Dynamic Frequency Selection (DFS) Test Report

FCC Part15 Subpart E & Industry Canada RSS-210

Product Name	:	Wireless LAN access Point
Model No.	:	H3C WA3620i-AGN; H3C WA3628i-AGN
FCC ID	:	O9C-WA3620i
IC	:	2299L-WA3620i

Applicant	:	Hewlett Packard Corporation
Address	:	153 Taylor street, Litterton Massachusetts United States

Date of Receipt	:	01/11/2011
Test Date	:	02/11/2011~ 04/12/2011
Issued Date	:	20/12/2011
Report No.	:	11BS004R-DFS-US-P08V01
Report Version	:	V1.2

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Manufacturer	:	Hewlett Packard Corporation
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Model No.	:	H3C WA3620i-AGN; H3C WA3628i-AGN
EUT Voltage	:	48Vdc, 0.27A (or POE input)
Brand Name	:	H3C
Applicable Standard	:	FCC CFR Title 47 Part 15 Subpart E: 2008 FCC OET Order 06-96A (2006) Industry Canada RSS-210 Issue 8
Test Result	:	Pass
Performed Location	:	Suzhou EMC Laboratory No.99 Hongye Rd., Suzhou Industrial Park Loufeng Hi-Tech Development Zone., Suzhou, China TEL: +86-512-6251-5088 / FAX: +86-512-6251-5098 FCC Registration Number: 800392; IC Lab Code: 4075B
Operation Mode (5250~5350MHz 5470~5725MHz)	:	☒ Master device ☐ Slaver device with radar detection function ☐ Slaver device without radar detection function

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1. UNII Device Information

1. The wireless LAN access point H3C WA3620i-AGN; H3C WA3628i-AGN operates in the following bands:
   a. 2412~2462MHz
   b. 5180~5240MHz
   c. 5260~5320MHz
   d. 5500~5700MHz
   e. 5745~5825MHz

2. The maximum mean EIRP of the device for 5GHz band is 22.97dBm, and the minimum possible mean EIRP is 21.26dBm.

3. The device installed with 3*Tx and 3*Rx antenna delivery. Antenna corresponding gains are 6.3dBi for 5GHz. 0dBi gain was used to set the -62dBm threshold level (-62dBm +1 dB) during calibration of the test setup.

   Antenna information shown below:

Antenna	Manufacturer	Model No.	Peak Gain
Built-in Antenna			
Internal Antenna	H3C	2701A01E	2.4GHz: 6dBi; 5GHz: 6.3dBi
External Antenna			
Dipole Antenna	WHA YU GROUP	C5060-510002-A	2.4GHz: 2dBi; 5GHz: 3dBi
Panel Antenna	H3C	ANT-2503C-M3	2.4GHz: 2.5dBi; 5GHz: 4dBi
Panel Antenna	H3C	ANT-2503C-M6	2.4GHz: 2.5dBi; 5GHz: 4.5dBi

4. System test was performed with the designated MPEG test file (download from NTIA) that streams full motion video at 30 frames per second from the Master to the Client IP based system.

5. This Master does not exceed 27dBm EIRP, so no transmit power control is implemented.

6. The Master requires 57.6s for completing its power-on cycle.

7. Information regarding the parameters of the detected Radar Waveforms is not available to the end user.

8. For the 5250~5350 MHz band, 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. Test Equipment

Dynamic Frequency Selection (DFS) / TR-8

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Spectrum Analyzer	Agilent	E4440A	MY49420128	2011-04-10
Vector Signal Generator	Agilent	E4438C	102168	2011-04-23

Instrument	Manufacturer	Type No.	Serial No
Splitter/Combiner (Qty: 2)	Mini-Circuits	ZAPD-50W 4.2-6.0 GHz	NN256400424
Splitter/Combiner (Qty: 2)	MCLI	PS3-7	4463/4464
ATT (Qty: 1)	Mini-Circuits	VAT-30+	30912
Laptop PC	Asus	N80V	8BN0AS226971468
RF Cable (Qty: 6)	Mini-Circuits	N/A	DFS-1~6

Software	Manufacturer	Function
Pulse Building	Agilent	Radar Signal Generation Software
DFS Tool	Agilent	DFS Test Software

3. DFS Detection Threshold and Response Requirement

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.	

4. Radar Wave Parameters

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

Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (μsec)	PRI (μsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of 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 Type 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.

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 Number of 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 Type waveforms. If more than 30 waveforms are used for the Long Pulse Radar Type waveforms, 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 frequency modulated 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 random time interval between the first and second pulses is chosen independently of the random time interval 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 randomly.

A representative example of a Long Pulse Radar Type waveform:

1) The total test waveform length is 12 seconds.

2) Eight (8) Bursts are randomly generated for the Burst_Count.

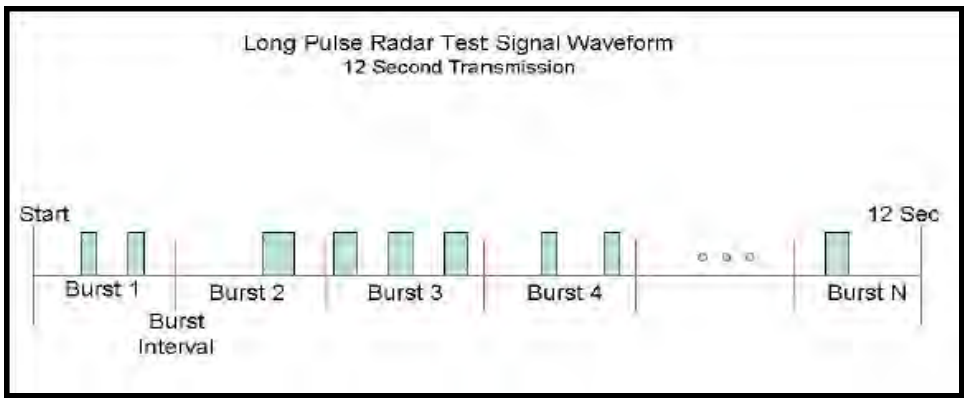
3) Burst 1 has 2 randomly generated pulses.

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).



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 Number of Trials
6	1	333	9	0.333	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 from the hopping sequence defined by the following algorithm: 3

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.

5. Test Setup

Conducted Test Setup

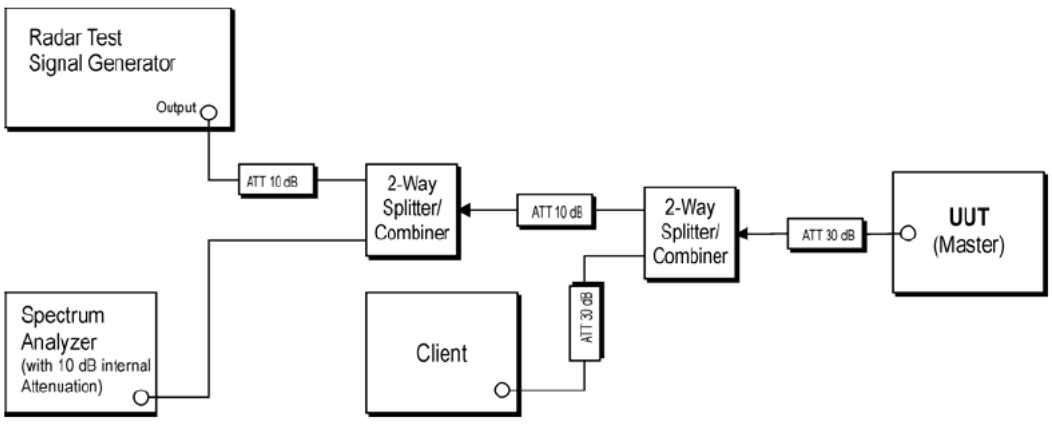
The sections below contain block diagrams that focus on the Radar Waveform injection path for each of the different conducted setups to be used. Each setup consists of a signal generator, analyzer (spectrum analyzer or vector signal analyzer), Master Device, Client Device, plus power combiner/splitters and attenuators. The Client Device is set up to Associate with the Master Device. The designation of the UUT (Master Device or Client Device) and the device into which the Radar Waveform is injected varies among the setups.

Other topologies may be used provided that: (1) the radar and UUT signals can be discriminated from each other on the analyzer and (2) the radar DFS Detection Threshold level at the UUT is stable.

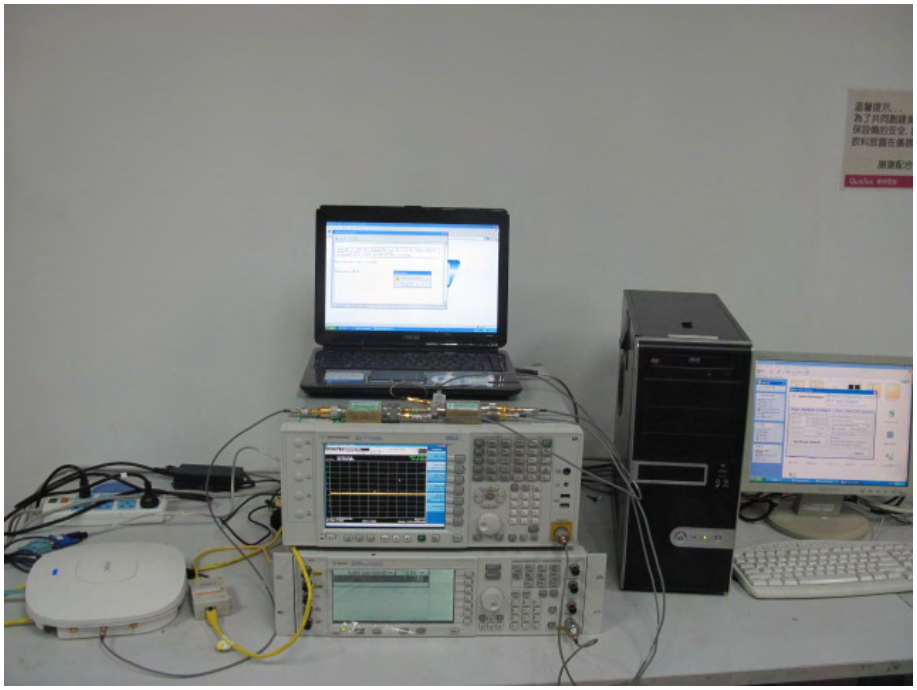
To address point (1), for typical UUT power levels and typical minimum antenna gains, the topologies shown will result in the following relative amplitudes of each signal as displayed on the analyzer: the Radar Waveform level is the highest, the signal from the UUT is the next highest, while the signal from the device that is associated with the UUT is the lowest. Attenuator values may need to be adjusted for particular configurations.

To address point (2), the isolation characteristic between ports 1 and 2 of a power combiner/splitter are extremely sensitive to the impedance presented to the common port, while the insertion loss characteristic between the common port and (port 1, for example) are relatively insensitive to the impedance presented to (port 2, in this example). Thus, the isolation between ports 1 and 2 should never be part of the path that establishes the radar DFS Detection Threshold. The 10 dB attenuator after the signal generator is specified as a precaution; since many of the radar test waveforms will require typical signal generators to operate with their ALC turned off, the source match will generally be degraded from the closed loop specifications.

Figure 1



DFS Set-up Photo: Master and Spectrum Analyzer

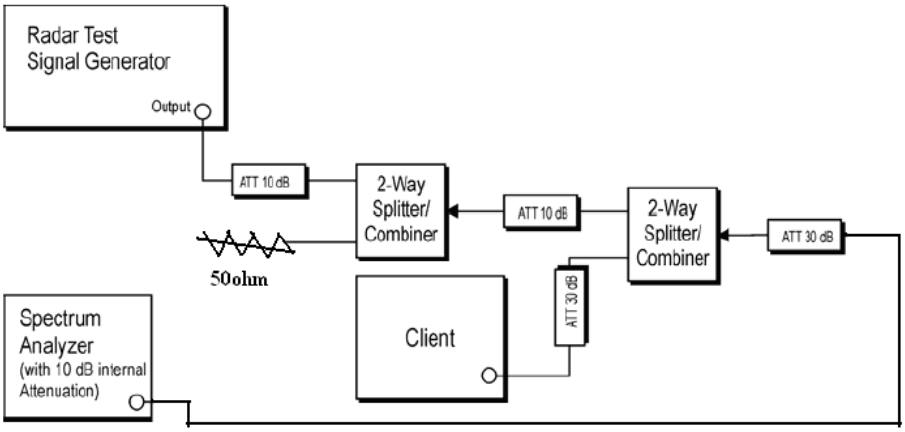


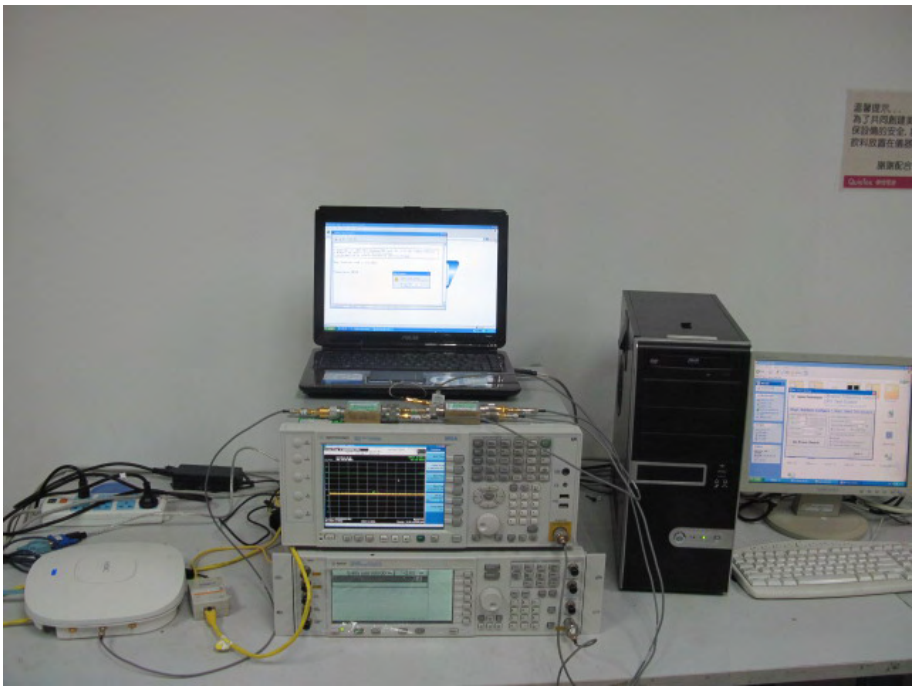
6. Radar Waveform Calibration

The following equipment setup was used to calibrate the conducted radar waveform. A spectrum analyzer was used to establish the test signal level for each radar type. During this process there were no transmissions by either the master or client device. The spectrum analyzer was switched to the zero spans (time domain) 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 and 3 MHz.

