MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*
33439 WESTERN AVENUE ! UNION CITY, CALIFORNIA 94587-3201 ! PHONE (510) 489-6300 ! FAX (510) 489-6372

June 22, 2007

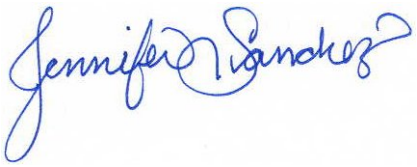
SkyPilot Networks
2055 Laurelwood Road, 2nd Floor
Santa Clara, CA 95054

Dear Bill Olsen,

Enclosed is the Dynamic Frequency Selection (DFS) test report for compliance testing of the SkyPilot Networks, RV7-SD1085 as tested to the requirements of Title 47 of the CFR, Ch. 1 (10-1-06 ed.), Title 47 of the CFR, Part 15.407 subpart E & RSS-210, Issue 6, September 2005 for Intentional Radiators.

Thank you for using the services of MET Laboratories, Inc. If you have any questions regarding these results or if MET can be of further service to you, please feel free to contact me.

Sincerely yours,
MET LABORATORIES, INC.



Jennifer Sanchez
Documentation Department

Reference: (\SkyPilot Networks\EMCS80168-DFS_REV1)

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Dynamic Frequency Selection
Test Report

for the

SkyPilot Networks
Model RV7-SD1085

Tested under
the FCC & Industry Canada Certification Rules
contained in
15.407, Subpart E & RSS-210, Issue 6, September 2005
for Intentional Radiators

MET Report: EMCS80168-DFS_REV1

June 22, 2007

Prepared For:

SkyPilot Networks
2055 Laurelwood Road, 2nd Floor
Santa Clara, CA 95054

Prepared By:
MET Laboratories, Inc.
4855 Patrick Henry Dr., Building 6
Santa Clara, CA 95054

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Shawn McMillen, Project Engineer
Electromagnetic Compatibility Lab

Jennifer Sanchez
Documentation Department

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Part 15.407, Subpart E of the FCC Rules & RSS-210, Issue 6, September 2005 of the Industry Canada Rules under normal use and maintenance.

Tony Permsombut, Manager
Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	June 12, 2007	Initial Issue.
1	June 22, 2007	Change FCC ID and UPN Number

Table of Contents

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List of Terms and Abbreviations

ACF	**A**ntenna **C**orrection **F**actor
Cal	**Cal**ibration
d	**M**easurement **D**istance
dB	**D**eci**b**els
dBµA	**D**eci**b**els above one **micro**amp
dBµV	**D**eci**b**els above one **micro**volt
dBµA/m	**D**eci**b**els above one **micro**amp **per m**eter
dBµV/m	**D**eci**b**els above one **micro**volt **per m**eter
E	**E**lectric Field
DSL	**D**igital **S**ubscriber **L**ine
EUT	**E**quipment **U**nder **T**est
f	**F**requency
FCC	**F**ederal **C**ommunications **C**ommission
Hz	**H**ert**z**
kHz	**k**ilo**h**ert**z**
kPa	**k**ilo**pa**scal
kV	**k**ilo**v**olt
MHz	**M**ega**h**ertz
µ	**microf**arad
µ**s**	**micros**econds
PRF	**P**ulse **R**epetition **F**requency
RF	**R**adio **F**requency
RMS	**R**oot-**M**ean-**S**quare
V/m	**V**olts **per m**eter

I. Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the SkyPilot Networks RV7-SD1085, with the Dynamic Frequency Selection (DFS) requirements of part §15.407 sub part E. All references are to the most current version of Title 47 of the Code of Federal Regulations in effect. In accordance with §2.1033, the following data is presented in support of the Certification of the RV7-SD1085. SkyPilot Networks should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the RV7-SD1085, has been permanently discontinued.

B. Executive Summary

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, §15.407, in accordance with SkyPilot Networks, purchase order number 5472.

Reference	Description	Results
15.407 (h)(1)	Transmit Power Control (TCP)	Compliant
15.407 (h)(2)	Radar Detection Function of Dynamic Frequency Selection (DFS)	Compliant
15.407 (h)(2)(ii)	Channel Availability Check Time	Compliant
15.407 (h)(2)(iii)	Channel Move Time and Channel Closing Time	Compliant
15.407 (h)(2)(iv)	Non-Occupancy Period	Compliant

Table 1 Executive Summary of EMC Part 15.407 DFS ComplianceTesting

II. Equipment Configuration

A. Overview

MET Laboratories, Inc. was contracted by SkyPilot Networks to perform testing on the RV7-SD1085, under SkyPilot Networks's purchase order number 5472.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the SkyPilot Networks RV7-SD1085.

The results obtained relate only to the item(s) tested.

Model(s) Tested:	RV7-SD1085	
Model(s) Covered:	RV7-SD1085	
EUT Specifications:	Primary Power: 24VDC	
	FCC ID: RV7-SD1085 IC: 5550A-SD1085	
	Type of Modulations:	OFDM
	Equipment Code:	NII
	EUT Frequency Ranges:	5250 – 5350MHz, 5475 – 5725MHz
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	Temperature: 15-35º C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
Evaluated by:	Shawn McMillen	
Date(s):	June 22, 2007	

B. References

ET Docket FCC 60-96	Compliance Measurement Procedures for Unlicensed National Information Infrastructure Devices (UNII) Operating in the 5250-5350 MHz and 5470-5725 MHz Band Incorporating Dynamic Frequency Selection
CFR 47, Part 15, Subpart E	Unlicensed National Information Infrastructure Devices (UNII)
ANSI/NCSL Z540-1-1994	Calibration Laboratories and Measuring and Test Equipment - General Requirements
ANSI/ISO/IEC 17025:2000	General Requirements for the Competence of Testing and Calibration Laboratories

C. Test Site

All testing was performed at MET Laboratories, Inc., 4855 Patrick Henry Drive, Building 6, Santa Clara, California 95054. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a 10 meter semi-anechoic chamber (equivalent to an Open Area Test Site). In accordance with §2.948(a)(3), a complete site description is contained at MET Laboratories. In accordance with §2.948(d), MET Laboratories has been accredited by A2LA (Certificate Number 591.02).

D. Description of Master Device

1. The operating frequency range of the EUT is 5250 – 5350MHz and 5475 – 5725MHz.
2. The mode of operation is OFDM.
3. The highest EIRP is 29.64 dBm and the minimum EIRP is 8dBm.
4. The only antenna available for the DFS bands is a Skypilot designed 17dBi sector antenna.
5. RF output Power levels are as follows:

UNII-2 lower band	
Frequency (MHz)	**Measured Peak Output Power dBm**
5260	12.35
5320	10.88
UNII-2 Upper band	
Frequency (MHz)	**Measured Peak Output Power dBm**
5500	11.53
5600	12.64
5700	11.44

6. The antenna impedance is 50Ω.
7. System testing was performed with the designated MPEG test file that streams full motion video at 30 frames per second from the Master to the Client IP based system.
8. The Master device has the TPC capabilities such that it can operate at least 6 dB lower than the 30 dBm EIRP limit. This capability was demonstrated with measurements showing reduced power levels.
9. Time for master to complete its power-on-cycle is 100 seconds
10. 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.

