

**DFS PORTION of FCC 47 CFR PART 15 SUBPART E
DFS PORTION of ISCED CANADA RSS-247 ISSUE 2**

CERTIFICATION TEST REPORT

FOR

SEMI-RUGGEDIZED ROUTER

**MODEL NUMBER: S5A246A (NORTH AMERICA) and
S5A245A (REST of THE WORLD)**

**FCC ID: UXX-S5A246A (NORTH AMERICA) and
UXX-S5A246A (REST of the WORLD)**

**IC: 6921A-S5A246A (NORTH AMERICA) and
6921A-S5A246A (REST of the WORLD)**

REPORT NUMBER: 14489196-E2V3

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Prepared for
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Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2022-12-14	Initial Issue	--
V2	2023-03-30	Updated declared AG and EIRP values	F. Ibrahim
V3	2023-04-07	Removed setup photos because of STC	F. Ibrahim

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: CRADLEPOINT, INC.
1111 WEST JEFFERSON ST.
BOISE, ID., 83702, U.S.A.

EUT DESCRIPTION: SEMI-RUGGEDIZED ROUTER

MODEL: S5A246A (NORTH AMERICA) and
S5A245A (REST of the WORLD)

SERIAL NUMBER: MS220192700064 (EUT1 / MASTER)
MM223500041821 (EUT 2 / SLAVE)
MM223500041857 (EUT 3 / SLAVE with DETECTION)

DATE TESTED: OCTOBER 03 TO 07, 2022; OCTOBER 17 TO 20, 2022 and
NOVEMBER 18 to 21, 2022

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
DFS Portion of CFR 47 Part 15 Subpart E	Complies
DFS Portion of ISED CANADA RSS-247 Issue 2	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 and RSS-247 Issue 2.

3. SUMMARY OF TEST RESULTS

Requirement Description	Result	Remarks
DFS Portion of FCC 47 CFR PART 15 SUBPART E	Complies	
DFS Portion of ISED CANADA RSS-247 ISSUE 2	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 Bureau Veritas Lab FCC 15E report RFBDEM-WTW-P22090716-1 and ISED RSS-247 Report ICBDEM-WTW-P22090716-1.

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. DYNAMIC FREQUENCY SELECTION REQUIREMENTS AND SETUP INFORMATION

7.1. OVERVIEW

7.1.1. LIMITS

INNOVATION, SCIENCE and ECONOMIC DEVELOPMENT CANADA (ISED)

ISED RSS-247 is closely harmonized with FCC Part 15 DFS rules. The deviations are as follows:

RSS-247 Issue 2

Note: For the band 5600–5650 MHz, no operation is permitted.

Until further notice, devices subject to this annex shall not be capable of transmitting in the band 5600–5650 MHz. This restriction is for the protection of Environment Canada weather radars operating in this band.

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)
<i>U-NII Detection Bandwidth and Statistical Performance Check</i>	All BW modes must be tested	Not required
<i>Channel Move Time and Channel Closing Transmission Time</i>	Test using widest BW mode available	Test using the widest BW mode available for the link
<i>All other tests</i>	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
<i>Non-occupancy period</i>	30 minutes
<i>Channel Availability Check Time</i>	60 seconds
<i>Channel Move Time</i>	10 seconds (See Note 1)
<i>Channel Closing Transmission Time</i>	200 milliseconds + approx. 60 milliseconds over remaining 10 second period. (See Notes 1 and 2)
<i>U-NII Detection Bandwidth</i>	Minimum 100% of the U- NII 99% transmission power bandwidth. (See Note 3)
Note 1: <i>Channel Move Time</i> and the <i>Channel Closing Transmission Time</i> should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst. Note 2: The <i>Channel Closing Transmission Time</i> is comprised of 200 milliseconds starting at the beginning of the <i>Channel Move Time</i> plus any additional intermittent control signals required to facilitate a <i>Channel</i> 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 <i>U-NII Detection Bandwidth</i> 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: $\{(1/360) \times (19 \times 10^6 / \text{PRI}_{\text{usec}})\}$	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 <i>Detection Bandwidth</i> test, <i>Channel Move Time</i> , and <i>Channel Closing Time</i> tests.					

Table 6 – Long Pulse Radar Test Signal

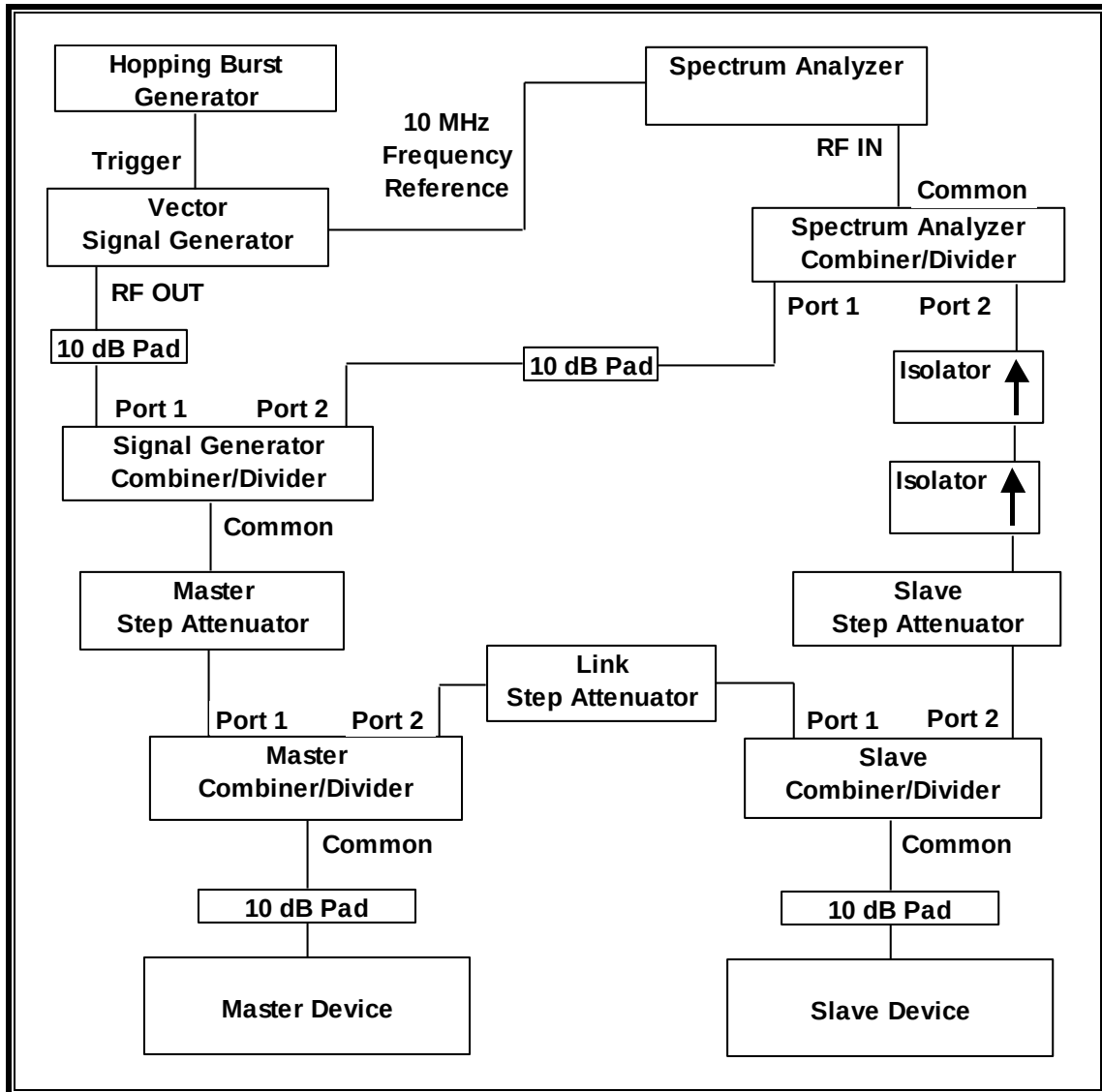
Radar Waveform Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

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

7.1.2. TEST AND MEASUREMENT SYSTEM

CONDUCTED 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.

Should multiple RF ports be utilized for the Master and/or Slave devices (for example, for diversity or MIMO implementations), additional combiner/dividers are inserted between the Master Combiner/Divider and the pad connected to the Master Device (and/or between the Slave Combiner/Divider and the pad connected to the Slave Device). Additional pads may be utilized such that there is one pad at each RF port on each EUT.

SYSTEM CALIBRATION

A 50-ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected in place of the master device. 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 Link Step Attenuator between the units is adjusted as needed to provide a suitable received level at the Master and Slave devices. Traffic that meets or exceeds the minimum loading requirement is streamed from the Master device to the Slave Device. The WLAN traffic level, as displayed on the spectrum analyzer, is confirmed to be at lower amplitude than the radar detection threshold and is confirmed to be the Radar Detection Device rather than the associated device. If a different setting of the Master Step Attenuator is required to meet the above conditions, a new System Calibration is performed for the new Master Step Attenuator setting.

TEST AND MEASUREMENT EQUIPMENT

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

Master Device Testing

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	Keysight	N5182B	215999	02/08/23
Frequency Extender	Keysight	N5182BX	213906	12/29/22
Arbitrary Waveform Generator	Agilent / HP	33220A	80815	01/24/23

Slave Device with and without Radar Detection Testing

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	Keysight	N5182B	215999	02/08/23
Frequency Extender	Keysight	N5182BX	213906	12/29/22

Note: An MXG series Signal Generator and separate external Frequency Extender module are shown in the preceding test system block diagram as a stand-alone Vector Signal Generator.

7.1.3. TEST AND MEASUREMENT SOFTWARE

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

Master Device Testing

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

Slave Device with and without Radar Detection Testing

TEST SOFTWARE LIST		
Name	Version	Test / Function
Aggregate Time-PXA	3.1	Channel Loading and Aggregate Closing Time
PXA Read	3.1	Signal Generator Screen Capture
SGXProject.exe	1.7	Radar Waveform Generation and Download

7.1.4. 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).

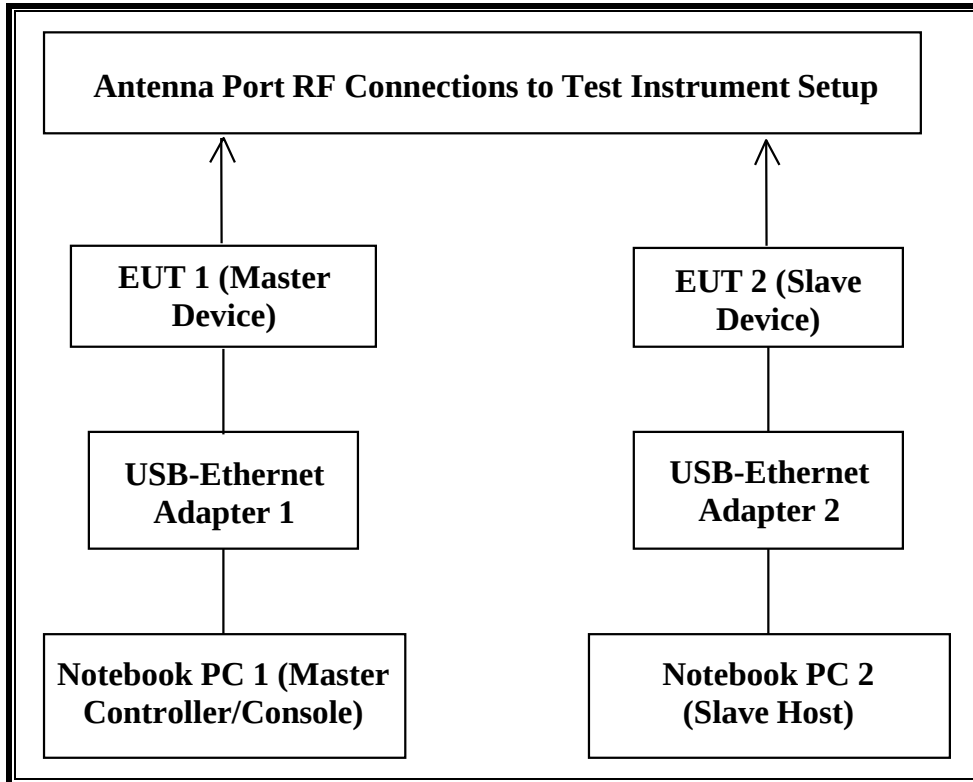
ENVIRONMENT CONDITION

Parameter	Value
Temperature	24.5, 25.2, 24.3, 24.5, 24.7, 23.1, 24.1, 21.7, 24.5, 21.3 and 23.4 °C
Humidity	49, 49, 47, 54, 53, 48, 50, 42, 43, 39 and 38 %

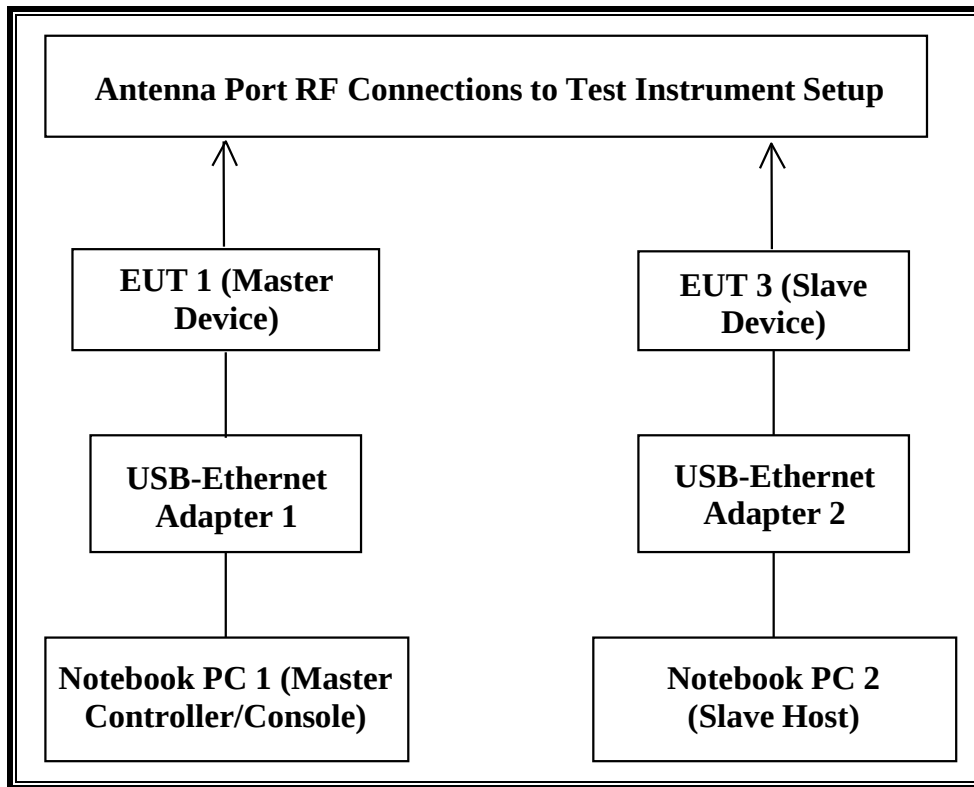
7.1.5. SETUP OF EUT

CONDUCTED METHOD EUT TEST SETUP

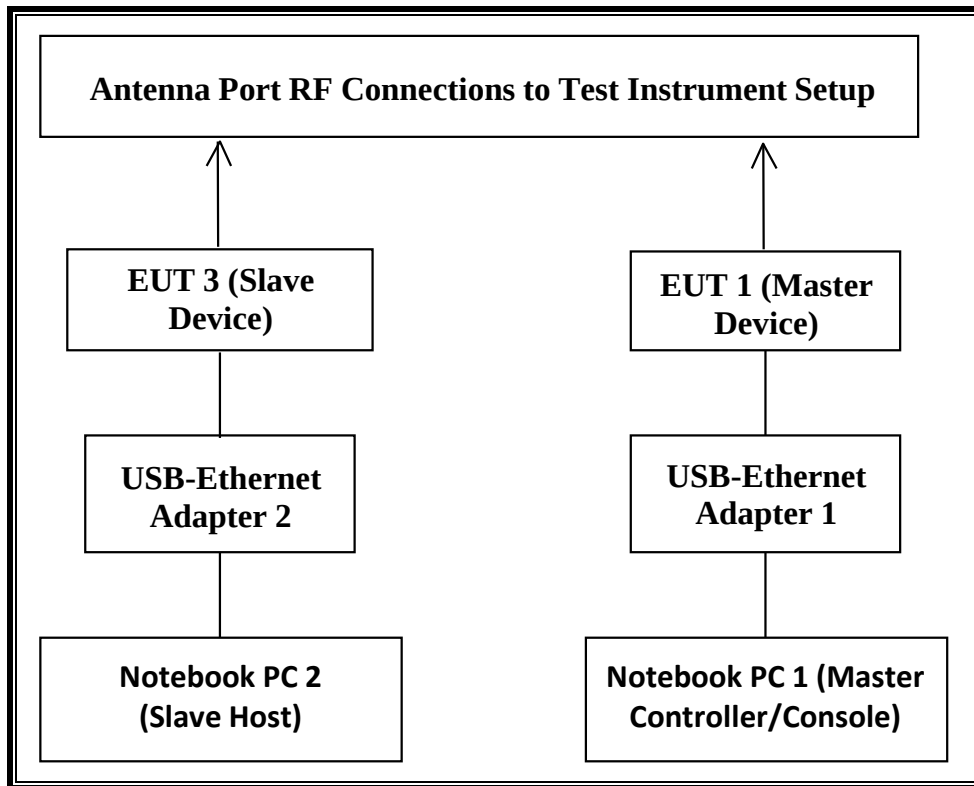
Master Device and Slave without Radar Detection Device Testing



Slave with Radar Detection Device Testing (Radar Applied to the Master Device)



Slave with Radar Detection Device Testing (Radar Applied to the Slave Device)



SUPPORT EQUIPMENT

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

Master Device Testing (North America)

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter 1 (Master / EUT 1)	Asian Power Devices, Inc.	WA-36A12R	Y070NB401441	DoC
Notebook PC 1 (Master Console)	Apple	A1708	FVFXRSQ4HV22	DoC
AC Adapter 2 (Notebook PC 1)	Apple	A1947	No Serial Number	DoC
USB-C to Ethernet Adapter 1 (PC 1)	Tripp Lite	U444-06N-HAGU-C	3145CCVCU88F102943	DoC
Semi-Ruggedized Router (Slave Device / EUT 2)	Cradlepoint, Inc.	S5A246A	MM223500041821	UXX-S5A246A
AC Adapter 3 (Slave)	Asian Power Devices, Inc.	WA-36A12R	Y18C01000996	DoC
Notebook PC 2 (Slave Host)	Apple	A1708	FVFXRWPCHV22	DoC
AC Adapter 4 (Notebook PC 2)	Apple	A1718	No Serial Number	DoC
USB-C to Ethernet Adapter 1 (PC 2)	Tripp Lite	U444-06N-HAGU-C	3008BCVCU88F105056	DoC

Master Device Testing (The Rest of the World)

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter 1 (Master / EUT 1)	Asian Power Devices, Inc.	WA-36A12R	Y070NB401441	DoC
Notebook PC 1 (Master Console)	Apple	A1708	FVFXRSQ4HV22	DoC
AC Adapter 2 (Notebook PC 1)	Apple	A1947	No Serial Number	DoC
USB-C to Ethernet Adapter 1 (PC 1)	Tripp Lite	U444-06N-HAGU-C	3145CCVCU88F102943	DoC
Semi-Ruggedized Router (Slave Device / EUT 2)	Cradlepoint, Inc.	S5A245A	MM223500041821	UXX-S5A245A
AC Adapter 3 (Slave)	Asian Power Devices, Inc.	WA-36A12R	Y18C01000996	DoC
Notebook PC 2 (Slave Host)	Apple	A1708	FVFXRWPCHV22	DoC
AC Adapter 4 (Notebook PC 2)	Apple	A1718	No Serial Number	DoC
USB-C to Ethernet Adapter 1 (PC 2)	Tripp Lite	U444-06N-HAGU-C	3008BCVCU88F105056	DoC

Slave Device with and without Radar Detection Testing (North America)

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Semi-Ruggedized Router (Master Device / EUT 1)	Cradlepoint, Inc.	S5A246A	MS220192700064	UXX-S5A246A
AC Adapter 1 (Master / EUT 1)	Asian Power Devices, Inc.	WA-36A12R	Y070NB401441	DoC
Notebook PC 1 (Master Console)	Apple	A1708	FVFXRSQ4HV22	DoC
AC Adapter 2 (Notebook PC 1)	Apple	A1947	No Serial Number	DoC
USB-C to Ethernet Adapter 1 (PC 1)	Tripp Lite	U444-06N-HAGU-C	3145CCVCU88F102943	DoC
AC Adapter 3 (Slave)	Asian Power Devices, Inc.	WA-36A12R	Y18C01000996	DoC
Notebook PC 2 (Slave Host)	Apple	A1708	FVFXRWPCHV22	DoC
AC Adapter 4 (Notebook PC 2)	Apple	A1718	No Serial Number	DoC
USB-C to Ethernet Adapter 1 (PC 2)	Tripp Lite	U444-06N-HAGU-C	3008BCVCU88F105056	DoC

Slave Device with and without Radar Detection Testing (The Rest of the World)

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Semi-Ruggedized Router (Master Device / EUT 1)	Cradlepoint, Inc.	S5A245A	MS220192700064	UXX-S5A245A
AC Adapter 1 (Master / EUT 1)	Asian Power Devices, Inc.	WA-36A12R	Y070NB401441	DoC
Notebook PC 1 (Master Console)	Apple	A1708	FVFXRSQ4HV22	DoC
AC Adapter 2 (Notebook PC 1)	Apple	A1947	No Serial Number	DoC
USB-C to Ethernet Adapter 1 (PC 1)	Tripp Lite	U444-06N-HAGU-C	3145CCVCU88F102943	DoC
AC Adapter 3 (Slave)	Asian Power Devices, Inc.	WA-36A12R	Y18C01000996	DoC
Notebook PC 2 (Slave Host)	Apple	A1708	FVFXRWPCHV22	DoC
AC Adapter 4 (Notebook PC 2)	Apple	A1718	No Serial Number	DoC
USB-C to Ethernet Adapter 1 (PC 2)	Tripp Lite	U444-06N-HAGU-C	3008BCVCU88F105056	DoC

7.1.6. DESCRIPTION OF EUT

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

For ISSED the EUT operates over the 5250-5350 MHz and 5470-5725 MHz ranges, excluding the 5600-5650 MHz range.

The EUT can be configured as a Master Device, standard Slave Device without Radar Detection or a Slave Device with Radar Detection.

The highest power level within these bands is 25.33 dBm EIRP in the 5250-5350 MHz band and 25.15 dBm EIRP in the 5470-5725 MHz band.

The manufacturer has declared that the highest gain antenna assembly utilized with the EUT has a gain of 4.63 dBi in the 5250-5350 MHz band and 5.60 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 0 dBi in the 5250-5350 MHz band and 0 dBi in the 5470-5725 MHz band.

Two 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 antenna gain and procedural adjustments, the required conducted threshold at the antenna port is $-64 + 0 + 1 = -63$ dBm.

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

The EUT uses two transmitter/receiver chains, each connected to a 50-ohm coaxial antenna port. However, only one of the two chains is a radar detecting port so only one was connected to the test system to perform conducted tests.

During Master Device testing the Slave device associated with the EUT 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 iPerf3 software package.

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

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

Channel puncturing is not supported by the EUT.

The software installed in the EUT is version 7.22.110.

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 Cradlepoint, Inc. Semi-Ruggedized Router, FCC ID: UXX-S5A246A for North American distribution and FCC ID: UXX-S5A246A for distribution in the rest of the world where FCC DFS compliance is required or accepted. The minimum antenna gain for the Master Device is 0 dBi.

The rated output power of the Master unit is $> 23\text{dBm}$ (EIRP). Therefore the required interference threshold level is -64 dBm . After correction for antenna gain and procedural adjustments, the required conducted threshold at the antenna port is $-64 + 0 + 1 = -63\text{ dBm}$.

The calibrated conducted 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 7.22.110.

8. MASTER DEVICE TEST RESULTS

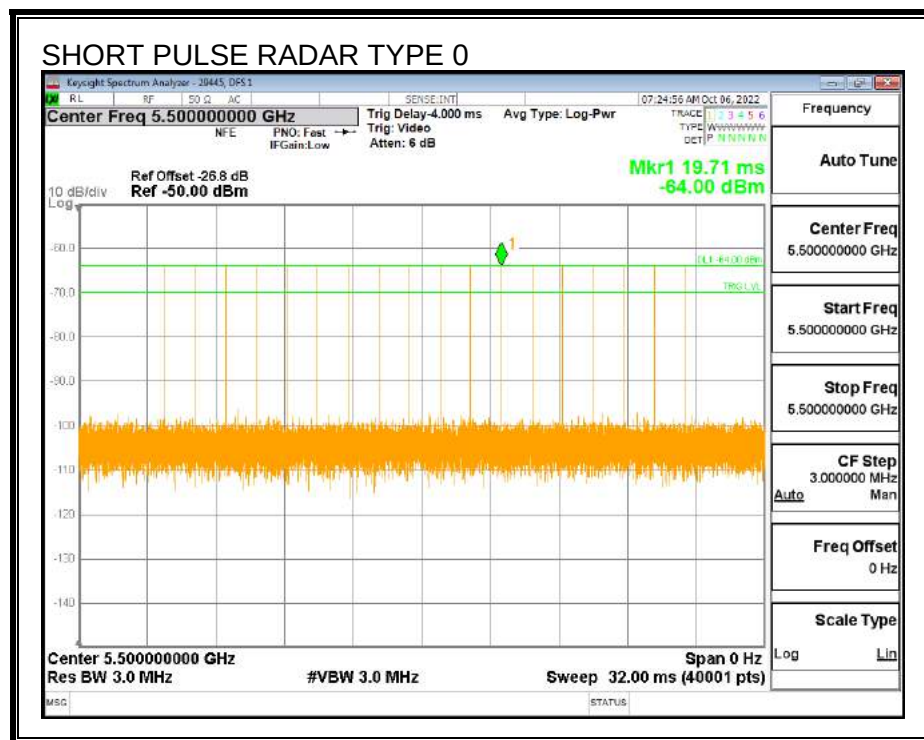
8.1. RESULTS FOR 20 MHz BANDWIDTH

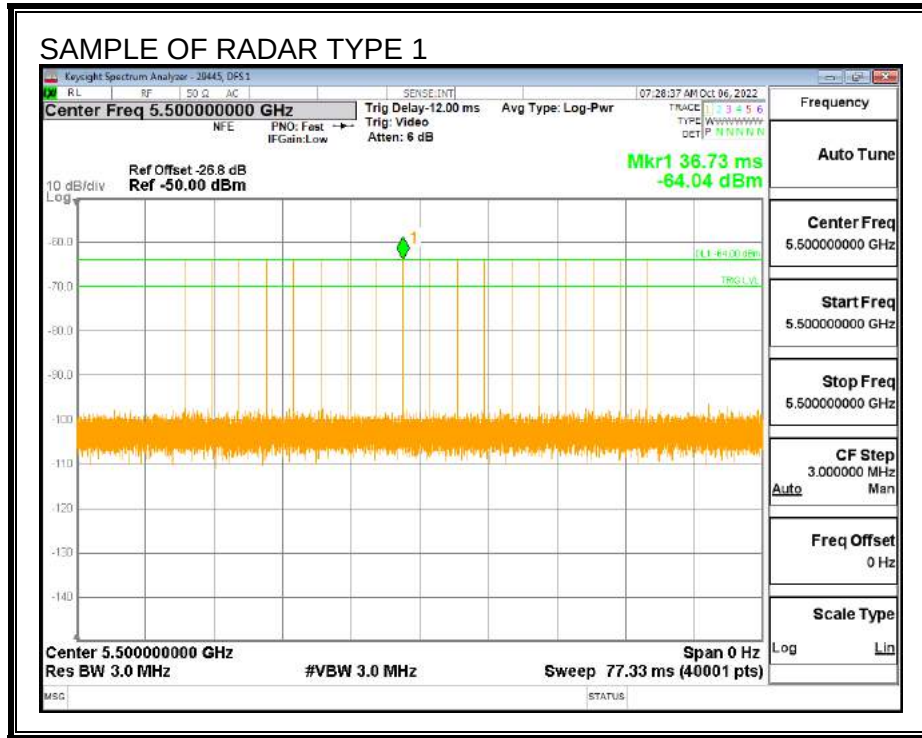
8.1.1. TEST CHANNEL

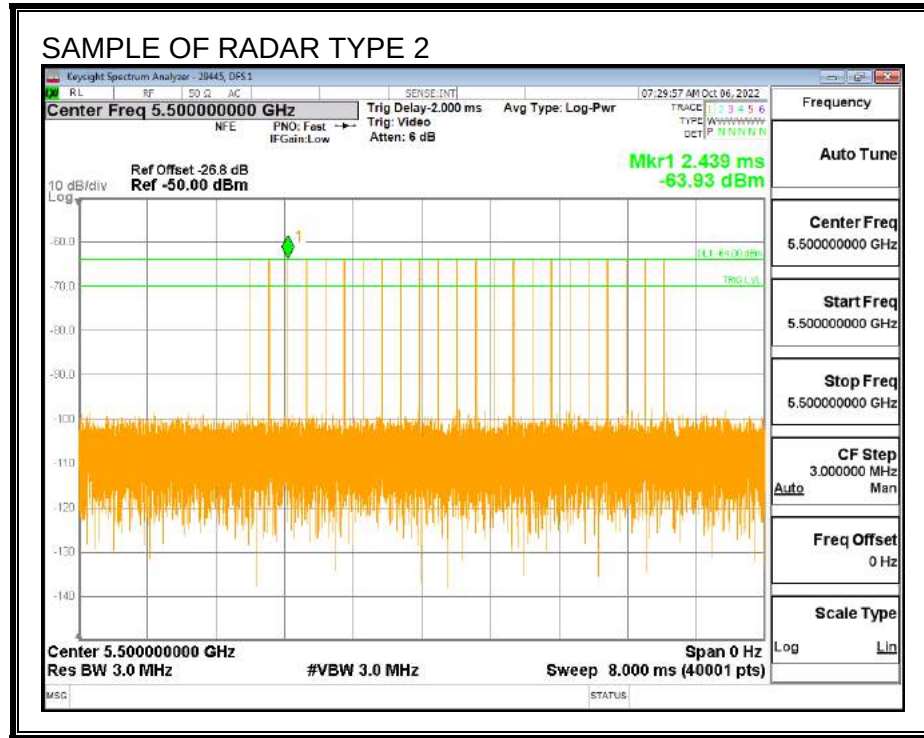
All tests were performed at a channel center frequency of 5500 MHz.