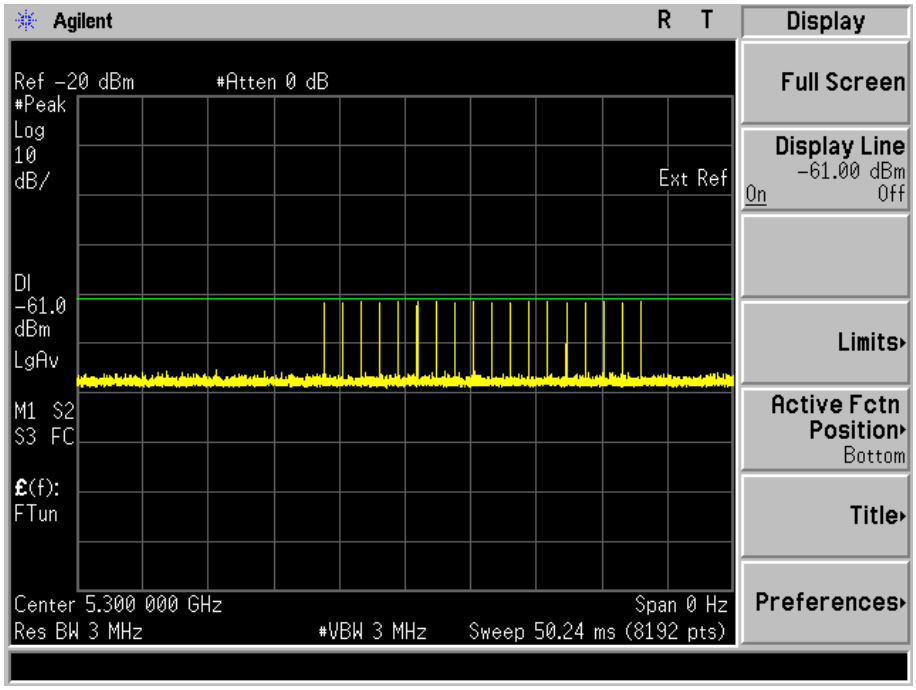
The signal generator amplitude was set so that the power level measured at the spectrum analyzer was -63dBm due to the interference threshold level.

Figure 2: Conducted Calibration Setup

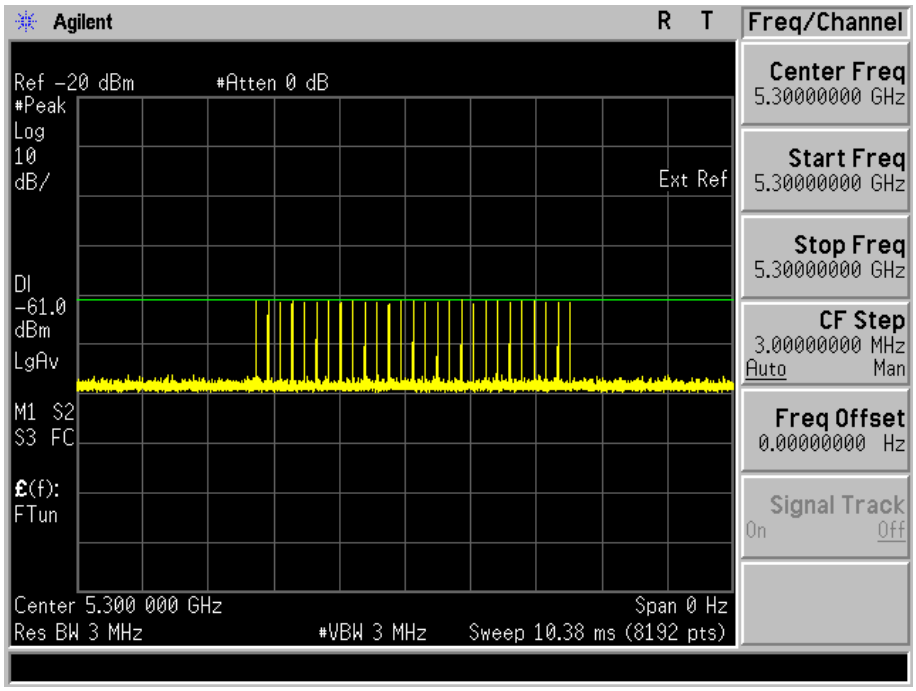




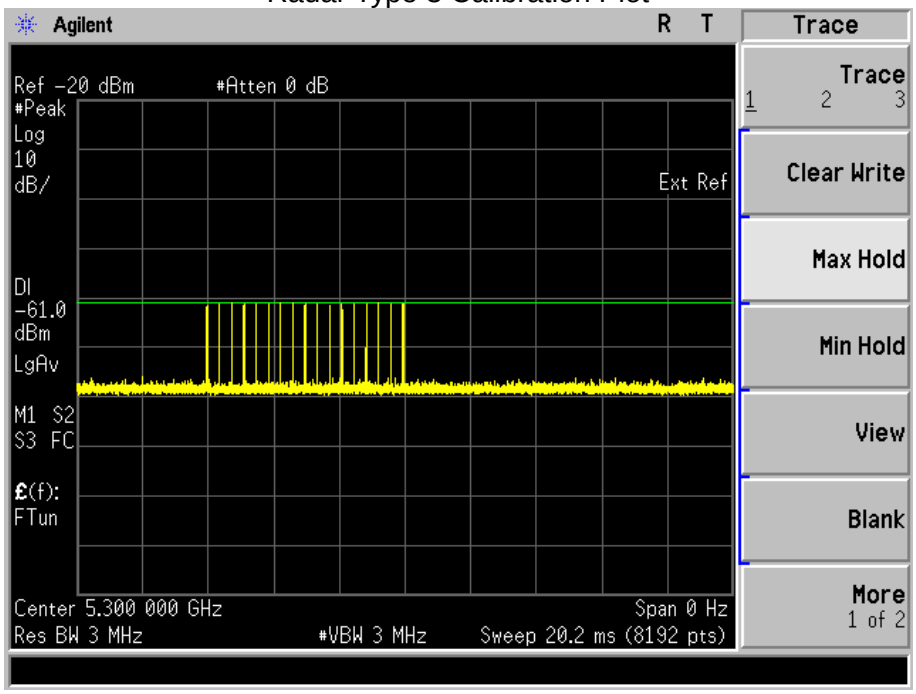
Radar Type 1 Calibration Plot



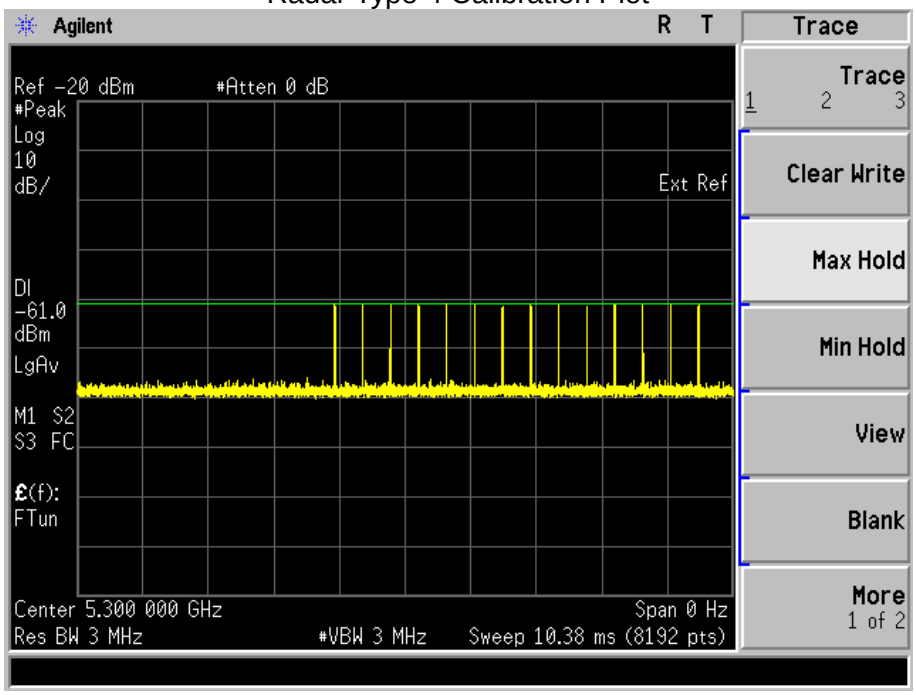
Radar Type 2 Calibration Plot



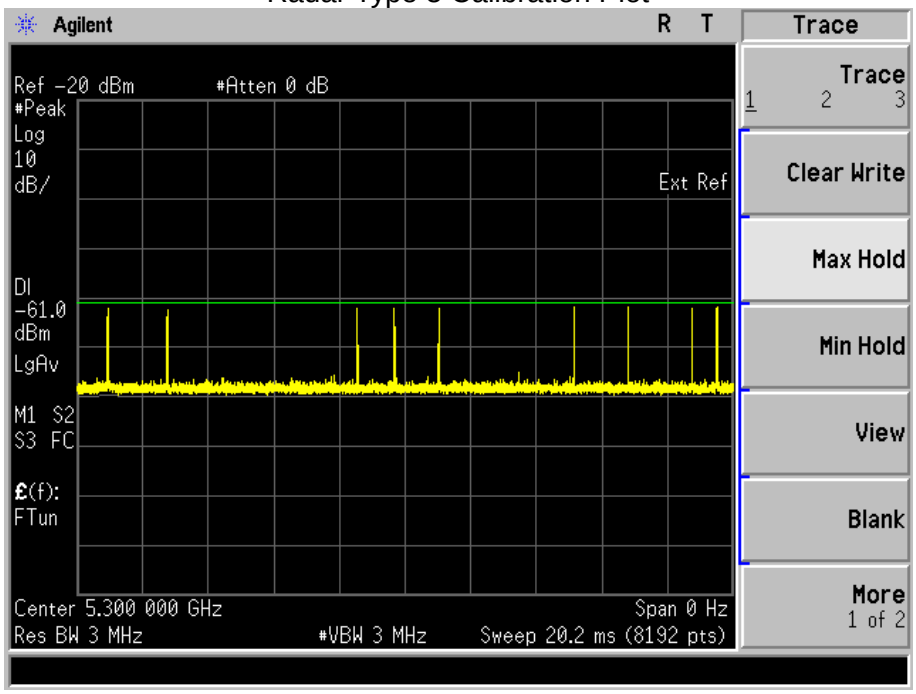
Radar Type 3 Calibration Plot



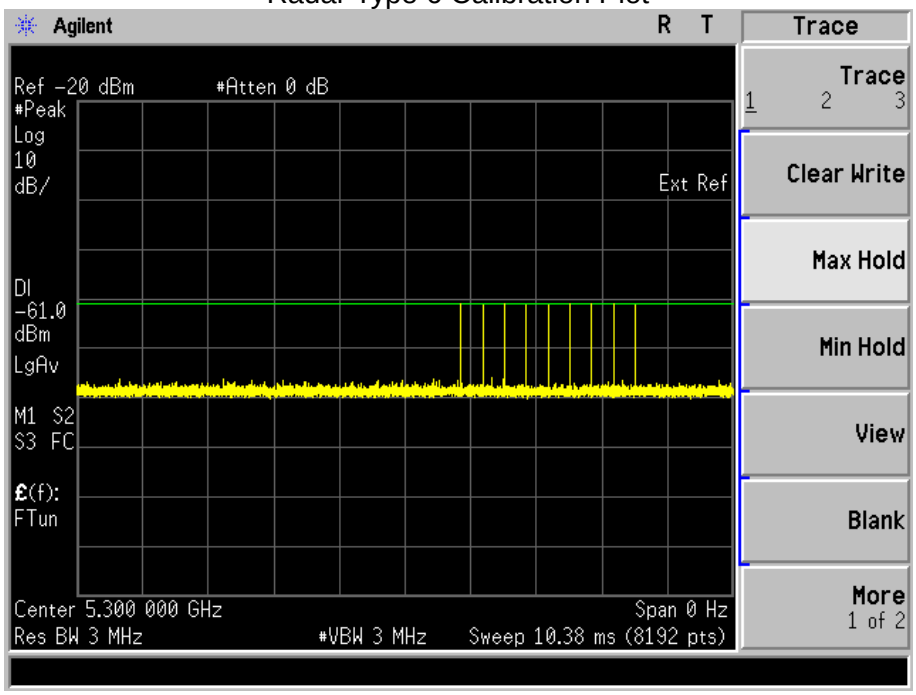
Radar Type 4 Calibration Plot



Radar Type 5 Calibration Plot



Radar Type 6 Calibration Plot



7. Test Procedures

7.1. U-NII Detection Bandwidth

Set up the generating equipment as shown in Figure 1, or equivalent. Set up the DFS timing monitoring equipment as shown in Figure 1. Set up the overall system for either radiated or conducted coupling to the UUT. Adjust the equipment to produce a single Burst of the Short Pulse Radar Type 1 at the center frequency of the UUT Operating Channel at the specified DFS Detection Threshold level.

