



**DFS Test Report:** EDCS - 506262

For

**AIR-RM21A-A-K9 and AIR-RM22A-A-K9 802.11a Radio Modules  
(FCC ID: LDK102053)**

**Against the following Specifications :**

**FCC CFR 47 Part 15.407**

**Cisco Systems**

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**Certificate Number : 1178-01**

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**Title:**



## Dynamic Frequency Selection (DFS) Test Results

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.

### 1.0 UNII Device Description

1. The AIR-RM21A-A-K9 and AIR-RM22A-A-K9 operate 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 equipment is 26.5 dBm, and the minimum possible EIRP is -1 dBm.

The AIR-RM21A-A-K9 uses integral 50 ohm, 9.5dBi Patch and 5dBi Omni-directional antennas. Below are the available 50 ohm antenna assemblies for the AIR-RM22A-A-K9 and their corresponding gains. 0dBi gain was used to set the -63 dBm threshold level (-64dBm +1 dB) during calibration of the test setup.

AIR-ANT5135D-R (5 GHz, 3.5 dBi Omnidirectional)  
AIR-ANT5145V-R (5 GHz, 4.5 dBi Diversity Omnidirectional)  
AIR-ANT5160V-R (5 GHz, 6.0dBi Diversity Omnidirectional)  
AIR-ANT5170P-R (5 GHz, 7.0 dBi Diversity Patch)  
AIR-ANT5195P-R (5 GHz, 9.5 dBi Patch)

Antenna gain measurement plots are included with this filing.

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. This device does not exceed 27dBm eirp, so no transmit power control is implemented.
5. The Master requires 1.333 minutes to complete its power-on cycle.
6. Information regarding the parameters of the detected Radar Waveforms is not available to the end user.
7. 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.

## 2.0 DFS Detection Thresholds

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

| Maximum Transmit Power                                                                                                                                                                                                                                                                                                                                                                      | Value<br>(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                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| <i>Non-occupancy period</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Minimum 30 minutes                                                                                        |
| <i>Channel Availability Check Time</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 60 seconds                                                                                                |
| <i>Channel Move Time</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 10 seconds<br>See Note 1.                                                                                 |
| <i>Channel Closing Transmission Time</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period.<br>See Notes 1 and 2. |
| <i>U-NII Detection Bandwidth</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Minimum 80% of the 99% power bandwidth See Note 3.                                                        |
| Note 1: The instant that the <i>Channel Move Time</i> and the <i>Channel Closing Transmission Time</i> begins is as follows: <ul style="list-style-type: none"> <li>For the Short pulse radar Test Signals this instant is the end of the <i>Burst</i>.</li> <li>For the Frequency Hopping radar Test Signal, this instant is the end of the last radar <i>Burst</i> generated.</li> <li>For the Long Pulse radar Test Signal this instant is the end of the 12 second period defining the radar transmission.</li> </ul> Note 2: The <i>Channel Closing Transmission Time</i> is comprised of 200 milliseconds starting at the beginning of the <i>Channel Move Time</i> plus any additional intermittent control signals required to facilitate <i>Channel</i> 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.<br>Note 3: During the <i>U-NII Detection Bandwidth</i> 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. |                                                                                                           |



### 3.0 Radar Test Waveforms

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

#### 1. Short Pulse Radar Test Waveforms

| 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.

#### 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.

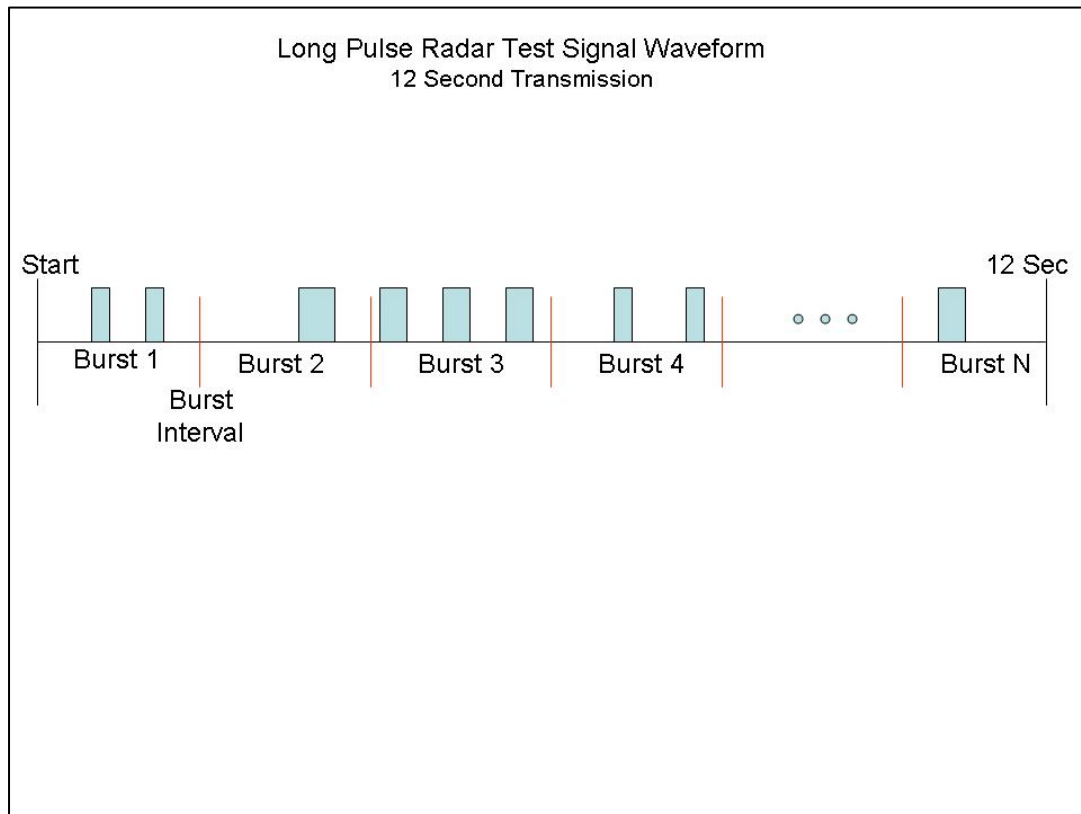


- 4) The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a Burst will have the same pulse width. Pulses in different Bursts may have different pulse widths.
- 5) Each pulse has a linear FM chirp between 5 and 20 MHz, with the chirp width being 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  $(12,000,000 / \text{Burst\_Count})$  microseconds. Each interval contains one Burst. The start time for the Burst, relative to the beginning of the interval, is between 1 and  $[(12,000,000 / \text{Burst\_Count}) - (\text{Total Burst Length}) + (\text{One Random PRI Interval})]$  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. Frequency Hopping Radar Test Waveform

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

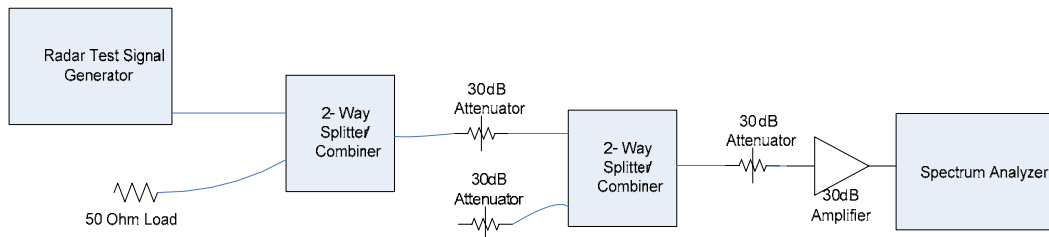
For the Frequency Hopping Radar Type, the same *Burst* parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected<sup>1</sup> from the hopping sequence defined by the following algorithm:

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.

#### 4.0 Radar Waveform Calibration

1. 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.

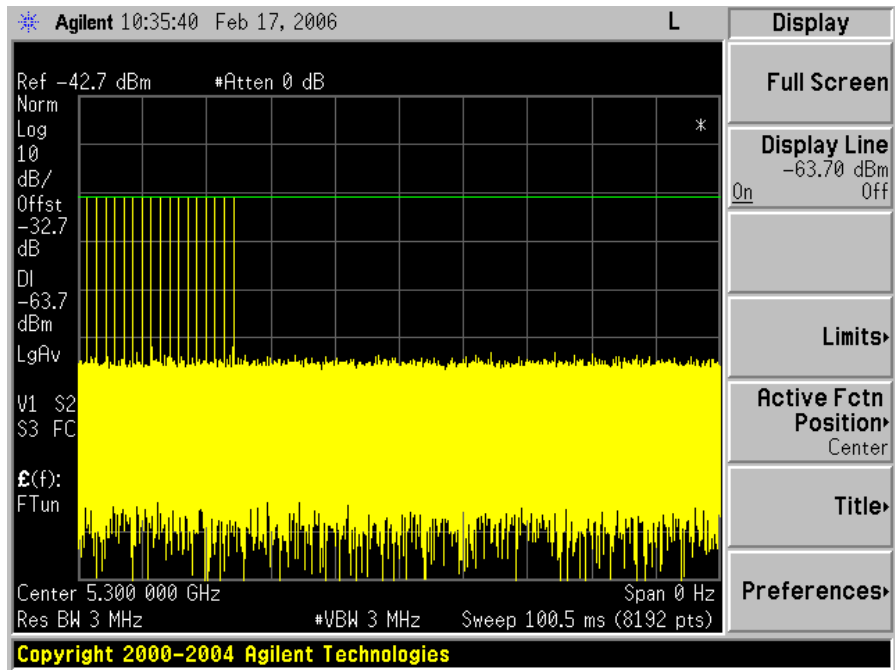
The signal generator amplitude was set so that the power level measured at the spectrum analyzer was -63dBm. The 30dB amplifier gain was entered as an amplitude offset on the spectrum analyzer.



