DFS PORTION OF
FCC CFR47 PART 15 SUBPART E

CERTIFICATION TEST REPORT
FOR

WIRELESS ACCESS POINT

MODEL NUMBER: 5054-R

FCC ID: HZB-MP11R-ABG

REPORT NUMBER: 06U10616-1

ISSUE DATE: APRIL 19, 2007

Prepared for
PROXIM WIRELESS CORPORATION
2115 O'NEL DRIVE
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	4/19/07	Initial Issue	M. Heckrotte

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: PROXIM WIRELESS CORPORATION
2115 O'NEL DRIVE
SAN JOSE, CA 95131, USA

EUT DESCRIPTION: WIRELESS ACCESS POINT

MODEL: 5054-R

MASTER S/N: O7UT0SS70381

SLAVE S/N: O7UT0SS70407

DATE TESTED: MARCH 22 – APRIL 11, 2007

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
DFS PORTION OF FCC PART 15 SUBPART E	NO NON-COMPLIANCE NOTED

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

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 Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

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EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 15 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".

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

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. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission, 200 to 1000 MHz	+4.5 / -2.9 dB
Radiated Emission, 1000 to 2000 MHz	+4.5 / -2.9 dB
Power Line Conducted Emission	+/- 2.9 dB

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

5. LIMITS AND RESULT

5.1. DYNAMIC FREQUENCY SELECTION

5.1.1. LIMITS

§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".

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.	

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

5.1.2. TEST AND MEASUREMENT SYSTEM

SYSTEM OVERVIEW

The measurement system is based on a conducted test method.

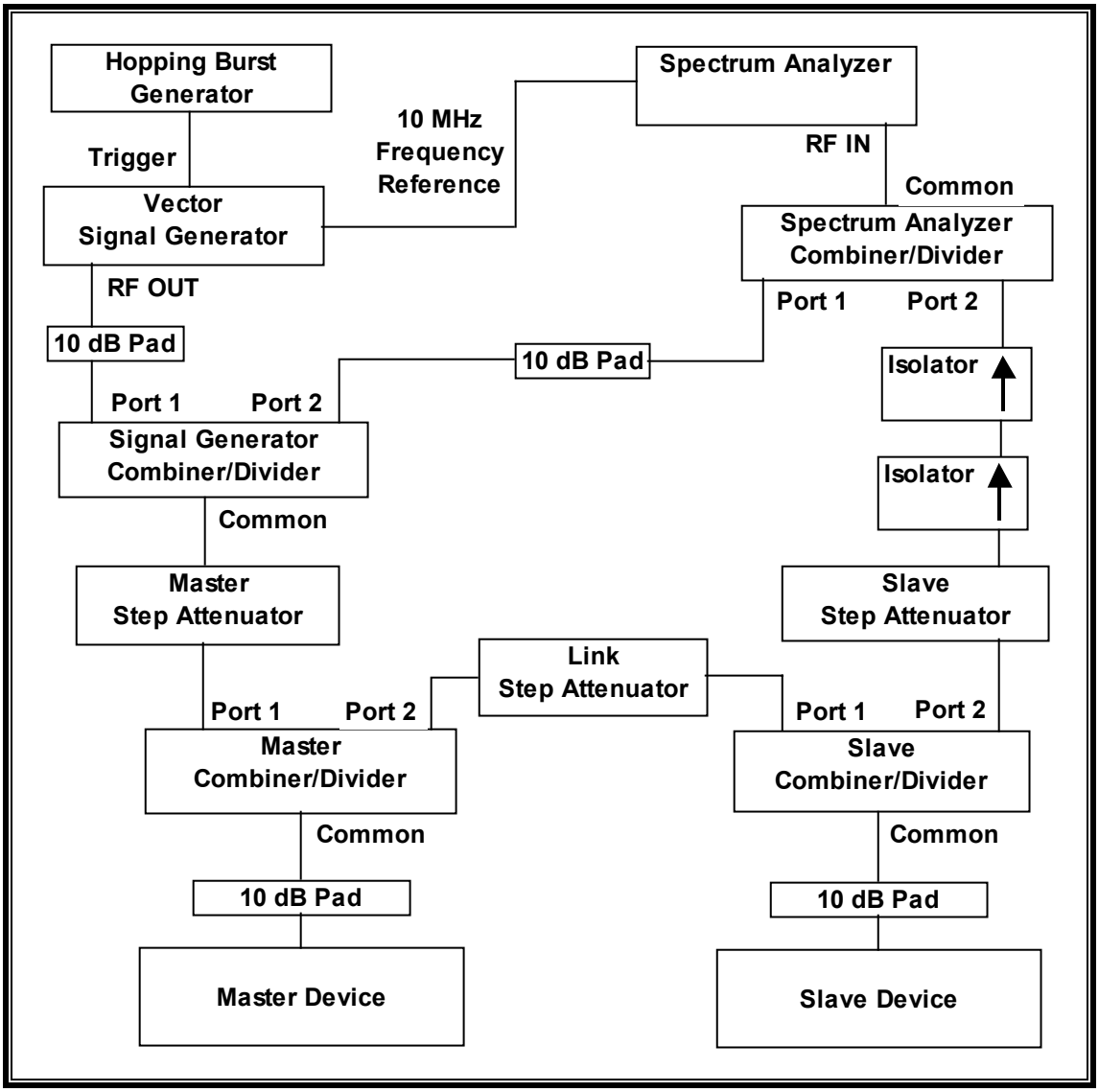
The short pulse and long pulse signal generating system utilizes the NTIA software. The Vector Signal Generator has been validated by the NTIA. The hopping signal generating system utilizes the CCS simulated hopping method and system, which has been validated by the DoD, FCC and NTIA. The software selects 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 Freqeuncy 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 set to display 8001 bins on the horizontal axis. The time-domain resolution is 2 msec / bin with a 16 second sweep time, meeting the 10 second short pulse reporting criteria. 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. The time-domain resolution is 3 msec / bin with a 24 second sweep time, meeting the 22 second long pulse reporting criteria and allowing a minimum of 10 seconds after the end of the long pulse waveform.

CONDUCTED METHOD SYSTEM BLOCK DIAGRAM



SYSTEM CALIBRATION

Connect the spectrum analyzer to the test system in place of the master device. Set the signal generator to CW mode. Adjust the amplitude of the signal generator to yield a measured level of –64 dBm on the spectrum analyzer.

Without changing any of the instrument settings, reconnect the spectrum analyer to the Common port of the Spectrum Analyzer Combiner/Divider and connect a 50 ohm load to the Master Device port of the test system.

Measure the amplitude and calculate the difference from –64 dBm. Adjust the Reference Level Offset of the spectrum analyzer to this difference. Confirm that the signal is displayed at –64 dBm. Readjust the RBW and VBW to 3 MHz, set the span to 10 MHz, and confirm that the signal is still displayed at –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.

Set the signal generator to produce a radar waveform, trigger a burst manually and measure the level on the spectrum analyzer. Readjust the amplitude of the signal generator as required so that the peak level of the waveform is at a displayed level equal to the required or desired interference detection threshold. Separate signal generator amplitude settings are determined as required for each radar type.

ADJUSTMENT OF DISPLAYED TRAFFIC LEVEL

Establish a link between the Master and Slave, adjusting the Link Step Attenuator as needed to provide a suitable received level at the Master and Slave devices. Stream the video test file to generate WLAN traffic. Confirm that the WLAN traffic level, as displayed on the spectrum analyzer, is at lower amplitude than the radar detection threshold. Confirm that the displayed traffic is from the Master Device. Confirm that the displayed traffic does not include Slave Device traffic.

If a different setting of the Master Step Attenuator is required to meet the above conditions, perform a new System Calibration for the new Master Step Attenuator setting.

5.1.3. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	Cal Due
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	US42070220	7/26/2007
Vector Signal Generator 250kHz-20GHz	Agilent / HP	E8267C	US43320336	11/2/2007
High Speed Digital I/O Card	National Instruments	PCI-6534	HA1612845	1/16/2008

5.1.4. DESCRIPTION OF EUT

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

The EUT can be configured either as a Master Device or as a Slave Device without Radar Detection.

The highest conducted power level within these bands is 16 dBm in the 5250-5350 MHz band and 24 dBm in the 5470-5725 MHz band.

The highest gain antenna assembly utilized with the EUT has a gain of 33.4 dBi. The lowest gain antenna assembly utilized with the EUT has a gain of 0 dBi.

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

The calibrated conducted DFS Detection Threshold level is set to –64 dBm.

The EUT uses one transmitter connected to a 50-ohm coaxial antenna port to perform conducted tests.

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

WLAN traffic is generated by streaming the video file TestFile.mp2 “6 ½ Magic Hours” from the Master to the Slave in full motion video mode using the media player with the V2.61 Codec package.

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

The EUT utilizes the 802.11a architecture. Two nominal channel bandwidths are implemented: 10 MHz and 20 MHz.

The software installed in the access point is revision 4.0.0.

Test results show that the EUT requires 48.08 seconds to complete its initial power-up cycle in 10 MHz bandwidth and 49.09 seconds in 20 MHz bandwidth.

MANUFACTURER'S DESCRIPTION OF TPC FUNCTION

This is in a separate document.

MANUFACTURER'S DESCRIPTION OF UNIFORM CHANNEL SPREADING FUNCTION

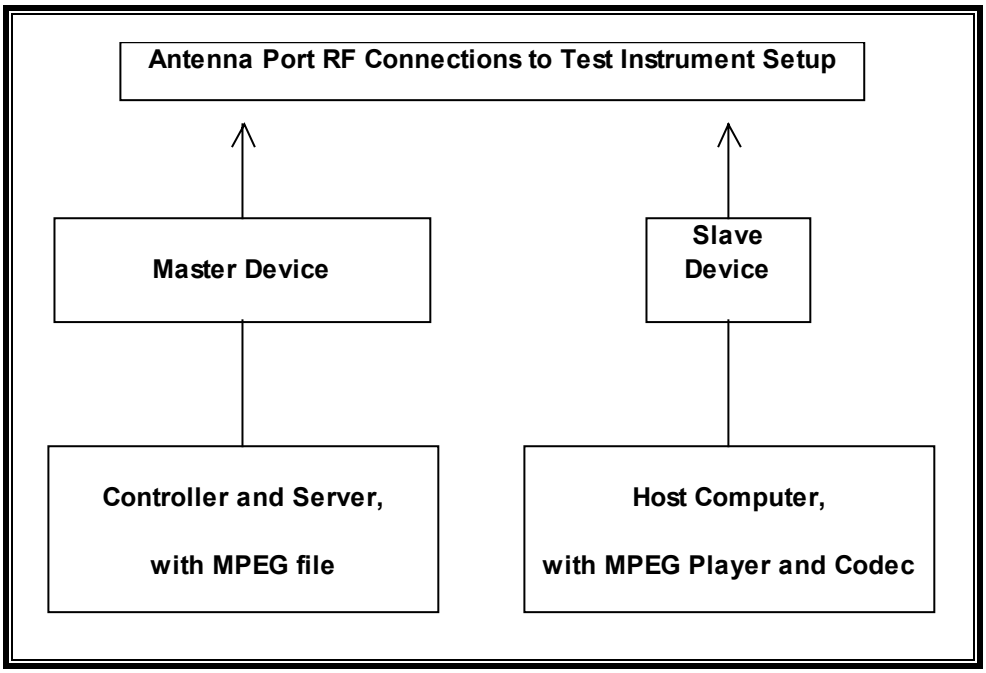
This is in a separate document.

5.1.5. SETUP OF EUT

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC Adapter	DELL	N/A	N/A	DoC
Laptop	DELL	DELL	1YM4Q91	DoC
AC Adapter	HP	HP	N/A	DoC
Laptop	HP	HP	CNU533210L	DoC