Photograph 1. SkyPilot Networks RV7-SD1085

E. Mode of Operation

5GHz Mesh Backhaul

F. Method of Monitoring EUT Operation

A Spectrum Analyzer and a Power Meter was use to monitor the EUT's transmitter channel and power output.

G. Modifications

1. Modifications to EUT

No modifications were made to the EUT.

2. Modifications to Test Standard

No modifications were made to the test standard.

H. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to SkyPilot Networks upon completion of testing.

III. DFS Radar Waveform Description and Calibration

DFS Requirements

DFS Detection Thresholds

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

Maximum Transmit Power	Value
≥ 200 milliwatt	-64 dBm
< 200 milliwatt	-62 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.

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 80% of the 99% power bandwidth. See Note 3.

Note 1: The instant that the *Channel Move Time* and the *Channel Closing Transmission Time* begins is as follows:

- For the Short pulse radar Test Signals this instant is the end of the *Burst*.
- For the Frequency Hopping radar Test Signal, this instant is the end of the last radar *Burst* generated.
- For the Long Pulse radar Test Signal this instant is the end of the 12 second period defining the radar transmission.

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 facilitating *Channel* changes (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.
Note 3: During the *U-NII Detection Bandwidth* detection test, radar type 1 is used and for each frequency step the minimum percentage of detection is 90%. Measurements are performed with no data traffic.

Required 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.

Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Trials
1	1	1428	18	60%	30
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

A minimum of 30 unique waveforms are required for each of the short pulse radar types 2 through 4. For short pulse radar type 1, the same waveform is used a minimum of 30 times. 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. The aggregate is the average of the percentage of successful detections of short pulse radar types 1-4.

Long Pulse Radar Test Waveform

Radar Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Number of Pulses per Bursts	Number of Bursts	Minimum Percentage of Successful Detection	Minimum 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 radar frequency of 5700 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 test waveform:

1) The total test signal length is 12 seconds.
2) 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).

Graphical Representation of a Long Pulse radar Test Waveform

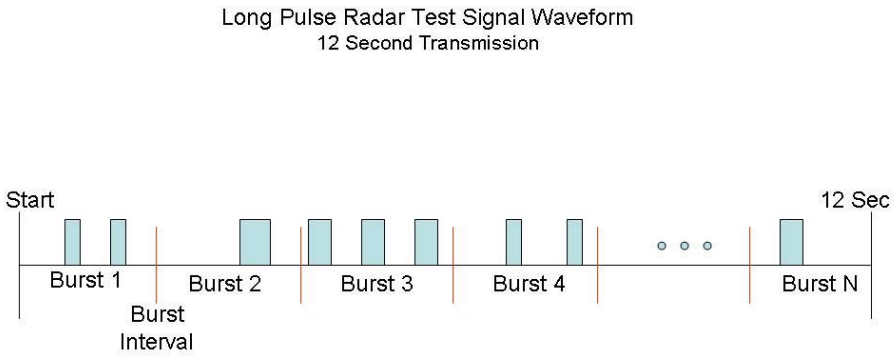


Figure 1. Long Pulse Radar Test Signal Waveform

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 selected1 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.

Radar Waveform Calibration

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's resolution bandwidth (RBW) was set to 1MHz and the video bandwidth (VBW) was set to 3 MHz. See Figure 2.

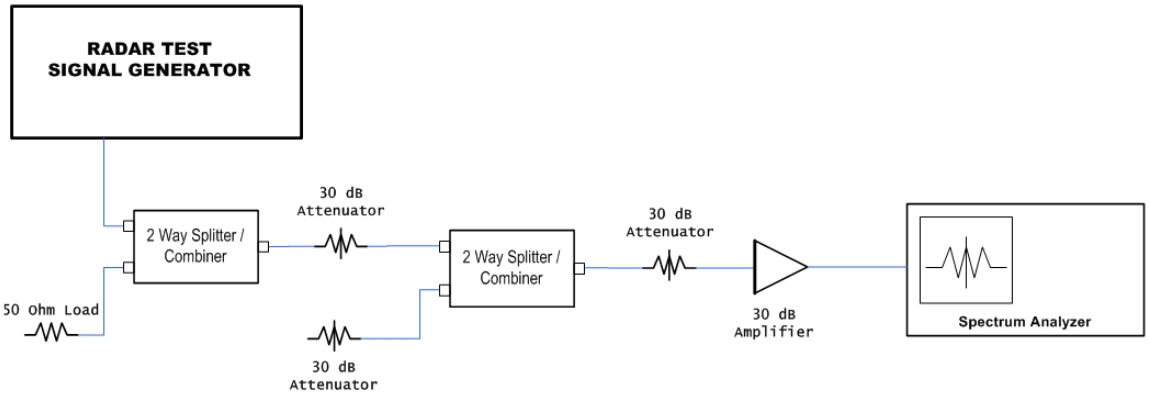
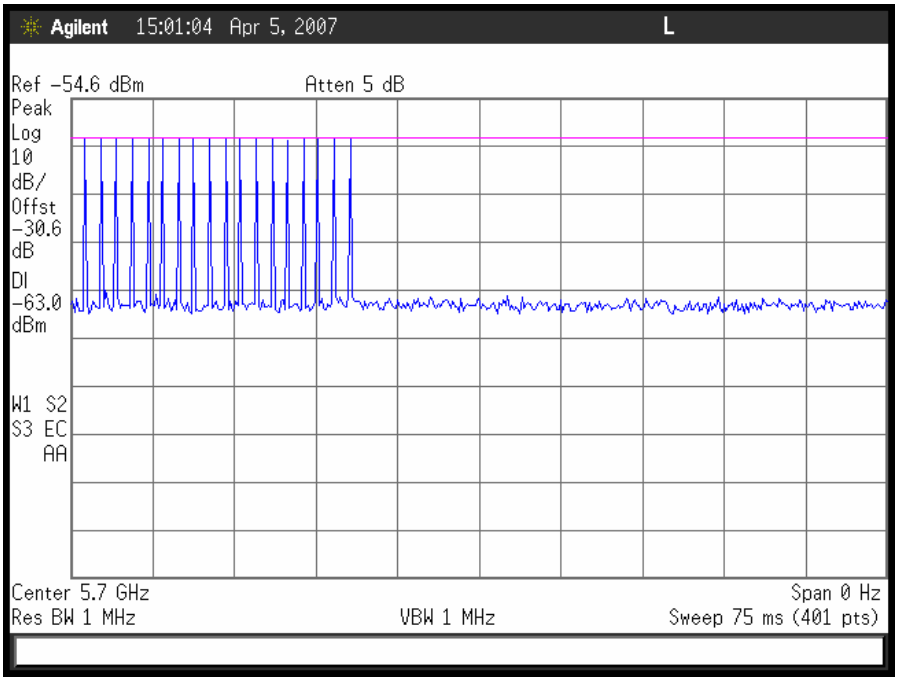
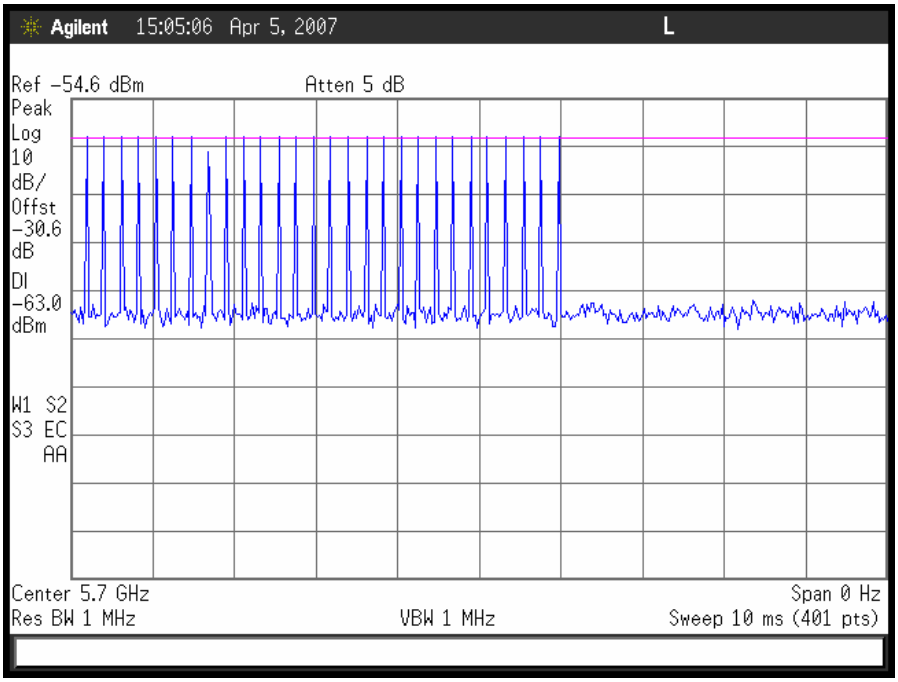


