DFS PORTION of FCC 47 CFR PART 15 SUBPART E
DFS PORTION of INDUSTRY CANADA RSS-210 ISSUE 8

CERTIFICATION TEST REPORT

FOR

MODULAR (PTP/PMP) ePMP 5 GHz TRANSCEIVER

MODEL NUMBER: C058900C062A, C058900P062A, C058900C072A and C058900P072A

FCC ID: ZH889FT0015
IC: 109W-0015

REPORT NUMBER: 15N20301-1

ISSUE DATE: MARCH 25, 2015

Prepared for
CAMBIUM NETWORKS
3800 GOLF ROAD
ROLLING MEADOWS, IL 60008-4023, U.S.A.

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	03/25/15	Initial Issue	C. Cheung

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: CAMBIUM NETWORKS
3800 GOLF ROAD
ROLLING MEADOWS, IL 60008-4023, U.S.A.

EUT DESCRIPTION: MODULAR (PTP/PMP) ePMP 5 GHz TRANSCEIVER

MODEL: C058900C062A, C058900P062A, C058900C072A and C058900P072A

MODELS TESTED: C058900P062A (DISH) and C058900P072A (ARRAY)

SERIAL NUMBER: 00 04 56 F8 01 EB / 00 04 56 F8 02 7B (MASTER / SLAVE)

DATE TESTED: MARCH 17 to 19, 2015

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
DFS Portion of CFR 47 Part 15 Subpart E	Pass
INDUSTRY CANADA RSS-GEN Issue 8	Pass

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

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

Approved & Released For
UL Verification Services Inc. By:

CONAN CHEUNG
PROJECT LEAD
UL Verification Services Inc.

Tested By:

DOUG ANDERSON
EMC ENGINEER
UL Verification Services Inc.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with the DFS portion of FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 06-96, FCC KDB 789033, ANSI C63.10-2013, RSS-GEN Issue 8.

3. FACILITIES AND ACCREDITATION

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	±3.52 dB
Radiated Disturbance, 30 to 1000 MHz	±4.94 dB

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

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5. DYNAMIC FREQUENCY SELECTION

5.1. OVERVIEW

5.1.1. LIMITS

INDUSTRY CANADA

IC RSS-210 is closely harmonized with FCC Part 15 DFS rules. The deviations are as follows:

RSS-210 Issue 7 A9.4 (b) (ii) **Channel Availability Check Time:** …

Additional requirements for the band 5600-5650 MHz: Until further notice, devices subject to this Section shall not be capable of transmitting in the band 5600-5650 MHz, so that Environment Canada weather radars operating in this band are protected.

FCC

§15.407 (h) and FCC 06-96 APPENDIX "COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVCIES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION".

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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
Uniform Spreading	Yes	Not required	Not required

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

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

Maximum Transmit Power	Value (see note)
≥ 200 milliwatt	-64 dBm
< 200 milliwatt	-62 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.	

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Table 4: DFS Response requirement values

Parameter	Value
Non-occupancy period	30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds
Channel Closing Transmission Time	200 milliseconds + approx. 60 milliseconds over remaining 10 second period
The instant that the *Channel Move Time* and the *Channel Closing Transmission Time* begins is as follows: For the Short pulse radar Test Signals this instant is the end of the *Burst*. For the Frequency Hopping radar Test Signal, this instant is the end of the last radar burst generated. For the Long Pulse radar Test Signal this instant is the end of the 12-second period defining the radar transmission. The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate channel changes (an aggregate of approximately 60 milliseconds) during the remainder of the 10-second period. The aggregate duration of control signals will not count quiet periods in between transmissions.	

Table 5 – Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (Microseconds)	PRI (Microseconds)	Pulses	Minimum Percentage of Successful Detection	Minimum Trials
1	1	1428	18	60%	30
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

Table 6 – Long Pulse Radar Test Signal

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

Table 7 – Frequency Hopping Radar Test Signal

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

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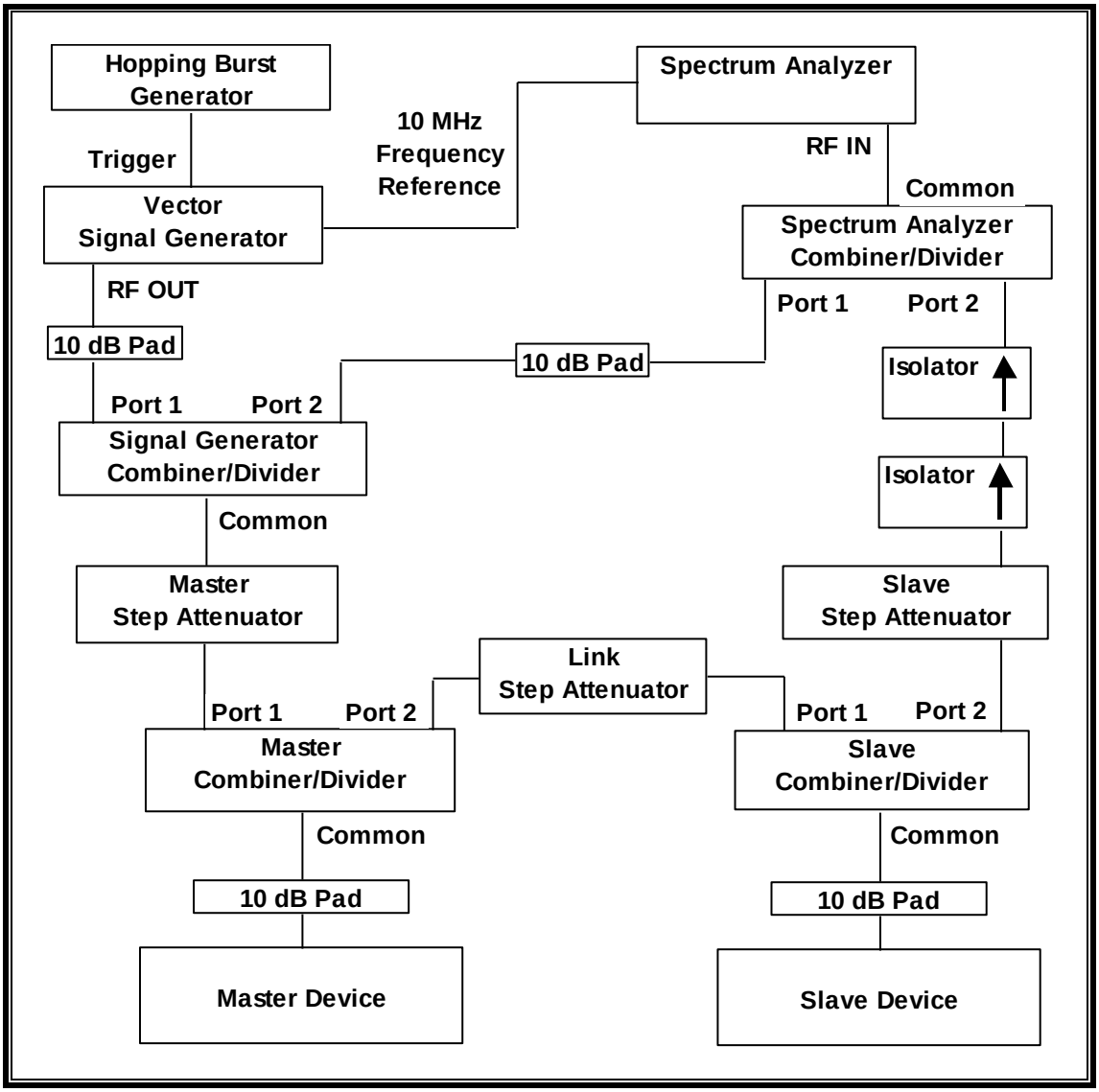
5.1.2. TEST AND MEASUREMENT SYSTEM

CONDUCTED METHOD SYSTEM BLOCK DIAGRAM



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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 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 FCC 06-96 APPENDIX. 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 are 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.

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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. The video test file is streamed to generate WLAN traffic. 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 DFS tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset Number**	**Cal Due**
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	09/05/15
Vector Signal Generator, 20GHz	Agilent / HP	E8267C	C01066	09/03/15
Arbitrary Waveform Generator	Agilent	33220A	C01168	04/03/15

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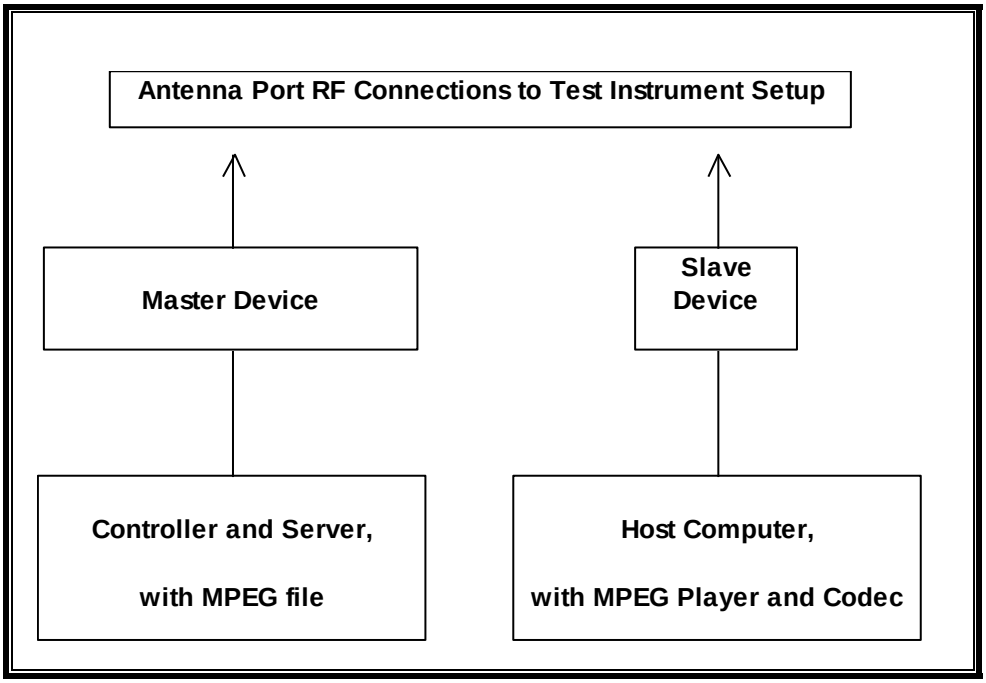
5.1.3. SETUP OF EUT

CONDUCTED METHOD EUT TEST SETUP



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SUPPORT EQUIPMENT

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

MASTER CONFIGURATION:

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
P.O.E.Injector (Master)	Phihong	PSA15M-360(SM)	None	DoC
Modualr (PTP/PMP) ePMP 5 GHz Transceiver (Slave Device)	Cambium Networks	C058900C062A (Dish) / C058900C072A (Array)	00 04 56 F8 00 7B	Z8H89FT0015
P.O.E.Injector (Slave)	Phihong	PSA15M-360(SM)	None	DoC
Notebook PC (Controller/Server)	Lenovo	Type 20B7-S0A200	PF-02JN9J 14/06	DoC
AC Adapter (Controller/Server PC)	Lenovo	ADLX65NLC2A	11S45N0259Z1ZS9 74594A9	DoC
Notebook PC (Host)	Motorola	HK1322	3433JC0021	DoC
AC Adapter (Host PC)	Hipro	HP-OW120F13	F3-070900272401	DoC

SLAVE CONFIGURATION:

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Modualr (PTP/PMP) ePMP 5 GHz Transceiver (Master Device)	Cambium Networks	C058900C062A (Dish) / C058900C072A (Array)	00 04 56 F8 01 EB	Z8H89FT0015
P.O.E.Injector (Master)	Phihong	PSA15M-360(SM)	None	DoC
P.O.E.Injector (Slave)	Phihong	PSA15M-360(SM)	None	DoC
Notebook PC (Controller/Server)	Lenovo	Type 20B7-S0A200	PF-02JN9J 14/06	DoC
AC Adapter (Controller/Server PC)	Lenovo	ADLX65NLC2A	11S45N0259Z1ZS9 74594A9	DoC
Notebook PC (Host)	Motorola	HK1322	3433JC0021	DoC
AC Adapter (Host PC)	Hipro	HP-OW120F13	F3-070900272401	DoC

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5.1.4. DESCRIPTION OF EUT

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 or a Slave Device without Radar Detection.

Two identical radio devices, one configured as a Master and the other configured as a Slave are associated during testing. The configuration is achieved choosing the role of each device via the system software GUI.

The highest power level within these bands is 30 dBm EIRP in the 5250-5350 MHz band and 30 dBm EIRP in the 5470-5725 MHz band.

The highest gain antenna assembly utilized with the EUT has a gain of 24 dBi in the 5250-5350 MHz band and 24 dBi in the 5470-5725 MHz band. The lowest gain antenna assembly utilized with the EUT has a gain of 2.15 dBi in the 5250-5350 MHz band and 2.15 dBi in the 5470-5725 MHz band.

The EUT can be equipped with a range of antennas options including, but not limited to: Integrated Dipole (2.15 dBi gain), Array (17 dBi gain), or Dish (24 dBi gain). The test was performed using the lowest gain value of 2.15 dBi.

One dual-polarized integrated dipole antenna is 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 + 2.15 + 1 = -60.85 dBm.

The calibrated conducted DFS Detection Threshold level at the antenna port is set to –60.85 dBm.

The EUT uses two transmitter/receiver chains, each connected to a 50-ohm coaxial antenna port. All antenna ports are connected to the test system via a power divider to perform conducted tests.

The EUT is a frame-based system. EUT system traffic was tested while running at a worst-case 75/25 percent uplink to downlink ratio.

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

The EUT utilizes the 802.11a/n architecture. Two nominal channel bandwidths are implemented: 10 MHz and 40 MHz.

The software installed in the EUT is version 2.3.

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UNIFORM CHANNEL SPREADING

See Manufacturer's Attestation for Master configuration.

For Slave configuration this requirement is not applicable.

OVERVIEW OF MASTER DEVICE USED DURING SLAVE DEVICE TESTING WITH RESPECT TO §15.407 (h) REQUIREMENTS

The Master Device is a Cambium Networks Modular (PMP/PTP) ePTP 5 GHz Transceiver, FCC ID: ZH889FT0015. The minimum antenna gain for the Master Device is 2.15 dBi.

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 + 2.15 + 1 = -60.85 dBm.

The calibrated radiated DFS Detection Threshold level is set to –60.85 dBm.

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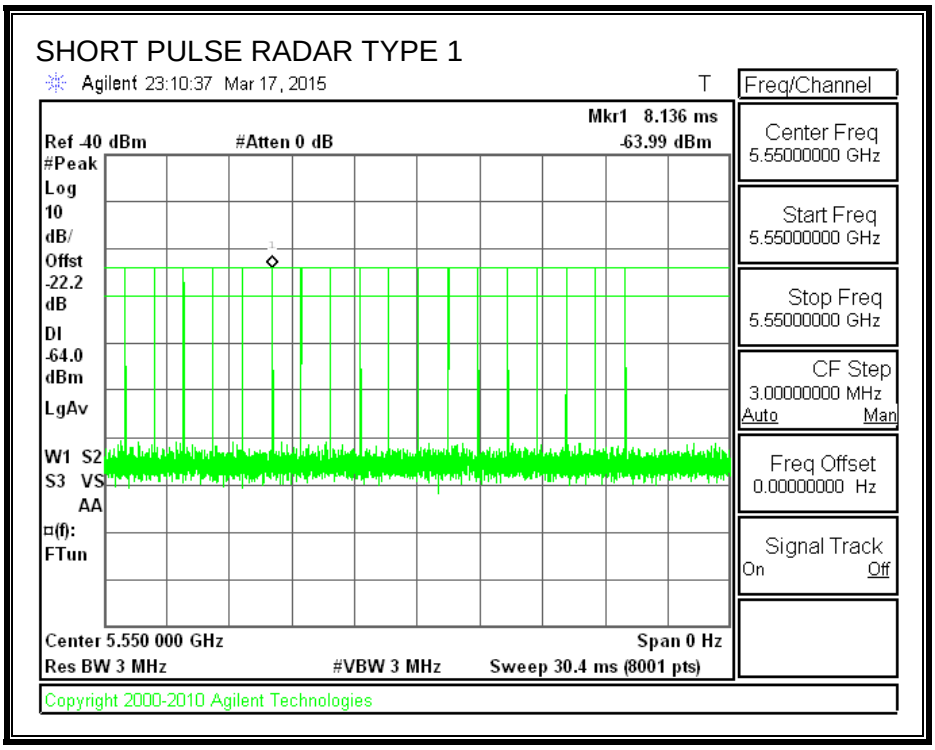
5.2. MASTER DEVICE TEST CHANNEL

All tests were performed at a channel center frequency of 5550 MHz.

