# Dynamic Frequency Selection (DFS) Test Report

# AIR-RM3010L-B-K9

## FCC ID: LDK102094
## IC: 2461B-102094

## 5250-5350, 5470-5725 MHz

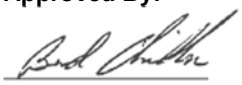
**Against the following Specifications:**

**CFR47 Part 15.407**

**RSS247**

**Cisco Systems**
170 West Tasman Drive
San Jose, CA 95134

**Approved By:**



Bud Chiller – Compliance Engineer

**Revision:** 2

This report replaces any previously entered test report under EDCS – **1525337**.This test report has been electronically authorized and archived using the CISCO Engineering Document Control system.

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## Section 1: Overview

**The samples were assessed against the tests detailed in section 3 under the requirements of the following specifications:**

| **Specifications:** |
| --- |
| CFR47 Part 15.407<br>RSS-247 |

RSS-247 section A9.3a allows the use of applicable FCC KDBs
Measurements were made in accordance with

- KDB 905462 D02 UNII DFS Compliance Procedures New Rules v01r02

## Section 2: Assessment Information

### 2.1 General

This report contains an assessment of an apparatus against Electromagnetic Compatibility 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*% |

e) 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**

26-February-2015

**2.3 Report Issue Date**

01-October-2015

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
San Jose, CA 95134, USA

**Registration Numbers for Industry Canada**

| Cisco System Site | Address | Site Identifier |
|---|---|---|
| Building P, 10m Chamber | 125 West Tasman Dr<br>San Jose, CA 95134 | Company #: 2461N-2 |
| Building P, 5m Chamber | 125 West Tasman Dr<br>San Jose, CA 95134 | Company #: 2461N-1 |
| Building I, 5m Chamber | 285 W. Tasman Drive<br>San Jose, California 95134 | Company #: 2461M-1 |

**Test Engineers**

Bud Chiller

**2.5 Equipment Assessed (EUT)**

AIR-RM3010L-B-K9

## Section 3: Result Summary

### 3.1 Results Summary Table

**Conducted emissions**

| Basic Standard | Technical Requirements / Details | Result |
|---|---|---|
| FCC 15.407<br>RSS-247 | Dynamic Frequency Selection (DFS)<br>Detection Threshold | NA |
| FCC 15.407<br>RSS-247 | Channel Availability Check Time | NA |
| FCC 15.407<br>RSS-247 | Channel Move Time | Pass |
| FCC 15.407<br>RSS-247 | Channel Closing Time | Pass |
| FCC 15.407<br>RSS-247 | Non-Occupancy Period | NA |
| FCC 15.407<br>RSS-247 | U-NII Detection Bandwidth | NA |

## 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-RM3010L-B-K9 | Cisco Systems | P1 | 15.2 | 15.3 (20150119:173904) | FOC19159933 |
| S02 | AIR-PWR-C | Meanwell | A0 | NA | NA | EB46E93226 |

### 4.2 System Details

| System Number | Description | Samples | System under test | Support equipment |
|---|---|---|---|---|
| 1 | AIR-RM3010L-B-K9 | S01 | ☑ | ☐ |
| | Support Power Supply | S02 | ☐ | ☑ |

### 4.3 Mode of Operation Details

| Mode# | Description | Comments |
|---|---|---|
| 1 | Continuous Transmitting | Continuous Transmitting |

All measurements were made in accordance with

- KDB 905462 D02 UNII DFS Compliance Procedures New Rules v01r02

## Appendix A: Dynamic Frequency Selection (DFS)

15.407: 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.

U-NII devices operating 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.

### A.1 UNII Device Description

1. The AIR-RM3010L-B-K9 Cisco Aironet 802.11ac Module 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 29 dBm, and the minimum possible EIRP is 10 dBm.

