MRT Technology (Suzhou) Co., Ltd
Phone: +86-512-66308358
Fax: +86-512-66308368
Web: www.mrt-cert.com

Report No.: 1704RSU00206
Report Version: V01
Issue Date: 06-23-2017

DFS MEASUREMENT REPORT

FCC PART 15.407(h)

FCC ID:	TK4WPJ428
APPLICANT:	Compex Systems Pte Ltd
Application Type:	Class II Permissible Change
Product:	Wireless Access Point
Model No.:	WPJ428HV
Serial Model:	WPJ428LV, WPJ418LV, WPJ418HV, MMS428LV, MMS428HV, MMS418LV, MMS418HV
Brand Name:	COMPEX
FCC Classification:	Unlicensed National Information Infrastructure (UNII)
FCC Rule Part(s):	Part 15.407 Section (h)(2) KDB 905462 D02v02, KDB 905462 D04v01
Type of Device:	Master Device
Test Date:	June 06 ~ 19, 2017

Reviewed By : Jame Yuan
(Jame Yuan)

Approved By : Marlin Chen
(Marlin Chen)

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

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.

Revision History

Report No.	Version	Description	Issue Date	Note
1704RSU00206	Rev. 01	Initial report	06-23-2017	Valid

CONTENTS

Description Page

Revision History **2**

§2.1033 General Information **5**

1. INTRODUCTION **6**

1.1. Scope 6
1.2. MRT Test Location 6

2. PRODUCT INFORMATION **7**

2.1. Equipment Description 7
2.2. DFS Band Carrier Frequencies Operation 7
2.3. Description of Available Antennas 8
2.4. Description of Antenna RF Port 9
2.5. Test Mode 9

3. DFS DETECTION THRESHOLDS AND RADAR TEST WAVEFORMS **10**

3.1. Applicability 10
3.2. DFS Devices Requirements 11
3.3. DFS Detection Threshold Values 12
3.4. Parameters of DFS Test Signals 13
3.5. Conducted Test Setup 16

4. TEST EQUIPMENT CALIBRATION DATE **17**

5. TEST RESULT **18**

5.1. Summary 18
5.2. Radar Waveform Calibration 19
5.2.1. Calibration Setup 19
5.2.2. Calibration Procedure 19
5.2.3. Cablibration Result 20
5.2.4. Channel Loading Test Result 24
5.3. UNII Detection Bandwidth Measurement 25
5.3.1. Test Limit 25
5.3.2. Test Procedure 25
5.3.3. Test Result 26
5.4. Initial Channel Availability Check Time Measurement 29
5.4.1. Test Limit 29
5.4.2. Test Procedure 29
5.4.3. Test Result 30

5.5. Radar Burst at the Beginning of the Channel Availability Check Time Measurement .. 31
5.5.1. Test Limit 31
5.5.2. Test Procedure 31
5.5.3. Test Result..... 32
5.6. Radar Burst at the End of the Channel Availability Check Time Measurement 33
5.6.1. Test Limit 33
5.6.2. Test Procedure 33
5.6.3. Test Result..... 34
5.7. In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period Measurement 35
5.7.1. Test Limit 35
5.7.2. Test Procedure Used 35
5.7.3. Test Result..... 36
5.8. Statistical Performance Check Measurement..... 38
5.8.1. Test Limit 38
5.8.2. Test Procedure 38
5.8.3. Test Result..... 39

6. CONCLUSION.....115

§2.1033 General Information

Applicant:	Compex Systems Pte Ltd
Applicant Address:	No:9 Harrison Road, Harrison Industrial Building, #05-01, Singapore 369651
Manufacturer:	Compex Systems Pte Ltd
Manufacturer Address:	No:9 Harrison Road, Harrison Industrial Building, #05-01, Singapore 369651
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
FCC ID:	TK4WPJ428
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 Tian'edang Rd., Suzhou, China.

- **MRT facility is a FCC registered (MRT Reg. No. 809388) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules.**
- **MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.**
- **MRT facility is a VCCI registered (R-4179, G-814, C-4664, T-2206) test laboratory with the site description on file at VCCI Council.**
- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications and Radio testing for FCC, Industry Canada, EU and TELEC Rules.**

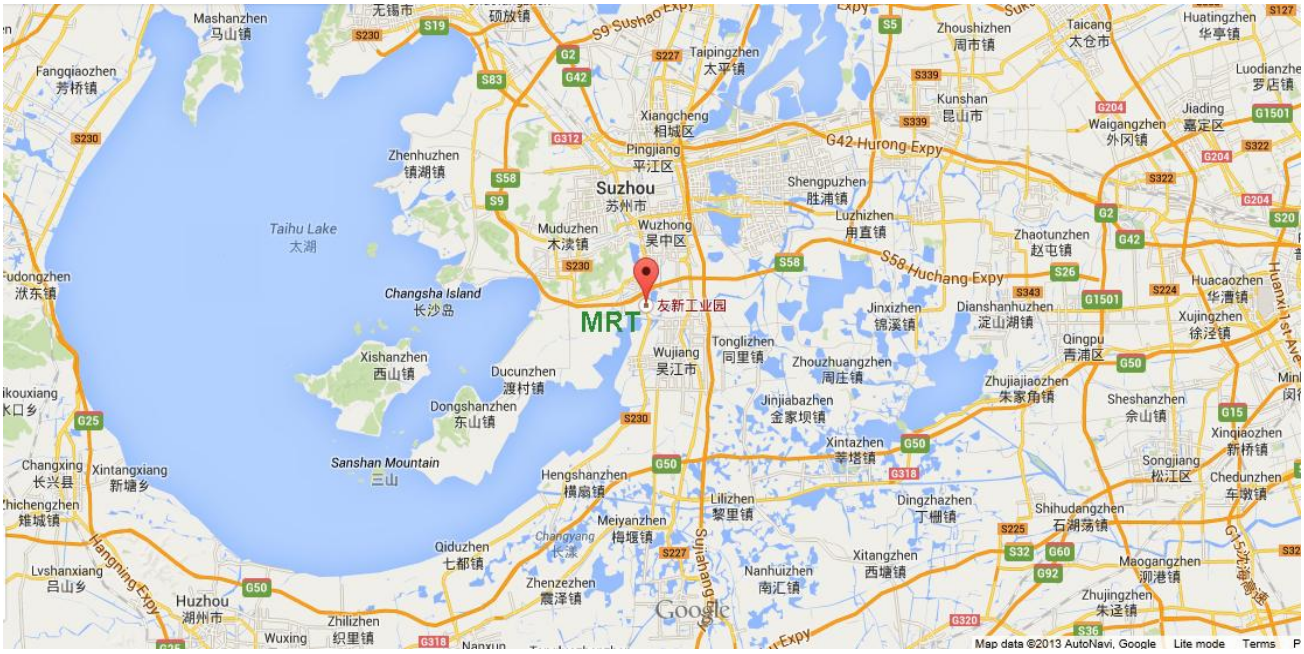
1. INTRODUCTION

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 Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on September 30, 2013.



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name	Wireless Access Point
Model No.	WPJ428HV
Serial Model:	WPJ428LV, WPJ418LV, WPJ418HV, MMS428LV, MMS428HV, MMS418LV, MMS418HV
Radio Type	Intentional Transceiver
Operation Mode	Master Device
Frequency Range	For 802.11a/n-HT20/ac-VHT20: 5260~5320MHz, 5500~5720MHz For 802.11n-HT40/ac-VHT40: 5270~5310MHz, 5510~5710MHz For 802.11ac-VHT80: 5290MHz, 5530MHz, 5610MHz, 5690MHz
Type of Modulation	802.11a/n/ac: OFDM;
Power-on cycle	Requires 51.5 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. DFS Band Carrier Frequencies Operation

802.11a/n-HT20/ac-VHT20

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/ac-VHT40

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	5710 MHz	--	--

802.11ac-VHT80

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

2.3. Description of Available Antennas

Antenna Type	Frequency Band (MHz)	TX Paths	Per Chain Max Antenna Gain (dBi)	
			Ant 0	Ant 1
Panel Antenna 3#	2412 ~ 2462	1	8	--
		2	8	8
	5180 ~ 5825	1	10	--
		2	10	10

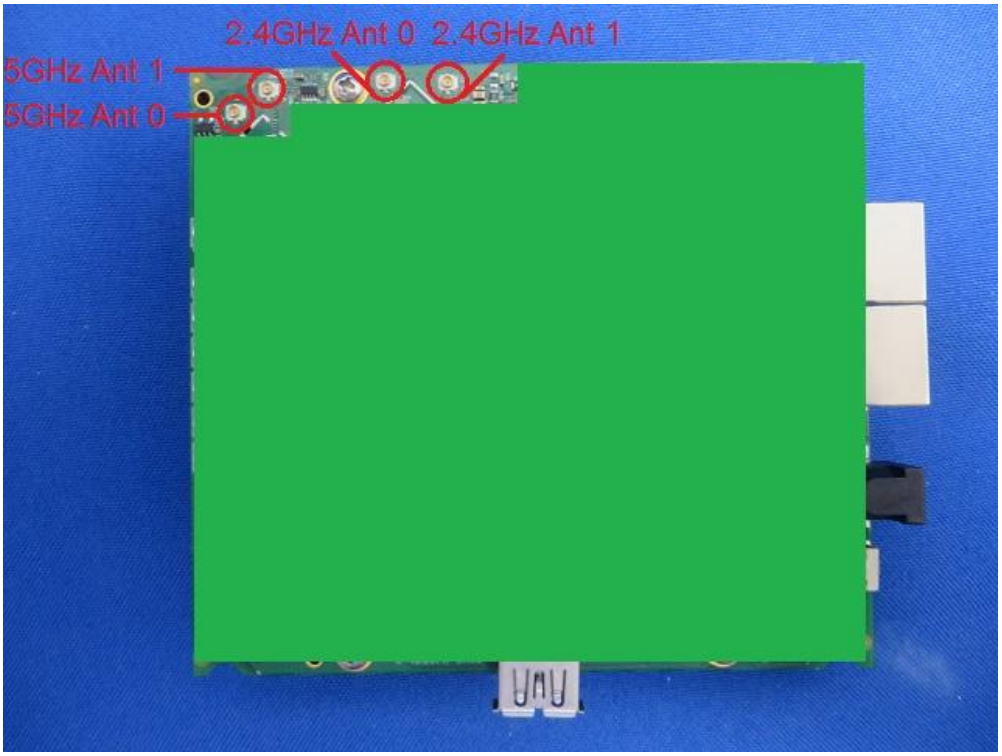
Note 1: The device didn't support beam-forming technology and Cyclic Delay Diversity (CDD) technology, and the transmit signals are uncorrected, so no add array gain to the band power and band PSD.

