DFS PORTION of FCC 47 CFR PART 15 SUBPART E

CERTIFICATION TEST REPORT

FOR

802.11a 2x3 MIMO ACCESS POINT

MODEL NUMBER: G5RL10

FCC ID: RHK-G5RL10

REPORT NUMBER: 11594709-E1V1

ISSUE DATE: JANUARY 09, 2017

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	01/09/2017	Initial Issue	Edgard Rincand

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: DIGITALPATH, INC.
1065 MARAUDER STREET
CHICO, CA., 95973, U.S.A.

EUT DESCRIPTION: 802.11a 2x3 MIMO ACCESS POINT

MODEL: G5RL10

SERIAL NUMBER: 00:0D:B9:2C:02:18

DATE TESTED: JANUARY 03 to 04, 2017

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
DFS Portion of CFR 47 Part 15 Subpart E	Pass
INDUSTRY CANADA RSS-247 Issue 1	Pass

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with the DFS portion of FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 06-96, FCC KDB 789033, KDB 905462 D02 and D03.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

UL Verification Services, Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://ts.nist.gov/standards/scopes/2000650.htm.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	± 3.52 dB
Radiated Disturbance, 30 to 1000 MHz	± 4.94 dB
Radiated Disturbance, 1 to 6 GHz	± 3.86 dB
Radiated Disturbance, 6 to 18 GHz	± 4.23 dB
Radiated Disturbance, 18 to 26 GHz	± 5.30 dB
Radiated Disturbance, 26 to 40 GHz	± 5.23 dB

Uncertainty figures are valid to a confidence level of 95%.

5. DYNAMIC FREQUENCY SELECTION

5.1. OVERVIEW

5.1.1. LIMITS

FCC

§15.407 (h), FCC KDB 905462 D02 “COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVICES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION” and KDB 905462 D03 “U-NII CLIENT DEVICES WITHOUT RADAR DETECTION CAPABILITY”.

Table 1: Applicability of DFS requirements prior to use of a channel

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 2: Applicability of DFS requirements during normal operation

Requirement	Operational Mode		
	Master	Client **(without DFS)**	Client **(with DFS)**
DFS Detection Threshold	Yes	Not required	Yes
Channel Closing Transmission Time	Yes	Yes	Yes
Channel Move Time	Yes	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required	Yes

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar DFS	Client (without DFS)
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 (Section 7.8.4) 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 all 20 MHz channel blocks and a null frequency between the bonded 20 MHz channel blocks.		

Table 3: Interference Threshold values, Master or Client incorporating In-Service Monitoring

Maximum Transmit Power	Value (see notes)
E.I.R.P. ≥ 200 mill watt	-64 dBm
E.I.R.P. < 200 mill watt and power spectral density < 10 dBm/MHz	-62 dBm
E.I.R.P. < 200 mill watt that do not meet 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.
Note 3: E.I.R.P. is based on the highest antenna gain. For MIMO devices refer to KDB publication 662911 D01.

Table 4: DFS Response requirement values

Parameter	Value
Non-occupancy period	30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds (See Note 1)
Channel Closing Transmission Time	200 milliseconds + approx. 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 5 – Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (usec)	PRI (usec)	Pulses	Minimum Percentage of Successful Detection	Minimum 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 5a	Roundup: {(1/360) x (19 x 10^6 PRI_{usec})}	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 usec. With a minimum increment of 1 usec, 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 6 – Long Pulse Radar Test Signal

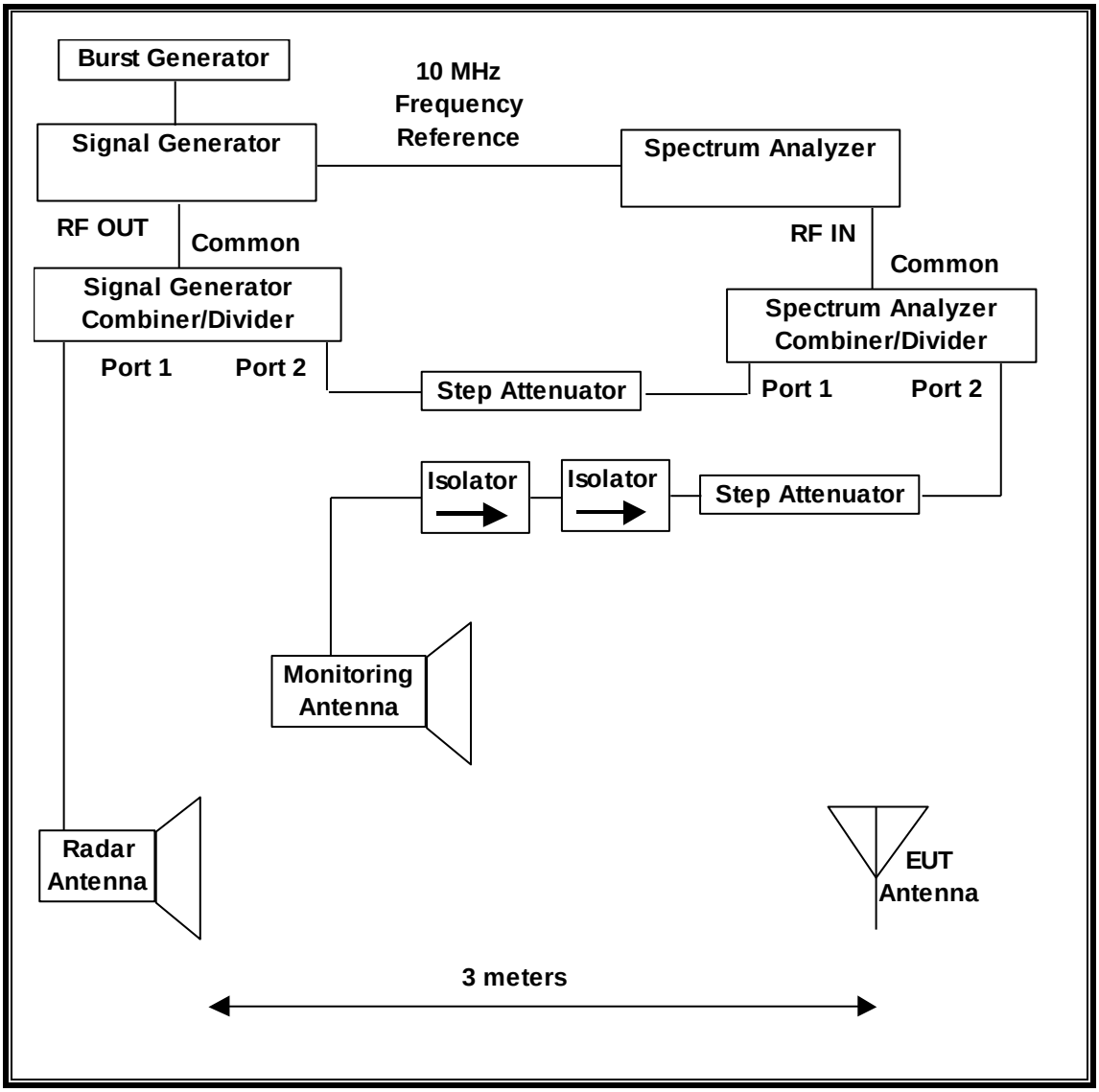
Radar Waveform Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

Table 7 – Frequency Hopping Radar Test Signal

Radar Waveform Type	Pulse Width (µsec)	PRI (µsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	9	0.333	300	70%	30

5.1.2. TEST AND MEASUREMENT SYSTEM

RADIATED METHOD SYSTEM BLOCK DIAGRAM



SYSTEM OVERVIEW

The short pulse and long pulse signal generating system utilizes the NTIA software. The Vector Signal Generator has been validated by the NTIA. The hopping signal generating system utilizes the CCS simulated hopping method and system, which has been validated by the DoD, FCC and NTIA. The software selects waveform parameters from within the bounds of the signal type on a random basis using uniform distribution.

The short pulse types 1, 2, 3 and 4, and the long pulse type 5 parameters are randomized at run-time.

The hopping type 6 pulse parameters are fixed while the hopping sequence is based on the August 2005 NTIA Hopping Frequency List. The initial starting point randomized at run-time and each subsequent starting point is incremented by 475. Each frequency in the 100-length segment is compared to the boundaries of the EUT Detection Bandwidth and the software creates a hopping burst pattern in accordance with Section 7.4.1.3 Method #2 Simulated Frequency Hopping Radar Waveform Generating Subsystem of KDB 905462 D02. The frequency of the signal generator is incremented in 1 MHz steps from F_L to F_H for each successive trial. This incremental sequence is repeated as required to generate a minimum of 30 total trials and to maintain a uniform frequency distribution over the entire Detection Bandwidth.

The signal monitoring equipment consists of a spectrum analyzer. The aggregate ON time is calculated by multiplying the number of bins above a threshold during a particular observation period by the dwell time per bin, with the analyzer set to peak detection and max hold.

