DFS MEASUREMENT REPORT

FCC PART 15 Subpart E & IC RSS-247

FCC ID:	2AD8UFZCWMBOM1
IC:	109D-FZCWMBOM1
APPLICANT:	Nokia Solutions and Networks
Application Type:	Certification
Product:	US Wi-Fi AP 2x2 OD ext. antenna
Model No.:	FZCWMBOM1
Brand Name:	Nokia
FCC Classification:	Unlicensed National Information Infrastructure (UNII)
IC Rule(s):	RSS-247 Issue 2, RSS-Gen Issue 4
FCC Rule Part(s):	Part 15 Subpart E - 15.407 Section (h)(2) KDB 905462 D02v02, KDB 905462 D04v01
Type of Device:	☒ Master Device ☐ Client Device (No radar detection) ☐ Client Device with radar detection
Test Date:	March 02 ~ 10, 2017

Reviewed By : Paddy Chen
(Paddy Chen)

Approved By : Chenz Ker
(Chenz Ker)

Testing Laboratory
3261

The test results relate only to the samples tested.
This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in KDB 905462 D02v02. Test results reported herein relate only to the item(s) tested.
The test report shall not be reproduced except in full without the written approval of MRT Technology (Taiwan) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
1703TW0103-U7	Rev. 01	Initial Report	05-14-2017	Valid

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Description Page

§2.1033 General Information

Applicant:	Nokia Solutions and Networks
Applicant Address:	1455 W Shure Drive, Arlington Heights, IL 60004
Manufacturer:	Nokia Solutions and Networks
Manufacturer Address:	1455 W Shure Drive, Arlington Heights, IL 60004
Test Site:	MRT Technology (Taiwan) Co., Ltd
Test Site Address:	No. 38, Fuxing Second Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C)
MRT FCC Registration No.:	153292
MRT IC Registration No.:	21723-1
Model No.:	FZCWMBOM1
FCC ID:	2AD8UFZCWMBOM1
IC:	109D-FZCWMBOM1
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ Engineering
FCC Classification:	Unlicensed National Information Infrastructure (UNII)

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Fuxing Rd., Taoyuan, Taiwan (R.O.C)

- **MRT facility is a FCC registered (Reg. No. 153292) test facility with the site description report on file and is designated by the FCC as an Accredited Test Film.**
- **MRT facility is an IC registered (MRT Reg. No. 21723-1) test laboratory with the site description on file at Industry Canada.**
- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (TAF) under the American Association for Laboratory Accreditation Program (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC, Industry Taiwan, EU and TELEC Rules.**

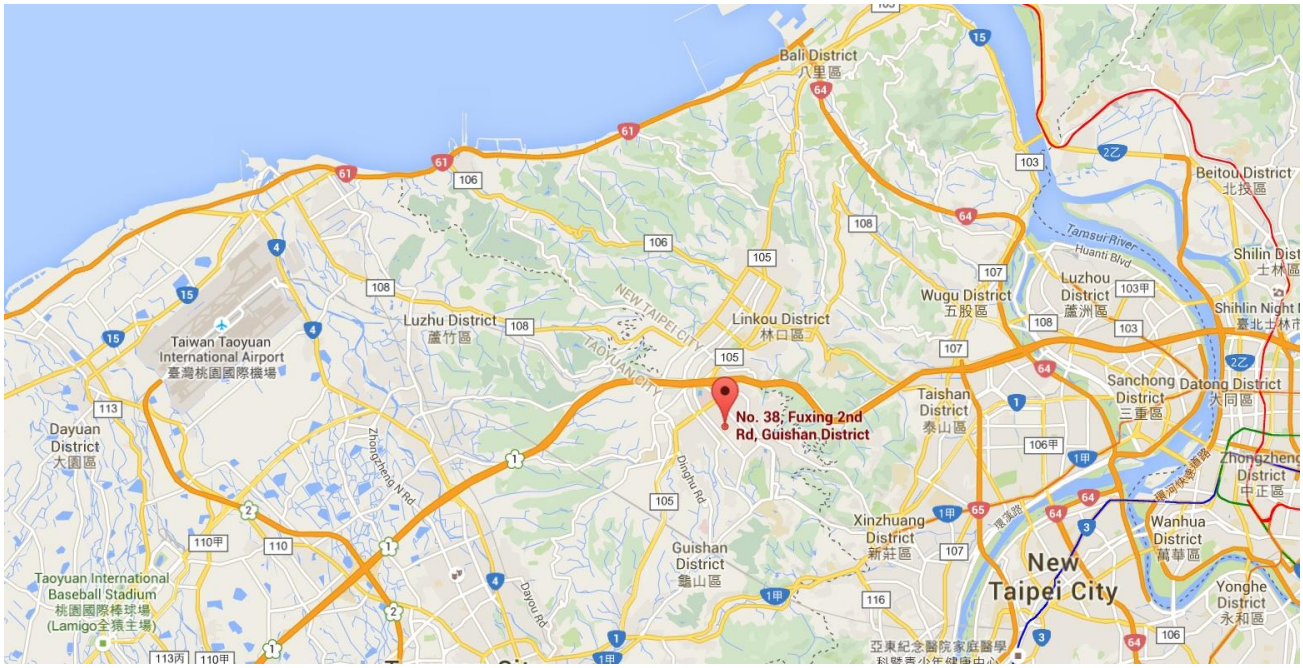
1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taoyuan City. These measurement tests were conducted at the MRT Technology (Taiwan) Co., Ltd. Facility located at No.38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan (R.O.C).



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name	US Wi-Fi AP 2x2 OD ext. antenna
Model No.	FZCWMBOM1
Radio Type	Intentional Transceiver
Operation Mode	Master Device
Frequency Range	**2.4GHz:** For 802.11b/g/n-HT20: 2412 ~ 2462 MHz For 802.11n-HT40: 2422 ~ 2452 MHz **5GHz:** For 802.11a/n-HT20: 5180~5320MHz, 5500~5700MHz, 5745~5825MHz For 802.11ac-VHT20: 5180~5320MHz, 5500~5720MHz, 5745~5825MHz For 802.11n-HT40: 5190~5310MHz, 5510~5670MHz, 5755~5795MHz For 802.11ac-VHT40: 5190~5310MHz, 5510~5710MHz, 5755~5795MHz For 802.11ac-VHT80: 5210MHz, 5290MHz, 5530MHz, 5610MHz, 5690MHz, 5775MHz
Type of Modulation	802.11a/n/ac: OFDM;
Modulation Type	16QAM, 64QAM, QPSK, BPSK for OFDM 802.11a/n/ac: OFDM
Power-on cycle	For 802.11a mode, requires 108.2 seconds to complete its power-on cycle;
Uniform Spreading (For DFS Frequency Band)	For the 5250-5350MHz, 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.

2.2. Description of Available Antennas

Antenna	Manufacturer	Frequency Band (GHz)	Antenna Name	Tx Paths
	Nokia	2.4	473171A / FAWH (WiFi Omni Ant)	2
		5		2

Note: The manufacture has provided an antenna cable to connect WiFi Omni Antenna with EUT, and the cable loss is: 0.45dB Max @ 0~3 GHz; 0.75dB Max @ 0~6 GHz

Antenna Name	Frequency Band (MHz)	Tx Paths	Per Chain Max Antenna Gain (dBi)		Beam Forming Directional Gain (dBi)	CDD Directional Gain (dBi)
			Ant 2	Ant 2		
473171A / FAWH (WiFi Omni Ant)	2412 ~2462	2	4.00	4.00	7.01	7.01
	5150 ~ 5250	2	7.00	7.00	10.01	10.01
	5150 ~ 5250 30°elevation angle	2	7.00	7.00	N/A	N/A
	5250 ~ 5350	2	7.00	7.00	10.01	10.01
	5470 ~ 5725	2	7.00	7.00	10.01	10.01
	5725 ~ 5850	2	7.00	7.00	10.01	10.01

Note

1. The EUT supports Cyclic Delay Diversity (CDD) technology for 802.11a/b/g mode, and CDD signals are correlated.
2. The EUT supports Beam Forming technology for 802.11n/ac mode.

For CDD transmissions, directional gain is calculated as follows, $N_{ANT} = 2$, $N_{SS} = 1$.

Three antennas have the same gain, G_{ANT}, Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

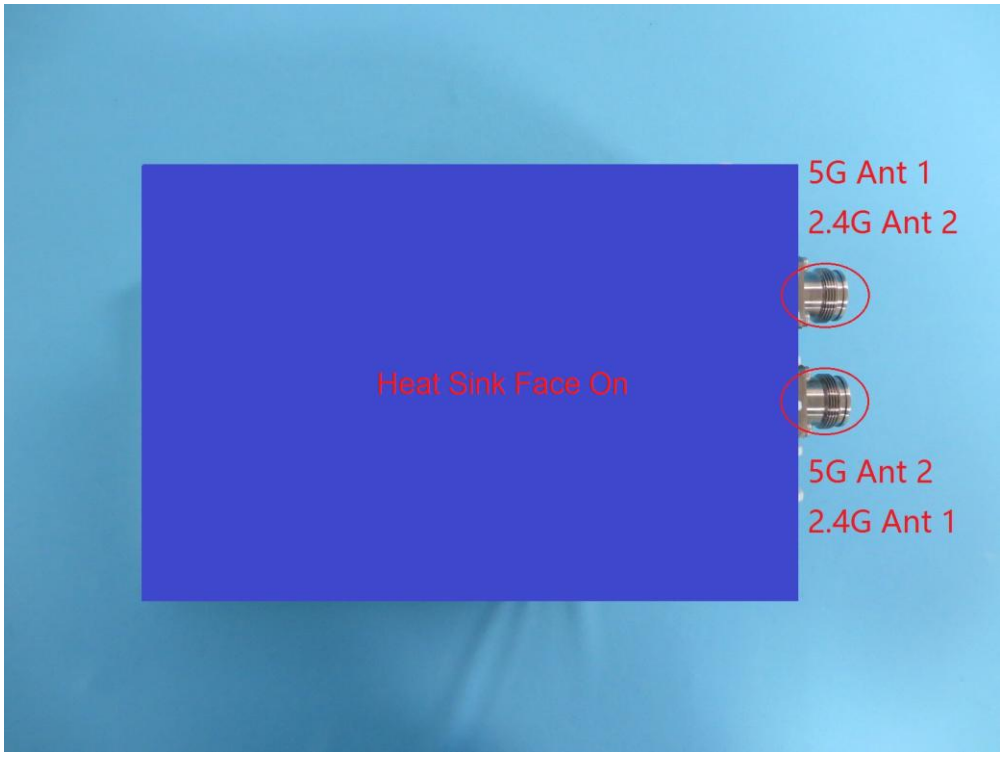
- For power spectral density (PSD) measurements on all devices,
  Array Gain = 10 log (N_{ANT}/ N_{SS}) dB = 3.01;
- For power measurements on IEEE 802.11 devices,
  Array Gain = 0 dB for $N_{ANT} \leq 4$;

Note 2: The EUT also supports Beam Forming technology, and the Beam Forming only support 802.11ac mode. Two antenna have the same gain, G_{ANT}:

Directional gain = G_{ANT} + 10 log (N_{ANT}/N_{SS}) dBi, where N_{SS} = the number of independent spatial streams of data and G_{ANT} is the antenna gain in dBi.

2.3. Description of Antenna RF Port

Antenna RF Port				
---	2.4GHz RF Port		5GHz RF Port	
Software Control Port	Ant 1	Ant 2	Ant 1	Ant 2



2.4. DFS Band Carrier Frequencies Operation

802.11a/n-HT20 Center Working Frequency of Each Channel

Channel	Frequency	Channel	Frequency	Channel	Frequency
52	5260 MHz	56	5280 MHz	60	5300 MHz
64	5320 MHz	100	5500 MHz	104	5520 MHz
108	5540 MHz	112	5560 MHz	116	5580 MHz
120	5600 MHz	124	5620 MHz	128	5640 MH z
132	5660 MHz	136	5680 MHz	140	5700 MHz

802.11ac-VHT20 Center Working Frequency of Each Channel

Channel	Frequency	Channel	Frequency	Channel	Frequency
52	5260 MHz	56	5280 MHz	60	5300 MHz
64	5320 MHz	100	5500 MHz	104	5520 MHz
108	5540 MHz	112	5560 MHz	116	5580 MHz
120	5600 MHz	124	5620 MHz	128	5640 MHz
132	5660 MHz	136	5680 MHz	140	5700 MHz
144	5720 MHz	--	--	--	--

802.11n-HT40 Center Working Frequency of Each Channel

Channel	Frequency	Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz	102	5510 MHz
110	5550 MHz	118	5590 MHz	126	5630 MHz
134	5670 MHz	--	--	--	--

802.11ac-VHT40 Center Working Frequency of Each Channel

Channel	Frequency	Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz	102	5510 MHz
110	5550 MHz	118	5590 MHz	126	5630 MHz
134	5670 MHz	142	5710MHz	--	--

802.11ac-VHT80 Center Working Frequency of Each Channel

Channel	Frequency	Channel	Frequency	Channel	Frequency
58	5290 MHz	106	5530 MHz	122	5610 MHz
138	5690 MHz	--	--	--	--

Note: The device can't operate in 5600~5650 MHz band in Canada (The frequency of blue font).

2.5. Test Mode

Test Mode	Mode 1: Communication with Notebook

3. DFS DETECTION THRESHOLDS AND RADAR TEST WAVEFORMS

3.1. Applicability

The following table from FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02 lists the applicable requirements for the DFS testing.

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

Table 3-1: Applicability of DFS Requirements Prior to Use of a Channel

Requirement	Operational Mode	
	Master Device or Client With Radar Detection	Client Without Radar Detection
DFS Detection Threshold	Yes	Not required
Channel Closing Transmission Time	Yes	Yes
Channel Move Time	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.		

Table 3-2: Applicability of DFS Requirements during normal operation

3.2. DFS Devices Requirements

Per FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02 the following are the requirements for Master Devices:

(a) The Master Device will use DFS in order to detect Radar Waveforms with received signal strength above the DFS Detection Threshold in the 5250 ~ 5350 MHz and 5470 ~ 5725 MHz bands. DFS is not required in the 5150 ~ 5250 MHz or 5725 ~ 5825 MHz bands.

(b) Before initiating a network on a Channel, the Master Device will perform a Channel Availability Check for a specified time duration (Channel Availability Check Time) to ensure that there is no radar system operating on the Channel, using DFS described under subsection a) above.

(c) The Master Device initiates a U-NII network by transmitting control signals that will enable other U-NII devices to Associate with the Master Device.

(d) During normal operation, the Master Device will monitor the Channel (In-Service Monitoring) to ensure that there is no radar system operating on the Channel, using DFS described under a).

(e) If the Master Device has detected a Radar Waveform during In-Service Monitoring as described under d), the Operating Channel of the U-NII network is no longer an Available Channel. The Master Device will instruct all associated Client Device(s) to stop transmitting on this Channel within the Channel Move Time. The transmissions during the Channel Move Time will be limited to the Channel Closing Transmission Time.

(f) Once the Master Device has detected a Radar Waveform it will not utilize the Channel for the duration of the Non-Occupancy Period.

(g) If the Master Device delegates the In-Service Monitoring to a Client Device, then the combination will be tested to the requirements described under d) through f) above.

Channel Move Time and Channel Closing Transmission Time requirements are listed in the following table.

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 100% of the U-NII 99% transmission power bandwidth. See Note 3.
Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.	

Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions. Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

Table 3-3: DFS Response Requirements

3.3. DFS Detection Threshold Values

The DFS detection thresholds are defined for Master devices and Client Devices with In-service monitoring. These detection thresholds are listed in the following table.

Maximum Transmit Power	**Value** **(See Notes 1, 2, and 3)**
EIRP ≥ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64 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. **Note3:** EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.	

Table 3-4: Detection Thresholds for Master Devices and Client Devices with Radar Detection

3.4. Parameters of DFS Test Signals

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
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 3-6	$\text{Roundup}\left\{\left(\frac{1}{360}\right)\cdot\left(\frac{19\cdot 10^6}{\text{PRI}_{\text{usec}}}\right)\right\}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 μsec, with a minimum increment of 1 μsec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120
Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.					

Table 3-5: Parameters for Short Pulse Radar Waveforms

A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. If more than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms.

Pulse Repetition Frequency Number	Pulse Repetition Frequency (Pulses Per Second)	Pulse Repetition Interval (Microseconds)
1	1930.5	518
2	1858.7	538
3	1792.1	558
4	1730.1	578
5	1672.2	598
6	1618.1	618
7	1567.4	638
8	1519.8	658
9	1474.9	678
10	1432.7	698
11	1392.8	718
12	1355	738
13	1319.3	758
14	1285.3	778
15	1253.1	798
16	1222.5	818
17	1193.3	838
18	1165.6	858
19	1139	878
20	1113.6	898
21	1089.3	918
22	1066.1	938
23	326.2	3066

Table 3-6: Pulse Repetition Intervals Values for Test A

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

Table 3-7: Parameters for Long Pulse Radar Waveforms

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.

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

Table 3-8: Parameters for Frequency Hopping Radar Waveforms

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:

The first frequency in a hopping sequence is selected randomly from the group of 475 integer frequencies from 5250 – 5724MHz. 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.

