FCC DFS TEST REPORT

FCC ID	:	G954331X
Equipment Name	:	DOCSIS Cable Gateway
Trade Name	:	Technicolor
Model Number	:	CGM4331COM
Applicant / Manufacturer	:	Technicolor Connected Home USA LLC 5030 Sugarloaf Parkway,Building 6, Lawrenceville Georgia,United States,30044
Standard	:	47 CFR FCC Part 15.407

The product was received on Jul. 19, 2019, and testing was started from Nov. 07, 2019 and completed on Nov. 09, 2019. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02 and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

Table of Contents

History of this test report **3**

Summary of Test Result **4**

1 General Description **5**

1.1 Information 5
1.2 Accessories 13
1.3 Support Equipment 13
1.4 Applicable Standards 13
1.5 Testing Location Information 13

2 Test Configuration of EUT **14**

2.1 Test Channel Frequencies Configuration 14
2.2 The Worst Case Measurement Configuration 14

3 Dynamic Frequency Selection (DFS) Test Result **15**

3.1 General DFS Information 15
3.2 Radar Test Waveform Calibration 18
3.3 UNII Detection Bandwidth 28
3.4 In-service Monitoring 30
3.5 Statistical Performance Check 35

4 Test Equipment and Calibration Data **62**

5 Measurement Uncertainty **63**

Appendix A. Test Photos

Photographs of EUT v01

History of this test report

Report No.	Version	Description	Issued Date
FZ971031-02	01	Initial issue of report	Nov. 15, 2019

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.3	FCC KDB 905462 7.8.1	DFS: UNII Detection Bandwidth Measurement	PASS	-
3.4	FCC KDB 905462 7.8.3	DFS: In-Service Monitoring for Channel Move Time (CMT)	PASS	-
3.4	FCC KDB 905462 7.8.3	DFS: In-Service Monitoring for Channel Closing Transmission Time (CCTT)	PASS	-
3.5	FCC KDB 905462 7.8.4	DFS: Statistical Performance Check	PASS	-
3.1.4	FCC KDB 905462 8.1	User Access Restrictions	PASS	-

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen

Report Producer: Cindy Peng

1 General Description

1.1 Information

1.1.1 RF General Information

Specification Items	Description	
Frequency Range	5250 MHz – 5350 MHz 5470 MHz – 5725 MHz	
Radio Type	Intentional Transceiver	
Power Type	From power adapter	
Modulation	IEEE 802.11a: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11n/ac/ax: see the below table	
Data Rate (Mbps)	IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n/ac/ax: see the below table	
Channel Bandwidth	20/40/80/160 MHz operating channel bandwidth	
Operating Mode	☒ Master	
	☐ Client with radar detection	
	☐ Client without radar detection	
Communication Mode	☒ IP Based (Load Based)	☐ Frame Based
TPC Function	☒ With TPC	☐ Without TPC
Weather Band (5600~5650MHz)	☒ With 5600~5650MHz	☐ Without 5600~5650MHz
Software / Firmware Version	Prod_19.2_d31 & Prod_19.2	
◆ 11a, HT20 and HT40 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation. ◆ VHT20, VHT40, VHT80 and VHT160 use a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation. ◆ HEW20, HEW40, HEW80 and HEW160 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation. ◆ EUT employ a TPC mechanism and TPC have the capability to operate at least 6 dB below highest RF output power.		

Note: The above information was declared by manufacturer.

TPC Power Result
For non-beamforming mode:
4 Stream 4 TX for SDM mode:

Mode	Min Power (dBm)	Max Power (dBm)	Min EIRP (dBm)	Max EIRP (dBm)
802.11ac VHT20_Nss4,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	17.76	23.76	20.36	26.36
5.47-5.725GHz	17.55	23.55	20.55	26.55
802.11ax HEW20_Nss4,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	17.93	23.93	20.53	26.53
5.47-5.725GHz	17.79	23.79	20.79	26.79
802.11ac VHT40_Nss4,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	17.66	23.66	20.26	26.26
5.47-5.725GHz	17.79	23.79	20.79	26.79
802.11ax HEW40_Nss4,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	17.87	23.87	20.47	26.47
5.47-5.725GHz	17.91	23.91	20.91	26.91
802.11ac VHT80_Nss4,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	16.96	22.96	19.56	25.56
5.47-5.725GHz	17.86	23.86	20.86	26.86
802.11ax HEW80_Nss4,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	16.96	22.96	19.56	25.56
5.47-5.725GHz	17.92	23.92	20.92	26.92
802.11ac VHT160_Nss4,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	10.09	16.09	12.29	18.29
5.47-5.725GHz	15.80	21.80	19.10	25.10
802.11ax HEW160_Nss4,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	10.51	16.51	12.71	18.71
5.47-5.725GHz	14.64	20.64	18.24	23.94

For beamforming mode:
1 Stream 4 TX for TxBF mode:

Mode	Min Power (dBm)	Max Power (dBm)	Min EIRP (dBm)	Max EIRP (dBm)
802.11ac VHT20-BF_Nss1,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	15.18	21.18	23.18	29.18
5.47-5.725GHz	14.4	20.40	23.5	29.5
802.11ax HEW20-BF_Nss1,(MCS0)_4TX		-		
5.25-5.35GHz	14.87	20.87	22.87	28.87
5.47-5.725GHz	14.78	20.78	23.88	29.88
802.11ac VHT40-BF_Nss1,(MCS0)_4TX		-		
5.25-5.35GHz	14.9	20.90	22.9	28.9
5.47-5.725GHz	14.46	20.46	23.56	29.56
802.11ax HEW40-BF_Nss1,(MCS0)_4TX		-		
5.25-5.35GHz	14.91	20.91	22.91	28.91
5.47-5.725GHz	14.77	20.77	23.87	29.87
802.11ac VHT80-BF_Nss1,(MCS0)_4TX		-		
5.25-5.35GHz	13.53	19.53	21.53	27.53
5.47-5.725GHz	14.34	20.34	23.44	29.44
802.11ax HEW80-BF_Nss1,(MCS0)_4TX		-		
5.25-5.35GHz	13.95	19.95	21.95	27.95
5.47-5.725GHz	14.59	20.59	23.69	29.69
802.11ac VHT160-BF_Nss1,(MCS0)_4TX		-		
5.25-5.35GHz	10.46	16.46	18.46	24.46
5.47-5.725GHz	12.63	18.63	21.73	27.73
802.11ax HEW160-BF_Nss1,(MCS0)_4TX		-		
5.25-5.35GHz	10.93	16.93	18.93	24.93
5.47-5.725GHz	12.84	18.84	21.94	27.94

2 Stream 4 TX for TxBF mode:

Mode	Min Power (dBm)	Max Power (dBm)	Min EIRP (dBm)	Max EIRP (dBm)
802.11ac VHT20-BF_Nss2,(MCS0)_4TX	-	-	-	-
5.25-5.35GHz	17.9	23.90	23.7	29.7
5.47-5.725GHz	17.57	23.57	23.87	29.87
802.11ac VHT40-BF_Nss2,(MCS0)_4TX			-	
5.25-5.35GHz	17.57	23.57	23.37	29.37
5.47-5.725GHz	17.21	23.21	23.51	29.51
802.11ac VHT80-BF_Nss2,(MCS0)_4TX			-5	
5.25-5.35GHz	15.29	21.29	21.09	27.09
5.47-5.725GHz	17.2	23.20	23.5	29.5
802.11ac VHT160-BF_Nss2,(MCS0)_4TX			-	
5.25-5.35GHz	11.51	17.51	17.31	23.31
5.47-5.725GHz	13.32	19.32	19.62	25.62
802.11ax HEW20-BF_Nss2,(MCS0)_4TX			-	
5.25-5.35GHz	17.88	23.88	23.68	29.68
5.47-5.725GHz	17.81	23.81	24.11	30.11
802.11ax HEW40-BF_Nss2,(MCS0)_4TX	-		-	
5.25-5.35GHz	17.75	23.75	23.55	29.55
5.47-5.725GHz	17.4	23.40	23.7	29.7
802.11ax HEW80-BF_Nss2,(MCS0)_4TX	-		-	
5.25-5.35GHz	15.46	21.46	21.26	27.26
5.47-5.725GHz	17.43	23.43	23.73	29.73
802.11ax HEW160-BF_Nss2,(MCS0)_4TX	-		-	
5.25-5.35GHz	11.51	17.51	17.31	23.31
5.47-5.725GHz	13.32	19.32	19.62	25.62

1.1.2 Antenna Information

Ant.	Port	Brand	Model Name	Antenna Type	Connector
1	1	-	-	-	-
2	2	-	-	-	-
3	3	-	-	-	-
4	4	-	-	-	-

Number of Transmit Antennas & Bandwidth

Number of Transmit Antennas	1TX				2TX				3TX				4TX			
Bandwidth Mode	20 MHz	40 MHz	80 MHz	160 MHz	20 MHz	40 MHz	80 MHz	160 MHz	20 MHz	40 MHz	80 MHz	160 MHz	20 MHz	40 MHz	80 MHz	160 MHz
802.11a	V	X	X	X	V	X	X	X	V	X	X	X	V	X	X	X
802.11n	V	V	X	X	V	V	X	X	V	V	X	X	V	V	X	X
802.11ac	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
802.11ax	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V

Directional Gain (dBi) for TxBF & SDM mode					
Bandwidth Mode	Frequency	1 Stream 4 TX for TxBF mode	2 Stream 4 TX for TxBF mode	3 Stream 4 TX for TxBF mode	4 Stream 4 TX for SDM mode
20MHz	5180MHz	8.0	5.0	4.6	2.2
	5200MHz	8.0	5.0	4.6	2.2
	5240MHz	8.0	5.0	4.6	2.2
	5260MHz	8.8	5.8	4.9	2.8
	5300MHz	8.8	5.8	4.9	2.8
	5320MHz	8.8	5.8	4.9	2.8
	5500MHz	9.1	6.1	5.2	3.1
	5580MHz	9.1	6.3	5.5	3.3
	5700MHz	9.1	6.3	5.5	3.3
	5720MHz	9.1	6.3	5.5	3.3
	5745MHz	9.1	6.2	5.6	3.2
	5785MHz	9.1	6.2	5.6	3.2
	5825MHz	9.1	6.2	5.6	3.2
40MHz	5190MHz	8.0	5.0	4.6	2.2
	5230MHz	8.0	5.0	4.6	2.2
	5270MHz	8.8	5.8	4.9	2.8
	5310MHz	8.8	5.8	4.9	2.8
	5510MHz	9.1	6.1	5.2	3.1
	5550MHz	9.1	6.1	5.2	3.1
	5670MHz	9.1	6.3	5.5	3.3
	5710MHz	9.1	6.3	5.5	3.3
	5755MHz	9.1	6.2	5.6	3.2
	5795MHz	9.1	6.2	5.6	3.2
80MHz	5210MHz	8.0	5.0	4.6	2.0
	5290MHz	8.8	5.8	4.9	2.8
	5530MHz	9.1	6.1	5.2	3.1
	5610MHz	9.1	6.3	5.5	3.3
	5690MHz	9.1	6.3	5.5	3.3
	5775MHz	9.1	6.2	5.6	3.2
160MHz	5250MHz	8.0	5.0	4.6	2.2
	5570MHz	9.1	6.3	5.5	3.3

Note: The above information was declared by manufacturer.