SYSTEM CALIBRATION

A 50-ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected to a horn antenna via a coaxial cable, with the reference level offset set to (horn antenna gain – coaxial cable loss). The signal generator is set to CW mode. The amplitude of the signal generator is adjusted to yield a level of –64 dBm as measured on the spectrum analyzer.

Without changing any of the instrument settings, the spectrum analyzer is reconnected to the Common port of the Spectrum Analyzer Combiner/Divider. The Reference Level Offset of the spectrum analyzer is adjusted so that the displayed amplitude of the signal is –64 dBm.

The spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device. The interference detection threshold may be varied from the calibrated value of –64 dBm and the spectrum analyzer will still indicate the level as received by the Master Device.

ADJUSTMENT OF DISPLAYED TRAFFIC LEVEL

A link is established between the Master and Slave and the distance between the units is adjusted as needed to provide a suitable received level at the Master and Slave devices. The video test file is streamed to generate WLAN traffic. The monitoring antenna is adjusted so that the WLAN traffic level, as displayed on the spectrum analyzer, is at lower amplitude than the radar detection threshold.

TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the DFS tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**Cal Due**
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	US51350187	06/13/17
Signal Generator, MXG X-Series RF Vector	Agilent	N5182B	MY51350337	03/11/17
Arbitrary Waveform Generator	Agilent / HP	33220A	MY44037572	04/11/17

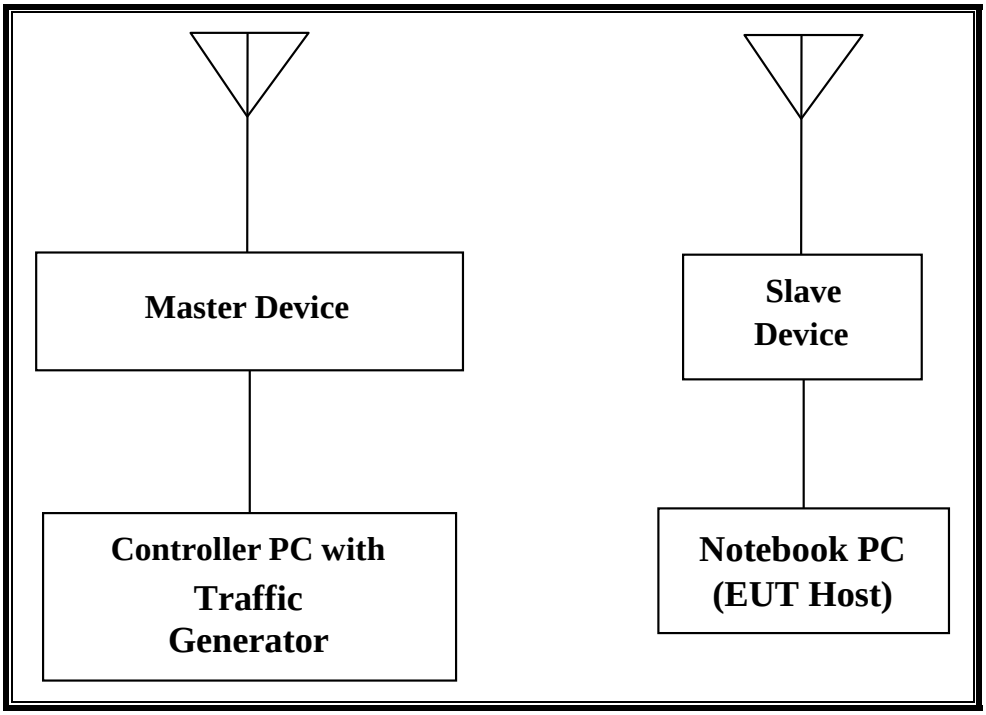
5.1.3. TEST AND MEASUREMENT SOFTWARE

The following test and measurement software was utilized for the tests documented in this report:

TEST SOFTWARE LIST		
Name	**Version**	**Test / Function**
Aggregate Time-PXA	3.0	Channel Loading and Aggregate Closing Time
FCC 2006 Detection Bandwidth-PXA	3.0	Detection Bandwidth in 1 MHz Steps
FCC 2014 Detection Bandwidth-PXA	3.0	Detection Bandwidth in 5 MHz Steps
In Service Monitoring-PXA	3.0	In-Service Monitoring (Probability of Detection)
PXA Read	3.0.0.9	Signal Generator Screen Capture
SGXProject.exe	1.7	Radar Waveform Generation and Download

5.1.4. SETUP OF EUT

RADIATED METHOD EUT TEST SETUP



SUPPORT EQUIPMENT

The following support equipment was utilized for the DFS tests documented in this report:

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
P.O.E. Injector (EUT)	Condor	STD-2427P	0915	DoC
Notebook PC (Controller)	HP	Probook 450 G3	5CD6386620	DoC
AC Adapter (Controller PC)	Lite On Technologies	HSTNN-LA40	WDUUV0B3U370M9	DoC
Notebook PC (Host)	Lenovo	Type 7448-CTO	R9-151B7 09/11	DoC
AC Adapter (Host PC)	Lenovo	42T4422	11S42T4422Z1ZF3D99W7EN	DoC
Customer Premise Equipment ("CPE" / Slave Radio)	Ubiquity Networks	NanoBridge M5	1132T0027223CA86C	SWX-M5N
P.O.E. Injector (CPE)	Ubiquity Networks	UBI-POE-25-5	1108-0315300	DoC

5.1.5. DESCRIPTION OF EUT

For FCC the EUT operates over the 5250-5350 MHz and 5470-5725 MHz ranges.

The EUT is a Master Device.

The highest power level within these bands is 29.94 dBm EIRP in the 5250-5350 MHz band and 29.93 dBm EIRP in the 5470-5725 MHz band.

The highest gain antenna assembly utilized with the EUT has a gain of 20 dBi in the 5250-5350 MHz band and 20 dBi in the 5470-5725 MHz band. The lowest gain antenna assembly utilized with the EUT has a gain of 10 dBi in the 5250-5350 MHz band and 10 dBi in the 5470-5725 MHz band.

Multiple antenna types can be utilized with the EUT to meet the diversity and MIMO operational requirements. During testing the EUT was equipped with one dual polarity antenna, which is, the lowest gain antenna assembly used with the EUT.

The rated output power of the Master unit is > 23dBm (EIRP). Therefore the required interference threshold level is –64 dBm. After correction for procedural adjustments, the required radiated threshold at the antenna port is –64 + 1 = -63 dBm.

The calibrated radiated DFS Detection Threshold level is set to –64 dBm. The tested level is lower than the required level hence it provides a margin to the limit.

The EUT uses two transmitter/receiver chains, each connected to an antenna to perform radiated tests.

The Slave device associated with the EUT during these tests does not have radar detection capability.

WLAN traffic that meets or exceeds the minimum required loading was generated by transferring a data stream from the Master Device to the Slave Device using iPerf version 2.0.5 software package.

TPC is required since the maximum EIRP is greater than 500 mW (27 dBm).

The EUT utilizes the 802.11a/n architecture. One nominal channel bandwidths is implemented: 20 MHz.

The software installed in the access point is 5014.

UNIFORM CHANNEL SPREADING

This function is not required per KDB 905462.

5.2. RESULTS FOR 20 MHz BANDWIDTH

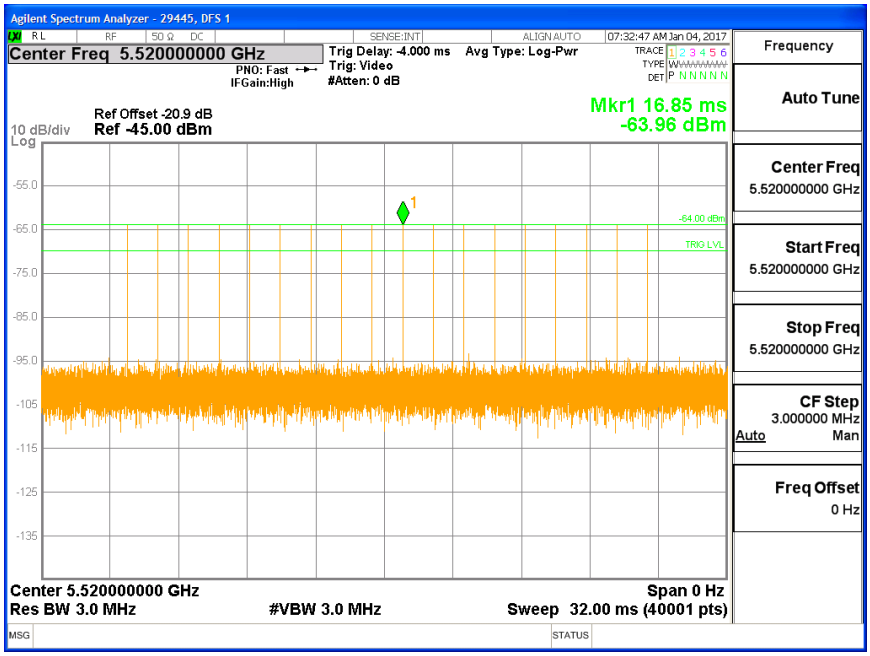
5.2.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5520 MHz.

