Dynamic Frequency Selection (DFS) Test Report

AIR-AP1840I-B-K9, AIR-AP1840I-A-K9

FCC ID: LDKSKMAA2017
IC: 2461N-SKMAA2017

5250-5350, 5470-5725 MHz

Against the following Specifications:

CFR47 Part 15.407

RSS-247 Issue 2 Section 6.3

ACCREDITED

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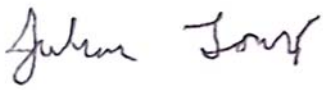
	
Author: Julian Land **Tested By:** Julian Land	**Approved By:** Gerard Thorpe **Title:** Compliance Manager **Revision:** 1.2

This report replaces any previously entered test report under EDCS – 18128852**.** This test report has been electronically authorized and archived using the CISCO Engineering Document Control system. Test Report Template EDCS# 1537616

Section 1: Overview

Samples were assessed against the tests detailed in section 3 under the requirements of the following specifications:

Specifications:
15.407 RSS-247 Issue 2 Section 6.3

Measurements were made in accordance with

1. KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02

Section 2: Assessment Information

2.1 General

This report contains an assessment of an apparatus against Radio Standards based upon tests carried out on the samples submitted. The testing was performed by and for the use of Cisco systems Inc:

With regard to this assessment, the following points should be noted:

a) The results contained in this report relate only to the items tested and were obtained in the period between the date of the initial assessment and the date of issue of the report. Manufactured products will not necessarily give identical results due to production and measurement tolerances.

b) The apparatus was set up and exercised using the configuration and modes of operation defined in this report only.

c) Where relevant, the apparatus was only assessed using the susceptibility criteria defined in this report and the Test Assessment Plan (TAP).

d) All testing was performed under the following environmental conditions:

Temperature	15°C to 35°C (54°F to 95°F)
Atmospheric Pressure	860mbar to 1060mbar (25.4" to 31.3")
Humidity	10% to 75*%

All AC testing was performed at one or more of the following supply voltages:
110V 60 Hz (+/-20%)

Units of Measurement

The units of measurements defined in the appendices are reported in specific terms, which are test dependent. Where radiated measurements are concerned these are defined at a particular distance. Basic voltage measurements are defined in units of [dBuV]

As an example, the basic calculation for all measurements is as follows:

Emission level [dBuV] = Indicated voltage level [dBuV] + Cable Loss [dB] + Other correction factors [dB]

The combinations of correction factors are dependent upon the exact test configurations [see test equipment lists for further details] and may include:-

Antenna Factors, Pre Amplifier Gain, LISN Loss, Pulse Limiter Loss and Filter Insertion Loss..

Note: to convert the results from dBuV/m to uV/m use the following formula:-

Level in uV/m = Common Antilogarithm [(X dBuV/m)/20] = Y uV/m

Measurement Uncertainty Values

voltage and power measurements	± 2 dB
conducted EIRP measurements	± 1.4 dB
radiated measurements	± 3.2 dB
frequency measurements	± 2.4 10-7
temperature measurements	± 0.54º.
humidity measurements	± 2.3%
DC and low frequency measurements	± 2.5%.

Where relevant measurement uncertainty levels have been estimated for tests performed on the apparatus. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Radiated emissions (expanded uncertainty, confidence interval 95%)

30 MHz - 300 MHz	+/- 3.8 dB
300 MHz - 1000 MHz	+/- 4.3 dB
1 GHz - 10 GHz	+/- 4.0 dB
10 GHz - 18GHz	+/- 8.2 dB
18GHz - 26.5GHz	+/- 4.1 dB
26.5GHz - 40GHz	+/- 3.9 dB

Conducted emissions (expanded uncertainty, confidence interval 95%)

30 MHz – 40GHz	+/- 0.38 dB

A product is considered to comply with a requirement if the nominal measured value is below the limit line. The product is considered to not be in compliance in case the nominal measured value is above the limit line.

2.2 Date of testing (initial sample receipt date to last date of testing)

6-Aug-2019 – 14 Aug 2019

2.3 Report Issue Date

Cisco uses an electronic system to issue, store and control the revision of test reports. This system is called the Engineering Document Control System (EDCS). The actual report issue date is embedded into the original file on EDCS. Any copies of this report, either electronic or paper, that are not on EDCS must be considered uncontrolled

2.4 Testing facilities

This assessment was performed by:

Testing Laboratory

Cisco Systems, Inc.
125 West Tasman Drive (Building P)
San Jose, CA 95134
USA

Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134
USA

Registration Numbers for ISED (Innovation, Science and Economic Development Canada)

Cisco System Site	Address	Site Identifier
Building P, 10m Chamber	125 West Tasman Dr San Jose, CA 95134 United States	Company #: 2461N-2
Building P, 5m Chamber	125 West Tasman Dr San Jose, CA 95134 United States	Company #: 2461N-1
Building I, 5m Chamber	285 W. Tasman Drive San Jose, California 95134 United States	Company #: 2461M-1
Building 7, 5m Chamber	425 E. Tasman Drive San Jose, California 95134 United States	Company #: 2461N-3

Test Engineers

Julian Land

2.5 Equipment Assessed (EUT)

AIR-AP1840I-B-K9, AIR-AP1840I-A-K9

2.6 EUT Description

AIR-AP1840I is a dual band wireless access point which supports 802.11 a, b, g, n, ac. It features a 2x2 2.4GHz radio, a 4x4 5GHz radio, and a BLE radio.

The following antennas are supported by this product series.

The data included in this report represent the worst-case data for all antennas.

Frequency	Port	Antenna Type	Highest Antenna Gain (dBi)
2.4GHz / 5GHz	Antenna 1	Internal dual band omni directional	4.4/5.6
2.4GHz / 5GHz	Antenna 2	Internal dual band omni directional	4/5.7
BLE / 5GHz	Antenna 3	Internal dual band omni directional	4.1/5.6
5GHz	Antenna 4	Internal single band omni directional	5.4

Section 3: Result Summary

Antenna Conducted Test

Basic Standard	Technical Requirement / Details	Result
15.407 RSS-247 Issue 2 Section 6.3	Dynamic Frequency Selection (DFS) Detection Threshold	Pass
	U-NII Detection Bandwidth	Pass
	Performance Requirements Check • Initial Channel Availability Check Time • Radar Pulse at the Beginning of the Channel Availability Check Time • Radar Pulse at the End of the Channel Availability Check Time	Pass
	In-Service Monitoring • Channel Move Time • Channel Closing Time	Pass
	Non-Occupancy Period	Pass
	Statistical Performance Check	Pass

Section 4: Sample Details

Note: Each sample was evaluated to ensure that its condition was suitable to be used as a test sample prior to the commencement of testing.

4.1 Sample Details

Sample No.	Equipment Details	Manufacturer	Hardware Rev.	Firmware Rev.	Software Rev.	Serial Number
S01	AIR-AP1840I-B-K9	Cisco Systems, Inc.	V01	833280777409a1e31e3eceda6c2785b6	8.8.1.10	PSZ22491NT3
S02	Catalyst 3850 48 PoE+	Cisco Systems, Inc.	T0	1.18 (cat3k_caa-universal k9)	03.03.03SE	FCW1931C1U7

4.2 System Details

System #	Description	Samples
1	EUT and Power Supply	S01, S02

4.3 Mode of Operation Details

Mode#	Description	Comments
1	802.11a, OFDM	Receive and Transmit (1, 2, 3, or 4 chains)
2	Duplicate mode NonHT40	Receive and Transmit (1, 2, 3, or 4 chains)
3	Duplicate mode NonHT80	Receive and Transmit (1, 2, 3, or 4 chains)
4	802.11n20, OFDM	Receive and Transmit (1, 2, 3, or 4 chains)
5	802.11n40, OFDM	Receive and Transmit (1, 2, 3, or 4 chains)
6	802.11ac80, OFDM	Receive and Transmit (1, 2, 3, or 4 chains)

Appendix A: Dynamic Frequency Selection (DFS)

RSS 247 Issue 2 / From 15.407:

(h) Transmit Power Control (TPC) and Dynamic Frequency Selection (DFS).

(1) Transmit power control (TPC). U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

(2) Radar Detection Function of Dynamic Frequency Selection (DFS). U-NII devices operating with any part of its 26dB emission bandwidth in the 5.25-5.35 GHz and 5.47-5.725 GHz bands shall employ a DFS radar detection mechanism to detect the presence of radar systems and to avoid co-channel operation with radar systems. Operators shall only use equipment with a DFS mechanism that is turned on when operating in these bands. The device must sense for radar signals at 100 percent of its emission bandwidth. The minimum DFS detection threshold for devices with a maximum e.i.r.p. of 200 mW to 1 W is −64 dBm. For devices that operate with less than 200 mW e.i.r.p. and a power spectral density of less than 10 dBm in a 1 MHz band, the minimum detection threshold is −62 dBm. The detection threshold is the received power averaged over 1 microsecond referenced to a 0 dBi antenna. For the initial channel setting, the manufacturers shall be permitted to provide for either random channel selection or manual channel selection.

(i) Operational Modes. The DFS requirement applies to the following operational modes:

(A) The requirement for channel availability check time applies in the master operational mode.

(B) The requirement for channel move time applies in both the master and slave operational modes.

(ii) Channel Availability Check Time. A U-NII device shall check if there is a radar system already operating on the channel before it can initiate a transmission on a channel and when it has to move to a new channel. The U-NII device may start using the channel if no radar signal with a power level greater than the interference threshold values listed in paragraph (h)(2) of this section, is detected within 60 seconds.

(iii) Channel Move Time. After a radar's presence is detected, all transmissions shall cease on the operating channel within 10 seconds. Transmissions during this period shall consist of normal traffic for a maximum of 200 ms after detection of the radar signal. In addition, intermittent management and control signals can be sent during the remaining time to facilitate vacating the operating channel.

(iv) Non-occupancy Period. A channel that has been flagged as containing a radar system, either by a channel availability check or in-service monitoring, is subject to a non-occupancy period of at least 30 minutes. The non-occupancy period starts at the time when the radar system is detected.

(i) *Device Security.* All U-NII devices must contain security features to protect against modification of software by unauthorized parties.

(1) Manufacturers must implement security features in any digitally modulated devices capable of operating in any of the U-NII bands, so that third parties are not able to reprogram the device to operate outside the parameters for which the device was certified. The software must prevent the user from operating the transmitter with operating frequencies, output power, modulation types or other radio frequency parameters outside those that were approved for the device. Manufacturers may use means including, but not limited to the use of a private network that allows only authenticated users to download software, electronic signatures in software or coding in hardware that is decoded by software to verify that new software can be legally loaded into a device to meet these requirements and must describe the methods in their application for equipment authorization.

(2) Manufacturers must take steps to ensure that DFS functionality cannot be disabled by the operator of the U-NII device.

A.1.0 UNII Device Description

1. The device operates in the following bands:
    a. 5150-5250 MHz
    b. 5250-5350 MHz
    c. 5470-5725 MHz
    d. 5725-5850 MHz

2. The maximum EIRP of the 5GHz equipment is 35.4dBm, and the minimum possible EIRP is 0dBm.

   Below are the available 50ohm antenna assemblies and their corresponding gains. 1dBi gain was used to set the -62 dBm threshold level (-63dBm +1 dB) during calibration of the test setup.

Frequency	Port	Antenna Type	Highest Antenna Gain (dBi)
2.4GHz / 5GHz	Antenna 1	Internal dual band omni directional	4.4/5.6
2.4GHz / 5GHz	Antenna 2	Internal dual band omni directional	4/5.7
BLE / 5GHz	Antenna 3	Internal dual band omni directional	4.1/5.6
5GHz	Antenna 4	Internal single band omni directional	5.4

3. System testing was performed with channel traffic that met the required 17% traffic loading

4. The Master requires 145 seconds to complete its power-on cycle.

5. Information regarding the parameters of the detected Radar Waveforms is not available to the end user.

6. For the 5250-5350 MHz and 5470-5725 MHz bands, the Master device provides, on aggregate, uniform loading of the spectrum across all devices by selecting an operating channel among the available channels using a random algorithm.

A.2.0 DFS Detection Thresholds

1. Interference Threshold values, Master or Client incorporating In-Service Monitoring

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

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

2. DFS Response Requirement Values

Table 4: DFS Response Requirement Values

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

A.3.0 Radar Test Waveforms

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

1. **Short Pulse Radar Test Waveforms**

Table 5 – Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	Roundup $\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot10^6}{PRI_{\mu sec}}\right)\right\}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 µsec, with a minimum increment of 1 µsec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

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

For example if in Short Pulse Radar Type 1 Test B a PRI of 3066 usec is selected, the number of pulses would be $\text{Roundup}\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot 10^6}{3066}\right)\right\} = \text{Roundup}\{17.2\} = 18.$

Table 5a - Pulse Repetition Intervals Values for Test A

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

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

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

2. **Long Pulse Radar Test Waveform**

Radar	Pulse	Chirp	PRI	Number of	Number of	Minimum	Minimum

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

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

Each waveform is defined as follows:

1) The transmission period for the Long Pulse Radar test signal is 12 seconds.
2) There are a total of 8 to 20 Bursts in the 12 second period, with the number of Bursts being randomly chosen. This number is Burst_Count.
3) Each Burst consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each Burst within the 12 second sequence may have a different number of pulses.
4) The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a Burst will have the same pulse width. Pulses in different Bursts may have different pulse widths.
5) Each pulse has a linear FM chirp between 5 and 20 MHz, with the chirp width being randomly chosen. Each pulse within a Burst will have the same chirp width. Pulses in different Bursts may have different chirp widths. The chirp is centered on the pulse. For example, with a radar frequency of 5300 MHz and a 20 MHz chirped signal, the chirp starts at 5290 MHz and ends at 5310 MHz.
6) If more than one pulse is present in a Burst, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a Burst, the time between the first and second pulses is chosen independently of the time between the second and third pulses.
7) The 12 second transmission period is divided into even intervals. The number of intervals is equal to Burst_Count. Each interval is of length (12,000,000 / Burst_Count) microseconds. Each interval contains one Burst. The start time for the Burst, relative to the beginning of the interval, is between 1 and [(12,000,000 / Burst_Count) – (Total Burst Length) + (One Random PRI Interval)] microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each Burst is chosen independently.

A representative example of a Long Pulse Radar Type waveform:
1) The total test waveform length is 12 seconds.
2) Eight (8) *Bursts* are randomly generated for the *Burst_Count*.
3) *Burst* 1 has 2 randomly generated pulses.
4) The pulse width (for both pulses) is randomly selected to be 75 microseconds.
5) The PRI is randomly selected to be at 1213 microseconds.
6) *Bursts* 2 through 8 are generated using steps 3 – 5.
7) Each *Burst* is contained in even intervals of 1,500,000 microseconds. The starting location for Pulse 1, *Burst* 1 is randomly generated (1 to 1,500,000 minus the total *Burst* 1 length + 1 random PRI interval) at the 325,001 microsecond step. *Bursts* 2 through 8 randomly fall in successive 1,500,000 microsecond intervals (i.e. *Burst* 2 falls in the 1,500,001 – 3,000,000 microsecond range).

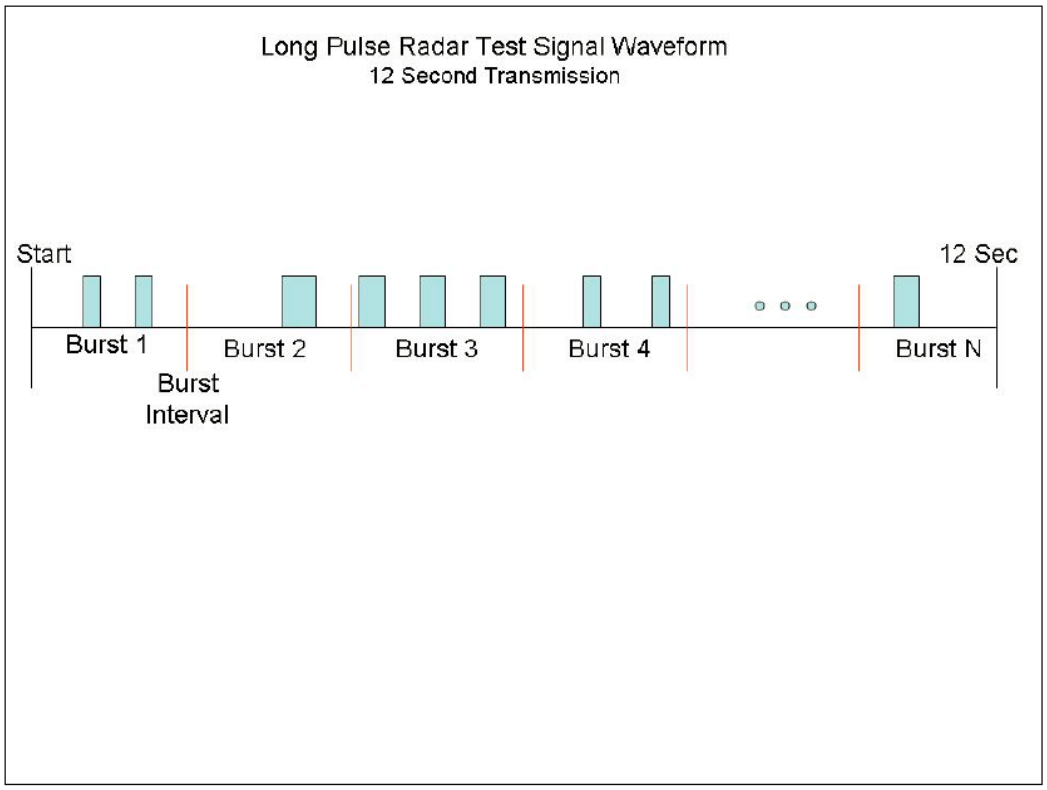


Figure 1: Graphical Representation of a Long Pulse Radar Type Waveform

3. **Frequency Hopping Radar Test Waveform**

Table 7 – Frequency Hopping Radar Test Waveform

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

For the Frequency Hopping Radar Type, the same *Burst* parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected[1] from the hopping sequence defined by the following algorithm:

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

Appendix B: Dynamic Frequency Selection / Test Results

Standards Reference:

15.407 / RSS-247

Test Procedure

Ref. KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02

Test parameters
Span = 0 Hz
RBW ≥ 3 MHz
VBW ≥ 3 MHz
Detector = Peak
Trace = Single sweep

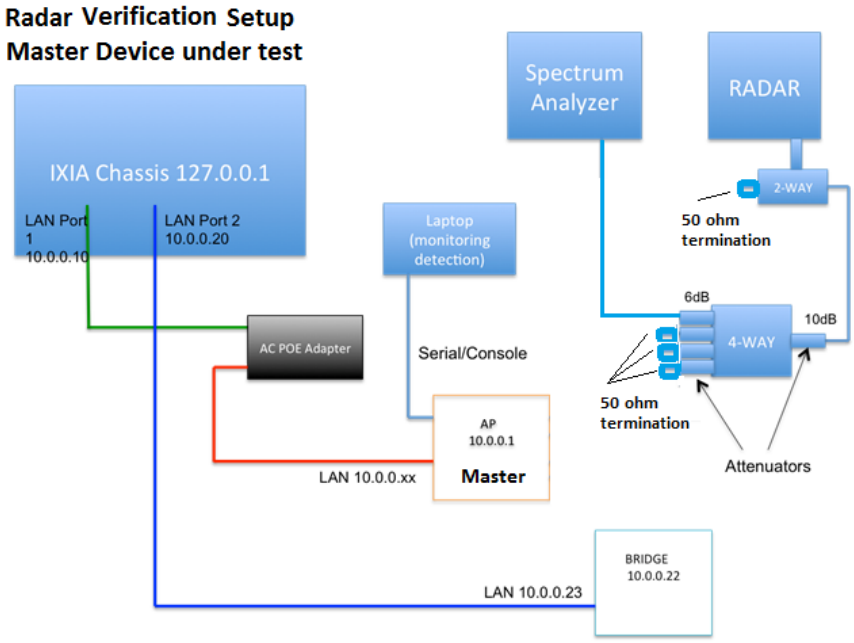
Tested By:	**Date of testing:**
Julian Land	06-Aug-2018 – 14-Aug-2019
Test Result: PASS	

See Appendix C for list of test equipment

Waveform Verification

The following equipment setup was used to calibrate the conducted Radar Waveform. A spectrum analyzer was used to establish the test signal level for each radar type. During this process there were no transmissions by either the Master or Client Device. The spectrum analyzer was switched to the zero span (Time Domain) mode at the frequency of the Radar Waveform generator. Peak detection was utilized. The spectrum analyzer resolution bandwidth (RBW) and video bandwidth (VBW) were set to 3 MHz.

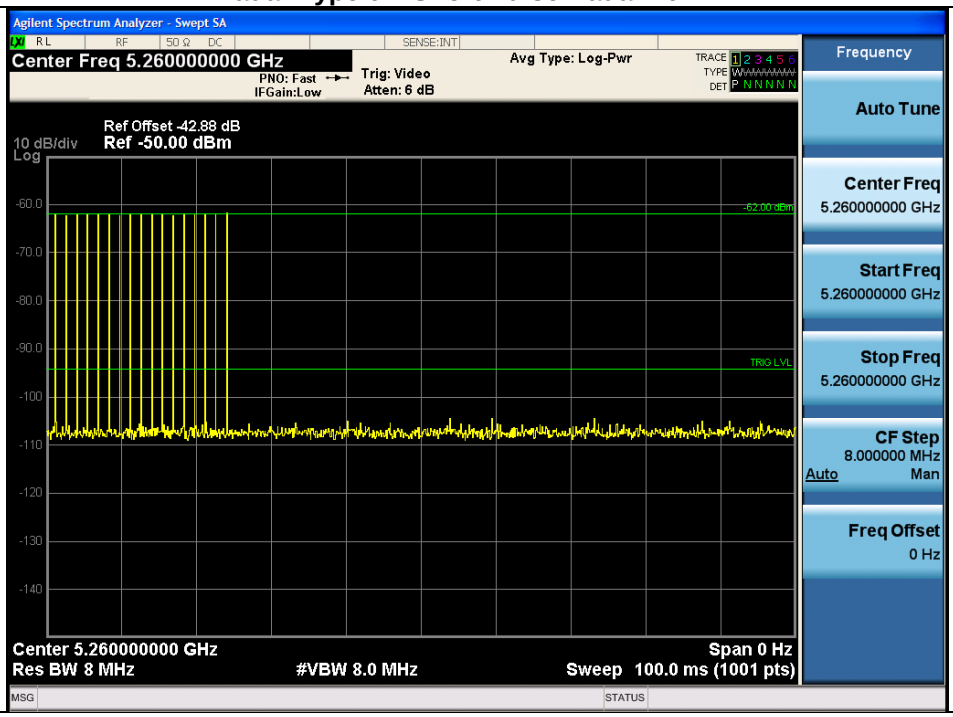
The signal generator amplitude was set so that the power level measured at the spectrum analyzer was -63dBm.



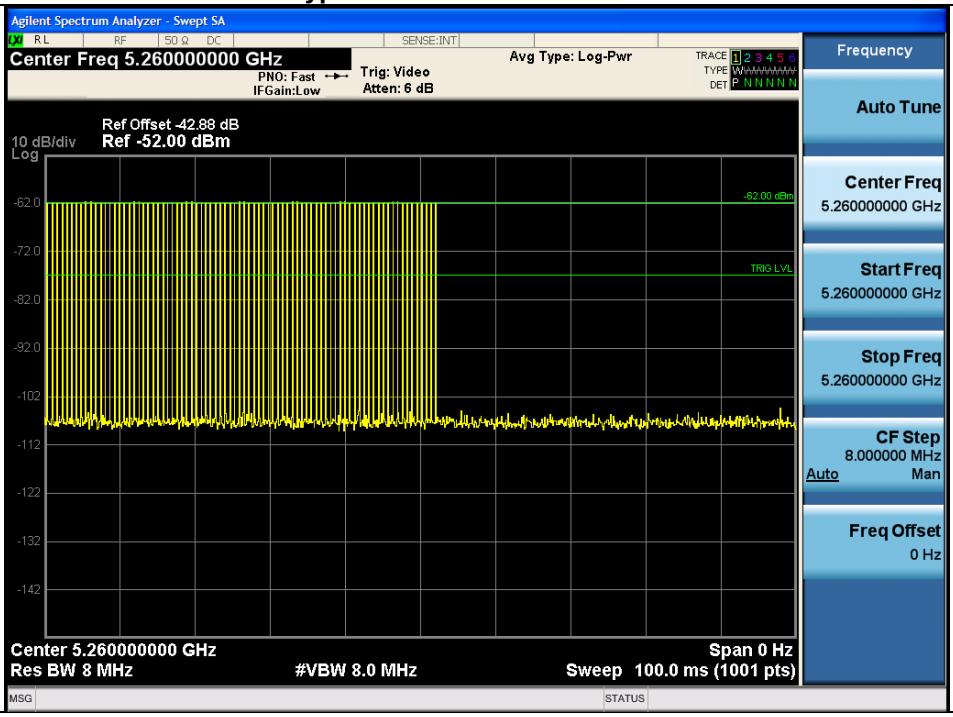
Conducted Calibration Setup

Following are the verification plots for each of the required radar waveforms.

