DFS PORTION of FCC 47 CFR PART 15 SUBPART E

CERTIFICATION TEST REPORT

FOR

WiFi EXTENDER WITH DTS/UNII a/b/g/n/ac/ax

MODEL NUMBER: AR1344, AR1344E, AR1344P and EVO6700AP

MODEL TESTED: AR1344

FCC ID: 2AXCW-AP6700

REPORT NUMBER: 13785976-E1V1

ISSUE DATE: JULY 16, 2021

Prepared for
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ACCREDITED
CERT #0751.05

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	07/16/2021	Initial Issue	

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: KAON BROADBAND CO., LTD.
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EUT DESCRIPTION: WiFi EXTENDER WITH DTS/UNII a/b/g/n/ac/ax

MODEL: AR1344, AR1344E, AR1344P and EVO6700AP

MODEL TESTED: AR1344

SERIAL NUMBER: 98:77:E7:60:41:71

DATE TESTED: JUNE 09 and 15 to to 17, 2021

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
DFS Portion of CFR 47 Part 15 Subpart E	Complies

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

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 A2LA, NIST, any agency of the Federal Government, or any agency of the U.S. 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 KDB 789033, KDB 905462 D02 and D03.

3. SUMMARY OF TEST RESULTS

Requirement Description	Result	Remarks
DFS Portion of FCC 47 CFR PART 15 SUBPART E	Complies	

4. REFERENCE DOCUMENTS

Measurements of transmitter parameters as referenced in this report and all other manufacturer's declarations relevant to the RF test requirements are documented in UL Verification Services report numbers 4789901731-FR3V1 and 4789901731-FR4V1.

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for the validity of results after the integration of the data provided by the customer.

5. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by A2LA, Certificate Number 0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☒	Building 1: 47173 Benicia Street, Fremont, California, USA	US0104	2324A	208313
	Building 2: 47266 Benicia Street, Fremont, California, USA	US0104	2324A	208313
	Building 4: 47658 Kato Rd, Fremont, California, USA	US0104	2324A	208313

6. DECISION RULES AND MEASUREMENT UNCERTAINTY

6.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

6.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement).

7. MODEL DIFFERENCES

7.1. INTRODUCTION

This test report covers 4 model numbers: AR1344, AR1344E, AR1344P and EVO6700AP. All 4 models fall under the umbrella FCC ID of 2AXCW-AP6700.

7.2. MODEL DIFFERENCES

The manufacturer hereby declares that all 4 models have the same technical construction including circuit diagram, PCB layout, components, component layout, mechanical construction and electrical construction. The differences between the 4 models is only related to the model name and memory capacity, which are as follows:

Hardware:

AR1344	128 Mb/256 Mb (Flash Memory / SDRAM)
AR1344E	128 Mb/256 Mb (Flash Memory / SDRAM)
AR1344P	256 Mb/512 Mb (Flash Memory / SDRAM)
EVO6700AP	256 Mb/512 Mb (Flash Memory / SDRAM)

The differences listed above do not have any influence upon the DFS performance of the models covered by this report and therefore the DFS test results documented for model AR1344 may be applied as representative to models AR1344E, AR1344P and EVO6700AP.

8. DYNAMIC FREQUENCY SELECTION

8.1. OVERVIEW

8.1.1. 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

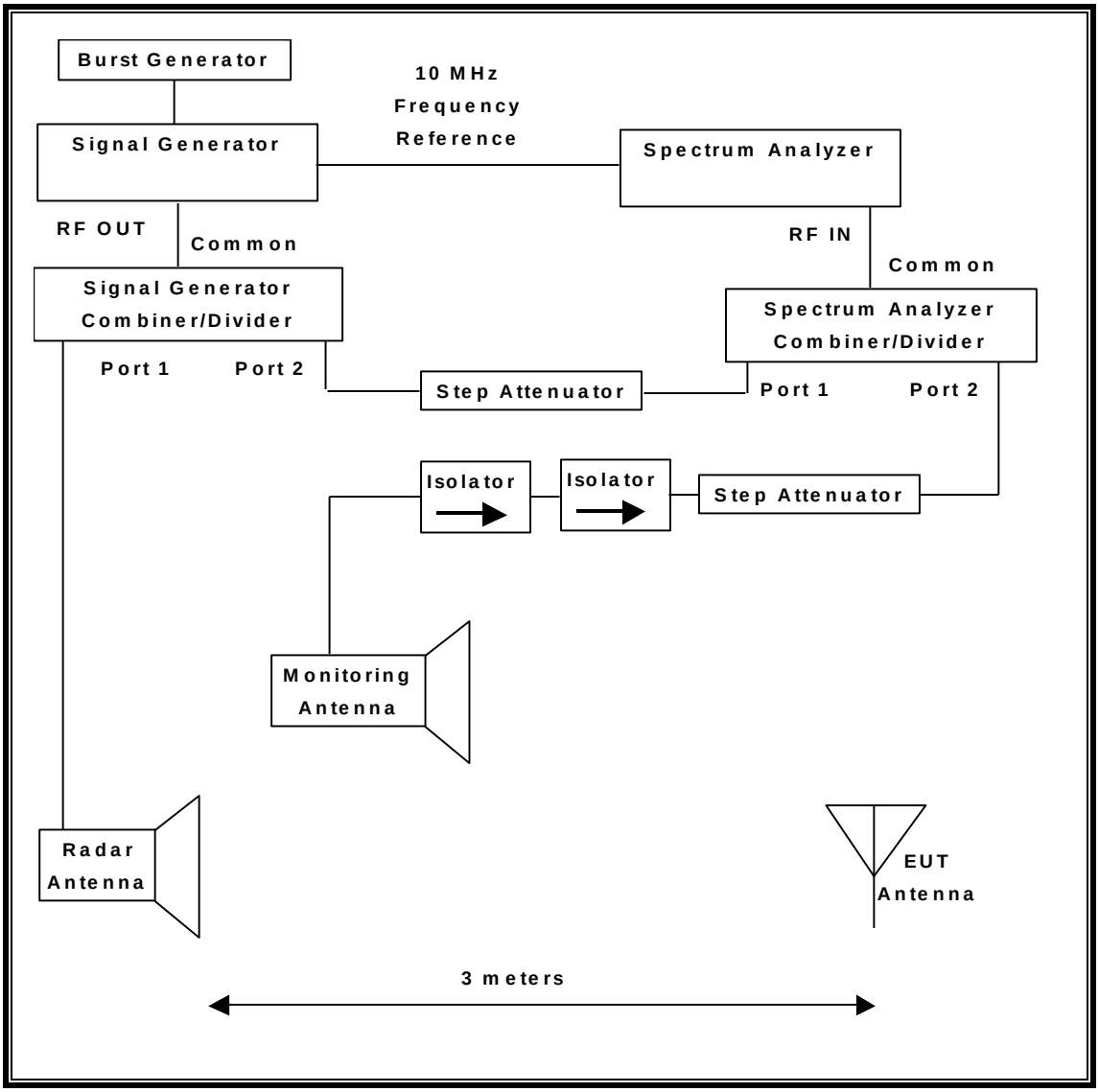
Radar Waveform Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

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

8.1.2. 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. Traffic that meets or exceed the minimum loading requirement is streamed from the Master device to the Slave Device. 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 tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**ID No.**	**Cal Due**
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight	N9030A	T1634	02/24/22
Signal Generator, MXG X-Series RF Vector	Agilent	N5182B	T1633	01/26/22
Arbitrary Waveform Generator	Agilent / HP	33220A	T190	01/28/22

8.1.3. 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	3.1	Channel Loading and Aggregate Closing Time
FCC 2014 Detection Bandwidth-PXA	3.1.1	Detection Bandwidth in 5 MHz Steps
In Service Monitoring-PXA	4.1	In-Service Monitoring (Probability of Detection)
PXA Read	3.1	Signal Generator Screen Capture
SGXProject.exe	1.7	Radar Waveform Generation and Download

8.1.4. TEST ROOM ENVIRONMENT

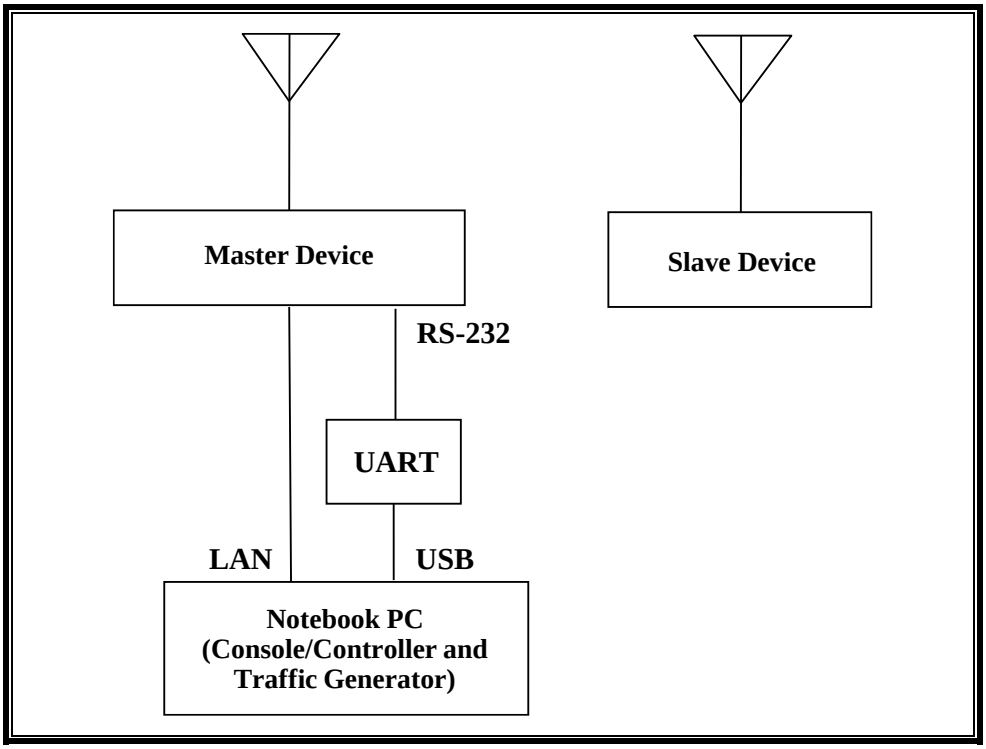
The test room temperature and humidity shall be maintained within normal temperature of 15~35 °C and normal humidity 20~75% (relative humidity).

ENVIRONMENT CONDITION

Parameter	Value
Temperature	25.7, 24.5, 25.1 and 23.7 °C
Humidity	34, 38, 38 and 39 %

8.1.5. SETUP OF EUT

RADIATED METHOD EUT TEST SETUP



SUPPORT EQUIPMENT

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

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC Adapter 1 (EUT)	Chenzhou Frecom Electronics	F18L16-120150 SPAU	01350646300R	DoC
Notebook PC (Console/Controller)	Samsung	NT550XDZ-AD1AW	KMA599YR1002EVJ	DoC
AC Adapter 2 (Notebook PC)	Samsung	PA-1400-96	CN60BA4400295AD2 VHNCNC859	DoC
RS-232 to USB UART	Nexi Network Solutions	UC232	No Serial Number	DoC
Ultra 5G Smartphone (Slave Device)	Samsung	SM-G998U	R3CNA0P3LAN	A3LSMG998U

8.1.6. 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 manufacturer has declared that the highest gain antenna assembly utilized with the EUT has a gain of 2 dBi in the 5250-5350 MHz band and 2 dBi in the 5470-5725 MHz band. The manufacturer has declared that the lowest gain antenna assembly utilized with the EUT has a gain of 2 dBi in the 5250-5350 MHz band and 2 dBi in the 5470-5725 MHz band.

The only antenna assembly utilized with the EUT has a gain of 2 dBi.

Four identical antennas are utilized to meet the diversity and MIMO operational requirements.

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.

For the highest output power figures in the 5250-5350 MHz and 5470-5725 MHz bands please refer to the RF reports referenced in section 4.

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 four 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).

TPC is not required since the maximum EIRP is less than 500 mW (27 dBm).

The EUT utilizes the 802.11ax architecture. Four nominal channel bandwidths are implemented: 20 MHz, 40 MHz, 80 MHz and 160 MHz.

Channel puncturing is not supported.

The software installed in the EUT is version 1.2.40.

UNIFORM CHANNEL SPREADING

This function is not required per KDB 905462.

OVERVIEW OF MASTER DEVICE WITH RESPECT TO §15.407 (h) REQUIREMENTS

The Master Device is a Kaon broadband 802.11ax 4x4 Access Point / Router, FCC ID: 2AXCW-AP6700. The minimum antenna gain for the Master Device is 2 dBi.

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 software installed in the Master Device is version 1.2.40.

8.2. RESULTS FOR 20 MHz BANDWIDTH

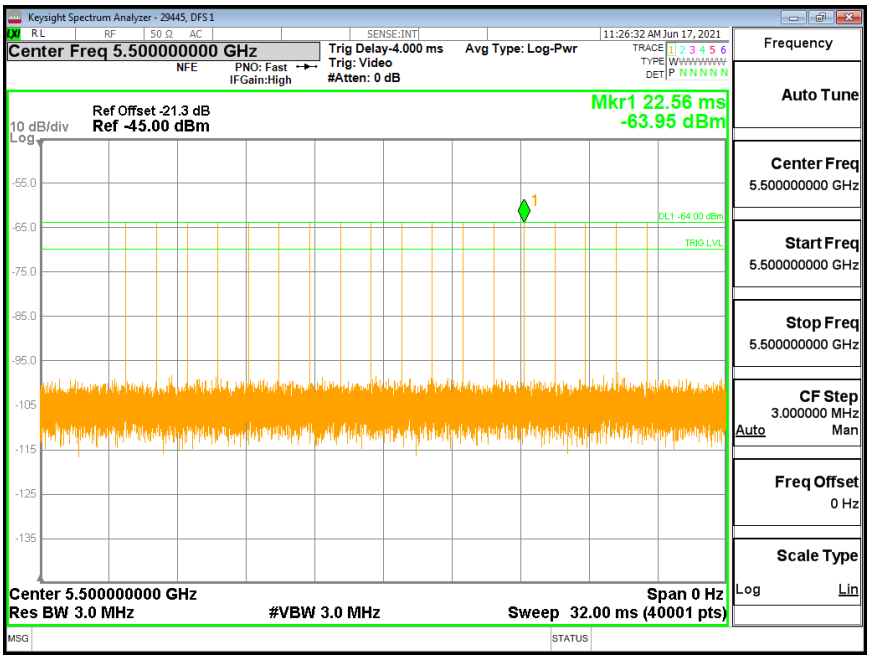
8.2.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5500 MHz.

