



**FCC CFR47 PART 15 SUBPART E
INDUSTRY CANADA RSS-210 ISSUE 8**

CERTIFICATION TEST REPORT

GSM AND WCDMA PHONE WITH BLUETOOTH, NFC, AND WLAN

MODEL NUMBER: E960, LGE960, AND LG-E960

FCC ID: ZNFE960

IC: 2703C-E960

REPORT NUMBER: 12U14580-3

ISSUE DATE: AUGUST 24, 2012

Prepared for

LG ELECTRONICS MOBILECOMM U.S.A., INC.

1000SYLVAN AVENUE

ENGLEWOOD CLIFFS, NEW JERSEY 07632

Prepared by

UL CCS

47173 BENICIA STREET

FREMONT, CA 94538, U.S.A.

TEL: (510) 771-1000

FAX: (510) 661-0888



NVLAP LAB CODE 200065-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	08/24/12	Initial Issue	T. LEE

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	6
2. TEST METHODOLOGY	7
3. FACILITIES AND ACCREDITATION	7
4. CALIBRATION AND UNCERTAINTY	7
4.1. <i>MEASURING INSTRUMENT CALIBRATION</i>	7
4.2. <i>SAMPLE CALCULATION</i>	7
4.3. <i>MEASUREMENT UNCERTAINTY</i>	7
5. EQUIPMENT UNDER TEST	8
5.1. <i>DESCRIPTION OF EUT</i>	8
5.2. <i>MAXIMUM OUTPUT POWER</i>	8
5.3. <i>DESCRIPTION OF AVAILABLE ANTENNAS</i>	8
5.4. <i>SOFTWARE AND FIRMWARE</i>	8
5.5. <i>MODIFICATIONS</i>	8
5.6. <i>MODEL DIFFERNECE</i>	9
5.7. <i>WORST-CASE CONFIGURATION AND MODE</i>	9
5.8. <i>DESCRIPTION OF TEST SETUP</i>	10
6. TEST AND MEASUREMENT EQUIPMENT	13
7. ANTENNA PORT TEST RESULTS	14
7.1. <i>ON TIME, DUTY CYCLE AND MEASUREMENT METHODS</i>	14
7.1.1. <i>ON TIME AND DUTY CYCLE RESULTS</i>	14
7.1.2. <i>MEASUREMENT METHOD FOR POWER AND PPSD</i>	14
7.1.3. <i>MEASUREMENT METHOD FOR AVERAGE SPURIOUS EMISSIONS ABOVE 1 GHz</i>	14
7.1.4. <i>DUTY CYCLE PLOTS</i>	15
7.2. <i>802.11a MODE IN THE 5.2 GHz BAND</i>	16
7.2.1. <i>26 dB BANDWIDTH</i>	16
7.2.2. <i>99% BANDWIDTH</i>	19
7.2.3. <i>AVERAGE POWER</i>	22
7.2.4. <i>OUTPUT POWER AND PPSD</i>	23
7.2.5. <i>PEAK EXCURSION</i>	28
7.3. <i>802.11n HT20 MODE IN THE 5.2 GHz BAND</i>	31
7.3.1. <i>26 dB BANDWIDTH</i>	31
7.3.2. <i>99% BANDWIDTH</i>	34
7.3.3. <i>AVERAGE POWER</i>	37
7.3.4. <i>OUTPUT POWER AND PPSD</i>	38
7.3.5. <i>PEAK EXCURSION</i>	43
7.4. <i>802.11a MODE IN THE 5.3 GHz BAND</i>	46
7.4.1. <i>26 dB BANDWIDTH</i>	46