3.5. Conducted Test Setup

The FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02 describes a radiated test setup and a conducted test setup. The conducted test setup was used for this testing. Figure 3-1 shows the typical test setup.

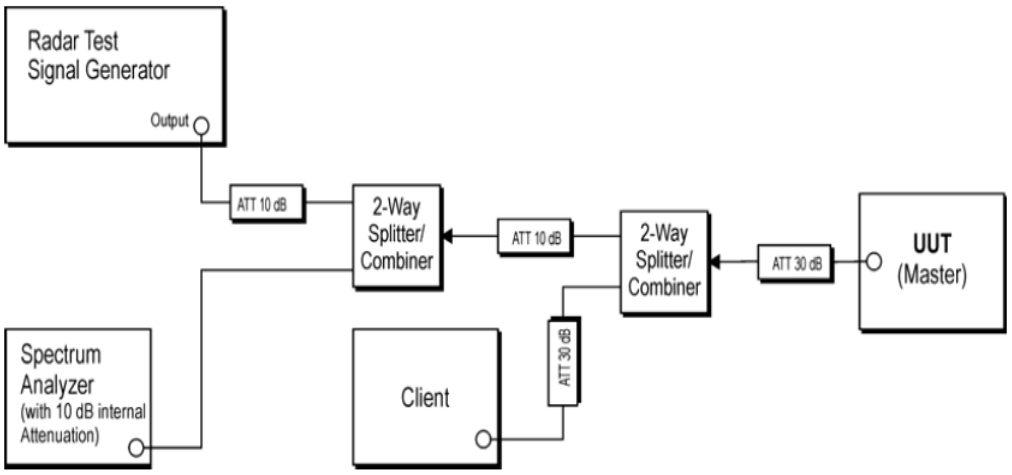


Figure 3-1: Conducted Test Setup where UUT is a Master and Radar Test Waveforms are injected into the Masters

4. TEST EQUIPMENT CALIBRATION DATE

Dynamic Frequency Selection (DFS) – TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2017/07/11
MXG X-Series Microwave Analog Signal Generator	KEYSIGHT	N5183B	MRTTWA00013	1 year	2017/04/18
Temperature/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00033	1 year	2017/06/09
Combiner	WOKEN	0120N02208001D	MRTTWA00040	1 year	N/A
Broadband Hornantenna	SCHWARZBECK	BBHA 9120D	MRTTWA00003	1 year	2017/04/06

Client Information

Instrument	Manufacturer	Type No.
Wireless Network Adapter	Intel	7260HMW

Software	Version	Manufacturer	Function
Pulse Building	N/A	Agilent	Radar Signal Generation Software
DFS Tool	V 6.9.2	Agilent	DFS Test Software

5. TEST RESULT

5.1. Summary

Company Name: **Nokia Solutions and Networks**

FCC ID: **2AD8UFZCWMBOM1**

IC: **109D-FZCWMBOM1**

Parameter	Limit	Test Result	Reference
UNII Detection Bandwidth Measurement	Refer Table 3-3	Pass	Section 5.4
Initial Channel Availability Check Time	Refer Table 3-3	Pass	Section 5.5
Radar Burst at the Beginning of the Channel Availability Check Time	Refer Table 3-3	Pass	Section 5.6
Radar Burst at the End of the Channel Availability Check Time	Refer Table 3-3	Pass	Section 5.7
In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time	Refer Table 3-3	Pass	Section 5.8
Non-Occupancy Period	Refer Table 3-3	Pass	Section 5.8
Statistical Performance Check	Refer Table 3-3	Pass	Section 5.9

5.2. Radar Waveform Calibration

5.2.1. Calibration Setup

The conducted test setup was used for this calibration testing. Figure 3-2 shows the typical test setup.

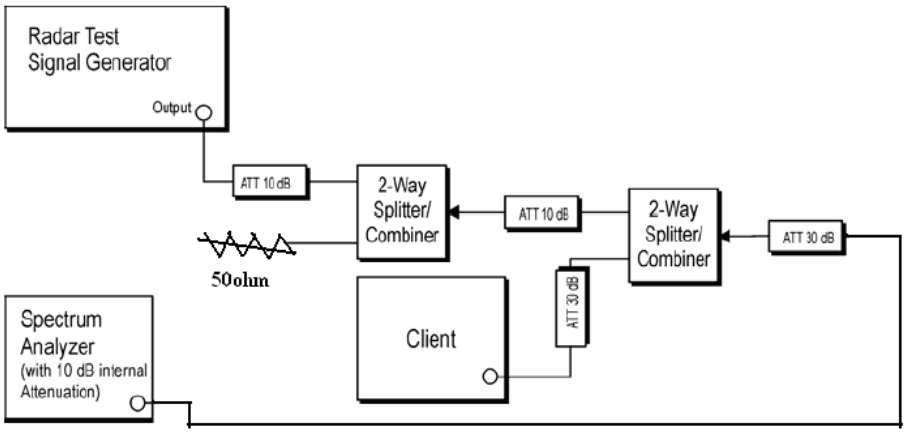


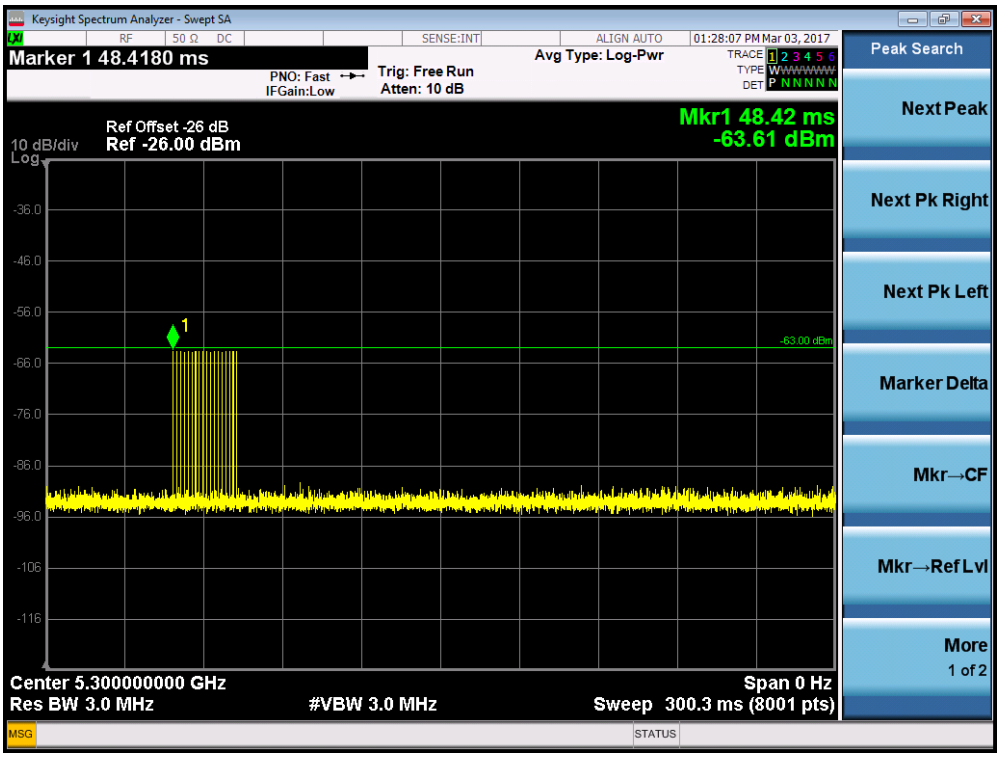
Figure 3-2: Conducted Test Setup

5.2.2. Calibration Procedure

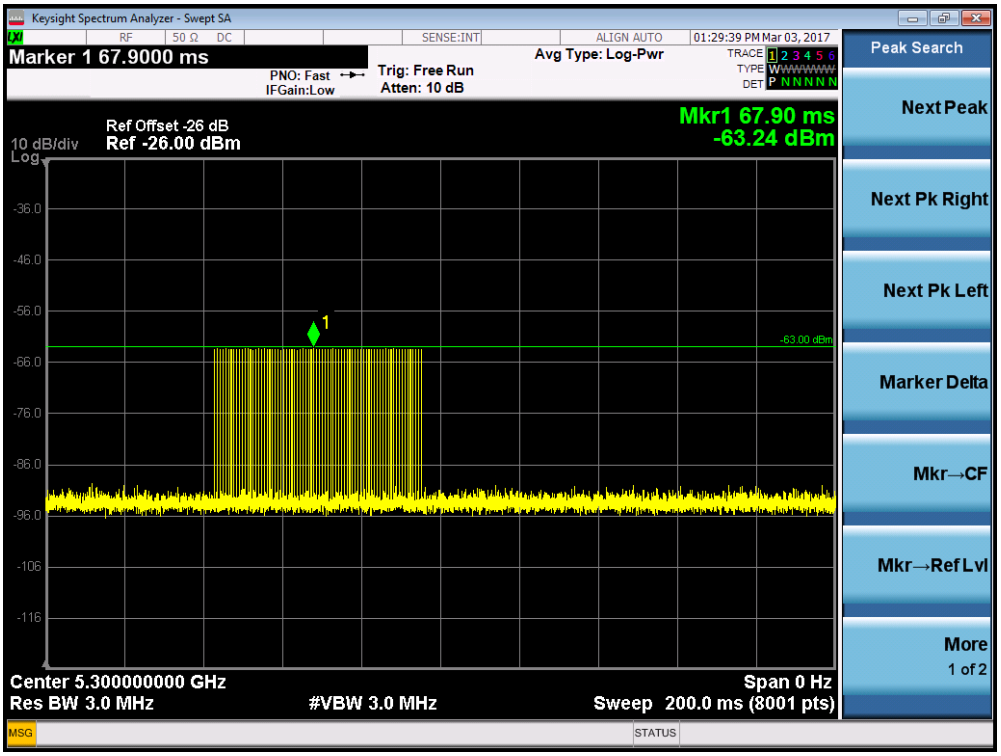
The Interference Radar Detection Threshold Level is (-64dBm) + (0) [dBi] + 1 dB= -63 dBm that had been taken into account the output power range and antenna gain. The above equipment setup was used to calibrate the conducted Radar Waveform. A vector signal generator was utilized to establish the test signal level for each radar type. During this process there were replace 50ohm terminal form Master and Client device and no transmissions by either the Master or Client Device. The spectrum analyzer was switched to the zero span (Time Domain) at the frequency of the Radar Waveform generator. Peak detection was used. The spectrum analyzer resolution bandwidth (RBW) and video bandwidth (VBW) were set to at least 3MHz. The vector signal generator amplitude was set so that the power level measured at the spectrum analyzer was (-64dBm) + (0) [dBi] + 1 dB= -63dBm. Capture the spectrum analyzer plots on short pulse radar types, long pulse radar type and hopping radar waveform.

5.2.3. Cablibration Result

Radar #0 DFS detection threshold level and the burst of pulses on the Channel frequency

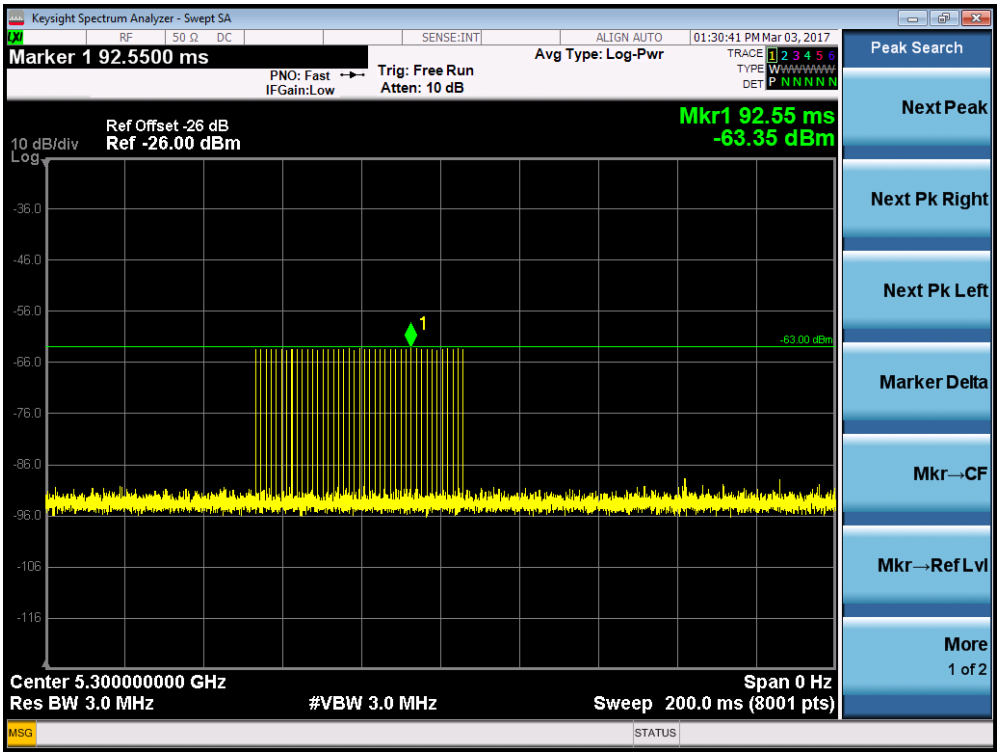


Radar #1(Test A) DFS detection threshold level and the burst of pulses on the Channel frequency



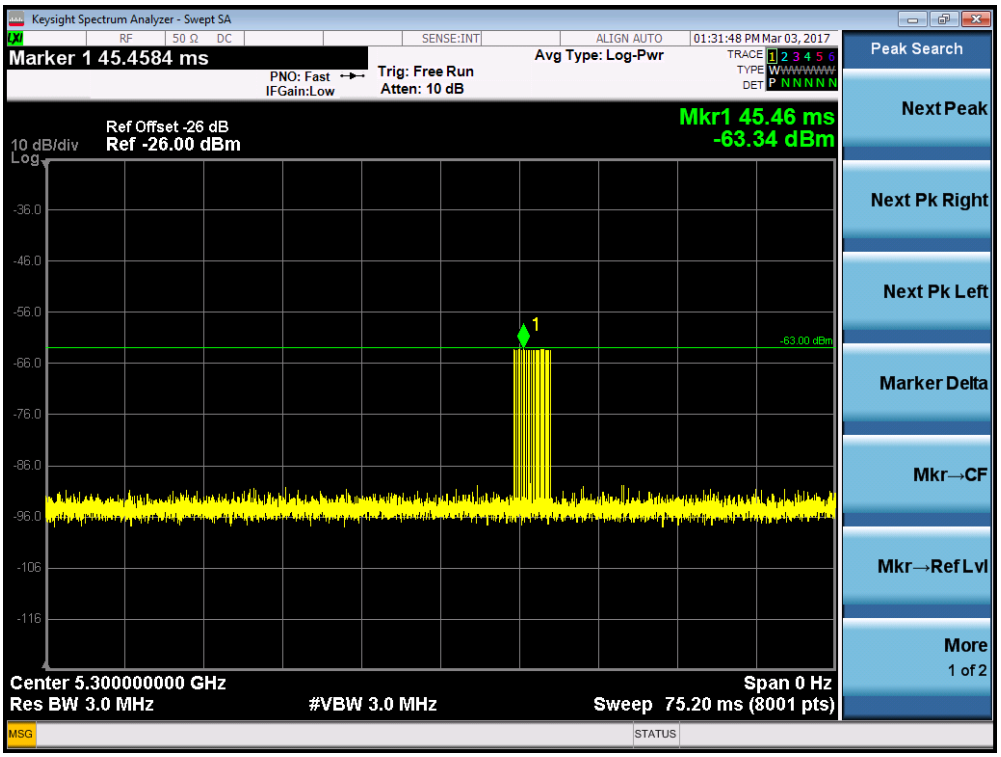
PRI = 698us and the number of pulses = 76

Radar #1(Test B) DFS detection threshold level and the burst of pulses on the Channel frequency