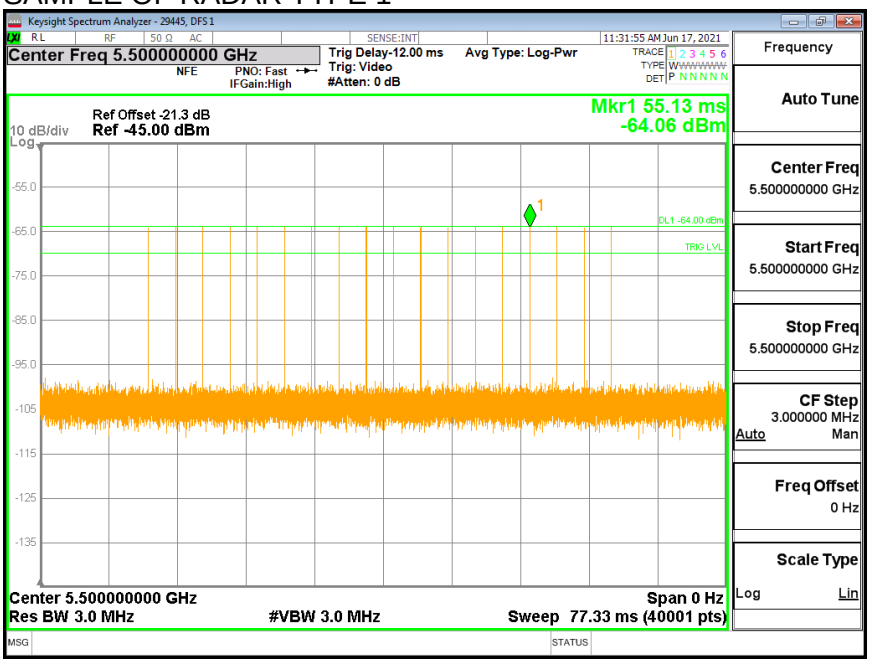
8.2.2. RADAR WAVEFORMS AND TRAFFIC

RADAR WAVEFORMS

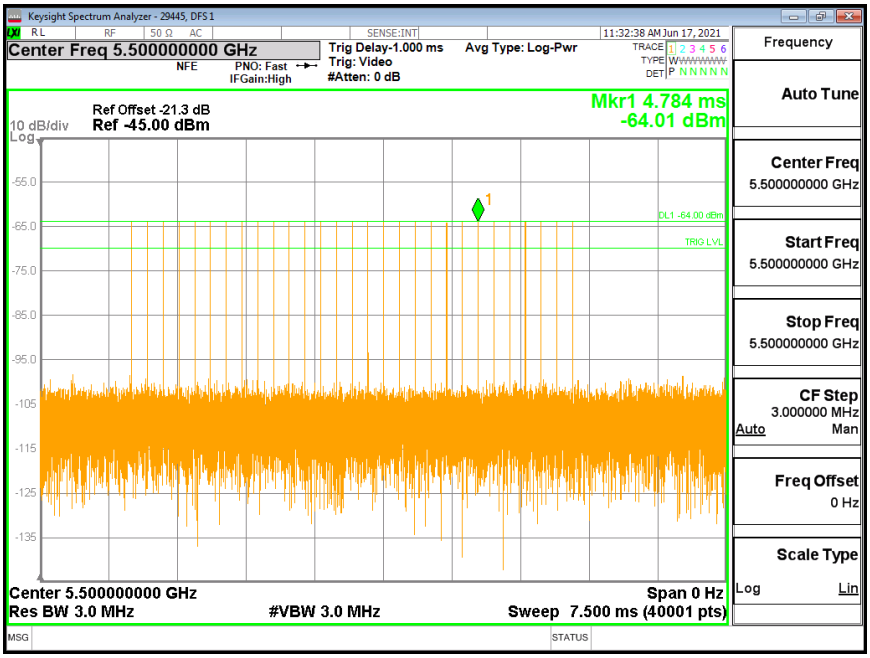
SHORT PULSE RADAR TYPE 0



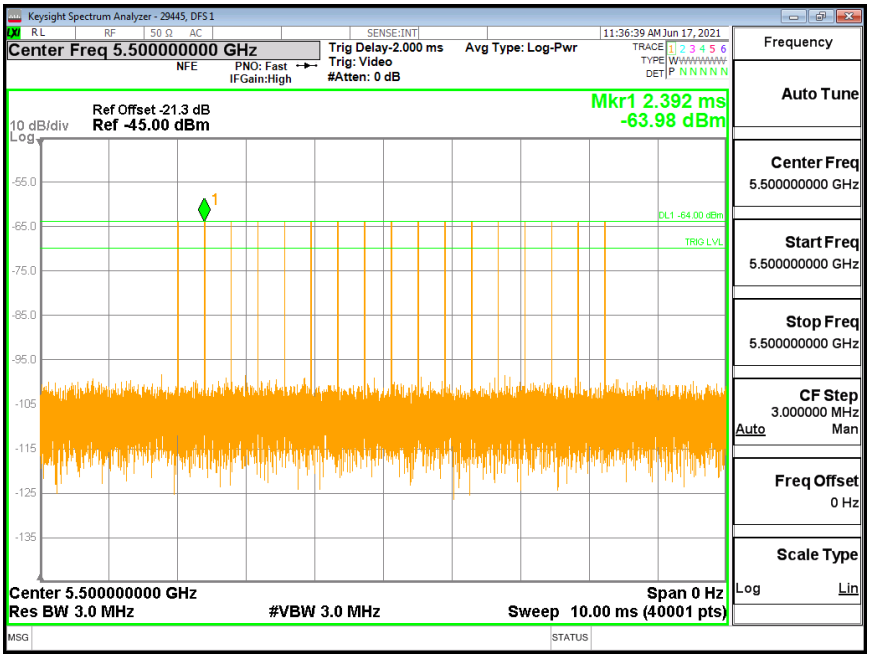
SAMPLE OF RADAR TYPE 1



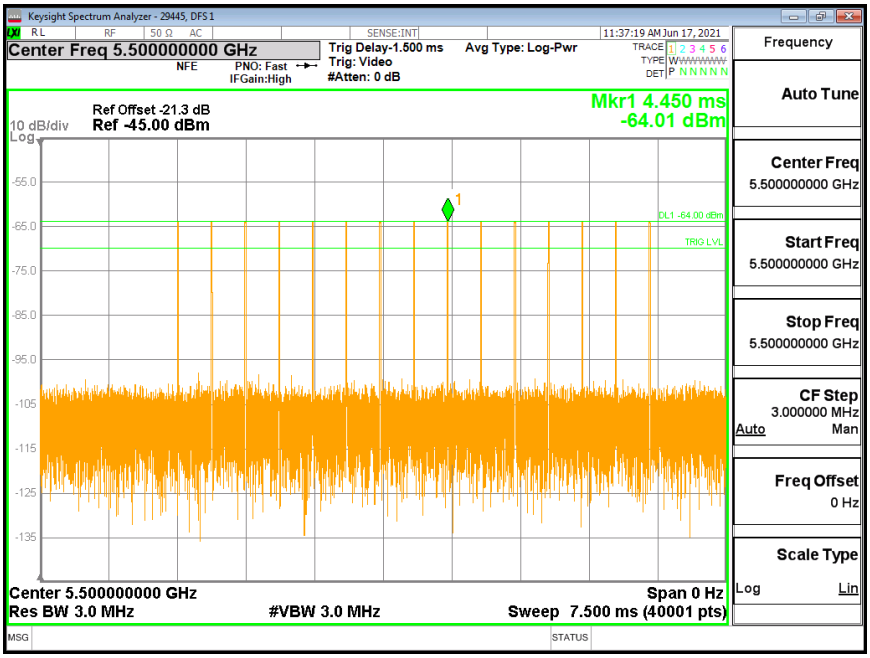
SAMPLE OF RADAR TYPE 2



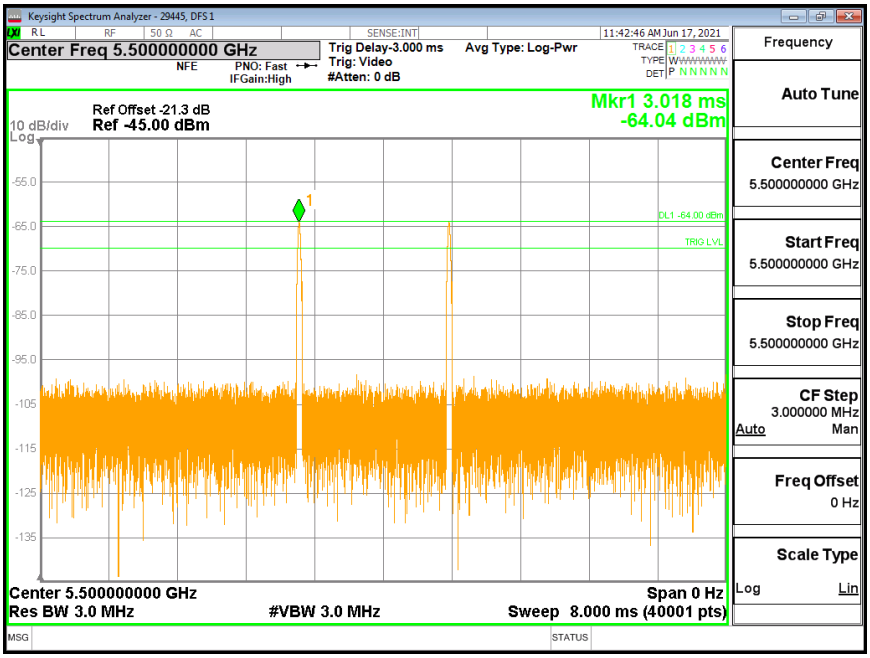
SAMPLE OF RADAR TYPE 3



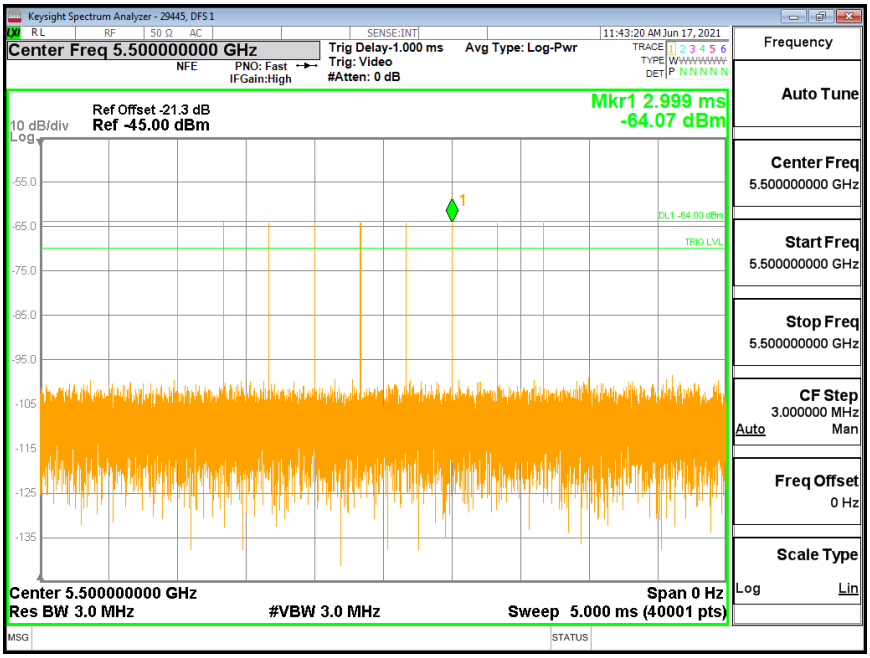
SAMPLE OF RADAR TYPE 4



SAMPLE OF SINGLE BURST OF RADAR TYPE 5

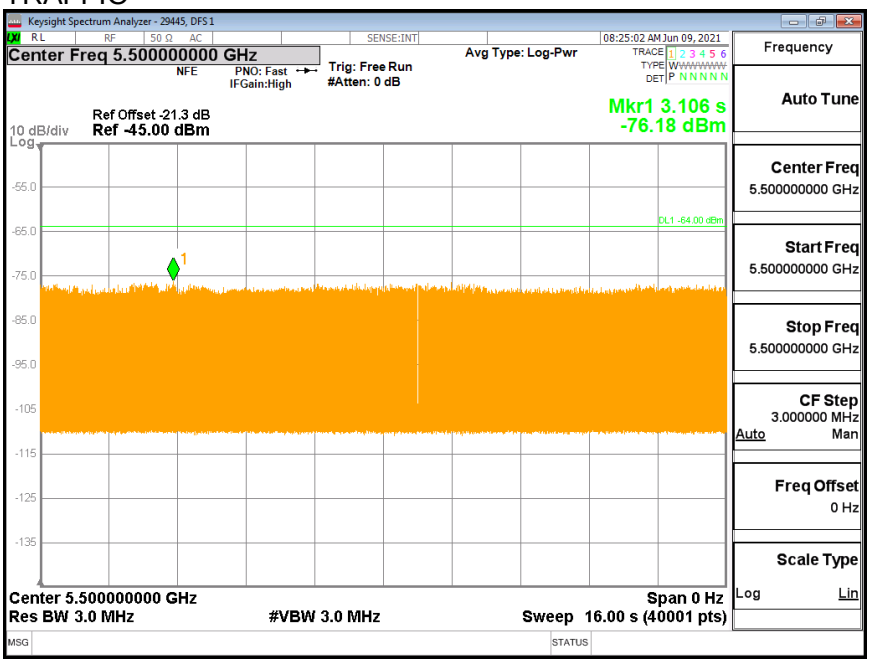


SINGLE BURST OF RADAR TYPE 6

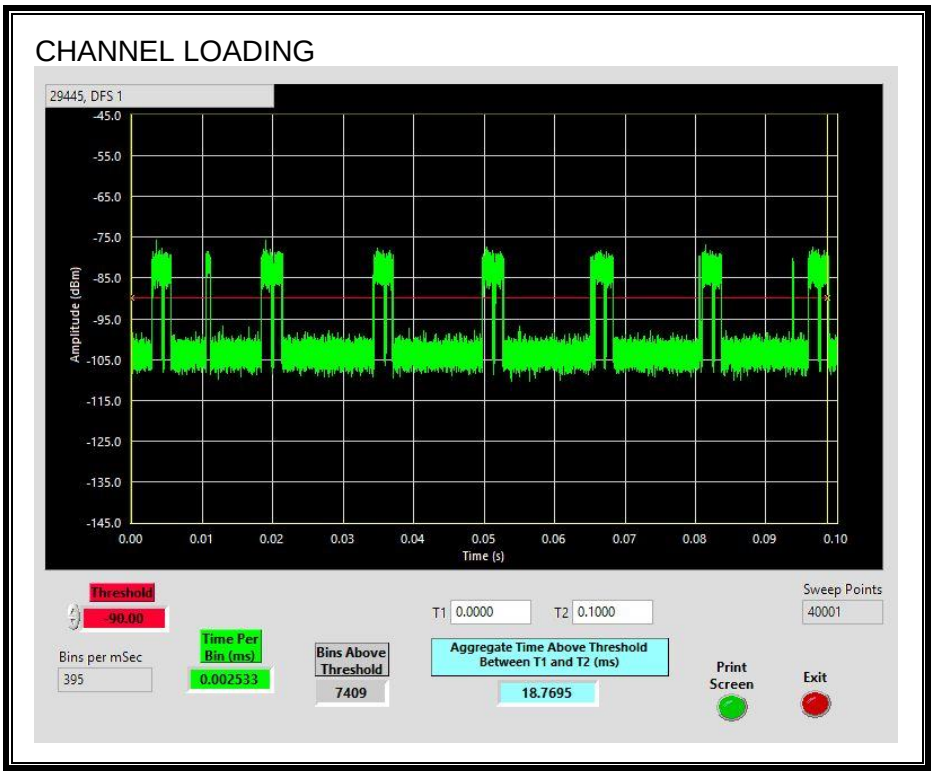


TRAFFIC

TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 18.77%

8.2.3. 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)
30.17	119.1	88.9	28.9

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)
30.35	63.2	32.9	3.9

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)
30.45	116.8	86.4	57.4

QUALITATIVE RESULTS

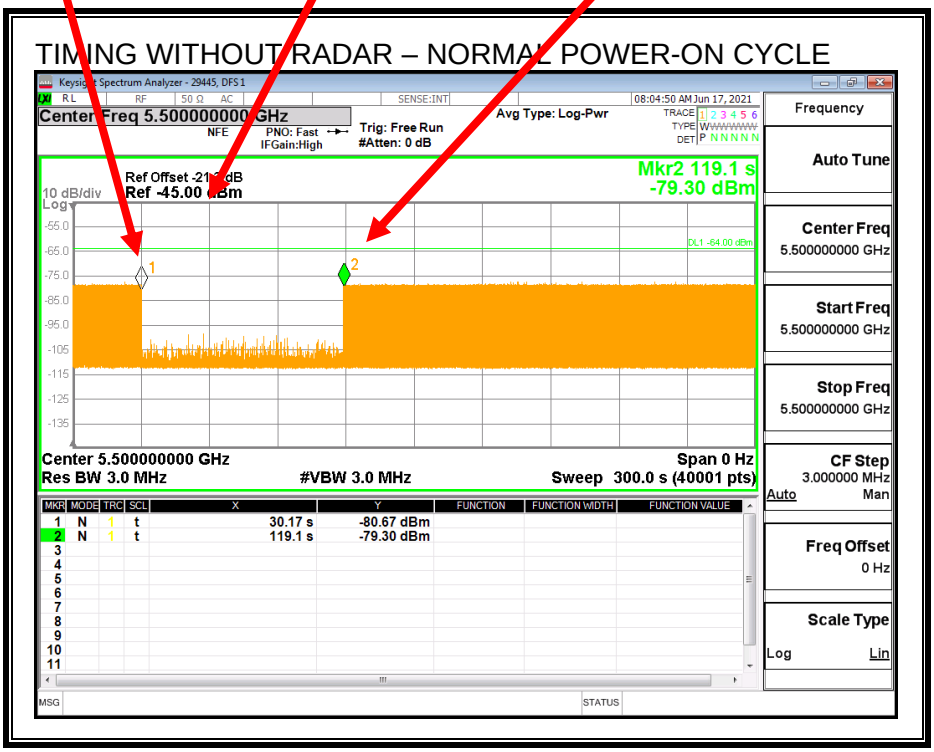
Timing of Radar Burst	Display on Control Computer	Spectrum Analyzer Display
No Radar Triggered	EUT marks Channel as active	Transmissions begin on channel after completion of the initial power-up cycle and the CAC
Within 0 to 6 second window	EUT indicates radar detected	No transmissions on channel
Within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



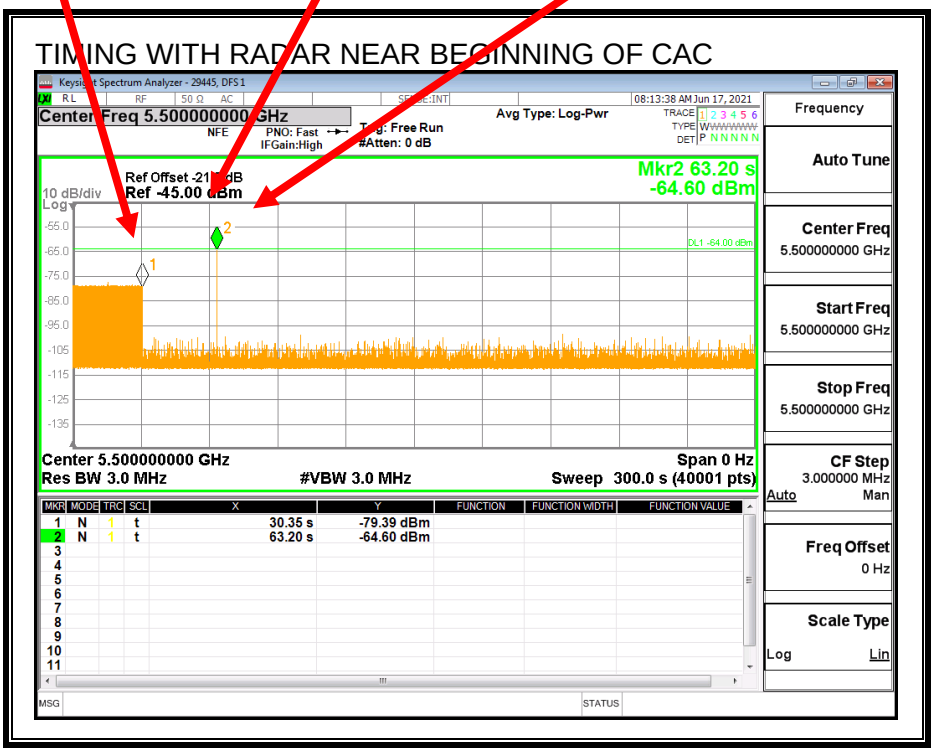
Transmissions begin on channel after completion of the initial power-up cycle and the CAC.

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



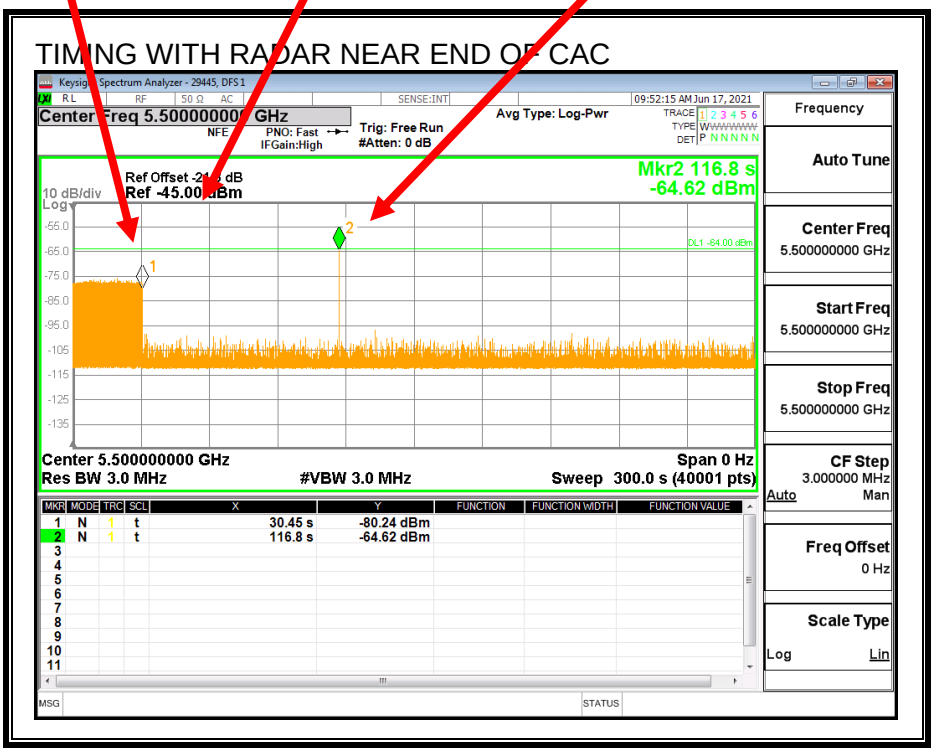
No EUT transmissions were observed after the radar signal.

TIMING WITH RADAR NEAR END OF CAC

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

End of Initial Power-up cycle
Start of CAC

Radar Signal Applied



No EUT transmissions were observed after the radar signal.

8.2.4. OVERLAPPING CHANNEL TESTS

RESULTS

The channel spacing is not less than the channel bandwidth therefore the EUT does not have an overlapping channel plan.

8.2.5. 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)

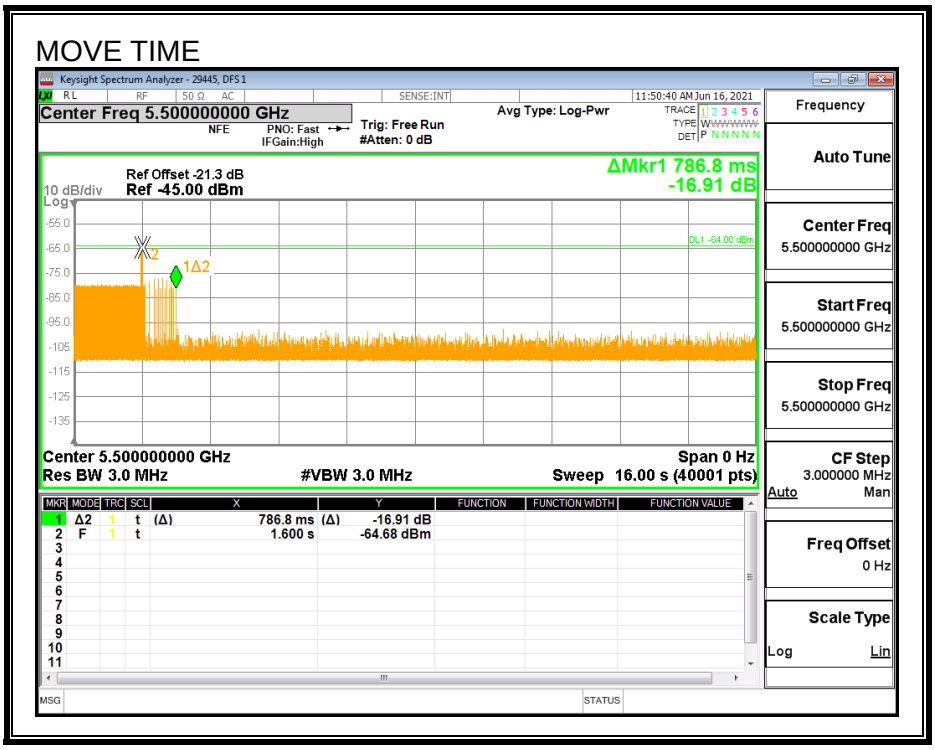
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

Channel Move Time (sec)	Limit (sec)
0.7868	10

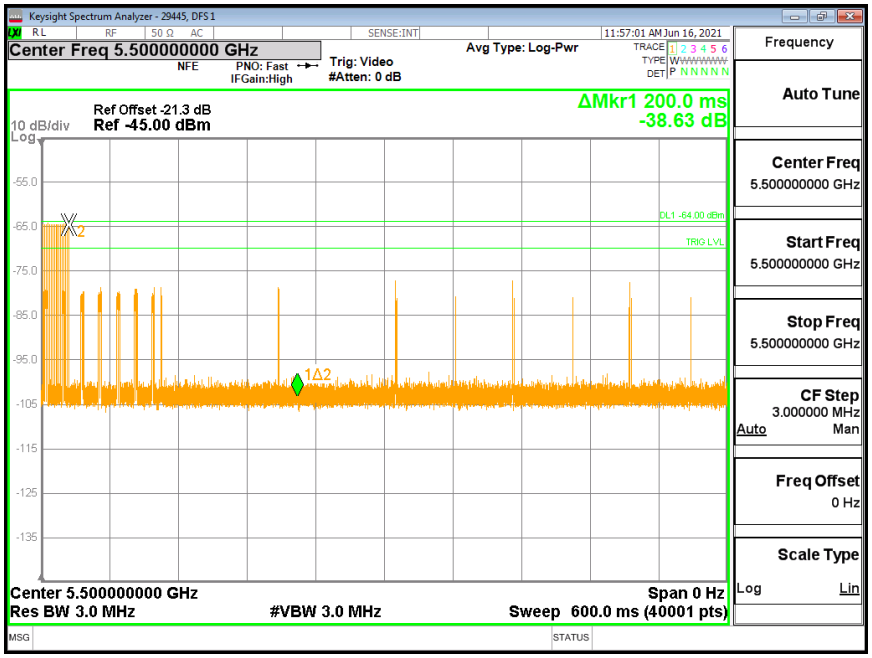
Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
11.2	60

MOVE TIME



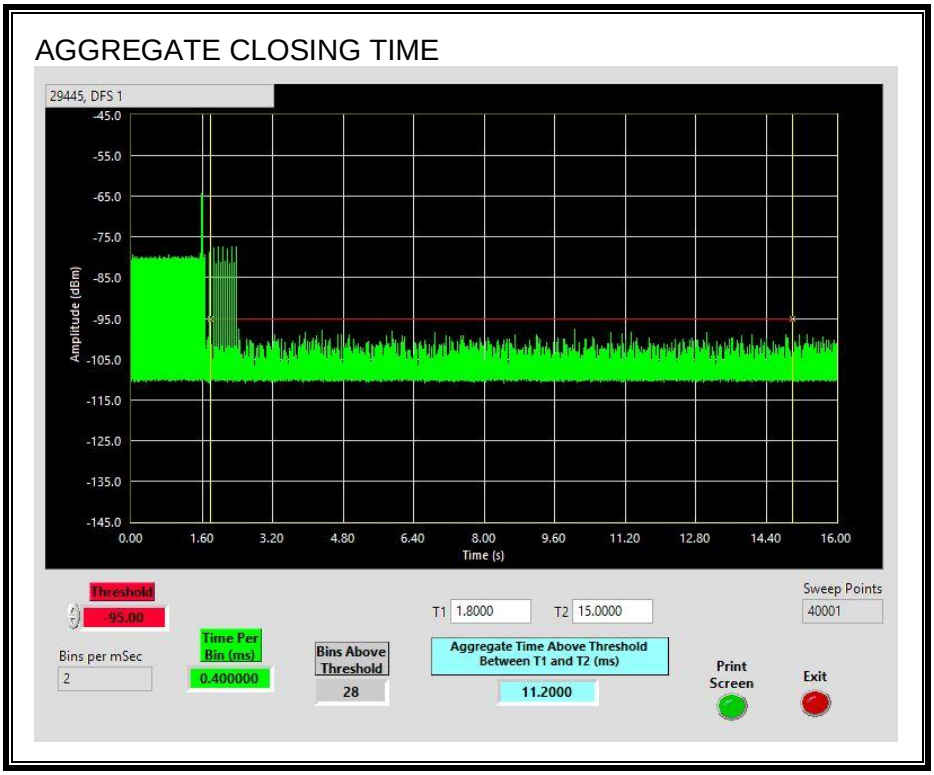
CHANNEL CLOSING TIME

CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the aggregate monitoring period.



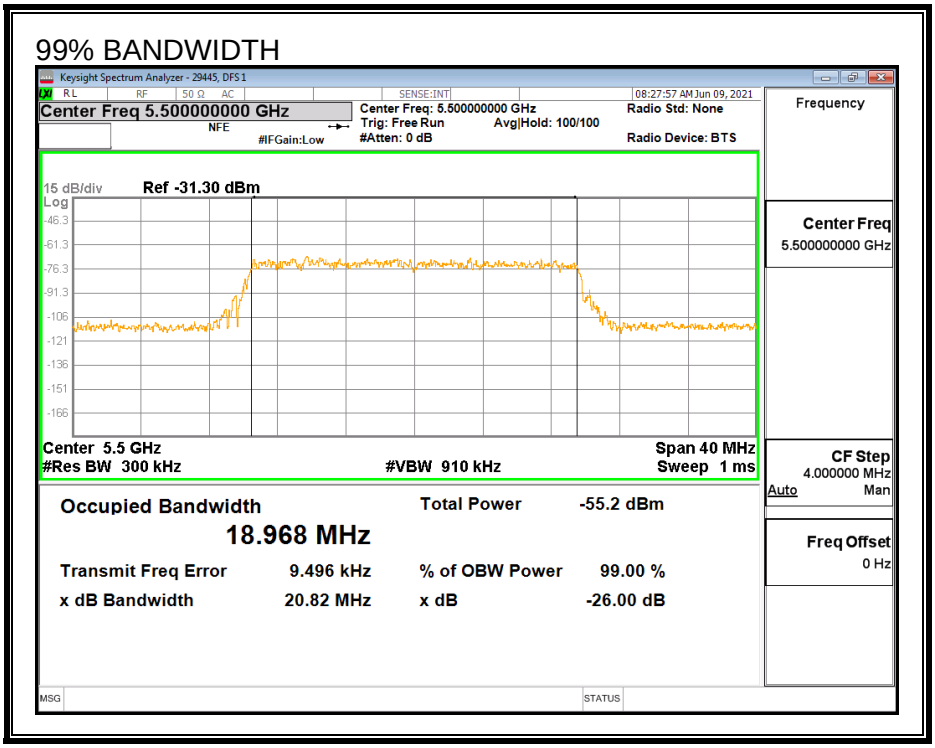
LONG PULSE CHANNEL MOVE TIME

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

MOVE TIME FOR LONG PULSE RADAR

8.2.6. DETECTION BANDWIDTH

REFERENCE PLOT OF 99% POWER BANDWIDTH



RESULTS

F_L (MHz)	F_H (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (%)	Minimum Limit (%)
5490	5509	19	18.968	100.2	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
5489	10	0	0	
5490	10	9	90	FL
5491	10	10	100	
5492	10	10	100	
5493	10	10	100	
5494	10	10	100	
5495	10	10	100	
5500	10	10	100	
5505	10	10	100	
5506	10	10	100	
5507	10	10	100	
5508	10	10	100	
5509	10	10	100	FH
5510	10	0	0	

8.2.7. 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	76.67	60	Pass	5490	5509	18.97	DFS 1	29445	v4.1
FCC Short Pulse Type 2	30	100.00	60	Pass	5490	5509	18.97	DFS 1	29445	v4.1
FCC Short Pulse Type 3	30	83.33	60	Pass	5490	5509	18.97	DFS 1	29445	v4.1
FCC Short Pulse Type 4	30	70.00	60	Pass	5490	5509	18.97	DFS 1	29445	v4.1
Aggregate		82.50	80	Pass						
FCC Long Pulse Type 5	30	83.33	80	Pass	5490	5509	18.97	DFS 1	29445	v4.1
FCC Hopping Type 6	40	82.50	70	Pass	5490	5509		DFS 1	29445	v4.1

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	5490	No
1002	1	618	86	A	5506	No
1003	1	558	95	A	5498	Yes
1004	1	518	102	A	5509	Yes
1005	1	538	99	A	5506	Yes
1006	1	778	68	A	5502	Yes
1007	1	878	61	A	5507	Yes
1008	1	898	59	A	5508	Yes
1009	1	838	63	A	5495	Yes
1010	1	638	83	A	5492	Yes
1011	1	798	67	A	5504	Yes
1012	1	918	58	A	5499	Yes
1013	1	578	92	A	5492	Yes
1014	1	598	89	A	5507	Yes
1015	1	718	74	A	5507	Yes
1016	1	982	54	B	5492	Yes
1017	1	1420	38	B	5501	Yes
1018	1	2182	25	B	5501	Yes
1019	1	1397	38	B	5498	Yes
1020	1	1094	49	B	5509	Yes
1021	1	2985	18	B	5505	No
1022	1	2812	19	B	5502	No
1023	1	1091	49	B	5493	Yes
1024	1	2400	22	B	5494	No
1025	1	808	66	B	5503	Yes
1026	1	2247	24	B	5505	No
1027	1	2138	25	B	5502	Yes
1028	1	1158	46	B	5505	Yes
1029	1	1179	45	B	5492	Yes
1030	1	2877	19	B	5495	No