5.3. MASTER DEVICE RADAR WAVEFORMS

RADAR WAVEFORMS



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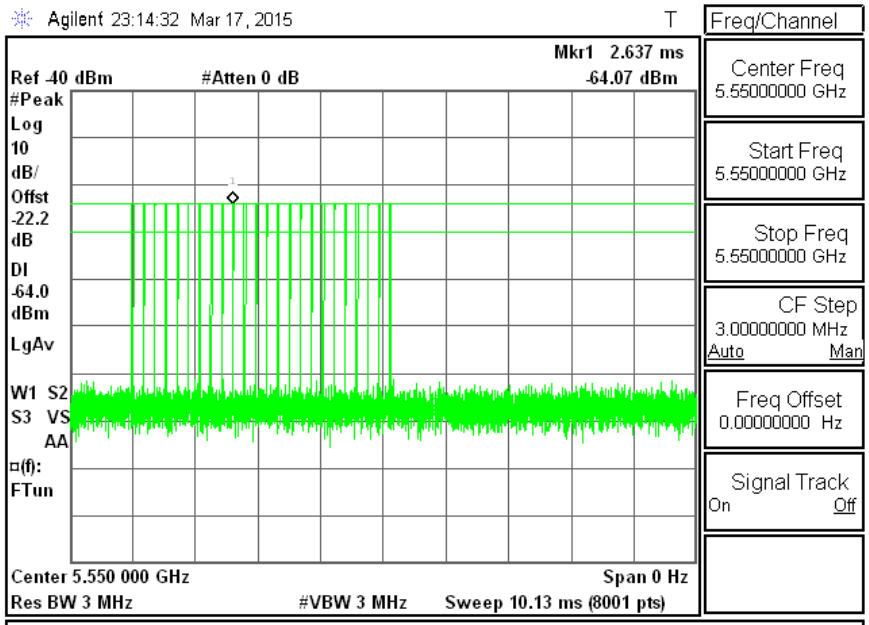
SAMPLE OF RADAR TYPE 2



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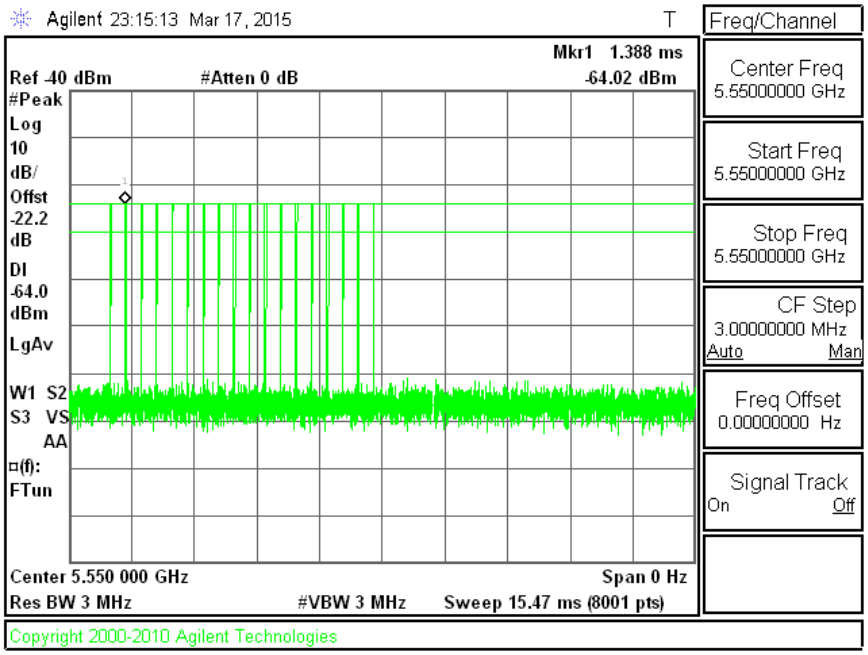
SAMPLE OF RADAR TYPE 3



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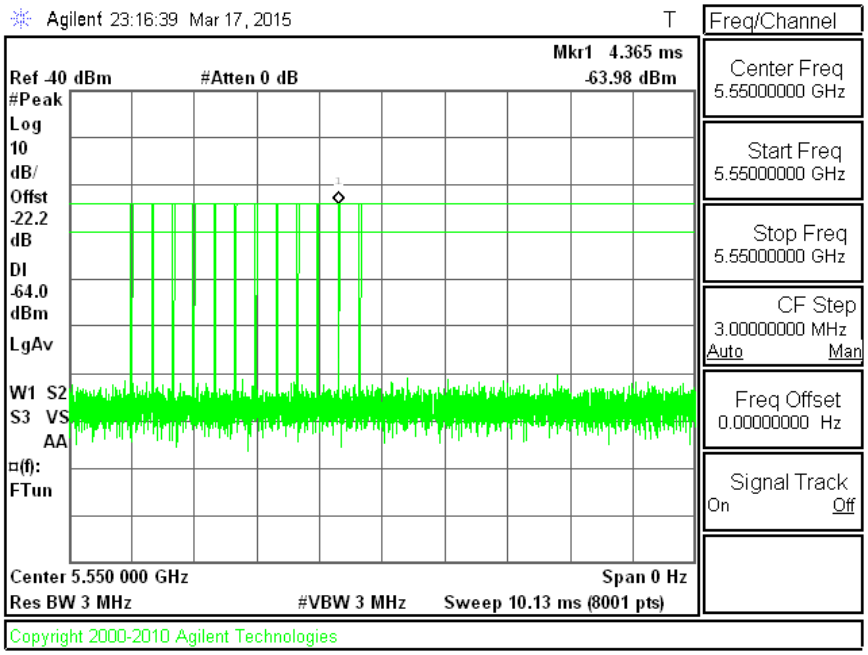
SAMPLE OF RADAR TYPE 4



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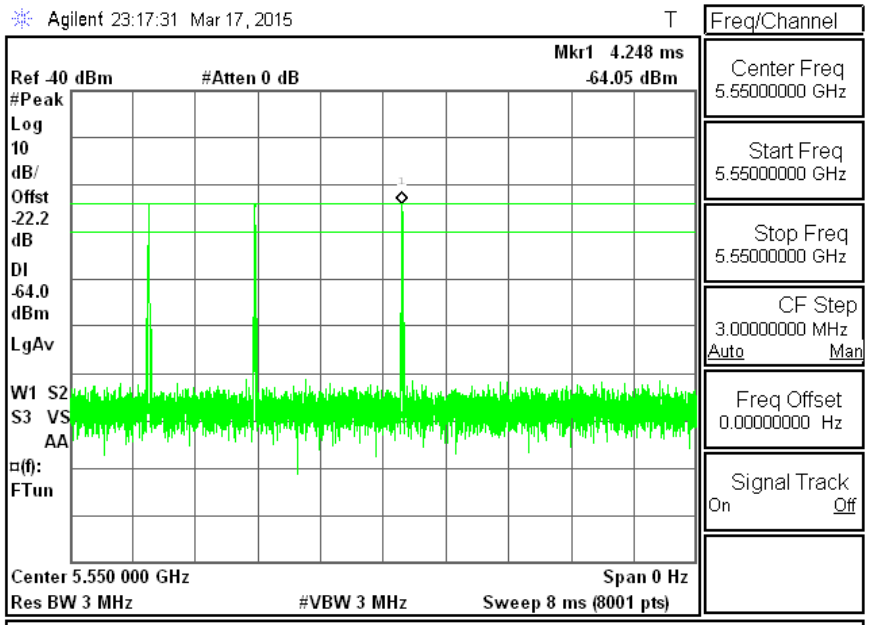
SAMPLE OF SINGLE BURST OF RADAR TYPE 5



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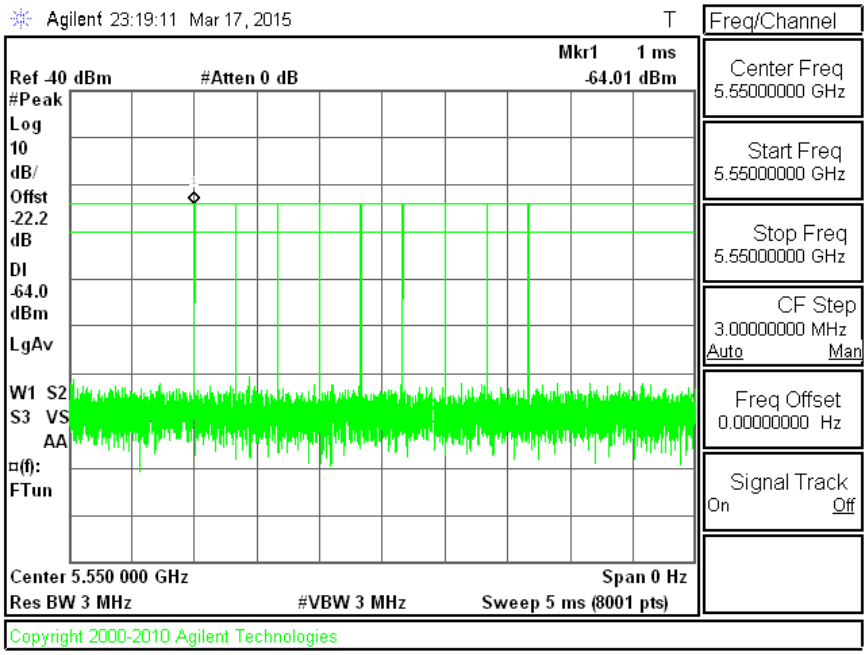
SINGLE BURST OF RADAR TYPE 6



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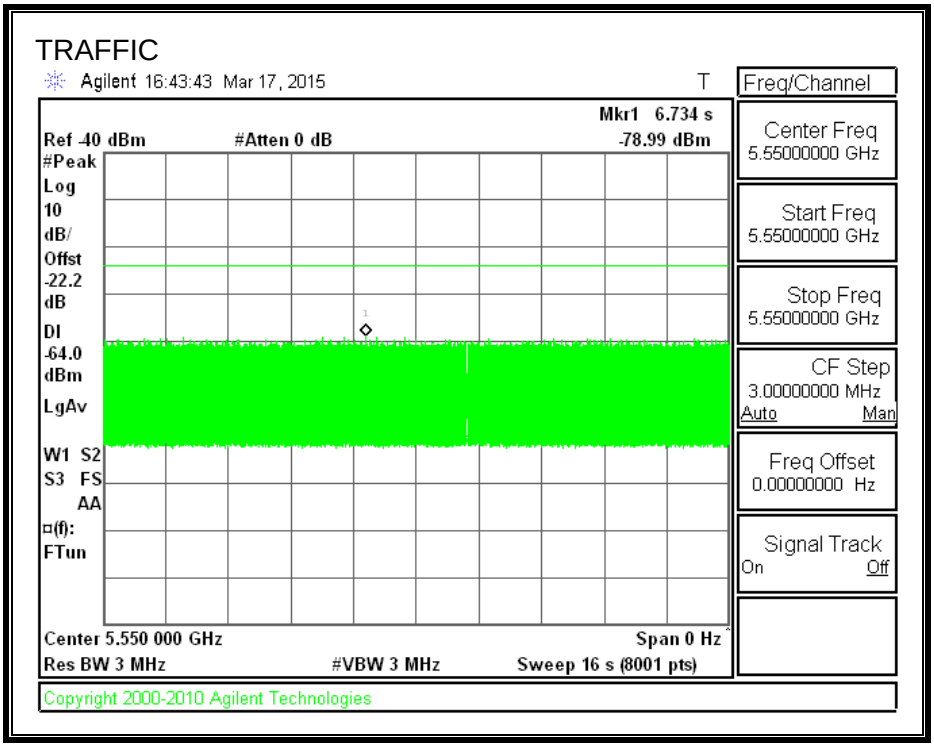
5.4. MASTER DEVICE RESULTS FOR 10 MHz BANDWIDTH

5.4.1. TRAFFIC AND CHANNEL LOADING

TRAFFIC



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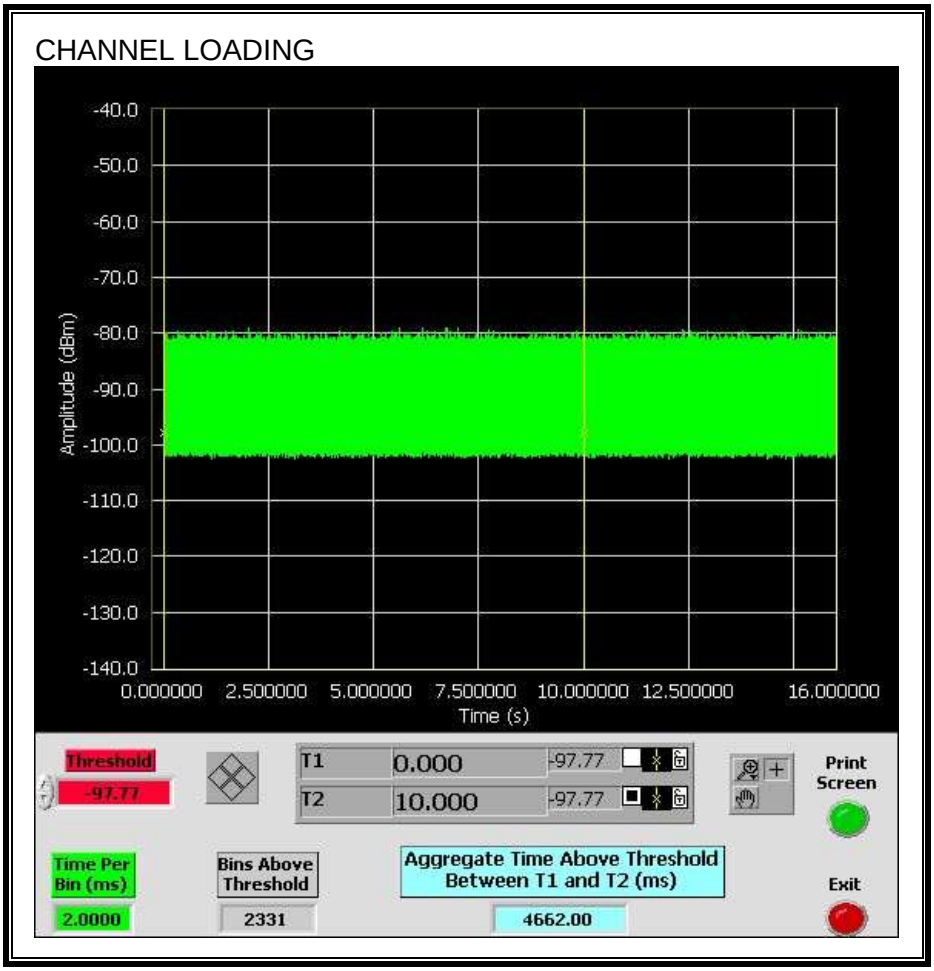
CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 46.62%

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5.4.2. CHANNEL AVAILABILITY CHECK TIME

PROCEDURE TO DETERMINE INITIAL POWER-UP CYCLE TIME

A link was established on channel then a software reboot command was issued to the EUT. 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.

An additional sweep was performed where the radar signal was triggered within 61 to 67 seconds after the initial power-up period to simulate the settings of an actual shipping radio. The transmissions on the channel were then monitored on the spectrum analyzer after the radar burst was triggered.

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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)
31.12	125.1	94.0	27.0

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)
30.6	59.85	29.3	2.3

Radar Near End of CAC (54 to 60 Second Timing)

Timing of Reboot (sec)	Timing of Radar Burst (sec)	Radar Relative to Reboot (sec)	Radar Relative to Start of CAC (sec)
30.23	113.8	83.6	56.6

Radar Near End of CAC (61 to 67 Second Timing)

Timing of Reboot (sec)	Timing of Radar Burst (sec)	Radar Relative to Reboot (sec)	Radar Relative to Start of CAC (sec)
30.94	121.9	91.0	64.0

Note: EUT CAC timing of an actual shipping radio is 67 seconds per client declaration.

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
Within 61 to 67 second window	EUT indicates radar detected	No transmissions on channel

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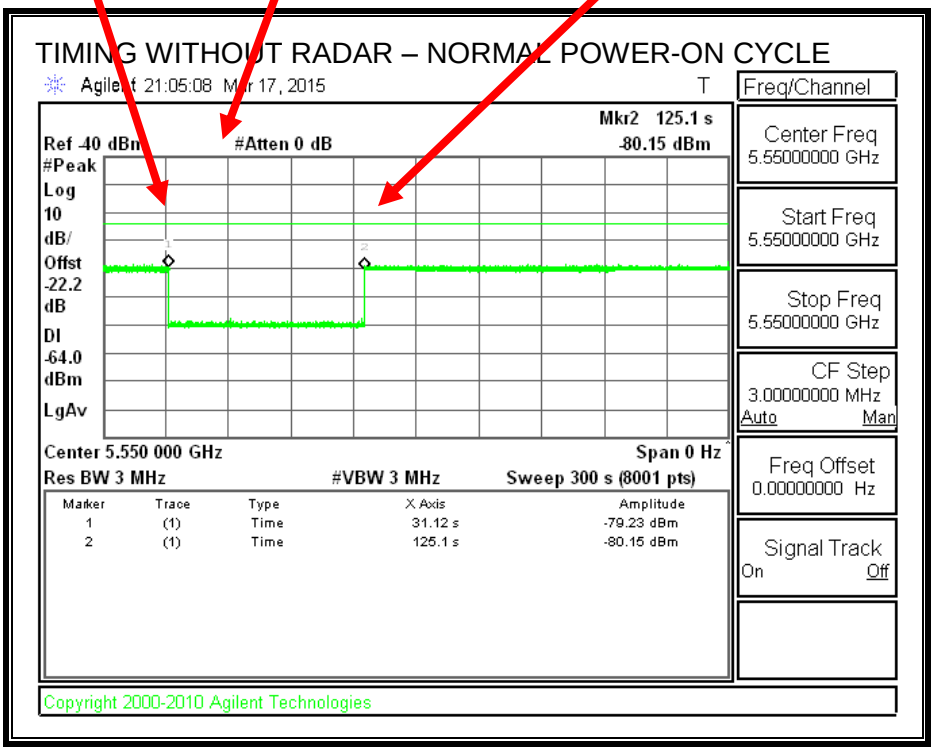
TIMING WITHOUT RADAR DURING CAC

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.

