FCC 47 CFR PART 15 SUBPART E

CERTIFICATION TEST REPORT

FOR

Intelligent Backhaul Radio UNII 5.3 Band

MODEL NUMBER: IBR-120x-38-NA

FCC ID: 2AAEH-104

REPORT NUMBER: 14U18829-2 Revision B

ISSUE DATE: FEBRUARY 2, 2015

Prepared for
CBF NETWORKS, INC., DBA FASTBACK NETWORKS
2460 N. FIRST STREET, SUITE 200
SAN JOSE, CA 95131, USA

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	1/16/15	Initial Issue	F. de Anda
A	1/26/15	Updated pages 34, 56 and 78, 137	F. de Anda
B	2/2/15	Update DFS EUT Description in Section 11.1.4	C. Cheung

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: CBF NETWORKS, INC., DBA FASTBACK NETWORKS
2460 N. FIRST STREET, SUITE 200
SAN JOSE, CA 95131, USA

EUT DESCRIPTION: Intelligent Backhaul Radio UNII 5.3 band

MODEL: IBR-120x-38-NA

SERIAL NUMBER: 40314380088 (conducted) 40314390023 (radiated)

DATE TESTED: October 21, 2014 – January 9, 2015

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart E	Pass

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

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

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Francisco deAnda
PROJECT LEAD/ PROGRAM MANAGER
UL VERIFICATION SERVICES INC.

Tested By:

Tony Wagoner
EMC ENGINEER
UL VERIFICATION SERVICES INC.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 06-96, FCC KDB 789033, ANSI C63.10-2009.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street	
☐ Chamber A	☐ Chamber D	☒ Chamber G
☐ Chamber B	☐ Chamber E	☒ Chamber H
☐ Chamber C	☒ Chamber F	

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://ts.nist.gov/standards/scopes/2000650.htm.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	± 3.52 dB
Radiated Disturbance, 30 to 1000 MHz	± 4.94 dB
Radiated Disturbance, 1 to 6 GHz	± 3.86 dB
Radiated Disturbance, 6 to 18 GHz	± 4.23 dB
Radiated Disturbance, 18 to 26 GHz	± 5.30 dB
Radiated Disturbance, 26 to 40 GHz	± 5.23 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

Fixed Point-to-Point radio in 5.3GHz unlicensed bands with a proprietary communication management interface Intelligent Backhaul Radio.

This device uses 40MHz, 20MHz and 10MHz bandwidths with QAM4, QAM16, QAM64, QAM256 modulation. It transmits dual stream uncorrelated MIMO.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

5.3 GHz BAND

Bandwidth (MHz)	Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5.3 GHz Band, 2Tx				
10	5250 - 5342	FDD	14.74	29.79
20	5250 - 5335	FDD	17.94	62.23
40	5250 - 5328	FDD	19.34	85.90

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a dipole array antenna, with a maximum gain of 10.6 dBi.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was Version: 1.6.1

The test utility software used during testing was Micro monitor 1.18.0

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

All radiated testing was performed with the EUT in normal use orientation.

Based on the baseline scan, the worst-case data rates were:

10MHz bandwidth QAM 4
20MHz bandwidth QAM 4
40MHz bandwidth QAM 4
Data rate 30 Msamples/s for all bandwidths

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Lenovo	Think Pad	R9-D497T 11/04	QDS-BRCM 1046
POE	PHIHONG	POE36U-1AT-R	P21601123D1	N/A
AC/DC Adapter	Lenovo	N/A	11S45N0113Z1ZH819P0FN	N/A

I/O CABLES

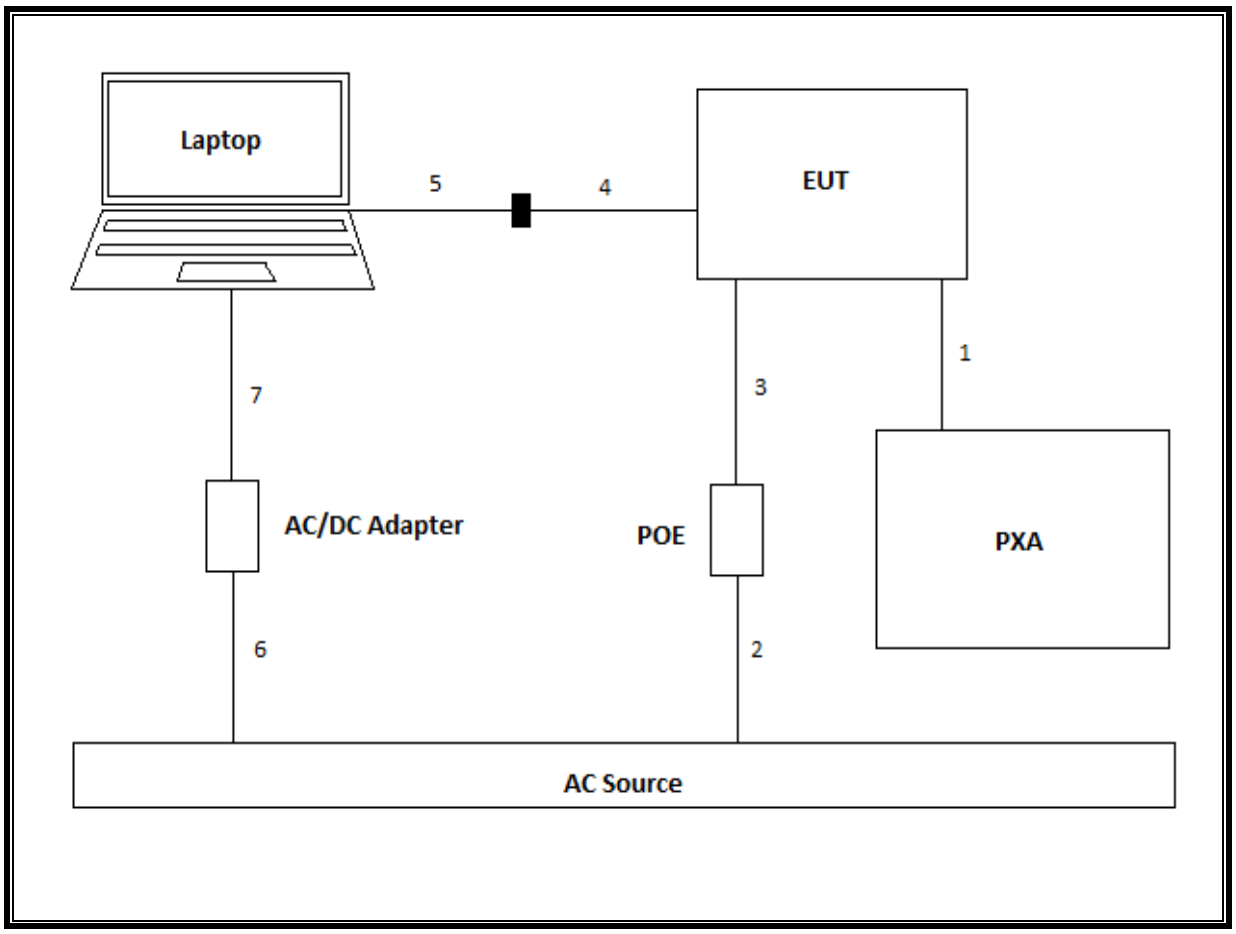
I/O Cable List						
Cable No	Port	# of identical	Connector Type	Cable Type	Cable Length (m)	Remarks
1	Antenna	1	U.FL	Sheilded	0.3	N/A
2	AC	2	3 Prong	Un-Sheilded	1	N/A
3	POE/LAN	1	RJ45	Sheilded	1	N/A
4	USB	1	USB	Sheilded	0.3	N/A
5	Serial	1	9 Pin Sub D	Sheilded	1	N/A
6	AC	2	3 Prong	Un-Sheilded	1	N/A
7	DC	1	Barrel	Un-Sheilded	1	N/A

TEST SETUP

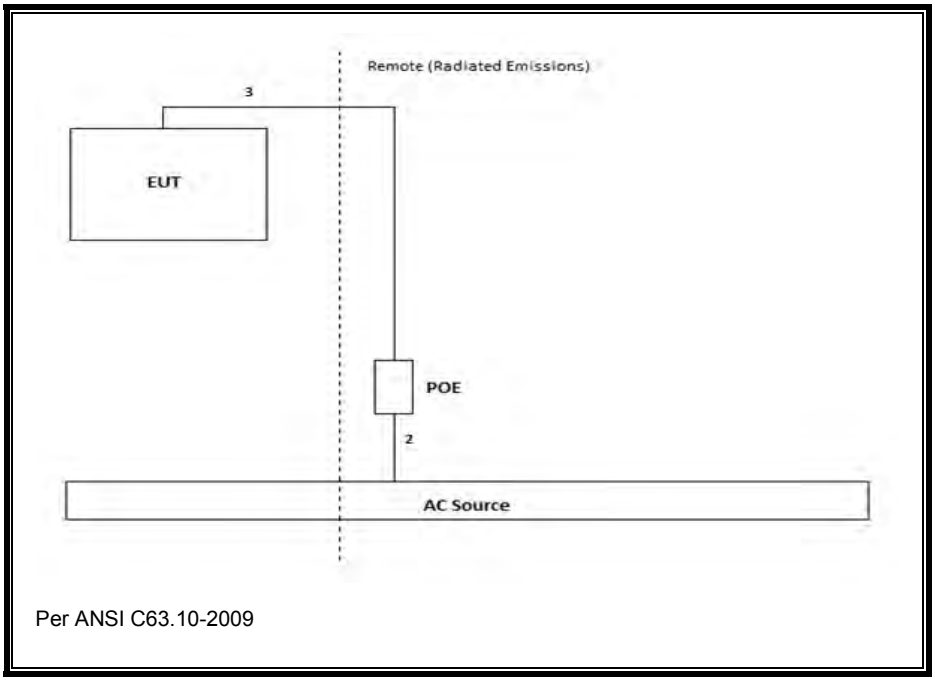
The EUT is a P-P outdoor radio used as a stand-alone device. Test software exercised the radio module

SETUP DIAGRAM FOR TESTS

CONDUCTED

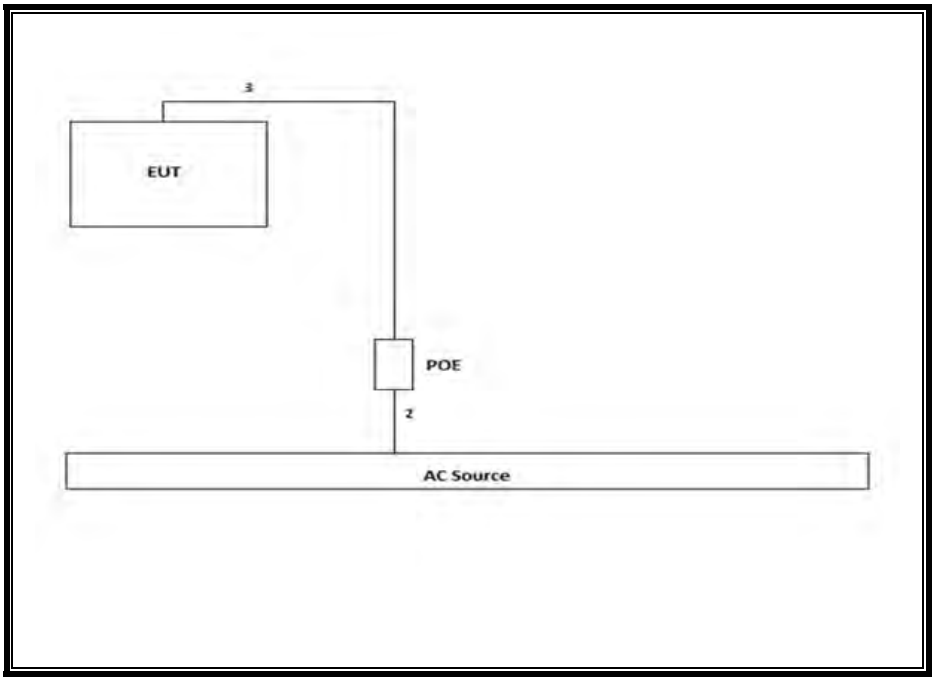


RADIATED



Per ANSI C63.10-2009

AC LINE CONDUCTED



6. 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	T No.	Cal Date	Cal Due
Chamber F					
Antenna, Horn 18 GHz	ETS Lindgren	3117	120	03/20/14	03/20/15
Antenna, Biconolog, 30MHz-1GHz	Sunol Sciences	JB1	122	04/22/14	01/28/15
High Pass Filter, fc: 3.0GHz, 50 Ohms	Micro-Tronics	HPM17543	427	01/20/14	01/20/15
Low Pass Filter, fc: 5GHz, 50 Ohms	Micro-Tronics	LPS17541	421	01/20/14	01/20/15
High Pass Filter, fc: 6GHz, 50 Ohms	Micro-Tronics	HPS17542	425	01/20/14	01/20/15
RF PreAmplifier, 1-18GHz	Miteq	AFS42-00101800-25-S-42	742	01/20/14	01/20/15
Preamp, 1000MHz	Sonoma	310N	173	06/07/14	06/07/15
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A	341	02/12/14	02/12/15
Chamber G					
Antenna, Horn 18 GHz	ETS Lindgren	3117	862	04/14/14	04/14/15
Antenna, Biconolog, 30MHz-1GHz	Sunol Sciences	JB3	899	05/14/14	04/27/15
High Pass Filter, fc: 3.0GHz, 50 Ohms	Micro-Tronics	HPM17543	898	05/13/14	05/13/15
Low Pass Filter, fc: 5GHz, 50 Ohms	Micro-Tronics	LPS17541	892	05/13/14	05/13/15
High Pass Filter, fc: 6GHz, 50 Ohms	Micro-Tronics	HPS17542	893	05/14/14	05/13/15
RF PreAmplifier, 1-18GHz	Miteq	AFS42-00101800-25-S-42	491	05/15/15	06/05/15
Preamp, 1000MHz	Sonoma	310N	834	05/16/15	06/05/15
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A	905	05/17/15	05/17/15
Chamber H					
Antenna, Horn 18 GHz	ETS Lindgren	3117	863	04/14/14	04/14/15
Antenna, Biconolog, 30MHz-1GHz	Sunol Sciences	JB3	900	05/14/14	04/27/15
High Pass Filter, fc: 3.0GHz, 50 Ohms	Micro-Tronics	HPM17543	897	05/14/14	05/13/15
Low Pass Filter, fc: 5GHz, 50 Ohms	Micro-Tronics	LPS17541	891	05/13/14	05/13/15
High Pass Filter, fc: 6GHz, 50 Ohms	Micro-Tronics	HPS17542	894	05/13/14	05/13/15
RF PreAmplifier, 1-18GHz	Miteq	AFS42-00101800-25-S-42	495	06/05/14	06/05/15
Preamp, 1000MHz	Sonoma	310N	835	06/05/14	06/05/15
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A	906	05/07/14	05/07/15
Conducted					
Spectrum Anaylyzer	Agilent	E4440A	189	05/09/14	05/09/15
Power Meter, P-series single channel	Agilent	N1911A	382	04/09/14	04/09/15
Power Sensor, Peak and average, 50 MHz to 6 GHz, 5 MHz BW	Agilent	E9323A	400	05/02/14	05/02/15
Power Meter, P-series single channel	Agilent	N1911A	385	04/30/14	04/30/15
Power Sensor, Peak and average, 50 MHz to 18 GHz, 5 MHz BW	Agilent	E9327A	117	05/15/14	05/15/15
LISN for Conducted Emissions CISPR-16	FCC	50/250-25-2	24	01/17/14	01/17/15
Rohde & Schwarz	ESCI 7	100773	212	08/14/14	08/14/15

Test Equipment List (cont.)					
Description	Manufacturer	Model	T No.	Cal Date	Cal Due
Above 18GHz					
Antenna, Horn 18 to 26.5GHz	ARA	SWH-28	T125	05/09/14	05/09/15
Amp. 26GHz	Agilent	8449B	T404	03/25/14	03/25/15
Antenna, Horn 26 to 40GHz	ARA	MWh-2640	T90	07/15/14	07/15/15
Amp. 26 to 40GHz	Miteq	NSP4000-SP2	T88	09/03/14	09/03/15
Spectrum Analyzer, 40 GHz	HP	8564E	T106	08/06/14	08/06/15

7. MEASUREMENT METHODS

26 dB Emission BW: KDB 789033 D02 v01r, Section C.

Conducted Output Power: KDB 789033 D02 v01, Section E.2.b (Method SA-1).

Power Spectral Density: KDB 789033 D02 v01, Section F.

Unwanted emissions in restricted bands: KDB 789033 D02 v01, Sections G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v01, Sections G.3, G.4, and G.6.

KDB 662911 D02 MIMO with Cross-Polarized Antennas v01

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 789033 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
802.11a 10MHz 2TX	3.963	4.023	0.985	98.51%	0.00	0.010
802.11n 20MHz 2TX	3.965	4.025	0.985	98.51%	0.00	0.010
802.11n 40MHz 2TX	3.970	4.030	0.985	98.51%	0.00	0.010

DUTY CYCLE PLOTS

DUTY CYCLE 802.11a 10MHz 2TX MODE

DUTY CYCLE 802.11n 20Hz 2TX MODE

DUTY CYCLE 802.11n 40MHz 2TX MODE

8.2. 10MHz 2Tx MODE IN THE 5.3 GHz BAND

8.2.1. 26 dB BANDWIDTH

LIMITS

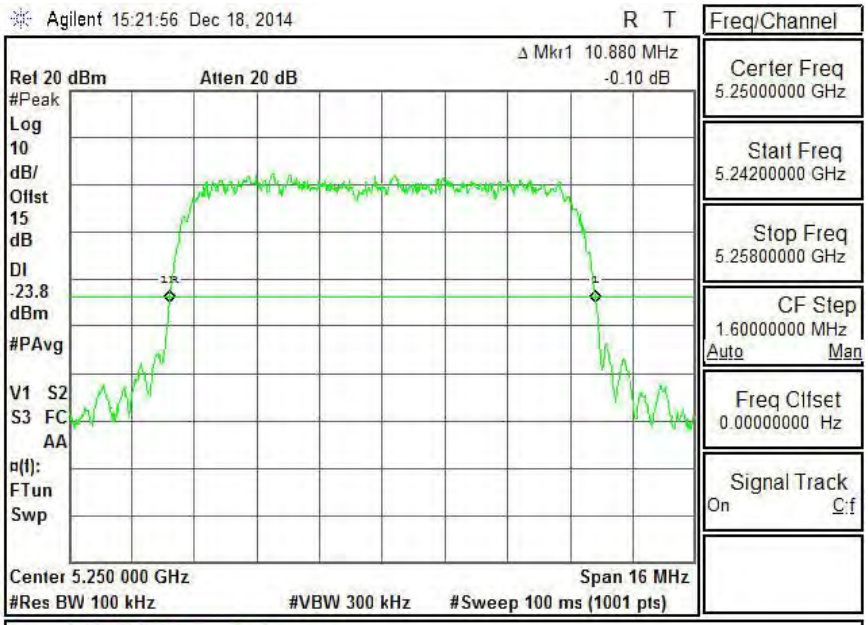
None; for reporting purposes only.

RESULTS

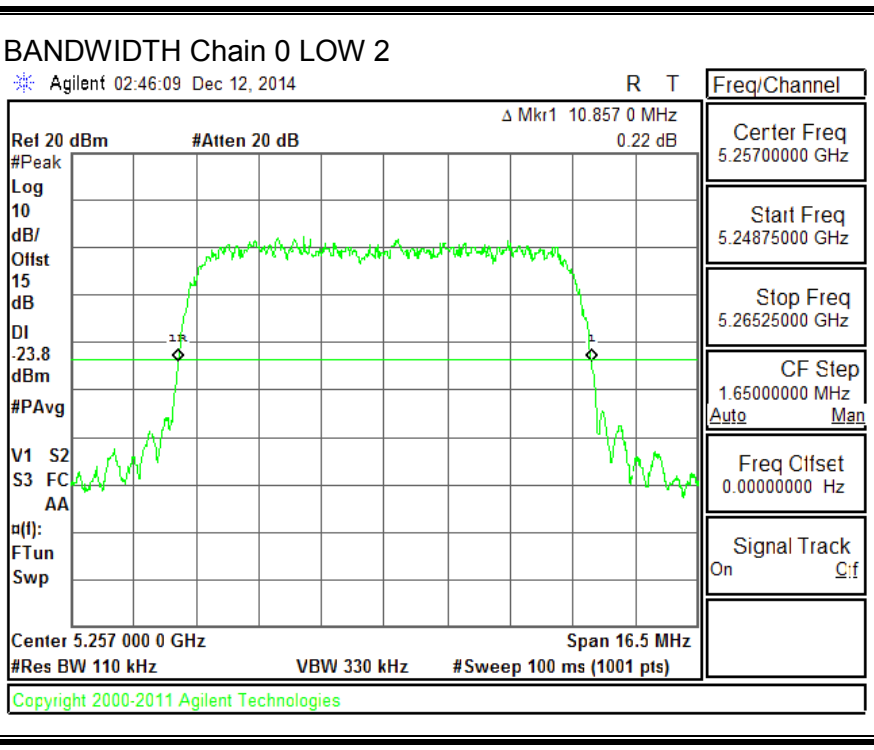
Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low 1	5250	10.880	10.900
Low 2	5257	10.857	10.890
Mid	5300	10.857	10.890
High 1	5339	10.857	10.890
High 2	5342	10.665	10.695

26 dB BANDWIDTH, Chain 0

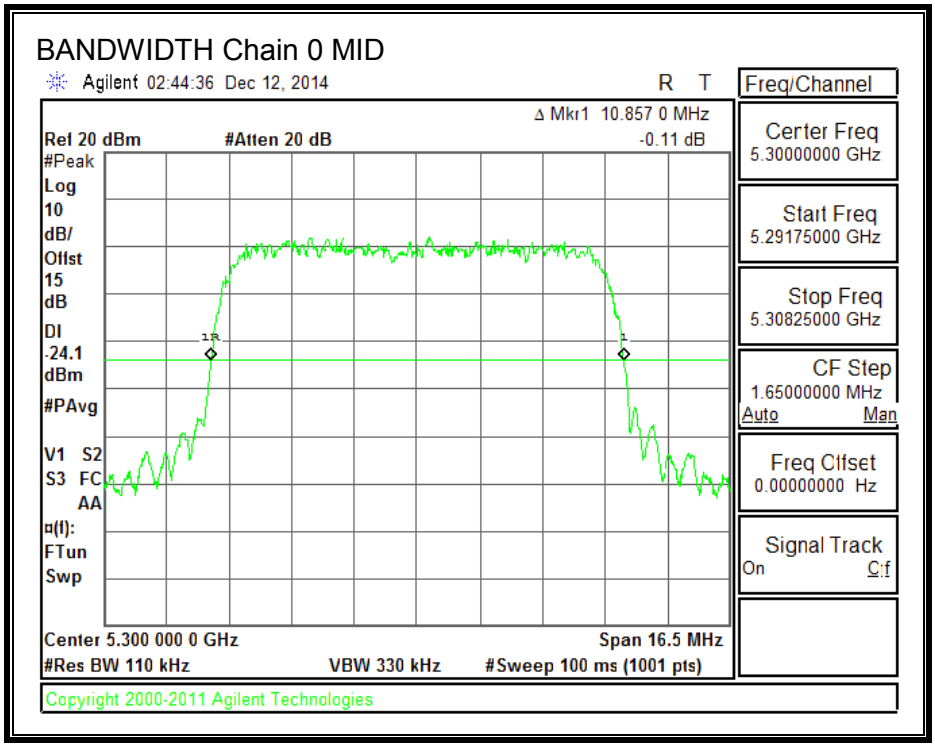
BANDWIDTH Chain 0 LOW 1



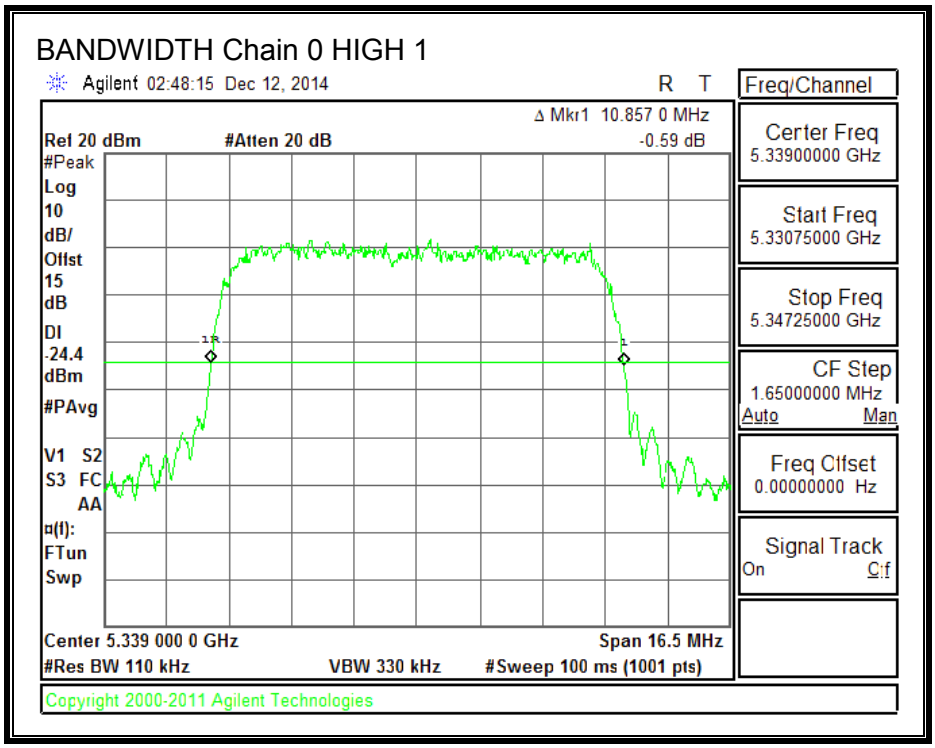
BANDWIDTH Chain 0 LOW 2



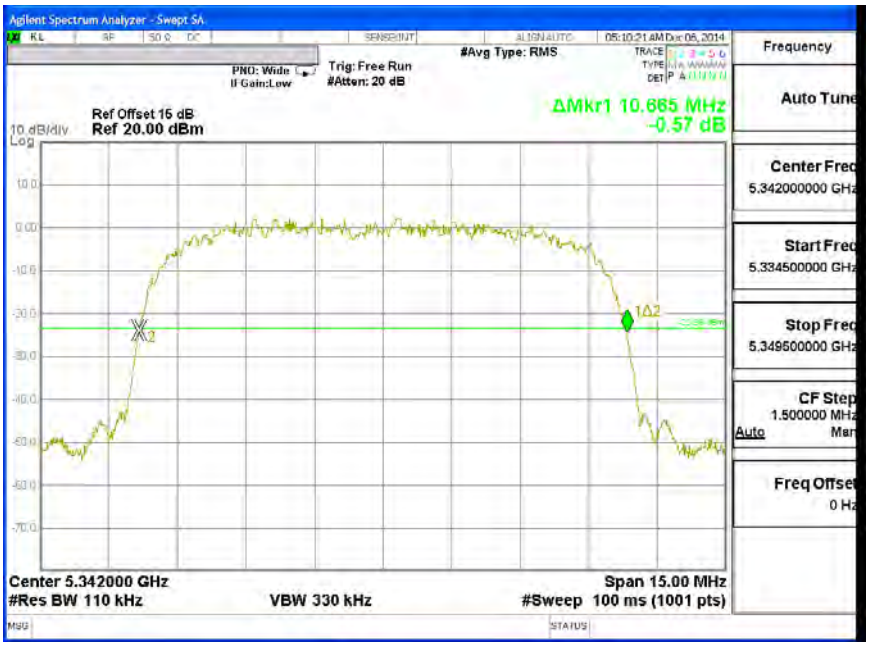
BANDWIDTH Chain 0 MID



BANDWIDTH Chain 0 HIGH 1

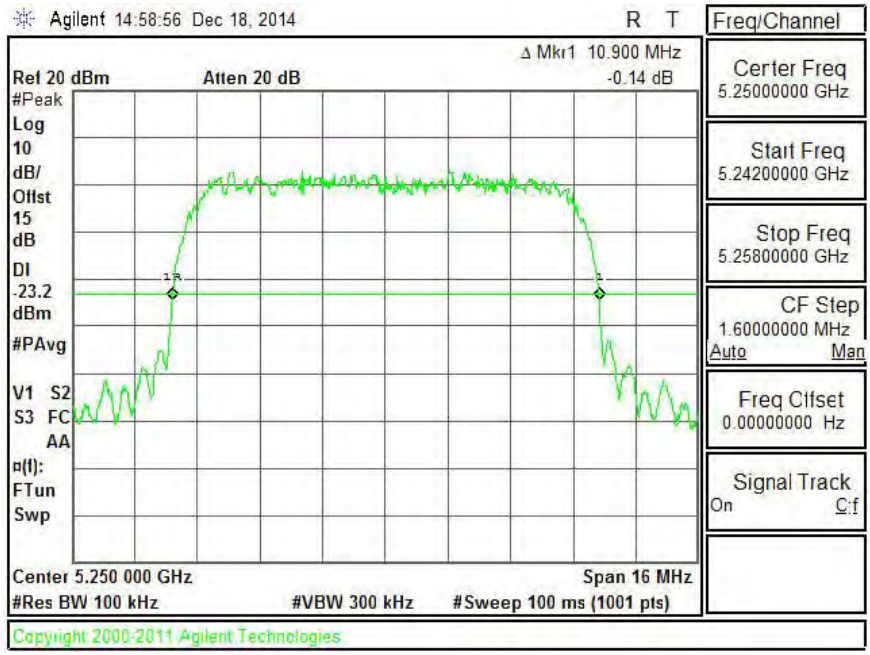


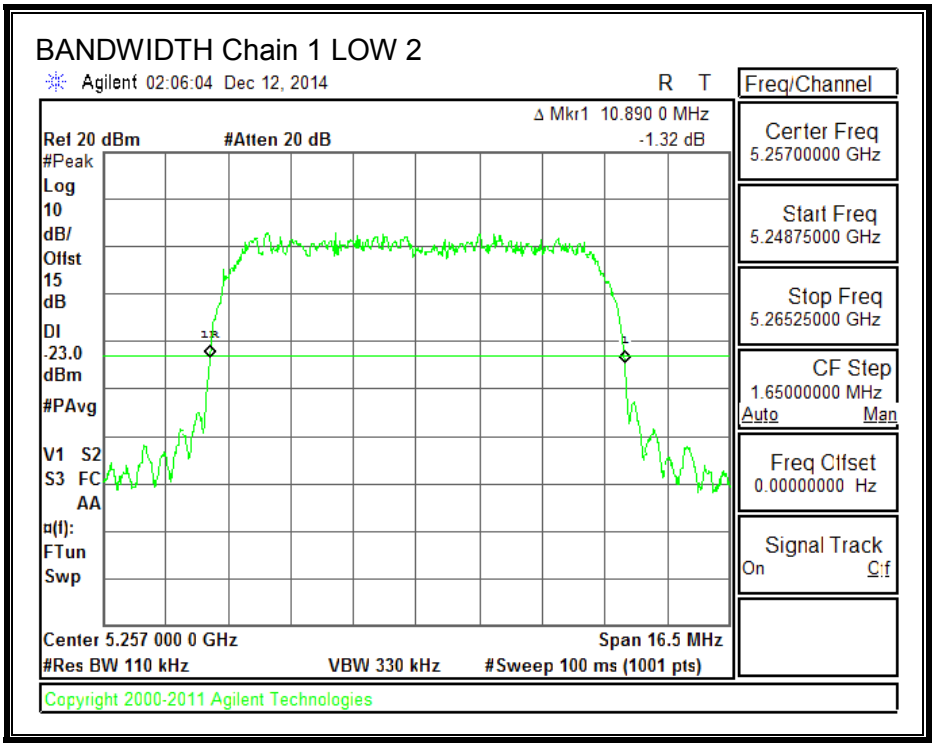
BANDWIDTH Chain 0 HIGH 2

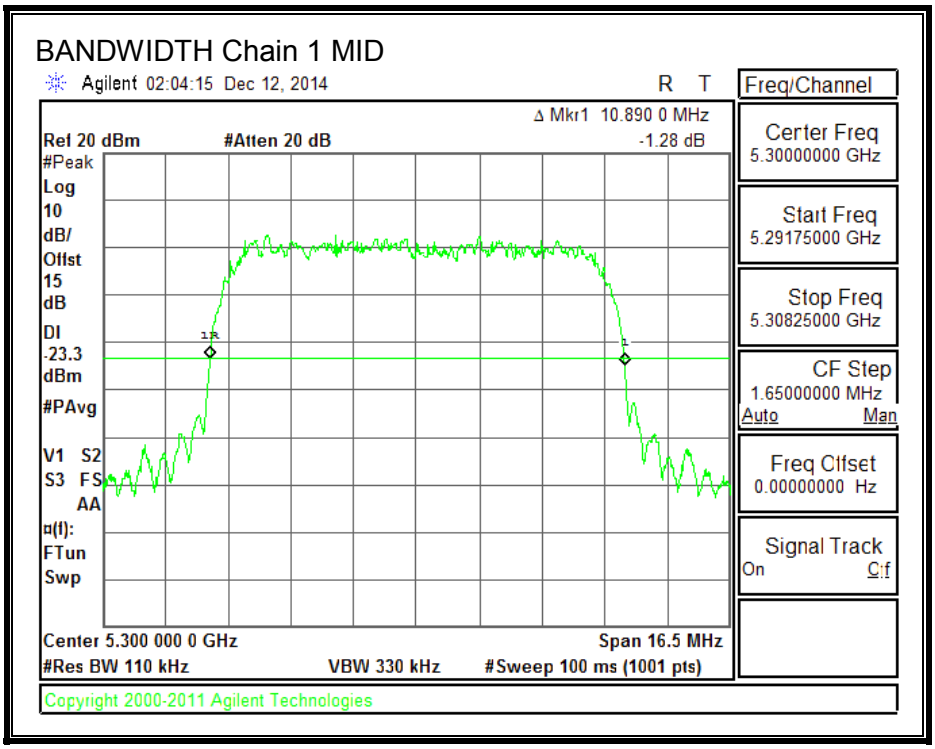


26 dB BANDWIDTH, Chain 1

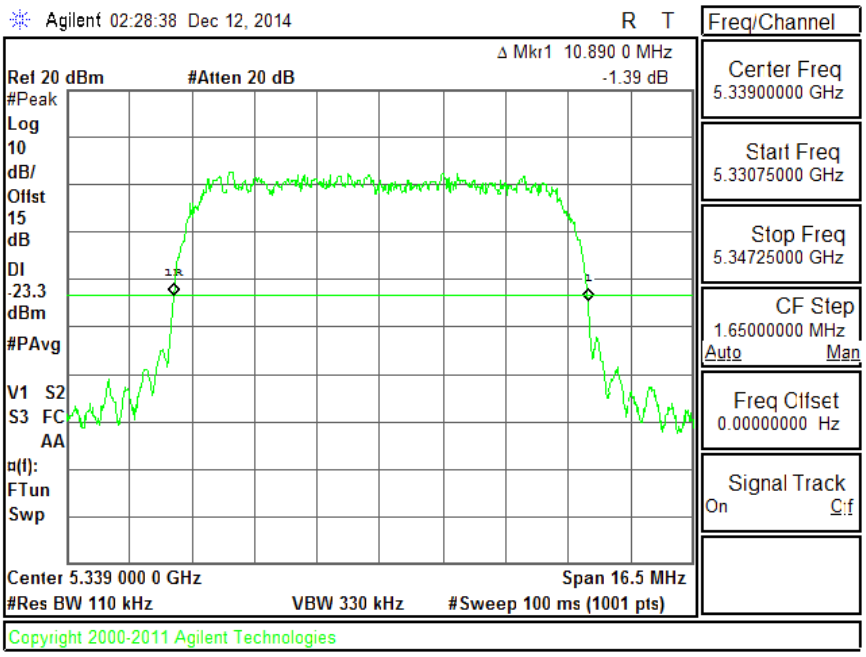
BANDWIDTH Chain 1 LOW 1



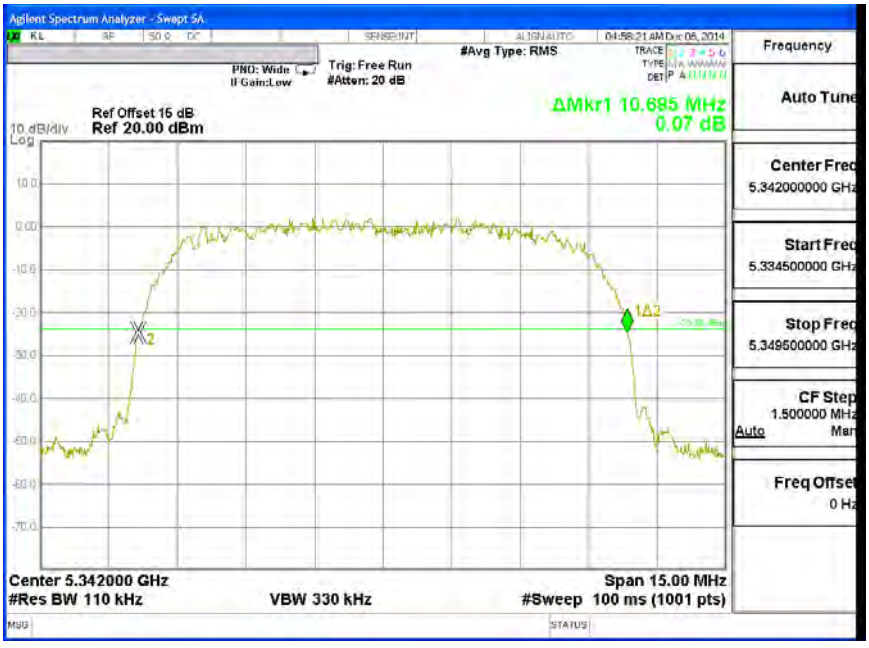




BANDWIDTH Chain 1 HIGH 1



BANDWIDTH Chain 1 HIGH 2



8.2.2. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
10.60	10.60	10.60

RESULTS

Bandwidth, Antenna Gain and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Straddle	5250	10.86	10.60	10.60	16.76	6.40
Low 2	5257	10.86	10.60	10.60	16.76	6.40
Mid	5300	10.86	10.60	10.60	16.76	6.40
High 1	5339	10.86	10.60	10.60	16.76	6.40
High 2	5342	10.86	10.60	10.60	16.76	6.40

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD

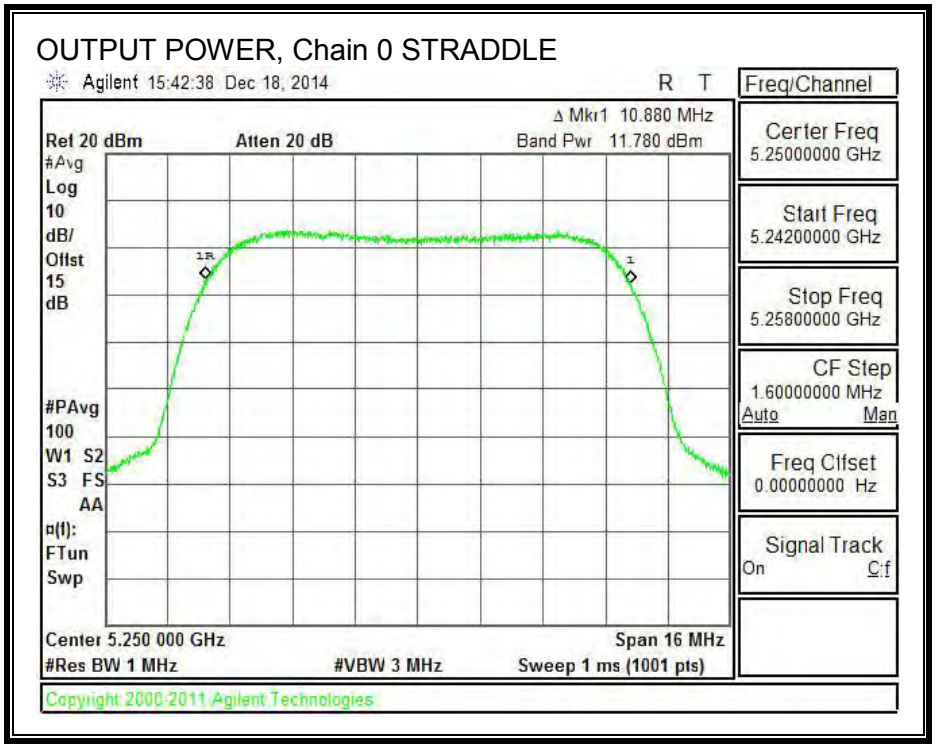
Output Power Results

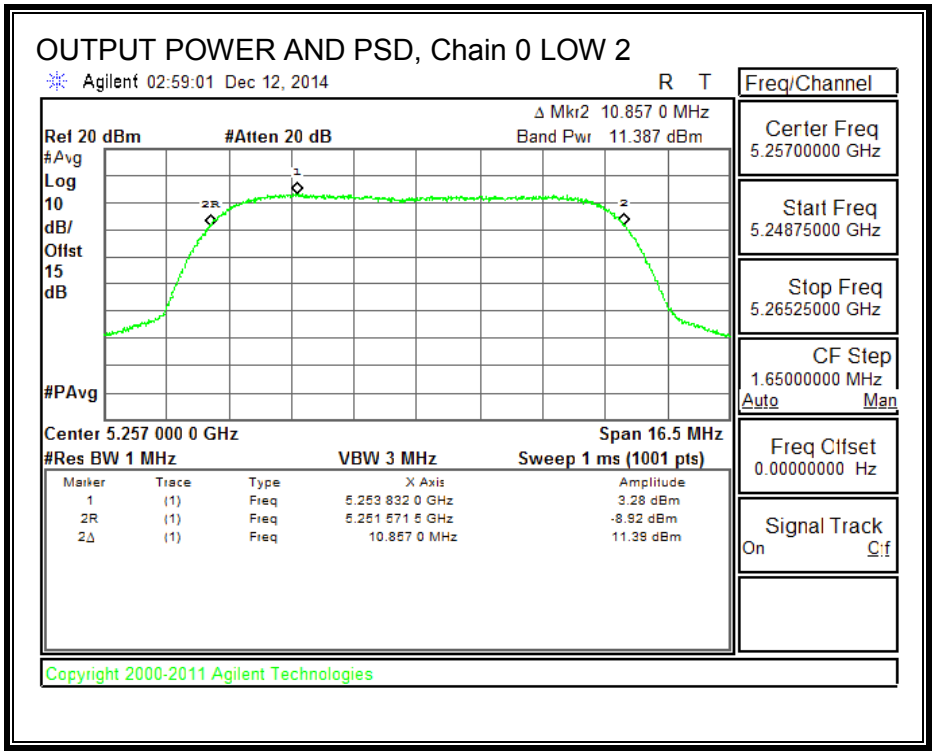
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Straddle	5250	11.78	11.69	14.74	16.76	-2.01
Low 2	5257	11.39	11.59	14.50	16.76	-2.26
Mid	5300	11.59	11.55	14.58	16.76	-2.18
High 1	5339	11.09	11.62	14.37	16.76	-2.38
High 2	5342	11.08	10.82	13.96	16.76	-2.79

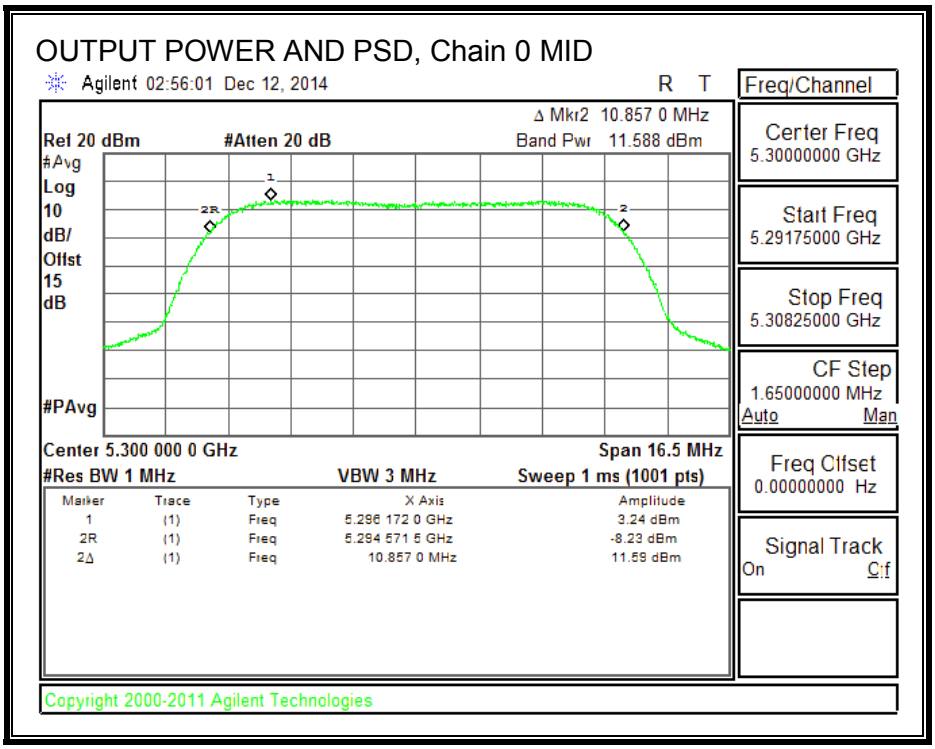
PSD Results

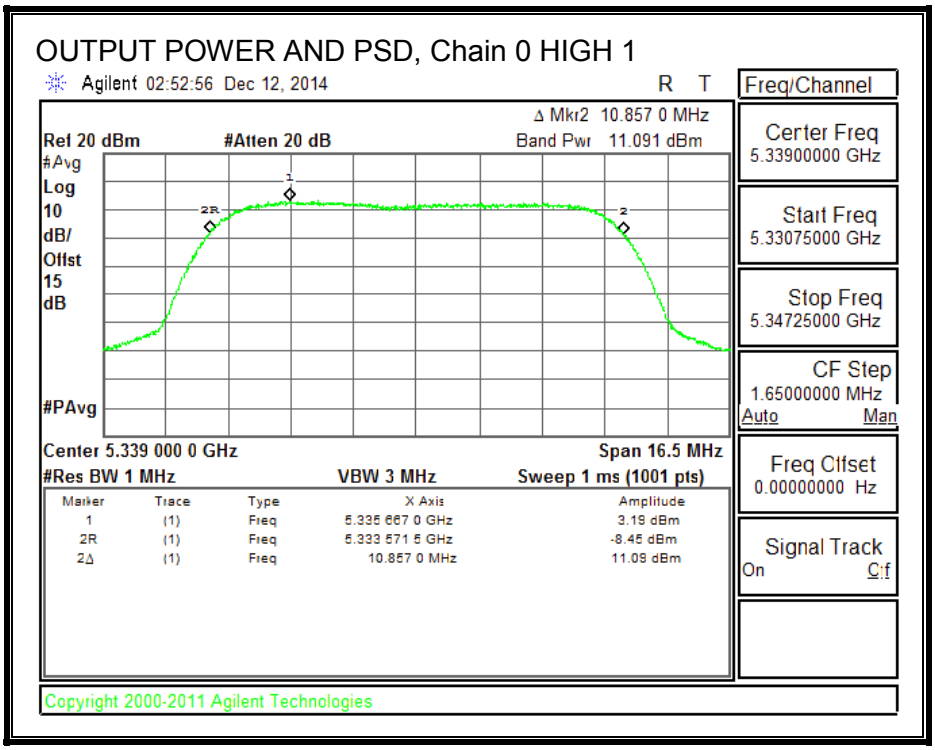
Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low 2	5257	3.28	3.23	6.27	6.40	-0.13
Mid	5300	3.24	3.27	6.27	6.40	-0.13
High 1	5339	3.19	3.32	6.27	6.40	-0.13
High 2	5342	3.06	3.26	6.17	6.40	-0.23

OUTPUT POWER AND PSD, Chain 0





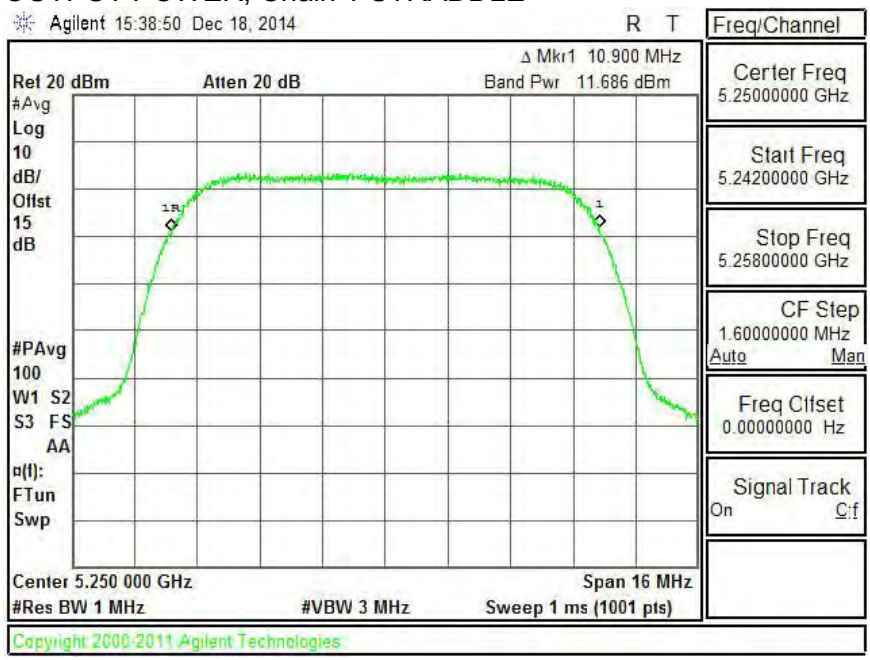


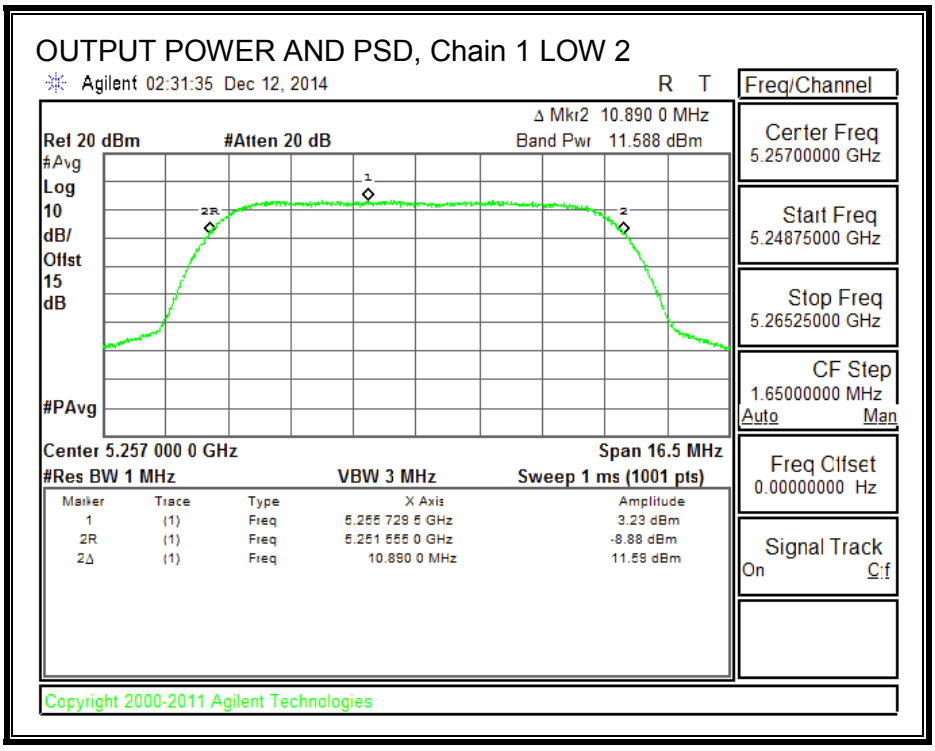


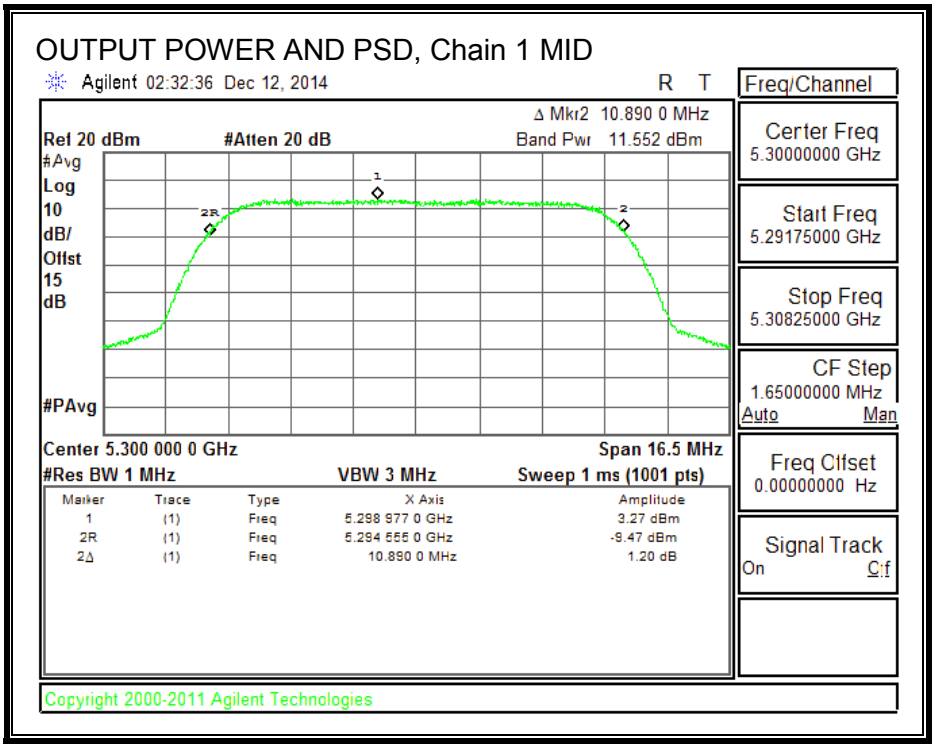
OUTPUT POWER AND PSD, Chain 0 HIGH 2

OUTPUT POWER AND PSD, Chain 1

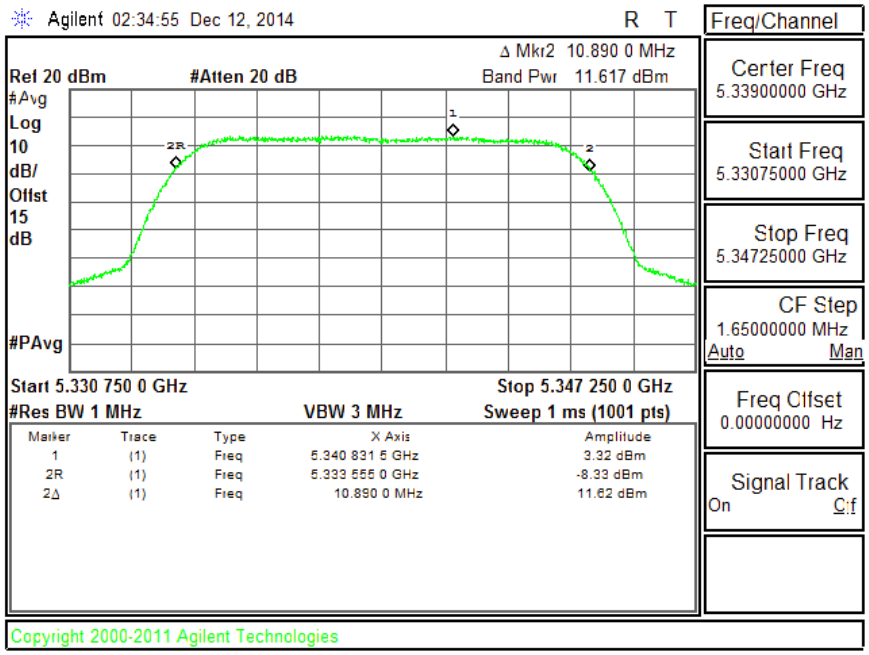
OUTPUT POWER, Chain 1 STRADDLE







OUTPUT POWER AND PSD, Chain 1 HIGH 1



OUTPUT POWER AND PSD, Chain 1 HIGH 2

8.2.3. STRADDLE CHANNEL RESULTS

UNII-1 BAND

Bandwidth and Antenna Gain

Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PPSD (dBi)
5250	5.44	10.60	10.60

Limits

Frequency (MHz)	FCC Power Limit (dBm)	PPSD Limit (dBm)
5250	30.00	17.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PPSD

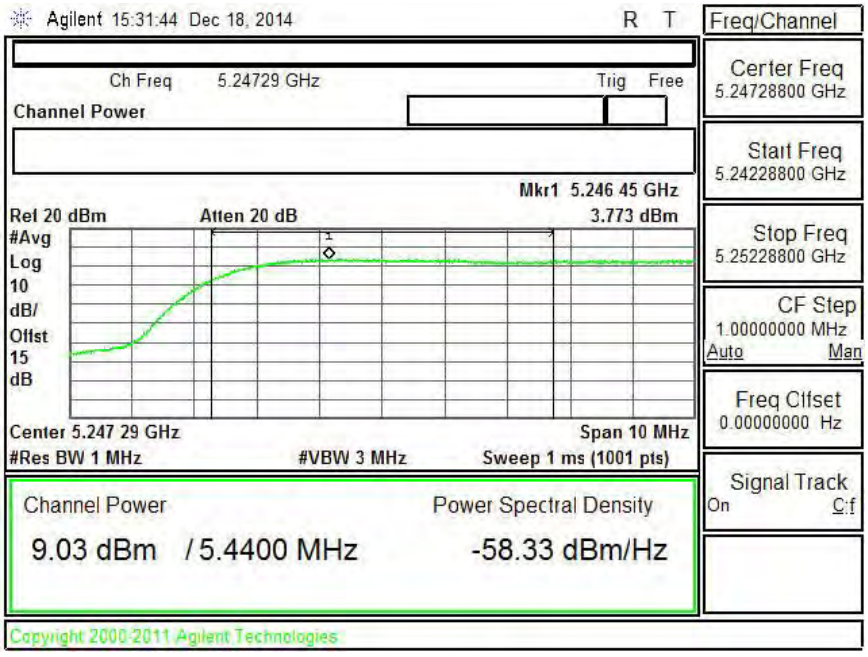
Output Power Results

Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
5250	9.03	8.85	11.95	30.00	-18.05

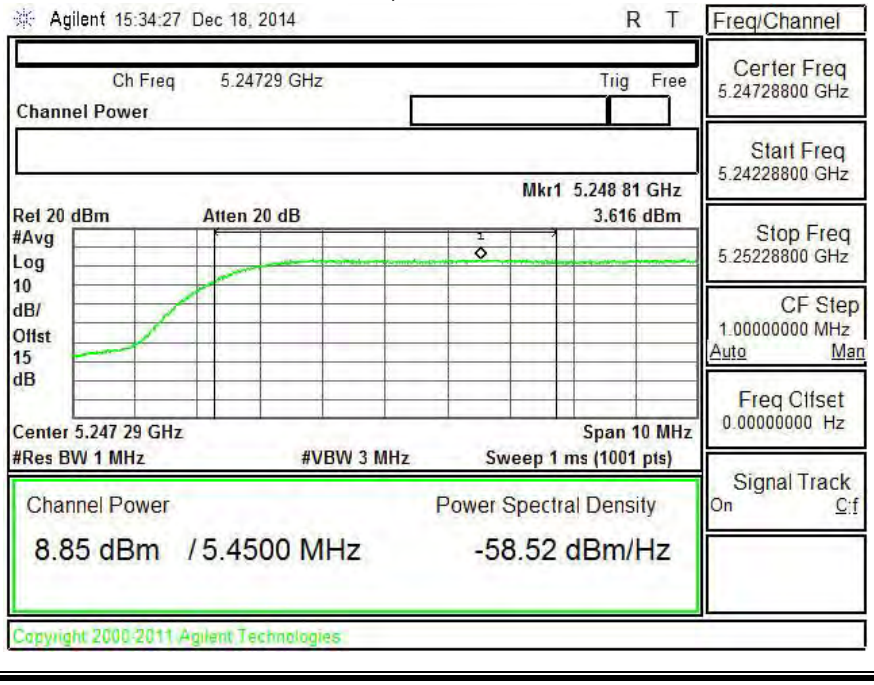
PPSD Results

Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Chain 1 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
5250	3.77	3.62	6.71	17.00	-10.29

OUTPUT POWER AND PSD, Chain 0 CH 5250 UNII-1



OUTPUT POWER AND PSD, Chain 1 CH 5250 UNII-1



UNII-2A BAND

Bandwidth and Antenna Gain

Frequen (MHz)	Min 26 dB BW (MHz)	Directio Gain for Power (dBi)	Directio Gain for PPSD (dBi)
5250	5.44	10.60	10.60

Limits

Frequency (MHz)	FCC Power Limit (dBm)	FCC PPSD Limit (dBm)
5250	13.76	6.40

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PPSD

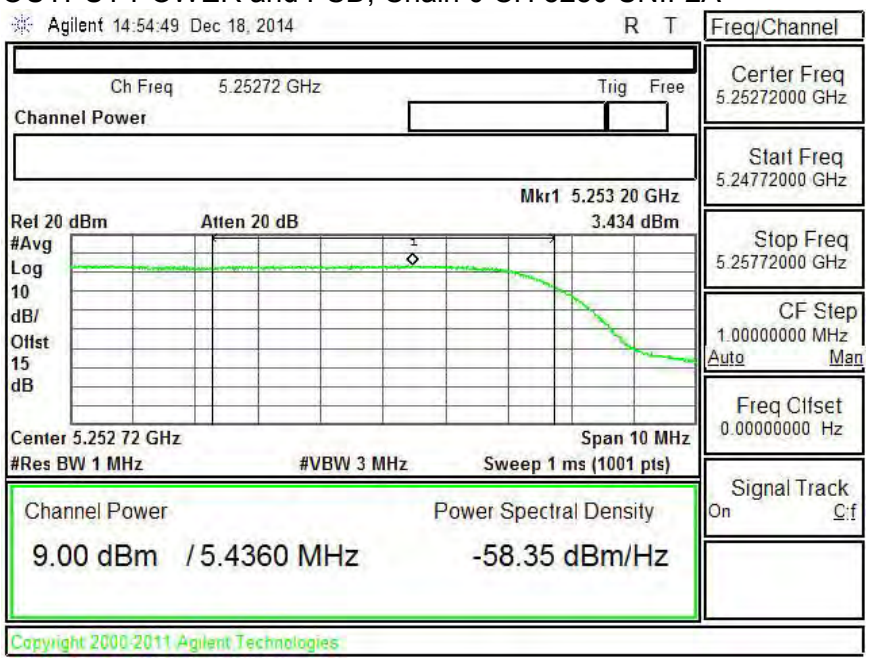
Output Power Results

Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
5250	9.00	8.21	11.63	13.76	-2.12

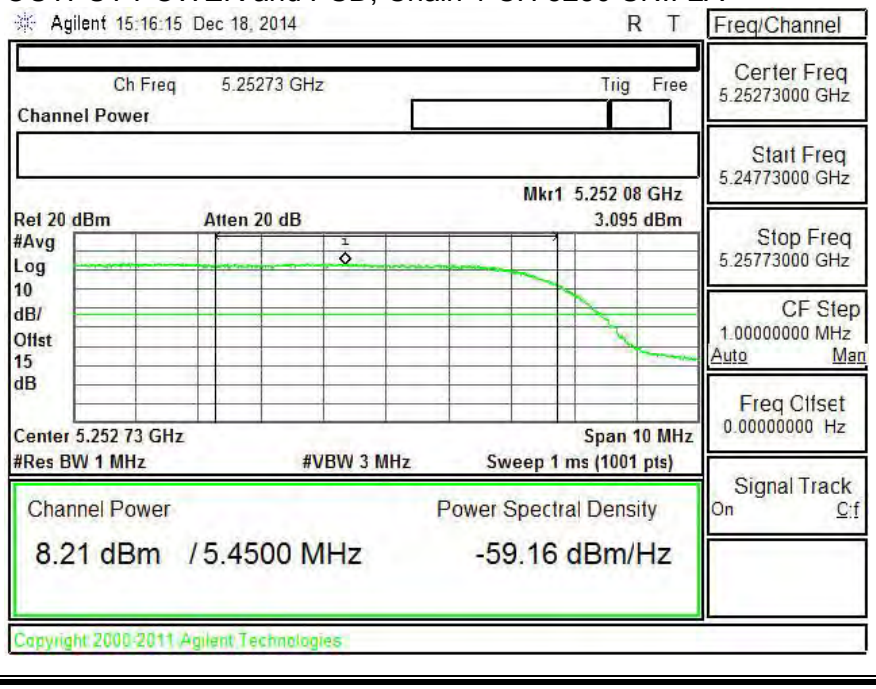
PPSD Results

Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Chain 1 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
5250	3.43	3.10	6.28	6.40	-0.12

OUTPUT POWER and PSD, Chain 0 CH 5250 UNII-2A



OUTPUT POWER and PSD, Chain 1 CH 5250 UNII-2A



8.2.4. CONDUCTED BANDEDGE

LIMITS

FCC §15.205 and §15.209

PART 15, SUBPART E

Radiated LIMIT:

(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

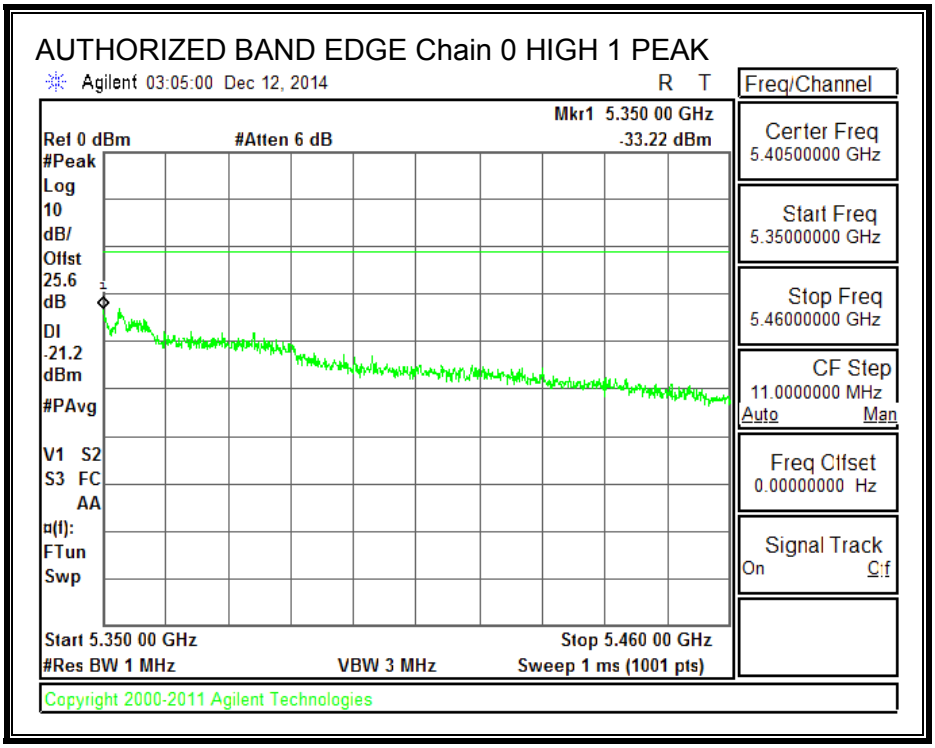
Procedure

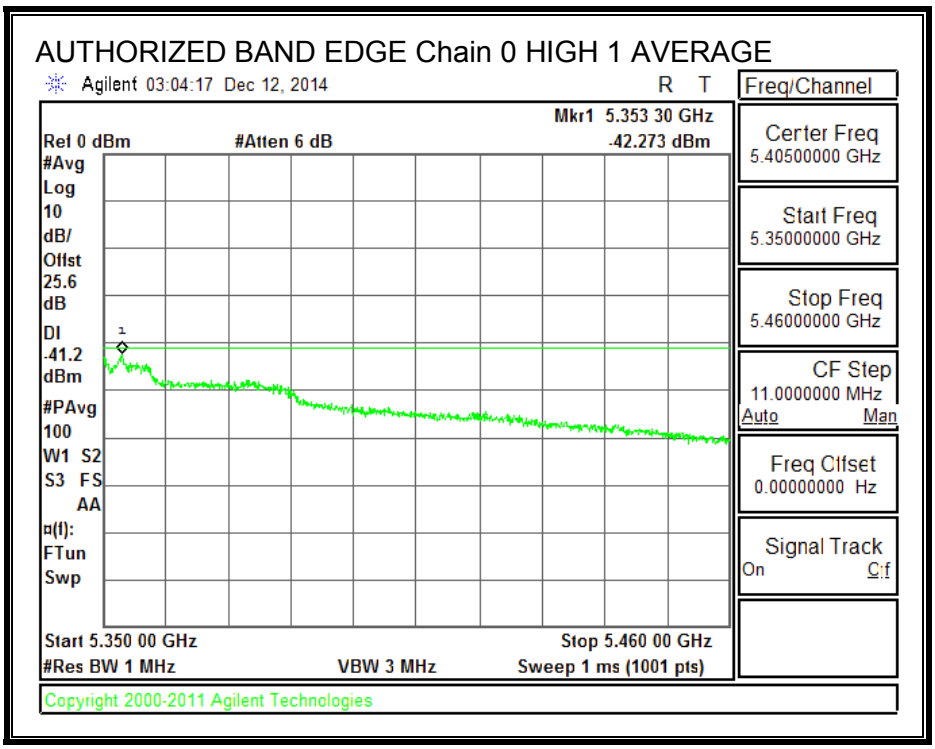
KDB 789033 D02 General UNII Test Procedures New Rules v01, Section II, G5, G6

Conducted measurements are being used to demonstrate compliance with the spurious limits in the restricted band (all other spurious emissions are measured using the radiated test method with the antennas connected). The limits are 54dBuV/m average and 74dBuV/m peak, which are equivalent to eirp of -41.2 dBm and -21.2dBm respectively. The plots include an offset to account for the EUT antenna gain and external attenuation between EUT antenna port and spectrum analyzer. As the two antenna chains feed cross polarized antennas with un- correlated signals the two chains are treated independently and the emissions do not need to be summed.