1.1.3 DFS Band Carrier Frequencies

There are four bandwidth systems.

For 20MHz bandwidth systems, use Channel 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140, 144.

For 40MHz bandwidth systems, use Channel 54, 62, 102, 110, 118, 126, 134, 142.

For 80MHz bandwidth systems, use Channel 58, 106, 122, 138.

For 160MHz bandwidth systems, use Channel 50, 114

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5250~5350 MHz Band 2	50	5250 MHz	58	5290 MHz
	52	5260 MHz	60	5300 MHz
	54	5270 MHz	62	5310 MHz
	56	5280 MHz	64	5320 MHz
5470~5725 MHz Band 3	100	5500 MHz	122	5610 MHz
	102	5510 MHz	124	5620 MHz
	104	5520 MHz	126	5630 MHz
	106	5530 MHz	128	5640 MHz
	108	5540 MHz	132	5660 MHz
	110	5550 MHz	134	5670 MHz
	112	5560 MHz	136	5680 MHz
	114	5570 MHz	138	5690 MHz
	116	5580 MHz	140	5700 MHz
	118	5590 MHz	142	5710 MHz
	120	5600 MHz	144	5720 MHz

1.1.4 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FZ971031-01

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
Changing the same type antenna with different directional gain (Only for WLAN function).	1. Radar Waveform calibration. 2. UNII Detection Bandwidth. 3. In-Service Monitoring for Channel Move Time (CMT). 4. In-Service Monitoring for Channel Closing Transmission Time (CCTT). 5. Statistical Performance Check. (After evaluating, 802.11ax (HEW160), 5250 MHz was tested.)

1.2 Accessories

Accessories				
No.	**Equipment Name**	**Brand Name**	**Model Name**	**Rating**
1	Adapter 1	AcBel	ADK002	INPUT: 100-120V ~50/60Hz, 1.5A, OUTPUT: 12V, 4.6A
2	Adapter 2	Netbit	NBC56A120460VU	INPUT: 100-120V ~50/60Hz, 1.5A, OUTPUT: 12V, 4.6A

1.3 Support Equipment

Support Equipment				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
A	Notebook	DELL	E4300	N/A
B	Notebook	DELL	E4300	N/A
C	Device	ASUS	RT-AX88U	MSQ-RTAXHP00

1.4 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02

1.5 Testing Location Information

Testing Location					
☐	HWA YA	ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL : 886-3-327-3456 FAX : 886-3-327-0973			
☒	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085			
Test Condition		**Test Site No.**	**Test Engineer**	**Test Environment**	**Test Date**
DFS Site		DF01-CB	Jeff Wu	24.8~25.4°C / 54~57%	Nov. 07, 2019~Nov. 09, 2019

Test site Designation No. TW0006 with FCC
Test site registered number IC 4086D with Industry Canada.

2 Test Configuration of EUT

2.1 Test Channel Frequencies Configuration

Test Channel Frequencies Configuration	
IEEE Std.	**Test Channel Freq. (MHz)**
802.11ax (HEW160)	5250 MHz

2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	Dynamic Frequency Selection (DFS)
Test Condition	Radiated measurement The EUT shall be configured to operate at the highest transmitter output power setting. If more than one antenna assembly is intended for this power setting, the gain of the antenna assembly with the lowest gain shall be used. The DFS radar test signals have been aligned to the direction corresponding to the EUT's maximum antenna gain.
Modulation Mode	802.11ax (HEW160)

3 Dynamic Frequency Selection (DFS) Test Result

3.1 General DFS Information

3.1.1 DFS Parameters

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

Table D.2: Interference threshold values	
Maximum Transmit Power	**Value (see note)**
EIRP ≥ 200 mW	-64 dBm
EIRP < 200 mW and PSD < 10dBm/MHz	-62 dBm
EIRP < 200 mW and PSD >= 10dBm/MHz	-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 662911D01.	

3.1.2 Applicability of DFS Requirements Prior to Use of a Channel

Requirement	DFS 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

3.1.3 Applicability of DFS Requirements during Normal Operation

Requirement	DFS Operational mode		
	Master	Client without radar detection	Client with radar detection
DFS Detection Threshold	Yes	Not required	Yes
Channel Closing Transmission Time	Yes	Yes	Yes
Channel Move Time	Yes	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required	Yes

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.		

3.1.4 User Access Restrictions

User Access Restrictions
☒ DFS controls (hardware or software) related to radar detection are NOT accessible to the user. Manufacturer statement confirming that information regarding the parameters of the detected Radar Waveforms is not available to the end user.

3.1.5 Channel Loading/Data Streaming

☐	The data file (MPEG-4) has been transmitting in a streaming mode.
☒	Software to ping the client is permitted to simulate data transfer with random ping intervals.
☒	Minimum channel loading of approximately 17%.
☐	Unicast protocol has been used.

3.2 Radar Test Waveform Calibration

3.2.1 Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Trials
0	1	1428	18	See Note 1	See Note 1
1A	1	15 unique PRI in KDB 905462 D02 Table 5a	$Roundup\left\{\left(\frac{1}{360}\right)\times\left(\frac{19\times10^6}{PRI}\right)\right\}$	60%	15
1B	1	15 unique PRI within 518-3066, Excluding 1A PRI		60%	15
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

A minimum of 30 unique waveforms are required for each of the short pulse radar types 1 through 4. If more than 30 waveforms are used for short pulse radar types 1 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. The aggregate is the average of the percentage of successful detections of short pulse radar types 1-4.

3.2.2 Long Pulse Radar Test Waveform

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

Each waveform is defined as follows:

- The transmission period for the Long Pulse Radar test signal is 12 seconds.
- There are a total of 8 to 20 Bursts in the 12 second period, with the number of Bursts being randomly chosen. This number is Burst Count.
- Each Burst consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each Burst within the 12 second sequence may have a different number of pulses.
- The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a Burst will have the same pulse width. Pulses in different Bursts may have different pulse widths.
- Each pulse has a linear FM chirp between 5 and 20 MHz, with the chirp width being randomly chosen. Each pulse within a transmission period will have the same chirp width. The chirp is centered on the pulse. For

example, with a radar frequency of 5300 MHz and a 20 MHz chirped signal, the chirp starts at 5290 MHz and ends at 5310 MHz.

- If more than one pulse is present in a Burst, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a Burst, the time between the first and second pulses is chosen independently of the time between the second and third pulses.
- The 12 second transmission period is divided into even intervals. The number of intervals is equal to Burst Count. Each interval is of length (12,000,000 / Burst Count) microseconds. Each interval contains one Burst. The start time for the Burst, relative to the beginning of the interval, is between 1 and [(12,000,000 / Burst Count) – (Total Burst Length) + (One Random PRI Interval)] microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each Burst is chosen independently.

3.2.3 Frequency Hopping Radar Test Waveform

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

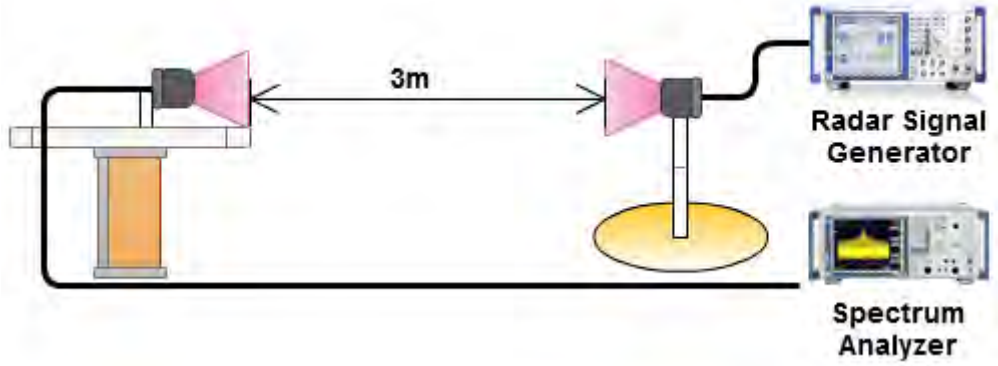
The FCC Type 6 waveform uses a static waveform with 100 bursts in the instruments ARB. In addition, the RF list mode is operated with a list containing 100 frequencies from a randomly generated list and it had be ensured that at least one of the random frequencies falls into the UNII Detection Bandwidth of the DUT. Each burst from the waveform file initiates a trigger pulse at the beginning that switches the RF list from one item to the next one.

3.2.4 DFS Threshold Level

DFS Threshold Level		
DFS Threshold level: -63 dBm	☐	at the antenna connector
	☒	in front of the antenna
The Interference **Radar Detection Threshold Level** is is *-64 dBm + 0 [dBi] + 1 dB* = -63 dBm. That had been been taken into account the output power range and antenna gain.		

