10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

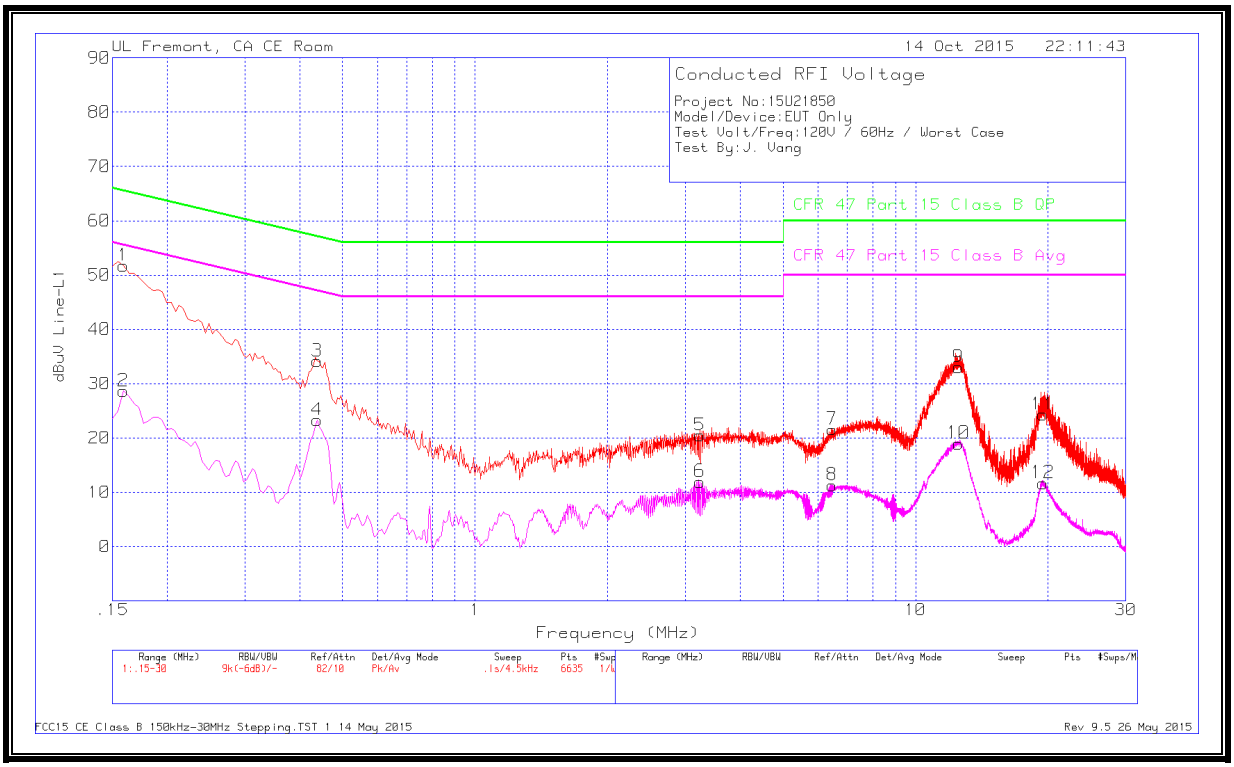
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

10.1. EUT POWERED BY AC ADAPTER

LINE 1 RESULTS



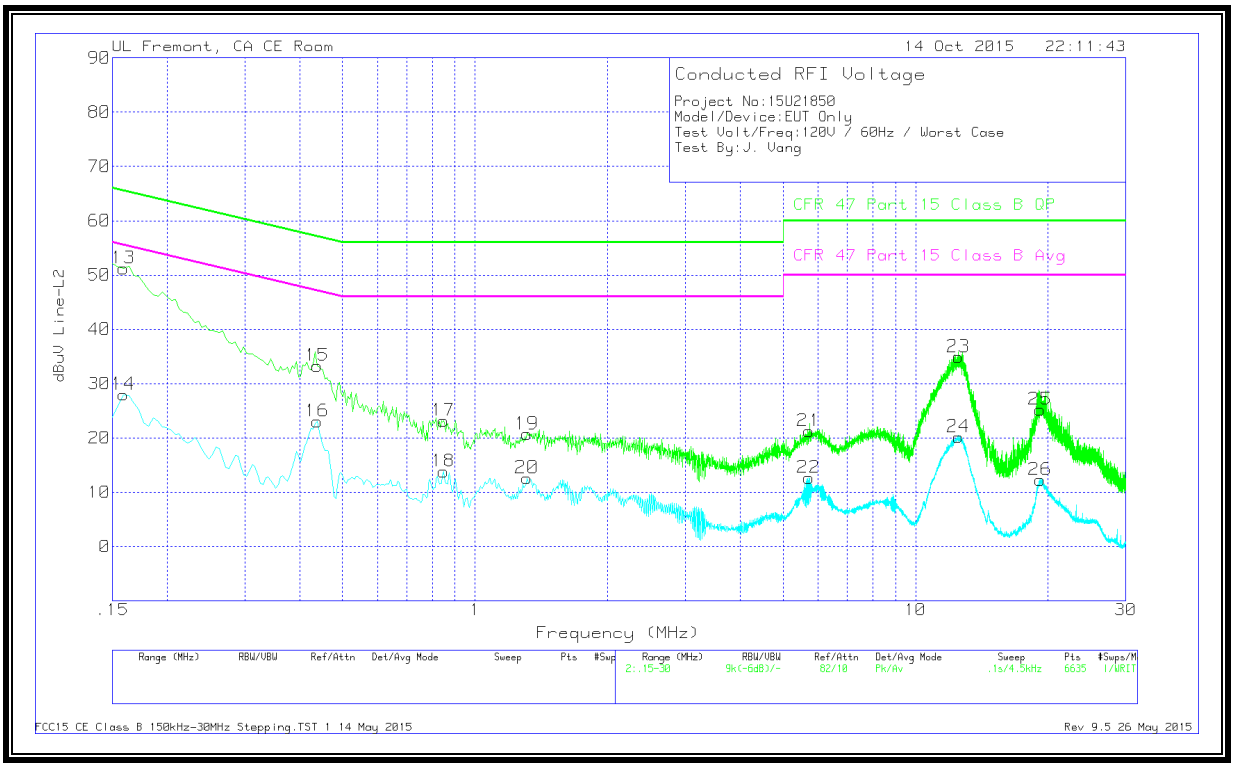
WORST EMISSIONS

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1	LC Cables 1&3	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	Margin (dB)	CFR 47 Part 15 Class B Avg	Margin (dB)
1	.159	50.42	Pk	1.3	0	51.72	65.52	-13.8	-	-
2	.159	27.35	Av	1.3	0	28.65	-	-	55.52	-26.87
3	.438	33.76	Pk	.4	0	34.16	57.1	-22.94	-	-
4	.438	22.88	Av	.4	0	23.28	-	-	47.1	-23.82
5	3.237	20.17	Pk	.2	.1	20.47	56	-35.53	-	-
6	3.237	11.65	Av	.2	.1	11.95	-	-	46	-34.05
7	6.468	21.28	Pk	.2	.1	21.58	60	-38.42	-	-
8	6.468	11	Av	.2	.1	11.3	-	-	50	-38.7
9	12.516	32.62	Pk	.2	.2	33.02	60	-26.98	-	-
10	12.516	18.59	Av	.2	.2	18.99	-	-	50	-31.01
11	19.464	23.84	Pk	.3	.2	24.34	60	-35.66	-	-
12	19.464	11.19	Av	.3	.2	11.69	-	-	50	-38.31

Pk - Peak detector

Av - Average detection

LINE 2 RESULTS



WORST EMISSIONS

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2	LC Cables 2&3	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	Margin (dB)	CFR 47 Part 15 Class B Avg	Margin (dB)
13	.159	49.85	Pk	1.4	0	51.25	65.52	-14.27	-	-
14	.159	26.57	Av	1.4	0	27.97	-	-	55.52	-27.55
15	.438	32.9	Pk	.4	0	33.3	57.1	-23.8	-	-
16	.438	22.66	Av	.4	0	23.06	-	-	47.1	-24.04
17	.8475	22.87	Pk	.3	0	23.17	56	-32.83	-	-
18	.8475	13.55	Av	.3	0	13.85	-	-	46	-32.15
19	1.311	20.4	Pk	.2	.1	20.7	56	-35.3	-	-
20	1.311	12.32	Av	.2	.1	12.62	-	-	46	-33.38
21	5.721	20.97	Pk	.2	.1	21.27	60	-38.73	-	-
22	5.721	12.36	Av	.2	.1	12.66	-	-	50	-37.34
23	12.516	34.51	Pk	.2	.2	34.91	60	-25.09	-	-
24	12.516	19.78	Av	.2	.2	20.18	-	-	50	-29.82
25	19.1805	24.71	Pk	.3	.2	25.21	60	-34.79	-	-
26	19.1805	11.78	Av	.3	.2	12.28	-	-	50	-37.72

Pk - Peak detector

Av - Average detection

11. DYNAMIC FREQUENCY SELECTION

11.1. OVERVIEW

11.1.1. LIMITS

FCC

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

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

Requirement	Operational Mode		
	Master	Client (without radar detection)	Client (with radar detection)
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

Table 2: Applicability of DFS requirements during normal operation

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

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar DFS	Client (without DFS)
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in all 20 MHz channel blocks and a null frequency between the bonded 20 MHz channel blocks.		

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

Maximum Transmit Power	Value (see notes)
E.I.R.P. ≥ 200 mill watt	-64 dBm
E.I.R.P. < 200 mill watt and power spectral density < 10 dBm/MHz	-62 dBm
E.I.R.P. < 200 mill watt that do not meet power spectral density requirement	-64 dBm

Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna
Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.
Note 3: E.I.R.P. is based on the highest antenna gain. For MIMO devices refer to KDB publication 662911 D01.

Table 4: DFS Response requirement values

Parameter	Value
Non-occupancy period	30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds (See Note 1)
Channel Closing Transmission Time	200 milliseconds + approx. 60 milliseconds over remaining 10 second period. (See Notes 1 and 2)
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. (See Note 3)

Note 1: *Channel Move Time* and the *Channel Closing Transmission Time* should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.
Note 2: The *Channel Closing Transmission Time* is comprised of 200 milliseconds starting at the beginning of the *Channel Move Time* plus any additional intermittent control signals required to facilitate a *Channel* move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.
Note 3: During the *U-NII Detection Bandwidth* detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

Table 5 – Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (usec)	PRI (usec)	Pulses	Minimum Percentage of Successful Detection	Minimum Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in table 5a	Roundup: {(1/360) x (19 x 10^6 PRI_{usec})}	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 usec. With a minimum increment of 1 usec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

Note 1: Short Pulse Radar Type 0 should be used for the *Detection Bandwidth* test, *Channel Move Time*, and *Channel Closing Time* tests.

Table 6 – Long Pulse Radar Test Signal

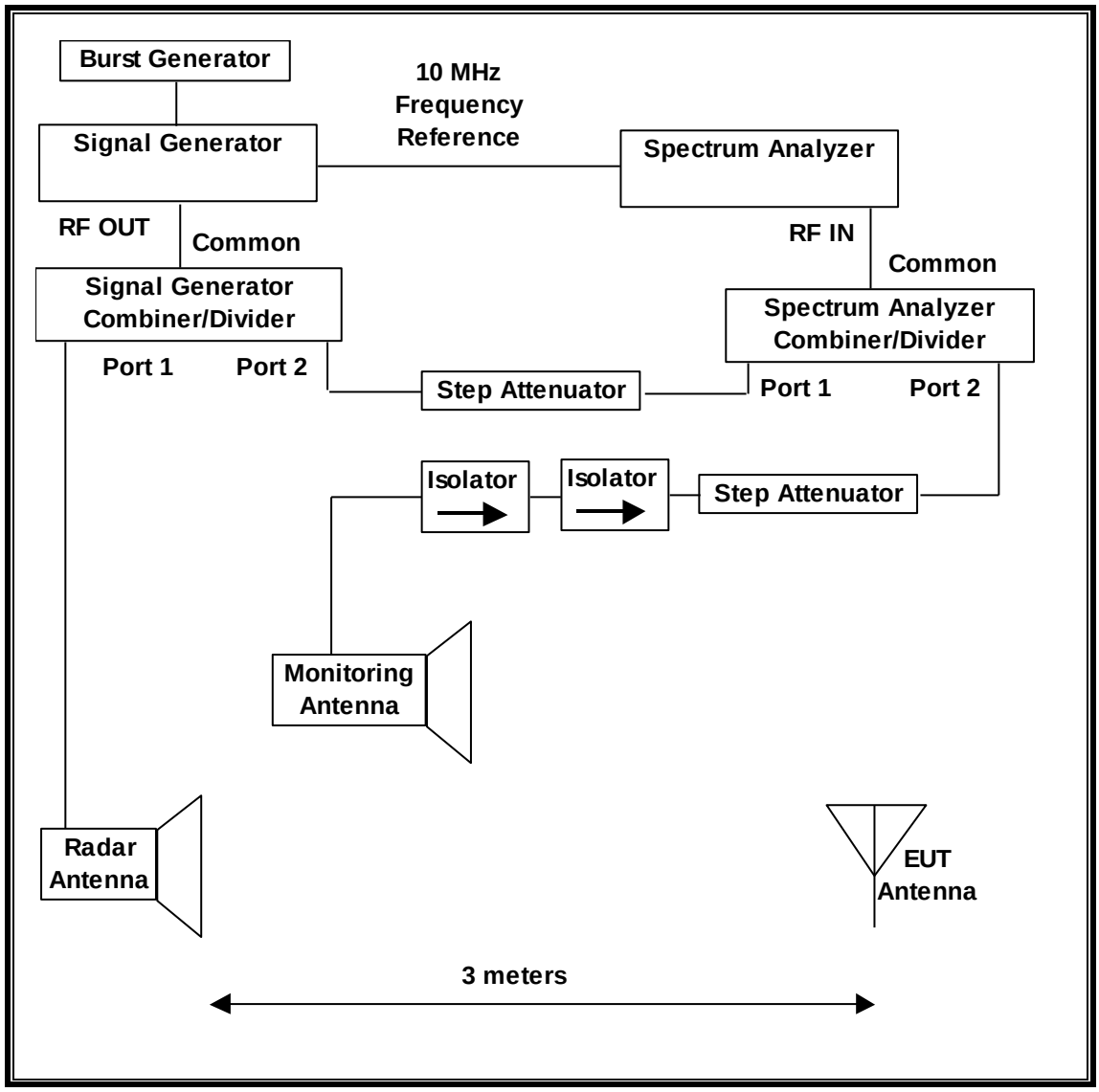
Radar Waveform Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

Table 7 – Frequency Hopping Radar Test Signal

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

11.1.2. TEST AND MEASUREMENT SYSTEM

RADIATED METHOD SYSTEM BLOCK DIAGRAM



SYSTEM OVERVIEW

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

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

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

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

SYSTEM CALIBRATION

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

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

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

ADJUSTMENT OF DISPLAYED TRAFFIC LEVEL

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

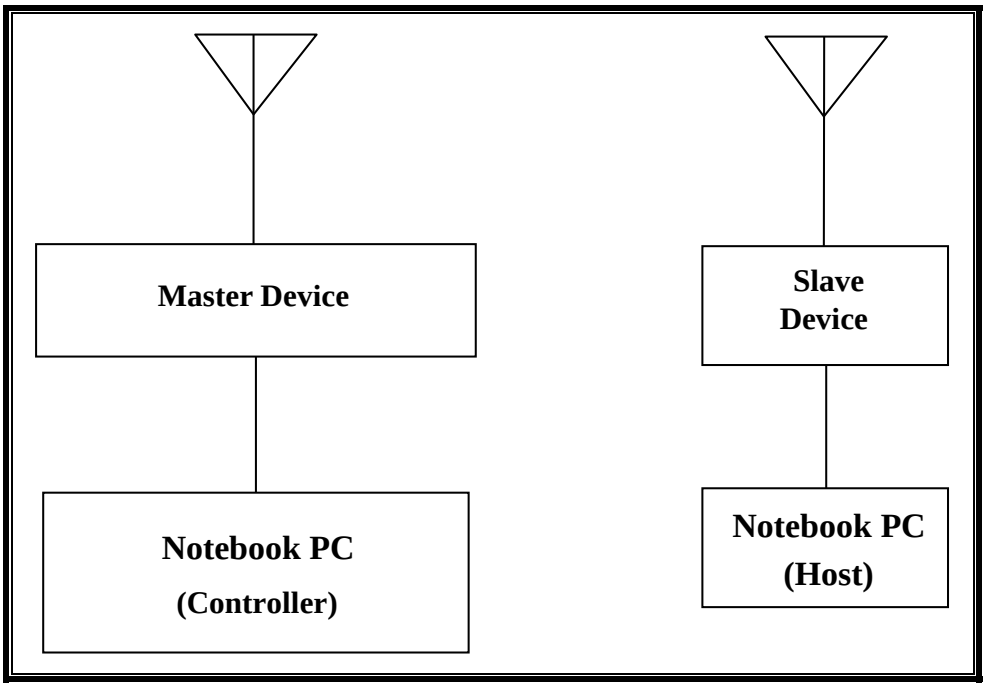
TEST AND MEASUREMENT EQUIPMENT

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

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Notebook PC (Controller)	Apple	A1278	C02HJ0A7DTY4	DoC
AC Adapter (ControllerPC)	Apple	A1172	MV7211FJAX4XA	DoC
iPhone 6S(Slave Device)	Apple	A1633	C7JPH035GL2T	BCG-E2946A
Notebook PC (Host)	Apple	A1502	C02LRLKYFH00	DoC
AC Adapter (Host PC)	Apple	A1435	D39346606VMF2YAJ	DoC

11.1.3. SETUP OF EUT

RADIATED METHOD EUT TEST SETUP



SUPPORT EQUIPMENT

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

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Notebook PC (Controller)	Apple	A1278	C02HJ0A7DTY4	DoC
AC Adapter (ControllerPC)	Apple	A1172	MV7211FJAX4XA	DoC
iPhone 6S(Slave Device)	Apple	A1633	C7JPH035GL2T	BCG-E2946A
Notebook PC (Host)	Apple	A1502	C02LRLKYFH00	DoC
AC Adapter (Host PC)	Apple	A1435	D39346606VMF2YAJ	DoC

11.1.4. DESCRIPTION OF EUT

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

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

The EUT is a Master Device.

The highest power level within these bands is 28.15 dBm EIRP in the 5250-5350 MHz band and 28.81 dBm EIRP in the 5470-5725 MHz band.

The only antenna assembly consists of 3 antennas with individual gains of 3.4 dBi, 1.6 dBi and 2.3 dBi in the 5250-5350 MHz band and 3.0 dBi, 1.7 dBi and 3.8 dBi in the 5470-5725 MHz band.

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

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

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

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

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

WLAN traffic that meets or exceeds the minimum required loading was generated by transferring a data stream from the controller/server PC to the EUT using iPerf version 2.0.5 software package.

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

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

The software installed in the access point is revision 7.7 D2.

UNIFORM CHANNEL SPREADING

This function is not required per KDB 905462.