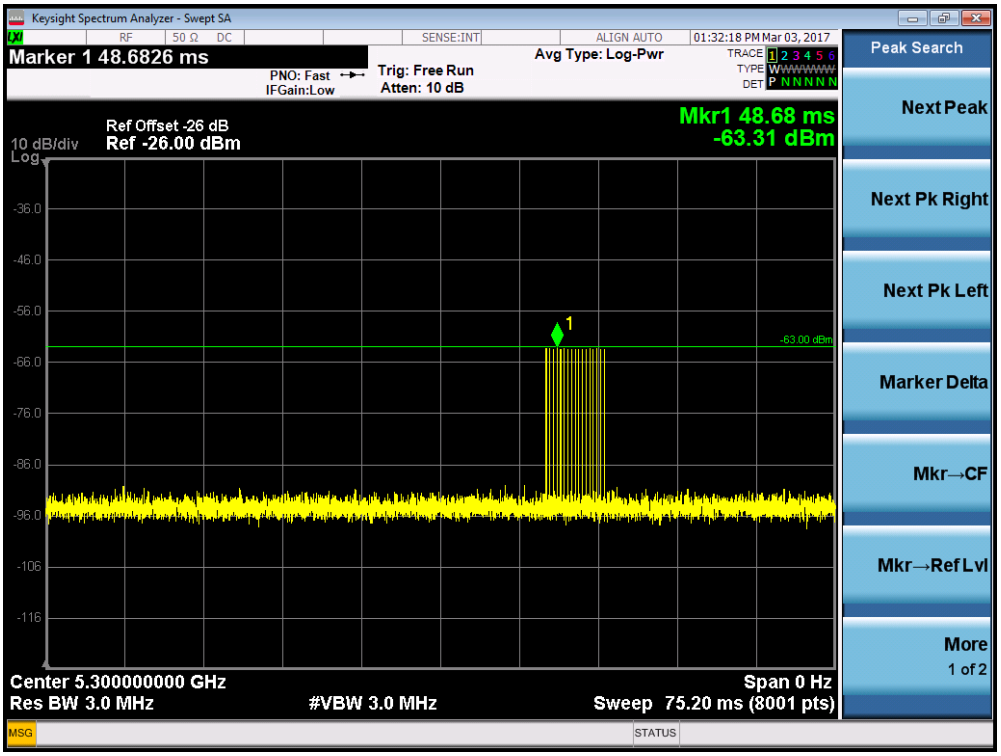


PRI = 1.299ms and the number of pulses = 41

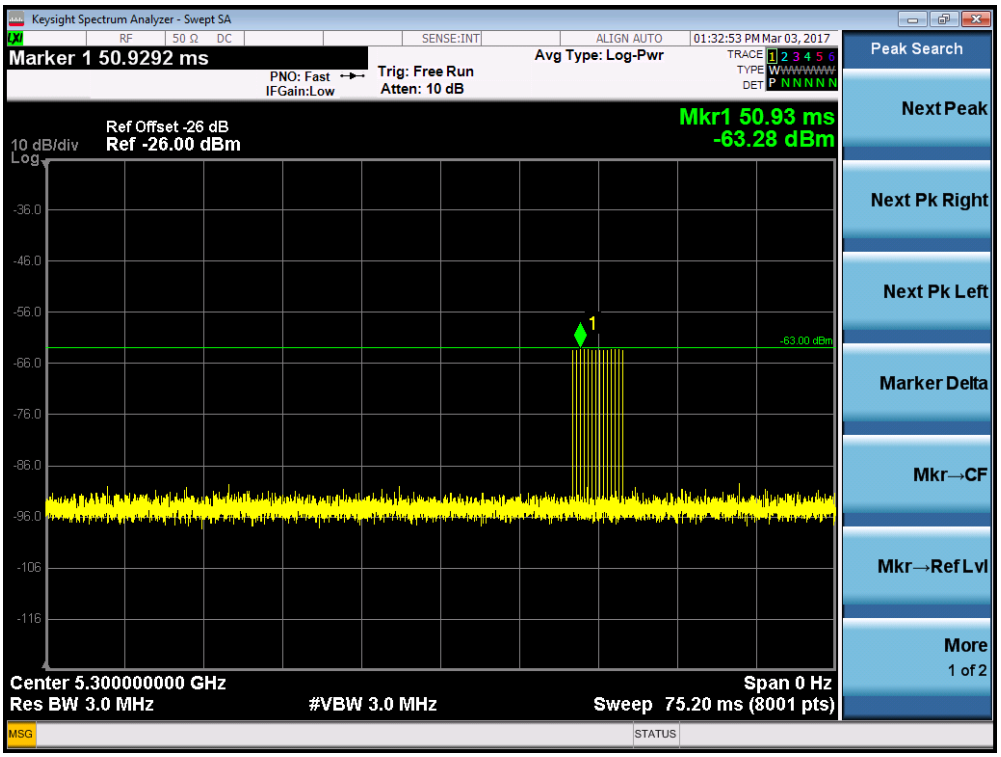
Radar #2 DFS detection threshold level and the burst of pulses on the Channel frequency



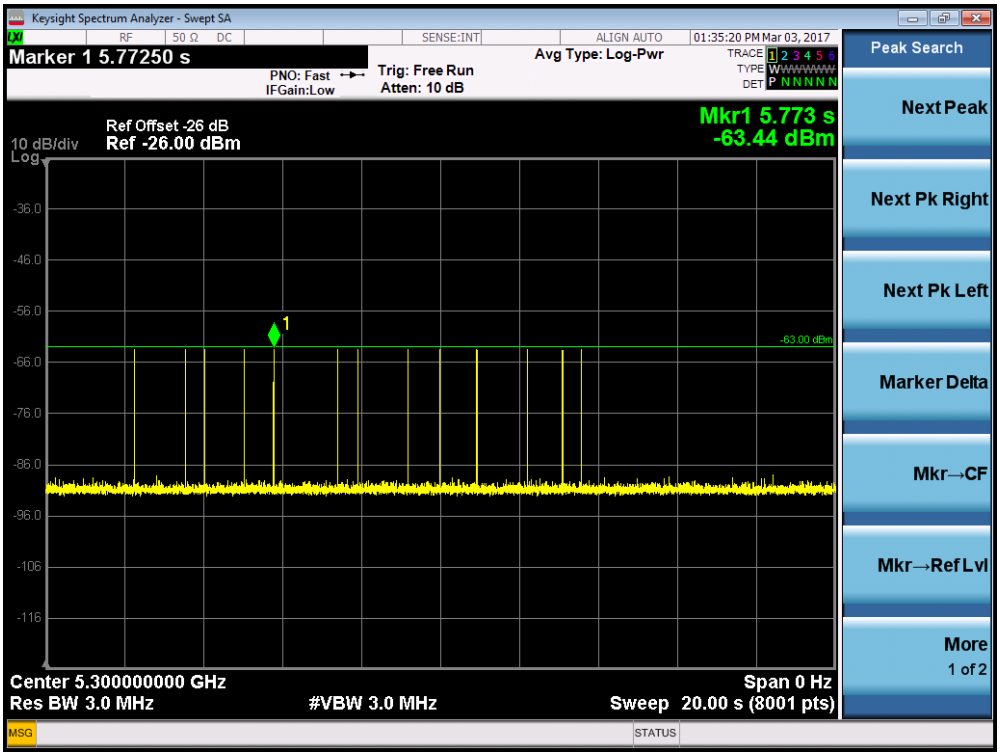
Radar #3 DFS detection threshold level and the burst of pulses on the Channel frequency



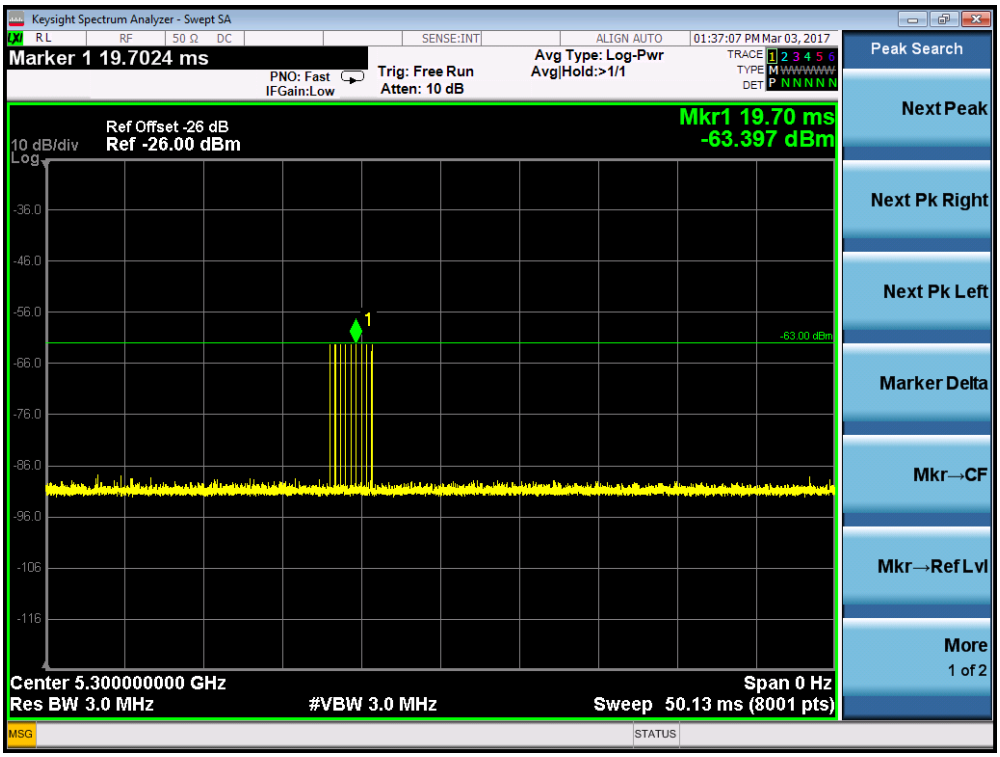
Radar #4 DFS detection threshold level and the burst of pulses on the Channel frequency



Radar #5 DFS detection threshold level and 12sec long burst on the Channel frequency

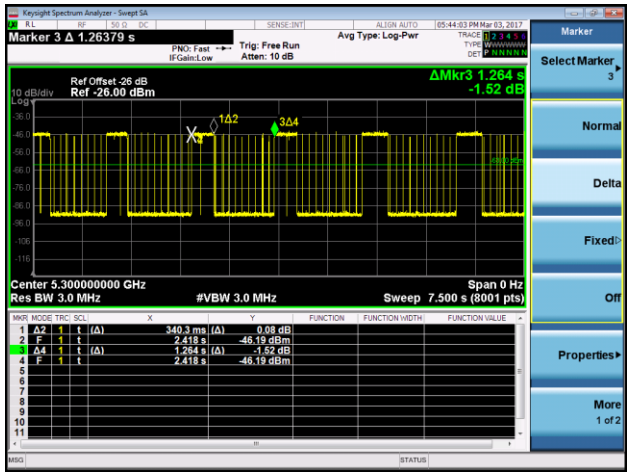
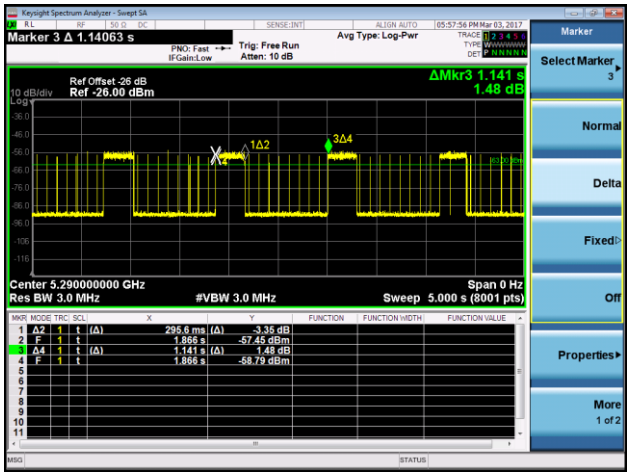


Radar #6 DFS detection threshold level and a single hop (9 pulses) on the Channel frequency within UNII detection bandwidth



5.2.4. Channel Loading Test Result

System testing was performed with the designated MPEG test file that streams full motion video from the **US Wi-Fi AP 2x2 OD ext. antenna** to the Client in full motion video mode using the media player with the V2.61 Codec package. This file is used by IP and Frame based systems for loading the test channel during the In-service compliance testing of the U-NII device. Packet ratio = Time On/ (Time On + Off Time).

Channel Loading Plot	
802.11a (5300MHz)	802.11ac-VHT80 (5290MHz)
	

Test Mode	Test Frequency	Packet ratio	Requirement ratio	Test Result
802.11a	5300 MHz	26.92%	≥ 17%	Pass
802.11ac-VHT80	5290 MHz	25.91%	≥ 17%	Pass

5.3. UNII Detection Bandwidth Measurement

5.3.1. Test Limit

Minimum 100% of the UNII 99% transmission power bandwidth. During the U-NII Detection Bandwidth detection test, each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

5.3.2. Test Procedure

1. Adjust the equipment to produce a single Burst of any one of the Short Pulse Radar Types 0-4 in Table 3-5 at the center frequency of the EUT Operating Channel at the specified DFS Detection Threshold level.
2. The generating equipment is configured as shown in the Conducted Test Setup above section 3.5.
3. The EUT is set up as a stand-alone device (no associated Client or Master, as appropriate) and no traffic. Frame based systems will be set to a talk/listen ratio reflecting the worst case (maximum) that is user configurable during this test.
4. Generate a single radar Burst, and note the response of the EUT. Repeat for a minimum of 10 trials. The EUT must detect the Radar Waveform using the specified U-NII Detection Bandwidth criterion shown in Table 3-5. In cases where the channel bandwidth may exceed past the DFS band edge on specific channels (i.e., 802.11ac or wideband frame based systems) select a channel that has the entire emission bandwidth within the DFS band. If this is not possible, test the detection BW to the DFS band edge.
5. Starting at the center frequency of the UUT operating Channel, increase the radar frequency in 5 MHz steps, repeating the above test sequence, until the detection rate falls below the U-NII Detection Bandwidth criterion specified in Table 3-3. Repeat this measurement in 1MHz steps at frequencies 5 MHz below where the detection rate begins to fall. 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.
6. Starting at the center frequency of the EUT operating Channel, decrease the radar frequency in 1 MHz steps, repeating the above item 4 test sequence, until the detection rate falls below the U-NII Detection Bandwidth criterion. 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.
7. The U-NII Detection Bandwidth is calculated as follows: U-NII Detection Bandwidth = FH – FL
8. The U-NII Detection Bandwidth must be at least 100% of the EUT transmitter 99% power, otherwise, the EUT does not comply with DFS requirements.

5.3.3. Test Result

EUT Frequency=5300MHz for 802.11a											
Radar Frequency (MHz)	DFS Detection Trials (1=Detection, 0= No Detection)										
	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5290	0	0	0	0	0	0	0	0	0	0	0%
5291 FL	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%
5300	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 FH	1	1	1	1	1	1	1	1	1	1	100%
5310	0	0	0	0	0	0	0	0	0	0	0%
Detection Bandwidth = FH - FL = 5309MHz - 5291MHz = 18MHz											
EUT 99% Bandwidth = 16.61MHz (see note)											
UNII Detection Bandwidth Min. Limit (MHz): 16.61MHz x 100% = 16.61MHz											

Note: All UNII channels for this device have identical Channel bandwidths. Therefore, all DFS testing was done at 5300MHz. The 99% channel bandwidth is 16.61MHz. (See the 99% BW section of the RF report for further measurement details).

EUT Frequency=5310MHz for 802.11n-HT40											
Radar Frequency (MHz)	**DFS Detection Trials (1=Detection, 0= No Detection)**										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Detection Rate (%)**
5291	0	0	0	0	0	0	0	0	0	0	0%
5292 FL	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%
5295	1	1	1	1	1	1	1	1	1	1	100%
5300	1	1	1	1	1	1	1	1	1	1	100%
5305	1	1	1	1	1	1	1	1	1	1	100%
5310	1	1	1	1	1	1	1	1	1	1	100%
5315	1	1	1	1	1	1	1	1	1	1	100%
5320	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 FH	1	1	1	1	1	1	1	1	1	1	100%
5330	0	0	0	0	0	0	0	0	0	0	0%
Detection Bandwidth = FH - FL = 5329MHz - 5292MHz = 37MHz											
EUT 99% Bandwidth = 36.35MHz (see note)											
UNII Detection Bandwidth Min. Limit (MHz): 36.35MHz x 100% = 36.35MHz											

Note: All UNII channels for this device have identical Channel bandwidths. Therefore, all DFS testing was done at 5310MHz. The 99% channel bandwidth is 36.35MHz. (See the 99% BW section of the RF report for further measurement details).

EUT Frequency=5290MHz for 802.11ac-VHT80											
Radar Frequency (MHz)	DFS Detection Trials (1=Detection, 0= No Detection)										
	1	2	3	4	5	6	7	8	9	10	Detection Rate (%)
5250	0	0	0	0	0	0	0	0	0	0	0%
5251 FL	1	1	1	1	1	1	1	1	1	1	100%
5252	1	1	1	1	1	1	1	1	1	1	100%
5253	1	1	1	1	1	1	1	1	1	1	100%
5254	1	1	1	1	1	1	1	1	1	1	100%
5255	1	1	1	1	1	1	1	1	1	1	100%
5260	1	1	1	1	1	1	1	1	1	1	100%
5265	1	1	1	1	1	1	1	1	1	1	100%
5270	1	1	1	1	1	1	1	1	1	1	100%
5275	1	1	1	1	1	1	1	1	1	1	100%
5280	1	1	1	1	1	1	1	1	1	1	100%
5285	1	1	1	1	1	1	1	1	1	1	100%
5290	1	1	1	1	1	1	1	1	1	1	100%
5295	1	1	1	1	1	1	1	1	1	1	100%
5300	1	1	1	1	1	1	1	1	1	1	100%
5305	1	1	1	1	1	1	1	1	1	1	100%
5310	1	1	1	1	1	1	1	1	1	1	100%
5315	1	1	1	1	1	1	1	1	1	1	100%
5320	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 FH	1	1	1	1	1	1	1	1	1	1	100%
5330	0	0	0	0	0	0	0	0	0	0	0%
Detection Bandwidth = FH - FL = 5329MHz - 5251MHz = 78MHz											
EUT 99% Bandwidth = 75.93MHz (see note)											
UNII Detection Bandwidth Min. Limit (MHz): 75.93MHz x 100% = 75.93MHz											

Note: All UNII channels for this device have identical Channel bandwidths. Therefore, all DFS testing was done at 5290MHz. The 99% channel bandwidth is 75.93MHz. (See the 99% BW section of the RF report for further measurement details).