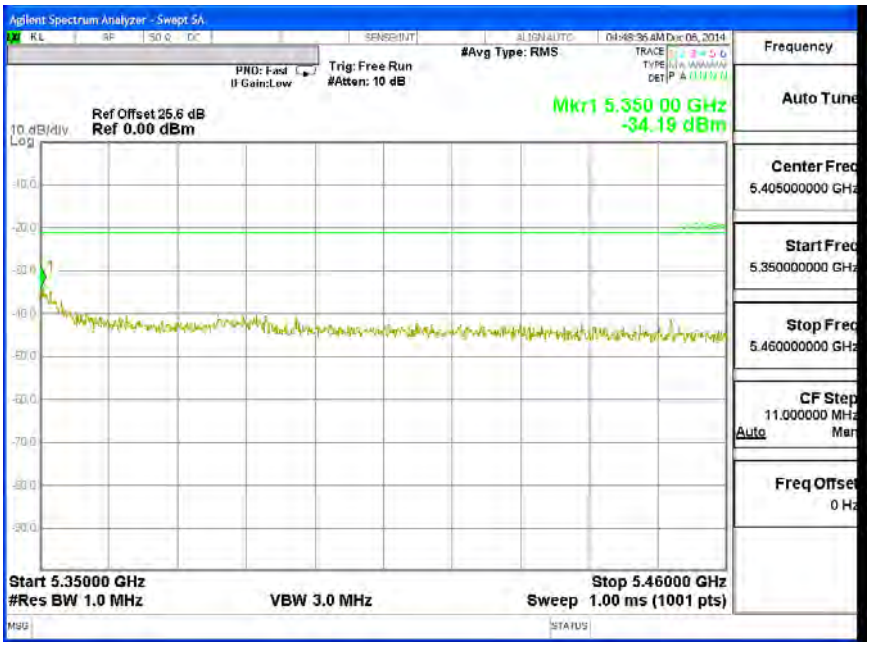
RESULTS

HIGH CHANNEL BANDEDGE, Chain 0

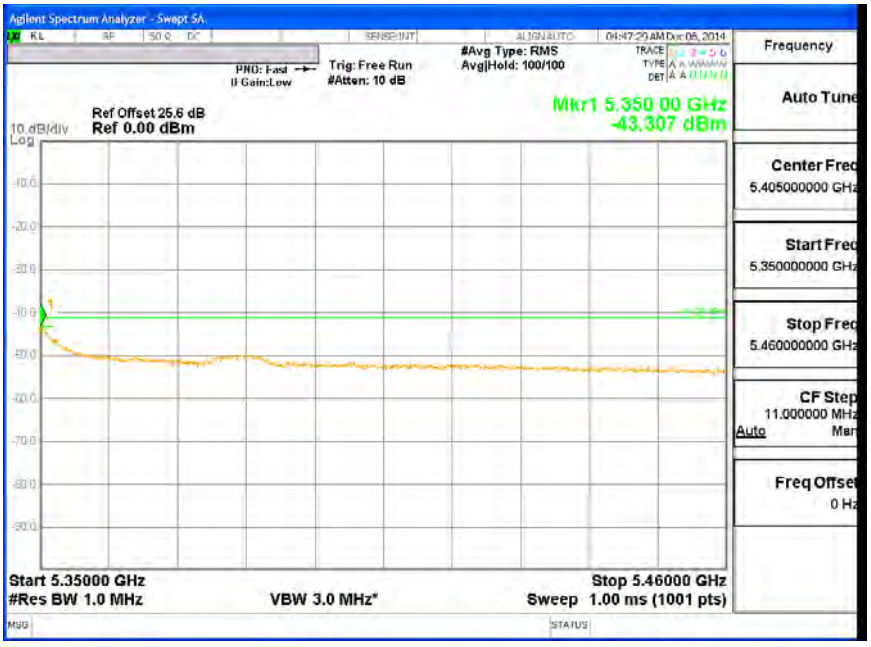




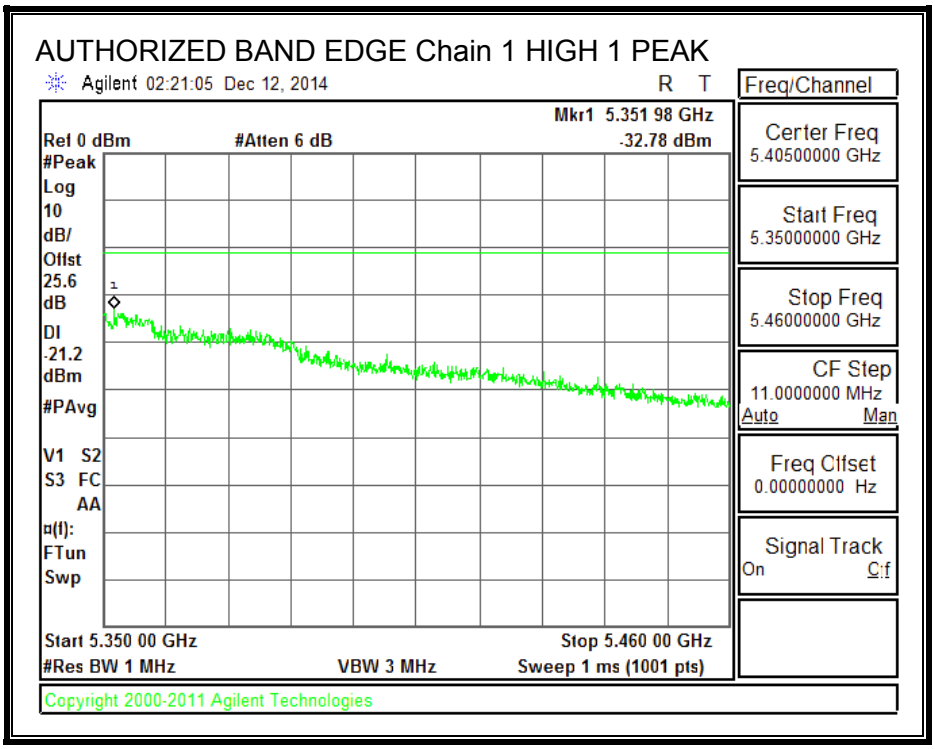
AUTHORIZED BAND EDGE Chain 0 HIGH 2 PEAK

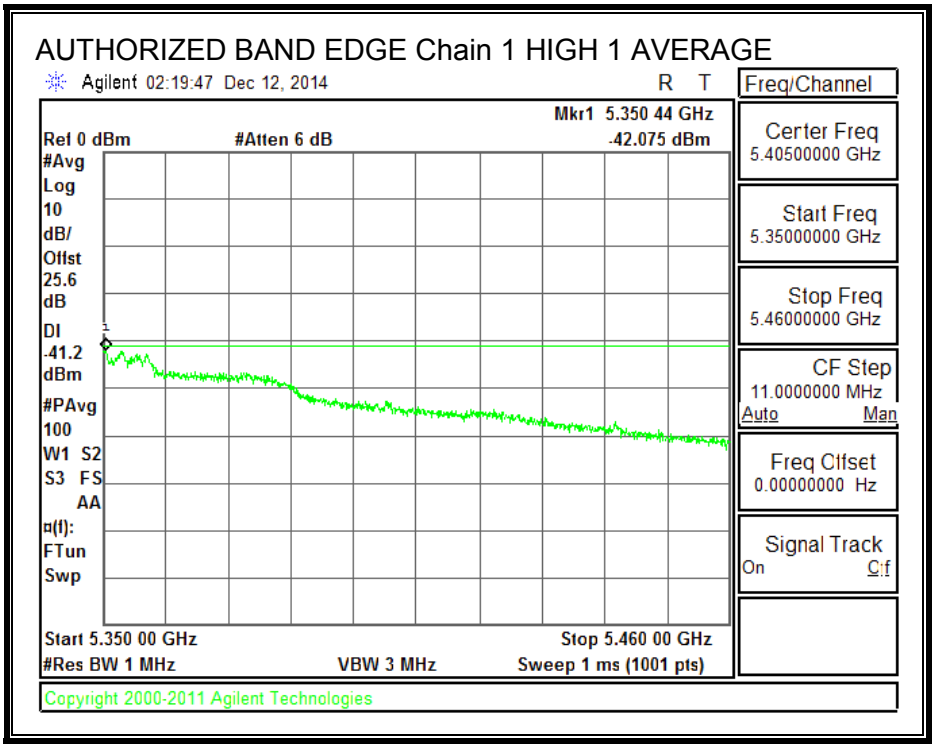


AUTHORIZED BAND EDGE Chain 0 HIGH CH 2 AVERAGE

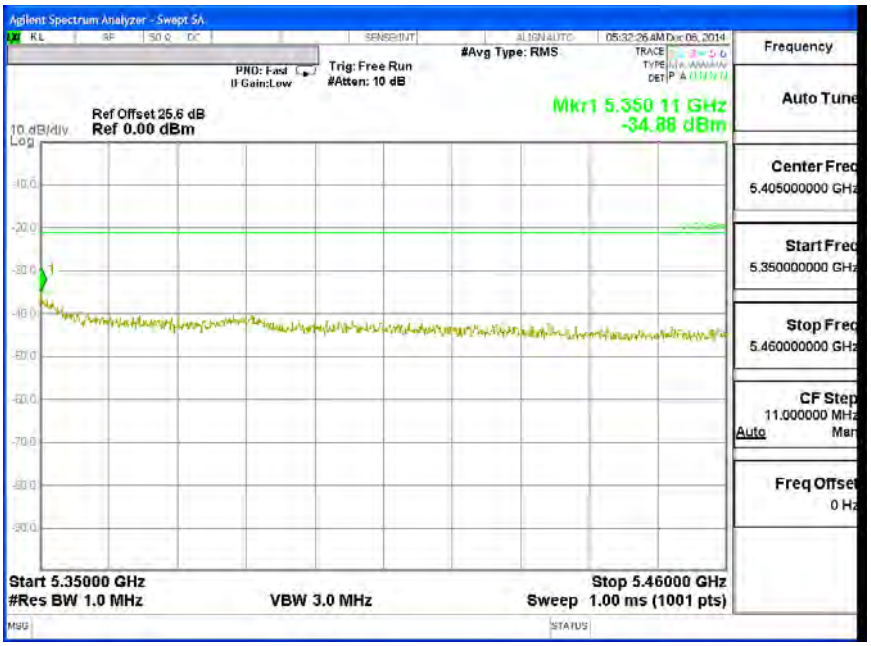


HIGH CHANNEL BANDEDGE, Chain 1

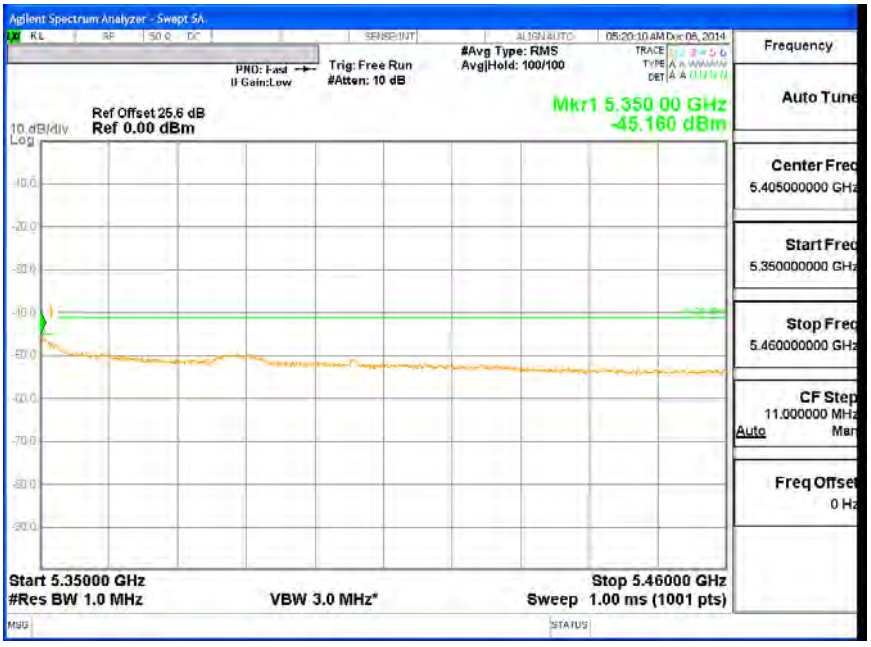




AUTHORIZED BAND EDGE Chain 1 HIGH 2 PEAK



AUTHORIZED BAND EDGE Chain 1 HIGH CH 2 AVERAGE



8.3. 20MHz 2Tx MODE IN THE 5.3 GHz BAND

8.3.1. 26 dB BANDWIDTH

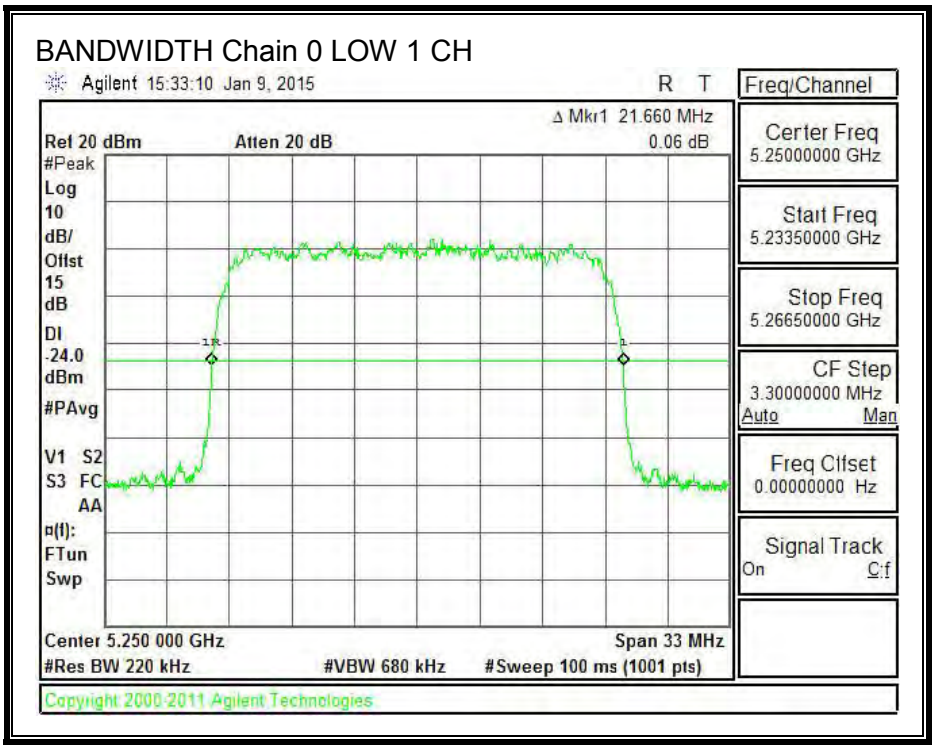
LIMITS

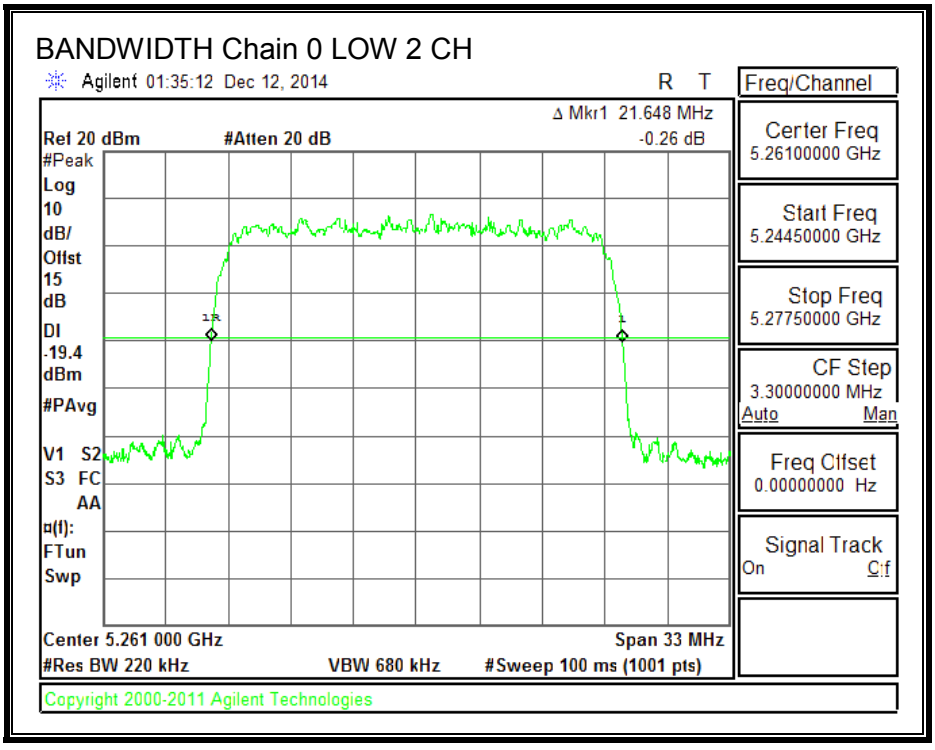
None; for reporting purposes only.

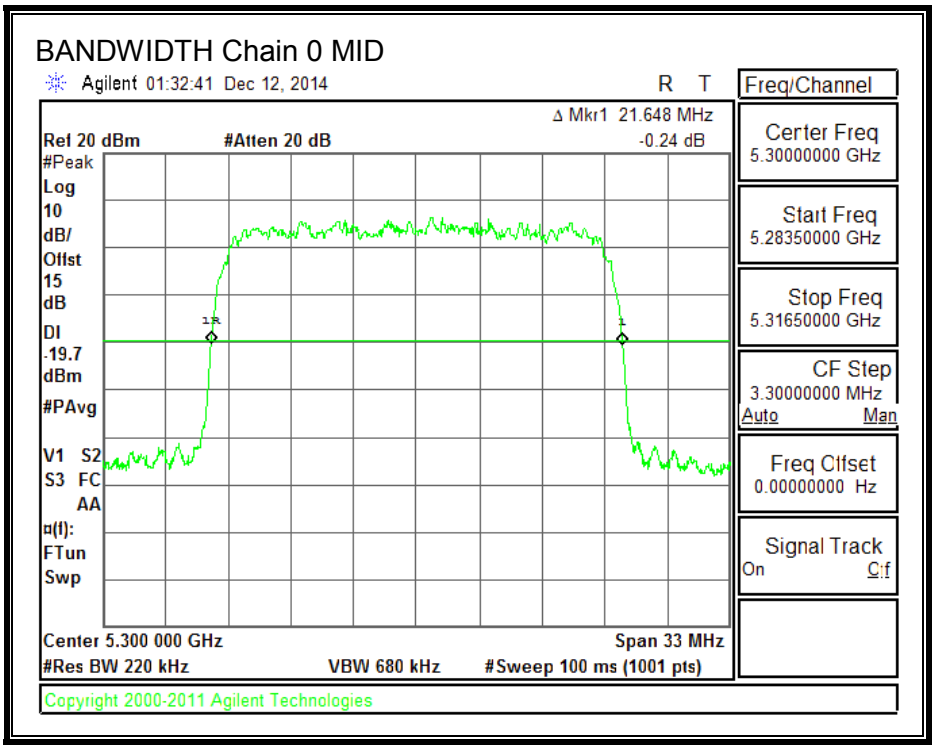
RESULTS

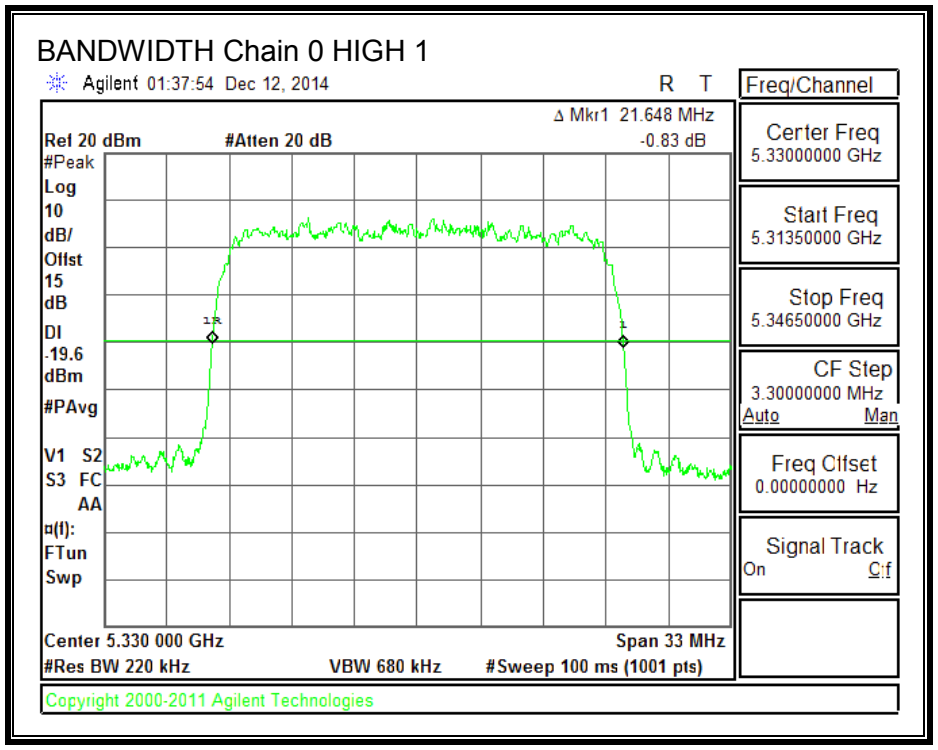
Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low 1	5250	21.66	21.66
Low 2	5261	21.65	21.62
Mid	5300	21.65	21.62
High 1	5330	21.65	21.62
High 2	5335	21.19	21.15

26 dB BANDWIDTH, Chain 0

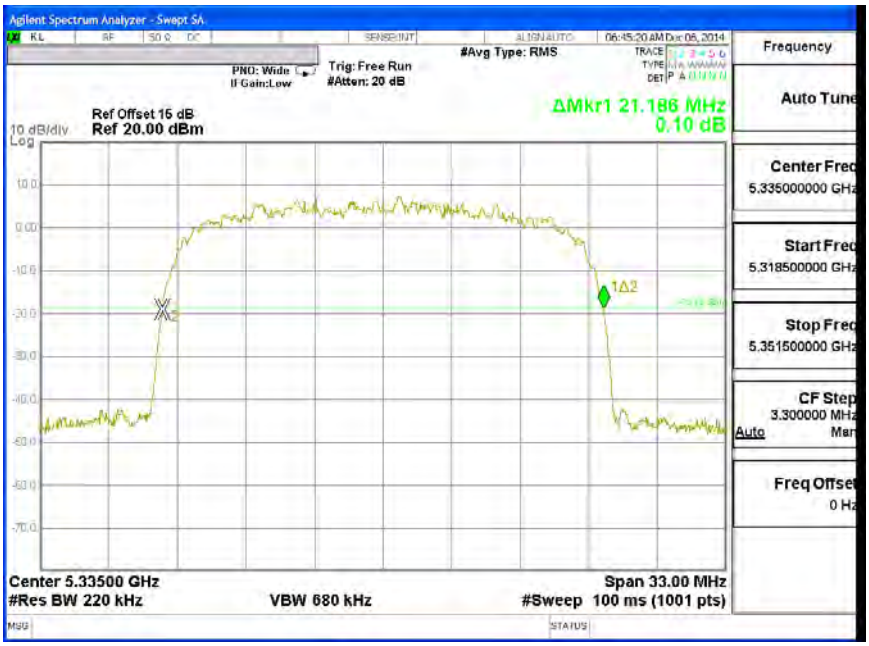




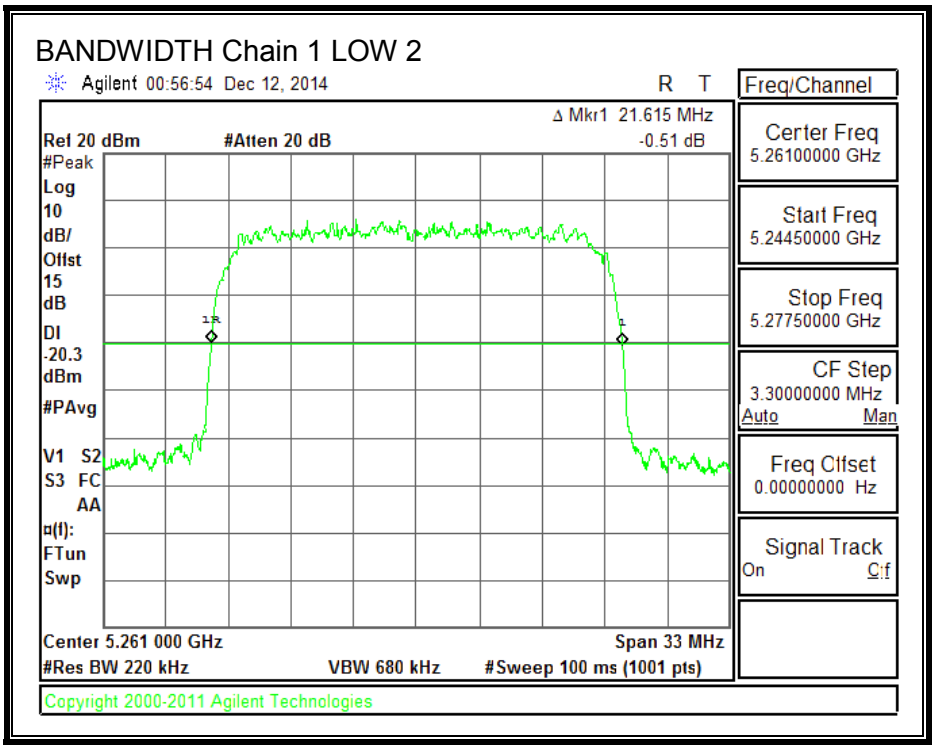


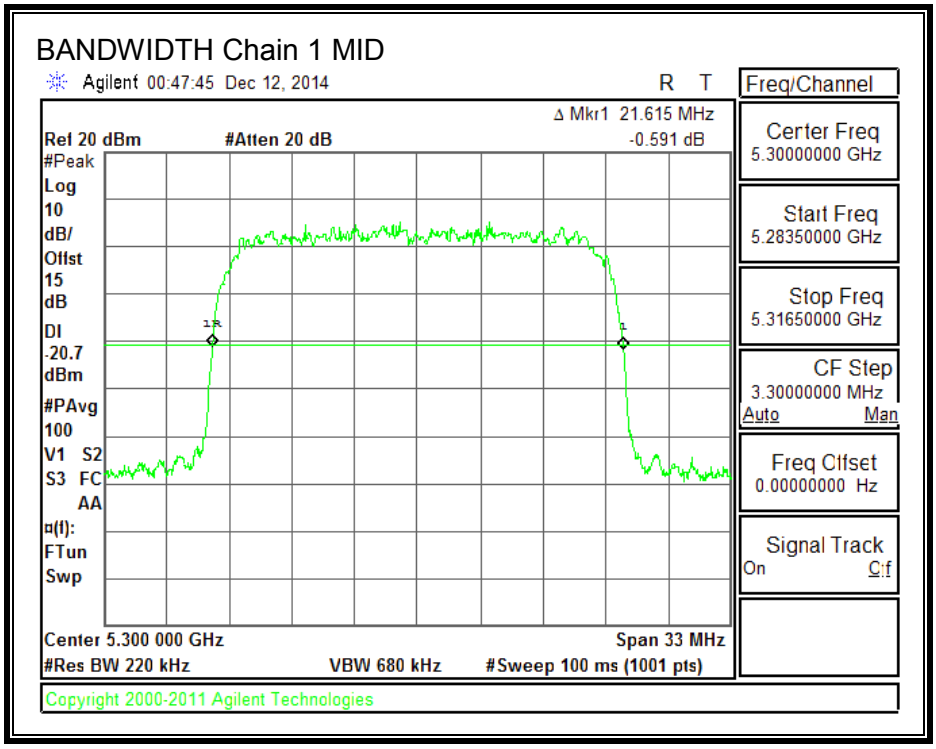


BANDWIDTH Chain 0 HIGH 2

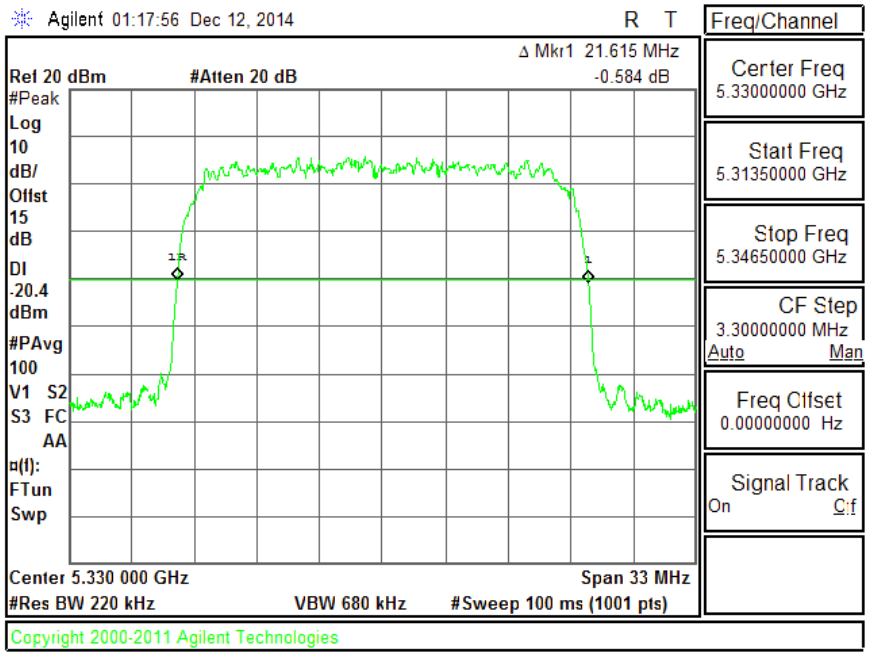


26 dB BANDWIDTH, Chain 1





BANDWIDTH Chain 1 HIGH 1



BANDWIDTH Chain 1 HIGH 2

8.3.2. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
10.60	10.60	10.60

RESULTS

Bandwidth, Antenna Gain and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Straddle	5250	21.15	10.60	10.60	19.40	6.40
Low 2	5261	21.15	10.60	10.60	19.40	6.40
Mid	5300	21.15	10.60	10.60	19.40	6.40
High 1	5330	21.15	10.60	10.60	19.40	6.40
High 2	5335	21.15	10.60	10.60	19.40	6.40

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD

Output Power Results

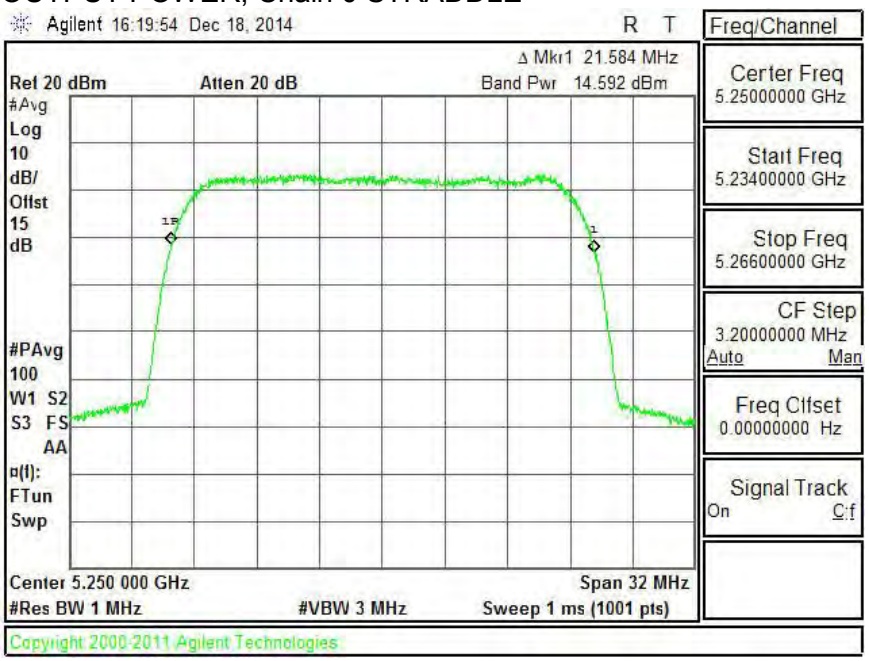
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Straddle	5250	14.59	15.23	17.94	19.40	-1.46
Low 2	5261	14.18	14.44	17.32	19.40	-2.08
Mid	5300	14.17	14.73	17.47	19.40	-1.93
High 1	5330	14.26	14.32	17.30	19.40	-2.10
High 2	5335	13.94	13.89	16.92	19.40	-2.48

PSD Results

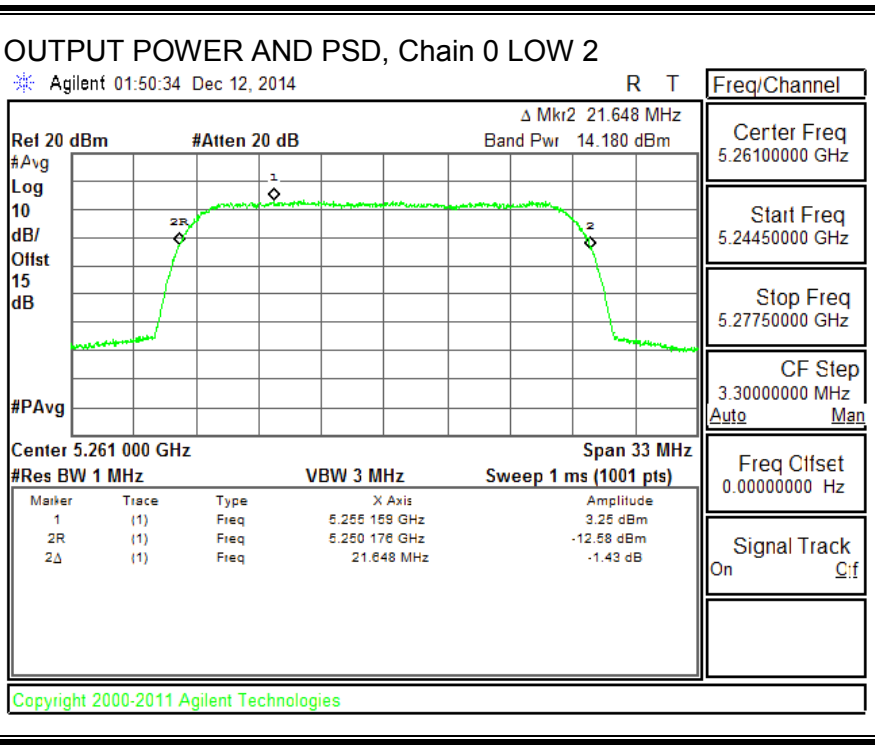
Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low 2	5261	3.25	3.27	6.27	6.40	-0.13
Mid	5300	3.12	3.27	6.21	6.40	-0.19
High 1	5330	3.18	3.31	6.26	6.40	-0.14
High 2	5335	3.35	3.15	6.26	6.40	-0.14

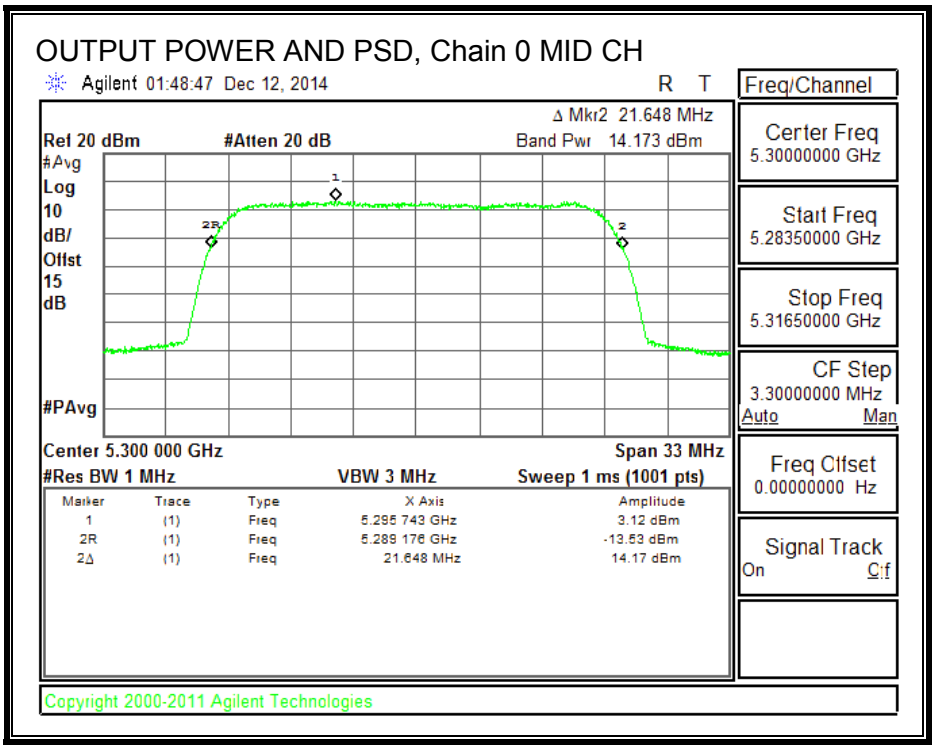
OUTPUT POWER AND PSD, Chain 0

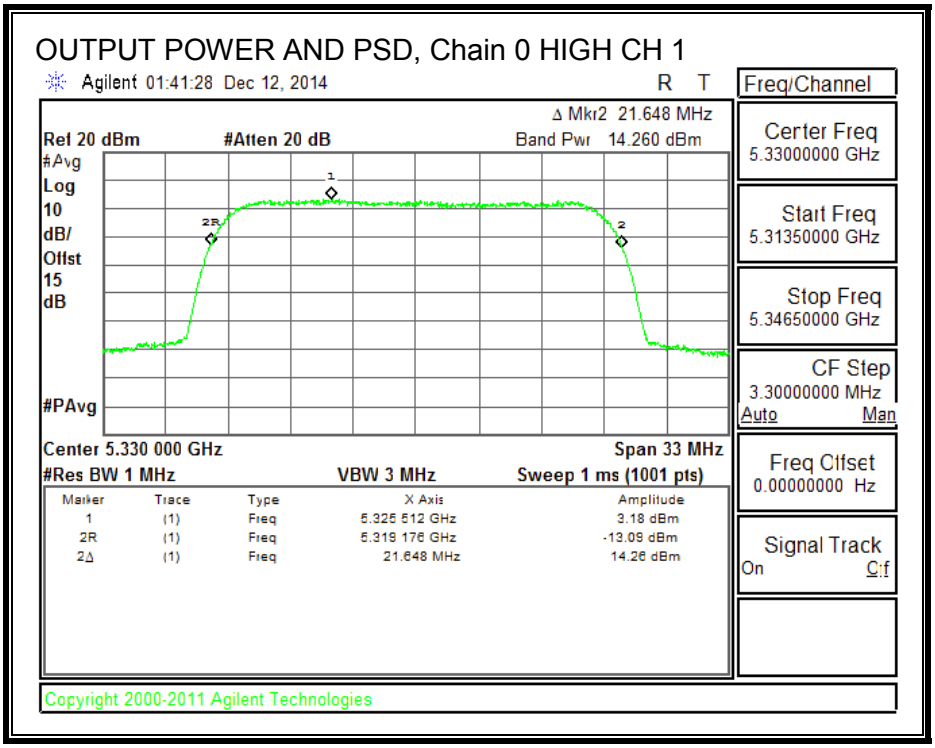
OUTPUT POWER, Chain 0 STRADDLE



OUTPUT POWER AND PSD, Chain 0 LOW 2

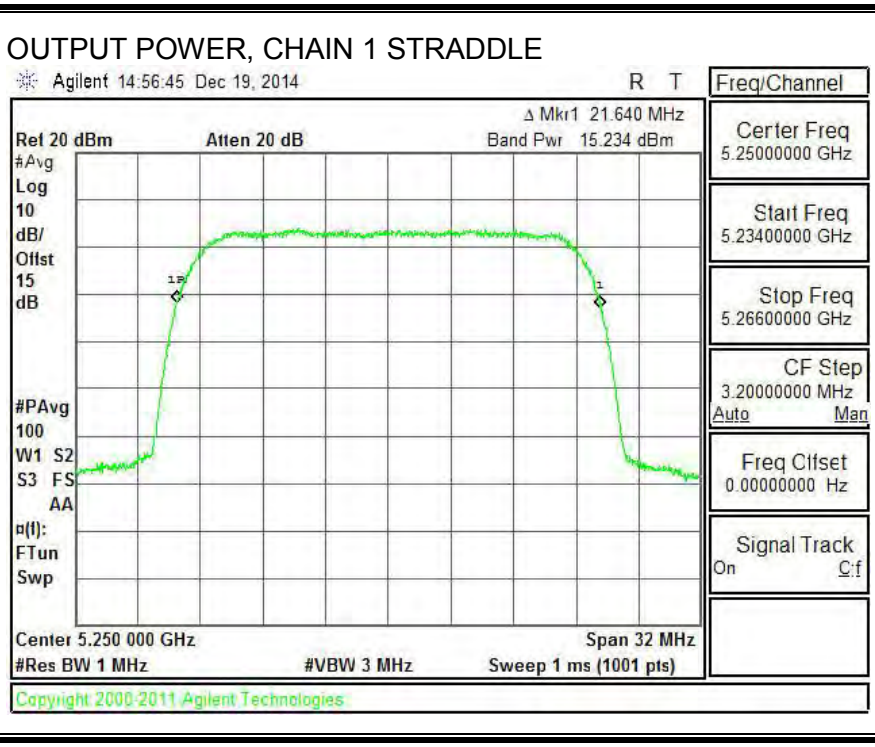


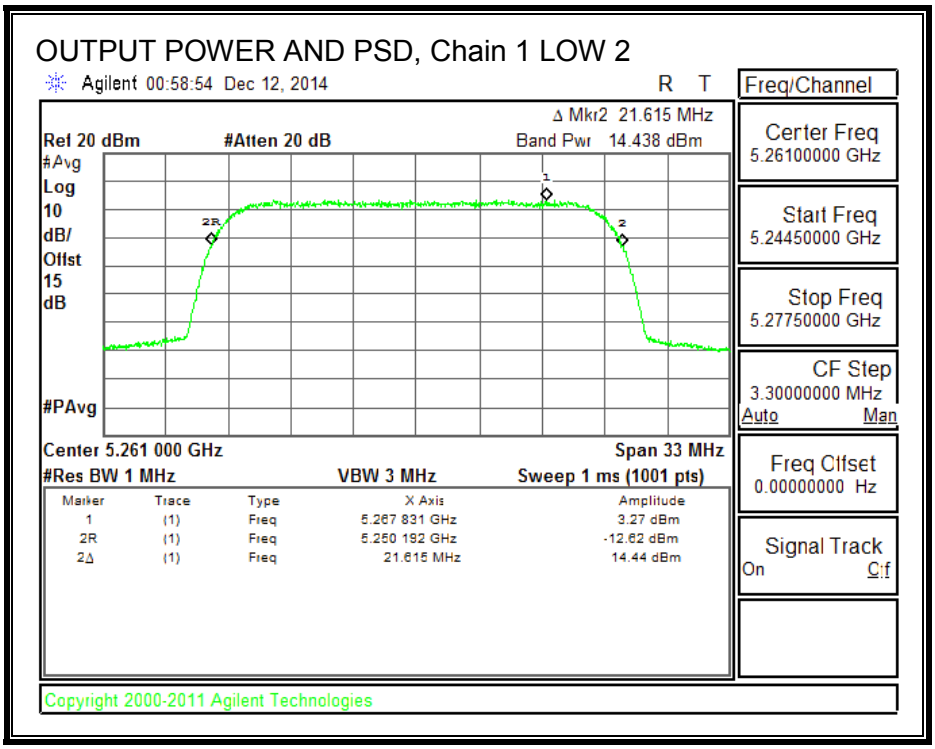


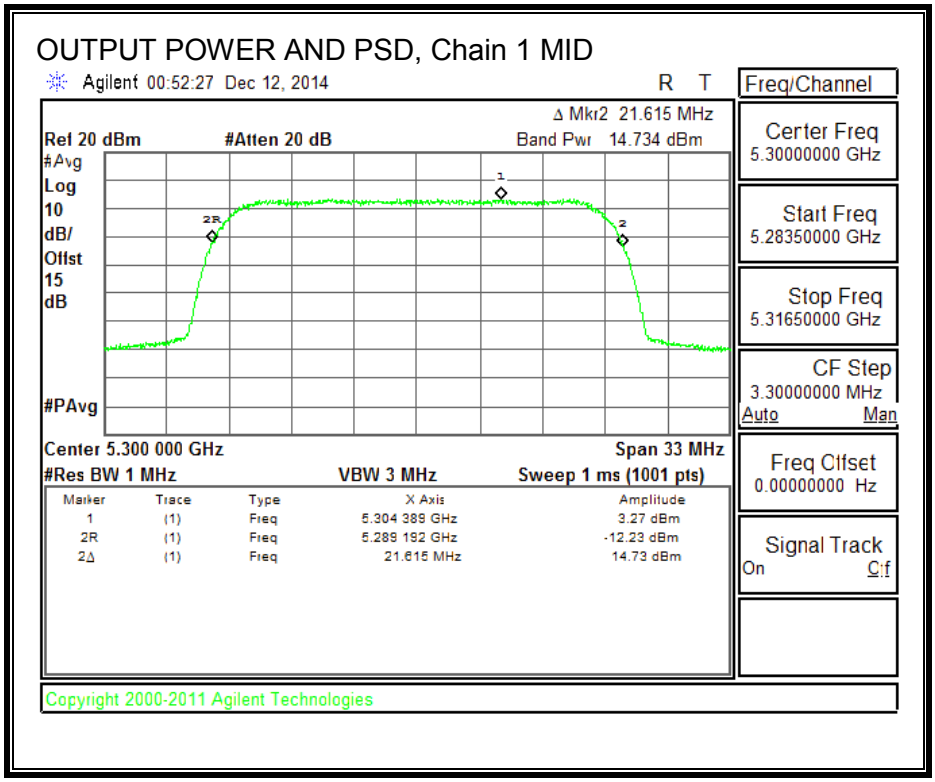


OUTPUT POWER AND PSD, Chain 0 HIGH CH 2

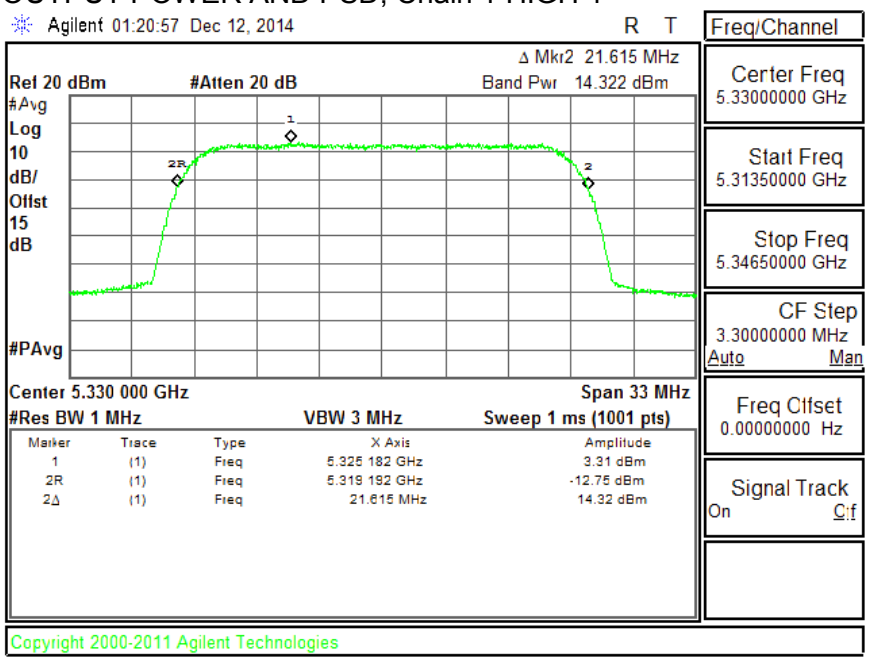
OUTPUT POWER AND PSD, Chain 1



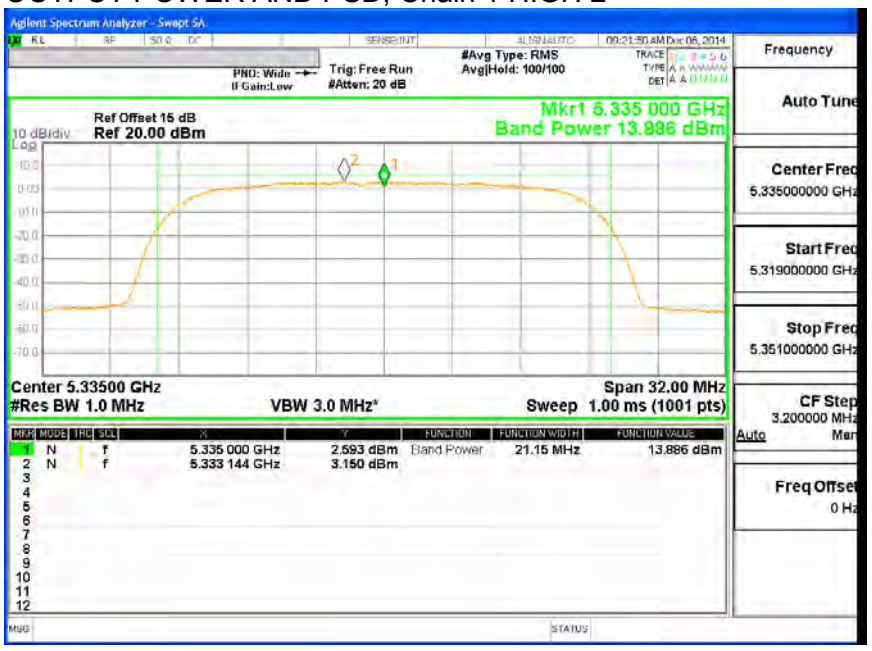




OUTPUT POWER AND PSD, Chain 1 HIGH 1



OUTPUT POWER AND PSD, Chain 1 HIGH 2



8.3.3. STRADDLE CHANNEL RESULTS

UNII-1 BAND

Bandwidth and Antenna Gain

Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PPSD (dBi)
5250	10.79	10.60	10.60

Limits

Frequency (MHz)	FCC Power Limit (dBm)	PPSD Limit (dBm)
5250	30.00	17.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PPSD

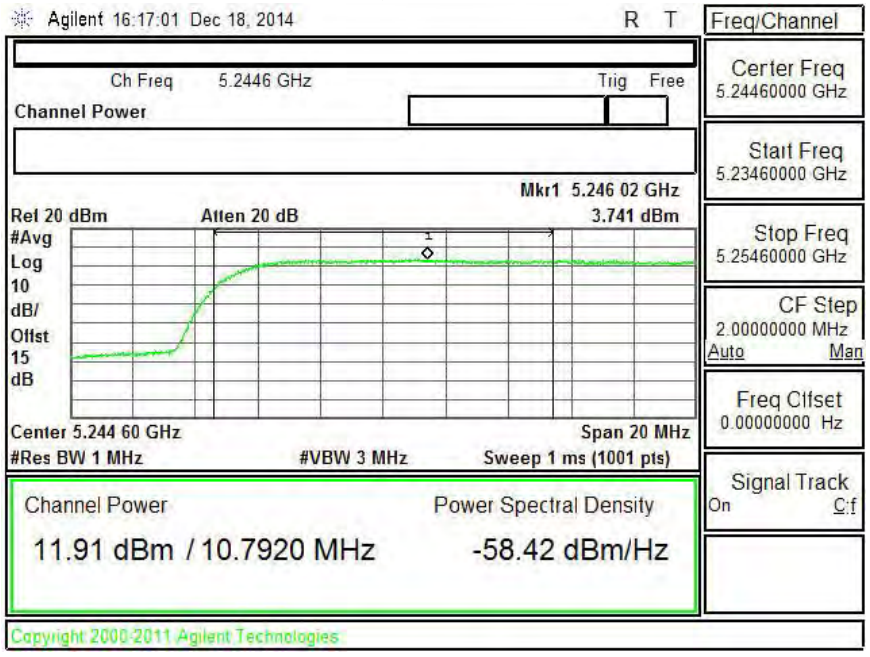
Output Power Results

Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
5250	11.91	11.80	14.87	30.00	-15.13

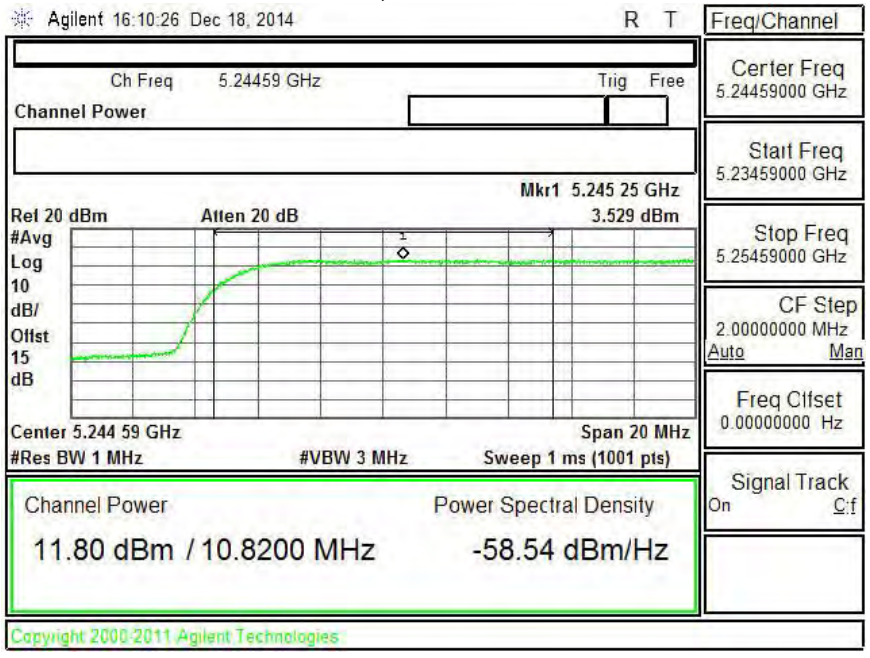
PPSD Results

Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Chain 1 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
5250	3.74	3.53	6.65	17.00	-10.35

OUTPUT POWER AND PSD, Chain 0 CH 5250 UNII-1



OUTPUT POWER AND PSD, Chain 1 CH 5250 UNII-1



UNII-2A BAND

Bandwidth and Antenna Gain

Frequency (MHz)	Min 26 dB BW (MHz)	Directio Gain for Power (dBi)	Directio Gain for PPSD (dBi)
5250	10.79	10.60	10.60

Limits

Frequency (MHz)	FCC Power Limit (dBm)	FCC PPSD Limit (dBm)
5250	16.73	6.40

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PPSD

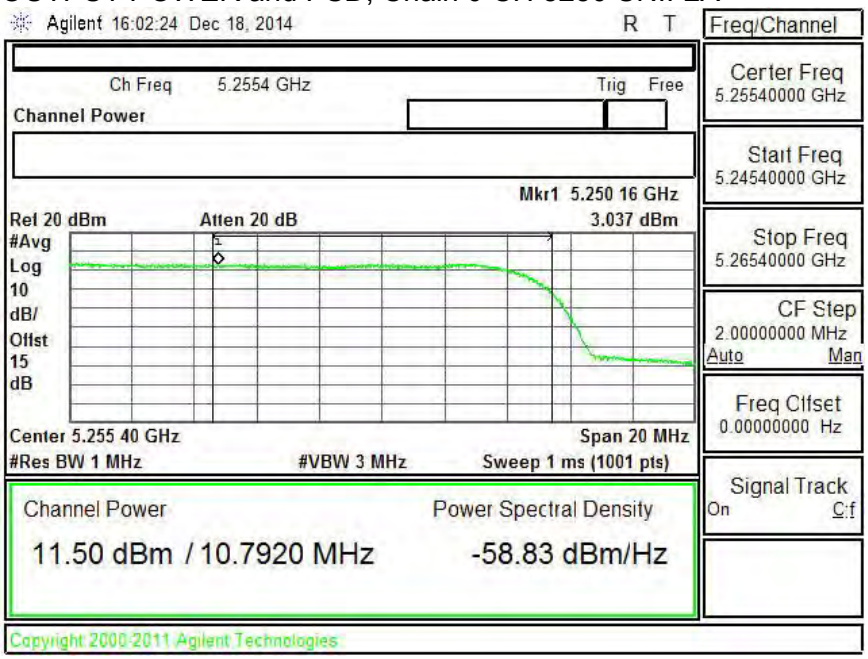
Output Power Results

Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
5250	11.50	11.19	14.36	16.73	-2.37

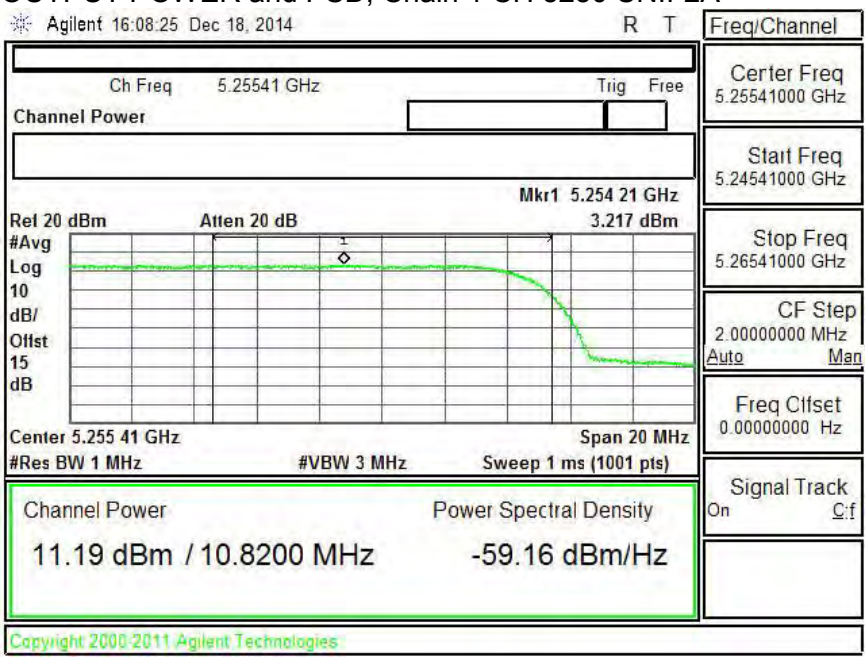
PPSD Results

Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Chain 1 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
5250	3.04	3.22	6.14	6.40	-0.26

OUTPUT POWER and PSD, Chain 0 CH 5250 UNII-2A



OUTPUT POWER and PSD, Chain 1 CH 5250 UNII-2A



8.3.4. CONDUCTED BANDEDGE

LIMITS

FCC §15.205 and §15.209

PART 15, SUBPART E

Radiated LIMIT:

(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

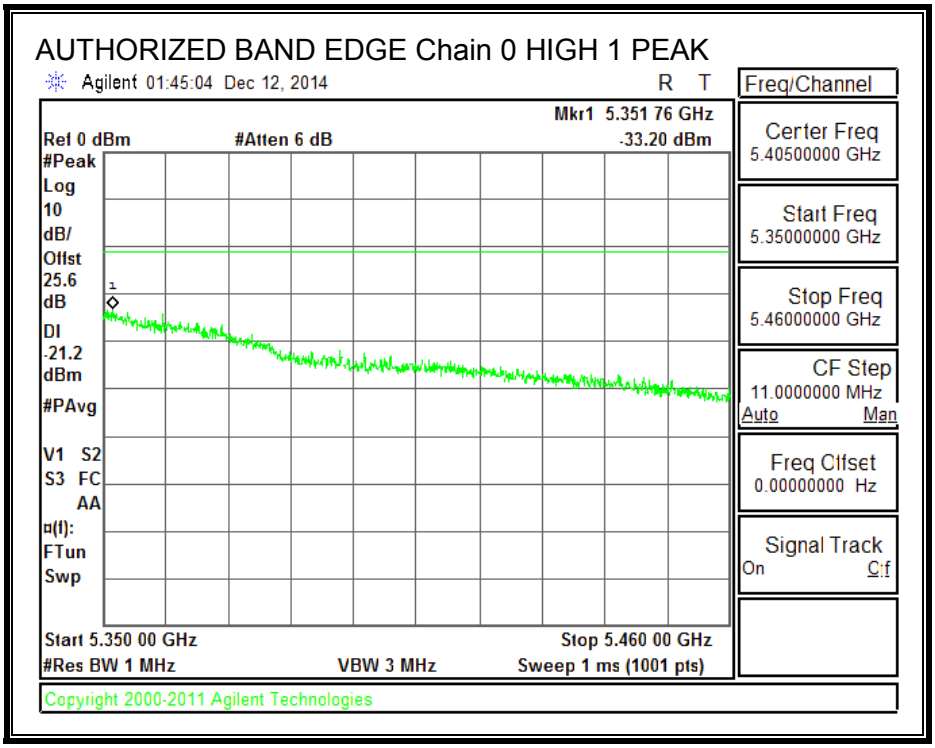
Procedure

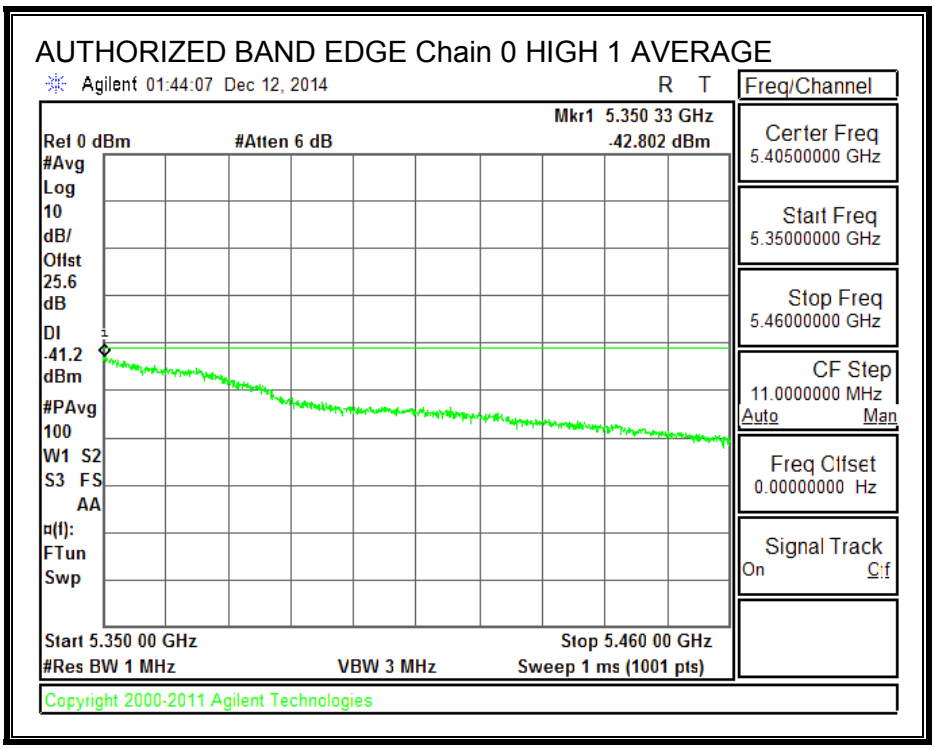
KDB 789033 D02 General UNII Test Procedures New Rules v01, Section II, G5, G6

Conducted measurements are being used to demonstrate compliance with the spurious limits in the restricted band (all other spurious emissions are measured using the radiated test method with the antennas connected). The limits are 54dBuV/m average and 74dBuV/m peak, which are equivalent to eirp of -41.2 dBm and -21.2dBm respectively. The plots include an offset to account for the EUT antenna gain and external attenuation between EUT antenna port and spectrum analyzer. As the two antenna chains feed cross polarized antennas with un- correlated signals the two chains are treated independently and the emissions do not need to be summed.