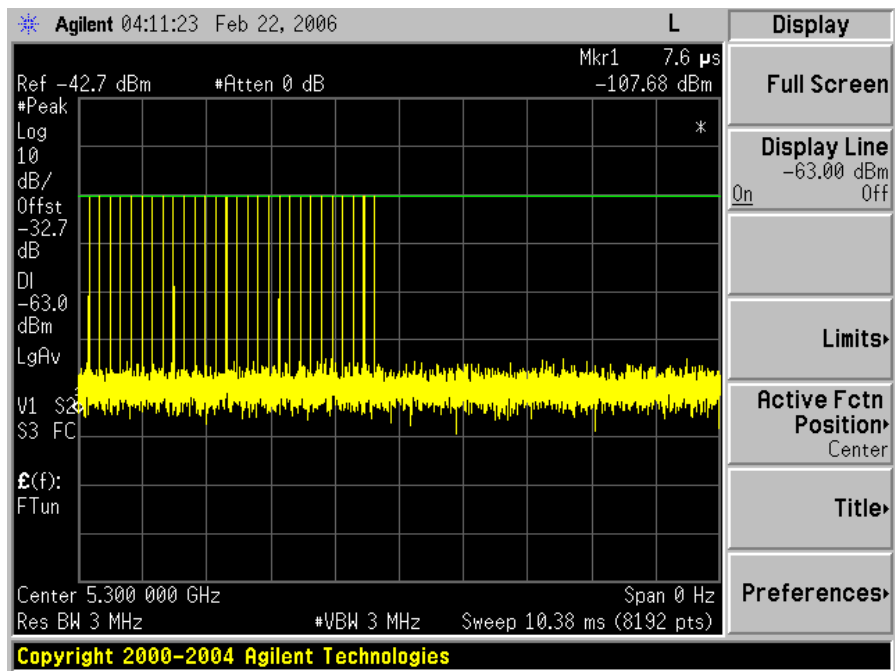
**Conducted Calibration Setup**



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

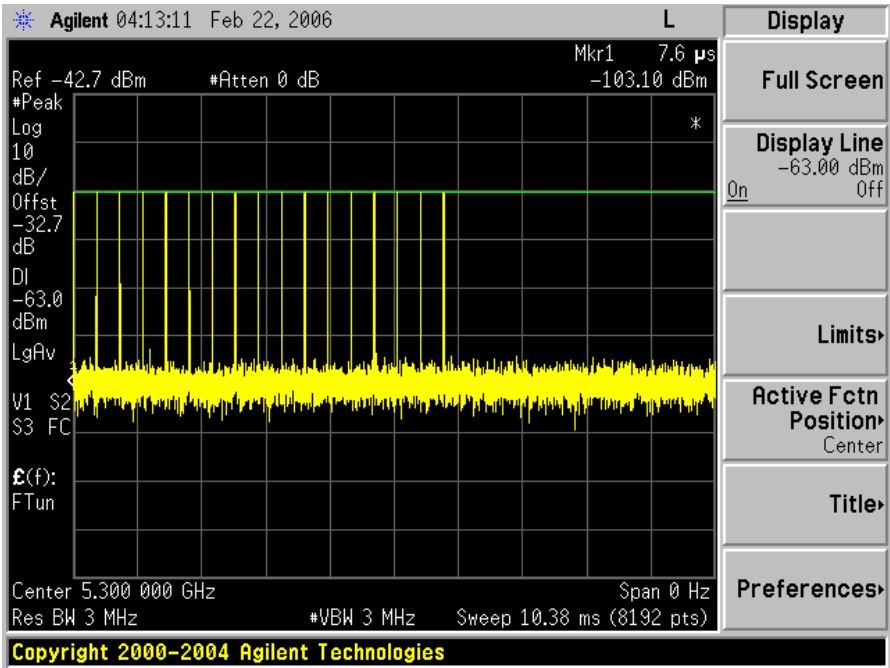


Bin 1 Radar Calibration

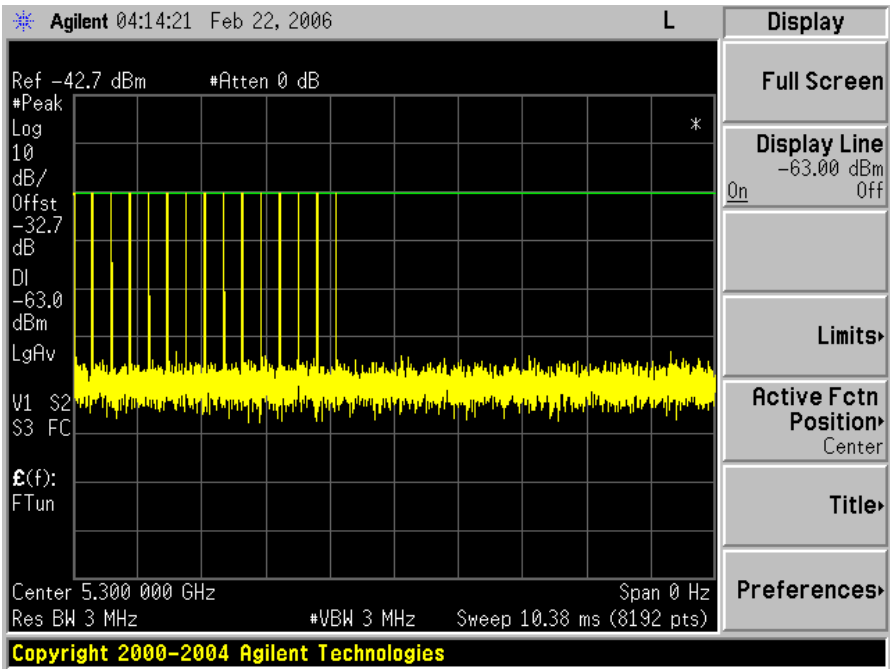


Bin 2 Radar Calibration

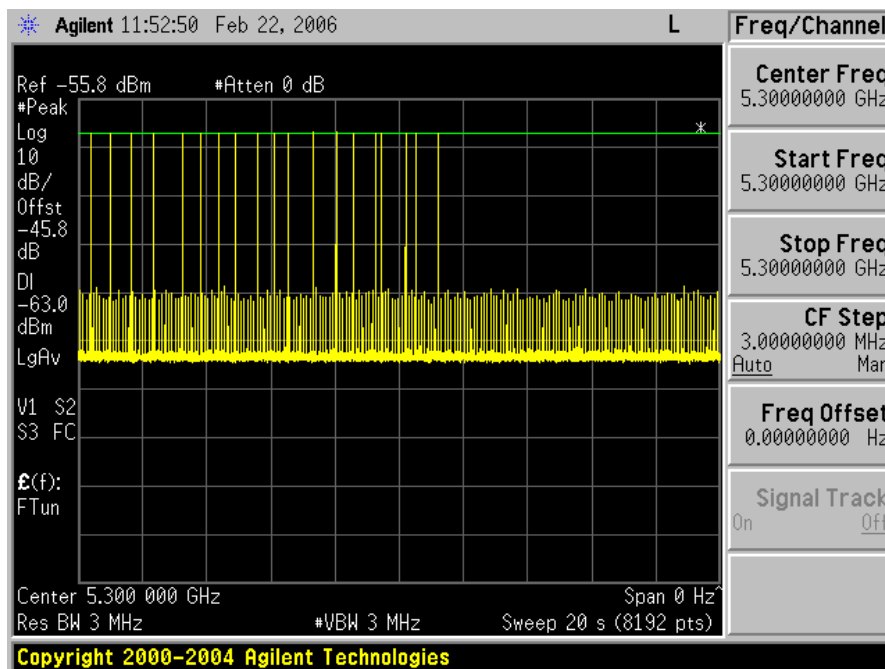




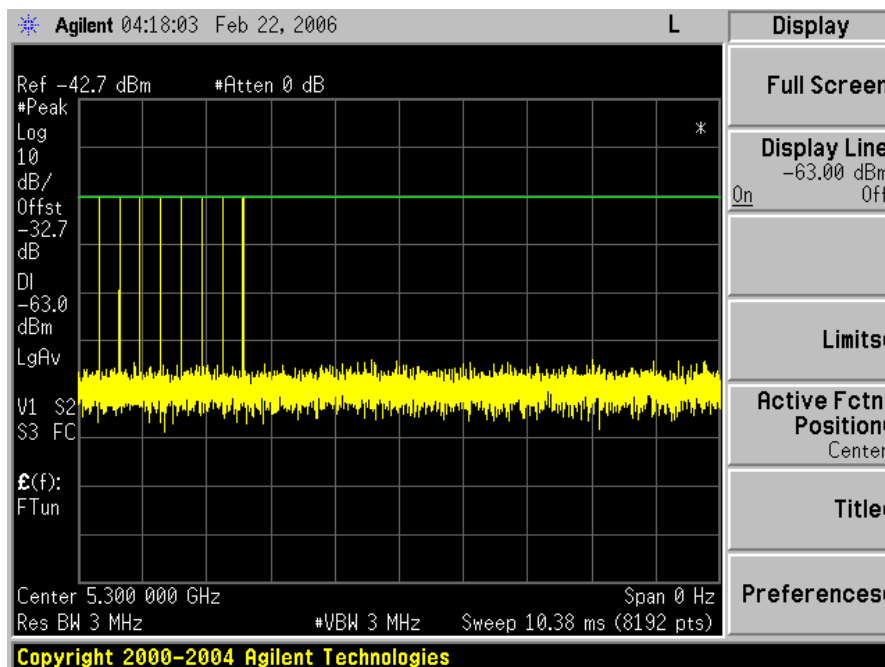
Bin 3 Radar Calibration



Bin 4 Radar Calibration



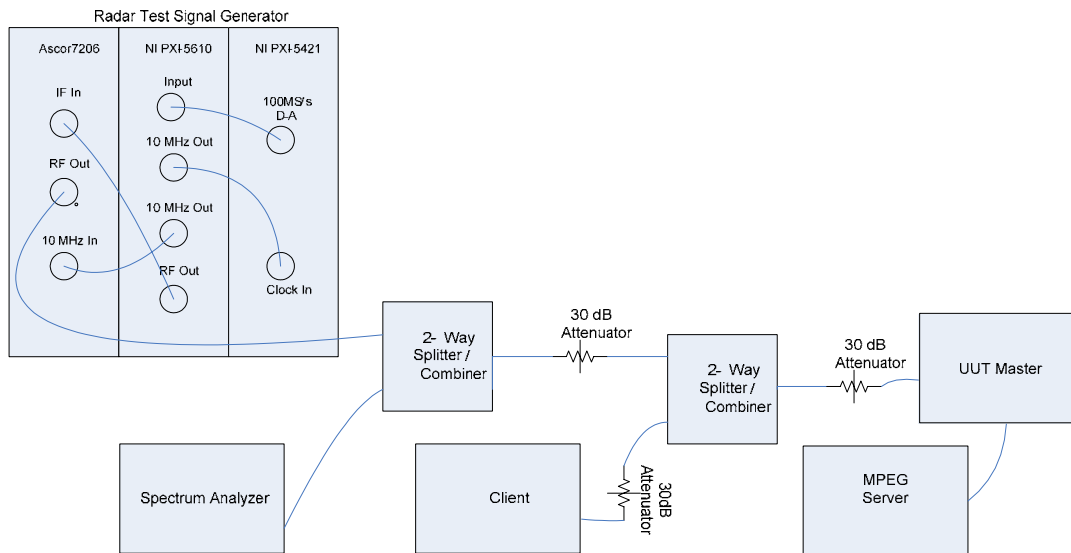
Bin 5 Radar Calibration



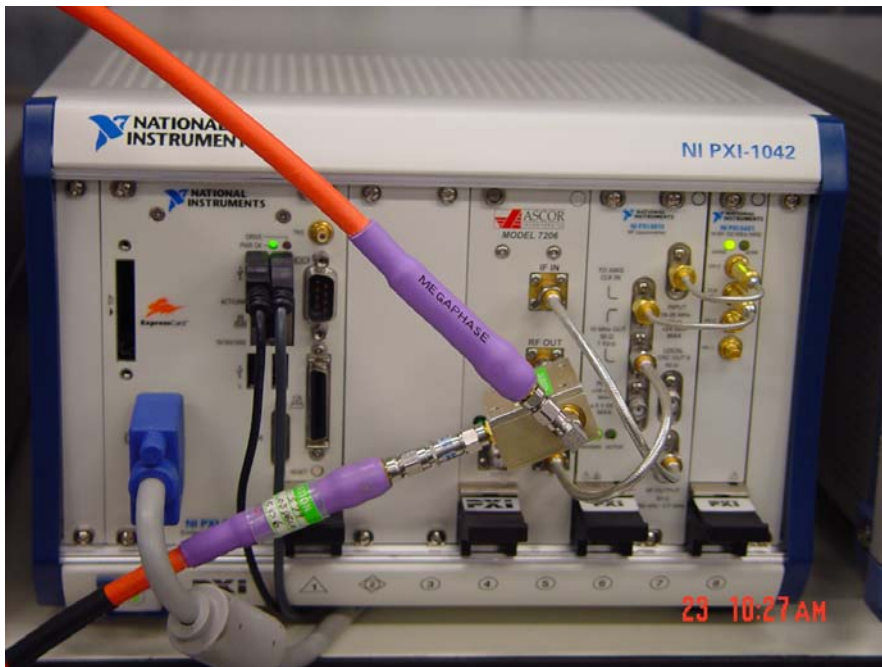
Bin 6 Radar Calibration

## 5.0 Test Procedure/Results

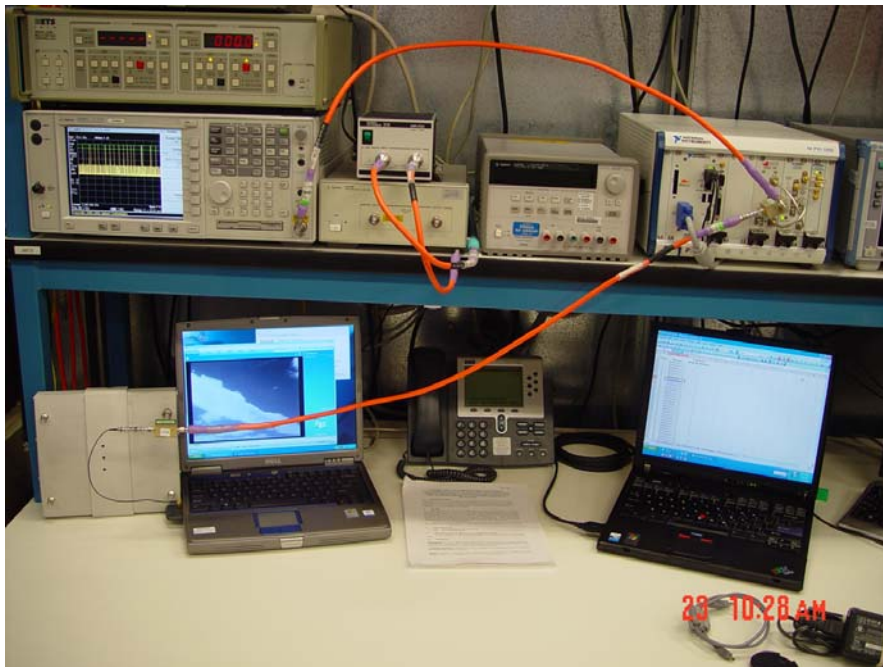
1. A spectrum analyzer is used as a monitor to verify that the UUT has vacated the Channel within the (Channel Closing Transmission Time and Channel Move Time, and does not transmit on a Channel during the Non-Occupancy Period after the detection and Channel move. It is also used to monitor UUT transmissions during the Channel Availability Check Time.
2. Following is the test setup used to generate the Radar Waveforms, and for all DFS tests described herein.



