DFS PORTION OF FCC CFR47 PART 15 SUBPART E
DFS PORTION OF INDUSTRY CANADA RSS-210 ISSUE 8

CERTIFICATION TEST REPORT

FOR

BreezeMax Extreme, 802.16e 5 GHz U-NII Base Station Radio

MODEL NUMBER: XTRM-BS-1DIV-5.4-90

FCC ID: LKT-EXTR-50

IC: 2514A-EXTR50

REPORT NUMBER: 09U12441-3

ISSUE DATE: APRIL 22, 2011

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	04/22/11	Initial Issue	M.Heckrotte

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: ALVARION, LTD.
21A BARZEL STREET
69710, ISRAEL

EUT DESCRIPTION: BreezeMax Extreme, 802.16e 5 GHz U-NII Base Station Radio

MODEL: XTRM-BS-1DIV-5.4-90

SERIAL NUMBER: 90051086

DATE TESTED: APRIL 22, 2011

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
DFS Portion of CFR 47 Part 15 Subpart E	Pass
DFS Portion of INDUSTRY CANADA RSS-210 Issue 8 Annex 9	Pass

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

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

Approved & Released For CCS By:

MICHAEL HECKROTTE
DIRECTOR OF ENGINEERING
UL CCS

Tested By:

DOUG ANDERSON
EMC ENGINEER
UL CCS

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 06-96, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. SCOPE

ThIs report documents the results of DFS testing with the EUT operating in the 20 MHz channel bandwidth mode.

CCS report 09U12441-1 documents the results of DFS testing with the EUT operating in the 5 and 10 MHz channel bandwidth modes.

4. MANUFACTURER'S DESCRIPTION OF CHANGES

The EUT was reprogrammed to include 20 MHz channel bandwidth functionality. This added functionality was made utilizing software changes only.

No hardware changes were made.

No changes to the DFS portion of the software were made.

5. FACILITIES AND ACCREDITATION

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

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

6. CALIBRATION AND UNCERTAINTY

6.1. 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.

6.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

6.3. MEASUREMENT UNCERTAINTY

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

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

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

7. DYNAMIC FREQUENCY SELECTION

7.1. OVERVIEW

7.1.1. LIMITS

INDUSTRY CANADA

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

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

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

RSS-210 Issue 7 A9.4 (b) (iv) **Channel closing time:** the maximum channel closing time is 260 ms.

FCC

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

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

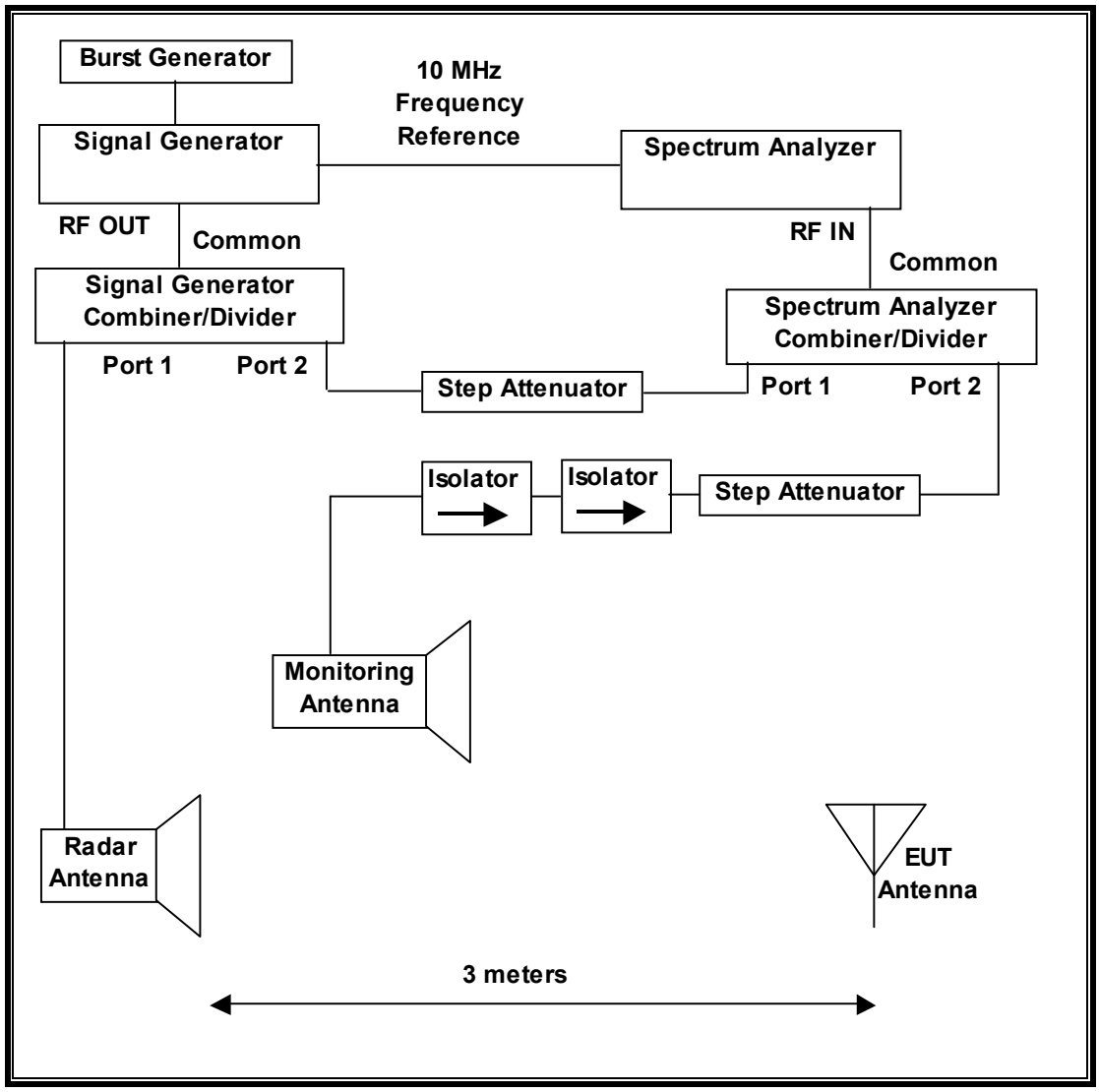
Radar Waveform	Bursts	Pulses per Burst	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Minimum Percentage of Successful Detection	Minimum Trials
5	8-20	1-3	50-100	5-20	1000-2000	80%	30

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

7.1.2. 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 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. 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. Measure the amplitude and calculate the difference from –64 dBm. Adjust the Reference Level Offset of the spectrum analyzer to this difference.

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 distance between the units 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. For Master Device testing confirm that the displayed traffic does not include Slave Device traffic. For Slave Device testing confirm that the displayed traffic does not include Master Device traffic.

