Maximum Permissible Exposure (MPE) Calculations

15.407: U-NII devices are subject to the radio frequency radiation exposure requirements specified in Sec. 1.1307(b), Sec. 2.1091 and Sec. 2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a ``general population/uncontrolled'' environment. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

Given

E=√(30*P*G)/d and S=E^2/3770

where

E=Field Strength in Volts/meter
P=Power in Watts
G=Numeric Antenna Gain
d=Distance in meters
S=Power Density in mW/cm^2

Combine equations and rearrange the terms to express the distance as a function of the remaining variables:

d=√((30*P*G)/(3770*S))

Changing to units of power in mW and distance in cm, using:

P(mW)=P(W)/1000 d(cm)=100*d(m)

yields

d=100*√((30*(P/1000)*G)/(3770*S))
d=0.282*√(P*G/S)

where

d=Distance in cm
P=Power in mW
G=Numerica Antenna Gain
S=Power Density in mW/cm^2

Substituting the logarithmic form of power and gain using:

P(mW)=10^(P(dBm)/10) G(numeric)=10^(G(dBi)/10)

yields

d=0.282*10^((P+G)/20)/√S Equation (1)

and

s=((0.282*10^((P+G)/20))/d)^2 Equation (2)

where

d=MPE distance in cm
P=Power in dBm
G=Antenna Gain in dBi
S=Power Density in mW/cm^2

Equation (1) and the measured peak power are used to calculate the MPE distance. Note that for mobile or fixed location transmitters such as an access point, the minimum separation distance is 20 cm even if the calculations indicate that the MPE distance may be less.

S=1mW/cm^2 maximum. The highest supported antenna gain is 6 dBi (9dBi with beamforming). Using the peak power levels recorded in the test report along with Equation 1 above, the MPE distances are calculated as follows.

Frequency (MHz)	Bit Rate (Mbps)	Power Density (mW/cm^2)	Peak Transmit Power (dBm)	Antenna Gain (dBi)	MPE Distance (cm)	Limit (cm)	Margin (cm)
5180	54	1	14.4	6	2.95	20	17.05
5260	54	1	20.3	6	5.82	20	14.18
5320	54	1	20.3	6	5.82	20	14.18
5500	54	1	20.4	6	5.89	20	14.11
5600	54	1	20.6	6	6.03	20	13.97
5700	54	1	19.8	6	5.50	20	14.50
5745	54	1	20.1	9	8.04	20	11.96
5785	54	1	20.2	9	8.13	20	11.87
5825	54	1	20.4	9	8.32	20	11.68

MPE Calculations

To maintain compliance, installations will assure a separation distance of at least 20cm.

Using Equation 2, the MPE levels (s) at 20 cm are calculated as follows:

Frequency (MHz)	Bit Rate (Mbps)	MPE Distance (cm)	Peak Transmit Power (dBm)	Antenna Gain (dBi)	Power Density (mW/cm^2)	Limit (mW/cm^2)	Margin (mW/cm^2)
5180	54	20	14.4	6	0.02	1	0.98
5260	54	20	20.3	6	0.08	1	0.92
5320	54	20	20.3	6	0.08	1	0.92
5500	54	20	20.4	6	0.09	1	0.91
5600	54	20	20.6	6	0.09	1	0.91
5700	54	20	19.8	6	0.08	1	0.92
5745	54	20	20.1	9	0.16	1	0.84
5785	54	20	20.2	9	0.17	1	0.83
5825	54	20	20.4	9	0.17	1	0.83

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-RM1252A-A-K9 operates in the following bands:
    a. 5150-5250 MHz
    b. 5250-5350 MHz
    c. 5470-5725 MHz
    d. 5725-5850 MHz

2. The maximum EIRP of the 5GHz equipment is 26 dBm, and the minimum possible EIRP is -1 dBm.

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

    AIR-ANT5135DG-R (5 GHz, 3.5 dBi Omnidirectional)
    AIR-ANT5135D-R (5 GHz, 3.5 dBi Omnidirectional)
    AIR-ANT5140V-R (5 GHz, 4 dBi Omnidirectional (3))
    AIR-ANT5145V-R (5 GHz, 4.5 dBi Diversity Omnidirectional)
    AIR-ANT5160V-R (5 GHz, 6.0dBi Diversity Omnidirectional)

    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 1.44 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 (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 Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.	

2. **DFS Response requirement values**

Parameter	**Value**
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 80% of the 99% power bandwidth See Note 3.

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

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

Note 2: The *Channel Closing Transmission Time* is comprised of 200 milliseconds starting at the beginning of the *Channel Move Time* plus any additional intermittent control signals required to facilitate *Channel* changes (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Note 3: During the *U-NII Detection Bandwidth* detection test, radar type 1 is used and for each frequency step the minimum percentage of detection is 90%. Measurements are performed with no data traffic.

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.

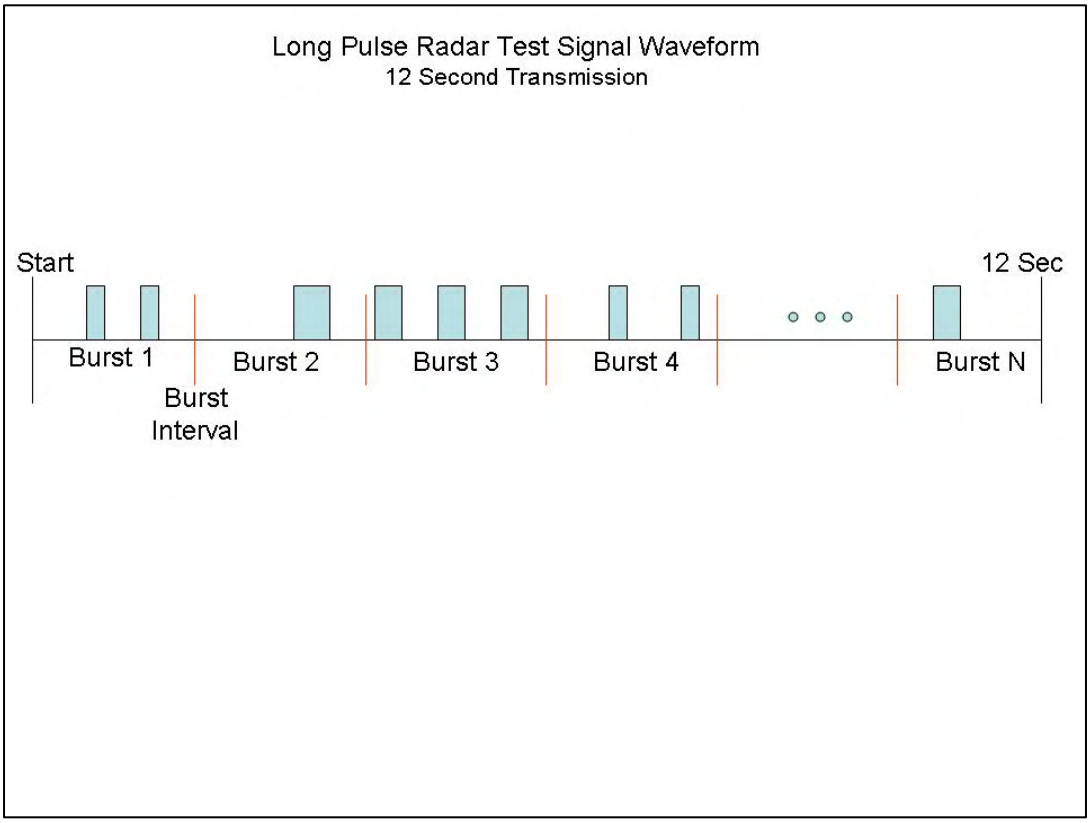
Each waveform is defined as follows:

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 / Burst_Count) microseconds. Each interval contains one Burst. The start time for the Burst, relative to the beginning of the interval, is between 1 and [(12,000,000 / Burst_Count) – (Total Burst Length) + (One Random PRI Interval)] microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each Burst is chosen independently.

A representative example of a Long Pulse radar test waveform:

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



Graphical Representation of a Long Pulse radar Test Waveform

3. **Frequency Hopping Radar Test Waveform**

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

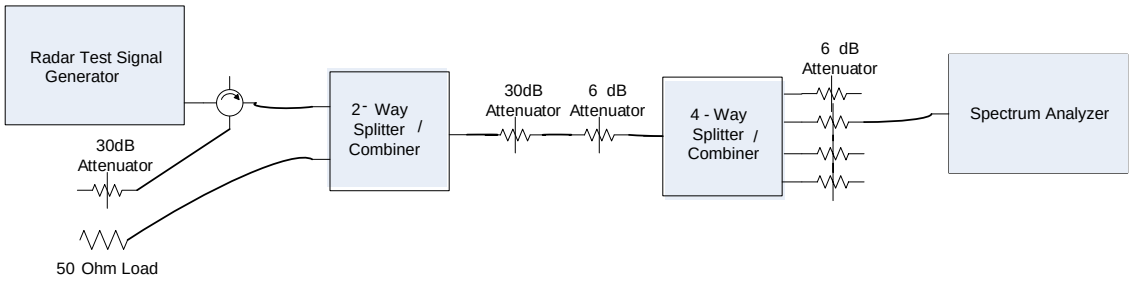
For the Frequency Hopping Radar Type, the same *Burst* parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected[1] from the hopping sequence defined by the following algorithm:

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

4.0 Radar Waveform Calibration

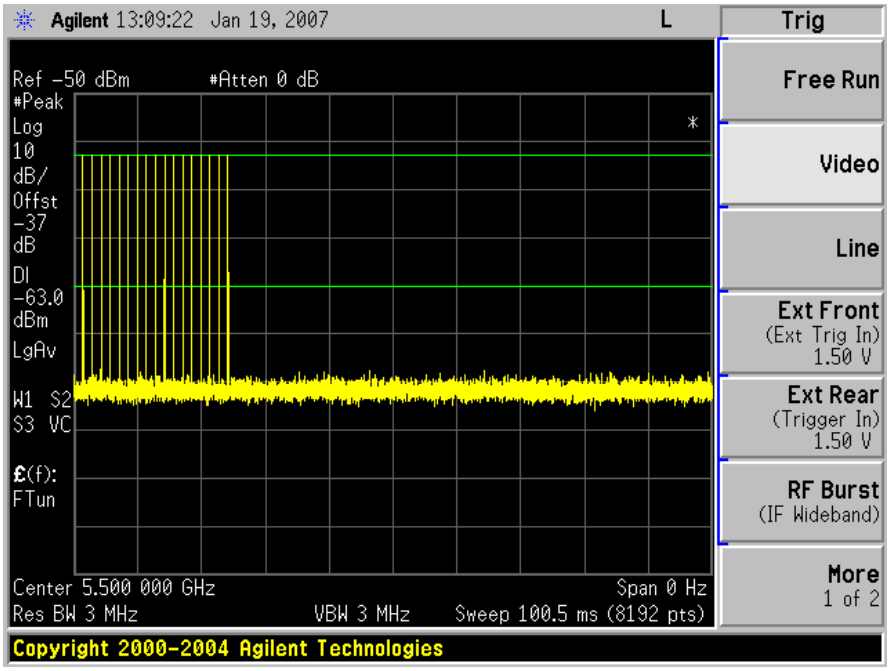
1. The following equipment setup was used to calibrate the conducted Radar Waveform. A spectrum analyzer was used to establish the test signal level for each radar type. During this process there were no transmissions by either the Master or Client Device. The spectrum analyzer was switched to the zero 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.