7.4.2.	99% BANDWIDTH	49
7.4.3.	AVERAGE POWER	52
7.4.4.	OUTPUT POWER AND PPSD.....	53
7.4.5.	PEAK EXCURSION	57
7.5.	<i>802.11n HT20 MODE IN THE 5.3 GHz BAND</i>	60
7.5.1.	26 dB BANDWIDTH	60
7.5.2.	99% BANDWIDTH	63
7.5.3.	AVERAGE POWER	66
7.5.4.	OUTPUT POWER AND PPSD.....	67
7.5.5.	PEAK EXCURSION	71
7.6.	<i>802.11a MODE IN THE 5.6 GHz BAND</i>	74
7.6.1.	26 dB BANDWIDTH	74
7.6.2.	99% BANDWIDTH	77
7.6.3.	AVERAGE POWER	80
7.6.4.	OUTPUT POWER AND PPSD.....	81
7.6.5.	PEAK EXCURSION	85
7.7.	<i>802.11n HT20 MODE IN THE 5.6 GHz BAND</i>	88
7.7.1.	26 dB BANDWIDTH	88
7.7.2.	99% BANDWIDTH	91
7.7.3.	AVERAGE POWER	94
7.7.4.	OUTPUT POWER AND PPSD.....	95
7.7.5.	PEAK EXCURSION	99
8.	RADIATED TEST RESULTS	102
8.1.	<i>LIMITS AND PROCEDURE</i>	102
8.2.	<i>TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND</i>	103
8.3.	<i>TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND</i>	106
8.4.	<i>TX ABOVE 1 GHz 802.11a MODE IN THE 5.3 GHz BAND</i>	109
8.5.	<i>TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.3 GHz BAND</i>	112
8.6.	<i>TX ABOVE 1 GHz 802.11a MODE IN THE 5.6 GHz BAND</i>	115
8.7.	<i>TX ABOVE 1GHz 802.11n HT20 MODE IN THE 5.6 GHz BAND</i>	119
8.8.	<i>TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND</i>	123
8.9.	<i>TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND</i>	126
8.10.	<i>TX ABOVE 1 GHz 802.11a MODE IN THE 5.3 GHz BAND</i>	129
8.11.	<i>TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.3 GHz BAND</i>	132
8.12.	<i>TX ABOVE 1 GHz 802.11a MODE IN THE 5.6 GHz BAND</i>	135
8.13.	<i>TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.6 GHz BAND</i>	139
8.14.	<i>WORST-CASE BELOW 1 GHz</i>	143
9.	AC POWER LINE CONDUCTED EMISSIONS	149
10.	DYNAMIC FREQUENCY SELECTION	156
10.1.	<i>OVERVIEW</i>	156
10.1.1.	<i>LIMITS</i>	156
10.1.2.	<i>TEST AND MEASUREMENT SYSTEM</i>	159

10.1.3.	SETUP OF EUT.....	162
10.1.4.	DESCRIPTION OF EUT	163
10.2.	<i>RESULTS FOR 20 MHz BANDWIDTH.....</i>	<i>165</i>
10.2.1.	TEST CHANNEL	165
10.2.2.	RADAR WAVEFORM AND TRAFFIC	165
10.2.3.	OVERLAPPING CHANNEL TESTS	167
10.2.4.	MOVE AND CLOSING TIME	167
10.2.5.	NON-OCCUPANCY PERIOD	172
11.	SETUP PHOTOS	173

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: LG ELECTRONICS MOBILECOMM U.S.A., INC
1000 SYLVAN AVENUE
ENGLEWOOD CLIFFS, NEW JERSEY 07632

EUT DESCRIPTION: GSM AND WCDMA PHONE WITHBLUETOOTH, NFC, AND
WLAN

MODEL: E960, LGE960, AND LG-E960

SERIAL NUMBER: 207KUU001162

DATE TESTED: AUGUST 13 TO 24, 2012

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart E	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 9	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

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

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

Approved & Released For UL CCS By:

Tested By:



TIM LEE
STAFF ENGINEER
UL CCS



CHIN PANG
EMC ENGINEER
UL CCS

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 C63.4-2003, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is BT3.0, 802.11b/g/n 1x1 HT20, GSM/WCDMA 850/1900MHz, Bar Phone with HOTSPOTS and VOIP supported.

The manufacturer of the radio module is LG.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5180 - 5240	802.11a	13.76	23.77
5180 - 5240	802.11n HT20	12.52	17.86
5260 - 5320	802.11a	12.92	19.59
5260 - 5320	802.11n HT20	11.92	15.56
5500 - 5700	802.11a	12.71	18.66
5500 - 5700	802.11n HT20	11.65	14.62

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a flexible PCB antenna, with a maximum gain of -3.33 dBi.

5.4. SOFTWARE AND FIRMWARE

The kernel version installed in the EUT during testing was 3.0.21 Jh.koo@fanta #1 SMP PREEMPT Tue Jul 17 13:18:23 KST 2012.

The Build number installed in the EUT during testing was geeb_att_us-eng 4.0.4 IMM76L b85552b7e test-keys.

5.5. MODIFICATIONS

A ferrite was added on the Charging Pad's AC Adapter in order to pass 30-1000MHz emissions test. Ferrite: Manufacture: TDK, Serial Number: ZCAT 2035-0930.

5.6. MODEL DIFFERNECE

Models LGE960 and LG-E960 are identical to Model E960 except for model designation.

5.7. WORST-CASE CONFIGURATION AND MODE

For the fundamental investigation, since the EUT is a portable device that has three orientations; X, Y and Z orientations have been investigated, also with AC/DC adapter, and earphone, and the worst case was found to be at X orientation with AC adapter and earphone for both 2.4GHz and 5GHz band.