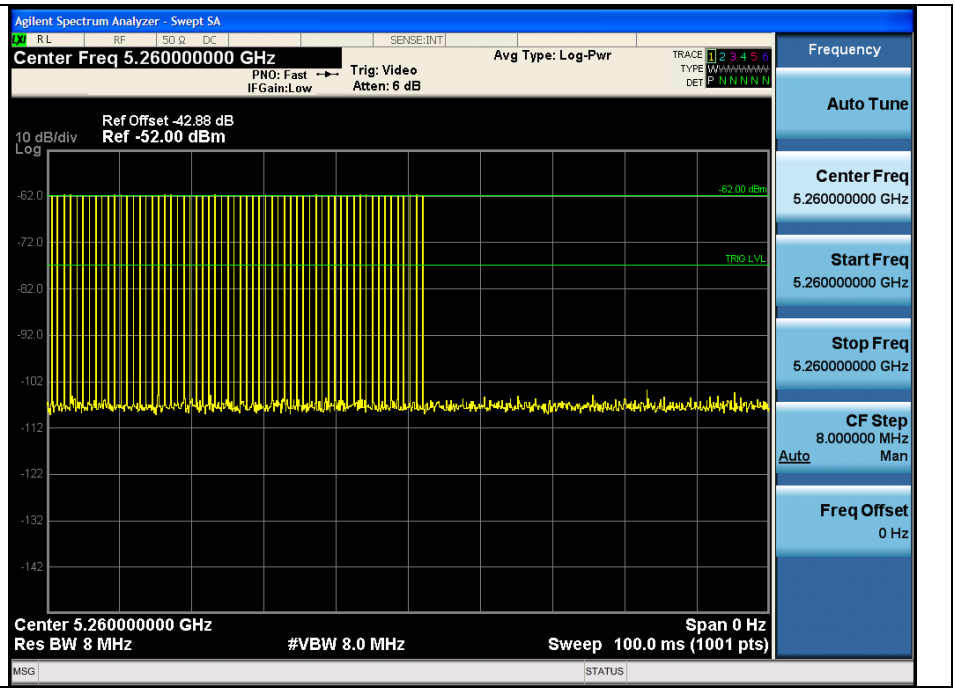
Radar Type 0 – Short Pulse Radar 20MHz



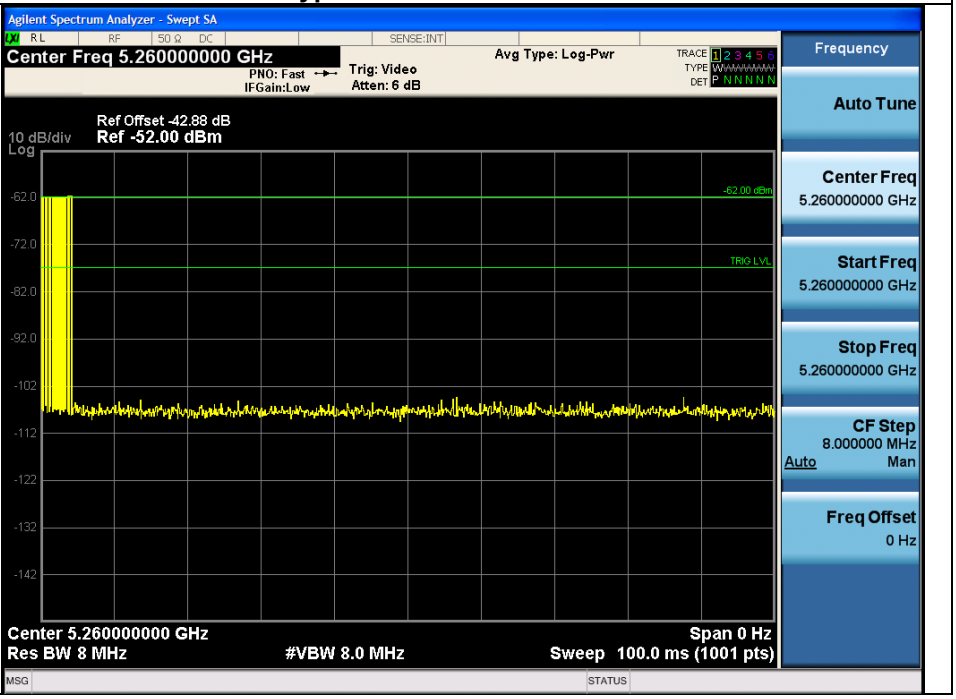
Radar Type 1A – Short Pulse Radar 20MHz



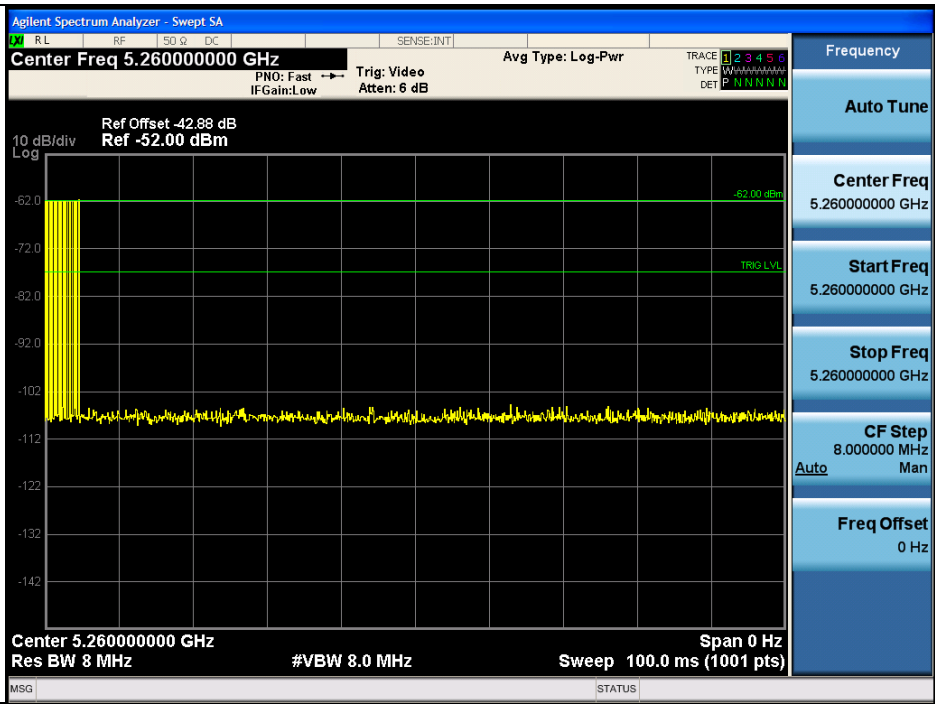
Radar Type 1B – Short Pulse Radar 20MHz



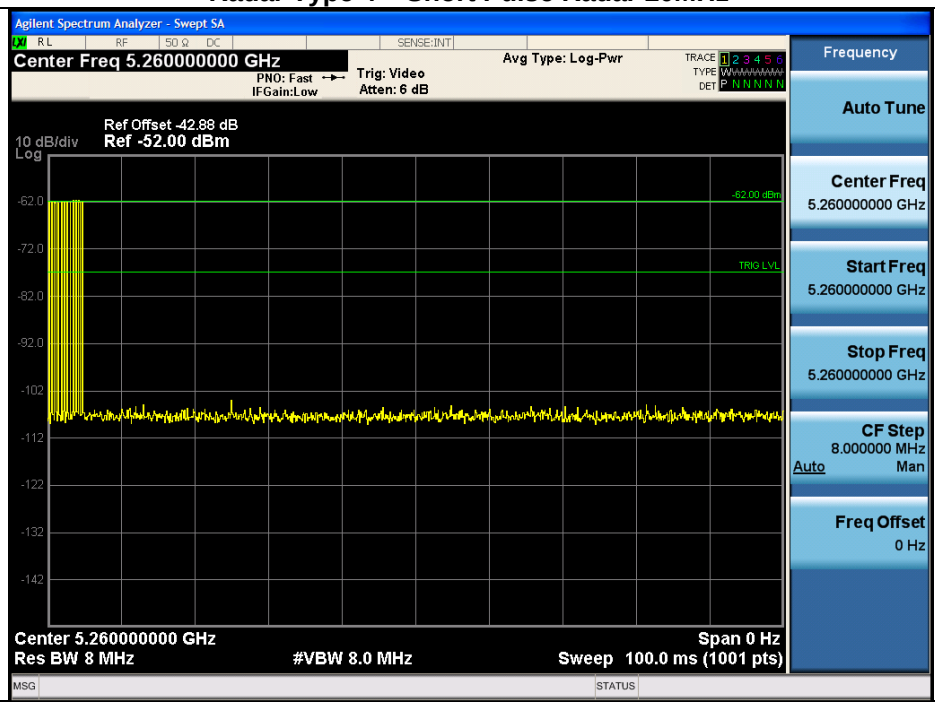
Radar Type 2 – Short Pulse Radar 20MHz



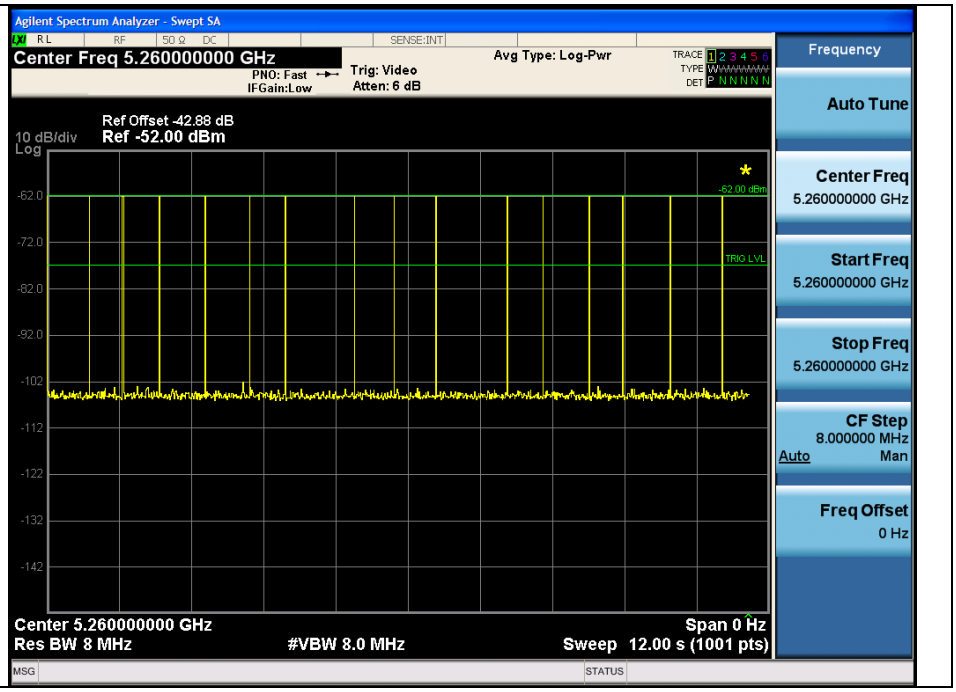
Radar Type 3 – Short Pulse Radar 20MHz



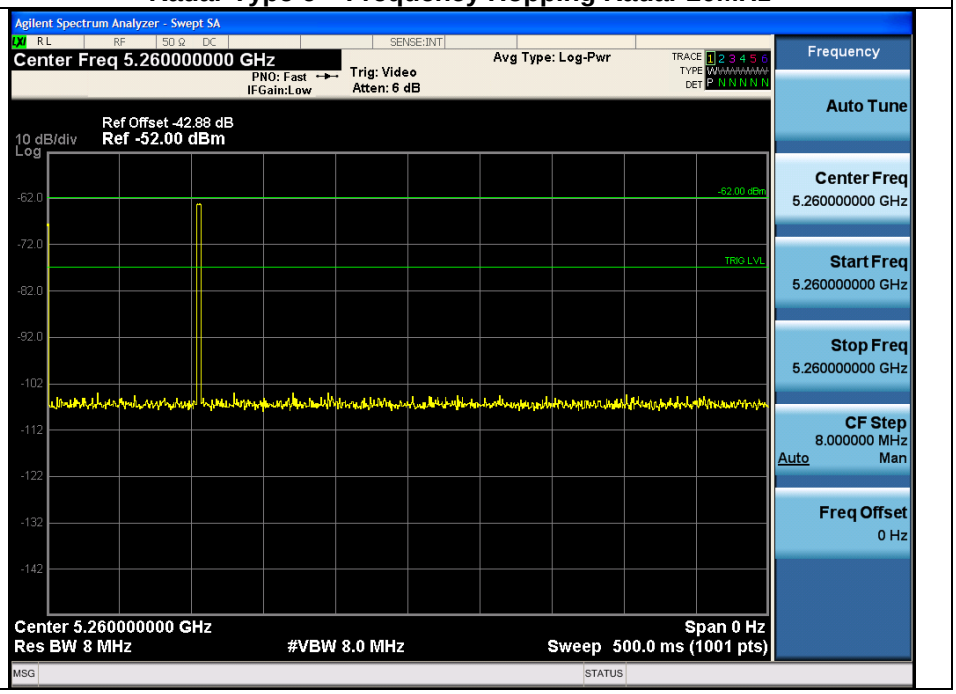
Radar Type 4 – Short Pulse Radar 20MHz



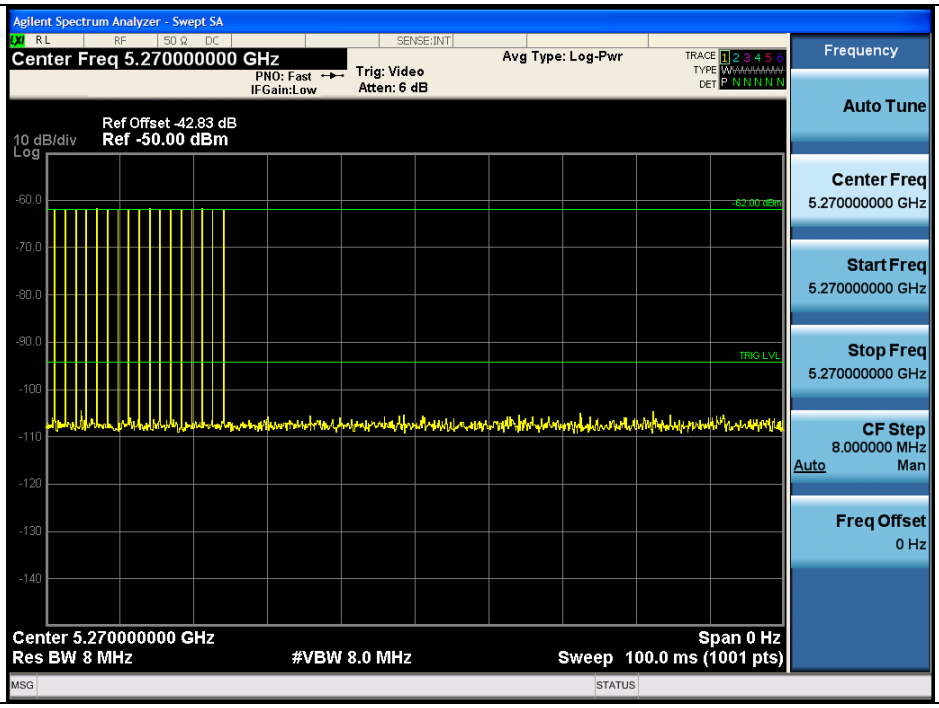
Radar Type 5 – Long Pulse Radar 20MHz



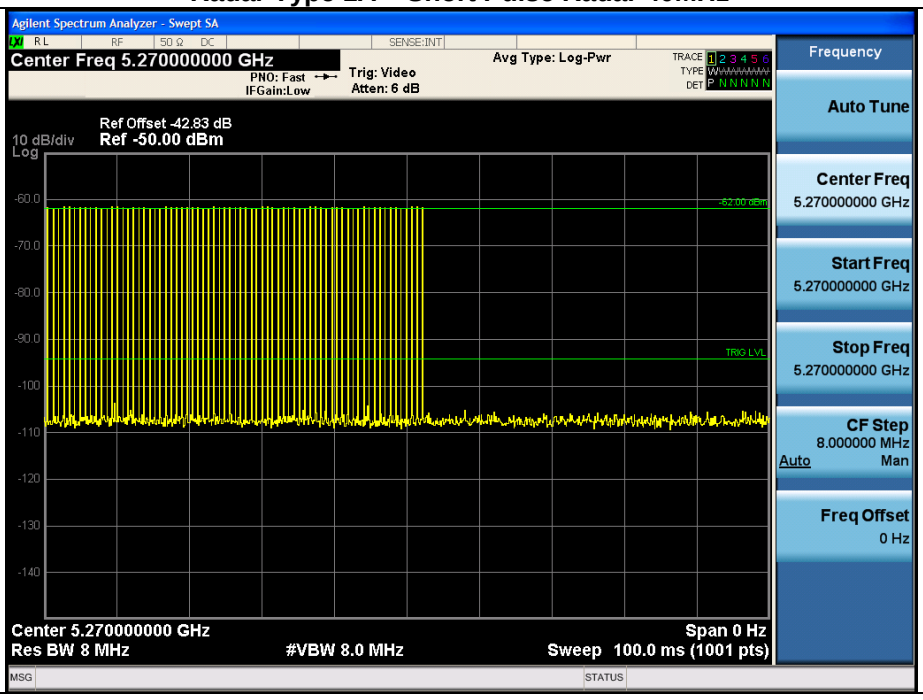
Radar Type 6 – Frequency Hopping Radar 20MHz



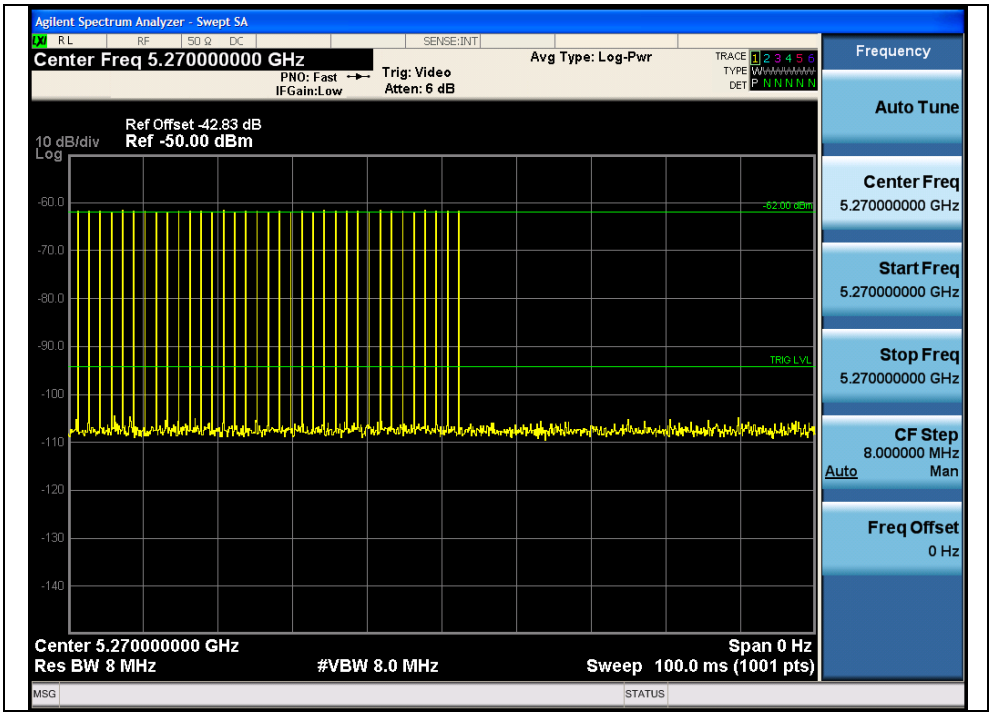
Radar Type 0 – Short Pulse Radar 40MHz



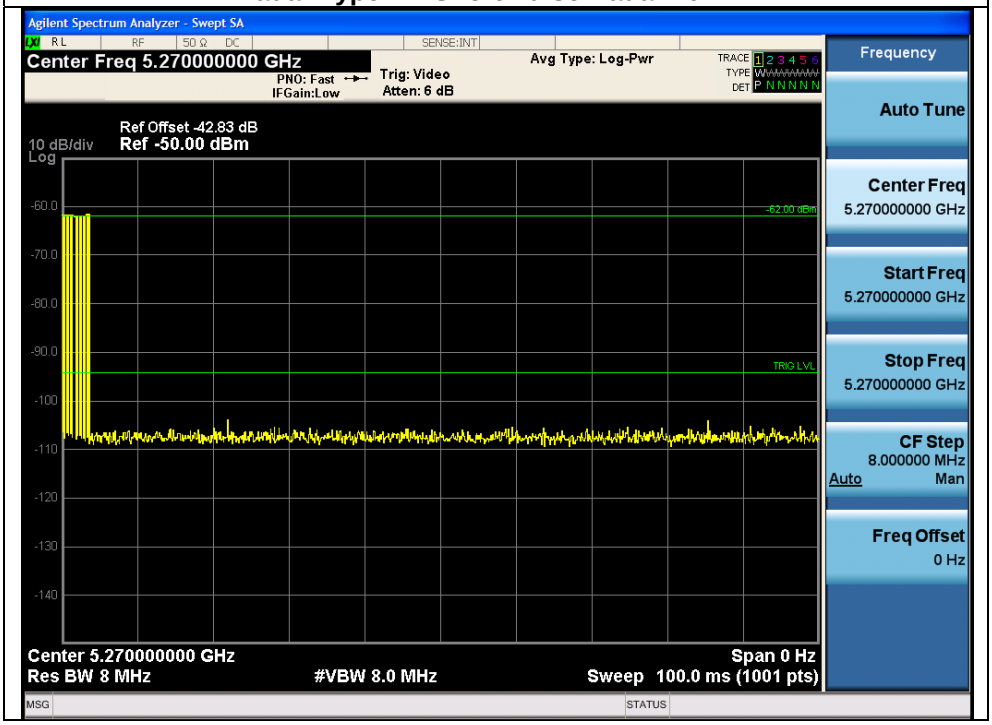
Radar Type 1A – Short Pulse Radar 40MHz



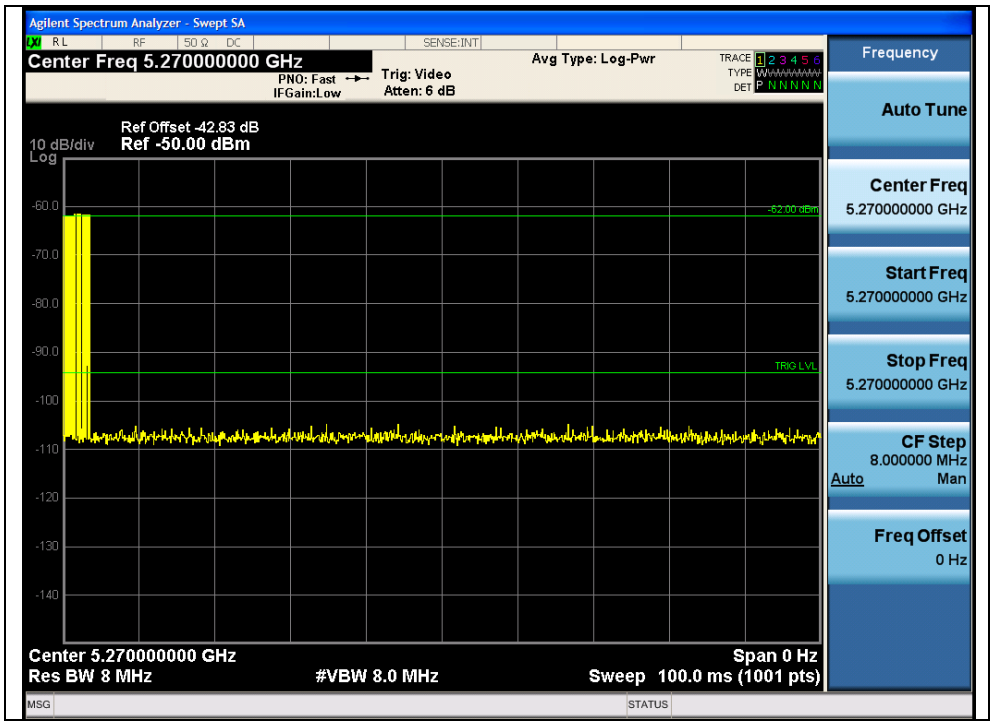
Radar Type 1B – Short Pulse Radar 40MHz



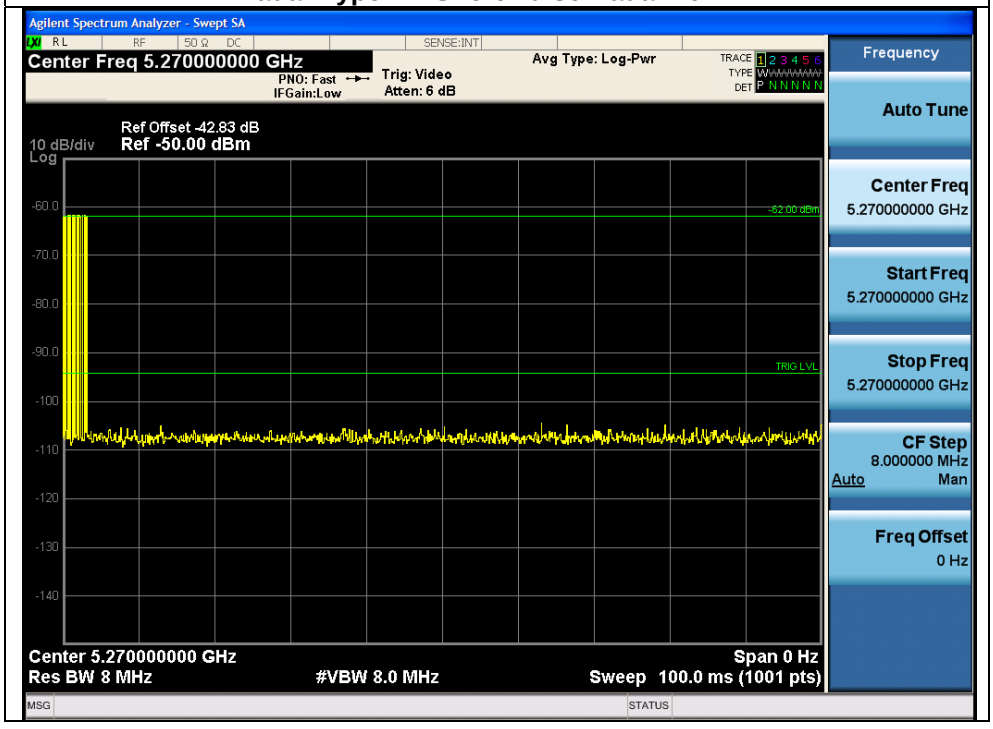
Radar Type 2 – Short Pulse Radar 40MHz



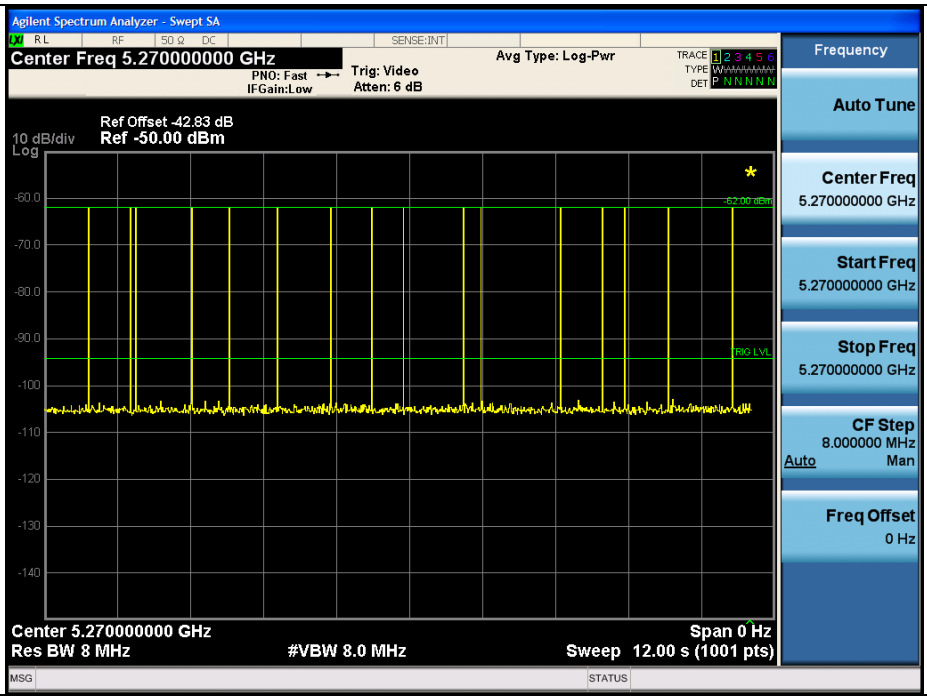
Radar Type 3 – Short Pulse Radar 40MHz



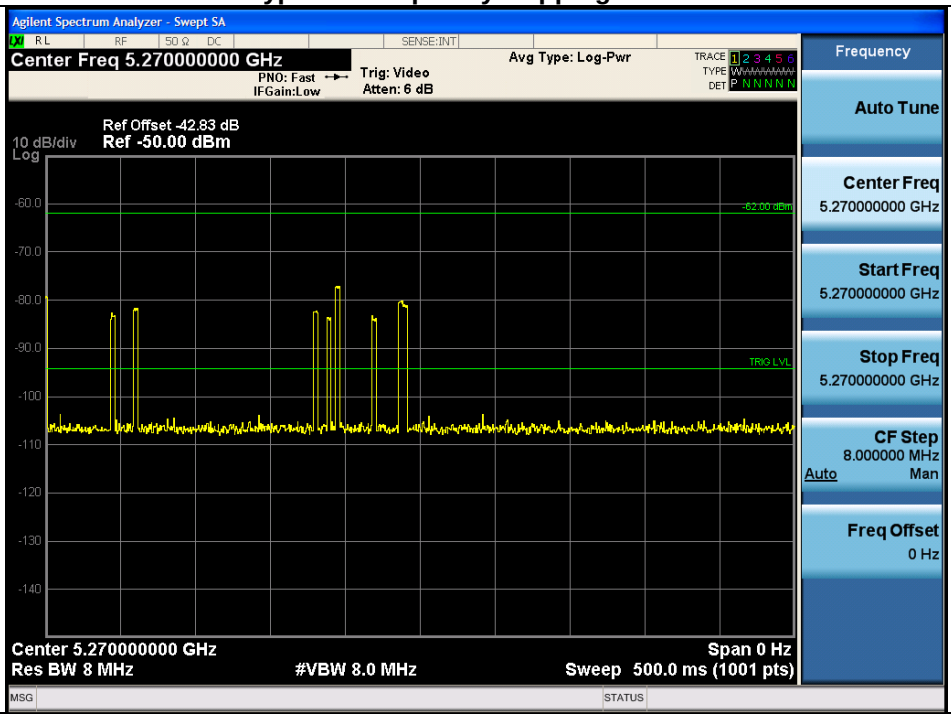
Radar Type 4 – Short Pulse Radar 40MHz



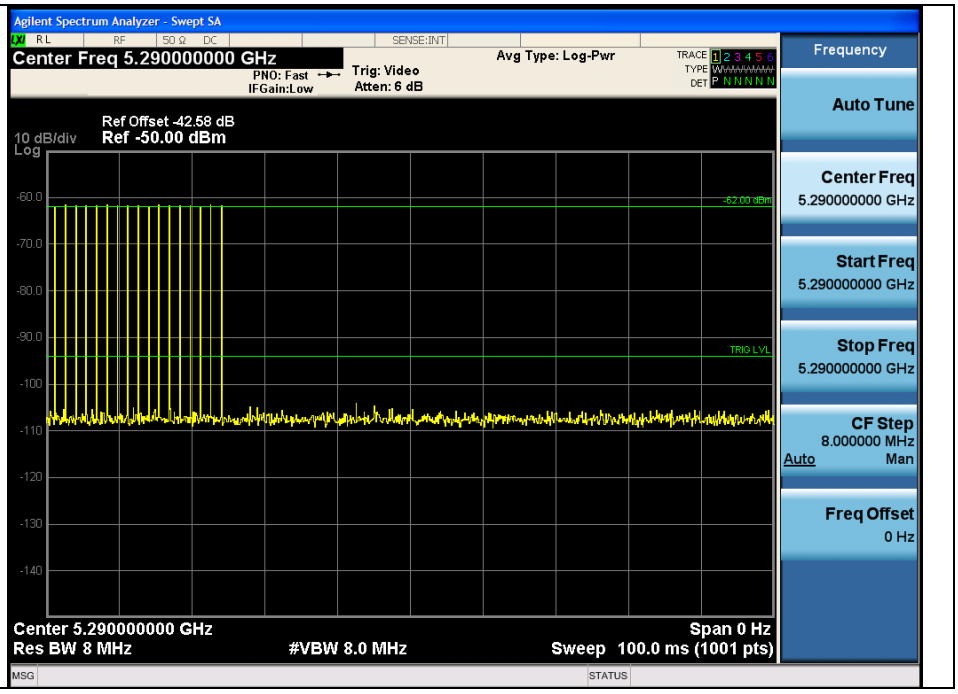
Radar Type 5 – Long Pulse Radar 40MHz



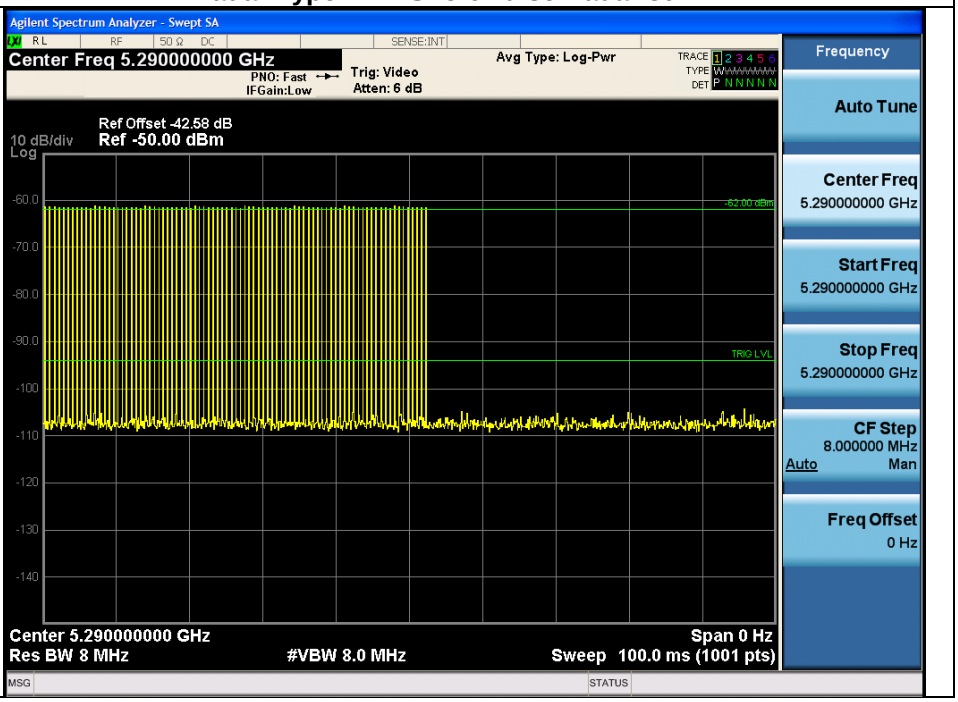
Radar Type 6 – Frequency Hopping Radar 40MHz