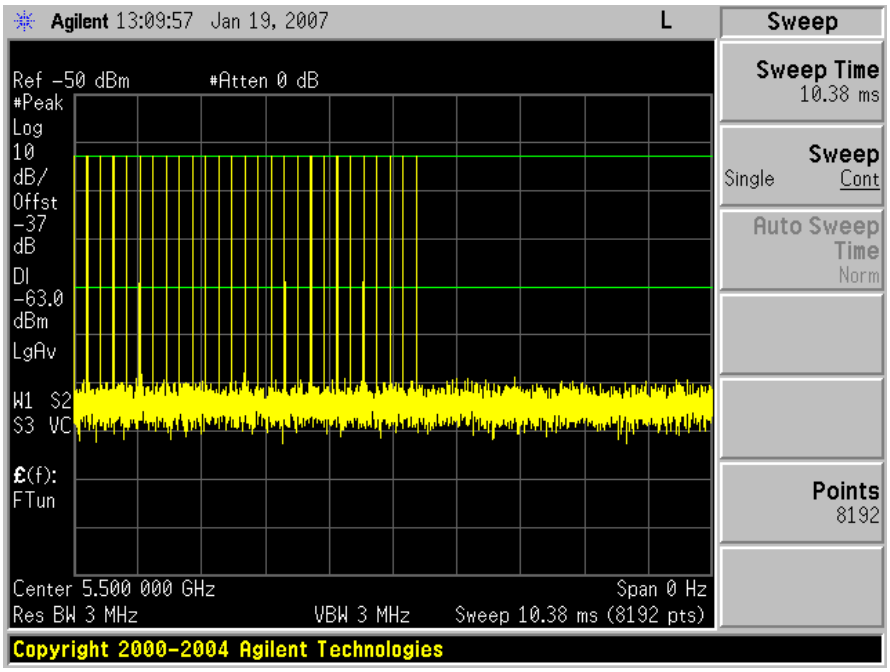


Conducted Calibration Setup

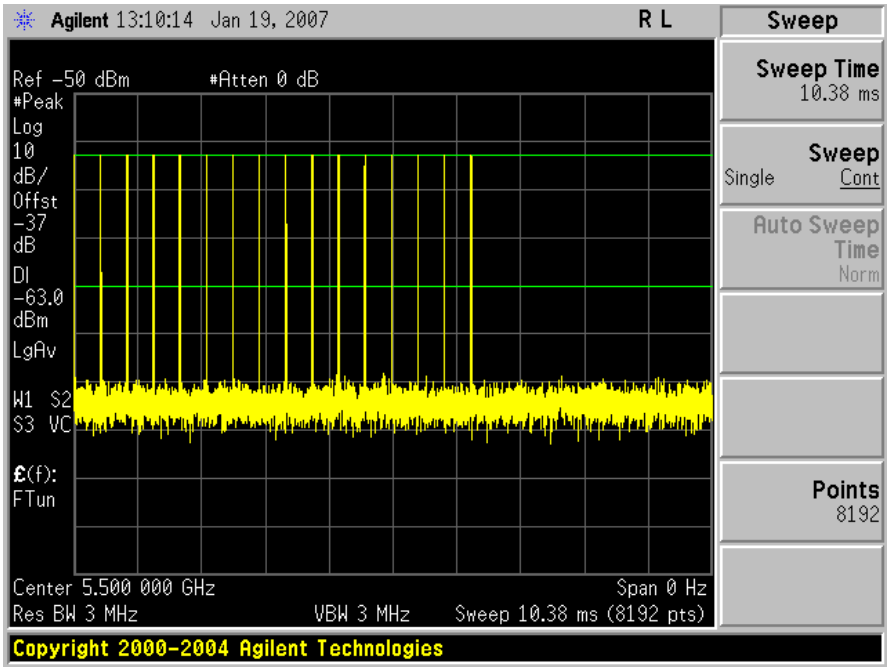
2. Following are the calibration plots for each of the required radar waveforms.