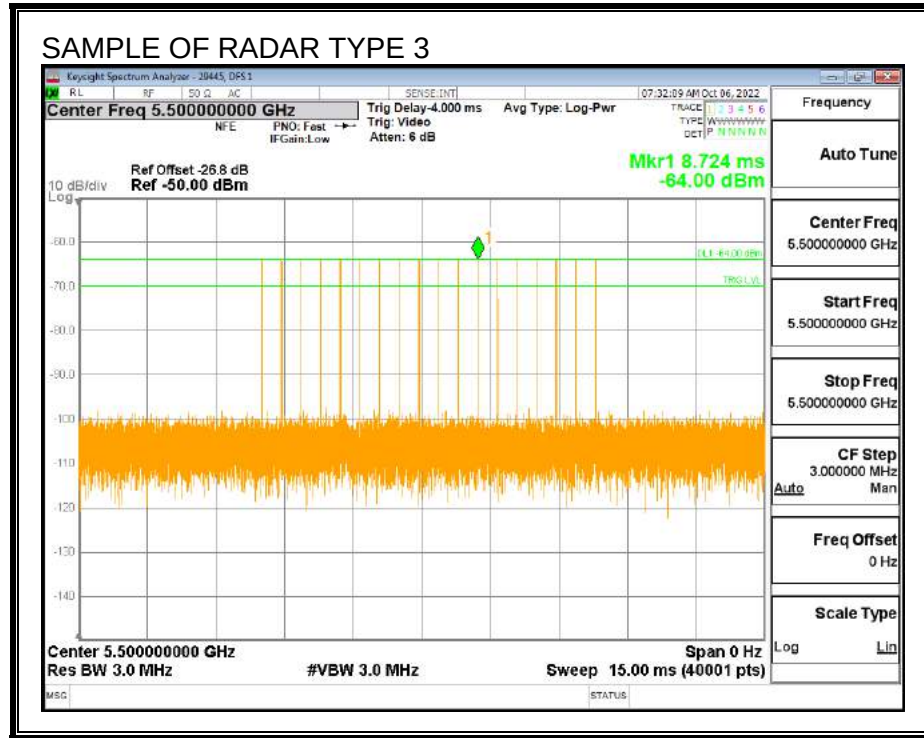
8.1.2. RADAR WAVEFORMS AND TRAFFIC

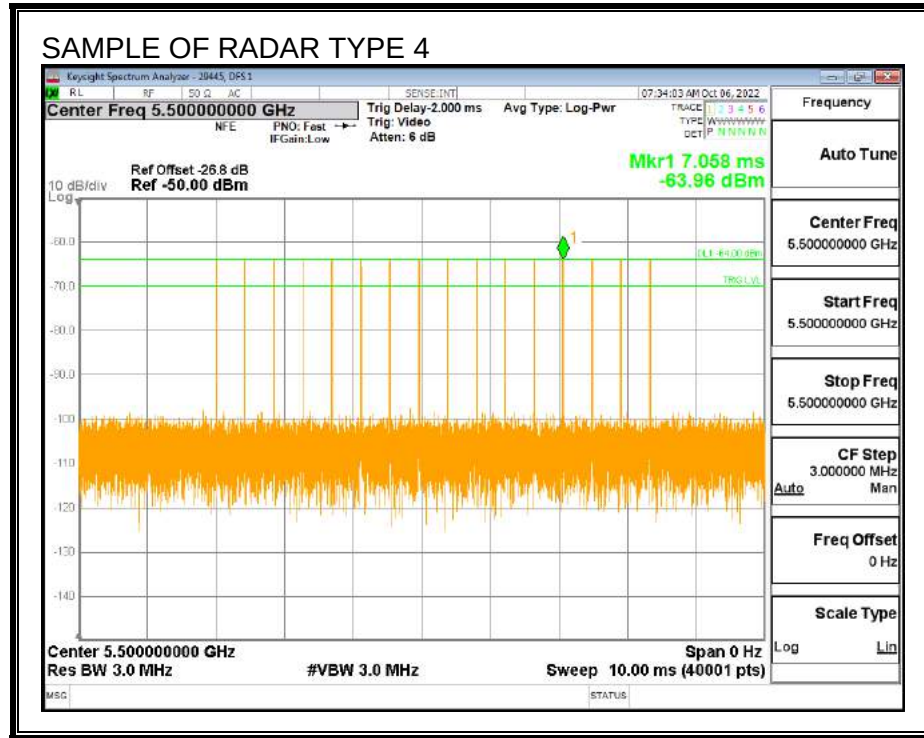
RADAR WAVEFORMS

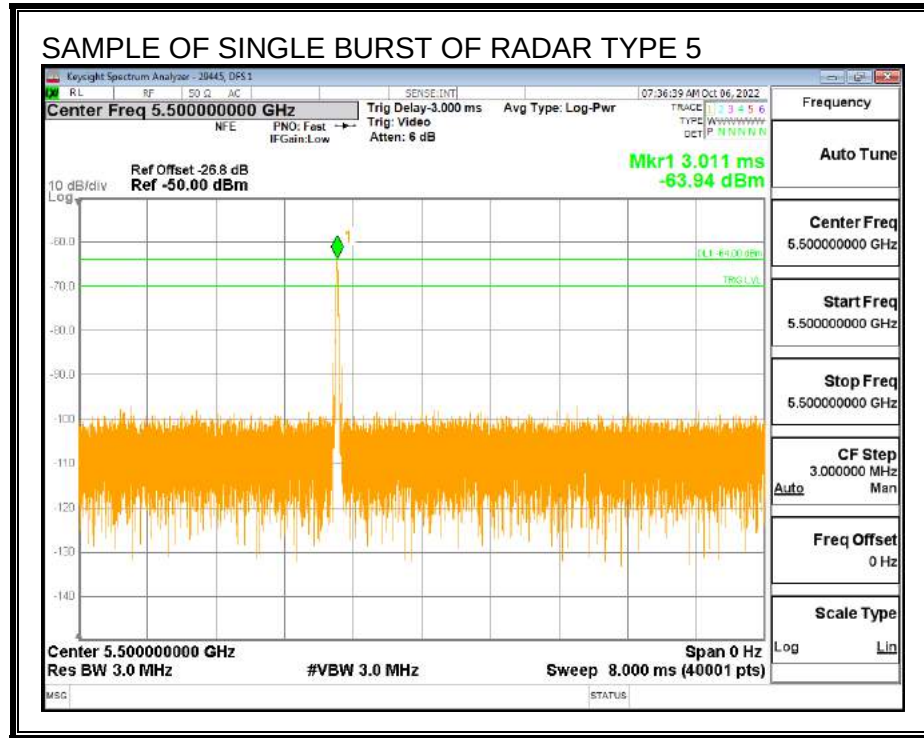


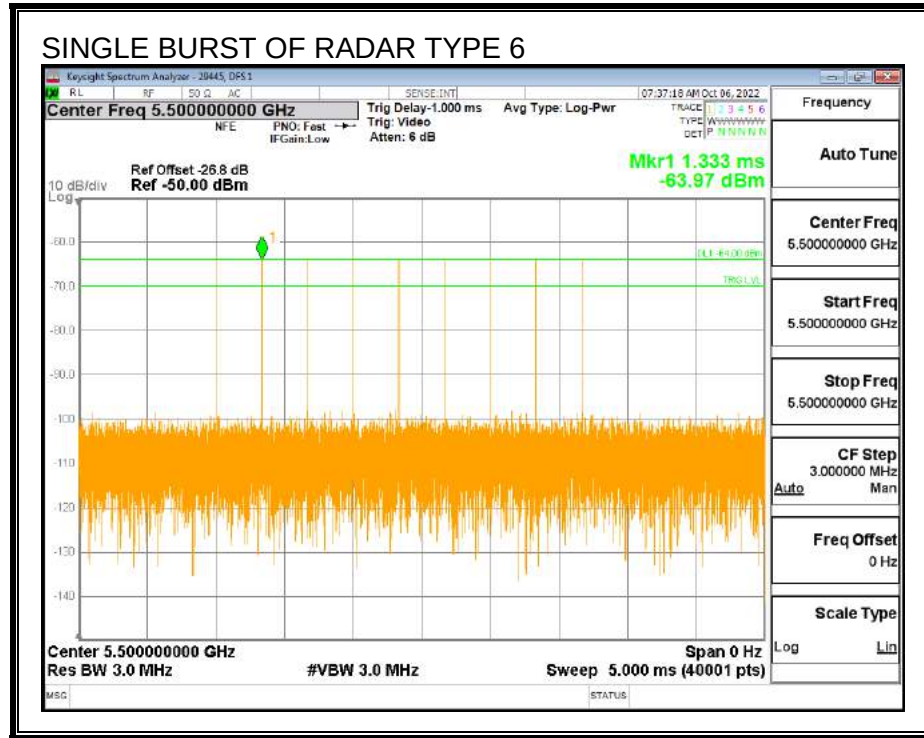




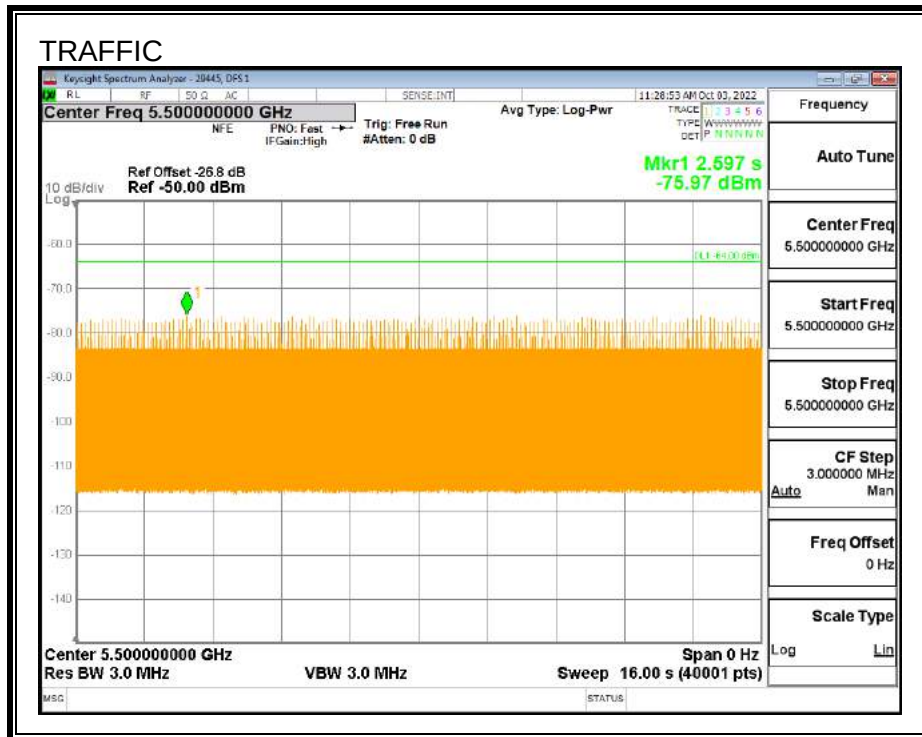




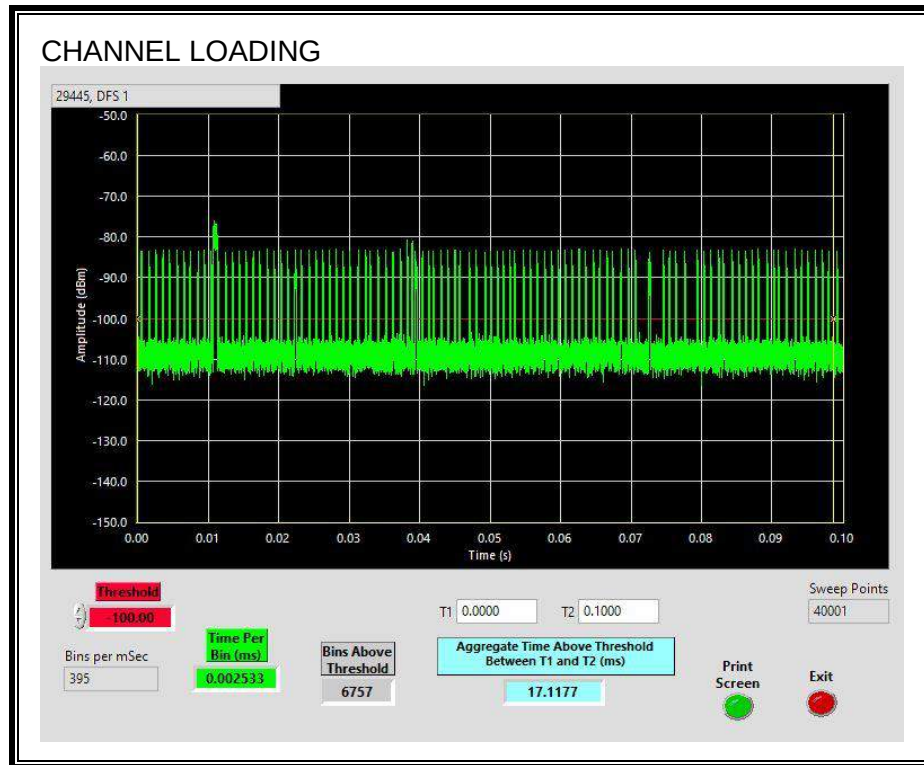




TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 17.11%

8.1.3. 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)
29.98	152.6	122.6	62.6

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)
30.2	93.3	63.1	0.5

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)
30.06	151.5	121.4	58.8

QUALITATIVE RESULTS

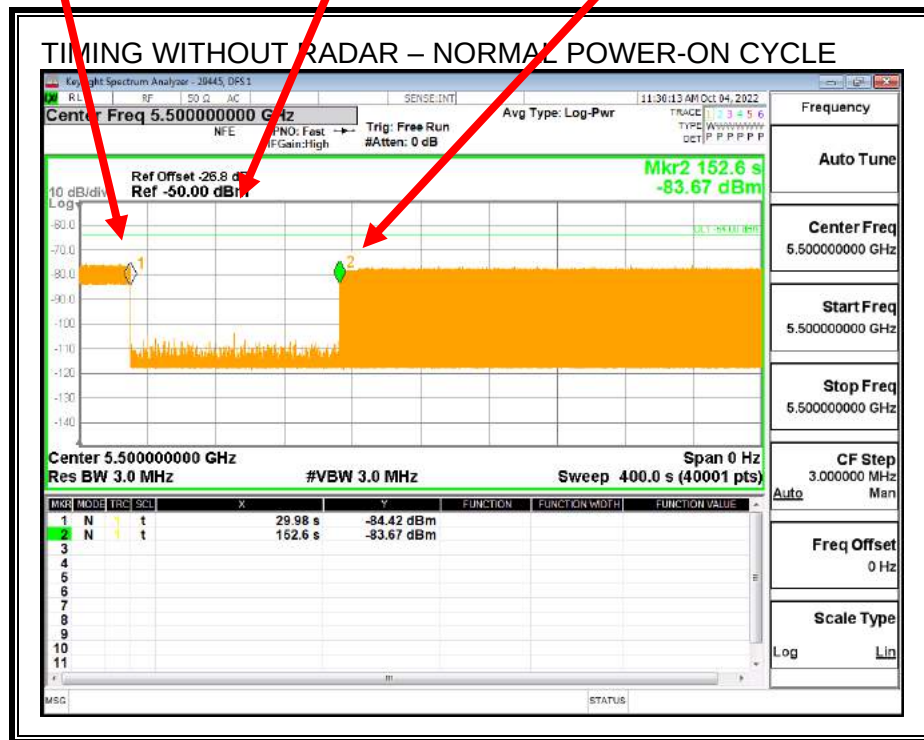
Timing of Radar Burst	Display on Control Computer	Spectrum Analyzer Display
No Radar Triggered	EUT marks Channel as active	Transmissions begin on channel after completion of the initial power-up cycle and the CAC
Within 0 to 6 second window	EUT indicates radar detected	No transmissions on channel
Within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



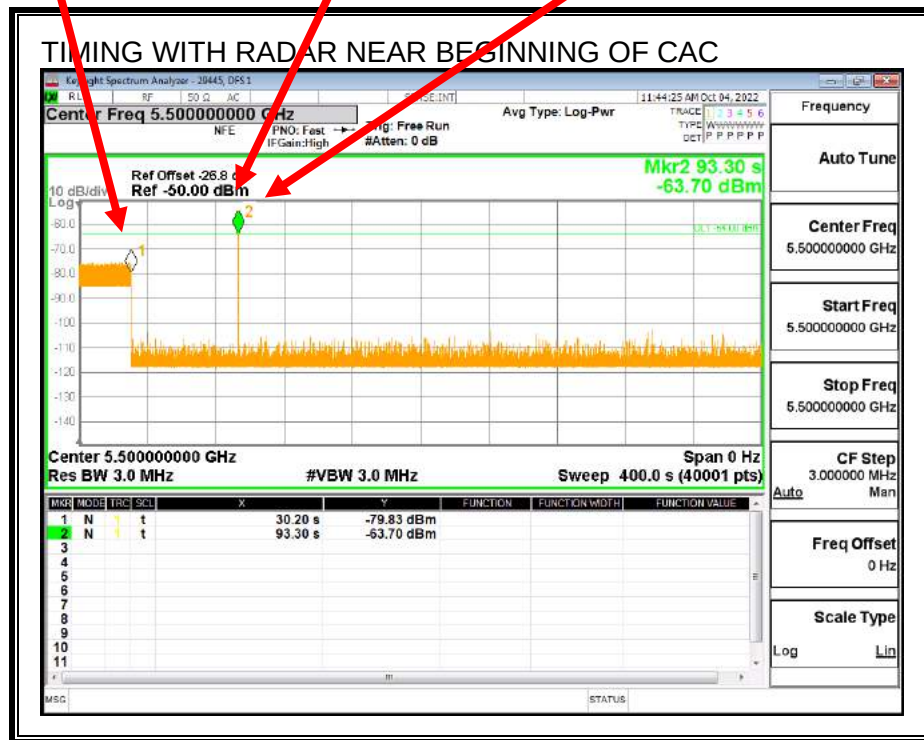
Transmissions begin on channel after completion of the initial power-up cycle and the CAC.

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



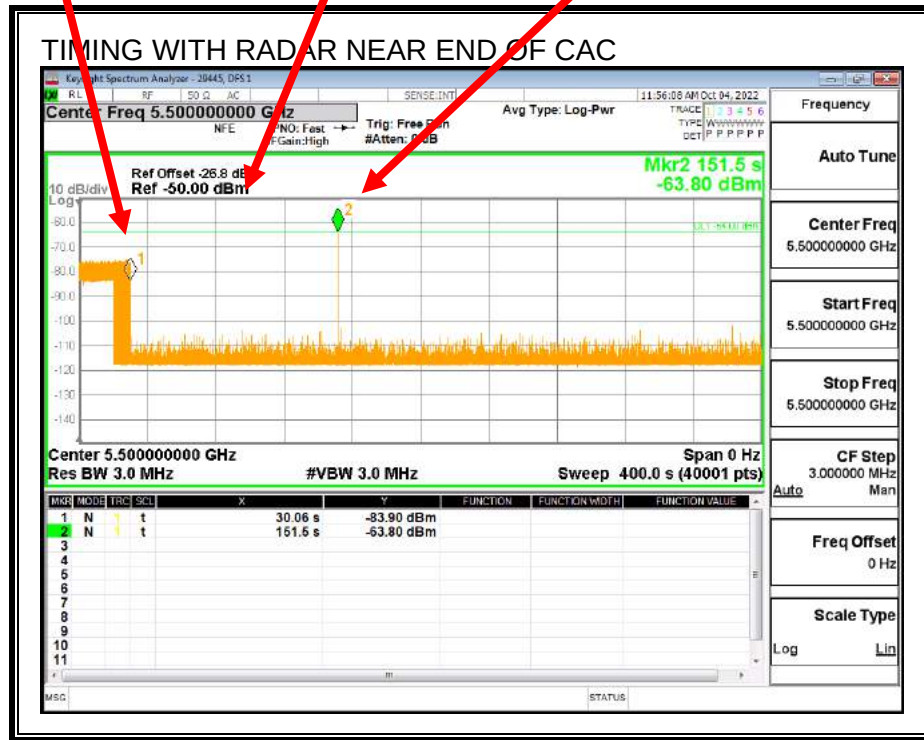
No EUT transmissions were observed after the radar signal.

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.

8.1.4. OVERLAPPING CHANNEL TESTS

RESULTS

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

8.1.5. 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)

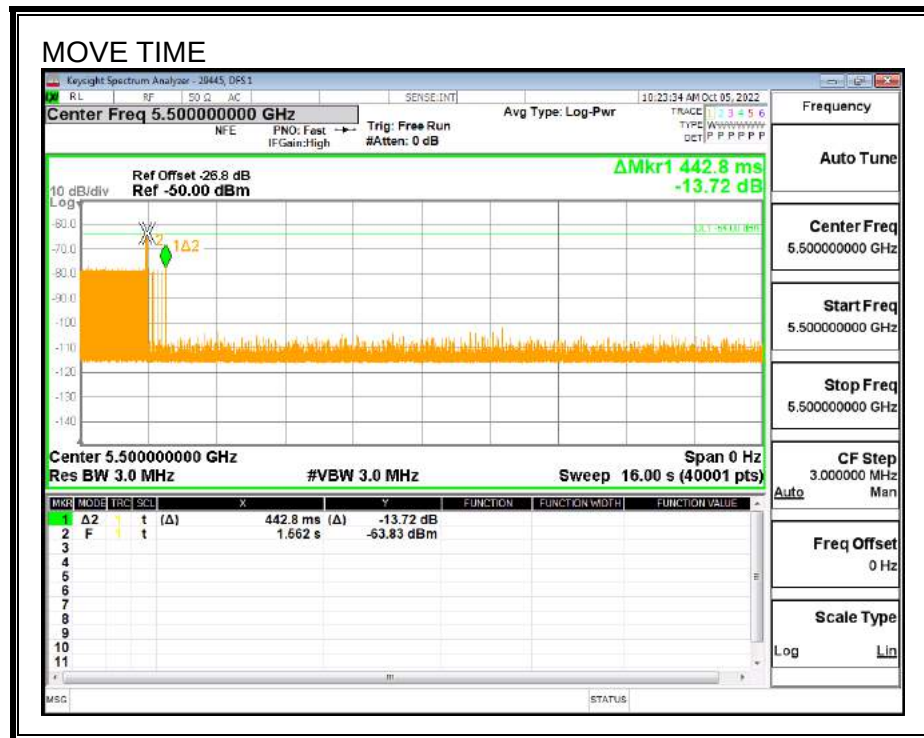
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

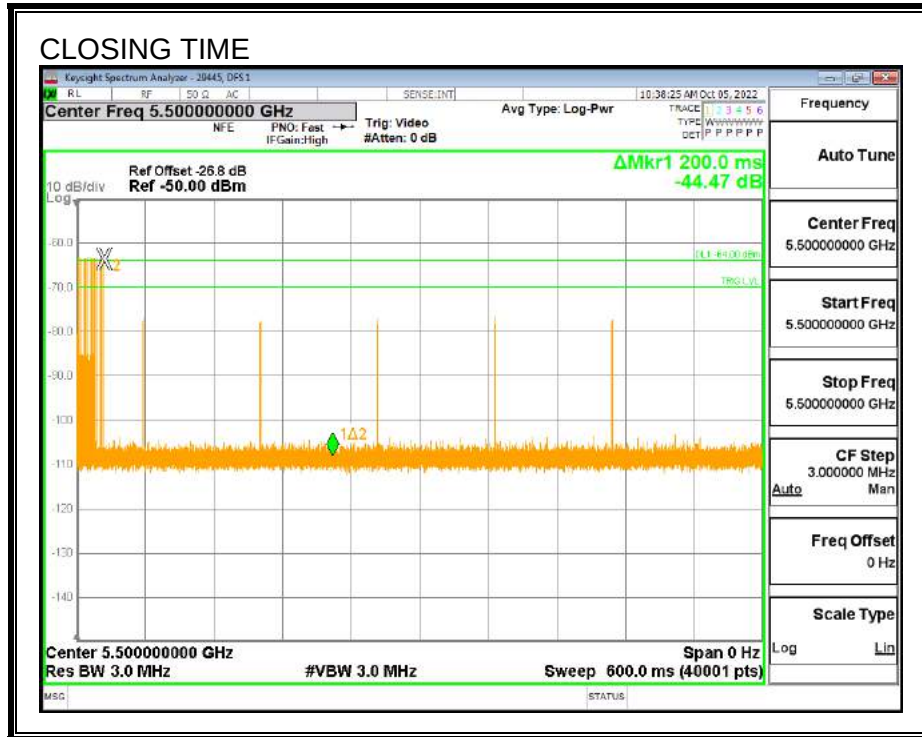
Channel Move Time (sec)	Limit (sec)
0.4428	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
3.6	60

MOVE TIME

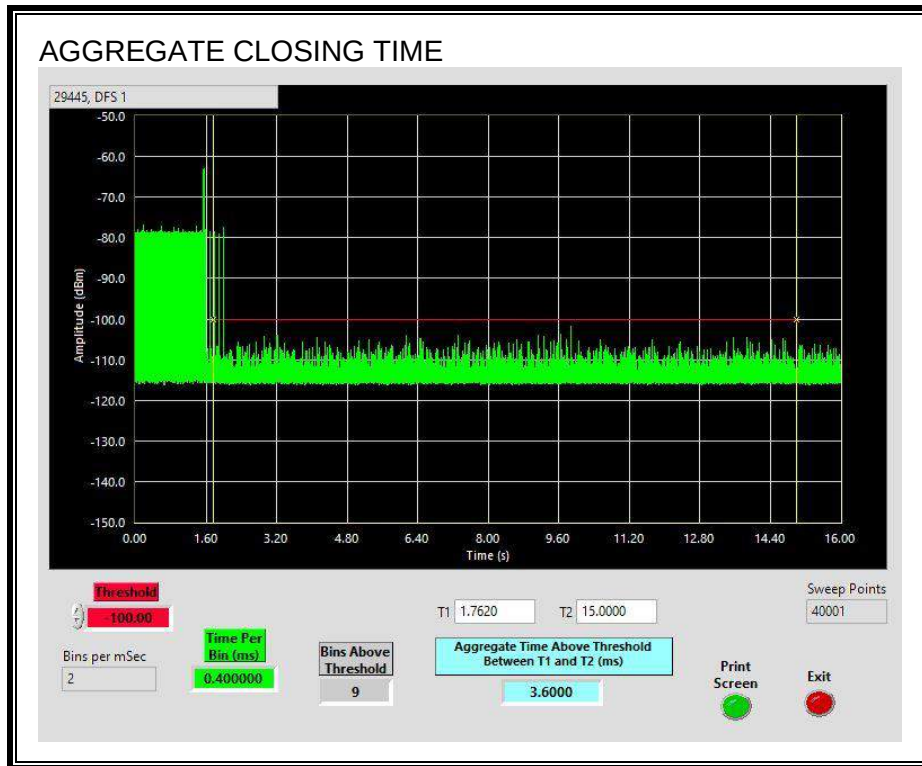


CHANNEL CLOSING TIME



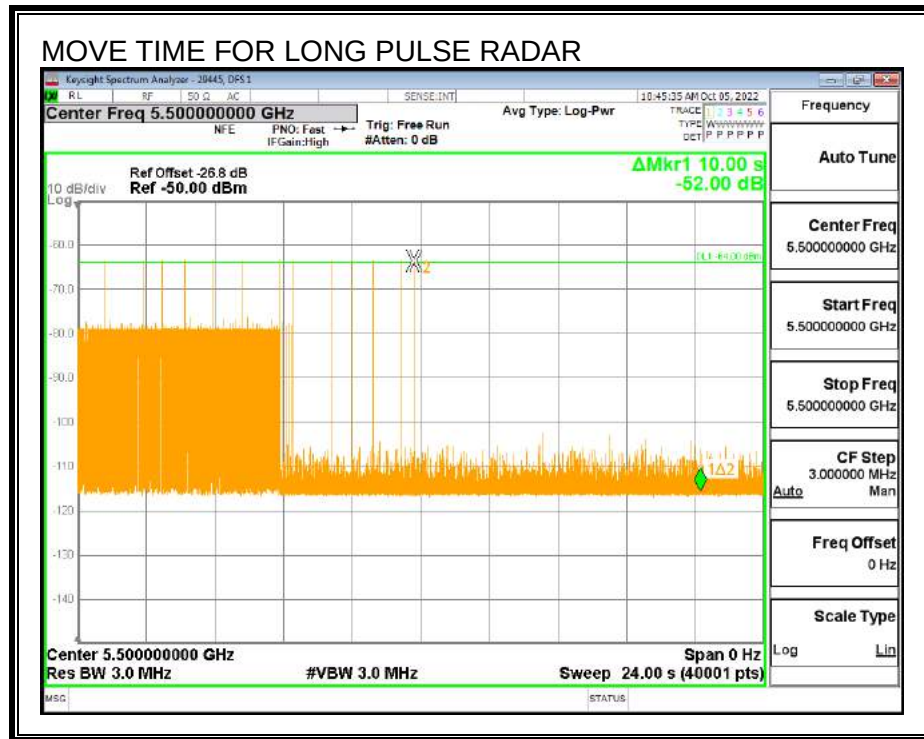
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the aggregate monitoring period.



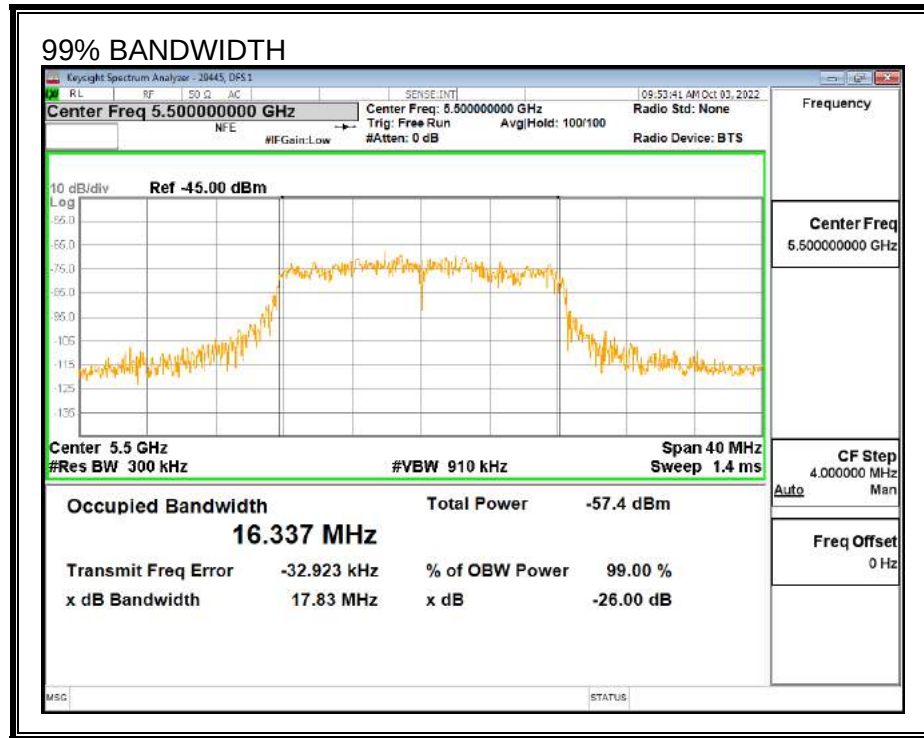
LONG PULSE CHANNEL MOVE TIME

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



8.1.6. 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	5512	22	16.337	134.7	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
5490	10	10	100	FL
5495	10	10	100	
5500	10	10	100	
5505	10	10	100	
5510	10	10	100	
5511	10	10	100	
5512	10	10	100	FH

8.1.7. IN-SERVICE MONITORING

RESULTS

FCC Radar Test Summary										
Signal Type	Number of Trials	Detection (%)	Limit (%)	Pass/Fail	Detection Bandwidth		OBW	Test Location	Employee Number	In-Service Monitoring Version
					FL	FH				
FCC Short Pulse Type 1	30	90.00	60	Pass	5490	5512	16.34	DFS 1	29445	v4.1
FCC Short Pulse Type 2	30	93.33	60	Pass	5490	5512	16.34	DFS 1	29445	v4.1
FCC Short Pulse Type 3	30	90.00	60	Pass	5490	5512	16.34	DFS 1	29445	v4.1
FCC Short Pulse Type 4	30	93.33	60	Pass	5490	5512	16.34	DFS 1	29445	v4.1
Aggregate		91.67	80	Pass						
FCC Long Pulse Type 5	30	100.00	80	Pass	5490	5512	16.34	DFS 1	29445	v4.1
FCC Hopping Type 6	46	97.83	70	Pass	5490	5512		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	5507	Yes
1002	1	578	92	A	5501	Yes
1003	1	538	99	A	5509	Yes
1004	1	518	102	A	5500	Yes
1005	1	798	67	A	5493	Yes
1006	1	598	89	A	5493	Yes
1007	1	878	61	A	5494	Yes
1008	1	698	76	A	5497	Yes
1009	1	658	81	A	5496	Yes
1010	1	918	58	A	5512	Yes
1011	1	898	59	A	5509	Yes
1012	1	818	65	A	5508	Yes
1013	1	558	95	A	5505	Yes
1014	1	778	68	A	5496	Yes
1015	1	618	86	A	5500	Yes
1016	1	1140	47	B	5507	No
1017	1	2838	19	B	5507	Yes
1018	1	1793	30	B	5501	Yes
1019	1	2426	22	B	5507	Yes
1020	1	1511	35	B	5504	Yes
1021	1	2273	24	B	5509	Yes
1022	1	1487	36	B	5501	Yes
1023	1	1184	45	B	5502	Yes
1024	1	1881	29	B	5508	No
1025	1	1708	31	B	5491	Yes
1026	1	2534	21	B	5498	Yes
1027	1	2490	22	B	5511	Yes
1028	1	2252	24	B	5512	No
1029	1	2338	23	B	5509	Yes
1030	1	2229	24	B	5493	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	4.4	219	23	5510	Yes
2002	3.6	178	29	5494	Yes
2003	2.2	192	29	5496	Yes
2004	1.5	156	25	5494	Yes
2005	2.5	173	28	5498	Yes
2006	4.3	222	26	5493	Yes
2007	1.4	206	29	5492	Yes
2008	3.3	221	27	5501	Yes
2009	2.8	208	23	5497	Yes
2010	5	228	25	5507	Yes
2011	4.7	219	26	5503	Yes
2012	2.9	205	28	5506	Yes
2013	5	201	29	5495	Yes
2014	1.6	190	28	5493	Yes
2015	3.9	152	23	5491	Yes
2016	4.7	227	29	5492	Yes
2017	3.1	155	28	5512	Yes
2018	2.3	153	27	5507	Yes
2019	5	166	26	5511	Yes
2020	4.3	211	23	5497	Yes
2021	3.4	228	26	5505	Yes
2022	3	158	23	5508	Yes
2023	4.2	180	27	5510	No
2024	2	195	24	5491	Yes
2025	1.5	183	28	5502	Yes
2026	3.7	202	26	5492	Yes
2027	3.4	194	24	5496	No
2028	1.6	179	25	5498	Yes
2029	3.7	175	27	5502	Yes
2030	4.4	165	26	5511	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	7.6	429	18	5512	Yes
3002	8.4	410	17	5504	No
3003	6.8	438	17	5492	Yes
3004	6	432	18	5509	No
3005	6.8	472	18	5493	Yes
3006	8	361	18	5501	Yes
3007	7.1	414	16	5506	Yes
3008	6.7	449	18	5491	Yes
3009	7.9	264	16	5512	No
3010	9.8	311	18	5491	Yes
3011	9.3	273	16	5512	Yes
3012	7.4	333	16	5510	Yes
3013	7.1	307	18	5506	Yes
3014	9.4	262	17	5509	Yes
3015	7.4	500	16	5501	Yes
3016	8.1	468	16	5510	Yes
3017	6.3	350	17	5502	Yes
3018	7.1	464	18	5506	Yes
3019	9.6	359	16	5496	Yes
3020	8.8	485	17	5506	Yes
3021	9.6	393	17	5492	Yes
3022	8.9	281	18	5491	Yes
3023	9.9	335	18	5505	Yes
3024	9.5	369	17	5511	Yes
3025	8.8	436	18	5505	Yes
3026	8.5	483	16	5505	Yes
3027	8	445	18	5498	Yes
3028	6.1	254	18	5503	Yes
3029	9.9	479	17	5499	Yes
3030	6.2	434	16	5497	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	11.3	421	16	5491	Yes
4002	12.8	389	16	5510	Yes
4003	17.9	271	14	5508	Yes
4004	19.8	385	14	5504	Yes
4005	12	279	15	5509	Yes
4006	14.4	406	13	5507	No
4007	16.1	314	12	5506	Yes
4008	14.7	453	15	5507	Yes
4009	16.9	389	14	5507	Yes
4010	15.9	290	12	5508	Yes
4011	14.3	356	15	5497	Yes
4012	13.8	404	16	5500	Yes
4013	12.7	365	13	5512	Yes
4014	17.5	425	15	5506	Yes
4015	16.8	399	13	5505	Yes
4016	17.8	354	12	5512	Yes
4017	17.5	475	12	5507	Yes
4018	19	442	14	5504	Yes
4019	15	442	13	5508	Yes
4020	16.9	305	12	5512	Yes
4021	18.2	451	14	5503	Yes
4022	11.5	327	16	5499	Yes
4023	13.2	485	16	5492	Yes
4024	11.8	256	13	5496	Yes
4025	14	309	13	5493	Yes
4026	13	462	16	5503	Yes
4027	11.4	410	13	5504	Yes
4028	20	324	14	5497	Yes
4029	18.9	286	12	5504	Yes
4030	14.6	346	13	5507	No

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	Yes
12	5499	Yes
13	5499	Yes
14	5499	Yes
15	5499	Yes
16	5499	Yes
17	5499	Yes
18	5499	Yes
19	5499	Yes
20	5499	Yes
21	5501	Yes
22	5501	Yes
23	5501	Yes
24	5501	Yes
25	5504	Yes
26	5501	Yes
27	5504	Yes
28	5501	Yes
29	5504	Yes
30	5501	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	714	5490	8	Yes
2	1189	5491	5	Yes
3	1664	5492	5	Yes
4	2139	5493	3	Yes
5	3089	5494	8	Yes
6	3564	5495	6	Yes
7	4039	5496	4	Yes
8	4514	5497	5	Yes
9	4989	5498	7	Yes
10	5464	5499	3	Yes
11	5939	5500	9	Yes
12	6414	5501	1	Yes
13	6889	5502	3	Yes
14	7364	5503	5	Yes
15	7839	5504	4	Yes
16	8314	5505	5	Yes
17	8789	5506	5	Yes
18	9264	5507	1	Yes
19	9739	5508	3	Yes
20	10214	5509	5	No

TYPE 6 DETECTION PROBABILITY (CONTINUED)

21	10689	5510	3	Yes
22	11164	5511	5	Yes
23	11639	5512	2	Yes
24	12114	5490	4	Yes
25	12589	5491	2	Yes
26	13064	5492	3	Yes
27	13539	5493	7	Yes
28	14014	5494	2	Yes
29	14489	5495	4	Yes
30	14964	5496	6	Yes
31	15439	5497	3	Yes
32	15914	5498	5	Yes
33	16389	5499	6	Yes
34	16864	5500	3	Yes
35	17339	5501	4	Yes
36	17814	5502	5	Yes
37	18289	5503	5	Yes
38	18764	5504	4	Yes
39	19239	5505	3	Yes
40	19714	5506	5	Yes
41	20189	5507	4	Yes
42	20664	5508	3	Yes
43	21139	5509	4	Yes
44	21614	5510	7	Yes
45	22089	5511	6	Yes
46	22564	5512	3	Yes

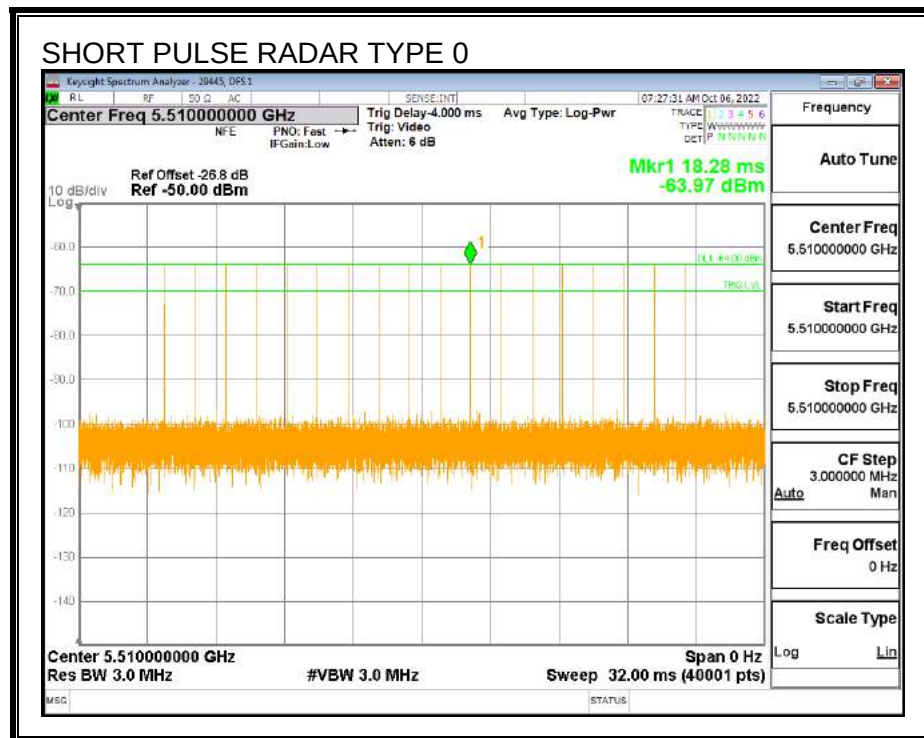
8.2. RESULTS FOR 40 MHz BANDWIDTH

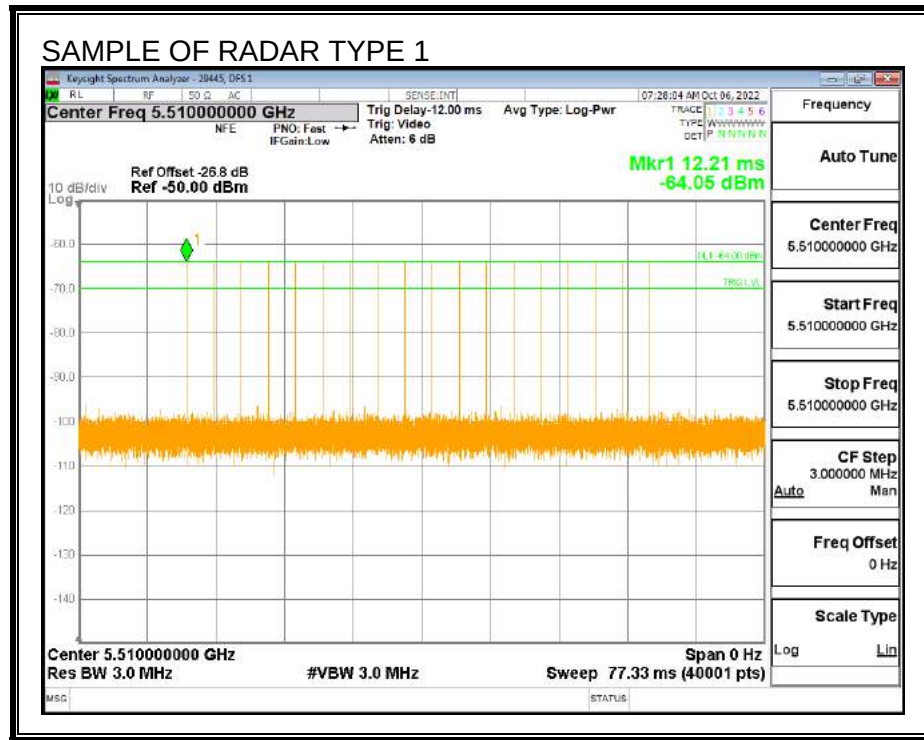
8.2.1. TEST CHANNEL

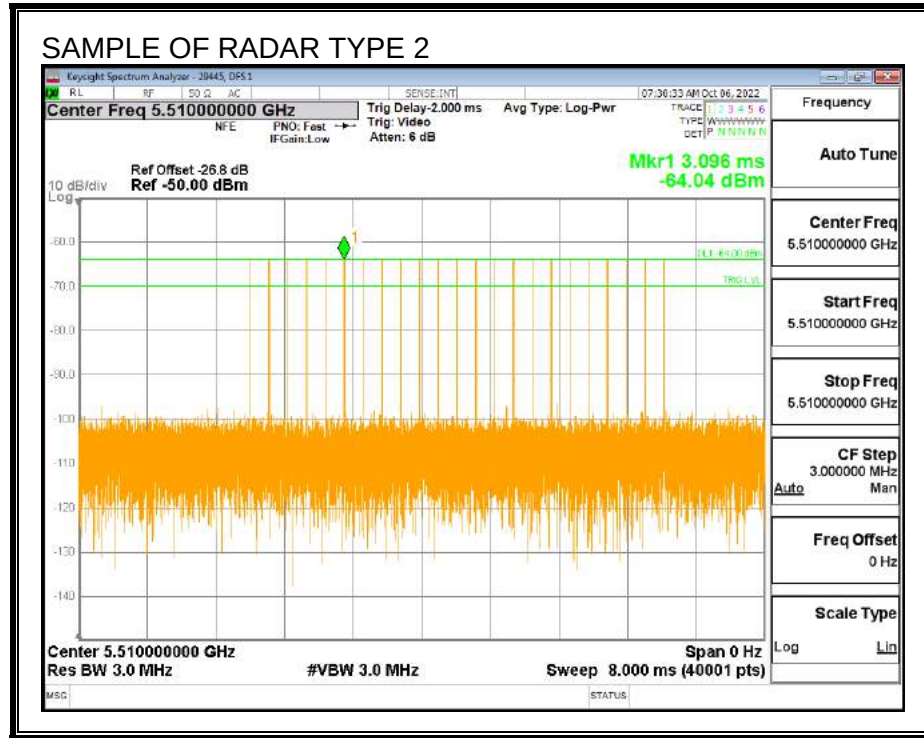
All tests were performed at a channel center frequency of 5510 MHz.