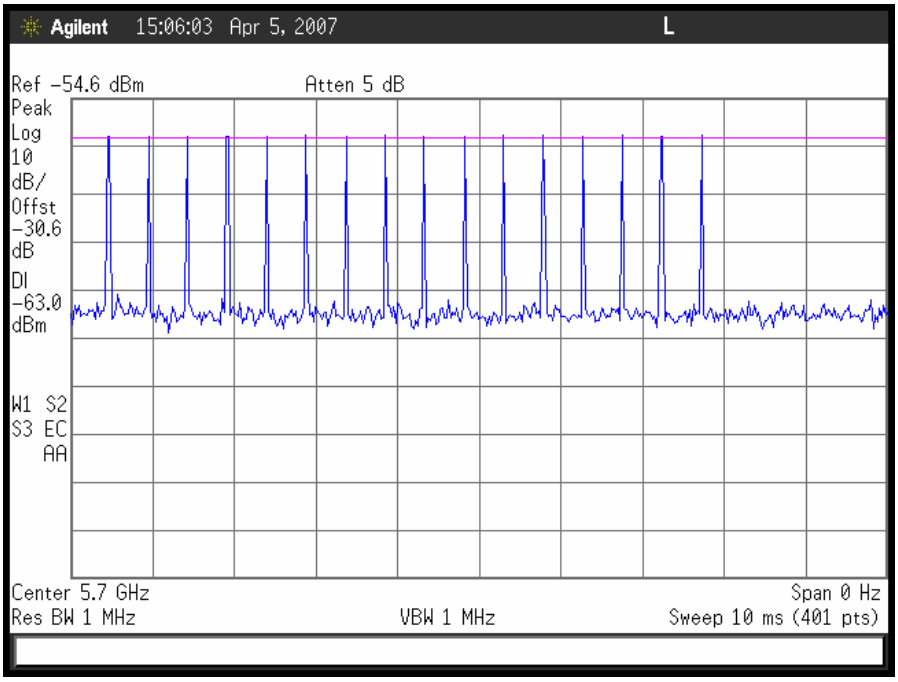
Figure 2. Radar Waveform Calibration Setup