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	1.1	172	29	5501	Yes
2002	1.8	223	28	5499	Yes
2003	1.2	230	25	5497	Yes
2004	2.2	166	24	5499	Yes
2005	1.8	215	28	5497	Yes
2006	1	199	25	5498	Yes
2007	4.9	171	26	5507	Yes
2008	4.4	159	23	5502	Yes
2009	2.5	178	24	5501	Yes
2010	4.3	213	29	5500	Yes
2011	2.6	155	27	5504	Yes
2012	4.7	194	28	5503	Yes
2013	3.2	184	27	5504	Yes
2014	1.3	226	29	5496	Yes
2015	2.2	220	28	5498	Yes
2016	2.8	186	27	5491	Yes
2017	3.9	227	27	5498	Yes
2018	4.6	159	26	5503	Yes
2019	4	204	23	5500	Yes
2020	5	222	29	5506	Yes
2021	4.6	190	23	5503	Yes
2022	3.8	173	23	5506	Yes
2023	3.6	226	24	5507	Yes
2024	3.1	214	28	5493	Yes
2025	1.2	195	29	5492	Yes
2026	3	187	23	5494	Yes
2027	1.3	210	25	5494	Yes
2028	3.4	168	26	5490	Yes
2029	1.9	158	25	5496	Yes
2030	4.1	201	27	5497	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	8.1	389	17	5498	No
3002	6.5	284	17	5508	Yes
3003	7.6	411	16	5501	Yes
3004	8.3	451	16	5491	Yes
3005	7.7	340	18	5506	Yes
3006	8.7	394	17	5494	Yes
3007	8.3	295	18	5499	Yes
3008	7.5	494	18	5504	Yes
3009	9.5	291	18	5494	Yes
3010	9	370	17	5495	No
3011	9	312	17	5491	No
3012	6.7	286	18	5497	Yes
3013	9.1	359	16	5503	Yes
3014	7.1	479	16	5508	No
3015	9.7	447	16	5499	Yes
3016	10	329	16	5506	Yes
3017	6.8	310	16	5503	Yes
3018	9.3	456	16	5498	Yes
3019	8.4	331	18	5499	Yes
3020	7	372	18	5491	Yes
3021	6.4	260	17	5491	Yes
3022	7.4	314	18	5507	Yes
3023	9.1	466	17	5505	Yes
3024	6.2	415	18	5491	Yes
3025	8.2	462	17	5508	Yes
3026	7.7	424	16	5509	Yes
3027	9.8	484	16	5499	Yes
3028	9.5	458	17	5495	No
3029	7.8	413	18	5504	Yes
3030	9.9	400	18	5502	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	12.1	368	15	5500	Yes
4002	17.1	250	16	5501	Yes
4003	19.1	481	16	5498	Yes
4004	15.5	258	15	5490	No
4005	13.6	252	15	5501	Yes
4006	19.6	293	14	5496	Yes
4007	18.2	432	12	5502	No
4008	16.1	486	14	5501	Yes
4009	15.2	269	12	5494	Yes
4010	17.8	336	14	5491	Yes
4011	13.1	383	13	5494	Yes
4012	11.9	344	15	5491	No
4013	16.7	404	14	5504	Yes
4014	16	378	12	5508	No
4015	12.2	334	13	5491	Yes
4016	16.8	320	14	5506	Yes
4017	18.3	288	14	5501	Yes
4018	14.2	421	15	5504	No
4019	16.2	402	14	5503	Yes
4020	12.6	430	13	5491	Yes
4021	19.8	423	16	5496	No
4022	12.4	464	15	5507	Yes
4023	15.3	353	15	5502	No
4024	13.2	406	12	5509	Yes
4025	12.3	441	15	5493	No
4026	14.9	256	13	5493	Yes
4027	19.3	303	16	5496	Yes
4028	18.1	265	16	5503	Yes
4029	13.8	325	13	5506	No
4030	13.1	299	16	5501	Yes

TYPE 5 DETECTION PROBABILITY

Data Sheet for FCC Long Pulse Radar Type 5		
Trial	Frequency (MHz)	Successful Detection (Yes/No)
1	5500	Yes
2	5500	Yes
3	5500	Yes
4	5500	Yes
5	5500	Yes
6	5500	Yes
7	5500	Yes
8	5500	Yes
9	5500	Yes
10	5500	Yes
11	5499	No
12	5497	Yes
13	5497	Yes
14	5498	Yes
15	5497	Yes
16	5497	Yes
17	5497	Yes
18	5497	No
19	5496	Yes
20	5495	Yes
21	5504	Yes
22	5506	Yes
23	5506	Yes
24	5501	Yes
25	5503	Yes
26	5506	Yes
27	5507	No
28	5506	Yes
29	5507	No
30	5506	No

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	754	5490	6	No
2	1229	5491	3	No
3	1704	5492	4	Yes
4	2179	5493	5	Yes
5	2654	5494	2	Yes
6	3129	5495	5	Yes
7	3604	5496	5	Yes
8	4079	5497	5	Yes
9	4554	5498	3	Yes
10	5029	5499	4	Yes
11	5504	5500	2	Yes
12	5979	5501	5	Yes
13	6454	5502	3	Yes
14	6929	5503	5	Yes
15	7404	5504	4	Yes
16	7879	5505	4	Yes
17	8354	5506	2	Yes
18	8829	5507	3	Yes
19	9304	5508	3	No
20	9779	5509	4	Yes
21	10254	5490	3	No
22	10729	5491	4	Yes
23	11204	5492	5	Yes
24	11679	5493	3	Yes
25	12154	5494	3	Yes
26	12629	5495	4	Yes
27	13104	5496	2	No
28	13579	5497	5	Yes
29	14054	5498	3	Yes
30	14529	5499	5	Yes
31	15004	5500	6	Yes
32	15479	5501	2	Yes
33	15954	5502	4	Yes
34	16429	5503	7	Yes
35	16904	5504	3	Yes
36	17379	5505	2	No
37	17854	5506	4	Yes
38	18329	5507	4	Yes
39	18804	5508	4	Yes
40	19279	5509	2	No

8.3. RESULTS FOR 40 MHz BANDWIDTH

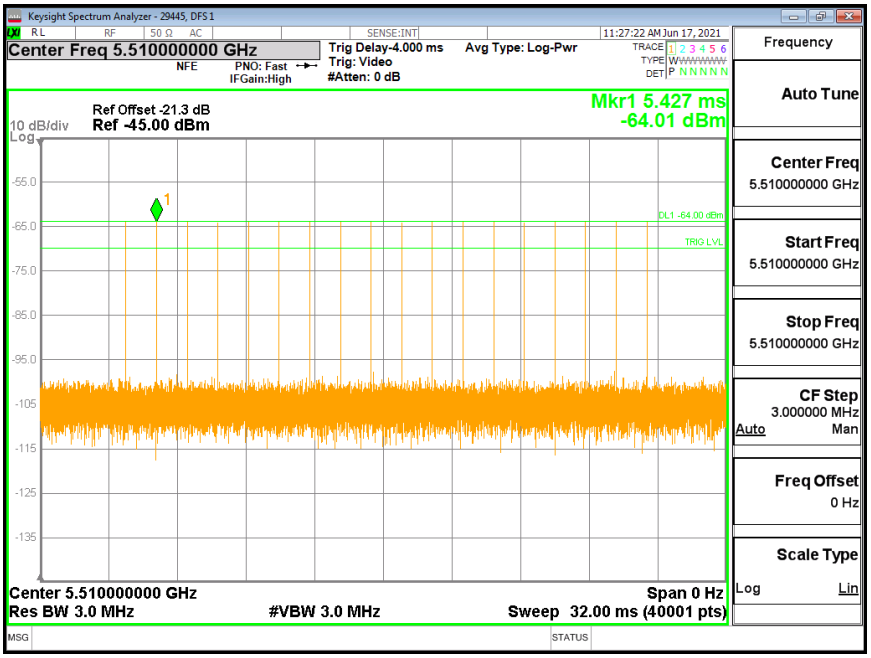
8.3.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5510 MHz.

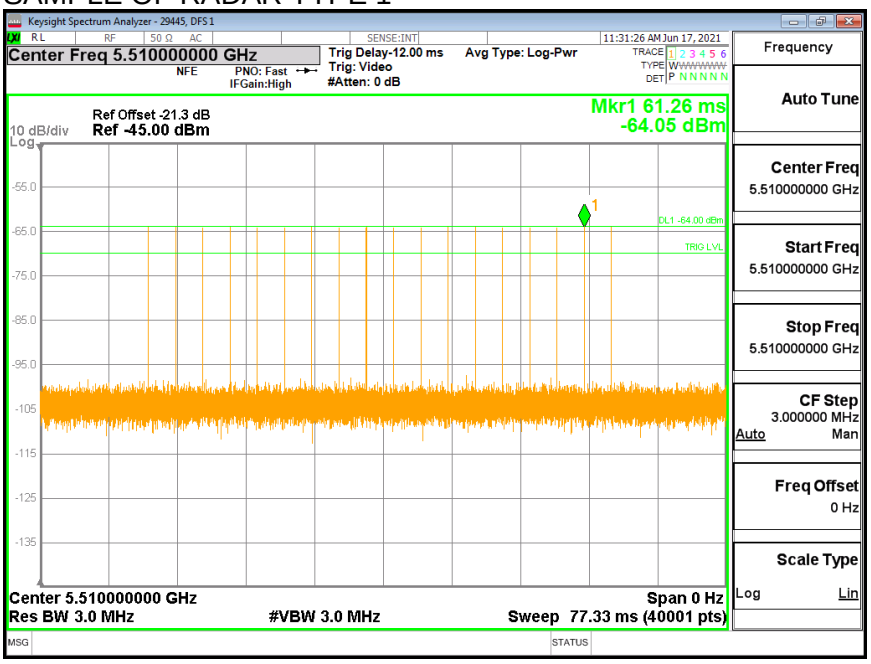
8.3.2. RADAR WAVEFORMS AND TRAFFIC

RADAR WAVEFORMS

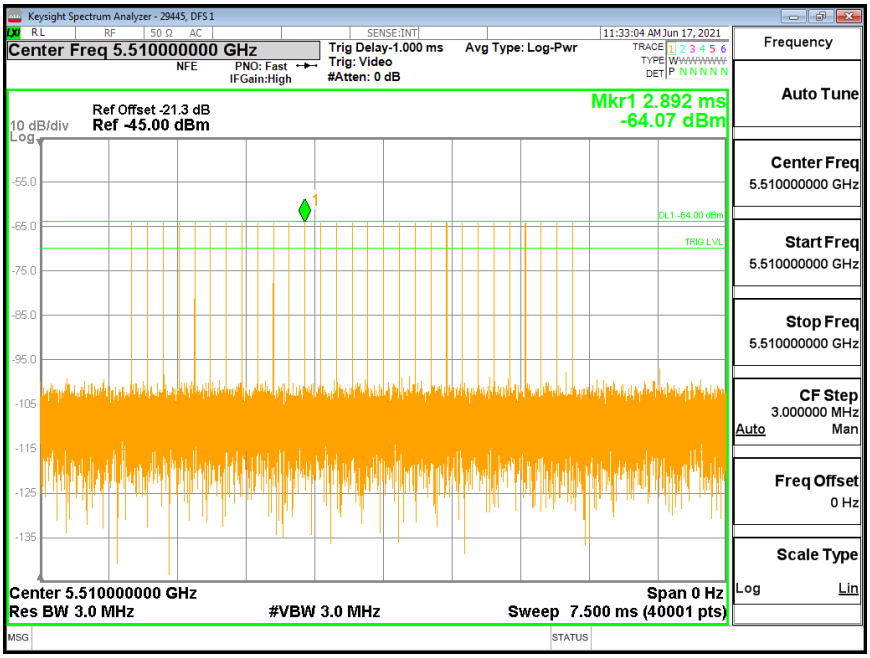
SHORT PULSE RADAR TYPE 0



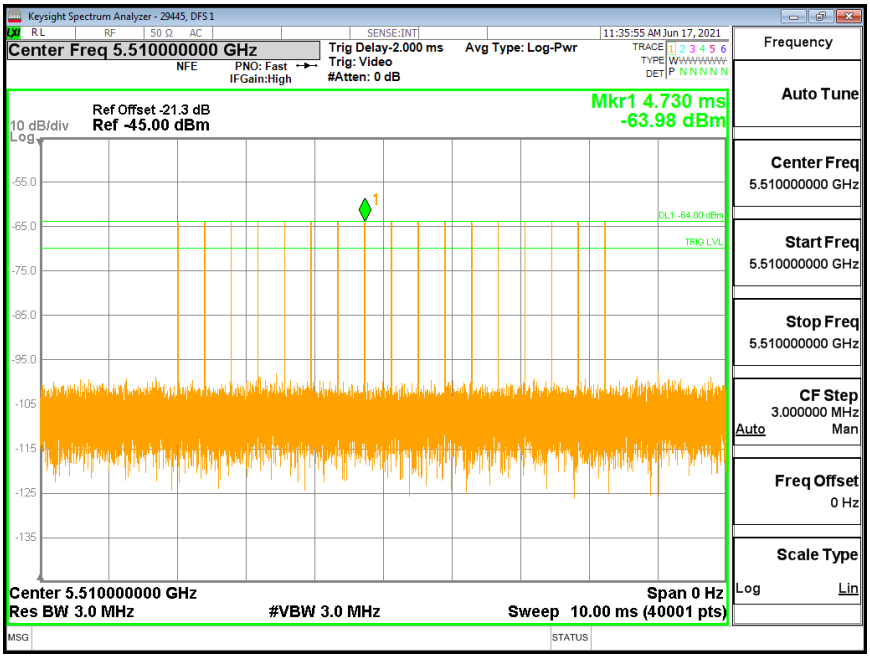
SAMPLE OF RADAR TYPE 1



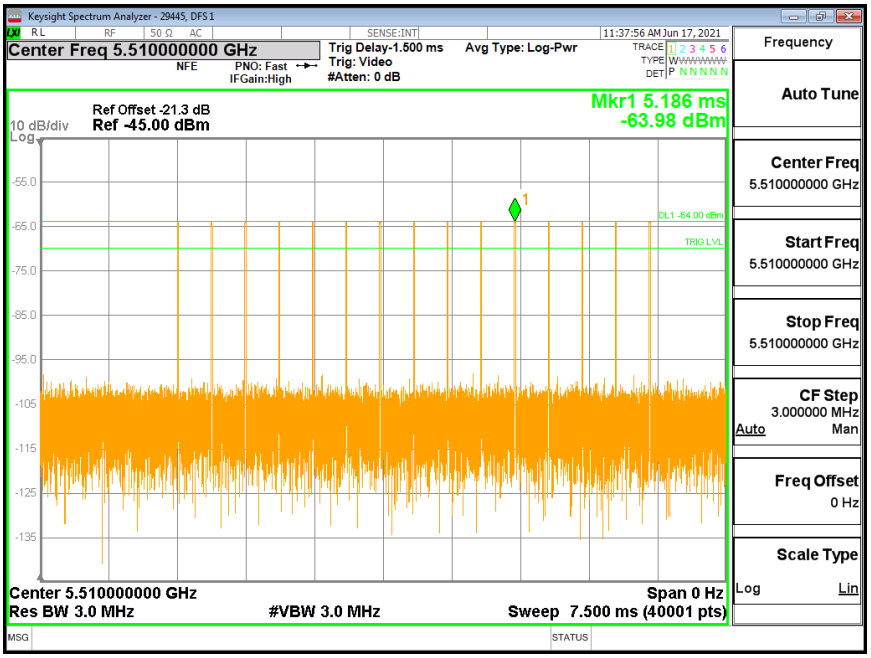
SAMPLE OF RADAR TYPE 2



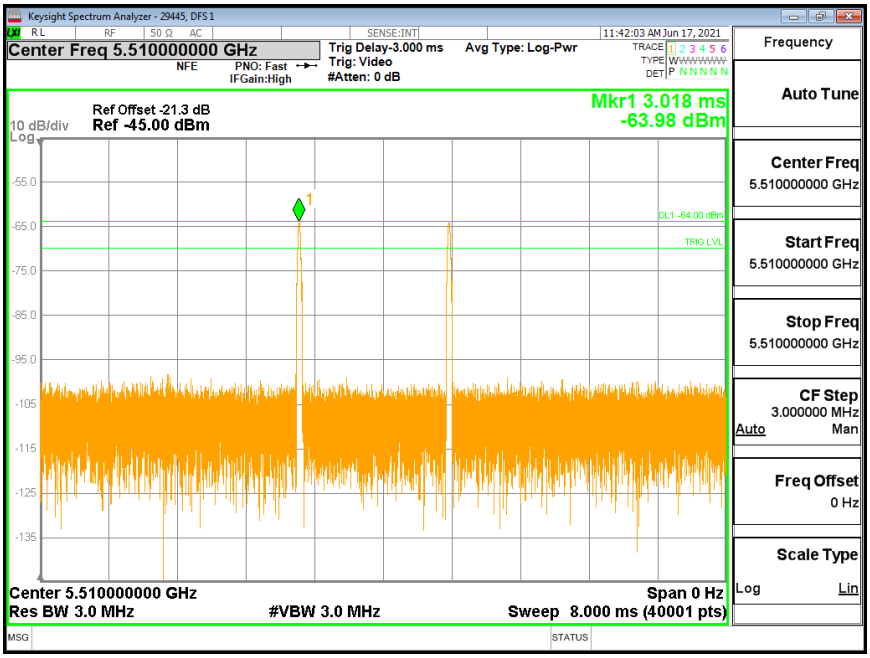
SAMPLE OF RADAR TYPE 3



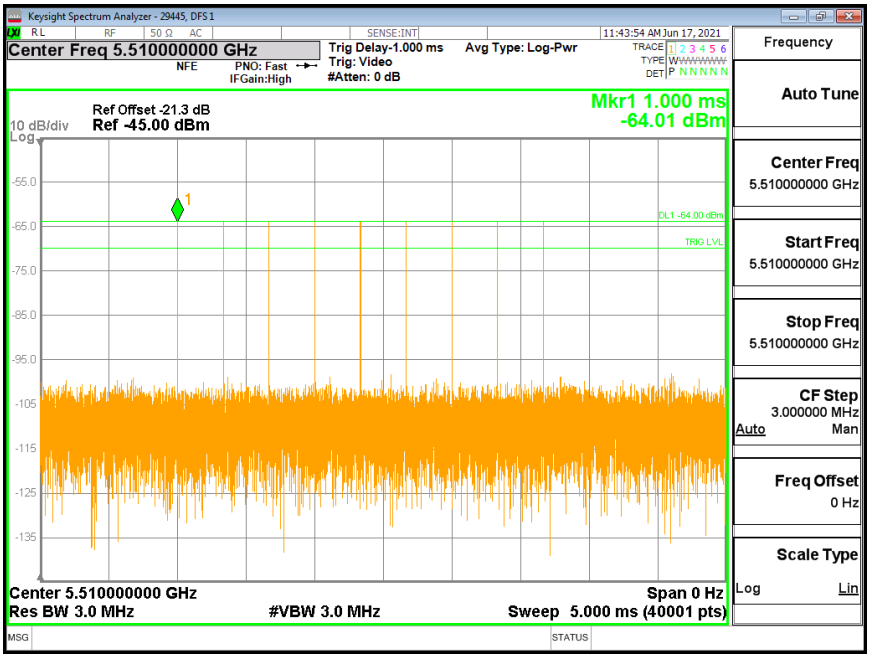
SAMPLE OF RADAR TYPE 4



SAMPLE OF SINGLE BURST OF RADAR TYPE 5

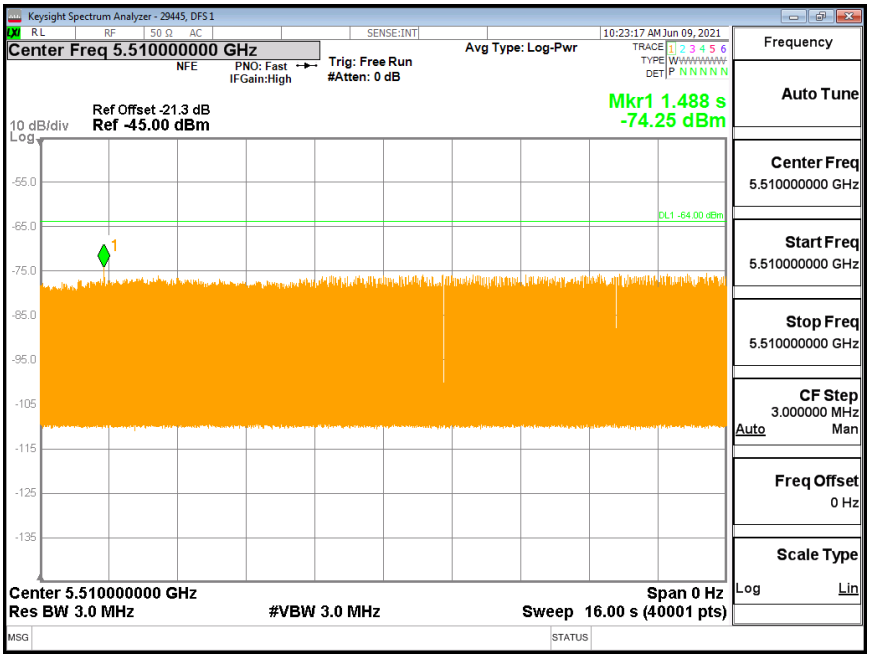


SINGLE BURST OF RADAR TYPE 6

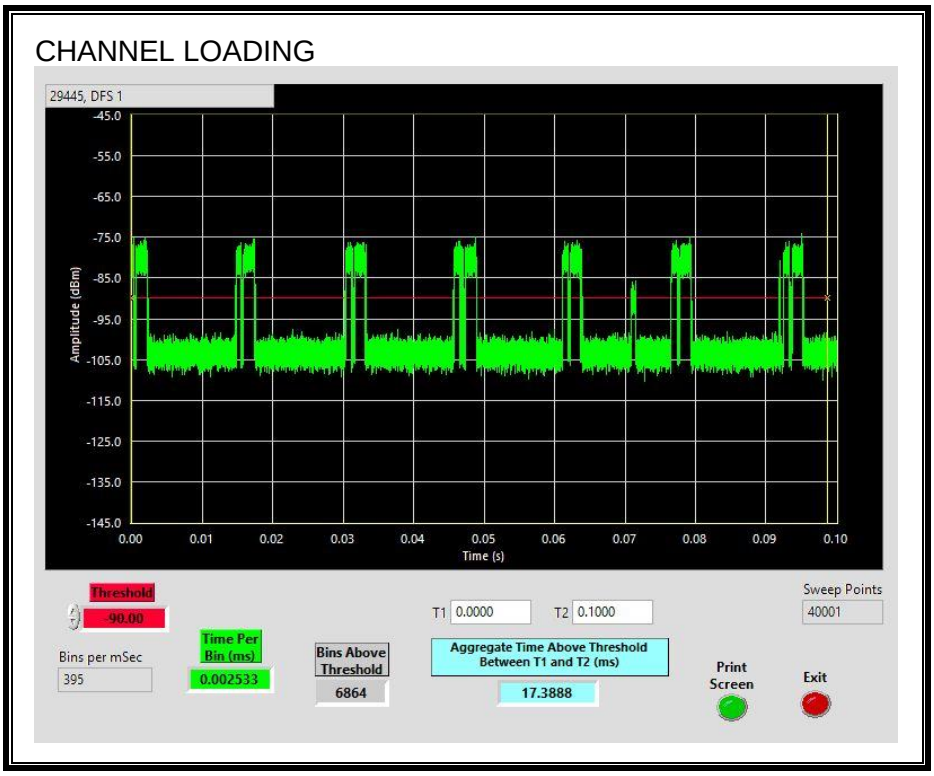


TRAFFIC

TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 17.39%

8.3.3. 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)
30.18	118.7	88.5	28.5

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)
30.08	61.84	31.8	3.2

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)
30.08	115.6	85.5	57.0

QUALITATIVE RESULTS

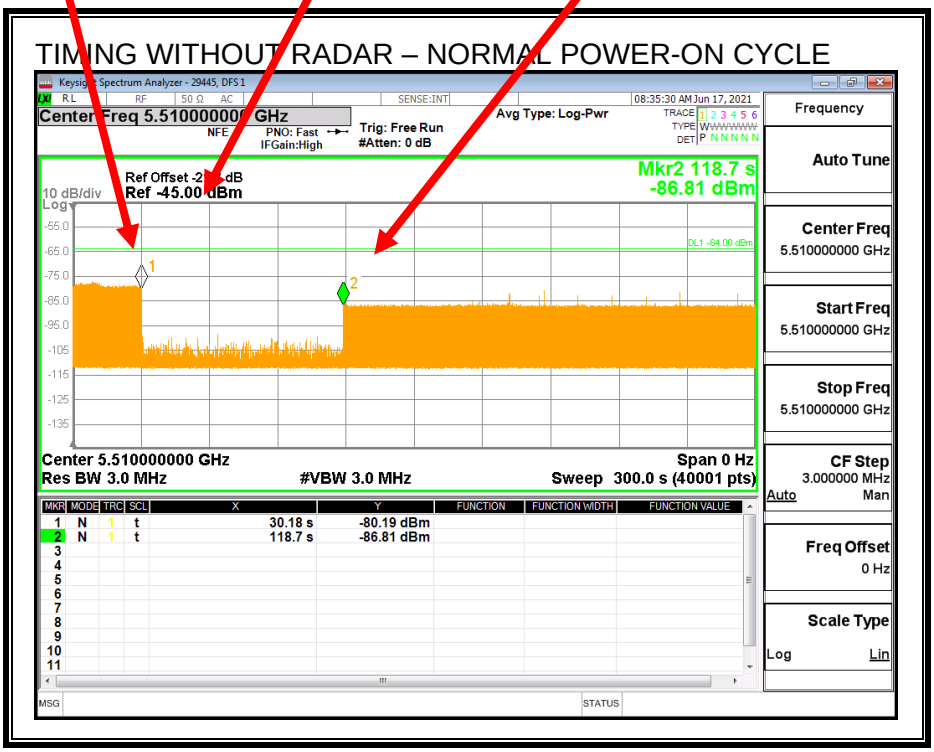
Timing of Radar Burst	Display on Control Computer	Spectrum Analyzer Display
No Radar Triggered	EUT marks Channel as active	Transmissions begin on channel after completion of the initial power-up cycle and the CAC
Within 0 to 6 second window	EUT indicates radar detected	No transmissions on channel
Within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