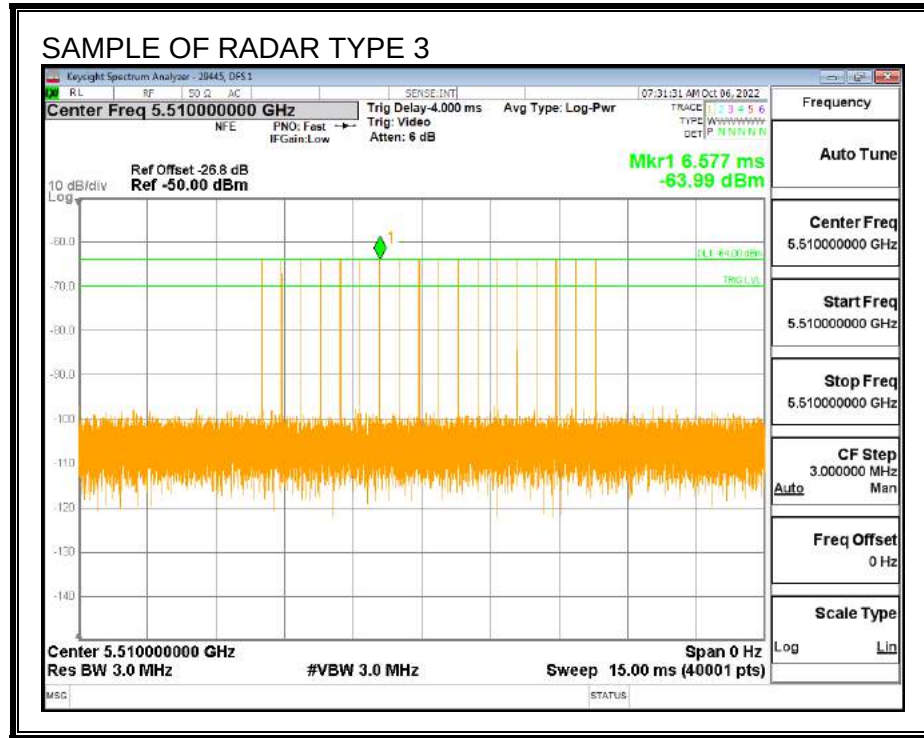
8.2.2. RADAR WAVEFORMS AND TRAFFIC

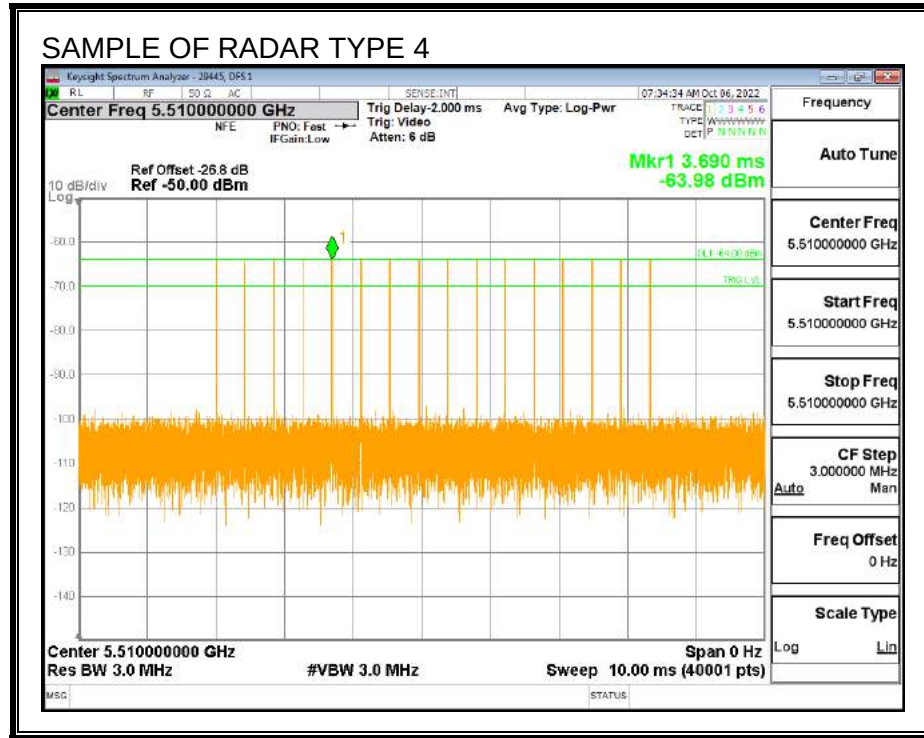
RADAR WAVEFORMS

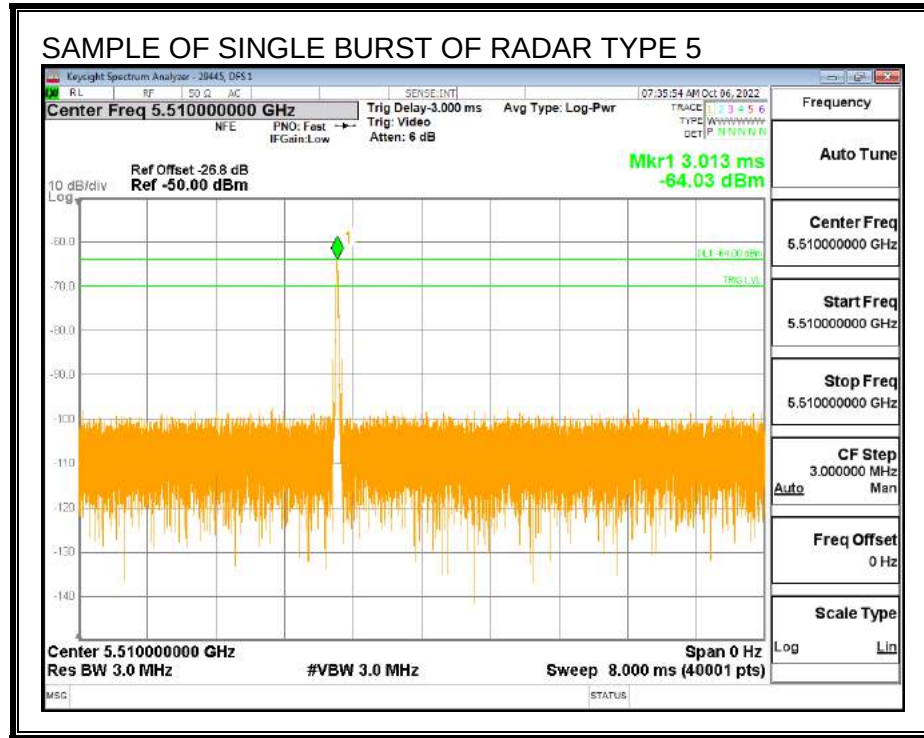


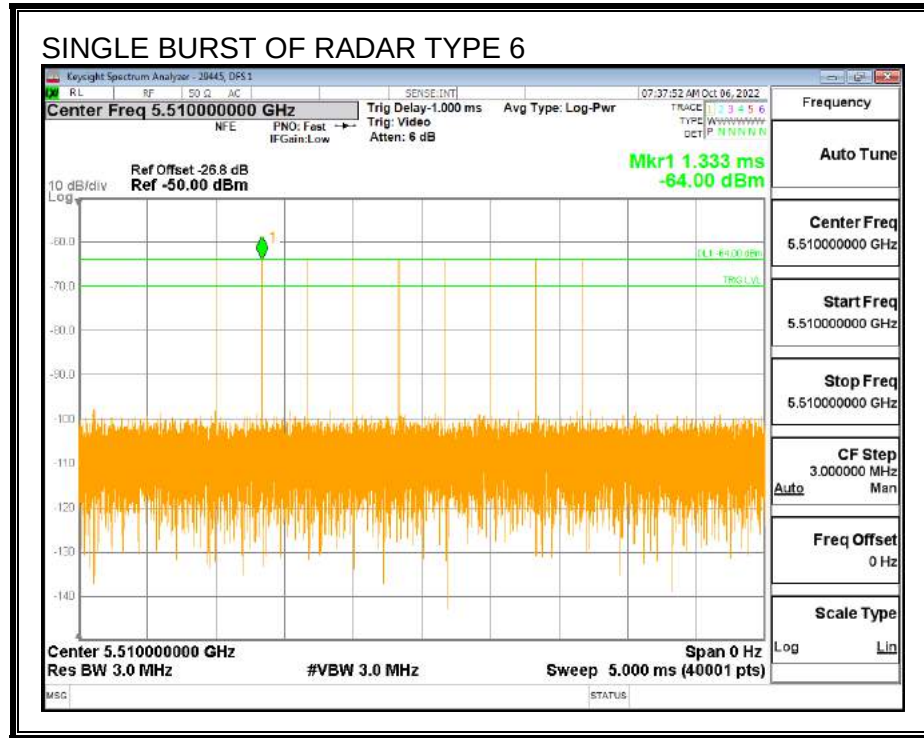




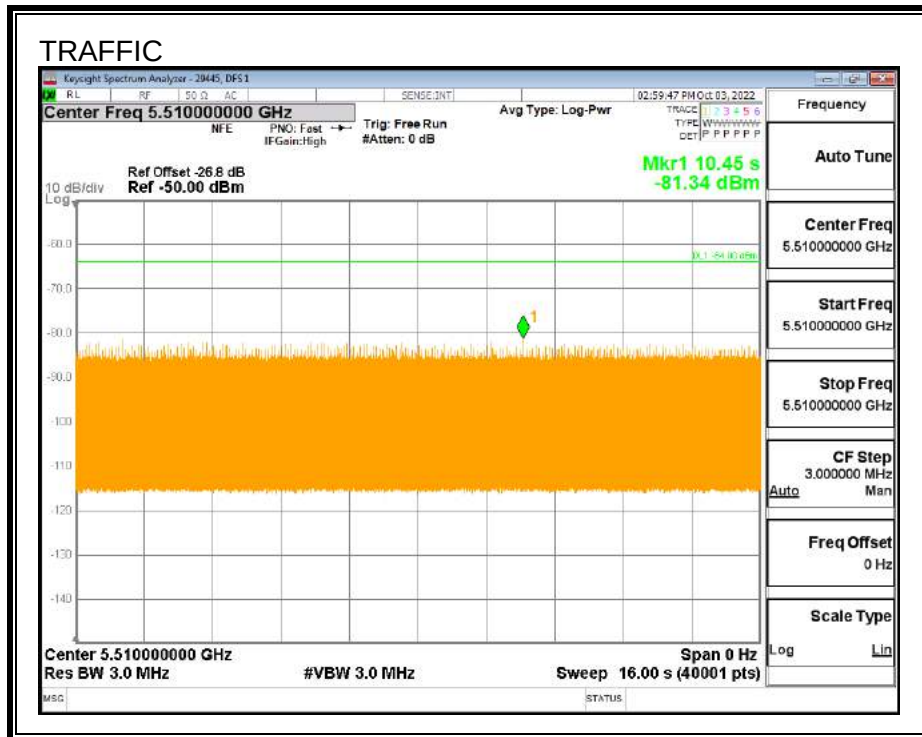




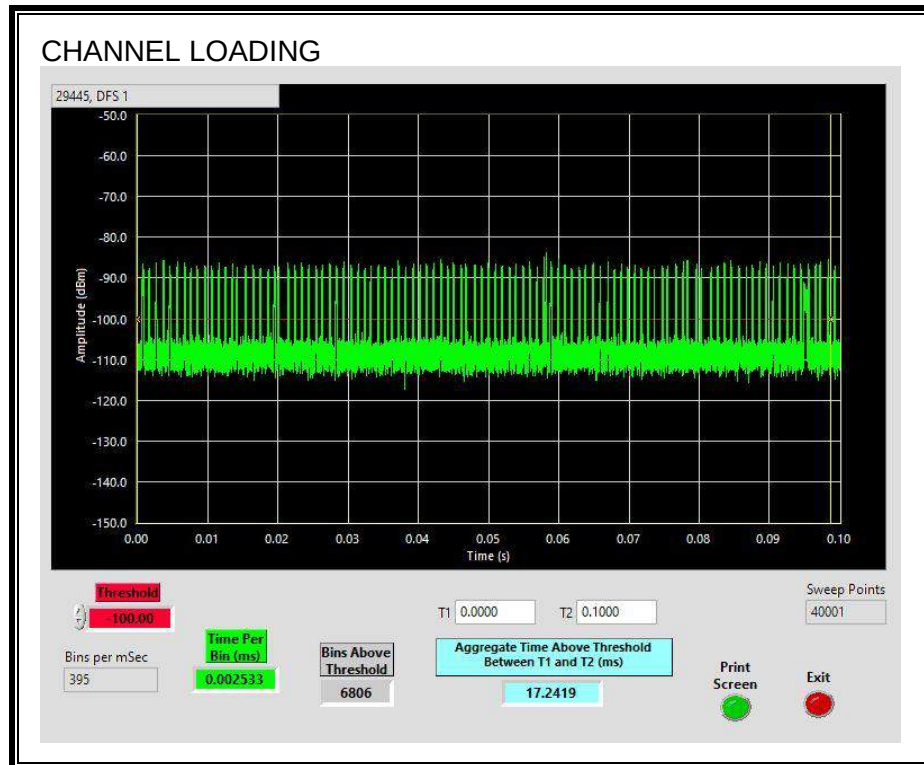




TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 17.24%

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)
30.28	152.6	122.3	62.3

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)
30.15	93.29	63.1	0.8

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)
30.49	152.1	121.6	59.3

QUALITATIVE RESULTS

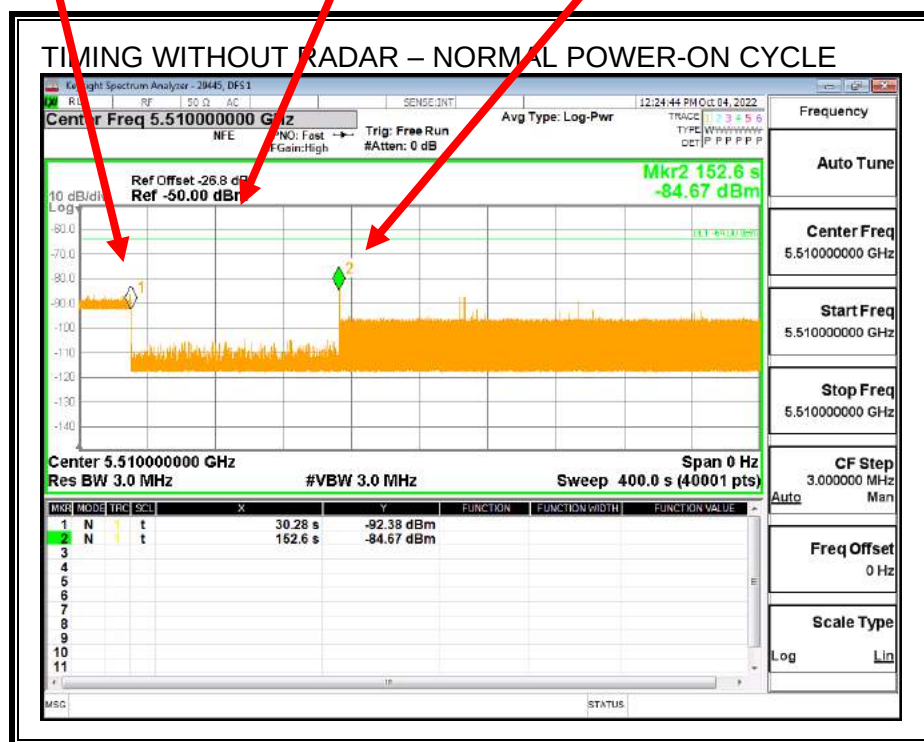
Timing of Radar Burst	Display on Control Computer	Spectrum Analyzer Display
No Radar Triggered	EUT marks Channel as active	Transmissions begin on channel after completion of the initial power-up cycle and the CAC
Within 0 to 6 second window	EUT indicates radar detected	No transmissions on channel
Within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



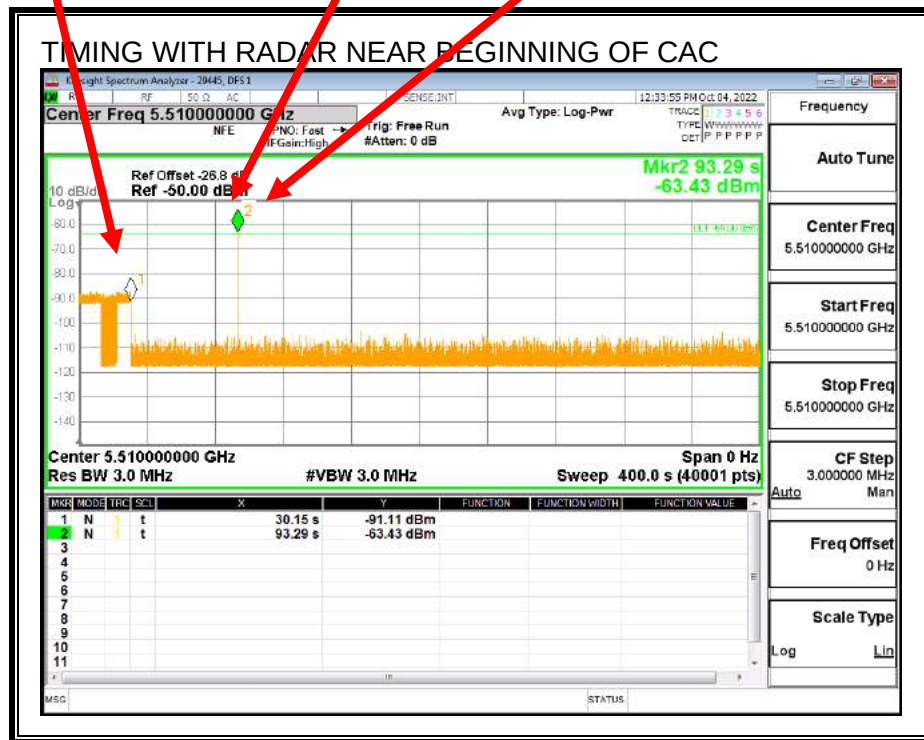
Transmissions begin on channel after completion of the initial power-up cycle and the CAC.

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



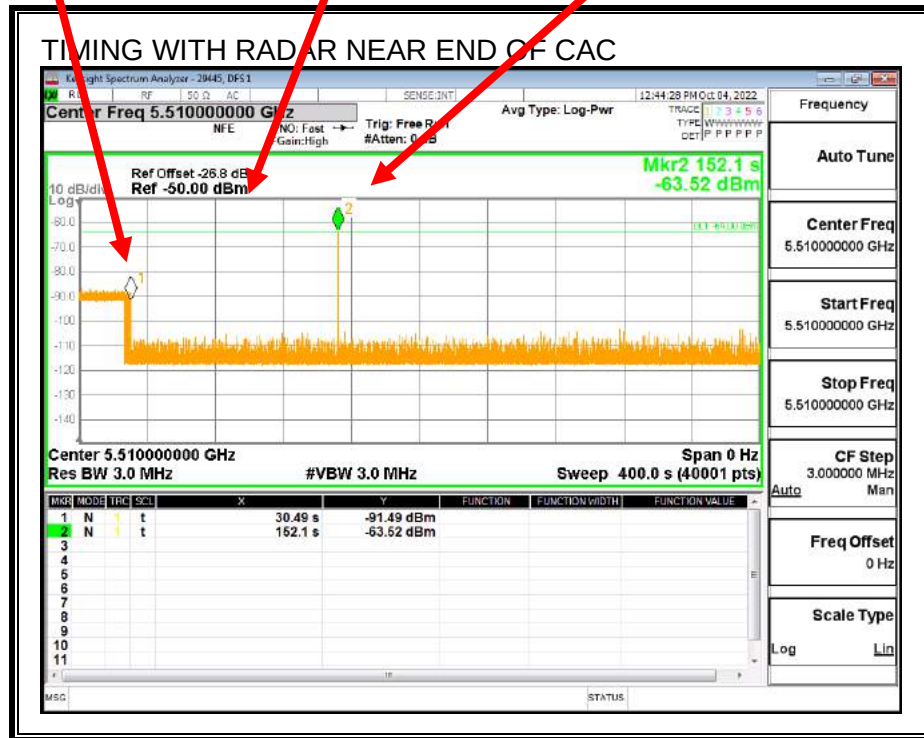
No EUT transmissions were observed after the radar signal.

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)

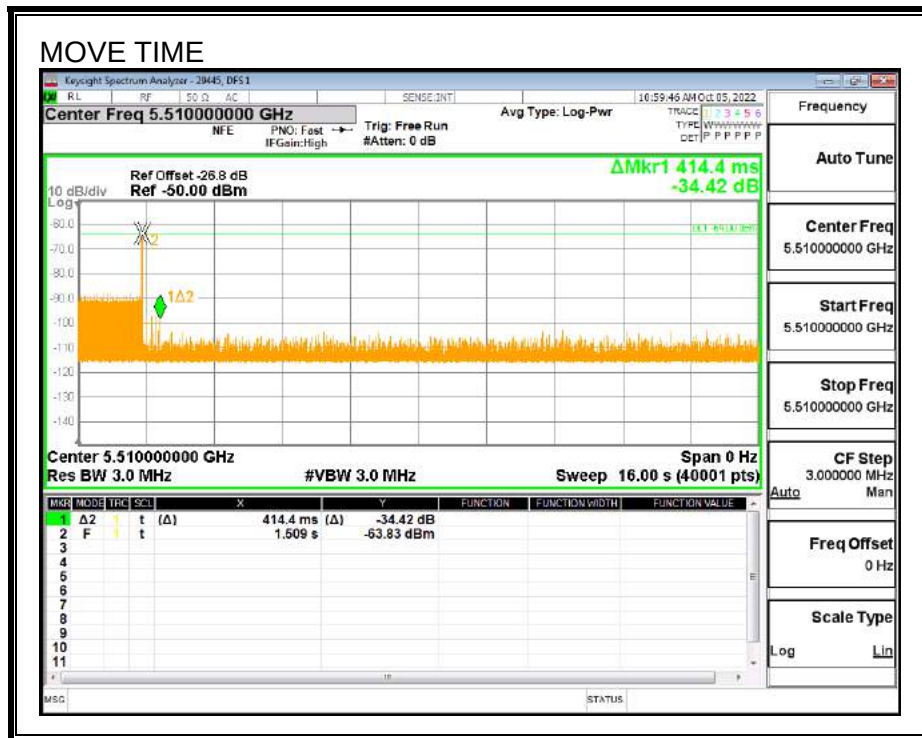
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

Channel Move Time (sec)	Limit (sec)
0.4144	10

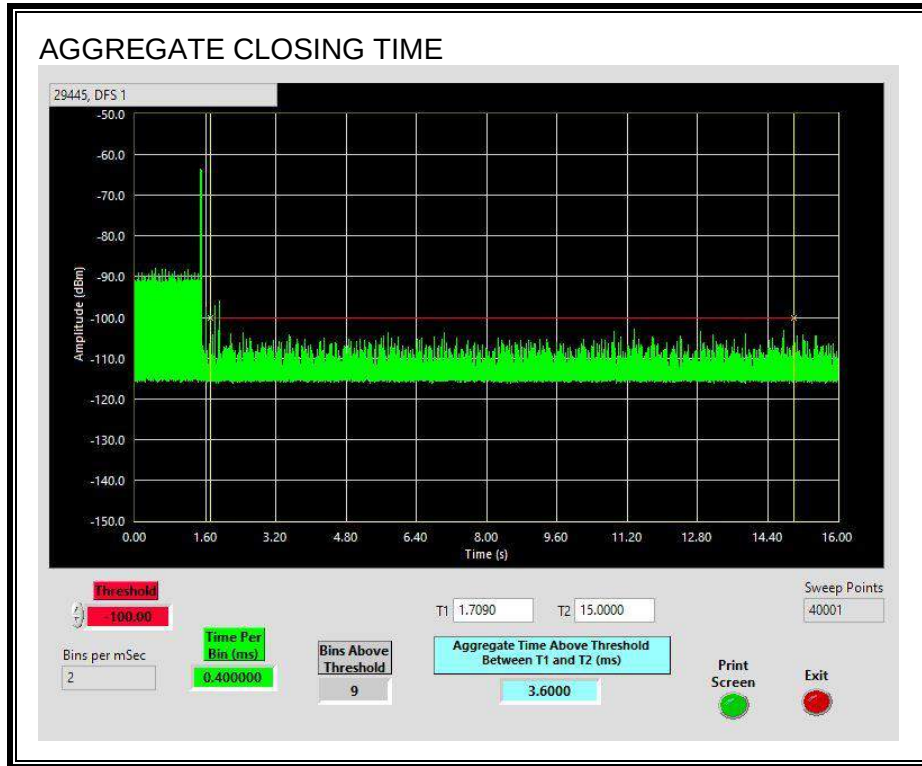
Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
3.6	60

MOVE TIME



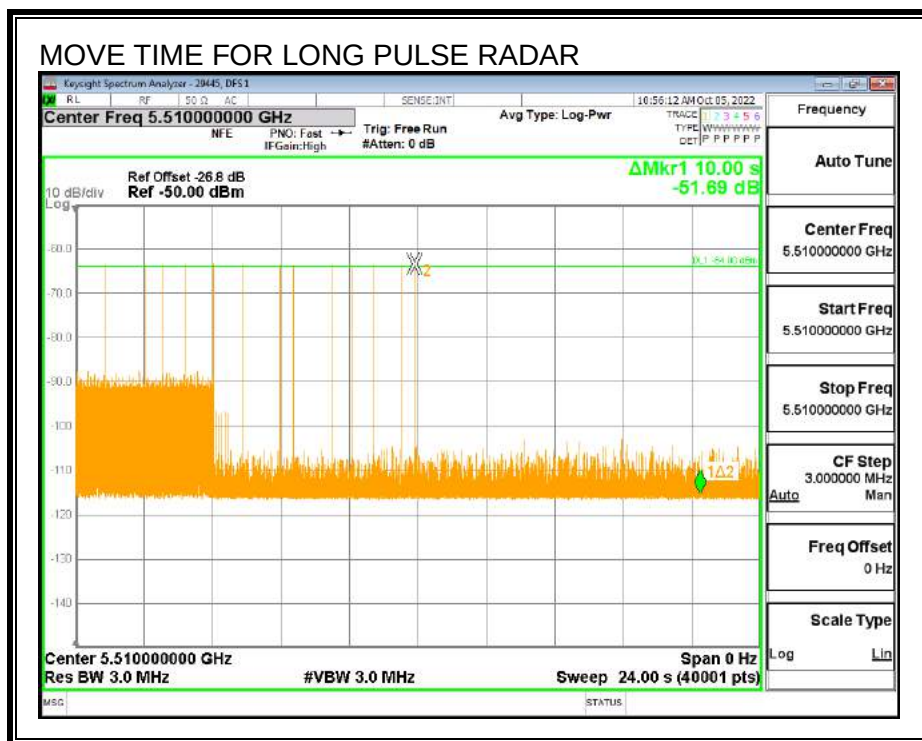
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the aggregate monitoring period.



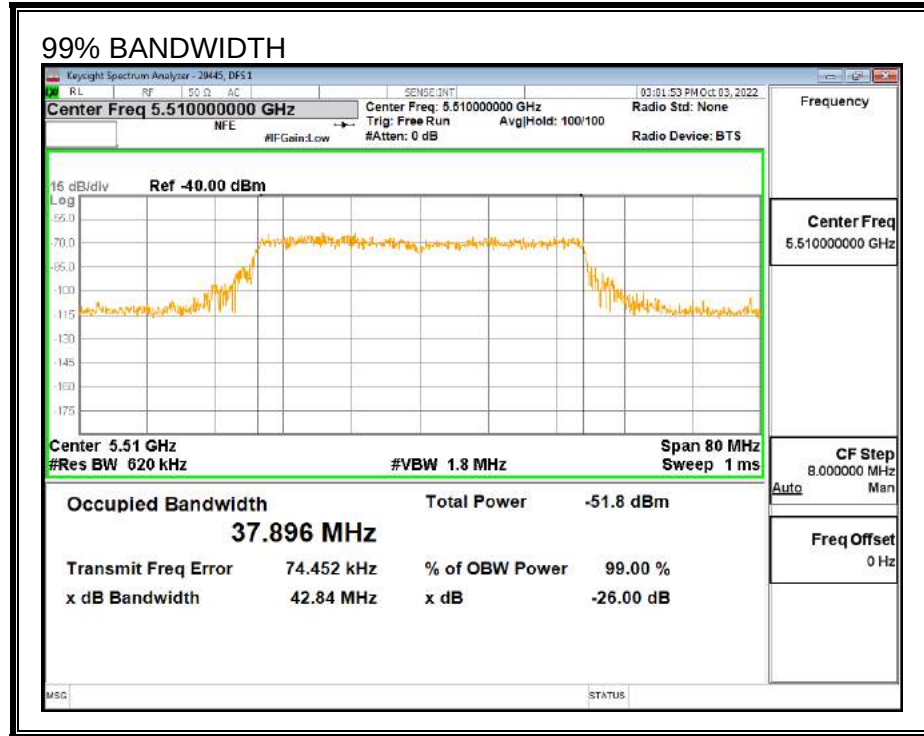
LONG PULSE CHANNEL MOVE TIME

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



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	5534	44	37.896	116.1	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
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	
5531	10	10	100	
5532	10	9	90	
5533	10	10	100	
5534	10	10	100	FH

8.2.7. IN-SERVICE MONITORING

RESULTS

FCC Radar Test Summary										
Signal Type	Number of Trials	Detection (%)	Limit (%)	Pass/Fail	Detection Bandwidth		OBW	Test Location	Employee Number	In-Service Monitoring Version
					FL	FH				
FCC Short Pulse Type 1	30	96.67	60	Pass	5490	5534	37.9	DFS 1	29445	v4.1
FCC Short Pulse Type 2	30	96.67	60	Pass	5490	5534	37.9	DFS 1	29445	v4.1
FCC Short Pulse Type 3	30	100.00	60	Pass	5490	5534	37.9	DFS 1	29445	v4.1
FCC Short Pulse Type 4	30	100.00	60	Pass	5490	5534	37.9	DFS 1	29445	v4.1
Aggregate		98.33	80	Pass						
FCC Long Pulse Type 5	30	100.00	80	Pass	5490	5534	37.9	DFS 1	29445	v4.1
FCC Hopping Type 6	45	100.00	70	Pass	5490	5534		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	5513	Yes
1002	1	578	92	A	5491	Yes
1003	1	538	99	A	5521	Yes
1004	1	518	102	A	5495	Yes
1005	1	798	67	A	5524	Yes
1006	1	598	89	A	5513	Yes
1007	1	878	61	A	5503	Yes
1008	1	698	76	A	5511	Yes
1009	1	658	81	A	5497	Yes
1010	1	918	58	A	5495	Yes
1011	1	898	59	A	5495	Yes
1012	1	818	65	A	5515	Yes
1013	1	558	95	A	5516	Yes
1014	1	778	68	A	5517	Yes
1015	1	618	86	A	5491	Yes
1016	1	1140	47	B	5516	Yes
1017	1	2838	19	B	5519	Yes
1018	1	1793	30	B	5496	Yes
1019	1	2426	22	B	5528	Yes
1020	1	1511	35	B	5513	No
1021	1	2273	24	B	5517	Yes
1022	1	1487	36	B	5532	Yes
1023	1	1184	45	B	5514	Yes
1024	1	1881	29	B	5498	Yes
1025	1	1708	31	B	5504	Yes
1026	1	2534	21	B	5506	Yes
1027	1	2490	22	B	5516	Yes
1028	1	2252	24	B	5522	Yes
1029	1	2338	23	B	5492	Yes
1030	1	2229	24	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	4.4	219	23	5511	Yes
2002	3.6	178	29	5509	Yes
2003	2.2	192	29	5515	Yes
2004	1.5	156	25	5492	Yes
2005	2.5	173	28	5495	Yes
2006	4.3	222	26	5524	Yes
2007	1.4	206	29	5524	Yes
2008	3.3	221	27	5532	Yes
2009	2.8	208	23	5533	Yes
2010	5	228	25	5521	Yes
2011	4.7	219	26	5521	Yes
2012	2.9	205	28	5512	Yes
2013	5	201	29	5522	Yes
2014	1.6	190	28	5513	Yes
2015	3.9	152	23	5525	Yes
2016	4.7	227	29	5510	No
2017	3.1	155	28	5514	Yes
2018	2.3	153	27	5530	Yes
2019	5	166	26	5525	Yes
2020	4.3	211	23	5521	Yes
2021	3.4	228	26	5509	Yes
2022	3	158	23	5514	Yes
2023	4.2	180	27	5521	Yes
2024	2	195	24	5502	Yes
2025	1.5	183	28	5501	Yes
2026	3.7	202	26	5522	Yes
2027	3.4	194	24	5491	Yes
2028	1.6	179	25	5530	Yes
2029	3.7	175	27	5493	Yes
2030	4.4	165	26	5510	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	7.6	429	18	5520	Yes
3002	8.4	410	17	5519	Yes
3003	6.8	438	17	5527	Yes
3004	6	432	18	5524	Yes
3005	6.8	472	18	5528	Yes
3006	8	361	18	5524	Yes
3007	7.1	414	16	5516	Yes
3008	6.7	449	18	5511	Yes
3009	7.9	264	16	5522	Yes
3010	9.8	311	18	5497	Yes
3011	9.3	273	16	5520	Yes
3012	7.4	333	16	5523	Yes
3013	7.1	307	18	5500	Yes
3014	9.4	262	17	5515	Yes
3015	7.4	500	16	5495	Yes
3016	8.1	468	16	5492	Yes
3017	6.3	350	17	5532	Yes
3018	7.1	464	18	5517	Yes
3019	9.6	359	16	5520	Yes
3020	8.8	485	17	5492	Yes
3021	9.6	393	17	5522	Yes
3022	8.9	281	18	5520	Yes
3023	9.9	335	18	5506	Yes
3024	9.5	369	17	5493	Yes
3025	8.8	436	18	5495	Yes
3026	8.5	483	16	5532	Yes
3027	8	445	18	5500	Yes
3028	6.1	254	18	5532	Yes
3029	9.9	479	17	5533	Yes
3030	6.2	434	16	5513	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	11.3	421	16	5497	Yes
4002	12.8	389	16	5514	Yes
4003	17.9	271	14	5513	Yes
4004	19.8	385	14	5509	Yes
4005	12	279	15	5530	Yes
4006	14.4	406	13	5508	Yes
4007	16.1	314	12	5525	Yes
4008	14.7	453	15	5515	Yes
4009	16.9	389	14	5518	Yes
4010	15.9	290	12	5515	Yes
4011	14.3	356	15	5526	Yes
4012	13.8	404	16	5510	Yes
4013	12.7	365	13	5523	Yes
4014	17.5	425	15	5517	Yes
4015	16.8	399	13	5502	Yes
4016	17.8	354	12	5519	Yes
4017	17.5	475	12	5505	Yes
4018	19	442	14	5491	Yes
4019	15	442	13	5504	Yes
4020	16.9	305	12	5516	Yes
4021	18.2	451	14	5506	Yes
4022	11.5	327	16	5510	Yes
4023	13.2	485	16	5507	Yes
4024	11.8	256	13	5505	Yes
4025	14	309	13	5531	Yes
4026	13	462	16	5502	Yes
4027	11.4	410	13	5533	Yes
4028	20	324	14	5510	Yes
4029	18.9	286	12	5507	Yes
4030	14.6	346	13	5505	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	5498	Yes
12	5498	Yes
13	5498	Yes
14	5498	Yes
15	5498	Yes
16	5498	Yes
17	5498	Yes
18	5498	Yes
19	5498	Yes
20	5498	Yes
21	5522	Yes
22	5522	Yes
23	5522	Yes
24	5522	Yes
25	5525	Yes
26	5522	Yes
27	5525	Yes
28	5522	Yes
29	5525	Yes
30	5522	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	589	5490	7	Yes
2	1064	5491	13	Yes
3	1539	5492	7	Yes
4	2014	5493	9	Yes
5	2489	5494	8	Yes
6	2964	5495	11	Yes
7	3439	5496	9	Yes
8	3914	5497	9	Yes
9	4389	5498	6	Yes
10	4864	5499	10	Yes
11	5339	5500	11	Yes
12	5814	5501	8	Yes
13	6289	5502	10	Yes
14	6764	5503	7	Yes
15	7239	5504	8	Yes
16	7714	5505	8	Yes
17	8189	5506	8	Yes
18	8664	5507	11	Yes
19	9139	5508	7	Yes
20	9614	5509	15	Yes
21	10089	5510	11	Yes
22	10564	5511	8	Yes
23	11039	5512	8	Yes
24	11514	5513	10	Yes
25	11989	5514	11	Yes
26	12464	5515	13	Yes
27	12939	5516	9	Yes
28	13414	5517	18	Yes
29	13889	5518	16	Yes
30	14364	5519	4	Yes
31	14839	5520	12	Yes
32	15314	5521	8	Yes
33	15789	5522	10	Yes
34	16264	5523	6	Yes
35	16739	5524	4	Yes
36	17214	5525	8	Yes
37	17689	5526	8	Yes
38	18164	5527	8	Yes
39	18639	5528	16	Yes
40	19114	5529	10	Yes
41	19589	5530	11	Yes
42	20064	5531	4	Yes
43	20539	5532	15	Yes
44	21014	5533	14	Yes
45	21489	5534	5	Yes