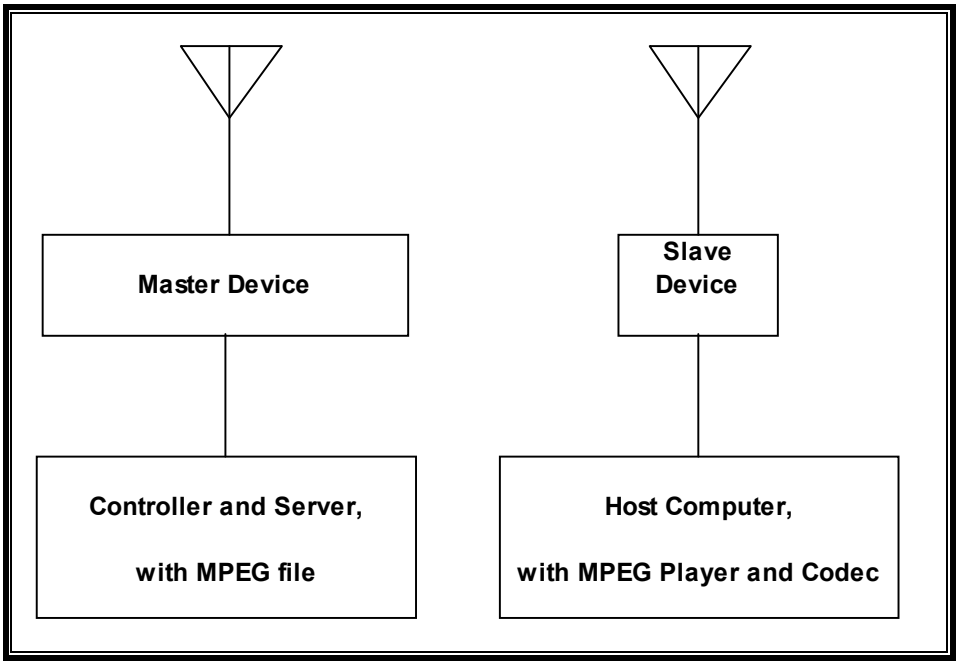
TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**Cal Due**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00169	04/07/12
Vector Signal Generator, 20GHz	Agilent / HP	E8267C	C01066	02/12/12
Arbitrary Waveform Generator	Agilent / HP	33220A	C01146	05/13/12

7.1.3. SETUP OF EUT

RADIATED METHOD EUT TEST SETUP



SUPPORT 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**
AC/DC Power Supply (Master)	Mean Well	SP-500-48	RA6A292328	DoC
802.16e DTS/U-NII Subscriber Unit (Slave Radio)	Alvarion, Ltd.	XTRM-SU-OD-1D-4.9-UL-A	7921530	LKT-EXTR-CPE-49
P.O.E. Injector (Slave Radio)	Alvarion, Ltd.	0525B5570	A30981000106	DoC
Notebook PC (Host/Console)	Lenovo	Type 2055-CTO	L3-A4006 08/09	DoC
AC Adapter (Host PC)	Lenovo	92P1107	1192P1107Z1ZD 2L7BN8NK	DoC
Notebook PC (Client)	Dell	Latitude E6400	38227494565	DoC
AC Adapter (Client PC)	Hipro Electronics	HA90PE1-00	CN-0U680F-47890-97Q-	DoC

7.1.4. DESCRIPTION OF EUT

The EUT operates over the 5470-5725 MHz range.

The EUT is a Master Device.

The highest power level is 24.2 dBm EIRP at a bandwidth of 5 MHz, 27.2 dBm EIRP at a bandwidth of 10 MHz in the 5470-5725 MHz band, and 29.9 dBm EIRP at a bandwidth of 20 MHz in the 5470-5725 MHz band

The highest gain antenna assembly utilized with the EUT has a gain of 17 dBi in the 5470-5725 MHz band. The lowest gain antenna assembly utilized with the EUT has a gain of 8 dBi in the 5470-5725 MHz band.

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

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

The EUT uses two transmitter/receiver chains, each connected to a 50-ohm coaxial antenna port. Two 8-dBi antennas were connected during the test.

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 WiMax 802.16e architecture. Three nominal channel bandwidths are implemented: 5 MHz, 10 MHz, and 20 MHz.

The software installed in the access point is version 1.7.1.40.

MANUFACTURER’S STATEMENT REGARDING UNIFORM CHANNEL SPREADING

This statement is in a separate document.

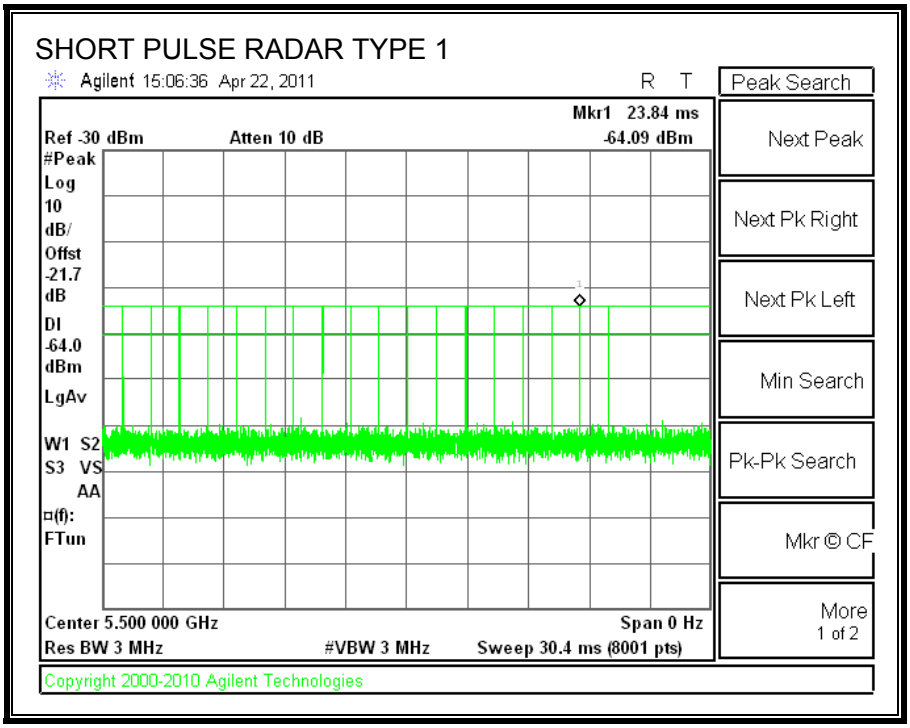
7.2. RESULTS FOR 20 MHz BANDWIDTH

7.2.1. TEST CHANNEL

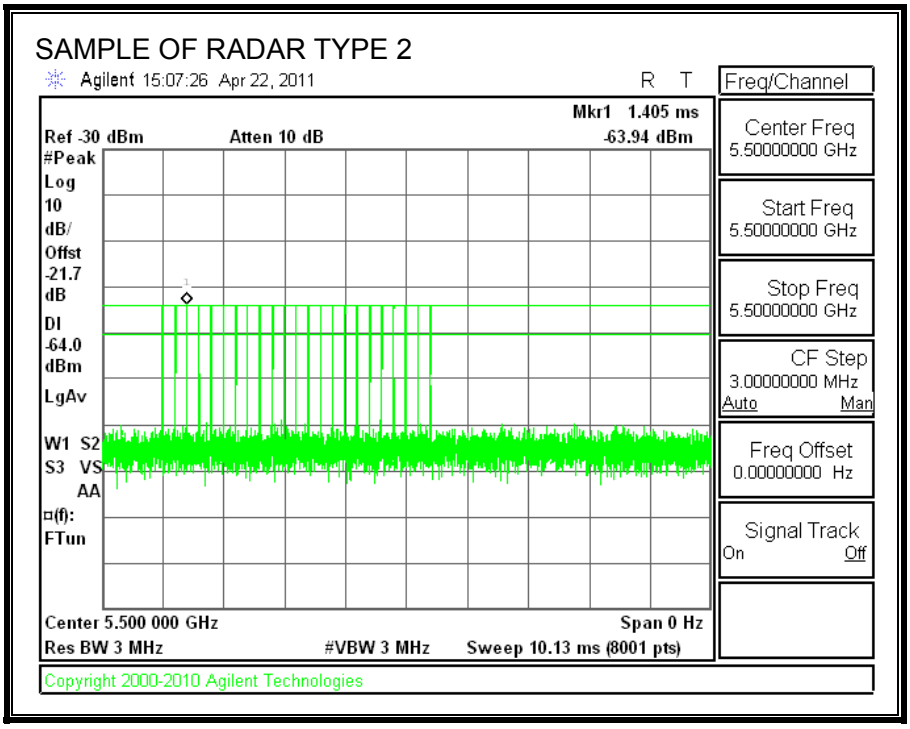
All tests were performed at a channel center frequency of 5500 MHz.

