UNIFIED COMPLIANCE LABORATORY

427 West 12800 South
Draper, UT 84020

Test Report

Certification

FCC ID	SWX-UX
ISED ID	6545A-UX
Equipment Under Test	UX
Test Report Serial Number	TR7912_02
Date of Test(s)	2, 7 – 10 and 16 – 17 February And May 3, 2023
Report Issue Date	8 May 2023

Test Specification	**Applicant**
47 CFR FCC Part 15, Subpart E RSS-GEN Issue 5	Ubiquiti Inc. 685 Third Avenue New York, NY 10017 U.S.A.

NVLAP TESTING ilac-MRA

NVLAP LAB CODE 600241-0

Certification of Engineering Report

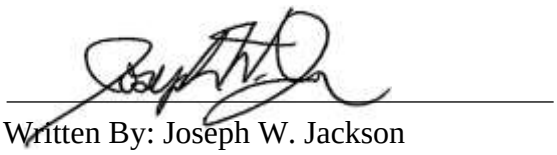
This report has been prepared by Unified Compliance Laboratory (UCL) to document compliance of the device described below with the requirement of Federal Communication Commissions (FCC) Part 15, Subpart E. This report may be reproduced in full. Partial reproduction of this report may only be made with the written consent of the laboratory. The results in this report apply only to the sample tested.

Applicant	Ubiquiti Inc.
Manufacturer	Ubiquiti Inc.
Brand Name	UniFi
Model Number	UX
FCC ID	SWX-UX
ISED ID	6545A-UX

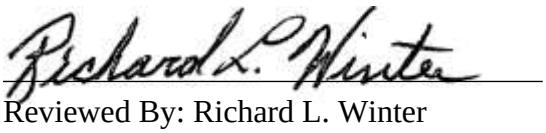
On this 8th day of May 2023, I individually and for Unified Compliance Laboratory certify that the statements made in this engineering report are true, complete and correct to the best of my knowledge and are made in good faith.

Although NVLAP has accredited the Unified Compliance Laboratory testing facilities, this report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. federal government.

Unified Compliance Laboratory



Written By: Joseph W. Jackson



Reviewed By: Richard L. Winter

Revision History		
Revision	**Description**	**Date**
01	Original Report Release	22 February 2023
02	Updated to include retest data with new Antenna information	8 May 2023

Table of Contents

1 Client Information

1.1 Applicant

Company	Ubiquiti Inc. 685 Third Avenue New York, NY 10017 U.S.A.
Contact Name	Alex Macon
Title	Compliance

1.2 Manufacturer

Company	Ubiquiti Inc. 685 Third Avenue New York, NY 10017 U.S.A.
Contact Name	Alex Macon
Title	Compliance

2 Equipment Under Test (EUT)

2.1 Identification of EUT

Brand Name	UniFi
Model Number	UX
Serial Number	5DA
Dimensions (cm)	9.8 x 9.8 x 2.8

2.2 Description of EUT

The UX is a WiFi 6 access point designed for wide-ranging wireless coverage while maintain overall network capacity. The UX delivers and aggregate radio rate of up to 2.7 Gbps with 5 GHz (2x2) and 2.4 GHz (2x2) radios. The UX uses a sophisticated antenna design to offer excellent range. The UX has a Bluetooth management radio for easy in setup and administration of the wireless system. The UX is power from a USB C connector.

Band	Modulation Bandwidth	Frequency (MHz)
UNII-2A	20 MHz	5260, 5265, 5270, 5275, 5280, 5285, 5290, 5295, 5300, 5305, 5310, 5315, 5320
	40 MHz	5270, 5275, 5280, 5285, 5290, 5295, 5300, 5305, 5310
	80 MHz	5290
	160 MHz	5250
UNII-2C	20 MHz	5500, 5505, 5510, 5515, 5520, 5525, 5530, 5535, 5540, 5545, 5550, 5555, 5560, 5565, 5570, 5575, 5580, 5585, 5590, 5595, 5600*, 5605*, 5610*, 5615*, 5620*, 5625*, 5630*, 5635*, 5640*, 5645*, 5650, 5655, 5660, 5665, 5670, 5675, 5680, 5685, 5690, 5695, 5700, 5705, 5710, 5715, 5720
	40 MHz	5510, 5515, 5520, 5525, 5530, 5535, 5540, 5545, 5550, 5555, 5560, 5565, 5570, 5575, 5580, 5585, 5590, 5595, 5600*, 5605*, 5610*, 5615*, 5620*, 5625*, 5630*, 5635*, 5640*, 5645*, 5650, 5655, 5660, 5665, 5670, 5675, 5680, 5685, 5690, 5695, 5700, 5705, 5710
	80 MHz	5530, 5535, 5540, 5545, 5550, 5555, 5560, 5565, 5570, 5575, 5580, 5585, 5590, 5595, 5600*, 5605*, 5610*, 5615*, 5620*, 5625*, 5630*, 5635*, 5640*, 5645*, 5650, 5655, 5660, 5665, 5670, 5675, 5680, 5685, 5690
	160 MHz	5570
* Frequency not applicable in Canada		

Table 1: UNII-2A and UNII-2C Channel Settings

This report covers the circuitry of the device subject to FCC Part 15, Subpart E. The circuitry of the device subject to FCC Part 15 Subpart B was found to be compliant and is covered under a separate Unified Compliance Laboratory test report.

2.3 EUT and Support Equipment

The EUT and support equipment used during the test are listed below.

Brand Name Model Number Serial Number	Description	Name of Interface Ports / Interface Cables
BN: UniFi MN: UX SN: 5 DA	Wireless Access Point	See Section 2.4
BN: Ubiquiti MN: GP-M015-QC SN: N/A	USB C Power Adapter	See Section 2.4
BN: Dell MN: XPS 13 SN: N/A	Laptop Personal Computer	LAN Port / Un-shielded Cat 5e cable (Note 2)

Notes: (1) EUT
(2) Interface port connected to EUT (See Section 2.4)

The support equipment listed above was not modified in order to achieve compliance with this standard.

2.4 Interface Ports on EUT

Name of Ports	No. of Ports Fitted to EUT	Cable Description/Length
AC / USB-C	1	2 conductor power cord/80 cm
LAN	1	Un-shielded Cat 6 cable/5 meter
WAN	1	Un-shielded Cat 6 cable/5 meter

2.5 Operating Environment

Power Supply	120 Volts AC
AC Mains Frequency	60 Hz
Temperature	21.3 – 23.2 °C
Humidity	22.3 – 28.5 %
Barometric Pressure	1015 mBar

2.6 Operating Modes

The UX was tested using test software in order to enable to constant transmission. The measurements within this report are corrected to reference a 100% duty cycle. All emission

modes of 802.11 a/n/ac/ax were investigated. All measurements are reported with the worst-case mode (802.11ax) unless otherwise stated.

2.7 EUT Exercise Software

EUT firmware version 1.0 was used to operate the transmitter using a constant transmit mode.

2.8 Block Diagram of Test Configuration

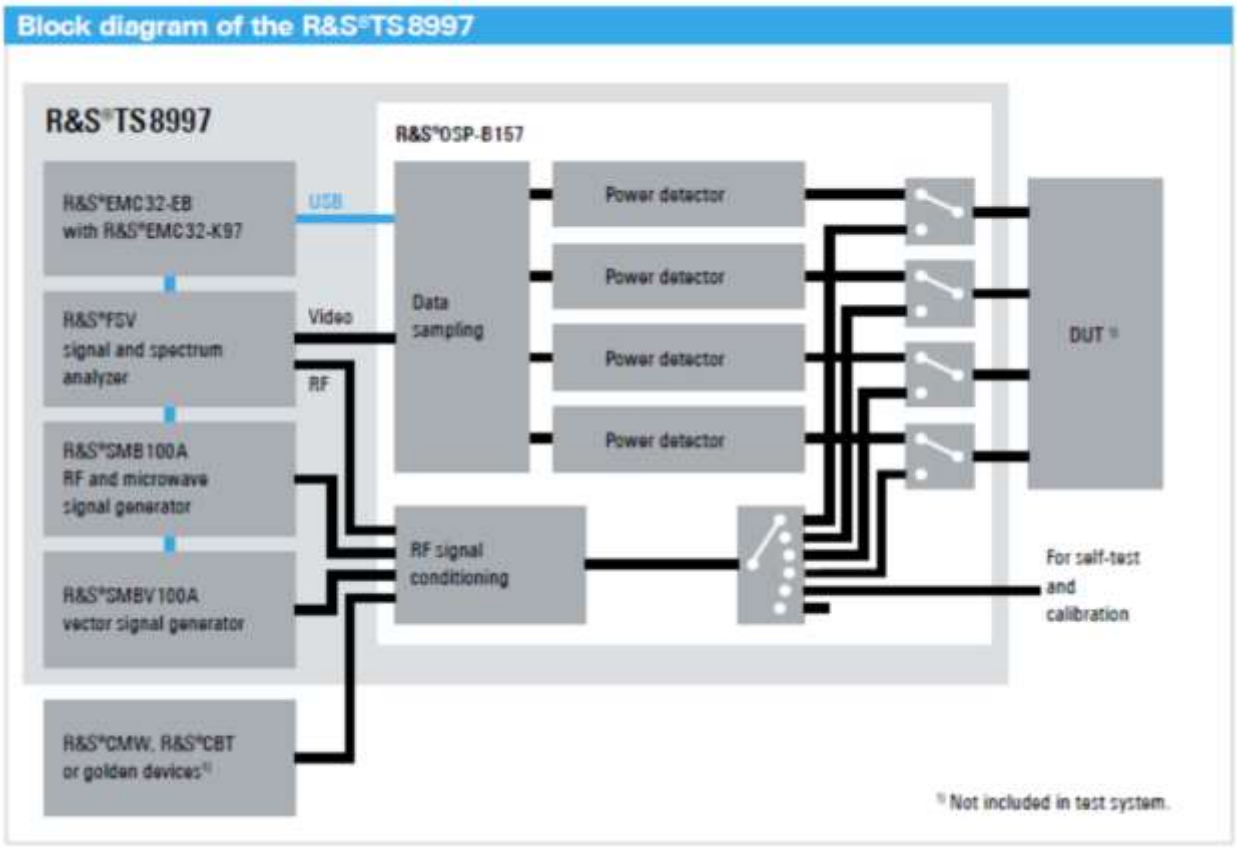


Diagram 1: Test Configuration Block Diagram

2.9 Modification Incorporated/Special Accessories on EUT

There were no modifications made to the EUT during testing to comply with the specification.

2.10 Deviation, Opinions Additional Information or Interpretations from Test Standard

There were no deviations, opinions, additional information or interpretations from the test specification.

3 Test Specification, Method and Procedures

3.1 Test Specification

Title	47 CFR FCC Part 15, Subpart E, Section 15.407 Limits and methods of measurement of radio interference characteristics of Unlicensed National Information Infrastructure Devices
Purpose of Test	The tests were performed to demonstrate initial compliance

3.2 Methods & Procedures

3.2.1 47 CFR FCC Part 15 Section 15.407

See test standard for details.

3.3 FCC Part 15, Subpart E

3.3.1 Summary of Tests

FCC Section	ISED Section	Environmental Phenomena	Frequency Range (MHZ)	Result
15.407(a)	N/A	Antenna requirements	Structural Requirement	Compliant
15.407(b)	RSS-Gen	Conducted Disturbance at Mains Port	0.15 to 30	Compliant
15.407(a)	RSS-247 §6.2.2, §6.2.3	Bandwidth Requirement	5260 to 5570	Compliant
15.407(a)	RSS-247 §6.2.2, §6.2.3	Peak Output Power	5260 to 5570	Compliant
15.407(b)	RSS-247 §6.2.2, §6.2.3	Antenna Conducted Spurious Emissions	0.009 to 40000	Compliant
15.407(b)	RSS-247 §6.2.2, §6.2.3	Radiated Spurious Emissions	0.009 to 40000	Compliant
15.407(a)	RSS-247 §6.2.2, §6.2.3	Peak Power Spectral Density	5260 to 5570	Compliant
15.407(h)	RSS-247 §6.3	DFS Requirements	5260 to 5570	Compliant
The testing was performed according to the procedures in ANSI C63.10-2013, KDB 558074 and 47 CFR Part 15. Where applicable, KDB 662911 was followed to sum required measurements.				

3.4 Results

In the configuration tested, the EUT complied with the requirements of the specification.

3.5 Test Location

Testing was performed at the Unified Compliance Laboratory 3-Meter and 10-Meter chambers located at 427 West 12800 South, Draper, UT 84020. Unified Compliance Laboratory is accredited by National Voluntary Laboratory Accreditation Program (NVLAP); NVLAP Code 600241-0 which is effective until 30 June 2023. This site has also been registered with Innovations, Science and Economic Development (ISED) department as was accepted under Appendix B, Phase 1 procedures of the APEC Tel MRA for Canadian recognition. ISED No.: 25346, effective until 30 June 2023.

Unified Compliance Laboratory has been assigned Designation Number US5037 by the FCC and Conformity Assessment Number US0223 by ISED.

