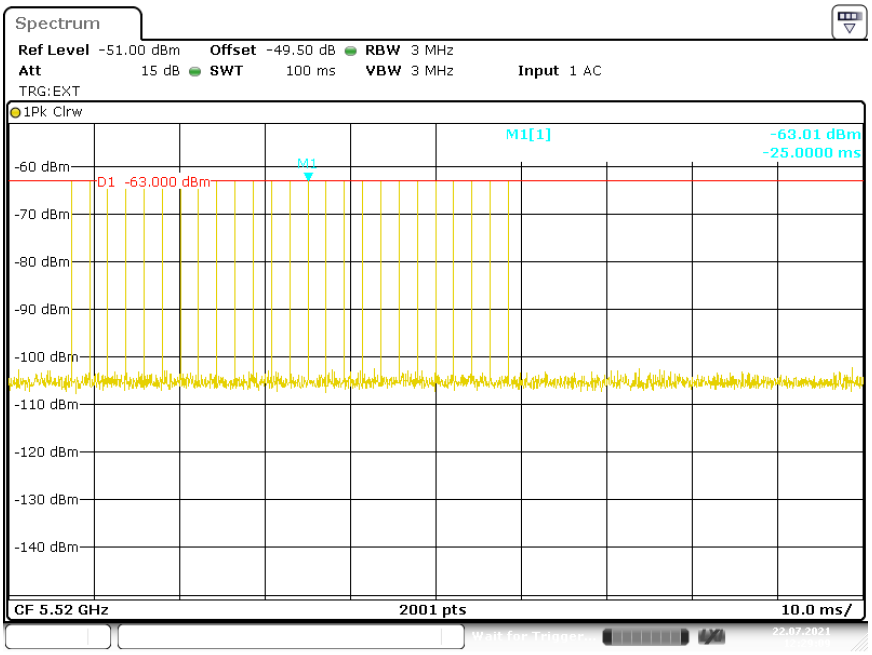
Radar Type 1B Calibration at 5520



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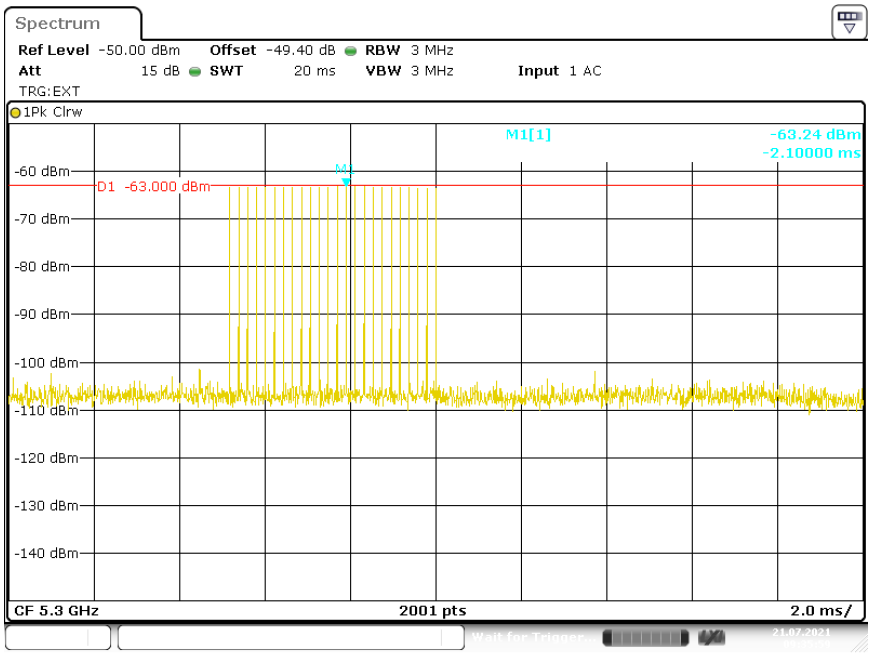
Radar Type 2 Calibration at 5300



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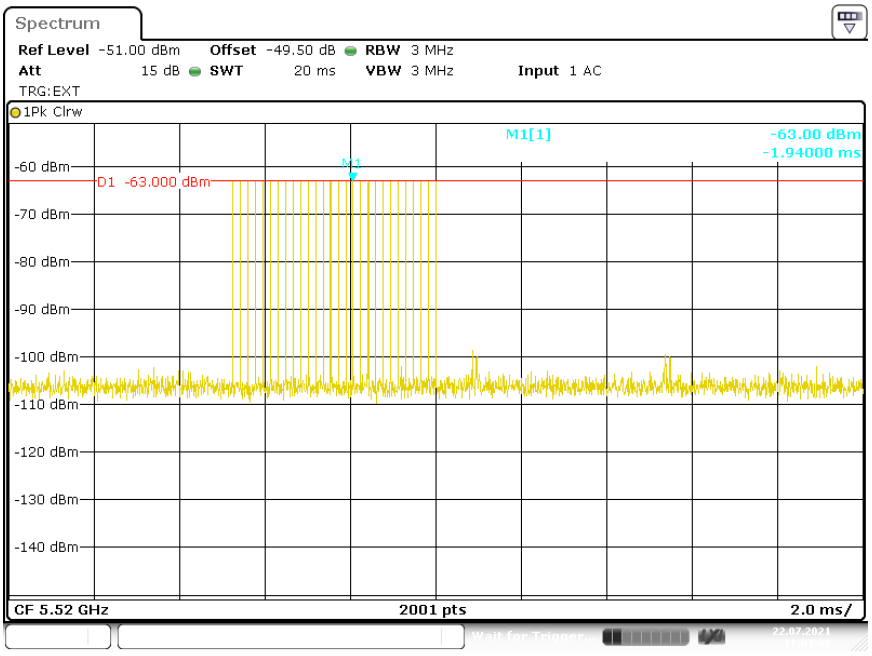
Radar Type 2 Calibration at 5520



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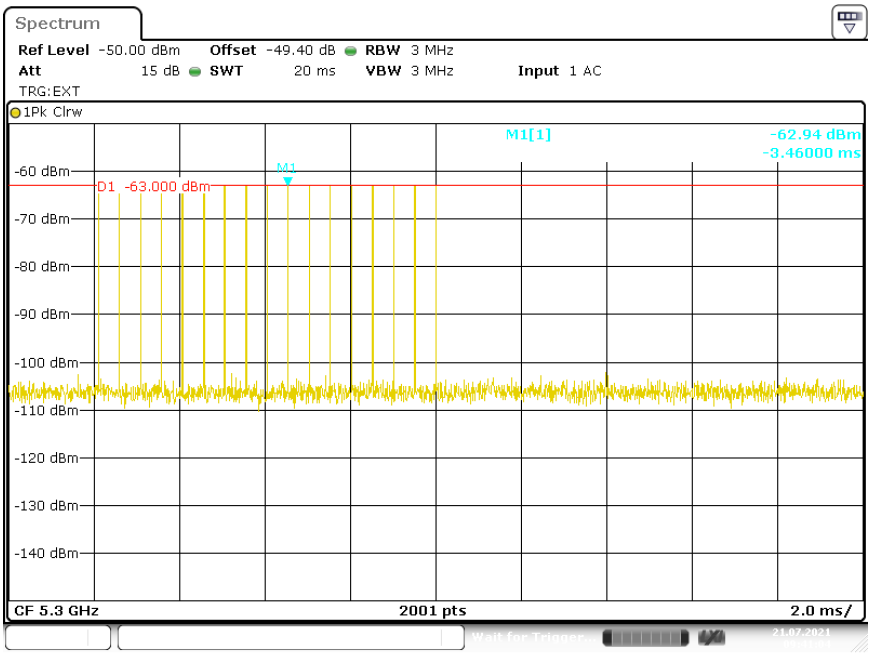

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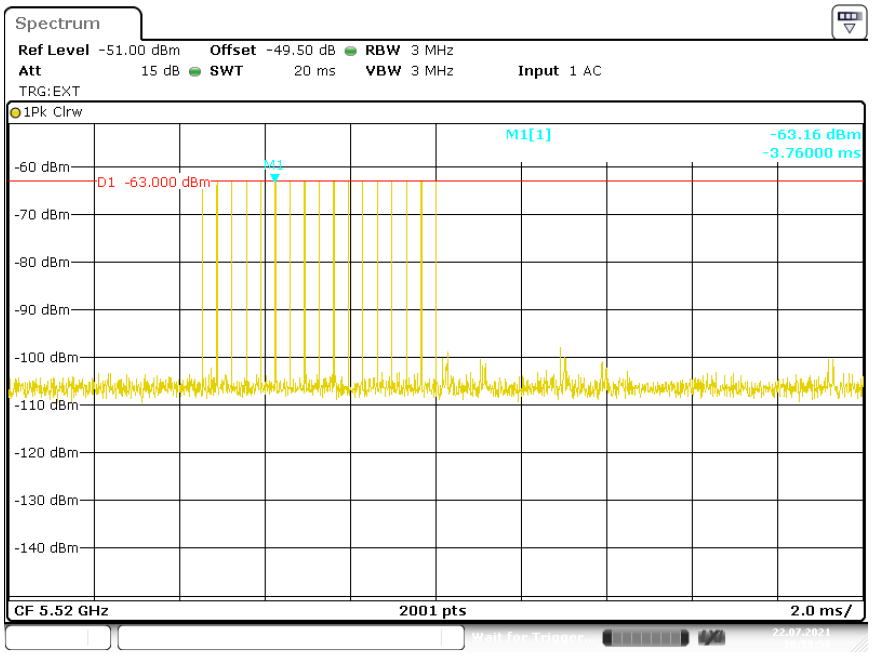
Radar Type 3 Calibration at 5520



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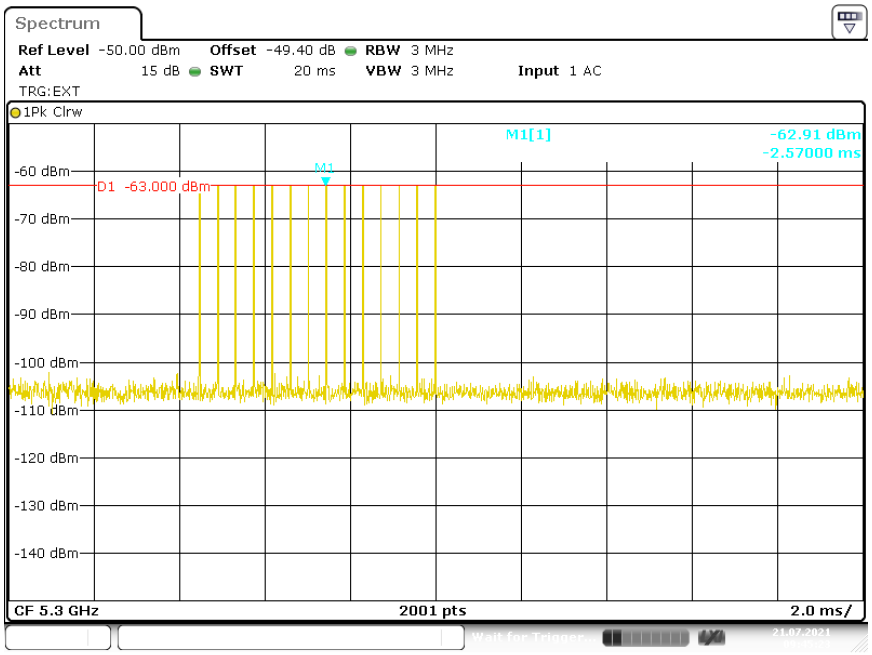
Radar Type 4 Calibration at 5300



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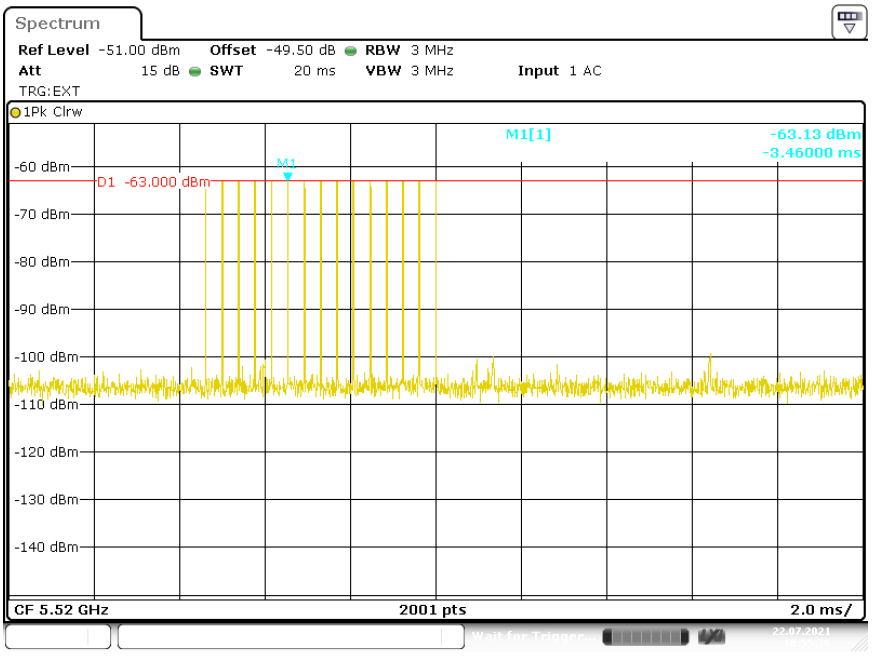
Radar Type 4 Calibration at 5520



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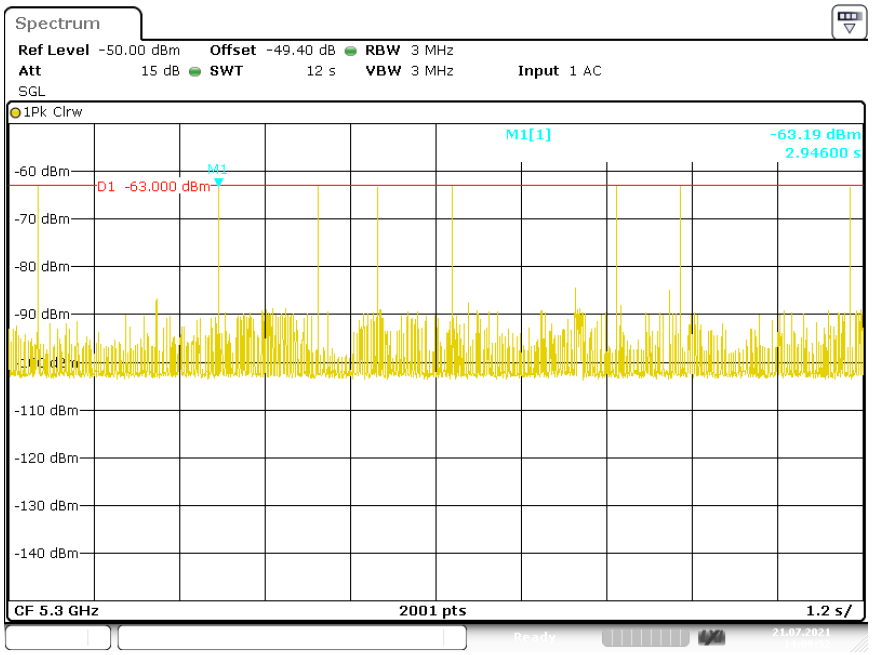
Radar Type 5 Calibration at 5300



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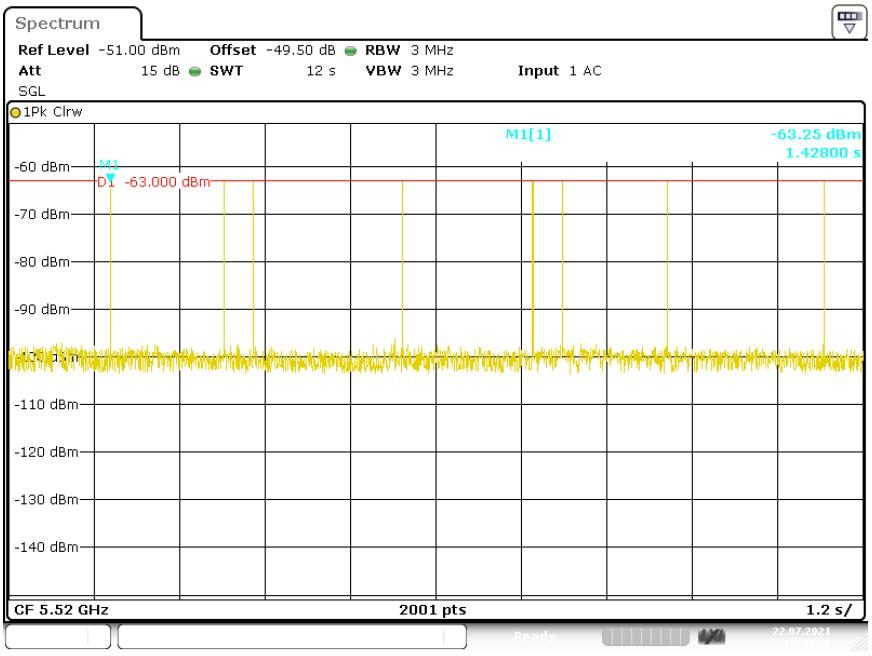
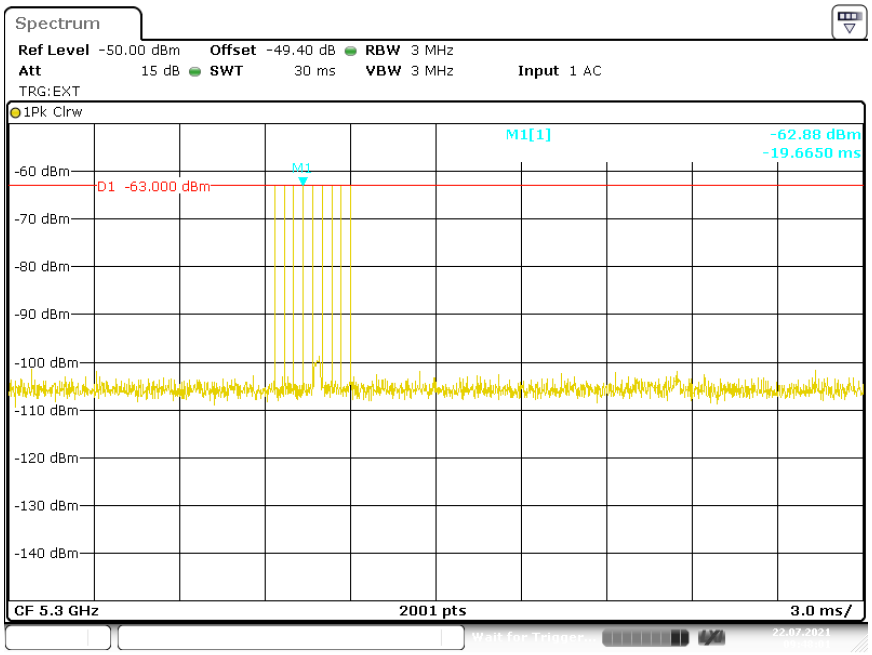
Radar Type 5 Calibration at 5520



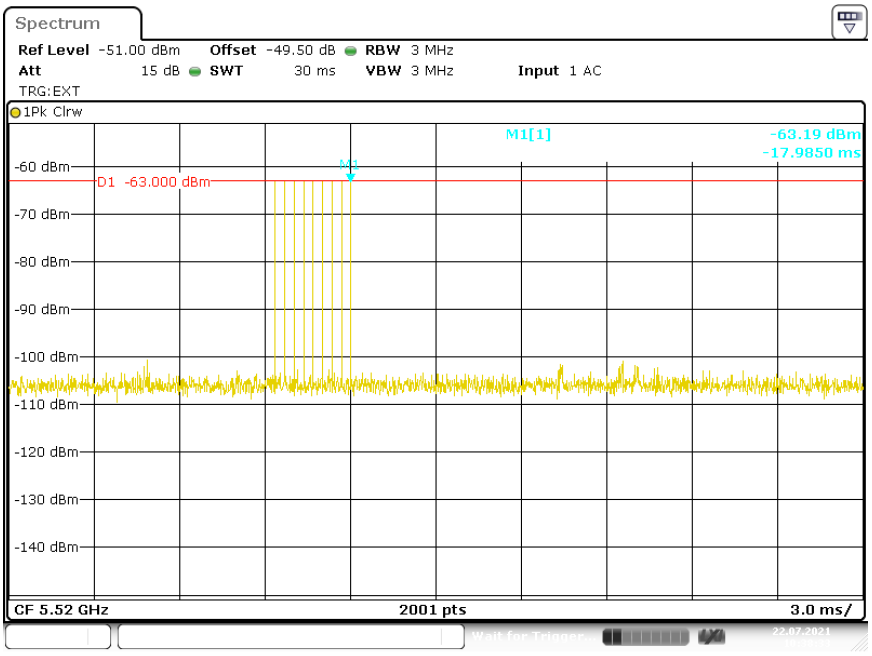
Date: 22.JUL.2021 10:43:28

Radar Type 6 Calibration at 5300



Date: 22.JUL.2021 09:48:01

Radar Type 6 Calibration at 5520

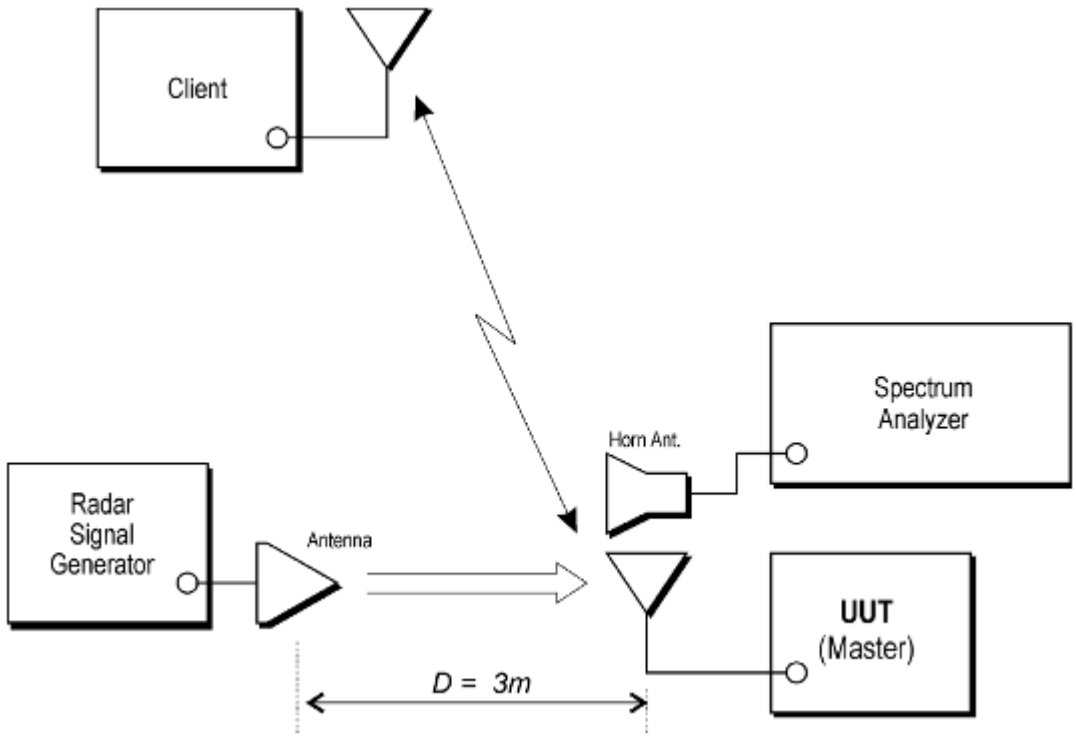


Date: 22.JUL.2021 10:38:33

4.3 DFS Test Procedures

Test procedures were made in accordance to 905462 D02 UNII DFS Compliance Procedures New Rules v02.

A Radiated test method was used, and the test setup was made as depicted in the diagram below. DFS testing was setup as a master with injection into the master.



4.4 U-NII Detection Bandwidth

4.4.1 Test Procedure

The equipment is setup for conducted test. The generating equipment is setup to produce a single burst of the Short Pulse Radar Type 0 at the center frequency of the UUT Operating Channel. The test level is set to the DFS Detection Threshold. The EUT is setup as a standalone device (no associated Client) and with no traffic.

A single radar Burst is sent to the EUT and the response of the EUT is noted. This is repeated for a minimum of 10 trials.

Radar test frequency selected is started at the center frequency of the EUT operating Channel. The center channel of the radar frequency is increased and decreased in 5 MHz steps until the detection rate falls below the U-NII Detection Bandwidth criterion. When rate falls below the U-NII Detection Bandwidth criterion the radar frequency is increased and decreased in 1MHz steps. The highest (f_H) and lowest (f_L) frequency at which detection is greater than or equal to the U-NII Detection Bandwidth criterion is recorded.

The U-NII Detection Bandwidth is calculated as follows: U-NII Detection Bandwidth = $f_H - f_L$

The U-NII Detection Bandwidth must meet the U-NII Detection Bandwidth criterion which is 100% of the EUT 99% Bandwidth. Otherwise, the UUT does not comply with DFS requirements.