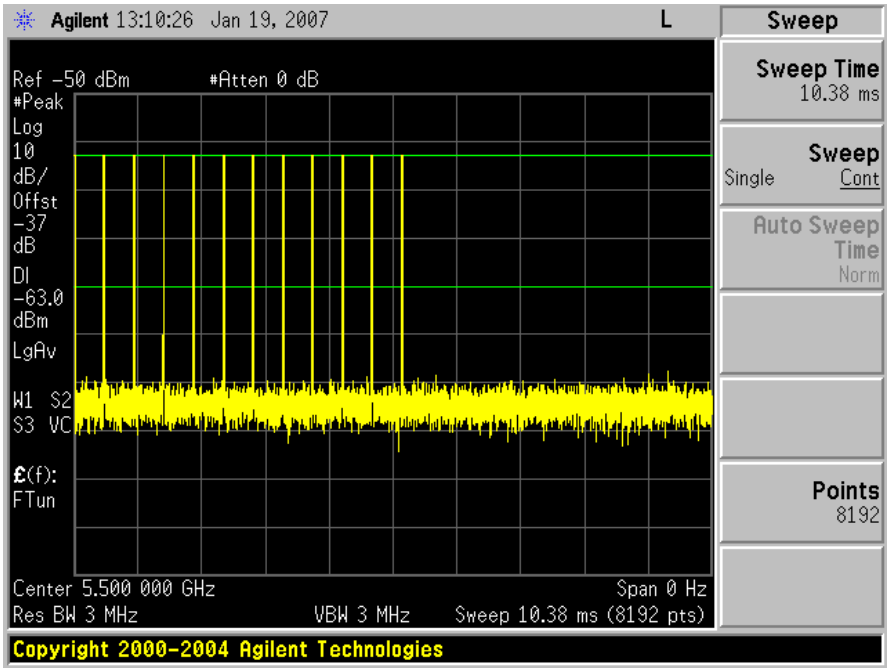
Bin 1 Radar Calibration



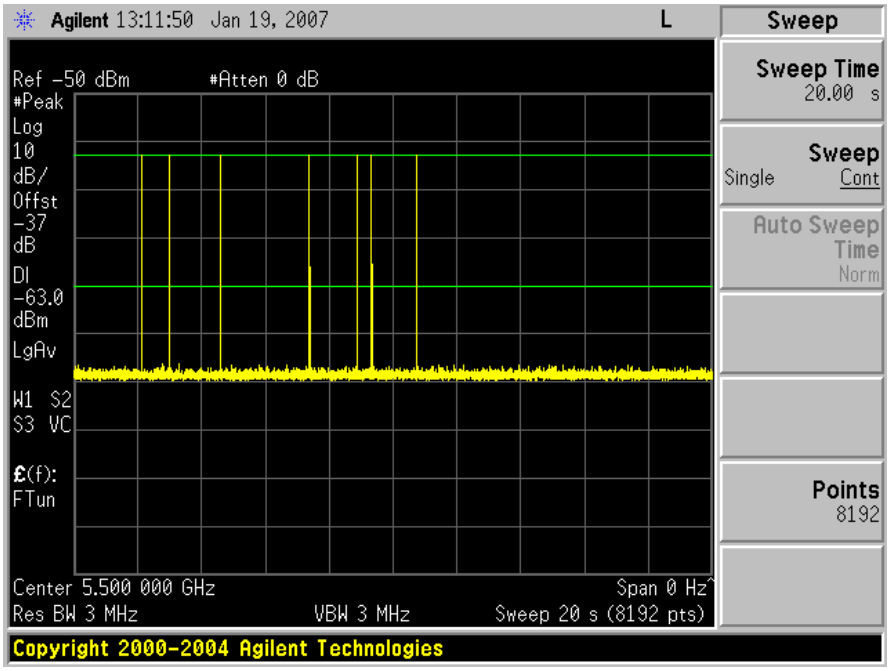
Bin 2 Radar Calibration



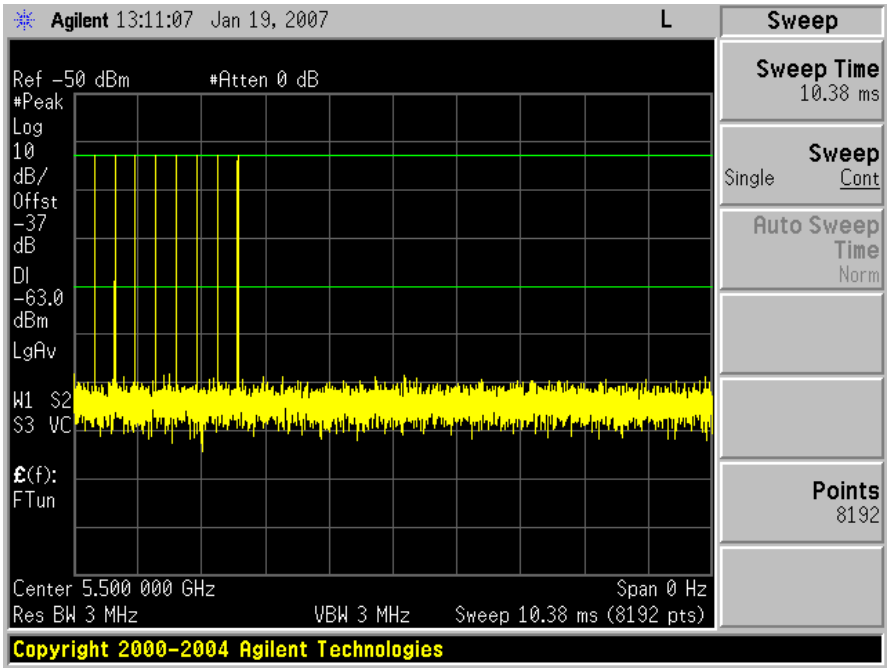
Bin 3 Radar Calibration



Bin 4 Radar Calibration



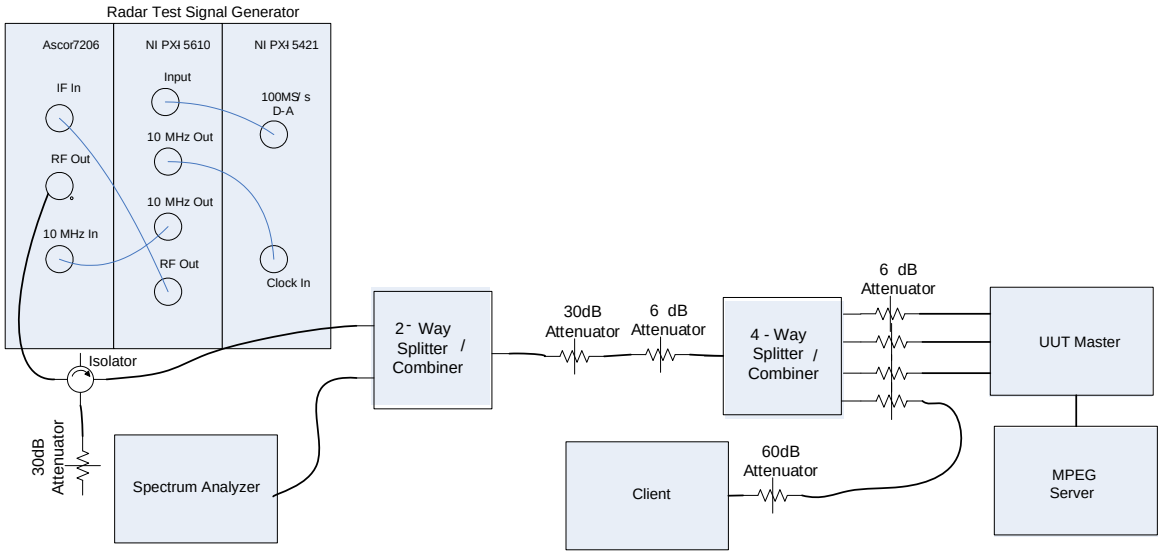
Bin 5 Radar Calibration



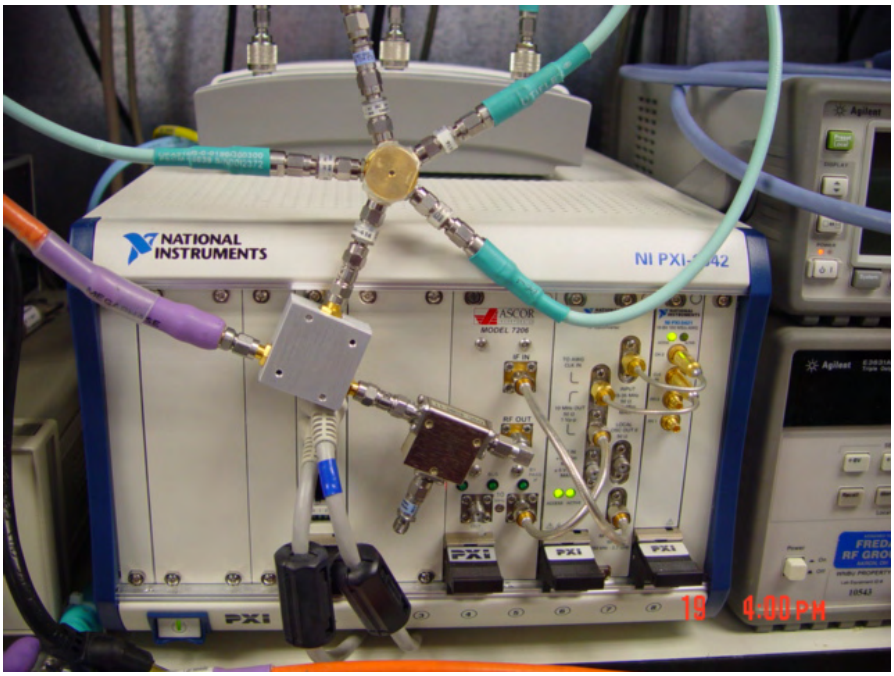
Bin 6 Radar Calibration

5.0 Test Procedure/Results

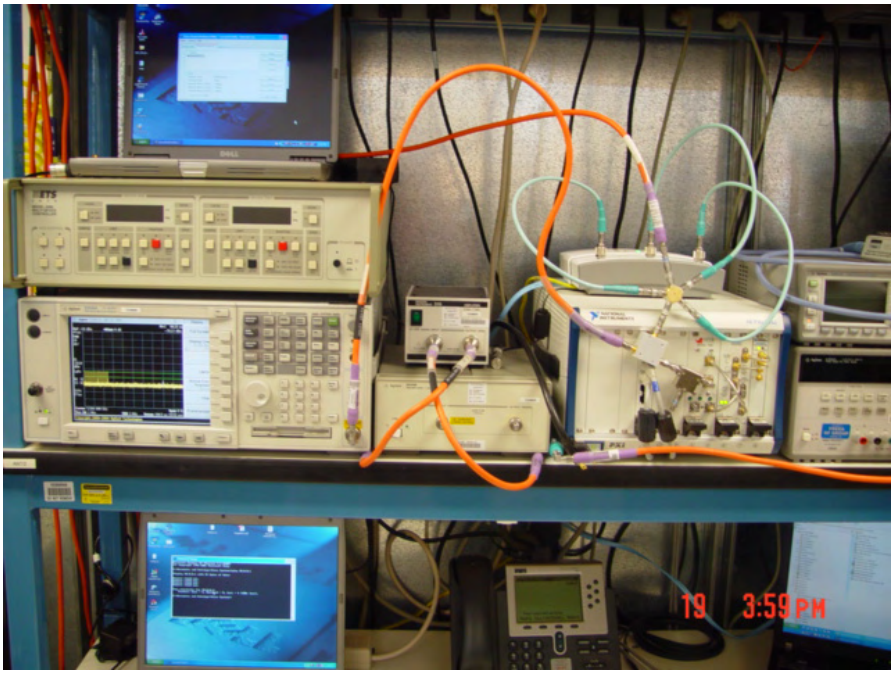
1. A spectrum analyzer is used as a monitor to verify that the UUT has vacated the Channel within the (Channel Closing Transmission Time and Channel Move Time, and does not transmit on a Channel during the Non-Occupancy Period after the detection and Channel move. It is also used to monitor UUT transmissions 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.



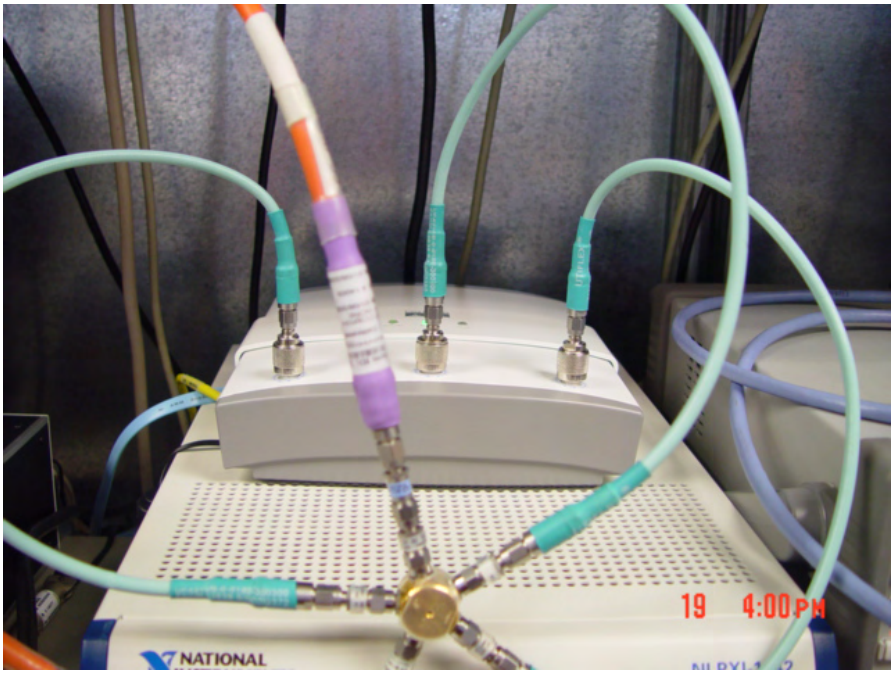
Conducted Setup: Radar Test Waveforms are injected into the Master



Radar Test Signal Generator



DFS Test Setup



DFS Setup: UUT

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. 1)
Weinschel 1594 4 to 1 power Splitter/Combiner (Qty. 1)
Ditom Microwave D3C-4080-11 Circulator/Isolator (Qty. 1)
Mini-Circuits BW-S30W2 30dB Attenuator (Qty. 4)
Mini-Circuits BW-S6W2 30dB Attenuator (Qty. 5)
Megaphase SF26 S1S1 36" Coaxial Cable (Qty. 2)
MicroCaox 18" Coaxial Cable (Qty. 3)
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 20 MHz channels for this device have identical Channel bandwidths. All UNII 40 MHz channels for this device also have identical Channel bandwidths. Therefore, all DFS testing was done at 5500 MHz. The 99% channel bandwidth for 20MHz signals is 16.6 MHz, and the 99% channel bandwidth for 40MHz signals is 36.6 MHz. (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 5500MHz at a -63dBm level. The UUT is set up as a standalone device (no associated Client and no traffic).

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

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

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

   The U-NII Detection Bandwidth is calculated as follows:

   U-NII Detection Bandwidth = $F_H - F_L$

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

UNII Detection Bandwidth Results

20 MHz Signal Bandwidth											
EUT Frequency=5500MHz											
	DFS Detection Trials (1=Detection, Blank= No Detection)										
Radar Frequency (MHz)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Detection Rate (%)**
5490 Fl	1	1	1	1	1	1	1	1	1		90%
5491	1	1	1	1	1	1	1	1	1	1	100%
5492	1	1	1	1	1	1	1	1	1	1	100%
5493	1	1	1	1	1	1	1	1	1	1	100%
5494	1	1	1	1	1	1	1	1	1	1	100%
5495	1	1	1	1	1	1	1	1	1	1	100%
5496	1	1	1	1	1	1	1	1	1	1	100%
5497	1	1	1	1	1	1	1	1	1	1	100%
5498	1	1	1	1	1	1	1	1	1	1	100%
5499	1	1	1	1	1	1	1	1	1	1	100%
5500	1	1	1	1	1	1	1	1	1	1	100%
5501	1	1	1	1	1	1	1	1	1	1	100%
5502	1	1	1	1	1	1	1	1	1	1	100%
5503	1	1	1	1	1	1	1	1	1	1	100%
5504	1	1	1	1	1	1	1	1	1	1	100%
5505	1	1	1	1	1	1	1	1	1	1	100%
5506	1	1	1	1	1	1	1	1	1	1	100%
5507	1	1	1	1	1	1	1	1	1	1	100%
5508	1	1	1	1	1	1	1	1	1	1	100%
5509	1	1	1	1	1	1	1	1	1	1	100%
5510 Fh	1	1	1	1	1	1	1	1	1		90%
20 MHz Detection Bandwidth = Fh-Fl = 5510MHz-5490MHz = 20MHz											
EUT 99% Bandwidth = 16.6MHz											
16.6MHz*80% = 13.3MHz											

40 MHz Signal Bandwidth											
EUT Frequency=5510MHz											
	DFS Detection Trials (1=Detection, Blank= No Detection)										
Radar Frequency (MHz)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Detection Rate (%)**
5490	1	1	1	1	1	1	1	1			80%
5491 Fl	1	1	1	1	1	1	1	1	1	1	100%
5492	1	1	1	1	1	1	1	1	1	1	100%
5493	1	1	1	1	1	1	1	1	1	1	100%
5494	1	1	1	1	1	1	1	1	1	1	100%
5495	1	1	1	1	1	1	1	1	1	1	100%

5496	1	1	1	1	1	1	1	1	1	1	100%
5497	1	1	1	1	1	1	1	1	1	1	100%
5498	1	1	1	1	1	1	1	1	1	1	100%
5499	1	1	1	1	1	1	1	1	1	1	100%
5500	1	1	1	1	1	1	1	1	1	1	100%
5501	1	1	1	1	1	1	1	1	1	1	100%
5502	1	1	1	1	1	1	1	1	1	1	100%
5503	1	1	1	1	1	1	1	1	1	1	100%
5504	1	1	1	1	1	1	1	1	1	1	100%
5505	1	1	1	1	1	1	1	1	1	1	100%
5506	1	1	1	1	1	1	1	1	1	1	100%
5507	1	1	1	1	1	1	1	1	1	1	100%
5508	1	1	1	1	1	1	1	1	1	1	100%
5509	1	1	1	1	1	1	1	1	1	1	100%
5510	1	1	1	1	1	1	1	1	1	1	100%
5511	1	1	1	1	1	1	1	1	1	1	100%
5512	1	1	1	1	1	1	1	1	1	1	100%
5513	1	1	1	1	1	1	1	1	1	1	100%
5514	1	1	1	1	1	1	1	1	1	1	100%
5515	1	1	1	1	1	1	1	1	1	1	100%
5516	1	1	1	1	1	1	1	1	1	1	100%
5517	1	1	1	1	1	1	1	1	1	1	100%
5518	1	1	1	1	1	1	1	1	1	1	100%
5519	1	1	1	1	1	1	1	1	1	1	100%
5520	1	1	1	1	1	1	1	1	1	1	100%
5521	1	1	1	1	1	1	1	1	1	1	100%
5522	1	1	1	1	1	1	1	1	1	1	100%
5523	1	1	1	1	1	1	1	1	1	1	100%
5524	1	1	1	1	1	1	1	1	1	1	100%
5525	1	1	1	1	1	1	1	1	1	1	100%
5526	1	1	1	1	1	1	1	1	1	1	100%
5527	1	1	1	1	1	1	1	1	1	1	100%
5528	1	1	1	1	1	1	1	1	1	1	100%
5529 Fh	1	1	1	1	1	1	1	1	1	1	100%
5530	1	1	1	1							40%
40 MHz Detection Bandwidth = Fh-Fl = 5529MHz-5491MHz = 38MHz											
EUT 99% Bandwidth = 36.6MHz											
36.6MHz*80% = 29.3MHz											