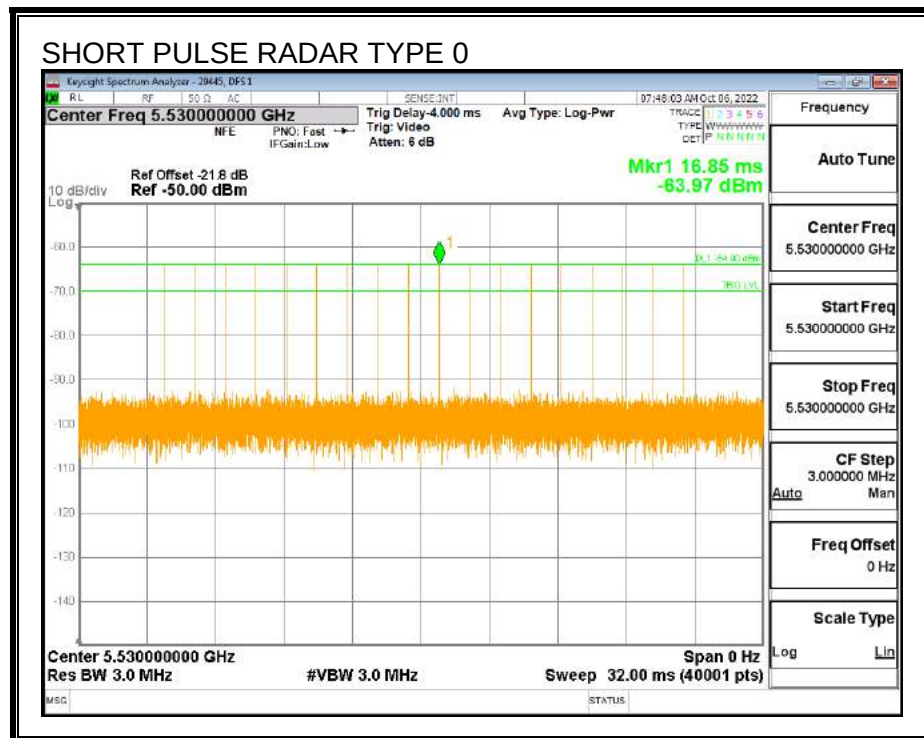
8.3. RESULTS FOR 80 MHz BANDWIDTH

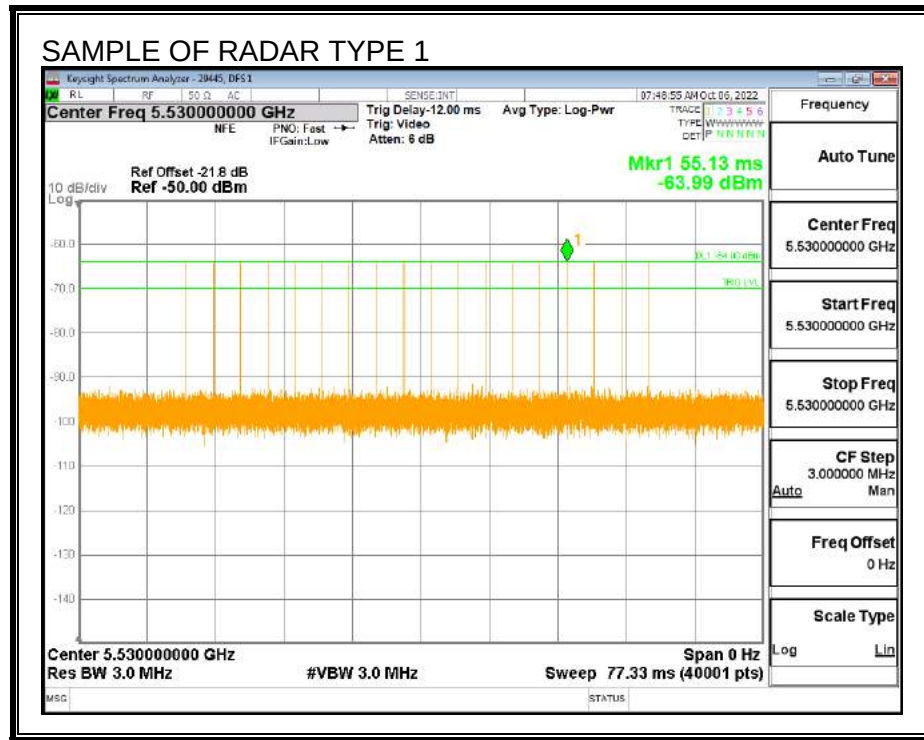
8.3.1. TEST CHANNEL

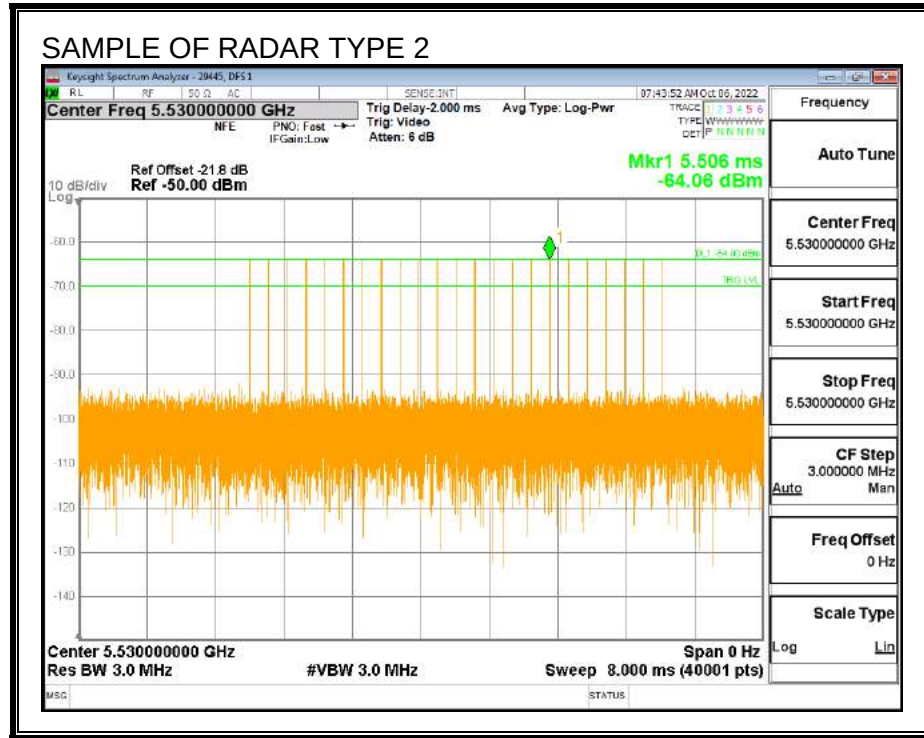
All tests were performed at a channel center frequency of 5530 MHz.

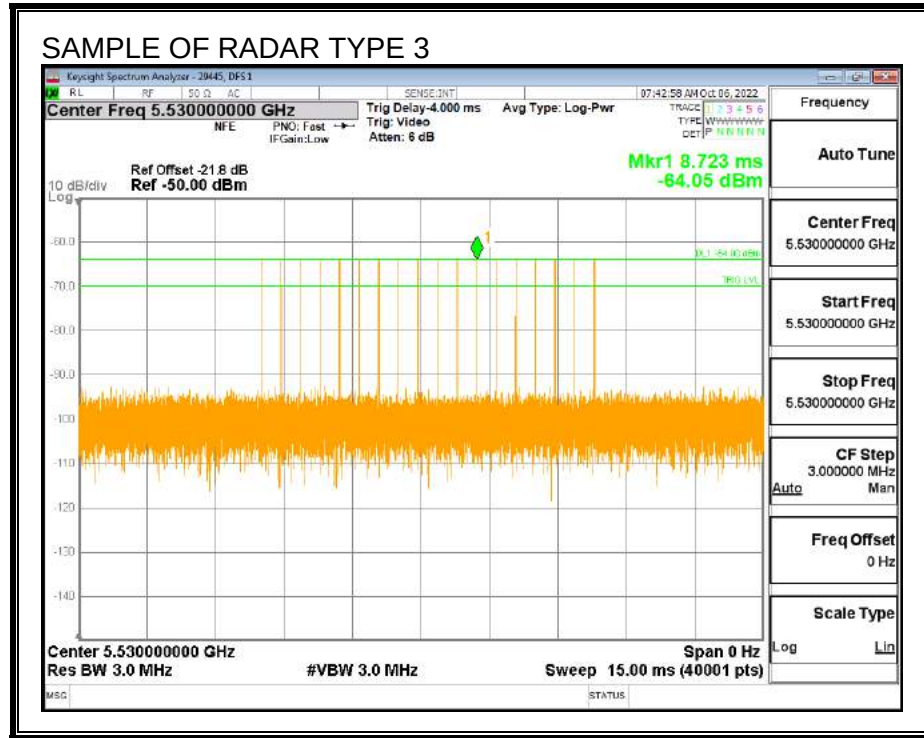
8.3.2. RADAR WAVEFORMS AND TRAFFIC

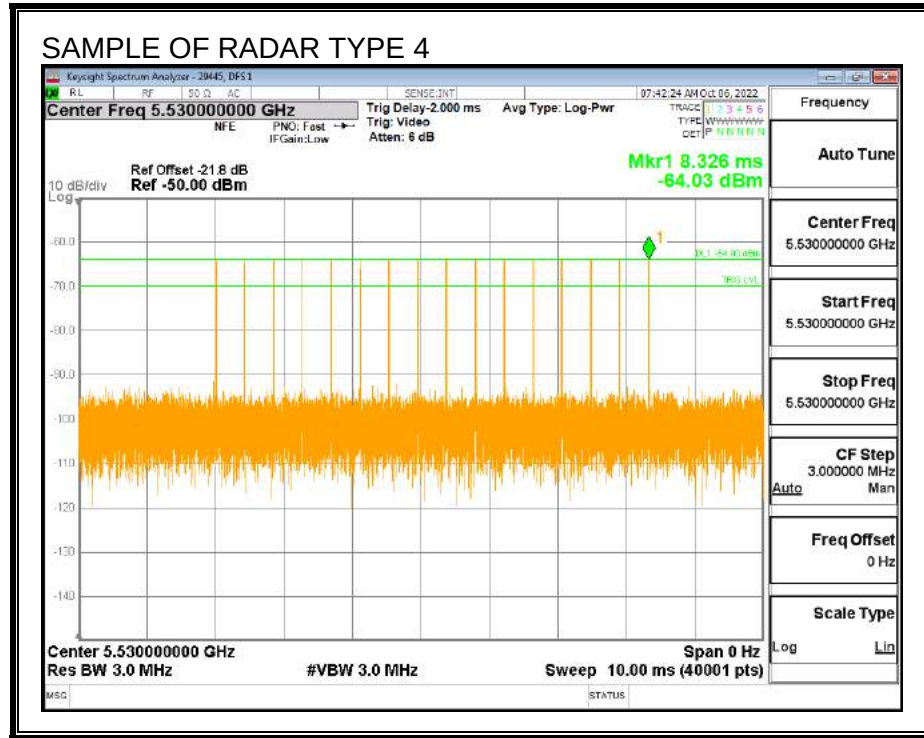
RADAR WAVEFORMS

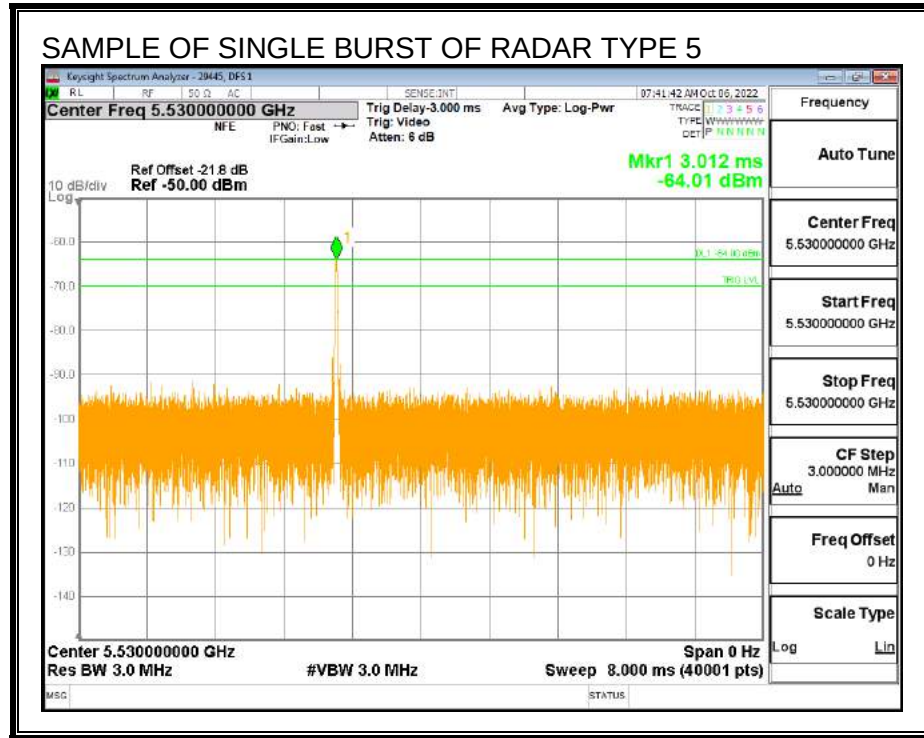


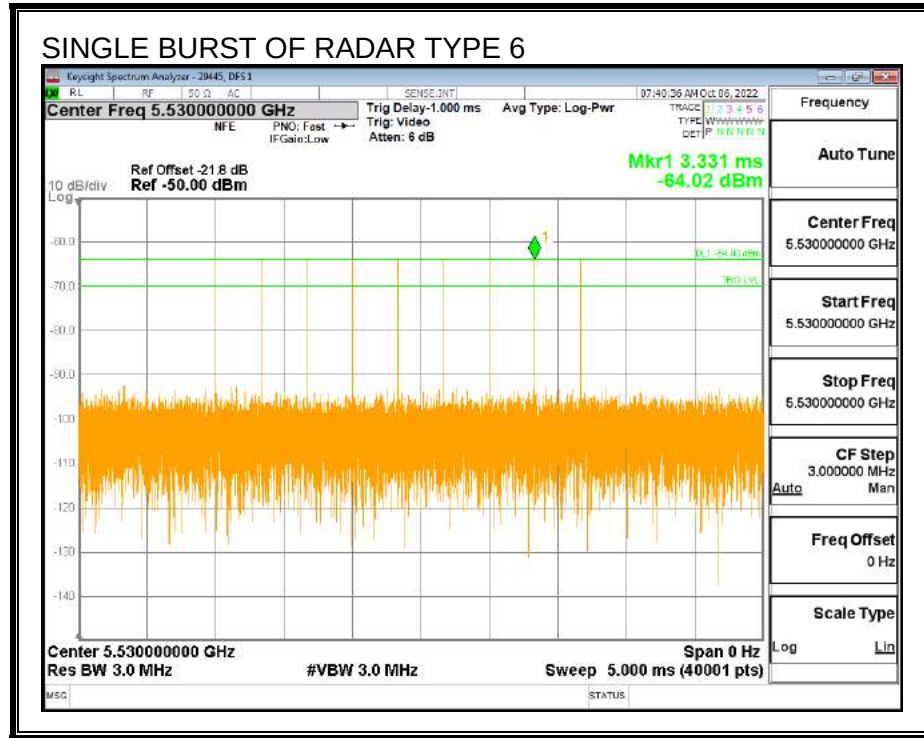




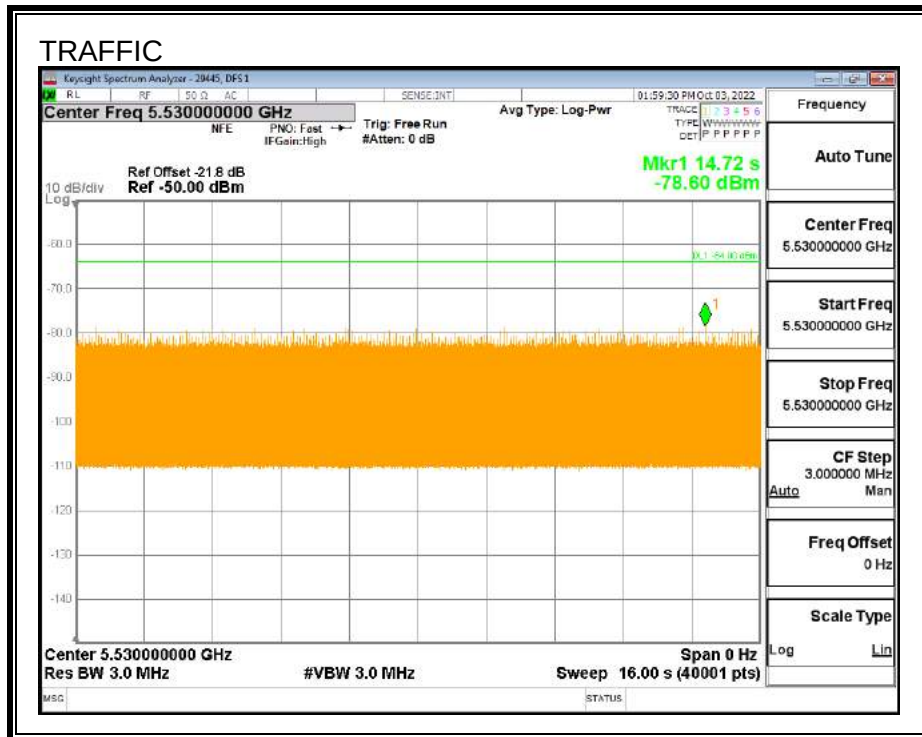




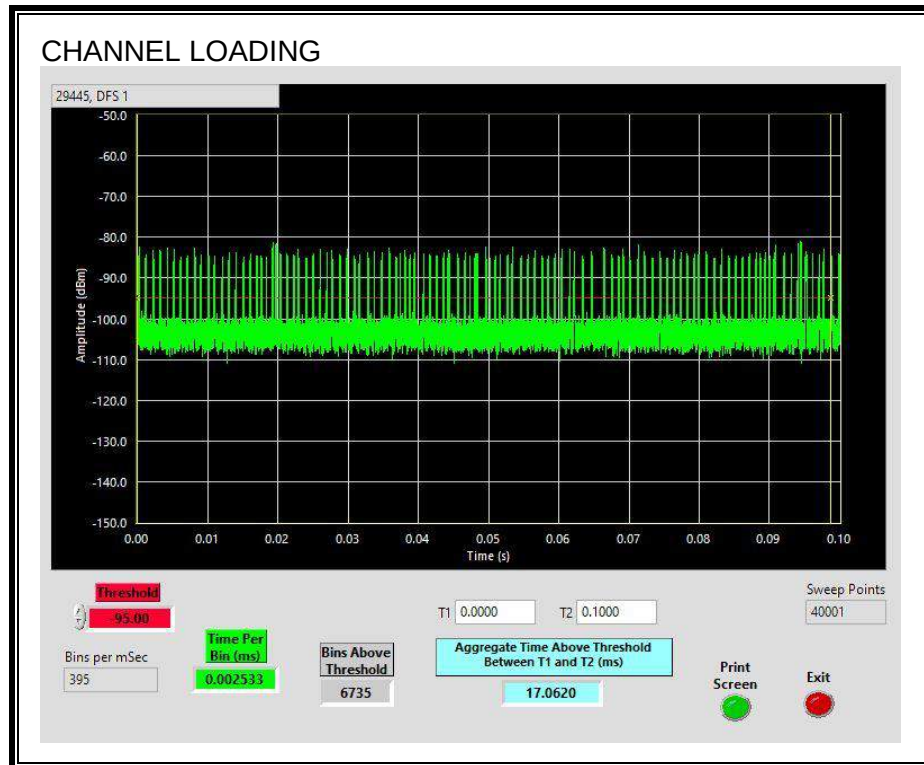




TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 17.062%

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)
30.16	152	121.8	61.8

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)
30.41	93.86	63.5	1.6

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)
30.31	151.4	121.1	59.3

QUALITATIVE RESULTS

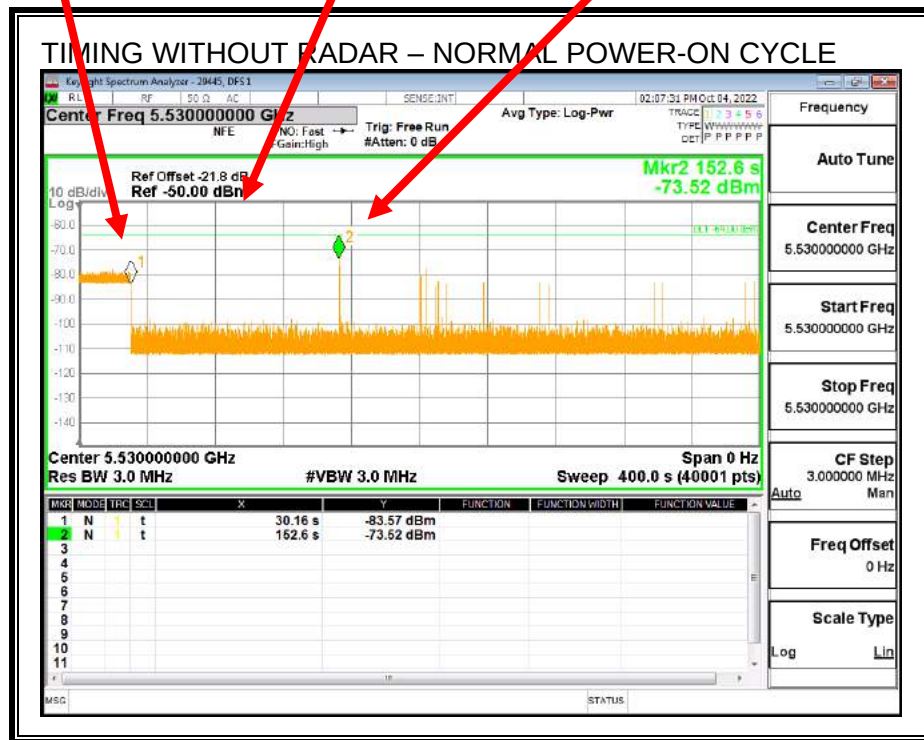
Timing of Radar Burst	Display on Control Computer	Spectrum Analyzer Display
No Radar Triggered	EUT marks Channel as active	Transmissions begin on channel after completion of the initial power-up cycle and the CAC
Within 0 to 6 second window	EUT indicates radar detected	No transmissions on channel
Within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



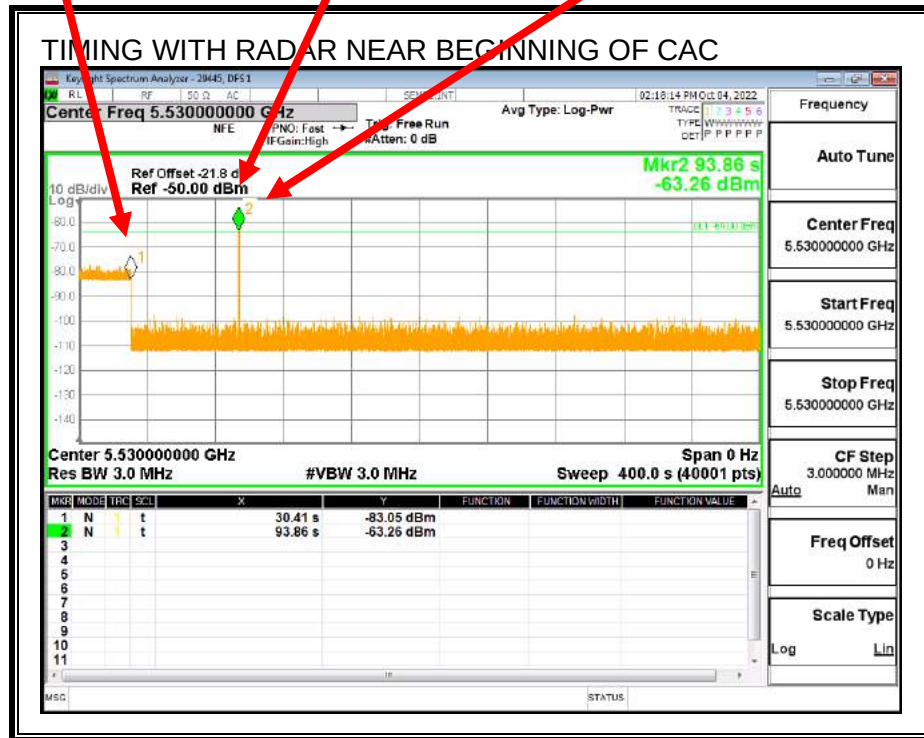
Transmissions begin on channel after completion of the initial power-up cycle and the CAC.

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



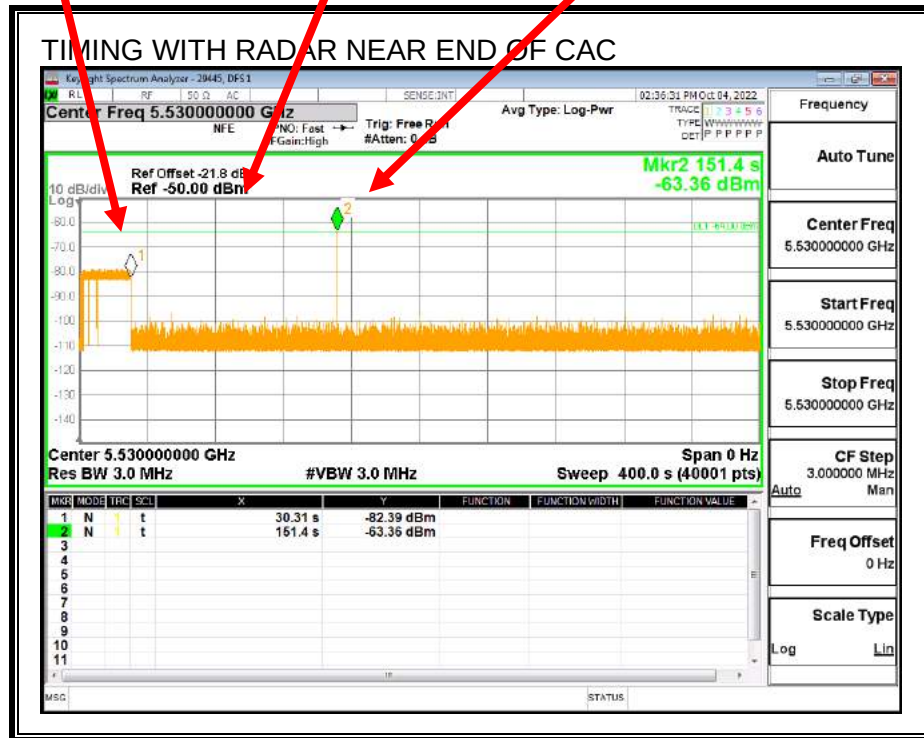
No EUT transmissions were observed after the radar signal.

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)

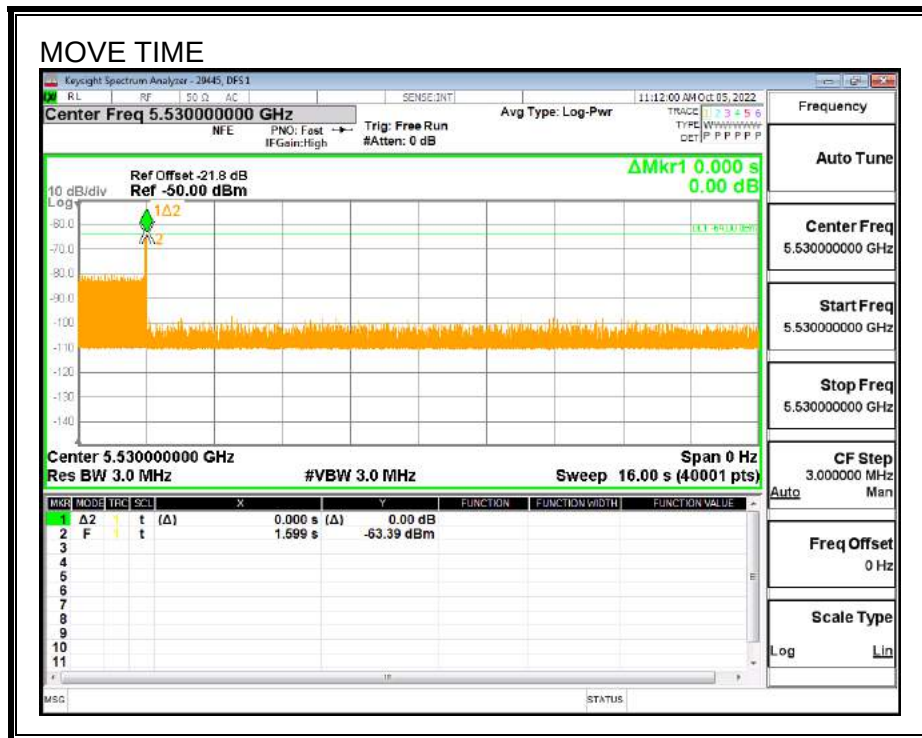
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

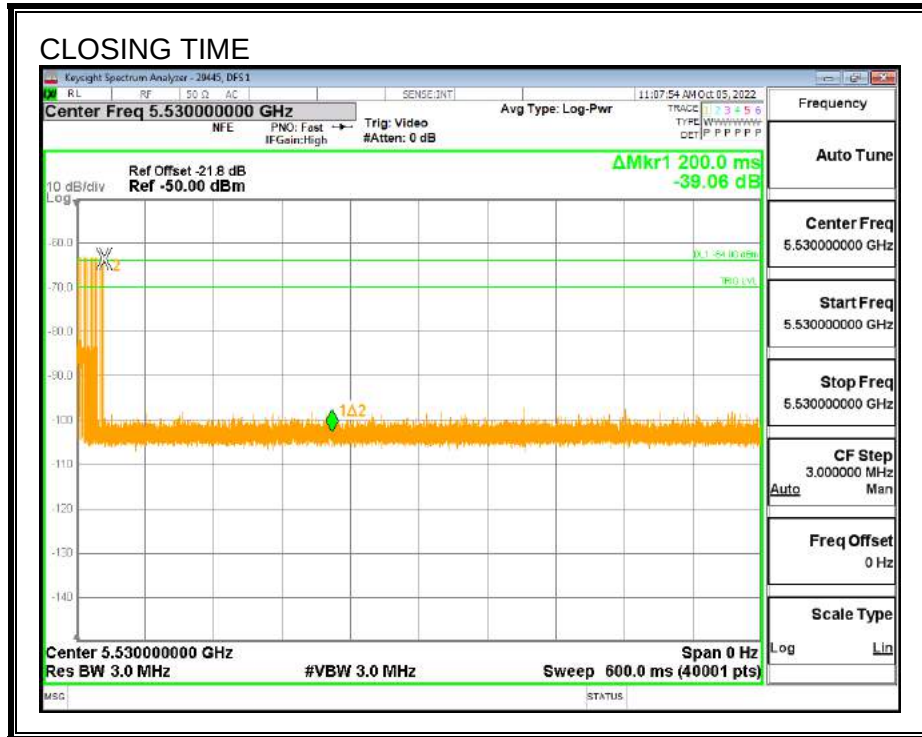
Channel Move Time (sec)	Limit (sec)
1.599	10

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

MOVE TIME

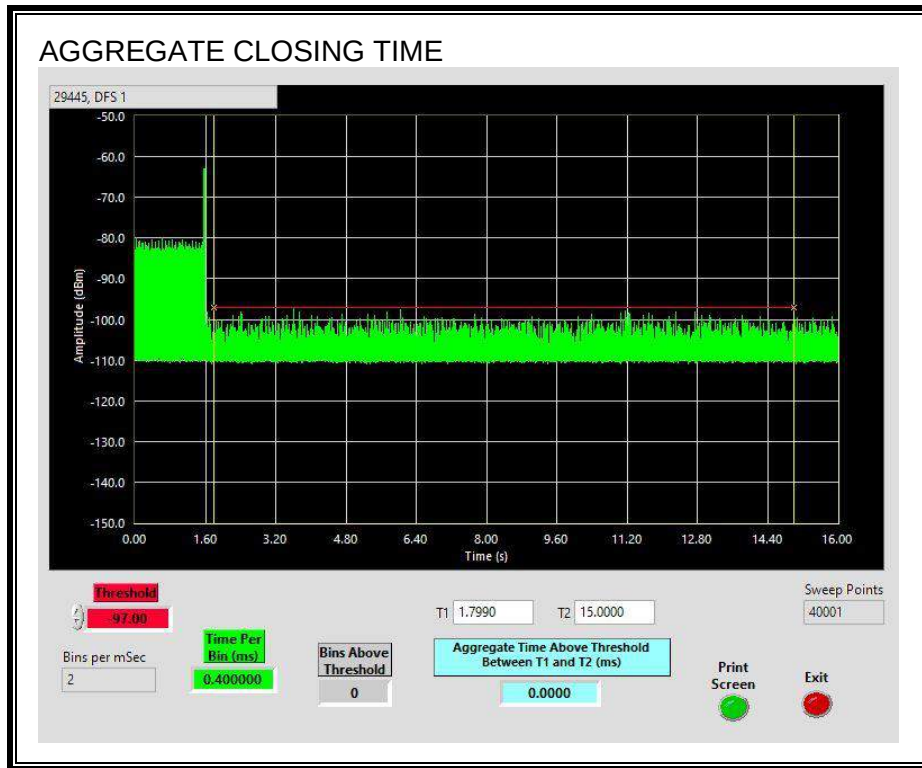


CHANNEL CLOSING TIME



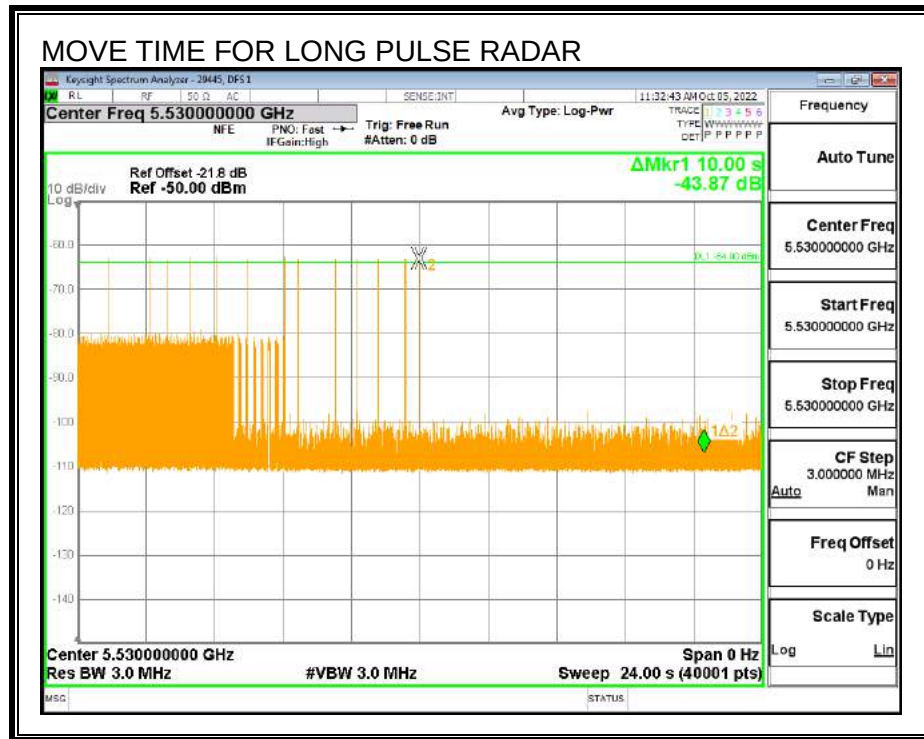
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.