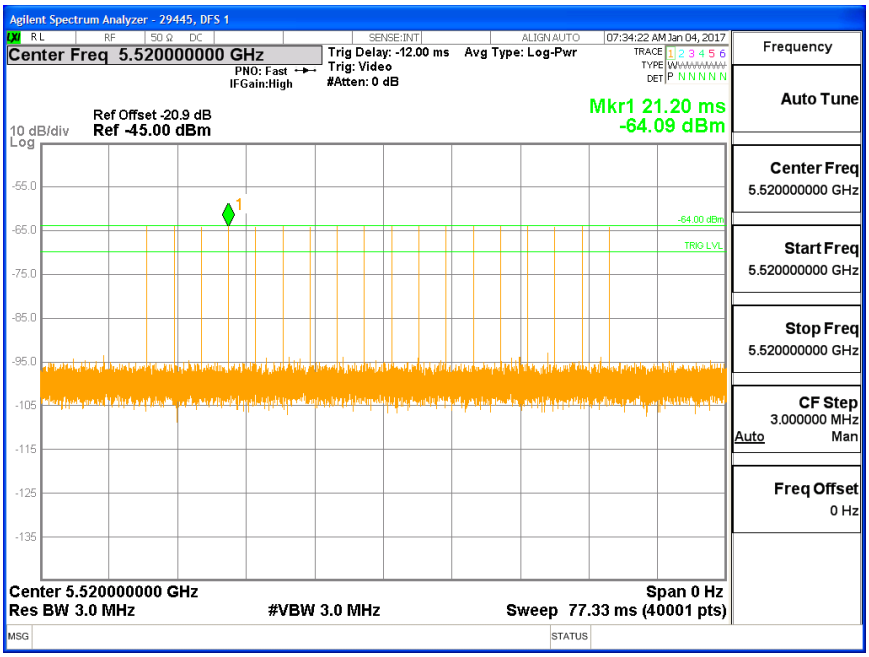
5.2.2. RADAR WAVEFORMS AND TRAFFIC

RADAR WAVEFORMS

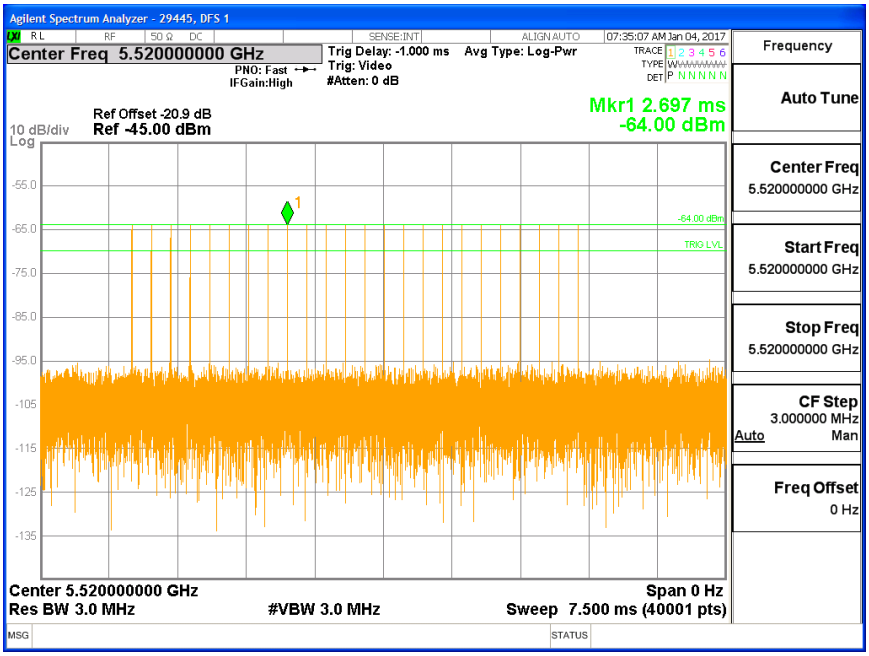
SHORT PULSE RADAR TYPE 0



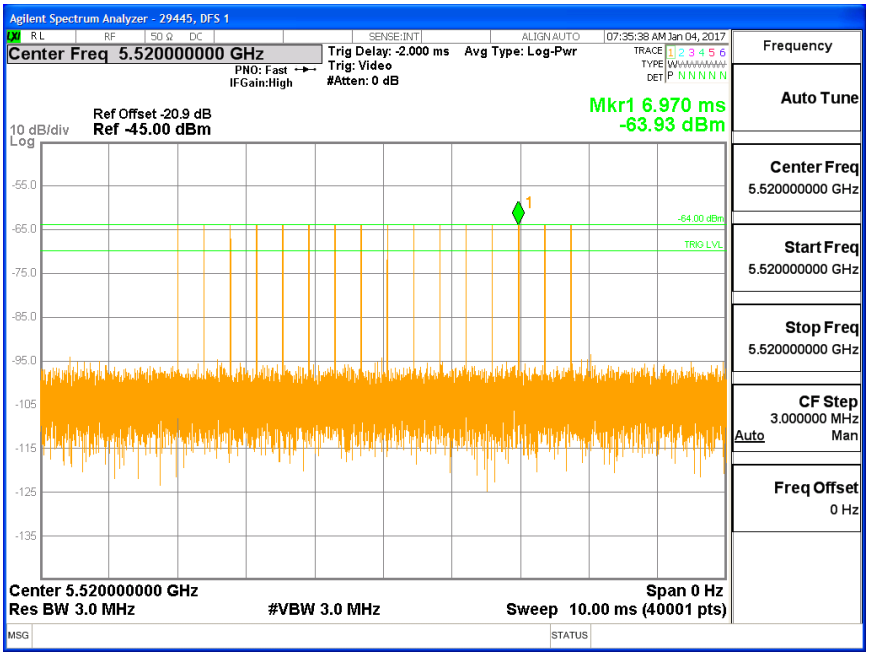
SAMPLE OF RADAR TYPE 1



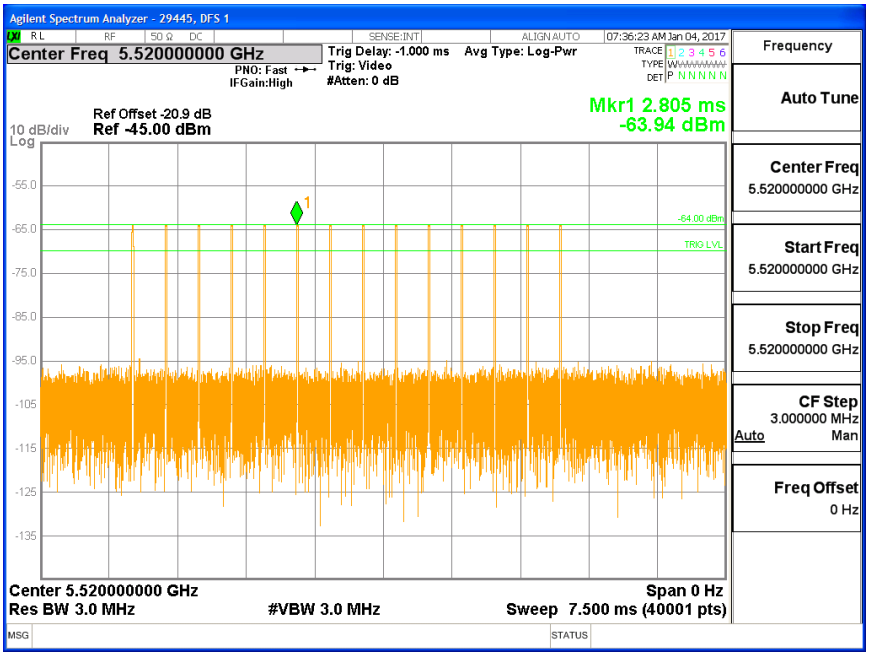
SAMPLE OF RADAR TYPE 2



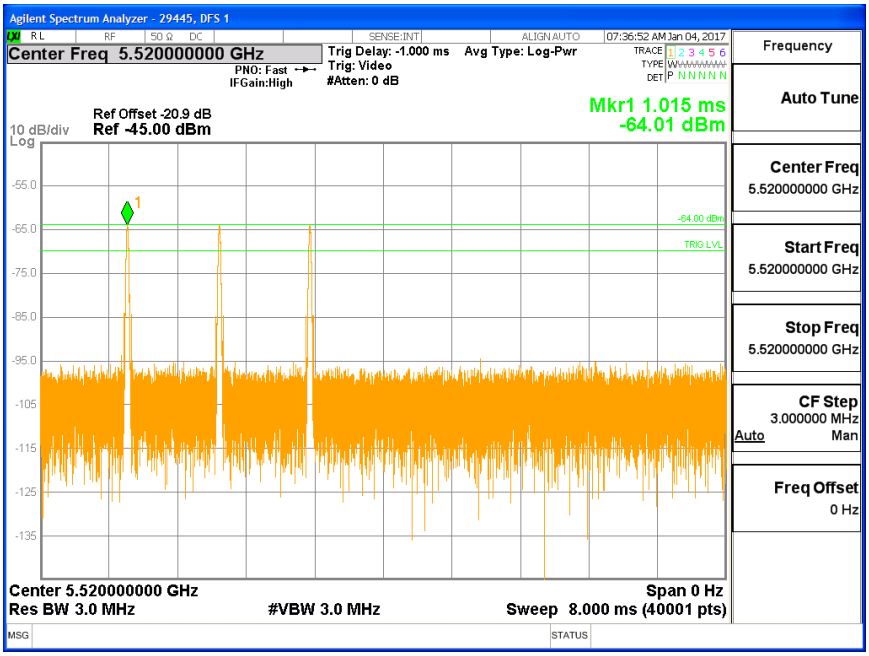
SAMPLE OF RADAR TYPE 3



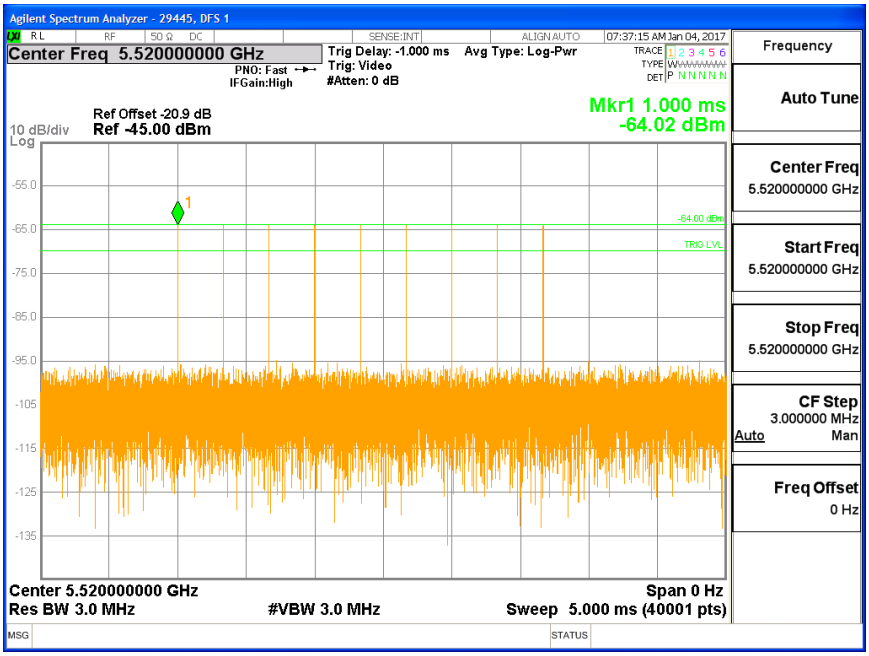
SAMPLE OF RADAR TYPE 4



SAMPLE OF SINGLE BURST OF RADAR TYPE 5

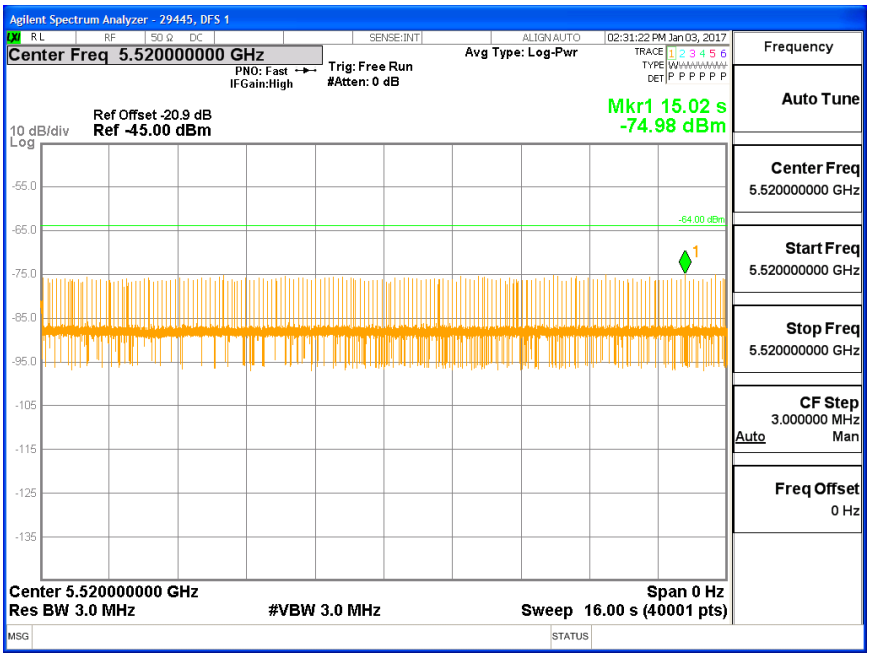


SINGLE BURST OF RADAR TYPE 6

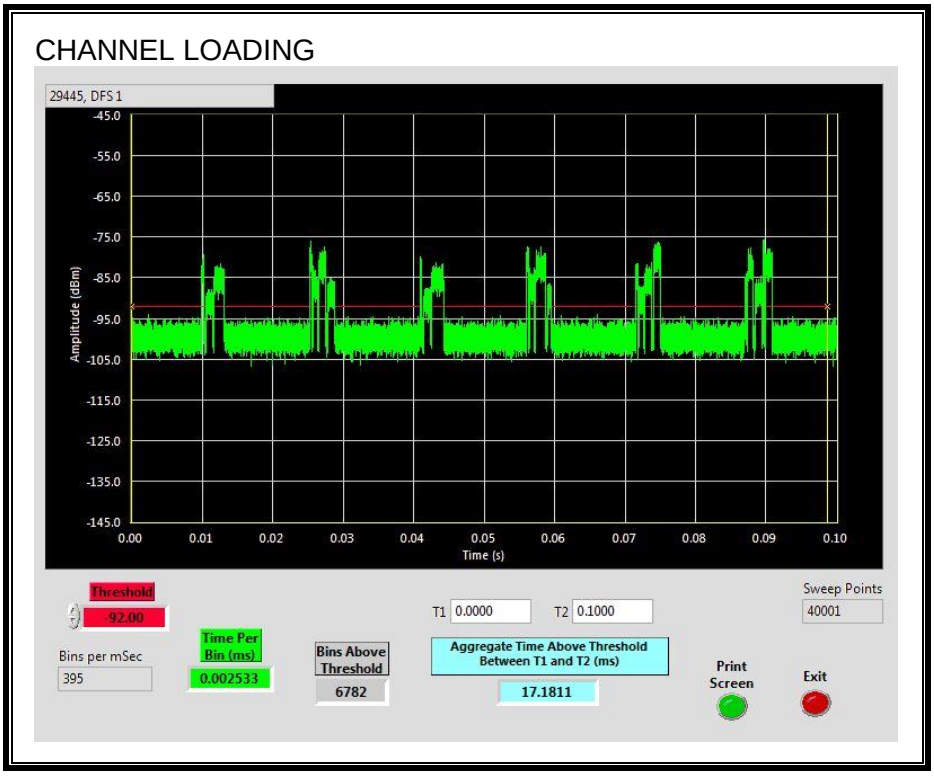


TRAFFIC

TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 17.18%

5.2.3. CHANNEL AVAILABILITY CHECK TIME

PROCEDURE TO DETERMINE INITIAL POWER-UP CYCLE TIME

A link was established on channel then the EUT was rebooted. The time from the cessation of traffic to the re-initialization of traffic was measured as the time required for the EUT to complete the total power-up cycle. The time to complete the initial power-up period is 60 seconds less than this total power-up time.

PROCEDURE FOR TIMING OF RADAR BURST

With a link established on channel, the EUT was rebooted. A radar signal was triggered within 0 to 6 seconds after the initial power-up period, and transmissions on the channel were monitored on the spectrum analyzer.

The Non-Occupancy list was cleared. With a link established on channel, the EUT was rebooted. A radar signal was triggered within 54 to 60 seconds after the initial power-up period, and transmissions on the channel were monitored on the spectrum analyzer.