11.2. RESULTS FOR 20 MHz BANDWIDTH

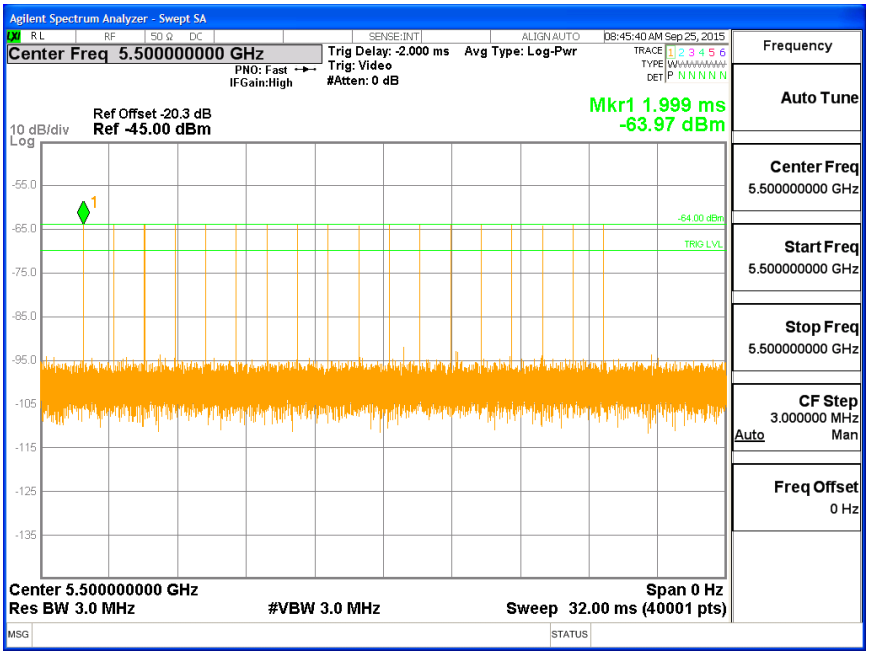
11.2.1. TEST CHANNEL

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

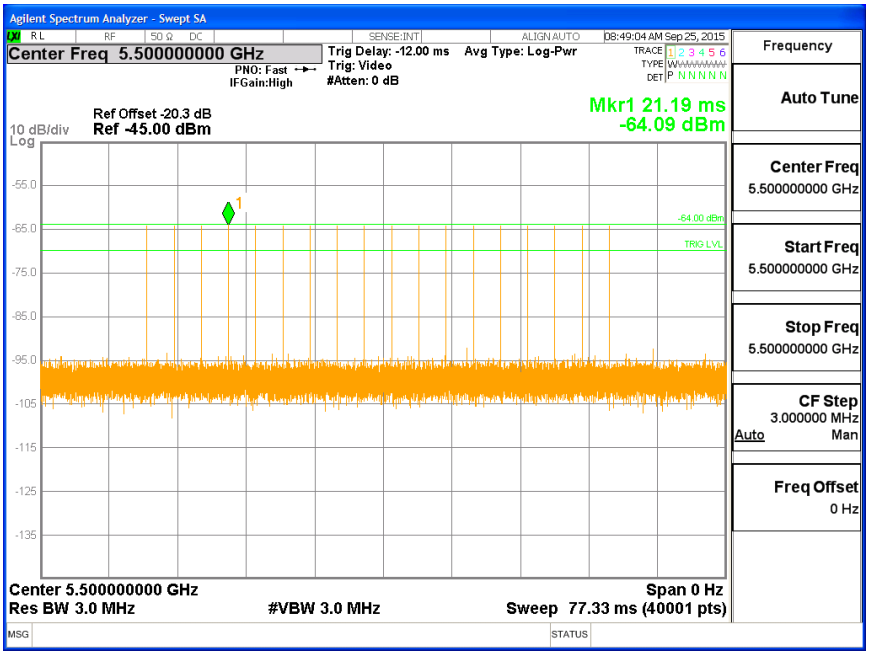
11.2.2. RADAR WAVEFORMS AND TRAFFIC

RADAR WAVEFORMS

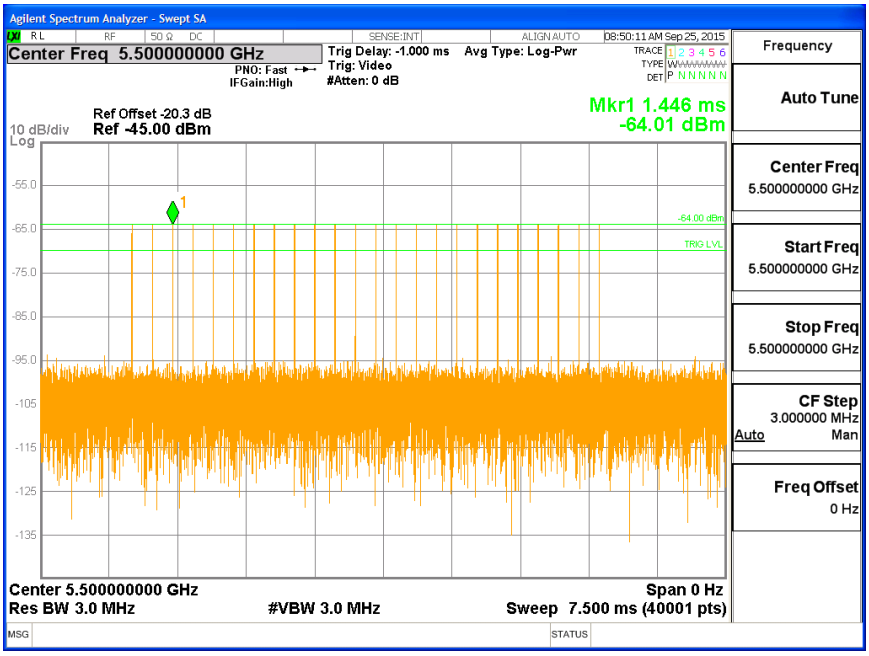
SHORT PULSE RADAR TYPE 0



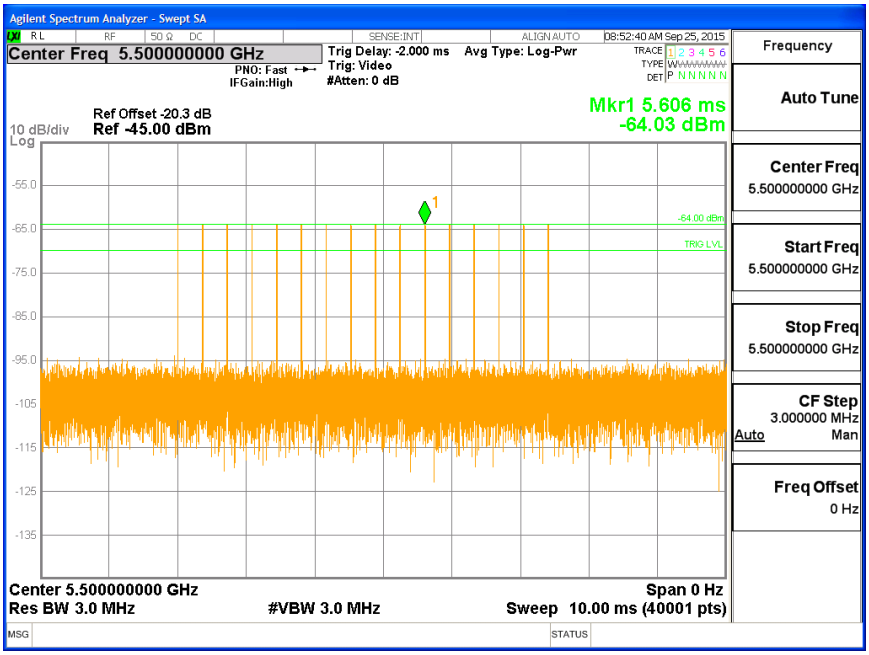
SAMPLE OF RADAR TYPE 1



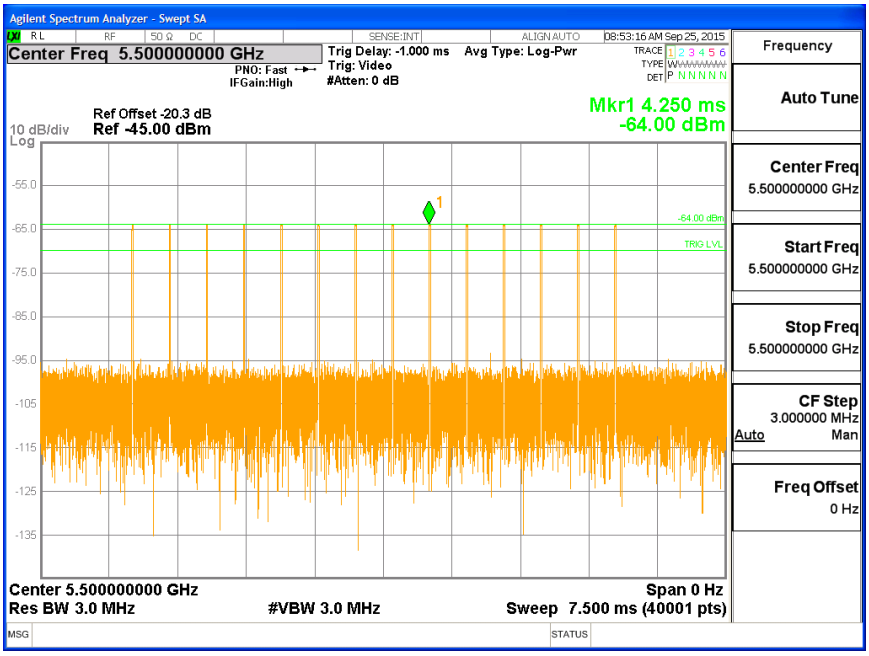
SAMPLE OF RADAR TYPE 2



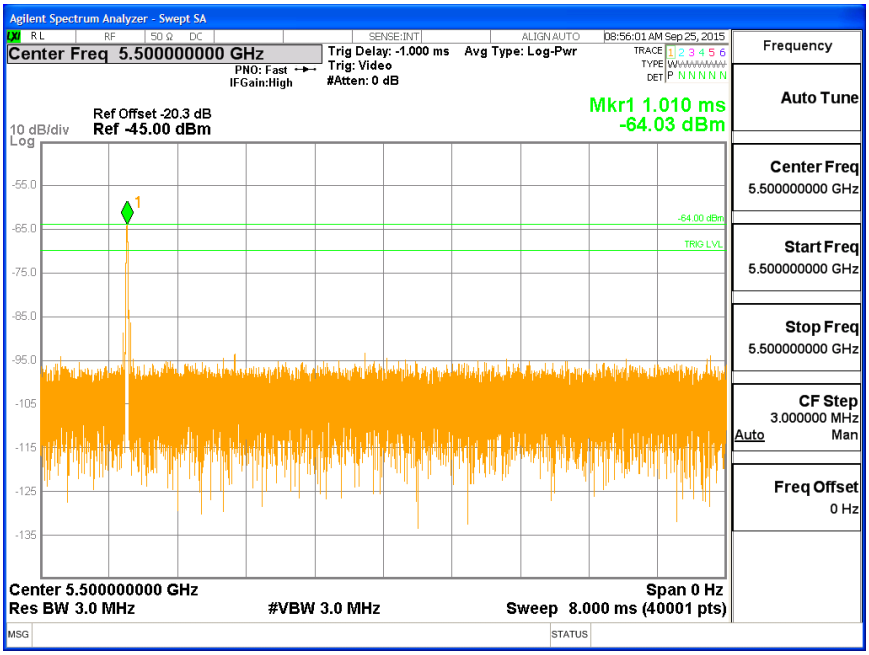
SAMPLE OF RADAR TYPE 3



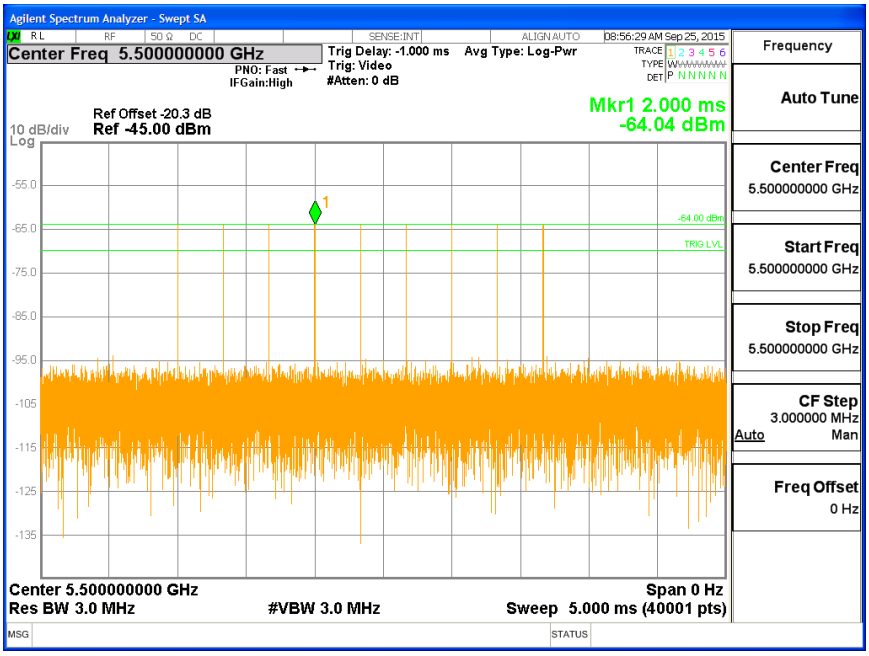
SAMPLE OF RADAR TYPE 4



SAMPLE OF SINGLE BURST OF RADAR TYPE 5

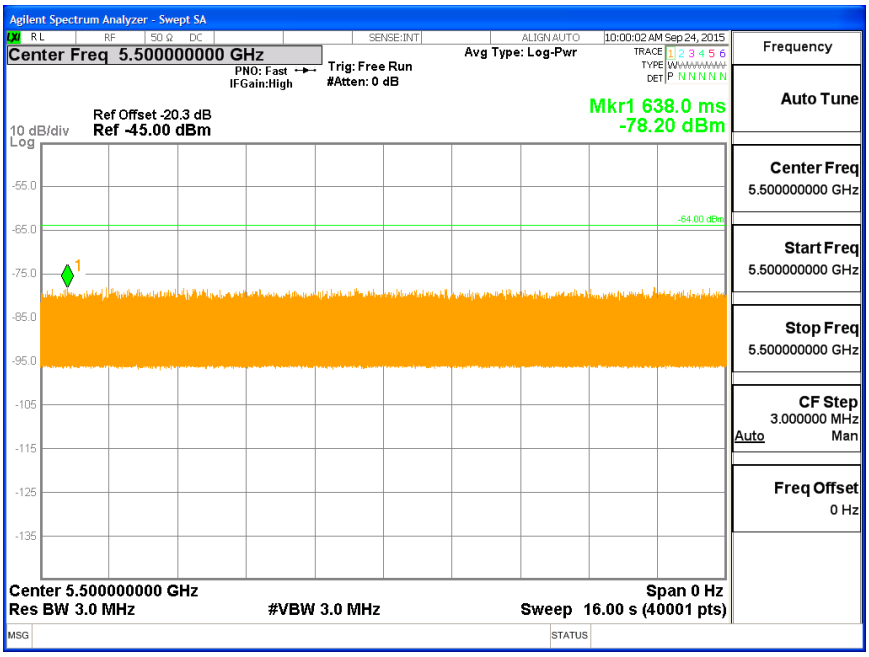


SINGLE BURST OF RADAR TYPE 6

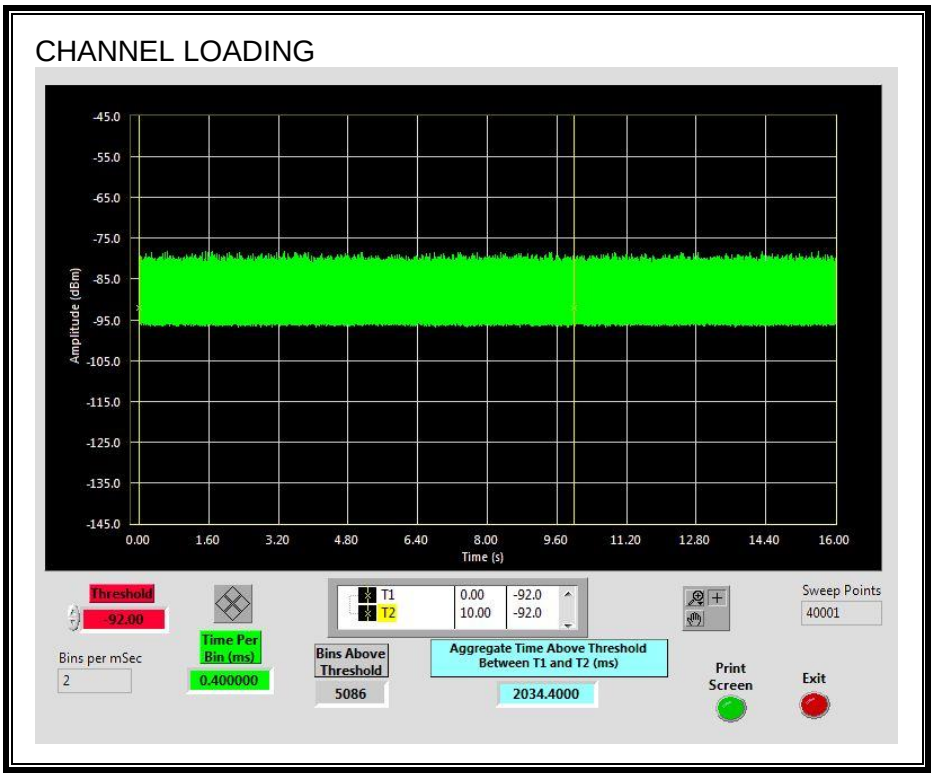


TRAFFIC

TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 20.34%

11.2.3. 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 period of time between reboot and the 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)
0	127.8	127.8	67.8

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)
4.65	72.88	68.2	0.4

Radar Near End of CAC

Timing of Reboot (sec)	Timing of Radar Burst (sec)	Radar Relative to Reboot (sec)	Radar Relative to Start of CAC (sec)
5.61	132.0	126.4	58.6

QUALITATIVE RESULTS

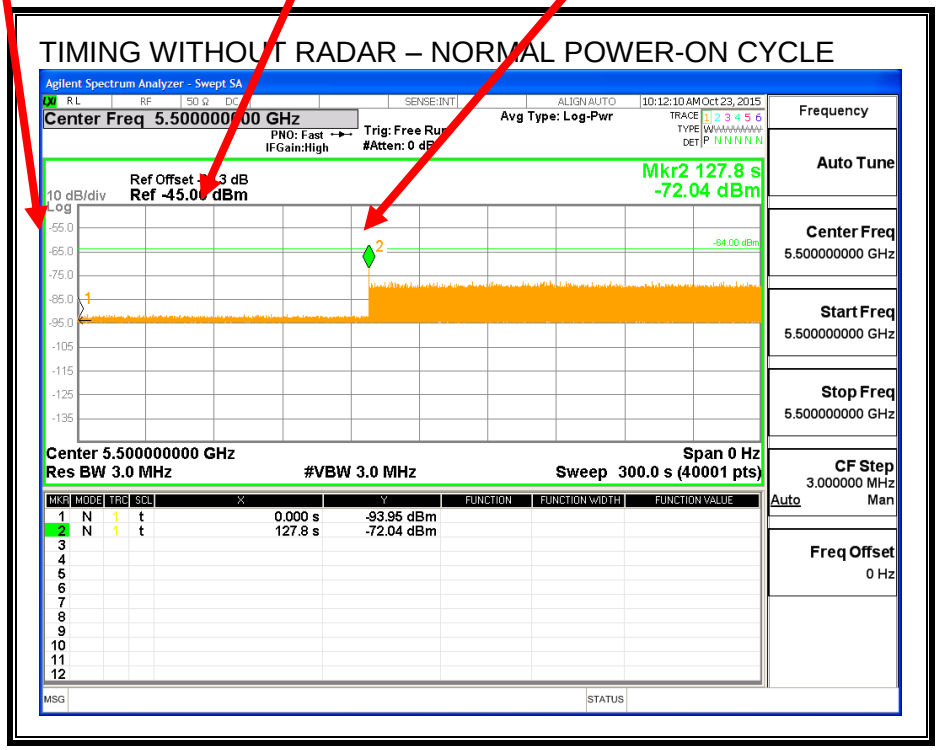
Timing of Radar Burst	Display on Control Computer	Spectrum Analyzer Display
No Radar Triggered	EUT marks Channel as active	Transmissions begin on channel after completion of the initial power-up cycle and the CAC
Within 0 to 6 second window	EUT indicates radar detected	No transmissions on channel
Within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



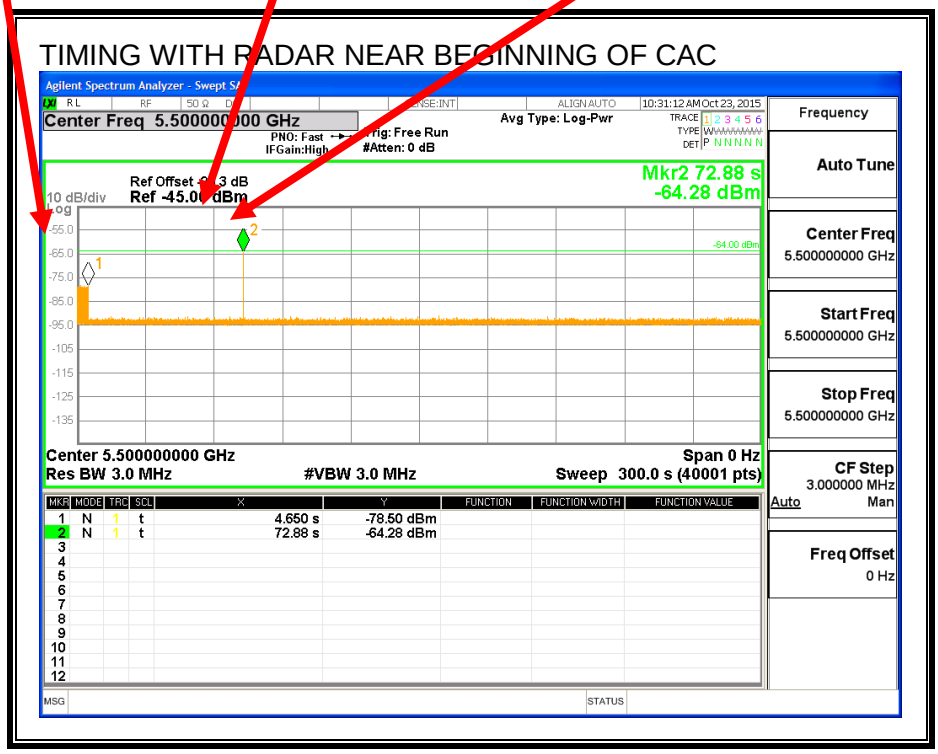
Transmissions begin on channel after completion of the initial power-up cycle and the CAC.