Set the UUT up as a standalone device (no associated Client or Master, as appropriate) and no traffic. Frame based systems will be set to a talk/listen ratio of 0%/100% during this test. Generate a single radar Burst, and note the response of the UUT. Repeat for a minimum of 10 trials. The UUT must detect the Radar Waveform using the specified U-NII Detection Bandwidth criterion.

Starting at the center frequency of the UUT operating Channel, increase the radar frequency in 1 MHz steps, repeating the above test sequence, until the detection rate falls below the U-NII Detection Bandwidth criterion. Record the highest frequency (denote as FH) at which detection is greater than or equal to the U-NII Detection Bandwidth criterion. Recording the detection rate at frequencies above FH is not required to demonstrate compliance.

Starting at the center frequency of the UUT operating Channel, decrease the radar frequency in 1 MHz steps, repeating the above test sequence, until the detection rate falls below the U-NII Detection Bandwidth criterion specified in Table 4. Record the lowest frequency (denote as FL) at which detection is greater than or equal to the U-NII Detection Bandwidth criterion. Recording the detection rate at frequencies below FL is not required to demonstrate compliance. The U-NII Detection Bandwidth is calculated as follows:

$$U\text{-}NII\ Detection\ Bandwidth = FH - FL$$

The U-NII Detection Bandwidth must meet the U-NII Detection Bandwidth criterion. Otherwise, the UUT does not comply with DFS requirements. This is essential to ensure that the UUT is capable of detecting Radar Waveforms across the same frequency spectrum that contains the significant energy from the system. In the case that the U-NII Detection Bandwidth is greater than or equal to the 99 percent power bandwidth for the measured FH and FL, the test can be truncated and the U-NII Detection Bandwidth can be reported as the measured FH and FL.

7.2. Channel Availability Check

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

a) The U-NII devices will be powered on and be instructed to operate on the appropriate U-NII Channel that must incorporate DFS functions. At the same time the UUT is powered on, the spectrum analyzer will be set to zero span modes with a 3 MHz RBW and 3 MHz VBW on the Channel occupied by the radar (Chr) with a 2.5 minute sweep time. The spectrum analyzer's sweep will be started at the same time power is applied to the U-NII device.

b) The UUT should not transmit any beacon or data transmissions until at least 1 minute after the completion of the power-on cycle. This measurement can be used to determine the length of the power-on cycle if it is not supplied by the manufacturer. If the spectrum analyzer sweep is started at the same time the UUT is powered on

and the UUT does not begin transmissions until it has completed the cycle, the power-on time can be determined by comparing the two times.

Radar Burst at the Beginning of the Channel Availability Check Time

The steps below define the procedure to verify successful radar detection on the test Channel during a period equal to the Channel Availability Check Time and avoidance of operation on that Channel when a radar Burst with a level equal to the DFS Detection Threshold + 1 dB occurs at the beginning of the Channel Availability Check Time. This is illustrated as shown below.

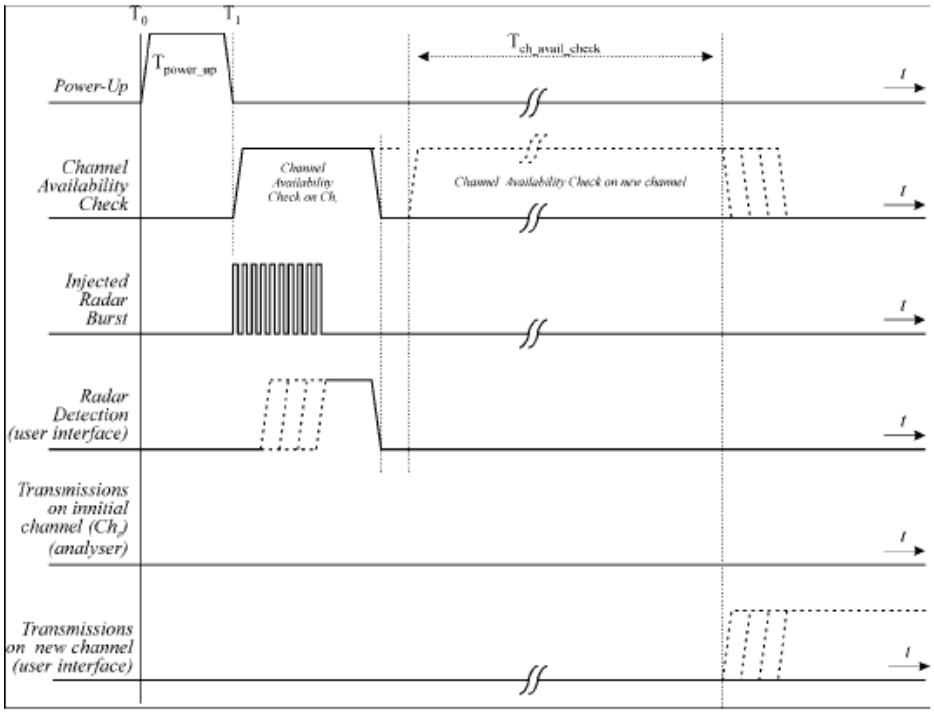
a) The Radar Waveform generator and UUT are connected using the applicable test setup described in the sections on configuration for Conducted Tests (7.2) or Radiated Tests (7.3) and the power of the UUT is switched off.

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

c) A single Burst of one of the Short Pulse Radar Types 1-4 will commence within a 6 second window starting at T1. An additional 1 dB is added to the radar test signal to ensure it is at or above the DFS Detection Threshold, accounting for equipment variations/errors.

d) Visual indication or measured results on the UUT of successful detection of the radar Burst will be recorded and reported. Observation of Chr for UUT emissions will continue for 2.5 minutes after the radar Burst has been generated.

e) Verify that during the 2.5 minute measurement window no UUT transmissions occurred on Chr. The Channel Availability Check results will be recorded.



Radar Burst at the End of the Channel Availability Check Time

The steps below define the procedure to verify successful radar detection on the test Channel during a period equal to the Channel Availability Check Time and avoidance of operation on that Channel when a radar Burst with a level equal to the DFS Detection Threshold + 1dB occurs at the end of the Channel Availability Check Time. This is illustrated as shown below.

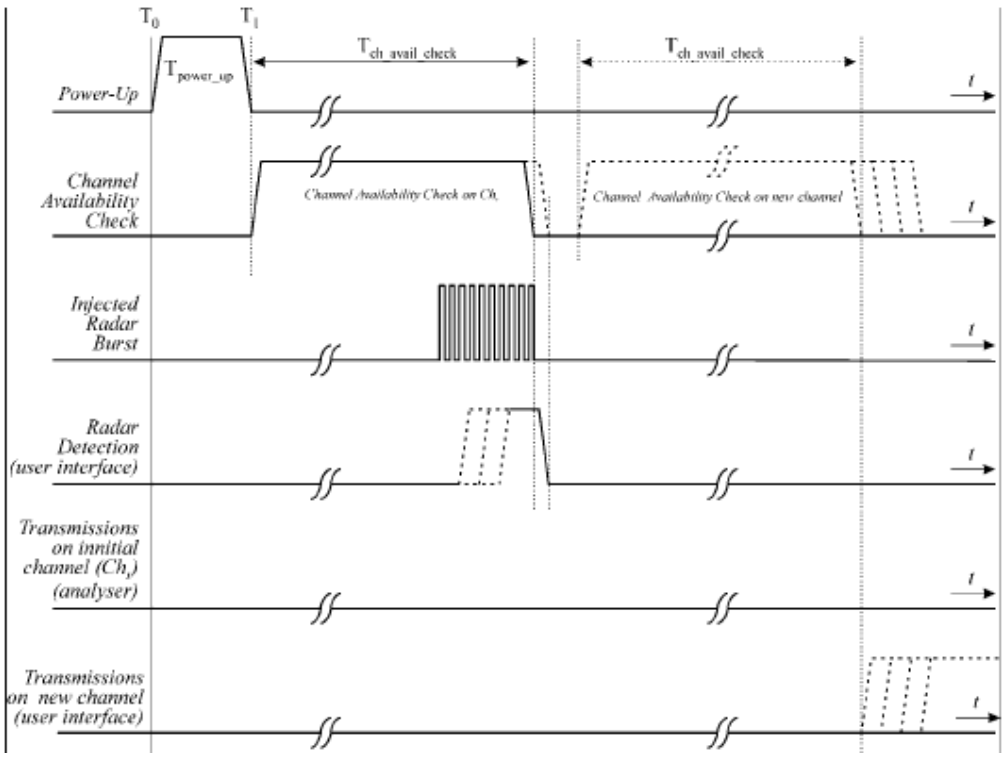
a) The Radar Waveform generator and UUT are connected using the applicable test setup described in the sections for Conducted Tests (7.2) or Radiated Tests (7.3) and the power of the UUT is switched off.

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

c) A single Burst of one of the Short Pulse Radar Types 1-4 will commence within a 6 second window starting at T1 + 54 seconds. An additional 1 dB is added to the radar test signal to ensure it is at or above the DFS Detection Threshold, accounting for equipment variations/errors.

d) Visual indication or measured results on the UUT of successful detection of the radar Burst will be recorded and reported. Observation of Chr for UUT emissions will continue for 2.5 minutes after the radar Burst has been generated.

e) Verify that during the 2.5 minute measurement window no UUT transmissions occurred on Chr. The Channel Availability Check results will be recorded.



7.3. 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
- 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 is generated on the Operating Channel of the UNII device (In-Service Monitoring).

a) One frequency will be chosen from the Operating Channels of the UUT within the 5250-5350 MHz or 5470-5725 MHz bands.

b) In case the UUT is a U-NII device operating as a Client Device (with or without DFS), a UNII device operating as a Master Device will be used to allow the UUT (Client device) to Associate with the Master Device. In case the UUT is a Master Device, a U-NII device operating as a Client Device will be used and it is assumed that the Client will associate with the UUT (Master). In both cases for conducted tests, the Radar Waveform generator will be connected to the Master Device. For radiated tests, the emissions of the Radar Waveform generator will be directed towards the Master Device. If the Master Device has antenna gain, the main beam of the antenna will be directed toward the radar emitter. Vertical polarization is used for testing.

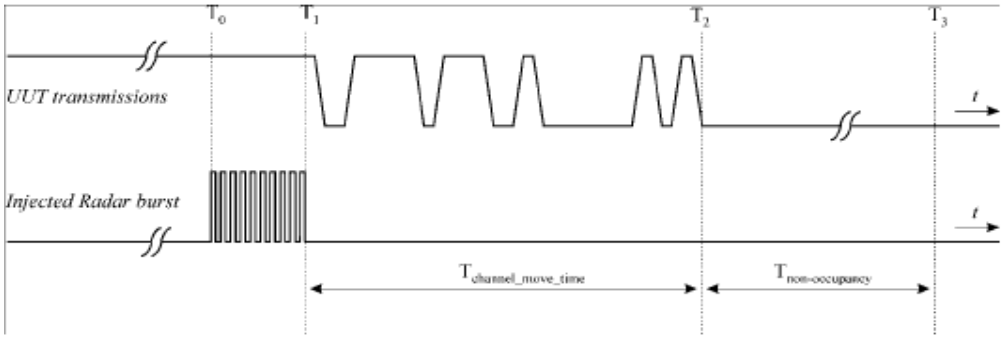
c) Stream the MPEG test file from the Master Device to the Client Device on the test Channel for the entire period of the test.

d) At time T0 the Radar Waveform generator sends a Burst of pulses for one of the Short Pulse Radar Types 1-4, on the Operating Channel. An additional 1 dB is added to the radar test signal to ensure it is at or above the DFS Detection Threshold, accounting for equipment variations/errors.

e) 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). Measure and record the Channel Move Time and Channel Closing Transmission Time if radar detection occurs. Figure shown below illustrates Channel Closing Transmission Time.

f) When operating as a Master Device, monitor the UUT for more than 30 minutes following instant T2 to verify that the UUT does not resume any transmissions on this Channel. Perform this test once and record the measurement result.

g) In case the UUT is U-NII device operating as Client Device with In-Service Monitoring, perform steps a) to f).



7.4. Statistical Performance Check

The steps below define the procedure to determine the minimum percentage of successful detection requirements when a radar burst with a level equal to the DFS Detection Threshold + 1dB is generated on the Operating Channel of the U-NII device (In- Service Monitoring).

a) One frequency will be chosen from the Operating Channels of the UUT within the 5250-5350 MHz or 5470-5725 MHz bands.

b) In case the UUT is a U-NII device operating as a Client Device (with or without Radar Detection), a U-NII device operating as a Master Device will be used to allow the UUT (Client device) to Associate with the Master Device. In case the UUT is a Master Device, a U-NII device operating as a Client Device will be used and it is assumed that the Client will associate with the UUT (Master). In both cases for conducted tests, the Radar Waveform generator will be connected to the Master Device. For radiated tests, the emissions of the Radar Waveform generator will be directed towards the Master Device. If the Master Device has antenna gain, the main beam of the antenna will be directed toward the radar emitter. Vertical polarization is used for testing.

c) Stream the MPEG test file from the Master Device to the Client Device on the test Channel for the entire period of the test.

d) At time T0 the Radar Waveform generator sends the individual waveform for each of the Radar Types 1-6, at levels defined shown above, on the Operating Channel. An additional 1 dB is added to the radar test signal to ensure it is at or above the DFS Detection Threshold, accounting for equipment variations/errors.

e) Observe the transmissions of the UUT at the end of the Burst on the Operating Channel for duration greater than 10 seconds for Short Pulse Radar Types 1-4 and 6 to ensure detection occurs.

f) Observe the transmissions of the UUT at the end of the Burst on the Operating Channel for duration greater than 22 seconds for Long Pulse Radar Type 5 to ensure detection occurs.

g) In case the UUT is a U-NII device operating as a Client Device with In-Service Monitoring, perform steps a) to f).