QUANTITATIVE RESULTS

No Radar Triggered

Timing of Reboot (sec)	Timing of Start of Traffic (sec)	Total Power-up Cycle Time (sec)	Initial Power-up Cycle Time (sec)
29.42	130.1	100.7	40.7

Radar Near Beginning of CAC

Timing of Reboot (sec)	Timing of Radar Burst (sec)	Radar Relative to Reboot (sec)	Radar Relative to Start of CAC (sec)
29.9	73.49	43.6	2.9

Radar Near End of CAC

Timing of Reboot (sec)	Timing of Radar Burst (sec)	Radar Relative to Reboot (sec)	Radar Relative to Start of CAC (sec)
30.14	127.6	97.5	56.8

QUALITATIVE RESULTS

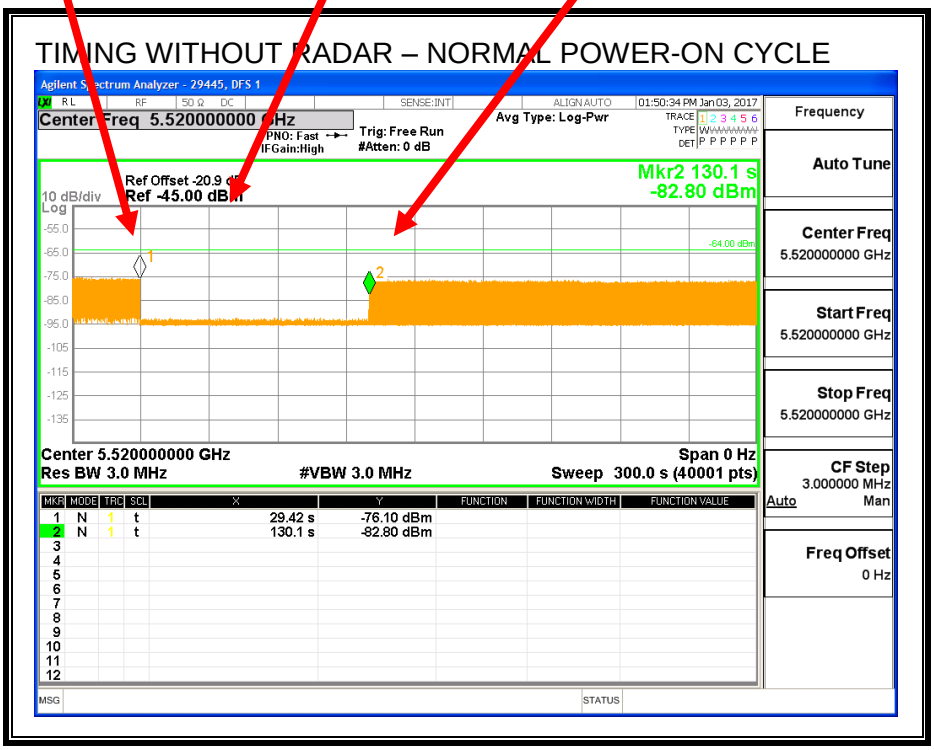
Timing of Radar Burst	Display on Control Computer	Spectrum Analyzer Display
No Radar Triggered	EUT marks Channel as active	Transmissions begin on channel after completion of the initial power-up cycle and the CAC
Within 0 to 6 second window	EUT indicates radar detected	No transmissions on channel
Within 54 to 60 second window	EUT indicates radar detected	No transmissions on channel

TIMING WITHOUT RADAR DURING CAC

AP is rebooted
Traffic ceases
Start of Initial Power-up cycle

End of Initial Power-up cycle
Start of CAC

End of CAC
Traffic is Initiated



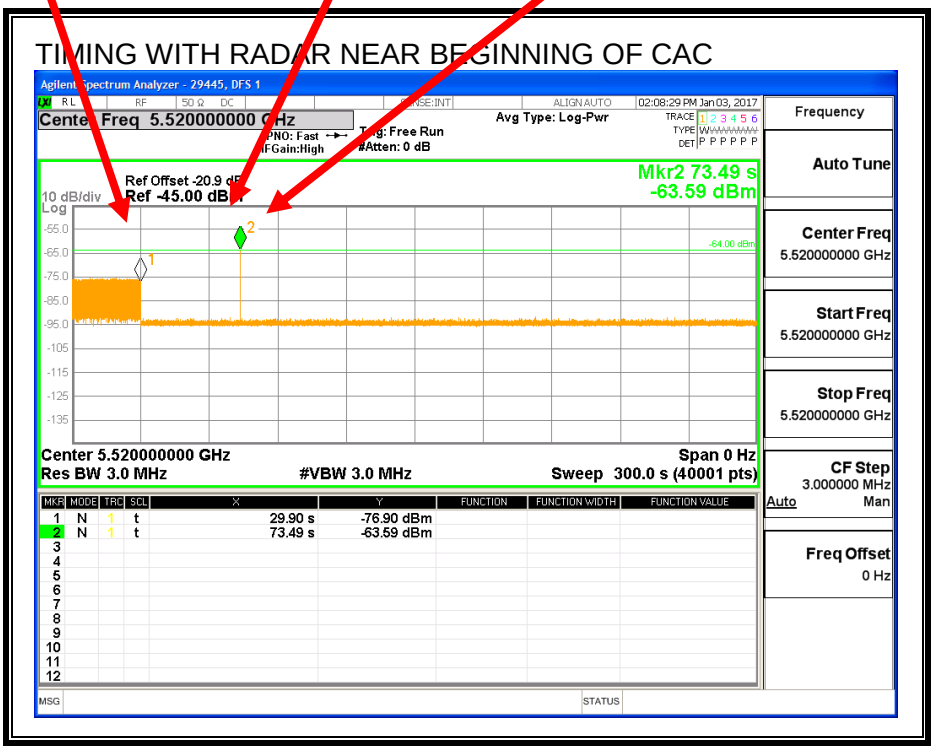
Transmissions begin on channel after completion of the initial power-up cycle and the CAC.

TIMING WITH RADAR NEAR BEGINNING OF CAC

AP is rebooted
Traffic ceases
Start of Initial Power-up cycle

End of Initial Power-up cycle
Start of CAC

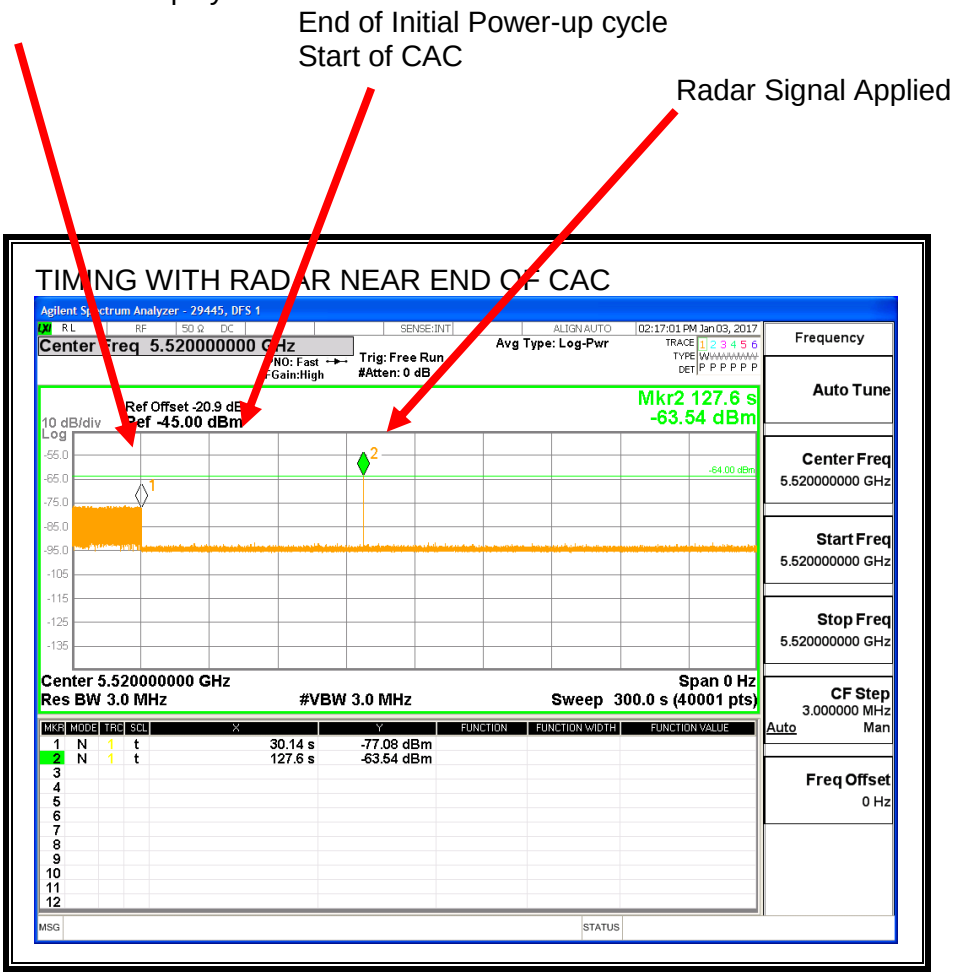
Radar Signal Applied



No EUT transmissions were observed after the radar signal.

TIMING WITH RADAR NEAR END OF CAC

AP is rebooted
Traffic ceases
Start of Initial Power-up cycle



No EUT transmissions were observed after the radar signal.

5.2.4. OVERLAPPING CHANNEL TESTS

RESULTS

The manufacturer has programmed the device to block out sufficient adjacent channels so that they can't overlap in the event that a radar burst is detected. Therefore these tests are not applicable.