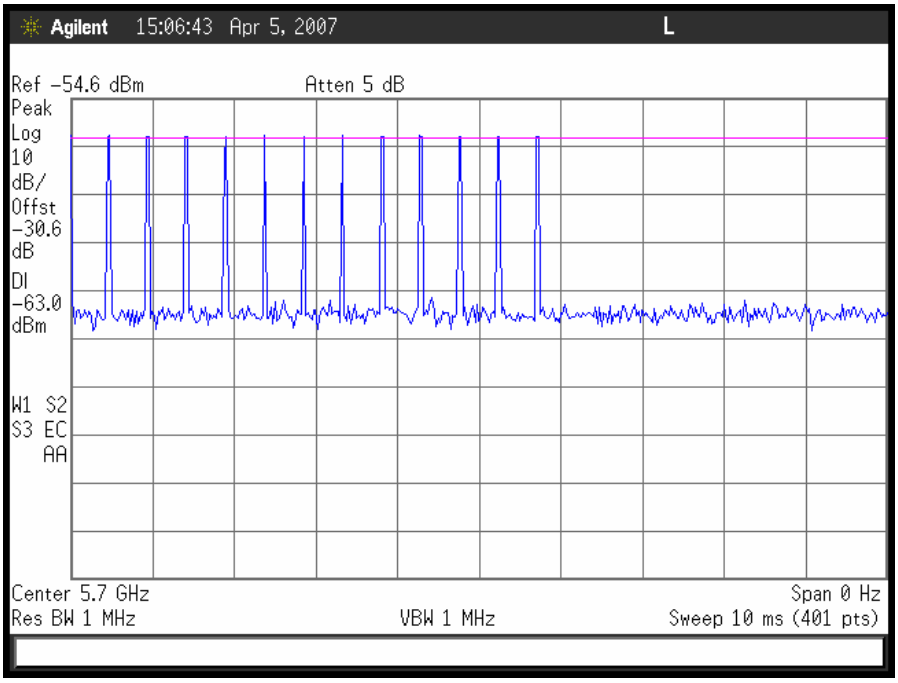
Plot 1. Bin 1 Cal Plot



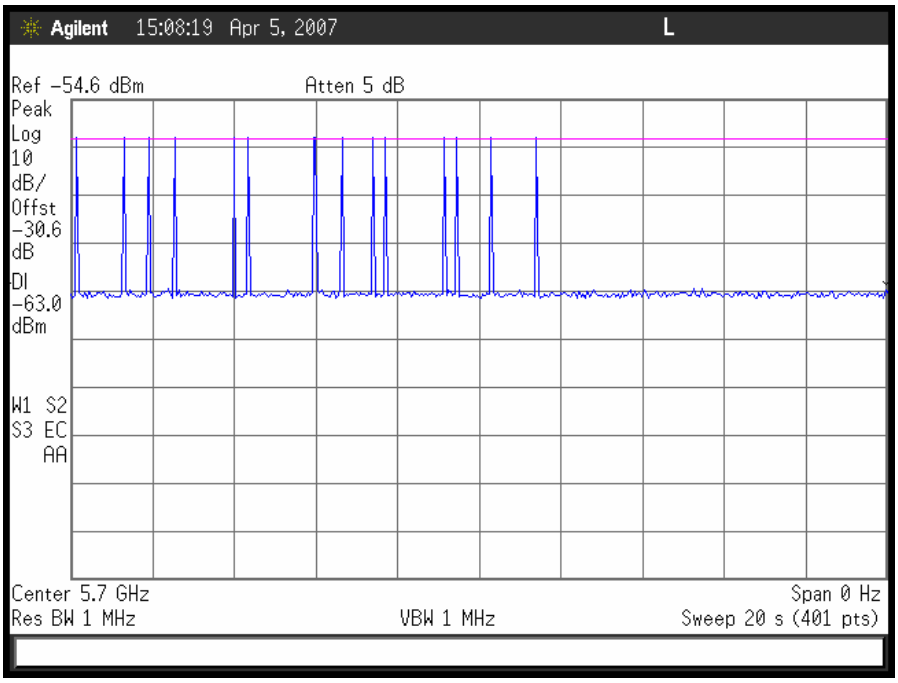
Plot 2. Bin 2 Cal Plot



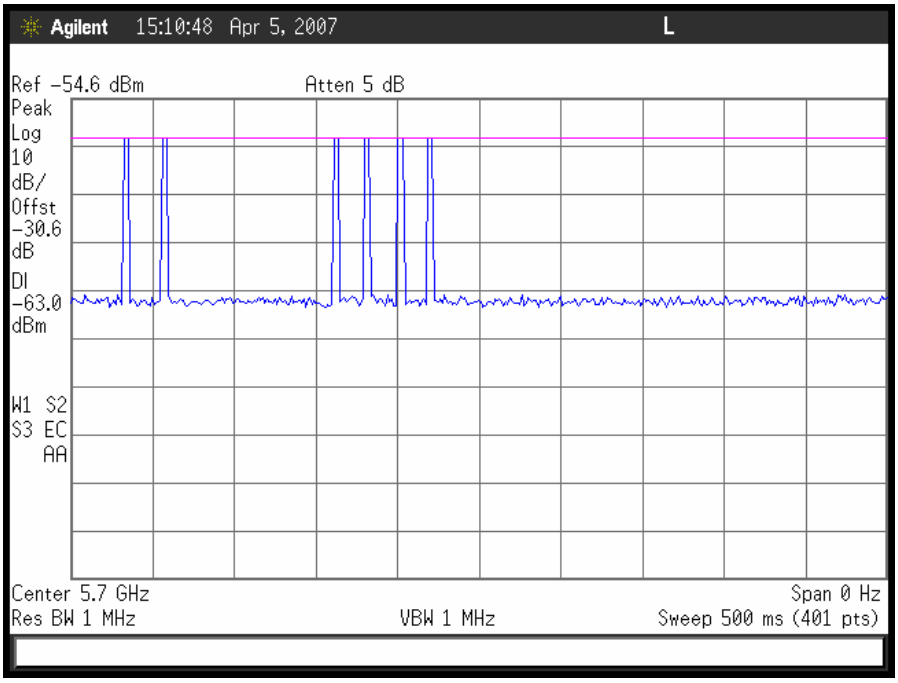
Plot 3. Bin 3 Cal Plot



Plot 4. Bin 4 Cal Plot



Plot 5. Bin 5 Cal Plot



Plot 6. Bin 6 Cal Plot

Test Setup for EUT

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. Figure 3 shows the test setup used to generate the Radar Waveforms.

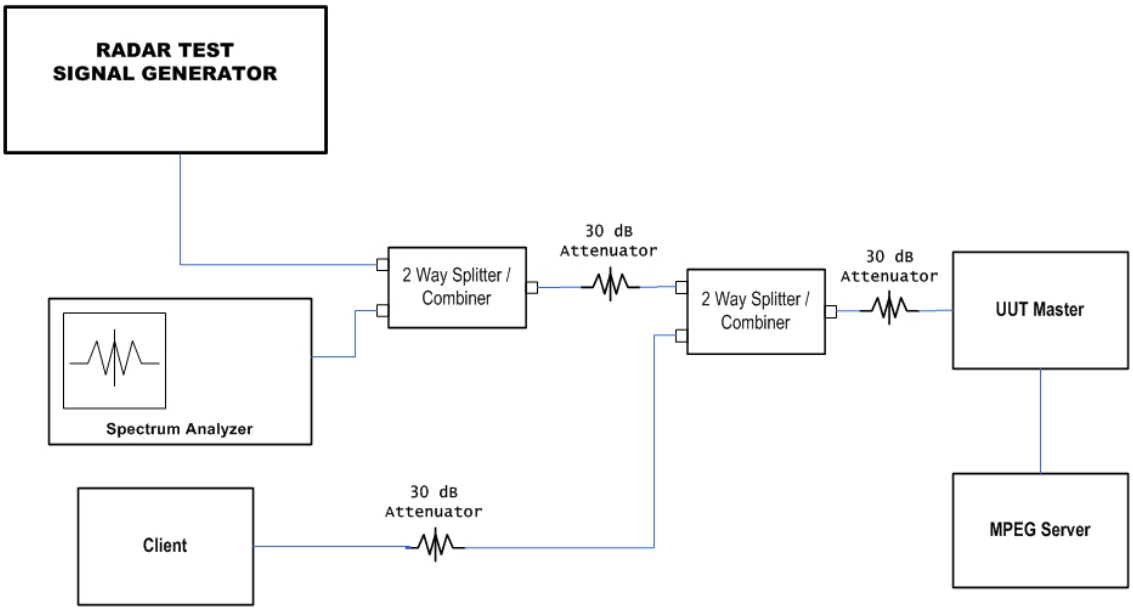


Figure 3. Test Setup for Master Device

IV. DFS Procedures and Test Results

UNII Detection Bandwidth

Test Requirement(s): **§ 15.407** A minimum 80% detection rate is required across a EUT's 99% bandwidth.

Test Procedure: All UNII channels for this device have identical Channel bandwidths. Therefore, all DFS testing was done at 5700 MHz.

A single *Burst* of the short pulse radar type 1 is produced at 5700 MHz at a -63dBm level. The UUT is set up as a standalone device (no associated Client and no traffic).

A single radar Burst is generated for a minimum of 10 trials, and the response of the UUT is noted. The UUT must detect the Radar Waveform 90% or more of the time.

The radar frequency is increased in 1 MHz steps, repeating the above test sequence, until the detection rate falls below 90%. The highest frequency at which detection is greater than or equal to 90% is denoted as F_h.

The radar frequency is decreased in 1 MHz steps, repeating the above test sequence, until the detection rate falls below 90%. The lowest frequency at which detection is greater than or equal to 90% is denoted as F_l.