4.4.2 Test Results

EUT Frequency- 5300MHz 20MHz BW (802.11a)											
DFS Detection Trials (1=Detection, 0= No Detection)											
Radar Frequency (MHz)	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5315	0	0	0	0	0	0	0	0	0	0	0
5311	0	0	0	0	0	0	0	0	0	0	0
5310_{fH}	1	1	1	1	1	1	1	1	1	1	100
5305	1	1	1	1	1	1	1	1	1	1	100
5300	1	1	1	1	1	1	1	1	1	1	100
5295	1	1	1	1	1	1	1	1	1	1	100
5290_{fL}	1	1	1	1	1	1	1	1	1	1	100
5289	0	0	0	0	0	0	0	0	0	0	0
5285	0	0	0	0	0	0	0	0	0	0	0
Overall Detection Percentage											100.00
Detection Bandwidth = f_H - f_L = 5310MHz-5290MHz = 20MHz											
EUT 99% Bandwidth = 16.82 MHz											

EUT Frequency- 5520MHz 20MHz BW (802.11a)											
DFS Detection Trials (1=Detection, 0= No Detection)											
Radar Frequency (MHz)	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5535	0	0	0	0	0	0	0	0	0	0	0
5531	0	0	0	0	0	0	0	0	0	0	0
5530_{fH}	1	1	1	1	1	1	1	1	1	1	100
5525	1	1	1	1	1	1	1	1	1	1	100
5520	1	1	1	1	1	1	1	1	1	1	100
5515	1	1	1	1	1	1	1	1	1	1	100
5510_{fL}	1	1	1	1	1	1	1	1	1	1	100
5509	0	0	0	0	0	0	0	0	0	0	0
5505	0	0	0	0	0	0	0	0	0	0	0
Overall Detection Percentage											100.00
Detection Bandwidth = f_h - f_l = 5530MHz-5510MHz = 20MHz											
EUT 99% Bandwidth = 16.82 MHz											

4.4.2 U-NII Detection Bandwidth (Continued)

EUT Frequency- 5300MHz 20MHz BW (802.11an)											
DFS Detection Trials (1=Detection, 0= No Detection)											
Radar Frequency (MHz)	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5311	0	0	0	0	0	0	0	0	0	0	0
5310_{fH}	1	1	1	1	1	1	1	1	1	1	100
5305	1	1	1	1	1	1	1	1	1	1	100
5300	1	1	1	1	1	1	1	1	1	1	100
5295	1	1	1	1	1	1	1	1	1	1	100
5290_{fl}	1	1	1	1	1	1	1	1	1	1	100
5289	0	0	0	0	0	0	0	0	0	0	0
Overall Detection Percentage											100.00
Detection Bandwidth = f_H - f_L = 5310MHz-5290MHz = 20MHz											
EUT 99% Bandwidth = 17.71 MHz											

EUT Frequency- 5520MHz 20MHz BW (802.11an)											
DFS Detection Trials (1=Detection, 0= No Detection)											
Radar Frequency (MHz)	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5531	0	0	0	0	0	0	0	0	0	0	0
5530_{fh}	1	1	1	1	1	1	1	1	1	1	100
5525	1	1	1	1	1	1	1	1	1	1	100
5520	1	1	1	1	1	1	1	1	1	1	100
5515	1	1	1	1	1	1	1	1	1	1	100
5510_{fl}	1	1	1	1	1	1	1	1	1	1	100
5509	0	0	0	0	0	0	0	0	0	0	0
Overall Detection Percentage											100.00
Detection Bandwidth = f_h - f_l = 5530MHz-5510MHz = 20MHz											
EUT 99% Bandwidth = 17.71 MHz											

4.4.2 U-NII Detection Bandwidth (Continued)

EUT Frequency- 5310MHz 40MHz BW											
	DFS Detection Trials (1=Detection, 0= No Detection)										
Radar Frequency (MHz)	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5331	0	0	0	0	0	0	0	0	0	0	0
5330 f_h	1	1	1	1	1	1	1	1	1	1	100
5325	1	1	1	1	1	1	1	1	1	1	100
5320	1	1	1	1	1	1	1	1	1	1	100
5315	1	1	1	1	1	1	1	1	1	1	100
5310	1	1	1	1	1	1	1	1	1	1	100
5305	1	1	1	1	1	1	1	1	1	1	100
5300	1	1	1	1	1	1	1	1	1	1	100
5295	1	1	1	1	1	1	1	1	1	1	100
5290 f_l	1	1	1	1	1	1	1	1	1	1	100
5289	0	0	0	0	0	0	0	0	0	0	0
										Overall Detection Percentage	100.00
Detection Bandwidth = f_h - f_l = 5330MHz-5290MHz = 40MHz											
EUT 99% Bandwidth = 36.21 MHz											

4.4.2 U-NII Detection Bandwidth (Continued)

EUT Frequency- 5510MHz 40MHz BW											
	DFS Detection Trials (1=Detection, 0= No Detection)										
Radar Frequency (MHz)	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5531	0	0	0	0	0	0	0	0	0	0	0
5530 f_h	1	1	1	1	1	1	1	1	1	1	100
5525	1	1	1	1	1	1	1	1	1	1	100
5520	1	1	1	1	1	1	1	1	1	1	100
5515	1	1	1	1	1	1	1	1	1	1	100
5510	1	1	1	1	1	1	1	1	1	1	100
5505	1	1	1	1	1	1	1	1	1	1	100
5500	1	1	1	1	1	1	1	1	1	1	100
5495	1	1	1	1	1	1	1	1	1	1	100
5490 f_l	1	1	1	1	1	1	1	1	1	1	100
5489	0	0	0	0	0	0	0	0	0	0	0
Overall Detection Percentage											100.00
Detection Bandwidth = f_h - f_l = 5530MHz-5490MHz = 40MHz											
EUT 99% Bandwidth = 36.37 MHz											

4.4.2 U-NII Detection Bandwidth (Continued)

EUT Frequency- 5290MHz 80MHz BW											
	DFS Detection Trials (1=Detection, 0= No Detection)										
Radar Frequency (MHz)	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5331	0	0	0	0	0	0	0	0	0	0	0
5330 f_l	1	1	1	1	1	1	1	0	1	1	90
5329	1	1	1	1	1	1	1	1	1	1	100
5328	1	1	1	1	1	1	1	1	1	1	100
5327	1	1	1	1	1	1	1	1	1	1	100
5326	1	1	1	1	1	1	1	1	1	1	100
5325	1	1	1	1	1	1	1	1	1	1	100
5320	1	1	1	1	1	1	1	1	1	1	100
5315	1	1	1	1	1	1	1	1	1	1	100
5310	1	1	1	1	1	1	1	1	1	1	100
5305	1	1	1	1	1	1	1	1	1	1	100
5300	1	1	1	1	0	1	1	1	1	1	90
5295	1	1	1	1	1	1	1	1	1	1	100
5290	1	1	1	1	1	1	1	1	1	1	100
5285	1	1	1	1	1	1	1	1	1	1	100
5280	1	1	1	1	1	1	1	1	1	1	100
5275	1	1	1	1	1	1	1	1	1	1	100
5270	1	1	1	1	1	1	1	1	1	1	100
5265	1	1	1	1	1	1	1	1	1	1	100
5260	1	1	1	1	1	1	1	1	1	1	100
5255	1	1	1	1	1	1	1	1	1	1	100
5254	1	1	1	1	1	1	1	1	1	1	100
5253	1	1	1	1	1	1	1	1	1	1	100
5252	1	1	1	1	1	1	1	1	1	1	100
5251	1	1	1	1	1	1	1	1	1	1	100
5250 f_h	1	1	1	1	1	1	1	0	1	1	90
5249	0	0	0	0	0	0	0	0	0	0	0
										Overall Detection Percentage	98.80
Detection Bandwidth = f_h - f_l = 5330MHz-5250MHz = 80MHz											
EUT 99% Bandwidth = 75.32 MHz											

4.4.2 U-NII Detection Bandwidth (Continued)

EUT Frequency- 5530MHz 80MHz BW											
	DFS Detection Trials (1=Detection, 0= No Detection)										
Radar Frequency (MHz)	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5571	0	0	0	0	0	0	0	0	0	0	0
5570 f_h	1	1	1	1	1	1	1	1	1	1	100
5569	1	1	1	1	1	1	1	1	1	1	100
5568	1	1	1	1	1	1	1	1	1	1	100
5567	1	1	1	1	1	1	1	1	1	1	100
5566	1	1	1	1	1	1	1	1	1	1	100
5565	1	1	1	1	1	1	1	1	1	1	100
5560	1	1	1	1	1	1	1	0	1	1	90
5555	1	1	1	1	1	1	1	1	1	1	100
5550	1	1	1	1	1	1	1	1	1	1	100
5545	1	1	1	1	1	1	1	1	1	1	100
5540	1	1	1	1	1	1	1	1	1	1	100
5535	1	1	1	1	1	1	1	1	1	1	100
5530	1	1	1	1	1	1	1	1	1	1	100
5525	1	1	1	1	1	1	1	1	1	1	100
5520	1	1	1	1	1	1	1	1	1	1	100
5515	1	1	1	1	1	1	1	1	1	1	100
5510	1	1	1	1	1	1	1	1	1	1	100
5505	1	1	1	1	1	1	1	1	1	1	100
5500	1	1	1	1	1	1	1	1	1	1	100
5495	1	1	1	1	1	1	1	1	1	1	100
5494	1	1	1	1	1	1	1	1	1	1	100
5493	1	1	1	1	1	1	1	1	1	1	100
5492	1	1	1	1	1	1	1	1	1	1	100
5491	1	1	1	1	1	1	1	1	1	1	100
5490	1	1	1	1	1	1	1	1	1	1	100
5489 f_l	0	0	0	0	0	0	0	0	0	0	0
										Overall Detection Percentage	99.60
Detection Bandwidth = f_h - f_l = 5570MHz-5490MHz = 80MHz											
EUT 99% Bandwidth = 75.64 MHz											

4.5 Initial Channel Availability Check Time

4.5.1 Test Procedure

The Initial Channel Availability Check Time (CACT) tests that the UUT does not emit beacon, control, or data signals on the test Channel until the power-up sequence has been completed and the U-NII device checks for Radar Waveforms for one minute on the test Channel. This test does not use any Radar Waveforms and only needs to be performed one time.

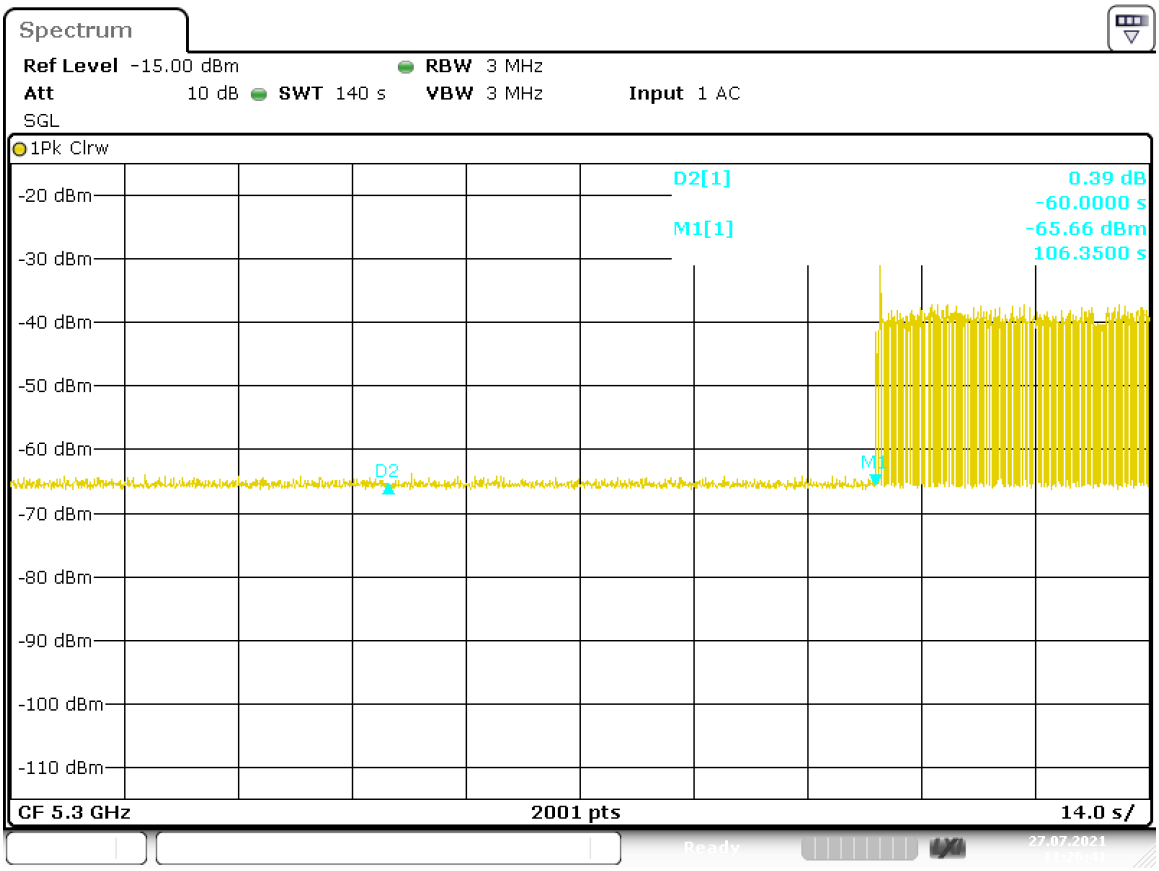
a) The U-NII devices was powered on and instructed to operate on the appropriate U-NII Channel that incorporated DFS functions. At the same time the UUT is powered on, the spectrum analyzer was set to zero span mode with a 3 MHz RBW and 3 MHz VBW on the Channel occupied by the radar with a 2.5-minute sweep time. The spectrum analyzer's sweep was started at the same time power is applied to the U-NII device.

b) The UUT should not transmit any beacon or data transmissions until at least 1 minute after the completion of the power-on cycle.

c) Marker M1 shows the begging of the power-on cycle. Marker D2 shows 60 seconds prior to the power-on cycle which is beginning of the CACT.

d) The plot shall be confirmed for power-on cycle.

4.5.2 Test Results



Date: 27.JUL.2021 11:26:41

4.6 Radar Burst at the Beginning of the Channel Availability Check Time

4.6.1 Test Procedure

The Initial Channel Availability Check Time (CACT) tests that the UUT does not emit beacon, control, or data signals on the test Channel until the power-up sequence has been completed and the U-NII device checks for Radar Waveforms for one minute on the test Channel. This test does not use any Radar Waveforms and only needs to be performed one time.

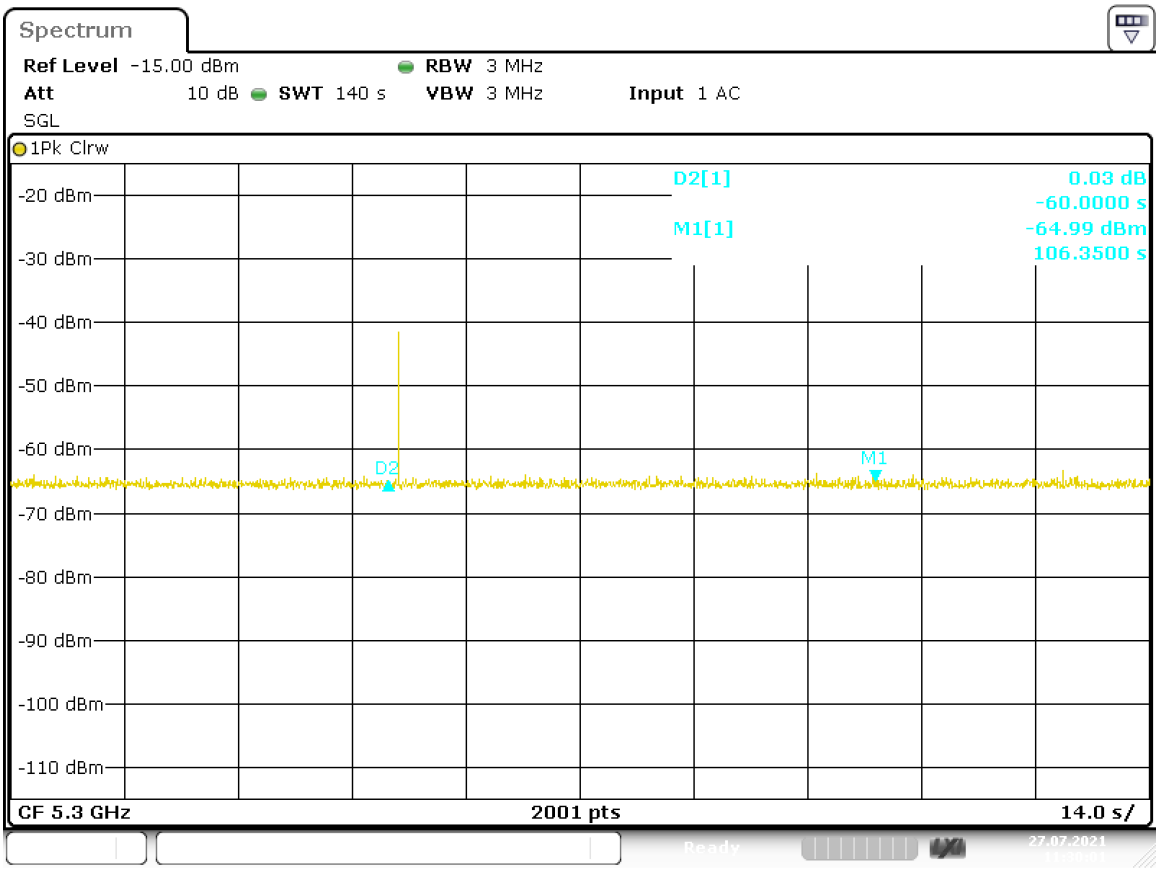
a) The U-NII devices was powered on and instructed to operate on the appropriate U-NII Channel that incorporated DFS functions. At the same time the UUT is powered on, the spectrum analyzer was set to zero span mode with a 3 MHz RBW and 3 MHz VBW on the Channel occupied by the radar with a 2.5-minute sweep time. The spectrum analyzer's sweep was started at the same time power is applied to the U-NII device.

b) The UUT should not transmit any beacon or data transmissions until at least 1 minute after the completion of the power-on cycle.

c) A single type 0 Radar (threshold +1dB) was transmitted to the EUT at the beginning of the CACT time. Radar was sent within 6 seconds after marker D2 in plot below.

d) The plot shall be confirmed for no transmission after Marker M1 (power-on cycle)

4.6.2 Test Results



Date: 27.JUL.2021 11:30:01

4.7 Radar Burst at the End of the Channel Availability Check Time

4.7.1 Test Procedure

The Initial Channel Availability Check Time (CACT) tests that the UUT does not emit beacon, control, or data signals on the test Channel until the power-up sequence has been completed and the U-NII device checks for Radar Waveforms for one minute on the test Channel. This test does not use any Radar Waveforms and only needs to be performed one time.

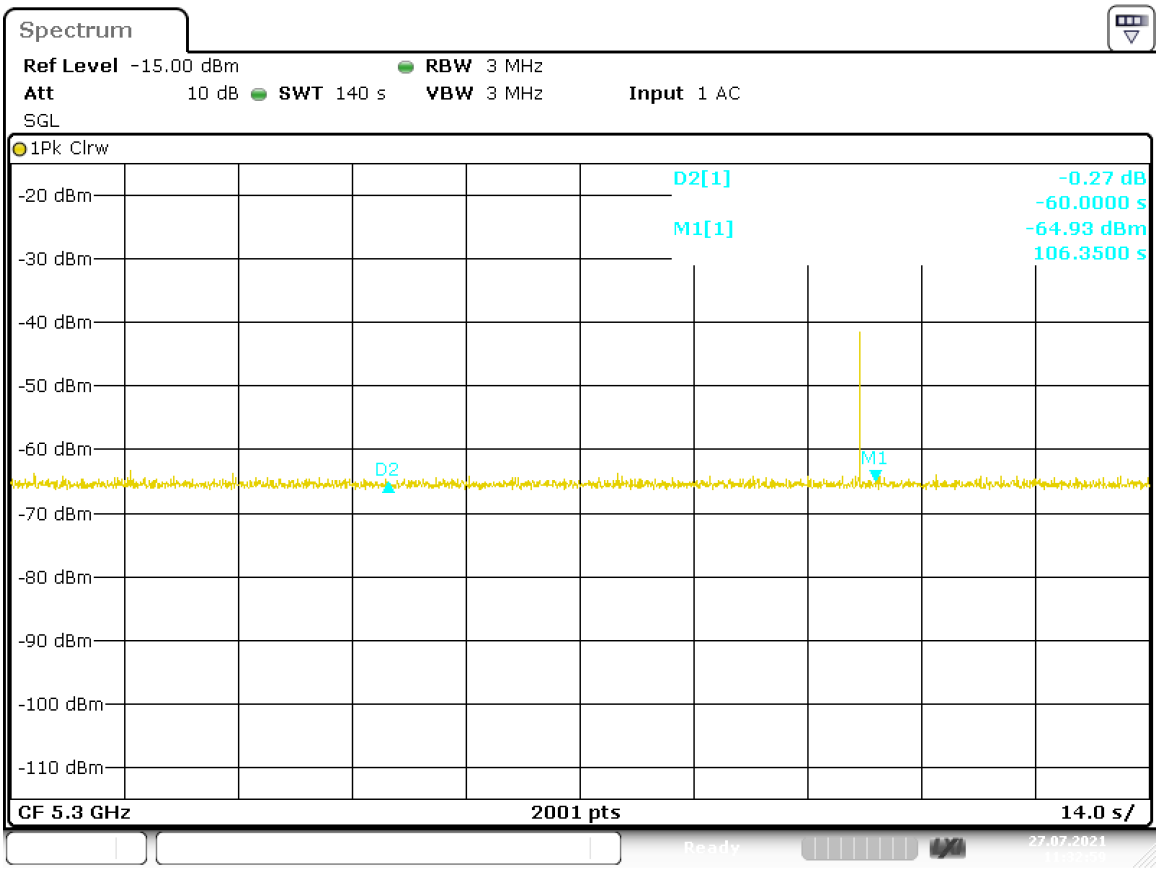
a) The U-NII devices was powered on and instructed to operate on the appropriate U-NII Channel that incorporated DFS functions. At the same time the UUT is powered on, the spectrum analyzer was set to zero span mode with a 3 MHz RBW and 3 MHz VBW on the Channel occupied by the radar with a 2.5-minute sweep time. The spectrum analyzer's sweep was started at the same time power is applied to the U-NII device.

b) The UUT should not transmit any beacon or data transmissions until at least 1 minute after the completion of the power-on cycle.

c) A single type 0 Radar (threshold +1dB) was transmitted to the EUT at the end of the CACT time. Radar was sent within 6 seconds prior to marker M1 in plot below.

d) The plot shall be confirmed for no transmission after Marker M1 (power-on cycle)

4.7.2 Test Results



Date: 27.JUL.2021 11:33:00

4.8 In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period

4.8.1 Test Procedure

The EUT was configured to communicate with a client device. The MPEG test file was streamed from the Master (EUT) to the Client on the selected test channel. Measurements were made while utilizing the widest bandwidth of the EUT.

Channel closing transmission time and channel move time were measured by applying a radar type 0 at threshold + 1dB to the EUT. The EUT transmissions were observed on the DFS control frequency. The time between the end of the applied radar waveform and the final transmission on the channel is the channel move time. The channel closing transmission time comprises only those fragments of the channel move time during which the EUT transmits.

