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MEASUREMENT REPORT
FCC PART 15.407 DFS (Master Device)

Company Name:
H&D Wireless AB
Färögatan 33
SE-164 51 Kista
Sweden

Date of Testing:
4/7 - 6/17/2016
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
0Y1604070738.XO2

FCC ID:	**XO2SPB209A**
COMPANY:	**H&D Wireless AB**

Model(s):	SPB209A
EUT Type:	Wifi/BT/NFC Module
Type of Device:	Master Device
Frequency Range:	5260 – 5320 MHz (UNII-2A Band)
	5500 – 5720 MHz (UNII-2C Band)
FCC Classification:	Unlicensed National Information Infrastructure (UNII)
FCC Rule Part(s):	Part 15.407(UNII)
Test Procedure(s):	KDB 905462 D02 v02

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in KDB 905462 D02 v02 *Compliance Measurement Procedures for Unlicensed-National Information Infrastructure Devices Operating in the 5.25 – 5.35 GHz and 5.47 – 5.725 GHz Bands Incorporating Dynamic Frequency Selection*. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Randy Ortanez
President

ACCREDITED
TESTING CERT#2041.01

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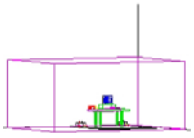
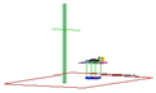


DFS MEASUREMENT REPORT
FCC Part 15.407



§ 2.1033 General Information

APPLICANT:	H&D Wireless AB
APPLICANT ADDRESS:	Färögatan 33
	SE-164 51 Kista, Sweden
TEST SITE:	PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS:	7185 Oakland Mills Road, Columbia, MD 21046 USA
FCC RULE PART(S):	Part 15.407(h)
BASE MODEL:	SPB209A
FCC ID:	XO2SPB209A
DEVICE CLASSIFICATION:	Master Device
DATE(S) OF TEST:	4/7 - 6/17/2016
TEST REPORT S/N:	0Y1604070738.XO2

Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21045, U.S.A.

- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451B-1).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (2451B-1) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.

1.0 INTRODUCTION

1.1 Scope

This report has been prepared to demonstrate compliance with the requirements for Dynamic Frequency Selection (DFS) as stated in KDB 905462. Testing was performed on the **H&D Wireless AB Wifi/BT/NFC Module FCC ID: XO2SPB209A**. As of July 20, 2007 all devices operating in the 5250 – 5350 MHz and/or the 5470 – 5725 MHz bands must comply with the DFS requirements. All test results reported herein are applicable to the sample selected for testing. The unit used for testing was supplied by H&D Wireless AB.

1.2 Evaluation Procedure

Per KDB 905462, conducted test methodology was used for the DFS evaluation procedure of the **H&D Wireless AB Wifi/BT/NFC Module FCC ID: XO2SPB209A**.

1.3 Summary of Test Results

The **H&D Wireless AB Wifi/BT/NFC Module FCC ID: XO2SPB209A** was found to be compliant with the requirements for DFS as required for a Master Device per Part 15.407(h) and KDB 905462 D02 v02.

Tests	Verdict
Non-Occupancy Period	Pass
DFS Detection Threshold	Pass
U-NII Detection Bandwidth	Pass
Channel Availability Check(CAC) Time	Pass
Channel Closing Transmission Time	Pass
Channel Move Time	Pass
Statistical Performance Check	Pass

Table 1-1. DFS Test Results Summary

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **H&D Wireless AB Wifi/BT/NFC Module FCC ID: XO2SPB209A**.

Mode of Operation:

Master Device	☒
Client Device (No radar detection)	☐
Client Device with Radar Detection	☐

Description of EUT:	
Operating Frequency Range:	5260 – 5320, 5500 – 5700 MHz
Output Power Range:	7.65 – 14.58 dBm
Antenna Port Used:	Wifi/BT, Single Port SISO
Antenna Assembly and Peak Gain:	4.9dBi with antenna connector impedance of 50Ohm.
Conducted Power U-NII 2a:	14.45 dBm
Conducted Power U-NII 2c:	14.26 dBm
Highest EIRP:	19.48 dBm
Lowest EIRP:	12.55 dBm
System Architecture:	IP based (802.11a/n/ac)
Supported Channel Bandwidths:	20, 40, 80 MHz
Time required for Master to complete power-on cycle:	8.84s

2.2 EUT Capabilities

This device contains the following capabilities:

802.11b/g/n/a/ac WLAN/UNII, Bluetooth (1x, EDR, LE), NFC, Master AP

2.3 Modifications

No modifications to the EUT were required in order to comply with the DFS specifications.

3.0 DESCRIPTION OF DYNAMIC FREQUENCY SELECTION TEST

3.1 Applicability

The following table from KDB 905462 lists the applicable requirements for the DFS testing. The device evaluated in this report is considered a client device without radar detection capability.

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

Table 3-1. DFS Applicability Prior to Use of a Channel

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

Table 3-2. DFS Applicability During Normal Operation

Additional Requirement	Operational Mode	
	Master	Client Without Radar Detection
UNII Detection BW and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required
NOTE: Frequencies selected for statistical performance check should include several frequencies within the radar detection BW and frequencies near the edge of the radar detection BW. For 802.11 devices, it is suggested to select frequencies in each of the bonded 20MHz channels and the channel center frequency.		

Table 3-3. Additional Requirements During Normal Operations for devices with multiple BW's

3.2 Master Device Overview

Per KDB 905462 the following are the requirements for Master Devices:

a) The *Master Device* will use DFS in order to detect *Radar Waveforms* with received signal strength above the *DFS Detection Threshold* in the 5250 - 5350 MHz and 5470 - 5725 MHz bands. DFS is not required in the 5150 - 5250 MHz or 5725 - 5825 MHz bands.

b) Before initiating a network on a *Channel*, the *Master Device* will perform a C*hannel Availability Check* for a specified time duration (*Channel Availability Check Time*) to ensure that there is no radar system operating on the *Channel*, using DFS described under subsection a) above.

c) The *Master Device* initiates a U-NII network by transmitting control signals that will enable other U-NII devices to *Associate* with the *Master Device*.

d) During normal operation, the *Master Device* will monitor the *Channel (In-Service Monitoring)* to ensure that there is no radar system operating on the *Channel*, using DFS described under a).

e) If the *Master Device* has detected a *Radar Waveform* during *In-Service Monitoring* as described under d), the *Operating Channel* of the U-NII network is no longer an *Available Channel*. The *Master Device* will instruct all associated *Client Device(s)* to stop transmitting on this *Channel* within the *Channel Move Time*. The transmissions during the *Channel Move Time* will be limited to the *Channel Closing Transmission Time*.

f) Once the *Master Device* has detected a *Radar Waveform* it will not utilize the *Channel* for the duration of the *Non-Occupancy Period*.

g) If the *Master Device* delegates the *In-Service Monitoring* to a *Client Device*, then the combination will be tested to the requirements described under d) through f) above.

3.3 DFS Detection Threshold Values

The DFS detection thresholds are defined for Master devices and Client Devices with In-service monitoring. These detection thresholds are listed in the following table.

Maximum Transmit Power	**Value (See Notes 1 and 2)**
EIRP ≥ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and psd < 10dBm/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. Note 3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.	

Table 3-4: Detection Thresholds for Master Devices and Client Devices with Radar Detection

3.4 Response Requirements

Requirements for both Master and Client device are listed in the following table.

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.	

Table 3-5: DFS Response Requirements

3.5 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.

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 from Table 5a of KDB 905462	See KDB 905462	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 usec, with a minimum increment of 1 usec, 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.					

Table 3-6: Short Pulse Radar Waveforms

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

Table 3-7. Long Pulse Radar Waveforms

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

Table 3-8. Frequency Hopping Radar Waveforms

3.6 Procedure and Test Setup

KDB 905462 describes a radiated test setup and a conducted test setup. The conducted test setup was used for testing reported herein. Figure 3-1 below shows the typical test setup.

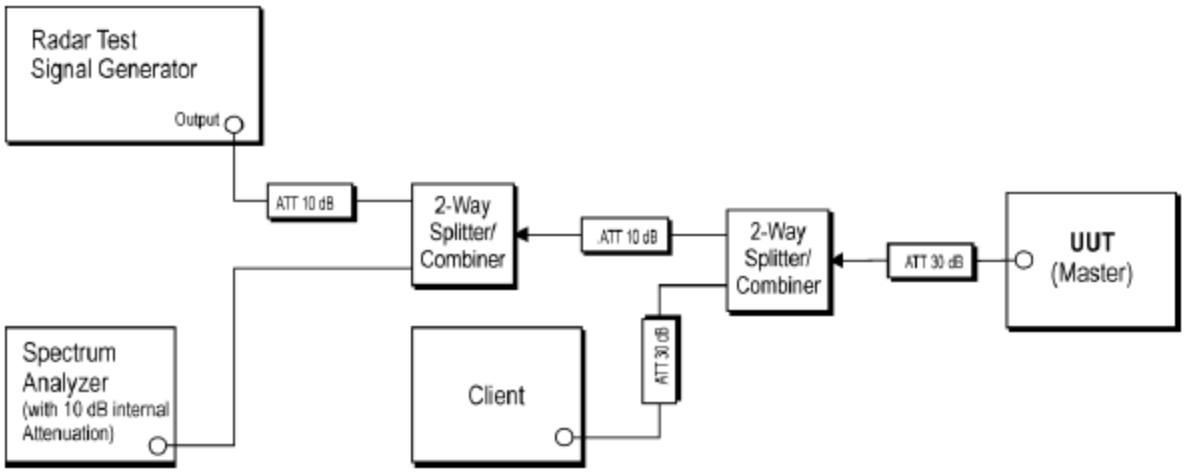


Figure 3-1. Example of Conducted Test Setup for DFS Master Device

1. The "Aeroflex PXI DFS Radar Simulator and Analyzer Test Suite" is setup to provide a simulated radar pulse at the frequency that the Master and Client are operating.
2. Testing is set up per the diagram in Figure 3-1 and communications between the Master device and the Client is established.
3. An MPEG video file (6½ Magic Hours) is streamed from the Master to the Client to properly load the network.
4. The "Aeroflex PXI DFS Radar Simulator and Analyzer Test Suite" is set to generate radars type 0 – 6 as specified in KDB 905462.

4.0 TEST EQUIPMENT

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST).

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Aeroflex	PXI 82531	PXI DFS Radar Simulator & Analyzer	7/20/2014	Biennial	7/20/2016	1082329
Agilent	E4448A	PSA (3Hz-50GHz) Spectrum Analyzer	3/1/2016	Annual	3/1/2017	US42510244
Agilent	N9038A	MXE EMI Receiver	4/21/2016	Annual	4/21/2017	MY51210133
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/2/2016	Biennial	3/2/2018	N/A

Table 4-1. Annual Test Equipment Calibration Schedule

4.1 Additional Equipment

The following equipment was used in support of the DFS testing.