5.4. Initial Channel Availability Check Time Measurement

5.4.1. Test Limit

The EUT shall perform a Channel Availability Check to ensure that there is no radar operating on the channel. After power-up sequence, receive at least 1 minute on the intended operating frequency.

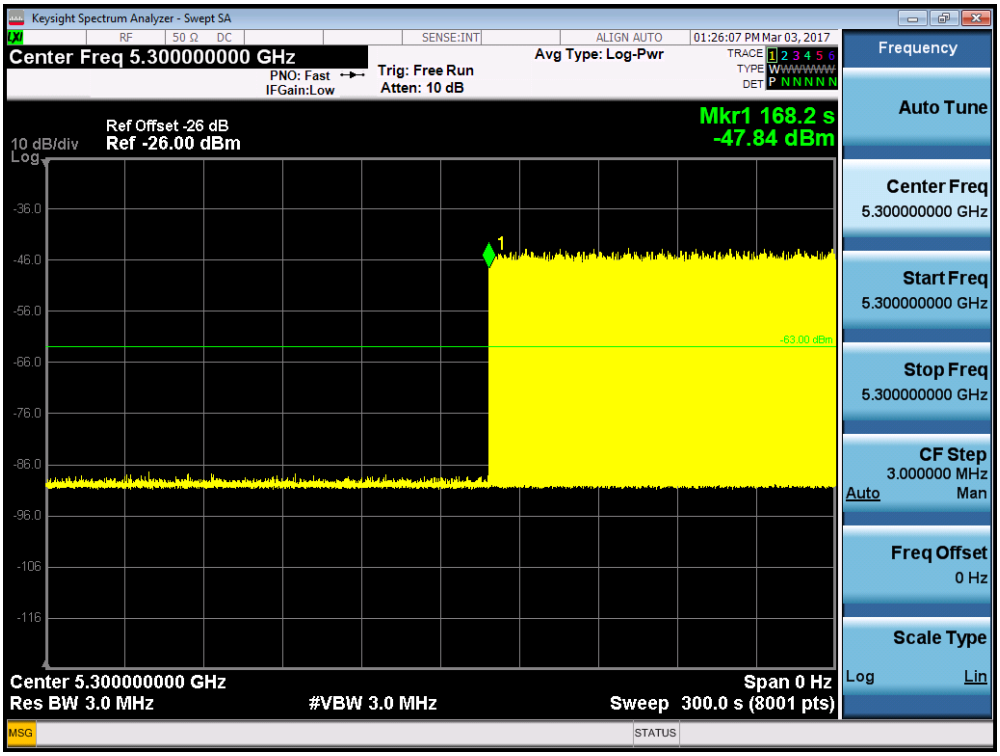
5.4.2. Test Procedure

1. 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 EUT is powered on, the spectrum analyzer will be set to zero span mode 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.
2. The EUT should not transmit any beacon or data transmissions until at least 1 minute after the completion of the power-on cycle.
3. Confirm that the EUT initiates transmission on the channel. Measurement system showing its nominal noise floor is marker1.

5.4.3. Test Result

The EUT does not transmit any beacon or data transmissions until at least 1 minute after the completion of the power-on cycle (108.2 sec). Initial beacons/data transmissions are indicated by marker 1 (168.2 sec).

Initial Channel Availability Check Time for 802.11a



5.5. Radar Burst at the Beginning of the Channel Availability Check Time Measurement

5.5.1. Test Limit

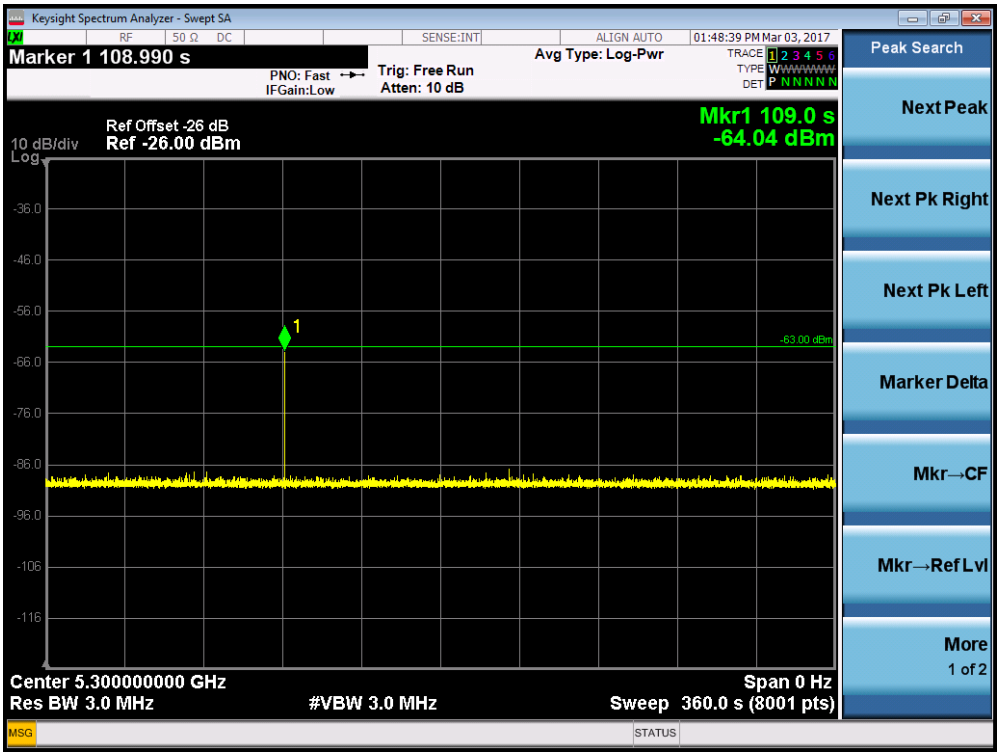
In beginning of the Channel Availability Check (CAC) Time, radar is detected on this channel, select another intended channel and perform a CAC on that channel.

5.5.2. Test Procedure

1. 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 occurs at the beginning of the Channel Availability Check Time.
2. The EUT is in completion power-up cycle (from T0 to T1). T1 denotes the instant when the EUT has completed its power-up sequence. The Channel Availability Check Time commences at instant T1 and will end no sooner than T1 + 60 seconds. A single Burst of one of Short Pulse Radar Types 0-4 at DFS Detection Threshold + 1 dB will commence within a 6 second window starting at T1.
3. Visual indication on the EUT of successful detection of the radar Burst will be recorded and reported. Observation of emissions will continue for 2.5 minutes after the radar Burst has been generated. Verify that during the 2.5 minutes measurement window no EUT transmissions occurred.

5.5.3. Test Result

Radar Burst at the Beginning of the Channel Availability Check Time for 802.11a



5.6. Radar Burst at the End of the Channel Availability Check Time Measurement

5.6.1. Test Limit

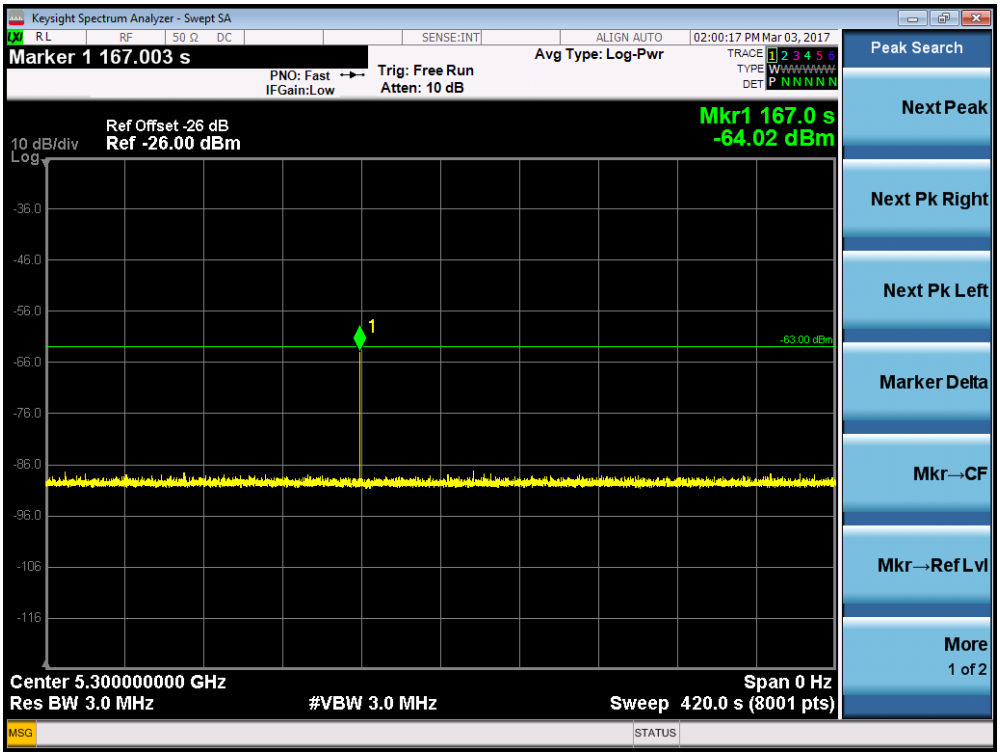
In the end of Channel Availability Check (CAC) Time, radar is detected on this channel, select another intended channel and perform a CAC on that channel.

5.6.2. Test Procedure

1. 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 occurs at the beginning of the Channel Availability Check Time.
2. The EUT is powered on at T0. T1 denotes the instant when the EUT has completed its power-up sequence. The Channel Availability Check Time commences at instant T1 and will end no sooner thanT1 + 60 seconds. A single Burst of one of Short Pulse Radar Types 0-4 at DFS Detection Threshold + 1 dB will commence within a 6 second window starting at T1+ 54 seconds.
3. Visual indication on the EUT of successful detection of the radar Burst will be recorded and reported. Observation of emissions will continue for 2.5 minutes after the radar Burst has been generated. Verify that during the 2.5 minutes measurement window no EUT transmissions occurred.

5.6.3. Test Result

Radar Burst at the End of the Channel Availability Check Time for 802.11a



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

5.7.1. Test Limit

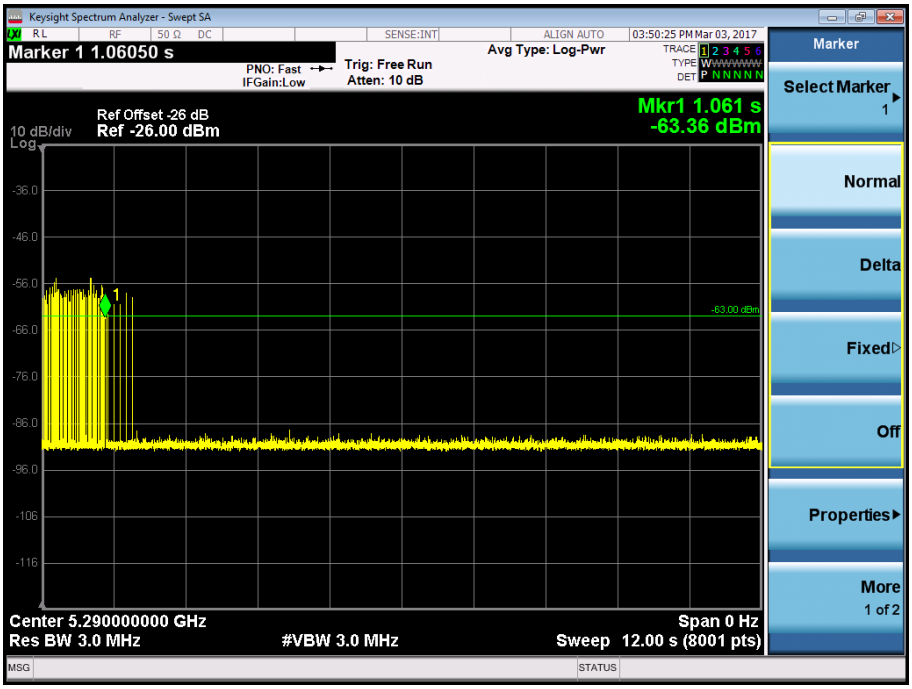
The EUT has In-Service Monitoring function to continuously monitor the radar signals. If the radar is detected, must leave the channel (Shutdown). The Channel Move Time to cease all transmissions on the current channel upon detection of a Radar Waveform above the DFS Detection Threshold within 10 sec. The total duration of Channel Closing Transmission Time is 260ms, consisting of data signals and the aggregate of control signals, by a U-NII device during the Channel Move Time. The Non-Occupancy Period time is 30 minute during which a Channel will not be utilized after a Radar Waveform is detected on that Channel.

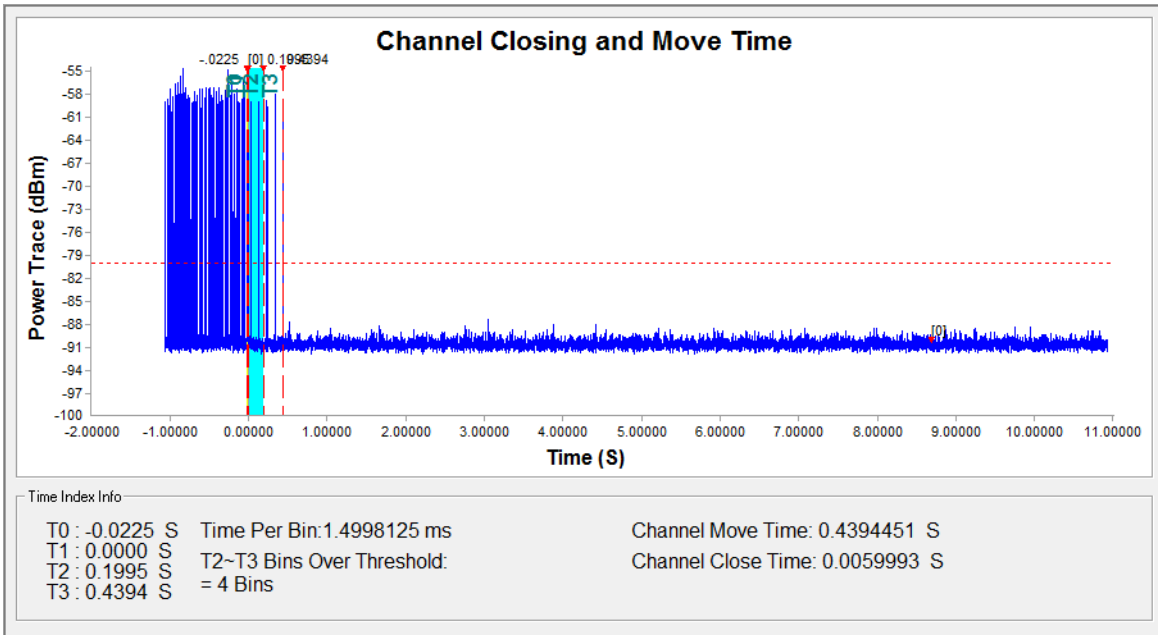
5.7.2. Test Procedure Used

1. The test should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0.
2. When the radar burst with a level equal to the DFS Detection Threshold + 1dB is generated on the Operating Channel of the U-NII device. A U-NII device operating as a Master Device will associate with the Client Device at Channel. Stream the MPEG test file from the Master Device to the Client Device on the selected Channel for the entire period of the test. At time T0 the Radar Waveform generator sends a Burst of pulses for each of the radar types at Detection Threshold + 1dB.
3. Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel. Measure and record the transmissions from the EUT during the observation time (Channel Move Time).
4. Measurement of the aggregate duration of the Channel Closing Transmission Time method. With the spectrum analyzer set to zero span tuned to the center frequency of the EUT operating channel at the radar simulated frequency, peak detection, and max hold, the dwell time per bin is given by: Dwell (1.5ms) = S (12 sec) / B (8000); where Dwell is the dwell time per spectrum analyzer sampling bin, S is the sweep time and B is the number of spectrum analyzer sampling bins. An upper bound of the aggregate duration of the intermittent control signals of Channel Closing Transmission Time is calculated by: C = N X Dwell; where C is the Closing Time, N is the number of spectrum analyzer sampling bins showing a U-NII transmission and Dwell is the dwell time per bin.
5. Measure the EUT for more than 30 minutes following the channel close/move time to verify that the EUT does not resume any transmissions on this Channel.

5.7.3. Test Result

Channel Move Time and Channel Closing Transmission Time for 802.11ac-VHT80 – 5290MHz





Non-Occupancy Period for 802.11a – 5300MHz

Parameter	Test Result	Limit
	Type 0	
Channel Move Time (s)	0.439s	<10s
Channel Closing Transmission Time (ms) (Note)	6.0ms	< 60ms
Non-Occupancy Period (min)	≥ 30min	≥ 30 min

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

5.8. Statistical Performance Check Measurement

5.8.1. Test Limit

The minimum percentage of successful detection requirements found in below table 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).