TEST SETUP

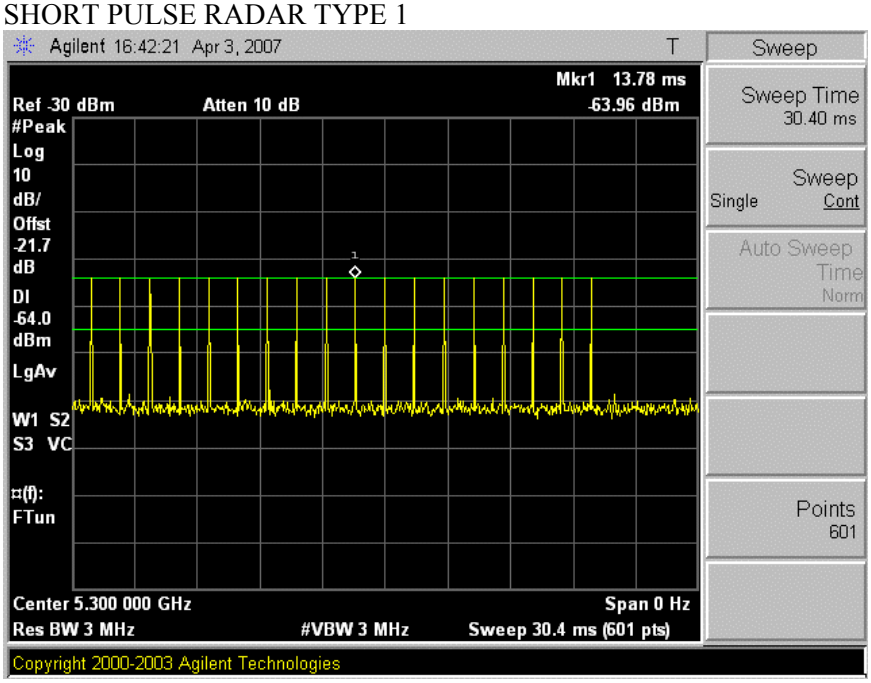


5.2. 10 MHz BANDWIDTH RESULTS

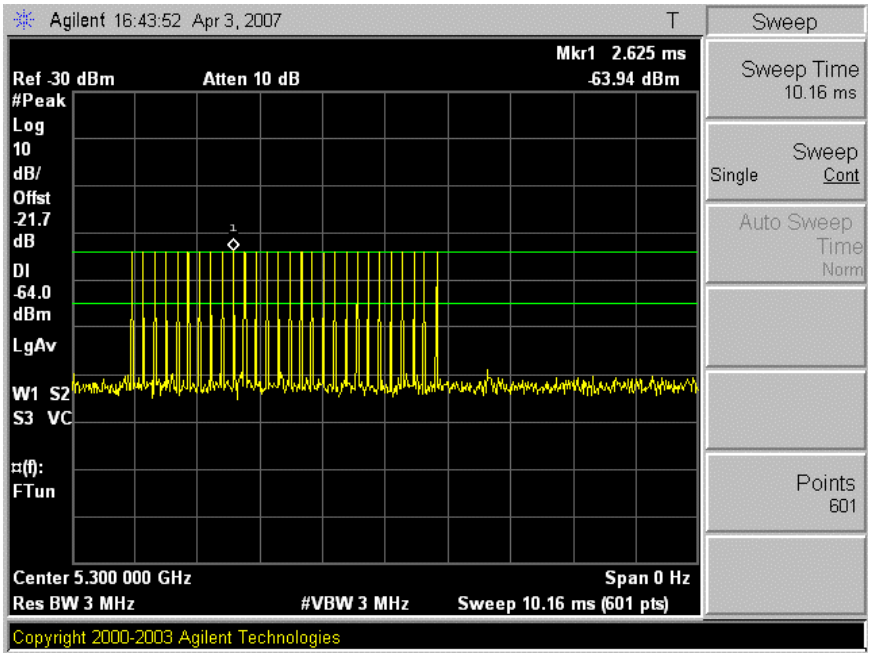
5.2.1. PLOTS OF RADAR WAVEFORM, AND WLAN TRAFFIC

PLOTS OF RADAR WAVEFORMS

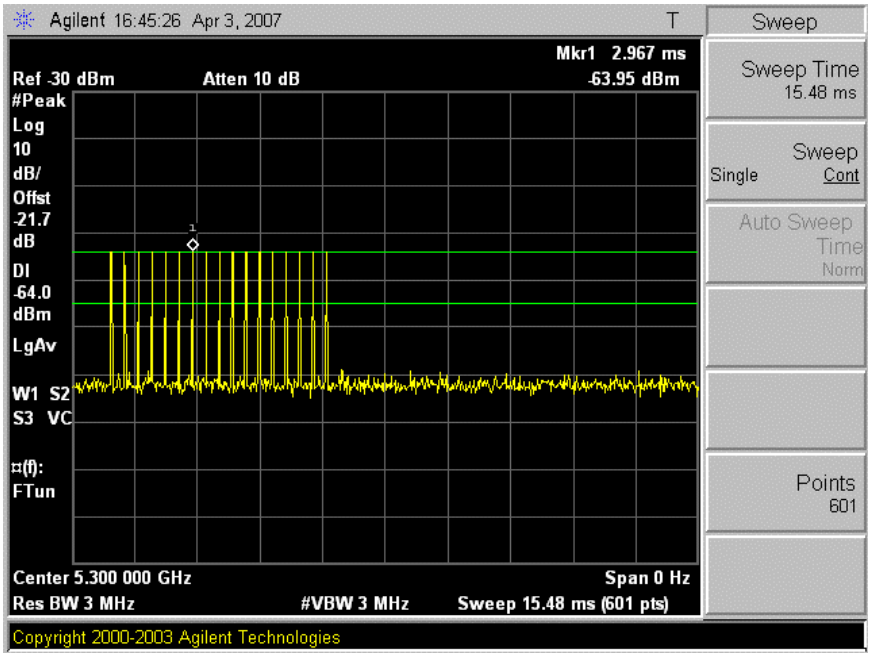
SHORT PULSE RADAR TYPE 1



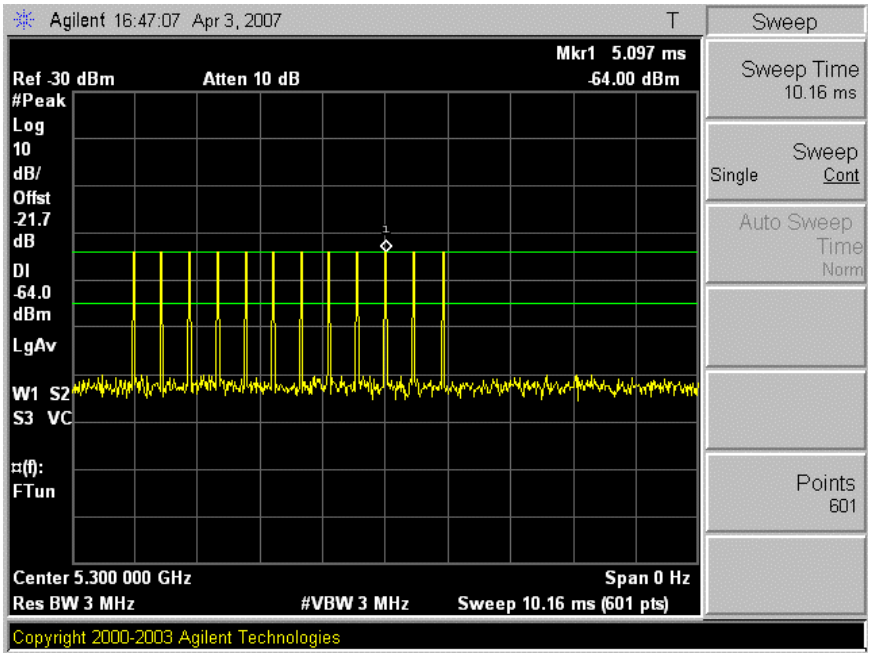
SAMPLE OF SHORT PULSE RADAR TYPE 2



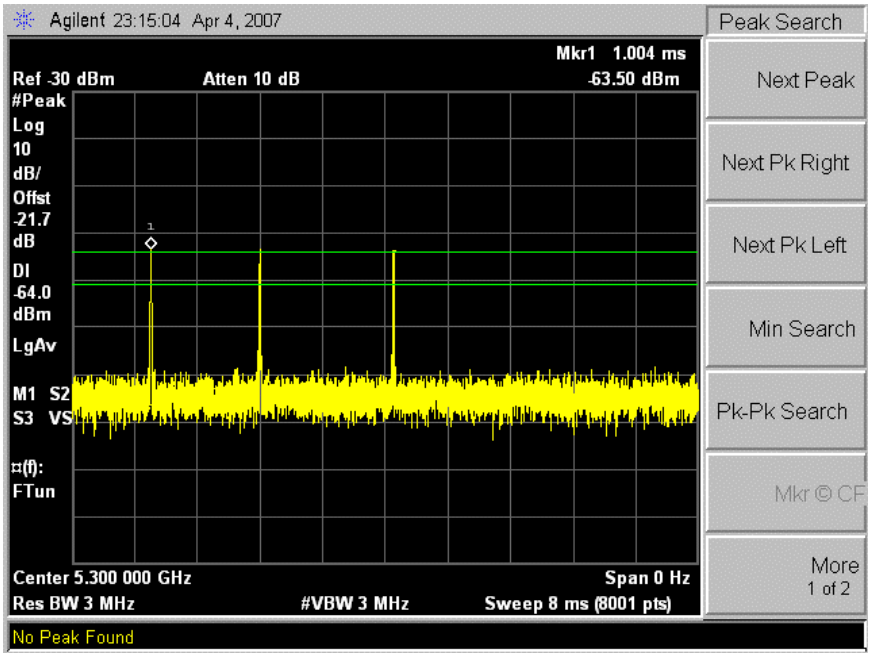
SAMPLE OF SHORT PULSE RADAR TYPE 3



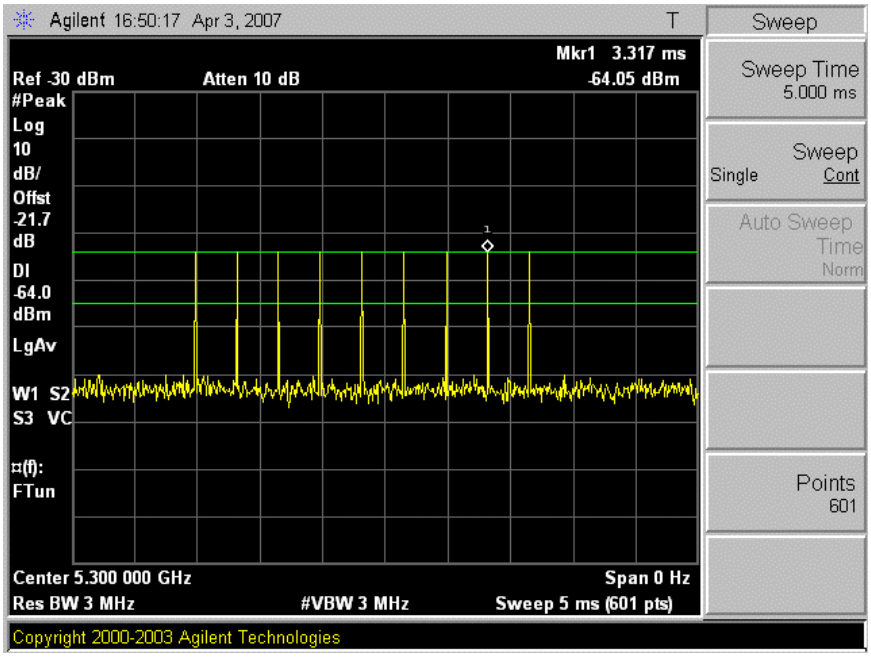
SAMPLE OF SHORT PULSE RADAR TYPE 4



SAMPLE OF SINGLE BURST OF RADAR TYPE 5

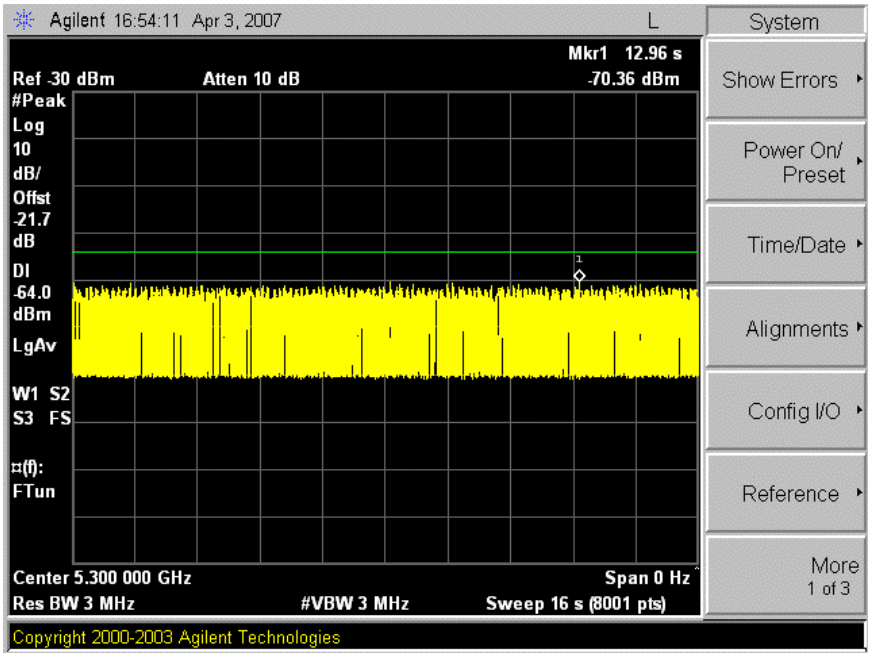


SINGLE BURST OF RADAR TYPE 6



PLOT OF WLAN TRAFFIC FROM MASTER

WLAN TRAFIC



5.2.2. TEST CHANNEL AND METHOD

All tests were performed at a channel center frequency of 5300 MHz utilizing a conducted test method.

5.2.3. CHANNEL AVAILABILITY CHECK TIME

EUT CHARACTERISTICS AFTER COMPLETION OF CHANNEL AVAILABILITY CHECK

The EUT does not initiate transmissions until 2 seconds after the completion of the CAC.

TEST PROCEDURE TO DETERMINE INITIAL POWER-UP CYCLE TIME

A link was established on channel, then the EUT was rebooted. The time from the cessation of traffic to the re-initialization of traffic was measured as the time required for the EUT to complete the total power-up cycle. Since the EUT does not initiate transmissions until 2 seconds after the completion of the CAC, the time to complete the initial power-up period is calculated as (60 + 2) = 62 seconds less than this total power-up time.

TEST 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 channel were monitored on the spectrum analyzer.

CHANNEL AVAILABILITY CHECK TIME RESULTS

No non-compliance noted:

Time required for EUT to complete the initial power-up cycle (sec)
49.09

If a radar signal is detected during the channel availability check then the PC controlling the EUT displays a message stating that radar was detected.

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

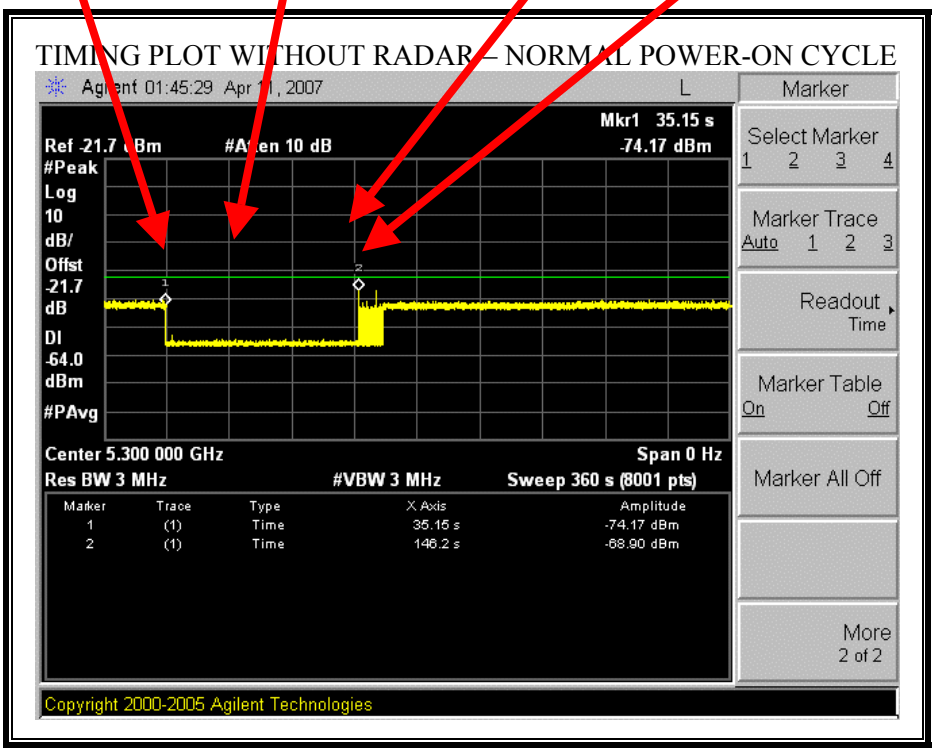
TIMING PLOT WITHOUT RADAR DURING CAC

AP is rebooted
Transmissions Cease
Start of Initial Power-up cycle

End of Initial Power-up cycle
Start of CAC

End of CAC

Transmissions Initiated



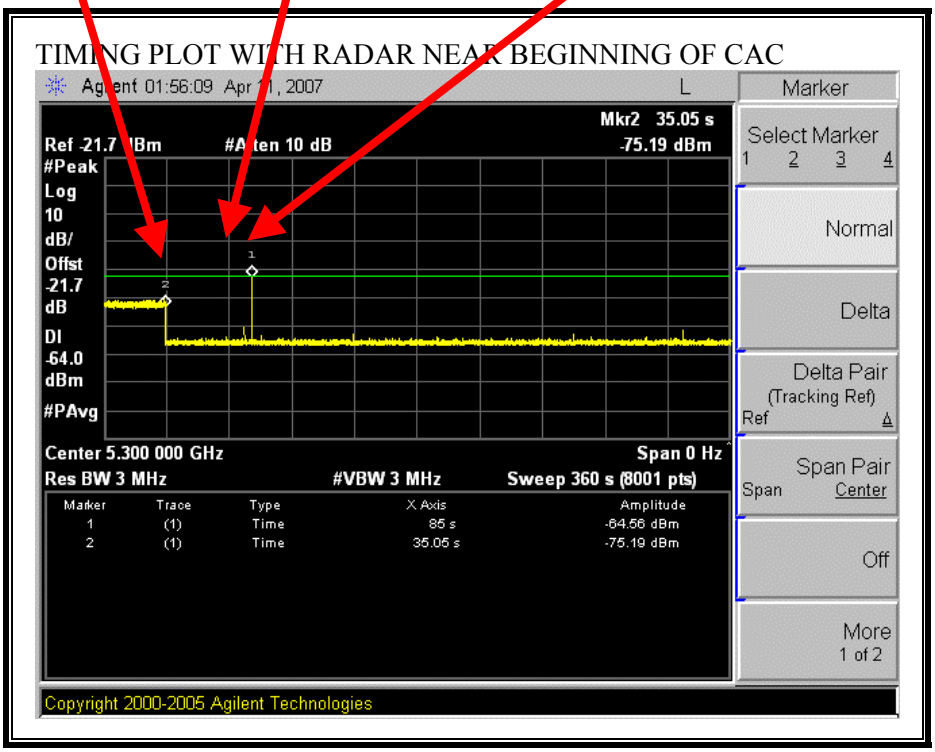
Note: The initial power-up cycle requires (146.2 – 35.15 – 60 – 2) = 49.09 seconds.

