DFS PORTION of FCC 47 CFR PART 15 SUBPART E

TEST REPORT

WiFi6 Smart Mesh

MODEL NUMBER: AR1344P, AR1344, AR1344E, AR1344E2, EVO6700AP2

MODEL TESTED: AR1344P

FCC ID: 2AXCW-AP67002

REPORT NUMBER: 14221535-E1V2

ISSUE DATE: May 13, 2022

Prepared for
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CERT #0751.05

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	5/10/22	Initial Issue	--
V2	5/13/22	Changed AG and separated the setup photos	Frank Ibrahim

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	Kaonbroadband CO., LTD. 884-3, Seongnam-daero, Bundang-gu, Seongnam-si Gyeonggi-do, South Korea
EUT DESCRIPTION:	WiFi6 Smart Mesh
MODEL:	AR1344P, AR1344, AR1344E, AR1344E2, EVO6700AP2
MODEL TESTED:	AR1344P
SERIAL NUMBER:	00:90:4C:3A:D0:11
DATE TESTED:	MAY 2, 2022 to MAY 5, 2022

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.

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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	None

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 "4790309672-FR3V2_FCC Report UNII 802.11a_n_ac" and "4790309672-FR4V2_FCC Report UNII 802.11ax".

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	550739
	Building 2: 47266 Benicia Street, Fremont, California, USA	US0104	2324A	550739
	Building 4: 47658 Kato Rd, Fremont, California, USA	US0104	2324A	550739

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 5 model numbers: AR1344P, AR1344, AR1344E, AR1344E2, EVO6700AP2. All 5 models fall under the umbrella FCC ID of 2AXCW-AP67002.

7.2. MODEL DIFFERENCES

The manufacturer hereby declares that all 5 models have the same technical construction including circuit diagram, PCB layout, components, component layout, mechanical construction and electrical construction. The differences among the 5 models are only related to the model's name and memory capacity, which are as follows:

Model	Memory size
AR1344P, AR1344E2, EVO6700AP2	256MB/512MB (FLASH MEMORY / SDRAM)
AR1344, AR1344E	128MB/256MB (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 AR1344PX may be applied as representative to models AR1344P, AR1344, AR1344E, AR1344E2, EVO6700AP2.

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

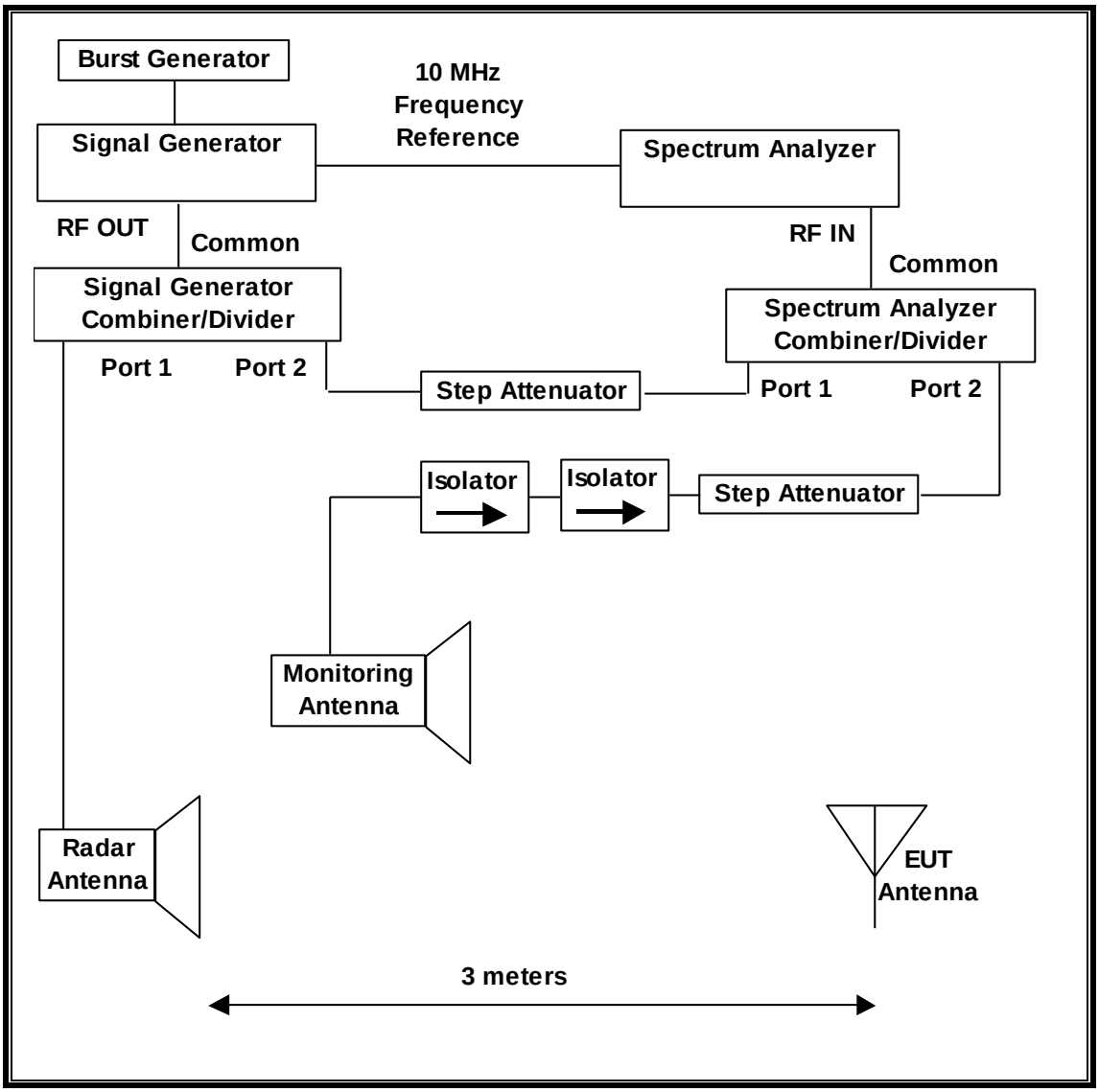
Radar Waveform Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

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 8.4GHz	Keysight	N9030A	150667	01/27/23
Signal Generator, MXG X-Series RF Vector	Agilent	N5182B	150666	01/26/23
Arbitrary Waveform Generator	Agilent / HP	33220A	80815	01/24/23

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

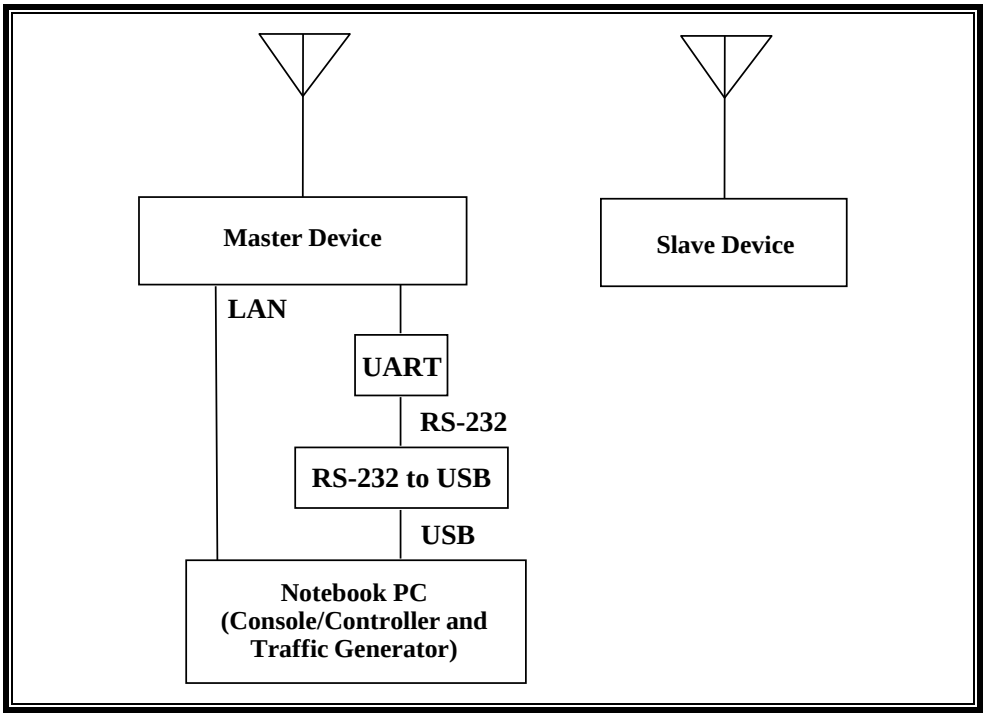
The test room temperature and humidity shall be maintained within normal temperature of 15~35 °C and normal humidity 20~75% (relative humidity).

ENVIRONMENT CONDITION

Parameter	Value
Temperature	24.9, 25.1, 24.4, 24.8 °C
Humidity	25, 32, 42, 48 %

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 (EUT)	Chenzhou Frecom Electronics	F18L16-120150SPAU	18WL6C00581A	DoC
Notebook PC (Console/Controller)	Lenovo	Type 4236-B92	PB-HEXC4 12/05	DoC
AC Adapter 2 (Console/Controller)	Lenovo	42T4418	11S42T4418Z1ZGW G08R90M	DoC
RS-232 to USB UART	Nexi Network Solutions	UC232	No Serial Number	DoC
RS-232 to USB Converter	Sabrent	SBT-USC1M	30224702122779	DoC

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 1.97 dBi in the 5250-5350 MHz band and 1.94 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 1.97 dBi in the 5250-5350 MHz band and 1.94 dBi in the 5470-5725 MHz band.

The only antenna assembly utilized with the EUT has a gain of 1.94 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 not required since the maximum EIRP is less than 500 mW (27 dBm).

The EUT utilizes the 802.11a/n/ac/ax 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 5.02L.07p2.

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 5.02L.07p2.