Radar Type	Minimum Number of Trails	Detection Probability
0	30	Pd > 60%
1	30(15 of test A and 15 of test B)	Pd > 60%
2	30	Pd > 60%
3	30	Pd > 60%
4	30	Pd > 60%
Aggregate (Radar Types 1-4)	120	Pd > 80%
5	30	Pd > 80%
6	30	Pd > 70%

The percentage of successful detection is calculated by:
(Total Waveform Detections / Total Waveform Trails) * 100 = Probability of Detection Radar Waveform In addition an aggregate minimum percentage of successful detection across all Short Pulse Radar Types 1-4 is required and is calculated as follows: (Pd1 + Pd2 + Pd3 + Pd4) / 4.

5.8.2. Test Procedure

1. Stream the MPEG test file from the Master Device to the Client Device on the test Channel for the entire period of the test.
2. At time T0 the Radar Waveform generator sends the individual waveform for each of the Radar Types 1-6, at levels equal to the DFS Detection Threshold + 1dB, on the Operating Channel.
3. Observe the transmissions of the EUT at the end of the Burst on the Operating Channel for duration greater than 10 seconds for Short Pulse Radar Types 0 to ensure detection occurs.
4. Observe the transmissions of the EUT 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.
5. The device can utilize a test mode to demonstrate when detection occurs to prevent the need to reset the device between trial runs.
6. The Minimum number of trails, minimum percentage of successful detection and the average minimum percentage of successful detection are found in below table.

5.8.3. Test Result

Statistical Performance Check for 802.11a

Radar Type 1 - Radar Statistical Performance

Trail #	Test Freq. (MHz)	Pulse Width (us)	PRI (us)	Pulses / Burst	1=Detection 0=No Detection
1	5292	1	618	86	1
2	5292	1	898	59	1
3	5292	1	678	78	1
4	5292	1	598	89	1
5	5292	1	538	99	1
6	5292	1	578	92	1
7	5292	1	878	61	1
8	5292	1	798	67	1
9	5292	1	518	102	1
10	5292	1	858	62	1
11	5292	1	638	83	1
12	5292	1	658	81	1
13	5292	1	738	72	1
14	5292	1	778	68	1
15	5292	1	838	63	1
16	5292	1	1805	30	1
17	5292	1	3056	18	1
18	5292	1	567	94	1
19	5292	1	3036	18	1
20	5292	1	2940	18	1
21	5292	1	808	66	1
22	5292	1	1514	35	1
23	5292	1	1589	34	1
24	5292	1	558	95	1
25	5292	1	822	65	1
26	5292	1	2897	19	1
27	5292	1	2916	19	1
28	5292	1	1971	27	1
29	5292	1	1244	43	1
30	5292	1	2421	22	1
Detection Percentage (%)					100%

Radar Type 2 - Radar Statistical Performance

Trail #	Test Freq. (MHz)	Pulse Width (us)	PRI (us)	Pulses / Burst	1=Detection 0=No Detection
1	5300	2.6	180	26	1
2	5300	2.1	218	23	1
3	5300	3.1	210	25	1
4	5300	4.5	208	26	1
5	5300	1.0	230	29	1
6	5300	1.5	218	24	1
7	5300	3.4	153	27	1
8	5300	2.9	156	27	1
9	5300	2.7	193	27	1
10	5300	1.1	187	24	1
11	5300	1.2	228	28	1
12	5300	2.0	212	25	1
13	5300	2.5	171	25	1
14	5300	5.0	212	27	1
15	5300	1.6	176	26	1
16	5300	1.9	225	25	1
17	5300	3.9	184	24	1
18	5300	1.1	158	29	1
19	5300	1.6	230	24	1
20	5300	1.3	188	23	1
21	5300	3.2	187	25	1
22	5300	3.5	200	25	1
23	5300	3.9	176	29	1
24	5300	1.4	158	29	1
25	5300	3.9	216	23	1
26	5300	4.8	180	25	1
27	5300	4.6	192	27	1
28	5300	2.0	224	23	1
29	5300	3.5	156	24	1
30	5300	3.8	173	28	1
Detection Percentage (%)					100%

Radar Type 3 - Radar Statistical Performance

Trail #	Test Freq. (MHz)	Pulse Width (us)	PRI (us)	Pulses / Burst	1=Detection 0=No Detection
1	5308	6.0	459	17	1
2	5308	9.9	288	16	1
3	5308	8.2	250	16	1
4	5308	9.2	389	16	1
5	5308	6.2	435	17	1
6	5308	6.6	297	18	1
7	5308	7.1	470	16	1
8	5308	8.0	252	18	1
9	5308	9.8	426	17	1
10	5308	9.6	256	18	1
11	5308	6.2	399	16	1
12	5308	9.2	451	16	1
13	5308	8.7	335	18	1
14	5308	6.4	435	17	1
15	5308	9.8	293	18	1
16	5308	9.5	398	17	1
17	5308	8.8	367	17	1
18	5308	7.1	269	18	1
19	5308	8.2	376	18	1
20	5308	7.5	250	16	1
21	5308	6.8	441	18	1
22	5308	9.1	298	16	1
23	5308	9.4	330	17	1
24	5308	8.5	427	16	1
25	5308	7.2	485	16	1
26	5308	9.9	363	17	1
27	5308	9.9	402	17	1
28	5308	8.1	271	18	1
29	5308	6.0	374	16	1
30	5308	9.6	420	18	1
Detection Percentage (%)					100%

Radar Type 4 - Radar Statistical Performance

Trail #	Test Freq. (MHz)	Pulse Width (us)	PRI (us)	Pulses / Burst	1=Detection 0=No Detection
1	5292	19.7	401	13	1
2	5292	13.1	267	12	1
3	5292	19.5	272	16	1
4	5292	19.6	389	15	1
5	5292	16.1	382	12	1
6	5292	13.4	467	16	1
7	5292	15.6	432	15	1
8	5292	16.7	405	16	1
9	5292	19.8	346	12	1
10	5292	11.7	354	16	1
11	5292	19.9	302	13	1
12	5497	19.2	360	13	1
13	5292	16.3	489	16	1
14	5292	13.9	442	13	1
15	5292	17.1	253	12	1
16	5292	19.8	307	15	1
17	5292	16.9	486	12	1
18	5292	12.8	443	13	1
19	5292	16.4	440	12	1
20	5292	12.1	256	13	1
21	5292	17.8	425	14	1
22	5292	19.8	307	13	1
23	5292	11.0	325	16	1
24	5292	14.3	477	14	1
25	5292	16.1	336	12	1
26	5292	16.9	400	15	1
27	5292	19.8	375	15	1
28	5292	17.8	350	16	1
29	5292	12.4	419	13	1
30	5292	12.6	396	15	1
Detection Percentage (%)					100%

Note: 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%)

Radar Type 5 - Radar Statistical Performance

Trail #	Test Freq. (MHz)	1=Detection 0=No Detection	Trail #	Test Freq. (MHz)	1=Detection 0=No Detection
1	5297.6	1	16	5300.0	1
2	5295.6	1	17	5300.0	1
3	5294.0	1	18	5300.0	1
4	5299.6	1	19	5300.0	1
5	5296.0	1	20	5300.0	1
6	5298.8	1	21	5304.0	1
7	5294.4	1	22	5300.4	1
8	5299.2	1	23	5301.2	1
9	5295.2	1	24	5306.0	1
10	5296.8	1	25	5304.8	1
11	5300.0	1	26	5302.4	1
12	5300.0	1	27	5305.6	1
13	5300.0	1	28	5300.8	1
14	5300.0	1	29	5304.4	1
15	5300.0	1	30	5303.2	1
Detection Percentage (%)					100%

Type 5 Radar Waveform_1

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)
1	40285	2	14	75	1676	1554	0	40285	0	1199999
2	2149693	2	14	50	1323	1596	0	2193208	1200000	2399999
3	674285	2	14	55	1358	1263	0	2870412	2400000	3599999
4	1411655	2	14	75	1410	1968	0	4284688	3600000	4799999
5	718990	2	14	65	1092	1990	0	5007056	4800000	5999999
6	1921943	1	14	60	1732	0	0	6932081	6000000	7199999
7	789647	2	14	80	1897	1374	0	7723460	7200000	8399999
8	1339408	3	14	75	1191	1276	1755	9066139	8400000	9599999
9	951243	1	14	80	1351	0	0	10021604	9600000	10799999
10	1135499	1	14	100	1364	0	0	11158454	10800000	11999999

Total number of pulses in waveform = 18
****

Type 5 Radar Waveform_2

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)
1	595412	3	9	50	1366	1492	1692	595412	0	1090908
2	1070508	1	9	80	1432	0	0	1670470	1090909	2181817
3	895085	2	9	50	1427	1415	0	2566987	2181818	3272726
4	1438117	1	9	85	1525	0	0	4007946	3272727	4363635
5	1125161	3	9	75	1521	1155	1890	5134632	4363636	5454544
6	795392	2	9	75	1251	1936	0	5934590	5454545	6545453
7	631091	3	9	85	1350	1700	1843	6568868	6545454	7636362
8	1177654	1	9	65	1316	0	0	7751415	7636363	8727271
9	1399168	1	9	90	1560	0	0	9151899	8727272	9818180
10	751387	2	9	100	1077	1934	0	9904846	9818181	10909089
11	1888434	3	9	55	1652	1128	1120	11796291	10909090	11999998

Total number of pulses in waveform = 22
****

Type 5 Radar Waveform_3

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)
1	287059	1	5	85	1615	0	0	287059	0	857142
2	940834	3	5	50	1790	1372	1349	1229508	857143	1714285
3	567605	2	5	75	1587	1812	0	1801624	1714286	2571428
4	1162956	1	5	80	1979	0	0	2967979	2571429	3428571
5	981183	1	5	70	1286	0	0	3951141	3428572	4285714
6	642951	1	5	100	1924	0	0	4595378	4285715	5142857
7	1197354	3	5	80	1491	1233	1628	5794656	5142858	6000000
8	1009557	3	5	95	1699	1418	1205	6808565	6000001	6857143
9	191283	2	5	50	1520	1661	0	7004170	6857144	7714286
10	1107103	2	5	75	1648	1733	0	8114454	7714287	8571429
11	584422	2	5	55	1649	1929	0	8702257	8571430	9428572
12	1217177	3	5	95	1929	1907	1648	9923012	9428573	10285715
13	816308	3	5	90	1948	1572	1043	10744804	10285716	11142858
14	671160	2	5	90	1879	1431	0	11420527	11142859	12000001

Total number of pulses in waveform = 29
****

Type 5 Radar Waveform_4

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)
1	30045	2	19	75	1373	1645	0	30045	0	999999
2	1082491	1	19	90	1036	0	0	1115554	1000000	1999999
3	1100717	2	19	55	1826	1945	0	2217307	2000000	2999999
4	834945	1	19	75	1306	0	0	3056023	3000000	3999999
5	1071106	1	19	70	1987	0	0	4128435	4000000	4999999
6	1668455	3	19	90	1900	1709	1971	5798877	5000000	5999999
7	211508	2	19	75	1721	1146	0	6015965	6000000	6999999
8	1601913	2	19	60	1860	1733	0	7620745	7000000	7999999
9	1169524	2	19	65	1019	1193	0	8793862	8000000	8999999
10	1145333	1	19	55	1800	0	0	9941407	9000000	9999999
11	660087	2	19	75	1843	1583	0	10603294	10000000	10999999
12	561969	3	19	90	1468	1408	1902	11168689	11000000	11999999

Total number of pulses in waveform = 22
****

Type 5 Radar Waveform_5

Num of Bursts = 19
Burst Interval (us)= 631579

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)
1	460452	2	10	85	1453	1074	0	460452	0	631578
2	441618	1	10	80	1721	0	0	904597	631579	1263157
3	728147	2	10	65	1433	1471	0	1634465	1263158	1894736
4	803938	1	10	70	1657	0	0	2441307	1894737	2526315
5	495940	1	10	70	1060	0	0	2938904	2526316	3157894
6	276755	1	10	100	1846	0	0	3216719	3157895	3789473
7	615660	1	10	90	1556	0	0	3834225	3789474	4421052
8	761722	3	10	60	1720	1943	1311	4597503	4421053	5052631
9	645647	2	10	95	1748	1160	0	5248124	5052632	5684210
10	750629	2	10	80	1833	1063	0	6001661	5684211	6315789
11	847494	1	10	75	1615	0	0	6852051	6315790	6947368
12	501546	1	10	85	1838	0	0	7355212	6947369	7578947
13	404346	2	10	85	1388	1933	0	7761396	7578948	8210526
14	782261	3	10	80	1116	1189	1576	8546978	8210527	8842105
15	348080	2	10	100	1424	1610	0	8898939	8842106	9473684
16	632690	1	10	60	1192	0	0	9534663	9473685	10105263
17	1063656	1	10	100	1036	0	0	10599511	10105264	10736842
18	348312	3	10	65	1581	1078	1869	10948859	10736843	11368421
19	854653	2	10	50	1654	1007	0	11808040	11368422	12000000

Total number of pulses in waveform = 32
****

Type 5 Radar Waveform_6

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)
1	567979	2	17	65	1256	1222	0	567979	0	923076
2	773812	2	17	50	1350	1336	0	1344269	923077	1846153
3	1086242	1	17	95	1005	0	0	2433197	1846154	2769230
4	755367	1	17	75	1112	0	0	3189569	2769231	3692307
5	956655	2	17	55	1153	1293	0	4147336	3692308	4615384
6	509997	2	17	70	1915	1454	0	4659779	4615385	5538461
7	1659705	2	17	80	1840	1828	0	6322853	5538462	6461538
8	772704	1	17	55	1699	0	0	7099225	6461539	7384615
9	1183117	1	17	85	1372	0	0	8284041	7384616	8307692
10	385308	3	17	70	1507	1425	1266	8670721	8307693	9230769
11	1441565	3	17	65	1359	1105	1828	10116484	9230770	10153846
12	570380	1	17	55	1590	0	0	10691156	10153847	11076923
13	470880	2	17	90	1900	1375	0	11163626	11076924	12000000

Total number of pulses in waveform = 23
****

Type 5 Radar Waveform_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)
1	116996	1	6	70	1182	0	0	116996	0	799999
2	915088	2	6	90	1774	1385	0	1033266	800000	1599999
3	1083433	1	6	95	1389	0	0	2119858	1600000	2399999
4	829086	1	6	70	1440	0	0	2950333	2400000	3199999
5	520397	3	6	70	1564	1891	1149	3472170	3200000	3999999
6	601988	3	6	70	1308	1303	1039	4078762	4000000	4799999
7	877921	3	6	90	1859	1866	1023	4960333	4800000	5599999
8	830602	1	6	80	1830	0	0	5795683	5600000	6399999
9	1138703	2	6	80	1189	1387	0	6936216	6400000	7199999
10	698915	2	6	65	1624	1901	0	7637707	7200000	7999999
11	1071564	3	6	90	1594	1736	1685	8712796	8000000	8799999
12	151312	2	6	85	1818	1259	0	8869123	8800000	9599999
13	1473016	1	6	95	1768	0	0	10345216	9600000	10399999
14	778088	3	6	65	1243	1942	1228	11125072	10400000	11199999
15	381276	1	6	95	1973	0	0	11510761	11200000	11999999

Total number of pulses in waveform = 29
****

Type 5 Radar Waveform_8

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)
1	6698	3	18	95	1864	1240	1797	6698	0	1499999
2	2335767	3	18	65	1031	1416	1031	2347366	1500000	2999999
3	1707080	3	18	70	1636	1308	1305	4057924	3000000	4499999
4	550300	1	18	50	1025	0	0	4612473	4500000	5999999
5	2768587	2	18	80	1790	1766	0	7382085	6000000	7499999
6	1527983	2	18	50	1647	1040	0	8913624	7500000	8999999
7	637897	3	18	75	1078	1355	1541	9554208	9000000	10499999
8	1681982	2	18	50	1818	1139	0	11240164	10500000	11999999

Total number of pulses in waveform = 19

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Type 5 Radar Waveform_9

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)
1	400901	1	8	50	1156	0	0	400901	0	705881
2	934885	3	8	60	1812	1716	1089	1336942	705882	1411763
3	691937	1	8	85	1271	0	0	2033496	1411764	2117645
4	670185	2	8	95	1517	1993	0	2704952	2117646	2823527
5	494254	3	8	95	1295	1203	1440	3202716	2823528	3529409
6	506435	3	8	50	1917	1676	1079	3713089	3529410	4235291
7	1142495	1	8	50	1928	0	0	4860256	4235292	4941173
8	169866	1	8	80	1793	0	0	5032050	4941174	5647055
9	837456	1	8	85	1143	0	0	5871299	5647056	6352937
10	732566	2	8	65	1258	1346	0	6605008	6352938	7058819
11	847162	2	8	100	1637	1806	0	7454774	7058820	7764701
12	432416	3	8	65	1184	1660	1888	7890633	7764702	8470583
13	728349	2	8	55	1923	1967	0	8623714	8470584	9176465
14	950754	3	8	60	1506	1557	1298	9578358	9176466	9882347
15	416892	3	8	55	1396	1801	1386	9999611	9882348	10588229
16	631722	2	8	50	1169	1663	0	10635916	10588230	11294111
17	988203	3	8	80	1292	1100	1208	11626951	11294112	11999993