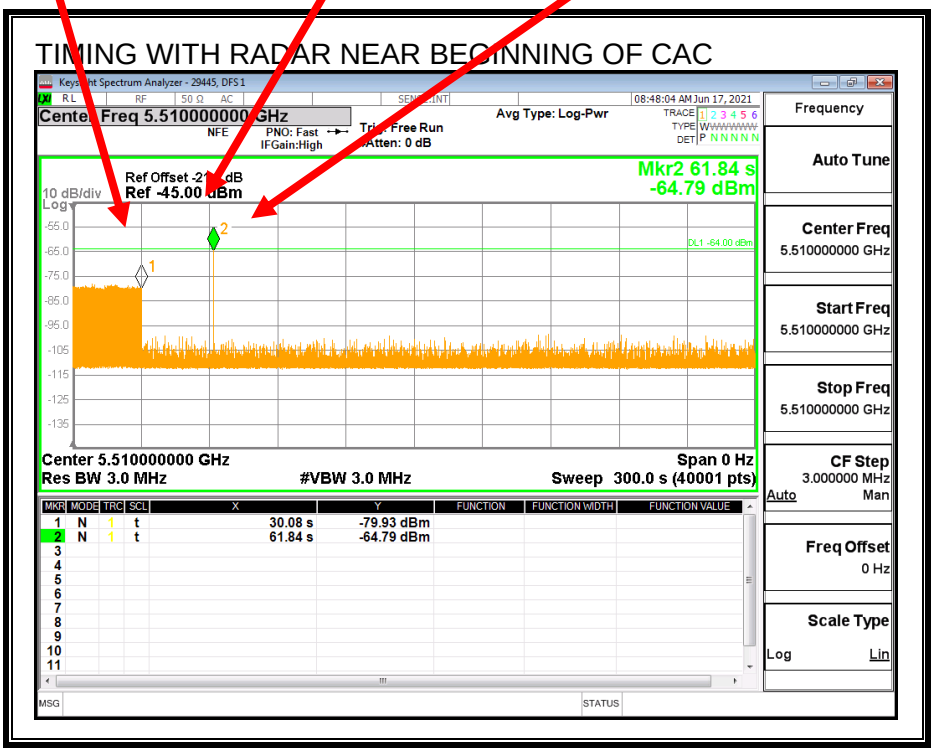
End of CAC
Traffic is Initiated



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



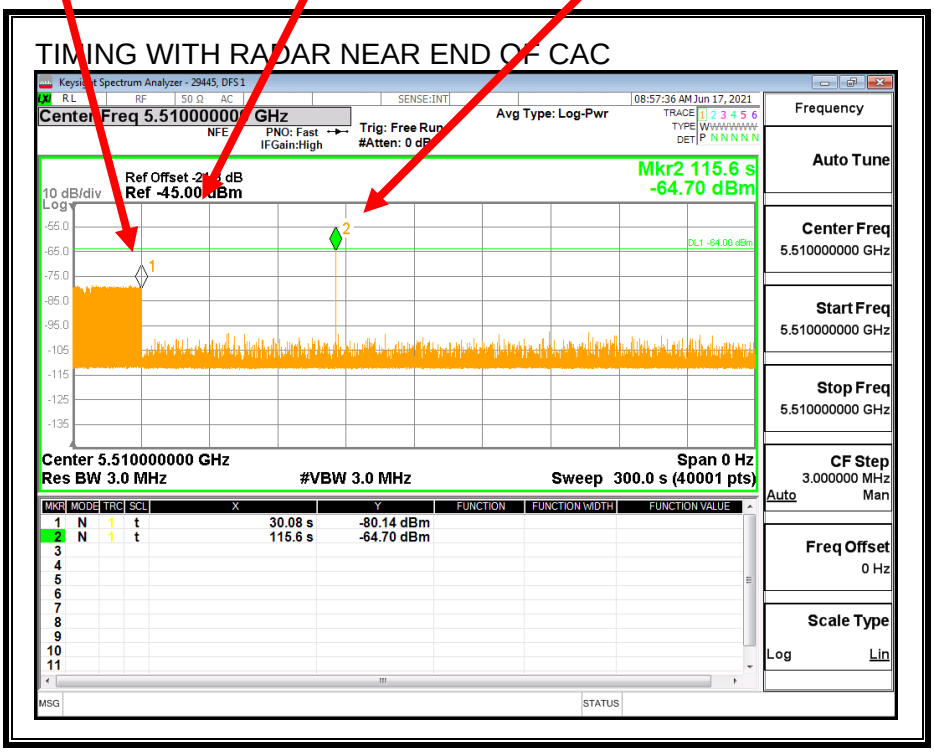
No EUT transmissions were observed after the radar signal.

TIMING WITH RADAR NEAR END OF CAC

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

End of Initial Power-up cycle
Start of CAC

Radar Signal Applied



No EUT transmissions were observed after the radar signal.

8.3.4. OVERLAPPING CHANNEL TESTS

RESULTS

The channel spacing is not less than the channel bandwidth therefore the EUT does not have an overlapping channel plan.

8.3.5. 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)

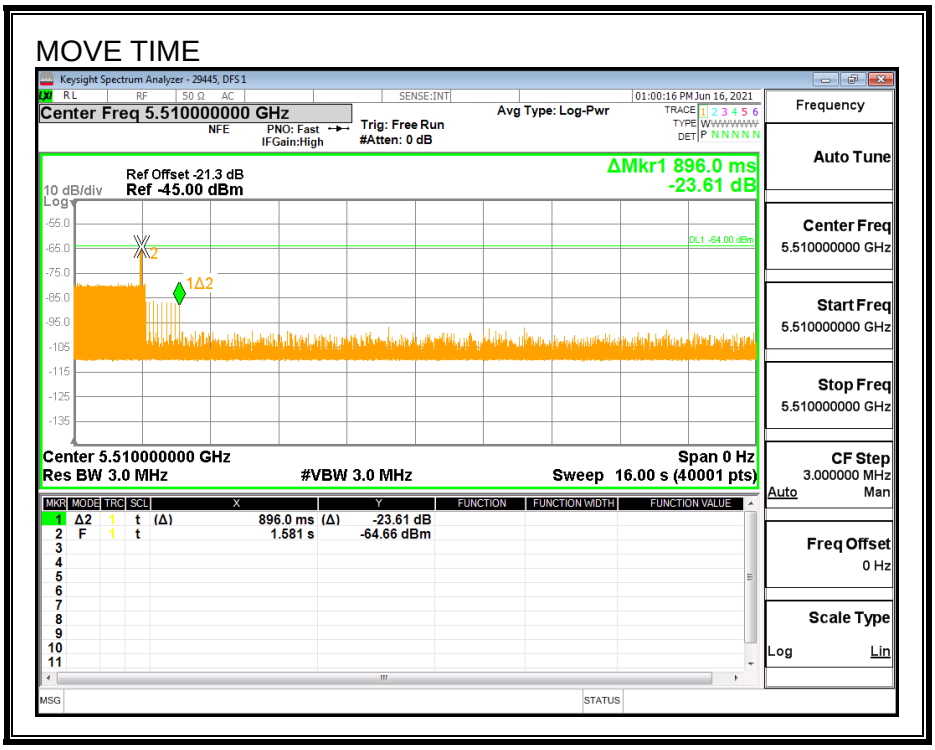
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

Channel Move Time (sec)	Limit (sec)
0.896	10

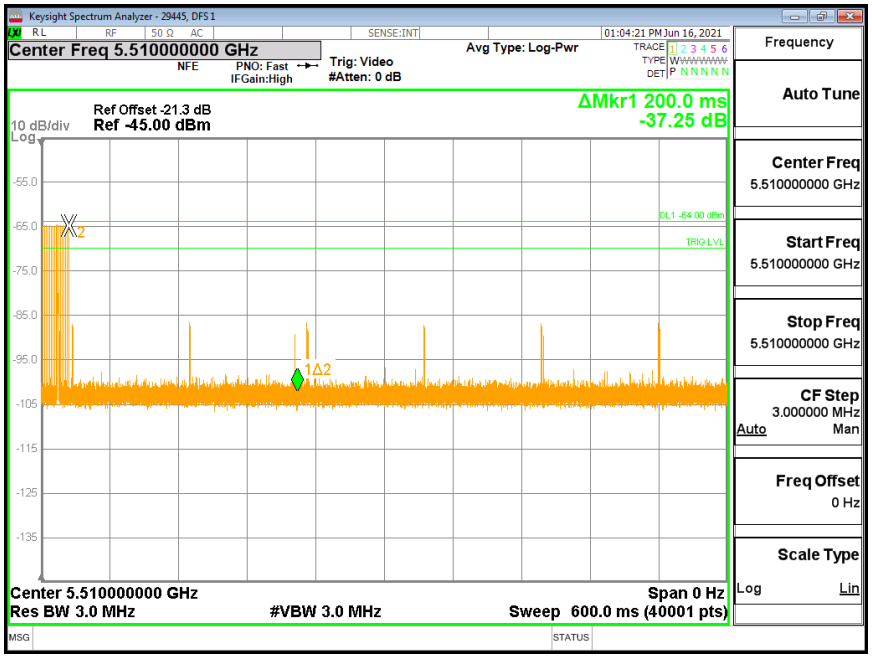
Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
8.40	60

MOVE TIME



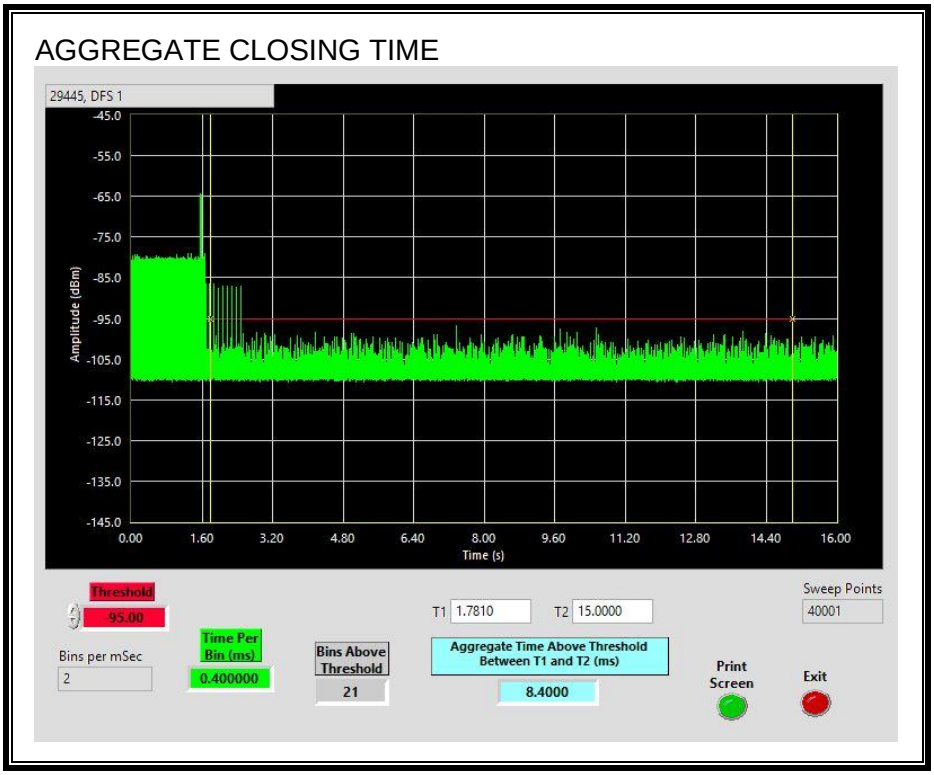
CHANNEL CLOSING TIME

CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

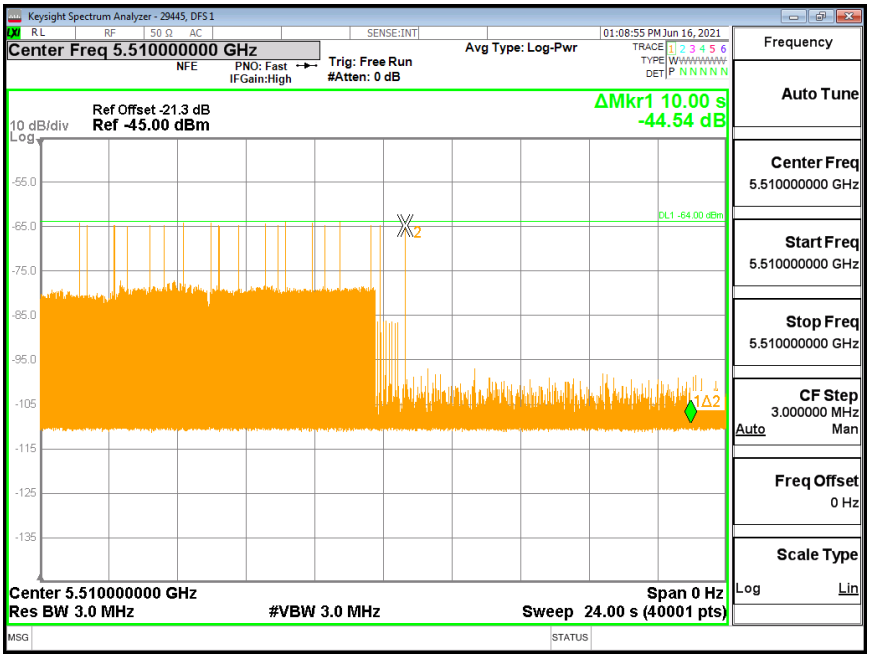
Only intermittent transmissions are observed during the aggregate monitoring period.



LONG PULSE CHANNEL MOVE TIME

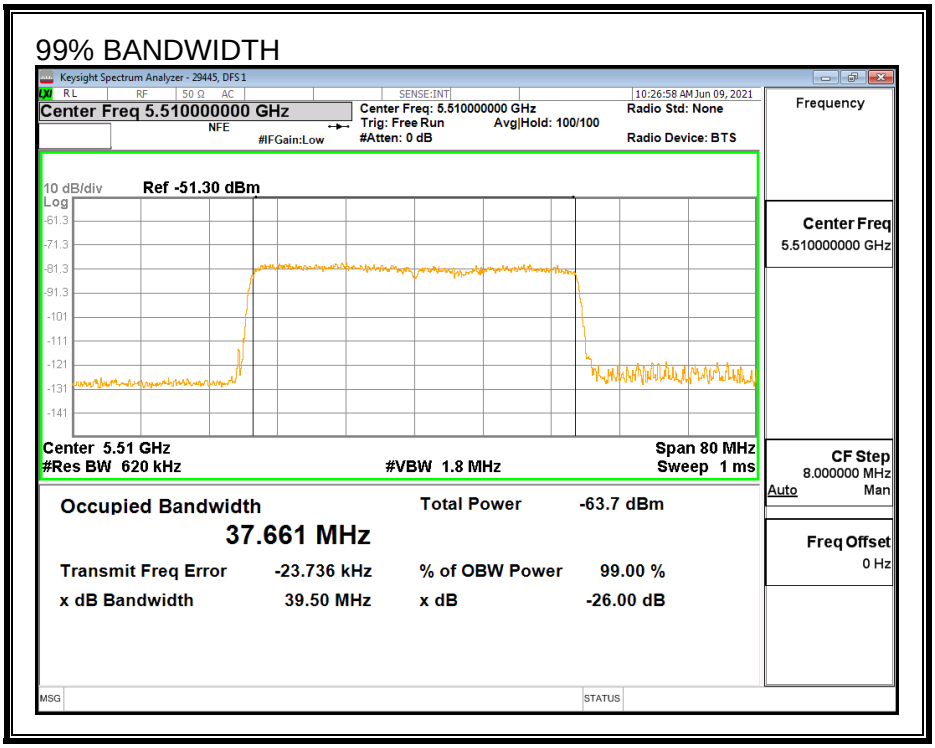
The traffic ceases prior to 10 seconds after the end of the radar waveform.

MOVE TIME FOR LONG PULSE RADAR



8.3.6. DETECTION BANDWIDTH

REFERENCE PLOT OF 99% POWER BANDWIDTH



RESULTS

F_L (MHz)	F_H (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (%)	Minimum Limit (%)
5490	5530	40	37.661	106.2	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
5489	10	0	0	
5490	10	10	100	FL
5495	10	10	100	
5500	10	10	100	
5505	10	10	100	
5510	10	10	100	
5515	10	10	100	
5520	10	10	100	
5525	10	10	100	
5530	10	10	100	FH
5531	10	0	0	

8.3.7. 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	86.67	60	Pass	5490	5530	37.66	DFS 1	29445	v4.1
FCC Short Pulse Type 2	30	96.67	60	Pass	5490	5530	37.66	DFS 1	29445	v4.1
FCC Short Pulse Type 3	30	93.33	60	Pass	5490	5530	37.66	DFS 1	29445	v4.1
FCC Short Pulse Type 4	30	73.33	60	Pass	5490	5530	37.66	DFS 1	29445	v4.1
Aggregate		87.50	80	Pass						
FCC Long Pulse Type 5	30	93.33	80	Pass	5490	5530	37.66	DFS 1	29445	v4.1
FCC Hopping Type 6	41	97.56	70	Pass	5490	5530		DFS 1	29445	v4.1

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	5491	No
1002	1	618	86	A	5496	Yes
1003	1	558	95	A	5506	Yes
1004	1	518	102	A	5504	Yes
1005	1	538	99	A	5521	Yes
1006	1	778	68	A	5527	Yes
1007	1	878	61	A	5496	Yes
1008	1	898	59	A	5510	Yes
1009	1	838	63	A	5517	Yes
1010	1	638	83	A	5496	Yes
1011	1	798	67	A	5505	Yes
1012	1	918	58	A	5518	Yes
1013	1	578	92	A	5518	Yes
1014	1	598	89	A	5515	Yes
1015	1	718	74	A	5520	Yes
1016	1	982	54	B	5498	Yes
1017	1	1420	38	B	5527	Yes
1018	1	2182	25	B	5520	Yes
1019	1	1397	38	B	5490	Yes
1020	1	1094	49	B	5519	Yes
1021	1	2985	18	B	5521	No
1022	1	2812	19	B	5515	Yes
1023	1	1091	49	B	5503	Yes
1024	1	2400	22	B	5497	No
1025	1	808	66	B	5522	Yes
1026	1	2247	24	B	5497	No
1027	1	2138	25	B	5503	Yes
1028	1	1158	46	B	5520	Yes
1029	1	1179	45	B	5505	Yes
1030	1	2877	19	B	5505	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	1.1	172	29	5504	Yes
2002	1.8	223	28	5526	No
2003	1.2	230	25	5517	Yes
2004	2.2	166	24	5524	Yes
2005	1.8	215	28	5513	Yes
2006	1	199	25	5530	Yes
2007	4.9	171	26	5516	Yes
2008	4.4	159	23	5496	Yes
2009	2.5	178	24	5504	Yes
2010	4.3	213	29	5523	Yes
2011	2.6	155	27	5503	Yes
2012	4.7	194	28	5493	Yes
2013	3.2	184	27	5525	Yes
2014	1.3	226	29	5521	Yes
2015	2.2	220	28	5491	Yes
2016	2.8	186	27	5499	Yes
2017	3.9	227	27	5521	Yes
2018	4.6	159	26	5498	Yes
2019	4	204	23	5515	Yes
2020	5	222	29	5498	Yes
2021	4.6	190	23	5510	Yes
2022	3.8	173	23	5498	Yes
2023	3.6	226	24	5522	Yes
2024	3.1	214	28	5528	Yes
2025	1.2	195	29	5500	Yes
2026	3	187	23	5498	Yes
2027	1.3	210	25	5526	Yes
2028	3.4	168	26	5524	Yes
2029	1.9	158	25	5513	Yes
2030	4.1	201	27	5507	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	8.1	389	17	5523	No
3002	6.5	284	17	5516	Yes
3003	7.6	411	16	5500	No
3004	8.3	451	16	5504	Yes
3005	7.7	340	18	5517	Yes
3006	8.7	394	17	5499	Yes
3007	8.3	295	18	5527	Yes
3008	7.5	494	18	5494	Yes
3009	9.5	291	18	5497	Yes
3010	9	370	17	5493	Yes
3011	9	312	17	5528	Yes
3012	6.7	286	18	5496	Yes
3013	9.1	359	16	5492	Yes
3014	7.1	479	16	5522	Yes
3015	9.7	447	16	5500	Yes
3016	10	329	16	5515	Yes
3017	6.8	310	16	5507	Yes
3018	9.3	456	16	5517	Yes
3019	8.4	331	18	5500	Yes
3020	7	372	18	5497	Yes
3021	6.4	260	17	5521	Yes
3022	7.4	314	18	5510	Yes
3023	9.1	466	17	5503	Yes
3024	6.2	415	18	5528	Yes
3025	8.2	462	17	5525	Yes
3026	7.7	424	16	5522	Yes
3027	9.8	484	16	5508	Yes
3028	9.5	458	17	5528	Yes
3029	7.8	413	18	5508	Yes
3030	9.9	400	18	5507	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	12.1	368	15	5492	Yes
4002	17.1	250	16	5495	No
4003	19.1	481	16	5513	Yes
4004	15.5	258	15	5525	No
4005	13.6	252	15	5521	Yes
4006	19.6	293	14	5495	No
4007	18.2	432	12	5502	Yes
4008	16.1	486	14	5520	Yes
4009	15.2	269	12	5505	Yes
4010	17.8	336	14	5528	Yes
4011	13.1	383	13	5519	Yes
4012	11.9	344	15	5505	Yes
4013	16.7	404	14	5528	Yes
4014	16	378	12	5524	Yes
4015	12.2	334	13	5494	No
4016	16.8	320	14	5497	No
4017	18.3	288	14	5506	Yes
4018	14.2	421	15	5520	Yes
4019	16.2	402	14	5493	Yes
4020	12.6	430	13	5494	Yes
4021	19.8	423	16	5529	Yes
4022	12.4	464	15	5517	No
4023	15.3	353	15	5510	No
4024	13.2	406	12	5530	No
4025	12.3	441	15	5515	Yes
4026	14.9	256	13	5517	Yes
4027	19.3	303	16	5508	Yes
4028	18.1	265	16	5517	Yes
4029	13.8	325	13	5510	Yes
4030	13.1	299	16	5527	Yes

TYPE 5 DETECTION PROBABILITY

Data Sheet for FCC Long Pulse Radar Type 5		
Trial	Frequency (MHz)	Successful Detection (Yes/No)
1	5510	Yes
2	5510	Yes
3	5510	Yes
4	5510	Yes
5	5510	Yes
6	5510	Yes
7	5510	Yes
8	5510	Yes
9	5510	Yes
10	5510	Yes
11	5499	No
12	5498	Yes
13	5497	Yes
14	5499	Yes
15	5498	Yes
16	5498	Yes
17	5498	Yes
18	5498	Yes
19	5497	Yes
20	5495	Yes
21	5524	No
22	5526	Yes
23	5526	Yes
24	5521	Yes
25	5522	Yes
26	5525	Yes
27	5526	Yes
28	5525	Yes
29	5526	Yes
30	5525	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	557	5490	8	Yes
2	1032	5491	10	Yes
3	1507	5492	6	Yes
4	1982	5493	9	Yes
5	2457	5494	11	Yes
6	2932	5495	11	Yes
7	3407	5496	9	Yes
8	3882	5497	6	Yes
9	4357	5498	10	Yes
10	4832	5499	7	Yes
11	5307	5500	9	Yes
12	5782	5501	8	Yes
13	6257	5502	10	Yes
14	6732	5503	10	Yes
15	7207	5504	6	Yes
16	7682	5505	8	Yes
17	8157	5506	7	Yes
18	8632	5507	10	Yes
19	9107	5508	6	Yes
20	9582	5509	14	Yes
21	10057	5510	7	Yes
22	10532	5511	8	Yes
23	11007	5512	5	Yes
24	11482	5513	6	Yes
25	11957	5514	9	Yes
26	12432	5515	14	Yes
27	12907	5516	7	Yes
28	13382	5517	14	Yes
29	13857	5518	17	Yes
30	14332	5519	4	Yes
31	14807	5520	9	No
32	15282	5521	6	Yes
33	15757	5522	10	Yes
34	16232	5523	8	Yes
35	16707	5524	7	Yes
36	17182	5525	8	Yes
37	17657	5526	8	Yes
38	18132	5527	9	Yes
39	18607	5528	11	Yes
40	19082	5529	7	Yes
41	19557	5530	5	Yes

8.4. RESULTS FOR 80 MHz BANDWIDTH

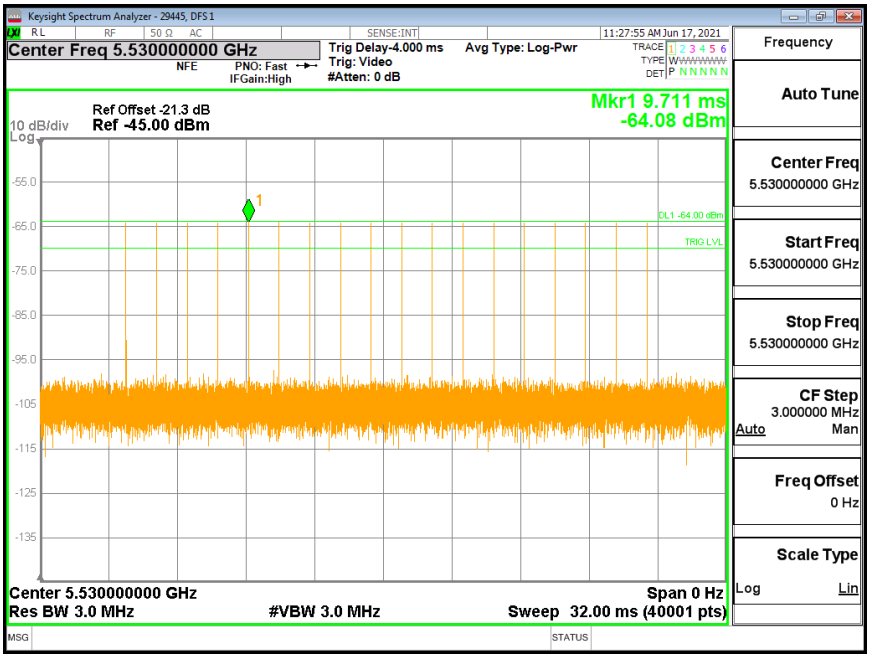
8.4.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5530 MHz.