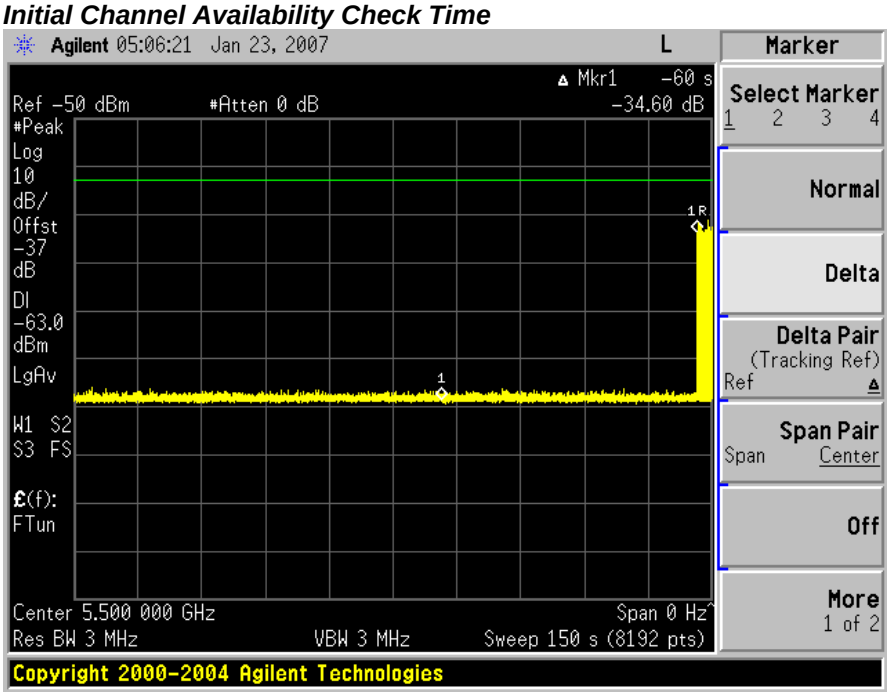
4. The **Initial Channel Availability Check Time** tests that the UUT does not emit beacon, control, or data signals on the test Channel until the power-up sequence has been completed and the U-NII device checks for Radar Waveforms for one minute on the test Channel. This test does not use any Radar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

   The U-NII device is powered on and instructed to operate at 5500 MHz. At the same time the UUT is powered on, the spectrum analyzer is set to zero span mode with a 3 MHz resolution bandwidth at 5500MHz with a 2.5 minute sweep time. The analyzer's sweep will be started the same time power is applied to the U-NII device.

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

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

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.

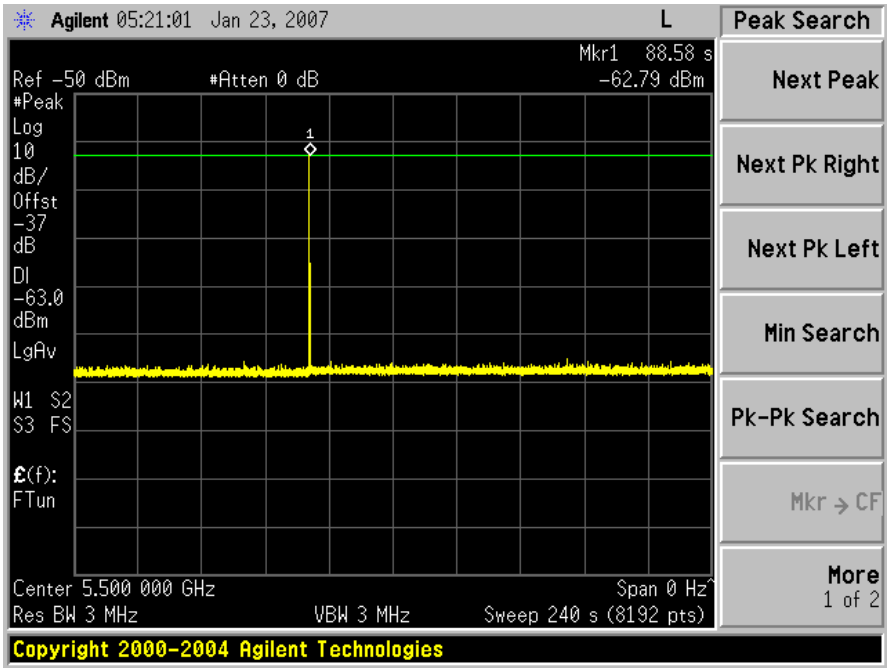
   The UUT is powered on at T_0. T_1 denotes the instant when the UUT has completed its power-up sequence. The Channel Availability Check Time commences at instant T_1 and will end no sooner than T_1 + 60 seconds.

   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 5500MHz will continue for 2.5 minutes after the radar Burst has been generated.

   Verify that during the 2.5 minute measurement window no UUT transmissions occurred at 5500MHz.

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.

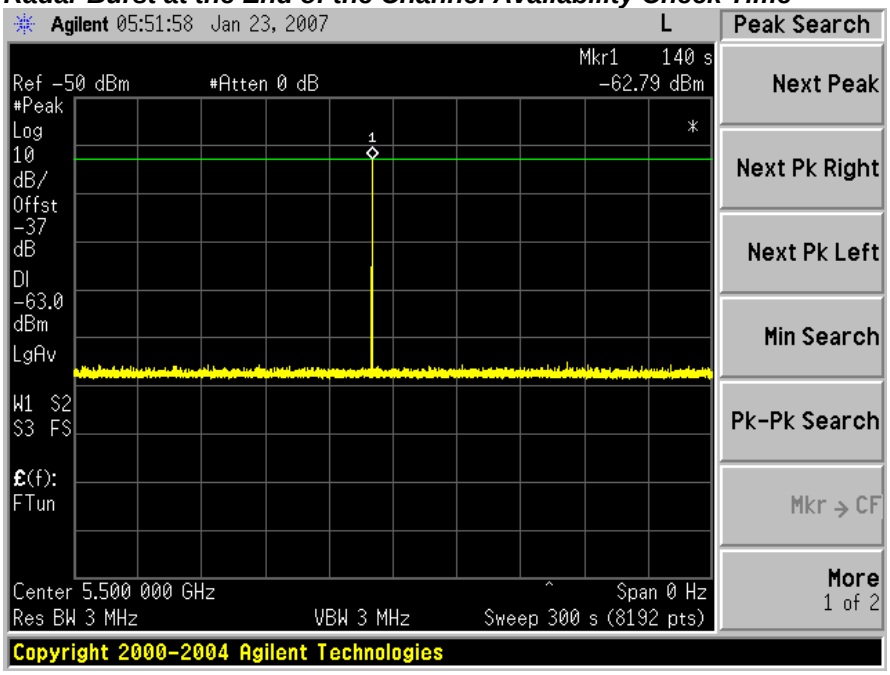
   The UUT is powered on at T_0. T_1 denotes the instant when the UUT has completed its power-up sequence. The Channel Availability Check Time commences at instant T_1 and will end no sooner than T_1 + 60 seconds.

   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 5500MHz will continue for 2.5 minutes after the radar Burst has been generated.

   Verify that during the 2.5 minute measurement window no UUT transmissions occurred at 5500MHz.

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.

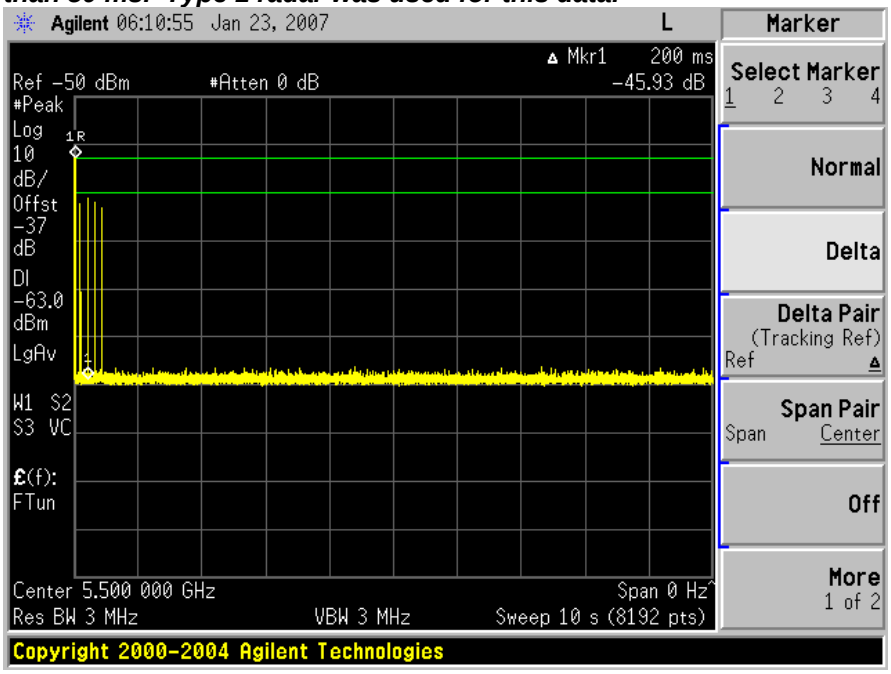
The steps below define the procedure to determine the above mentioned parameters when a radar Burst with a level equal to the DFS Detection Threshold + 1dB (-63dBm) is generated on the Operating Channel of the U-NII device.

A U-NII device operating as a Client Device will associate with the UUT (Master) at 5500 MHz. Stream the MPEG test file from the Master Device to the Client Device on the selected Channel for the entire period of the test.

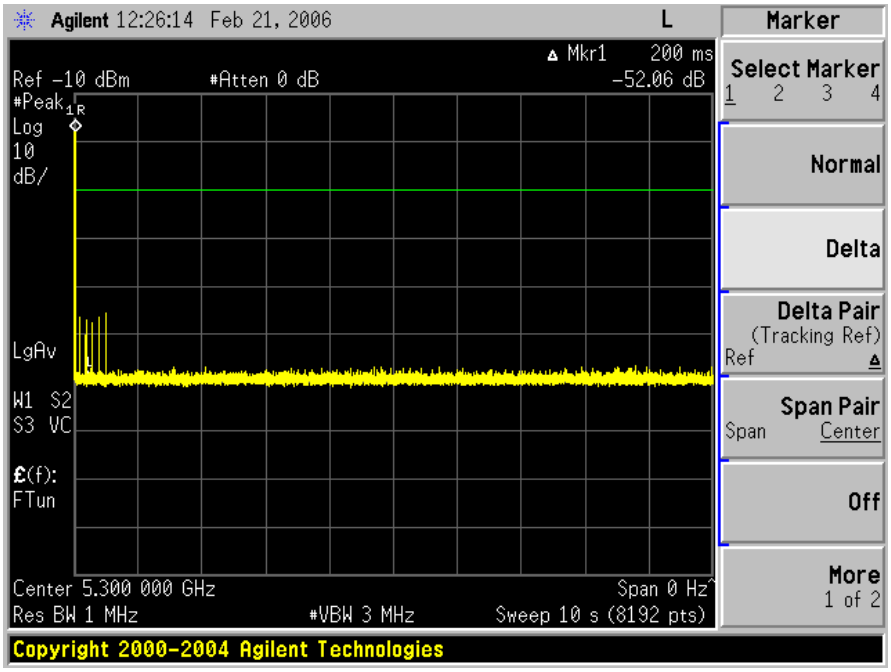
At time T_0 the Radar Waveform generator sends a Burst of pulses for each of the radar types at -63dBm.