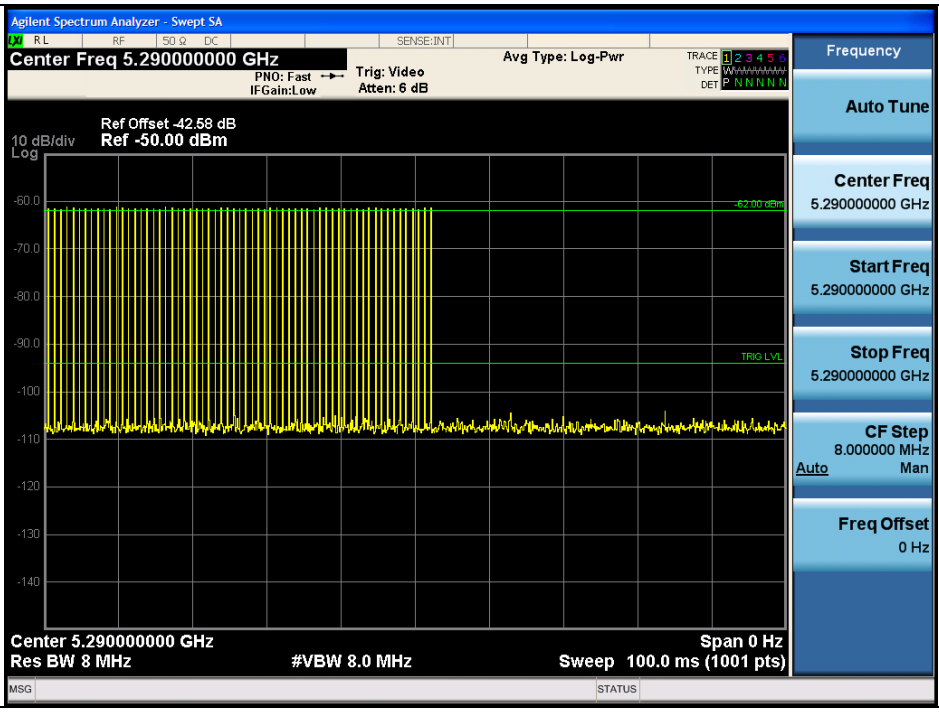
Radar Type 0 – Short Pulse Radar 80MHz



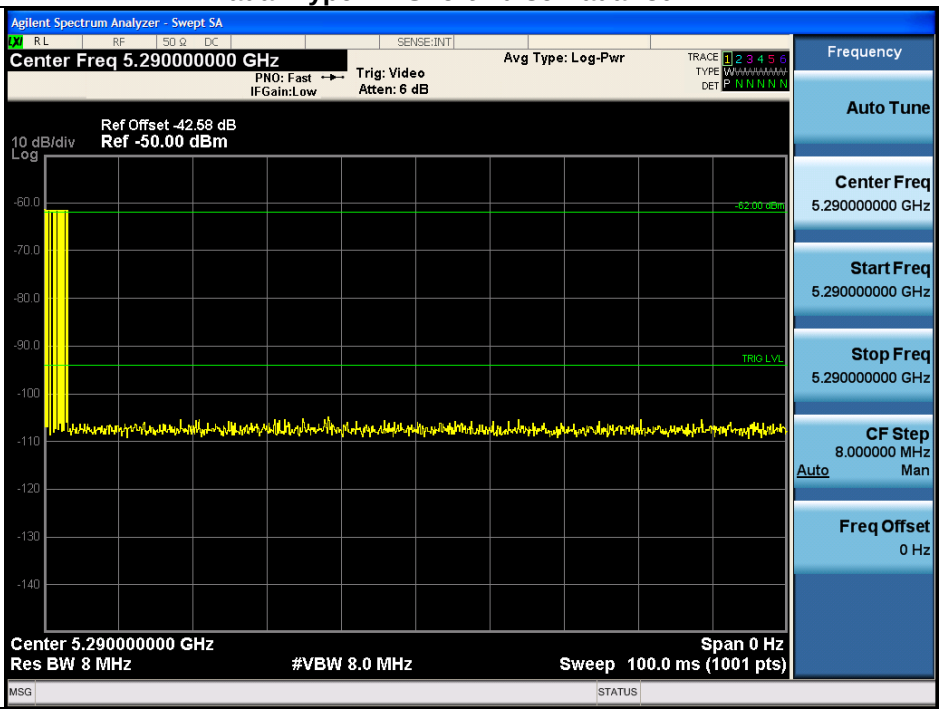
Radar Type 1A – Short Pulse Radar 80MHz



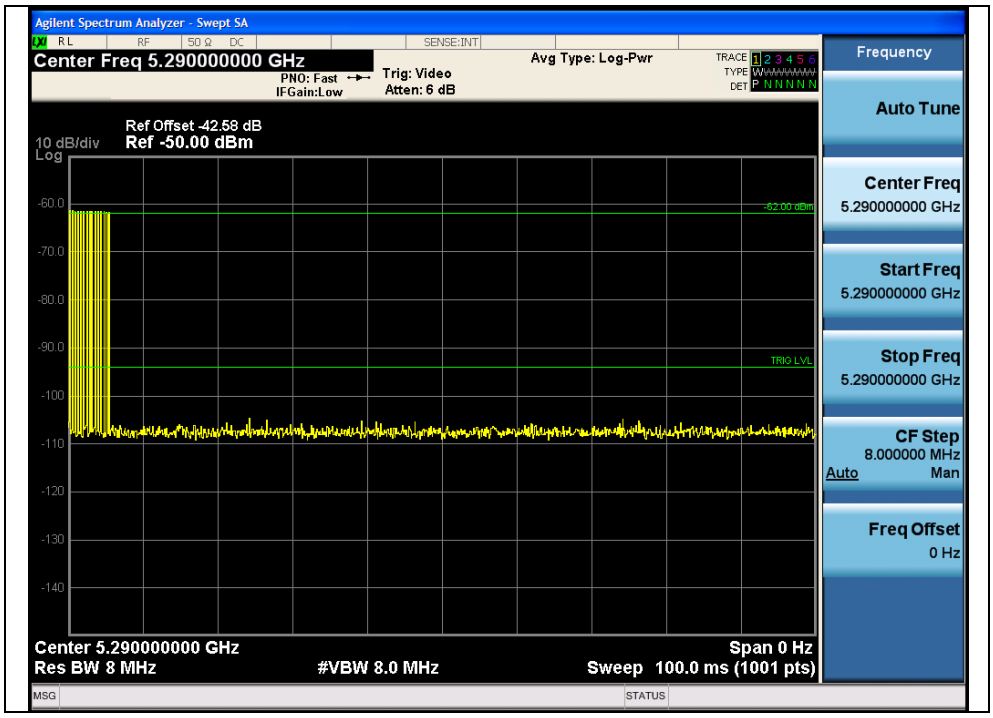
Radar Type 1B – Short Pulse Radar 80MHz



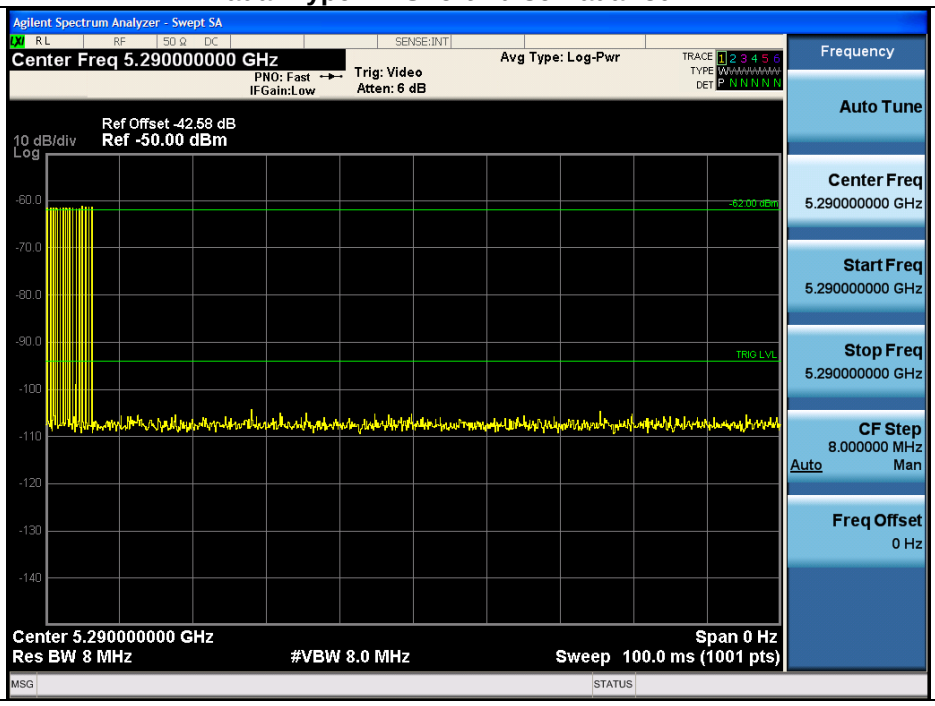
Radar Type 2 – Short Pulse Radar 80MHz



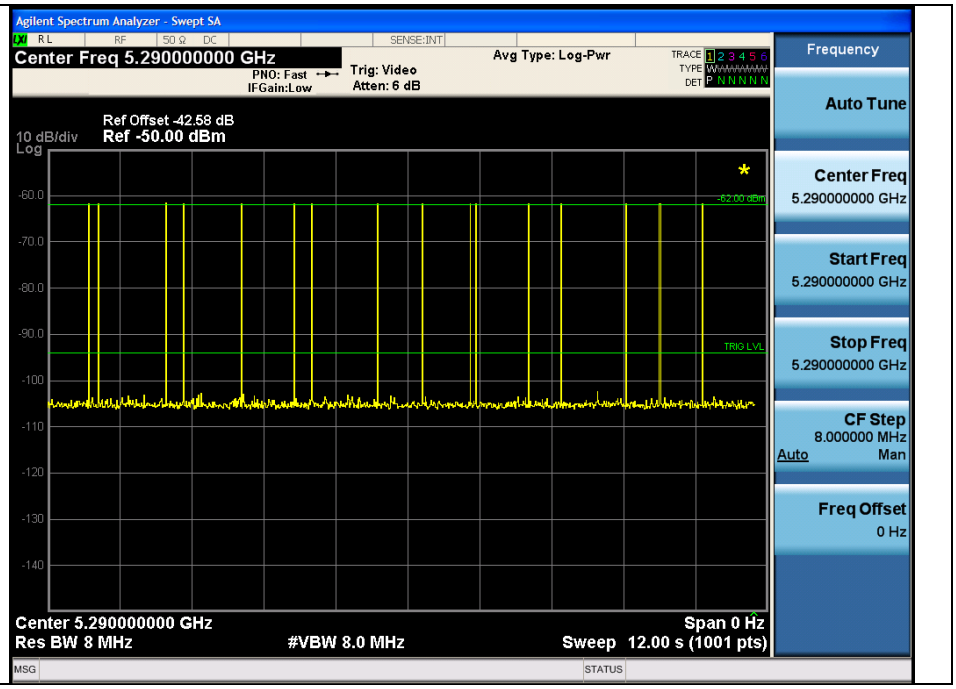
Radar Type 3 – Short Pulse Radar 80MHz



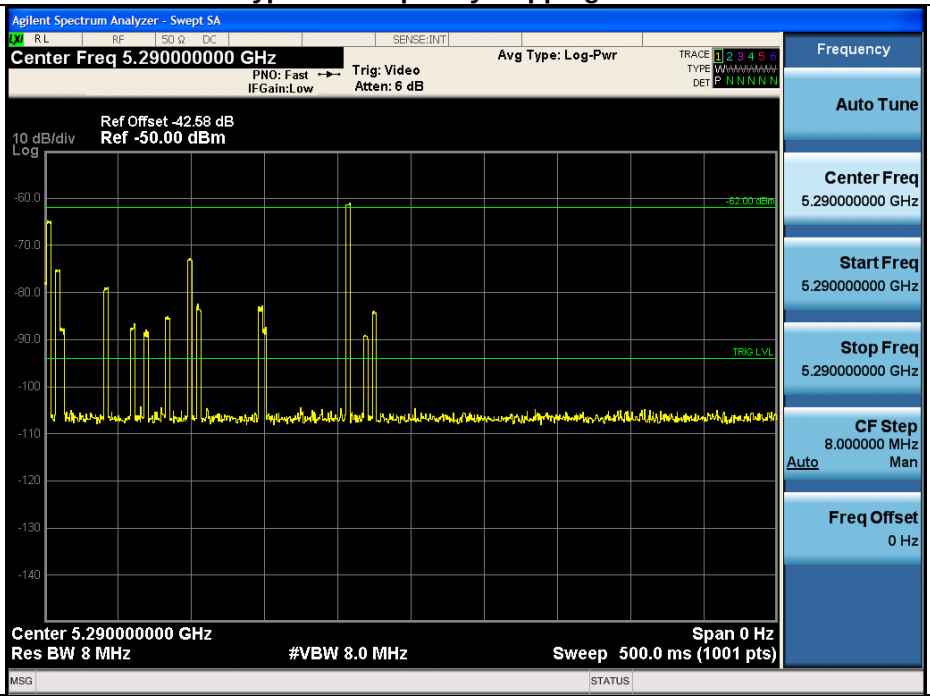
Radar Type 4 – Short Pulse Radar 80MHz



Radar Type 5 – Long Pulse Radar 80MHz



Radar Type 6 – Frequency Hopping Radar 80MHz

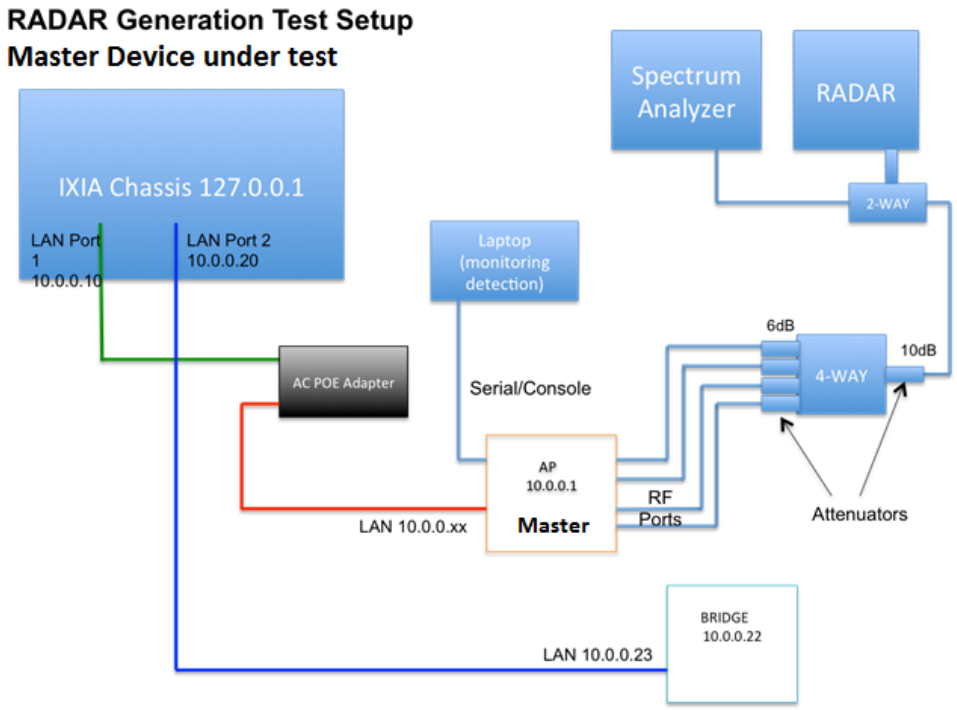


Test Procedure/Results

1. A spectrum analyzer is used as a monitor to verify that the UUT 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. It is also used to monitor UUT transmissions during the Channel Availability Check Time.

2. Following is the test setup used to generate the Radar Waveforms, and for all DFS tests described herein.



Conducted Setup: Radar Test Waveforms are injected into the Master

The waveform parameters from within the bounds of the signal type are selected randomly using uniform distribution.

UNII Detection Bandwidth

Procedure from KDB 905462, Section 7.8.1 U-NII Detection Bandwidth:

Set up the generating equipment as shown in **Figure 8**, or equivalent. Set up the DFS timing monitoring equipment as shown in **Figure 13** or **Figure 14**. Set up the overall system for either radiated or conducted coupling to the UUT.

Adjust the equipment to produce a single *Burst* of any one of the Short Pulse Radar Types 0 – 4 in **Table 5** at the center frequency of the UUT *Operating Channel* at the specified *DFS Detection Threshold* level found in **Table 3**.

Set the UUT up as a standalone device (no associated Client or Master, as appropriate) and no traffic. Frame based systems will be set to a talk/listen ratio reflecting the worst case (maximum) that is user configurable during this test.

Generate a single radar *Burst* and note the response of the UUT. Repeat for a minimum of 10 trials. The UUT must detect the *Radar Waveform* within the DFS band using the specified *U-NII Detection Bandwidth* criterion shown in **Table 4**. In cases where the channel bandwidth may exceed past the DFS band edge on specific channels (i.e., 802.11ac or wideband frame based systems) select a channel that has the entire emission bandwidth within the DFS band. If this is not possible, test the detection BW to the DFS band edge.

Starting at the center frequency of the UUT operating *Channel*, increase the radar frequency in 5 MHz steps, repeating the above test sequence, until the detection rate falls below the *U-NII Detection Bandwidth* criterion specified in **Table 4**. Repeat this measurement in 1MHz steps at frequencies 5 MHz below where the detection rate begins to fall. Record the highest frequency (denote as F_H) at which detection is greater than or equal to the *U-NII Detection Bandwidth* criterion. Recording the detection rate at frequencies above F_H is not required to demonstrate compliance.

Starting at the center frequency of the UUT operating *Channel*, decrease the radar frequency in 5 MHz steps, repeating the above test sequence, until the detection rate falls below the *U-NII Detection Bandwidth* criterion specified in **Table 4**. Repeat this measurement in 1MHz steps at frequencies 5 MHz above where the detection rate begins to fall. Record the lowest frequency (denote as F_L) at which detection is greater than or equal to the *U-NII Detection Bandwidth* criterion. Recording the detection rate at frequencies below F_L is not required to demonstrate compliance.

The *U-NII Detection Bandwidth* is calculated as follows:
U-NII Detection Bandwidth = $F_H - F_L$

The *U-NII Detection Bandwidth* must meet the *U-NII Detection Bandwidth* criterion specified in **Table 4**. Otherwise, the UUT does not comply with DFS requirements. This is essential to ensure that the UUT is capable of detecting *Radar Waveforms* across the same frequency spectrum that contains the significant energy from the system. In the case that the *U-NII Detection Bandwidth* is greater than or equal to the 99 percent power bandwidth for the measured F_H and F_L, the test can be truncated and the *U-NII Detection Bandwidth* can be reported as the measured F_H and F_L.

All UNII 20 MHz channels for this device have identical Channel bandwidths, all 40 MHz channels have identical Channel bandwidths, and all 80 MHz channels have identical Channel bandwidths. Therefore, all DFS testing was done at 5260 MHz. The 99% channel bandwidth for 20MHz signals is 18 MHz, the the

99% channel bandwidth for 40MHz signals is 36 MHz, and the 99% channel bandwidth for 80MHz signals is 72. (See the 26dB BW section of the RF report for further measurement details).

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 Fh.

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 Fl.

The U-NII Detection Bandwidth must be at least 100% of the UUT transmitter 99% power bandwidth (20 MHz for 20MHz signals, 40 MHz for 40 MHz signals, and 80 MHz for 80 MHz signals), otherwise, the UUT does not comply with DFS requirements.

For the chirped Bin 5 radar, the U-NII Detection Bandwidth must be at least 80% of the UUT transmitter 99% power bandwidth (16 MHz for 20MHz signals, 32 MHz for 40 MHz signals, and 64 MHz for 80 MHz signals), otherwise, the UUT does not comply with DFS requirements.

UNII Detection Bandwidth Results, 20MHz Signal Bandwidth

Type 0 Radar Pulse

	DFS Detection Trials (1=Detection, Blank= No Detection)												
Radar Frequency	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)	Detection Bandwidth (MHz)	Limit (MHz)
5250	1	1	1	1	1	1	1	1	1	1	100		
5251	1	1	1	1	1	1	1	1	1	1	100		
5252	1	1	1	1	1	1	1	1	1	1	100		
5253	1	1	1	1	1	1	1	1	1	1	100		
5254	1	1	1	1	1	1	1	1	1	1	100		
5255	1	1	1	1	1	1	1	1	1	1	100		
5256	1	1	1	1	1	1	1	1	1	1	100		
5257	1	1	1	1	1	1	1	1	1	1	100		
5258	1	1	1	1	1	1	1	1	1	1	100		
5259	1	1	1	1	1	1	1	1	1	1	100		
5260	1	1	1	1	1	1	1	1	1	1	100	20	18
5261	1	1	1	1	1	1	1	1	1	1	100		
5262	1	1	1	1	1	1	1	1	1	1	100		
5263	1	1	1	1	1	1	1	1	1	1	100		
5264	1	1	1	1	1	1	1	1	1	1	100		
5265	1	1	1	1	1	1	1	1	1	1	100		
5266	1	1	1	1	1	1	1	1	1	1	100		
5267	1	1	1	1	1	1	1	1	1	1	100		
5268	1	1	1	1	1	1	1	1	1	1	100		
5269	1	1	1	1	1	1	1	1	1	1	100		
5270	1	1	1	1	1	1	1	1	1	1	100		

UNII Detection Bandwidth Results, 40MHz Signal Bandwidth

Type 0 Radar Pulse

	DFS Detection Trials (1=Detection, Blank= No Detection)												
Radar Frequency	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)	Detection Bandwidth (MHz)	Limit (MHz)
5250	1	1	1	1	1	1	1	1	1	1	100		
5251	1	1	1	1	1	1	1	1	1	1	100		
5252	1	1	1	1	1	1	1	1	1	1	100		
5253	1	1	1	1	1	1	1	1	1	1	100		
5254	1	1	1	1	1	1	1	1	1	1	100		
5255	1	1	1	1	1	1	1	1	1	1	100		
5256	1	1	1	1	1	1	1	1	1	1	100		
5257	1	1	1	1	1	1	1	1	1	1	100		
5258	1	1	1	1	1	1	1	1	1	1	100		
5259	1	1	1	1	1	1	1	1	1	1	100		
5260	1	1	1	1	1	1	1	1	1	1	100		
5261	1	1	1	1	1	1	1	1	1	1	100		
5262	1	1	1	1	1	1	1	1	1	1	100		
5263	1	1	1	1	1	1	1	1	1	1	100		
5264	1	1	1	1	1	1	1	1	1	1	100		
5265	1	1	1	1	1	1	1	1	1	1	100		
5266	1	1	1	1	1	1	1	1	1	1	100		
5267	1	1	1	1	1	1	1	1	1	1	100		
5268	1	1	1	1	1	1	1	1	1	1	100	40	36
5269	1	1	1	1	1	1	1	1	1	1	100		
5270	1	1	1	1	1	1	1	1	1	1	100		
5271	1	1	1	1	1	1	1	1	1	1	100		
5272	1	1	1	1	1	1	1	1	1	1	100		
5273	1	1	1	1	1	1	1	1	1	1	100		
5274	1	1	1	1	1	1	1	1	1	1	100		
5275	1	1	1	1	1	1	1	1	1	1	100		
5276	1	1	1	1	1	1	1	1	1	1	100		
5277	1	1	1	1	1	1	1	1	1	1	100		
5278	1	1	1	1	1	1	1	1	1	1	100		
5279	1	1	1	1	1	1	1	1	1	1	100		
5280	1	1	1	1	1	1	1	1	1	1	100		
5281	1	1	1	1	1	1	1	1	1	1	100		
5282	1	1	1	1	1	1	1	1	1	1	100		
5283	1	1	1	1	1	1	1	1	1	1	100		
5284	1	1	1	1	1	1	1	1	1	1	100		
5285	1	1	1	1	1	1	1	1	1	1	100		
5286	1	1	1	1	1	1	1	1	1	1	100		

5287	1	1	1	1	1	1	1	1	1	1	100		
5288	1	1	1	1	1	1	1	1	1	1	100		
5289	1	1	1	1	1	1	1	1	1	1	100		
5290	1	1	1	1	1	1	1	1	1	1	100		

UNII Detection Bandwidth Results, 80MHz Signal Bandwidth

Type 0 Radar Pulse

	DFS Detection Trials (1=Detection, Blank= No Detection)												
Radar Frequency	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)	Detection Bandwidth (MHz)	Limit (MHz)
5250	1	1	1	1	1	1	1	1	1	1	100	80	76
5251	1	1	1	1	1	1	1	1	1	1	100		
5252	1	1	1	1	1	1	1	1	1	1	100		
5253	1	1	1	1	1	1	1	1	1	1	100		
5254	1	1	1	1	1	1	1	1	1	1	100		
5255	1	1	1	1	1	1	1	1	1	1	100		
5256	1	1	1	1	1	1	1	1	1	1	100		
5257	1	1	1	1	1	1	1	1	1	1	100		
5258	1	1	1	1	1	1	0	1	1	1	90		
5259	1	1	1	1	1	1	1	1	1	1	100		
5260	1	1	1	1	1	1	1	1	1	1	100		
5261	1	1	1	1	1	1	1	1	1	1	100		
5262	1	1	1	1	1	1	1	1	1	1	100		
5263	1	1	1	1	1	1	1	1	1	1	100		
5264	1	1	1	1	1	1	1	1	1	1	100		
5265	1	1	1	1	1	1	1	1	1	1	100		
5266	1	1	1	1	1	1	1	1	1	1	100		
5267	1	1	1	1	1	1	1	1	1	1	100		
5268	1	1	1	1	1	1	1	1	1	1	100		
5269	1	1	1	1	1	1	1	1	1	1	100		
5270	1	1	1	1	1	1	1	1	1	1	100		
5271	1	1	1	1	1	1	1	1	1	1	100		
5272	1	1	1	1	1	1	1	1	1	1	100		
5273	1	1	1	1	1	1	1	1	1	1	100		
5274	1	1	1	1	1	1	1	1	1	1	100		
5275	1	1	1	1	1	1	1	1	1	1	100		
5276	1	1	1	1	1	1	1	1	1	1	100		
5277	1	1	1	1	1	1	1	1	1	1	100		
5278	1	1	1	1	1	1	1	1	1	1	100		
5279	1	1	1	1	1	1	1	1	1	1	100		
5280	1	1	1	1	1	1	1	1	1	1	100		
5281	1	1	1	1	1	1	1	1	1	1	100		
5282	1	1	1	1	1	1	1	1	1	1	100		
5283	1	1	1	1	1	1	1	1	1	1	100		

5284	1	1	1	1	1	1	1	1	1	1	100		
5285	1	1	1	1	1	1	1	1	1	1	100		
5286	1	1	1	1	1	1	1	1	1	1	100		
5287	1	1	1	1	1	1	1	1	1	1	100		
5288	1	1	1	1	1	1	1	1	1	1	100		
5289	1	1	1	1	1	1	1	1	1	1	100		
5290	1	1	1	1	1	1	1	1	1	1	100		
5291	1	1	1	1	1	1	1	1	1	1	100		
5292	1	1	1	1	1	1	1	1	1	1	100		
5293	1	1	1	1	1	1	1	1	1	1	100		
5294	1	1	1	1	1	1	1	1	1	1	100		
5295	1	1	1	1	1	1	1	1	1	1	100		
5296	1	1	1	1	1	1	1	1	1	1	100		
5297	1	1	1	1	1	1	1	1	1	1	100		
5298	1	1	1	1	1	1	1	1	1	1	100		
5299	1	1	1	1	1	1	1	1	1	1	100		
5300	1	1	1	1	1	1	1	1	1	1	100		
5301	1	1	1	1	1	1	1	1	1	1	100		
5302	1	1	1	1	1	1	1	1	1	1	100		
5303	1	1	1	1	1	1	1	1	1	1	100		
5304	1	1	1	1	1	1	1	1	1	1	100		
5305	1	1	1	1	1	1	1	1	1	1	100		
5306	1	1	1	1	1	1	1	1	1	1	100		
5307	1	1	1	1	1	1	1	1	1	1	100		
5308	1	1	1	1	1	1	1	1	1	1	100		
5309	1	1	1	1	1	1	1	1	1	1	100		
5310	1	1	1	1	1	1	1	1	1	1	100		
5311	1	1	1	1	1	1	1	1	1	1	100		
5312	1	1	1	1	1	1	1	1	1	1	100		
5313	1	1	1	1	1	1	1	1	1	0	90		
5314	1	1	1	1	1	1	1	1	1	1	100		
5315	1	1	1	1	1	1	1	1	1	1	100		
5316	1	1	1	1	1	1	1	1	1	1	100		
5317	1	1	1	1	1	1	1	1	1	1	100		
5318	1	1	1	1	1	1	1	1	1	1	100		
5319	1	1	1	1	1	1	1	1	1	1	100		
5320	1	1	1	1	1	1	1	1	1	1	100		
5321	1	1	1	1	1	1	1	1	1	1	100		
5322	1	1	1	1	1	1	1	1	1	1	100		
5323	1	1	1	1	1	1	1	1	1	1	100		
5324	1	1	1	1	1	1	1	1	1	1	100		
5325	1	1	1	1	1	1	1	1	1	1	100		

5326	1	1	1	1	1	1	1	1	1	1	100		
5327	1	1	1	1	1	1	1	1	1	1	100		
5328	1	1	1	1	1	1	1	1	1	1	100		
5329	1	1	1	1	1	1	1	1	1	1	100		
5330	1	1	1	1	1	1	1	1	1	1	100		

Initial Channel Availability Check Time

Procedure from KDB 905462, Section 7.8.2.1 Initial Channel Availability Check Time:

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

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

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

c) Confirm that the UUT initiates transmission on the channel

This measurement can be used to determine the length of the power-on cycle if it is not supplied by the manufacturer. If the spectrum analyzer sweep is started at the same time the UUT is powered on and the UUT does not begin transmissions until it has completed the cycle, the power-on time can be determined by comparing the two times.

