



427 West 12800 South
Draper, UT 84020

Test Report Certification

FCC ID	SWX-UBBXG
ISED ID	6545A-UBBXG
Equipment Under Test	UBB-XG
Test Report Serial Number	TR6771_05
Date of Test(s)	14 – 18 December 2020; 18 March, 27 April, 21 October and 20 December 2021
Report Issue Date	21 December 2021

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



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	UBB-XG
FCC ID	SWX-UBBXG
ISED ID	6545A-UBBXG

On this 21st day of December 2021, 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	21 December 2021
02	Added KDB Reference in Section 5.7	14 February 2022
03	Updated Section 2.2 and 5.7	30 March 2022
04	Updated Section 3.5	11 April 2022
05	Correcting Detection Level, Radar Plots and Adding Type 5 Trials in Section 5.7	18 April 2022

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1 Client Information

1.1 Applicant

Company	Ubiquiti Inc. 685 Third Avenue New York, NY 10017 U.S.A.
Contact Name	Mark Feil
Title	Compliance Manager

1.2 Manufacturer

Company	Ubiquiti Inc. 685 Third Avenue New York, NY 10017 U.S.A.
Contact Name	Mark Feil
Title	Compliance Manager

2 Equipment Under Test (EUT)

2.1 Identification of EUT

Brand Name	UniFi
Model Number	UBB-XG
Serial Number	0418D6A24C9F
Dimensions (cm)	19.2 x 19.2 x 5.9

2.2 Description of EUT

The UBB-XG is a PTP 60 GHz building to building network bridge transmitter with a 5 GHz backup redundancy transmitter. The UBB-XG is paired with a second UBB-XG for ease in setup and operation. When used with the UniFi Controller it provides bridging two networks with a high Gbps throughput. The UBB-XG is powered from a Model U-PoE-at 48 Volt PoE power adapter.

The manufacturer has declared that the information regarding the parameters of the detected radar Waveforms during normal use is not reported by the EUT or made available to the end user.

Band	Modulation Bandwidth	Frequency (MHz)
UNII-2A	20 MHz	5260, 5280, 5320
	40 MHz	5270, 5310
	80 MHz	5290
UNII-2C	20 MHz	5500, 5600, 5720
	40 MHz	5510, 5590, 5710
	80 MHz	5530, 5610*, 5690
* 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: UBB-XG (Note 1)	Building-to-Building Bridge	See Section 2.4

SN: 0418D6A24C9F		
BN: Ubiquiti MN: U-POE-48V SN: N/A	PoE Power Adapter	Shielded or Un-Shielded Cat 5e cable (Note 2)
BN: Toshiba MN: Satellite SN: N/A	Laptop Personal Computer	Shielded or Un-Shielded Cat 5e cable (Note 2)
BN: Dell MN: XPS 13 SN: N/A	Laptop Personal Computer	Shielded or 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
Ethernet/PoE	1	Un-Shielded Cat 5e Cable / 3m
SFP+	1	N/A

2.5 Operating Environment

Power Supply	120 Volts ac VAC
AC Mains Frequency	60 Hz
Temperature	19.3 – 22.9 °C
Humidity	24.6 – 32.5 %
Barometric Pressure	1021 mBar

2.6 Operating Modes

The UBB-XG 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 were investigated. All measurements are reported with the worst-case mode (802.11ac) unless otherwise stated.

2.7 EUT Exercise Software

EUT firmware version 5.70 was used to operate the transmitter using a constant transmit mode.

2.8 Block Diagram of Test Configuration

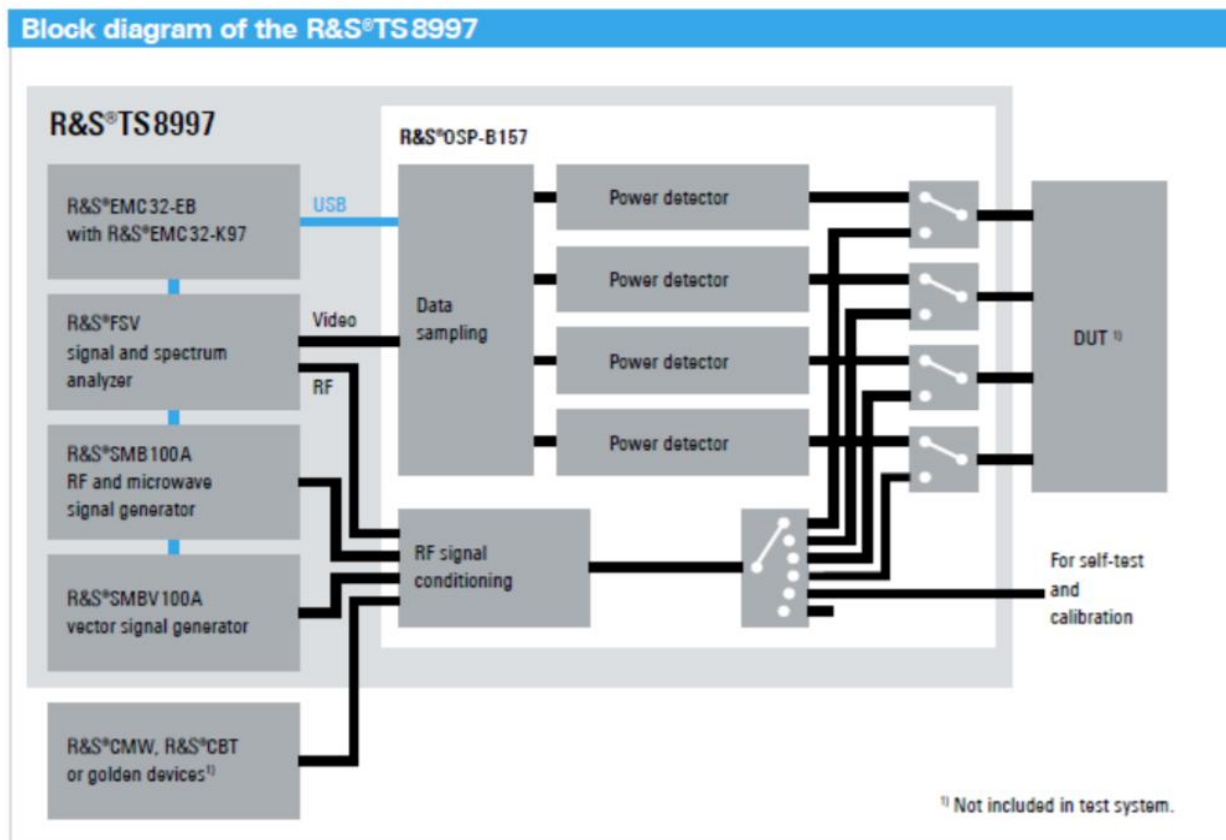


Diagram 1: Test Configuration Block Diagram

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 2022. The FCC Designator Number for Unified Compliance Laboratory is US5037. 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 2022. Unified Compliance Laboratory has been assigned 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	9/18/2020	3/17/2022
LISN	AFJ	LS16C/10	UCL-2512	5/26/2020	5/26/2022
Cat6 ISN	Teseq	ISN T8-Cat6	UCL-2971	5/18/2020	5/18/2022
ISN	Teseq	ISN T800	UCL-2974	6/4/2021	6/4/2022
LISN	Com-Power	LIN-120C	UCL-2612	5/19/2021	5/19/2022
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

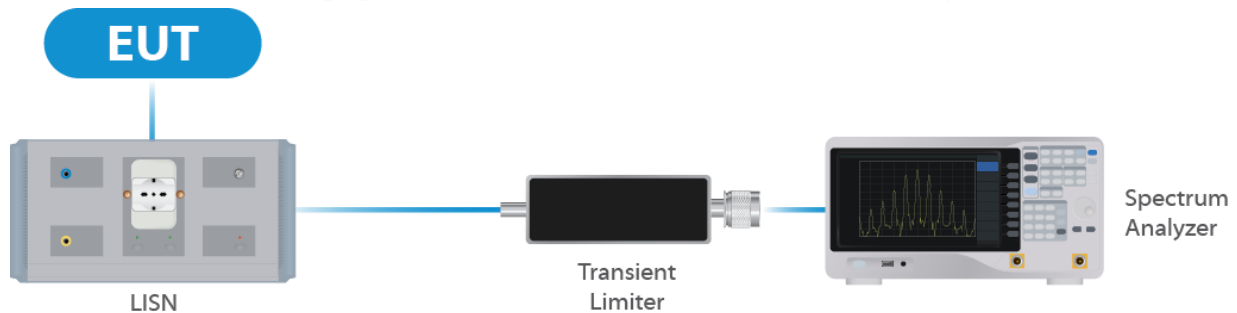


Figure 1: Conducted Emissions Test

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	8/24/2021	12/31/2021
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	9/8/2020	12/31/2021
Switch Extension	R&S	OSP-150W	UCL-2870	3/3/2021	3/3/2022

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

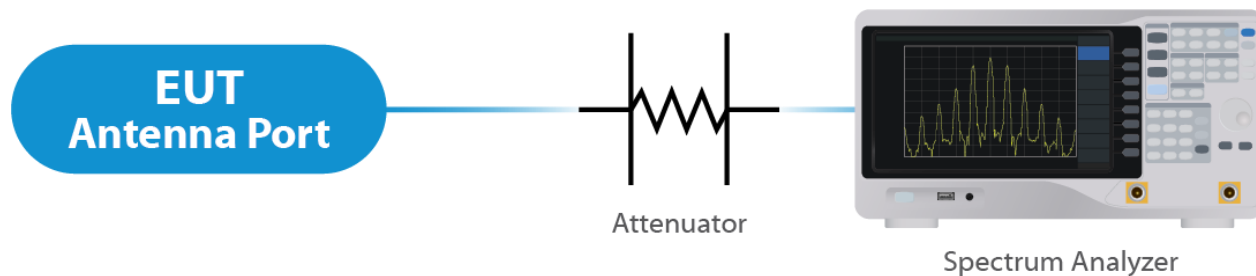


Figure 2: Direct Connect at the Antenna Port Test



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	6/21/2021	6/21/2022
Pre-Amplifier 9 kHz – 1 GHz	Sonoma Instruments	310N	UCL-2889	10/7/2021	10/7/2022
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3062	8/28/2020	8/27/2022
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3071	5/19/2020	5/19/2022
Double Ridge Horn Antenna	Scwarzbeck	BBHA 9120D	UCL-3065	7/8/2021	7/8/2022
Log Periodic	Scwarzbeck	STLP 9129	UCL-3068	11/16/2020	11/16/2022
15 - 40 GHz Horn Antenna	Scwarzbeck	BBHA 9170	UCL-2487	5/21/2020	5/21/2022
1 – 18 GHz Amplifier	Com-Power	PAM 118A	UCL-3833	10/7/2021	10/7/2022
Test Software	UCL	Revision 1	UCL-3108	N/A	N/A

Table 4: List of equipment used for Radiated Emissions

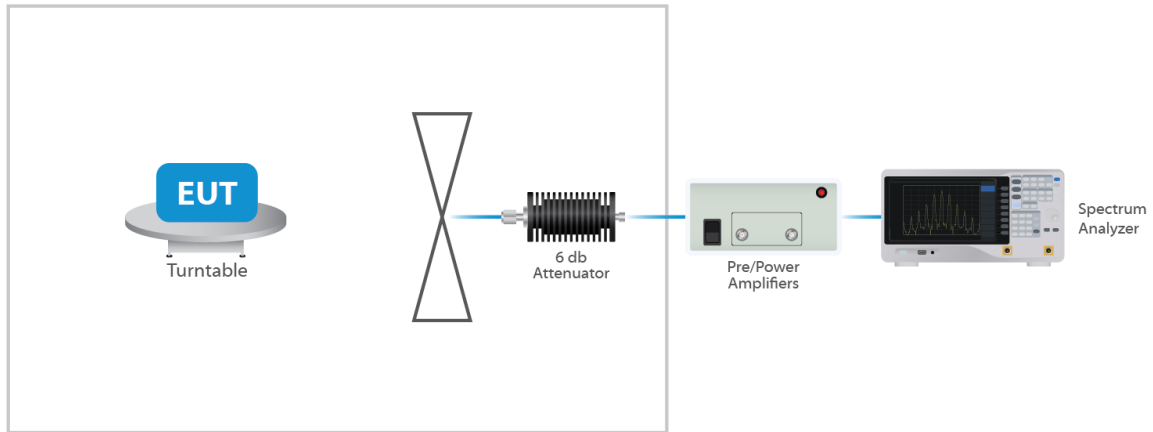


Figure 4: Radiated Emissions Test

4.4 DFS Testing

4.4.1 Master Test Set Up

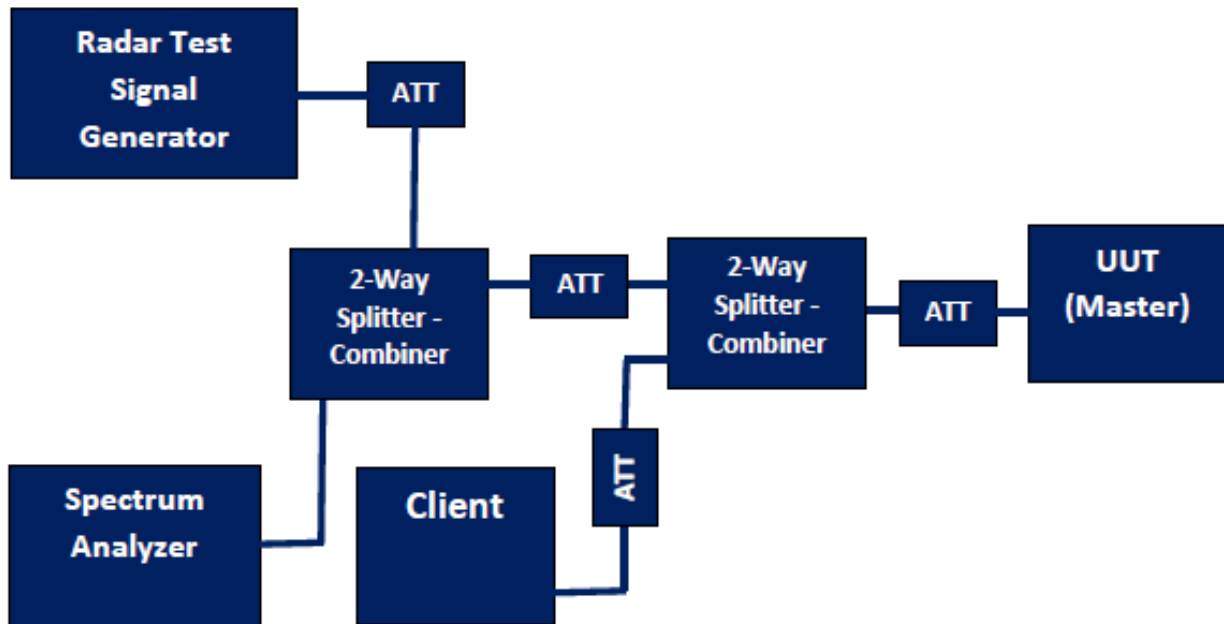


Figure 5: DFS Test Set Up - Master

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 (\pm 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

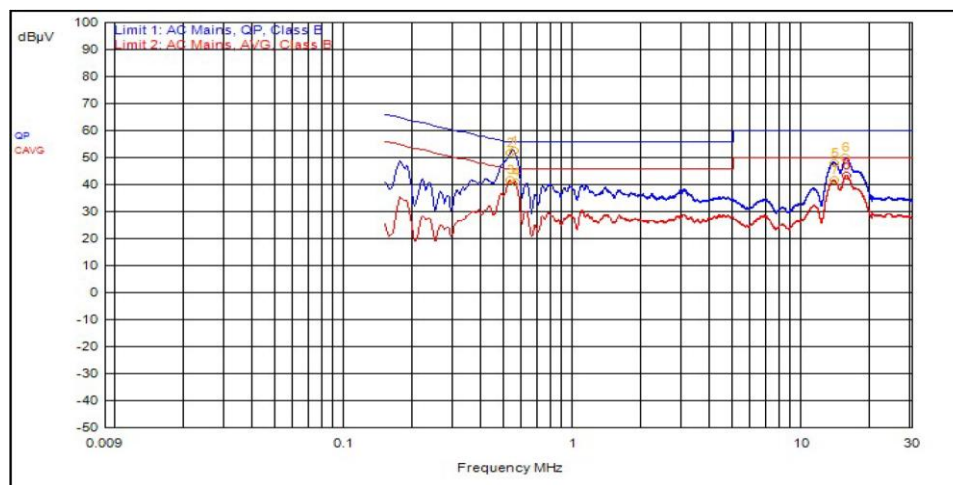
The EUT uses an integral antenna. The Maximum gain of the antenna is 14 dBi. This is an 802.11 device and utilizes CDD as described in KDB 662911 D01. The antenna is not user replaceable.