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



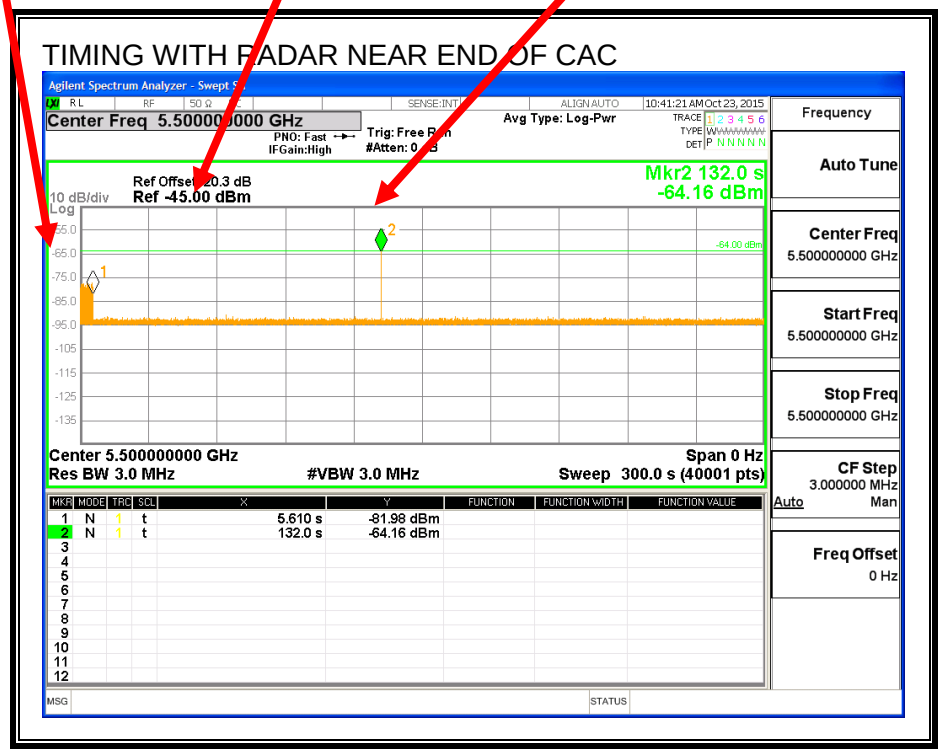
No EUT transmissions were observed after the radar signal.

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.

11.2.4. OVERLAPPING CHANNEL TESTS

RESULTS

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

11.2.5. 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).

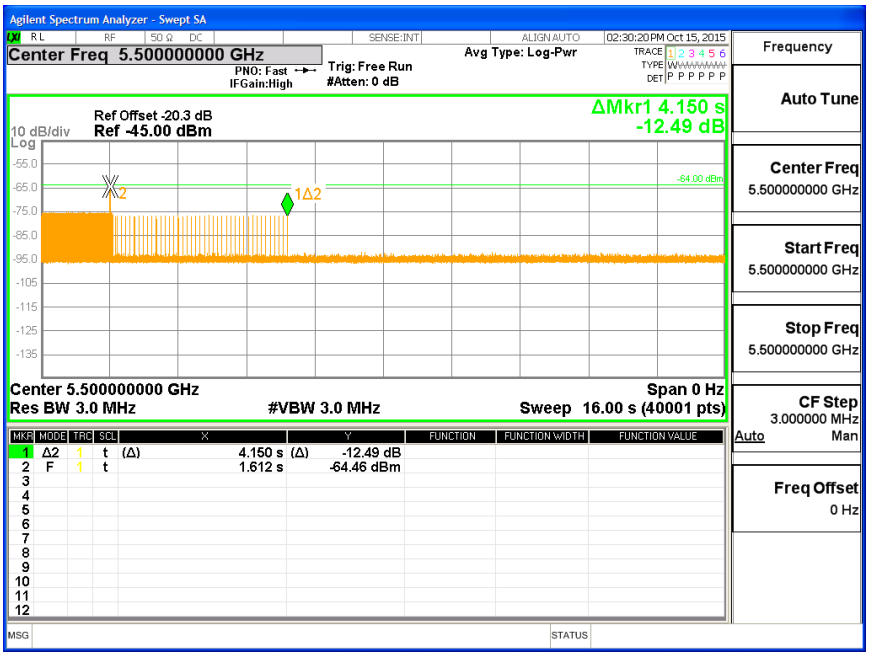
RESULTS

Channel Move Time (sec)	Limit (sec)
1.612	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
34.8	60

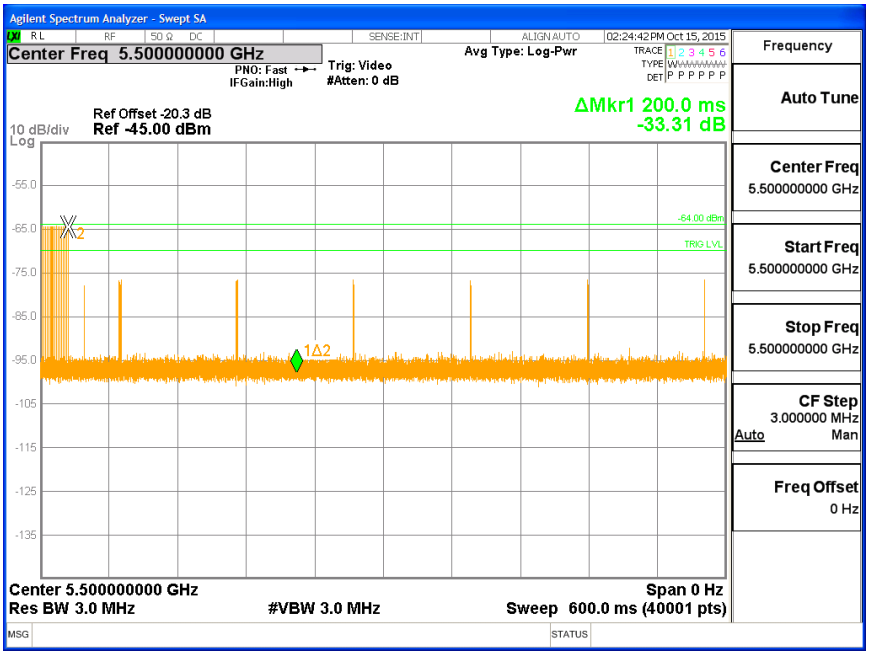
MOVE TIME

MOVE TIME



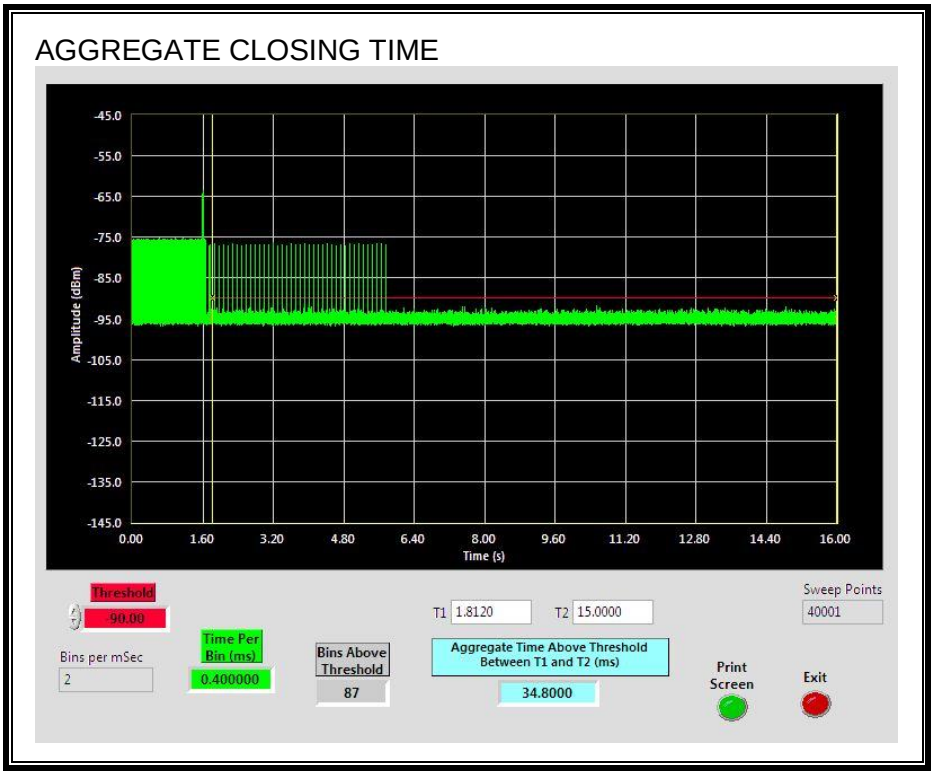
CHANNEL CLOSING TIME

CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

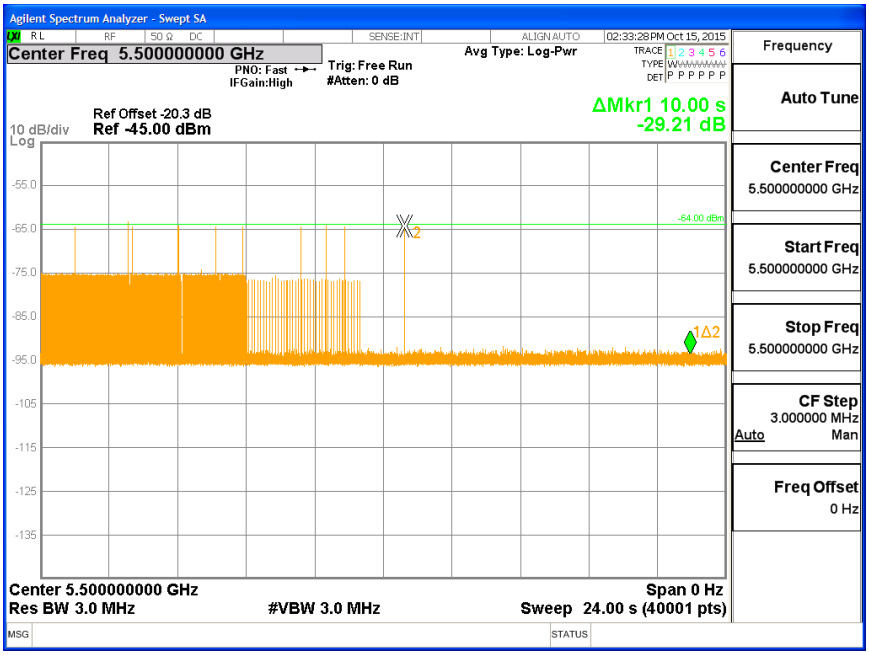
Only intermittent transmissions are observed during the aggregate monitoring period.



LONG PULSE CHANNEL MOVE TIME

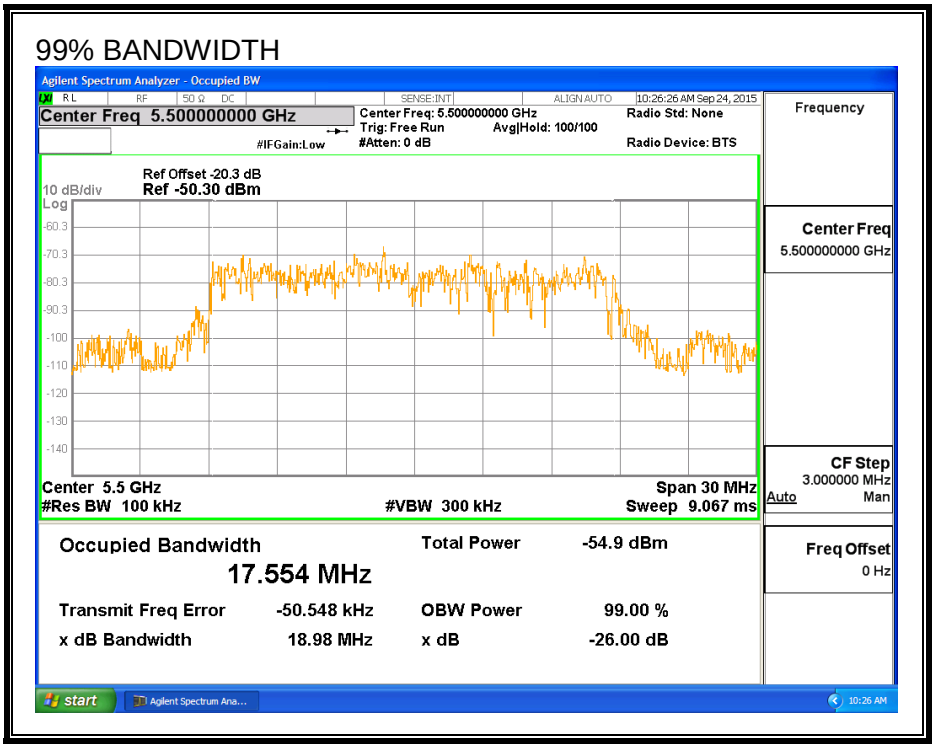
The traffic ceases prior to 10 seconds after the end of the radar waveform.

MOVE TIME FOR LONG PULSE RADAR



11.2.6. 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 (%)
5491	5509	18	17.554	102.5	100

DETECTION BANDWIDTH PROBABILITY

DETECTION BANDWIDTH PROBABILITY RESULTS

Detection Bandwidth Test Results				
FCC Type 0 Waveform: 1 us Pulse Width, 1428 us PRI, 18 Pulses per Burst				
Frequency (MHz)	Number of Trials	Number Detected	Detection (%)	Mark
5490	10	0	0	
5491	10	10	100	FL
5492	10	10	100	
5493	10	10	100	
5494	10	10	100	
5495	10	10	100	
5500	10	10	100	
5505	10	10	100	
5506	10	10	100	
5507	10	10	100	
5508	10	10	100	
5509	10	10	100	FH
5510	10	1	10	

11.2.7. IN-SERVICE MONITORING

RESULTS

FCC Radar Test Summary

Signal Type	Number of Trials	Detection (%)	Limit (%)	Pass/Fail	Detection Bandwidth		80% of Det BW	
					FL	FH	FL5	FH5
FCC Short Pulse Type 1	30	96.67	60	Pass	5491	5509		
FCC Short Pulse Type 2	30	100.00	60	Pass	5491	5509		
FCC Short Pulse Type 3	30	100.00	60	Pass	5491	5509		
FCC Short Pulse Type 4	30	100.00	60	Pass	5491	5509		
Aggregate		99.17	80	Pass				
FCC Long Pulse Type 5	30	96.67	80	Pass	5491	5509	5493	5507
FCC Hopping Type 6	38	100.00	70	Pass	5491	5509		

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	5500	Yes
1002	1	938	57	A	5500	Yes
1003	1	778	68	A	5500	Yes
1004	1	898	59	A	5500	Yes
1005	1	558	95	A	5500	Yes
1006	1	718	74	A	5500	Yes
1007	1	838	63	A	5500	Yes
1008	1	798	67	A	5500	Yes
1009	1	698	76	A	5500	Yes
1010	1	518	102	A	5500	Yes
1011	1	818	65	A	5500	Yes
1012	1	638	83	A	5500	Yes
1013	1	738	72	A	5500	Yes
1014	1	578	92	A	5500	No
1015	1	538	99	A	5500	Yes
1016	1	1346	40	B	5500	Yes
1017	1	2367	23	B	5500	Yes
1018	1	1999	27	B	5500	Yes
1019	1	1955	27	B	5500	Yes
1020	1	2911	19	B	5500	Yes
1021	1	1802	30	B	5500	Yes
1022	1	1693	32	B	5500	Yes
1023	1	713	75	B	5500	Yes
1024	1	734	72	B	5500	Yes
1025	1	1237	43	B	5500	Yes
1026	1	1387	39	B	5500	Yes
1027	1	2019	27	B	5500	Yes
1028	1	1104	48	B	5500	Yes
1029	1	1866	29	B	5500	Yes
1030	1	2434	22	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	4.5	222	24	5500	Yes
2002	1.4	184	25	5500	Yes
2003	2.2	178	25	5500	Yes
2004	4.7	187	23	5500	Yes
2005	3.9	185	27	5500	Yes
2006	4.7	198	26	5500	Yes
2007	1.8	162	26	5500	Yes
2008	5	179	29	5500	Yes
2009	4.6	190	26	5500	Yes
2010	1.7	212	23	5500	Yes
2011	3.6	227	27	5500	Yes
2012	3.1	214	28	5500	Yes
2013	1.2	153	29	5500	Yes
2014	5	225	26	5500	Yes
2015	3.2	211	25	5500	Yes
2016	1.2	207	23	5500	Yes
2017	1.9	196	28	5500	Yes
2018	4.2	158	23	5500	Yes
2019	5	195	26	5500	Yes
2020	3.4	161	28	5500	Yes
2021	2.6	202	25	5500	Yes
2022	3.4	172	24	5500	Yes
2023	2.7	217	27	5500	Yes
2024	3.7	153	27	5500	Yes
2025	3.3	165	24	5500	Yes
2026	2.6	186	27	5500	Yes
2027	2.3	201	29	5500	Yes
2028	1.8	189	25	5500	Yes
2029	4	208	27	5500	Yes
2030	3.7	200	24	5500	Yes

TYPE 3 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 3					
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Frequency (MHz)	Successful Detection (Yes/No)
3001	8.9	360	16	5500	Yes
3002	8.8	347	18	5500	Yes
3003	9.6	315	17	5500	Yes
3004	7.3	448	16	5500	Yes
3005	8.4	311	16	5500	Yes
3006	9.1	457	17	5500	Yes
3007	5.4	333	18	5500	Yes
3008	6.3	491	18	5500	Yes
3009	5.5	380	17	5500	Yes
3010	6.8	316	16	5500	Yes
3011	6.2	350	17	5500	Yes
3012	8	416	18	5500	Yes
3013	7.8	464	16	5500	Yes
3014	7.1	425	17	5500	Yes
3015	9.8	485	18	5500	Yes
3016	9.4	459	17	5500	Yes
3017	10	414	16	5500	Yes
3018	9.9	284	17	5500	Yes
3019	5.6	251	18	5500	Yes
3020	8.4	251	17	5500	Yes
3021	9.5	365	17	5500	Yes
3022	5.1	260	18	5500	Yes
3023	6.5	387	16	5500	Yes
3024	7.4	294	16	5500	Yes
3025	6.6	316	17	5500	Yes
3026	7.9	369	17	5500	Yes
3027	7.3	271	16	5500	Yes
3028	6.4	470.00	17	5500	Yes
3029	6.2	384	18	5500	Yes
3030	5.5	346	16	5500	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	16.4	406	14	5500	Yes
4002	10.9	262	12	5500	Yes
4003	16.8	335	16	5500	Yes
4004	11.8	455	12	5500	Yes
4005	18.1	423	16	5500	Yes
4006	13.6	305	13	5500	Yes
4007	15.8	286	12	5500	Yes
4008	17.2	431	16	5500	Yes
4009	19.9	307	16	5500	Yes
4010	11.7	348	15	5500	Yes
4011	10.1	487	13	5500	Yes
4012	12.5	290	12	5500	Yes
4013	11.5	442	13	5500	Yes
4014	19.8	391	13	5500	Yes
4015	19.3	305	14	5500	Yes
4016	18	266	16	5500	Yes
4017	13.2	460	13	5500	Yes
4018	17.8	434	13	5500	Yes
4019	13.6	256	15	5500	Yes
4020	18.7	376	16	5500	Yes
4021	14.9	344	15	5500	Yes
4022	10.4	477	16	5500	Yes
4023	18	457	15	5500	Yes
4024	14	352	15	5500	Yes
4025	16.7	479	14	5500	Yes
4026	18.6	269	14	5500	Yes
4027	17	408	16	5500	Yes
4028	19.4	462.00	13	5500	Yes
4029	12.4	465.00	13	5500	Yes
4030	10.6	413.00	13	5500	Yes

TYPE 5 DETECTION PROBABILITY

Data Sheet for FCC Long Pulse Radar Type 5		
Trial	Frequency (MHz)	Successful Detection (Yes/No)
1	5494	No
2	5498	Yes
3	5499	Yes
4	5503	Yes
5	5495	Yes
6	5496	Yes
7	5504	Yes
8	5494	Yes
9	5501	Yes
10	5502	Yes
11	5500	Yes
12	5504	Yes
13	5505	Yes
14	5505	Yes
15	5502	Yes
16	5497	Yes
17	5505	Yes
18	5505	Yes
19	5506	Yes
20	5502	Yes
21	5501	Yes
22	5503	Yes
23	5504	Yes
24	5499	Yes
25	5506	Yes
26	5506	Yes
27	5497	Yes
28	5507	Yes
29	5495	Yes
30	5494	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	252	5491	5	Yes
2	727	5492	3	Yes
3	1202	5493	2	Yes
4	1677	5494	2	Yes
5	2152	5495	1	Yes
6	2627	5496	7	Yes
7	3102	5497	5	Yes
8	3577	5498	3	Yes
9	4052	5499	1	Yes
10	4527	5500	5	Yes
11	5002	5501	3	Yes
12	5477	5502	6	Yes
13	5952	5503	1	Yes
14	6427	5504	2	Yes
15	6902	5505	5	Yes
16	7377	5506	2	Yes
17	7852	5507	4	Yes
18	8327	5508	2	Yes
19	8802	5509	2	Yes
20	9277	5491	2	Yes
21	9752	5492	2	Yes
22	10227	5493	2	Yes
23	10702	5494	6	Yes
24	11177	5495	2	Yes
25	11652	5496	4	Yes
26	12127	5497	2	Yes
27	12602	5498	2	Yes
28	13077	5499	4	Yes
29	13552	5500	2	Yes
30	14027	5501	5	Yes
31	14502	5502	5	Yes
32	14977	5503	3	Yes
33	15452	5504	5	Yes
34	15927	5505	5	Yes
35	16402	5506	4	Yes
36	16877	5507	3	Yes
37	17352	5508	4	Yes
38	17827	5509	2	Yes