4 Test Equipment

4.1 Conducted Emissions at Mains Ports

Type of Equipment	Manufacturer	Model Number	Asset Number	Date of Last Calibration	Due Date of Calibration
EMI Receiver	AFJ	FFT3010	UCL-2500	6/27/2022	6/27/2023
LISN	AFJ	LS16C/10	UCL-6749	12/6/2021	12/6/2023
Cat6 ISN	Teseq	ISN T8-Cat6	UCL-2971	1/30/2022	3/30/2023
ISN	Teseq	ISN T800	UCL-2974	6/27/2022	6/272023
LISN	Com-Power	LIN-120C	UCL-2612	1/6/2022	3/6/2023
AC Power Source	Laplace Instruments	AC1000A	UCL-2857	N/A	N/A
Test Software	UCL	Revision 1	UCL-3107	N/A	N/A

Table 2: List of equipment used for Conducted Emissions Testing at Mains Port

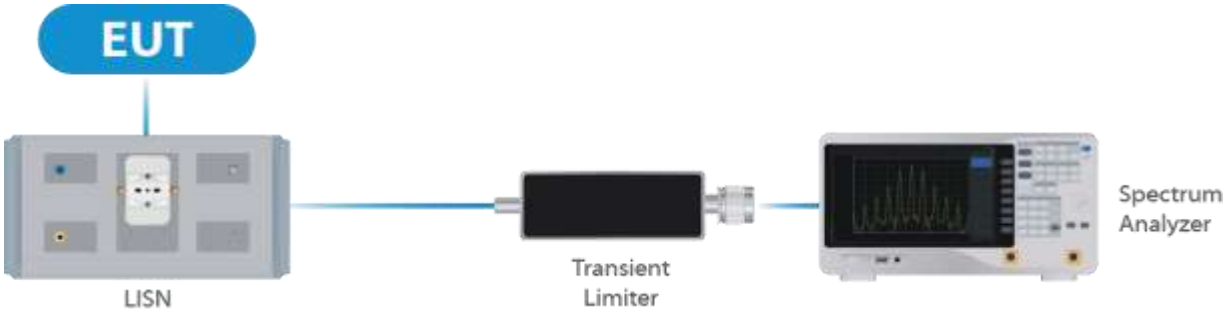


Figure 1: Conducted Emissions Test

4.2 Direct Connect at the Antenna Port Tests

Type of Equipment	Manufacturer	Model Number	Asset Number	Date of Last Calibration	Due Date of Calibration
Spectrum Analyzer	R&S	FSV40	UCL-2861	1/03/2022	3/03/2023
Signal Generator	R&S	SMB100A	UCL-2864	N/A	N/A
Vector Signal Generator	R&S	SMBV100A	UCL-2873	N/A	N/A
Switch Extension	R&S	OSP-B157WX	UCL-2867	1/03/2022	3/03/2023
Switch Extension	R&S	OSP-150W	UCL-2870	1/03/2022	3/03/2023

Table 3: List of equipment used for Direct Connect at the Antenna Port

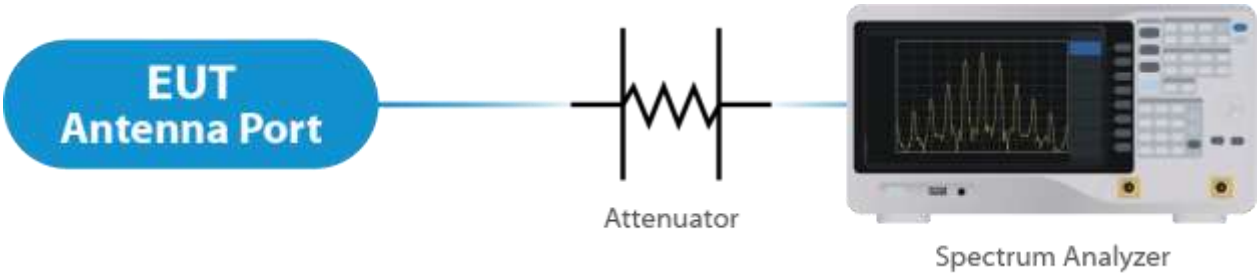


Figure 2: Direct Connect at the Antenna Port Test

Figure 3: Output Power Measurement

4.3 Radiated Emissions

Type of Equipment	Manufacturer	Model Number	Asset Number	Date of Last Calibration	Due Date of Calibration
EMI Receiver	Keysight	N9038A	UCL-2778	1/4/2022	3/4/2023
Pre-Amplifier 9 kHz – 1 GHz	Sonoma Instruments	310N	UCL-2889	10/7/2021	12/7/2023
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3062	9/13/2022	9/13/2024
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3071	6/08/2022	6/22/2024
Double Ridge Horn Antenna	Scwarzbeck	BBHA 9120D	UCL-3065	9/22/2022	9/22/2024
Log Periodic	Scwarzbeck	STLP 9129	UCL-3068	11/16/2020	12/16/2023
15 - 40 GHz Horn Antenna	Scwarzbeck	BBHA 9170	UCL-2487	6/09/2022	6/09/2024
1 – 18 GHz Amplifier	Com-Power	PAM 118A	UCL-3833	12/9/2022	12/9/2023
Test Software	UCL	Revision 1	UCL-3108	N/A	N/A

Table 4: List of equipment used for Radiated Emissions

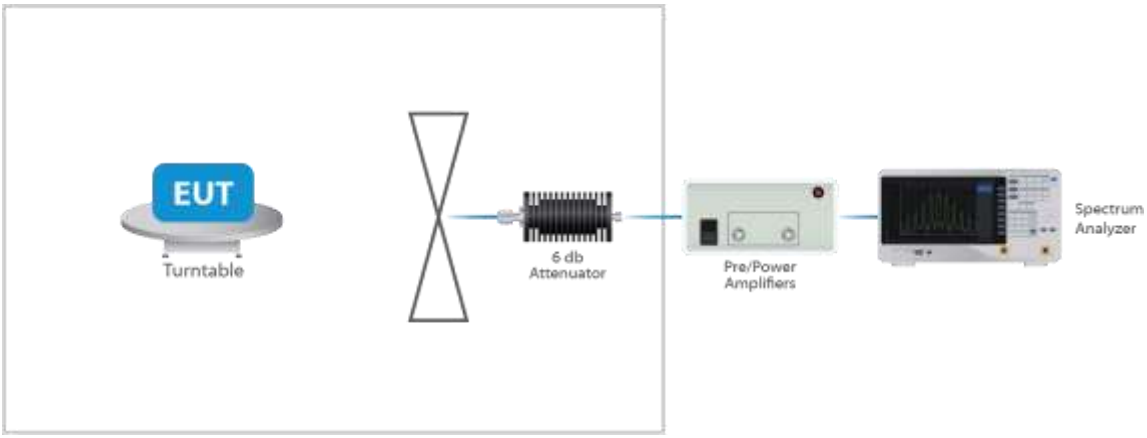


Figure 4: Radiated Emissions Test

4.4 DFS Testing

Type of Equipment	Manufacturer	Model Number	Asset Number	Date of Last Calibration	Due Date of Calibration
Vector Signal Generator	R&S	SMBV100A	UCL-2873	N/A	N/A
Spectrum Analyzer	Keysight	N9010B	UCL-7069	4/25/2022	4/25/2023

4.4.1 Master Test Set Up

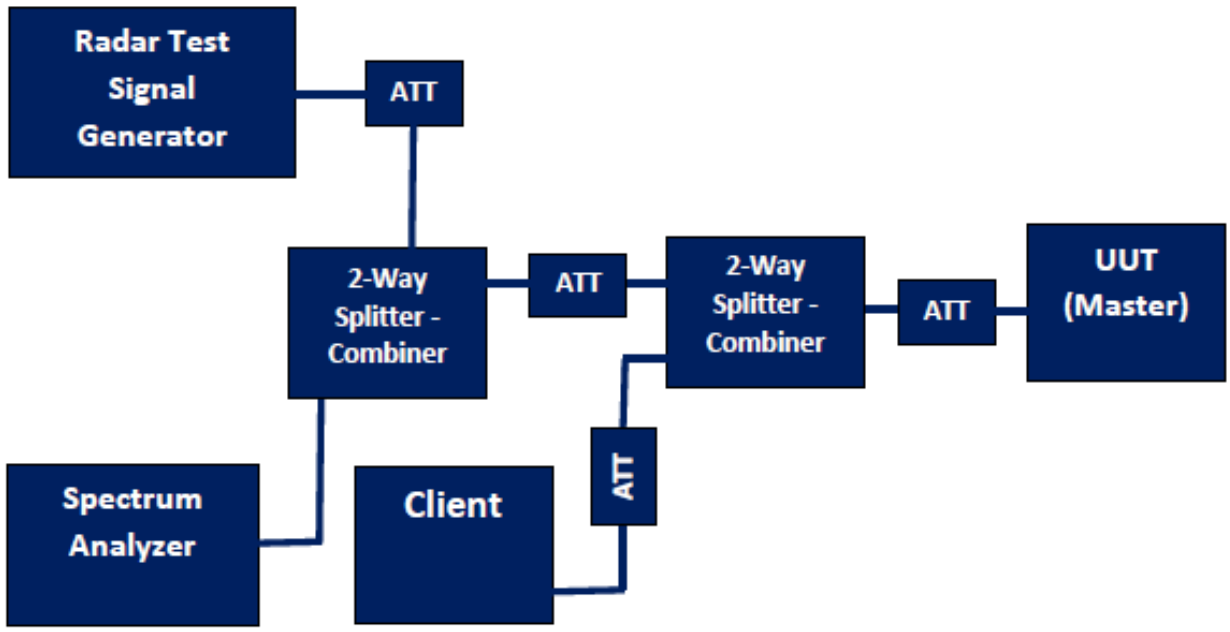


Figure 5: DFS Test Set Up - Master

4.5 Equipment Calibration

All applicable equipment is calibrated using either an independent calibration laboratory or Unified Compliance Laboratory personnel at intervals defined in ANSI C63.4:2014 following outlined calibration procedures. All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and is available for examination upon request.

4.6 Measurement Uncertainty

Test	Uncertainty (± dB)	Confidence (%)
Conducted Emissions	1.44	95
Radiated Emissions (9 kHz to 30 MHz)	2.50	95
Radiated Emissions (30 MHz to 1 GHz)	4.38	95
Radiated Emissions (1 GHz to 18 GHz)	4.37	95
Radiated Emissions (18 GHz to 40 GHz)	3.93	95
Direct Connect Tests	**K Factor**	**Value**
Emissions Bandwidth	2	2.0%
Output Power	2	1.0 dB
Peak Power Spectral Density	2	1.3 dB
Band Edge	2	0.8 dB
Transmitter Spurious Emissions	2	1.8 dB

5 Test Results

5.1 §15.203 Antenna Requirements

The EUT uses an integral antenna. Per the manufacturer, the Maximum gain of the antenna is 4.5 dBi. This is an 802.11 device and utilizes CDD as described in KDB 662911 D01. The antenna is not user replaceable.

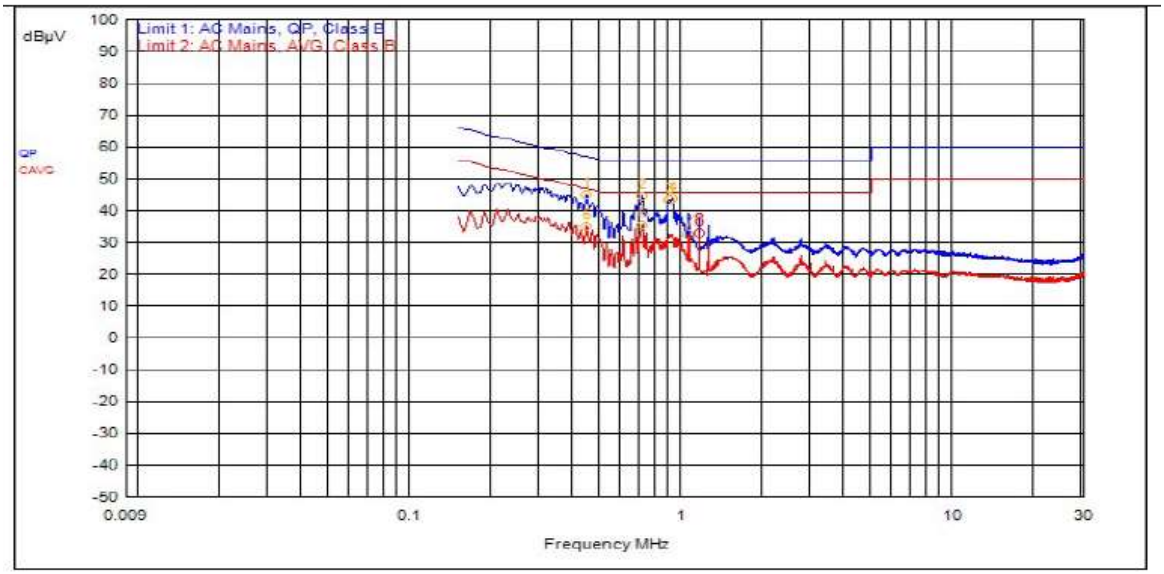
For power measurements on IEEE 802.11 devices, Array Gain = 0 dB for NANT ≤ 4;
For PSD measurements when Nss=1: Array Gain = 10 log(Nant/Nss) dB = 3.01dB; Direction gain = Ant Gain + Array Gain or 7.51dB (4.5 dBi + 3.01 dB)