The U-NII Detection Bandwidth is calculated as follows:

U-NII Detection Bandwidth = $F_h - F_l$

Test Results: The EUT is compliant with this test requirement.

EUT Frequency- 5700MHz											
	DFS Detection Trials (1=Detection, 0= No Detection)										
Radar Frequency (MHz)	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5691	1	1	1	1	1	1	1	1	1	1	N/A
5692	1	1	1	1	1	1	1	1	1	1	N/A
5693(f_l)	1	1	0	1	1	1	1	1	1	1	90
5694	1	1	1	1	1	1	1	1	1	1	100
5695	1	1	1	1	1	1	1	1	1	1	100
5696	1	1	1	1	1	1	1	1	1	1	100
5697	1	1	1	1	1	1	1	1	1	1	100
5698	1	1	1	1	1	1	1	1	1	1	100
5699	1	1	1	1	1	1	1	1	1	1	100
5700	1	1	1	1	1	1	1	0	1	1	90
5701	1	1	1	1	1	1	1	1	1	1	100
5702	1	1	1	1	1	1	1	1	1	1	100
5703	1	1	1	1	1	1	1	1	1	1	100
5704	1	1	0	1	1	1	1	1	1	1	90
5705	1	1	1	1	1	1	1	1	1	1	100
5706	1	1	1	1	1	1	1	1	1	1	100
5707 (f_h)	1	1	1	1	1	1	1	1	1	0	90
5708	1	1	1	1	1	1	1	1	1	1	N/A
5709	1	1	1	1	1	0	1	1	1	1	N/A
Overall Detection Percentage											97.3%
Detection Bandwidth = f_h - f_l = 5707MHz-5693MHz = 14MHz											
EUT 99% Bandwidth = 16.5MHz											
16.5MHz* 80% = 13.2MHz											

Table 2. UNII Detection Bandwidth Test Results

Test Engineer: Shawn McMillen

Test Date: April 6, 2007

Initial Channel Availability Check Time

Test Requirements: **§ 15.407** 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 of the Radar Waveforms and only needs to be performed one time.

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

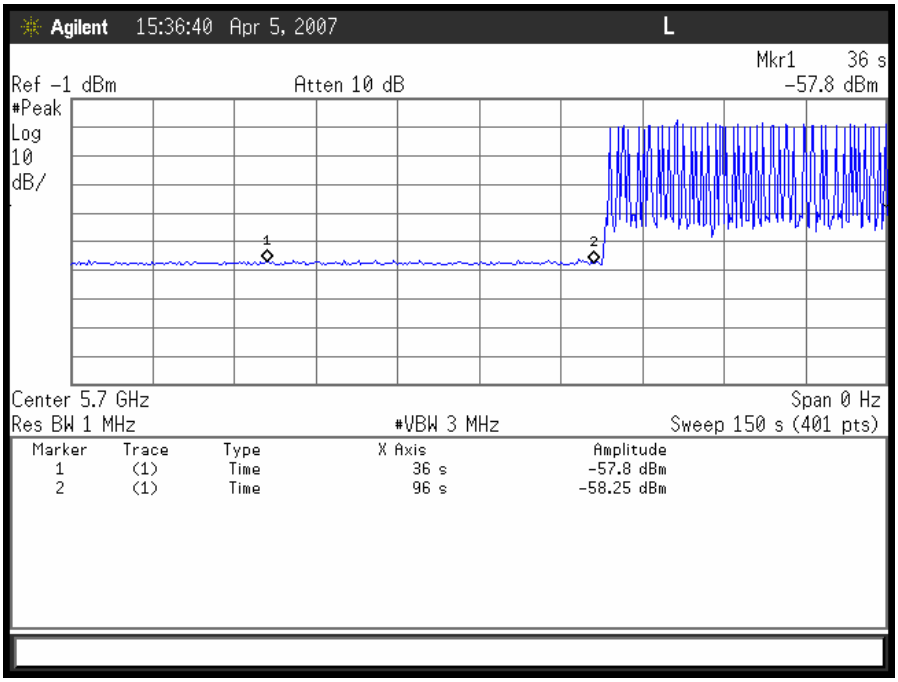
The initial power up time of the UUT is indicated by marker 1 in the plot. Initial beacons/data transmissions are indicated by marker 1R.

Test Procedure: The U-NII device is powered on and instructed to operate at 5700 MHz. At the same time the UUT is powered on, the spectrum analyzer is set to 5700MHz with a zero span and a 2.5 minute sweep time. The analyzer is triggered at the same time power is applied to the U-NII device.

Test Results The Equipment complies with § 15.407 Initial Channel Availability Check Time.

Test Engineer: Shawn McMillen

Test Date: April 5, 2007



Plot 7. Channel Availability Check Time

Radar Burst at the Beginning of the Channel Availability Check Time

Test Requirements: **§ 15.407** A Radar Burst at the Beginning of the Channel Availability Check Time tests that the UUT does not emit beacon, control, or data signals on the test Channel if it has detected a radar burst during that time period until the power-up sequence has been completed and the U-NII device checks for Radar Waveforms for one minute on the test Channel. The steps below define the procedure to verify successful radar detection on the selected 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 (-63dBm) occurs at the beginning of the Channel Availability Check Time.

Test Procedure: The UUT is powered on at T0. T1 denotes the instant when the UUT has completed its power-up sequence. The Channel Availability Check Time commences at instant T1 and will end no sooner than T1 + 60 seconds.

A single Burst of short pulse of radar type 1 at -63 dBm will commence within a 6 second window starting at T1.

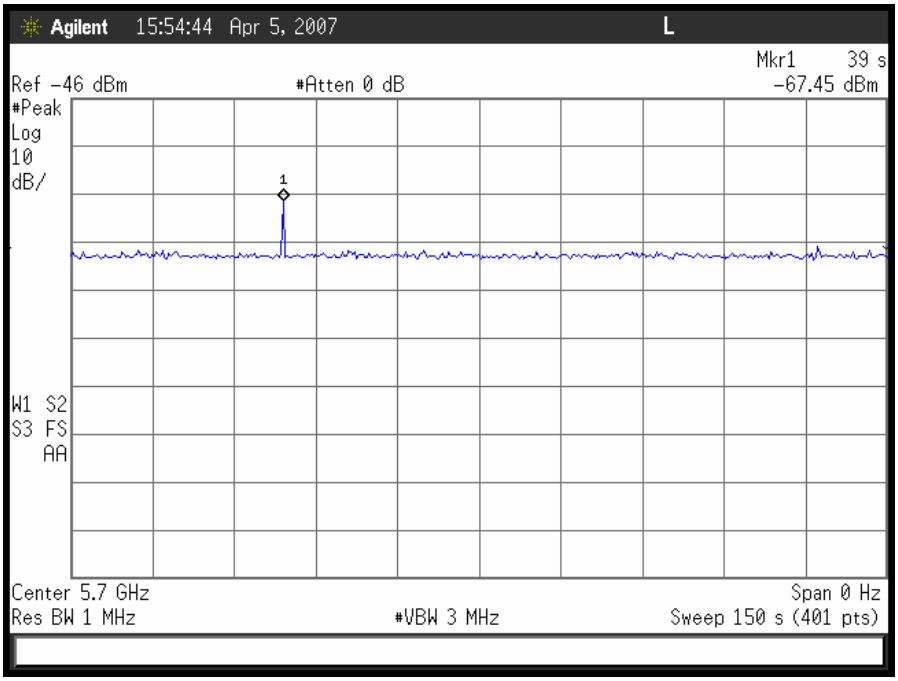
Visual indication on the UUT of successful detection of the radar Burst will be recorded and reported. Observation of emissions at 5700MHz will continue for 2.5 minutes after the radar Burst has been generated.