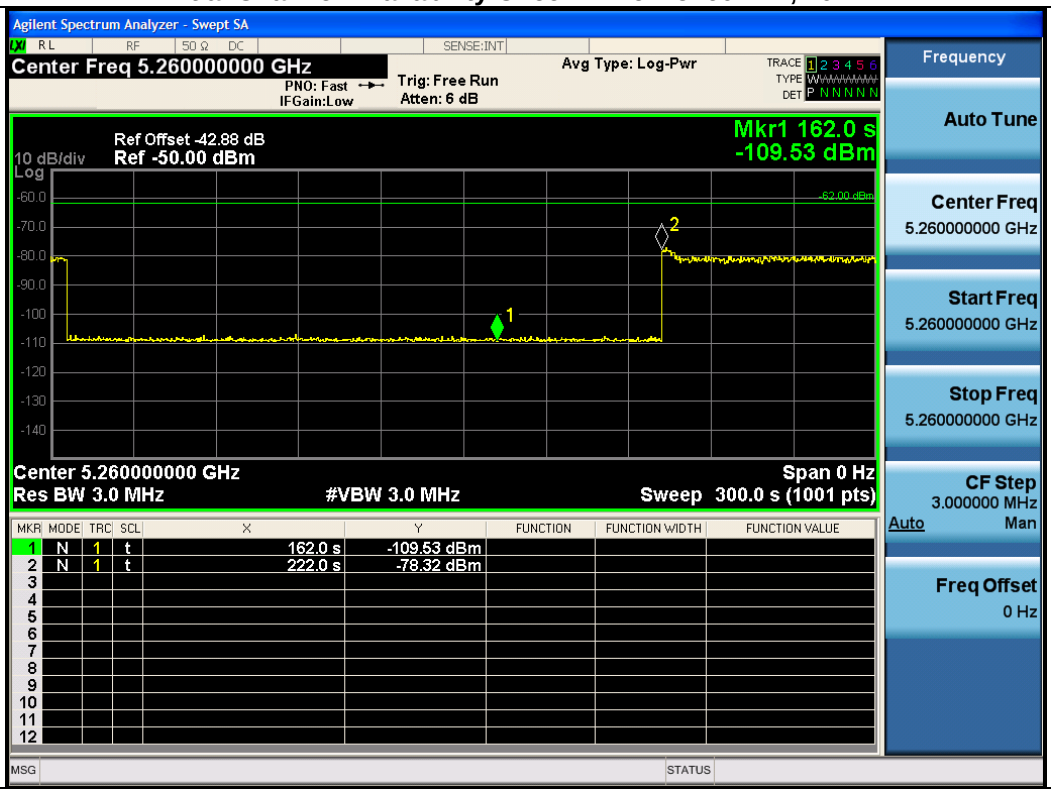
The tests that the UUT does not emit beacon, control, or data signals on the test Channel until the power-up sequence has been completed and the U-NII device checks for Radar Waveforms for one minute on the test Channel. This test does not use any Radar Waveforms.

The U-NII device is powered on and instructed to operate at 5260 MHz. At the same time the UUT is powered on, the spectrum analyzer is set to zero span mode with a 3 MHz resolution bandwidth at 5260MHz with a 2.5 minute sweep time. The analyzer's sweep will be started the same time power is applied to the U-NII device.

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

The initial power up time of the UUT is indicated by marker 1 in the plot. Initial beacons/data transmissions are indicated by marker 1R.

Initial Channel Availability Check Time – 5260MHz, 20MHz



Radar Burst at the Beginning of the Channel Availability Check Time

Procedure from KDB 905462, 7.8.2.2 Radar Burst at the Beginning of the Channel Availability Check Time:

The steps below define the procedure to verify successful radar detection on the test *Channel* during a period equal to the *Channel Availability Check Time* and avoidance of operation on that *Channel* when a radar *Burst* with a level equal to the *DFS Detection Threshold* + 1 dB occurs at the beginning of the *Channel Availability Check Time*. This is illustrated in **Figure 15**.

a) The *Radar Waveform* generator and UUT are connected using the applicable test setup described in the sections on configuration for Conducted Tests (7.2) or Radiated Tests (7.3) and the power of the UUT is switched off.

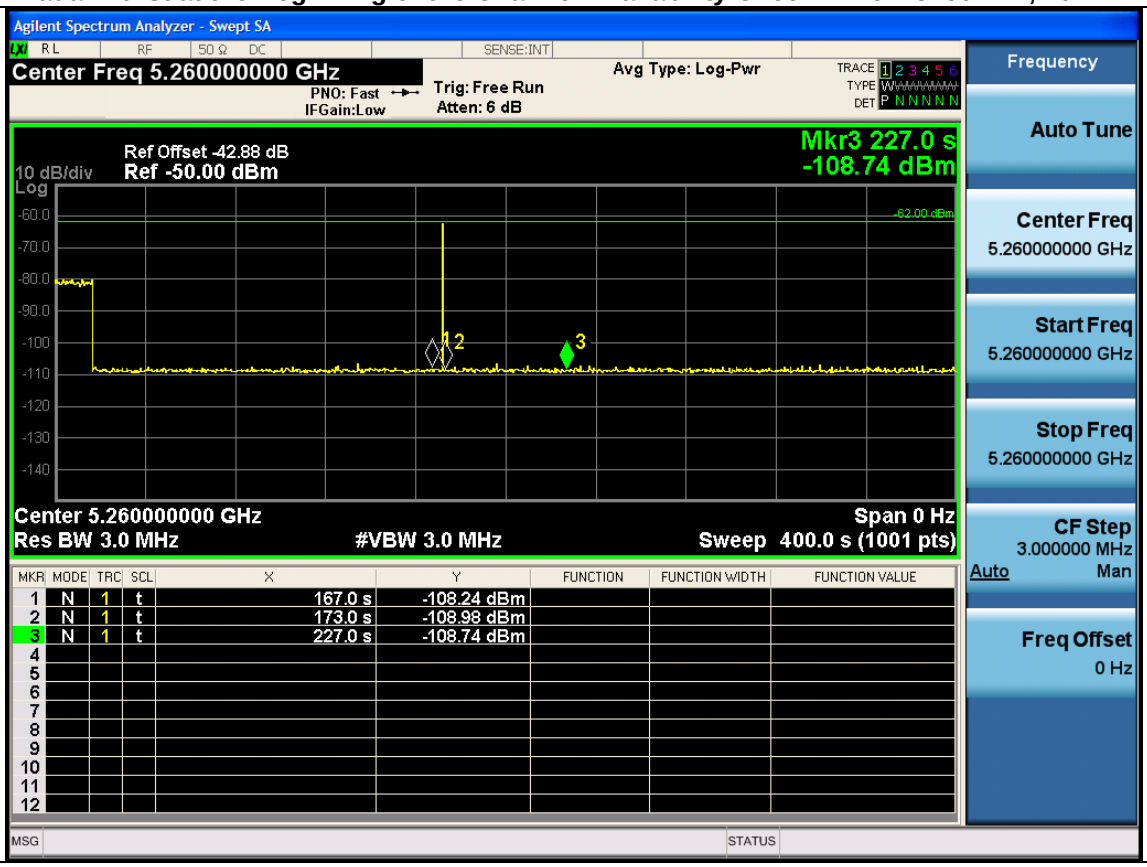
b) The UUT is powered on at T0. T1 denotes the instant when the UUT has completed its power-up sequence (Tpower_up). The *Channel Availability Check Time* commences on Chr at instant T1 and will end no sooner than T1 + Tch_avail_check.

c) A single *Burst* of one of the Short Pulse Radar Types 0-4 will commence within a 6 second window starting at T1. An additional 1 dB is added to the radar test signal to ensure it is at or above the *DFS Detection Threshold*, accounting for equipment variations/errors.

d) Visual indication or measured results on the UUT of successful detection of the radar *Burst* will be recorded and reported. Observation of Chr for UUT emissions will continue for 2.5 minutes after the radar *Burst* has been generated.

e) Verify that during the 2.5 minute measurement window no UUT transmissions occurred on Chr. The *Channel Availability Check* results will be recorded.

Radar Burst at the Beginning of the Channel Availability Check Time – 5260MHz, 20MHz



Radar Burst at the End of the Channel Availability Check Time

Procedure from KDB 905462, 7.8.2.3 Radar Burst at the End of the Channel Availability Check Time:

The steps below define the procedure to verify successful radar detection on the test *Channel* during a period equal to the *Channel Availability Check Time* and avoidance of operation on that *Channel* when a radar *Burst* with a level equal to the *DFS Detection Threshold* + 1dB occurs at the end of the *Channel Availability Check Time*. This is illustrated in **Figure 16**.

a) The *Radar Waveform* generator and UUT are connected using the applicable test setup described in the sections for Conducted Tests (7.2) or Radiated Tests (7.3) and the power of the UUT is switched off.

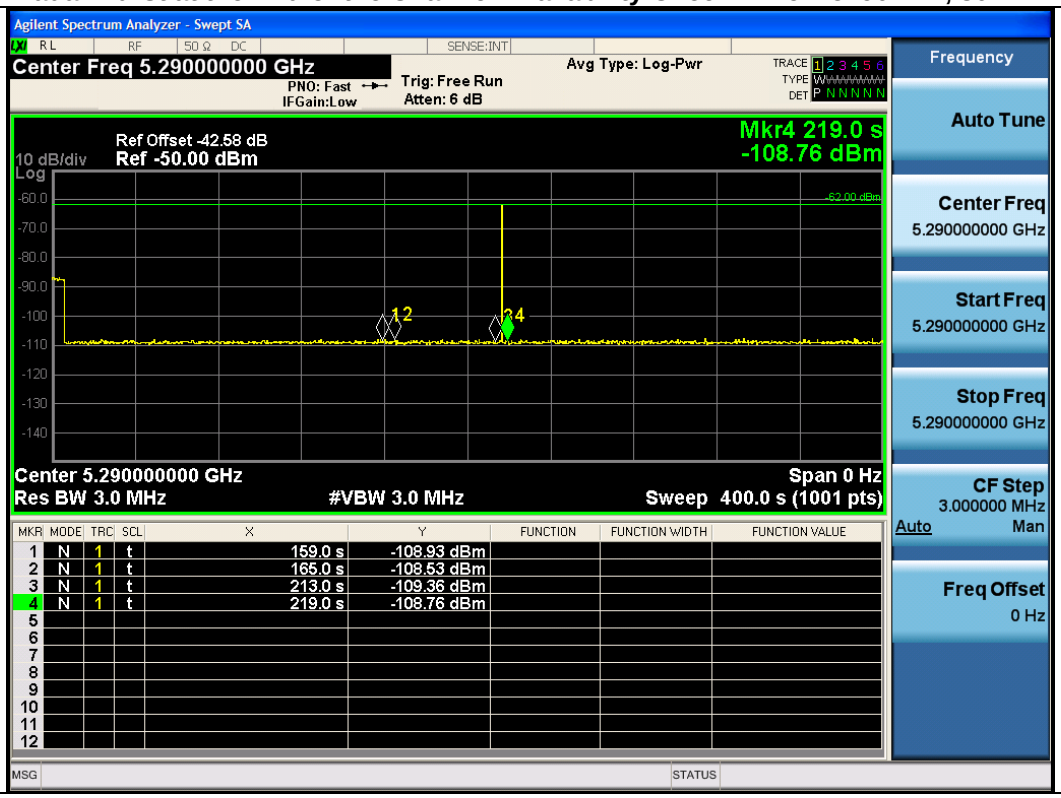
b) The UUT is powered on at T0. T1 denotes the instant when the UUT has completed its power-up sequence (Tpower_up). The *Channel Availability Check Time* commences on Chr at instant T1 and will end no sooner than T1 + Tch_avail_check.

c) A single *Burst* of one of the Short Pulse Radar Types 0-4 will commence within a 6 second window starting at T1 + 54 seconds. An additional 1 dB is added to the radar test signal to ensure it is at or above the *DFS Detection Threshold*, accounting for equipment variations/errors.

d) Visual indication or measured results on the UUT of successful detection of the radar *Burst* will be recorded and reported. Observation of Chr for UUT emissions will continue for 2.5 minutes after the radar *Burst* has been generated.

e) Verify that during the 2.5 minute measurement window no UUT transmissions occurred on Chr. The *Channel Availability Check* results will be recorded.

Radar Burst at the End of the Channel Availability Check Time – 5290MHz, 80MHz



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

Procedure from KDB 905462, 7.8.3 In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period:

These tests define how the following DFS parameters are verified during *In-Service Monitoring;*

- *Channel Closing Transmission Time*
- *Channel Move Time*
- *Non-Occupancy Period*

The steps below define the procedure to determine the above mentioned parameters when a radar *Burst* with a level equal to the *DFS Detection Threshold* + 1dB is generated on the *Operating Channel* of the U-NII device *(In- Service Monitoring).*

a) One frequency will be chosen from the *Operating Channels* of the UUT within the 5250-5350 MHz or 5470-5725 MHz bands. For 802.11 devices, the test frequency must contain control signals. This can be verified by disabling channel loading and monitoring the spectrum analyzer. If no control signals are detected, another frequency must be selected within the emission bandwidth where control signals are detected.

b) In case the UUT is a U-NII device operating as a *Client Device* (with or without DFS), a U-NII device operating as a *Master Device* will be used to allow the UUT (Client device) to *Associate* with the *Master Device*. In case the UUT is a *Master Device*, a U-NII device operating as a *Client Device* will be used and it is assumed that the Client will *Associate* with the UUT (Master). In both cases for conducted tests, the *Radar Waveform* generator will be connected to the *Master Device*. For radiated tests, the emissions of the *Radar Waveform* generator will be directed towards the *Master Device*. If the *Master Device* has antenna gain, the main beam of the antenna will be directed toward the radar emitter. Vertical polarization is used for testing.

c) Stream the channel loading test file from the *Master Device* to the *Client Device* on the test *Channel* for the entire period of the test.

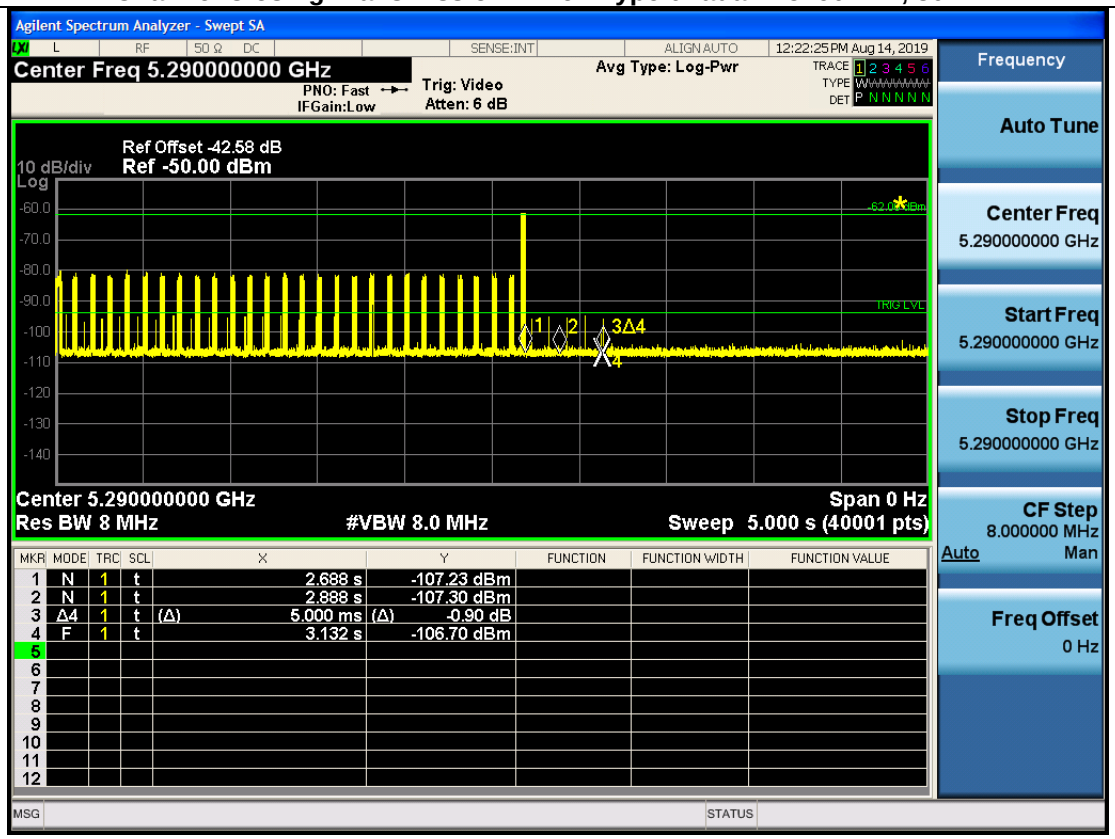
d) At time T0 the *Radar Waveform* generator sends a *Burst* of pulses for one of the Radar Type 0 in **Table 5** at levels defined in **Table 3**, on the *Operating Channel*. An additional 1 dB is added to the radar test signal to ensure it is at or above the *DFS Detection Threshold*, accounting for equipment variations/errors.

e) Observe the transmissions of the UUT at the end of the radar *Burst* on the *Operating Channel* for duration greater than 10 seconds. Measure and record the transmissions from the UUT during the observation time (*Channel Move Time)*. Measure and record the *Channel Move Time* and *Channel Closing Transmission Time* if radar detection occurs. **Figure 17** illustrates *Channel Closing Transmission Time.*

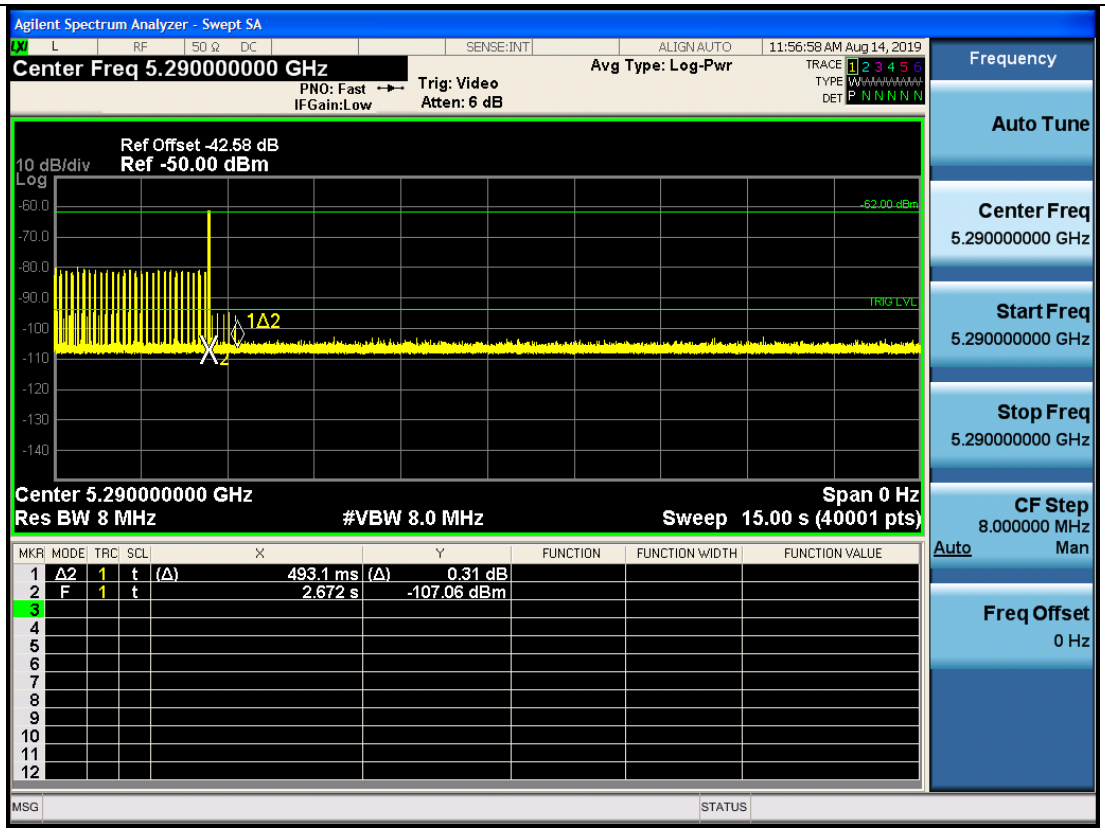
f) When operating as a *Master Device*, monitor the UUT for more than 30 minutes following instant T2 to verify that the UUT does not resume any transmissions on this *Channel*. Perform this test once and record the measurement result.

g) In case the UUT is a U-NII device operating as a *Client Device* with *In-Service Monitoring*, perform steps a) to f).

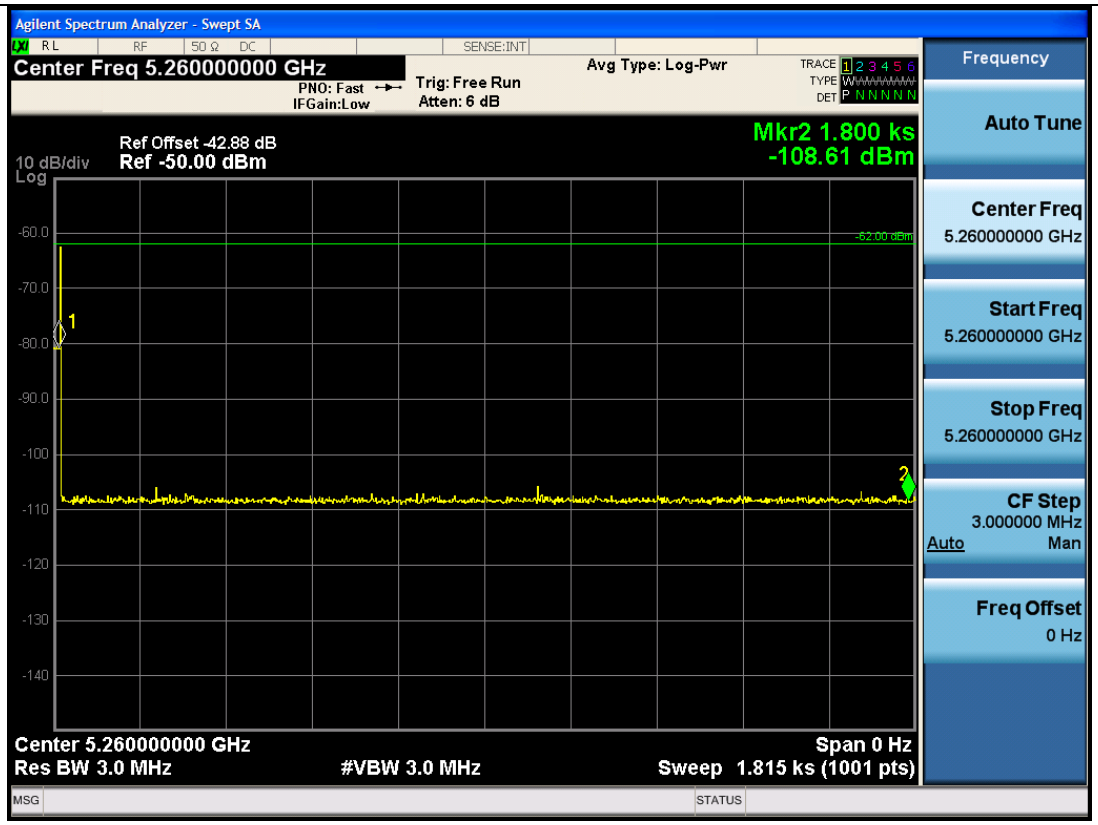
Channel Closing Transmission Time - Type 0 radar – 5290MHz, 80MHz



Channel Move Time for Type 0 radar – 5290MHz, 80MHz



30 Minute Non-Occupancy Period (using Type 1 radar) – 5290MHz, 80MHz



Statistical Performance Check

Procedure from KDB 905462, 7.8.4 Statistical Performance Check:

The steps below define the procedure to determine the minimum percentage of successful detection requirements found in **Tables 5-7** when a radar burst with a level equal to the *DFS Detection Threshold* + 1dB is generated on the *Operating Channel* of the U-NII device *(In- Service Monitoring).*

a) One frequency will be chosen from the *Operating Channels* of the UUT within the 5250-5350 MHz or 5470-5725 MHz bands.

b) In case the UUT is a U-NII device operating as a *Client Device* (with or without Radar Detection), a U-NII device operating as a *Master Device* will be used to allow the UUT (Client device) to *Associate* with the *Master Device*. In case the UUT is a *Master Device*, a U-NII device operating as a *Client Device* will be used and it is assumed that the Client will *Associate* with the UUT (Master). In both cases for conducted tests, the *Radar Waveform* generator will be connected to the *Master Device*. For radiated tests, the emissions of the *Radar Waveform* generator will be directed towards the *Master Device*. If the *Master Device* has antenna gain, the main beam of the antenna will be directed toward the radar emitter. Vertical polarization is used for testing.

c) Stream the channel loading test file from the *Master Device* to the Client Device on the test *Channel* for the entire period of the test.

d) At time T0 the *Radar Waveform* generator sends the individual waveform for each of the Radar Types 1- 6 in **Tables 5-7**, at levels defined in **Table 3**, on the *Operating Channel*. An additional 1 dB is added to the radar test signal to ensure it is at or above the *DFS Detection Threshold*, accounting for equipment variations/errors.

e) Observe the transmissions of the UUT at the end of the Burst on the *Operating Channel* for duration greater than 10 seconds for Radar Type 0 to ensure detection occurs.

f) 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.

g) In case the UUT is a U-NII device operating as a *Client Device* with *In-Service Monitoring*, perform steps a) to f).

7.8.4.1 Short Pulse Radar Test

Once the performance requirements check is complete, statistical data will be gathered, to determine the ability of the device to detect the radar test waveforms (Short Pulse Radar Types 1-4) found in **Table 5**. The device can utilize a test mode to demonstrate when detection occurs to prevent the need to reset the device between trials. The percentage of successful detection is calculated by:

$$\frac{TotalWaveformDetections}{TotalWaveformTrials} \times 100 = \text{Percentage of Successful Detection } \textit{Radar Waveform } N = P_d N$$

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

$$\frac{P_d 1 + P_d 2 + P_d 3 + P_d 4}{4}$$

The minimum number of trails, minimum percentage of successful detection and the aggregate minimum percentage of successful detection are found in **Table 5**.