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*.

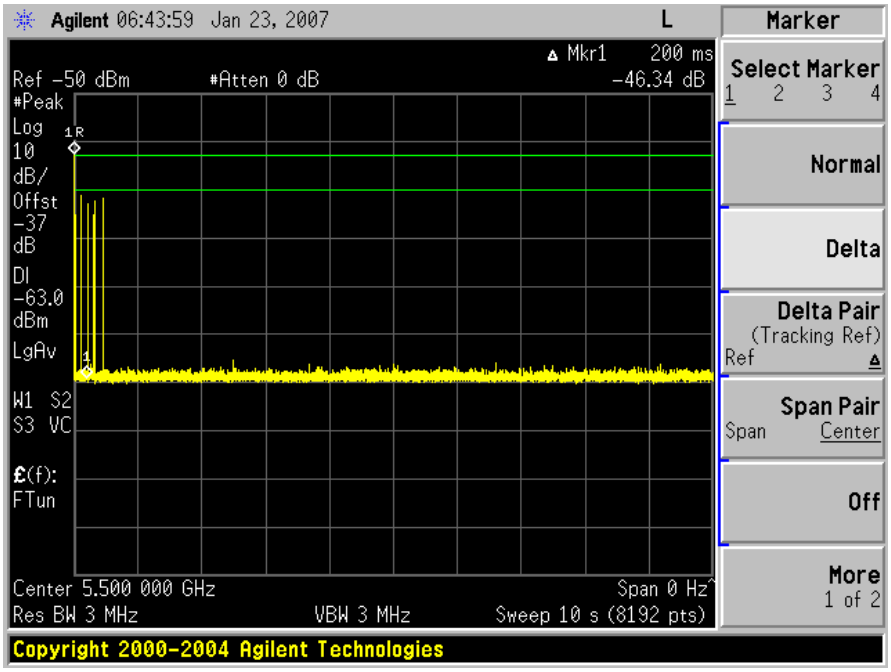
The following plot demonstrates a channel close time of 50ms, with an aggregate of no more than 50 ms. Type 1 radar was used for this data.



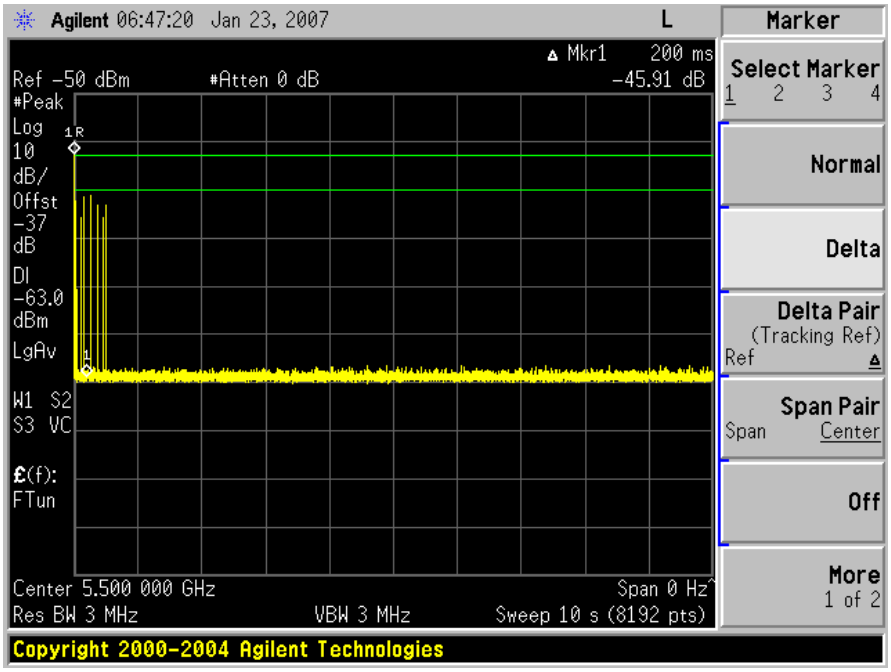
Channel Move Time, Channel Closing Transmission Time for Type 1 radar.



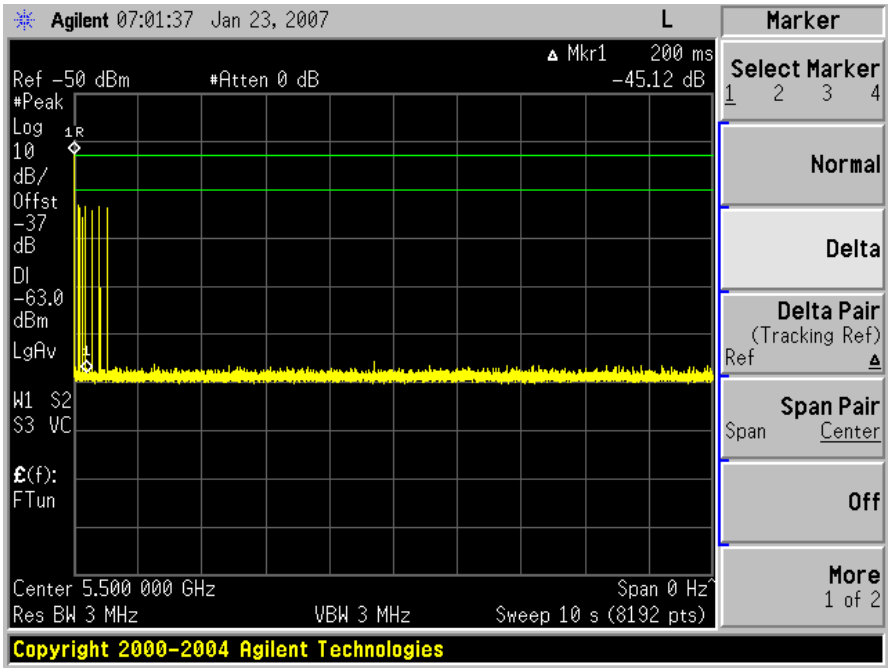
Channel Move Time, Channel Closing Transmission Time for Type 2 radar.



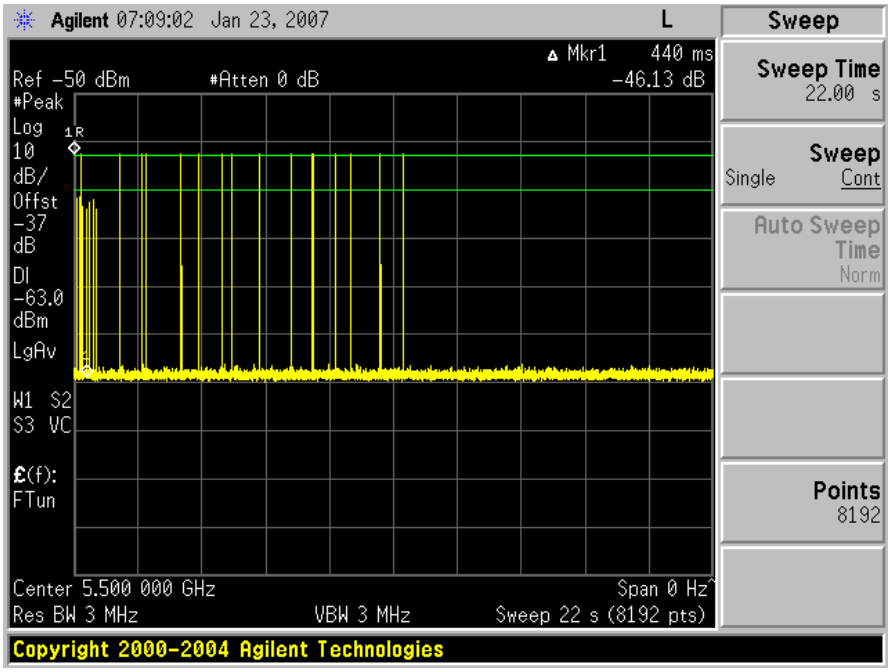
Channel Move Time, Channel Closing Transmission Time for Type 3 radar.



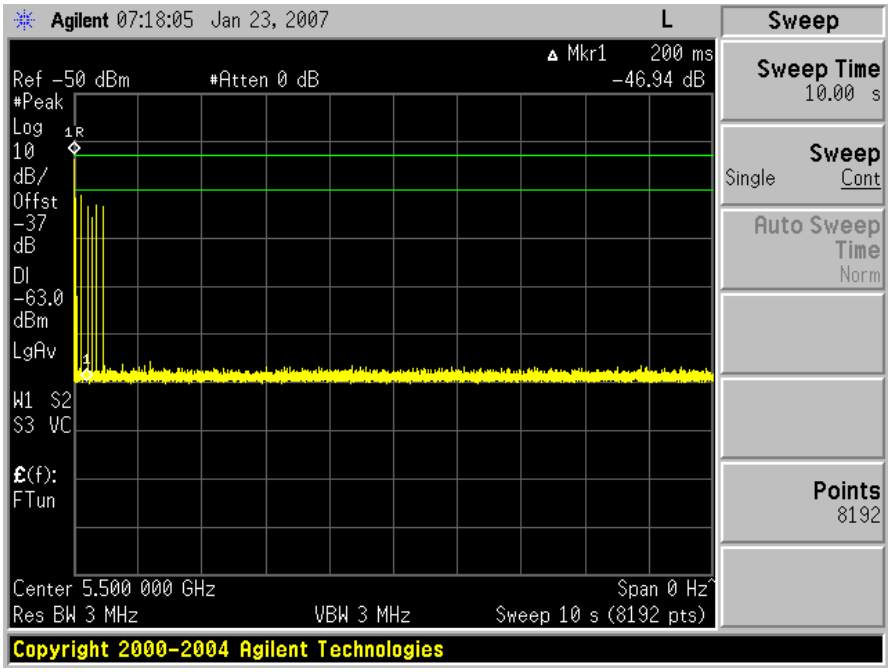
Channel Move Time, Channel Closing Transmission Time for Type 4 radar.



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

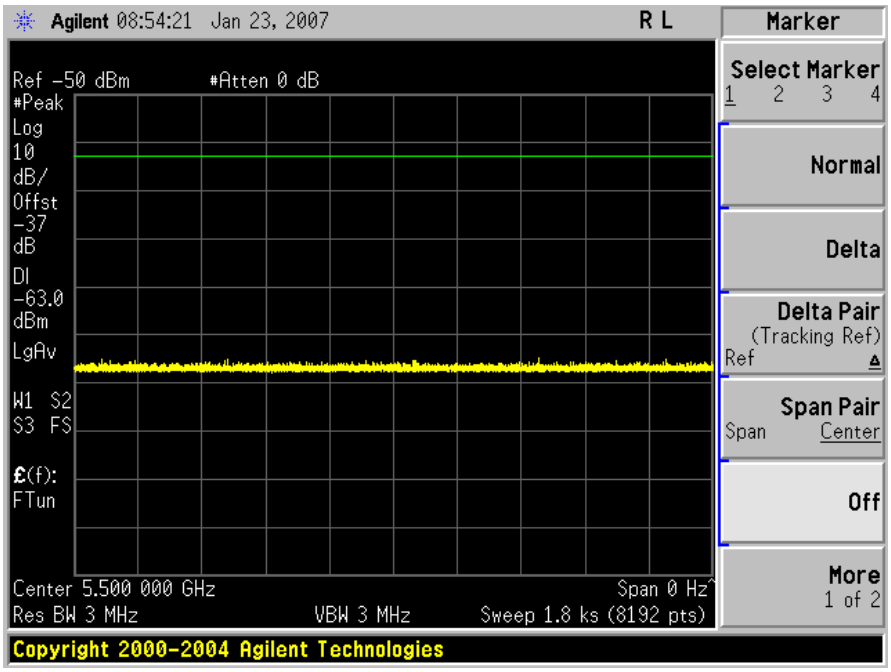


Channel Move Time, Channel Closing Transmission Time for Type 6 radar.