Device	Manufacturer	Model/Description	Description	S/N:
Client	HP	Compaq 6710b	802.11 Laptop	CNU7402SDL

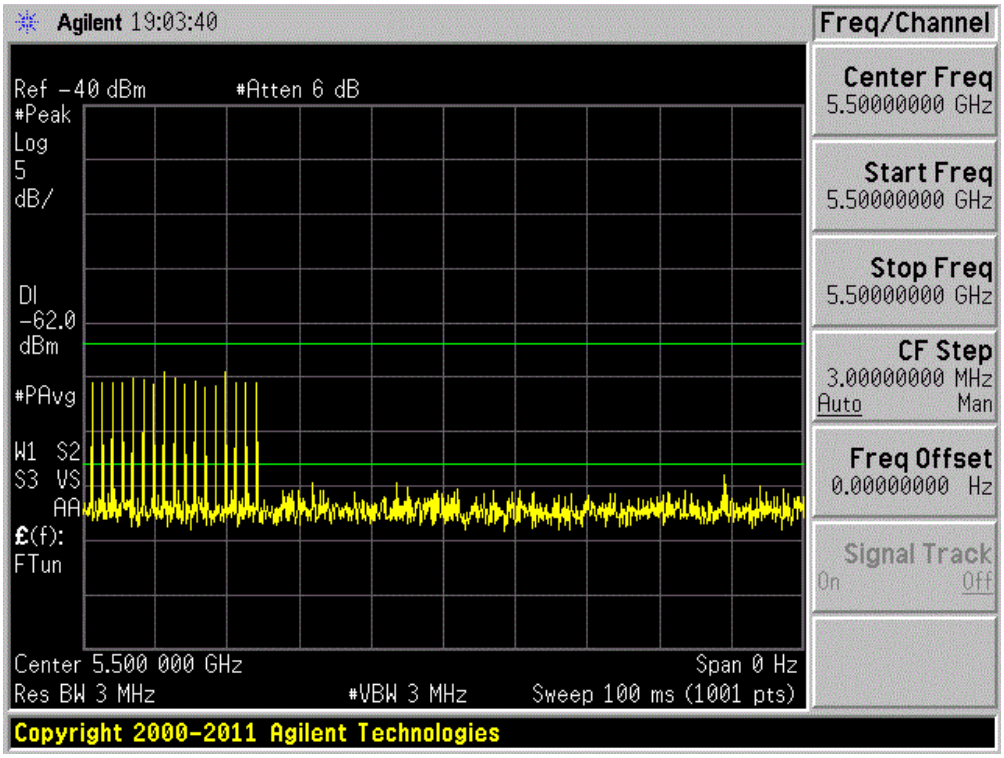
Table 4-2. Support Equipment

5.0 TEST RESULTS

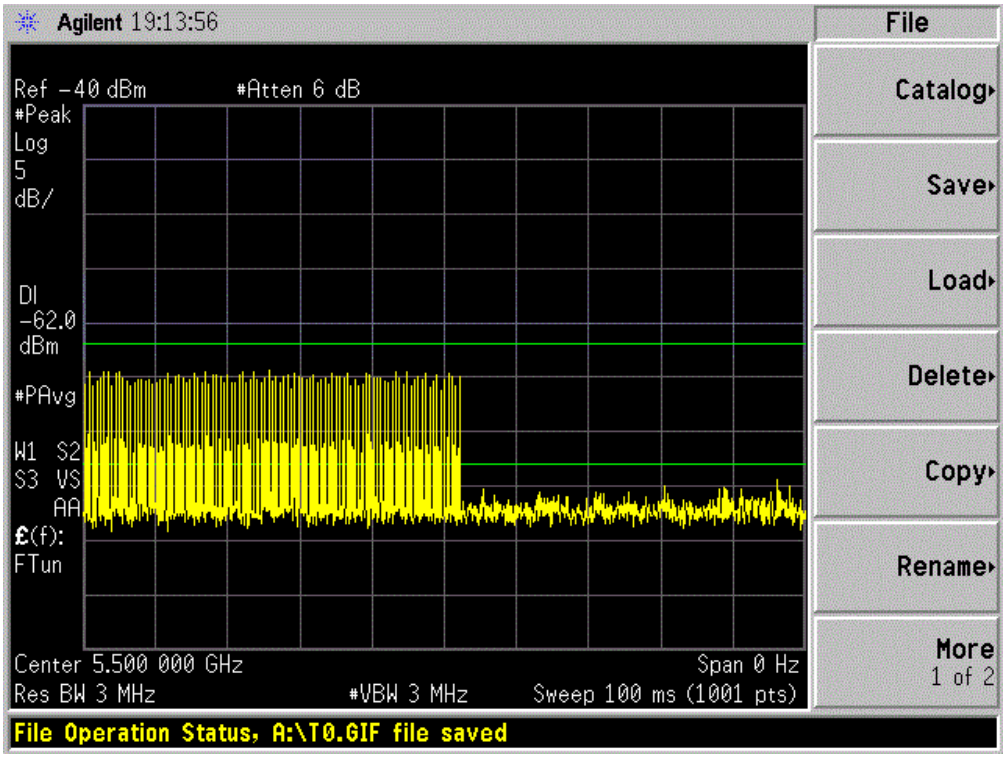
5.1 Radar Waveform Calibration

Radar waveforms signal levels were calibrated to ensure that the detection threshold of -62 dBm is achieved. The RF cable, which during normal testing would be connected to the master EUT device, is connected to a spectrum analyzer zero span mode and with the appropriate RBW/VBW. The level measured by the spectrum analyzer is the level to which the master device would receive the radar waveform.

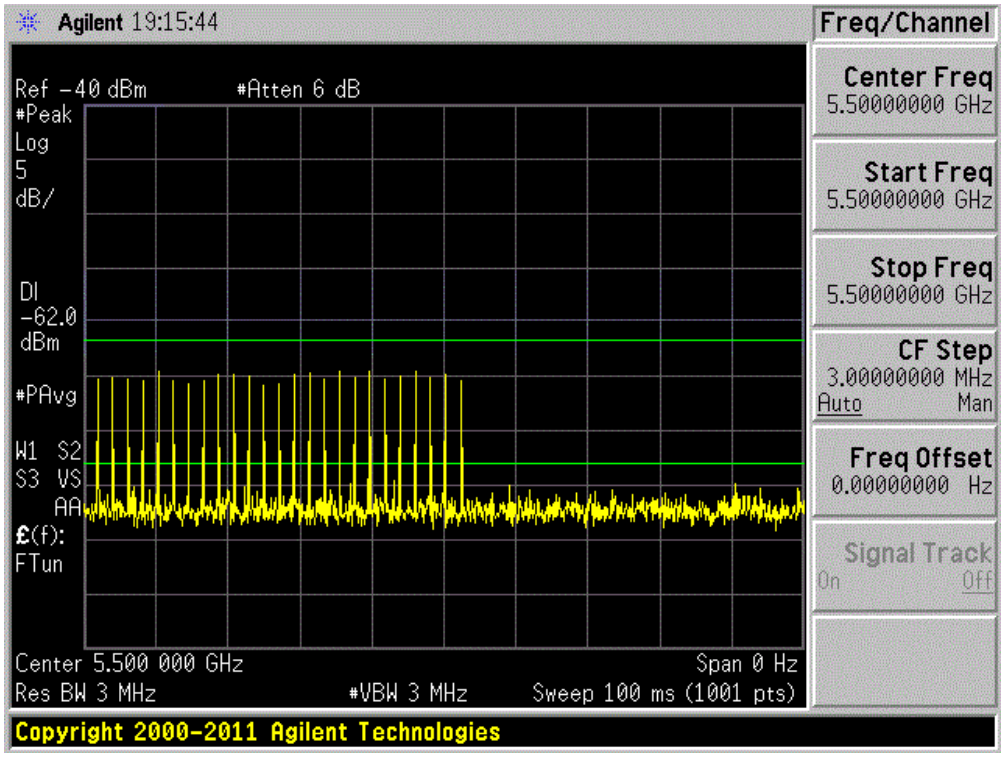
Note: The antenna gain of 0dBi was used to set the calibration levels.