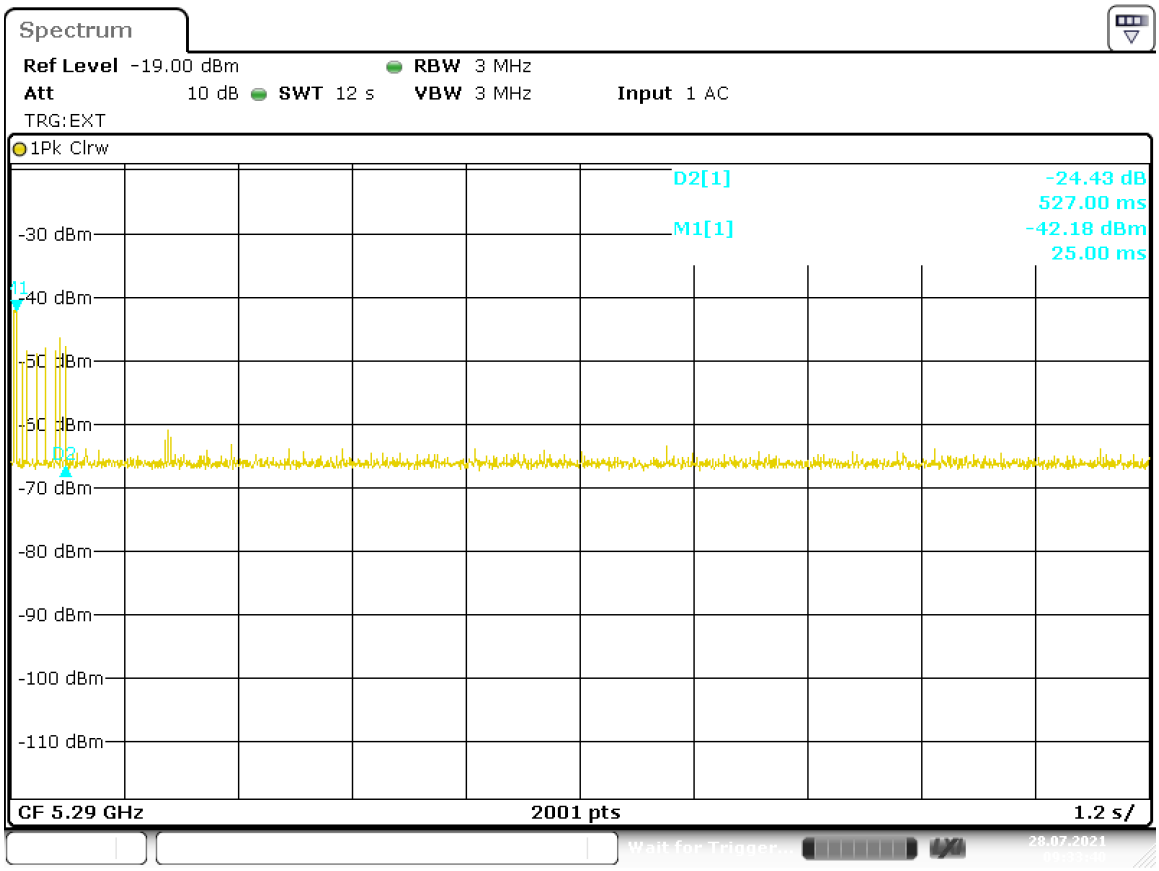
The Channel Move time shall be less than 10 seconds.

The Channel Close time shall be 200ms +60ms of aggregate time.

The Non-occupancy time shall 30 minutes or greater.

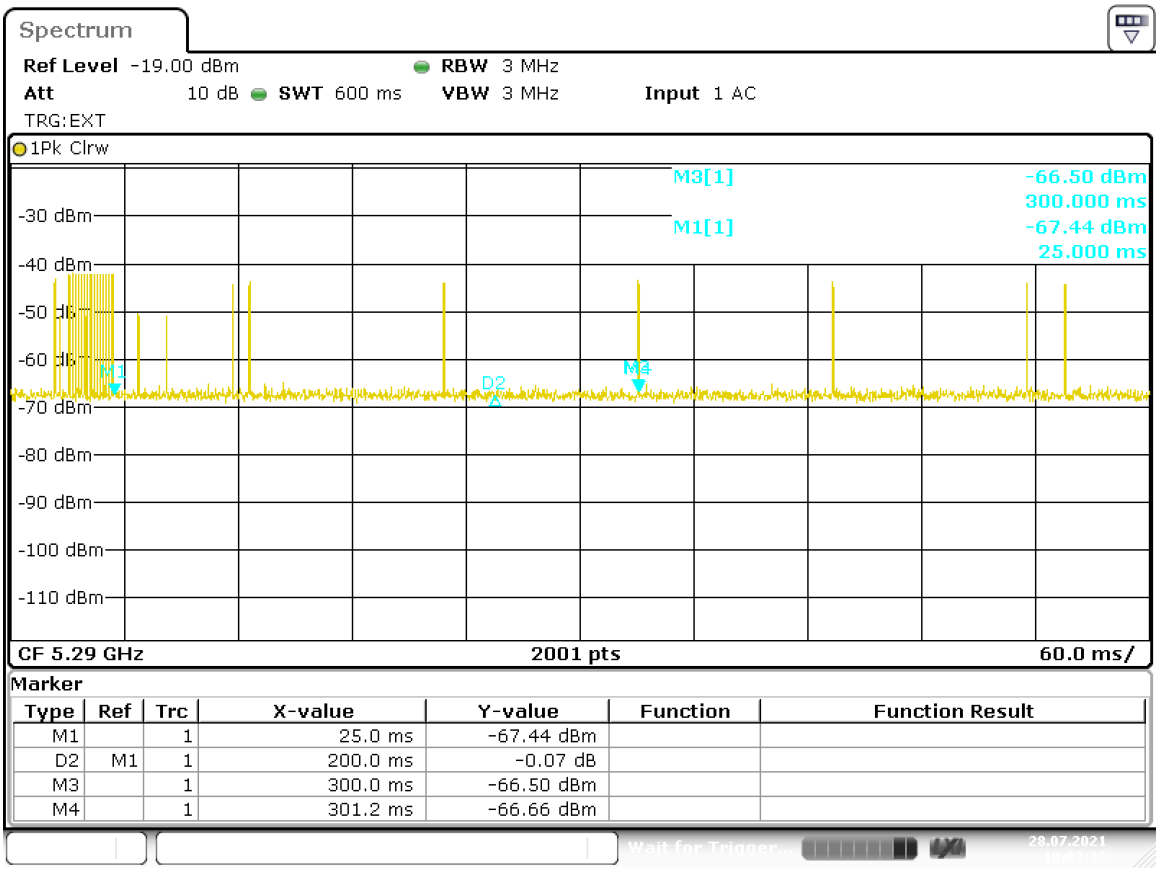
The Channel Loading shall be approximately 17% or greater.

4.8.1 Test Results Channel Move time



Channel Move Time				
Frequency	**Bandwidth**	**Measured Value**	**Limit Requirements**	**Results**
5290	80 MHz	527ms	10 s	Pass

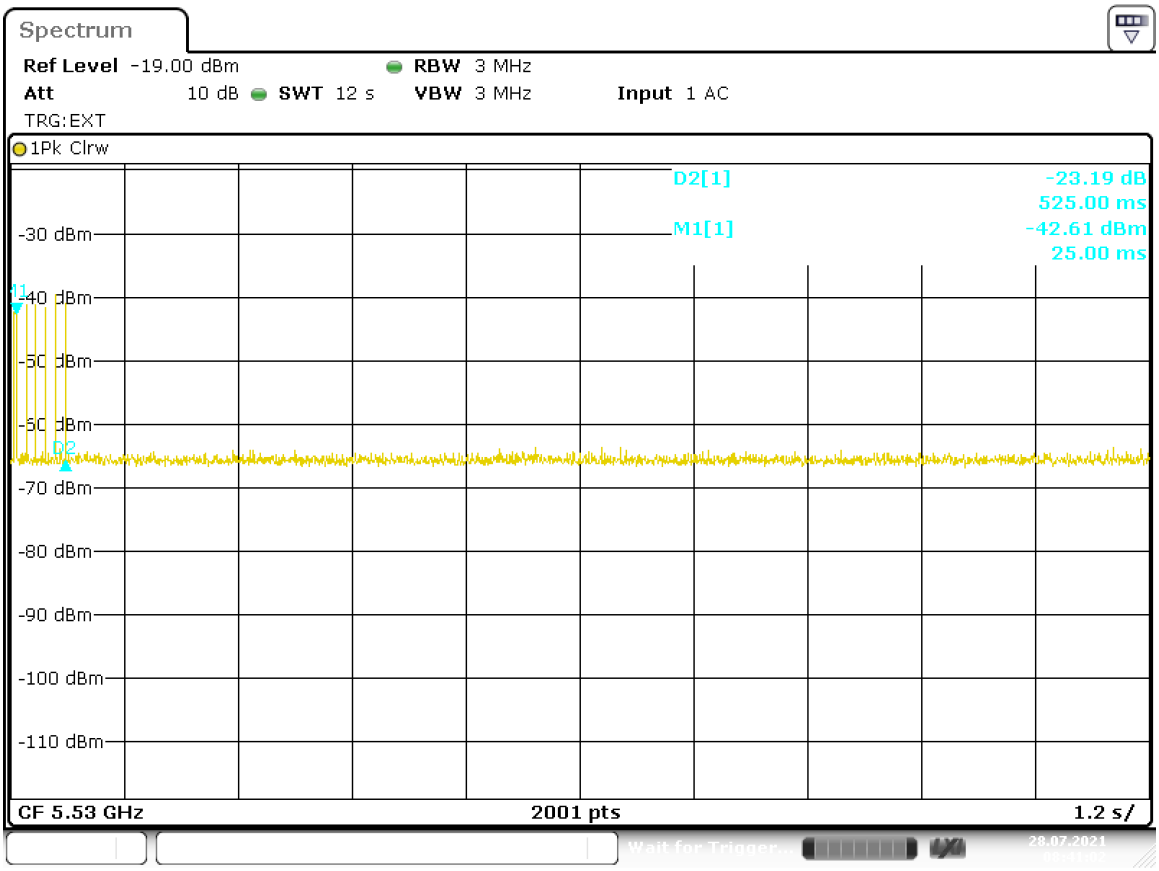
4.8.2 Test Results Channel Close Time



Date: 28.JUL.2021 10:03:33

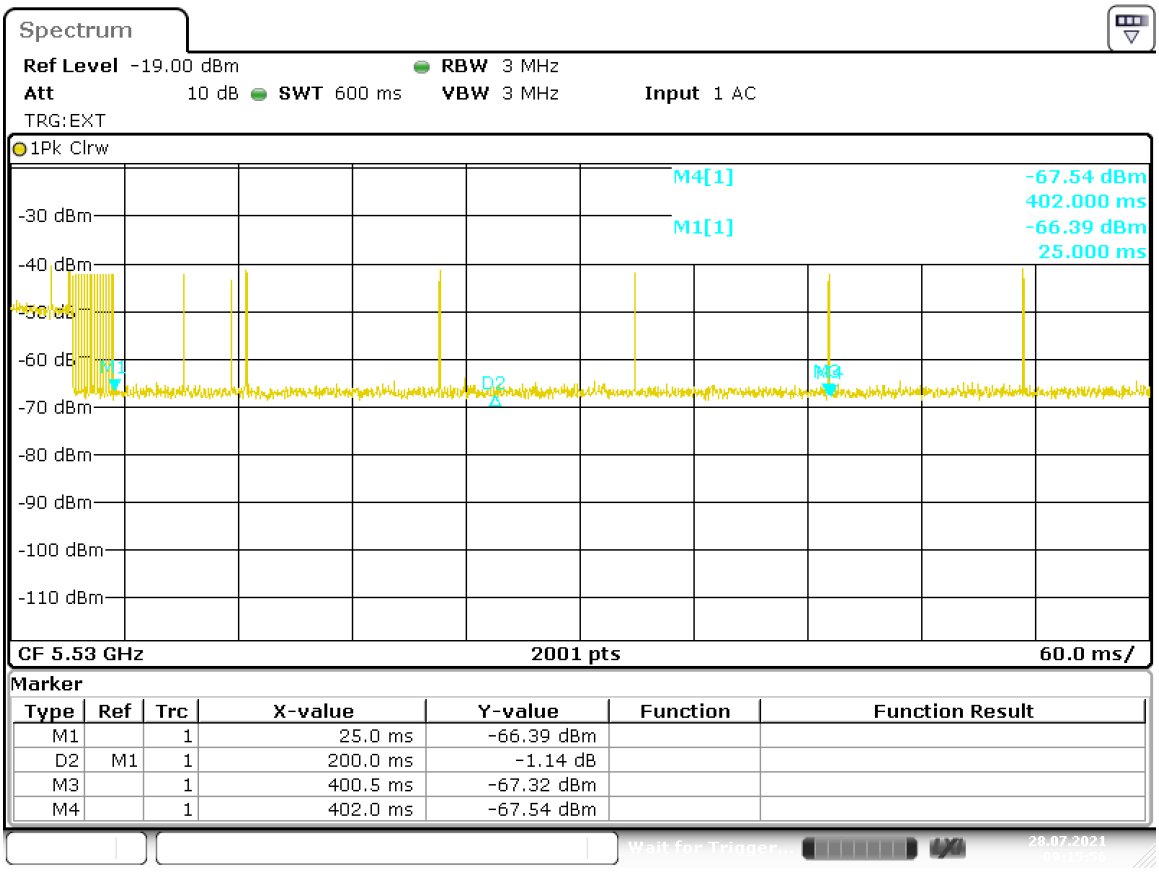
Channel Closing Time				
Frequency	**Bandwidth**	**Measured Value**	**Limit Requirements**	**Results**
5290 MHz	80 MHz	<200 ms	200 ms	Pass
		Aggregate Measured Value after 200 ms	**Limit Requirements**	**Results**
		3.6 ms	60 ms	Pass

4.8.2 Test Results Channel Close Time (Continued)



Channel Move Time				
Frequency	**Bandwidth**	**Measured Value**	**Limit Requirements**	**Results**
5530	80 MHz	525ms	10 s	Pass

4.8.2 Test Results Channel Close Time

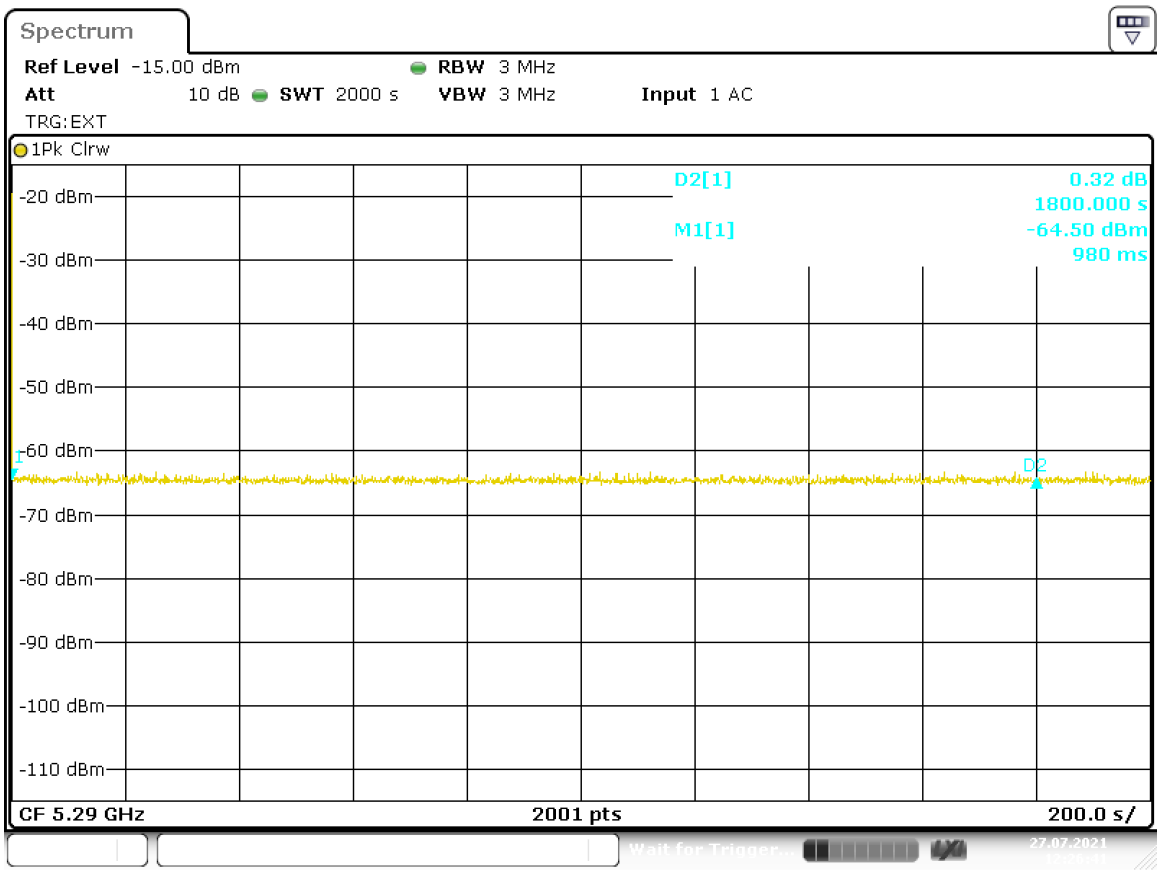


Date: 28.JUL.2021 09:15:56

Channel Closing Time				
Frequency	**Bandwidth**	**Measured Value**	**Limit Requirements**	**Results**
5530 MHz	80 MHz	<200 ms	200 ms	Pass
		Aggregate Measured Value after 200 ms	**Limit Requirements**	**Results**
		7.5 ms	60 ms	Pass

4.8.3 Test Results Non-Occupancy Period

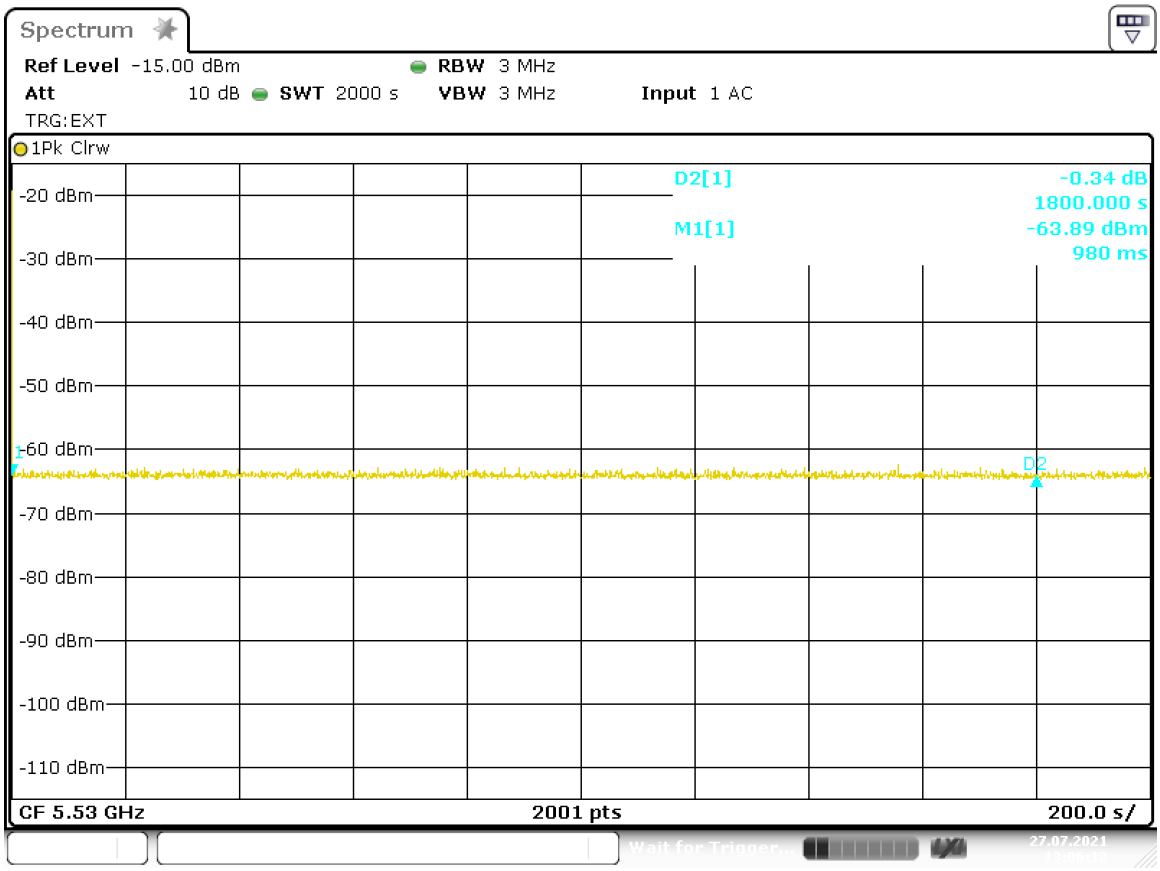
Non-Occupancy Period at 5290 MHz



Date: 27.JUL.2021 12:26:41

Non-Occupancy Period				
Frequency	**Bandwidth**	**Measured Value**	**Limit Requirements**	**Results**
5310 MHz	80 MHz	> 30min	30min	Pass

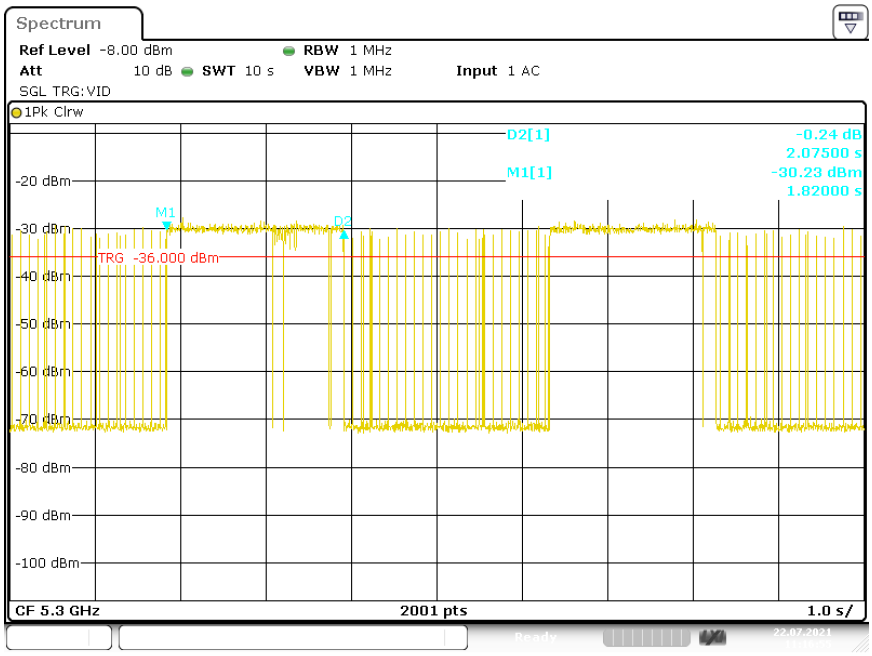
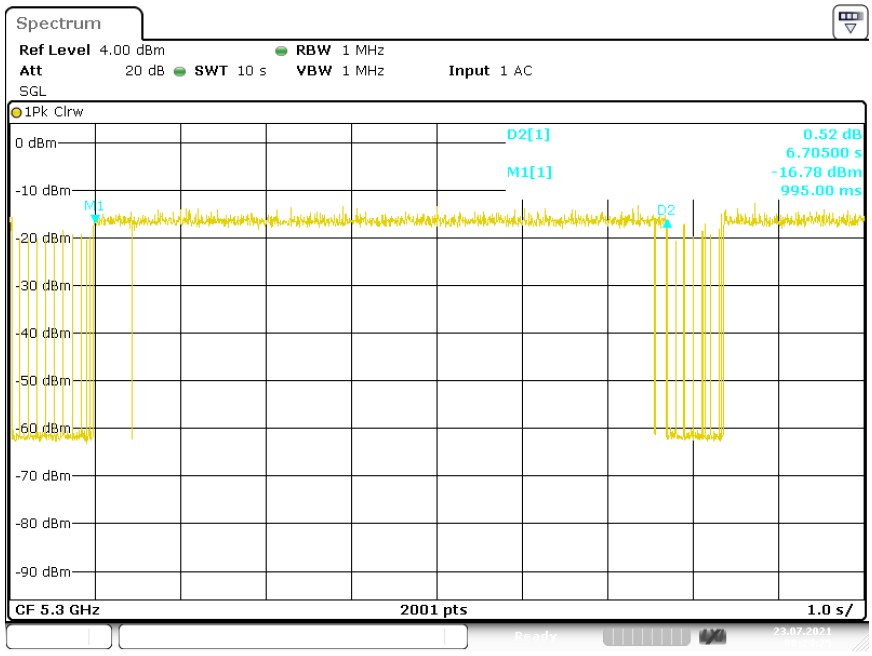
Non-Occupancy Period at 5530 MHz



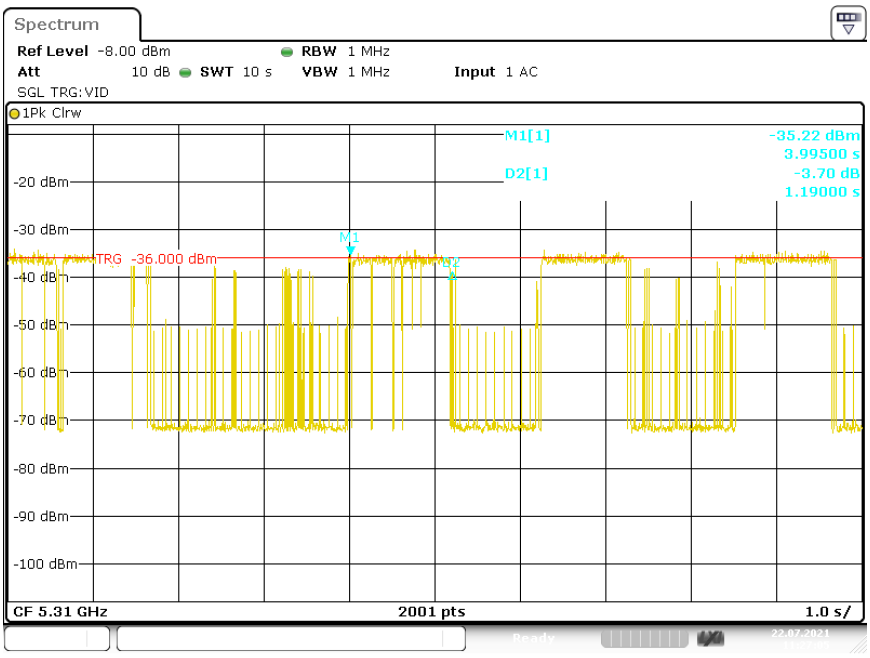
Date: 27.JUL.2021 13:06:12

Non-Occupancy Period				
Frequency	**Bandwidth**	**Measured Value**	**Limit Requirements**	**Results**
5530 MHz	80 MHz	> 30min	30min	Pass

4.8.4 Test Results Channel Loading

802.11a  	Requirements >17 % Results Pass, Measured Channel Load is greater than 17%
802.11an 20MHz BW  	Requirements >17 % Results Pass, Measured Channel Load is greater than 17%

802.11ac 40MHz BW

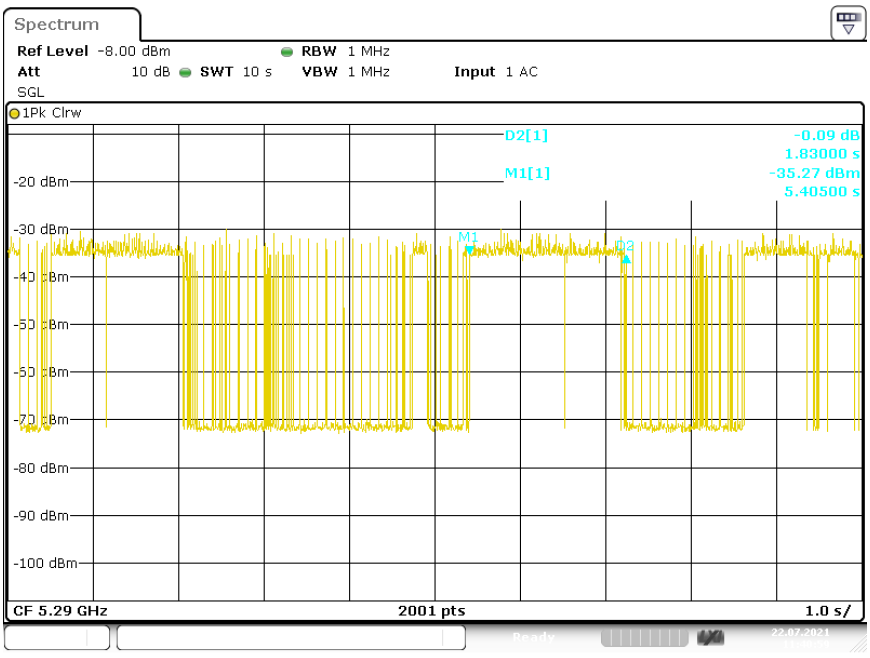


Date: 22.JUL.2021 11:27:06

Requirements
>17 %

Results
Pass, Measured Channel Load is greater than 17%

802.11ax 80MHz BW



Date: 22.JUL.2021 11:41:00

Requirements
>17 %

Results
Pass, Measured Channel Load is greater than 17%

4.9 Statistical Performance Check

4.9.1 Test Procedure

The EUT was configured to communicate with a client device. The MPEG test file was streamed from the Master (EUT) to the Client on the selected test channel. Channel move was disabled. Measurements were made while utilizing all the bandwidths of the EUT.