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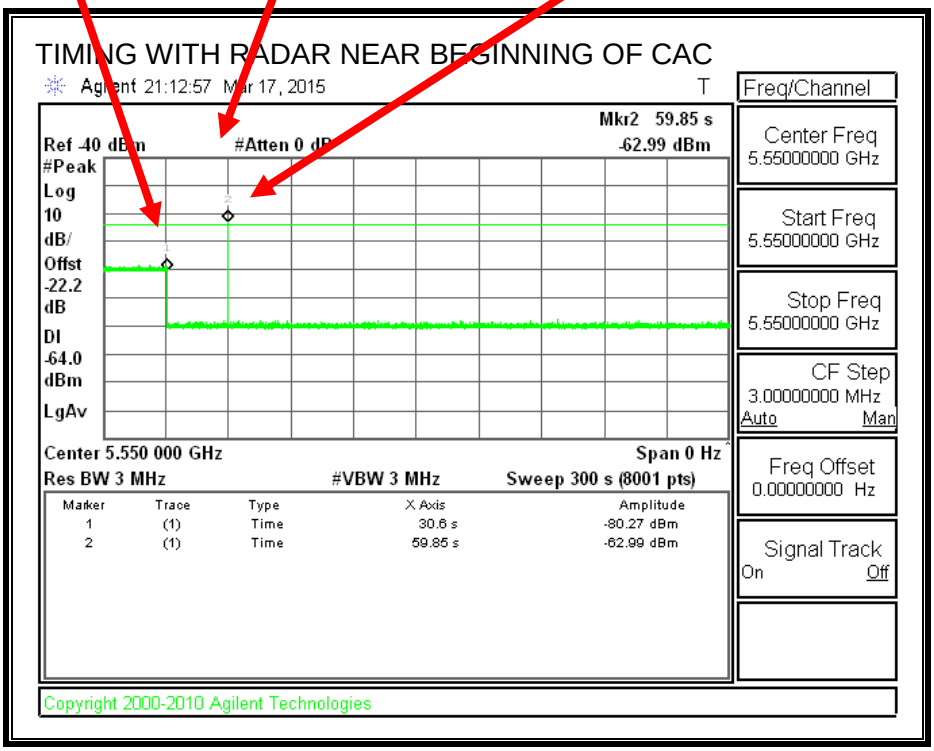
TIMING WITH RADAR NEAR BEGINNING OF CAC

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.

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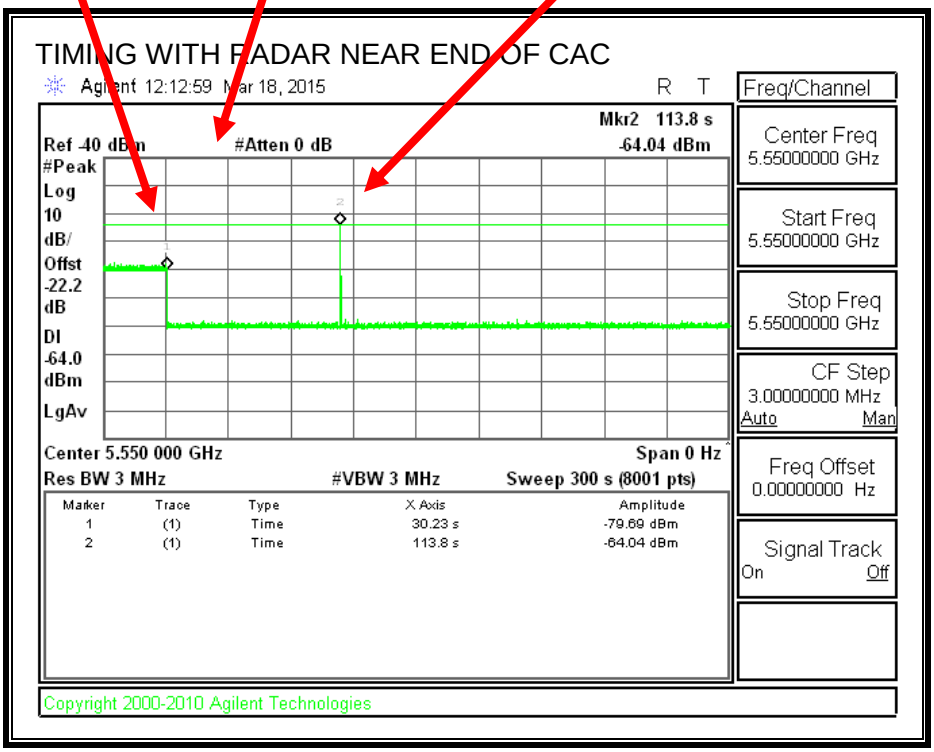
TIMING WITH RADAR NEAR END OF CAC (RADAR BURST BETWEEN 54 AND 60 SECONDS AFTER BEGINNING OF CAC)

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.

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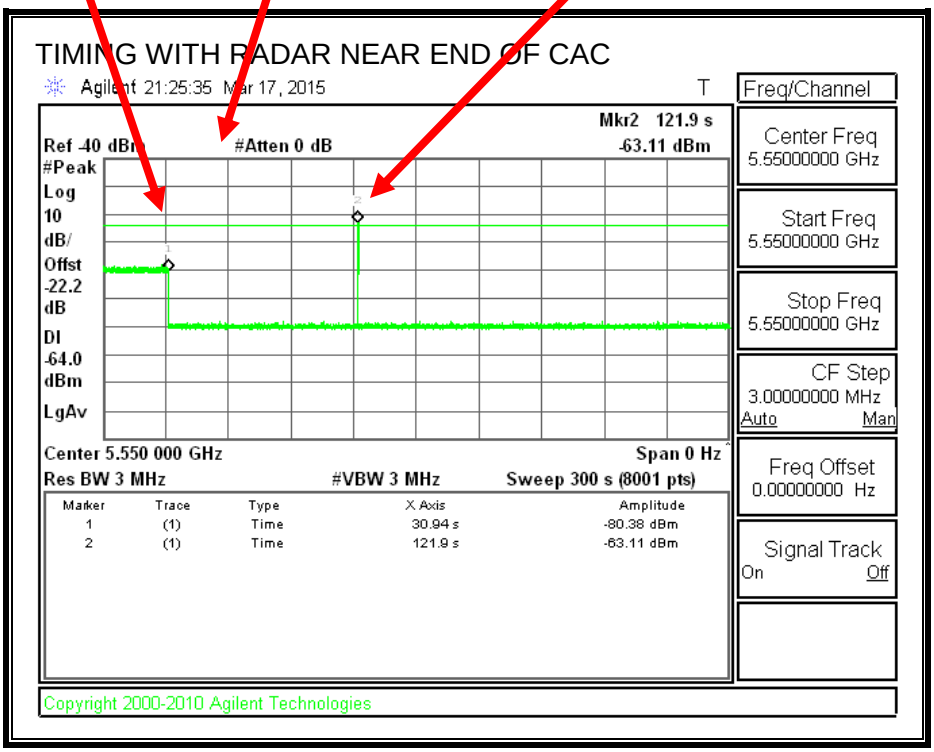
TIMING WITH RADAR NEAR END OF CAC (RADAR BURST BETWEEN 61 AND 67 SECONDS AFTER BEGINNING OF CAC)

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.

Note: The timing of this radar burst is at the client request to simulate the CAC period settings of an actual shipping radio.

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5.4.3. OVERLAPPING CHANNEL VERIFICATION TEST

PROCEDURE

The EUT was set to block all channels except 5545 MHz, 5550 MHz and 5555 MHz, which are overlapping. The first active channel was 5550 MHz and the radar test frequency was 5550 MHz.

A link was established on the first active channel with the video file streaming.

A radar burst was triggered and a stopwatch timer was started.

The EUT was confirmed to vacate the first active channel then a second radar burst was triggered approximately 45 seconds after the first radar burst.

The EUT was confirmed to vacate the second active channel then a third radar burst was triggered approximately 45 seconds after the second radar burst.

The EUT was confirmed to vacate the third channel.

The spectrum was continuously monitored throughout the test.

RESULTS

After the first radar burst was transmitted the EUT display indicated that 5550 MHz was blocked.

The EUT display then indicated that a CAC was started on one of the remaining two unblocked channels.

After the second radar burst was transmitted the EUT displayed that the second channel was also blocked.

The EUT display then indicated that a CAC was started on the last unblocked channel.

After the third radar burst was transmitted the EUT displayed that all three channels were blocked.

No beacons or traffic was observed after the first radar burst was transmitted.

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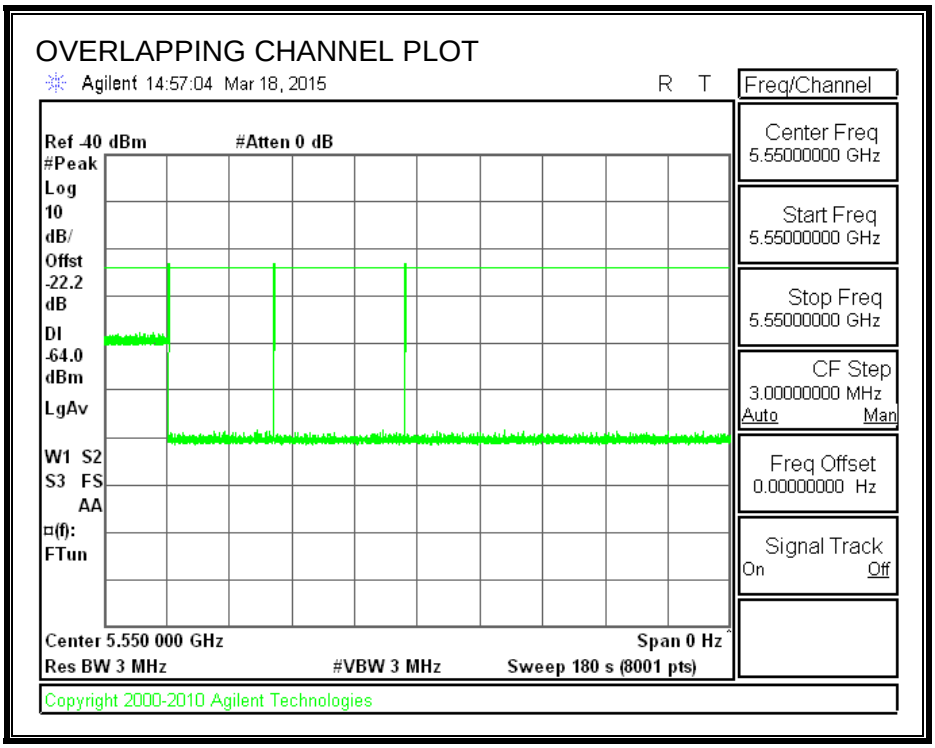
TEST RESULTS

No EUT transmissions were observed on the test channel during the observation time after the first radar burst.



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5.4.4. 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)
0.008	10

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

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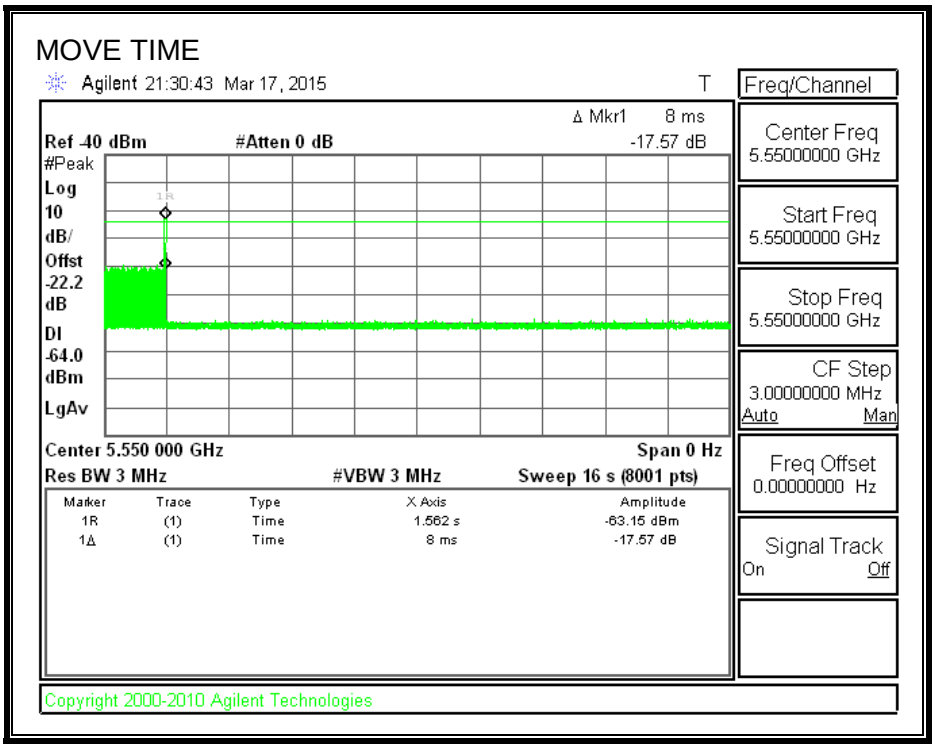
MOVE TIME



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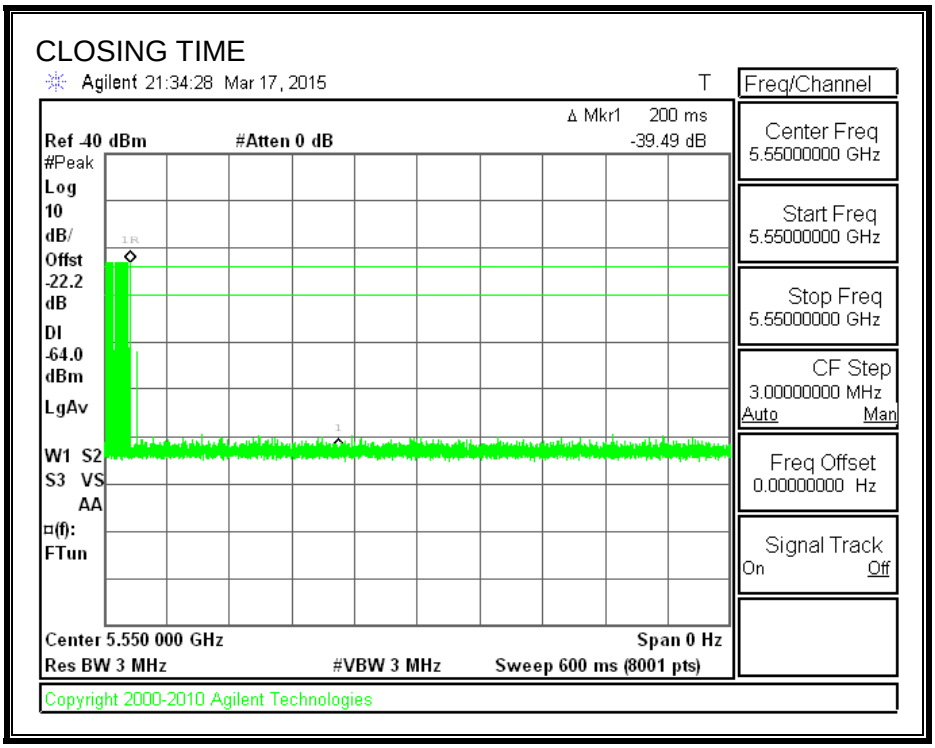
CHANNEL CLOSING TIME



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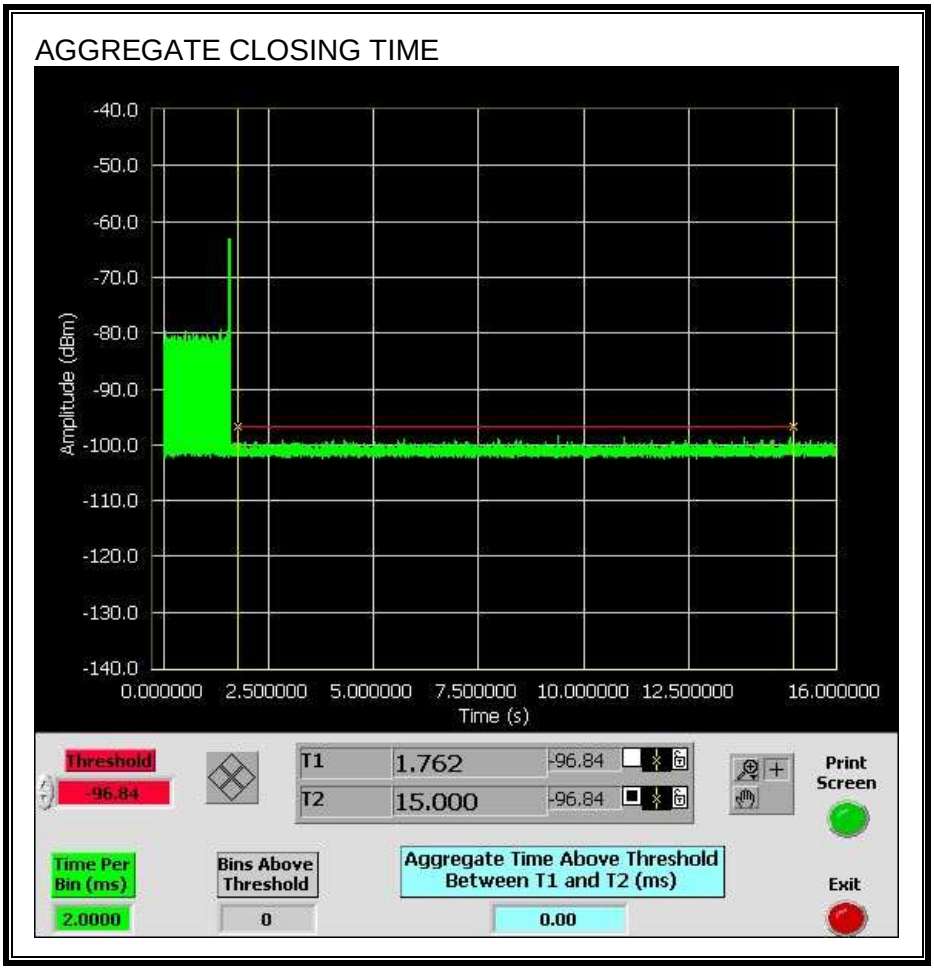
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.