Note 2: For SISO mode, only the Ant 0 chain can transmit. 11a&11b&11g mode support SISO mode, 11n mode support MIMO mode.

Note 3: When the device working on UNII-2A & UNII-2C bands, only the panel antenna 3# or antenna gain less than 10dBi can be used.

2.4. Description of Antenna RF Port

Antenna RF Port				
--	2.4GHz RF Port		5GHz RF Port	
Software Control Port for 1Tx	Ant 0	--	Ant 0	--
Software Control Port for 2Tx	Ant 0	Ant 1	Ant 0	Ant 1



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.

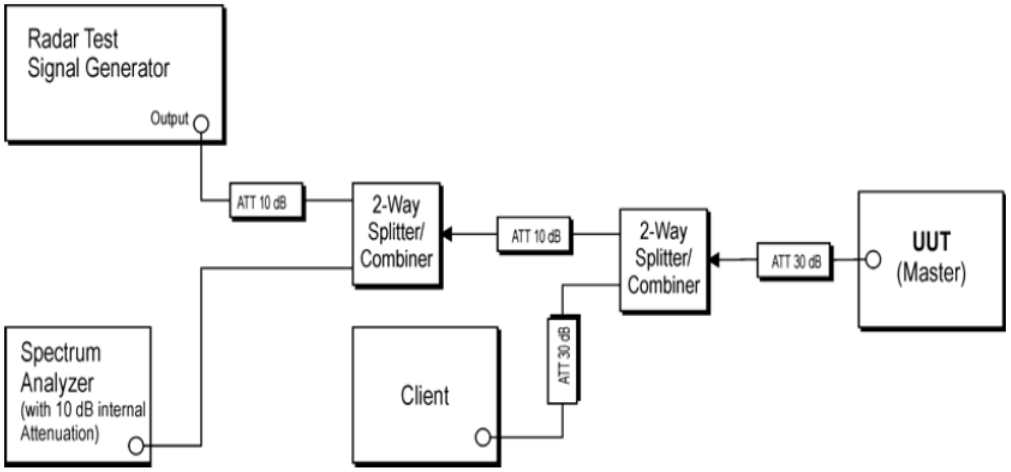


Figure 3-1: Conducted Test Setup where UUT is a Master and Radar Test Waveforms are injected into the Masters

4. TEST EQUIPMENT CALIBRATION DATE

Dynamic Frequency Selection (DFS) – TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2018/05/08
ESG Vector Signal Generator	Agilent	E4438C	MRTSUE06026	1 year	2017/12/09
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2017/11/20
Combiner	WOKEN	0120N02208001D	MRTSUE06200	1 year	N/A
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06023	1 year	2017/11/07
Notebook	ASUS	PRO45V	MRTSUE06180	N/A	N/A

Note: The notebook has a built-in Intel dual band wireless module (AC 7260).

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: **Compex Systems Pte Ltd**

FCC ID: **TK4WPJ428**

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.

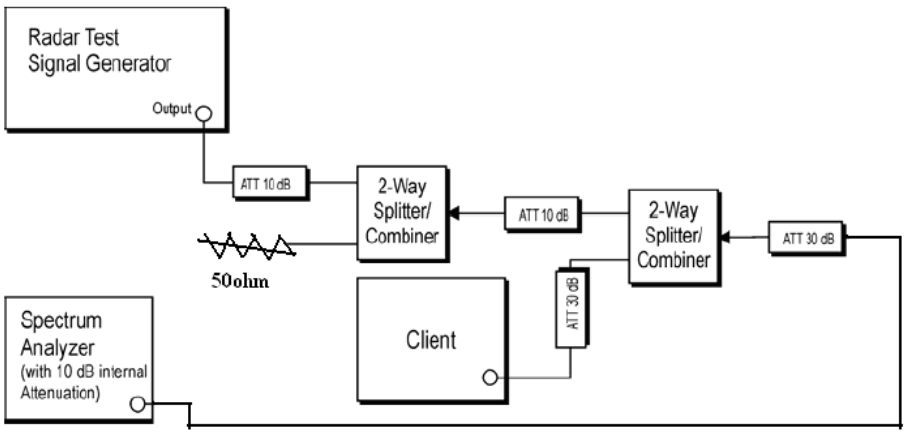


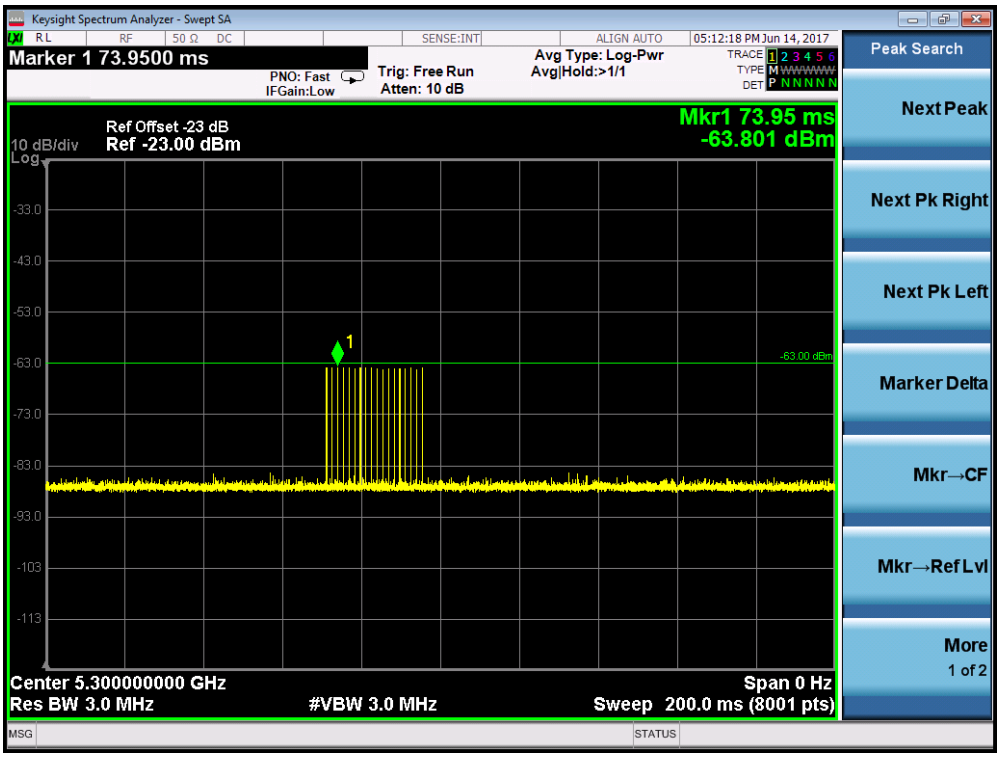
Figure 3-2: Conducted Test Setup

5.2.2. Calibration Procedure

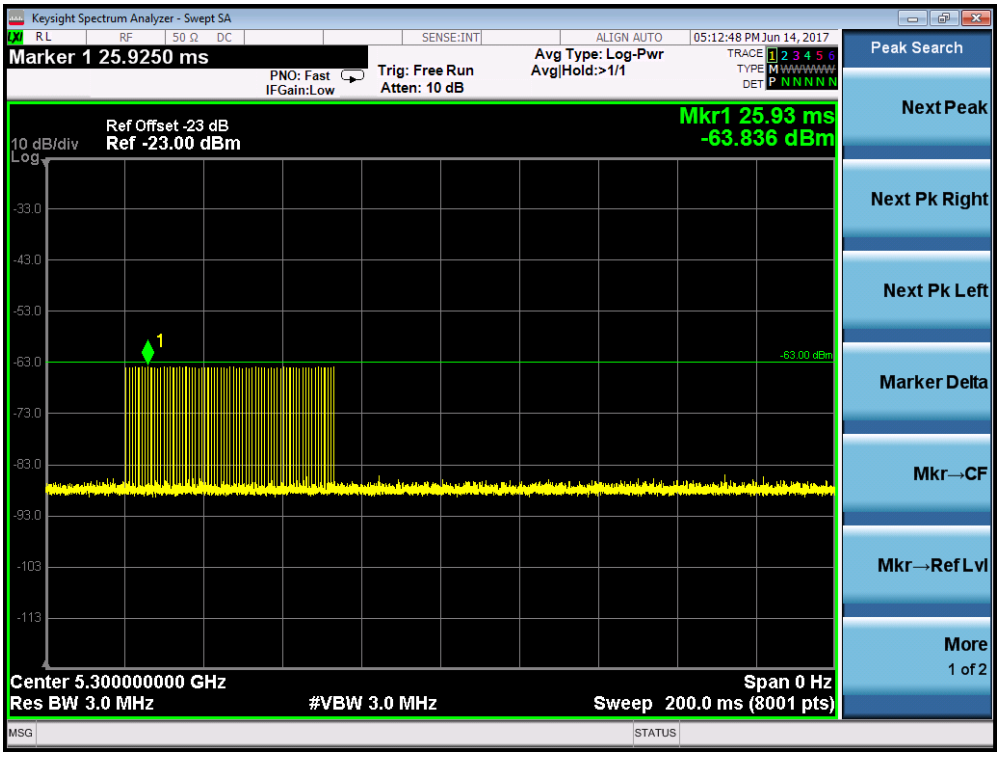
The Interference Radar Detection Threshold Level is (-64dBm) + (0) [dBi] + 1 dB= -63 dBm that had been taken into account the output power range and antenna gain. The above equipment setup was used to calibrate the conducted Radar Waveform. A vector signal generator was utilized to establish the test 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