8. Test Result

8.1. Detection Bandwidth

20 MHz Signal Bandwidth											
EUT Frequency = 5300MHz											
Radar Frequency (MHz)	DFS Detection Trials (1=Detection, Blank= No Detection)										
	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5289											0%
5290 Fl	1	1	1	1	1	1	1	1	1	1	100%
5291	1	1	1	1	1	1	1	1	1	1	100%
5292	1	1	1	1	1	1	1	1	1	1	100%
5293	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	1	1	1	1	1	1	1	1	1	1	100%
5308	1	1	1	1	1	1	1	1	1	1	100%
5309	1	1	1	1	1	1	1	1	1	1	100%
5310 Fh	1	1	1	1	1	1	1	1	1	1	100%
5311											0%
20 MHz Detection Bandwidth = Fh-Fl = 5310MHz - 5290MHz = 20MHz											
EUT 99% Bandwidth = 16.8MHz											
16.8MHz × 80% = 13.4MHz											

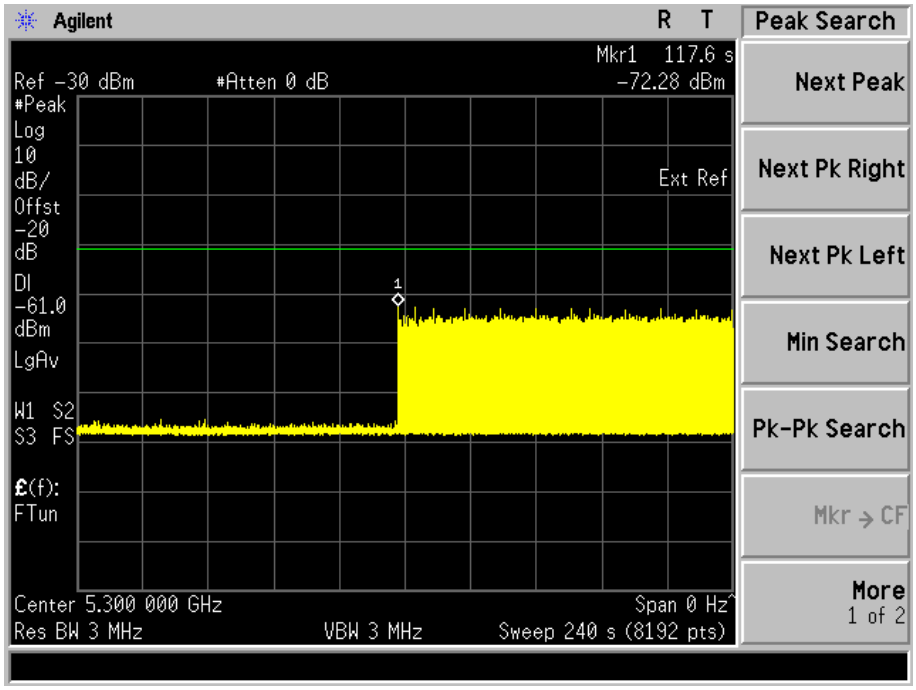
40 MHz Signal Bandwidth											
EUT Frequency = 5310MHz											
Radar Frequency (MHz)	DFS Detection Trials (1=Detection, Blank= No Detection)										
	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5289											0%
5290 Fl	1	1	1	1	1	1	1	1	1	1	100%
5291	1	1	1	1	1	1	1	1	1	1	100%
5292	1	1	1	1	1	1	1	1	1	1	100%
5293	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	1	1	1	1	1	1	1	1	1	1	100%
5308	1	1	1	1	1	1	1	1	1	1	100%
5309	1	1	1	1	1	1	1	1	1	1	100%
5310	1	1	1	1	1	1	1	1	1	1	100%
5311	1	1	1	1	1	1	1	1	1	1	100%
5312	1	1	1	1	1	1	1	1	1	1	100%
5313	1	1	1	1	1	1	1	1	1	1	100%
5314	1	1	1	1	1	1	1	1	1	1	100%
5315	1	1	1	1	1	1	1	1	1	1	100%
5316	1	1	1	1	1	1	1	1	1	1	100%
5317	1	1	1	1	1	1	1	1	1	1	100%
5318	1	1	1	1	1	1	1	1	1	1	100%
5319	1	1	1	1	1	1	1	1	1	1	100%
5320	1	1	1	1	1	1	1	1	1	1	100%
5321	1	1	1	1	1	1	1	1	1	1	100%

5322	1	1	1	1	1	1	1	1	1	1	100%
5323	1	1	1	1	1	1	1	1	1	1	100%
5324	1	1	1	1	1	1	1	1	1	1	100%
5325	1	1	1	1	1	1	1	1	1	1	100%
5326	1	1	1	1	1	1	1	1	1	1	100%
5327	1	1	1	1	1	1	1	1	1	1	100%
5328	1	1	1	1	1	1	1	1	1	1	100%
5329	1	1	1	1	1	1	1	1	1	1	100%
5330 Fh	1	1	1	1	1	1	1	1	1	1	100%
5331											0%
40 MHz Detection Bandwidth = Fh - Fl = 5330MHz - 5290MHz = 40MHz											
EUT 99% Bandwidth = 36.3MHz											
36.3MHz × 80% = 29.0MHz											

8.2. Channel Available Check

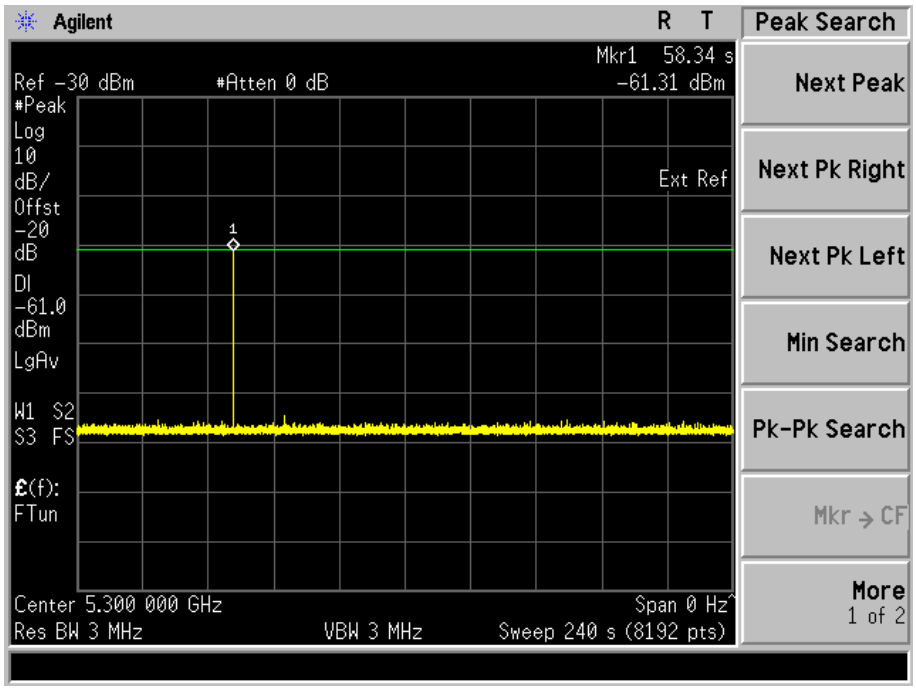
The following results reflect both 20 MHz and 40 MHz Channel Bandwidth operation.

Initial Channel Availability Check Time



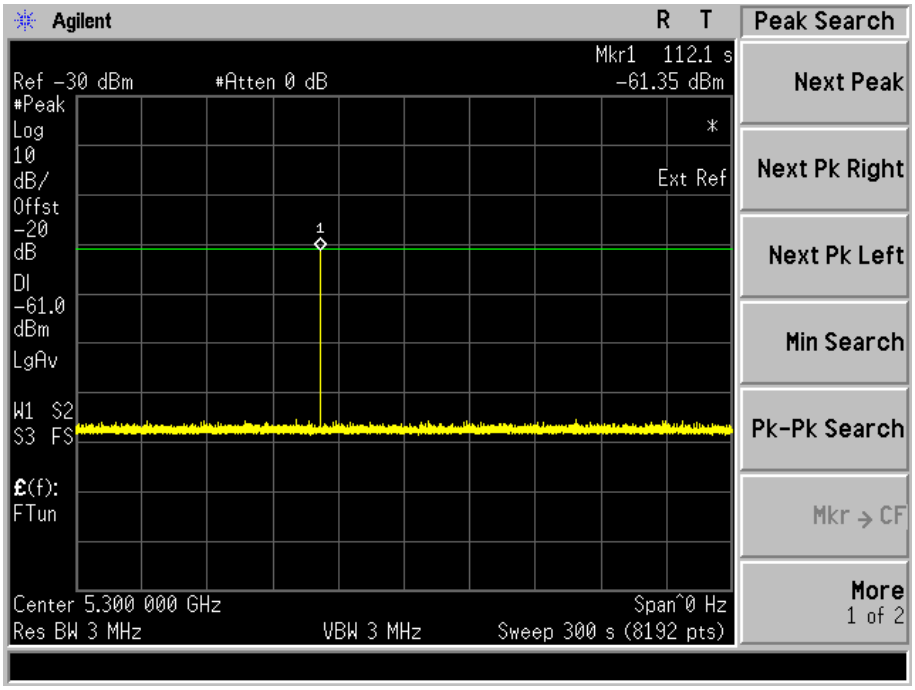
8.2.1. Test result with a radar burst at the beginning of the Channel Availability Check Time

Channel 60 5300MHz



8.2.2. Test result with radar burst at the end of the Channel Availability Check Time

Channel 60 5300MHz



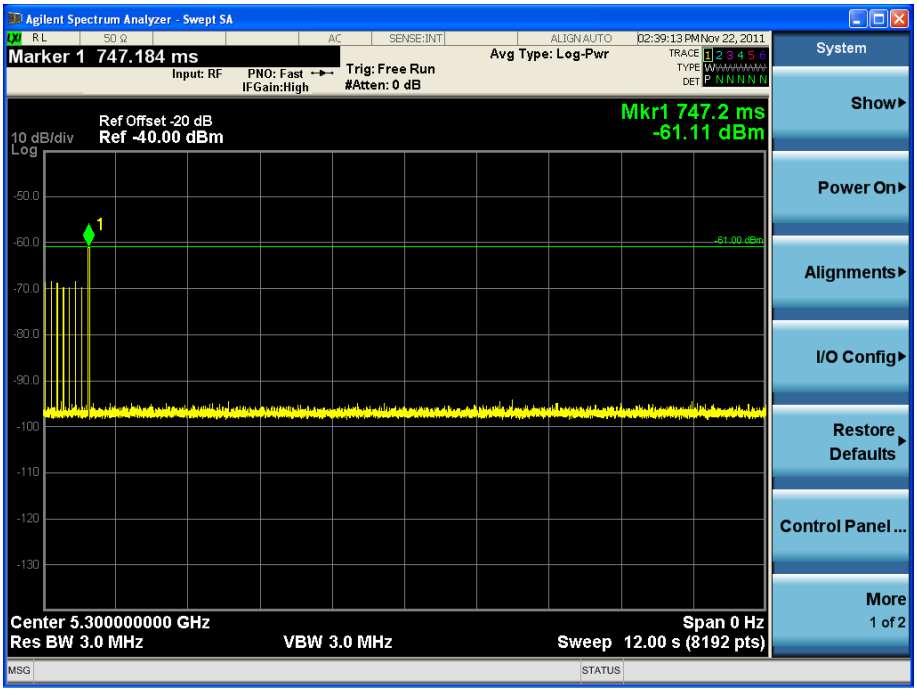
Test Item	Limit	Results
Channel Availability Check Time	60 s	Pass

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

The following results reflect both 20 MHz and 40 MHz Channel Bandwidth operation.

8.3.1. Channel Move Time and Closing Transmission Time

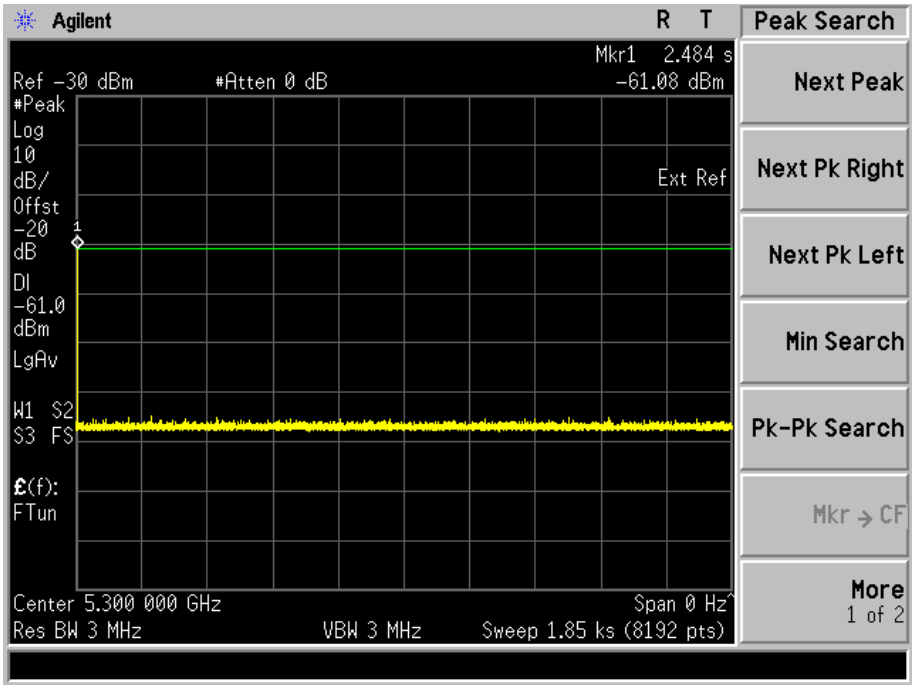
Type 1 radar at 5300MHz



Test Item	Limit	Results
Channel Move Time	10 s	Pass
Channel Closing Transmission Time	200ms + an aggregate of 60ms over remaining 10 second period.	Pass

8.3.2. Non-Occupancy Period

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



Test Item	Limit	Results
Non-Occupancy Period	30 minutes	Pass

8.4. Statistical Performance Check

A U-NII device operating as a Client Device associates 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 device can also utilize a test mode to demonstrate when detection occurs to prevent the need to reset the device between trial runs.