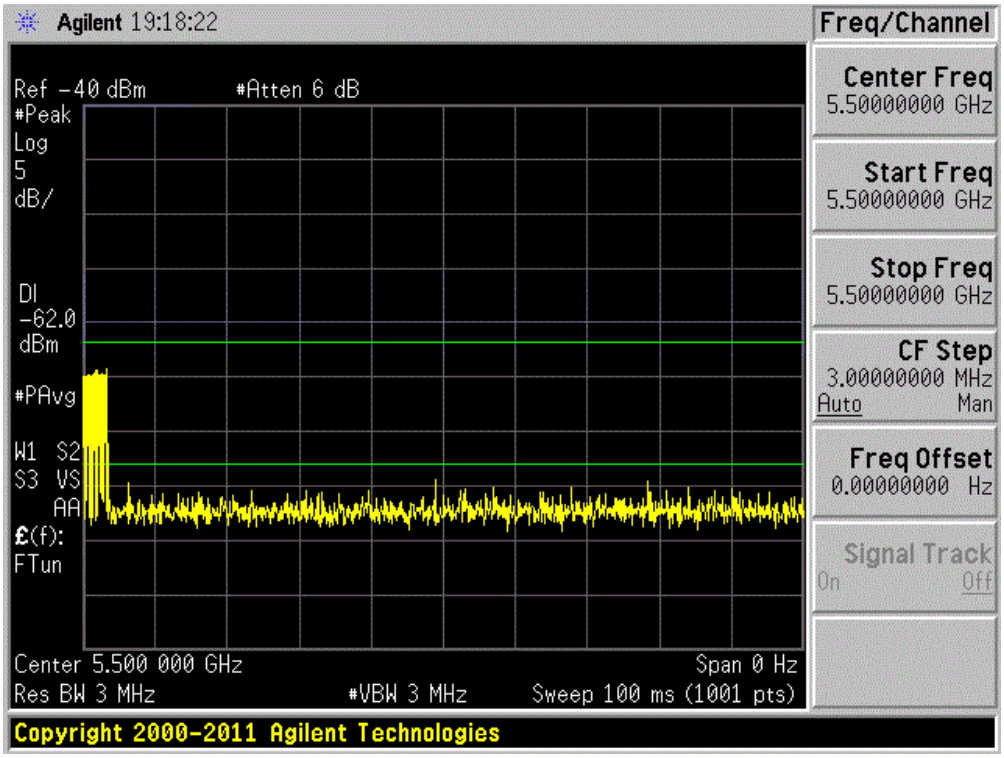
Plot 5-1. Radar Type 0 Calibration



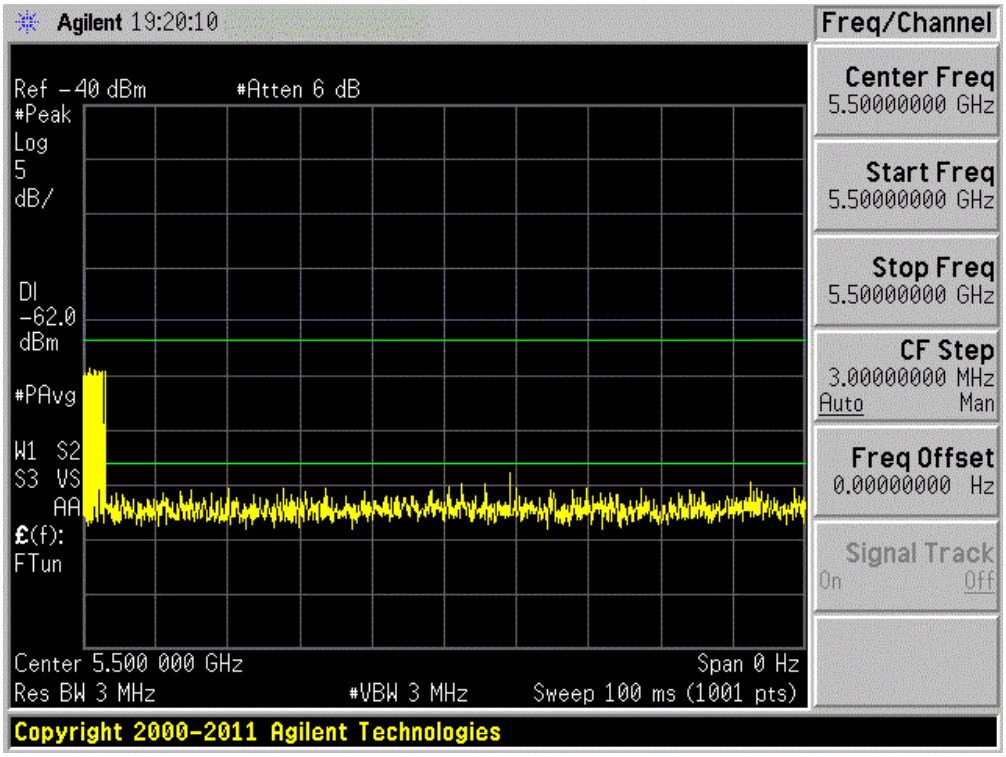
Plot 5-2. Radar Type 1A Calibration



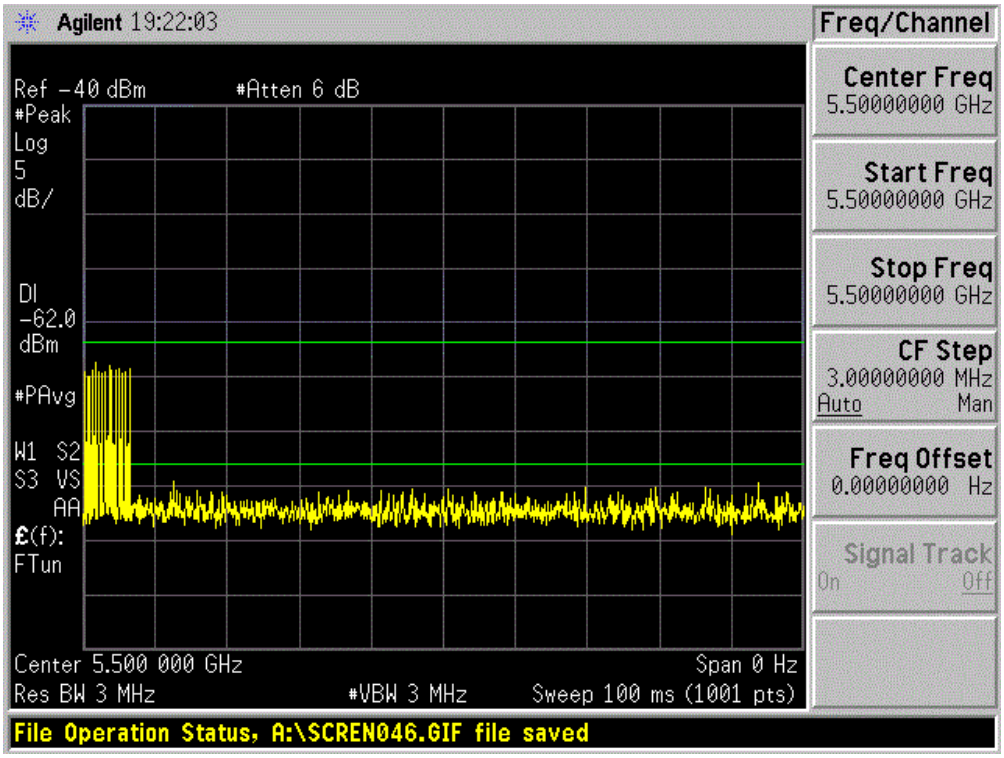
Plot 5-3. Radar Type 1B Calibration



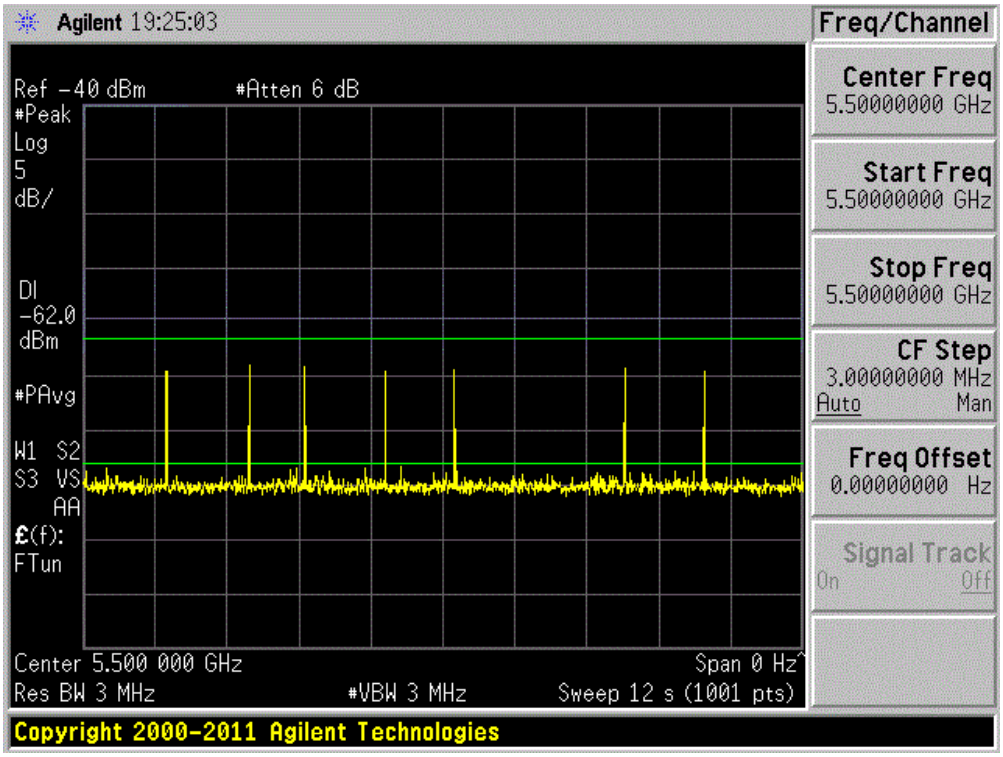
Plot 5-4. Radar Type 2 Calibration



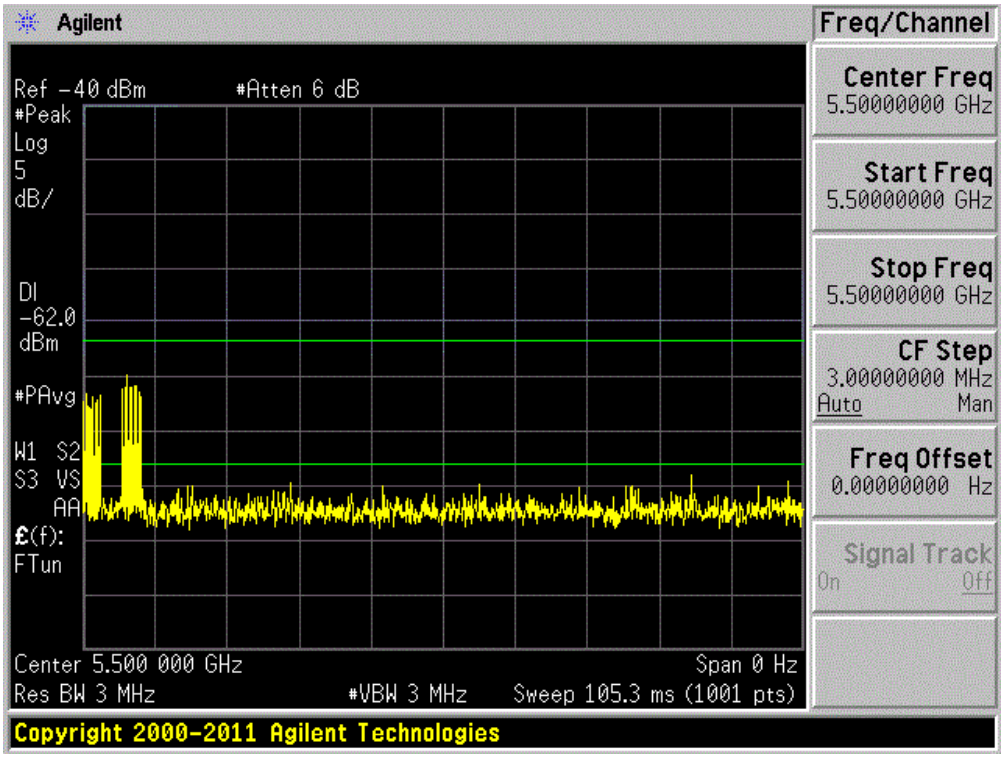
Plot 5-5. Radar Type 3 Calibration



Plot 5-6. Radar Type 4 Calibration



Plot 5-7. Radar Type 5 Calibration

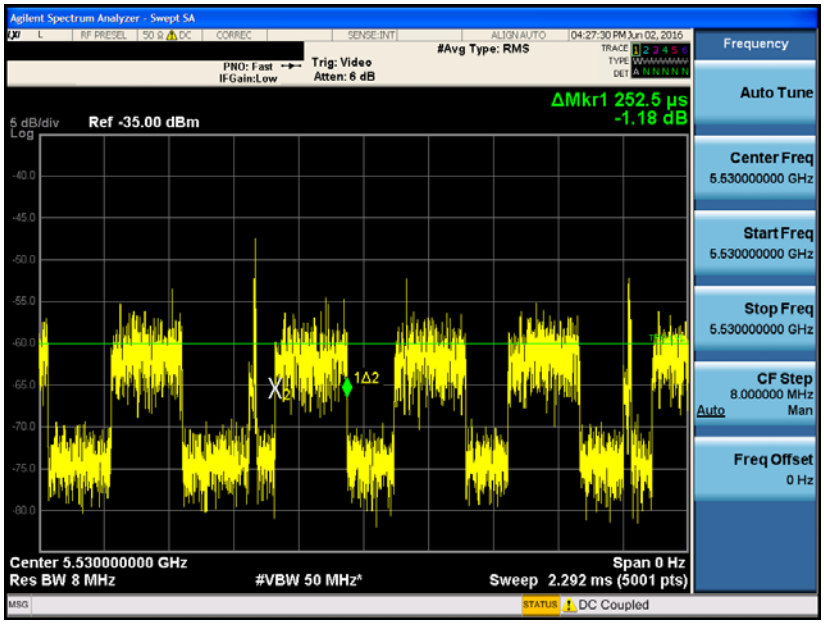


Plot 5-8. Radar Type 6 Calibration

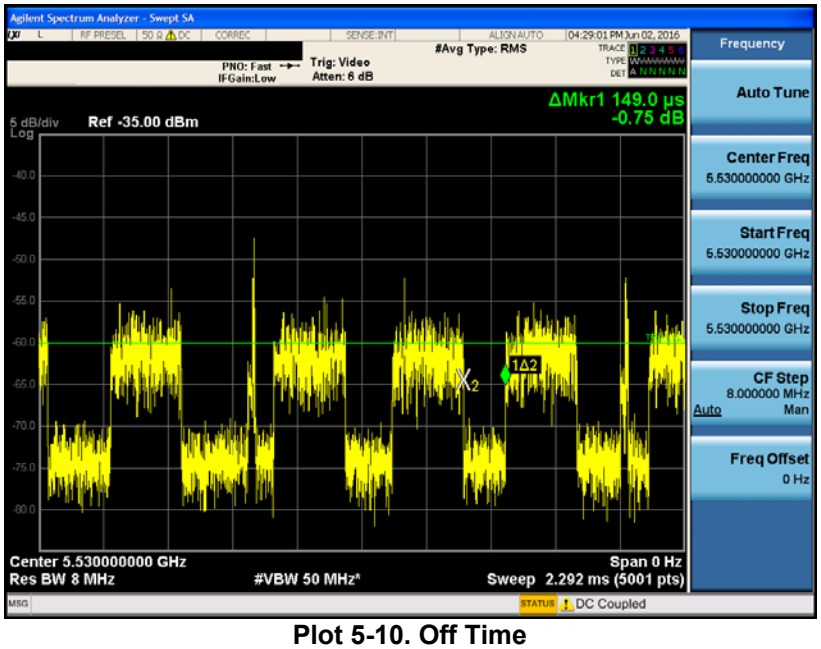
5.2 Channel Loading

Per KDB 905462, timing plots with calculations are required to demonstrate a minimum channel loading of approximately 17% or greater. A zero span spectrum analyzer plot is used to approximate the channel loading time.

Channel Loading = Pulse Width / Period = 252.5 µs / 401.5 µs = 62.9 %



Plot 5-9. Pulse Width



Plot 5-10. Off Time

5.3 UNII Detection Bandwidth

All UNII 20MHz channels for this device have identical channel bandwidths, all 40MHz channels have identical channel bandwidths, and all 80MHz channels have identical channel bandwidths. All UNII detection bandwidth tests were done at 5500MHz. Please see UNII report for 26dB Bandwidth plot which also includes the 99% power bandwidth.

Per KDB 905462, Radar Type 0 was used for all UNII detection bandwidth tests. The master EUT device was setup as standalone device with no associated Client and no traffic. The EUT must detect the radar waveform at least 90% of the time. Test procedure used is KDB 905462. UNII detection bandwidth is calculated as follows:

UNII Detection BW = FH – FL.

UNII Detection BW must be 100% of the 99% power bandwidth.

Summary to UNII Detection Bandwidth results:

802.11 Bandwidth [MHz]	99% power Bandwidth [MHz]	UNII Detection Bandwidth [MHz]	Verdict
20	17.6	20	PASS
40	36.1	37	PASS
80	76	78	PASS

Table 5-1. UNII Detection BW Summary Table

DFS Detection Trials (1=Detection, Blank=No Detection)													
Radar Frequency	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)	Detection Bandwidth	Limit (MHz)
5490	1	1	1	1	1	1	1	1	1	1	100		
5491	1	1	1	1	1	1	1	1	1	1	100		
5492	1	1	1	1	1	1	1	1	1	1	100		
5493	1	1	1	1	1	1	1	1	1	1	100		
5494	1	1	1	1	1	1	1	1	1	1	100		
5495	1	1	1	1	1	1	1	1	1	1	100		
5496	1	1	1	1	1	1	1	1	1	1	100		
5497	1	1	1	1	1	1	1	1	1	1	100		
5498	1	1	1	1	1	1	1	1	1	1	100		
5499	1	1	1	1	1	1	1	1	1	1	100		
5500	1	1	1	1	1	1	1	1	1	1	100	20	17.594
5501	1	1	1	1	1	1	1	1	1	1	100		
5502	1	1	1	1	1	1	1	1	1	1	100		
5503	1	1	1	1	1	1	1	1	1	1	100		
5504	1	1	1	1	1	1	1	1	1	1	100		
5505	1	1	1	1	1	1	1	1	1	1	100		
5506	1	1	1	1	1	1	1	1	1	1	100		
5507	1	1	1	1	1	1	1	1	1	1	100		
5508	1	1	1	1	1	1	1	1	1	1	100		
5509	1	1	1	1	1	1	1	1	1	1	100		
5510	1	1	1	1	1	1	1	1	1	1	100		

Table 5-11. 20MHz UNII Detection Bandwidth Data

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)
5490											0		
5491			1	1		1	1			1	50		
5492	1	1	1	1	1	1	1	1	1	1	100		
5493	1	1	1	1	1	1	1	1	1	1	100		
5494	1	1	1	1	1	1	1	1	1	1	100		
5495	1	1	1	1	1	1	1	1	1	1	100		
5496	1	1	1	1	1	1	1	1	1	1	100		
5497	1	1	1	1	1	1	1	1	1	1	100		
5498	1	1	1	1	1	1	1	1	1	1	100		
5499	1	1	1	1	1	1	1	1	1	1	100		
5500	1	1	1	1	1	1	1	1	1	1	100		
5501	1	1	1	1	1	1	1	1	1	1	100		
5502	1	1	1	1	1	1	1	1	1	1	100		
5503	1	1	1	1	1	1	1	1	1	1	100		
5504	1	1	1	1	1	1	1	1	1	1	100		
5505	1	1	1	1	1	1	1	1	1	1	100		
5506	1	1	1	1	1	1	1	1	1	1	100		
5507	1	1	1	1	1	1	1	1	1	1	100		
5508	1	1	1	1	1	1	1	1	1	1	100		