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 5500 MHz. Stream the MPEG test file from the Master Device to the Client Device on the selected Channel for the entire period of the test.

The Radar Waveform generator sends the individual waveform for each of the radar types 1-6 at -63dbm. Statistical data will be gathered to determine the ability of the device to detect the radar test waveforms. The device can utilize a test mode to demonstrate when detection occurs to prevent the need to reset the device between trial runs. The percentage of successful detection is calculated by:

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

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

Type 1 Radar Statistical Performance

Trial #	Pulse Width (us)	PRI (us)	Pulses/Burst	1=Detection Blank=No Detection
1	1	1428	18	1
2	1	1428	18	1
3	1	1428	18	1
4	1	1428	18	1
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	
12	1	1428	18	1
13	1	1428	18	1
14	1	1428	18	1
15	1	1428	18	
16	1	1428	18	
17	1	1428	18	1
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	
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
Detection Percentage				87% (>60%)

Type 2 Radar Statistical Performance

Trial #	Pulses/Burst	Pulse Width (us)	PRI (us)	1=Detection Blank=No Detection
1	27	3.2	182	1
2	24	4.9	192	1
3	23	4.6	169	1
4	27	2.5	201	1
5	27	2.3	217	1
6	28	1.5	215	1
7	28	2.5	171	1
8	29	3.0	173	1
9	28	3.3	177	1
10	27	3.0	179	
11	28	4.9	168	1
12	26	2.9	190	1
13	26	2.3	178	1
14	24	3.0	166	1
15	26	3.7	166	1
16	29	3.1	178	1
17	24	3.7	230	1
18	29	3.8	230	1
19	28	2.7	194	1
20	28	4.4	214	1
21	24	3.2	218	1
22	26	1.7	161	1
23	28	2.7	158	1
24	28	1.4	162	1
25	26	1.9	197	1
26	27	1.6	177	1
27	25	1.2	171	1
28	29	1.6	223	1
29	23	3.4	177	1
30	29	2.4	192	
Detection Percentage				93% (>60%)

Type 3 Radar Statistical Performance

Trial #	Pulses/Burst	Pulse Width (us)	PRI (us)	1=Detection Blank=No Detection
1	16	9.1	203	1
2	18	9.4	316	
3	17	9.4	438	1
4	17	9.7	390	1
5	17	7.7	292	1
6	16	6.9	293	1
7	16	8.3	282	1
8	16	6.6	312	1
9	18	9.4	316	1
10	18	7.6	244	1
11	17	6.2	322	1
12	16	7.3	362	1
13	18	7.4	277	1
14	18	7.0	395	1
15	18	8.7	202	1
16	16	7.8	421	1
17	17	7.4	263	1
18	18	8.7	336	1
19	16	9.3	403	
20	17	6.7	398	1
21	16	9.7	420	1
22	18	8.6	297	1
23	18	8.6	423	1
24	17	7.5	317	
25	16	7.3	337	1
26	16	7.0	233	1
27	18	7.3	256	
28	17	9.2	498	1
29	17	9.3	312	1
30	16	6.6	303	1
Detection Percentage				87% (>60%)

Type 4 Radar Statistical Performance

Trial #	Pulses/Burst	Pulse Width (us)	PRI (us)	1=Detection Blank=No Detection
1	12	11.1	385	1
2	16	17.3	219	1
3	16	11.7	370	1
4	16	16.5	372	1
5	14	13.3	299	1
6	12	12.0	351	1
7	15	14.2	236	1
8	12	12.3	321	1
9	16	19.4	406	1
10	16	19.9	434	
11	13	14.2	478	1
12	12	13.7	445	1
13	13	19.5	359	1
14	12	11.2	212	
15	15	11.8	379	1
16	14	11.3	458	1
17	14	11.1	478	1
18	13	16.5	490	1
19	16	16.7	212	1
20	15	18.5	492	
21	14	16.7	358	1
22	14	12.8	483	1
23	12	15.7	496	1
24	15	17.2	485	1
25	12	12.9	365	1
26	15	18.0	263	1
27	16	16.2	457	1
28	15	12.2	497	1
29	12	14.1	434	
30	16	19.9	255	1
Detection Percentage				87% (>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%+93%+87%+87%)/4 = 88.5% (>80%)

Type 5 Radar Statistical Performance

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

Trial #	Filename	1=Detection Blank=No Detection
1	Bin5StatistiConducted Spurious Emissions, 1	1
2	Bin5StatistiConducted Spurious Emissions, 2	1
3	Bin5StatistiConducted Spurious Emissions, 3	1
4	Bin5StatistiConducted Spurious Emissions, 4	1
5	Bin5StatistiConducted Spurious Emissions, 5	1
6	Bin5StatistiConducted Spurious Emissions, 6	1
7	Bin5StatistiConducted Spurious Emissions, 7	1
8	Bin5StatistiConducted Spurious Emissions, 8	1
9	Bin5StatistiConducted Spurious Emissions, 9	1
10	Bin5StatistiConducted Spurious Emissions, 10	1
11	Bin5StatistiConducted Spurious Emissions, 11	1
12	Bin5StatistiConducted Spurious Emissions, 12	1
13	Bin5StatistiConducted Spurious Emissions, 13	1
14	Bin5StatistiConducted Spurious Emissions, 14	1
15	Bin5StatistiConducted Spurious Emissions, 15	1
16	Bin5StatistiConducted Spurious Emissions, 16	1
17	Bin5StatistiConducted Spurious Emissions, 17	1
18	Bin5StatistiConducted Spurious Emissions, 18	1
19	Bin5StatistiConducted Spurious Emissions, 19	1
20	Bin5StatistiConducted Spurious Emissions, 20	1
21	Bin5StatistiConducted Spurious Emissions, 21	1
22	Bin5StatistiConducted Spurious Emissions, 22	1
23	Bin5StatistiConducted Spurious Emissions, 23	1
24	Bin5StatistiConducted Spurious Emissions, 24	1
25	Bin5StatistiConducted Spurious Emissions, 25	1
26	Bin5StatistiConducted Spurious Emissions, 26	1
27	Bin5StatistiConducted Spurious Emissions, 27	1
28	Bin5StatistiConducted Spurious Emissions, 28	1
29	Bin5StatistiConducted Spurious Emissions, 29	1
30	Bin5StatistiConducted Spurious Emissions, 30	1
	Detection Percentage	100% (>80%)

Type 6 Radar Statistical Performance

*See the Bin6 Radar Characteristics at the end of this report.

Trial #	Filename	1=Detection Blank=No Detection
1	Bin6StatistiConducted Spurious Emissions, 1	1
2	Bin6StatistiConducted Spurious Emissions, 2	1
3	Bin6StatistiConducted Spurious Emissions, 3	1
4	Bin6StatistiConducted Spurious Emissions, 4	1
5	Bin6StatistiConducted Spurious Emissions, 5	1
6	Bin6StatistiConducted Spurious Emissions, 6	1
7	Bin6StatistiConducted Spurious Emissions, 7	1
8	Bin6StatistiConducted Spurious Emissions, 8	1
9	Bin6StatistiConducted Spurious Emissions, 9	1
10	Bin6StatistiConducted Spurious Emissions, 10	1
11	Bin6StatistiConducted Spurious Emissions, 11	1
12	Bin6StatistiConducted Spurious Emissions, 12	1
13	Bin6StatistiConducted Spurious Emissions, 13	1
14	Bin6StatistiConducted Spurious Emissions, 14	1
15	Bin6StatistiConducted Spurious Emissions, 15	1
16	Bin6StatistiConducted Spurious Emissions, 16	1
17	Bin6StatistiConducted Spurious Emissions, 17	1
18	Bin6StatistiConducted Spurious Emissions, 18	1
19	Bin6StatistiConducted Spurious Emissions, 19	1
20	Bin6StatistiConducted Spurious Emissions, 20	1
21	Bin6StatistiConducted Spurious Emissions, 21	1
22	Bin6StatistiConducted Spurious Emissions, 22	1
23	Bin6StatistiConducted Spurious Emissions, 23	1
24	Bin6StatistiConducted Spurious Emissions, 24	1
25	Bin6StatistiConducted Spurious Emissions, 25	1
26	Bin6StatistiConducted Spurious Emissions, 26	1
27	Bin6StatistiConducted Spurious Emissions, 27	1
28	Bin6StatistiConducted Spurious Emissions, 28	1
29	Bin6StatistiConducted Spurious Emissions, 29	1
30	Bin6StatistiConducted Spurious Emissions, 30	1
	Detection Percentage	100%

Bin5StatistiConducted Spurious Emissions, 1.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	2	13	80	1526	0.560217
2	1	15	50	NA	0.953744
3	2	14	55	1125	1.735364
4	3	6	70	1628,1284	2.169408
5	2	11	85	1688	2.875505
6	1	15	55	NA	3.605622
7	3	6	90	1166,1633	4.091200
8	2	6	65	1266	4.895836
9	1	20	65	NA	5.361546
10	3	16	75	1681,1455	5.894187
11	1	17	60	NA	6.498116
12	1	8	75	NA	7.267939
13	1	9	75	NA	7.643700
14	3	9	100	1785,1005	8.832884
15	2	13	95	1341	9.057083
16	3	7	70	1895,1986	10.011506
17	2	9	100	1344	10.640842
18	3	7	75	1259,1930	11.211950
19	2	14	65	1279	11.934478

Bin5StatistiConducted Spurious Emissions, 2.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	1	8	55	NA	0.714840
2	1	11	60	NA	1.260443
3	2	19	95	1197	2.464833
4	3	16	95	1274,1271	3.352196
5	2	11	60	1189	4.386793
6	2	20	100	1372	5.354048
7	3	19	65	1127,1632	5.665524
8	2	15	65	1139	6.773930
9	2	11	100	1134	8.159611
10	1	7	100	NA	8.557186
11	1	12	100	NA	9.801278
12	3	12	75	1553,1637	10.626580
13	1	14	60	NA	11.468533

Bin5StatistiConducted Spurious Emissions, 3.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	3	9	95	1774,1861	0.330926
2	3	7	50	1097,1675	1.268554
3	1	11	90	NA	3.220163
4	3	19	70	1321,1236	3.459299
5	1	12	55	NA	4.369143
6	2	15	50	1772	6.475775
7	1	14	95	NA	7.415298
8	1	6	50	NA	8.187541
9	2	9	60	1774	9.733912
10	3	9	85	1562,1903	10.043844
11	2	17	100	1164	11.499290

Bin5StatistiConducted Spurious Emissions, 4.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	3	15	85	1402,1277	0.173027
2	2	13	70	1159	1.365341
3	2	7	60	1194	1.918282
4	3	15	100	1300,1913	2.786892
5	1	11	70	NA	3.181060
6	1	6	80	NA	4.044459
7	3	16	95	1912,1896	4.631559
8	3	7	60	1297,1762	5.055307
9	2	8	85	1205	6.338871
10	1	15	95	NA	6.926445
11	1	18	60	NA	7.180331
12	1	20	95	NA	7.922777
13	1	6	95	NA	8.918576
14	2	5	55	1979	9.205396
15	2	13	80	1811	10.113533
16	2	5	85	1266	10.861224
17	3	12	80	1382,1630	11.956113