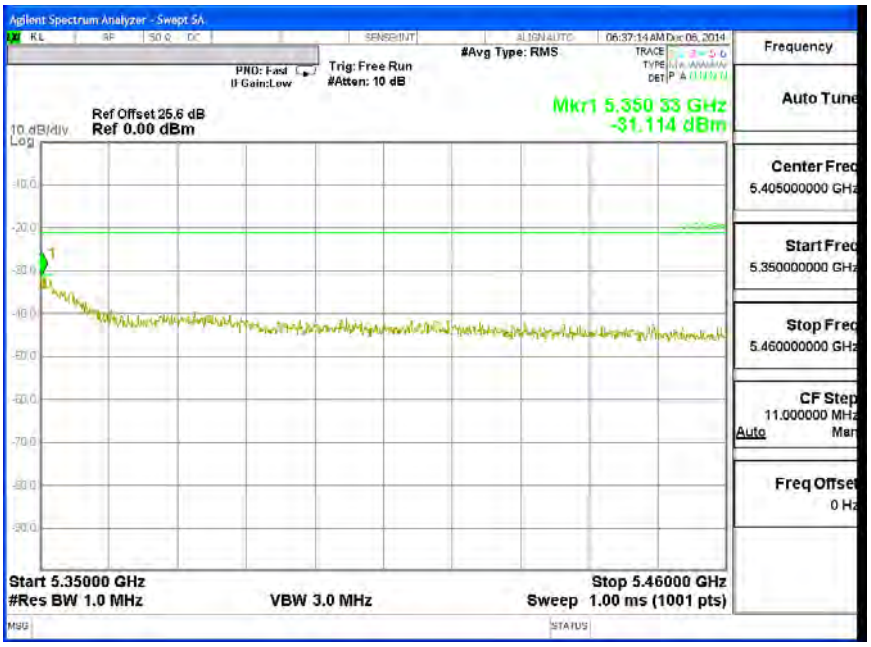
RESULTS

HIGH CHANNEL BANDEDGE, Chain 0

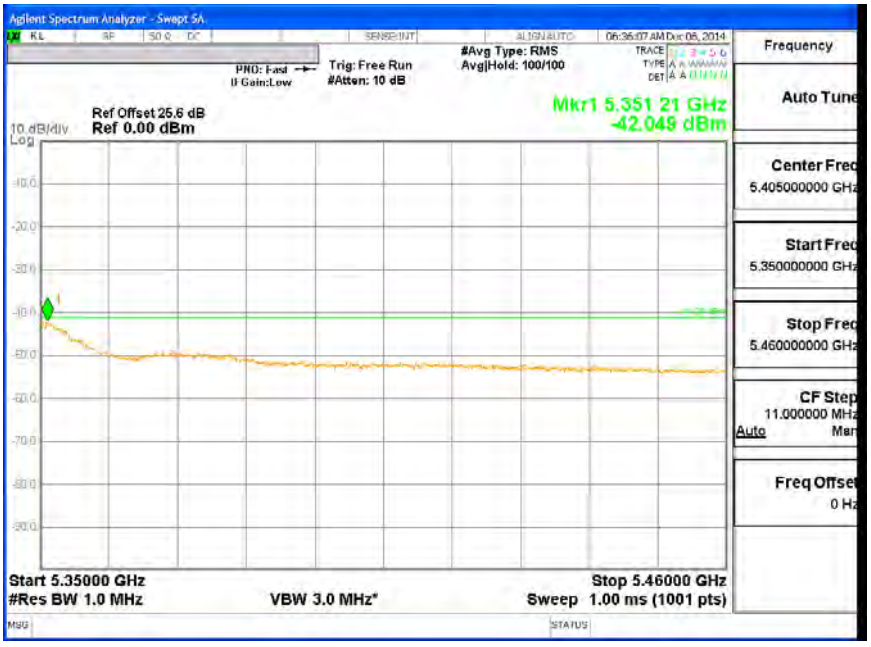




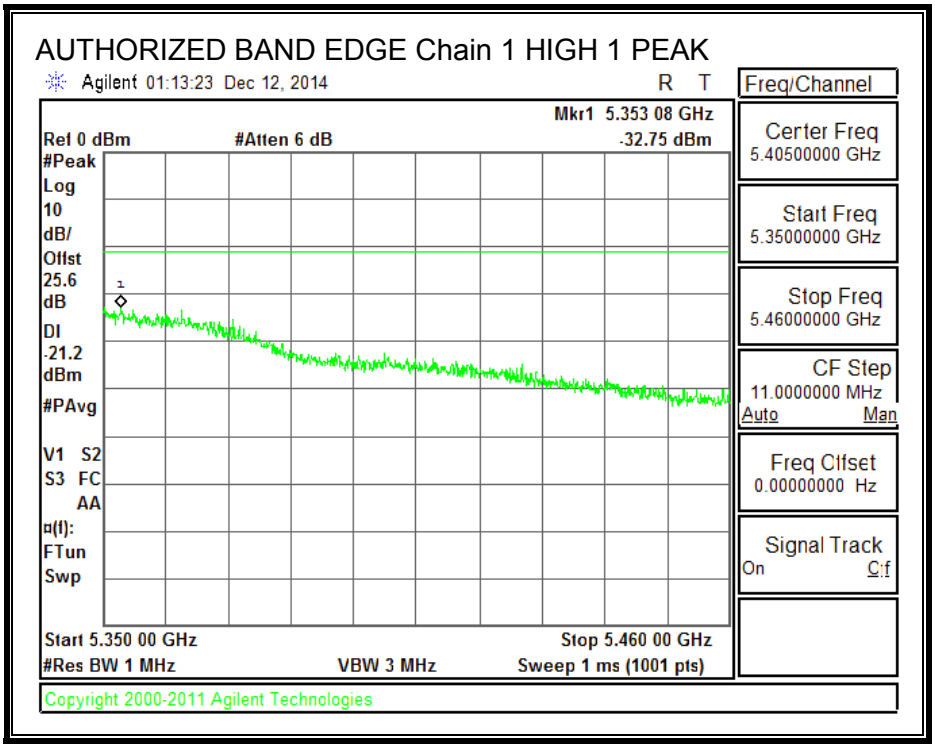
AUTHORIZED BAND EDGE Chain 0 HIGH 2 PEAK

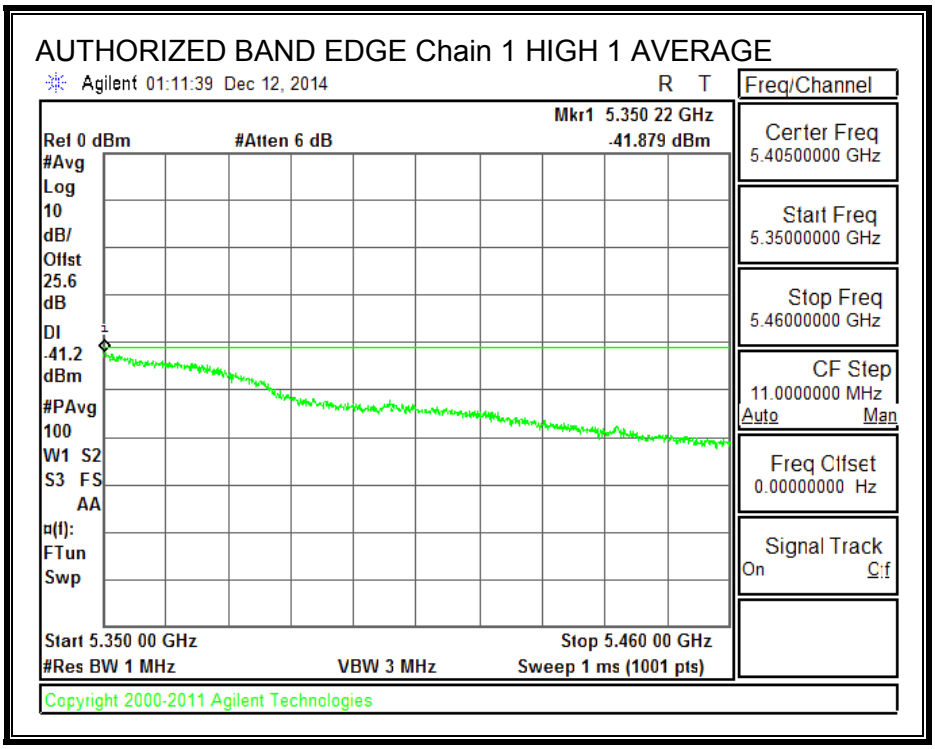


AUTHORIZED BAND EDGE Chain 0 HIGH 2 AVERAGE

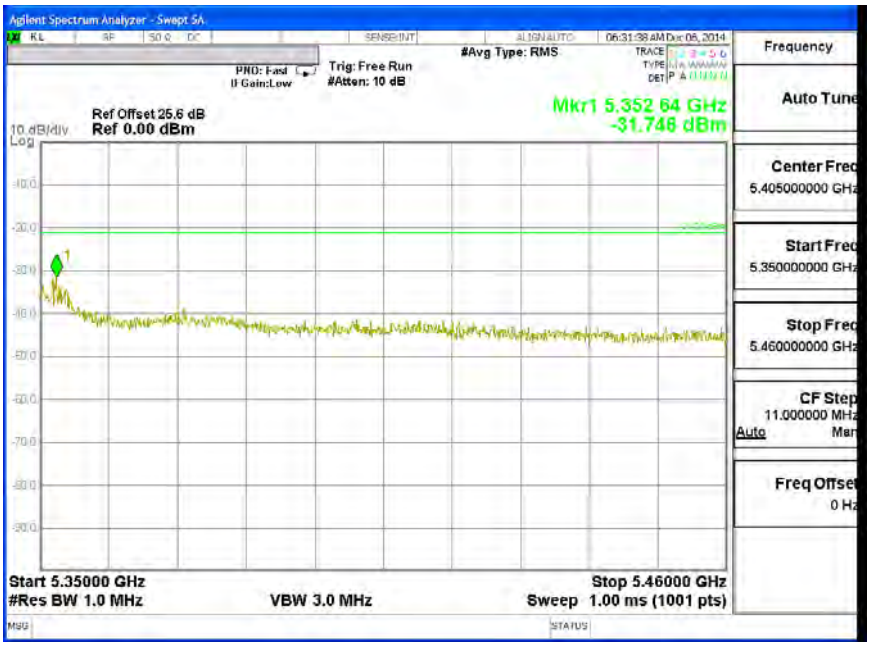


HIGH CHANNEL BANDEDGE, Chain 1

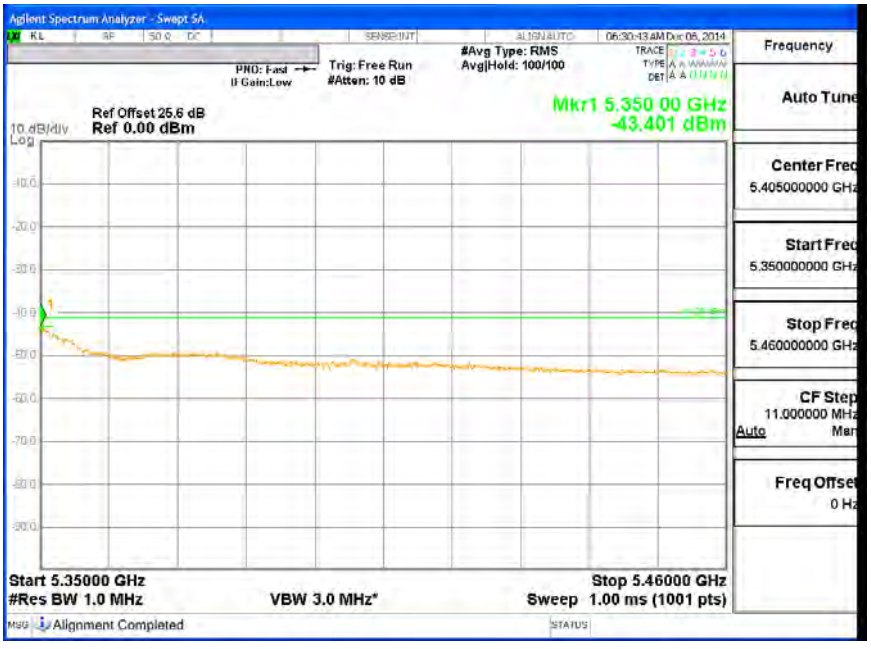




AUTHORIZED BAND EDGE Chain 1 HIGH 2 PEAK



AUTHORIZED BAND EDGE Chain 1 HIGH 2 AVERAGE



8.4. 40MHz 2TX MODE IN THE 5.3 GHz BAND

8.4.1. 26 dB BANDWIDTH

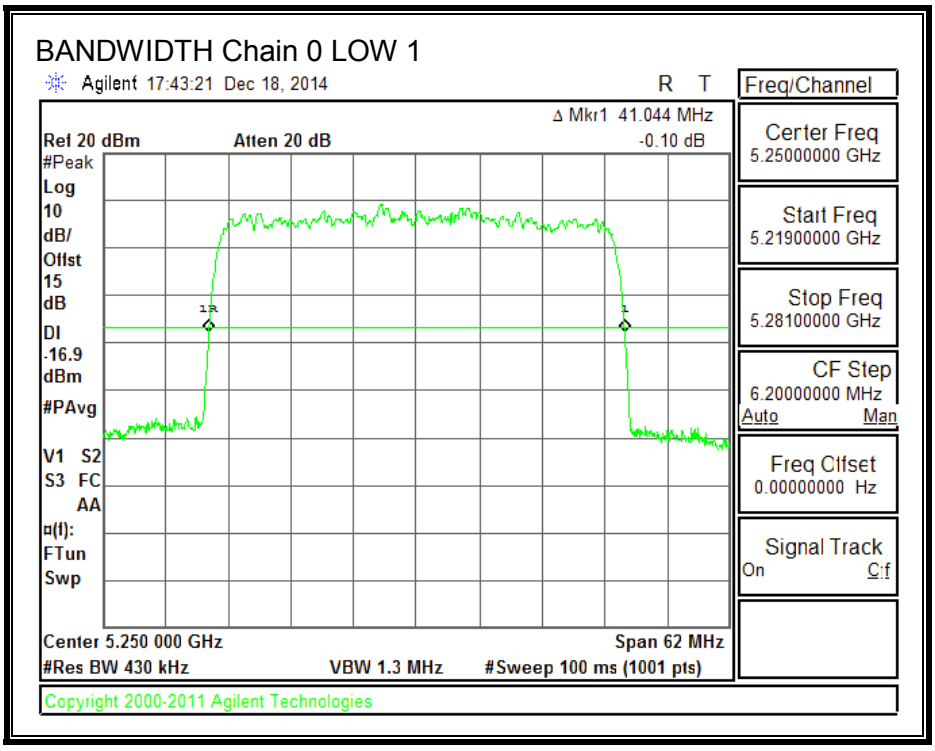
LIMITS

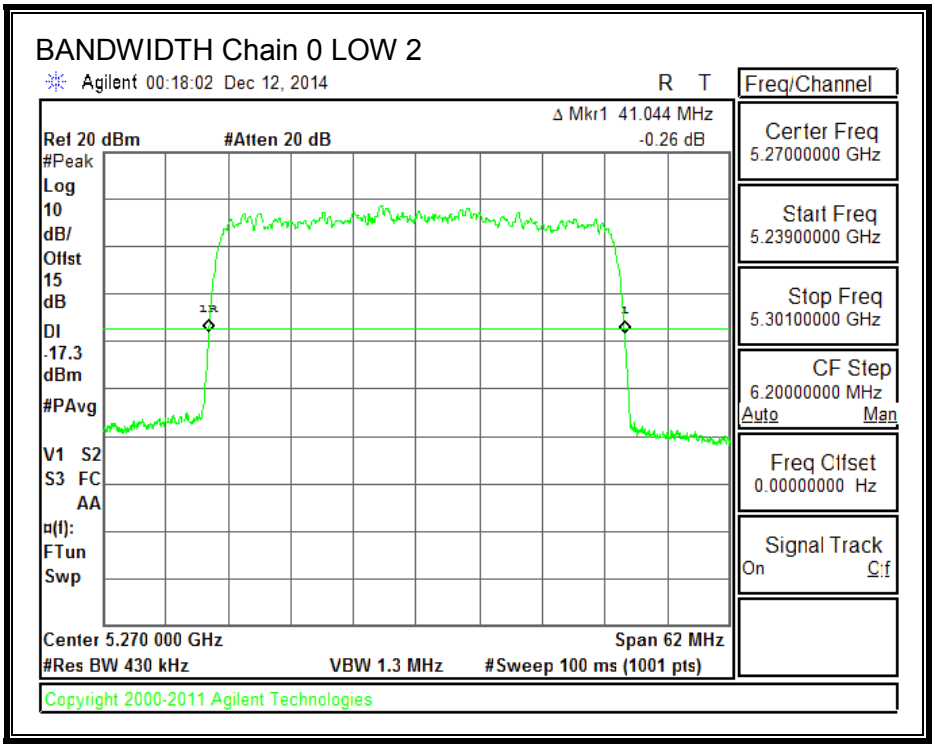
None; for reporting purposes only.

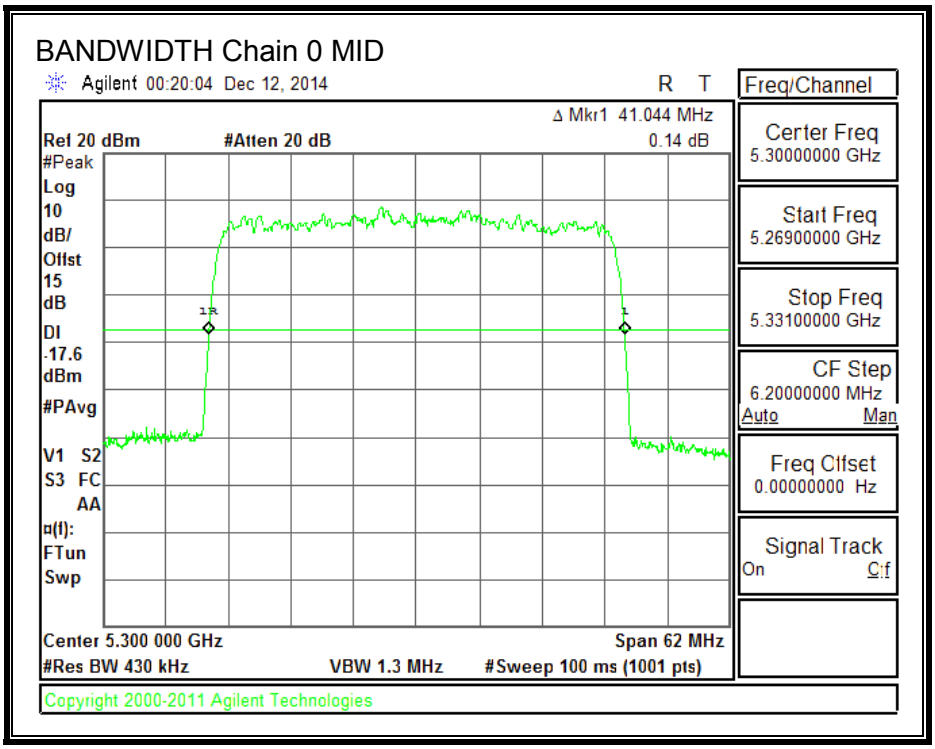
RESULTS

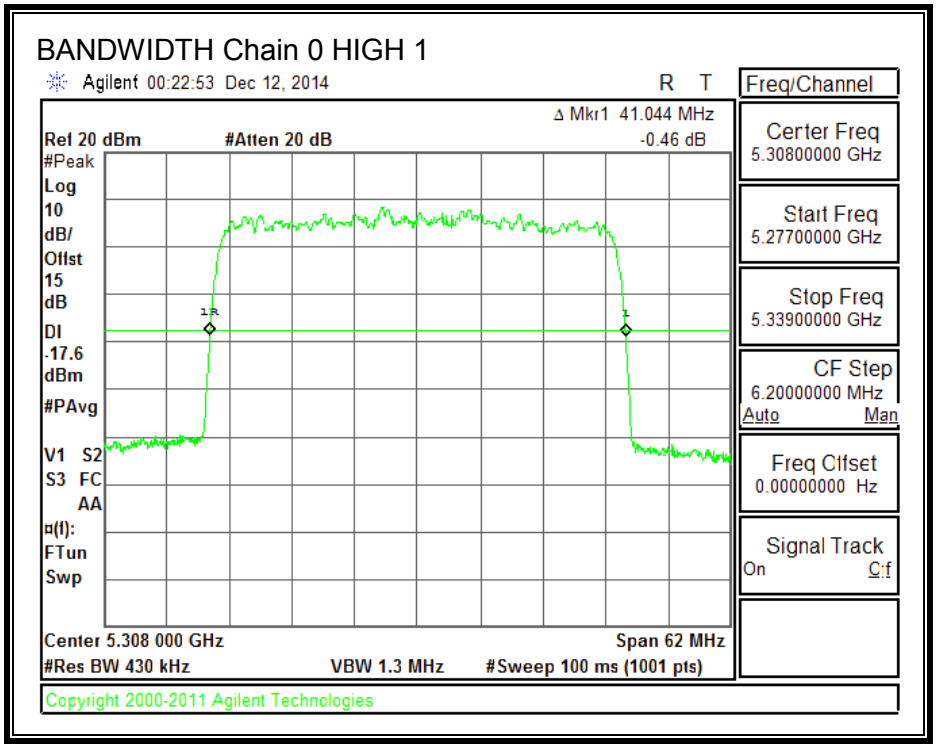
Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low 1	5250	41.04	40.98
Low 2	5270	41.04	41.02
Mid	5300	41.04	41.02
High 1	5308	41.04	41.02
High 2	5328	40.56	40.38

26 dB BANDWIDTH, Chain 0





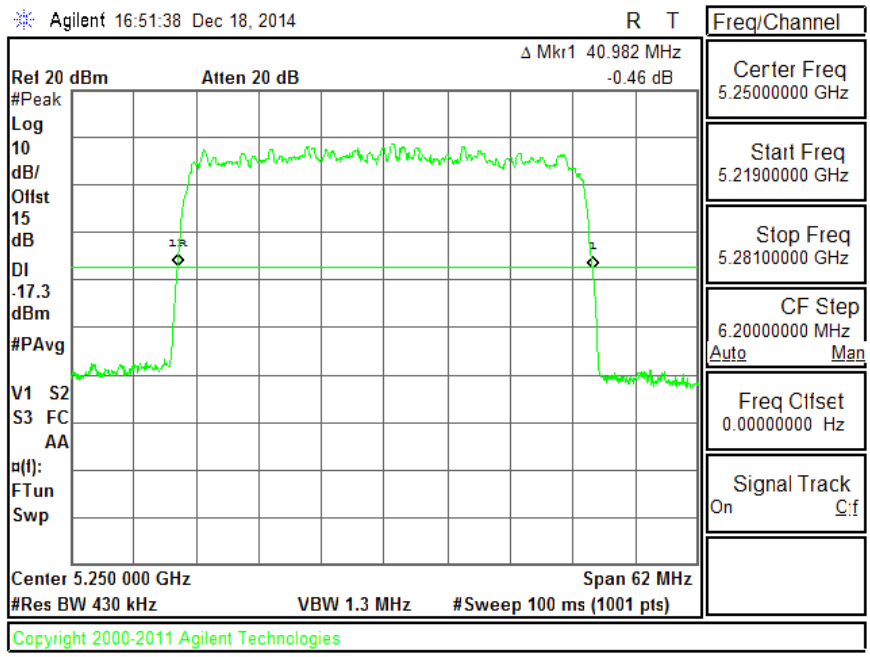


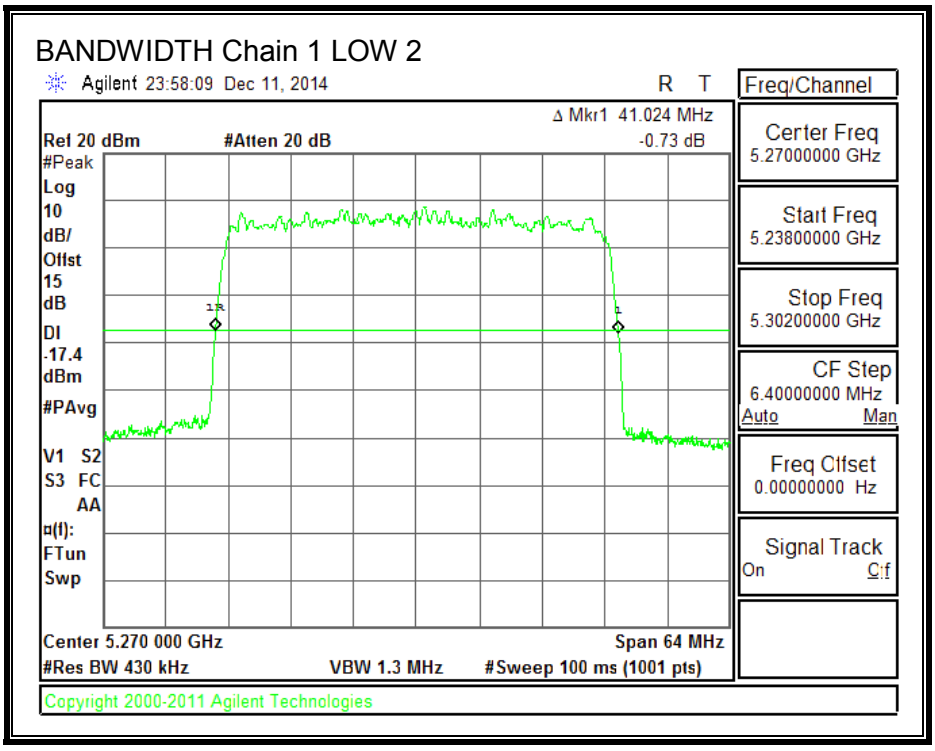


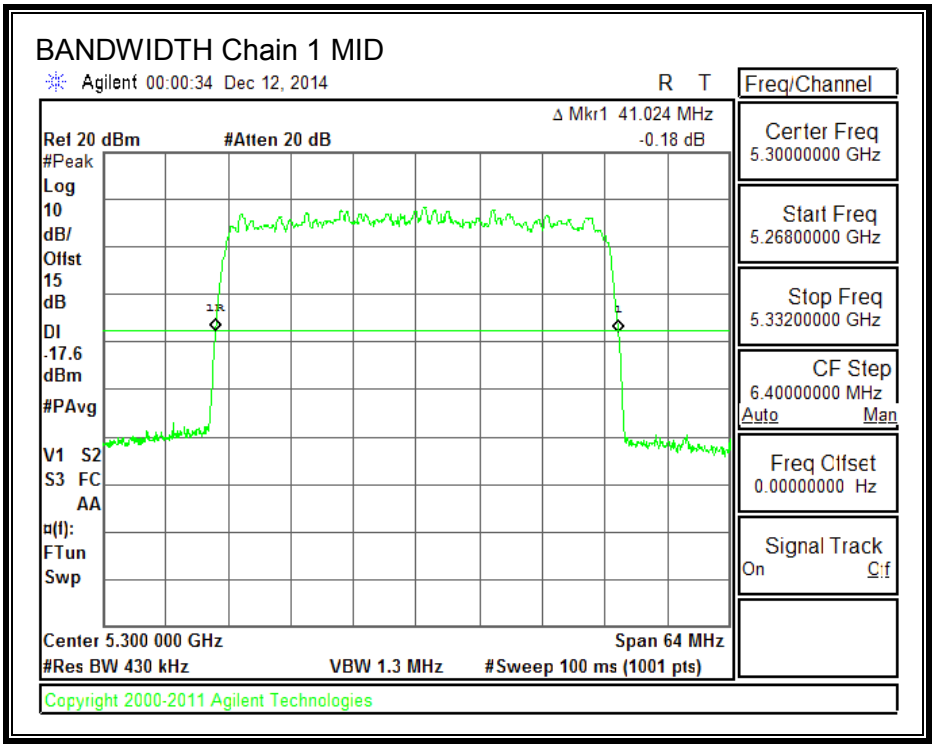
BANDWIDTH Chain 0 HIGH 2

26 dB BANDWIDTH, Chain 1

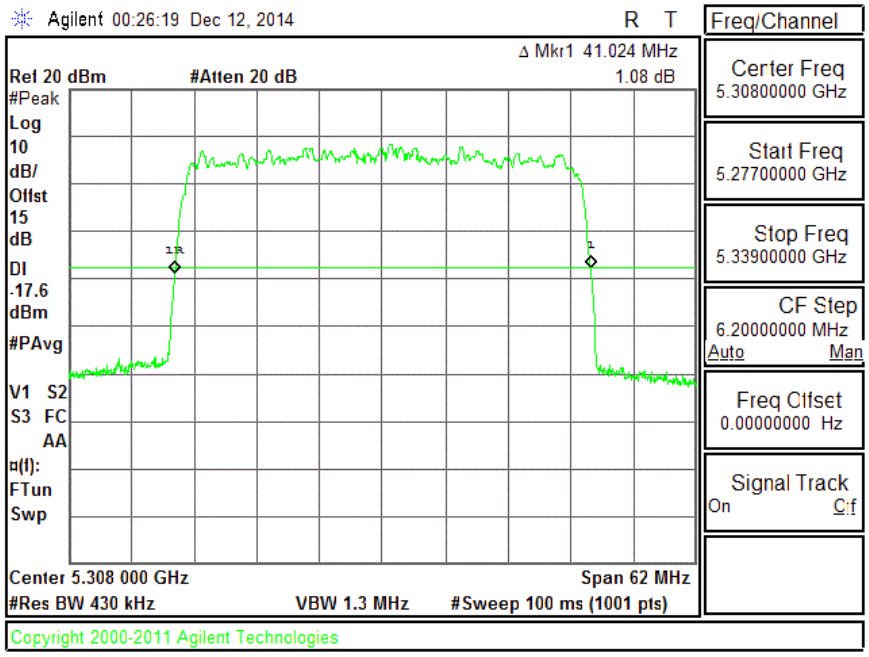
BANDWIDTH Chain 1 LOW 1



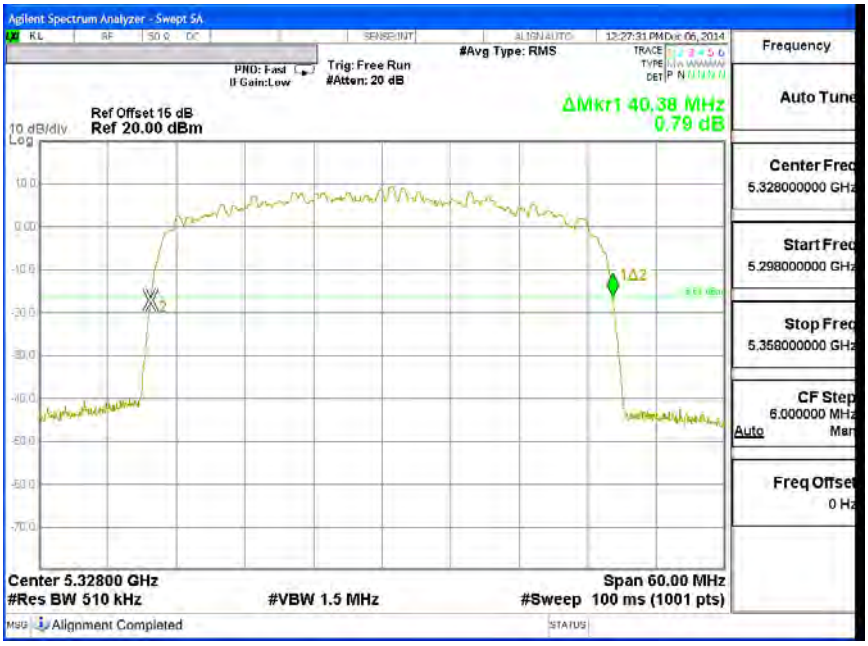




BANDWIDTH Chain 1 HIGH 1



BANDWIDTH Chain 1 HIGH 2



8.4.2. OUTPUT POWER AND PSD

LIMITS

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
10.60	10.60	10.60

RESULTS

Bandwidth, Antenna Gain and Limits

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Straddle	5250	40.98	10.60	10.60	19.40	6.40
Low 2	5270	41.02	10.60	10.60	19.40	6.40
Mid	5300	41.02	10.60	10.60	19.40	6.40
High 1	5308	41.02	10.60	10.60	19.40	6.40
High 2	5328	40.38	10.60	10.60	19.40	6.40

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PSD

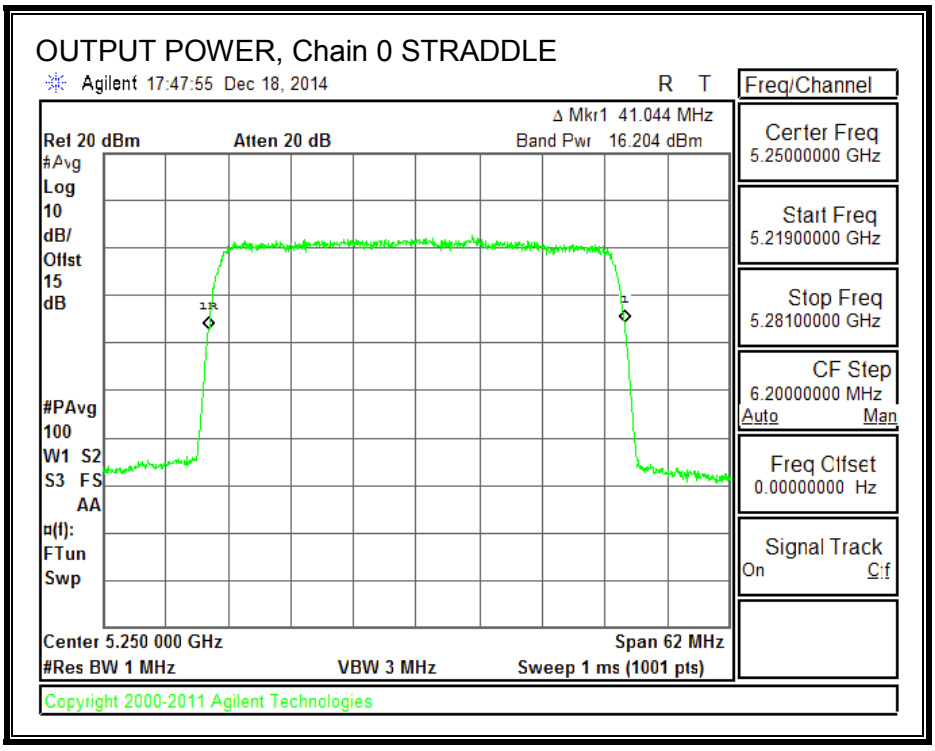
Output Power Results

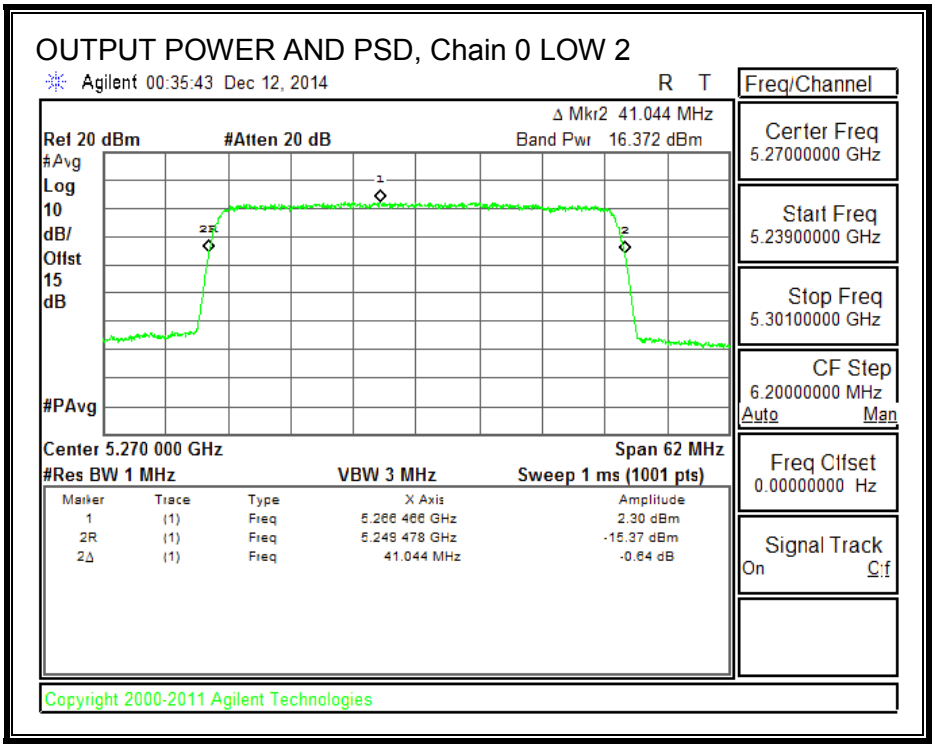
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Straddle	5250	16.20	16.24	19.23	19.40	-0.17
Low 2	5270	16.37	16.29	19.34	19.40	-0.06
Mid	5300	16.26	16.19	19.24	19.40	-0.16
High 1	5308	16.21	16.20	19.22	19.40	-0.18
High 2	5328	15.73	15.76	18.76	19.40	-0.64

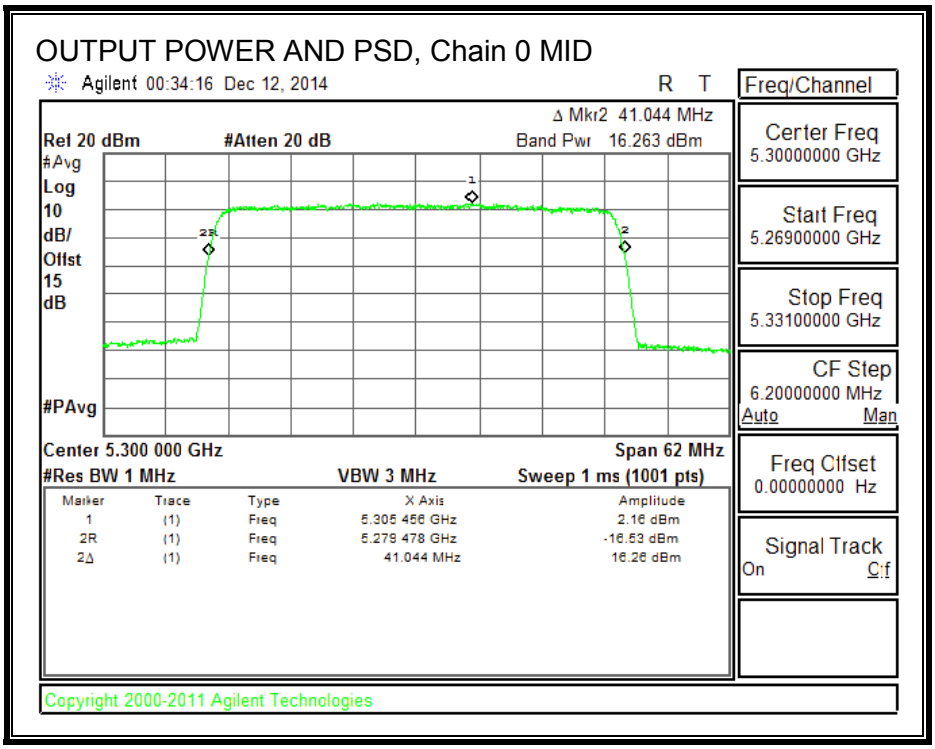
PSD Results

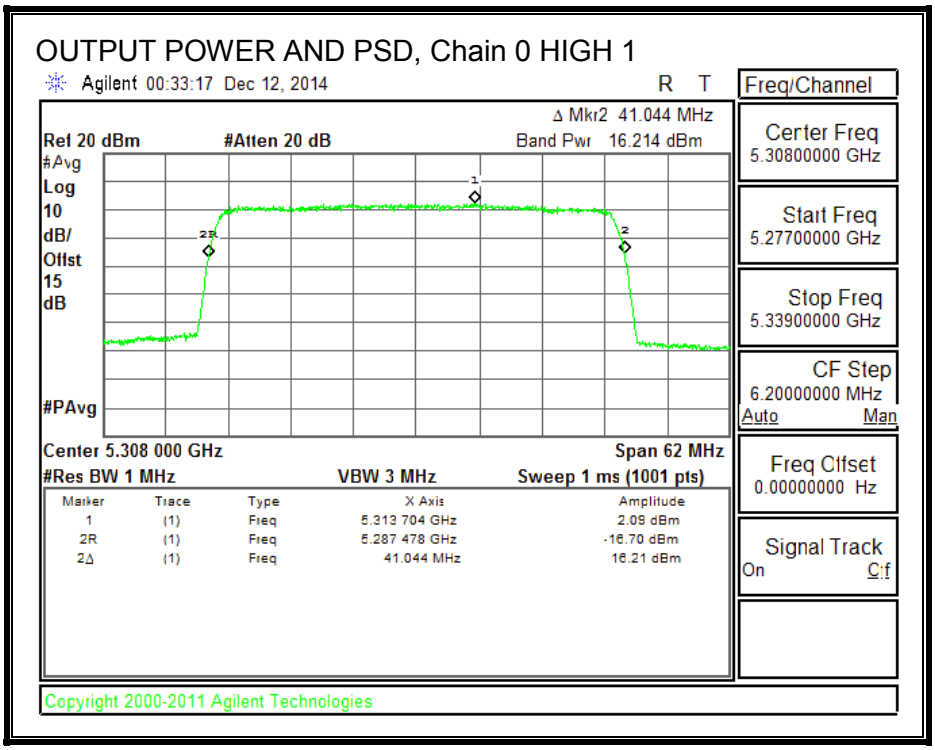
Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low 2	5270	2.30	2.30	5.31	6.40	-1.09
Mid	5300	2.16	2.37	5.28	6.40	-1.12
High 1	5308	2.09	2.51	5.32	6.40	-1.08
High 2	5328	2.65	3.05	5.86	6.40	-0.54

OUTPUT POWER AND PSD, Chain 0

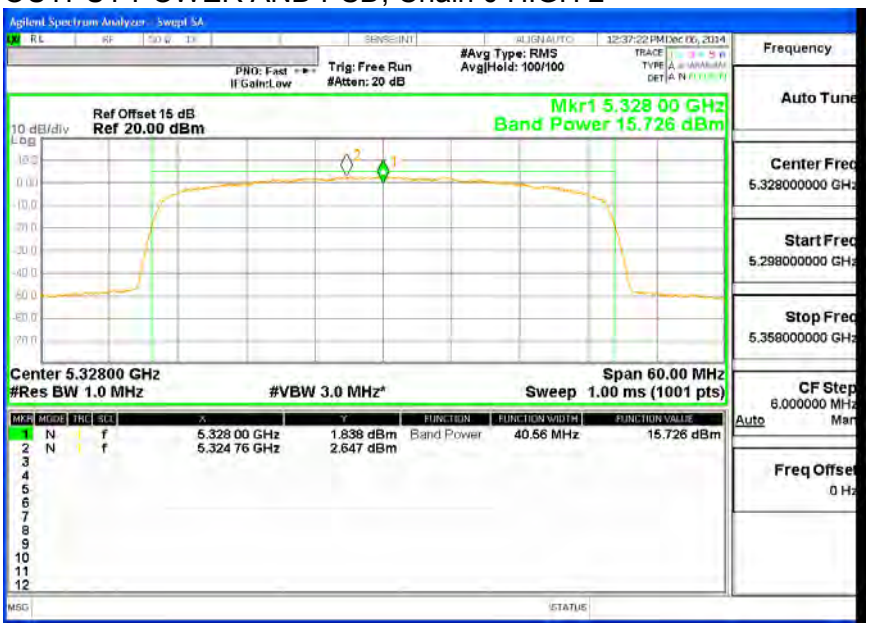






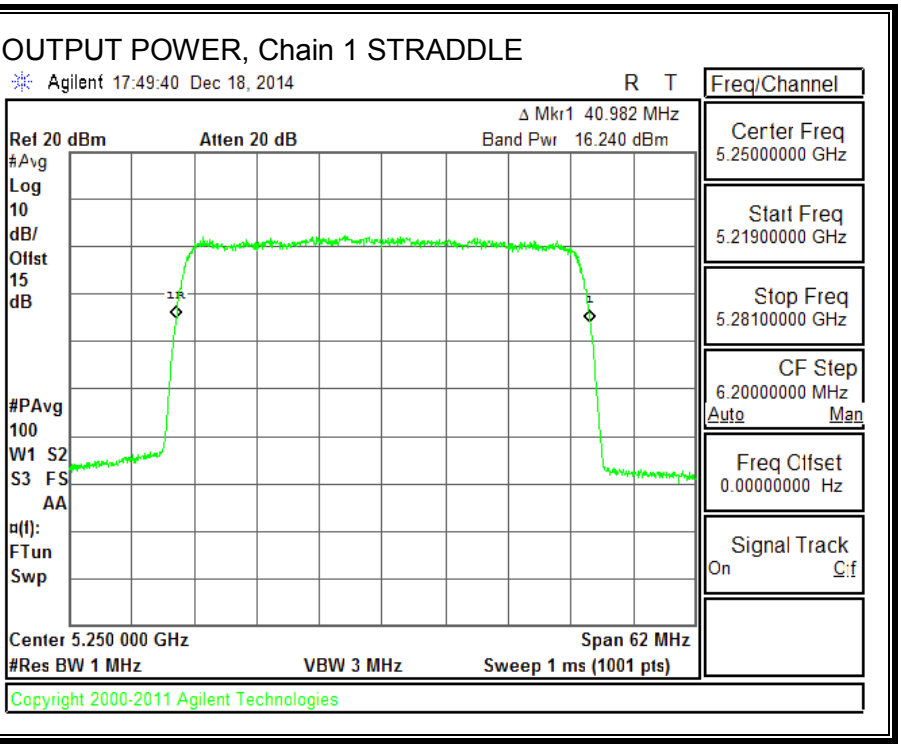


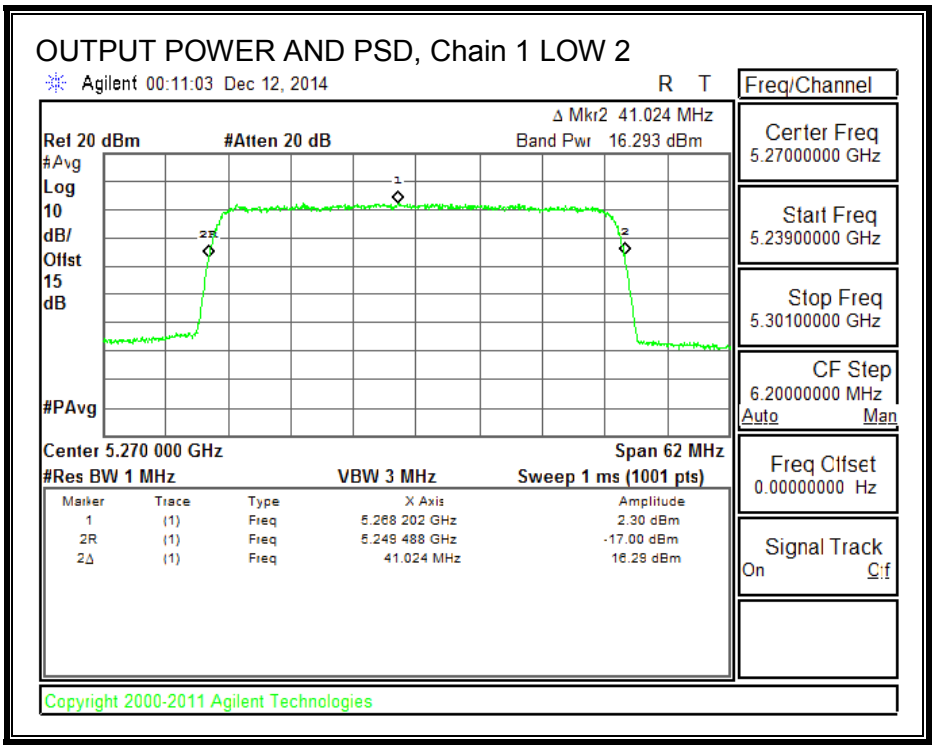
OUTPUT POWER AND PSD, Chain 0 HIGH 2

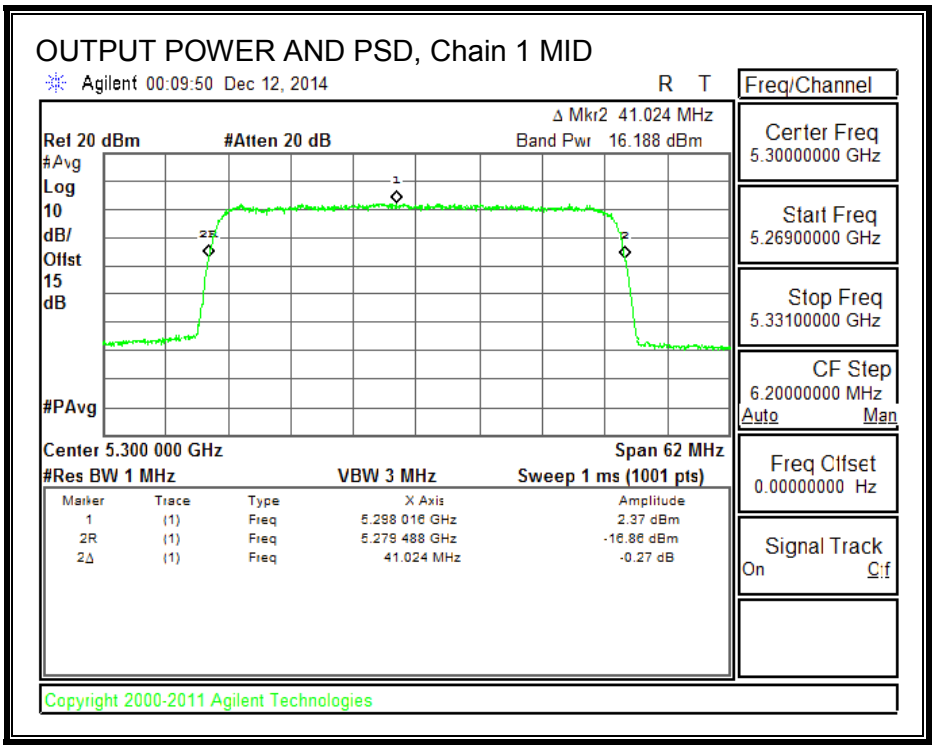


OUTPUT POWER AND PSD, Chain 1

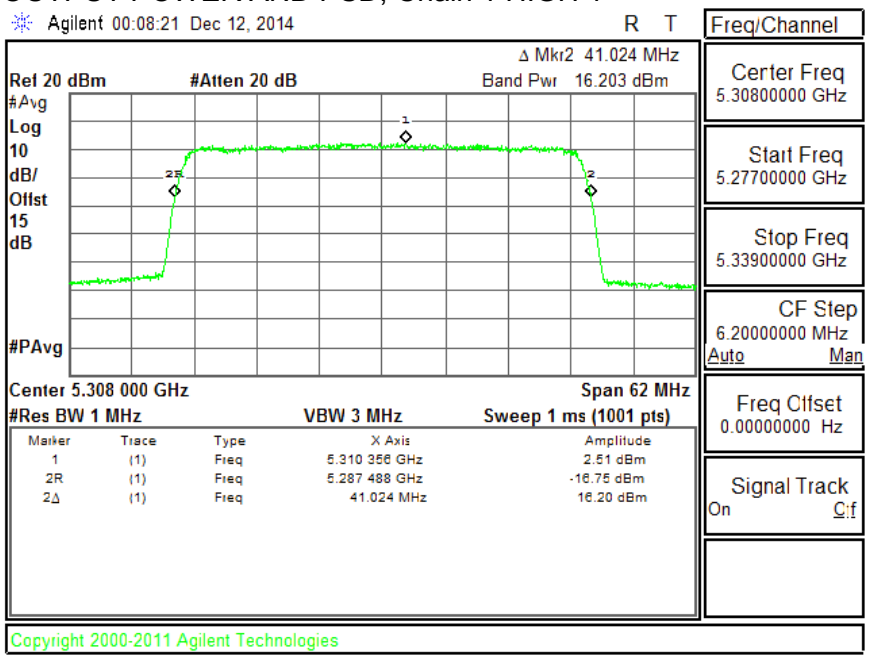
OUTPUT POWER, Chain 1 STRADDLE







OUTPUT POWER AND PSD, Chain 1 HIGH 1



OUTPUT POWER AND PSD, Chain 1 HIGH 2

8.4.3. STRADDLE CHANNEL RESULTS

UNII-1 BAND

Bandwidth and Antenna Gain

Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PPSD (dBi)
5250	20.49	10.60	10.60

Limits

Frequency (MHz)	FCC Power Limit (dBm)	PPSD Limit (dBm)
5250	30.00	17.00

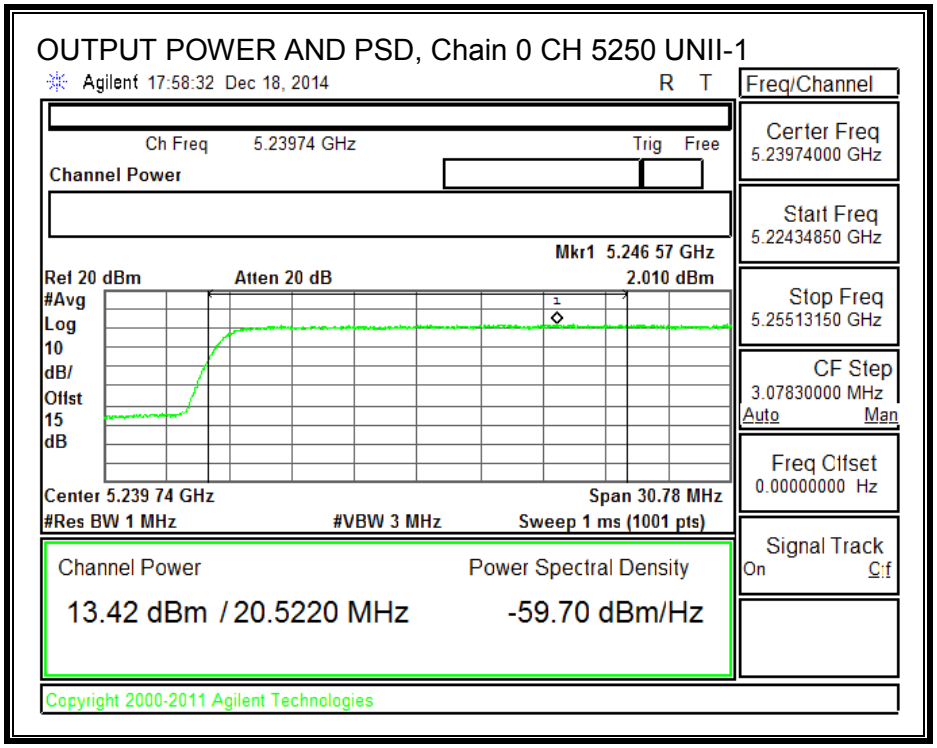
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PPSD

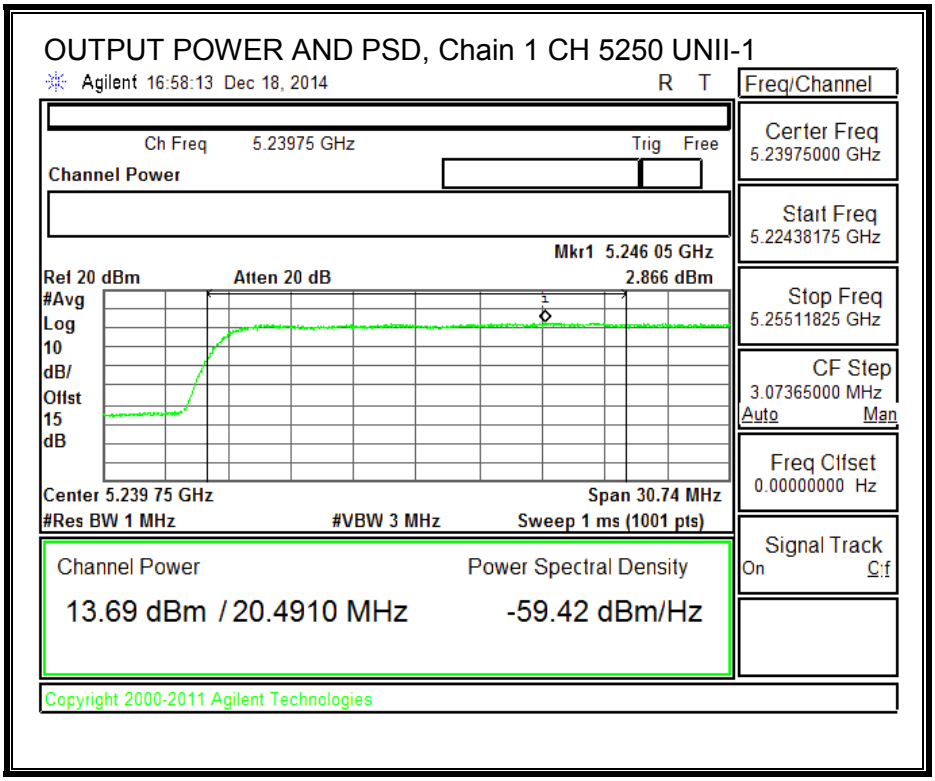
Output Power Results

Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
5250	13.42	13.69	16.57	30.00	-13.43

PPSD Results

Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Chain 1 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
5250	2.01	2.87	5.47	17.00	-11.53





UNII-2A BAND

Bandwidth and Antenna Gain

Frequency (MHz)	Min 26 dB BW (MHz)	Directio Gain for Power (dBi)	Directio Gain for PPSD (dBi)
5250	20.49	10.60	10.60

Limits

Frequency (MHz)	FCC Power Limit (dBm)	FCC PPSD Limit (dBm)
5250	19.40	6.40

Duty Cycle CF (dB)		Included in Calculations of Corr'd Power & PPSD

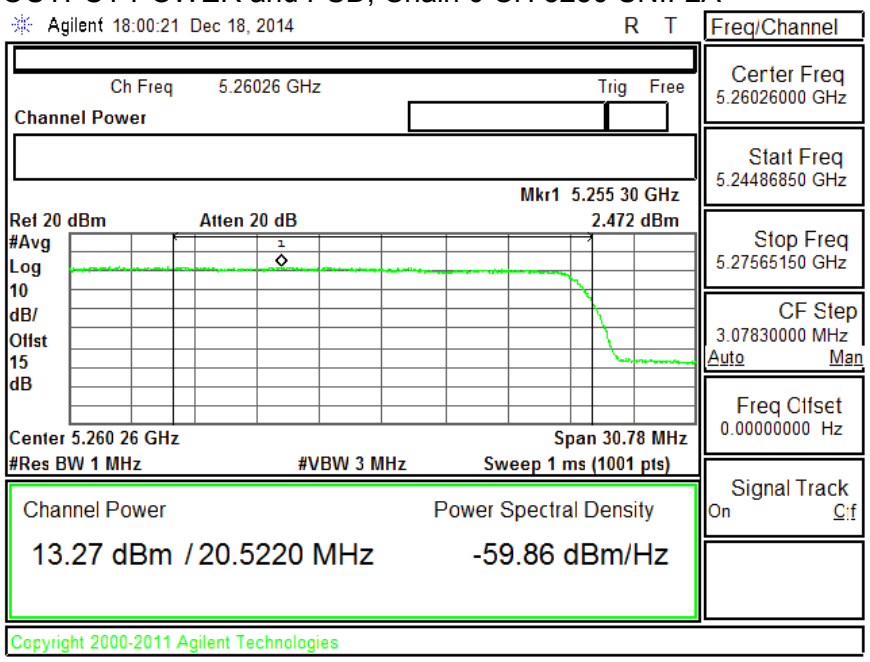
Output Power Results

Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
5250	13.27	13.44	16.37	19.40	-3.03

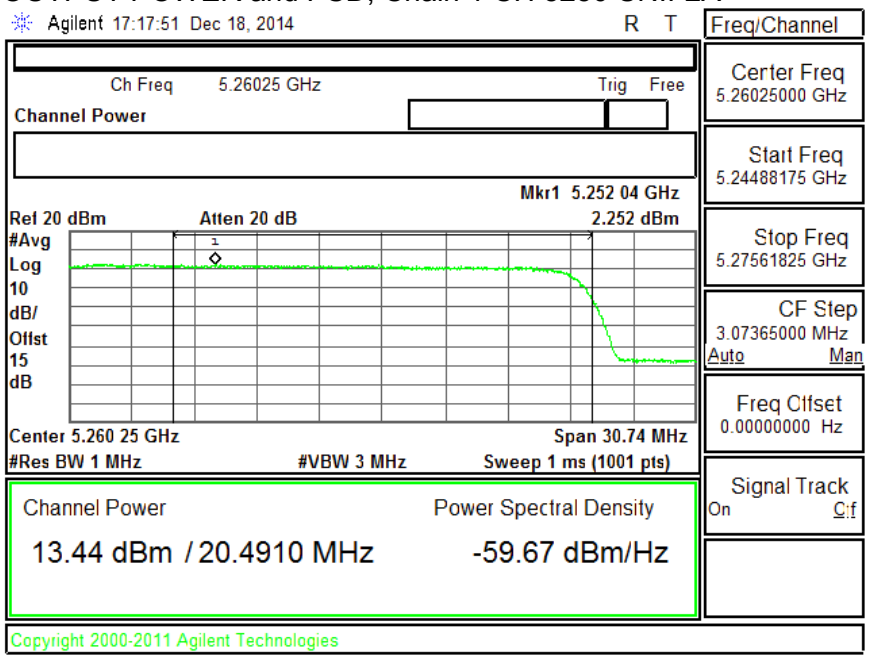
PPSD Results

Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Chain 1 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
5250	2.47	2.25	5.37	6.40	-1.03

OUTPUT POWER and PSD, Chain 0 CH 5250 UNII-2A



OUTPUT POWER and PSD, Chain 1 CH 5250 UNII-2A



8.4.4. CONDUCTED BANDEDGE

LIMITS

FCC §15.205 and §15.209

PART 15, SUBPART E

Radiated LIMIT:

(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

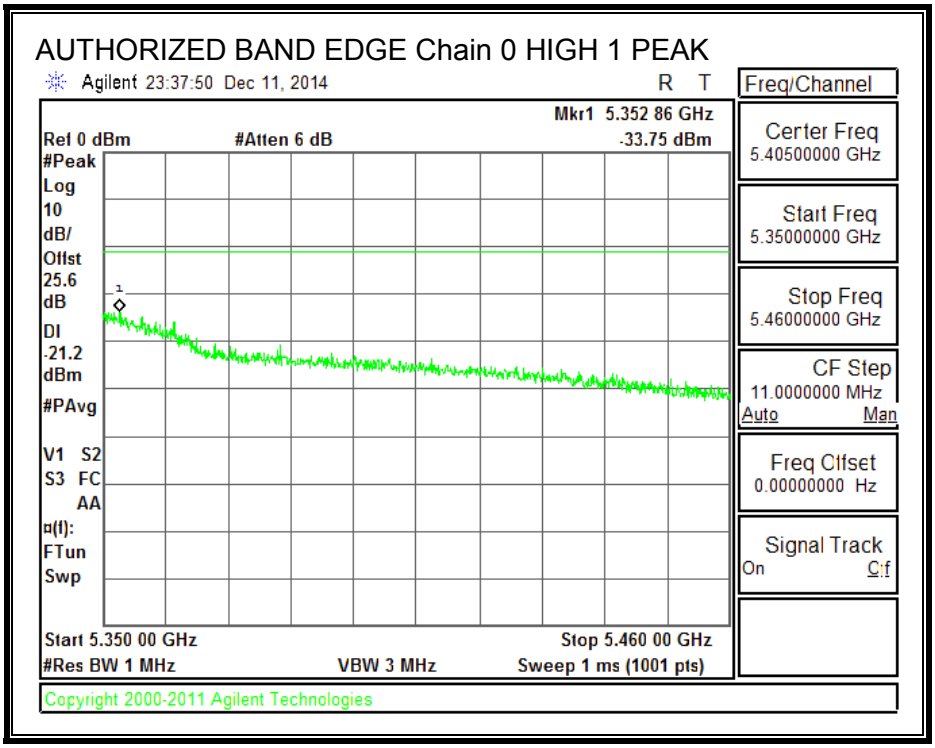
Procedure

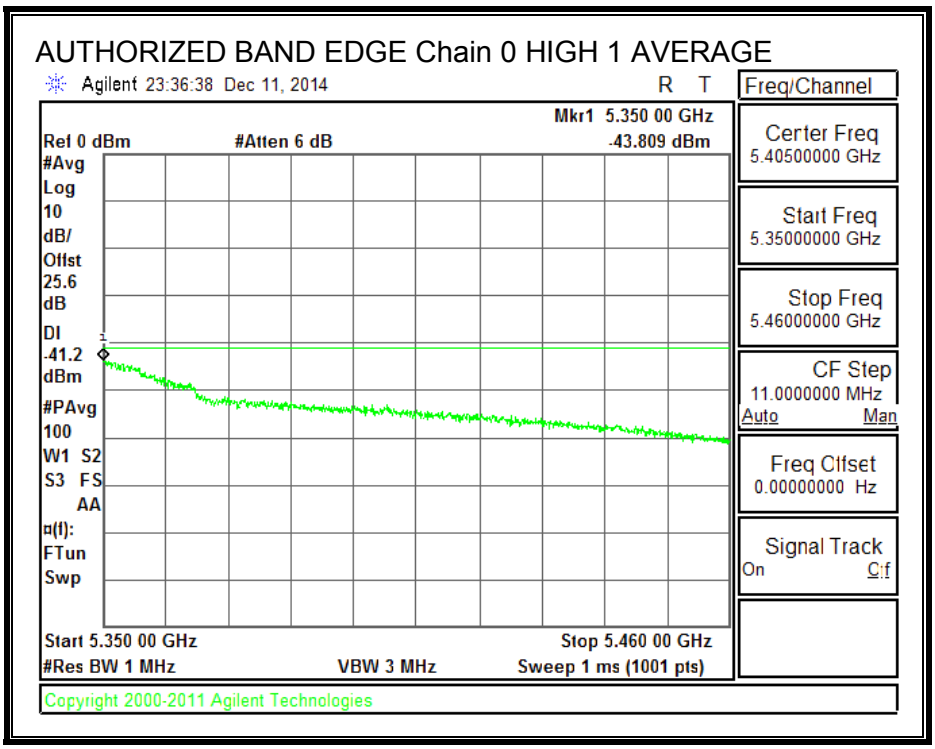
KDB 789033 D02 General UNII Test Procedures New Rules v01, Section II, G5, G6

Conducted measurements are being used to demonstrate compliance with the spurious limits in the restricted band (all other spurious emissions are measured using the radiated test method with the antennas connected). The limits are 54dBuV/m average and 74dBuV/m peak, which are equivalent to eirp of -41.2 dBm and -21.2dBm respectively. The plots include an offset to account for the EUT antenna gain and external attenuation between EUT antenna port and spectrum analyzer. As the two antenna chains feed cross polarized antennas with un- correlated signals the two chains are treated independently and the emissions do not need to be summed.