5509	1	1	1	1	1	1	1	1	1	1	100		
5510	1	1	1	1	1	1	1	1	1	1	100	37	36.087
5511	1	1	1	1	1	1	1	1	1	1	100		
5512	1	1	1	1	1	1	1	1	1	1	100		
5513	1	1	1	1	1	1	1	1	1	1	100		
5514	1	1	1	1	1	1	1	1	1	1	100		
5515	1	1	1	1	1	1	1	1	1	1	100		
5516	1	1	1	1	1	1	1	1	1	1	100		
5517	1	1	1	1	1	1	1	1	1	1	100		
5518	1	1	1	1	1	1	1	1	1	1	100		
5519	1	1	1	1	1	1	1	1	1	1	100		
5520	1	1	1	1	1	1	1	1	1	1	100		
5521	1	1	1	1	1	1	1	1	1	1	100		
5522	1	1	1	1	1	1	1	1	1	1	100		
5523	1	1	1	1	1	1	1	1	1	1	100		
5524	1	1	1	1	1	1	1	1	1	1	100		
5525	1	1	1	1	1	1	1	1	1	1	100		
5526	1	1	1	1	1	1	1	1	1	1	100		
5527	1	1	1	1	1	1	1	1	1	1	100		
5528	1	1	1	1	1	1	1	1	1	1	100		
5529	1	1	1	1	1	1	1	1	1	1	100		
5530											0		

Table 5-12. 40MHz UNII Detection Bandwidth Data

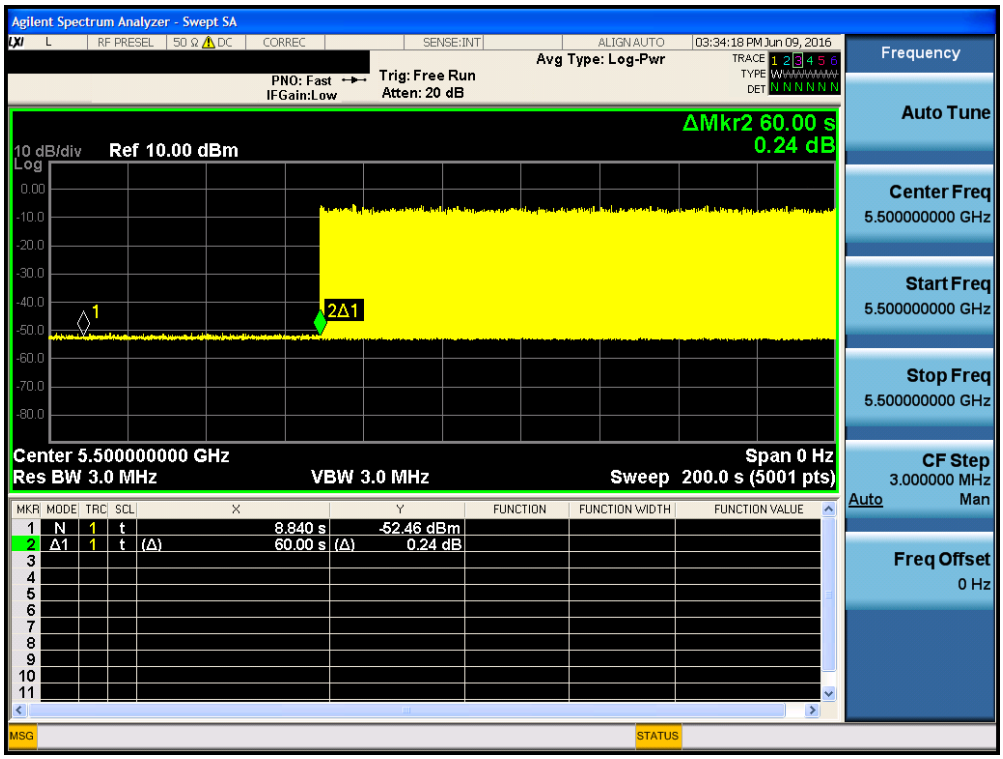
DFS Detection Trials (1=Detection, Blank=No Detection)													
Radar Frequency	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)	Detection Bandwidth (MHz)	Limit (MHz)
5490											0		
5491	1	1	1	1	1	1	1	1	1	1	100		
5492	1	1	1	1	1	1	1	1	1	1	100		
5493	1	1	1	1	1	1	1	1	1	1	100		
5494	1	1	1	1	1	1	1	1	1	1	100		
5495	1	1	1	1	1	1	1	1	1	1	100		
5496	1	1	1	1	1	1	1	1	1	1	100		
5497	1	1	1	1	1	1	1	1	1	1	100		
5498	1	1	1	1	1	1	1	1	1	1	100		
5499	1	1	1	1	1	1	1	1	1	1	100		
5500	1	1	1	1	1	1	1	1	1	1	100		
5501	1	1	1	1	1	1	1	1	1	1	100		
5502	1	1	1	1	1	1	1	1	1	1	100		
5503	1	1	1	1	1	1	1	1	1	1	100		
5504	1	1	1	1	1	1	1	1	1	1	100		
5505	1	1	1	1	1	1	1	1	1	1	100		
5506	1	1	1	1	1	1	1	1	1	1	100		
5507	1	1	1	1	1	1	1	1	1	1	100		
5508	1	1	1	1	1	1	1	1	1	1	100		
5509	1	1	1	1	1	1	1	1	1	1	100		
5510	1	1	1	1	1	1	1	1	1	1	100		
5511	1	1	1	1	1	1	1	1	1	1	100		
5512	1	1	1	1	1	1	1	1	1	1	100		
5513	1	1	1	1	1	1	1	1	1	1	100		
5514	1	1	1	1	1	1	1	1	1	1	100		
5515	1	1	1	1	1	1	1	1	1	1	100		
5516	1	1	1	1	1	1	1	1	1	1	100		
5517	1	1	1	1	1	1	1	1	1	1	100		
5518	1	1	1	1	1	1	1	1	1	1	100		
5519	1	1	1	1	1	1	1	1	1	1	100		
5520	1	1	1	1	1	1	1	1	1	1	100		
5521	1	1	1	1	1	1	1	1	1	1	100		
5522	1	1	1	1	1	1	1	1	1	1	100		
5523	1	1	1	1	1	1	1	1	1	1	100		
5524	1	1	1	1	1	1	1	1	1	1	100		
5525	1	1	1	1	1	1	1	1	1	1	100		
5526	1	1	1	1	1	1	1	1	1	1	100		
5527	1	1	1	1	1	1	1	1	1	1	100		
5528	1	1	1	1	1	1	1	1	1	1	100		
5529	1	1	1	1	1	1	1	1	1	1	100		
5530	1	1	1	1	1	1	1	1	1	1	100	78	76.043
5531	1	1	1	1	1	1	1	1	1	1	100		
5532	1	1	1	1	1	1	1	1	1	1	100		
5533	1	1	1	1	1	1	1	1	1	1	100		
5534	1	1	1	1	1	1	1	1	1	1	100		
5535	1	1	1	1	1	1	1	1	1	1	100		
5536	1	1	1	1	1	1	1	1	1	1	100		
5537	1	1	1	1	1	1	1	1	1	1	100		
5538	1	1	1	1	1	1	1	1	1	1	100		
5539	1	1	1	1	1	1	1	1	1	1	100		
5540	1	1	1	1	1	1	1	1	1	1	100		
5541	1	1	1	1	1	1	1	1	1	1	100		
5542	1	1	1	1	1	1	1	1	1	1	100		
5543	1	1	1	1	1	1	1	1	1	1	100		
5544	1	1	1	1	1	1	1	1	1	1	100		
5545	1	1	1	1	1	1	1	1	1	1	100		
5546	1	1	1	1	1	1	1	1	1	1	100		
5547	1	1	1	1	1	1	1	1	1	1	100		
5548	1	1	1	1	1	1	1	1	1	1	100		
5549	1	1	1	1	1	1	1	1	1	1	100		
5550	1	1	1	1	1	1	1	1	1	1	100		
5551	1	1	1	1	1	1	1	1	1	1	100		
5552	1	1	1	1	1	1	1	1	1	1	100		
5553	1	1	1	1	1	1	1	1	1	1	100		
5554	1	1	1	1	1	1	1	1	1	1	100		
5555	1	1	1	1	1	1	1	1	1	1	100		
5556	1	1	1	1	1	1	1	1	1	1	100		
5557	1	1	1	1	1	1	1	1	1	1	100		
5558	1	1	1	1	1	1	1	1	1	1	100		
5559	1	1	1	1	1	1	1	1	1	1	100		
5560	1	1	1	1	1	1	1	1	1	1	100		
5561	1	1	1	1	1	1	1	1	1	1	100		
5562	1	1	1	1	1	1	1	1	1	1	100		
5563	1	1	1	1	1	1	1	1	1	1	100		
5564	1	1	1	1	1	1	1	1	1	1	100		
5565	1	1	1	1	1	1	1	1	1	1	100		
5566	1	1	1	1	1	1	1	1	1	1	100		
5567	1	1	1	1	1	1	1	1	1	1	100		
5568	1	1	1	1	1	1	1	1	1	1	100		
5569	1	1	1	1	1	1	1	1	1	1	100		
5570											0		