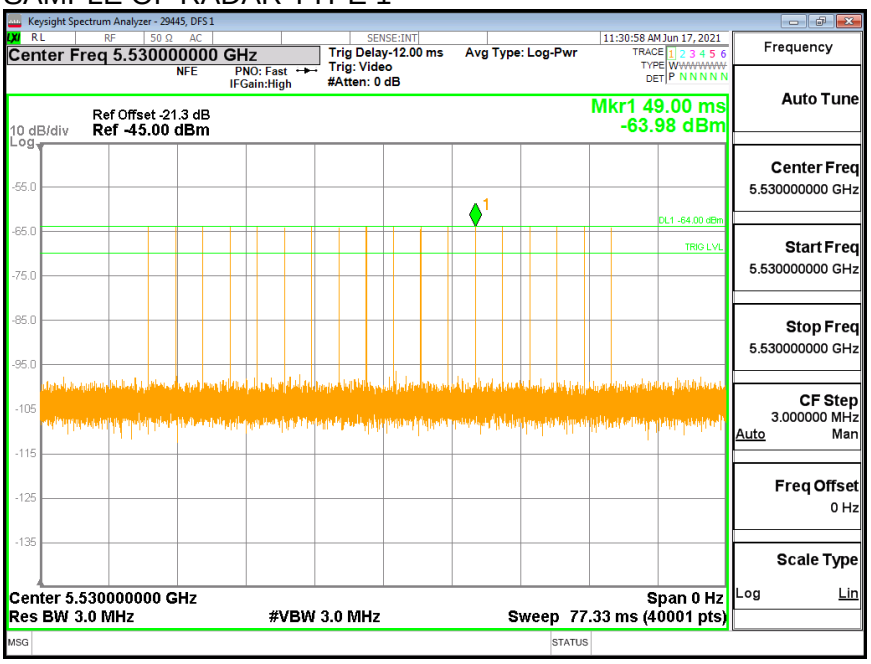
8.4.2. RADAR WAVEFORMS AND TRAFFIC

RADAR WAVEFORMS

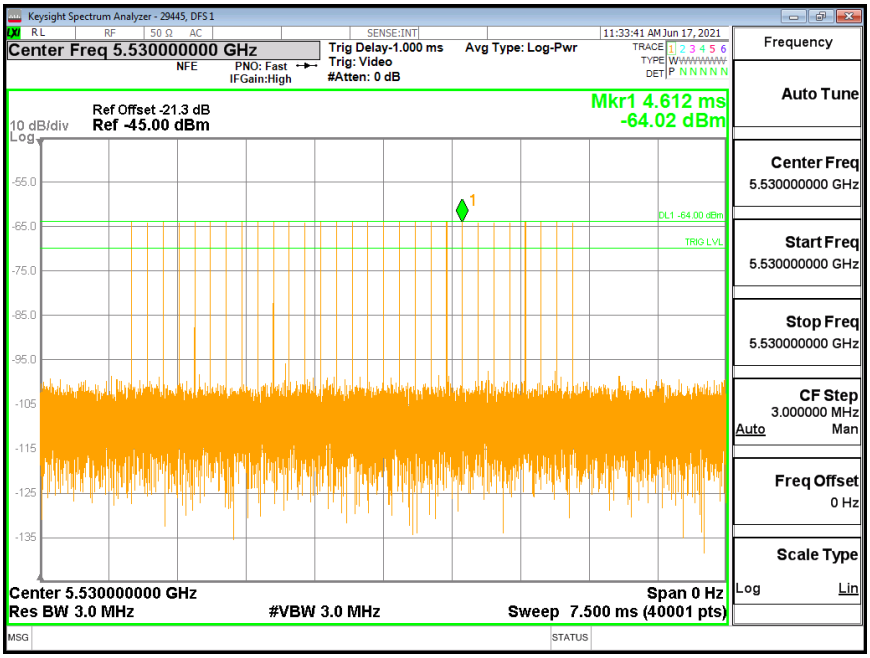
SHORT PULSE RADAR TYPE 0



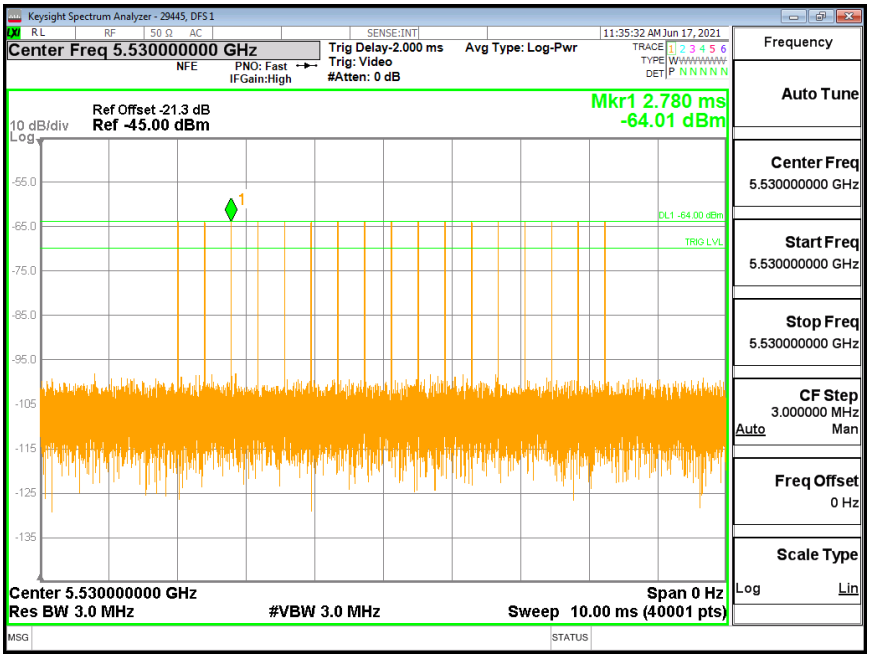
SAMPLE OF RADAR TYPE 1



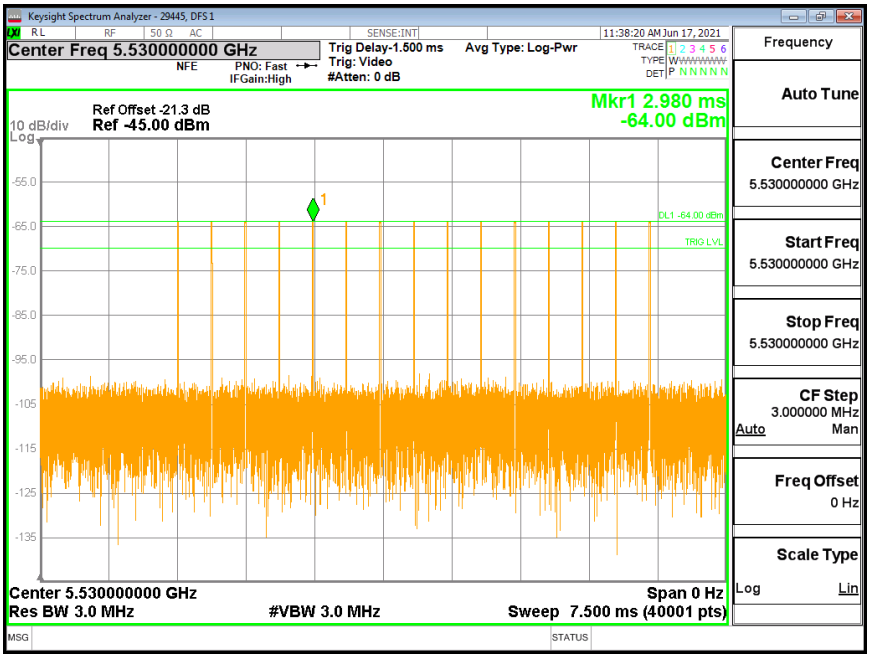
SAMPLE OF RADAR TYPE 2



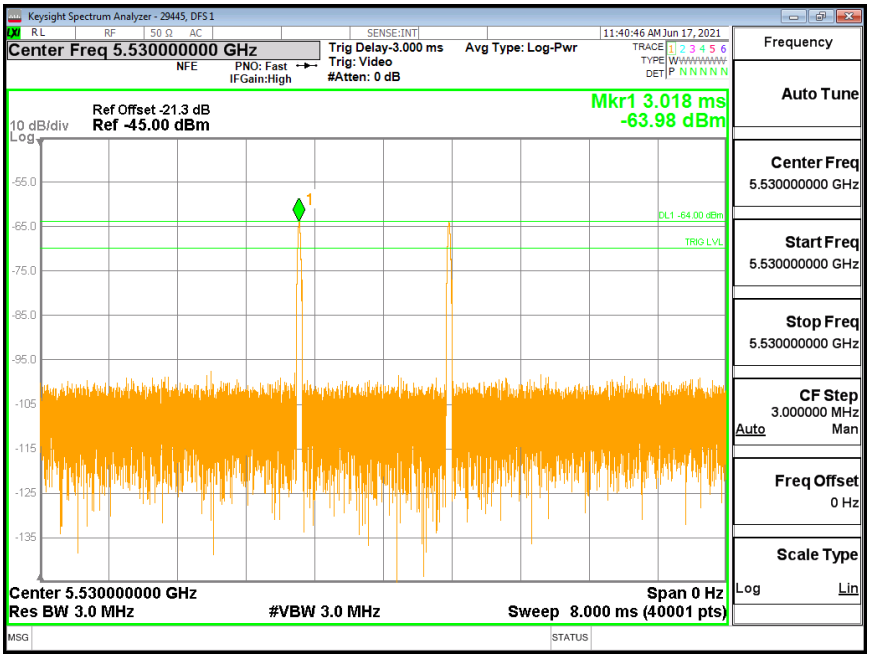
SAMPLE OF RADAR TYPE 3



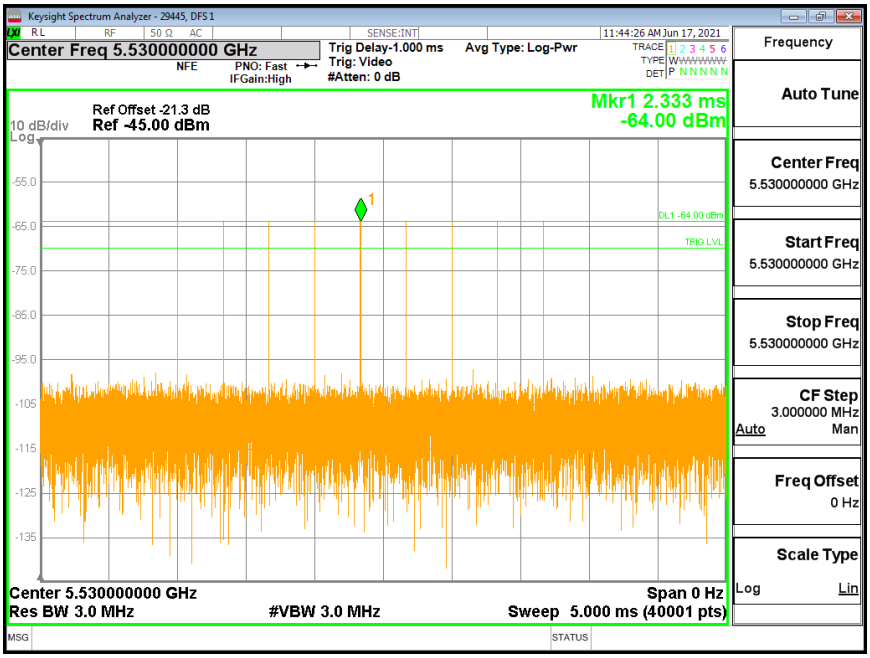
SAMPLE OF RADAR TYPE 4



SAMPLE OF SINGLE BURST OF RADAR TYPE 5

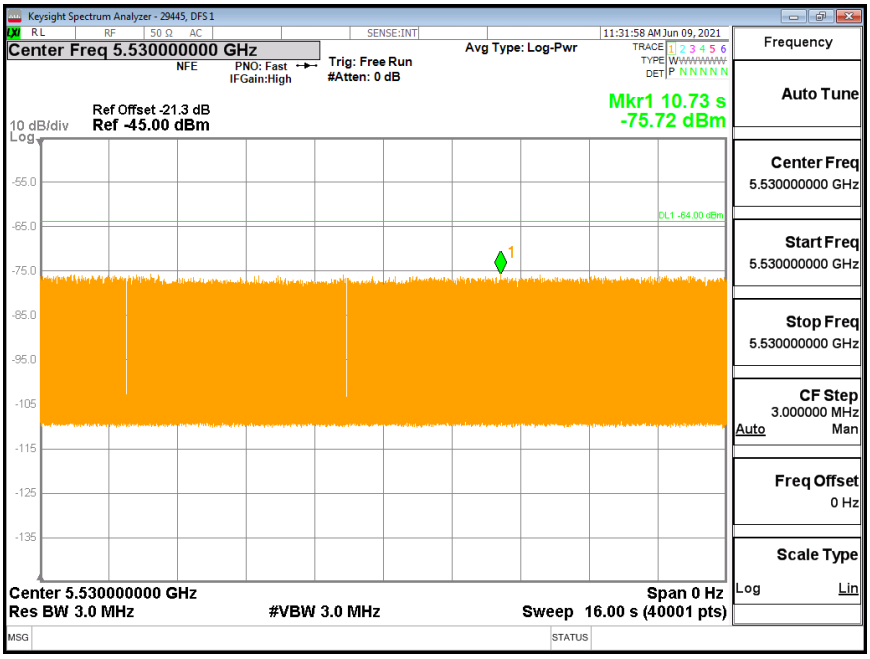


SINGLE BURST OF RADAR TYPE 6

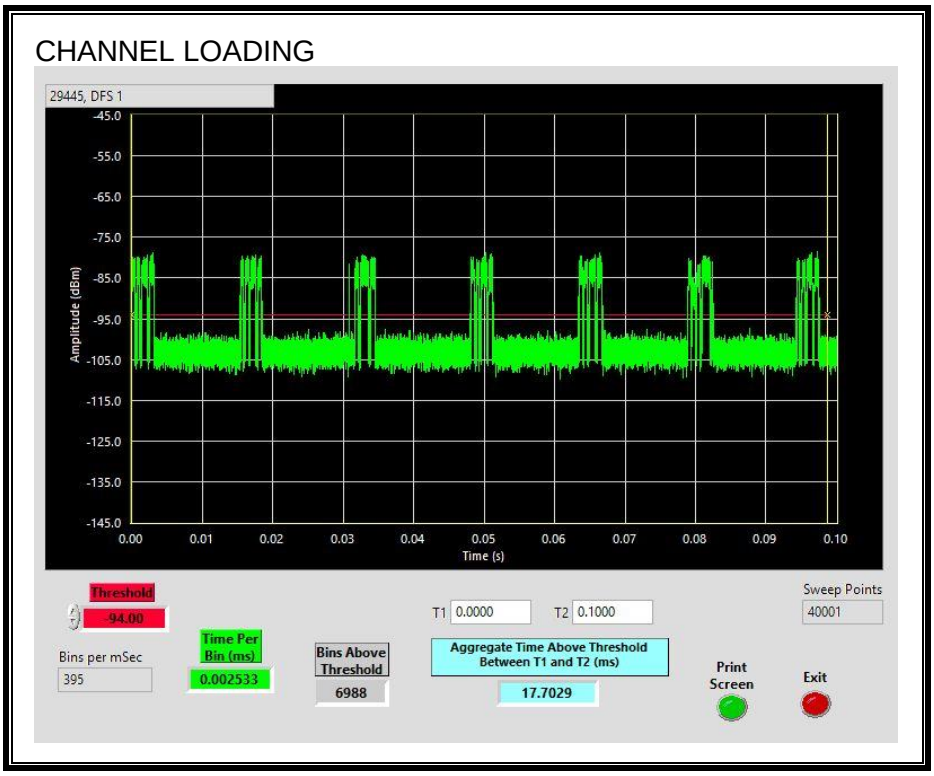


TRAFFIC

TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 17.7%

8.4.3. 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)
30.07	118.5	88.4	28.4

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)
30.61	62.46	31.9	3.4

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)
30.13	115.4	85.3	56.8

QUALITATIVE RESULTS

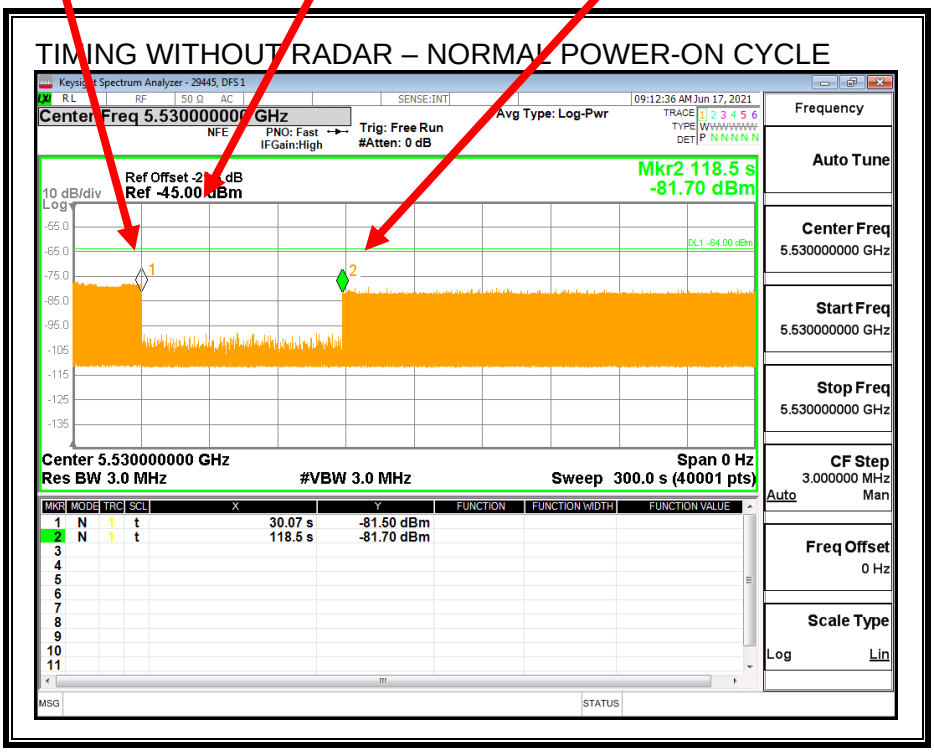
Timing of Radar Burst	Display on Control Computer	Spectrum Analyzer Display
No Radar Triggered	EUT marks Channel as active	Transmissions begin on channel after completion of the initial power-up cycle and the CAC
Within 0 to 6 second window	EUT indicates radar detected	No transmissions on channel
Within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



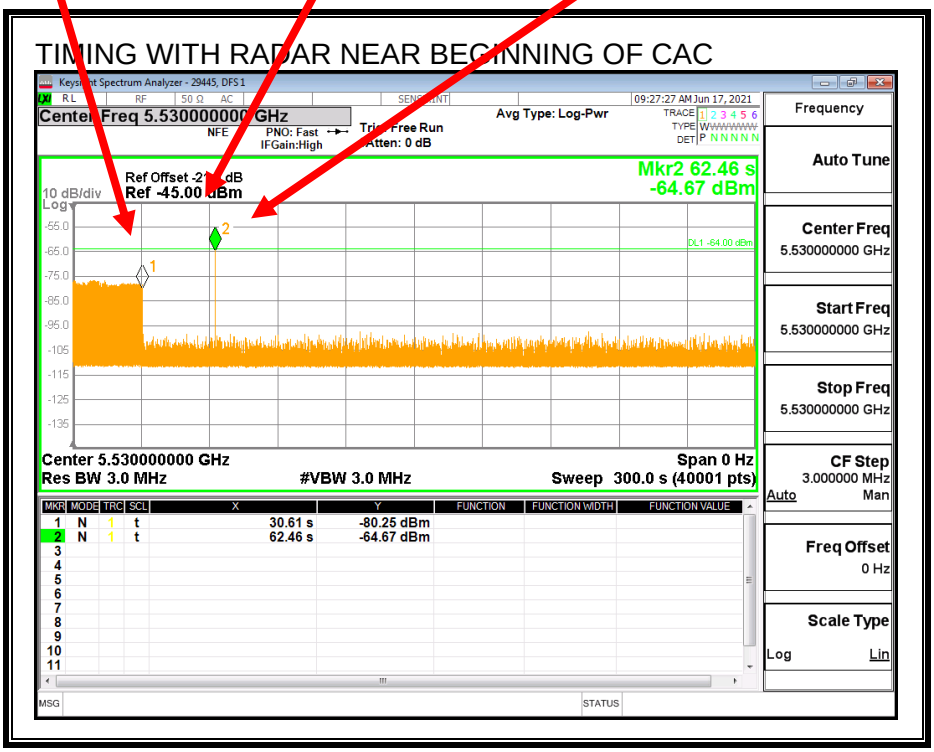
Transmissions begin on channel after completion of the initial power-up cycle and the CAC.

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



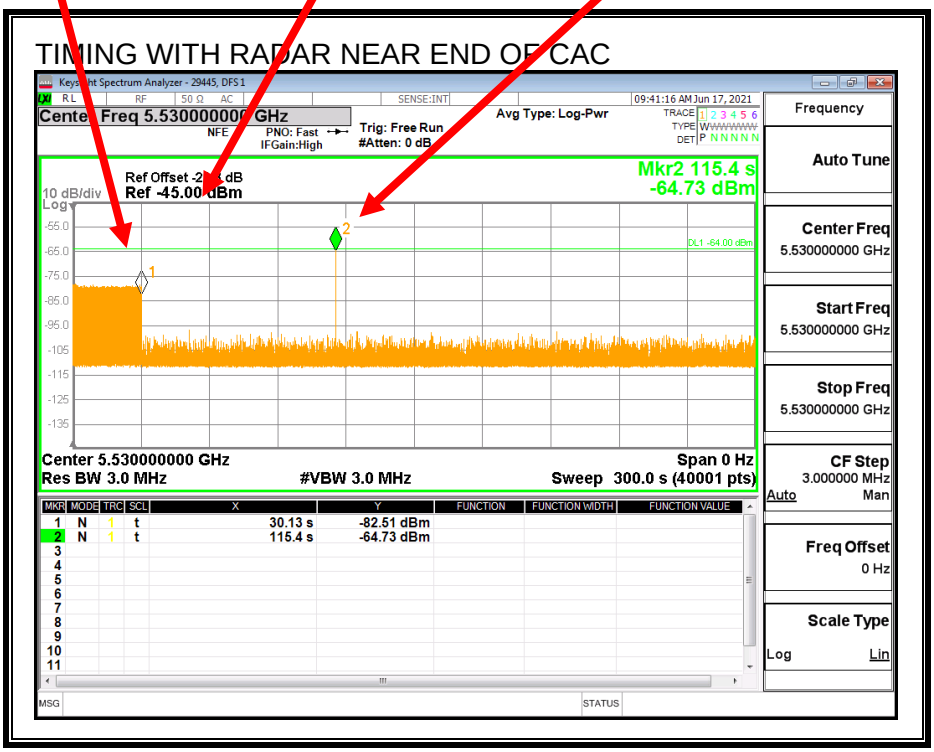
No EUT transmissions were observed after the radar signal.