   Below are the available 50 ohm antenna assemblies and their corresponding gains. 0dBi gain was used to set the -63 dBm threshold level (-64dBm +1 dB) during calibration of the test setup.

| Frequency | Part Number | Antenna Type | Antenna Gain (dBi) |
|---|---|---|---|
| **5GHz** | Internal | omnidirectional | 4 |

3. 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.

4. The Master requires 106.5 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 DFS Detection Thresholds

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

| **Maximum Transmit Power** | **Value (see note)** |
|---|---|
| ≥ 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<br>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. | |

2. **DFS Response requirement values**

| **Parameter** | **Value** |
|---|---|
| *Non-occupancy period* | Minimum 30 minutes |
| *Channel Availability Check Time* | 60 seconds |
| *Channel Move Time* | 10 seconds<br>See Note 1. |
| *Channel Closing Transmission Time* | 200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period.<br>See Notes 1 and 2. |
| *U-NII Detection Bandwidth* | Minimum 100% of the U-NII 99% transmission power bandwidth.<br>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.<br>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.<br>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 precent. Measurements are performed with no data traffic. | |

### A.3 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**

| Radar Type | Pulse Width (μsec) | PRI (μsec) | Number of Pulses | Minimum Percentage of Successful Detection | Minimum Numbers 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$\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot10^6}{\mathrm{PRI}_{\mu\mathrm{sec}}}\right)\right\}$ | 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 μsec is selected, the number of pulses would be $\text{Roundup}\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot10^6}{3066}\right)\right\} = \text{Roundup}\{17.2\} = 18$

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

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.

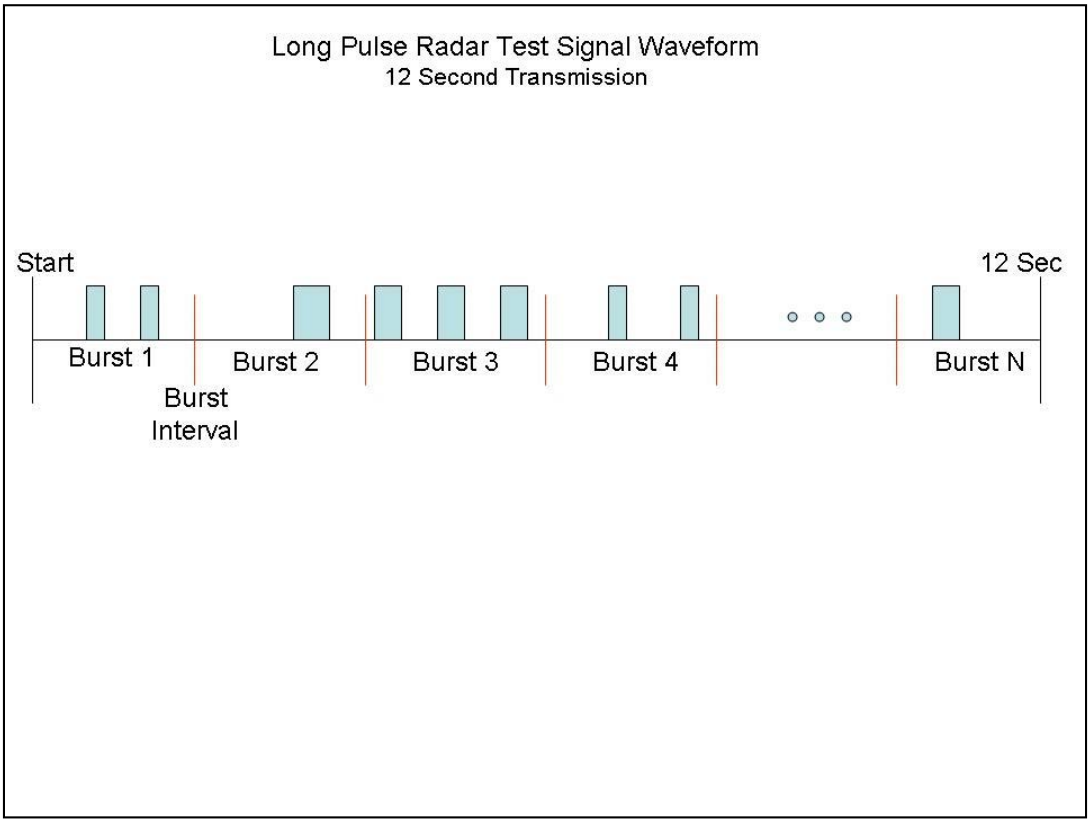
Each waveform is defined as follows:

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 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***




**3. Long Pulse 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:**
FCC 15.407 / RSS-247

### Test Procedure

**Ref.** KDB 905462 D02 UNII DFS Compliance Procedures New Rules v01r02

| Test parameters |
|---|
| Span = 0 Hz<br>RBW ≥ 3 MHz<br>VBW ≥ 3 MHz<br>Detector = Peak<br>Trace = Single Sweep |

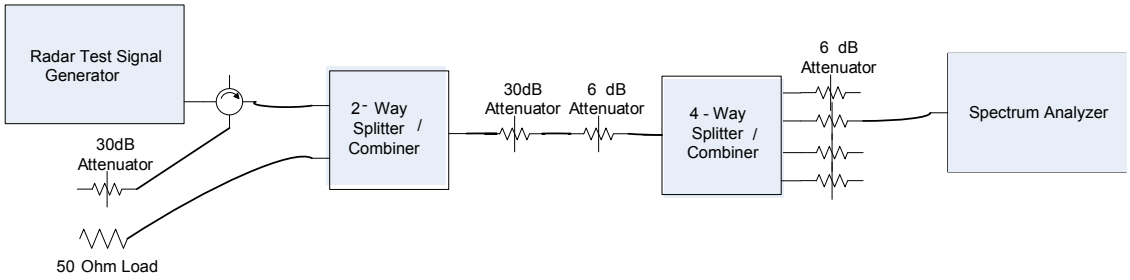
| System Number | Description | Samples | System under test | Support equipment |
|---|---|---|---|---|
| 1 | AIR-RM3010L-B-K9 | S01 | ☑ | ☐ |
| | Support Power Supply | S02 | ☐ | ☑ |

| **Tested By :** | **Date of testing:** |
|---|---|
| John Liscio | 26-February-2015 |
| **Test Result : NA** | |

See Appendix C for list of test equipment

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.

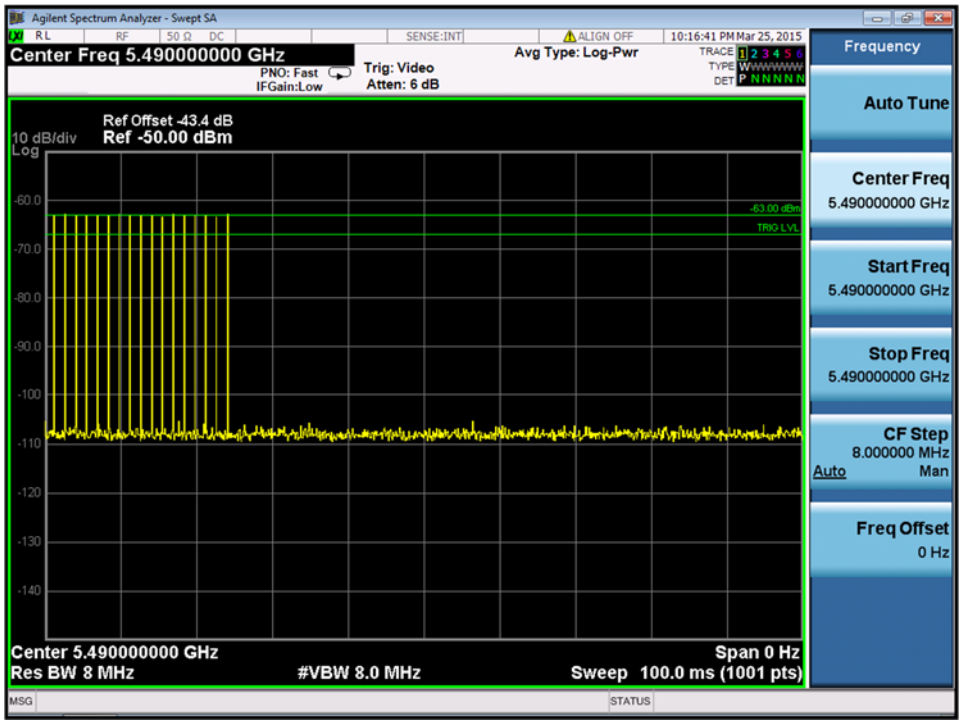
The signal generator amplitude was set so that the power level measured at the spectrum analyzer was -63dBm.