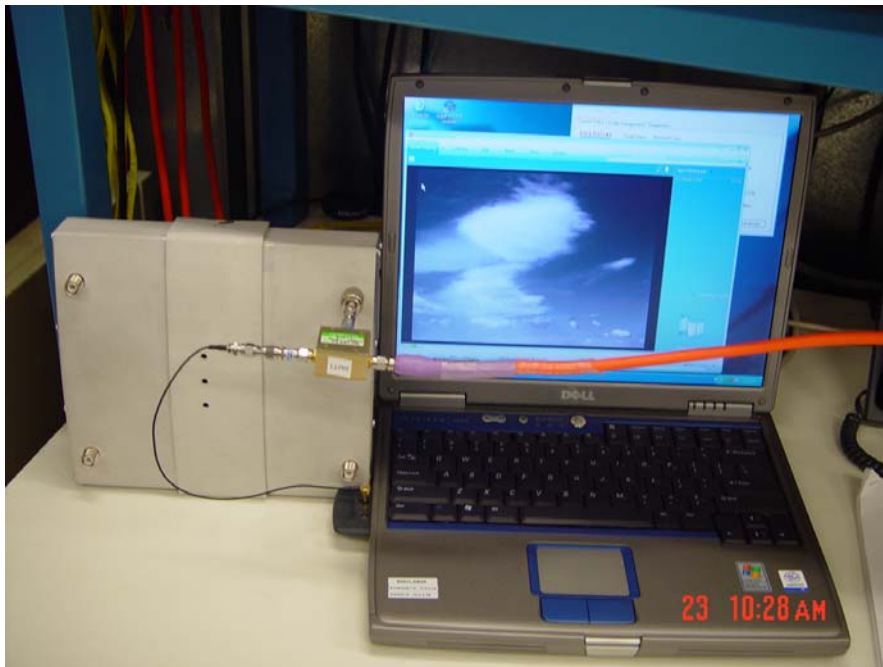
*Conducted Setup: Radar Test Waveforms are injected into the Master*



**Radar Test Signal Generator**



**DFS Test Setup (Does not reflect actual unit under test)**



**DFS Setup: UUT and Client (Does not reflect actual unit under test)**



The test setup is constructed of the following equipment:

**Radar Test Signal Generator**

National Instruments NI PXI-1042 8-Slot 3U Chassis

National Instruments NI PXI-5421 16-Bit 100MS/s Arbitrary Waveform Generator

National Instruments NI PXI-5610 2.7GHz RF Upconverter

Ascor 7206 PXI 4.9 to 6GHz Upconverter

**Agilent E4448A Spectrum Analyzer**

Mini-Circuits ZFSC-2-9G Splitter/Combiner (Qty. 2)

Mini-Circuits BW-S30W2 30dB Attenuator (Qty. 3)

Agilent 8449B Preamplifier (used for detection level calibration only)

Megaphase SF26 S1S1 36" Coaxial Cable (Qty. 2)

Dell 600M Laptop (Qty. 2: 1 for wireless client, 1 for MPEG server)

Cisco AIR-CB21AG 802.11a/b/g NIC card (wireless client)

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

3. **UNII Detection Bandwidth:** All UNII channels for this device have identical Channel bandwidths. Therefore, all DFS testing was done at 5300 MHz. The 99% channel bandwidth is 16.4MHz. (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 short pulse radar type 1 is produced at 5300MHz 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:

$$\text{U-NII Detection Bandwidth} = F_H - F_L$$

The U-NII Detection Bandwidth must be at least 80% of the UUT transmitter 99% power, otherwise, the UUT does not comply with DFS requirements.

**UNII Detection Bandwidth Results**

| <b>EUT Frequency=5300MHz</b>                          |                                                                |   |   |   |   |   |   |   |   |    |                           |
|-------------------------------------------------------|----------------------------------------------------------------|---|---|---|---|---|---|---|---|----|---------------------------|
|                                                       | <b>DFS Detection Trials (1=Detection, Blank= No Detection)</b> |   |   |   |   |   |   |   |   |    |                           |
| <b>Radar Frequency (MHz)</b>                          | 1                                                              | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | <b>Detection Rate (%)</b> |
| 5292                                                  |                                                                |   |   |   |   |   |   |   |   |    | 0%                        |
| 5293 (FI)                                             | 1                                                              | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1  | 100%                      |
| 5294                                                  | 1                                                              | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1  | 100%                      |
| 5295                                                  | 1                                                              | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1  | 100%                      |
| 5296                                                  | 1                                                              | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1  | 100%                      |
| 5297                                                  | 1                                                              | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1  | 100%                      |
| 5298                                                  | 1                                                              | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1  | 100%                      |
| 5299                                                  | 1                                                              | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1  | 100%                      |
| 5300                                                  | 1                                                              | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1  | 100%                      |
| 5301                                                  | 1                                                              | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1  | 100%                      |
| 5302                                                  | 1                                                              | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1  | 100%                      |
| 5303                                                  | 1                                                              | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1  | 100%                      |
| 5304                                                  | 1                                                              | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1  | 100%                      |
| 5305                                                  | 1                                                              | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1  | 100%                      |
| 5306                                                  | 1                                                              | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1  | 100%                      |
| 5307 (Fh)                                             | 1                                                              | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1  | 100%                      |
| 5308                                                  |                                                                |   |   |   |   |   |   |   |   |    | 0%                        |
| Detection Bandwidth = Fh-FI = 5307MHz-5293MHz = 14MHz |                                                                |   |   |   |   |   |   |   |   |    |                           |
| EUT 99% Bandwidth = 16.4MHz                           |                                                                |   |   |   |   |   |   |   |   |    |                           |
| 16.4MHz*80% = 13.12MHz                                |                                                                |   |   |   |   |   |   |   |   |    |                           |



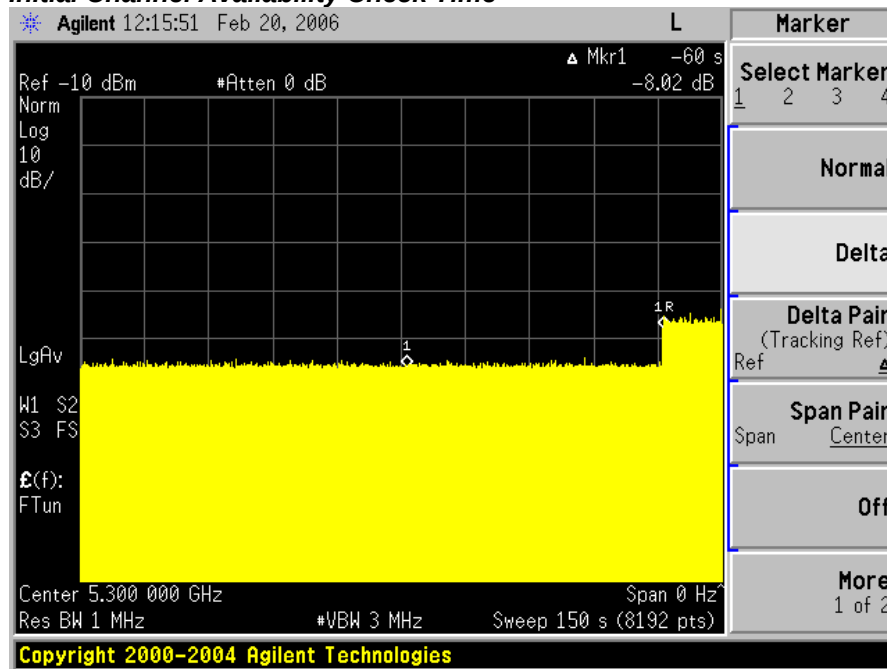
4. The **Initial Channel Availability Check Time** tests that the UUT does not emit beacon, control, or data signals on the test Channel until the power-up sequence has been completed and the U-NII device checks for Radar Waveforms for one minute on the test Channel. This test does not use any Radar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

The U-NII device is powered on and be instructed to operate at 5300 MHz. At the same time the UUT is powered on, the spectrum analyzer is set to zero span mode with a 1 MHz resolution bandwidth at 5300MHz with a 2.5 minute sweep time. The analyzer's sweep will be started the same time power is applied to the U-NII device.

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

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

#### Initial Channel Availability Check Time





5. **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.

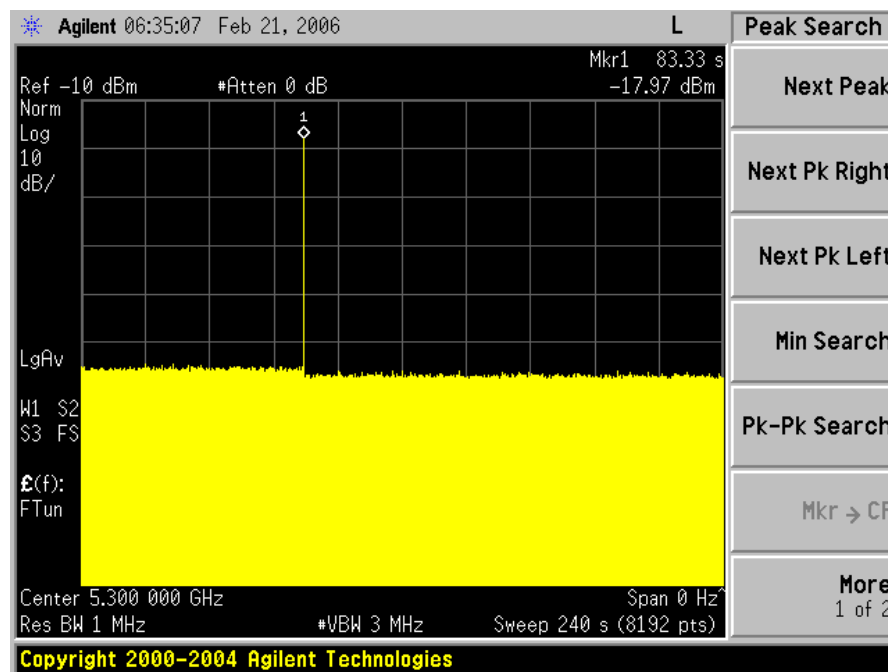
The UUT is powered on at  $T_0$ .  $T_1$  denotes the instant when the UUT has completed its power-up sequence. The Channel Availability Check Time commences at instant  $T_1$  and will end no sooner than  $T_1 + 60$  seconds.

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 5300MHz 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 5300MHz.

#### ***Radar Burst at the Beginning of the Channel Availability Check Time***







6. **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.

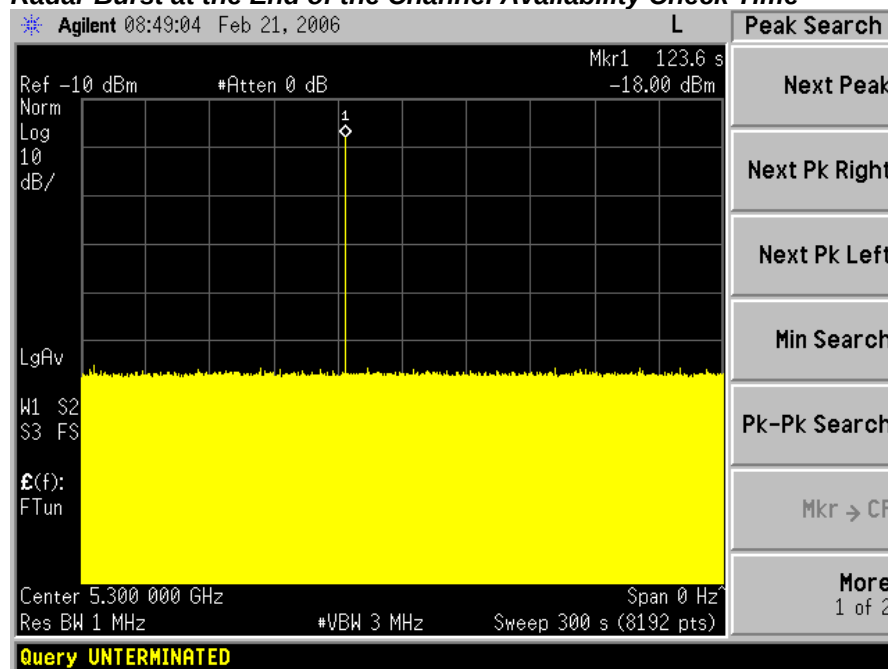
The UUT is powered on at  $T_0$ .  $T_1$  denotes the instant when the UUT has completed its power-up sequence. The Channel Availability Check Time commences at instant  $T_1$  and will end no sooner than  $T_1 + 60$  seconds.