Verify that during the 2.5 minute measurement window no UUT transmissions occurred at 5700MHz.

Test Results The equipment complies with § 15.407 Radar Burst at the Beginning of the Channel Availability Check Time.

Test Engineer: Shawn McMillen

Test Date: April 5, 2007



Plot 8. Channel Availability Burst at Beginning

Radar Burst at the End of the Channel Availability Check Time

Test Requirements: **§ 15.407** A Radar Burst at the End of the Channel Availability Check Time tests that the UUT does not emit beacon, control, or data signals on the test Channel if it has detected a radar burst during that time period until the power-up sequence has been completed and the U-NII device checks for Radar Waveforms for one minute on the test Channel. The steps below define the procedure to verify successful radar detection on the selected 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 (-63dBm) occurs at the end of the Channel Availability Check Time.

Test Procedure: The steps below define the procedure to verify successful radar detection on the selected 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 (-63dBm) occurs at the end of the Channel Availability Check Time.

The UUT is powered on at T0. T1 denotes the instant when the UUT has completed its power-up sequence. The Channel Availability Check Time commences at instant T1 and will end no sooner than T1 + 60 seconds.

A single Burst of short pulse of radar type 1 at -63 dBm will commence within a 6 second window starting at T1+ 54 seconds.

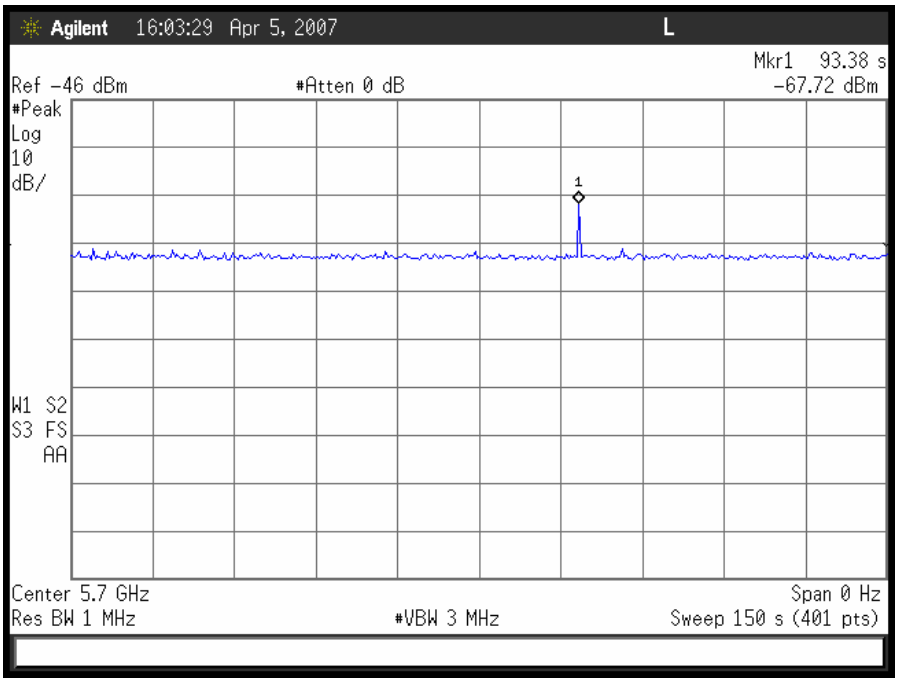
Visual indication on the UUT of successful detection of the radar Burst will be recorded and reported. Observation of emissions at 5700MHz will continue for 2.5 minutes after the radar Burst has been generated.

Verify that during the 2.5 minute measurement window no UUT transmissions occurred at 5700MHz.

Test Results The equipment complies with § 15.407 Radar Burst at the End of the Channel Availability Check Time.

Test Engineer: Shawn McMillen

Test Date: April 5, 2007



Plot 9. Channel Availability Burst at End

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

Test Requirements: **§ 15.407**

Test Procedure: These tests define how the following DFS parameters are verified during In-Service Monitoring; Channel Closing Transmission Time, Channel Move Time, and 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 (-63dBm) is generated on the Operating Channel of the U-NII device.

A U-NII device operating as a Client Device will associate with the UUT (Master) at 5700 MHz. Stream the MPEG test file from the Master Device to the Client Device on the selected Channel for the entire period of the test.

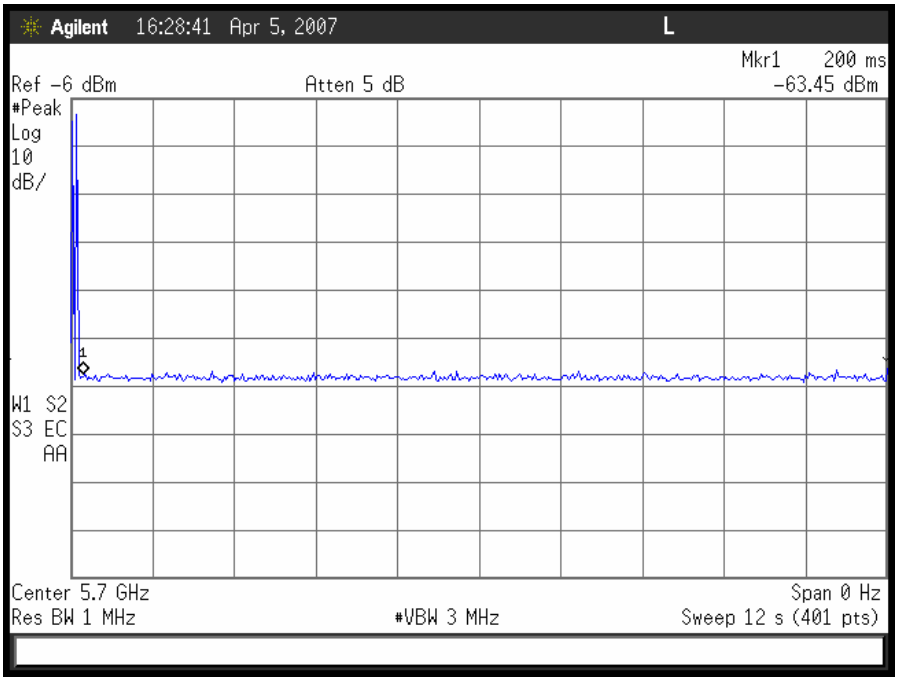
At time T0 the Radar Waveform generator sends a Burst of pulses for each of the radar types at -63dBm.