***Conducted Calibration Setup***

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

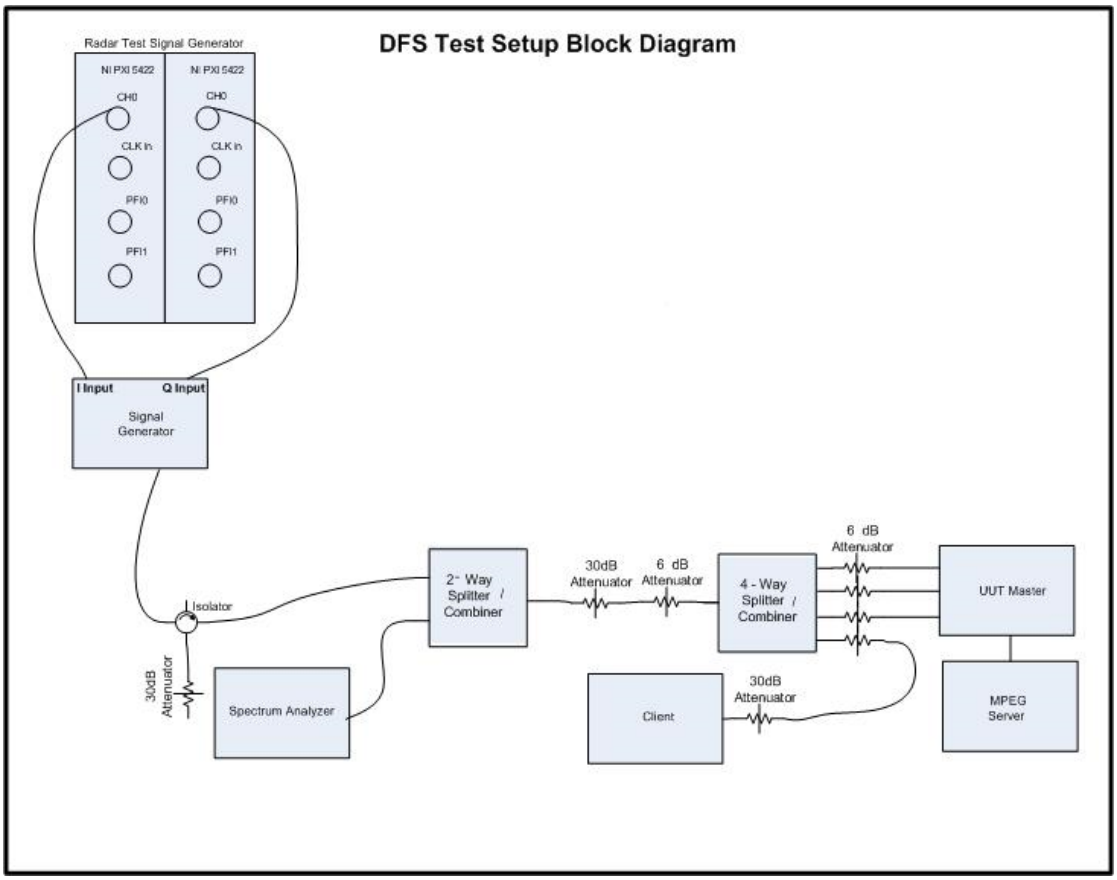