Results

The EUT complied with the specification

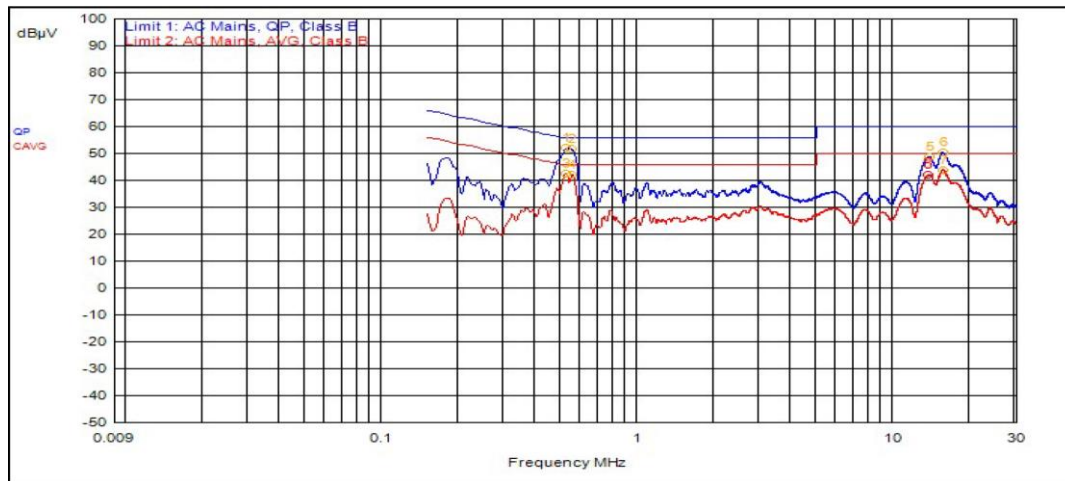
5.2 Conducted Emissions at Mains Ports Data

5.2.1 Line



ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit	Limit Dist.
1	546.000kHz	12.4	0.0		QPeak	40.2	52.6	56.0	-3.4
2	528.000kHz	12.4	0.0		QPeak	39.4	51.8	56.0	-4.2
3	528.000kHz	12.4	0.0		C_AVG	29.1	41.5	46.0	-4.5
4	558.000kHz	12.4	0.0		C_AVG	28.5	40.9	46.0	-5.1
8	15.465MHz	12.5	0.2		C_AVG	30.8	43.5	50.0	-6.5
7	13.644MHz	12.4	0.2		C_AVG	28.9	41.5	50.0	-8.5
6	15.363MHz	12.5	0.2		QPeak	37.2	49.9	60.0	-10.1
5	13.689MHz	12.4	0.2		QPeak	35.3	48.0	60.0	-12.0

5.2.2 Neutral



ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit	Limit Dist.
3	519.000kHz	12.4	0.0		C_AVG	30.0	42.4	46.0	-3.6
1	522.000kHz	12.4	0.0		QPeak	39.4	51.9	56.0	-4.1
4	552.000kHz	12.4	0.0		C_AVG	29.5	41.9	46.0	-4.1
2	549.000kHz	12.4	0.0		QPeak	39.1	51.5	56.0	-4.5
7	15.405MHz	12.5	0.2		C_AVG	31.3	43.9	50.0	-6.1
8	13.563MHz	12.4	0.2		C_AVG	29.4	42.1	50.0	-7.9
6	15.450MHz	12.5	0.2		QPeak	37.8	50.4	60.0	-9.6
5	13.623MHz	12.4	0.2		QPeak	35.9	48.6	60.0	-11.4

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)
OFDM 20	5260	16.5	20.8
OFDM 20	5280	16.6	20.4
OFDM 20	5320	16.6	21.4
HT 20	5260	17.7	21.2
HT 20	5280	17.7	21.1
HT 20	5320	17.8	21.3
HT 40	5270	36.8	42.9
HT 40	5310	36.5	41.9
VHT 20	5260	17.9	21.5
VHT 20	5280	17.8	22.1
VHT 20	5320	17.6	21.2
VHT 40	5270	36.5	42.2
VHT 40	5310	36.3	41.6
VHT 80	5290	75.5	85.0

5.3.2 UNII-2C

Bandwidth	Frequency (MHz)	99% Bandwidth (MHz)	Emissions 26 dB Bandwidth (MHz)
OFDM 20	5500	16.6	20.4
OFDM 20	5600	16.5	20.8
OFDM 20	5720	16.6	20.9
HT 20	5500	17.7	22.0

HT 20	5600	17.7	21.6
HT 20	5720	17.8	21.8
HT 40	5510	36.8	42.3
HT 40	5590	36.5	42.3
HT 40	5710	37.0	42.9
VHT 20	5500	17.8	21.2
VHT 20	5600	17.9	21.1
VHT 20	5720	17.7	22.1
VHT 40	5510	36.3	42.3
VHT 40	5590	36.8	42.5
VHT 40	5710	36.5	42.8
VHT 80	5530	76.5	86.5
VHT 80	5610	76.0	87.0
VHT 80	5690	76.0	89.0

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 16.0 dBm or 39.81 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 14 dBi.

5.4.1 UNII-2A

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power*	Measured PSD
OFDM 20	5260	Mcs0	32	15.8	1.93
OFDM 20	5280	Mcs0	31	15.5	1.5
OFDM 20	5320	Mcs0	31	15.5	1.5
HT 20	5260	Mcs0	31	15.3	0.8
HT 20	5280	Mcs0	32	16.0	1.6
HT 20	5320	Mcs0	32	15.9	1.5
HT 40	5270	Mcs0	33	15.9	-1.5
HT 40	5310	Mcs0	33	15.9	-1.2
VHT 20	5260	Mcs0	32	15.7	1.5
VHT 20	5280	Mcs0	32	15.9	1.5
VHT 20	5320	Mcs0	31	15.6	1.1
VHT 40	5270	Mcs0	32	15.4	-2.0
VHT 40	5310	Mcs0	32	15.4	-1.8
VHT80	5290	Mcs0	33	15.6	-5.0

5.4.2 UNII-2C

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power*	Measured PSD
OFDM 20	5500	Mcs0	30	15.7	2.1
OFDM 20	5600	Mcs0	29	15.7	2.1
OFDM 20	5720	Mcs0	30	15.1	1.1
HT 20	5500	Mcs0	30	15.8	1.5

HT 20	5600	Mcs0	29	15.6	1.8
HT 20	5720	Mcs0	31	15.5	0.9
HT 40	5510	Mcs0	30	15.4	-1.3
HT 40	5590	Mcs0	30	15.7	-1.6
HT 40	5710	Mcs0	31	15.5	-1.4
VHT 20	5500	Mcs0	30	15.7	1.4
VHT 20	5600	Mcs0	29	15.6	2.2
VHT 20	5720	Mcs0	31	15.5	1.5
VHT 40	5510	Mcs0	30	15.5	-1.1
VHT 40	5590	Mcs0	30	15.8	-1.2
VHT 40	5710	Mcs0	31	15.3	-1.7
VHT80	5530	Mcs0	31	16.0	-4.3
VHT80	5610	Mcs0	31	15.6	-5.0
VHT80	5690	Mcs0	32	15.5	-5.1

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.

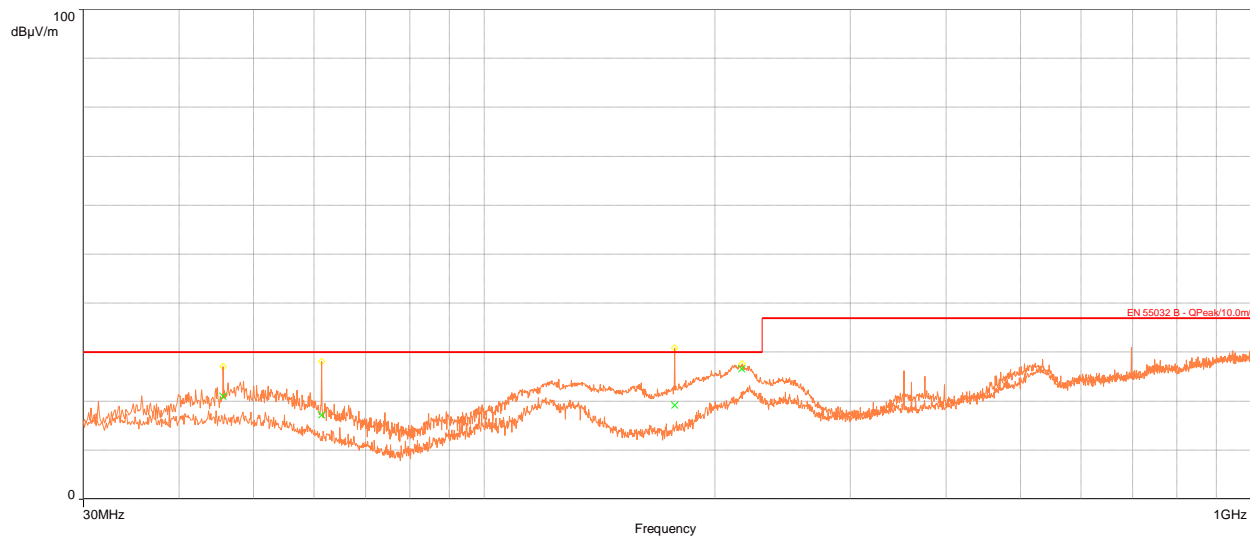
5.5 §15.407(b) Spurious Emissions

5.5.1 Radiated Spurious Emissions in the Restricted Bands of § 15.205

The frequency ranges 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.

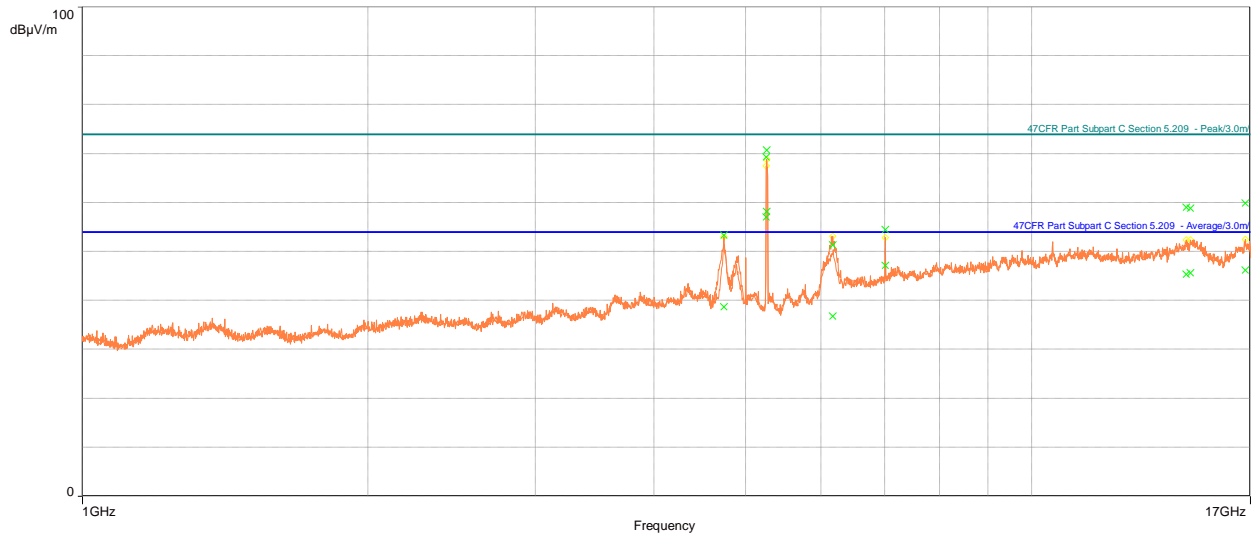
5.5.2 UNII-2A



Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height	Pol.	Correction (dB)
45.661	21.03	30.00	-8.97	359.00	1.61	Vertical	-11.29
61.367	17.20	30.00	-12.80	304.00	1.54	Vertical	-14.33
177.1	19.19	30.00	-10.81	335.00	1.14	Vertical	-16.37
216.51	26.58	30.00	-3.42	359.00	1.12	Vertical	-14.49

Note: No significant emissions were observed in the Horizontal Polarity

Graph 1: 30 MHz – 1 GHz



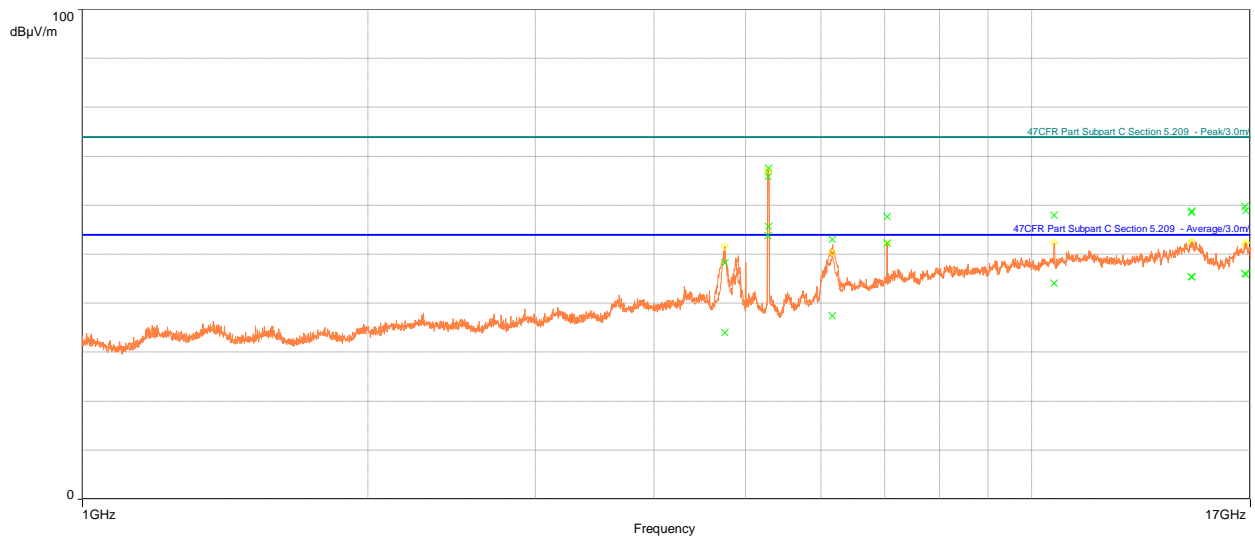
Avg

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
5256.5	58.19	54.00	4.19	44.00	1.50	Vertical	2.40
6172.7	36.83	54.00	-17.17	36.00	1.98	Vertical	4.09
14705	45.61	54.00	-8.39	229.00	3.73	Vertical	17.74
16788	46.23	54.00	-7.77	65.00	2.15	Vertical	18.72
4740.1	38.73	54.00	-15.27	41.00	1.50	Horizontal	1.81
5254.6	57.08	54.00	3.08	49.00	2.01	Horizontal	2.39
7013.3	47.15	54.00	-6.85	347.00	2.59	Horizontal	7.32
14557	45.33	54.00	-8.67	41.00	2.24	Horizontal	17.45