Results

The EUT complied with the specification

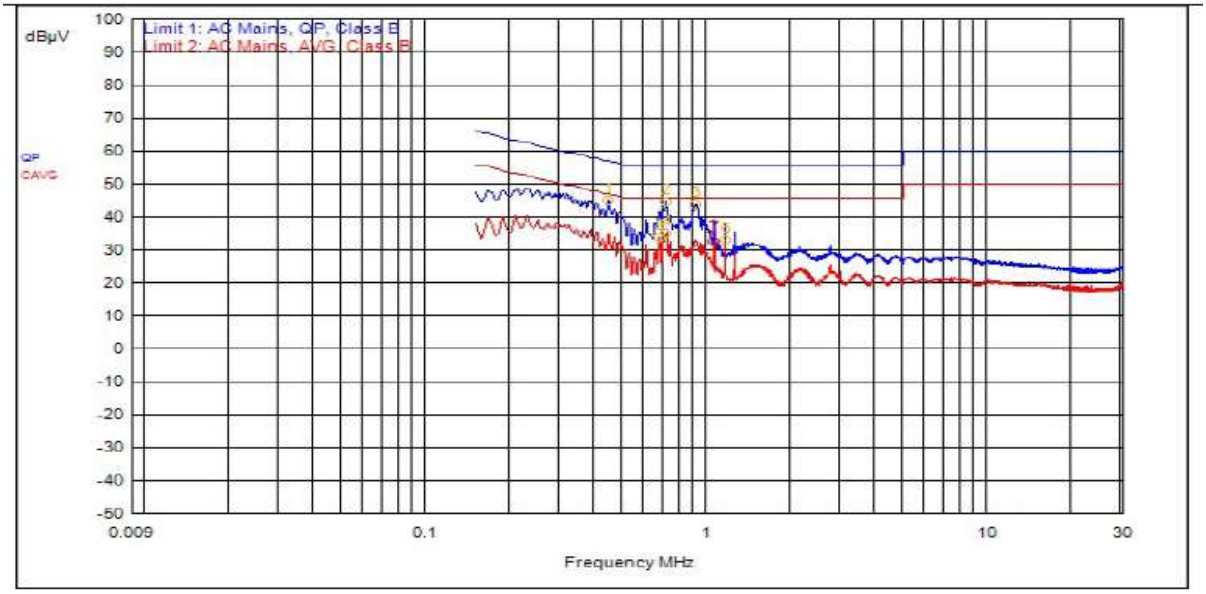
5.2 Conducted Emissions at Mains Ports Data

5.2.1 Line



ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit 1	Limit 1 Dist.	Limit 2	Limit 2 Dist.
2	708,000kHz	12.4	0.0		QPeak	32.0	44.4	56.0	-11.6		
1	444,000kHz	12.4	0.0		QPeak	32.7	45.1	57.0	-11.9		
4	921,000kHz	12.4	0.1		QPeak	31.1	43.6	56.0	-12.4		
3	891,000kHz	12.4	0.1		QPeak	30.9	43.4	56.0	-12.6		
5	444,000kHz	12.4	0.0		C_AVG	22.8	35.2			47.0	-11.8
6	711,000kHz	12.4	0.0		C_AVG	22.9	35.3			46.0	-10.7
7	1.056MHz	12.4	0.1		C_AVG	20.2	32.7			46.0	-13.3
8	1.152MHz	12.4	0.1		C_AVG	20.3	32.8			46.0	-13.2

5.2.2 Neutral



ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit 1	Limit 1 Dist.	Limit 2	Limit 2 Dist.
2	708,000kHz	12.4	0.0		QPeak	32.3	44.7	56.0	-11.3		
1	444,000kHz	12.4	0.0		QPeak	32.6	45.0	57.0	-12.0		
3	909,000kHz	12.4	0.1		QPeak	31.1	43.7	56.0	-12.3		
4	708,000kHz	12.4	0.0		C_AVG	22.8	35.2			46.0	-10.8
5	672,000kHz	12.4	0.0		C_AVG	21.3	33.8			46.0	-12.2
6	1.152MHz	12.4	0.1		C_AVG	20.3	32.8			46.0	-13.2
7	1.056MHz	12.4	0.1		C_AVG	20.1	32.6			46.0	-13.4

Result

The EUT complied with the specification limit.

5.3 §15.403(i) 26 dB Emissions Bandwidth

All chains were measured under the guidance of KDB 789033 Section II.C. and KDB 66291 D01. Please see associated annex for details on instrument settings.

5.3.1 UNII-2A

Bandwidth	Frequency (MHz)	99% Bandwidth (MHz)	Emissions 26 dB Bandwidth (MHz)
20 a	5260	16.3	18.7
20 a	5280	16.3	18.5
20 a	5320	16.3	19.4
20 n	5260	17.5	20.1
20 n	5280	17.5	20.0
20 n	5320	17.5	19.4
40 n	5270	36.0	39.3
40 n	5310	36.0	39.0
20 ac	5260	17.5	20.5
20 ac	5280	17.5	20.2
20 ac	5320	17.5	20.1
40 ac	5270	36.0	39.8
40 ac	5310	36.0	39.6
80 ac	5290	75.0	81.5
160 ac	5250	153.0	165.0
20 ax	5260	18.9	20.8
20 ax	5280	18.8	20.8
20 ax	5320	18.9	20.5
40 ax	5270	37.8	39.9
40 ax	5310	37.8	40.4
80 ax	5290	76.5	82.0
160 ax	5250	155.0	165.0

5.3.2 UNII-2C

Bandwidth	Frequency (MHz)	99% Bandwidth (MHz)	Emissions 26 dB Bandwidth (MHz)
20 a	5500	16.3	18.6
20 a	5600	16.3	18.5
20 a	5720	16.3	19.1
20 n	5500	17.5	19.5
20 n	5600	17.6	20.2
20 n	5720	17.5	19.7
40 n	5510	36.3	42.0
40 n	5590	36.3	40.1
40 n	5710	36.3	40.8
20 ac	5500	17.6	21.0
20 ac	5600	17.6	20.3
20 ac	5720	17.5	19.4
40 ac	5510	36.3	39.6
40 ac	5590	36.3	40.7
40 ac	5710	36.3	41.3
80 ac	5530	75.5	86.5
80 ac	5610	76.0	93.5
80 ac	5690	75.5	83.5
160 ac	5570	155.0	204.0
20 ax	5500	17.5	19.8
20 ax	5600	17.6	19.7
20 ax	5720	17.5	19.9
40 ax	5510	36.3	41.6
40 ax	5590	36.3	41.1
40 ax	5710	36.3	39.8
80 ax	5530	75.5	81.5
80 ax	5610	76.0	85.5
80 ax	5690	75.5	82.0
160 ax	5570	157.0	186.0

Result

The 26 dB bandwidths are reported for information purposes. Please see Annex for all bandwidth measurements.

5.4 §15.407(a)(2) Maximum Average Output Power

All chains were measured and summed under the guidance of KDB 789033 Section II. E.2. and KDB 66291 D01. Please see associated annex for details on instrument settings.

The maximum average RF conducted output power measured for this device was 23.93 dBm or 247.17 mW. The limit is 24 dBm or 250 mW when using antennas with 6 dBi or less gain. The antenna has a maximum gain of 5.15 dBi.

5.4.1 UNII-2A

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power*
20 a	5260	Mcs0	40	22.15
20 a	5280	Mcs0	40	22.20
20 a	5320	Mcs0	40	22.34
20 n	5260	Mcs0	42	22.54
20 n	5280	Mcs0	42	22.57
20 n	5320	Mcs0	42	22.77
40 n	5270	Mcs0	43	23.73
40 n	5310	Mcs0	42	23.53
20 ac	5260	Mcs0	42	22.51
20 ac	5280	Mcs0	42	22.55
20 ac	5320	Mcs0	42	22.78
40 ac	5270	Mcs0	43	23.70
40 ac	5310	Mcs0	42	23.44
80 ac	5290	Mcs0	43	23.52
160 ac	5250	Mcs0	43	23.82
20 ax	5260	Mcs0	42	22.67
20 ax	5280	Mcs0	42	22.65
20 ax	5320	Mcs0	42	22.89
40 ax	5270	Mcs0	43	23.52
40 ax	5310	Mcs0	43	23.83
80 ax	5290	Mcs0	43	23.52
160 ax	5250	Mcs0	43	23.88

5.4.2 UNII-2C

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power*
20 a	5500	Mcs0	40	22.09
20 a	5600	Mcs0	40	21.90
20 a	5720	Mcs0	40	22.13
20 n	5500	Mcs0	42	22.49
20 n	5600	Mcs0	42	22.36
20 n	5720	Mcs0	41	22.05
40 n	5510	Mcs0	43	23.57
40 n	5590	Mcs0	43	23.52
40 n	5710	Mcs0	43	23.76
20 ac	5500	Mcs0	42	22.51
20 ac	5600	Mcs0	42	22.39
20 ac	5720	Mcs0	41	22.05
40 ac	5510	Mcs0	43	23.57
40 ac	5590	Mcs0	43	23.52
40 ac	5710	Mcs0	43	23.74
80 ac	5530	Mcs0	44	23.72
80 ac	5610	Mcs0	44	23.83
80 ac	5690	Mcs0	44	23.77
160 ac	5570	Mcs0	43	23.66
20 ax	5500	Mcs0	42	22.52
20 ax	5600	Mcs0	42	22.39
20 ax	5720	Mcs0	41	22.02
40 ax	5510	Mcs0	43	23.50
40 ax	5590	Mcs0	43	23.45
40 ax	5710	Mcs0	43	23.64
80 ax	5530	Mcs0	44	23.63
80 ax	5610	Mcs0	44	23.74
80 ax	5690	Mcs0	44	23.71
160 ax	5570	Mcs0	43	23.65

Result

In the configuration tested, the maximum average RF output power was less than 1 watt; therefore, the EUT complied with the requirements of the specification.

5.5 §15.407(b) Spurious Emissions

5.5.1 Conducted Spurious Emissions

The frequency range from the lowest frequency generated or used in the device to the tenth harmonic of the highest fundamental frequency was investigated to measure any antenna-conducted emissions. The graphs show the measurement data from spurious emissions noted across the frequency range when transmitting at the lowest frequency, middle frequency and upper frequency. Shown below are plots with the EUT turned to the upper and lower channels with the antenna gain of 5.15 dBi accounted for. These demonstrate compliance with the provisions of this section at the band edges.

The emissions must be below -27 dBm EIRP.

Result

Conducted spurious emissions were below -27 dBm; therefore, the EUT complies with the specification. See Annex for results.

5.5.2 Radiated Spurious Emissions in the Restricted Bands of § 15.205

The frequency range from the lowest frequency generated or used in the device to the tenth harmonic of the highest fundamental emissions was investigated to measure any radiated emissions in the restricted bands. For frequencies above 18.0 GHz. The emissions in the restricted bans must meet the limits specified in § 15.209. Conducted measurement results are included in the Annex. Radiated data with the EUT transmitting into a load is included below. All emissions between the required frequencies were investigated, the following plots represent the worst case. The “fail” is the transmitted signal exceeding the spurious limit.

Correction Factor = Antenna Factor + Cable Loss - Pre-Amplifier Gain, and is added to the Receiver reading.