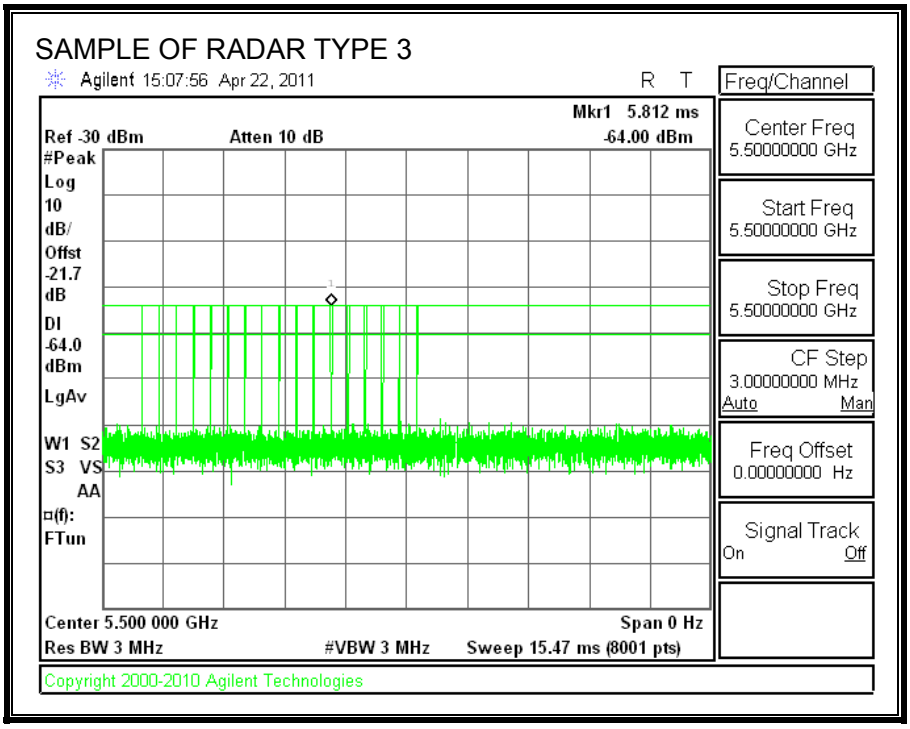
7.2.2. RADAR WAVEFORMS AND TRAFFIC

RADAR WAVEFORMS

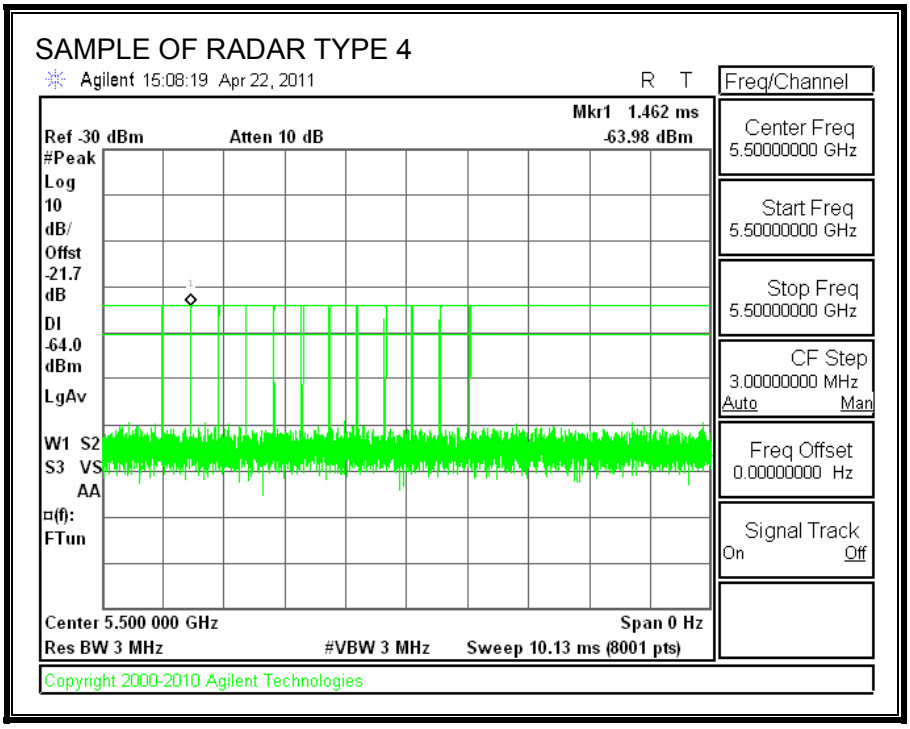


SAMPLE OF RADAR TYPE 2

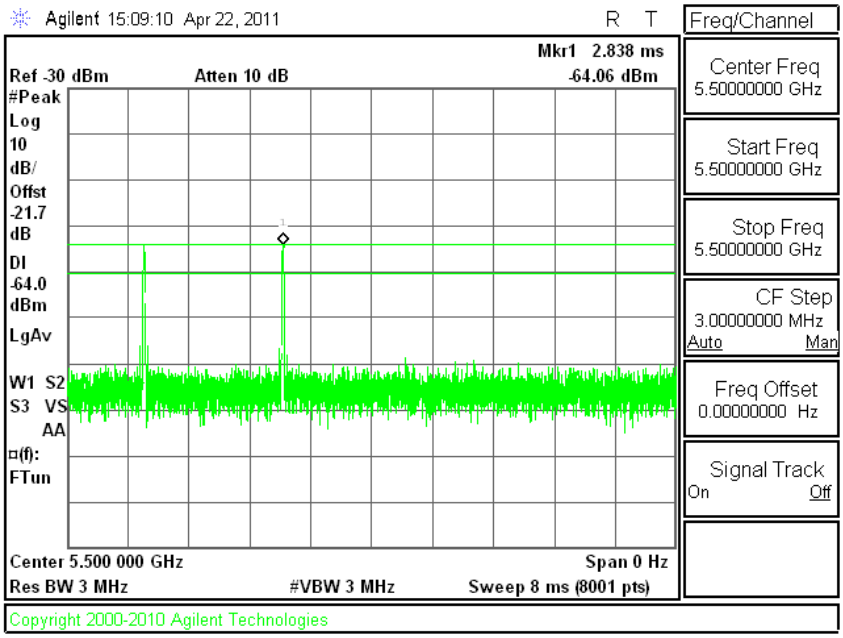


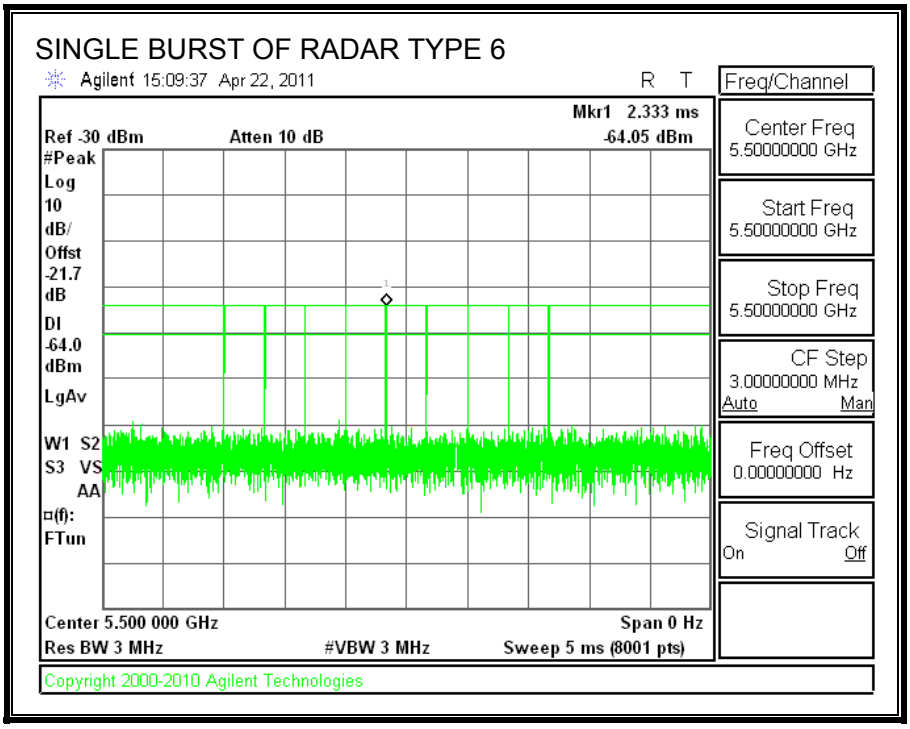


SAMPLE OF RADAR TYPE 4

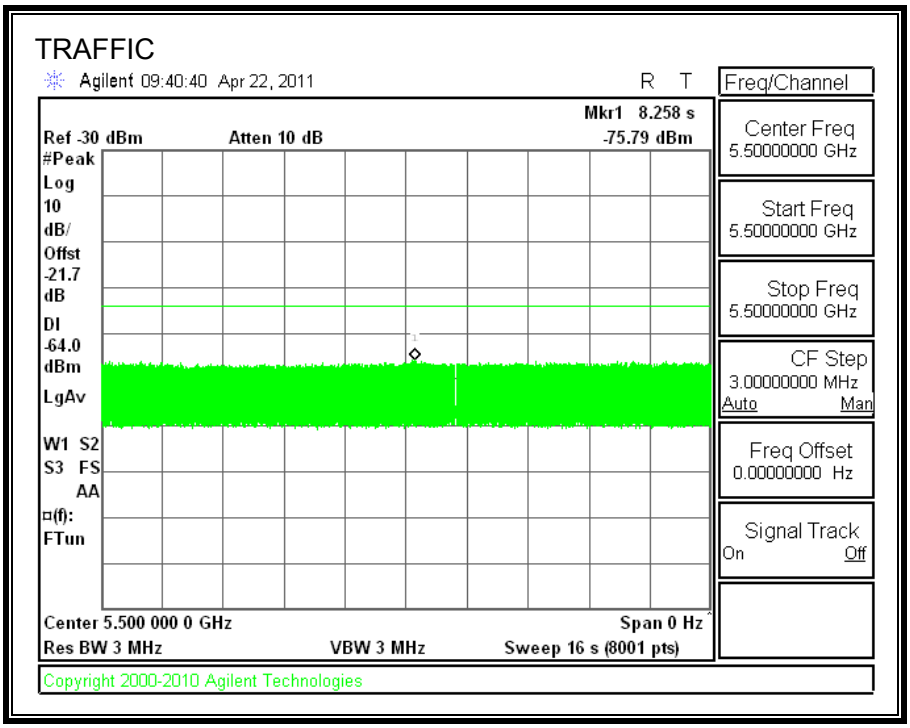


SAMPLE OF SINGLE BURST OF RADAR TYPE 5





TRAFFIC



7.2.3. CHANNEL AVAILABILITY CHECK TIME

PROCEDURE TO DETERMINE INITIAL POWER-UP CYCLE TIME

A link was established on channel then the EUT was rebooted. The time from the cessation of traffic to the re-initialization of traffic was measured as the time required for the EUT to complete the total power-up cycle. The time to complete the initial power-up period is 60 seconds less than this total power-up time.

PROCEDURE FOR TIMING OF RADAR BURST

With a link established on channel, the EUT was rebooted. A radar signal was triggered within 0 to 6 seconds after the initial power-up period, and transmissions on the channel were monitored on the spectrum analyzer.