The Radar Waveform generator sends the individual waveform for each of radar type 1~6 with a level equal to the DFS detection threshold level + 1dB (-61dBm).

The following results reflect both 20 MHz and 40 MHz Channel Bandwidth operation.

Type 1 Radar Statistical Performance

Trial Number	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	1
12	1	1428	18	1
13	1	1428	18	1
14	1	1428	18	1
15	1	1428	18	1
16	1	1428	18	1
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	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
Detection Percentage				100% (>60%)

Type 2 Radar Statistical Performance

Trial Number	Pulse Width (us)	PRI (us)	Pulses/Burst	1=Detection Blank=No Detection
1	1.7	187	28	1
2	3.4	169	26	1
3	4.4	158	28	1
4	2.9	162	28	1
5	1.1	226	25	1
6	4.5	221	27	1
7	2.7	192	27	1
8	1.7	161	24	1
9	4.9	156	29	1
10	3.0	153	28	1
11	2.5	184	26	1
12	4.2	190	25	1
13	1.0	184	29	1
14	5.0	162	26	1
15	2.8	212	26	1
16	4.6	160	25	1
17	2.6	221	26	1
18	4.4	156	23	1
19	4.6	158	25	1
20	3.7	152	26	1
21	4.7	223	28	1
22	4.0	168	25	1
23	2.9	222	29	1
24	1.3	193	23	1
25	2.0	211	29	1
26	3.9	193	28	1
27	2.3	212	24	1
28	1.0	169	28	1
29	1.8	171	26	1
30	2.9	205	29	1
Detection Percentage				100% (>60%)

Type 3 Radar Statistical Performance

Trial Number	Pulse Width (us)	PRI (us)	Pulses/Burst	1=Detection Blank=No Detection
1	9.5	266	17	1
2	5.8	373	18	1
3	9.7	410	16	1
4	5.1	299	17	1
5	8.3	353	17	1
6	7.6	307	18	1
7	8.2	425	17	1
8	8.0	416	17	1
9	9.8	436	17	1
10	6.9	488	17	1
11	5.7	296	17	1
12	7.6	361	16	1
13	7.9	347	18	1
14	8.5	317	17	1
15	7.4	352	18	1
16	6.1	359	18	1
17	7.1	357	18	1
18	7.8	344	18	1
19	7.1	309	16	1
20	5.3	485	18	1
21	7.5	313	17	1
22	7.2	490	18	1
23	6.9	294	16	1
24	5.1	288	17	1
25	6.8	459	18	1
26	5.1	268	16	1
27	6.8	260	17	1
28	5.5	312	17	1
29	5.8	417	18	1
30	5.0	322	18	1
Detection Percentage				100% (>60%)

Type 4 Radar Statistical Performance

Trial Number	Pulse Width (us)	PRI (us)	Pulses/Burst	1=Detection Blank=No Detection
1	14.5	296	12	1
2	15.7	431	16	1
3	16.4	449	13	1
4	11.3	375	12	1
5	12.3	487	14	1
6	19.2	353	14	1
7	12.5	388	16	1
8	17.1	477	13	1
9	14.8	457	15	1
10	14.9	319	16	1
11	14.2	431	12	1
12	12.9	343	16	1
13	10.3	410	14	1
14	10.1	453	15	1
15	18.8	266	15	1
16	18.0	474	12	1
17	14.7	396	15	1
18	11.8	445	12	1
19	10.2	345	13	1
20	10.7	418	16	1
21	12.3	386	14	1
22	16.6	384	12	1
23	16.7	403	13	1
24	15.5	385	15	1
25	13.7	283	16	1
26	19.9	351	13	1
27	18.0	415	12	1
28	19.3	448	12	1
29	17.8	313	15	1
30	11.5	447	14	1
Detection Percentage				100% (>60%)

In addition an average minimum percentage of successful detection across all four Short pulse radar test waveforms is as follows: $\frac{P_d1+P_d2+P_d3+P_d4}{4}$ = (100%+100%+100%+100%)/4 = 100% (>80%)

Type 5 Radar Statistical Performance

See the type 5 Radar Characteristics at the end of this report.

Trial Number	File name	1=Detection Blank=No Detection
1	Statistical_Check_RandParm_For_Radar_Type_5_1_trail	1
2	Statistical_Check_RandParm_For_Radar_Type_5_2_trail	1
3	Statistical_Check_RandParm_For_Radar_Type_5_3_trail	1
4	Statistical_Check_RandParm_For_Radar_Type_5_4_trail	1
5	Statistical_Check_RandParm_For_Radar_Type_5_5_trail	1
6	Statistical_Check_RandParm_For_Radar_Type_5_6_trail	1
7	Statistical_Check_RandParm_For_Radar_Type_5_7_trail	1
8	Statistical_Check_RandParm_For_Radar_Type_5_8_trail	1
9	Statistical_Check_RandParm_For_Radar_Type_5_9_trail	1
10	Statistical_Check_RandParm_For_Radar_Type_5_10_trail	1
11	Statistical_Check_RandParm_For_Radar_Type_5_11_trail	1
12	Statistical_Check_RandParm_For_Radar_Type_5_12_trail	1
13	Statistical_Check_RandParm_For_Radar_Type_5_13_trail	1
14	Statistical_Check_RandParm_For_Radar_Type_5_14_trail	1
15	Statistical_Check_RandParm_For_Radar_Type_5_15_trail	1
16	Statistical_Check_RandParm_For_Radar_Type_5_16_trail	1
17	Statistical_Check_RandParm_For_Radar_Type_5_17_trail	1
18	Statistical_Check_RandParm_For_Radar_Type_5_18_trail	1
19	Statistical_Check_RandParm_For_Radar_Type_5_19_trail	1
20	Statistical_Check_RandParm_For_Radar_Type_5_20_trail	1
21	Statistical_Check_RandParm_For_Radar_Type_5_21_trail	1
22	Statistical_Check_RandParm_For_Radar_Type_5_22_trail	1
23	Statistical_Check_RandParm_For_Radar_Type_5_23_trail	1
24	Statistical_Check_RandParm_For_Radar_Type_5_24_trail	1
25	Statistical_Check_RandParm_For_Radar_Type_5_25_trail	1
26	Statistical_Check_RandParm_For_Radar_Type_5_26_trail	1
27	Statistical_Check_RandParm_For_Radar_Type_5_27_trail	1
28	Statistical_Check_RandParm_For_Radar_Type_5_28_trail	1
29	Statistical_Check_RandParm_For_Radar_Type_5_29_trail	1
30	Statistical_Check_RandParm_For_Radar_Type_5_30_trail	1
Detection Percentage		100% (>80 %)

Type 6 Radar Statistical Performance

See the type 6 Radar Characteristics at the end of this report.

Trial Number	File name	1=Detection Blank=No Detection
1	Statistical_Check_RandParm_For_Radar_Type_6_1_trail	1
2	Statistical_Check_RandParm_For_Radar_Type_6_2_trail	1
3	Statistical_Check_RandParm_For_Radar_Type_6_3_trail	1
4	Statistical_Check_RandParm_For_Radar_Type_6_4_trail	1
5	Statistical_Check_RandParm_For_Radar_Type_6_5_trail	1
6	Statistical_Check_RandParm_For_Radar_Type_6_6_trail	1
7	Statistical_Check_RandParm_For_Radar_Type_6_7_trail	1
8	Statistical_Check_RandParm_For_Radar_Type_6_8_trail	1
9	Statistical_Check_RandParm_For_Radar_Type_6_9_trail	1
10	Statistical_Check_RandParm_For_Radar_Type_6_10_trail	1
11	Statistical_Check_RandParm_For_Radar_Type_6_11_trail	1
12	Statistical_Check_RandParm_For_Radar_Type_6_12_trail	1
13	Statistical_Check_RandParm_For_Radar_Type_6_13_trail	1
14	Statistical_Check_RandParm_For_Radar_Type_6_14_trail	1
15	Statistical_Check_RandParm_For_Radar_Type_6_15_trail	1
16	Statistical_Check_RandParm_For_Radar_Type_6_16_trail	1
17	Statistical_Check_RandParm_For_Radar_Type_6_17_trail	1
18	Statistical_Check_RandParm_For_Radar_Type_6_18_trail	1
19	Statistical_Check_RandParm_For_Radar_Type_6_19_trail	1
20	Statistical_Check_RandParm_For_Radar_Type_6_20_trail	1
21	Statistical_Check_RandParm_For_Radar_Type_6_21_trail	1
22	Statistical_Check_RandParm_For_Radar_Type_6_22_trail	1
23	Statistical_Check_RandParm_For_Radar_Type_6_23_trail	1
24	Statistical_Check_RandParm_For_Radar_Type_6_24_trail	1
25	Statistical_Check_RandParm_For_Radar_Type_6_25_trail	1
26	Statistical_Check_RandParm_For_Radar_Type_6_26_trail	1
27	Statistical_Check_RandParm_For_Radar_Type_6_27_trail	1
28	Statistical_Check_RandParm_For_Radar_Type_6_28_trail	1
29	Statistical_Check_RandParm_For_Radar_Type_6_29_trail	1
30	Statistical_Check_RandParm_For_Radar_Type_6_30_trail	1
Detection Percentage		100 % (>70 %)

Appendix for Type 5~6 radar waveform test characteristic

Type 5 Radar Waveform_1.txt

Waveform Num = 1
Num of Bursts = 14
Burst Interval (us)= 857143

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	744024									
1		1	8	95	1170	0	0	744024	0	857142
	768507									
2		1	8	65	1605	0	0	1513701	857143	1714285
	866899									
3		3	14	55	1344	1657	1907	2382205	1714286	2571428
	689892									
4		3	20	50	1285	1399	1543	3077005	2571429	3428571
	677163									
5		1	14	70	1837	0	0	3758395	3428572	4285714
	879056									
6		2	16	75	1972	1516	0	4639288	4285715	5142857
	1336346									
7		1	9	75	1828	0	0	5979122	5142858	6000000
	139603									
8		1	11	80	1539	0	0	6120553	6000001	6857143
	896056									
9		2	20	70	1903	1657	0	7018148	6857144	7714286
	948546									
10		1	17	85	1154	0	0	7970254	7714287	8571429
	1236478									
11		2	16	75	1334	1428	0	9207886	8571430	9428572
	1018656									
12		3	7	55	1383	1520	1627	10229304	9428573	10285715
	390466									
13		2	18	85	1285	1465	0	10624300	10285716	11142858
	888820									
14		1	13	50	1215	0	0	11515870	11142859	12000001

Total number of pulses in waveform = 24

****

Type 5 Radar Waveform_2.txt

Waveform Num = 2
Num of Bursts = 8
Burst Interval (us)= 1500000

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	185623									
1		1	17	50	1545	0	0	185623	0	1499999
	1740308									
2		3	9	50	1301	1283	1653	1927476	1500000	2999999
	1616760									
3		1	16	55	1711	0	0	3548473	3000000	4499999
	1963544									
4		2	5	50	1175	1593	0	5513728	4500000	5999999
	1093007									
5		1	16	70	1314	0	0	6609503	6000000	7499999
	1155273									
6		2	15	80	1727	1402	0	7766090	7500000	8999999
	2433965									
7		3	11	50	1918	1217	1948	10203184	9000000	10499999
	1356157									
8		1	7	60	1653	0	0	11564424	10500000	11999999

Total number of pulses in waveform = 14

****

Type 5 Radar Waveform_3.txt

Waveform Num = 3
Num of Bursts = 15
Burst Interval (us)= 800000

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	53242									
1		3	7	95	1218	1967	1988	53242	0	799999
	1336198									
2		2	7	85	1179	1534	0	1394613	800000	1599999
	640245									
3		3	15	95	1180	1957	1078	2037571	1600000	2399999
	690584									
4		1	11	80	1626	0	0	2732370	2400000	3199999
	533316									
5		3	19	85	1194	1013	1362	3267312	3200000	3999999
	1020396									
6		1	11	70	1334	0	0	4291277	4000000	4799999
	552931									
7		2	5	80	1482	1925	0	4845542	4800000	5599999
	1386459									
8		2	9	75	1734	1236	0	6235408	5600000	6399999
	270344									
9		2	16	50	1499	1511	0	6508722	6400000	7199999
	834034									
10		2	9	50	1049	1489	0	7345766	7200000	7999999
	920698									
11		3	5	70	1980	1759	1076	8269002	8000000	8799999
	1040246									
12		2	15	90	1562	1049	0	9314063	8800000	9599999
	331028									
13		2	14	75	1180	1783	0	9647702	9600000	10399999
	1188095									
14		2	12	95	1222	1033	0	10838760	10400000	11199999
	962794									
15		1	11	60	1420	0	0	11803809	11200000	11999999