5.5.3 UNII-2A

QuasiPeak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin	Azimuth (°)	Height	Pol.	Correction (dB)
33.006 MHz	37.448	40	-2.552	143	1.71	Vertical	-9.062
120.81 MHz	38.184	40	-1.816	58	1.129	Vertical	-14.015
128.07 MHz	38.534	40	-1.466	83	1.131	Vertical	-13.665
31.914 MHz	31.756	40	-8.244	71	3.333	Horizontal	-8.245
127.13 MHz	26.332	40	-13.668	266	2.071	Horizontal	-13.671
672 MHz	19.064	47	-27.936	359	1.49	Horizontal	-6.278

Graph 1: Radiated Emissions within 30MHz - 1GHz

Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.064 GHz	49.733	74	-24.267	302	3.105	Vertical	14.318
14.539 GHz	53.998	74	-20.002	347	2.585	Vertical	15.7
15.835 GHz	69.406	74	-4.594	333	2.529	Vertical	11.354
14.858 GHz	52.116	74	-21.884	34	3.107	Horizontal	15.698
15.846 GHz	63.327	74	-10.673	203	3.112	Horizontal	11.368

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.064 GHz	37.327	54	-16.673	302	3.105	Vertical	14.318
14.539 GHz	39.227	54	-14.773	347	2.585	Vertical	15.7
15.835 GHz	53.802	54	-0.198	333	2.529	Vertical	11.354
14.858 GHz	38.961	54	-15.039	34	3.107	Horizontal	15.698
15.846 GHz	47.517	54	-6.483	203	3.112	Horizontal	11.368

Graph 2: Transmitting on the Middle Frequency 1 GHz – 17 GHz (worse case)

Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
21.032 GHz	53.722	74	-20.278	99	Vertical	-2.009
37.338 GHz	58.495	74	-15.505	169	Vertical	11.067
16.019 GHz	51.79	74	-22.21	273	Horizontal	3.541
37.376 GHz	59.035	74	-14.965	274	Horizontal	11.262

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
21.032 GHz	39.01	54	-14.99	99	Vertical	-2.009
37.338 GHz	45.347	54	-8.653	169	Vertical	11.067
16.019 GHz	38.733	54	-15.267	273	Horizontal	3.541
37.376 GHz	45.229	54	-8.771	274	Horizontal	11.262

Graph 3: Transmitting on the Lowest Frequency 17 GHz – 40 GHz (worse case)

5.5.4 UNII-2C

QuasiPeak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin	Azimuth (°)	Height	Pol.	Correction (dB)
33.006 MHz	37.448	40	-2.552	143	1.71	Vertical	-9.062
120.81 MHz	38.184	40	-1.816	58	1.129	Vertical	-14.015
128.07 MHz	38.534	40	-1.466	83	1.131	Vertical	-13.665
31.914 MHz	31.756	40	-8.244	71	3.333	Horizontal	-8.245
127.13 MHz	26.332	40	-13.668	266	2.071	Horizontal	-13.671
672 MHz	19.064	47	-27.936	359	1.49	Horizontal	-6.278

Graph 4: Radiated Emissions within 30MHz - 1GHz

Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
4.8001 GHz	49.822	74	-24.178	332	3.634	Vertical	-0.379
11.003 GHz	61.68	74	-12.32	252	3.458	Vertical	14.336
14.708 GHz	51.402	74	-22.598	55	2.753	Vertical	15.826
16.493 GHz	68.868	74	-5.132	85	1.5	Vertical	15.175
4.8001 GHz	51.162	74	-22.838	301	3.285	Horizontal	-0.379
10.996 GHz	61.619	74	-12.381	333	3.633	Horizontal	14.292
16.503 GHz	66.057	74	-7.943	292	3.455	Horizontal	15.233

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
4.8001 GHz	44.092	54	-9.908	332	3.634	Vertical	-0.379
11.003 GHz	46.227	54	-7.773	252	3.458	Vertical	14.336
14.708 GHz	39.077	54	-14.923	55	2.753	Vertical	15.826
16.493 GHz	52.786	54	-1.214	85	1.5	Vertical	15.175
4.8001 GHz	45.833	54	-8.167	301	3.285	Horizontal	-0.379
10.996 GHz	44.99	54	-9.01	333	3.633	Horizontal	14.292
16.503 GHz	50.608	54	-3.392	292	3.455	Horizontal	15.233

Graph 5: Transmitting on the Lowest Frequency 1 GHz – 17 GHz (worse case)

Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
16.494 GHz	67.381	74	-6.619	73	Vertical	0.417
37.344 GHz	57.561	74	-16.439	172	Vertical	11.136
16.498 GHz	64.87	74	-9.13	146	Horizontal	0.382
37.373 GHz	58.797	74	-15.203	331	Horizontal	11.25

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
16.494 GHz	53.472	54	-0.528	73	Vertical	0.417
37.344 GHz	45.403	54	-8.597	172	Vertical	11.136
16.498 GHz	50.563	54	-3.437	146	Horizontal	0.382
37.373 GHz	45.232	54	-8.768	331	Horizontal	11.25

Graph 6: Transmitting on the Lowest Frequency 17 GHz – 40 GHz (worse case)

5.6 §15.407(a) Maximum Power Spectral Density

All chains were measured and summed under the guidance of KDB 789033 Section II. F. and KDB 66291 D01. Please see associated annex for details on instrument settings.

The maximum average power spectral density conducted from the intentional radiator of the antenna shall not be greater than 11 dBm in any 1 MHz band during any time interval of continuous transmission. Results of this testing are summarized. With a 4.5 dBi antenna, the conducted limit for power spectral density is 11 dBm. As per KDB 662911, When the EUT is using spatial-multiplexing in HT to HE modes, there is not additional array gain to accommodate. When the EUT uses Nss=1 data rates, the antenna gain is 4.5 dBi + Array gain of 3.01 dB which is a total of 7.51 dBi
Results of this testing are summarized.

5.6.1 UNII-2A

Modulation (BW)	Frequency (MHz)	Data Rate	Measured PSD Limit – 11dB		Measured PSD (NSS=1) Limit = 9.49dB	
			TP Setting	Measured PSD Limit – 11dB	TP Setting	Measured PSD Limit – 9.49dB
20 a	5260	Mcs0	40	10.85	37	9.39
20 a	5280	Mcs0	40	10.47	37	9.25
20 a	5320	Mcs0	40	10.72	37	9.18
20 n	5260	Mcs0	42	10.69	39	9.04
20 n	5280	Mcs0	42	10.57	39	8.97
20 n	5320	Mcs0	42	10.90	39	9.31
40 n	5270	Mcs0	43	8.57	43	8.57
40 n	5310	Mcs0	42	8.27	42	8.27
20 ac	5260	Mcs0	42	10.67	39	9.06
20 ac	5280	Mcs0	42	10.58	39	8.95
20 ac	5320	Mcs0	42	10.87	39	9.29
40 ac	5270	Mcs0	43	8.67	43	8.67
40 ac	5310	Mcs0	42	9.13	42	9.13
80 ac	5290	Mcs0	43	6.16	43	6.16
160 ac	5250	Mcs0	43	3.82	43	3.82
20 ax	5260	Mcs0	42	10.62	39	9.01
20 ax	5280	Mcs0	42	10.42	40	9.47
20 ax	5320	Mcs0	42	10.76	39	9.26
40 ax	5270	Mcs0	43	8.27	43	8.27
40 ax	5310	Mcs0	43	8.82	43	8.82
80 ax	5290	Mcs0	43	6.11	43	6.11
160 ax	5250	Mcs0	43	3.87	43	3.87

5.6.2 UNII-2C

Modulation (BW)	Frequency (MHz)	Data Rate	Measured PSD Limit – 11dB		Measured PSD (NSS=1) Limit = 9.49dB	
			TP Setting	Measured PSD Limit – 11dB	TP Setting	Measured PSD Limit – 11dB
20 a	5500	Mcs0	40	10.59	37	8.94
20 a	5600	Mcs0	40	10.62	37	9.03
20 a	5720	Mcs0	40	10.74	37	9.09
20 n	5500	Mcs0	42	10.76	39	9.25
20 n	5600	Mcs0	42	10.88	39	9.34
20 n	5720	Mcs0	41	10.45	39	9.38
40 n	5510	Mcs0	43	9.09	43	9.09
40 n	5590	Mcs0	43	8.99	43	8.99
40 n	5710	Mcs0	43	9.33	43	9.33
20 ac	5500	Mcs0	42	10.81	39	9.23
20 ac	5600	Mcs0	42	10.88	39	9.35
20 ac	5720	Mcs0	41	10.42	39	9.41
40 ac	5510	Mcs0	43	8.91	43	8.91
40 ac	5590	Mcs0	43	8.93	43	8.93
40 ac	5710	Mcs0	43	9.36	43	9.36
80 ac	5530	Mcs0	44	6.86	44	6.86
80 ac	5610	Mcs0	44	7.07	44	7.07
80 ac	5690	Mcs0	44	6.25	44	6.25
160 ac	5570	Mcs0	43	4.11	43	4.11
20 ax	5500	Mcs0	42	10.81	39	9.26
20 ax	5600	Mcs0	42	10.86	39	9.33
20 ax	5720	Mcs0	41	10.41	39	9.39
40 ax	5510	Mcs0	43	9.08	43	9.08
40 ax	5590	Mcs0	43	8.80	43	8.80
40 ax	5710	Mcs0	43	9.39	43	9.39
80 ax	5530	Mcs0	44	6.88	44	6.88
80 ax	5610	Mcs0	44	7.17	44	7.17
80 ax	5690	Mcs0	44	6.34	44	6.34
160 ax	5570	Mcs0	43	4.01	43	4.01

Result

The maximum average power spectral density was less than the limit noted; therefore, the EUT complies with the specification.

5.7 DFS Requirement

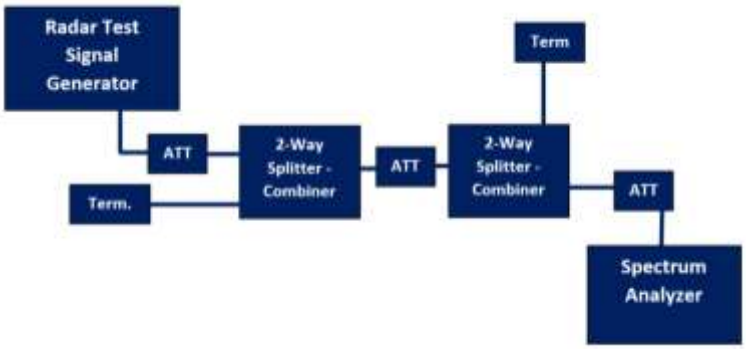
This product is a master with radar detection. The outcome of the required DFS tests is located in this section. DFS testing was performed following the test procedures as outlined in KDB 905462.

The product passes all required DFS tests for a master with radar detection.

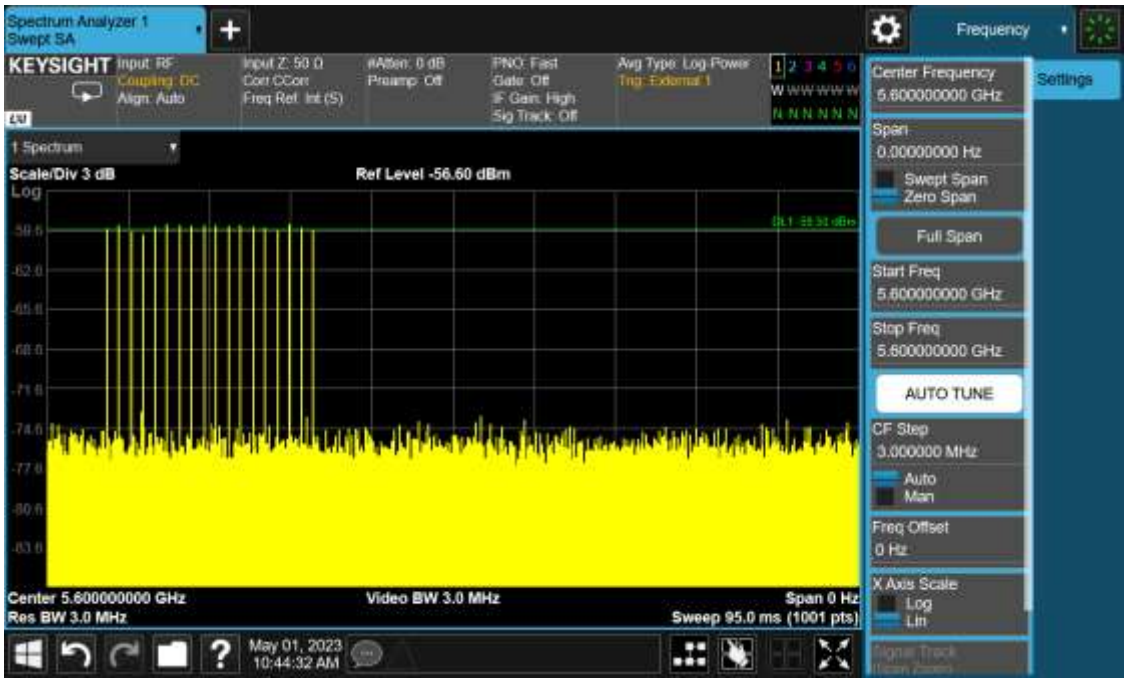
Information	Status	
Possible Antenna/s	Integral 4.5 dBi	
Antenna used for test	Integral 4.5 dBi	
Operating mode	Client	
If Client	N/A	
Port used for testing	J87	
EIRP range	> 200 milliwatts	
Impedance of port	50 ohms	
Channel loading technique	Data transfer was enacted to achieve a minimum channel loading of approximately 17%	
Antenna measurement technique	See note 1	
Time of power-on cycle	60s	
Detection threshold level	-64 dBm	