7.8.4.2 Long Pulse Radar Test

Statistical data will be gathered to determine the ability of the device to detect the Long Pulse Radar Type 5 found in **Table 6**. The device can utilize a test mode to demonstrate when detection occurs to prevent the need to reset the device between trials. The percentage of successful detection is calculated by:

$$\frac{TotalWaveformDetections}{TotalWaveformTrials} \times 100$$

7.8.4.3 Frequency Hopping Radar Test

Statistical data will be gathered to determine the ability of the device to detect the Frequency Hopping radar test signal (radar type 6) found in **Table 7**. The device can utilize a test mode to demonstrate when detection occurs to prevent the need to reset the device between trial runs. The probability of successful detection is calculated by:

$$\frac{TotalWaveformDetections}{TotalWaveformTrials} \times 100$$

Statistical Performance Check - 20MHz Bandwidth, 5260MHz

Type 1A/1B Radar Statistical Performance

Trial	Frequency	Pulses	PW (uS)	PRI (uS)	1=Detection 0=No Detection	Detection Percentage	Limit
1	5254	72	1	738	1	100.0%	60.0%
2	5254	67	1	798	1		
3	5254	62	1	858	1		
4	5252	81	1	658	1		
5	5252	70	1	758	1		
6	5252	89	1	598	1		
7	5253	95	1	558	1		
8	5253	78	1	678	1		
9	5253	58	1	918	1		
10	5255	67	1	798	1		
11	5255	65	1	818	1		
12	5255	67	1	798	1		
13	5257	83	1	638	1		
14	5257	86	1	618	1		
15	5257	83	1	638	1		
16	5260	21	1	2545	1		
17	5260	18	1	2957	1		
18	5260	24	1	2200	1		
19	5263	29	1	1870	1		
20	5263	19	1	2799	1		
21	5263	21	1	2531	1		
22	5265	21	1	2633	1		
23	5265	36	1	1490	1		
24	5265	27	1	1975	1		
25	5267	53	1	1000	1		
26	5267	33	1	1617	1		
27	5267	85	1	621	1		
28	5266	27	1	1998	1		
29	5266	20	1	2655	1		
30	5266	19	1	2887	1		

Trial	Frequency	Pulses	PW (uS)	PRI (uS)	1=Detection 0=No Detection	Detection Percentage	Limit

1	5254	95	1	558	1		
2	5254	72	1	738	1		
3	5254	70	1	758	1		
4	5252	83	1	638	1		
5	5252	102	1	518	1		
6	5252	74	1	718	0		
7	5253	76	1	698	1		
8	5253	57	1	938	1		
9	5253	59	1	898	1		
10	5255	78	1	678	1		
11	5255	72	1	738	1		
12	5255	70	1	758	1		
13	5257	61	1	878	1		
14	5257	74	1	718	0		
15	5257	74	1	718	0	90.0%	60.0%
16	5260	54	1	990	1		
17	5260	35	1	1544	1		
18	5260	50	1	1077	1		
19	5263	42	1	1283	1		
20	5263	45	1	1188	1		
21	5263	24	1	2271	1		
22	5265	28	1	1909	1		
23	5265	34	1	1567	1		
24	5265	57	1	941	1		
25	5267	23	1	2382	1		
26	5267	33	1	1647	1		
27	5267	22	1	2446	1		
28	5266	27	1	1998	1		
29	5266	28	1	1911	1		
30	5266	46	1	1160	1		

Type 2 Radar Statistical Performance

Trial	Frequency	Pulses	PW (uS)	PRI (uS)	1=Detection 0=No Detection	Detection Percentage	Limit
1	5254	26	1.8	151	0	83.3%	60.0%

2	5254	29	4.6	167	1		
3	5254	24	3.3	198	1		
4	5252	25	4.2	182	1		
5	5252	29	4.5	190	1		
6	5252	24	3.3	215	0		
7	5253	29	3.3	190	1		
8	5253	25	5	182	1		
9	5253	28	1.1	212	1		
10	5255	28	4	180	1		
11	5255	26	1.2	213	1		
12	5255	23	5	196	1		
13	5257	27	3.4	216	1		
14	5257	29	2.5	154	1		
15	5257	29	2.5	229	1		
16	5260	29	2.9	224	1		
17	5260	27	3.2	154	1		
18	5260	23	1.2	174	0		
19	5263	29	4.4	226	1		
20	5263	25	4.2	219	1		
21	5263	25	2.3	191	1		
22	5265	25	4.3	173	1		
23	5265	24	1.3	163	0		
24	5265	24	2.5	153	0		
25	5267	27	4.1	214	1		
26	5267	24	3.8	167	1		
27	5267	29	1.2	196	1		
28	5266	25	3.8	177	1		
29	5266	27	1.6	208	1		
30	5266	28	1.4	198	1		

Type 3 Radar Statistical Performance

Trial	Frequency	Pulses	PW (uS)	PRI (uS)	1=Detection 0=No Detection	Detection Percentage	Limit
1	5254	17	9.8	419	1	73.3%	60.0%
2	5254	18	9.5	415	1		
3	5254	16	8.8	330	0		
4	5252	18	7.9	494	1		

5	5252	18	10	401	1		
6	5252	18	9.6	428	1		
7	5253	16	9.6	447	1		
8	5253	16	7.8	329	1		
9	5253	18	10	265	1		
10	5255	18	6	476	0		
11	5255	18	7.3	394	1		
12	5255	16	7.8	233	1		
13	5257	16	7.5	494	0		
14	5257	18	9.4	343	1		
15	5257	18	8	324	0		
16	5260	17	8.5	216	1		
17	5260	18	6.3	479	1		
18	5260	18	7.3	325	0		
19	5263	17	6.2	256	1		
20	5263	17	9.8	309	1		
21	5263	18	8.2	353	0		
22	5265	16	6.3	241	1		
23	5265	18	9.5	457	0		
24	5265	17	6.9	352	1		
25	5267	16	7.7	329	1		
26	5267	18	8.5	442	1		
27	5267	16	7.6	341	1		
28	5266	17	8.9	337	0		
29	5266	17	9.8	218	1		
30	5266	18	8.3	406	1		

Type 4 Radar Statistical Performance

Trial	Frequency	Pulses	PW (uS)	PRI (uS)	1=Detection 0=No Detection	Detection Percentage	Limit
1	5254	12	13.8	336	1		
2	5254	12	17	264	0		
3	5254	16	12.8	380	1		
4	5252	15	15.4	263	1	83.3%	60.0%
5	5252	13	13.3	449	1		
6	5252	13	12.6	397	1		
7	5253	12	14.2	293	1		

8	5253	13	12.9	416	0		
9	5253	12	16.7	486	1		
10	5255	14	14.5	213	1		
11	5255	13	13.9	397	1		
12	5255	16	17	329	1		
13	5257	15	19.6	246	1		
14	5257	12	11.5	364	1		
15	5257	14	11.2	336	0		
16	5260	15	19.6	377	1		
17	5260	15	15	441	1		
18	5260	15	19.3	487	1		
19	5263	14	16.1	248	1		
20	5263	16	12.3	219	1		
21	5263	13	11.1	258	1		
22	5265	13	14.9	288	1		
23	5265	13	16.8	412	1		
24	5265	14	12.2	317	1		
25	5267	15	17	338	1		
26	5267	16	12.5	284	1		
27	5267	12	18.2	317	0		
28	5266	16	11.5	453	1		
29	5266	14	12.8	380	1		
30	5266	12	17.5	395	0		

In addition, an average minimum percentage of successful detection across all four Short pulse radar test waveforms is required and is calculated as follows:

$$\frac{P_d 1 + P_d 2 + P_d 3 + P_d 4}{4}$$ = (90%+83.3%+73.3%+83.3%)/4 = 82.475% (>80%)

Type 5 Long Pulse Radar Statistical Performance

Trial	Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)	1 = Detection 0 = No Detection	Detection Percentage	Limit
1	1	3	5255.4	11	85	1380	1086	0.315513	1	90.0%	80.0%
2	1	1	5259	20	65			1.16163	0		
3	1	2	5253.8	7	75	1776		0.793399	1		
4	1	2	5255.8	12	85	1466		0.329778	1		
5	1	2	5255	10	100	1117		0.766642	1		
6	1	2	5258.6	19	75	1424		1.059925	0		
7	1	1	5257.4	16	60			0.16372	1		
8	1	3	5255	10	70	1741	1523	0.28821	1		
9	1	1	5255	10	65			1.185048	1		
10	1	1	5257.8	17	85			1.107677	0		
11	1	1	5260	19	60			0.182068	1		
12	1	3	5260	16	75	1653	1039	0.48735	1		
13	1	3	5260	8	50	1173	1490	0.108746	1		
14	1	3	5260	6	65	1274	1451	0.684432	1		
15	1	3	5260	10	70	1927	1695	0.45014	1		
16	1	1	5260	7	95			0.398252	1		
17	1	1	5260	6	95			0.29529	1		
18	1	3	5260	16	75	1009	1295	1.075146	1		
19	1	3	5260	14	90	1303	1707	0.415194	1		
20	1	3	5260	11	50	1280	1933	0.366958	1		
21	1	1	5264.2	12	90			0.169344	1		
22	1	3	5266.2	7	80	1178	1417	0.293979	1		
23	1	3	5264.2	12	75	1165	1952	1.135555	1		
24	1	3	5264.2	12	75	1568	1841	0.402774	1		
25	1	3	5264.2	12	65	1558	1755	0.299647	1		
26	1	1	5262.2	17	55			0.312283	1		
27	1	2	5266.2	7	90	1071		0.33448	1		
28	1	2	5261.4	19	55	1964		0.097067	1		
29	1	3	5262.6	16	75	1072	1812	0.87939	1		
30	1	1	5267	5	75			0.964121	1		

Type 5 Long Pulse Radar Statistical Performance – Details

USA Bin 5 Trial #1							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5255.4	11	85	1380	1086	0.315513
2	2	5255.4	11	85	1745		1.158003
3	3	5255.4	11	80	1425	1326	1.7808
4	1	5255.4	11	80			2.610266
5	3	5255.4	11	95	1144	1981	3.795319
6	2	5255.4	11	90	1011		4.256583
7	3	5255.4	11	65	1124	1222	5.058183
8	1	5255.4	11	90			6.011809
9	1	5255.4	11	95			6.81005
10	3	5255.4	11	100	1472	1717	7.845485
11	1	5255.4	11	80			8.347987
12	1	5255.4	11	50			9.513723
13	2	5255.4	11	60	1324		10.203095
14	3	5255.4	11	100	1827	1844	11.002697
15	2	5255.4	11	70	1486		11.479372
16	3	5257	15	55	1535	1338	1.529415
USA Bin 5 Trial #2							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5259	20	65			1.16163
2	2	5259	20	65	1682		1.389578
3	2	5259	20	70	1061		3.102624
4	2	5259	20	90	1939		4.973117
5	2	5259	20	95	1996		5.662275
6	3	5259	20	55	1096	1038	7.215205
7	2	5259	20	50	1334		8.663029
8	2	5259	20	85	1838		10.030166
9	2	5259	20	65	1867		10.752535
10	3	5257	15	60	1019	1536	8.744712
USA Bin 5 Trial #3							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5253.8	7	75	1776		0.793399
2	2	5253.8	7	90	1212		1.376425
3	3	5253.8	7	100	1242	1380	2.023765
4	2	5253.8	7	60	1379		2.455731
5	1	5253.8	7	55			3.374446

6	1	5253.8	7	80			4.726235
7	2	5253.8	7	100	1883		5.085669
8	1	5253.8	7	50			6.029092
9	2	5253.8	7	85	1674		6.686114
10	1	5253.8	7	65			7.836706
11	3	5253.8	7	100	1396	1447	8.323634
12	1	5253.8	7	65			8.856452
13	2	5253.8	7	55	1842		10.322213
14	1	5253.8	7	65			11.16076
15	2	5253.8	7	90	1361		11.935214
16	1	5253.4	6	75			6.065221
USA Bin 5 Trial #4							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5255.8	12	85	1466		0.329778
2	2	5255.8	12	75	1248		1.366518
3	3	5255.8	12	55	1873	1779	2.848389
4	2	5255.8	12	95	1406		3.203778
5	1	5255.8	12	60			4.655165
6	2	5255.8	12	100	1218		5.588896
7	1	5255.8	12	80			6.844816
8	2	5255.8	12	60	1103		7.402565
9	2	5255.8	12	60	1528		8.394551
10	2	5255.8	12	55	1731		9.019501
11	1	5255.8	12	95			10.693945
12	1	5255.8	12	50			11.87924
13	3	5256.6	14	90	1385	1269	2.014063
USA Bin 5 Trial #5							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5255	10	100	1117		0.766642
2	3	5255	10	50	1824	1908	2.617167
3	2	5255	10	85	1548		3.515035
4	3	5255	10	60	1225	1870	4.062845
5	3	5255	10	70	1738	1990	6.235754
6	1	5255	10	90			6.913402
7	2	5255	10	95	1644		8.694385
8	3	5255	10	85	1869	1520	9.403967
9	1	5255	10	50			11.856102
10	1	5256.6	14	55			9.744439
USA Bin 5 Trial #6							

Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5258.6	19	75	1424		1.059925
2	1	5258.6	19	60			1.55023
3	2	5258.6	19	90	1109		2.749945
4	1	5258.6	19	65			3.667971
5	3	5258.6	19	85	1079	1508	5.294941
6	2	5258.6	19	50	1501		6.012749
7	1	5258.6	19	75			7.818223
8	2	5258.6	19	100	1726		9.368117
9	2	5258.6	19	100	1164		9.704186
10	1	5258.6	19	100			11.390621
11	1	5256.2	13	55			6.011685
USA Bin 5 Trial #7							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5257.4	16	60			0.16372
2	2	5257.4	16	50	1124		1.435886
3	1	5257.4	16	90			2.956032
4	2	5257.4	16	65	1536		4.259742
5	1	5257.4	16	75			5.085578
6	3	5257.4	16	95	1749	1967	6.101953
7	2	5257.4	16	85	1157		7.609843
8	3	5257.4	16	85	1729	1753	8.710853
9	2	5257.4	16	50	1806		9.768403
10	2	5257.4	16	60	1916		10.175977
11	2	5257.4	16	65	1527		11.67714
12	1	5257	15	60			4.987527
USA Bin 5 Trial #8							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5255	10	70	1741	1523	0.28821
2	1	5255	10	80			0.793136
3	1	5255	10	100			2.052323
4	3	5255	10	80	1590	1624	2.757516
5	2	5255	10	75	1408		3.381614
6	1	5255	10	50			3.997559
7	1	5255	10	100			4.714376
8	3	5255	10	50	1389	1610	5.369722
9	1	5255	10	50			6.370549

10	1	5255	10	65			7.235789
11	2	5255	10	60	1030		8.025745
12	3	5255	10	55	1856	1470	8.632239
13	1	5255	10	95			9.312507
14	2	5255	10	90	1557		10.356194
15	2	5255	10	70	1308		11.050221
16	1	5255	10	50			11.291639
17	3	5256.6	14	50	1959	1359	10.504301
USA Bin 5 Trial #9							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5255	10	65			1.185048
2	3	5255	10	90	1723	1502	1.745354
3	3	5255	10	85	1399	1151	3.43785
4	3	5255	10	95	1776	1758	4.350012
5	2	5255	10	55	1879		5.274477
6	1	5255	10	75			6.918698
7	2	5255	10	50	1421		7.938991
8	3	5255	10	95	1445	1065	8.820744
9	1	5255	10	100			10.248868
10	2	5255	10	65	1935		10.981522
11	3	5254.2	8	95	1933	1720	10.867558
USA Bin 5 Trial #10							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5257.8	17	85			1.107677
2	1	5257.8	17	100			2.724676
3	3	5257.8	17	100	1461	1739	4.034208
4	2	5257.8	17	85	1070		4.527153
5	2	5257.8	17	60	1815		7.010416
6	3	5257.8	17	70	1616	1136	7.600084
7	3	5257.8	17	90	1560	1622	10.492769
8	1	5257.8	17	70			11.851596
9	2	5259	20	80	1979		4.749422
USA Bin 5 Trial #11							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5260	19	60			0.182068
2	3	5260	19	90	1445	1876	1.372421
3	1	5260	19	100			2.586834

4	2	5260	19	85	1308		3.754352
5	2	5260	19	60	1081		5.284814
6	3	5260	19	55	1630	1898	6.879502
7	1	5260	19	55			7.744477
8	2	5260	19	90	1612		9.176571
9	1	5260	19	75			9.852073
10	2	5260	19	60	1421		11.500554
USA Bin 5 Trial #12							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5260	16	75	1653	1039	0.48735
2	2	5260	16	85	1956		1.518858
3	3	5260	16	70	1343	1297	2.477851
4	2	5260	16	100	1790		4.286119
5	3	5260	16	100	1175	1824	4.647175
6	1	5260	16	85			6.283034
7	3	5260	16	100	1502	1568	7.361026
8	1	5260	16	70			8.608842
9	2	5260	16	80	1825		9.531772
10	2	5260	16	90	1437		9.82252
11	1	5260	16	90			11.806387
12	1	5254.6	9	95			11.28451
USA Bin 5 Trial #13							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5260	8	50	1173	1490	0.108746
2	1	5260	8	55			2.033154
3	2	5260	8	60	1757		3.406318
4	2	5260	8	55	1081		4.333798
5	2	5260	8	75	1017		5.163166
6	1	5260	8	60			6.724245
7	3	5260	8	55	1496	1847	7.502577
8	2	5260	8	60	1456		8.443838
9	3	5260	8	85	1314	1305	10.235169
10	1	5260	8	90			10.914989
11	2	5260	19	95	1074		7.852073
USA Bin 5 Trial #14							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5260	6	65	1274	1451	0.684432

2	2	5260	6	75	1954		1.498901
3	2	5260	6	75	1241		2.7651
4	3	5260	6	75	1532	1982	3.85563
5	2	5260	6	70	1001		4.888691
6	2	5260	6	90	1858		5.509982
7	3	5260	6	60	1213	1553	7.597162
8	3	5260	6	75	1573	1047	7.95945
9	3	5260	6	55	1943	1047	9.153041
10	1	5260	6	90			10.154572
11	3	5260	6	90	1147	1154	10.93129
12	3	5260	17	55	1230	1872	4.839652

USA Bin 5 Trial #15

Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5260	10	70	1927	1695	0.45014
2	1	5260	10	60			1.011125
3	3	5260	10	90	1635	1866	1.5226
4	2	5260	10	65	1779		2.023419
5	2	5260	10	65	1367		2.7025
6	3	5260	10	95	1844	1550	3.43587
7	2	5260	10	90	1156		4.00105
8	2	5260	10	70	1891		4.486563
9	1	5260	10	70			5.653714
10	2	5260	10	55	1637		6.158173
11	2	5260	10	95	1440		6.812025
12	3	5260	10	55	1466	1466	7.189958
13	1	5260	10	85			8.147543
14	2	5260	10	90	1313		8.743056
15	1	5260	10	60			9.38117
16	2	5260	10	65	1150		9.708296
17	1	5260	10	100			10.198857
18	2	5260	10	60	1942		11.169911
19	2	5260	10	80	1131		11.863975
20	1	5260	11	95			9.099267

USA Bin 5 Trial #16

Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5260	7	95			0.398252
2	2	5260	7	90	1598		1.282407
3	3	5260	7	70	1911	1072	1.414299
4	2	5260	7	90	1669		2.762039

5	2	5260	7	85	1766		2.832453
6	2	5260	7	80	1271		3.79286
7	3	5260	7	60	1690	1510	4.91336
8	2	5260	7	75	1180		5.086908
9	2	5260	7	75	1441		5.912107
10	3	5260	7	55	1233	1538	6.716438
11	1	5260	7	50			7.454176
12	2	5260	7	65	1439		8.092074
13	3	5260	7	80	1674	1592	8.549382
14	3	5260	7	95	1363	1783	9.744401
15	3	5260	7	65	1774	1086	9.899382
16	2	5260	7	85	1799		11.192389
17	1	5260	7	70			11.771242
18	1	5260	20	95			8.729114
USA Bin 5 Trial #17							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5260	6	95			0.29529
2	2	5260	6	100	1782		0.791703
3	1	5260	6	50			2.021867
4	3	5260	6	80	1330	1862	2.812368
5	1	5260	6	75			2.862858
6	3	5260	6	60	1762	1332	4.004536
7	3	5260	6	100	1946	1115	4.828655
8	2	5260	6	50	1026		5.334483
9	3	5260	6	100	1849	1501	5.786308
10	1	5260	6	70			6.8804
11	2	5260	6	90	1709		7.080812
12	3	5260	6	95	1405	1940	7.79485
13	1	5260	6	55			8.79124
14	3	5260	6	60	1713	1673	9.508252
15	2	5260	6	60	1763		9.946849
16	2	5260	6	100	1838		10.615053
17	2	5260	6	65	1837		11.715017
USA Bin 5 Trial #18							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5260	16	75	1009	1295	1.075146
2	3	5260	16	65	1550	1831	1.532258
3	1	5260	16	50			3.899579
4	1	5260	16	80			5.830038

5	3	5260	16	70	1833	1851	6.172852
6	2	5260	16	80	1039		7.6728
7	1	5260	16	90			9.418579
8	3	5260	16	70	1576	1904	10.742913
9	2	5260	16	70	1312		10.732612
USA Bin 5 Trial #19							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5260	14	90	1303	1707	0.415194
2	2	5260	14	75	1344		0.942467
3	2	5260	14	100	1292		1.803201
4	1	5260	14	100			2.035581
5	3	5260	14	55	1473	1447	2.988953
6	2	5260	14	90	1449		3.738794
7	2	5260	14	70	1432		3.973978
8	1	5260	14	75			4.71643
9	2	5260	14	100	1367		5.4624
10	3	5260	14	100	1896	1823	6.017105
11	3	5260	14	75	1532	1112	6.772612
12	3	5260	14	60	1653	1148	7.547011
13	2	5260	14	100	1318		7.872143
14	3	5260	14	55	1535	1590	8.489325
15	3	5260	14	100	1040	1848	9.242647
16	2	5260	14	55	1530		9.964601
17	1	5260	14	80			10.226636
18	3	5260	14	70	1710	1828	11.057008
19	2	5260	14	55	1266		11.885413
20	1	5260	18	80			1.549476
USA Bin 5 Trial #20							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5260	11	50	1280	1933	0.366958
2	1	5260	11	85			1.610426
3	1	5260	11	90			2.330214
4	2	5260	11	55	1518		3.911577
5	2	5260	11	55	1392		4.597055
6	2	5260	11	50	1071		5.769936
7	2	5260	11	95	1771		6.388004
8	2	5260	11	65	1242		7.484538
9	3	5260	11	60	1425	1410	8.808927
10	2	5260	11	95	1773		9.736545

11	3	5260	11	55	1481	1021	10.874999
12	3	5260	11	80	1490	1041	11.132134
13	2	5260	18	85	1592		9.820757
USA Bin 5 Trial #21							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5264.2	12	90			0.169344
2	3	5264.2	12	75	1833	1677	1.569009
3	1	5264.2	12	85			2.53942
4	3	5264.2	12	80	1154	1415	3.198521
5	1	5264.2	12	65			4.413094
6	2	5264.2	12	90	1531		5.521437
7	1	5264.2	12	75			6.743722
8	1	5264.2	12	100			7.440417
9	1	5264.2	12	90			8.343725
10	2	5264.2	12	80	1538		9.922343
11	2	5264.2	12	50	1752		10.420225
12	1	5264.2	12	55			11.42879
13	1	5260	13	60			10.201122
USA Bin 5 Trial #22							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5266.2	7	80	1178	1417	0.293979
2	2	5266.2	7	70	1731		1.16807
3	3	5266.2	7	50	1946	1555	1.843373
4	2	5266.2	7	65	1319		2.526696
5	1	5266.2	7	85			3.697205
6	1	5266.2	7	65			4.02703
7	3	5266.2	7	75	1570	1014	5.082838
8	1	5266.2	7	100			5.50669
9	3	5266.2	7	100	1539	1224	6.116236
10	2	5266.2	7	75	1279		6.918468
11	3	5266.2	7	85	1533	1172	8.093555
12	1	5266.2	7	65			8.536179
13	2	5266.2	7	60	1047		9.310331
14	2	5266.2	7	100	1893		9.885698
15	1	5266.2	7	100			10.894833
16	1	5266.2	7	70			11.527583
17	1	5265	10	60			2.13829
USA Bin 5 Trial #23							

Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5264.2	12	75	1165	1952	1.135555
2	2	5264.2	12	80	1885		2.509764
3	2	5264.2	12	95	1107		3.326479
4	2	5264.2	12	55	1200		5.94432
5	3	5264.2	12	50	1145	1340	6.235993
6	2	5264.2	12	100	1193		7.759132
7	2	5264.2	12	90	1659		9.258512
8	1	5264.2	12	65			10.910996
9	3	5265	10	65	2000	1081	8.385706
USA Bin 5 Trial #24							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5264.2	12	75	1568	1841	0.402774
2	1	5264.2	12	75			1.130045
3	1	5264.2	12	60			2.234849
4	2	5264.2	12	65	1500		2.413216
5	3	5264.2	12	60	1505	1614	3.296397
6	1	5264.2	12	70			4.359209
7	2	5264.2	12	85	1097		4.922717
8	2	5264.2	12	50	1067		5.276652
9	2	5264.2	12	55	1173		6.165717
10	1	5264.2	12	65			6.790262
11	3	5264.2	12	80	1576	1781	8.231113
12	1	5264.2	12	95			8.978707
13	2	5264.2	12	80	1390		9.164463
14	2	5264.2	12	55	1624		9.871576
15	1	5264.2	12	75			10.937981
16	1	5264.2	12	85			11.45165
17	1	5266.2	7	95			7.405901
USA Bin 5 Trial #25							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5264.2	12	65	1558	1755	0.299647
2	3	5264.2	12	95	1838	1254	1.051524
3	1	5264.2	12	85			1.619786
4	1	5264.2	12	80			3.128113
5	1	5264.2	12	85			3.436372
6	2	5264.2	12	100	1817		4.577118

7	1	5264.2	12	65			5.125561
8	3	5264.2	12	55	1157	1956	5.682809
9	2	5264.2	12	65	1742		6.969341
10	1	5264.2	12	60			7.810972
11	1	5264.2	12	65			8.742392
12	1	5264.2	12	100			9.542594
13	1	5264.2	12	55			9.731986
14	3	5264.2	12	55	1854	1543	11.142162
15	2	5264.2	12	60	1778		11.721517
16	3	5262.2	17	65	1018	1375	11.406791
USA Bin 5 Trial #26							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5262.2	17	55			0.312283
2	1	5262.2	17	50			0.64519
3	1	5262.2	17	65			1.752499
4	1	5262.2	17	60			2.117627
5	3	5262.2	17	55	1677	1620	2.939802
6	1	5262.2	17	70			3.3131
7	3	5262.2	17	50	1110	1785	4.070199
8	3	5262.2	17	80	1608	1007	4.686678
9	1	5262.2	17	85			5.228743
10	1	5262.2	17	75			5.964737
11	3	5262.2	17	85	1913	1970	6.459299
12	3	5262.2	17	60	1768	1482	7.188774
13	2	5262.2	17	75	1631		7.25389
14	2	5262.2	17	85	1174		8.29887
15	1	5262.2	17	80			8.803265
16	2	5262.2	17	60	1345		9.453459
17	2	5262.2	17	85	1128		10.176983
18	1	5262.2	17	80			10.444596
19	2	5262.2	17	80	1597		11.069907
20	3	5262.2	17	50	1519	1373	11.605273
21	2	5261.4	19	100	1718		3.903126
USA Bin 5 Trial #27							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5266.2	7	90	1071		0.33448
2	3	5266.2	7	95	1567	1005	1.831093
3	1	5266.2	7	95			1.872926
4	2	5266.2	7	100	1632		3.551904

5	2	5266.2	7	70	1352		4.18703
6	3	5266.2	7	55	1557	1466	5.493465
7	1	5266.2	7	80			6.011681
8	1	5266.2	7	85			7.165312
9	2	5266.2	7	70	1262		8.036148
10	2	5266.2	7	100	1283		9.137502
11	2	5266.2	7	50	1098		9.356329
12	2	5266.2	7	50	1947		10.763962
13	3	5266.2	7	80	1913	1787	11.650877
14	1	5264.6	11	100			2.971532
USA Bin 5 Trial #28							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5261.4	19	55	1964		0.097067
2	2	5261.4	19	90	1499		1.16235
3	1	5261.4	19	55			1.657462
4	1	5261.4	19	95			2.060679
5	2	5261.4	19	95	1656		2.73437
6	1	5261.4	19	65			3.413693
7	1	5261.4	19	55			4.293718
8	2	5261.4	19	65	1802		4.697316
9	2	5261.4	19	85	1562		5.472555
10	1	5261.4	19	95			5.974881
11	1	5261.4	19	70			6.771919
12	2	5261.4	19	50	1583		7.256732
13	2	5261.4	19	90	1744		7.582003
14	1	5261.4	19	55			8.761252
15	2	5261.4	19	85	1895		9.04741
16	1	5261.4	19	100			9.994633
17	2	5261.4	19	100	1987		10.666873
18	3	5261.4	19	50	1852	1405	10.934212
19	2	5261.4	19	60	1553		11.933502
20	1	5261.4	19	55			7.759783
USA Bin 5 Trial #29							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5262.6	16	75	1072	1812	0.87939
2	1	5262.6	16	60			1.659375
3	1	5262.6	16	60			3.271514
4	2	5262.6	16	55	1123		4.227598
5	2	5262.6	16	90	1020		5.814206

6	3	5262.6	16	60	1092	1894	6.505671
7	3	5262.6	16	80	1741	1741	8.066376
8	1	5262.6	16	65			8.477341
9	1	5262.6	16	100			10.30031
10	2	5262.6	16	75	1634		11.849011
11	1	5261.8	18	100			1.649277
USA Bin 5 Trial #30							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5267	5	75			0.964121
2	2	5267	5	95	1738		1.011343
3	3	5267	5	80	1827	1199	2.505212
4	1	5267	5	90			3.008271
5	3	5267	5	50	1316	1802	4.8932
6	1	5267	5	100			5.334425
7	3	5267	5	80	1536	1585	6.63111
8	2	5267	5	70	1624		7.751236
9	1	5267	5	65			8.116647
10	3	5267	5	75	1908	1188	9.898247
11	2	5267	5	95	1267		10.624367
12	3	5267	5	50	1419	1434	11.93239

Type 6 Frequency Hopping Radar Statistical Performance

Trial	Hop #	Freq (GHz)	Pulse Start (mS)	1=Detection 0=No Detection	Detection Percentage	Limit
1	11	5256	33	1	96.7%	70.0%
2	1	5264	3	1		
3	37	5256	111	1		
4	2	5261	6	1		
5	13	5269	39	1		
6	0	5268	0	1		
7	13	5256	39	1		
8	17	5266	51	1		
9	33	5261	99	1		
10	24	5266	72	1		
11	5	5261	15	1		
12	1	5254	3	1		
13	40	5253	120	0		
14	19	5268	57	1		
15	7	5263	21	1		
16	28	5264	84	1		
17	5	5269	15	1		
18	52	5266	156	1		
19	40	5253	120	1		
20	7	5253	21	1		
21	2	5269	6	1		
22	30	5255	90	1		
23	3	5252	9	1		
24	10	5264	30	1		
25	8	5265	24	1		
26	1	5251	3	1		
27	38	5259	114	1		
28	4	5252	12	1		
29	11	5261	33	1		
30	22	5264	66	1		