TIMING PLOT WITH RADAR NEAR BEGINNING OF CAC

AP is rebooted
Transmissions Cease
Start of Initial Power-up cycle

End of Initial Power-up cycle
Start of CAC

Radar Signal Applied



The radar signal is applied (85 – 35.05) = 49.95 seconds after reboot, which is (49.95 – 49.09) = 0.9 seconds after the start of the CAC period.

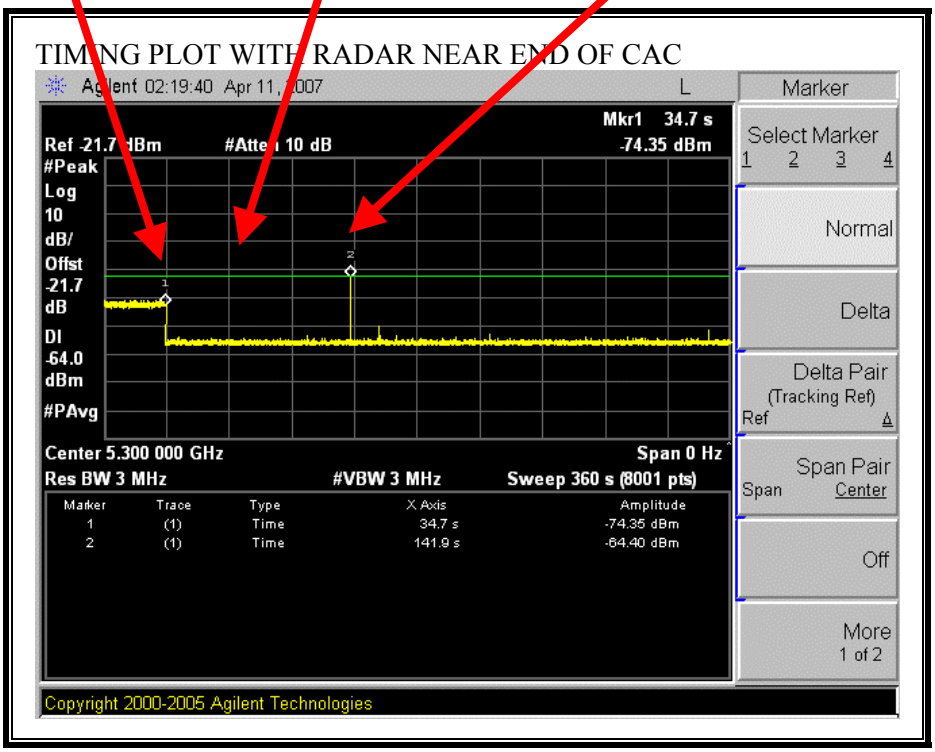
No EUT transmissions were observed after the radar signal.

TIMING PLOT WITH RADAR NEAR END OF CAC

AP is rebooted
Transmissions Cease
Start of Initial Power-up cycle

End of Initial Power-up cycle
Start of CAC

Radar Signal Applied



The radar signal is applied (141.9 – 34.7) = 107.2 seconds after reboot, which is (107.2 – 49.09) = 58.11 seconds after the start of the CAC period.

No EUT transmissions were observed after the radar signal.

5.2.4. CHANNEL MOVE TIME AND CHANNEL CLOSING TRANSMISSION TIME

GENERAL REPORTING NOTES

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

SHORT PULSE 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:

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).

LONG PULSE RADAR REPORTING NOTES

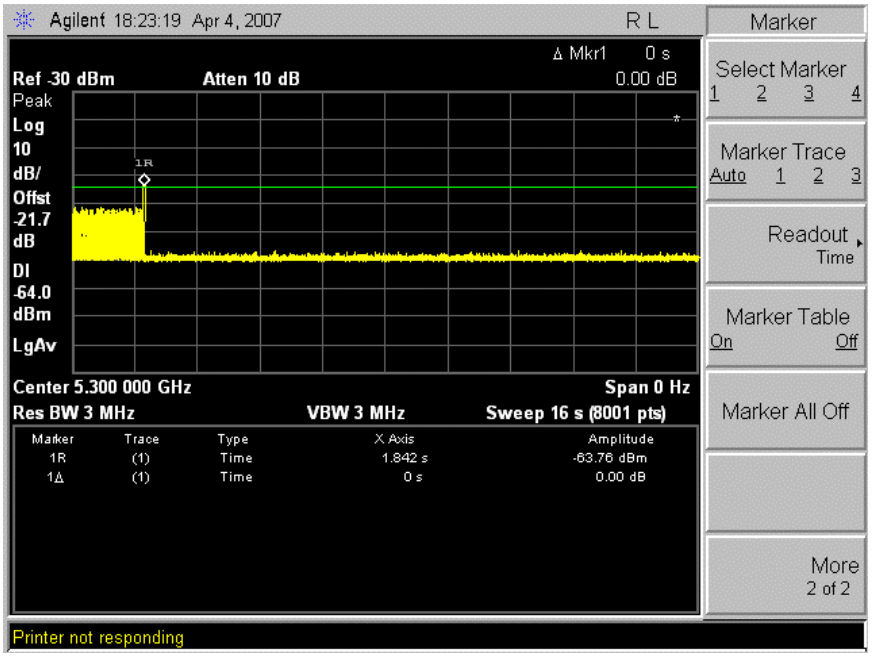
The delta marker is set to 10 seconds after the end of the radar pulse.

CHANNEL MOVE TIME RESULTS

No non-compliance noted:

Channel Move Time (s)	Limit (s)
0.000	10

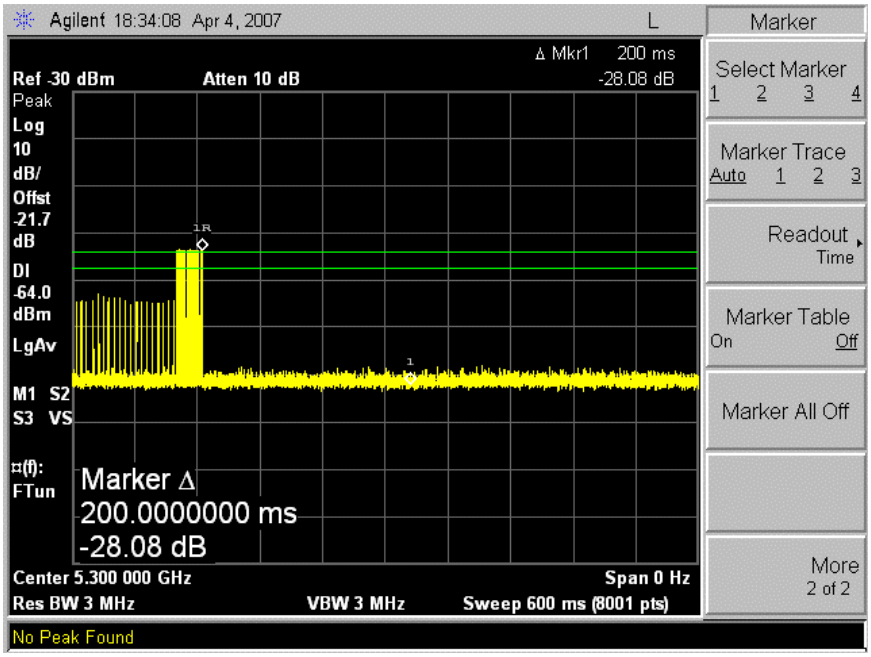
MOVE TIME PLOT



CHANNEL CLOSING TIME RESULTS

No non-compliance noted:

CLOSING TIME PLOT



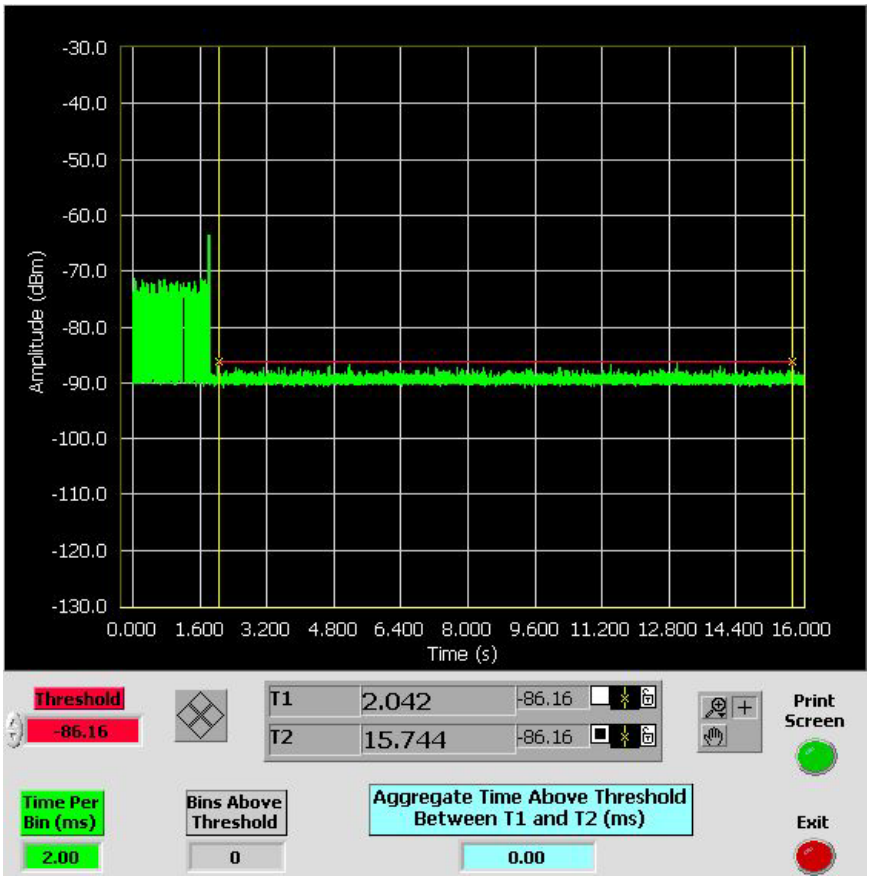
FCC AGGREGATE CHANNEL CLOSING TIME RESULTS

No non-compliance noted:

Aggregate Transmission Time (ms)	Limit (ms)	Margin (ms)
0.00	60	60.00

No transmissions are observed during the aggregate monitoring period.

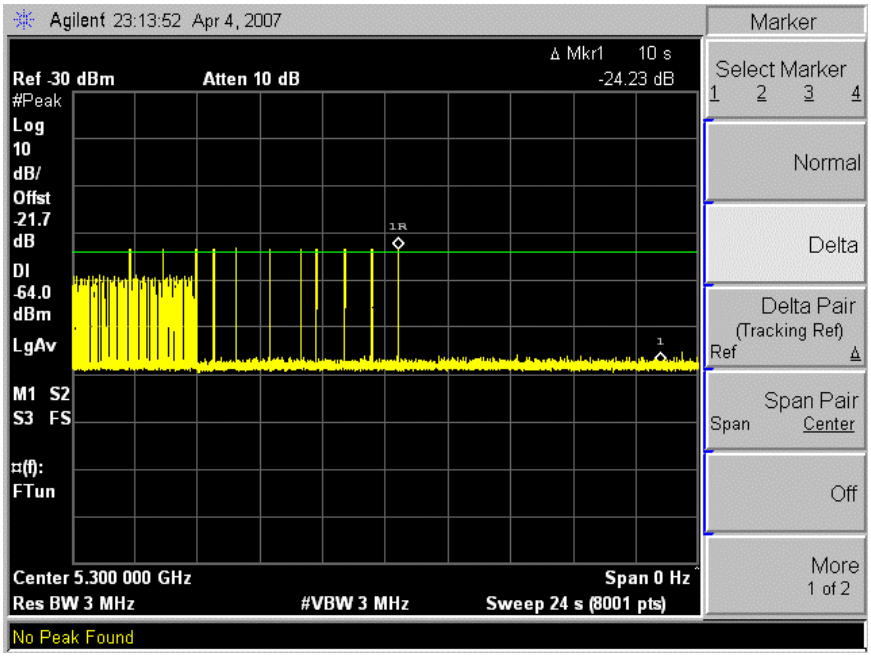
FCC AGGREGATE CLOSING TIME PLOT



LONG PULSE CHANNEL MOVE TIME RESULTS

No non-compliance noted: The traffic ceases prior to the end of the radar waveform, therefore it also ceases prior to 10 seconds after the end of the radar waveform.