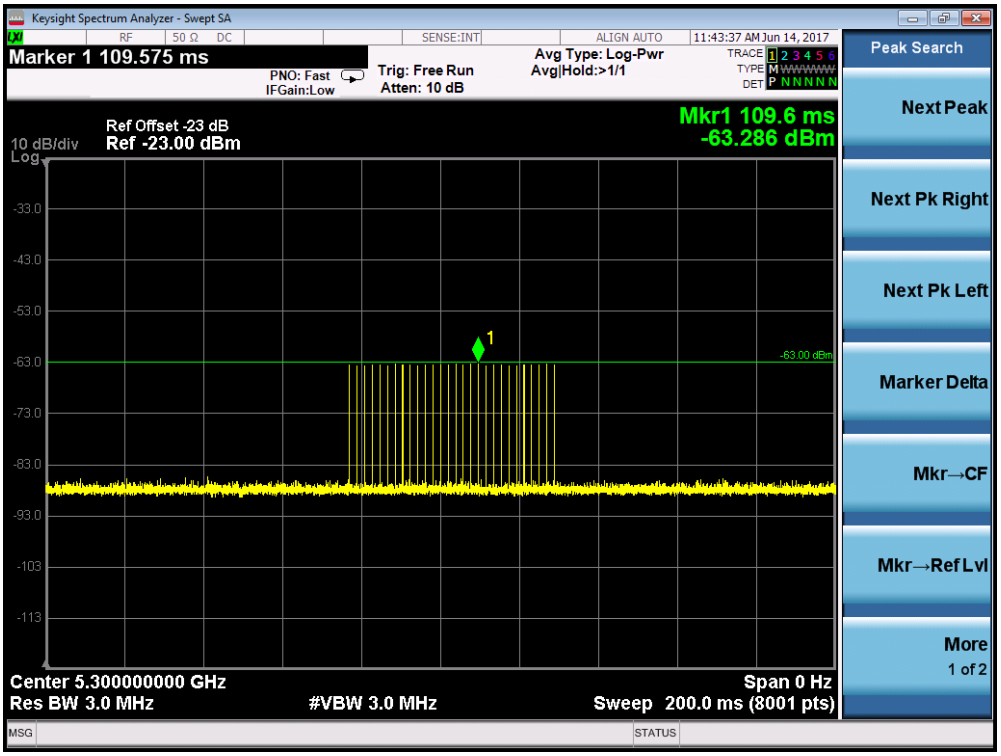


Radar #1(Test A) DFS detection threshold level and the burst of pulses on the Channel frequency



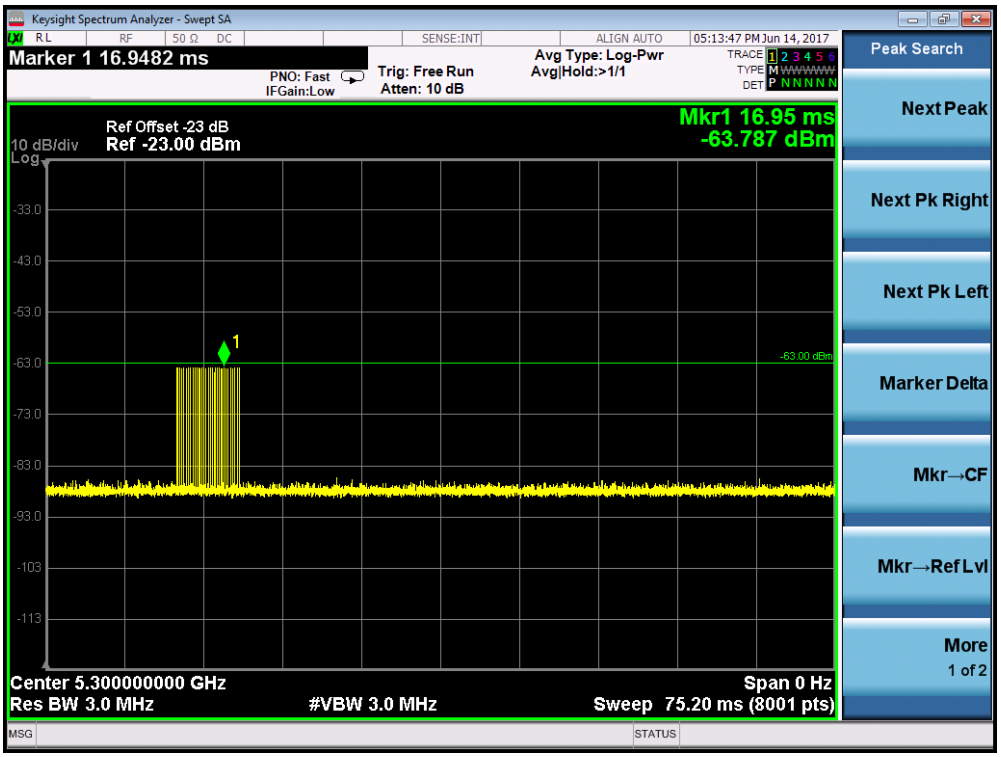
PRI = 798us and the number of pulses = 67

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

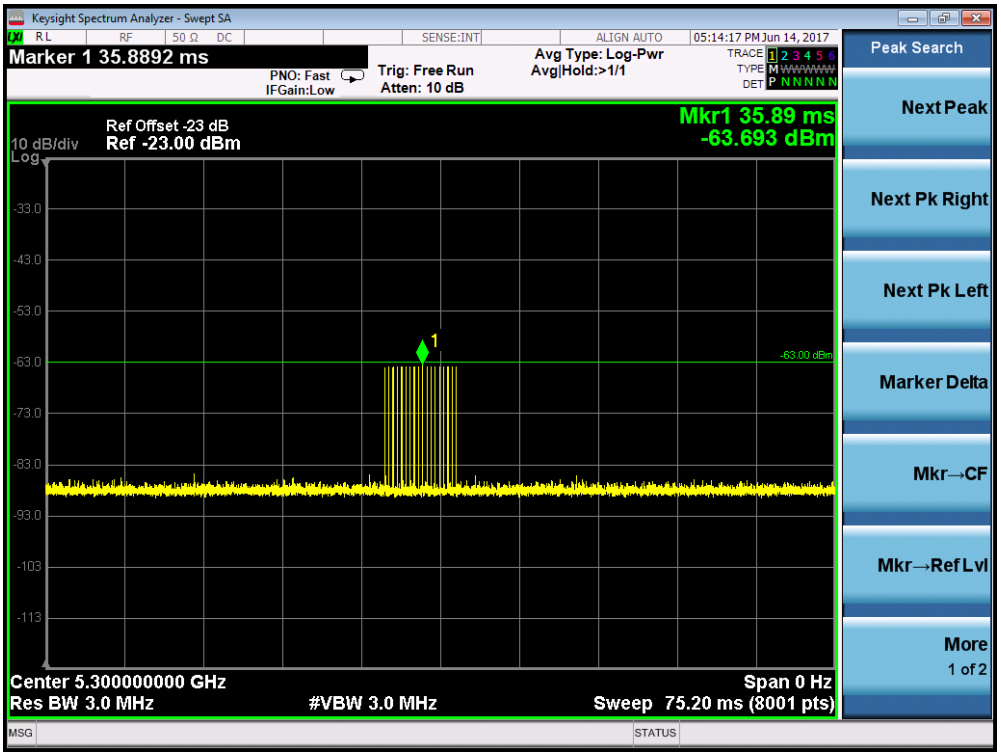


PRI = 1.951ms and the number of pulses = 28

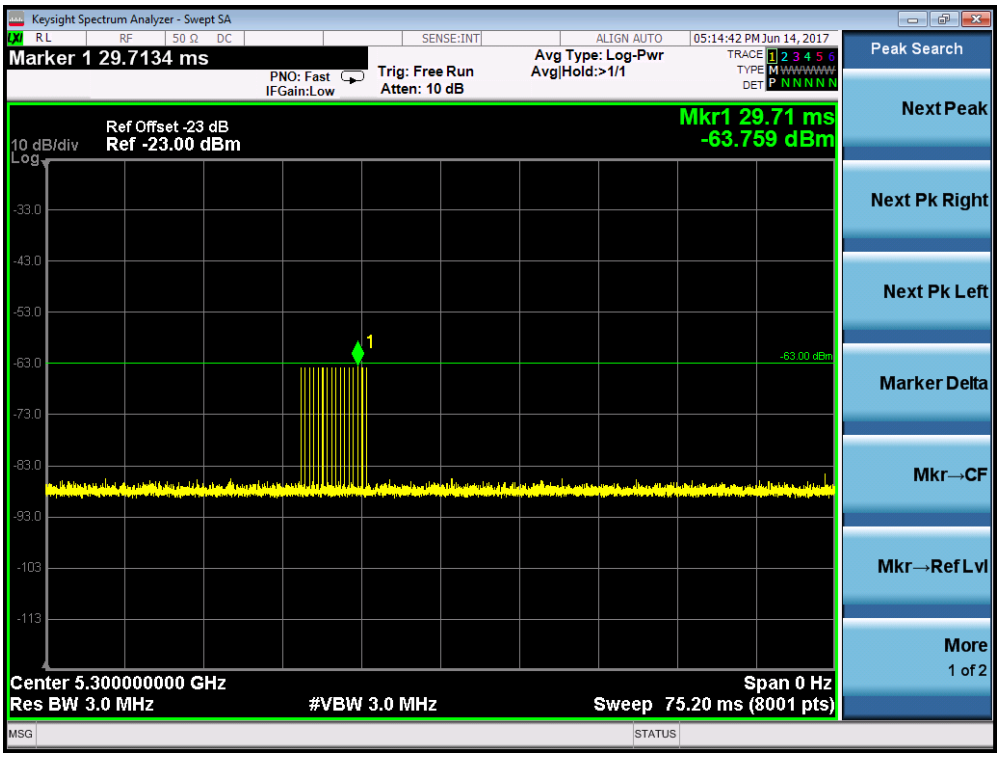
Radar #2 DFS detection threshold level and the burst of pulses on the Channel frequency