3.2.5 Calibration Setup

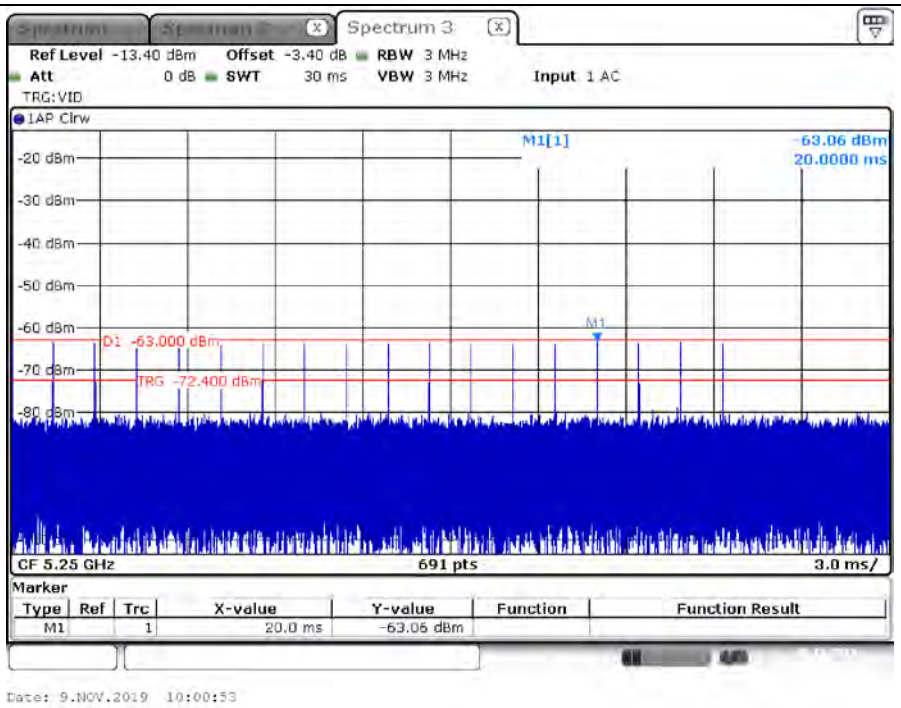
Master Radiated Calibration Setup



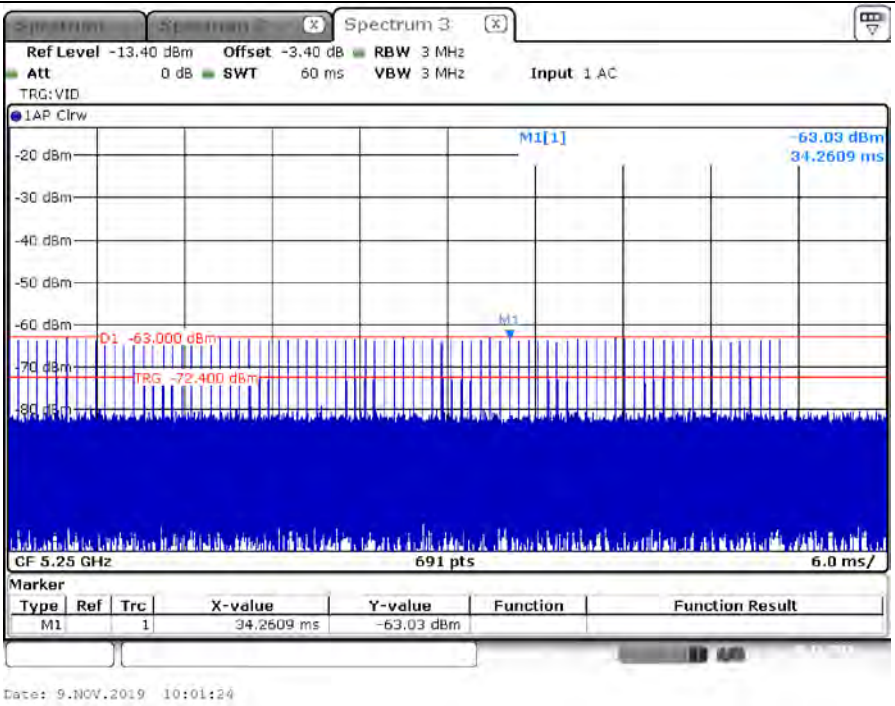
3.2.6 Radar Waveform calibration Plot

Test Frequency: 5250 MHz

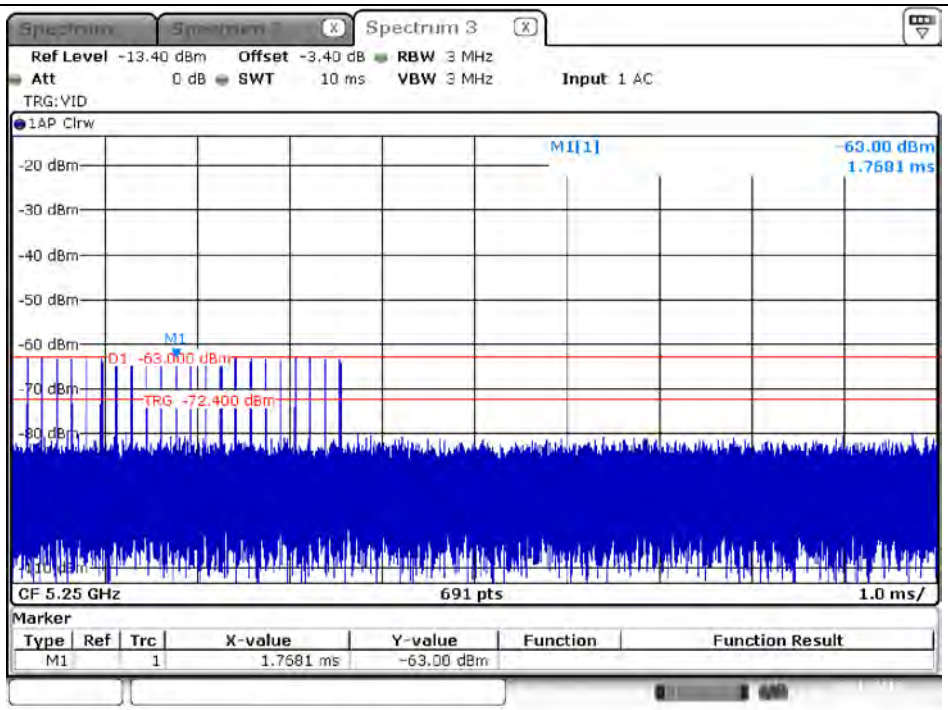
Radar #0 DFS detection threshold level



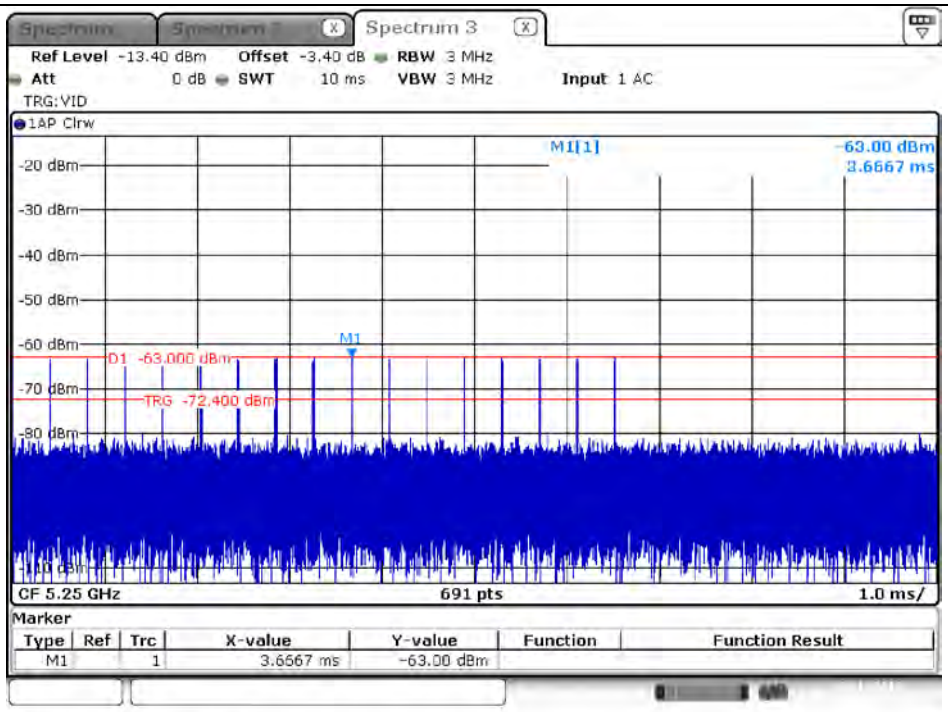
Radar #1 DFS detection threshold level



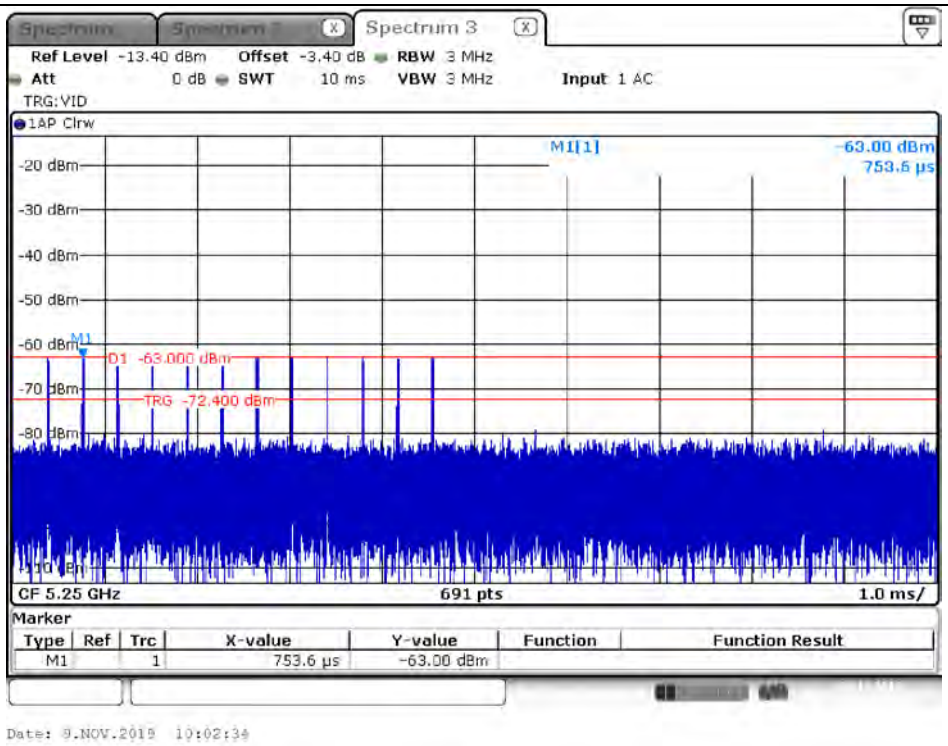
Radar #2 DFS detection threshold level



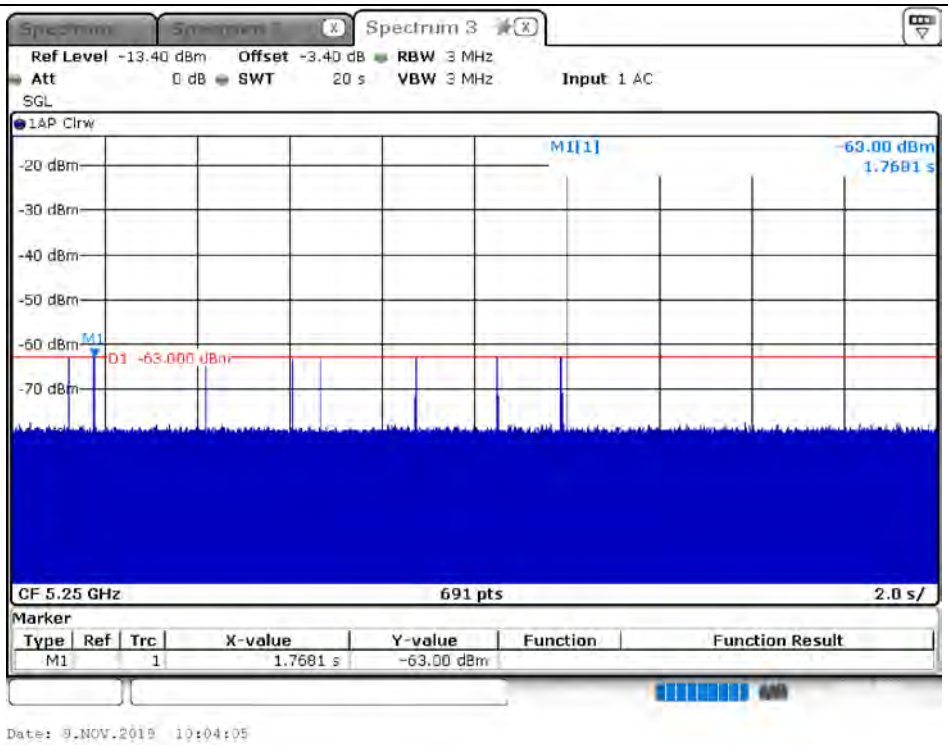
Radar #3 DFS detection threshold level