Total number of pulses in waveform = 36

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Type 5 Radar Waveform_10

Num of Bursts = 20
Burst Interval (us)= 600000

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)
1	65000	1	12	70	1985	0	0	65000	0	599999
2	1118895	2	12	60	1777	1734	0	1185880	600000	1199999
3	377719	1	12	50	1477	0	0	1567110	1200000	1799999
4	363459	3	12	100	1209	1054	1737	1932046	1800000	2399999
5	567052	2	12	100	1969	1436	0	2503098	2400000	2999999
6	986702	2	12	75	1867	1041	0	3493205	3000000	3599999
7	528109	3	12	55	1362	1056	1663	4024222	3600000	4199999
8	524816	1	12	100	1946	0	0	4553119	4200000	4799999
9	249798	1	12	75	1792	0	0	4804863	4800000	5399999
10	834208	3	12	65	1558	1855	1047	5640863	5400000	5999999
11	672688	3	12	65	1064	1811	1310	6318011	6000000	6599999
12	543999	3	12	90	1420	1737	1363	6866195	6600000	7199999
13	745058	1	12	60	1902	0	0	7615773	7200000	7799999
14	660779	2	12	55	1033	1369	0	8278454	7800000	8399999
15	123327	3	12	70	1977	1929	1837	8404183	8400000	8999999
16	1174269	1	12	70	1382	0	0	9584195	9000000	9599999
17	28331	2	12	90	1204	1847	0	9613908	9600000	10199999
18	1173805	2	12	50	1611	1388	0	10790764	10200000	10799999
19	71359	1	12	70	1856	0	0	10865122	10800000	11399999
20	542321	2	12	55	1599	1287	0	11409299	11400000	11999999

Total number of pulses in waveform = 39

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Type 5 Radar Waveform_11

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)
1	1138972	2	9	95	1184	1248	0	1138972	0	1333332
2	462153	2	9	70	1632	1415	0	1603557	1333333	2666665
3	2156634	3	9	85	1117	1382	1405	3763238	2666666	3999998
4	662918	1	9	70	1046	0	0	4430060	3999999	5333331
5	971172	1	9	90	1978	0	0	5402278	5333332	6666664
6	1889828	2	9	75	1842	1441	0	7294084	6666665	7999997
7	1965448	1	9	90	1026	0	0	9262815	7999998	9333330
8	999790	2	9	60	1172	1542	0	10263631	9333331	10666663
9	517238	2	9	100	1876	1986	0	10783583	10666664	11999996

Total number of pulses in waveform = 16
****

Type 5 Radar Waveform_12

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)
1	599880	2	12	95	1743	1112	0	599880	0	1499999
2	1556204	1	12	55	1486	0	0	2158939	1500000	2999999
3	1726287	1	12	95	1236	0	0	3886712	3000000	4499999
4	1105033	1	12	60	1492	0	0	4992981	4500000	5999999
5	2368961	2	12	50	1655	1857	0	7363434	6000000	7499999
6	426206	3	12	95	1311	1697	1840	7793152	7500000	8999999
7	1240970	3	12	100	1372	1811	1665	9038970	9000000	10499999
8	2582281	3	12	55	1940	1510	1673	11626099	10500000	11999999

Total number of pulses in waveform = 16
****

Type 5 Radar Waveform_13

Num of Bursts = 20
Burst Interval (us)= 600000

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)
1	177344	3	18	90	1948	1629	1456	177344	0	599999
2	482485	3	18	95	1511	1580	1488	664862	600000	1199999
3	987397	1	18	70	1540	0	0	1656838	1200000	1799999
4	234248	1	18	90	1862	0	0	1892626	1800000	2399999
5	519248	2	18	65	1972	1248	0	2413736	2400000	2999999
6	1157867	3	18	90	1178	1150	1125	3574823	3000000	3599999
7	245495	3	18	75	1448	1433	1309	3823771	3600000	4199999
8	579070	2	18	65	1362	1817	0	4407031	4200000	4799999
9	685267	1	18	60	1166	0	0	5095477	4800000	5399999
10	806323	2	18	50	1330	1625	0	5902966	5400000	5999999
11	503556	2	18	55	1242	1597	0	6409477	6000000	6599999
12	369509	1	18	65	1631	0	0	6781825	6600000	7199999
13	530918	3	18	65	1803	1934	1434	7314374	7200000	7799999
14	716912	1	18	90	1780	0	0	8036457	7800000	8399999
15	647827	3	18	90	1967	1495	1334	8686064	8400000	8999999
16	753479	1	18	60	1392	0	0	9444339	9000000	9599999
17	511814	3	18	55	1664	1837	1761	9957545	9600000	10199999
18	668382	2	18	50	1305	1517	0	10631189	10200000	10799999
19	220154	1	18	80	1894	0	0	10854165	10800000	11399999
20	876652	3	18	70	1545	1003	1954	11732711	11400000	11999999

Total number of pulses in waveform = 41
****

Type 5 Radar Waveform_14

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)
1	460707	3	19	95	1016	1522	1102	460707	0	923076
2	833324	2	19	75	1597	1652	0	1297671	923077	1846153
3	884873	2	19	80	1635	1247	0	2185793	1846154	2769230
4	847780	3	19	60	1781	1820	1493	3036455	2769231	3692307
5	732415	3	19	90	1920	1093	1169	3773964	3692308	4615384
6	1114582	1	19	85	1363	0	0	4892728	4615385	5538461
7	663118	3	19	90	1052	1816	1388	5557209	5538462	6461538
8	1080789	1	19	70	1715	0	0	6642254	6461539	7384615
9	1132229	3	19	100	1484	1959	1398	7776198	7384616	8307692
10	1194173	2	19	85	1143	1884	0	8975212	8307693	9230769
11	404239	3	19	70	1768	1647	1398	9382478	9230770	10153846
12	1120150	1	19	90	1570	0	0	10507441	10153847	11076923
13	1230566	1	19	65	1111	0	0	11739577	11076924	12000000

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

Type 5 Radar Waveform_15

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)
1	231138	3	5	85	1969	1321	1419	231138	0	666666
2	973608	3	5	60	1599	1137	1919	1209455	666667	1333333
3	195530	1	5	60	1539	0	0	1409640	1333334	2000000
4	1067490	3	5	95	1846	1594	1709	2478669	2000001	2666667
5	741193	1	5	60	1752	0	0	3225011	2666668	3333334
6	224129	2	5	65	1010	1393	0	3450892	3333335	4000001
7	939345	2	5	70	1203	1098	0	4392640	4000002	4666668
8	384598	2	5	80	1257	1482	0	4779539	4666669	5333335
9	1001336	2	5	50	1540	1537	0	5783614	5333336	6000002
10	404989	3	5	50	1446	1719	1801	6191680	6000003	6666669
11	979018	1	5	55	1242	0	0	7175664	6666670	7333336
12	522660	3	5	85	1992	1295	1184	7699566	7333337	8000003
13	445405	1	5	50	1153	0	0	8149442	8000004	8666670
14	794651	2	5	60	1975	1406	0	8945246	8666671	9333337
15	732671	3	5	95	1962	1767	1753	9681298	9333338	10000004
16	863248	1	5	75	1175	0	0	10550028	10000005	10666671
17	238773	1	5	80	1602	0	0	10789976	10666672	11333338
18	745886	1	5	95	1142	0	0	11537464	11333339	12000005

Total number of pulses in waveform = 35
****

Type 5 Radar Waveform_16

Num of Bursts = 19
Burst Interval (us)= 631579

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)
1	38818	1	17	85	1540	0	0	38818	0	631578
2	1125481	2	17	85	1960	1379	0	1165839	631579	1263157
3	467585	1	17	95	1597	0	0	1636763	1263158	1894736
4	421247	1	17	60	1541	0	0	2059607	1894737	2526315
5	742936	2	17	85	1294	1778	0	2804084	2526316	3157894
6	949842	1	17	95	1485	0	0	3756998	3157895	3789473
7	286726	1	17	95	1165	0	0	4045209	3789474	4421052
8	375502	3	17	75	1335	1621	1017	4421876	4421053	5052631
9	1223376	3	17	65	1403	1457	1199	5649225	5052632	5684210
10	522792	3	17	85	1497	1060	1790	6176076	5684211	6315789
11	268023	3	17	75	1483	1654	1673	6448446	6315790	6947368
12	897347	1	17	85	1353	0	0	7350603	6947369	7578947
13	320245	2	17	80	1398	1827	0	7672201	7578948	8210526
14	863301	2	17	50	1732	1409	0	8538727	8210527	8842105
15	447896	2	17	60	1749	1244	0	8989764	8842106	9473684
16	892831	1	17	75	1902	0	0	9885588	9473685	10105263
17	241944	1	17	90	1382	0	0	10129434	10105264	10736842
18	786482	2	17	50	1354	1828	0	10917298	10736843	11368421
19	616310	2	17	60	1905	1819	0	11536790	11368422	12000000

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

Type 5 Radar Waveform_17

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)
1	733073	2	10	50	1211	1259	0	733073	0	999999
2	929052	2	10	75	1059	1812	0	1664595	1000000	1999999
3	560044	2	10	100	1866	1320	0	2227510	2000000	2999999
4	1565395	3	10	90	1027	1026	1411	3796091	3000000	3999999
5	1008492	3	10	55	1397	1086	1789	4808047	4000000	4999999
6	1174668	1	10	65	1870	0	0	5986987	5000000	5999999
7	706327	2	10	80	1038	1098	0	6695184	6000000	6999999
8	686861	1	10	100	1279	0	0	7384181	7000000	7999999
9	931644	1	10	65	1534	0	0	8317104	8000000	8999999
10	1356618	2	10	85	1765	1845	0	9675256	9000000	9999999
11	762287	2	10	80	1934	1026	0	10441153	10000000	10999999
12	1516487	1	10	50	1523	0	0	11960600	11000000	11999999

Total number of pulses in waveform = 22
****

Type 5 Radar Waveform_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)
1	399433	2	6	50	1321	1443	0	399433	0	1499999
2	1126139	3	6	60	1010	1620	1880	1528336	1500000	2999999
3	1661434	1	6	85	1067	0	0	3194280	3000000	4499999
4	1896185	3	6	85	1524	1487	1809	5091532	4500000	5999999
5	1631060	2	6	90	1840	1995	0	6727412	6000000	7499999
6	1662664	1	6	55	1663	0	0	8393911	7500000	8999999
7	1380524	3	6	75	1956	1799	1675	9776098	9000000	10499999
8	1542710	2	6	85	1127	1739	0	11324238	10500000	11999999

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

Type 5 Radar Waveform_19

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)
1	376412	2	14	75	1193	1107	0	376412	0	1199999
2	1553150	1	14	100	1699	0	0	1931862	1200000	2399999
3	685993	2	14	60	1403	1449	0	2619554	2400000	3599999
4	1372526	1	14	65	1228	0	0	3994932	3600000	4799999
5	1134516	3	14	90	1009	1367	1279	5130676	4800000	5999999
6	1969505	1	14	55	1077	0	0	7103836	6000000	7199999
7	726623	2	14	50	1250	1756	0	7831536	7200000	8399999
8	681438	1	14	50	1842	0	0	8515980	8400000	9599999
9	1545258	1	14	90	1377	0	0	10063080	9600000	10799999
10	1012808	3	14	100	1989	1028	1252	11077265	10800000	11999999

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

Type 5 Radar Waveform_20

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)
1	466785	2	8	90	1138	1083	0	466785	0	666666
2	776789	3	8	65	1082	1382	1282	1245795	666667	1333333
3	304388	1	8	65	1676	0	0	1553929	1333334	2000000
4	486798	1	8	90	1728	0	0	2042403	2000001	2666667
5	953416	1	8	65	1596	0	0	2997547	2666668	3333334
6	589422	2	8	55	1240	1775	0	3588565	3333335	4000001
7	827552	1	8	55	1966	0	0	4419132	4000002	4666668
8	446734	2	8	60	1947	1864	0	4867832	4666669	5333335
9	470822	2	8	80	1817	1670	0	5342465	5333336	6000002
10	820722	3	8	60	1826	1722	1991	6166674	6000003	6666669
11	972552	2	8	100	1139	1433	0	7144765	6666670	7333336
12	254502	1	8	60	1456	0	0	7401839	7333337	8000003
13	638620	3	8	70	1097	1436	1388	8041915	8000004	8666670
14	1242455	1	8	65	1029	0	0	9288291	8666671	9333337
15	502856	1	8	90	1590	0	0	9792176	9333338	10000004
16	384775	1	8	75	1909	0	0	10178541	10000005	10666671
17	642868	2	8	85	1131	1306	0	10823318	10666672	11333338
18	1012979	1	8	90	1396	0	0	11838734	11333339	12000005

Total number of pulses in waveform = 30

Type 5 Radar Waveform_21

Num of Bursts = 19
Burst Interval (us)= 631579

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)
1	148682	1	10	70	1249	0	0	148682	0	631578
2	542991	2	10	100	1423	1850	0	692922	631579	1263157
3	720073	3	10	65	1776	1067	1995	1416268	1263158	1894736
4	610226	1	10	80	1220	0	0	2031332	1894737	2526315
5	1005611	2	10	95	1829	1476	0	3038163	2526316	3157894
6	510739	2	10	65	1312	1677	0	3552207	3157895	3789473
7	412261	2	10	95	1950	1842	0	3967457	3789474	4421052
8	640622	1	10	70	1908	0	0	4611871	4421053	5052631
9	500505	1	10	95	1904	0	0	5114284	5052632	5684210
10	835255	3	10	55	1480	1944	1900	5951443	5684211	6315789
11	858884	2	10	95	1248	1194	0	6815651	6315790	6947368
12	236107	3	10	90	1225	1061	1672	7054200	6947369	7578947
13	803079	2	10	55	1732	1015	0	7861237	7578948	8210526
14	620637	3	10	90	1634	1251	1290	8484621	8210527	8842105
15	804307	2	10	80	1053	1854	0	9293103	8842106	9473684
16	705576	1	10	90	1518	0	0	10001586	9473685	10105263
17	492017	2	10	60	1364	1957	0	10495121	10105264	10736842
18	405133	3	10	80	1479	1759	1141	10903575	10736843	11368421
19	706738	1	10	65	1072	0	0	11614692	11368422	12000000

Total number of pulses in waveform = 37

Type 5 Radar Waveform_22

Num of Bursts = 20
Burst Interval (us)= 600000

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
1	334989	3	19	60	1748	1480	1583	334989	0	599999
2	800600	1	19	100	1272	0	0	1140400	600000	1199999
3	156343	3	19	70	1589	1700	1445	1298015	1200000	1799999
4	590557	2	19	55	1876	1579	0	1893306	1800000	2399999
5	914385	1	19	85	1429	0	0	2811146	2400000	2999999
6	502747	3	19	65	1989	1158	1716	3315322	3000000	3599999
7	484826	2	19	75	1805	1341	0	3805011	3600000	4199999
8	986395	3	19	100	1804	1210	1508	4794552	4200000	4799999
9	117840	2	19	55	1993	1449	0	4916914	4800000	5399999
10	1016601	1	19	70	1189	0	0	5936957	5400000	5999999
11	643877	2	19	95	1386	1947	0	6582023	6000000	6599999
12	198789	1	19	85	1749	0	0	6784145	6600000	7199999
13	564719	3	19	70	1360	1298	1657	7350613	7200000	7799999
14	523509	3	19	80	1212	1296	1566	7878437	7800000	8399999
15	861570	2	19	60	1394	1157	0	8744081	8400000	8999999
16	468158	3	19	80	1758	1220	1798	9214790	9000000	9599999
17	512060	1	19	55	1349	0	0	9731626	9600000	10199999
18	769053	1	19	100	1214	0	0	10502028	10200000	10799999
19	879855	3	19	55	1778	1897	1753	11383097	10800000	11399999
20	285922	2	19	60	1403	1393	0	11674447	11400000	11999999

Total number of pulses in waveform = 42

Type 5 Radar Waveform_23

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)
1	46014	3	17	85	1099	1858	1343	46014	0	999999
2	1583759	1	17	65	1500	0	0	1634073	1000000	1999999
3	541558	2	17	90	1929	1766	0	2177131	2000000	2999999
4	1031185	2	17	85	1345	1865	0	3212011	3000000	3999999
5	817976	2	17	55	1144	1424	0	4033197	4000000	4999999
6	1757676	1	17	90	1322	0	0	5793441	5000000	5999999
7	1160161	2	17	95	1598	1852	0	6954924	6000000	6999999
8	220801	1	17	50	1412	0	0	7179175	7000000	7999999
9	1618987	2	17	95	1915	1204	0	8799574	8000000	8999999
10	434059	2	17	80	1110	1734	0	9236752	9000000	9999999
11	1126807	1	17	50	1310	0	0	10366403	10000000	10999999
12	1536241	1	17	75	1089	0	0	11903954	11000000	11999999