Type 6 Frequency Hopping Radar Statistical Performance - Details

USA Frequency Hopping Trial #1

Hop #	Freq (GHz)	Pulse Start (mS)
11	5256	33
42	5254	126
53	5267	159
61	5261	183
74	5252	222
78	5264	234
USA Frequency Hopping Trial #2		
Hop #	Freq (GHz)	Pulse Start (mS)
1	5264	3
26	5257	78
45	5251	135
56	5252	168
79	5265	237
91	5262	273
USA Frequency Hopping Trial #3		
Hop #	Freq (GHz)	Pulse Start (mS)
37	5256	111
66	5260	198
76	5258	228
79	5262	237
USA Frequency Hopping Trial #4		
Hop #	Freq (GHz)	Pulse Start (mS)
2	5261	6
22	5269	66
57	5256	171
64	5266	192
USA Frequency Hopping Trial #5		
Hop #	Freq (GHz)	Pulse Start (mS)
13	5269	39
47	5258	141
55	5262	165
74	5261	222
USA Frequency Hopping Trial #6		
Hop #	Freq (GHz)	Pulse Start (mS)
0	5268	0
61	5263	183

62	5255	186
USA Frequency Hopping Trial #7		
Hop #	Freq (GHz)	Pulse Start (mS)
13	5256	39
19	5265	57
52	5254	156
83	5267	249
85	5262	255
USA Frequency Hopping Trial #8		
Hop #	Freq (GHz)	Pulse Start (mS)
17	5266	51
51	5252	153
75	5260	225
85	5264	255
95	5255	285
USA Frequency Hopping Trial #9		
Hop #	Freq (GHz)	Pulse Start (mS)
33	5261	99
35	5256	105
75	5251	225
98	5269	294
USA Frequency Hopping Trial #10		
Hop #	Freq (GHz)	Pulse Start (mS)
24	5266	72
26	5260	78
45	5265	135
73	5263	219
USA Frequency Hopping Trial #11		
Hop #	Freq (GHz)	Pulse Start (mS)
5	5261	15
8	5267	24
46	5264	138
97	5253	291
USA Frequency Hopping Trial #12		
Hop #	Freq (GHz)	Pulse Start (mS)
1	5254	3
5	5258	15

58	5255	174
83	5252	249
USA Frequency Hopping Trial #13		
Hop #	Freq (GHz)	Pulse Start (mS)
40	5253	120
USA Frequency Hopping Trial #14		
Hop #	Freq (GHz)	Pulse Start (mS)
19	5268	57
30	5259	90
78	5260	234
85	5251	255
87	5256	261
USA Frequency Hopping Trial #15		
Hop #	Freq (GHz)	Pulse Start (mS)
7	5263	21
28	5251	84
32	5260	96
34	5257	102
80	5269	240
97	5262	291
USA Frequency Hopping Trial #16		
Hop #	Freq (GHz)	Pulse Start (mS)
28	5264	84
35	5268	105
68	5263	204
88	5251	264
USA Frequency Hopping Trial #17		
Hop #	Freq (GHz)	Pulse Start (mS)
5	5269	15
8	5262	24
56	5253	168
73	5267	219
USA Frequency Hopping Trial #18		
Hop #	Freq (GHz)	Pulse Start (mS)
52	5266	156
USA Frequency Hopping Trial #19		

Hop #	Freq (GHz)	Pulse Start (mS)
40	5253	120
76	5267	228
USA Frequency Hopping Trial #20		
Hop #	Freq (GHz)	Pulse Start (mS)
7	5253	21
13	5252	39
USA Frequency Hopping Trial #21		
Hop #	Freq (GHz)	Pulse Start (mS)
2	5269	6
3	5260	9
18	5258	54
24	5262	72
43	5261	129
91	5268	273
USA Frequency Hopping Trial #22		
Hop #	Freq (GHz)	Pulse Start (mS)
30	5255	90
69	5263	207
75	5260	225
93	5259	279
98	5268	294
USA Frequency Hopping Trial #23		
Hop #	Freq (GHz)	Pulse Start (mS)
3	5252	9
25	5269	75
90	5262	270
USA Frequency Hopping Trial #24		
Hop #	Freq (GHz)	Pulse Start (mS)
10	5264	30
32	5266	96
70	5256	210
99	5265	297
USA Frequency Hopping Trial #25		
Hop #	Freq (GHz)	Pulse Start (mS)

8	5265	24
18	5268	54
44	5264	132
USA Frequency Hopping Trial #26		
Hop #	Freq (GHz)	Pulse Start (mS)
1	5251	3
12	5260	36
31	5263	93
56	5267	168
57	5268	171
76	5256	228
93	5264	279
USA Frequency Hopping Trial #27		
Hop #	Freq (GHz)	Pulse Start (mS)
38	5259	114
44	5266	132
47	5265	141
51	5260	153
93	5262	279
94	5269	282
USA Frequency Hopping Trial #28		
Hop #	Freq (GHz)	Pulse Start (mS)
4	5252	12
5	5257	15
16	5265	48
24	5267	72
49	5263	147
56	5264	168
USA Frequency Hopping Trial #29		
Hop #	Freq (GHz)	Pulse Start (mS)
11	5261	33
85	5259	255
86	5262	258
87	5260	261
91	5251	273
USA Frequency Hopping Trial #30		
Hop #	Freq (GHz)	Pulse Start (mS)

22	5264	66
60	5251	180
97	5264	291
USA Frequency Hopping Trial #30		
Hop #	Freq (GHz)	Pulse Start (mS)
40	5258	120
45	5262	135
70	5255	210

Statistical Performance Check - 40MHz Bandwidth

Type 1A/1B Radar Statistical Performance

Trial	Frequency	Pulses	PW (uS)	PRI (uS)	1=Detection 0=No Detection	Detection Percentage	Limit
1	5255	83	1	638	1	100.0%	60.0%
2	5255	78	1	678	1		
3	5255	68	1	778	1		
4	5257	81	1	658	1		
5	5257	102	1	518	1		
6	5257	62	1	858	1		
7	5261	78	1	678	1		
8	5261	102	1	518	1		
9	5261	99	1	538	1		
10	5265	78	1	678	1		
11	5265	72	1	738	1		
12	5267	67	1	798	1		
13	5267	76	1	698	1		
14	5267	86	1	618	1		
15	5270	86	1	618	1		
16	5270	51	1	1051	1		
17	5270	80	1	661	1		
18	5272	19	1	2869	1		
19	5272	76	1	702	1		
20	5272	65	1	823	1		
21	5275	18	1	3065	1		
22	5275	55	1	962	1		
23	5279	35	1	1539	1		
24	5279	36	1	1491	1		
25	5279	21	1	2532	1		
26	5283	21	1	2515	1		
27	5283	19	1	2877	1		
28	5283	90	1	589	1		
29	5285	22	1	2484	1		
30	5285	21	1	2524	1		

Trial	Frequency	Pulses	PW (uS)	PRI (uS)	1=Detection 0=No Detection	Detection Percentage	Limit

1	5255	83	1	638	1		
2	5255	70	1	758	1		
3	5255	74	1	718	0		
4	5257	86	1	618	1		
5	5257	59	1	898	1		
6	5257	74	1	718	0		
7	5261	74	1	718	0		
8	5261	58	1	918	1		
9	5261	81	1	658	1		
10	5265	83	1	638	1		
11	5265	86	1	618	1		
12	5267	62	1	858	1		
13	5267	102	1	518	1		
14	5267	58	1	918	1		
15	5270	61	1	878	1	90.0%	60.0%
16	5270	20	1	2689	1		
17	5270	40	1	1345	1		
18	5272	23	1	2342	1		
19	5272	56	1	952	1		
20	5272	24	1	2275	1		
21	5275	20	1	2692	1		
22	5275	22	1	2471	1		
23	5279	18	1	2955	1		
24	5279	25	1	2149	1		
25	5279	29	1	1843	1		
26	5283	57	1	941	1		
27	5283	47	1	1135	1		
28	5283	25	1	2194	1		
29	5285	31	1	1752	1		
30	5285	83	1	642	1		

Type 2 Radar Statistical Performance

Trial	Frequency	Pulses	PW (uS)	PRI (uS)	1=Detection 0=No Detection	Detection Percentage	Limit
1	5255	23	4.3	225	1	93.3%	60.0%

2	5255	23	4.1	181	1		
3	5255	23	1.9	192	1		
4	5257	24	3.1	224	1		
5	5257	25	4.8	167	1		
6	5257	28	2.1	190	1		
7	5261	25	2.5	155	0		
8	5261	29	2	174	1		
9	5261	26	2.2	200	0		
10	5265	29	2.9	185	1		
11	5265	27	2.5	171	1		
12	5267	27	3.7	171	1		
13	5267	26	3.3	228	1		
14	5267	29	4.6	156	1		
15	5270	23	4.5	215	1		
16	5270	29	4.8	207	1		
17	5270	28	3.9	218	1		
18	5272	26	3.7	164	1		
19	5272	28	4	172	1		
20	5272	27	3.2	196	1		
21	5275	27	1.2	182	1		
22	5275	25	3	204	1		
23	5279	29	1.2	167	1		
24	5279	25	4.3	180	1		
25	5279	24	2.2	209	1		
26	5283	24	1.2	229	1		
27	5283	28	2.9	171	1		
28	5283	29	4.5	210	1		
29	5285	26	1.5	219	1		
30	5285	27	2.3	230	1		

Type 3 Radar Statistical Performance

Trial	Frequency	Pulses	PW (uS)	PRI (uS)	1=Detection 0=No Detection	Detection Percentage	Limit
1	5255	16	7.2	318	1	90.0%	60.0%
2	5255	17	7.1	455	1		
3	5255	18	8.5	202	1		
4	5257	16	7.2	201	0		

5	5257	16	7.6	262	1		
6	5257	17	8.2	284	1		
7	5261	17	6.9	475	1		
8	5261	18	10	433	1		
9	5261	18	9	483	1		
10	5265	16	9.6	442	0		
11	5265	18	7.3	287	1		
12	5267	18	9.9	491	1		
13	5267	18	8.1	264	1		
14	5267	18	6.1	235	1		
15	5270	16	9.2	479	1		
16	5270	16	9.6	203	1		
17	5270	18	6	406	1		
18	5272	18	6.7	329	1		
19	5272	16	8.8	476	1		
20	5272	17	7.1	386	1		
21	5275	16	6.7	282	1		
22	5275	17	9.2	207	1		
23	5279	17	9.6	352	1		
24	5279	17	6.9	490	1		
25	5279	17	9.4	323	1		
26	5283	17	9.1	341	1		
27	5283	16	7.2	350	1		
28	5283	16	8.4	390	0		
29	5285	17	6.9	400	1		
30	5285	17	8.1	231	1		

Type 4 Radar Statistical Performance

Trial	Frequency	Pulses	PW (uS)	PRI (uS)	1=Detection 0=No Detection	Detection Percentage	Limit
1	5255	13	19	279	1		
2	5255	12	15.8	369	1		
3	5255	12	18.3	303	1		
4	5257	15	14.8	395	0	86.7%	60.0%
5	5257	16	19.9	417	1		
6	5257	16	19.9	281	1		
7	5261	12	14.2	437	1		

8	5261	12	11.7	418	1		
9	5261	14	15.6	217	1		
10	5265	15	13.4	317	1		
11	5265	15	17.4	290	1		
12	5267	14	16.2	358	1		
13	5267	14	18.5	453	1		
14	5267	16	11.6	384	1		
15	5270	12	13.9	225	0		
16	5270	16	17.9	300	1		
17	5270	13	11.6	290	1		
18	5272	15	16.4	249	1		
19	5272	15	19.7	465	1		
20	5272	14	14.4	266	1		
21	5275	16	11.1	458	1		
22	5275	16	17	455	0		
23	5279	15	16	345	1		
24	5279	12	17	364	0		
25	5279	12	14.5	238	1		
26	5283	13	13.1	456	1		
27	5283	12	17.7	228	1		
28	5283	14	14.9	342	1		
29	5285	15	19.1	459	1		
30	5285	15	17.5	411	1		

In addition an average minimum percentage of successful detection across all four Short pulse radar test waveforms is required and is calculated as follows:

$$\frac{P_d 1 + P_d 2 + P_d 3 + P_d 4}{4}$$ = (90%+93.3%+90%+86.7%)/4 = 90% (>80%)

Type 5 Long Pulse Radar Statistical Performance

Trial	Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)	1 = Detection 0 = No Detection	Detection Percentage	Limit
1	1	2	5258	15	50	1238		0.621507	1	100.0%	80.0%
2	1	1	5259.6	19	85			0.486482	1		
3	1	1	5256.4	11	55			0.110496	1		
4	1	1	5254.4	6	55			0.634644	1		
5	1	1	5255.2	8	100			0.693304	1		
6	1	3	5259.2	18	60	1702	1386	0.275455	1		
7	1	2	5255.6	9	50	1449		0.153813	1		
8	1	3	5256.8	12	80	1544	1939	0.822374	1		
9	1	3	5255.2	8	85	1420	1493	0.17968	1		
10	1	2	5255.6	9	50	1048		1.063855	1		
11	1	2	5270	6	55	1815		0.357791	1		
12	1	1	5270	12	55			0.964677	1		
13	1	1	5270	14	95			0.593965	1		
14	1	2	5270	19	75	1651		0.687516	1		
15	1	1	5270	14	100			0.539035	1		
16	1	1	5270	7	75			0.662061	1		
17	1	3	5270	11	65	1549	1293	0.571532	1		
18	1	3	5270	15	100	1296	1507	0.087281	1		
19	1	1	5270	18	55			1.007194	1		
20	1	2	5270	7	100	1143		0.055135	1		
21	1	2	5283.6	11	75	1395		0.64456	1		
22	1	3	5282.8	13	100	1215	1654	0.734052	1		
23	1	1	5285.6	6	50			0.160697	1		
24	1	2	5281.6	16	60	1245		0.676211	1		
25	1	1	5284.8	8	65			0.563026	1		
26	1	3	5286	5	75	1359	1918	0.697829	1		
27	1	1	5285.6	6	50			0.190896	1		
28	1	3	5280.8	18	90	1202	1018	0.298535	1		
29	1	3	5286	5	65	1503	1853	0.472755	1		
30	1	1	5282.4	14	50			0.768649	1		

Type 5 Long Pulse Radar Statistical Performance - Details

USA Bin 5 Trial #1							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5258	15	50	1238		0.621507
2	1	5258	15	100			1.533585
3	1	5258	15	85			2.442499
4	3	5258	15	80	1594	1121	3.061804
5	2	5258	15	70	1444		3.433557
6	2	5258	15	90	1184		4.910931
7	1	5258	15	85			5.904616
8	2	5258	15	100	1925		6.853781
9	2	5258	15	60	1269		7.121005
10	3	5258	15	55	1131	1577	8.270423
11	3	5258	15	75	1634	1556	8.612952
12	3	5258	15	90	1388	1180	9.495661
13	2	5258	15	75	1810		11.055256
14	3	5258	15	65	1055	1762	11.544745
USA Bin 5 Trial #2							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5259.6	19	85			0.486482
2	1	5259.6	19	55			0.906837
3	2	5259.6	19	50	1810		1.425409
4	2	5259.6	19	65	1243		2.544129
5	2	5259.6	19	55	1611		3.064885
6	2	5259.6	19	65	1599		3.367979
7	1	5259.6	19	70			4.402597
8	3	5259.6	19	85	1286	1148	4.990437
9	1	5259.6	19	80			5.646347
10	2	5259.6	19	100	1276		6.455903
11	3	5259.6	19	100	1193	1287	7.24149
12	1	5259.6	19	55			7.593793
13	3	5259.6	19	80	1378	1926	8.587079
14	3	5259.6	19	55	1210	1050	9.206079
15	1	5259.6	19	100			9.90889
16	1	5259.6	19	80			10.158693
17	2	5259.6	19	80	1903		10.710463
18	3	5259.6	19	60	1271	1785	11.747192
USA Bin 5 Trial #3							

Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5256.4	11	55			0.110496
2	2	5256.4	11	55	1977		0.732965
3	1	5256.4	11	65			1.529307
4	2	5256.4	11	100	1520		2.335058
5	1	5256.4	11	50			3.014421
6	1	5256.4	11	100			3.77024
7	1	5256.4	11	50			3.852347
8	1	5256.4	11	90			4.59756
9	3	5256.4	11	95	1784	1712	5.397341
10	3	5256.4	11	85	1247	1229	5.838927
11	2	5256.4	11	85	1576		6.710609
12	2	5256.4	11	65	1863		6.951961
13	2	5256.4	11	55	1792		8.033771
14	2	5256.4	11	55	1148		8.693883
15	2	5256.4	11	65	1975		9.142961
16	3	5256.4	11	95	1416	1522	9.503088
17	3	5256.4	11	55	1462	1564	10.445277
18	2	5256.4	11	85	1010		11.128087
19	3	5256.4	11	50	1803	1677	11.464809
USA Bin 5 Trial #4							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5254.4	6	55			0.634644
2	1	5254.4	6	50			1.316259
3	3	5254.4	6	70	1216	1320	1.70177
4	1	5254.4	6	65			2.424021
5	1	5254.4	6	95			3.08547
6	2	5254.4	6	55	1242		3.745456
7	2	5254.4	6	100	1026		4.854464
8	2	5254.4	6	65	1330		5.502847
9	3	5254.4	6	100	1151	1898	6.060373
10	1	5254.4	6	50			6.79157
11	2	5254.4	6	80	1554		7.34778
12	3	5254.4	6	85	1981	1351	7.903225
13	3	5254.4	6	75	1124	1985	9.096807
14	1	5254.4	6	70			9.713031
15	2	5254.4	6	50	1144		9.904311
16	3	5254.4	6	95	1287	1026	11.09314
17	3	5254.4	6	50	1770	1241	11.653092

USA Bin 5 Trial #5							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5255.2	8	100			0.693304
2	2	5255.2	8	90	1326		0.75827
3	1	5255.2	8	100			1.797084
4	2	5255.2	8	85	1310		2.377138
5	1	5255.2	8	90			3.469523
6	1	5255.2	8	70			3.777827
7	3	5255.2	8	90	1586	1133	5.211647
8	3	5255.2	8	80	1818	1151	5.498789
9	3	5255.2	8	95	1694	1147	6.093091
10	2	5255.2	8	65	1288		6.809227
11	3	5255.2	8	100	1178	1928	8.04857
12	2	5255.2	8	100	1365		8.862902
13	3	5255.2	8	55	1393	1837	9.229471
14	1	5255.2	8	70			10.265186
15	3	5255.2	8	100	1231	1488	10.925396
16	3	5255.2	8	70	1919	1491	11.484361
USA Bin 5 Trial #6							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5259.2	18	60	1702	1386	0.275455
2	2	5259.2	18	95	1937		1.05387
3	2	5259.2	18	75	1587		1.605855
4	1	5259.2	18	95			2.035771
5	1	5259.2	18	65			3.330416
6	1	5259.2	18	65			3.720773
7	1	5259.2	18	65			4.150487
8	1	5259.2	18	100			5.071834
9	3	5259.2	18	85	1061	1866	5.573499
10	3	5259.2	18	50	1931	1641	6.085041
11	3	5259.2	18	90	1942	1382	7.319064
12	2	5259.2	18	50	1646		7.43089
13	1	5259.2	18	80			8.56071
14	2	5259.2	18	70	1667		8.860411
15	2	5259.2	18	55	1590		9.683581
16	2	5259.2	18	65	1885		10.168104
17	2	5259.2	18	65	1773		10.921049
18	3	5259.2	18	85	1959	1036	11.759961
USA Bin 5 Trial #7							

Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5255.6	9	50	1449		0.153813
2	2	5255.6	9	60	1287		0.826237
3	1	5255.6	9	90			1.581346
4	2	5255.6	9	65	1497		2.767081
5	2	5255.6	9	50	1789		3.230083
6	3	5255.6	9	80	1026	1412	4.172364
7	3	5255.6	9	50	1676	1853	4.702601
8	1	5255.6	9	90			5.606149
9	1	5255.6	9	85			6.324423
10	2	5255.6	9	55	1576		6.837793
11	1	5255.6	9	70			7.568034
12	3	5255.6	9	55	1783	1202	7.991105
13	1	5255.6	9	50			9.072429
14	3	5255.6	9	65	1686	1415	9.849581
15	3	5255.6	9	85	1221	1722	10.190909
16	3	5255.6	9	85	1138	1826	10.971202
17	2	5255.6	9	85	1429		11.685662
USA Bin 5 Trial #8							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5256.8	12	80	1544	1939	0.822374
2	3	5256.8	12	100	1431	1534	1.373852
3	1	5256.8	12	85			2.032049
4	1	5256.8	12	80			2.837239
5	2	5256.8	12	55	1915		4.206774
6	1	5256.8	12	80			5.078771
7	1	5256.8	12	70			5.309163
8	2	5256.8	12	70	1232		6.585178
9	1	5256.8	12	90			7.231966
10	2	5256.8	12	50	1389		7.746921
11	3	5256.8	12	55	1053	1625	8.965927
12	2	5256.8	12	100	1649		10.180326
13	1	5256.8	12	50			10.356088
14	3	5256.8	12	70	1988	1844	11.392727
USA Bin 5 Trial #9							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5255.2	8	85	1420	1493	0.17968

2	1	5255.2	8	85			1.330652
3	3	5255.2	8	70	1152	1812	2.108458
4	2	5255.2	8	95	1817		2.899075
5	2	5255.2	8	55	1010		3.62682
6	1	5255.2	8	65			4.76551
7	3	5255.2	8	75	1833	1407	5.16437
8	1	5255.2	8	50			6.110899
9	1	5255.2	8	65			6.928551
10	3	5255.2	8	80	1839	1664	7.795221
11	3	5255.2	8	55	1924	1094	8.166821
12	2	5255.2	8	65	1555		9.333143
13	2	5255.2	8	90	1290		9.792139
14	1	5255.2	8	75			11.156382
15	1	5255.2	8	75			11.984053
USA Bin 5 Trial #10							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5255.6	9	50	1048		1.063855
2	3	5255.6	9	75	1861	1111	1.427273
3	3	5255.6	9	90	1645	1745	2.805164
4	2	5255.6	9	70	1497		4.070375
5	1	5255.6	9	50			5.563057
6	3	5255.6	9	55	1899	1601	6.226721
7	2	5255.6	9	70	1717		7.680463
8	3	5255.6	9	50	1672	1042	8.432604
9	3	5255.6	9	80	1861	1264	10.375754
10	2	5255.6	9	50	1129		11.718538
USA Bin 5 Trial #11							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5270	6	55	1815		0.357791
2	3	5270	6	50	1291	1140	0.665452
3	3	5270	6	85	1862	1867	1.689822
4	3	5270	6	65	1370	1527	2.108061
5	1	5270	6	80			2.988173
6	2	5270	6	65	1714		3.663669
7	2	5270	6	90	1253		4.070168
8	1	5270	6	70			4.695924
9	3	5270	6	90	1454	1600	5.553943
10	2	5270	6	95	1877		5.826666
11	2	5270	6	60	1334		6.915512

12	3	5270	6	85	1719	1613	7.48085
13	1	5270	6	85			7.884812
14	1	5270	6	50			8.431779
15	1	5270	6	80			9.462843
16	3	5270	6	55	1378	1919	9.587178
17	2	5270	6	55	1569		10.53709
18	3	5270	6	85	1696	1323	10.78702
19	2	5270	6	100	1514		11.855013
USA Bin 5 Trial #12							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5270	12	55			0.964677
2	1	5270	12	75			2.398962
3	1	5270	12	100			3.455174
4	1	5270	12	85			3.812412
5	2	5270	12	70	1060		5.560482
6	3	5270	12	80	1224	1302	6.769775
7	3	5270	12	50	1656	1682	8.316285
8	3	5270	12	60	1723	1974	8.949814
9	2	5270	12	100	1636		10.48182
10	2	5270	12	80	1752		11.591824
USA Bin 5 Trial #13							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5270	14	95			0.593965
2	3	5270	14	55	1901	1653	0.743346
3	2	5270	14	50	1789		1.33807
4	2	5270	14	100	1699		1.814047
5	2	5270	14	70	1208		2.587265
6	1	5270	14	100			3.163965
7	2	5270	14	75	1999		3.825679
8	1	5270	14	75			4.686334
9	1	5270	14	75			5.321064
10	2	5270	14	85	1255		5.494815
11	3	5270	14	55	1162	1410	6.02998
12	2	5270	14	55	1234		6.969346
13	3	5270	14	100	1016	1069	7.792045
14	3	5270	14	60	1719	1554	8.239333
15	1	5270	14	80			8.975291
16	1	5270	14	85			9.332424
17	1	5270	14	75			10.112996

18	3	5270	14	75	1630	1683	10.263325
19	3	5270	14	85	1601	1639	11.361818
20	3	5270	14	65	1105	1763	11.569918
USA Bin 5 Trial #14							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5270	19	75	1651		0.687516
2	3	5270	19	55	1725	1708	1.361873
3	1	5270	19	60			1.576702
4	3	5270	19	80	1231	1388	2.288885
5	2	5270	19	70	1628		3.336763
6	1	5270	19	80			3.661906
7	3	5270	19	90	1518	1337	4.843482
8	1	5270	19	65			5.542421
9	1	5270	19	100			5.708814
10	1	5270	19	90			6.59504
11	1	5270	19	75			7.625853
12	2	5270	19	75	1919		8.222695
13	1	5270	19	90			9.105548
14	2	5270	19	65	1882		9.61157
15	1	5270	19	100			9.914177
16	1	5270	19	90			11.050567
17	1	5270	19	55			11.751254
USA Bin 5 Trial #15							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5270	14	100			0.539035
2	1	5270	14	80			2.270024
3	2	5270	14	70	1948		3.764238
4	2	5270	14	95	1933		4.834158
5	1	5270	14	60			6.178109
6	1	5270	14	50			7.339618
7	2	5270	14	80	1078		8.359131
8	2	5270	14	100	1776		9.79684
9	3	5270	14	85	1139	1380	11.546602
USA Bin 5 Trial #16							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5270	7	75			0.662061
2	1	5270	7	70			1.021347

3	1	5270	7	60			1.386307
4	3	5270	7	90	1964	1094	2.346162
5	2	5270	7	60	1633		2.66873
6	2	5270	7	85	1544		3.462192
7	1	5270	7	100			4.62296
8	2	5270	7	90	1595		5.114591
9	1	5270	7	80			5.386389
10	1	5270	7	85			6.202625
11	3	5270	7	70	1366	1112	7.190794
12	2	5270	7	95	1937		7.546619
13	2	5270	7	75	1457		8.236196
14	3	5270	7	55	1317	1023	9.319673
15	2	5270	7	85	1078		9.821224
16	2	5270	7	85	1929		10.452899
17	3	5270	7	50	1295	1929	11.134227
18	1	5270	7	75			11.562966
USA Bin 5 Trial #17							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5270	11	65	1549	1293	0.571532
2	1	5270	11	80			0.770802
3	2	5270	11	80	1409		1.268358
4	3	5270	11	70	1363	1634	2.087188
5	2	5270	11	90	1521		2.477364
6	1	5270	11	90			3.197351
7	3	5270	11	65	1611	1789	3.914325
8	2	5270	11	100	1419		4.668073
9	1	5270	11	95			5.382356
10	3	5270	11	95	1043	1496	5.80967
11	3	5270	11	95	1438	1070	6.206413
12	2	5270	11	90	1331		7.113346
13	1	5270	11	50			7.777855
14	2	5270	11	100	1956		7.96743
15	1	5270	11	65			8.625593
16	3	5270	11	70	1465	1854	9.268688
17	2	5270	11	50	1401		9.87077
18	3	5270	11	55	1978	1813	10.264993
19	2	5270	11	55	1071		11.094743
20	1	5270	11	65			11.719924
USA Bin 5 Trial #18							

Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5270	15	100	1296	1507	0.087281
2	3	5270	15	80	1748	1602	2.658503
3	2	5270	15	90	1585		3.795092
4	2	5270	15	65	1637		4.005498
5	2	5270	15	60	1294		6.071796
6	3	5270	15	85	1140	1146	7.302175
7	1	5270	15	55			8.194765
8	1	5270	15	75			10.043303
9	3	5270	15	80	1772	1894	11.450638
USA Bin 5 Trial #19							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5270	18	55			1.007194
2	2	5270	18	95	1241		1.376184
3	1	5270	18	50			3.150597
4	1	5270	18	90			4.680089
5	1	5270	18	95			5.441229
6	2	5270	18	80	1036		7.168392
7	1	5270	18	50			7.966711
8	3	5270	18	80	1039	1779	9.540412
9	1	5270	18	90			10.560003
10	1	5270	18	90			11.533782
USA Bin 5 Trial #20							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5270	7	100	1143		0.055135
2	3	5270	7	100	1255	1433	1.974196
3	2	5270	7	75	1411		2.950751
4	1	5270	7	90			3.000667
5	3	5270	7	90	1707	1978	4.758066
6	2	5270	7	65	1312		5.480035
7	2	5270	7	75	1650		6.414783
8	1	5270	7	80			7.439559
9	1	5270	7	100			8.56178
10	2	5270	7	80	1696		9.464789
11	2	5270	7	70	1545		10.24912
12	1	5270	7	75			11.261111
USA Bin 5 Trial #21							

Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5283.6	11	75	1395		0.64456
2	3	5283.6	11	55	1408	1899	1.887303
3	3	5283.6	11	95	1512	1481	3.162495
4	3	5283.6	11	95	1167	1733	4.365796
5	3	5283.6	11	75	1700	1256	4.828827
6	3	5283.6	11	95	1255	1547	6.685008
7	1	5283.6	11	65			8.301196
8	1	5283.6	11	90			8.928523
9	2	5283.6	11	90	1585		10.271188
10	1	5283.6	11	60			11.895246
USA Bin 5 Trial #22							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5282.8	13	100	1215	1654	0.734052
2	1	5282.8	13	80			1.717783
3	3	5282.8	13	65	1718	1737	3.550319
4	2	5282.8	13	60	1603		4.761803
5	1	5282.8	13	65			5.050547
6	3	5282.8	13	70	1818	1751	7.130012
7	1	5282.8	13	60			8.192065
8	3	5282.8	13	100	1379	1662	8.811773
9	2	5282.8	13	65	1927		10.631991
10	3	5282.8	13	85	1812	1667	11.466662
USA Bin 5 Trial #23							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5285.6	6	50			0.160697
2	1	5285.6	6	60			1.332339
3	1	5285.6	6	55			3.515977
4	1	5285.6	6	80			4.420808
5	1	5285.6	6	85			5.639515
6	1	5285.6	6	60			7.121433
7	3	5285.6	6	70	1331	1950	7.402652
8	2	5285.6	6	80	1797		9.215679
9	3	5285.6	6	100	1428	1029	9.610986
10	1	5285.6	6	75			11.587563
USA Bin 5 Trial #24							

Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5281.6	16	60	1245		0.676211
2	2	5281.6	16	95	1810		2.065207
3	1	5281.6	16	90			2.875127
4	2	5281.6	16	85	1972		4.372118
5	1	5281.6	16	85			4.85242
6	2	5281.6	16	70	1720		6.389543
7	3	5281.6	16	95	1675	1528	8.081945
8	1	5281.6	16	100			9.019176
9	3	5281.6	16	95	1670	1996	9.709031
10	3	5281.6	16	70	1304	1884	11.301063
USA Bin 5 Trial #25							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5284.8	8	65			0.563026
2	3	5284.8	8	100	1344	1978	1.339437
3	2	5284.8	8	90	1830		1.520706
4	3	5284.8	8	50	1449	1227	2.232415
5	2	5284.8	8	65	1749		3.383738
6	1	5284.8	8	50			4.199188
7	1	5284.8	8	80			4.699205
8	3	5284.8	8	55	1899	1093	5.412186
9	3	5284.8	8	55	1650	1292	5.822699
10	1	5284.8	8	90			6.434669
11	2	5284.8	8	60	1289		7.714009
12	2	5284.8	8	70	1181		7.783809
13	3	5284.8	8	85	1898	1878	8.612055
14	3	5284.8	8	75	1468	1987	9.441538
15	1	5284.8	8	80			10.11705
16	3	5284.8	8	90	1688	1227	11.192123
17	2	5284.8	8	55	1455		11.45845
USA Bin 5 Trial #26							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5286	5	75	1359	1918	0.697829
2	1	5286	5	55			1.776601
3	1	5286	5	95			3.159398
4	2	5286	5	95	1273		3.987055
5	3	5286	5	60	1637	1617	4.826453

6	3	5286	5	50	1664	1155	6.119485
7	1	5286	5	50			8.048549
8	1	5286	5	85			9.199666
9	2	5286	5	60	1481		10.674525
10	3	5286	5	85	1710	1182	10.805432
USA Bin 5 Trial #27							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5285.6	6	50			0.190896
2	2	5285.6	6	100	1696		1.734157
3	2	5285.6	6	90	1782		2.780892
4	1	5285.6	6	100			4.757146
5	1	5285.6	6	80			5.257998
6	2	5285.6	6	50	1411		6.604575
7	1	5285.6	6	55			7.696916
8	1	5285.6	6	85			8.850298
9	3	5285.6	6	60	1225	1804	10.593147
10	2	5285.6	6	85	1702		11.385175
USA Bin 5 Trial #28							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5280.8	18	90	1202	1018	0.298535
2	3	5280.8	18	55	1162	1599	0.966841
3	1	5280.8	18	50			1.417897
4	1	5280.8	18	80			2.009024
5	1	5280.8	18	75			3.087963
6	2	5280.8	18	70	1305		3.634035
7	2	5280.8	18	75	1812		3.808597
8	3	5280.8	18	50	1814	1574	4.970439
9	2	5280.8	18	50	1484		5.422726
10	1	5280.8	18	75			6.112329
11	3	5280.8	18	75	1566	1185	6.906022
12	3	5280.8	18	80	1814	1698	7.342959
13	3	5280.8	18	80	1895	1967	7.658959
14	1	5280.8	18	55			8.567542
15	2	5280.8	18	85	1841		9.301277
16	3	5280.8	18	80	1509	1637	9.840867
17	3	5280.8	18	55	1362	1336	10.488424
18	3	5280.8	18	65	1213	1402	10.891674
19	1	5280.8	18	75			11.90873
USA Bin 5 Trial #29							

Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5286	5	65	1503	1853	0.472755
2	3	5286	5	65	1655	1978	1.045244
3	1	5286	5	65			1.670871
4	3	5286	5	50	1655	1749	2.247284
5	1	5286	5	75			3.006554
6	2	5286	5	75	1835		3.625014
7	3	5286	5	75	1480	1592	4.398024
8	1	5286	5	55			5.159857
9	3	5286	5	50	1319	1383	5.94507
10	2	5286	5	65	1325		6.033514
11	3	5286	5	95	1623	1895	6.82479
12	3	5286	5	75	1820	1000	7.966272
13	3	5286	5	55	1635	1885	8.06293
14	2	5286	5	70	1820		8.7944
15	3	5286	5	80	1615	1931	9.812445
16	2	5286	5	80	1128		10.290477
17	1	5286	5	90			11.265906
18	1	5286	5	70			11.47734
USA Bin 5 Trial #30							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5282.4	14	50			0.768649
2	2	5282.4	14	60	1223		1.211709
3	3	5282.4	14	50	1018	1196	2.241361
4	3	5282.4	14	95	1378	1005	3.243543
5	1	5282.4	14	95			3.794813
6	2	5282.4	14	65	1896		4.96753
7	3	5282.4	14	100	1729	1598	5.466632
8	1	5282.4	14	60			6.080242
9	1	5282.4	14	75			7.67738
10	3	5282.4	14	80	1802	1767	7.735037
11	3	5282.4	14	90	1872	1229	9.188797
12	3	5282.4	14	85	1305	1587	9.748234
13	2	5282.4	14	85	1188		10.639816
14	2	5282.4	14	75	1312		11.258954

Type 6 Frequency Hopping Radar Statistical Performance

Trial	Hop #	Freq (GHz)	Pulse Start (mS)	1=Detection 0=No Detection	Detection Percentage	Limit
1	0	5265	0	1	100.0%	70.0%
2	15	5255	45	1		
3	45	5262	135	1		
4	4	5264	12	1		
5	1	5262	3	1		
6	1	5255	3	1		
7	10	5265	30	1		
8	20	5275	60	1		
9	2	5272	6	1		
10	1	5269	3	1		
11	26	5270	78	1		
12	24	5288	72	1		
13	15	5280	45	1		
14	0	5287	0	1		
15	11	5252	33	1		
16	21	5254	63	1		
17	52	5255	156	1		
18	4	5278	12	1		
19	8	5268	24	1		
20	5	5255	15	1		
21	2	5257	6	1		
22	14	5274	42	1		
23	22	5277	66	1		
24	15	5280	45	1		
25	18	5285	54	1		
26	2	5266	6	1		
27	1	5277	3	1		
28	20	5286	60	1		
29	4	5272	12	1		
30	0	5288	0	1		

Type 6 Frequency Hopping Radar Statistical Performance - Details

USA Frequency Hopping Trial #1		
Hop #	Freq (GHz)	Pulse Start (mS)
0	5265	0
5	5257	15
8	5278	24
19	5272	57
34	5277	102
38	5285	114
45	5262	135
75	5269	225
82	5273	246
95	5281	285
USA Frequency Hopping Trial #2		
Hop #	Freq (GHz)	Pulse Start (mS)
15	5255	45
18	5278	54
22	5252	66
39	5267	117
60	5275	180
65	5263	195
68	5264	204
70	5261	210
81	5274	243
83	5284	249
89	5282	267
USA Frequency Hopping Trial #3		
Hop #	Freq (GHz)	Pulse Start (mS)
45	5262	135
48	5278	144
51	5254	153
58	5252	174
74	5287	222
98	5263	294
99	5268	297
USA Frequency Hopping Trial #4		
Hop #	Freq (GHz)	Pulse Start (mS)
4	5264	12
11	5268	33
31	5258	93

50	5276	150
59	5274	177
61	5272	183
65	5287	195
89	5256	267
98	5253	294
99	5280	297
USA Frequency Hopping Trial #5		
Hop #	Freq (GHz)	Pulse Start (mS)
1	5262	3
21	5268	63
34	5256	102
87	5279	261
99	5274	297
USA Frequency Hopping Trial #6		
Hop #	Freq (GHz)	Pulse Start (mS)
1	5255	3
16	5273	48
28	5283	84
30	5269	90
54	5271	162
63	5265	189
77	5264	231
97	5277	291
99	5257	297
USA Frequency Hopping Trial #7		
Hop #	Freq (GHz)	Pulse Start (mS)
10	5265	30
26	5278	78
28	5279	84
30	5259	90
31	5257	93
43	5277	129
64	5284	192
66	5262	198
69	5272	207
74	5271	222
79	5273	237
99	5269	297
USA Frequency Hopping Trial #8		

Hop #	Freq (GHz)	Pulse Start (mS)
20	5275	60
35	5259	105
38	5264	114
40	5272	120
49	5276	147
69	5271	207
71	5278	213
73	5277	219
92	5285	276
93	5257	279
USA Frequency Hopping Trial #9		
Hop #	Freq (GHz)	Pulse Start (mS)
2	5272	6
19	5264	57
51	5255	153
61	5257	183
81	5284	243
94	5285	282
96	5279	288
USA Frequency Hopping Trial #10		
Hop #	Freq (GHz)	Pulse Start (mS)
1	5269	3
67	5260	201
84	5265	252
94	5275	282
USA Frequency Hopping Trial #11		
Hop #	Freq (GHz)	Pulse Start (mS)
26	5270	78
39	5262	117
42	5287	126
58	5272	174
64	5260	192
65	5279	195
71	5259	213
73	5253	219
86	5271	258
89	5256	267
91	5252	273

USA Frequency Hopping Trial #12		
Hop #	Freq (GHz)	Pulse Start (mS)
24	5288	72
32	5287	96
35	5256	105
42	5273	126
43	5279	129
57	5278	171
59	5267	177
67	5275	201
75	5259	225
81	5274	243
90	5281	270
92	5268	276
USA Frequency Hopping Trial #13		
Hop #	Freq (GHz)	Pulse Start (mS)
15	5280	45
20	5275	60
30	5273	90
USA Frequency Hopping Trial #14		
Hop #	Freq (GHz)	Pulse Start (mS)
0	5287	0
7	5278	21
9	5267	27
17	5271	51
18	5268	54
24	5263	72
45	5275	135
91	5252	273
USA Frequency Hopping Trial #15		
Hop #	Freq (GHz)	Pulse Start (mS)
11	5252	33
20	5280	60
38	5270	114
40	5269	120
90	5287	270
USA Frequency Hopping Trial #16		
Hop #	Freq (GHz)	Pulse Start (mS)

21	5254	63
22	5270	66
30	5260	90
35	5256	105
36	5279	108
41	5277	123
51	5265	153
56	5286	168
66	5263	198
78	5276	234
85	5268	255
USA Frequency Hopping Trial #17		
Hop #	Freq (GHz)	Pulse Start (mS)
52	5255	156
71	5268	213
79	5281	237
80	5276	240
87	5288	261
91	5253	273
95	5259	285
USA Frequency Hopping Trial #18		
Hop #	Freq (GHz)	Pulse Start (mS)
4	5278	12
17	5259	51
22	5285	66
24	5283	72
27	5281	81
36	5284	108
53	5269	159
56	5271	168
USA Frequency Hopping Trial #19		
Hop #	Freq (GHz)	Pulse Start (mS)
8	5268	24
18	5257	54
31	5276	93
64	5253	192
80	5265	240
82	5275	246
USA Frequency Hopping Trial #20		

Hop #	Freq (GHz)	Pulse Start (mS)
5	5255	15
29	5288	87
44	5275	132
82	5286	246
92	5252	276
USA Frequency Hopping Trial #21		
Hop #	Freq (GHz)	Pulse Start (mS)
2	5257	6
33	5266	99
36	5263	108
45	5282	135
50	5288	150
61	5280	183
74	5271	222
83	5277	249
USA Frequency Hopping Trial #22		
Hop #	Freq (GHz)	Pulse Start (mS)
14	5274	42
42	5256	126
47	5269	141
58	5265	174
USA Frequency Hopping Trial #23		
Hop #	Freq (GHz)	Pulse Start (mS)
22	5277	66
25	5253	75
26	5288	78
29	5276	87
42	5274	126
58	5262	174
63	5272	189
64	5252	192
USA Frequency Hopping Trial #24		
Hop #	Freq (GHz)	Pulse Start (mS)
15	5280	45
26	5267	78
47	5278	141
48	5257	144

90	5258	270
92	5284	276
98	5276	294
USA Frequency Hopping Trial #25		
Hop #	Freq (GHz)	Pulse Start (mS)
18	5285	54
39	5270	117
52	5273	156
62	5275	186
73	5256	219
80	5276	240
90	5262	270
USA Frequency Hopping Trial #26		
Hop #	Freq (GHz)	Pulse Start (mS)
2	5266	6
20	5269	60
40	5257	120
48	5277	144
49	5276	147
73	5282	219
90	5278	270
93	5279	279
USA Frequency Hopping Trial #27		
Hop #	Freq (GHz)	Pulse Start (mS)
1	5277	3
17	5257	51
21	5260	63
39	5270	117
62	5256	186
77	5272	231
84	5263	252
87	5275	261
USA Frequency Hopping Trial #28		
Hop #	Freq (GHz)	Pulse Start (mS)
20	5286	60
24	5285	72
34	5264	102
36	5260	108
53	5271	159

73	5277	219
86	5268	258
USA Frequency Hopping Trial #29		
Hop #	Freq (GHz)	Pulse Start (mS)
4	5272	12
8	5273	24
11	5283	33
12	5267	36
21	5282	63
23	5274	69
44	5266	132
50	5269	150
62	5285	186
97	5288	291
USA Frequency Hopping Trial #30		
Hop #	Freq (GHz)	Pulse Start (mS)
0	5288	0
15	5271	45
30	5254	90
62	5259	186
65	5280	195
72	5256	216
94	5274	282

Statistical Performance Check - 80MHz Bandwidth

Type 1A/1B Radar Statistical Performance

Trial	Frequency	Pulses	PW (uS)	PRI (uS)	1=Detection 0=No Detection	Detection Percentage	Limit
1	5255	81	1	658	1	83.3%	60.0%
2	5255	92	1	578	1		
3	5255	72	1	738	1		
4	5263	86	1	618	1		
5	5263	59	1	898	1		
6	5263	86	1	618	1		
7	5270	92	1	578	0		
8	5270	61	1	878	1		
9	5270	18	1	3066	1		
10	5275	78	1	678	1		
11	5275	89	1	598	1		
12	5285	65	1	818	1		
13	5285	83	1	638	1		
14	5285	76	1	698	1		
15	5290	92	1	578	1		
16	5290	26	1	2048	1		
17	5290	20	1	2715	1		
18	5295	87	1	612	1		
19	5295	27	1	1978	1		
20	5295	21	1	2571	1		
21	5305	18	1	3034	0		
22	5305	21	1	2629	0		
23	5313	19	1	2813	0		
24	5313	29	1	1866	0		
25	5313	37	1	1430	1		
26	5322	22	1	2460	1		
27	5322	58	1	916	1		
28	5322	20	1	2752	1		
29	5325	20	1	2686	1		
30	5325	24	1	2235	1		

Trial	Frequency	Pulses	PW (uS)	PRI (uS)	1=Detection 0=No Detection	Detection Percentage	Limit

1	5255	58	1	918	1		
2	5255	81	1	658	1		
3	5255	58	1	918	1		
4	5263	81	1	658	0		
5	5263	59	1	898	1		
6	5263	18	1	3066	1		
7	5270	61	1	878	1		
8	5270	58	1	918	1		
9	5270	81	1	658	1		
10	5275	61	1	878	1		
11	5275	102	1	518	1		
12	5285	65	1	818	0		
13	5285	81	1	658	1		
14	5285	102	1	518	1		
15	5290	67	1	798	1	90.0%	60.0%
16	5290	50	1	1065	1		
17	5290	74	1	716	1		
18	5295	20	1	2701	1		
19	5295	22	1	2441	1		
20	5295	26	1	2083	1		
21	5305	18	1	2960	0		
22	5305	48	1	1112	1		
23	5313	19	1	2805	1		
24	5313	18	1	3008	1		
25	5313	19	1	2896	1		
26	5322	64	1	830	1		
27	5322	75	1	710	1		
28	5322	23	1	2307	1		
29	5325	28	1	1894	1		
30	5325	23	1	2328	1		

Type 2 Radar Statistical Performance

Trial	Frequency	Pulses	PW (uS)	PRI (uS)	1=Detection 0=No Detection	Detection Percentage	Limit
1	5255	28	3	166	1	70.0%	60.0%

2	5255	27	5	171	1		
3	5255	29	3.2	166	1		
4	5263	28	2.8	181	1		
5	5263	24	2.2	150	0		
6	5263	23	1.7	155	1		
7	5270	27	1.5	152	0		
8	5270	28	1	194	0		
9	5270	26	2.9	221	1		
10	5275	26	4.7	219	0		
11	5275	28	1.9	196	1		
12	5285	26	1.4	198	1		
13	5285	28	2.8	230	1		
14	5285	26	3.7	174	0		
15	5290	23	3.6	229	0		
16	5290	27	1.9	155	1		
17	5290	27	3.9	214	1		
18	5295	25	4.9	207	1		
19	5295	28	3.6	228	1		
20	5295	26	1.3	206	0		
21	5305	26	1	201	0		
22	5305	23	4.9	199	0		
23	5313	26	3.2	214	1		
24	5313	29	4	184	1		
25	5313	28	1.6	228	1		
26	5322	27	2.3	221	1		
27	5322	23	2.9	153	1		
28	5322	29	2.3	230	1		
29	5325	27	4.2	204	1		
30	5325	25	2.1	150	1		

Type 3 Radar Statistical Performance

Trial	Frequency	Pulses	PW (uS)	PRI (uS)	1=Detection 0=No Detection	Detection Percentage	Limit
1	5255	18	7.9	345	1	93.3%	60.0%
2	5255	17	8.3	322	1		
3	5255	16	8.8	386	0		
4	5263	18	7	293	1		

5	5263	16	7.7	498	1		
6	5263	16	8.5	319	1		
7	5270	16	9.6	408	0		
8	5270	16	8.6	398	1		
9	5270	18	7.9	373	1		
10	5275	18	9.2	276	1		
11	5275	17	9.5	272	1		
12	5285	17	6.8	289	1		
13	5285	17	9.5	274	1		
14	5285	17	7.4	404	1		
15	5290	16	7.3	386	1		
16	5290	17	9.4	378	1		
17	5290	17	8.6	475	1		
18	5295	16	8.3	392	1		
19	5295	16	9.6	452	1		
20	5295	18	10	222	1		
21	5305	17	6.2	232	1		
22	5305	18	9.9	492	1		
23	5313	18	9.3	367	1		
24	5313	17	8.5	422	1		
25	5313	18	8.3	276	1		
26	5322	16	9.9	492	1		
27	5322	17	6.7	376	1		
28	5322	17	6.6	274	1		
29	5325	17	7.1	371	1		
30	5325	17	9.5	352	1		

Type 4 Radar Statistical Performance

Trial	Frequency	Pulses	PW (uS)	PRI (uS)	1=Detection 0=No Detection	Detection Percentage	Limit
1	5255	12	14.9	445	1		
2	5255	12	13.4	322	1		
3	5255	15	16	287	1		
4	5263	16	13.6	455	0	80.0%	60.0%
5	5263	16	18.4	454	1		
6	5263	14	13.9	333	1		
7	5270	14	13.2	239	1		

8	5270	15	18.7	452	1		
9	5270	13	13.4	496	1		
10	5275	14	16.1	339	1		
11	5275	16	16.6	337	1		
12	5285	16	19.8	407	0		
13	5285	14	12.5	201	1		
14	5285	12	12.7	485	0		
15	5290	12	15.9	401	1		
16	5290	15	11.5	311	1		
17	5290	13	14.4	458	1		
18	5295	15	12.9	476	1		
19	5295	12	15.9	278	1		
20	5295	14	11.8	434	0		
21	5305	13	15.7	452	1		
22	5305	13	13.1	311	1		
23	5313	16	18.5	437	0		
24	5313	13	15.4	224	1		
25	5313	13	16.1	227	1		
26	5322	13	15.7	252	1		
27	5322	16	12.9	399	0		
28	5322	15	12.3	439	1		
29	5325	12	11.3	268	1		
30	5325	15	13.8	389	1		

In addition, an average minimum percentage of successful detection across all four Short pulse radar test waveforms is required and is calculated as follows:

$$\frac{P_d 1 + P_d 2 + P_d 3 + P_d 4}{4}$$ = (83.3%+70%+93.3%+80%)/4 = 81.65% (>80%)

Type 5 Long Pulse Radar Statistical Performance

Trial	Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)	1 = Detection 0 = No Detection	Detection Percentage	Limit
1	1	1	5258.4	16	85			0.473174	0		
2	1	1	5256.8	12	60			0.427086	1		
3	1	3	5255.2	8	100	1144	1582	0.505143	0		
4	1	1	5255.6	9	50			0.569873	0		
5	1	2	5258.4	16	65	1205		0.71959	0		
6	1	3	5260	20	60	1820	1399	0.478237	0		
7	1	3	5255.2	8	65	1090	1191	0.771015	1		
8	1	3	5259.2	18	100	1213	1008	0.284627	1		
9	1	2	5259.2	18	70	1257		0.420491	0		
10	1	1	5254	5	65			0.130041	1		
11	1	1	5290	12	90			0.455969	1		
12	1	3	5290	18	70	1491	1964	0.344911	1		
13	1	1	5290	16	95			0.826479	1		
14	1	1	5290	16	100			0.323694	1		
15	1	3	5290	15	50	1623	1462	0.640148	1		
16	1	2	5290	10	80	1776		0.689544	1	80.0%	80.0%
17	1	3	5290	15	90	1404	1322	0.566412	1		
18	1	2	5290	8	90	1446		0.028338	1		
19	1	2	5290	11	100	1723		0.797364	1		
20	1	1	5290	19	65			0.116152	1		
21	1	2	5320.4	19	95	1445		0.336745	1		
22	1	3	5324.8	8	80	1939	1199	0.405611	1		
23	1	3	5326	5	60	1749	1005	0.296545	1		
24	1	1	5323.6	11	60			0.179364	1		
25	1	1	5324	10	85			0.021035	1		
26	1	1	5322.8	13	80			0.479233	1		
27	1	3	5321.2	17	50	1713	1199	0.474371	1		
28	1	1	5322.8	13	60			0.185015	1		
29	1	2	5324.4	9	50	1597		0.912663	1		
30	1	2	5324	10	100	1875		0.581953	1		

Type 5 Long Pulse Radar Statistical Performance - Details

USA Bin 5 Trial #1							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5258.4	16	85			0.473174
2	3	5258.4	16	100	1276	1011	1.715626
3	2	5258.4	16	75	1735		2.767596
4	1	5258.4	16	100			4.449474
5	1	5258.4	16	70			6.412673
6	3	5258.4	16	65	1068	1150	7.251163
7	2	5258.4	16	65	1901		8.111641
8	2	5258.4	16	95	1705		9.637364
9	3	5258.4	16	60	1909	1328	10.870394
USA Bin 5 Trial #2							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5256.8	12	60			0.427086
2	1	5256.8	12	50			1.677813
3	3	5256.8	12	55	1898	1280	2.495918
4	2	5256.8	12	85	1126		3.833654
5	2	5256.8	12	60	1904		4.79028
6	3	5256.8	12	60	1052	1401	5.780969
7	2	5256.8	12	95	1837		6.045273
8	1	5256.8	12	85			7.510441
9	2	5256.8	12	50	1669		8.442779
10	2	5256.8	12	80	1399		9.400977
11	1	5256.8	12	85			10.585995
12	2	5256.8	12	60	1013		11.384671
USA Bin 5 Trial #3							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5255.2	8	100	1144	1582	0.505143
2	3	5255.2	8	65	1394	1248	1.528693
3	3	5255.2	8	65	1647	1769	1.604348
4	3	5255.2	8	60	1571	1320	3.188771
5	3	5255.2	8	100	1127	1834	3.478247
6	3	5255.2	8	85	1290	1157	4.62549
7	1	5255.2	8	70			5.459919
8	2	5255.2	8	55	1619		6.200636
9	1	5255.2	8	70			6.858173
10	2	5255.2	8	70	1306		7.774795

11	2	5255.2	8	85	1588		8.77588
12	1	5255.2	8	65			8.894738
13	2	5255.2	8	90	1071		10.12482
14	3	5255.2	8	90	1612	1798	10.529459
15	3	5255.2	8	80	1869	1451	11.829393
USA Bin 5 Trial #4							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5255.6	9	50			0.569873
2	2	5255.6	9	95	1052		0.856504
3	3	5255.6	9	100	1567	1342	1.774256
4	3	5255.6	9	85	1879	1716	2.527534
5	3	5255.6	9	80	1508	1269	3.91195
6	2	5255.6	9	75	1192		4.651104
7	1	5255.6	9	100			5.112502
8	2	5255.6	9	60	1383		6.267564
9	1	5255.6	9	100			6.959548
10	2	5255.6	9	80	1269		7.602155
11	3	5255.6	9	50	1642	1564	8.558279
12	1	5255.6	9	95			9.473021
13	2	5255.6	9	85	1920		10.022883
14	2	5255.6	9	65	1019		11.085121
15	2	5255.6	9	95	1868		11.383689
USA Bin 5 Trial #5							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5258.4	16	65	1205		0.71959
2	1	5258.4	16	100			1.622529
3	2	5258.4	16	50	1599		2.625502
4	1	5258.4	16	90			3.928911
5	3	5258.4	16	85	1247	1233	4.708269
6	3	5258.4	16	100	1338	1231	5.831601
7	3	5258.4	16	80	1509	1667	6.862007
8	1	5258.4	16	85			7.999484
9	1	5258.4	16	75			9.057489
10	2	5258.4	16	85	1443		10.032222
11	1	5258.4	16	85			11.596685
USA Bin 5 Trial #6							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)

1	3	5260	20	60	1820	1399	0.478237
2	2	5260	20	75	1849		1.943652
3	3	5260	20	55	1723	1424	3.283489
4	3	5260	20	85	1743	1698	5.264618
5	2	5260	20	90	1358		7.393757
6	3	5260	20	85	1129	1454	8.642815
7	3	5260	20	70	1618	1053	9.754277
8	1	5260	20	60			11.271951
USA Bin 5 Trial #7							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5255.2	8	65	1090	1191	0.771015
2	2	5255.2	8	95	1219		2.262073
3	1	5255.2	8	65			3.058151
4	2	5255.2	8	55	1981		4.747479
5	1	5255.2	8	100			6.123325
6	3	5255.2	8	100	1541	1372	7.062428
7	3	5255.2	8	100	1285	1835	8.968962
8	3	5255.2	8	90	1725	1679	9.88845
9	3	5255.2	8	80	1400	1339	11.151684
USA Bin 5 Trial #8							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5259.2	18	100	1213	1008	0.284627
2	3	5259.2	18	55	1731	1710	2.98863
3	1	5259.2	18	50			3.163806
4	3	5259.2	18	75	1196	1901	5.293022
5	1	5259.2	18	65			6.714386
6	1	5259.2	18	95			7.513876
7	1	5259.2	18	95			9.095537
8	2	5259.2	18	100	1448		10.914856
USA Bin 5 Trial #9							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5259.2	18	70	1257		0.420491
2	3	5259.2	18	95	1263	1439	1.245895
3	3	5259.2	18	80	1381	1166	2.517301
4	2	5259.2	18	65	1999		4.584815
5	2	5259.2	18	70	1250		5.984529
6	1	5259.2	18	95			6.082759

7	2	5259.2	18	70	1273		7.206726
8	1	5259.2	18	80			8.411976
9	1	5259.2	18	75			10.162841
10	2	5259.2	18	70	1004		11.648359
USA Bin 5 Trial #10							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5254	5	65			0.130041
2	1	5254	5	85			1.542152
3	1	5254	5	95			2.301987
4	3	5254	5	75	1200	1135	3.119413
5	1	5254	5	70			3.917572
6	1	5254	5	85			4.77165
7	3	5254	5	80	1090	1826	5.959107
8	3	5254	5	85	1929	1052	6.302386
9	3	5254	5	65	1777	1894	6.888651
10	1	5254	5	50			7.804913
11	1	5254	5	75			9.233182
12	2	5254	5	50	1445		9.669761
13	2	5254	5	85	1780		10.403728
14	1	5254	5	80			11.530603
USA Bin 5 Trial #11							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5290	12	90			0.455969
2	1	5290	12	90			0.994453
3	1	5290	12	95			1.942883
4	1	5290	12	100			2.533846
5	1	5290	12	80			2.699684
6	3	5290	12	100	1447	1470	3.795712
7	1	5290	12	100			4.529181
8	1	5290	12	50			4.745954
9	2	5290	12	55	1068		5.685662
10	2	5290	12	90	1779		6.315002
11	1	5290	12	70			7.095124
12	3	5290	12	90	1443	1008	7.617004
13	3	5290	12	100	1752	1486	8.36308
14	2	5290	12	95	1026		9.172024
15	3	5290	12	55	1442	1304	9.351002
16	1	5290	12	65			10.530437
17	3	5290	12	80	1950	1207	11.06835