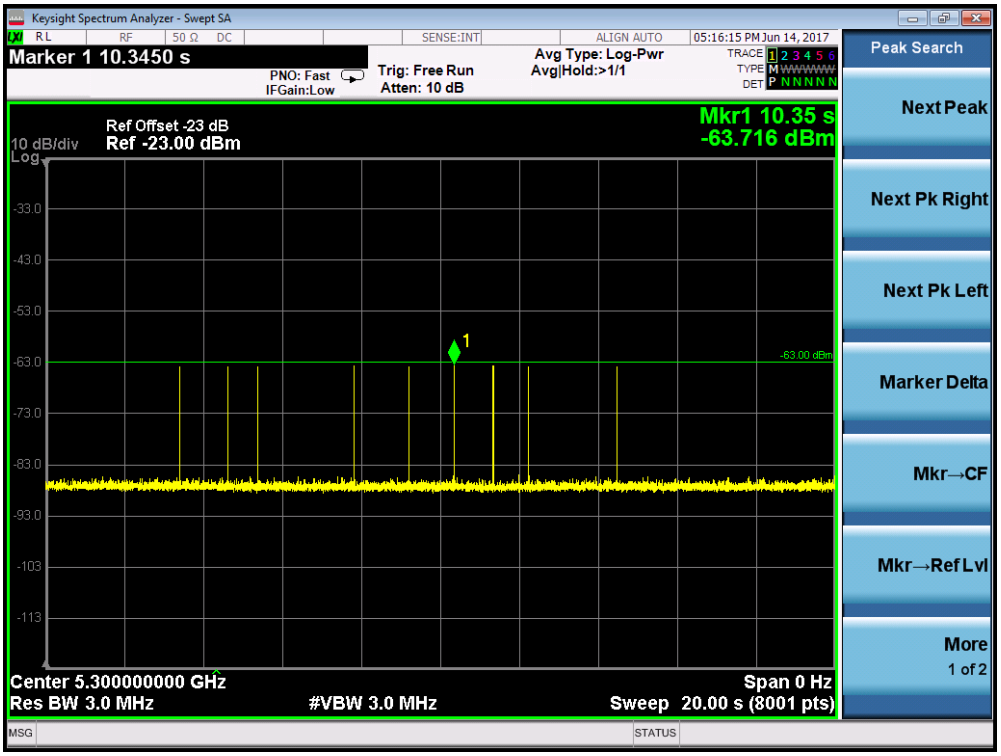
Radar #3 DFS detection threshold level and the burst of pulses on the Channel frequency



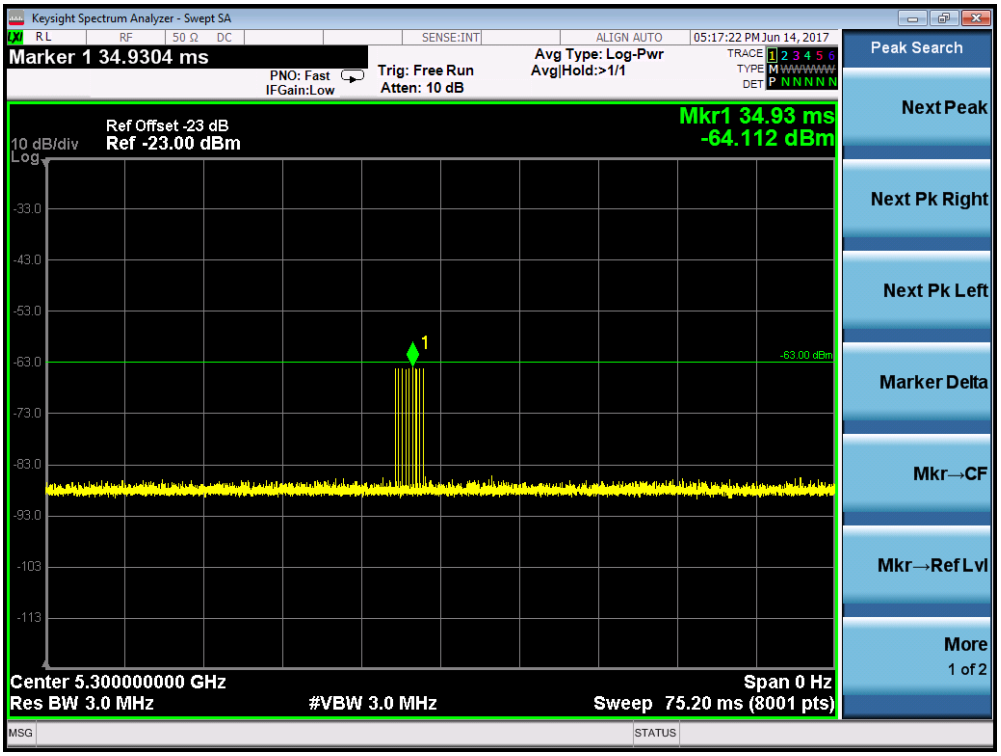
Radar #4 DFS detection threshold level and the burst of pulses on the Channel frequency



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

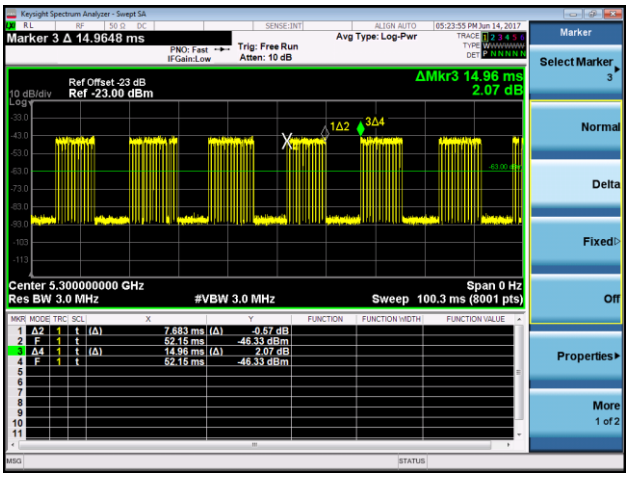
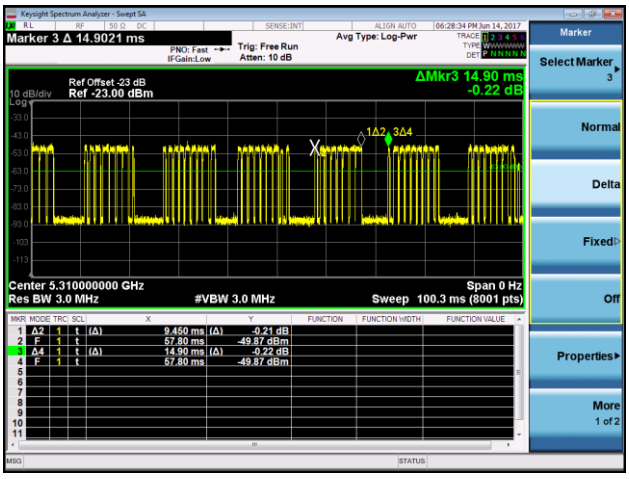
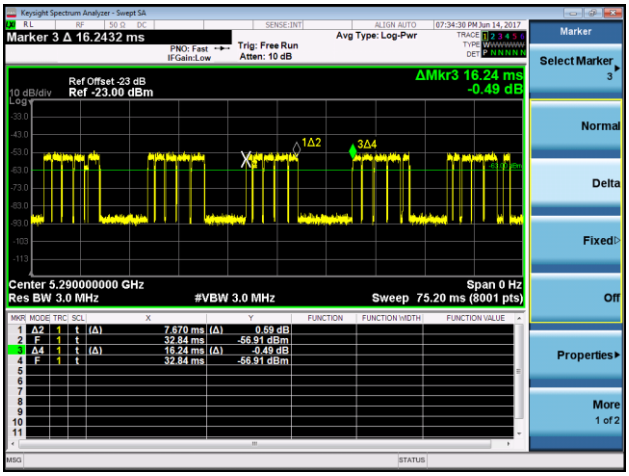


Radar #6 DFS detection threshold level and a single hop (9 pulses) on the Channel frequency within UNII detection bandwidth



5.2.4. Channel Loading Test Result

System testing was performed with the designated MPEG test file that streams full motion video from the Wireless Access Point 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).

<table>
<tr><th colspan="2">Channel Loading Plot</th></tr>
<tr><td>802.11a (5300MHz)</td><td>802.11n-HT40 (5310MHz)</td></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td>802.11ac-VHT80 (5290MHz)</td><td></td></tr>
<tr><td> 
</td><td></td></tr>
</table>

Test Mode	Test Frequency	Packet ratio	Requirement ratio	Test Result
802.11a	5300 MHz	51.36%	≥ 17%	Pass
802.11n-HT40	5310 MHz	63.42%	≥ 17%	Pass
802.11ac-VHT80	5290 MHz	47.23%	≥ 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 = 16.42MHz (see note)											
UNII Detection Bandwidth Min. Limit (MHz): 16.42MHz x 100% = 16.42MHz											

Note: All UNII channels for this device have identical Channel bandwidths. Therefore, all DFS testing was done at 5300MHz. The 99% channel bandwidth is 16.42MHz. (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 (%)
5290	0	0	0	0	0	0	0	0	0	0	0%
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 = 36.09MHz (see note)											
UNII Detection Bandwidth Min. Limit (MHz): 36.09MHz x 100% = 36.09MHz											

Note: All UNII channels for this device have identical Channel bandwidths. Therefore, all DFS testing was done at 5310MHz. The 99% channel bandwidth is 36.09MHz. (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 = 75.68MHz (see note)											
UNII Detection Bandwidth Min. Limit (MHz): 75.48MHz x 100% = 75.68MHz											

Note: All UNII channels for this device have identical Channel bandwidths. Therefore, all DFS testing was done at 5290MHz. The 99% channel bandwidth is 75.68MHz. (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.