5.2.5. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time =
(Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

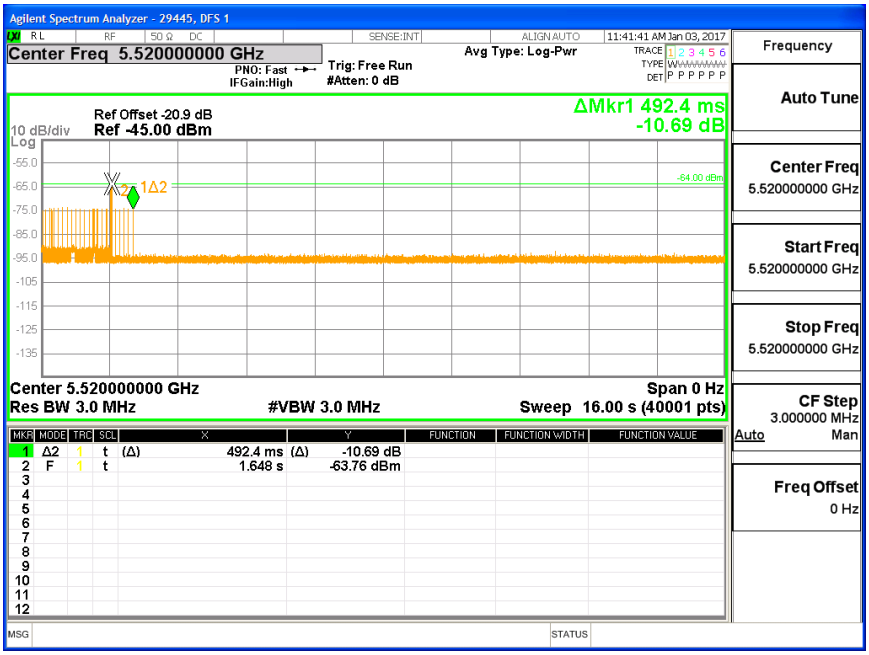
RESULTS

Channel Move Time (sec)	Limit (sec)
0.4924	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
2.4	60

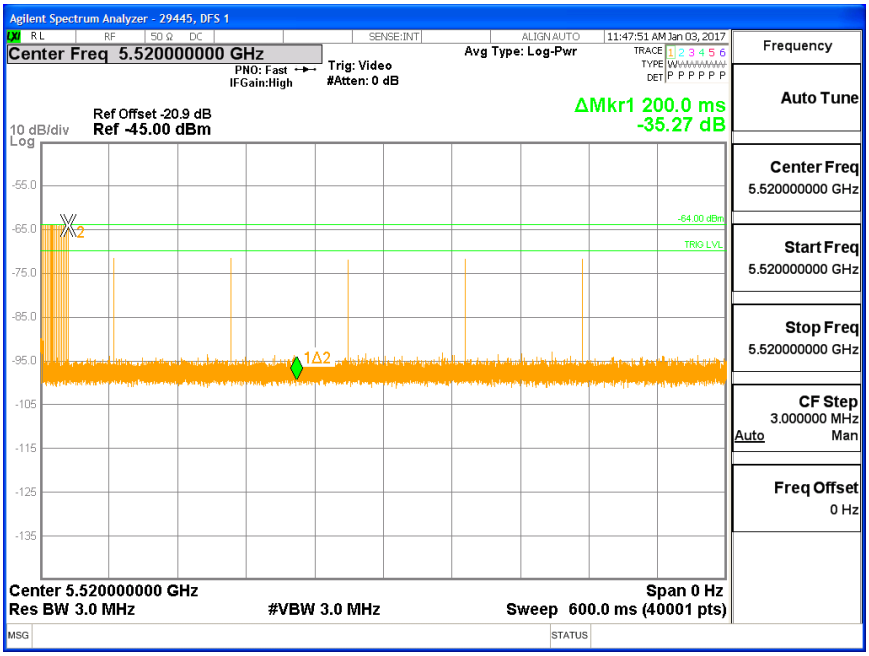
MOVE TIME

MOVE TIME



CHANNEL CLOSING TIME

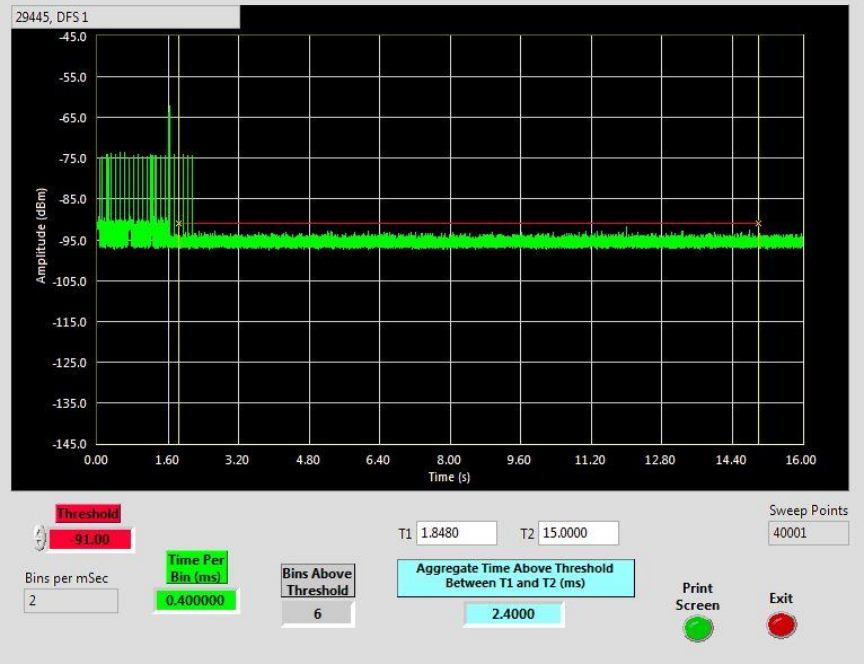
CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the aggregate monitoring period.

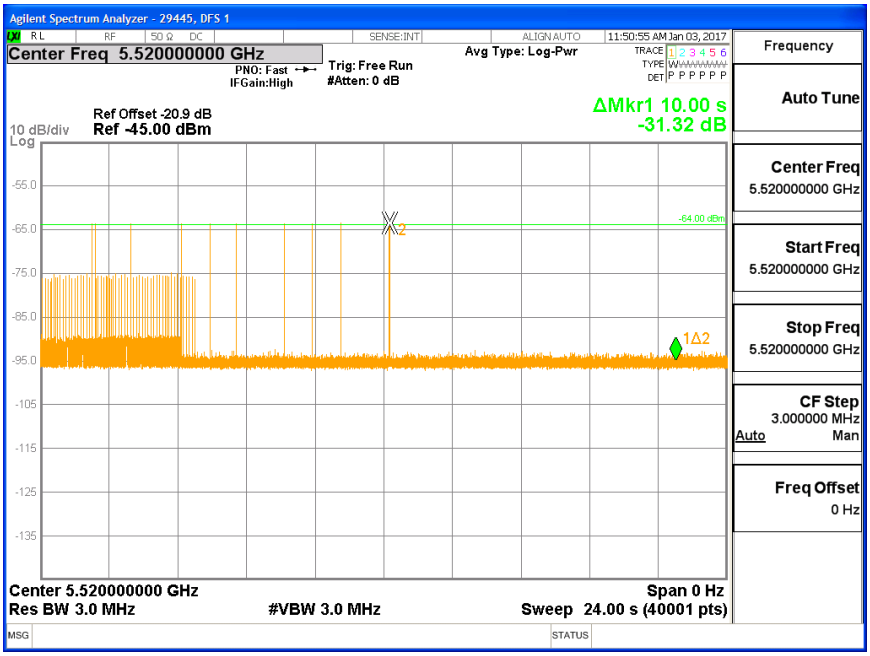
AGGREGATE CLOSING TIME



LONG PULSE CHANNEL MOVE TIME

The traffic ceases prior to 10 seconds after the end of the radar waveform.