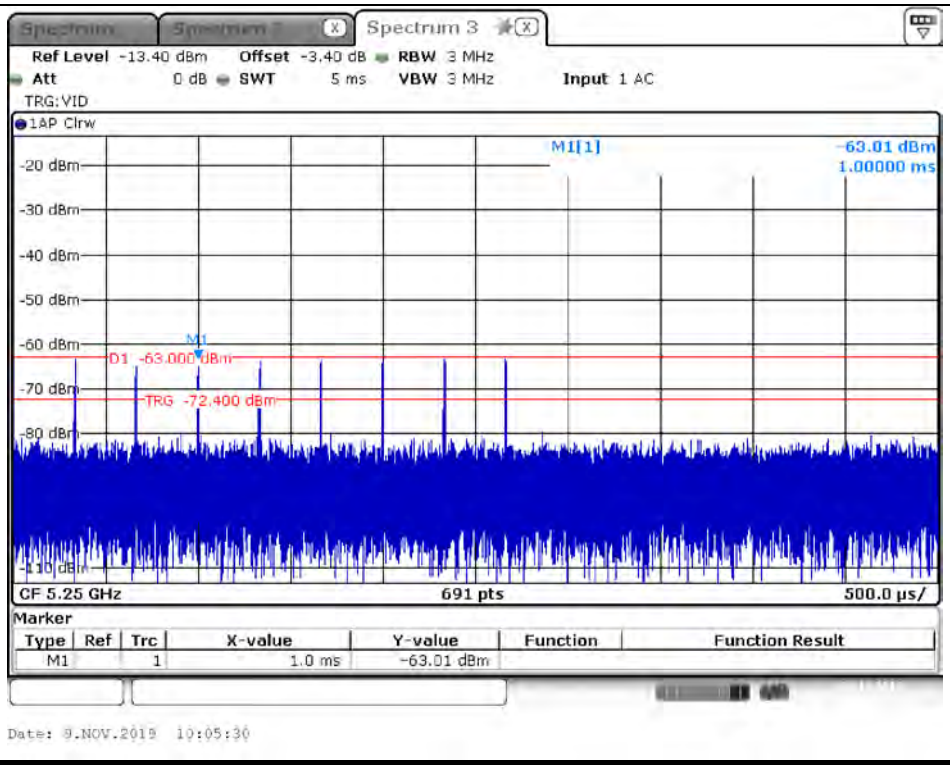
Radar #4 DFS detection threshold level



Radar #5 DFS detection threshold level



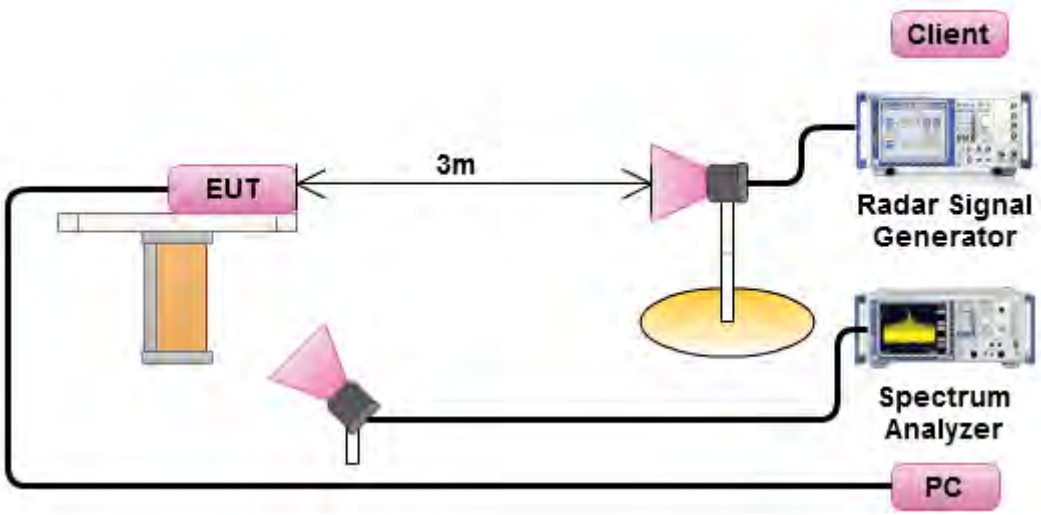
Radar #6 DFS detection threshold level



3.2.7 Test Setup

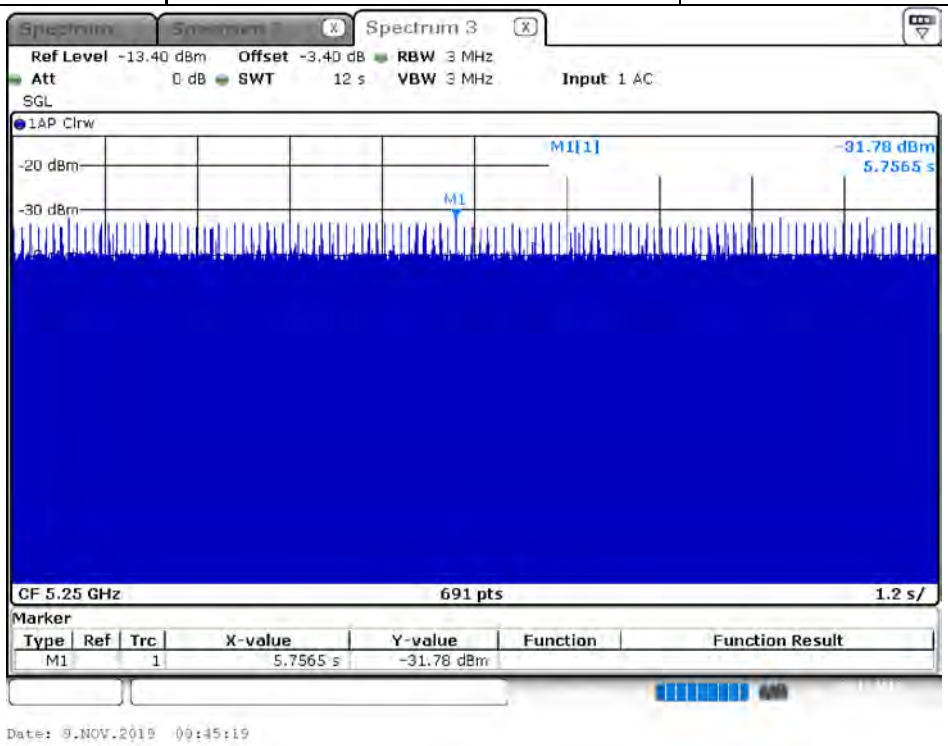
A spectrum analyzer is used as a monitor to verify that the EUT has vacated the Channel within the (Channel Closing Transmission Time and Channel Move Time, and does not transmit on a Channel during the Non-Occupancy Period after the detection and Channel move.