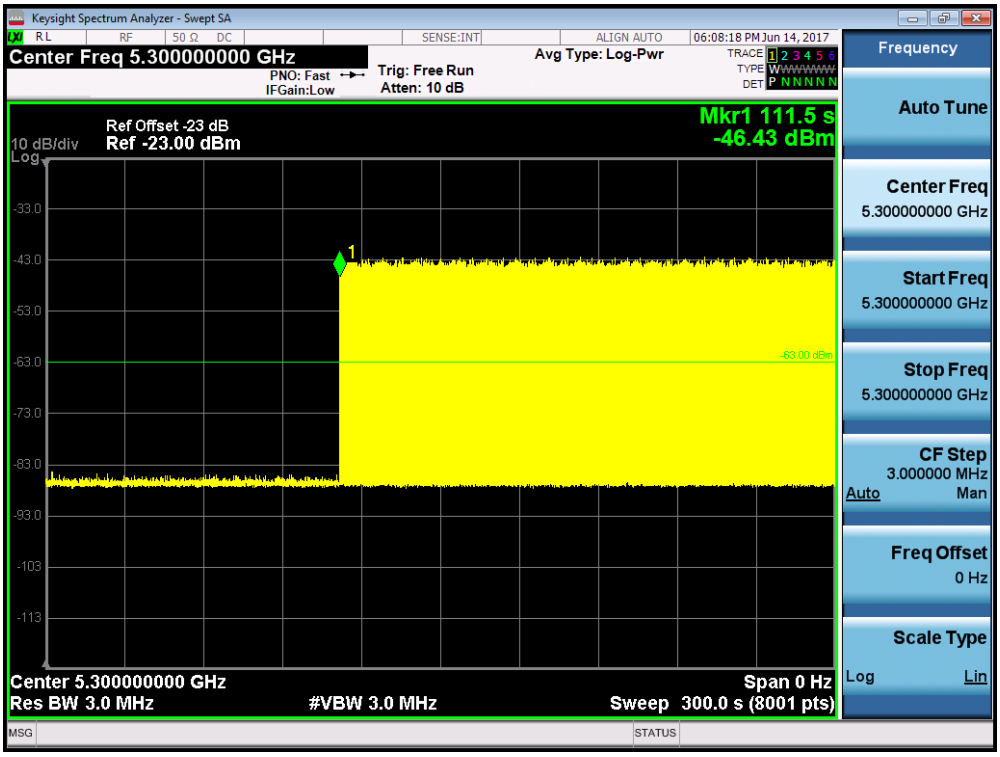
5.4.2. Test Procedure

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 (51.5 sec). Initial beacons/data transmissions are indicated by marker 1 (111.5 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

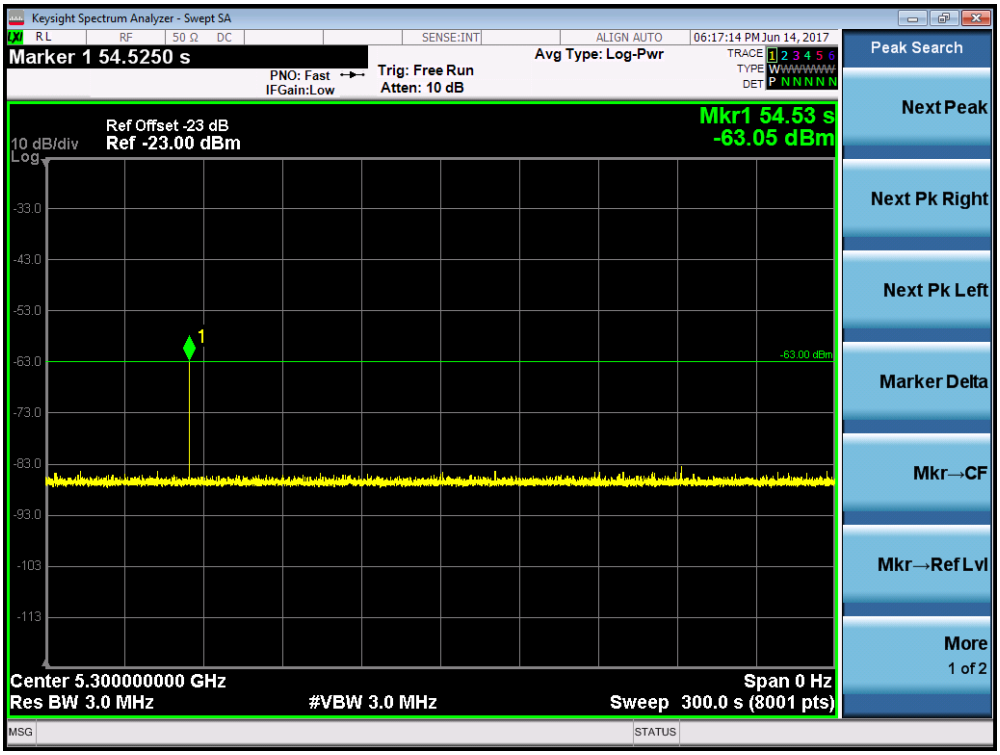
In beginning of the Channel Availability Check (CAC) Time, radar is detected on this channel, select another intended channel and perform a CAC on that channel.

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

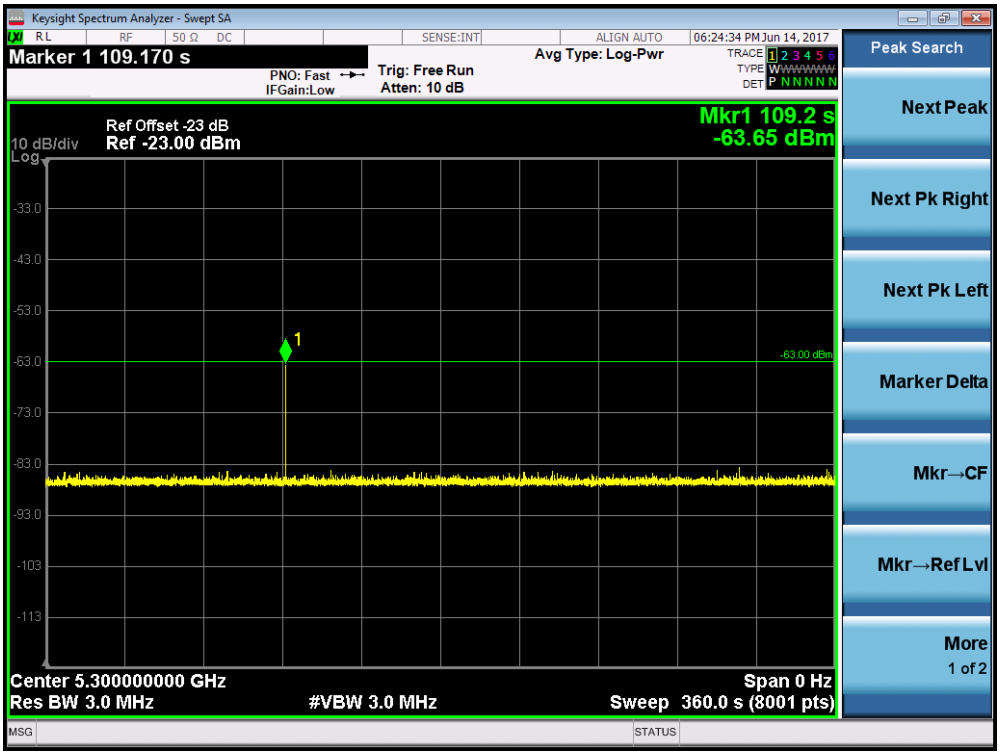
In the end of Channel Availability Check (CAC) Time, radar is detected on this channel, select another intended channel and perform a CAC on that channel.

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

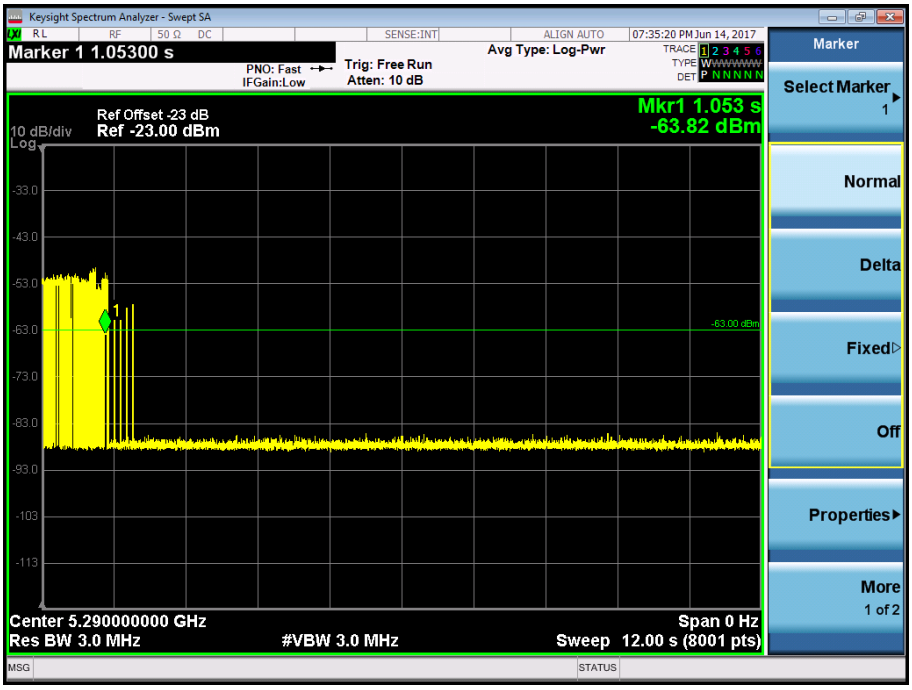
The EUT has In-Service Monitoring function to continuously monitor the radar signals. If the radar is detected, must leave the channel (Shutdown). The Channel Move Time to cease all transmissions on the current channel upon detection of a Radar Waveform above the DFS Detection Threshold within 10 sec. 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.