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 5300MHz 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 5300MHz.

#### **Radar Burst at the End of the Channel Availability Check Time**



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

These tests define how the following DFS parameters are verified during In-Service Monitoring; Channel Closing Transmission Time, Channel Move Time, and Non-Occupancy Period.

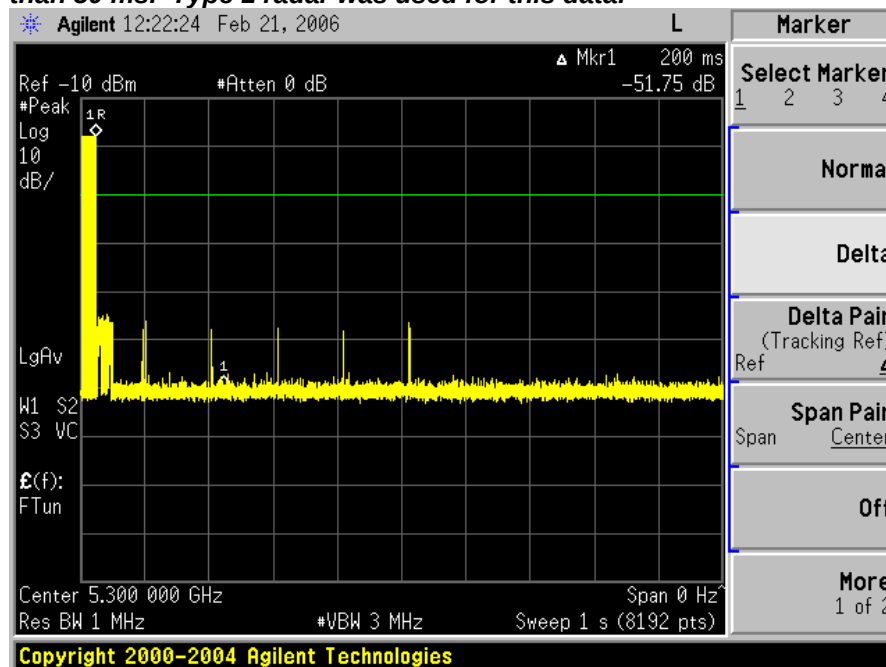
The steps below define the procedure to determine the above mentioned parameters when a radar Burst with a level equal to the DFS Detection Threshold + 1dB (-63dBm) is generated on the Operating Channel of the U-NII device.

A U-NII device operating as a Client Device will associate with the UUT (Master) at 5300 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 each of the radar types at -63dBm.

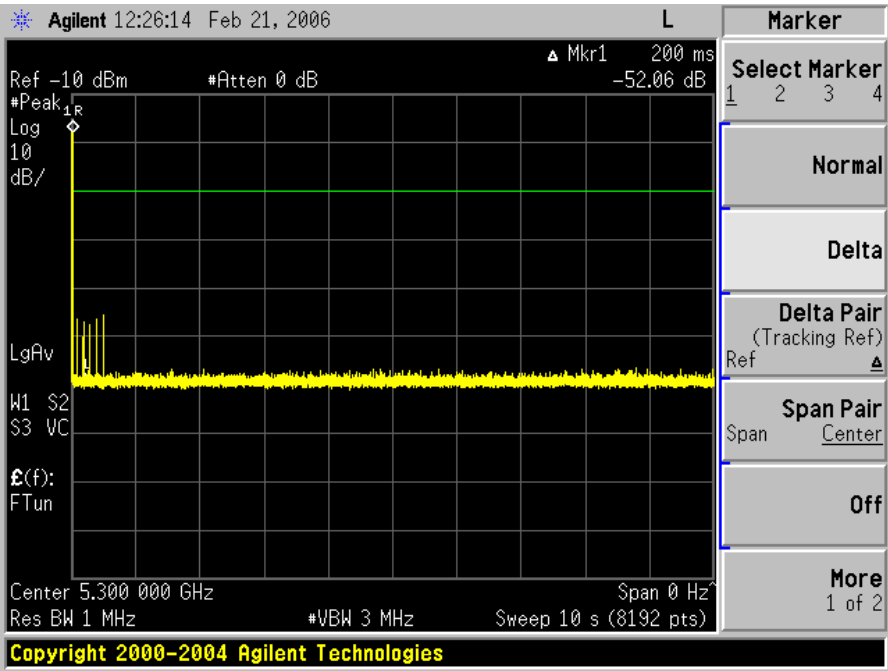
Observe the transmissions of the UUT at the end of the radar Burst on the Operating Channel for duration greater than 10 seconds. Measure and record the transmissions from the UUT during the observation time (Channel Move Time). Compare the Channel Move Time and Channel Closing Transmission Time results to the limits defined in the *DFS Response requirement values table*.

**The following plot demonstrates a channel close time of 50ms, with an aggregate of no more than 50 ms. Type 1 radar was used for this data.**

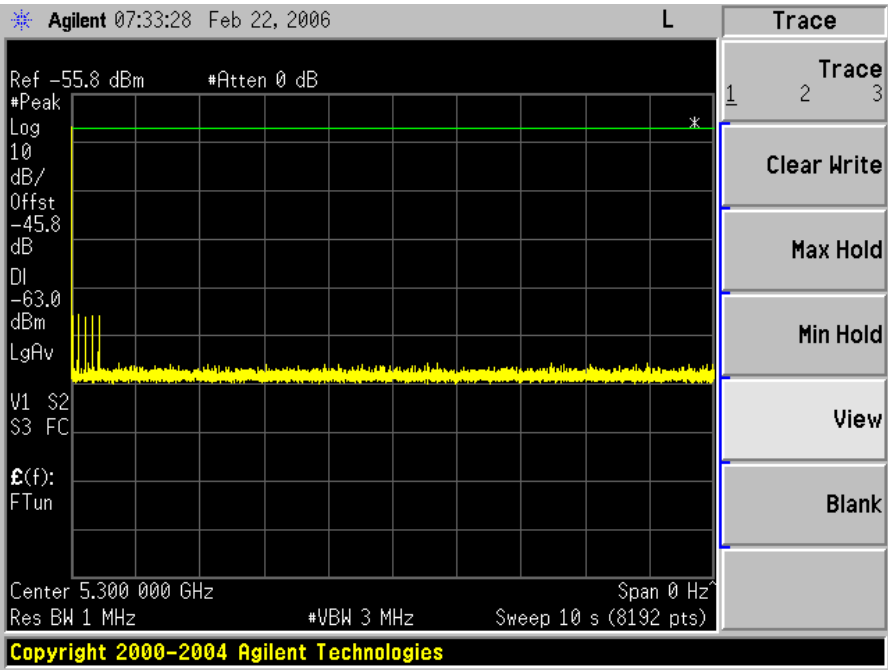




Channel Move Time, Channel Closing Transmission Time for Type 1 radar.

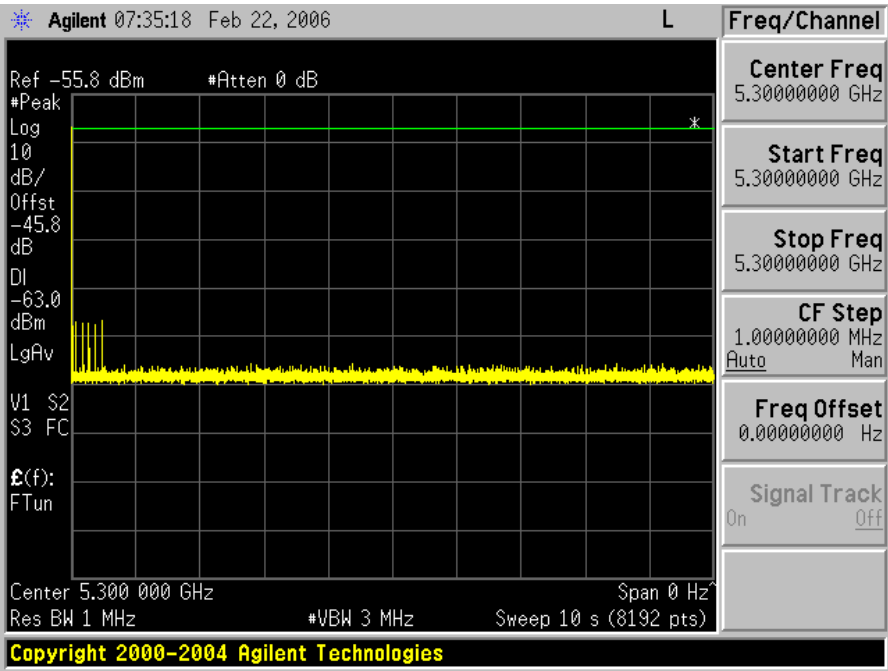


Channel Move Time, Channel Closing Transmission Time for Type 2 radar.

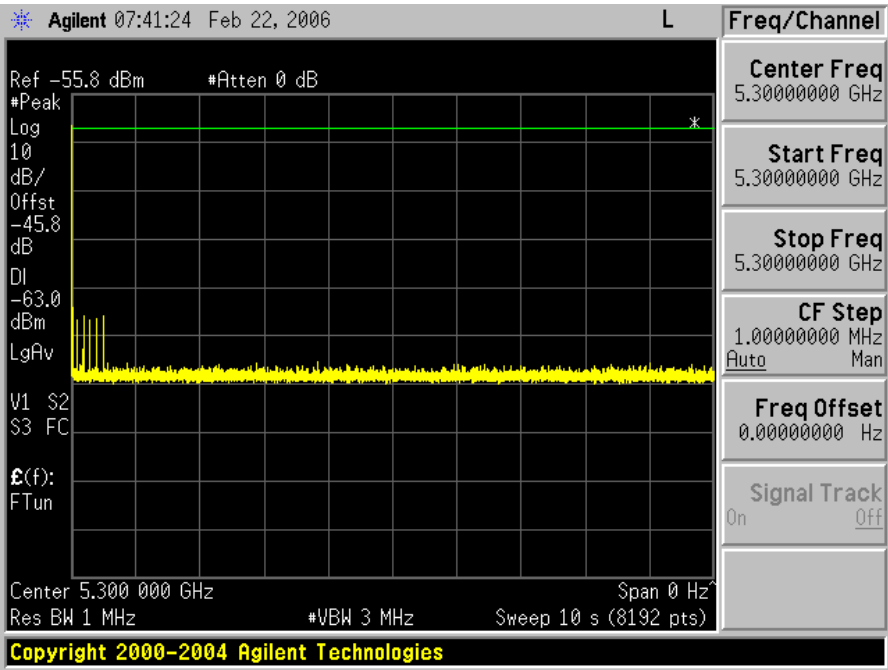


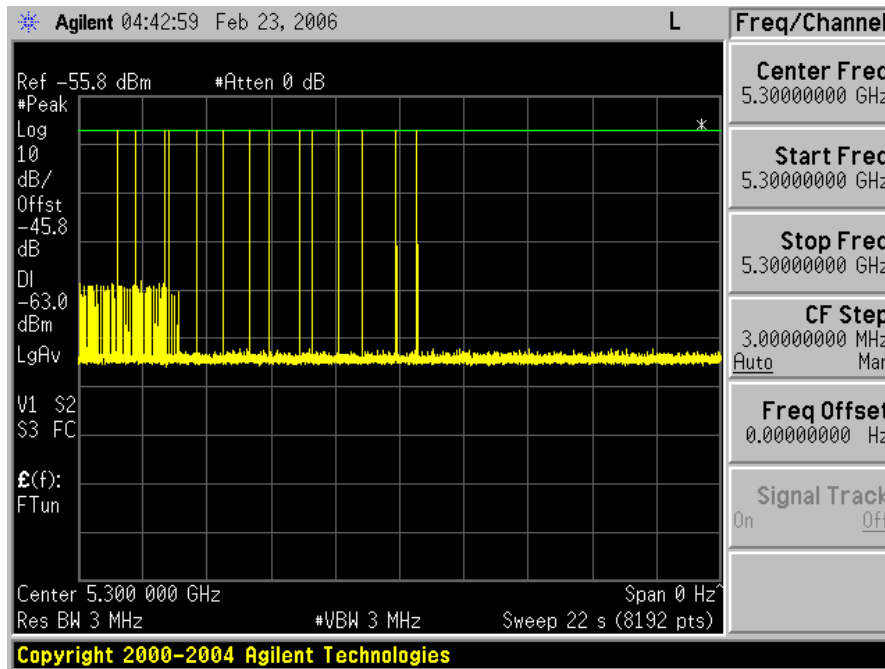
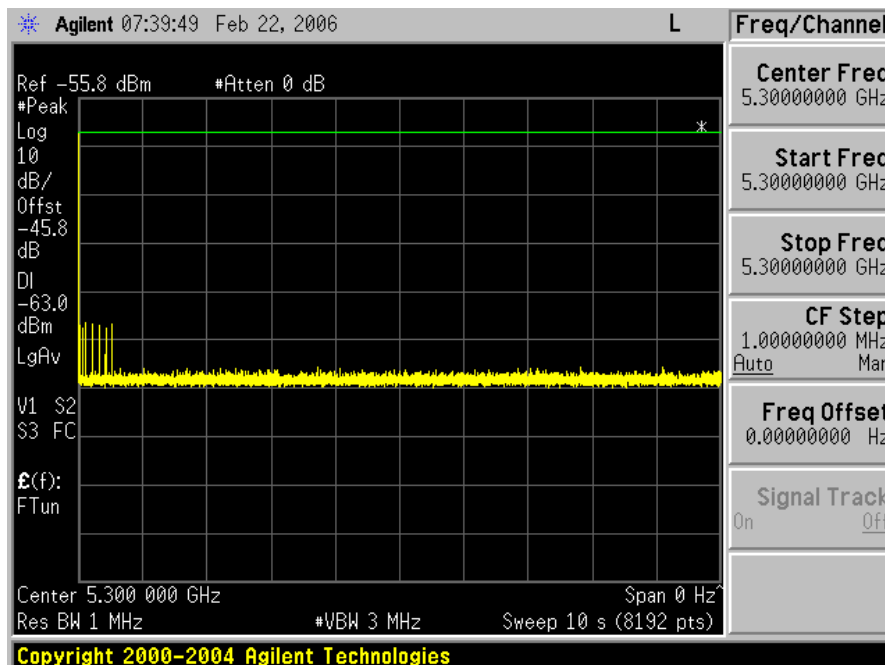