Total number of pulses in waveform = 31
****

Type 5 Radar Waveform_4.txt

Waveform Num = 4
Num of Bursts = 13
Burst Interval (us)= 923077

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	245430									
1		3	6	60	1324	1790	1845	245430	0	923076
	869948									
2		2	6	60	1105	1860	0	1120337	923077	1846153
	942191									
3		3	7	80	1155	1394	1432	2065493	1846154	2769230
	870686									
4		2	10	90	1838	1338	0	2940160	2769231	3692307
	1569198									
5		2	20	80	1742	1427	0	4512534	3692308	4615384
	763820									
6		2	5	95	1397	1034	0	5279523	4615385	5538461
	938488									
7		3	10	100	1360	1269	1025	6220442	5538462	6461538
	602626									
8		1	10	60	1097	0	0	6826722	6461539	7384615
	1456624									
9		3	8	60	1451	1790	1831	8284443	7384616	8307692
	754809									
10		2	12	75	1192	1402	0	9044324	8307693	9230769
	514910									
11		3	6	65	1561	1277	1108	9561828	9230770	10153846
	1073117									
12		1	14	95	1173	0	0	10638891	10153847	11076923
	993630									
13		1	14	95	1066	0	0	11633694	11076924	12000000

Total number of pulses in waveform = 28
****

Type 5 Radar Waveform_5.txt

```
Waveform Num = 5
Num of Bursts = 10
Burst Interval (us)= 1200000

Burst         Off Time      #             Chirp         PW            Pulse 1       Pulse 2       Pulse 3       Start Loc     Start Burst   End Burst
#             (us)          Pulses        (MHz)         (us)          Pri(us)       Pri(us)       Pri(us)       (us)          Interval(us)  Interval(us)
              449697
 1                          1             18            90            1758          0             0             449697        0             1199999
              1456067
 2                          2             5             80            1057          1128          0             1907522       1200000       2399999
              684896
 3                          2             20            70            1526          1393          0             2594603       2400000       3599999
              2092123
 4                          3             18            90            1579          1124          1673          4689645       3600000       4799999
              437502
 5                          1             6             55            1644          0             0             5131523       4800000       5999999
              1911127
 6                          2             16            95            1526          1129          0             7044294       6000000       7199999
              713957
 7                          2             6             100           1928          1991          0             7760906       7200000       8399999
              1107645
 8                          3             18            75            1512          1740          1086          8872470       8400000       9599999
              1658880
 9                          1             20            75            1814          0             0             10535688      9600000       10799999
              1042517
 10                         2             20            60            1644          1072          0             11580019      10800000      11999999
Total number of pulses in waveform = 19
*******************************************************************************
```

Type 5 Radar Waveform_6.txt

```
Waveform Num = 6
Num of Bursts = 16
Burst Interval (us)= 750000

Burst         Off Time      #             Chirp         PW            Pulse 1       Pulse 2       Pulse 3       Start Loc     Start Burst   End Burst
#             (us)          Pulses        (MHz)         (us)          Pri(us)       Pri(us)       Pri(us)       (us)          Interval(us)  Interval(us)
              628697
 1                          3             5             70            1524          1123          1738          628697        0             749999
              458830
 2                          1             8             50            1400          0             0             1091912       750000        1499999
              988009
 3                          2             6             80            1910          1163          0             2081321       1500000       2249999
              824089
 4                          3             15            75            1210          1257          1384          2908483       2250000       2999999
              176195
 5                          3             14            75            1755          1827          1126          3088529       3000000       3749999
              1371817
 6                          1             20            50            1857          0             0             4465054       3750000       4499999
              467610
 7                          3             9             70            1630          1122          1231          4934521       4500000       5249999
              579425
 8                          1             10            50            1694          0             0             5517929       5250000       5999999
              894493
 9                          2             14            100           1107          1143          0             6414116       6000000       6749999
              436517
 10                         1             9             100           1597          0             0             6852883       6750000       7499999
              1227161
 11                         2             6             55            1326          1705          0             8081641       7500000       8249999
              895476
 12                         1             18            100           1425          0             0             8980148       8250000       8999999
              599406
 13                         1             18            100           1123          0             0             9580979       9000000       9749999
              238353
 14                         3             17            70            1957          1369          1119          9820455       9750000       10499999
              890073
 15                         3             18            95            1689          1767          1709          10714973      10500000      11249999
              1110628
 16                         2             11            95            1166          1174          0             11830766      11250000      11999999
Total number of pulses in waveform = 32
*******************************************************************************
```

Type 5 Radar Waveform_7.txt

Waveform Num = 7
Num of Bursts = 15
Burst Interval (us)= 800000

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	536761									
1		2	8	100	1266	1886	0	536761	0	799999
	916750									
2		3	14	80	1624	1813	1258	1456663	800000	1599999
	654433									
3		2	9	100	1731	1056	0	2115791	1600000	2399999
	750288									
4		3	8	70	1369	1248	1635	2868866	2400000	3199999
	1096650									
5		3	13	55	1207	1624	1393	3969768	3200000	3999999
	219008									
6		3	7	65	1971	1638	1253	4193008	4000000	4799999
	1143292									
7		3	8	70	1491	1449	1766	5341154	4800000	5599999
	964165									
8		1	15	50	1707	0	0	6310025	5600000	6399999
	289122									
9		2	11	50	1877	1915	0	6600854	6400000	7199999
	1098240									
10		1	13	80	1547	0	0	7702886	7200000	7999999
	332723									
11		1	12	80	1845	0	0	8037156	8000000	8799999
	1253299									
12		1	6	75	1702	0	0	9292300	8800000	9599999
	1034194									
13		2	18	60	1775	1071	0	10328196	9600000	10399999
	366863									
14		3	12	75	1310	1534	1200	10697905	10400000	11199999
	802683									
15		3	13	70	1523	1258	1497	11504632	11200000	11999999

Total number of pulses in waveform = 33

****

Type 5 Radar Waveform_8.txt

Waveform Num = 8
Num of Bursts = 14
Burst Interval (us)= 857143

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	170227									
1		3	20	75	1812	1507	1906	170227	0	857142
	1365964									
2		1	18	65	1394	0	0	1541416	857143	1714285
	823708									
3		3	8	95	1770	1047	1792	2366518	1714286	2571428
	970884									
4		2	8	65	1372	1094	0	3342011	2571429	3428571
	840756									
5		1	18	70	1224	0	0	4185233	3428572	4285714
	940985									
6		2	15	95	1786	1679	0	5127442	4285715	5142857
	379821									
7		2	7	75	1998	1015	0	5510728	5142858	6000000
	1162265									
8		3	12	95	1490	1121	1738	6676006	6000001	6857143
	581085									
9		2	7	80	1291	1017	0	7261440	6857144	7714286
	1281618									
10		2	8	80	1639	1223	0	8545366	7714287	8571429
	551204									
11		3	13	85	1600	1175	1489	9099432	8571430	9428572
	1063715									
12		2	20	60	1160	1867	0	10167411	9428573	10285715
	600904									
13		2	7	60	1241	1189	0	10771342	10285716	11142858
	600962									
14		1	15	50	1594	0	0	11374734	11142859	12000001

Total number of pulses in waveform = 29

****

Type 5 Radar Waveform_9.txt

Waveform Num = 9
Num of Bursts = 15
Burst Interval (us)= 800000

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	410233									
1		3	16	70	1835	1784	1416	410233	0	799999
	955988									
2		3	13	70	1201	1422	1603	1371256	800000	1599999
	887852									
3		3	17	100	1544	1928	1043	2263334	1600000	2399999
	162202									
4		1	7	90	1836	0	0	2430051	2400000	3199999
	776378									
5		2	8	65	1880	1221	0	3208265	3200000	3999999
	1040976									
6		1	12	90	1462	0	0	4252342	4000000	4799999
	991477									
7		2	17	95	1408	1681	0	5245281	4800000	5599999
	565462									
8		2	17	90	1033	1270	0	5813832	5600000	6399999
	649586									
9		2	11	55	1078	1881	0	6465721	6400000	7199999
	1042182									
10		2	19	65	1108	1430	0	7510862	7200000	7999999
	791964									
11		3	13	90	1635	1315	1213	8305364	8000000	8799999
	709812									
12		1	18	95	1555	0	0	9019339	8800000	9599999
	752827									
13		1	11	70	1896	0	0	9773721	9600000	10399999
	707213									
14		1	6	90	1794	0	0	10482830	10400000	11199999
	1465812									
15		3	6	75	1369	1122	1640	11950436	11200000	11999999

Total number of pulses in waveform = 30
****

Type 5 Radar Waveform_10.txt

Waveform Num = 10
Num of Bursts = 9
Burst Interval (us)= 1333333

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	114848									
1		1	19	55	1640	0	0	114848	0	1333332
	2274577									
2		3	6	95	1186	1461	1186	2391065	1333333	2666665
	882502									
3		1	16	95	1587	0	0	3277400	2666666	3999998
	723626									
4		3	13	55	1428	1050	1227	4002613	3999999	5333331
	1677919									
5		2	16	60	1036	1183	0	5684237	5333332	6666664
	1102668									
6		2	5	95	1181	1975	0	6789124	6666665	7999997
	1581185									
7		3	17	70	1333	1418	1931	8373465	7999998	9333330
	1892682									
8		1	8	75	1194	0	0	10270829	9333331	10666663
	524418									
9		1	11	65	1896	0	0	10796441	10666664	11999996

Total number of pulses in waveform = 17
****

Type 5 Radar Waveform_11.txt

```
Waveform Num = 11
Num of Bursts = 13
Burst Interval (us)= 923077

Burst         Off Time      #             Chirp         PW            Pulse 1       Pulse 2       Pulse 3       Start Loc     Start Burst   End Burst
#             (us)          Pulses        (MHz)         (us)          Pri(us)       Pri(us)       Pri(us)       (us)          Interval(us)  Interval(us)
              540785
 1                          1             17            70            1126          0             0             540785        0             923076
              923626
 2                          2             20            50            1818          1176          0             1465537       923077        1846153
              853408
 3                          3             19            80            1080          1061          1292          2321939       1846154       2769230
              1084598
 4                          3             7             95            1811          1340          1353          3409970       2769231       3692307
              988051
 5                          3             20            65            1991          1393          1980          4402525       3692308       4615384
              527205
 6                          3             10            60            1082          1094          1759          4935094       4615385       5538461
              1282818
 7                          3             6             85            1819          1732          1372          6221847       5538462       6461538
              292318
 8                          2             19            60            1806          1021          0             6519088       6461539       7384615
              1160487
 9                          1             7             70            1197          0             0             7682402       7384616       8307692
              1486016
 10                         2             12            85            1913          1184          0             9169615       8307693       9230769
              129424
 11                         3             12            90            1710          1424          1695          9302136       9230770       10153846
              1441680
 12                         1             17            95            1107          0             0             10748645      10153847      11076923
              933186
 13                         1             16            75            1221          0             0             11682938      11076924      12000000
Total number of pulses in waveform = 28
*******************************************************************************
```

Type 5 Radar Waveform_12.txt

```
Waveform Num = 12
Num of Bursts = 8
Burst Interval (us)= 1500000

Burst         Off Time      #             Chirp         PW            Pulse 1       Pulse 2       Pulse 3       Start Loc     Start Burst   End Burst
#             (us)          Pulses        (MHz)         (us)          Pri(us)       Pri(us)       Pri(us)       (us)          Interval(us)  Interval(us)
              225985
 1                          3             14            100           1724          1440          1597          225985        0             1499999
              2253694
 2                          2             10            80            1519          1873          0             2484440       1500000       2999999
              1748591
 3                          2             13            50            1637          1147          0             4236423       3000000       4499999
              1542207
 4                          2             13            75            1269          1173          0             5781414       4500000       5999999
              528268
 5                          1             11            50            1994          0             0             6312124       6000000       7499999
              1325906
 6                          1             12            95            1930          0             0             7640024       7500000       8999999
              1766504
 7                          3             20            75            1969          1810          1740          9408458       9000000       10499999
              2152269
 8                          2             18            95            1646          1475          0             11566246      10500000      11999999
Total number of pulses in waveform = 16
*******************************************************************************
```

Type 5 Radar Waveform_13.txt

Waveform Num = 13
Num of Bursts = 17
Burst Interval (us)= 705882

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	579125									
1		2	16	50	1400	1210	0	579125	0	705881
	262909									
2		1	15	90	1725	0	0	844644	705882	1411763
	1201715									
3		3	9	80	1050	1139	1213	2048084	1411764	2117645
	207198									
4		1	9	80	1558	0	0	2258684	2117646	2823527
	1163589									
5		1	15	65	1679	0	0	3423831	2823528	3529409
	600153									
6		1	10	55	1109	0	0	4025663	3529410	4235291
	282176									
7		1	18	85	1725	0	0	4308948	4235292	4941173
	917620									
8		3	20	75	1911	1830	1396	5228293	4941174	5647055
	991332									
9		1	15	60	1131	0	0	6224762	5647056	6352937
	470731									
10		2	13	100	1374	1911	0	6696624	6352938	7058819
	437914									
11		3	9	75	1998	1926	1656	7137823	7058820	7764701
	1209950									
12		1	5	50	1200	0	0	8353353	7764702	8470583
	620536									
13		3	13	60	1068	1316	1427	8975089	8470584	9176465
	372000									
14		2	10	80	1060	1285	0	9350900	9176466	9882347
	901084									
15		2	6	50	1503	1971	0	10254329	9882348	10588229
	736273									
16		2	17	75	1871	1641	0	10994076	10588230	11294111
	897176									
17		3	11	85	1790	1813	1649	11894764	11294112	11999993

Total number of pulses in waveform = 32

****

Type 5 Radar Waveform_14.txt

Waveform Num = 14
Num of Bursts = 9
Burst Interval (us)= 1333333

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	635793									
1		3	7	65	1713	1043	1449	635793	0	1333332
	1241463									
2		2	18	60	1874	1362	0	1881461	1333333	2666665
	1996113									
3		3	20	95	1746	1501	1597	3880810	2666666	3999998
	801588									
4		1	11	75	1880	0	0	4687242	3999999	5333331
	806459									
5		2	20	65	1854	1043	0	5495581	5333332	6666664
	1602420									
6		2	17	70	1800	1737	0	7100898	6666665	7999997
	1495716									
7		2	11	50	1314	1924	0	8600151	7999998	9333330
	1196551									
8		2	12	80	1766	1242	0	9799940	9333331	10666663
	1106453									
9		2	14	55	1985	1253	0	10909401	10666664	11999996