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

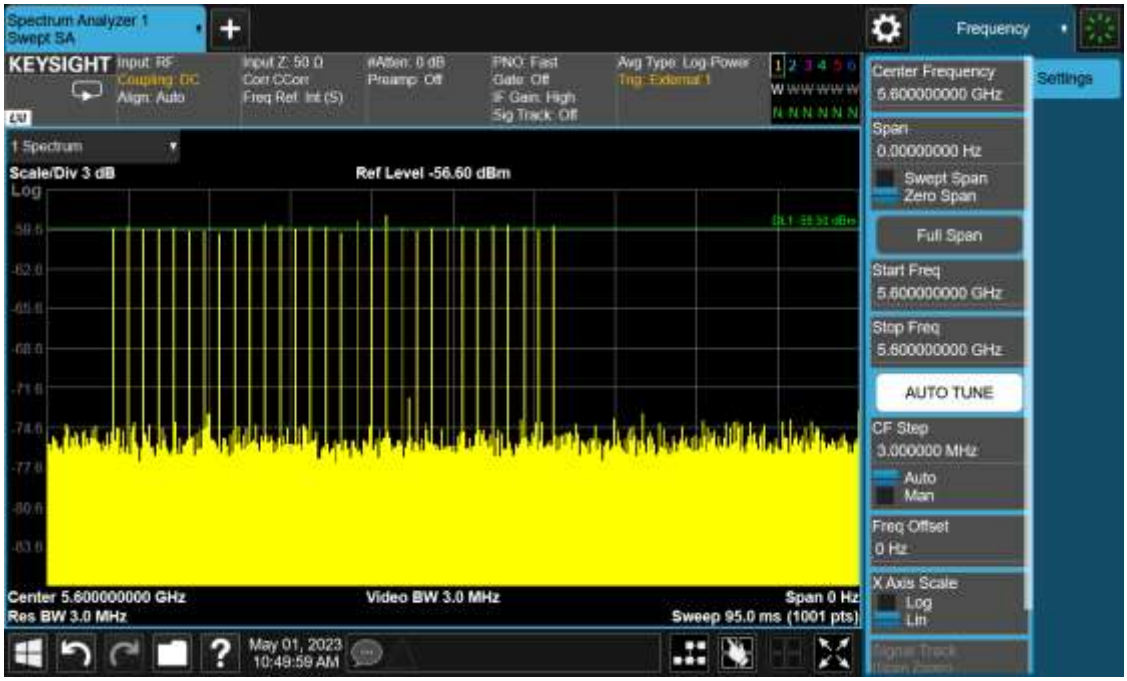
Requirement	Operational Mode	
	Master or Client Client Without Radar Detection	Client Without Radar Detection
DFS Detection Threshold	Yes	Not Required
Channel Closing Transmission Time	Yes	Yes
Channel Move Time	Yes	Yes
U-NII Detection Bandwidth	Yes	Not Required



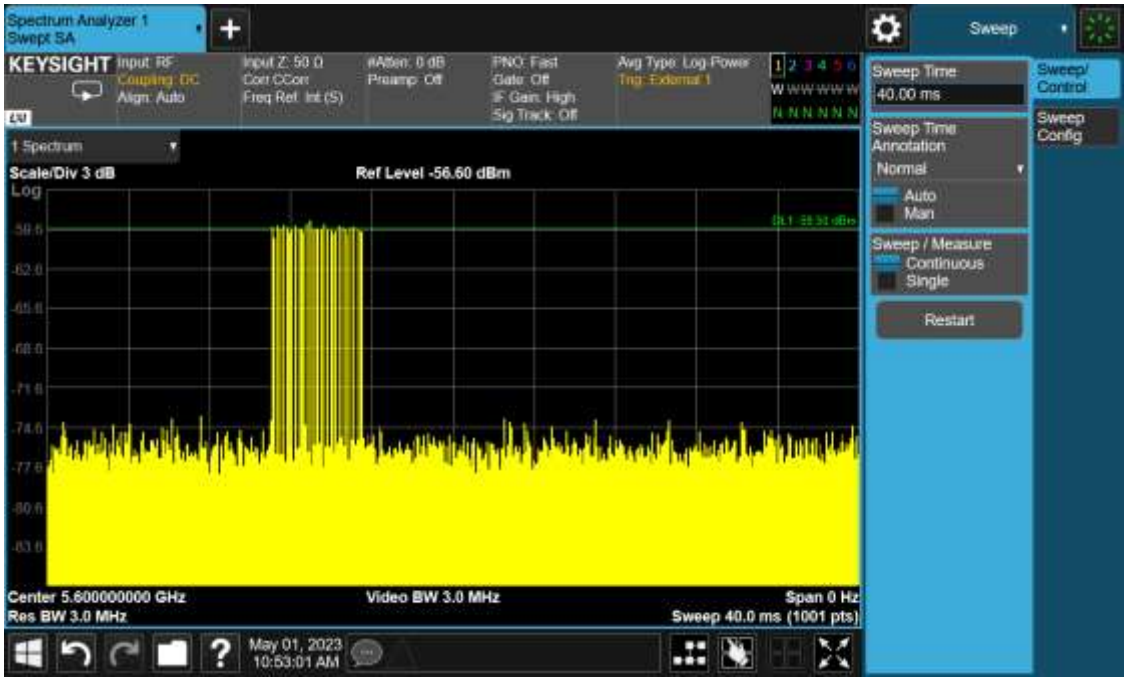
Maximum Transmit Power	Value (See Notes 1, 2, and 3)
EIRP ≥ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64 dBm
Note 1: This is the level at the input of the receiver assuming a 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.	