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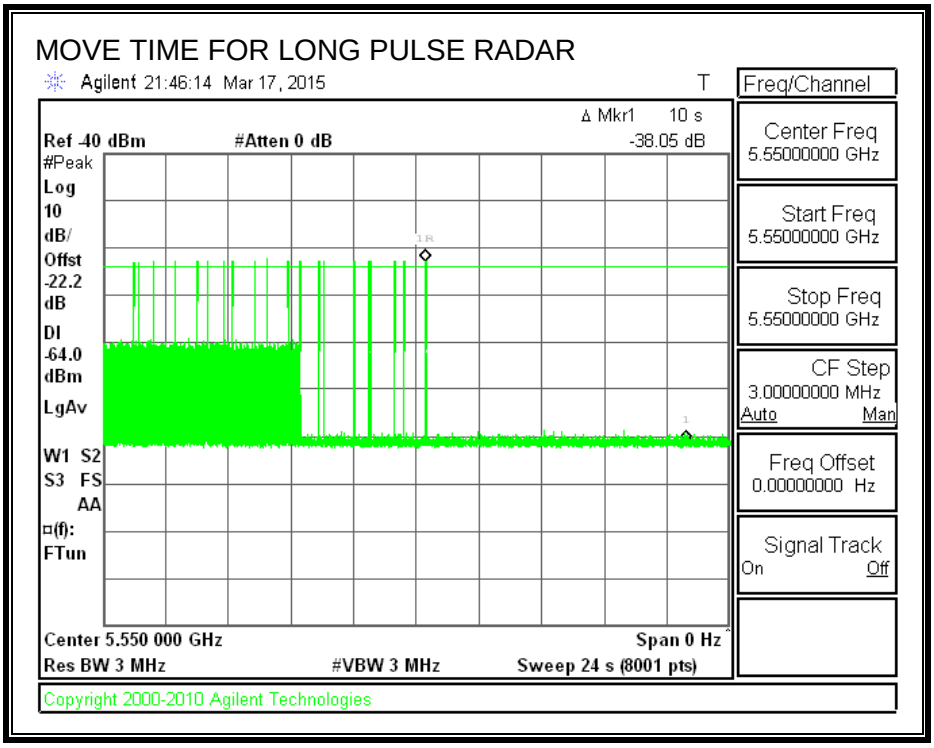
LONG PULSE CHANNEL MOVE TIME

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



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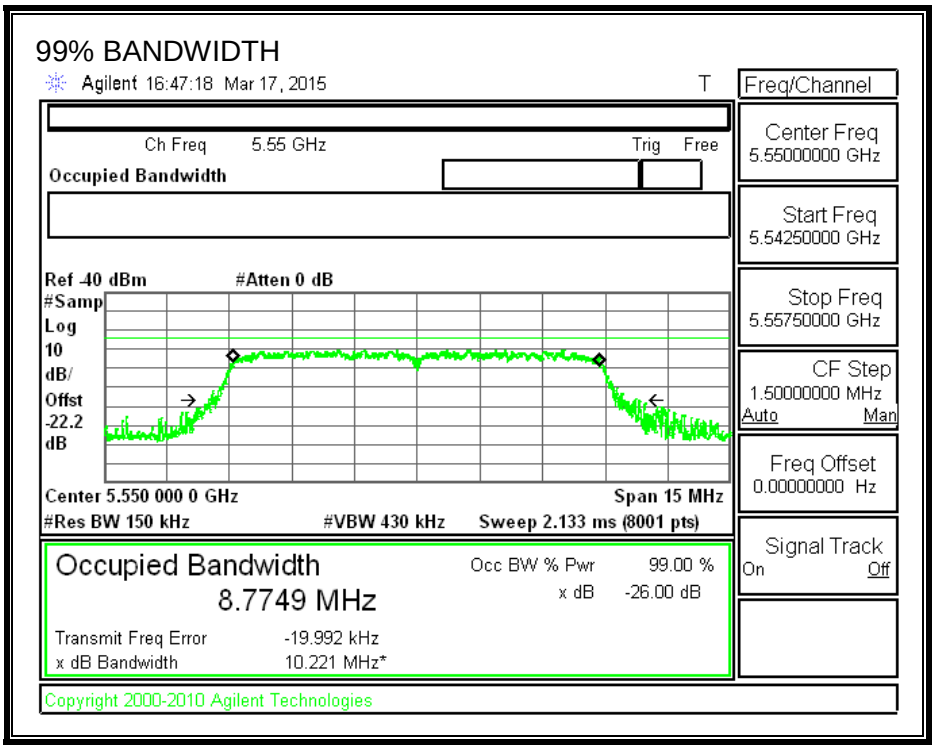
5.4.5. DETECTION BANDWIDTH

REFERENCE PLOT OF 99% POWER BANDWIDTH



RESULTS

FL (MHz)	FH (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (%)	Minimum Limit (%)
5546	5554	8	8.775	91.2	80

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DETECTION BANDWIDTH PROBABILITY

DETECTION BANDWIDTH PROBABILITY RESULTS

Detection Bandwidth Test Results				
FCC Type 1 Waveform: 1 us Pulse Width, 1428 us PRI, 18 Pulses per Burst				
Frequency (MHz)	Number of Trials	Number Detected	Detection (%)	Mark
5546	10	10	100	FL
5547	10	10	100	
5548	10	10	100	
5549	10	10	100	
5550	10	10	100	
5551	10	10	100	
5552	10	10	100	
5553	10	10	100	
5554	10	10	100	FH

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5.4.6. IN-SERVICE MONITORING

RESULTS

FCC Radar Test Summary				
Signal Type	Number of Trials	Detection (%)	Limit (%)	Pass/Fail
FCC Short Pulse Type 1	30	93.33	60	Pass
FCC Short Pulse Type 2	30	86.67	60	Pass
FCC Short Pulse Type 3	30	86.67	60	Pass
FCC Short Pulse Type 4	30	93.33	60	Pass
Aggregate		90.00	80	Pass
FCC Long Pulse Type 5	30	83.33	80	Pass
FCC Hopping Type 6	36	100.00	70	Pass

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TYPE 1 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 1 1 us Pulse Width, 1428 us PRI, 18 Pulses per Burst	
Trial	Successful Detection (Yes/No)
1	Yes
2	Yes
3	Yes
4	Yes
5	No
6	Yes
7	Yes
8	Yes
9	Yes
10	Yes
11	Yes
12	Yes
13	No
14	Yes
15	Yes
16	Yes
17	Yes
18	Yes
19	Yes
20	Yes
21	Yes
22	Yes
23	Yes
24	Yes
25	Yes
26	Yes
27	Yes
28	Yes
29	Yes
30	Yes

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TYPE 2 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 2				
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Successful Detection (Yes/No)
2001	4.7	182.00	24	No
2002	3.1	190.00	23	Yes
2003	4.8	178.00	24	Yes
2004	1.3	189.00	28	Yes
2005	4.9	186.00	26	Yes
2006	2.9	177.00	24	Yes
2007	2.5	194.00	27	Yes
2008	1.1	202.00	23	Yes
2009	3.1	186.00	29	Yes
2010	3.6	218.00	24	Yes
2011	4.3	190.00	28	Yes
2012	3.8	182.00	27	Yes
2013	2.9	223.00	29	Yes
2014	4.6	216.00	25	No
2015	1.3	200.00	26	Yes
2016	1.6	215.00	28	Yes
2017	2.7	165.00	29	Yes
2018	1.8	169.00	29	Yes
2019	2.9	214.00	23	Yes
2020	3.1	220.00	24	Yes
2021	4.6	200.00	27	Yes
2022	4.2	170.00	24	Yes
2023	3.3	179.00	27	Yes
2024	2.5	202.00	26	No
2025	5	190.00	27	Yes
2026	2.9	174.00	25	No
2027	2.2	168.00	28	Yes
2028	1.2	201.00	28	Yes
2029	1.6	164.00	28	Yes
2030	2.3	195.00	28	Yes

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TYPE 3 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 3				
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Successful Detection (Yes/No)
3001	9.4	384.00	18	Yes
3002	7.2	329.00	16	Yes
3003	8.3	496.00	16	Yes
3004	8.7	475.00	18	Yes
3005	7.5	336.00	16	Yes
3006	7.6	304.00	17	No
3007	7.6	444.00	17	Yes
3008	7.3	358.00	18	Yes
3009	5.3	483.00	18	Yes
3010	5.8	371.00	17	Yes
3011	6.9	316.00	17	Yes
3012	8.9	387.00	18	No
3013	8.6	302.00	16	Yes
3014	9	465.00	17	Yes
3015	7.4	341.00	17	Yes
3016	5.6	273.00	17	Yes
3017	5.4	375.00	17	Yes
3018	8.5	424.00	16	Yes
3019	6.6	457.00	16	Yes
3020	7.8	438.00	16	Yes
3021	7.3	411.00	18	Yes
3022	5.5	446.00	16	No
3023	9.2	251.00	17	Yes
3024	7.2	287.00	16	Yes
3025	6.3	478.00	16	Yes
3026	9.7	496.00	18	Yes
3027	5.1	252.00	16	No
3028	5.5	342.00	16	Yes
3029	8.4	299	16	Yes
3030	8.4	271	17	Yes

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TYPE 4 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 4				
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Successful Detection (Yes/No)
4001	17.3	336.00	12	Yes
4002	16.5	344.00	16	Yes
4003	11.7	426.00	16	Yes
4004	14.8	325.00	12	No
4005	19.2	362.00	12	No
4006	12.5	341.00	14	Yes
4007	10.1	492.00	14	Yes
4008	16.8	268.00	12	Yes
4009	13.2	284.00	14	Yes
4010	19.3	257.00	13	Yes
4011	19	341.00	12	Yes
4012	17.7	295.00	12	Yes
4013	12.2	425.00	14	Yes
4014	16.3	438.00	12	Yes
4015	10	263.00	15	Yes
4016	18.1	432.00	12	Yes
4017	12.9	447.00	15	Yes
4018	11.4	419.00	12	Yes
4019	13.9	256.00	13	Yes
4020	10.5	299.00	12	Yes
4021	16	441.00	16	Yes
4022	17.4	392.00	13	Yes
4023	18	365.00	12	Yes
4024	10.5	284.00	13	Yes
4025	12.9	306.00	14	Yes
4026	17	383.00	15	Yes
4027	18.2	496.00	15	Yes
4028	15.8	270.00	12	Yes
4029	11.8	397.00	14	Yes
4030	15.9	299.00	15	Yes

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TYPE 5 DETECTION PROBABILITY

Data Sheet for FCC Long Pulse Radar Type 5	
Trial	Successful Detection (Yes/No)
1	Yes
2	No
3	Yes
4	Yes
5	Yes
6	Yes
7	Yes
8	Yes
9	No
10	No
11	No
12	Yes
13	Yes
14	Yes
15	Yes
16	Yes
17	Yes
18	Yes
19	Yes
20	Yes
21	Yes
22	Yes
23	Yes
24	Yes
25	Yes
26	Yes
27	Yes
28	Yes
29	Yes
30	No

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

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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	40	5546	3	Yes
2	515	5547	3	Yes
3	990	5548	4	Yes
4	1465	5549	2	Yes
5	2415	5550	3	Yes
6	2890	5551	4	Yes
7	3365	5552	3	Yes
8	3840	5553	2	Yes
9	4315	5554	1	Yes
10	5740	5546	2	Yes
11	6215	5547	3	Yes
12	6690	5548	2	Yes
13	7640	5549	2	Yes
14	8115	5550	1	Yes
15	8590	5551	1	Yes
16	9065	5552	3	Yes
17	10015	5553	2	Yes
18	10490	5554	1	Yes
19	10965	5546	4	Yes
20	11440	5547	2	Yes
21	11915	5548	1	Yes
22	12390	5549	2	Yes
23	13815	5550	2	Yes
24	14290	5551	2	Yes
25	14765	5552	1	Yes
26	15240	5553	2	Yes
27	15715	5554	3	Yes
28	16190	5546	2	Yes
29	16665	5547	1	Yes
30	17140	5548	4	Yes
31	17615	5549	1	Yes
32	18090	5550	2	Yes
33	18565	5551	2	Yes
34	19040	5552	2	Yes
35	19515	5553	1	Yes
36	19990	5554	1	Yes

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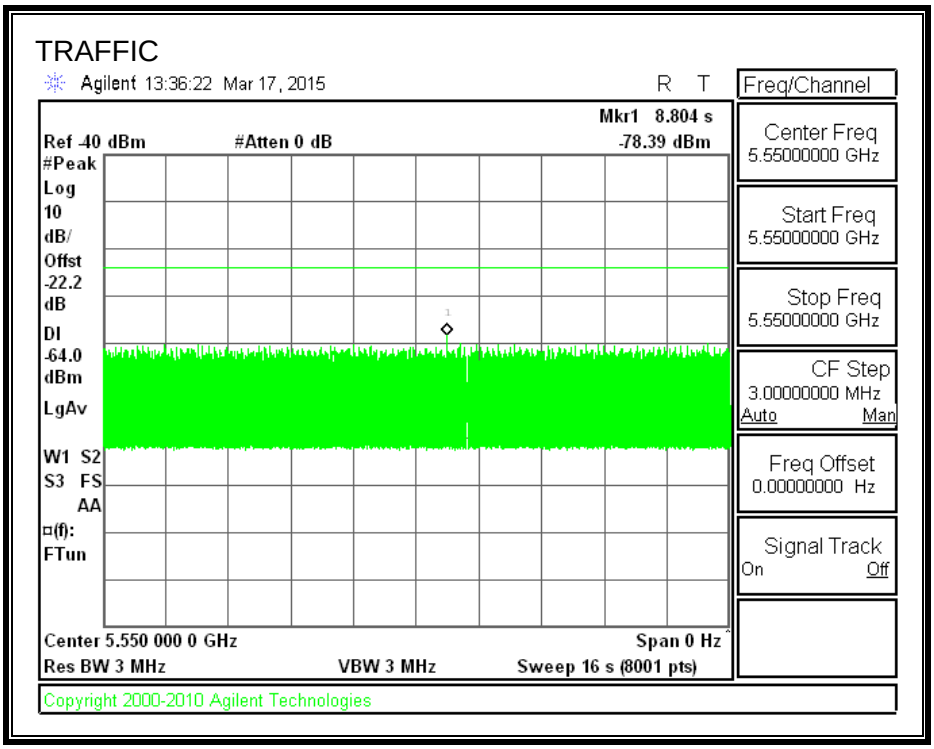
5.5. MASTER DEVICE RESULTS FOR 40 MHz BANDWIDTH

5.5.1. TRAFFIC AND CHANNEL LOADING

TRAFFIC



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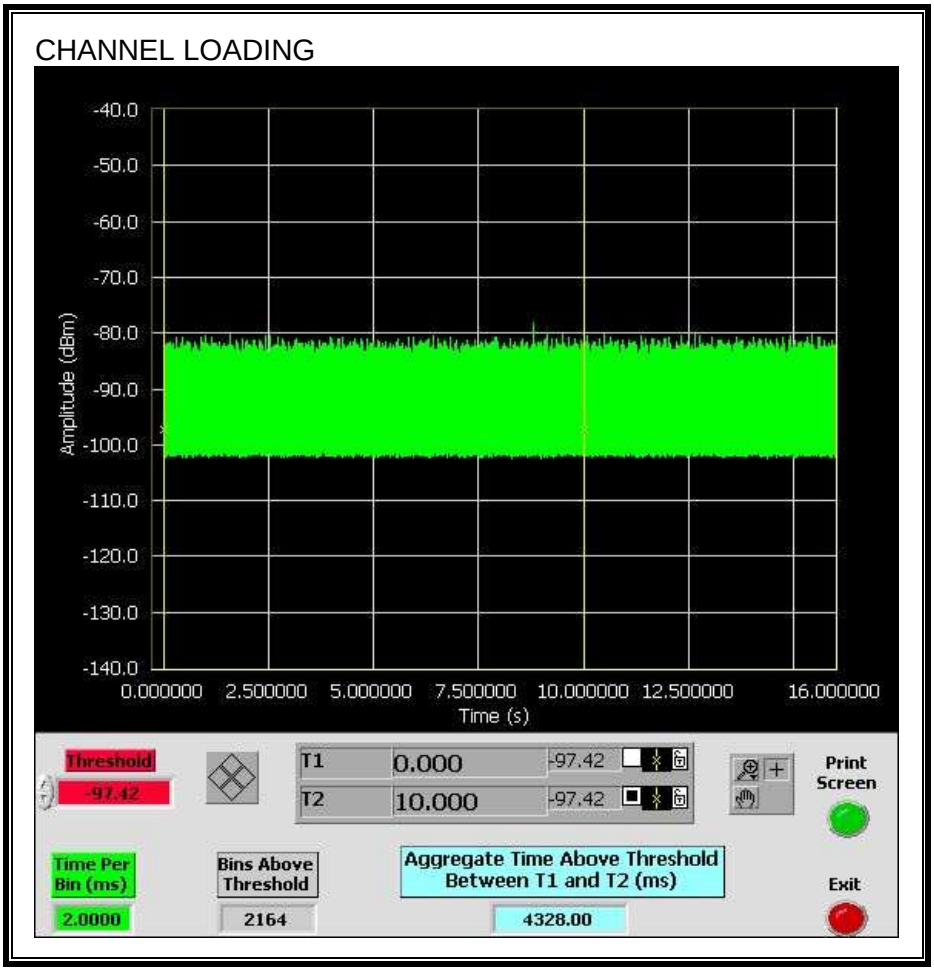
CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 43.28%

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5.5.2. CHANNEL AVAILABILITY CHECK 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.