18	1	5290	12	50			11.381845
USA Bin 5 Trial #12							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5290	18	70	1491	1964	0.344911
2	1	5290	18	100			1.17403
3	3	5290	18	100	1875	1077	2.071016
4	1	5290	18	85			3.373148
5	2	5290	18	60	1021		3.877612
6	1	5290	18	80			4.631747
7	3	5290	18	85	1102	1820	5.715419
8	2	5290	18	60	1261		6.807086
9	3	5290	18	50	1317	1395	8.29578
10	2	5290	18	60	1401		9.020699
11	2	5290	18	55	1018		9.571075
12	2	5290	18	60	1364		10.910479
13	2	5290	18	85	1873		11.320398
USA Bin 5 Trial #13							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5290	16	95			0.826479
2	3	5290	16	60	1763	1413	1.939886
3	1	5290	16	80			3.291149
4	1	5290	16	60			5.276096
5	1	5290	16	65			7.088394
6	2	5290	16	55	1588		8.017661
7	2	5290	16	95	1324		9.08753
8	3	5290	16	60	1964	1602	11.209707
USA Bin 5 Trial #14							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5290	16	100			0.323694
2	1	5290	16	50			1.541317
3	1	5290	16	70			1.967506
4	3	5290	16	85	1605	1215	3.383861
5	1	5290	16	70			3.9218
6	3	5290	16	100	1613	1473	4.858821
7	2	5290	16	90	1254		5.902158
8	1	5290	16	55			6.578914
9	3	5290	16	80	1162	1741	7.414272

10	2	5290	16	55	1533		9.075292
11	3	5290	16	70	1645	1215	9.740132
12	2	5290	16	85	1587		10.92459
13	2	5290	16	60	1693		11.416857
USA Bin 5 Trial #15							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5290	15	50	1623	1462	0.640148
2	3	5290	15	95	1777	1935	1.173355
3	2	5290	15	80	1050		1.766702
4	3	5290	15	75	1668	1060	3.039468
5	2	5290	15	75	1447		3.443492
6	1	5290	15	75			4.385056
7	1	5290	15	70			5.462841
8	2	5290	15	60	1610		5.89029
9	3	5290	15	100	1841	1858	6.59061
10	2	5290	15	90	1789		7.718155
11	1	5290	15	85			8.554405
12	3	5290	15	70	1861	1502	9.539111
13	1	5290	15	90			10.322928
14	1	5290	15	60			11.193748
15	3	5290	15	60	1968	1062	11.525324
USA Bin 5 Trial #16							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5290	10	80	1776		0.689544
2	3	5290	10	70	1276	1939	1.02577
3	3	5290	10	100	1522	1192	2.246024
4	1	5290	10	80			2.618612
5	2	5290	10	50	1099		4.01685
6	3	5290	10	100	1420	1285	4.557903
7	3	5290	10	65	1546	1279	5.755658
8	2	5290	10	60	1170		6.403156
9	3	5290	10	85	1851	1500	6.963818
10	2	5290	10	70	1782		8.551676
11	3	5290	10	60	1981	1954	8.90801
12	3	5290	10	55	1735	1224	9.53439
13	3	5290	10	85	1204	1330	10.752747
14	3	5290	10	85	1320	1751	11.498081
USA Bin 5 Trial #17							

Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5290	15	90	1404	1322	0.566412
2	1	5290	15	90			1.776053
3	1	5290	15	60			3.049634
4	3	5290	15	80	1570	1725	4.182518
5	1	5290	15	75			5.427186
6	1	5290	15	70			5.617247
7	3	5290	15	60	1559	1873	7.065822
8	1	5290	15	90			7.651958
9	1	5290	15	85			9.095798
10	1	5290	15	50			10.226731
11	2	5290	15	75	1265		11.806725
USA Bin 5 Trial #18							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5290	8	90	1446		0.028338
2	2	5290	8	70	1154		2.432904
3	2	5290	8	65	1105		3.749882
4	1	5290	8	55			5.297407
5	2	5290	8	80	1183		5.734545
6	1	5290	8	90			7.522072
7	1	5290	8	90			8.178923
8	3	5290	8	80	1918	1923	10.061533
9	2	5290	8	60	1780		10.848572
USA Bin 5 Trial #19							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5290	11	100	1723		0.797364
2	3	5290	11	100	1507	1717	2.351956
3	1	5290	11	55			4.296207
4	1	5290	11	95			4.556268
5	2	5290	11	50	1925		6.334447
6	3	5290	11	55	1766	1284	8.254483
7	1	5290	11	90			9.883351
8	2	5290	11	65	1278		10.670662
USA Bin 5 Trial #20							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)

1	1	5290	19	65			0.116152
2	3	5290	19	95	1791	1602	1.135007
3	2	5290	19	50	1438		1.82036
4	3	5290	19	55	1839	1606	2.412195
5	2	5290	19	60	1006		3.409861
6	2	5290	19	100	1687		4.156115
7	3	5290	19	70	1953	1176	4.534321
8	2	5290	19	85	1259		5.713518
9	1	5290	19	65			6.056936
10	3	5290	19	60	1546	1674	6.851491
11	1	5290	19	70			7.772095
12	2	5290	19	70	1568		8.858323
13	3	5290	19	75	1527	1802	9.287057
14	3	5290	19	85	1260	1807	9.750731
15	2	5290	19	90	1795		10.55176
16	2	5290	19	90	1931		11.828486
USA Bin 5 Trial #21							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5320.4	19	95	1445		0.336745
2	2	5320.4	19	75	1125		0.878092
3	3	5320.4	19	75	1505	1866	1.333377
4	1	5320.4	19	90			2.056753
5	1	5320.4	19	100			2.671135
6	1	5320.4	19	70			3.435095
7	3	5320.4	19	100	1741	1337	4.157804
8	3	5320.4	19	80	1804	1850	4.963367
9	3	5320.4	19	90	1423	1594	5.106525
10	3	5320.4	19	90	1435	1104	5.68596
11	2	5320.4	19	55	1846		6.894224
12	2	5320.4	19	95	1499		7.472282
13	2	5320.4	19	80	1109		7.753729
14	2	5320.4	19	90	1187		8.454
15	1	5320.4	19	85			8.904457
16	3	5320.4	19	50	1182	1735	9.640844
17	3	5320.4	19	95	1684	1659	10.131463
18	1	5320.4	19	100			11.099836
19	1	5320.4	19	100			11.617812
USA Bin 5 Trial #22							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)

1	3	5324.8	8	80	1939	1199	0.405611
2	1	5324.8	8	75			1.100324
3	1	5324.8	8	70			1.606904
4	3	5324.8	8	90	1403	1845	1.963123
5	1	5324.8	8	100			2.633875
6	1	5324.8	8	70			3.667515
7	2	5324.8	8	60	1193		4.33228
8	3	5324.8	8	75	1666	1670	4.923284
9	1	5324.8	8	80			5.525295
10	2	5324.8	8	75	1137		6.059154
11	1	5324.8	8	95			6.725727
12	3	5324.8	8	70	1457	1044	6.996385
13	3	5324.8	8	80	1940	1496	7.74963
14	2	5324.8	8	60	1565		8.243948
15	1	5324.8	8	70			8.888889
16	3	5324.8	8	85	1641	1197	9.714993
17	1	5324.8	8	55			10.416031
18	3	5324.8	8	100	1892	1946	11.271269
19	2	5324.8	8	65	1735		11.711801
USA Bin 5 Trial #23							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5326	5	60	1749	1005	0.296545
2	2	5326	5	85	1922		1.334814
3	2	5326	5	90	1119		2.075857
4	1	5326	5	75			3.080692
5	1	5326	5	55			3.790716
6	3	5326	5	75	1728	1013	4.543755
7	2	5326	5	75	1666		5.078825
8	2	5326	5	50	1365		6.376221
9	3	5326	5	55	1413	1362	6.647202
10	1	5326	5	90			7.355824
11	2	5326	5	85	1485		8.072116
12	3	5326	5	50	1241	1293	8.897505
13	2	5326	5	100	1133		9.872416
14	3	5326	5	85	1658	1006	10.896748
15	3	5326	5	85	1777	1655	11.651385
USA Bin 5 Trial #24							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5323.6	11	60			0.179364

2	1	5323.6	11	65			0.823921
3	1	5323.6	11	80			1.917473
4	3	5323.6	11	85	1471	1933	2.272882
5	1	5323.6	11	100			2.708406
6	2	5323.6	11	50	1515		3.749157
7	1	5323.6	11	100			4.612502
8	2	5323.6	11	80	1942		5.279801
9	1	5323.6	11	90			5.923187
10	3	5323.6	11	70	1223	1905	6.523144
11	1	5323.6	11	55			7.225319
12	3	5323.6	11	70	1338	1659	7.462289
13	1	5323.6	11	95			8.593845
14	1	5323.6	11	75			9.035341
15	1	5323.6	11	85			9.58766
16	2	5323.6	11	95	1480		10.124631
17	2	5323.6	11	50	1083		10.819386
18	3	5323.6	11	60	1828	1003	11.577873
USA Bin 5 Trial #25							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5324	10	85			0.021035
2	2	5324	10	100	1247		1.216088
3	2	5324	10	60	1143		1.661897
4	2	5324	10	50	1207		2.408729
5	3	5324	10	95	1523	1718	3.139068
6	3	5324	10	60	1996	1383	3.721149
7	1	5324	10	95			4.45717
8	3	5324	10	80	1167	1682	5.213306
9	3	5324	10	85	1050	1138	5.5613
10	3	5324	10	60	1434	1867	6.526075
11	2	5324	10	50	1736		7.2003
12	3	5324	10	60	1816	1197	7.983387
13	2	5324	10	95	1825		8.636253
14	1	5324	10	50			8.762189
15	3	5324	10	100	1743	1046	9.803117
16	1	5324	10	65			10.138899
17	2	5324	10	80	1621		11.021417
18	1	5324	10	60			11.99864
USA Bin 5 Trial #26							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)

1	1	5322.8	13	80			0.479233
2	1	5322.8	13	60			0.6878
3	3	5322.8	13	90	1811	1828	1.930246
4	2	5322.8	13	85	1939		2.173749
5	2	5322.8	13	55	2000		3.022408
6	1	5322.8	13	50			3.340463
7	3	5322.8	13	95	1220	1291	4.339118
8	2	5322.8	13	65	1955		5.062986
9	2	5322.8	13	95	1671		5.507667
10	2	5322.8	13	80	1930		6.055792
11	2	5322.8	13	70	1019		7.097913
12	2	5322.8	13	70	1857		7.837107
13	2	5322.8	13	85	1626		8.6049
14	1	5322.8	13	70			8.736554
15	2	5322.8	13	55	1647		9.417104
16	3	5322.8	13	95	1611	1819	10.45115
17	1	5322.8	13	70			10.668861
18	3	5322.8	13	80	1160	1693	11.976645
USA Bin 5 Trial #27							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	3	5321.2	17	50	1713	1199	0.474371
2	3	5321.2	17	55	1836	1108	1.447008
3	1	5321.2	17	75			2.249275
4	1	5321.2	17	70			2.924374
5	3	5321.2	17	80	1598	1693	3.392128
6	3	5321.2	17	85	1847	1314	4.595935
7	1	5321.2	17	65			5.550371
8	2	5321.2	17	80	1494		5.732118
9	2	5321.2	17	65	1278		6.613477
10	3	5321.2	17	100	1439	1921	7.536807
11	1	5321.2	17	65			8.463184
12	3	5321.2	17	85	1922	1607	8.925732
13	3	5321.2	17	60	1465	1869	10.383121
14	3	5321.2	17	65	1858	1938	10.487909
15	1	5321.2	17	70			11.280835
USA Bin 5 Trial #28							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	1	5322.8	13	60			0.185015
2	1	5322.8	13	80			0.991645

3	1	5322.8	13	55			1.205428
4	2	5322.8	13	50	1100		2.00167
5	3	5322.8	13	75	1097	1550	2.629684
6	3	5322.8	13	100	1600	1153	3.269567
7	1	5322.8	13	85			3.915558
8	1	5322.8	13	90			4.345303
9	3	5322.8	13	85	1748	1819	4.902457
10	2	5322.8	13	50	1687		5.869955
11	2	5322.8	13	70	1784		6.213488
12	1	5322.8	13	70			6.806464
13	1	5322.8	13	85			7.261261
14	3	5322.8	13	60	1186	1185	7.864648
15	3	5322.8	13	60	1008	1833	8.688833
16	1	5322.8	13	80			9.096328
17	1	5322.8	13	60			10.060537
18	2	5322.8	13	50	1756		10.314265
19	1	5322.8	13	85			11.152515
20	3	5322.8	13	60	1662	1904	11.939395
USA Bin 5 Trial #29							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5324.4	9	50	1597		0.912663
2	1	5324.4	9	80			1.120714
3	1	5324.4	9	95			2.256992
4	3	5324.4	9	55	1872	1296	2.78997
5	2	5324.4	9	65	1713		4.075561
6	1	5324.4	9	80			4.767078
7	1	5324.4	9	80			5.710435
8	1	5324.4	9	55			6.579364
9	2	5324.4	9	50	1586		7.849737
10	3	5324.4	9	80	1863	1702	8.687982
11	2	5324.4	9	65	1151		9.483673
12	2	5324.4	9	60	1233		10.995159
13	3	5324.4	9	75	1695	1131	11.340236
USA Bin 5 Trial #30							
Burst #	Pulses	Frequency (MHz)	Chirp (MHz)	PW (uS)	Inter-pulse spacing (uS)	Inter-pulse spacing (uS)	Pulse Start (S)
1	2	5324	10	100	1875		0.581953
2	1	5324	10	95			1.133746
3	2	5324	10	75	1569		2.547936
4	2	5324	10	55	1821		2.927594

5	2	5324	10	60	1958		4.077811
6	2	5324	10	90	1484		4.763243
7	1	5324	10	75			5.96816
8	3	5324	10	65	1921	1669	6.352946
9	2	5324	10	85	1795		7.033305
10	1	5324	10	85			8.333985
11	3	5324	10	55	1541	1509	8.600037
12	3	5324	10	80	1476	1977	9.671967
13	1	5324	10	85			10.810185
14	1	5324	10	70			11.154527

Type 6 Frequency Hopping Radar Statistical Performance

Trial	Hop #	Freq (GHz)	Pulse Start (mS)	1=Detection 0=No Detection	Detection Percentage	Limit
1	2	5304	6	1	100.0%	70.0%
2	2	5290	6	1		
3	5	5259	15	1		
4	0	5286	0	1		
5	9	5325	27	1		
6	2	5314	6	1		
7	5	5294	15	1		
8	2	5307	6	1		
9	1	5309	3	1		
10	0	5307	0	1		
11	5	5297	15	1		
12	6	5289	18	1		
13	0	5278	0	1		
14	9	5296	27	1		
15	0	5323	0	1		
16	1	5296	3	1		
17	11	5326	33	1		
18	0	5257	0	1		
19	6	5280	18	1		
20	10	5300	30	1		
21	15	5260	45	1		
22	2	5259	6	1		
23	4	5307	12	1		
24	4	5264	12	1		
25	1	5298	3	1		
26	4	5297	12	1		
27	5	5295	15	1		
28	6	5286	18	1		
29	5	5304	15	1		
30	0	5270	0	1		

Type 6 Frequency Hopping Radar Statistical Performance - Details

USA Frequency Hopping Trial #1

Hop #	Freq (GHz)	Pulse Start (mS)
2	5304	6
16	5298	48
22	5303	66
26	5323	78
28	5317	84
29	5319	87
30	5271	90
41	5276	123
44	5325	132
45	5321	135
47	5295	141
70	5274	210
74	5328	222
80	5255	240
94	5279	282
97	5294	291
USA Frequency Hopping Trial #2		
Hop #	Freq (GHz)	Pulse Start (mS)
2	5290	6
4	5274	12
9	5252	27
14	5307	42
20	5293	60
29	5273	87
30	5281	90
34	5266	102
43	5296	129
49	5267	147
53	5259	159
60	5276	180
61	5280	183
USA Frequency Hopping Trial #3		
Hop #	Freq (GHz)	Pulse Start (mS)
5	5259	15
6	5261	18
9	5282	27
27	5309	81
31	5310	93
38	5275	114

46	5272	138
50	5279	150
53	5301	159
58	5322	174
64	5295	192
66	5268	198
74	5328	222
75	5299	225
80	5303	240
88	5253	264
USA Frequency Hopping Trial #4		
Hop #	Freq (GHz)	Pulse Start (mS)
0	5286	0
2	5298	6
5	5322	15
12	5299	36
14	5312	42
16	5268	48
22	5318	66
23	5277	69
34	5308	102
46	5319	138
49	5326	147
59	5294	177
62	5290	186
71	5306	213
73	5273	219
78	5281	234
82	5282	246
85	5275	255
USA Frequency Hopping Trial #5		
Hop #	Freq (GHz)	Pulse Start (mS)
9	5325	27
11	5291	33
15	5308	45
33	5301	99
35	5262	105
36	5274	108
39	5267	117
45	5288	135

56	5312	168
59	5266	177
65	5277	195
67	5307	201
74	5296	222
75	5260	225
82	5319	246
83	5284	249
89	5311	267
93	5290	279
USA Frequency Hopping Trial #6		
Hop #	Freq (GHz)	Pulse Start (mS)
2	5314	6
6	5277	18
13	5260	39
21	5285	63
28	5276	84
32	5268	96
34	5291	102
35	5306	105
36	5321	108
37	5301	111
47	5296	141
56	5262	168
59	5292	177
60	5284	180
61	5289	183
64	5270	192
82	5258	246
84	5252	252
95	5326	285
96	5294	288
97	5299	291
USA Frequency Hopping Trial #7		
Hop #	Freq (GHz)	Pulse Start (mS)
5	5294	15
20	5327	60
27	5260	81
30	5275	90
36	5317	108

38	5281	114
42	5263	126
47	5274	141
54	5304	162
55	5300	165
67	5284	201
70	5258	210
79	5320	237
80	5322	240
81	5253	243
90	5288	270
USA Frequency Hopping Trial #8		
Hop #	Freq (GHz)	Pulse Start (mS)
2	5307	6
10	5264	30
17	5300	51
23	5288	69
34	5292	102
35	5303	105
41	5269	123
46	5314	138
47	5306	141
70	5289	210
74	5318	222
83	5279	249
91	5281	273
95	5255	285
USA Frequency Hopping Trial #9		
Hop #	Freq (GHz)	Pulse Start (mS)
1	5309	3
17	5263	51
21	5259	63
28	5293	84
36	5262	108
37	5267	111
54	5291	162
63	5314	189
69	5265	207
72	5320	216
73	5305	219

83	5292	249
85	5316	255
89	5289	267
92	5290	276
94	5252	282
USA Frequency Hopping Trial #10		
Hop #	Freq (GHz)	Pulse Start (mS)
0	5307	0
5	5320	15
8	5265	24
21	5314	63
28	5269	84
29	5283	87
32	5299	96
35	5278	105
49	5261	147
56	5274	168
57	5279	171
65	5287	195
67	5310	201
78	5298	234
79	5315	237
88	5264	264
93	5256	279
USA Frequency Hopping Trial #11		
Hop #	Freq (GHz)	Pulse Start (mS)
5	5297	15
7	5291	21
16	5270	48
20	5282	60
26	5262	78
32	5327	96
36	5312	108
44	5278	132
47	5283	141
51	5314	153
70	5289	210
71	5293	213
76	5294	228
97	5252	291

USA Frequency Hopping Trial #12		
Hop #	Freq (GHz)	Pulse Start (mS)
6	5289	18
21	5256	63
27	5303	81
31	5286	93
32	5273	96
49	5323	147
53	5298	159
58	5294	174
60	5262	180
73	5291	219
74	5280	222
75	5301	225
81	5263	243
89	5304	267
93	5293	279
95	5317	285
96	5297	288
USA Frequency Hopping Trial #13		
Hop #	Freq (GHz)	Pulse Start (mS)
0	5278	0
3	5264	9
4	5297	12
8	5301	24
13	5280	39
24	5286	72
25	5255	75
27	5327	81
31	5296	93
45	5311	135
46	5266	138
78	5279	234
81	5304	243
83	5258	249
85	5285	255
USA Frequency Hopping Trial #14		
Hop #	Freq (GHz)	Pulse Start (mS)
9	5296	27

11	5270	33
18	5302	54
30	5263	90
41	5257	123
46	5297	138
49	5279	147
72	5276	216
76	5308	228
79	5301	237
93	5299	279
94	5264	282
USA Frequency Hopping Trial #15		
Hop #	Freq (GHz)	Pulse Start (mS)
0	5323	0
2	5277	6
6	5289	18
17	5276	51
30	5266	90
31	5316	93
48	5269	144
63	5283	189
72	5257	216
73	5328	219
74	5297	222
83	5272	249
88	5313	264
99	5256	297
USA Frequency Hopping Trial #16		
Hop #	Freq (GHz)	Pulse Start (mS)
1	5296	3
10	5275	30
17	5281	51
20	5273	60
22	5254	66
35	5313	105
37	5270	111
49	5288	147
67	5282	201
69	5277	207
75	5305	225

77	5269	231
81	5321	243
USA Frequency Hopping Trial #17		
Hop #	Freq (GHz)	Pulse Start (mS)
11	5326	33
22	5296	66
24	5270	72
27	5313	81
29	5273	87
38	5325	114
39	5321	117
40	5324	120
41	5255	123
42	5299	126
44	5284	132
53	5300	159
57	5315	171
61	5312	183
63	5305	189
65	5259	195
68	5314	204
77	5304	231
84	5283	252
99	5271	297
USA Frequency Hopping Trial #18		
Hop #	Freq (GHz)	Pulse Start (mS)
0	5257	0
5	5309	15
9	5297	27
29	5289	87
35	5258	105
42	5305	126
46	5269	138
50	5253	150
55	5328	165
60	5277	180
61	5326	183
62	5304	186
67	5282	201
84	5299	252

86	5288	258
93	5268	279
96	5306	288
USA Frequency Hopping Trial #19		
Hop #	Freq (GHz)	Pulse Start (mS)
6	5280	18
18	5294	54
27	5309	81
34	5313	102
42	5301	126
43	5318	129
44	5320	132
64	5253	192
66	5274	198
83	5304	249
85	5299	255
86	5312	258
87	5327	261
95	5287	285
98	5282	294
USA Frequency Hopping Trial #20		
Hop #	Freq (GHz)	Pulse Start (mS)
10	5300	30
14	5278	42
19	5286	57
21	5293	63
31	5318	93
42	5295	126
47	5308	141
62	5310	186
65	5263	195
67	5303	201
70	5274	210
78	5282	234
84	5311	252
88	5259	264
89	5257	267
USA Frequency Hopping Trial #21		
Hop #	Freq (GHz)	Pulse Start (mS)
15	5260	45

18	5300	54
22	5307	66
53	5325	159
65	5289	195
67	5265	201
70	5319	210
74	5261	222
78	5263	234
80	5262	240
96	5271	288
97	5304	291
USA Frequency Hopping Trial #22		
Hop #	Freq (GHz)	Pulse Start (mS)
2	5259	6
4	5288	12
5	5294	15
6	5254	18
20	5283	60
24	5263	72
25	5305	75
27	5308	81
32	5262	96
37	5268	111
53	5303	159
54	5327	162
55	5253	165
62	5311	186
76	5324	228
84	5276	252
85	5298	255
88	5307	264
92	5312	276
93	5304	279
USA Frequency Hopping Trial #23		
Hop #	Freq (GHz)	Pulse Start (mS)
4	5307	12
24	5314	72
31	5290	93
32	5295	96
34	5327	102

37	5259	111
42	5310	126
46	5264	138
55	5298	165
60	5254	180
66	5275	198
72	5276	216
75	5253	225
79	5252	237
89	5272	267
94	5260	282
98	5287	294
USA Frequency Hopping Trial #24		
Hop #	Freq (GHz)	Pulse Start (mS)
4	5264	12
19	5324	57
20	5313	60
21	5292	63
22	5328	66
27	5262	81
60	5321	180
63	5320	189
89	5279	267
91	5260	273
USA Frequency Hopping Trial #25		
Hop #	Freq (GHz)	Pulse Start (mS)
1	5298	3
14	5276	42
20	5318	60
27	5294	81
30	5262	90
40	5283	120
42	5256	126
46	5280	138
49	5279	147
50	5274	150
51	5301	153
55	5282	165
70	5273	210
74	5325	222

79	5278	237
85	5284	255
94	5306	282
99	5260	297
USA Frequency Hopping Trial #26		
Hop #	Freq (GHz)	Pulse Start (mS)
4	5297	12
6	5301	18
9	5276	27
18	5287	54
43	5263	129
46	5298	138
50	5327	150
65	5262	195
66	5290	198
71	5323	213
92	5265	276
USA Frequency Hopping Trial #27		
Hop #	Freq (GHz)	Pulse Start (mS)
5	5295	15
10	5288	30
15	5283	45
16	5276	48
33	5266	99
34	5324	102
36	5300	108
37	5303	111
39	5323	117
40	5268	120
47	5263	141
49	5281	147
51	5325	153
57	5298	171
58	5277	174
60	5317	180
61	5275	183
68	5322	204
80	5252	240
84	5328	252
85	5286	255

86	5287	258
95	5258	285
USA Frequency Hopping Trial #28		
Hop #	Freq (GHz)	Pulse Start (mS)
6	5286	18
7	5316	21
11	5256	33
13	5312	39
15	5318	45
17	5255	51
30	5299	90
31	5279	93
43	5290	129
61	5257	183
62	5301	186
78	5262	234
81	5283	243
86	5263	258
USA Frequency Hopping Trial #29		
Hop #	Freq (GHz)	Pulse Start (mS)
5	5304	15
8	5303	24
9	5291	27
13	5287	39
15	5310	45
31	5323	93
40	5258	120
46	5320	138
48	5267	144
56	5297	168
59	5296	177
62	5315	186
66	5293	198
75	5269	225
77	5277	231
79	5278	237
82	5268	246
90	5306	270
USA Frequency Hopping Trial #30		
Hop #	Freq (GHz)	Pulse Start (mS)

0	5270	0
1	5256	3
5	5292	15
10	5282	30
13	5322	39
18	5289	54
19	5326	57
22	5297	66
34	5271	102
53	5284	159
56	5277	168
58	5313	174
66	5294	198
67	5291	201
70	5307	210
79	5321	237
82	5261	246
83	5305	249
87	5260	261
89	5325	267
90	5295	270
92	5285	276
94	5306	282

Appendix C: List of Test Equipment Used to perform the test

Equip#	Manufacturer/ Model	Description	Last Cal	Next Due
7329	Omega / CT485B	Chart Recorder	18 Feb. 2019	18 Feb. 2020
42003	Mini Circuits / BWS30W2+	SMA 30dB Attenuator	19 Sep. 2018	19 Sep. 2019
42636	Pasternack / PE6072	SMA 50ohm Termination	10 May 2019	10 May 2020
47287	Huber + Suhner / Sucoflex 102E	40GHz Cable K Connector	20 Jun. 2019	20 Jun. 2020
49516	Keysight (Agilent/HP) / N9030A-550	PXA Signal Analyzer, 3Hz to 50GHz	29 Nov. 2018	29 Nov. 2019
54395	Huber + Suhner / Sucoflex 102	RF Cable 2.4mm – N Type 18GHz	24 Apr. 2019	24 Apr. 2020
54404	Huber + Suhner / Sucoflex 102	RF Cable 2.4mm – N Type 18GHz	24 Apr. 2019	24 Apr. 2020
54632	Megaphase / GC12-S1S1-18	SMA Cable	14 May 2019	14 May 2020
54696	Ditom / D3C2060	Splitter	15 Nov. 2018	15 Nov. 2019
55097	National Instruments / PXI-1042	Chassis PXI	Cal. not required	Cal. not required
55107	Keysight (Agilent/HP) / N5182B	MXG X-Series RF Vector Signal Generator	23 Oct. 2018	23 Oct. 2019
55558	Mini Circuits ZFSC-2-10G	Splitter, 2-10GHz	03 Jul. 2019	03 Jul. 2020
55594	Megaphase / GC12-8181-16	SMA Cable	14 May 2019	14 May 2019
56062	Pulsar / PS4-09-452/4S	Splitter	12 Apr. 2019	12 Apr. 2020
56089	National Instruments / PXI-2796	40GHz Dual 6x1 Multiplexer (SP6T)	Verify Before Use	Verify Before Use
57231	National Instruments / PXI-5422	200MS/s, 16bit Arbitrary Waveform Generator	26 Sep. 2018	26 Sep. 2019
57232	National Instruments / PXI-5422	200MS/s, 16bit Arbitrary Waveform Generator	28 Sep. 2018	28 Sep. 2019
57233	National Instruments / PXI-8115	Embedded Controller	Cal. not required	Cal. not required
57253	National Instruments / PXI-2796	40GHz Dual 6x1 Multiplexer (SP6T)	Verify Before Use	Verify Before Use
57254	National Instruments / PXI-2799	Switch 1x1	Verify Before Use	Verify Before Use
57479	Cisco / ATIL	Automation Test Insertion Loss	Verify Before Use	Verify Before Use

Appendix D: Abbreviation Key and Definitions

The following table defines abbreviations used within this test report.

Abbreviation	Description
DFS	Dynamic Frequency Selection
EIRP	Equivalent Isotropic Radiated Power
CAC	Channel Availability Check
TPC	Transmit Power Control
PRI	Pulse Repetition Interval
U-NII	Unlicensed National Information Infrastructure
RSS	Received Signal Strength
UUT	Unit Under Test
RDD	Radar Detection Device
RBW	Resolution Bandwidth
VBW	Video Bandwidth

Appendix E: Software Used to Perform Testing

DFS_Automation_Main.vi: Version 19

Appendix F: Test Procedures

Measurements were made in accordance with

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

Test procedures are summarized below:

FCC 5GHz DFS Test Procedures	EDCS # - 1445052

Appendix G: Scope of Accreditation (A2LA certificate number 1178-01)

The scope of accreditation of Cisco Systems, Inc. can be found on the A2LA web page at:

http://www.a2la.org/scopepdf/1178-01.pdf

Appendix H: Test Assessment Plan

Test Plan EDCS# 13513665
Power Tables EDCS# 15952129