11.3. RESULTS FOR 40 MHz BANDWIDTH

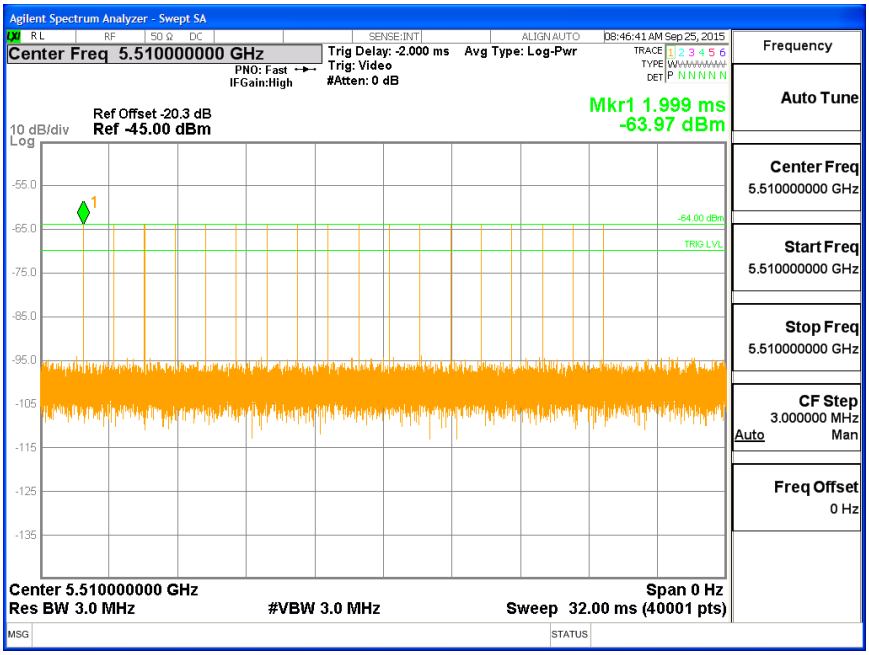
11.3.1. TEST CHANNEL

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

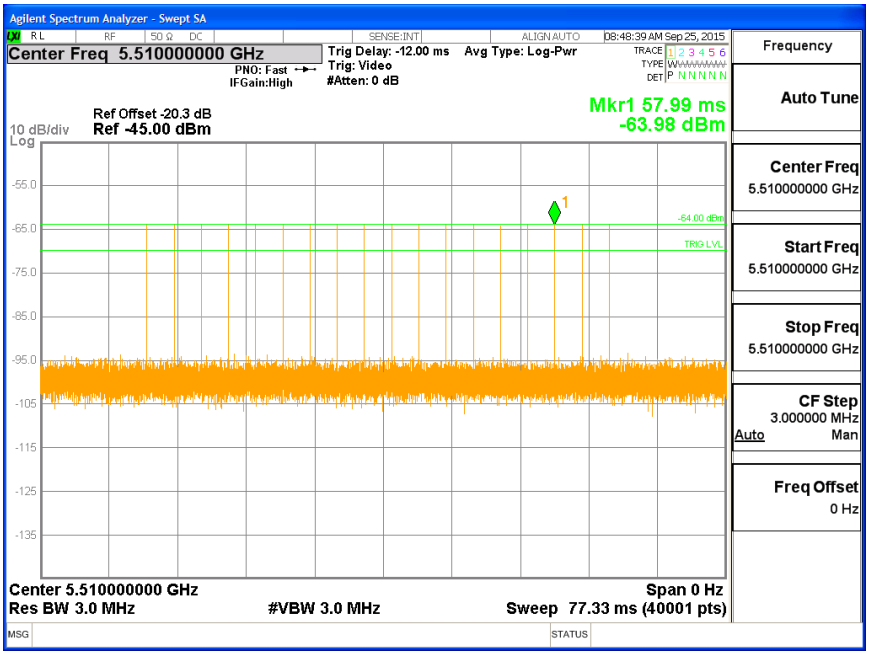
11.3.2. RADAR WAVEFORMS AND TRAFFIC

RADAR WAVEFORMS

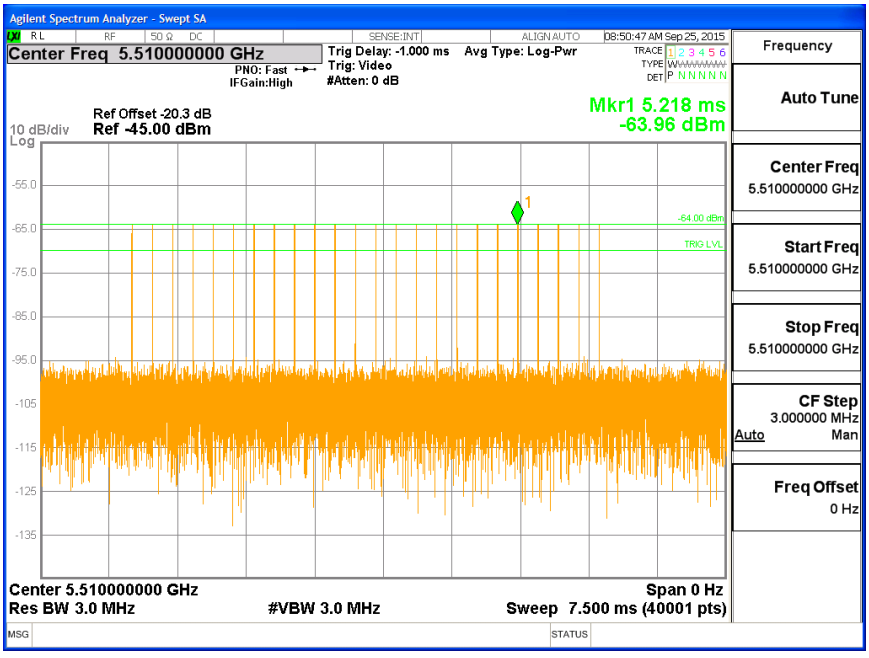
SHORT PULSE RADAR TYPE 0



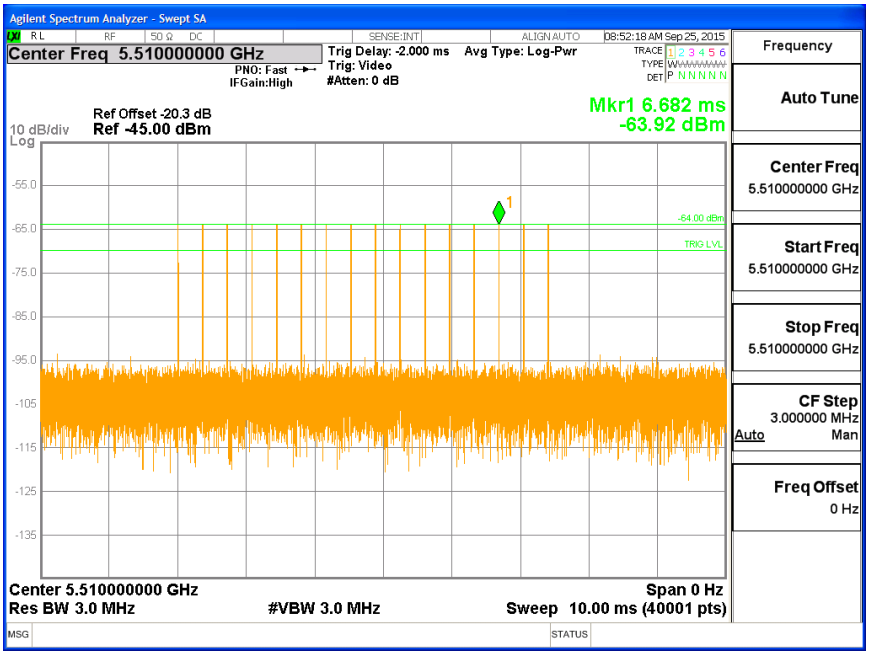
SAMPLE OF RADAR TYPE 1



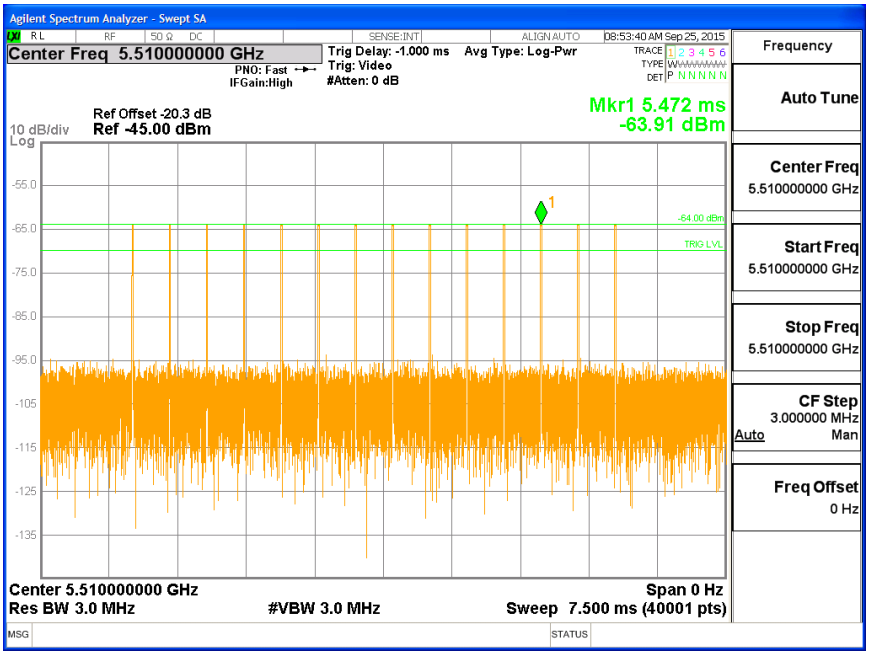
SAMPLE OF RADAR TYPE 2



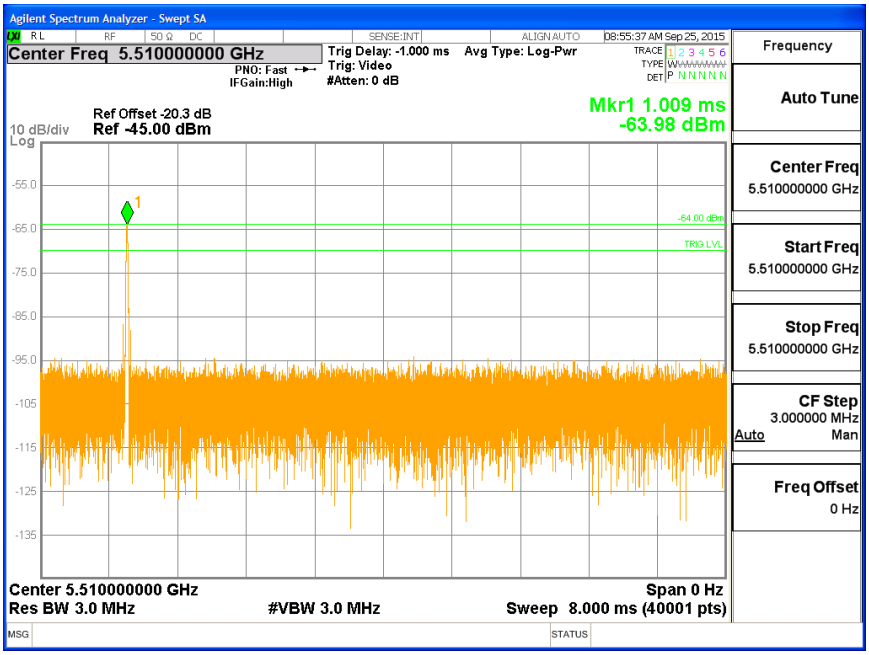
SAMPLE OF RADAR TYPE 3



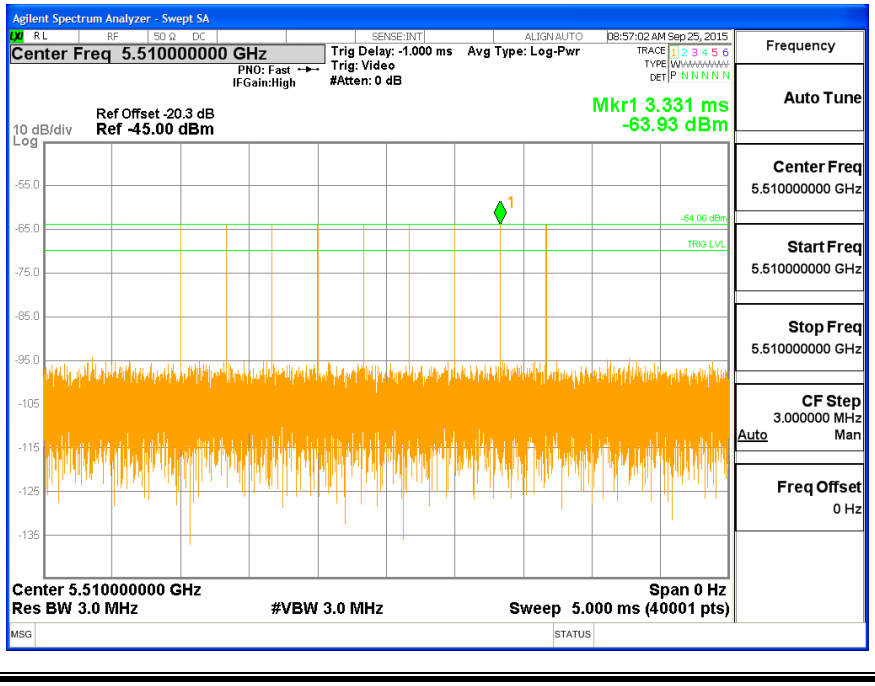
SAMPLE OF RADAR TYPE 4



SAMPLE OF SINGLE BURST OF RADAR TYPE 5

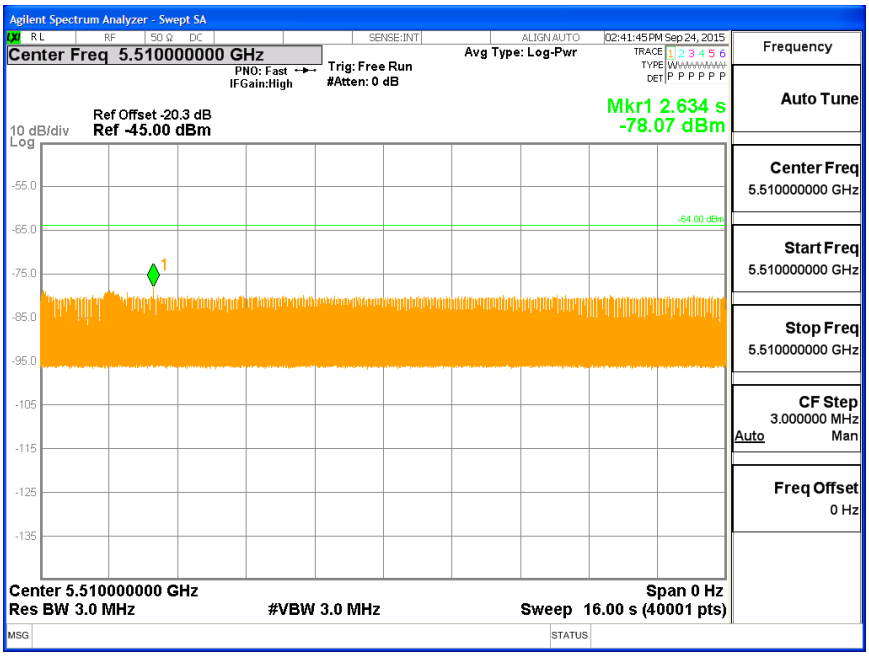


SINGLE BURST OF RADAR TYPE 6

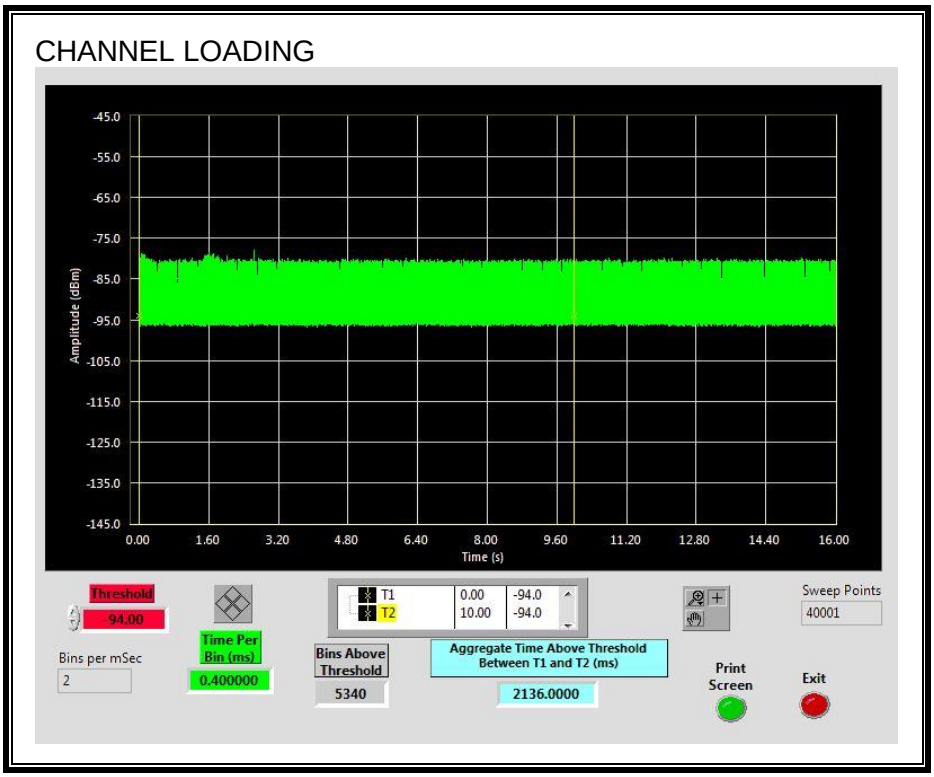


TRAFFIC

TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 21.36%

11.3.3. 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 period of time between reboot and the 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)
0.0	60.39	60.4	0.4

Radar Near Beginning of CAC

Timing of Reboot (sec)	Timing of Radar Burst (sec)	Radar Relative to Reboot (sec)	Radar Relative to Start of CAC (sec)
0.0	1.5	1.5	1.1

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)
0.0	58.0	58.0	57.6

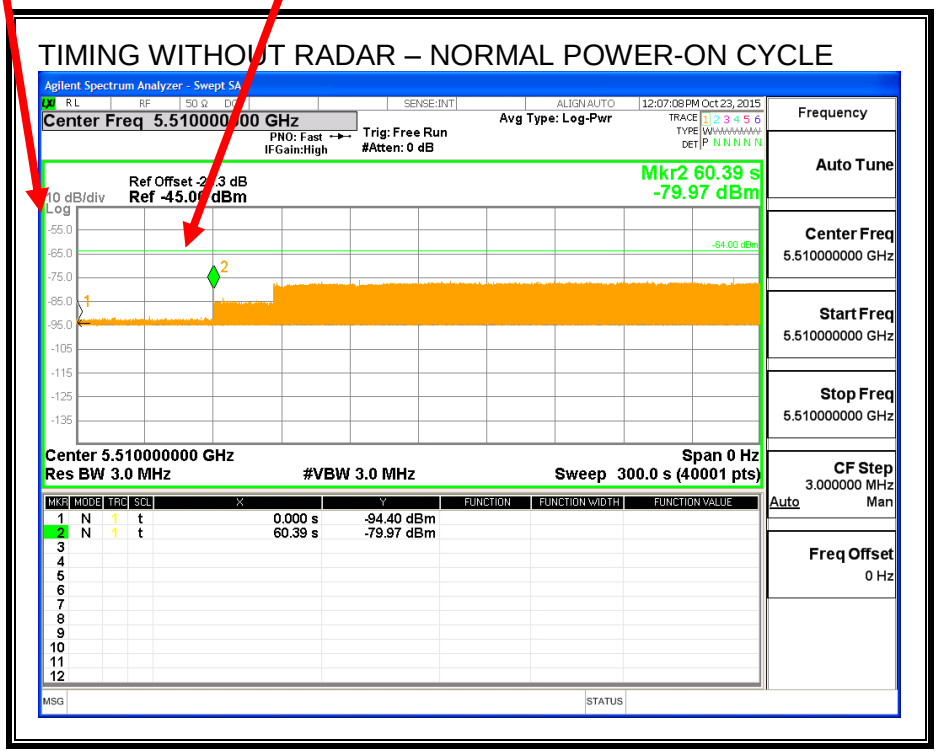
QUALITATIVE RESULTS

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

End of CAC
Traffic is Initiated

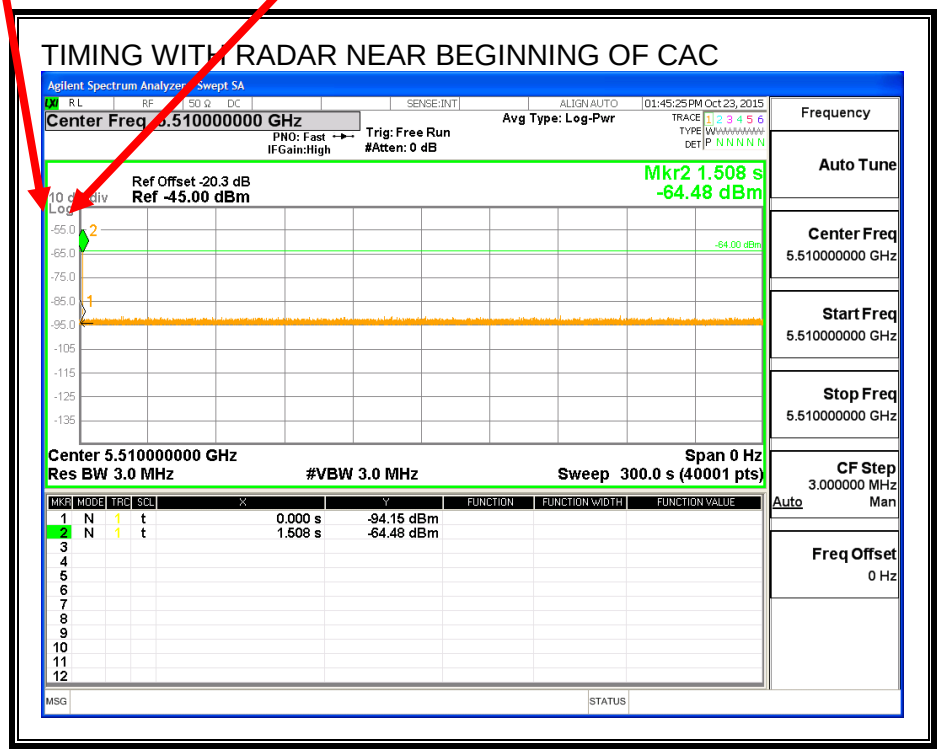


Transmissions begin on channel after completion of the initial power-up cycle and the CAC.