An additional sweep was performed where the radar signal was triggered within 61 to 67 seconds after the initial power-up period to simulate the settings of an actual shipping radio. The transmissions on the channel were then monitored on the spectrum analyzer after the radar burst was triggered.

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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)
30.98	125.0	94.0	27.0

Radar Near Beginning of CAC

Timing of Reboot (sec)	Timing of Radar Burst (sec)	Radar Relative to Reboot (sec)	Radar Relative to Start of CAC (sec)
29.77	59.44	29.7	2.7

Radar Near End of CAC (54 to 60 Second Timing)

Timing of Reboot (sec)	Timing of Radar Burst (sec)	Radar Relative to Reboot (sec)	Radar Relative to Start of CAC (sec)
32.17	116.3	84.1	57.1

Radar Near End of CAC (61 to 67 Second Timing)

Timing of Reboot (sec)	Timing of Radar Burst (sec)	Radar Relative to Reboot (sec)	Radar Relative to Start of CAC (sec)
31.05	122.1	91.1	64.0

Note: EUT CAC timing of and actual shipping radio is 67 seconds per client declaration.

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
Within 61 to 67 second window	EUT indicates radar detected	No transmissions on channel

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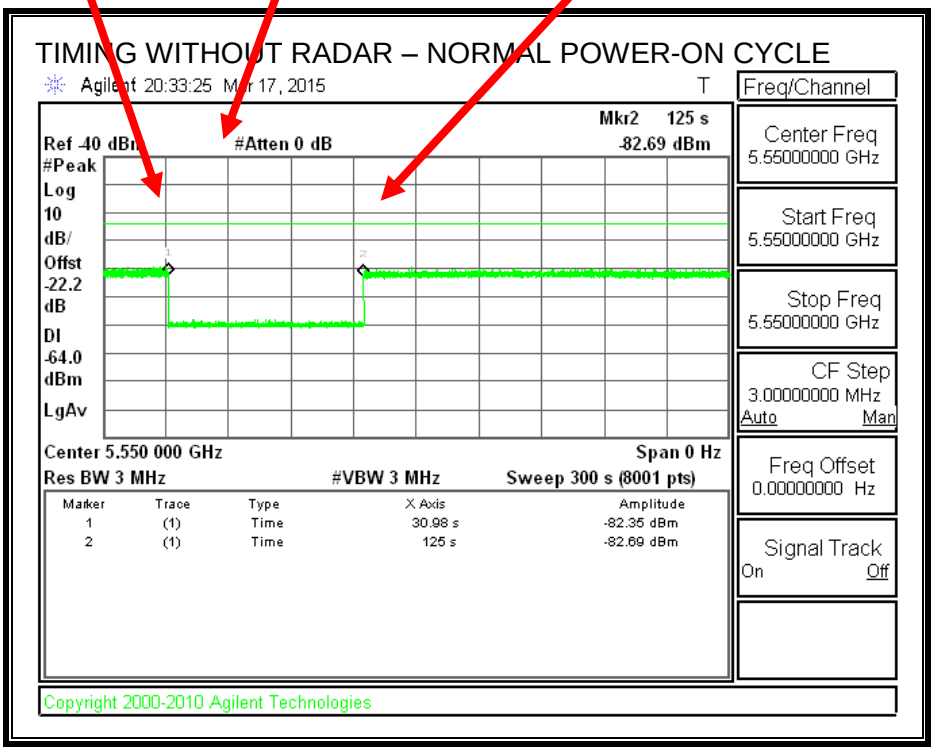
TIMING WITHOUT RADAR DURING CAC

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.

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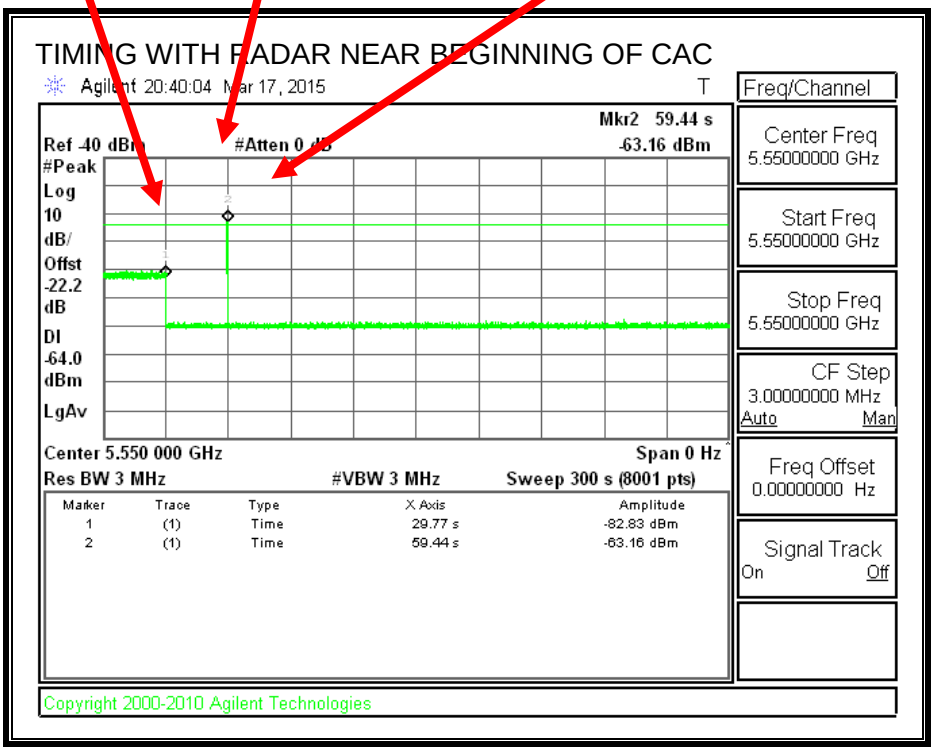
TIMING WITH RADAR NEAR BEGINNING OF CAC

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.

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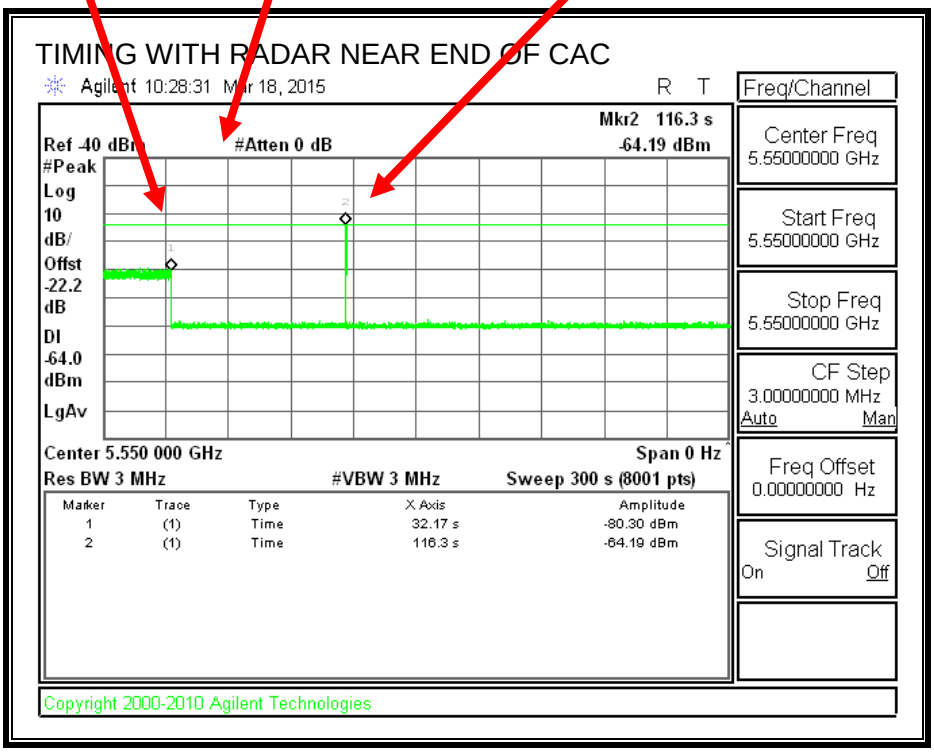
TIMING WITH RADAR NEAR END OF CAC (RADAR BURST BETWEEN 54 AND 60 SECONDS AFTER BEGINNING OF CAC)

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.

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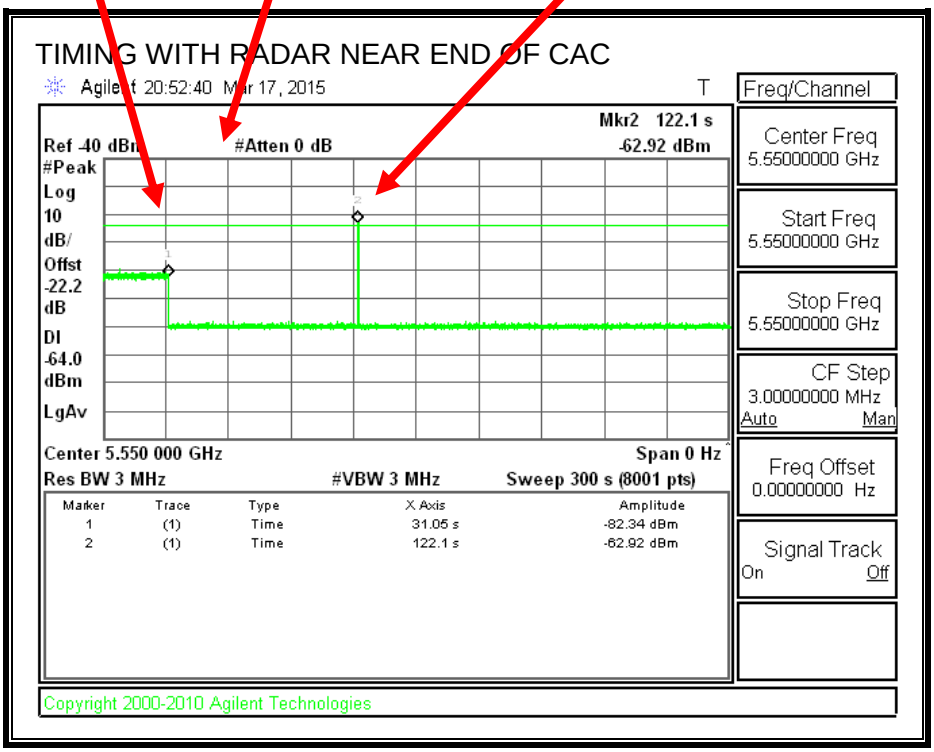
TIMING WITH RADAR NEAR END OF CAC (RADAR BURST BETWEEN 61 AND 67 SECONDS AFTER BEGINNING OF CAC)

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.

Note: The timing of this radar burst is at the client request to simulate the CAC period settings of an actual shipping radio.

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5.5.3. OVERLAPPING CHANNEL VERIFICATION TEST

PROCEDURE

The EUT was set to block all channels except 5545 MHz, 5550 MHz and 5555 MHz, which are overlapping. The first active channel was 5550 MHz and the radar test frequency was 5550 MHz.

A link was established on the first active channel with the video file streaming.

A radar burst was triggered and a stopwatch timer was started.

The EUT was confirmed to vacate the first active channel then a second radar burst was triggered approximately 45 seconds after the first radar burst.

The EUT was confirmed to vacate the second active channel then a third radar burst was triggered approximately 45 seconds after the second radar burst.

The EUT was confirmed to vacate the third channel.

The spectrum was continuously monitored throughout the test.

RESULTS

After the first radar burst was transmitted the EUT display indicated that 5550 MHz was blocked.

The EUT display then indicated that a CAC was started on one of the remaining two unblocked channels.

After the second radar burst was transmitted the EUT displayed that the second channel was also blocked.

The EUT display then indicated that a CAC was started on the last unblocked channel.

After the third radar burst was transmitted the EUT displayed that all three channels were blocked.

No beacons or traffic was observed after the first radar burst was transmitted.

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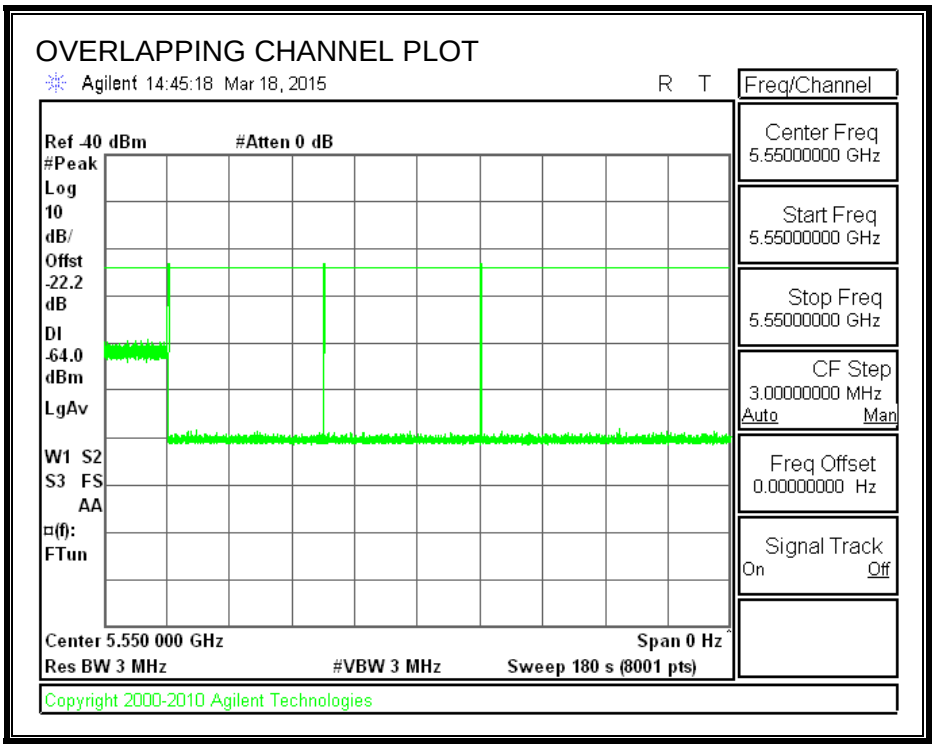
TEST RESULTS

No EUT transmissions were observed on the test channel during the observation time after the first radar burst.