***USA Bin 0 Radar Calibration***



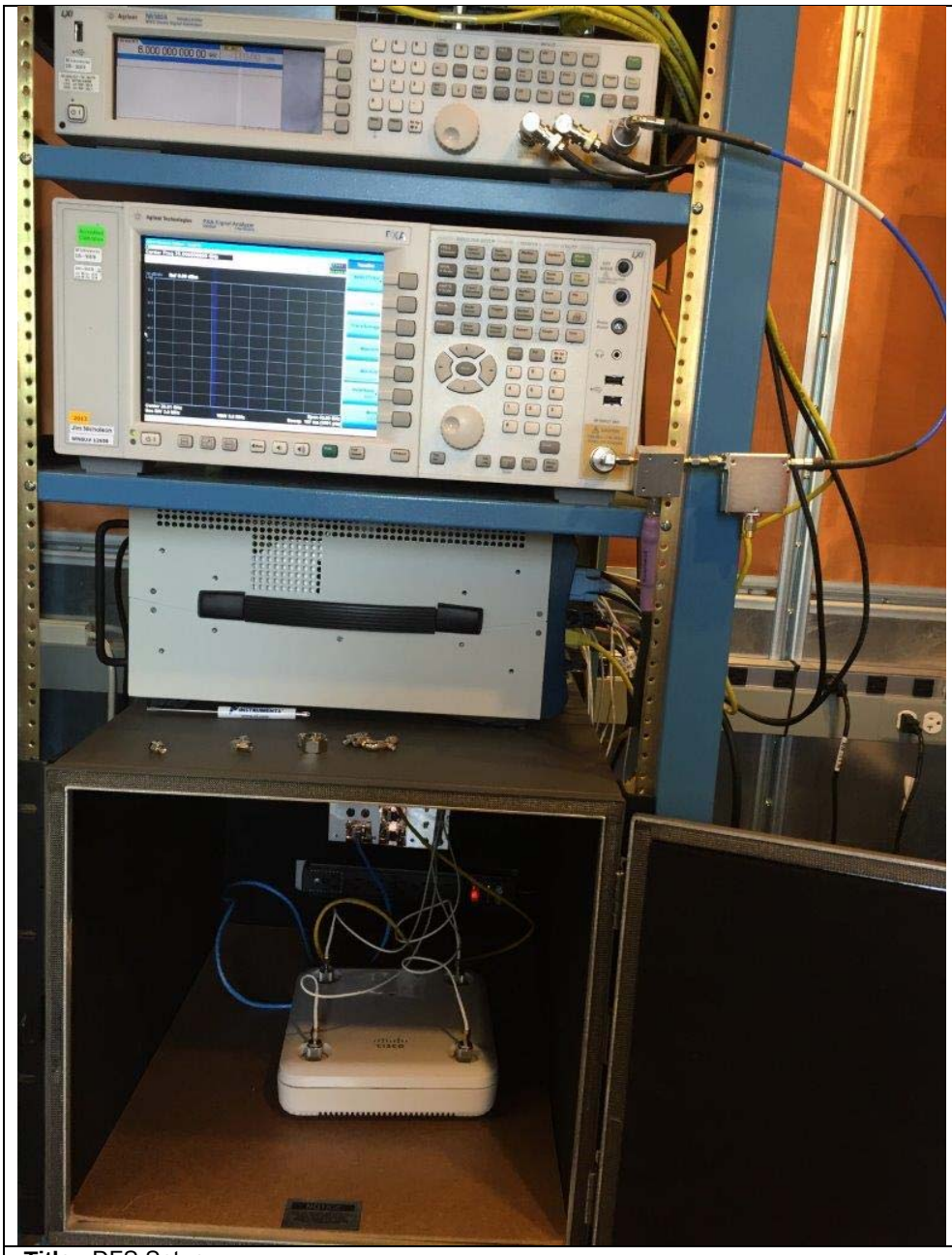
### B.1 Test Procedure/Results

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.