Bin5StatistiConducted Spurious Emissions, 5.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	3	15	65	1427,1592	0.614753
2	3	8	55	1886,1303	1.566678
3	2	18	95	1349	2.516713
4	2	12	75	1569	2.660388
5	2	11	100	1442	3.531121
6	2	7	95	1306	4.952481
7	2	15	65	1401	5.534210
8	2	5	100	1181	6.702358
9	3	6	75	1991,1770	7.020351
10	1	12	60	NA	8.060096
11	2	6	65	1988	8.917513
12	1	15	60	NA	9.710094
13	2	8	80	1318	10.513300
14	2	8	70	1189	11.212685

Bin5StatistiConducted Spurious Emissions, 6.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	1	8	60	NA	0.225216
2	1	15	55	NA	0.871990
3	3	12	50	1191,1074	1.830064
4	1	12	95	NA	2.473085
5	3	10	55	1600,1792	2.700804
6	2	7	100	1519	3.303128
7	1	15	60	NA	3.984527
8	2	15	80	1819	4.904388
9	3	5	60	1802,1415	5.437462
10	1	20	75	NA	5.960085
11	2	17	75	1495	6.594229
12	2	11	65	1179	7.120730
13	3	14	60	1545,1349	7.865940
14	2	8	60	1119	8.503451
15	1	6	60	NA	9.014856
16	1	18	75	NA	9.648008
17	2	5	100	1412	10.164553
18	3	5	100	1921,1291	10.959446

19	2	19	70	1843	11.408333

Bin5StatistiConducted Spurious Emissions, 7.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	1	8	65	NA	0.132099
2	2	9	50	1101	0.872877
3	3	17	85	1813,1466	1.579421
4	1	20	85	NA	2.387520
5	2	7	70	1767	2.774479
6	1	10	65	NA	3.698633
7	2	7	95	1191	4.393195
8	1	8	95	NA	5.180680
9	1	7	90	NA	5.882481
10	2	20	90	1633	6.365193
11	2	19	90	1654	7.083376
12	2	6	55	1413	7.604303
13	1	11	100	NA	8.178167
14	1	11	50	NA	8.677061
15	1	8	85	NA	9.341013
16	2	10	70	1426	10.326174
17	2	14	85	1726	10.904667
18	1	12	55	NA	11.387776

Bin5StatistiConducted Spurious Emissions, 8.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	3	14	75	1540,1937	0.582275
2	1	9	55	NA	1.137515
3	2	20	80	1846	1.582968
4	3	5	75	1255,1569	1.885850
5	2	5	50	1752	2.674544
6	1	12	100	NA	3.252808
7	1	6	60	NA	4.140951
8	2	6	90	1471	4.690600
9	1	17	50	NA	5.279135
10	3	20	60	1548,1058	5.566230
11	3	14	55	1916,1594	6.478463
12	1	7	55	NA	7.033762
13	2	19	100	1017	7.324421
14	1	6	70	NA	8.177663
15	2	13	50	1480	8.718469
16	2	6	55	1780	9.131123
17	3	8	75	1703,1292	9.601000
18	2	12	70	1802	10.598327
19	2	7	90	1568	10.981009
20	3	9	90	1275,1765	11.585895

Bin5StatistiConducted Spurious Emissions, 9.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	3	14	75	1793,1520	0.822066
2	3	5	80	1457,1212	1.403773
3	3	17	55	1818,1127	2.042658
4	1	12	70	NA	3.165749
5	3	17	85	1581,1181	4.264747
6	3	15	100	1340,1912	5.391711
7	2	16	50	1392	6.005467
8	2	20	70	1981	7.082225
9	3	5	55	1081,1471	8.514468
10	1	18	75	NA	9.097194

11	2	7	75	1004	10.108961
12	3	11	95	1730,1017	11.757126

Bin5StatistiConducted Spurious Emissions, 10.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	1	16	80	NA	1.077169
2	1	16	65	NA	1.649315
3	2	10	55	1136	3.585451
4	3	17	65	1985,1900	3.790973
5	3	9	65	1504,1319	4.998306
6	3	8	50	1566,1369	6.169706
7	1	11	65	NA	7.741842
8	3	16	65	1559,1123	8.680934
9	1	9	100	NA	9.791225
10	2	13	60	1203	10.936134

Bin5StatistiConducted Spurious Emissions, 11.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	1	12	70	NA	0.276209
2	1	12	90	NA	0.857629
3	1	9	65	NA	1.972257
4	3	17	95	1243,1305	2.377855
5	2	5	100	1829	2.884010
6	3	19	100	1984,1688	3.719547
7	3	20	85	1669,1013	4.596640
8	2	17	100	1175	5.189525
9	2	18	85	1626	6.253215
10	1	19	80	NA	6.563515
11	3	9	65	1673,1662	7.509498
12	2	9	50	1678	8.215471
13	2	7	75	1737	8.797598
14	2	20	75	1757	9.203840
15	1	10	80	NA	10.433617
16	1	6	75	NA	10.821532
17	2	6	70	1892	11.914572

Bin5StatistiConducted Spurious Emissions, 12.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	2	5	50	1126	0.539743
2	2	20	100	1845	1.167925
3	1	15	70	NA	1.612192
4	3	10	100	1767,1017	2.607807
5	2	7	85	1246	2.983769
6	1	10	95	NA	3.660234
7	1	19	80	NA	4.171231
8	1	17	50	NA	5.301488
9	1	7	80	NA	5.926970
10	2	8	90	1108	6.254736
11	3	17	100	1744,1905	7.212272
12	1	16	50	NA	7.732777
13	1	11	65	NA	8.317470
14	3	18	65	1200,1301	8.992285
15	2	9	90	1159	9.627510
16	1	14	85	NA	10.337423
17	2	6	50	1456	10.871174
18	2	14	100	1900	11.987835

Bin5StatistiConducted Spurious Emissions, 13.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	2	20	95	1652	0.906890
2	1	9	80	NA	2.680484
3	1	5	65	NA	4.320778
4	1	18	90	NA	5.202694
5	2	11	95	1651	6.822708
6	3	9	100	1597,1019	8.864861
7	3	12	90	1411,1646	9.710988
8	1	18	80	NA	11.266605

Bin5StatistiConducted Spurious Emissions, 14.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	2	9	55	1302	1.139250
2	2	19	80	1541	2.266972
3	1	5	80	NA	4.179267
4	3	12	50	1799,1043	4.818273
5	2	18	60	1856	6.364186
6	2	6	60	1897	7.975767
7	2	12	85	1594	9.061920
8	3	18	95	1912,1622	11.717029

Bin5StatistiConducted Spurious Emissions, 15.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	1	13	100	NA	0.364783
2	2	10	50	1199	2.666412
3	3	15	75	1779,1637	3.081402
4	2	17	70	1557	5.765578
5	2	6	100	1651	6.332456
6	2	8	75	1576	8.597645
7	2	20	85	1193	10.483370
8	1	12	90	NA	11.883729

Bin5StatistiConducted Spurious Emissions, 16.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	3	20	85	1065,1714	0.189062
2	1	15	65	NA	0.750116
3	1	7	65	NA	1.507785
4	3	5	95	1489,1985	2.435155
5	3	18	55	1082,1498	3.083722
6	1	6	80	NA	3.971948
7	2	14	55	1592	4.485996
8	3	17	55	1485,1577	5.030177
9	3	11	95	1052,1410	5.958709
10	1	20	55	NA	6.184327
11	2	8	75	1615	7.077090
12	1	6	100	NA	7.524728
13	3	7	50	1003,1605	8.363682
14	1	19	70	NA	9.232491
15	1	18	60	NA	9.557501
16	2	7	70	1069	10.374854
17	3	15	75	1806,1492	11.040716
18	3	5	75	1210,1477	11.920784

Bin5StatistiConducted Spurious Emissions, 17.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	2	18	95	1223	0.665694
2	2	7	50	1380	1.284694
3	2	13	85	1162	2.517303
4	2	7	100	1247	4.224119
5	2	14	50	1361	5.846404
6	2	13	90	1233	6.076306
7	3	12	85	1093,1206	7.419080
8	3	11	65	1674,1547	8.983513
9	2	17	60	1554	10.665377
10	2	6	65	1148	10.837530

Bin5StatistiConducted Spurious Emissions, 18.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	1	13	65	NA	0.484717
2	1	11	80	NA	1.159442
3	1	11	85	NA	1.989763
4	1	17	95	NA	3.113992
5	2	14	70	1815	4.253228
6	3	15	85	1630,1259	4.521067
7	3	7	90	1579,1110	5.936267
8	2	10	55	1455	6.678804
9	3	10	70	1597,1342	7.508272
10	3	18	60	1747,1248	8.176820
11	1	20	70	NA	9.056342
12	2	7	80	1587	9.607438
13	3	9	50	1698,1867	10.485855
14	1	18	90	NA	11.584605

Bin5StatistiConducted Spurious Emissions, 19.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	3	16	55	1327,1743	0.189354
2	2	5	50	1172	1.087821
3	1	19	80	NA	1.425253
4	3	6	70	1752,1450	2.196791
5	3	18	50	1057,1315	2.534874
6	3	18	100	1991,1254	3.303705
7	2	12	65	1128	4.299627
8	3	17	90	1152,1980	4.618446
9	3	5	50	1603,1247	5.221283
10	2	19	95	1105	6.238795
11	3	20	95	1386,1992	6.585909
12	2	19	90	1370	7.391358
13	2	15	60	1507	7.655405
14	2	16	90	1471	8.557446
15	3	17	80	1499,1977	8.862875
16	1	11	70	NA	9.700538
17	3	8	80	1056,1667	10.657443
18	1	5	60	NA	10.997991
19	2	9	50	1991	11.610160

Bin5StatistiConducted Spurious Emissions, 20.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	2	11	75	1528	0.477278
2	3	14	55	1764,1515	1.313624
3	2	6	50	1864	2.691367
4	2	20	50	1622	3.540585
5	3	7	70	1782,1809	4.535160
6	3	16	95	1270,1921	5.198525
7	1	15	90	NA	5.844929
8	2	11	90	1318	6.464262
9	1	9	50	NA	8.131810
10	2	16	50	1252	8.737775
11	1	10	90	NA	9.341513
12	1	8	85	NA	10.536350
13	3	14	90	1493,1500	11.192702

Bin5StatistiConducted Spurious Emissions, 21.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	1	11	60	NA	0.198394
2	2	15	50	1860	1.098795
3	3	7	95	1136,1855	1.838017
4	2	6	55	1068	2.749918
5	1	7	55	NA	3.067552
6	3	16	55	1223,1604	4.092717
7	1	5	70	NA	4.964621
8	2	5	55	1080	5.997556
9	1	16	75	NA	6.334557
10	1	17	50	NA	7.229808
11	2	6	65	1827	7.784109
12	3	13	55	1692,1308	8.460396
13	3	19	75	1161,1147	9.335023
14	3	7	75	1155,1400	10.164647
15	2	19	60	1500	11.028585
16	3	16	60	1206,1490	11.287696

Bin5StatistiConducted Spurious Emissions, 22.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	1	17	60	NA	0.259190
2	3	16	60	1755,1016	1.154477
3	2	6	75	1618	1.503157
4	3	18	55	1315,1815	2.389196
5	1	9	55	NA	2.429890
6	2	9	100	1217	3.307418
7	2	6	75	1456	3.959000
8	2	16	65	1761	4.518037
9	1	13	95	NA	5.121371
10	2	6	90	1073	5.897151
11	2	12	95	1849	6.452961
12	1	15	75	NA	6.608709
13	3	20	65	1611,1352	7.766821
14	3	19	90	1571,1687	8.029902
15	2	15	100	1642	8.406261
16	1	7	75	NA	9.210887
17	1	19	100	NA	9.717320
18	2	14	65	1969	10.579678
19	1	14	90	NA	10.950622