LONG PULSE CHANNEL MOVE TIME

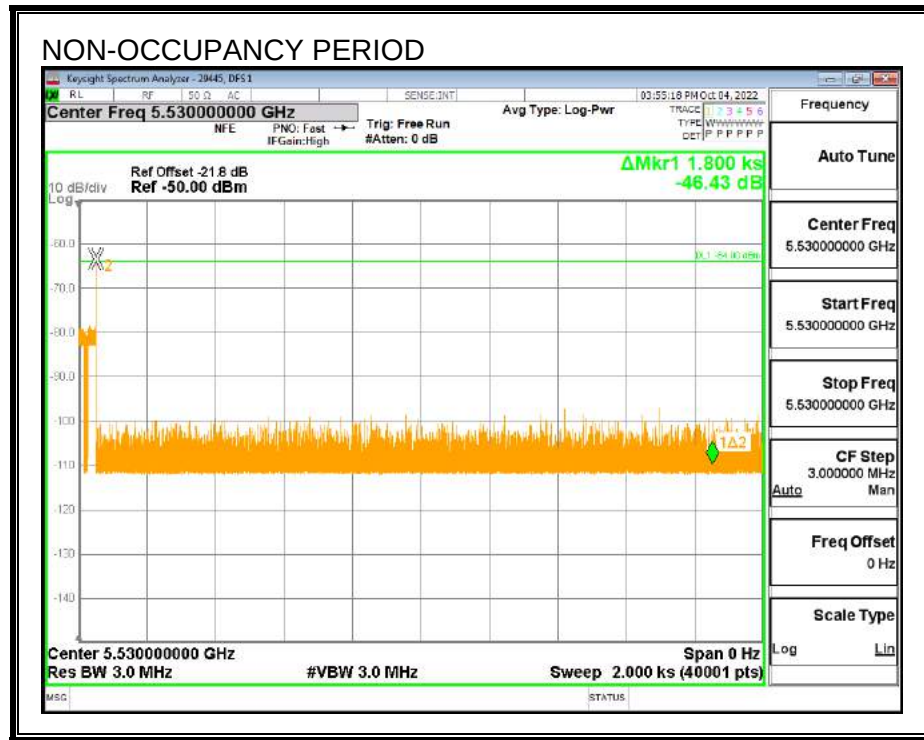
The traffic ceases prior to 10 seconds after the end of the radar waveform.



8.3.6. NON-OCCUPANCY PERIOD

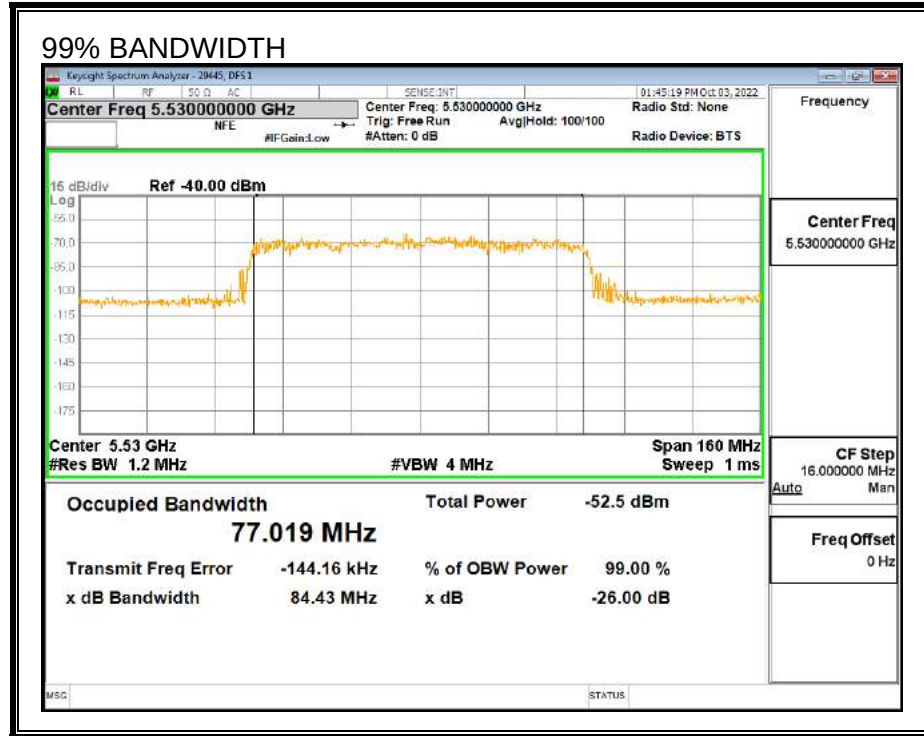
RESULTS

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



8.3.7. 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	5574	84	77.019	109.1	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
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	
5571	10	10	100	
5572	10	10	100	
5573	10	10	100	
5574	10	10	100	FH

8.3.8. IN-SERVICE MONITORING

RESULTS

FCC Radar Test Summary										
Signal Type	Number of Trials	Detection (%)	Limit (%)	Pass/Fail	Detection Bandwidth		OBW	Test Location	Employee Number	In-Service Monitoring Version
					FL	FH				
FCC Short Pulse Type 1	30	96.67	60	Pass	5490	5574	77.02	DFS 1	29445	v4.1
FCC Short Pulse Type 2	30	96.67	60	Pass	5490	5574	77.02	DFS 1	29445	v4.1
FCC Short Pulse Type 3	30	100.00	60	Pass	5490	5574	77.02	DFS 1	29445	v4.1
FCC Short Pulse Type 4	30	86.67	60	Pass	5490	5574	77.02	DFS 1	29445	v4.1
Aggregate		95.00	80	Pass						
FCC Long Pulse Type 5	30	100.00	80	Pass	5490	5574	77.02	DFS 1	29445	v4.1
FCC Hopping Type 6	85	100.00	70	Pass	5490	5574		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	5541	No
1002	1	578	92	A	5524	Yes
1003	1	538	99	A	5523	Yes
1004	1	518	102	A	5546	Yes
1005	1	798	67	A	5557	Yes
1006	1	598	89	A	5520	Yes
1007	1	878	61	A	5524	Yes
1008	1	698	76	A	5526	Yes
1009	1	658	81	A	5505	Yes
1010	1	918	58	A	5500	Yes
1011	1	898	59	A	5505	Yes
1012	1	818	65	A	5548	Yes
1013	1	558	95	A	5558	Yes
1014	1	778	68	A	5529	Yes
1015	1	618	86	A	5507	Yes
1016	1	1140	47	B	5567	Yes
1017	1	2838	19	B	5538	Yes
1018	1	1793	30	B	5494	Yes
1019	1	2426	22	B	5551	Yes
1020	1	1511	35	B	5554	Yes
1021	1	2273	24	B	5508	Yes
1022	1	1487	36	B	5539	Yes
1023	1	1184	45	B	5517	Yes
1024	1	1881	29	B	5547	Yes
1025	1	1708	31	B	5559	Yes
1026	1	2534	21	B	5499	Yes
1027	1	2490	22	B	5497	Yes
1028	1	2252	24	B	5545	Yes
1029	1	2338	23	B	5531	Yes
1030	1	2229	24	B	5496	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	4.4	219	23	5526	Yes
2002	3.6	178	29	5533	Yes
2003	2.2	192	29	5524	Yes
2004	1.5	156	25	5502	Yes
2005	2.5	173	28	5504	Yes
2006	4.3	222	26	5529	Yes
2007	1.4	206	29	5555	Yes
2008	3.3	221	27	5526	No
2009	2.8	208	23	5498	Yes
2010	5	228	25	5528	Yes
2011	4.7	219	26	5515	Yes
2012	2.9	205	28	5494	Yes
2013	5	201	29	5524	Yes
2014	1.6	190	28	5573	Yes
2015	3.9	152	23	5531	Yes
2016	4.7	227	29	5516	Yes
2017	3.1	155	28	5506	Yes
2018	2.3	153	27	5549	Yes
2019	5	166	26	5516	Yes
2020	4.3	211	23	5502	Yes
2021	3.4	228	26	5555	Yes
2022	3	158	23	5536	Yes
2023	4.2	180	27	5572	Yes
2024	2	195	24	5496	Yes
2025	1.5	183	28	5543	Yes
2026	3.7	202	26	5492	Yes
2027	3.4	194	24	5520	Yes
2028	1.6	179	25	5549	Yes
2029	3.7	175	27	5573	Yes
2030	4.4	165	26	5499	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	7.6	429	18	5550	Yes
3002	8.4	410	17	5557	Yes
3003	6.8	438	17	5537	Yes
3004	6	432	18	5548	Yes
3005	6.8	472	18	5508	Yes
3006	8	361	18	5493	Yes
3007	7.1	414	16	5540	Yes
3008	6.7	449	18	5531	Yes
3009	7.9	264	16	5525	Yes
3010	9.8	311	18	5517	Yes
3011	9.3	273	16	5541	Yes
3012	7.4	333	16	5547	Yes
3013	7.1	307	18	5526	Yes
3014	9.4	262	17	5509	Yes
3015	7.4	500	16	5524	Yes
3016	8.1	468	16	5533	Yes
3017	6.3	350	17	5570	Yes
3018	7.1	464	18	5545	Yes
3019	9.6	359	16	5530	Yes
3020	8.8	485	17	5508	Yes
3021	9.6	393	17	5515	Yes
3022	8.9	281	18	5503	Yes
3023	9.9	335	18	5555	Yes
3024	9.5	369	17	5571	Yes
3025	8.8	436	18	5556	Yes
3026	8.5	483	16	5510	Yes
3027	8	445	18	5503	Yes
3028	6.1	254	18	5543	Yes
3029	9.9	479	17	5505	Yes
3030	6.2	434	16	5543	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	11.3	421	16	5556	Yes
4002	12.8	389	16	5513	Yes
4003	17.9	271	14	5566	Yes
4004	19.8	385	14	5521	Yes
4005	12	279	15	5569	Yes
4006	14.4	406	13	5570	Yes
4007	16.1	314	12	5549	Yes
4008	14.7	453	15	5493	Yes
4009	16.9	389	14	5522	Yes
4010	15.9	290	12	5535	Yes
4011	14.3	356	15	5540	Yes
4012	13.8	404	16	5497	Yes
4013	12.7	365	13	5572	Yes
4014	17.5	425	15	5542	Yes
4015	16.8	399	13	5552	No
4016	17.8	354	12	5505	Yes
4017	17.5	475	12	5499	Yes
4018	19	442	14	5569	Yes
4019	15	442	13	5515	No
4020	16.9	305	12	5499	Yes
4021	18.2	451	14	5498	Yes
4022	11.5	327	16	5497	Yes
4023	13.2	485	16	5562	Yes
4024	11.8	256	13	5546	Yes
4025	14	309	13	5556	Yes
4026	13	462	16	5542	No
4027	11.4	410	13	5506	Yes
4028	20	324	14	5529	Yes
4029	18.9	286	12	5573	Yes
4030	14.6	346	13	5529	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	5499	Yes
12	5498	Yes
13	5499	Yes
14	5498	Yes
15	5499	Yes
16	5498	Yes
17	5499	Yes
18	5498	Yes
19	5499	Yes
20	5498	Yes
21	5561	Yes
22	5562	Yes
23	5561	Yes
24	5561	Yes
25	5565	Yes
26	5561	Yes
27	5565	Yes
28	5561	Yes
29	5565	Yes
30	5561	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	818	5490	11	Yes
2	1293	5491	16	Yes
3	1768	5492	21	Yes
4	2243	5493	21	Yes
5	2718	5494	21	Yes
6	3193	5495	14	Yes
7	3668	5496	12	Yes
8	4143	5497	12	Yes
9	4618	5498	20	Yes
10	5093	5499	15	Yes
11	5568	5500	13	Yes
12	6043	5501	16	Yes
13	6518	5502	14	Yes
14	6993	5503	18	Yes
15	7468	5504	16	Yes
16	7943	5505	13	Yes
17	8418	5506	15	Yes
18	8893	5507	20	Yes
19	9368	5508	28	Yes
20	9843	5509	13	Yes
21	10318	5510	13	Yes
22	10793	5511	18	Yes
23	11268	5512	21	Yes
24	11743	5513	17	Yes
25	12218	5514	12	Yes
26	12693	5515	15	Yes
27	13168	5516	30	Yes
28	13643	5517	16	Yes
29	14118	5518	14	Yes
30	14593	5519	19	Yes
31	15068	5520	13	Yes
32	15543	5521	17	Yes
33	16018	5522	15	Yes
34	16493	5523	20	Yes
35	16968	5524	21	Yes
36	17443	5525	15	Yes
37	17918	5526	15	Yes
38	18393	5527	16	Yes
39	18868	5528	15	Yes

TYPE 6 DETECTION PROBABILITY (CONTINUED)

40	19343	5529	19	Yes
41	19818	5530	24	Yes
42	20293	5531	17	Yes
43	20768	5532	14	Yes
44	21243	5533	11	Yes
45	21718	5534	25	Yes
46	22193	5535	16	Yes
47	22668	5536	12	Yes
48	23143	5537	15	Yes
49	23618	5538	14	Yes
50	24093	5539	15	Yes
51	24568	5540	16	Yes
52	25043	5541	18	Yes
53	25518	5542	17	Yes
54	25993	5543	19	Yes
55	26468	5544	18	Yes
56	26943	5545	17	Yes
57	27418	5546	16	Yes
58	27893	5547	19	Yes
59	28368	5548	22	Yes
60	28843	5549	16	Yes
61	29318	5550	19	Yes
62	29793	5551	21	Yes
63	30268	5552	15	Yes
64	30743	5553	17	Yes
65	31218	5554	15	Yes
66	31693	5555	21	Yes
67	32168	5556	15	Yes
68	32643	5557	22	Yes
69	33118	5558	22	Yes
70	33593	5559	20	Yes
71	34068	5560	21	Yes
72	34543	5561	23	Yes
73	35018	5562	17	Yes
74	35493	5563	25	Yes
75	35968	5564	19	Yes
76	36443	5565	25	Yes
77	36918	5566	15	Yes
78	37393	5567	16	Yes
79	37868	5568	16	Yes
80	38343	5569	17	Yes
81	38818	5570	18	Yes
82	39293	5571	16	Yes
83	39768	5572	18	Yes
84	40243	5573	16	Yes
85	40718	5574	18	Yes

8.4. 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.

9. SLAVE DEVICE TEST RESULTS

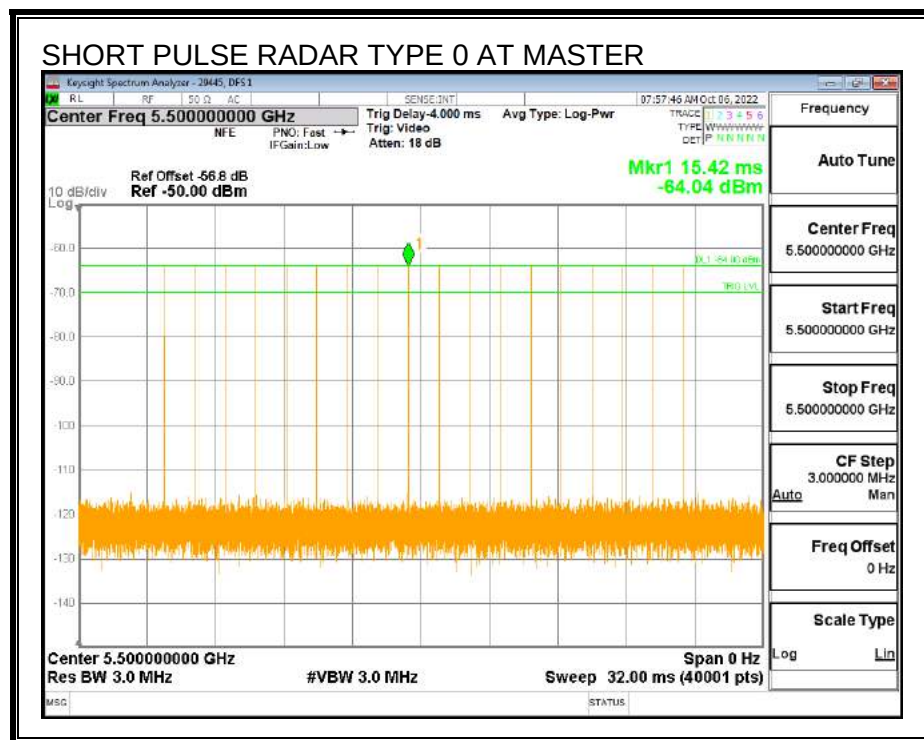
9.1. RESULTS FOR 20 MHz BANDWIDTH

9.1.1. TEST CHANNEL

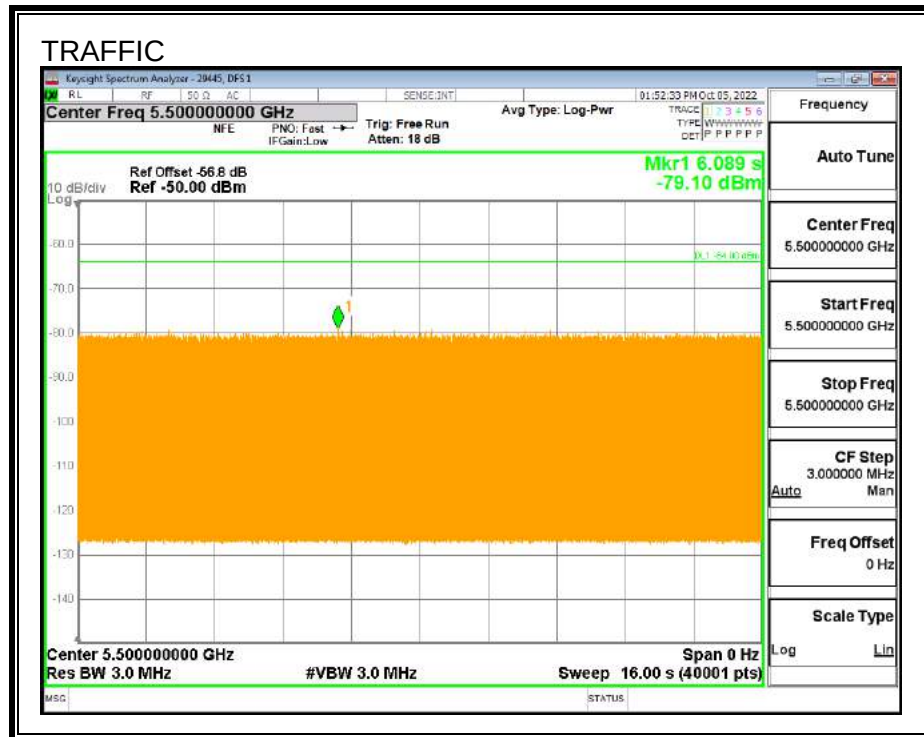
All tests were performed at a channel center frequency of 5500 MHz.

9.1.2. RADAR WAVEFORM AND TRAFFIC

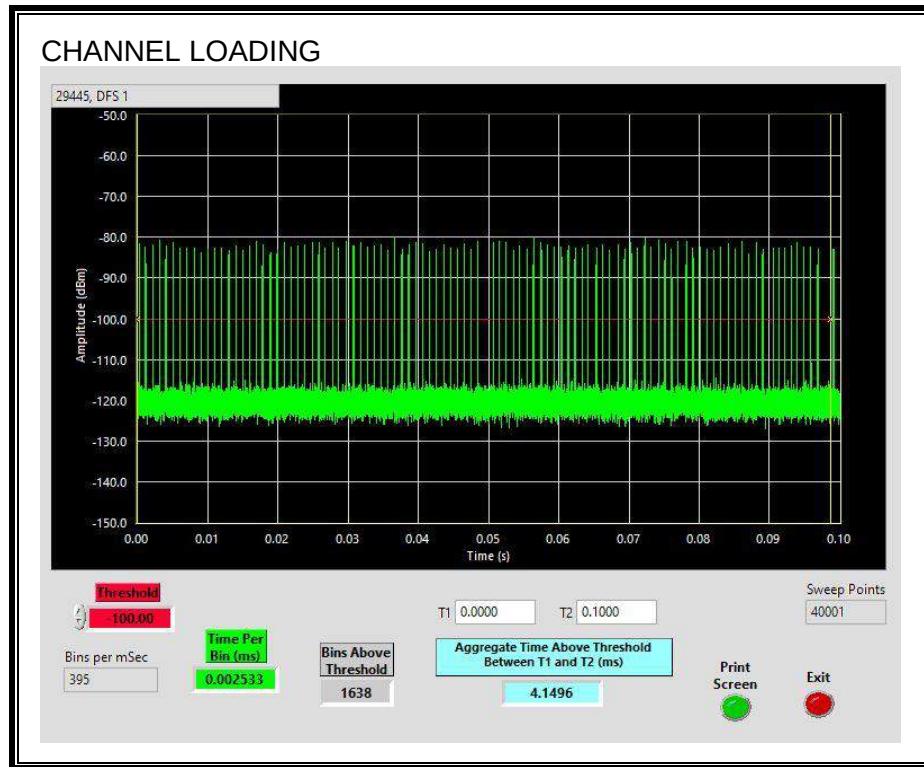
RADAR WAVEFORM



SLAVE TRAFFIC



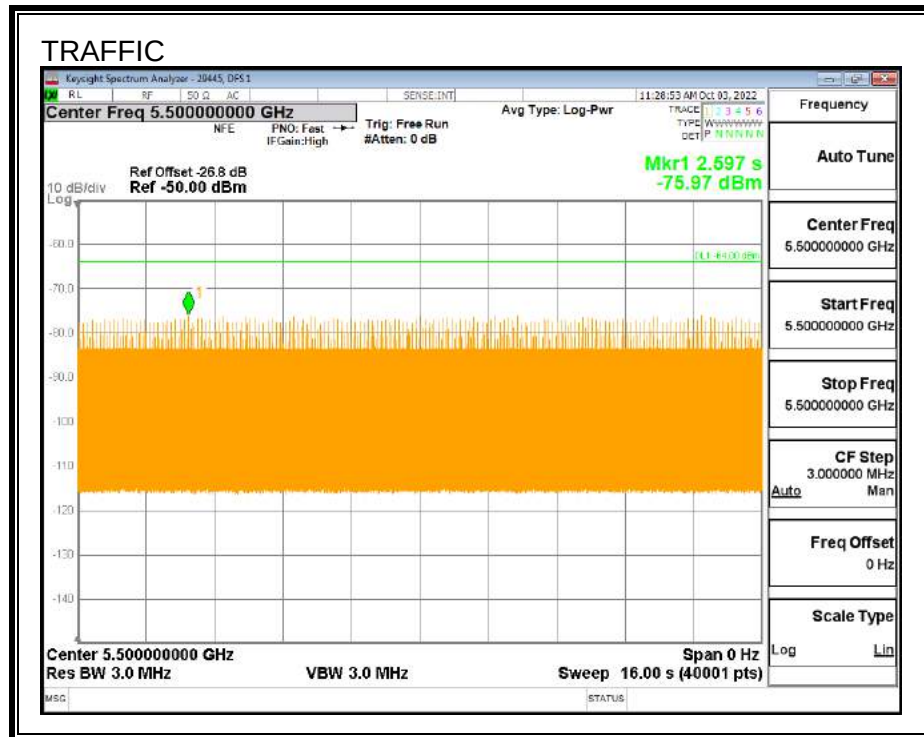
SLAVE DEVICE CHANNEL LOADING



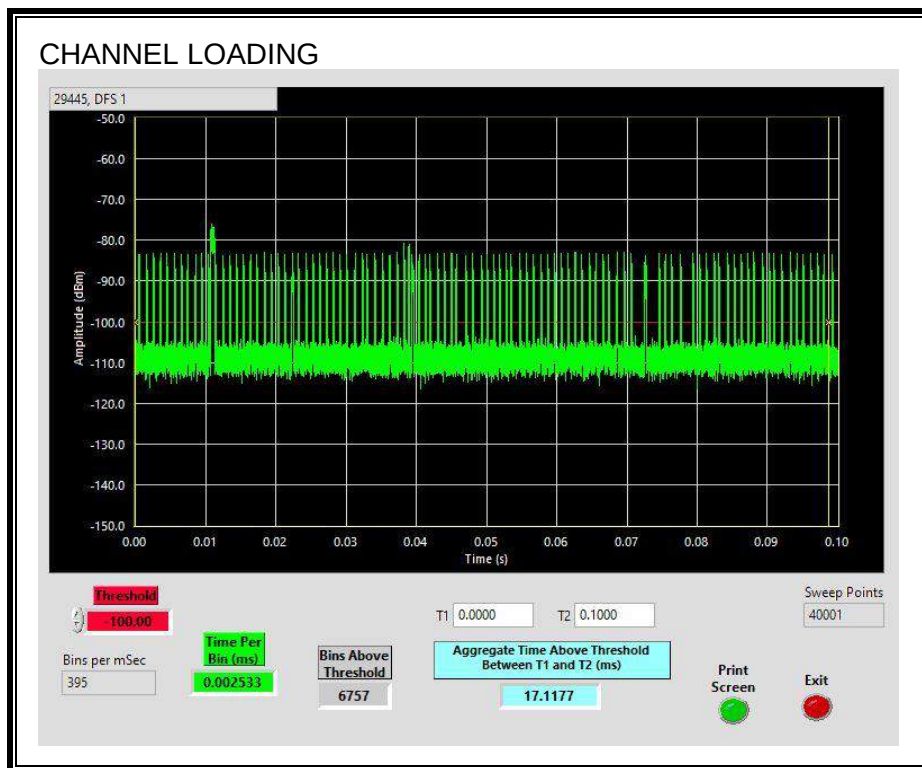
The level of traffic loading on the channel by the EUT is 4.14%

Per KDB 905462 D02 page 2, channel Loading is defined as the data transfer from the master device to a client device. Therefore, the channel loading upon the Master Device meets the requirement as shown in the following plots taken from the Master Device test results.

MASTER DEVICE TRAFFIC



MASTER DEVICE CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 17.11%

9.1.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

9.1.4. 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)

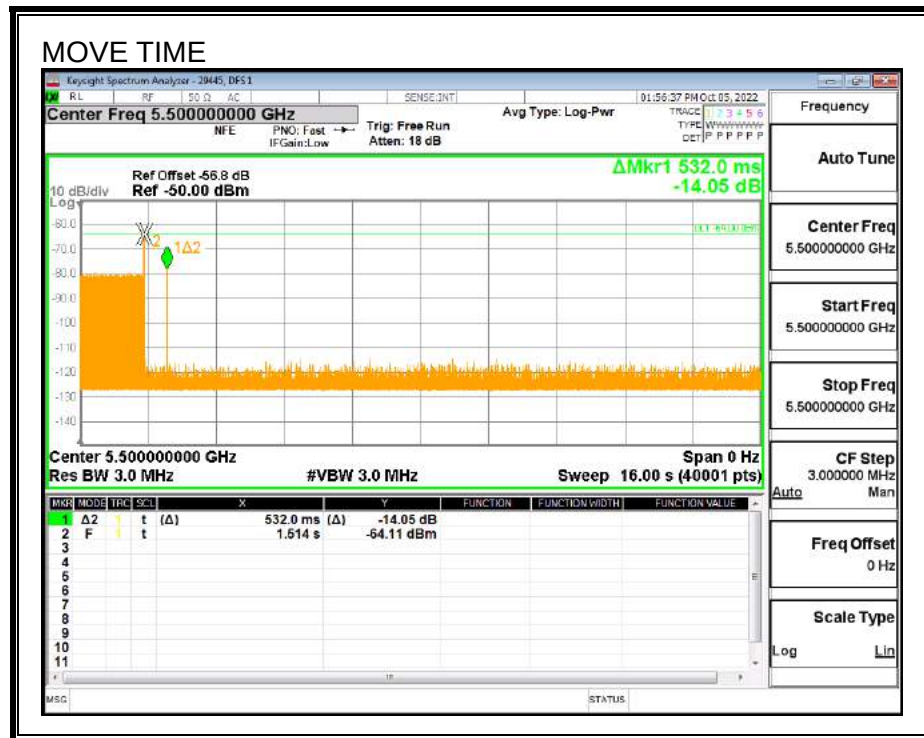
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

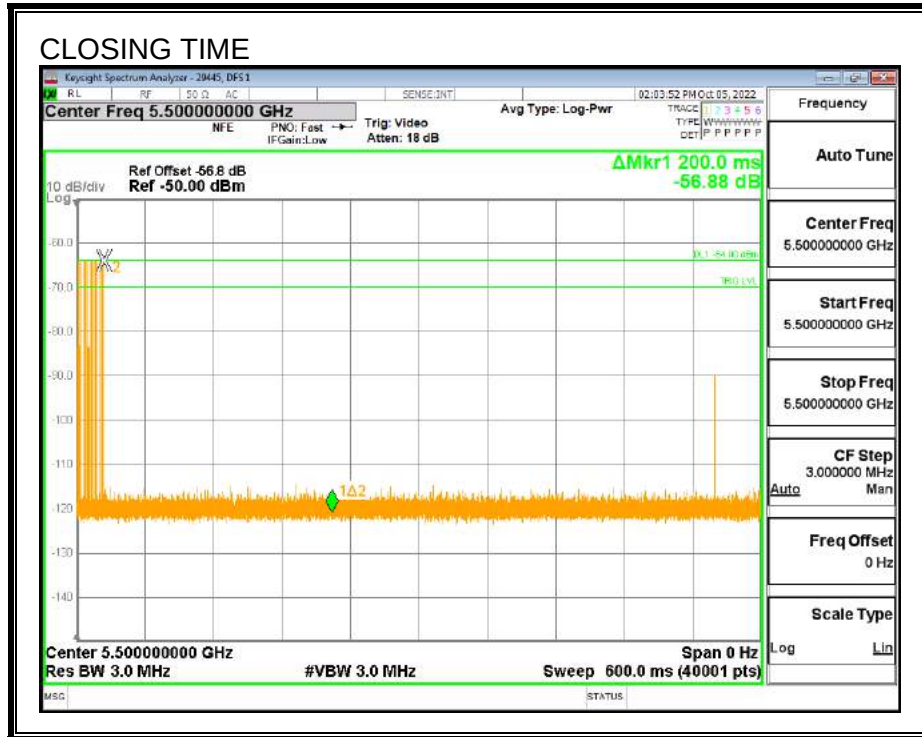
Channel Move Time (sec)	Limit (sec)
0.532	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
1.20	60

MOVE TIME

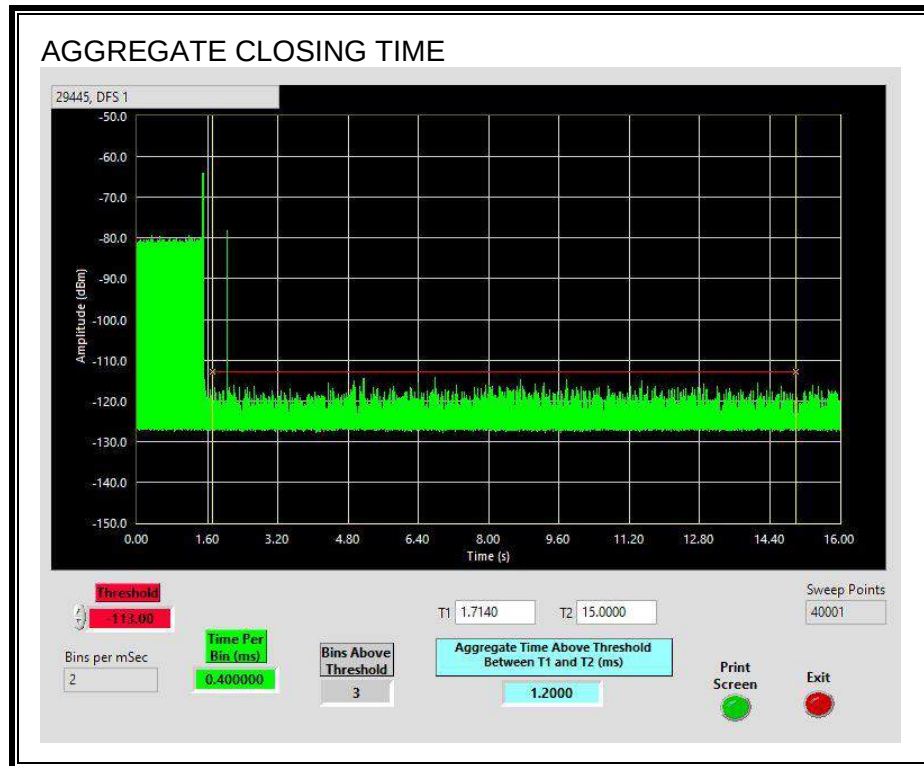


CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the aggregate monitoring period.



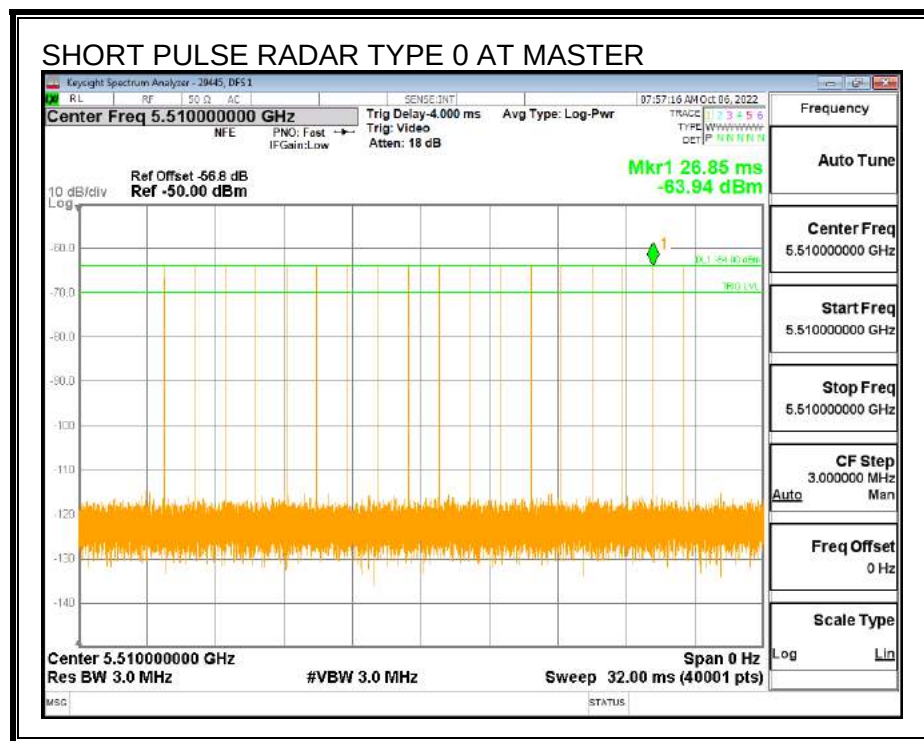
9.2. RESULTS FOR 40 MHz BANDWIDTH

9.2.1. TEST CHANNEL

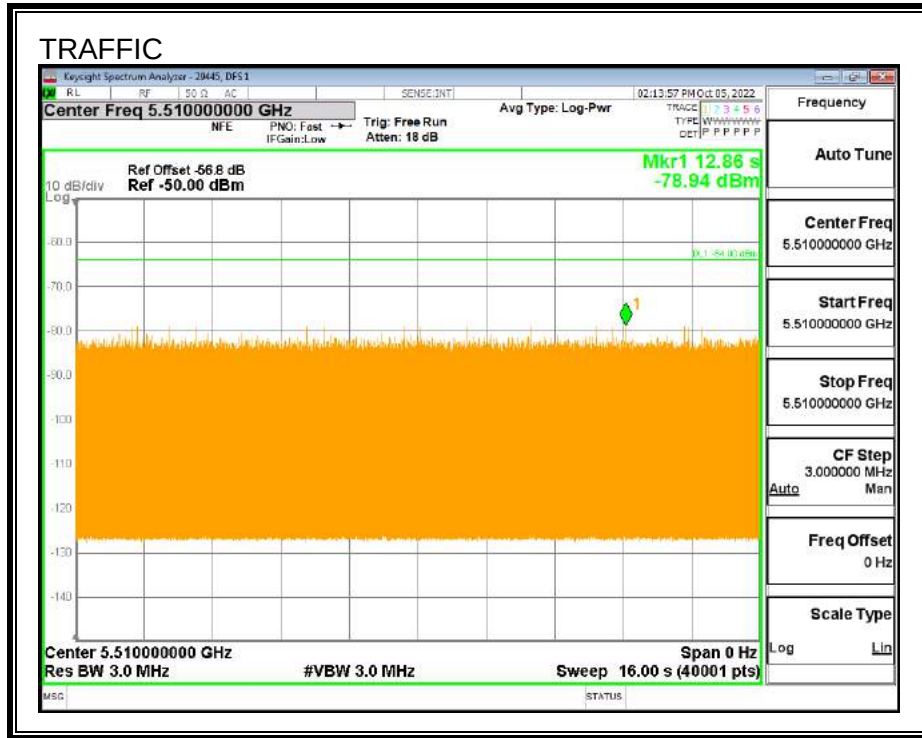
All tests were performed at a channel center frequency of 5510 MHz.