Total number of pulses in waveform = 20

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Type 5 Radar Waveform_24

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)
1	631093	1	5	100	1137	0	0	631093	0	923076
2	599600	2	5	60	1888	1738	0	1231830	923077	1846153
3	627432	1	5	55	1480	0	0	1862888	1846154	2769230
4	1812922	3	5	85	1339	1596	1192	3677290	2769231	3692307
5	129598	3	5	85	1120	1874	1554	3811015	3692308	4615384
6	1394910	1	5	50	1308	0	0	5210473	4615385	5538461
7	1128181	2	5	50	1376	1729	0	6339962	5538462	6461538
8	381594	1	5	95	1933	0	0	6724661	6461539	7384615
9	872936	3	5	50	1216	1494	1283	7599530	7384616	8307692
10	751330	3	5	70	1268	1681	1252	8354853	8307693	9230769
11	1499241	1	5	55	1087	0	0	9858295	9230770	10153846
12	707120	3	5	65	1000	1705	1275	10566502	10153847	11076923
13	545753	2	5	50	1961	1439	0	11116235	11076924	12000000

Total number of pulses in waveform = 26

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Type 5 Radar Waveform_25

Num of Bursts = 20
Burst Interval (us)= 600000

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)
1	239174	1	8	90	1915	0	0	239174	0	599999
2	473560	2	8	80	1600	1403	0	714649	600000	1199999
3	559944	1	8	85	1689	0	0	1277596	1200000	1799999
4	668187	2	8	75	1206	1494	0	1947472	1800000	2399999
5	799043	3	8	70	1326	1351	1897	2749215	2400000	2999999
6	503003	3	8	85	1220	1413	1049	3256792	3000000	3599999
7	560259	2	8	95	1192	1703	0	3820733	3600000	4199999
8	779037	2	8	100	1217	1093	0	4602665	4200000	4799999
9	221166	2	8	65	1435	1184	0	4826141	4800000	5399999
10	676172	3	8	75	1474	1708	1430	5504932	5400000	5999999
11	873764	2	8	70	1372	1919	0	6383308	6000000	6599999
12	688780	1	8	75	1006	0	0	7075379	6600000	7199999
13	719128	1	8	75	1428	0	0	7795513	7200000	7799999
14	256026	3	8	70	1249	1614	1582	8052967	7800000	8399999
15	662220	3	8	50	1776	1910	1881	8719632	8400000	8999999
16	835140	3	8	65	1864	1474	1769	9560339	9000000	9599999
17	523115	3	8	50	1372	1779	1675	10088561	9600000	10199999
18	264335	1	8	90	1089	0	0	10357722	10200000	10799999
19	514751	3	8	95	1219	1752	1957	10873562	10800000	11399999
20	981422	3	8	55	1811	1076	1246	11859912	11400000	11999999

Total number of pulses in waveform = 44

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Type 5 Radar Waveform_26

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)
1	198808	3	14	70	1638	1777	1167	198808	0	749999
2	776324	1	14	70	1284	0	0	979714	750000	1499999
3	1124524	1	14	55	1425	0	0	2105522	1500000	2249999
4	224820	2	14	95	1006	1848	0	2331767	2250000	2999999
5	1361655	3	14	50	1894	1719	1277	3696276	3000000	3749999
6	179239	2	14	100	1726	1372	0	3880405	3750000	4499999
7	835734	3	14	50	1589	1664	1540	4719237	4500000	5249999
8	921207	3	14	60	1551	1101	1312	5645237	5250000	5999999
9	529227	1	14	75	1706	0	0	6178428	6000000	6749999
10	819868	2	14	70	1788	1701	0	7000002	6750000	7499999
11	703072	3	14	80	1256	1242	1248	7706563	7500000	8249999
12	1049209	1	14	60	1907	0	0	8759518	8250000	8999999
13	433760	2	14	85	1011	1565	0	9195185	9000000	9749999
14	1115619	1	14	65	1742	0	0	10313380	9750000	10499999
15	562987	3	14	90	1867	1004	1994	10878109	10500000	11249999
16	461053	2	14	50	1554	1795	0	11344027	11250000	11999999

Total number of pulses in waveform = 33
****

Type 5 Radar Waveform_27

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)
1	629194	2	6	55	1306	1481	0	629194	0	857142
2	452134	1	6	55	1989	0	0	1084115	857143	1714285
3	1465262	1	6	60	1459	0	0	2551366	1714286	2571428
4	465546	3	6	100	1133	1473	1340	3018371	2571429	3428571
5	440100	1	6	75	1062	0	0	3462417	3428572	4285714
6	1439957	3	6	60	1068	1564	1128	4903436	4285715	5142857
7	570888	3	6	85	1199	1802	1838	5478084	5142858	6000000
8	797432	1	6	100	1179	0	0	6280355	6000001	6857143
9	810092	2	6	80	1050	1912	0	7091626	6857144	7714286
10	1444322	2	6	90	1503	1930	0	8538910	7714287	8571429
11	760320	2	6	50	1478	1965	0	9302663	8571430	9428572
12	684128	1	6	80	1905	0	0	9990234	9428573	10285715
13	994527	3	6	90	1547	1079	1359	10986666	10285716	11142858
14	173743	3	6	95	1221	1972	1747	11164394	11142859	12000001

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

Type 5 Radar Waveform_28

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)
1	409694	3	18	55	1817	1746	1370	409694	0	923076
2	1216397	3	18	60	1245	1421	1022	1631024	923077	1846153
3	618748	1	18	65	1794	0	0	2253460	1846154	2769230
4	1432025	3	18	70	1079	1419	1278	3687279	2769231	3692307
5	745981	1	18	95	1099	0	0	4437036	3692308	4615384
6	651838	2	18	50	1191	1837	0	5089973	4615385	5538461
7	917918	2	18	90	1995	1528	0	6010919	5538462	6461538
8	902363	1	18	60	1954	0	0	6916805	6461539	7384615
9	977993	2	18	75	1758	1136	0	7896752	7384616	8307692
10	930415	3	18	80	1427	1599	1633	8830061	8307693	9230769
11	1063340	2	18	75	1773	1075	0	9898060	9230770	10153846
12	408874	2	18	70	1453	1209	0	10309782	10153847	11076923
13	1473052	2	18	55	1475	1806	0	11785496	11076924	12000000

Total number of pulses in waveform = 27
****

Type 5 Radar Waveform_29

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)
1	24639	2	9	70	1969	1961	0	24639	0	1090908
2	1477216	2	9	75	1076	1135	0	1505785	1090909	2181817
3	1075051	3	9	75	1850	1698	1424	2583047	2181818	3272726
4	1605538	2	9	100	1910	1171	0	4193557	3272727	4363635
5	1021398	1	9	100	1925	0	0	5218036	4363636	5454544
6	613805	3	9	100	1626	1111	1077	5833766	5454545	6545453
7	1586413	3	9	60	1911	1478	1629	7423993	6545454	7636362
8	979868	3	9	70	1773	1233	1897	8408879	7636363	8727271
9	1385796	1	9	60	1765	0	0	9799578	8727272	9818180
10	461624	1	9	90	1936	0	0	10262967	9818181	10909089
11	1159902	1	9	50	1878	0	0	11424805	10909090	11999998

Total number of pulses in waveform = 22
****

Type 5 Radar Waveform_30

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)
1	393575	2	12	100	1135	1335	0	393575	0	857142
2	918488	1	12	90	1488	0	0	1314533	857143	1714285
3	1075135	3	12	85	1520	1382	1536	2391156	1714286	2571428
4	519649	1	12	75	1022	0	0	2915243	2571429	3428571
5	816801	3	12	80	1996	1145	1421	3733066	3428572	4285714
6	911833	2	12	100	1583	1899	0	4649461	4285715	5142857
7	874435	1	12	80	1670	0	0	5527378	5142858	6000000
8	636827	1	12	95	1842	0	0	6165875	6000001	6857143
9	1430858	2	12	65	1320	1720	0	7598575	6857144	7714286
10	552917	1	12	75	1146	0	0	8154532	7714287	8571429
11	1266030	2	12	60	1878	1247	0	9421708	8571430	9428572
12	420350	2	12	95	1966	1597	0	9845183	9428573	10285715
13	1256411	2	12	50	1537	1056	0	11105157	10285716	11142858
14	582323	1	12	90	1659	0	0	11690073	11142859	12000001

Total number of pulses in waveform = 24
****

Radar Type 6 - Radar Statistical Performance

Trail #	Test Freq. (MHz)	1=Detection 0=No Detection	Trail #	Test Freq. (MHz)	1=Detection 0=No Detection
1	5308	1	16	5308	1
2	5308	1	17	5308	1
3	5308	1	18	5308	1
4	5308	1	19	5308	1
5	5308	1	20	5308	1
6	5308	1	21	5308	1
7	5308	1	22	5308	1
8	5308	1	23	5308	1
9	5308	1	24	5308	1
10	5308	1	25	5308	1
11	5308	1	26	5308	1
12	5308	1	27	5308	1
13	5308	1	28	5308	1
14	5308	1	29	5308	1
15	5308	1	30	5308	1
Detection Percentage (%)					100%

Radar waveform #1			Radar waveform #2		
Hopping Number	Frequency (MHz)	Pulse Start (ms)	Hopping Number	Frequency (MHz)	Pulse Start (ms)
16	5293	48	2	5312	6
22	5288	66	19	5294	57
25	5294	75	41	5327	123
29	5291	87	43	5288	129
34	5335	102	50	5325	150
36	5320	108	51	5331	153
37	5311	111	82	5286	246
60	5313	180	91	5316	273
87	5278	261	95	5332	285
93	5301	279	--	--	--
96	5296	288	--	--	--
16	5293	48	--	--	--
22	5288	66	--	--	--

Radar waveform #3			Radar waveform #4		
Hopping Number	Frequency (MHz)	Pulse Start (ms)	Hopping Number	Frequency (MHz)	Pulse Start (ms)
10	5286	30	7	5278	21
18	5328	54	24	5284	72
25	5291	75	27	5292	81
36	5303	108	32	5281	96
50	5285	150	33	5298	99
71	5300	213	38	5333	114
76	5282	228	44	5293	132
79	5316	237	53	5312	159
86	5288	258	54	5313	162
--	--	--	59	5326	177
--	--	--	64	5279	192
--	--	--	77	5300	231

Radar waveform #5			Radar waveform #6		
Hopping Number	Frequency (MHz)	Pulse Start (ms)	Hopping Number	Frequency (MHz)	Pulse Start (ms)
0	5292	0	5	5322	15
4	5296	12	11	5287	33
6	5299	18	14	5302	42
11	5308	33	17	5328	51
29	5322	87	43	5317	129
36	5286	108	45	5288	135
38	5333	114	56	5309	168
55	5335	165	57	5298	171
62	5314	186	66	5311	198
75	5297	225	74	5338	222
79	5330	237	81	5292	243
83	5293	249	82	5300	246
84	5338	252	89	5331	267
85	5298	255	--	--	--

Radar waveform #7			Radar waveform #8		
Hopping Number	Frequency (MHz)	Pulse Start (ms)	Hopping Number	Frequency (MHz)	Pulse Start (ms)
3	5322	9	8	5314	24
6	5283	18	20	5318	60
10	5312	30	39	5285	117
17	5311	51	42	5284	126
29	5304	87	49	5306	147
31	5302	93	55	5316	165
33	5293	99	58	5298	174
51	5299	153	68	5294	204
60	5323	180	85	5327	255
87	5292	261	86	5296	258
--	--	--	92	5329	276

Radar waveform #9			Radar waveform #10		
Hopping Number	Frequency (MHz)	Pulse Start (ms)	Hopping Number	Frequency (MHz)	Pulse Start (ms)
5	5335	15	10	5316	30
9	5279	27	11	5298	33
12	5298	36	18	5318	54
52	5290	156	20	5327	60
64	5297	192	25	5289	75
67	5301	201	30	5299	90
74	5338	222	45	5325	135
76	5284	228	52	5285	156
79	5332	237	55	5296	165
81	5307	243	58	5320	174
89	5306	267	67	5326	201
91	5296	273	69	5333	207
--	--	--	73	5304	219
--	--	--	83	5305	249
--	--	--	85	5311	255
--	--	--	90	5295	270
--	--	--	96	5328	288

Radar waveform #11			Radar waveform #12		
Hopping Number	Frequency (MHz)	Pulse Start (ms)	Frequency (MHz)	Hopping Number	Pulse Start (ms)
0	5287	0	2	5311	6
1	5283	3	7	5304	21
13	5279	39	9	5335	27
15	5329	45	13	5303	39
17	5292	51	16	5296	48
22	5302	66	20	5338	60
27	5314	81	22	5333	66
29	5330	87	59	5295	177
33	5298	99	72	5323	216
36	5322	108	75	5313	225
39	5310	117	77	5317	231
47	5335	141	80	5305	240
53	5288	159	85	5315	255
63	5331	189	88	5331	264
--	--	--	89	5309	267
--	--	--	93	5290	279
--	--	--	95	5327	285
--	--	--	96	5279	288

Radar waveform #13			Radar waveform #14		
Hopping Number	Frequency (MHz)	Pulse Start (ms)	Hopping Number	Frequency (MHz)	Pulse Start (ms)
2	5305	6	10	5328	30
3	5278	9	11	5318	33
23	5315	69	37	5302	111
24	5298	72	40	5314	120
47	5313	141	45	5300	135
50	5286	150	57	5310	171
53	5314	159	62	5324	186
58	5334	174	75	5290	225
72	5330	216	93	5305	279
73	5300	219	95	5295	285
86	5295	258	--	--	--
87	5279	261	--	--	--

Radar waveform #15			Radar waveform #16		
Hopping Number	Frequency (MHz)	Pulse Start (ms)	Hopping Number	Frequency (MHz)	Pulse Start (ms)
7	5302	21	6	5313	18
16	5327	48	21	5322	63
45	5291	135	23	5295	69
50	5337	150	27	5290	81
53	5326	159	34	5334	102
58	5322	174	58	5278	174
62	5309	186	66	5336	198
74	5285	222	69	5303	207
--	--	--	72	5301	216
--	--	--	84	5288	252
--	--	--	87	5323	261
--	--	--	89	5325	267
--	--	--	93	5285	279
--	--	--	94	5298	282
--	--	--	98	5279	294

Radar waveform #17			Radar waveform #18		
Hopping Number	Frequency (MHz)	Pulse Start (ms)	Hopping Number	Frequency (MHz)	Pulse Start (ms)
13	5288	39	4	5329	12
16	5313	48	5	5336	15
21	5283	63	10	5278	30
27	5297	81	15	5307	45
41	5321	123	18	5320	54
53	5317	159	28	5308	84
54	5289	162	30	5297	90
55	5333	165	44	5313	132
74	5298	222	66	5326	198
85	5338	255	72	5298	216
97	5305	291	91	5319	273
--	--	--	92	5288	276
--	--	--	93	5324	279

Radar waveform #19			Radar waveform #20		
Hopping Number	Frequency (MHz)	Pulse Start (ms)	Hopping Number	Frequency (MHz)	Pulse Start (ms)
6	5286	18	1	5300	3
10	5306	30	11	5278	33
19	5293	57	22	5287	66
25	5334	75	30	5301	90
30	5280	90	47	5330	141
34	5285	102	59	5306	177
41	5332	123	60	5294	180
55	5305	165	67	5291	201
67	5279	201	92	5289	276
69	5287	207	99	5313	297
72	5327	216	--	--	--
78	5303	234	--	--	--
88	5326	264	--	--	--
93	5321	279	--	--	--

Radar waveform #21			Radar waveform #22		
Hopping Number	Frequency (MHz)	Pulse Start (ms)	Hopping Number	Frequency (MHz)	Pulse Start (ms)
11	5333	33	3	5278	9
16	5335	48	4	5310	12
17	5278	51	22	5301	66
29	5300	87	28	5282	84
30	5297	90	30	5281	90
44	5331	132	56	5300	168
51	5283	153	76	5283	228
74	5307	222	79	5304	237
82	5282	246	88	5322	264
84	5301	252	90	5314	270
89	5308	267	91	5326	273
91	5287	273	--	--	--
92	5313	276	--	--	--
95	5316	285	--	--	--

Radar waveform #23			Radar waveform #24		
Hopping Number	Frequency (MHz)	Pulse Start (ms)	Hopping Number	Frequency (MHz)	Pulse Start (ms)
2	5327	6	1	5314	3
7	5288	21	30	5312	90
16	5286	48	39	5308	117
18	5332	54	40	5310	120
25	5311	75	44	5302	132
27	5323	81	46	5320	138
50	5328	150	51	5290	153
53	5297	159	57	5301	171
65	5308	195	66	5313	198
66	5335	198	68	5306	204
69	5284	207	69	5289	207
71	5324	213	80	5330	240
74	5291	222	81	5294	243
94	5315	282	89	5279	267
--	--	--	92	5329	276

Radar waveform #25			Radar waveform #26		
Hopping Number	Frequency (MHz)	Pulse Start (ms)	Hopping Number	Frequency (MHz)	Pulse Start (ms)
2	5278	6	9	5320	27
15	5310	45	14	5287	42
54	5307	162	30	5299	90
59	5332	177	39	5289	117
66	5325	198	45	5317	135
67	5293	201	46	5293	138
72	5300	216	49	5327	147
74	5285	222	55	5309	165
82	5328	246	56	5286	168
87	5324	261	63	5330	189
93	5321	279	67	5282	201
--	--	--	73	5307	219
--	--	--	85	5288	255