**Channel Move Time, Channel Closing Transmission Time for Type 3 radar.**



**Channel Move Time, Channel Closing Transmission Time for Type 4 radar.**

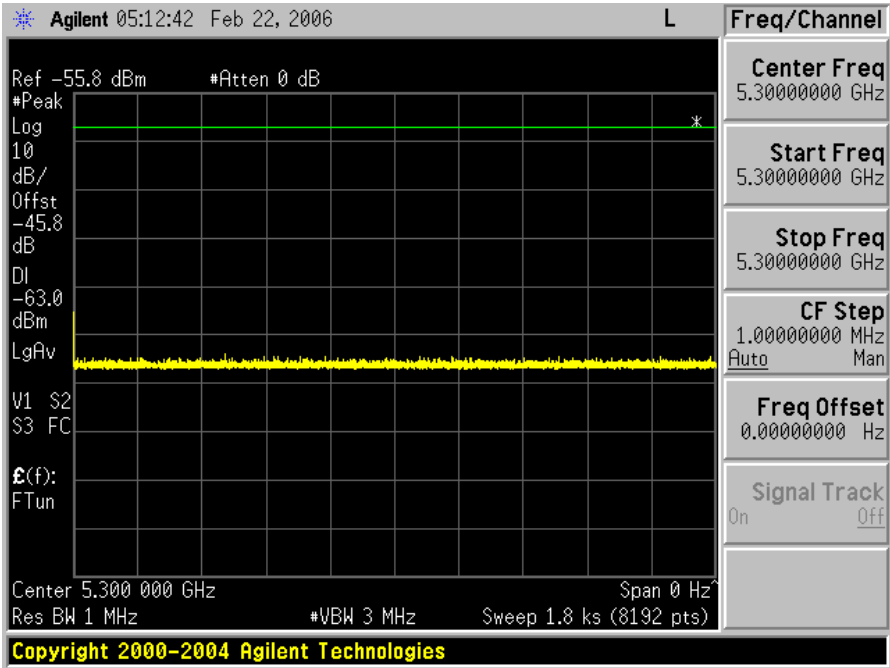


**Channel Move Time, Channel Closing Transmission Time for Type 5 radar.****Channel Move Time, Channel Closing Transmission Time for Type 6 radar.**



Measure the UUT for more than 30 minutes following the channel close/move time to verify that the UUT does not resume any transmissions on this Channel.

30 Minute Non-Occupancy Period (using Type 1 radar)





## 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 5300 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:

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

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.

**Type 1 Radar Statistical Performance**

| <b>Trial #</b>              | <b>Pulse Width (us)</b> | <b>PRI (us)</b> | <b>Pulses/Burst</b> | <b>1=Detection<br/>Blank=No Detection</b> |
|-----------------------------|-------------------------|-----------------|---------------------|-------------------------------------------|
| 1                           | 1                       | 1428            | 18                  | 1                                         |
| 2                           | 1                       | 1428            | 18                  | 1                                         |
| 3                           | 1                       | 1428            | 18                  | 1                                         |
| 4                           | 1                       | 1428            | 18                  |                                           |
| 5                           | 1                       | 1428            | 18                  | 1                                         |
| 6                           | 1                       | 1428            | 18                  | 1                                         |
| 7                           | 1                       | 1428            | 18                  | 1                                         |
| 8                           | 1                       | 1428            | 18                  | 1                                         |
| 9                           | 1                       | 1428            | 18                  | 1                                         |
| 10                          | 1                       | 1428            | 18                  | 1                                         |
| 11                          | 1                       | 1428            | 18                  | 1                                         |
| 12                          | 1                       | 1428            | 18                  |                                           |
| 13                          | 1                       | 1428            | 18                  |                                           |
| 14                          | 1                       | 1428            | 18                  | 1                                         |
| 15                          | 1                       | 1428            | 18                  | 1                                         |
| 16                          | 1                       | 1428            | 18                  | 1                                         |
| 17                          | 1                       | 1428            | 18                  |                                           |
| 18                          | 1                       | 1428            | 18                  | 1                                         |
| 19                          | 1                       | 1428            | 18                  | 1                                         |
| 20                          | 1                       | 1428            | 18                  | 1                                         |
| 21                          | 1                       | 1428            | 18                  | 1                                         |
| 22                          | 1                       | 1428            | 18                  | 1                                         |
| 23                          | 1                       | 1428            | 18                  | 1                                         |
| 24                          | 1                       | 1428            | 18                  | 1                                         |
| 25                          | 1                       | 1428            | 18                  | 1                                         |
| 26                          | 1                       | 1428            | 18                  | 1                                         |
| 27                          | 1                       | 1428            | 18                  | 1                                         |
| 28                          | 1                       | 1428            | 18                  | 1                                         |
| 29                          | 1                       | 1428            | 18                  | 1                                         |
| 30                          | 1                       | 1428            | 18                  | 1                                         |
| <b>Detection Percentage</b> |                         |                 |                     | <b>87% (&gt;60%)</b>                      |



**Type 2 Radar Statistical Performance**

| <b>Trial #</b>              | <b>Pulses/Burst</b> | <b>Pulse Width (us)</b> | <b>PRI (us)</b> | <b>1=Detection<br/>Blank=No Detection</b> |
|-----------------------------|---------------------|-------------------------|-----------------|-------------------------------------------|
| 1                           | 25                  | 3.3                     | 186             | 1                                         |
| 2                           | 25                  | 2.2                     | 193             | 1                                         |
| 3                           | 29                  | 1.8                     | 194             | 1                                         |
| 4                           | 29                  | 2.4                     | 230             | 1                                         |
| 5                           | 23                  | 1.1                     | 207             | 1                                         |
| 6                           | 27                  | 1.9                     | 187             | 1                                         |
| 7                           | 27                  | 3.3                     | 164             | 1                                         |
| 8                           | 23                  | 4.5                     | 197             | 1                                         |
| 9                           | 26                  | 3.9                     | 188             | 1                                         |
| 10                          | 26                  | 2.0                     | 199             | 1                                         |
| 11                          | 28                  | 4.2                     | 190             | 1                                         |
| 12                          | 29                  | 2.9                     | 204             | 1                                         |
| 13                          | 26                  | 5.0                     | 175             | 1                                         |
| 14                          | 28                  | 4.0                     | 191             | 1                                         |
| 15                          | 27                  | 2.0                     | 208             | 1                                         |
| 16                          | 28                  | 3.9                     | 197             | 1                                         |
| 17                          | 25                  | 1.7                     | 205             | 1                                         |
| 18                          | 29                  | 1.0                     | 180             | 1                                         |
| 19                          | 23                  | 4.4                     | 171             | 1                                         |
| 20                          | 27                  | 3.6                     | 228             |                                           |
| 21                          | 24                  | 1.0                     | 159             | 1                                         |
| 22                          | 25                  | 4.1                     | 191             | 1                                         |
| 23                          | 25                  | 3.8                     | 170             | 1                                         |
| 24                          | 29                  | 1.0                     | 222             | 1                                         |
| 25                          | 28                  | 2.0                     | 229             | 1                                         |
| 26                          | 23                  | 1.0                     | 208             | 1                                         |
| 27                          | 28                  | 2.2                     | 154             | 1                                         |
| 28                          | 28                  | 1.8                     | 230             | 1                                         |
| 29                          | 23                  | 1.8                     | 166             | 1                                         |
| 30                          | 25                  | 2.1                     | 226             | 1                                         |
| <b>Detection Percentage</b> |                     |                         |                 | <b>97% (&gt;60%)</b>                      |

**Type 3 Radar Statistical Performance**

| Trial #                     | Pulses/Burst | Pulse Width (us) | PRI (us) | 1=Detection<br>Blank=No Detection |
|-----------------------------|--------------|------------------|----------|-----------------------------------|
| 1                           | 18           | 7.5              | 460      | 1                                 |
| 2                           | 16           | 7.4              | 424      | 1                                 |
| 3                           | 16           | 7.4              | 240      | 1                                 |
| 4                           | 16           | 6.0              | 288      | 1                                 |
| 5                           | 16           | 9.8              | 329      | 1                                 |
| 6                           | 16           | 9.2              | 378      | 1                                 |
| 7                           | 18           | 9.8              | 223      | 1                                 |
| 8                           | 17           | 8.0              | 362      | 1                                 |
| 9                           | 17           | 6.1              | 373      |                                   |
| 10                          | 16           | 8.7              | 461      |                                   |
| 11                          | 16           | 6.9              | 376      | 1                                 |
| 12                          | 17           | 8.9              | 308      | 1                                 |
| 13                          | 18           | 9.9              | 471      | 1                                 |
| 14                          | 17           | 9.3              | 355      | 1                                 |
| 15                          | 18           | 6.1              | 446      | 1                                 |
| 16                          | 16           | 6.9              | 478      | 1                                 |
| 17                          | 18           | 7.6              | 482      | 1                                 |
| 18                          | 16           | 6.8              | 403      | 1                                 |
| 19                          | 17           | 6.5              | 405      | 1                                 |
| 20                          | 16           | 6.5              | 285      | 1                                 |
| 21                          | 17           | 7.4              | 316      | 1                                 |
| 22                          | 16           | 7.0              | 427      | 1                                 |
| 23                          | 18           | 6.0              | 266      | 1                                 |
| 24                          | 16           | 6.5              | 230      | 1                                 |
| 25                          | 17           | 8.2              | 489      | 1                                 |
| 26                          | 16           | 6.3              | 267      | 1                                 |
| 27                          | 16           | 8.0              | 370      | 1                                 |
| 28                          | 16           | 9.0              | 354      | 1                                 |
| 29                          | 18           | 6.6              | 284      | 1                                 |
| 30                          | 16           | 6.0              | 390      | 1                                 |
| <b>Detection Percentage</b> |              |                  |          | <b>93% (&gt;60%)</b>              |