8.2. RESULTS FOR 20 MHz BANDWIDTH

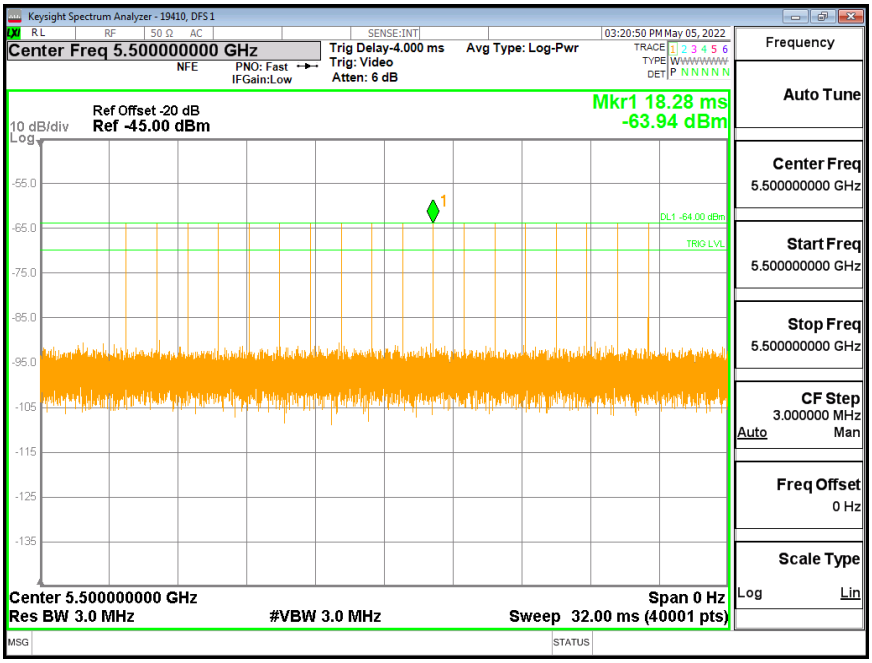
8.2.1. TEST CHANNEL

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

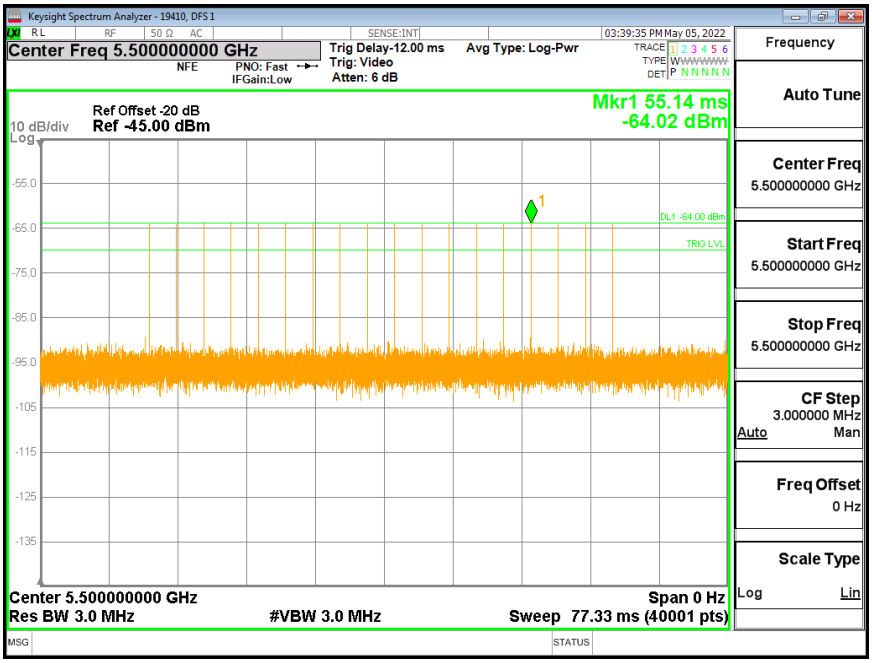
8.2.2. RADAR WAVEFORMS AND TRAFFIC

RADAR WAVEFORMS

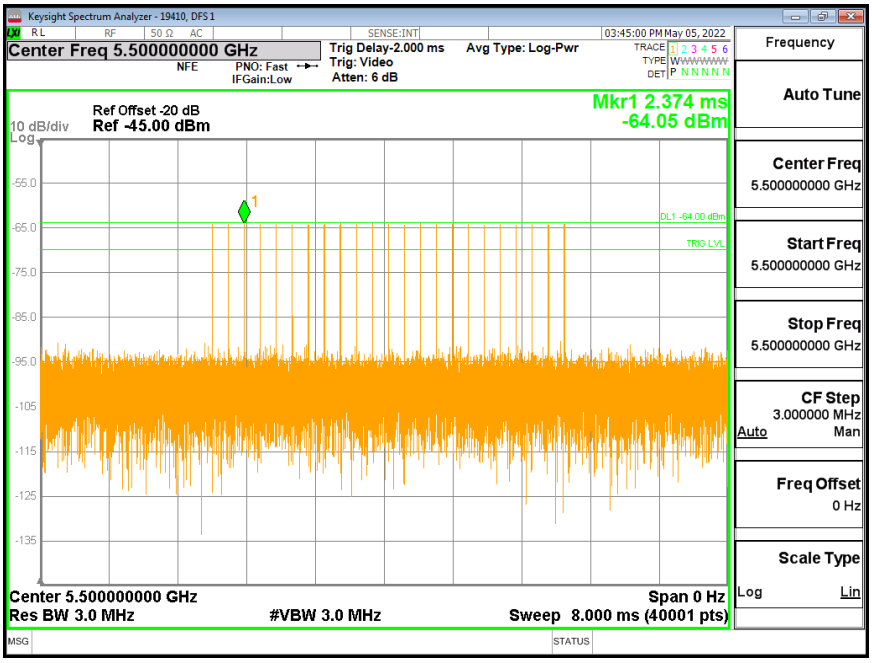
SHORT PULSE RADAR TYPE 0



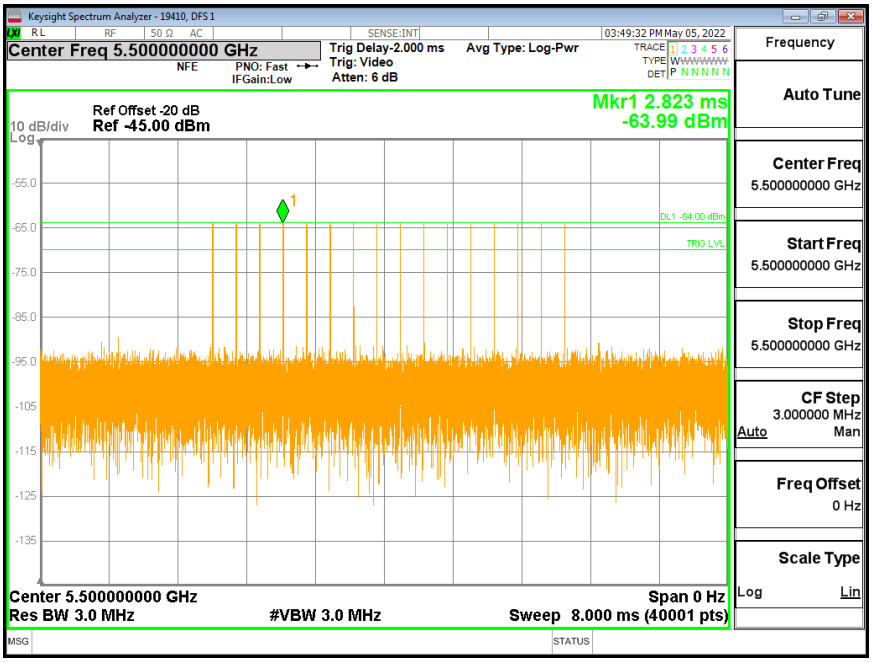
SAMPLE OF RADAR TYPE 1



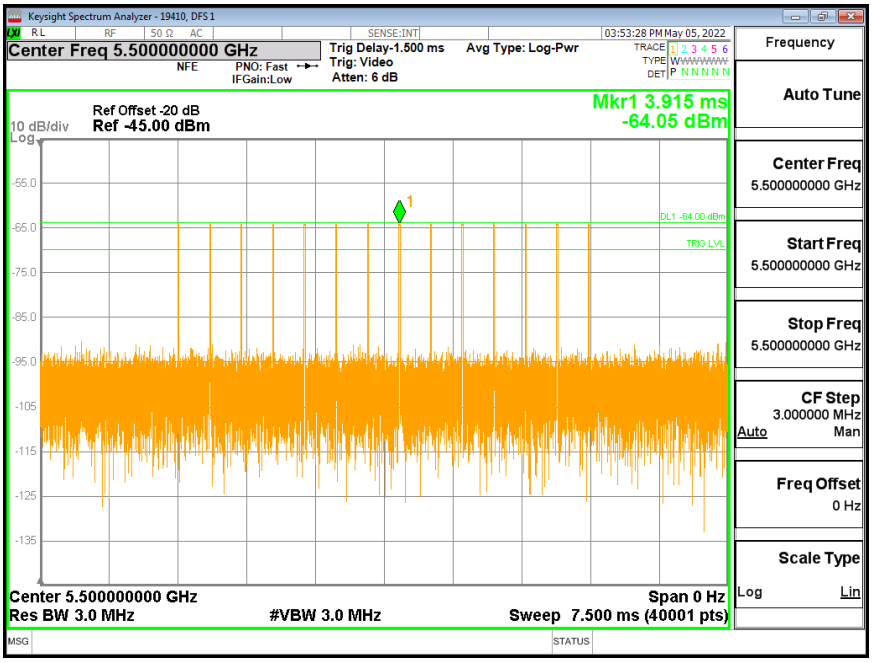
SAMPLE OF RADAR TYPE 2



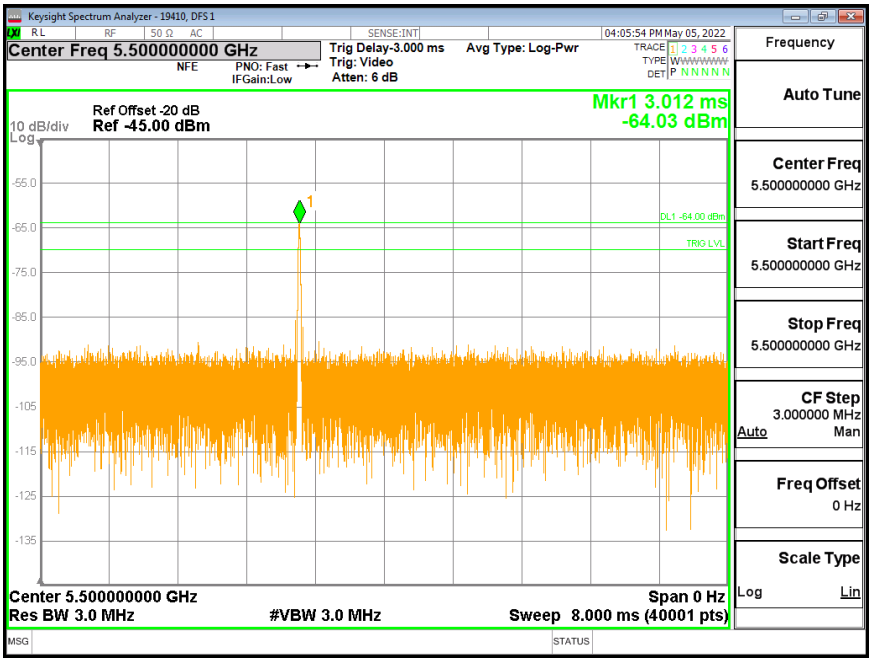
SAMPLE OF RADAR TYPE 3



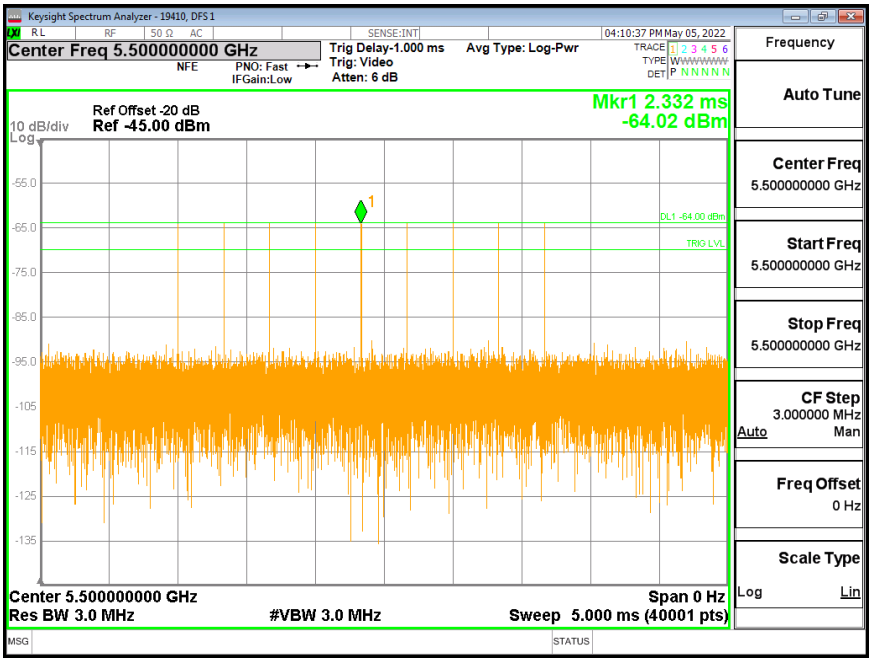
SAMPLE OF RADAR TYPE 4



SAMPLE OF SINGLE BURST OF RADAR TYPE 5

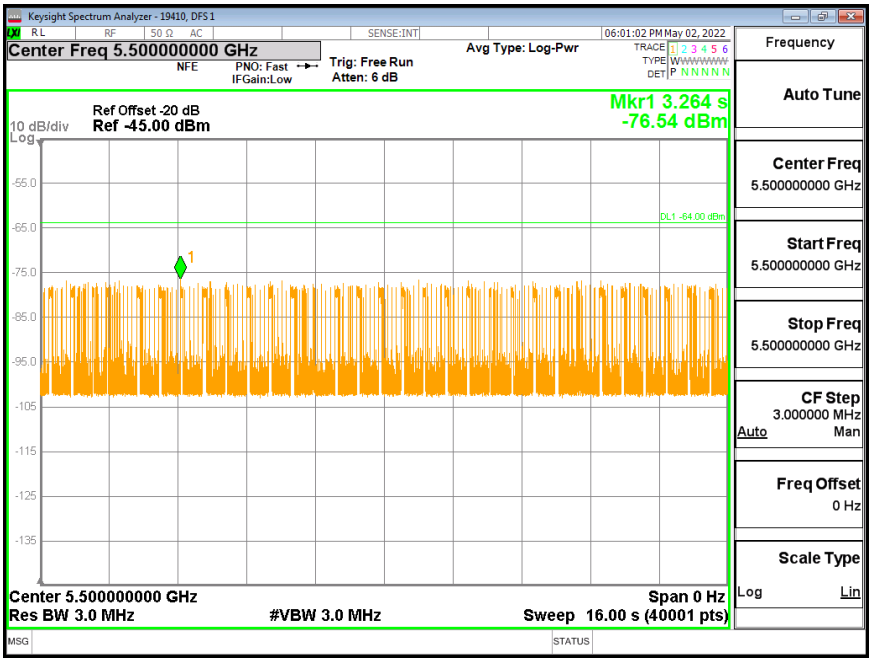


SINGLE BURST OF RADAR TYPE 6

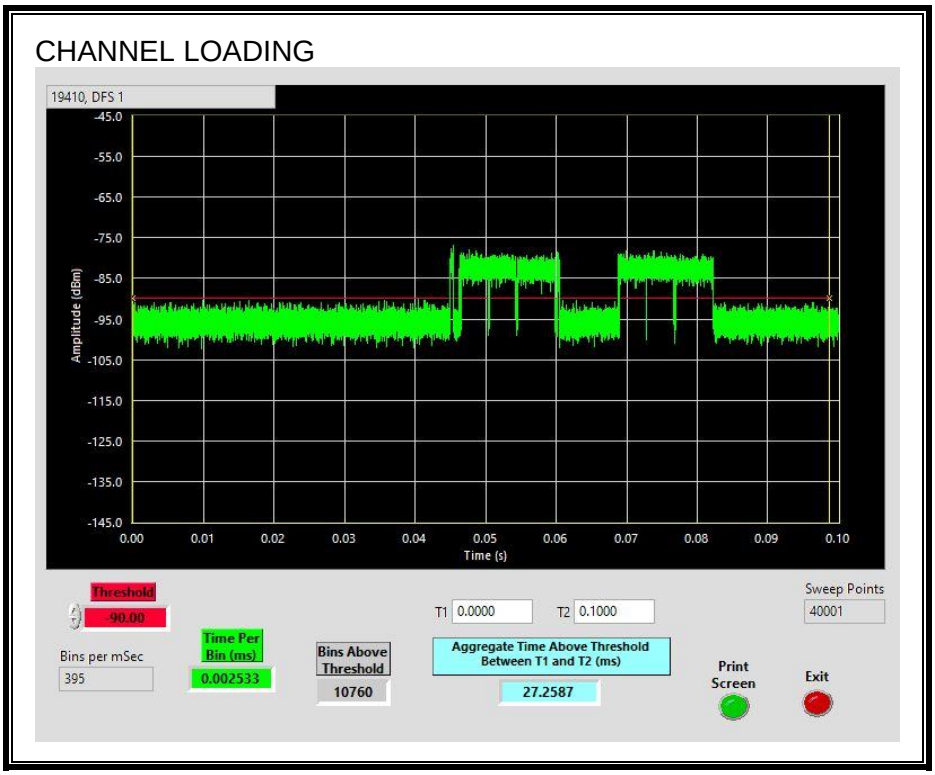


TRAFFIC

TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 27.25%

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)
29.65	133.3	103.7	43.7

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)
30.52	75.44	44.9	1.3

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)
30.43	132.2	101.8	58.1

QUALITATIVE RESULTS

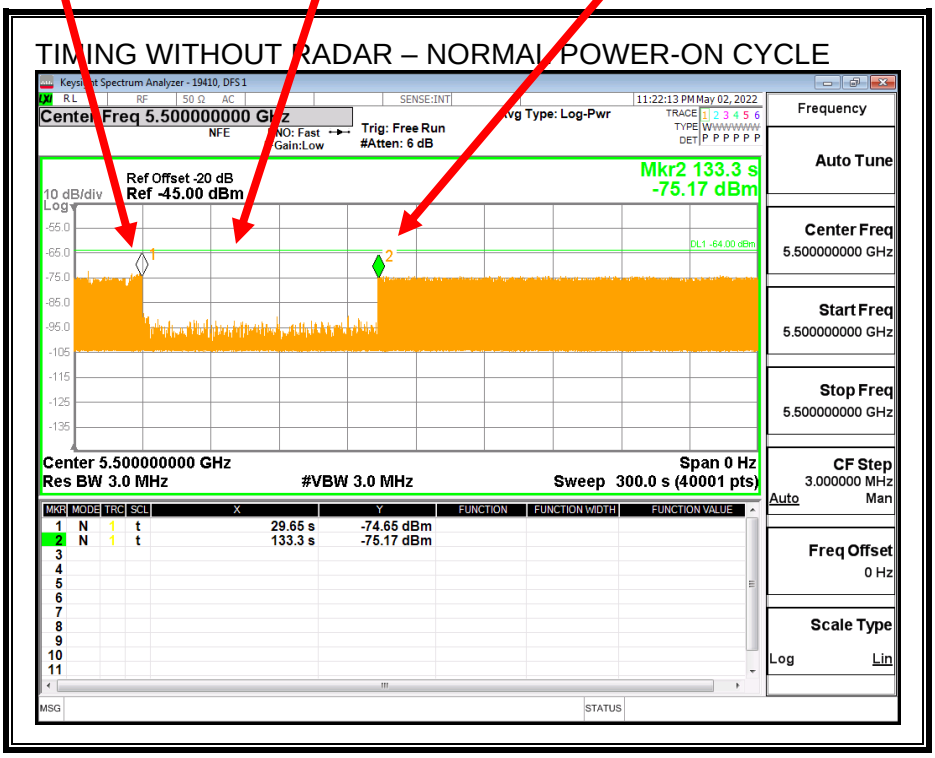
Timing of Radar Burst	Display on Control Computer	Spectrum Analyzer Display
No Radar Triggered	EUT marks Channel as active	Transmissions begin on channel after completion of the initial power-up cycle and the CAC
Within 0 to 6 second window	EUT does not display any radar parameter values	No transmissions on channel
Within 54 to 60 second window	EUT does not display any radar parameter values	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



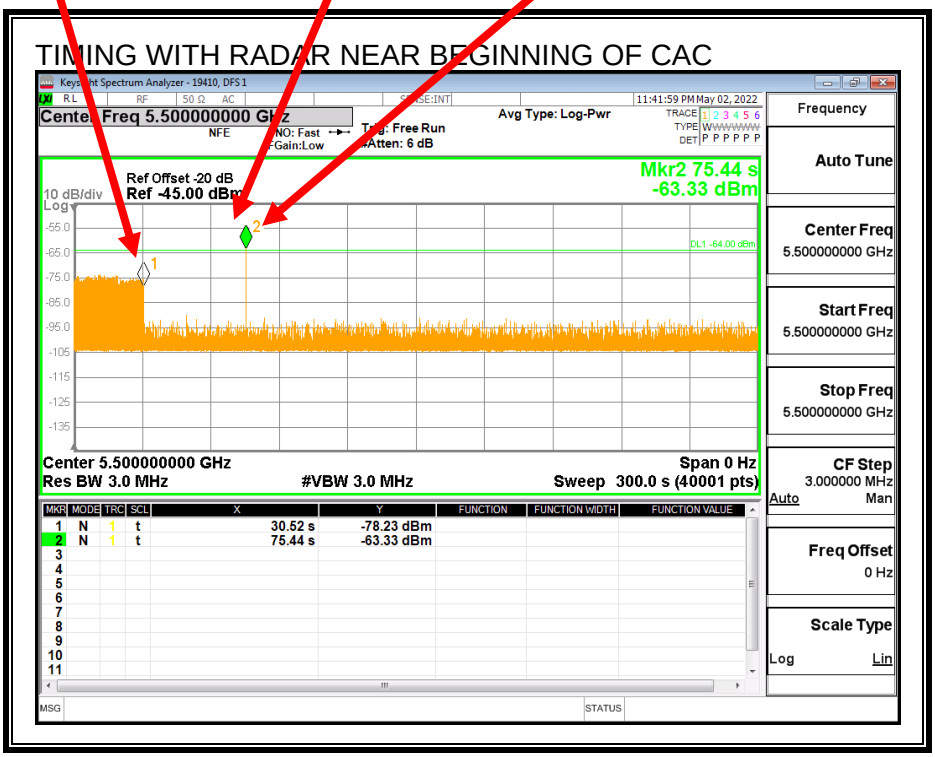
Transmissions begin on channel after completion of the initial power-up cycle and the CAC.

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



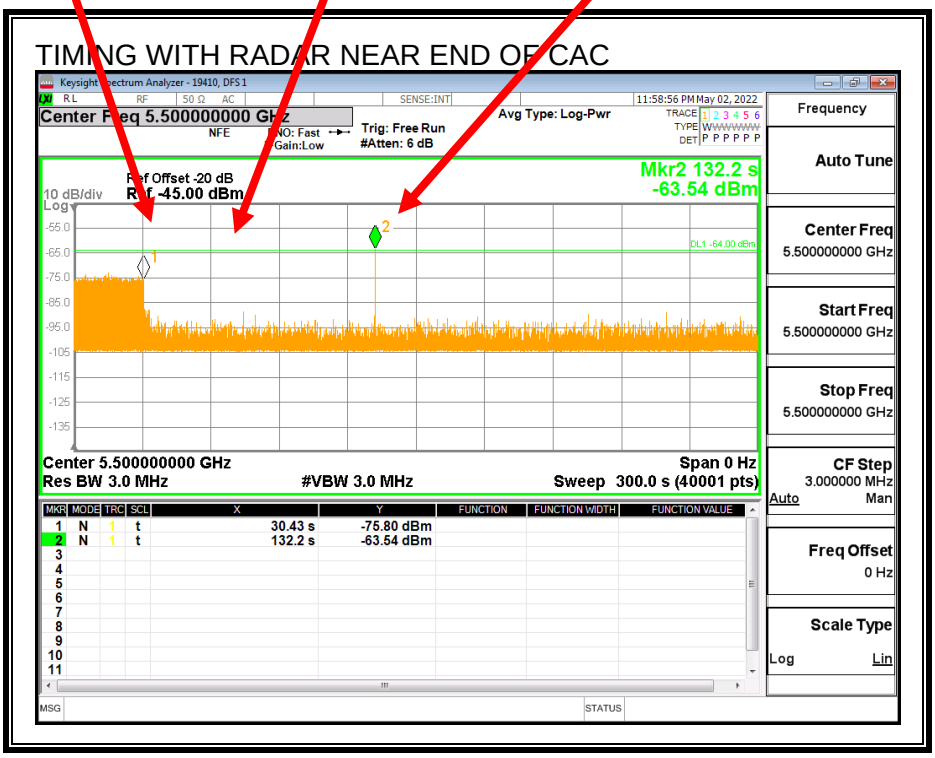
No EUT transmissions were observed after the radar signal.

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).

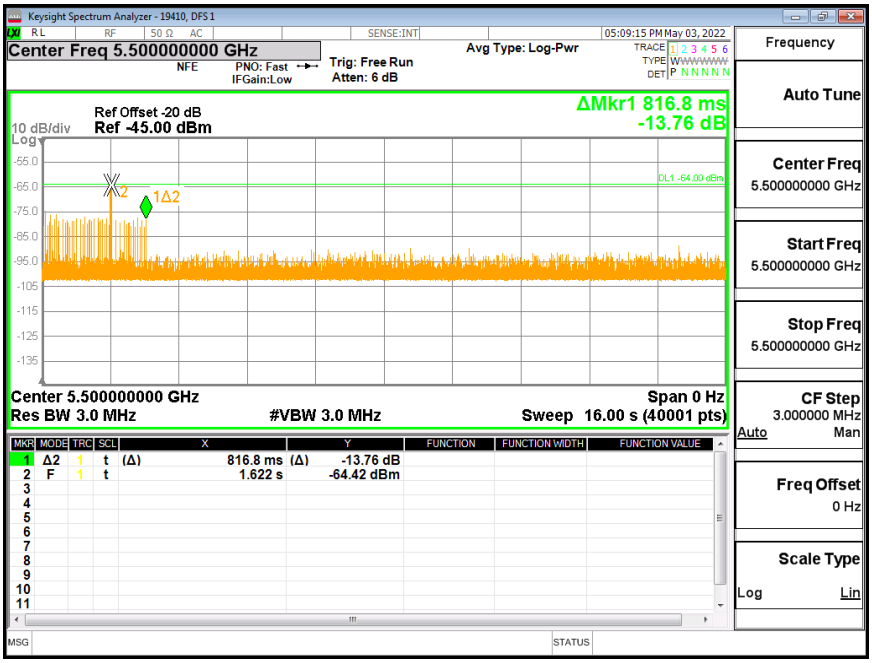
RESULTS

Channel Move Time (sec)	Limit (sec)
0.8168	10

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

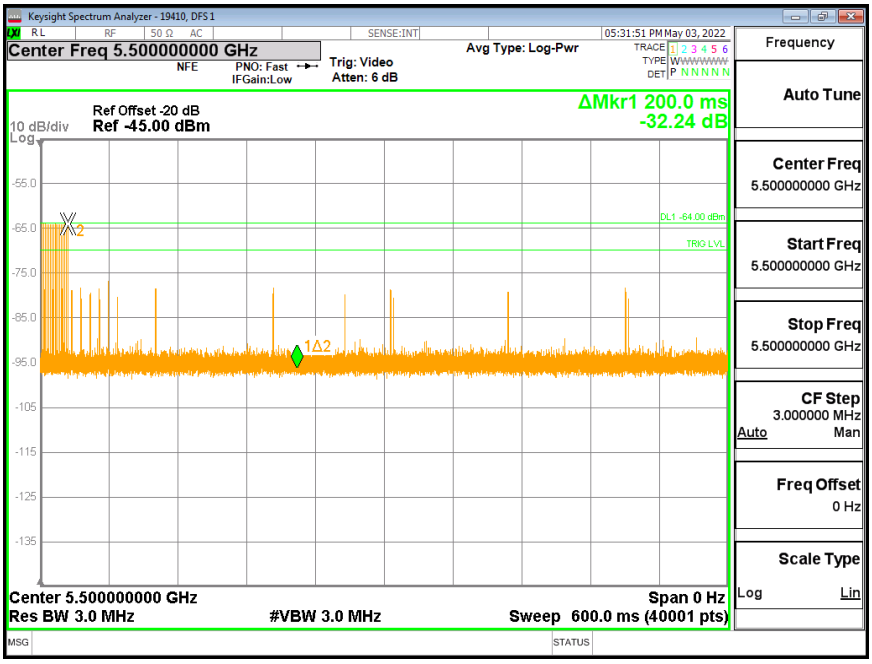
MOVE TIME

MOVE TIME



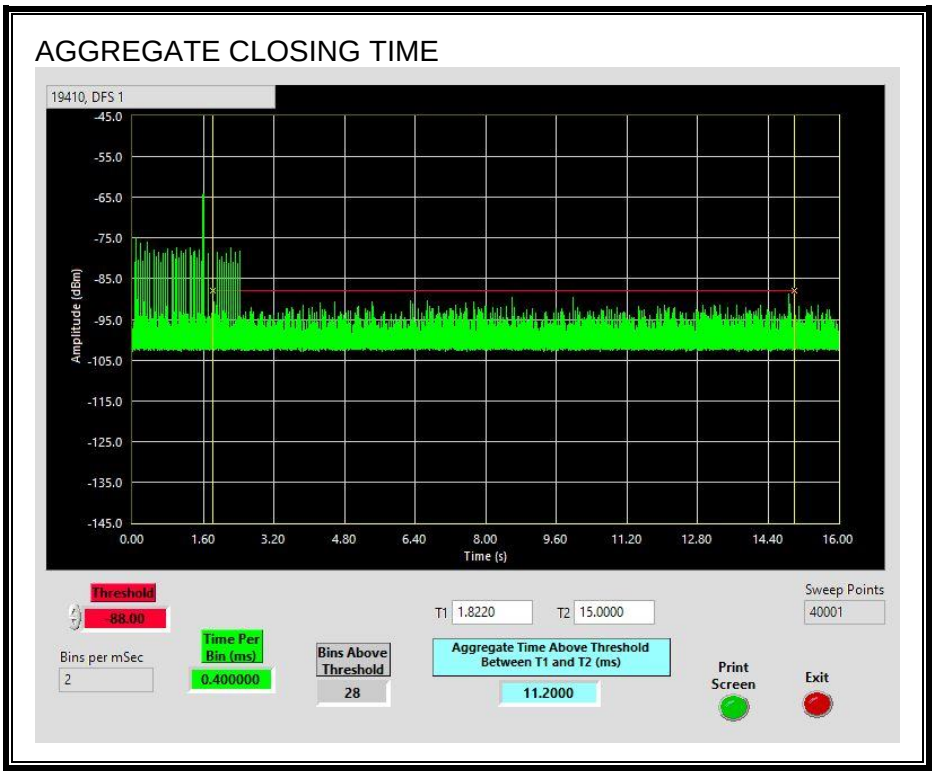
CHANNEL CLOSING TIME

CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

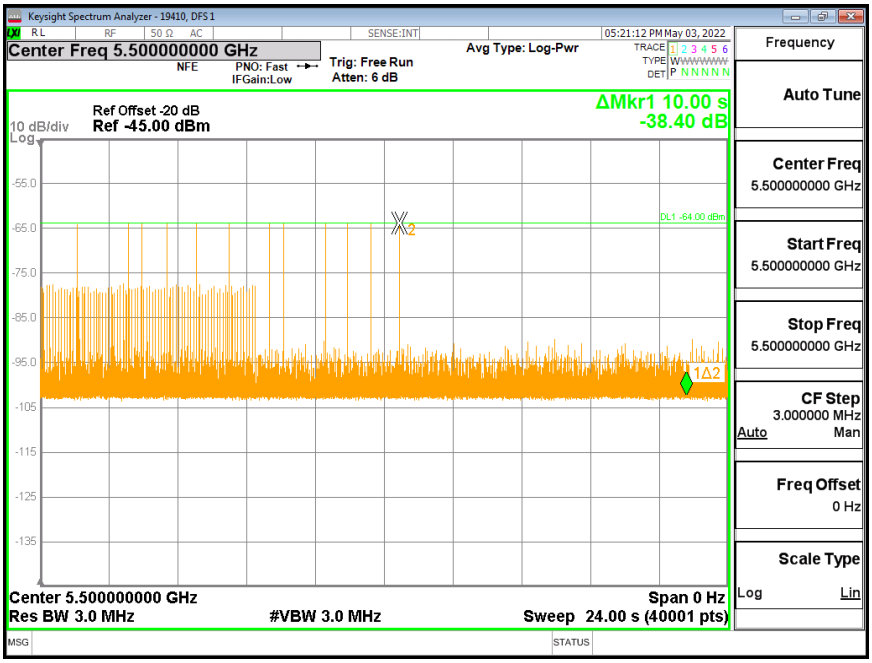
Only intermittent transmissions are observed during the aggregate monitoring period.



LONG PULSE CHANNEL MOVE TIME

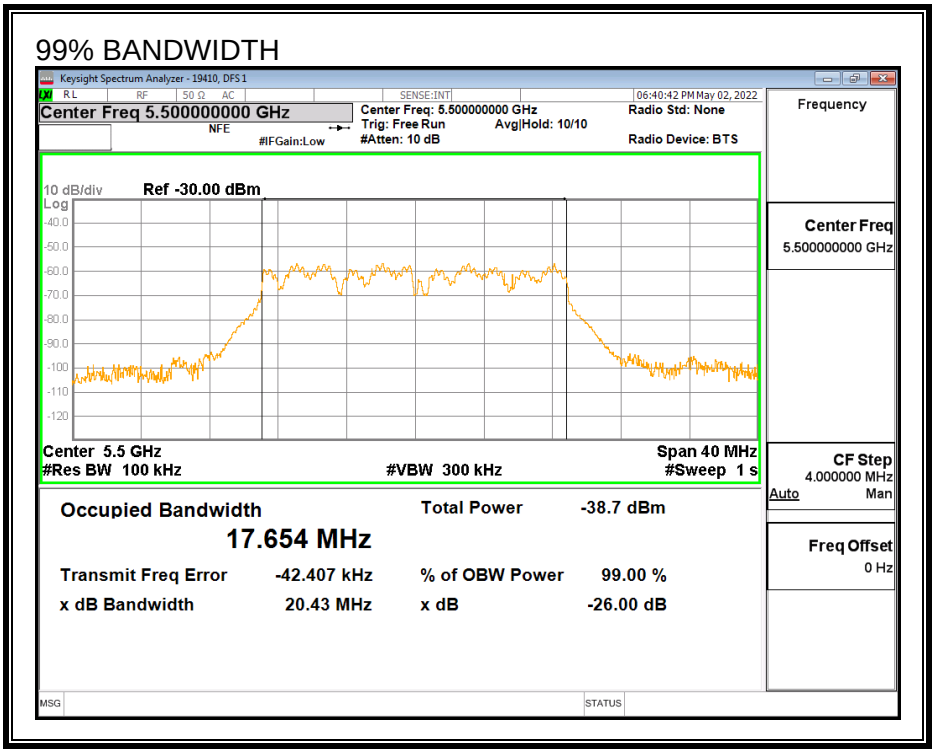
The traffic ceases prior to 10 seconds after the end of the radar waveform.