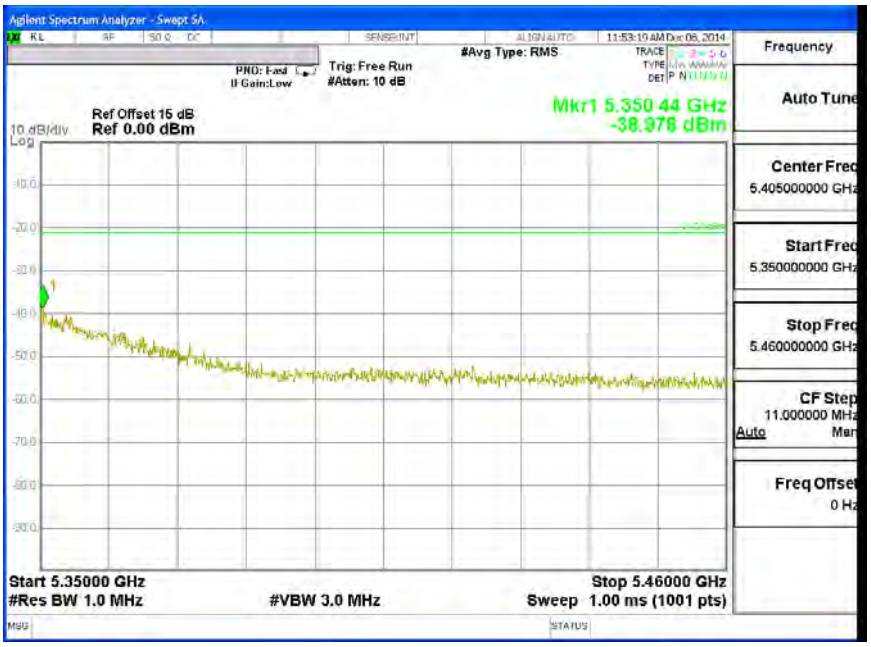
RESULTS

HIGH CHANNEL BANDEDGE, Chain 0

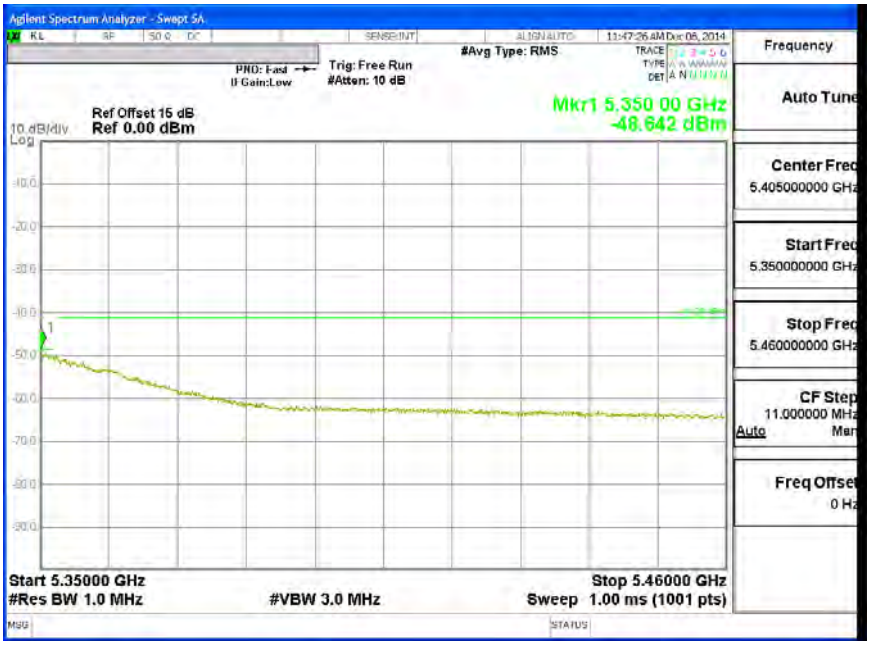




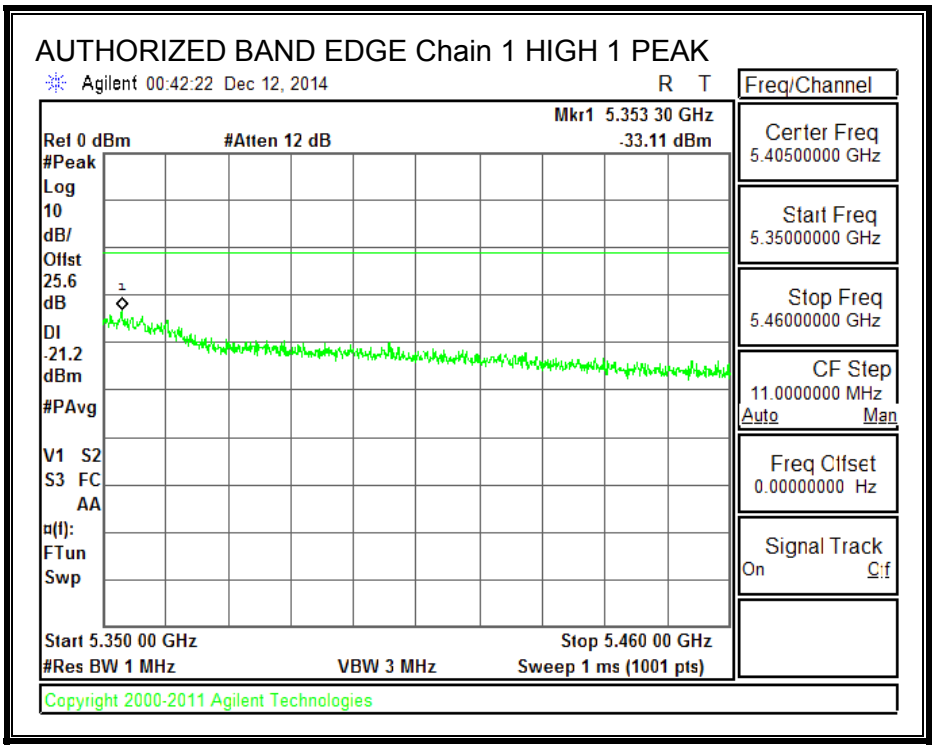
AUTHORIZED BAND EDGE Chain 0 HIGH 2 PEAK

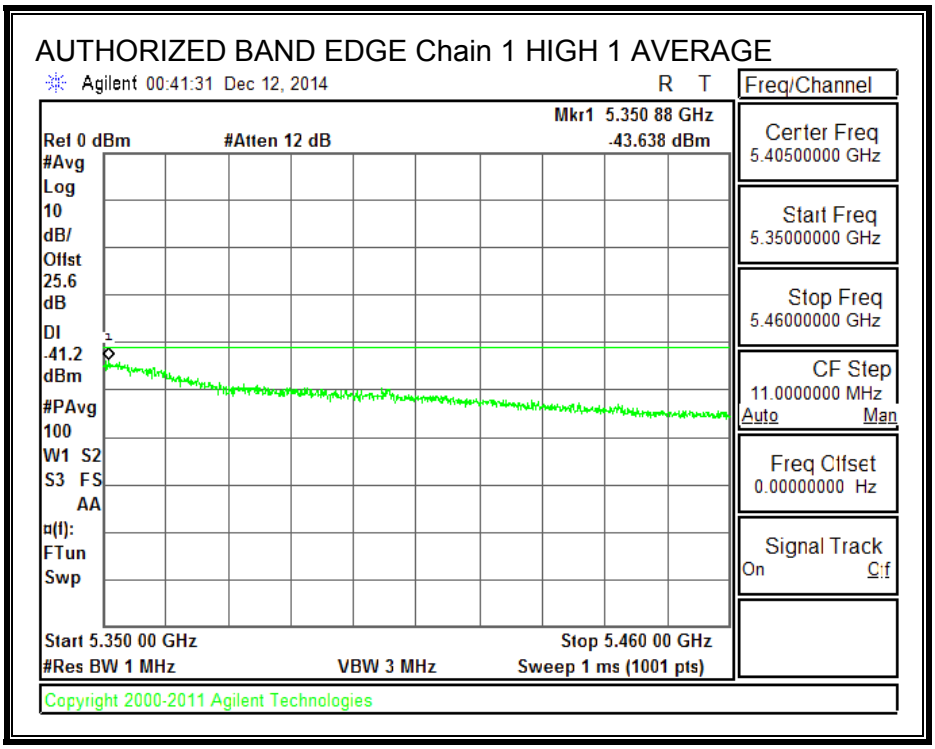


AUTHORIZED BAND EDGE Chain 0 HIGH 2 AVERAGE

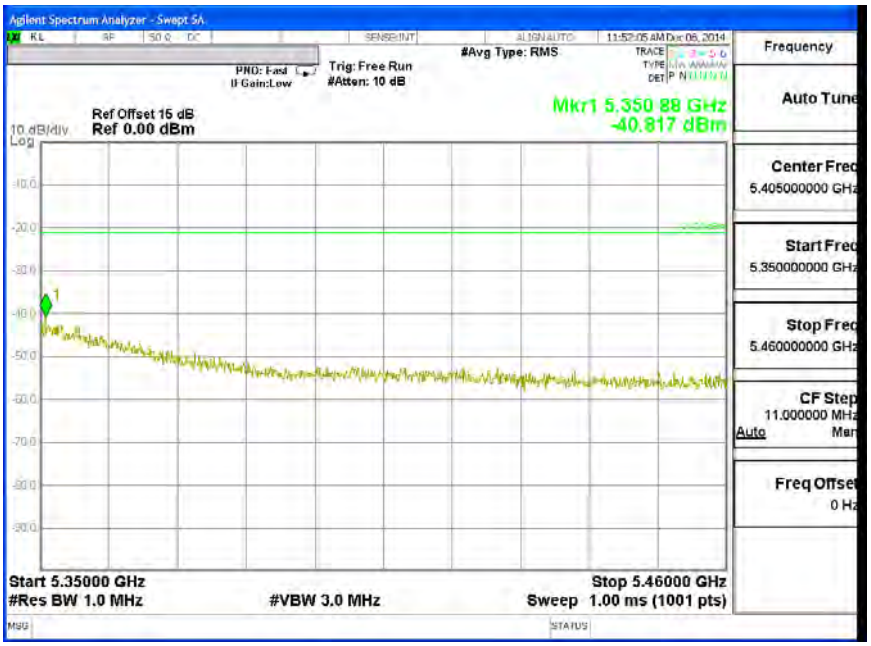


HIGH CHANNEL BANDEDGE, Chain 1

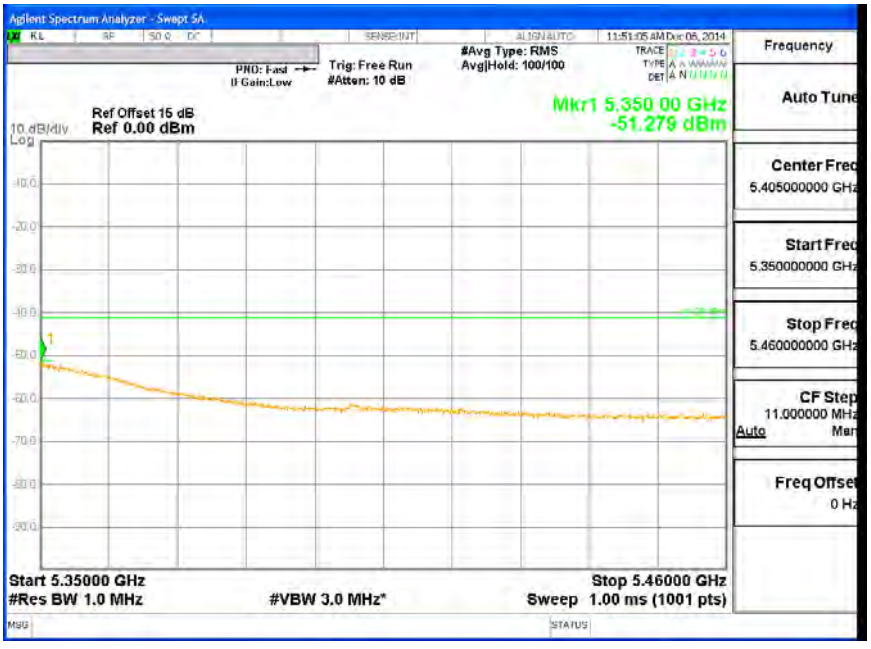




AUTHORIZED BAND EDGE Chain 1 HIGH 2 PEAK



AUTHORIZED BAND EDGE Chain 1 HIGH 2 AVERAGE



9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

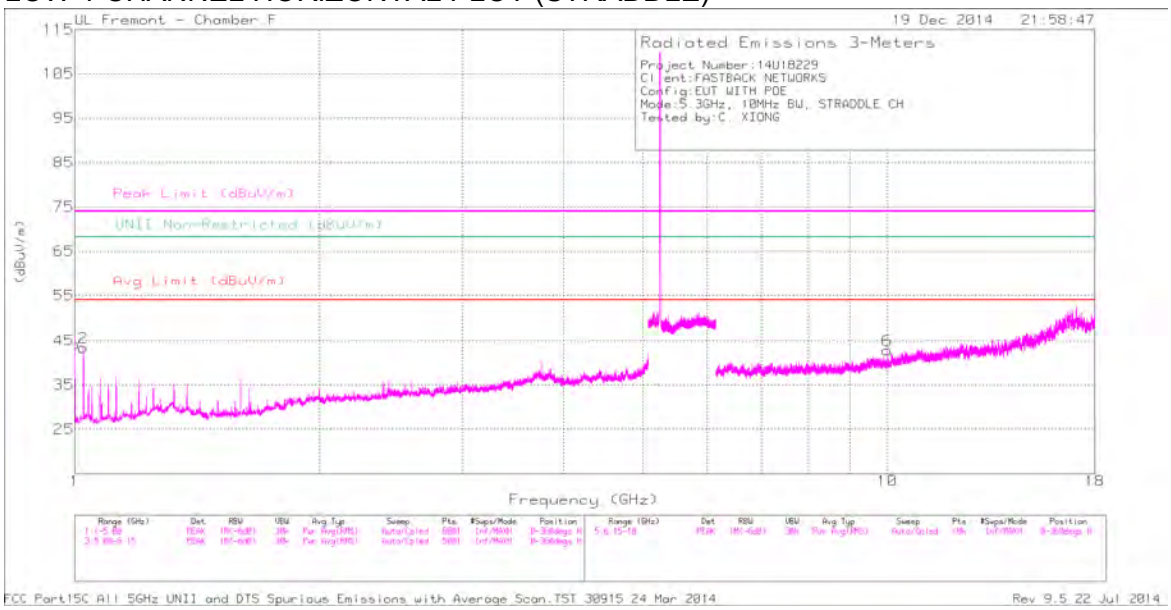
Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

9.2. TRANSMITTER ABOVE 1 GHz

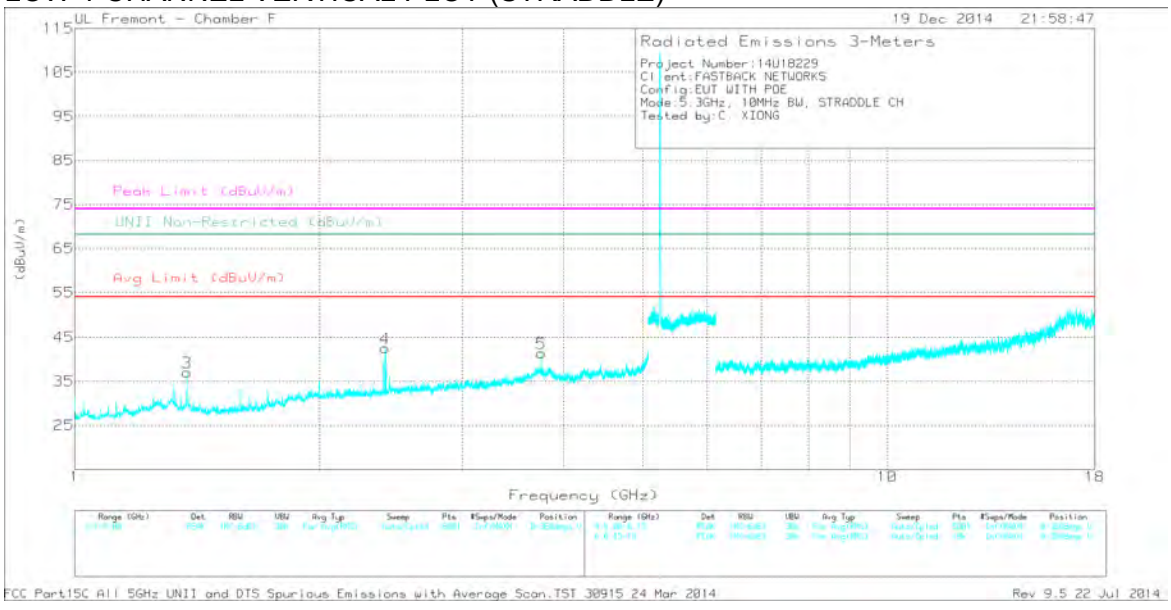
9.2.1. TX ABOVE 1 GHz 10MHz 2 TX MODE IN THE 5.3 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

LOW 1 CHANNEL HORIZONTAL PLOT (STRADDLE)



LOW 1 CHANNEL VERTICAL PLOT (STRADDLE)



DATA

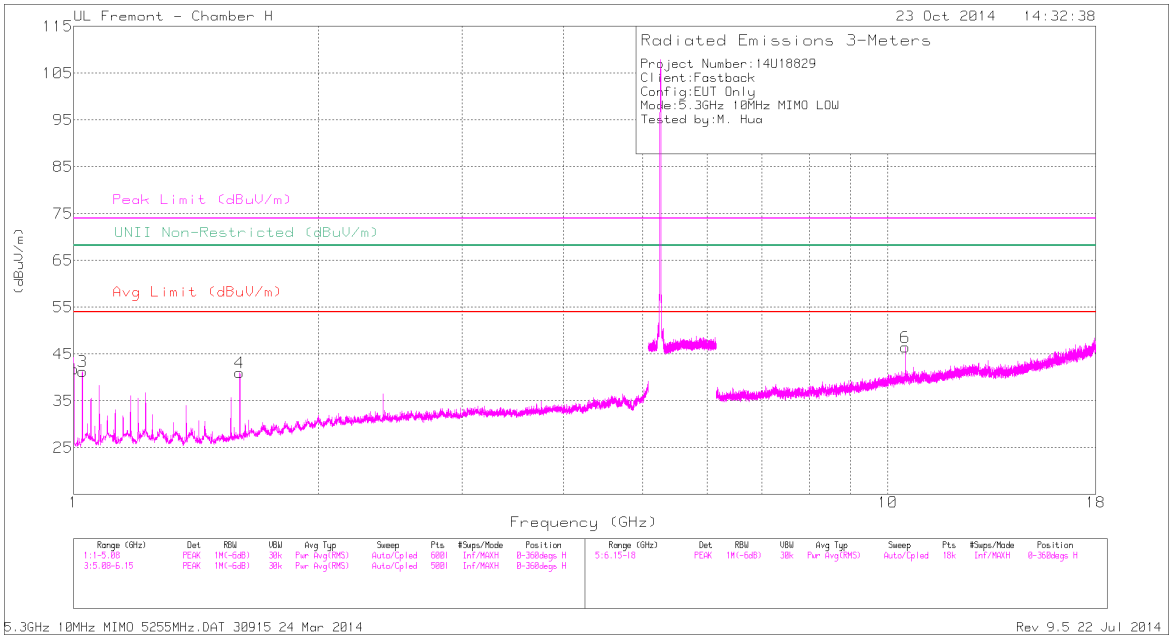
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/Fltr/ Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1	53.07	PK1	27.6	-32.6	48.07	-	-	74	-25.93	-	-	317	119	H
1	* 1	47.73	AD1	27.6	-32.6	42.73	54	-11.27	-	-	-	-	317	119	H
2	* 1.025	50.76	PK1	27.6	-32.4	45.96	-	-	74	-28.04	-	-	311	117	H
2	* 1.025	45.33	AD1	27.6	-32.4	40.53	54	-13.47	-	-	-	-	311	117	H
3	* 1.375	43.27	PK1	29.4	-31.9	40.77	-	-	74	-33.23	-	-	343	152	V
3	* 1.375	35.09	AD1	29.4	-31.9	32.59	54	-21.41	-	-	-	-	343	152	V
4	2.409	39.78	PK1	32.2	-30.8	41.18	-	-	-	-	68.2	-27.02	220	215	V
5	* 3.75	42.08	PK1	34.6	-29.7	46.98	-	-	74	-27.02	-	-	3	195	V
5	* 3.75	33.46	AD1	34.6	-29.7	38.36	54	-15.64	-	-	-	-	3	195	V
6	10.001	35.43	PK1	37.2	-22.3	50.33	-	-	-	-	68.2	-17.87	177	107	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

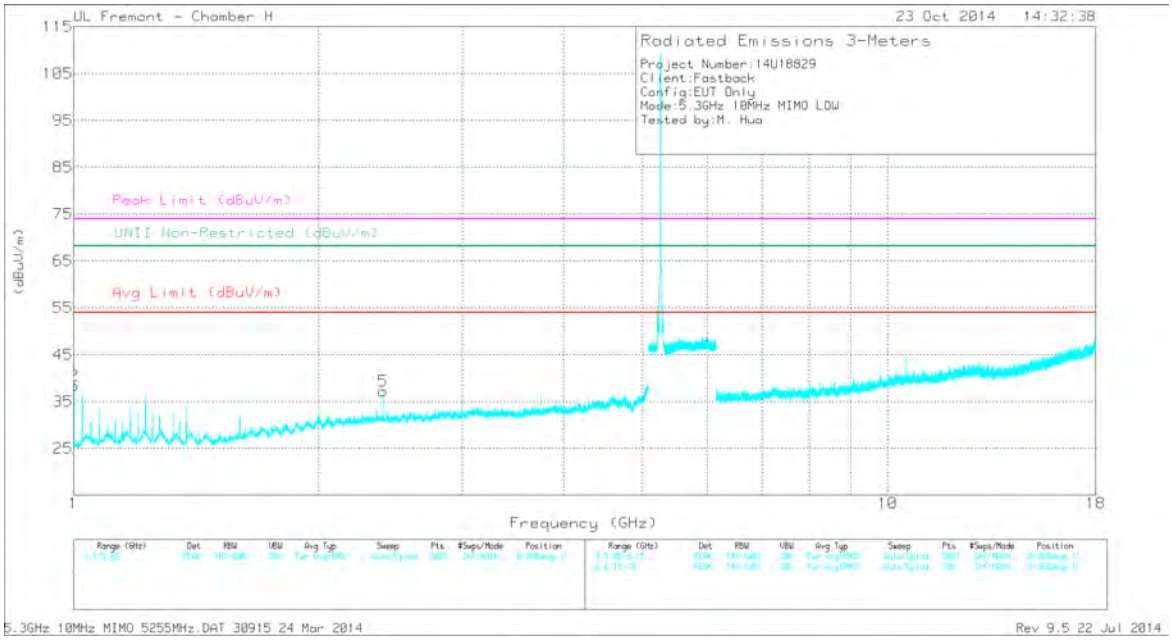
PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average

LOW 2 CHANNEL HORIZONTAL PLOT



LOW 2 CHANNEL VERTICAL PLOT



DATA

Radiated Emissions

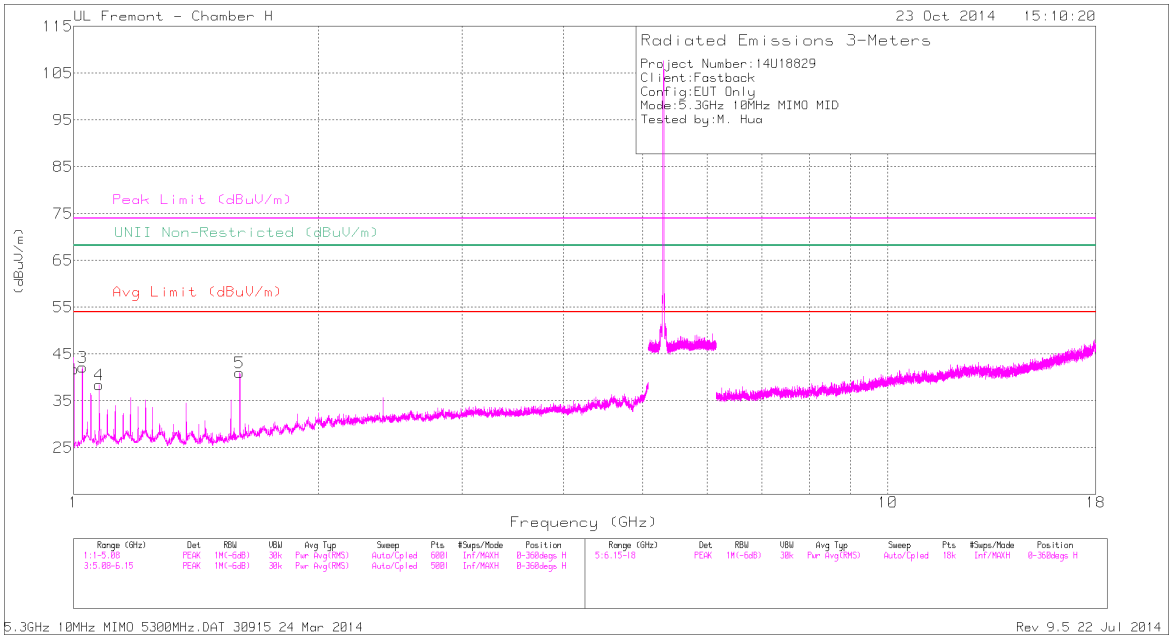
Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1	55.43	PK1	27.7	-35.6	47.53	-	-	74	-26.47	-	-	21	305	H
1	* 1	50.43	AD1	27.7	-35.6	42.53	54	-11.47	-	-	-	-	21	305	H
2	* 1	53.11	PK1	27.7	-35.6	45.21	-	-	74	-28.79	-	-	342	131	V
2	* 1	47.64	AD1	27.7	-35.6	39.74	54	-14.26	-	-	-	-	342	131	V
3	* 1.025	53.26	PK1	27.8	-35.5	45.56	-	-	74	-28.44	-	-	20	118	H
3	* 1.025	48.43	AD1	27.8	-35.5	40.73	54	-13.27	-	-	-	-	20	118	H
4	* 1.6	51.08	PK1	28.5	-35	44.58	-	-	74	-29.42	-	-	14	195	H
4	* 1.6	46.56	AD1	28.5	-35	40.06	54	-13.94	-	-	-	-	14	195	H
5	2.4	45.94	PK1	32	-34	43.94	-	-	-	-	68.2	-24.26	17	110	V
6	10.51	39.63	PK1	37.6	-25.5	51.73	-	-	-	-	68.2	-16.47	337	100	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

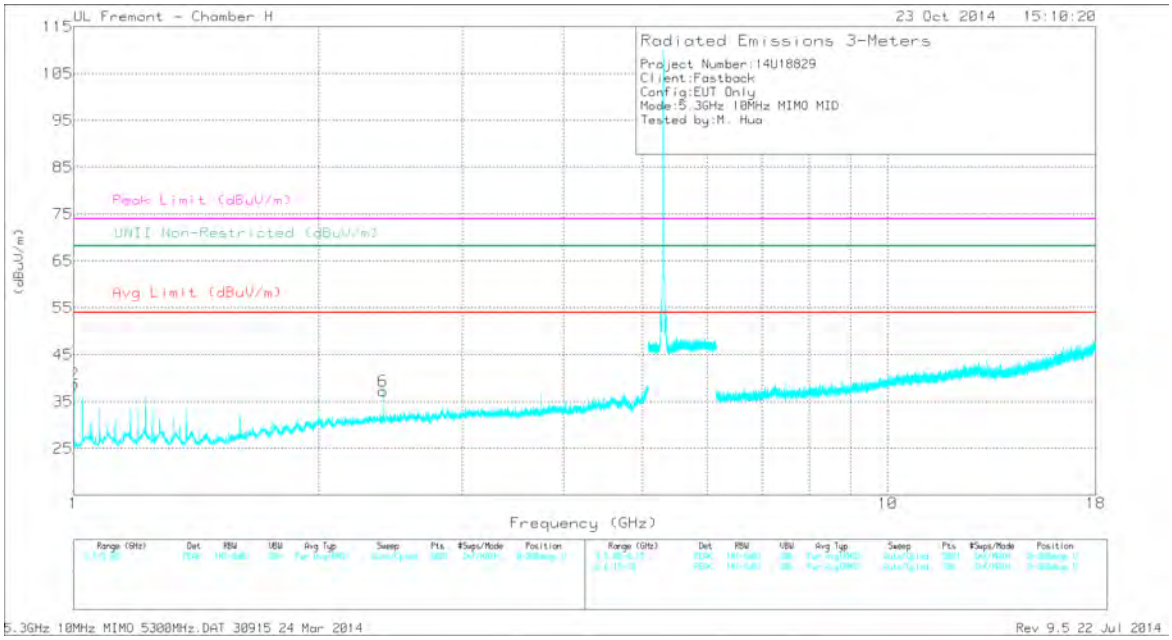
PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average

MID CHANNEL HORIZONTAL PLOT



MID CHANNEL VERTICAL PLOT



DATA

Radiated Emissions

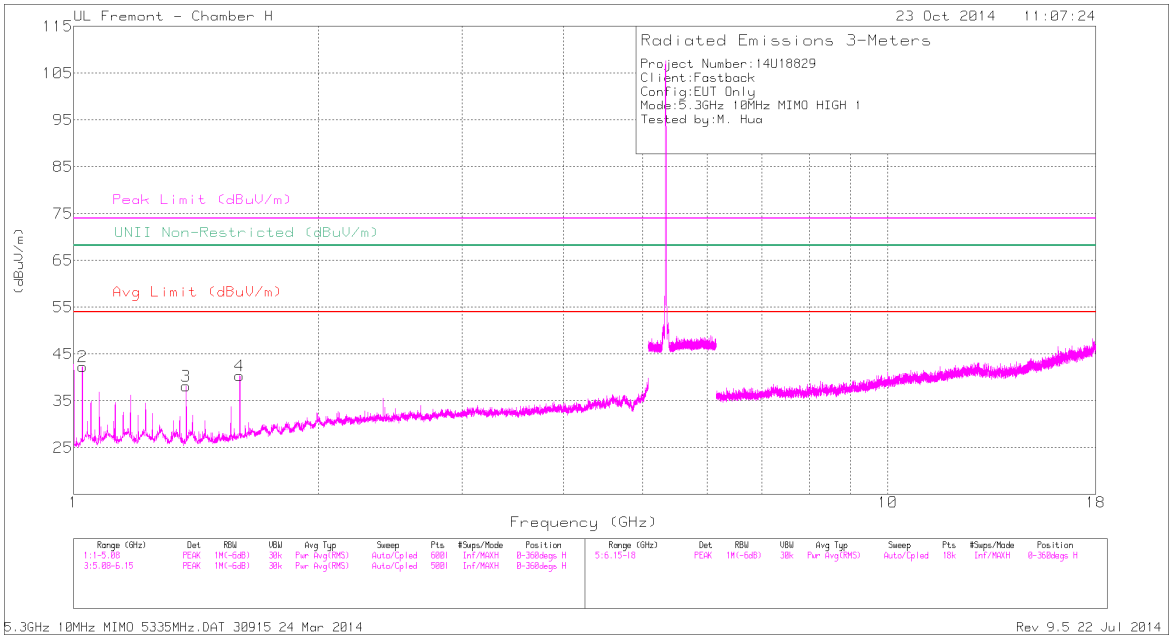
Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1	55.42	PK1	27.7	-35.6	47.52	-	-	74	-26.48	-	-	19	305	H
1	* 1	50.56	AD1	27.7	-35.6	42.66	54	-11.34	-	-	-	-	19	305	H
2	* 1	53.26	PK1	27.7	-35.6	45.36	-	-	74	-28.64	-	-	336	125	V
2	* 1	47.96	AD1	27.7	-35.6	40.06	54	-13.94	-	-	-	-	336	125	V
3	* 1.025	53.33	PK1	27.8	-35.5	45.63	-	-	74	-28.37	-	-	18	117	H
3	* 1.025	48.73	AD1	27.8	-35.5	41.03	54	-12.97	-	-	-	-	18	117	H
4	* 1.075	50.64	PK1	28.1	-35.5	43.24	-	-	74	-30.76	-	-	24	116	H
4	* 1.075	44.32	AD1	28.1	-35.5	36.92	54	-17.08	-	-	-	-	24	116	H
5	* 1.6	50.15	PK1	28.5	-35	43.65	-	-	74	-30.35	-	-	14	352	H
5	* 1.6	45.1	AD1	28.5	-35	38.6	54	-15.4	-	-	-	-	14	352	H
6	2.4	45.32	PK1	32	-34	43.32	-	-	-	-	68.2	-24.88	350	257	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

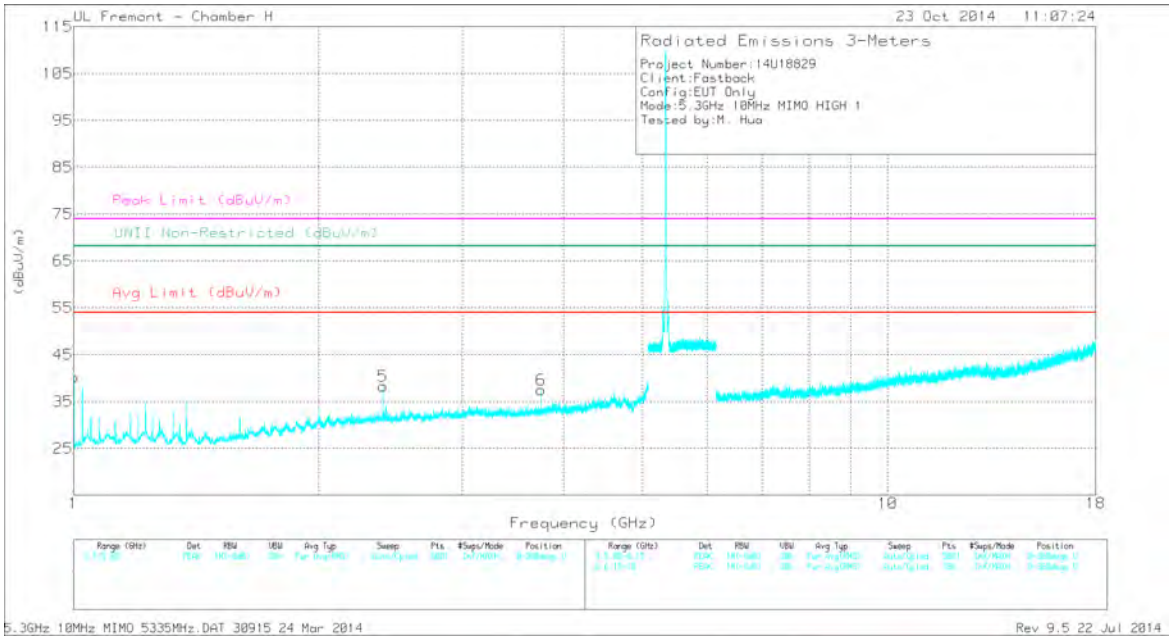
PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average

HIGH CHANNEL 1 HORIZONTAL PLOT



HIGH CHANNEL 1 VERTICAL PLOT



DATA

Radiated Emissions

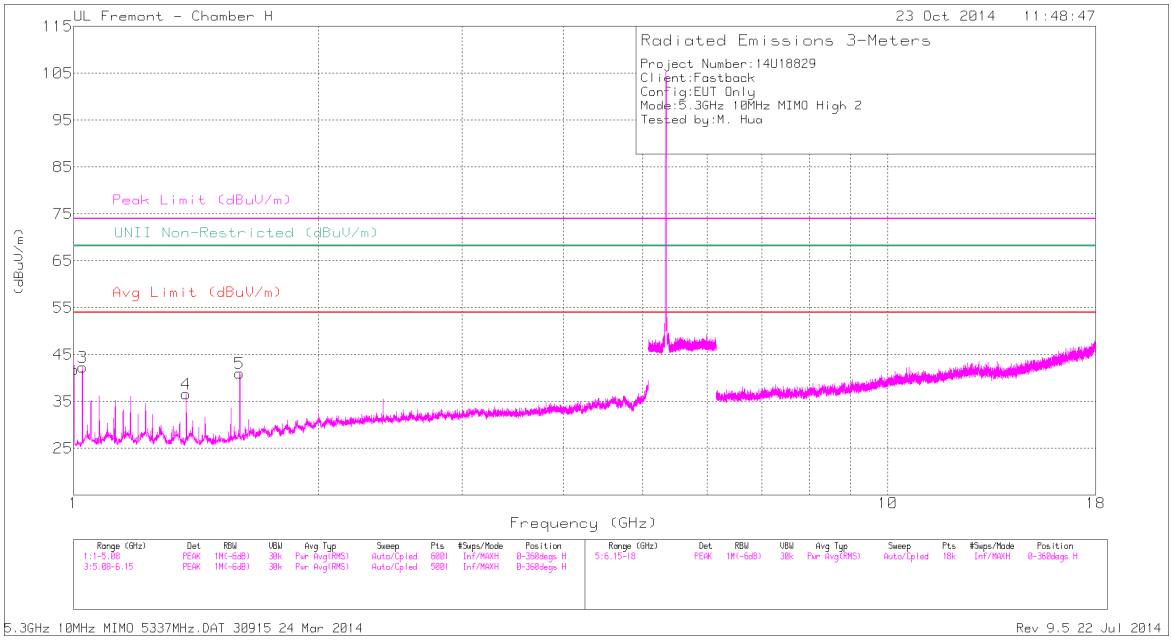
Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1	53.99	PK1	27.7	-35.6	0	46.09	-	-	74	-27.91	-	-	346	125	V
1	* 1	48.43	AD1	27.7	-35.6	0	40.53	54	-13.47	-	-	-	-	346	125	V
2	* 1.025	53.32	PK1	27.8	-35.5	0	45.62	-	-	74	-28.38	-	-	31	121	H
2	* 1.025	48.46	AD1	27.8	-35.5	0	40.76	54	-13.24	-	-	-	-	31	121	H
3	* 1.375	47.94	PK1	28.4	-35.3	0	41.04	-	-	74	-32.96	-	-	15	214	H
3	* 1.375	42.42	AD1	28.4	-35.3	0	35.52	54	-18.48	-	-	-	-	15	214	H
4	* 1.6	50.81	PK1	28.5	-35.0	0	44.31	-	-	74	-29.69	-	-	62	101	H
4	* 1.6	45.55	AD1	28.5	-35.0	0	39.05	54	-14.95	-	-	-	-	62	101	H
5	2.4	46.19	PK1	32.0	-34.0	0	44.19	-	-	-	-	68.2	-24.01	24	119	V
6	* 3.75	42.01	PK1	33.2	-33.1	0	42.11	-	-	74	-31.89	-	-	32	114	V
6	* 3.75	30.88	AD1	33.2	-33.1	0	30.98	54	-23.02	-	-	-	-	32	114	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

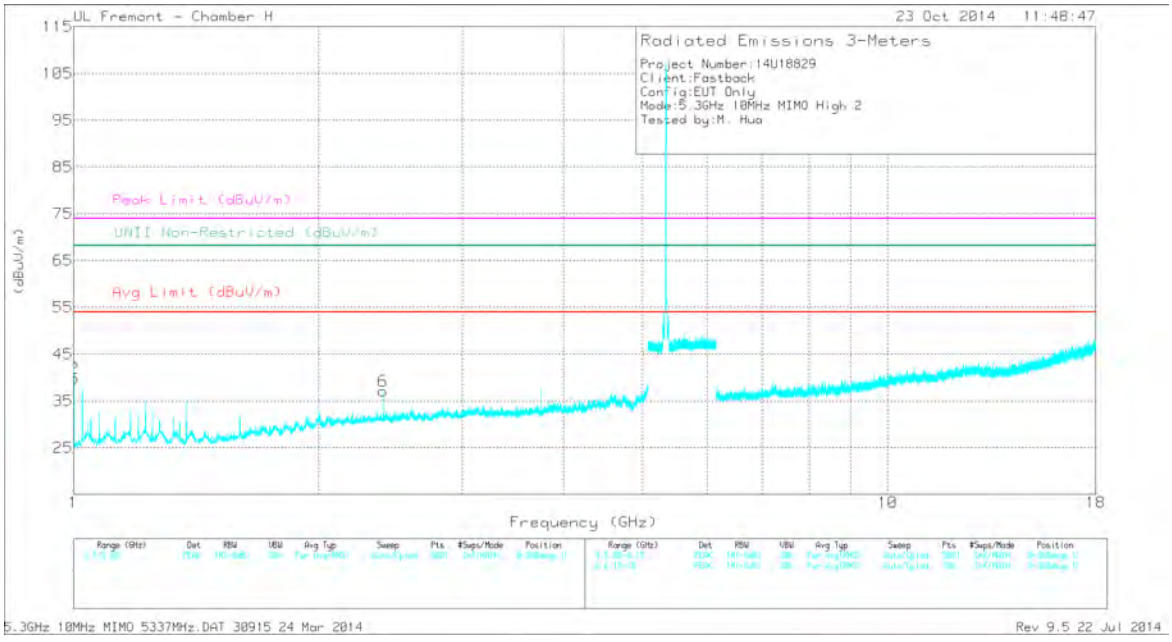
PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average

HIGH CHANNEL 2 HORIZONTAL PLOT



HIGH CHANNEL 2 VERTICAL PLOT



DATA

Radiated Emissions

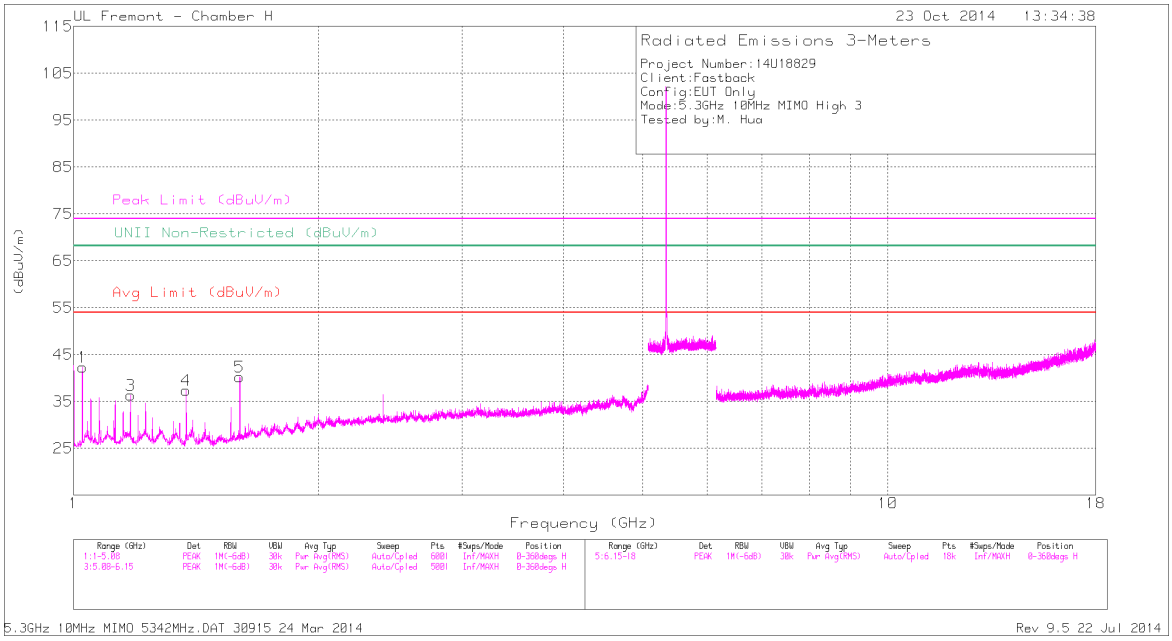
Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.000	55.39	PK1	27.7	-35.6	0	47.49	-	-	74	-26.51	-	-	32	309	H
1	* 1.000	50.87	AD1	27.7	-35.6	0	42.97	54	-11.03	-	-	-	-	32	309	H
2	* 1.000	53.57	PK1	27.7	-35.6	0	45.67	-	-	74	-28.33	-	-	348	120	V
2	* 1.000	48.13	AD1	27.7	-35.6	0	40.23	54	-13.77	-	-	-	-	348	120	V
3	* 1.025	53.14	PK1	27.8	-35.5	0	45.44	-	-	74	-28.56	-	-	34	126	H
3	* 1.025	48.34	AD1	27.8	-35.5	0	40.64	54	-13.36	-	-	-	-	34	126	H
4	* 1.375	47.72	PK1	28.3	-35.3	0	40.72	-	-	74	-33.28	-	-	16	213	H
4	* 1.375	41.55	AD1	28.3	-35.3	0	34.55	54	-19.45	-	-	-	-	16	213	H
5	* 1.600	50.23	PK1	28.5	-35.0	0	43.73	-	-	74	-30.27	-	-	22	193	H
5	* 1.600	45.88	AD1	28.5	-35.0	0	39.38	54	-14.62	-	-	-	-	22	193	H
6	2.400	44.90	PK1	32	-34.0	0	42.90	-	-	-	-	68.2	-25.30	354	253	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

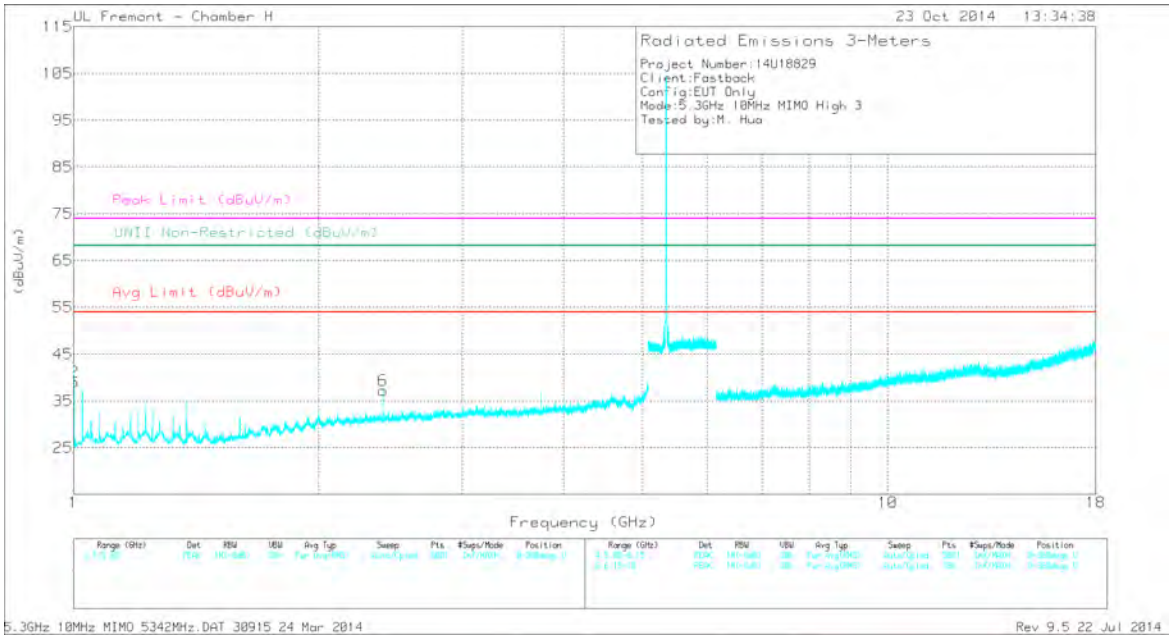
PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average

HIGH CHANNEL 3 HORIZONTAL PLOT



HIGH CHANNEL 3 VERTICAL PLOT



DATA

Radiated Emissions

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.025	53.03	PK1	27.8	-35.5	0	45.33	-	-	74	-28.67	-	-	23	114	H
1	* 1.025	48.34	AD1	27.8	-35.5	0	40.64	54	-13.36	-	-	-	-	23	114	H
2	* 1.000	53.96	PK1	27.7	-35.6	0	46.06	-	-	74	-27.94	-	-	336	127	V
2	* 1.000	48.50	AD1	27.7	-35.6	0	40.60	54	-13.40	-	-	-	-	336	127	V
3	* 1.175	48.94	PK1	28.6	-35.6	0	41.94	-	-	74	-32.06	-	-	358	118	H
3	* 1.175	41.68	AD1	28.6	-35.6	0	34.68	54	-19.32	-	-	-	-	358	118	H
4	* 1.375	48.10	PK1	28.4	-35.3	0	41.20	-	-	74	-32.8	-	-	3	205	H
4	* 1.375	42.28	AD1	28.4	-35.3	0	35.38	54	-18.55	-	-	-	-	3	205	H
5	* 1.600	49.86	PK1	28.5	-35.0	0	43.36	-	-	74	-30.64	-	-	14	180	H
5	* 1.600	45.52	AD1	28.5	-35.0	0	39.02	54	-14.98	-	-	-	-	14	180	H
6	2.400	46.85	PK1	32.0	-34.0	0	44.85	-	-	-	-	68.2	-23.35	16	314	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

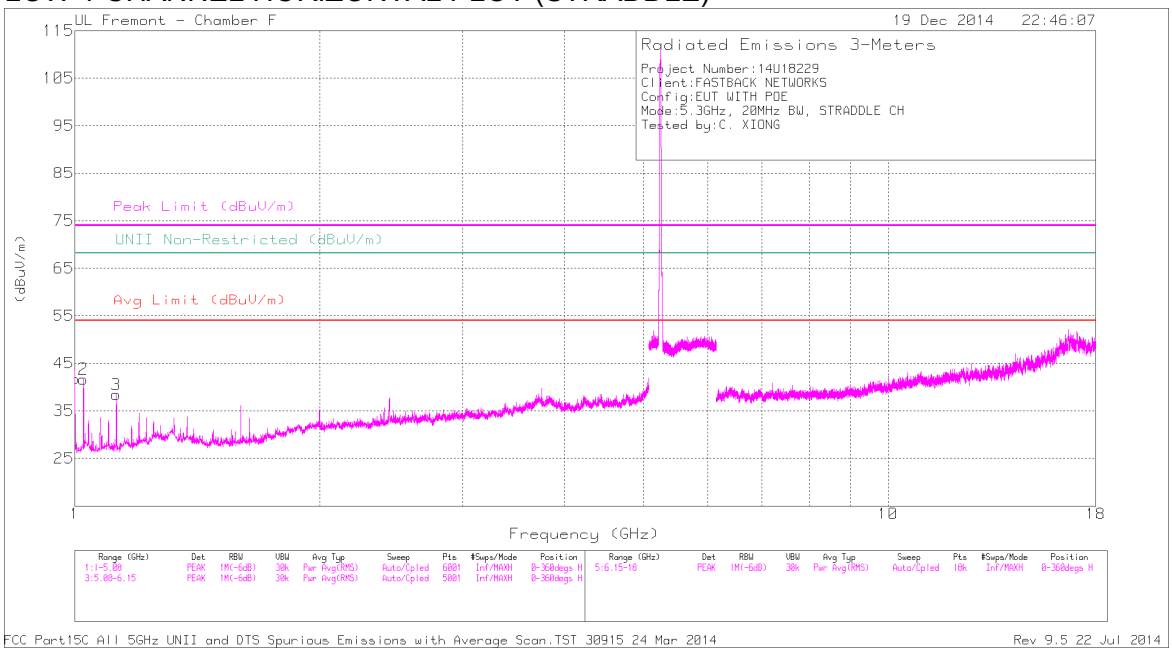
PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average

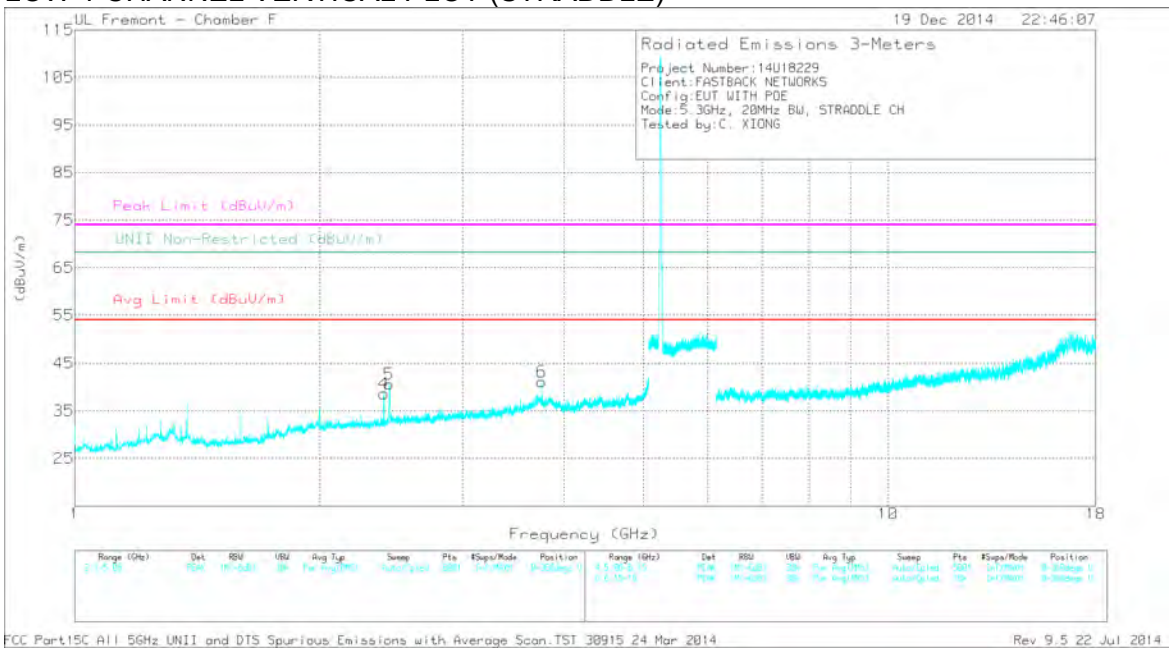
9.2.2. TX ABOVE 1 GHz 20MHz 2 TX MODE IN THE 5.3 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

LOW 1 CHANNEL HORIZONTAL PLOT (STRADDLE)



LOW 1 CHANNEL VERTICAL PLOT (STRADDLE)



DATA

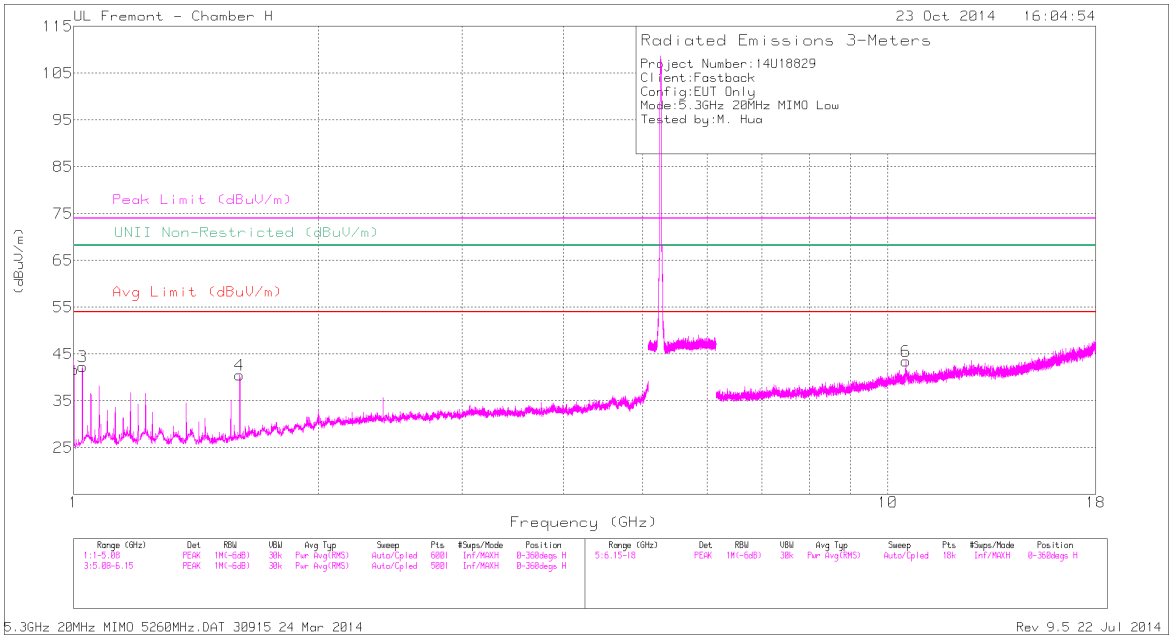
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/Fltr/ Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1	50.9	PK1	27.6	-32.6	45.9	-	-	74	-28.1	-	-	316	121	H
1	* 1	44.83	AD1	27.6	-32.6	39.83	54	-14.17	-	-	-	-	316	121	H
2	* 1.025	50.29	PK1	27.6	-32.4	45.49	-	-	74	-28.51	-	-	302	118	H
2	* 1.025	44.69	AD1	27.6	-32.4	39.89	54	-14.11	-	-	-	-	302	118	H
3	* 1.125	46.83	PK1	27.9	-32.5	42.23	-	-	74	-31.77	-	-	19	111	H
3	* 1.125	41.26	AD1	27.9	-32.5	36.66	54	-17.34	-	-	-	-	19	111	H
4	2.4	44.1	PK1	32.2	-30.8	45.5	-	-	-	-	68.2	-22.7	12	110	V
5	2.437	44.94	PK1	32.4	-30.9	46.44	-	-	-	-	68.2	-21.76	3	111	V
6	* 3.75	41.37	PK1	34.6	-29.7	46.27	-	-	74	-27.73	-	-	0	196	V
6	* 3.75	33.16	AD1	34.6	-29.7	38.06	54	-15.94	-	-	-	-	0	196	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

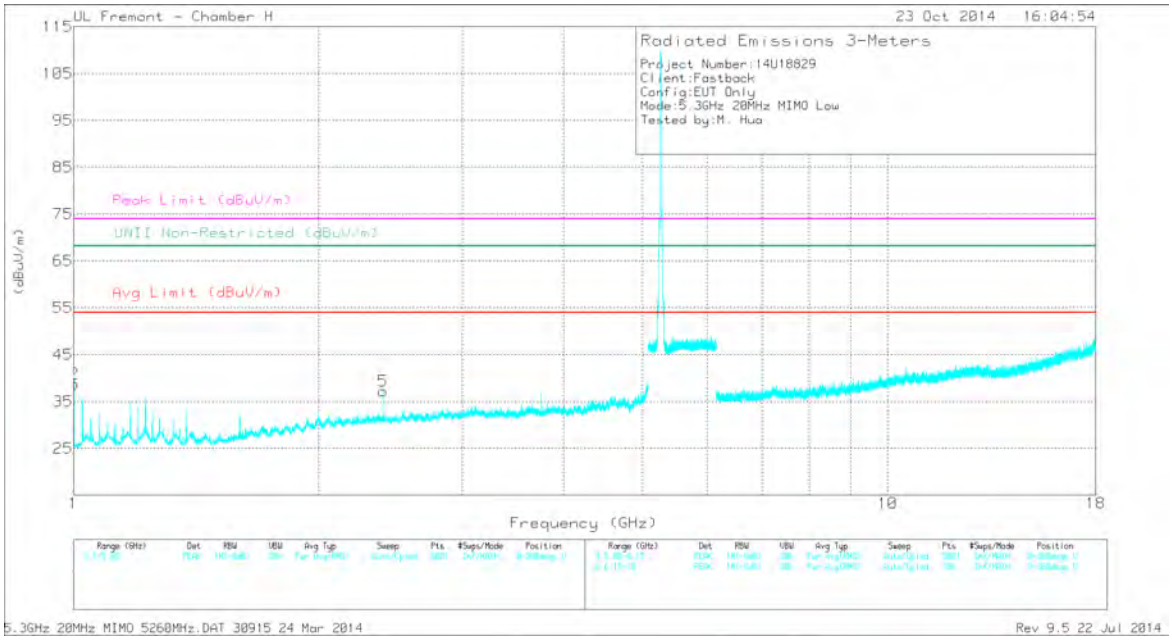
PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average

LOW 2 CHANNEL HORIZONTAL PLOT



LOW 2 CHANNEL VERTICAL PLOT



DATA

Radiated Emissions

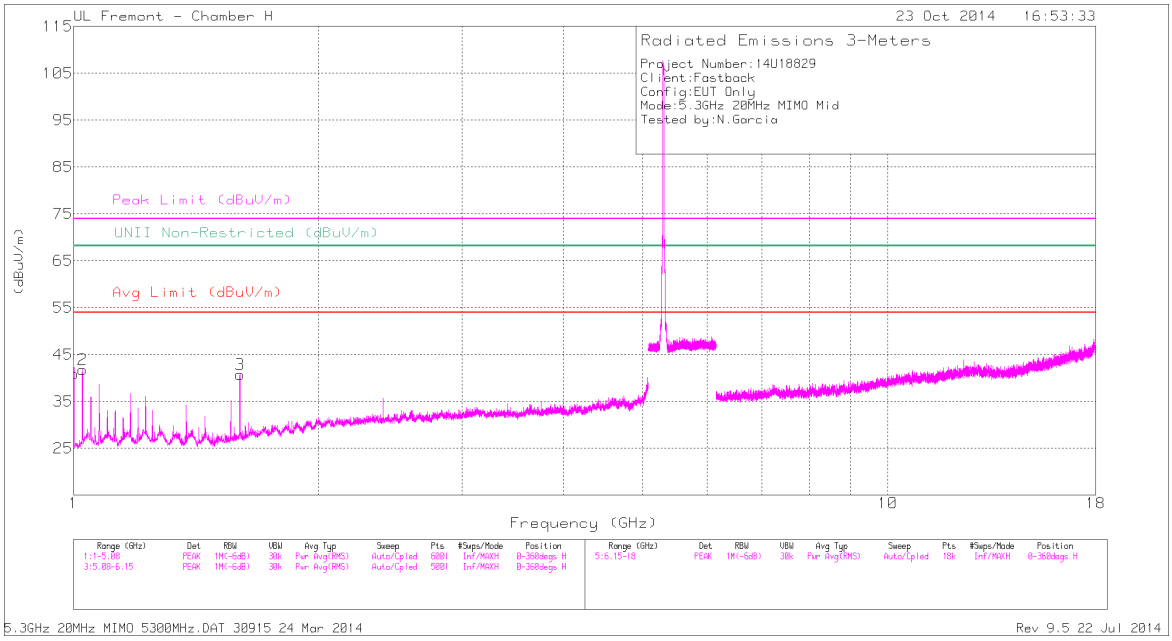
Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1	55.5	PK1	27.7	-35.6	47.6	-	-	74	-26.4	-	-	14	308	H
1	* 1	50.24	AD1	27.7	-35.6	42.34	54	-11.66	-	-	-	-	14	308	H
2	* 1	52.86	PK1	27.7	-35.6	44.96	-	-	74	-29.04	-	-	345	123	V
2	* 1	47.18	AD1	27.7	-35.6	39.28	54	-14.72	-	-	-	-	345	123	V
3	* 1.025	53.48	PK1	27.8	-35.5	45.78	-	-	74	-28.22	-	-	21	117	H
3	* 1.025	48.3	AD1	27.8	-35.5	40.6	54	-13.4	-	-	-	-	21	117	H
4	* 1.6	50.63	PK1	28.5	-35	44.13	-	-	74	-29.87	-	-	14	197	H
4	* 1.6	46.53	AD1	28.5	-35	40.03	54	-13.97	-	-	-	-	14	197	H
5	2.4	46.35	PK1	32	-34	44.35	-	-	-	-	68.2	-23.85	18	318	V
6	10.52	40.48	PK1	37.6	-25.6	52.48	-	-	-	-	68.2	-15.72	310	106	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

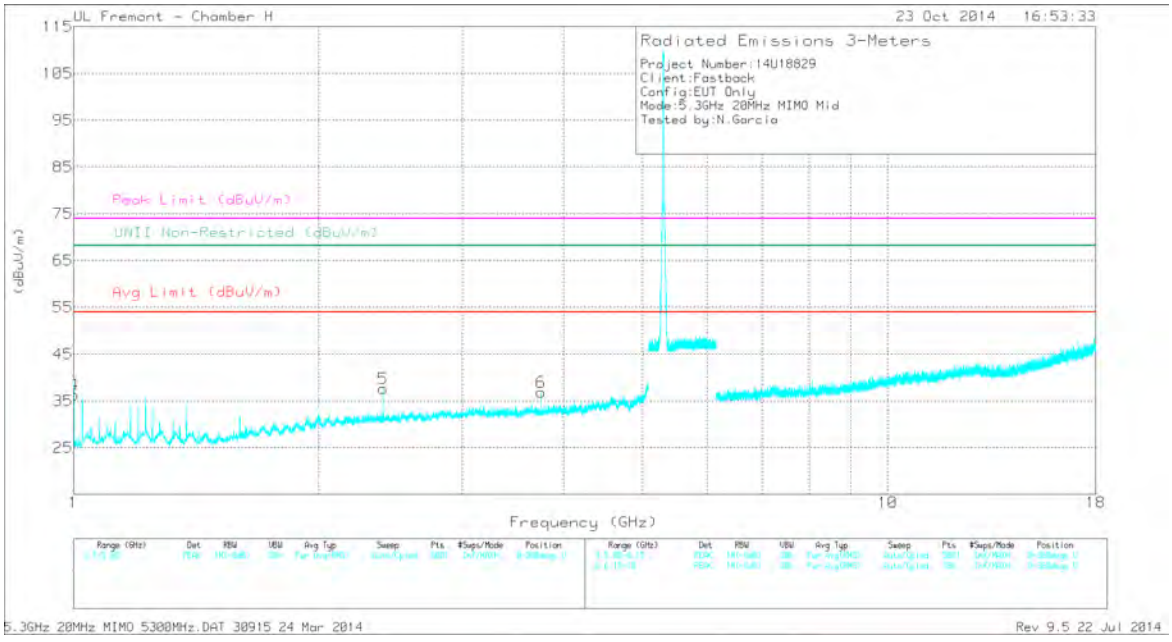
PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average

MID CHANNEL HORIZONTAL PLOT



MID CHANNEL VERTICAL PLOT



DATA

Radiated Emissions

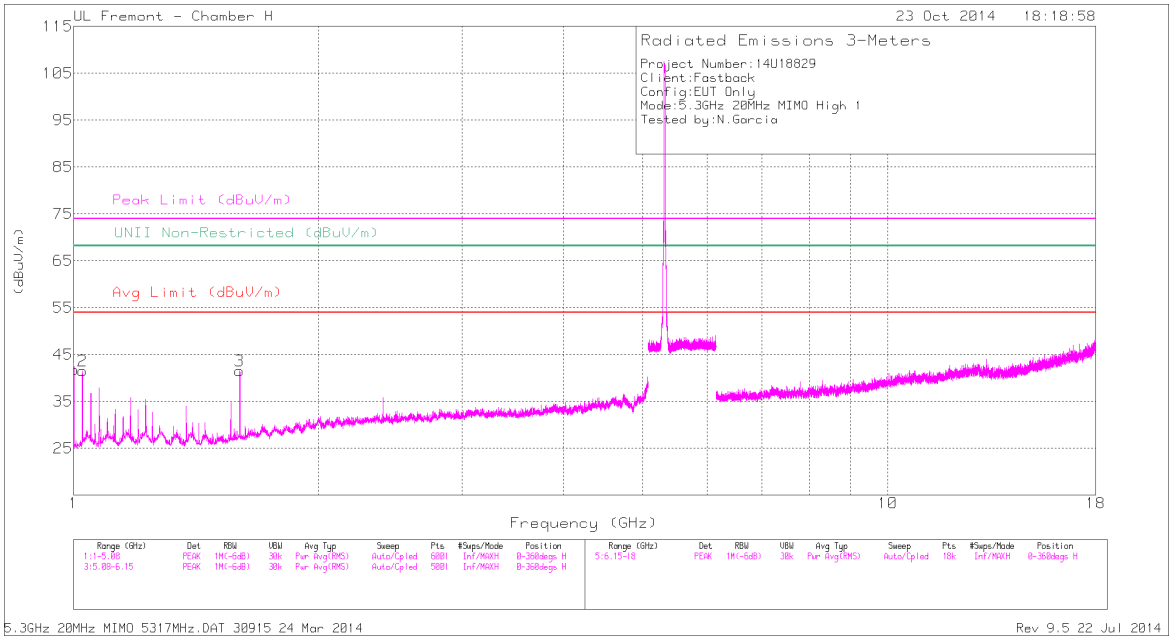
Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1	54.97	PK1	27.7	-35.6	47.07	-	-	74	-26.93	-	-	25	329	H
1	* 1	50.13	AD1	27.7	-35.6	42.23	54	-11.77	-	-	-	-	25	329	H
2	* 1.025	52.96	PK1	27.8	-35.5	45.26	-	-	74	-28.74	-	-	15	113	H
2	* 1.025	48.09	AD1	27.8	-35.5	40.39	54	-13.61	-	-	-	-	15	113	H
3	* 1.6	50.26	PK1	28.5	-35	43.76	-	-	74	-30.24	-	-	18	261	H
3	* 1.6	45.64	AD1	28.5	-35	39.14	54	-14.86	-	-	-	-	18	261	H
4	* 1	53.05	PK1	27.7	-35.6	45.15	-	-	74	-28.85	-	-	336	130	V
1	* 1	47.52	AD1	27.7	-35.6	39.62	54	-14.38	-	-	-	-	336	130	V
5	2.4	46.46	PK1	32	-34	44.46	-	-	-	-	68.2	-23.74	20	314	V
6	* 3.75	42.01	PK1	33.2	-33.1	42.11	-	-	74	-31.89	-	-	32	114	V
6	* 3.75	30.88	AD1	33.2	-33.1	30.98	54	-23.02	-	-	-	-	32	114	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

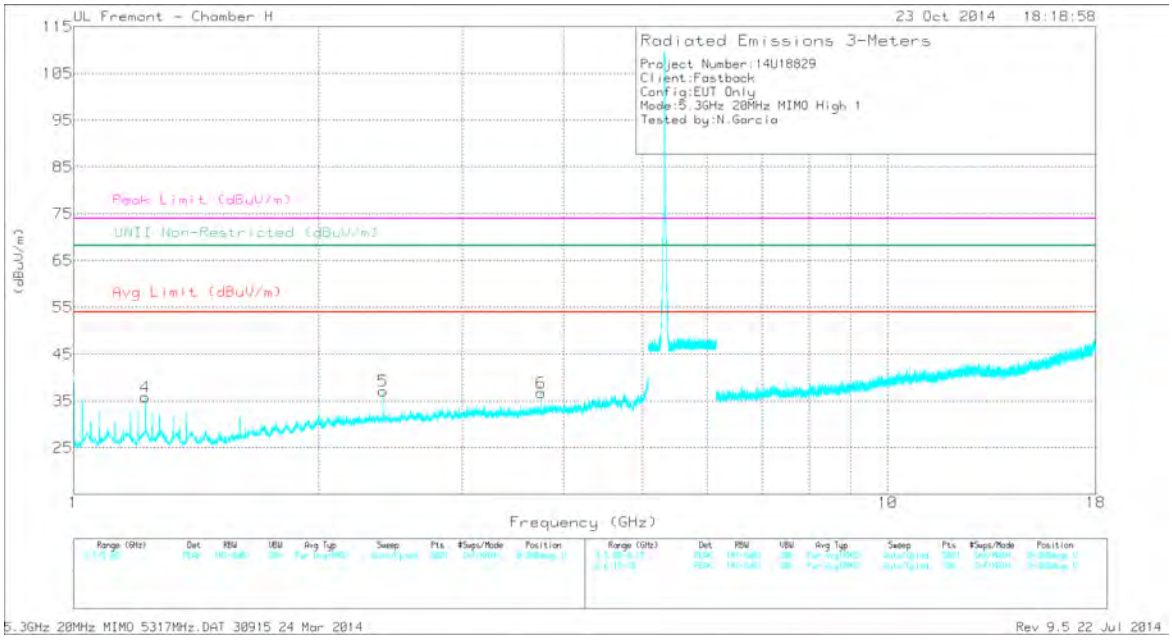
PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average

HIGH CHANNEL 1 HORIZONTAL PLOT



HIGH CHANNEL 1 VERTICAL PLOT



DATA

Radiated Emissions

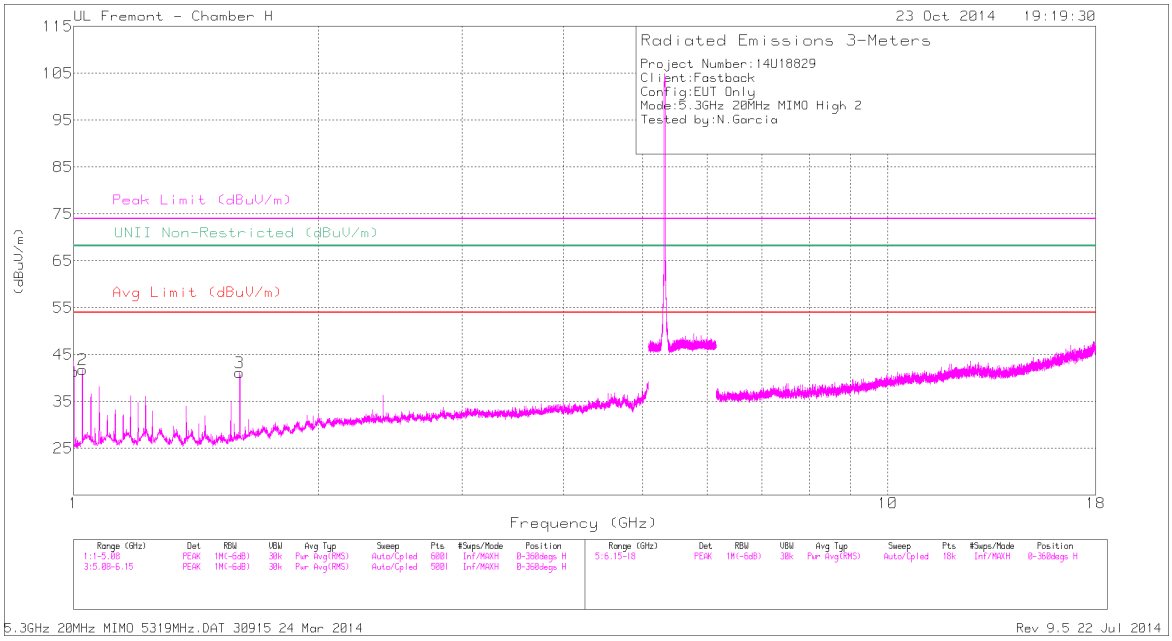
Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1	55.03	PK1	27.7	-35.6	47.13	-	-	74	-26.87	-	-	22	327	H
1	* 1	50.43	AD1	27.7	-35.6	42.53	54	-11.47	-	-	-	-	22	327	H
2	* 1.025	53.01	PK1	27.8	-35.5	45.31	-	-	74	-28.69	-	-	15	117	H
2	* 1.025	48.3	AD1	27.8	-35.5	40.6	54	-13.4	-	-	-	-	15	117	H
3	* 1.6	51.12	PK1	28.5	-35	44.62	-	-	74	-29.38	-	-	13	260	H
3	* 1.6	46.26	AD1	28.5	-35	39.76	54	-14.24	-	-	-	-	13	260	H
4	* 1.225	47.26	PK1	28.9	-35.5	40.66	-	-	74	-33.34	-	-	8	107	V
4	* 1.225	40.27	AD1	28.9	-35.5	33.67	54	-20.33	-	-	-	-	8	107	V
5	2.4	46.45	PK1	32	-34	44.45	-	-	-	-	68.2	-23.75	18	321	V
6	* 3.75	44.32	PK1	33.2	-33.1	44.42	-	-	74	-29.58	-	-	312	106	V
6	* 3.75	36.4	AD1	33.2	-33.1	36.5	54	-17.5	-	-	-	-	312	106	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

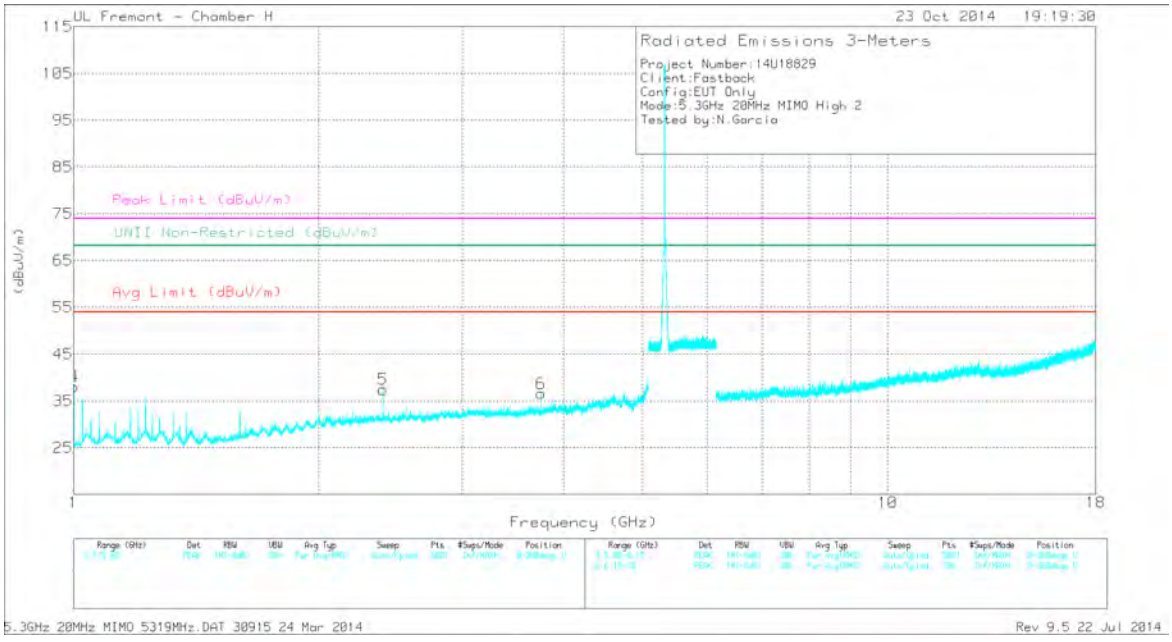
PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average

HIGH CHANNEL 2 HORIZONTAL PLOT



HIGH CHANNEL 2 VERTICAL PLOT



DATA

Radiated Emissions

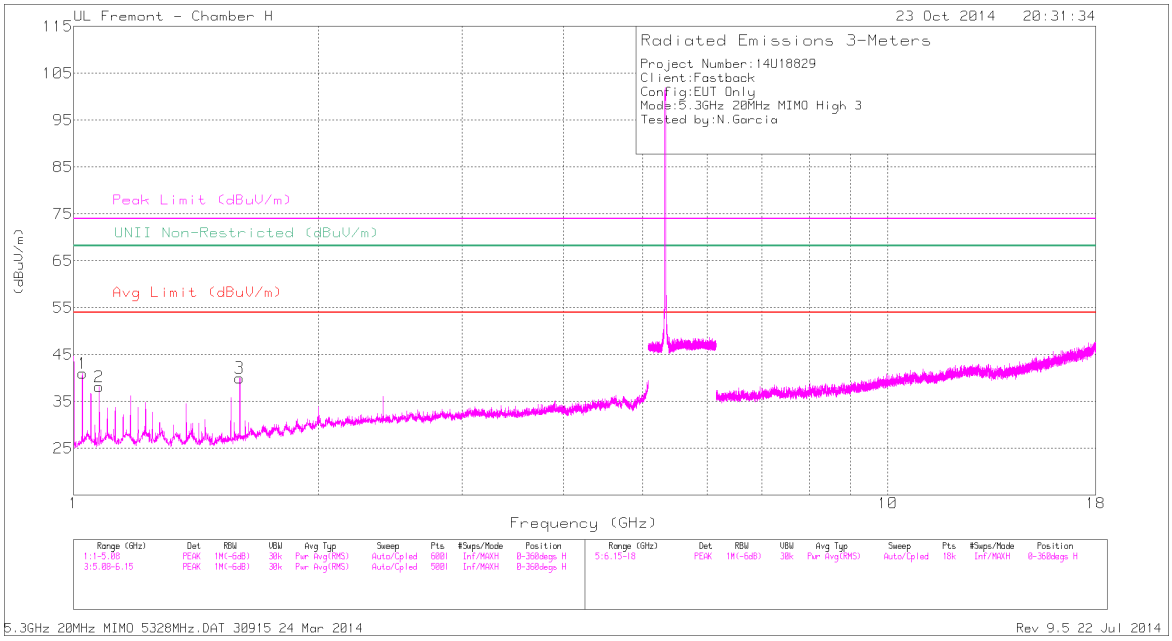
Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1	55.39	PK1	27.7	-35.6	47.49	-	-	74	-26.51	-	-	18	330	H
1	* 1	50.6	AD1	27.7	-35.6	42.7	54	-11.3	-	-	-	-	18	330	H
2	* 1.025	53.18	PK1	27.8	-35.5	45.48	-	-	74	-28.52	-	-	19	124	H
2	* 1.025	48.56	AD1	27.8	-35.5	40.86	54	-13.14	-	-	-	-	19	124	H
3	* 1.6	51.77	PK1	28.5	-35	45.27	-	-	74	-28.73	-	-	13	196	H
3	* 1.6	46.74	AD1	28.5	-35	40.24	54	-13.76	-	-	-	-	13	196	H
4	* 1	52.81	PK1	27.7	-35.6	44.91	-	-	74	-29.09	-	-	343	130	V
4	* 1	47.7	AD1	27.7	-35.6	39.8	54	-14.2	-	-	-	-	343	130	V
5	2.4	44.64	PK1	32	-34	42.64	-	-	-	-	68.2	-25.56	28	315	V
6	* 3.749	42.17	PK1	33.2	-33.1	42.27	-	-	74	-31.73	-	-	330	120	V
6	* 3.75	31.54	AD1	33.2	-33.1	31.64	54	-22.36	-	-	-	-	330	120	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