MOVE TIME PLOT FOR LONG PULSE RADAR

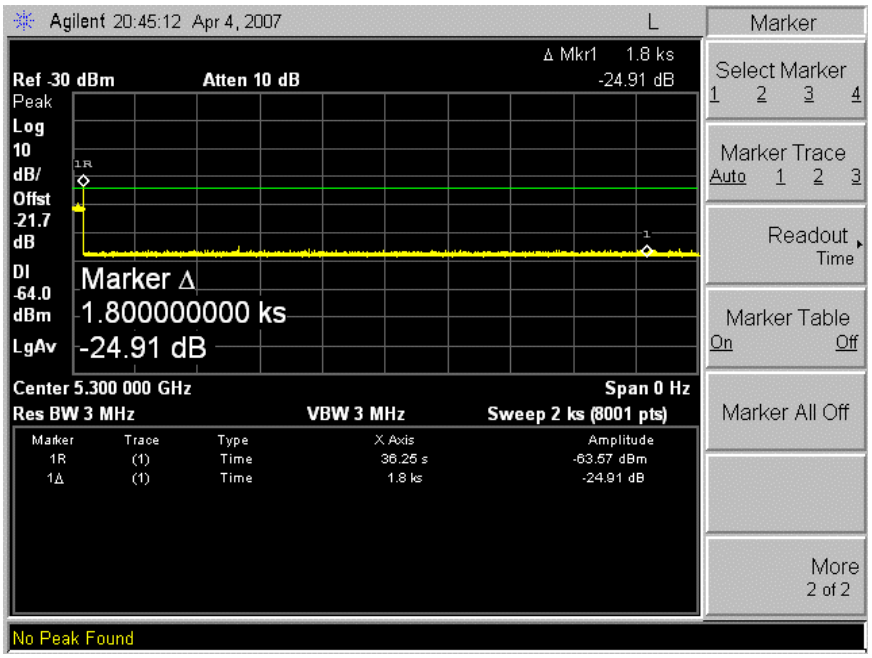


5.2.5. NON-OCCUPANCY PERIOD

RESULTS

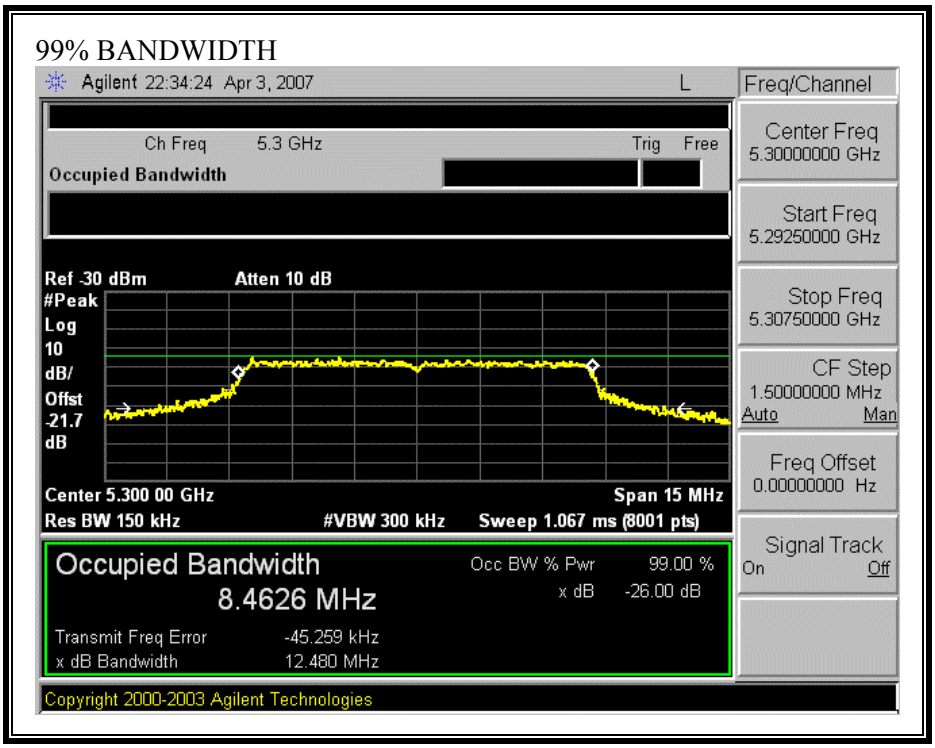
No non-compliance noted: No EUT transmissions were observed on the test channel during the 30 minute observation time.

NON-OCCUPANCY PERIOD PLOT



5.2.6. DETECTION BANDWIDTH

REFERENCE PLOT OF 99% POWER BANDWIDTH



RESULTS

No non-compliance noted:

FL (MHz)	FH (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (%)	Minimum Limit (%)
5296	5304	8	8.464	94.5	80

DETECTION BANDWIDTH PROBABILITY

DETECTION BANDWIDTH PROBABILITY RESULTS

Detection Bandwidth Test Results:			Waveform: TYPE 1	
Frequency (MHz)	Number of Trials	Number Detected	Detection (%)	Mark
5295	10	0	0.00	
5296	10	10	100.00	FL
5297	10	10	100.00	
5298	10	10	100.00	
5299	10	10	100.00	
5300	10	10	100.00	
5301	10	10	100.00	
5302	10	10	100.00	
5303	10	10	100.00	
5304	10	10	100.00	FH
5305	10	0	0.00	

5.2.7. IN-SERVICE MONITORING

RESULTS

No non-compliance noted:

Radar Test Summary:

Signal Type	Number of Waveforms	Detection (%)	Limit (%)	Pas/Fail
FCC TYPE 1	30	93.33	60.00	Pass
FCC TYPE 2	30	93.33	60.00	Pass
FCC TYPE 3	30	93.33	60.00	Pass
FCC TYPE 4	30	83.33	60.00	Pass
Aggregate		90.83	80.00	Pass
FCC TYPE 5	30	93.33	80.00	Pass
FCC TYPE 6	36	83.33	70.00	Pass

TYPE 1 DETECTION PROBABILITY

Data Sheet for Short Pulse Radar Type 1	
Trial No.	Successful Detection (Yes/No)
1	Yes
2	Yes
3	Yes
4	Yes
5	Yes
6	Yes
7	Yes
8	Yes
9	No
10	No
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

TYPE 2 DETECTION PROBABILITY

Data Sheet for Short Pulse Radar Type 2				
Waveform No.	# Pulses per burst	Pulse Width (us)	Pulse repetition Interval (us)	Successful Detection (Yes/No)
2001	28	2.00	183	Yes
2002	28	1.00	214	Yes
2003	29	3.30	168	Yes
2004	27	3.50	171	Yes
2005	24	4.60	227	Yes
2006	26	1.00	208	Yes
2007	26	2.90	208	Yes
2008	28	4.90	203	Yes
2009	27	3.80	221	Yes
2010	24	5.00	177	Yes
2011	28	2.80	157	Yes
2012	29	1.10	172	Yes
2013	23	5.00	223	No
2014	23	4.20	178	Yes
2015	23	2.30	185	Yes
2016	29	3.10	189	Yes
2017	25	1.30	151	No
2018	23	1.10	212	Yes
2019	27	5.00	159	Yes
2020	28	2.50	182	Yes
2021	26	1.20	203	Yes
2022	24	1.30	224	Yes
2023	28	4.30	216	Yes
2024	26	1.00	152	Yes
2025	26	2.80	169	Yes
2026	26	1.00	205	Yes
2027	27	3.50	178	Yes
2028	29	2.10	211	Yes
2029	23	1.00	203	Yes
2030	25	3.20	177	Yes

TYPE 3 DETECTION PROBABILITY

Data Sheet for Short Pulse Radar Type 3				
Waveform No.	# Pulses per burst	Pulse Width (us)	Pulse repetition Interval (us)	Successful Detection (Yes/No)
3001	17	8.10	333	Yes
3002	16	8.30	273	No
3003	16	9.30	422	Yes
3004	18	8.50	274	Yes
3005	18	9.60	349	Yes
3006	16	9.80	485	Yes
3007	18	8.90	429	Yes
3008	18	8.80	363	Yes
3009	16	9.40	253	Yes
3010	16	5.90	389	Yes
3011	17	5.50	410	Yes
3012	16	9.80	312	Yes
3013	17	5.10	430	Yes
3014	18	9.40	301	Yes
3015	16	7.20	403	Yes
3016	16	7.90	402	Yes
3017	18	6.30	475	Yes
3018	17	8.40	292	Yes
3019	16	5.40	358	Yes
3020	18	9.00	477	No
3021	18	8.60	310	Yes
3022	18	9.00	346	Yes
3023	18	7.30	310	Yes
3024	17	8.50	434	Yes
3025	16	9.00	500	Yes
3026	16	7.30	387	Yes
3027	16	7.80	255	Yes
3028	17	8.90	333	Yes
3029	17	9.80	394	Yes
3030	17	8.30	314	Yes

TYPE 4 DETECTION PROBABILITY

Data Sheet for Short Pulse Radar Type 4				
Waveform No.	# Pulses per burst	Pulse Width (us)	Pulse repetition Interval (us)	Successful Detection (Yes/No)
4001	12	18.10	456	Yes
4002	14	10.40	338	Yes
4003	13	14.10	489	Yes
4004	16	18.40	400	Yes
4005	12	11.40	286	Yes
4006	16	13.30	350	Yes
4007	16	17.30	345	No
4008	13	19.80	273	Yes
4009	16	17.00	458	Yes
4010	14	18.90	476	Yes
4011	12	19.00	256	Yes
4012	14	18.80	328	Yes
4013	15	15.50	416	Yes
4014	14	18.40	371	No
4015	16	11.30	408	Yes
4016	16	16.20	418	Yes
4017	14	17.60	379	Yes
4018	16	11.00	448	No
4019	12	14.10	334	Yes
4020	15	13.90	407	Yes
4021	15	10.10	378	No
4022	12	14.60	483	Yes
4023	16	17.50	431	Yes
4024	13	12.10	285	Yes
4025	14	10.20	451	No
4026	16	18.00	485	Yes
4027	16	15.20	347	Yes
4028	13	17.10	384	Yes
4029	14	16.80	463	Yes
4030	13	17.10	252	Yes

TYPE 5 DETECTION PROBABILITY

Data Sheet for Long Pulse Radar Type 5	
Waveform No.	Successful Detection (Yes/No)
5001	Yes
5002	Yes
5003	Yes
5004	No
5005	Yes
5006	Yes
5007	Yes
5008	Yes
5009	Yes
5010	Yes
5011	Yes
5012	Yes
5013	Yes
5014	Yes
5015	Yes
5016	Yes
5017	Yes
5018	Yes
5019	Yes
5020	Yes
5021	No
5022	Yes
5023	Yes
5024	Yes
5025	Yes
5026	Yes
5027	Yes
5028	Yes
5029	Yes
5030	Yes

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

TYPE 6 DETECTION PROBABILITY

Data Sheet for Hopping Signal				
Trial No.	Starting Index within NTIA August 2005 Sequence	Signal Generator Frequency (MHz)	Hops within Detection BW	Successful Detection (Yes/No)
1	47	5296	1	Yes
2	522	5297	3	Yes
3	1472	5298	1	Yes
4	1947	5299	1	Yes
5	2897	5300	3	Yes
6	3372	5301	3	Yes
7	3847	5302	1	Yes
8	4322	5303	1	No
9	4797	5304	1	No
10	5272	5296	1	Yes
11	5747	5297	3	Yes
12	6697	5298	2	Yes
13	7172	5299	2	Yes
14	7647	5300	1	No
15	8122	5301	2	No
16	8597	5302	1	Yes
17	9547	5303	2	Yes
18	10022	5304	1	No
19	10497	5296	1	Yes
20	10972	5297	1	No
21	11447	5298	2	Yes
22	11922	5299	3	Yes
23	12872	5300	4	Yes
24	13347	5301	4	Yes
25	13822	5302	2	Yes
26	14297	5303	1	Yes
27	14772	5304	1	Yes
28	15247	5296	1	Yes
29	15722	5297	2	Yes
30	16197	5298	2	Yes
31	16672	5299	2	Yes
32	17147	5300	1	Yes
33	17622	5301	2	Yes
34	18097	5302	3	Yes
35	18572	5303	2	Yes
36	19522	5304	1	Yes

5.2.8. SLAVE DEVICE CONFIGURATION - CHANNEL MOVE TIME AND CHANNEL CLOSING TRANSMISSION 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:

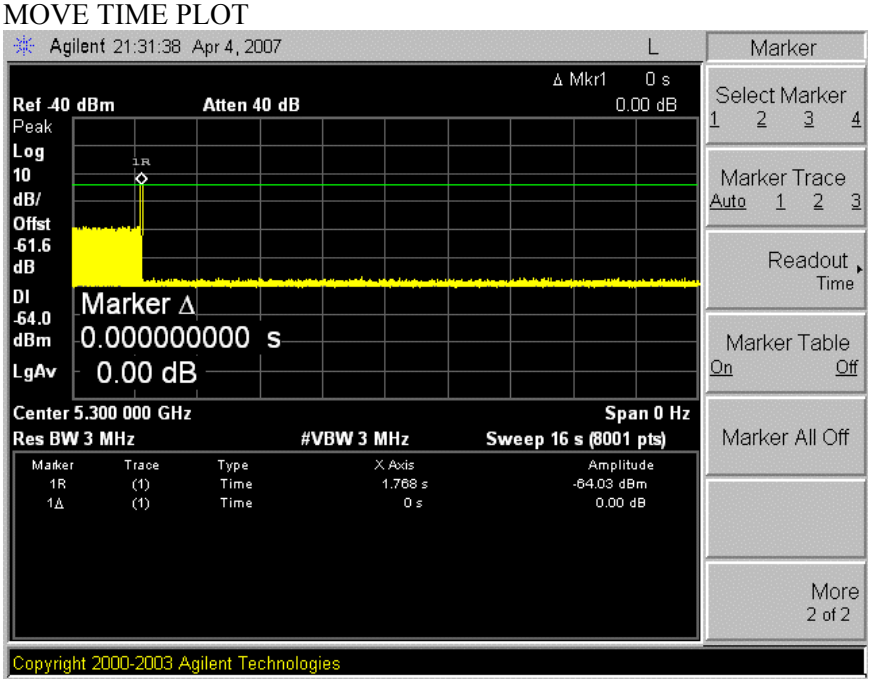
The observation period over which the aggregate time is calculated
Begins at (Reference Marker + 200 msec)
and
Ends no earlier than (Reference Marker + 10 sec).