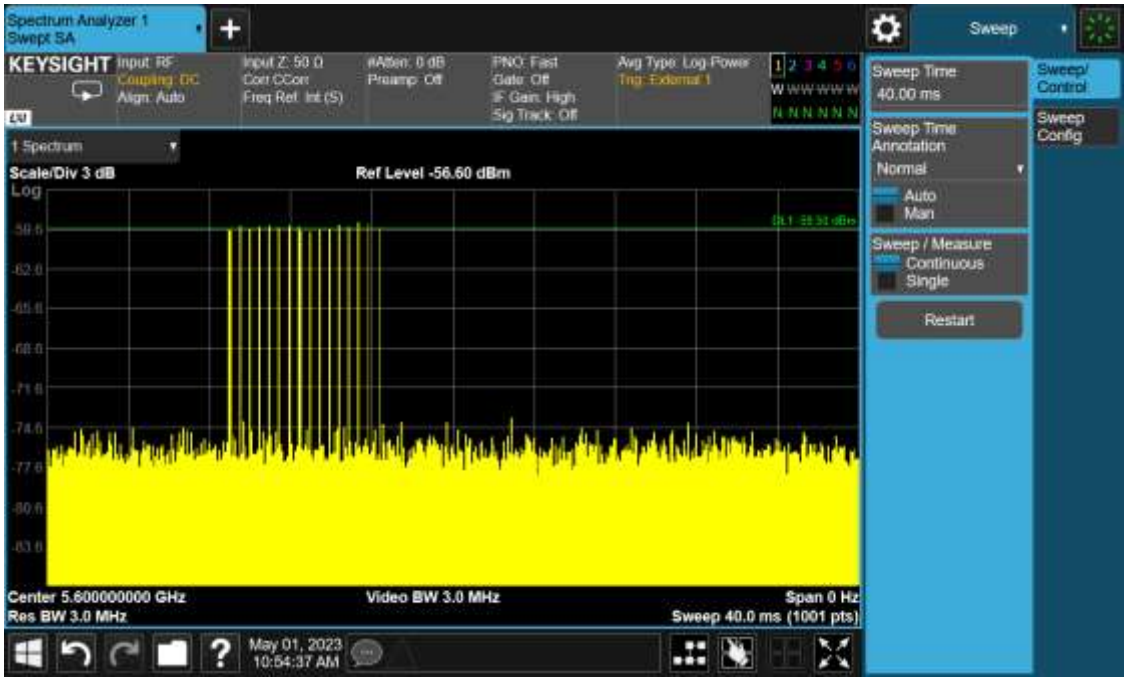
Plot 1: Radar Level 0



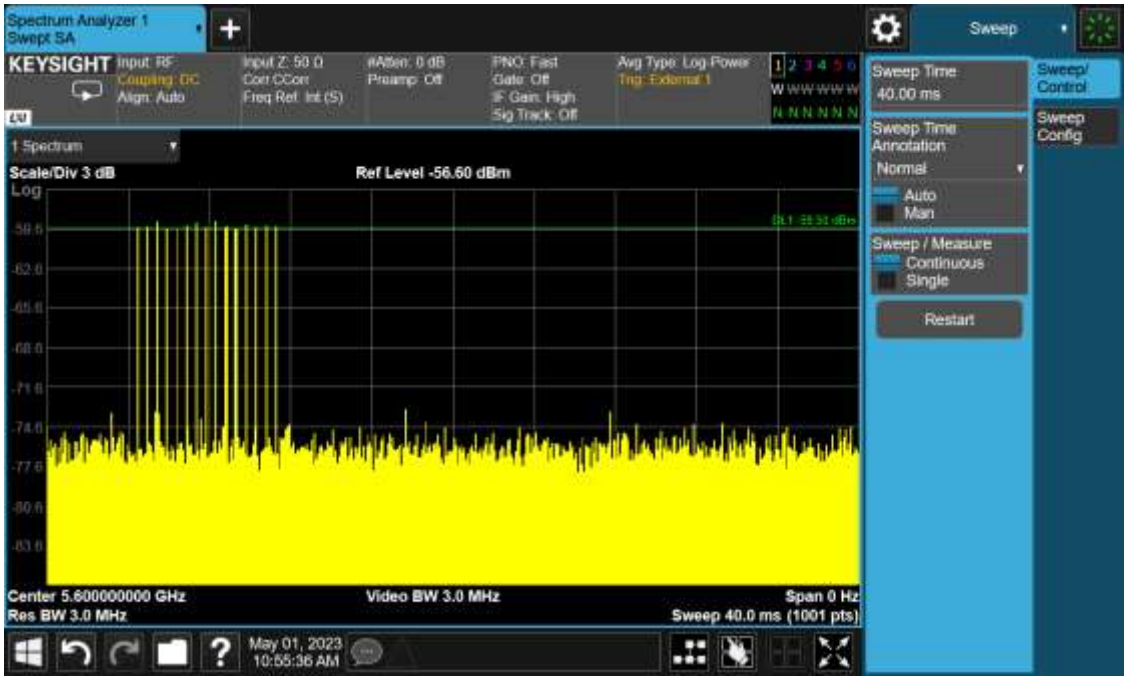
Plot 2: Radar Level 1



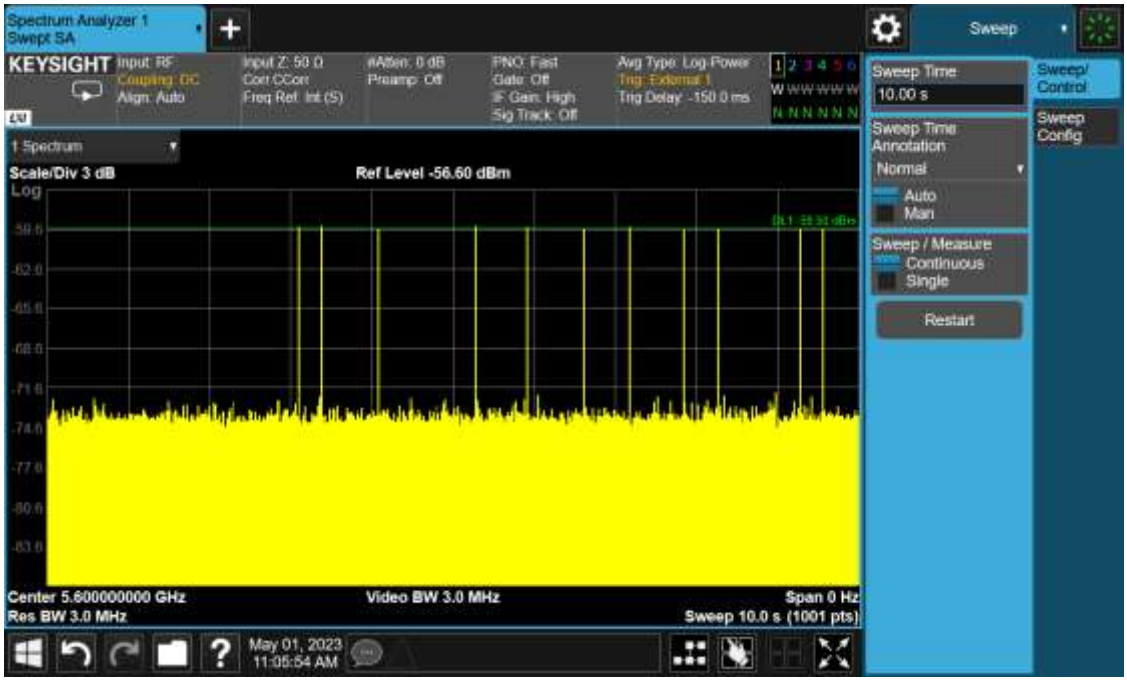
Plot 3: Radar Level 2



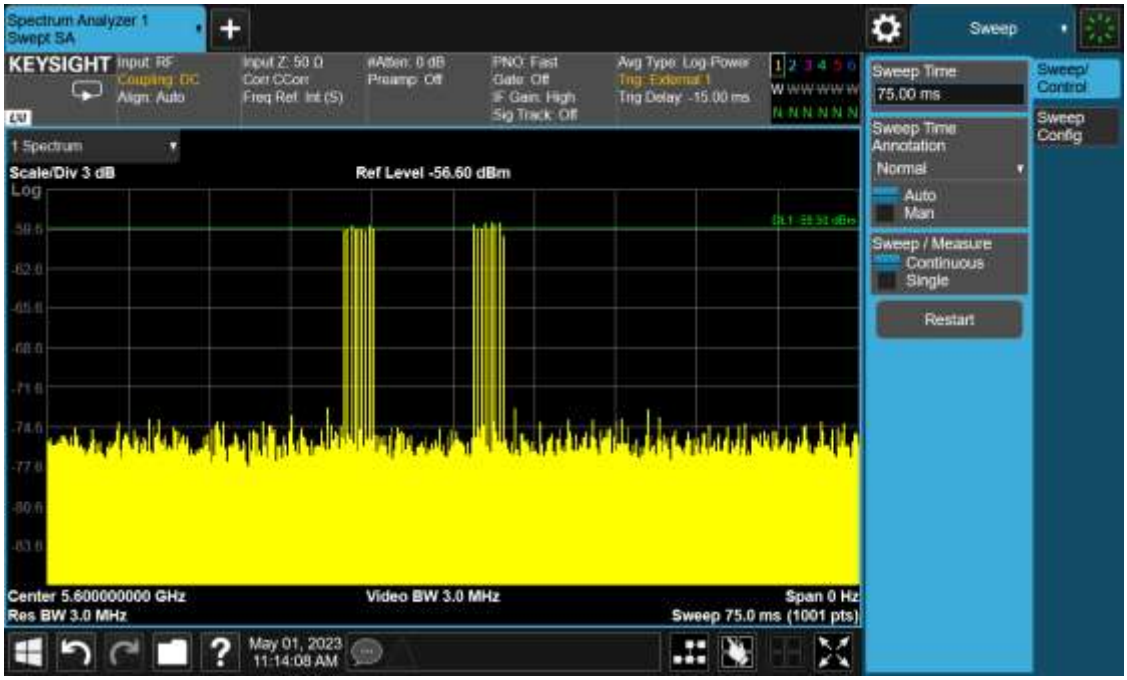
Plot 4: Radar Level 3



Plot 5: Radar Level 4



Plot 6: Radar Level 5



Plot 7: Radar Level 6

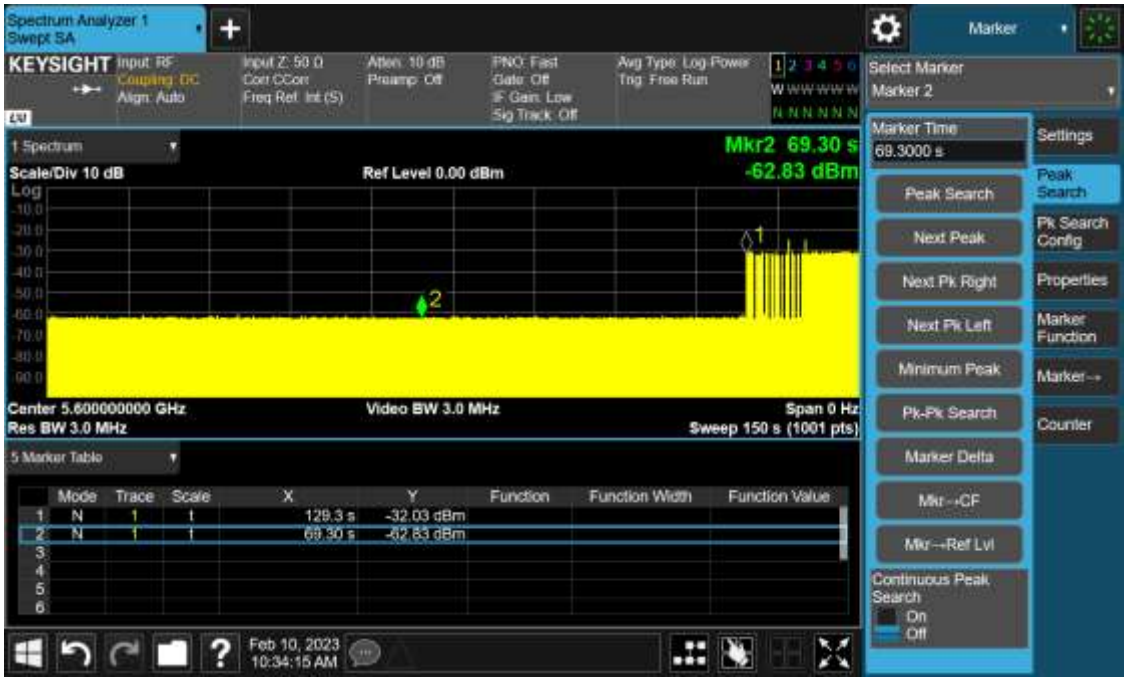
5.7.1 Channel Availability Check (CAC)

The EUT shall perform a CAC to ensure that there is no radar operating on the channel. After the power-up sequence, at-east 1 minute shall be monitored on the intended operating frequency. For initial CAC, the EUT does not emit beacon, control, or data signals on the test channel until the power-up sequence has been completed and the UNII device checks for radar waveforms for one minute on the test channel. This test does not use any radar waveforms. The markers in the associated plots indicate initial beacons.

For radar burst at the beginning of the CAC. To verify successful radar detection on the selected channel during a period equal to the beginning of the CAC time, visual indication on the EUT of successful detection of the radar burst will be recorded and reported. Observation of the radar burst is show on the associated plot to be within the beginning of the CAC time. Emissions will continue to be monitored for the remaining 300 seconds.

For radar burst at the end of the CAC. To verify successful radar detection on the selected channel during a period equal to the end of the CAC time, visual indication on the EUT of successful detection of the radar burst will be recorded and reported. Observation of the radar burst is show on the associated plot to be within the end of the CAC time. Emissions will continue to be monitored for the remaining 300 seconds.

A spectrum analyzer is used as a monitor to verify that the EUT has vacated the channel within the channel closing transmission time and channel move time, and does not transmit on a channel during the non-occupancy period after the detection and channel move.



Plot 8: DUT Turn On

Plot 9: Beginning

Plot 10: End

5.7.2 In-service Monitoring

Channel Move Time	10 seconds
Channel Closing Transmission Time	200 ms + aggregate of 60 ms over remaining 10 second period
Non-occupancy period	Minimum 30 minutes

Verified during in-service monitoring: channel closing transmission time and channel move time. The transmissions were observed at the end of the radar burst on the operating channel for a duration of greater than 10 seconds. The transmissions were measured and recorded during the observation time. This was compared to the channel move time and channel closing time limits.
One 12 second plot is reported for the short pulse radar type 0. A 60 ms plot is also provided to verify closing time for the aggregate transmission time starting from 200 ms after the end of the radar signal to the completion of the channel move.
During the 30 minutes observation time, the EUT did not make any transmissions on a channel after a radar signal was detected.
Please see plots below.

A spectrum analyzer is used as a monitor to verify that the EUT has vacated the channel within the channel closing transmission time and channel move time, and does not transmit on a channel during the non-occupancy period after the detection and channel move.

Plot 11: Close (2 s)

Plot 12: Move

Plot 13: Non-Occupancy

5.7.3 DFS Detection Bandwidth

20 MHz

EUT Frequency = 5600 MHz ; Bandwidth = 20 MHz											
Radar Frequency MHz	**DFS Detection Trials (1 = Detection, 0 = No Detection)**										**Detection Rate %**
	Trials										
	1	2	3	4	5	6	7	8	9	10	
F_Low 5990	1	1	1	1	1	1	1	1	1	1	100
5991											
5992											
5993											
5994											
5995	1	1	1	1	1	1	1	1	1	1	100
5996											
5997											
5998											
5999											
6000	1	1	1	0	1	1	1	1	1	1	90
6001											
6002											
6003											
6004											
6005	1	1	1	1	1	1	1	1	1	1	100
6006											
6007											
6008											
6009											
F_High 5610	1	1	1	1	1	1	1	1	1	1	100
Total Detection Percentage											98
Detection Bandwidth = FH-FL = 5590 MHz - 5610 MHz = 20 MHz											
99% Bandwidth = 19.8 MHz											

40 MHz

EUT Frequency = 5590 MHz ; Bandwidth = 40 MHz											
Radar Frequency MHz	**DFS Detection Trials (1 = Detection, 0 = No Detection)**										**Detection Rate %**
	Trials										
	1	2	3	4	5	6	7	8	9	10	
F_Low 5570	1	1	1	1	1	1	1	1	1	1	100
5571											
5572											
5573											
5574											

5575	1	1	1	1	1	1	1	1	1	1	100
5576											
5577											
5578											
5579											
5580	1	1	1	1	1	1	1	1	1	1	100
5581											
5582											
5583											
5584											
5585	1	1	1	1	1	1	1	1	1	1	100
5586											
5587											
5588											
5589											
5590	1	1	1	1	1	1	1	1	1	1	100
5591											
5592											
5593											
5594											
5595	1	1	1	1	1	1	1	1	1	1	100
5596											
5597											
5598											
5599											
5600	1	1	1	1	1	1	1	1	1	1	100
5601											
5602											
5603											
5604											
5605	1	1	1	1	1	1	1	1	1	1	100
5606											
5607											
5608											
5609											
F_High 5610	1	1	1	1	1	1	1	1	1	1	100
Total Detection Percentage											100
Detection Bandwidth = FH-FL = 5570 MHz - 5610 MHz = 40 MHz											
99% Bandwidth = 39.6 MHz											

80 MHz

EUT Frequency = 5610 MHz ; Bandwidth = 80 MHz											
Radar Frequency MHz	DFS Detection Trials (1 = Detection, 0 = No Detection)										Detection Rate %
	Trials										
	1	2	3	4	5	6	7	8	9	10	
F_Low 5570	1	1	1	1	1	1	1	1	1	1	100
5571											
5572											
5573											
5574											
5575	1	1	1	1	1	1	1	1	1	1	100
5576											
5577											
5578											
5579											
5580	1	1	1	1	1	1	1	1	1	1	100
5581											
5582											
5583											
5584											
5585	1	1	1	1	1	1	1	1	1	1	100
5586											
5587											
5588											
5589											
5590	1	1	1	1	1	1	1	1	1	1	100
5591											
5592											
5593											
5594											
5595	1	1	1	1	1	1	1	1	1	1	100
5596											
5597											
5598											
5599											
5600	0	1	1	1	1	1	1	1	1	1	90
5601											
5602											
5603											
5604											
5605	1	1	1	1	1	1	1	1	1	1	100
5606											

5607											
5608											
5609											
5610	1	1	1	1	1	1	1	1	1	1	100
5611											
5612											
5613											
5614											
5615	1	1	1	1	1	1	1	1	1	1	100
5616											
5617											
5618											
5619											
5620	1	1	1	1	1	1	1	1	1	1	100
5621											
5622											
5623											
5624											
5625	1	1	1	1	1	1	1	1	1	1	100
5626											
5627											
5628											
5629											
5630	1	1	1	1	1	1	1	1	1	1	100
5631											
5632											
5633											
5634											
5635	1	1	1	1	1	1	1	1	1	1	100
5636											
5637											
5638											
5639											
5640	1	1	1	1	1	1	1	1	1	1	100
5641											
5642											
5643											
5644											
5645	1	1	1	1	1	1	1	1	1	1	100
5646											
5647											
5648											
5649											

F_High 5650	1	1	1	1	1	1	1	1	1	1	100
Total Detection Percentage											99.41176471
Detection Bandwidth = FH-FL = 5570 MHz - 5650 MHz = 80 MHz											
99% Bandwidth = 79.2 MHz											

160 MHz

EUT Frequency = 5570 MHz ; Bandwidth = 160 MHz											
Radar Frequency MHz	**DFS Detection Trials (1 = Detection, 0 = No Detection)**										**Detection Rate %**
	Trials										
	1	2	3	4	5	6	7	8	9	10	
F_Low 5490	1	1	1	1	1	1	1	1	1	1	100
5491											
5492											
5493											
5494											
5495	1	1	1	1	1	1	1	1	1	1	100
5496											
5497											
5498											
5499											
5500	1	1	1	1	1	1	1	1	1	1	100
5501											
5502											
5503											
5504											
5505	1	1	1	1	1	1	1	1	1	1	100
5506											
5507											
5508											
5509											
5510	1	1	1	1	1	1	1	1	1	1	100
5511											
5512											
5513											
5514											
5515	1	1	1	1	1	1	1	1	1	1	100
5516											
5517											
5518											
5519											

5520	1	1	1	1	1	1	1	1	1	1	100
5521											
5522											
5523											
5524											
5525	1	1	1	1	1	1	1	1	1	1	100
5526											
5527											
5528											
5529											
5530	1	1	1	1	1	1	1	1	1	1	100
5531											
5532											
5533											
5534											
5535	1	1	1	1	1	1	1	1	1	1	100
5536											
5537											
5538											
5539											
5540	1	1	1	1	1	1	1	1	1	1	100
5541											
5542											
5543											
5544											
5545	1	1	1	1	1	1	1	1	1	1	100
5546											
5547											
5548											
5549											
5550	1	1	1	1	1	1	1	1	1	1	100
5551											
5552											
5553											
5554											
5555	1	1	1	1	1	1	1	1	1	1	100
5556											
5557											
5558											
5559											