TIMING WITH RADAR NEAR BEGINNING OF CAC

AP is rebooted
Start of CAC

Radar Signal Applied

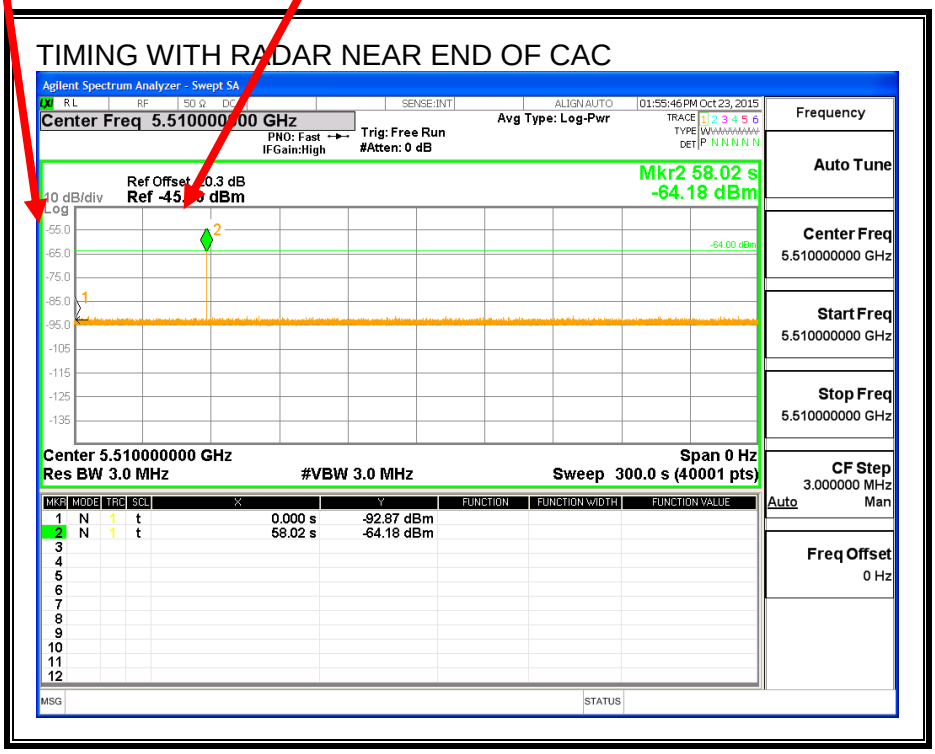


No EUT transmissions were observed after the radar signal.

TIMING WITH RADAR NEAR END OF CAC

AP is rebooted
Start of CAC

Radar Signal Applied



No EUT transmissions were observed after the radar signal.

11.3.4. OVERLAPPING CHANNEL TESTS

RESULTS

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

11.3.5. 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).

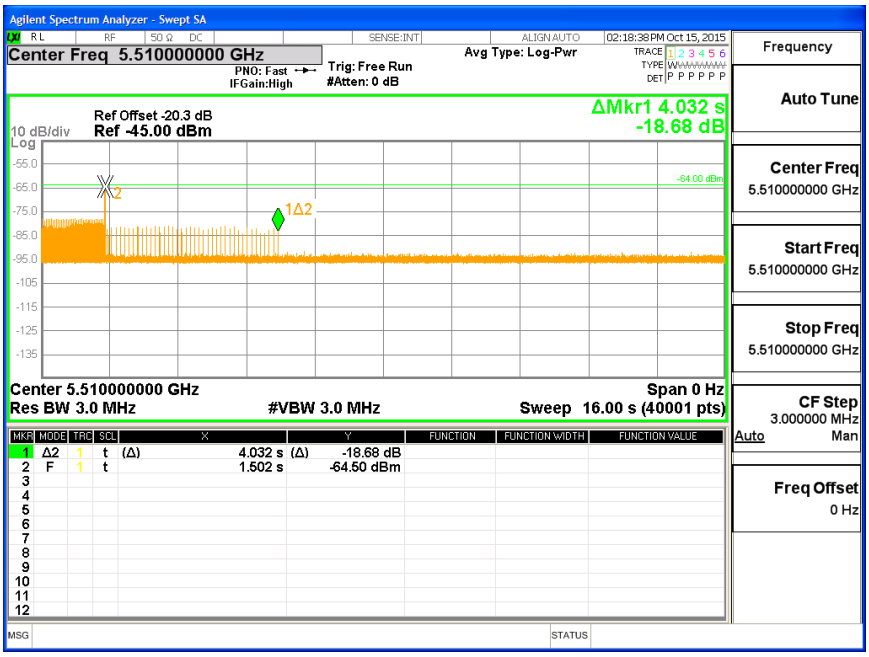
RESULTS

Channel Move Time (sec)	Limit (sec)
4.032	10

Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
33.6	60

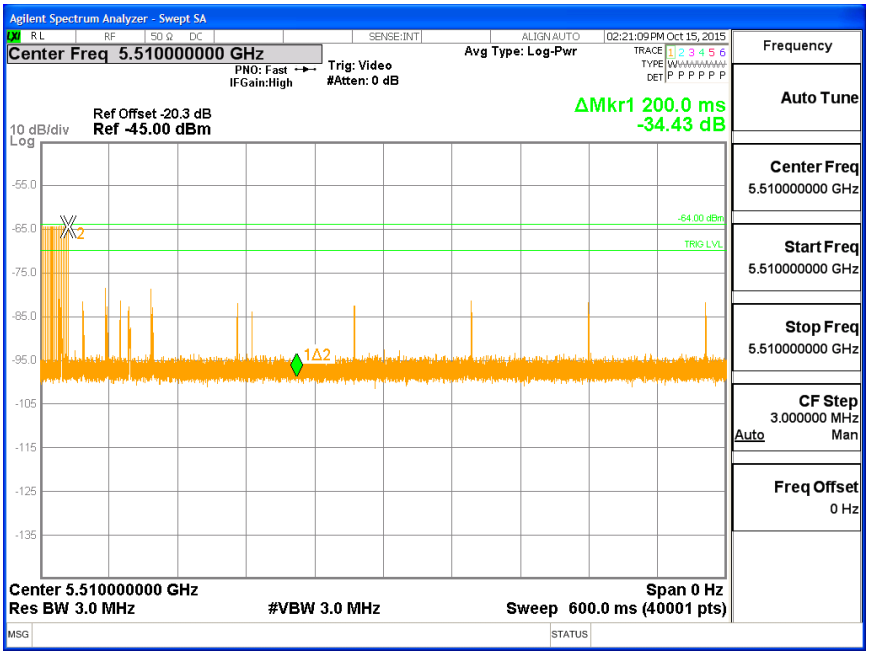
MOVE TIME

MOVE TIME



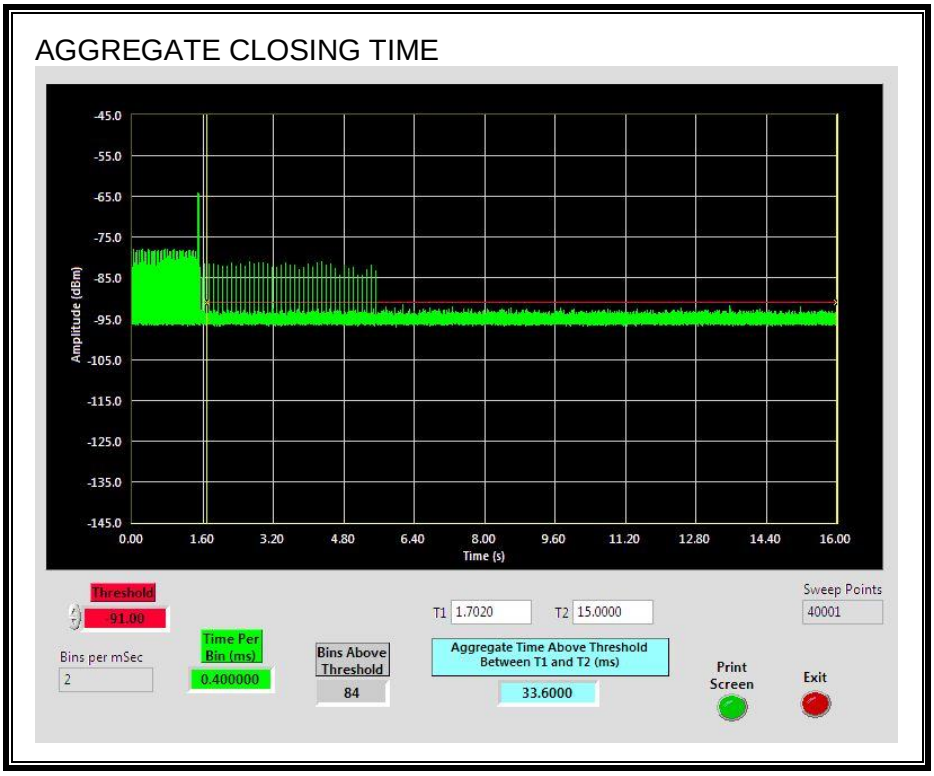
CHANNEL CLOSING TIME

CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

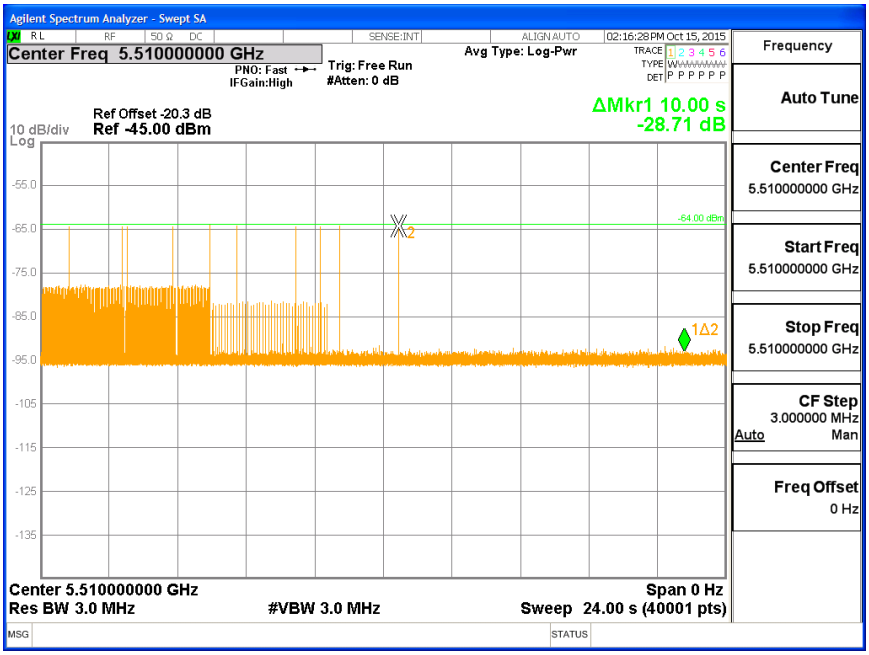
Only intermittent transmissions are observed during the aggregate monitoring period.



LONG PULSE CHANNEL MOVE TIME

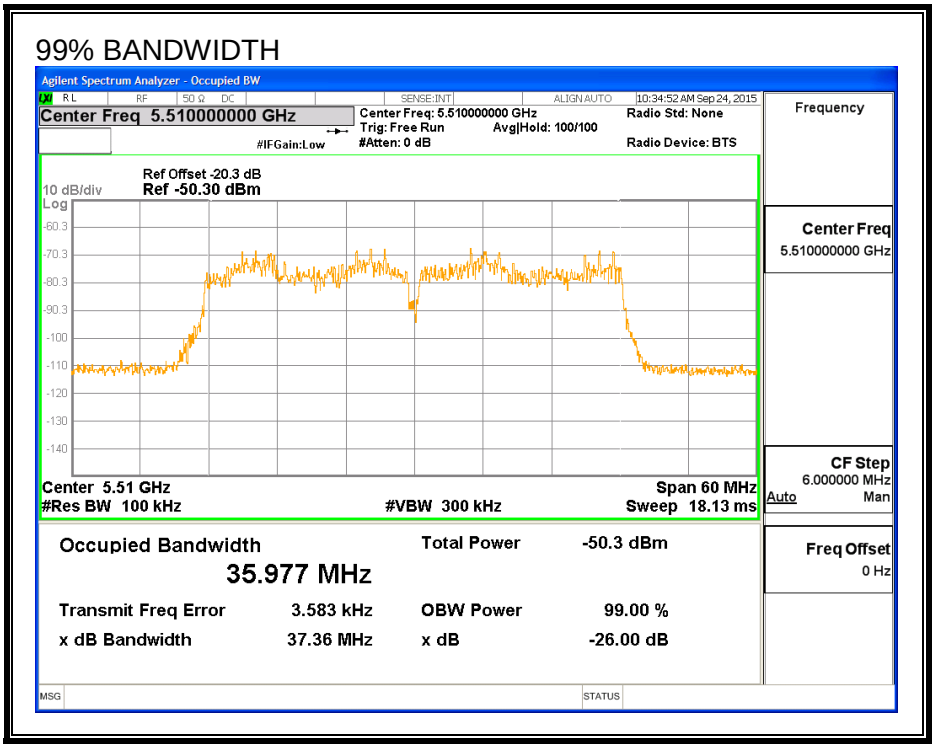
The traffic ceases prior to 10 seconds after the end of the radar waveform.

MOVE TIME FOR LONG PULSE RADAR



11.3.6. 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 (%)
5491	5529	38	35.977	105.6	100

DETECTION BANDWIDTH PROBABILITY

DETECTION BANDWIDTH PROBABILITY RESULTS

Detection Bandwidth Test Results				
FCC Type 0 Waveform: 1 us Pulse Width, 1428 us PRI, 18 Pulses per Burst				
Frequency (MHz)	Number of Trials	Number Detected	Detection (%)	Mark
5490	10	0	0	
5491	10	10	100	FL
5492	10	10	100	
5493	10	10	100	
5494	10	10	100	
5495	10	10	100	
5500	10	10	100	
5505	10	10	100	
5510	10	9	90	
5515	10	10	100	
5520	10	10	100	
5525	10	10	100	
5526	10	10	100	
5527	10	10	100	
5528	10	10	100	
5529	10	10	100	FH
5530	10	0	0	

11.3.7. IN-SERVICE MONITORING

RESULTS

FCC Radar Test Summary

Signal Type	Number of Trials	Detection (%)	Limit (%)	Pass/Fail	Detection Bandwidth		80% of Det BW	
					FL	FH	FL5	FH5
FCC Short Pulse Type 1	30	100.00	60	Pass	5491	5529		
FCC Short Pulse Type 2	30	100.00	60	Pass	5491	5529		
FCC Short Pulse Type 3	30	86.67	60	Pass	5491	5529		
FCC Short Pulse Type 4	30	83.33	60	Pass	5491	5529		
Aggregate		92.50	80	Pass				
FCC Long Pulse Type 5	30	100.00	80	Pass	5491	5529	5495	5525
FCC Hopping Type 6	39	100.00	70	Pass	5491	5529		

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	5510	Yes
1002	1	938	57	A	5510	Yes
1003	1	778	68	A	5510	Yes
1004	1	898	59	A	5510	Yes
1005	1	558	95	A	5510	Yes
1006	1	718	74	A	5510	Yes
1007	1	838	63	A	5510	Yes
1008	1	798	67	A	5510	Yes
1009	1	698	76	A	5510	Yes
1010	1	518	102	A	5510	Yes
1011	1	818	65	A	5510	Yes
1012	1	638	83	A	5510	Yes
1013	1	738	72	A	5510	Yes
1014	1	578	92	A	5510	Yes
1015	1	538	99	A	5510	Yes
1016	1	1346	40	B	5510	Yes
1017	1	2367	23	B	5510	Yes
1018	1	1999	27	B	5510	Yes
1019	1	1955	27	B	5510	Yes
1020	1	2911	19	B	5510	Yes
1021	1	1802	30	B	5510	Yes
1022	1	1693	32	B	5510	Yes
1023	1	713	75	B	5510	Yes
1024	1	734	72	B	5510	Yes
1025	1	1237	43	B	5510	Yes
1026	1	1387	39	B	5510	Yes
1027	1	2019	27	B	5510	Yes
1028	1	1104	48	B	5510	Yes
1029	1	1866	29	B	5510	Yes
1030	1	2434	22	B	5510	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	4.5	222	24	5510	Yes
2002	1.4	184	25	5510	Yes
2003	2.2	178	25	5510	Yes
2004	4.7	187	23	5510	Yes
2005	3.9	185	27	5510	Yes
2006	4.7	198	26	5510	Yes
2007	1.8	162	26	5510	Yes
2008	5	179	29	5510	Yes
2009	4.6	190	26	5510	Yes
2010	1.7	212	23	5510	Yes
2011	3.6	227	27	5510	Yes
2012	3.1	214	28	5510	Yes
2013	1.2	153	29	5510	Yes
2014	5	225	26	5510	Yes
2015	3.2	211	25	5510	Yes
2016	1.2	207	23	5510	Yes
2017	1.9	196	28	5510	Yes
2018	4.2	158	23	5510	Yes
2019	5	195	26	5510	Yes
2020	3.4	161	28	5510	Yes
2021	2.6	202	25	5510	Yes
2022	3.4	172	24	5510	Yes
2023	2.7	217	27	5510	Yes
2024	3.7	153	27	5510	Yes
2025	3.3	165	24	5510	Yes
2026	2.6	186	27	5510	Yes
2027	2.3	201	29	5510	Yes
2028	1.8	189	25	5510	Yes
2029	4	208	27	5510	Yes
2030	3.7	200	24	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	8.9	360	16	5510	Yes
3002	8.8	347	18	5510	Yes
3003	9.6	315	17	5510	Yes
3004	7.3	448	16	5510	Yes
3005	8.4	311	16	5510	Yes
3006	9.1	457	17	5510	Yes
3007	5.4	333	18	5510	Yes
3008	6.3	491	18	5510	No
3009	5.5	380	17	5510	Yes
3010	6.8	316	16	5510	Yes
3011	6.2	350	17	5510	Yes
3012	8	416	18	5510	Yes
3013	7.8	464	16	5510	No
3014	7.1	425	17	5510	Yes
3015	9.8	485	18	5510	Yes
3016	9.4	459	17	5510	Yes
3017	10	414	16	5510	Yes
3018	9.9	284	17	5510	No
3019	5.6	251	18	5510	Yes
3020	8.4	251	17	5510	Yes
3021	9.5	365	17	5510	Yes
3022	5.1	260	18	5510	Yes
3023	6.5	387	16	5510	Yes
3024	7.4	294	16	5510	No
3025	6.6	316	17	5510	Yes
3026	7.9	369	17	5510	Yes
3027	7.3	271	16	5510	Yes
3028	6.4	470.00	17	5510	Yes
3029	6.2	384	18	5510	Yes
3030	5.5	346	16	5510	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	16.4	406	14	5510	Yes
4002	10.9	262	12	5510	No
4003	16.8	335	16	5510	Yes
4004	11.8	455	12	5510	Yes
4005	18.1	423	16	5510	Yes
4006	13.6	305	13	5510	Yes
4007	15.8	286	12	5510	Yes
4008	17.2	431	16	5510	Yes
4009	19.9	307	16	5510	No
4010	11.7	348	15	5510	Yes
4011	10.1	487	13	5510	Yes
4012	12.5	290	12	5510	Yes
4013	11.5	442	13	5510	Yes
4014	19.8	391	13	5510	Yes
4015	19.3	305	14	5510	No
4016	18	266	16	5510	Yes
4017	13.2	460	13	5510	Yes
4018	17.8	434	13	5510	Yes
4019	13.6	256	15	5510	Yes
4020	18.7	376	16	5510	Yes
4021	14.9	344	15	5510	Yes
4022	10.4	477	16	5510	Yes
4023	18	457	15	5510	Yes
4024	14	352	15	5510	Yes
4025	16.7	479	14	5510	Yes
4026	18.6	269	14	5510	No
4027	17	408	16	5510	Yes
4028	19.4	462.00	13	5510	Yes
4029	12.4	465.00	13	5510	No
4030	10.6	413.00	13	5510	Yes