**Type 4 Radar Statistical Performance**

| Trial #                     | Pulses/Burst | Pulse Width (us) | PRI (us) | 1=Detection<br>Blank=No Detection |
|-----------------------------|--------------|------------------|----------|-----------------------------------|
| 1                           | 12           | 11.2             | 248      | 1                                 |
| 2                           | 12           | 13.6             | 204      | 1                                 |
| 3                           | 15           | 15.1             | 238      |                                   |
| 4                           | 13           | 14.8             | 429      | 1                                 |
| 5                           | 15           | 18.6             | 460      | 1                                 |
| 6                           | 14           | 19.0             | 247      | 1                                 |
| 7                           | 12           | 15.0             | 211      | 1                                 |
| 8                           | 13           | 12.0             | 247      | 1                                 |
| 9                           | 16           | 16.7             | 378      | 1                                 |
| 10                          | 14           | 19.4             | 417      | 1                                 |
| 11                          | 13           | 15.0             | 418      | 1                                 |
| 12                          | 13           | 18.8             | 283      | 1                                 |
| 13                          | 12           | 13.0             | 226      | 1                                 |
| 14                          | 12           | 14.9             | 259      | 1                                 |
| 15                          | 16           | 16.1             | 207      |                                   |
| 16                          | 14           | 16.9             | 235      | 1                                 |
| 17                          | 12           | 17.1             | 491      |                                   |
| 18                          | 15           | 17.8             | 267      | 1                                 |
| 19                          | 13           | 12.5             | 355      | 1                                 |
| 20                          | 14           | 11.7             | 425      | 1                                 |
| 21                          | 15           | 12.7             | 284      | 1                                 |
| 22                          | 16           | 15.2             | 318      | 1                                 |
| 23                          | 13           | 19.6             | 346      | 1                                 |
| 24                          | 13           | 13.8             | 356      | 1                                 |
| 25                          | 13           | 17.0             | 359      | 1                                 |
| 26                          | 14           | 15.2             | 473      | 1                                 |
| 27                          | 12           | 16.9             | 246      | 1                                 |
| 28                          | 16           | 11.2             | 221      | 1                                 |
| 29                          | 13           | 13.7             | 345      | 1                                 |
| 30                          | 13           | 13.0             | 443      | 1                                 |
| <b>Detection Percentage</b> |              |                  |          | 90% (>60%)                        |

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

$$\frac{P_d 1 + P_d 2 + P_d 3 + P_d 4}{4} = (87\% + 97\% + 93\% + 90\%) / 4 = 91.75\% (>80\%)$$

**Type 5 Radar Statistical Performance**

| <b>Trial #</b>              | <b>Filename*</b>  | <b>1=Detection<br/>Blank=No Detection</b> |
|-----------------------------|-------------------|-------------------------------------------|
| 1                           | Bin5Statistics_1  | 1                                         |
| 2                           | Bin5Statistics_2  | 1                                         |
| 3                           | Bin5Statistics_3  |                                           |
| 4                           | Bin5Statistics_4  | 1                                         |
| 5                           | Bin5Statistics_5  | 1                                         |
| 6                           | Bin5Statistics_6  | 1                                         |
| 7                           | Bin5Statistics_7  | 1                                         |
| 8                           | Bin5Statistics_8  | 1                                         |
| 9                           | Bin5Statistics_9  | 1                                         |
| 10                          | Bin5Statistics_10 | 1                                         |
| 11                          | Bin5Statistics_11 | 1                                         |
| 12                          | Bin5Statistics_12 | 1                                         |
| 13                          | Bin5Statistics_13 | 1                                         |
| 14                          | Bin5Statistics_9  | 1                                         |
| 15                          | Bin5Statistics_15 | 1                                         |
| 16                          | Bin5Statistics_16 | 1                                         |
| 17                          | Bin5Statistics_17 | 1                                         |
| 18                          | Bin5Statistics_18 | 1                                         |
| 19                          | Bin5Statistics_19 | 1                                         |
| 20                          | Bin5Statistics_20 | 1                                         |
| 21                          | Bin5Statistics_21 | 1                                         |
| 22                          | Bin5Statistics_22 | 1                                         |
| 23                          | Bin5Statistics_23 | 1                                         |
| 24                          | Bin5Statistics_24 | 1                                         |
| 25                          | Bin5Statistics_25 | 1                                         |
| 26                          | Bin5Statistics_26 | 1                                         |
| 27                          | Bin5Statistics_27 |                                           |
| 28                          | Bin5Statistics_28 | 1                                         |
| 29                          | Bin5Statistics_29 | 1                                         |
| 30                          | Bin5Statistics_30 | 1                                         |
| <b>Detection Percentage</b> |                   | <b>93% (&gt;80%)</b>                      |

\*See the Bin5 Radar Characteristics at the end of this report.

**Type 6 Radar Statistical Performance**

| <b>Trial #</b>              | <b>Pulses/Hop</b> | <b>Pulse Width (us)</b> | <b>PRI (us)</b> | <b>1=Detection<br/>Blank=No Detection</b> |
|-----------------------------|-------------------|-------------------------|-----------------|-------------------------------------------|
| 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             |                                           |
| 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                                         |
| <b>Detection Percentage</b> |                   |                         |                 | <b>97% (&gt;70%)</b>                      |



## Bin5Statistics\_1.txt

| Burst# | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
|--------|--------|------------|--------|---------------------------|----------------|
| 1      | 2      | 9          | 55     | 1521                      | 0.246287       |
| 2      | 3      | 6          | 80     | 1262,1901                 | 0.924482       |
| 3      | 3      | 10         | 85     | 1824,1637                 | 1.872273       |
| 4      | 1      | 8          | 100    | NA                        | 2.431316       |
| 5      | 1      | 8          | 95     | NA                        | 3.889790       |
| 6      | 3      | 15         | 95     | 1758,1730                 | 4.753358       |
| 7      | 3      | 9          | 80     | 1413,1222                 | 5.572570       |
| 8      | 3      | 17         | 50     | 1397,1158                 | 5.918443       |
| 9      | 2      | 10         | 80     | 1977                      | 6.557103       |
| 10     | 2      | 5          | 90     | 1861                      | 7.522707       |
| 11     | 3      | 19         | 65     | 1983,1770                 | 8.486594       |
| 12     | 1      | 12         | 60     | NA                        | 9.389964       |
| 13     | 2      | 11         | 85     | 1563                      | 9.784574       |
| 14     | 1      | 16         | 60     | NA                        | 10.783674      |
| 15     | 1      | 5          | 90     | NA                        | 11.594683      |

## Bin5Statistics\_2.txt

| Burst# | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
|--------|--------|------------|--------|---------------------------|----------------|
| 1      | 1      | 18         | 90     | NA                        | 0.452644       |
| 2      | 1      | 9          | 75     | NA                        | 2.099265       |
| 3      | 3      | 13         | 65     | 1031,1696                 | 2.807488       |
| 4      | 1      | 5          | 60     | NA                        | 3.741491       |
| 5      | 3      | 16         | 65     | 1325,1857                 | 5.409811       |
| 6      | 3      | 19         | 60     | 1880,1092                 | 5.760215       |
| 7      | 1      | 17         | 80     | NA                        | 7.027694       |
| 8      | 1      | 12         | 100    | NA                        | 7.661985       |
| 9      | 1      | 15         | 55     | NA                        | 8.771149       |
| 10     | 3      | 20         | 55     | 1119,1195                 | 10.351116      |
| 11     | 3      | 14         | 90     | 1713,1583                 | 11.494393      |

## Bin5Statistics\_3.txt

| Burst# | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
|--------|--------|------------|--------|---------------------------|----------------|
| 1      | 1      | 13         | 65     | NA                        | 0.134358       |
| 2      | 1      | 10         | 70     | NA                        | 1.712318       |
| 3      | 1      | 12         | 60     | NA                        | 2.950198       |
| 4      | 1      | 17         | 55     | NA                        | 4.063267       |
| 5      | 1      | 17         | 70     | NA                        | 4.800903       |
| 6      | 3      | 20         | 50     | 1071,1420                 | 6.241647       |
| 7      | 3      | 11         | 65     | 1105,1203                 | 7.291000       |
| 8      | 1      | 20         | 65     | NA                        | 9.476822       |
| 9      | 1      | 12         | 90     | NA                        | 10.744746      |
| 10     | 1      | 12         | 70     | NA                        | 11.877409      |



## Bin5Statistics\_4.txt

| Burst# | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
|--------|--------|------------|--------|---------------------------|----------------|
| 1      | 3      | 17         | 50     | 1414,1793                 | 0.392262       |
| 2      | 1      | 5          | 65     | NA                        | 1.300813       |
| 3      | 1      | 10         | 75     | NA                        | 2.058838       |
| 4      | 2      | 19         | 60     | 1624                      | 2.330585       |
| 5      | 1      | 14         | 60     | NA                        | 3.349062       |
| 6      | 3      | 17         | 75     | 1448,1433                 | 4.190149       |
| 7      | 1      | 8          | 55     | NA                        | 4.395628       |
| 8      | 1      | 17         | 95     | NA                        | 5.162492       |
| 9      | 2      | 14         | 50     | 1559                      | 5.927574       |
| 10     | 3      | 18         | 65     |                           | 6.684199       |
| 11     | 3      | 15         | 55     | 1005,1949 1215,1314       | 7.609330       |
| 12     | 2      | 9          | 90     | 1884                      | 8.071826       |
| 13     | 2      | 12         | 50     | 1199                      | 8.541376       |
| 14     | 1      | 20         | 65     | NA                        | 9.435895       |
| 15     | 2      | 17         | 65     | 1220                      | 9.896956       |
| 16     | 1      | 13         | 50     | NA                        | 10.784747      |
| 17     | 1      | 5          | 75     | NA                        | 11.375583      |

## Bin5Statistics\_5.txt

| Burst# | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
|--------|--------|------------|--------|---------------------------|----------------|
| 1      | 3      | 7          | 75     | 1345,1830                 | 0.942297       |
| 2      | 3      | 11         | 85     | 1011,1989                 | 1.958298       |
| 3      | 2      | 16         | 60     | 1584                      | 3.230325       |
| 4      | 1      | 7          | 90     | NA                        | 5.367928       |
| 5      | 2      | 9          | 95     | 1087                      | 6.574788       |
| 6      | 1      | 18         | 80     | NA                        | 8.239984       |
| 7      | 3      | 9          | 60     | 1749,1221                 | 9.783378       |
| 8      | 3      | 15         | 50     | 1548,1840                 | 11.741036      |

## Bin5Statistics\_6.txt

| Burst# | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
|--------|--------|------------|--------|---------------------------|----------------|
| 1      | 1      | 5          | 100    | NA                        | 0.790197       |
| 2      | 1      | 7          | 85     | NA                        | 2.410497       |
| 3      | 3      | 12         | 75     | 1405,1036                 | 3.244272       |
| 4      | 2      | 7          | 100    | 1699                      | 5.742278       |
| 5      | 3      | 8          | 95     | 1639,1341                 | 6.693310       |
| 6      | 1      | 16         | 75     | NA                        | 8.333037       |
| 7      | 2      | 18         | 80     | 1640                      | 9.014737       |
| 8      | 1      | 11         | 80     | NA                        | 11.871922      |



| Bin5Statistics_7.txt |        |            |        |                           |                |
|----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#               | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                    | 3      | 15         | 60     | 1595,1224                 | 0.457801       |
| 2                    | 3      | 11         | 100    | 1591,1089                 | 1.061580       |
| 3                    | 3      | 9          | 90     | 1977,1765                 | 1.603406       |
| 4                    | 2      | 15         | 65     | 1343                      | 2.203330       |
| 5                    | 2      | 9          | 70     | 1295                      | 2.494725       |
| 6                    | 2      | 5          | 60     | 1401                      | 3.520407       |
| 7                    | 3      | 16         | 60     | 1062,1661                 | 3.616961       |
| 8                    | 3      | 19         | 100    | 1836,1737                 | 4.207720       |
| 9                    | 1      | 16         | 60     | NA                        | 5.103347       |
| 10                   | 3      | 11         | 55     | 1814,1493                 | 5.988766       |
| 11                   | 1      | 15         | 65     | NA                        | 6.186605       |
| 12                   | 1      | 7          | 70     | NA                        | 6.803399       |
| 13                   | 3      | 13         | 60     | 1535,1037                 | 7.441443       |
| 14                   | 3      | 6          | 100    | 1270,1482                 | 7.827951       |
| 15                   | 1      | 14         | 75     | NA                        | 8.731000       |
| 16                   | 3      | 18         | 90     | 1053,1161                 | 9.234468       |
| 17                   | 2      | 10         | 70     | 1130                      | 9.958936       |
| 18                   | 2      | 5          | 95     | 1793                      | 10.364713      |
| 19                   | 2      | 14         | 50     | 1217                      | 11.052249      |
| 20                   | 3      | 20         | 55     | 1154,1427                 | 11.882144      |