Short Pulse Radar Test

Once the performance requirements check is complete, statistical data was gathered, to determine the ability of the device to detect the radar test waveforms (Short Pulse Radar Types 1-4). The percentage of successful detection is calculated. In addition, an aggregate minimum percentage of successful detection across all Short Pulse Radar Types 1-4 is calculated.

Long Pulse Radar Test

Statistical data were gathered to determine the ability of the device to detect the Long Pulse Radar Type 5. Three subsets of trials were performed with a minimum of ten trials per subset. The subset of trials differ in where the Long Pulse Type 5 Signal is tuned in frequency:

For subset case 1: the center frequency of the signal generator will remain fixed at the center of the UUT Channel.

For subset case 2: to retain 90% frequency overlap between the radar signal and the UUT Occupied Bandwidth, the center frequency of the signal generator will vary for each of the ten trials in subset case 2. The center frequency of the signal generator for each trial is calculated by:
FL+(0.4$*Chirp\ Width\ [in\ MHz]$)

For subset case 3: to retain 90% frequency overlap between the radar signal and the UUT Occupied Bandwidth, the center frequency of the signal generator will vary for each of the ten trials in subset case 3. The center frequency of the signal generator for each trial is calculated by:
FH–(0.4$*Chirp\ Width\ [in\ MHz]$)

Frequency Hopping Radar Test

Statistical data will be gathered to determine the ability of the device to detect the Frequency Hopping radar test signal (radar type 6).

4.9.2 Test Results 802.11a at 5300MHz

Radar Type 1

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1A	83	1	638	y
2A	86	1	618	y
3A	76	1	698	y
4A	59	1	898	y
5A	89	1	598	y
6A	72	1	738	y
7A	65	1	818	y
8A	61	1	878	y
9A	70	1	758	y
10A	62	1	858	y
11A	81	1	658	n
12A	92	1	578	y
13A	95	1	558	y
14A	74	1	718	y
15A	68	1	778	y
16B	30	1	1815	y
17B	19	1	2798	y
18B	61	1	873	y
19B	26	1	2061	y
20B	55	1	975	y
21B	27	1	1990	y
22B	30	1	1763	n
23B	19	1	2853	y
24B	21	1	2615	y
25B	32	1	1678	y
26B	56	1	956	y
27B	32	1	1651	y
28B	25	1	2117	y
29B	33	1	1634	y
30B	86	1	616	y
			Total Detection Percentage	93.33 %

4.9.2 Test Results 802.11a at 5300MHz (Continued)

Radar Type 2

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	25	5.0	210	y
2	29	5.0	219	n
3	24	4.8	151	n
4	24	1.9	160	y
5	27	1.3	157	y
6	26	4.2	223	y
7	28	4.0	195	y
8	25	4.2	189	y
9	28	2.6	187	n
10	27	4.9	230	y
11	23	4.6	222	y
12	24	3.9	205	y
13	28	4.1	193	n
14	28	4.0	160	y
15	25	4.5	180	y
16	25	2.8	211	y
17	25	1.2	229	y
18	26	4.6	170	y
19	25	2.4	152	y
20	27	1.5	230	y
21	24	4.7	197	y
22	28	2.9	190	y
23	25	3.1	197	y
24	24	3.0	151	y
25	24	3.1	195	y
26	26	1.7	151	y
27	23	3.3	202	y
28	27	3.3	206	y
29	28	4.8	199	y
30	25	4.3	227	y
			Total Detection Percentage	86.67 %

4.9.2 Test Results 802.11a at 5300MHz (Continued)

Radar Type 3

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	17	9.1	459	y
2	17	9.2	312	y
3	18	7.1	233	y
4	18	7.6	433	y
5	16	7.0	367	y
6	17	6.1	287	y
7	17	9.4	217	y
8	18	6.2	461	y
9	17	9.0	305	y
10	17	6.7	234	y
11	17	8.2	307	n
12	16	9.7	422	y
13	18	6.9	469	y
14	17	9.3	371	y
15	18	6.9	352	y
16	16	8.1	492	y
17	17	8.9	482	y
18	18	7.4	458	y
19	18	10	420	y
20	17	10	344	y
21	17	9.8	497	y
22	16	8.9	271	y
23	17	8.8	367	y
24	16	8.5	309	y
25	16	7.4	324	y
26	18	8.6	327	y
27	16	6.5	276	y
28	17	8.9	217	y
29	17	8.1	406	y
30	17	6.1	465	n
			Total Detection Percentage	93.33 %

4.9.2 Test Results 802.11a at 5300MHz (Continued)

Radar Type 4

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	15	17.9	378	y
2	15	17.4	410	y
3	16	17.4	281	y
4	14	16.3	258	y
5	12	16.5	341	y
6	12	12.8	345	y
7	15	14.1	440	y
8	16	15.9	369	y
9	13	17.3	231	y
10	16	15.3	253	y
11	13	18.8	440	y
12	14	12.6	428	y
13	14	12.5	220	y
14	14	19.1	490	y
15	14	11.5	411	y
16	15	11.3	458	y
17	15	15.4	289	y
18	13	17.8	423	y
19	15	15.6	354	n
20	13	17.6	434	y
21	13	18.3	294	y
22	14	19.4	391	y
23	14	19.9	419	y
24	15	13.7	478	y
25	13	18.1	449	y
26	16	14.1	345	n
27	14	12.2	250	y
28	16	15.4	293	y
29	13	11.7	497	y
30	14	14.1	498	y
			Total Detection Percentage	93.33 %

802.11a Aggregated Detection 1-4

Type 1	Type 2	Type 3	Type 4	Aggregate	Limit	Results
93.33 %	86.67 %	93.33 %	93.33 %	91.67%	>80%	Pass

4.9.2 Test Results 802.11a at 5300MHz (Continued)

Radar Type 5

Trial #	Radar Type	Waveform #	Detection (y/n)
1	FCC Radar Type 5	Waveform #1	y
2	FCC Radar Type 5	Waveform #2	y
3	FCC Radar Type 5	Waveform #3	y
4	FCC Radar Type 5	Waveform #4	y
5	FCC Radar Type 5	Waveform #5	y
6	FCC Radar Type 5	Waveform #6	y
7	FCC Radar Type 5	Waveform #7	y
8	FCC Radar Type 5	Waveform #8	y
9	FCC Radar Type 5	Waveform #9	y
10	FCC Radar Type 5	Waveform #10	y
11	FCC Radar Type 5	Waveform #11	y
12	FCC Radar Type 5	Waveform #12	y
13	FCC Radar Type 5	Waveform #13	n
14	FCC Radar Type 5	Waveform #14	y
15	FCC Radar Type 5	Waveform #15	y
16	FCC Radar Type 5	Waveform #16	y
17	FCC Radar Type 5	Waveform #17	y
18	FCC Radar Type 5	Waveform #18	y
19	FCC Radar Type 5	Waveform #19	y
20	FCC Radar Type 5	Waveform #20	y
21	FCC Radar Type 5	Waveform #21	y
22	FCC Radar Type 5	Waveform #22	y
23	FCC Radar Type 5	Waveform #23	y
24	FCC Radar Type 5	Waveform #24	y
25	FCC Radar Type 5	Waveform #25	y
26	FCC Radar Type 5	Waveform #26	y
27	FCC Radar Type 5	Waveform #27	y
28	FCC Radar Type 5	Waveform #28	y
29	FCC Radar Type 5	Waveform #29	y
30	FCC Radar Type 5	Waveform #30	y
		Total Detection Percentage	96.67 %

4.9.2 Test Results 802.11a at 5300MHz (Continued)

Radar Type 6

Trial #	Radar Type	Waveform #	Detection (y/n)
1	FCC Radar Type 6	Sequencing List #1	n
2	FCC Radar Type 6	Sequencing List #2	y
3	FCC Radar Type 6	Sequencing List #3	y
4	FCC Radar Type 6	Sequencing List #4	y
5	FCC Radar Type 6	Sequencing List #5	y
6	FCC Radar Type 6	Sequencing List #6	y
7	FCC Radar Type 6	Sequencing List #7	y
8	FCC Radar Type 6	Sequencing List #8	y
9	FCC Radar Type 6	Sequencing List #9	y
10	FCC Radar Type 6	Sequencing List #10	y
11	FCC Radar Type 6	Sequencing List #11	y
12	FCC Radar Type 6	Sequencing List #12	y
13	FCC Radar Type 6	Sequencing List #13	y
14	FCC Radar Type 6	Sequencing List #14	y
15	FCC Radar Type 6	Sequencing List #15	y
16	FCC Radar Type 6	Sequencing List #16	y
17	FCC Radar Type 6	Sequencing List #17	y
18	FCC Radar Type 6	Sequencing List #18	y
19	FCC Radar Type 6	Sequencing List #19	y
20	FCC Radar Type 6	Sequencing List #20	y
21	FCC Radar Type 6	Sequencing List #21	y
22	FCC Radar Type 6	Sequencing List #22	y
23	FCC Radar Type 6	Sequencing List #23	y
24	FCC Radar Type 6	Sequencing List #24	y
25	FCC Radar Type 6	Sequencing List #25	y
26	FCC Radar Type 6	Sequencing List #26	y
27	FCC Radar Type 6	Sequencing List #27	y
28	FCC Radar Type 6	Sequencing List #28	y
29	FCC Radar Type 6	Sequencing List #29	y
30	FCC Radar Type 6	Sequencing List #30	y
		Total Detection Percentage	96.67 %

4.9.3 Test Results 802.11an 20MHz at 5300MHz

Radar Type 1

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1A	81	1	658	y
2A	95	1	558	y
3A	57	1	938	y
4A	18	1	3066	y
5A	63	1	838	y
6A	98	1	538	n
7A	68	1	778	y
8A	59	1	898	y
9A	74	1	718	y
10A	72	1	738	y
11A	92	1	578	y
12A	78	1	678	y
13A	86	1	618	y
14A	65	1	818	y
15A	67	1	798	y
16B	42	1	1264	y
17B	22	1	2413	y
18B	23	1	2340	y
19B	21	1	2578	y
20B	33	1	1627	y
21B	18	1	3018	n
22B	24	1	2260	y
23B	46	1	1157	y
24B	63	1	846	y
25B	21	1	2541	n
26B	51	1	1039	y
27B	19	1	2835	y
28B	24	1	2257	y
29B	18	1	2938	y
30B	32	1	1666	y
			Total Detection Percentage	90.00 %

4.9.3 Test Results 802.11an 20MHz at 5300MHz (Continued)

Radar Type 2

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	27	4.8	195	y
2	27	3.9	185	y
3	23	4.9	190	n
4	28	1.6	176	n
5	27	3.6	172	y
6	28	4.6	200	y
7	26	1	220	y
8	24	4.2	207	y
9	24	4.8	219	y
10	27	4.6	194	y
11	29	3.5	209	y
12	26	1	206	y
13	24	1.3	154	y
14	29	1.5	151	y
15	27	2.1	174	y
16	24	3.2	230	y
17	27	4.9	153	y
18	25	2.5	183	y
19	26	4.6	227	y
20	24	1.9	158	y
21	23	1.2	220	y
22	26	2.5	168	y
23	24	3.3	155	y
24	25	1	169	y
25	27	2.1	210	y
26	23	3.4	201	y
27	25	1.3	202	y
28	23	2.4	177	y
29	29	2.4	203	y
30	29	3.6	164	y
Total Detection Percentage				93.33 %

4.9.3 Test Results 802.11an 20MHz at 5300MHz (Continued)

Radar Type 3

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	16	9.5	315	y
2	17	8.6	395	y
3	17	7.2	216	y
4	18	6.5	270	y
5	17	9.4	451	y
6	16	8.4	336	y
7	17	8.1	318	y
8	17	6.7	341	y
9	17	8.9	204	y
10	18	7.3	240	n
11	17	6.4	479	y
12	17	7.9	449	y
13	17	7.5	470	n
14	16	6	482	y
15	18	7.5	403	y
16	18	6.8	294	y
17	17	8.9	408	y
18	16	9.9	286	y
19	18	7.9	451	n
20	16	6.4	420	n
21	16	7.7	445	y
22	16	9.7	421	n
23	17	8.9	361	y
24	16	6.2	401	y
25	17	8.3	237	y
26	17	6.4	487	y
27	17	6.2	379	y
28	17	6.8	484	y
29	16	9.8	486	y
30	16	9.9	315	y
			Total Detection Percentage	83.33 %

4.9.3 Test Results 802.11an 20MHz at 5300MHz (Continued)

Radar Type 4

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	15	15.8	385	y
2	13	15.6	272	y
3	14	20	435	y
4	14	19.3	499	y
5	14	12	285	y
6	13	17.7	320	n
7	14	14.9	254	y
8	14	12.5	420	y
9	12	19.1	270	y
10	15	13.6	428	y
11	15	17.3	270	y
12	14	14.9	416	y
13	16	18.6	302	y
14	14	17.6	301	y
15	16	13.8	456	y
16	14	17.1	266	y
17	12	15.5	245	y
18	15	13.9	387	y
19	16	14.8	342	y
20	12	14.1	379	y
21	16	19.8	286	y
22	14	19.4	387	y
23	14	13	406	y
24	15	18.9	337	y
25	15	17.4	325	y
26	12	11.7	326	y
27	14	14.8	474	y
28	14	19.1	355	y
29	16	12.9	280	y
30	14	11.7	299	y
			Total Detection Percentage	96.67 %

802.11n 20MHz Aggregated Detection 1-4

Type 1	Type 2	Type 3	Type 4	Aggregate	Limit	Results
90.00%	93.33%	83.33%	96.67%	90.83%	>80%	Pass

4.9.3 Test Results 802.11an 20MHz at 5300MHz (Continued)

Radar Type 5

Trial #	Radar Type	Waveform #	Detection (y/n)
1	FCC Radar Type 5	Waveform #1	y
2	FCC Radar Type 5	Waveform #2	y
3	FCC Radar Type 5	Waveform #3	n
4	FCC Radar Type 5	Waveform #4	y
5	FCC Radar Type 5	Waveform #5	y
6	FCC Radar Type 5	Waveform #6	y
7	FCC Radar Type 5	Waveform #7	y
8	FCC Radar Type 5	Waveform #8	n
9	FCC Radar Type 5	Waveform #9	y
10	FCC Radar Type 5	Waveform #10	y
11	FCC Radar Type 5	Waveform #11	n
12	FCC Radar Type 5	Waveform #12	y
13	FCC Radar Type 5	Waveform #13	y
14	FCC Radar Type 5	Waveform #14	y
15	FCC Radar Type 5	Waveform #15	y
16	FCC Radar Type 5	Waveform #16	y
17	FCC Radar Type 5	Waveform #17	y
18	FCC Radar Type 5	Waveform #18	y
19	FCC Radar Type 5	Waveform #19	y
20	FCC Radar Type 5	Waveform #20	y
21	FCC Radar Type 5	Waveform #21	y
22	FCC Radar Type 5	Waveform #22	y
23	FCC Radar Type 5	Waveform #23	y
24	FCC Radar Type 5	Waveform #24	y
25	FCC Radar Type 5	Waveform #25	y
26	FCC Radar Type 5	Waveform #26	y
27	FCC Radar Type 5	Waveform #27	y
28	FCC Radar Type 5	Waveform #28	y
29	FCC Radar Type 5	Waveform #29	y
30	FCC Radar Type 5	Waveform #30	y
		Total Detection Percentage	90.00 %

4.9.3 Test Results 802.11an 20MHz at 5300MHz (Continued)

Radar Type 6

Trial #	Radar Type	Waveform #	Detection (y/n)
1	FCC Radar Type 6	Sequencing List #1	n
2	FCC Radar Type 6	Sequencing List #2	y
3	FCC Radar Type 6	Sequencing List #3	y
4	FCC Radar Type 6	Sequencing List #4	y
5	FCC Radar Type 6	Sequencing List #5	y
6	FCC Radar Type 6	Sequencing List #6	y
7	FCC Radar Type 6	Sequencing List #7	y
8	FCC Radar Type 6	Sequencing List #8	y
9	FCC Radar Type 6	Sequencing List #9	y
10	FCC Radar Type 6	Sequencing List #10	y
11	FCC Radar Type 6	Sequencing List #11	y
12	FCC Radar Type 6	Sequencing List #12	y
13	FCC Radar Type 6	Sequencing List #13	y
14	FCC Radar Type 6	Sequencing List #14	y
15	FCC Radar Type 6	Sequencing List #15	y
16	FCC Radar Type 6	Sequencing List #16	y
17	FCC Radar Type 6	Sequencing List #17	y
18	FCC Radar Type 6	Sequencing List #18	y
19	FCC Radar Type 6	Sequencing List #19	y
20	FCC Radar Type 6	Sequencing List #20	y
21	FCC Radar Type 6	Sequencing List #21	y
22	FCC Radar Type 6	Sequencing List #22	y
23	FCC Radar Type 6	Sequencing List #23	y
24	FCC Radar Type 6	Sequencing List #24	y
25	FCC Radar Type 6	Sequencing List #25	y
26	FCC Radar Type 6	Sequencing List #26	y
27	FCC Radar Type 6	Sequencing List #27	y
28	FCC Radar Type 6	Sequencing List #28	y
29	FCC Radar Type 6	Sequencing List #29	y
30	FCC Radar Type 6	Sequencing List #30	y
		Total Detection Percentage	96.67 %

4.9.4 Test Results 802.11ac 40MHz at 5310MHz

Radar Type 1

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1A	61	1	878	y
2A	102	1	518	y
3A	58	1	918	y
4A	68	1	778	y
5A	57	1	938	y
6A	86	1	618	n
7A	89	1	598	y
8A	63	1	838	y
9A	74	1	718	y
10A	59	1	898	y
11A	83	1	638	y
12A	92	1	578	y
13A	78	1	678	y
14A	95	1	558	y
15A	72	1	738	y
16B	72	1	732	y
17B	95	1	559	y
18B	46	1	1162	y
19B	23	1	2353	y
20B	25	1	2184	y
21B	40	1	1328	y
22B	24	1	2256	y
23B	74	1	721	y
24B	29	1	1840	y
25B	39	1	1380	y
26B	74	1	714	y
27B	30	1	1767	y
28B	18	1	2943	n
29B	19	1	2777	y
30B	34	1	1550	y
			Total Detection Percentage	93.33 %

4.9.4 Test Results 802.11ac 40MHz at 5310MHz (Continued)

Radar Type 2

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	26	3.9	230	y
2	27	4.2	170	y
3	24	3.8	172	y
4	24	2	213	y
5	26	3.9	185	y
6	26	4.2	197	y
7	28	4.3	209	y
8	24	3.5	188	y
9	27	2.7	186	y
10	25	2.9	190	y
11	24	4.9	193	y
12	27	4.8	206	y
13	28	4.4	221	y
14	24	3.4	199	y
15	27	3.2	184	y
16	24	1.8	228	y
17	28	3.5	230	y
18	27	2.5	164	y
19	28	3.6	217	y
20	29	3.4	206	n
21	24	4.2	174	y
22	25	4.9	154	y
23	23	1	218	y
24	29	3.5	160	y
25	27	2	172	y
26	25	3.4	156	y
27	23	2.9	229	y
28	27	4.9	198	y
29	25	2.2	220	y
30	29	2.8	169	y
			Total Detection Percentage	96.67 %

4.9.4 Test Results 802.11ac 40MHz at 5310MHz (Continued)

Radar Type 3

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	17	6.4	320	y
2	16	9.7	316	y
3	16	6.3	234	n
4	16	9.7	461	y
5	17	7.8	218	y
6	17	7.4	402	y
7	17	9.4	316	y
8	17	6.3	289	y
9	17	6.9	456	y
10	18	7.3	419	y
11	18	9.6	459	y
12	17	9	397	y
13	17	9.4	267	n
14	16	6.7	212	y
15	16	9	421	y
16	16	9.2	300	y
17	18	6.5	425	y
18	16	7.9	435	y
19	17	10	236	y
20	16	10	351	y
21	18	8.2	281	n
22	17	6.1	398	y
23	17	6.2	412	y
24	16	6	460	y
25	18	8.5	437	y
26	17	6.9	427	y
27	18	8.1	425	y
28	17	7	236	y
29	16	7	335	y
30	18	9.8	241	y
			Total Detection Percentage	90.00 %

4.9.4 Test Results 802.11ac 40MHz at 5310MHz (Continued))

Radar Type 4

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	12	16.2	358	y
2	14	18.7	388	y
3	12	11.5	448	y
4	15	13.9	352	y
5	13	20	324	y
6	13	11.7	314	y
7	13	17.9	285	y
8	14	14.1	293	y
9	15	15.2	429	y
10	14	19.4	268	y
11	13	15	381	y
12	13	11.8	286	y
13	14	13.9	205	y
14	15	17.7	494	y
15	16	18.7	211	y
16	13	17.6	266	y
17	14	19.5	311	y
18	16	14.4	258	y
19	15	19.6	444	y
20	14	20	449	y
21	13	13.1	272	y
22	14	11.1	259	y
23	15	14.9	461	y
24	15	12.1	496	y
25	14	11.8	438	y
26	15	19.8	407	y
27	16	14.8	489	y
28	13	17.5	212	y
29	16	17.4	425	y
30	13	15.7	307	y
			Total Detection Percentage	100.00 %

802.11ac 40MHz Aggregated Detection 1-4

Type 1	Type 2	Type 3	Type 4	Aggregate	Limit	Results
93.33%	96.67%	90.00%	100.00%	95%	>80%	Pass