CHANNEL MOVE TIME RESULTS

No non-compliance noted:

Channel Move Time (s)	Limit (s)
0.000	10

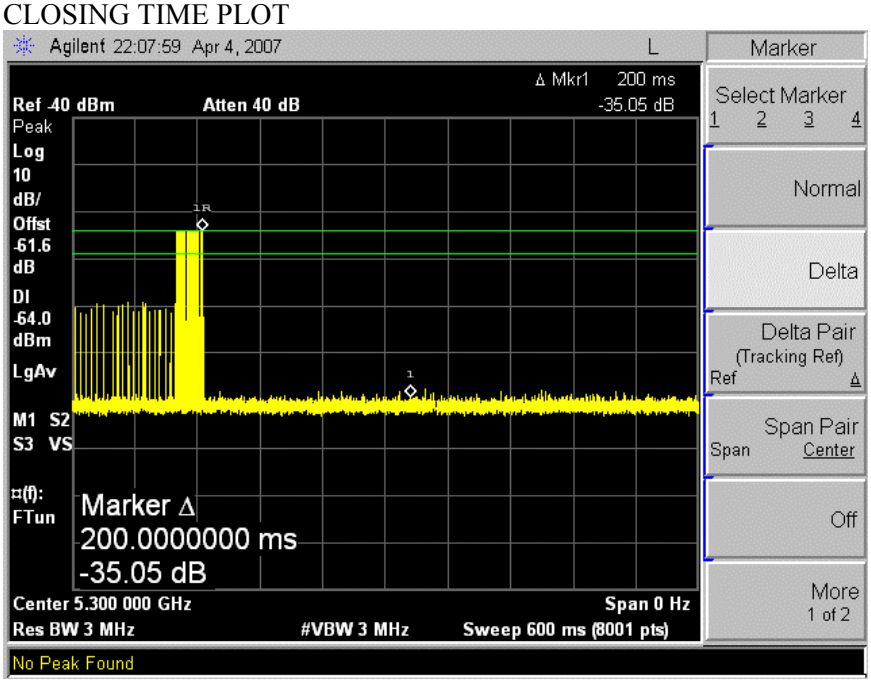
MOVE TIME PLOT



CHANNEL CLOSING TIME RESULTS

No non-compliance noted:

CLOSING TIME PLOT



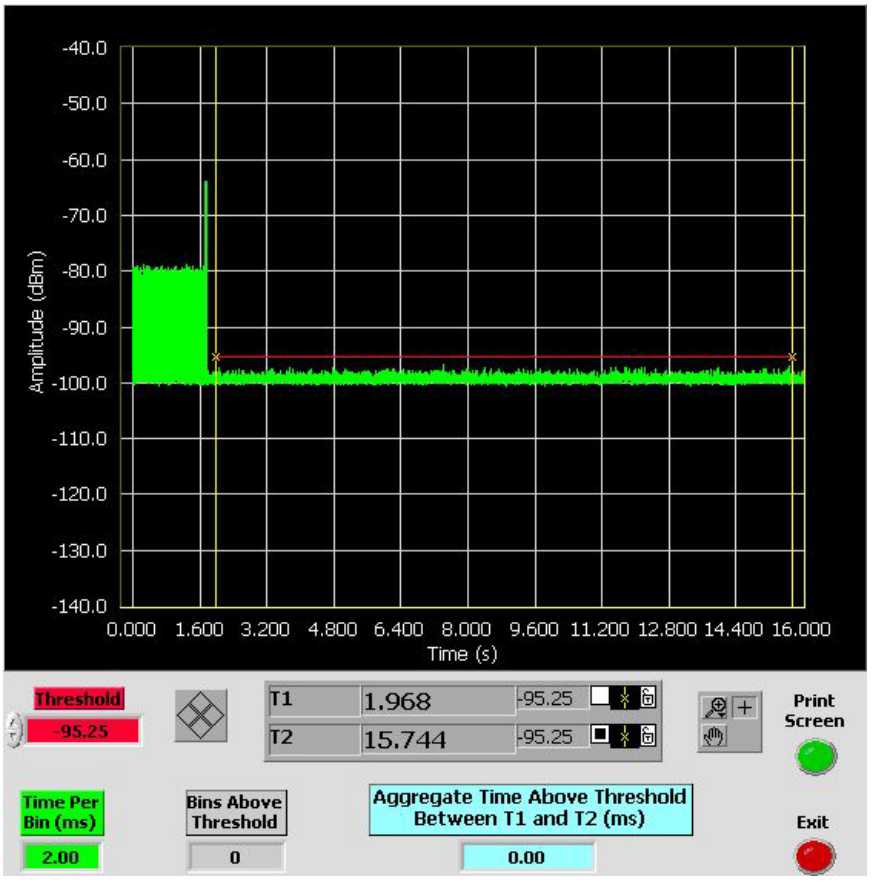
FCC AGGREGATE CHANNEL CLOSING TIME RESULTS

No non-compliance noted:

Aggregate Transmission Time (ms)	Limit (ms)	Margin (ms)
0.00	60	60.00

No transmissions are observed during the aggregate monitoring period.

FCC AGGREGATE CLOSING TIME PLOT

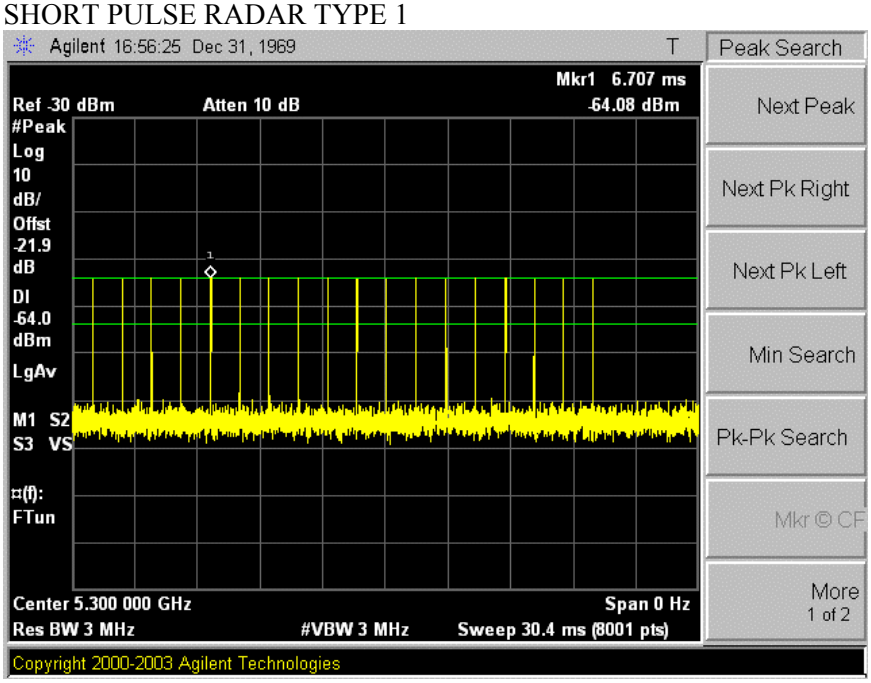


5.3. 20 MHz BANDWIDTH RESULTS

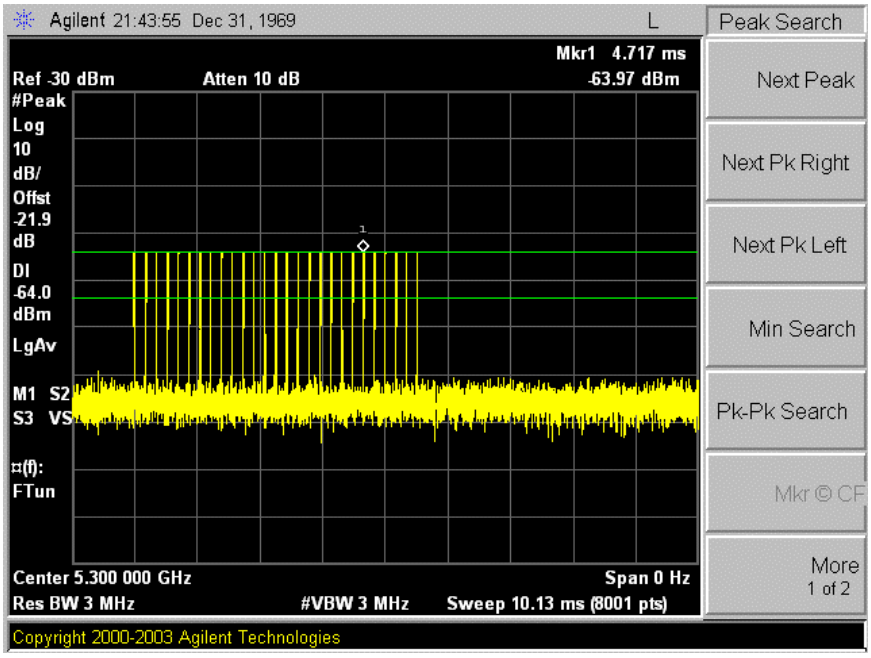
5.3.1. PLOTS OF RADAR WAVEFORM, AND WLAN TRAFFIC