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 (%)
5491	5509	18	17.654	102.0	100

DETECTION BANDWIDTH PROBABILITY

DETECTION BANDWIDTH PROBABILITY RESULTS

Detection Bandwidth Test Results		19410	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
5490	10	0	0	
5491	10	10	100	FL
5492	10	10	100	
5493	10	10	100	
5494	10	10	100	
5495	10	10	100	
5500	10	9	90	
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	96.67	60	Pass	5491	5509	17.65	DFS 1	19410	v4.1
FCC Short Pulse Type 2	30	90.00	60	Pass	5491	5509	17.65	DFS 1	19410	v4.1
FCC Short Pulse Type 3	30	80.00	60	Pass	5491	5509	17.65	DFS 1	19410	v4.1
FCC Short Pulse Type 4	30	93.33	60	Pass	5491	5509	17.65	DFS 1	19410	v4.1
Aggregate		90.00	80	Pass						
FCC Long Pulse Type 5	30	90.00	80	Pass	5491	5509	17.65	DFS 1	19410	v4.1
FCC Hopping Type 6	38	94.74	70	Pass	5491	5509		DFS 1	19410	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	5494	No
1002	1	738	72	A	5498	Yes
1003	1	718	74	A	5500	Yes
1004	1	838	63	A	5504	Yes
1005	1	818	65	A	5506	Yes
1006	1	518	102	A	5503	Yes
1007	1	938	57	A	5500	Yes
1008	1	898	59	A	5507	Yes
1009	1	918	58	A	5501	Yes
1010	1	538	99	A	5494	Yes
1011	1	638	83	A	5503	Yes
1012	1	598	89	A	5508	Yes
1013	1	858	62	A	5503	Yes
1014	1	758	70	A	5493	Yes
1015	1	558	95	A	5504	Yes
1016	1	2461	22	B	5502	Yes
1017	1	1416	38	B	5508	Yes
1018	1	2049	26	B	5493	Yes
1019	1	1134	47	B	5493	Yes
1020	1	1896	28	B	5493	Yes
1021	1	1110	48	B	5509	Yes
1022	1	807	66	B	5494	Yes
1023	1	1505	36	B	5497	Yes
1024	1	1331	40	B	5503	Yes
1025	1	2158	25	B	5499	Yes
1026	1	2114	25	B	5506	Yes
1027	1	1875	29	B	5504	Yes
1028	1	1961	27	B	5499	Yes
1029	1	1852	29	B	5507	Yes
1030	1	872	61	B	5500	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	186	23	5506	Yes
2002	4	181	27	5497	Yes
2003	4.7	171	26	5506	Yes
2004	2.9	214	28	5497	Yes
2005	3.8	170	24	5492	Yes
2006	2.1	217	26	5506	Yes
2007	1.3	177	29	5507	Yes
2008	2.1	228	28	5500	Yes
2009	1.4	192	25	5508	Yes
2010	2.4	209	25	5503	Yes
2011	2	220	29	5496	Yes
2012	1.3	161	25	5508	Yes
2013	1.1	176	26	5493	Yes
2014	4.6	163	23	5497	Yes
2015	2.7	183	25	5504	Yes
2016	2.4	174	29	5495	Yes
2017	2.8	160	28	5502	Yes
2018	2.7	156	25	5508	Yes
2019	3.4	226	24	5503	Yes
2020	1.6	188	29	5496	Yes
2021	2.5	225	29	5500	Yes
2022	3	191	24	5508	Yes
2023	4.1	151	27	5507	Yes
2024	4.9	202	26	5509	No
2025	4.3	166	23	5501	Yes
2026	1.1	226	29	5495	No
2027	4.8	195	26	5502	Yes
2028	4.1	216	23	5497	No
2029	3.9	150	24	5504	Yes
2030	3.3	219	28	5496	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	6.4	273	16	5505	Yes
3002	6.1	498	17	5493	Yes
3003	6.6	454	17	5499	Yes
3004	6.4	323	17	5501	Yes
3005	7.1	291	18	5503	No
3006	9.4	290	18	5505	No
3007	6.2	404	17	5498	Yes
3008	6.7	299	18	5500	Yes
3009	7.8	426	17	5503	Yes
3010	8.6	333	16	5509	Yes
3011	8	355	18	5499	No
3012	8.9	409	18	5509	Yes
3013	8.5	310	16	5500	No
3014	7.8	259	18	5498	Yes
3015	7.6	423	18	5494	Yes
3016	7	385	17	5498	Yes
3017	9.2	445	18	5497	Yes
3018	7	301	16	5494	Yes
3019	9.4	374	16	5494	Yes
3020	7.3	494	16	5504	Yes
3021	9.9	462	16	5494	Yes
3022	8.1	344	17	5502	No
3023	9	325	16	5506	Yes
3024	9.5	471	16	5509	Yes
3025	6.5	346	16	5498	Yes
3026	7.3	387	18	5502	Yes
3027	6.7	276	17	5498	No
3028	7.6	329	17	5495	Yes
3029	7.2	481	17	5491	Yes
3030	6.5	430	17	5495	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	11.7	344	14	5505	Yes
4002	19.6	305	12	5496	Yes
4003	15.3	499	13	5495	Yes
4004	19.4	473	14	5495	Yes
4005	15.6	295	15	5509	Yes
4006	11.1	415	16	5508	Yes
4007	16.9	383	16	5501	Yes
4008	12.8	265	12	5501	Yes
4009	19.6	496	16	5501	Yes
4010	16	391	15	5491	Yes
4011	18.4	267	15	5502	Yes
4012	11	308	14	5506	Yes
4013	18.7	447	12	5500	Yes
4014	11.8	250	12	5500	Yes
4015	20	402	12	5507	Yes
4016	18.3	351	12	5505	Yes
4017	13.6	398	13	5496	Yes
4018	12.4	477	16	5494	Yes
4019	12.4	419	12	5501	No
4020	16.6	394	12	5492	Yes
4021	12.7	466	14	5504	Yes
4022	17.3	336	15	5491	Yes
4023	14	303	14	5495	Yes
4024	14.8	436	15	5495	Yes
4025	16.7	417	15	5503	Yes
4026	13.1	312	14	5501	Yes
4027	11.3	439	13	5508	Yes
4028	17.3	479	13	5498	No
4029	15.9	368	15	5498	Yes
4030	18	421	13	5508	Yes

TYPE 5 DETECTION PROBABILITY

Data Sheet for FCC Long Pulse Radar Type 5		
Trial	Frequency (MHz)	Successful Detection (Yes/No)
1	5500	No
2	5500	No
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	Yes
12	5500	Yes
13	5499	Yes
14	5500	Yes
15	5499	Yes
16	5498	Yes
17	5500	No
18	5500	Yes
19	5500	Yes
20	5500	Yes
21	5500	Yes
22	5500	Yes
23	5500	Yes
24	5500	Yes
25	5501	Yes
26	5500	Yes
27	5500	Yes
28	5500	Yes
29	5500	Yes
30	5500	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	684	5491	5	Yes
2	1159	5492	5	Yes
3	1634	5493	1	Yes
4	2109	5494	1	No
5	2584	5495	2	Yes
6	3059	5496	4	Yes
7	3534	5497	4	Yes
8	4009	5498	3	Yes
9	4484	5499	4	Yes
10	4959	5500	5	Yes
11	5434	5501	4	Yes
12	5909	5502	6	Yes
13	6384	5503	4	Yes
14	6859	5504	4	Yes
15	7334	5505	2	Yes
16	7809	5506	5	Yes
17	8284	5507	4	Yes
18	8759	5508	4	Yes
19	9234	5509	4	Yes
20	9709	5491	3	No
21	10184	5492	2	Yes
22	10659	5493	2	Yes
23	11134	5494	4	Yes
24	11609	5495	2	Yes
25	12084	5496	5	Yes
26	12559	5497	1	Yes
27	13034	5498	4	Yes
28	13509	5499	3	Yes
29	13984	5500	3	Yes
30	14459	5501	5	Yes
31	14934	5502	2	Yes
32	15409	5503	3	Yes
33	15884	5504	4	Yes
34	16359	5505	5	Yes
35	16834	5506	3	Yes
36	17309	5507	4	Yes
37	17784	5508	3	Yes
38	18259	5509	4	Yes

8.3. RESULTS FOR 40 MHz BANDWIDTH

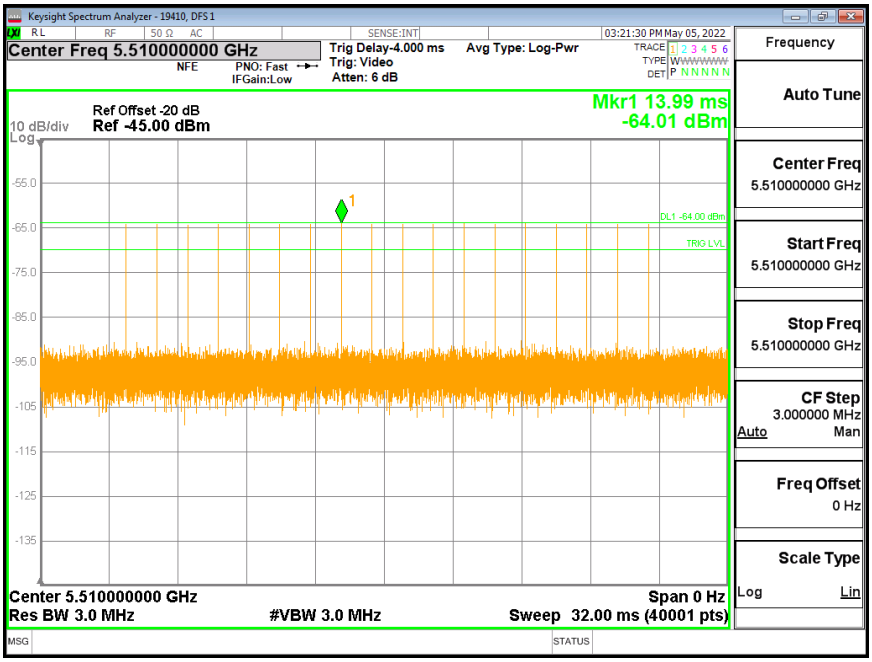
8.3.1. TEST CHANNEL

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

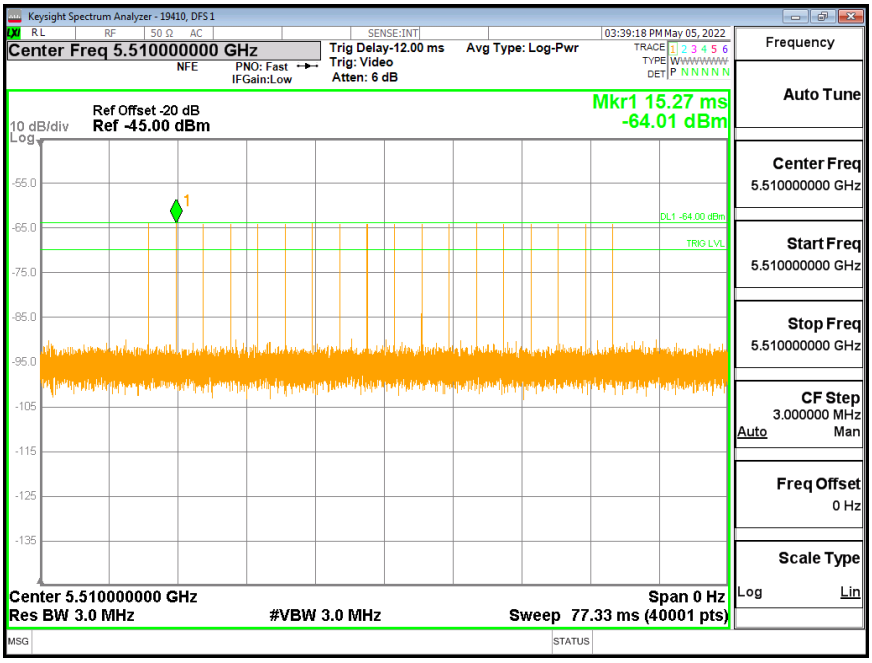
8.3.2. RADAR WAVEFORMS AND TRAFFIC

RADAR WAVEFORMS

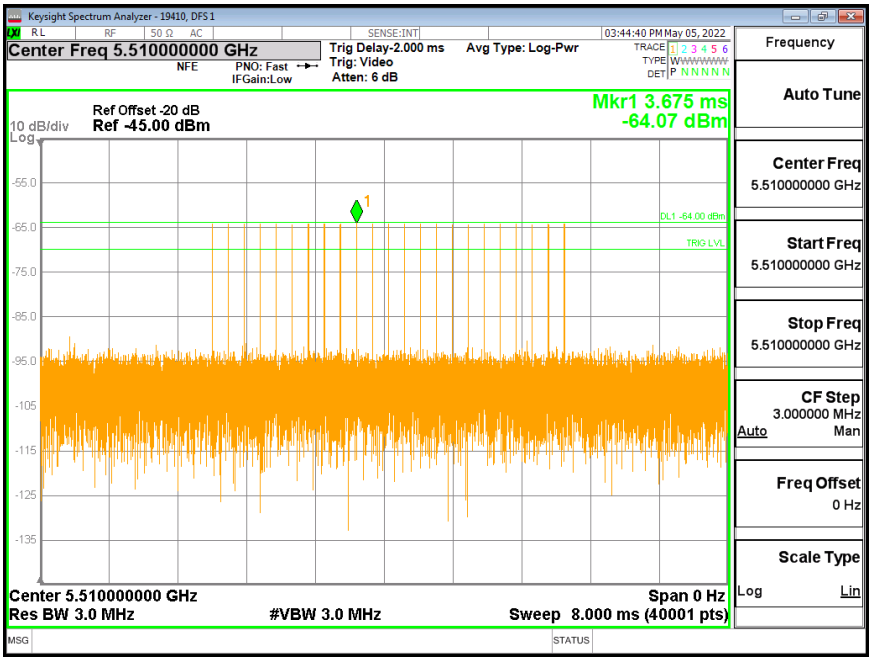
SHORT PULSE RADAR TYPE 0



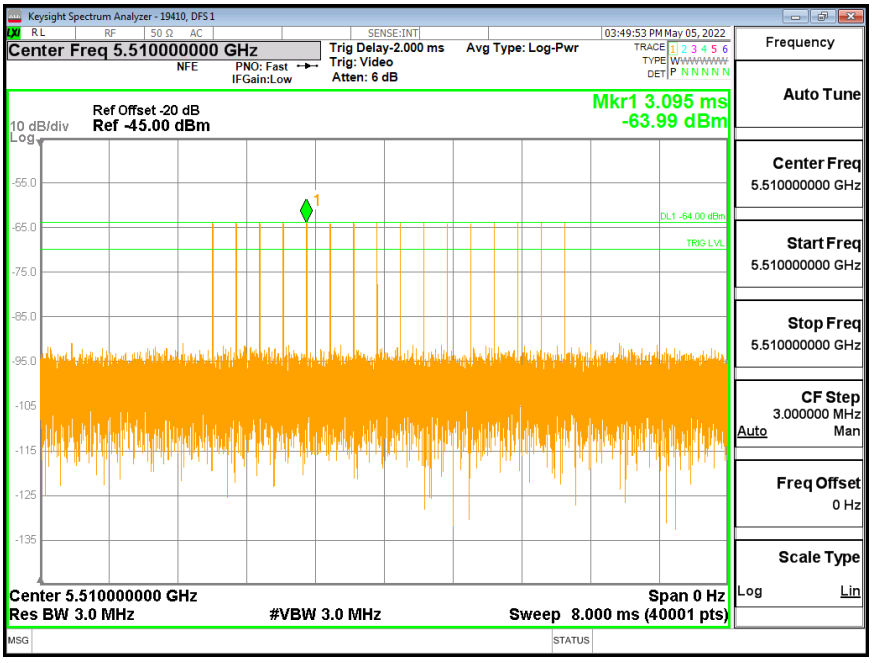
SAMPLE OF RADAR TYPE 1



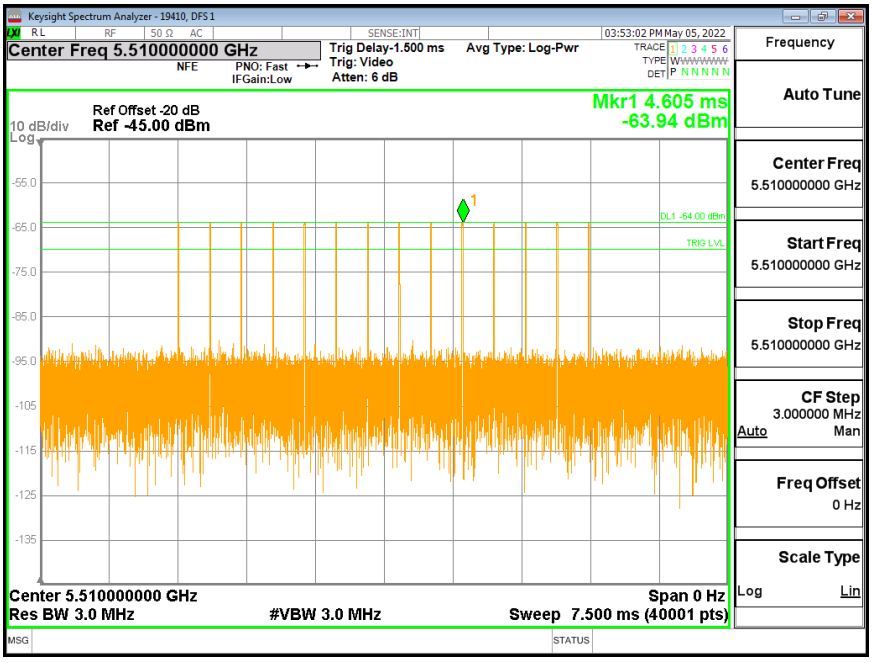
SAMPLE OF RADAR TYPE 2



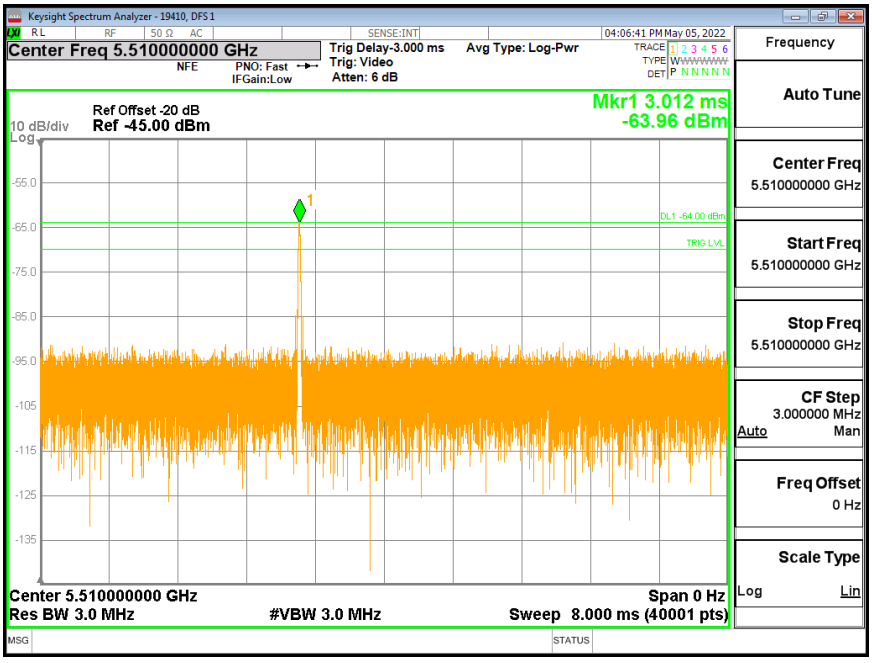
SAMPLE OF RADAR TYPE 3



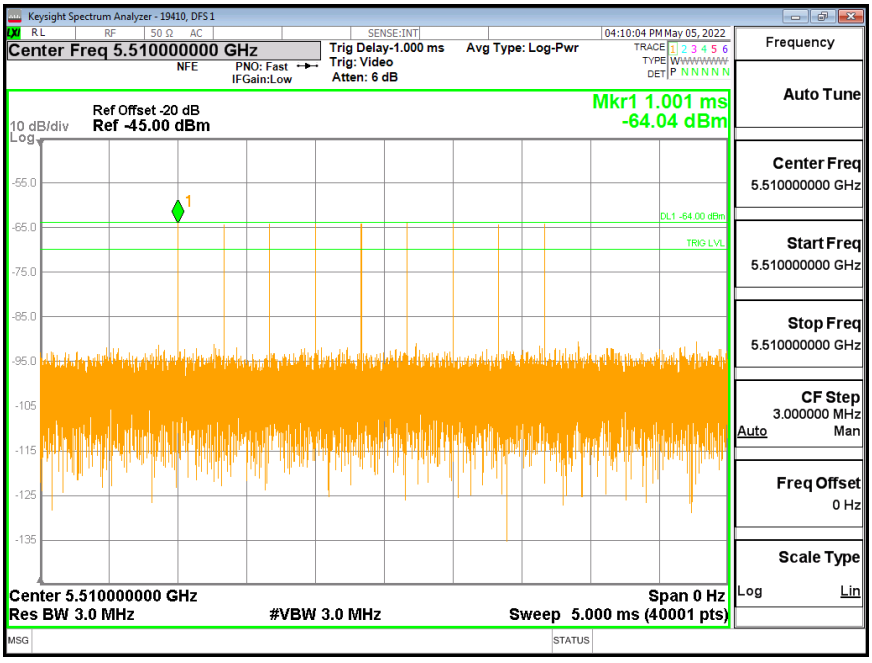
SAMPLE OF RADAR TYPE 4



SAMPLE OF SINGLE BURST OF RADAR TYPE 5

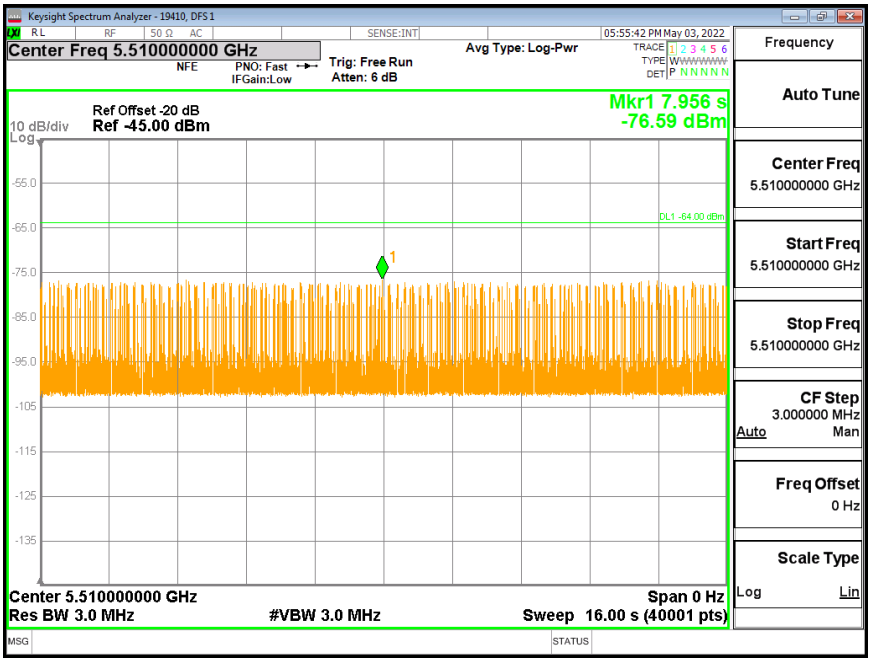


SINGLE BURST OF RADAR TYPE 6

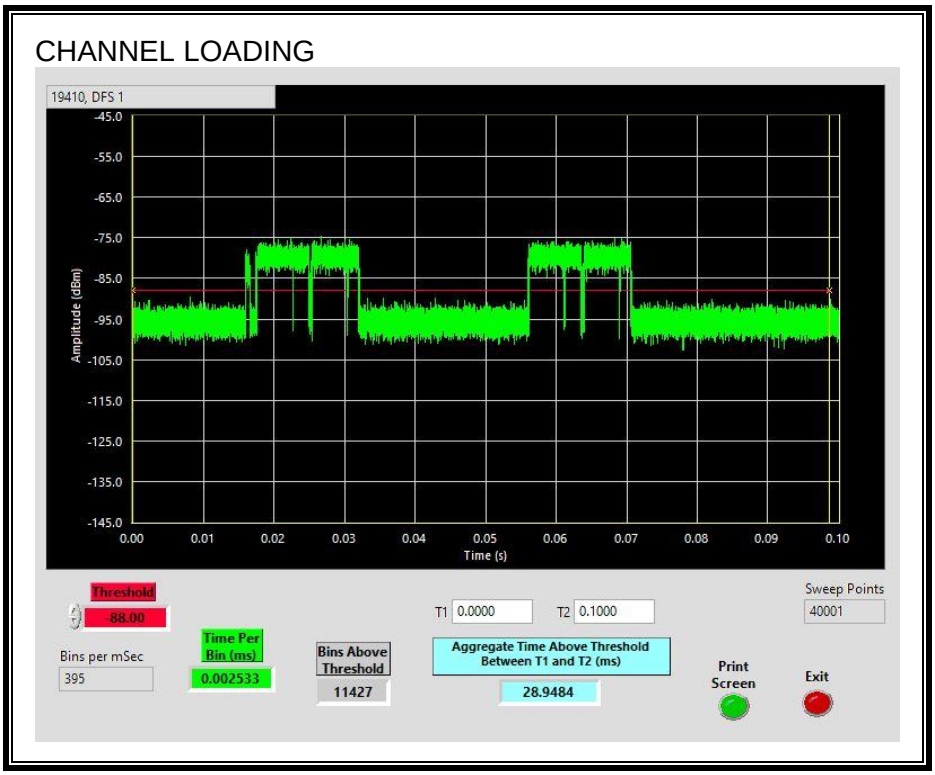


TRAFFIC

TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 28.95%

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)
30.66	138.5	107.8	47.8

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)
30.57	79.79	49.2	1.4

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)
30.47	137.4	106.9	59.1

QUALITATIVE RESULTS

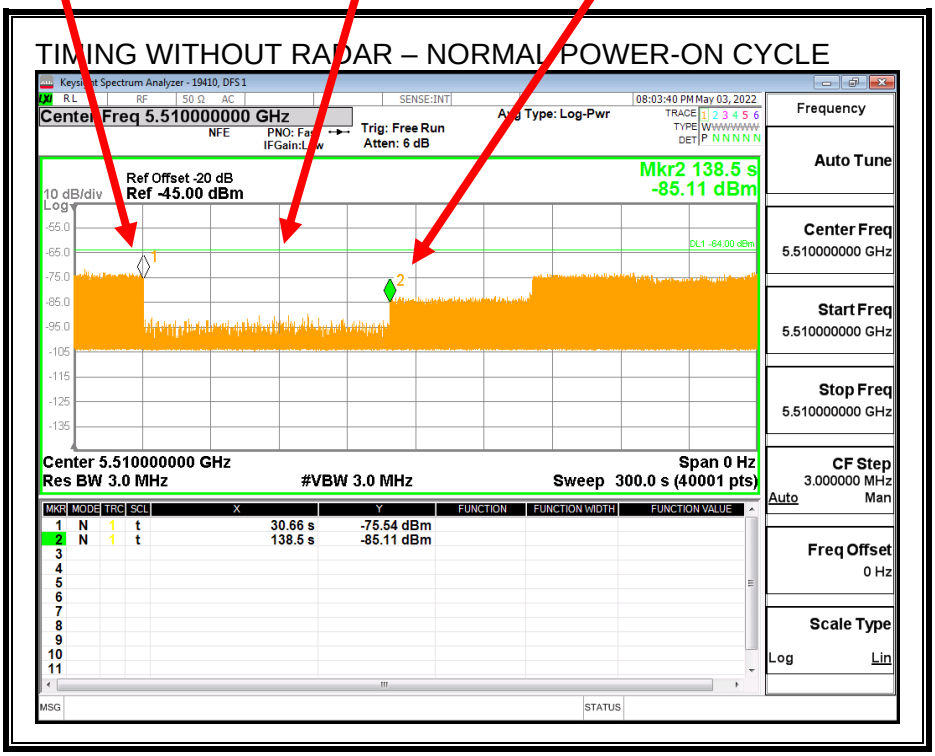
Timing of Radar Burst	Display on Control Computer	Spectrum Analyzer Display
No Radar Triggered	EUT marks Channel as active	Transmissions begin on channel after completion of the initial power-up cycle and the CAC
Within 0 to 6 second window	EUT does not display any radar parameter values	No transmissions on channel
Within 54 to 60 second window	EUT does not display any radar parameter values	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