The Non-Occupancy list was cleared. With a link established on channel, the EUT was rebooted. A radar signal was triggered within 54 to 60 seconds after the initial power-up period, and transmissions on the channel were monitored on the spectrum analyzer.

QUANTITATIVE RESULTS

No Radar Triggered

Timing of Reboot (sec)	Timing of Start of Traffic (sec)	Total Power-up Cycle Time (sec)	Initial Power-up Cycle Time (sec)
30.07	186.3	156.2	96.2

Radar Near Beginning of CAC

Timing of Reboot (sec)	Timing of Radar Burst (sec)	Radar Relative to Reboot (sec)	Radar Relative to Start of CAC (sec)
29.85	128.8	99.0	2.7

Radar Near End of CAC

Timing of Reboot (sec)	Timing of Radar Burst (sec)	Radar Relative to Reboot (sec)	Radar Relative to Start of CAC (sec)
30.23	185.5	155.3	59.0

QUALITATIVE RESULTS

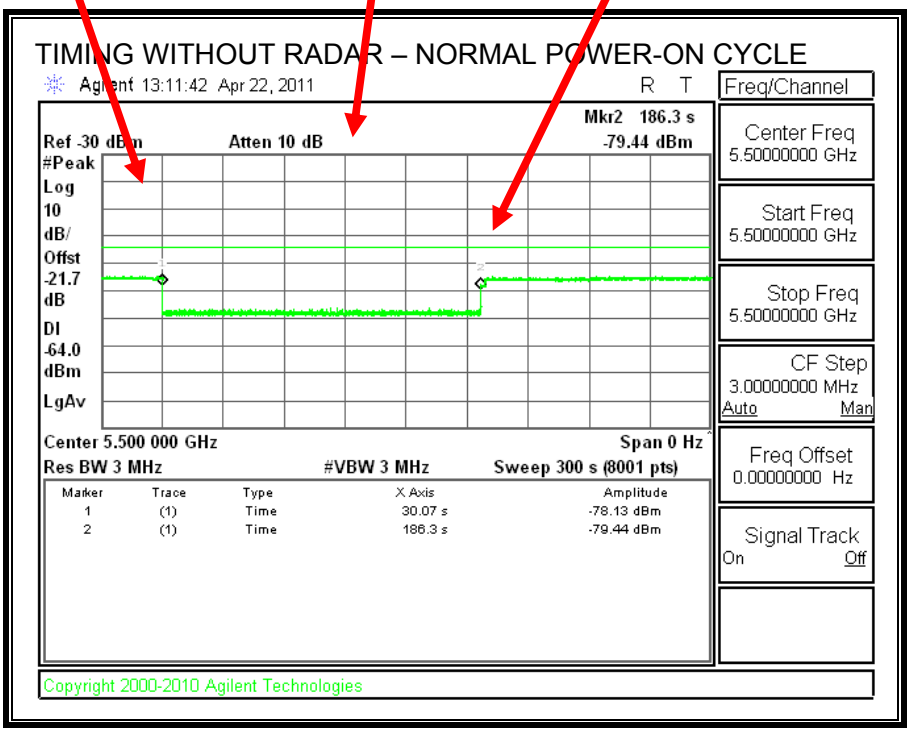
Timing of Radar Burst	Display on Control Computer	Spectrum Analyzer Display
No Radar Triggered	EUT marks Channel as active	Transmissions begin on channel after completion of the initial power-up cycle and the CAC
Within 0 to 6 second window	EUT indicates radar detected	No transmissions on channel
Within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