4.9.4 Test Results 802.11ac 40MHz at 5310MHz (Continued)

Radar Type 5

Trial #	Radar Type	Waveform #	Detection (y/n)
1	FCC Radar Type 5	Waveform #1	y
2	FCC Radar Type 5	Waveform #2	y
3	FCC Radar Type 5	Waveform #3	y
4	FCC Radar Type 5	Waveform #4	y
5	FCC Radar Type 5	Waveform #5	y
6	FCC Radar Type 5	Waveform #6	y
7	FCC Radar Type 5	Waveform #7	y
8	FCC Radar Type 5	Waveform #8	y
9	FCC Radar Type 5	Waveform #9	y
10	FCC Radar Type 5	Waveform #10	y
11	FCC Radar Type 5	Waveform #11	y
12	FCC Radar Type 5	Waveform #12	y
13	FCC Radar Type 5	Waveform #13	y
14	FCC Radar Type 5	Waveform #14	y
15	FCC Radar Type 5	Waveform #15	y
16	FCC Radar Type 5	Waveform #16	y
17	FCC Radar Type 5	Waveform #17	y
18	FCC Radar Type 5	Waveform #18	y
19	FCC Radar Type 5	Waveform #19	y
20	FCC Radar Type 5	Waveform #20	y
21	FCC Radar Type 5	Waveform #21	y
22	FCC Radar Type 5	Waveform #22	y
23	FCC Radar Type 5	Waveform #23	y
24	FCC Radar Type 5	Waveform #24	n
25	FCC Radar Type 5	Waveform #25	y
26	FCC Radar Type 5	Waveform #26	y
27	FCC Radar Type 5	Waveform #27	y
28	FCC Radar Type 5	Waveform #28	y
29	FCC Radar Type 5	Waveform #29	y
30	FCC Radar Type 5	Waveform #30	y
		Total Detection Percentage	96.67 %

4.9.4 Test Results 802.11ac 40MHz at 5310MHz (Continued)

Radar Type 6

Trial #	Radar Type	Waveform #	Detection (y/n)
1	FCC Radar Type 6	Sequencing List #1	y
2	FCC Radar Type 6	Sequencing List #2	y
3	FCC Radar Type 6	Sequencing List #3	y
4	FCC Radar Type 6	Sequencing List #4	y
5	FCC Radar Type 6	Sequencing List #5	y
6	FCC Radar Type 6	Sequencing List #6	y
7	FCC Radar Type 6	Sequencing List #7	y
8	FCC Radar Type 6	Sequencing List #8	y
9	FCC Radar Type 6	Sequencing List #9	y
10	FCC Radar Type 6	Sequencing List #10	y
11	FCC Radar Type 6	Sequencing List #11	y
12	FCC Radar Type 6	Sequencing List #12	y
13	FCC Radar Type 6	Sequencing List #13	y
14	FCC Radar Type 6	Sequencing List #14	y
15	FCC Radar Type 6	Sequencing List #15	y
16	FCC Radar Type 6	Sequencing List #16	y
17	FCC Radar Type 6	Sequencing List #17	y
18	FCC Radar Type 6	Sequencing List #18	y
19	FCC Radar Type 6	Sequencing List #19	y
20	FCC Radar Type 6	Sequencing List #20	y
21	FCC Radar Type 6	Sequencing List #21	y
22	FCC Radar Type 6	Sequencing List #22	y
23	FCC Radar Type 6	Sequencing List #23	y
24	FCC Radar Type 6	Sequencing List #24	y
25	FCC Radar Type 6	Sequencing List #25	y
26	FCC Radar Type 6	Sequencing List #26	y
27	FCC Radar Type 6	Sequencing List #27	y
28	FCC Radar Type 6	Sequencing List #28	y
29	FCC Radar Type 6	Sequencing List #29	y
30	FCC Radar Type 6	Sequencing List #30	y
		Total Detection Percentage	100.00%

4.9.5 Test Results 802.11ax 80MHz at 5290MHz

Radar Type 1

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1A	74	1	718	y
2A	89	1	598	y
3A	65	1	818	y
4A	81	1	658	y
5A	58	1	918	y
6A	86	1	618	y
7A	67	1	798	y
8A	76	1	698	y
9A	72	1	738	y
10A	92	1	578	y
11A	102	1	518	y
12A	70	1	758	y
13A	83	1	638	y
14A	57	1	938	y
15A	95	1	558	y
16B	33	1	1635	y
17B	22	1	2440	y
18B	21	1	2519	y
19B	81	1	651	y
20B	27	1	2018	y
21B	22	1	2459	y
22B	19	1	2830	y
23B	43	1	1244	y
24B	18	1	3034	n
25B	43	1	1241	n
26B	28	1	1897	n
27B	23	1	2376	y
28B	24	1	2279	y
29B	26	1	2095	y
30B	21	1	2546	y
			Total Detection Percentage	90.00 %

4.9.5 Test Results 802.11ax 80MHz at 5290MHz (Continued)

Radar Type 2

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	23	3.9	158	y
2	28	1.4	209	y
3	25	3.9	151	y
4	26	1.4	167	y
5	23	1.9	171	y
6	28	2.1	210	y
7	24	3.9	206	y
8	27	1.9	163	y
9	24	4.9	151	y
10	23	4.4	212	y
11	26	1.5	218	y
12	26	3.2	199	y
13	28	3.4	173	y
14	27	2.2	157	y
15	24	2.9	187	y
16	24	2.4	194	y
17	24	2	181	y
18	25	3.3	186	y
19	28	2.8	194	y
20	28	3.4	174	n
21	28	4.3	213	y
22	26	1.6	158	n
23	27	1.4	176	y
24	27	1.8	201	y
25	23	2.7	198	y
26	28	4.4	160	y
27	24	4.6	188	y
28	23	3.2	152	y
29	24	2	217	y
30	27	4.4	207	y
			Total Detection Percentage	93.33 %

4.9.5 Test Results 802.11ax 80MHz at 5290MHz (Continued)

Radar Type 3

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	17	7.8	495	y
2	16	8.5	333	y
3	17	9.6	329	y
4	17	8.3	222	y
5	16	10	459	y
6	17	8.8	251	y
7	17	9.7	327	y
8	16	8.6	290	y
9	16	6.7	220	y
10	17	10	220	y
11	17	7	363	y
12	16	7.5	343	y
13	18	7.5	203	y
14	16	6.8	281	y
15	17	7.1	437	y
16	18	6.2	319	y
17	17	9.1	237	y
18	17	6.3	353	y
19	17	8.4	378	y
20	18	9.2	282	y
21	17	9.7	428	y
22	17	9	262	y
23	16	9	218	y
24	17	7.3	235	y
25	17	7.7	208	y
26	17	6.4	412	y
27	17	9.6	234	y
28	17	8.6	229	y
29	16	9.4	440	y
30	16	9.5	426	y
Total Detection Percentage				100.00 %

4.9.5 Test Results 802.11ax 80MHz at 5290MHz (Continued)

Radar Type 4

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	15	11.9	389	y
2	14	14.5	247	y
3	16	11.7	353	y
4	14	17.9	209	y
5	14	11.9	367	y
6	14	17.5	397	y
7	16	17.8	415	y
8	13	18.3	442	y
9	13	18.9	465	y
10	12	16.7	238	y
11	12	15	434	y
12	13	15.2	454	y
13	14	15.8	458	n
14	15	16.6	467	y
15	15	18.9	383	y
16	15	14.6	339	y
17	13	18.7	360	n
18	14	15.4	429	y
19	15	12	262	y
20	15	11.3	206	y
21	12	19.9	376	y
22	14	11	432	n
23	14	11.2	227	y
24	13	18.4	307	y
25	13	14.5	209	y
26	15	14.9	279	y
27	16	12.5	469	y
28	15	18	227	y
29	13	13.3	492	y
30	13	14.6	365	y
			Total Detection Percentage	90.00 %

802.11ax 80MHz Aggregated Detection 1-4

Type 1	Type 2	Type 3	Type 4	Aggregate	Limit	Results
90.00%	93.33%	100.00%	90.00%	93.33%	>80%	Pass

4.9.5 Test Results 802.11ax 80MHz at 5290MHz (Continued)

Radar Type 5

Trial #	Radar Type	Waveform #	Detection (y/n)
1	FCC Radar Type 5	Waveform #1	y
2	FCC Radar Type 5	Waveform #2	y
3	FCC Radar Type 5	Waveform #3	y
4	FCC Radar Type 5	Waveform #4	y
5	FCC Radar Type 5	Waveform #5	y
6	FCC Radar Type 5	Waveform #6	y
7	FCC Radar Type 5	Waveform #7	y
8	FCC Radar Type 5	Waveform #8	y
9	FCC Radar Type 5	Waveform #9	y
10	FCC Radar Type 5	Waveform #10	y
11	FCC Radar Type 5	Waveform #11	y
12	FCC Radar Type 5	Waveform #12	y
13	FCC Radar Type 5	Waveform #13	y
14	FCC Radar Type 5	Waveform #14	y
15	FCC Radar Type 5	Waveform #15	y
16	FCC Radar Type 5	Waveform #16	y
17	FCC Radar Type 5	Waveform #17	y
18	FCC Radar Type 5	Waveform #18	y
19	FCC Radar Type 5	Waveform #19	y
20	FCC Radar Type 5	Waveform #20	y
21	FCC Radar Type 5	Waveform #21	y
22	FCC Radar Type 5	Waveform #22	y
23	FCC Radar Type 5	Waveform #23	y
24	FCC Radar Type 5	Waveform #24	y
25	FCC Radar Type 5	Waveform #25	y
26	FCC Radar Type 5	Waveform #26	y
27	FCC Radar Type 5	Waveform #27	y
28	FCC Radar Type 5	Waveform #28	y
29	FCC Radar Type 5	Waveform #29	y
30	FCC Radar Type 5	Waveform #30	y
		Total Detection Percentage	100.00 %

4.9.5 Test Results 802.11ax 80MHz at 5290MHz (Continued)

Radar Type 6

Trial #	Radar Type	Waveform #	Detection (y/n)
1	FCC Radar Type 6	Sequencing List #1	y
2	FCC Radar Type 6	Sequencing List #2	y
3	FCC Radar Type 6	Sequencing List #3	y
4	FCC Radar Type 6	Sequencing List #4	y
5	FCC Radar Type 6	Sequencing List #5	y
6	FCC Radar Type 6	Sequencing List #6	y
7	FCC Radar Type 6	Sequencing List #7	y
8	FCC Radar Type 6	Sequencing List #8	y
9	FCC Radar Type 6	Sequencing List #9	y
10	FCC Radar Type 6	Sequencing List #10	y
11	FCC Radar Type 6	Sequencing List #11	y
12	FCC Radar Type 6	Sequencing List #12	y
13	FCC Radar Type 6	Sequencing List #13	y
14	FCC Radar Type 6	Sequencing List #14	y
15	FCC Radar Type 6	Sequencing List #15	y
16	FCC Radar Type 6	Sequencing List #16	y
17	FCC Radar Type 6	Sequencing List #17	n
18	FCC Radar Type 6	Sequencing List #18	y
19	FCC Radar Type 6	Sequencing List #19	y
20	FCC Radar Type 6	Sequencing List #20	y
21	FCC Radar Type 6	Sequencing List #21	y
22	FCC Radar Type 6	Sequencing List #22	y
23	FCC Radar Type 6	Sequencing List #23	y
24	FCC Radar Type 6	Sequencing List #24	y
25	FCC Radar Type 6	Sequencing List #25	y
26	FCC Radar Type 6	Sequencing List #26	y
27	FCC Radar Type 6	Sequencing List #27	y
28	FCC Radar Type 6	Sequencing List #28	y
29	FCC Radar Type 6	Sequencing List #29	y
30	FCC Radar Type 6	Sequencing List #30	y
		Total Detection Percentage	96.67%

4.9.6 Test Results 802.11a at 5520MHz

Radar Type 1

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1A	76	1	698	y
2A	83	1	638	y
3A	70	1	758	y
4A	58	1	918	y
5A	67	1	798	n
6A	57	1	938	y
7A	62	1	858	y
8A	98	1	538	y
9A	18	1	3066	y
10A	61	1	878	y
11A	89	1	598	y
12A	86	1	618	y
13A	95	1	558	y
14A	63	1	838	y
15A	81	1	658	y
16B	29	1	1837	y
17B	21	1	2575	y
18B	20	1	2665	y
19B	62	1	858	y
20B	27	1	2011	y
21B	19	1	2863	y
22B	23	1	2384	y
23B	24	1	2288	y
24B	18	1	2966	y
25B	38	1	1423	y
26B	28	1	1933	y
27B	39	1	1375	y
28B	64	1	828	y
29B	20	1	2710	y
30B	47	1	1143	y
			Total Detection Percentage	96.67 %

4.9.6 Test Results 802.11a at 5520MHz (Continued)

Radar Type 2

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	25	2.4	224	y
2	24	4.5	166	y
3	23	3.5	210	y
4	27	4.9	229	n
5	24	2.7	200	y
6	26	2	226	y
7	24	2.9	222	y
8	24	5	186	y
9	26	3	210	y
10	28	1	155	y
11	25	1.9	227	y
12	25	4.4	169	y
13	24	3.1	203	y
14	24	2.4	199	y
15	25	3.2	228	y
16	24	3.9	178	y
17	28	1.7	213	y
18	28	1.1	159	y
19	29	3.6	169	y
20	23	2	216	y
21	28	1.1	165	n
22	27	2	227	y
23	28	1.4	217	y
24	23	2.1	206	y
25	26	4.6	195	y
26	29	4.2	179	y
27	25	2.2	198	y
28	24	3.7	165	y
29	27	2.5	153	y
30	26	4.4	177	y
			Total Detection Percentage	93.33 %

4.9.6 Test Results 802.11a at 5520MHz (Continued)

Radar Type 3

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	17	9.1	459	y
2	17	9.2	312	y
3	18	7.1	233	y
4	18	7.6	433	y
5	16	7.0	367	y
6	17	6.1	287	y
7	17	9.4	217	n
8	18	6.2	461	y
9	17	9.0	305	y
10	17	6.7	234	y
11	17	8.2	307	y
12	16	9.7	422	y
13	18	6.9	469	y
14	17	9.3	371	y
15	18	6.9	352	y
16	16	8.1	492	y
17	17	8.9	482	y
18	18	7.4	458	y
19	18	10	420	y
20	17	10	344	y
21	17	9.8	497	y
22	16	8.9	271	y
23	17	8.8	367	y
24	16	8.5	309	y
25	16	7.4	324	y
26	18	8.6	327	y
27	16	6.5	276	y
28	17	8.9	217	y
29	17	8.1	406	y
30	17	6.1	465	y
			Total Detection Percentage	96.67 %

4.9.6 Test Results 802.11a at 5520MHz (Continued)

Radar Type 4

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	13	16.8	481	y
2	16	19.1	211	y
3	12	17.4	336	y
4	13	14.1	240	y
5	14	12.9	253	y
6	13	13.3	304	y
7	15	19.4	378	y
8	16	16.3	281	y
9	14	11.7	299	y
10	13	12.3	420	y
11	13	18.2	467	y
12	13	18.1	410	y
13	14	13.1	341	y
14	14	20	401	y
15	12	17.6	434	y
16	13	19.9	348	y
17	14	11.7	281	y
18	13	11.1	333	y
19	14	16	483	y
20	12	18	487	y
21	13	16.2	454	y
22	14	15	285	y
23	13	14	298	y
24	14	19.9	211	y
25	14	15.3	354	y
26	15	11.1	456	y
27	12	19.5	424	y
28	13	18.7	342	y
29	12	14.5	391	y
30	14	13.1	363	y
			Total Detection Percentage	100.00 %

802.11a Aggregated Detection 1-4

Type 1	Type 2	Type 3	Type 4	Aggregate	Limit	Results
96.67%	93.33%	96.67%	100.00%	96.67%	>80%	Pass

4.9.6 Test Results 802.11a at 5520MHz (Continued)

Radar Type 5

Trial #	Radar Type	Waveform #	Detection (y/n)
1	FCC Radar Type 5	Waveform #1	y
2	FCC Radar Type 5	Waveform #2	y
3	FCC Radar Type 5	Waveform #3	y
4	FCC Radar Type 5	Waveform #4	y
5	FCC Radar Type 5	Waveform #5	y
6	FCC Radar Type 5	Waveform #6	y
7	FCC Radar Type 5	Waveform #7	y
8	FCC Radar Type 5	Waveform #8	y
9	FCC Radar Type 5	Waveform #9	y
10	FCC Radar Type 5	Waveform #10	y
11	FCC Radar Type 5	Waveform #11	y
12	FCC Radar Type 5	Waveform #12	n
13	FCC Radar Type 5	Waveform #13	y
14	FCC Radar Type 5	Waveform #14	y
15	FCC Radar Type 5	Waveform #15	y
16	FCC Radar Type 5	Waveform #16	y
17	FCC Radar Type 5	Waveform #17	y
18	FCC Radar Type 5	Waveform #18	y
19	FCC Radar Type 5	Waveform #19	n
20	FCC Radar Type 5	Waveform #20	y
21	FCC Radar Type 5	Waveform #21	y
22	FCC Radar Type 5	Waveform #22	y
23	FCC Radar Type 5	Waveform #23	y
24	FCC Radar Type 5	Waveform #24	n
25	FCC Radar Type 5	Waveform #25	y
26	FCC Radar Type 5	Waveform #26	y
27	FCC Radar Type 5	Waveform #27	y
28	FCC Radar Type 5	Waveform #28	y
29	FCC Radar Type 5	Waveform #29	y
30	FCC Radar Type 5	Waveform #30	y
		Total Detection Percentage	90.00 %

4.9.6 Test Results 802.11a at 5520MHz (Continued)

Radar Type 6

Trial #	Radar Type	Waveform #	Detection (y/n)
1	FCC Radar Type 6	Sequencing List #31	y
2	FCC Radar Type 6	Sequencing List #32	y
3	FCC Radar Type 6	Sequencing List #33	y
4	FCC Radar Type 6	Sequencing List #34	y
5	FCC Radar Type 6	Sequencing List #35	y
6	FCC Radar Type 6	Sequencing List #36	y
7	FCC Radar Type 6	Sequencing List #37	y
8	FCC Radar Type 6	Sequencing List #38	y
9	FCC Radar Type 6	Sequencing List #39	y
10	FCC Radar Type 6	Sequencing List #40	y
11	FCC Radar Type 6	Sequencing List #41	n
12	FCC Radar Type 6	Sequencing List #42	y
13	FCC Radar Type 6	Sequencing List #43	y
14	FCC Radar Type 6	Sequencing List #44	y
15	FCC Radar Type 6	Sequencing List #45	y
16	FCC Radar Type 6	Sequencing List #46	y
17	FCC Radar Type 6	Sequencing List #47	y
18	FCC Radar Type 6	Sequencing List #48	y
19	FCC Radar Type 6	Sequencing List #49	y
20	FCC Radar Type 6	Sequencing List #50	y
21	FCC Radar Type 6	Sequencing List #51	y
22	FCC Radar Type 6	Sequencing List #52	y
23	FCC Radar Type 6	Sequencing List #53	y
24	FCC Radar Type 6	Sequencing List #54	y
25	FCC Radar Type 6	Sequencing List #55	y
26	FCC Radar Type 6	Sequencing List #56	y
27	FCC Radar Type 6	Sequencing List #57	y
28	FCC Radar Type 6	Sequencing List #58	n
29	FCC Radar Type 6	Sequencing List #59	y
30	FCC Radar Type 6	Sequencing List #60	y
		Total Detection Percentage	93.33 %

4.9.7 Test Results 802.11an 20MHz at 5520MHz

Radar Type 1

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1A	65	1	818	y
2A	95	1	558	y
3A	57	1	938	y
4A	83	1	638	y
5A	89	1	598	y
6A	62	1	858	y
7A	78	1	678	y
8A	72	1	738	y
9A	68	1	778	y
10A	98	1	538	y
11A	61	1	878	y
12A	102	1	518	y
13A	81	1	658	y
14A	76	1	698	y
15A	74	1	718	y
16B	20	1	2674	y
17B	20	1	2719	y
18B	19	1	2869	y
19B	34	1	1595	y
20B	35	1	1520	y
21B	26	1	2070	y
22B	18	1	2974	y
23B	54	1	987	y
24B	29	1	1881	y
25B	22	1	2432	y
26B	24	1	2201	y
27B	26	1	2035	y
28B	72	1	736	y
29B	80	1	665	y
30B	24	1	2283	y
			Total Detection Percentage	100.00 %

4.9.7 Test Results 802.11an 20MHz at 5520MHz (Continued)

Radar Type 2

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	26	4.9	201	y
2	24	2.6	167	n
3	27	3.7	161	y
4	23	2.1	229	y
5	27	4.8	218	y
6	25	1.3	193	y
7	27	1.9	225	y
8	23	4	162	y
9	27	1.6	198	y
10	27	1.5	194	y
11	25	1.2	196	y
12	28	1.3	218	y
13	28	4.8	183	y
14	26	2.6	227	y
15	25	4.7	214	y
16	23	2.9	191	y
17	25	1.8	184	y
18	23	4.6	203	y
19	25	1.7	167	y
20	23	3.2	153	y
21	29	1.2	209	y
22	28	3.3	218	y
23	27	3.1	174	y
24	23	3.4	161	y
25	25	4	191	y
26	24	4.6	160	y
27	26	2.1	182	y
28	24	2.9	228	y
29	23	3.6	201	y
30	26	1	198	y
			Total Detection Percentage	96.67 %

4.9.7 Test Results 802.11an 20MHz at 5520MHz (Continued)

Radar Type 3

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	17	9.8	385	y
2	18	7.3	275	y
3	17	7	451	y
4	17	8.9	214	y
5	18	8.4	213	y
6	16	7.7	449	n
7	17	9.9	486	y
8	17	7.5	314	y
9	18	9.3	227	y
10	18	7.2	233	y
11	17	6.1	256	n
12	17	6.9	201	y
13	17	8.1	467	y
14	17	9.4	413	y
15	17	8.4	459	y
16	18	6.1	490	y
17	17	9.2	489	y
18	16	9.2	273	y
19	16	6.6	361	y
20	18	7.3	239	y
21	17	6	201	y
22	17	7.9	279	y
23	17	7.2	378	y
24	16	7	372	y
25	17	9.6	414	y
26	18	8.8	446	y
27	18	7.1	314	y
28	18	6.8	246	n
29	17	9.1	227	y
30	17	6.5	307	y
			Total Detection Percentage	90.00 %

4.9.7 Test Results 802.11an 20MHz at 5520MHz (Continued)

Radar Type 4

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	15	15.9	488	y
2	15	13.6	246	y
3	14	15.6	408	y
4	14	17.7	229	y
5	15	12	450	y
6	14	17.8	360	y
7	16	13	315	y
8	13	13.9	392	y
9	13	17.8	424	y
10	14	15.1	412	y
11	14	19.9	412	y
12	16	14.8	289	y
13	14	19.6	258	y
14	16	17.8	351	y
15	15	11.8	500	y
16	13	11.7	387	y
17	14	14.1	333	y
18	15	13.2	200	y
19	14	18.6	432	n
20	14	15.4	209	y
21	15	13.3	284	y
22	15	14.5	301	y
23	14	18.8	443	y
24	12	19.3	315	y
25	15	13.9	371	y
26	13	13.8	267	n
27	16	19.1	384	y
28	16	18.8	357	y
29	13	11.1	461	y
30	15	17.4	477	y
			Total Detection Percentage	93.33 %

802.11n 20MHz Aggregated Detection 1-4

Type 1	Type 2	Type 3	Type 4	Aggregate	Limit	Results
100.00%	96.67%	90.00%	93.33%	95.00%	>80%	Pass

4.9.7 Test Results 802.11an 20MHz at 5520MHz (Continued)

Radar Type 5

Trial #	Radar Type	Waveform #	Detection (y/n)
1	FCC Radar Type 5	Waveform #1	y
2	FCC Radar Type 5	Waveform #2	y
3	FCC Radar Type 5	Waveform #3	y
4	FCC Radar Type 5	Waveform #4	y
5	FCC Radar Type 5	Waveform #5	y
6	FCC Radar Type 5	Waveform #6	y
7	FCC Radar Type 5	Waveform #7	y
8	FCC Radar Type 5	Waveform #8	y
9	FCC Radar Type 5	Waveform #9	y
10	FCC Radar Type 5	Waveform #10	y
11	FCC Radar Type 5	Waveform #11	y
12	FCC Radar Type 5	Waveform #12	y
13	FCC Radar Type 5	Waveform #13	y
14	FCC Radar Type 5	Waveform #14	y
15	FCC Radar Type 5	Waveform #15	y
16	FCC Radar Type 5	Waveform #16	y
17	FCC Radar Type 5	Waveform #17	y
18	FCC Radar Type 5	Waveform #18	y
19	FCC Radar Type 5	Waveform #19	n
20	FCC Radar Type 5	Waveform #20	y
21	FCC Radar Type 5	Waveform #21	y
22	FCC Radar Type 5	Waveform #22	y
23	FCC Radar Type 5	Waveform #23	y
24	FCC Radar Type 5	Waveform #24	y
25	FCC Radar Type 5	Waveform #25	y
26	FCC Radar Type 5	Waveform #26	y
27	FCC Radar Type 5	Waveform #27	y
28	FCC Radar Type 5	Waveform #28	y
29	FCC Radar Type 5	Waveform #29	y
30	FCC Radar Type 5	Waveform #30	y
		Total Detection Percentage	96.67 %