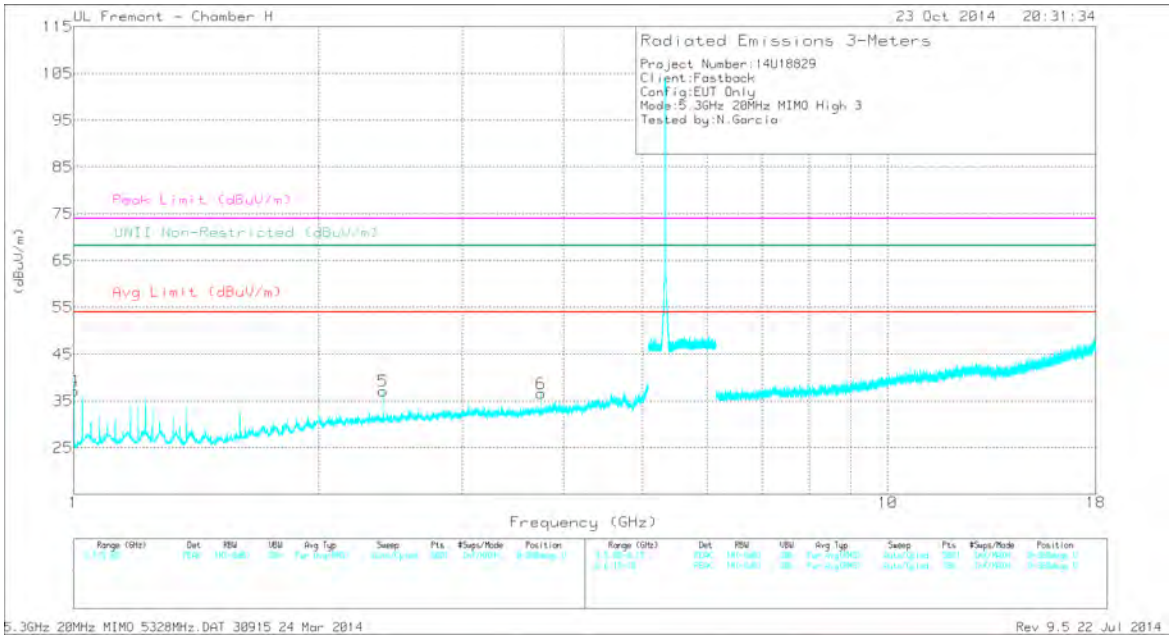
PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average

HIGH CHANNEL 3 HORIZONTAL PLOT



HIGH CHANNEL 3 VERTICAL PLOT



DATA

Radiated Emissions

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.025	53.33	PK1	27.8	-35.5	45.63	-	-	74	-28.37	-	-	18	118	H
1	* 1.025	48.67	AD1	27.8	-35.5	40.97	54	-13.03	-	-	-	-	18	118	H
2	* 1.075	49.99	PK1	28.1	-35.5	42.59	-	-	74	-31.41	-	-	25	131	H
2	* 1.075	43.65	AD1	28.1	-35.5	36.25	54	-17.75	-	-	-	-	25	131	H
3	* 1.6	49.35	PK1	28.5	-35	42.85	-	-	74	-31.15	-	-	10	203	H
3	* 1.6	43.08	AD1	28.5	-35	36.58	54	-17.42	-	-	-	-	10	203	H
4	* 1	52.67	PK1	27.7	-35.6	44.77	-	-	74	-29.23	-	-	345	126	V
4	* 1	47.26	AD1	27.7	-35.6	39.36	54	-14.64	-	-	-	-	345	126	V
5	2.4	45.06	PK1	32	-34	43.06	-	-	-	-	68.2	-25.14	39	251	V
6	* 3.75	44.41	PK1	33.2	-33.1	44.51	-	-	74	-29.49	-	-	309	225	V
6	* 3.75	35.94	AD1	33.2	-33.1	36.04	54	-17.96	-	-	-	-	309	225	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

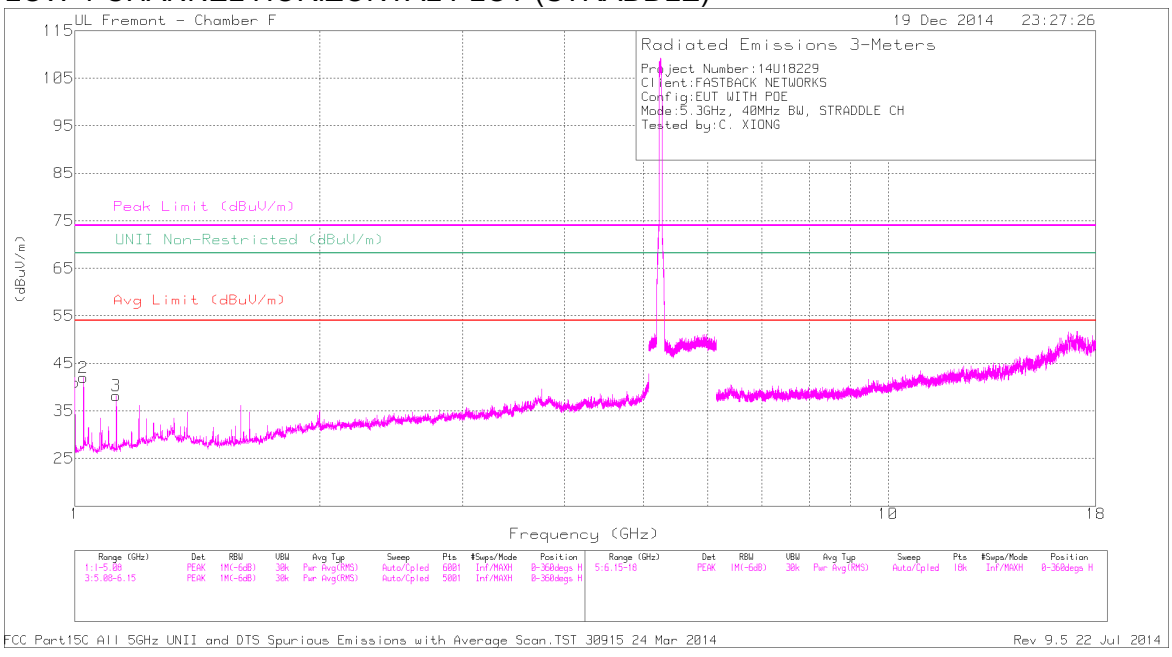
PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average

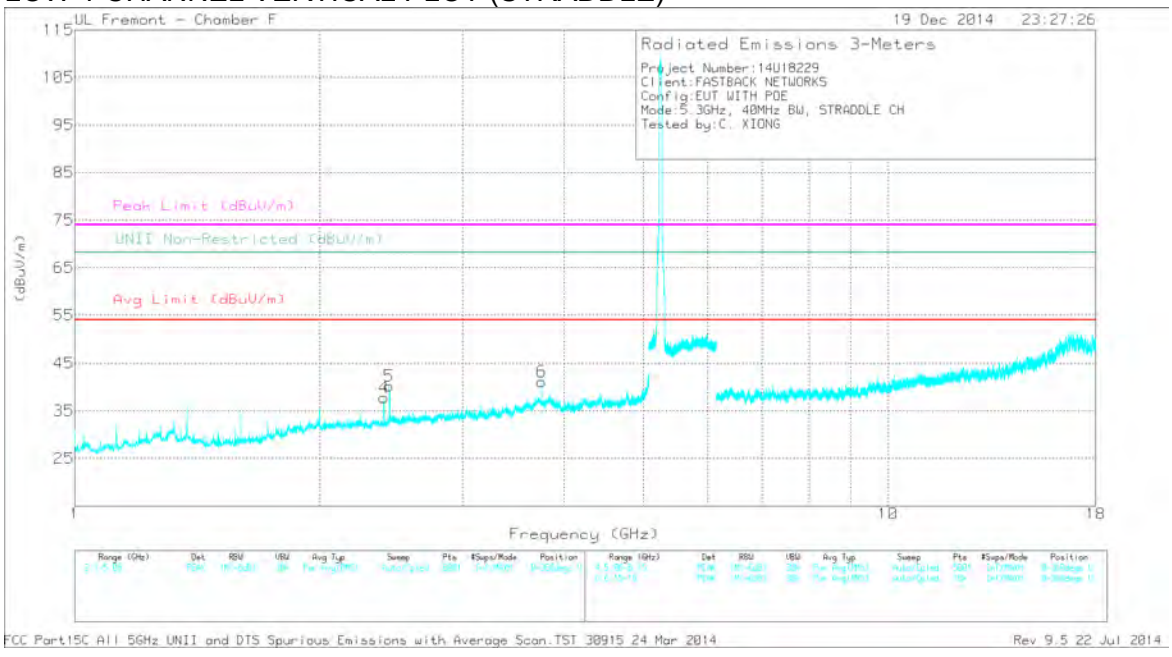
9.2.3. TX ABOVE 1 GHz 40MHz 2 TX MODE IN THE 5.3 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

LOW 1 CHANNEL HORIZONTAL PLOT (STRADDLE)



LOW 1 CHANNEL VERTICAL PLOT (STRADDLE)



DATA

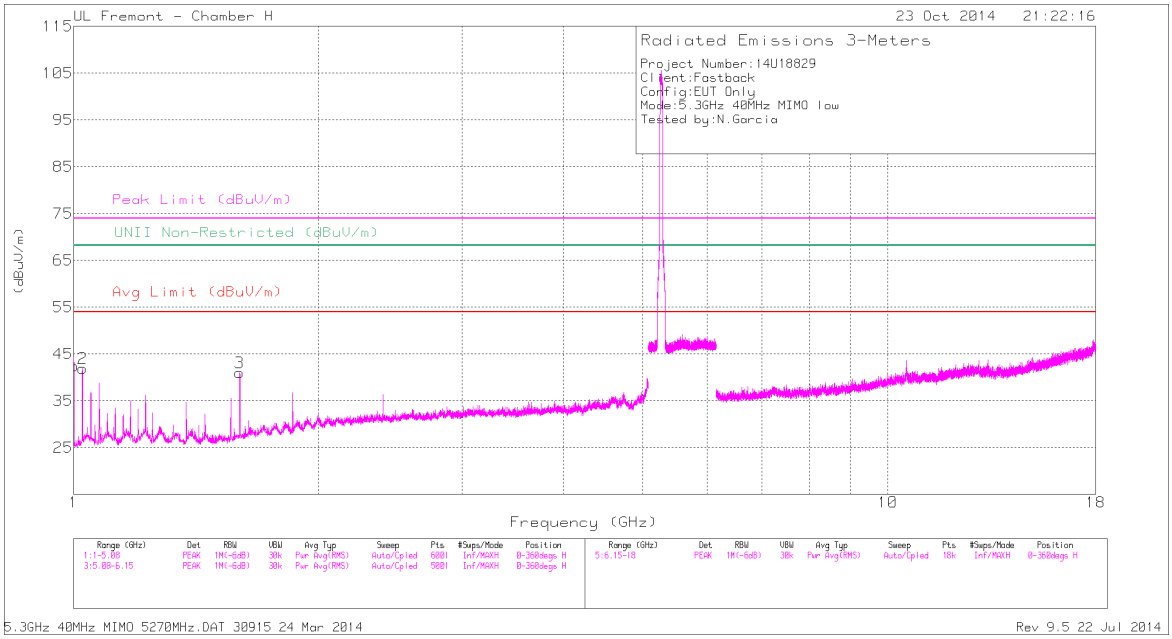
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T120 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1	51.35	PK1	27.6	-32.6	46.35	-	-	74	-27.65	-	-	312	126	H
1	* 1	45.21	AD1	27.6	-32.6	40.21	54	-13.79	-	-	-	-	312	126	H
2	* 1.025	50.23	PK1	27.6	-32.4	45.43	-	-	74	-28.57	-	-	299	121	H
2	* 1.025	44.56	AD1	27.6	-32.4	39.76	54	-14.24	-	-	-	-	299	121	H
3	* 1.125	47.5	PK1	27.9	-32.5	42.9	-	-	74	-31.1	-	-	20	112	H
3	* 1.125	41.79	AD1	27.9	-32.5	37.19	54	-16.81	-	-	-	-	20	112	H
4	2.4	43.37	PK1	32.2	-30.8	44.77	-	-	-	-	68.2	-23.43	14	288	V
5	2.437	45.07	PK1	32.4	-30.9	46.57	-	-	-	-	68.2	-21.63	266	109	V
6	* 3.75	41.36	PK1	34.6	-29.7	46.26	-	-	74	-27.74	-	-	0	196	V
6	* 3.75	33.13	AD1	34.6	-29.7	38.03	54	-15.97	-	-	-	-	0	196	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

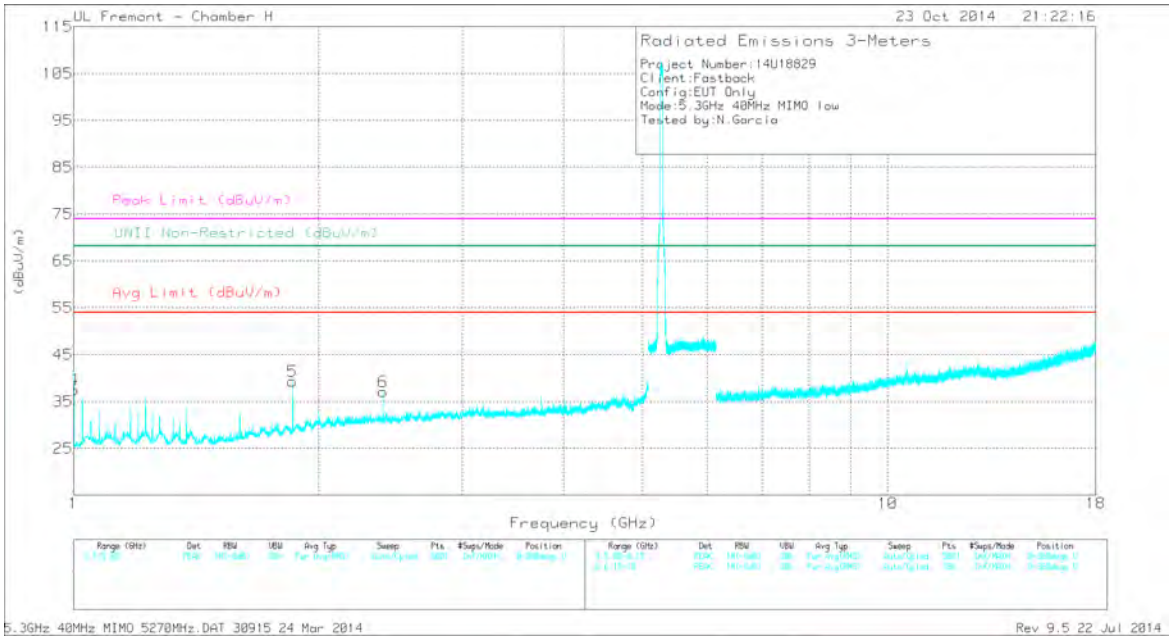
PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average

LOW 2 CHANNEL HORIZONTAL PLOT



LOW 2 CHANNEL VERTICAL PLOT



DATA

Radiated Emissions

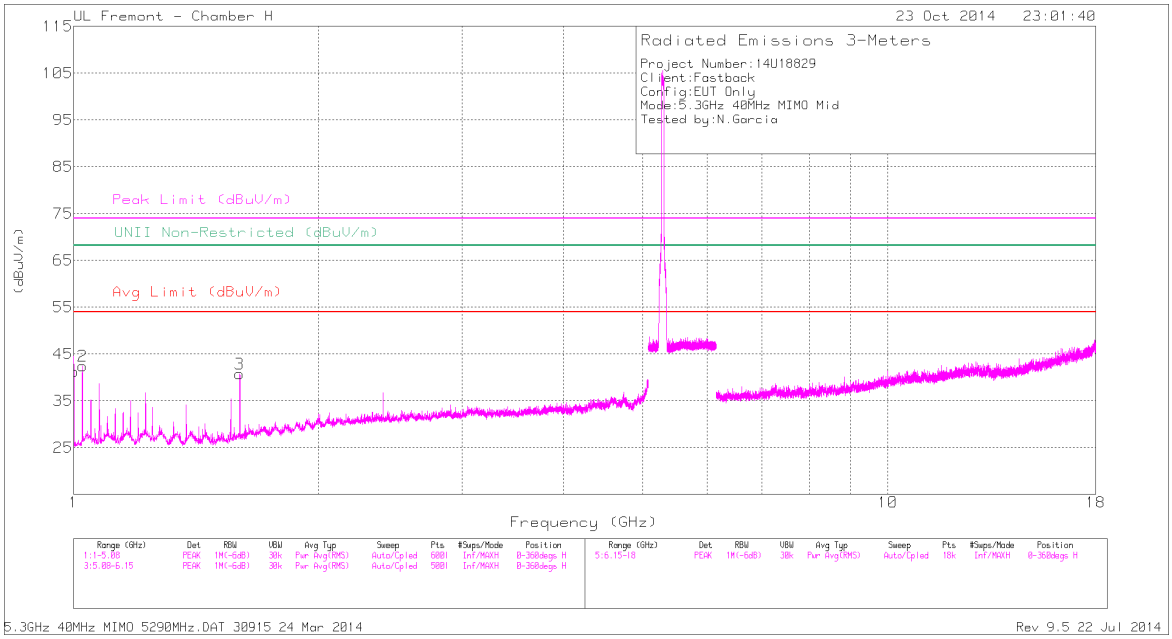
Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1	55.19	PK1	27.7	-35.6	47.29	-	-	74	-26.71	-	-	19	323	H
1	* 1	50.46	AD1	27.7	-35.6	42.56	54	-11.44	-	-	-	-	19	323	H
2	* 1.025	53.51	PK1	27.8	-35.5	45.81	-	-	74	-28.19	-	-	16	115	H
2	* 1.025	48.37	AD1	27.8	-35.5	40.67	54	-13.33	-	-	-	-	16	115	H
3	* 1.6	51.58	PK1	28.5	-35	45.08	-	-	74	-28.92	-	-	16	263	H
3	* 1.6	46.13	AD1	28.5	-35	39.63	54	-14.37	-	-	-	-	16	263	H
4	* 1	52.33	PK1	27.7	-35.6	44.43	-	-	74	-29.57	-	-	348	124	V
4	* 1	47.11	AD1	27.7	-35.6	39.21	54	-14.79	-	-	-	-	348	124	V
5	1.859	42.5	PK1	30.4	-35	37.9	-	-	-	-	68.2	-30.3	302	177	V
6	2.4	46.41	PK1	32	-34	44.41	-	-	-	-	68.2	-23.79	18	320	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

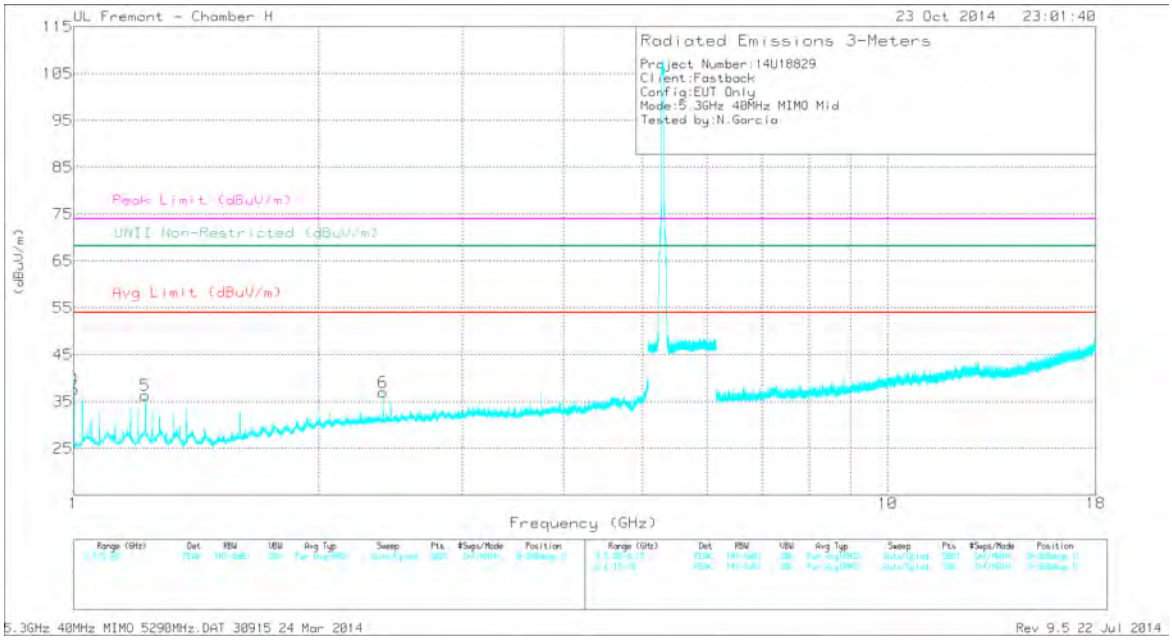
PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average

MID CHANNEL HORIZONTAL PLOT



MID CHANNEL VERTICAL PLOT



DATA

Radiated Emissions

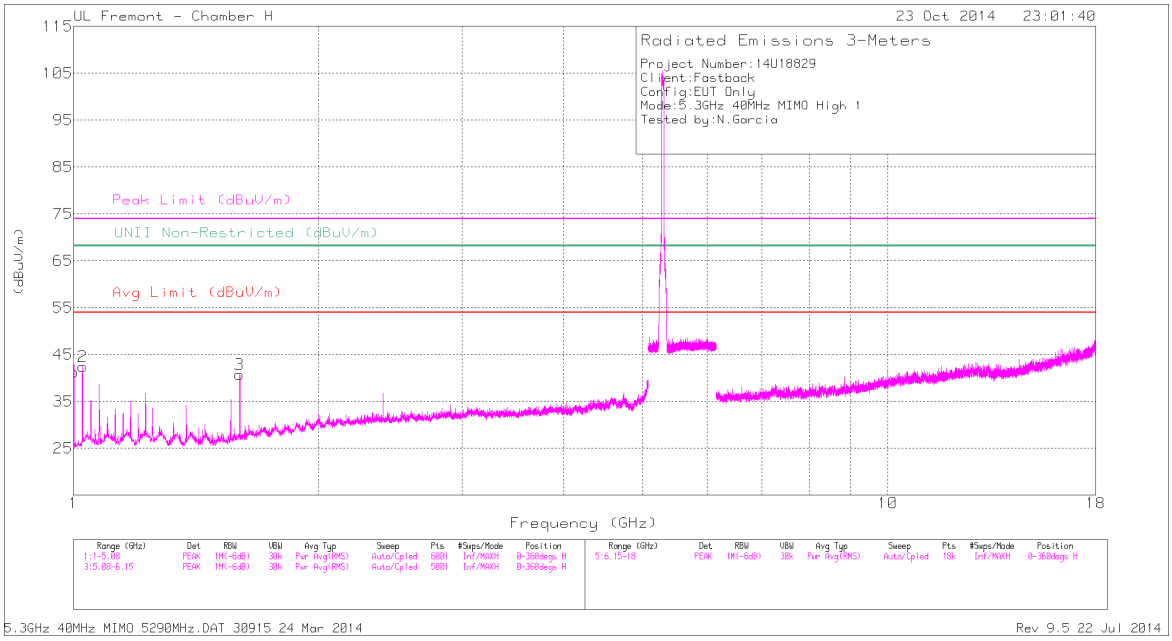
Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1	55.24	PK1	27.7	-35.6	47.34	-	-	74	-26.66	-	-	18	327	H
1	* 1	50.85	AD1	27.7	-35.6	42.95	54	-11.05	-	-	-	-	18	327	H
2	* 1.025	53.19	PK1	27.8	-35.5	45.49	-	-	74	-28.51	-	-	19	116	H
2	* 1.025	48.25	AD1	27.8	-35.5	40.55	54	-13.45	-	-	-	-	19	116	H
3	* 1.6	50.86	PK1	28.5	-35	44.36	-	-	74	-29.64	-	-	12	203	H
3	* 1.6	46.55	AD1	28.5	-35	40.05	54	-13.95	-	-	-	-	12	203	H
4	* 1	52.22	PK1	27.7	-35.6	44.32	-	-	74	-29.68	-	-	346	127	V
4	* 1	46.85	AD1	27.7	-35.6	38.95	54	-15.05	-	-	-	-	346	127	V
5	2.4	46.14	PK1	32	-34	44.14	-	-	-	-	68.2	-24.06	18	318	V
6	* 1.225	47.8	PK1	28.9	-35.5	41.2	-	-	74	-32.8	-	-	6	100	V
6	* 1.225	40.77	AD1	28.9	-35.5	34.17	54	-19.83	-	-	-	-	6	100	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

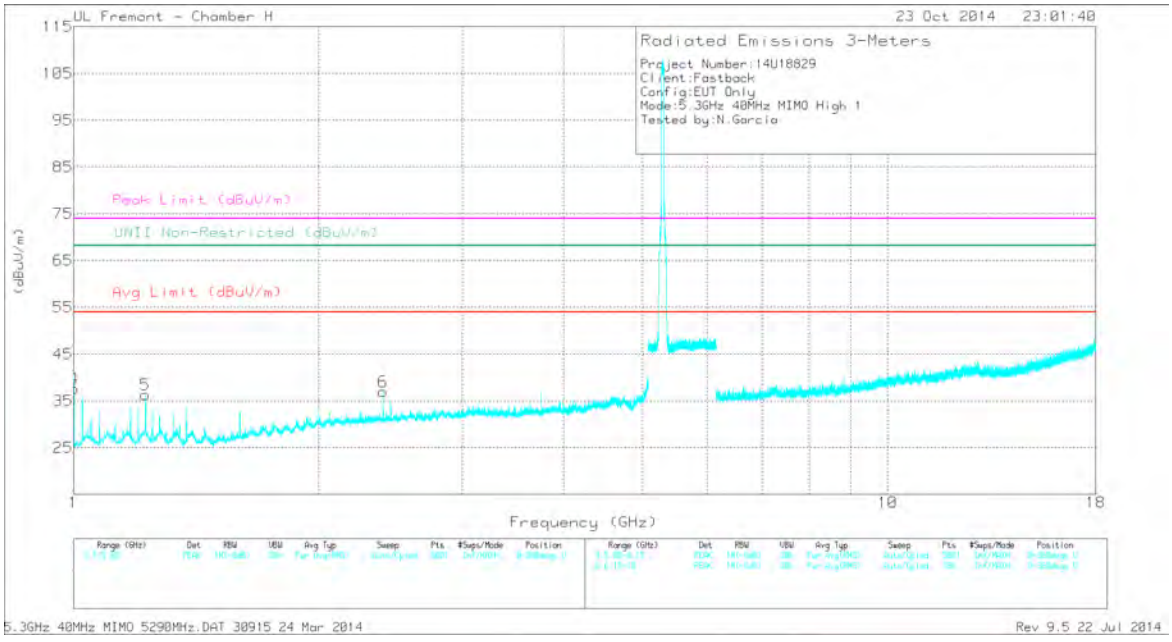
PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



DATA

Radiated Emissions

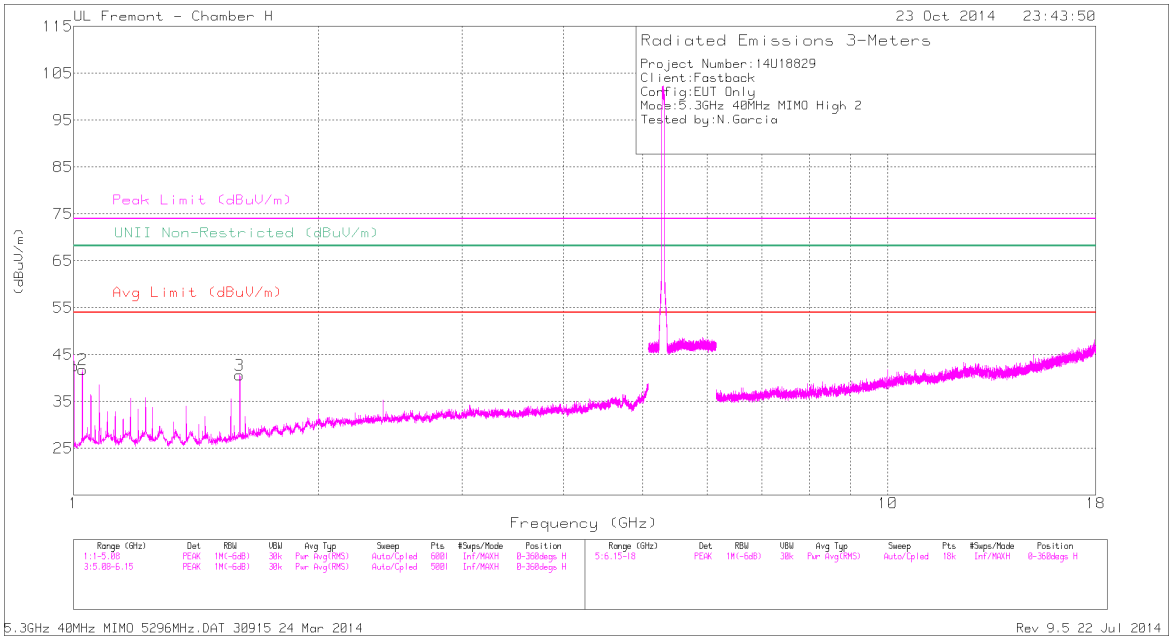
Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1	55.24	PK1	27.7	-35.6	47.34	-	-	74	-26.66	-	-	18	327	H
1	* 1	50.85	AD1	27.7	-35.6	42.95	54	-11.05	-	-	-	-	18	327	H
2	* 1.025	53.19	PK1	27.8	-35.5	45.49	-	-	74	-28.51	-	-	19	116	H
2	* 1.025	48.25	AD1	27.8	-35.5	40.55	54	-13.45	-	-	-	-	19	116	H
3	* 1.6	50.86	PK1	28.5	-35	44.36	-	-	74	-29.64	-	-	12	203	H
3	* 1.6	46.55	AD1	28.5	-35	40.05	54	-13.95	-	-	-	-	12	203	H
4	* 1	52.22	PK1	27.7	-35.6	44.32	-	-	74	-29.68	-	-	346	127	V
4	* 1	46.85	AD1	27.7	-35.6	38.95	54	-15.05	-	-	-	-	346	127	V
5	2.4	46.14	PK1	32	-34	44.14	-	-	-	-	68.2	-24.06	18	318	V
6	* 1.225	47.8	PK1	28.9	-35.5	41.2	-	-	74	-32.8	-	-	6	100	V
6	* 1.225	40.77	AD1	28.9	-35.5	34.17	54	-19.83	-	-	-	-	6	100	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

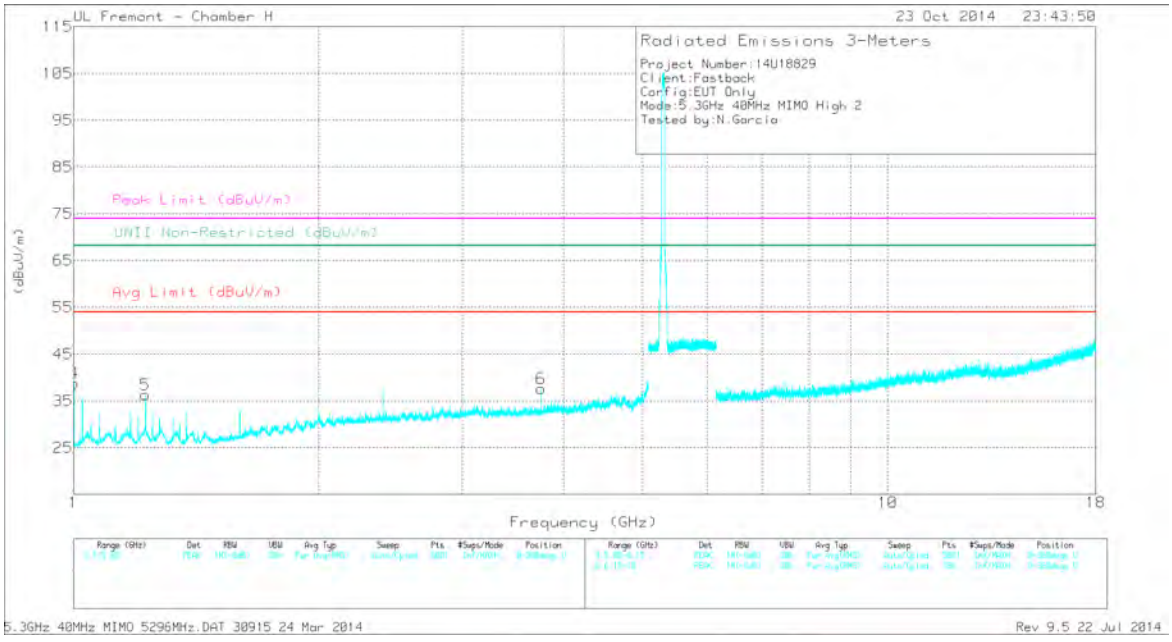
PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



DATA

Radiated Emissions

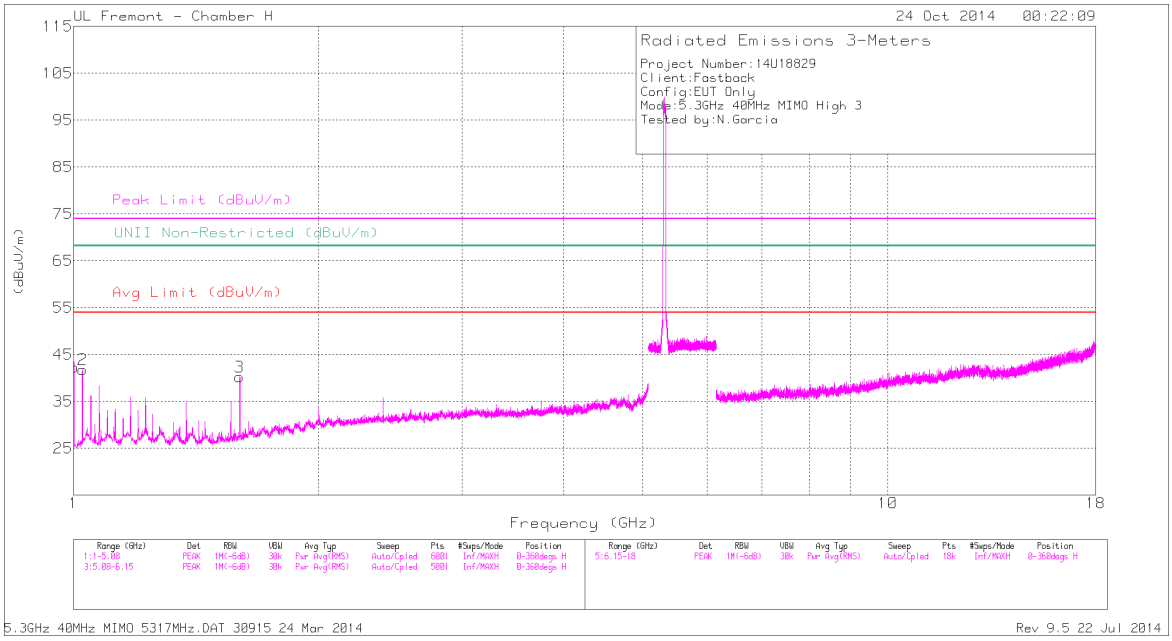
Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1	55.39	PK1	27.7	-35.6	47.49	-	-	74	-26.51	-	-	20	305	H
1	* 1	50.43	AD1	27.7	-35.6	42.53	54	-11.47	-	-	-	-	20	305	H
2	* 1.025	53.1	PK1	27.8	-35.5	45.4	-	-	74	-28.6	-	-	23	121	H
2	* 1.025	48.47	AD1	27.8	-35.5	40.77	54	-13.23	-	-	-	-	23	121	H
3	* 1.6	51.54	PK1	28.5	-35	45.04	-	-	74	-28.96	-	-	15	203	H
3	* 1.6	46.72	AD1	28.5	-35	40.22	54	-13.78	-	-	-	-	15	203	H
4	* 1	51.08	PK1	27.7	-35.6	43.18	-	-	74	-30.82	-	-	355	120	V
4	* 1	45.33	AD1	27.7	-35.6	37.43	54	-16.57	-	-	-	-	355	120	V
5	* 1.225	47.49	PK1	28.9	-35.5	40.89	-	-	74	-33.11	-	-	5	115	V
5	* 1.225	40.02	AD1	28.9	-35.5	33.42	54	-20.58	-	-	-	-	5	115	V
6	* 3.75	43.58	PK1	33.2	-33.1	43.68	-	-	74	-30.32	-	-	317	211	V
6	* 3.75	34.17	AD1	33.2	-33.1	34.27	54	-19.73	-	-	-	-	317	211	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

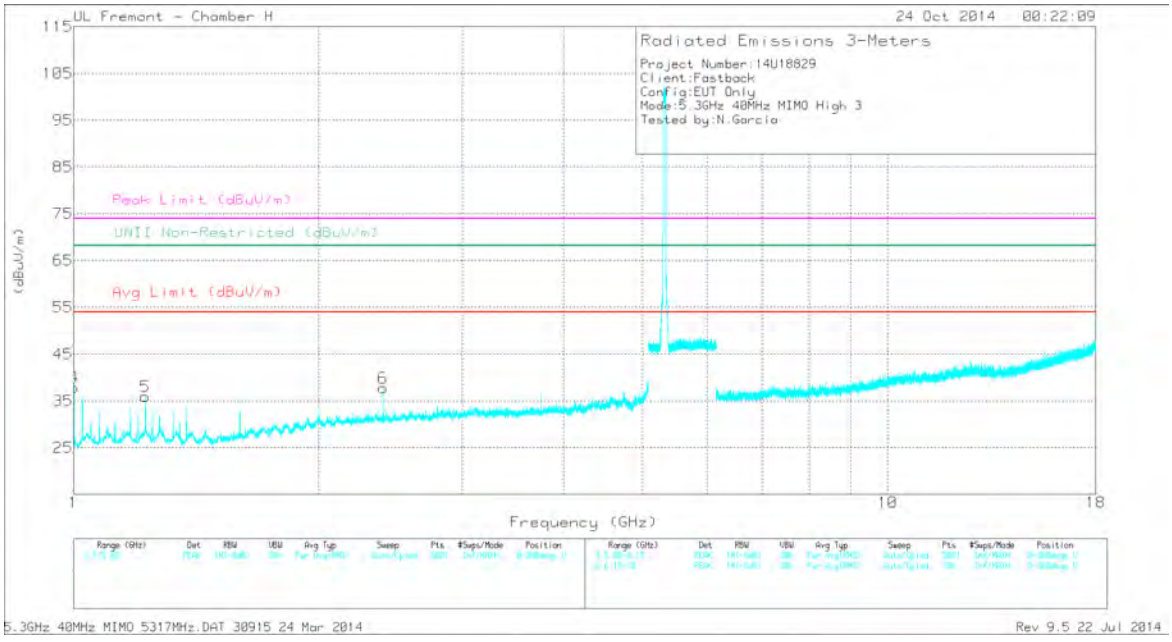
PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average

HIGH CHANNEL HORIZONTAL PLOT



HIGH CHANNEL VERTICAL PLOT



DATA

Radiated Emissions

Markers	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1	55.07	PK1	27.7	-35.6	47.17	-	-	74	-26.83	-	-	20	334	H
1	* 1	50.18	AD1	27.7	-35.6	42.28	54	-11.72	-	-	-	-	20	334	H
2	* 1.025	53.07	PK1	27.8	-35.5	45.37	-	-	74	-28.63	-	-	15	126	H
2	* 1.025	47.77	AD1	27.8	-35.5	40.07	54	-13.93	-	-	-	-	15	126	H
3	* 1.6	50.21	PK1	28.5	-35	43.71	-	-	74	-30.29	-	-	9	210	H
3	* 1.6	45.3	AD1	28.5	-35	38.8	54	-15.2	-	-	-	-	9	210	H
4	* 1	53.05	PK1	27.7	-35.6	45.15	-	-	74	-28.85	-	-	340	128	V
4	* 1	48.3	AD1	27.7	-35.6	40.4	54	-13.6	-	-	-	-	340	128	V
5	* 1.225	47.61	PK1	28.9	-35.5	41.01	-	-	74	-32.99	-	-	360	103	V
5	* 1.225	40	AD1	28.9	-35.5	33.4	54	-20.6	-	-	-	-	360	103	V
6	2.4	46.81	PK1	32	-34	44.81	-	-	-	-	68.2	-23.39	22	324	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

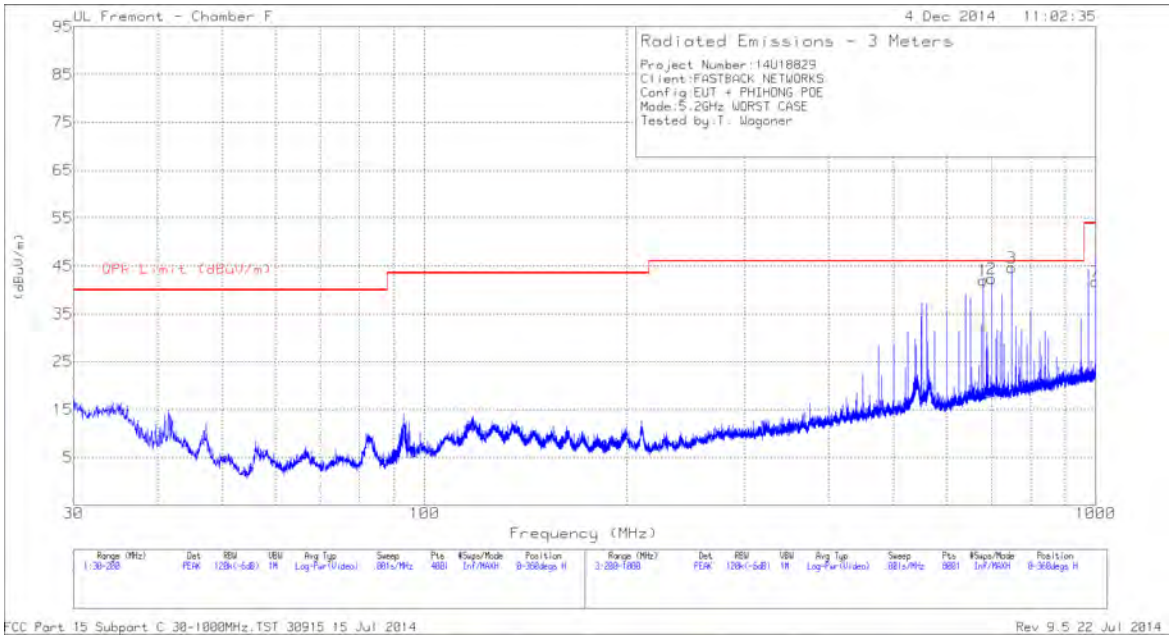
PK1 - KDB789033 Method: Peak

AD1 - KDB789033 Method: AD Primary Power Average

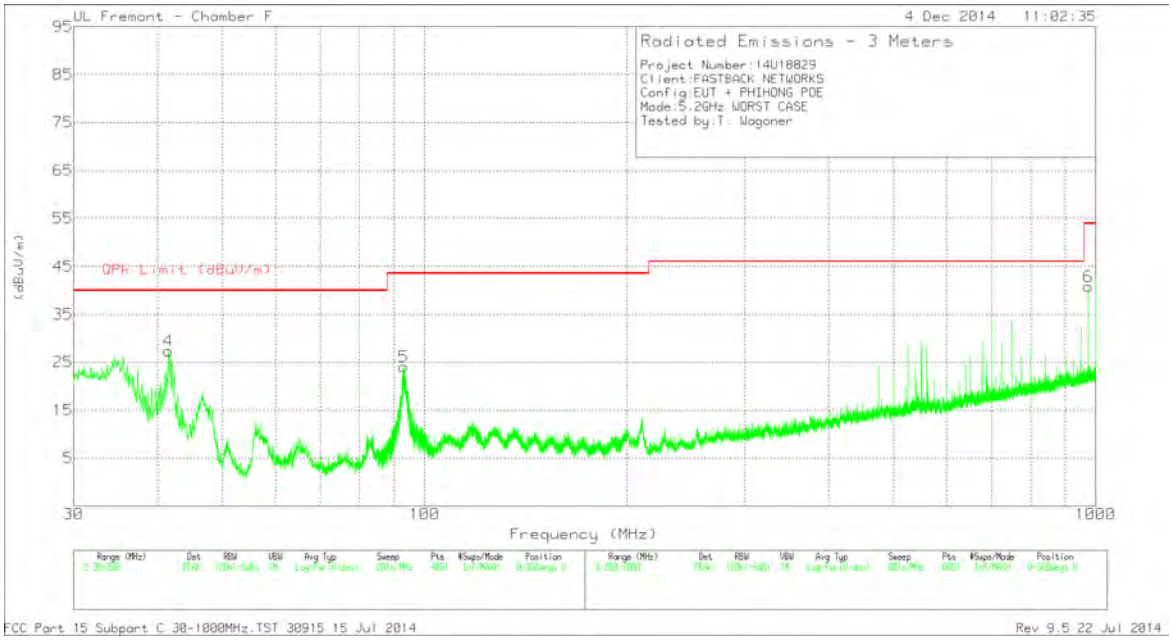
9.3. WORST-CASE BELOW 1 GHz

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)

HORIZONTAL PLOT



VERTICAL PLOT



DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T122 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	41.56	46.71	PK	12.7	-32	27.41	40	-12.59	0-360	100	V
5	93.07	47.27	PK	8.4	-31.6	24.07	43.52	-19.45	0-360	100	V
1	680	51.71	PK	20	-29.7	42.01	46.02	-4.01	0-360	100	H
	679.999	51.94	QP	20	-29.7	42.24	46.02	-3.78	328	106	H
2	700	51.8	PK	20.3	-29.7	42.4	46.02	-3.62	0-360	100	H
	700.004	54.87	QP	20.3	-29.7	45.47	46.02	-.55	286	104	H
3	750	53.45	PK	20.8	-29.6	44.65	46.02	-1.37	0-360	100	H
	750.005	50.33	QP	20.8	-29.6	41.53	46.02	-4.49	268	101	H
7	* 999.9	45.85	PK	23.4	-27.5	41.75	53.97	-12.22	0-360	201	H
6	* 975	45.56	PK	23.1	-27.8	40.86	53.97	-13.11	0-360	100	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

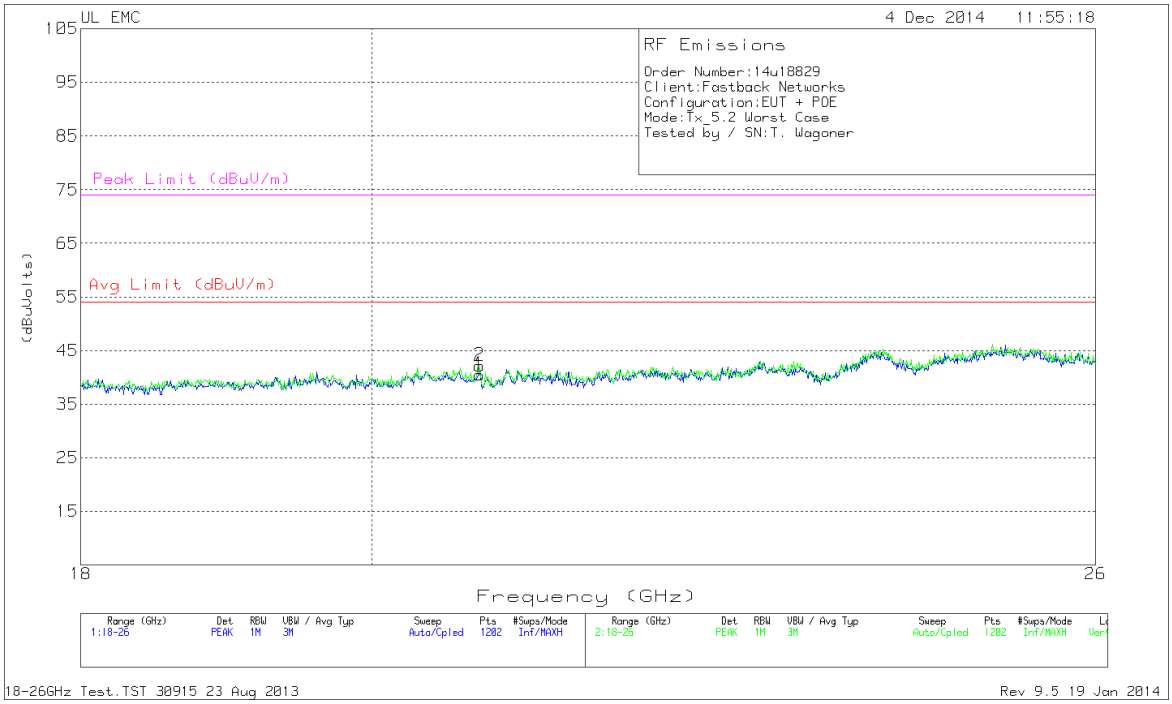
PK - Peak detector

QP - Quasi-Peak detector

9.4. WORST-CASE 18 to 26 GHz

SPURIOUS EMISSIONS 18000 TO 26000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL & VERTICAL)

HORIZONTAL & VERTICAL PLOT



HORIZONTAL & VERTICAL DATA

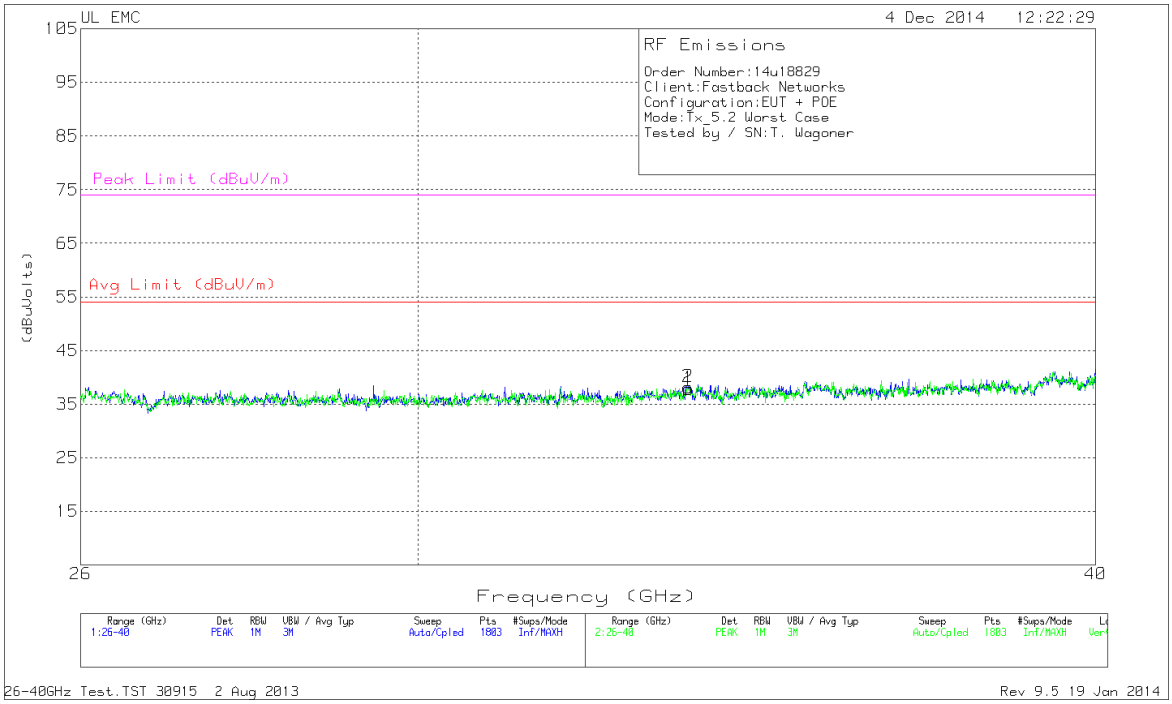
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T125 (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	20.798	41.3	PK	33.1	-24.4	-9.5	40.5	54	-13.5	74	-33.5
2	20.798	42.97	PK	33.1	-24.4	-9.5	42.167	54	-11.833	74	-31.833

PK - Peak detector

9.5. WORST-CASE 26 to 40 GHz

SPURIOUS EMISSIONS 26 TO 40 GHz (WORST-CASE CONFIGURATION, HORIZONTAL & VERTICAL)

HORIZONTAL & VERTICAL PLOT



HORIZONTAL & VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T90 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	33.653	47.33	PK	36.9	-36.9	-9.5	37.833	54	-16.167	74	-36.167
2	33.645	47.57	PK	36.9	-36.8	-9.5	38.167	54	-15.833	74	-35.833

PK - Peak detector

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

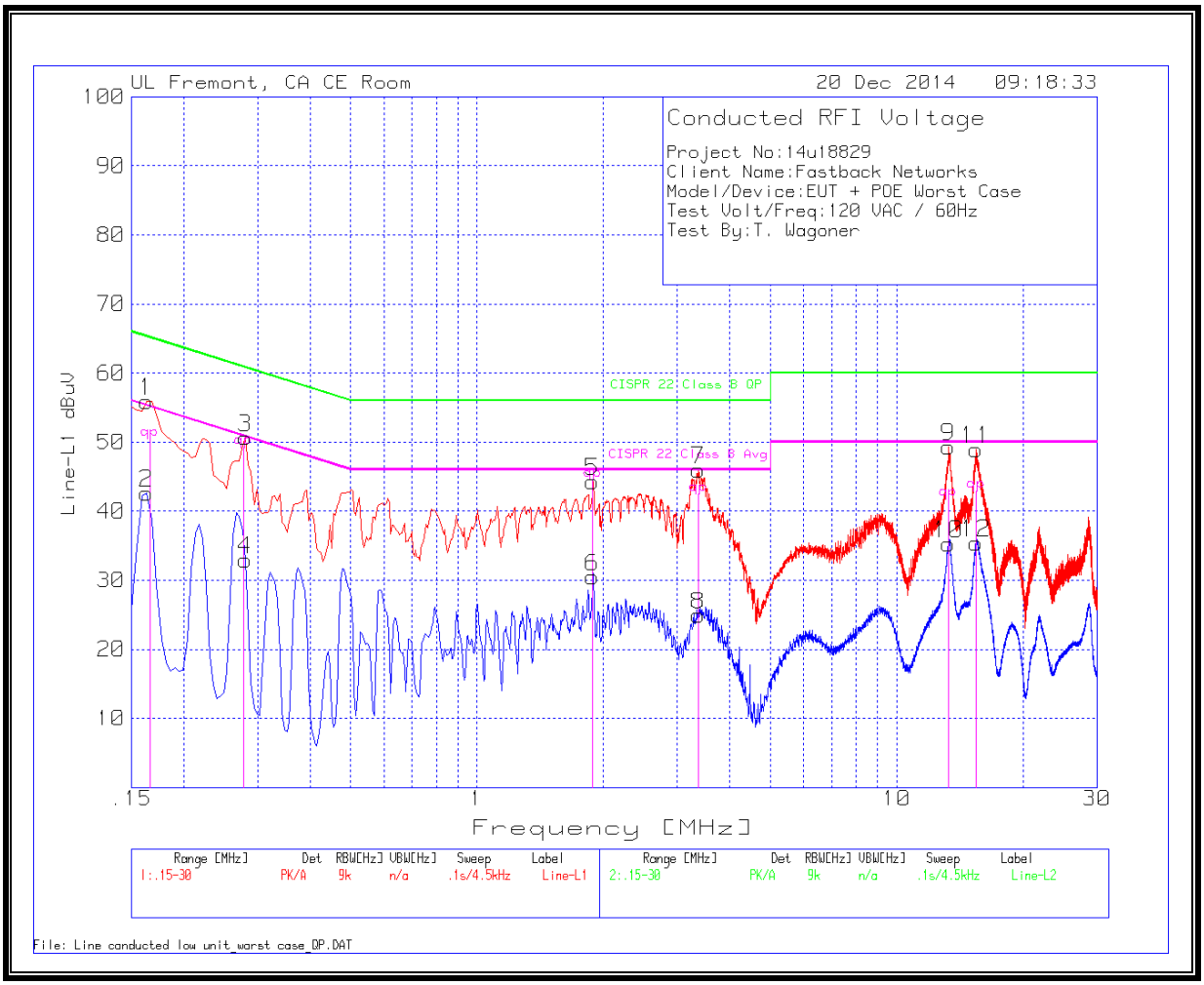
FCC §15.207 (a)

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

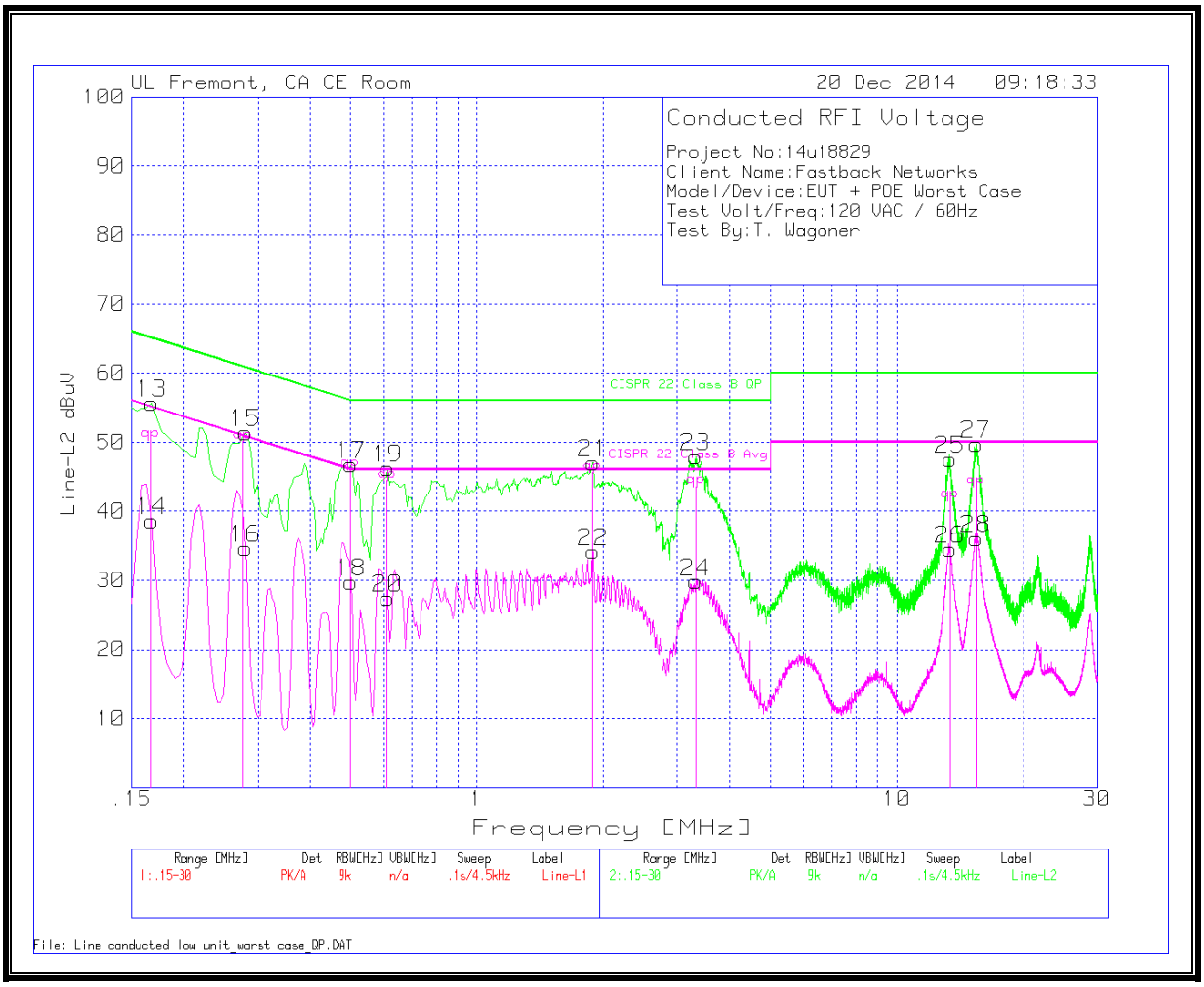
* Decreases with the logarithm of the frequency.

WORST CASE RESULTS

LINE 1 RESULTS



LINE 2 RESULTS



DATA

Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
1	.1635	54.72	PK	1.2	0	55.92	65.3	-9.38	-	-
2	.1635	41.45	Av	1.2	0	42.65	-	-	55.3	-12.65
3	.2805	50.08	PK	.6	0	50.68	60.8	-10.12	-	-
4	.2805	32.33	Av	.6	0	32.93	-	-	50.8	-17.87
5	1.887	43.98	PK	.2	.1	44.28	56	-11.72	-	-
6	1.887	30.15	Av	.2	.1	30.45	-	-	46	-15.55
7	3.372	45.72	PK	.2	.1	46.02	56	-9.98	-	-
8	3.372	24.61	Av	.2	.1	24.91	-	-	46	-21.09
9	13.272	48.94	PK	.2	.2	49.34	60	-10.66	-	-
10	13.272	34.83	Av	.2	.2	35.23	-	-	50	-14.77
11	15.45	48.5	PK	.3	.2	49	60	-11	-	-
12	15.45	34.94	Av	.3	.2	35.44	-	-	50	-14.56

Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dBuV	CISPR 22 Class B QP	Margin to Limit (dB)	CISPR 22 Class B Avg	Margin to Limit (dB)
13	.168	54.33	PK	1.3	0	55.63	65.1	-9.47	-	-
14	.168	37.38	Av	1.3	0	38.68	-	-	55.1	-16.42
15	.2805	50.79	PK	.6	0	51.39	60.8	-9.41	-	-
16	.2805	34.01	Av	.6	0	34.61	-	-	50.8	-16.19
17	.501	46.39	PK	.4	0	46.79	56	-9.21	-	-
18	.501	29.34	Av	.4	0	29.74	-	-	46	-16.26
19	.6135	45.97	PK	.3	0	46.27	56	-9.73	-	-
20	.6135	27.12	Av	.3	0	27.42	-	-	46	-18.58
21	1.8915	46.74	PK	.2	.1	47.04	56	-8.96	-	-
22	1.8915	33.88	Av	.2	.1	34.18	-	-	46	-11.82
23	3.3225	47.63	PK	.2	.1	47.93	56	-8.07	-	-
24	3.3225	29.5	Av	.2	.1	29.8	-	-	46	-16.2
25	13.3845	47	PK	.3	.2	47.5	60	-12.5	-	-
26	13.3845	34	Av	.3	.2	34.5	-	-	50	-15.5
27	15.432	49.19	PK	.3	.2	49.69	60	-10.31	-	-
28	15.432	35.61	Av	.3	.2	36.11	-	-	50	-13.89

11. DYNAMIC FREQUENCY SELECTION

11.1. OVERVIEW

11.1.1. LIMITS

INDUSTRY CANADA

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

RSS-210 Issue 8 A9.3

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

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

FCC

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

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

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

Table 2: Applicability of DFS requirements during normal operation

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

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar DFS	Client (without DFS)
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 frequencies 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 milliwatt	-64 dBm
E.I.R.P. < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
E.I.R.P. < 200 milliwatt 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

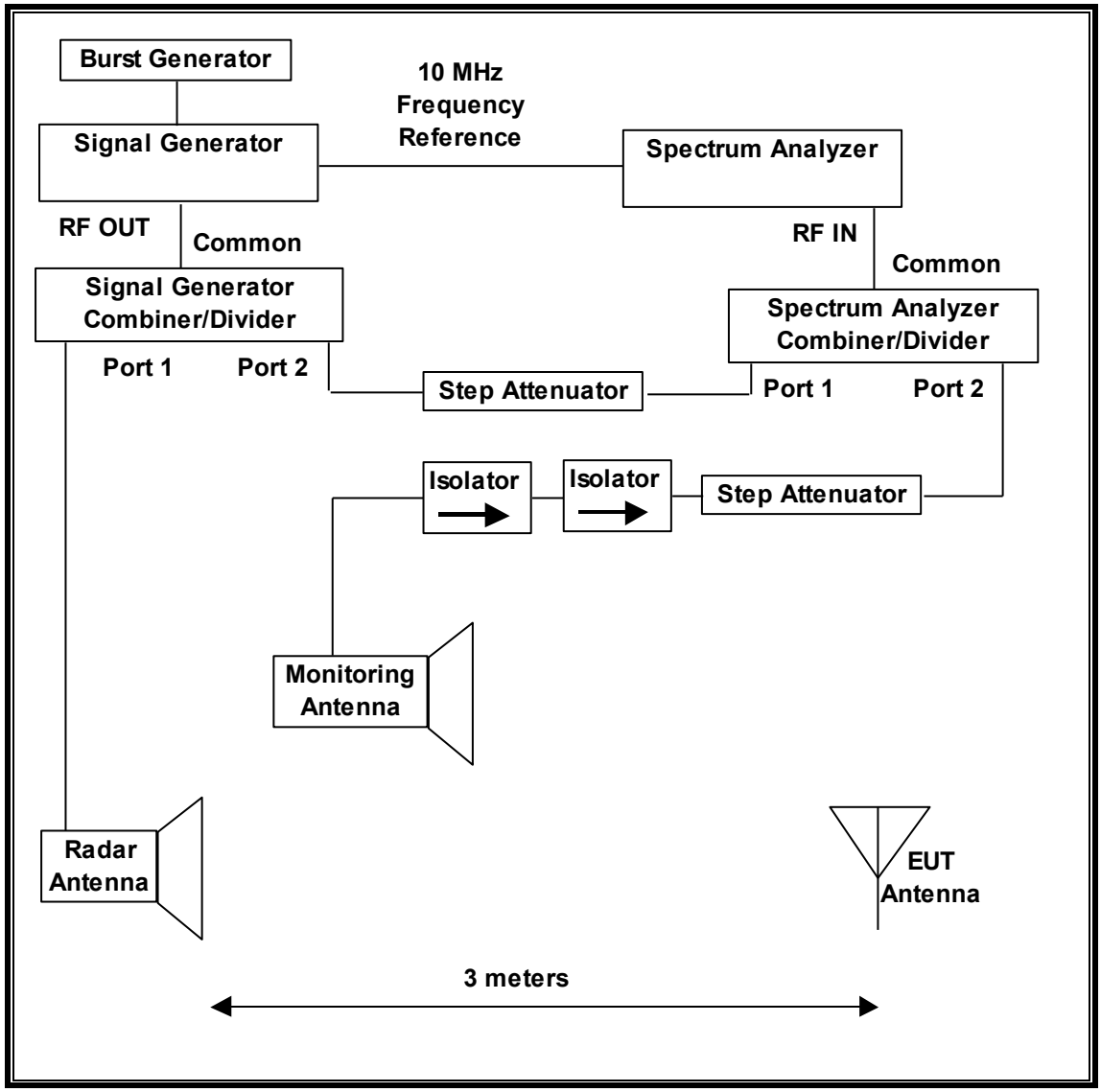
Radar Waveform Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

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.