Master Radiated Measurement

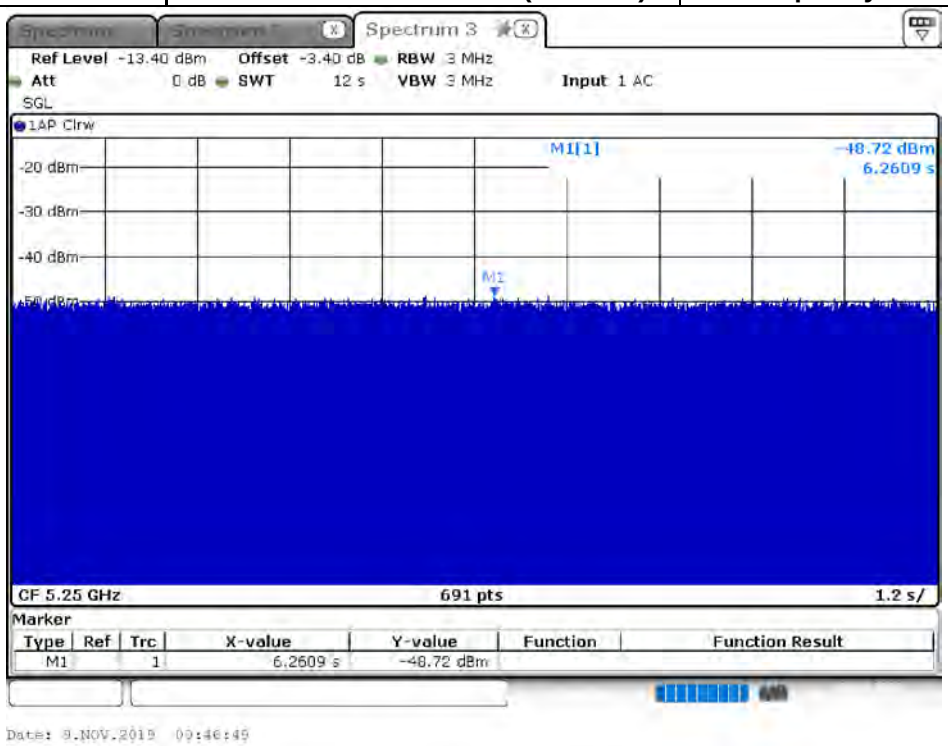


3.2.8 Data traffic Plot

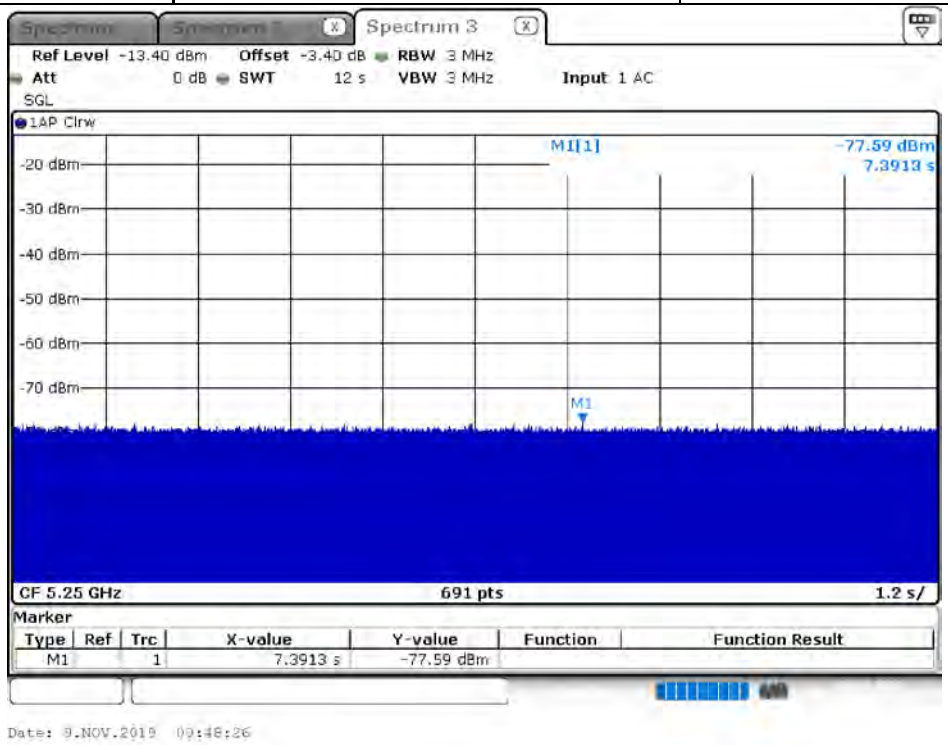
EUT Data traffic Plot	Modulation Mode: 802.11ax (HEW160)	Test Frequency: 5250 MHz



Client Data Traffic Plot	Modulation Mode: 802.11ax (HEW160)	Test Frequency: 5250 MHz



Without Data Traffic Plot	Modulation Mode: 802.11ax (HEW160)	Test Frequency: 5250 MHz



3.3 UNII Detection Bandwidth

3.3.1 UNII Detection Bandwidth Limit

Channel Bandwidth (MHz)	Frequency (MHz)	99% Occupied Bandwidth (MHz)	UNII Detection Bandwidth Min. Limit (MHz)
160	5250 MHz	78.148	79
UNII Detection Bandwidth is minimum 100% of the 99% power bandwidth. A single radar Burst is generated for a minimum of 10 trials, and the response of the UUT is noted. The UUT must detect the Radar Waveform 90% or more of the time.			

3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

Test Method
☒ During the U-NII Detection Bandwidth detection test, radar type 0 is used and for each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic. The EUT is set up as a standalone device (no associated Client and no traffic). The radar frequency is increased in 1 MHz steps, repeating the above test sequence, until the detection rate falls below 90%. The highest frequency at which detection is greater than or equal to 90% is denoted as F_H. The radar frequency is decreased in 1 MHz steps, repeating the above test sequence, until the detection rate falls below 90%. The lowest frequency at which detection is greater than or equal to 90% is denoted as F_L. UNII Detection Bandwidth = F_H - F_L.

3.3.4 Test Result of UNII Detection Bandwidth

EUT Frequency=5250 MHz											
Channel Bandwidth (MHz)	**160**										
Radar Frequency (MHz)	**DFS Detection Trials (1=Detection, 0= No Detection)**										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Detection Rate (%)**
5249	0	0	0	0	0	0	0	0	0	0	0
5250(FL)	1	1	1	0	1	1	1	1	1	1	90
5251	1	1	1	1	1	1	1	1	1	1	100
5252	1	1	1	1	1	1	1	1	1	1	100
5253	1	1	1	1	1	1	1	1	1	1	100
5254	1	1	1	1	1	1	1	1	1	1	100
5255	1	1	1	1	1	1	1	1	1	1	100
5260	1	1	1	1	1	1	1	1	1	1	100
5280	1	1	1	1	1	1	1	1	1	1	100
5281	1	1	1	1	1	1	1	1	1	1	100
5282	1	1	1	1	1	1	1	1	1	1	100
5283	1	1	1	1	1	1	1	1	1	1	100
5284	1	1	1	1	1	1	1	1	1	1	100
5285	1	1	1	1	1	1	1	1	1	1	100
5290	1	1	1	1	1	1	1	1	1	1	100
5291	1	1	1	1	1	1	1	1	1	1	100
5292	1	1	1	1	1	1	1	1	1	1	100
5293	1	1	1	1	1	1	1	1	1	1	100
5294	1	1	1	1	1	1	1	1	1	1	100
5295	1	1	1	1	1	1	1	1	1	1	100
5300	1	1	1	1	1	1	1	1	1	1	100
5320	1	1	1	1	1	1	1	1	1	1	100
5325	1	1	1	1	1	1	1	1	1	1	100
5326	1	1	1	1	1	1	1	1	1	1	100
5327	1	1	1	1	1	1	1	1	1	1	100
5328	1	1	1	1	1	1	1	1	1	1	100
5329(FH)	1	1	1	1	0	1	1	1	1	1	90
5330	0	0	0	0	0	0	0	0	0	0	0
Radar Type 0-Detection Bandwidth (MHz) = (FH-FL) = (5329MHz-5250MHz)=											79
UNII Detection Bandwidth Min. Limit (MHz) =											79
Test Result											**Complied**

3.4 In-service Monitoring

3.4.1 In-service Monitoring Limit

In-service Monitoring Limit	
Channel Move Time	10 sec
Channel Closing Transmission Time	200 ms + an aggregate of 60 ms over remaining 10 sec periods.
Non-occupancy period	Minimum 30 minutes

3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

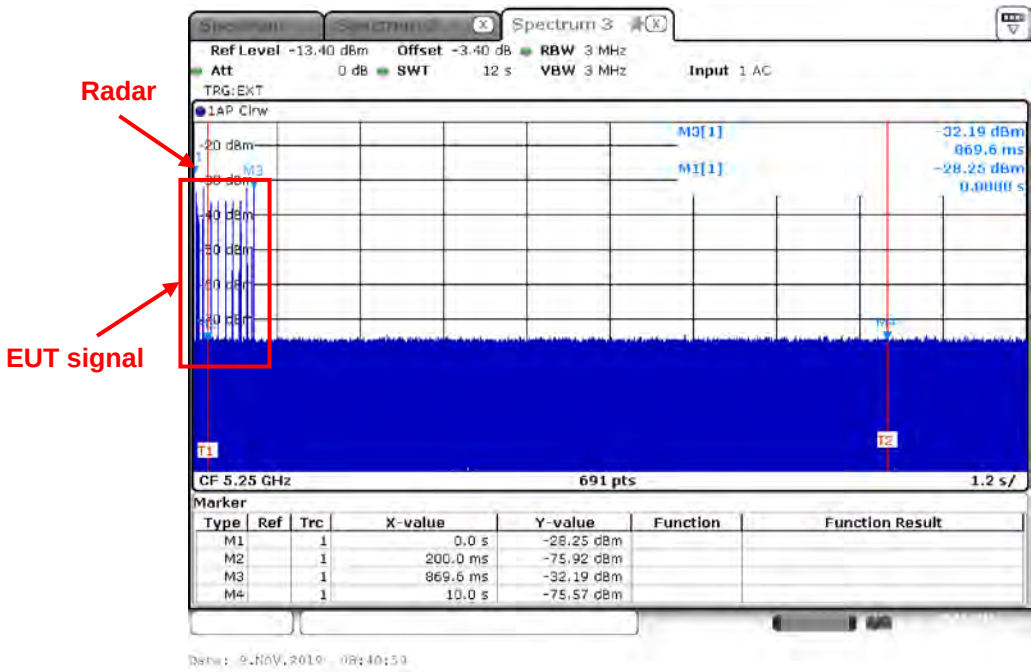
	Test Method
☒	Verified during In-Service Monitoring; Channel Closing Transmission Time, Channel Move Time. Client Device will associate with the EUT. Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel for duration greater than 10 seconds. Measure and record the transmissions from the EUT during the observation time (Channel Move Time). Compare the Channel Move Time and Channel Closing Transmission Time limits.
☒	Verified during In-Service Monitoring; Channel Closing Transmission Time, Channel Move Time. One 12 sec plot needs to be reported for the Short Pulse Radar Types 0. And zoom-in a 60 ms plot verified channel closing time for the aggregate transmission time starting from 200ms after the end of the radar signal to the completion of the channel move.
☒	Verified during In-Service Monitoring; Non-Occupancy Period. Client Device will associate with the EUT. Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel for duration greater than 10 seconds. Measure and record the transmissions from the EUT during the observation time (Non-Occupancy Period). Compare the Non-Occupancy Period limits.

3.4.4 Test Result of Channel Move Time

Modulation Mode: 802.11ax (HEW160)

Parameter	Test Result	Limit
	Type 0	
Test Channel (MHz)	5250 MHz	-
Channel Move Time (sec.)	0.869	< 10s

Modulation Mode	Freq.	Radar Type
802.11ax (HEW160)	5250 MHz	0



3.4.5 Test Result of Channel Closing Transmission Time

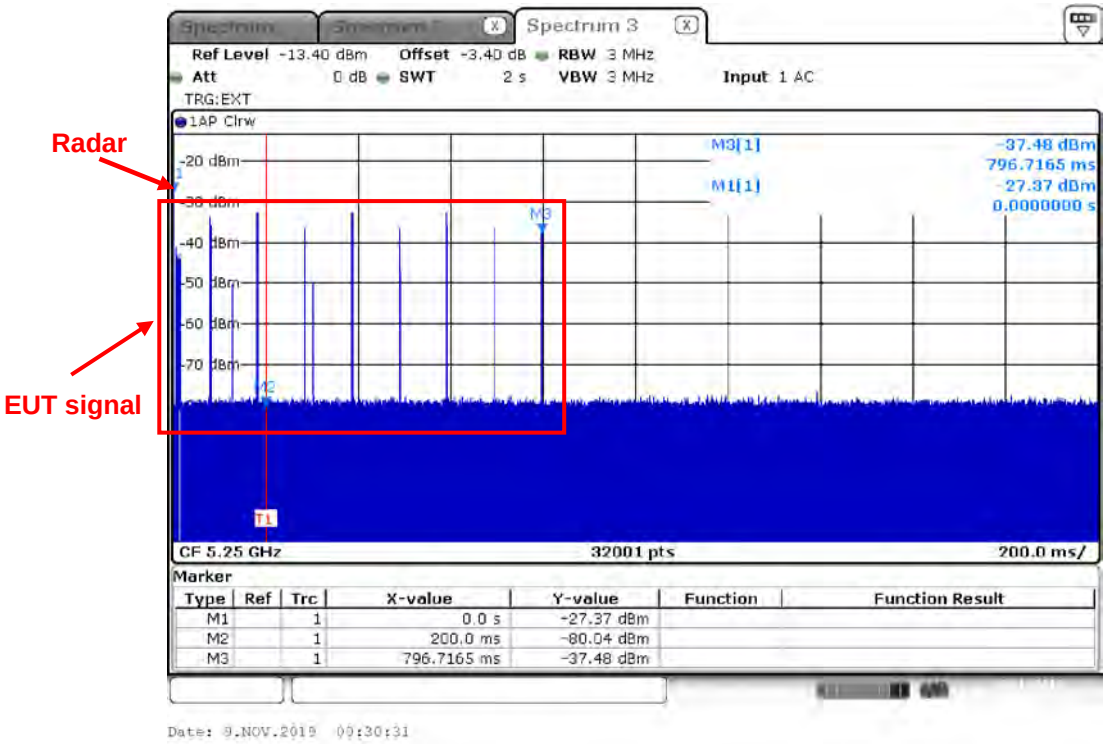
Modulation Mode: 802.11ax (HEW160)

Parameter	Test Result	Limit
	Type 0	
Test Channel (MHz)	5250 MHz	-
Channel Closing Transmission Time (ms) (Note)	24.63	＜ 60ms

Note: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 seconds period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Modulation Mode	Freq.	Radar Type
802.11ax (HEW160)	5250 MHz	0

Channel Closing Transmission Time is comprised of 200 ms starting at the beginning of the Channel Move Time plus 60ms additional intermittent control signals



Dwell is the dwell time per spectrum analyzer sampling bin.