Table 5-13. 80MHz UNII Detection Bandwidth Data

5.4 Channel Availability Check Time

5.4.1 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.

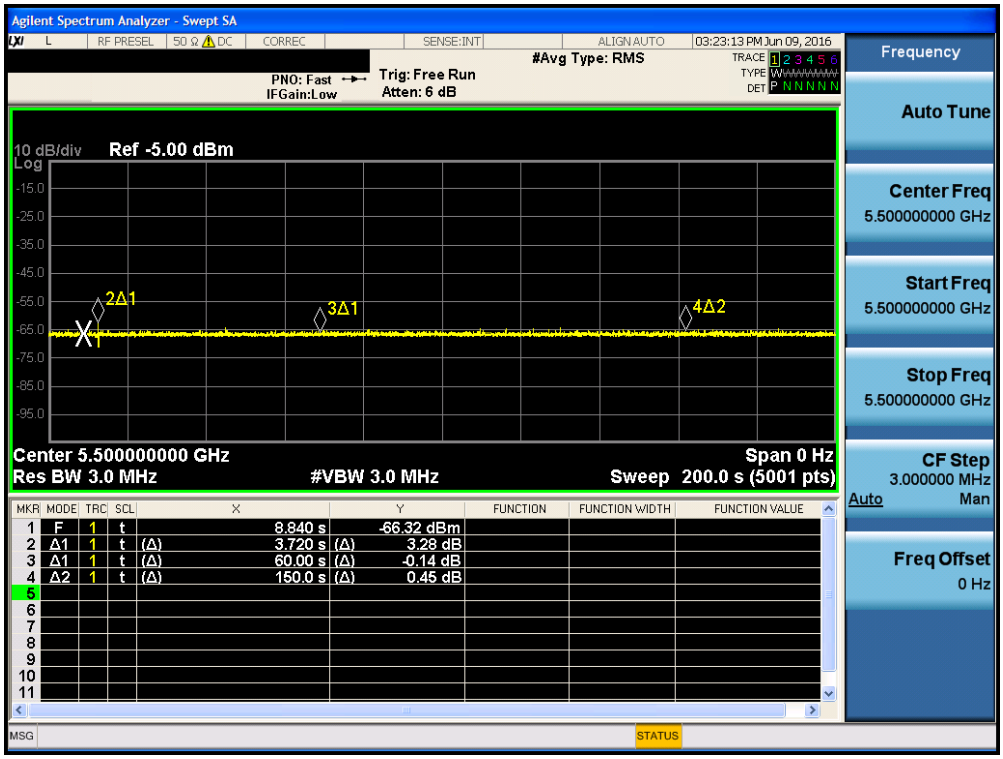


Plot 5-14. Initial CAC Time

Note: Marker 1 is set at the end of the power-up sequence. Marker 2 is set at the beginning of the data transmissions.

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

The plot below verifies 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*.



Plot 5-15. Radar Burst at Beginning CAC Time

Note:

1. Marker 1 is set at the end of the power-up sequence. Marker 2 is set at the radar burst. Marker 3 is set 60 sec after power-up (CAC period). Marker 4 is set 2.5 min after radar burst.

2. Radar Type 0 was used for this test.

5.4.3 Radar Bust at the End of the Channel Availability Check Time

The plot below verifies 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*.

Plot 5-16. Radar Burst at End of CAC Time

Note:

1. Marker 1 is set at the end of the power-up sequence. Marker 2 is set at the radar burst. Marker 3 is set 60 sec after power-up (CAC period). Marker 4 is set 2.5 min after radar burst.

2. Radar Type 0 was used for this test.

5.5 In-Service Monitoring

5.5.1 Channel Move Time and Channel Closing Transmission Time

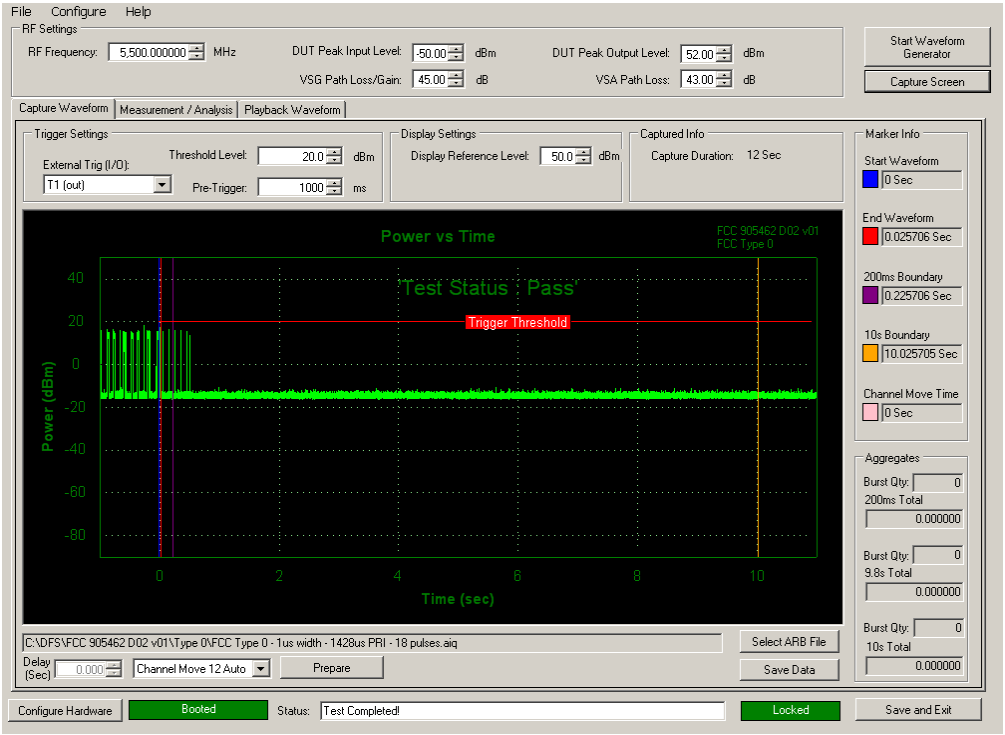
While the master is associated with a client and actively streaming a video file to the client, channel move time and channel closing transmission time ensures that the master EUT device detects the radar and changes channels within the required amount of time. Per KDB 905462, radar type 0 was used for this test. Please see the following definitions and summary table.

Channel Move Time: The time to cease all transmissions on the current *Channel* upon detection of a *Radar Waveform* above the *DFS Detection Threshold*.

Channel Closing Transmission Time: The total duration of transmissions, consisting of data signals and the aggregate of control signals, by a U-NII device during the *Channel Move Time.* This is also called "Aggregate Time."