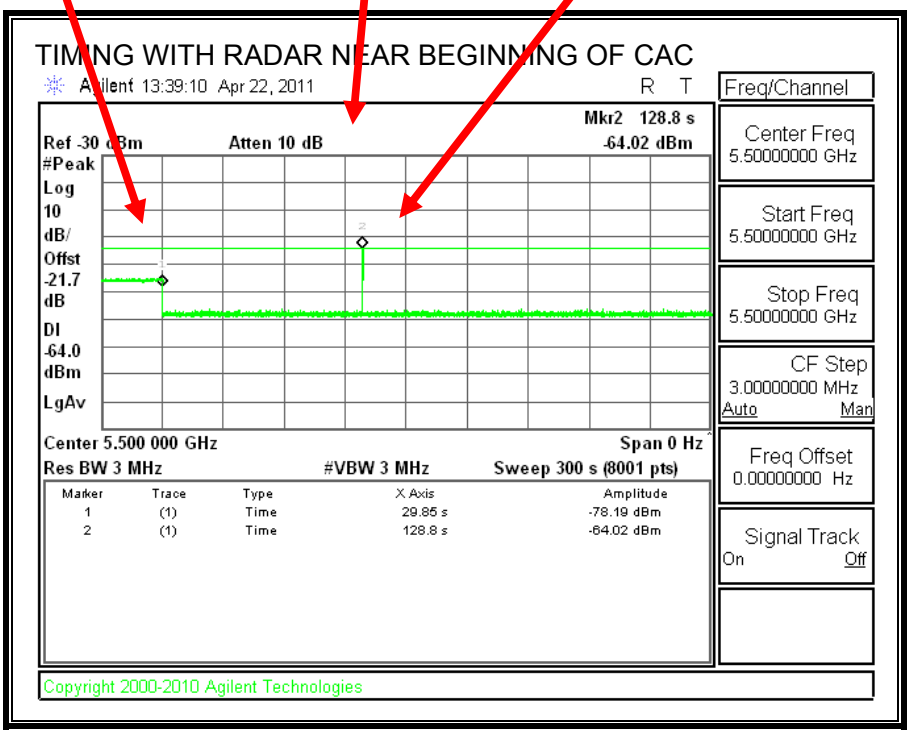
Transmissions begin on channel after completion of the initial power-up cycle and the CAC.

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



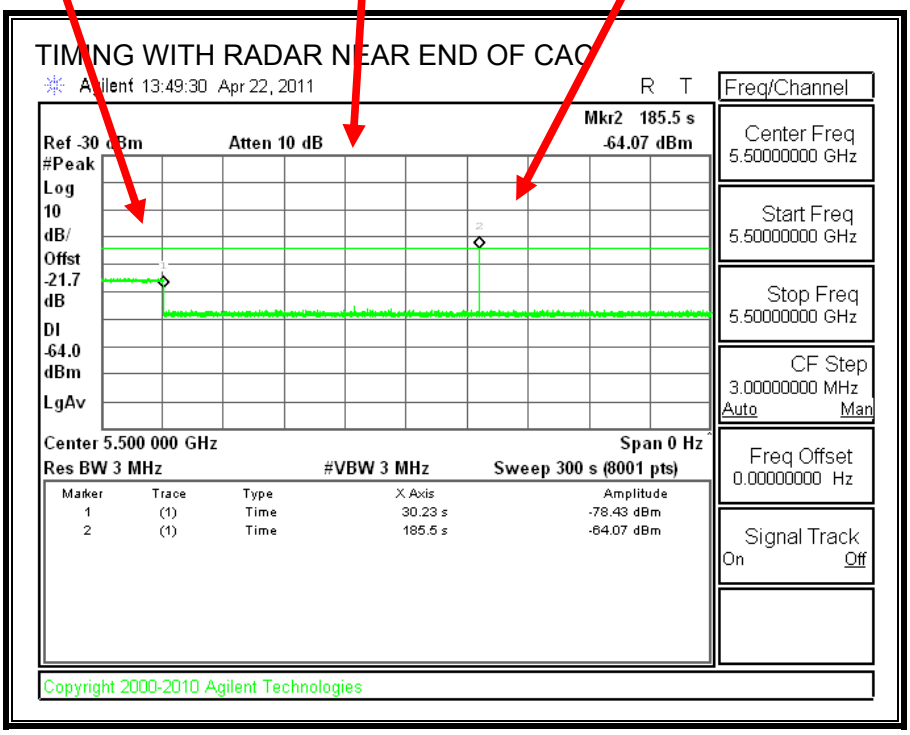
No EUT transmissions were observed after the radar signal.

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.

7.2.4. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

7.2.5. 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 FCC aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

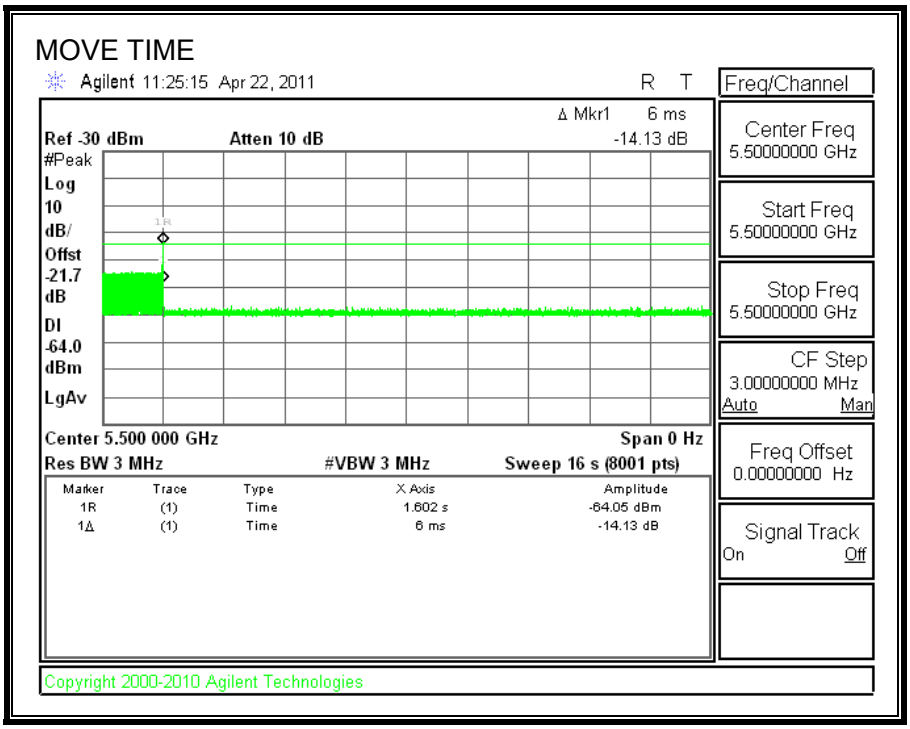
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