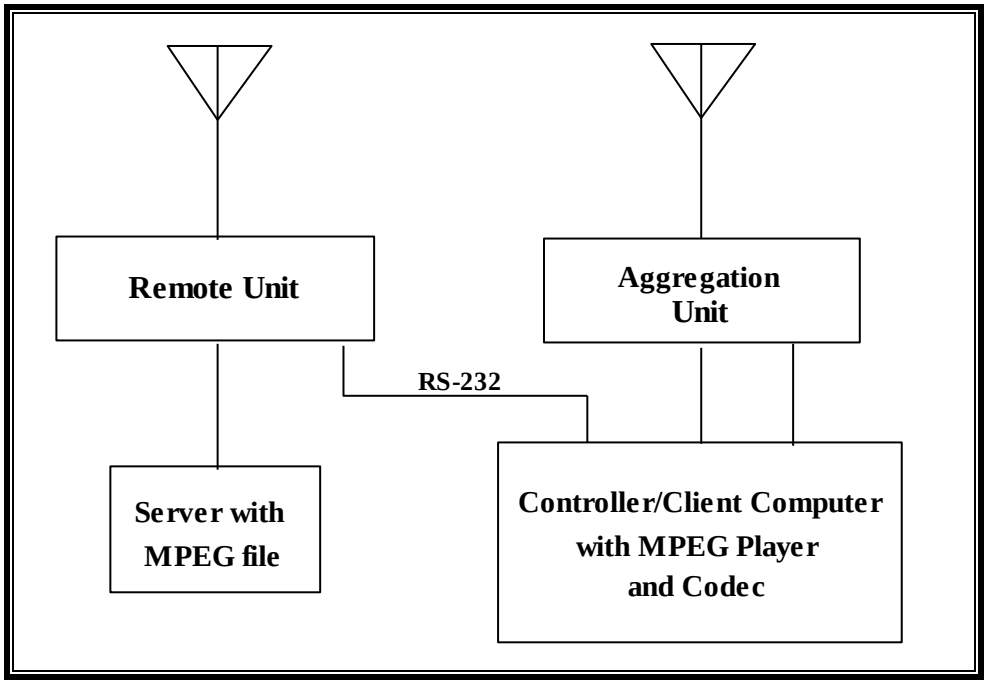
TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset Number**	**Cal Due**
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	09/05/15
Vector Signal Generator, 20GHz	Agilent / HP	E8267C	C01066	09/03/15
Arbitrary Waveform Generator	Agilent / HP	33220A	C01146	04/03/15

11.1.3. RADIATED METHOD EUT SETUP

CONFIGURATION 1:

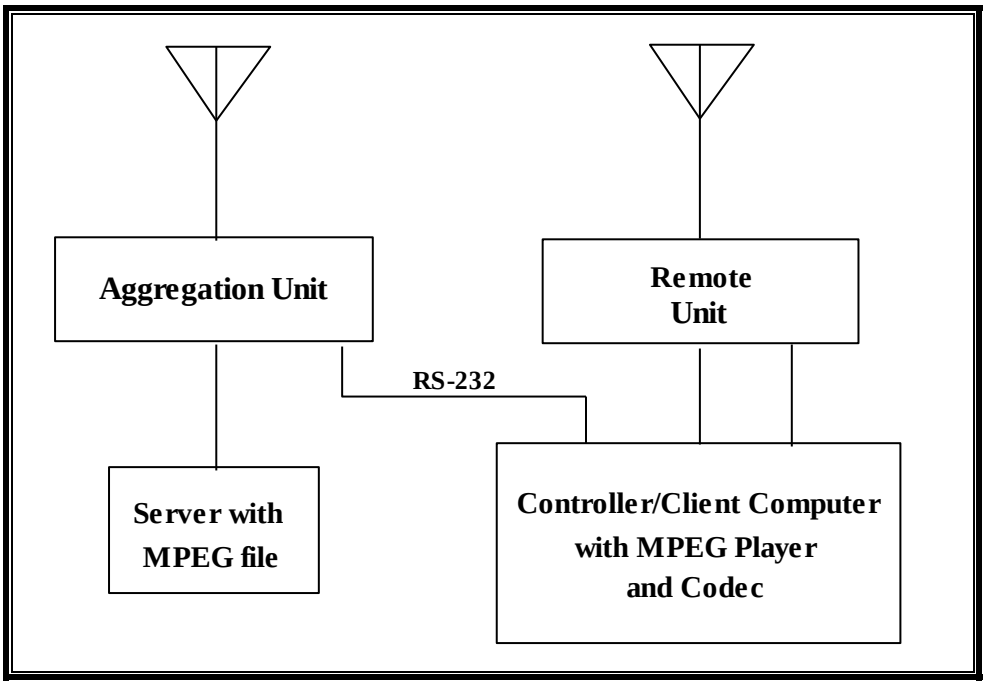


SUPPORT EQUIPMENT

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**
P.O.E. Injector (Aggregation Unit)	Phihong	POE36U-1AT-R	P30300384D1	DoC
Notebook PC (Controller/Client)	Lenovo	Type 20BG-0014US	R9-013NYV 14/03	DoC
AC Adapter (Controller/Client PC)	Lenovo	ADL170NLC1A	11S45N0375Z1ZS9 G41P4H9	DoC
Point to Point Outdoor Radio (Remote Unit)	Fastback Networks	40314380094	40314380094	2AAEH-104
P.O.E. Injector (Remote Unit)	Blackbox	LPJ001A-T	P21002705D1	DoC
Notebook PC (Server PC)	Lenovo	Type 4276-37U	R9-H8Y3C 11/10	DoC
AC Adapter (Server PC)	Lenovo	45N0113	11S45N0113Z1ZHX 819P0FN	DoC

CONFIGURATION 2:



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**
P.O.E. Injector (Remote Unit)	Blackbox	LPJ001A-T	P21002705D1	DoC
Notebook PC (Controller/Client)	Lenovo	Type 20BG-0014US	R9-013NYV 14/03	DoC
AC Adapter (Controller/Client PC)	Lenovo	ADL170NLC1A	11S45N0375Z1ZS9 G41P4H9	DoC
Point to Point Outdoor Radio (Aggregation Unit)	Fastback Networks	4031439002	40314390020	2AAEH-104
P.O.E. Injector (Aggregation Unit)	Phihong	POE36U-1AT-R	P30300384D1	DoC
Notebook PC (Server PC)	Lenovo	Type 4276-37U	R9-H8Y3C 11/10	DoC
AC Adapter (Server PC)	Lenovo	45N0113	11S45N0113Z1ZH X819P0FN	DoC

11.1.4. DESCRIPTION OF EUT

The EUT is a Master Receive only Device employing two DFS detector radio modules in the 5470-5725 MHz range.

Note: The DFS detection circuitry (include antenna) is independent from the EUT's transmitter per information provided by manufacturer.

The EUT does not transmit in the 5470-5725 MHz range. Transmit frequency range is 5250-5350 MHz range.

The only antenna assembly utilized with the EUT has a gain of 0 dBi.

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 a margin to the limit.

The EUT uses two transmitter/receiver chains connected to the antenna to perform radiated tests.

The Slave transmit 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 Slave Transmitter to the Master Receiver 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 is a Frame-based system. The Frame timing is set to a listen / talk ratio of 100%.

Three nominal channel bandwidths are implemented: 10 MHz, 20 MHz and 40 MHz.

The EUT always starts using a channel bandwidth of 10 MHz. After it has entered the operational phase when traffic can be passed it may select 10 MHz, 20 MHz or 40 MHz channel bandwidths depending on channel conditions.

The DFS sensor bandwidth is always wider than the widest nominal channel bandwidth. Therefore, 40 MHz CAC testing covers all nominal channel bandwidths.

The In-Service monitoring tests were performed for each of the operational bandwidths.

The software installed in the access point is revision 1.6.1.

UNIFORM CHANNEL SPREADING

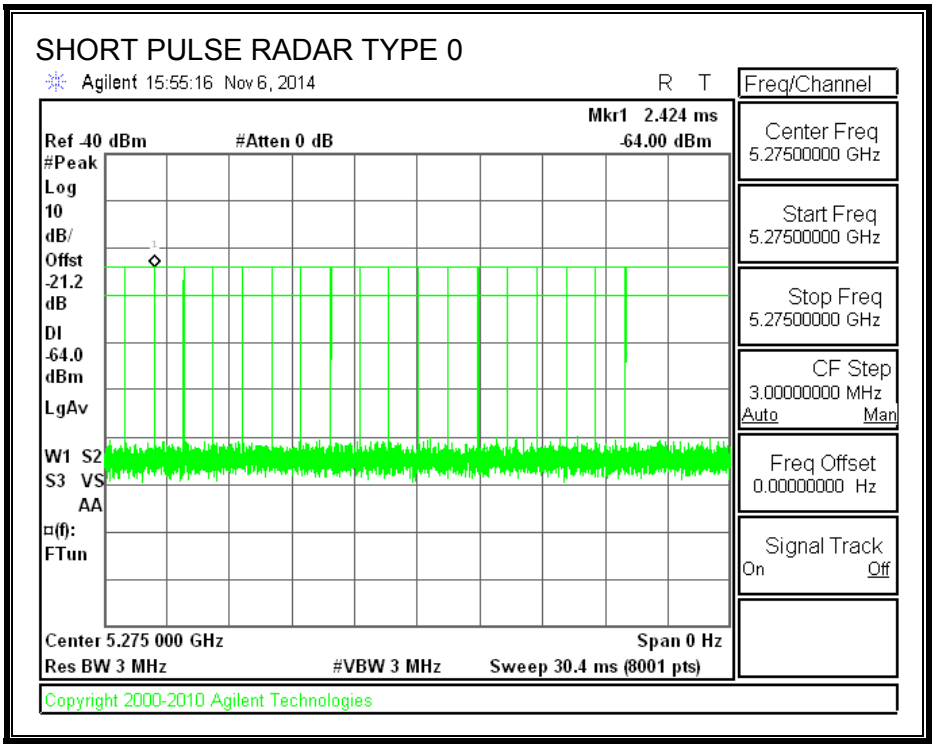
This function is not required per KDB 905462.

11.2. PRIMARY SENSOR LOWER HALF-BAND TEST CHANNEL

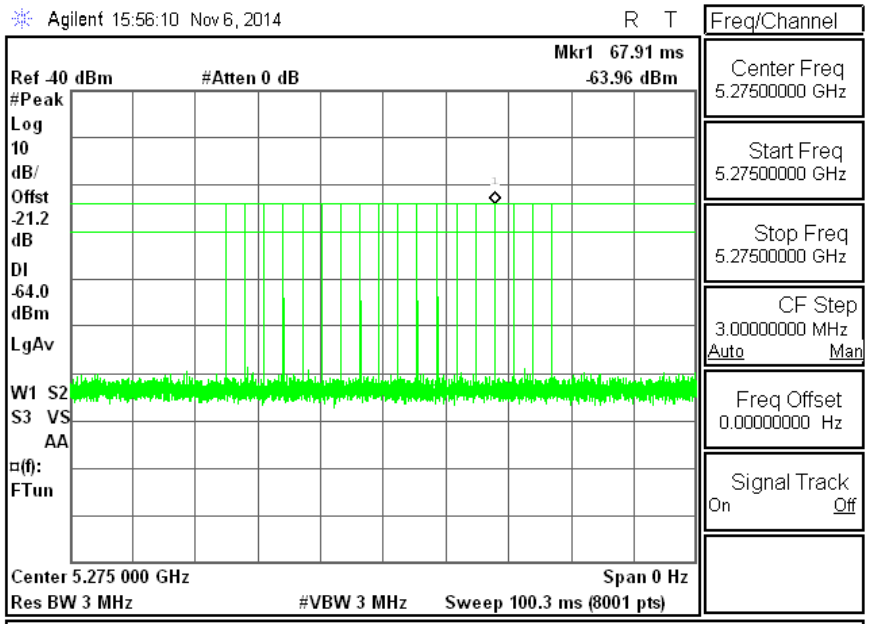
All tests were performed at a channel center frequency of 5275 MHz.

11.3. RADAR WAVEFORMS

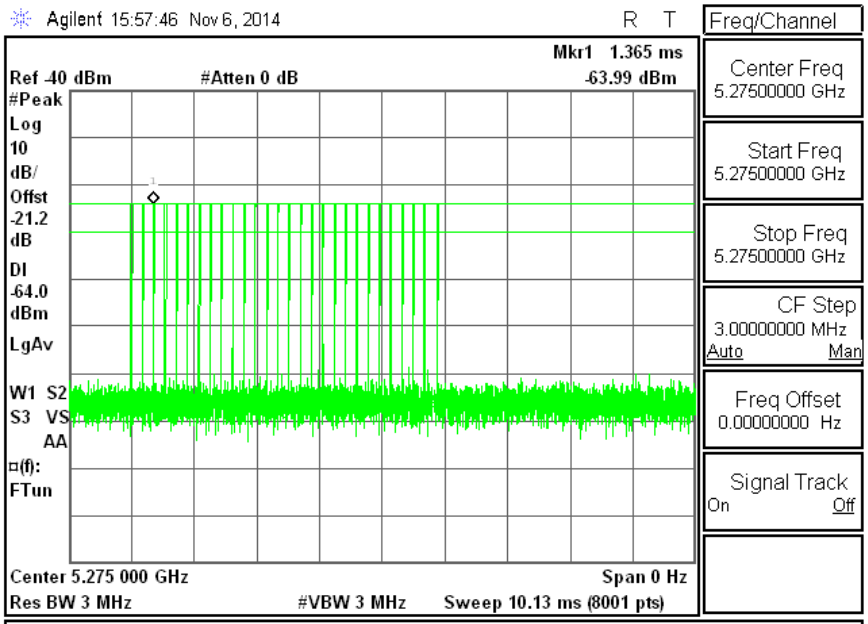
RADAR WAVEFORMS



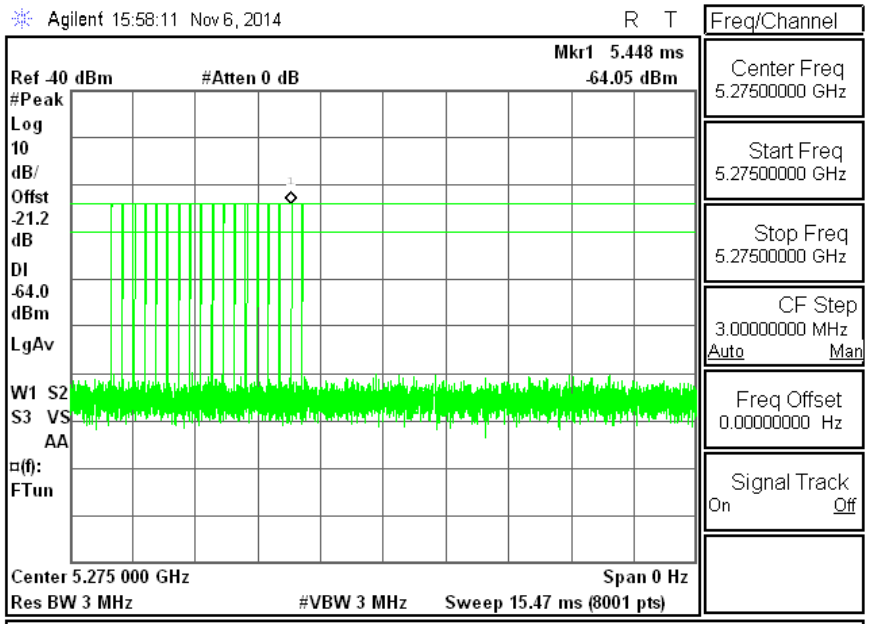
SAMPLE OF RADAR TYPE 1



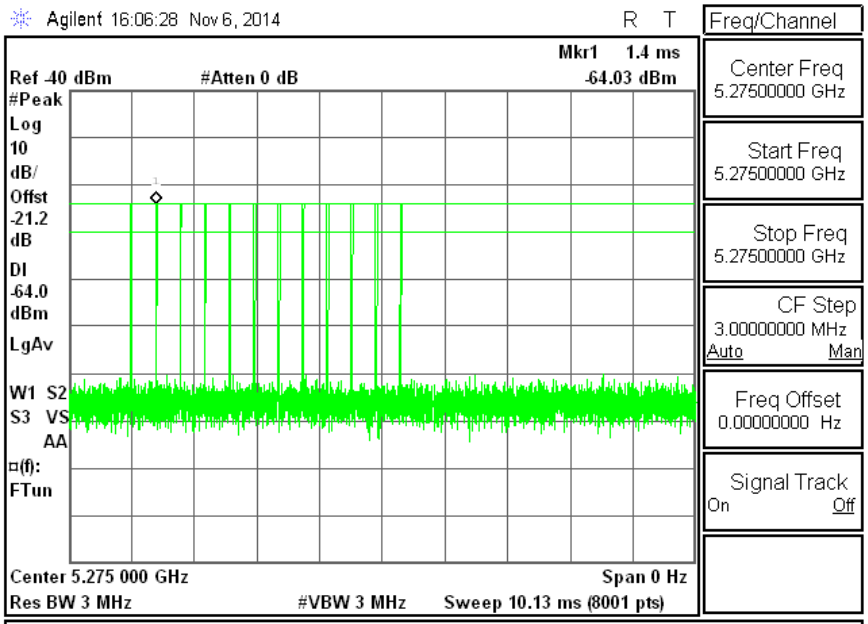
SAMPLE OF RADAR TYPE 2



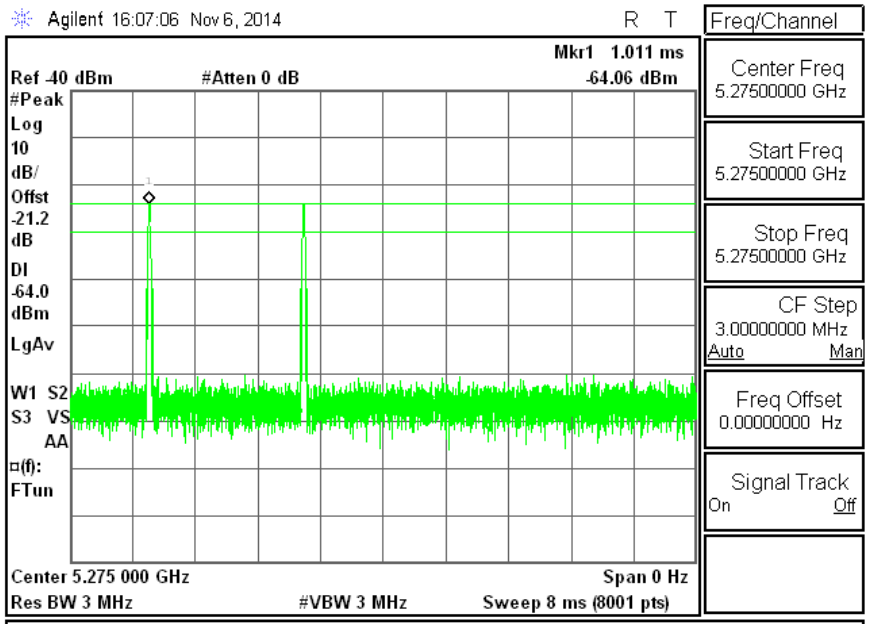
SAMPLE OF RADAR TYPE 3



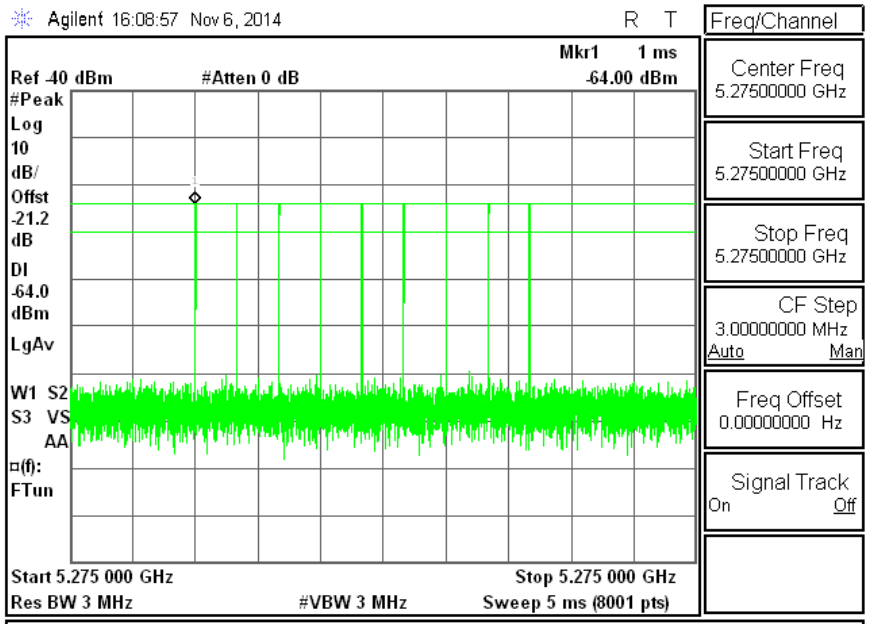
SAMPLE OF RADAR TYPE 4



SAMPLE OF SINGLE BURST OF RADAR TYPE 5

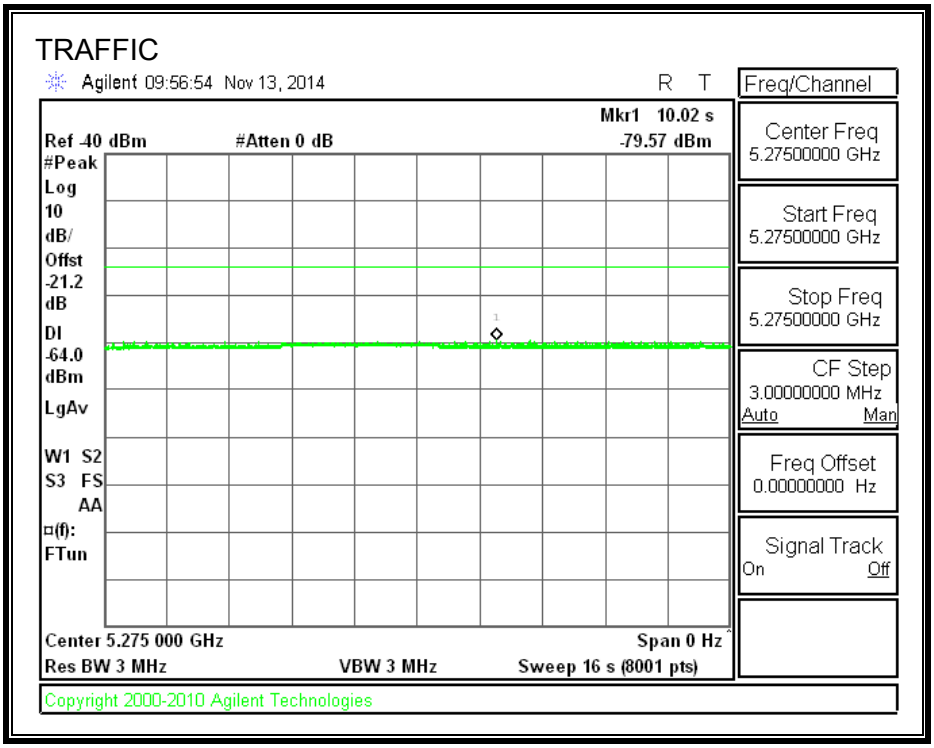


SINGLE BURST OF RADAR TYPE 6



11.4. RESULTS FOR 10 MHz BANDWIDTH

11.4.1. TRAFFIC



11.4.2. CHANNEL AVAILABILITY CHECK TIME

The DFS sensor bandwidth is always wider than the widest nominal channel bandwidth. Therefore, 40 MHz CAC testing covers all nominal channel bandwidths and this test was not performed for this channel bandwidth.

11.4.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

11.4.4. MOVE AND CLOSING TIME

REPORTING NOTES

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

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

The aggregate channel closing transmission time is calculated as follows:

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

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

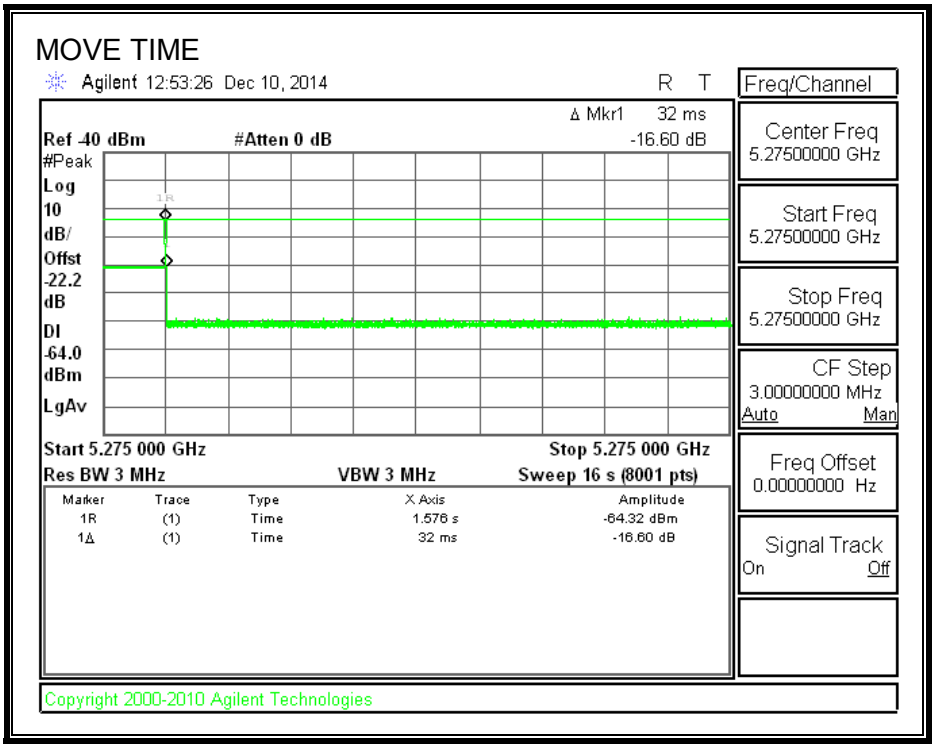
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

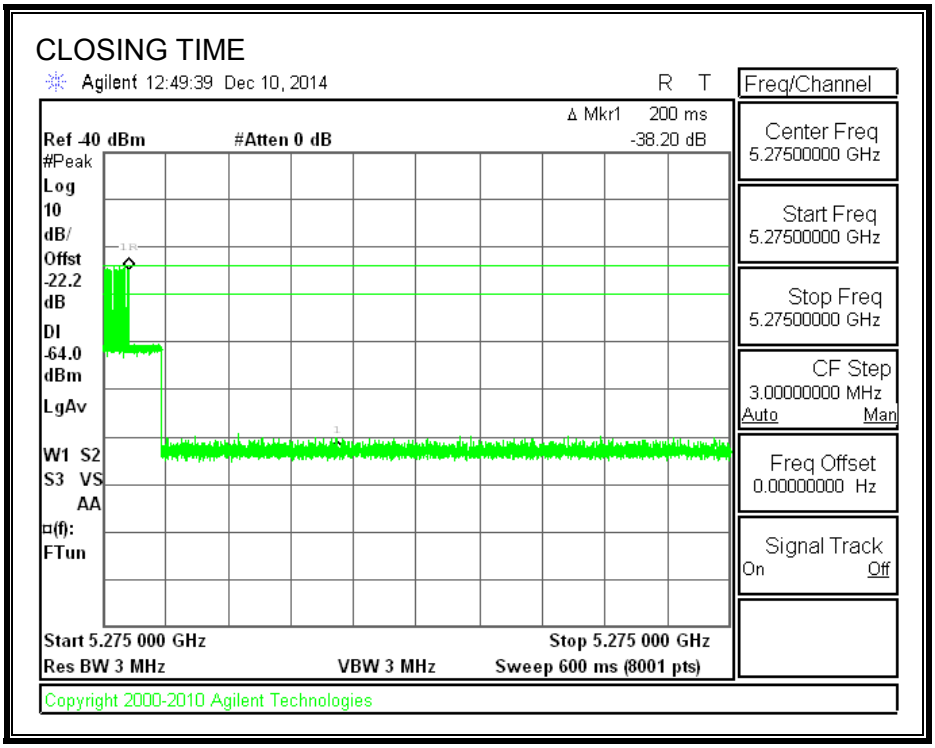
Channel Move Time (sec)	Limit (sec)
0.032	10

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

MOVE TIME

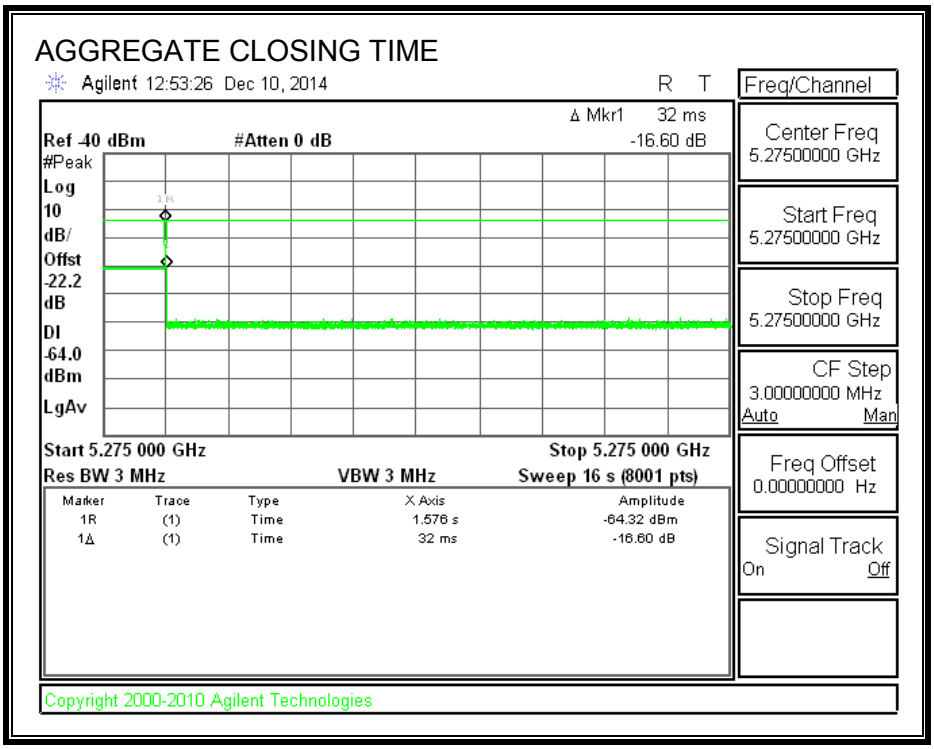


CHANNEL CLOSING TIME



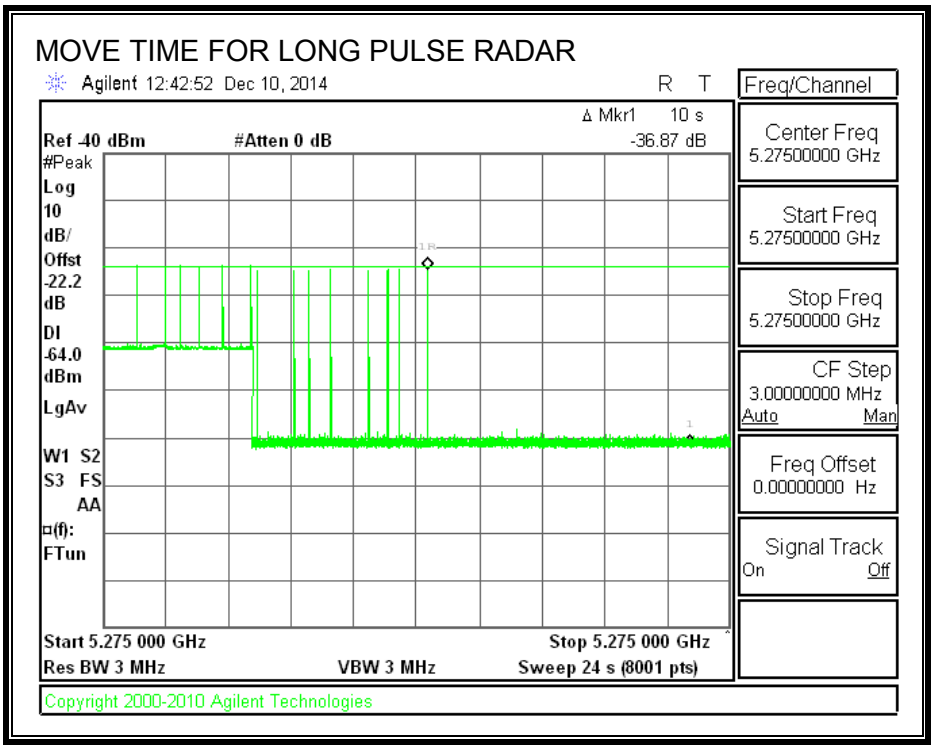
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the aggregate monitoring period.



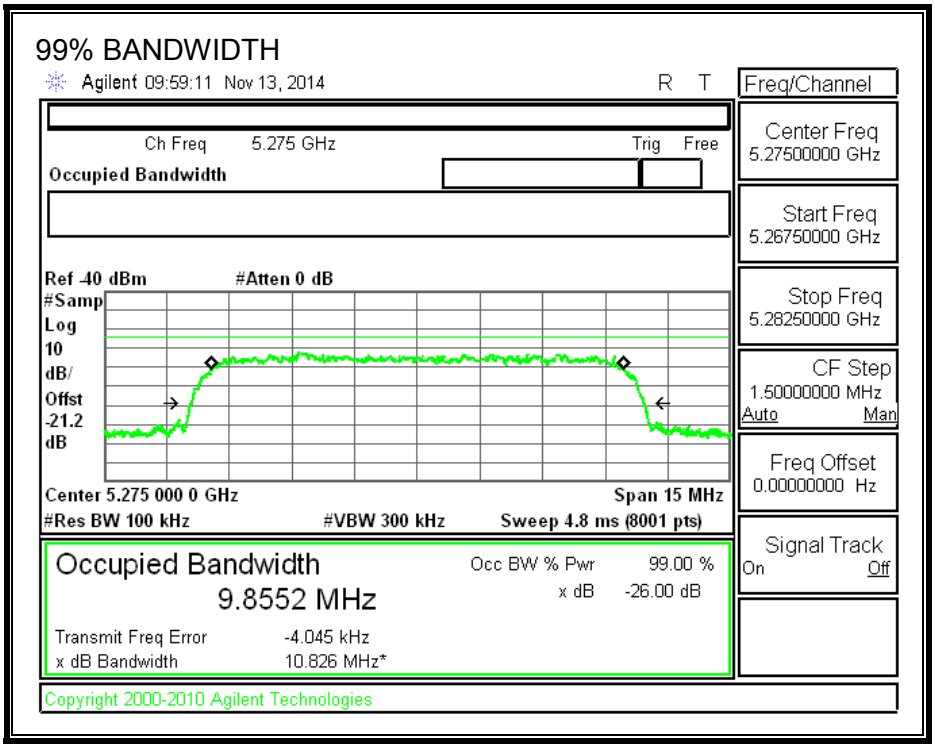
LONG PULSE CHANNEL MOVE TIME

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



11.4.5. DETECTION BANDWIDTH

REFERENCE PLOT OF 99% POWER BANDWIDTH



RESULTS

FL (MHz)	FH (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (%)	Minimum Limit (%)
5270	5280	10	9.855	101.5	80

DETECTION BANDWIDTH PROBABILITY

DETECTION BANDWIDTH PROBABILITY RESULTS

Detection Bandwidth Test Results				
FCC Type 0 Waveform: 0 us Pulse Width, 1428 us PRI, 18 Pulses per Burst				
Frequency (MHz)	Number of Trials	Number Detected	Detection (%)	Mark
5270	10	10	100	FL
5275	10	10	100	
5280	10	10	100	FH

11.4.6. IN-SERVICE MONITORING

RESULTS

FCC Radar Test Summary				
Signal Type	Number of Trials	Detection (%)	Limit (%)	Pass/Fail
FCC Short Pulse Type 1	30	96.67	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	96.67	60	Pass
Aggregate		98.33	80	Pass
FCC Long Pulse Type 5	30	86.67	80	Pass
FCC Hopping Type 6	33	100.00	70	Pass

TYPE 1 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 1				
1 us Pulse Width				
Waveform	PRI (us)	Pulses Per Burst	Test (A/B)	Successful Detection (Yes/No)
1001	3066	18	A	No
1002	678	78	A	Yes
1003	858	62	A	Yes
1004	638	83	A	Yes
1005	898	59	A	Yes
1006	558	95	A	Yes
1007	778	68	A	Yes
1008	718	74	A	Yes
1009	918	58	A	Yes
1010	698	76	A	Yes
1011	758	70	A	Yes
1012	938	57	A	Yes
1013	838	63	A	Yes
1014	738	72	A	Yes
1015	598	89	A	Yes
1016	798	67	B	Yes
1017	1224	44	B	Yes
1018	993	54	B	Yes
1019	2874	19	B	Yes
1020	1435	37	B	Yes
1021	1032	52	B	Yes
1022	931	57	B	Yes
1023	1399	38	B	Yes
1024	1476	36	B	Yes
1025	2706	20	B	Yes
1026	1979	27	B	Yes
1027	894	60	B	Yes
1028	3029	18	B	Yes
1029	1613	33	B	Yes
1030	1078	49	B	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	4.4	227.00	29	Yes
2002	3.3	159.00	29	Yes
2003	4.2	211.00	29	Yes
2004	3.1	191.00	23	Yes
2005	4.1	167.00	23	Yes
2006	3.8	160.00	24	Yes
2007	2.8	193.00	26	Yes
2008	3.7	170.00	29	Yes
2009	1.7	202.00	26	Yes
2010	1.4	213.00	26	Yes
2011	3.9	223.00	28	Yes
2012	3.4	210.00	25	Yes
2013	4.5	158.00	25	Yes
2014	2.2	170.00	23	Yes
2015	4.9	183.00	27	Yes
2016	4.9	206.00	29	Yes
2017	1.4	205.00	29	Yes
2018	1.2	182.00	27	Yes
2019	3.8	222.00	26	Yes
2020	1.2	178.00	29	Yes
2021	1.4	153.00	25	Yes
2022	2.9	172.00	24	Yes
2023	1.9	192.00	24	Yes
2024	2.4	213.00	24	Yes
2025	2.4	154.00	26	Yes
2026	1.9	222.00	28	Yes
2027	1.7	169.00	29	Yes
2028	3.3	158.00	29	Yes
2029	3	216.00	23	Yes
2030	1.4	210.00	25	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	10	499.00	17	Yes
3002	8.8	319.00	18	Yes
3003	9.4	379.00	18	Yes
3004	9.4	430.00	17	Yes
3005	9.4	308.00	17	Yes
3006	8.1	373.00	18	Yes
3007	9.7	414.00	16	Yes
3008	6.9	475.00	18	Yes
3009	7.1	497.00	17	Yes
3010	9.5	409.00	17	Yes
3011	6.5	262.00	17	Yes
3012	6.4	351.00	17	Yes
3013	9.3	277.00	17	Yes
3014	5.4	335.00	17	Yes
3015	8.1	408.00	17	Yes
3016	7.9	387.00	18	Yes
3017	6.7	302.00	17	Yes
3018	7.9	445.00	16	Yes
3019	5.5	309.00	16	Yes
3020	6	444.00	16	Yes
3021	8	480.00	17	Yes
3022	8	384.00	17	Yes
3023	8.6	456.00	17	Yes
3024	7	401.00	18	Yes
3025	7.4	282.00	18	Yes
3026	6.8	366.00	17	Yes
3027	7.2	305.00	17	Yes
3028	7.5	468.00	18	Yes
3029	6.1	420	18	Yes
3030	6.5	401	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	14.5	365.00	16	Yes
4002	13.4	433.00	12	Yes
4003	15.3	438.00	12	No
4004	19.4	374.00	14	Yes
4005	16.8	250.00	12	Yes
4006	11.6	375.00	15	Yes
4007	13.1	250.00	16	Yes
4008	16	404.00	16	Yes
4009	17.3	354.00	16	Yes
4010	16.6	282.00	15	Yes
4011	19.9	294.00	13	Yes
4012	15.4	253.00	15	Yes
4013	18.4	312.00	12	Yes
4014	16.6	307.00	16	Yes
4015	19.5	435.00	13	Yes
4016	15.5	253.00	13	Yes
4017	15	321.00	13	Yes
4018	11.7	475.00	13	Yes
4019	11.6	319.00	14	Yes
4020	17.2	451.00	15	Yes
4021	16.6	331.00	16	Yes
4022	17.6	485.00	13	Yes
4023	14.6	306.00	15	Yes
4024	17.4	327.00	13	Yes
4025	14.8	319.00	13	Yes
4026	17.3	303.00	15	Yes
4027	13.7	361.00	13	Yes
4028	18.2	395.00	16	Yes
4029	18.6	455.00	16	Yes
4030	15.6	420.00	14	Yes

TYPE 5 DETECTION PROBABILITY

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

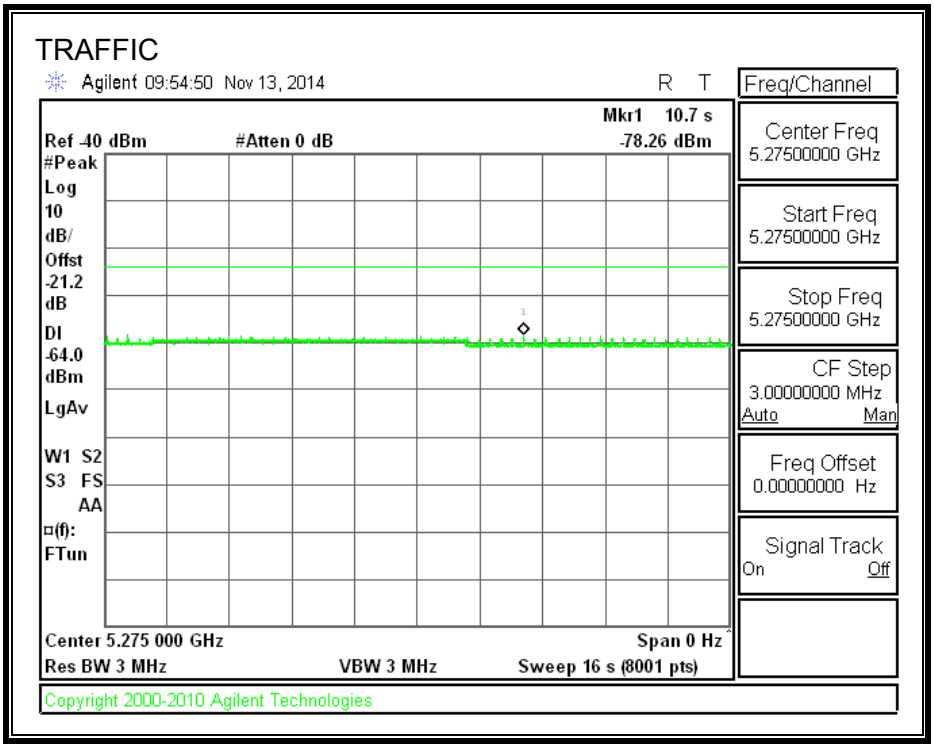
Note: Randomized parameters for the Type 5 In-Service Monitoring testing performed on 11/06/14 are shown in a separate document.

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	259	5270	3	Yes
2	734	5271	2	Yes
3	1209	5272	1	Yes
4	1684	5273	3	Yes
5	2159	5274	2	Yes
6	2634	5275	1	Yes
7	3109	5276	4	Yes
8	3584	5277	3	Yes
9	4059	5278	2	Yes
10	4534	5279	1	Yes
11	5009	5280	2	Yes
12	5484	5270	3	Yes
13	5959	5271	4	Yes
14	6434	5272	1	Yes
15	6909	5273	2	Yes
16	7384	5274	2	Yes
17	7859	5275	3	Yes
18	8334	5276	1	Yes
19	8809	5277	5	Yes
20	9284	5278	5	Yes
21	9759	5279	5	Yes
22	10234	5280	4	Yes
23	10709	5270	2	Yes
24	11184	5271	2	Yes
25	11659	5272	2	Yes
26	12134	5273	2	Yes
27	12609	5274	1	Yes
28	13084	5275	4	Yes
29	13559	5276	3	Yes
30	14034	5277	5	Yes
31	14509	5278	5	Yes
32	14984	5279	2	Yes
33	15459	5280	3	Yes

11.5. RESULTS FOR 20 MHz BANDWIDTH

11.5.1. TRAFFIC



11.5.2. CHANNEL AVAILABILITY CHECK TIME

The DFS sensor bandwidth is always wider than the widest nominal channel bandwidth. Therefore, 40 MHz CAC testing covers all nominal channel bandwidths and this test was not performed for this channel bandwidth.

11.5.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

11.5.4. MOVE AND CLOSING TIME

REPORTING NOTES

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

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

The aggregate channel closing transmission time is calculated as follows:

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

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

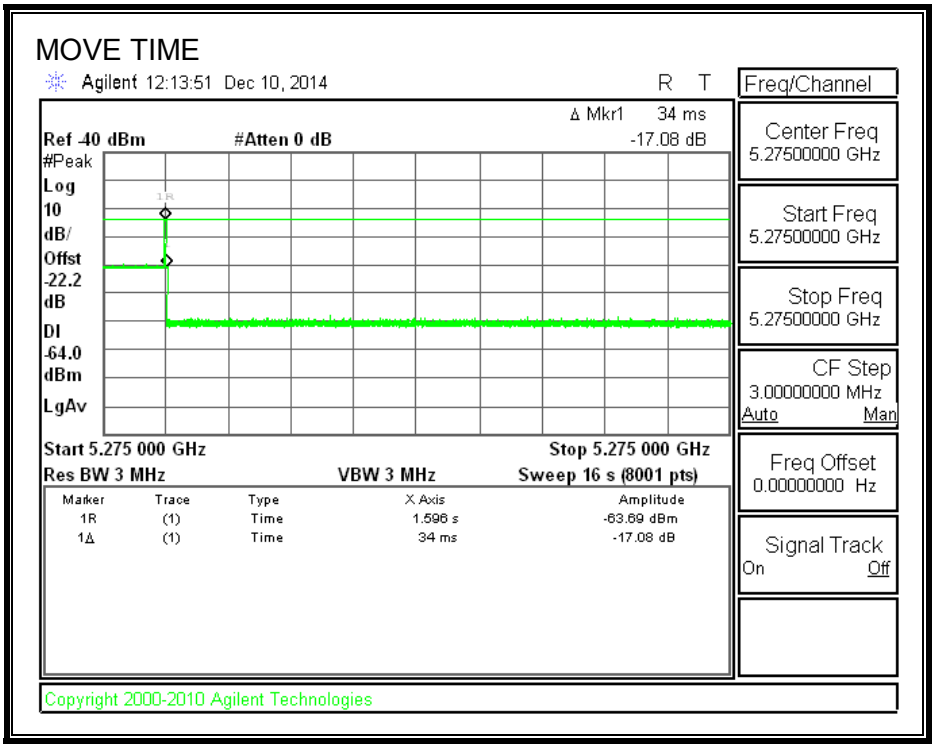
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

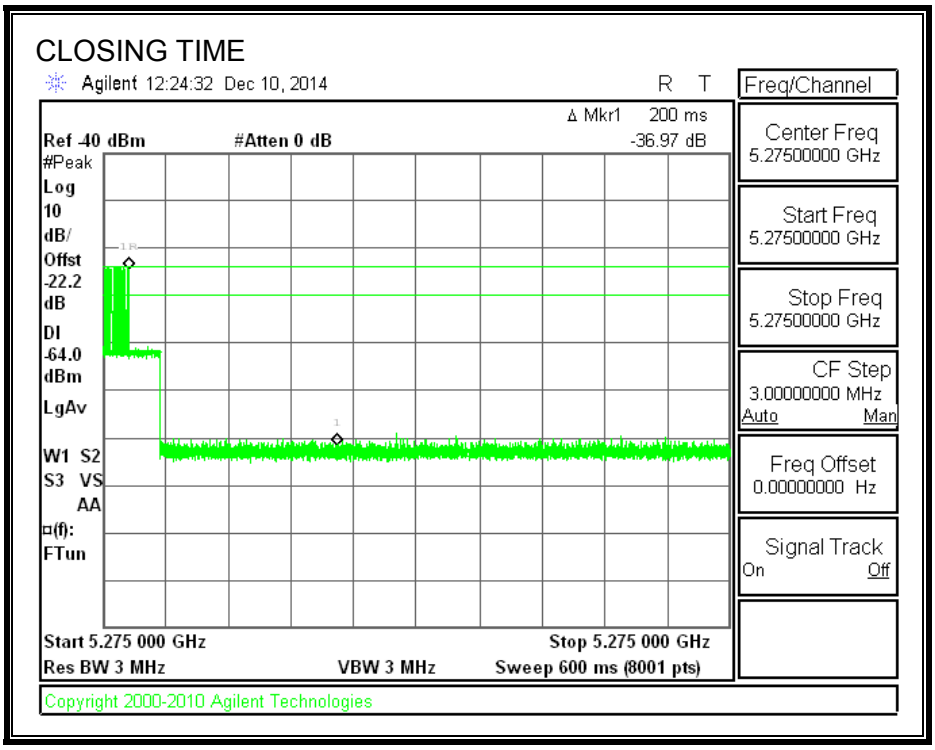
Channel Move Time (sec)	Limit (sec)
0.034	10

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

MOVE TIME



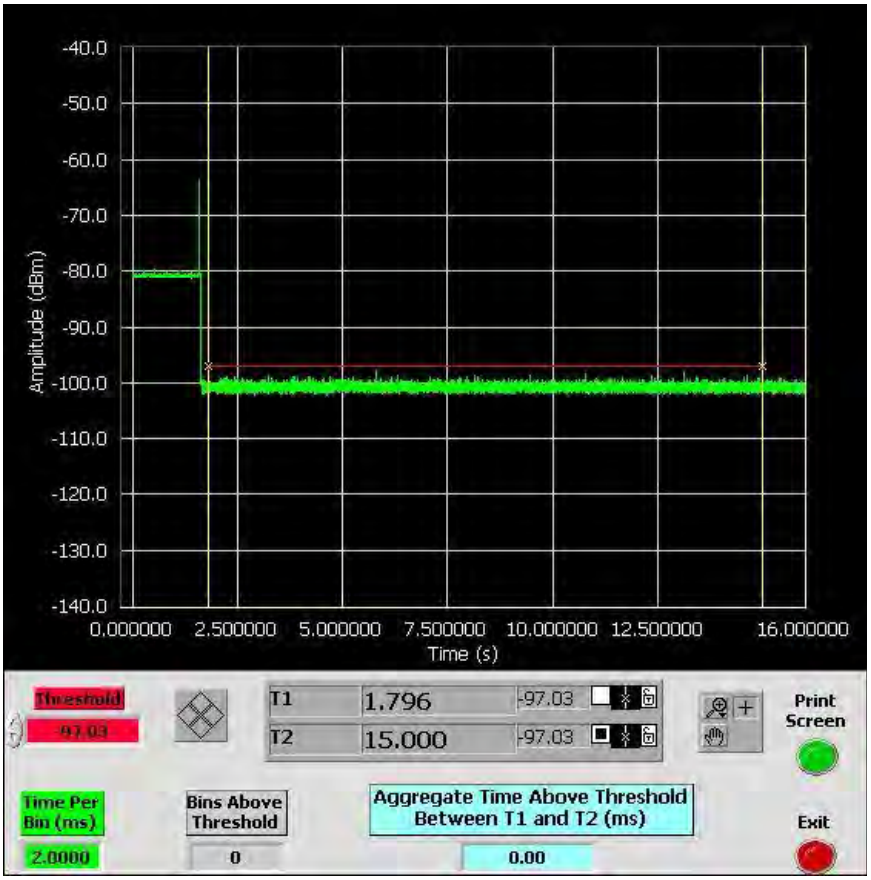
CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

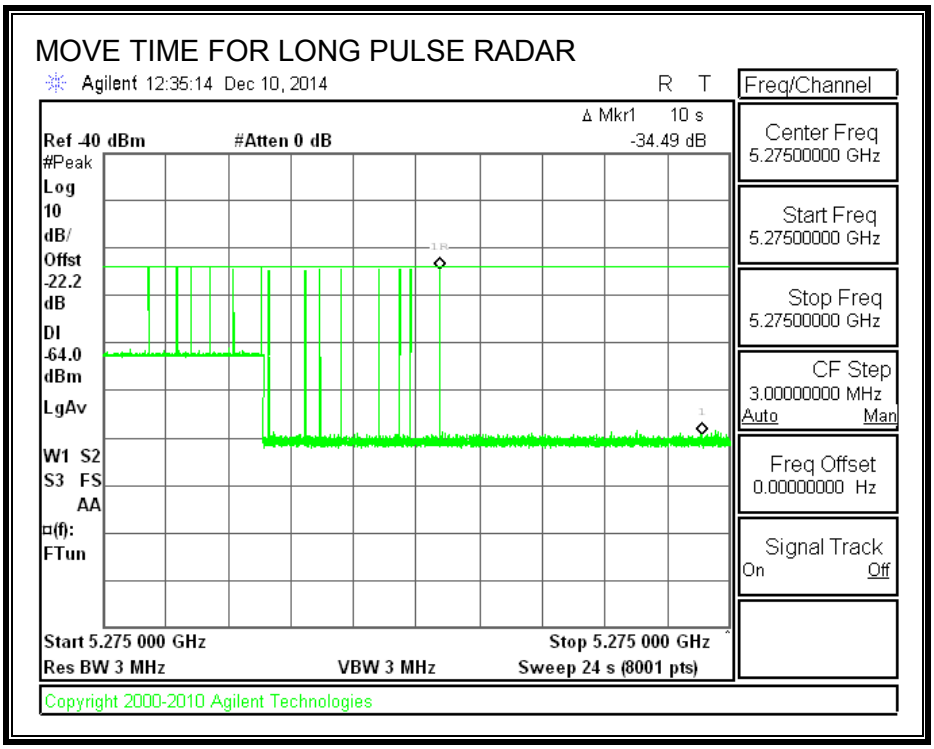
No transmissions are observed during the aggregate monitoring period.

AGGREGATE CLOSING TIME



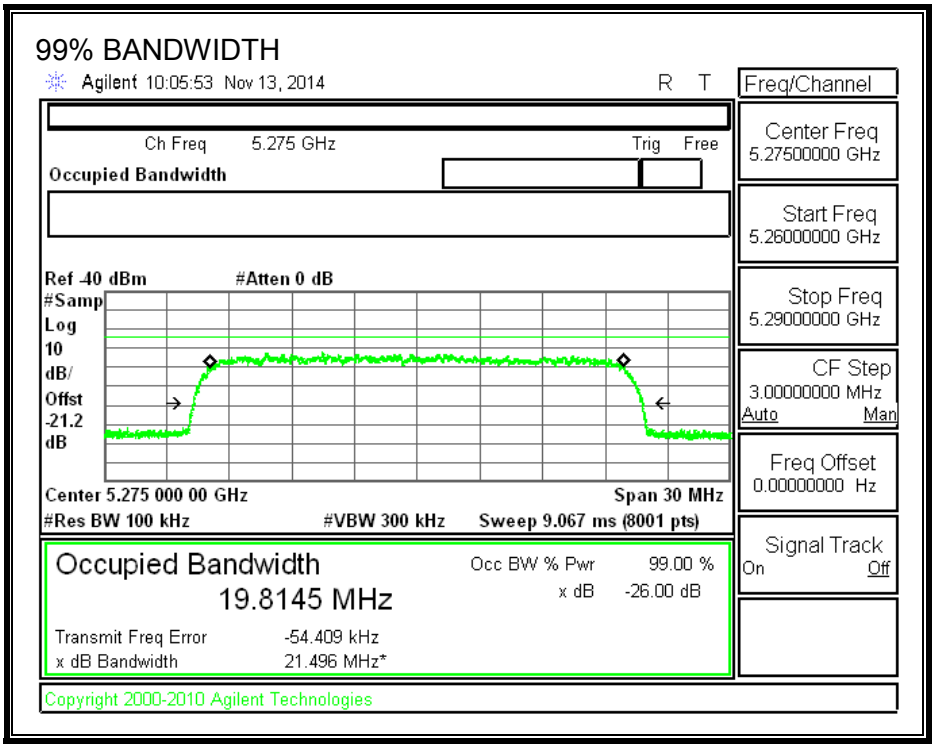
LONG PULSE CHANNEL MOVE TIME

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



11.5.5. DETECTION BANDWIDTH

REFERENCE PLOT OF 99% POWER BANDWIDTH



RESULTS

FL (MHz)	FH (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (%)	Minimum Limit (%)
5265	5285	20	19.815	100.9	100

DETECTION BANDWIDTH PROBABILITY

DETECTION BANDWIDTH PROBABILITY RESULTS

Detection Bandwidth Test Results				
FCC Type 0 Waveform: 0 us Pulse Width, 1428 us PRI, 18 Pulses per Burst				
Frequency (MHz)	Number of Trials	Number Detected	Detection (%)	Mark
5265	10	10	100	FL
5270	10	10	100	
5275	10	10	100	
5280	10	10	100	
5285	10	10	100	FH

11.5.6. IN-SERVICE MONITORING

RESULTS

FCC Radar Test Summary				
Signal Type	Number of Trials	Detection (%)	Limit (%)	Pass/Fail
FCC Short Pulse Type 1	30	100.00	60	Pass
FCC Short Pulse Type 2	30	100.00	60	Pass
FCC Short Pulse Type 3	30	96.67	60	Pass
FCC Short Pulse Type 4	30	96.67	60	Pass
Aggregate		98.33	80	Pass
FCC Long Pulse Type 5	30	93.33	80	Pass
FCC Hopping Type 6	42	100.00	70	Pass

TYPE 1 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 1				
1 us Pulse Width				
Waveform	PRI (us)	Pulses Per Burst	Test (A/B)	Successful Detection (Yes/No)
1001	3066	18	A	Yes
1002	678	78	A	Yes
1003	858	62	A	Yes
1004	638	83	A	Yes
1005	898	59	A	Yes
1006	558	95	A	Yes
1007	778	68	A	Yes
1008	718	74	A	Yes
1009	918	58	A	Yes
1010	698	76	A	Yes
1011	758	70	A	Yes
1012	938	57	A	Yes
1013	838	63	A	Yes
1014	738	72	A	Yes
1015	598	89	A	Yes
1016	798	67	B	Yes
1017	1224	44	B	Yes
1018	993	54	B	Yes
1019	2874	19	B	Yes
1020	1435	37	B	Yes
1021	1032	52	B	Yes
1022	931	57	B	Yes
1023	1399	38	B	Yes
1024	1476	36	B	Yes
1025	2706	20	B	Yes
1026	1979	27	B	Yes
1027	894	60	B	Yes
1028	3029	18	B	Yes
1029	1613	33	B	Yes
1030	1078	49	B	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	4.4	227.00	29	Yes
2002	3.3	159.00	29	Yes
2003	4.2	211.00	29	Yes
2004	3.1	191.00	23	Yes
2005	4.1	167.00	23	Yes
2006	3.8	160.00	24	Yes
2007	2.8	193.00	26	Yes
2008	3.7	170.00	29	Yes
2009	1.7	202.00	26	Yes
2010	1.4	213.00	26	Yes
2011	3.9	223.00	28	Yes
2012	3.4	210.00	25	Yes
2013	4.5	158.00	25	Yes
2014	2.2	170.00	23	Yes
2015	4.9	183.00	27	Yes
2016	4.9	206.00	29	Yes
2017	1.4	205.00	29	Yes
2018	1.2	182.00	27	Yes
2019	3.8	222.00	26	Yes
2020	1.2	178.00	29	Yes
2021	1.4	153.00	25	Yes
2022	2.9	172.00	24	Yes
2023	1.9	192.00	24	Yes
2024	2.4	213.00	24	Yes
2025	2.4	154.00	26	Yes
2026	1.9	222.00	28	Yes
2027	1.7	169.00	29	Yes
2028	3.3	158.00	29	Yes
2029	3	216.00	23	Yes
2030	1.4	210.00	25	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	10	499.00	17	Yes
3002	8.8	319.00	18	Yes
3003	9.4	379.00	18	Yes
3004	9.4	430.00	17	Yes
3005	9.4	308.00	17	Yes
3006	8.1	373.00	18	Yes
3007	9.7	414.00	16	Yes
3008	6.9	475.00	18	Yes
3009	7.1	497.00	17	No
3010	9.5	409.00	17	Yes
3011	6.5	262.00	17	Yes
3012	6.4	351.00	17	Yes
3013	9.3	277.00	17	Yes
3014	5.4	335.00	17	Yes
3015	8.1	408.00	17	Yes
3016	7.9	387.00	18	Yes
3017	6.7	302.00	17	Yes
3018	7.9	445.00	16	Yes
3019	5.5	309.00	16	Yes
3020	6	444.00	16	Yes
3021	8	480.00	17	Yes
3022	8	384.00	17	Yes
3023	8.6	456.00	17	Yes
3024	7	401.00	18	Yes
3025	7.4	282.00	18	Yes
3026	6.8	366.00	17	Yes
3027	7.2	305.00	17	Yes
3028	7.5	468.00	18	Yes
3029	6.1	420	18	Yes
3030	6.5	401	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	14.5	365.00	16	Yes
4002	13.4	433.00	12	Yes
4003	15.3	438.00	12	No
4004	19.4	374.00	14	Yes
4005	16.8	250.00	12	Yes
4006	11.6	375.00	15	Yes
4007	13.1	250.00	16	Yes
4008	16	404.00	16	Yes
4009	17.3	354.00	16	Yes
4010	16.6	282.00	15	Yes
4011	19.9	294.00	13	Yes
4012	15.4	253.00	15	Yes
4013	18.4	312.00	12	Yes
4014	16.6	307.00	16	Yes
4015	19.5	435.00	13	Yes
4016	15.5	253.00	13	Yes
4017	15	321.00	13	Yes
4018	11.7	475.00	13	Yes
4019	11.6	319.00	14	Yes
4020	17.2	451.00	15	Yes
4021	16.6	331.00	16	Yes
4022	17.6	485.00	13	Yes
4023	14.6	306.00	15	Yes
4024	17.4	327.00	13	Yes
4025	14.8	319.00	13	Yes
4026	17.3	303.00	15	Yes
4027	13.7	361.00	13	Yes
4028	18.2	395.00	16	Yes
4029	18.6	455.00	16	Yes
4030	15.6	420.00	14	Yes

TYPE 5 DETECTION PROBABILITY

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

Note: Randomized parameters for the Type 5 In-Service Monitoring testing performed on 11/06/14 are shown in a separate document.

TYPE 6 DETECTION PROBABILITY

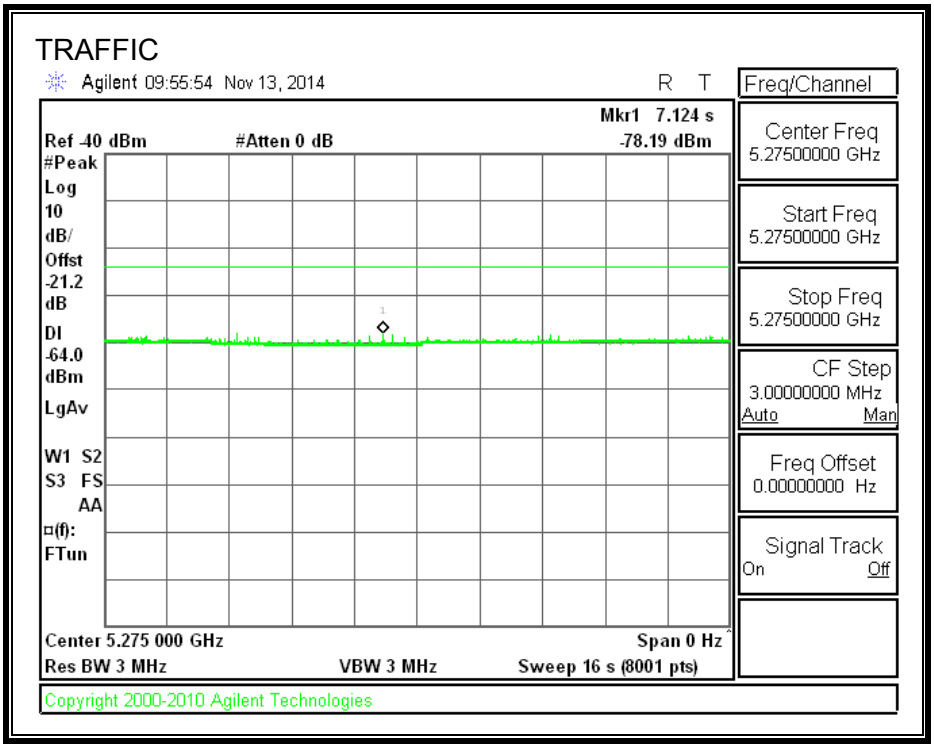
Data Sheet for FCC Hopping Radar Type 6				
1 us Pulse Width, 333 us PRI, 9 Pulses per Burst, 1 Burst per Hop				
NTIA August 2005 Hopping Sequence				
Trial	Starting Index Within Sequence	Signal Generator Frequency (MHz)	Hops within Detection BW	Successful Detection (Yes/No)
1	47	5265	4	Yes
2	522	5266	4	Yes
3	997	5267	6	Yes
4	1472	5268	2	Yes
5	1947	5269	5	Yes
6	2422	5270	5	Yes
7	2897	5271	9	Yes
8	3372	5272	6	Yes
9	3847	5273	7	Yes
10	4322	5274	6	Yes
11	4797	5275	6	Yes
12	5272	5276	5	Yes
13	5747	5277	6	Yes
14	6222	5278	2	Yes
15	6697	5279	4	Yes
16	7172	5280	5	Yes
17	7647	5281	2	Yes
18	8122	5282	3	Yes
19	8597	5283	4	Yes
20	9072	5284	5	Yes

TYPE 6 DETECTION PROBABILITY (CONT.)

21	10022	5285	6	Yes
22	10497	5265	6	Yes
23	10972	5266	4	Yes
24	11447	5267	3	Yes
25	11922	5268	10	Yes
26	12397	5269	6	Yes
27	12872	5270	5	Yes
28	13347	5271	3	Yes
29	13822	5272	4	Yes
30	14297	5273	5	Yes
31	14772	5274	4	Yes
32	15247	5275	4	Yes
33	15722	5276	3	Yes
34	16197	5277	3	Yes
35	16672	5278	6	Yes
36	17147	5279	7	Yes
37	17622	5280	10	Yes
38	18097	5281	4	Yes
39	18572	5282	5	Yes
40	19047	5283	4	Yes
41	19522	5284	5	Yes
42	19997	5285	5	Yes

11.6. RESULTS FOR 40 MHz BANDWIDTH

11.6.1. TRAFFIC



11.6.2. CHANNEL AVAILABILITY CHECK TIME

PROCEDURE TO DETERMINE TEST CHANNEL CYCLE TIME

The AC power was toggled off and then on to re-boot the EUT while a spectrum analyzer sweep was started to monitor the test channel (5275 MHz) and a log file was generated. Upon completion of the CAC period on the test channel the 5.8 GHz downlink (which includes the 5.7 GHz DFS band) begins a "discovery phase" while the 5.3 GHz (which includes the 5.2 GHz non-DFS band) In-Service Monitoring continues. When the 5.8 GHz downlink connects the 5.3 GHz Uplink Transmitter is enabled. The 5.3 GHz Receive Radio then associates to the 5.3 GHz Transmit Radio. After the association process was complete, transmissions began on the test channel. The elapsed time between the end of the CAC period and the start of transmissions on the test channel is the discovery time and association period. This reference measurement and the time stamps within the log file were used to determine when radar bursts were to be triggered at the beginning and end of the CAC period.

PROCEDURE FOR TIMING OF RADAR BURST

The AC power was toggled off and then on to re-boot the EUT while a spectrum analyzer sweep was started to monitor the test channel (5275 MHz) and a log file was generated. A radar signal was triggered on the test channel between 0 to 6 seconds after the beginning of the CAC period and transmissions on the test channel were monitored on the spectrum analyzer.

The AC power was then again toggled off and then on to re-boot the EUT while a spectrum analyzer sweep was started to monitor the test channel (5275 MHz) and a log file was generated. A radar signal was triggered on the test channel between 54 to 60 seconds after the beginning of the CAC period and transmissions on the test channel were monitored on the spectrum analyzer.

The log file recorded the timing of these events. The time from the beginning of the CAC on the test channel to the detection of the radar burst on the test channel was measured.

APPROXIMATE QUANTITATIVE RESULTS BASED ON RF MARKERS

NO RADAR TRIGGERED ON THE TEST CHANNEL

The time between the beginning of the CAC period and the start of transmissions on the test channel minus the elapsed time for the Receive Radio to associate to the Transmit Radio is the CAC time.

RADAR TRIGGERED ON THE TEST CHANNEL

The time from the beginning of the CAC period to the radar burst on the test channel was measured as the approximate relative time from the start of the CAC.

No Radar Triggered

Start of CAC at 5275 MHz (sec)	End of CAC at 5275 MHz (sec)	CAC Time (sec)
113.2	174.2	61.0

Radar Near Beginning of CAC

Start of CAC at 5275 MHz (sec)	Timing of Radar Burst at 5275 MHz (sec)	Radar Relative to Start of CAC at 5275 MHz (sec)
145.4	149.4	4.0

Radar Near End of CAC

Start of CAC at 5275 MHz (sec)	Timing of Radar Burst at 5275 MHz (sec)	Radar Relative to Start of CAC at 5275 MHz (sec)
146.0	205.0	59.0

QUANTITATIVE RESULTS BASED ON EUT TEST MODE LOG FILE TIME STAMPS

No Radar Triggered

Start of CAC at 5275 MHz (hh:mm:ss)	End of CAC at 5275 MHz (hh:mm:ss)	CAC Time (hh:mm:ss)
0:02:16	0:03:17	0:01:01

Radar Near Beginning of CAC

Start of CAC at 5275 MHz (hh:mm:ss)	Radar Detected at 5275 MHz (hh:mm:ss)	Radar Relative to Start of CAC (hh:mm:ss)
0:02:14	0:02:18	0:00:04

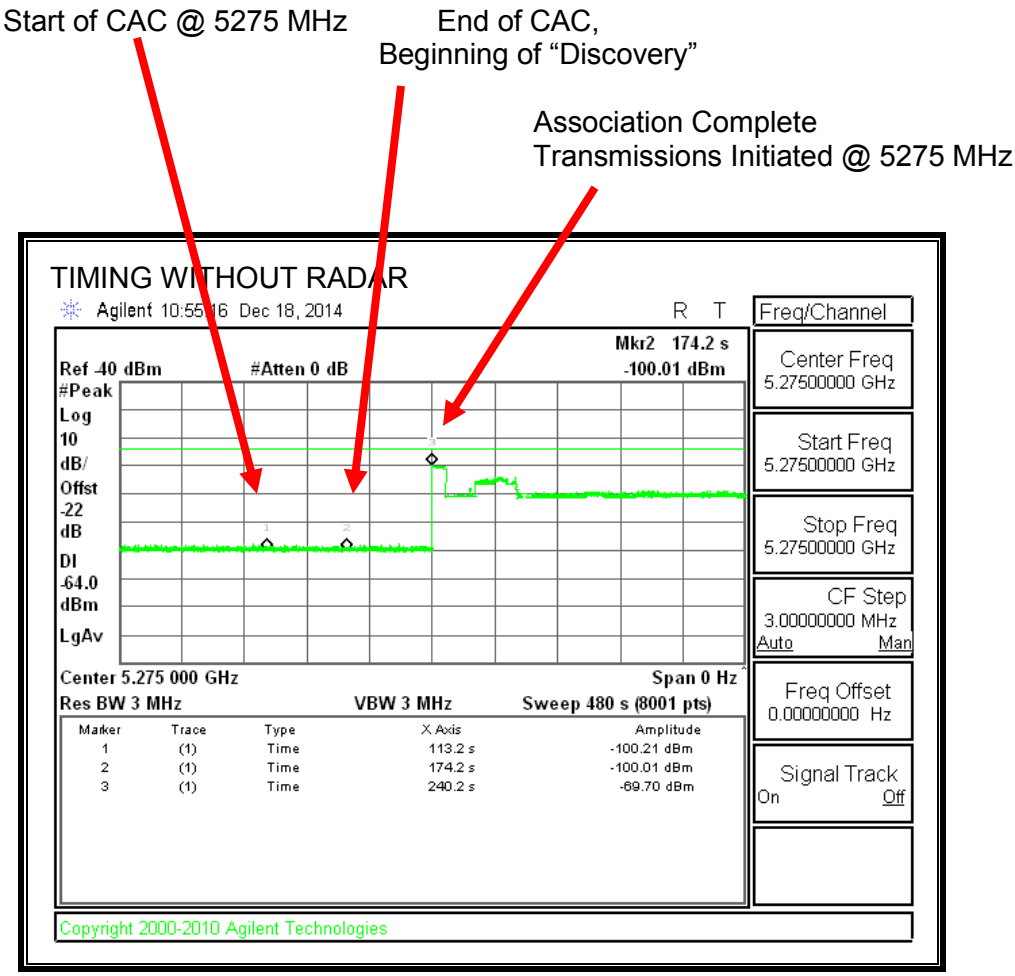
Radar Near End of CAC

Start of CAC at 5275 MHz (hh:mm:ss)	Radar Detected at 5275 MHz (hh:mm:ss)	Radar Relative to Start of CAC (hh:mm:ss)
0:02:14	0:03:13	0:00:59

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 the completion of the association period following 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



Transmissions begin on intended channel after completion of CAC.