| Bin5Statistics_8.txt |        |            |        |                           |                |
|----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#               | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                    | 3      | 16         | 90     | 1456,1571                 | 0.353281       |
| 2                    | 1      | 14         | 90     | NA                        | 0.836312       |
| 3                    | 1      | 15         | 75     | NA                        | 1.382728       |
| 4                    | 1      | 9          | 70     | NA                        | 2.185795       |
| 5                    | 3      | 6          | 75     | 1297,1226                 | 2.662728       |
| 6                    | 1      | 13         | 95     | NA                        | 3.564776       |
| 7                    | 2      | 6          | 100    | 1594                      | 3.971332       |
| 8                    | 3      | 8          | 50     | 1825,1923                 | 4.508699       |
| 9                    | 2      | 14         | 95     | 1836                      | 5.361428       |
| 10                   | 1      | 16         | 50     | NA                        | 5.536490       |
| 11                   | 3      | 13         | 60     | 1234,1066                 | 6.349730       |
| 12                   | 2      | 20         | 60     | 1446                      | 7.019008       |
| 13                   | 2      | 12         | 100    | 1467                      | 7.789912       |
| 14                   | 2      | 14         | 55     | 1591                      | 7.924687       |
| 15                   | 3      | 6          | 50     | 1128,1434                 | 8.825602       |
| 16                   | 1      | 19         | 60     | NA                        | 9.028199       |
| 17                   | 2      | 20         | 80     | 1513                      | 9.790945       |
| 18                   | 1      | 12         | 65     | NA                        | 10.756373      |
| 19                   | 3      | 6          | 65     | 1892,1028                 | 11.244397      |
| 20                   | 2      | 10         | 80     | 1695                      | 11.693240      |





| Bin5Statistics_9.txt |        |            |        |                           |                |
|----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#               | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                    | 3      | 10         | 65     | 1319,1320                 | 0.123725       |
| 2                    | 1      | 13         | 95     | NA                        | 0.679258       |
| 3                    | 2      | 10         | 55     | 1710                      | 1.561018       |
| 4                    | 2      | 9          | 95     | 1460                      | 2.029640       |
| 5                    | 3      | 8          | 85     | 1586,1947                 | 2.816176       |
| 6                    | 2      | 17         | 90     | 1359                      | 3.488058       |
| 7                    | 2      | 19         | 60     | 1523                      | 3.833848       |
| 8                    | 1      | 10         | 75     | NA                        | 4.600990       |
| 9                    | 2      | 16         | 70     | 1207                      | 5.355715       |
| 10                   | 3      | 12         | 60     | 1776,1186                 | 5.565856       |
| 11                   | 3      | 12         | 75     | 1803,1524                 | 6.203642       |
| 12                   | 2      | 9          | 60     | 1267                      | 7.149198       |
| 13                   | 1      | 18         | 70     | NA                        | 7.380846       |
| 14                   | 3      | 11         | 55     | 1636,1448                 | 8.090914       |
| 15                   | 1      | 6          | 65     | NA                        | 8.597364       |
| 16                   | 3      | 7          | 70     | 1461,1760                 | 9.466593       |
| 17                   | 2      | 19         | 60     | 1501                      | 9.961888       |
| 18                   | 3      | 17         | 60     | 1302,1156                 | 10.395089      |
| 19                   | 2      | 15         | 75     | 1416                      | 10.956211      |
| 20                   | 3      | 15         | 70     | 1654,1259                 | 11.461361      |

| Bin5Statistics_10.txt |        |            |        |                           |                |
|-----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#                | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                     | 3      | 20         | 100    | 1337,1945                 | 0.917037       |
| 2                     | 3      | 5          | 85     | 1636,1035                 | 2.737162       |
| 3                     | 2      | 20         | 85     | 1185                      | 3.893494       |
| 4                     | 2      | 11         | 80     | 1808                      | 5.542858       |
| 5                     | 1      | 6          | 55     | NA                        | 6.082829       |
| 6                     | 2      | 14         | 60     | 1234                      | 8.796411       |
| 7                     | 1      | 9          | 70     | NA                        | 9.529375       |
| 8                     | 2      | 9          | 100    | 1877                      | 10.700461      |

| Bin5Statistics_11.txt |        |            |        |                           |                |
|-----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#                | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                     | 1      | 14         | 60     | NA                        | 0.990167       |
| 2                     | 3      | 9          | 70     | 1406,1986                 | 2.244706       |
| 3                     | 3      | 8          | 90     | 1106,1488                 | 2.960573       |
| 4                     | 3      | 15         | 50     | 1739,1038                 | 4.509384       |
| 5                     | 1      | 19         | 90     | NA                        | 5.033382       |
| 6                     | 3      | 6          | 85     | 1678,1959                 | 6.756751       |
| 7                     | 1      | 9          | 70     | NA                        | 7.485086       |
| 8                     | 1      | 8          | 90     | NA                        | 8.784489       |
| 9                     | 2      | 14         | 50     | 1147                      | 10.581212      |
| 10                    | 2      | 10         | 65     | 1020                      | 11.289374      |



| Bin5Statistics_12.txt |        |            |        |                           |                |
|-----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#                | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                     | 3      | 19         | 95     | 1225,1231                 | 0.033670       |
| 2                     | 2      | 13         | 75     | 1867                      | 0.761849       |
| 3                     | 1      | 17         | 50     | NA                        | 2.105049       |
| 4                     | 3      | 12         | 90     | 1445,1620                 | 2.436484       |
| 5                     | 1      | 17         | 60     | NA                        | 3.322861       |
| 6                     | 2      | 6          | 65     | 1156                      | 4.041820       |
| 7                     | 3      | 11         | 75     | 1341,1667                 | 4.559879       |
| 8                     | 1      | 14         | 80     | NA                        | 5.605528       |
| 9                     | 3      | 17         | 55     | 1303,1906                 | 6.491394       |
| 10                    | 3      | 13         | 80     | 1016,1672                 | 7.064682       |
| 11                    | 1      | 10         | 70     | NA                        | 8.238815       |
| 12                    | 3      | 18         | 80     | 1536,1619                 | 8.671898       |
| 13                    | 3      | 9          | 80     | 1852,1505                 | 9.459053       |
| 14                    | 3      | 7          | 50     | 1699,1838                 | 10.434823      |
| 15                    | 1      | 6          | 50     | NA                        | 10.937071      |
| 16                    | 1      | 7          | 65     | NA                        | 11.572879      |

| Bin5Statistics_13.txt |        |            |        |                           |                |
|-----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#                | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                     | 3      | 5          | 100    | 1994,1657                 | 0.212483       |
| 2                     | 2      | 7          | 65     | 1908                      | 1.737974       |
| 3                     | 1      | 11         | 80     | NA                        | 1.850478       |
| 4                     | 1      | 19         | 50     | NA                        | 3.154995       |
| 5                     | 2      | 6          | 75     | 1708                      | 4.606621       |
| 6                     | 3      | 8          | 60     | 1760,1885                 | 5.508717       |
| 7                     | 2      | 10         | 100    | 1403                      | 5.784591       |
| 8                     | 2      | 12         | 55     | 1734                      | 7.043373       |
| 9                     | 2      | 20         | 80     | 1130                      | 8.202944       |
| 10                    | 1      | 12         | 95     | NA                        | 8.338472       |
| 11                    | 3      | 11         | 65     | 1894,1082                 | 9.662044       |
| 12                    | 3      | 19         | 65     | 1257,1910                 | 10.352585      |
| 13                    | 3      | 18         | 65     | 1564,1246                 | 11.820741      |



| Bin5Statistics_14.txt |        |            |        |                           |                |
|-----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#                | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                     | 1      | 14         | 85     | NA                        | 0.398389       |
| 2                     | 3      | 15         | 95     | 1630,1500                 | 1.151616       |
| 3                     | 2      | 10         | 95     | 1005                      | 2.037676       |
| 4                     | 1      | 5          | 90     | NA                        | 3.273951       |
| 5                     | 2      | 15         | 75     | 1491                      | 3.766544       |
| 6                     | 1      | 12         | 80     | NA                        | 4.569432       |
| 7                     | 3      | 8          | 50     | 1942,1764                 | 5.498577       |
| 8                     | 1      | 12         | 50     | NA                        | 6.731193       |
| 9                     | 2      | 12         | 55     | 1555                      | 7.270068       |
| 10                    | 3      | 17         | 100    | 1643,1419                 | 8.408891       |
| 11                    | 1      | 7          | 85     | NA                        | 9.260391       |
| 12                    | 3      | 7          | 75     | 1258,1416                 | 9.544812       |
| 13                    | 1      | 18         | 95     | NA                        | 10.915297      |
| 14                    | 3      | 7          | 90     | 1623,1394                 | 11.162282      |

| Bin5Statistics_15.txt |        |            |        |                           |                |
|-----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#                | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                     | 2      | 18         | 100    | 1847                      | 0.549291       |
| 2                     | 3      | 11         | 80     | 1095,1664                 | 1.710120       |
| 3                     | 1      | 5          | 100    | NA                        | 2.092751       |
| 4                     | 3      | 8          | 70     | 1790,1146                 | 3.084616       |
| 5                     | 2      | 16         | 50     | 1299                      | 4.423566       |
| 6                     | 1      | 15         | 70     | NA                        | 4.956382       |
| 7                     | 1      | 12         | 85     | NA                        | 5.711146       |
| 8                     | 2      | 14         | 50     | 1063                      | 6.999373       |
| 9                     | 1      | 20         | 70     | NA                        | 7.949971       |
| 10                    | 1      | 7          | 55     | NA                        | 8.698228       |
| 11                    | 3      | 20         | 90     | 1628,1382                 | 9.364847       |
| 12                    | 3      | 12         | 85     | 1857,1720                 | 10.478761      |
| 13                    | 3      | 17         | 80     | 1133,1861                 | 11.374023      |

| Bin5Statistics_16.txt |        |            |        |                           |                |
|-----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#                | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                     | 2      | 20         | 95     | 1972                      | 0.982727       |
| 2                     | 1      | 18         | 100    | NA                        | 1.266440       |
| 3                     | 2      | 14         | 90     | 1898                      | 3.517665       |
| 4                     | 1      | 20         | 55     | NA                        | 4.497820       |
| 5                     | 3      | 11         | 80     | 1861,1717                 | 5.106569       |
| 6                     | 2      | 12         | 60     | 1660                      | 7.073856       |
| 7                     | 3      | 7          | 55     | 1645,1085                 | 8.323434       |
| 8                     | 2      | 15         | 55     | 1694                      | 9.512301       |
| 9                     | 2      | 18         | 55     | 1434                      | 10.480360      |
| 10                    | 2      | 12         | 80     | 1088                      | 11.621332      |



| Bin5Statistics_17.txt |        |            |        |                           |                |
|-----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#                | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                     | 2      | 9          | 75     | 1153                      | 1.088453       |
| 2                     | 3      | 9          | 60     | 1680,1359                 | 2.051927       |
| 3                     | 1      | 20         | 90     | NA                        | 3.327541       |
| 4                     | 1      | 13         | 90     | NA                        | 4.183652       |
| 5                     | 3      | 9          | 100    | 1795,1157                 | 4.880381       |
| 6                     | 1      | 15         | 75     | NA                        | 7.126289       |
| 7                     | 2      | 10         | 85     | 1748                      | 7.231523       |
| 8                     | 2      | 19         | 75     | 1952                      | 8.469657       |
| 9                     | 3      | 12         | 100    | 1492,1044                 | 10.544474      |
| 10                    | 3      | 11         | 80     | 1069,1485                 | 11.068740      |

| Bin5Statistics_18.txt |        |            |        |                           |                |
|-----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#                | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                     | 2      | 16         | 90     | 1354                      | 0.627796       |
| 2                     | 1      | 13         | 50     | NA                        | 2.059322       |
| 3                     | 1      | 14         | 55     | NA                        | 2.936790       |
| 4                     | 2      | 8          | 50     | 1956                      | 3.778622       |
| 5                     | 2      | 12         | 50     | 1240                      | 4.658820       |
| 6                     | 2      | 15         | 95     | 1193                      | 5.525153       |
| 7                     | 1      | 20         | 70     | NA                        | 6.558312       |
| 8                     | 1      | 13         | 100    | NA                        | 8.618717       |
| 9                     | 2      | 12         | 65     | 1267                      | 9.057408       |
| 10                    | 1      | 14         | 75     | NA                        | 10.852975      |
| 11                    | 2      | 14         | 90     | 1086                      | 11.214612      |



| Bin5Statistics_19.txt |        |            |        |                           |                |
|-----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#                | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                     | 1      | 11         | 50     | NA                        | 0.295058       |
| 2                     | 3      | 13         | 60     | 1022,1096                 | 0.758336       |
| 3                     | 3      | 7          | 65     | 1560,1592                 | 1.890348       |
| 4                     | 1      | 13         | 85     | NA                        | 1.896963       |
| 5                     | 3      | 8          | 95     | 1398,1163                 | 2.846130       |
| 6                     | 1      | 14         | 65     | NA                        | 3.378350       |
| 7                     | 1      | 15         | 90     | NA                        | 3.973148       |
| 8                     | 3      | 15         | 100    | 1633,1157                 | 4.970687       |
| 9                     | 1      | 11         | 95     | NA                        | 5.125884       |
| 10                    | 3      | 16         | 70     | 1508,1771                 | 5.712335       |
| 11                    | 1      | 12         | 70     | NA                        | 6.943145       |
| 12                    | 2      | 14         | 65     | 1297                      | 7.392205       |
| 13                    | 1      | 12         | 75     | NA                        | 7.639831       |
| 14                    | 1      | 15         | 55     | NA                        | 8.491171       |
| 15                    | 3      | 6          | 90     | 1495,1376                 | 9.295285       |
| 16                    | 2      | 10         | 100    | 1741                      | 9.504974       |
| 17                    | 1      | 9          | 75     | NA                        | 10.468330      |
| 18                    | 2      | 5          | 50     | 1507                      | 11.065044      |
| 19                    | 3      | 9          | 80     | 1833,1428                 | 11.864814      |