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). Compare the Channel Move Time and Channel Closing Transmission Time results to the limits defined in the *DFS Response requirement values table*.

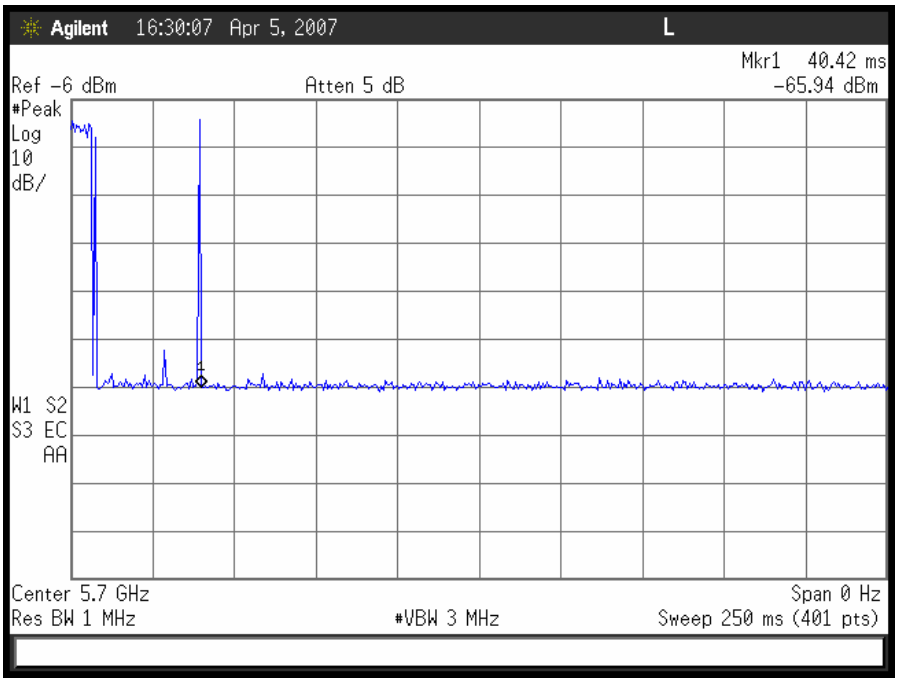
Test Results: The equipment complies with § 15.407 In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period

Test Engineer: Shawn McMillen

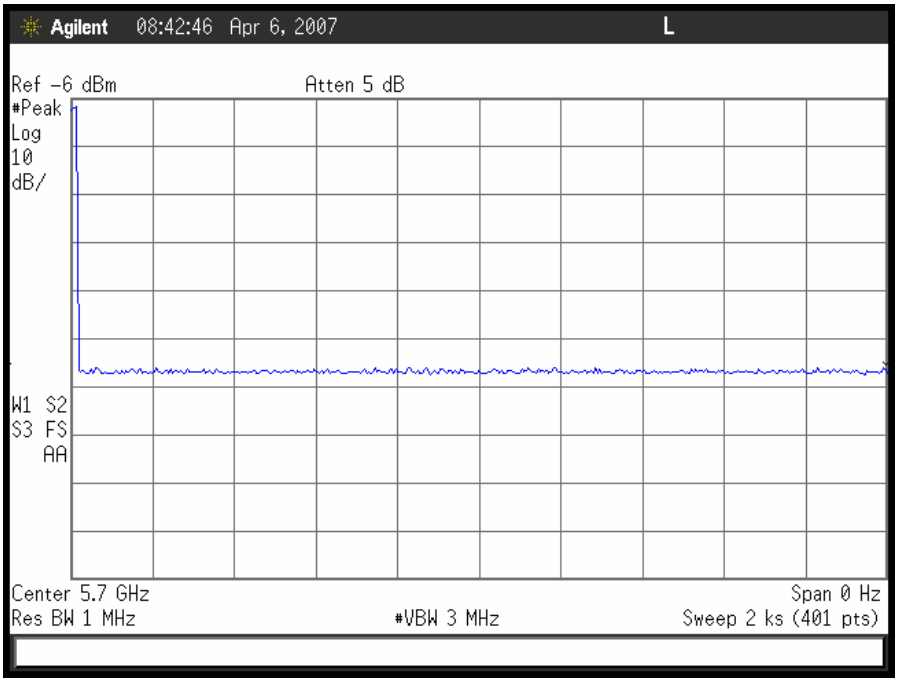
Test Date: April 5, 2007



Plot 10. Channel Closing Transmission time in 12 sec



Plot 11. Channel Closing Transmission time in 250 msec



Plot 12. Non-Occupancy period/30 minutes

Statistical Performance Check

Test Requirements: **§ 15.407** During In-Service Monitoring, the EUT requires a minimum percentage of successful radar detections from all required radar waveforms at a level equal to the DFS Detection Threshold + 1dB.

Test Procedure: Stream the MPEG test file from the Master Device to the Client Device on the selected Channel for the entire period of the test. The Radar Waveform generator sends the individual waveform for each of the radar types 1-6 at -63dbm. Statistical data is gathered to determine the ability of the device to detect the radar test waveforms. The device can utilize a test mode to demonstrate when detection occurs to prevent the need to reset the device between trial runs. The percentage of successful detection is calculated by:

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

The Minimum number of trails, minimum percentage of successful detection and the average minimum percentage of successful detection are found in the Radar Test Waveforms section.

Test Results: The equipment complies with § 15.407 Statistical Performance Check.

Test Engineer: Shawn McMillen

Test Date: April 5, 2007

Statistical Performance Check Test Results

Radar Type	Trial #	Pulses per Burst	Pulse Width (µsec)	PRI (µsec)	Detection 1 = Yes, 0 = No
1	1	18	1	1428	1
	2	18	1	1428	1
	3	18	1	1428	1
	4	18	1	1428	1
	5	18	1	1428	1
	6	18	1	1428	1
	7	18	1	1428	1
	8	18	1	1428	1
	9	18	1	1428	1
	10	18	1	1428	1
	11	18	1	1428	1
	12	18	1	1428	1
	13	18	1	1428	1
	14	18	1	1428	1
	15	18	1	1428	1
	16	18	1	1428	1
	17	18	1	1428	1
	18	18	1	1428	1
	19	18	1	1428	1
	20	18	1	1428	1
	21	18	1	1428	1
	22	18	1	1428	1
	23	18	1	1428	1
	24	18	1	1428	1
	25	18	1	1428	1
	26	18	1	1428	1
	27	18	1	1428	1
	28	18	1	1428	1
	29	18	1	1428	1
	30	18	1	1428	1
	Detection Percentage				**100% (> 60%)**