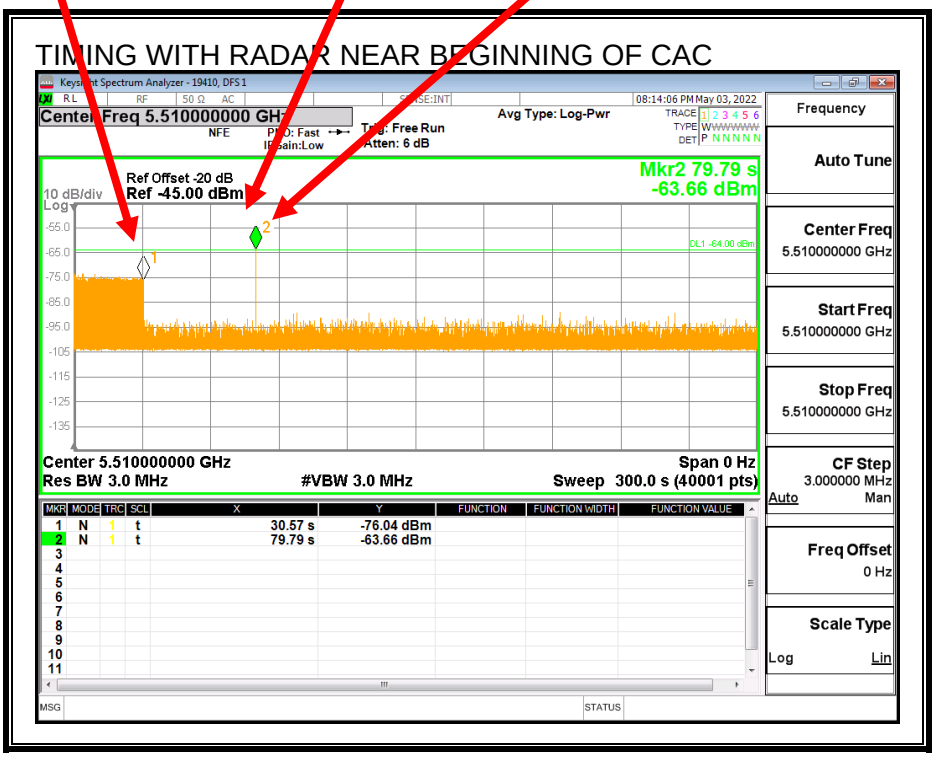
Transmissions begin on channel after completion of the initial power-up cycle and the CAC.

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



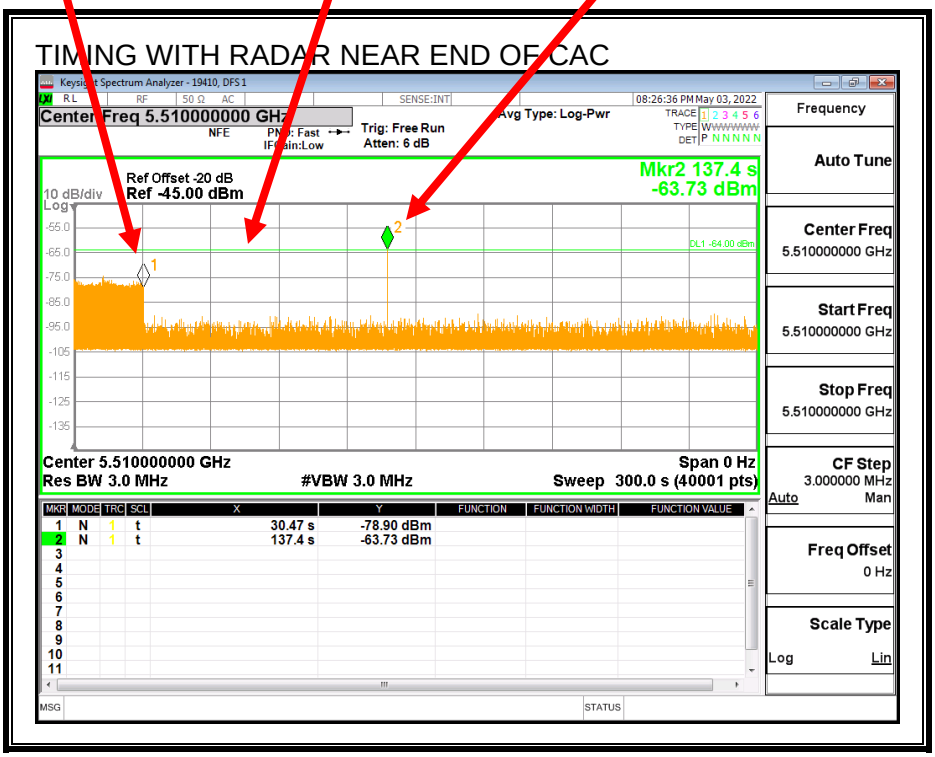
No EUT transmissions were observed after the radar signal.

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).

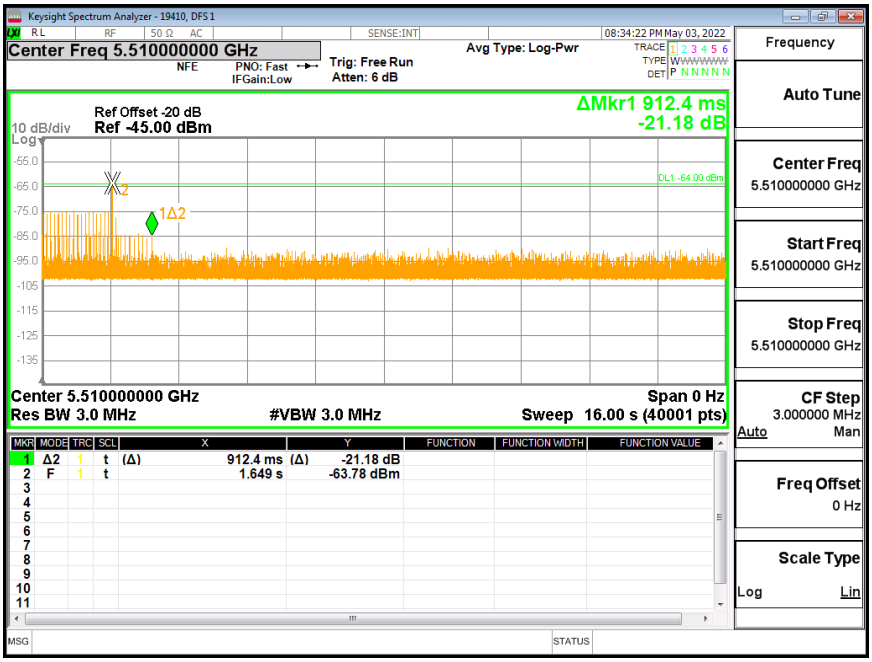
RESULTS

Channel Move Time (sec)	Limit (sec)
0.9124	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
9.2	60

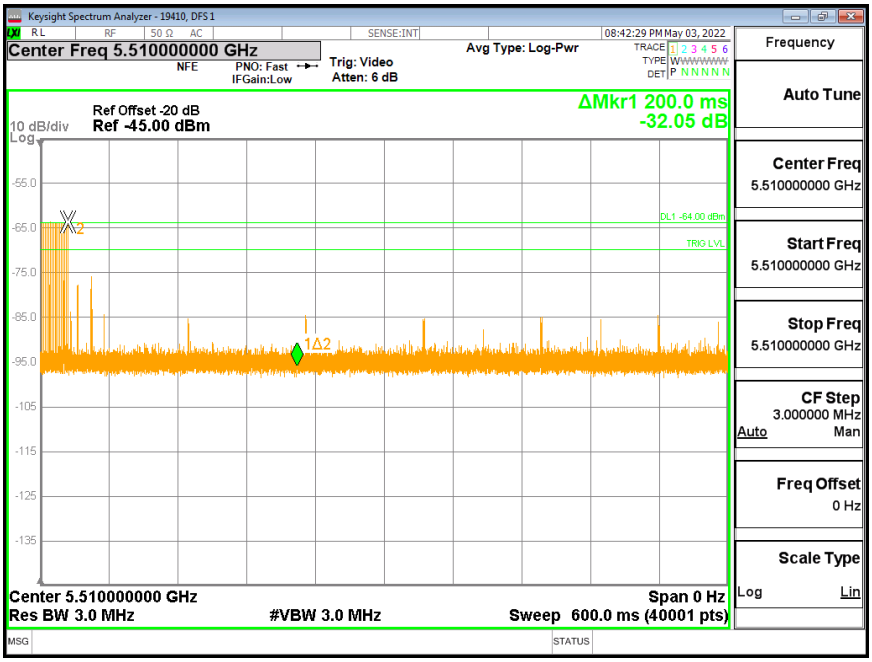
MOVE TIME

MOVE TIME



CHANNEL CLOSING TIME

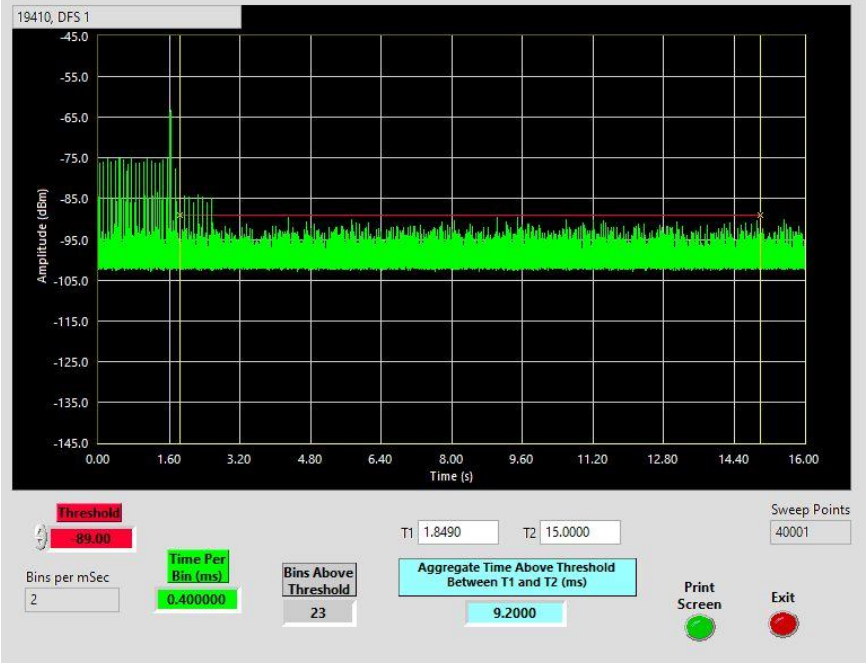
CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the aggregate monitoring period.

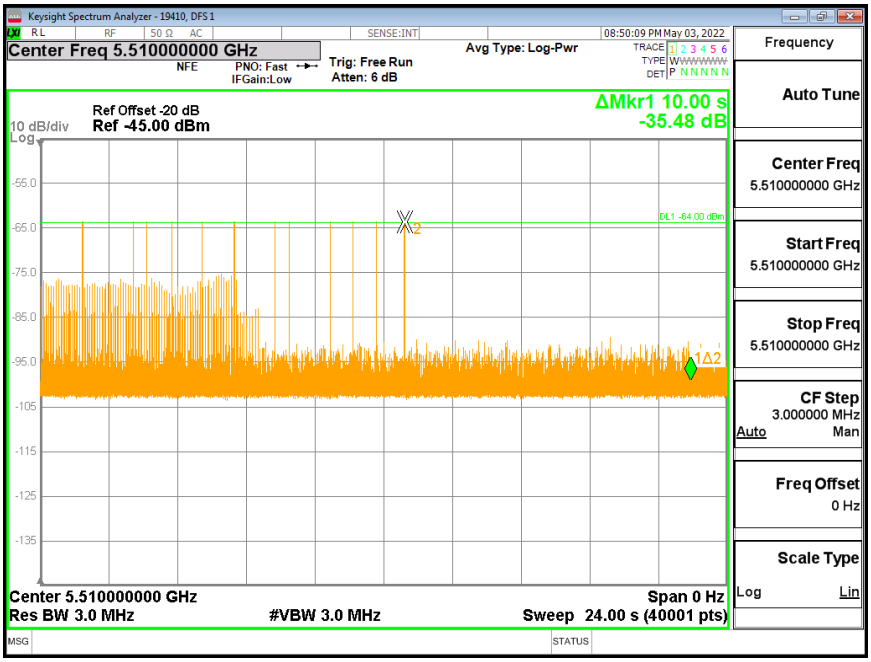
AGGREGATE CLOSING TIME



LONG PULSE CHANNEL MOVE TIME

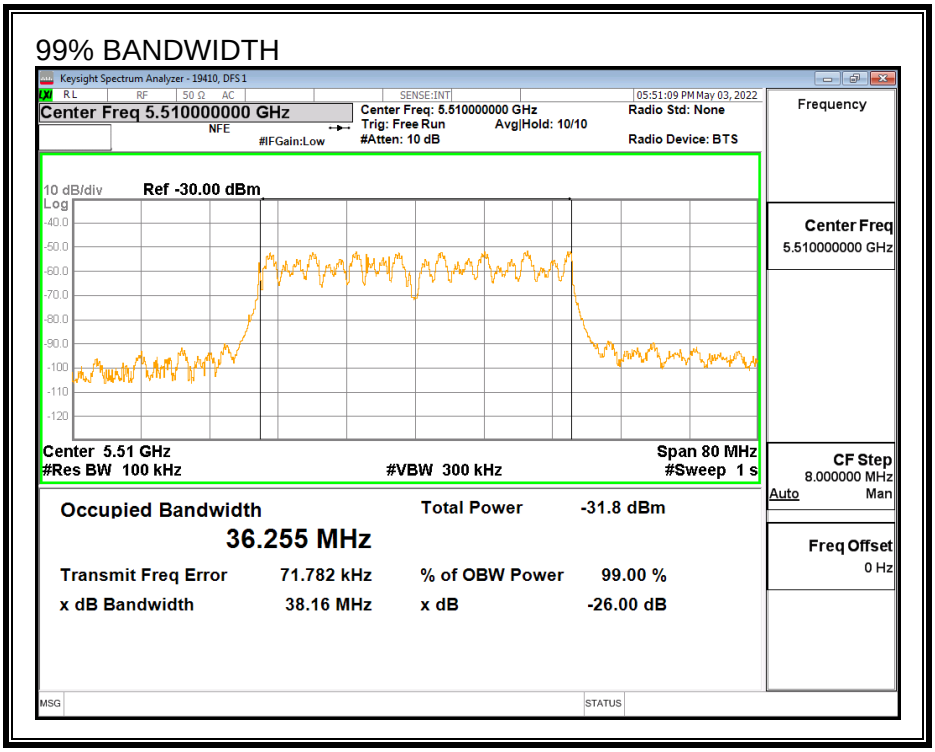
The traffic ceases prior to 10 seconds after the end of the radar waveform.

MOVE TIME FOR LONG PULSE RADAR



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 (%)
5491	5529	38	36.255	104.8	100

DETECTION BANDWIDTH PROBABILITY

DETECTION BANDWIDTH PROBABILITY RESULTS

Detection Bandwidth Test Results		19410	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
5490	10	0	0	
5491	10	10	100	FL
5492	10	10	100	
5493	10	10	100	
5494	10	10	100	
5495	10	10	100	
5500	10	10	100	
5505	10	10	100	
5510	10	9	90	
5515	10	10	100	
5520	10	10	100	
5525	10	10	100	
5526	10	10	100	
5527	10	10	100	
5528	10	10	100	
5529	10	10	100	FH
5530	10	1	10	

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	96.67	60	Pass	5491	5529	36.26	DFS 1	19410	v4.1
FCC Short Pulse Type 2	30	83.33	60	Pass	5491	5529	36.26	DFS 1	19410	v4.1
FCC Short Pulse Type 3	30	83.33	60	Pass	5491	5529	36.26	DFS 1	19410	v4.1
FCC Short Pulse Type 4	30	80.00	60	Pass	5491	5529	36.26	DFS 1	19410	v4.1
Aggregate		85.83	80	Pass						
FCC Long Pulse Type 5	30	83.33	80	Pass	5491	5529	36.26	DFS 1	19410	v4.1
FCC Hopping Type 6	39	100.00	70	Pass	5491	5529		DFS 1	19410	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	5492	No
1002	1	738	72	A	5520	Yes
1003	1	718	74	A	5522	Yes
1004	1	838	63	A	5513	Yes
1005	1	818	65	A	5497	Yes
1006	1	518	102	A	5505	Yes
1007	1	938	57	A	5519	Yes
1008	1	898	59	A	5494	Yes
1009	1	918	58	A	5517	Yes
1010	1	538	99	A	5519	Yes
1011	1	638	83	A	5507	Yes
1012	1	598	89	A	5497	Yes
1013	1	858	62	A	5503	Yes
1014	1	758	70	A	5505	Yes
1015	1	558	95	A	5518	Yes
1016	1	2461	22	B	5510	Yes
1017	1	1416	38	B	5518	Yes
1018	1	2049	26	B	5523	Yes
1019	1	1134	47	B	5498	Yes
1020	1	1896	28	B	5508	Yes
1021	1	1110	48	B	5498	Yes
1022	1	807	66	B	5511	Yes
1023	1	1505	36	B	5492	Yes
1024	1	1331	40	B	5514	Yes
1025	1	2158	25	B	5505	Yes
1026	1	2114	25	B	5525	Yes
1027	1	1875	29	B	5505	Yes
1028	1	1961	27	B	5500	Yes
1029	1	1852	29	B	5500	Yes
1030	1	872	61	B	5529	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	186	23	5511	Yes
2002	4	181	27	5508	Yes
2003	4.7	171	26	5498	No
2004	2.9	214	28	5513	Yes
2005	3.8	170	24	5527	Yes
2006	2.1	217	26	5502	Yes
2007	1.3	177	29	5495	Yes
2008	2.1	228	28	5522	No
2009	1.4	192	25	5501	Yes
2010	2.4	209	25	5520	Yes
2011	2	220	29	5528	Yes
2012	1.3	161	25	5506	No
2013	1.1	176	26	5492	Yes
2014	4.6	163	23	5521	Yes
2015	2.7	183	25	5497	Yes
2016	2.4	174	29	5523	Yes
2017	2.8	160	28	5514	Yes
2018	2.7	156	25	5507	Yes
2019	3.4	226	24	5527	Yes
2020	1.6	188	29	5502	Yes
2021	2.5	225	29	5506	Yes
2022	3	191	24	5519	Yes
2023	4.1	151	27	5499	Yes
2024	4.9	202	26	5508	No
2025	4.3	166	23	5518	Yes
2026	1.1	226	29	5511	Yes
2027	4.8	195	26	5514	Yes
2028	4.1	216	23	5498	Yes
2029	3.9	150	24	5500	Yes
2030	3.3	219	28	5519	No

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	6.4	273	16	5529	Yes
3002	6.1	498	17	5512	Yes
3003	6.6	454	17	5524	Yes
3004	6.4	323	17	5528	Yes
3005	7.1	291	18	5495	Yes
3006	9.4	290	18	5501	Yes
3007	6.2	404	17	5525	No
3008	6.7	299	18	5511	No
3009	7.8	426	17	5511	Yes
3010	8.6	333	16	5507	Yes
3011	8	355	18	5499	Yes
3012	8.9	409	18	5526	No
3013	8.5	310	16	5499	Yes
3014	7.8	259	18	5508	No
3015	7.6	423	18	5495	Yes
3016	7	385	17	5507	Yes
3017	9.2	445	18	5506	Yes
3018	7	301	16	5501	Yes
3019	9.4	374	16	5510	Yes
3020	7.3	494	16	5511	Yes
3021	9.9	462	16	5521	Yes
3022	8.1	344	17	5526	Yes
3023	9	325	16	5511	Yes
3024	9.5	471	16	5510	Yes
3025	6.5	346	16	5512	No
3026	7.3	387	18	5501	Yes
3027	6.7	276	17	5525	Yes
3028	7.6	329	17	5491	Yes
3029	7.2	481	17	5526	Yes
3030	6.5	430	17	5503	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	11.7	344	14	5506	Yes
4002	19.6	305	12	5512	Yes
4003	15.3	499	13	5494	No
4004	19.4	473	14	5507	Yes
4005	15.6	295	15	5526	Yes
4006	11.1	415	16	5517	Yes
4007	16.9	383	16	5497	Yes
4008	12.8	265	12	5529	Yes
4009	19.6	496	16	5520	Yes
4010	16	391	15	5492	Yes
4011	18.4	267	15	5507	Yes
4012	11	308	14	5499	No
4013	18.7	447	12	5509	Yes
4014	11.8	250	12	5502	Yes
4015	20	402	12	5510	Yes
4016	18.3	351	12	5492	Yes
4017	13.6	398	13	5499	Yes
4018	12.4	477	16	5519	Yes
4019	12.4	419	12	5500	No
4020	16.6	394	12	5507	Yes
4021	12.7	466	14	5516	Yes
4022	17.3	336	15	5500	Yes
4023	14	303	14	5518	Yes
4024	14.8	436	15	5502	No
4025	16.7	417	15	5525	Yes
4026	13.1	312	14	5520	Yes
4027	11.3	439	13	5497	No
4028	17.3	479	13	5496	No
4029	15.9	368	15	5519	Yes
4030	18	421	13	5514	Yes

TYPE 5 DETECTION PROBABILITY

Data Sheet for FCC Long Pulse Radar Type 5		
Trial	Frequency (MHz)	Successful Detection (Yes/No)
1	5510	No
2	5510	Yes
3	5510	Yes
4	5510	Yes
5	5510	Yes
6	5510	No
7	5510	No
8	5510	No
9	5510	Yes
10	5510	No
11	5500	Yes
12	5500	Yes
13	5500	Yes
14	5500	Yes
15	5500	Yes
16	5499	Yes
17	5500	Yes
18	5500	Yes
19	5500	Yes
20	5500	Yes
21	5520	Yes
22	5520	Yes
23	5520	Yes
24	5520	Yes
25	5520	Yes
26	5520	Yes
27	5520	Yes
28	5520	Yes
29	5520	Yes
30	5520	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	488	5491	13	Yes
2	963	5492	9	Yes
3	1438	5493	7	Yes
4	1913	5494	9	Yes
5	2388	5495	12	Yes
6	2863	5496	10	Yes
7	3338	5497	7	Yes
8	3813	5498	8	Yes
9	4288	5499	12	Yes
10	4763	5500	8	Yes
11	5238	5501	8	Yes
12	5713	5502	7	Yes
13	6188	5503	6	Yes
14	6663	5504	10	Yes
15	7138	5505	8	Yes
16	7613	5506	9	Yes
17	8088	5507	12	Yes
18	8563	5508	4	Yes
19	9038	5509	6	Yes
20	9513	5510	7	Yes
21	9988	5511	7	Yes
22	10463	5512	7	Yes
23	10938	5513	5	Yes
24	11413	5514	8	Yes
25	11888	5515	7	Yes
26	12363	5516	5	Yes
27	12838	5517	6	Yes
28	13313	5518	6	Yes
29	13788	5519	8	Yes
30	14263	5520	5	Yes
31	14738	5521	7	Yes
32	15213	5522	10	Yes
33	15688	5523	8	Yes
34	16163	5524	9	Yes
35	16638	5525	9	Yes
36	17113	5526	6	Yes
37	17588	5527	11	Yes
38	18063	5528	12	Yes
39	18538	5529	10	Yes