MOVE TIME FOR LONG PULSE RADAR

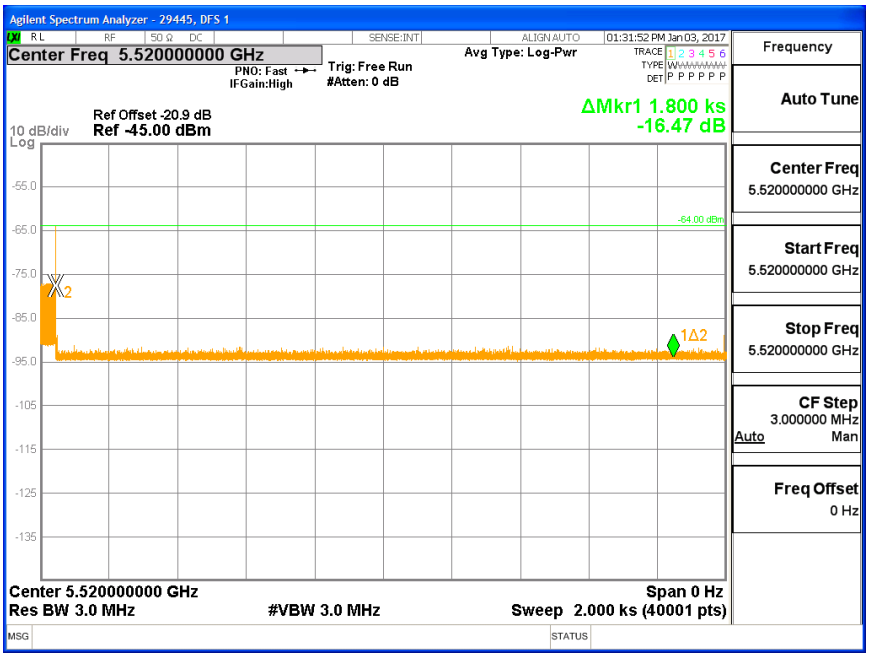


5.2.6. NON-OCCUPANCY PERIOD

RESULTS

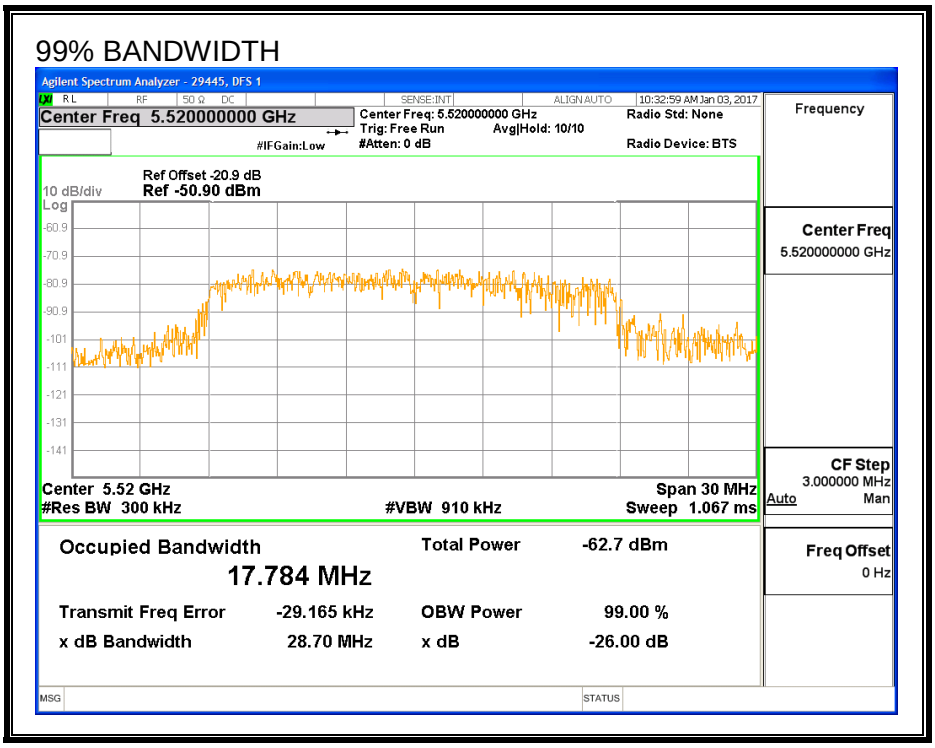
No EUT transmissions were observed on the test channel during the 30-minute observation time.

NON-OCCUPANCY PERIOD



5.2.7. DETECTION BANDWIDTH

REFERENCE PLOT OF 99% POWER BANDWIDTH



RESULTS

FL (MHz)	FH (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (%)	Minimum Limit (%)
5510	5530	20	17.784	112.5	100

DETECTION BANDWIDTH PROBABILITY

DETECTION BANDWIDTH PROBABILITY RESULTS

Detection Bandwidth Test Results		29445	DFS 1	
FCC Type 0 Waveform: 1 us Pulse Width, 1428 us PRI, 18 Pulses per Burst				
Frequency (MHz)	Number of Trials	Number Detected	Detection (%)	Mark
5510	10	10	100	FL
5515	10	10	100	
5520	10	10	100	
5525	10	10	100	
5530	10	10	100	FH

5.2.8. IN-SERVICE MONITORING

RESULTS

FCC Radar Test Summary

Signal Type	Number of Trials	Detection (%)	Limit (%)	Pass/Fail	Detection Bandwidth FL	Detection Bandwidth FH	OBW	Test Location	Employee Number	In-Service Monitoring Version
FCC Short Pulse Type 1	30	96.67	60	Pass	5510	5530	17.78	DFS 1	29445	Version 3.0
FCC Short Pulse Type 2	30	73.33	60	Pass	5510	5530	17.78	DFS 1	29445	Version 3.0
FCC Short Pulse Type 3	30	80.00	60	Pass	5510	5530	17.78	DFS 1	29445	Version 3.0
FCC Short Pulse Type 4	30	70.00	60	Pass	5510	5530	17.78	DFS 1	29445	Version 3.0
Aggregate		80.00	80	Pass						
FCC Long Pulse Type 5	30	93.33	80	Pass	5510	5530	17.78	DFS 1	29445	Version 3.0
FCC Hopping Type 6	42	95.24	70	Pass	5510	5530	17.78	DFS 1	29445	Version 3.0

TYPE 1 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 1						
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Test (A/B)	Frequency (MHz)	Successful Detection (Yes/No)
1001	1	3066	18	A	5520	Yes
1002	1	918	58	A	5520	Yes
1003	1	598	89	A	5520	Yes
1004	1	898	59	A	5520	Yes
1005	1	858	62	A	5520	Yes
1006	1	538	99	A	5520	Yes
1007	1	718	74	A	5520	Yes
1008	1	658	81	A	5520	Yes
1009	1	638	83	A	5520	Yes
1010	1	618	86	A	5520	Yes
1011	1	878	61	A	5520	Yes
1012	1	518	102	A	5520	Yes
1013	1	938	57	A	5520	Yes
1014	1	558	95	A	5520	Yes
1015	1	678	78	A	5520	Yes
1016	1	1415	38	B	5520	Yes
1017	1	1177	45	B	5520	Yes
1018	1	1262	42	B	5520	Yes
1019	1	1153	46	B	5520	Yes
1020	1	2722	20	B	5520	Yes
1021	1	1548	35	B	5520	Yes
1022	1	697	76	B	5520	Yes
1023	1	2201	24	B	5520	Yes
1024	1	1480	36	B	5520	Yes
1025	1	1918	28	B	5520	No
1026	1	2680	20	B	5520	Yes
1027	1	1895	28	B	5520	Yes
1028	1	1592	34	B	5520	Yes
1029	1	936	57	B	5520	Yes
1030	1	762	70	B	5520	Yes

TYPE 2 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 2					
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Frequency (MHz)	Successful Detection (Yes/No)
2001	2	212	24	5520	Yes
2002	3.9	204	25	5520	No
2003	2.2	228	26	5520	Yes
2004	4.2	185	28	5520	No
2005	2.7	175	27	5520	No
2006	3.1	218	28	5520	Yes
2007	4	212	28	5520	Yes
2008	2.3	178	26	5520	Yes
2009	1.5	219	26	5520	Yes
2010	4.2	151	25	5520	Yes
2011	3.6	196	29	5520	Yes
2012	4.5	213	25	5520	Yes
2013	2.2	181	29	5520	Yes
2014	3.4	165	26	5520	Yes
2015	1.3	180	23	5520	No
2016	4.8	167	27	5520	Yes
2017	4.8	225	25	5520	No
2018	4.5	216	26	5520	Yes
2019	2.8	202	27	5520	No
2020	4.9	198	29	5520	Yes
2021	1.4	187	28	5520	Yes
2022	3.7	230	29	5520	Yes
2023	4.6	224	29	5520	Yes
2024	3	152	27	5520	Yes
2025	2.1	150	27	5520	Yes
2026	4.8	163	26	5520	No
2027	4.2	208	23	5520	Yes
2028	3.3	225	26	5520	No
2029	2.8	156	23	5520	Yes
2030	4	177	27	5520	Yes

TYPE 3 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 3					
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Frequency (MHz)	Successful Detection (Yes/No)
3001	6.9	382	16	5520	No
3002	6.4	343	18	5520	Yes
3003	8.5	403	17	5520	Yes
3004	8.2	377	16	5520	No
3005	6.5	332	17	5520	Yes
3006	8.6	319	17	5520	Yes
3007	9.2	287	17	5520	Yes
3008	7.4	420	17	5520	Yes
3009	8.3	401	17	5520	Yes
3010	6.7	429	17	5520	No
3011	9.9	422	18	5520	No
3012	6.6	463	18	5520	Yes
3013	7.9	352	18	5520	Yes
3014	7	405	16	5520	Yes
3015	6.5	440	18	5520	Yes
3016	7.7	255	16	5520	No
3017	9.7	302	18	5520	Yes
3018	9.2	264	18	5520	Yes
3019	7.2	324	16	5520	Yes
3020	6.9	298	18	5520	Yes
3021	9.3	253	17	5520	Yes
3022	7.3	491	16	5520	Yes
3023	7.9	459	16	5520	Yes
3024	6.1	341	17	5520	Yes
3025	7	455	18	5520	Yes
3026	9.5	350	16	5520	Yes
3027	8.6	476	17	5520	Yes
3028	9.4	384	17	5520	Yes
3029	8.8	272	18	5520	No
3030	9.8	326	18	5520	Yes