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5.5.4. 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)
0.008	10

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

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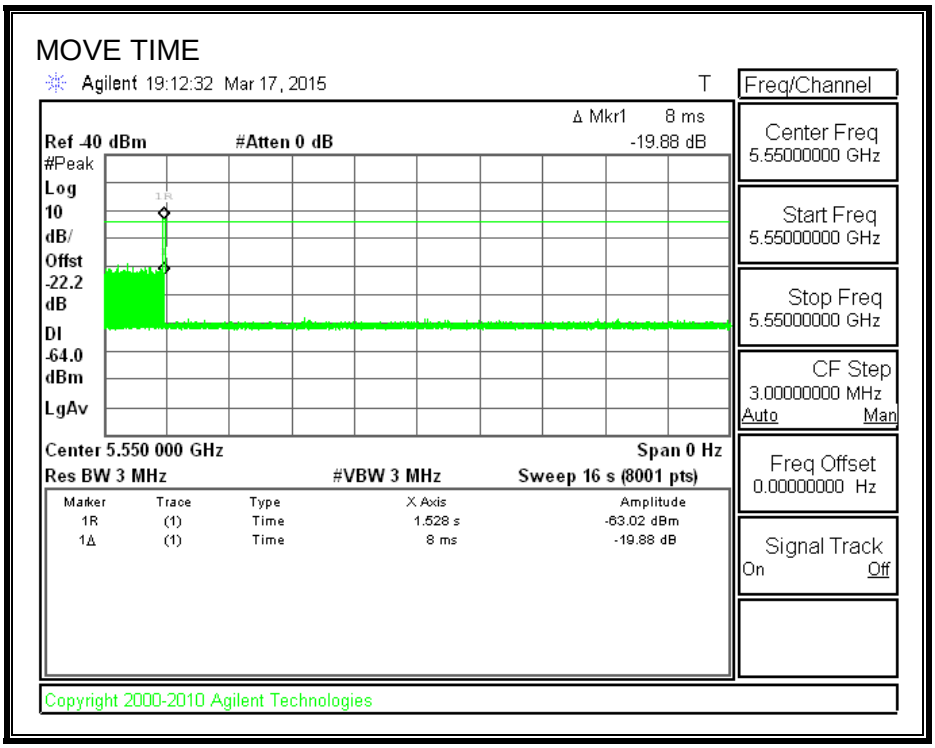
MOVE TIME



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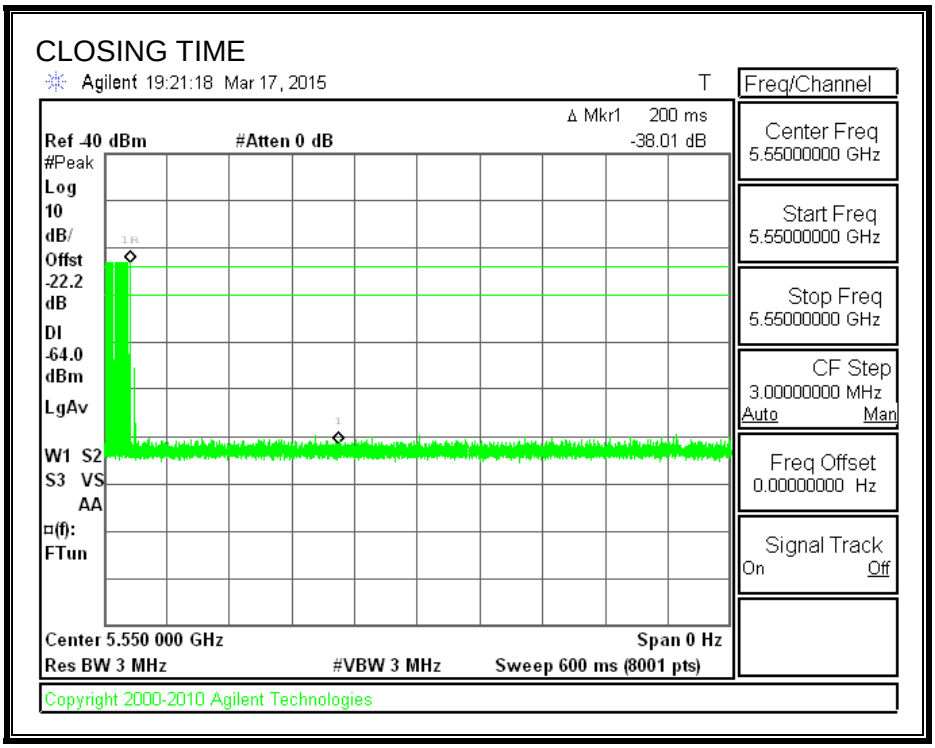
CHANNEL CLOSING TIME



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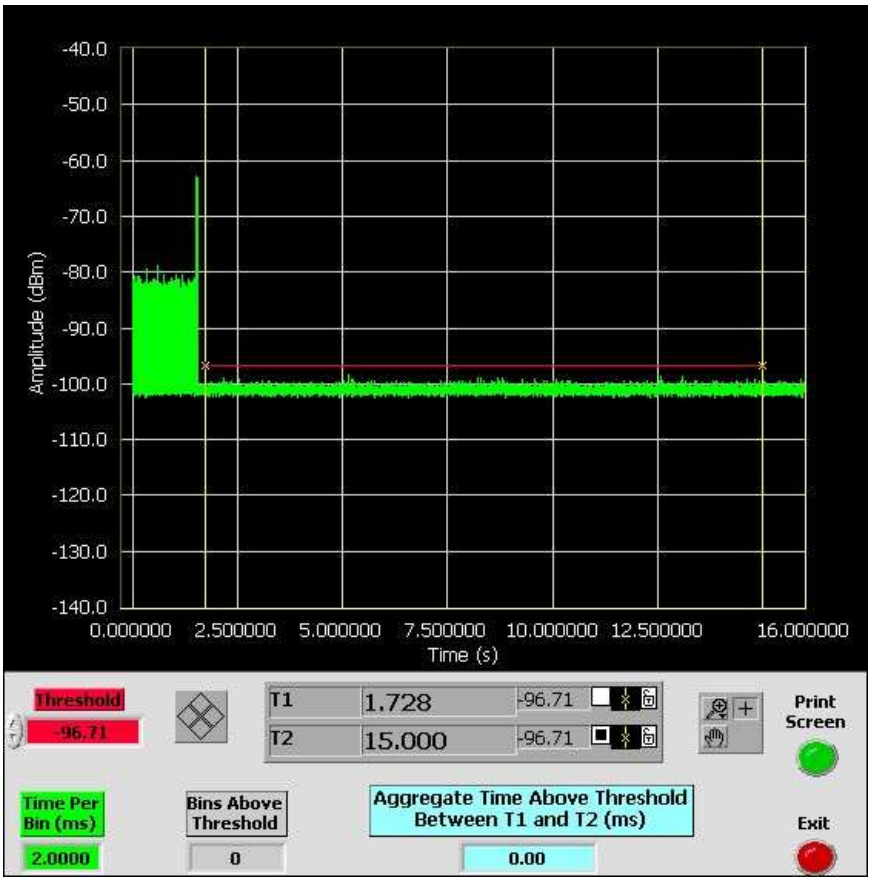
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.

AGGREGATE CLOSING TIME



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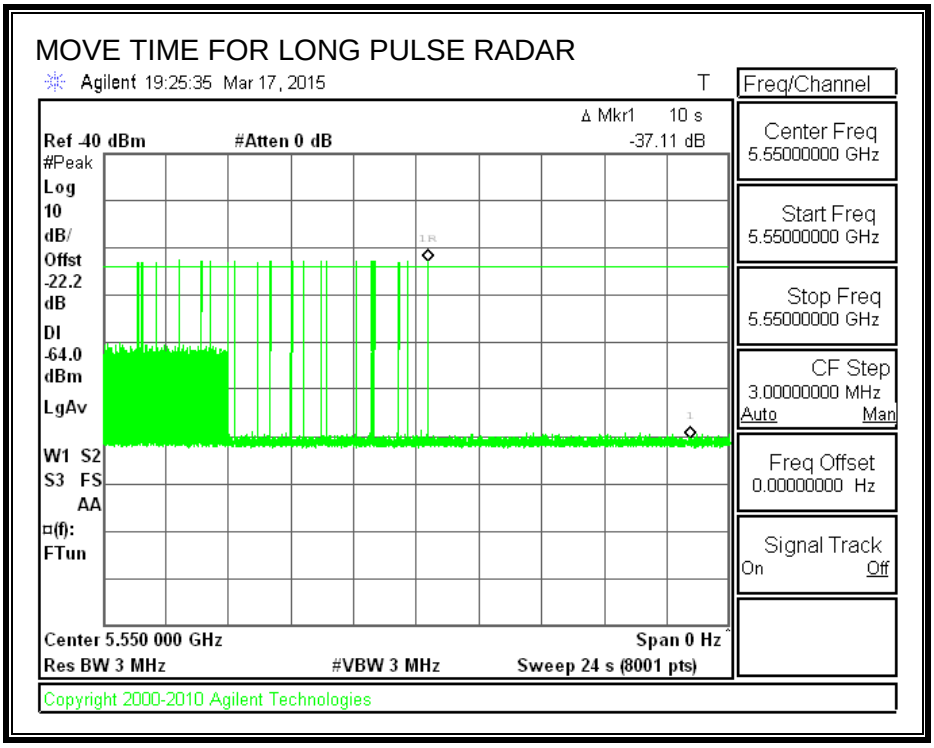
LONG PULSE CHANNEL MOVE TIME

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



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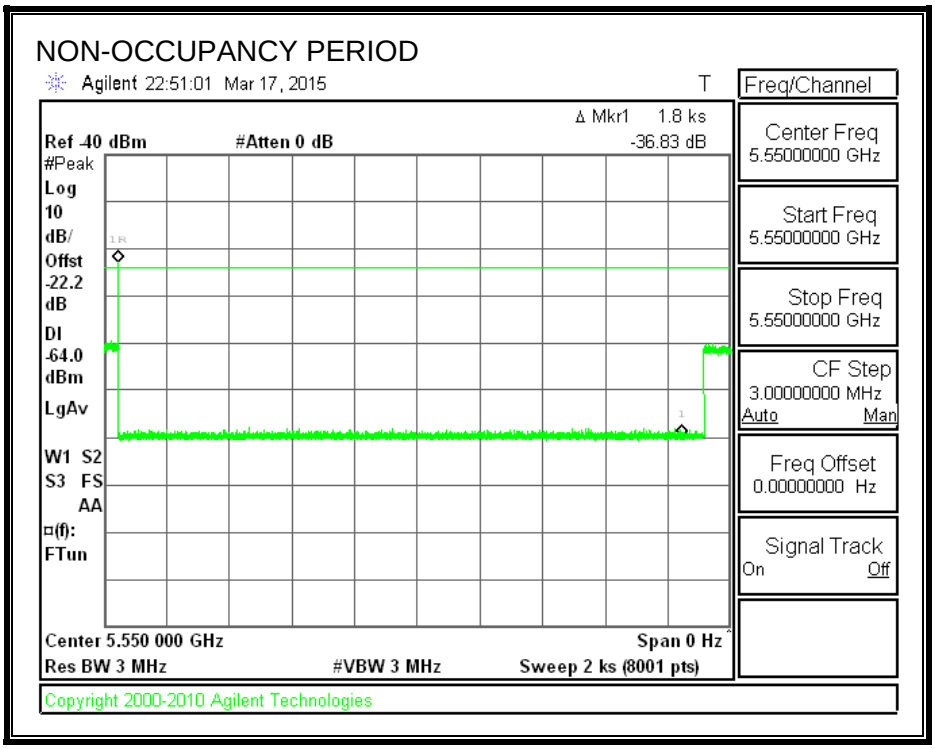
5.5.1. NON-OCCUPANCY PERIOD

RESULTS

No EUT transmissions were observed on the test channel during the 30-minute observation time. After the 30-minute non-occupancy period the EUT performed a new CAC, then resumed transmissions upon detecting no radar during this CAC period.



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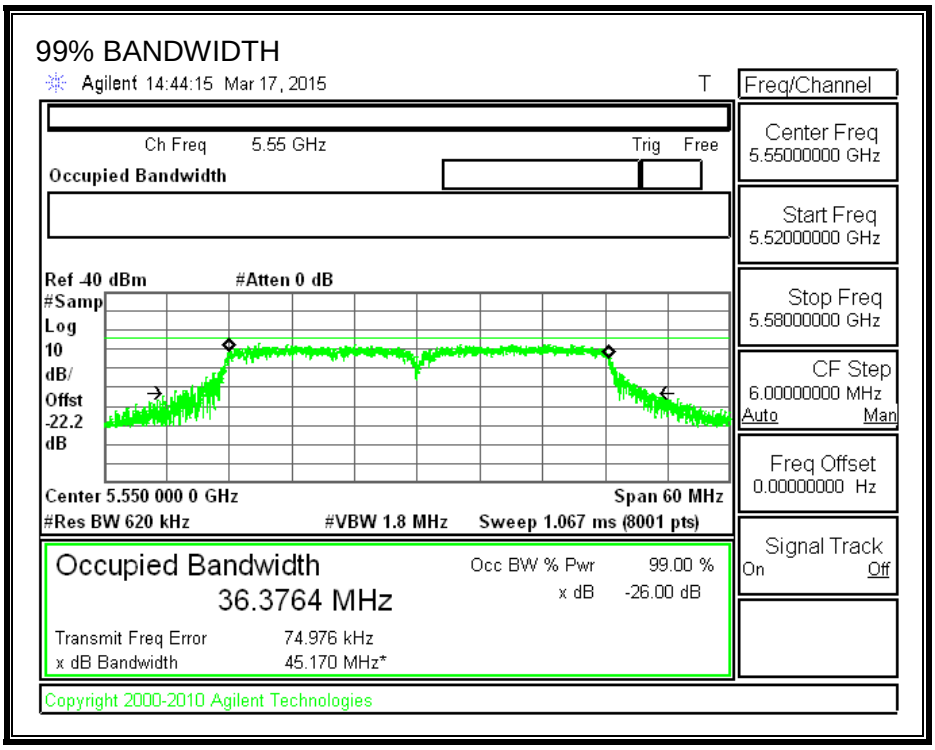
5.5.2. DETECTION BANDWIDTH

REFERENCE PLOT OF 99% POWER BANDWIDTH



RESULTS

FL (MHz)	FH (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (%)	Minimum Limit (%)
5534	5566	32	36.376	88.0	80

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DETECTION BANDWIDTH PROBABILITY

DETECTION BANDWIDTH PROBABILITY RESULTS

Detection Bandwidth Test Results				
FCC Type 1 Waveform: 1 us Pulse Width, 1428 us PRI, 18 Pulses per Burst				
Frequency (MHz)	Number of Trials	Number Detected	Detection (%)	Mark
5534	10	10	100	FL
5535	10	10	100	
5536	10	10	100	
5537	10	10	100	
5538	10	10	100	
5539	10	10	100	
5540	10	10	100	
5541	10	10	100	
5542	10	10	100	
5543	10	10	100	
5544	10	10	100	
5545	10	10	100	
5546	10	10	100	
5547	10	10	100	
5548	10	10	100	
5549	10	10	100	
5550	10	10	100	
5551	10	9	90	
5552	10	10	100	
5553	10	10	100	
5554	10	10	100	
5555	10	10	100	
5556	10	10	100	
5557	10	10	100	
5558	10	10	100	
5559	10	10	100	
5560	10	10	100	
5561	10	10	100	
5562	10	10	100	
5563	10	10	100	
5564	10	10	100	
5565	10	10	100	
5566	10	10	100	FH

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5.5.3. IN-SERVICE MONITORING

RESULTS

FCC Radar Test Summary				
Signal Type	Number of Trials	Detection (%)	Limit (%)	Pass/Fail
FCC Short Pulse Type 1	30	73.33	60	Pass
FCC Short Pulse Type 2	30	90.00	60	Pass
FCC Short Pulse Type 3	30	100.00	60	Pass
FCC Short Pulse Type 4	30	96.67	60	Pass
Aggregate		90.00	80	Pass
FCC Long Pulse Type 5	30	100.00	80	Pass
FCC Hopping Type 6	33	100.00	70	Pass

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TYPE 1 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 1 1 us Pulse Width, 1428 us PRI, 18 Pulses per Burst	
Trial	Successful Detection (Yes/No)
1	Yes
2	Yes
3	Yes
4	No
5	Yes
6	No
7	Yes
8	No
9	Yes
10	Yes
11	No
12	Yes
13	Yes
14	Yes
15	Yes
16	No
17	Yes
18	Yes
19	Yes
20	Yes
21	Yes
22	Yes
23	Yes
24	No
25	Yes
26	Yes
27	Yes
28	No
29	Yes
30	No

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TYPE 2 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 2				
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Successful Detection (Yes/No)
2001	4.7	182.00	24	Yes
2002	3.1	190.00	23	Yes
2003	4.8	178.00	24	Yes
2004	1.3	189.00	28	No
2005	4.9	186.00	26	Yes
2006	2.9	177.00	24	Yes
2007	2.5	194.00	27	No
2008	1.1	202.00	23	Yes
2009	3.1	186.00	29	Yes
2010	3.6	218.00	24	Yes
2011	4.3	190.00	28	Yes
2012	3.8	182.00	27	Yes
2013	2.9	223.00	29	Yes
2014	4.6	216.00	25	Yes
2015	1.3	200.00	26	Yes
2016	1.6	215.00	28	Yes
2017	2.7	165.00	29	Yes
2018	1.8	169.00	29	Yes
2019	2.9	214.00	23	Yes
2020	3.1	220.00	24	Yes
2021	4.6	200.00	27	Yes
2022	4.2	170.00	24	Yes
2023	3.3	179.00	27	Yes
2024	2.5	202.00	26	No
2025	5	190.00	27	Yes
2026	2.9	174.00	25	Yes
2027	2.2	168.00	28	Yes
2028	1.2	201.00	28	Yes
2029	1.6	164.00	28	Yes
2030	2.3	195.00	28	Yes

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TYPE 3 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 3				
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Successful Detection (Yes/No)
3001	9.4	384.00	18	Yes
3002	7.2	329.00	16	Yes
3003	8.3	496.00	16	Yes
3004	8.7	475.00	18	Yes
3005	7.5	336.00	16	Yes
3006	7.6	304.00	17	Yes
3007	7.6	444.00	17	Yes
3008	7.3	358.00	18	Yes
3009	5.3	483.00	18	Yes
3010	5.8	371.00	17	Yes
3011	6.9	316.00	17	Yes
3012	8.9	387.00	18	Yes
3013	8.6	302.00	16	Yes
3014	9	465.00	17	Yes
3015	7.4	341.00	17	Yes
3016	5.6	273.00	17	Yes
3017	5.4	375.00	17	Yes
3018	8.5	424.00	16	Yes
3019	6.6	457.00	16	Yes
3020	7.8	438.00	16	Yes
3021	7.3	411.00	18	Yes
3022	5.5	446.00	16	Yes
3023	9.2	251.00	17	Yes
3024	7.2	287.00	16	Yes
3025	6.3	478.00	16	Yes
3026	9.7	496.00	18	Yes
3027	5.1	252.00	16	Yes
3028	5.5	342.00	16	Yes
3029	8.4	299	16	Yes
3030	8.4	271	17	Yes