PLOTS OF RADAR WAVEFORMS

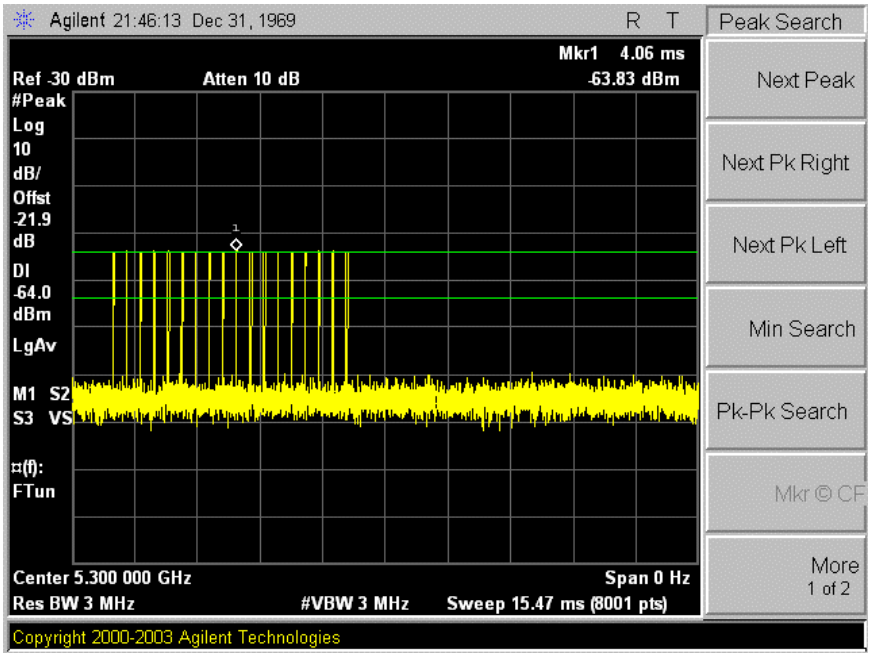
SHORT PULSE RADAR TYPE 1



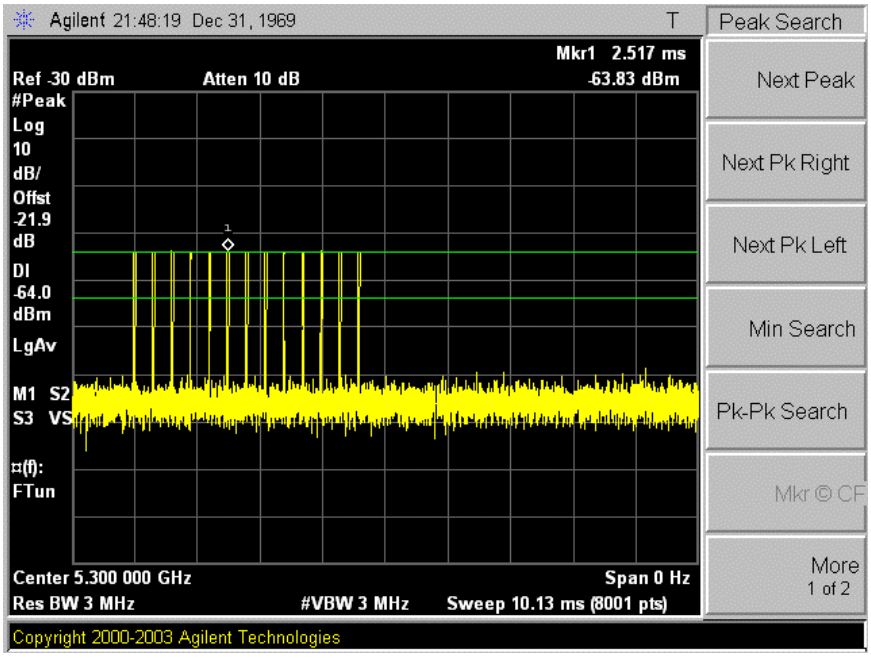
SAMPLE OF SHORT PULSE RADAR TYPE 2



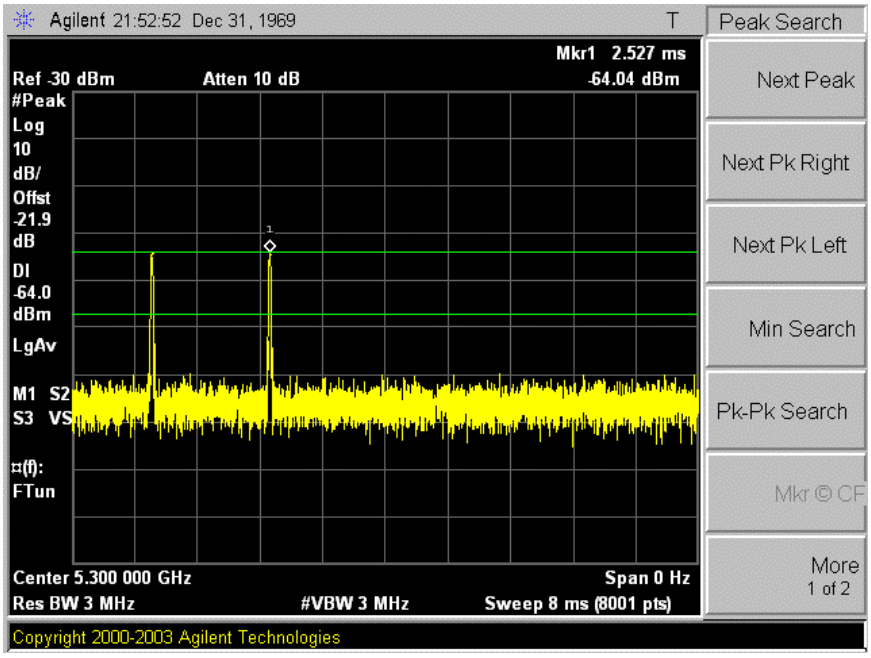
SAMPLE OF SHORT PULSE RADAR TYPE 3



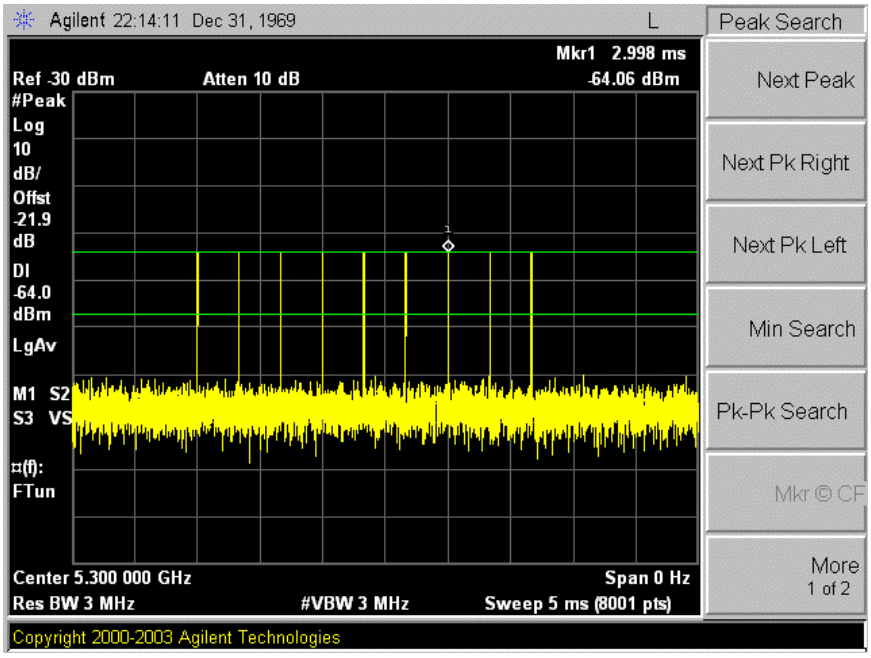
SAMPLE OF SHORT PULSE RADAR TYPE 4



SAMPLE OF SINGLE BURST OF RADAR TYPE 5

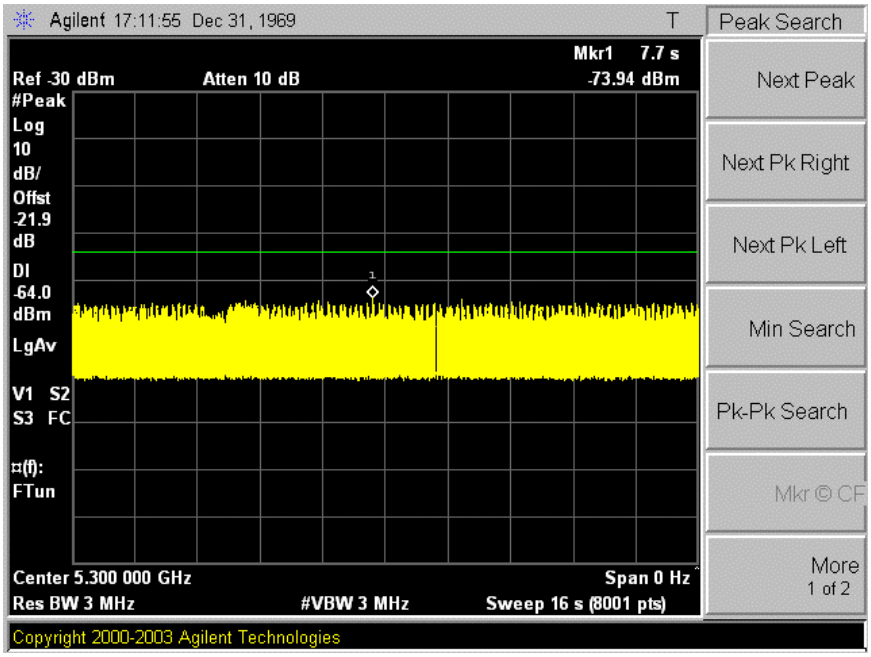


SINGLE BURST OF RADAR TYPE 6



PLOT OF WLAN TRAFFIC FROM MASTER

WLAN TRAFIC



5.3.2. TEST CHANNEL AND METHOD

All tests were performed at a channel center frequency of 5300 MHz utilizing a conducted test method.

5.3.3. CHANNEL AVAILABILITY CHECK TIME

EUT CHARACTERISTICS AFTER COMPLETION OF CHANNEL AVAILABILITY CHECK

The EUT does not initiate transmissions until 2 seconds after the completion of the CAC.

TEST PROCEDURE TO DETERMINE INITIAL POWER-UP CYCLE TIME

A link was established on channel, then the EUT was rebooted. The time from the cessation of traffic to the re-initialization of traffic was measured as the time required for the EUT to complete the total power-up cycle. Since the EUT does not initiate transmissions until 2 seconds after the completion of the CAC, the time to complete the initial power-up period is calculated as (60 + 2) = 62 seconds less than this total power-up time.

TEST 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 channel were monitored on the spectrum analyzer.

CHANNEL AVAILABILITY CHECK TIME RESULTS

No non-compliance noted:

Time required for EUT to complete the initial power-up cycle (sec)
48.08

If a radar signal is detected during the channel availability check then the PC controlling the EUT displays a message stating that radar was detected.

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

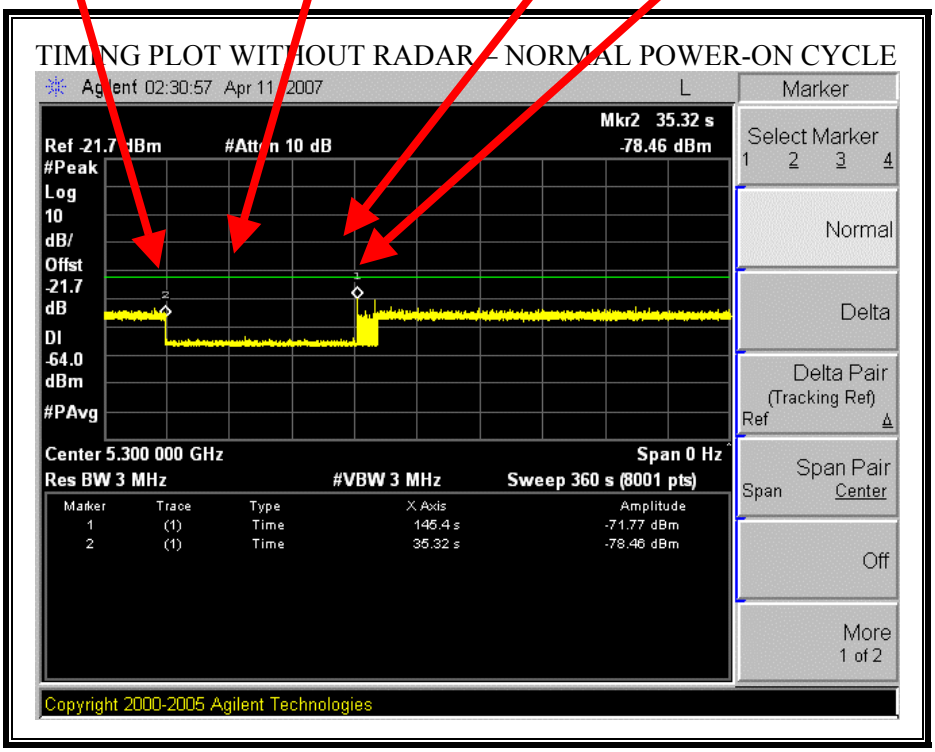
TIMING PLOT WITHOUT RADAR DURING CAC

AP is rebooted
Transmissions Cease
Start of Initial Power-up cycle

End of Initial Power-up cycle
Start of CAC

End of CAC

Transmissions Initiated



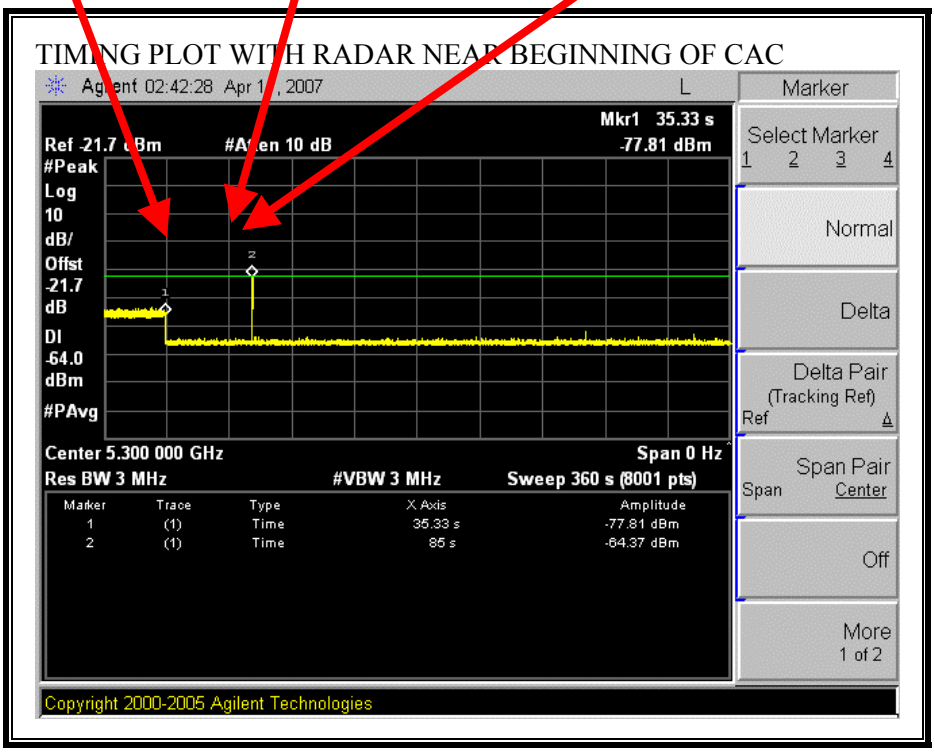
Note: The initial power-up cycle requires (145.4 – 35.32 – 60 – 2) = 48.08 seconds.

TIMING PLOT WITH RADAR NEAR BEGINNING OF CAC

AP is rebooted
Transmissions Cease
Start of Initial Power-up cycle

End of Initial Power-up cycle
Start of CAC

Radar Signal Applied



The radar signal is applied (85 – 35.33) = 49.67 seconds after reboot, which is (49.67 – 48.08) = 1.59 seconds after the start of the CAC period.

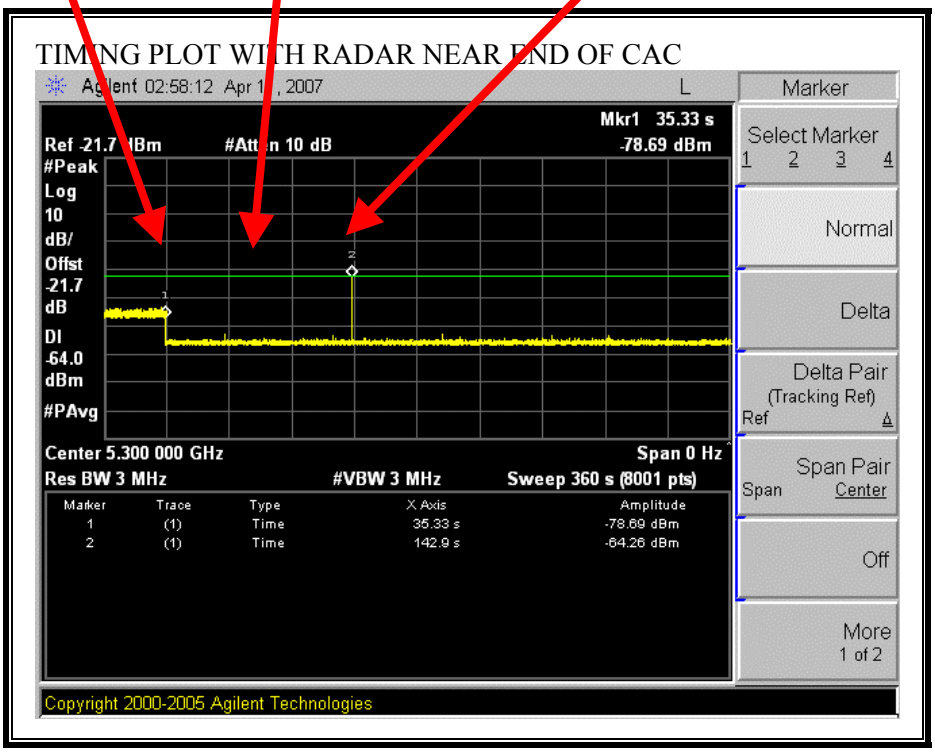
No EUT transmissions were observed after the radar signal.

TIMING PLOT WITH RADAR NEAR END OF CAC

AP is rebooted
Transmissions Cease
Start of Initial Power-up cycle

End of Initial Power-up cycle
Start of CAC

Radar Signal Applied



The radar signal is applied (142.9 – 35.33) = 107.54 seconds after reboot, which is (107.54 – 48.08) = 59.46 seconds after the start of the CAC period.

No EUT transmissions were observed after the radar signal.

5.3.4. CHANNEL MOVE TIME AND CHANNEL CLOSING TRANSMISSION TIME

GENERAL REPORTING NOTES

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

SHORT PULSE 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:

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).

LONG PULSE RADAR REPORTING NOTES

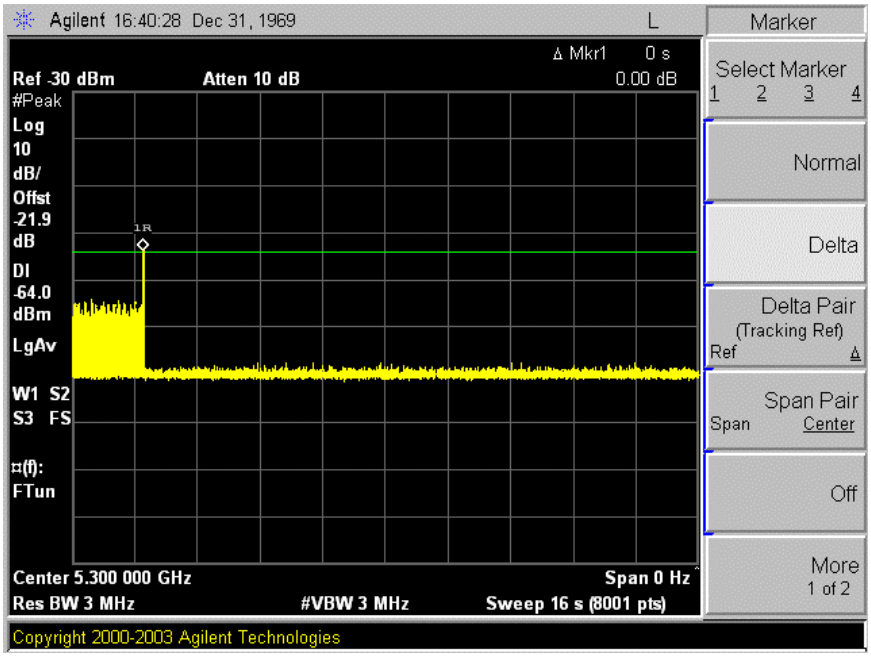
The delta marker is set to 10 seconds after the end of the radar pulse.