8.4. RESULTS FOR 80 MHz BANDWIDTH

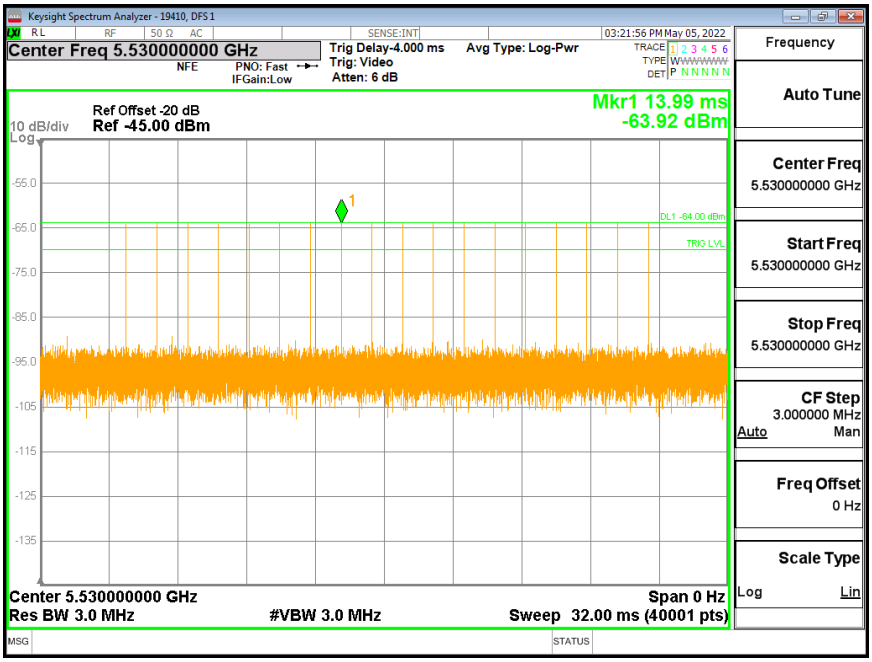
8.4.1. TEST CHANNEL

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

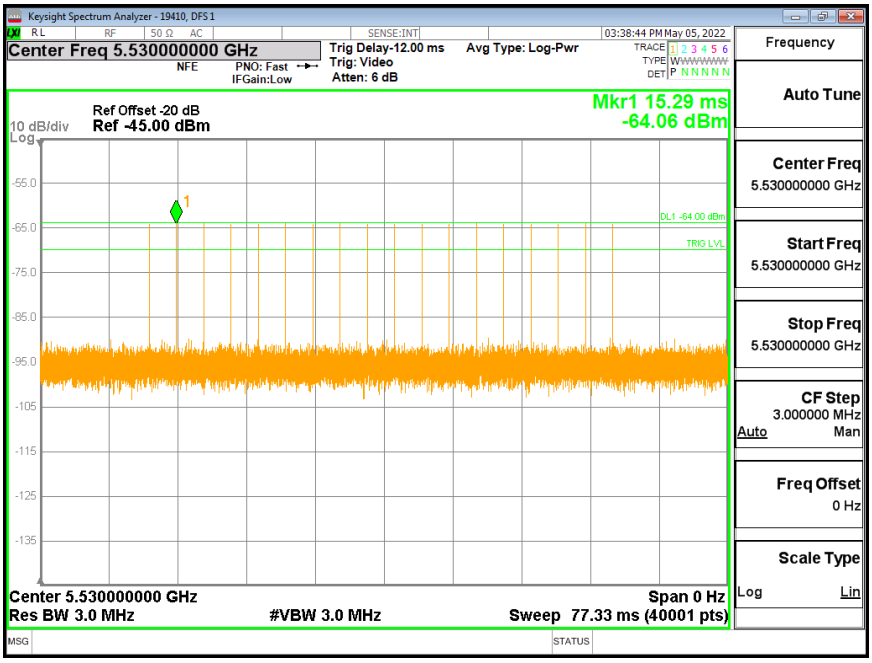
8.4.2. RADAR WAVEFORMS AND TRAFFIC

RADAR WAVEFORMS

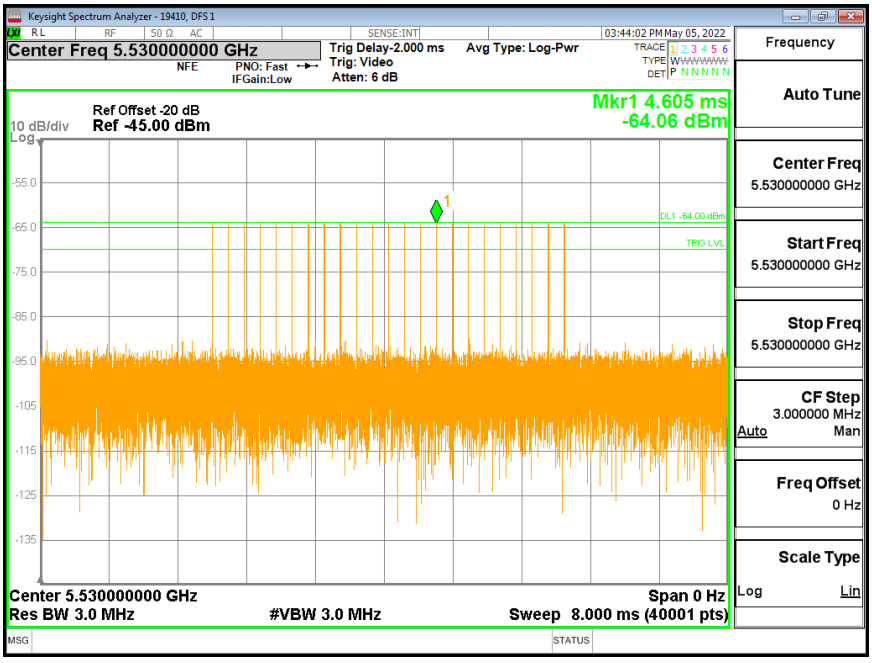
SHORT PULSE RADAR TYPE 0



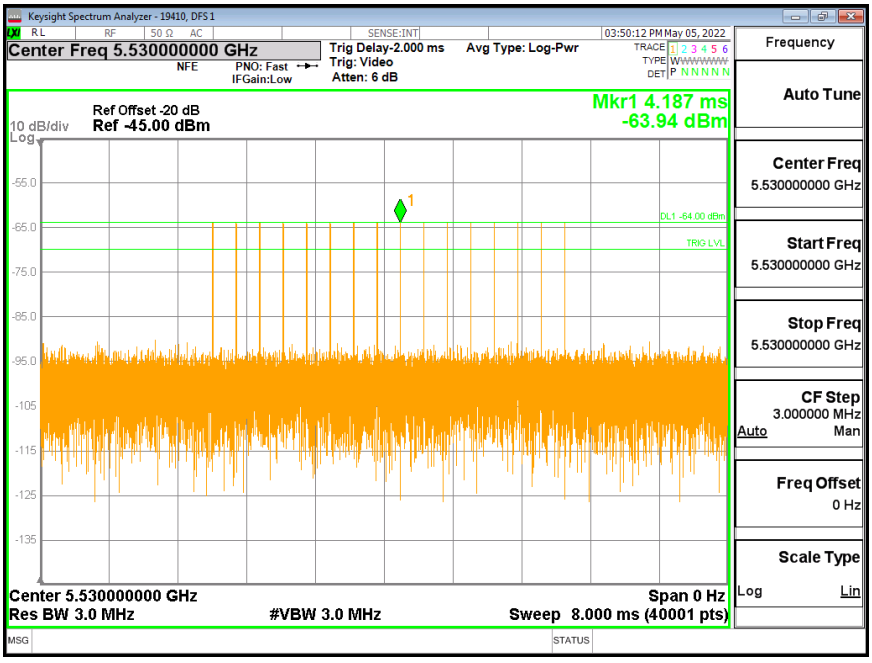
SAMPLE OF RADAR TYPE 1



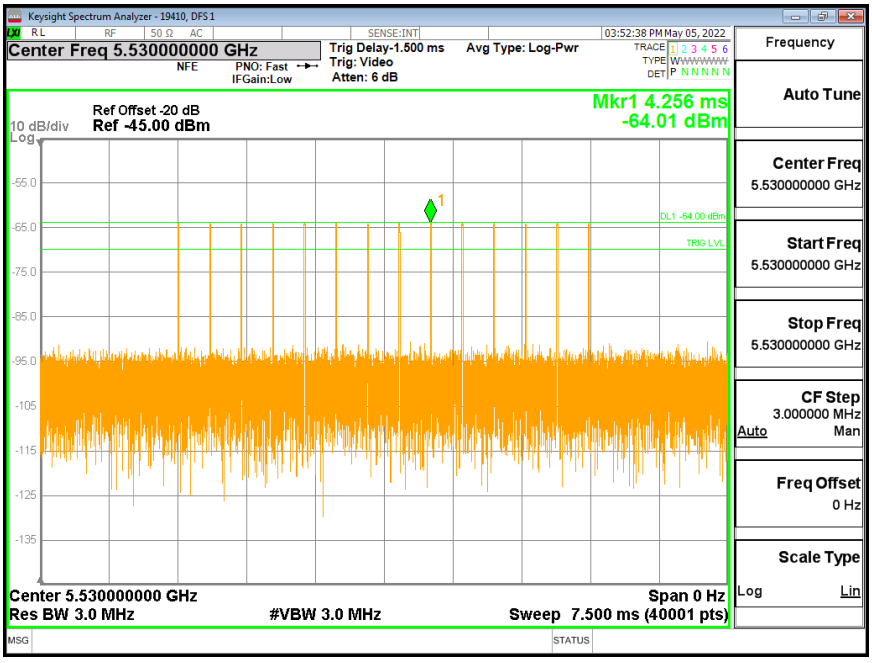
SAMPLE OF RADAR TYPE 2



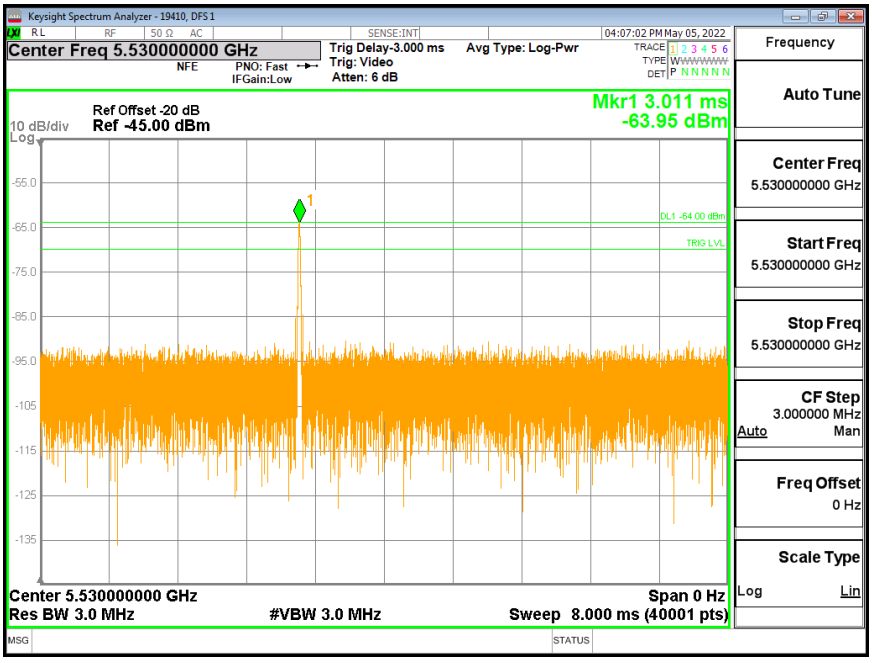
SAMPLE OF RADAR TYPE 3



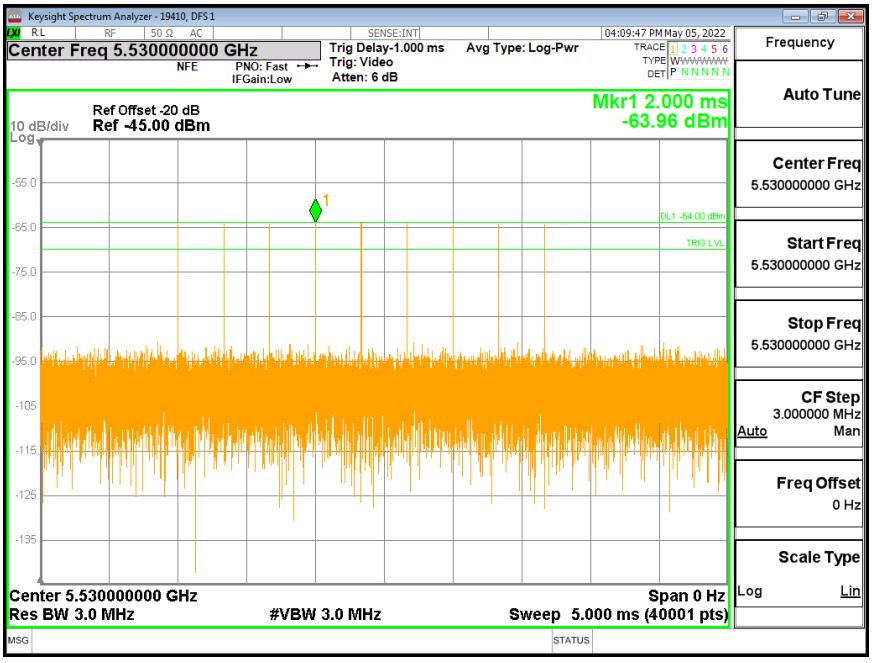
SAMPLE OF RADAR TYPE 4



SAMPLE OF SINGLE BURST OF RADAR TYPE 5

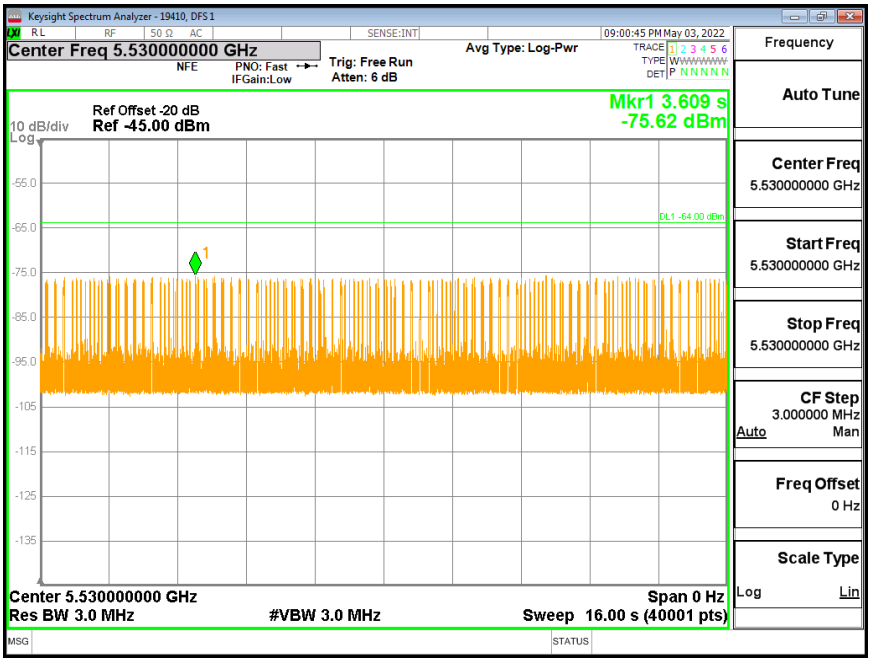


SINGLE BURST OF RADAR TYPE 6

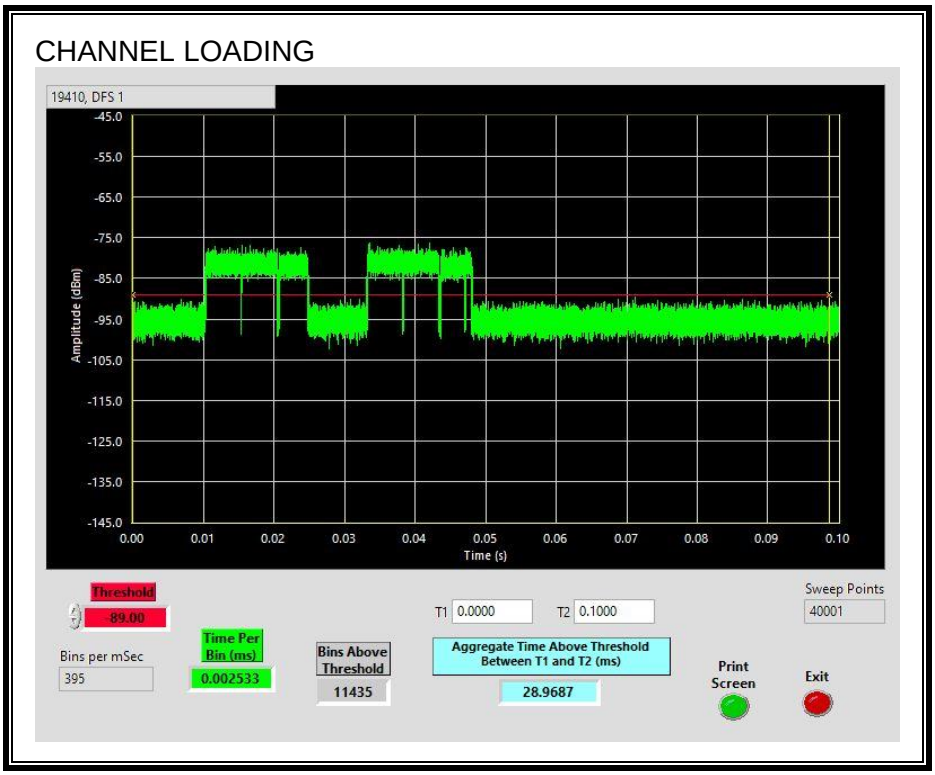


TRAFFIC

TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 28.97%

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)
30.2	144	113.8	53.8

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)
30.43	86.11	55.7	1.9

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)
30.59	143.8	113.2	59.4

QUALITATIVE RESULTS

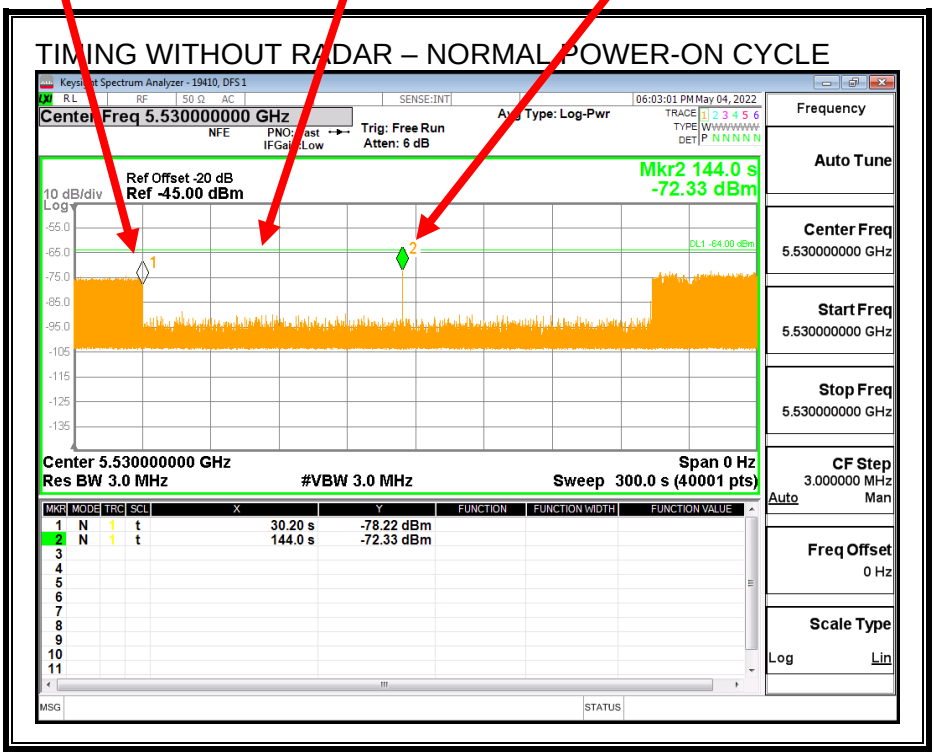
Timing of Radar Burst	Display on Control Computer	Spectrum Analyzer Display
No Radar Triggered	EUT marks Channel as active	Transmissions begin on channel after completion of the initial power-up cycle and the CAC
Within 0 to 6 second window	EUT does not display any radar parameter values	No transmissions on channel
Within 54 to 60 second window	EUT does not display any radar parameter values	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



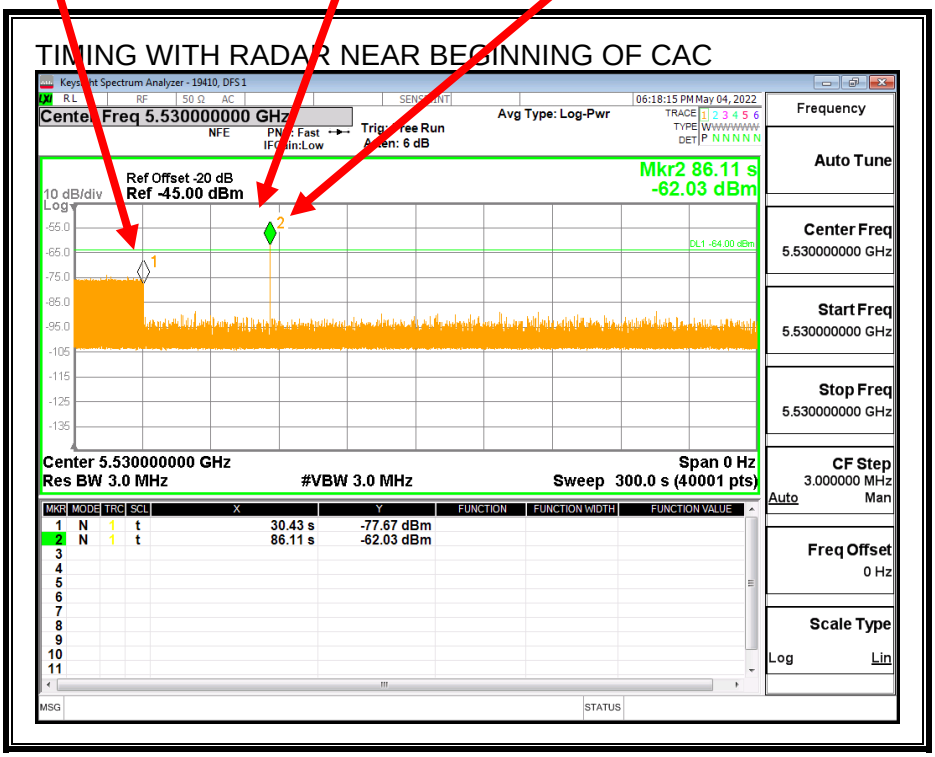
Transmissions begin on channel after completion of the initial power-up cycle and the CAC.