Peak

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
5256.5	70.71	74.00	-3.29	44.00	1.50	Vertical	2.40
6172.7	51.32	74.00	-22.68	36.00	1.98	Vertical	4.09
14705	58.80	74.00	-15.20	229.00	3.73	Vertical	17.74
16788	59.89	74.00	-14.11	65.00	2.15	Vertical	18.72
4740.1	53.33	74.00	-20.67	41.00	1.50	Horizontal	1.81
5254.6	69.31	74.00	-4.69	49.00	2.01	Horizontal	2.39
7013.3	54.51	74.00	-19.49	347.00	2.59	Horizontal	7.32
14557	59.04	74.00	-14.96	41.00	2.24	Horizontal	17.45

Graph 2: 1 GHz – 16 GHz – Low Channel 5260 MHz

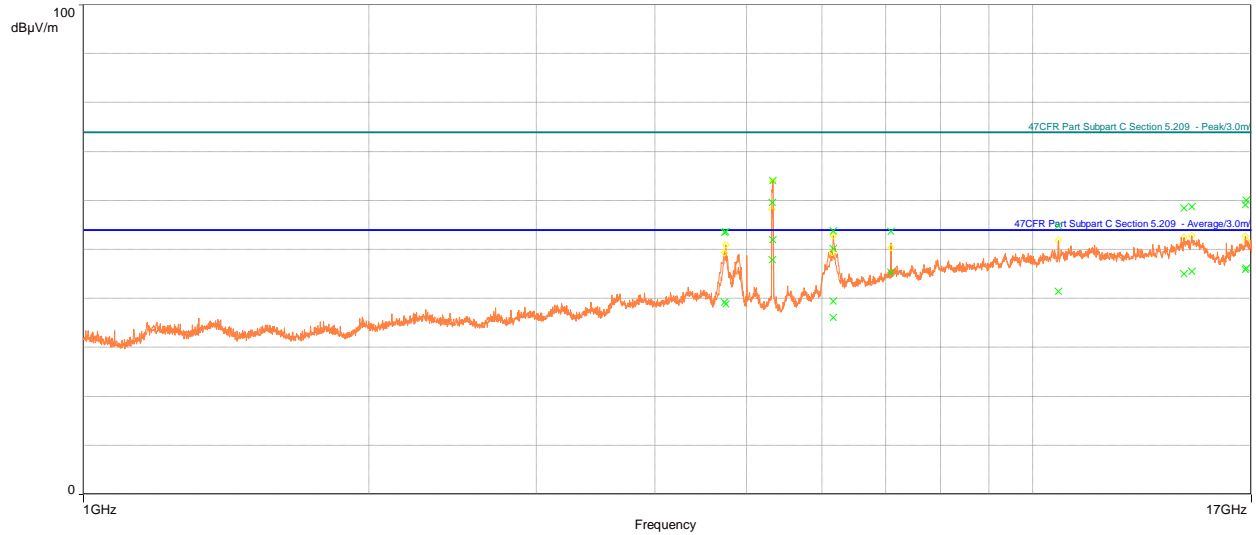

Avg

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
5281	55.70	54.00	1.70	36.00	2.12	Vertical	2.51
7039.9	52.28	54.00	-1.72	97.00	2.11	Vertical	7.48
14730	45.48	54.00	-8.52	278.00	1.52	Vertical	17.59
16819	45.90	54.00	-8.10	350.00	3.17	Vertical	18.60
4748.4	34.07	54.00	-19.93	74.00	2.60	Horizontal	1.91
5274.5	53.77	54.00	-0.23	25.00	1.50	Horizontal	2.49
6164	37.48	54.00	-16.52	357.00	2.12	Horizontal	4.06
10561	44.08	54.00	-9.92	13.00	2.00	Horizontal	12.97
14749	45.38	54.00	-8.62	263.00	1.76	Horizontal	17.55
16768	46.12	54.00	-7.88	78.00	3.95	Horizontal	18.61

Peak

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
5281	67.58	74.00	-6.42	36.00	2.12	Vertical	2.51
7039.9	57.72	74.00	-16.28	97.00	2.11	Vertical	7.48
14730	58.53	74.00	-15.47	278.00	1.52	Vertical	17.59
16819	58.94	74.00	-15.06	350.00	3.17	Vertical	18.60
4748.4	48.26	74.00	-25.74	74.00	2.60	Horizontal	1.91
5274.5	65.90	74.00	-8.10	25.00	1.50	Horizontal	2.49

6164	53.06	74.00	-20.94	357.00	2.12	Horizontal	4.06
10561	57.97	74.00	-16.03	13.00	2.00	Horizontal	12.97
14749	58.87	74.00	-15.13	263.00	1.76	Horizontal	17.55
16768	59.78	74.00	-14.22	78.00	3.95	Horizontal	18.61

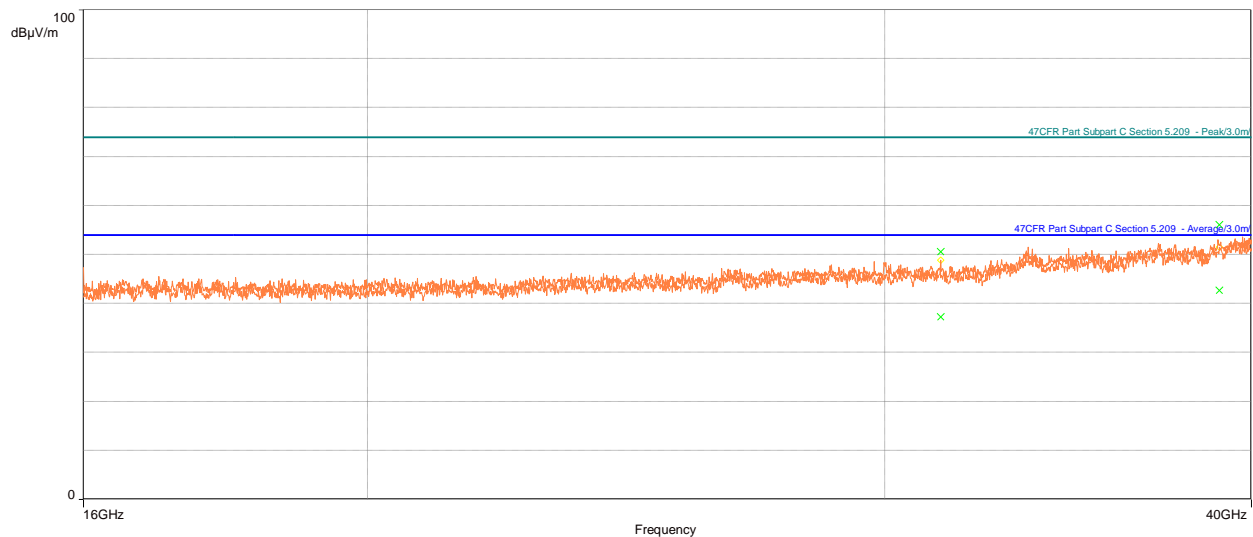
Graph 3: 1 GHz – 16 GHz – Middle Channel 5280 MHz


Avg

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
4752.4	38.90	54.00	-15.10	39.00	1.50	Vertical	1.95
5324.6	51.96	54.00	-2.04	49.00	1.62	Vertical	2.42
6162	36.14	54.00	-17.86	42.00	2.23	Vertical	4.05
6162.3	39.47	54.00	-14.53	351.00	2.96	Vertical	4.05
14438	45.02	54.00	-8.98	1.00	3.21	Vertical	17.19
16754	45.93	54.00	-8.07	56.00	3.41	Vertical	18.49
4733.9	39.23	54.00	-14.77	47.00	1.99	Horizontal	1.79
5315.3	47.93	54.00	-6.07	37.00	1.69	Horizontal	2.42
7093.2	45.35	54.00	-8.65	39.00	2.60	Horizontal	7.90
10640	41.46	54.00	-12.54	18.00	3.85	Horizontal	12.82
14709	45.57	54.00	-8.43	166.00	1.98	Horizontal	17.72
16797	46.24	54.00	-7.76	342.00	2.52	Horizontal	18.74

Peak

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
4752.4	53.65	74.00	-20.35	39.00	1.50	Vertical	1.95
5324.6	64.12	74.00	-9.88	49.00	1.62	Vertical	2.42
6162	50.22	74.00	-23.78	42.00	2.23	Vertical	4.05
6162.3	53.82	74.00	-20.18	351.00	2.96	Vertical	4.05
14438	58.47	74.00	-15.53	1.00	3.21	Vertical	17.19
16754	59.13	74.00	-14.87	56.00	3.41	Vertical	18.49
4733.9	53.52	74.00	-20.48	47.00	1.99	Horizontal	1.79
5315.3	59.61	74.00	-14.39	37.00	1.69	Horizontal	2.42
7093.2	53.69	74.00	-20.31	39.00	2.60	Horizontal	7.90
10640	54.82	74.00	-19.18	18.00	3.85	Horizontal	12.82
14709	58.74	74.00	-15.26	166.00	1.98	Horizontal	17.72
16797	60.09	74.00	-13.91	342.00	2.52	Horizontal	18.74

Graph 4: 1 GHz – 16 GHz – High Channel 5320 MHz

Avg

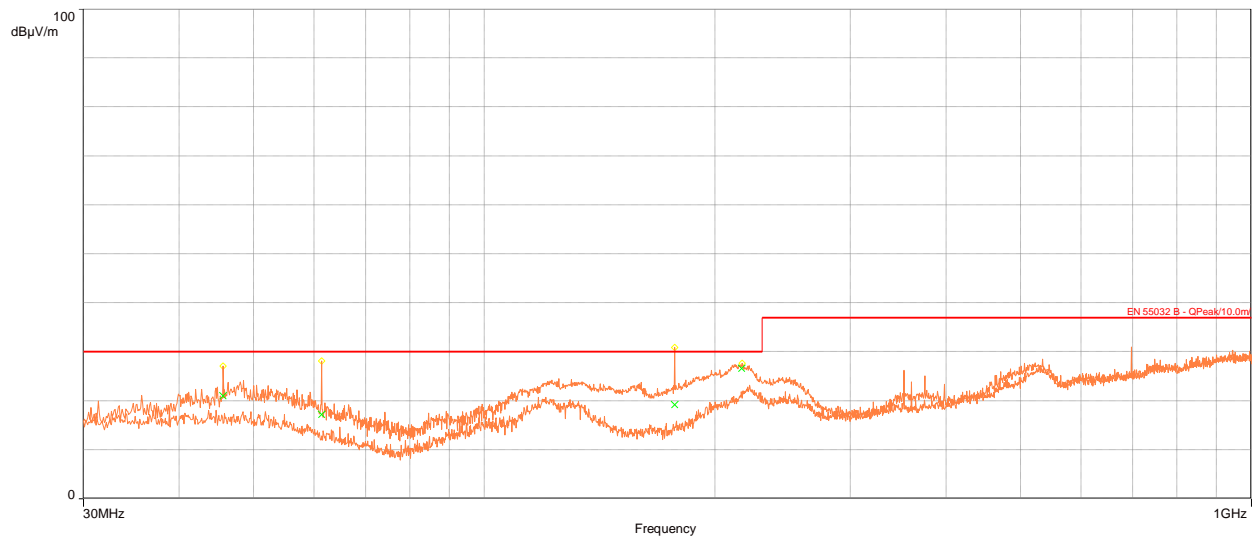
Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
31349	37.25	54.00	-16.75	287.00	Vertical	0.54
39000	42.67	54.00	-11.33	189.00	Horizontal	3.95

Peak

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Azimuth ($^{\circ}$)	Pol.	Correction (dB)
31349	50.57	74.00	-23.43	287.00	Vertical	0.54
39000	56.10	74.00	-17.90	189.00	Horizontal	3.95

Graph 5: 16 GHz – 40 GHz – Low Channel 5260 MHz (worse case)

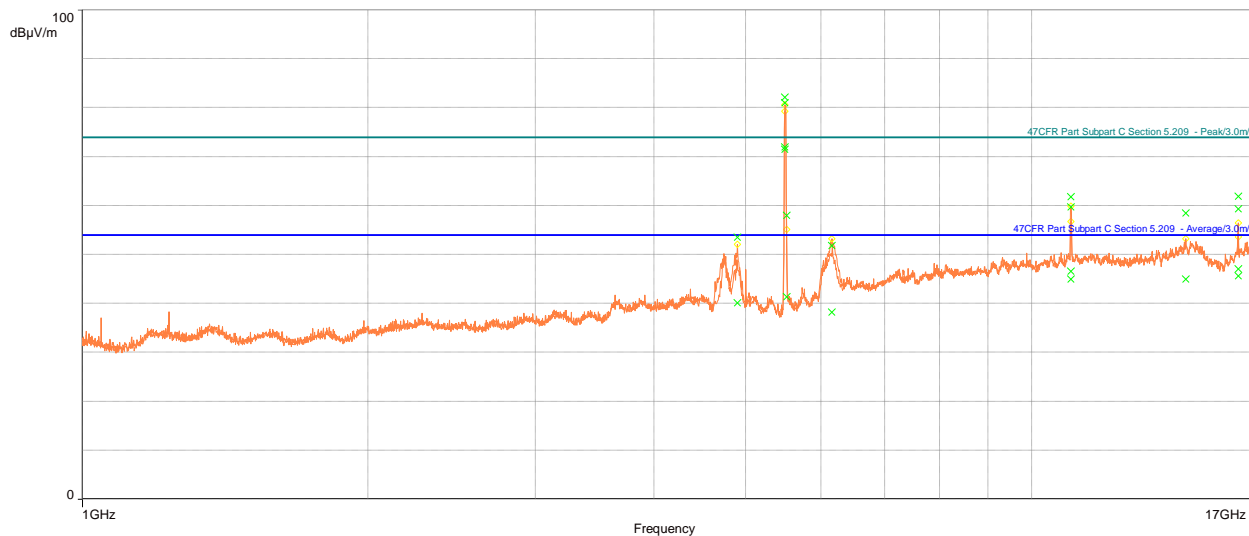
5.5.3 UNII-2C



Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Azimuth ($^{\circ}$)	Height	Pol.	Correction (dB)
45.661	21.03	30.00	-8.97	359.00	1.61	Vertical	-11.29
61.367	17.20	30.00	-12.80	304.00	1.54	Vertical	-14.33
177.1	19.19	30.00	-10.81	335.00	1.14	Vertical	-16.37
216.51	26.58	30.00	-3.42	359.00	1.12	Vertical	-14.49