Test	Measured	Requirement	Verdict
Channel Move Time	0 s	10 seconds	Pass
Channel Closing Transmission Time	< 200ms + 0ms (aggregate)	200ms + aggregate of 60ms over remaining 10 second period	Pass

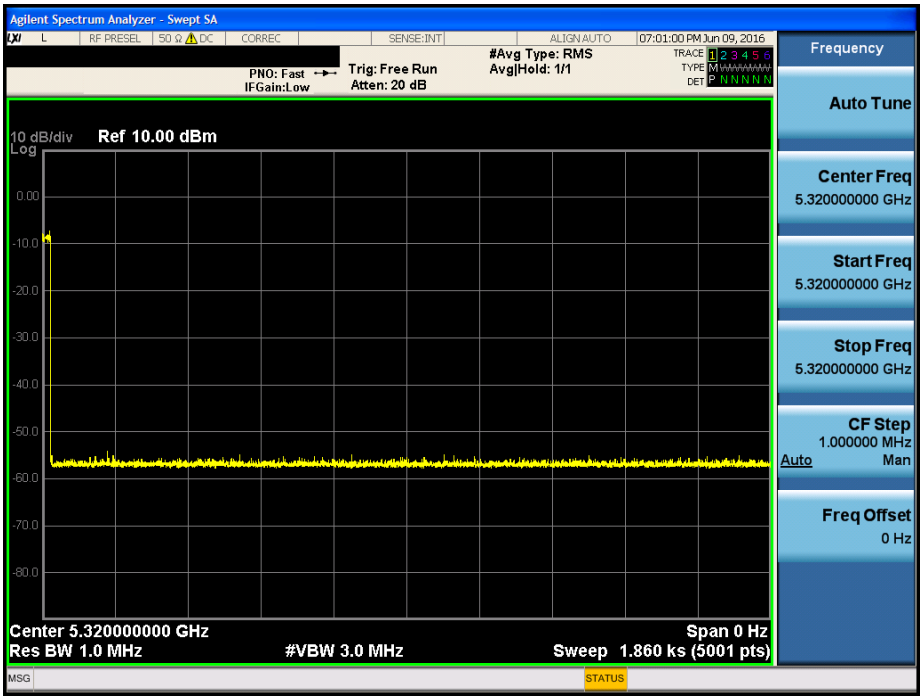
Table 5-2. In-Service Monitoring Summary Table



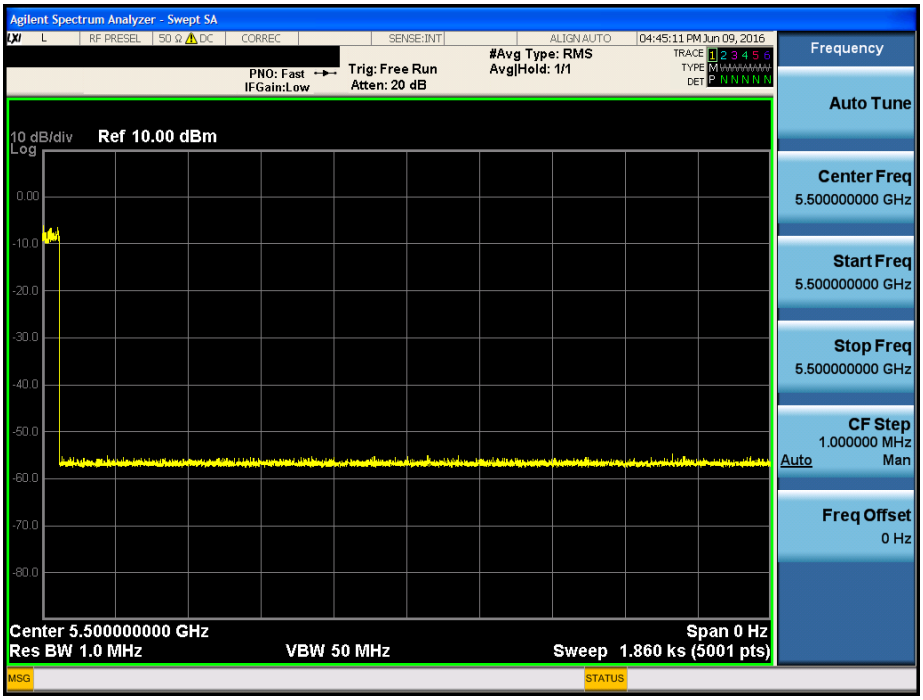
Plot 5-17. Channel Move Time and Channel Closing Transmission Time with Radar Type 0

5.5.2 Non-Occupancy Period

After the 10 seconds monitored in Channel Move Time, the EUT is monitored for an additional 30 minutes to verify that the EUT does not resume any transmissions on the channel.



Plot 5-18. UNII Band 2A Non-Occupancy Period (Monitoring Live Spectrum Elapsed time: 30 minutes)



Plot 5-19. UNII Band 2C Non-Occupancy Period (Monitoring Live Spectrum Elapsed time: 30 minutes)

5.6 Statistical Performance Check

The statistical performance check is performed to determine the minimum percentage of successful detection requirements found in KDB 905462 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).* For each trial, while the master device (EUT) is associated and streaming video to the client device, a radar waveform is transmitted to the master and the EUT's ability to detect the radar waveform is recorded.

Note: The radar burst level = DFS Detection Threshold + 1dB = -61 dBm

Trial #	Pulses	PW	PRI	Detection?	Detection Percentage	Limit
1	86	1	618	1	90%	60%
2	83	1	638	0		
3	102	1	518	1		
4	68	1	778	1		
5	78	1	678	1		
6	70	1	758	1		
7	81	1	658	1		
8	61	1	878	1		
9	86	1	618	1		
10	65	1	818	0		
11	70	1	758	1		
12	89	1	598	1		
13	92	1	578	1		
14	57	1	938	1		
15	57	1	938	0		
16	20	1	2713	1		
17	69	1	770	1		
18	70	1	756	1		
19	20	1	2644	1		
20	20	1	2668	1		
21	20	1	2765	1		
22	95	1	560	1		
23	50	1	1059	1		
24	54	1	986	1		
25	39	1	1356	1		
26	24	1	2239	1		
27	29	1	1884	1		
28	25	1	2126	0		
29	87	1	610	1		
30	34	1	1574	1		

Table 5-20. Radar Type 1A/1B Statistical Performance (Ch. 100)

Trial #	Pulses	PW	PRI	Detection?	Detection Percentage	Limit
1	28	1.2	159	1		
2	25	4.1	154	1		
3	25	3.1	206	1		
4	24	4.5	221	1		
5	29	4.7	198	1		
6	28	2.5	178	1		
7	25	2.4	195	1		
8	26	2.7	200	1		
9	29	4.1	171	0		
10	28	2.9	193	1		
11	27	1.4	179	1		
12	28	2	217	1		
13	24	1.7	218	1		
14	29	1.3	159	1		
15	23	4.7	155	1		
16	27	4.7	202	1	93%	60%
17	24	4.4	164	1		
18	27	3	167	1		
19	24	3.9	167	1		
20	27	3.4	164	1		
21	24	2.3	226	1		
22	28	5	214	1		
23	28	3.9	203	1		
24	29	2.4	188	1		
25	25	5	201	1		
26	29	3.7	185	0		
27	28	3.9	218	1		
28	28	2.4	168	1		
29	27	2.7	215	1		
30	29	1.9	225	1		

Table 5-21. Radar Type 2 Statistical Performance (Ch. 100)

Trial #	Pulses	PW	PRI	Detection?	Detection Percentage	Limit
1	16	6.5	311	1		
2	18	9.1	487	1		
3	18	6.8	356	1		
4	18	6.6	326	1		
5	18	8.1	258	0		
6	16	8.4	208	1		
7	18	8.6	395	1		
8	16	7.1	244	1		
9	17	8.7	454	1		
10	18	8.3	419	1		
11	16	9.9	385	1		
12	17	6.4	403	1		
13	16	6.6	202	1		
14	17	9.3	389	1		
15	18	6	418	1		
16	18	6.1	216	1	97%	60%
17	18	6.1	340	1		
18	17	9.8	249	1		
19	16	9.6	425	1		
20	17	7.7	336	1		
21	17	7.5	309	1		
22	17	9.6	478	1		
23	17	9.3	229	1		
24	16	6.8	350	1		
25	17	9.6	282	1		
26	17	6.3	254	1		
27	17	6	206	1		
28	16	9.3	220	1		
29	16	8.3	294	1		
30	16	9.7	500	1		

Table 5-22. Radar Type 3 Statistical Performance (Ch. 100)

Trial #	Pulses	PW	PRI	Detection?	Detection Percentage	Limit
1	13	15.7	299	1		
2	14	18.7	268	1		
3	13	19.3	278	1		
4	14	14.7	393	1		
5	12	13.5	303	1		
6	14	15	456	1		
7	15	18.4	272	1		
8	13	15.2	381	1		
9	15	16.2	373	1		
10	14	14.6	394	1		
11	16	12.7	292	1		
12	16	12.4	262	1		
13	13	15	261	1		
14	16	16.3	346	0		
15	14	14.2	385	1		
16	13	11.4	217	1	97%	60%
17	16	18.9	419	1		
18	16	15.2	334	1		
19	13	16.8	250	1		
20	14	15.1	292	1		
21	14	11.4	458	1		
22	14	15.9	331	1		
23	13	17	424	1		
24	13	14.7	394	1		
25	15	18.4	349	1		
26	12	15.2	392	1		
27	16	14.2	297	1		
28	15	13	341	1		
29	12	19.9	243	1		
30	15	15.5	265	1		

Table 5-23. Radar Type 4 Statistical Performance (Ch. 100)

Radar Type	Number of Trials	Number of Successful Detections	Percentage of Successful Detection
1	30	26	90%
2	30	28	93%
3	30	29	97%
4	30	29	97%
Aggregate (90 + 93 + 97 + 97)/4 = 94.25%; Minimum = 80%			

Table 5-24.Aggregate (Radar Types 1-4)

Trial #	USA Bin 5 Radar Test #	Detection?	Detection Percentage	Limit
1	1	1	100%	80%
2	2	1		
3	3	1		
4	4	1		
5	5	1		
6	6	1		
7	7	1		
8	8	1		
9	9	1		
10	10	1		
11	11	1		
12	12	1		
13	13	1		
14	14	1		
15	15	1		
16	16	1		
17	17	1		
18	18	1		
19	19	1		
20	20	1		
21	21	1		
22	22	1		
23	23	1		
24	24	1		
25	25	1		
26	26	1		
27	27	1		
28	28	1		
29	29	1		
30	30	1		

Table 5-25. Radar Type 5 Statistical Performance (Ch. 100)

Trial #	USA Bin 6 Radar Test #	Detection?	Detection Percentage	Limit
1	1	1	93%	70%
2	2	1		
3	3	1		
4	4	0		
5	5	1		
6	6	1		
7	7	1		
8	8	1		
9	9	1		
10	10	1		
11	11	1		
12	12	1		
13	13	1		
14	14	1		
15	15	1		
16	16	1		
17	17	1		
18	18	1		
19	19	1		
20	20	1		
21	21	1		
22	22	1		
23	23	1		
24	24	1		
25	25	1		
26	26	1		
27	27	1		
28	28	0		
29	29	1		
30	30	1		

Table 5-26. Radar Type 6 Statistical Performance (Ch. 100)

USA Bin 5 Radar Types:

Trial Number: 1						
Number of Bursts in Trial: 10						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	3	87	5	1349	1821	174751
2	3	97	17	1989	1961	972517
3	2	51	9	1555	0	585144
4	3	55	8	1724	1891	992498
5	1	95	18	0	0	457301
6	3	69	8	1572	1279	636596
7	2	86	18	1775	0	645659
8	3	66	15	1457	1619	1039542
9	2	81	15	1667	0	191651
10	3	74	18	1687	1132	542183

Trial Number: 2						
Number of Bursts in Trial: 18						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	3	89	12	1947	1765	611438
2	2	78	11	1681	0	187119
3	1	65	12	0	0	520342
4	3	53	17	1596	1266	180428
5	3	85	9	1195	1714	457307
6	2	89	16	1593	0	265577
7	3	97	20	1009	1077	598088
8	2	86	19	1068	0	300585
9	3	67	12	1358	1706	65608
10	2	89	19	1537	0	123993
11	2	98	6	1199	0	500187
12	1	61	5	0	0	523460
13	3	54	19	1218	1384	340150
14	3	94	7	1212	1890	227557
15	1	75	17	0	0	613226
16	3	68	20	1411	1231	645659
17	3	94	17	1402	1991	621341
18	3	57	13	1473	1900	187955