TIMING WITH RADAR NEAR END OF CAC

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

End of Initial Power-up cycle
Start of CAC

Radar Signal Applied



No EUT transmissions were observed after the radar signal.

8.4.4. OVERLAPPING CHANNEL TESTS

RESULTS

The channel spacing is not less than the channel bandwidth therefore the EUT does not have an overlapping channel plan.

8.4.5. 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)

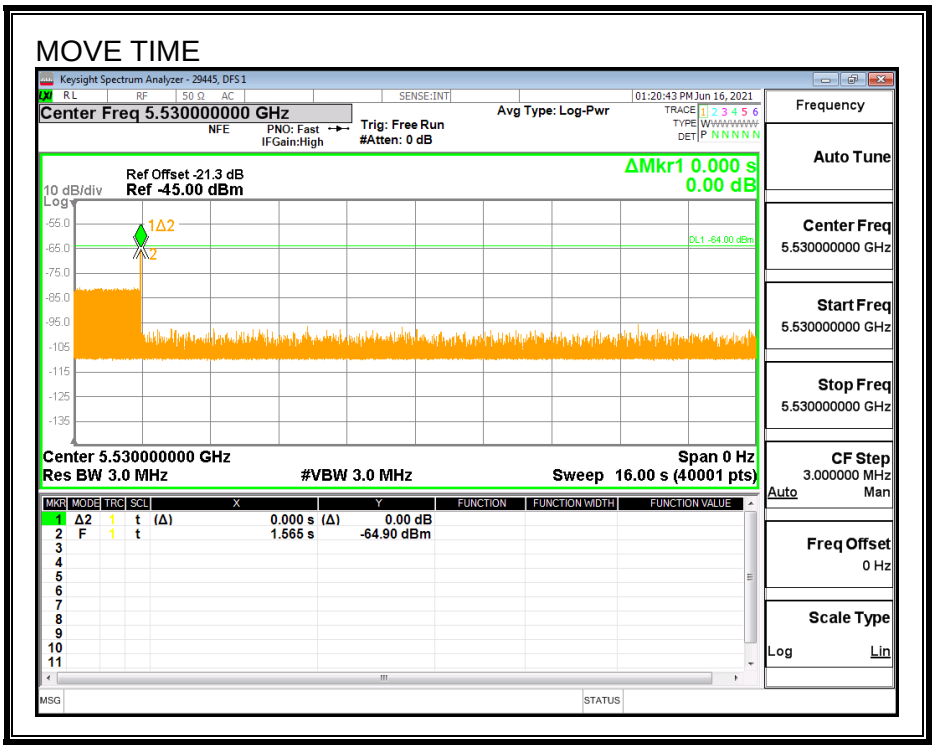
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

Channel Move Time (sec)	Limit (sec)
0.0	10

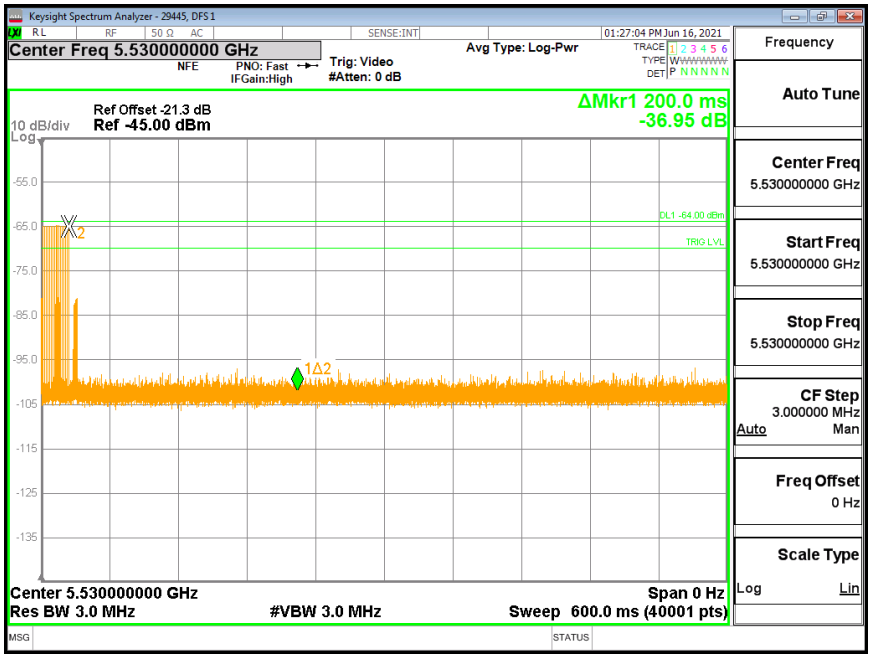
Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
0.0	60

MOVE TIME



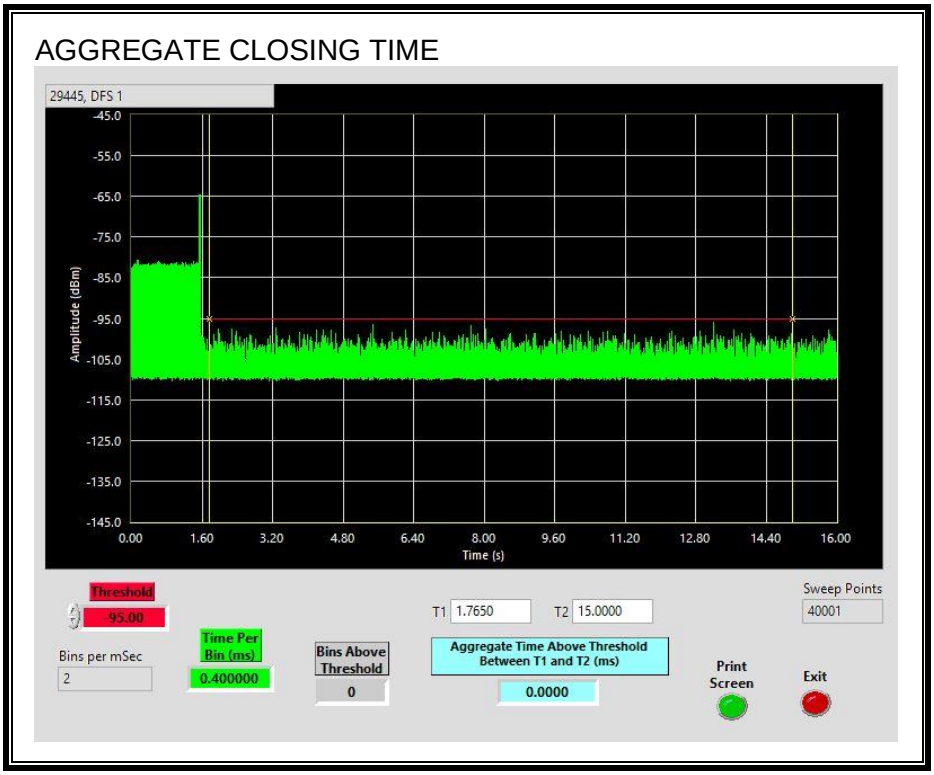
CHANNEL CLOSING TIME

CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

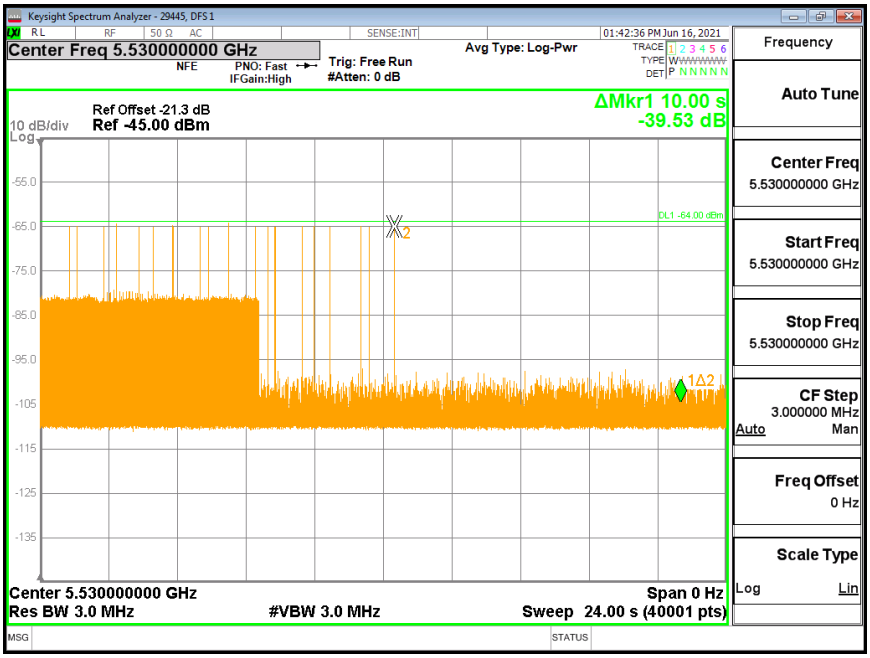
No transmissions are observed during the aggregate monitoring period.



LONG PULSE CHANNEL MOVE TIME

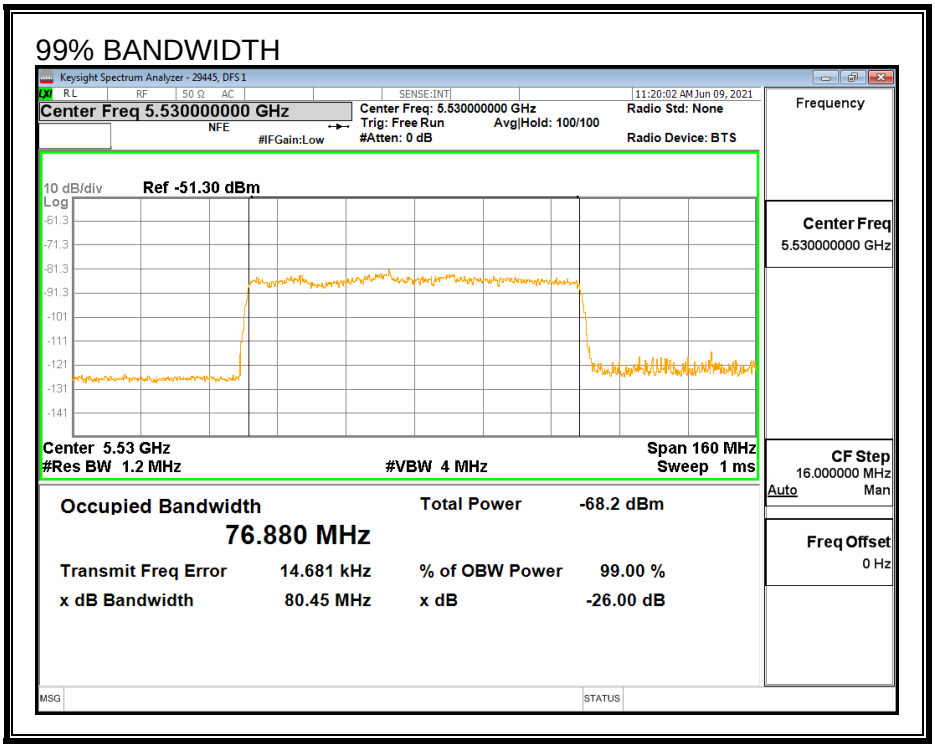
The traffic ceases prior to 10 seconds after the end of the radar waveform.

MOVE TIME FOR LONG PULSE RADAR



8.4.6. DETECTION BANDWIDTH

REFERENCE PLOT OF 99% POWER BANDWIDTH



RESULTS

F_L (MHz)	F_H (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (%)	Minimum Limit (%)
5490	5570	80	76.88	104.1	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
5489	10	0	0	
5490	10	10	100	FL
5495	10	10	100	
5500	10	10	100	
5505	10	10	100	
5510	10	10	100	
5515	10	10	100	
5520	10	10	100	
5525	10	10	100	
5530	10	10	100	
5535	10	10	100	
5540	10	10	100	
5545	10	10	100	
5550	10	10	100	
5555	10	10	100	
5560	10	10	100	
5565	10	10	100	
5570	10	10	100	FH
5571	10	0	0	

8.4.7. 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	5490	5570	76.88	DFS 1	29445	v4.1
FCC Short Pulse Type 2	30	86.67	60	Pass	5490	5570	76.88	DFS 1	29445	v4.1
FCC Short Pulse Type 3	30	66.67	60	Pass	5490	5570	76.88	DFS 1	29445	v4.1
FCC Short Pulse Type 4	30	83.33	60	Pass	5490	5570	76.88	DFS 1	29445	v4.1
Aggregate		83.33	80	Pass						
FCC Long Pulse Type 5	30	100.00	80	Pass	5490	5570	76.88	DFS 1	29445	v4.1
FCC Hopping Type 6	81	100.00	70	Pass	5490	5570		DFS 1	29445	v4.1

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	5550	No
1002	1	618	86	A	5508	Yes
1003	1	558	95	A	5565	Yes
1004	1	518	102	A	5494	Yes
1005	1	538	99	A	5508	Yes
1006	1	778	68	A	5540	Yes
1007	1	878	61	A	5559	Yes
1008	1	898	59	A	5531	Yes
1009	1	838	63	A	5549	Yes
1010	1	638	83	A	5524	Yes
1011	1	798	67	A	5544	Yes
1012	1	918	58	A	5545	Yes
1013	1	578	92	A	5565	Yes
1014	1	598	89	A	5551	Yes
1015	1	718	74	A	5534	Yes
1016	1	982	54	B	5528	Yes
1017	1	1420	38	B	5506	Yes
1018	1	2182	25	B	5560	Yes
1019	1	1397	38	B	5532	Yes
1020	1	1094	49	B	5538	Yes
1021	1	2985	18	B	5549	Yes
1022	1	2812	19	B	5490	Yes
1023	1	1091	49	B	5565	Yes
1024	1	2400	22	B	5563	Yes
1025	1	808	66	B	5530	Yes
1026	1	2247	24	B	5551	Yes
1027	1	2138	25	B	5539	Yes
1028	1	1158	46	B	5570	Yes
1029	1	1179	45	B	5547	Yes
1030	1	2877	19	B	5502	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	1.1	172	29	5540	Yes
2002	1.8	223	28	5558	Yes
2003	1.2	230	25	5533	Yes
2004	2.2	166	24	5529	Yes
2005	1.8	215	28	5509	Yes
2006	1	199	25	5518	Yes
2007	4.9	171	26	5515	No
2008	4.4	159	23	5566	Yes
2009	2.5	178	24	5515	Yes
2010	4.3	213	29	5564	Yes
2011	2.6	155	27	5522	Yes
2012	4.7	194	28	5505	Yes
2013	3.2	184	27	5523	Yes
2014	1.3	226	29	5516	Yes
2015	2.2	220	28	5542	No
2016	2.8	186	27	5515	No
2017	3.9	227	27	5499	Yes
2018	4.6	159	26	5550	No
2019	4	204	23	5537	Yes
2020	5	222	29	5535	Yes
2021	4.6	190	23	5493	Yes
2022	3.8	173	23	5565	Yes
2023	3.6	226	24	5553	Yes
2024	3.1	214	28	5561	Yes
2025	1.2	195	29	5528	Yes
2026	3	187	23	5510	Yes
2027	1.3	210	25	5510	Yes
2028	3.4	168	26	5539	Yes
2029	1.9	158	25	5507	Yes
2030	4.1	201	27	5507	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	8.1	389	17	5492	Yes
3002	6.5	284	17	5519	No
3003	7.6	411	16	5558	No
3004	8.3	451	16	5564	Yes
3005	7.7	340	18	5539	Yes
3006	8.7	394	17	5504	Yes
3007	8.3	295	18	5540	Yes
3008	7.5	494	18	5519	Yes
3009	9.5	291	18	5547	Yes
3010	9	370	17	5533	No
3011	9	312	17	5542	Yes
3012	6.7	286	18	5528	No
3013	9.1	359	16	5509	No
3014	7.1	479	16	5506	No
3015	9.7	447	16	5515	Yes
3016	10	329	16	5548	Yes
3017	6.8	310	16	5559	Yes
3018	9.3	456	16	5547	Yes
3019	8.4	331	18	5551	Yes
3020	7	372	18	5521	Yes
3021	6.4	260	17	5567	No
3022	7.4	314	18	5521	No
3023	9.1	466	17	5564	Yes
3024	6.2	415	18	5501	No
3025	8.2	462	17	5564	No
3026	7.7	424	16	5553	Yes
3027	9.8	484	16	5497	Yes
3028	9.5	458	17	5526	Yes
3029	7.8	413	18	5512	Yes
3030	9.9	400	18	5535	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	12.1	368	15	5501	Yes
4002	17.1	250	16	5536	Yes
4003	19.1	481	16	5556	Yes
4004	15.5	258	15	5546	Yes
4005	13.6	252	15	5555	Yes
4006	19.6	293	14	5569	Yes
4007	18.2	432	12	5526	Yes
4008	16.1	486	14	5538	Yes
4009	15.2	269	12	5526	Yes
4010	17.8	336	14	5563	Yes
4011	13.1	383	13	5538	Yes
4012	11.9	344	15	5564	Yes
4013	16.7	404	14	5503	Yes
4014	16	378	12	5502	Yes
4015	12.2	334	13	5522	Yes
4016	16.8	320	14	5566	No
4017	18.3	288	14	5510	Yes
4018	14.2	421	15	5525	Yes
4019	16.2	402	14	5554	No
4020	12.6	430	13	5553	Yes
4021	19.8	423	16	5562	Yes
4022	12.4	464	15	5533	Yes
4023	15.3	353	15	5499	Yes
4024	13.2	406	12	5520	Yes
4025	12.3	441	15	5570	No
4026	14.9	256	13	5502	Yes
4027	19.3	303	16	5513	No
4028	18.1	265	16	5519	Yes
4029	13.8	325	13	5509	No
4030	13.1	299	16	5527	Yes

TYPE 5 DETECTION PROBABILITY

Data Sheet for FCC Long Pulse Radar Type 5		
Trial	Frequency (MHz)	Successful Detection (Yes/No)
1	5530	Yes
2	5530	Yes
3	5530	Yes
4	5530	Yes
5	5530	Yes
6	5530	Yes
7	5530	Yes
8	5530	Yes
9	5530	Yes
10	5530	Yes
11	5500	Yes
12	5499	Yes
13	5498	Yes
14	5499	Yes
15	5498	Yes
16	5499	Yes
17	5499	Yes
18	5499	Yes
19	5497	Yes
20	5496	Yes
21	5563	Yes
22	5565	Yes
23	5565	Yes
24	5560	Yes
25	5562	Yes
26	5565	Yes
27	5566	Yes
28	5565	Yes
29	5566	Yes
30	5565	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	734	5490	18	Yes
2	1209	5491	18	Yes
3	1684	5492	16	Yes
4	2159	5493	16	Yes
5	2634	5494	11	Yes
6	3109	5495	16	Yes
7	3584	5496	17	Yes
8	4059	5497	15	Yes
9	4534	5498	15	Yes
10	5009	5499	11	Yes
11	5484	5500	16	Yes
12	5959	5501	21	Yes
13	6434	5502	21	Yes
14	6909	5503	13	Yes
15	7384	5504	21	Yes
16	7859	5505	18	Yes
17	8334	5506	22	Yes
18	8809	5507	11	Yes
19	9284	5508	13	Yes
20	9759	5509	14	Yes
21	10234	5510	20	Yes
22	10709	5511	14	Yes
23	11184	5512	14	Yes
24	11659	5513	21	Yes
25	12134	5514	16	Yes
26	12609	5515	17	Yes
27	13084	5516	14	Yes
28	13559	5517	15	Yes
29	14034	5518	15	Yes
30	14509	5519	22	Yes
31	14984	5520	16	Yes
32	15459	5521	14	Yes
33	15934	5522	13	Yes
34	16409	5523	17	Yes
35	16884	5524	20	Yes
36	17359	5525	20	Yes
37	17834	5526	13	Yes
38	18309	5527	17	Yes
39	18784	5528	15	Yes
40	19259	5529	13	Yes

TYPE 6 DETECTION PROBABILITY (CONTINUED)

41	19734	5530	13	Yes
42	20209	5531	21	Yes
43	20684	5532	18	Yes
44	21159	5533	25	Yes
45	21634	5534	18	Yes
46	22109	5535	20	Yes
47	22584	5536	17	Yes
48	23059	5537	24	Yes
49	23534	5538	22	Yes
50	24009	5539	28	Yes
51	24484	5540	14	Yes
52	24959	5541	9	Yes
53	25434	5542	14	Yes
54	25909	5543	16	Yes
55	26384	5544	13	Yes
56	26859	5545	14	Yes
57	27334	5546	15	Yes
58	27809	5547	23	Yes
59	28284	5548	14	Yes
60	28759	5549	22	Yes
61	29234	5550	15	Yes
62	29709	5551	15	Yes
63	30184	5552	19	Yes
64	30659	5553	19	Yes
65	31134	5554	17	Yes
66	31609	5555	12	Yes
67	32084	5556	12	Yes
68	32559	5557	19	Yes
69	33034	5558	14	Yes
70	33509	5559	15	Yes
71	33984	5560	24	Yes
72	34459	5561	13	Yes
73	34934	5562	16	Yes
74	35409	5563	15	Yes
75	35884	5564	17	Yes
76	36359	5565	22	Yes
77	36834	5566	16	Yes
78	37309	5567	19	Yes
79	37784	5568	15	Yes
80	38259	5569	20	Yes
81	38734	5570	21	Yes

8.5. RESULTS FOR 160 MHz BANDWIDTH

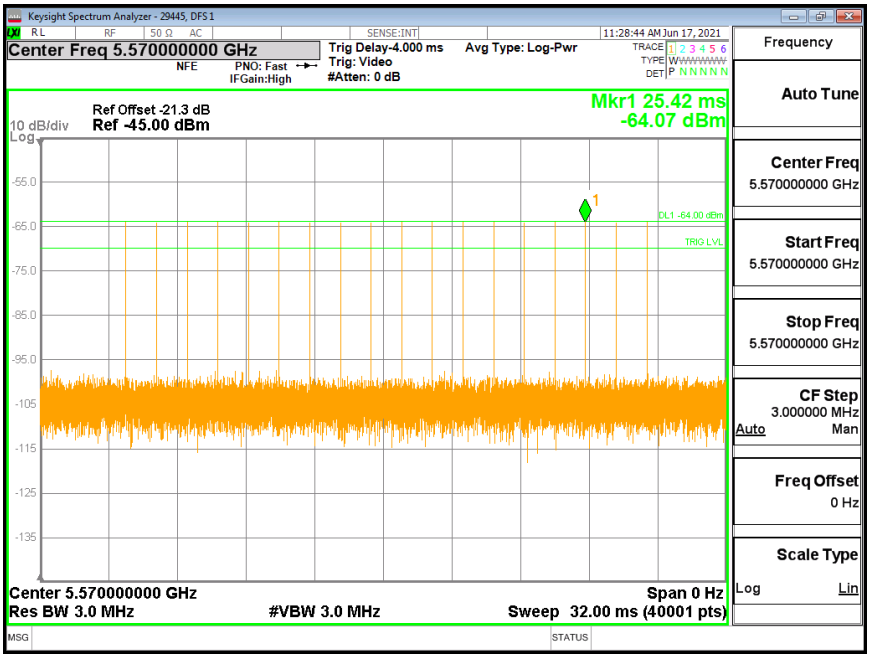
8.5.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5570 MHz.