EUT RADAR EVENTS LOG FILE - CAC TIMING WITHOUT RADAR

Jan 1 00:02:16 IBR daemon.notice mgd: RRC DFS: TStamp = 65372 msec, CAC START ... wait for 60-secs,

Jan 1 00:03:17 IBR daemon.notice mgd: RRC DFS: TStamp = 126372 msec, CAC DONE

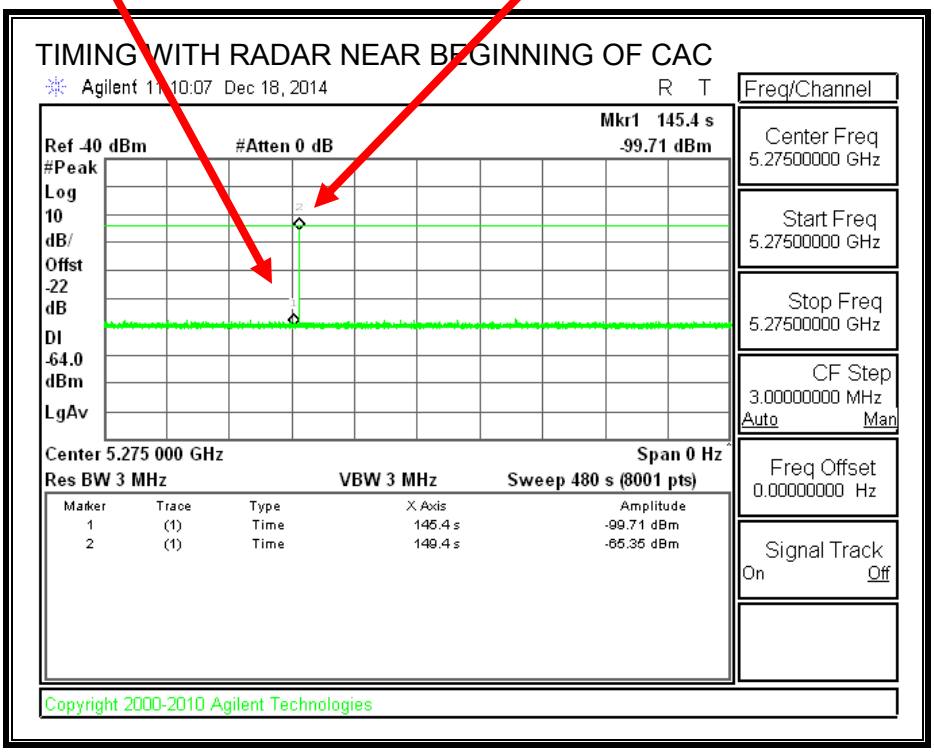
Jan 1 00:03:17 IBR daemon.notice mgd: RRC MASTER : ENTER -> STATE_IAS
Jan 1 00:03:28 IBR daemon.notice mgd: RRC MASTER : ENTER -> STATE_WAIT_SYNCH
Jan 1 00:03:50 IBR daemon.notice mgd: RRC MASTER : ENTER -> STATE_PICK_TOP_ANTS
Jan 1 00:03:50 IBR daemon.notice mgd: RRC MASTER : ENTER -> STATE_WAIT_NODE_INFO
Jan 1 00:03:50 IBR daemon.notice mgd: RRC MASTER : ENTER -> STATE_EXCH_FREQ_MASK
Jan 1 00:03:51 IBR daemon.notice mgd: RRC MASTER : ENTER -> STATE_WAIT_COORD_TRANS
Jan 1 00:03:51 IBR daemon.notice mgd: RRC MASTER : ENTER -> STATE_DL_XS
Jan 1 00:04:23 IBR daemon.notice mgd: RRC MASTER : ENTER -> STATE_MAINT_MODE

Jan 1 00:04:23 IBR daemon.notice mgd: Rx Frequency change: From [5270] / To [5275], ant combo change: From 1758 to 1758

TIMING WITH RADAR NEAR BEGINNING OF CAC

Start of CAC @ 5275 MHz

Radar Signal Applied @ 5275 MHz



No EUT transmissions on the intended channel were observed.

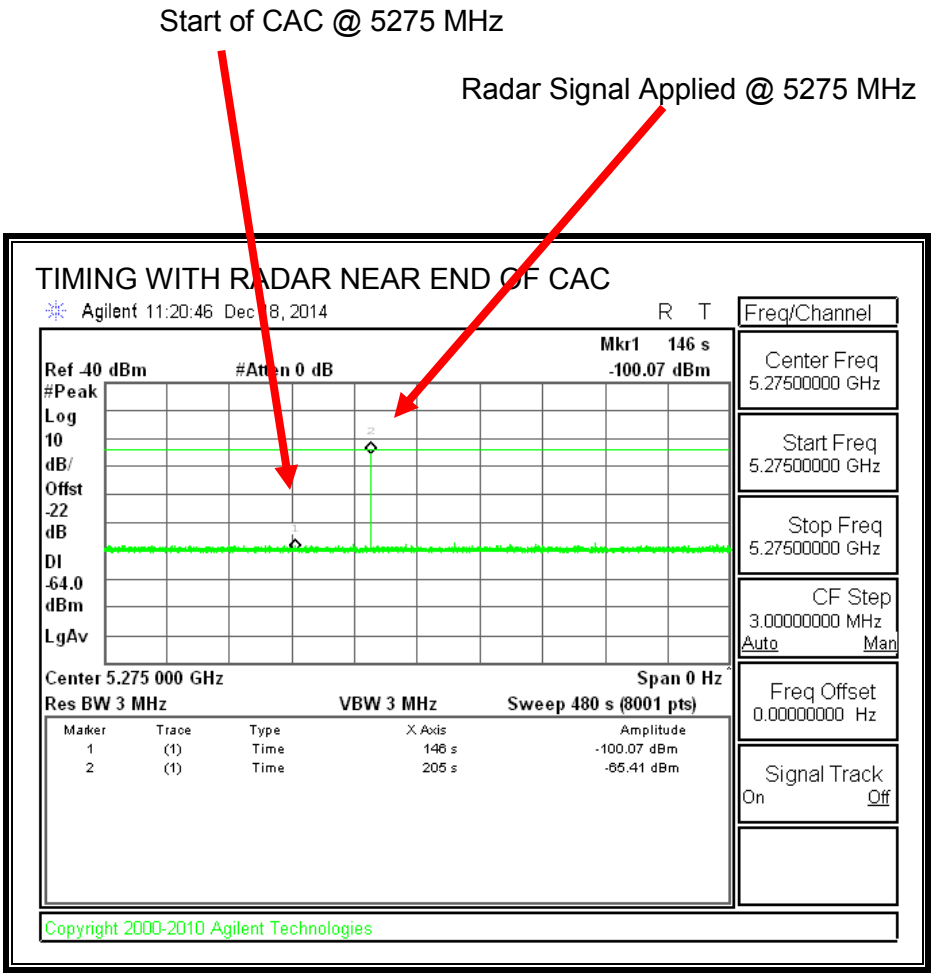
EUT RADAR EVENTS LOG FILE - BEGINNING OF CAC

Jan 1 00:02:14 IBR daemon.notice mgd: RRC DFS: TStamp = 64296 msec, CAC START ... wait for 60-secs,

Jan 1 00:02:18 IBR daemon.notice mgd: RRC_DFS_RX: TStamp:68343 msec,RADAR DETECTED in freq_band lbe= 50,ube= 57,start=5250,end=5289

Jan 1 00:02:18 IBR daemon.notice mgd: DFS Blackout Table
Jan 1 00:02:18 IBR daemon.notice mgd: 5250 Mhz: 31:00 31:00 31:00 31:00
Jan 1 00:02:18 IBR daemon.notice mgd: 5270 Mhz: 31:00 31:00 31:00 31:00
Jan 1 00:02:18 IBR daemon.notice mgd: 5290 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:02:18 IBR daemon.notice mgd: 5310 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:02:18 IBR daemon.notice mgd: 5330 Mhz: 00:00 00:00 00:00 00:00

TIMING WITH RADAR NEAR END OF CAC



No EUT transmissions on the intended channel were observed.

EUT RADAR EVENTS LOG FILE - END OF CAC

Jan 1 00:02:14 IBR daemon.notice mgd: RRC DFS: TStamp = 64397 msec, CAC START ... wait for 60-secs,

Jan 1 00:03:13 IBR daemon.notice mgd: RRC_DFS_RX: TStamp:122847 msec,RADAR DETECTED in freq_band lbe= 50,ube= 57,start=5250,end=5289

Jan 1 00:03:13 IBR daemon.notice mgd: DFS Blackout Table
Jan 1 00:03:13 IBR daemon.notice mgd: 5250 Mhz: 31:00 31:00 31:00 31:00
Jan 1 00:03:13 IBR daemon.notice mgd: 5270 Mhz: 31:00 31:00 31:00 31:00
Jan 1 00:03:13 IBR daemon.notice mgd: 5290 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:13 IBR daemon.notice mgd: 5310 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:13 IBR daemon.notice mgd: 5330 Mhz: 00:00 00:00 00:00 00:00

11.6.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

11.6.4. MOVE AND CLOSING TIME

REPORTING NOTES

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

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

The aggregate channel closing transmission time is calculated as follows:

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

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

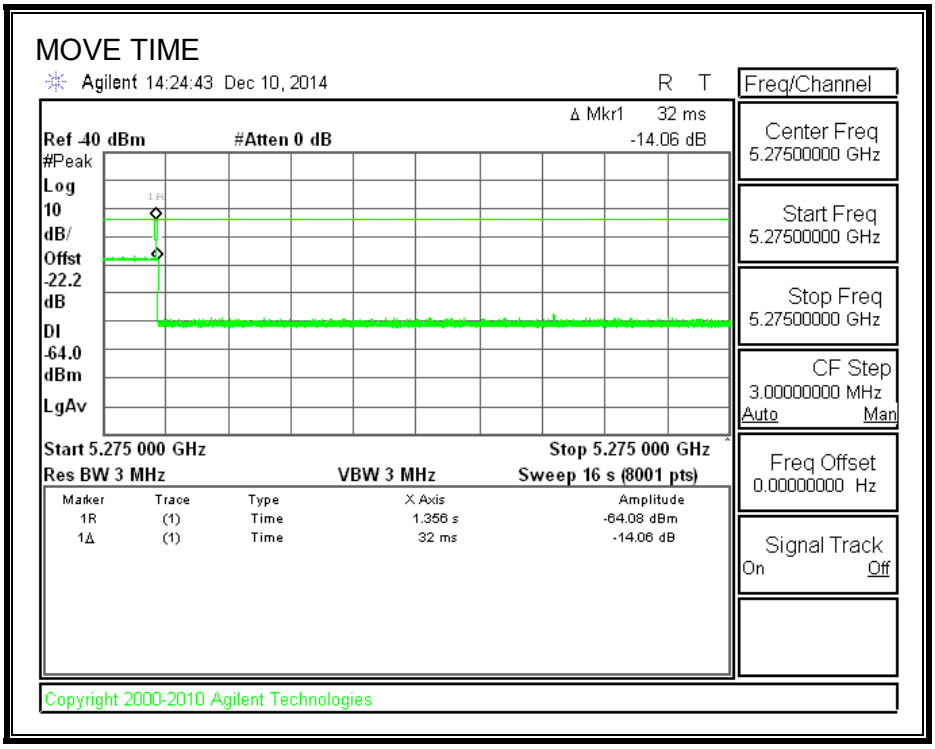
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

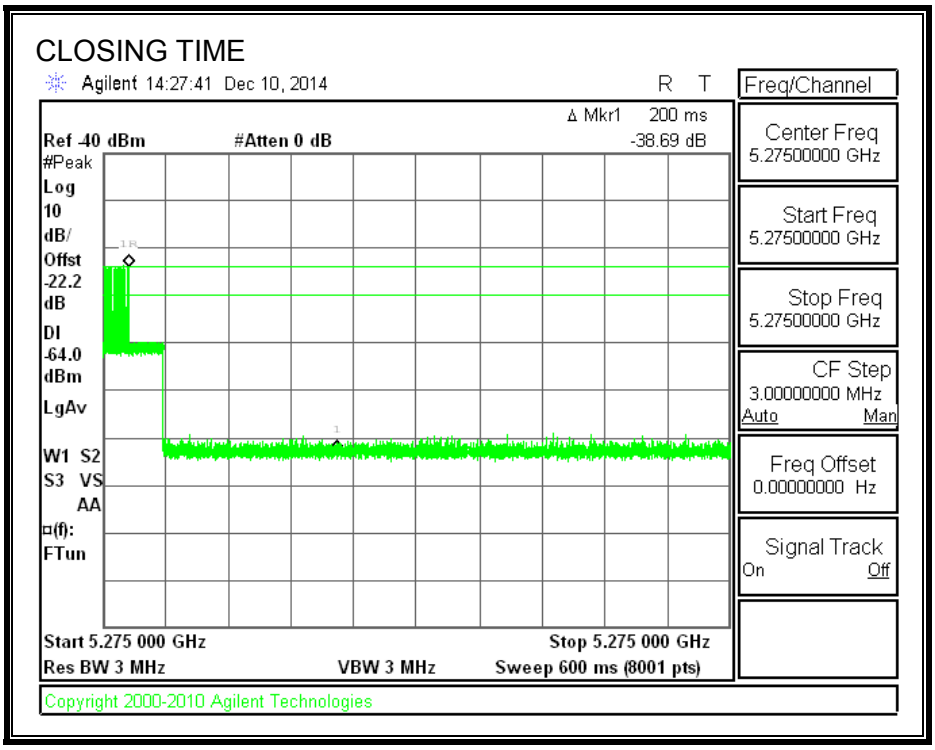
Channel Move Time (sec)	Limit (sec)
0.032	10

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

MOVE TIME



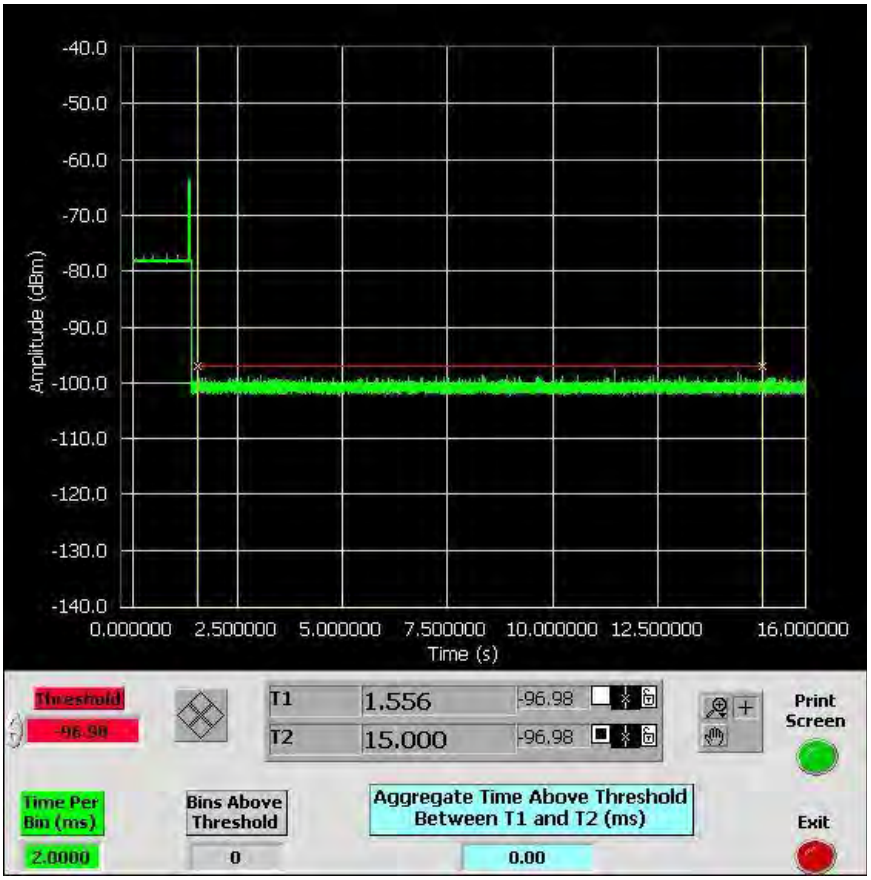
CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

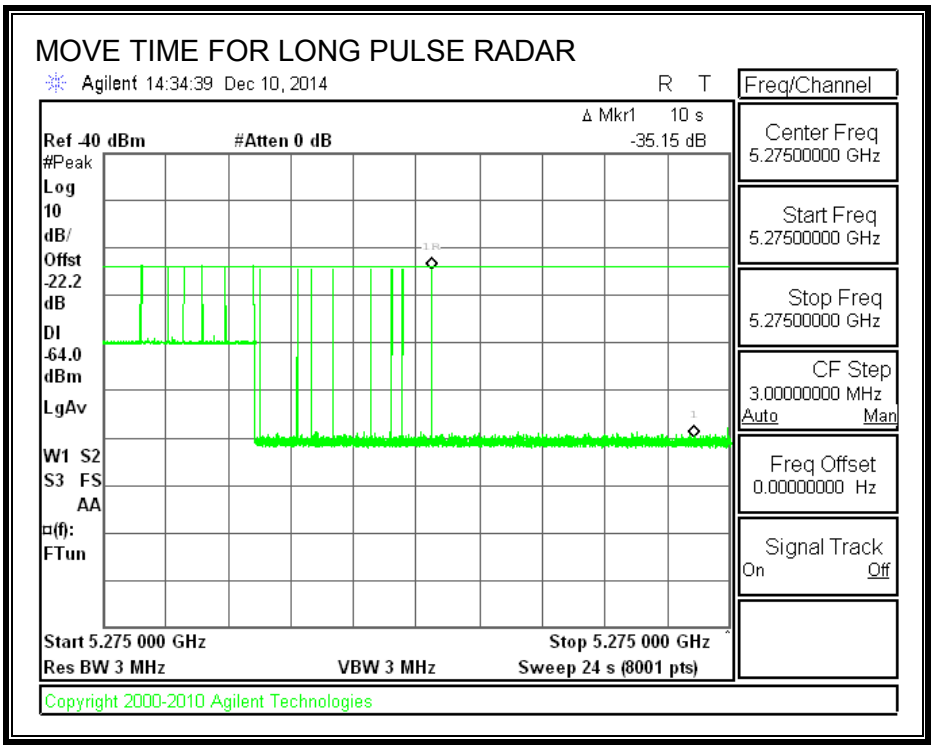
No transmissions are observed during the aggregate monitoring period.

FCC AGGREGATE CLOSING TIME



LONG PULSE CHANNEL MOVE TIME

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

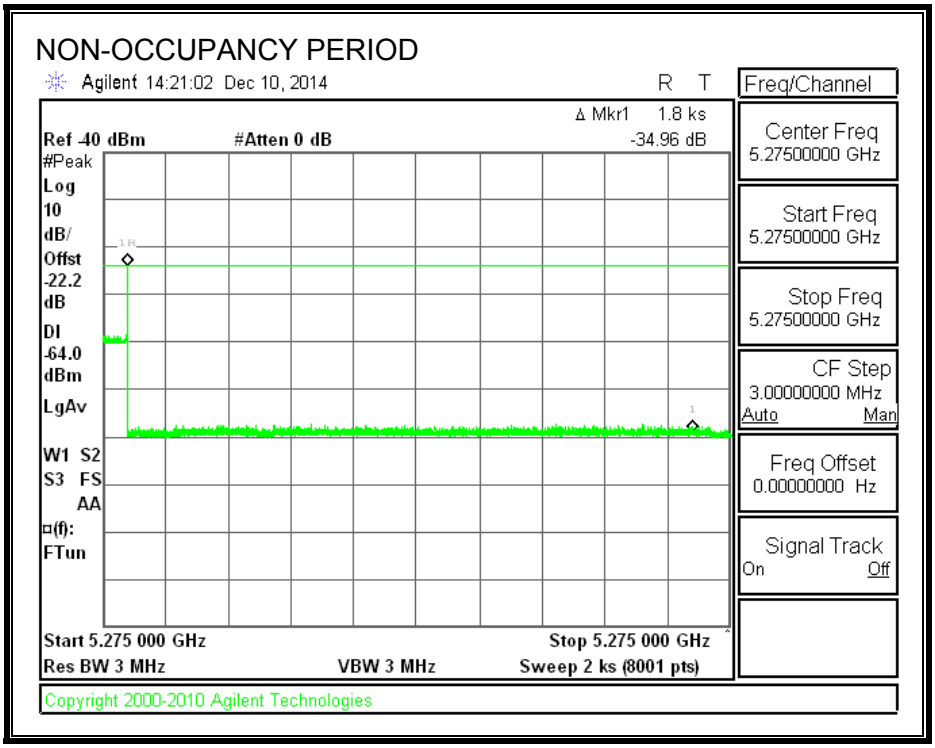


11.6.5. NON-OCCUPANCY PERIOD

RESULTS

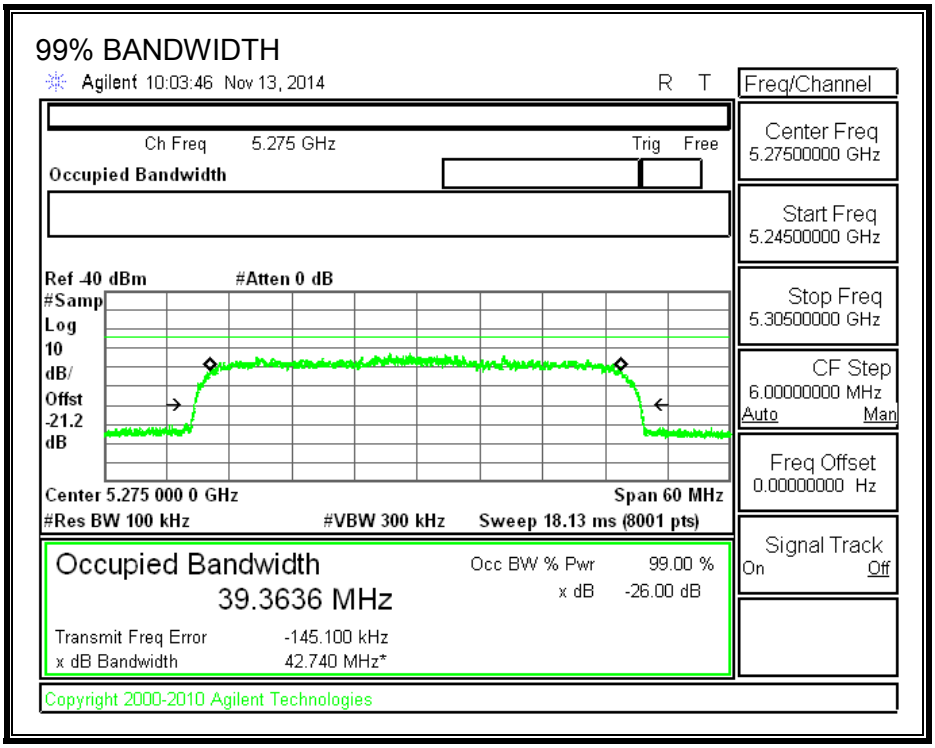
No EUT transmissions were observed on the test channel during the 30-minute observation time.

Testing of 40MHz bandwidth is considered representative of all other bandwidths.



11.6.6. 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 (%)
5255	5295	40	39.364	101.6	100

DETECTION BANDWIDTH PROBABILITY

DETECTION BANDWIDTH PROBABILITY RESULTS

Detection Bandwidth Test Results				
FCC Type 0 Waveform: 0 us Pulse Width, 1428 us PRI, 18 Pulses per Burst				
Frequency (MHz)	Number of Trials	Number Detected	Detection (%)	Mark
5254	10	1	10	
5255	10	10	100	FL
5260	10	10	100	
5265	10	10	100	
5270	10	10	100	
5275	10	10	100	
5280	10	10	100	
5285	10	10	100	
5290	10	10	100	
5295	10	10	100	FH
5296	10	0	0	

11.6.7. IN-SERVICE MONITORING

RESULTS

FCC Radar Test Summary				
Signal Type	Number of Trials	Detection (%)	Limit (%)	Pass/Fail
FCC Short Pulse Type 1	30	100.00	60	Pass
FCC Short Pulse Type 2	30	93.33	60	Pass
FCC Short Pulse Type 3	30	76.67	60	Pass
FCC Short Pulse Type 4	30	90.00	60	Pass
Aggregate		90.00	80	Pass
FCC Long Pulse Type 5	30	80.00	80	Pass
FCC Hopping Type 6	41	97.56	70	Pass

TYPE 1 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 1				
1 us Pulse Width				
Waveform	PRI (us)	Pulses Per Burst	Test (A/B)	Successful Detection (Yes/No)
1001	3066	18	A	Yes
1002	658	81	A	Yes
1003	698	76	A	Yes
1004	578	92	A	Yes
1005	878	61	A	Yes
1006	598	89	A	Yes
1007	858	62	A	Yes
1008	778	68	A	Yes
1009	838	63	A	Yes
1010	898	59	A	Yes
1011	558	95	A	Yes
1012	918	58	A	Yes
1013	938	57	A	Yes
1014	678	78	A	Yes
1015	738	72	A	Yes
1016	518	102	B	Yes
1017	2104	26	B	Yes
1018	2013	27	B	Yes
1019	2155	25	B	Yes
1020	1354	39	B	Yes
1021	2268	24	B	Yes
1022	877	61	B	Yes
1023	1290	41	B	Yes
1024	2766	20	B	Yes
1025	2049	26	B	Yes
1026	2270	24	B	Yes
1027	669	79	B	Yes
1028	1899	28	B	Yes
1029	1023	52	B	Yes
1030	2269	24	B	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	1.1	154.00	26	Yes
2002	2.1	229.00	26	Yes
2003	4.1	211.00	23	Yes
2004	2	213.00	26	Yes
2005	3.9	167.00	25	No
2006	4.4	152.00	28	No
2007	3.9	164.00	24	Yes
2008	3.9	202.00	26	Yes
2009	3.5	190.00	26	Yes
2010	4.1	206.00	29	Yes
2011	5	161.00	23	Yes
2012	3.3	172.00	27	Yes
2013	2.3	168.00	25	Yes
2014	3.5	222.00	28	Yes
2015	4	165.00	26	Yes
2016	1.3	174.00	23	Yes
2017	3.4	164.00	29	Yes
2018	5	216.00	24	Yes
2019	2.1	160.00	28	Yes
2020	2.2	157.00	24	Yes
2021	3.8	204.00	29	Yes
2022	4.7	191.00	28	Yes
2023	3.9	189.00	23	Yes
2024	3	227.00	27	Yes
2025	3	211.00	27	Yes
2026	1.4	199.00	24	Yes
2027	4	189.00	29	Yes
2028	1.9	210.00	23	Yes
2029	1.2	187.00	29	Yes
2030	3	196.00	26	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	9.7	396.00	18	Yes
3002	9.8	323.00	16	Yes
3003	6.3	469.00	18	Yes
3004	8.5	293.00	17	Yes
3005	9.5	283.00	18	Yes
3006	8.4	384.00	17	No
3007	6.4	415.00	18	No
3008	9.1	440.00	17	Yes
3009	6.8	335.00	18	Yes
3010	5.1	311.00	16	Yes
3011	9.2	353.00	18	Yes
3012	6.4	286.00	16	No
3013	6.3	297.00	18	Yes
3014	5.9	426.00	18	No
3015	7.8	476.00	17	Yes
3016	5.9	365.00	17	No
3017	7.3	418.00	18	Yes
3018	8.4	430.00	18	Yes
3019	9.5	331.00	16	Yes
3020	7.4	393.00	18	Yes
3021	5.2	374.00	17	Yes
3022	6.9	330.00	16	No
3023	7.1	473.00	17	Yes
3024	8	359.00	16	Yes
3025	7.8	482.00	17	Yes
3026	8.5	488.00	16	Yes
3027	7.9	430.00	18	No
3028	5.9	483.00	18	Yes
3029	6.6	440	16	Yes
3030	8.8	342	16	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	12.7	447.00	16	Yes
4002	16.9	316.00	12	Yes
4003	17.2	458.00	13	No
4004	15.5	347.00	14	Yes
4005	13.8	395.00	14	Yes
4006	19.8	316.00	13	Yes
4007	12.8	405.00	13	Yes
4008	17.9	351.00	13	Yes
4009	20	366.00	14	Yes
4010	17.3	428.00	15	Yes
4011	18.4	373.00	12	Yes
4012	18.5	387.00	13	Yes
4013	15.8	445.00	15	Yes
4014	10.9	378.00	12	No
4015	16.5	401.00	15	Yes
4016	16.9	276.00	16	Yes
4017	11.6	336.00	14	Yes
4018	13.4	343.00	16	Yes
4019	11.1	304.00	12	Yes
4020	16.6	390.00	14	No
4021	13.6	454.00	13	Yes
4022	15.4	374.00	15	Yes
4023	10	363.00	15	Yes
4024	12.4	470.00	15	Yes
4025	19.7	487.00	16	Yes
4026	14.2	466.00	12	Yes
4027	17.2	415.00	12	Yes
4028	10.6	328.00	15	Yes
4029	19.6	429.00	16	Yes
4030	12	363.00	14	Yes

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	No
5	No
6	No
7	No
8	Yes
9	Yes
10	Yes
11	Yes
12	Yes
13	Yes
14	Yes
15	Yes
16	Yes
17	Yes
18	Yes
19	Yes
20	Yes
21	Yes
22	Yes
23	Yes
24	No
25	Yes
26	Yes
27	Yes
28	Yes
29	Yes
30	Yes

Note: Randomized parameters for the Type 5 In-Service Monitoring testing performed on 11/06/14 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	369	5255	10	No
2	844	5256	13	Yes
3	1319	5257	8	Yes
4	1794	5258	8	Yes
5	2269	5259	8	Yes
6	2744	5260	10	Yes
7	3219	5261	6	Yes
8	3694	5262	11	Yes
9	4169	5263	7	Yes
10	4644	5264	12	Yes
11	5119	5265	11	Yes
12	5594	5266	15	Yes
13	6069	5267	11	Yes
14	6544	5268	10	Yes
15	7019	5269	6	Yes
16	7494	5270	7	Yes
17	7969	5271	10	Yes
18	8444	5272	6	Yes
19	8919	5273	6	Yes
20	9394	5274	9	Yes
21	9869	5275	5	Yes
22	10344	5276	7	Yes
23	10819	5277	3	Yes
24	11294	5278	13	Yes
25	11769	5279	11	Yes
26	12244	5280	9	Yes
27	12719	5281	10	Yes
28	13194	5282	5	Yes
29	13669	5283	8	Yes
30	14144	5284	7	Yes
31	14619	5285	7	Yes
32	15094	5286	11	Yes
33	15569	5287	10	Yes
34	16044	5288	10	Yes
35	16519	5289	7	Yes
36	16994	5290	6	Yes
37	17469	5291	10	Yes
38	17944	5292	6	Yes
39	18419	5293	12	Yes
40	18894	5294	8	Yes
41	19369	5295	12	Yes

11.6.8. CAC DUAL SENSOR BAND BLOCKING VERIFICATION TEST PROCEDURE

The spectrum analyzer is tuned to 5275 MHz and the log file from the EUT records the events.

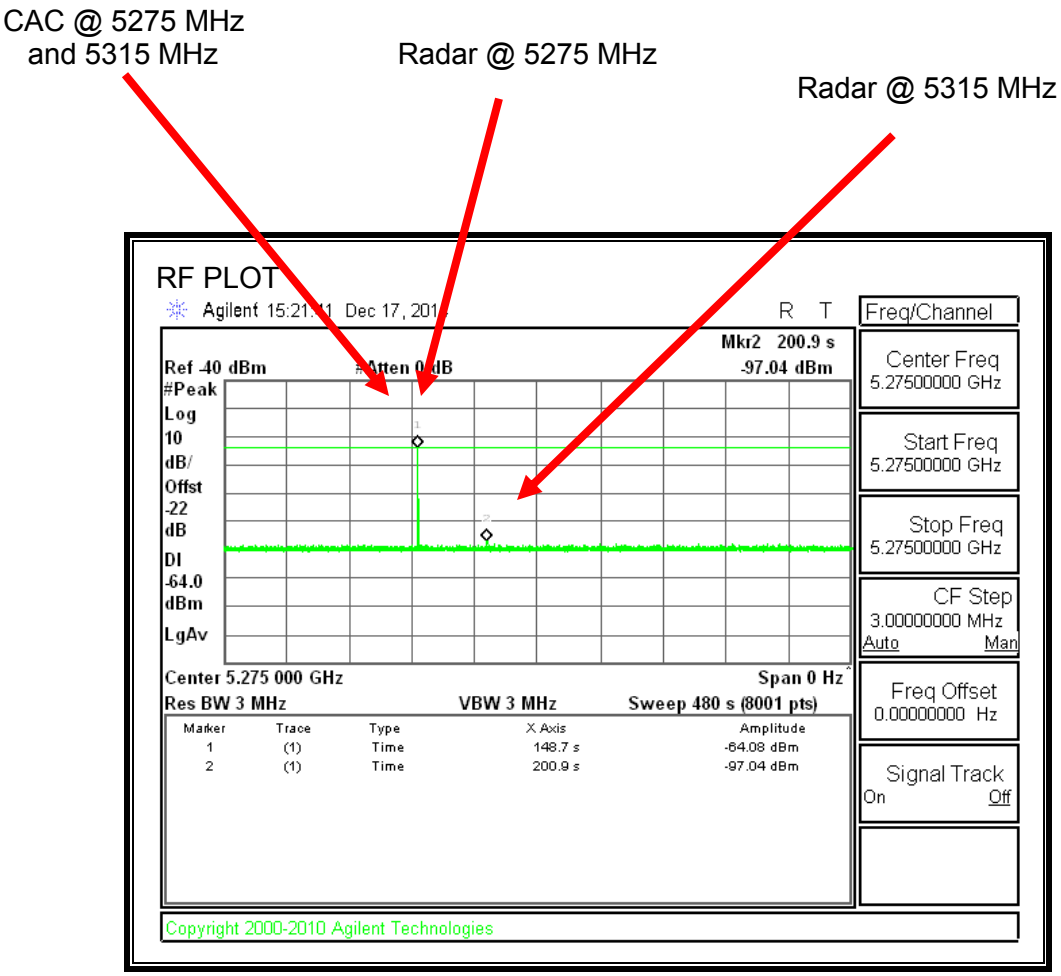
The power to the EUT is cycled and a sweep is concurrently started on the spectrum analyzer. After the EUT boots-up a CAC period is simultaneously performed on 5275 MHz and 5315 MHz.

A radar burst is triggered on 5275 MHz approximately 4 seconds into the CAC period. In response to this the EUT places 5275 MHz on the blocked channel list. A radar burst is then triggered approximately 52 seconds later on 5315 MHz. After the second detection the EUT places 5315 MHz on the blocked channel list and removes itself from service in the 5.3 GHz band.

Once the non-occupancy period is complete on 5275 MHz the channel is cleared from the blocked channel list. A CAC period is performed on the cleared channel and upon successful completion the EUT enters service.

11.6.9. CAC DUAL SENSOR BAND BLOCKING VERIFICATION TEST RESULTS

RF PLOT



LOG FILE

Jan 1 00:02:13 IBR daemon.notice mgd: RRC DFS: TStamp = 64285 msec, CAC START ... wait for

60-secs,

Jan 1 00:02:17 IBR daemon.notice mgd: RRC_DFS_RX: TStamp:68777 msec,RADAR DETECTED in freq_band

lbe= 50,ube= 57,start=5250,end=5289
Jan 1 00:02:17 IBR daemon.notice mgd: DFS Blackout Table
Jan 1 00:02:17 IBR daemon.notice mgd: 5250 Mhz: 31:00 31:00 31:00 31:00
Jan 1 00:02:17 IBR daemon.notice mgd: 5270 Mhz: 31:00 31:00 31:00 31:00
Jan 1 00:02:17 IBR daemon.notice mgd: 5290 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:02:17 IBR daemon.notice mgd: 5310 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:02:17 IBR daemon.notice mgd: 5330 Mhz: 00:00 00:00 00:00 00:00

Jan 1 00:03:09 IBR daemon.notice mgd: RRC_DFS_RX: TStamp:121090 msec,RADAR DETECTED in freq_band

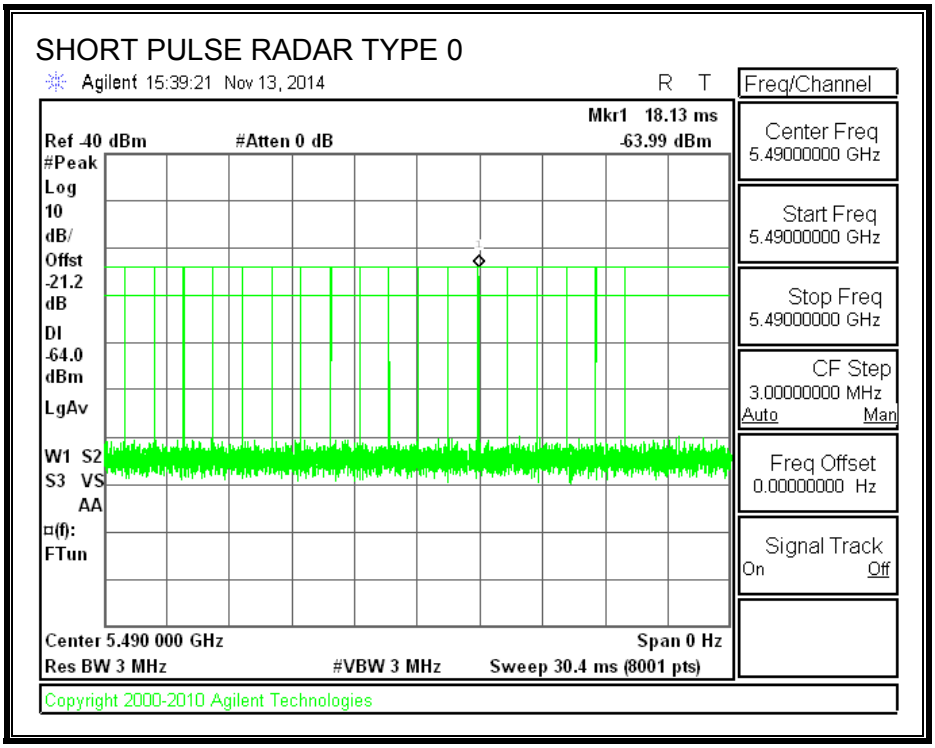
lbe= 58,ube= 65,start=5290,end=5329
Jan 1 00:03:09 IBR daemon.notice mgd: DFS Blackout Table
Jan 1 00:03:09 IBR daemon.notice mgd: 5250 Mhz: 30:07 30:07 30:07 30:07
Jan 1 00:03:09 IBR daemon.notice mgd: 5270 Mhz: 30:07 30:07 30:07 30:07
Jan 1 00:03:09 IBR daemon.notice mgd: 5290 Mhz: 31:00 31:00 31:00 31:00
Jan 1 00:03:09 IBR daemon.notice mgd: 5310 Mhz: 31:00 31:00 31:00 31:00
Jan 1 00:03:09 IBR daemon.notice mgd: 5330 Mhz: 00:00 00:00 00:00 00:00

11.7. SECONDARY SENSOR LOWER HALF-BAND TEST CHANNEL

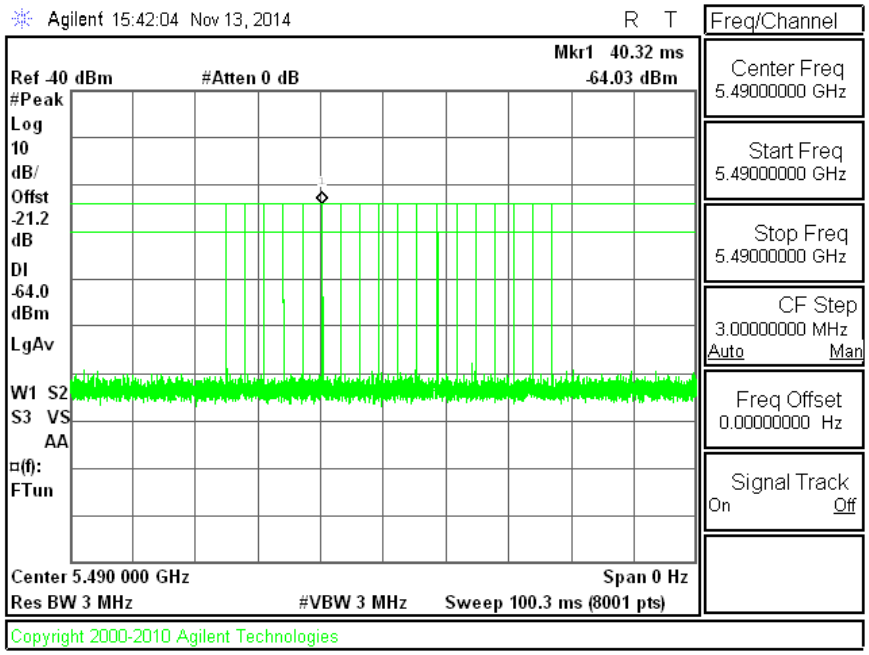
All tests were performed at a channel center frequency of 5490 MHz.

11.7.1. RADAR WAVEFORMS

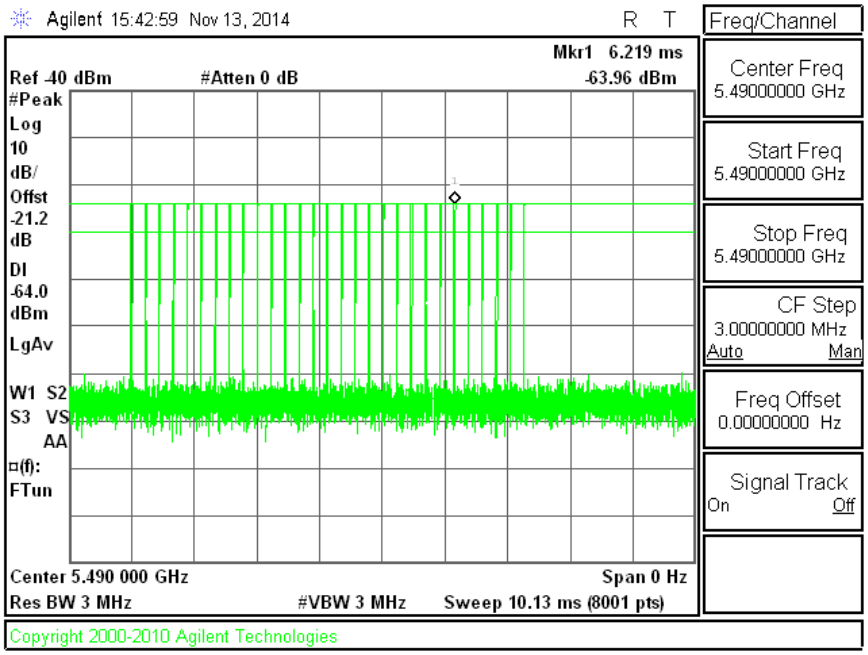
RADAR WAVEFORMS



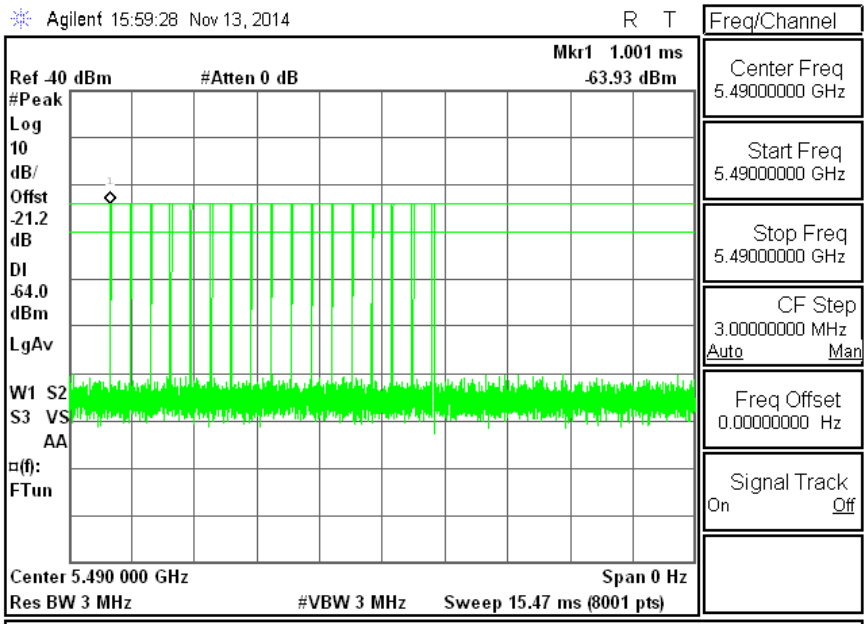
SAMPLE OF RADAR TYPE 1



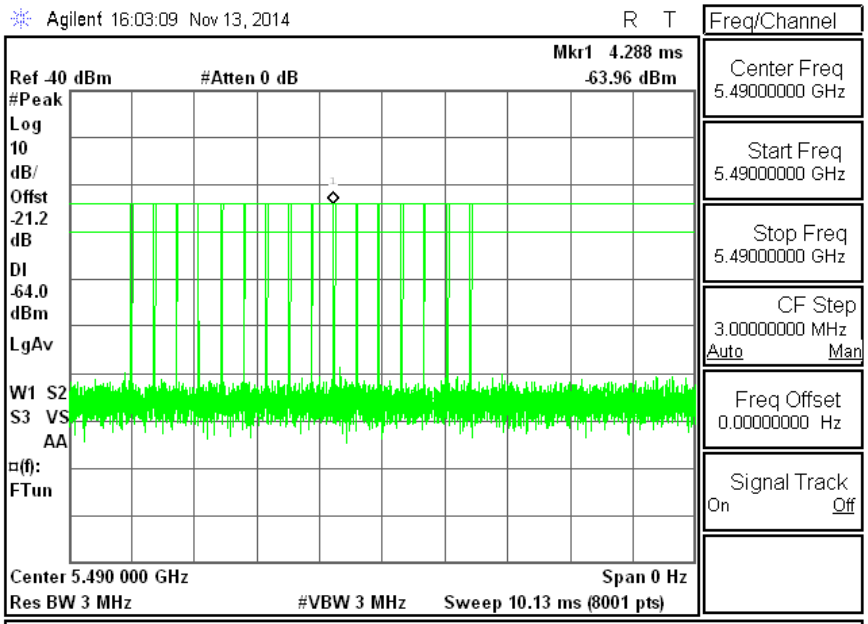
SAMPLE OF RADAR TYPE 2



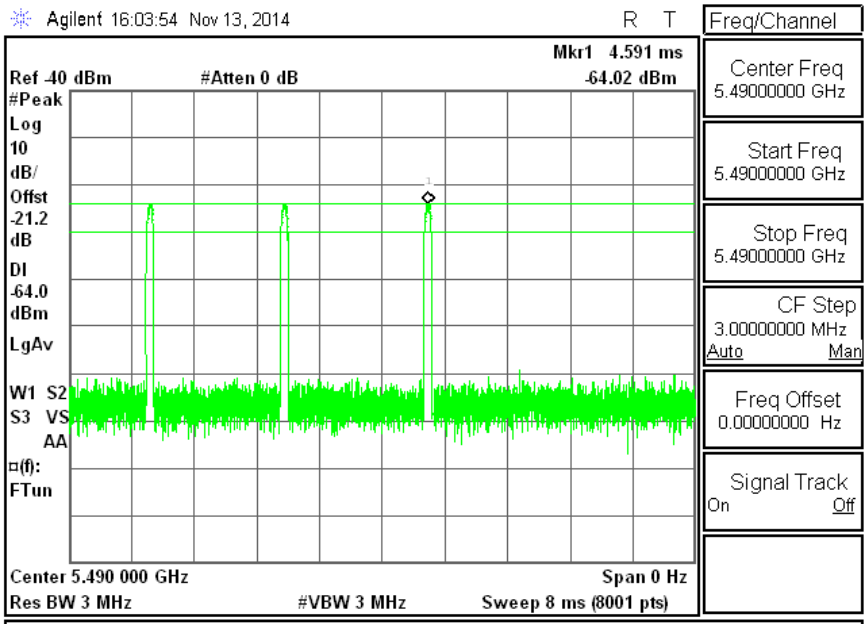
SAMPLE OF RADAR TYPE 3



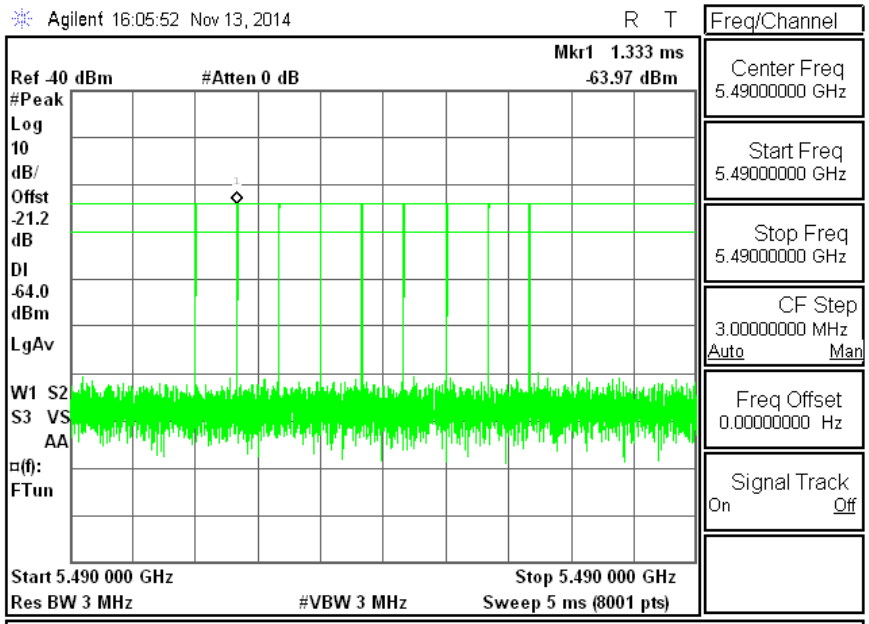
SAMPLE OF RADAR TYPE 4



SAMPLE OF SINGLE BURST OF RADAR TYPE 5

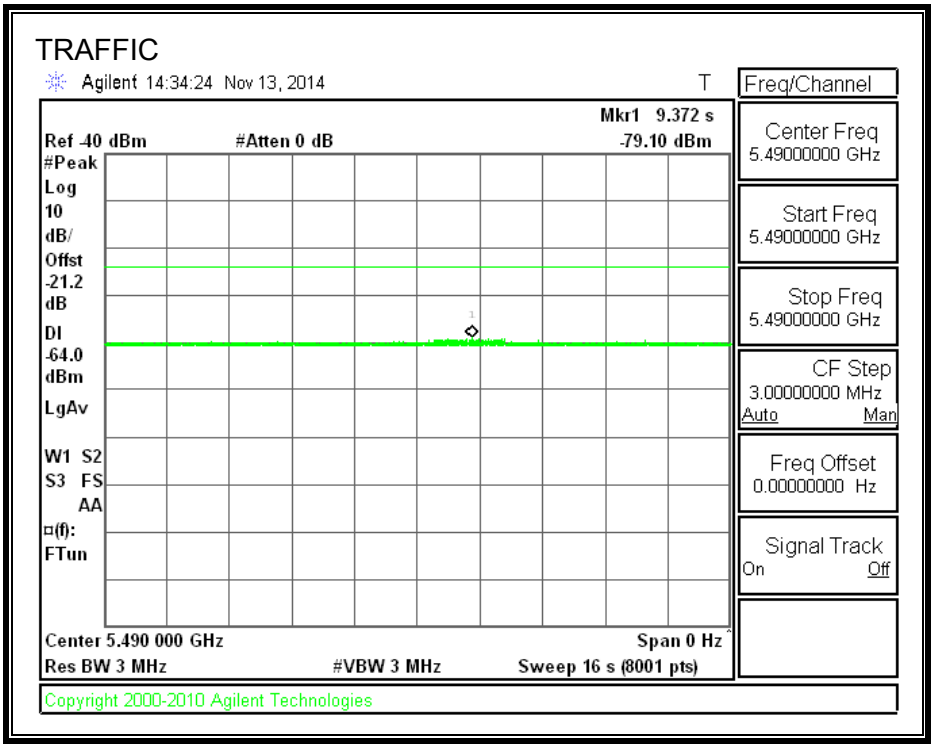


SINGLE BURST OF RADAR TYPE 6



11.8. RESULTS FOR 10 MHz BANDWIDTH

11.8.1. TRAFFIC



11.8.2. CHANNEL AVAILABILITY CHECK TIME

The DFS sensor bandwidth is always wider than the widest nominal channel bandwidth. Therefore, 40 MHz CAC testing covers all nominal channel bandwidths and this test was not performed for this channel bandwidth.

11.8.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

11.8.4. MOVE AND CLOSING TIME

REPORTING NOTES

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

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

The aggregate channel closing transmission time is calculated as follows:

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

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

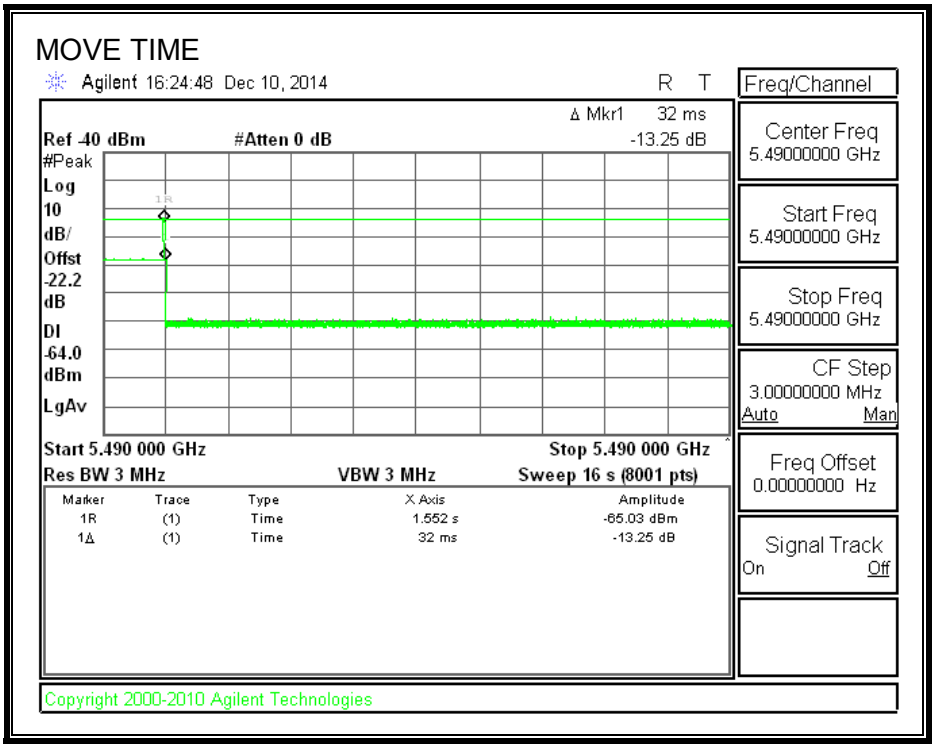
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

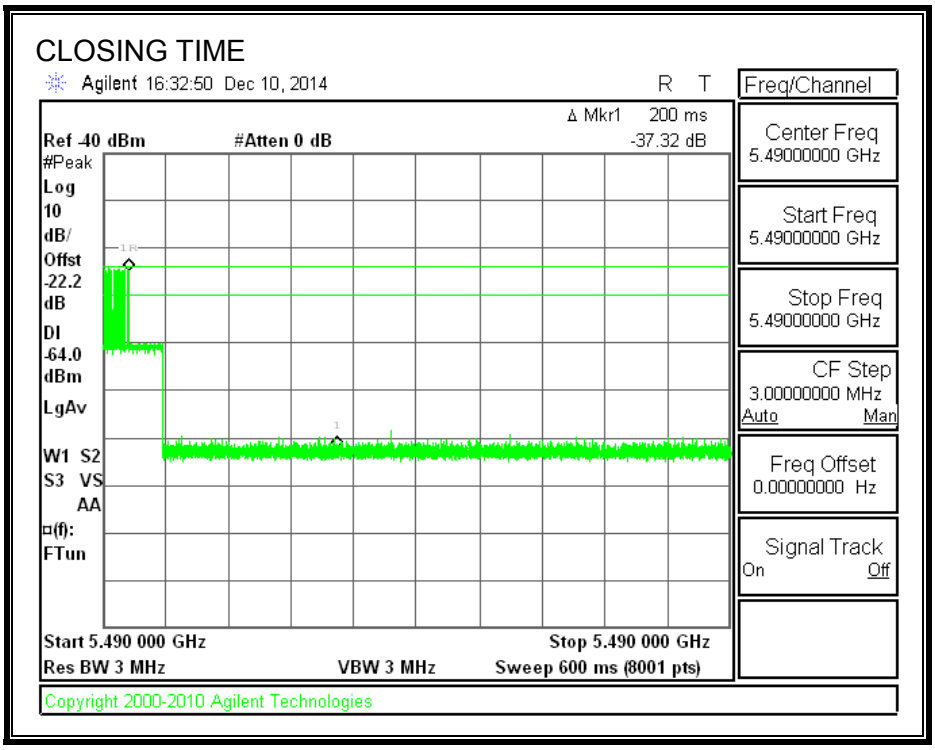
Channel Move Time (sec)	Limit (sec)
0.032	10

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

MOVE TIME



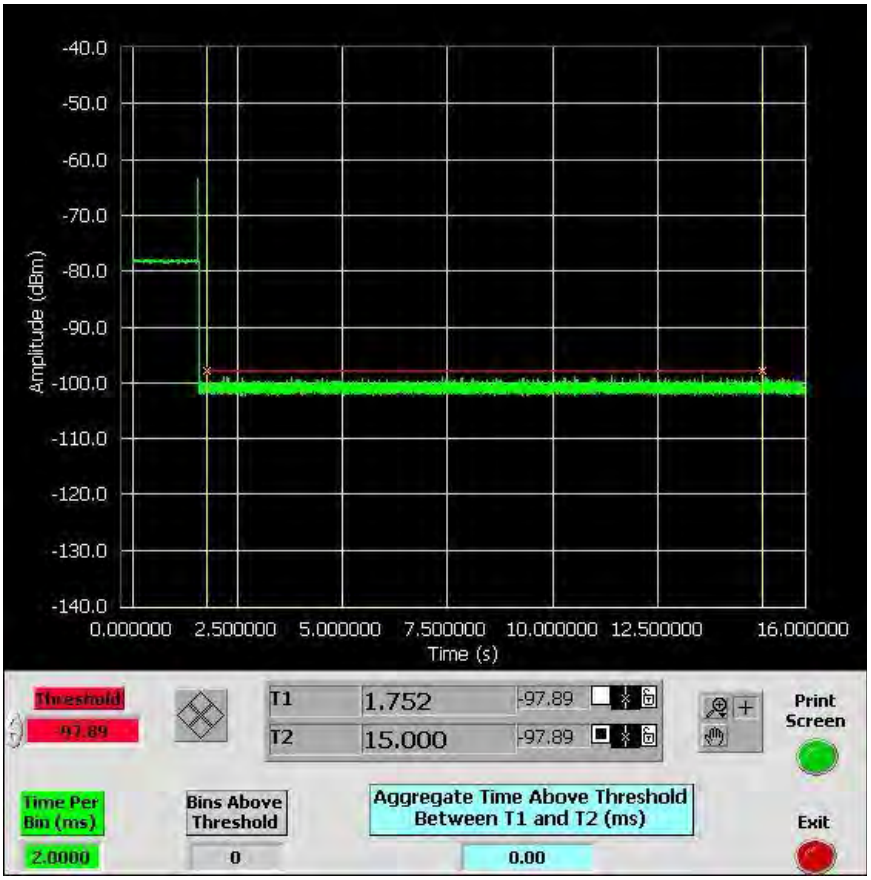
CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

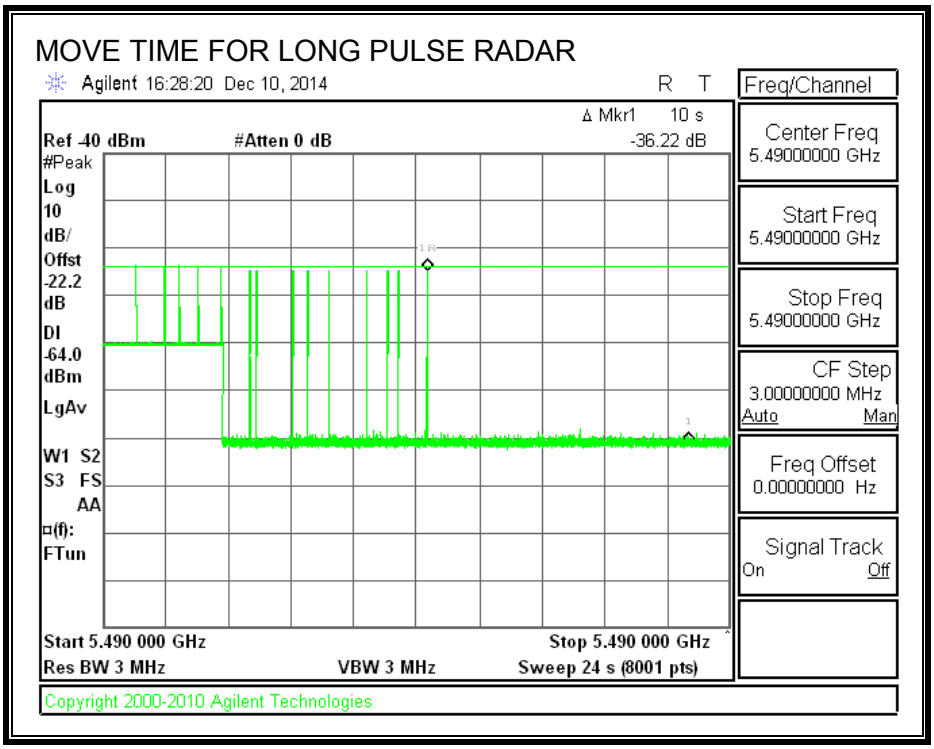
No transmissions are observed during the aggregate monitoring period.

AGGREGATE CLOSING TIME



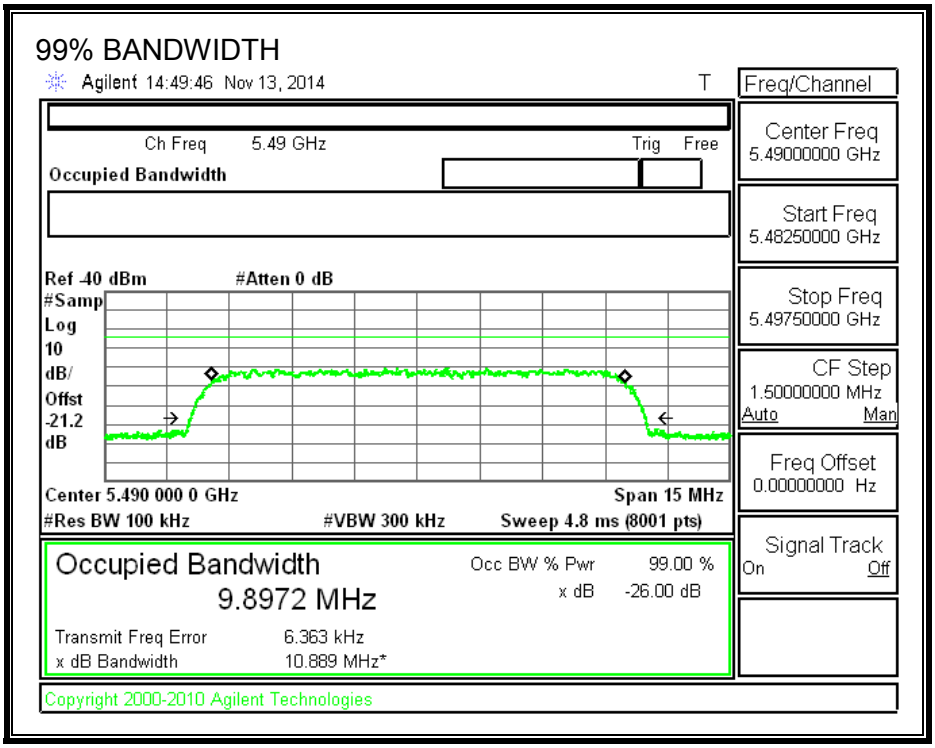
LONG PULSE CHANNEL MOVE TIME

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



11.8.5. DETECTION BANDWIDTH

REFERENCE PLOT OF 99% POWER BANDWIDTH



RESULTS

FL (MHz)	FH (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (%)	Minimum Limit (%)
5485	5495	10	9.897	101.0	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
5485	10	10	100	FL
5490	10	10	100	
5495	10	10	100	FH

11.8.6. IN-SERVICE MONITORING

RESULTS

FCC Radar Test Summary				
Signal Type	Number of Trials	Detection (%)	Limit (%)	Pass/Fail
FCC Short Pulse Type 1	30	96.67	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	100.00	60	Pass
Aggregate		99.17	80	Pass
FCC Long Pulse Type 5	30	100.00	80	Pass
FCC Hopping Type 6	33	93.94	70	Pass

TYPE 1 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 1				
1 us Pulse Width				
Waveform	PRI (us)	Pulses Per Burst	Test (A/B)	Successful Detection (Yes/No)
1001	3066	18	A	No
1002	678	78	A	Yes
1003	858	62	A	Yes
1004	638	83	A	Yes
1005	898	59	A	Yes
1006	558	95	A	Yes
1007	778	68	A	Yes
1008	718	74	A	Yes
1009	918	58	A	Yes
1010	698	76	A	Yes
1011	758	70	A	Yes
1012	938	57	A	Yes
1013	838	63	A	Yes
1014	738	72	A	Yes
1015	598	89	A	Yes
1016	798	67	B	Yes
1017	1224	44	B	Yes
1018	993	54	B	Yes
1019	2874	19	B	Yes
1020	1435	37	B	Yes
1021	1032	52	B	Yes
1022	931	57	B	Yes
1023	1399	38	B	Yes
1024	1476	36	B	Yes
1025	2706	20	B	Yes
1026	1979	27	B	Yes
1027	894	60	B	Yes
1028	3029	18	B	Yes
1029	1613	33	B	Yes
1030	1078	49	B	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	4.4	227.00	29	Yes
2002	3.3	159.00	29	Yes
2003	4.2	211.00	29	Yes
2004	3.1	191.00	23	Yes
2005	4.1	167.00	23	Yes
2006	3.8	160.00	24	Yes
2007	2.8	193.00	26	Yes
2008	3.7	170.00	29	Yes
2009	1.7	202.00	26	Yes
2010	1.4	213.00	26	Yes
2011	3.9	223.00	28	Yes
2012	3.4	210.00	25	Yes
2013	4.5	158.00	25	Yes
2014	2.2	170.00	23	Yes
2015	4.9	183.00	27	Yes
2016	4.9	206.00	29	Yes
2017	1.4	205.00	29	Yes
2018	1.2	182.00	27	Yes
2019	3.8	222.00	26	Yes
2020	1.2	178.00	29	Yes
2021	1.4	153.00	25	Yes
2022	2.9	172.00	24	Yes
2023	1.9	192.00	24	Yes
2024	2.4	213.00	24	Yes
2025	2.4	154.00	26	Yes
2026	1.9	222.00	28	Yes
2027	1.7	169.00	29	Yes
2028	3.3	158.00	29	Yes
2029	3	216.00	23	Yes
2030	1.4	210.00	25	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	10	499.00	17	Yes
3002	8.8	319.00	18	Yes
3003	9.4	379.00	18	Yes
3004	9.4	430.00	17	Yes
3005	9.4	308.00	17	Yes
3006	8.1	373.00	18	Yes
3007	9.7	414.00	16	Yes
3008	6.9	475.00	18	Yes
3009	7.1	497.00	17	Yes
3010	9.5	409.00	17	Yes
3011	6.5	262.00	17	Yes
3012	6.4	351.00	17	Yes
3013	9.3	277.00	17	Yes
3014	5.4	335.00	17	Yes
3015	8.1	408.00	17	Yes
3016	7.9	387.00	18	Yes
3017	6.7	302.00	17	Yes
3018	7.9	445.00	16	Yes
3019	5.5	309.00	16	Yes
3020	6	444.00	16	Yes
3021	8	480.00	17	Yes
3022	8	384.00	17	Yes
3023	8.6	456.00	17	Yes
3024	7	401.00	18	Yes
3025	7.4	282.00	18	Yes
3026	6.8	366.00	17	Yes
3027	7.2	305.00	17	Yes
3028	7.5	468.00	18	Yes
3029	6.1	420	18	Yes
3030	6.5	401	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	14.5	365.00	16	Yes
4002	13.4	433.00	12	Yes
4003	15.3	438.00	12	Yes
4004	19.4	374.00	14	Yes
4005	16.8	250.00	12	Yes
4006	11.6	375.00	15	Yes
4007	13.1	250.00	16	Yes
4008	16	404.00	16	Yes
4009	17.3	354.00	16	Yes
4010	16.6	282.00	15	Yes
4011	19.9	294.00	13	Yes
4012	15.4	253.00	15	Yes
4013	18.4	312.00	12	Yes
4014	16.6	307.00	16	Yes
4015	19.5	435.00	13	Yes
4016	15.5	253.00	13	Yes
4017	15	321.00	13	Yes
4018	11.7	475.00	13	Yes
4019	11.6	319.00	14	Yes
4020	17.2	451.00	15	Yes
4021	16.6	331.00	16	Yes
4022	17.6	485.00	13	Yes
4023	14.6	306.00	15	Yes
4024	17.4	327.00	13	Yes
4025	14.8	319.00	13	Yes
4026	17.3	303.00	15	Yes
4027	13.7	361.00	13	Yes
4028	18.2	395.00	16	Yes
4029	18.6	455.00	16	Yes
4030	15.6	420.00	14	Yes

TYPE 5 DETECTION PROBABILITY

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

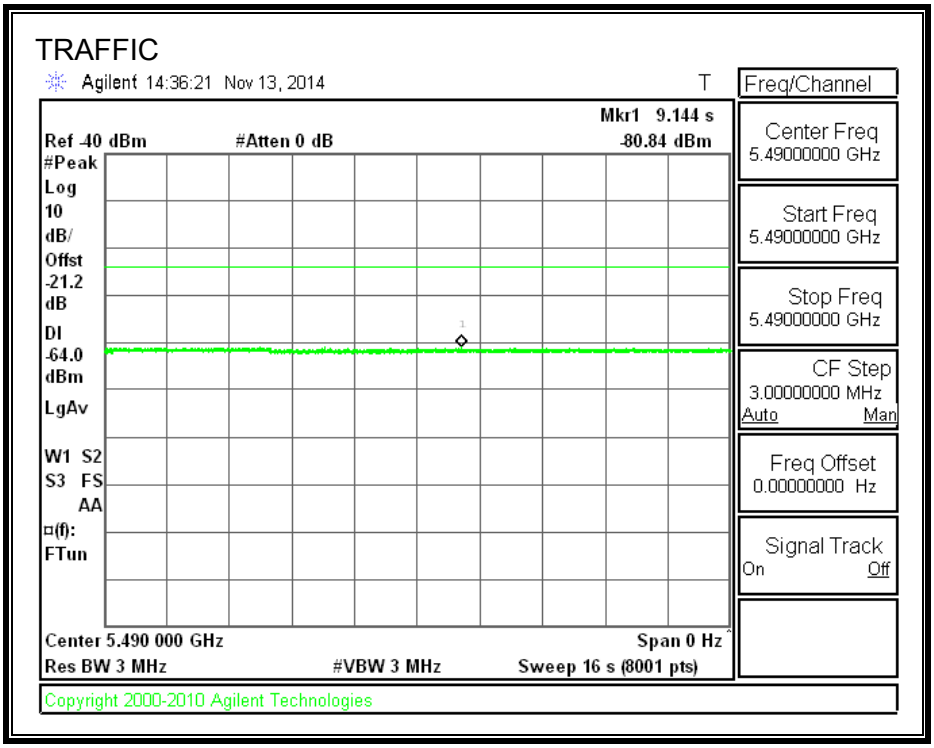
Note: Randomized parameters for the Type 5 In-Service Monitoring testing performed on 11/13/14 are shown in a separate document.