Trial Number: 3						
Number of Bursts in Trial: 18						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	3	73	9	1975	1193	217534
2	2	80	16	1647	0	560737
3	1	72	9	0	0	186046
4	1	85	8	0	0	408835
5	2	85	11	1019	0	277712
6	3	76	18	1995	1015	462480
7	2	72	19	1735	0	653749
8	2	73	11	1791	0	55143
9	2	68	20	1216	0	636866
10	1	77	15	0	0	399303
11	1	91	8	0	0	190533
12	3	53	11	1442	1839	658290
13	3	75	15	1589	2000	152846
14	2	70	16	1295	0	545428
15	2	65	12	1530	0	655519
16	2	71	17	1460	0	597752
17	3	58	11	1897	1877	128108
18	1	59	15	0	0	384860

Trial Number: 4						
Number of Bursts in Trial: 8						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	2	69	6	1589	0	1349390
2	3	100	20	1558	1683	1256714
3	2	89	13	1507	0	1144055
4	3	87	16	1990	1639	566356
5	1	85	10	0	0	409473
6	3	56	5	1241	1209	66410
7	3	90	20	1924	1340	1409124
8	1	78	11	0	0	1226894

Trial Number: 5						
Number of Bursts in Trial: 19						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	1	56	17	0	0	388985
2	2	68	11	1403	0	281905
3	3	79	11	1248	1295	265523
4	1	82	6	0	0	546809
5	3	66	12	1796	1645	613350
6	2	79	11	1814	0	414393
7	1	78	18	0	0	300743
8	3	78	13	1657	1347	472790
9	2	92	17	1116	0	81828
10	2	85	15	1919	0	422925
11	2	73	14	1870	0	368910
12	3	67	7	1639	1731	493757
13	1	80	17	0	0	473080
14	1	78	17	0	0	263966
15	3	88	20	1740	1113	213965
16	2	86	15	1515	0	348699
17	3	98	13	1142	1200	447217
18	3	98	19	1135	1223	213937
19	1	81	20	0	0	379442

Trial Number: 6						
Number of Bursts in Trial: 11						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	3	68	6	1865	1919	228078
2	1	96	12	0	0	794150
3	2	77	6	1031	0	718760
4	2	54	17	1831	0	546477
5	2	80	5	1029	0	662893
6	3	64	15	1423	1953	133805
7	1	87	8	0	0	806117
8	1	71	16	0	0	5722
9	3	72	8	1714	1984	596324
10	2	89	6	1564	0	750268
11	3	91	7	1099	1804	417713

Trial Number: 7						
Number of Bursts in Trial: 12						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	1	63	5	0	0	926775
2	2	74	13	1605	0	301507
3	3	94	9	1347	1238	395299
4	3	54	5	1214	1875	54871
5	2	59	6	1179	0	73126
6	3	51	10	1011	1641	423071
7	2	100	10	1433	0	966860
8	3	51	16	1179	1378	245894
9	2	95	17	1216	0	450024
10	2	50	5	1043	0	588732
11	2	63	14	1068	0	935827
12	3	67	17	1514	1292	289713

Trial Number: 8						
Number of Bursts in Trial: 9						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	2	97	10	1898	0	1282499
2	3	63	5	1467	1695	900399
3	1	78	8	0	0	489763
4	3	64	12	1303	1961	793604
5	3	93	16	1749	1364	41888
6	1	84	20	0	0	887808
7	1	98	12	0	0	592154
8	3	93	13	1573	1176	1045630
9	1	56	18	0	0	795500

Trial Number: 9						
Number of Bursts in Trial: 12						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	2	87	11	1492	0	468485
2	1	100	10	0	0	552549
3	2	54	15	1149	0	598303
4	3	59	10	1473	1029	589809
5	1	53	17	0	0	492671
6	1	87	19	0	0	127191
7	1	79	16	0	0	31510
8	1	69	18	0	0	293544
9	3	59	13	1637	1096	623687
10	3	91	17	1201	1404	970598
11	2	80	15	1649	0	783561
12	1	54	12	0	0	983014

Trial Number: 10						
Number of Bursts in Trial: 19						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	2	87	6	1862	0	98435
2	3	96	5	1539	1758	469146
3	2	75	7	1948	0	247040
4	2	83	7	1933	0	446606
5	3	66	20	1753	1582	579172
6	1	62	6	0	0	197651
7	2	65	17	1696	0	494957
8	2	61	12	1960	0	574773
9	3	83	15	1226	1867	56073
10	2	85	11	1510	0	268129
11	1	52	7	0	0	434762
12	2	59	6	1574	0	29900
13	3	91	11	1444	1332	124061
14	3	74	7	1873	1260	115497
15	1	50	20	0	0	87059
16	3	86	19	1493	1429	227465
17	3	80	19	1122	1260	393221
18	1	69	10	0	0	79149
19	3	96	6	1910	1233	127125

Trial Number: 11						
Number of Bursts in Trial: 19						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	3	69	5	1539	1520	157283
2	1	55	5	0	0	121246
3	2	87	12	1224	0	51424
4	2	74	20	1832	0	350689
5	1	97	6	0	0	293164
6	3	77	7	1289	1274	598833
7	1	96	12	0	0	516991
8	1	55	11	0	0	519550
9	2	67	15	1016	0	144354
10	2	73	15	1876	0	567555
11	3	64	14	1951	1401	405318
12	3	87	10	1557	1751	620854
13	1	98	18	0	0	49666
14	1	82	9	0	0	408687
15	1	99	8	0	0	417581
16	2	74	19	1193	0	446470
17	2	50	7	1656	0	146910
18	2	100	10	1125	0	317761
19	3	56	12	1788	1851	45323

Trial Number: 12						
Number of Bursts in Trial: 12						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	1	85	7	0	0	150315
2	1	91	11	0	0	228427
3	3	92	6	1922	1325	913259
4	3	75	5	1675	1550	599778
5	1	94	12	0	0	850405
6	3	100	7	1424	1512	522052
7	1	68	14	0	0	279626
8	1	61	5	0	0	558054
9	1	59	17	0	0	427129
10	2	82	19	1447	0	799225
11	2	54	15	1460	0	112830
12	1	73	5	0	0	349862

Trial Number: 13						
Number of Bursts in Trial: 10						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	2	72	10	1670	0	1150494
2	3	68	15	1724	1333	54623
3	2	76	12	1466	0	420514
4	2	92	19	1543	0	1001296
5	3	63	8	1554	1326	1038163
6	1	53	5	0	0	142475
7	1	96	5	0	0	806624
8	1	100	13	0	0	964958
9	3	99	20	1173	1114	903895
10	3	79	7	1995	1762	1133262

Trial Number: 14						
Number of Bursts in Trial: 16						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	1	91	11	0	0	286586
2	1	57	6	0	0	475559
3	3	65	14	1666	1214	581529
4	3	76	17	1348	1355	618463
5	1	59	14	0	0	628218
6	3	57	11	1631	1743	526679
7	1	66	6	0	0	364356
8	1	54	14	0	0	217544
9	3	93	11	1170	1862	494937
10	2	75	19	1977	0	120582
11	1	67	15	0	0	305304
12	1	80	19	0	0	175232
13	2	80	5	1704	0	363496
14	3	57	8	1249	1556	544001
15	2	84	19	1521	0	306776
16	2	71	18	1333	0	681570

Trial Number: 15						
Number of Bursts in Trial: 13						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	1	62	12	0	0	433030
2	3	68	11	1909	1991	814419
3	1	93	6	0	0	634625
4	3	57	19	1279	1718	390952
5	1	98	7	0	0	330527
6	2	59	18	1236	0	838529
7	3	87	14	1323	1137	303932
8	3	62	5	1218	1789	750092
9	2	78	18	1369	0	742216
10	3	92	13	1343	1494	537354
11	2	74	8	1320	0	69081
12	1	99	12	0	0	483640
13	1	100	9	0	0	138257

Trial Number: 16						
Number of Bursts in Trial: 16						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	2	98	10	1123	0	680004
2	3	53	19	1610	1844	288882
3	1	100	16	0	0	279518
4	3	87	14	1207	1152	719893
5	3	96	5	1709	1145	31285
6	3	63	15	1341	1275	517210
7	3	63	18	1476	1379	325106
8	2	76	15	1876	0	282658
9	3	87	6	1286	1117	393507
10	2	72	6	1998	0	528906
11	3	51	10	1414	1763	646023
12	1	83	20	0	0	376849
13	1	82	9	0	0	316408
14	2	76	10	1131	0	464135
15	2	64	20	1538	0	57180
16	3	51	17	1610	1739	132086

Trial Number: 17						
Number of Bursts in Trial: 19						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	1	85	20	0	0	357518
2	3	56	20	1673	1722	120254
3	1	95	19	0	0	519015
4	1	91	18	0	0	386002
5	1	55	9	0	0	291874
6	2	71	16	1488	0	170803
7	2	87	6	1722	0	583020
8	3	80	19	1944	1298	537511
9	3	70	11	1458	1898	274510
10	1	53	15	0	0	160730
11	3	60	19	1999	1734	49483
12	2	87	10	1562	0	520794
13	2	93	13	1944	0	385740
14	2	54	6	1281	0	569609
15	1	76	5	0	0	596239
16	2	86	18	1564	0	586865
17	1	84	18	0	0	10501
18	2	76	8	1723	0	121055
19	3	100	7	1618	1736	18156

Trial Number: 18						
Number of Bursts in Trial: 12						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	2	94	13	1285	0	966229
2	1	99	11	0	0	350607
3	3	85	19	1054	1122	369013
4	3	58	11	1388	1153	524380
5	3	97	11	1395	1747	900199
6	2	64	16	1546	0	786832
7	3	82	6	1835	1329	278339
8	3	50	16	1443	1666	895357
9	3	67	15	1069	1354	225599
10	1	61	10	0	0	875479
11	3	85	20	1087	1890	220537
12	1	80	6	0	0	633460

Trial Number: 19						
Number of Bursts in Trial: 9						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	3	96	11	1048	1535	577004
2	3	71	11	1453	1082	232032
3	1	80	5	0	0	104210
4	3	50	6	1698	1323	586087
5	1	92	11	0	0	1178025
6	1	69	16	0	0	1008043
7	1	68	5	0	0	1000208
8	3	71	8	1021	1820	1054254
9	1	90	20	0	0	563037

Trial Number: 20						
Number of Bursts in Trial: 17						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	2	97	12	1828	0	100716
2	2	80	5	1937	0	580883
3	2	90	14	1670	0	458641
4	1	75	15	0	0	436861
5	2	87	7	1274	0	472845
6	2	92	17	1194	0	192654
7	2	76	12	1682	0	91963
8	3	98	17	1563	1600	233527
9	2	66	6	1925	0	329710
10	2	83	10	1168	0	422881
11	2	55	10	1064	0	689473
12	2	83	18	1194	0	216023
13	2	70	17	1371	0	208474
14	3	56	12	1814	1695	308291
15	3	54	9	1856	1400	32018
16	2	60	5	1183	0	324041
17	1	84	19	0	0	298700