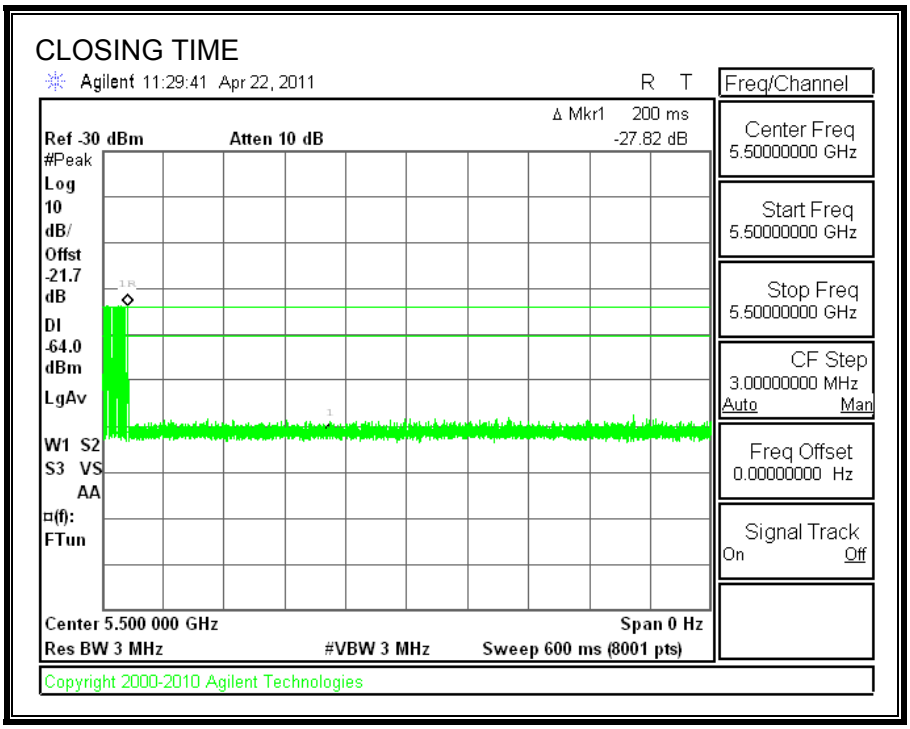
Agency	Channel Move Time (sec)	Limit (sec)
FCC / IC	0.006	10

Agency	Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
FCC	0.0	60
IC	8.0	260

MOVE TIME

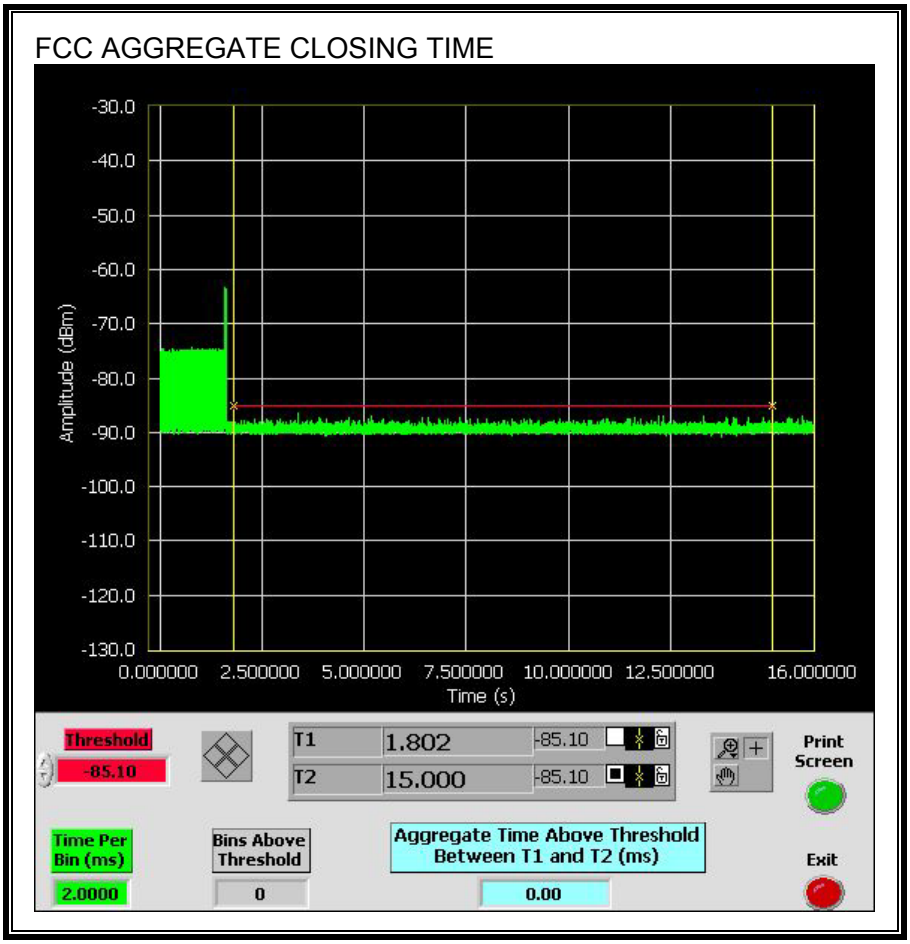


CHANNEL CLOSING TIME

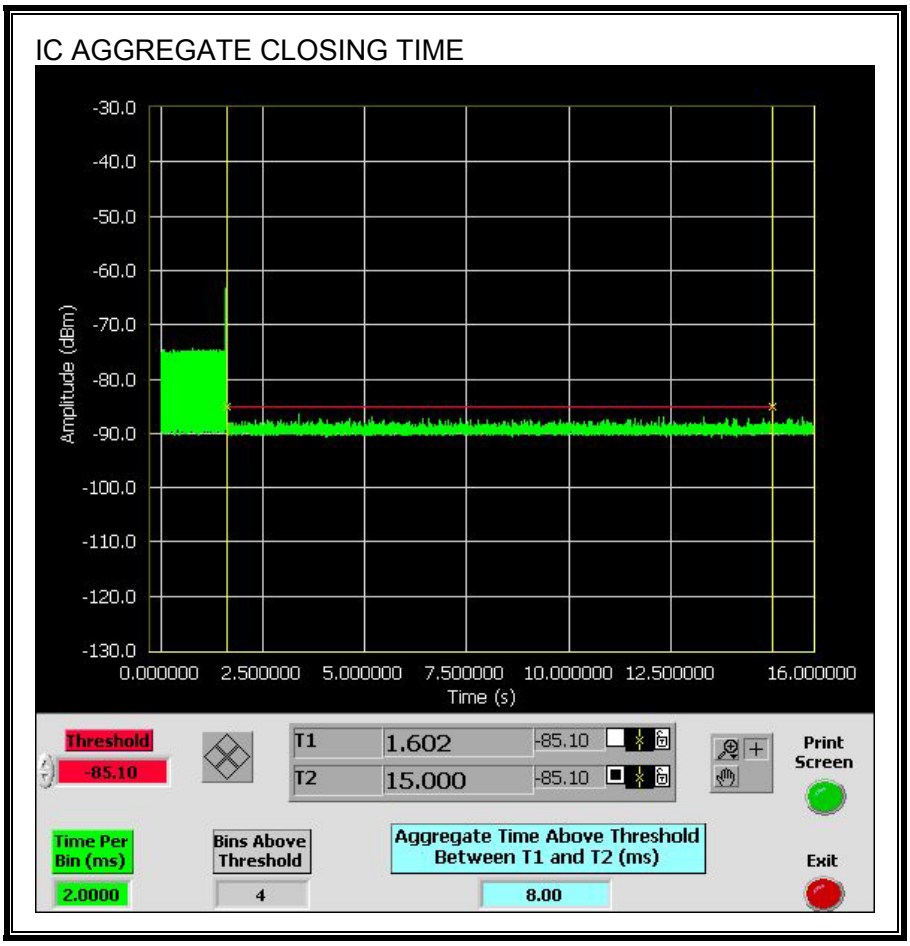


AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the FCC aggregate monitoring period.