S is the sweep time

B is the number of spectrum analyzer sampling bins

C is the intermittent control signals of Channel Closing Transmission Time

N is the number of spectrum analyzer sampling bins (intermittent control signals) showing a U-NII transmission

Dwell (0.0625 ms)= S (2000 ms) / B (32000)

C (24.63 ms) = N (394) X Dwell (6 ms)

3.5 Statistical Performance Check

3.5.1 Statistical Performance Check Limit

Radar Type	Minimum Percentage of Successful Detection (Pd)	Minimum Trials
1	60%	30
2	60%	30
3	60%	30
4	60%	30
Aggregate (Radar Types 1-4)	80%	120
5	80%	30
6	70%	30

The percentage of successful detection is calculated by:

$$\frac{TotalWaveformDetections}{TotalWaveformTrails} \times 100 = \text{Probability of Detection Radar Waveform}$$

In addition an aggregate minimum percentage of successful detection across all Short Pulse Radar Types 1-4 is required and is calculated as follows:

$$\frac{Pd1 + Pd2 + Pd3 + Pd4}{4}$$

3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

Test Method
☒ For Statistical Performance Check test. Demonstrating a minimum channel loading of approximately 17% or greater of the test. Observe the transmissions of the UUT at the end of the Burst on the Operating Channel for duration greater than 10 seconds for Short Pulse Radar Types 1-4 and 6 to ensure detection occurs. Then Observe the transmissions of the UUT 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.

3.5.4 Test Result of Statistical Performance Check

Modulation Mode: 802.11ax (HEW160)

Type 1 Radar Statistical Performance

Trial #	Test Freq. (MHz)	Pulse Repetition Frequency Number	Pulse Repetition Frequency (Pulse Per Second)	PRI (us)	1=Detection 0=No Detection
1	5296	1	1930.5	518	1
2	5274	23	326.2	3066	1
3	5291	19	1139.0	878	1
4	5319	12	1355.0	738	1
5	5268	4	1730.1	578	1
6	5261	8	1519.8	658	1
7	5270	15	1253.1	798	1
8	5290	6	1618.1	618	1
9	5262	14	1285.3	778	1
10	5290	3	1792.1	558	1
11	5303	13	1319.3	758	1
12	5265	9	1474.9	678	1
13	5252	7	1567.4	638	1
14	5297	17	1193.3	838	1
15	5287	10	1432.7	698	1
16	5307	-	1692.0	591	1
17	5257	-	328.1	3048	1
18	5266	-	373.4	2678	1
19	5304	-	574.4	1741	1
20	5305	-	1216.5	822	1
21	5323	-	801.3	1248	0
22	5287	-	488.5	2047	1
23	5252	-	956.0	1046	1
24	5281	-	517.6	1932	1
25	5275	-	1422.5	703	1
26	5251	-	542.0	1845	1
27	5271	-	741.3	1349	1
28	5299	-	881.8	1134	1
29	5323	-	427.4	2340	1
30	5307	-	628.9	1590	1
Detection Percentage (%)					96.667
Limit					60%
Test Result					**Complied**

Type 2 Radar Statistical Performance

Trial #	Test Freq. (MHz)	Pulse Width (us)	PRI (us)	Pulses / Burst	1=Detection 0=No Detection
1	5281	2.6	221	23	1
2	5277	4.6	198	27	1
3	5321	1.1	184	29	1
4	5305	4.8	203	24	0
5	5297	2.4	162	25	0
6	5299	3.4	204	28	1
7	5320	2.3	170	27	1
8	5295	3.5	184	23	0
9	5252	4.9	150	27	1
10	5267	4.6	211	29	1
11	5318	2.9	158	23	0
12	5310	2.6	226	27	1
13	5255	1.6	204	26	1
14	5285	3.9	181	25	1
15	5288	4.6	202	24	1
16	5275	4.1	194	27	0
17	5276	2.3	193	28	1
18	5322	3.9	173	29	0
19	5293	4.3	188	23	1
20	5301	1.5	215	26	1
21	5319	4.9	227	27	1
22	5265	1.1	199	23	1
23	5303	4.5	155	29	1
24	5284	4.0	190	27	1
25	5255	2.4	151	23	1
26	5315	2.5	180	28	1
27	5269	2.5	228	23	1
28	5257	2.5	203	25	1
29	5297	1.5	188	25	0
30	5311	1.9	217	24	1
Detection Percentage (%)					76.667
Limit					60%
Test Result					**Complied**

Type 3 Radar Statistical Performance

Trial #	Test Freq. (MHz)	Pulse Width (us)	PRI (us)	Pulses / Burst	1=Detection 0=No Detection
1	5324	8.0	205	16	1
2	5292	6.7	382	18	1
3	5324	8.6	418	16	1
4	5309	9.4	351	17	0
5	5325	7.4	383	18	1
6	5268	9.8	232	16	1
7	5303	9.1	377	17	0
8	5269	9.6	457	16	1
9	5295	8.0	471	18	1
10	5316	9.0	304	18	1
11	5322	8.0	316	17	1
12	5298	9.8	325	16	1
13	5300	8.0	409	17	1
14	5282	9.9	200	17	0
15	5325	8.8	458	16	1
16	5260	8.0	232	18	1
17	5283	8.3	250	16	1
18	5253	8.7	270	16	1
19	5282	7.7	350	17	0
20	5252	7.1	230	16	1
21	5316	7.3	416	18	1
22	5304	7.6	498	18	1
23	5325	7.3	286	17	1
24	5321	7.3	287	16	1
25	5255	7.5	462	17	0
26	5255	6.2	300	17	1
27	5277	6.4	323	18	1
28	5308	7.1	420	16	1
29	5314	7.2	395	18	1
30	5252	8.4	377	16	1
Detection Percentage (%)					83.333
Limit					60%
Test Result					**Complied**

Type 4 Radar Statistical Performance

Trial #	*Test Freq. (MHz)*	*Pulse Width (us)*	*PRI (us)*	*Pulses / Burst*	*1=Detection 0=No Detection*
1	5277	18.0	242	15	1
2	5251	19.9	279	12	0
3	5308	12.9	487	14	1
4	5254	15.0	452	13	0
5	5258	16.3	230	12	1
6	5305	19.8	238	13	0
7	5313	18.2	420	16	1
8	5277	16.3	452	15	0
9	5279	14.2	495	12	1
10	5314	17.8	228	16	1
11	5272	19.1	211	16	1
12	5267	18.4	283	15	1
13	5317	11.8	411	12	1
14	5295	14.2	284	13	0
15	5318	13.9	202	12	1
16	5299	17.8	340	14	1
17	5263	15.6	290	16	0
18	5268	14.6	250	16	1
19	5252	14.4	484	15	1
20	5260	18.9	387	13	1
21	5325	11.1	348	15	0
22	5272	13.8	291	16	1
23	5260	14.3	295	12	1
24	5266	12.5	300	12	0
25	5311	12.5	322	14	1
26	5284	12.5	383	13	0
27	5256	15.7	322	16	1
28	5282	19.8	469	13	1
29	5260	18.6	406	15	1
30	5312	15.9	238	14	1
Detection Percentage (%)					70.000
Limit					60%
Test Result					**Complied**

Total Type 1~4 Radar Statistical Performance

Radar Type #	Detection Percentage (%)
1	96.667
2	76.667
3	83.333
4	70.000
Aggregate (Radar Types 1-4)	81.667
Limit	80%
Test Result	**Complied**

Type 5 Radar Statistical Performance

Center Freq. (MHz)		High Edge (MHz)	VSG Freq. (MHz)	Detection
5250		5329		
Trial	Chirp	Offset		
1	5	2	5327	1
2	20	8	5321	1
3	7	2.8	5326	1
4	8	3.2	5326	1
5	9	3.6	5325	1
6	10	4	5325	1
7	11	4.4	5325	1
8	12	4.8	5324	1
9	13	5.2	5324	1
10	14	5.6	5323	1
11	15	6	5323	1
12	16	6.4	5323	1
13	17	6.8	5322	1
14	20	8	5321	1
15	19	7.6	5321	1
16	18	7.2	5322	1
17	17	6.8	5322	1
18	16	6.4	5323	1
19	15	6	5323	1
20	14	5.6	5323	1
21	13	5.2	5324	1
22	12	4.8	5324	1
23	11	4.4	5325	1
24	10	4	5325	1
25	9	3.6	5325	1
26	8	3.2	5326	1
27	18	7.2	5322	1
28	19	7.6	5321	1
29	20	8	5321	1
30	5	2	5327	1
Total				30
Detection Percentage (%)				100%
Limit				80%
Test Result				**Complied**