Trial Number: 21						
Number of Bursts in Trial: 9						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	2	57	12	1304	0	1247152
2	2	64	16	1105	0	771037
3	3	82	12	1509	1195	716456
4	2	58	16	1018	0	89351
5	1	79	10	0	0	404196
6	2	59	6	1152	0	495427
7	1	72	18	0	0	1169140
8	2	65	10	1390	0	669466
9	2	90	14	1750	0	1093121

Trial Number: 22						
Number of Bursts in Trial: 12						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	3	87	12	1988	1922	550265
2	2	61	11	1047	0	408422
3	2	57	5	1322	0	178271
4	1	79	16	0	0	501487
5	1	88	14	0	0	7398
6	3	60	6	1659	1131	223947
7	2	73	17	1014	0	581912
8	3	85	7	1230	1820	563359
9	1	73	18	0	0	92800
10	3	59	11	1180	1389	622844
11	3	50	10	1034	1965	125257
12	2	54	16	1470	0	852202

Trial Number: 23						
Number of Bursts in Trial: 9						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	1	77	20	0	0	1088191
2	1	71	11	0	0	646033
3	1	67	19	0	0	1248338
4	1	64	17	0	0	1219398
5	1	50	16	0	0	637427
6	3	80	13	1442	1438	1303250
7	2	88	8	1038	0	680183
8	2	86	6	1288	0	377254
9	1	96	6	0	0	1294909

Trial Number: 24						
Number of Bursts in Trial: 17						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	3	80	15	1102	1383	672648
2	3	68	14	1940	1714	545262
3	2	68	14	1041	0	358460
4	2	57	17	1671	0	196300
5	3	92	14	1224	1971	701773
6	2	89	8	1940	0	508026
7	3	92	5	1846	1339	38497
8	1	98	11	0	0	446143
9	1	90	14	0	0	237300
10	3	86	8	1634	1537	645807
11	1	53	15	0	0	420429
12	3	77	7	1986	1678	609008
13	3	85	17	1054	1644	364952
14	2	60	7	1323	0	87960
15	3	63	15	1896	1030	696839
16	3	61	9	1246	1138	496014
17	1	78	15	0	0	150488

Trial Number: 25						
Number of Bursts in Trial: 13						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	1	90	19	0	0	34509
2	1	77	18	0	0	371850
3	1	76	16	0	0	212342
4	1	52	12	0	0	197576
5	3	65	17	1979	1700	735556
6	2	63	17	1387	0	572763
7	2	100	17	1504	0	909973
8	1	58	7	0	0	341033
9	2	54	14	1724	0	751752
10	2	50	12	1196	0	914020
11	1	60	15	0	0	453385
12	1	62	18	0	0	216433
13	3	60	9	1626	1273	806041

Trial Number: 26						
Number of Bursts in Trial: 19						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	1	70	9	0	0	8884
2	3	97	20	1864	1094	494433
3	3	86	6	1162	1207	498406
4	1	53	17	0	0	148861
5	2	100	13	1529	0	166953
6	1	53	12	0	0	610339
7	1	90	18	0	0	454154
8	3	83	6	1740	1459	308651
9	1	58	10	0	0	366287
10	3	76	13	1756	1071	318621
11	2	59	13	1501	0	403437
12	2	59	19	1739	0	471662
13	2	93	13	1898	0	615912
14	3	95	20	1284	1514	78862
15	1	81	14	0	0	445215
16	1	54	11	0	0	502523
17	1	87	11	0	0	631312
18	3	77	19	1249	1313	49526
19	1	73	7	0	0	417

Trial Number: 27						
Number of Bursts in Trial: 17						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	3	60	15	1439	1602	504862
2	2	76	12	1558	0	268613
3	2	78	20	1796	0	404796
4	2	89	6	1728	0	4290
5	1	93	14	0	0	249485
6	1	87	14	0	0	648461
7	3	52	20	1052	1904	458815
8	2	72	15	1807	0	54365
9	2	61	19	1442	0	390767
10	1	68	9	0	0	365359
11	2	95	16	1053	0	192295
12	3	88	10	1030	1085	393337
13	3	52	14	1495	1513	299150
14	1	83	10	0	0	215730
15	1	89	20	0	0	27284
16	2	90	9	1411	0	33200
17	1	84	12	0	0	43609

Trial Number: 28						
Number of Bursts in Trial: 13						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	1	67	19	0	0	719341
2	1	95	7	0	0	372030
3	2	62	6	1340	0	564406
4	2	97	7	1858	0	651057
5	3	60	10	1124	1736	13967
6	3	96	12	1952	1984	833238
7	3	76	20	1191	1411	153582
8	2	77	12	1419	0	163630
9	3	60	16	1944	1002	161366
10	3	74	19	1321	1966	453510
11	3	52	20	1610	1887	780117
12	1	70	7	0	0	387703
13	2	68	14	1355	0	388540

Trial Number: 29						
Number of Bursts in Trial: 8						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	3	80	10	1243	1545	51525
2	2	96	5	1071	0	1391681
3	3	83	12	1065	1586	1378092
4	1	56	7	0	0	676879
5	2	82	16	1181	0	26693
6	1	66	13	0	0	530902
7	2	82	17	1831	0	1076194
8	1	50	16	0	0	1422902

Trial Number: 30						
Number of Bursts in Trial: 12						
Burst	Number of Pulses	Pulse Width (µsec)	Chirp Width (MHz)	Pulse 1-to-2 Spacing (µsec)	Pulse 2-to-3 Spacing (µsec)	Starting Location Within Interval (µsec)
1	1	82	5	0	0	277847
2	3	71	15	1503	1872	494584
3	1	92	5	0	0	187081
4	2	82	17	1888	0	973376
5	2	80	9	1520	0	484598
6	3	78	6	1680	1546	176248
7	3	72	10	1590	1913	764948
8	3	98	5	957	1438	224885
9	2	84	13	1875	0	809338
10	1	56	12	0	0	8396
11	2	88	10	1646	0	919210
12	1	76	13	0	0	183459

USA Bin 6 Radar Types:

USA Frequency Hopping Trial #1		
Hop #	Freq (GHz)	Pulse Start (msec)
80	5508	240
91	5505	273
96	5518	288

USA Frequency Hopping Trial #2		
Hop #	Freq (GHz)	Pulse Start (msec)
42	5510	126
60	5509	180
95	5513	285

USA Frequency Hopping Trial #3		
Hop #	Freq (GHz)	Pulse Start (msec)
6	5512	18
27	5515	81
77	5507	231
87	5505	261

USA Frequency Hopping Trial #4		
Hop #	Freq (GHz)	Pulse Start (msec)
12	5509	36
30	5505	90
35	5503	105
88	5502	264

USA Frequency Hopping Trial #5		
Hop #	Freq (GHz)	Pulse Start (msec)
70	5512	210

USA Frequency Hopping Trial #6		
Hop #	Freq (GHz)	Pulse Start (msec)
26	5518	78
31	5511	93

USA Frequency Hopping Trial #7		
Hop #	Freq (GHz)	Pulse Start (msec)
36	5510	108
53	5513	159
75	5508	225

USA Frequency Hopping Trial #8		
Hop #	Freq (GHz)	Pulse Start (msec)
46	5504	138
57	5508	171
70	5502	210
71	5509	213
84	5514	252

USA Frequency Hopping Trial #9		
Hop #	Freq (GHz)	Pulse Start (msec)
2	5515	6
3	5514	9
4	5518	12
38	5505	114
54	5513	162
67	5504	201
81	5506	243
82	5510	246

USA Frequency Hopping Trial #10		
Hop #	Freq (GHz)	Pulse Start (msec)
1	5515	3
29	5506	87
72	5509	216
81	5518	243
89	5505	267

USA Frequency Hopping Trial #11		
Hop #	Freq (GHz)	Pulse Start (msec)
19	5504	57
39	5512	117

USA Frequency Hopping Trial #12		
Hop #	Freq (GHz)	Pulse Start (msec)
14	5504	42
30	5516	90
40	5517	120

USA Frequency Hopping Trial #13		
Hop #	Freq (GHz)	Pulse Start (msec)
26	5517	78
85	5503	255
93	5506	279

USA Frequency Hopping Trial #14		
Hop #	Freq (GHz)	Pulse Start (msec)
15	5507	45
19	5516	57
24	5508	72
44	5503	132
46	5506	138
91	5511	273

USA Frequency Hopping Trial #15		
Hop #	Freq (GHz)	Pulse Start (msec)
27	5517	81
38	5503	114
77	5516	231

USA Frequency Hopping Trial #16		
Hop #	Freq (GHz)	Pulse Start (msec)
83	5517	249
84	5503	252

USA Frequency Hopping Trial #17		
Hop #	Freq (GHz)	Pulse Start (msec)
39	5502	117
50	5509	150
74	5516	222
77	5513	231
81	5507	243

USA Frequency Hopping Trial #18		
Hop #	Freq (GHz)	Pulse Start (msec)
23	5504	69
33	5505	99
37	5506	111

USA Frequency Hopping Trial #19		
Hop #	Freq (GHz)	Pulse Start (msec)
78	5515	234
88	5517	264

USA Frequency Hopping Trial #20		
Hop #	Freq (GHz)	Pulse Start (msec)
59	5502	177
86	5517	258

USA Frequency Hopping Trial #21		
Hop #	Freq (GHz)	Pulse Start (msec)
13	5516	39
61	5502	183
80	5518	240
91	5504	273
92	5511	276

USA Frequency Hopping Trial #22		
Hop #	Freq (GHz)	Pulse Start (msec)
64	5502	192

USA Frequency Hopping Trial #23		
Hop #	Freq (GHz)	Pulse Start (msec)
14	5503	42
47	5508	141
67	5509	201
91	5517	273
93	5504	279

USA Frequency Hopping Trial #24		
Hop #	Freq (GHz)	Pulse Start (msec)
3	5515	9
29	5503	87
33	5513	99
61	5508	183

USA Frequency Hopping Trial #25		
Hop #	Freq (GHz)	Pulse Start (msec)
8	5515	24
28	5502	84
48	5509	144
56	5508	168
68	5518	204
88	5516	264
91	5512	273

USA Frequency Hopping Trial #26		
Hop #	Freq (GHz)	Pulse Start (msec)
19	5516	57
71	5517	213
77	5507	231

USA Frequency Hopping Trial #27		
Hop #	Freq (GHz)	Pulse Start (msec)
25	5503	75
31	5510	93
34	5516	102
45	5511	135
78	5502	234

USA Frequency Hopping Trial #28		
Hop #	Freq (GHz)	Pulse Start (msec)
69	5506	207
90	5508	270

USA Frequency Hopping Trial #29		
Hop #	Freq (GHz)	Pulse Start (msec)
26	5507	78
29	5505	87
53	5511	159
57	5512	171
69	5506	207
84	5504	252
98	5517	294

USA Frequency Hopping Trial #30		
Hop #	Freq (GHz)	Pulse Start (msec)
2	5516	6
5	5513	15
7	5517	21

6.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **H&D Wireless AB Wifi/BT/NFC Module FCC ID: XO2SPB209A** is in compliance with the DFS requirements for a Master Device in accordance with Part 15.407 of the FCC Rules.