Note: No significant emissions were observed in the Horizontal Polarity

Graph 6: 30 MHz – 1 GHz

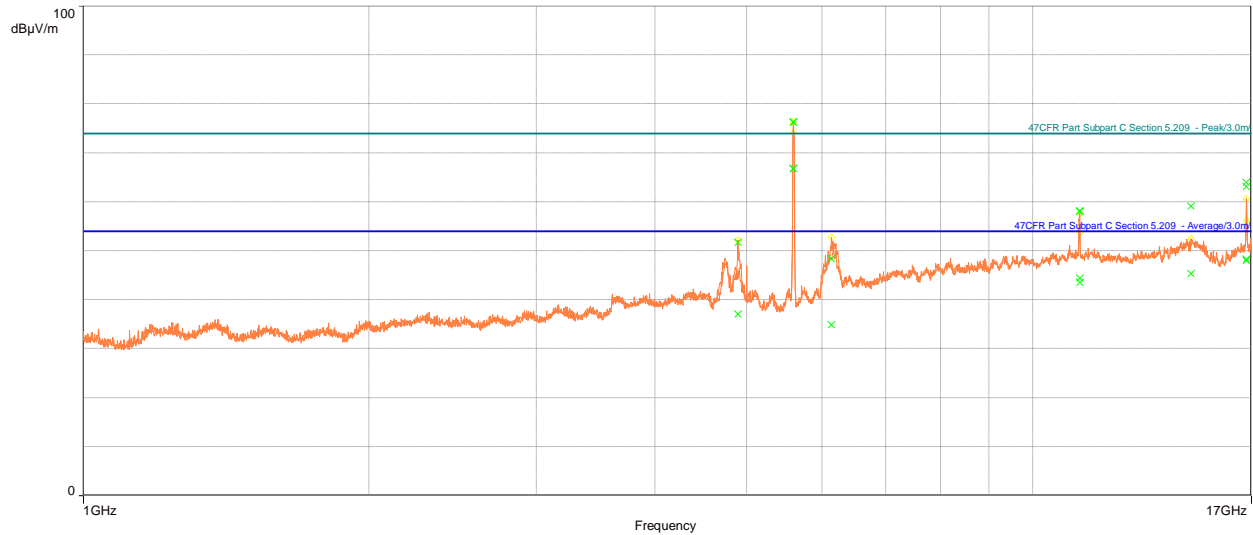

Avg

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
5495.5	71.93	54.00	17.93	44.00	1.50	Vertical	2.89
5518.3	41.38	54.00	-12.62	53.00	1.86	Vertical	2.95
6160.6	38.20	54.00	-15.80	43.00	1.98	Vertical	4.05
10998	46.58	54.00	-7.42	56.00	1.88	Vertical	14.05
16504	45.61	54.00	-8.39	39.00	2.84	Vertical	17.48
4897.3	40.15	54.00	-13.85	53.00	1.62	Horizontal	2.11
5495.6	71.52	54.00	17.52	49.00	1.74	Horizontal	2.89
10992	44.95	54.00	-9.05	39.00	2.02	Horizontal	13.99
14533	44.99	54.00	-9.01	49.00	3.84	Horizontal	17.02
16506	47.09	54.00	-6.91	1.00	1.50	Horizontal	17.50

Peak

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
5495.5	82.14	74.00	8.14	44.00	1.50	Vertical	2.89
5518.3	57.96	74.00	-16.04	53.00	1.86	Vertical	2.95
6160.6	51.78	74.00	-22.22	43.00	1.98	Vertical	4.05
10998	61.77	74.00	-12.23	56.00	1.88	Vertical	14.05
16504	59.34	74.00	-14.66	39.00	2.84	Vertical	17.48
4897.3	53.53	74.00	-20.47	53.00	1.62	Horizontal	2.11
5495.6	80.95	74.00	6.95	49.00	1.74	Horizontal	2.89

10992	59.74	74.00	-14.26	39.00	2.02	Horizontal	13.99
14533	58.51	74.00	-15.49	49.00	3.84	Horizontal	17.02
16506	61.92	74.00	-12.08	1.00	1.50	Horizontal	17.50

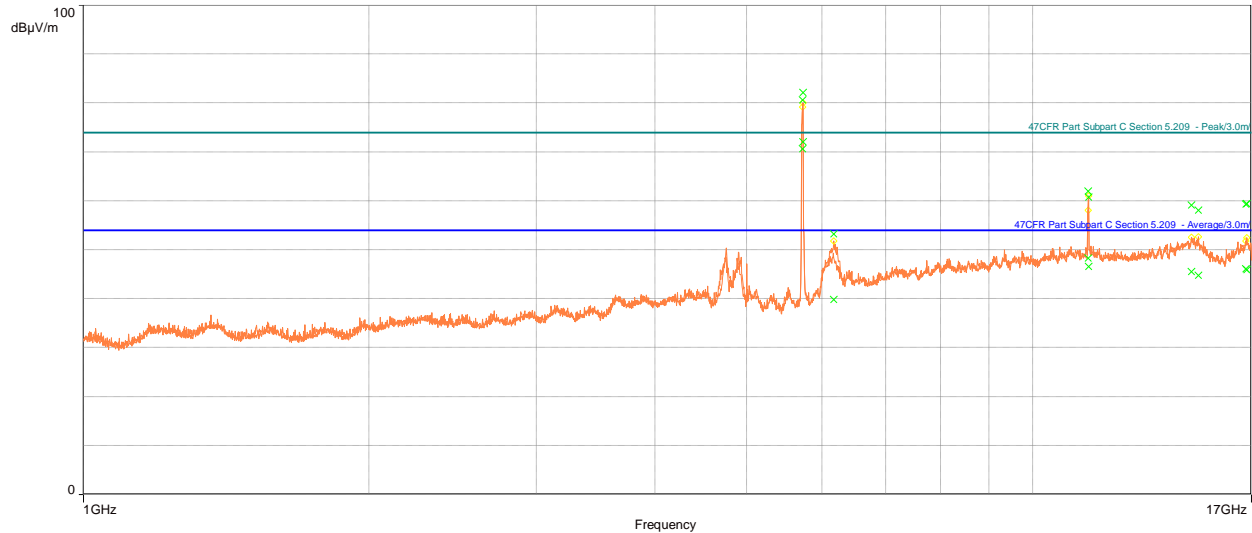
Graph 7: 1 GHz – 16 GHz – Low Channel 5500 MHz

Avg

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
5595.7	66.69	54.00	12.69	49.00	1.50	Vertical	2.98
6133.7	34.89	54.00	-19.11	119.00	2.60	Vertical	3.99
11211	43.53	54.00	-10.47	53.00	1.86	Vertical	14.02
16788	47.98	54.00	-6.02	72.00	2.63	Vertical	18.72
4892.6	37.11	54.00	-16.89	53.00	1.99	Horizontal	2.09
5594.4	66.79	54.00	12.79	32.00	1.50	Horizontal	2.98
11209	44.35	54.00	-9.65	37.00	1.87	Horizontal	14.00
14681	45.37	54.00	-8.63	112.00	1.64	Horizontal	17.71
16796	48.34	54.00	-5.66	13.00	2.31	Horizontal	18.75

Peak

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
5595.7	76.36	74.00	2.36	49.00	1.50	Vertical	2.98
6133.7	48.38	74.00	-25.62	119.00	2.60	Vertical	3.99
11211	57.98	74.00	-16.02	53.00	1.86	Vertical	14.02
16788	64.01	74.00	-9.99	72.00	2.63	Vertical	18.72

4892.6	51.73	74.00	-22.27	53.00	1.99	Horizontal	2.09
5594.4	76.28	74.00	2.28	32.00	1.50	Horizontal	2.98
11209	58.15	74.00	-15.85	37.00	1.87	Horizontal	14.00
14681	59.09	74.00	-14.91	112.00	1.64	Horizontal	17.71
16796	63.08	74.00	-10.92	13.00	2.31	Horizontal	18.75

Graph 8: 1 GHz – 16 GHz – Middle Channel 5600 MHz


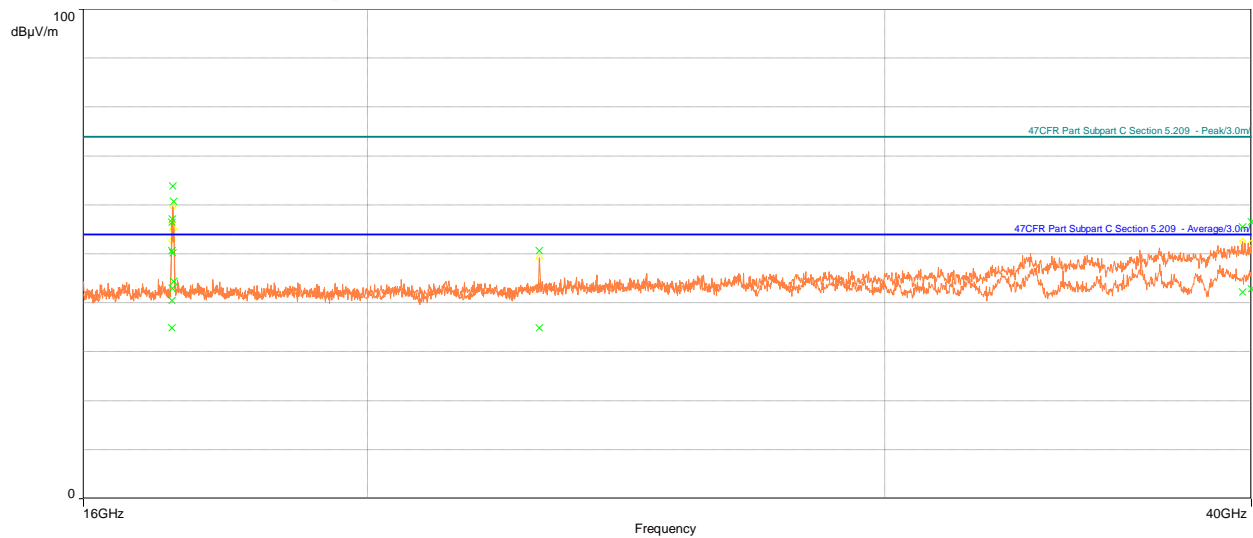
Avg

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
5727.5	72.07	54.00	18.07	49.00	1.50	Vertical	3.00
6175.4	39.80	54.00	-14.20	1.00	2.87	Vertical	4.09
11440	48.34	54.00	-5.66	35.00	1.51	Vertical	14.39
14697	45.50	54.00	-8.50	324.00	2.97	Vertical	17.77
16812	45.97	54.00	-8.03	158.00	3.10	Vertical	18.66
5723.6	70.60	54.00	16.60	36.00	1.89	Horizontal	2.95
11451	46.63	54.00	-7.37	347.00	1.94	Horizontal	14.57
14954	44.76	54.00	-9.24	359.00	1.53	Horizontal	17.33
16765	46.09	54.00	-7.91	355.00	2.82	Horizontal	18.60

Peak

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
5727.5	82.14	74.00	8.14	49.00	1.50	Vertical	3.00
6175.4	53.28	74.00	-20.72	1.00	2.87	Vertical	4.09

11440	62.01	74.00	-11.99	35.00	1.51	Vertical	14.39
14697	59.15	74.00	-14.85	324.00	2.97	Vertical	17.77
16812	59.42	74.00	-14.58	158.00	3.10	Vertical	18.66
5723.6	80.58	74.00	6.58	36.00	1.89	Horizontal	2.95
11451	60.76	74.00	-13.24	347.00	1.94	Horizontal	14.57
14954	58.11	74.00	-15.89	359.00	1.53	Horizontal	17.33
16765	59.35	74.00	-14.65	355.00	2.82	Horizontal	18.60

Graph 9: 1 GHz – 16 GHz – High Channel 5720 MHz


Avg

Frequency (MHz)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
17146	34.91	54.00	-19.09	54.00	Vertical	-3.99
17156	42.96	54.00	-11.04	32.00	Vertical	-3.90
17174	44.37	54.00	-9.63	56.00	Vertical	-4.02
22881	34.93	54.00	-19.07	42.00	Vertical	-4.01
17150	40.54	54.00	-13.46	18.00	Horizontal	-3.93
17164	50.24	54.00	-3.76	112.00	Horizontal	-3.93
39731	42.26	54.00	-11.74	130.00	Horizontal	4.46
39997	42.85	54.00	-11.15	15.00	Horizontal	4.79

Peak

Frequency (MHz)	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
17146	50.65	74.00	-23.35	54.00	Vertical	-3.99
17156	57.11	74.00	-16.89	32.00	Vertical	-3.90
17174	60.77	74.00	-13.23	56.00	Vertical	-4.02
22881	50.71	74.00	-23.29	42.00	Vertical	-4.01
17150	56.44	74.00	-17.56	18.00	Horizontal	-3.93
17164	63.85	74.00	-10.15	112.00	Horizontal	-3.93
39731	55.55	74.00	-18.45	130.00	Horizontal	4.46
39997	56.54	74.00	-17.46	15.00	Horizontal	4.79

Graph 10: 16 GHz – 40 GHz – High Channel 5720 MHz (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 14 dBi antenna, the conducted limit for power spectral density is 11 dBm.

Results of this testing are summarized.

5.6.1 UNII-2A

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power*	Measured PSD
OFDM 20	5260	Mcs0	32	15.8	1.93
OFDM 20	5280	Mcs0	31	15.5	1.5
OFDM 20	5320	Mcs0	31	15.5	1.5
HT 20	5260	Mcs0	31	15.3	0.8
HT 20	5280	Mcs0	32	16.0	1.6
HT 20	5320	Mcs0	32	15.9	1.5
HT 40	5270	Mcs0	33	15.9	-1.5
HT 40	5310	Mcs0	33	15.9	-1.2
VHT 20	5260	Mcs0	32	15.7	1.5
VHT 20	5280	Mcs0	32	15.9	1.5
VHT 20	5320	Mcs0	31	15.6	1.1
VHT 40	5270	Mcs0	32	15.4	-2.0
VHT 40	5310	Mcs0	32	15.4	-1.8
VHT80	5290	Mcs0	33	15.6	-5.0

5.6.2 UNII-2C

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power*	Measured PSD
OFDM 20	5500	Mcs0	30	15.7	2.1
OFDM 20	5600	Mcs0	29	15.7	2.1
OFDM 20	5720	Mcs0	30	15.1	1.1
HT 20	5500	Mcs0	30	15.8	1.5
HT 20	5600	Mcs0	29	15.6	1.8
HT 20	5720	Mcs0	31	15.5	0.9
HT 40	5510	Mcs0	30	15.4	-1.3
HT 40	5590	Mcs0	30	15.7	-1.6
HT 40	5710	Mcs0	31	15.5	-1.4
VHT 20	5500	Mcs0	30	15.7	1.4
VHT 20	5600	Mcs0	29	15.6	2.2
VHT 20	5720	Mcs0	31	15.5	1.5
VHT 40	5510	Mcs0	30	15.5	-1.1
VHT 40	5590	Mcs0	30	15.8	-1.2
VHT 40	5710	Mcs0	31	15.3	-1.7
VHT80	5530	Mcs0	31	16.0	-4.3
VHT80	5610	Mcs0	31	15.6	-5.0
VHT80	5690	Mcs0	32	15.5	-5.1

Result

The maximum average power spectral density was less than the limit of 8 dBm; 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 the DFS Annex. DFS testing followed the test procedures as outlined in KDB 905462.

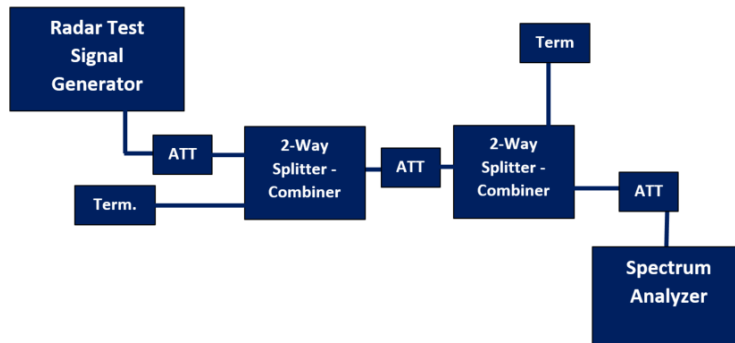
The product passes all required DFS tests for a master with radar detection.