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	94	5485	1	Yes
2	569	5486	6	Yes
3	1044	5487	3	No
4	1519	5488	1	Yes
5	1994	5489	3	Yes
6	2469	5490	3	Yes
7	2944	5491	1	Yes
8	3419	5492	3	Yes
9	3894	5493	2	Yes
10	4369	5494	2	Yes
11	4844	5495	2	Yes
12	5319	5485	3	Yes
13	5794	5486	4	Yes
14	6269	5487	2	Yes
15	6744	5488	2	Yes
16	7694	5489	4	Yes
17	8169	5490	1	Yes
18	8644	5491	1	Yes
19	9119	5492	6	Yes
20	9594	5493	3	Yes
21	10069	5494	3	Yes
22	10544	5495	1	Yes
23	11019	5485	3	Yes
24	11494	5486	2	Yes
25	11969	5487	1	Yes
26	12444	5488	3	No
27	12919	5489	3	Yes
28	13394	5490	3	Yes
29	13869	5491	2	Yes
30	14344	5492	1	Yes
31	14819	5493	4	Yes
32	15294	5494	3	Yes
33	15769	5495	1	Yes

11.9. RESULTS FOR 20 MHz BANDWIDTH

11.9.1. TRAFFIC



11.9.2. CHANNEL AVAILABILITY CHECK TIME

The DFS sensor bandwidth is always wider than the widest nominal channel bandwidth. Therefore, 40 MHz CAC testing covers all nominal channel bandwidths and this test was not performed for this channel bandwidth.

11.9.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

11.9.4. MOVE AND CLOSING TIME

REPORTING NOTES

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

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

The aggregate channel closing transmission time is calculated as follows:

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

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

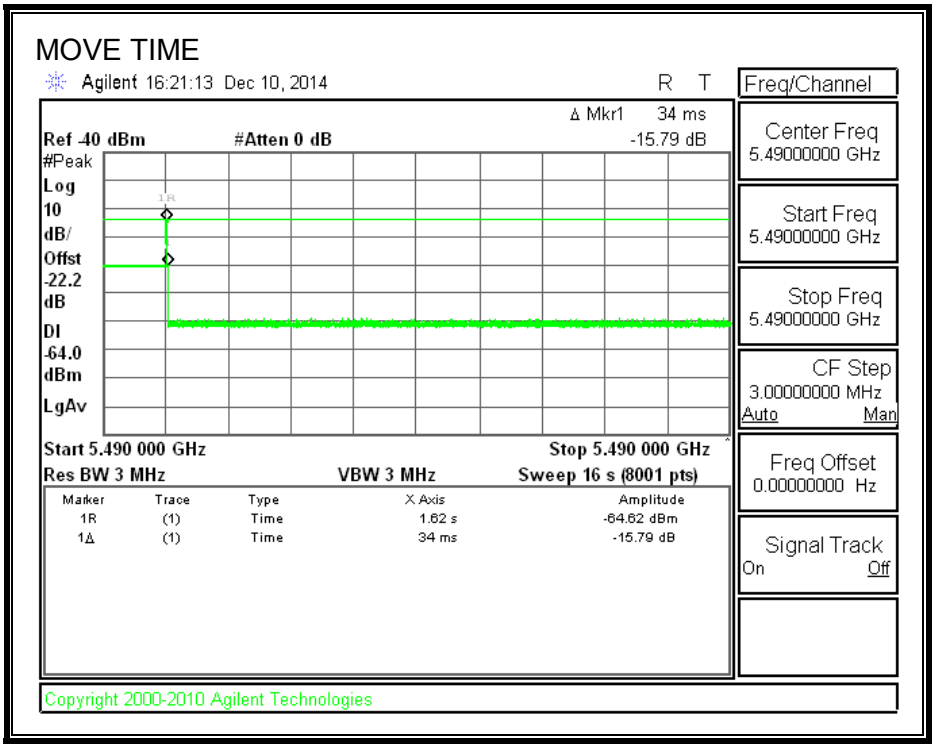
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

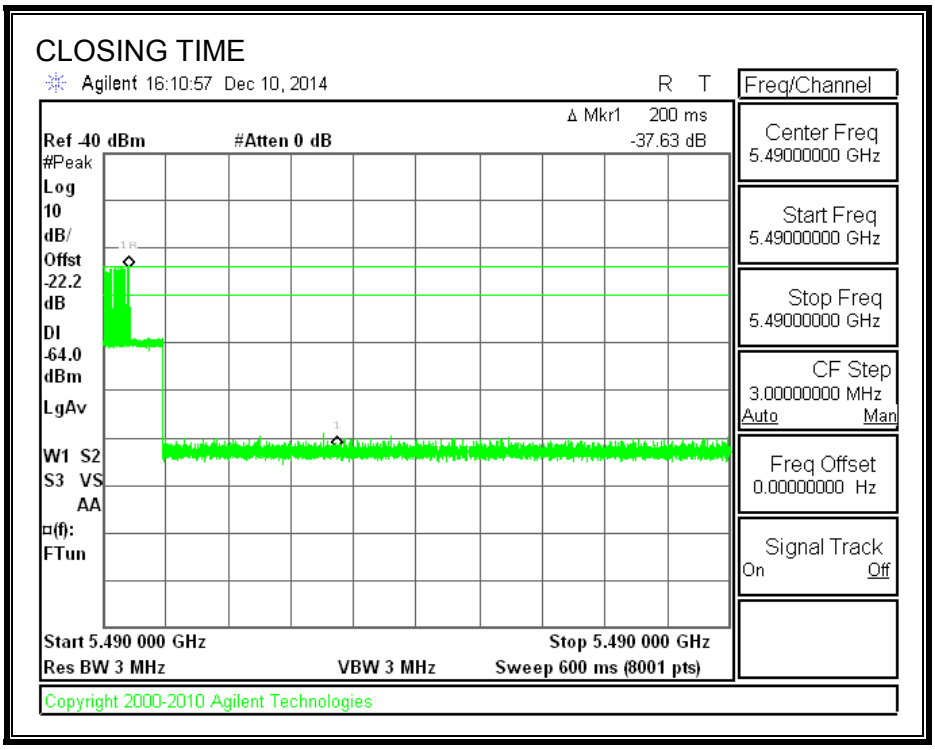
Channel Move Time (sec)	Limit (sec)
0.034	10

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

MOVE TIME



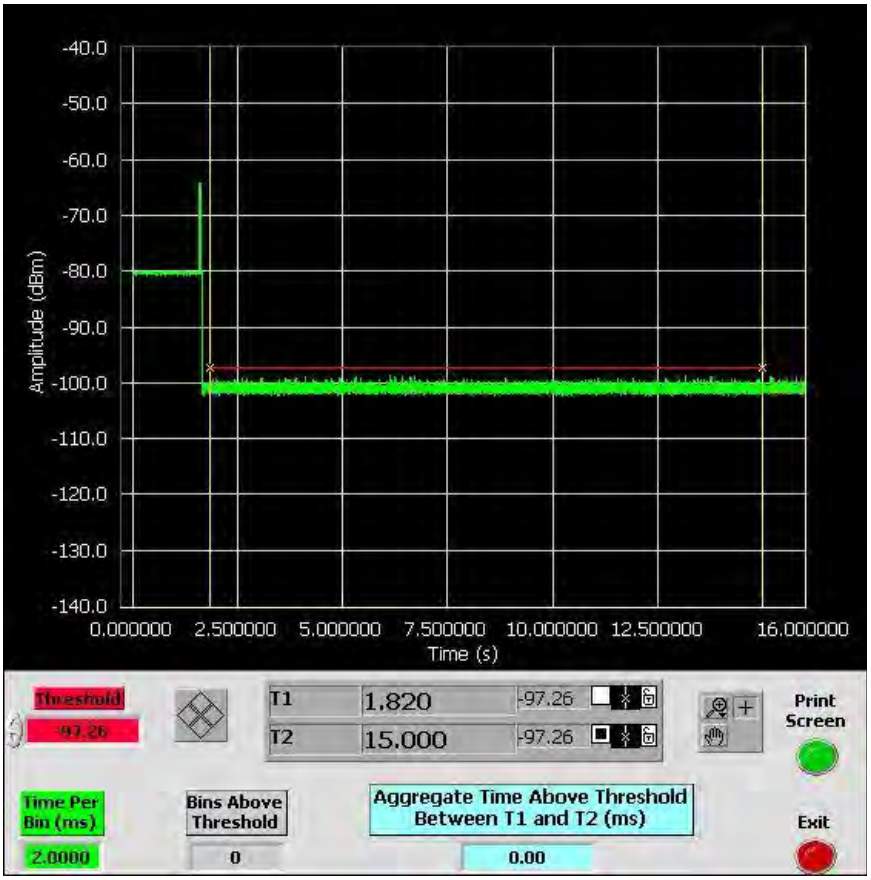
CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

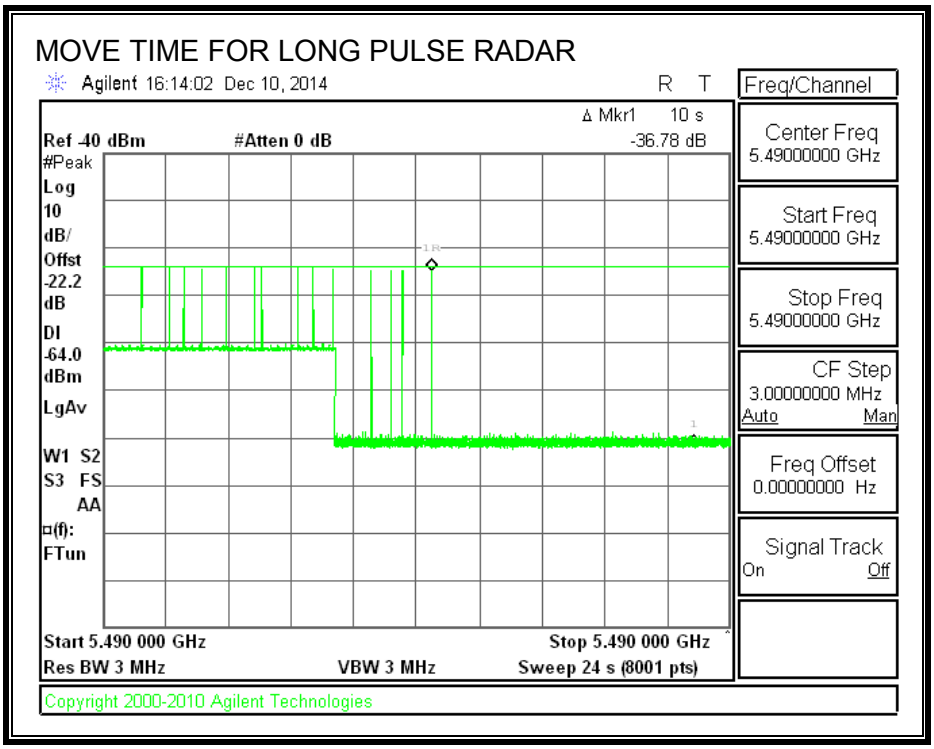
No transmissions are observed during the aggregate monitoring period.

AGGREGATE CLOSING TIME



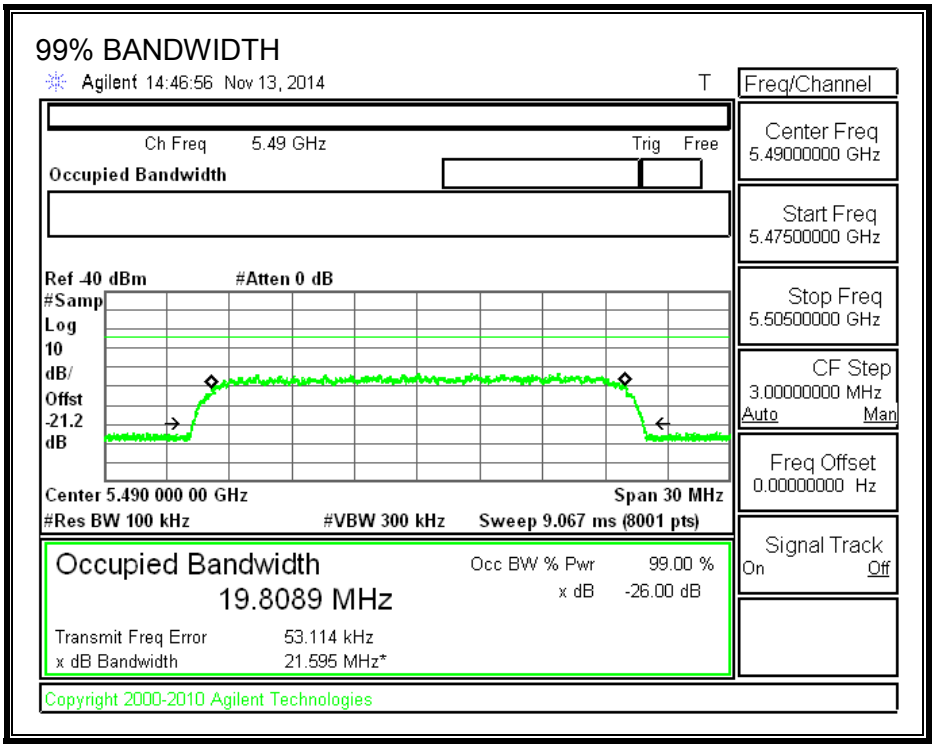
LONG PULSE CHANNEL MOVE TIME

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



11.9.5. DETECTION BANDWIDTH

REFERENCE PLOT OF 99% POWER BANDWIDTH



RESULTS

FL (MHz)	FH (MHz)	Detection Bandwidth (MHz)	99% Power Bandwidth (MHz)	Ratio of Detection BW to 99% Power BW (%)	Minimum Limit (%)
5480	5500	20	19.809	101.0	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
5480	10	10	100	FL
5485	10	10	100	
5490	10	10	100	
5495	10	10	100	
5500	10	10	100	FH

11.9.6. IN-SERVICE MONITORING

RESULTS

FCC Radar Test Summary				
Signal Type	Number of Trials	Detection (%)	Limit (%)	Pass/Fail
FCC Short Pulse Type 1	30	100.00	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		97.50	80	Pass
FCC Long Pulse Type 5	30	96.67	80	Pass
FCC Hopping Type 6	42	100.00	70	Pass

TYPE 1 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 1				
1 us Pulse Width				
Waveform	PRI (us)	Pulses Per Burst	Test (A/B)	Successful Detection (Yes/No)
1001	3066	18	A	Yes
1002	678	78	A	Yes
1003	858	62	A	Yes
1004	638	83	A	Yes
1005	898	59	A	Yes
1006	558	95	A	Yes
1007	778	68	A	Yes
1008	718	74	A	Yes
1009	918	58	A	Yes
1010	698	76	A	Yes
1011	758	70	A	Yes
1012	938	57	A	Yes
1013	838	63	A	Yes
1014	738	72	A	Yes
1015	598	89	A	Yes
1016	798	67	B	Yes
1017	1224	44	B	Yes
1018	993	54	B	Yes
1019	2874	19	B	Yes
1020	1435	37	B	Yes
1021	1032	52	B	Yes
1022	931	57	B	Yes
1023	1399	38	B	Yes
1024	1476	36	B	Yes
1025	2706	20	B	Yes
1026	1979	27	B	Yes
1027	894	60	B	Yes
1028	3029	18	B	Yes
1029	1613	33	B	Yes
1030	1078	49	B	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	4.4	227.00	29	Yes
2002	3.3	159.00	29	Yes
2003	4.2	211.00	29	Yes
2004	3.1	191.00	23	Yes
2005	4.1	167.00	23	Yes
2006	3.8	160.00	24	Yes
2007	2.8	193.00	26	Yes
2008	3.7	170.00	29	Yes
2009	1.7	202.00	26	Yes
2010	1.4	213.00	26	Yes
2011	3.9	223.00	28	Yes
2012	3.4	210.00	25	Yes
2013	4.5	158.00	25	Yes
2014	2.2	170.00	23	Yes
2015	4.9	183.00	27	Yes
2016	4.9	206.00	29	Yes
2017	1.4	205.00	29	Yes
2018	1.2	182.00	27	Yes
2019	3.8	222.00	26	Yes
2020	1.2	178.00	29	Yes
2021	1.4	153.00	25	Yes
2022	2.9	172.00	24	Yes
2023	1.9	192.00	24	Yes
2024	2.4	213.00	24	Yes
2025	2.4	154.00	26	Yes
2026	1.9	222.00	28	Yes
2027	1.7	169.00	29	Yes
2028	3.3	158.00	29	Yes
2029	3	216.00	23	Yes
2030	1.4	210.00	25	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	10	499.00	17	Yes
3002	8.8	319.00	18	Yes
3003	9.4	379.00	18	Yes
3004	9.4	430.00	17	Yes
3005	9.4	308.00	17	Yes
3006	8.1	373.00	18	Yes
3007	9.7	414.00	16	Yes
3008	6.9	475.00	18	Yes
3009	7.1	497.00	17	Yes
3010	9.5	409.00	17	Yes
3011	6.5	262.00	17	Yes
3012	6.4	351.00	17	Yes
3013	9.3	277.00	17	Yes
3014	5.4	335.00	17	Yes
3015	8.1	408.00	17	Yes
3016	7.9	387.00	18	Yes
3017	6.7	302.00	17	Yes
3018	7.9	445.00	16	Yes
3019	5.5	309.00	16	Yes
3020	6	444.00	16	Yes
3021	8	480.00	17	Yes
3022	8	384.00	17	Yes
3023	8.6	456.00	17	Yes
3024	7	401.00	18	Yes
3025	7.4	282.00	18	Yes
3026	6.8	366.00	17	Yes
3027	7.2	305.00	17	Yes
3028	7.5	468.00	18	Yes
3029	6.1	420	18	Yes
3030	6.5	401	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	14.5	365.00	16	Yes
4002	13.4	433.00	12	Yes
4003	15.3	438.00	12	No
4004	19.4	374.00	14	Yes
4005	16.8	250.00	12	Yes
4006	11.6	375.00	15	Yes
4007	13.1	250.00	16	No
4008	16	404.00	16	No
4009	17.3	354.00	16	Yes
4010	16.6	282.00	15	Yes
4011	19.9	294.00	13	Yes
4012	15.4	253.00	15	Yes
4013	18.4	312.00	12	Yes
4014	16.6	307.00	16	Yes
4015	19.5	435.00	13	Yes
4016	15.5	253.00	13	Yes
4017	15	321.00	13	Yes
4018	11.7	475.00	13	Yes
4019	11.6	319.00	14	Yes
4020	17.2	451.00	15	Yes
4021	16.6	331.00	16	Yes
4022	17.6	485.00	13	Yes
4023	14.6	306.00	15	Yes
4024	17.4	327.00	13	Yes
4025	14.8	319.00	13	Yes
4026	17.3	303.00	15	Yes
4027	13.7	361.00	13	Yes
4028	18.2	395.00	16	Yes
4029	18.6	455.00	16	Yes
4030	15.6	420.00	14	Yes

TYPE 5 DETECTION PROBABILITY

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

Note: Randomized parameters for the Type 5 In-Service Monitoring testing performed on 11/13/14 are shown in a separate document.

TYPE 6 DETECTION PROBABILITY

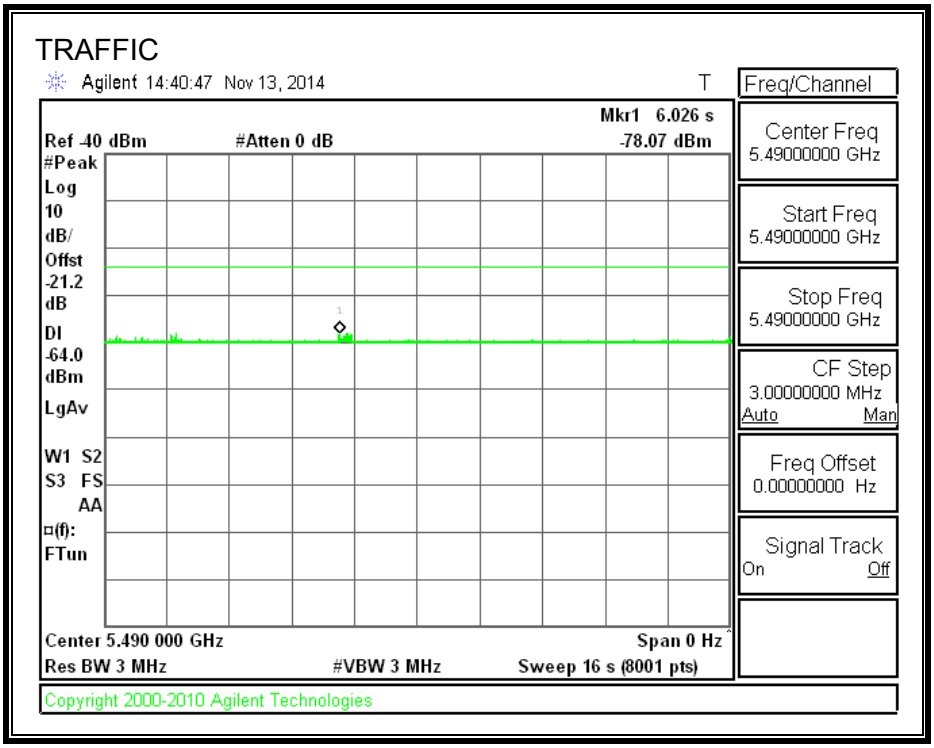
Data Sheet for FCC Hopping Radar Type 6				
1 us Pulse Width, 333 us PRI, 9 Pulses per Burst, 1 Burst per Hop				
NTIA August 2005 Hopping Sequence				
Trial	Starting Index Within Sequence	Signal Generator Frequency (MHz)	Hops within Detection BW	Successful Detection (Yes/No)
1	70	5480	3	Yes
2	545	5481	9	Yes
3	1020	5482	4	Yes
4	1495	5483	5	Yes
5	1970	5484	7	Yes
6	2445	5485	6	Yes
7	2920	5486	3	Yes
8	3395	5487	1	Yes
9	3870	5488	5	Yes
10	4345	5489	6	Yes
11	4820	5490	5	Yes
12	5295	5491	7	Yes
13	5770	5492	6	Yes
14	6245	5493	5	Yes
15	6720	5494	4	Yes
16	7195	5495	6	Yes
17	7670	5496	6	Yes
18	8145	5497	4	Yes
19	8620	5498	6	Yes
20	9095	5499	8	Yes

TYPE 6 DETECTION PROBABILITY (CONT.)

21	9570	5500	4	Yes
22	10045	5480	5	Yes
23	10520	5481	1	Yes
24	10995	5482	2	Yes
25	11470	5483	2	Yes
26	11945	5484	6	Yes
27	12420	5485	4	Yes
28	12895	5486	8	Yes
29	13370	5487	5	Yes
30	13845	5488	2	Yes
31	14320	5489	5	Yes
32	14795	5490	4	Yes
33	15270	5491	5	Yes
34	15745	5492	3	Yes
35	16220	5493	5	Yes
36	16695	5494	3	Yes
37	17170	5495	4	Yes
38	17645	5496	4	Yes
39	18120	5497	2	Yes
40	18595	5498	7	Yes
41	19070	5499	1	Yes
42	19545	5500	4	Yes

11.10. RESULTS FOR 40 MHz BANDWIDTH

11.10.1. TRAFFIC



11.10.2. CHANNEL AVAILABILITY CHECK TIME

PROCEDURE TO DETERMINE TEST CHANNEL CYCLE TIME

The AC power was toggled off and then on to re-boot the EUT while a spectrum analyzer sweep was started to monitor the test channel (5490 MHz) and a log file was generated. Upon completion of the CAC period on the test channel the 5.3 GHz uplink (which includes the 5.2 GHz non-DFS band) begins a “discovery phase” while 5.8GHz (which includes the 5.7 GHz DFS band) In-Service Monitoring continues. When the 5.8 GHz downlink connects the 5.3 GHz uplink Transmitter is enabled. The 5.3 GHz Receive Radio then associates to the 5.3 GHz Transmit Radio. After the association process was complete, transmissions began on the test channel. The elapsed time between the end of the CAC period and the start of transmissions on the test channel is the discovery time and association period. This reference measurement and the time stamps within the log file were used to determine when radar bursts were to be triggered at the beginning and end of the CAC period.

PROCEDURE FOR TIMING OF RADAR BURST

The AC power was toggled off and then on to re-boot the EUT while a spectrum analyzer sweep was started to monitor the test channel (5490 MHz) and a log file was generated. A radar signal was triggered on the test channel between 0 to 6 seconds after the beginning of the CAC period and transmissions on the test channel were monitored on the spectrum analyzer.

The AC power was then again toggled off and then on to re-boot the EUT while a spectrum analyzer sweep was started to monitor the test channel (5490 MHz) and a log file was generated. A radar signal was triggered on the test channel between 54 to 60 seconds after the beginning of the CAC period and transmissions on the test channel were monitored on the spectrum analyzer.

The log file recorded the timing of these events. The time from the beginning of the CAC on the test channel to the detection of the radar burst on the test channel was measured.

APPROXIMATE QUANTITATIVE RESULTS BASED ON RF MARKERS

NO RADAR TRIGGERED ON THE TEST CHANNEL

The time between the beginning of the CAC period and the start of transmissions on the test channel minus the elapsed time for the Receive Radio to associate to the Transmit Radio is the CAC time.

RADAR TRIGGERED ON THE TEST CHANNEL

The time from the beginning of the CAC period to the radar burst on the test channel was measured as the approximate relative time from the start of the CAC.

No Radar Triggered

Start of CAC at 5490 MHz (sec)	End of CAC at 5490 MHz (sec)	CAC Time (sec)
203.1	264.1	61.0

Radar Near Beginning of CAC

Start of CAC at 5490 MHz (sec)	Timing of Radar Burst at 5490 MHz (sec)	Radar Relative to Start of CAC at 5490 MHz (sec)
201.9	202.9	1.0

Radar Near End of CAC

Start of CAC at 5490 MHz (sec)	Timing of Radar Burst at 5490 MHz (sec)	Radar Relative to Start of CAC at 5490 MHz (sec)
203.3	260.3	57.0

QUANTITATIVE RESULTS BASED ON EUT TEST MODE LOG FILE TIME STAMPS

No Radar Triggered

Start of CAC at 5490 MHz (hh:mm:ss)	End of CAC at 5490 MHz (hh:mm:ss)	CAC Time (hh:mm:ss)
0:03:13	0:04:14	0:01:01

Radar Near Beginning of CAC

Start of CAC at 5490 MHz (hh:mm:ss)	Radar Detected at 5490 MHz (hh:mm:ss)	Radar Relative to Start of CAC (hh:mm:ss)
0:03:12	0:03:13	0:00:01

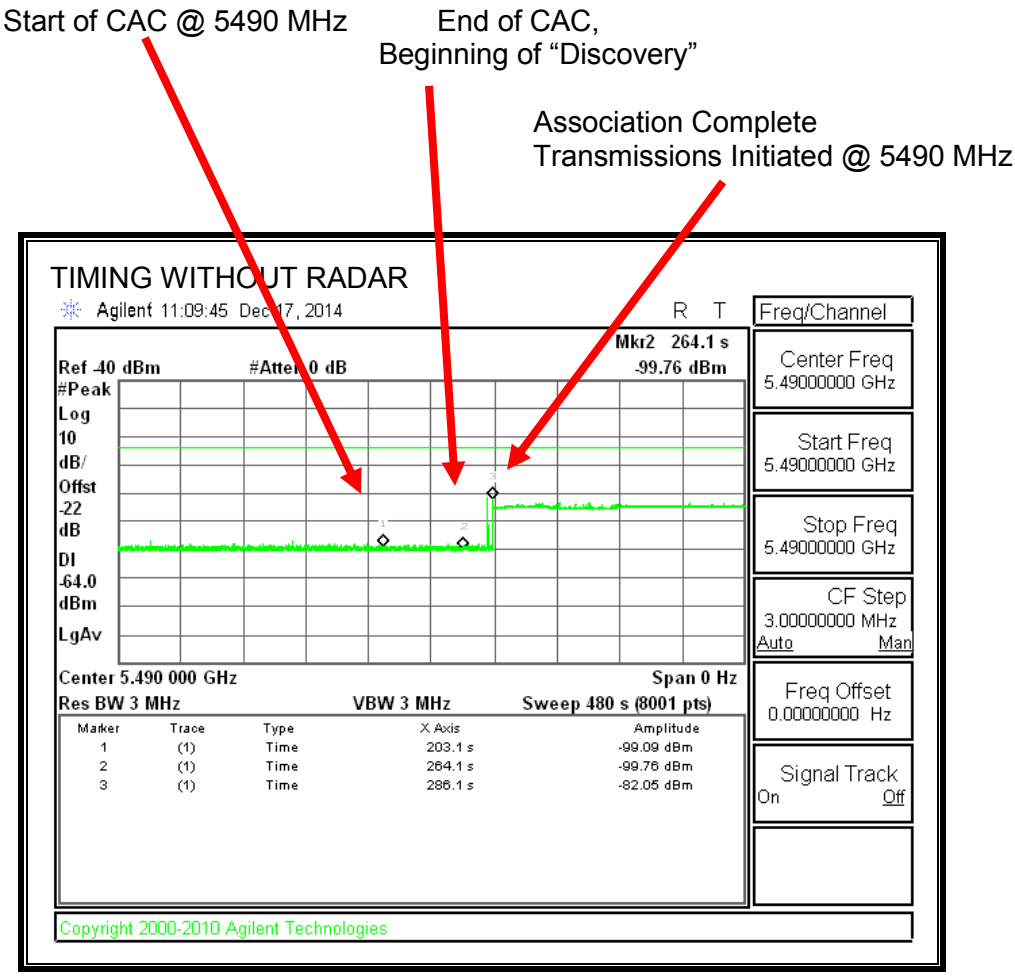
Radar Near End of CAC

Start of CAC at 5490 MHz (hh:mm:ss)	Radar Detected at 5490 MHz (hh:mm:ss)	Radar Relative to Start of CAC (hh:mm:ss)
0:03:13	0:04:10	0:00:57

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 the completion of the association period following 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



Transmissions begin on intended channel after completion of CAC.

EUT RADAR EVENTS LOG FILE - CAC TIMING WITHOUT RADAR

Jan 1 00:03:13 IBR daemon.notice mgd: RRC DFS: TStamp = 122726 msec, CAC START ... wait for 60-secs,

Jan 1 00:04:14 IBR daemon.notice mgd: RRC DFS: TStamp = 183726 msec, CAC DONE

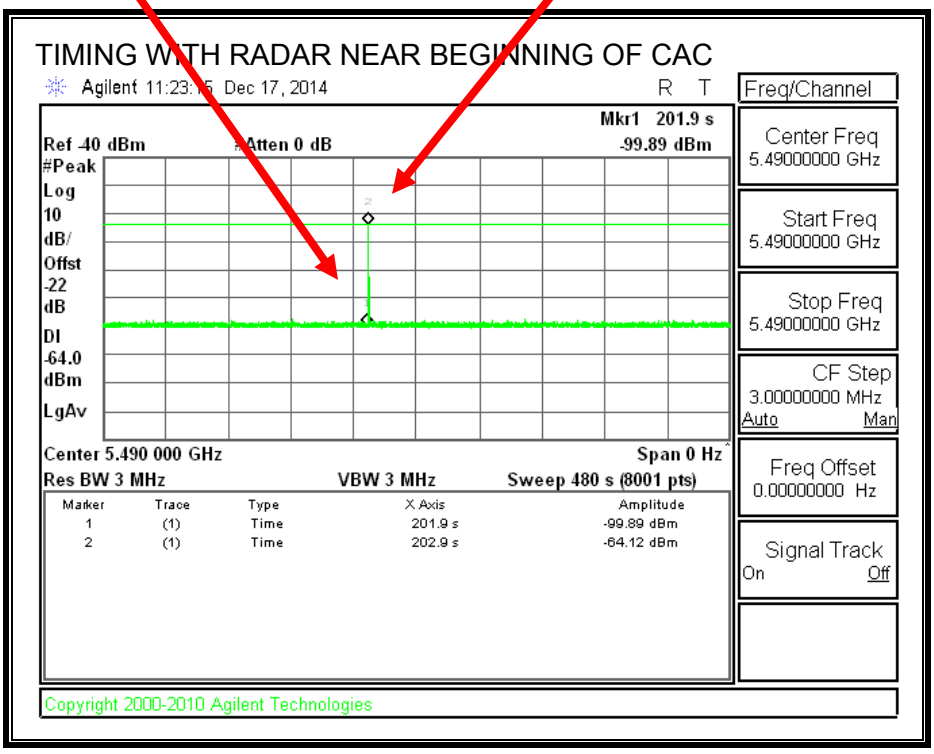
Jan 1 00:04:14 IBR daemon.notice mgd: RRC CLIENT : ENTER -> STATE_WAIT_SYNCH
Jan 1 00:04:14 IBR daemon.notice mgd: RRC CLIENT : ENTER -> STATE_PICK_TOP_ANTS
Jan 1 00:04:14 IBR daemon.notice mgd: RRC CLIENT : ENTER -> STATE_WAIT_ULRS_INFO
Jan 1 00:04:14 IBR daemon.notice mgd: RRC CLIENT : ENTER -> STATE_WAIT_NODE_INFO
Jan 1 00:04:14 IBR daemon.notice mgd: RRC CLIENT : ENTER -> STATE_EXCH_FREQ_MASK

Jan 1 00:04:36 IBR daemon.notice mgd: Rx Frequency change: From [5840] / To [5490], ant combo change: From 1723 to 1723

TIMING WITH RADAR NEAR BEGINNING OF CAC

Start of CAC @ 5490 MHz

Radar Signal Applied @ 5490 MHz



No EUT transmissions on the intended channel were observed.

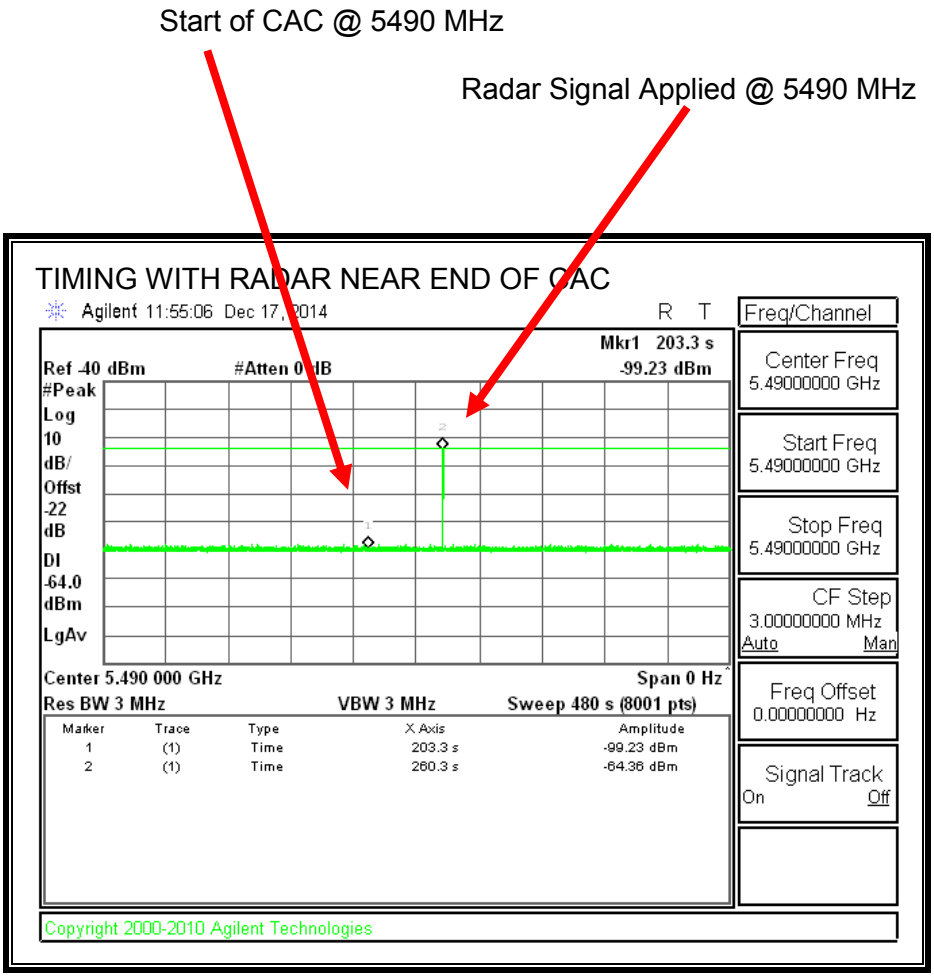
EUT RADAR EVENTS LOG FILE - BEGINNING OF CAC

Jan 1 00:03:12 IBR daemon.notice mgd: RRC DFS: TStamp = 122629 msec, CAC START ... wait for 60-secs,

Jan 1 00:03:13 IBR daemon.notice mgd: RRC_DFS_RX: TStamp:123491 msec,RADAR DETECTED in freq_band lbe= 94,ube= 101,start=5470,end=5509

Jan 1 00:03:13 IBR daemon.notice mgd: DFS Blackout Table
Jan 1 00:03:13 IBR daemon.notice mgd: 5470 Mhz: 31:00 31:00 31:00 31:00
Jan 1 00:03:13 IBR daemon.notice mgd: 5490 Mhz: 31:00 31:00 31:00 31:00
Jan 1 00:03:13 IBR daemon.notice mgd: 5510 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:13 IBR daemon.notice mgd: 5530 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:13 IBR daemon.notice mgd: 5550 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:13 IBR daemon.notice mgd: 5570 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:13 IBR daemon.notice mgd: 5590 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:13 IBR daemon.notice mgd: 5610 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:13 IBR daemon.notice mgd: 5630 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:13 IBR daemon.notice mgd: 5650 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:13 IBR daemon.notice mgd: 5670 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:13 IBR daemon.notice mgd: 5690 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:13 IBR daemon.notice mgd: 5710 Mhz: 00:00 00:00 00:00 00:00

TIMING WITH RADAR NEAR END OF CAC



No EUT transmissions on the intended channel were observed.

EUT RADAR EVENTS LOG FILE - END OF CAC

Jan 1 00:03:13 IBR daemon.notice mgd: RRC DFS: TStamp = 122746 msec, CAC START ... wait for 60-secs,

Jan 1 00:04:10 IBR daemon.notice mgd: RRC_DFS_RX: TStamp:179593 msec,RADAR DETECTED in freq_band lbe= 94,ube= 101,start=5470,end=5509

Jan 1 00:04:10 IBR daemon.notice mgd: DFS Blackout Table
Jan 1 00:04:10 IBR daemon.notice mgd: 5470 Mhz: 31:00 31:00 31:00 31:00
Jan 1 00:04:10 IBR daemon.notice mgd: 5490 Mhz: 31:00 31:00 31:00 31:00
Jan 1 00:04:10 IBR daemon.notice mgd: 5510 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:04:10 IBR daemon.notice mgd: 5530 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:04:10 IBR daemon.notice mgd: 5550 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:04:10 IBR daemon.notice mgd: 5570 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:04:10 IBR daemon.notice mgd: 5590 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:04:10 IBR daemon.notice mgd: 5610 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:04:10 IBR daemon.notice mgd: 5630 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:04:10 IBR daemon.notice mgd: 5650 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:04:10 IBR daemon.notice mgd: 5670 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:04:10 IBR daemon.notice mgd: 5690 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:04:10 IBR daemon.notice mgd: 5710 Mhz: 00:00 00:00 00:00 00:00

11.10.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

11.10.4. MOVE AND CLOSING TIME

REPORTING NOTES

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

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

The aggregate channel closing transmission time is calculated as follows:

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

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

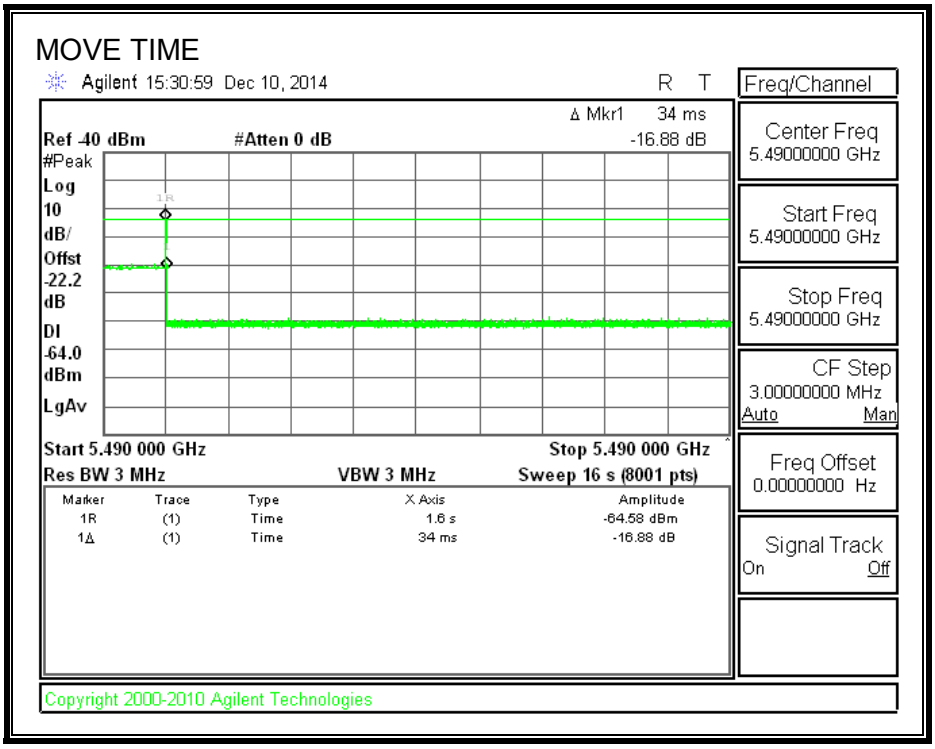
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

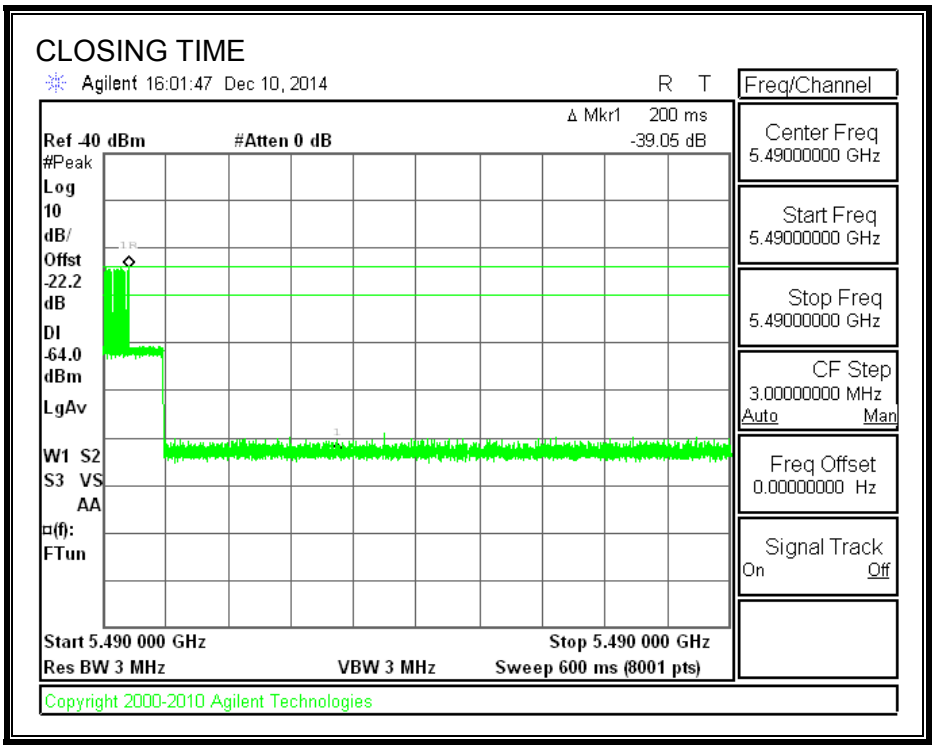
Channel Move Time (sec)	Limit (sec)
0.034	10

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

MOVE TIME



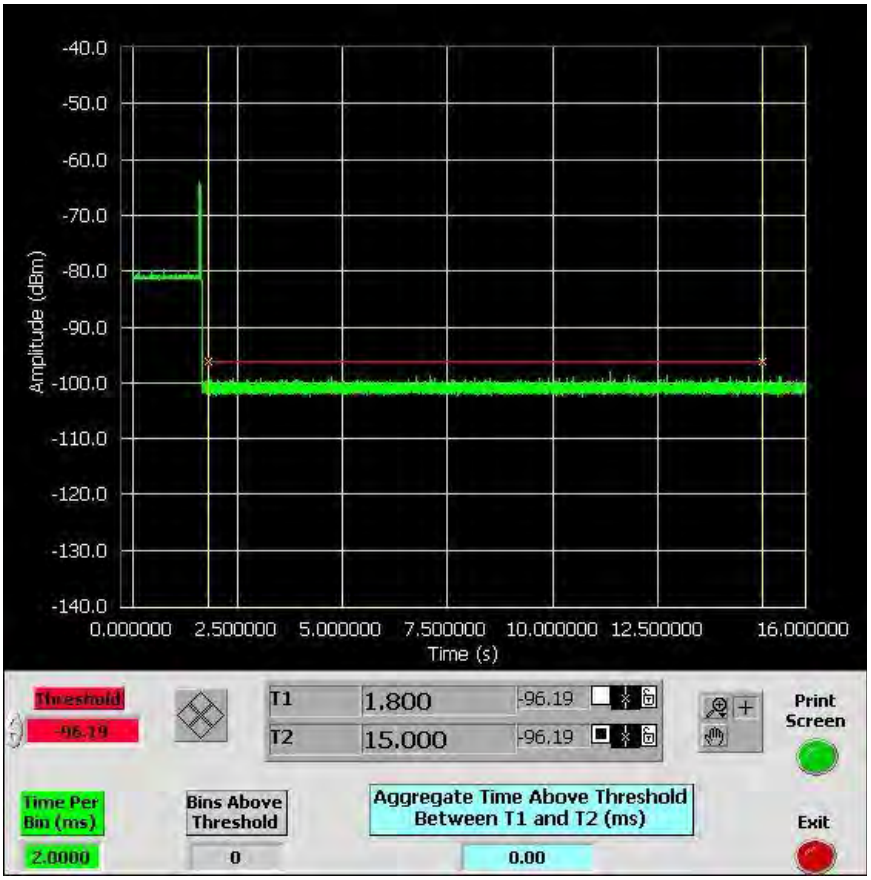
CHANNEL CLOSING TIME



AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

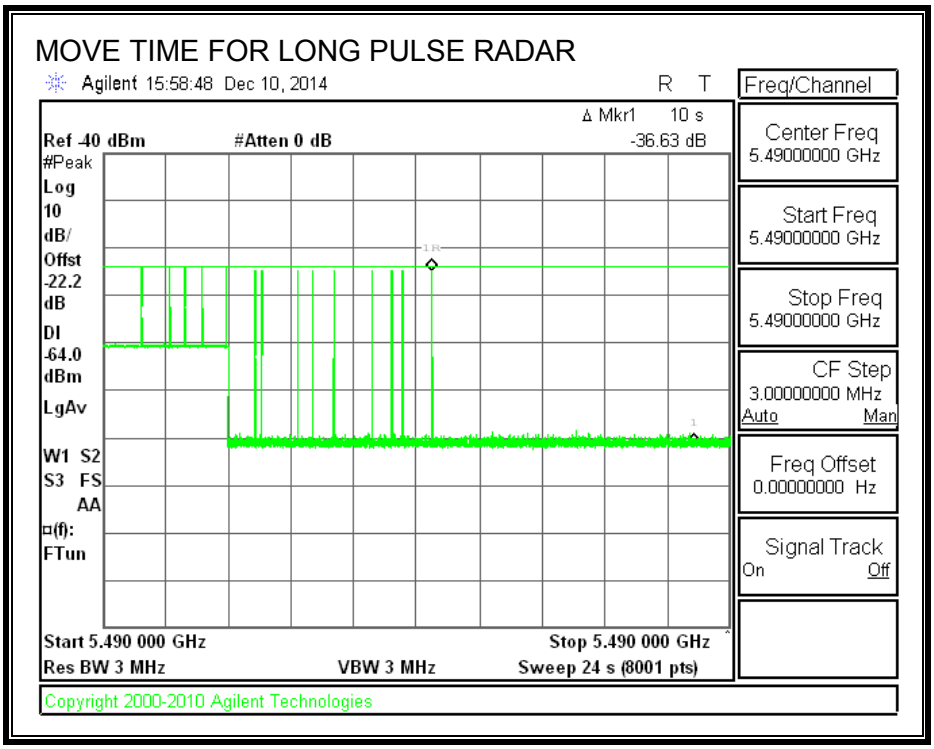
No transmissions are observed during the aggregate monitoring period.

AGGREGATE CLOSING TIME



LONG PULSE CHANNEL MOVE TIME

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

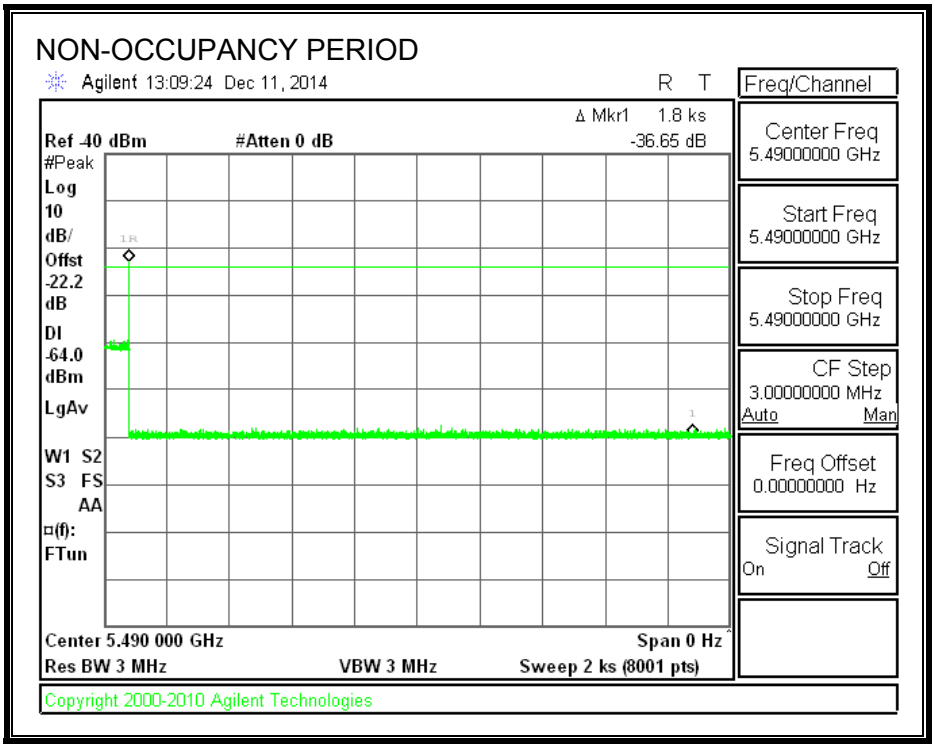


11.10.5. NON-OCCUPANCY PERIOD

RESULTS

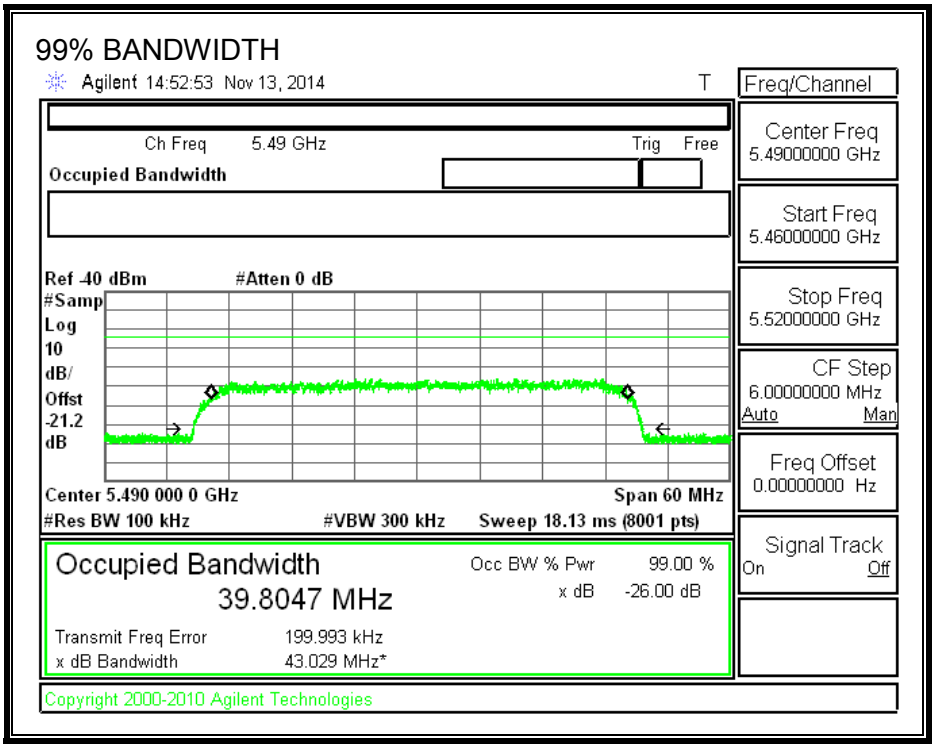
No EUT transmissions were observed on the test channel during the 30-minute observation time.

Testing of 40MHz bandwidth is considered representative of all other bandwidths.



11.10.6. 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 (%)
5470	5510	40	39.805	100.5	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
5469	10	0	0	
5470	10	10	100	FL
5475	10	10	100	
5480	10	10	100	
5485	10	10	100	
5490	10	10	100	
5495	10	10	100	
5500	10	10	100	
5505	10	10	100	
5510	10	10	100	FH
5511	10	0	10	

11.10.7. IN-SERVICE MONITORING

RESULTS

FCC Radar Test Summary				
Signal Type	Number of Trials	Detection (%)	Limit (%)	Pass/Fail
FCC Short Pulse Type 1	30	100.00	60	Pass
FCC Short Pulse Type 2	30	86.67	60	Pass
FCC Short Pulse Type 3	30	96.67	60	Pass
FCC Short Pulse Type 4	30	80.00	60	Pass
Aggregate		90.83	80	Pass
FCC Long Pulse Type 5	30	86.67	80	Pass
FCC Hopping Type 6	41	100.00	70	Pass

TYPE 1 DETECTION PROBABILITY

Data Sheet for FCC Short Pulse Radar Type 1				
1 us Pulse Width				
Waveform	PRI (us)	Pulses Per Burst	Test (A/B)	Successful Detection (Yes/No)
1001	3066	18	A	Yes
1002	678	78	A	Yes
1003	858	62	A	Yes
1004	638	83	A	Yes
1005	898	59	A	Yes
1006	558	95	A	Yes
1007	778	68	A	Yes
1008	718	74	A	Yes
1009	918	58	A	Yes
1010	698	76	A	Yes
1011	758	70	A	Yes
1012	938	57	A	Yes
1013	838	63	A	Yes
1014	738	72	A	Yes
1015	598	89	A	Yes
1016	798	67	B	Yes
1017	1224	44	B	Yes
1018	993	54	B	Yes
1019	2874	19	B	Yes
1020	1435	37	B	Yes
1021	1032	52	B	Yes
1022	931	57	B	Yes
1023	1399	38	B	Yes
1024	1476	36	B	Yes
1025	2706	20	B	Yes
1026	1979	27	B	Yes
1027	894	60	B	Yes
1028	3029	18	B	Yes
1029	1613	33	B	Yes
1030	1078	49	B	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	4.4	227.00	29	No
2002	3.3	159.00	29	No
2003	4.2	211.00	29	Yes
2004	3.1	191.00	23	Yes
2005	4.1	167.00	23	Yes
2006	3.8	160.00	24	Yes
2007	2.8	193.00	26	Yes
2008	3.7	170.00	29	Yes
2009	1.7	202.00	26	Yes
2010	1.4	213.00	26	Yes
2011	3.9	223.00	28	Yes
2012	3.4	210.00	25	Yes
2013	4.5	158.00	25	Yes
2014	2.2	170.00	23	Yes
2015	4.9	183.00	27	Yes
2016	4.9	206.00	29	Yes
2017	1.4	205.00	29	Yes
2018	1.2	182.00	27	Yes
2019	3.8	222.00	26	Yes
2020	1.2	178.00	29	Yes
2021	1.4	153.00	25	Yes
2022	2.9	172.00	24	No
2023	1.9	192.00	24	No
2024	2.4	213.00	24	Yes
2025	2.4	154.00	26	Yes
2026	1.9	222.00	28	Yes
2027	1.7	169.00	29	Yes
2028	3.3	158.00	29	Yes
2029	3	216.00	23	Yes
2030	1.4	210.00	25	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	10	499.00	17	Yes
3002	8.8	319.00	18	Yes
3003	9.4	379.00	18	Yes
3004	9.4	430.00	17	Yes
3005	9.4	308.00	17	Yes
3006	8.1	373.00	18	No
3007	9.7	414.00	16	Yes
3008	6.9	475.00	18	Yes
3009	7.1	497.00	17	Yes
3010	9.5	409.00	17	Yes
3011	6.5	262.00	17	Yes
3012	6.4	351.00	17	Yes
3013	9.3	277.00	17	Yes
3014	5.4	335.00	17	Yes
3015	8.1	408.00	17	Yes
3016	7.9	387.00	18	Yes
3017	6.7	302.00	17	Yes
3018	7.9	445.00	16	Yes
3019	5.5	309.00	16	Yes
3020	6	444.00	16	Yes
3021	8	480.00	17	Yes
3022	8	384.00	17	Yes
3023	8.6	456.00	17	Yes
3024	7	401.00	18	Yes
3025	7.4	282.00	18	Yes
3026	6.8	366.00	17	Yes
3027	7.2	305.00	17	Yes
3028	7.5	468.00	18	Yes
3029	6.1	420	18	Yes
3030	6.5	401	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	14.5	365.00	16	Yes
4002	13.4	433.00	12	Yes
4003	15.3	438.00	12	No
4004	19.4	374.00	14	Yes
4005	16.8	250.00	12	Yes
4006	11.6	375.00	15	Yes
4007	13.1	250.00	16	Yes
4008	16	404.00	16	Yes
4009	17.3	354.00	16	No
4010	16.6	282.00	15	Yes
4011	19.9	294.00	13	Yes
4012	15.4	253.00	15	No
4013	18.4	312.00	12	Yes
4014	16.6	307.00	16	Yes
4015	19.5	435.00	13	Yes
4016	15.5	253.00	13	Yes
4017	15	321.00	13	Yes
4018	11.7	475.00	13	Yes
4019	11.6	319.00	14	Yes
4020	17.2	451.00	15	Yes
4021	16.6	331.00	16	Yes
4022	17.6	485.00	13	Yes
4023	14.6	306.00	15	Yes
4024	17.4	327.00	13	Yes
4025	14.8	319.00	13	No
4026	17.3	303.00	15	Yes
4027	13.7	361.00	13	Yes
4028	18.2	395.00	16	Yes
4029	18.6	455.00	16	No
4030	15.6	420.00	14	No

TYPE 5 DETECTION PROBABILITY

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

Note: Randomized parameters for the Type 5 In-Service Monitoring testing performed on 11/13/14 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	83	5470	5	Yes
2	558	5471	12	Yes
3	1033	5472	6	Yes
4	1508	5473	11	Yes
5	1983	5474	7	Yes
6	2458	5475	10	Yes
7	2933	5476	9	Yes
8	3408	5477	5	Yes
9	3883	5478	9	Yes
10	4358	5479	8	Yes
11	4833	5480	11	Yes
12	5308	5481	12	Yes
13	5783	5482	8	Yes
14	6258	5483	9	Yes
15	6733	5484	5	Yes
16	7208	5485	9	Yes
17	7683	5486	9	Yes
18	8158	5487	8	Yes
19	8633	5488	5	Yes
20	9108	5489	15	Yes

TYPE 6 DETECTION PROBABILITY (CONT.)

21	9583	5490	10	Yes
22	10058	5491	9	Yes
23	10533	5492	4	Yes
24	11008	5493	5	Yes
25	11483	5494	7	Yes
26	11958	5495	14	Yes
27	12433	5496	12	Yes
28	12908	5497	10	Yes
29	13383	5498	12	Yes
30	13858	5499	5	Yes
31	14333	5500	11	Yes
32	14808	5501	8	Yes
33	15283	5502	11	Yes
34	15758	5503	9	Yes
35	16233	5504	7	Yes
36	16708	5505	5	Yes
37	17183	5506	7	Yes
38	17658	5507	11	Yes
39	18133	5508	7	Yes
40	18608	5509	10	Yes
41	19083	5510	4	Yes

11.10.8. CAC DUAL SENSOR BAND BLOCKING VERIFICATION TEST PROCEDURE

The spectrum analyzer is tuned to 5490 MHz and the log file from the EUT records the events.

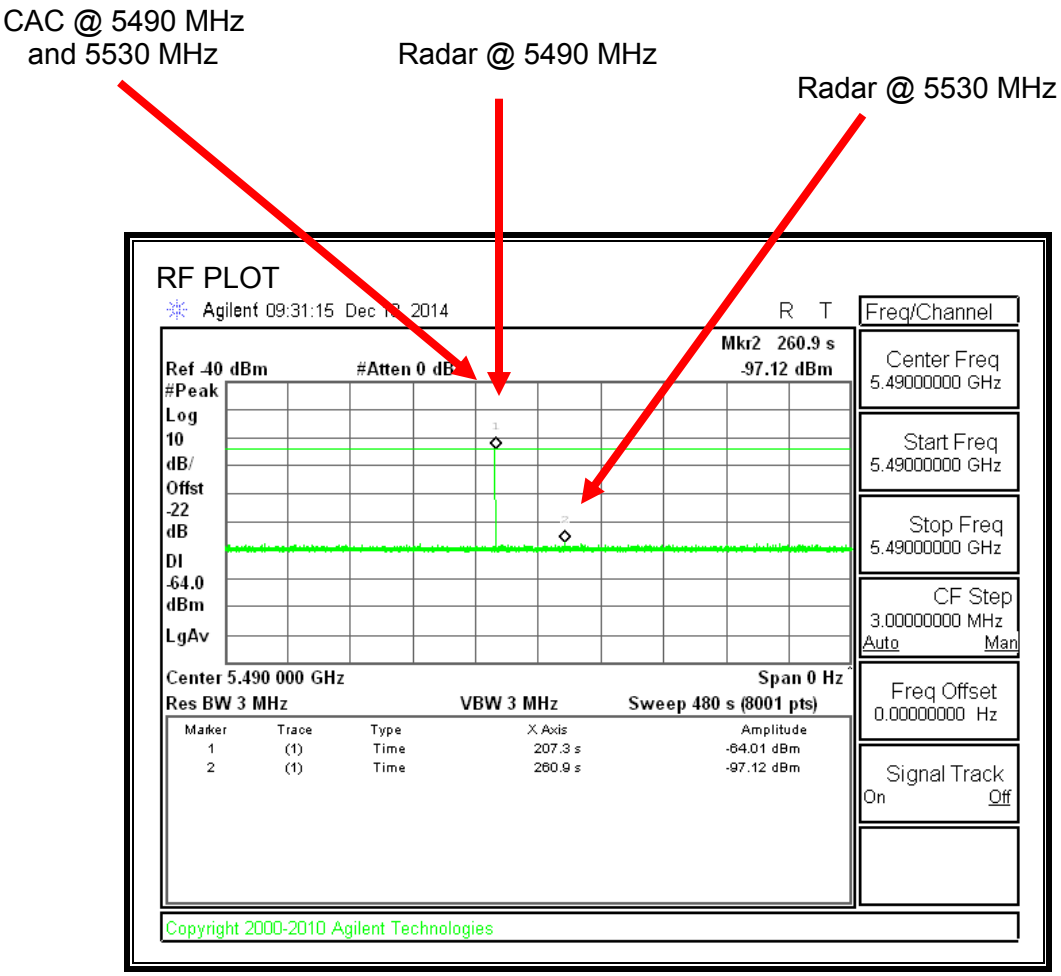
The power to the EUT is cycled and a sweep is concurrently started on the spectrum analyzer. After the EUT boots-up a CAC period is simultaneously performed on 5490 MHz and 5530 MHz.

A radar burst is triggered on 5490 MHz approximately 3 seconds into the CAC period. In response to this the EUT places 5490 MHz on the blocked channel list. A radar burst is then triggered approximately 54 seconds later on 5530 MHz. After the second detection the EUT places 5530 MHz on the blocked channel list and removes itself from service in the 5470 MHz to 5725 MHz band.

Once the non-occupancy period is complete on 5490 MHz the channel is cleared from the blocked channel list. A CAC period is performed on the cleared channel and upon successful completion the EUT enters service.

11.10.9. CAC DUAL SENSOR BAND BLOCKING VERIFICATION TEST RESULTS

RF PLOT



LOG FILE

Jan 1 00:03:14 IBR daemon.notice mgd: RRC DFS: TStamp = 122645 msec, CAC START ... wait for 60-secs,

Jan 1 00:03:17 IBR daemon.notice mgd: RRC_DFS_RX: TStamp:126535 msec,RADAR DETECTED in freq_band lbe= 94,ube= 101,start=5470,end=5509

Jan 1 00:03:17 IBR daemon.notice mgd: DFS Blackout Table
Jan 1 00:03:17 IBR daemon.notice mgd: 5470 Mhz: 31:00 31:00 31:00 31:00
Jan 1 00:03:17 IBR daemon.notice mgd: 5490 Mhz: 31:00 31:00 31:00 31:00
Jan 1 00:03:17 IBR daemon.notice mgd: 5510 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:17 IBR daemon.notice mgd: 5530 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:17 IBR daemon.notice mgd: 5550 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:17 IBR daemon.notice mgd: 5570 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:17 IBR daemon.notice mgd: 5590 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:17 IBR daemon.notice mgd: 5610 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:17 IBR daemon.notice mgd: 5630 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:17 IBR daemon.notice mgd: 5650 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:17 IBR daemon.notice mgd: 5670 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:17 IBR daemon.notice mgd: 5690 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:03:17 IBR daemon.notice mgd: 5710 Mhz: 00:00 00:00 00:00 00:00

Jan 1 00:04:11 IBR daemon.notice mgd: RRC_DFS_RX: TStamp:180166 msec,RADAR DETECTED in freq_band lbe= 102,ube= 109,start=5510,end=5549

Jan 1 00:04:11 IBR daemon.notice mgd: DFS Blackout Table
Jan 1 00:04:11 IBR daemon.notice mgd: 5470 Mhz: 30:06 30:06 30:06 30:06
Jan 1 00:04:11 IBR daemon.notice mgd: 5490 Mhz: 30:06 30:06 30:06 30:06
Jan 1 00:04:11 IBR daemon.notice mgd: 5510 Mhz: 31:00 31:00 31:00 31:00
Jan 1 00:04:11 IBR daemon.notice mgd: 5530 Mhz: 31:00 31:00 31:00 31:00
Jan 1 00:04:11 IBR daemon.notice mgd: 5550 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:04:11 IBR daemon.notice mgd: 5570 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:04:11 IBR daemon.notice mgd: 5590 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:04:11 IBR daemon.notice mgd: 5610 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:04:11 IBR daemon.notice mgd: 5630 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:04:11 IBR daemon.notice mgd: 5650 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:04:11 IBR daemon.notice mgd: 5670 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:04:11 IBR daemon.notice mgd: 5690 Mhz: 00:00 00:00 00:00 00:00
Jan 1 00:04:11 IBR daemon.notice mgd: 5710 Mhz: 00:00 00:00 00:00 00:00