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TYPE 4 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 4				
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Successful Detection (Yes/No)
4001	17.3	336.00	12	Yes
4002	16.5	344.00	16	Yes
4003	11.7	426.00	16	Yes
4004	14.8	325.00	12	No
4005	19.2	362.00	12	Yes
4006	12.5	341.00	14	Yes
4007	10.1	492.00	14	Yes
4008	16.8	268.00	12	Yes
4009	13.2	284.00	14	Yes
4010	19.3	257.00	13	Yes
4011	19	341.00	12	Yes
4012	17.7	295.00	12	Yes
4013	12.2	425.00	14	Yes
4014	16.3	438.00	12	Yes
4015	10	263.00	15	Yes
4016	18.1	432.00	12	Yes
4017	12.9	447.00	15	Yes
4018	11.4	419.00	12	Yes
4019	13.9	256.00	13	Yes
4020	10.5	299.00	12	Yes
4021	16	441.00	16	Yes
4022	17.4	392.00	13	Yes
4023	18	365.00	12	Yes
4024	10.5	284.00	13	Yes
4025	12.9	306.00	14	Yes
4026	17	383.00	15	Yes
4027	18.2	496.00	15	Yes
4028	15.8	270.00	12	Yes
4029	11.8	397.00	14	Yes
4030	15.9	299.00	15	Yes

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TYPE 5 DETECTION PROBABILITY

Data Sheet for FCC Long Pulse Radar Type 5	
Trial	Successful Detection (Yes/No)
1	Yes
2	Yes
3	Yes
4	Yes
5	Yes
6	Yes
7	Yes
8	Yes
9	Yes
10	Yes
11	Yes
12	Yes
13	Yes
14	Yes
15	Yes
16	Yes
17	Yes
18	Yes
19	Yes
20	Yes
21	Yes
22	Yes
23	Yes
24	Yes
25	Yes
26	Yes
27	Yes
28	Yes
29	Yes
30	Yes

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

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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	222	5534	10	Yes
2	697	5535	5	Yes
3	1172	5536	8	Yes
4	1647	5537	5	Yes
5	2122	5538	10	Yes
6	2597	5539	4	Yes
7	3072	5540	8	Yes
8	3547	5541	8	Yes
9	4022	5542	5	Yes
10	4497	5543	7	Yes
11	4972	5544	9	Yes
12	5447	5545	9	Yes
13	5922	5546	9	Yes
14	6397	5547	6	Yes
15	6872	5548	10	Yes
16	7347	5549	3	Yes
17	7822	5550	13	Yes
18	8297	5551	6	Yes
19	8772	5552	4	Yes
20	9247	5553	9	Yes
21	9722	5554	9	Yes
22	10197	5555	5	Yes
23	10672	5556	4	Yes
24	11147	5557	13	Yes
25	11622	5558	11	Yes
26	12097	5559	8	Yes
27	12572	5560	10	Yes
28	13047	5561	3	Yes
29	13522	5562	12	Yes
30	13997	5563	6	Yes
31	14472	5564	13	Yes
32	14947	5565	9	Yes
33	15422	5566	9	Yes

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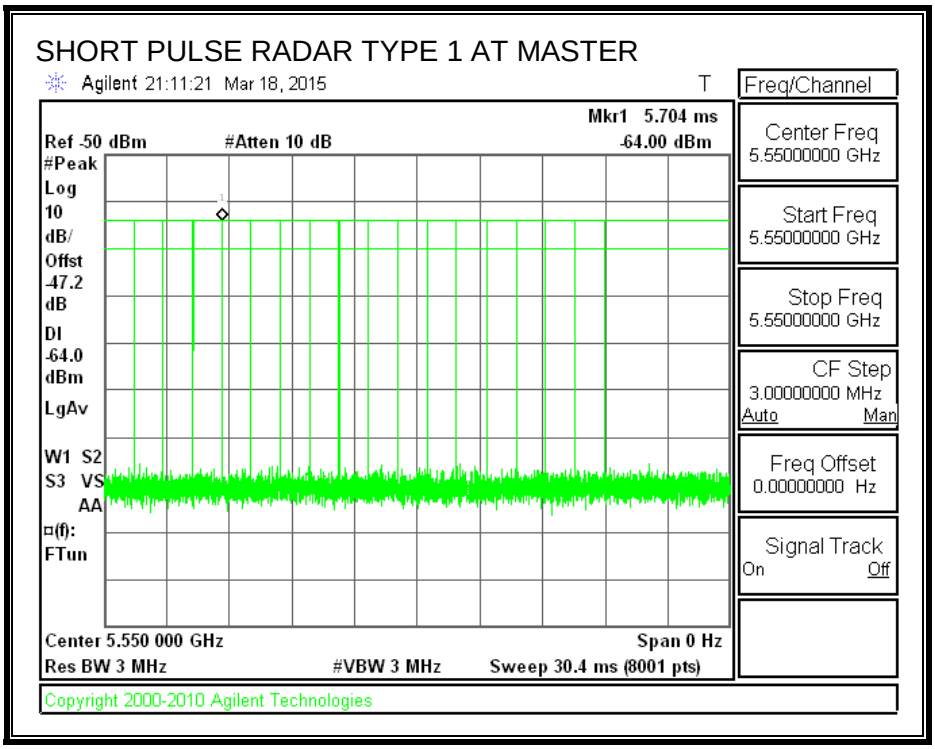
5.6. SLAVE DEVICE TEST CHANNEL

All tests were performed at a channel center frequency of 5550 MHz.

5.7. SLAVE DEVICE RADAR WAVEFORM

RADAR WAVEFORM



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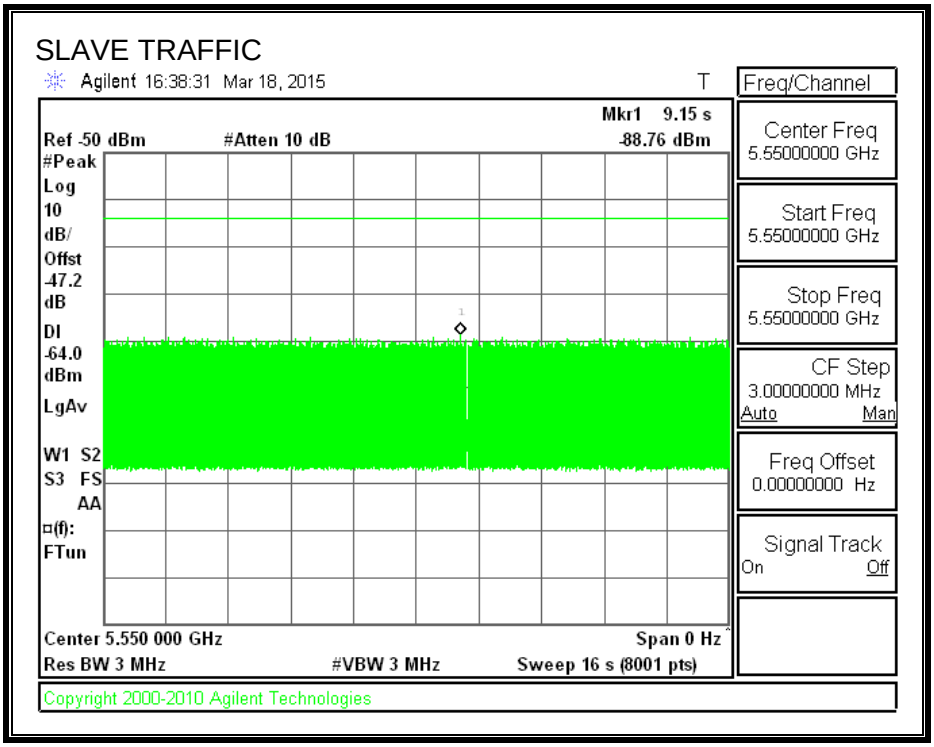
5.8. SLAVE DEVICE RESULTS FOR 10 MHz BANDWIDTH

5.8.1. TRAFFIC AND CHANNEL LOADING

TRAFFIC



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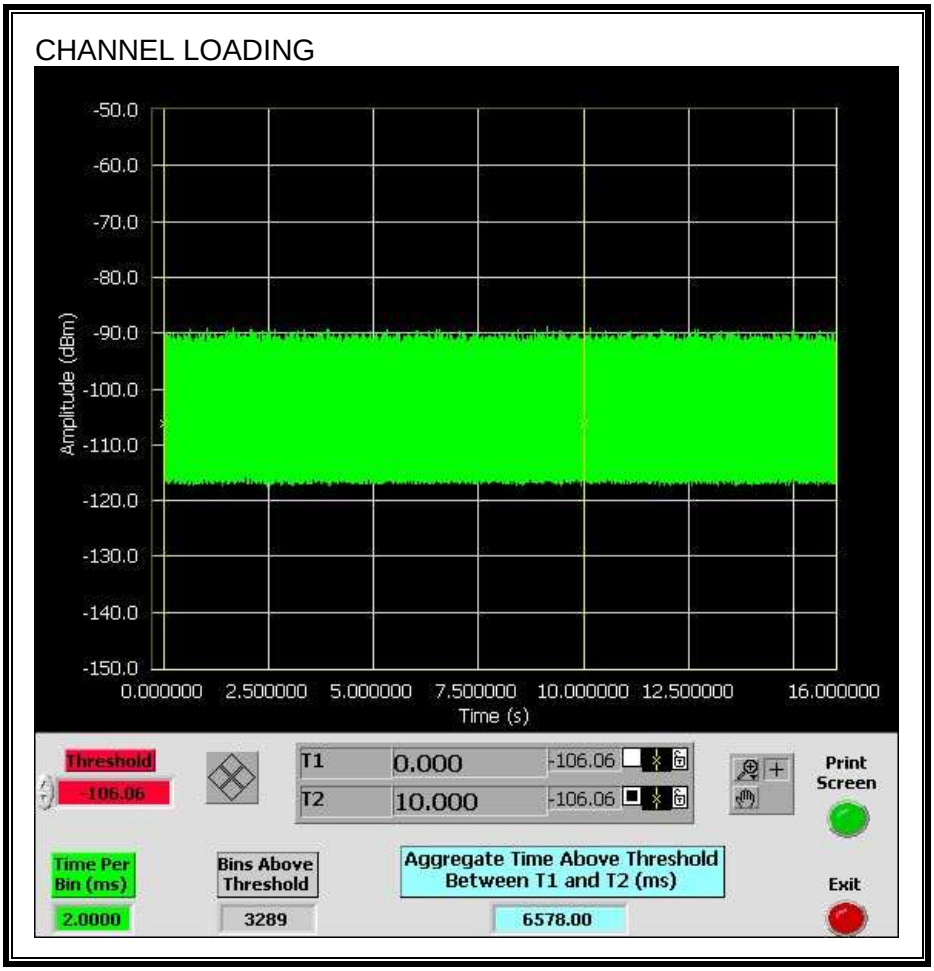
CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 65.78%.

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47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
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5.8.2. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

5.8.3. 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)
0.010	10

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

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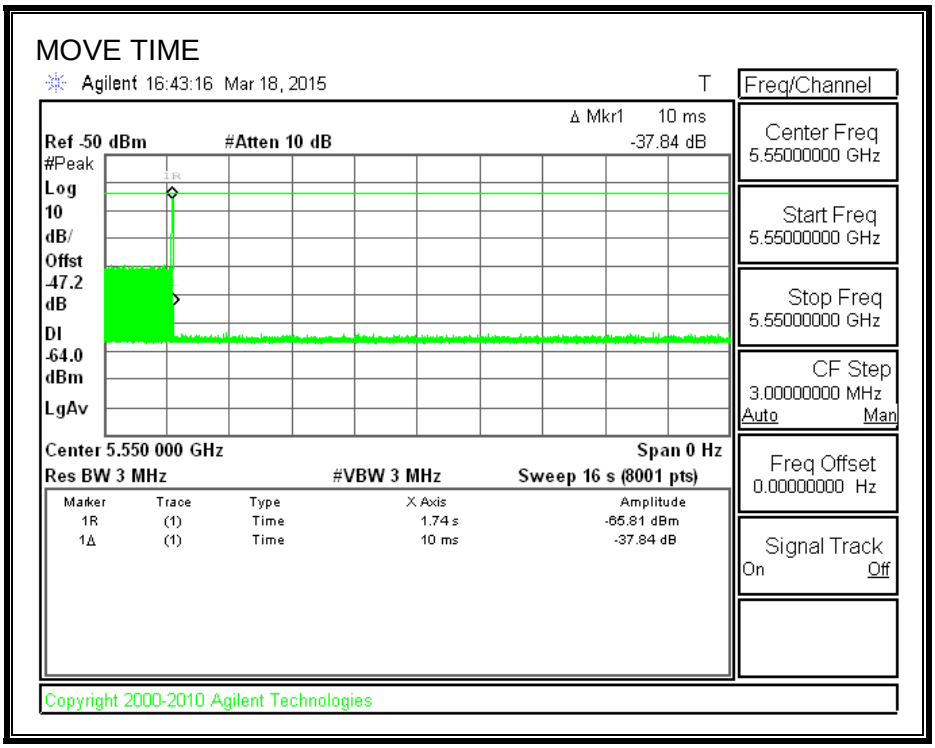
MOVE TIME



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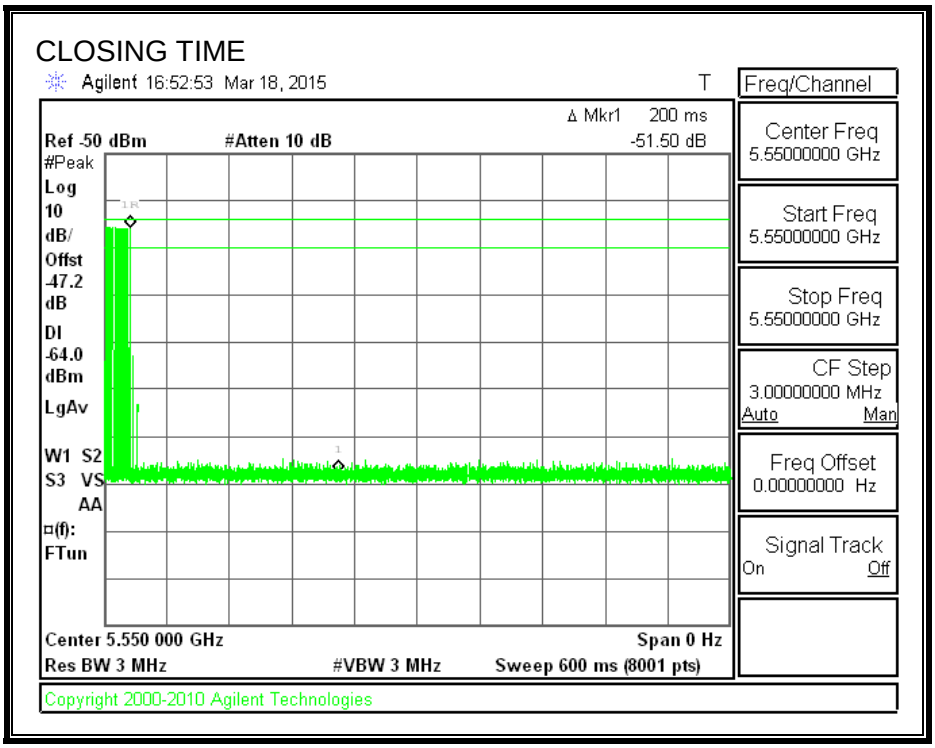
CHANNEL CLOSING TIME



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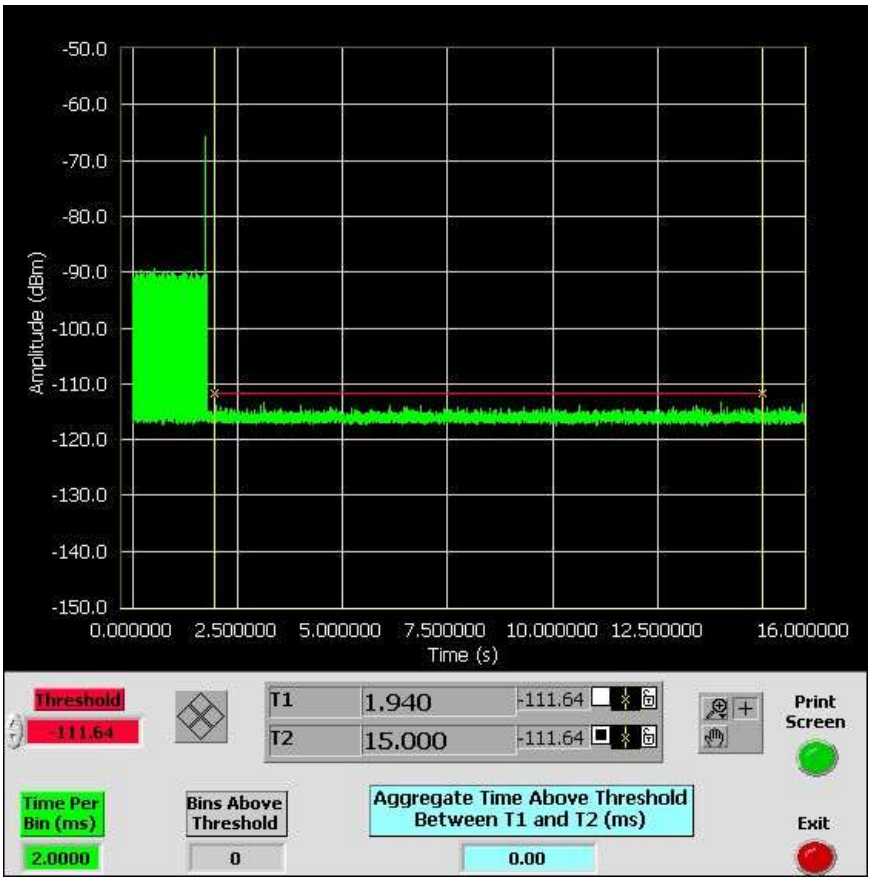
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.