Trial Number			1			
Number of Bursts in Trial			8			
Chirp Center Frequency			5327			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	1	62.1	5	-	-	1091
2	2	56	5	1729	-	133
3	2	91.3	5	1230	-	1057
4	3	50.7	5	1762	1616	1442
5	2	92.6	5	1723	-	544
6	2	87.3	5	1302	-	1089
7	2	59.5	5	1291	-	1374
8	2	52.2	5	1653	-	1237
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			2			
Number of Bursts in Trial			9			
Chirp Center Frequency			5321			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	3	90	20	1007	1326	30
2	2	73.7	20	1785	-	979
3	1	78.1	20	-	-	683
4	2	92.4	20	1281	-	950
5	1	61.2	20	-	-	612
6	3	67.2	20	1525	1870	17
7	1	78.5	20	-	-	429
8	2	60.3	20	1931	-	936
9	3	92.9	20	1403	1476	548
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			3			
Number of Bursts in Trial			10			
Chirp Center Frequency			5326.2			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	3	63.4	7	1574	1607	801
2	1	98	7	-	-	966
3	1	58.7	7	-	-	185
4	1	88	7	-	-	1012
5	3	79.5	7	1562	1370	943
6	3	57.1	7	1900	1188	686
7	2	64.4	7	1090	-	599
8	1	78.7	7	-	-	1089
9	1	69.3	7	-	-	188
10	3	55.3	7	1375	1691	933
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			4			
Number of Bursts in Trial			11			
Chirp Center Frequency			5325.8			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	2	74.3	8	1642	-	24
2	1	83.1	8	-	-	985
3	2	59.5	8	1680	-	988
4	2	59.8	8	1786	-	800
5	2	77.6	8	1617	-	339
6	2	79.9	8	1553	-	1040
7	1	56	8	-	-	544
8	3	71.4	8	1406	1927	452
9	1	97.4	8	-	-	204
10	2	98.3	8	1037	-	926
11	1	63.6	8	-	-	1052
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			5			
Number of Bursts in Trial			12			
Chirp Center Frequency			5325.4			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	1	50	9	-	-	557
2	2	62.5	9	1731	-	567
3	2	55.4	9	1070	-	460
4	1	65.7	9	-	-	4
5	2	58	9	1512	-	64
6	2	60.9	9	1230	-	650
7	3	89.6	9	1598	1738	235
8	3	84.4	9	1271	1617	873
9	3	72.3	9	1498	1321	901
10	1	58.9	9	-	-	663
11	2	74.8	9	1584	-	919
12	1	71.8	9	-	-	375
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			6			
Number of Bursts in Trial			13			
Chirp Center Frequency			5325			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	2	88.1	10	1257	-	846
2	1	58.7	10	-	-	725
3	2	97.1	10	1037	-	30
4	3	83.1	10	1029	1106	490
5	1	62.1	10	-	-	262
6	2	71.4	10	1058	-	283
7	2	86.3	10	1867	-	49
8	3	77.3	10	1418	1876	634
9	1	78.9	10	-	-	304
10	3	79.2	10	1055	1572	564
11	3	52	10	1582	1836	852
12	3	56.5	10	1195	1542	525
13	3	100	10	1638	1729	750
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			7			
Number of Bursts in Trial			14			
Chirp Center Frequency			5324.6			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	2	92.7	11	1208	-	231
2	2	81.3	11	1144	-	804
3	2	60.4	11	1555	-	34
4	2	62.1	11	1320	-	427
5	1	50	11	-	-	577
6	3	65.9	11	1020	1365	3
7	2	73.8	11	1308	-	51
8	2	74.3	11	1143	-	360
9	1	62.9	11	-	-	394
10	2	74.8	11	1404	-	317
11	2	69.7	11	1309	-	532
12	2	69.8	11	1688	-	339
13	2	77.4	11	1857	-	381
14	1	55.1	11	-	-	426
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			8			
Number of Bursts in Trial			15			
Chirp Center Frequency			5324.2			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	1	91.7	12	-	-	776
2	2	90	12	1196	-	187
3	3	92.3	12	1486	1853	448
4	2	66.8	12	1545	-	702
5	1	64	12	-	-	403
6	3	95.4	12	1123	1473	230
7	3	66.8	12	1867	1401	604
8	3	67.7	12	1472	1397	38
9	1	68.2	12	-	-	735
10	2	82.2	12	1297	-	610
11	1	92.1	12	-	-	618
12	2	57	12	1764	-	705
13	2	58.5	12	1310	-	22
14	3	85.5	12	1630	1447	641
15	2	82.2	12	1371	-	109
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			9			
Number of Bursts in Trial			16			
Chirp Center Frequency			5323.8			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	2	74.4	13	1707	-	442
2	2	63.6	13	1725	-	280
3	2	71.3	13	1704	-	459
4	3	77.6	13	1063	1405	197
5	3	65.2	13	1731	1294	101
6	3	55.1	13	1109	1549	17
7	2	96.8	13	1034	-	131
8	3	80.8	13	1533	1051	365
9	1	60.4	13	-	-	222
10	2	61.8	13	1312	-	371
11	2	71.3	13	1657	-	33
12	2	98.1	13	1024	-	291
13	1	57.9	13	-	-	188
14	1	91.8	13	-	-	163
15	2	56.7	13	1259	-	426
16	2	89.7	13	1690	-	606
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			10			
Number of Bursts in Trial			17			
Chirp Center Frequency			5323.4			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	2	74.4	14	1107	-	462
2	1	87.6	14	-	-	653
3	2	61.7	14	1741	-	457
4	2	57.5	14	1566	-	388
5	2	66.1	14	1855	-	63
6	3	70.1	14	1044	1012	136
7	1	66.4	14	-	-	343
8	1	59.2	14	-	-	349
9	2	88.3	14	1240	-	362
10	1	64.7	14	-	-	221
11	2	73	14	1703	-	144
12	2	81.7	14	1450	-	671
13	3	70.1	14	1741	1278	320
14	1	63.6	14	-	-	196
15	1	58.7	14	-	-	413
16	2	65.9	14	1478	-	170
17	1	72.7	14	-	-	564
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			11			
Number of Bursts in Trial			18			
Chirp Center Frequency			5323			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	2	72.1	15	1193	-	130
2	3	76.3	15	1484	1390	114
3	1	86.1	15	-	-	14
4	1	73.2	15	-	-	604
5	1	81.2	15	-	-	548
6	2	99.5	15	1398	-	173
7	1	93.9	15	-	-	262
8	2	75.9	15	1921	-	38
9	3	79.2	15	1100	1429	84
10	3	77	15	1166	1799	610
11	1	91.8	15	-	-	339
12	3	56.8	15	1330	1556	580
13	2	83.1	15	1556	-	295
14	2	63	15	1552	-	156
15	1	65.7	15	-	-	439
16	1	64.5	15	-	-	188
17	1	88.5	15	-	-	419
18	1	60.6	15	-	-	205
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			12			
Number of Bursts in Trial			19			
Chirp Center Frequency			5323			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	2	90.5	16	1299	-	381
2	2	88.4	16	1418	-	327
3	2	53.7	16	1055	-	536
4	1	80.5	16	-	-	285
5	1	50.4	16	-	-	398
6	2	61.2	16	1749	-	439
7	2	78.8	16	1065	-	129
8	3	75	16	1748	1820	325
9	2	96.7	16	1254	-	440
10	3	76.3	16	1848	1106	397
11	1	73.3	16	-	-	232
12	2	92.4	16	1317	-	91
13	2	92.4	16	1854	-	256
14	3	64.4	16	1240	1634	582
15	2	67.3	16	1473	-	117
16	2	84.1	16	1795	-	202
17	1	80.9	16	-	-	135
18	1	74.6	16	-	-	396
19	2	97.6	16	1805	-	615
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			13			
Number of Bursts in Trial			20			
Chirp Center Frequency			5322			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	2	66.1	17	1417	-	388
2	2	86.7	17	1693	-	348
3	2	70.5	17	1263	-	215
4	2	78	17	1446	-	28
5	2	66	17	1185	-	585
6	2	80.6	17	1855	-	65
7	1	95.5	17	-	-	92
8	1	98.8	17	-	-	68
9	3	64.3	17	1641	1108	517
10	1	75.1	17	-	-	121
11	2	72.6	17	1499	-	448
12	1	60.3	17	-	-	567
13	2	54.9	17	1056	-	245
14	2	98.8	17	1023	-	584
15	2	60.9	17	1243	-	579
16	2	62.7	17	1226	-	464
17	1	80.1	17	-	-	89
18	2	70.9	17	1711	-	153
19	1	90.7	17	-	-	282
20	1	98.9	17	-	-	71
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			14			
Number of Bursts in Trial			8			
Chirp Center Frequency			5321			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	2	67.5	20	1542	-	947
2	3	83.6	20	1272	1696	124
3	2	93.2	20	1877	-	701
4	1	55.6	20	-	-	1123
5	3	84.2	20	1733	1619	756
6	3	69.1	20	1612	1071	1
7	2	66.9	20	1905	-	7
8	3	86.8	20	1697	1621	1082
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			15			
Number of Bursts in Trial			9			
Chirp Center Frequency			5321			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	2	62.2	19	1571	-	949
2	2	85	19	1669	-	189
3	2	64.5	19	1505	-	176
4	2	50.4	19	1325	-	538
5	2	66.1	19	1483	-	908
6	2	71.2	19	1110	-	1017
7	3	53.7	19	1445	1677	492
8	3	62.5	19	1596	1341	349
9	3	62	19	1929	1221	1105
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			16			
Number of Bursts in Trial			10			
Chirp Center Frequency			5322			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	2	80.5	18	1910	-	284
2	2	64.2	18	1661	-	751
3	2	90.1	18	1041	-	491
4	2	69.8	18	1495	-	107
5	1	73.1	18	-	-	490
6	3	77.2	18	1418	1145	1155
7	3	52.6	18	1732	1787	772
8	2	71.4	18	1562	-	121
9	2	89.8	18	1491	-	89
10	2	76.4	18	1355	-	615
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			17			
Number of Bursts in Trial			11			
Chirp Center Frequency			5322			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	2	51.2	17	1236	-	740
2	1	71.7	17	-	-	941
3	2	74.7	17	1164	-	370
4	2	50.9	17	1919	-	371
5	2	65.2	17	1206	-	1033
6	2	98	17	1182	-	346
7	2	58.7	17	1612	-	639
8	1	63.8	17	-	-	1056
9	3	86.3	17	1545	1065	205
10	1	94.4	17	-	-	753
11	3	88.5	17	1699	1319	58
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			18			
Number of Bursts in Trial			12			
Chirp Center Frequency			5323			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	2	88.7	16	1405	-	448
2	3	90.2	16	1544	1235	621
3	1	96.5	16	-	-	512
4	2	80.5	16	1090	-	321
5	2	63.7	16	1268	-	798
6	1	53.4	16	-	-	809
7	2	52.3	16	1043	-	301
8	3	54.7	16	1701	1104	796
9	3	75.6	16	1923	1729	669
10	2	59.2	16	1244	-	369
11	1	56.3	16	-	-	51
12	2	87.8	16	1608	-	733
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			19			
Number of Bursts in Trial			13			
Chirp Center Frequency			5323			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	2	68.2	15	1104	-	229
2	2	58.4	15	1627	-	488
3	3	74.7	15	1861	1015	137
4	2	58.2	15	1593	-	520
5	1	51.6	15	-	-	799
6	2	94.7	15	1469	-	43
7	2	70.7	15	1091	-	126
8	2	82.9	15	1472	-	607
9	3	62.7	15	1168	1453	527
10	2	63.1	15	1529	-	143
11	1	96.1	15	-	-	176
12	2	57	15	1457	-	882
13	3	95.6	15	1707	1501	214
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			20			
Number of Bursts in Trial			14			
Chirp Center Frequency			5323			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	1	95.7	14	-	-	117
2	1	93.1	14	-	-	720
3	1	55.8	14	-	-	297
4	1	76.7	14	-	-	284
5	2	68	14	1686	-	472
6	3	94.1	14	1796	1393	264
7	2	53.9	14	1293	-	525
8	1	99.3	14	-	-	155
9	2	73.3	14	1458	-	65
10	2	93.3	14	1196	-	451
11	3	55.8	14	1895	1034	243
12	1	66.4	14	-	-	228
13	2	65.6	14	1732	-	746
14	2	76.5	14	1187	-	522
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			21			
Number of Bursts in Trial			15			
Chirp Center Frequency			5324			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	1	85.1	13	-	-	565
2	2	72.5	13	1648	-	211
3	1	67.5	13	-	-	348
4	2	56.1	13	1360	-	156
5	1	71.1	13	-	-	718
6	2	93.1	13	1391	-	400
7	1	56.5	13	-	-	482
8	1	63.8	13	-	-	703
9	2	67.4	13	1727	-	780
10	1	52.3	13	-	-	102
11	3	62.4	13	1228	1715	304
12	2	53.3	13	1630	-	57
13	2	83.1	13	1205	-	768
14	2	93.7	13	1085	-	461
15	2	90.7	13	1297	-	746
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			22			
Number of Bursts in Trial			16			
Chirp Center Frequency			5324			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	2	98.8	12	1439	-	95
2	1	54.5	12	-	-	676
3	2	80.5	12	1360	-	8
4	2	55.9	12	1906	-	373
5	2	72.1	12	1623	-	254
6	2	84.4	12	1604	-	480
7	1	78.5	12	-	-	663
8	1	88	12	-	-	314
9	2	74.7	12	1157	-	596
10	2	97.1	12	1673	-	264
11	1	81.6	12	-	-	740
12	1	83.6	12	-	-	163
13	3	87.6	12	1757	1322	628
14	2	58.5	12	1372	-	132
15	3	91.8	12	1767	1183	106
16	2	58.8	12	1432	-	659
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			23			
Number of Bursts in Trial			17			
Chirp Center Frequency			5325			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	1	96	11	-	-	284
2	2	92.5	11	1241	-	488
3	2	89.5	11	1347	-	76
4	2	74.8	11	1607	-	688
5	2	60.6	11	1523	-	28
6	2	71.5	11	1659	-	383
7	2	71.1	11	1454	-	182
8	1	98.7	11	-	-	20
9	2	85.1	11	1770	-	576
10	2	89.2	11	1086	-	410
11	2	60.7	11	1101	-	458
12	2	75.2	11	1719	-	348
13	2	75.7	11	1799	-	481
14	3	56.7	11	1132	1884	587
15	2	65	11	1885	-	480
16	2	64.6	11	1910	-	195
17	3	69.9	11	1410	1190	396
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			24			
Number of Bursts in Trial			18			
Chirp Center Frequency			5325			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	3	83.8	10	1290	1021	536
2	2	66.9	10	1112	-	44
3	3	91	10	1220	1504	611
4	2	86.1	10	1678	-	456
5	3	65.5	10	1928	1222	330
6	1	62.6	10	-	-	297
7	3	68.7	10	1505	1200	351
8	3	59.2	10	1452	1114	230
9	1	73.9	10	-	-	222
10	1	77.2	10	-	-	57
11	2	96.4	10	1357	-	399
12	2	99.9	10	1173	-	299
13	2	99.9	10	1520	-	464
14	1	86.7	10	-	-	294
15	1	92.6	10	-	-	653
16	1	77.1	10	-	-	550
17	2	81.1	10	1664	-	566
18	3	68.4	10	1536	1309	580
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			25			
Number of Bursts in Trial			19			
Chirp Center Frequency			5325			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	3	68.2	9	1723	1868	471
2	3	83.7	9	1711	1405	368
3	2	69.7	9	1781	-	425
4	1	59.7	9	-	-	440
5	2	96.7	9	1484	-	123
6	2	95.8	9	1319	-	261
7	3	71.3	9	1095	1354	332
8	3	53.2	9	1527	1427	427
9	2	69.5	9	1771	-	397
10	3	63.9	9	1075	1447	67
11	2	93.4	9	1783	-	174
12	2	77.3	9	1564	-	17
13	2	73.1	9	1294	-	216
14	1	77.4	9	-	-	292
15	3	57.2	9	1722	1886	619
16	2	68.7	9	1629	-	233
17	1	60.8	9	-	-	226
18	3	69.7	9	1128	1224	599
19	1	62.2	9	-	-	433
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			26			
Number of Bursts in Trial			20			
Chirp Center Frequency			5326			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	1	80.5	8	-	-	90
2	3	62.6	8	1406	1343	319
3	3	85.6	8	1190	1529	384
4	2	83.9	8	1208	-	567
5	2	92.4	8	1488	-	234
6	2	54	8	1529	-	535
7	3	81.3	8	1501	1812	325
8	1	98.5	8	-	-	532
9	1	85.8	8	-	-	272
10	2	84.7	8	1593	-	182
11	2	83.3	8	1705	-	134
12	2	79.8	8	1567	-	286
13	1	77.9	8	-	-	368
14	3	98.4	8	1510	1569	290
15	2	79.9	8	1588	-	231
16	3	78	8	1140	1353	353
17	3	55.2	8	1700	1327	53
18	3	71.9	8	1081	1224	44
19	1	62	8	-	-	298
20	3	70.5	8	1888	1442	529
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			27			
Number of Bursts in Trial			8			
Chirp Center Frequency			5322			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	2	69.1	18	1076	-	1436
2	2	62.1	18	1688	-	22
3	2	94.8	18	1891	-	897
4	1	75.8	18	-	-	1186
5	2	65.4	18	1713	-	589
6	2	97.7	18	1292	-	614
7	3	98.1	18	1670	1711	506
8	2	85.4	18	1672	-	776
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			28			
Number of Bursts in Trial			9			
Chirp Center Frequency			5321			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	3	82	19	1233	1713	679
2	3	87.7	19	1554	1123	473
3	2	98.9	19	1518	-	869
4	1	55	19	-	-	719
5	1	93.6	19	-	-	902
6	2	58.7	19	1641	-	1243
7	2	88.7	19	1387	-	410
8	1	60.3	19	-	-	1154
9	1	97.7	19	-	-	512
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			29			
Number of Bursts in Trial			10			
Chirp Center Frequency			5321			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	1	69.6	20	-	-	1131
2	1	74.5	20	-	-	290
3	1	60.9	20	-	-	895
4	1	74.6	20	-	-	202
5	2	99.3	20	1501	-	139
6	2	95.3	20	1065	-	854
7	2	91.9	20	1722	-	219
8	2	51	20	1285	-	57
9	2	87.7	20	1747	-	141
10	1	87.2	20	-	-	596
Detection Check (1=Detection; 0=No Detection)						1