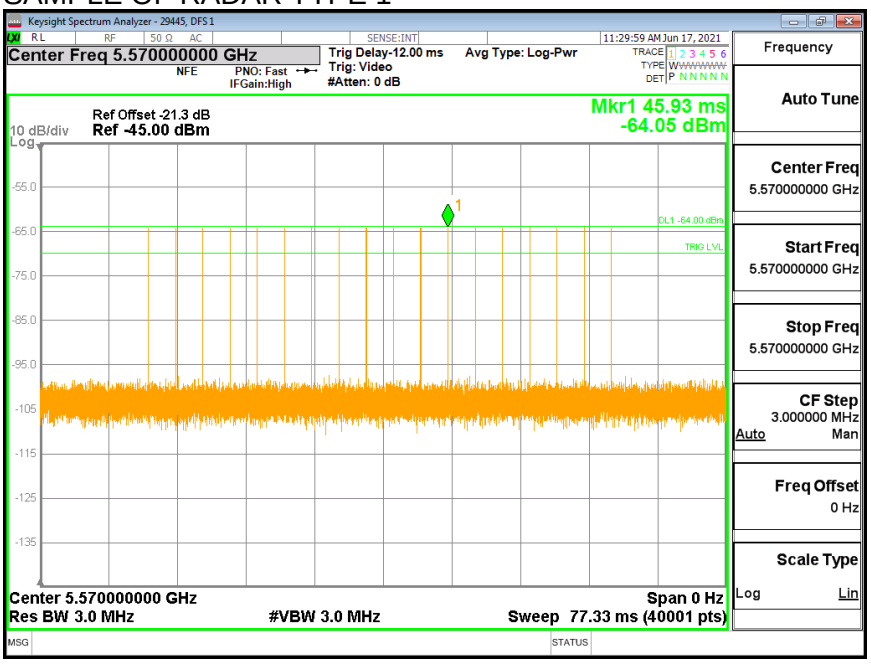
8.5.2. RADAR WAVEFORMS AND TRAFFIC

RADAR WAVEFORMS

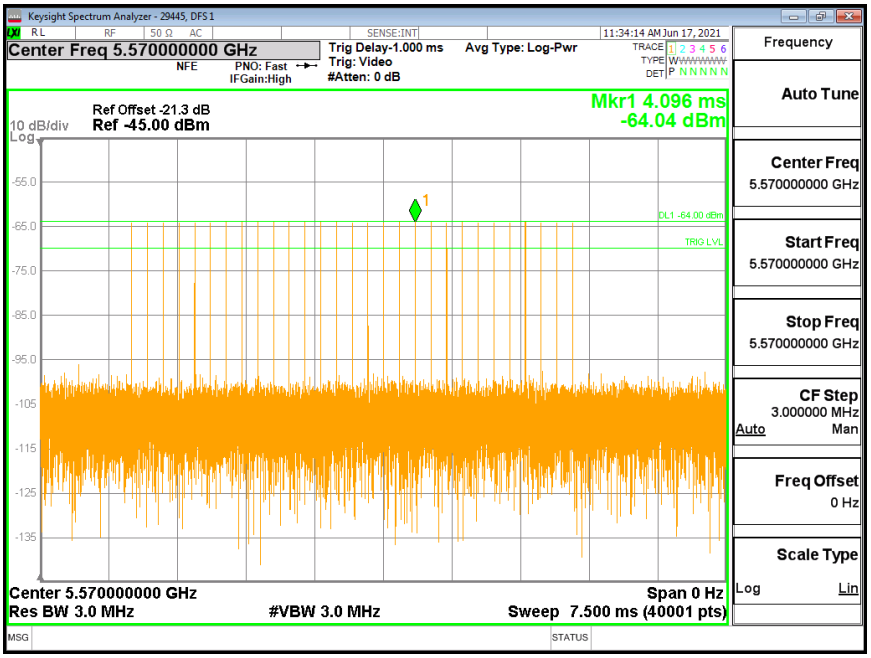
SHORT PULSE RADAR TYPE 0



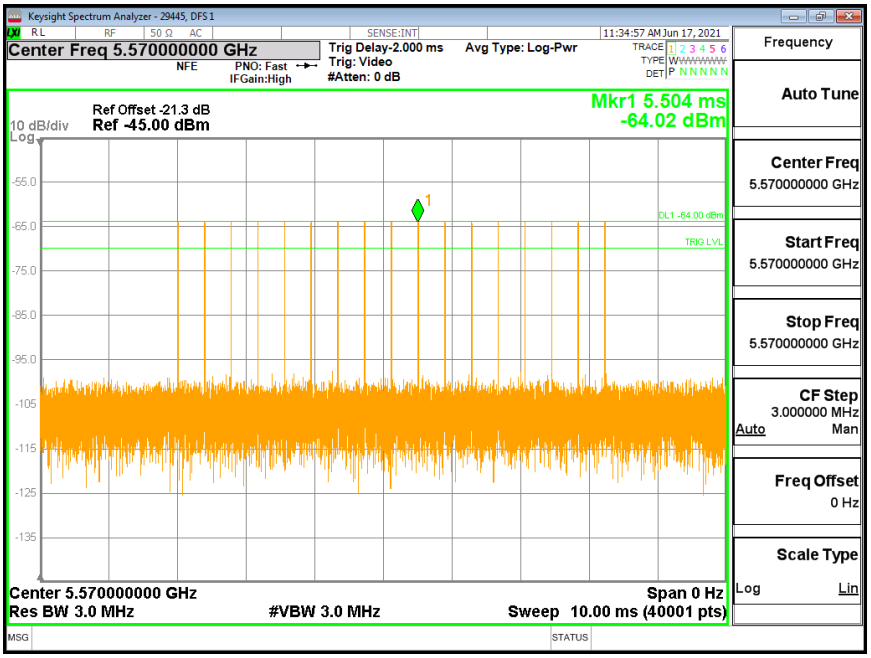
SAMPLE OF RADAR TYPE 1



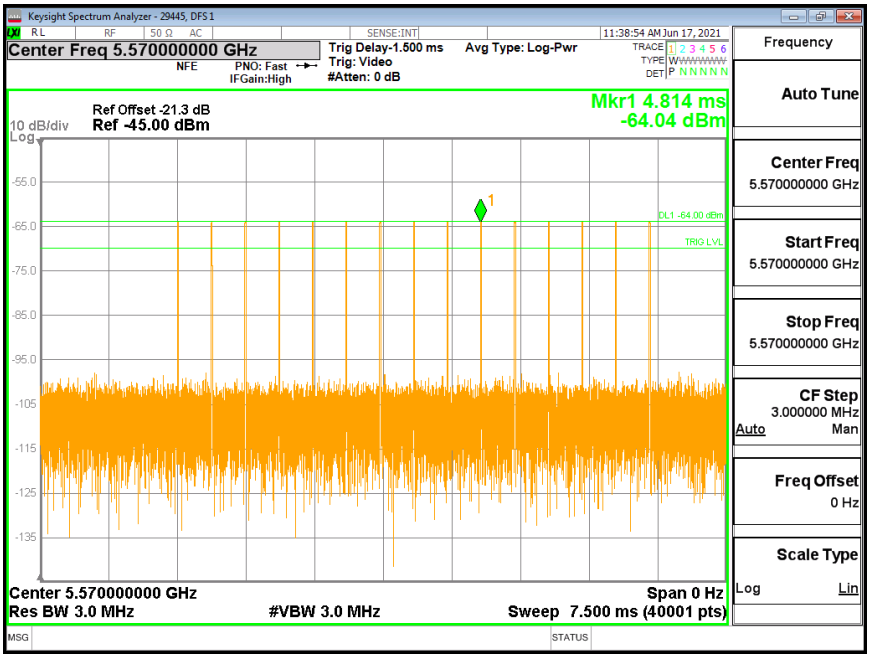
SAMPLE OF RADAR TYPE 2



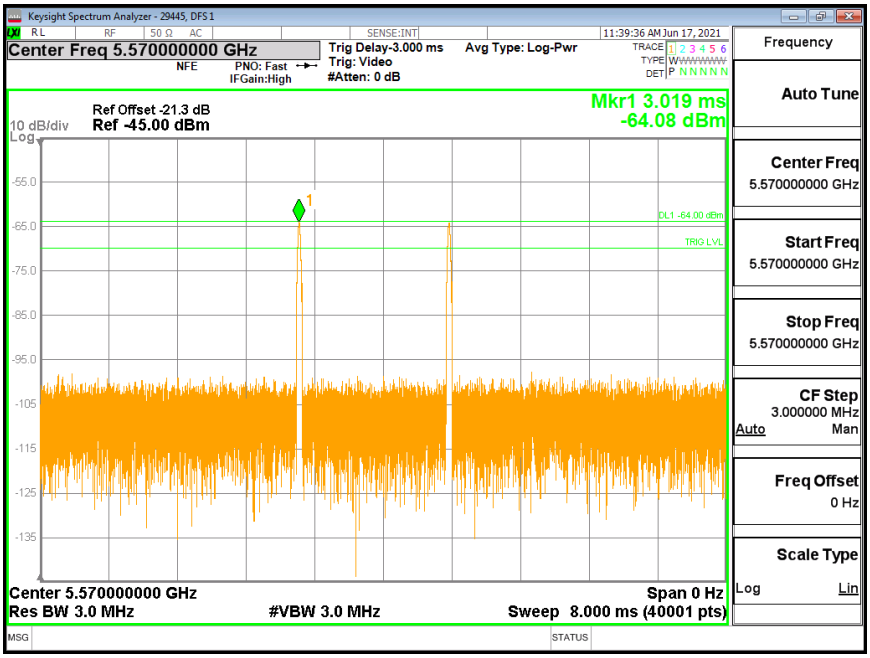
SAMPLE OF RADAR TYPE 3



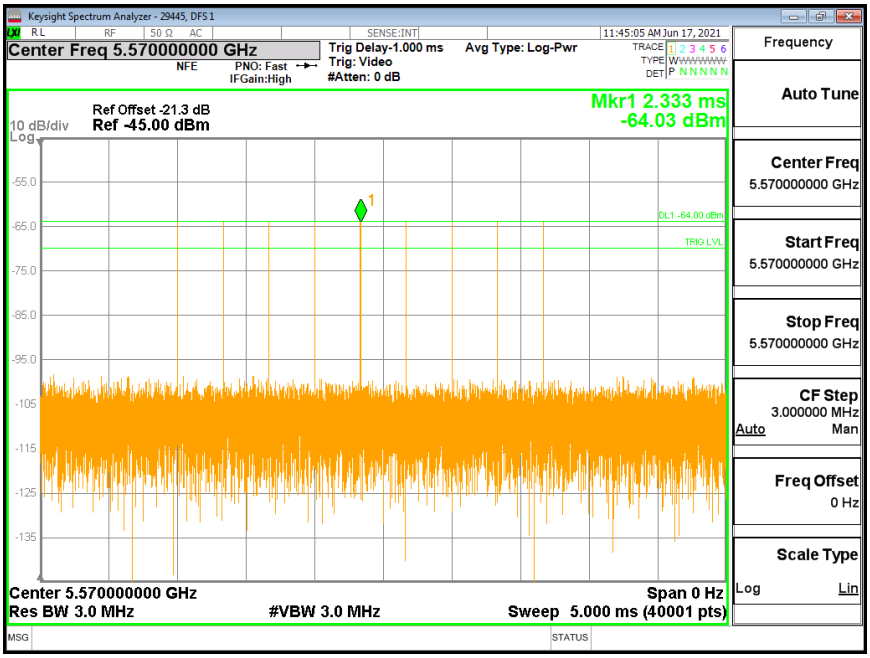
SAMPLE OF RADAR TYPE 4



SAMPLE OF SINGLE BURST OF RADAR TYPE 5

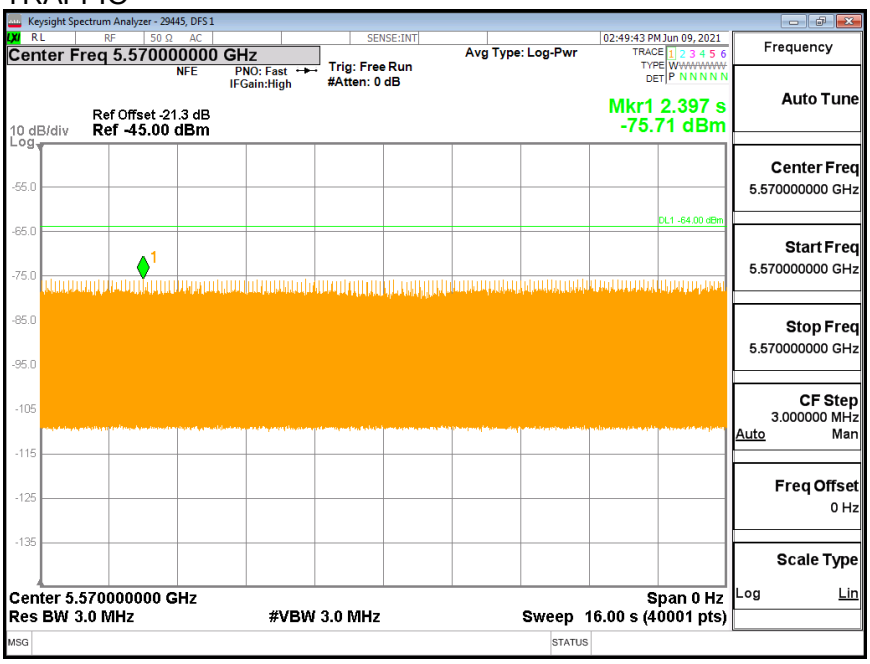


SINGLE BURST OF RADAR TYPE 6

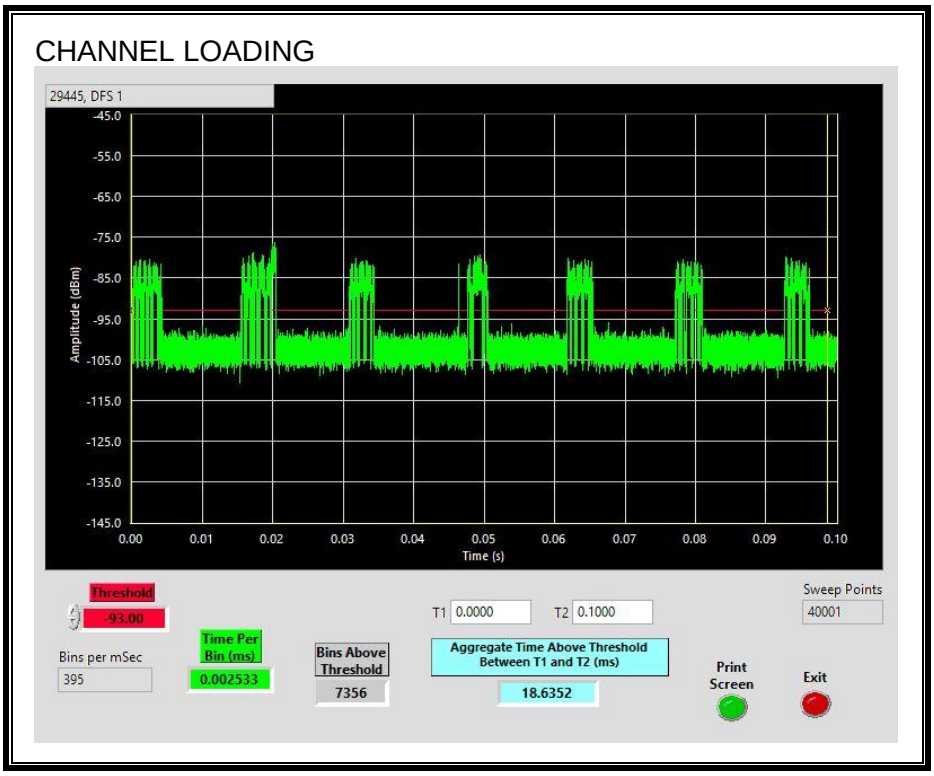


TRAFFIC

TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 18.63%

8.5.3. 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)
30.01	119.1	89.1	29.1

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)
30.35	62.72	32.4	3.3

Radar Near End of CAC

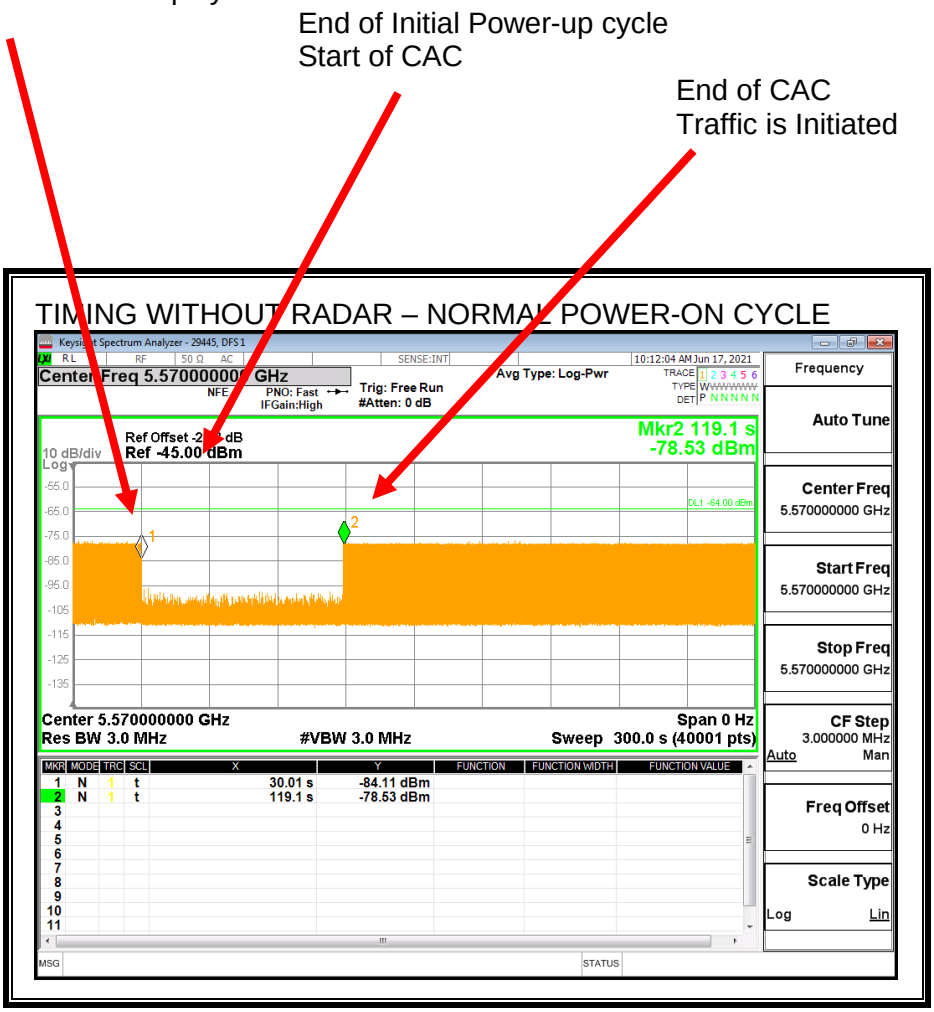
Timing of Reboot (sec)	Timing of Radar Burst (sec)	Radar Relative to Reboot (sec)	Radar Relative to Start of CAC (sec)
30.35	116.5	86.2	57.1

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



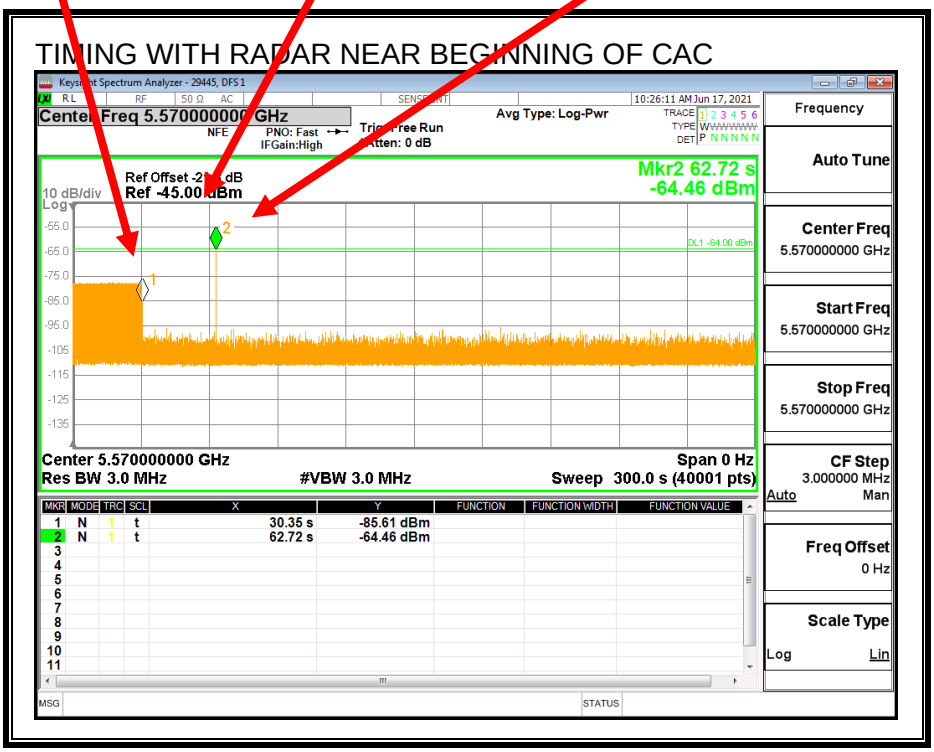
Transmissions begin on channel after completion of the initial power-up cycle and the CAC.

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



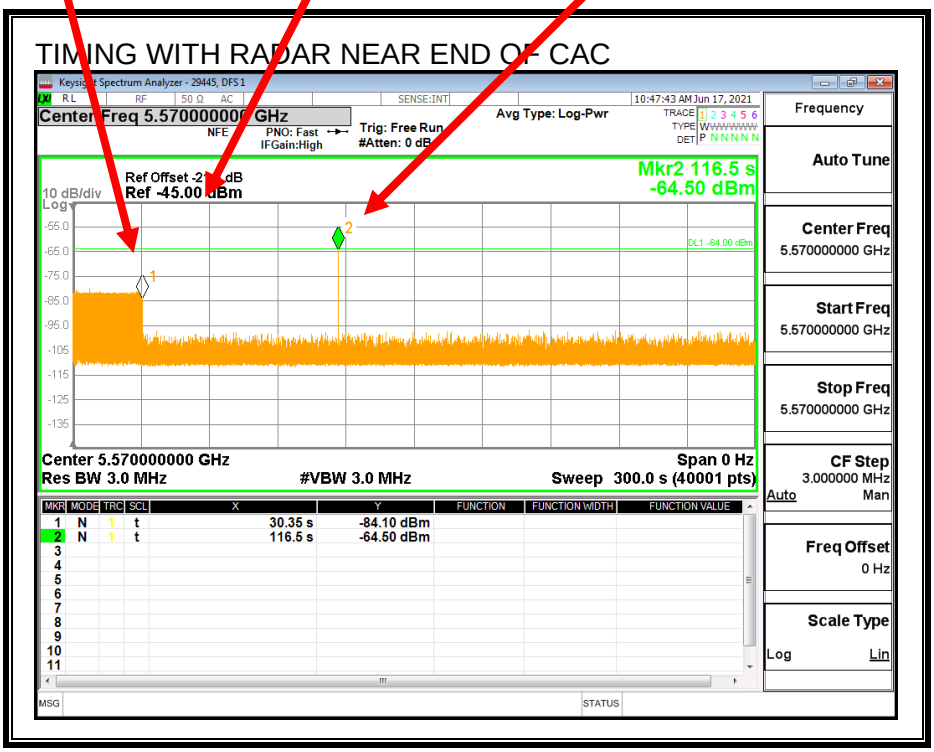
No EUT transmissions were observed after the radar signal.

TIMING WITH RADAR NEAR END OF CAC

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

End of Initial Power-up cycle
Start of CAC

Radar Signal Applied



No EUT transmissions were observed after the radar signal.

8.5.4. OVERLAPPING CHANNEL TESTS

RESULTS

The channel spacing is not less than the channel bandwidth therefore the EUT does not have an overlapping channel plan.