Information	Status
Possible Antenna/s	14 dBi integral
Antenna used for test	14 dBi integral
Operating mode	Master
Port used for testing	J7
EIRP range	< 200 milliwatt
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	28.2 secs
Detection threshold level	-63 dBm

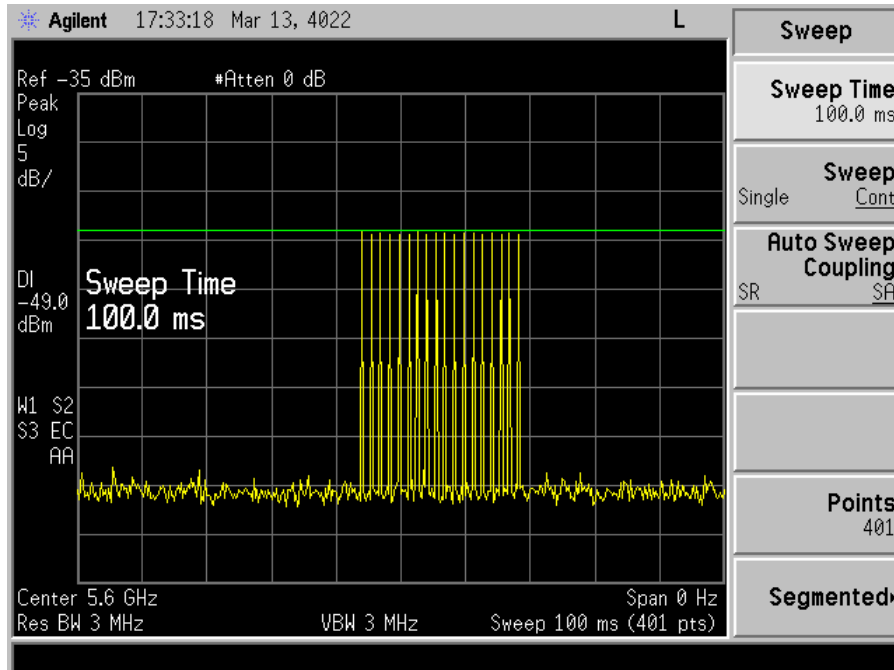
*Note 1: The UBB-XG was designed in Ansys HFSS, industry-leading full-wave 3D electromagnetic simulation software. The hardware was measured against calibrated standard gain horn antennas in two internal Ubiquiti antenna chambers. The first antenna test chamber is a spherical near-field chamber manufactured by The Howland Company. This chamber measures the complex spherical near-field radiated power and computes the near-field to far-field transformation to accurately measure the directivity and realized gain of the antenna under test. The second chamber is a Compact Antenna Test Range (CATR). The compact range radiates a spherical wavefront from a fixed source into a parabolic reflector which collimates the signal into a plane wave to uniformly illuminate the antenna under test. This method is commonly used to accurately measure large antenna structures' directivity and realized gain.

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

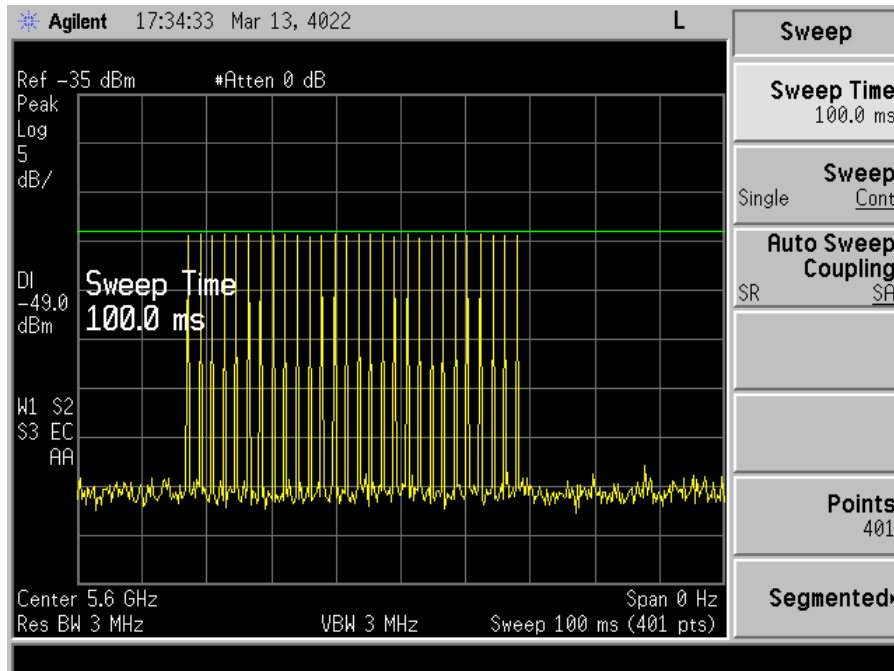
Requirement	Operational Mode	
	Master Client Without Radar Detection	Client With Radar Detection
<i>DFS Detection Threshold</i>	Yes	Not Required
<i>Channel Closing Transmission Time</i>	Yes	Yes
<i>Channel Move Time</i>	Yes	Yes
<i>U-NII Detection Bandwidth</i>	Yes	Not Required



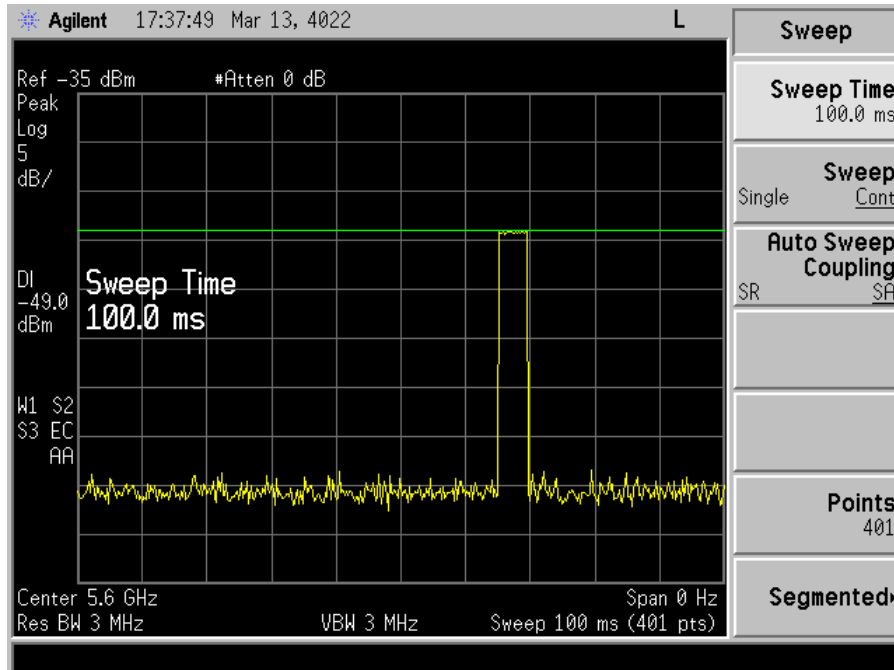
Maximum Transmit Power	Value (See Notes 1, 2, and 3)
EIRP \geq 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64 dBm
<p>Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna.</p> <p>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.</p> <p>Note3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.</p>	



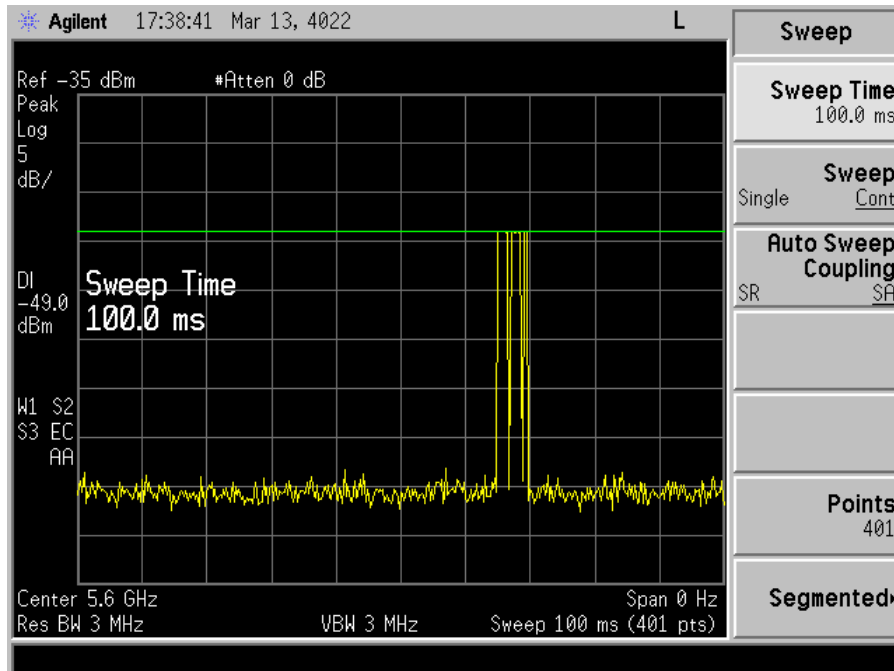
Plot 1: Radar Level 0



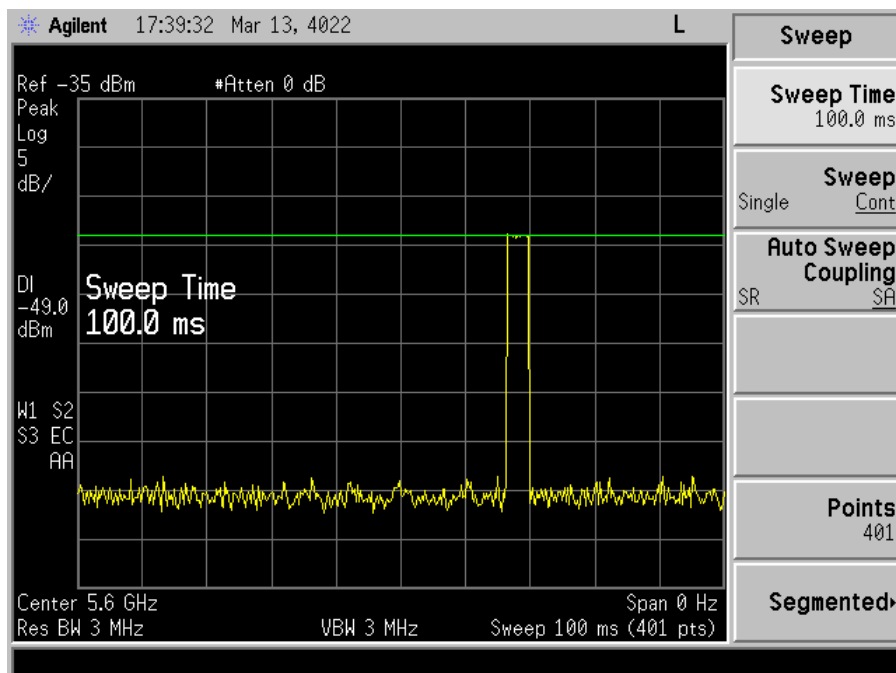
Plot 2: Radar Level 1



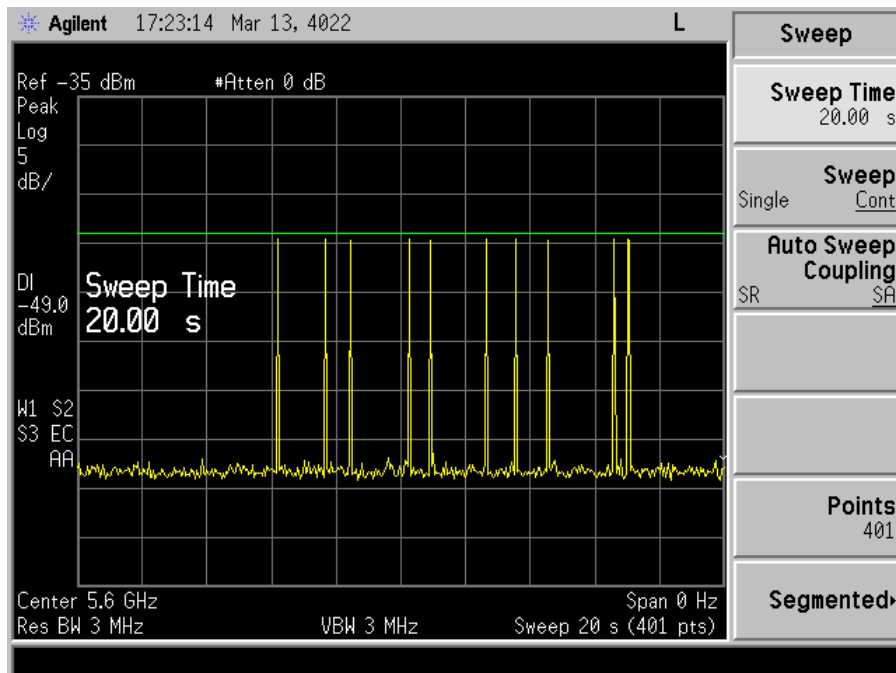
Plot 3: Radar Level 2



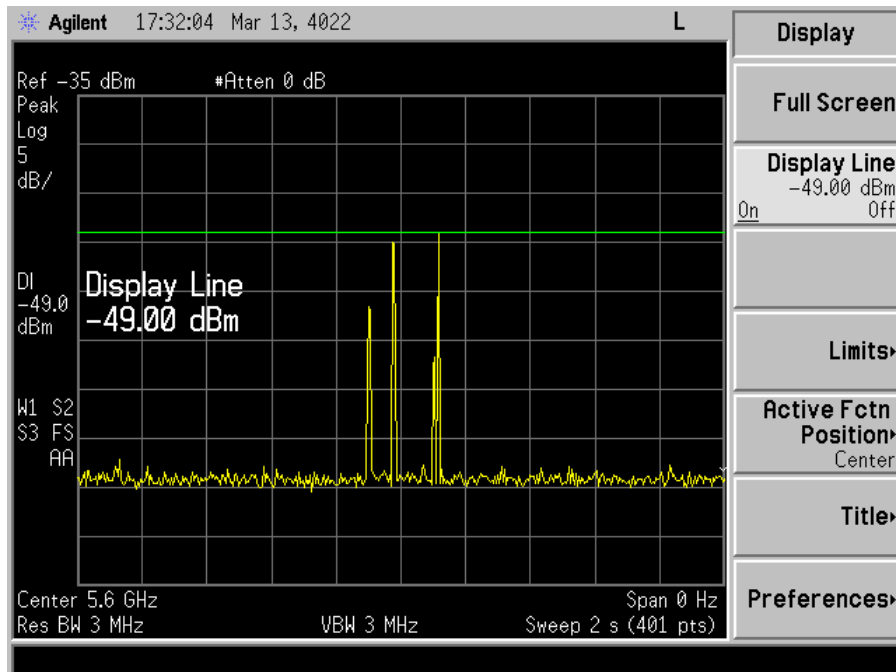
Plot 4: Radar Level 3



Plot 5: Radar Level 4



Plot 6: Radar Level 5



Plot 7: Radar Level 6

5.7.1 Channel Availability Check (CAC)

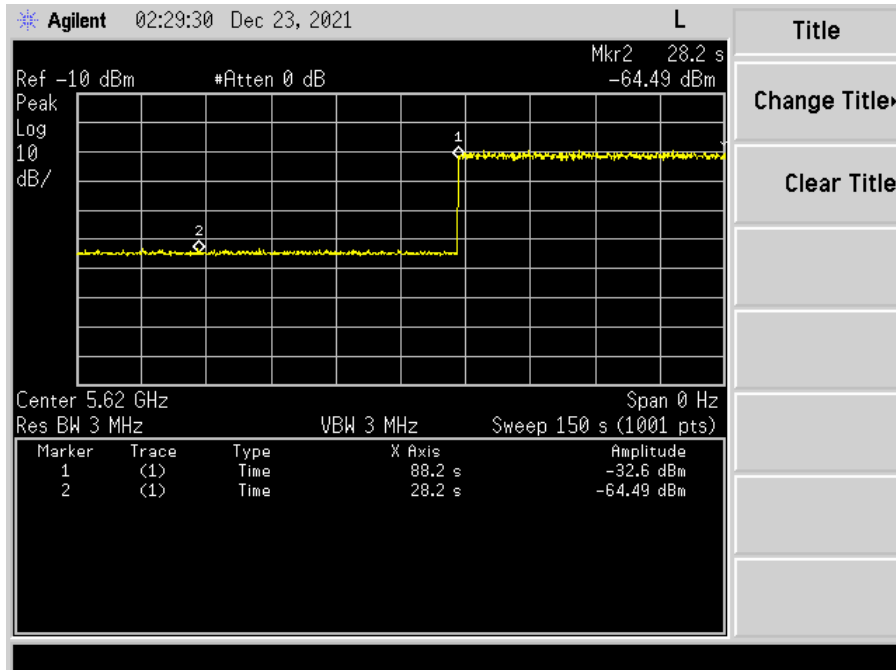
The EUT shall perform a CAC to ensure that there is no radar operating on the channel. After the power-up sequence, at-least 1 minute shall be monitored on the intended operating frequency.