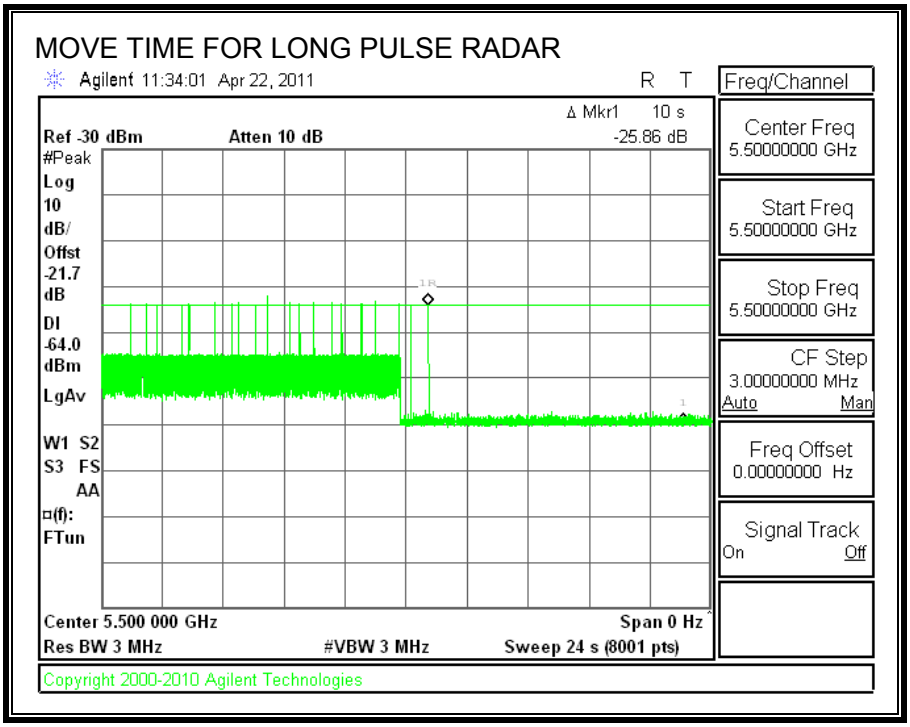


Only intermittent transmissions are observed during the IC aggregate monitoring period.



LONG PULSE CHANNEL MOVE TIME

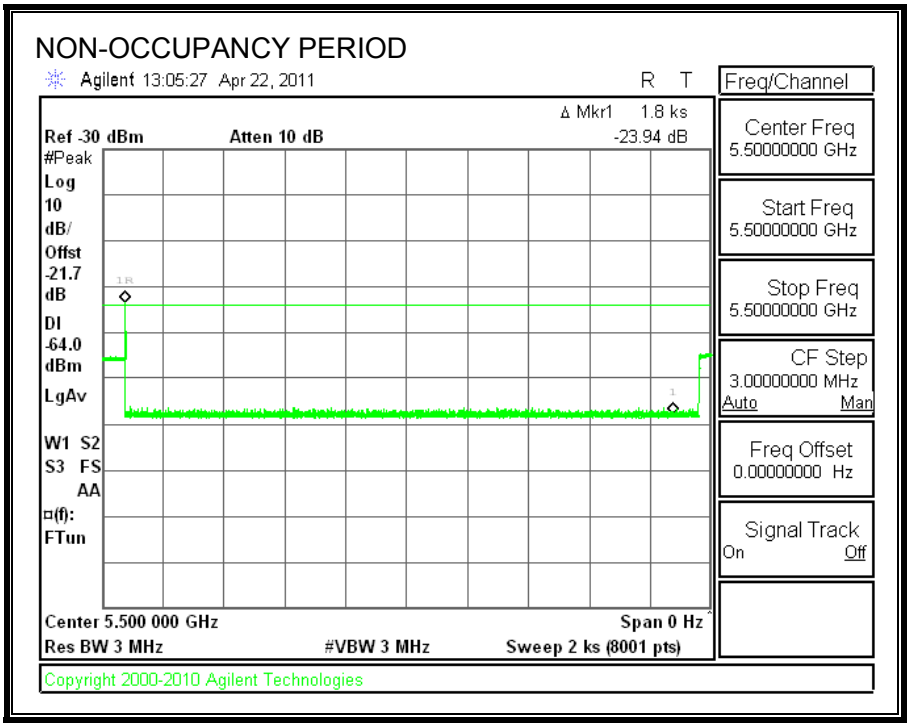
The traffic ceases prior to 10 seconds after the end of the radar waveform.



7.2.6. NON-OCCUPANCY PERIOD

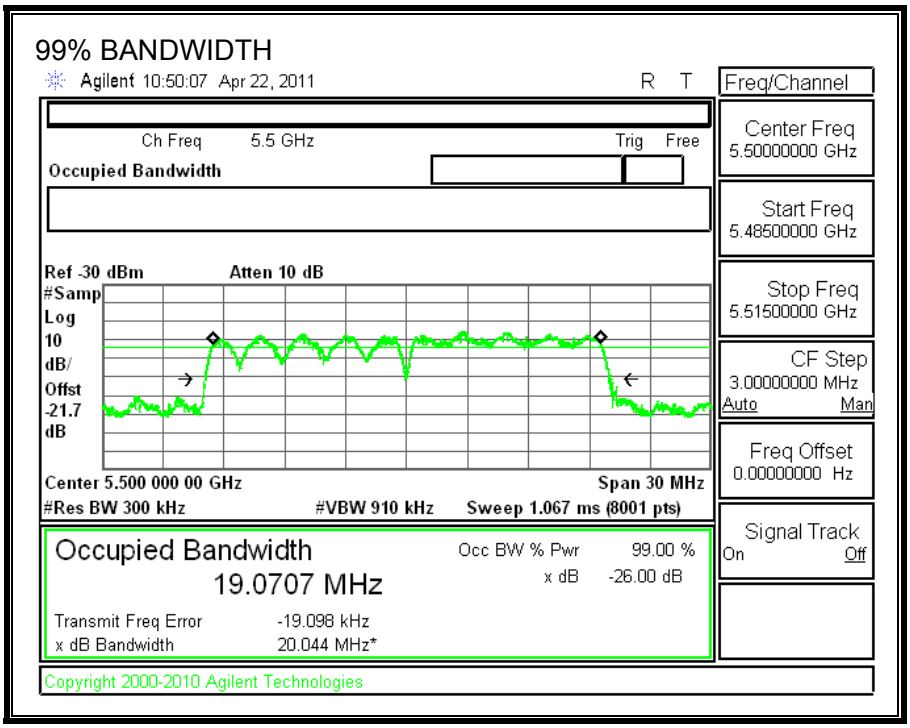
RESULTS

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



7.2.7. 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 (%)
5492	5508	16	19.071	83.9	80

DETECTION BANDWIDTH PROBABILITY

DETECTION BANDWIDTH PROBABILITY RESULTS

Detection Bandwidth Test Results				
FCC Type 1 Waveform: 1 us Pulse Width, 1428 us PRI, 18 Pulses per Burst				
Frequency (MHz)	Number of Trials	Number Detected	Detection (%)	Mark
5492	10	9	90	FL
5493	10	9	90	
5494	10	10	100	
5495	10	10	100	
5496	10	9	90	
5497	10	9	90	
5498	10	10	100	
5499	10	9	90	
5500	10	9	90	
5501	10	10	100	
5502	10	10	100	
5503	10	9	90	
5504	10	10	100	
5505	10	9	90	
5506	10	10	100	
5507	20	18	90	
5508	10	10	100	FH