TYPE 5 DETECTION PROBABILITY

Data Sheet for FCC Long Pulse Radar Type 5		
Trial	Frequency (MHz)	Successful Detection (Yes/No)
1	5503	Yes
2	5509	Yes
3	5519	Yes
4	5517	Yes
5	5520	Yes
6	5513	Yes
7	5520	Yes
8	5522	Yes
9	5502	Yes
10	5511	Yes
11	5505	Yes
12	5512	Yes
13	5503	Yes
14	5502	Yes
15	5515	Yes
16	5496	Yes
17	5504	Yes
18	5517	Yes
19	5513	Yes
20	5523	Yes
21	5503	Yes
22	5498	Yes
23	5505	Yes
24	5515	Yes
25	5522	Yes
26	5511	Yes
27	5514	Yes
28	5503	Yes
29	5503	Yes
30	5511	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	104	5491	5	Yes
2	579	5492	9	Yes
3	1054	5493	6	Yes
4	1529	5494	9	Yes
5	2004	5495	9	Yes
6	2479	5496	8	Yes
7	2954	5497	9	Yes
8	3429	5498	6	Yes
9	3904	5499	7	Yes
10	4379	5500	7	Yes
11	4854	5501	9	Yes
12	5329	5502	8	Yes
13	5804	5503	9	Yes
14	6279	5504	9	Yes
15	6754	5505	8	Yes
16	7229	5506	6	Yes
17	7704	5507	6	Yes
18	8179	5508	11	Yes
19	8654	5509	7	Yes
20	9129	5510	11	Yes
21	9604	5511	9	Yes
22	10079	5512	7	Yes
23	10554	5513	6	Yes
24	11029	5514	9	Yes
25	11504	5515	9	Yes
26	11979	5516	14	Yes
27	12454	5517	7	Yes
28	12929	5518	14	Yes
29	13404	5519	14	Yes
30	13879	5520	3	Yes
31	14354	5521	9	Yes
32	14829	5522	6	Yes
33	15304	5523	9	Yes
34	15779	5524	8	Yes
35	16254	5525	4	Yes
36	16729	5526	8	Yes
37	17204	5527	8	Yes
38	17679	5528	10	Yes
39	18154	5529	12	Yes

11.4. RESULTS FOR 80 MHz BANDWIDTH

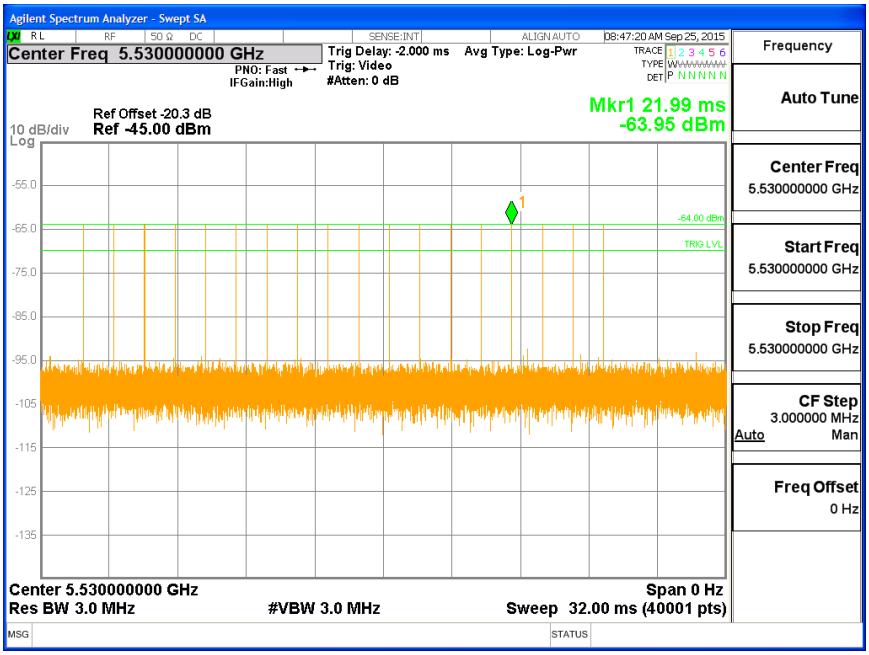
11.4.1. TEST CHANNEL

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

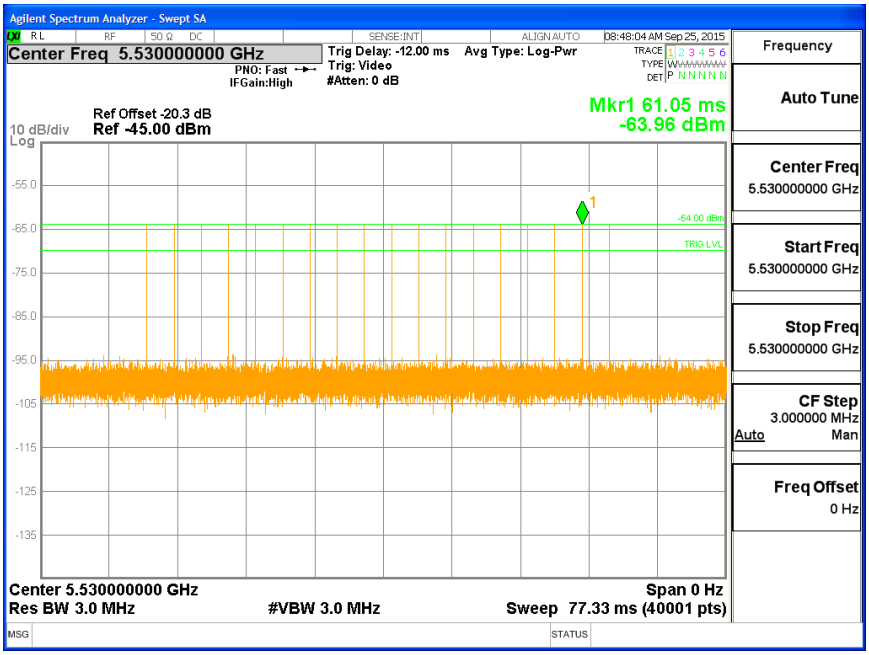
11.4.2. RADAR WAVEFORMS AND TRAFFIC

RADAR WAVEFORMS

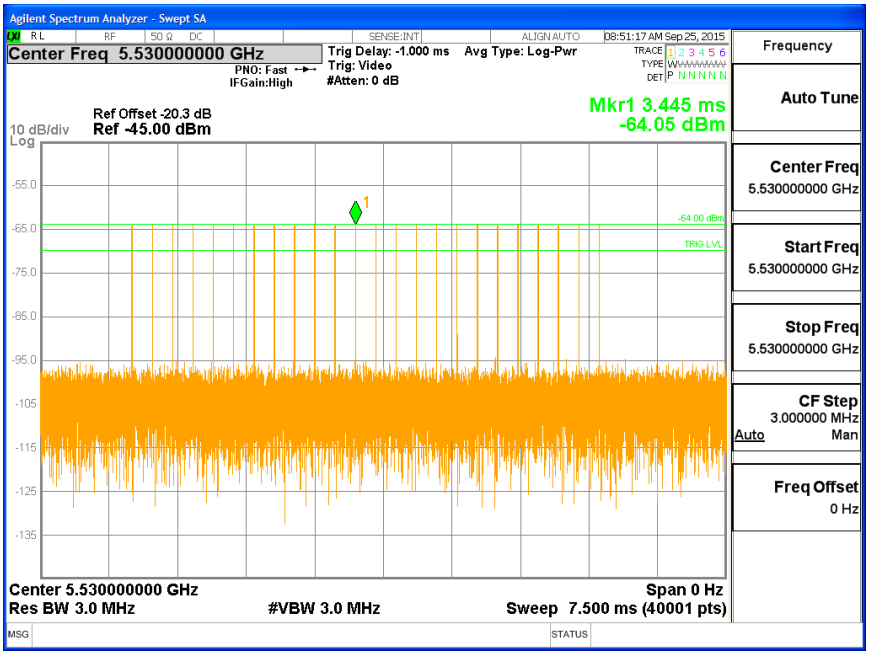
SHORT PULSE RADAR TYPE 0



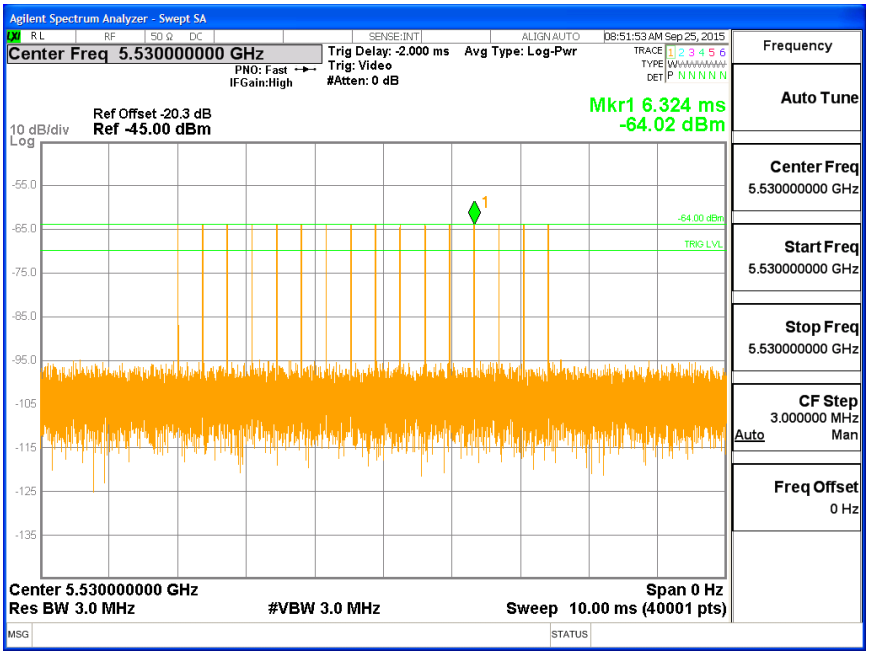
SAMPLE OF RADAR TYPE 1



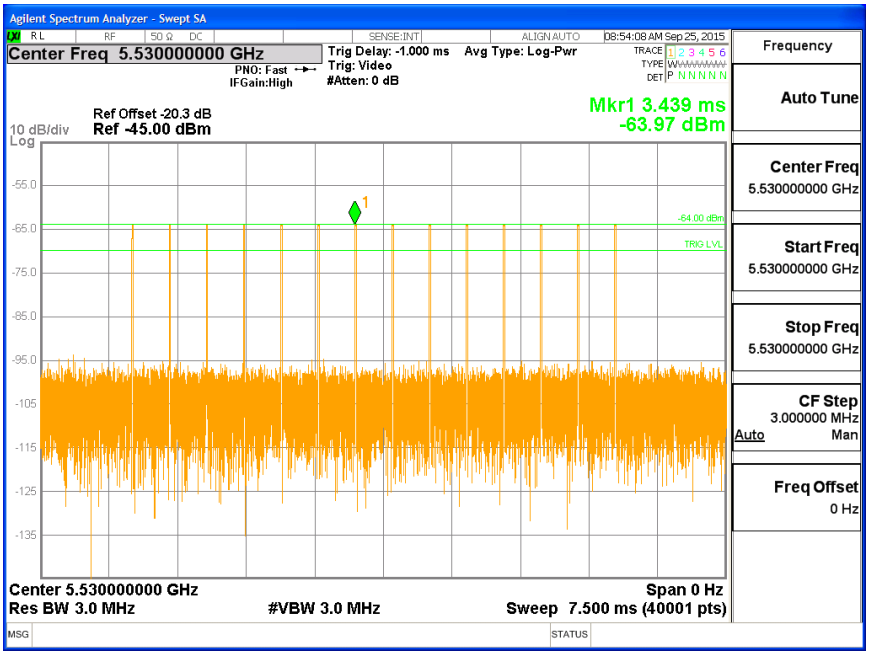
SAMPLE OF RADAR TYPE 2



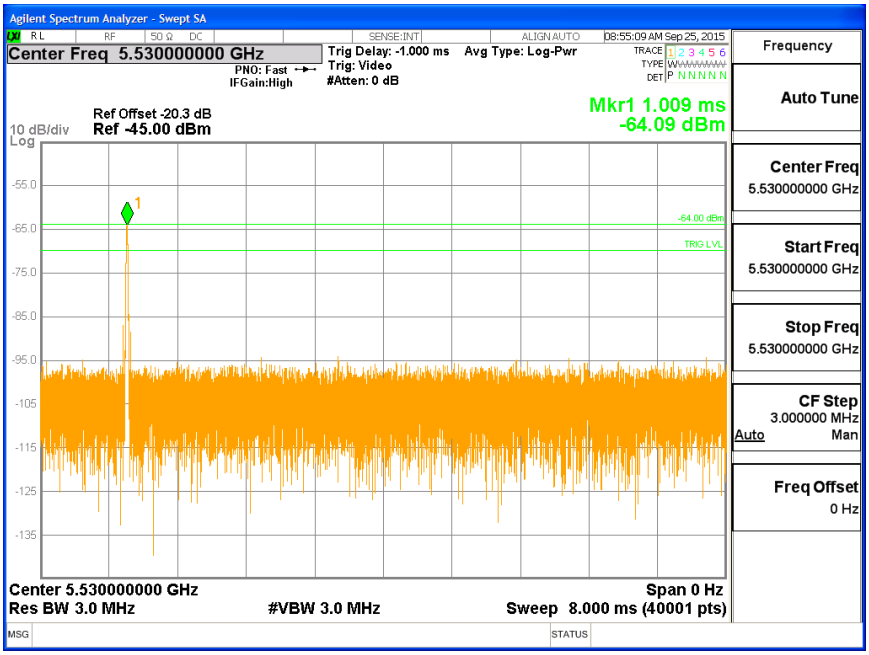
SAMPLE OF RADAR TYPE 3



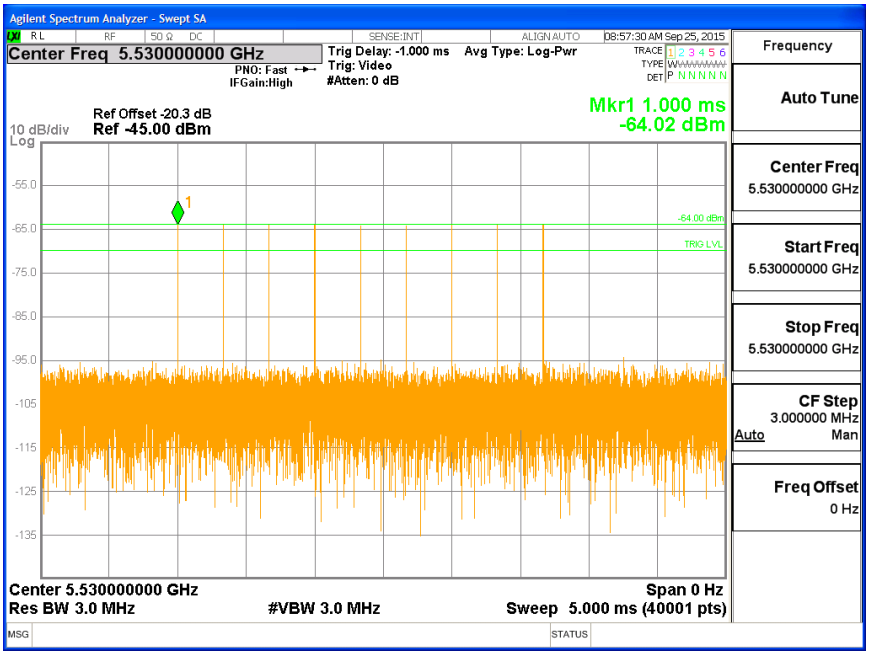
SAMPLE OF RADAR TYPE 4



SAMPLE OF SINGLE BURST OF RADAR TYPE 5

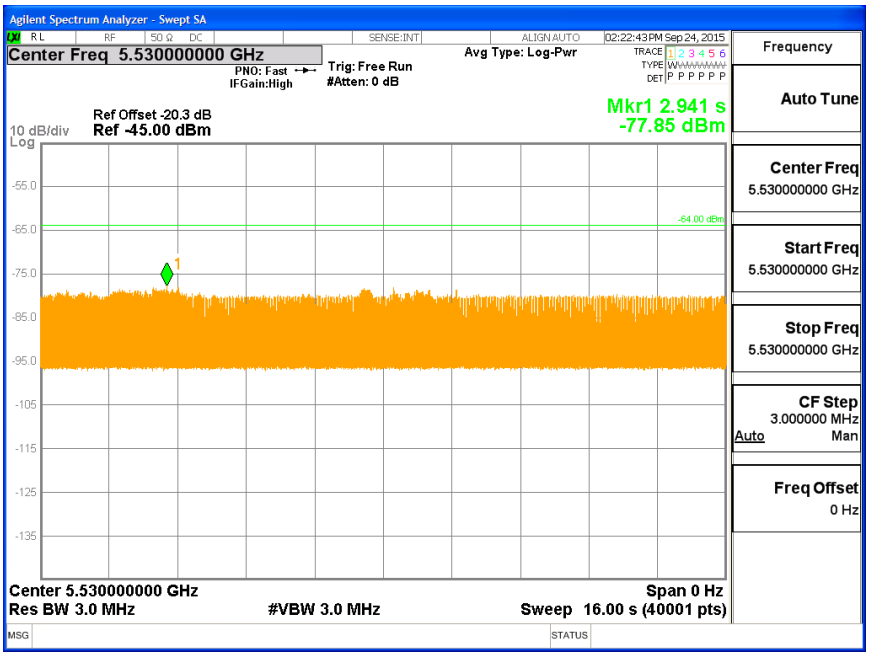


SINGLE BURST OF RADAR TYPE 6

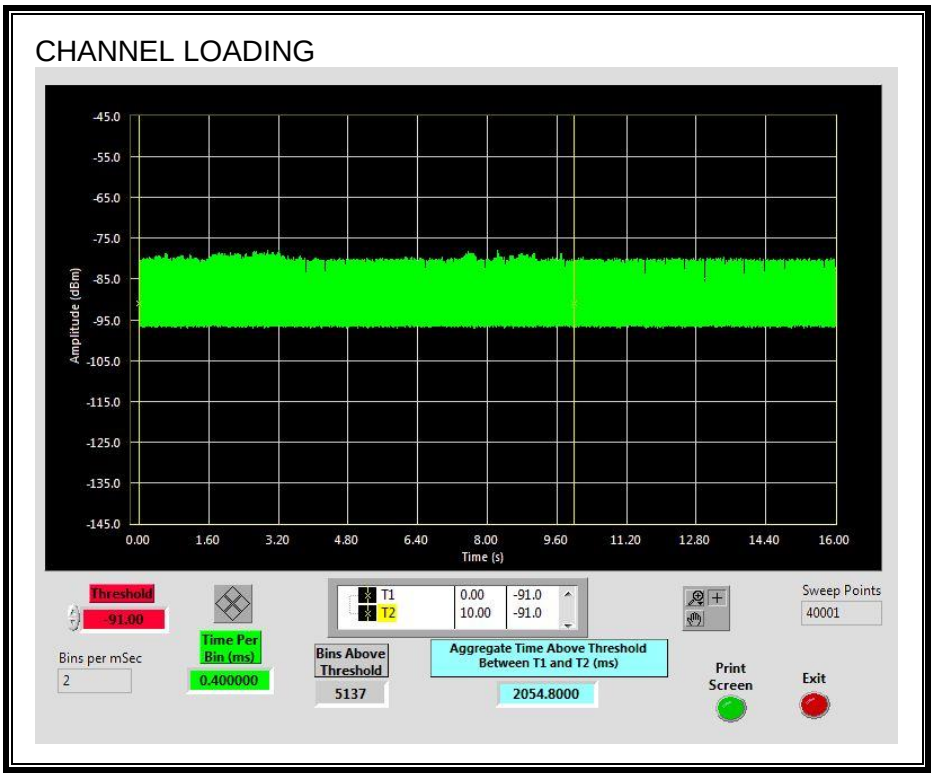


TRAFFIC

TRAFFIC



CHANNEL LOADING



The level of traffic loading on the channel by the EUT is 20.54%

11.4.3. 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 period of time between reboot and the 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)
4.875	126.8	121.9	61.9