4.9.7 Test Results 802.11an 20MHz at 5520MHz (Continued)

Radar Type 6

Trial #	Radar Type	Waveform #	Detection (y/n)
1	FCC Radar Type 6	Sequencing List #31	y
2	FCC Radar Type 6	Sequencing List #32	y
3	FCC Radar Type 6	Sequencing List #33	y
4	FCC Radar Type 6	Sequencing List #34	y
5	FCC Radar Type 6	Sequencing List #35	y
6	FCC Radar Type 6	Sequencing List #36	y
7	FCC Radar Type 6	Sequencing List #37	y
8	FCC Radar Type 6	Sequencing List #38	y
9	FCC Radar Type 6	Sequencing List #39	y
10	FCC Radar Type 6	Sequencing List #40	y
11	FCC Radar Type 6	Sequencing List #41	y
12	FCC Radar Type 6	Sequencing List #42	y
13	FCC Radar Type 6	Sequencing List #43	y
14	FCC Radar Type 6	Sequencing List #44	y
15	FCC Radar Type 6	Sequencing List #45	y
16	FCC Radar Type 6	Sequencing List #46	y
17	FCC Radar Type 6	Sequencing List #47	y
18	FCC Radar Type 6	Sequencing List #48	y
19	FCC Radar Type 6	Sequencing List #49	y
20	FCC Radar Type 6	Sequencing List #50	y
21	FCC Radar Type 6	Sequencing List #51	y
22	FCC Radar Type 6	Sequencing List #52	y
23	FCC Radar Type 6	Sequencing List #53	y
24	FCC Radar Type 6	Sequencing List #54	n
25	FCC Radar Type 6	Sequencing List #55	y
26	FCC Radar Type 6	Sequencing List #56	y
27	FCC Radar Type 6	Sequencing List #57	y
28	FCC Radar Type 6	Sequencing List #58	y
29	FCC Radar Type 6	Sequencing List #59	y
30	FCC Radar Type 6	Sequencing List #60	y
		Total Detection Percentage	96.67 %

4.9.8 Test Results 802.11ac 40MHz at 5510MHz

Radar Type 1

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1A	74	1	718	y
2A	83	1	638	y
3A	63	1	838	y
4A	67	1	798	n
5A	89	1	598	y
6A	95	1	558	y
7A	68	1	778	y
8A	86	1	618	y
9A	92	1	578	y
10A	72	1	738	y
11A	78	1	678	y
12A	62	1	858	y
13A	61	1	878	y
14A	70	1	758	y
15A	76	1	698	y
16B	30	1	1786	y
17B	27	1	1999	y
18B	34	1	1585	y
19B	21	1	2588	y
20B	31	1	1750	y
21B	25	1	2179	y
22B	98	1	543	y
23B	40	1	1344	y
24B	22	1	2458	y
25B	63	1	843	y
26B	77	1	690	y
27B	28	1	1921	y
28B	19	1	2851	y
29B	47	1	1144	y
30B	20	1	2724	n
			Total Detection Percentage	93.33 %

4.9.8 Test Results 802.11ac 40MHz at 5510MHz (Continued)

Radar Type 2

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	28	3.4	213	y
2	24	4.7	173	y
3	25	2.3	209	y
4	28	4.8	191	y
5	27	2.6	164	y
6	28	4.1	220	y
7	27	4.6	154	y
8	26	1.8	182	y
9	26	2.1	172	y
10	27	5	165	y
11	25	4.8	198	y
12	27	4.2	166	y
13	29	1.1	170	y
14	27	2.4	196	y
15	29	3.6	216	y
16	25	3.4	175	y
17	29	1.5	190	y
18	28	2.4	197	y
19	28	4.7	195	y
20	25	4.8	153	y
21	29	1.5	204	y
22	26	3.9	170	y
23	24	3.6	220	y
24	29	4.1	199	y
25	27	2.6	224	y
26	25	3.1	201	y
27	25	1.6	174	y
28	23	4.8	184	y
29	26	4.1	220	y
30	24	4.9	153	y
			Total Detection Percentage	100.00 %

4.9.8 Test Results 802.11ac 40MHz at 5510MHz (Continued)

Radar Type 3

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	17	7.5	355	y
2	18	8.5	232	y
3	16	7.8	369	y
4	18	6.4	311	y
5	16	6.4	355	y
6	18	7.4	244	y
7	17	7.4	364	y
8	17	9.8	217	y
9	17	8	462	y
10	18	8.7	263	n
11	16	8.4	475	y
12	17	8.5	342	y
13	17	9	422	y
14	16	6	289	y
15	17	6.8	223	y
16	16	6	438	y
17	17	7.7	346	y
18	17	8.5	376	y
19	17	9.1	250	y
20	17	6.9	298	y
21	17	9.6	281	y
22	17	8.7	422	y
23	18	7	229	y
24	16	6.7	485	y
25	18	9.7	396	y
26	17	8	472	y
27	16	8.8	316	y
28	18	7.2	447	y
29	18	9.1	459	y
30	18	6	217	y
			Total Detection Percentage	96.67 %

4.9.8 Test Results 802.11ac 40MHz at 5510MHz (Continued)

Radar Type 4

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	15	19	255	y
2	12	14.5	378	y
3	14	18.9	208	y
4	12	15.5	220	y
5	14	19.2	231	y
6	16	19.5	407	n
7	16	14	484	y
8	12	12.5	255	y
9	13	13.3	458	n
10	15	19.3	435	y
11	13	16	253	y
12	15	16	260	y
13	15	12	443	y
14	13	13.5	371	y
15	15	11.9	312	y
16	12	19.6	219	y
17	14	15.9	229	y
18	14	12.5	212	y
19	15	15.9	426	y
20	15	13.3	284	y
21	16	13.2	455	y
22	13	19.4	237	y
23	15	15.4	259	y
24	15	18.7	252	y
25	12	14.8	315	y
26	14	15.2	401	y
27	15	16.3	268	y
28	13	17.6	366	y
29	12	14.9	444	y
30	14	16.9	301	y
			Total Detection Percentage	93.33 %

802.11ac 40MHz Aggregated Detection 1-4

Type 1	Type 2	Type 3	Type 4	Aggregate	Limit	Results
93.33%	100.00%	96.67%	93.33%	95.83%	>80%	Pass

4.9.8 Test Results 802.11ac 40MHz at 5510MHz (Continued)

Radar Type 5

Trial #	Radar Type	Waveform #	Detection (y/n)
1	FCC Radar Type 5	Waveform #1	y
2	FCC Radar Type 5	Waveform #2	y
3	FCC Radar Type 5	Waveform #3	y
4	FCC Radar Type 5	Waveform #4	y
5	FCC Radar Type 5	Waveform #5	y
6	FCC Radar Type 5	Waveform #6	y
7	FCC Radar Type 5	Waveform #7	y
8	FCC Radar Type 5	Waveform #8	n
9	FCC Radar Type 5	Waveform #9	n
10	FCC Radar Type 5	Waveform #10	y
11	FCC Radar Type 5	Waveform #11	y
12	FCC Radar Type 5	Waveform #12	y
13	FCC Radar Type 5	Waveform #13	y
14	FCC Radar Type 5	Waveform #14	y
15	FCC Radar Type 5	Waveform #15	y
16	FCC Radar Type 5	Waveform #16	y
17	FCC Radar Type 5	Waveform #17	y
18	FCC Radar Type 5	Waveform #18	y
19	FCC Radar Type 5	Waveform #19	y
20	FCC Radar Type 5	Waveform #20	y
21	FCC Radar Type 5	Waveform #21	y
22	FCC Radar Type 5	Waveform #22	y
23	FCC Radar Type 5	Waveform #23	y
24	FCC Radar Type 5	Waveform #24	y
25	FCC Radar Type 5	Waveform #25	y
26	FCC Radar Type 5	Waveform #26	y
27	FCC Radar Type 5	Waveform #27	y
28	FCC Radar Type 5	Waveform #28	y
29	FCC Radar Type 5	Waveform #29	y
30	FCC Radar Type 5	Waveform #30	y
		Total Detection Percentage	93.33 %

4.9.8 Test Results 802.11ac 40MHz at 5510MHz (Continued)

Radar Type 6

Trial #	Radar Type	Waveform #	Detection (y/n)
1	FCC Radar Type 6	Sequencing List #31	y
2	FCC Radar Type 6	Sequencing List #32	y
3	FCC Radar Type 6	Sequencing List #33	y
4	FCC Radar Type 6	Sequencing List #34	y
5	FCC Radar Type 6	Sequencing List #35	y
6	FCC Radar Type 6	Sequencing List #36	y
7	FCC Radar Type 6	Sequencing List #37	y
8	FCC Radar Type 6	Sequencing List #38	y
9	FCC Radar Type 6	Sequencing List #39	y
10	FCC Radar Type 6	Sequencing List #40	y
11	FCC Radar Type 6	Sequencing List #41	y
12	FCC Radar Type 6	Sequencing List #42	y
13	FCC Radar Type 6	Sequencing List #43	y
14	FCC Radar Type 6	Sequencing List #44	y
15	FCC Radar Type 6	Sequencing List #45	y
16	FCC Radar Type 6	Sequencing List #46	y
17	FCC Radar Type 6	Sequencing List #47	y
18	FCC Radar Type 6	Sequencing List #48	y
19	FCC Radar Type 6	Sequencing List #49	y
20	FCC Radar Type 6	Sequencing List #50	y
21	FCC Radar Type 6	Sequencing List #51	y
22	FCC Radar Type 6	Sequencing List #52	y
23	FCC Radar Type 6	Sequencing List #53	y
24	FCC Radar Type 6	Sequencing List #54	y
25	FCC Radar Type 6	Sequencing List #55	y
26	FCC Radar Type 6	Sequencing List #56	y
27	FCC Radar Type 6	Sequencing List #57	y
28	FCC Radar Type 6	Sequencing List #58	y
29	FCC Radar Type 6	Sequencing List #59	y
30	FCC Radar Type 6	Sequencing List #60	y
		Total Detection Percentage	100.00%

4.9.10 Test Results 802.11ax 80MHz at 5530MHz

Radar Type 1

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1A	57	1	938	y
2A	86	1	618	y
3A	78	1	678	y
4A	102	1	518	y
5A	95	1	558	y
6A	18	1	3066	y
7A	68	1	778	y
8A	62	1	858	y
9A	81	1	658	y
10A	98	1	538	y
11A	67	1	798	y
12A	59	1	898	y
13A	83	1	638	y
14A	72	1	738	y
15A	63	1	838	y
16B	51	1	1043	y
17B	24	1	2212	y
18B	23	1	2359	y
19B	19	1	2903	y
20B	25	1	2116	y
21B	48	1	1100	y
22B	35	1	1521	y
23B	80	1	660	y
24B	28	1	1924	y
25B	24	1	2215	y
26B	40	1	1325	y
27B	33	1	1625	y
28B	21	1	2626	y
29B	47	1	1122	y
30B	20	1	2746	y
			Total Detection Percentage	100.00 %

4.9.10 Test Results 802.11ax 80MHz at 5530MHz (Continued)

Radar Type 2

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	28	4.7	158	y
2	26	4	223	y
3	27	3.4	184	y
4	25	1.4	155	y
5	28	4.3	197	y
6	24	4	153	y
7	26	4	174	y
8	25	3.8	203	y
9	28	3.5	215	y
10	27	2.9	185	y
11	28	2.7	200	y
12	28	3.3	223	y
13	24	4.6	158	y
14	28	4.6	179	y
15	28	5	174	y
16	27	4	207	y
17	27	1.9	226	y
18	26	4.9	197	y
19	27	4.1	228	y
20	25	1.1	212	y
21	28	2	211	y
22	25	2.8	186	y
23	27	4.9	151	y
24	26	3.7	189	y
25	24	1.2	172	y
26	27	4.2	157	y
27	23	4.5	201	y
28	28	3.6	154	y
29	29	3.1	225	y
30	29	2.5	195	y
			Total Detection Percentage	100.00 %

4.9.10 Test Results 802.11ax 80MHz at 5530MHz (Continued)

Radar Type 3

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	16	9.6	338	y
2	18	7.8	460	y
3	16	6.3	470	y
4	17	9	333	y
5	17	9.4	319	y
6	16	6.7	281	y
7	18	6.1	261	y
8	17	8	305	y
9	17	6.3	376	y
10	18	6.7	278	y
11	17	9.5	306	y
12	17	7.7	208	y
13	17	6.5	327	y
14	17	8.8	482	y
15	18	9.1	360	y
16	16	8.7	420	n
17	16	8.3	463	y
18	16	6.6	297	y
19	16	9.7	321	y
20	17	6.3	391	n
21	18	9.8	376	y
22	16	7.6	457	y
23	17	9.6	247	n
24	16	8.1	356	y
25	18	9.3	458	y
26	16	9.6	287	y
27	17	7.7	459	y
28	17	7.1	225	y
29	17	8.1	358	y
30	17	6	356	y
			Total Detection Percentage	90.00 %

4.9.10 Test Results 802.11ax 80MHz at 5530MHz (Continued)

Radar Type 4

Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (y/n)
1	16	17.2	428	y
2	13	17.1	336	y
3	13	11.8	403	y
4	15	19.3	342	y
5	14	18	357	y
6	13	12.8	221	y
7	15	18.6	299	y
8	16	19.4	471	y
9	14	15.4	235	y
10	14	11.5	449	y
11	14	14.2	414	y
12	14	11.4	329	n
13	13	15.9	473	y
14	16	17.7	428	y
15	16	16.6	407	y
16	16	14.8	256	y
17	13	12	279	y
18	16	17.9	415	y
19	13	17.1	346	y
20	14	13	221	y
21	12	17.9	356	y
22	15	14	492	y
23	14	13.6	452	y
24	14	14.3	313	y
25	14	18.9	345	y
26	12	17.3	484	y
27	16	19.8	205	y
28	16	19.2	433	y
29	15	19.6	482	y
30	13	11.5	221	y
			Total Detection Percentage	96.67 %

802.11ax 80MHz Aggregated Detection 1-4

Type 1	Type 2	Type 3	Type 4	Aggregate	Limit	Results
100.00%	100.00%	90.00%	96.67%	96.67%	>80%	Pass

4.9.10 Test Results 802.11ax 80MHz at 5530MHz (Continued)

Radar Type 5

Trial #	Radar Type	Waveform #	Detection (y/n)
1	FCC Radar Type 5	Waveform #1	y
2	FCC Radar Type 5	Waveform #2	y
3	FCC Radar Type 5	Waveform #3	y
4	FCC Radar Type 5	Waveform #4	y
5	FCC Radar Type 5	Waveform #5	y
6	FCC Radar Type 5	Waveform #6	y
7	FCC Radar Type 5	Waveform #7	y
8	FCC Radar Type 5	Waveform #8	y
9	FCC Radar Type 5	Waveform #9	y
10	FCC Radar Type 5	Waveform #10	y
11	FCC Radar Type 5	Waveform #11	y
12	FCC Radar Type 5	Waveform #12	y
13	FCC Radar Type 5	Waveform #13	y
14	FCC Radar Type 5	Waveform #14	y
15	FCC Radar Type 5	Waveform #15	y
16	FCC Radar Type 5	Waveform #16	y
17	FCC Radar Type 5	Waveform #17	y
18	FCC Radar Type 5	Waveform #18	y
19	FCC Radar Type 5	Waveform #19	y
20	FCC Radar Type 5	Waveform #20	y
21	FCC Radar Type 5	Waveform #21	y
22	FCC Radar Type 5	Waveform #22	y
23	FCC Radar Type 5	Waveform #23	y
24	FCC Radar Type 5	Waveform #24	y
25	FCC Radar Type 5	Waveform #25	y
26	FCC Radar Type 5	Waveform #26	y
27	FCC Radar Type 5	Waveform #27	y
28	FCC Radar Type 5	Waveform #28	y
29	FCC Radar Type 5	Waveform #29	y
30	FCC Radar Type 5	Waveform #30	y
		Total Detection Percentage	100.00 %

4.9.10 Test Results 802.11ax 80MHz at 5530MHz (Continued)

Radar Type 6

Trial #	Radar Type	Waveform #	Detection (y/n)
1	FCC Radar Type 6	Sequencing List #31	y
2	FCC Radar Type 6	Sequencing List #32	y
3	FCC Radar Type 6	Sequencing List #33	y
4	FCC Radar Type 6	Sequencing List #34	y
5	FCC Radar Type 6	Sequencing List #35	y
6	FCC Radar Type 6	Sequencing List #36	y
7	FCC Radar Type 6	Sequencing List #37	y
8	FCC Radar Type 6	Sequencing List #38	y
9	FCC Radar Type 6	Sequencing List #39	y
10	FCC Radar Type 6	Sequencing List #40	y
11	FCC Radar Type 6	Sequencing List #41	y
12	FCC Radar Type 6	Sequencing List #42	y
13	FCC Radar Type 6	Sequencing List #43	y
14	FCC Radar Type 6	Sequencing List #44	y
15	FCC Radar Type 6	Sequencing List #45	y
16	FCC Radar Type 6	Sequencing List #46	y
17	FCC Radar Type 6	Sequencing List #47	y
18	FCC Radar Type 6	Sequencing List #48	y
19	FCC Radar Type 6	Sequencing List #49	y
20	FCC Radar Type 6	Sequencing List #50	y
21	FCC Radar Type 6	Sequencing List #51	y
22	FCC Radar Type 6	Sequencing List #52	y
23	FCC Radar Type 6	Sequencing List #53	y
24	FCC Radar Type 6	Sequencing List #54	y
25	FCC Radar Type 6	Sequencing List #55	y
26	FCC Radar Type 6	Sequencing List #56	y
27	FCC Radar Type 6	Sequencing List #57	y
28	FCC Radar Type 6	Sequencing List #58	y
29	FCC Radar Type 6	Sequencing List #59	y
30	FCC Radar Type 6	Sequencing List #60	y
		Total Detection Percentage	100.00 %

5.0 List of Test Equipment

Measurement equipment used for emission compliance testing utilized the equipment on the following list:

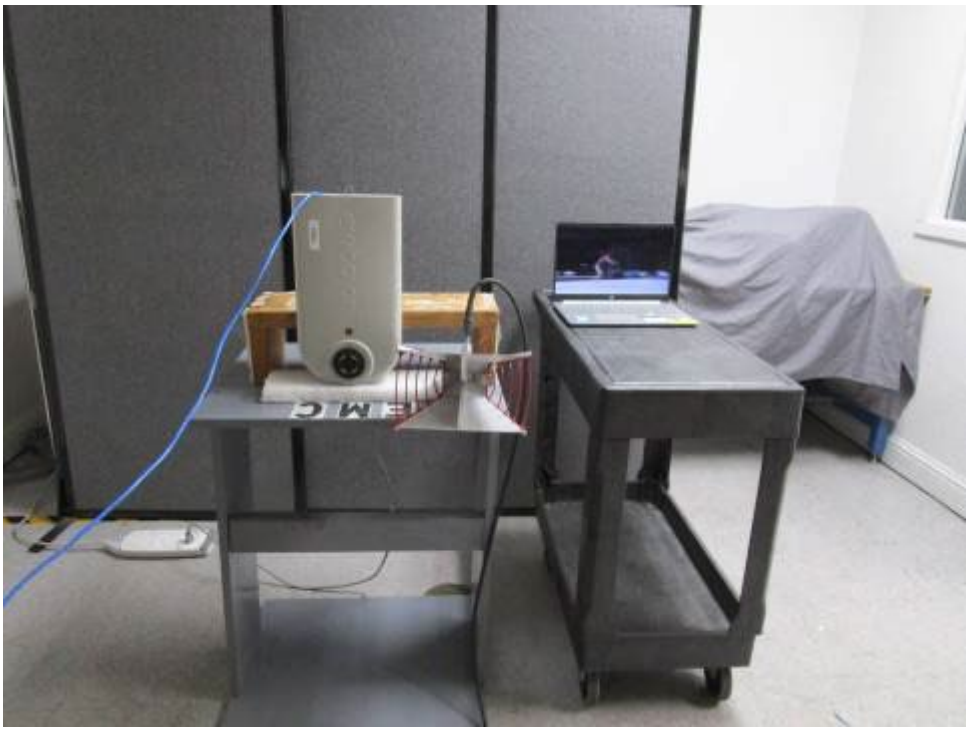
Equipment	Manufacturer	Model/Type	Asset/ Serial #	Cal Int	Cal Due
Spectrum Analyzer	Rohde Schwarz	ESR7	01607	12	11/05/2021
RF Cable	Megaphase	EMC1-K1K1-20	01898	12	03/31/2022
RF Cable	Megaphase	EMC1-K1K1-236	01917	12	05/24/2022
Vector Signal Generator	Rohde Schwarz	SMU 200A	00880	12	12/09/2021
Vector Signal Generator	Rohde Schwarz	SMW 200A	108846	VBU	VBU
Horn Antenna	Amplifier Research	ATH1G18	01432	VBU	VBU
Horn Antenna	ETS Lindgren	3115	00982	12	05/13/2022
Preamplifier	uComp Nordic	MCN-40-001018002510P	01817	12	01/07/2022

VBU-Verified before use

Software used for emission compliance testing utilized the following:

Name	Manufacturer	Version	Template/Profile
R&S Commander	Rohde Schwarz	1.9.3, 1.16.2017	Not Applicable (Screen grabber)
R&S Pulse Sequencer DFS	Rohde Schwarz	V 2.1, 17.11.2020	FCC KDB 905462 D02
R&S K6 Pulse Sequencer	Rohde Schwarz	V 4.1, 29.09.2014	FCC0696-Type1-4 FCC0696-Type5-Sequencer FCC0696-Type6

6.0 Test Setup Pictures



7.0 Document History

Revision/ Job Number	Writer Initials	Reviewer Initials	Date	Change
1.0 / G104626259	AS	KV	August 27, 2021	Original document
1.1 / G104626259	AS	ML	August 19, 2022	Added Appendix B – Antenna Information

Appendix A - FCC Radar Type 5 Waveform

Waveform #1 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	1	86.2	5			1361
2	2	92.2	10	940		234
3	2	98.8	13	1395		454
4	2	51.9	10	1745		1128
5	1	87.7	9			304
6	2	71.7	10	1667		1282
7	3	50.1	5	1046	1533	750
8	2	50.2	15	1947		266
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Waveform #2 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	3	61	14	1182	1903	883
2	1	85.1	9			264
3	2	95.3	9	1641		867
4	3	54.7	13	1380	1125	91
5	2	69.8	13	1115		208
6	2	92.6	13	1345		325
7	2	64.6	20	1128		771
8	3	71.8	7	1544	1018	330
9	2	69.9	19	1247		226
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13						
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19						
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Waveform #3 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	2	64	18	1138		1122
2	2	70	5	1280		353
3	1	95.5	9			329
4	3	93.6	14	1406	925	422
5	2	86.1	17	1222		578
6	2	57.4	13	1738		1099
7	2	60.7	20	1314		395
8	1	63.4	20			9
9	1	98	13			593
10	2	59.6	5	1583		471
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19						
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Waveform #4 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	2	62.7	10	1358		1038
2	3	82.2	13	1270	1304	708
3	3	97.8	13	1693	1774	770
4	1	97.1	20			901
5	3	96.3	19	1653	1641	1065
6	2	73.6	5	1220		503
7	2	94	8	951		811
8	1	66	11			331
9	3	84.3	10	1564	1218	468
10	2	51.9	13	1080		287
11	3	99.8	13	1763	1444	510
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13						
14						
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17						
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19						
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Waveform #5 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	2	79.2	11	1447		761
2	3	95	14	1882	1334	793
3	3	68.6	9	1488	1307	75
4	1	72.8	13			294
5	2	81.1	11	1506		740
6	3	65.4	5	1713	1233	347
7	2	79.7	18	1027		937
8	1	76.7	13			796
9	2	74.3	5	992		327
10	2	68	19	1835		198
11	2	70	19	1097		397
12	3	77.4	6	1913	1776	342
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17						
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19						
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Waveform #6 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	1	78.9	10			67
2	1	53.9	13			477
3	2	58.9	9	1260		596
4	3	86.7	10	1590	1623	535
5	2	56.2	19	1083		121
6	3	96.5	17	1180	1183	879
7	2	95.5	19	1656		72
8	2	64.5	7	1659		262
9	2	91.1	8	1323		701
10	3	95.8	7	1585	1353	647
11	2	66.9	9	1743		6
12	1	76.4	13			856
13	1	89.8	5			303
14						
15						
16						
17						
18						
19						
20						