7.2.8. IN-SERVICE MONITORING

RESULTS

FCC Radar Test Summary				
Signal Type	Number of Trials	Detection (%)	Limit (%)	Pass/Fail
FCC Short Pulse Type 1	30	90.00	60	Pass
FCC Short Pulse Type 2	30	100.00	60	Pass
FCC Short Pulse Type 3	30	100.00	60	Pass
FCC Short Pulse Type 4	30	90.00	60	Pass
Aggregate		95.00	80	Pass
FCC Long Pulse Type 5	30	83.33	80	Pass
FCC Hopping Type 6	34	94.12	70	Pass

TYPE 1 DETECTION PROBABILITY

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

TYPE 2 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 2				
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Successful Detection (Yes/No)
2001	1.9	203.00	23	Yes
2002	1.2	217.00	28	Yes
2003	4.6	180.00	24	Yes
2004	3.3	162.00	27	Yes
2005	3.4	185.00	29	Yes
2006	1.5	215.00	24	Yes
2007	3.7	163.00	27	Yes
2008	4.9	174.00	24	Yes
2009	4.5	177.00	24	Yes
2010	4.5	224.00	27	Yes
2011	4.4	164.00	23	Yes
2012	5	221.00	23	Yes
2013	4.6	162.00	26	Yes
2014	2.7	203.00	23	Yes
2015	2	220.00	26	Yes
2016	2.6	223.00	26	Yes
2017	4.1	223.00	24	Yes
2018	4.9	183.00	29	Yes
2019	2.5	192.00	26	Yes
2020	4.5	178.00	25	Yes
2021	4.3	152.00	24	Yes
2022	4.7	158.00	29	Yes
2023	1.2	181.00	27	Yes
2024	2	220.00	27	Yes
2025	4.5	190.00	29	Yes
2026	4.6	161.00	25	Yes
2027	2.3	151.00	28	Yes
2028	4.6	213.00	29	Yes
2029	4.5	197.00	24	Yes
2030	4.1	163.00	24	Yes

TYPE 3 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 3				
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Successful Detection (Yes/No)
3001	7.5	437.00	17	Yes
3002	8.1	440.00	18	Yes
3003	9.9	274.00	18	Yes
3004	7.3	494.00	17	Yes
3005	7	441.00	16	Yes
3006	8.8	386.00	18	Yes
3007	9.8	271.00	17	Yes
3008	6.8	457.00	16	Yes
3009	7.4	490.00	18	Yes
3010	6.1	388.00	17	Yes
3011	8.4	317.00	16	Yes
3012	8.7	385.00	17	Yes
3013	5.3	407.00	17	Yes
3014	8.5	262.00	16	Yes
3015	5.1	435.00	16	Yes
3016	6.6	449.00	18	Yes
3017	9.2	496.00	16	Yes
3018	7.4	431.00	18	Yes
3019	10	416.00	17	Yes
3020	8.3	339.00	18	Yes
3021	8.1	281.00	18	Yes
3022	6.5	479.00	17	Yes
3023	5.3	441.00	16	Yes
3024	7.7	455.00	17	Yes
3025	9.6	362.00	17	Yes
3026	9	487.00	16	Yes
3027	9	315.00	17	Yes
3028	9	448.00	18	Yes
3029	9.3	309	17	Yes
3030	7.9	427	17	Yes

TYPE 4 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 4				
Waveform	Pulse Width (us)	PRI (us)	Pulses Per Burst	Successful Detection (Yes/No)
4001	13	463.00	12	Yes
4002	17.5	391.00	16	Yes
4003	13.2	454.00	12	Yes
4004	12.4	332.00	14	Yes
4005	18.9	445.00	12	Yes
4006	10.3	297.00	13	Yes
4007	18.7	267.00	13	Yes
4008	15	357.00	13	Yes
4009	11.2	476.00	15	Yes
4010	18	437.00	12	Yes
4011	15.1	369.00	13	Yes
4012	18.6	432.00	13	Yes
4013	19	322.00	16	Yes
4014	19.7	401.00	12	Yes
4015	18.1	331.00	16	No
4016	12.7	464.00	14	Yes
4017	17.7	261.00	16	No
4018	15.5	464.00	16	Yes
4019	11.7	432.00	14	Yes
4020	13.8	275.00	14	Yes
4021	19.2	349.00	15	Yes
4022	15.7	396.00	15	Yes
4023	14.2	475.00	15	Yes
4024	18.9	441.00	15	Yes
4025	14.2	425.00	16	Yes
4026	12	443.00	15	Yes
4027	18.6	256.00	13	Yes
4028	12.5	436.00	16	Yes
4029	15.1	452.00	12	Yes
4030	19.1	295.00	14	No

TYPE 5 DETECTION PROBABILITY

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

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

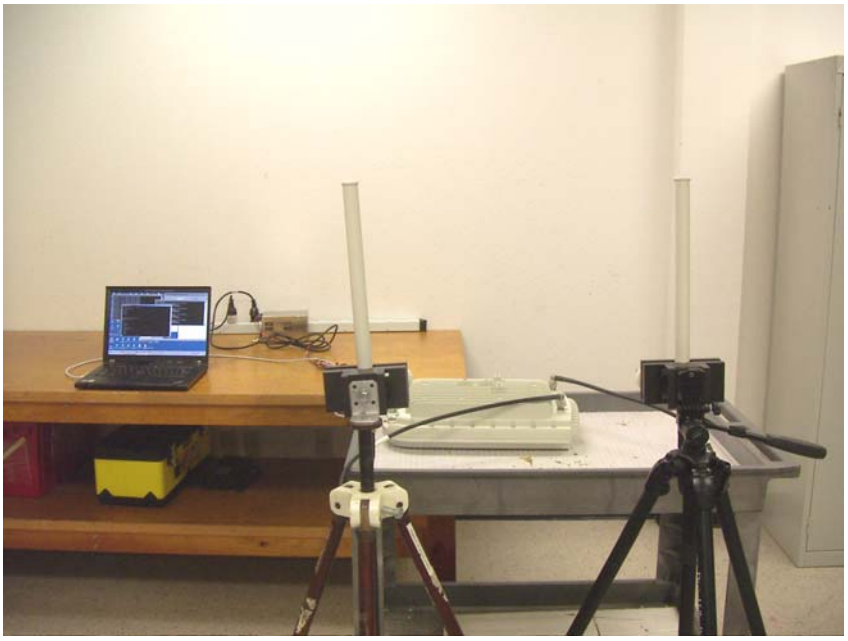
TYPE 6 DETECTION PROBABILITY

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	79	5492	2	Yes
2	554	5493	5	Yes
3	1029	5494	3	Yes
4	1504	5495	3	Yes
5	1979	5496	4	Yes
6	2454	5497	7	Yes
7	2929	5498	6	Yes
8	3404	5499	1	No
9	3879	5500	4	Yes
10	4354	5501	4	Yes
11	4829	5502	5	Yes
12	5304	5503	6	Yes
13	5779	5504	3	Yes
14	6254	5505	6	Yes
15	6729	5506	3	Yes
16	7204	5507	4	No
17	7679	5508	3	Yes
18	8154	5492	3	Yes
19	8629	5493	4	Yes
20	9104	5494	4	Yes
21	9579	5495	3	Yes
22	10054	5496	5	Yes
23	10529	5497	1	Yes
24	11004	5498	3	Yes
25	11479	5499	4	Yes
26	11954	5500	10	Yes
27	12429	5501	3	Yes
28	12904	5502	7	Yes
29	13379	5503	5	Yes
30	13854	5504	2	Yes
31	14329	5505	3	Yes
32	14804	5506	2	Yes
33	15279	5507	4	Yes
34	15754	5508	3	Yes

8. SETUP PHOTOS

DYNAMIC FREQUENCY SELECTION MEASUREMENT SETUP

DFS FRONT PHOTO



DFS BACK PHOTO

END OF REPORT

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