8.5.5. 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)

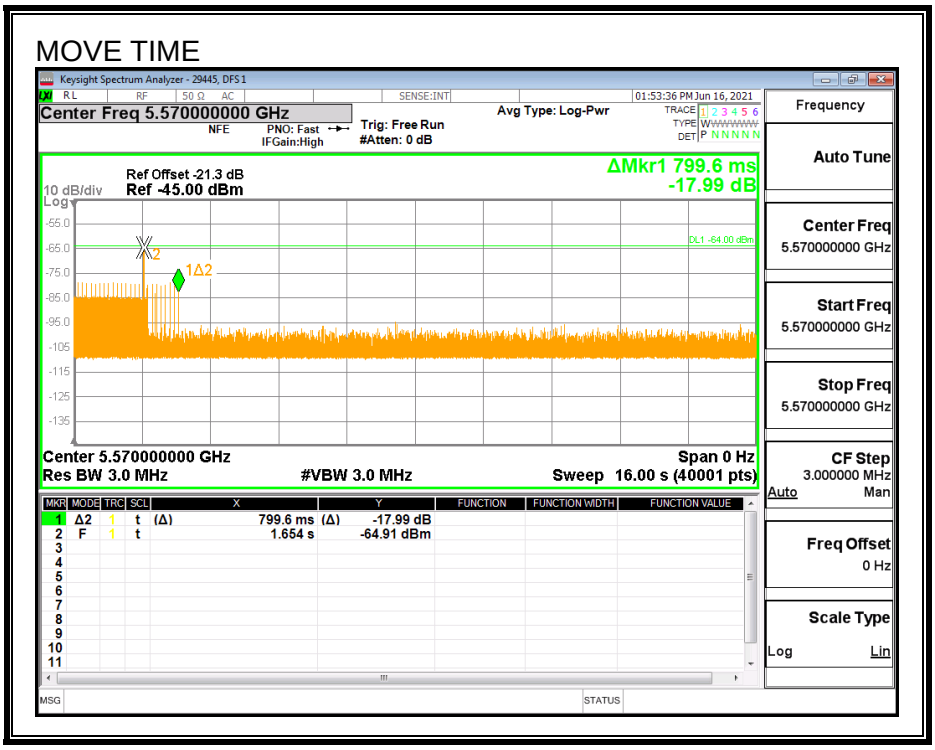
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

Channel Move Time (sec)	Limit (sec)
0.7996	10

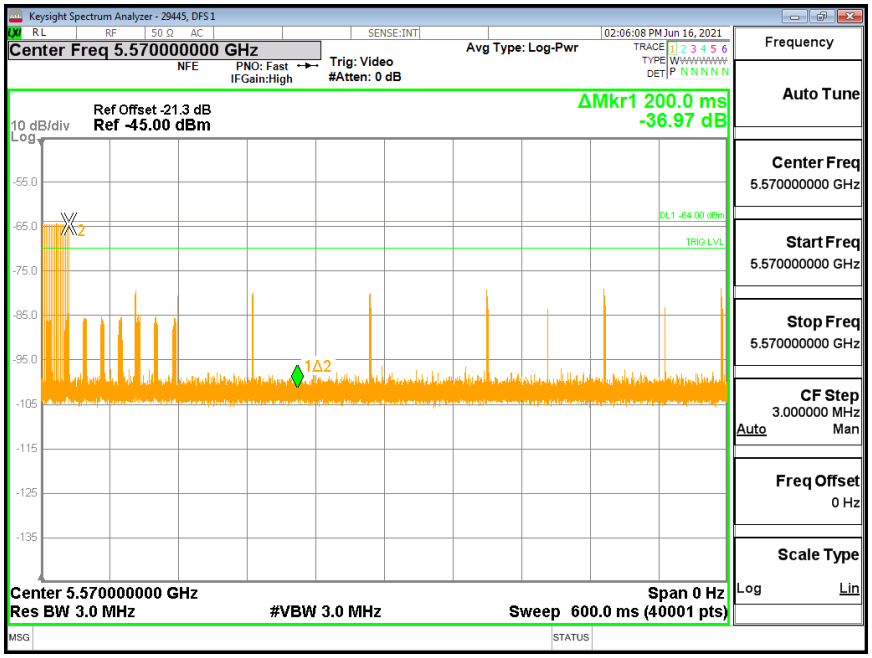
Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
7.6	60

MOVE TIME



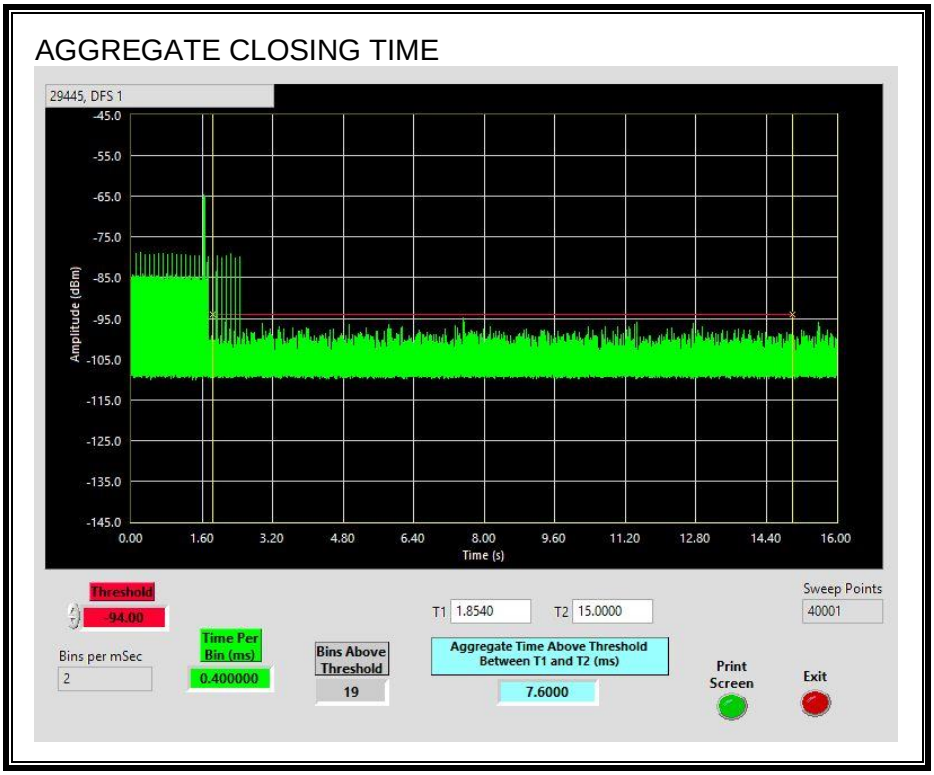
CHANNEL CLOSING TIME

CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

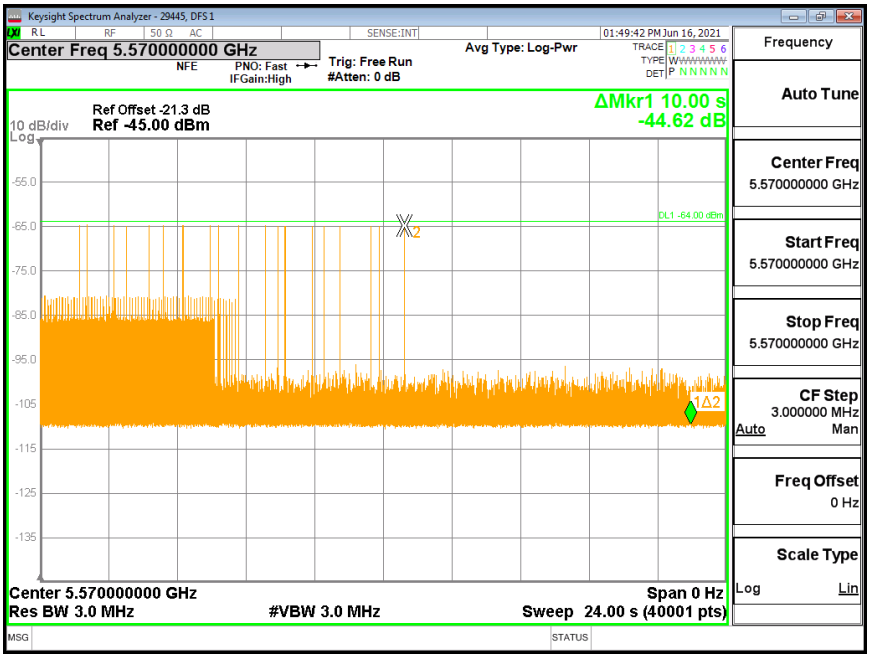
Only intermittent transmissions are observed during the aggregate monitoring period.



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

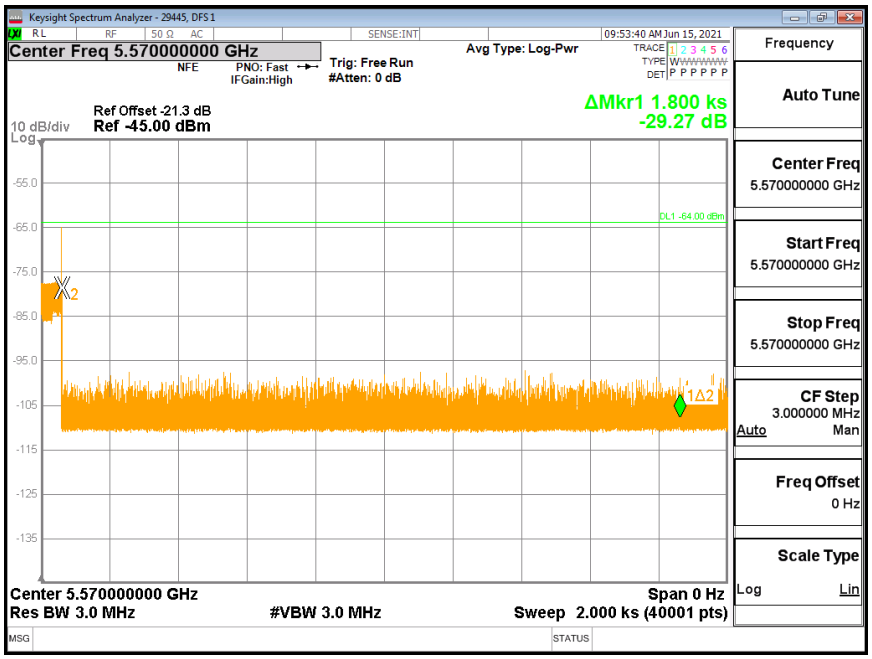


8.5.6. NON-OCCUPANCY PERIOD

RESULTS

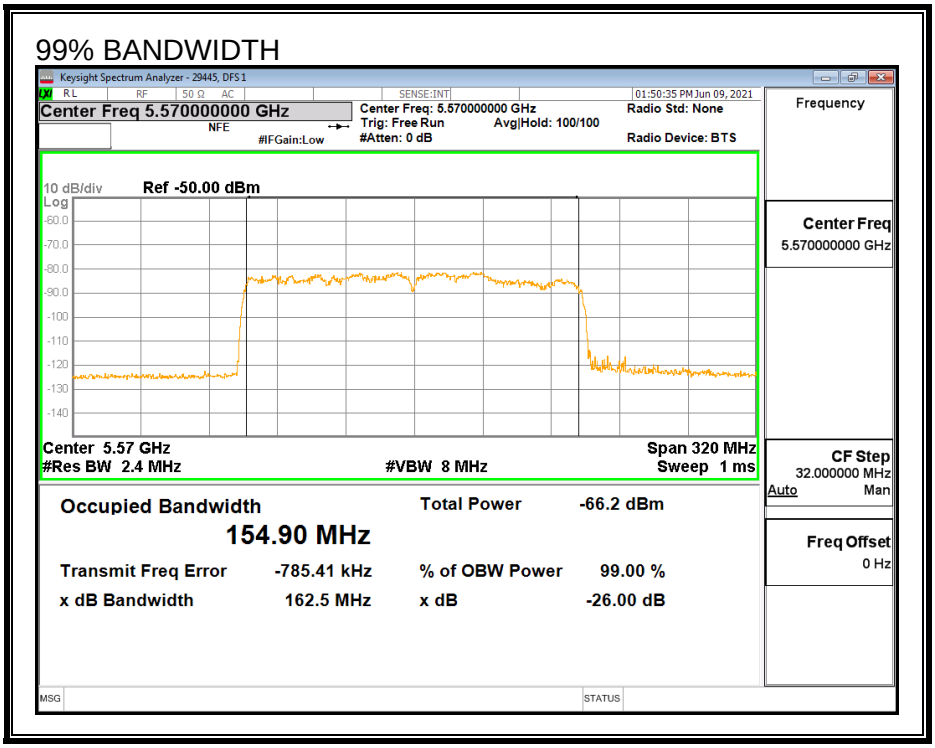
No EUT transmissions were observed on the test channel during the 30-minute observation time.

NON-OCCUPANCY PERIOD



8.5.7. DETECTION BANDWIDTH

REFERENCE PLOT OF 99% POWER BANDWIDTH



RESULTS

F_L (MHz)	F_H (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (%)	Minimum Limit (%)
5490	5649	159	154.9	102.6	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
5489	10	0	0	
5490	10	10	100	FL
5495	10	10	100	
5500	10	10	100	
5505	10	10	100	
5510	10	10	100	
5515	10	10	100	
5520	10	10	100	
5525	10	10	100	
5530	10	10	100	
5535	10	10	100	
5540	10	10	100	
5545	10	10	100	
5550	10	10	100	
5555	10	10	100	
5560	10	10	100	
5565	10	10	100	
5570	10	10	100	
5575	10	10	100	
5580	10	10	100	
5585	10	10	100	
5590	10	9	90	
5595	10	10	100	
5600	10	10	100	
5605	10	10	100	
5610	10	10	100	
5615	10	10	100	
5620	10	10	100	
5625	10	10	100	
5630	10	9	90	
5635	10	10	100	
5640	10	10	100	
5645	10	10	100	
5646	10	10	100	
5647	10	9	90	
5648	10	10	100	
5649	10	10	100	FH
5650	10	0	0	

8.5.8. 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	86.67	60	Pass	5490	5649	154.9	DFS 1	29445	v4.1
FCC Short Pulse Type 2	30	100.00	60	Pass	5490	5649	154.9	DFS 1	29445	v4.1
FCC Short Pulse Type 3	30	83.33	60	Pass	5490	5649	154.9	DFS 1	29445	v4.1
FCC Short Pulse Type 4	30	83.33	60	Pass	5490	5649	154.9	DFS 1	29445	v4.1
Aggregate		88.33	80	Pass						
FCC Long Pulse Type 5	30	86.67	80	Pass	5490	5649	154.9	DFS 1	29445	v4.1
FCC Hopping Type 6	160	100.00	70	Pass	5490	5649		DFS 1	29445	v4.1

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	5621	No
1002	1	618	86	A	5638	Yes
1003	1	558	95	A	5495	Yes
1004	1	518	102	A	5628	Yes
1005	1	538	99	A	5492	Yes
1006	1	778	68	A	5497	Yes
1007	1	878	61	A	5549	Yes
1008	1	898	59	A	5588	Yes
1009	1	838	63	A	5514	Yes
1010	1	638	83	A	5615	Yes
1011	1	798	67	A	5634	Yes
1012	1	918	58	A	5548	Yes
1013	1	578	92	A	5626	Yes
1014	1	598	89	A	5513	Yes
1015	1	718	74	A	5490	Yes
1016	1	982	54	B	5513	Yes
1017	1	1420	38	B	5643	Yes
1018	1	2182	25	B	5637	Yes
1019	1	1397	38	B	5626	Yes
1020	1	1094	49	B	5547	Yes
1021	1	2985	18	B	5502	No
1022	1	2812	19	B	5576	No
1023	1	1091	49	B	5527	Yes
1024	1	2400	22	B	5623	Yes
1025	1	808	66	B	5554	Yes
1026	1	2247	24	B	5583	Yes
1027	1	2138	25	B	5504	Yes
1028	1	1158	46	B	5519	Yes
1029	1	1179	45	B	5539	Yes
1030	1	2877	19	B	5570	No

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	1.1	172	29	5609	Yes
2002	1.8	223	28	5510	Yes
2003	1.2	230	25	5500	Yes
2004	2.2	166	24	5593	Yes
2005	1.8	215	28	5564	Yes
2006	1	199	25	5501	Yes
2007	4.9	171	26	5578	Yes
2008	4.4	159	23	5636	Yes
2009	2.5	178	24	5502	Yes
2010	4.3	213	29	5635	Yes
2011	2.6	155	27	5615	Yes
2012	4.7	194	28	5586	Yes
2013	3.2	184	27	5618	Yes
2014	1.3	226	29	5592	Yes
2015	2.2	220	28	5626	Yes
2016	2.8	186	27	5528	Yes
2017	3.9	227	27	5638	Yes
2018	4.6	159	26	5603	Yes
2019	4	204	23	5622	Yes
2020	5	222	29	5625	Yes
2021	4.6	190	23	5635	Yes
2022	3.8	173	23	5557	Yes
2023	3.6	226	24	5522	Yes
2024	3.1	214	28	5521	Yes
2025	1.2	195	29	5554	Yes
2026	3	187	23	5569	Yes
2027	1.3	210	25	5595	Yes
2028	3.4	168	26	5614	Yes
2029	1.9	158	25	5571	Yes
2030	4.1	201	27	5590	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	8.1	389	17	5498	Yes
3002	6.5	284	17	5630	Yes
3003	7.6	411	16	5563	No
3004	8.3	451	16	5500	Yes
3005	7.7	340	18	5586	Yes
3006	8.7	394	17	5537	Yes
3007	8.3	295	18	5512	Yes
3008	7.5	494	18	5589	No
3009	9.5	291	18	5594	Yes
3010	9	370	17	5549	Yes
3011	9	312	17	5590	No
3012	6.7	286	18	5543	No
3013	9.1	359	16	5643	Yes
3014	7.1	479	16	5568	Yes
3015	9.7	447	16	5646	Yes
3016	10	329	16	5572	Yes
3017	6.8	310	16	5513	Yes
3018	9.3	456	16	5617	Yes
3019	8.4	331	18	5647	Yes
3020	7	372	18	5496	Yes
3021	6.4	260	17	5553	Yes
3022	7.4	314	18	5635	Yes
3023	9.1	466	17	5643	Yes
3024	6.2	415	18	5608	Yes
3025	8.2	462	17	5581	Yes
3026	7.7	424	16	5576	No
3027	9.8	484	16	5569	Yes
3028	9.5	458	17	5557	Yes
3029	7.8	413	18	5499	Yes
3030	9.9	400	18	5615	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	12.1	368	15	5613	No
4002	17.1	250	16	5529	No
4003	19.1	481	16	5542	Yes
4004	15.5	258	15	5622	Yes
4005	13.6	252	15	5571	Yes
4006	19.6	293	14	5525	Yes
4007	18.2	432	12	5499	Yes
4008	16.1	486	14	5632	Yes
4009	15.2	269	12	5623	Yes
4010	17.8	336	14	5494	Yes
4011	13.1	383	13	5589	Yes
4012	11.9	344	15	5630	Yes
4013	16.7	404	14	5631	Yes
4014	16	378	12	5641	Yes
4015	12.2	334	13	5527	No
4016	16.8	320	14	5527	Yes
4017	18.3	288	14	5567	Yes
4018	14.2	421	15	5529	No
4019	16.2	402	14	5535	Yes
4020	12.6	430	13	5549	Yes
4021	19.8	423	16	5570	Yes
4022	12.4	464	15	5548	Yes
4023	15.3	353	15	5513	Yes
4024	13.2	406	12	5619	No
4025	12.3	441	15	5496	Yes
4026	14.9	256	13	5572	Yes
4027	19.3	303	16	5561	Yes
4028	18.1	265	16	5546	Yes
4029	13.8	325	13	5646	Yes
4030	13.1	299	16	5526	Yes

TYPE 5 DETECTION PROBABILITY

Data Sheet for FCC Long Pulse Radar Type 5		
Trial	Frequency (MHz)	Successful Detection (Yes/No)
1	5570	Yes
2	5570	Yes
3	5570	Yes
4	5570	No
5	5570	Yes
6	5570	Yes
7	5570	Yes
8	5570	Yes
9	5570	Yes
10	5570	Yes
11	5501	Yes
12	5500	Yes
13	5499	Yes
14	5500	Yes
15	5499	Yes
16	5500	Yes
17	5500	Yes
18	5500	No
19	5498	Yes
20	5497	Yes
21	5642	Yes
22	5644	Yes
23	5644	Yes
24	5639	Yes
25	5641	Yes
26	5644	No
27	5645	Yes
28	5644	Yes
29	5645	Yes
30	5644	No

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	684	5490	40	Yes
2	1159	5491	32	Yes
3	1634	5492	40	Yes
4	2109	5493	25	Yes
5	2584	5494	36	Yes
6	3059	5495	33	Yes
7	3534	5496	36	Yes
8	4009	5497	33	Yes
9	4484	5498	30	Yes
10	4959	5499	36	Yes
11	5434	5500	38	Yes
12	5909	5501	41	Yes
13	6384	5502	35	Yes
14	6859	5503	37	Yes
15	7334	5504	37	Yes
16	7809	5505	39	Yes
17	8284	5506	46	Yes
18	8759	5507	28	Yes
19	9234	5508	31	Yes
20	9709	5509	34	Yes
21	10184	5510	38	Yes
22	10659	5511	32	Yes
23	11134	5512	34	Yes
24	11609	5513	34	Yes
25	12084	5514	33	Yes
26	12559	5515	35	Yes
27	13034	5516	32	Yes
28	13509	5517	32	Yes
29	13984	5518	31	Yes
30	14459	5519	34	Yes
31	14934	5520	36	Yes
32	15409	5521	36	Yes
33	15884	5522	37	Yes
34	16359	5523	36	Yes
35	16834	5524	43	Yes
36	17309	5525	35	Yes
37	17784	5526	31	Yes
38	18259	5527	33	Yes
39	18734	5528	31	Yes

TYPE 6 DETECTION PROBABILITY (CONTINUED)

40	19209	5529	31	Yes
41	19684	5530	32	Yes
42	20159	5531	36	Yes
43	20634	5532	34	Yes
44	21109	5533	33	Yes
45	21584	5534	28	Yes
46	22059	5535	30	Yes
47	22534	5536	37	Yes
48	23009	5537	31	Yes
49	23484	5538	44	Yes
50	23959	5539	36	Yes
51	24434	5540	34	Yes
52	24909	5541	26	Yes
53	25384	5542	33	Yes
54	25859	5543	34	Yes
55	26334	5544	32	Yes
56	26809	5545	38	Yes
57	27284	5546	36	Yes
58	27759	5547	31	Yes
59	28234	5548	33	Yes
60	28709	5549	29	Yes
61	29184	5550	32	Yes
62	29659	5551	34	Yes
63	30134	5552	35	Yes
64	30609	5553	32	Yes
65	31084	5554	40	Yes
66	31559	5555	34	Yes
67	32034	5556	35	Yes
68	32509	5557	26	Yes
69	32984	5558	37	Yes
70	33459	5559	35	Yes
71	33934	5560	31	Yes
72	34409	5561	33	Yes
73	34884	5562	35	Yes
74	35359	5563	36	Yes
75	35834	5564	30	Yes
76	36309	5565	25	Yes
77	36784	5566	40	Yes
78	37259	5567	35	Yes
79	37734	5568	32	Yes

TYPE 6 DETECTION PROBABILITY (CONTINUED)

80	38209	5569	28	Yes
81	38684	5570	29	Yes
82	39159	5571	36	Yes
83	39634	5572	37	Yes
84	40109	5573	33	Yes
85	40584	5574	24	Yes
86	41059	5575	34	Yes
87	41534	5576	40	Yes
88	42009	5577	31	Yes
89	42484	5578	30	Yes
90	42959	5579	36	Yes
91	43434	5580	31	Yes
92	43909	5581	33	Yes
93	44384	5582	46	Yes
94	44859	5583	28	Yes
95	45334	5584	38	Yes
96	45809	5585	31	Yes
97	46284	5586	33	Yes
98	46759	5587	30	Yes
99	47234	5588	30	Yes
100	47709	5589	31	Yes
101	48184	5590	28	Yes
102	48659	5591	35	Yes
103	49134	5592	33	Yes
104	49609	5593	34	Yes
105	50084	5594	35	Yes
106	50559	5595	37	Yes
107	51034	5596	38	Yes
108	51509	5597	30	Yes
109	51984	5598	29	Yes
110	52459	5599	31	Yes
111	52934	5600	36	Yes
112	53409	5601	23	Yes
113	53884	5602	27	Yes
114	54359	5603	31	Yes
115	54834	5604	40	Yes
116	55309	5605	35	Yes
117	55784	5606	38	Yes
118	56259	5607	34	Yes
119	56734	5608	26	Yes

TYPE 6 DETECTION PROBABILITY (CONTINUED)

120	57209	5609	38	Yes
121	57684	5610	31	Yes
122	58159	5611	34	Yes
123	58634	5612	34	Yes
124	59109	5613	28	Yes
125	59584	5614	33	Yes
126	60059	5615	37	Yes
127	60534	5616	27	Yes
128	61009	5617	38	Yes
129	61484	5618	32	Yes
130	61959	5619	30	Yes
131	62434	5620	38	Yes
132	62909	5621	38	Yes
133	63384	5622	35	Yes
134	63859	5623	33	Yes
135	64334	5624	33	Yes
136	64809	5625	35	Yes
137	65284	5626	33	Yes
138	223	5627	36	Yes
139	698	5628	42	Yes
140	1173	5629	33	Yes
141	1648	5630	41	Yes
142	2123	5631	28	Yes
143	2598	5632	37	Yes
144	3073	5633	30	Yes
145	3548	5634	35	Yes
146	4023	5635	30	Yes
147	4498	5636	35	Yes
148	4973	5637	31	Yes
149	5448	5638	41	Yes
150	5923	5639	41	Yes
151	6398	5640	33	Yes
152	6873	5641	36	Yes
153	7348	5642	36	Yes
154	7823	5643	36	Yes
155	8298	5644	50	Yes
156	8773	5645	27	Yes
157	9248	5646	32	Yes
158	9723	5647	31	Yes
159	10198	5648	38	Yes
160	10673	5649	34	Yes

8.6. BRIDGE MODE RESULTS

Per KDB 905462 D02, Section 5.1 (footnote 2):

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 where they act as master and client must also employ DFS function for the master. 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.