9.2.2. RADAR WAVEFORM AND TRAFFIC

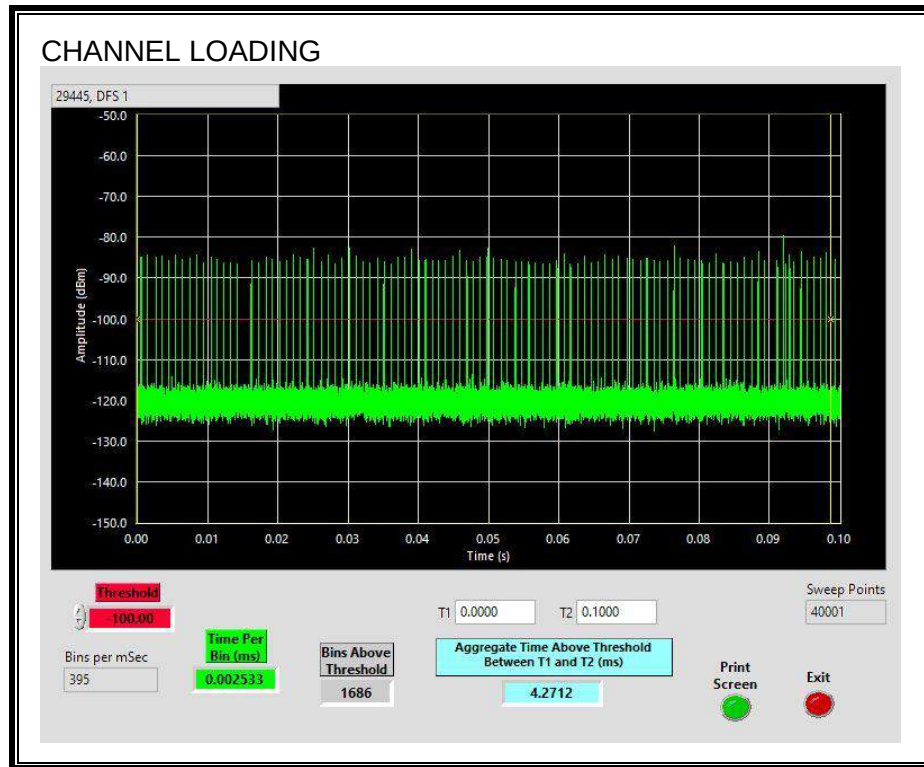
RADAR WAVEFORM



SLAVE TRAFFIC



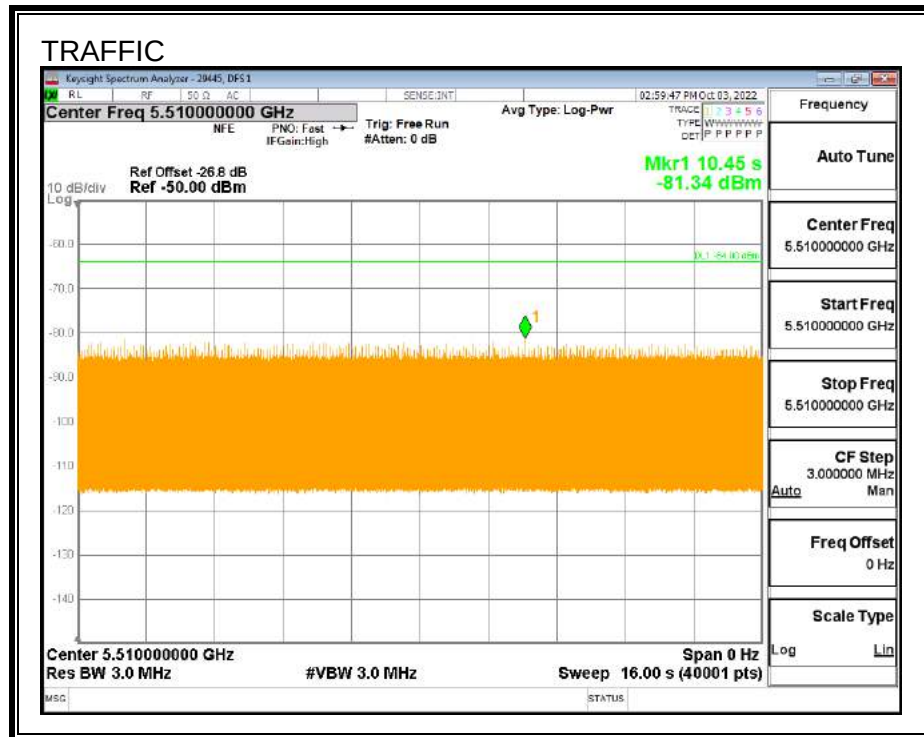
SLAVE DEVICE CHANNEL LOADING



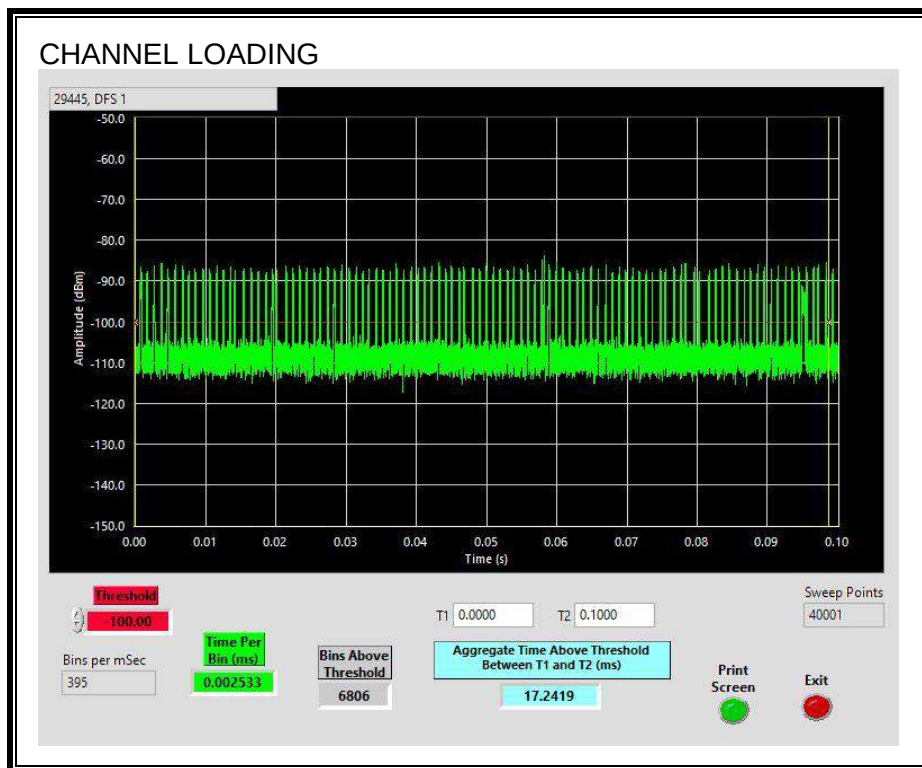
The level of traffic loading on the channel by the EUT is 4.27%

Per KDB 905462 D02 page 2, channel Loading is defined as the data transfer from the aster device to a client device. Therefore, the channel loading upon the Master Device meets the requirement as shown in the following plots taken from the Master Device test results.

MASTER DEVICE TRAFFIC



MASTER DEVICE CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 17.24%

9.2.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

9.2.4. 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)

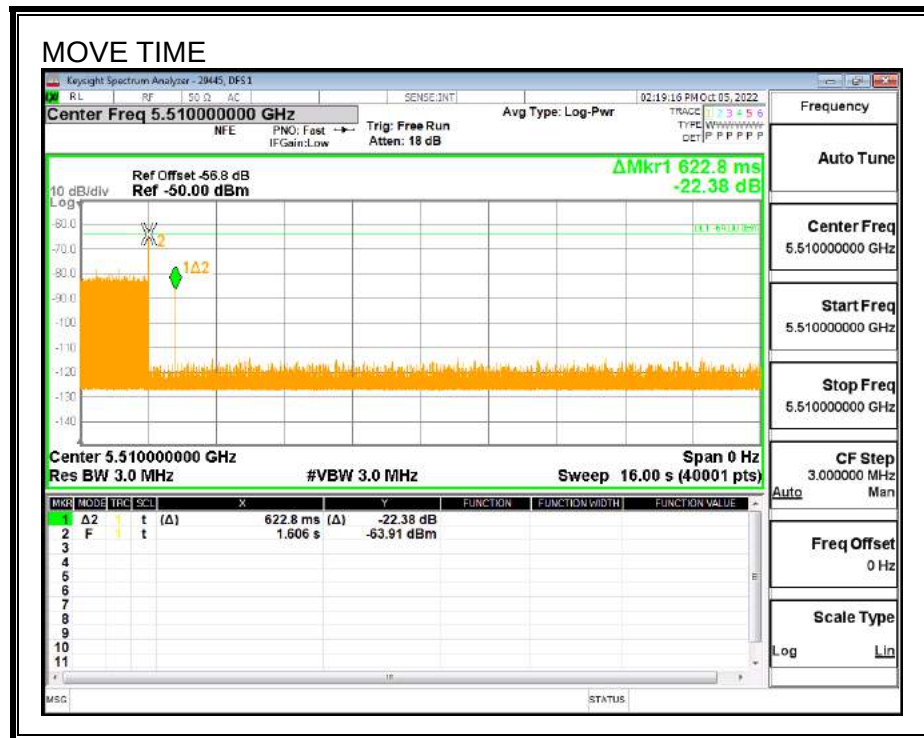
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

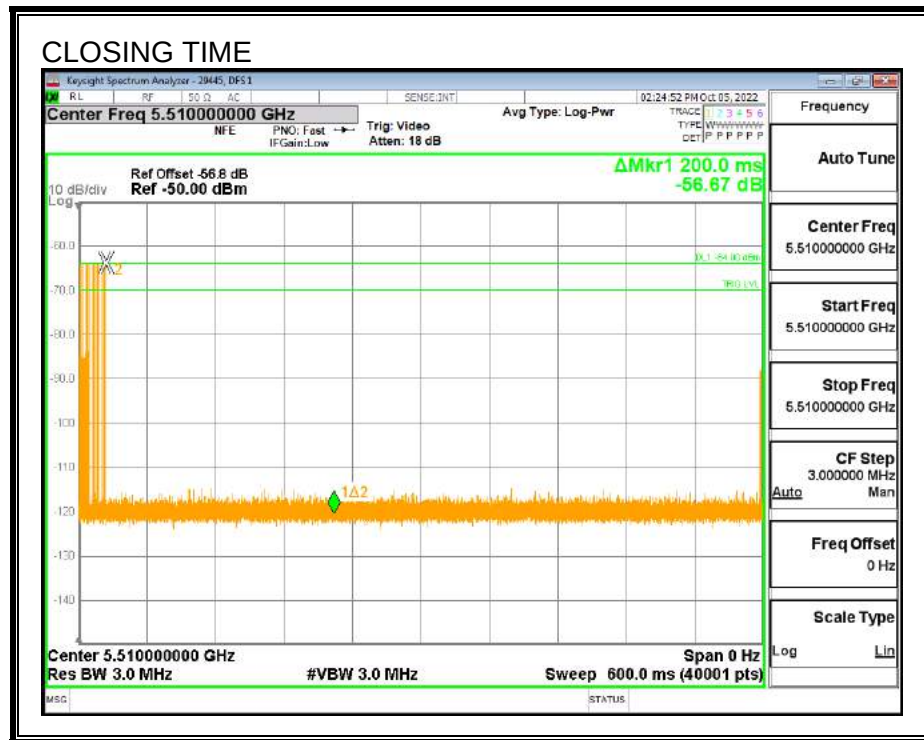
Channel Move Time (sec)	Limit (sec)
0.6228	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
1.20	60

MOVE TIME

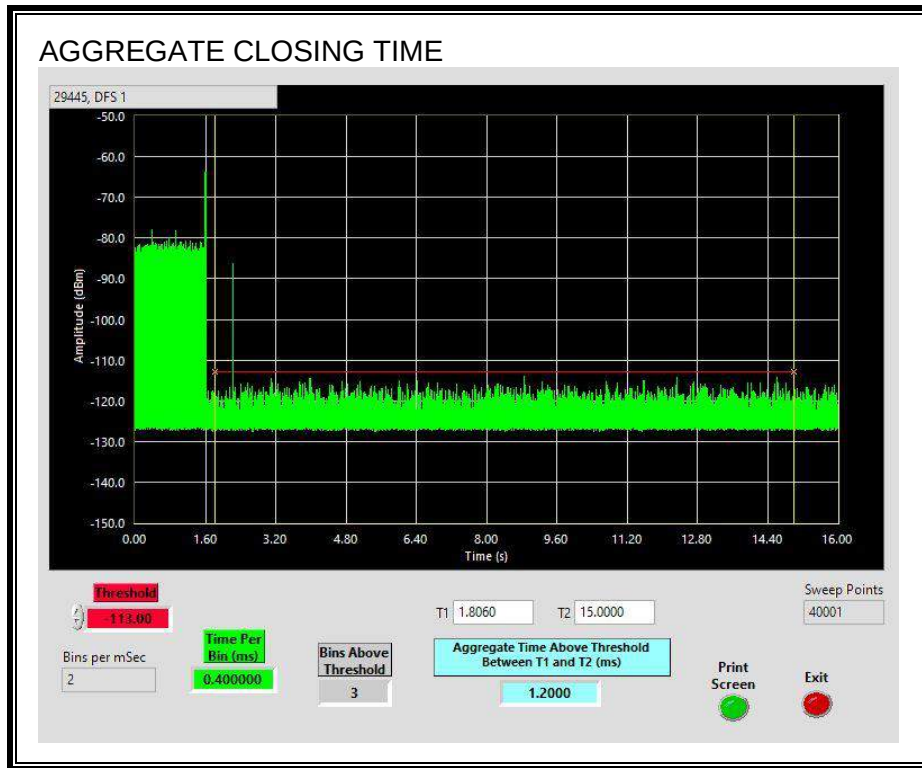


CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the aggregate monitoring period.



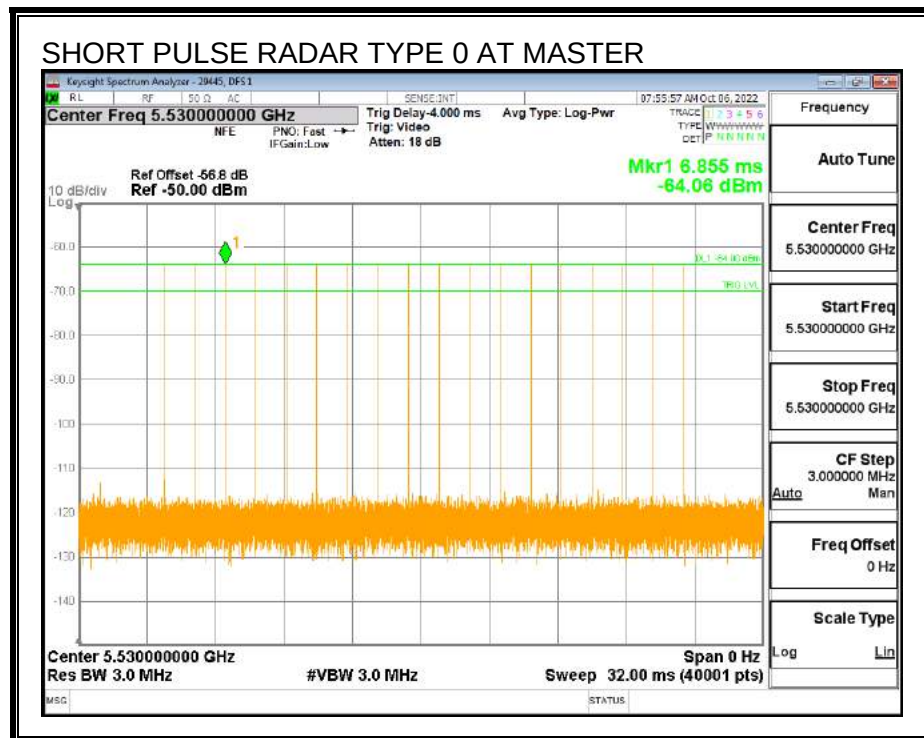
9.3. RESULTS FOR 80 MHz BANDWIDTH

9.3.1. TEST CHANNEL

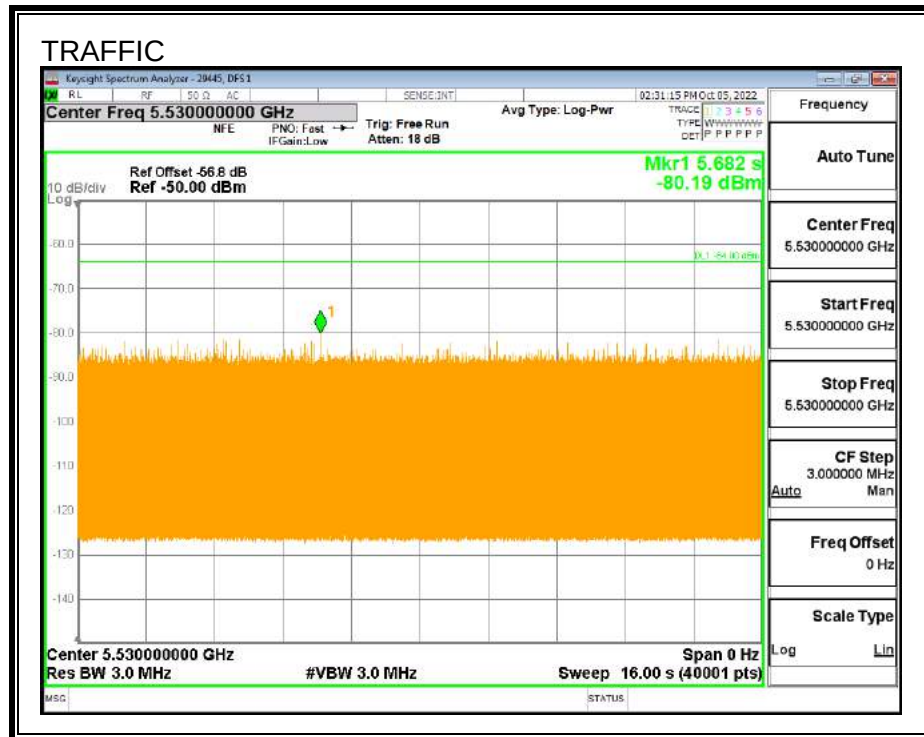
All tests were performed at a channel center frequency of 5530 MHz.

9.3.2. RADAR WAVEFORM AND TRAFFIC

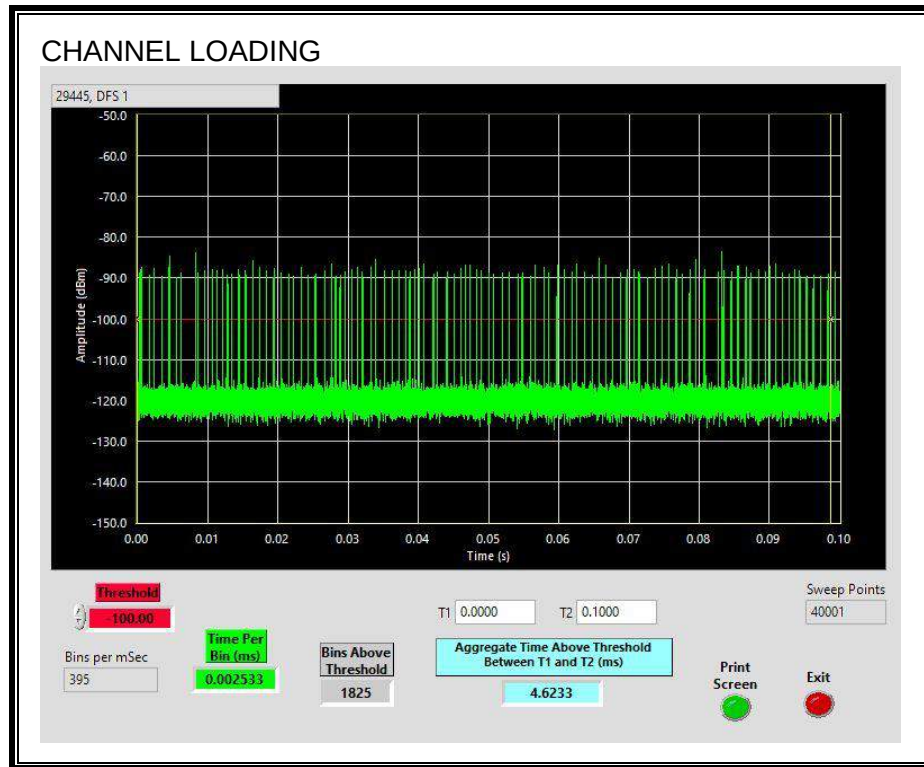
RADAR WAVEFORM



SLAVE TRAFFIC



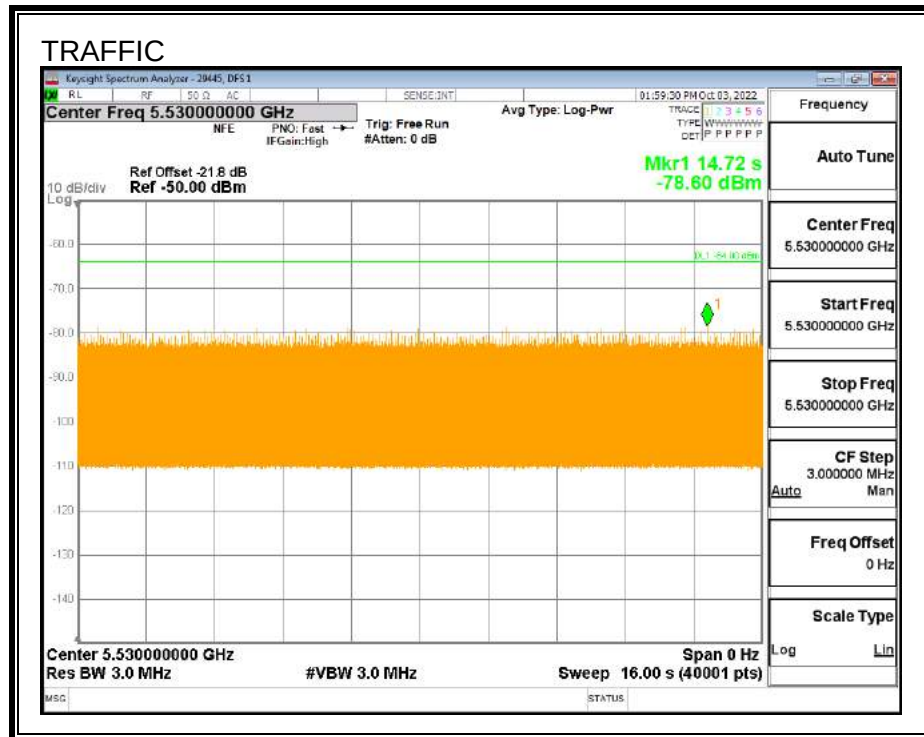
SLAVE DEVICE CHANNEL LOADING



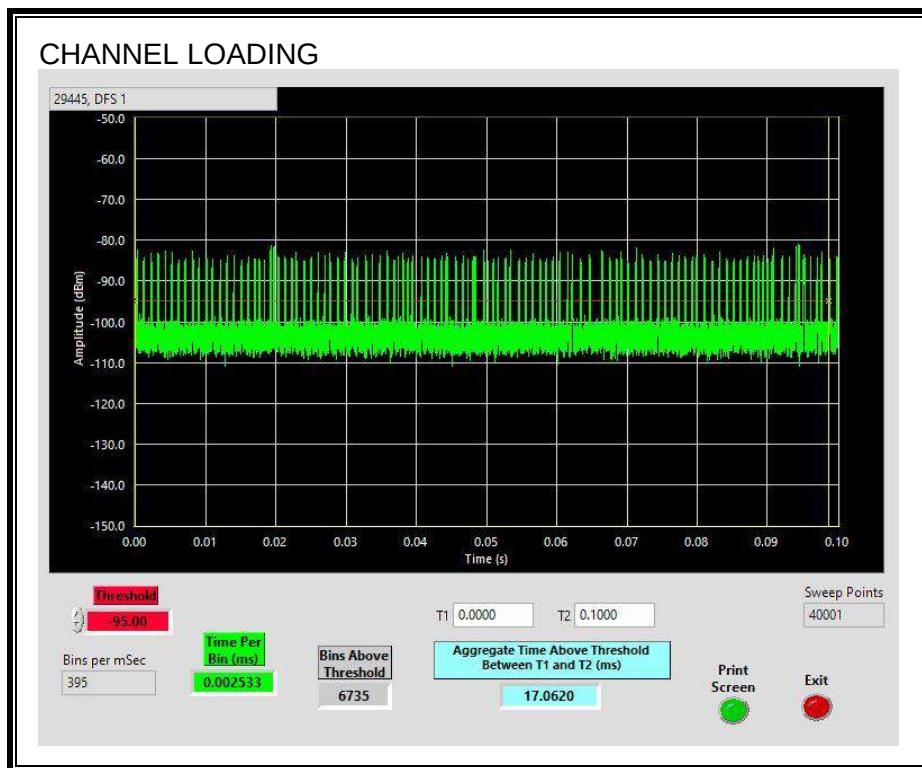
The level of traffic loading on the channel by the EUT is 4.62%

Per KDB 905462 D02 page 2, channel Loading is defined as the data transfer from the aster device to a client device. Therefore, the channel loading upon the Master Device meets the requirement as shown in the following plots taken from the Master Device test results.

MASTER DEVICE TRAFFIC



MASTER DEVICE CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 17.062%

9.3.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

9.3.4. 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)

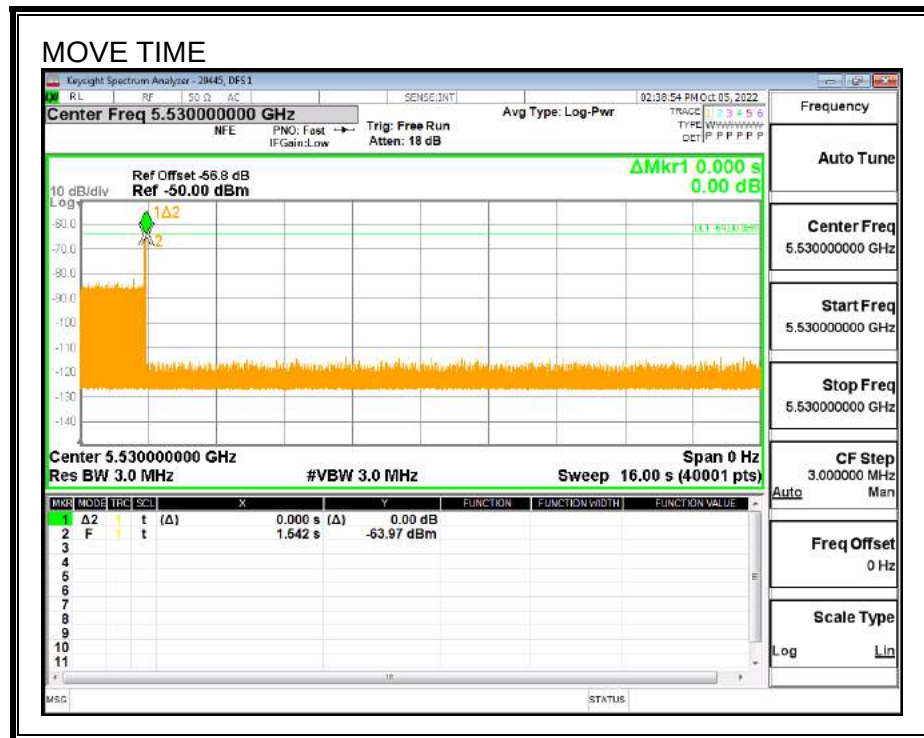
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

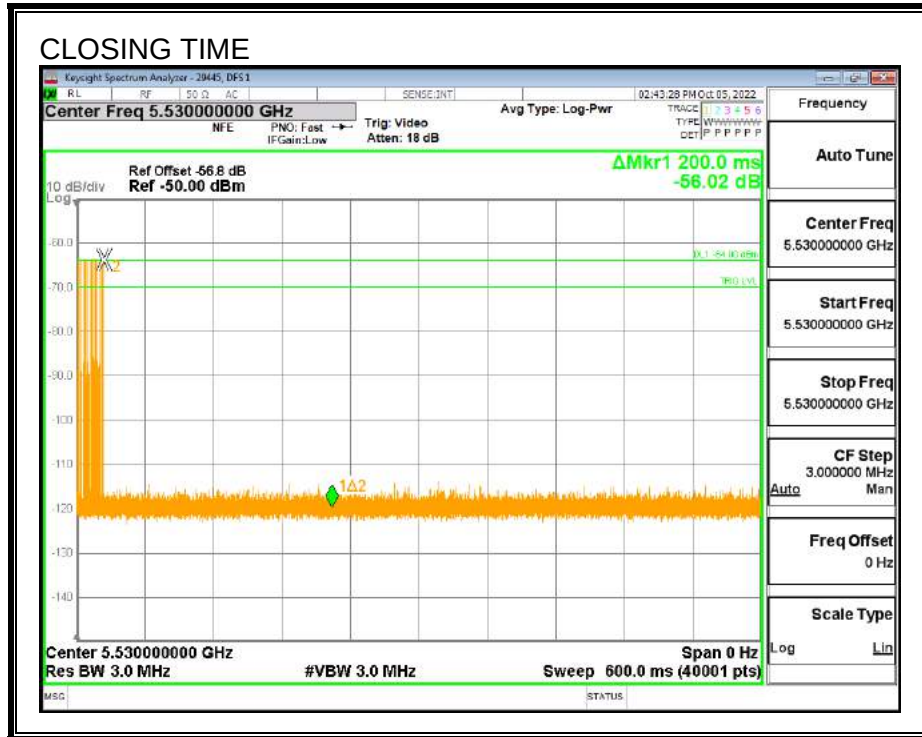
Channel Move Time (sec)	Limit (sec)
0.0	10

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

MOVE TIME

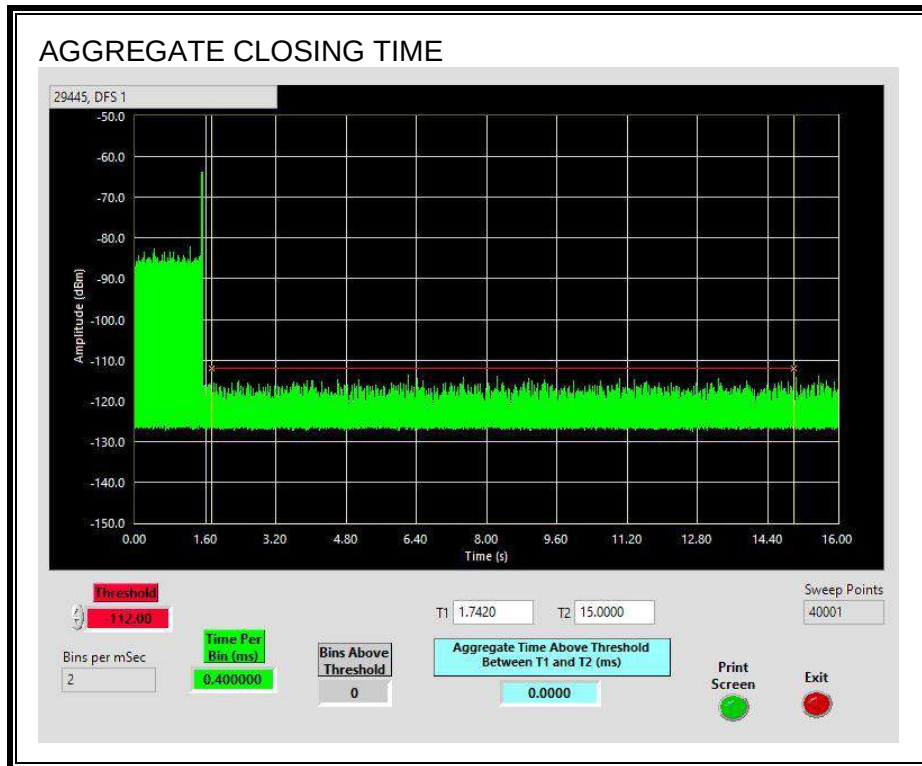


CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

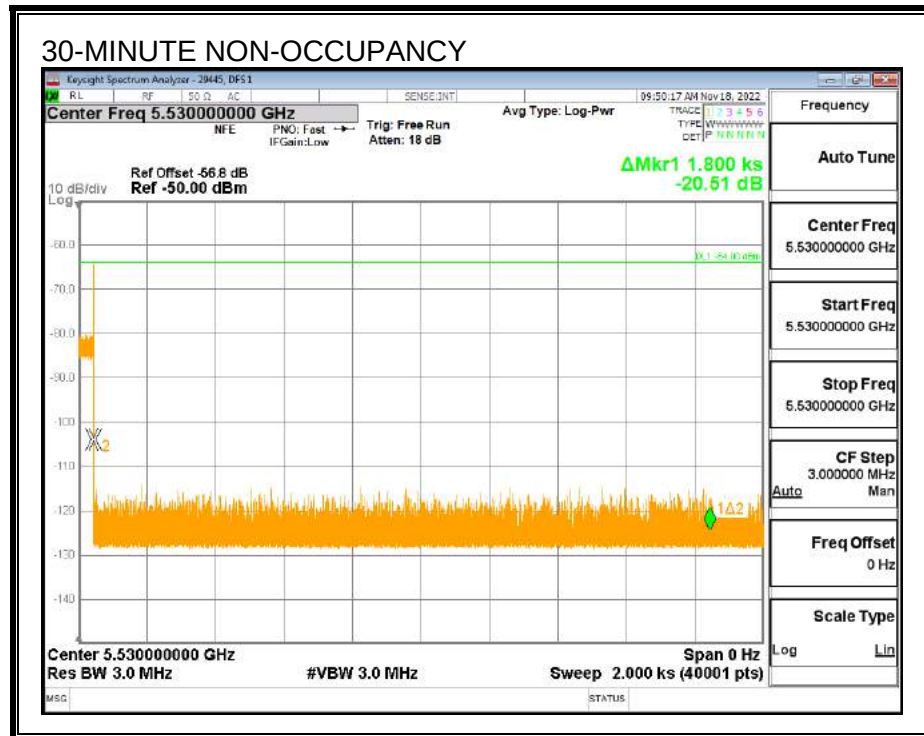
No transmissions are observed during the aggregate monitoring period.



9.3.5. 30-MINUTE NON-OCCUPANCY PERIOD

RESULTS

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



10. SLAVE DEVICE WITH RADAR DETECTION CAPABILITY TEST RESULTS

10.1. APPLICABLE TESTS FOR SLAVE DEVICE CONFIGURATION

10.1.1. APPLICABILITY OF MASTER DEVICE CONFIGURATION TEST RESULTS

The EUT is identical for the two configurations: Master Device, and Slave with Radar Detection. Therefore the performance of the EUT in the Slave Device configuration, when the Slave detects a radar signal, is represented by the above tests of the Master Device Configuration.

10.1.2. ADDITIONAL APPLICABLE TESTS OF SLAVE DEVICE

Per KDB 905462 D02 section 5.1.2, clause c):

“If a Client Device is performing In-Service Monitoring and detects a Radar Waveform above the DFS Detection Threshold, it will inform the Master Device. This is equivalent to the Master Device detecting the Radar Waveform and d) through f) of section 5.1.1 apply”.

Therefore the following two test conditions must be performed to demonstrate compliance:

Channel shutdown tests to measure the performance of the Slave Device configuration, in response to the detection of a radar signal by the Master Device, are applicable.

Channel shutdown tests to measure the performance of the Master Device configuration, in response to the detection of a radar signal by the Slave Device, are applicable.

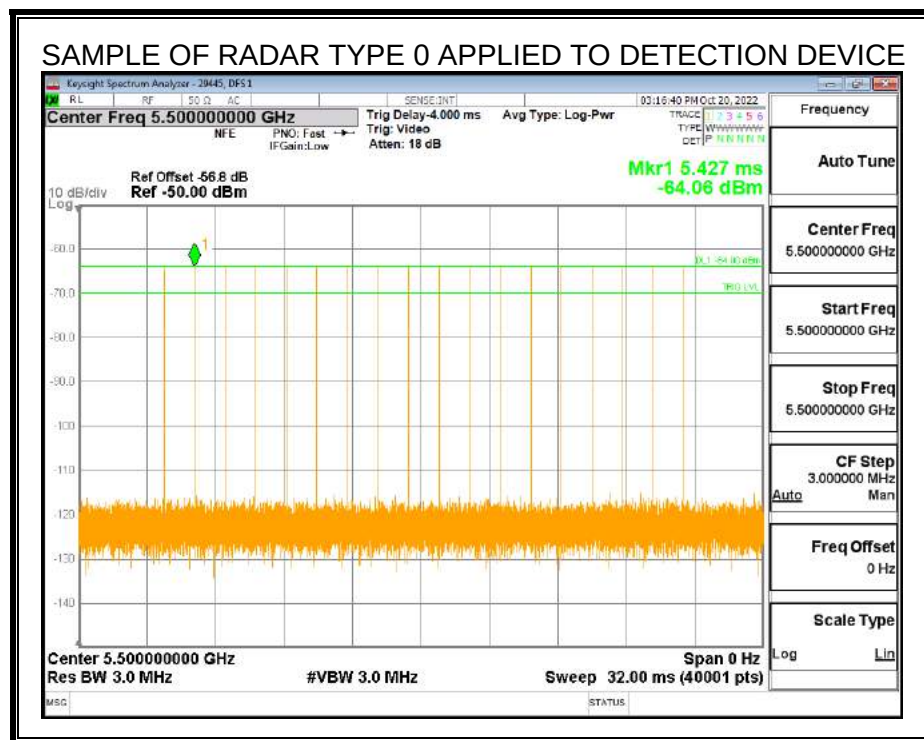
10.2. SLAVE DEVICE CONFIGURATION RESULTS FOR 20 MHz BANDWIDTH

10.2.1. TEST CHANNEL

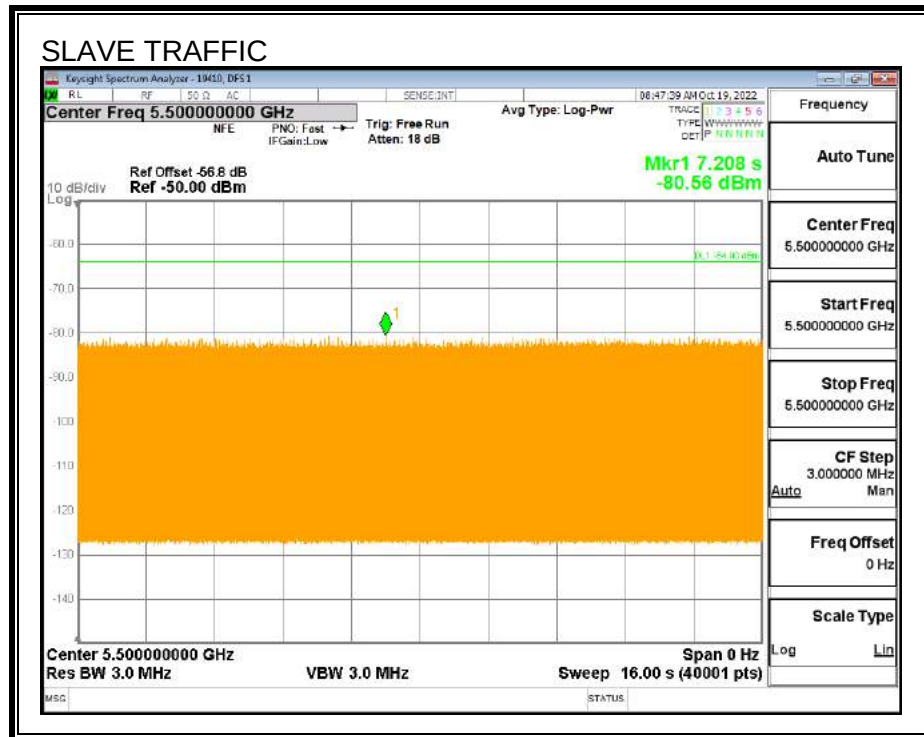
All tests were performed at a channel center frequency of 5500 MHz.