20	3	5	65	1805,1349	11.702990

Bin5StatistiConducted Spurious Emissions, 23.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	2	9	95	1375	0.426164
2	3	10	75	1903,1329	0.682080
3	3	12	85	1524,1915	1.349755
4	1	20	55	NA	2.201036
5	2	12	95	1445	2.948833
6	1	9	50	NA	3.404405
7	3	17	55	1990,1545	4.081089
8	2	15	90	1544	4.530982
9	3	13	90	1857,1942	4.938504
10	1	7	75	NA	5.877314
11	2	16	70	1928	6.568613
12	2	17	100	1278	6.616126
13	3	7	85	1656,1767	7.758380
14	2	11	95	1013	7.910941
15	3	17	75	1653,1453	8.650009
16	1	18	75	NA	9.355870
17	3	9	100	1938,1981	9.792517
18	2	6	50	1303	10.708265
19	2	12	55	1455	11.049167
20	3	18	85	1228,1340	11.666018

Bin5StatistiConducted Spurious Emissions, 24.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	3	20	80	1289,1154	0.708080
2	1	7	90	NA	1.118844
3	1	15	100	NA	1.795530
4	1	16	60	NA	2.605457
5	1	12	55	NA	3.379687
6	2	5	90	1587	3.893407
7	2	5	70	1171	4.584573
8	2	16	85	1102	5.625719
9	3	12	95	1409,1047	6.547662
10	2	5	85	1352	7.164235
11	1	15	90	NA	8.061174
12	2	5	75	1383	8.919423
13	3	5	90	1813,1632	9.193176
14	1	9	90	NA	9.996179
15	2	13	75	1814	11.212747
16	1	14	85	NA	11.866708

Bin5StatistiConducted Spurious Emissions, 25.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	2	8	95	1472	0.042703
2	3	7	95	1961,1742	0.682571
3	2	20	100	1821	1.864106
4	2	10	50	1893	2.171655
5	2	5	55	1068	2.898343
6	3	15	85	1773,1997	3.220556
7	1	20	60	NA	4.305020
8	3	10	65	1583,1982	4.759748
9	2	18	65	1862	5.274031
10	2	14	75	1206	5.739309
11	3	14	60	1045,1646	6.613432
12	3	10	85	1727,1348	7.313473
13	1	19	100	NA	8.164345
14	3	7	70	1856,1214	8.231440
15	1	10	85	NA	9.029920
16	3	10	65	1140,1640	10.006982
17	2	5	60	1399	10.189309
18	3	19	55	1889,1992	10.754588
19	3	15	70	1751,1462	11.653754

Bin5StatistiConducted Spurious Emissions, 26.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	3	18	65	1146,1664	0.311317
2	3	9	70	1660,1080	0.706229
3	3	13	85	1513,1980	1.432773
4	2	10	50	1998	2.431026
5	2	13	85	1577	2.660954
6	1	5	75	NA	3.491355
7	3	12	70	1426,1239	3.859928
8	2	11	65	1701	4.455209
9	2	19	100	1091	5.462188
10	2	10	90	1325	6.151259
11	2	7	55	1297	6.767631
12	2	14	60	1077	7.146611
13	1	10	65	NA	7.885784
14	3	10	95	1003,1021	8.358920
15	2	15	95	1104	8.866920
16	1	15	100	NA	9.825739
17	2	12	65	1517	10.133463
18	2	10	50	1894	10.920214
19	2	8	75	1578	11.925033

Bin5StatistiConducted Spurious Emissions, 27.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	2	14	95	1723	0.381878
2	2	19	85	1512	0.943462
3	1	13	85	NA	1.715041
4	2	5	95	1124	2.637521
5	2	10	70	1228	2.678302
6	2	6	100	1583	3.925576
7	1	14	85	NA	4.186924
8	3	19	65	1980,1256	4.888864
9	1	17	75	NA	5.748240
10	1	19	75	NA	6.609447
11	2	13	55	1881	6.676110
12	2	7	50	1952	7.933780
13	3	7	65	1163,1089	8.360277
14	2	14	60	1118	8.898094
15	2	16	50	1628	9.889217
16	3	10	90	1109,1316	10.176947
17	1	17	80	NA	10.718500
18	1	12	50	NA	11.507719

Bin5StatistiConducted Spurious Emissions, 28.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	3	11	85	1613,1491	0.221110
2	1	17	100	NA	2.906973
3	1	8	85	NA	3.666031
4	3	8	90	1594,1695	5.419139
5	2	9	80	1210	6.651231
6	2	15	55	1336	8.938872
7	3	20	90	1049,1591	9.704559
8	2	11	90	1798	11.314932

Bin5StatistiConducted Spurious Emissions, 29.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	3	9	50	1717,1364	0.396265
2	2	6	50	1148	1.190643
3	1	10	75	NA	1.217983
4	3	11	90	1141,1163	2.034267
5	1	9	75	NA	2.510143
6	3	17	100	1970,1773	3.492568
7	3	18	100	1906,1702	4.141282
8	1	9	75	NA	4.547303
9	2	8	50	1051	4.977426
10	2	6	75	1894	5.757913
11	2	5	60	1019	6.345496
12	3	17	50	1445,1019	6.639344
13	1	13	70	NA	7.438649
14	2	13	90	1999	7.806934
15	2	9	80	1202	8.778397
16	1	14	55	NA	9.560934
17	3	16	55	1467,1226	9.696714
18	2	15	60	1255	10.637733
19	1	18	75	NA	10.838545
20	3	18	95	1842,1178	11.890255

Bin5StatistiConducted Spurious Emissions, 30.txt

Burst#	Pulses	Chirp(MHz)	PW(uS)	Inter-pulse spacing/s(uS)	Pulse Start(S)
1	3	19	75	1697,1491	0.431787
2	2	12	70	1681	0.814901
3	2	15	70	1832	1.353137
4	2	12	85	1368	2.323234
5	1	16	85	NA	2.423792
6	2	16	55	1458	3.501635
7	1	9	100	NA	4.116155
8	2	14	90	1644	4.204810
9	1	13	70	NA	5.235199
10	3	5	70	1156,1411	5.986557
11	1	15	65	NA	6.199038
12	3	18	55	1604,1229	7.153491
13	2	18	65	1359	7.290605
14	3	8	55	1464,1249	8.147313
15	1	10	95	NA	8.494478
16	1	18	75	NA	9.234184
17	1	7	65	NA	9.635216
18	3	6	55	1483,1782	10.707749
19	1	7	100	NA	10.941650
20	1	8	55	NA	11.812996

Bin6StatistiConducted Spurious Emissions, 1.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
14	5.493000	42
48	5.504000	144
85	5.506000	255
88	5.500000	264

Bin6StatistiConducted Spurious Emissions, 2.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
0	5.506000	0
7	5.508000	21
9	5.507000	27
33	5.499000	99
41	5.503000	123
48	5.496000	144

Bin6StatistiConducted Spurious Emissions, 3.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
16	5.492000	48
18	5.491000	54
40	5.493000	120
45	5.494000	135
65	5.495000	195
67	5.496000	201
90	5.500000	270

Bin6StatistiConducted Spurious Emissions, 4.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
18	5.499000	54
29	5.501000	87
53	5.498000	159
82	5.503000	246

Bin6StatistiConducted Spurious Emissions, 5.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
78	5.505000	234
88	5.500000	264
92	5.494000	276

Bin6StatistiConducted Spurious Emissions, 6.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
5	5.494000	15
15	5.503000	45
27	5.509000	81
66	5.496000	198
69	5.493000	207

Bin6StatistiConducted Spurious Emissions, 7.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
24	5.491000	72
50	5.503000	150

Bin6StatistiConducted Spurious Emissions, 8.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
18	5.498000	54
34	5.503000	102
71	5.507000	213
90	5.492000	270

Bin6StatistiConducted Spurious Emissions, 9.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
3	5.493000	9
34	5.495000	102
39	5.506000	117
89	5.494000	267
95	5.492000	285

Bin6StatistiConducted Spurious Emissions, 10.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
52	5.491000	156
61	5.493000	183
62	5.492000	186

Bin6StatistiConducted Spurious Emissions, 11.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
1	5.491000	3
55	5.508000	165
73	5.507000	219
97	5.498000	291

Bin6StatistiConducted Spurious Emissions, 12.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
8	5.491000	24
32	5.499000	96
48	5.493000	144
78	5.502000	234

Bin6StatistiConducted Spurious Emissions, 13.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
44	5.492000	132
48	5.491000	144
51	5.500000	153
91	5.495000	273

Bin6StatistiConducted Spurious Emissions, 14.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
10	5.508000	30
39	5.503000	117
65	5.496000	195
76	5.502000	228

Bin6StatistiConducted Spurious Emissions, 15.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
16	5.498000	48
24	5.503000	72

Bin6StatistiConducted Spurious Emissions, 16.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
11	5.501000	33
28	5.500000	84
32	5.509000	96
35	5.505000	105
51	5.495000	153
57	5.496000	171
60	5.491000	180
71	5.507000	213
74	5.499000	222
90	5.508000	270

Bin6StatistiConducted Spurious Emissions, 17.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
16	5.508000	48
28	5.496000	84
30	5.507000	90
45	5.502000	135
77	5.492000	231
85	5.498000	255

Bin6StatistiConducted Spurious Emissions, 18.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
2	5.499000	6
5	5.491000	15
20	5.496000	60
26	5.505000	78
66	5.492000	198
75	5.498000	225

Bin6StatistiConducted Spurious Emissions, 19.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
0	5.503000	0
1	5.497000	3
67	5.499000	201
79	5.496000	237

Bin6StatistiConducted Spurious Emissions, 20.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
22	5.501000	66
39	5.497000	117
47	5.494000	141
48	5.498000	144
52	5.507000	156

Bin6StatistiConducted Spurious Emissions, 21.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
0	5.507000	0
19	5.491000	57
40	5.508000	120
89	5.496000	267

Bin6StatistiConducted Spurious Emissions, 22.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
5	5.498000	15
30	5.505000	90
41	5.499000	123
80	5.507000	240
97	5.502000	291

Bin6StatistiConducted Spurious Emissions, 23.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
6	5.500000	18
20	5.493000	60
49	5.504000	147
59	5.508000	177
90	5.503000	270
95	5.495000	285

Bin6StatistiConducted Spurious Emissions, 24.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
17	5.495000	51
32	5.500000	96
68	5.505000	204

Bin6StatistiConducted Spurious Emissions, 25.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
9	5.492000	27
20	5.501000	60
22	5.506000	66
56	5.496000	168
72	5.503000	216

Bin6StatistiConducted Spurious Emissions, 26.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
6	5.508000	18
37	5.505000	111
45	5.499000	135
54	5.502000	162
63	5.495000	189
69	5.501000	207
70	5.497000	210
87	5.493000	261
98	5.503000	294

Bin6StatistiConducted Spurious Emissions, 27.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
9	5.498000	27
23	5.502000	69
29	5.495000	87
79	5.503000	237

Bin6StatistiConducted Spurious Emissions, 28.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
15	5.508000	45
18	5.497000	54
48	5.501000	144
61	5.503000	183
75	5.493000	225
83	5.507000	249
85	5.499000	255
98	5.505000	294

Bin6StatistiConducted Spurious Emissions, 29.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
33	5.505000	99
38	5.492000	114
88	5.504000	264

Bin6StatistiConducted Spurious Emissions, 30.txt

Hop#	Frequency(GHz)	Pulse Start (mS)
5	5.497000	15
45	5.506000	135
76	5.498000	228