Waveform #7 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	3	57.2	19	1557	1618	625
2	2	94.9	13	1419		221
3	1	93.9	10			565
4	2	69.6	20	1762		567
5	1	69.6	10			76
6	3	58	6	1180	1442	541
7	2	69.4	13	946		16
8	2	76.2	7	1080		4
9	2	58.6	7	1642		176
10	2	73.9	14	1071		209
11	1	76.6	9			470
12	1	55.2	19			766
13	2	71.5	7	992		183
14	3	89.9	6	1175	1679	808
15						
16						
17						
18						
19						
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Waveform #8 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	1	63.4	7			721
2	2	77.5	17	1489		175
3	1	97.7	13			50
4	2	50.9	15	1208		49
5	2	97.8	19	1718		661
6	1	66.9	13			19
7	1	90.6	13			706
8	2	70.2	18	1473		434
9	2	98.7	12	1629		144
10	3	83.6	10	1599	1770	378
11	3	87.2	18	1084	965	622
12	2	53.9	7	1385		539
13	1	80	7			707
14	3	81	11	1616	1308	590
15	3	97.7	10	1181	1858	563
16						
17						
18						
19						
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Waveform #9 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	3	58.4	14	1209	1787	253
2	2	58.2	10	1428		334
3	2	83.7	8	1872		159
4	2	70.1	6	1714		20
5	2	83.3	12	1019		201
6	1	84.9	19			487
7	3	73.9	15	1060	1546	403
8	2	68.9	13	1610		126
9	2	76.3	5	1831		286
10	2	60.7	15	1461		591
11	1	56.9	19			107
12	1	78	8			28
13	3	62.4	5	1660	1629	60
14	2	84.9	7	1471		438
15	2	83.7	6	980		186
16	2	75.6	6	1090		351
17						
18						
19						
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Waveform #10 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	2	88.8	11	993		248
2	2	69.2	13	932		695
3	2	74.8	18	1102		18
4	2	84.6	7	1528		427
5	1	79.4	10			246
6	2	73.2	18	1559		565
7	1	90.1	19			129
8	1	75.6	19			209
9	1	87.1	8			411
10	2	55.4	18	1052		620
11	1	90.8	11			184
12	2	55.2	18	1141		306
13	1	77.7	15			50
14	2	96.3	18	1536		608
15	2	56.1	13	1585		574
16	3	85.4	19	1261	1238	461
17	3	87.8	18	1805	1702	359
18						
19						
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Waveform #11 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	3	87.8	10	1427	1827	299
2	1	63	5			332
3	3	59.4	8	1201	1491	631
4	2	97.6	17	1782		35
5	2	73.9	7	1139		84
6	1	79.9	13			275
7	3	70	6	1860	1407	549
8	3	75.6	18	1340	1658	197
9	1	85.6	7			655
10	1	74.7	8			38
11	1	51.5	8			117
12	1	57.9	17			36
13	2	61.3	15	1409		125
14	1	85.9	10			26
15	2	85.7	11	1520		371
16	1	93.3	13			317
17	2	98.6	8	1020		38
18	1	66.4	11			105
19						
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Waveform #12 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	2	61.6	17	1119		260
2	1	77.2	9			256
3	1	50.8	11			24
4	1	85	9			415
5	2	69.5	15	1010		552
6	2	74.5	11	1842		24
7	3	58.1	10	1739	1028	571
8	2	95.7	5	1615		238
9	3	77.8	18	1748	1658	240
10	1	53.6	14			392
11	2	51.4	8	1457		28
12	2	97	18	1758		429
13	1	72.9	20			536
14	3	63.7	19	1595	1438	388
15	2	69.9	13	1898		358
16	2	59.7	12	990		166
17	3	96.4	10	1511	1187	403
18	1	78.2	10			361
19	2	52.2	6	1156		454
20						

Waveform #13 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	2	52.6	8	1894		1481
2	1	97	17			1317
3	2	53.9	18	1738		956
4	2	89.2	10	1784		767
5	1	89.4	8			889
6	2	79.7	13	1463		1246
7	3	80.6	17	1297	1330	439
8	2	64.7	20	1689		285

Waveform #14 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	2	61.6	11	1936		1020
2	1	66.6	10			449
3	3	91.2	9	963	1375	290
4	3	87.3	17	1864	1762	1182
5	2	68.8	13	1807		1216
6	2	63.7	14	1868		108
7	2	73.1	19	1597		1263
8	1	66.8	14			410
9	3	60.8	14	1093	1603	1138
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12						
13						
14						
15						
16						
17						
18						
19						
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Waveform #15 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	2	84.3	6	1601		703
2	3	62.7	8	1544	1507	1048
3	2	86.1	19	1816		76
4	1	98.2	6			238
5	3	64.8	12	937	1092	43
6	1	98.9	9			392
7	2	71.9	5	1903		776
8	3	88.2	10	1866	1893	590
9	3	85	18	1857	1078	477
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Waveform #16 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	2	77.8	7	1373		17
2	1	63.7	15			651
3	3	72.3	9	1856	1642	439
4	2	60.2	15	1289		444
5	3	76.7	9	971	1735	205
6	2	52.9	5	1631		160
7	2	79.8	20	1718		198
8	2	80.2	14	1546		356
9	3	95.4	11	993	999	1102
10	3	56.9	7	1534	1087	1128
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Waveform #17 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	2	63.7	14	1338		733
2	1	99.4	12			642
3	3	56.8	12	1703	989	507
4	3	67.2	13	1879	1005	697
5	2	50.5	20	1839		980
6	2	71.2	10	1209		846
7	1	76.9	13			394
8	2	90.8	7	1836		673
9	3	95	13	1179	1471	817
10	1	86.9	14			233
11	2	51.5	7	1600		961
12						
13						
14						
15						
16						
17						
18						
19						
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Waveform #18 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	3	75.8	15	1852	967	881
2	2	96.1	15	1488		653
3	2	68.2	20	1030		55
4	3	66.3	20	1444	1927	951
5	2	90.4	13	1584		512
6	3	89.4	13	994	1265	474
7	3	52.3	7	1947	1496	152
8	1	67.9	18			298
9	1	66	9			167
10	2	52.8	15	1073		676
11	2	82.8	10	917		417
12	1	62.7	5			103
13						
14						
15						
16						
17						
18						
19						
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Waveform #19 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	3	63	12	1120	1133	593
2	3	93.2	19	1203	1836	413
3	2	82.3	19	1122		209
4	2	56.8	20	1730		411
5	1	62.3	7			347
6	1	61.1	10			62
7	2	69.7	12	1043		607
8	1	90.7	9			827
9	3	98.3	14	1792	1356	219
10	3	65.3	8	1780	1137	112
11	1	51.2	19			276
12	2	86.4	20	1530		54
13	2	67.4	12	1857		67
14						
15						
16						
17						
18						
19						
20						

Waveform #20 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	1	84.4	6			125
2	3	96.1	10	1008	1713	502
3	2	51.4	7	1706		659
4	3	59.4	8	1396	1380	158
5	1	79.8	17			56
6	1	73.2	6			746
7	2	82	9	1801		3
8	2	53.2	20	1191		383
9	1	72.5	10			379
10	2	85	17	1377		349
11	2	54.8	5	1428		57
12	2	65.4	20	1116		53
13	2	96.5	6	1242		515
14	2	92.4	9	1053		175
15						
16						
17						
18						
19						
20						

Waveform #21 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	1	87.9	9			738
2	3	53.5	14	1079	996	748
3	2	71.4	13	1102		532
4	3	54.9	17	1177	1424	40
5	2	59.7	10	1879		581
6	2	81.8	18	1738		612
7	2	62.8	14	1636		322
8	2	94.8	13	1206		144
9	2	58.3	12	1703		334
10	1	73	13			469
11	2	64.6	9	942		342
12	3	72.3	9	1496	1112	343
13	3	86.2	13	973	1784	2
14	3	81	19	1087	1564	708
15	2	74.6	17	1433		359
16						
17						
18						
19						
20						

Waveform #22 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	2	69.6	17	1019		702
2	1	98.7	10			671
3	1	90.2	12			433
4	2	95.4	17	1178		427
5	1	82.3	8			536
6	1	75.6	6			724
7	1	75.5	20			367
8	2	77.3	5	1353		35
9	2	60.4	19	1490		357
10	2	97.2	8	1803		197
11	2	58.5	11	1051		283
12	2	56.8	13	1151		324
13	1	59.2	13			39
14	2	52.9	11	1316		55
15	3	66.8	5	1140	1087	358
16	2	67.3	15	1716		176
17						
18						
19						
20						

Waveform #23 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	2	96.1	19	949		94
2	2	55.5	13	1712		193
3	2	56.9	9	1915		369
4	2	63.8	6	1398		217
5	2	79.2	7	1304		688
6	2	87.6	19	1438		346
7	1	79.2	20			498
8	2	53	11	1492		126
9	3	62.3	14	1267	1882	235
10	2	61.1	18	1633		91
11	3	51	6	1859	1771	253
12	3	94.7	17	1022	1826	325
13	1	90.9	5			297
14	1	54.2	5			42
15	2	98.8	18	1291		465
16	3	77.5	12	1814	1890	86
17	3	63.1	7	1909	1019	643
18						
19						
20						

Waveform #24 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	2	97.2	12	1126		453
2	3	65.8	15	1242	1105	272
3	2	50.6	5	1651		417
4	2	95.8	6	1726		423
5	3	95.1	9	1611	1512	596
6	2	65.5	12	1839		387
7	2	97.1	10	1647		46
8	1	71.2	9			577
9	2	74.1	20	1062		0
10	2	85	6	969		83
11	2	69.6	10	1715		554
12	2	91	9	1680		177
13	2	80.3	6	1773		166
14	2	65.1	17	1894		449
15	2	94.6	12	1214		368
16	2	50.3	20	1349		237
17	3	62.1	14	1078	973	218
18	2	83.5	7	1322		586
19						
20						

Waveform #25 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	3	85.3	7	1371	1279	514
2	1	99.7	12			430
3	1	69.1	17			40
4	1	89.8	18			528
5	3	90.8	9	1727	1872	303
6	1	65.9	8			314
7	1	50.6	5			56
8	2	68	18	1140		92
9	3	69.2	18	1539	1477	41
10	2	61.9	15	1112		411
11	2	81.9	19	1161		91
12	1	99.1	12			288
13	1	84.1	8			48
14	2	86.2	19	1611		471
15	1	90.9	12			596
16	1	99.2	7			458
17	1	73	19			224
18	2	87.2	19	1860		355
19	3	90.8	19	1752	987	256
20						

Waveform #26 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	1	61.5	13			142
2	3	72.8	15	970	1287	186
3	2	83.7	5	1662		119
4	3	86.3	13	1780	1445	24
5	2	71.6	19	1640		185
6	1	57.1	17			136
7	3	54.6	19	1609	1298	104
8	3	91.4	6	959	1235	168
9	1	66.1	9			280
10	2	66.8	9	1433		565
11	3	86.9	12	1458	966	41
12	1	64.1	13			283
13	1	66.2	7			155
14	2	65.1	17	1193		115
15	2	94	17	1459		474
16	2	52.9	5	1659		378
17	2	93.1	10	1710		128
18	1	57.2	8			393
19	3	90.3	8	1852	1214	207
20	2	76.9	5	1869		538

Waveform #27 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	3	60.3	17	1584	1521	1
2	3	72.5	13	1602	1166	425
3	1	68	11			314
4	2	91.1	6	1769		1344
5	2	95.7	17	1189		1142
6	1	59.9	5			779
7	2	67.6	7	1921		1192
8	1	53.6	10			632

Waveform #28 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	1	70.4	17			917
2	2	59.2	10	1548		729
3	2	83	14	1556		221
4	3	58.5	17	1825	1496	416
5	3	80.7	13	1659	1335	1295
6	3	84.3	8	1306	1476	900
7	3	50.3	9	1300	1657	531
8	1	60.6	20			330
9	2	52.1	20	1768		371
10						
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Waveform #29 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	1	80.6	15			394
2	2	59.9	13	1548		1107
3	2	55.6	12	1118		588
4	3	90.3	12	1115	1271	119
5	1	56.3	7			1093
6	2	51.8	12	1601		685
7	2	52.8	9	1161		657
8	1	72	11			826
9	2	58.4	5	1277		189
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

Waveform #30 Parameters

Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Start Location Within Interval (msec)
1	2	52.3	13	1504		561
2	2	53.4	13	1854		905
3	2	99.6	8	1088		669
4	2	66.4	14	946		1074
5	2	75.4	18	1054		926
6	2	88.9	20	1112		72
7	2	92.7	17	1781		737
8	2	56.5	20	1382		510
9	2	89.3	14	1796		630
10	2	86.3	17	1232		288
11						
12						
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Appendix B - Antenna Datasheet

TAOGLAS

Datasheet

Part No:
FXP524.D.07.C.001

Description:

Venti Flex PCB Wi-Fi MIMO 2.4/5.8/7.1GHz Antenna with 4 ports with Wi-Fi 6 frequency bands included

Features:

Covers Extended Wi-Fi Frequencies of 2.4-2.5GHz, 5-7.125GHz
Flex PCB MIMO Antenna
Adhesive Tape for ease of installation
Dimensions: 80*20*0.2mm
Cables: 100mm of Ø1.37mm
Connectors: I-PEX MHF® I (U.FL Compatible)
RoHS & Reach Compliant

1. Introduction

The FXP524 Venti antenna is a 4-in-1 MIMO, flexible PCB monopole type antenna designed to operate at widely used Wi-Fi frequencies. The FXP524 is a future proof antenna as it has been proven to cover the frequencies required for Wi-Fi 6 applications. The antenna has excellent efficiency and isolation performance for all Wi-Fi applications. Featuring a low profile height of only 0.15mm, the FXP.524 is an ideal solution for maintaining high performance while fitting into narrow spaces such as plastic enclosures for laptops, tablets, routers, and other Wi-Fi applications.

The antenna has been designed in a flexible material with a rectangular form-factor and cable connection for an easy installation. The antenna comes with double-sided 3M tape for easy and robust "peel and stick" mounting. The antenna cables feature IPEX connectors for easy installation.

Typical applications include:

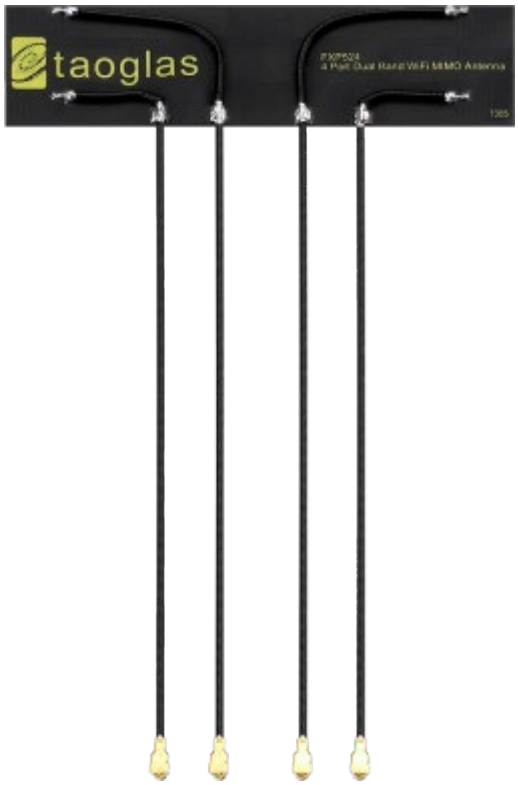
- Smart Home
- Routers and Gateways
- Smart Devices
- HD Video Streaming

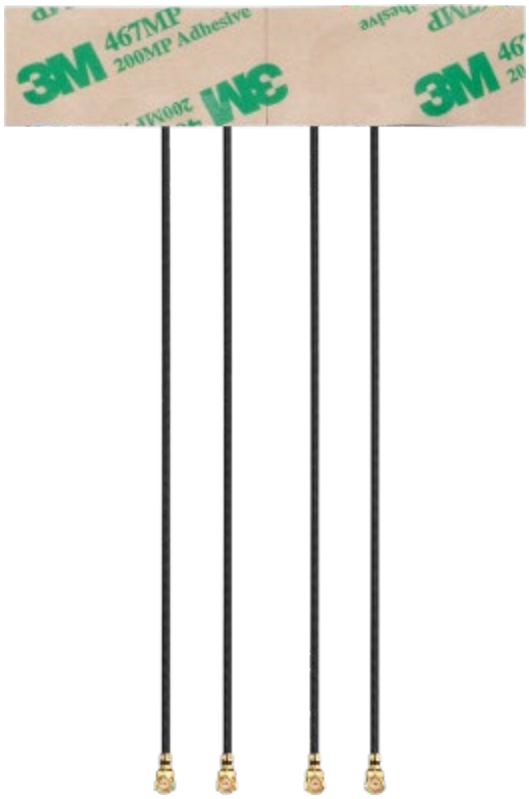
Many module manufacturers specify peak gain limits for any antennas that are to be connected to that module. Those peak gain limits are based on free-space conditions. In practice, the peak gain of an antenna tested in free-space can degrade by at least 1 or 2dBi when put inside a device. So ideally you should go for a slightly higher peak gain antenna than mentioned on the module specification to compensate for this effect, giving you better performance.

Upon testing of any of our antennas with your device and a selection of appropriate layout, integration technique, or cable, Taoglas can make sure any of our antennas' peak gain will be below the peak gain limits. Taoglas can then issue a specification and/or report for the selected antenna in your device that will clearly show it complying with the peak gain limits, so you can be assured you are meeting regulatory requirements for that module.

For example, a module manufacturer may state that the antenna must have less than 2dBi peak gain, but you don't need to select an embedded antenna that has a peak gain of less than 2dBi in free-space. This will give you a less optimized solution. It is better to go for a slightly higher free-space peak gain of 3dBi or more if available. Once that antenna gets integrated into your device, performance will degrade below this 2dBi peak gain due to the effects of GND plane, surrounding components, and device housing. If you want to be absolutely sure, contact Taoglas and we will test. Choosing a Taoglas antenna with a higher peak gain than what is specified by the module manufacturer and enlisting our help will ensure you are getting the best performance possible without exceeding the peak gain limits.

The Cables and connectors are fully customizable subject to MOQ, for further information please contact your regional Taoglas customer support team for more information.





2. Specifications

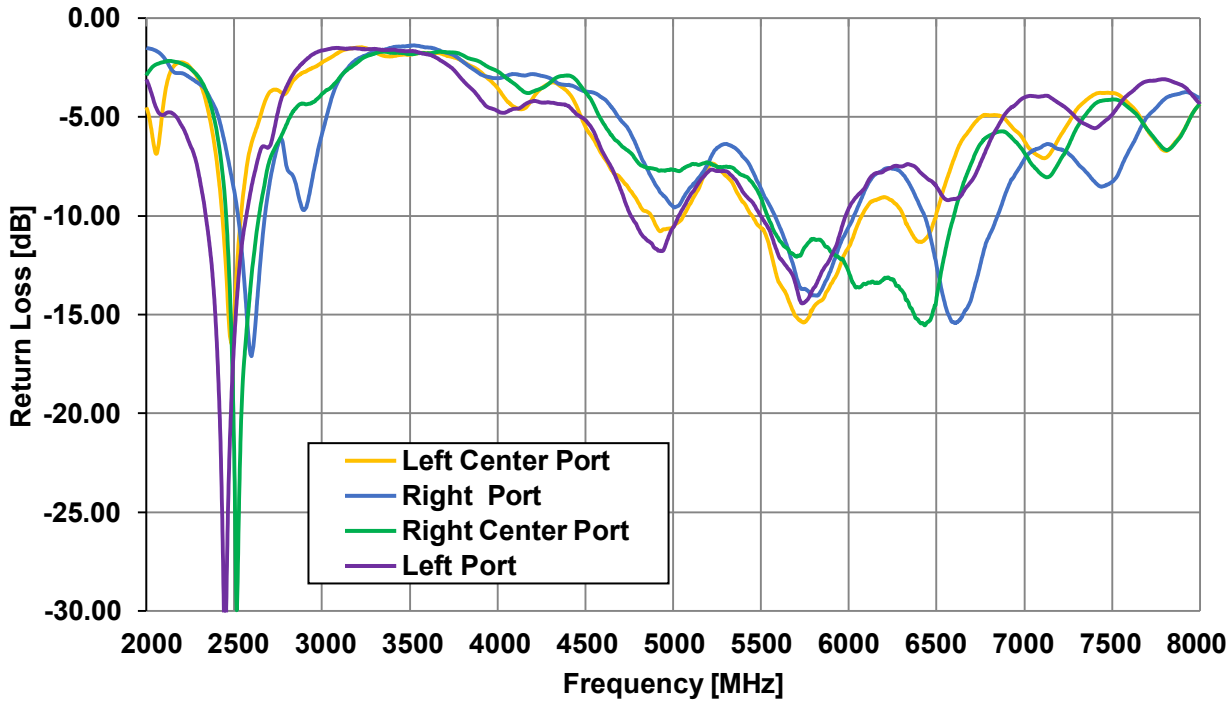
Electrical									
Band	**Frequency (MHz)**	**Setup**	**Efficiency (%)**	**Average Gain (dB)**	**Peak Gain (dBi)**	**Impedance**	**Max Power Input**	**Polarization**	**Radiation Pattern**
2.4GHz Wi-Fi	2400~2500	Port 1	50.8	-2.9	0.8	50Ω	2W	Linear	Omnidirectional
		Port 2	44.9	-3.5	1.5				
		Port 3	27.9	-5.6	-1.4				
		Port 4	57.6	-2.4	2.1				
5.8GHz Wi-Fi	5150~5850	Port 1	58.1	-2.4	4.2				
		Port 2	52.6	-2.8	5.7				
		Port 3	50	-3	4.4				
		Port 4	52.9	-2.8	3.9				
7.1GHz Wi-Fi 6	5925~7125	Port 1	39.4	-4.2	3.8				
		Port 2	12.6	-9.8	0.7				
		Port 3	37.3	-4.3	4.8				
		Port 4	40.4	-4	4.3				

Mechanical	
Dimensions	80mm X 20mm X 0.1mm
Antenna Body Material	Polymer
Cable	4* Black 1.37mm Coaxial Cable
Cable Length	100mm
Connector	IPEX MHFHT
Weight	8g

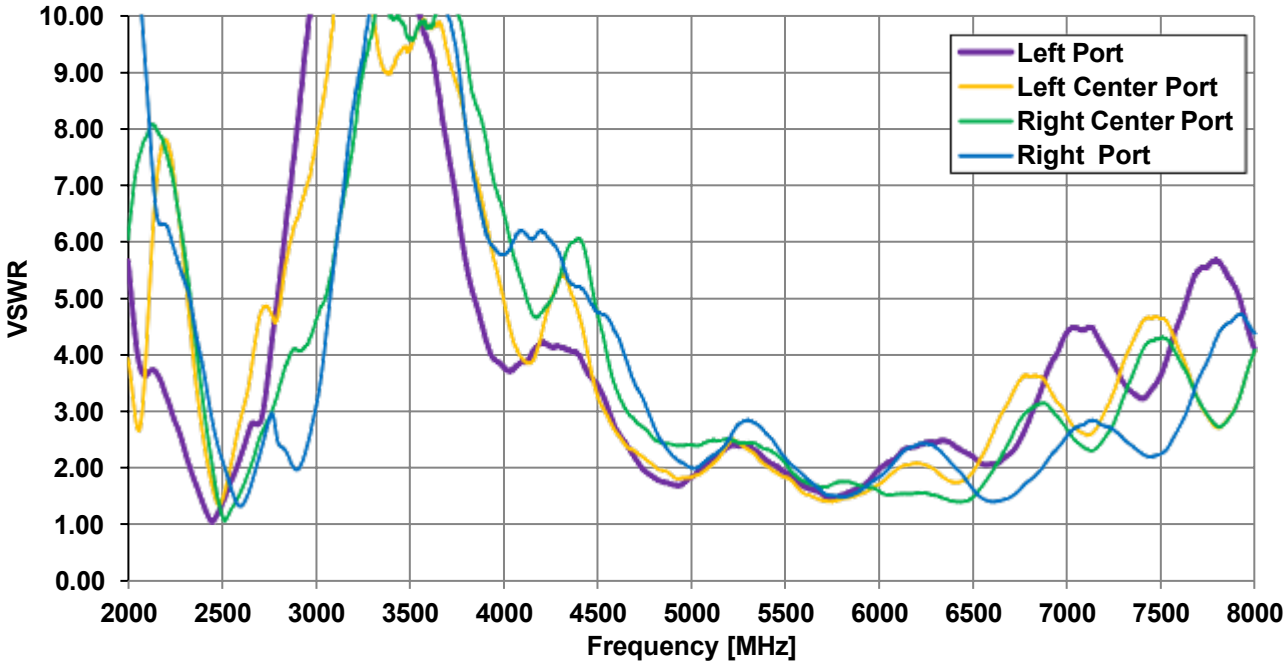
Environmental	
Temperature Range	-40°C to 85°C
Humidity	Non-condensing 65°C 95% RH