CHANNEL MOVE TIME RESULTS

No non-compliance noted:

Channel Move Time (s)	Limit (s)
0.000	10

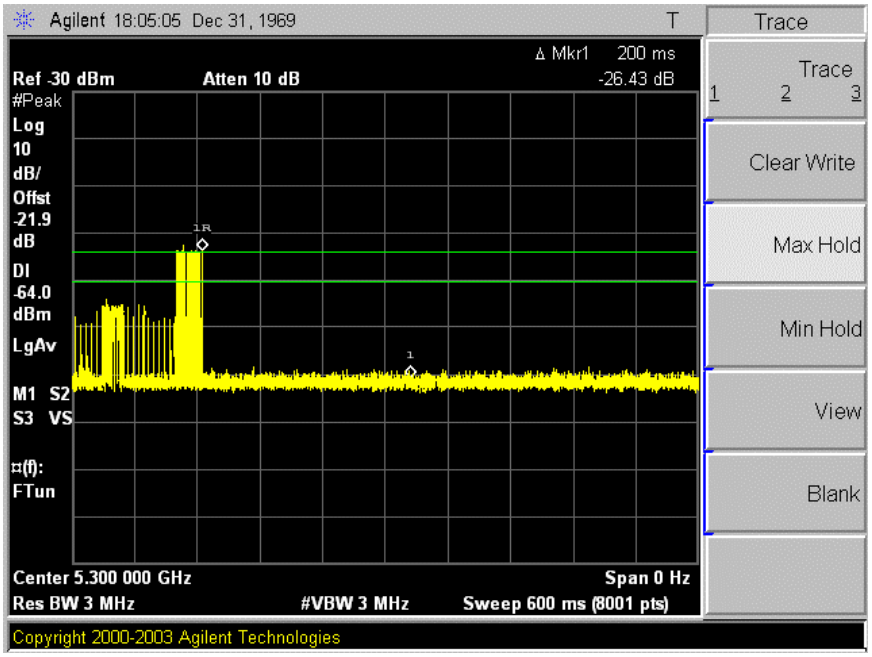
MOVE TIME PLOT



CHANNEL CLOSING TIME RESULTS

No non-compliance noted:

CLOSING TIME PLOT



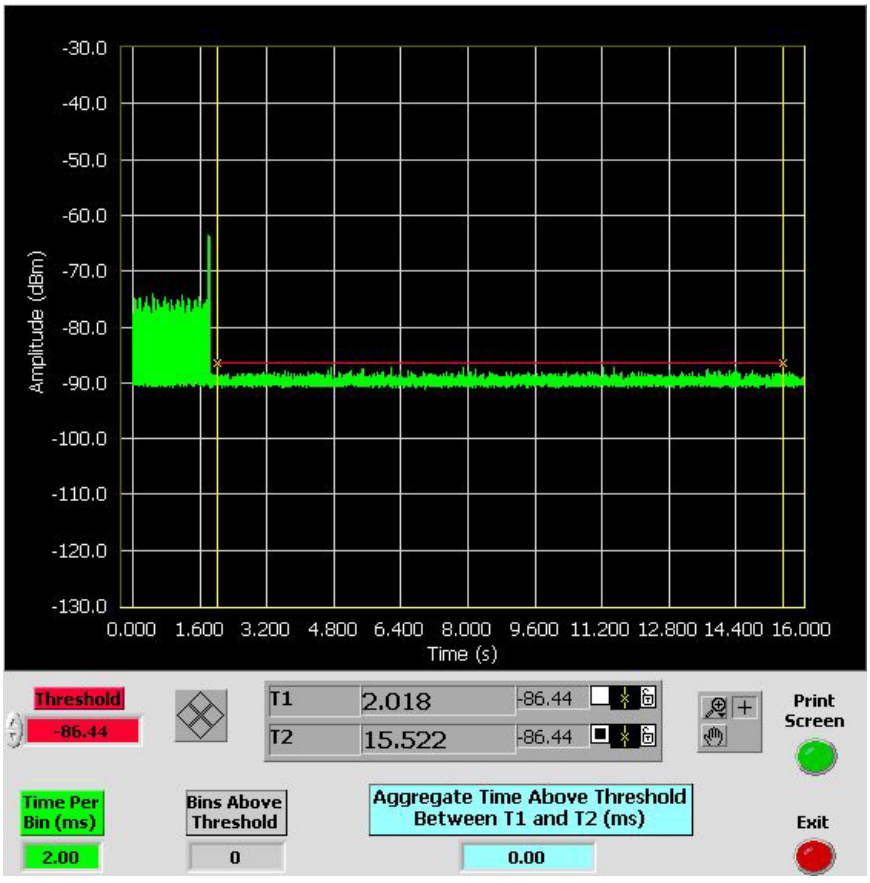
FCC AGGREGATE CHANNEL CLOSING TIME RESULTS

No non-compliance noted:

Aggregate Transmission Time (ms)	Limit (ms)	Margin (ms)
0.00	60	60.00

No transmissions are observed during the aggregate monitoring period.

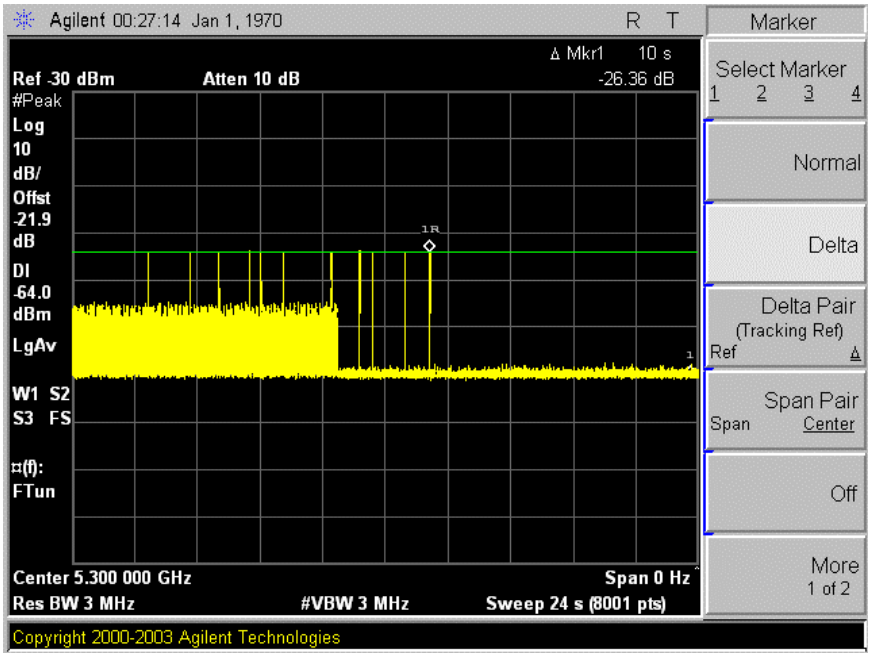
FCCAGGREGATE CLOSING TIME PLOT



LONG PULSE CHANNEL MOVE TIME RESULTS

No non-compliance noted: The traffic ceases prior to the end of the radar waveform, therefore it also ceases prior to 10 seconds after the end of the radar waveform.

MOVE TIME PLOT FOR LONG PULSE RADAR

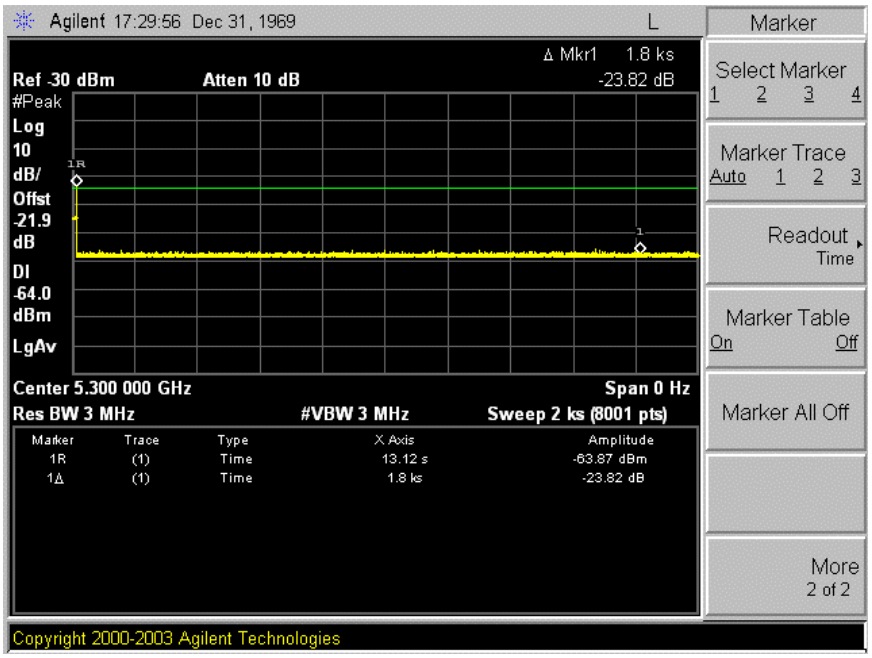


5.3.5. NON-OCCUPANCY PERIOD

RESULTS

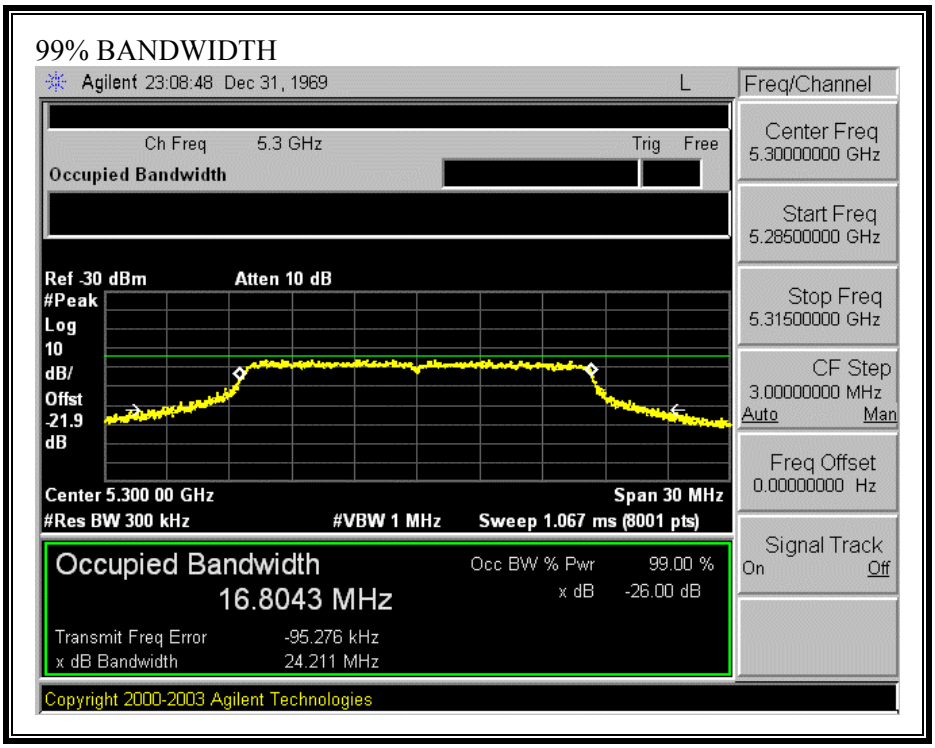
No non-compliance noted: No EUT transmissions were observed on the test channel during the 30 minute observation time.

NON-OCCUPANCY PERIOD PLOT



5.3.6. DETECTION BANDWIDTH

REFERENCE PLOT OF 99% POWER BANDWIDTH



RESULTS

No non-compliance noted:

FL (MHz)	FH (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (%)	Minimum Limit (%)
5292	5309	17	16.804	101.2	80

DETECTION BANDWIDTH PROBABILITY

DETECTION BANDWIDTH PROBABILITY RESULTS

Detection Bandwidth Test Results:			Waveform: TYPE 1	
Frequency (MHz)	Number of Trials	Number Detected	Detection (%)	Mark
5291	10	8	80.00	
5292	10	10	100.00	FL
5293	10	10	100.00	
5294	10	10	100.00	
5295	10	10	100.00	
5296	10	10	100.00	
5297	10	10	100.00	
5298	10	10	100.00	
5299	10	10	100.00	
5300	10	10	100.00	
5301	10	10	100.00	
5302	10	10	100.00	
5303	10	9	90.00	
5304	10	10	100.00	
5305	10	10	100.00	
5306	10	10	100.00	
5307	10	10	100.00	
5308	10	10	100.00	
5309	10	9	90.00	FH
5310	10	2	20.00	

5.3.7. IN-SERVICE MONITORING

RESULTS

No non-compliance noted:

Radar Test Summary:				
Signal Type	**Number of Trials**	**Detection (%)**	**Limit (%)**	**Pas/Fail**
FCC TYPE 1	30	83.33	60.00	Pass
FCC TYPE 2	30	100.00	60.00	Pass
FCC TYPE 3	30	96.67	60.00	Pass
FCC TYPE 4	30	96.67	60.00	Pass
Aggregate		94.17	80.00	Pass
FCC TYPE 5	30	100.00	80.00	Pass
FCC TYPE 6	36	100.00	70.00	Pass

TYPE 1 DETECTION PROBABILITY

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

TYPE 2 DETECTION PROBABILITY

Data Sheet for Short Pulse Radar Type 2				
Waveform No.	# Pulses per burst	Pulse Width (us)	Pulse repetition Interval (us)	Successful Detection (Yes/No)
2001	27	2.20	177	Yes
2002	28	1.20	201	Yes
2003	29	1.70	211	Yes
2004	27	3.20	165	Yes
2005	26	2.90	174	Yes
2006	26	4.00	174	Yes
2007	25	1.00	199	Yes
2008	27	4.10	222	Yes
2009	29	4.90	222	Yes
2010	26	2.20	199	Yes
2011	28	3.70	166	Yes
2012	28	4.20	205	Yes
2013	29	4.50	194	Yes
2014	28	4.80	203	Yes
2015	25	2.60	204	Yes
2016	25	3.80	169	Yes
2017	25	1.10	152	Yes
2018	25	1.20	217	Yes
2019	29	1.20	199	Yes
2020	27	4.20	222	Yes
2021	26	2.50	158	Yes
2022	25	1.30	167	Yes
2023	29	1.50	176	Yes
2024	24	3.00	157	Yes
2025	29	3.00	200	Yes
2026	24	1.20	163	Yes
2027	25	1.30	199	Yes
2028	28	1.60	163	Yes
2029	24	1.70	150	Yes
2030	28	3.40	157	Yes

TYPE 3 DETECTION PROBABILITY

Data Sheet for Short Pulse Radar Type 3				
Waveform No.	# Pulses per burst	Pulse Width (us)	Pulse repetition Interval (us)	Successful Detection (Yes/No)
3001	18	9.00	340	Yes
3002	17	5.30	388	Yes
3003	16	9.80	397	Yes
3004	17	7.90	308	Yes
3005	18	8.70	285	Yes
3006	18	5.00	343	Yes
3007	17	8.50	443	Yes
3008	17	8.50	292	Yes
3009	18	6.60	273	Yes
3010	18	5.20	451	Yes
3011	18	7.80	482	Yes
3012	18	7.90	301	Yes
3013	16	6.40	497	Yes
3014	18	6.10	378	Yes
3015	16	8.10	434	Yes
3016	16	5.50	373	Yes
3017	16	9.00	424	Yes
3018	16	7.60	396	Yes
3019	17	9.10	377	Yes
3020	17	9.10	500	Yes
3021	18	5.10	469	Yes
3022	16	7.50	407	Yes
3023	17	6.30	438	Yes
3024	16	5.00	458	Yes
3025	18	9.20	286	No
3026	18	9.10	252	Yes
3027	17	9.50	251	Yes
3028	16	6.40	319	Yes
3029	16	7.30	427	Yes
3030	17	8.30	315	Yes