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



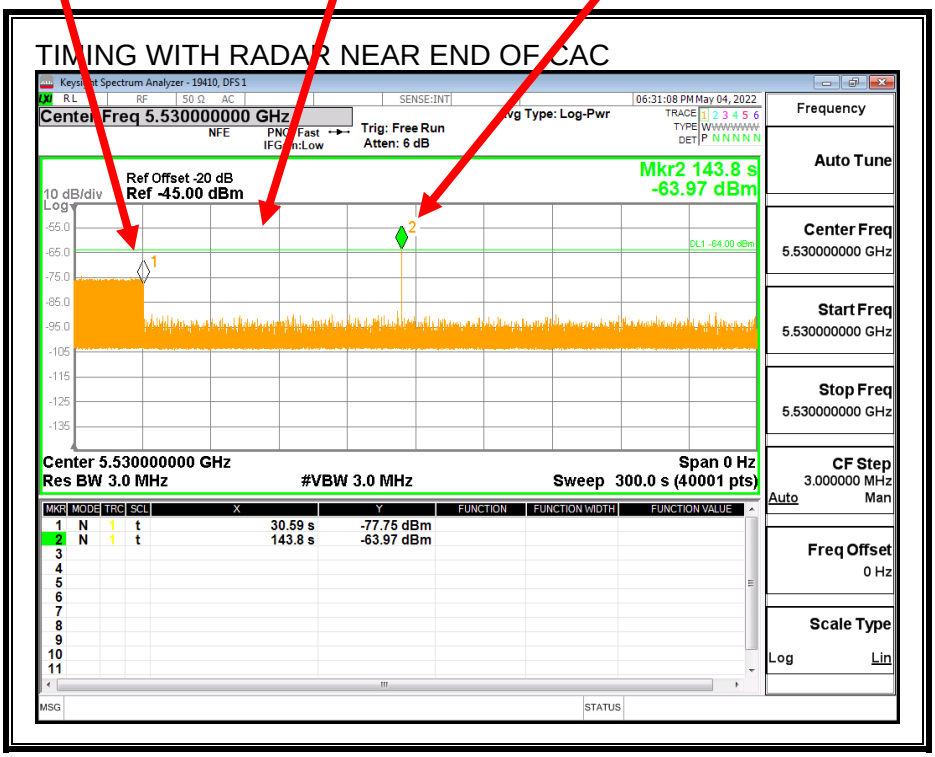
No EUT transmissions were observed after the radar signal.

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)
0.048	10

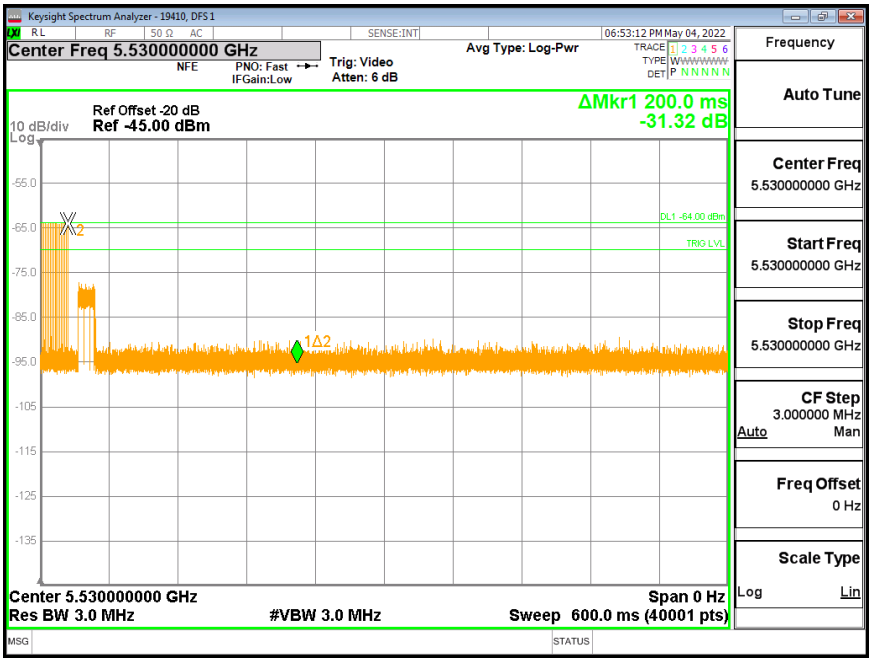
Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
0	60

MOVE TIME

MOVE TIME

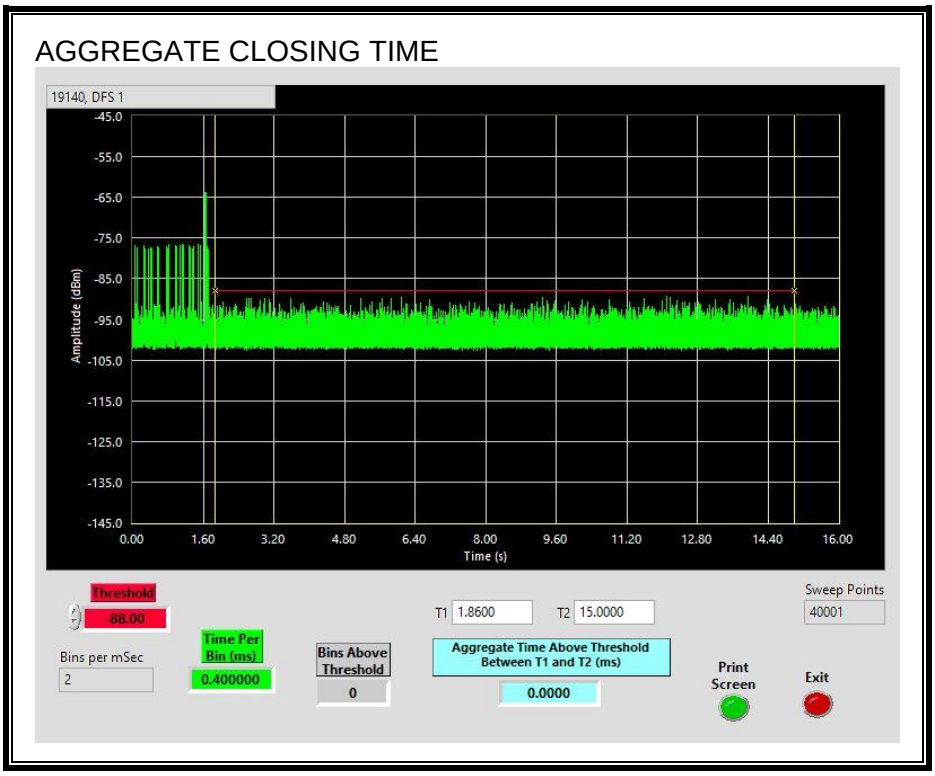
CHANNEL CLOSING TIME

CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

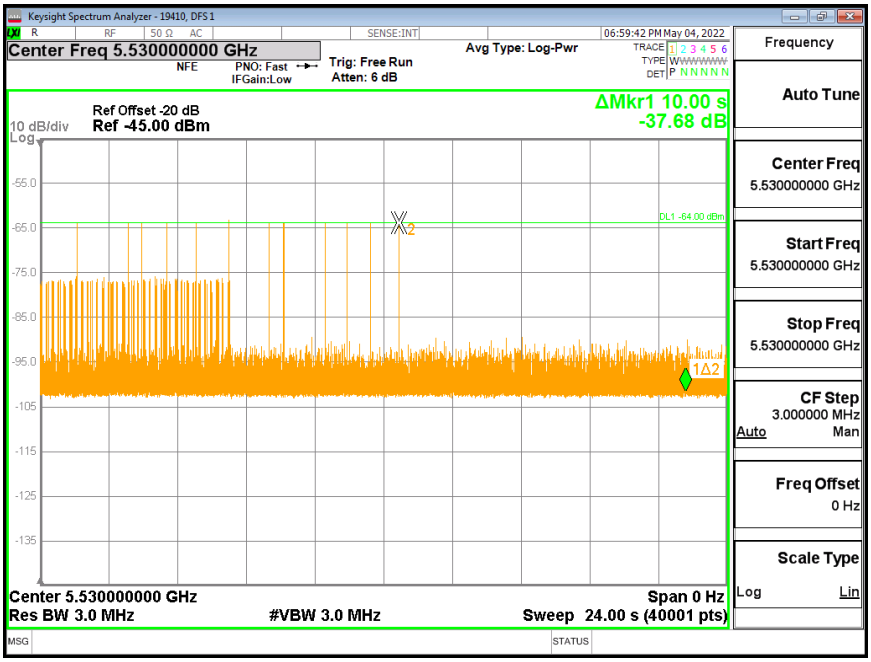
Only intermittent transmissions are observed during the aggregate monitoring period.



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

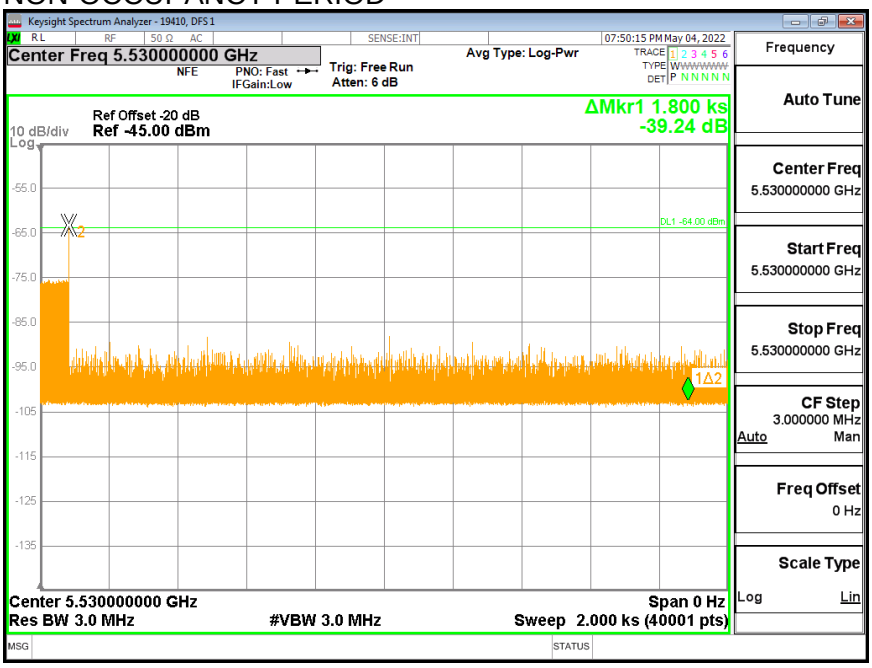


8.4.6. NON-OCCUPANCY PERIOD

RESULTS

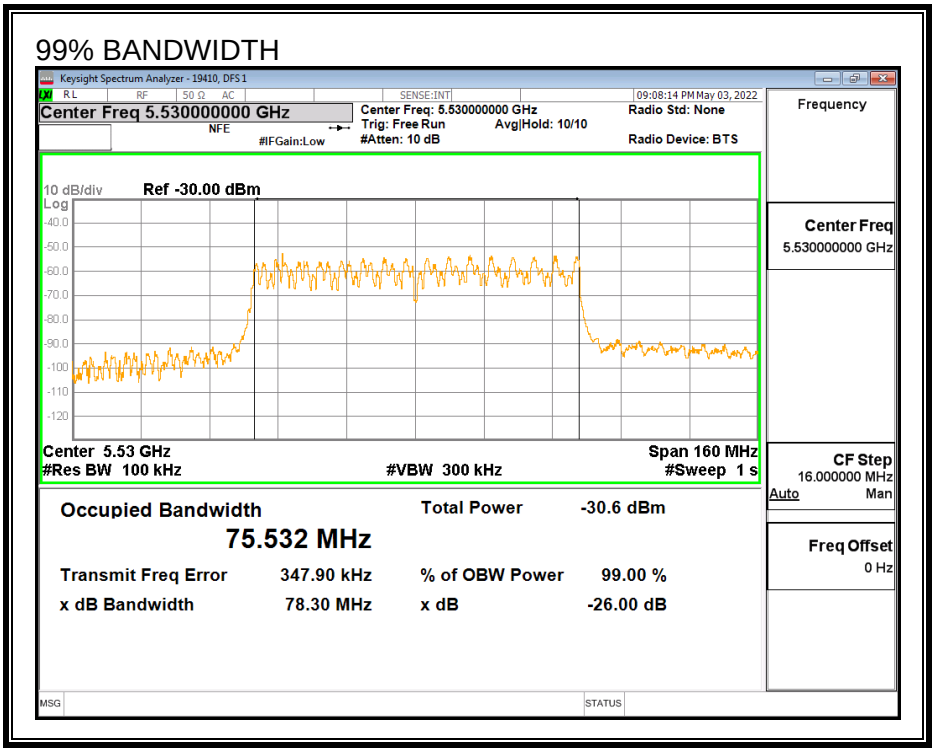
No EUT transmissions were observed on the test channel during the 30-minute observation time.

NON-OCCUPANCY PERIOD



8.4.7. 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 (%)
5491	5569	78	75.532	103.3	100

DETECTION BANDWIDTH PROBABILITY

DETECTION BANDWIDTH PROBABILITY RESULTS

Detection Bandwidth Test Results		19410	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
5490	10	8	80	
5491	10	10	100	FL
5492	10	10	100	
5493	10	10	100	
5494	10	10	100	
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	
5566	10	10	100	
5567	10	10	100	
5568	10	10	100	
5569	10	10	100	FH
5570	10	0	0	

8.4.8. 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	5491	5569	75.53	DFS 1	19410	v4.1
FCC Short Pulse Type 2	30	73.33	60	Pass	5491	5569	75.53	DFS 1	19410	v4.1
FCC Short Pulse Type 3	30	80.00	60	Pass	5491	5569	75.53	DFS 1	19410	v4.1
FCC Short Pulse Type 4	30	80.00	60	Pass	5491	5569	75.53	DFS 1	19410	v4.1
Aggregate		82.50	80	Pass						
FCC Long Pulse Type 5	30	100.00	80	Pass	5491	5569	75.53	DFS 1	19410	v4.1
FCC Hopping Type 6	79	100.00	70	Pass	5491	5569		DFS 1	19410	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	5545	No
1002	1	738	72	A	5530	Yes
1003	1	718	74	A	5503	Yes
1004	1	838	63	A	5533	Yes
1005	1	818	65	A	5538	Yes
1006	1	518	102	A	5553	Yes
1007	1	938	57	A	5552	Yes
1008	1	898	59	A	5497	Yes
1009	1	918	58	A	5554	Yes
1010	1	538	99	A	5551	Yes
1011	1	638	83	A	5510	Yes
1012	1	598	89	A	5545	Yes
1013	1	858	62	A	5513	Yes
1014	1	758	70	A	5503	Yes
1015	1	558	95	A	5542	Yes
1016	1	2461	22	B	5528	Yes
1017	1	1416	38	B	5514	Yes
1018	1	2049	26	B	5532	Yes
1019	1	1134	47	B	5568	Yes
1020	1	1896	28	B	5526	Yes
1021	1	1110	48	B	5504	Yes
1022	1	807	66	B	5562	Yes
1023	1	1505	36	B	5560	Yes
1024	1	1331	40	B	5509	Yes
1025	1	2158	25	B	5546	Yes
1026	1	2114	25	B	5495	Yes
1027	1	1875	29	B	5565	Yes
1028	1	1961	27	B	5532	Yes
1029	1	1852	29	B	5535	Yes
1030	1	872	61	B	5561	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	186	23	5509	Yes
2002	4	181	27	5515	Yes
2003	4.7	171	26	5492	Yes
2004	2.9	214	28	5559	Yes
2005	3.8	170	24	5531	Yes
2006	2.1	217	26	5503	No
2007	1.3	177	29	5562	Yes
2008	2.1	228	28	5536	Yes
2009	1.4	192	25	5516	No
2010	2.4	209	25	5565	Yes
2011	2	220	29	5492	Yes
2012	1.3	161	25	5515	No
2013	1.1	176	26	5495	Yes
2014	4.6	163	23	5498	Yes
2015	2.7	183	25	5547	Yes
2016	2.4	174	29	5535	Yes
2017	2.8	160	28	5538	No
2018	2.7	156	25	5568	Yes
2019	3.4	226	24	5562	Yes
2020	1.6	188	29	5548	Yes
2021	2.5	225	29	5567	Yes
2022	3	191	24	5568	No
2023	4.1	151	27	5544	No
2024	4.9	202	26	5513	Yes
2025	4.3	166	23	5526	No
2026	1.1	226	29	5558	Yes
2027	4.8	195	26	5551	Yes
2028	4.1	216	23	5503	Yes
2029	3.9	150	24	5536	Yes
2030	3.3	219	28	5555	No

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	6.4	273	16	5508	Yes
3002	6.1	498	17	5545	No
3003	6.6	454	17	5522	Yes
3004	6.4	323	17	5496	Yes
3005	7.1	291	18	5543	Yes
3006	9.4	290	18	5536	Yes
3007	6.2	404	17	5556	No
3008	6.7	299	18	5531	No
3009	7.8	426	17	5522	Yes
3010	8.6	333	16	5559	Yes
3011	8	355	18	5552	Yes
3012	8.9	409	18	5546	Yes
3013	8.5	310	16	5492	Yes
3014	7.8	259	18	5554	Yes
3015	7.6	423	18	5544	Yes
3016	7	385	17	5555	No
3017	9.2	445	18	5509	Yes
3018	7	301	16	5564	Yes
3019	9.4	374	16	5568	Yes
3020	7.3	494	16	5543	Yes
3021	9.9	462	16	5564	Yes
3022	8.1	344	17	5539	Yes
3023	9	325	16	5553	Yes
3024	9.5	471	16	5560	Yes
3025	6.5	346	16	5503	Yes
3026	7.3	387	18	5543	No
3027	6.7	276	17	5495	Yes
3028	7.6	329	17	5566	No
3029	7.2	481	17	5543	Yes
3030	6.5	430	17	5538	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	11.7	344	14	5543	Yes
4002	19.6	305	12	5507	No
4003	15.3	499	13	5495	No
4004	19.4	473	14	5566	Yes
4005	15.6	295	15	5557	Yes
4006	11.1	415	16	5524	Yes
4007	16.9	383	16	5527	Yes
4008	12.8	265	12	5512	No
4009	19.6	496	16	5525	Yes
4010	16	391	15	5506	Yes
4011	18.4	267	15	5502	Yes
4012	11	308	14	5498	No
4013	18.7	447	12	5493	Yes
4014	11.8	250	12	5561	Yes
4015	20	402	12	5501	Yes
4016	18.3	351	12	5562	Yes
4017	13.6	398	13	5542	No
4018	12.4	477	16	5564	Yes
4019	12.4	419	12	5513	Yes
4020	16.6	394	12	5528	Yes
4021	12.7	466	14	5526	Yes
4022	17.3	336	15	5568	Yes
4023	14	303	14	5566	Yes
4024	14.8	436	15	5515	Yes
4025	16.7	417	15	5516	Yes
4026	13.1	312	14	5503	Yes
4027	11.3	439	13	5500	Yes
4028	17.3	479	13	5554	Yes
4029	15.9	368	15	5546	Yes
4030	18	421	13	5542	No

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	5501	Yes
13	5500	Yes
14	5501	Yes
15	5500	Yes
16	5500	Yes
17	5501	Yes
18	5501	Yes
19	5501	Yes
20	5501	Yes
21	5559	Yes
22	5559	Yes
23	5559	Yes
24	5559	Yes
25	5560	Yes
26	5559	Yes
27	5559	Yes
28	5559	Yes
29	5559	Yes
30	5559	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	527	5491	18	Yes
2	1002	5492	16	Yes
3	1477	5493	17	Yes
4	1952	5494	19	Yes
5	2427	5495	22	Yes
6	2902	5496	17	Yes
7	3377	5497	17	Yes
8	3852	5498	21	Yes
9	4327	5499	21	Yes
10	4802	5500	12	Yes
11	5277	5501	17	Yes
12	5752	5502	17	Yes
13	6227	5503	21	Yes
14	6702	5504	21	Yes
15	7177	5505	12	Yes
16	7652	5506	16	Yes
17	8127	5507	13	Yes
18	8602	5508	18	Yes
19	9077	5509	12	Yes
20	9552	5510	14	Yes
21	10027	5511	18	Yes
22	10502	5512	19	Yes
23	10977	5513	14	Yes
24	11452	5514	16	Yes
25	11927	5515	17	Yes
26	12402	5516	16	Yes
27	12877	5517	14	Yes
28	13352	5518	18	Yes
29	13827	5519	25	Yes
30	14302	5520	16	Yes
31	14777	5521	13	Yes
32	15252	5522	14	Yes
33	15727	5523	19	Yes
34	16202	5524	19	Yes
35	16677	5525	16	Yes
36	17152	5526	15	Yes
37	17627	5527	19	Yes
38	18102	5528	17	Yes
39	18577	5529	15	Yes

TYPE 6 DETECTION PROBABILITY (CONTINUED)

40	19052	5530	18	Yes
41	19527	5531	13	Yes
42	20002	5532	18	Yes
43	20477	5533	13	Yes
44	20952	5534	23	Yes
45	21427	5535	18	Yes
46	21902	5536	18	Yes
47	22377	5537	22	Yes
48	22852	5538	9	Yes
49	23327	5539	16	Yes
50	23802	5540	17	Yes
51	24277	5541	21	Yes
52	24752	5542	24	Yes
53	25227	5543	17	Yes
54	25702	5544	14	Yes
55	26177	5545	14	Yes
56	26652	5546	15	Yes
57	27127	5547	15	Yes
58	27602	5548	17	Yes
59	28077	5549	16	Yes
60	28552	5550	14	Yes
61	29027	5551	15	Yes
62	29502	5552	12	Yes
63	29977	5553	19	Yes
64	30452	5554	16	Yes
65	30927	5555	13	Yes
66	31402	5556	14	Yes
67	31877	5557	23	Yes
68	32352	5558	16	Yes
69	32827	5559	14	Yes
70	33302	5560	12	Yes
71	33777	5561	16	Yes
72	34252	5562	19	Yes
73	34727	5563	17	Yes
74	35202	5564	8	Yes
75	35677	5565	15	Yes
76	36152	5566	12	Yes
77	36627	5567	16	Yes
78	37102	5568	16	Yes
79	37577	5569	19	Yes