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***



**Title:** DFS Setup

**This test in not required for this product**

### B.2 UNII Detection Bandwidth

#### Test Procedure

**Ref.** KDB 905462 D02 UNII section 7.8.1

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 5500 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 generating equipment is configured as shown in the Conducted Test Setup above. A single *Burst* of the desired radar profile is produced at 5500MHz 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 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 is calculated as follows:

U-NII Detection Bandwidth = $F_H - F_L$

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.

**This test in not required for this product**

### B.3 Initial Channel Availability Check Time

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 5500 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 5500MHz 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.

**This test in not required for this product**

### B.4 Radar Burst at the Beginning of the Channel Availability Check Time

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.

The UUT is powered on at $T_0$. $T_1$ denotes the instant when the UUT has completed its power-up sequence. The Channel Availability Check Time commences at instant $T_1$ and will end no sooner than $T_1$ + 60 seconds.

A single Burst of short pulse of radar type 1 at -63 dBm will commence within a 6 second window starting at $T_1$.

Visual indication on the UUT of successful detection of the radar Burst will be recorded and reported. Observation of emissions at 5500MHz 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 5500MHz.

**This test in not required for this product**

### B.5 Radar Burst at the End of the Channel Availability Check Time

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 $T_0$. $T_1$ denotes the instant when the UUT has completed its power-up sequence. The Channel Availability Check Time commences at instant $T_1$ and will end no sooner than $T_1$ + 60 seconds.

A single Burst of short pulse of radar type 1 at -63 dBm will commence within a 6 second window starting at $T_1$+ 54 seconds.

Visual indication on the UUT of successful detection of the radar Burst will be recorded and reported. Observation of emissions at 5500MHz 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 5500MHz.

### B.6 In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time

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.

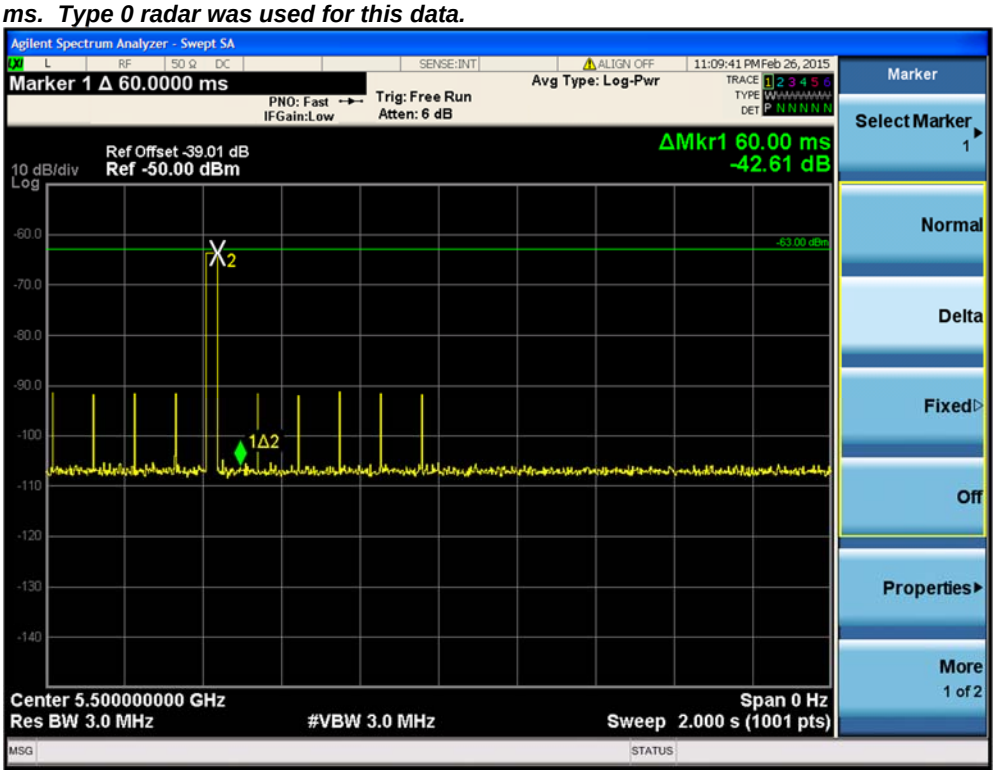
The steps below define the procedure to determine the above mentioned parameters when a radar Burst with a level equal to the DFS Detection Threshold + 1dB (-63dBm) is generated on the Operating Channel of the U-NII device.