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 within the annex indicate initial beacons.

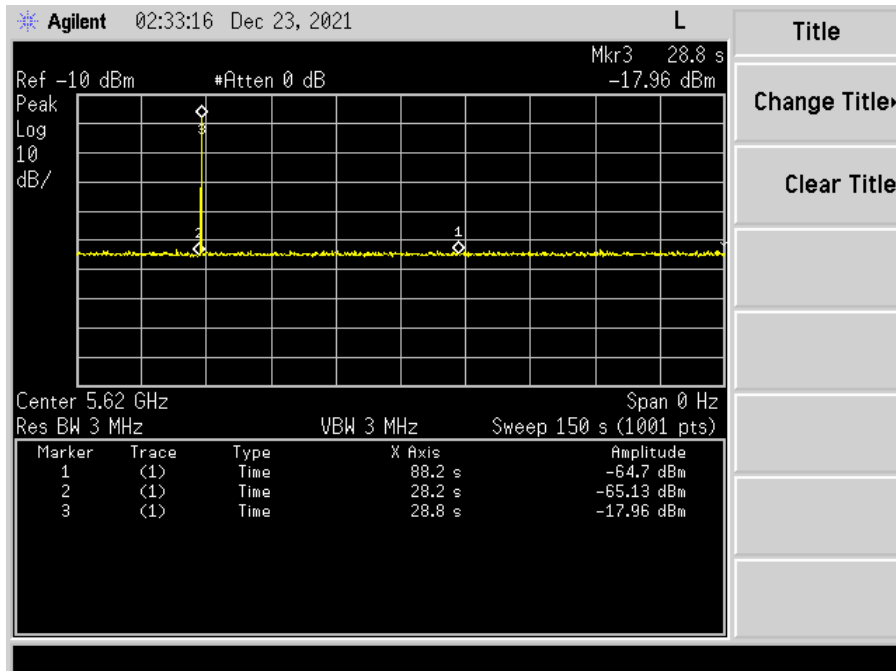
For radar burst at the beginning of the CAC. To verify successful radar detection on the selected channel during a period equal to the beginning of the CAC time, visual indication on the EUT of successful detection of the radar burst will be recorded and reported. Observation of the radar burst is show 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.

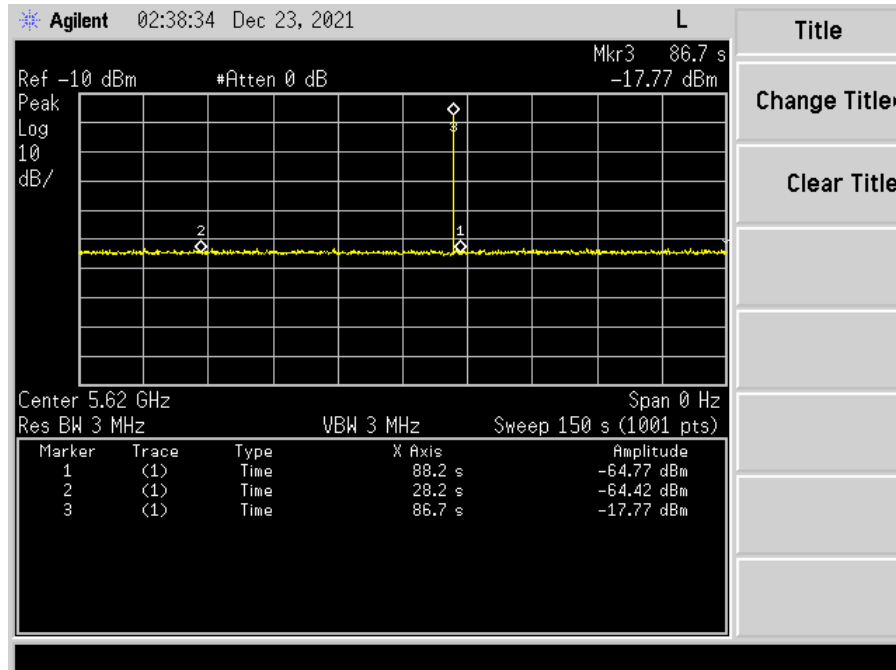
A spectrum analyzer is used as a monitor to verify that the EUT has vacated the channel within the channel closing transmission time and channel move time, and does not transmit on a channel during the non-occupancy period after the detection and channel move.



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

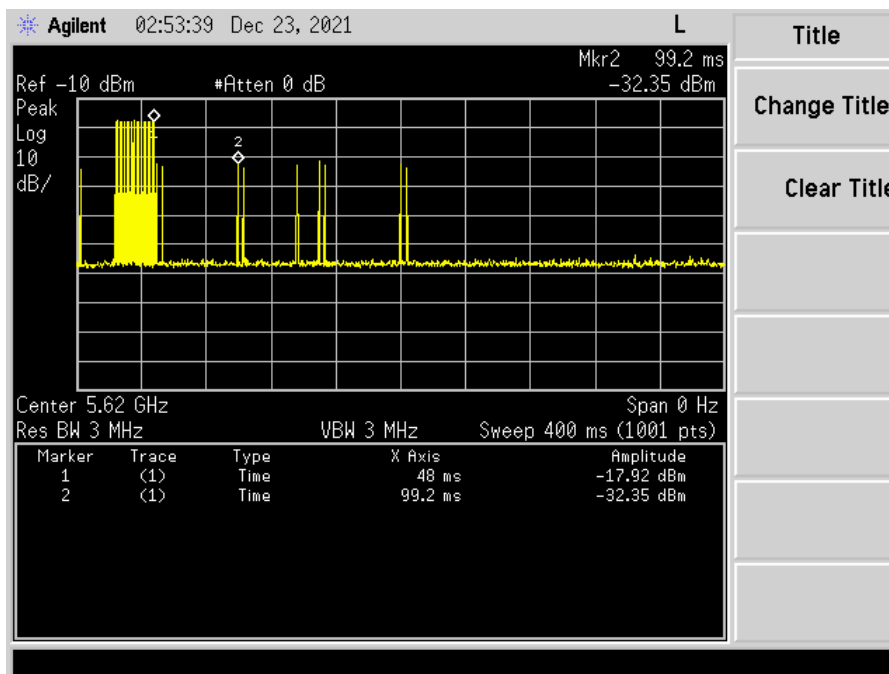
Verified during in-service monitoring: channel closing transmission time and channel move time. The transmissions were observed at the end of the radar burst on the operating channel for a duration of greater than 10 seconds. The transmissions were measured and recorded during the observation time. This 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.

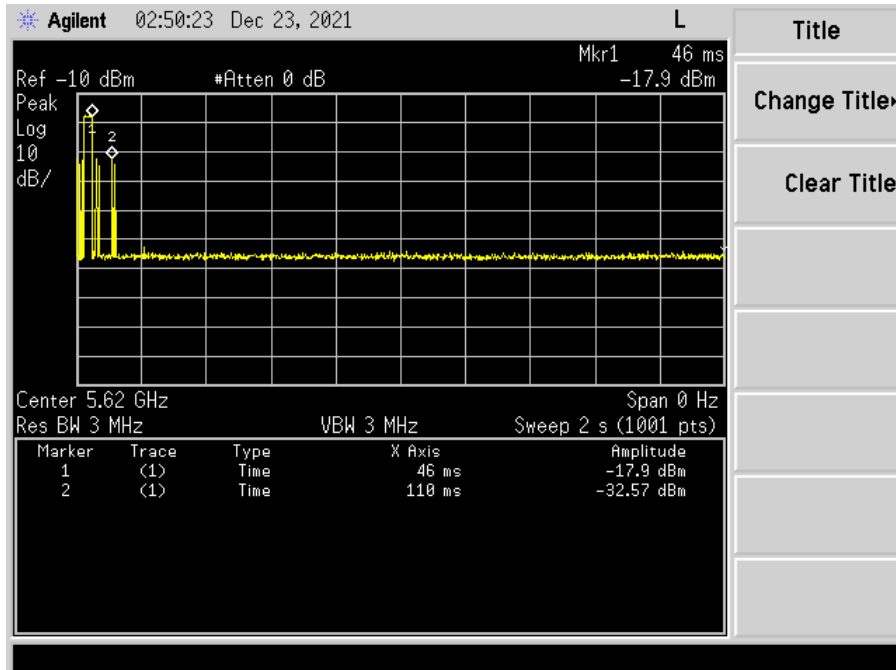
During the 30 minutes observation time, the EUT did not make any transmissions on a channel after a radar signal was detected.

Please see plots within the annex.

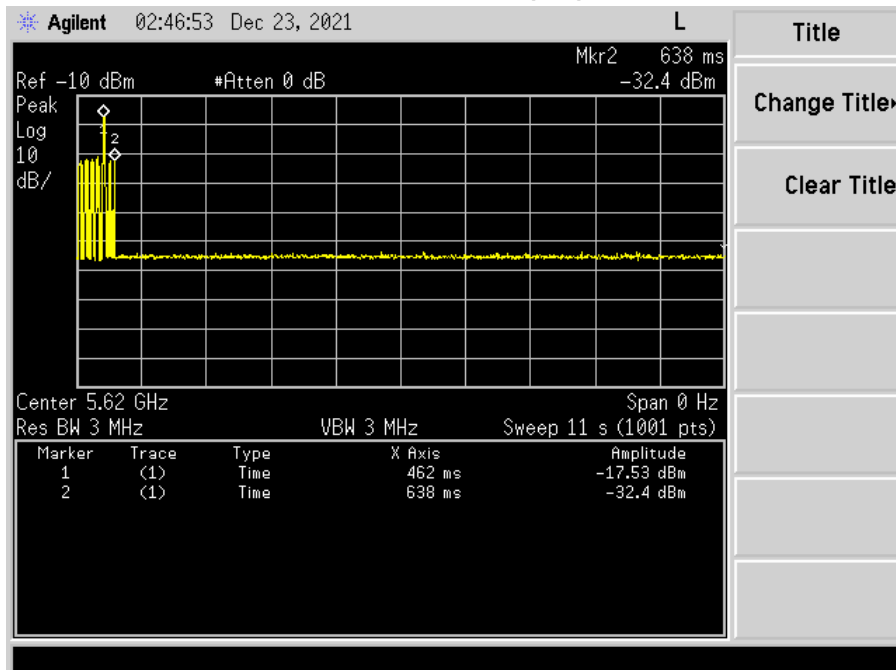
A spectrum analyzer is used as a monitor to verify that the EUT has vacated the channel within the channel closing transmission time and channel move time, and does not transmit on a channel during the non-occupancy period after the detection and channel move.



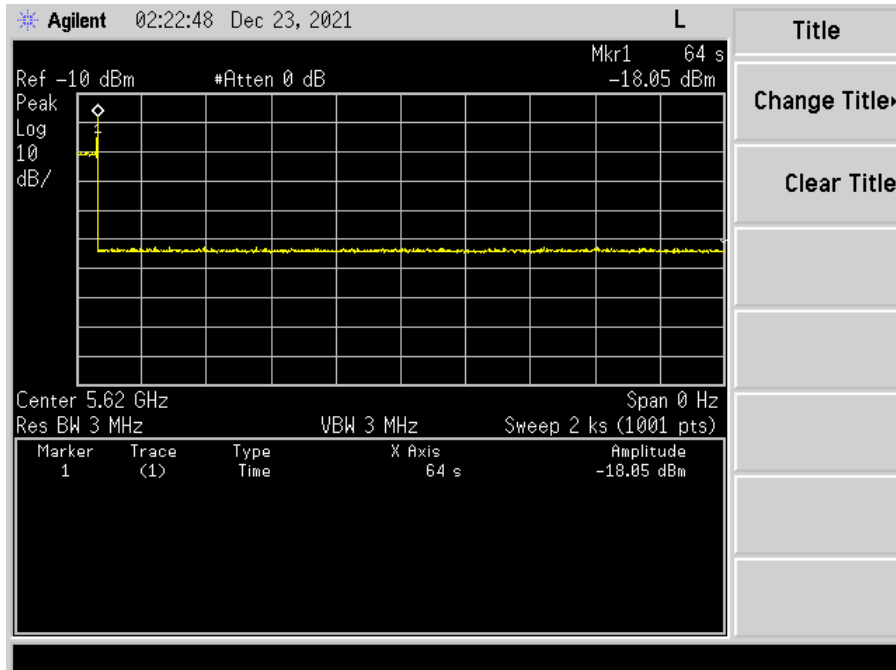
Plot 11: Close (400 ms)



Plot 12: Close (2 s)



Plot 13: Move



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 5590	1	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	1	100
5596												
5597												
5598												
5599												
5600	1	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	1	100
5606												
5607												
5608												
5609												
F_High 5610	1	1	1	1	1	1	1	1	1	1	1	100
Total Detection Percentage											100	
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	1	100
5596												
5597												
5598												
5599												
5600	1	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	1	100
5606												
5607												
5608												
5609												
5610	1	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	1	100
5616												
5617												
5618												
5619												
5620	1	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	1	100
5626												
5627												
5628												
5629												
5630	1	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	1	100

5636												
5637												
5638												
5639												
5640	1	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	1	100
5646												
5647												
5648												
5649												
F_High 5650	1	1	1	1	1	1	1	1	1	1	1	100
Total Detection Percentage												100
Detection Bandwidth = FH-FL = 5570 MHz - 5650 MHz = 80 MHz												
99% Bandwidth = 79.2 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 within the annex.