Total number of pulses in waveform = 19

****

Type 5 Radar Waveform_15.txt

Waveform Num = 15
Num of Bursts = 12
Burst Interval (us)= 1000000

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	543677									
1		2	9	50	1906	1656	0	543677	0	999999
	803371									
2		3	12	85	1321	1300	1315	1350610	1000000	1999999
	1267222									
3		1	9	95	1540	0	0	2621768	2000000	2999999
	1152610									
4		1	14	50	1343	0	0	3775918	3000000	3999999
	1032427									
5		1	15	95	1257	0	0	4809688	4000000	4999999
	751084									
6		3	9	50	1284	1728	1450	5562029	5000000	5999999
	516439									
7		1	20	60	1911	0	0	6082930	6000000	6999999
	1318549									
8		3	7	75	1757	1880	1040	7403390	7000000	7999999
	662622									
9		2	18	70	1134	1194	0	8070689	8000000	8999999
	1650882									
10		2	15	80	1097	1953	0	9723899	9000000	9999999
	606580									
11		1	19	90	1261	0	0	10333529	10000000	10999999
	1348136									
12		3	10	60	1004	1191	1443	11682926	11000000	11999999

Total number of pulses in waveform = 23

****

Type 5 Radar Waveform_16.txt

Waveform Num = 16
Num of Bursts = 18
Burst Interval (us)= 666667

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	437119									
1		3	19	100	1933	1611	1068	437119	0	666666
	286214									
2		3	8	55	1262	1701	1871	727945	666667	1333333
	1226086									
3		3	19	65	1958	1642	1537	1958865	1333334	2000000
	626242									
4		2	9	95	1468	1953	0	2590244	2000001	2666667
	409859									
5		2	18	50	1845	1097	0	3003524	2666668	3333334
	867491									
6		3	20	70	1508	1316	1098	3873957	3333335	4000001
	323854									
7		2	14	80	1446	1051	0	4201733	4000002	4666668
	806685									
8		3	10	85	1693	1711	1505	5010915	4666669	5333335
	857325									
9		2	6	80	1051	1924	0	5873149	5333336	6000002
	569493									
10		1	9	60	1118	0	0	6445617	6000003	6666669
	660229									
11		2	7	90	1971	1455	0	7106964	6666670	7333336
	544745									
12		2	10	85	1118	1993	0	7655135	7333337	8000003
	793846									
13		2	15	90	1507	1106	0	8452092	8000004	8666670
	763623									
14		1	8	50	1737	0	0	9218328	8666671	9333337
	389490									
15		2	18	80	1988	1522	0	9609555	9333338	10000004
	883560									
16		2	16	70	1358	1725	0	10496625	10000005	10666671
	761691									
17		3	8	90	1859	1197	1285	11261399	10666672	11333338
	582182									
18		3	8	65	1799	1536	1349	11847922	11333339	12000005

Total number of pulses in waveform = 41

****

Type 5 Radar Waveform_17.txt

Waveform Num = 17
Num of Bursts = 8
Burst Interval (us)= 1500000

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	37199									
1		3	13	90	1798	1936	1457	37199	0	1499999
	2263914									
2		1	19	50	1897	0	0	2306304	1500000	2999999
	695224									
3		3	9	100	1330	1564	1644	3003425	3000000	4499999
	2972092									
4		1	14	85	1511	0	0	5980055	4500000	5999999
	192697									
5		1	18	85	1765	0	0	6174263	6000000	7499999
	2378208									
6		1	14	85	1917	0	0	8554236	7500000	8999999
	1377100									
7		2	20	70	1854	1346	0	9933253	9000000	10499999
	1074061									
8		3	6	50	1143	1571	1035	11010514	10500000	11999999

Total number of pulses in waveform = 15

****

Type 5 Radar Waveform_18.txt

Waveform Num = 18
Num of Bursts = 8
Burst Interval (us)= 1500000

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	22920									
1		1	11	100	1633	0	0	22920	0	1499999
	1890813									
2		2	9	80	1842	1097	0	1915366	1500000	2999999
	1705581									
3		1	5	85	1254	0	0	3623886	3000000	4499999
	1201962									
4		2	5	90	1896	1162	0	4827102	4500000	5999999
	1569165									
5		2	19	80	1764	1582	0	6399325	6000000	7499999
	1922335									
6		1	20	85	1738	0	0	8325006	7500000	8999999
	1372480									
7		1	14	100	1583	0	0	9699224	9000000	10499999
	961545									
8		1	9	85	1710	0	0	10662352	10500000	11999999

Total number of pulses in waveform = 11

****

Type 5 Radar Waveform_19.txt

Waveform Num = 19
Num of Bursts = 9
Burst Interval (us)= 1333333

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	875004									
1		2	6	100	1791	1371	0	875004	0	1333332
	609694									
2		2	9	50	1650	1068	0	1487860	1333333	2666665
	2092179									
3		2	11	65	1938	1771	0	3582757	2666666	3999998
	1562746									
4		2	20	100	1584	1835	0	5149212	3999999	5333331
	1291399									
5		3	8	95	1817	1789	1418	6444030	5333332	6666664
	1064075									
6		3	11	75	1839	1417	1269	7513129	6666665	7999997
	969641									
7		3	8	50	1285	1422	1274	8487295	7999998	9333330
	1062958									
8		3	7	65	1100	1593	1229	9554234	9333331	10666663
	2010859									
9		1	20	85	1907	0	0	11569015	10666664	11999996

Total number of pulses in waveform = 21

****

Type 5 Radar Waveform_20.txt

Waveform Num = 20
Num of Bursts = 16
Burst Interval (us)= 750000

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	663668									
1		1	5	70	1004	0	0	663668	0	749999
	441841									
2		1	12	75	1498	0	0	1106513	750000	1499999
	744549									
3		3	18	50	1047	1491	1883	1852560	1500000	2249999
	981409									
4		2	20	65	1957	1278	0	2838390	2250000	2999999
	898312									
5		2	12	65	1978	1028	0	3731937	3000000	3749999
	473078									
6		3	17	85	1091	1448	1309	4208021	3750000	4499999
	648933									
7		3	9	90	1892	1493	1900	4860802	4500000	5249999
	727474									
8		3	14	80	1595	1151	1926	5593561	5250000	5999999
	561631									
9		3	5	90	1657	1020	1715	6159864	6000000	6749999
	944283									
10		1	12	100	1383	0	0	7108539	6750000	7499999
	969880									
11		1	12	60	1781	0	0	8079802	7500000	8249999
	457845									
12		3	12	60	1446	1355	1549	8539428	8250000	8999999
	626460									
13		1	8	50	1423	0	0	9170238	9000000	9749999
	1006070									
14		1	15	90	1285	0	0	10177731	9750000	10499999
	404364									
15		2	18	55	1425	1658	0	10583380	10500000	11249999
	1282790									
16		3	14	85	1528	1283	1803	11869253	11250000	11999999

Total number of pulses in waveform = 33

****

Type 5 Radar Waveform_21.txt

Waveform Num = 21
Num of Bursts = 17
Burst Interval (us)= 705882

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	358482									
1		2	18	70	1958	1574	0	358482	0	705881
	592799									
2		1	11	80	1461	0	0	954813	705882	1411763
	793589									
3		1	11	100	1075	0	0	1749863	1411764	2117645
	927773									
4		1	6	85	1196	0	0	2678711	2117646	2823527
	232378									
5		1	19	70	1694	0	0	2912285	2823528	3529409
	778041									
6		2	9	75	1681	1055	0	3692020	3529410	4235291
	948206									
7		3	9	65	1404	1923	1395	4642962	4235292	4941173
	305814									
8		1	9	100	1460	0	0	4953498	4941174	5647055
	1183065									
9		2	14	90	1878	1788	0	6138023	5647056	6352937
	680577									
10		3	9	90	1117	1485	1224	6822266	6352938	7058819
	637761									
11		3	17	90	1007	1815	1798	7463853	7058820	7764701
	623781									
12		1	16	80	1870	0	0	8092254	7764702	8470583
	519287									
13		3	11	70	1588	1669	1203	8613411	8470584	9176465
	586205									
14		2	16	50	1743	1099	0	9204076	9176466	9882347
	1308927									
15		3	10	65	1893	1240	1720	10515845	9882348	10588229
	90362									
16		3	18	50	1564	1015	1587	10611060	10588230	11294111
	821522									
17		2	14	85	1135	1858	0	11436748	11294112	11999993

Total number of pulses in waveform = 34
****

Type 5 Radar Waveform_22.txt

Waveform Num = 22
Num of Bursts = 8
Burst Interval (us)= 1500000

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	785860									
1		1	20	55	1946	0	0	785860	0	1499999
	795482									
2		1	18	55	1679	0	0	1583288	1500000	2999999
	2094009									
3		1	10	55	1533	0	0	3678976	3000000	4499999
	1342052									
4		2	13	85	1511	1906	0	5022561	4500000	5999999
	1232384									
5		2	19	90	1599	1198	0	6258362	6000000	7499999
	1812115									
6		3	6	90	1133	1904	1508	8073274	7500000	8999999
	1944582									
7		2	12	60	1439	1968	0	10022401	9000000	10499999
	1440372									
8		3	5	65	1495	1661	1902	11466180	10500000	11999999

Total number of pulses in waveform = 15
****

Type 5 Radar Waveform_23.txt

Waveform Num = 23
Num of Bursts = 18
Burst Interval (us)= 666667

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	82233									
1		1	12	90	1369	0	0	82233	0	666666
	1179577									
2		2	13	65	1683	1712	0	1263179	666667	1333333
	526962									
3		1	15	70	1105	0	0	1793536	1333334	2000000
	344908									
4		1	14	70	1524	0	0	2139549	2000001	2666667
	609408									
5		2	9	65	1434	1380	0	2750481	2666668	3333334
	674418									
6		3	18	80	1473	1347	1853	3427713	3333335	4000001
	675910									
7		1	12	100	1528	0	0	4108296	4000002	4666668
	716398									
8		1	6	55	1527	0	0	4826222	4666669	5333335
	582767									
9		3	11	60	1251	1928	1559	5410516	5333336	6000002
	998470									
10		3	17	55	1392	1063	1781	6413724	6000003	6666669
	342309									
11		2	6	65	1105	1026	0	6760269	6666670	7333336
	675246									
12		1	12	100	1218	0	0	7437646	7333337	8000003
	821315									
13		3	10	65	1946	1490	1868	8260179	8000004	8666670
	566138									
14		3	19	100	1005	1422	1795	8831621	8666671	9333337
	1022369									
15		3	5	85	1594	1853	1235	9858212	9333338	10000004
	192435									
16		2	8	80	1498	1281	0	10055329	10000005	10666671
	916925									
17		1	15	70	1005	0	0	10975033	10666672	11333338
	401433									
18		3	6	50	1561	1804	1451	11377471	11333339	12000005

Total number of pulses in waveform = 36
****

Type 5 Radar Waveform_24.txt

Waveform Num = 24
Num of Bursts = 11
Burst Interval (us)= 1090909

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	916520									
1		2	13	90	1676	1753	0	916520	0	1090908
	996948									
2		3	16	70	1171	1570	1352	1916897	1090909	2181817
	974753									
3		1	5	80	1483	0	0	2895743	2181818	3272726
	701713									
4		1	9	90	1040	0	0	3598939	3272727	4363635
	1029733									
5		3	14	100	1996	1059	1694	4629712	4363636	5454544
	1785426									
6		2	19	60	1996	1661	0	6419887	5454545	6545453
	1111452									
7		1	6	50	1862	0	0	7534996	6545454	7636362
	689427									
8		2	17	60	1528	1639	0	8226285	7636363	8727271
	1176888									
9		2	5	50	1811	1264	0	9406340	8727272	9818180
	439686									
10		1	6	85	1918	0	0	9849101	9818181	10909089
	1475305									
11		2	10	100	1370	1475	0	11326324	10909090	11999998

Total number of pulses in waveform = 20
****

Type 5 Radar Waveform_25.txt

Waveform Num = 25
Num of Bursts = 10
Burst Interval (us)= 1200000

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	448713									
1		2	13	50	1517	1287	0	448713	0	1199999
	1933531									
2		3	10	70	1390	1228	1253	2385048	1200000	2399999
	269613									
3		1	6	75	1012	0	0	2658532	2400000	3599999
	1281240									
4		1	12	95	1296	0	0	3940784	3600000	4799999
	942777									
5		2	16	60	1293	1309	0	4884857	4800000	5999999
	1775284									
6		1	9	65	1554	0	0	6662743	6000000	7199999
	1226398									
7		1	18	95	1283	0	0	7890695	7200000	8399999
	1292188									
8		3	19	85	1519	1695	1725	9184166	8400000	9599999
	822036									
9		3	6	90	1080	1729	1527	10011141	9600000	10799999
	1372062									
10		3	19	100	1462	1485	1880	11387539	10800000	11999999