Trial Number			30			
Number of Bursts in Trial			11			
Chirp Center Frequency			5327			
Burst	No. of Pulses	Pulse Width (us)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (us)	Pulse 2-to-3 Spacing (us)	Starting Location Within Interval (ms)
1	3	59.9	5	1901	1196	935
2	2	77.1	5	1590	-	1038
3	2	62.7	5	1227	-	690
4	1	77.1	5	-	-	547
5	3	99.8	5	1798	1790	551
6	2	61.5	5	1135	-	876
7	2	77.5	5	1583	-	448
8	2	57.3	5	1890	-	736
9	2	53.5	5	1757	-	362
10	1	66.6	5	-	-	836
11	3	80.7	5	1811	1289	410
Detection Check (1=Detection; 0=No Detection)						1

Type 6 Radar Statistical Performance

Trial #	Test Freq. (MHz)	Pulses / Hop	Pulse Width (us)	PRI (us)	1=Detection 0=No Detection
1	5250	9	1	333	1
2	5250	9	1	333	1
3	5250	9	1	333	1
4	5250	9	1	333	1
5	5250	9	1	333	1
6	5250	9	1	333	1
7	5250	9	1	333	1
8	5250	9	1	333	1
9	5250	9	1	333	1
10	5250	9	1	333	1
11	5250	9	1	333	1
12	5250	9	1	333	1
13	5250	9	1	333	1
14	5250	9	1	333	1
15	5250	9	1	333	1
16	5250	9	1	333	1
17	5250	9	1	333	1
18	5250	9	1	333	1
19	5250	9	1	333	1
20	5250	9	1	333	1
21	5250	9	1	333	1
22	5250	9	1	333	1
23	5250	9	1	333	1
24	5250	9	1	333	1
25	5250	9	1	333	1
26	5250	9	1	333	1
27	5250	9	1	333	1
28	5250	9	1	333	1
29	5250	9	1	333	1
30	5250	9	1	333	1
Detection Percentage (%)					100.000
Limit					70%
Test Result					**Complied**

4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101026	9kHz~40GHz	Oct. 03, 2019	Oct. 02, 2020	Radiated (DF01-CB)
Vector Signal generator	R&S	SMU200A	102782	100kHz-6GHz	Jan. 16, 2019	Jan. 15, 2020	Radiated (DF01-CB)
Horn Antenna	COM-POWER	AH-118	071187	1GHz – 18GHz	Jul. 02, 2019	Jul. 01, 2020	Radiated (DF01-CB)
Horn Antenna	COM-POWER	AH-118	071042	1GHz – 18GHz	Dec. 24, 2018	Dec. 23, 2019	Radiated (DF01-CB)
RF Power Divider	ANAREN	2 Way	DFS-01-DV-02	1GHz ~ 6GHz	Oct. 07, 2019	Oct. 06, 2020	Radiated (DF01-CB)
RF Power Divider	MTJ	2 Way	DFS-01-DV-03	1GHz ~ 6GHz	Oct. 07, 2019	Oct. 06, 2020	Radiated (DF01-CB)
RF Power Divider	ANAREN	4 Way	DFS-01-DV-01	1GHz ~ 6GHz	Oct. 07, 2019	Oct. 06, 2020	Radiated (DF01-CB)
RF Cable-high	Woken	RG402	High Cable-57	1 GHz –18 GHz	Oct. 07, 2019	Oct. 06, 2020	Radiated (DF01-CB)
RF Cable-high	Woken	RG402	High Cable-58	1 GHz –18 GHz	Oct. 07, 2019	Oct. 06, 2020	Radiated (DF01-CB)

Note: Calibration Interval of instruments listed above is one year.

5 Measurement Uncertainty

Test Items	Uncertainty	Remark
Radiated Emission	3.4 dB	Confidence levels of 95%