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

RADAR TYPE 1				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (yes/no)
1	98	1	538	y
2	67	1	798	y
3	67	1	798	y
4	74	1	718	y
5	72	1	738	y
6	68	1	778	y
7	86	1	618	y
8	63	1	838	y
9	61	1	878	y
10	67	1	798	y
11	70	1	758	y
12	59	1	898	y
13	78	1	678	y
14	98	1	538	y
15	74	1	718	y
16	58	1	918	y
17	72	1	738	y
18	78	1	678	y

19	18	1	3066	y
20	72	1	738	y
21	62	1	858	y
22	72	1	738	y
23	76	1	698	y
24	89	1	598	y
25	57	1	938	y
26	61	1	878	y
27	92	1	578	y
28	78	1	678	y
29	76	1	698	y
30	92	1	578	y
Detection Probability 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	4.5	224	y
2	25	4.4	196	y
3	24	4.8	167	y
4	28	2.8	153	y
5	29	5	204	y
6	26	5	150	y
7	27	2.9	192	y
8	23	4.7	172	y
9	24	4.4	188	y
10	24	3.5	216	y
11	27	2.8	208	y
12	23	2.5	163	y
13	27	2.5	210	y
14	25	2.1	204	y
15	25	3.1	218	y
16	29	2.8	150	y
17	24	3	164	y
18	25	3	190	n
19	29	5	208	y
20	27	3.6	228	y
21	27	1.3	223	n
22	25	2.9	215	y
23	26	4.5	192	y
24	27	3.2	175	y
25	26	3.4	170	y
26	25	3	180	y

27	27	1.9	159	y
28	28	3.9	201	y
29	27	1.2	221	y
30	27	4.6	181	y
Detection Probability 28/30				93 %

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	320	y
2	16	8.6	424	n
3	16	8	468	y
4	16	8.9	274	y
5	18	7.8	453	n
6	17	9.6	291	y
7	16	6.6	481	y
8	17	9.6	287	y
9	18	7.3	248	y
10	16	8.3	234	y
11	17	6.2	377	y
12	16	6.6	429	y
13	17	8.8	308	y
14	18	8.6	374	n
15	18	7.9	487	y
16	17	8.5	310	y
17	16	8.2	300	n
18	17	6.1	227	y
19	17	9.2	494	n
20	17	6.4	453	n
21	17	6.6	483	n
22	18	6.8	451	y
23	17	9.5	340	n
24	17	6	215	y
25	18	6	229	n
26	17	7.6	245	y
27	17	9	248	y
28	17	7.6	469	y
29	18	8.3	457	n
30	16	7.6	399	y
Detection Probability 20/30				67 %

RADAR TYPE 4				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (yes/no)
1	15	19.2	284	y
2	14	11.9	208	y
3	13	18	308	y
4	15	15	356	n
5	13	15.3	272	y
6	16	19.3	299	y
7	14	17.5	287	y
8	13	19.2	308	n
9	12	19.2	468	y
10	14	19.2	422	y
11	13	18.7	273	y
12	12	13.2	266	y
13	15	16	368	y
14	15	13	499	n
15	15	18.7	321	y
16	16	18.2	353	y
17	14	16.2	431	y
18	15	12.9	476	y
19	14	20	375	y
20	15	19.3	268	y
21	12	15.4	330	y
22	13	13.9	297	y
23	12	16.9	249	y
24	13	11.5	421	y
25	13	15.4	472	n
26	13	13	419	n
27	14	14.8	478	y
28	16	13	258	y
29	15	12.2	304	y
30	14	11.8	370	y
Detection Probability 25/30				83 %

TYPE 5		Rohde & Schwarz K350 Pulse Sequencer DFS		
Trial #	Detection (yes/no)	Chirp Width (MHz)	Subset	Fc
1	y	12	1	5500
2	y	7	1	5500
3	y	9	1	5500
4	y	11	1	5500

5	y	14	1	5500
6	y	16	1	5500
7	y	17	1	5500
8	y	5	1	5500
9	y	20	1	5500
10	y	5	1	5500
11	y	19	2	5498.6
12	y	19	2	5498.6
13	y	7	2	5493.8
14	y	19	2	5498.6
15	y	20	2	5499
16	y	9	2	5494.6
17	y	5	2	5493
18	y	7	2	5493.8
19	y	19	2	5498.6
20	y	14	2	5496.6
21	y	12	3	5504.2
22	y	16	3	5502.6
23	y	15	3	5503
24	y	17	3	5502.2
25	y	9	3	5505.4
26	y	17	3	5502.2
27	y	10	3	5505
28	y	11	3	5504.6
29	y	8	3	5505.8
30	y	16	3	5502.6
Detection Probability 30/30	100 %			

TYPE 5 PARAMETER SHEET							Rohde & Schwarz Pulse Sequencer
Trial Number : 17							
Bursts in Trial: 11							
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 PRI (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)	
1	2	84.2	5	1781		952.746	
2	3	92	5	1238	1961	596.851	
3	1	56.5	5			439.632	
4	3	96.1	5	1758	1101	737.433	
5	1	64.5	5			520.334	
6	1	76.1	5			522.825	
7	3	89.2	5	1309	1791	429.095	
8	1	50.2	5			517.656	
9	3	54.2	5	1305	1111	753.007	
10	2	87.5	5	1672		893.618	
11	3	51.9	5	1768	1258	687.309	

TYPE 5 PARAMETER SHEET							Rohde & Schwarz Pulse Sequencer
Trial Number : 18							
Bursts in Trial: 12							
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 PRI (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)	
1	2	85.3	7	1856		697.024	
2	3	85.5	7	1703	1182	567.86	
3	3	96.2	7	1656	1465	711.2	
4	3	74.3	7	1917	1395	728.26	
5	3	97.6	7	1915	1487	637.87	
6	2	97.7	7	1511		280.14	
7	1	68.3	7			531.52	
8	1	75.7	7			924.35	
9	1	56.3	7			935.79	
10	2	64.6	7	1263		750.03	
11	3	61.1	7	1504	1008	158.1	
12	2	79.7	7	1981		520.8	

TYPE 5 PARAMETER SHEET							Rohde & Schwarz Pulse Sequencer
Trial Number : 29							
Bursts in Trial: 19							
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 PRI (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)	
1	3	84.9	8	1295	1850	297.481	
2	3	94.2	8	1709	1549	417.171	
3	3	70.3	8	1554	1580	323.002	
4	3	60.8	8	1926	1207	113.673	
5	3	90	8	1179	1864	504.214	
6	3	93	8	1537	1384	362.005	
7	2	50.3	8	1516		331.446	
8	1	53.1	8			621.137	
9	1	88.7	8			342.068	
10	2	68	8	1740		587.749	
11	1	55	8			333.431	
12	1	92	8			304.512	
13	2	63.5	8	1165		357.023	
14	1	54.7	8			224.514	
15	1	76.2	8			145.445	
16	2	89.8	8	1109		608.416	
17	3	82	8	1520	1057	322.037	
18	2	96.6	8	1192		358.258	
19	3	55.5	8	1311	1683	319.579	

TYPE 5 PARAMETER SHEET							Rohde & Schwarz Pulse Sequencer
Trial Number : 30							
Bursts in Trial: 17							
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 PRI (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)	
1	1	86.9	16			290.366	
2	2	57.2	16	1902		515.678	
3	1	97.1	16			72.895	
4	3	84.5	16	1317	1505	420.573	
5	2	70	16	1058		629.911	
6	3	84.8	16	1943	1465	372.758	
7	3	59.2	16	1422	1432	538.546	
8	1	90.8	16			455.194	
9	3	52.1	16	1525	1362	117.861	
10	1	93.2	16			193.599	
11	2	50.1	16	1289		663.196	
12	2	83.6	16	1464		66.084	
13	2	99.2	16	1129		305.012	
14	1	67.8	16			553.499	
15	2	94.4	16	1125		696.147	
16	3	84.1	16	1258	1697	246.065	
17	1	81.5	16			564.582	

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	n
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
Detection Probability 29/30	97 %

40 MHz

RADAR TYPE 1				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (yes/no)
1	67	1	798	y
2	86	1	618	y
3	81	1	658	y
4	74	1	718	y
5	76	1	698	y
6	63	1	838	y
7	83	1	638	y
8	58	1	918	y
9	57	1	938	y
10	62	1	858	y
11	57	1	938	y
12	89	1	598	y
13	98	1	538	y
14	72	1	738	y
15	72	1	738	y
16	81	1	658	y
17	65	1	818	y
18	72	1	738	y
19	61	1	878	y
20	62	1	858	y
21	89	1	598	y
22	95	1	558	y
23	89	1	598	y
24	81	1	658	y
25	98	1	538	y
26	67	1	798	y
27	57	1	938	y
28	102	1	518	y
29	89	1	598	y
30	81	1	658	y
Detection Probability 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	2.9	167	y

2	27	1.1	230	y
3	28	3.9	217	y
4	24	2.1	182	y
5	25	1.8	174	n
6	26	4.2	179	y
7	26	2.5	216	y
8	28	2.7	202	y
9	28	1.2	204	y
10	28	2.2	217	y
11	27	4.4	227	y
12	23	1.7	172	y
13	29	2.1	152	y
14	28	1.2	192	y
15	23	1.4	171	y
16	27	4.6	222	y
17	24	2.9	196	y
18	27	3.2	197	y
19	25	3.8	194	y
20	26	4.8	167	y
21	23	2.7	176	y
22	23	2.5	227	y
23	27	1.8	226	n
24	24	1.8	178	y
25	27	3.9	197	y
26	25	3.2	182	y
27	26	2.3	228	y
28	25	3.6	223	y
29	28	2.8	185	y
30	28	4.1	226	y
Detection Probability 28/30				93 %

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	8.6	255	y
2	16	6.6	252	y
3	16	8.8	232	y
4	17	7.9	471	y
5	17	9.8	432	y
6	17	7.2	432	y
7	17	7.7	320	y
8	16	7	215	y
9	18	7.9	377	y

10	17	9	348	y
11	18	8.2	253	y
12	17	9.1	325	y
13	17	6.1	368	y
14	16	6.5	481	n
15	16	7.8	280	y
16	16	6.9	441	n
17	17	6	237	y
18	17	8.6	474	y
19	17	7.3	353	n
20	16	8.9	301	y
21	17	9.5	236	y
22	18	6.8	289	y
23	17	7.9	225	y
24	18	9.6	312	y
25	16	6.4	295	y
26	18	7.8	266	y
27	17	9	268	y
28	17	8.4	437	y
29	16	8.1	281	y
30	17	9.8	334	y
Detection Probability 27/30				90 %

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	17.7	236	y
2	14	14.1	345	y
3	16	18	256	y
4	14	15.1	425	y
5	13	15.4	304	y
6	15	19.4	244	y
7	13	16.9	210	y
8	15	16.9	256	y
9	12	11.4	277	y
10	15	18	355	y
11	12	12.7	467	y
12	16	19.4	443	y
13	13	13.3	266	y
14	16	12.1	270	y
15	16	18.6	340	y
16	14	15.8	447	y
17	13	19.1	476	y

18	16	16.6	314	y
19	13	16.7	239	y
20	15	11.7	389	n
21	12	19.8	289	y
22	14	11.1	345	y
23	15	14.5	408	y
24	16	16.7	379	y
25	15	18	294	y
26	16	12.7	397	y
27	13	17.2	351	y
28	13	17.8	210	y
29	16	14.5	375	y
30	16	14.2	368	y
Detection Probability 29/30				97 %

TYPE 5		Rohde & Schwarz K350 Pulse Sequencer DFS			
Trial #	Detection (yes/no)	Chirp Width (MHz)	Subset	Fc	
1	y	16	1	5500	
2	y	18	1	5500	
3	y	17	1	5500	
4	y	19	1	5500	
5	y	19	1	5500	
6	y	13	1	5500	
7	y	20	1	5500	
8	y	19	1	5500	
9	y	10	1	5500	
10	y	14	1	5500	
11	y	10	2	5495	
12	y	17	2	5497.8	
13	y	12	2	5495.8	
14	y	12	2	5495.8	
15	y	17	2	5497.8	
16	y	6	2	5493.4	
17	y	7	2	5493.8	
18	y	15	2	5497	
19	y	10	2	5495	
20	y	10	2	5495	
21	y	18	3	5501.8	
22	y	10	3	5505	
23	y	12	3	5504.2	
24	y	5	3	5507	
25	y	8	3	5505.8	
26	y	17	3	5502.2	

27	y	11	3	5504.6
28	y	18	3	5501.8
29	y	10	3	5505
30	y	19	3	5501.4
Detection Probability 30/30	100 %			

40 MHz Trails

TYPE 5 PARAMETER SHEET Rohde & Schwarz Pulse Sequencer						
Trial Number : 1						
Bursts in Trial: 15						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 PRI (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)
1	1	84.9	16			38.889
2	1	51	16			455.03
3	2	65.3	16	1826		28.32
4	2	64.6	16	1515		566.14
5	2	91.8	16	1156		699.51
6	2	62.4	16	1686		330.43
7	1	69.7	16			755.35
8	2	91.2	16	1731		220.42
9	2	90.7	16	1050		212.76
10	2	68.1	16	1054		3.81
11	3	50.5	16	1872	1531	451.68
12	1	51.6	16			561.14
13	3	96	16	1471	1024	704.8
14	1	88.2	16			241.9
15	2	85.9	16	1984		409.1

TYPE 5 PARAMETER SHEET							Rohde & Schwarz Pulse Sequencer
Trial Number : 6							
Bursts in Trial: 20							
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 PRI (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)	
1	2	86.6	13	1666		275.64	
2	2	84.9	13	1805		564.06	
3	2	59.4	13	1243		486.38	
4	2	90	13	1033		465.89	
5	2	80.2	13	1751		431.55	
6	2	91	13	1165		255.6	
7	2	83.9	13	1827		4.04	
8	3	71.9	13	1833	1953	290.62	
9	3	69.7	13	1386	1759	24.44	
10	2	66.1	13	1594		110.78	
11	2	100	13	1982		124.82	
12	2	89.3	13	1264		526.65	
13	2	71.9	13	1973		442.85	
14	1	73.8	13			80.23	
15	2	65.5	13	1030		316.01	
16	3	94	13	1100	1268	82.83	
17	2	55.5	13	1824		197.02	
18	2	60.9	13	1020		158.6	
19	3	64.6	13	1452	1842	197.9	
20	1	54	13			324.1	

TYPE 5 PARAMETER SHEET							Rohde & Schwarz Pulse Sequencer
Trial Number : 7							
Bursts in Trial: 16							
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 PRI (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)	
1	2	54.3	20	1918		655.388	
2	1	77.7	20			10.956	
3	3	55.3	20	1554	1802	741.27	
4	1	61.8	20			694.65	
5	3	89.1	20	1112	1518	566.61	
6	2	62.1	20	1726		244.66	
7	2	79.8	20	1516		631.04	
8	2	54.2	20	1855		252.27	
9	3	80.8	20	1759	1667	463.53	
10	2	61.2	20	1966		571.79	
11	2	72.4	20	1895		390.43	
12	3	57.8	20	1704	1761	116.31	
13	1	65.5	20			740.71	
14	2	85.4	20	1326		267.5	
15	3	50.2	20	1846	1726	229.1	
16	2	62.9	20	1983		286.7	

TYPE 5 PARAMETER SHEET							Rohde & Schwarz Pulse Sequencer
Trial Number : 8							
Bursts in Trial: 19							
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)	
1	1	72.8	19			307.858	
2	2	61.9	19	1957		479.711	
3	1	99.1	19			104.642	
4	1	73.4	19			472.393	
5	2	64.7	19	1134		356.254	
6	3	75.8	19	1333	1356	208.825	
7	1	60.8	19			521.296	
8	1	97.1	19			441.237	
9	3	57.9	19	1551	1509	587.018	
10	2	59.1	19	1241		597.049	
11	1	100	19			475.741	
12	3	79.6	19	1410	1910	316.362	
13	1	97.4	19			352.963	
14	1	94.6	19			507.264	
15	2	51	19	1178		158.825	
16	2	79.7	19	1352		480.986	
17	1	67.9	19			129.637	
18	2	81.9	19	1829		255.358	
19	3	97	19	1874	1128	340.579	

TYPE 5 PARAMETER SHEET							Rohde & Schwarz Pulse Sequencer
Trial Number : 9							
Bursts in Trial: 12							
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 PRI (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)	
1	1	96.2	10			895.36	
2	1	76.4	10			313.28	
3	2	86.1	10	1866		11.68	
4	2	71.1	10	1709		535.26	
5	1	67.7	10			410.09	
6	3	80.8	10	1250	1548	918.97	
7	1	95.6	10			889.62	
8	2	77.7	10	1126		834.1	
9	3	54.3	10	1695	1683	157.86	
10	1	77.5	10			328.12	
11	2	54	10	1729		556.8	
12	2	63.7	10	1778		487.6	