A U-NII device operating as a Client Device will associate with the UUT (Master) at 5500 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.

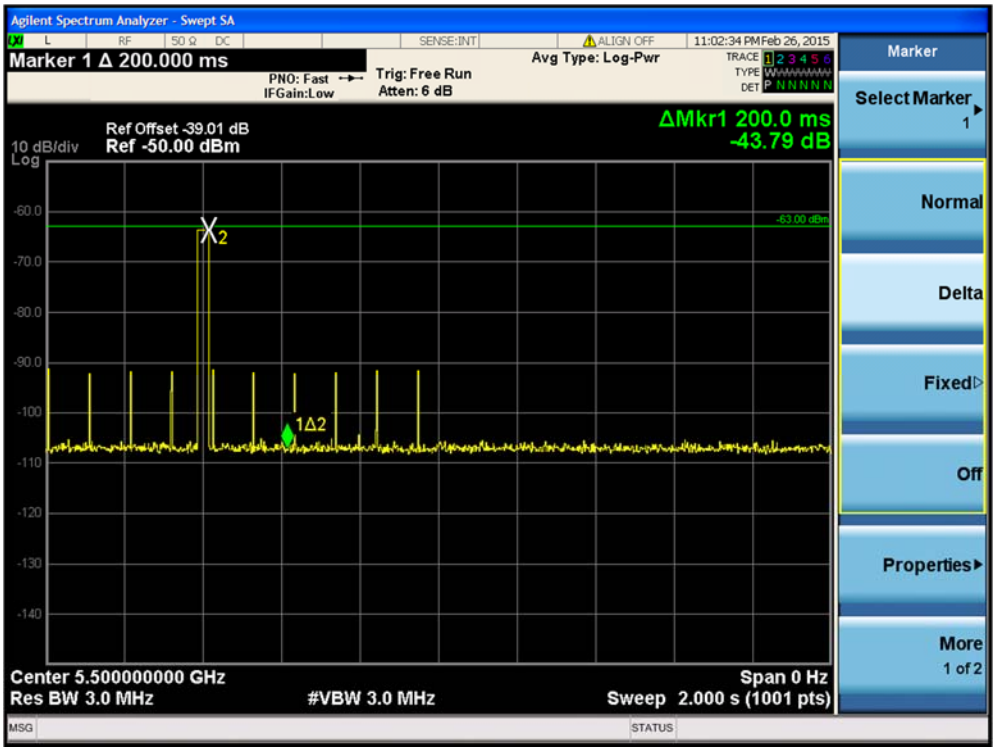
At time $T_0$ the Radar Waveform generator sends a Burst of pulses for US Bin 0 at -63dBm.

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*.

***The following plot demonstrates a channel close time of 50ms, with an aggregate of no more than 60 ms. Type 0 radar was used for this data.***



***Channel Move Time, Channel Closing Transmission Time for USA Bin 0***



**This test in not required for this product**

**B.7 Statistical Performance Check**

The steps below define the procedure to determine the minimum percentage of detection 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 5500 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.

The Radar Waveform generator sends the individual waveform for each of the radar types 1-6 at -63dbm. Statistical data will be 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:

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

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. The data represents the worst case detection for 20 MHz and 40 MHz signal bandwidths.