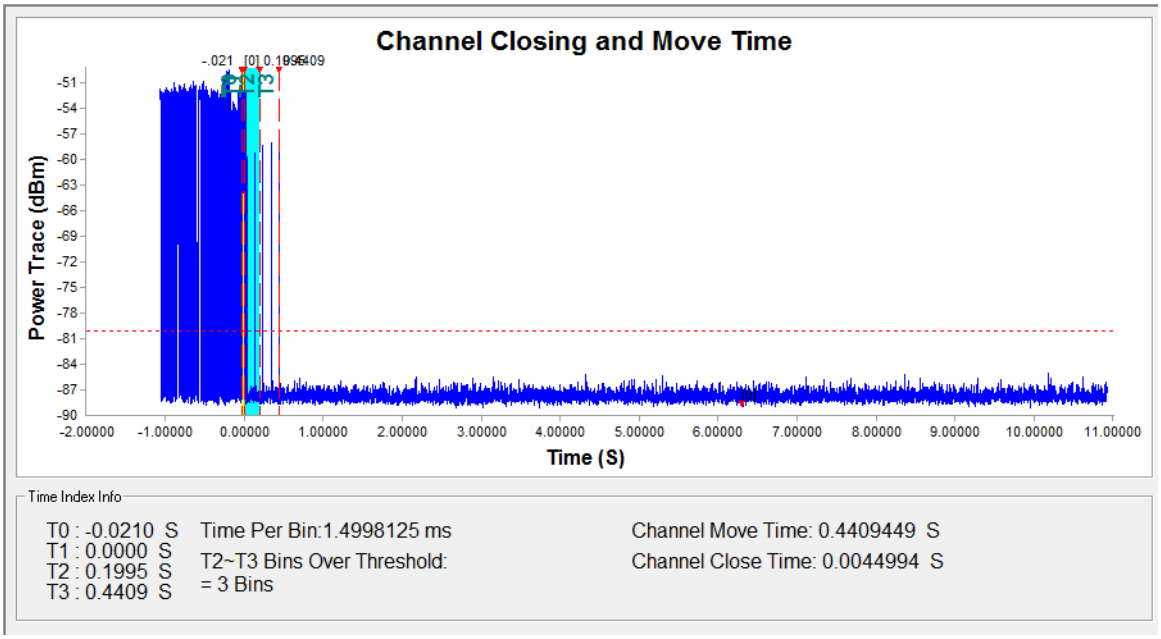
5.7.2. Test Procedure Used

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.

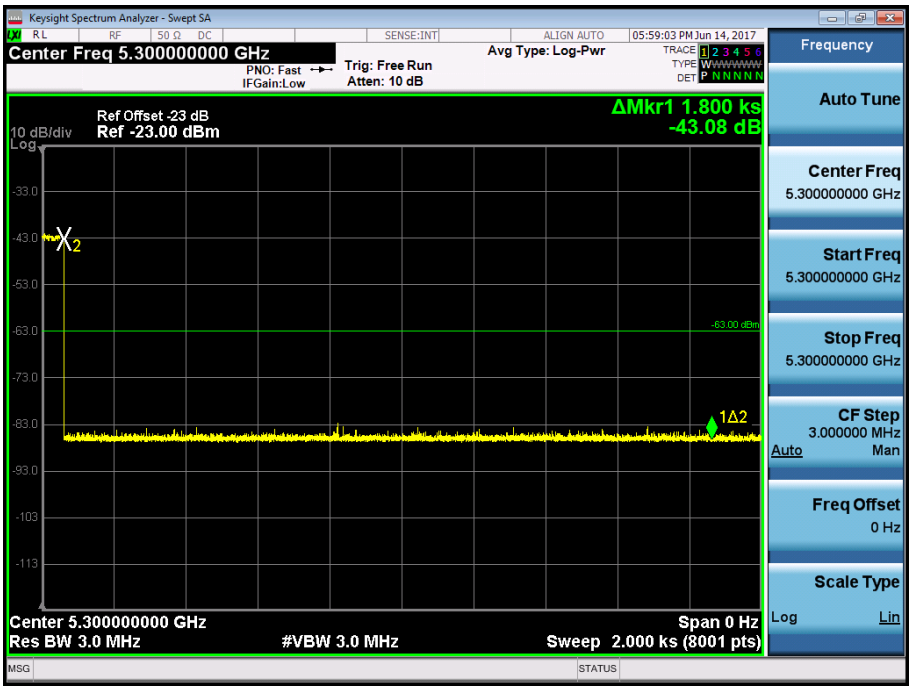
5.7.3. Test Result

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)	0.441s	<10s
Channel Closing Transmission Time (ms) (Note)	4.5ms	< 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	738	72	1
2	5292	1	698	76	1
3	5292	1	818	65	1
4	5293	1	858	62	1
5	5293	1	758	70	1
6	5293	1	918	58	1
7	5294	1	838	63	1
8	5295	1	558	95	1
9	5296	1	618	86	1
10	5297	1	518	102	1
11	5298	1	678	78	1
12	5299	1	778	68	1
13	5300	1	3066	18	1
14	5300	1	638	83	1
15	5300	1	718	74	1
16	5300	1	2175	25	1
17	5300	1	1351	40	1
18	5300	1	1927	28	1
19	5301	1	768	69	1
20	5302	1	2592	21	1
21	5303	1	1201	44	1
22	5304	1	1828	29	1
23	5305	1	1432	37	1
24	5306	1	1611	33	1
25	5307	1	2162	25	1
26	5307	1	2407	22	1
27	5307	1	2876	19	1
28	5308	1	1186	45	1
29	5308	1	2473	22	1
30	5308	1	1297	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	5292	3.1	191	25	1
2	5292	3.3	206	24	1
3	5292	3.7	195	27	1
4	5293	5.0	230	23	1
5	5293	2.4	199	23	1
6	5293	3.2	202	23	1
7	5294	3.0	198	24	1
8	5295	1.9	211	23	1
9	5296	4.4	173	26	1
10	5297	4.3	201	29	1
11	5298	3.8	212	28	1
12	5299	2.3	167	24	1
13	5300	3.0	162	29	1
14	5300	1.5	228	29	1
15	5300	4.3	185	24	1
16	5300	1.1	160	29	1
17	5300	5.0	167	29	1
18	5300	3.8	217	24	1
19	5301	4.7	202	28	1
20	5302	2.9	160	29	1
21	5303	1.2	214	27	1
22	5304	3.2	186	27	1
23	5305	4.1	228	23	1
24	5306	1.4	173	23	1
25	5307	5.0	162	24	1
26	5307	3.5	228	24	1
27	5307	4.5	193	25	1
28	5308	3.5	203	28	1
29	5308	3.8	214	24	1
30	5308	1.1	211	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	5292	7.8	329	16	1
2	5292	9.2	359	17	1
3	5292	7.7	304	17	1
4	5293	7.5	290	18	1
5	5293	7.4	387	17	1
6	5293	8.2	303	18	1
7	5294	7.4	396	17	1
8	5295	10.0	379	18	1
9	5296	9.7	259	16	1
10	5297	8.3	258	16	1
11	5298	7.6	417	17	1
12	5299	7.0	299	18	1
13	5300	9.2	470	18	1
14	5300	6.7	475	17	1
15	5300	8.4	271	18	1
16	5300	8.1	260	17	1
17	5300	8.8	316	16	1
18	5300	6.4	467	16	1
19	5301	9.9	359	16	1
20	5302	7.8	474	17	1
21	5303	7.2	469	18	1
22	5304	8.9	261	16	1
23	5305	7.4	405	17	1
24	5306	8.2	455	16	1
25	5307	6.5	327	17	1
26	5307	7.9	417	17	1
27	5307	9.0	295	16	1
28	5308	6.7	477	18	1
29	5308	10.0	431	16	1
30	5308	9.3	263	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	14.6	474	13	1
2	5292	18.2	288	12	1
3	5292	19.0	475	15	1
4	5293	14.8	270	13	1
5	5293	12.8	358	15	1
6	5293	16.4	458	14	1
7	5294	14.1	370	13	1
8	5295	11.1	417	15	1
9	5296	15.7	454	12	1
10	5297	12.3	447	14	1
11	5298	14.2	411	16	1
12	5299	16.5	358	14	1
13	5300	18.5	480	13	1
14	5300	11.2	335	12	1
15	5300	13.6	403	14	1
16	5300	11.1	252	12	1
17	5300	13.4	455	16	1
18	5300	11.9	268	12	1
19	5301	11.9	303	16	1
20	5302	18.3	302	13	1
21	5303	11.6	499	13	1
22	5304	16.7	411	15	1
23	5305	16.7	456	13	1
24	5306	19.4	262	12	1
25	5307	15.3	472	12	1
26	5307	16.1	463	15	1
27	5307	18.0	486	16	1
28	5308	13.1	286	13	1
29	5308	14.6	325	12	1
30	5308	13.9	341	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	5299.2	1	16	5300.0	1
2	5296.8	1	17	5300.0	1
3	5295.2	1	18	5300.0	1
4	5294.0	1	19	5300.0	1
5	5297.6	1	20	5300.0	1
6	5298.8	1	21	5304.8	1
7	5294.4	1	22	5302.4	1
8	5295.2	1	23	5306.0	1
9	5299.6	1	24	5303.2	1
10	5296.0	1	25	5305.6	1
11	5300.0	1	26	5303.2	1
12	5300.0	1	27	5304.4	1
13	5300.0	1	28	5301.2	1
14	5300.0	1	29	5300.8	1
15	5300.0	1	30	5300.4	1
Detection Percentage (%)					100%

Type 5 Radar Waveform_1

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	330070	2	18	100	1415	1744	0	330070	0	1090908
2	1773910	3	18	90	1218	1412	1445	2107139	1090909	2181817
3	364267	2	18	75	1934	1253	0	2475481	2181818	3272726
4	1190171	2	18	60	1781	1113	0	3668839	3272727	4363635
5	969851	2	18	65	1591	1729	0	4641584	4363636	5454544
6	1300034	1	18	90	1557	0	0	5944938	5454545	6545453
7	1511561	1	18	75	1131	0	0	7458056	6545454	7636362
8	396777	2	18	90	1108	1795	0	7855964	7636363	8727271
9	1689239	3	18	70	1350	1714	1388	9548106	8727272	9818180
10	527895	2	18	65	1816	1883	0	10080453	9818181	10909089
11	1295752	3	18	50	1745	1094	1985	11379904	10909090	11999998