5560	1	1	1	1	1	1	1	1	1	1	100
5561											
5562											
5563											
5564											
5565	1	1	1	1	1	1	1	1	1	1	100
5566											
5567											
5568											
5569											
5570	1	1	1	1	1	1	1	1	1	1	100
5571											
5572											
5573											
5574											
5575	1	1	1	1	1	1	1	1	1	1	100
5576											
5577											
5578											
5579											
5580	1	1	1	1	1	1	1	1	1	1	100
5581											
5582											
5583											
5584											
5585	1	1	1	1	1	1	1	1	1	1	100
5586											
5587											
5588											
5589											
5590	1	1	1	1	0	1	1	1	1	1	90
5591											
5592											
5593											
5594											
5595	1	1	1	1	1	1	1	1	1	1	100
5596											
5597											
5598											
5599											

5600	1	1	1	1	1	1	1	1	1	1	100
5601											
5602											
5603											
5604											
5605	1	1	1	1	1	1	1	1	1	1	100
5606											
5607											
5608											
5609											
5610	1	1	1	1	1	1	1	1	1	1	100
5611											
5612											
5613											
5614											
5615	1	1	1	1	1	1	1	1	1	1	100
5616											
5617											
5618											
5619											
5620	1	1	1	1	1	1	1	1	1	1	100
5621											
5622											
5623											
5624											
5625	1	1	1	1	1	1	1	1	1	1	100
5626											
5627											
5628											
5629											
5630	1	1	1	1	1	1	1	1	1	1	100
5631											
5632											
5633											
5634											
5635	1	1	1	1	1	1	1	1	1	1	100
5636											
5637											
5638											
5639											

5640	1	1	1	1	1	1	1	1	1	1	100
5641											
5642											
5643											
5644											
5645	1	1	1	1	1	1	1	1	1	1	100
5646											
5647											
5648											
5649											
F_High 5650	1	1	1	1	1	1	1	1	1	1	100
Total Detection Percentage											99.6969697
Detection Bandwidth = FH-FL = 5490 MHz - 5650 MHz = 160 MHz											
99% Bandwidth = 158.4 MHz											

5.7.4 Detection Probability

For statistical performance check. Demonstrating a minimum channel loading of approximately 17% or greater of the test. Observe the transmissions of the EUT at the end of the burst on the operating channel for duration greater than 10 seconds for short pulse radar type 1-4 and 6 to ensure detection occurs. Then observe the transmissions of the EUT at the end of the burst on the operating channel for duration greater than 22 seconds for long pulse radar type 5 to ensure detection occurs. The device can utilize a test mode to demonstrate when detection occurs to prevent the need to reset the device between trial runs.
Please see data below.

Radar Type	Min successful detection (%)	Minimum Trials
1	60	30
2	60	30
3	60	30
4	60	30
Types 1 - 4	80	120
5	80	30
6	70	30

20 MHz

Summary			
Type	**Detections**	**Trials**	**Detection Probability**
Type 1	30	30	100%
Type 2	28	30	93%
Type 3	25	30	83%
Type 4	28	30	93%
Type 5	30	30	100%
Type 6	28	30	93%
Aggregate 1-4	111	120	93%

RADAR TYPE 1				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	**Number of Pulses per Burst**	**Pulse Width (µsec)**	**PRI (µs)**	**Detection (yes/no)**
1	19	1	2846	y
2	90	1	590	y
3	21	1	2633	y
4	60	1	892	y
5	33	1	1617	y
6	33	1	1622	y
7	32	1	1668	y
8	25	1	2113	y
9	22	1	2432	y
10	70	1	758	y
11	21	1	2513	y
12	28	1	1933	y
13	21	1	2562	y
14	90	1	587	y
15	75	1	706	y
16	82	1	648	y
17	48	1	1121	y
18	19	1	2788	y
19	58	1	914	y
20	26	1	2094	y
21	46	1	1170	y
22	38	1	1420	y
23	64	1	833	y
24	28	1	1937	y
25	28	1	1904	y
26	31	1	1750	y
27	20	1	2638	y
28	72	1	736	y
29	94	1	563	y
30	23	1	2304	y
				30/30: 100%

RADAR TYPE 2				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	**Number of Pulses per Burst**	**Pulse Width (µsec)**	**PRI (µs)**	**Detection (yes/no)**
1	26	2.8	152	y
2	25	3.2	223	n
3	23	2.6	151	y
4	29	1.5	153	y
5	27	2.1	172	y
6	29	4.1	188	y
7	25	1.7	209	y
8	23	1.1	168	y
9	24	1.9	150	y
10	27	1.5	212	y
11	28	4.3	208	y
12	25	3.5	179	y
13	28	2.9	202	y
14	26	3.8	218	y
15	26	4	202	y
16	25	2.6	219	y
17	26	3	214	y
18	26	2	210	y
19	28	3.1	211	y
20	24	3.4	226	y
21	27	1.1	196	n
22	28	1.3	204	y
23	26	3.9	163	y
24	26	2.3	194	y
25	25	4	223	y
26	23	4.3	218	y
27	24	1.8	227	y
28	28	2.8	176	y
29	29	2.6	173	y
30	28	1.2	228	y
				28/30: 93.3%

RADAR TYPE 3				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	**Number of Pulses per Burst**	**Pulse Width (µsec)**	**PRI (µs)**	**Detection (yes/no)**
1	17	7.8	484	y
2	17	7	250	y
3	16	7.3	472	n
4	18	9	468	n
5	17	9.2	279	y
6	17	6	472	n
7	17	8.3	475	y
8	16	7.4	257	y
9	17	8.8	263	y
10	18	8.3	347	y
11	17	7.2	342	y
12	18	8.5	216	y
13	17	8.8	458	y
14	18	9.6	361	y
15	17	8.5	458	n
16	18	6.6	404	y
17	17	6.6	223	y
18	16	8.5	367	y
19	17	9.1	219	y
20	16	9.6	393	y
21	17	6	493	y
22	16	7.8	255	n
23	17	6.5	214	y
24	17	9.9	429	y
25	17	7.6	378	y
26	17	7.7	469	y
27	17	6	365	y
28	18	6.9	473	y
29	16	8.2	344	y
30	17	7.2	288	y
				25/30: 83.3%

RADAR TYPE 4				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	**Number of Pulses per Burst**	**Pulse Width (µsec)**	**PRI (µs)**	**Detection (yes/no)**
1	14	11.6	279	y
2	15	13	409	y
3	14	18.7	371	y
4	16	17.7	466	y
5	16	16.7	335	y
6	14	12	430	y
7	13	15.9	363	y
8	13	14.7	403	y
9	13	19.8	307	y
10	13	12.9	259	y
11	14	13.8	466	y
12	13	18.6	489	y
13	15	12.1	211	y
14	12	12.5	311	y
15	14	12.7	433	y
16	12	19.5	240	n
17	15	12.8	451	y
18	13	14.1	385	n
19	15	12.8	407	y
20	13	19.9	331	y
21	12	11.9	297	y
22	15	14.7	465	y
23	14	17.2	279	y
24	15	15.1	276	y
25	15	11.9	304	y
26	13	18.9	460	y
27	14	18.8	213	y
28	15	12.7	272	y
29	15	16.4	423	y
30	15	12.6	459	y
				28/30: 93.3%

TYPE 5	Rohde & Schwarz K350 Pulse Sequencer DFS			
Trial #	**Detection (yes/no)**	**Chirp Width (MHz)**	**Subset**	**Fc**
1	y	17	1	5600
2	y	8	1	5600
3	y	13	1	5600
4	y	18	1	5600
5	y	15	1	5600
6	y	12	1	5600
7	y	12	1	5600
8	y	11	1	5600
9	y	14	1	5600
10	y	11	1	5600
11	y	12	2	5594.8
12	y	16	2	5596.4
13	y	9	2	5593.6
14	y	12	2	5594.8
15	y	7	2	5592.8
16	y	5	2	5592
17	y	14	2	5595.6
18	y	5	2	5592
19	y	6	2	5592.4
20	y	11	2	5594.4
21	y	13	3	5604.8
22	y	13	3	5604.8
23	y	6	3	5607.6
24	y	9	3	5606.4
25	y	10	3	5606
26	y	15	3	5604
27	y	12	3	5605.2
28	y	6	3	5607.6
29	y	11	3	5605.6
30	y	8	3	5606.8

30/30: 100%

TYPE 6 S	Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	**Detection (yes/no)**
1	y
2	y
3	y
4	y
5	y
6	y
7	y
8	y
9	y
10	y
11	y
12	y
13	y
14	y
15	y
16	y
17	y
18	y
19	y
20	y
21	y
22	y
23	y
24	n
25	y
26	n
27	y
28	y
29	y
30	y
	28/30: 93.3%

40 MHz

Summary			
Type	**Detections**	**Trials**	**Detection Probability**
Type 1	27	30	90%
Type 2	25	30	83%
Type 3	26	30	87%
Type 4	28	30	93%
Type 5	29	30	97%
Type 6	30	30	100%
Aggregate 1-4	106	120	88%

RADAR TYPE 1				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	**Number of Pulses per Burst**	**Pulse Width (µsec)**	**PRI (µs)**	**Detection (yes/no)**
1	43	1	1248	y
2	38	1	1397	y
3	18	1	2932	n
4	35	1	1549	n
5	28	1	1945	y
6	20	1	2679	y
7	51	1	1040	y
8	25	1	2157	y
9	20	1	2696	y
10	39	1	1372	n
11	19	1	2887	y
12	31	1	1755	y
13	55	1	975	y
14	25	1	2175	y
15	32	1	1685	y
16	37	1	1433	y
17	49	1	1081	y
18	24	1	2282	y
19	22	1	2462	y
20	21	1	2548	y
21	33	1	1630	y
22	63	1	837	y
23	30	1	1773	y
24	24	1	2226	y
25	44	1	1204	y
26	59	1	897	y
27	20	1	2754	y
28	26	1	2049	y
29	19	1	2907	y
30	23	1	2296	y
				27/30: 90%

RADAR TYPE 2				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	**Number of Pulses per Burst**	**Pulse Width (µsec)**	**PRI (µs)**	**Detection (yes/no)**
1	29	2.2	203	y
2	28	2.1	189	y
3	29	4.8	150	y
4	25	4	219	n
5	26	1.6	196	y
6	27	4.6	156	y
7	25	3.8	154	y
8	28	3.5	213	y
9	26	3.4	210	y
10	26	4.3	214	y
11	26	3.9	150	y
12	23	1.1	176	y
13	27	1.4	163	n
14	24	1.5	229	y
15	26	2.5	172	y
16	24	1.2	163	y
17	25	3.9	216	y
18	29	1	151	y
19	23	1.7	205	n
20	23	1.8	190	n
21	25	4.9	224	y
22	25	2.4	185	y
23	24	2.1	190	y
24	26	1.3	165	n
25	25	2.2	154	y
26	24	1.4	211	y
27	26	4.3	212	y
28	24	3.5	196	y
29	25	4.6	203	y
30	27	3.5	200	y
				25/30: 83.3%

RADAR TYPE 3				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	**Number of Pulses per Burst**	**Pulse Width (µsec)**	**PRI (µs)**	**Detection (yes/no)**
1	18	6.4	246	y
2	16	7.3	243	y
3	17	8.7	449	n
4	17	6.6	347	n
5	17	7.4	412	y
6	18	7.4	415	y
7	17	9.5	202	y
8	17	8.7	446	y
9	17	9.3	268	y
10	17	6.9	404	y
11	16	6.5	229	y
12	16	6.2	386	y
13	17	7.8	377	y
14	16	9.6	474	y
15	16	8.8	455	y
16	17	8.8	279	y
17	18	6.8	436	y
18	17	9.8	499	n
19	17	9	342	y
20	16	8.3	313	y
21	16	8.8	463	n
22	18	7.2	291	y
23	17	9.8	250	y
24	17	7.3	410	y
25	17	8.7	433	y
26	18	8.3	211	y
27	16	8.9	384	y
28	18	8.3	294	y
29	16	8.8	468	y
30	16	6.5	468	y
				26/30: 86.7%

RADAR TYPE 4				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	**Number of Pulses per Burst**	**Pulse Width (µsec)**	**PRI (µs)**	**Detection (yes/no)**
1	14	17.4	241	y
2	16	16.2	279	y
3	15	15.9	211	y
4	14	13.9	297	y
5	15	12.9	462	y
6	15	12	232	y
7	13	13.9	370	y
8	12	15.2	300	y
9	14	13	212	y
10	14	17.7	393	n
11	16	11.3	300	y
12	15	18.9	470	y
13	12	11	331	y
14	13	13.2	341	n
15	15	18.8	349	y
16	13	19.8	416	y
17	15	19.3	499	y
18	14	18.5	422	y
19	13	18.5	410	y
20	16	14.1	485	y
21	13	15.9	223	y
22	15	12.3	216	y
23	15	11.7	347	y
24	14	11.2	210	y
25	13	16.8	444	y
26	15	17.7	205	y
27	14	11.5	497	y
28	14	19	326	y
29	14	17.9	312	y
30	13	12.6	229	y
				28/30: 93.3%