Radar waveform #27			Radar waveform #28		
Hopping Number	Frequency (MHz)	Pulse Start (ms)	Hopping Number	Frequency (MHz)	Pulse Start (ms)
2	5287	6	0	5300	0
9	5322	27	9	5330	27
26	5318	78	16	5287	48
40	5284	120	38	5296	114
42	5324	126	40	5278	120
48	5280	144	55	5312	165
49	5332	147	59	5303	177
58	5278	174	61	5310	183
61	5307	183	66	5319	198
71	5289	213	67	5297	201
79	5319	237	76	5285	228
82	5294	246	78	5286	234
85	5329	255	89	5288	267
89	5283	267	93	5336	279
--	--	--	98	5311	294

Radar waveform #29			Radar waveform #30		
Hopping Number	Frequency (MHz)	Pulse Start (ms)	Hopping Number	Frequency (MHz)	Pulse Start (ms)
7	5338	21	13	5304	39
8	5325	24	19	5306	57
12	5308	36	37	5281	111
27	5295	81	39	5327	117
34	5292	102	44	5300	132
44	5287	132	48	5337	144
53	5309	159	52	5284	156
57	5298	171	57	5313	171
59	5313	177	60	5330	180
66	5333	198	75	5307	225
68	5282	204	80	5323	240
70	5318	210	85	5298	255
75	5286	225	88	5288	264
81	5335	243	93	5328	279
95	5317	285	--	--	--
99	5280	297	--	--	--

Radar Statistical Performance for 802.11n-HT40

Radar Type 1 - Radar Statistical Performance

Trail #	Test Freq. (MHz)	Pulse Width (us)	PRI (us)	Pulses / Burst	1=Detection 0=No Detection
1	5292	1	918	58	1
2	5292	1	758	70	1
3	5292	1	678	78	1
4	5292	1	818	65	1
5	5292	1	718	74	1
6	5292	1	3066	18	1
7	5292	1	578	92	1
8	5292	1	878	61	1
9	5292	1	618	86	1
10	5292	1	698	76	1
11	5292	1	898	59	1
12	5292	1	518	102	1
13	5292	1	738	72	1
14	5292	1	858	62	1
15	5292	1	778	68	1
16	5292	1	3042	18	1
17	5292	1	2857	19	1
18	5292	1	537	99	1
19	5292	1	2055	26	1
20	5292	1	1442	37	1
21	5292	1	1318	41	1
22	5292	1	1420	38	1
23	5292	1	1293	41	1
24	5292	1	2670	20	1
25	5292	1	2573	21	1
26	5292	1	2619	21	1
27	5292	1	1371	39	1
28	5292	1	2472	22	1
29	5292	1	1255	43	1
30	5292	1	1292	41	1
Detection Percentage (%)					100%

Radar Type 2 - Radar Statistical Performance

Trail #	Test Freq. (MHz)	Pulse Width (us)	PRI (us)	Pulses / Burst	1=Detection 0=No Detection
1	5310	1.6	203	27	1
2	5310	3.4	163	28	1
3	5310	4.7	205	23	1
4	5310	4.4	160	28	1
5	5310	3.9	203	26	1
6	5310	2.2	215	25	1
7	5310	3.2	228	26	1
8	5310	4.8	151	24	1
9	5310	1.8	163	28	1
10	5310	2.2	183	25	1
11	5310	2.2	204	23	1
12	5310	4.0	201	23	1
13	5310	2.9	200	26	1
14	5310	1.0	151	25	1
15	5310	2.5	152	23	1
16	5310	2.2	155	24	1
17	5310	3.8	192	28	1
18	5310	3.9	182	25	1
19	5310	3.4	164	29	1
20	5310	1.7	198	29	1
21	5310	2.5	157	29	1
22	5310	1.5	209	25	1
23	5310	3.4	162	29	1
24	5310	2.7	194	27	1
25	5310	2.2	229	29	1
26	5310	2.3	211	24	1
27	5310	3.5	215	27	1
28	5310	3.8	214	27	1
29	5310	1.1	217	23	1
30	5310	4.1	198	29	1
Detection Percentage (%)					100%

Radar Type 3 - Radar Statistical Performance

Trail #	Test Freq. (MHz)	Pulse Width (us)	PRI (us)	Pulses / Burst	1=Detection 0=No Detection
1	5328	7.6	314	16	1
2	5328	8.9	346	17	1
3	5328	7.7	459	16	1
4	5328	6.6	341	18	1
5	5328	7.0	458	18	1
6	5328	8.7	295	18	1
7	5328	9.1	348	17	1
8	5328	9.8	426	18	1
9	5328	6.4	496	18	1
10	5328	7.8	378	17	1
11	5328	9.9	354	17	1
12	5328	7.3	423	18	1
13	5328	8.3	405	17	1
14	5328	9.0	296	17	1
15	5328	7.0	433	18	1
16	5328	7.7	492	16	1
17	5328	6.8	459	17	1
18	5328	6.8	465	16	1
19	5328	7.2	278	18	1
20	5328	8.2	423	16	1
21	5328	7.3	399	17	1
22	5328	6.0	318	16	1
23	5328	6.8	490	16	1
24	5328	7.3	257	16	1
25	5328	9.8	373	17	1
26	5328	6.7	429	17	1
27	5328	7.7	360	16	1
28	5328	7.3	308	17	1
29	5328	8.4	312	18	1
30	5328	9.6	472	16	1
Detection Percentage (%)					100%

Radar Type 4 - Radar Statistical Performance

Trail #	Test Freq. (MHz)	Pulse Width (us)	PRI (us)	Pulses / Burst	1=Detection 0=No Detection
1	5328	18.3	294	12	1
2	5328	12.3	338	13	1
3	5328	16.6	394	13	1
4	5328	17.3	303	14	1
5	5328	18.8	257	13	1
6	5328	15.3	292	12	1
7	5328	12.8	496	13	1
8	5328	19.6	473	16	1
9	5328	17.7	458	14	1
10	5328	16.4	500	14	1
11	5328	14.3	411	14	1
12	5328	13.6	279	13	1
13	5328	15.5	270	12	1
14	5328	14.5	286	12	1
15	5328	14.7	483	12	1
16	5328	18.5	371	12	1
17	5328	14.7	396	14	1
18	5328	16.7	257	14	1
19	5328	13.6	474	12	1
20	5328	14.7	441	16	1
21	5328	13.2	423	12	1
22	5328	14.0	421	15	1
23	5328	11.0	361	13	1
24	5328	14.7	268	12	1
25	5328	18.9	285	12	1
26	5328	11.9	316	12	1
27	5328	14.5	479	15	1
28	5328	15.4	289	15	1
29	5328	18.2	409	15	1
30	5328	12.6	265	13	1
Detection Percentage (%)					100%

Note: 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%)

Radar Type 5 - Radar Statistical Performance

Trail #	Test Freq. (MHz)	1=Detection 0=No Detection	Trail #	Test Freq. (MHz)	1=Detection 0=No Detection
1	5294.4	1	16	5310.0	1
2	5299.2	1	17	5310.0	1
3	5297.6	1	18	5310.0	1
4	5296.8	1	19	5310.0	1
5	5294.0	1	20	5310.0	1
6	5295.6	1	21	5322.4	1
7	5299.6	1	22	5320.8	1
8	5295.2	1	23	5323.2	1
9	5298.8	1	24	5326.0	1
10	5296.0	1	25	5324.0	1
11	5310.0	1	26	5324.4	1
12	5310.0	1	27	5325.6	1
13	5310.0	1	28	5321.2	1
14	5310.0	1	29	5324.8	1
15	5310.0	1	30	5320.4	1
Detection Percentage (%)					100%

Type 5 Radar Waveform_1

Num of Bursts = 20
Burst Interval (us)= 600000

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)
1	177880	2	6	95	1178	1704	0	177880	0	599999
2	767740	2	6	85	1875	1175	0	948502	600000	1199999
3	523466	2	6	85	1974	1609	0	1475018	1200000	1799999
4	545452	1	6	85	1966	0	0	2024053	1800000	2399999
5	789278	1	6	50	1438	0	0	2815297	2400000	2999999
6	603554	2	6	95	1296	1085	0	3420289	3000000	3599999
7	187233	1	6	85	1584	0	0	3609903	3600000	4199999
8	1109323	3	6	70	1483	1772	1468	4720810	4200000	4799999
9	358839	2	9	85	1372	1864	0	5084372	4800000	5399999
10	563169	1	6	95	1153	0	0	5650777	5400000	5999999
11	360531	2	6	70	1105	1683	0	6012461	6000000	6599999
12	940883	2	6	100	1127	1367	0	6956132	6600000	7199999
13	748961	1	6	90	1033	0	0	7707587	7200000	7799999
14	587617	2	6	95	1990	1502	0	8296237	7800000	8399999
15	552026	1	6	90	1321	0	0	8851755	8400000	8999999
16	486316	3	6	95	1521	1401	1720	9339392	9000000	9599999
17	483302	2	9	85	1412	1132	0	9827336	9600000	10199999
18	469115	3	6	60	1956	1515	1565	10298995	10200000	10799999
19	604472	1	6	75	1284	0	0	10908503	10800000	11399999
20	712736	2	6	65	1450	1431	0	11622523	11400000	11999999

Total number of pulses in waveform = 36

Type 5 Radar Waveform_2

Num of Bursts = 20
Burst Interval (us)= 600000

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)
1	126187	3	18	65	1903	1157	1125	126187	0	599999
2	628848	2	18	60	1749	1792	0	759220	600000	1199999
3	766566	3	18	75	1962	1031	1288	1529327	1200000	1799999
4	397308	2	18	60	1647	1233	0	1930916	1800000	2399999
5	561168	1	18	50	1180	0	0	2494964	2400000	2999999
6	785652	3	18	85	1351	1550	1795	3281796	3000000	3599999
7	820913	2	18	80	1567	1519	0	4107405	3600000	4199999
8	129643	3	18	60	1768	1339	1001	4240134	4200000	4799999
9	995418	1	18	65	1724	0	0	5239660	4800000	5399999
10	591714	2	18	65	1860	1372	0	5833098	5400000	5999999
11	324913	1	18	55	1789	0	0	6161243	6000000	6599999
12	963014	3	18	60	1668	1979	1626	7126046	6600000	7199999
13	144614	3	18	95	1125	1528	1020	7275933	7200000	7799999
14	536348	3	18	70	1420	1957	1864	7815954	7800000	8399999
15	1020565	2	18	90	1484	1266	0	8841760	8400000	8999999
16	580043	1	18	60	1831	0	0	9424553	9000000	9599999
17	728985	3	18	80	1207	1196	1457	10155369	9600000	10199999
18	476592	3	18	90	1228	1751	1752	10635821	10200000	10799999
19	191825	3	18	70	1229	1412	1843	10832377	10800000	11399999
20	863158	2	18	100	1692	1661	0	11700019	11400000	11999999

Total number of pulses in waveform = 46
****

Type 5 Radar Waveform_3

Num of Bursts = 19
Burst Interval (us)= 631579

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)
1	259308	1	14	95	1185	0	0	259308	0	631578
2	963176	3	14	100	1402	1246	1724	1223669	631579	1263157
3	404583	1	14	65	1682	0	0	1632624	1263158	1894736
4	265739	1	14	90	1804	0	0	1900045	1894737	2526315
5	1152214	1	14	90	1275	0	0	3054063	2526316	3157894
6	688649	1	14	65	1370	0	0	3743987	3157895	3789473
7	467916	3	14	70	1129	1181	1878	4213273	3789474	4421052
8	636794	1	14	100	1513	0	0	4854255	4421053	5052631
9	355471	3	14	60	1979	1643	1213	5211239	5052632	5684210
10	669393	2	14	70	1561	1970	0	5885467	5684211	6315789
11	704378	3	14	80	1048	1426	1080	6593376	6315790	6947368
12	370446	1	14	80	1798	0	0	6967376	6947369	7578947
13	848604	3	14	60	1735	1189	1069	7817778	7578948	8210526
14	930807	2	14	60	1182	1229	0	8752578	8210527	8842105
15	140673	1	14	85	1196	0	0	8895662	8842106	9473684
16	850338	3	14	60	1332	1241	1003	9747196	9473685	10105263
17	727463	2	14	50	1888	1737	0	10478235	10105264	10736842
18	834944	3	14	100	1551	1059	1059	11316804	10736843	11368421
19	442814	2	14	70	1430	1198	0	11763287	11368422	12000000

Total number of pulses in waveform = 37
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Type 5 Radar Waveform_4

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)
1	517347	3	12	90	1206	1542	1454	517347	0	799999
2	538138	1	12	55	1757	0	0	1059687	800000	1599999
3	1068784	3	12	65	1358	1935	1488	2130228	1600000	2399999
4	704875	2	12	85	1814	1251	0	2839884	2400000	3199999
5	1033733	1	12	90	1178	0	0	3876682	3200000	3999999
6	844861	1	12	70	1302	0	0	4722721	4000000	4799999
7	256063	3	12	55	1635	1385	1353	4980086	4800000	5599999
8	1221547	3	12	60	1066	1201	1886	6206006	5600000	6399999
9	701334	3	12	55	1058	1771	1102	6911493	6400000	7199999
10	467381	2	12	75	1644	1507	0	7382805	7200000	7999999
11	1353476	3	12	55	1871	1497	1120	8739432	8000000	8799999
12	826888	3	12	65	1433	1451	1903	9570808	8800000	9599999
13	385129	3	12	65	1099	1778	1758	9960724	9600000	10399999
14	633928	2	12	50	1181	1916	0	10599287	10400000	11199999
15	715836	1	12	100	1741	0	0	11318220	11200000	11999999

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

Type 5 Radar Waveform_5

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
1	604590	1	5	50	1918	0	0	604590	0	666666
2	170559	2	5	65	1468	1980	0	777067	666667	1333333
3	1093790	2	5	90	1324	1316	0	1874305	1333334	2000000
4	580151	2	5	60	1799	1355	0	2457096	2000001	2666667
5	798416	2	5	80	1473	1872	0	3258666	2666668	3333334
6	220257	2	5	65	1939	1681	0	3482268	3333335	4000001
7	722846	1	5	55	1400	0	0	4208734	4000002	4666668
8	561693	2	5	55	1317	1133	0	4771827	4666669	5333335
9	1067876	2	5	50	1518	1878	0	5842153	5333336	6000002
10	364344	2	5	90	1126	1520	0	6209893	6000003	6666669
11	594993	3	5	85	1233	1653	1424	6807532	6666670	7333336
12	538014	3	5	50	1860	1804	1448	7349856	7333337	8000003
13	948405	3	5	90	1465	1287	1911	8303373	8000004	8666670
14	851955	2	5	70	1383	1448	0	9159991	8666671	9333337
15	823687	3	5	60	1262	1896	1525	9986509	9333338	10000004
16	148933	3	5	95	1959	1485	1530	10140125	10000005	10666671
17	549310	2	5	55	1750	1223	0	10694409	10666672	11333338
18	1026052	1	5	55	1216	0	0	11723434	11333339	12000005

Total number of pulses in waveform = 38
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Type 5 Radar Waveform_6

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)
1	462403	2	9	80	1499	1298	0	462403	0	857142
2	763304	2	9	90	1350	1517	0	1228504	857143	1714285
3	603991	2	9	60	1360	1198	0	1835362	1714286	2571428
4	1122756	2	9	90	1861	1708	0	2960676	2571429	3428571
5	1215684	2	9	60	1249	1533	0	4179929	3428572	4285714
6	645991	3	9	60	1508	1220	1293	4828702	4285715	5142857
7	967157	2	9	80	1734	1397	0	5799880	5142858	6000000
8	229082	2	9	55	1804	1143	0	6032093	6000001	6857143
9	1349637	1	9	55	1139	0	0	7384677	6857144	7714286
10	414156	2	9	55	1018	1571	0	7799972	7714287	8571429
11	1180731	1	9	60	1266	0	0	8983292	8571430	9428572
12	817157	1	9	65	1642	0	0	9801715	9428573	10285715
13	674554	1	9	85	1793	0	0	10477911	10285716	11142858
14	1311137	1	9	90	1884	0	0	11790841	11142859	12000001

Total number of pulses in waveform = 24
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Type 5 Radar Waveform_7

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)
1	357636	1	19	85	1664	0	0	357636	0	1090908
2	1409736	1	19	65	1507	0	0	1769036	1090909	2181817
3	1155797	1	19	95	1180	0	0	2926340	2181818	3272726
4	670394	1	19	60	1692	0	0	3597914	3272727	4363635
5	1074989	2	19	75	1537	1731	0	4674595	4363636	5454544
6	907479	1	19	85	1078	0	0	5585342	5454545	6545453
7	1046603	2	19	95	1155	1349	0	6633023	6545454	7636362
8	1752249	2	19	85	1780	1789	0	8387776	7636363	8727271
9	1398996	2	19	55	1009	1209	0	9790341	8727272	9818180
10	659237	1	19	70	1184	0	0	10451796	9818181	10909089
11	1413895	1	19	60	1430	0	0	11866875	10909090	11999998

Total number of pulses in waveform = 15
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