Total number of pulses in waveform = 23

Type 5 Radar Waveform_2

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	553836	1	12	100	1356	0	0	553836	0	631578
2	88737	2	12	70	1675	1747	0	643929	631579	1263157
3	629209	2	12	80	1571	1381	0	1276560	1263158	1894736
4	773022	1	12	75	1883	0	0	2052534	1894737	2526315
5	732392	3	12	50	1350	1141	1250	2786809	2526316	3157894
6	380907	2	12	60	1817	1784	0	3171457	3157895	3789473
7	796011	2	12	70	1272	1367	0	3971069	3789474	4421052
8	503630	1	12	100	1791	0	0	4477338	4421053	5052631
9	952566	1	12	85	1016	0	0	5431695	5052632	5684210
10	488901	1	12	60	1392	0	0	5921612	5684211	6315789
11	491421	1	12	65	1006	0	0	6414425	6315790	6947368
12	722515	2	12	70	1043	1729	0	7137946	6947369	7578947
13	821307	2	12	60	1674	1211	0	7962025	7578948	8210526
14	341428	2	12	55	1297	1164	0	8306338	8210527	8842105
15	882749	1	12	55	1506	0	0	9191548	8842106	9473684
16	529042	3	12	90	1798	1873	1720	9722096	9473685	10105263
17	809616	2	12	65	1615	1871	0	10537103	10105264	10736842
18	390547	3	12	85	1193	1806	1741	10931136	10736843	11368421
19	442443	2	12	90	1955	1295	0	11378319	11368422	12000000

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

Type 5 Radar Waveform_3

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	1000032	1	9	95	1954	0	0	1000032	0	1499999
2	1919907	2	9	95	1800	1008	0	2921893	1500000	2999999
3	1095005	2	9	65	1119	1385	0	4019706	3000000	4499999
4	1019588	1	9	100	1288	0	0	5041798	4500000	5999999
5	2401355	1	9	50	1411	0	0	7444441	6000000	7499999
6	1009148	3	9	90	1724	1230	1174	8455000	7500000	8999999
7	1616178	1	9	70	1063	0	0	10075306	9000000	10499999
8	809007	1	9	75	1890	0	0	10885376	10500000	11999999

Total number of pulses in waveform = 12
****

Type 5 Radar Waveform_4

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	199403	3	5	55	2000	1985	1916	199403	0	1333332
2	1473547	1	5	75	1510	0	0	1678851	1333333	2666665
3	2108115	3	5	100	1932	1654	1253	3788476	2666666	3999998
4	455038	3	5	100	1556	1885	1319	4248353	3999999	5333331
5	2338623	3	5	65	1258	1464	1835	6591736	5333332	6666664
6	349887	2	5	95	1744	1600	0	6946180	6666665	7999997
7	1237922	3	5	95	1436	1429	1386	8187446	7999998	9333330
8	1747550	3	5	80	1112	1600	1588	9939247	9333331	10666663
9	1189873	3	5	65	1553	1604	1150	11133420	10666664	11999996

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

Type 5 Radar Waveform_5

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	1128120	3	14	85	1117	1560	1524	1128120	0	1199999
2	274875	1	14	90	1332	0	0	1407196	1200000	2399999
3	1366054	2	14	55	1766	1582	0	2774582	2400000	3599999
4	1280520	3	14	85	1601	1150	1252	4058450	3600000	4799999
5	1874058	2	14	50	1597	1718	0	5936511	4800000	5999999
6	871841	3	14	100	1162	1445	1877	6811667	6000000	7199999
7	1510395	1	14	50	1819	0	0	8326546	7200000	8399999
8	179650	3	14	55	1419	1530	1805	8508015	8400000	9599999
9	2079742	1	14	75	1480	0	0	10592511	9600000	10799999
10	659411	1	14	95	1944	0	0	11253402	10800000	11999999

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

Type 5 Radar Waveform_6

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	263006	2	17	100	1199	1126	0	263006	0	1333332
2	1797847	2	17	80	1145	1379	0	2063178	1333333	2666665
3	1220238	3	17	85	1077	1885	1503	3285940	2666666	3999998
4	1457802	1	17	95	1203	0	0	4748207	3999999	5333331
5	768415	1	17	70	1457	0	0	5517825	5333332	6666664
6	1646540	1	17	50	1831	0	0	7165822	6666665	7999997
7	1802233	3	17	90	1215	1261	1372	8969886	7999998	9333330
8	551810	1	17	70	1967	0	0	9525544	9333331	10666663
9	1341398	2	17	60	1234	1061	0	10868909	10666664	11999996

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

Type 5 Radar Waveform_7

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	483324	2	6	100	1083	1049	0	483324	0	749999
2	382199	2	6	100	1481	1347	0	867655	750000	1499999
3	693516	1	6	85	1749	0	0	1563999	1500000	2249999
4	805228	1	6	55	1755	0	0	2370976	2250000	2999999
5	1222249	1	6	50	1311	0	0	3594980	3000000	3749999
6	776961	1	6	80	1948	0	0	4373252	3750000	4499999
7	436652	3	6	70	1833	1694	1036	4811852	4500000	5249999
8	921185	2	6	75	1020	1069	0	5737600	5250000	5999999
9	904970	2	6	75	1547	1974	0	6644659	6000000	6749999
10	374417	1	6	55	1722	0	0	7022597	6750000	7499999
11	720424	1	6	95	1868	0	0	7744743	7500000	8249999
12	1173148	2	6	75	1335	1286	0	8919759	8250000	8999999
13	255976	1	6	90	1549	0	0	9178356	9000000	9749999
14	1059993	2	6	70	1150	1864	0	10239898	9750000	10499999
15	854184	3	6	55	1593	1757	1191	11097096	10500000	11249999
16	563719	1	6	90	1206	0	0	11665356	11250000	11999999

Total number of pulses in waveform = 26
****

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	1226001	3	8	85	1983	1949	1223	1226001	0	1499999
2	730182	3	8	50	1530	1475	1945	1961338	1500000	2999999
3	1740115	3	8	95	1175	1507	1004	3706403	3000000	4499999
4	1880637	3	8	100	1098	1887	1738	5590726	4500000	5999999
5	1707113	2	8	50	1956	1840	0	7302562	6000000	7499999
6	1251801	2	8	55	1327	1204	0	8558159	7500000	8999999
7	1556863	1	8	80	1978	0	0	10117553	9000000	10499999
8	1720576	3	8	50	1143	1858	1002	11840107	10500000	11999999

Total number of pulses in waveform = 20

****

Type 5 Radar Waveform_9

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	583072	1	19	90	1752	0	0	583072	0	857142
2	1104682	1	19	100	1120	0	0	1689506	857143	1714285
3	575239	3	19	60	1089	1469	1137	2265865	1714286	2571428
4	704171	3	19	90	1279	1353	1935	2973731	2571429	3428571
5	605619	3	19	80	1750	1274	1236	3583917	3428572	4285714
6	1110966	2	19	55	1288	1311	0	4699143	4285715	5142857
7	1038943	2	19	80	1134	1652	0	5740685	5142858	6000000
8	545522	2	19	80	1697	1847	0	6288993	6000001	6857143
9	633191	1	19	75	1767	0	0	6925728	6857144	7714286
10	1365096	1	19	100	1748	0	0	8292591	7714287	8571429
11	615458	3	19	100	1893	1425	1110	8909797	8571430	9428572
12	1339847	3	19	95	1139	1065	1606	10254072	9428573	10285715
13	263671	1	19	55	1168	0	0	10521553	10285716	11142858
14	1225807	3	19	65	1138	1828	1798	11748528	11142859	12000001

Total number of pulses in waveform = 29

****

Type 5 Radar Waveform_10

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	2707	3	10	50	1274	1720	1900	2707	0	1499999
2	1901985	1	10	90	1285	0	0	1909586	1500000	2999999
3	1923066	1	10	65	1032	0	0	3833937	3000000	4499999
4	2120222	3	10	60	1621	1015	1200	5955191	4500000	5999999
5	184303	2	10	95	1380	1113	0	6143330	6000000	7499999
6	1870105	3	10	50	1974	1053	1989	8015928	7500000	8999999
7	2062713	3	10	55	1031	1269	1237	10083657	9000000	10499999
8	983154	3	10	65	1904	1431	1729	11070348	10500000	11999999

Total number of pulses in waveform = 19

****

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)
	491292									
1		1	10	50	1732	0	0	491292	0	1333332
	2161413									
2		1	10	85	1858	0	0	2654437	1333333	2666665
	512978									
3		3	10	65	1989	1210	1915	3169273	2666666	3999998
	1308516									
4		1	10	80	1345	0	0	4482903	3999999	5333331
	1819047									
5		3	10	60	1617	1474	1417	6303295	5333332	6666664
	571009									
6		1	10	100	1995	0	0	6878812	6666665	7999997
	2189748									
7		3	10	100	1681	1266	1842	9070555	7999998	9333330
	1095850									
8		3	10	60	1518	1680	1886	10171194	9333331	10666663
	1188874									
9		3	10	85	1724	1184	1324	11365152	10666664	11999996

Total number of pulses in waveform = 19

****

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)
	1253917									
1		2	9	80	1669	1691	0	1253917	0	1499999
	1736092									
2		3	9	90	1794	1467	1436	2993369	1500000	2999999
	143129									
3		2	9	95	1640	1974	0	3141195	3000000	4499999
	2294029									
4		2	9	55	1651	1681	0	5438838	4500000	5999999
	561861									
5		2	9	50	1679	1388	0	6004031	6000000	7499999
	1539201									
6		1	9	85	1639	0	0	7546299	7500000	8999999
	1769304									
7		2	9	95	1008	1828	0	9317242	9000000	10499999
	1455565									
8		2	9	85	1430	1429	0	10775643	10500000	11999999