3. Antenna Characteristics

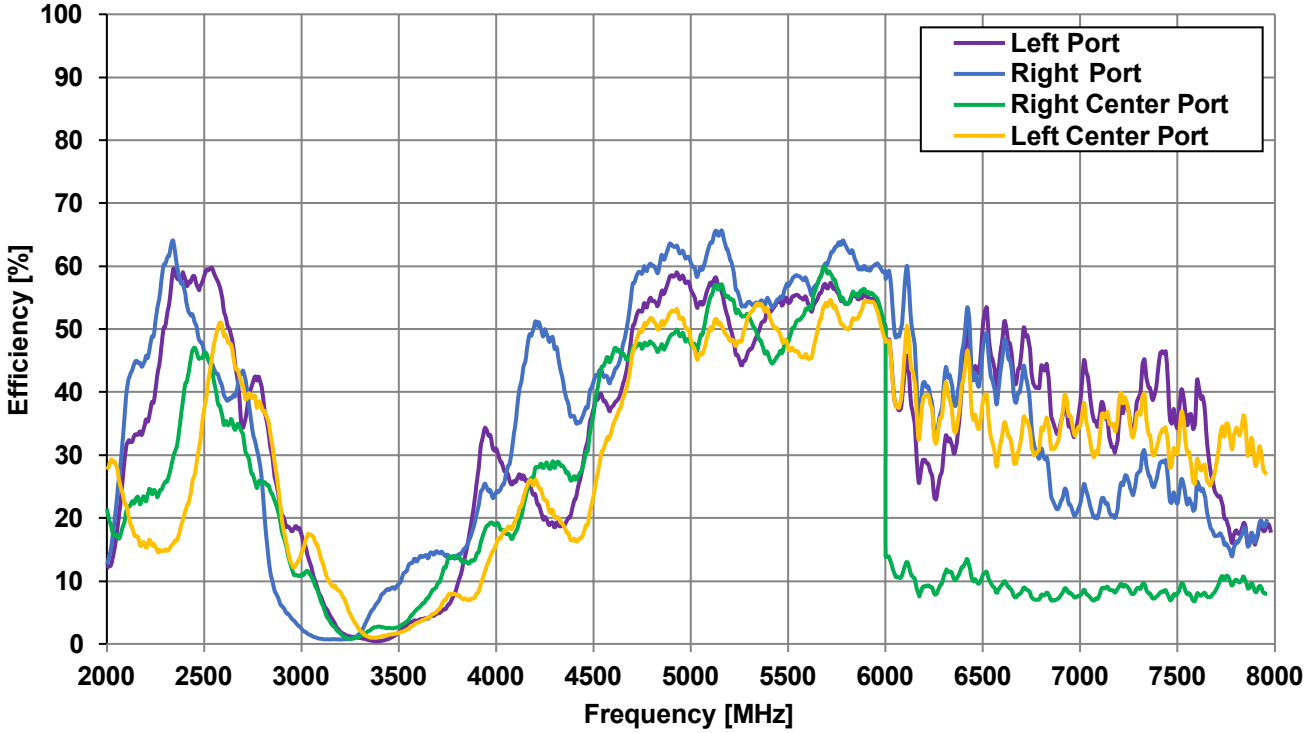
3.1 Return Loss



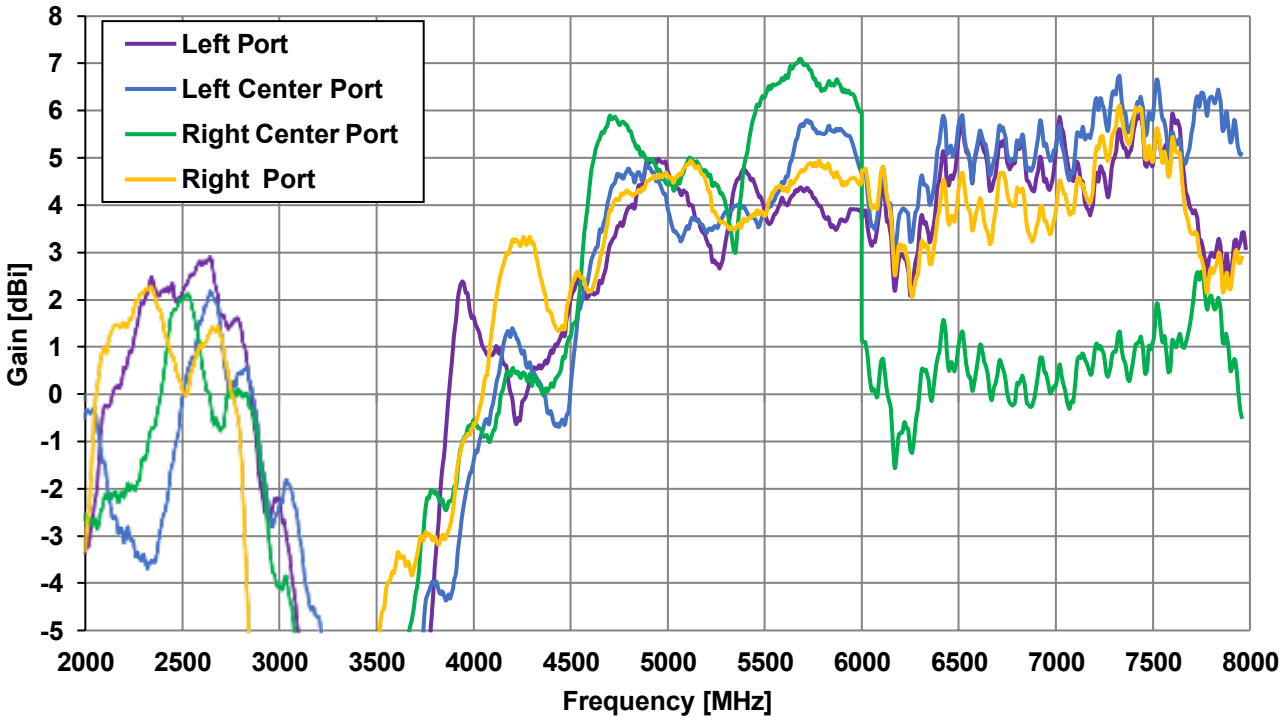
3.2 VSWR



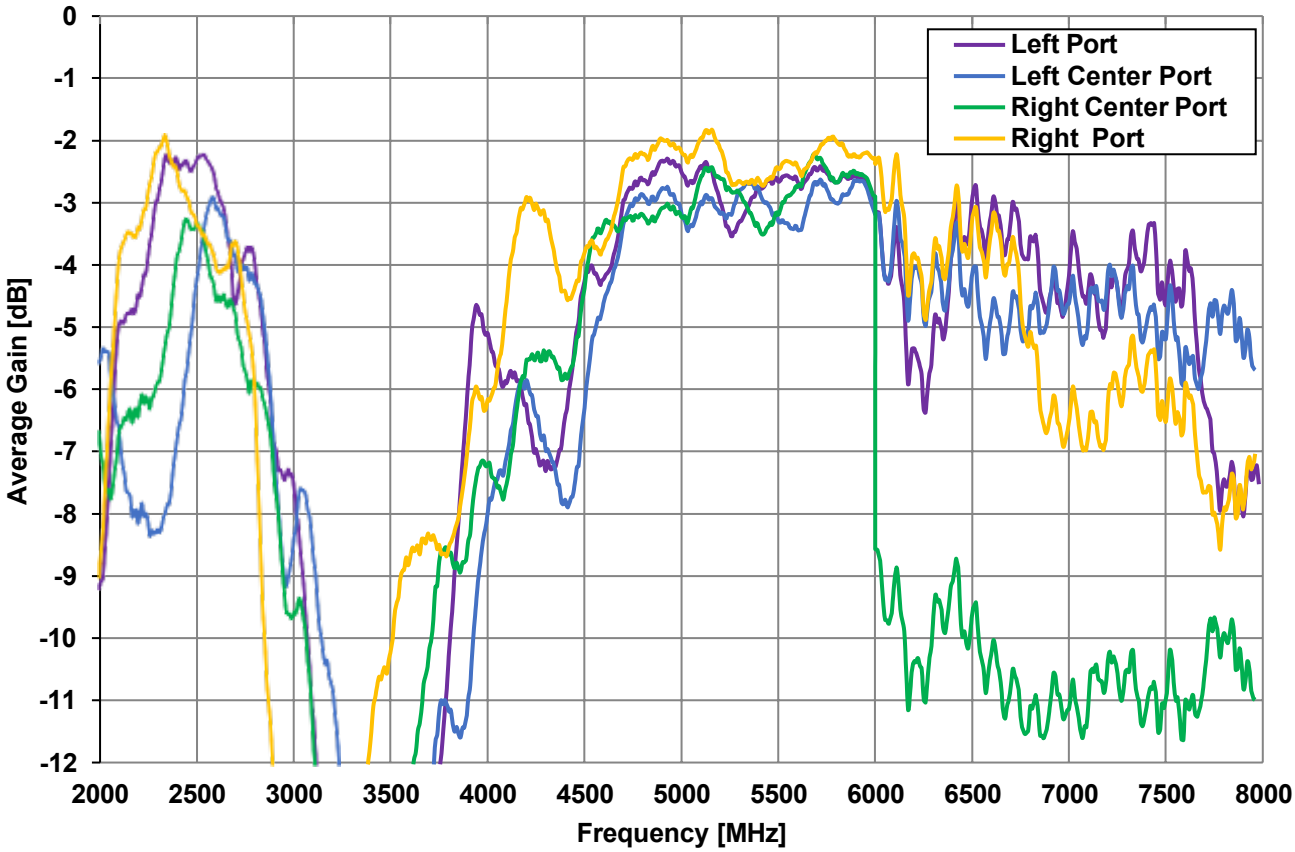
3.3 Efficiency



3.4 Peak Gain



3.5 Average Gain

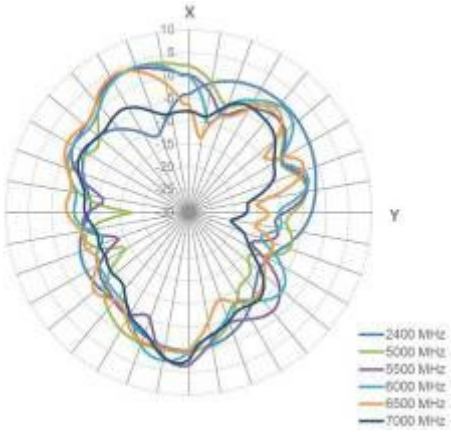


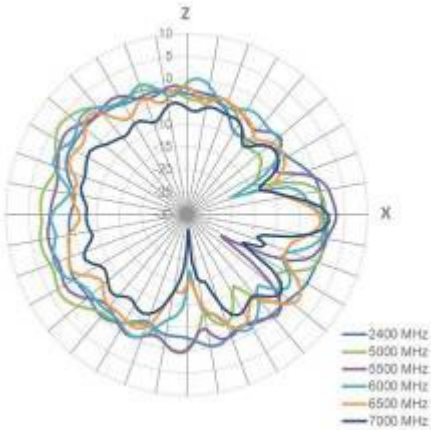
4. Radiation Patterns

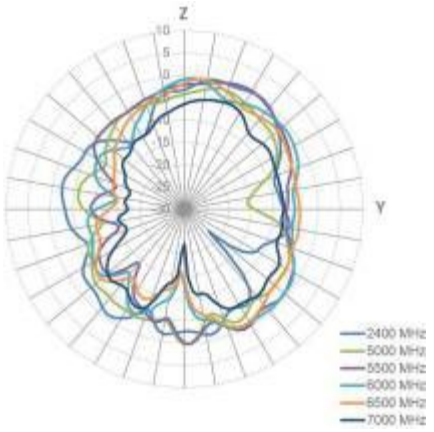
4.1 Test Setup – 2mm ABS

4.2 842MHz 3D and 2D Radiation Patterns

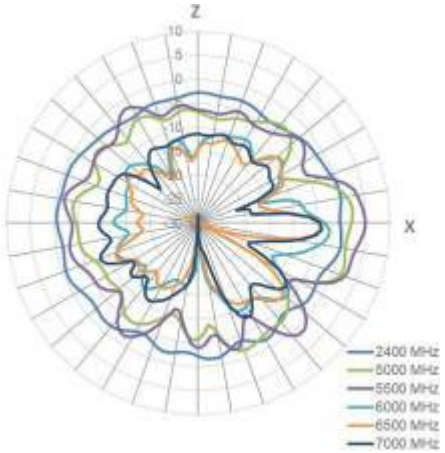
Port 1		
XY Plane	XZ Plane	YZ Plane

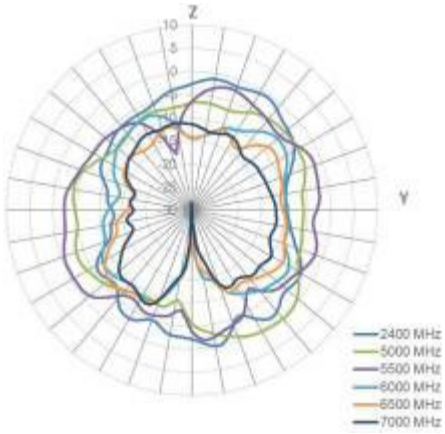


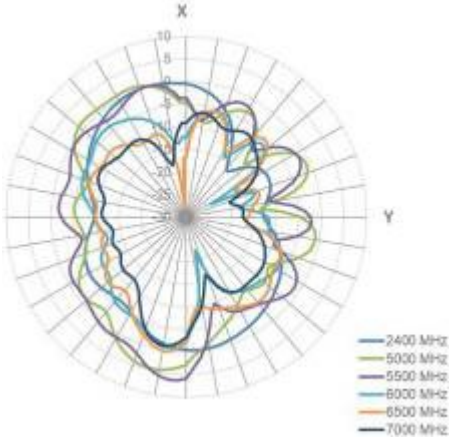




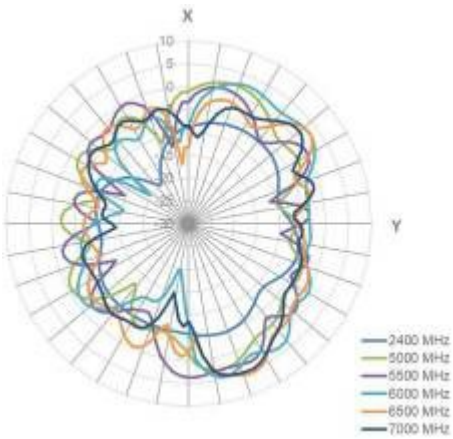
Port 2		
XY Plane	XZ Plane	YZ Plane

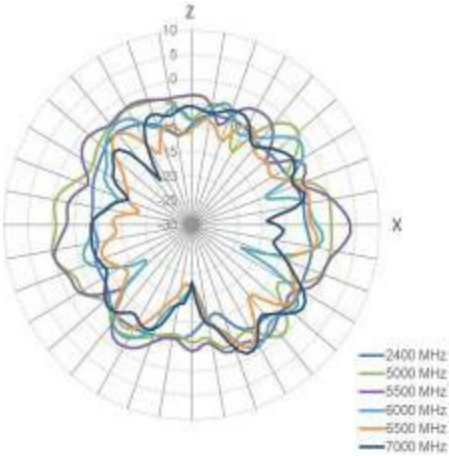


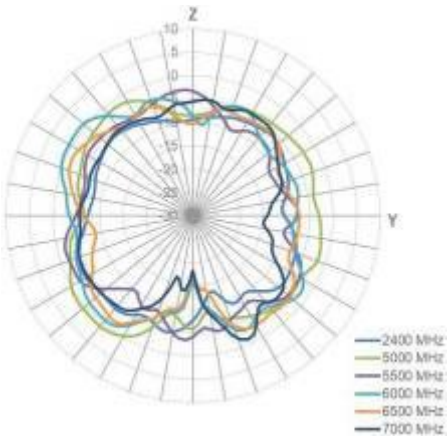




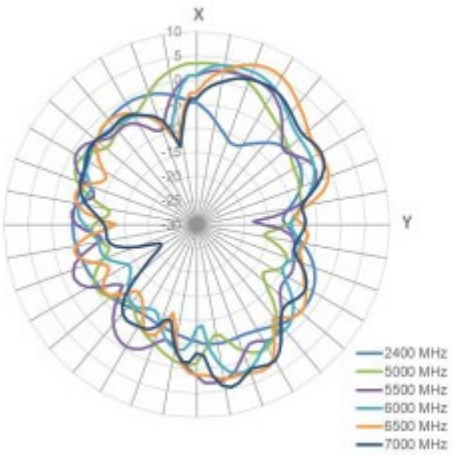
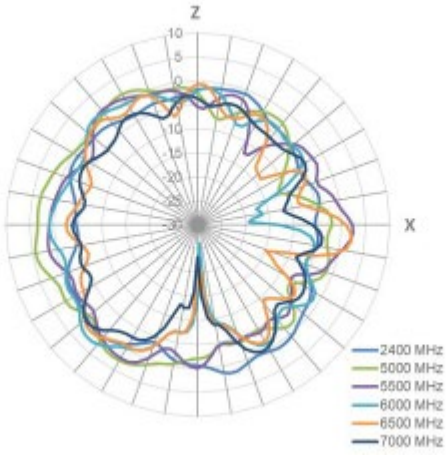
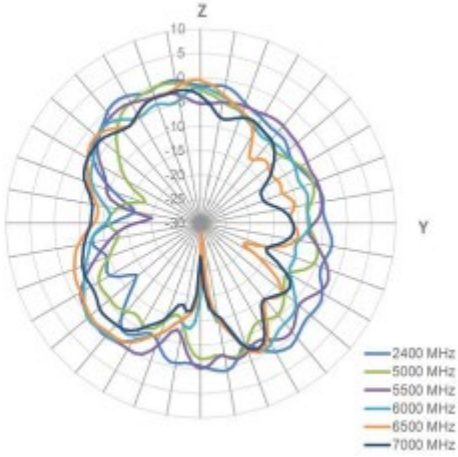
Port 3		
XY Plane	XZ Plane	YZ Plane



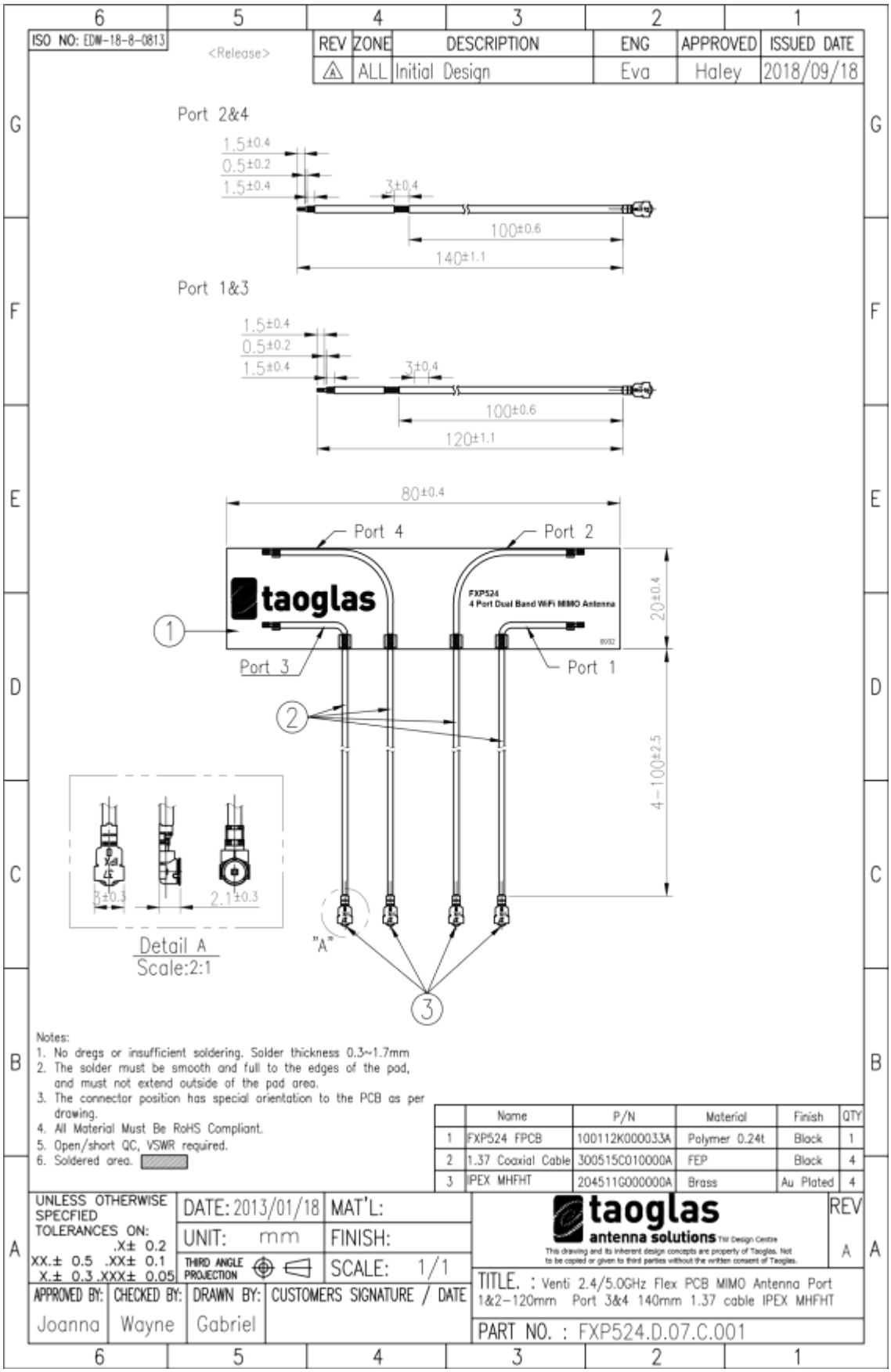




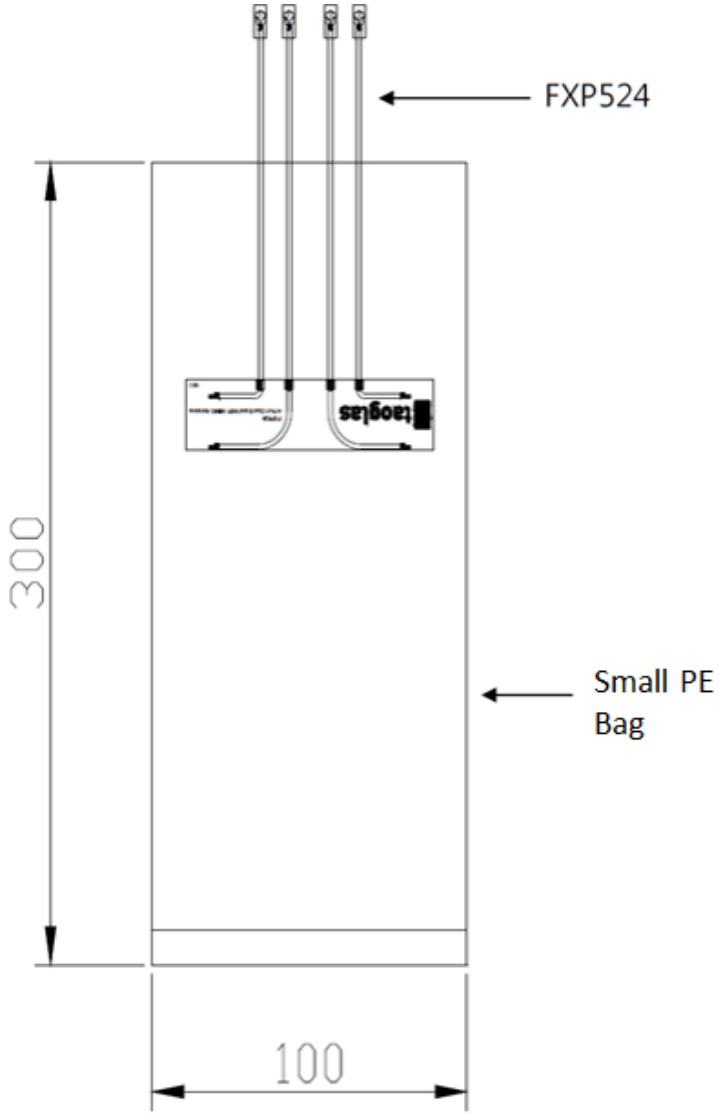
Port 4

XY Plane	XZ Plane	YZ Plane
		

5. Mechanical Drawing (Units: mm)



6. Packaging



Changelog for the datasheet

SPE-17-8-042 - OMB.868.B12F21

Revision: F (Current Version)

Date:	2018-03-27
Changes:	Updated to Include Wi-Fi 6
Changes Made by:	Jack Conroy

Previous Revisions

Revision: E

Date:	2015-08-21
Changes:	Updated Intro
Changes Made by:	Aine Doyle

Revision: D

Date:	2015-01-14
Changes:	Added Intro note
Changes Made by:	Aine Doyle

Revision: C

Date:	2014-04-10
Changes:	Updated graphs
Changes Made by:	Wayne Yang

Revision: B

Date:	2014-04-09
Changes:	Updated Name
Changes Made by:	Aine Doyle

Revision: A (Original First Release)

Date:	2014-03-27
Notes:	
Author:	Technical Writer

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END OF REPORT