TYPE 4 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 4					
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Frequency (MHz)	Successful Detection (Yes/No)
4001	18.5	360	14	5520	Yes
4002	16.8	427	16	5520	Yes
4003	16.4	474	12	5520	Yes
4004	15.2	435	15	5520	Yes
4005	20	495	16	5520	Yes
4006	19.3	470	14	5520	Yes
4007	11.2	425	13	5520	Yes
4008	11	412	16	5520	Yes
4009	12.5	379	15	5520	Yes
4010	17.5	261	14	5520	Yes
4011	19.5	375	14	5520	No
4012	11.6	270	15	5520	Yes
4013	14	397	13	5520	Yes
4014	15.7	304	12	5520	Yes
4015	14.3	444	15	5520	No
4016	16.5	380	14	5520	No
4017	15.6	281	12	5520	Yes
4018	14	347	15	5520	Yes
4019	13.5	395	16	5520	Yes
4020	12.3	356	13	5520	Yes
4021	17.1	416	14	5520	No
4022	16.4	390	12	5520	No
4023	13.8	494	14	5520	Yes
4024	13.5	363	15	5520	Yes
4025	15	331	12	5520	No
4026	11	331	16	5520	No
4027	12.9	445	15	5520	No
4028	14.1	340	12	5520	No
4029	16.6	466	14	5520	Yes
4030	18.3	374	13	5520	Yes

TYPE 5 DETECTION PROBABILITY

Data Sheet for FCC Long Pulse Radar Type 5		
Trial	Frequency (MHz)	Successful Detection (Yes/No)
1	5520	Yes
2	5520	Yes
3	5520	Yes
4	5520	Yes
5	5520	Yes
6	5520	Yes
7	5520	Yes
8	5520	Yes
9	5520	Yes
10	5520	Yes
11	5519	Yes
12	5516	Yes
13	5517	Yes
14	5517	Yes
15	5516	Yes
16	5514	Yes
17	5515	Yes
18	5517	Yes
19	5518	Yes
20	5518	Yes
21	5526	Yes
22	5523	Yes
23	5524	No
24	5526	Yes
25	5522	Yes
26	5524	No
27	5521	Yes
28	5524	Yes
29	5526	Yes
30	5521	Yes

Note: The Type 5 randomized parameters tested are shown in a separate document.

TYPE 6 DETECTION PROBABILITY

Data Sheet for FCC Hopping Radar Type 6
1 us Pulse Width, 333 us PRI, 9 Pulses per Burst, 1 Burst per Hop
NTIA August 2005 Hopping Sequence

Trial	Starting Index Within Sequence	Signal Generator Frequency (MHz)	Hops within Detection BW	Successful Detection (Yes/No)
1	179	5510	3	No
2	654	5511	4	Yes
3	1129	5512	5	Yes
4	1604	5513	5	Yes
5	2079	5514	5	Yes
6	2554	5515	3	Yes
7	3029	5516	4	Yes
8	3504	5517	6	Yes
9	3979	5518	7	Yes
10	4929	5519	3	Yes
11	5404	5520	5	Yes
12	5879	5521	2	Yes
13	6354	5522	2	Yes
14	6829	5523	4	Yes
15	7304	5524	5	Yes
16	7779	5525	5	Yes
17	8254	5526	2	Yes
18	8729	5527	4	Yes
19	9204	5528	3	Yes
20	9679	5529	5	Yes
21	10154	5530	3	Yes
22	10629	5510	1	No
23	11104	5511	4	Yes
24	11579	5512	6	Yes
25	12054	5513	2	Yes
26	12529	5514	3	Yes
27	13004	5515	6	Yes
28	13479	5516	2	Yes
29	13954	5517	4	Yes
30	14429	5518	6	Yes
31	14904	5519	8	Yes
32	15379	5520	4	Yes
33	15854	5521	2	Yes
34	16329	5522	4	Yes
35	16804	5523	2	Yes
36	17279	5524	2	Yes
37	17754	5525	3	Yes
38	18229	5526	3	Yes
39	18704	5527	5	Yes
40	19179	5528	4	Yes
41	19654	5529	3	Yes
42	20129	5530	9	Yes

5.3. BRIDGE MODE RESULTS

Per KDB 905462, Section 5.1 (footnote 1):

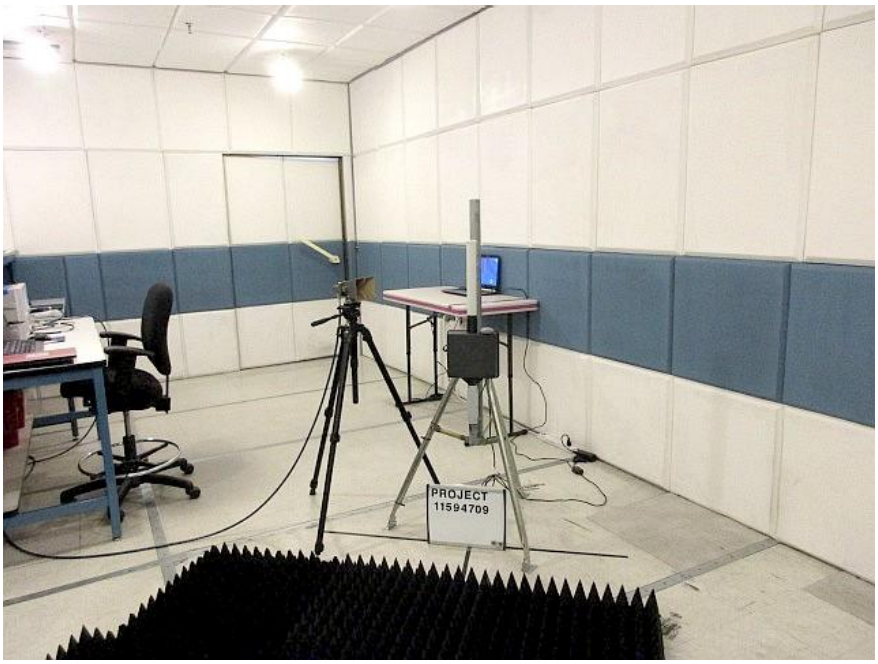
Networks Access Points with Bridge and/or MESH modes of operation are permitted to operate in the DFS bands but must employ a DFS function. The functionality of the Bridge mode as specified in §15.403(a) must be validated in the DFS test report. Devices operating as relays must also employ DFS function. The method used to validate the functionality must be documented and validation data must be documented. Bridge mode can be validated by performing a test statistical performance check (Section 7.8.4) on any one of the radar types. This is an abbreviated test to verify DFS functionality. MESH mode operational methodology must be submitted in the application for certification for evaluation by the FCC.

This device does not support Bridge Mode therefore this test was not performed.

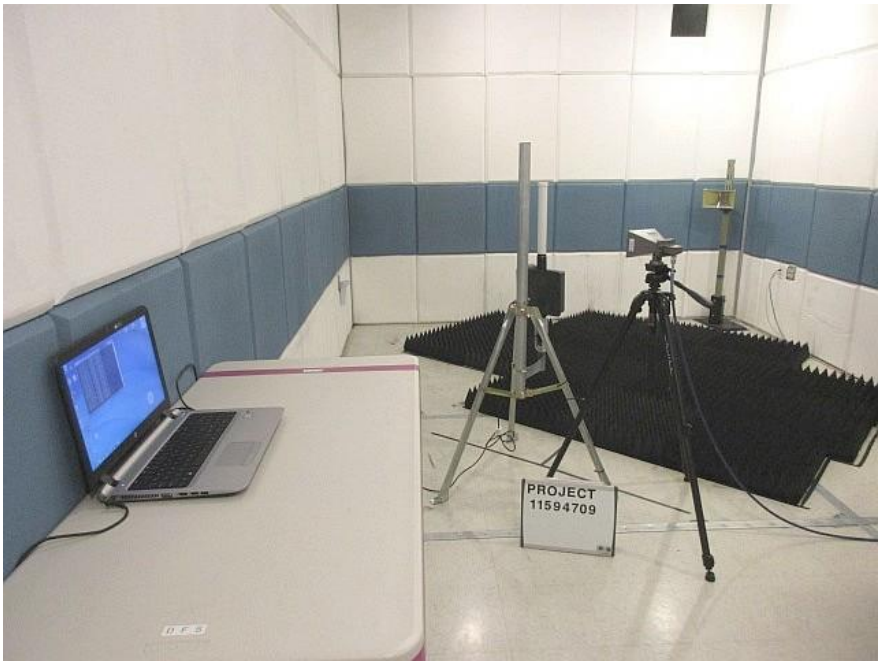
6. SETUP PHOTOS

DYNAMIC FREQUENCY SELECTION MEASUREMENT SETUP

DFS FRONT PHOTO



DFS BACK PHOTO



END OF REPORT