8.5. RESULTS FOR 160 MHz BANDWIDTH

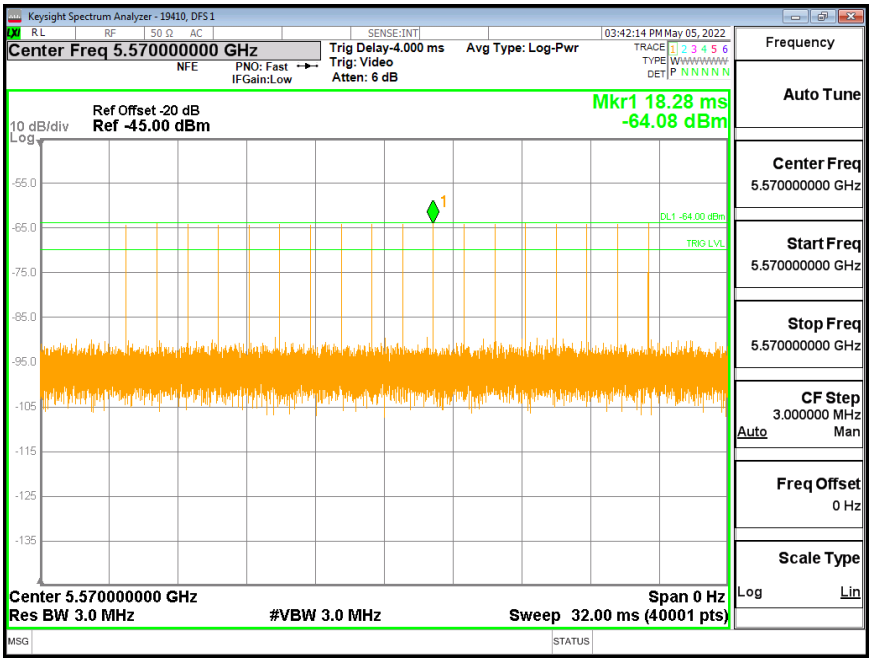
8.5.1. TEST CHANNEL

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

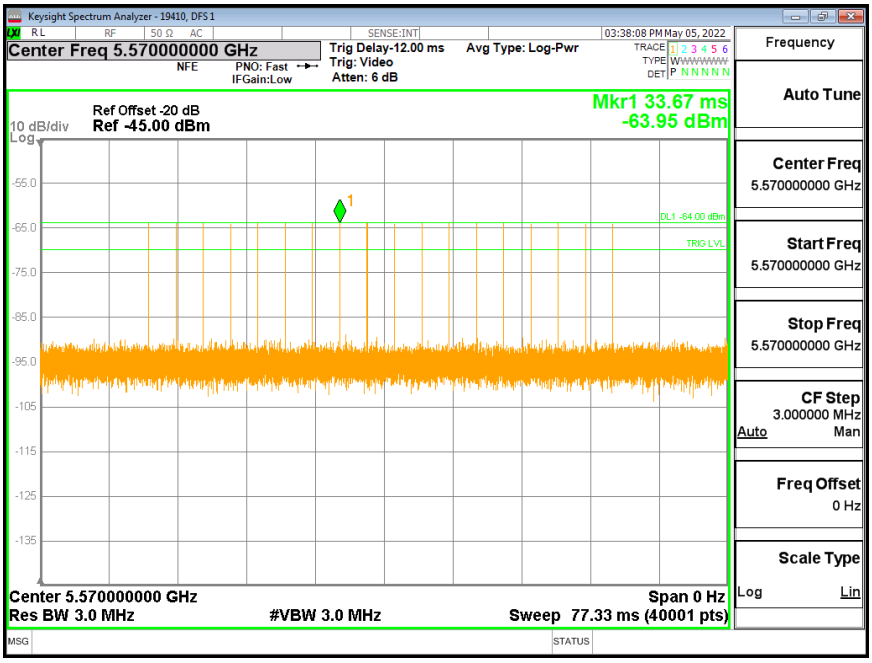
8.5.2. RADAR WAVEFORMS AND TRAFFIC

RADAR WAVEFORMS

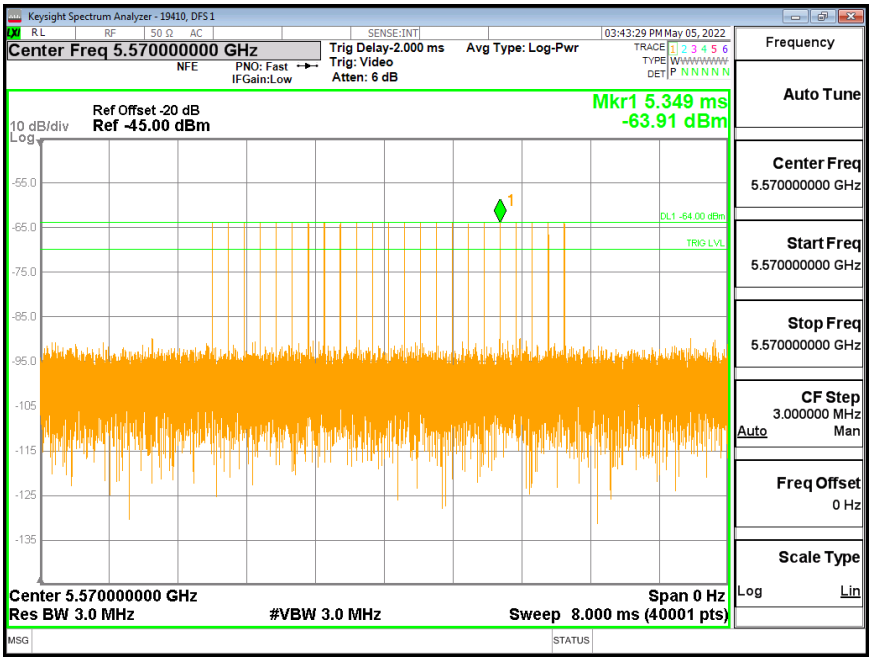
SHORT PULSE RADAR TYPE 0



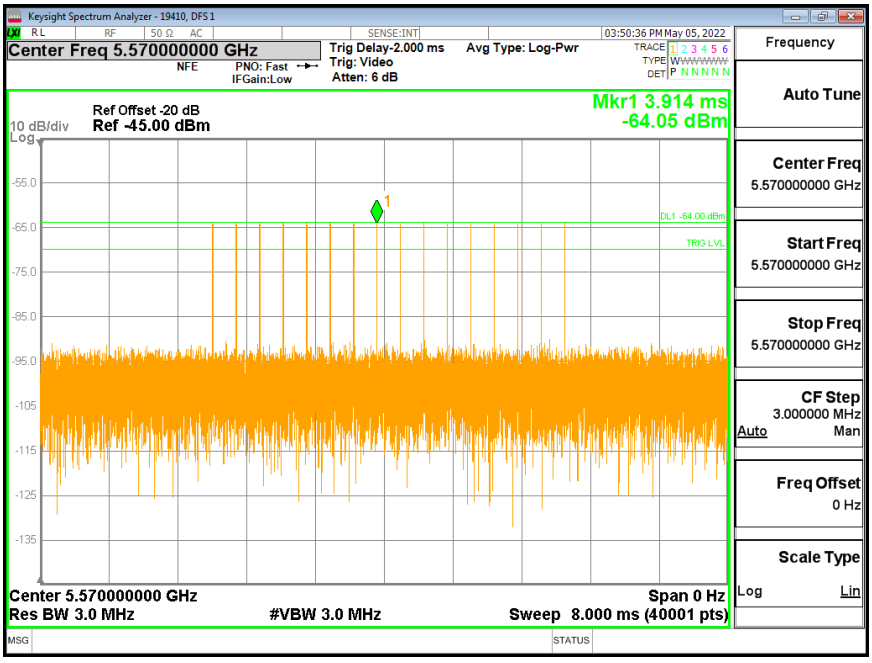
SAMPLE OF RADAR TYPE 1



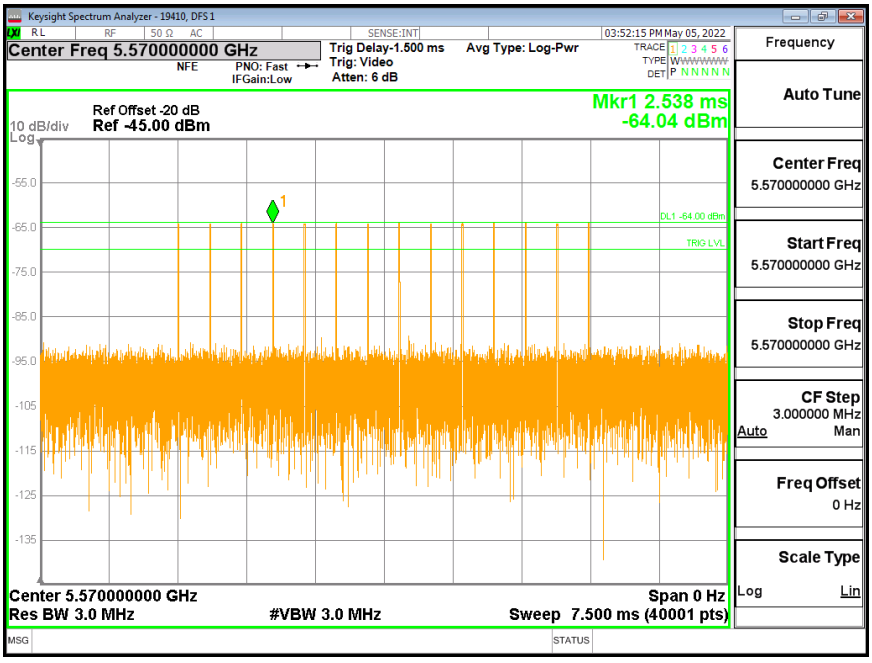
SAMPLE OF RADAR TYPE 2



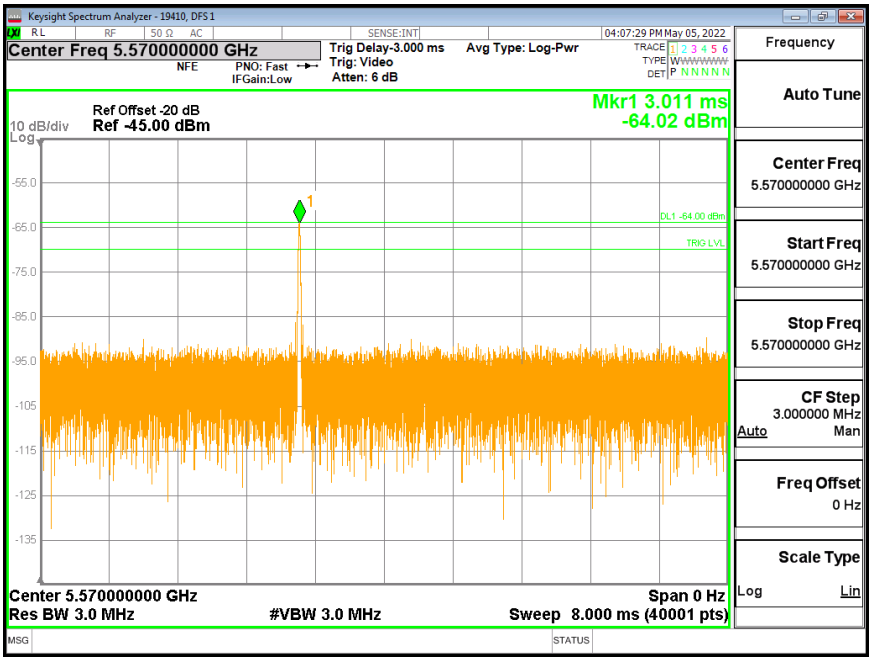
SAMPLE OF RADAR TYPE 3



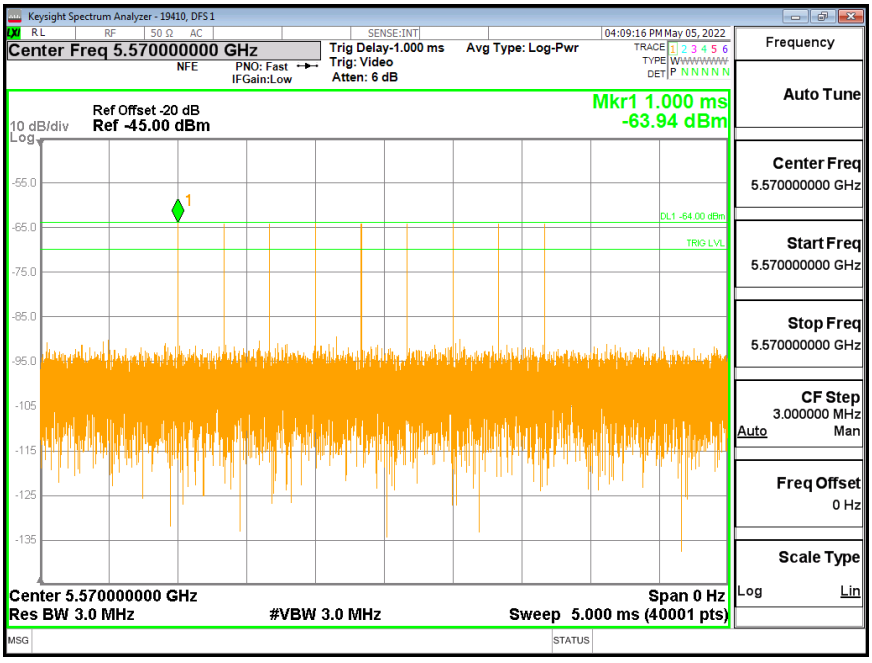
SAMPLE OF RADAR TYPE 4



SAMPLE OF SINGLE BURST OF RADAR TYPE 5

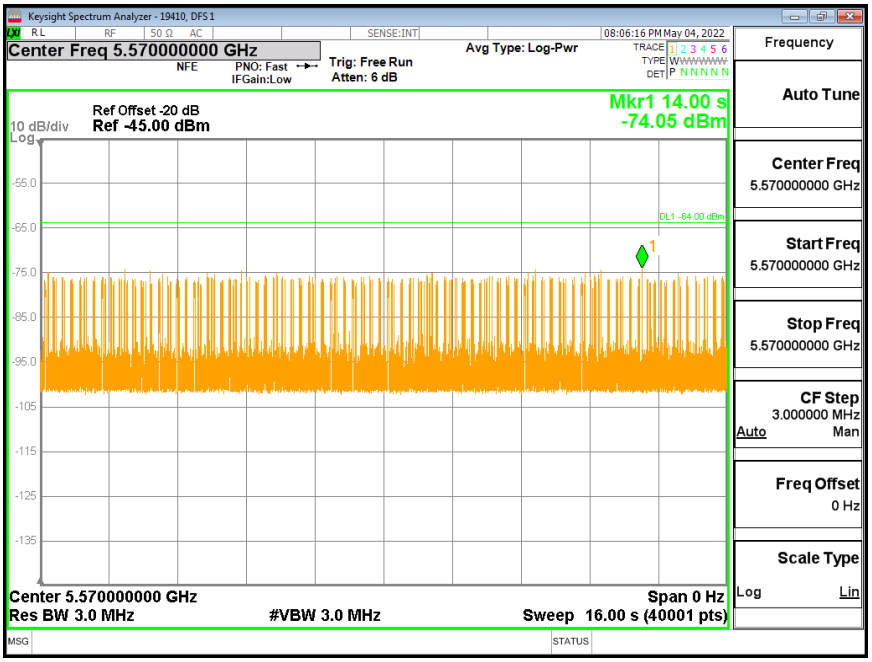


SINGLE BURST OF RADAR TYPE 6

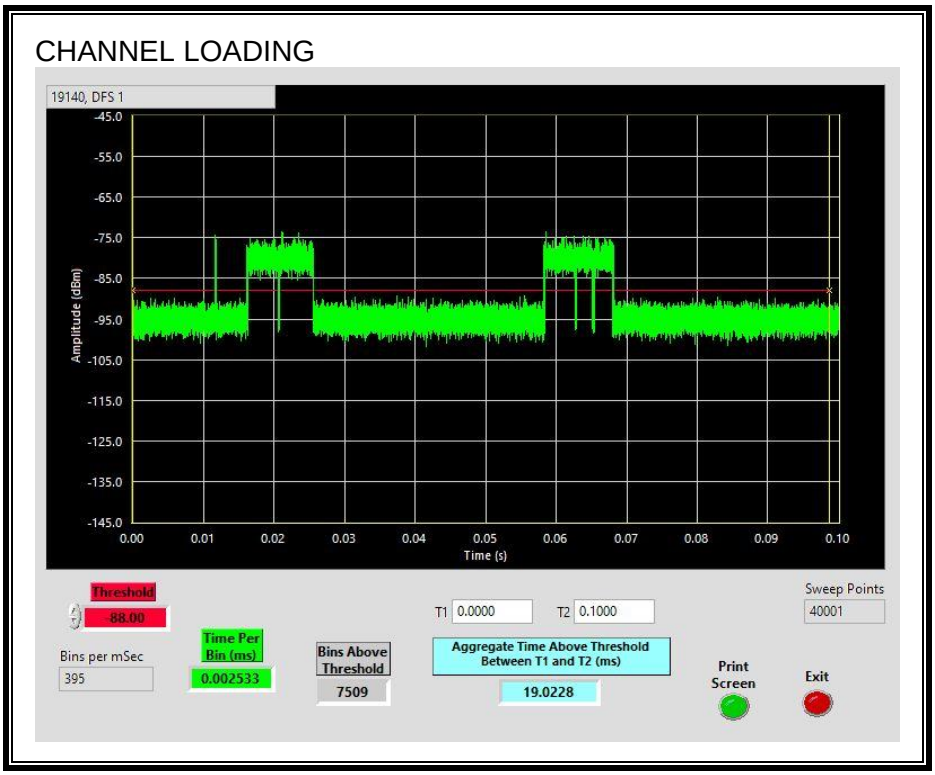


TRAFFIC

TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 19.023%

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)
30.36	152.5	122.1	62.1

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)
30.32	94.17	63.9	1.7

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)
30.67	151.4	120.7	58.6

QUALITATIVE RESULTS

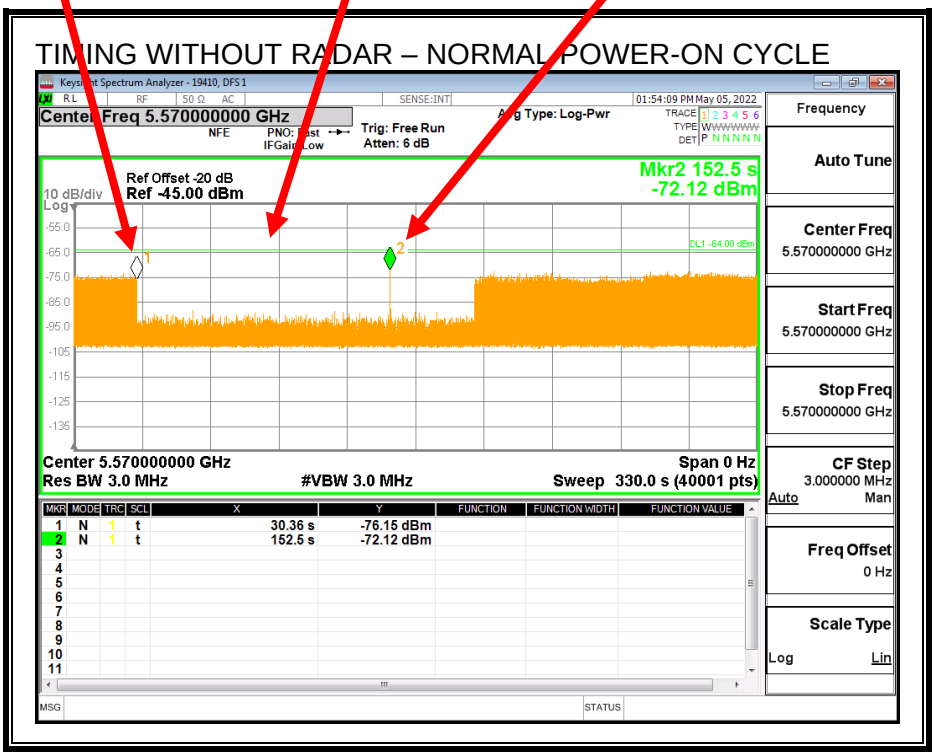
Timing of Radar Burst	Display on Control Computer	Spectrum Analyzer Display
No Radar Triggered	EUT marks Channel as active	Transmissions begin on channel after completion of the initial power-up cycle and the CAC
Within 0 to 6 second window	EUT does not display any radar parameter values	No transmissions on channel
Within 54 to 60 second window	EUT does not display any radar parameter values	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



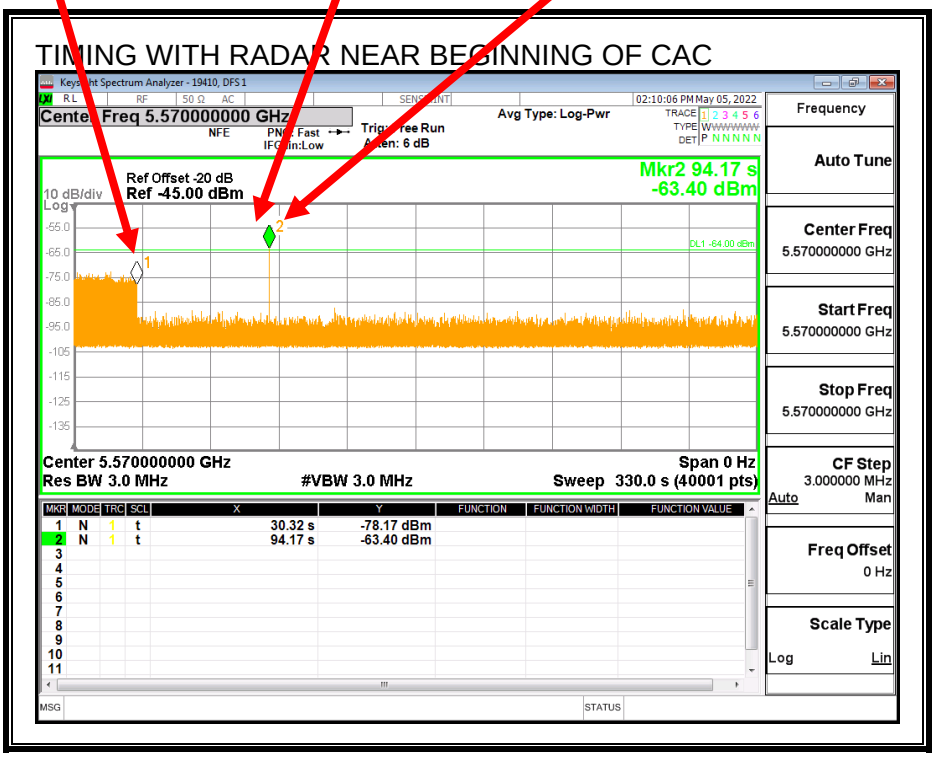
Transmissions begin on channel after completion of the initial power-up cycle and the CAC.

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



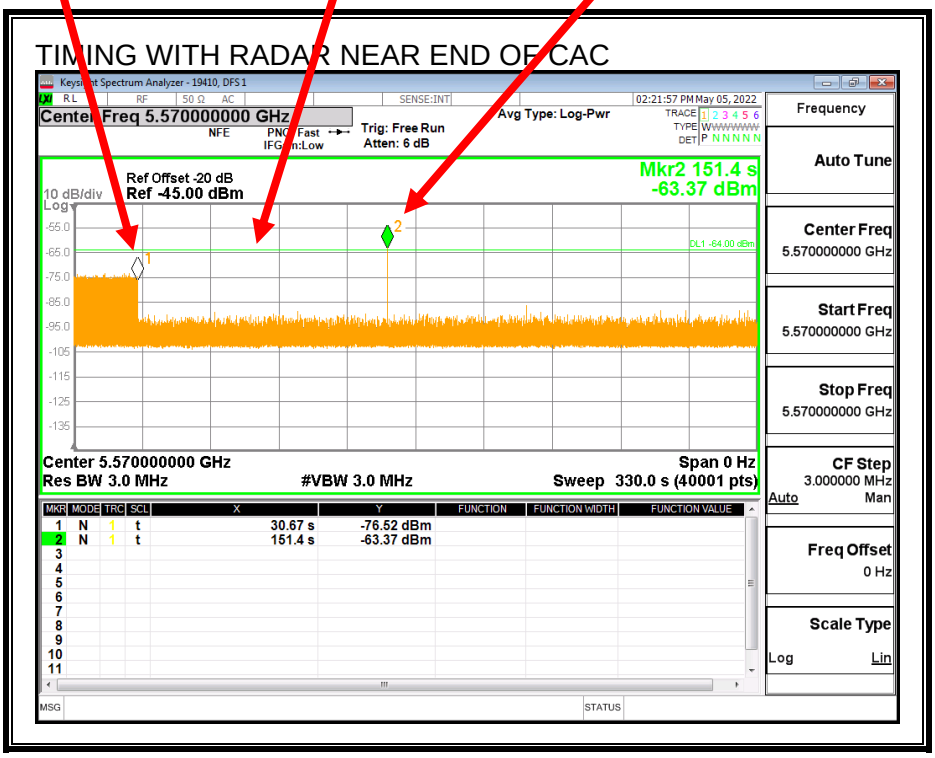
No EUT transmissions were observed after the radar signal.

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.

8.5.4. 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).