Radar Near Beginning of CAC

Timing of Reboot (sec)	Timing of Radar Burst (sec)	Radar Relative to Reboot (sec)	Radar Relative to Start of CAC (sec)
5.595	68.9	63.3	1.4

Radar Near End of CAC

Timing of Reboot (sec)	Timing of Radar Burst (sec)	Radar Relative to Reboot (sec)	Radar Relative to Start of CAC (sec)
5.28	125.9	120.6	58.7

QUALITATIVE RESULTS

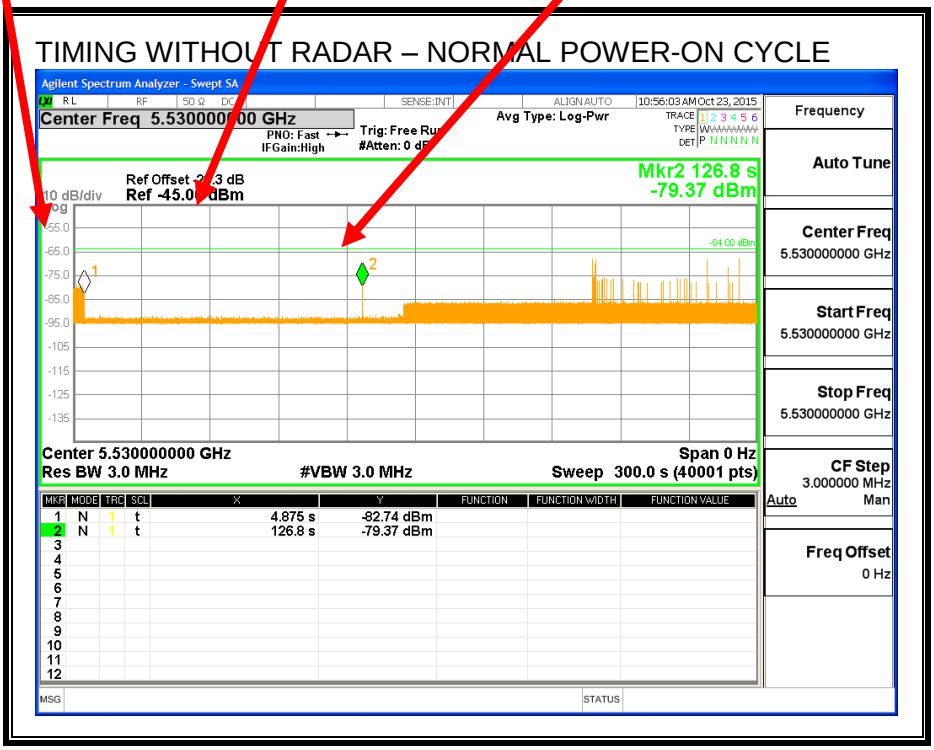
Timing of Radar Burst	Display on Control Computer	Spectrum Analyzer Display
No Radar Triggered	EUT marks Channel as active	Transmissions begin on channel after completion of the initial power-up cycle and the CAC
Within 0 to 6 second window	EUT indicates radar detected	No transmissions on channel
Within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



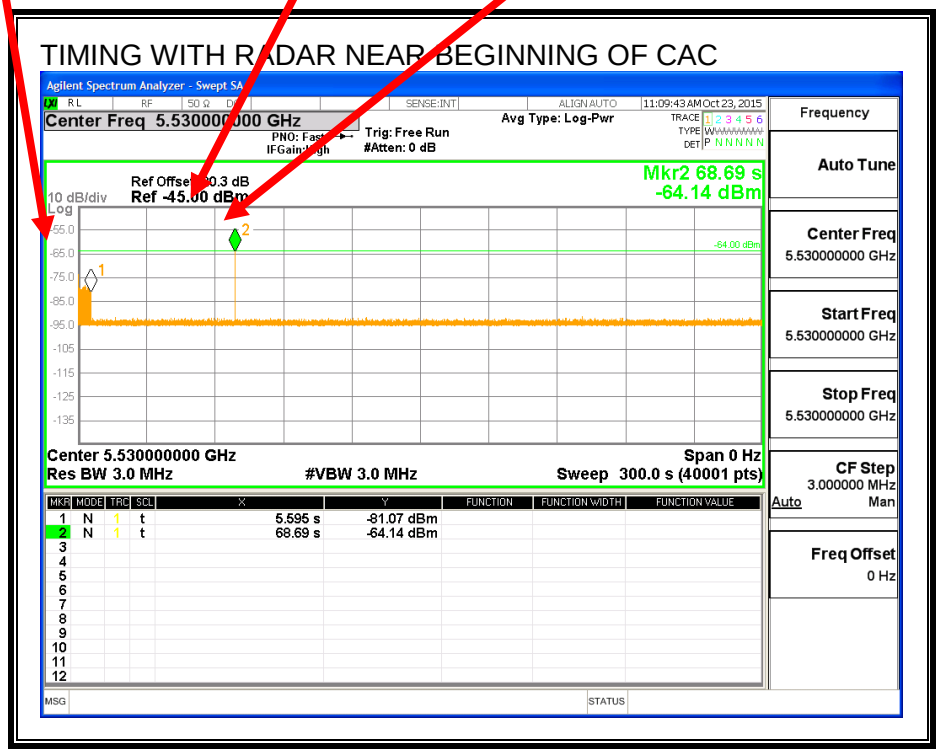
Transmissions begin on channel after completion of the initial power-up cycle and the CAC.

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



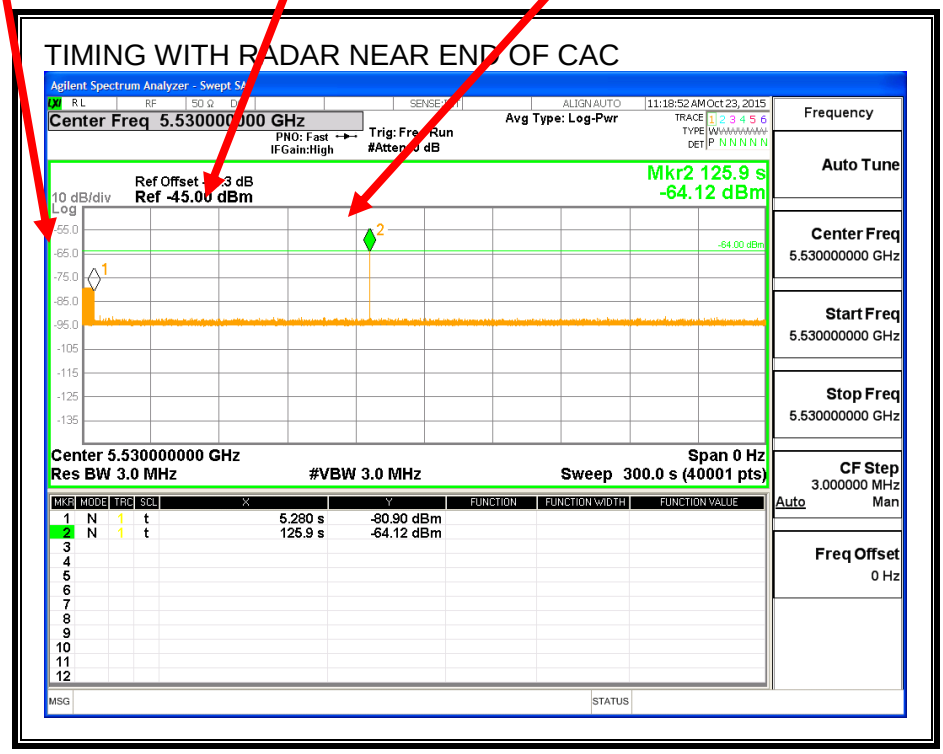
No EUT transmissions were observed after the radar signal.

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.

11.4.4. OVERLAPPING CHANNEL TESTS

RESULTS

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

11.4.5. MOVE AND CLOSING TIME

REPORTING NOTES

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

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

The aggregate channel closing transmission time is calculated as follows:

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

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

RESULTS

Channel Move Time (sec)	Limit (sec)
4.122	10

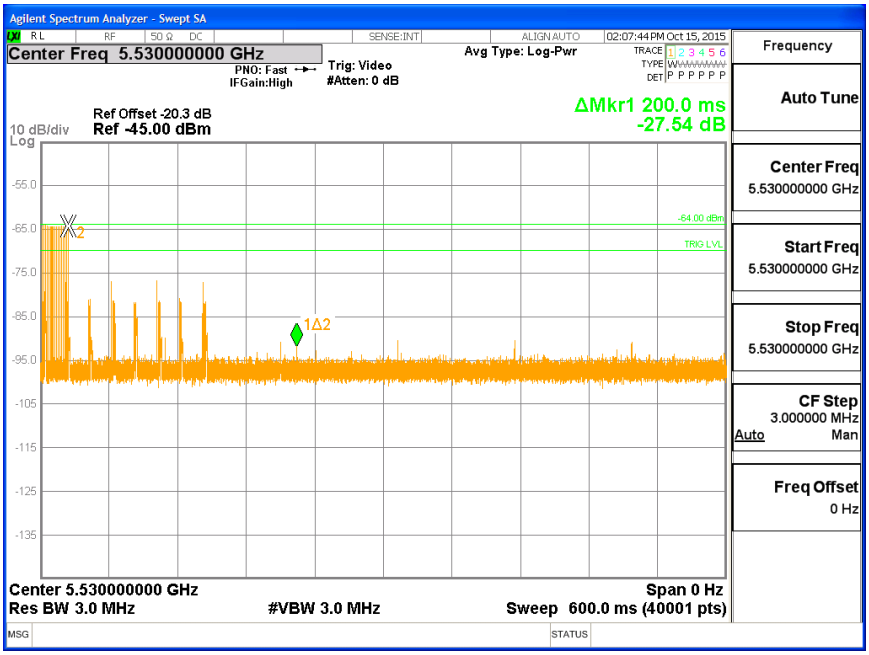
Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
31.2	60

MOVE TIME

MOVE TIME

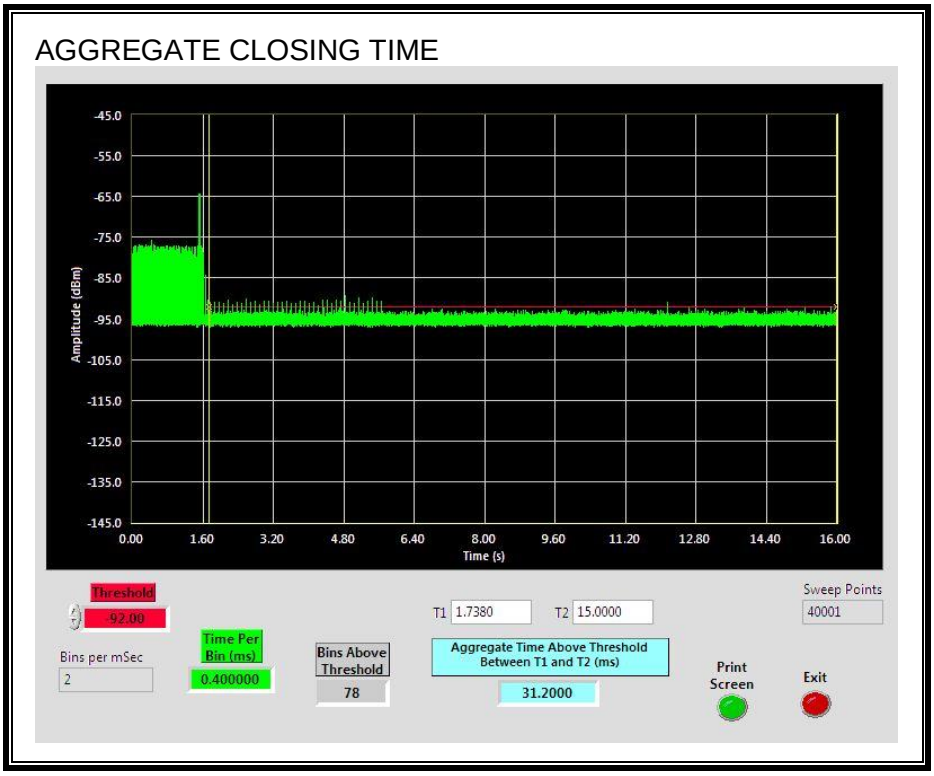
CHANNEL CLOSING TIME

CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

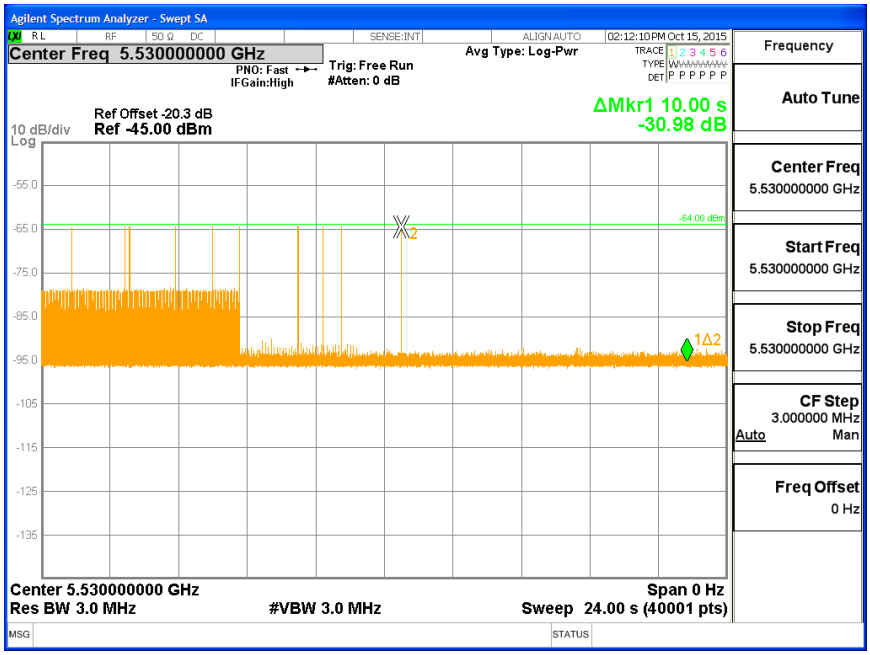
Only intermittent transmissions are observed during the aggregate monitoring period.



LONG PULSE CHANNEL MOVE TIME

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

MOVE TIME FOR LONG PULSE RADAR

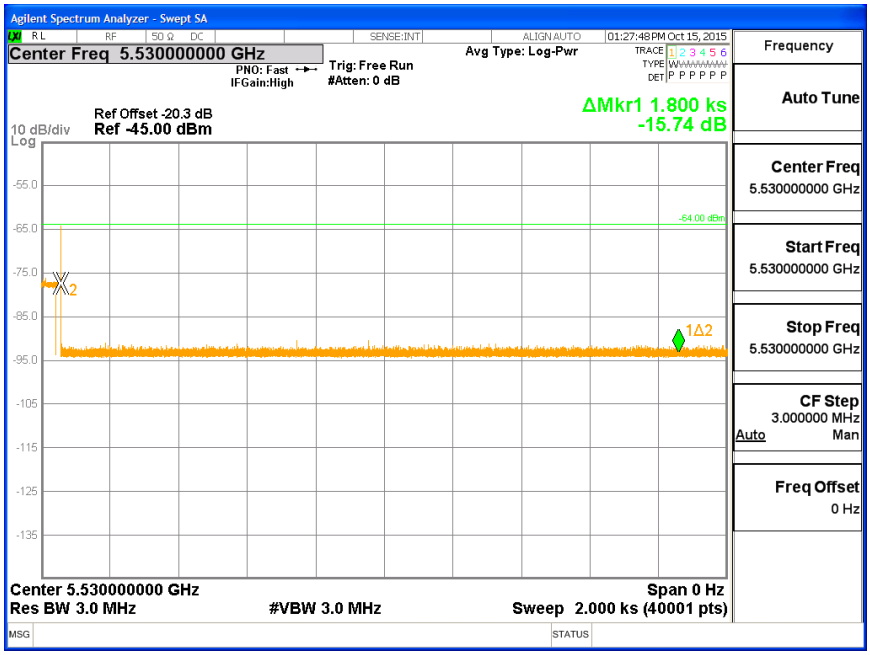


11.4.6. NON-OCCUPANCY PERIOD

RESULTS

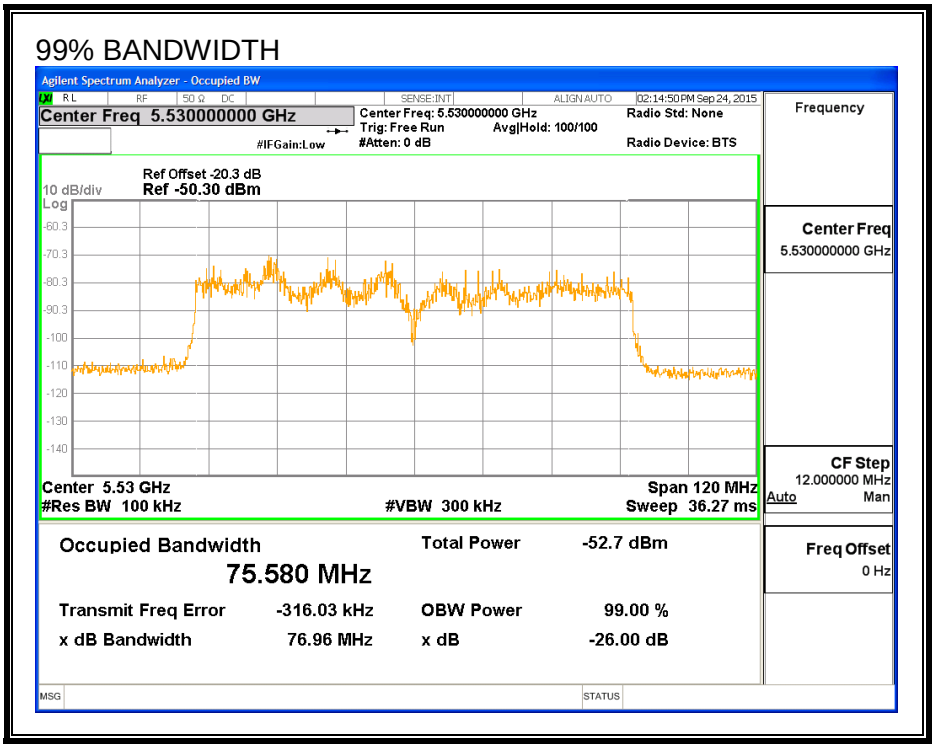
No EUT transmissions were observed on the test channel during the 30-minute observation time.