Table 3. Radar 1 Test Results

Radar Type	Trial #	Pulse Width 1 to 5 µsec	PRI 150 to 230 µsec	Pulses per Burst 23 to 29	Detection 1 = Yes, 0 = No
2	1	4	155	24	1
	2	2.5	190	28	1
	3	3.4	182	29	1
	4	3	156	27	1
	5	2.5	173	27	1
	6	4.1	176	23	0
	7	3.4	158	23	1
	8	2.7	165	26	1
	9	3.8	202	26	1
	10	1.2	174	29	1
	11	2.6	185	23	1
	12	4.7	209	29	1
	13	2.2	229	27	1
	14	4	213	25	1
	15	4.4	160	23	1
	16	4.9	193	28	1
	17	3.2	170	25	1
	18	4.3	174	26	1
	19	3.5	209	23	1
	20	1.7	173	28	1
	21	3	221	27	1
	22	2.1	201	25	1
	23	1.2	204	26	1
	24	2.7	166	28	1
	25	4.3	227	27	1
	26	2.3	168	28	1
	27	2.1	229	28	1
	28	3.9	186	25	1
	29	2.3	211	25	1
	30	1.3	211	25	0
	Detection Percentage				**93% (> 60%)**

Table 4. Radar 2 Test Results

Radar Type	Trial #	Pulse Width 6 to 10 µsec	PRI 200 to 500 µsec	Pulses per Burst 16 to 18	Detection 1 = Yes, 0 = No
3	1	5.2	413	18	1
	2	8.7	384	17	1
	3	8.2	341	18	1
	4	8.1	489	17	1
	5	9.3	447	18	1
	6	6.7	263	17	1
	7	5.3	434	16	1
	8	7.2	342	18	1
	9	9.8	386	17	1
	10	6.3	283	17	1
	11	6.3	369	18	1
	12	7.3	256	17	1
	13	5.4	289	16	1
	14	9	474	17	0
	15	5.6	333	18	1
	16	7.2	292	18	0
	17	9.8	378	16	1
	18	9	456	17	1
	19	9.7	279	18	1
	20	8.6	490	18	1
	21	7	493	16	1
	22	9.9	355	16	0
	23	6.6	390	18	1
	24	8	447	17	1
	25	5.4	420	18	1
	26	8.2	394	16	1
	27	6.3	254	18	1
	28	7.6	313	17	0
	29	5.8	447	18	1
	30	7.4	425	18	1
	Detection Percentage				**86.6% (> 60%)**

Table 5. Radar 3 Test Results

Radar Type	Trial #	Pulse Width 11 to 20 µsec	PRI 200 to 500 µsec	Pulses per Burst 12 to 16	Detection 1 = Yes, 0 = No
4	1	16.7	396	13	1
	2	18.9	380	13	1
	3	14.5	324	15	1
	4	14.2	302	12	1
	5	17.5	458	13	1
	6	12.2	414	15	1
	7	17.7	426	16	1
	8	11.6	318	13	1
	9	13.8	266	15	1
	10	13	334	13	0
	11	17.2	438	12	0
	12	19.3	276	14	1
	13	18	477	13	0
	14	16.7	344	16	1
	15	19	271	13	1
	16	12.1	363	15	1
	17	15.1	485	12	1
	18	13.5	295	13	1
	19	13.2	491	15	1
	20	12.2	355	14	1
	21	10	364	16	1
	22	14	355	14	1
	23	19.7	374	16	1
	24	14.5	325	15	1
	25	18.3	311	16	1
	26	16.3	387	14	1
	27	14.4	334	15	0
	28	19.6	323	15	1
	29	19.2	444	16	1
	30	19.9	346	12	0
	Detection Percentage				**83.3% (> 60%)**

Table 6. Radar 4 Test Results

Radar Type	Trial #	Filename*	Detection
			1 = Yes, 0 = No
5	1	bin5-trial 1	1
	2	bin5-trial 2	1
	3	bin5-trial 3	1
	4	bin5-trial 4	1
	5	bin5-trial 5	1
	6	bin5-trial 6	1
	7	bin5-trial 7	1
	8	bin5-trial 8	1
	9	bin5-trial 9	1
	10	bin5-trial 10	1
	11	bin5-trial 11	1
	12	bin5-trial 12	1
	13	bin5-trial 13	1
	14	bin5-trial 14	1
	15	bin5-trial 15	1
	16	bin5-trial 16	1
	17	bin5-trial 17	1
	18	bin5-trial 18	1
	19	bin5-trial 19	1
	20	bin5-trial 20	1
	21	bin5-trial 21	1
	22	bin5-trial 22	1
	23	bin5-trial 23	1
	24	bin5-trial 24	1
	25	bin5-trial 25	1
	26	bin5-trial 26	1
	27	bin5-trial 27	1
	28	bin5-trial 28	1
	29	bin5-trial 29	1
	30	bin5-trial 30	1
	Detection Percentage		**100% (> 60%)**

Table 7. Radar 5 Test Results

Radar Type	Trial #	Pulses/Hop	Pulse Width (µsec)	PRI (µsec)	Detection 1 = Yes, 0 = No
6	1	9	1	333	1
	2	9	1	333	1
	3	9	1	333	1
	4	9	1	333	1
	5	9	1	333	1
	6	9	1	333	1
	7	9	1	333	1
	8	9	1	333	1
	9	9	1	333	1
	10	9	1	333	1
	11	9	1	333	1
	12	9	1	333	1
	13	9	1	333	1
	14	9	1	333	1
	15	9	1	333	1
	16	9	1	333	1
	17	9	1	333	1
	18	9	1	333	1
	19	9	1	333	1
	20	9	1	333	1
	21	9	1	333	1
	22	9	1	333	1
	23	9	1	333	1
	24	9	1	333	1
	25	9	1	333	1
	26	9	1	333	1
	27	9	1	333	1
	28	9	1	333	1
	29	9	1	333	1
	30	9	1	333	1
	Detection Percentage				100% (> 60%)

Table 8. Radar 6 Test Results

V. Test Equipment

Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ANSI/NCSL Z540-1-1994 and ANSI/ISO/IEC 17025:2000.

Description	Manufacturer	Model	Serial No.	Cal date	Cal due
Laptop computer	Dell	Inspiron 630m	4WVH891	See Note	
MXI-Express controller	National Instruments	PXI-8360	-	See Note	
Arbitrary Waveform Generator 16-Bit 100 MS/s	National Instruments	PXI-5421	-	See Note	
RF Upconverter 250 kHz to 2.7 GHz	National Instruments	PXI-5610	-	See Note	
RF Upconverter 4.9 to 6 GHz	ASCOR	7206	-	See Note	
Spectrum Analyzer 3 Hz to 50 GHz	Agilent	E4448A	MY46180580	2/2/2007	2/2/2008
Pre-amplifier 30 dB 1 to 26.5 GHz	Hewlett-Packard	8449B	3008A01235	11/28/2006	11/28/2007
Power Splitter 2.95 to 7.1 GHz	Mini-Circuits	ZX10-2-71	-	See Note	
Attenuator 10 dB DC to 18 GHz	Pasternack Enterprises	PE7005-10	-	See Note	
Attenuator 30 dB DC to 18 GHz	Pasternack Enterprises	PE7005-30	-	See Note	

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.

End of Report