TYPE 5	Rohde & Schwarz K350 Pulse Sequencer DFS			
Trial #	**Detection (yes/no)**	**Chirp Width (MHz)**	**Subset**	**Fc**
1	y	8	1	5600
2	y	7	1	5600
3	y	16	1	5600
4	n	7	1	5600
5	y	11	1	5600
6	y	15	1	5600
7	y	11	1	5600
8	y	5	1	5600
9	y	11	1	5600
10	y	17	1	5600
11	y	18	2	5587.2
12	y	9	2	5583.6
13	y	11	2	5584.4
14	y	5	2	5582
15	y	6	2	5582.4
16	y	14	2	5585.6
17	y	19	2	5587.6
18	y	14	2	5585.6
19	y	8	2	5583.2
20	y	15	2	5586
21	y	10	3	5616
22	y	5	3	5618
23	y	12	3	5615.2
24	y	11	3	5615.6
25	y	12	3	5615.2
26	y	10	3	5616
27	y	13	3	5614.8
28	y	15	3	5614
29	y	19	3	5612.4
30	y	9	3	5616.4

29/30: 96.7%

TYPE 6 S	Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	**Detection (yes/no)**
1	y
2	y
3	y
4	y
5	y
6	y
7	y
8	y
9	y
10	y
11	y
12	y
13	y
14	y
15	y
16	y
17	y
18	y
19	y
20	y
21	y
22	y
23	y
24	y
25	y
26	y
27	y
28	y
29	y
30	y
	30/30: 100%

80 MHz

Summary			
Type	**Detections**	**Trials**	**Detection Probability**
Type 1	29	30	97%
Type 2	24	30	80%
Type 3	28	30	93%
Type 4	25	30	83%
Type 5	29	30	97%
Type 6	30	30	100%
Aggregate 1-4	106	120	88%

RADAR TYPE 1				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	**Number of Pulses per Burst**	**Pulse Width (µsec)**	**PRI (µs)**	**Detection (yes/no)**
1	80	1	663	y
2	20	1	2726	y
3	47	1	1134	y
4	23	1	2385	y
5	22	1	2435	y
6	23	1	2331	n
7	22	1	2443	y
8	21	1	2586	y
9	43	1	1247	y
10	47	1	1142	y
11	65	1	823	y
12	63	1	840	y
13	72	1	739	y
14	44	1	1217	y
15	22	1	2399	y
16	27	1	2018	y
17	31	1	1711	y
18	43	1	1234	y
19	31	1	1718	y
20	52	1	1028	y
21	94	1	566	y
22	30	1	1758	y
23	26	1	2088	y
24	25	1	2125	y
25	27	1	2003	y
26	50	1	1065	y
27	24	1	2201	y
28	24	1	2223	y
29	20	1	2742	y
30	32	1	1695	y
				29/30: 96.7%

RADAR TYPE 2				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	**Number of Pulses per Burst**	**Pulse Width (µsec)**	**PRI (µs)**	**Detection (yes/no)**
1	27	2.7	224	y
2	27	4.1	168	y
3	29	4.4	212	y
4	26	2.7	184	y
5	24	2.7	226	n
6	25	4.6	157	y
7	27	2.5	198	y
8	29	2.8	174	y
9	25	3.6	159	y
10	25	3.8	183	y
11	26	3	211	n
12	23	1.9	229	n
13	26	4.1	179	y
14	23	3.5	201	n
15	24	3.4	193	n
16	24	3.8	211	y
17	27	3	215	y
18	26	4.8	218	y
19	24	1.2	175	y
20	27	4.9	162	y
21	23	3.5	169	y
22	27	2.1	179	y
23	28	3.3	205	y
24	24	2.9	210	y
25	25	1.2	206	y
26	27	1.4	150	y
27	24	1.5	161	y
28	24	4.6	215	y
29	26	1	228	n
30	28	4.1	157	y
				24/30: 80%

RADAR TYPE 3				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	**Number of Pulses per Burst**	**Pulse Width (µsec)**	**PRI (µs)**	**Detection (yes/no)**
1	17	6.8	281	y
2	17	7.7	463	n
3	16	6.9	226	y
4	18	6.4	374	y
5	17	9.4	382	y
6	16	6.6	469	y
7	18	9.4	222	y
8	18	6.4	335	y
9	18	8.1	228	y
10	17	7.6	489	y
11	17	8.5	213	y
12	17	7.8	493	y
13	18	7.9	258	y
14	16	9	256	n
15	16	9.4	260	y
16	17	8.3	495	y
17	17	9.3	247	y
18	17	9.1	435	y
19	17	7.5	234	y
20	17	6.7	400	y
21	17	8.5	376	y
22	16	7.9	378	y
23	17	6.9	370	y
24	18	6.4	479	y
25	18	8.8	399	y
26	16	8.4	269	y
27	17	8.4	470	y
28	17	6.7	286	y
29	18	7.6	448	y
30	17	6.5	430	y
				28/30: 93.3%

RADAR TYPE 4				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	**Number of Pulses per Burst**	**Pulse Width (µsec)**	**PRI (µs)**	**Detection (yes/no)**
1	12	19.5	307	y
2	16	19.5	320	y
3	16	11.3	311	y
4	13	13.6	484	y
5	15	11.1	494	y
6	13	17.4	382	y
7	14	18.6	240	y
8	13	13.2	355	n
9	14	17.7	484	y
10	16	15.4	312	y
11	14	12.1	360	y
12	14	11.3	428	y
13	14	18.4	397	y
14	12	14.9	201	n
15	15	12.4	313	n
16	15	11.2	431	y
17	13	14.5	338	n
18	13	18	371	y
19	13	17	202	y
20	15	19.8	445	y
21	13	15.1	350	y
22	14	15.2	264	y
23	13	19.7	329	n
24	15	18.6	298	y
25	15	13.9	332	y
26	13	11.7	455	y
27	15	17.3	246	y
28	15	11.8	398	y
29	15	12	204	y
30	14	15.5	323	y
				25/30: 83.3%

TYPE 5	Rohde & Schwarz K350 Pulse Sequencer DFS			
Trial #	**Detection (yes/no)**	**Chirp Width (MHz)**	**Subset**	**Fc**
1	y	7	1	5600
2	y	19	1	5600
3	y	13	1	5600
4	y	5	1	5600
5	y	19	1	5600
6	y	9	1	5600
7	y	8	1	5600
8	y	16	1	5600
9	y	17	1	5600
10	y	5	1	5600
11	n	18	2	5567.2
12	y	12	2	5564.8
13	y	10	2	5564
14	y	13	2	5565.2
15	y	9	2	5563.6
16	y	6	2	5562.4
17	y	8	2	5563.2
18	y	12	2	5564.8
19	y	16	2	5566.4
20	y	7	2	5562.8
21	y	19	3	5632.4
22	y	9	3	5636.4
23	y	5	3	5638
24	y	19	3	5632.4
25	y	16	3	5633.6
26	y	7	3	5637.2
27	y	8	3	5636.8
28	y	19	3	5632.4
29	y	8	3	5636.8
30	y	6	3	5637.6

29/30: 96.7%

TYPE 6 S	Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	**Detection (yes/no)**
1	y
2	y
3	y
4	y
5	y
6	y
7	y
8	y
9	y
10	y
11	y
12	y
13	y
14	y
15	y
16	y
17	y
18	y
19	y
20	y
21	y
22	y
23	y
24	y
25	y
26	y
27	y
28	y
29	y
30	y
	30/30: 100%

160 MHz

Summary			
Type	**Detections**	**Trials**	**Detection Probability**
Type 1	27	30	90%
Type 2	26	30	87%
Type 3	24	30	80%
Type 4	23	30	77%
Type 5	30	30	100%
Type 6	30	30	100%
Aggregate 1-4	100	120	83%

RADAR TYPE 1				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	**Number of Pulses per Burst**	**Pulse Width (µsec)**	**PRI (µs)**	**Detection (yes/no)**
1	81	1	654	y
2	19	1	2833	y
3	20	1	2672	y
4	69	1	773	y
5	34	1	1583	n
6	26	1	2060	n
7	46	1	1162	y
8	27	1	2006	y
9	35	1	1525	y
10	31	1	1744	y
11	20	1	2687	y
12	19	1	2915	y
13	21	1	2557	n
14	32	1	1688	y
15	22	1	2478	y
16	36	1	1501	y
17	26	1	2092	y
18	19	1	2779	y
19	57	1	936	y
20	37	1	1426	y
21	31	1	1716	y
22	29	1	1869	y
23	22	1	2445	y
24	85	1	621	y
25	24	1	2197	y
26	20	1	2712	y
27	81	1	653	y
28	29	1	1828	y
29	55	1	969	y
30	22	1	2410	y
				27/30: 90%

RADAR TYPE 2				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	**Number of Pulses per Burst**	**Pulse Width (µsec)**	**PRI (µs)**	**Detection (yes/no)**
1	23	2.2	220	y
2	25	2.2	150	y
3	25	1	215	y
4	27	1.3	206	y
5	26	3	180	n
6	29	2.6	202	y
7	24	4	188	y
8	26	2.8	208	n
9	25	2.4	150	n
10	26	3.8	192	y
11	25	2.4	177	y
12	24	2	190	y
13	24	2.6	175	y
14	25	1	163	y
15	26	3.3	159	y
16	23	4.2	229	y
17	25	2.1	170	y
18	24	1.8	215	y
19	24	1.3	165	y
20	27	1.8	200	y
21	25	2	207	n
22	27	1	198	y
23	24	1.4	193	y
24	24	2.5	153	y
25	28	1.1	151	y
26	29	1	162	y
27	27	3.2	210	y
28	25	3	180	y
29	28	4.8	151	y
30	29	4.2	150	y
				26/30: 86.7%

RADAR TYPE 3				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	**Number of Pulses per Burst**	**Pulse Width (µsec)**	**PRI (µs)**	**Detection (yes/no)**
1	17	8.9	284	y
2	17	7.9	403	y
3	16	6.2	236	n
4	17	7.6	392	y
5	18	7.9	346	y
6	18	7.9	494	n
7	16	9.7	487	n
8	18	7.4	383	y
9	17	6.5	268	y
10	18	7.2	408	y
11	17	9.9	247	n
12	16	6.5	461	y
13	16	6	392	y
14	17	6.1	210	y
15	17	7.5	455	y
16	18	8.9	394	y
17	16	9	467	n
18	17	8.3	296	y
19	16	7.1	201	y
20	17	7.8	207	y
21	17	7.4	241	y
22	17	7.3	309	y
23	17	9	398	y
24	18	6.7	273	y
25	16	6.4	309	y
26	16	7.7	350	y
27	18	9.1	363	y
28	18	8.7	305	n
29	16	6.2	395	y
30	18	7.3	328	y
				24/30: 80%

RADAR TYPE 4				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	**Number of Pulses per Burst**	**Pulse Width (µsec)**	**PRI (µs)**	**Detection (yes/no)**
1	14	13.4	401	y
2	16	16.8	495	y
3	13	14.9	240	y
4	13	17.6	420	n
5	15	16.7	466	y
6	16	12.8	327	n
7	15	11.2	359	y
8	13	11.2	237	y
9	16	18.6	271	y
10	14	14.3	346	y
11	13	13.7	395	n
12	15	14.9	288	y
13	14	15.5	251	y
14	14	17.6	369	y
15	15	14.5	209	y
16	15	17.8	436	y
17	12	16	437	n
18	15	14.6	463	n
19	14	15.9	255	y
20	13	19	223	y
21	14	12.4	264	y
22	16	13.7	203	y
23	13	14.8	268	y
24	16	15.2	218	n
25	13	14	387	y
26	14	13.2	261	y
27	13	15.8	422	y
28	15	15.8	297	y
29	15	15.5	246	y
30	13	13.1	413	n
				23/30: 76.7%

TYPE 5	Rohde & Schwarz K350 Pulse Sequencer DFS			
Trial #	**Detection (yes/no)**	**Chirp Width (MHz)**	**Subset**	**Fc**
1	y	17	1	5570
2	y	17	1	5570
3	y	8	1	5570
4	y	19	1	5570
5	y	14	1	5570
6	y	12	1	5570
7	y	5	1	5570
8	y	17	1	5570
9	y	19	1	5570
10	y	17	1	5570
11	y	9	2	5493.6
12	y	14	2	5495.6
13	y	11	2	5494.4
14	y	12	2	5494.8
15	y	13	2	5495.2
16	y	16	2	5496.4
17	y	19	2	5497.6
18	y	12	2	5494.8
19	y	7	2	5492.8
20	y	12	2	5494.8
21	y	14	3	5644.4
22	y	5	3	5648
23	y	8	3	5646.8
24	y	13	3	5644.8
25	y	12	3	5645.2
26	y	15	3	5644
27	y	12	3	5645.2
28	y	18	3	5642.8
29	y	9	3	5646.4
30	y	8	3	5646.8

30/30: 100%

TYPE 6 S	Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	**Detection (yes/no)**
1	y
2	y
3	y
4	y
5	y
6	y
7	y
8	y
9	y
10	y
11	y
12	y
13	y
14	y
15	y
16	y
17	y
18	y
19	y
20	y
21	y
22	y
23	y
24	y
25	y
26	y
27	y
28	y
29	y
30	y
	30/30: 100%

-- End of Test Report --