NON-OCCUPANCY PERIOD



11.4.7. DETECTION BANDWIDTH

REFERENCE PLOT OF 99% POWER BANDWIDTH



RESULTS

FL (MHz)	FH (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (%)	Minimum Limit (%)
5491	5569	78	75.580	103.2	100

DETECTION BANDWIDTH PROBABILITY

DETECTION BANDWIDTH PROBABILITY RESULTS

Detection Bandwidth Test Results				
FCC Type 0 Waveform: 1 us Pulse Width, 1428 us PRI, 18 Pulses per Burst				
Frequency (MHz)	Number of Trials	Number Detected	Detection (%)	Mark
5490	10	0	0	
5491	10	10	100	FL
5492	10	10	100	
5493	10	10	100	
5494	10	10	100	
5495	10	10	100	
5500	10	10	100	
5505	10	10	100	
5510	10	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	9	90	
5550	10	10	100	
5555	10	10	100	
5560	10	10	100	
5565	10	10	100	
5566	10	10	100	
5567	10	10	100	
5568	10	10	100	
5569	10	10	100	FH
5570	10	0	0	

11.4.8. IN-SERVICE MONITORING

RESULTS

FCC Radar Test Summary

Signal Type	Number of Trials	Detection (%)	Limit (%)	Pass/Fail	Detection Bandwidth		80% of Det BW	
					FL	FH	FL5	FH5
FCC Short Pulse Type 1	30	100.00	60	Pass	5491	5569		
FCC Short Pulse Type 2	30	100.00	60	Pass	5491	5569		
FCC Short Pulse Type 3	30	100.00	60	Pass	5491	5569		
FCC Short Pulse Type 4	30	100.00	60	Pass	5491	5569		
Aggregate		100.00	80	Pass				
FCC Long Pulse Type 5	30	93.33	80	Pass	5491	5569	5499	5561
FCC Hopping Type 6	79	100.00	70	Pass	5491	5569		

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	5530	Yes
1002	1	938	57	A	5530	Yes
1003	1	778	68	A	5530	Yes
1004	1	898	59	A	5530	Yes
1005	1	558	95	A	5530	Yes
1006	1	718	74	A	5530	Yes
1007	1	838	63	A	5530	Yes
1008	1	798	67	A	5530	Yes
1009	1	698	76	A	5530	Yes
1010	1	518	102	A	5530	Yes
1011	1	818	65	A	5530	Yes
1012	1	638	83	A	5530	Yes
1013	1	738	72	A	5530	Yes
1014	1	578	92	A	5530	Yes
1015	1	538	99	A	5530	Yes
1016	1	1346	40	B	5530	Yes
1017	1	2367	23	B	5530	Yes
1018	1	1999	27	B	5530	Yes
1019	1	1955	27	B	5530	Yes
1020	1	2911	19	B	5530	Yes
1021	1	1802	30	B	5530	Yes
1022	1	1693	32	B	5530	Yes
1023	1	713	75	B	5530	Yes
1024	1	734	72	B	5530	Yes
1025	1	1237	43	B	5530	Yes
1026	1	1387	39	B	5530	Yes
1027	1	2019	27	B	5530	Yes
1028	1	1104	48	B	5530	Yes
1029	1	1866	29	B	5530	Yes
1030	1	2434	22	B	5530	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	4.5	222	24	5530	Yes
2002	1.4	184	25	5530	Yes
2003	2.2	178	25	5530	Yes
2004	4.7	187	23	5530	Yes
2005	3.9	185	27	5530	Yes
2006	4.7	198	26	5530	Yes
2007	1.8	162	26	5530	Yes
2008	5	179	29	5530	Yes
2009	4.6	190	26	5530	Yes
2010	1.7	212	23	5530	Yes
2011	3.6	227	27	5530	Yes
2012	3.1	214	28	5530	Yes
2013	1.2	153	29	5530	Yes
2014	5	225	26	5530	Yes
2015	3.2	211	25	5530	Yes
2016	1.2	207	23	5530	Yes
2017	1.9	196	28	5530	Yes
2018	4.2	158	23	5530	Yes
2019	5	195	26	5530	Yes
2020	3.4	161	28	5530	Yes
2021	2.6	202	25	5530	Yes
2022	3.4	172	24	5530	Yes
2023	2.7	217	27	5530	Yes
2024	3.7	153	27	5530	Yes
2025	3.3	165	24	5530	Yes
2026	2.6	186	27	5530	Yes
2027	2.3	201	29	5530	Yes
2028	1.8	189	25	5530	Yes
2029	4	208	27	5530	Yes
2030	3.7	200	24	5530	Yes

TYPE 3 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 3					
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Frequency (MHz)	Successful Detection (Yes/No)
3001	8.9	360	16	5530	Yes
3002	8.8	347	18	5530	Yes
3003	9.6	315	17	5530	Yes
3004	7.3	448	16	5530	Yes
3005	8.4	311	16	5530	Yes
3006	9.1	457	17	5530	Yes
3007	5.4	333	18	5530	Yes
3008	6.3	491	18	5530	Yes
3009	5.5	380	17	5530	Yes
3010	6.8	316	16	5530	Yes
3011	6.2	350	17	5530	Yes
3012	8	416	18	5530	Yes
3013	7.8	464	16	5530	Yes
3014	7.1	425	17	5530	Yes
3015	9.8	485	18	5530	Yes
3016	9.4	459	17	5530	Yes
3017	10	414	16	5530	Yes
3018	9.9	284	17	5530	Yes
3019	5.6	251	18	5530	Yes
3020	8.4	251	17	5530	Yes
3021	9.5	365	17	5530	Yes
3022	5.1	260	18	5530	Yes
3023	6.5	387	16	5530	Yes
3024	7.4	294	16	5530	Yes
3025	6.6	316	17	5530	Yes
3026	7.9	369	17	5530	Yes
3027	7.3	271	16	5530	Yes
3028	6.4	470.00	17	5530	Yes
3029	6.2	384	18	5530	Yes
3030	5.5	346	16	5530	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	16.4	406	14	5530	Yes
4002	10.9	262	12	5530	Yes
4003	16.8	335	16	5530	Yes
4004	11.8	455	12	5530	Yes
4005	18.1	423	16	5530	Yes
4006	13.6	305	13	5530	Yes
4007	15.8	286	12	5530	Yes
4008	17.2	431	16	5530	Yes
4009	19.9	307	16	5530	Yes
4010	11.7	348	15	5530	Yes
4011	10.1	487	13	5530	Yes
4012	12.5	290	12	5530	Yes
4013	11.5	442	13	5530	Yes
4014	19.8	391	13	5530	Yes
4015	19.3	305	14	5530	Yes
4016	18	266	16	5530	Yes
4017	13.2	460	13	5530	Yes
4018	17.8	434	13	5530	Yes
4019	13.6	256	15	5530	Yes
4020	18.7	376	16	5530	Yes
4021	14.9	344	15	5530	Yes
4022	10.4	477	16	5530	Yes
4023	18	457	15	5530	Yes
4024	14	352	15	5530	Yes
4025	16.7	479	14	5530	Yes
4026	18.6	269	14	5530	Yes
4027	17	408	16	5530	Yes
4028	19.4	462.00	13	5530	Yes
4029	12.4	465.00	13	5530	Yes
4030	10.6	413.00	13	5530	Yes

TYPE 5 DETECTION PROBABILITY

Data Sheet for FCC Long Pulse Radar Type 5		
Trial	Frequency (MHz)	Successful Detection (Yes/No)
1	5528	Yes
2	5525	Yes
3	5529	No
4	5529	No
5	5511	Yes
6	5506	Yes
7	5520	Yes
8	5516	Yes
9	5546	Yes
10	5527	Yes
11	5547	Yes
12	5555	Yes
13	5547	Yes
14	5544	Yes
15	5545	Yes
16	5506	Yes
17	5516	Yes
18	5516	Yes
19	5516	Yes
20	5517	Yes
21	5544	Yes
22	5531	Yes
23	5507	Yes
24	5532	Yes
25	5516	Yes
26	5541	Yes
27	5515	Yes
28	5528	Yes
29	5516	Yes
30	5526	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	18	5491	19	Yes
2	493	5492	15	Yes
3	968	5493	16	Yes
4	1443	5494	16	Yes
5	1918	5495	24	Yes
6	2393	5496	21	Yes
7	2868	5497	19	Yes
8	3343	5498	19	Yes
9	3818	5499	22	Yes
10	4293	5500	16	Yes
11	4768	5501	19	Yes
12	5243	5502	13	Yes
13	5718	5503	16	Yes
14	6193	5504	18	Yes
15	6668	5505	11	Yes
16	7143	5506	19	Yes
17	7618	5507	16	Yes
18	8093	5508	14	Yes
19	8568	5509	10	Yes
20	9043	5510	13	Yes
21	9518	5511	14	Yes
22	9993	5512	17	Yes
23	10468	5513	13	Yes
24	10943	5514	20	Yes
25	11418	5515	17	Yes
26	11893	5516	17	Yes
27	12368	5517	11	Yes
28	12843	5518	13	Yes
29	13318	5519	24	Yes
30	13793	5520	13	Yes
31	14268	5521	15	Yes
32	14743	5522	20	Yes
33	15218	5523	16	Yes
34	15693	5524	22	Yes
35	16168	5525	13	Yes
36	16643	5526	14	Yes
37	17118	5527	22	Yes
38	17593	5528	16	Yes
39	18068	5529	16	Yes

TYPE 6 DETECTION PROBABILITY (CONTINUED)

40	18543	5530	18	Yes
41	19018	5531	12	Yes
42	19493	5532	15	Yes
43	19968	5533	12	Yes
44	20443	5534	16	Yes
45	20918	5535	16	Yes
46	21393	5536	13	Yes
47	21868	5537	19	Yes
48	22343	5538	13	Yes
49	22818	5539	13	Yes
50	23293	5540	22	Yes
51	23768	5541	23	Yes
52	24243	5542	21	Yes
53	24718	5543	20	Yes
54	25193	5544	16	Yes
55	25668	5545	16	Yes
56	26143	5546	19	Yes
57	26618	5547	16	Yes
58	27093	5548	19	Yes
59	27568	5549	20	Yes
60	28043	5550	14	Yes
61	28518	5551	17	Yes
62	28993	5552	16	Yes
63	29468	5553	16	Yes
64	29943	5554	15	Yes
65	30418	5555	16	Yes
66	30893	5556	15	Yes
67	31368	5557	18	Yes
68	31843	5558	15	Yes
69	32318	5559	16	Yes
70	32793	5560	18	Yes
71	33268	5561	21	Yes
72	33743	5562	21	Yes
73	34218	5563	18	Yes
74	34693	5564	10	Yes
75	35168	5565	13	Yes
76	35643	5566	12	Yes
77	36118	5567	14	Yes
78	36593	5568	12	Yes
79	37068	5569	19	Yes

12. BRIDGE MODE RESULTS

Per KDB 905462, Section 5.1 (footnote 1):

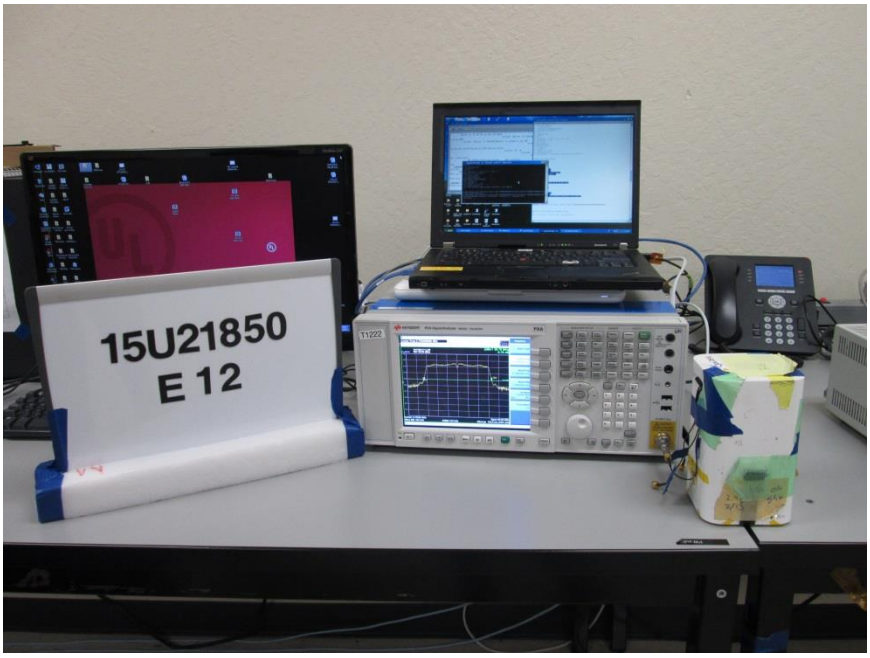
Networks Access Points with Bridge and/or MESH modes of operation are permitted to operate in the DFS bands but must employ a DFS function. The functionality of the Bridge mode as specified in §15.403(a) must be validated in the DFS test report. Devices operating as relays must also employ DFS function.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

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

13. SETUP PHOTOS

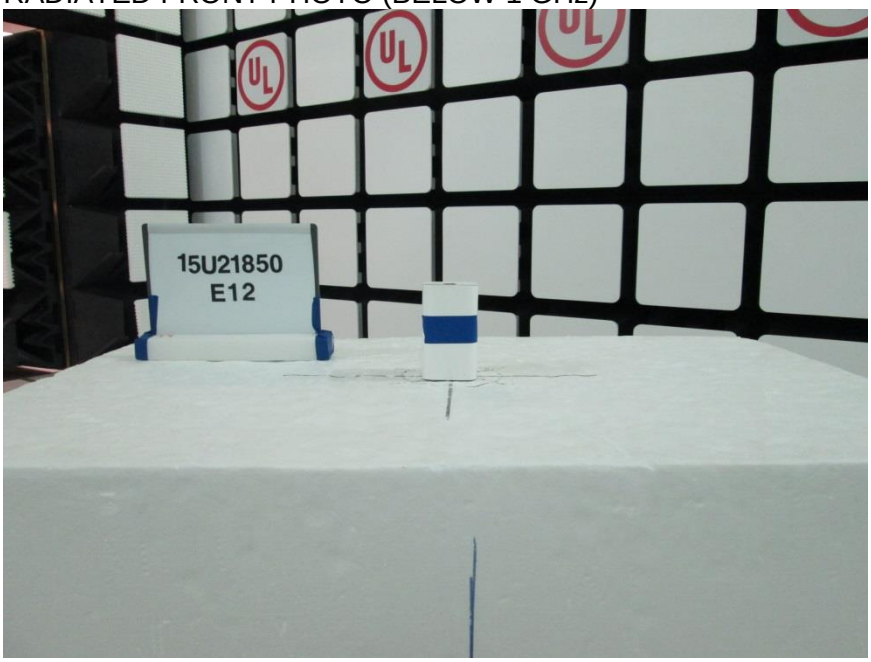
ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

ANTENNA PORT CONDUCTED PHOTO

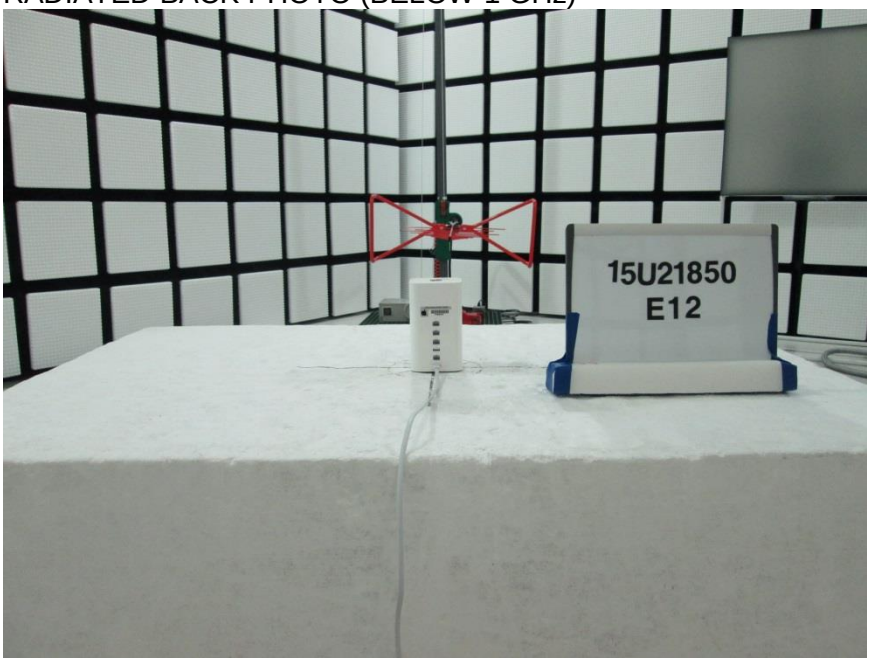


RADIATED RF MEASUREMENT SETUP (BELOW 1 GHz)

RADIATED FRONT PHOTO (BELOW 1 GHz)



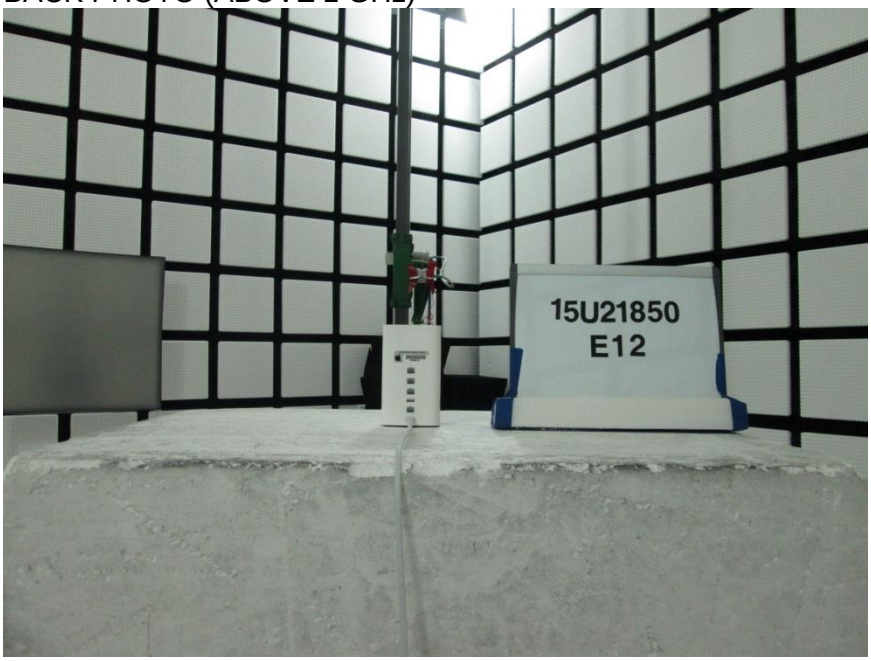
RADIATED BACK PHOTO (BELOW 1 GHz)



RADIATED RF MEASUREMENT SETUP FOR PORTABLE CONFIGURATION

FRONT PHOTO (ABOVE 1 GHz)

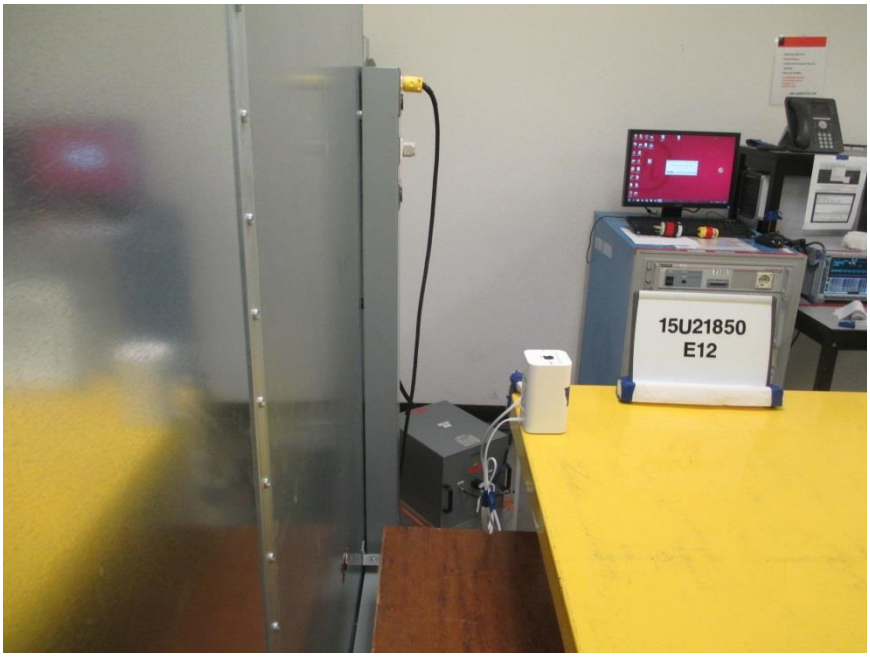
BACK PHOTO (ABOVE 1 GHz)



POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP

EUT ONLY LINE CONDUCTED FRONT PHOTO

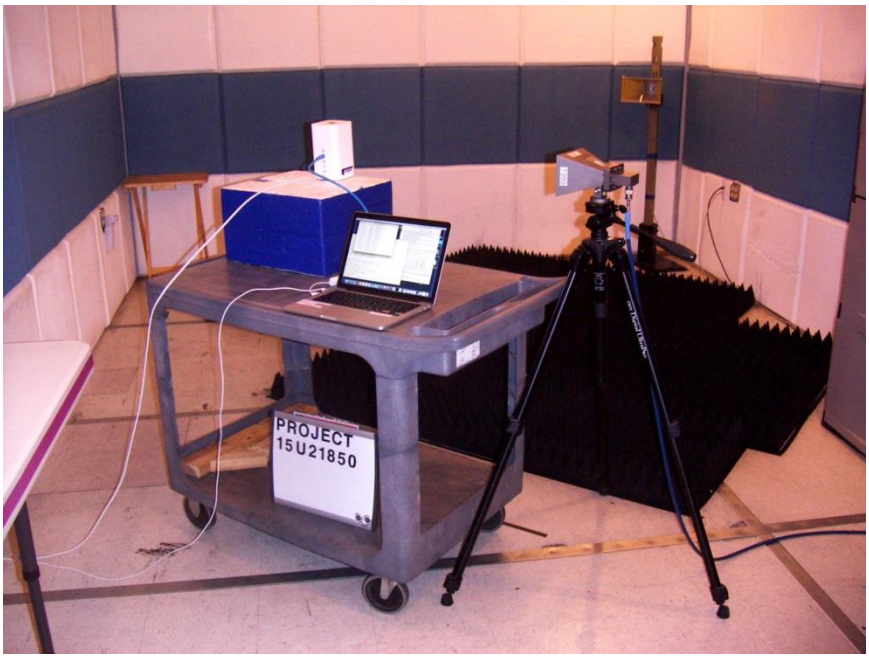
EUT ONLY LINE CONDUCTED BACK PHOTO



DYNAMIC FREQUENCY SELECTION MEASUREMENT SETUP

DFS FRONT PHOTO

DFS BACK PHOTO



END OF REPORT