TYPE 4 DETECTION PROBABILITY

Data Sheet for Short Pulse Radar Type 4				
Waveform No.	# Pulses per burst	Pulse Width (us)	Pulse repetition Interval (us)	Successful Detection (Yes/No)
4001	13	11.00	303	Yes
4002	16	11.20	492	Yes
4003	14	14.70	389	Yes
4004	13	19.70	306	Yes
4005	14	13.70	302	Yes
4006	13	18.80	495	Yes
4007	15	16.70	354	Yes
4008	12	12.80	426	Yes
4009	16	18.40	446	Yes
4010	16	17.80	374	Yes
4011	16	19.50	431	Yes
4012	14	10.40	450	Yes
4013	15	10.30	459	Yes
4014	13	10.80	319	Yes
4015	16	11.40	402	Yes
4016	16	12.20	433	Yes
4017	14	15.40	482	Yes
4018	14	14.70	366	Yes
4019	14	15.40	453	Yes
4020	16	14.30	252	Yes
4021	13	19.70	265	No
4022	15	11.50	446	Yes
4023	13	17.60	315	Yes
4024	14	14.30	260	Yes
4025	14	14.40	350	Yes
4026	14	18.30	483	Yes
4027	14	11.50	439	Yes
4028	16	17.70	479	Yes
4029	15	10.40	369	Yes
4030	15	18.60	445	Yes

TYPE 5 DETECTION PROBABILITY

Data Sheet for Long Pulse Radar Type 5	
Waveform No.	Successful Detection (Yes/No)
5001	Yes
5002	Yes
5003	Yes
5004	Yes
5005	Yes
5006	Yes
5007	Yes
5008	Yes
5009	Yes
5010	Yes
5011	Yes
5012	Yes
5013	Yes
5014	Yes
5015	Yes
5016	Yes
5017	Yes
5018	Yes
5019	Yes
5020	Yes
5021	Yes
5022	Yes
5023	Yes
5024	Yes
5025	Yes
5026	Yes
5027	Yes
5028	Yes
5029	Yes
5030	Yes

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

TYPE 6 DETECTION PROBABILITY

Data Sheet for Hopping Signal				
Trial No.	Starting Index within NTIA August 2005 Sequence	Signal Generator Frequency (MHz)	Hops within Detection BW	Successful Detection (Yes/No)
1	349	5292	6	Yes
2	824	5293	6	Yes
3	1299	5294	4	Yes
4	1774	5295	5	Yes
5	2249	5296	5	Yes
6	2724	5297	2	Yes
7	3199	5298	3	Yes
8	3674	5299	6	Yes
9	4149	5300	4	Yes
10	4624	5301	5	Yes
11	5099	5302	6	Yes
12	5574	5303	8	Yes
13	6049	5304	5	Yes
14	6524	5305	8	Yes
15	6999	5306	6	Yes
16	7474	5307	3	Yes
17	7949	5308	7	Yes
18	8424	5309	5	Yes
19	8899	5292	3	Yes
20	9374	5293	3	Yes
21	9849	5294	7	Yes
22	10324	5295	6	Yes
23	10799	5296	5	Yes
24	11274	5297	2	Yes
25	11749	5298	5	Yes
26	12224	5299	5	Yes
27	12699	5300	2	Yes
28	13174	5301	1	Yes
29	13649	5302	3	Yes
30	14124	5303	2	Yes
31	14599	5304	2	Yes
32	15074	5305	5	Yes
33	15549	5306	4	Yes
34	16024	5307	4	Yes
35	16499	5308	5	Yes
36	16974	5309	3	Yes

5.3.8. SLAVE DEVICE CONFIGURATION - CHANNEL MOVE TIME AND CHANNEL CLOSING TRANSMISSION 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:

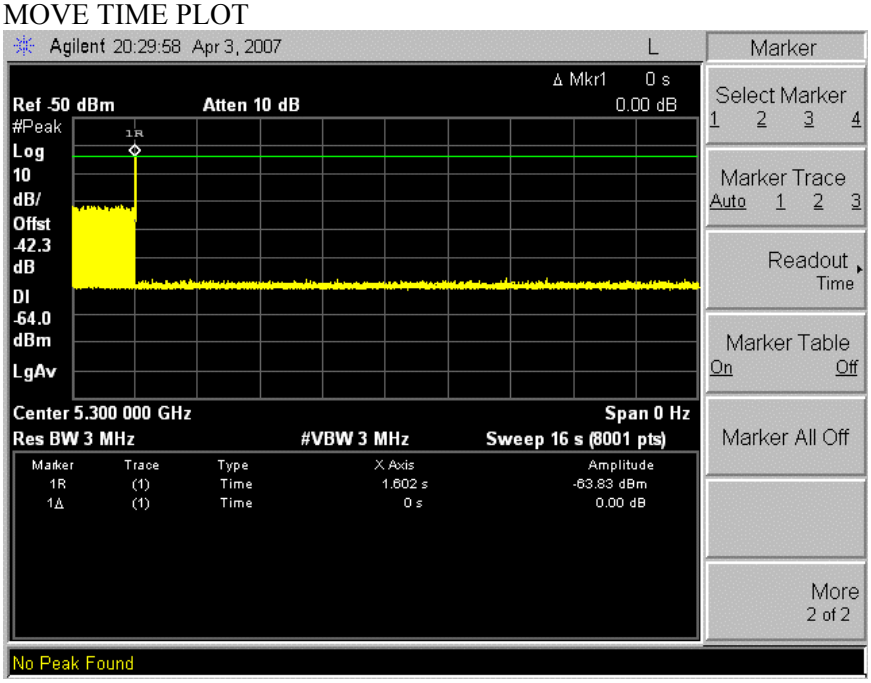
The observation period over which the aggregate time is calculated
Begins at (Reference Marker + 200 msec)
and
Ends no earlier than (Reference Marker + 10 sec).

CHANNEL MOVE TIME RESULTS

No non-compliance noted:

Channel Move Time (s)	Limit (s)
0.000	10

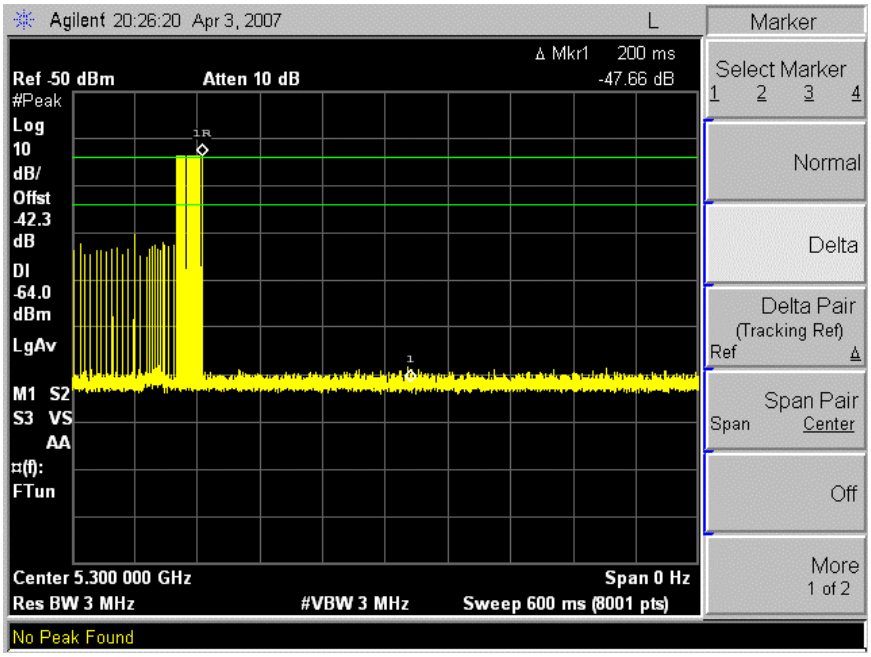
MOVE TIME PLOT



CHANNEL CLOSING TIME RESULTS

No non-compliance noted:

CLOSING TIME PLOT



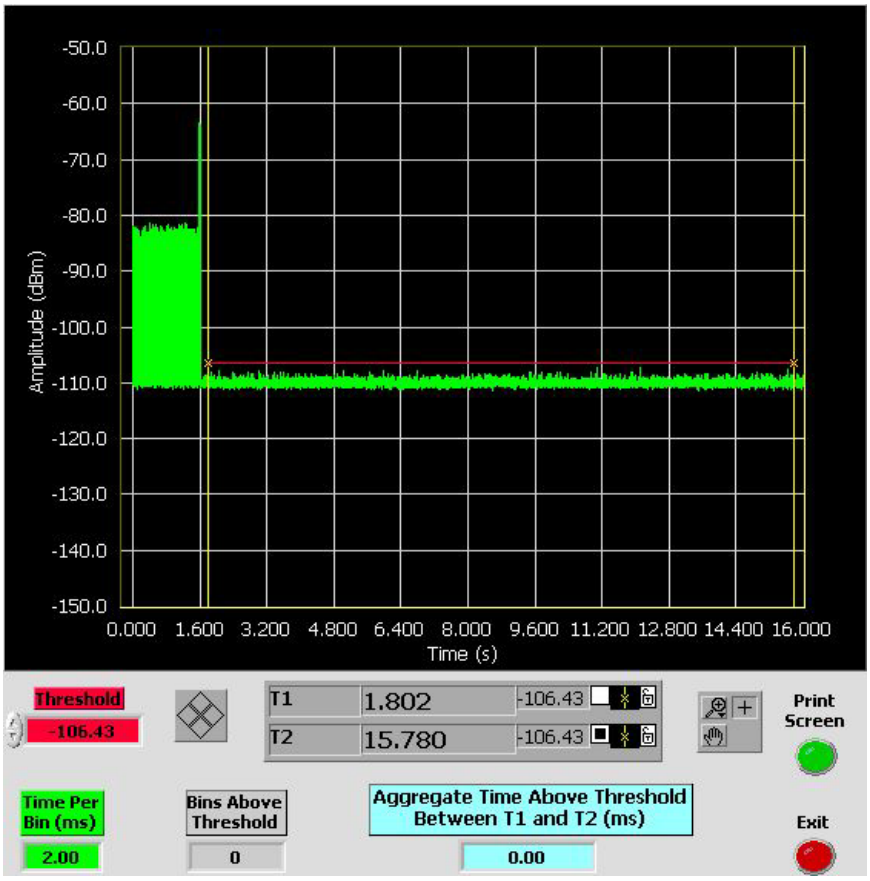
FCC AGGREGATE CHANNEL CLOSING TIME RESULTS

No non-compliance noted:

Aggregate Transmission Time (ms)	Limit (ms)	Margin (ms)
0.00	60	60.00

No transmissions are observed during the aggregate monitoring period.

FCC AGGREGATE CLOSING TIME PLOT

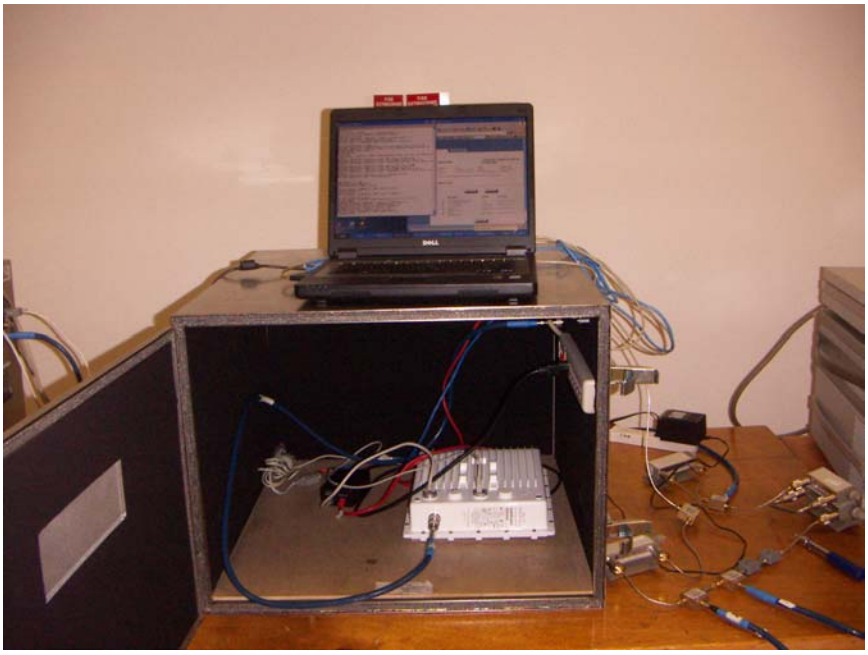


6. SETUP PHOTOS

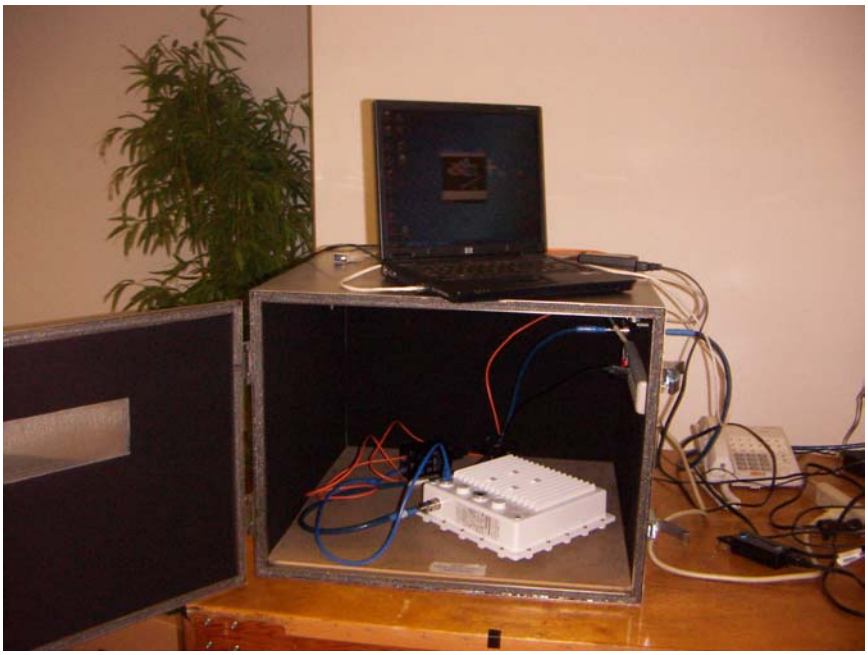
DFS MEASUREMENT SETUP

DFS SETUP PHOTO

DFS MASTER DEVICE PHOTO



DFS SLAVE DEVICE PHOTO



END OF REPORT