AGGREGATE CLOSING TIME



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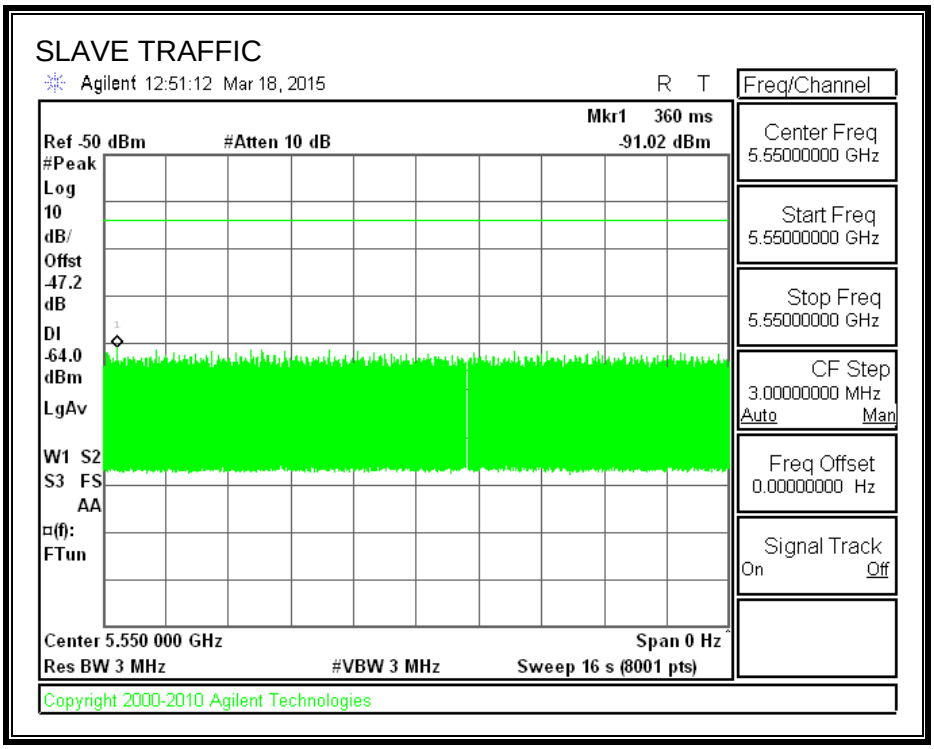
5.9. SLAVE DEVICE RESULTS FOR 40 MHz BANDWIDTH

5.9.1. TRAFFIC AND CHANNEL LOADING

TRAFFIC



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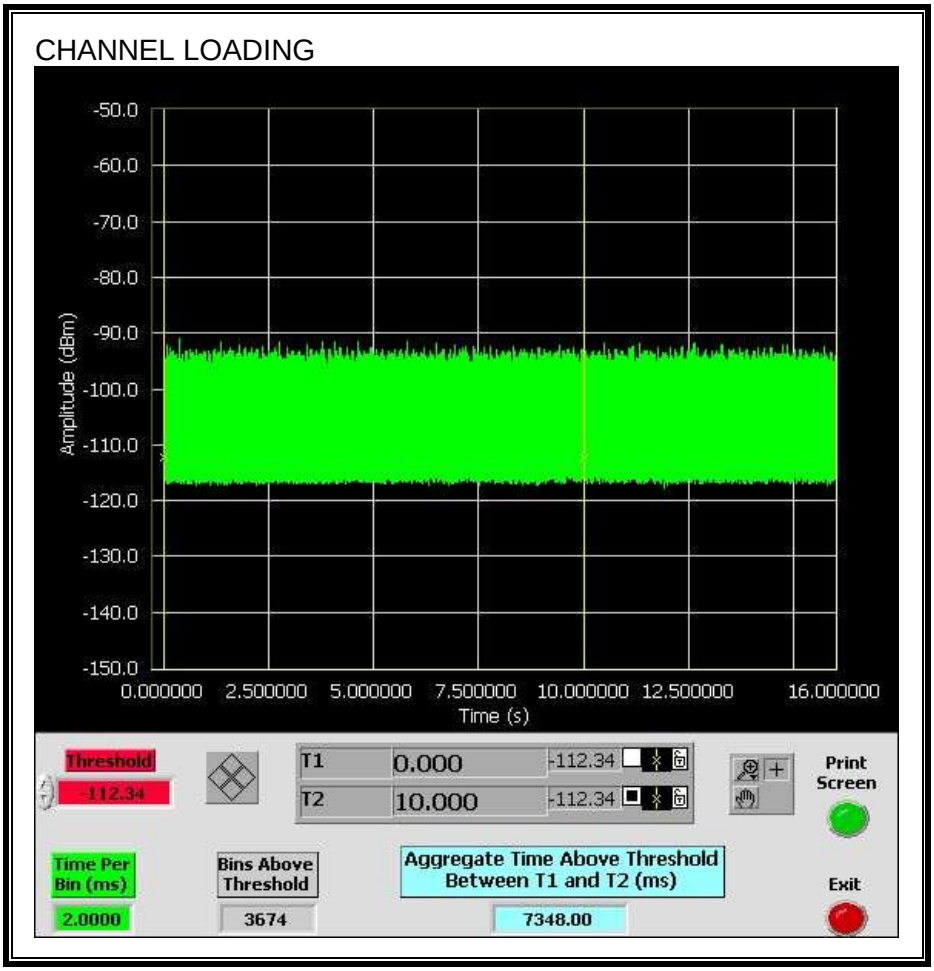
CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 73.48%

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5.9.2. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

5.9.3. 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)
0.012	10

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

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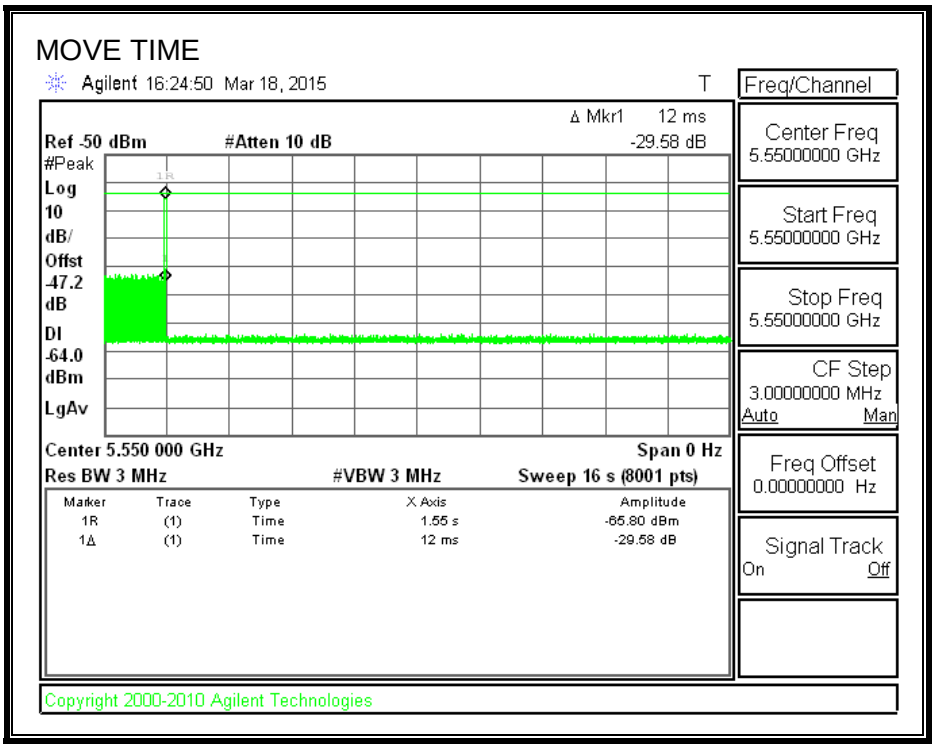
MOVE TIME



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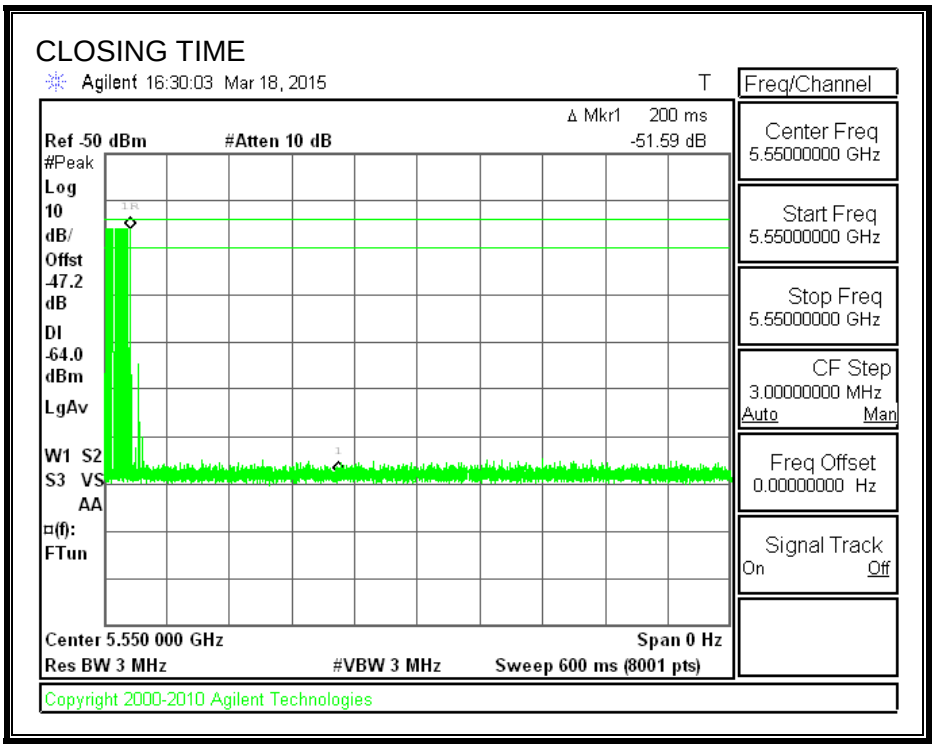
CHANNEL CLOSING TIME



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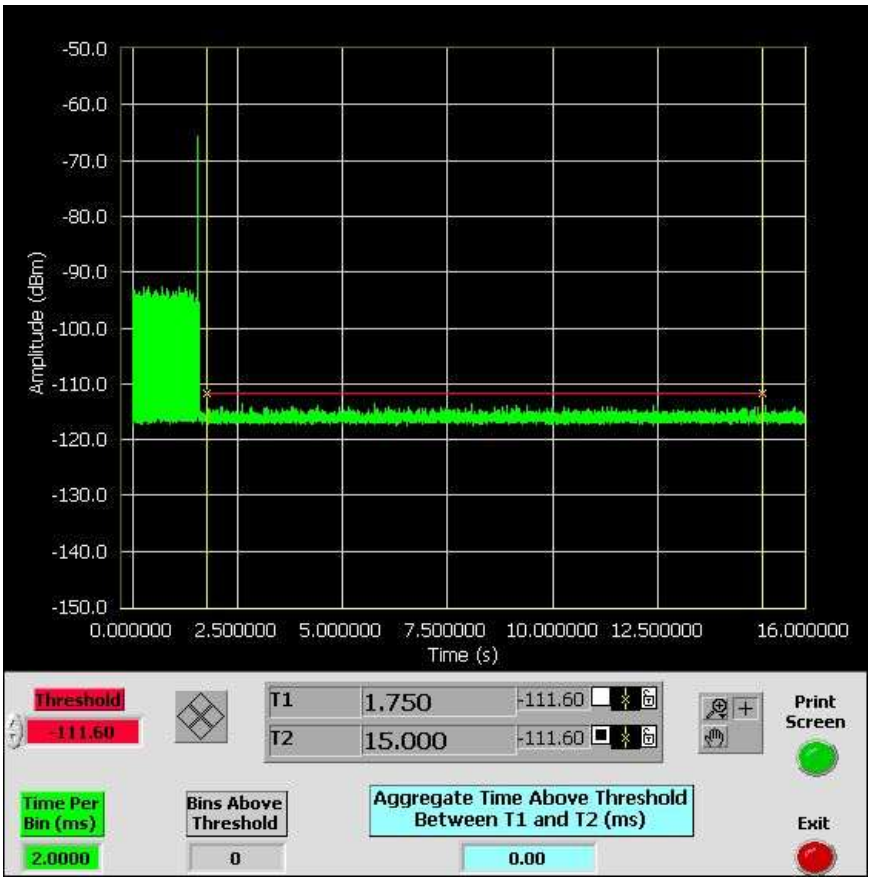
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.

AGGREGATE CLOSING TIME



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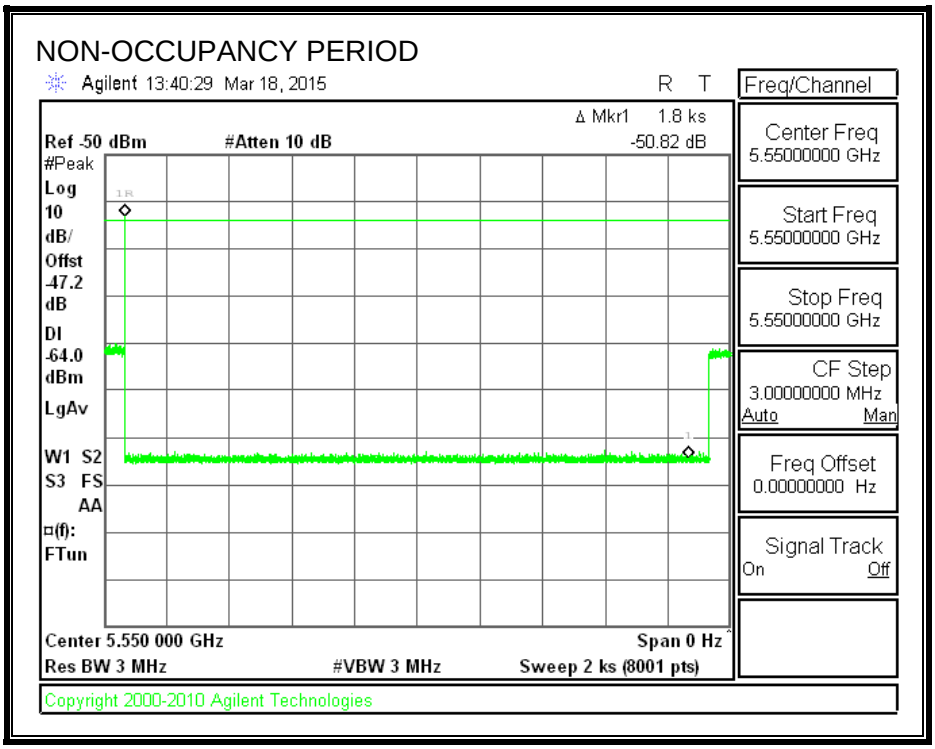
5.9.4. NON-OCCUPANCY PERIOD

RESULTS

No EUT transmissions were observed on the test channel during the 30-minute observation time. After the 30-minute non-occupancy period the Master Device performed a new CAC, then resumed transmissions upon detecting no radar during this CAC period.



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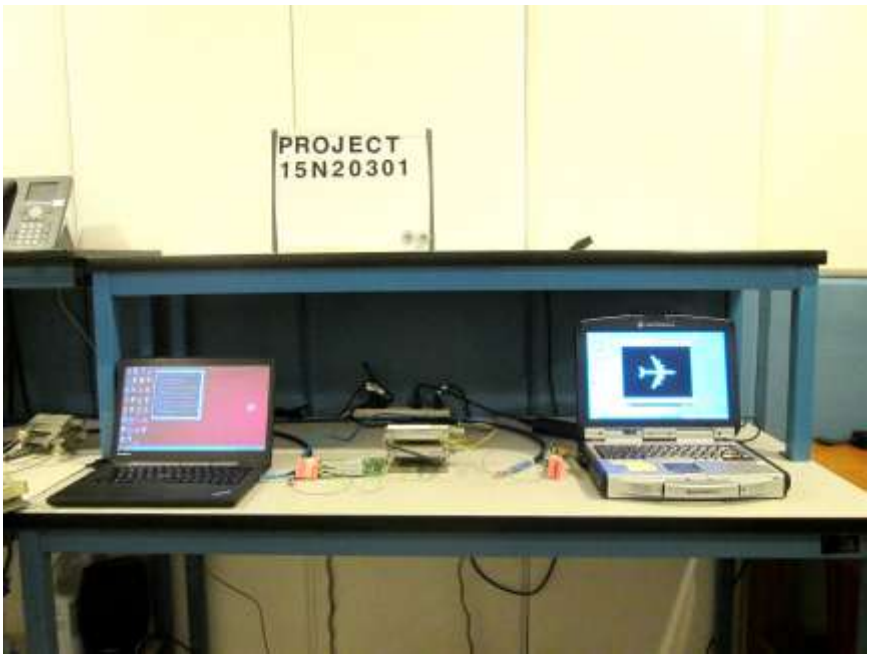
6. SETUP PHOTOS

MASTER AND SLAVE DEVICE DYNAMIC FREQUENCY SELECTION MEASUREMENT SETUP

DFS FRONT PHOTO



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DFS SIDE PHOTO

END OF REPORT

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