TYPE 5 PARAMETER SHEET							Rohde & Schwarz Pulse Sequencer
Trial Number : 18							
Bursts in Trial: 11							
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 PRI (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)	
1	2	53	15	1811		311.016	
2	2	89	15	1983		345.821	
3	1	50.8	15			939.512	
4	3	62.3	15	1958	1482	623.173	
5	3	55.7	15	1161	1729	903.234	
6	2	60.2	15	1297		885.895	
7	1	78	15			553.635	
8	1	85.5	15			369.126	
9	2	50.2	15	1040		890.267	
10	1	77.1	15			244.918	
11	2	93.7	15	1246		656.009	

TYPE 5 PARAMETER SHEET							Rohde & Schwarz Pulse Sequencer
Trial Number : 19							
Bursts in Trial: 16							
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 PRI (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)	
1	2	79.8	10	1766		515.499	
2	2	83	10	1953		277.73	
3	2	72.1	10	1624		227.17	
4	2	85	10	1043		327.14	
5	2	89.6	10	1453		182	
6	2	75	10	1599		727.55	
7	1	51.2	10			486.07	
8	2	92.8	10	1108		728.3	
9	2	83.4	10	1696		161.43	
10	2	91.4	10	1999		410.3	
11	1	65.9	10			187.67	
12	3	90.8	10	1910	1163	61.41	
13	2	99.7	10	1144		682.68	
14	2	68.4	10	1239		519.4	
15	3	71	10	1854	1207	338.9	
16	1	62	10			218.8	

TYPE 5 PARAMETER SHEET							Rohde & Schwarz Pulse Sequencer
Trial Number : 20							
Bursts in Trial: 19							
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 PRI (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)	
1	2	86.3	10	1475		271.385	
2	1	71.1	10			263.672	
3	1	95.5	10			62.602	
4	2	70.2	10	1102		453.273	
5	2	63.2	10	1541		237.044	
6	3	82.3	10	1544	1852	317.825	
7	2	88.4	10	1727		12.436	
8	2	72.1	10	1337		276.957	
9	2	55.3	10	1857		438.078	
10	1	92.4	10			105.139	
11	2	87	10	1628		53.341	
12	3	69.8	10	1923	1011	361.412	
13	3	66.6	10	1011	1659	12.663	
14	2	64.2	10	1820		142.204	
15	2	94.5	10	1577		219.225	
16	2	92.1	10	1623		579.216	
17	2	71.3	10	1289		327.437	
18	2	98.6	10	1854		463.058	
19	2	93.5	10	1704		431.679	

TYPE 5 PARAMETER SHEET							Rohde & Schwarz Pulse Sequencer
Trial Number : 21							
Bursts in Trial: 13							
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 PRI (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)	
1	1	61.8	18			865.129	
2	2	69.6	18	1184		892.803	
3	2	57.3	18	1742		273.006	
4	3	50	18	1942	1277	211.449	
5	1	70.3	18			116.202	
6	2	73	18	1268		454.875	
7	1	70.3	18			735.328	
8	3	89.1	18	1371	1699	667.922	
9	1	52.5	18			59.695	
10	2	59.7	18	1361		873.278	
11	3	93.5	18	1831	1716	170.771	
12	2	62.3	18	1186		882.254	
13	2	86.6	18	1019		642.477	

TYPE 5 PARAMETER SHEET							Rohde & Schwarz Pulse Sequencer
Trial Number : 26							
Bursts in Trial: 19							
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 PRI (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)	
1	2	87.1	17	1195		71.752	
2	2	68.9	17	1479		516.781	
3	2	90.7	17	1777		598.422	
4	2	83.7	17	1859		237.303	
5	1	94.8	17			35.734	
6	1	66.3	17			28.235	
7	1	99.3	17			202.656	
8	1	60.6	17			25.327	
9	1	93.4	17			27.748	
10	2	83.4	17	1653		57.669	
11	2	81.2	17	1982		423.981	
12	1	99.3	17			520.122	
13	2	87.2	17	1336		458.223	
14	1	66.1	17			379.864	
15	2	94.4	17	1492		126.215	
16	2	93.6	17	1515		273.366	
17	2	66.9	17	1379		567.137	
18	2	56.1	17	1401		459.258	
19	1	83.9	17			470.179	

TYPE 5 PARAMETER SHEET							Rohde & Schwarz Pulse Sequencer
Trial Number : 27							
Bursts in Trial: 19							
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 PRI (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)	
1	3	89.9	11	1078	1233	426.001	
2	3	74.3	11	1628	1000	107.759	
3	2	58.1	11	1892		562.392	
4	1	67.7	11			400.843	
5	1	52	11			190.134	
6	3	79.7	11	1431	1843	393.355	
7	3	69.6	11	1700	1905	403.836	
8	2	99.1	11	1072		240.897	
9	1	54	11			127.198	
10	2	95.3	11	1540		317.869	
11	3	75.7	11	1414	1458	440.351	
12	1	75.6	11			463.782	
13	1	56.2	11			478.943	
14	2	81.9	11	1015		522.014	
15	2	62.7	11	1713		231.075	
16	3	61.4	11	1567	1111	290.306	
17	1	62.3	11			222.737	
18	3	91	11	1673	1558	63.958	
19	2	63.4	11	1539		101.279	

TYPE 5 PARAMETER SHEET							Rohde & Schwarz Pulse Sequencer
Trial Number : 30							
Bursts in Trial: 17							
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 PRI (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)	
1	2	64.7	19	1021		153.974	
2	1	95.2	19			10.969	
3	1	74.8	19			377.065	
4	2	66.3	19	1668		304.083	
5	3	90.4	19	1619	1848	491.651	
6	1	70.3	19			5.348	
7	2	63.7	19	1779		248.626	
8	3	76.9	19	1948	1557	622.644	
9	2	87.7	19	1274		481.061	
10	2	72.2	19	1972		577.079	
11	2	91.4	19	1771		268.896	
12	2	63.1	19	1045		301.994	
13	2	99.7	19	1574		611.912	
14	1	62.6	19			558.209	
15	3	50.1	19	1213	1129	409.347	
16	2	98.5	19	1659		172.265	
17	2	78.6	19	1959		80.482	

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	n	
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
Detection Probability 29/30	97 %

80 MHz

RADAR TYPE 1				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (yes/no)
1	68	1	778	y
2	81	1	658	y
3	102	1	518	y
4	65	1	818	y
5	74	1	718	y
6	92	1	578	y
7	68	1	778	y
8	70	1	758	y
9	68	1	778	y
10	63	1	838	y
11	92	1	578	y
12	63	1	838	y
13	95	1	558	y
14	92	1	578	y
15	68	1	778	y
16	98	1	538	y
17	74	1	718	y
18	18	1	3066	y
19	62	1	858	y
20	74	1	718	y
21	65	1	818	y
22	65	1	818	y
23	98	1	538	y
24	63	1	838	y

25	68	1	778	y
26	74	1	718	y
27	98	1	538	y
28	83	1	638	y
29	74	1	718	y
30	89	1	598	y
Detection Probability 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	27	3.8	189	y
2	25	4	168	y
3	26	1.3	196	y
4	25	2.8	218	y
5	27	3.9	220	n
6	28	2.6	170	n
7	27	2.9	201	y
8	27	4	171	n
9	27	3.5	229	y
10	25	4	203	y
11	24	4.1	217	y
12	25	3.6	164	y
13	28	1.9	169	y
14	28	3.8	185	y
15	23	4.1	155	y
16	27	2	226	y
17	25	3.2	223	y
18	25	2.9	152	y
19	28	1.7	210	y
20	25	2.9	196	y
21	27	3.1	171	y
22	27	4	220	y
23	29	4.2	222	y
24	27	1	207	y
25	27	3.9	156	y
26	29	5	161	y
27	27	2.5	190	y
28	26	4.2	227	y
29	24	3.6	166	y
30	27	4.8	169	y
Detection Probability 27/30				90 %

RADAR TYPE 3				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (yes/no)
1	16	7.4	383	y
2	17	6.4	210	y
3	18	9.7	440	y
4	17	6.2	313	y
5	18	6.4	438	y
6	16	6.6	279	y
7	16	8.6	338	y
8	16	7	385	y
9	18	6.8	306	y
10	18	6	255	y
11	16	9.9	406	y
12	17	7	355	y
13	17	9.8	306	y
14	16	8.5	285	y
15	17	6	233	y
16	17	6.7	250	y
17	17	7.3	265	n
18	16	7.2	274	y
19	18	7	214	y
20	18	9.5	406	y
21	18	7.6	299	y
22	18	8.9	347	y
23	18	7.5	318	y
24	17	9.1	472	y
25	17	7.4	389	y
26	17	7.3	322	y
27	17	7.2	444	y
28	16	9.7	398	y
29	18	7.9	371	y
30	17	7.9	451	y
Detection Probability 29/30				97 %

RADAR TYPE 4				Rohde & Schwarz K350 Pulse Sequencer DFS
Trial #	Number of Pulses per Burst	Pulse Width (µsec)	PRI (µs)	Detection (yes/no)
1	15	11.9	241	y
2	12	17.9	344	y
3	12	15.7	332	n

4	15	18.8	489	y
5	12	12.5	306	n
6	13	17	377	n
7	16	12.3	293	y
8	13	11.7	327	y
9	14	11.9	284	y
10	13	14.9	445	y
11	14	18	372	y
12	12	16.3	400	y
13	15	11.5	352	y
14	13	16	242	y
15	16	15.2	246	y
16	15	16.6	364	y
17	13	12.5	343	y
18	15	12.1	477	y
19	13	12.7	362	y
20	15	11.3	214	y
21	15	11.3	353	y
22	15	13	342	y
23	16	13.1	200	y
24	14	11.3	435	y
25	13	15	203	y
26	15	17.7	427	y
27	14	18.4	486	y
28	16	11	399	y
29	14	13.8	464	y
30	13	14	234	y
Detection Probability 27/30				90 %

TYPE 5		Rohde & Schwarz K350 Pulse Sequencer DFS			
Trial #	Detection (yes/no)	Chirp Width (MHz)	Subset	Fc	
1	y	10	1	5500	
2	y	15	1	5500	
3	y	20	1	5500	
4	n	13	1	5500	
5	y	12	1	5500	
6	y	14	1	5500	
7	y	13	1	5500	
8	y	19	1	5500	
9	y	12	1	5500	
10	y	14	1	5500	
11	y	7	2	5493.8	
12	n	18	2	5498.2	

13	y	14	2	5496.6
14	y	9	2	5494.6
15	y	17	2	5497.8
16	y	12	2	5495.8
17	y	8	2	5494.2
18	y	10	2	5495
19	y	16	2	5497.4
20	y	6	2	5493.4
21	y	7	3	5506.2
22	y	5	3	5507
23	y	12	3	5504.2
24	y	16	3	5502.6
25	y	6	3	5506.6
26	y	6	3	5506.6
27	y	12	3	5504.2
28	y	18	3	5501.8
29	y	20	3	5501
30	n	17	3	5502.2
Detection Probability 27/30	90 %			

80 MHz Trails

TYPE 5 PARAMETER SHEET						Rohde & Schwarz Pulse Sequencer
Trial Number : 1						
Bursts in Trial: 16						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 PRI (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)
1	2	96.4	10	1258		488.131
2	2	61.2	10	1757		453.39
3	3	88	10	1179	1256	142.19
4	3	65.4	10	1729	1050	78.68
5	1	81	10			721.62
6	2	80.8	10	1072		306.55
7	2	66	10	1318		264.76
8	3	52.9	10	1380	1931	220.47
9	2	71.3	10	1207		227.5
10	2	68.9	10	1417		40.2
11	2	78.8	10	1566		692.37
12	2	59.4	10	1503		341.79
13	2	88.8	10	1563		688.36
14	3	67.4	10	1274	1476	130.16
15	3	94.8	10	1768	1756	589.1
16	2	88.1	10	1691		581.7

TYPE 5 PARAMETER SHEET							Rohde & Schwarz Pulse Sequencer
Trial Number : 16							
Bursts in Trial: 19							
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 PRI (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)	
1	1	94.2	12			581.688	
2	2	86.3	12	1515		319.113	
3	1	77.3	12			184.272	
4	2	87.4	12	1054		128.263	
5	2	76.3	12	1458		256.534	
6	2	63	12	1219		530.945	
7	1	90	12			494.816	
8	2	56.9	12	1212		455.847	
9	3	51.5	12	1950	1601	114.488	
10	3	100	12	1037	1759	108.799	
11	2	95.7	12	1980		607.431	
12	2	78.8	12	1076		313.912	
13	3	77.8	12	1394	1034	151.293	
14	3	94.8	12	1316	1835	288.664	
15	3	83.2	12	1921	1248	247.405	
16	2	80.7	12	1002		287.956	
17	2	91.1	12	1034		280.337	
18	2	97.9	12	1760		252.258	
19	1	66.6	12			104.479	

TYPE 5 PARAMETER SHEET							Rohde & Schwarz Pulse Sequencer
Trial Number : 17							
Bursts in Trial: 16							
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 PRI (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)	
1	2	75.8	8	1219		243.421	
2	2	52.2	8	1719		117.116	
3	3	71.8	8	1244	1582	1.93	
4	2	74.8	8	1851		268.89	
5	1	62.8	8			523.89	
6	2	82.9	8	1958		38.08	
7	1	74.1	8			10.81	
8	1	54.9	8			290.67	
9	1	68.8	8			461.33	
10	2	100	8	1581		722.91	
11	2	85.5	8	1385		430.36	
12	2	98.2	8	1017		62.27	
13	2	70.1	8	1248		283.27	
14	2	75.5	8	1422		530.5	
15	2	51.1	8	1341		386.3	
16	1	77.3	8			157.3	

TYPE 5 PARAMETER SHEET							Rohde & Schwarz Pulse Sequencer
Trial Number : 22							
Bursts in Trial: 16							
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 PRI (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)	
1	3	61.3	5	1874	1970	555.766	
2	1	78	5			682.63	
3	2	67.8	5	1869		355.36	
4	1	89.9	5			378.48	
5	2	96	5	1905		152.23	
6	3	96	5	1461	1674	576.27	
7	2	78.3	5	1082		635.39	
8	2	65.1	5	1157		155.54	
9	2	89.7	5	1717		214.79	
10	3	50.6	5	1665	1566	35.23	
11	2	83.5	5	1517		128.87	
12	3	67.6	5	1560	1753	60.59	
13	1	83.3	5			593.09	
14	2	55.4	5	1046		584.7	
15	2	70.1	5	1555		350.2	
16	3	87	5	1050	1885	595.4	

TYPE 5 PARAMETER SHEET							Rohde & Schwarz Pulse Sequencer
Trial Number : 23							
Bursts in Trial: 15							
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 PRI (µsec)	Pulse 2-to-3 PRI (µsec)	Start Location Within Interval (msec)	
1	1	76.5	12			208.223	
2	3	68.5	12	1596	1337	487.37	
3	2	74.5	12	1797		235.09	
4	2	72.5	12	1688		199.37	
5	2	82.4	12	1459		574.74	
6	2	92.9	12	1032		689.92	
7	3	54.3	12	1834	1482	205.41	
8	1	91.5	12			567.62	
9	3	68.7	12	1958	1649	92.24	
10	1	81.5	12			105.28	
11	2	51.4	12	1982		573.87	
12	1	54.8	12			321.15	
13	3	63.2	12	1784	1550	746.3	
14	1	94.1	12			54.5	
15	2	52.4	12	1124		83.1	

22	y
23	y
24	y
25	y
26	y
27	y
28	y
29	y
30	y
Detection Probability 29/30	97 %

-- End of Test Report --