Total number of pulses in waveform = 16

****

Type 5 Radar Waveform_13

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)
	320650									
1		2	5	70	1590	1882	0	320650	0	1499999
	2426088									
2		1	5	60	1502	0	0	2750210	1500000	2999999
	1442998									
3		1	5	80	1148	0	0	4194710	3000000	4499999
	1390837									
4		1	5	55	1189	0	0	5586695	4500000	5999999
	1230955									
5		3	5	50	1400	1029	1980	6818839	6000000	7499999
	1344326									
6		3	5	85	1496	1289	1368	8167574	7500000	8999999
	1224126									
7		1	5	55	1271	0	0	9395853	9000000	10499999
	2582033									
8		2	5	95	1706	1663	0	11979157	10500000	11999999

Total number of pulses in waveform = 14

****

Type 5 Radar Waveform_14

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	284636	2	14	60	1339	1052	0	284636	0	1090908
2	1279655	1	14	50	1615	0	0	1566682	1090909	2181817
3	1465965	3	14	100	1371	1093	1293	3034262	2181818	3272726
4	954831	2	14	80	1786	1170	0	3992850	3272727	4363635
5	1413080	1	14	100	1446	0	0	5408886	4363636	5454544
6	79307	2	14	70	1741	1019	0	5489639	5454545	6545453
7	1100300	1	14	75	1431	0	0	6592699	6545454	7636362
8	1397501	2	14	60	1817	1743	0	7991631	7636363	8727271
9	1421498	3	14	65	1722	1750	1509	9416689	8727272	9818180
10	773575	1	14	100	1263	0	0	10195245	9818181	10909089
11	1545622	3	14	60	1969	1622	1805	11742130	10909090	11999998

Total number of pulses in waveform = 21
****

Type 5 Radar Waveform_15

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	1064461	3	19	75	1950	1542	1329	1064461	0	1499999
2	487540	1	19	60	1343	0	0	1556822	1500000	2999999
3	2800978	1	19	85	1785	0	0	4359143	3000000	4499999
4	1014673	2	19	65	1223	1162	0	5375601	4500000	5999999
5	1967404	1	19	80	1586	0	0	7345390	6000000	7499999
6	281927	3	19	100	1601	1837	1451	7628903	7500000	8999999
7	1629236	2	19	90	1601	1434	0	9263028	9000000	10499999
8	2015635	2	19	65	1692	1220	0	11281698	10500000	11999999

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

Type 5 Radar Waveform_16

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	182717	2	6	55	1959	1251	0	182717	0	749999
2	630675	1	6	100	1936	0	0	816602	750000	1499999
3	909046	3	6	60	1328	1003	1966	1727584	1500000	2249999
4	756092	1	6	70	1755	0	0	2487973	2250000	2999999
5	706967	3	6	95	1049	1589	1720	3196695	3000000	3749999
6	986233	1	6	55	1646	0	0	4187286	3750000	4499999
7	787062	3	6	100	1054	1619	1237	4975994	4500000	5249999
8	883110	1	6	65	1279	0	0	5863014	5250000	5999999
9	682435	2	6	70	1495	1835	0	6546728	6000000	6749999
10	663636	2	6	50	1984	1432	0	7213694	6750000	7499999
11	600526	1	6	50	1702	0	0	7817636	7500000	8249999
12	919754	1	6	90	1915	0	0	8739092	8250000	8999999
13	793179	1	6	55	1838	0	0	9534186	9000000	9749999
14	849698	1	6	60	1569	0	0	10385722	9750000	10499999
15	374362	3	6	80	1705	1410	1390	10761653	10500000	11249999
16	1112070	1	6	95	1191	0	0	11878228	11250000	11999999

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

Type 5 Radar Waveform_17

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	234564	3	18	100	1196	1566	1467	234564	0	1333332
2	1377305	2	18	85	1263	1560	0	1616098	1333333	2666665
3	2342745	3	18	65	1250	1735	1152	3961666	2666666	3999998
4	1098601	1	18	95	1649	0	0	5064404	3999999	5333331
5	1166691	1	18	95	1739	0	0	6232744	5333332	6666664
6	746166	3	18	75	1444	1476	1654	6980649	6666665	7999997
7	2154105	1	18	50	1737	0	0	9139328	7999998	9333330
8	559993	2	18	50	1095	1854	0	9701058	9333331	10666663
9	1281055	3	18	75	1535	1707	1578	10985062	10666664	11999996

Total number of pulses in waveform = 19

****

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	1379548	3	8	55	1271	1873	1017	1379548	0	1499999
2	626546	2	8	85	1752	1192	0	2010255	1500000	2999999
3	2200256	2	8	65	1699	1755	0	4213455	3000000	4499999
4	1421660	2	8	50	1737	1602	0	5638569	4500000	5999999
5	1772622	3	8	95	1542	1227	1137	7414530	6000000	7499999
6	1509175	2	8	50	1415	1835	0	8927611	7500000	8999999
7	697543	2	8	50	1915	1152	0	9628404	9000000	10499999
8	2124813	2	8	85	1583	1893	0	11756284	10500000	11999999

Total number of pulses in waveform = 18

****

Type 5 Radar Waveform_19

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	388437	2	17	55	1056	1444	0	388437	0	666666
2	519861	1	17	85	1622	0	0	910798	666667	1333333
3	473457	1	17	80	1196	0	0	1385877	1333334	2000000
4	1072392	2	17	65	1935	1776	0	2459465	2000001	2666667
5	679066	2	17	70	1609	1488	0	3142242	2666668	3333334
6	728679	3	17	100	1758	1055	1355	3874018	3333335	4000001
7	491318	2	17	100	1504	1204	0	4369504	4000002	4666668
8	447884	3	17	90	2000	1259	1636	4820096	4666669	5333335
9	637655	3	17	50	1826	1720	1003	5462646	5333336	6000002
10	778539	3	17	100	1843	1593	1424	6245734	6000003	6666669
11	800784	1	17	80	1573	0	0	7051378	6666670	7333336
12	617621	1	17	85	1039	0	0	7670572	7333337	8000003
13	651512	3	17	60	1497	1148	1896	8323123	8000004	8666670
14	658562	2	17	80	1268	1528	0	8986226	8666671	9333337
15	904173	1	17	85	1794	0	0	9893195	9333338	10000004
16	526645	3	17	70	1069	1939	1122	10421634	10000005	10666671
17	289840	2	17	55	1522	1653	0	10715604	10666672	11333338
18	1120364	2	17	60	1994	1144	0	11839143	11333339	12000005

Total number of pulses in waveform = 37

****

Type 5 Radar Waveform_20

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	295362	2	12	85	1173	1402	0	295362	0	631578
2	586288	1	12	95	1304	0	0	884225	631579	1263157
3	602110	1	12	65	1995	0	0	1487639	1263158	1894736
4	544300	1	12	50	1805	0	0	2033934	1894737	2526315
5	651104	3	12	100	1816	1414	1056	2686843	2526316	3157894
6	851751	3	12	65	1917	1812	1077	3542880	3157895	3789473
7	442551	2	12	70	1878	1756	0	3990237	3789474	4421052
8	646739	3	12	75	1517	1653	1557	4640610	4421053	5052631
9	759432	1	12	50	1145	0	0	5404769	5052632	5684210
10	590048	3	12	80	1226	1379	1568	5995962	5684211	6315789
11	395483	3	12	50	1663	1153	1313	6395618	6315790	6947368
12	1142072	1	12	85	1938	0	0	7541819	6947369	7578947
13	228803	2	12	60	1292	1333	0	7772560	7578948	8210526
14	508397	1	12	50	1760	0	0	8283582	8210527	8842105
15	1070409	1	12	70	1657	0	0	9355751	8842106	9473684
16	236469	3	12	70	1043	1198	1359	9593877	9473685	10105263
17	571504	1	12	50	1369	0	0	10168981	10105264	10736842
18	939850	2	12	50	1293	1743	0	11110200	10736843	11368421
19	668662	2	12	60	1106	1826	0	11781898	11368422	12000000

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

Type 5 Radar Waveform_21

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	844848	1	8	75	1706	0	0	844848	0	923076
2	722266	1	8	100	1872	0	0	1568820	923077	1846153
3	475169	3	8	50	1095	1960	1139	2045861	1846154	2769230
4	1623684	1	8	75	1163	0	0	3673739	2769231	3692307
5	730933	1	8	70	1516	0	0	4405835	3692308	4615384
6	352315	1	8	75	1155	0	0	4759666	4615385	5538461
7	1517678	2	8	60	1054	1973	0	6278499	5538462	6461538
8	739259	3	8	95	1514	1795	1114	7020785	6461539	7384615
9	1190500	3	8	95	1489	1163	1939	8215708	7384616	8307692
10	767713	1	8	75	1207	0	0	8988012	8307693	9230769
11	559466	1	8	95	1634	0	0	9548685	9230770	10153846
12	745247	1	8	90	1377	0	0	10295566	10153847	11076923
13	1591737	3	8	70	1396	1306	1791	11888680	11076924	12000000

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

Type 5 Radar Waveform_22

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	276669	3	14	90	1968	1298	1376	276669	0	749999
2	689844	2	14	50	1935	1248	0	971155	750000	1499999
3	1037246	2	14	80	1696	1520	0	2011584	1500000	2249999
4	793442	3	14	85	1512	1023	1195	2808242	2250000	2999999
5	441521	1	14	85	1657	0	0	3253493	3000000	3749999
6	1087478	2	14	75	1131	1786	0	4342628	3750000	4499999
7	844563	1	14	65	1242	0	0	5190108	4500000	5249999
8	269012	3	14	85	1287	1273	1283	5460362	5250000	5999999
9	1206783	2	14	50	1550	1078	0	6670988	6000000	6749999
10	750002	3	14	85	1304	1602	1843	7423618	6750000	7499999
11	402232	3	14	50	1499	1271	1635	7830599	7500000	8249999
12	906331	2	14	90	1818	1258	0	8741335	8250000	8999999
13	445305	3	14	70	1264	1296	1285	9189716	9000000	9749999
14	588370	3	14	55	1361	1949	1059	9781931	9750000	10499999
15	866108	2	14	60	1450	1927	0	10652408	10500000	11249999
16	1269950	3	14	65	1181	1421	1530	11925735	11250000	11999999

Total number of pulses in waveform = 38
****