10.2.2. RADAR WAVEFORM AND TRAFFIC

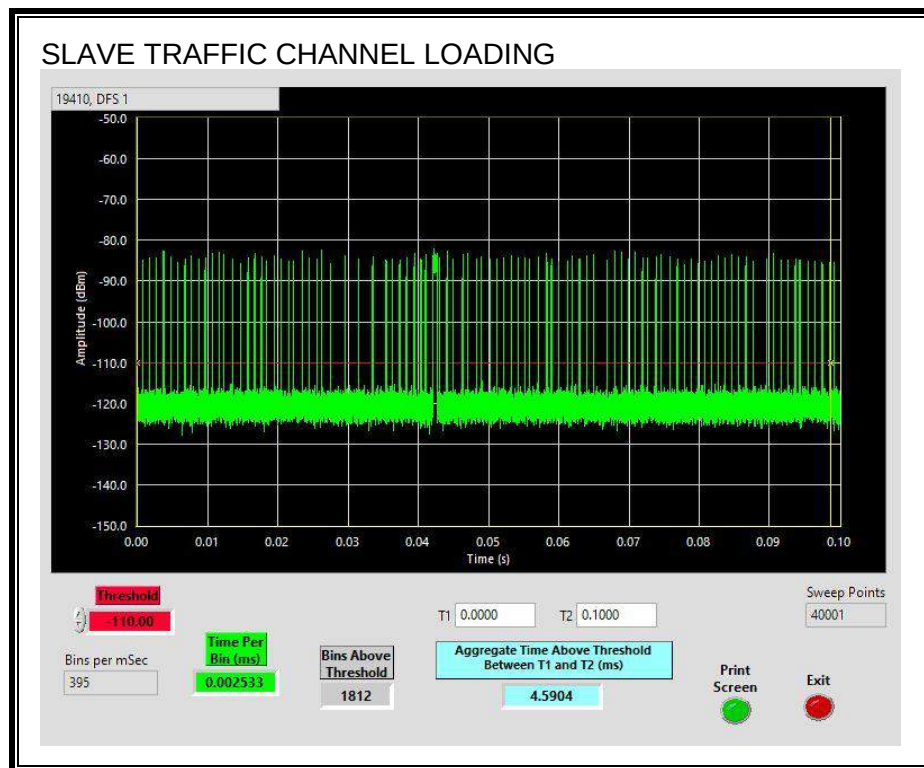
RADAR WAVEFORM



TRAFFIC



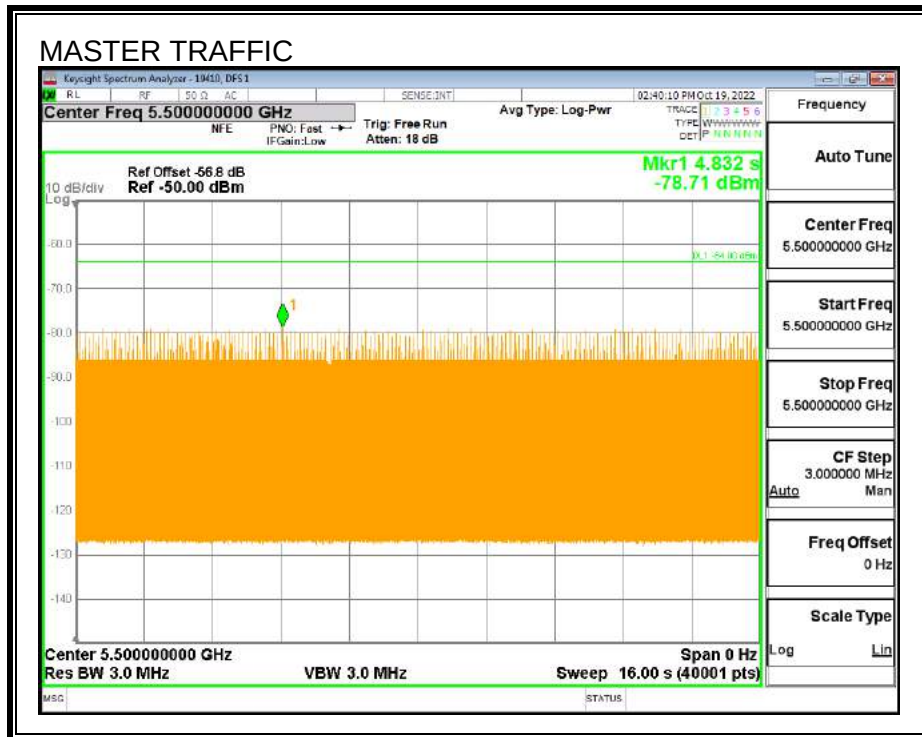
CHANNEL LOADING



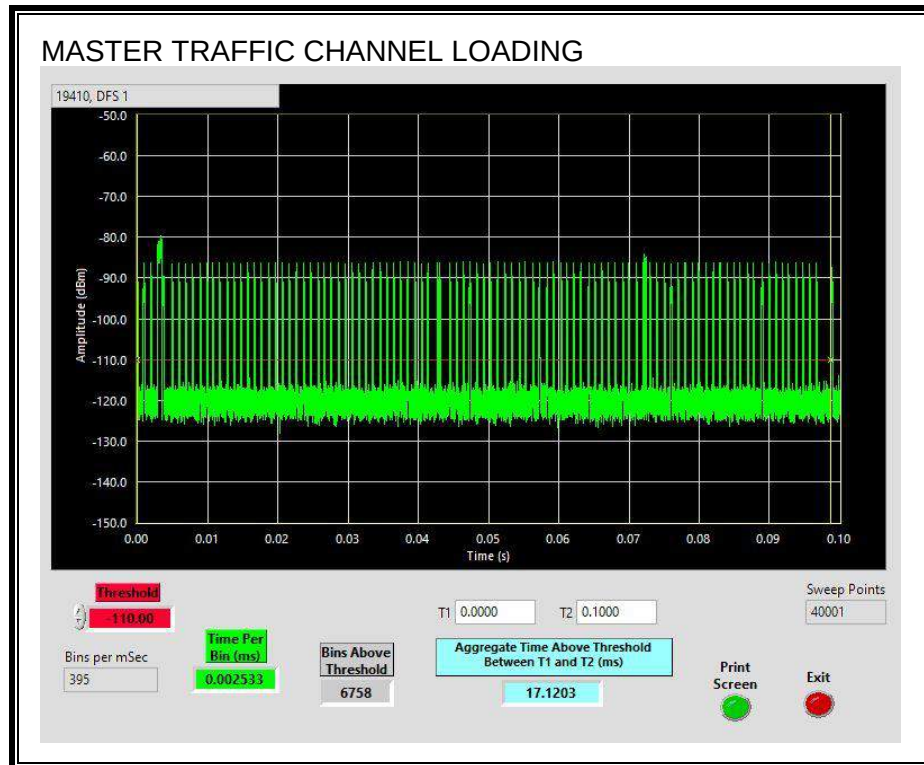
The level of traffic loading on the channel by the EUT is 4.59%

Per KDB 905462 D02 page 2, channel Loading is defined as the data transfer from the aster device to a client device. Therefore, the channel loading upon the Master Device meets the requirement as shown in the following plots taken from the Master Device test results.

TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 17.12%

10.2.3. MOVE AND CLOSING TIME OF SLAVE DEVICE IN RESPONSE TO DETECTION BY MASTER DEVICE

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)

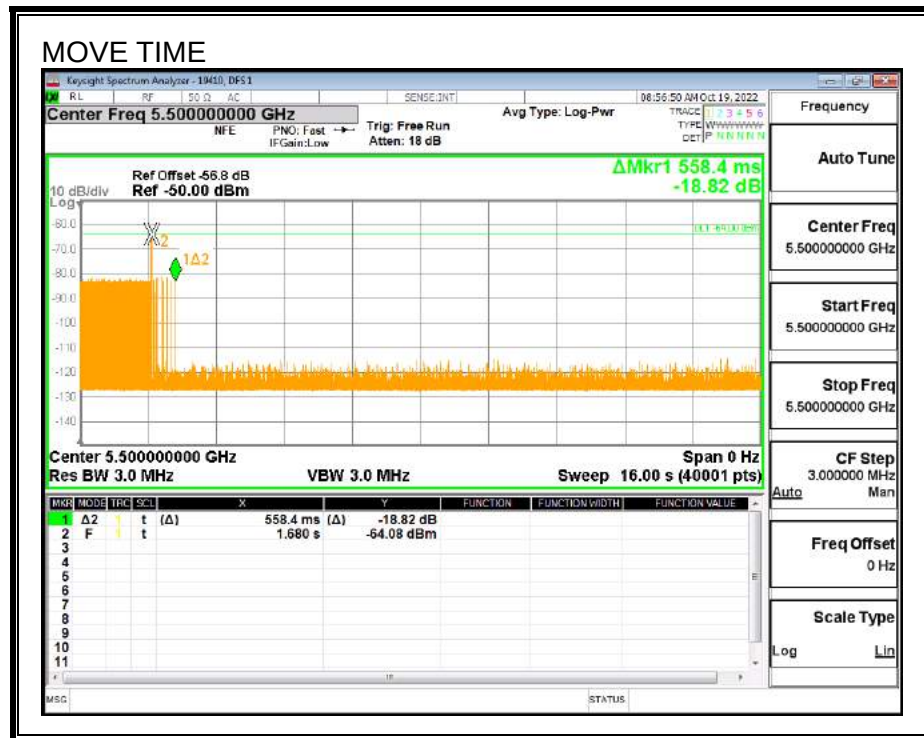
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

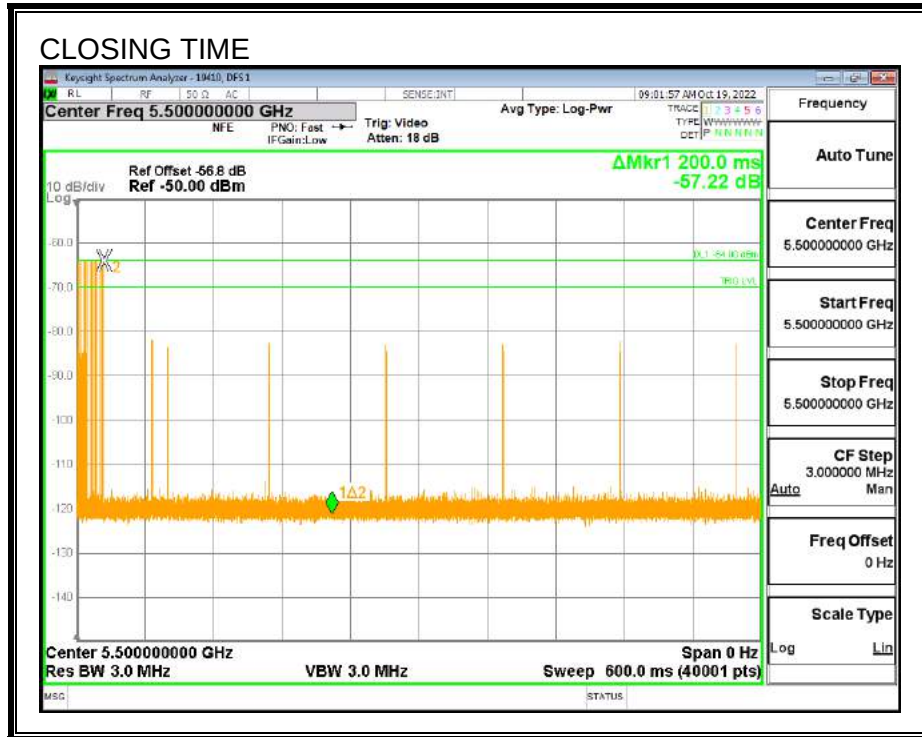
Channel Move Time (sec)	Limit (sec)
0.5584	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
4.8	60

MOVE TIME

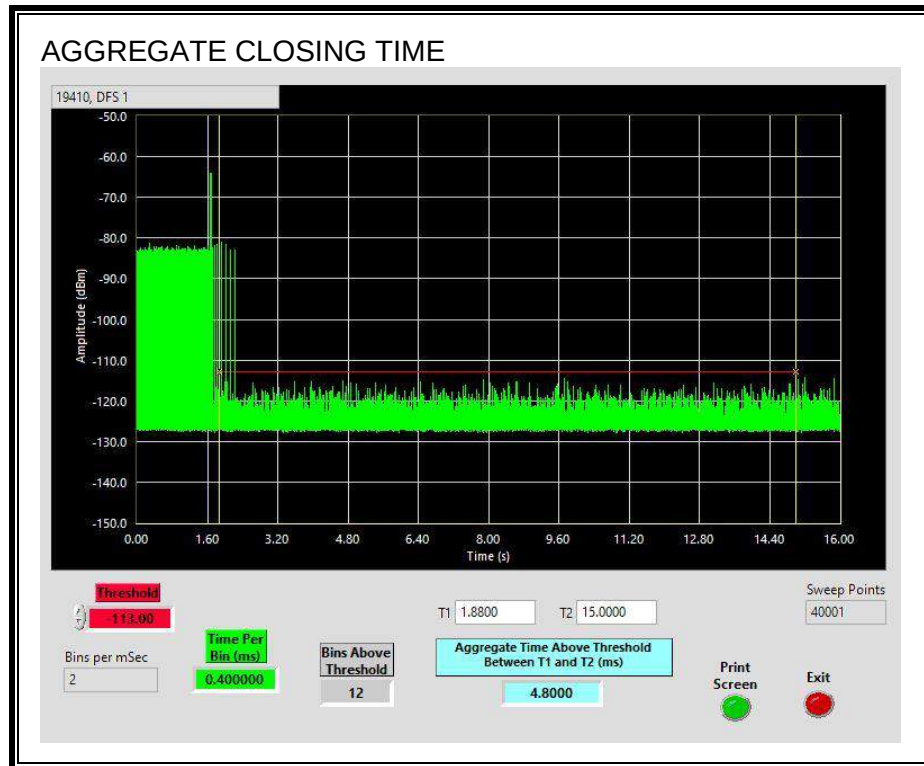


CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the aggregate monitoring period.



10.2.4. MOVE AND CLOSING TIME OF MASTER DEVICE IN RESPONSE TO DETECTION BY SLAVE DEVICE

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)

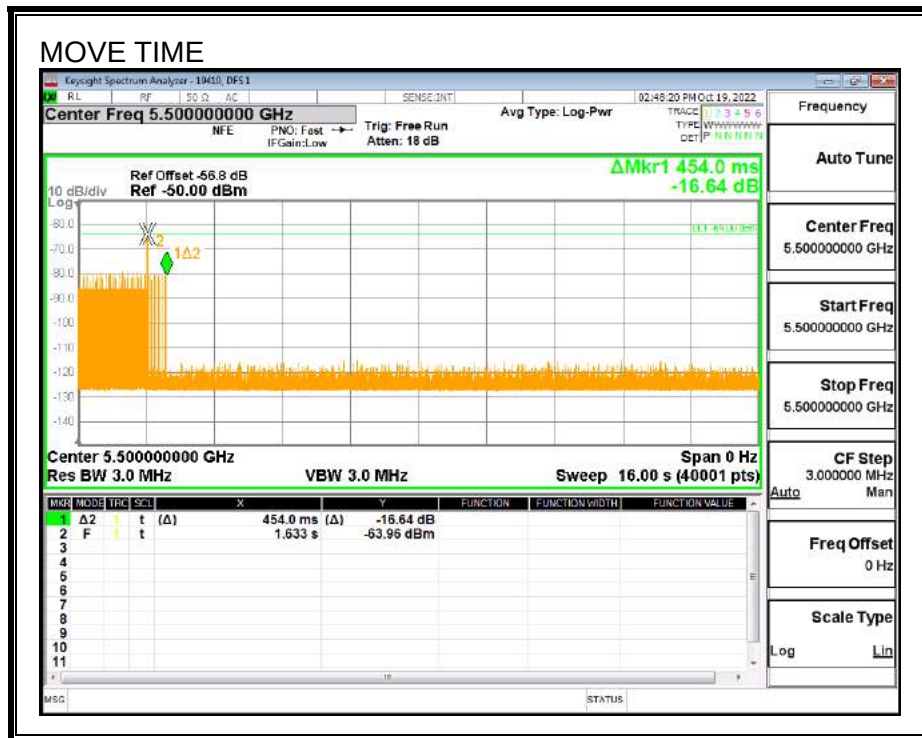
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

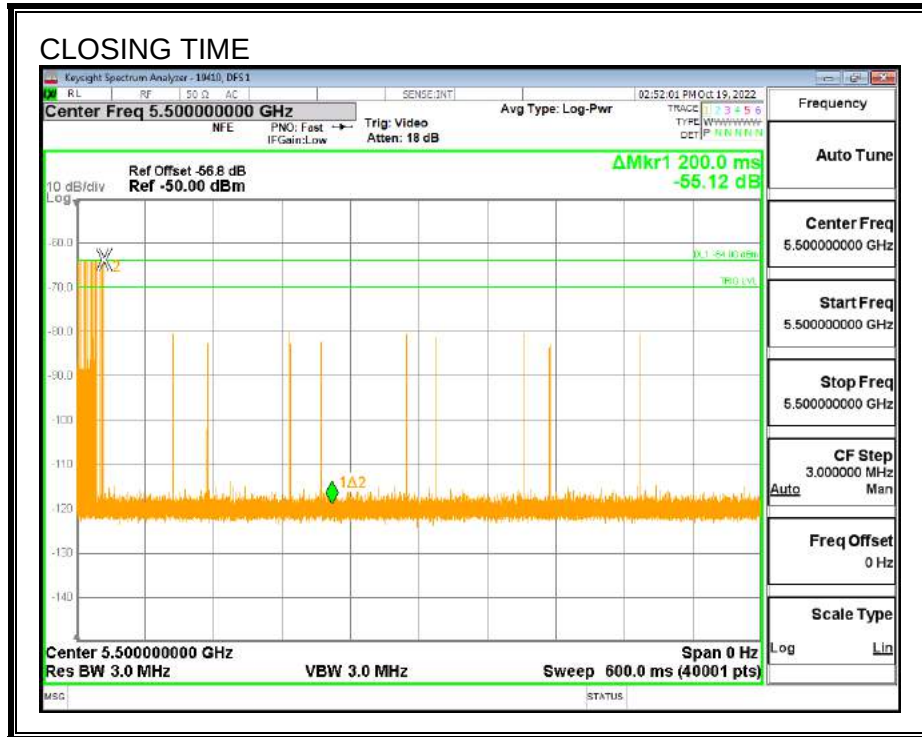
Channel Move Time (sec)	Limit (sec)
0.4540	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
3.2	60

MOVE TIME

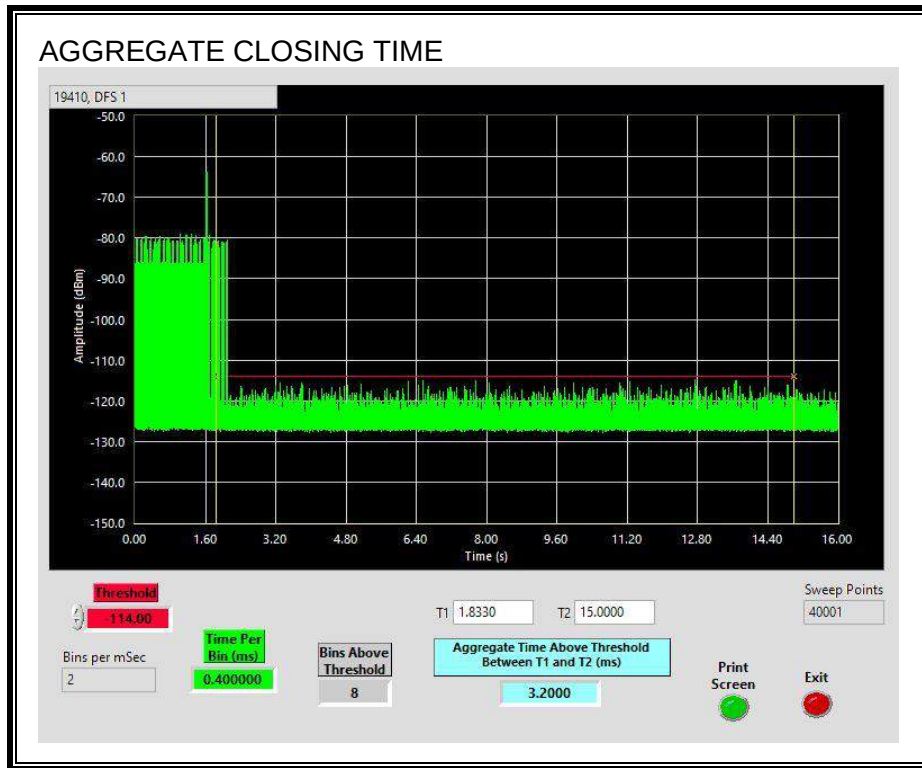


CHANNEL CLOSING TIME

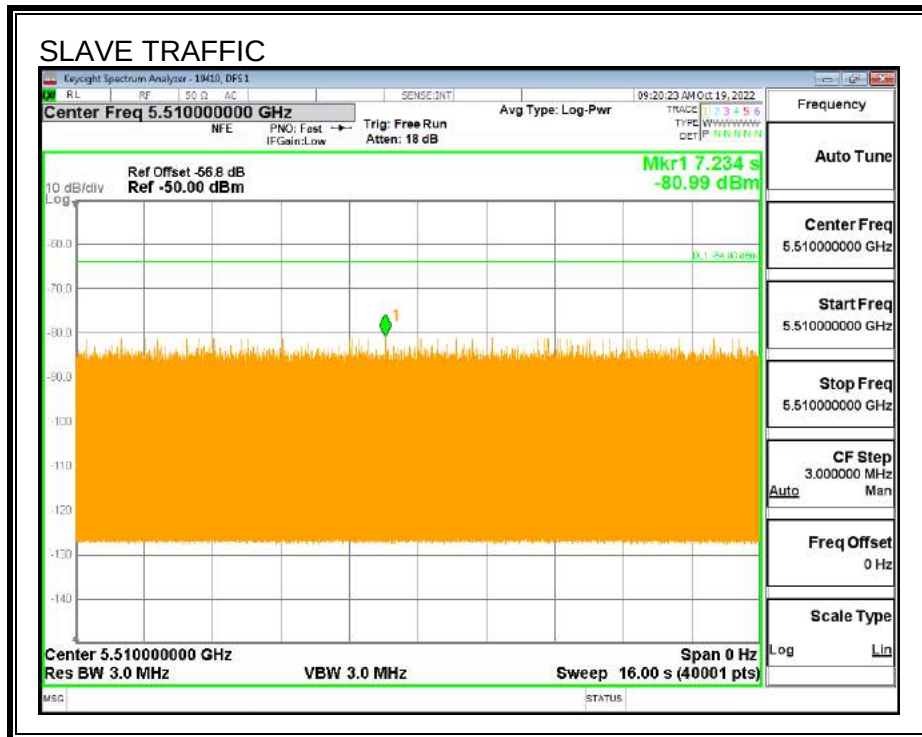


AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

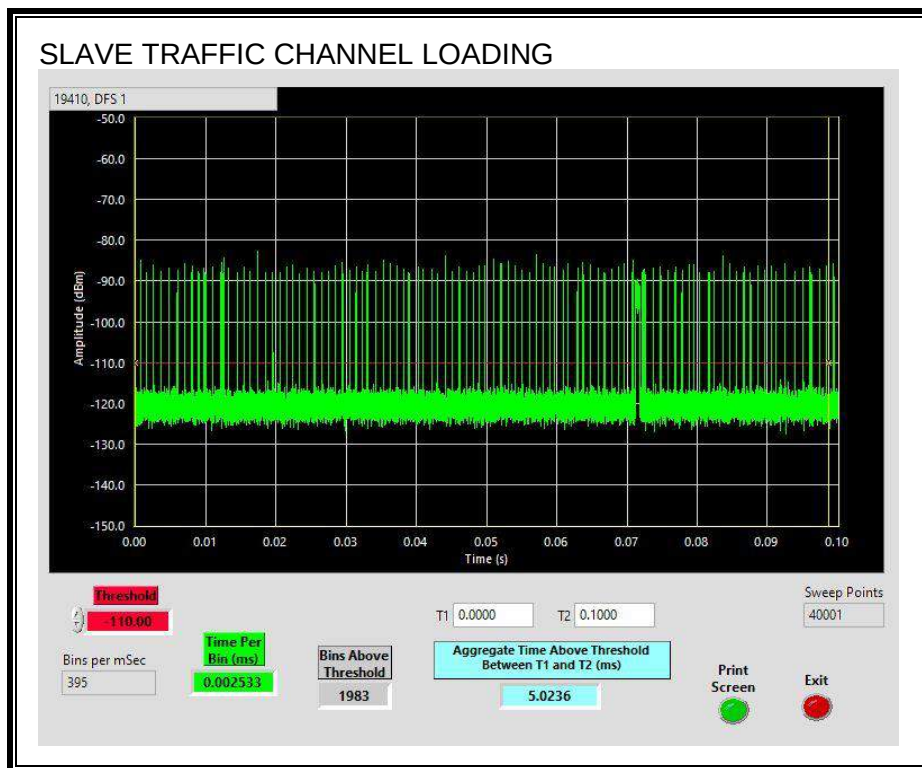
Only intermittent transmissions are observed during the aggregate monitoring period.



TRAFFIC



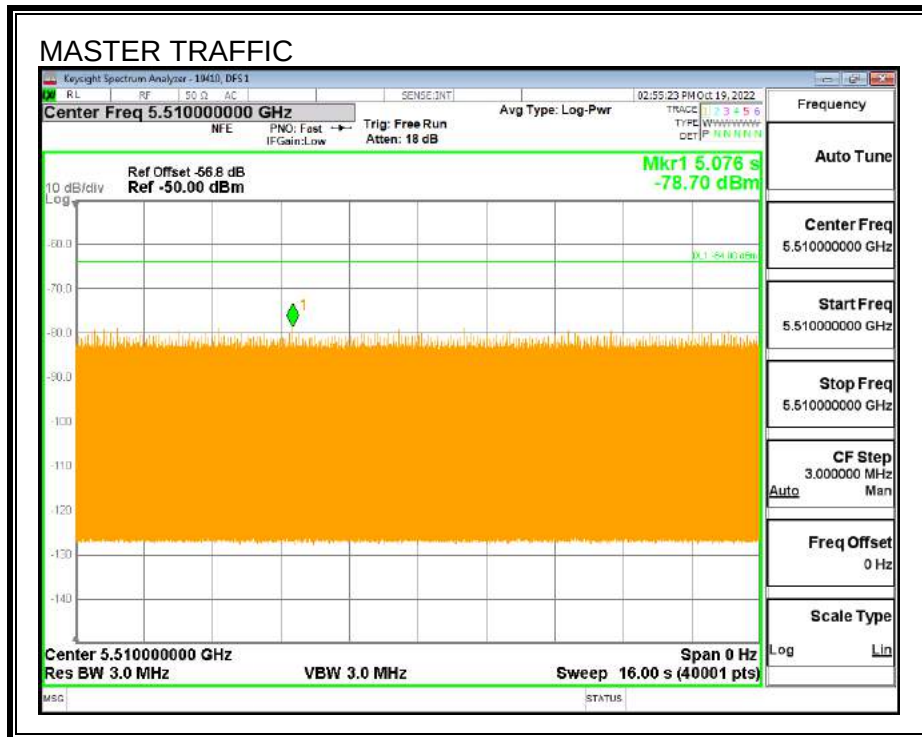
CHANNEL LOADING



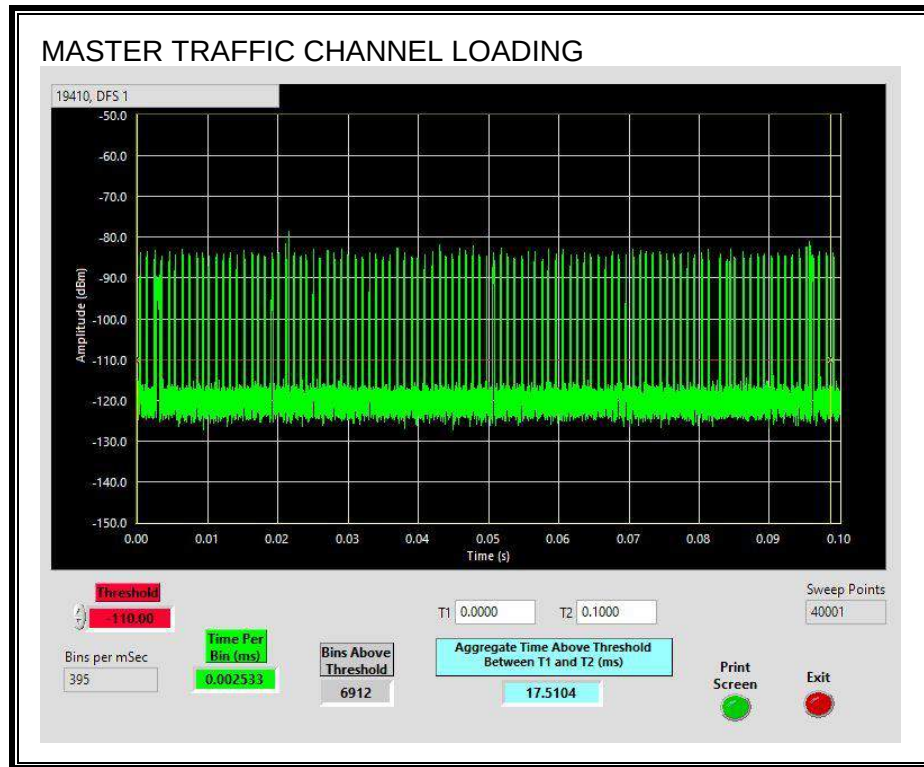
The level of traffic loading on the channel by the EUT is 5.02%

Per KDB 905462 D02 page 2, channel Loading is defined as the data transfer from the aster device to a client device. Therefore, the channel loading upon the Master Device meets the requirement as shown in the following plots taken from the Master Device test results.

TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 17.51%

10.3.3. MOVE AND CLOSING TIME OF SLAVE DEVICE IN RESPONSE TO DETECTION BY MASTER DEVICE

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)

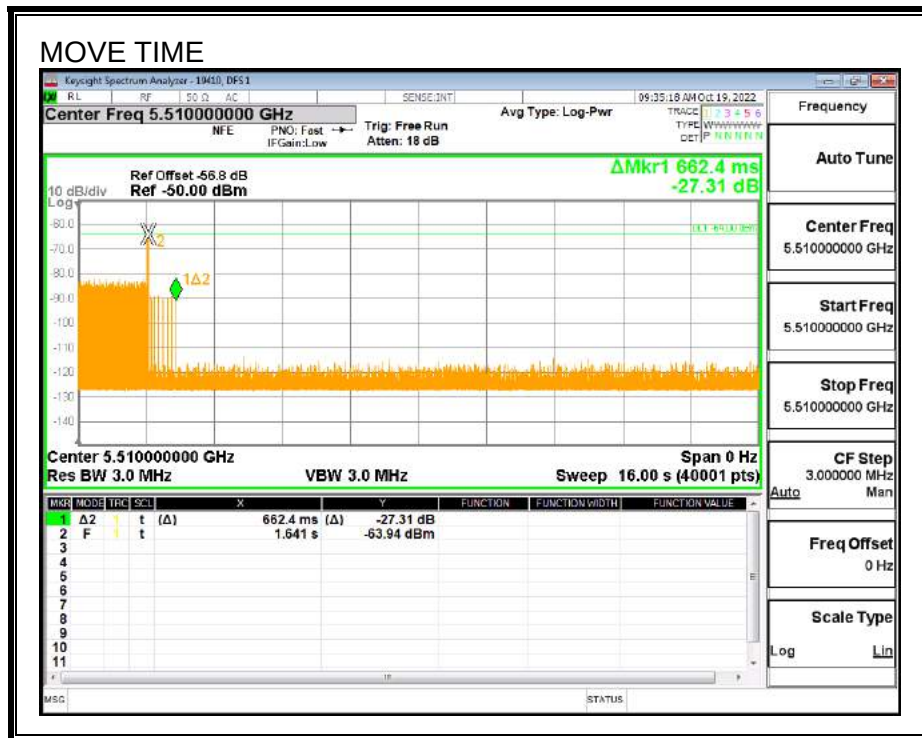
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

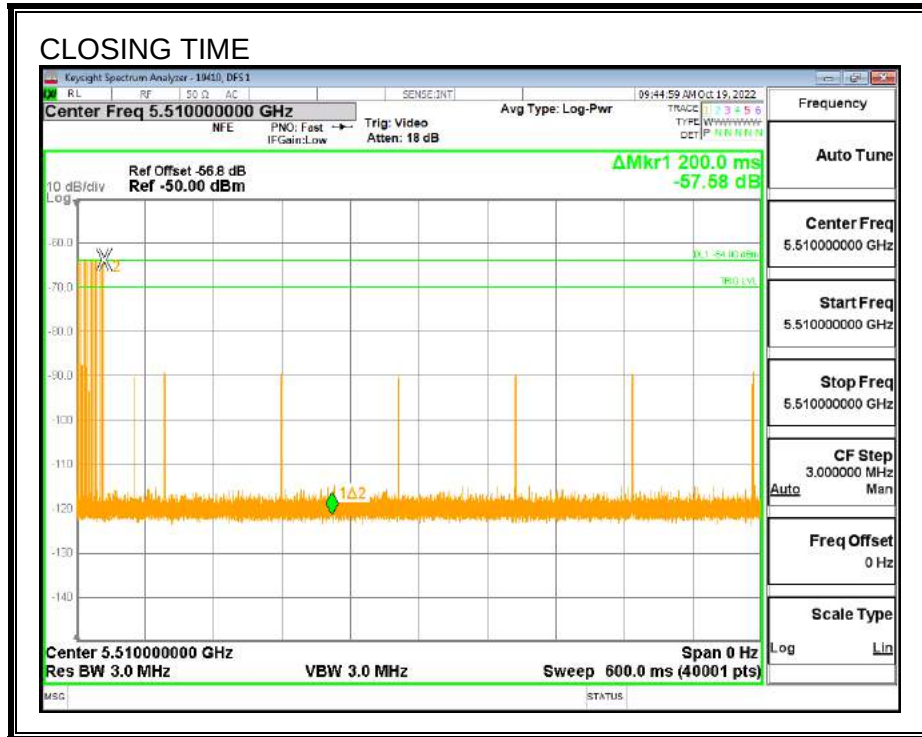
Channel Move Time (sec)	Limit (sec)
0.6624	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
6.0	60

MOVE TIME

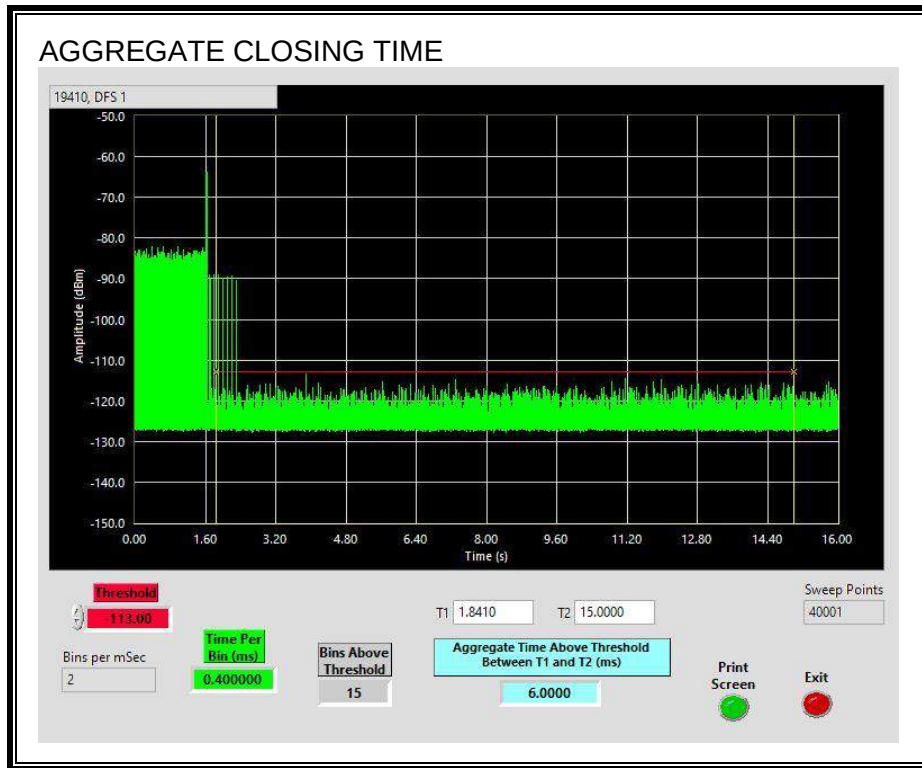


CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the aggregate monitoring period.