| Bin5Statistics_20.txt |        |            |        |                           |                |
|-----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#                | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                     | 2      | 16         | 50     | 2000                      | 0.372643       |
| 2                     | 3      | 6          | 50     | 1398,1499                 | 1.232612       |
| 3                     | 1      | 19         | 85     | NA                        | 1.514363       |
| 4                     | 3      | 16         | 65     | 1298,1593                 | 2.532303       |
| 5                     | 3      | 19         | 65     | 1035,1000                 | 3.017801       |
| 6                     | 3      | 11         | 80     | 1954,1369                 | 3.878699       |
| 7                     | 1      | 20         | 80     | NA                        | 5.075896       |
| 8                     | 2      | 5          | 80     | 1283                      | 5.919874       |
| 9                     | 1      | 6          | 85     | NA                        | 6.424047       |
| 10                    | 1      | 6          | 65     | NA                        | 7.294505       |
| 11                    | 3      | 5          | 80     | 1858,1520                 | 8.236850       |
| 12                    | 2      | 9          | 80     | 1698                      | 8.526208       |
| 13                    | 2      | 10         | 50     | 1800                      | 9.562765       |
| 14                    | 3      | 11         | 80     | 1997,1651                 | 9.780188       |
| 15                    | 1      | 20         | 65     | NA                        | 10.823517      |
| 16                    | 1      | 19         | 55     | NA                        | 11.918558      |



| Bin5Statistics_21.txt |        |            |        |                           |                |
|-----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#                | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                     | 2      | 15         | 95     | 1090                      | 0.154670       |
| 2                     | 2      | 12         | 60     | 1730                      | 1.754179       |
| 3                     | 3      | 10         | 95     | 1166,1941                 | 2.618319       |
| 4                     | 3      | 19         | 75     | 1018,1841                 | 3.538059       |
| 5                     | 3      | 15         | 85     | 1744,1809                 | 4.435161       |
| 6                     | 2      | 16         | 90     | 1586                      | 5.604252       |
| 7                     | 1      | 9          | 100    | NA                        | 6.358547       |
| 8                     | 2      | 7          | 70     | 1314                      | 7.562533       |
| 9                     | 3      | 18         | 65     | 1257,1357                 | 8.731204       |
| 10                    | 3      | 12         | 50     | 1838,1221                 | 9.004081       |
| 11                    | 1      | 17         | 100    | NA                        | 10.311876      |
| 12                    | 1      | 14         | 80     | NA                        | 11.492352      |

| Bin5Statistics_22.txt |        |            |        |                           |                |
|-----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#                | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                     | 2      | 15         | 50     | 1833                      | 0.733368       |
| 2                     | 3      | 10         | 100    | 1150,1568                 | 1.357979       |
| 3                     | 3      | 10         | 80     | 1095,1252                 | 2.800413       |
| 4                     | 2      | 11         | 100    | 1497                      | 4.247862       |
| 5                     | 3      | 20         | 70     | 1680,1707                 | 5.373839       |
| 6                     | 3      | 10         | 70     | 1391,1656                 | 5.793849       |
| 7                     | 3      | 15         | 85     | 1604,1732                 | 6.726478       |
| 8                     | 2      | 10         | 85     | 1101                      | 8.529162       |
| 9                     | 2      | 6          | 75     | 1019                      | 9.002649       |
| 10                    | 2      | 10         | 85     | 1399                      | 10.746289      |
| 11                    | 2      | 12         | 60     | 1828                      | 11.618874      |

| Bin5Statistics_23.txt |        |            |        |                           |                |
|-----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#                | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                     | 3      | 16         | 80     | 1819,1773                 | 0.192466       |
| 2                     | 2      | 13         | 50     | 1535                      | 1.405143       |
| 3                     | 3      | 11         | 55     | 1221,1185                 | 2.761553       |
| 4                     | 2      | 8          | 85     | 1826                      | 4.020767       |
| 5                     | 3      | 20         | 60     | 1872,1156                 | 5.491484       |
| 6                     | 3      | 8          | 50     | 1633,1412                 | 7.137450       |
| 7                     | 3      | 17         | 90     | 1066,1569                 | 8.263974       |
| 8                     | 1      | 8          | 100    | NA                        | 10.072129      |
| 9                     | 1      | 19         | 60     | NA                        | 10.765613      |



| Bin5Statistics_24.txt |        |            |        |                           |                |
|-----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#                | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                     | 3      | 9          | 85     | 1613,1283                 | 0.346674       |
| 2                     | 3      | 11         | 100    | 1622,1911                 | 1.009025       |
| 3                     | 2      | 12         | 75     | 1469                      | 2.027916       |
| 4                     | 3      | 11         | 70     | 1410,1545                 | 3.007877       |
| 5                     | 3      | 17         | 90     | 1960,1422                 | 3.903858       |
| 6                     | 2      | 19         | 65     | 1064                      | 4.374226       |
| 7                     | 1      | 16         | 70     | NA                        | 5.303858       |
| 8                     | 2      | 10         | 65     | 1650                      | 5.729172       |
| 9                     | 2      | 10         | 50     | 1238                      | 6.960769       |
| 10                    | 3      | 15         | 80     | 1055,1798                 | 7.350575       |
| 11                    | 2      | 7          | 60     | 1901                      | 8.479697       |
| 12                    | 1      | 9          | 60     | NA                        | 9.023576       |
| 13                    | 3      | 8          | 55     | 1646,1897                 | 10.114573      |
| 14                    | 1      | 17         | 80     | NA                        | 11.155209      |
| 15                    | 1      | 17         | 85     | NA                        | 11.327446      |

| Bin5Statistics_25.txt |        |            |        |                           |                |
|-----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#                | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                     | 2      | 8          | 90     | 1881                      | 0.114491       |
| 2                     | 3      | 16         | 100    | 1391,1864                 | 1.879320       |
| 3                     | 1      | 20         | 65     | NA                        | 2.885220       |
| 4                     | 2      | 19         | 80     | 1770                      | 3.593760       |
| 5                     | 1      | 20         | 95     | NA                        | 4.424549       |
| 6                     | 2      | 19         | 90     | 1307                      | 5.594003       |
| 7                     | 1      | 11         | 65     | NA                        | 6.153904       |
| 8                     | 2      | 6          | 95     | 1302                      | 7.160734       |
| 9                     | 2      | 13         | 50     | 1485                      | 8.404539       |
| 10                    | 3      | 13         | 70     | 1797,1591                 | 9.319933       |
| 11                    | 3      | 13         | 60     | 1768,1822                 | 10.480072      |
| 12                    | 2      | 6          | 85     | 1218                      | 11.280752      |

| Bin5Statistics_26.txt |        |            |        |                           |                |
|-----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#                | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                     | 1      | 8          | 80     | NA                        | 0.304141       |
| 2                     | 1      | 15         | 80     | NA                        | 1.507392       |
| 3                     | 2      | 16         | 85     | 1112                      | 3.216967       |
| 4                     | 3      | 20         | 95     | 1968,1181                 | 5.328848       |
| 5                     | 3      | 13         | 60     | 1429,1737                 | 6.022028       |
| 6                     | 3      | 8          | 90     | 1385,1562                 | 7.551800       |
| 7                     | 1      | 8          | 70     | NA                        | 9.405552       |
| 8                     | 1      | 10         | 60     | NA                        | 10.827510      |



## Bin5Statistics\_27.txt

| Burst# | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
|--------|--------|------------|--------|---------------------------|----------------|
| 1      | 2      | 12         | 75     | 1663                      | 0.487285       |
| 2      | 2      | 19         | 90     | 1709                      | 2.135252       |
| 3      | 1      | 6          | 85     | NA                        | 3.140017       |
| 4      | 1      | 5          | 55     | NA                        | 4.745021       |
| 5      | 1      | 17         | 95     | NA                        | 6.916680       |
| 6      | 3      | 5          | 85     | 1265,1022                 | 7.778005       |
| 7      | 1      | 6          | 55     | NA                        | 9.109545       |
| 8      | 3      | 6          | 75     | 1828,1069                 | 11.041950      |

## Bin5Statistics\_28.txt

| Burst# | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
|--------|--------|------------|--------|---------------------------|----------------|
| 1      | 2      | 20         | 50     | 1059                      | 0.911509       |
| 2      | 2      | 7          | 95     | 1195                      | 1.350836       |
| 3      | 1      | 20         | 100    | NA                        | 2.522307       |
| 4      | 1      | 16         | 95     | NA                        | 4.131000       |
| 5      | 2      | 19         | 95     | 1262                      | 5.239877       |
| 6      | 2      | 15         | 70     | 1067                      | 5.899036       |
| 7      | 3      | 20         | 55     | 1507,1757                 | 6.678873       |
| 8      | 2      | 10         | 100    | 1352                      | 8.059416       |
| 9      | 1      | 19         | 70     | NA                        | 9.811315       |
| 10     | 2      | 17         | 50     | 1679                      | 10.878139      |
| 11     | 3      | 12         | 90     | 1242,1078                 | 11.549879      |

## Bin5Statistics\_29.txt

| Burst# | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
|--------|--------|------------|--------|---------------------------|----------------|
| 1      | 1      | 15         | 55     | NA                        | 0.404580       |
| 2      | 1      | 16         | 55     | NA                        | 1.449394       |
| 3      | 3      | 20         | 75     | 1789,1807                 | 2.016031       |
| 4      | 1      | 14         | 80     | NA                        | 2.689175       |
| 5      | 3      | 19         | 50     | 1661,1776                 | 3.206599       |
| 6      | 2      | 14         | 55     | 1729                      | 4.169881       |
| 7      | 3      | 9          | 50     | 1293,1404                 | 5.284722       |
| 8      | 2      | 19         | 60     | 1509                      | 6.331572       |
| 9      | 3      | 14         | 60     | 1354,1849                 | 6.652558       |
| 10     | 3      | 13         | 70     | 1692,1200                 | 7.263614       |
| 11     | 3      | 14         | 90     | 1071,1318                 | 8.162366       |
| 12     | 3      | 13         | 90     | 1674,1911                 | 8.972822       |
| 13     | 1      | 17         | 90     | NA                        | 10.125491      |
| 14     | 2      | 20         | 90     | 1832                      | 10.821064      |
| 15     | 2      | 19         | 50     | 1753                      | 11.824729      |





| Bin5Statistics_30.txt |        |            |        |                           |                |
|-----------------------|--------|------------|--------|---------------------------|----------------|
| Burst#                | Pulses | Chirp(MHz) | PW(uS) | Inter-pulse spacing/s(uS) | Pulse Start(S) |
| 1                     | 2      | 10         | 70     | 1462                      | 0.127083       |
| 2                     | 1      | 19         | 85     | NA                        | 0.873202       |
| 3                     | 1      | 16         | 55     | NA                        | 1.779357       |
| 4                     | 3      | 13         | 55     | 1589,1655                 | 2.026120       |
| 5                     | 1      | 6          | 70     | NA                        | 2.682897       |
| 6                     | 2      | 13         | 75     | 1694                      | 3.166846       |
| 7                     | 3      | 7          | 65     | 1747,1684                 | 4.166501       |
| 8                     | 2      | 6          | 90     | 1731                      | 4.819822       |
| 9                     | 3      | 18         | 60     | 1798,1544                 | 5.434693       |
| 10                    | 2      | 5          | 70     | 1242                      | 6.174259       |
| 11                    | 1      | 11         | 90     | NA                        | 6.819444       |
| 12                    | 3      | 12         | 50     | 1506,1289                 | 7.399999       |
| 13                    | 2      | 5          | 90     | 1364                      | 7.886215       |
| 14                    | 1      | 6          | 95     | NA                        | 8.322875       |
| 15                    | 3      | 19         | 70     | 1146,1661                 | 9.416912       |
| 16                    | 2      | 15         | 85     | 1949                      | 9.509949       |
| 17                    | 3      | 14         | 50     | 1280,1797                 | 10.731485      |
| 18                    | 3      | 7          | 90     | 1925,1662                 | 10.760541      |
| 19                    | 2      | 5          | 65     | 1162                      | 11.509563      |