Total number of pulses in waveform = 20

****

Type 5 Radar Waveform_26.txt

Waveform Num = 26
Num of Bursts = 18
Burst Interval (us)= 666667

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	470028									
1		2	13	70	1529	1778	0	470028	0	666666
	785866									
2		1	20	75	1536	0	0	1259201	666667	1333333
	114859									
3		1	11	50	1869	0	0	1375596	1333334	2000000
	862931									
4		2	10	90	1031	1414	0	2240396	2000001	2666667
	598096									
5		3	20	60	1025	1500	1280	2840937	2666668	3333334
	772488									
6		2	13	90	1149	1924	0	3617230	3333335	4000001
	462333									
7		1	10	100	1751	0	0	4082636	4000002	4666668
	937434									
8		3	7	90	1501	1340	1079	5021821	4666669	5333335
	856025									
9		3	19	50	1973	1736	1780	5881766	5333336	6000002
	142942									
10		2	10	95	1780	1073	0	6030197	6000003	6666669
	1122640									
11		2	7	75	1311	1390	0	7155690	6666670	7333336
	792240									
12		2	5	60	1558	1384	0	7950631	7333337	8000003
	624651									
13		1	6	100	1213	0	0	8578224	8000004	8666670
	666100									
14		2	9	80	1545	1257	0	9245537	8666671	9333337
	745981									
15		2	10	100	1692	1328	0	9994320	9333338	10000004
	33541									
16		2	7	80	1767	1020	0	10030881	10000005	10666671
	1081702									
17		1	13	55	1861	0	0	11115370	10666672	11333338
	353708									
18		1	7	60	1291	0	0	11470939	11333339	12000005

Total number of pulses in waveform = 33

****

Type 5 Radar Waveform_27.txt

Waveform Num = 27
Num of Bursts = 9
Burst Interval (us)= 1333333

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	333519									
1		2	20	75	1120	1623	0	333519	0	1333332
	2271308									
2		2	13	90	1877	1015	0	2607570	1333333	2666665
	314206									
3		1	12	55	1000	0	0	2924668	2666666	3999998
	1668972									
4		2	19	65	1717	1810	0	4594640	3999999	5333331
	1215299									
5		3	13	80	1497	1472	1827	5813466	5333332	6666664
	2117829									
6		2	5	60	1830	1170	0	7936091	6666665	7999997
	821691									
7		2	8	100	1900	1107	0	8760782	7999998	9333330
	938200									
8		2	7	85	1017	1125	0	9701989	9333331	10666663
	1210602									
9		2	17	70	1844	1047	0	10914733	10666664	11999996

Total number of pulses in waveform = 18

****

Type 5 Radar Waveform_28.txt

Waveform Num = 28
Num of Bursts = 18
Burst Interval (us)= 666667

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	317289									
1		2	20	100	1280	1512	0	317289	0	666666
	841801									
2		1	16	50	1431	0	0	1161882	666667	1333333
	414006									
3		2	18	55	1044	1102	0	1577319	1333334	2000000
	819225									
4		3	5	100	1494	1436	1694	2398690	2000001	2666667
	598580									
5		1	17	65	1525	0	0	3001894	2666668	3333334
	829934									
6		3	17	100	1306	1325	1793	3833353	3333335	4000001
	378248									
7		3	12	55	1505	1740	1337	4216025	4000002	4666668
	717886									
8		3	12	55	1996	1635	1616	4938493	4666669	5333335
	610231									
9		2	17	80	1529	1933	0	5553971	5333336	6000002
	887672									
10		2	11	65	1607	1572	0	6445105	6000003	6666669
	688500									
11		1	15	85	1767	0	0	7136784	6666670	7333336
	358671									
12		1	12	85	1734	0	0	7497222	7333337	8000003
	1039668									
13		3	10	100	1456	1901	1055	8538624	8000004	8666670
	322006									
14		3	7	75	1219	1006	1619	8865042	8666671	9333337
	944894									
15		2	15	70	1839	1111	0	9813780	9333338	10000004
	240322									
16		3	10	55	1142	1957	1802	10057052	10000005	10666671
	1197380									
17		3	14	50	1016	1222	1404	11259333	10666672	11333338
	339791									
18		1	19	90	1760	0	0	11602766	11333339	12000005

Total number of pulses in waveform = 39

****

Type 5 Radar Waveform_29.txt

Waveform Num = 29
Num of Bursts = 14
Burst Interval (us)= 857143

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	648617									
1		1	8	80	1661	0	0	648617	0	857142
	329141									
2		1	12	100	1248	0	0	979419	857143	1714285
	892002									
3		1	10	90	1460	0	0	1872669	1714286	2571428
	1061249									
4		1	13	60	1639	0	0	2935378	2571429	3428571
	933785									
5		1	20	50	1766	0	0	3870802	3428572	4285714
	1172041									
6		3	10	95	1338	1029	1350	5044689	4285715	5142857
	324776									
7		3	7	80	1713	1018	1105	5373102	5142858	6000000
	793219									
8		1	7	70	1672	0	0	6170157	6000001	6857143
	1325944									
9		3	6	75	1127	1902	1825	7497773	6857144	7714286
	838336									
10		2	8	50	1684	1301	0	8340963	7714287	8571429
	1039865									
11		3	6	70	1303	1324	1898	9383813	8571430	9428572
	437287									
12		2	11	90	1308	1900	0	9825625	9428573	10285715
	1193675									
13		1	12	60	1198	0	0	11022508	10285716	11142858
	850959									
14		1	18	75	1037	0	0	11874665	11142859	12000001

Total number of pulses in waveform = 24

****

Type 5 Radar Waveform_30.txt

Waveform Num = 30
Num of Bursts = 10
Burst Interval (us)= 1200000

Burst #	Off Time (us)	# Pulses	Chirp (MHz)	PW (us)	Pulse 1 Pri(us)	Pulse 2 Pri(us)	Pulse 3 Pri(us)	Start Loc (us)	Start Burst Interval(us)	End Burst Interval(us)
	1184037									
1		2	11	95	1772	1636	0	1184037	0	1199999
	930161									
2		1	17	65	1071	0	0	2117606	1200000	2399999
	719132									
3		3	9	70	1190	1797	1328	2837809	2400000	3599999
	821092									
4		1	14	95	1129	0	0	3663216	3600000	4799999
	1363947									
5		2	12	85	1865	1098	0	5028292	4800000	5999999
	1170844									
6		1	7	75	1465	0	0	6202099	6000000	7199999
	1689330									
7		1	15	50	1790	0	0	7892894	7200000	8399999
	1655078									
8		1	9	80	1016	0	0	9549762	8400000	9599999
	150548									
9		3	14	75	1744	1574	1365	9701326	9600000	10799999
	1681766									
10		3	9	80	1768	1034	1200	11387775	10800000	11999999

Total number of pulses in waveform = 18

****

Type 6 Radar Waveform_1.txt

Hop number	Frequency (MHz)	Pulse Start (ms)
12	5287	36
13	5292	39
16	5310	48
23	5299	69
25	5283	75
40	5311	120
43	5279	129
56	5275	168
62	5304	186
98	5278	294

Type 6 Radar Waveform_2.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
13	5328	39
22	5305	66
33	5295	99
42	5288	126
51	5310	153
52	5312	156
53	5306	159
54	5272	162
55	5330	165
68	5283	204
79	5327	237
82	5297	246

Type 6 Radar Waveform_3.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
7	5287	21
10	5327	30
36	5281	108
41	5314	123
51	5280	153
54	5292	162
57	5278	171
62	5299	186
63	5294	189
73	5308	219
76	5320	228
89	5282	267

Type 6 Radar Waveform_4.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
9	5308	27
21	5282	63
31	5304	93
37	5284	111
38	5275	114
46	5302	138
49	5294	147
63	5297	189
67	5278	201

Type 6 Radar Waveform_5.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
4	5303	12
6	5300	18
19	5294	57
23	5317	69
27	5281	81
28	5278	84
47	5310	141
55	5330	165
67	5296	201
71	5299	213
75	5321	225
79	5328	237
94	5308	282
97	5306	291

Type 6 Radar Waveform_6.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
34	5294	102
41	5293	123
55	5279	165
80	5281	240
81	5276	243
82	5284	246
84	5282	252
94	5306	282
96	5304	288

Type 6 Radar Waveform_7.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
3	5271	9
10	5270	30
11	5326	33
23	5294	69
26	5295	78
29	5307	87
31	5291	93
36	5311	108
41	5299	123
44	5314	132
45	5304	135
49	5296	147
50	5330	150
51	5321	153
62	5293	186
65	5273	195

Type 6 Radar Waveform_8.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
4	5309	12
14	5307	42
31	5317	93
34	5275	102
44	5276	132
61	5296	183
80	5294	240
82	5286	246
83	5301	249
88	5290	264
89	5292	267
97	5319	291

Type 6 Radar Waveform_9.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
2	5281	6
4	5274	12
7	5278	21
19	5318	57
20	5279	60
31	5289	93
48	5291	144
56	5284	168
64	5325	192
74	5328	222
79	5294	237
80	5327	240
81	5273	243
82	5286	246
86	5282	258

Type 6 Radar Waveform_10.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
14	5284	42
15	5297	45
29	5281	87
31	5278	93
35	5323	105
45	5300	135
63	5277	189
81	5295	243
92	5316	276
97	5283	291
98	5314	294

Type 6 Radar Waveform_11.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
12	5322	36
15	5317	45
17	5298	51
21	5283	63
22	5280	66
35	5306	105
38	5284	114
39	5328	117
50	5307	150
55	5329	165
58	5321	174
61	5281	183
66	5327	198
80	5302	240

Type 6 Radar Waveform_12.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
8	5329	24
10	5273	30
18	5302	54
21	5306	63
24	5288	72
47	5290	141
54	5320	162
78	5317	234
87	5318	261
89	5292	267
90	5301	270
95	5294	285

Type 6 Radar Waveform_13.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
2	5270	6
17	5282	51
19	5299	57
20	5325	60
29	5312	87
30	5274	90
34	5295	102
35	5303	105
36	5327	108
37	5298	111
41	5306	123
48	5324	144
67	5318	201
68	5310	204
69	5291	207
87	5313	261
96	5290	288

Type 6 Radar Waveform_14.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
32	5292	96
35	5307	105
55	5280	165
69	5288	207
91	5325	273

Type 6 Radar Waveform_15.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
1	5311	3
13	5308	39
23	5306	69
24	5284	72
39	5330	117
41	5299	123
52	5289	156
54	5301	162
59	5320	177
70	5303	210
78	5283	234
84	5271	252
87	5278	261

Type 6 Radar Waveform_16.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
6	5319	18
21	5273	63
25	5313	75
29	5308	87
43	5318	129
44	5298	132
46	5329	138
49	5300	147
54	5271	162
57	5299	171
63	5316	189
66	5324	198
67	5310	201
75	5328	225
77	5270	231
78	5283	234
85	5275	255
99	5326	297

Type 6 Radar Waveform_17.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
6	5288	18
15	5300	45
16	5299	48
30	5330	90
50	5279	150
51	5284	153
75	5285	225
77	5291	231
84	5276	252

Type 6 Radar Waveform_18.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
1	5329	3
9	5273	27
10	5326	30
16	5322	48
17	5272	51
34	5321	102
36	5304	108
39	5291	117
56	5317	168
59	5314	177
60	5297	180
75	5308	225
79	5324	237
93	5282	279
97	5319	291

Type 6 Radar Waveform_19.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
7	5276	21
14	5277	42
19	5272	57
30	5313	90
50	5309	150
54	5274	162
55	5281	165
81	5305	243
88	5298	264
90	5291	270
97	5287	291
99	5317	297

Type 6 Radar Waveform_20.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
11	5288	33
13	5309	39
17	5316	51
28	5325	84
33	5282	99
52	5311	156
53	5298	159
54	5323	162
69	5320	207
70	5327	210
71	5300	213
74	5318	222
78	5297	234
79	5303	237
81	5302	243
97	5279	291

Type 6 Radar Waveform_21.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
3	5297	9
17	5325	51
20	5273	60
31	5299	93
35	5328	105
41	5304	123
53	5294	159
54	5329	162
61	5293	183
65	5280	195
84	5289	252
86	5315	258
95	5282	285

Type 6 Radar Waveform_22.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
1	5302	3
10	5321	30
19	5273	57
20	5290	60
23	5310	69
29	5315	87
31	5312	93
38	5274	114
45	5329	135
55	5282	165
60	5271	180
70	5278	210
72	5295	216
75	5297	225
82	5308	246
99	5286	297

Type 6 Radar Waveform_23.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
27	5276	81
34	5301	102
39	5299	117
43	5318	129
44	5303	132
50	5296	150
72	5280	216
73	5330	219
75	5278	225
76	5302	228
79	5271	237
81	5290	243

Type 6 Radar Waveform_24.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
0	5323	0
13	5293	39
23	5321	69
24	5289	72
26	5286	78
27	5312	81
34	5282	102
38	5300	114
45	5277	135
46	5324	138
56	5284	168
57	5271	171
65	5313	195
81	5329	243
84	5319	252
91	5281	273
99	5276	297

Type 6 Radar Waveform_25.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
23	5318	69
25	5313	75
28	5279	84
33	5308	99
45	5322	135
61	5275	183
70	5283	210
78	5312	234
81	5304	243
86	5302	258
89	5297	267
90	5294	270

Type 6 Radar Waveform_26.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
9	5282	27
26	5316	78
46	5311	138
56	5313	168
57	5327	171
59	5290	177
60	5330	180
80	5321	240
93	5306	279

Type 6 Radar Waveform_27.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
6	5289	18
7	5314	21
20	5290	60
30	5318	90
32	5270	96
37	5309	111
40	5286	120
42	5313	126
49	5285	147
78	5272	234
96	5324	288

Type 6 Radar Waveform_28.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
4	5325	12
22	5301	66
27	5308	81
31	5291	93
37	5294	111
43	5313	129
53	5329	159
55	5311	165
57	5314	171
64	5271	192
71	5283	213
78	5277	234
97	5274	291

Type 6 Radar Waveform_29.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
0	5304	0
5	5292	15
13	5281	39
22	5306	66
31	5323	93
34	5288	102
38	5280	114
39	5329	117
56	5279	168
85	5303	255
87	5309	261
94	5325	282

Type 6 Radar Waveform_30.txt

Hop number	Frequency (GHz)	Pulse Start (ms)
1	5270	3
2	5282	6
16	5323	48
21	5301	63
26	5297	78
35	5278	105
42	5279	126
44	5298	132
82	5291	246
87	5328	261
88	5326	264