10.3.4. MOVE AND CLOSING TIME OF MASTER DEVICE IN RESPONSE TO DETECTION BY SLAVE DEVICE

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)

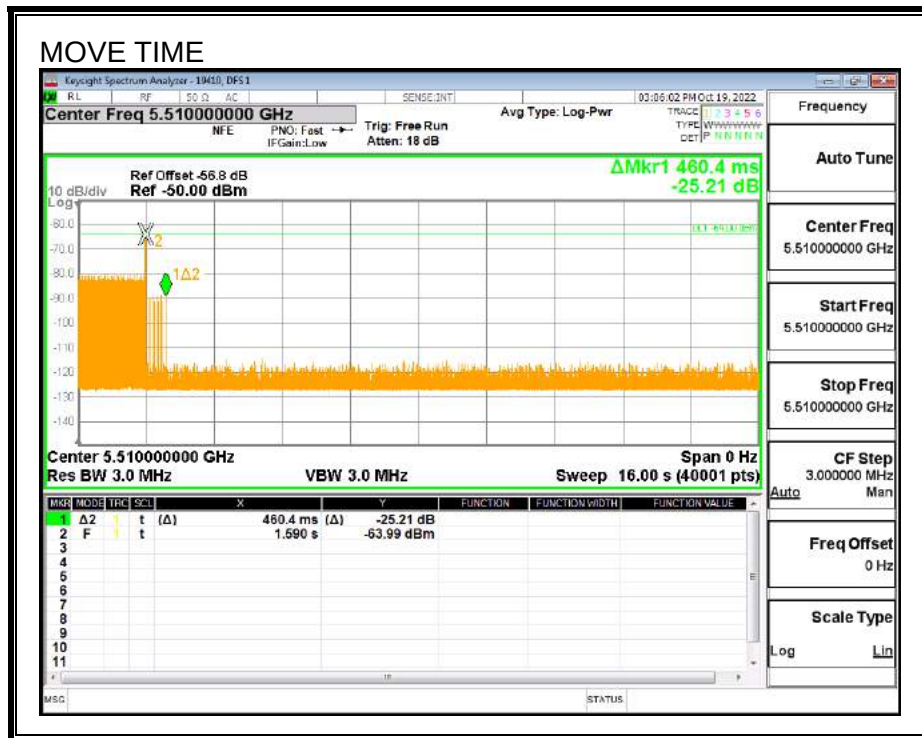
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

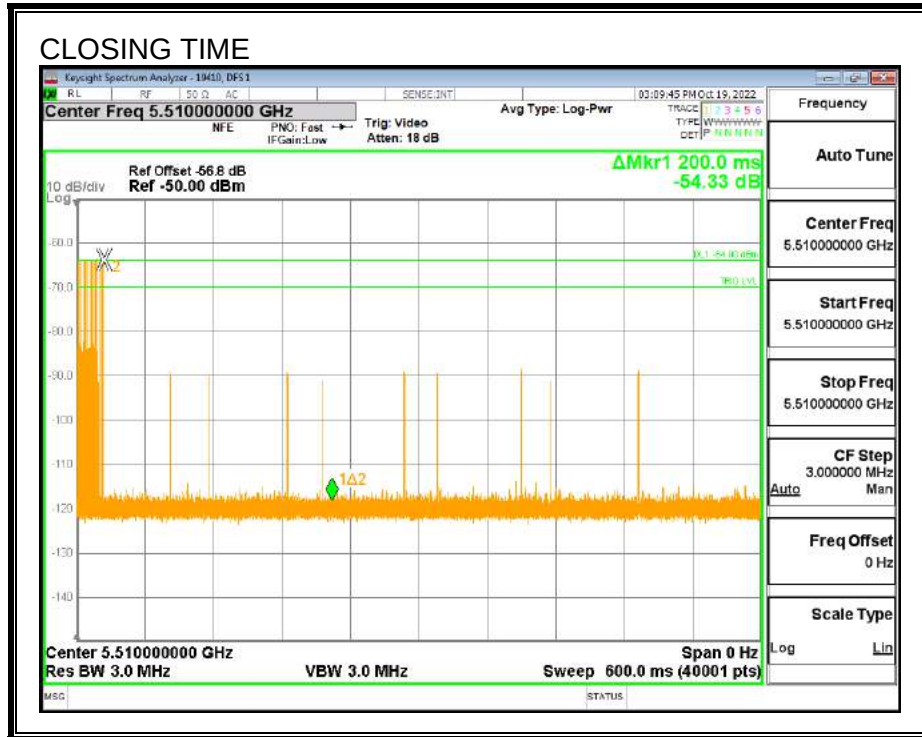
Channel Move Time (sec)	Limit (sec)
0.4604	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
3.2	60

MOVE TIME

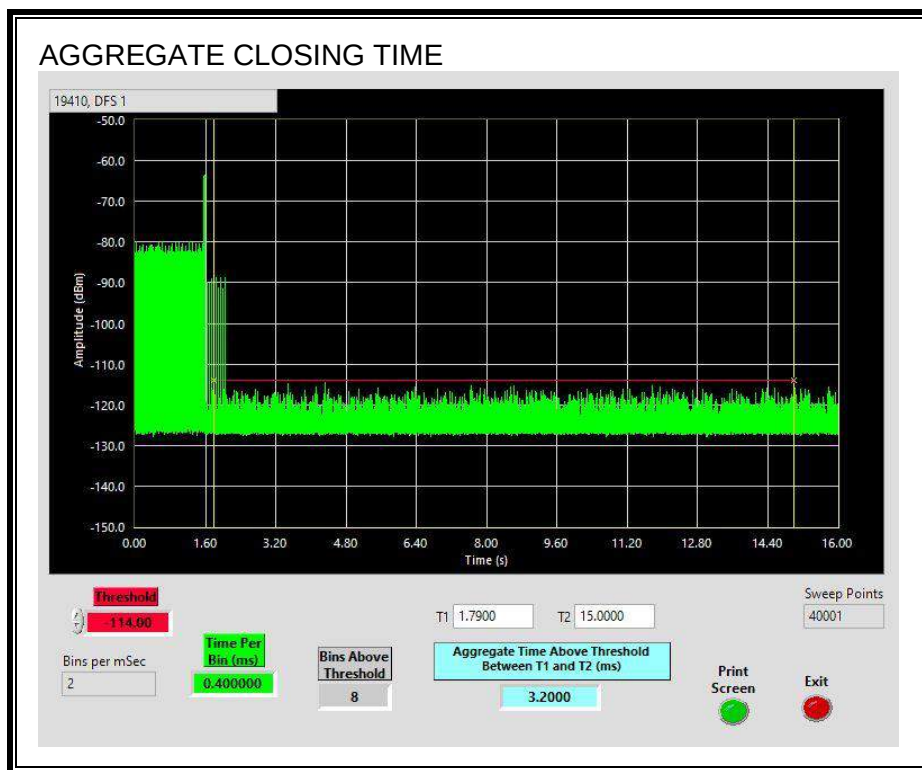


CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the aggregate monitoring period.



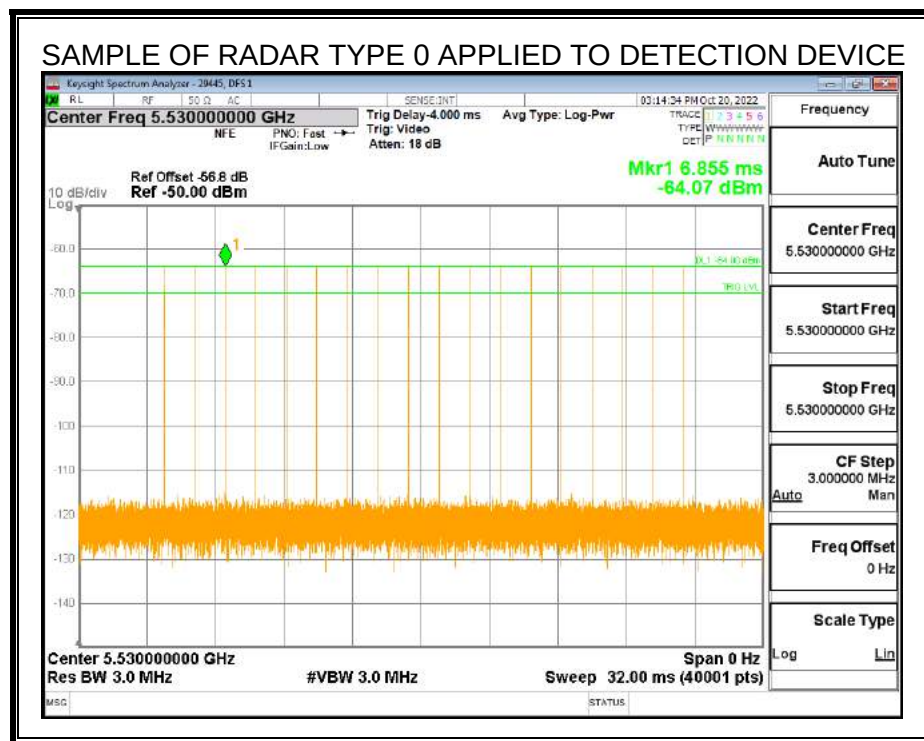
10.4. SLAVE DEVICE CONFIGURATION RESULTS FOR 80 MHz BANDWIDTH

10.4.1. TEST CHANNEL

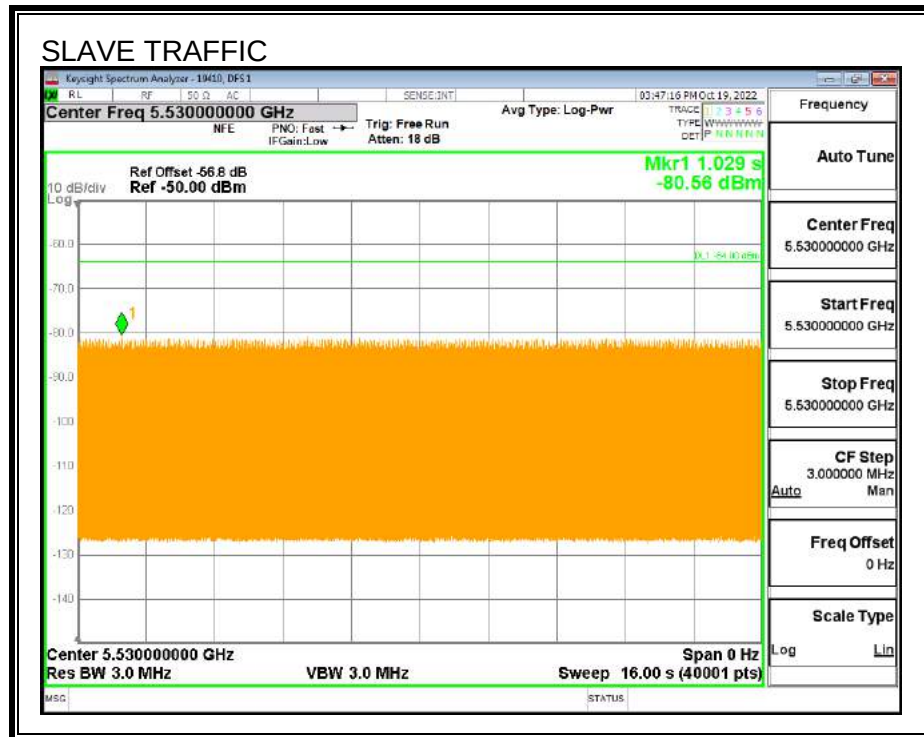
All tests were performed at a channel center frequency of 5530 MHz.

10.4.2. RADAR WAVEFORM AND TRAFFIC

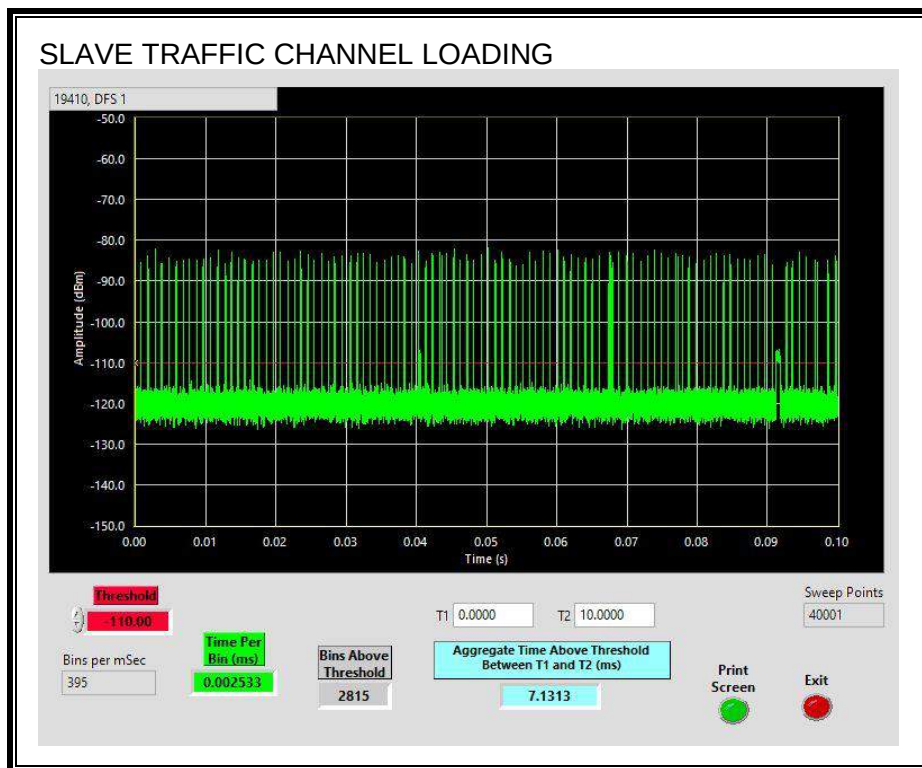
RADAR WAVEFORM



TRAFFIC



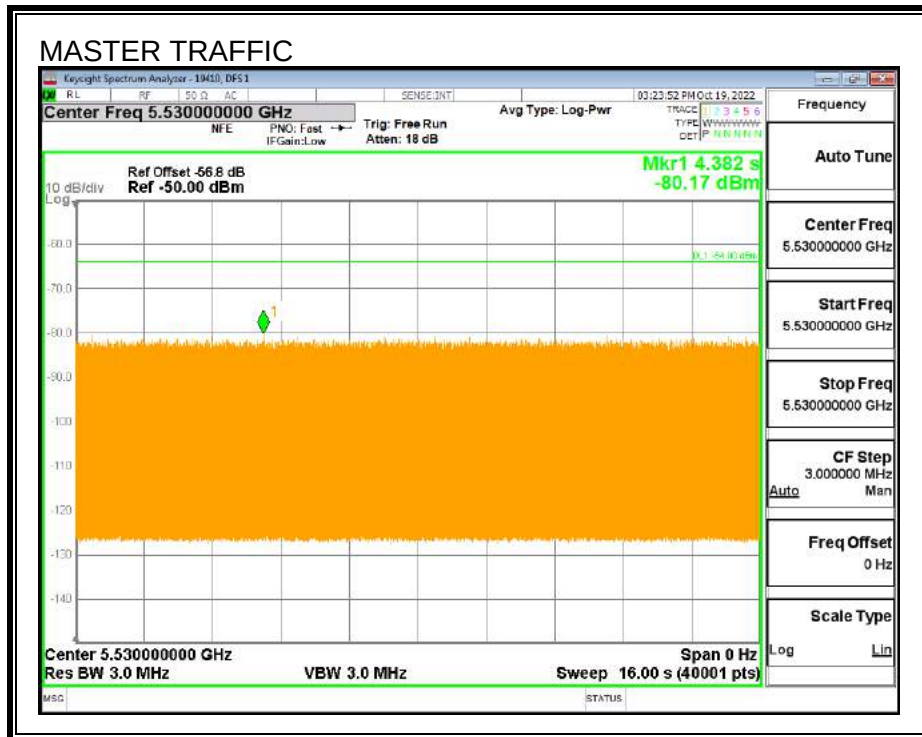
CHANNEL LOADING



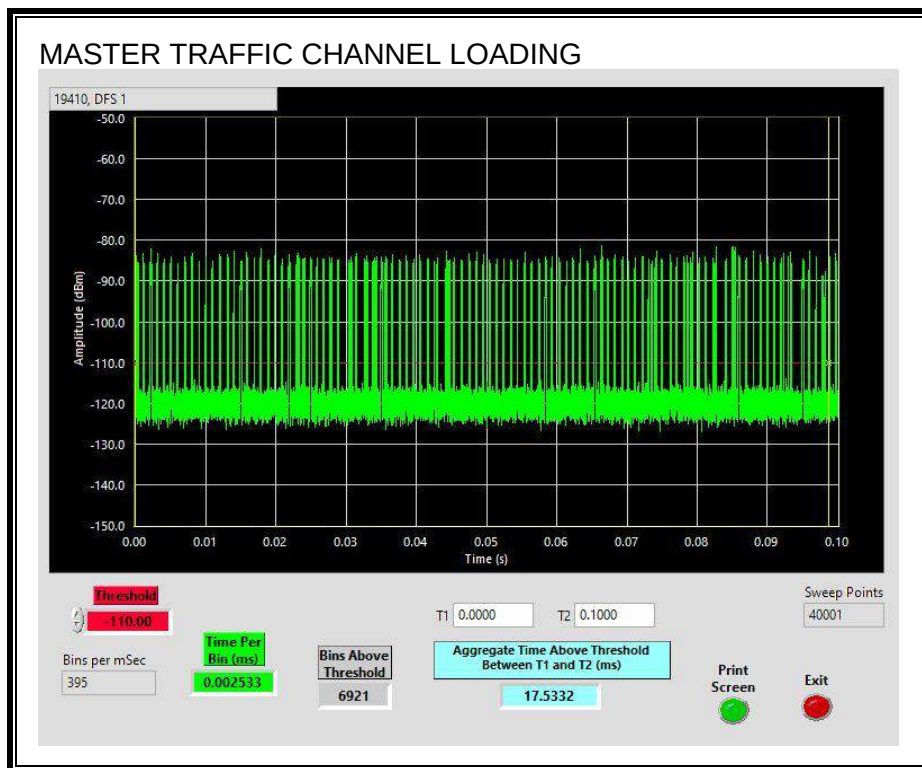
The level of traffic loading on the channel by the EUT is 7.13%

Per KDB 905462 D02 page 2, channel Loading is defined as the data transfer from the aster device to a client device. Therefore, the channel loading upon the Master Device meets the requirement as shown in the following plots taken from the Master Device test results.

TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 17.50%

10.4.3. MOVE AND CLOSING TIME OF SLAVE DEVICE IN RESPONSE TO DETECTION BY MASTER DEVICE

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)

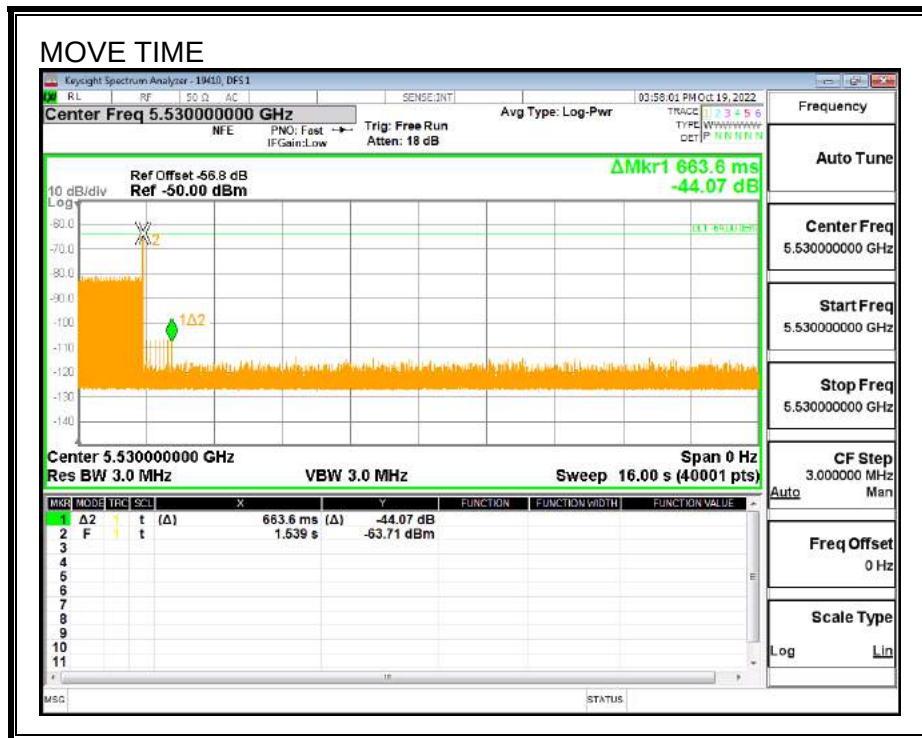
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

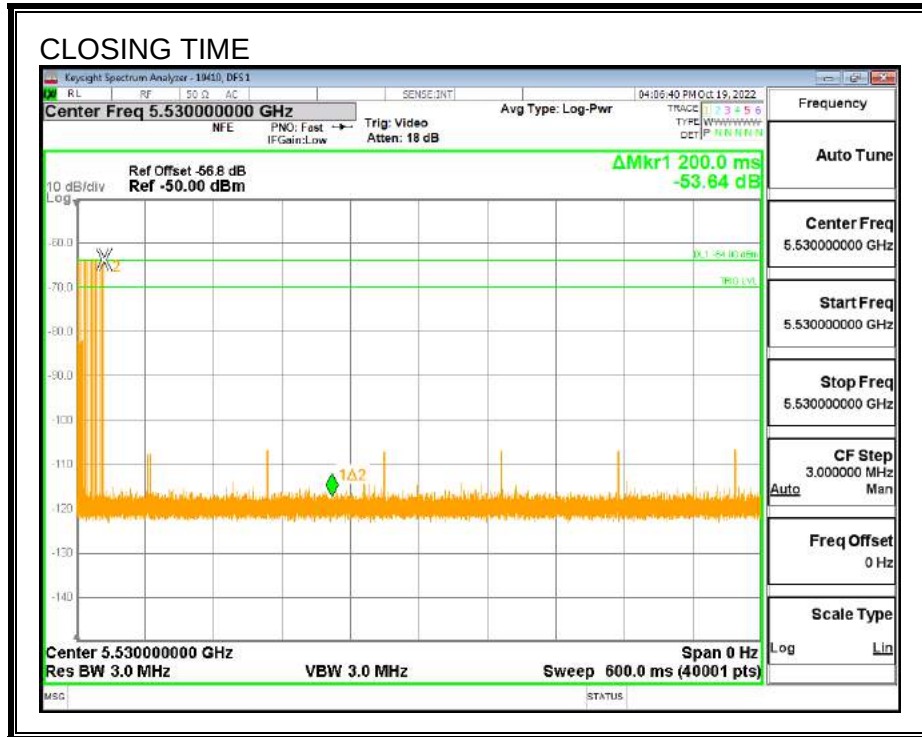
Channel Move Time (sec)	Limit (sec)
0.6636	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
6.4	60

MOVE TIME

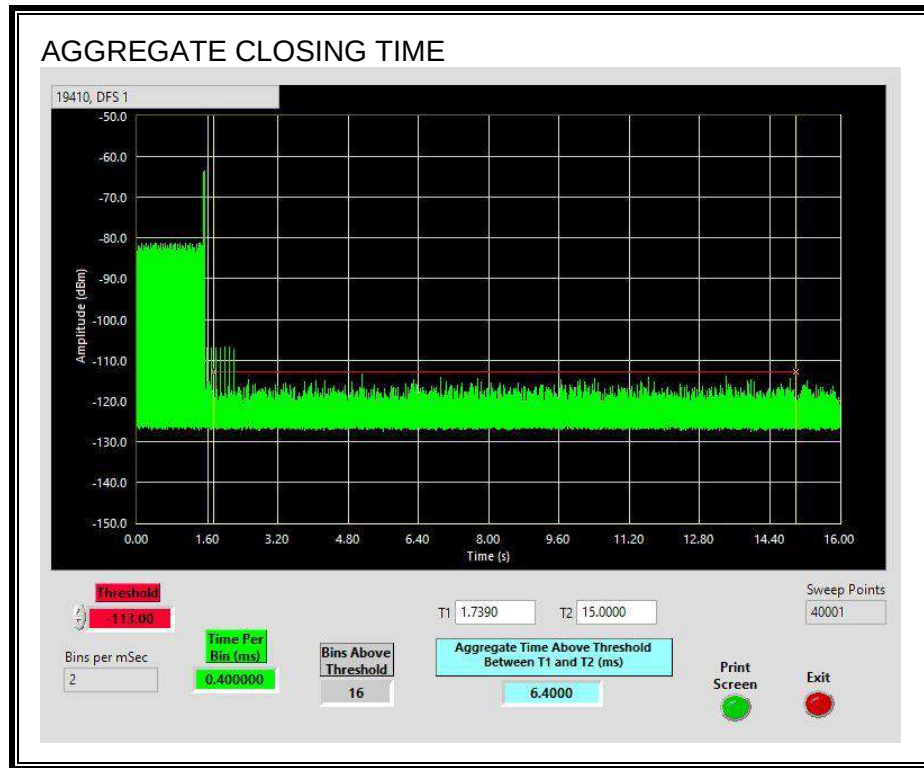


CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

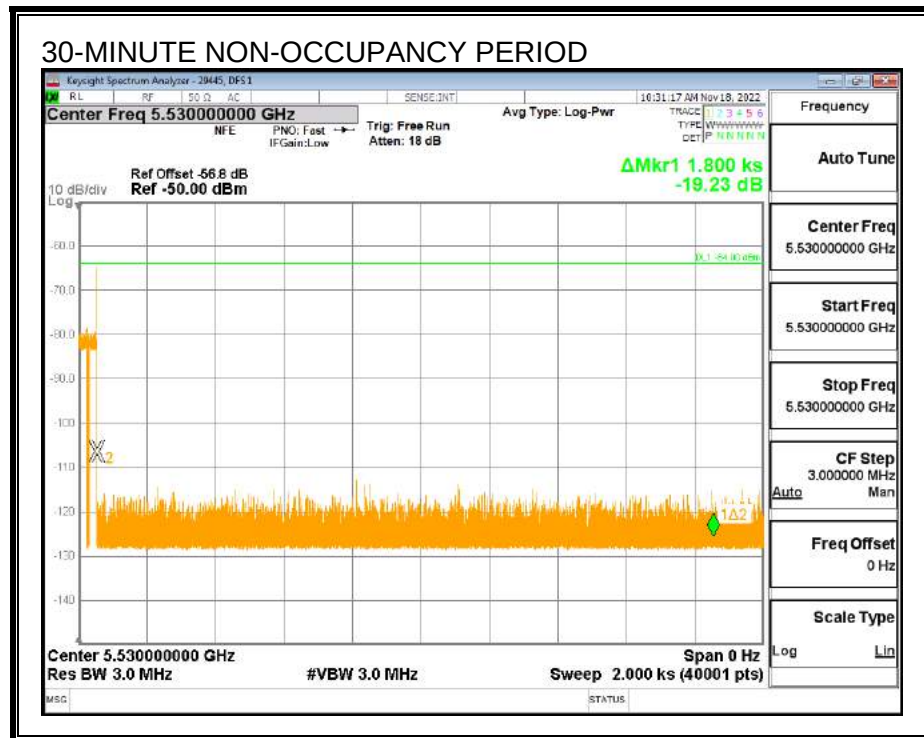
No transmissions are observed during the aggregate monitoring period.



10.4.4. 30-MINUTE NON-OCCUPANCY PERIOD OF SLAVE DEVICE IN RESPONSE TO DETECTION BY MASTER DEVICE

RESULTS

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



10.4.5. MOVE AND CLOSING TIME OF MASTER DEVICE IN RESPONSE TO DETECTION BY SLAVE DEVICE

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)

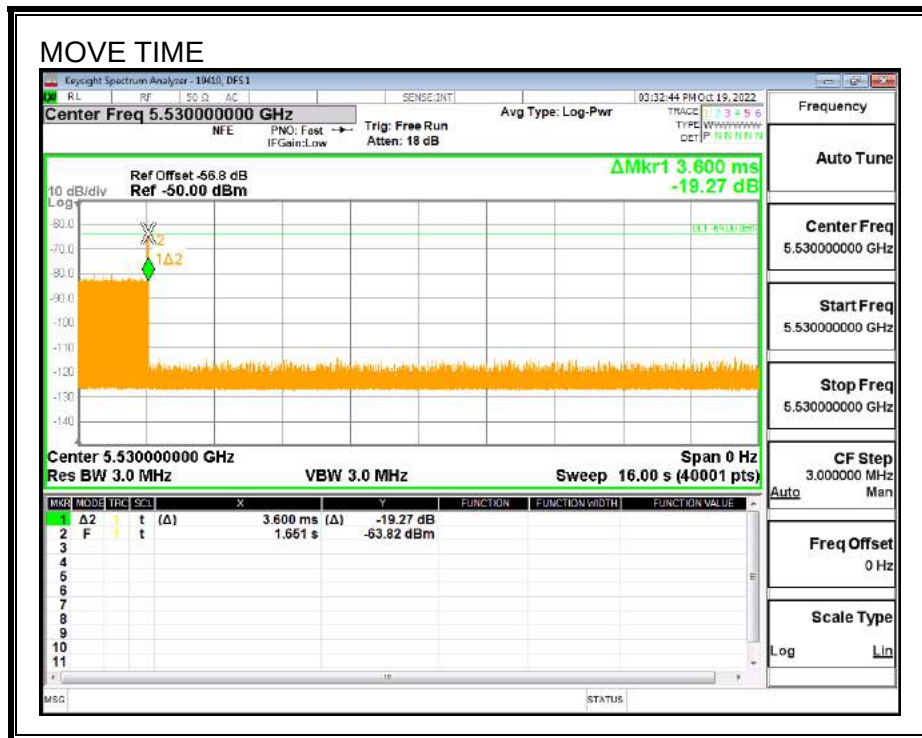
The observation period over which the aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

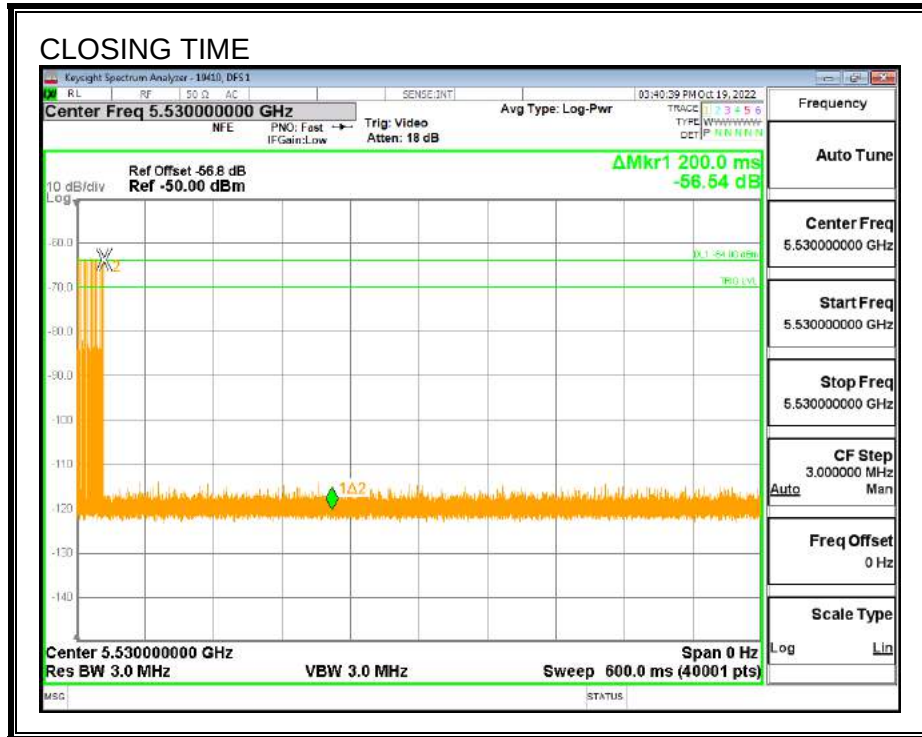
Channel Move Time (sec)	Limit (sec)
0.0036	10

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

MOVE TIME

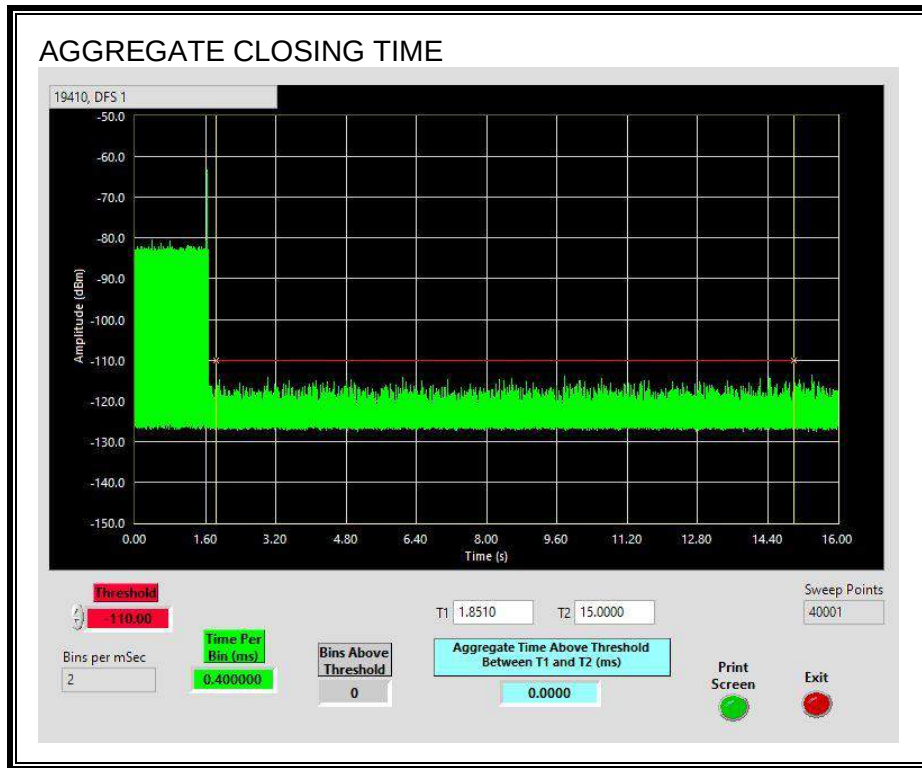


CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

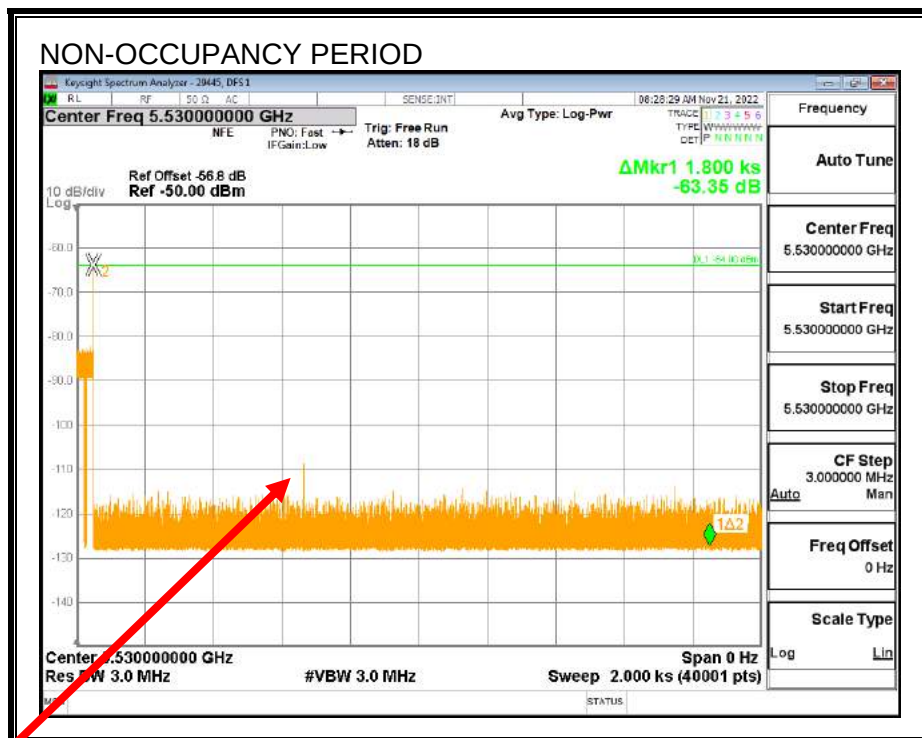
No transmissions are observed during the aggregate monitoring period.



10.4.6. NON-OCCUPANCY PERIOD OF MASTER DEVICE IN RESPONSE TO DETECTION BY SLAVE DEVICE

RESULTS

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



Note: This signal has been declared and determined, by the chipset vendor Qualcomm, to be due to a short-duration transmission on an adjacent channel during the initial radio calibration of a new operating channel after a successful Channel Availability Check on that new channel. A portion of the out-of-band emissions associated with that transmission fall within the channel under test, resulting in the observed spike signal. Therefore, this emission does not represent a failure of the DFS CAC test under observation. Rather, this signal is subject to the limits for in-band emissions, out-of-band emissions and spurious emissions, where applicable, and not addressed in this test report.

END OF TEST REPORT