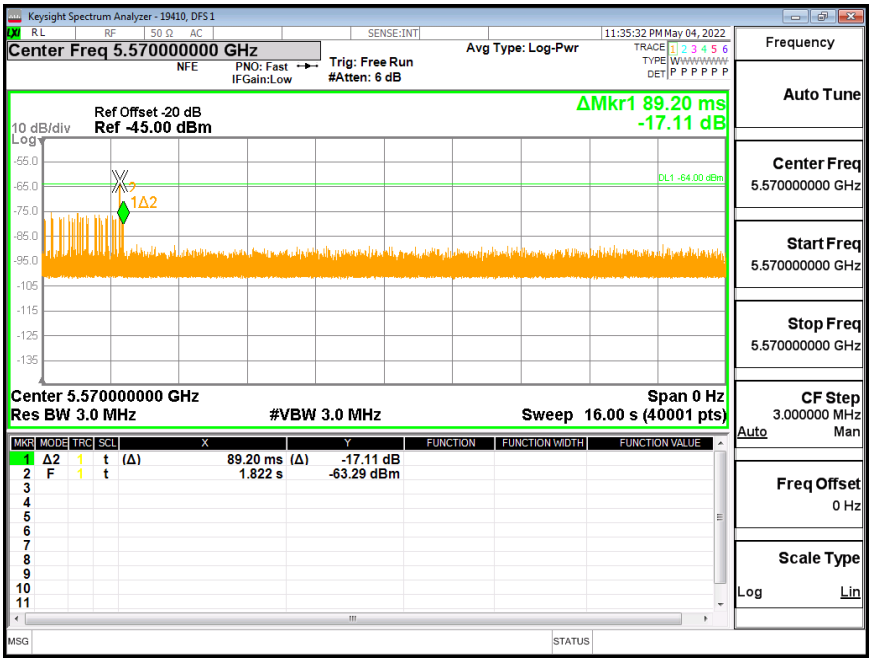
RESULTS

Channel Move Time (sec)	Limit (sec)
0.0892	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
0	60

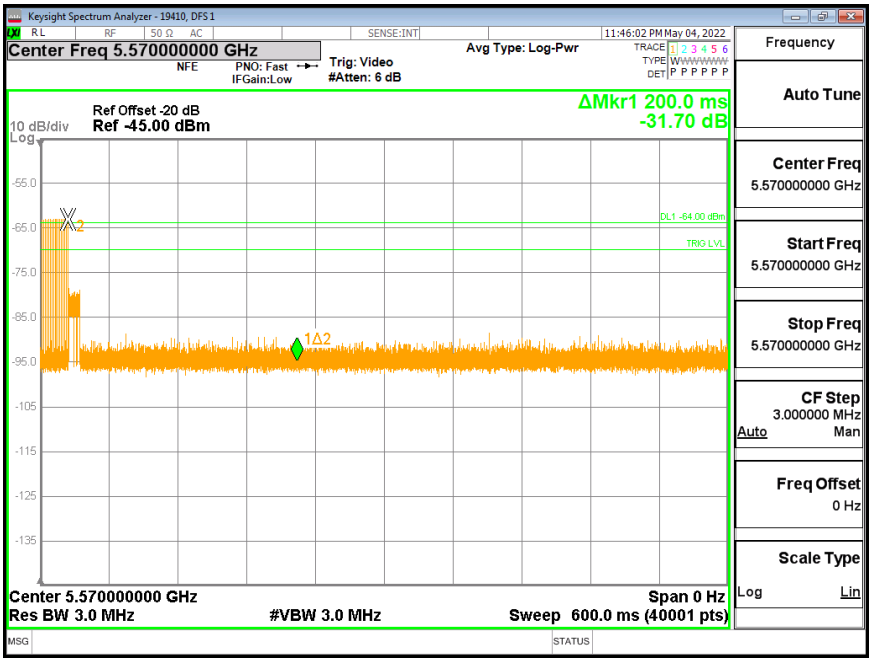
MOVE TIME

MOVE TIME



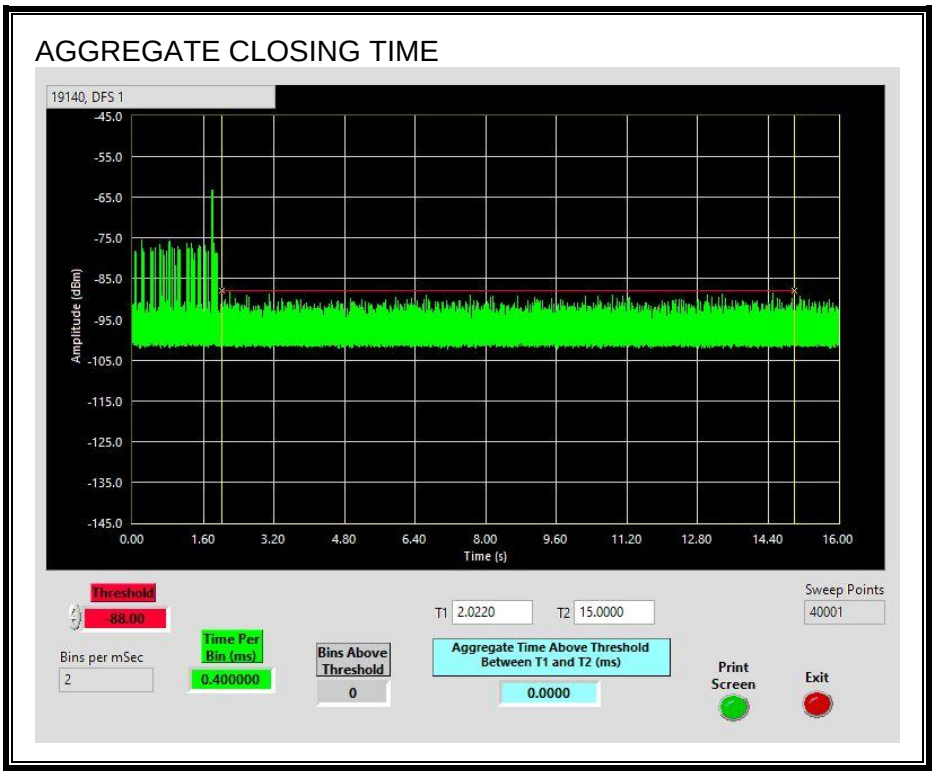
CHANNEL CLOSING TIME

CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

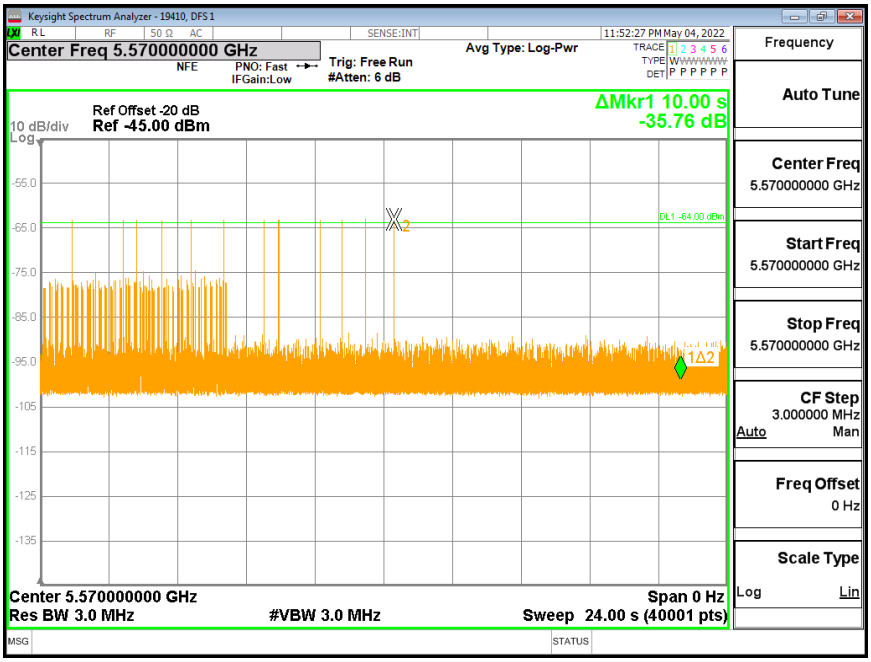
Only intermittent transmissions are observed during the aggregate monitoring period.



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

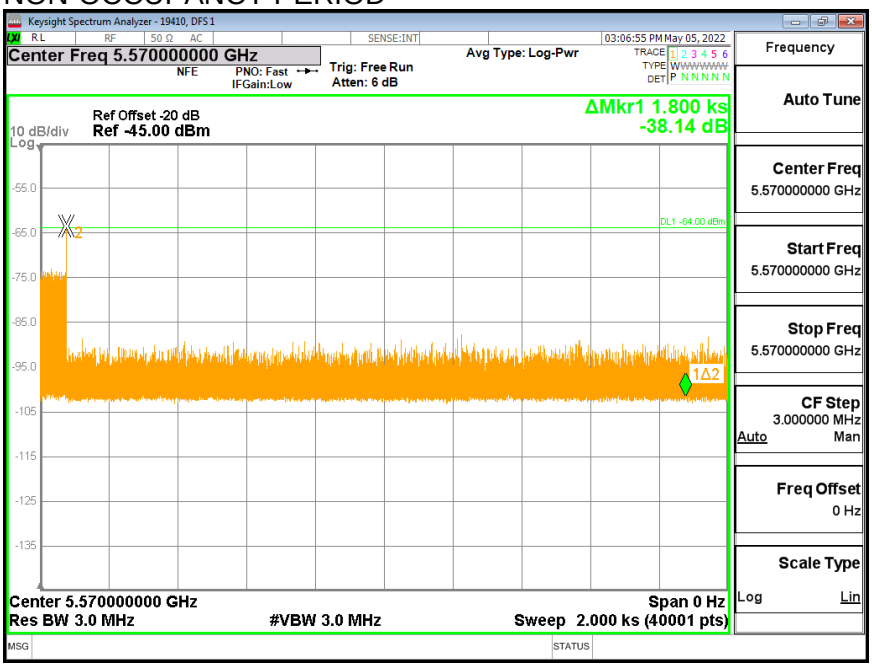


8.5.6. NON-OCCUPANCY PERIOD

RESULTS

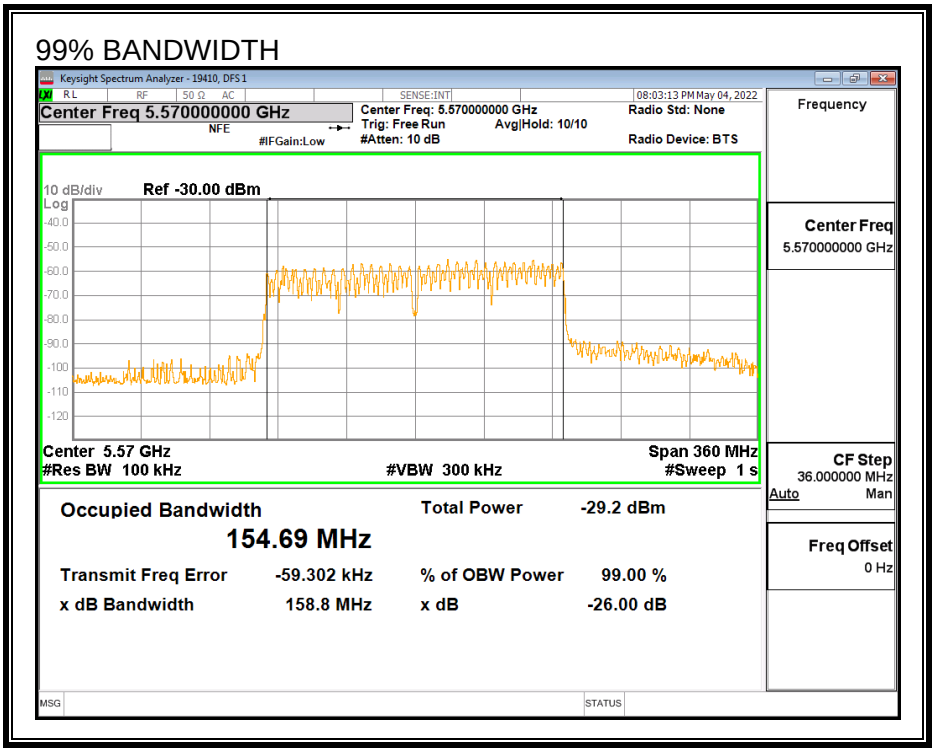
No EUT transmissions were observed on the test channel during the 30-minute observation time.

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	154.69	102.8	100

DETECTION BANDWIDTH PROBABILITY

DETECTION BANDWIDTH PROBABILITY RESULTS

Detection Bandwidth Test Results		19140	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
5491	10	10	100	
5492	10	9	90	
5493	10	10	100	
5494	10	10	100	
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	9	90	
5570	10	10	100	

DETECTION BANDWIDTH PROBABILITY (CONTINUED)

DETECTION BANDWIDTH PROBABILITY RESULTS

5575	10	10	100	
5580	10	10	100	
5585	10	10	100	
5590	10	10	100	
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	10	100	
5635	10	10	100	
5640	10	10	100	
5645	10	10	100	
5646	10	9	90	
5647	10	10	100	
5648	10	10	100	
5649	10	10	100	FH
5650	10	1	10	

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	96.67	60	Pass	5490	5649	154.69	DFS 1	19410	v4.1
FCC Short Pulse Type 2	30	66.67	60	Pass	5490	5649	154.69	DFS 1	19410	v4.1
FCC Short Pulse Type 3	30	80.00	60	Pass	5490	5649	154.69	DFS 1	19410	v4.1
FCC Short Pulse Type 4	30	83.33	60	Pass	5490	5649	154.69	DFS 1	19410	v4.1
Aggregate		81.67	80	Pass						
FCC Long Pulse Type 5	30	93.33	80	Pass	5490	5649	154.69	DFS 1	19410	v4.1
FCC Hopping Type 6	160	100.00	70	Pass	5490	5649		DFS 1	19410	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	5638	Yes
1002	1	738	72	A	5640	Yes
1003	1	718	74	A	5590	Yes
1004	1	838	63	A	5526	Yes
1005	1	818	65	A	5632	Yes
1006	1	518	102	A	5523	Yes
1007	1	938	57	A	5641	Yes
1008	1	898	59	A	5551	Yes
1009	1	918	58	A	5572	Yes
1010	1	538	99	A	5631	Yes
1011	1	638	83	A	5546	Yes
1012	1	598	89	A	5609	Yes
1013	1	858	62	A	5592	Yes
1014	1	758	70	A	5501	Yes
1015	1	558	95	A	5551	Yes
1016	1	2461	22	B	5534	Yes
1017	1	1416	38	B	5593	Yes
1018	1	2049	26	B	5619	No
1019	1	1134	47	B	5593	Yes
1020	1	1896	28	B	5498	Yes
1021	1	1110	48	B	5490	Yes
1022	1	807	66	B	5624	Yes
1023	1	1505	36	B	5617	Yes
1024	1	1331	40	B	5581	Yes
1025	1	2158	25	B	5612	Yes
1026	1	2114	25	B	5593	Yes
1027	1	1875	29	B	5605	Yes
1028	1	1961	27	B	5569	Yes
1029	1	1852	29	B	5504	Yes
1030	1	872	61	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	2	186	23	5513	No
2002	4	181	27	5569	Yes
2003	4.7	171	26	5523	No
2004	2.9	214	28	5561	No
2005	3.8	170	24	5639	No
2006	2.1	217	26	5542	No
2007	1.3	177	29	5521	Yes
2008	2.1	228	28	5509	Yes
2009	1.4	192	25	5613	Yes
2010	2.4	209	25	5641	No
2011	2	220	29	5553	Yes
2012	1.3	161	25	5604	Yes
2013	1.1	176	26	5575	Yes
2014	4.6	163	23	5509	No
2015	2.7	183	25	5626	Yes
2016	2.4	174	29	5548	Yes
2017	2.8	160	28	5538	Yes
2018	2.7	156	25	5610	Yes
2019	3.4	226	24	5556	Yes
2020	1.6	188	29	5538	Yes
2021	2.5	225	29	5550	Yes
2022	3	191	24	5644	Yes
2023	4.1	151	27	5534	Yes
2024	4.9	202	26	5619	No
2025	4.3	166	23	5600	Yes
2026	1.1	226	29	5646	No
2027	4.8	195	26	5593	Yes
2028	4.1	216	23	5593	Yes
2029	3.9	150	24	5623	No
2030	3.3	219	28	5545	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	6.4	273	16	5600	Yes
3002	6.1	498	17	5591	No
3003	6.6	454	17	5525	Yes
3004	6.4	323	17	5572	No
3005	7.1	291	18	5585	Yes
3006	9.4	290	18	5539	No
3007	6.2	404	17	5573	Yes
3008	6.7	299	18	5536	Yes
3009	7.8	426	17	5494	Yes
3010	8.6	333	16	5503	Yes
3011	8	355	18	5522	Yes
3012	8.9	409	18	5571	Yes
3013	8.5	310	16	5533	Yes
3014	7.8	259	18	5547	Yes
3015	7.6	423	18	5556	Yes
3016	7	385	17	5605	Yes
3017	9.2	445	18	5517	Yes
3018	7	301	16	5606	Yes
3019	9.4	374	16	5494	Yes
3020	7.3	494	16	5637	No
3021	9.9	462	16	5557	Yes
3022	8.1	344	17	5567	Yes
3023	9	325	16	5640	Yes
3024	9.5	471	16	5591	No
3025	6.5	346	16	5538	Yes
3026	7.3	387	18	5536	Yes
3027	6.7	276	17	5572	Yes
3028	7.6	329	17	5495	Yes
3029	7.2	481	17	5577	Yes
3030	6.5	430	17	5585	No

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	11.7	344	14	5519	Yes
4002	19.6	305	12	5505	Yes
4003	15.3	499	13	5648	No
4004	19.4	473	14	5607	Yes
4005	15.6	295	15	5507	Yes
4006	11.1	415	16	5539	Yes
4007	16.9	383	16	5591	Yes
4008	12.8	265	12	5576	Yes
4009	19.6	496	16	5548	No
4010	16	391	15	5616	Yes
4011	18.4	267	15	5574	Yes
4012	11	308	14	5575	Yes
4013	18.7	447	12	5586	Yes
4014	11.8	250	12	5595	Yes
4015	20	402	12	5534	Yes
4016	18.3	351	12	5619	No
4017	13.6	398	13	5630	Yes
4018	12.4	477	16	5624	Yes
4019	12.4	419	12	5644	Yes
4020	16.6	394	12	5587	No
4021	12.7	466	14	5627	Yes
4022	17.3	336	15	5618	Yes
4023	14	303	14	5640	Yes
4024	14.8	436	15	5571	Yes
4025	16.7	417	15	5499	No
4026	13.1	312	14	5526	Yes
4027	11.3	439	13	5644	Yes
4028	17.3	479	13	5496	Yes
4029	15.9	368	15	5541	Yes
4030	18	421	13	5551	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	Yes
5	5570	Yes
6	5570	Yes
7	5570	Yes
8	5570	Yes
9	5570	Yes
10	5570	Yes
11	5500	Yes
12	5501	Yes
13	5500	Yes
14	5501	Yes
15	5500	Yes
16	5500	No
17	5501	Yes
18	5501	No
19	5501	Yes
20	5501	Yes
21	5639	Yes
22	5639	Yes
23	5639	Yes
24	5639	Yes
25	5639	Yes
26	5639	Yes
27	5639	Yes
28	5639	Yes
29	5639	Yes
30	5639	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	538	5490	38	Yes
2	1013	5491	32	Yes
3	1488	5492	29	Yes
4	1963	5493	32	Yes
5	2438	5494	42	Yes
6	2913	5495	35	Yes
7	3388	5496	27	Yes
8	3863	5497	34	Yes
9	4338	5498	37	Yes
10	4813	5499	36	Yes
11	5288	5500	31	Yes
12	5763	5501	29	Yes
13	6238	5502	36	Yes
14	6713	5503	32	Yes
15	7188	5504	32	Yes
16	7663	5505	25	Yes
17	8138	5506	27	Yes
18	8613	5507	35	Yes
19	9088	5508	32	Yes
20	9563	5509	37	Yes
21	10038	5510	22	Yes
22	10513	5511	31	Yes
23	10988	5512	28	Yes
24	11463	5513	32	Yes
25	11938	5514	38	Yes
26	12413	5515	36	Yes
27	12888	5516	33	Yes
28	13363	5517	35	Yes
29	13838	5518	41	Yes
30	14313	5519	40	Yes
31	14788	5520	33	Yes
32	15263	5521	28	Yes
33	15738	5522	33	Yes
34	16213	5523	37	Yes
35	16688	5524	27	Yes
36	17163	5525	29	Yes
37	17638	5526	33	Yes
38	18113	5527	30	Yes
39	18588	5528	32	Yes

TYPE 6 DETECTION PROBABILITY (CONTINUED)

40	19063	5529	34	Yes
41	19538	5530	32	Yes
42	20013	5531	33	Yes
43	20488	5532	35	Yes
44	20963	5533	32	Yes
45	21438	5534	36	Yes
46	21913	5535	28	Yes
47	22388	5536	41	Yes
48	22863	5537	31	Yes
49	23338	5538	34	Yes
50	23813	5539	32	Yes
51	24288	5540	33	Yes
52	24763	5541	33	Yes
53	25238	5542	37	Yes
54	25713	5543	29	Yes
55	26188	5544	30	Yes
56	26663	5545	31	Yes
57	27138	5546	30	Yes
58	27613	5547	34	Yes
59	28088	5548	33	Yes
60	28563	5549	33	Yes
61	29038	5550	32	Yes
62	29513	5551	29	Yes
63	29988	5552	38	Yes
64	30463	5553	36	Yes
65	30938	5554	27	Yes
66	31413	5555	32	Yes
67	31888	5556	36	Yes
68	32363	5557	36	Yes
69	32838	5558	34	Yes
70	33313	5559	31	Yes
71	33788	5560	28	Yes
72	34263	5561	35	Yes
73	34738	5562	26	Yes
74	35213	5563	29	Yes
75	35688	5564	37	Yes
76	36163	5565	33	Yes
77	36638	5566	34	Yes
78	37113	5567	33	Yes
79	37588	5568	36	Yes

TYPE 6 DETECTION PROBABILITY (CONTINUED)

80	38063	5569	38	Yes
81	38538	5570	34	Yes
82	39013	5571	32	Yes
83	39488	5572	32	Yes
84	39963	5573	41	Yes
85	40438	5574	37	Yes
86	40913	5575	37	Yes
87	41388	5576	30	Yes
88	41863	5577	31	Yes
89	42338	5578	36	Yes
90	42813	5579	26	Yes
91	43288	5580	33	Yes
92	43763	5581	39	Yes
93	44238	5582	32	Yes
94	44713	5583	31	Yes
95	45188	5584	36	Yes
96	45663	5585	35	Yes
97	46138	5586	35	Yes
98	46613	5587	32	Yes
99	47088	5588	35	Yes
100	47563	5589	33	Yes
101	48038	5590	39	Yes
102	48513	5591	35	Yes
103	48988	5592	30	Yes
104	49463	5593	33	Yes
105	49938	5594	37	Yes
106	50413	5595	37	Yes
107	50888	5596	32	Yes
108	51363	5597	32	Yes
109	51838	5598	30	Yes
110	52313	5599	35	Yes
111	52788	5600	30	Yes
112	53263	5601	34	Yes
113	53738	5602	30	Yes
114	54213	5603	40	Yes
115	54688	5604	30	Yes
116	55163	5605	33	Yes
117	55638	5606	31	Yes
118	56113	5607	36	Yes
119	56588	5608	35	Yes

TYPE 6 DETECTION PROBABILITY (CONTINUED)

120	57063	5609	33	Yes
121	57538	5610	33	Yes
122	58013	5611	36	Yes
123	58488	5612	29	Yes
124	58963	5613	40	Yes
125	59438	5614	41	Yes
126	59913	5615	35	Yes
127	60388	5616	34	Yes
128	60863	5617	33	Yes
129	61338	5618	34	Yes
130	61813	5619	36	Yes
131	62288	5620	38	Yes
132	62763	5621	32	Yes
133	63238	5622	32	Yes
134	63713	5623	40	Yes
135	64188	5624	33	Yes
136	64663	5625	41	Yes
137	65138	5626	32	Yes
138	77	5627	30	Yes
139	552	5628	35	Yes
140	1027	5629	35	Yes
141	1502	5630	28	Yes
142	1977	5631	33	Yes
143	2452	5632	38	Yes
144	2927	5633	37	Yes
145	3402	5634	29	Yes
146	3877	5635	32	Yes
147	4352	5636	33	Yes
148	4827	5637	34	Yes
149	5302	5638	29	Yes
150	5777	5639	33	Yes
151	6252	5640	35	Yes
152	6727	5641	33	Yes
153	7202	5642	32	Yes
154	7677	5643	30	Yes
155	8152	5644	30	Yes
156	8627	5645	39	Yes
157	9102	5646	32	Yes
158	9577	5647	34	Yes
159	10052	5648	24	Yes
160	10527	5649	35	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.