For Radiated Emissions below 1 GHz and Power line Conducted Emissions, the channel with the highest conducted output power was selected as a worst-case scenario.

Worst-case data rates based on base line measurement are:

For 802.11a mode: 6Mbps

For 802.11n HT20: MCS0

5.8. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

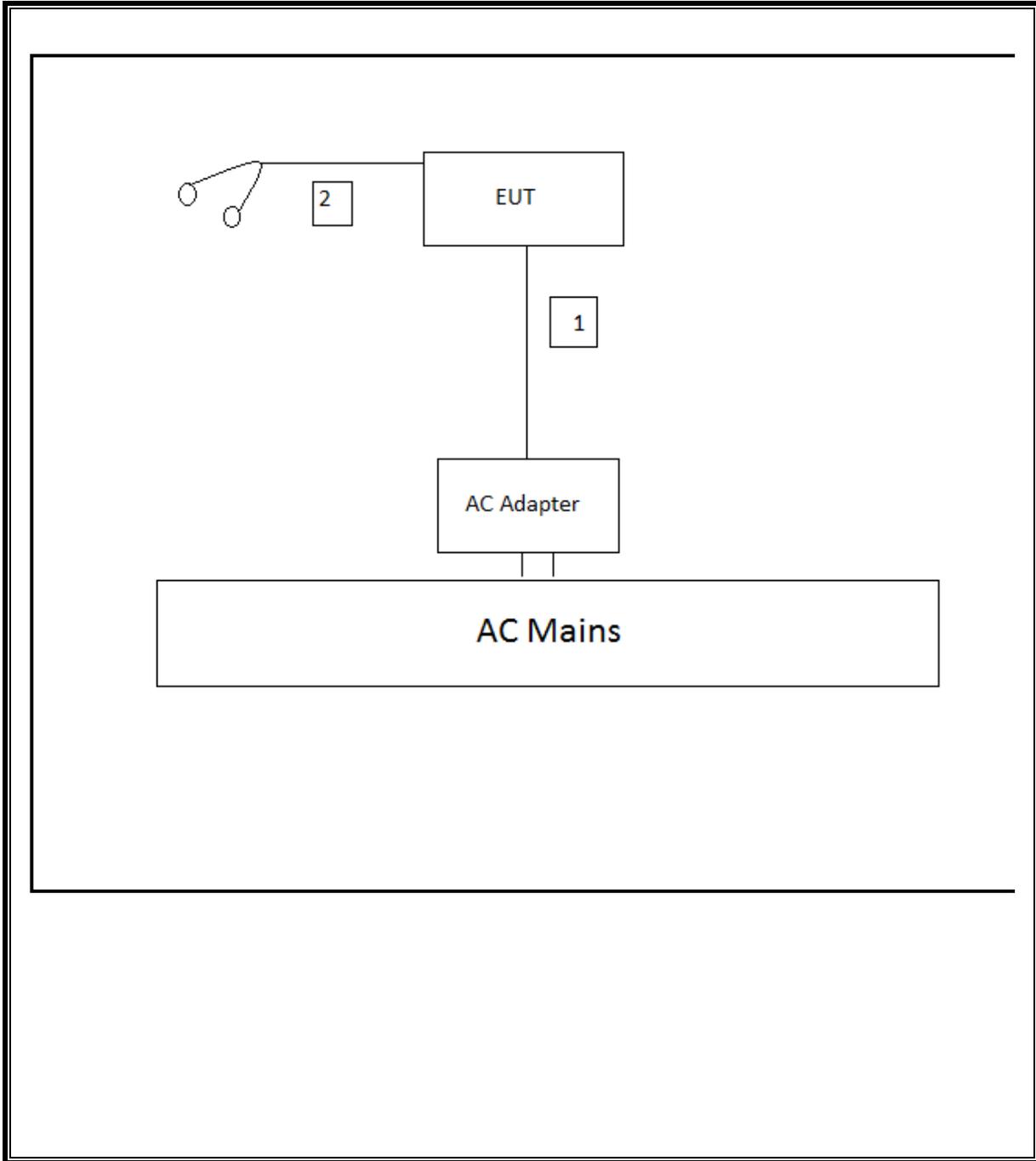
Support Equipment List			
Description	Manufacturer	Model	Serial Number
AC ADAPTER	LG ELECTRONICS	MCS-01WR	RA1Z0051473
HEADSET	LG ELECTRONICS	NA	N/A
AC ADAPTER	LG ELECTRONICS	WCA-D01WT	TA170000040
INDUCTIVE CHARGER	LG ELECTRONICS	WCP-700	A1106WP000029

I/O CABLES

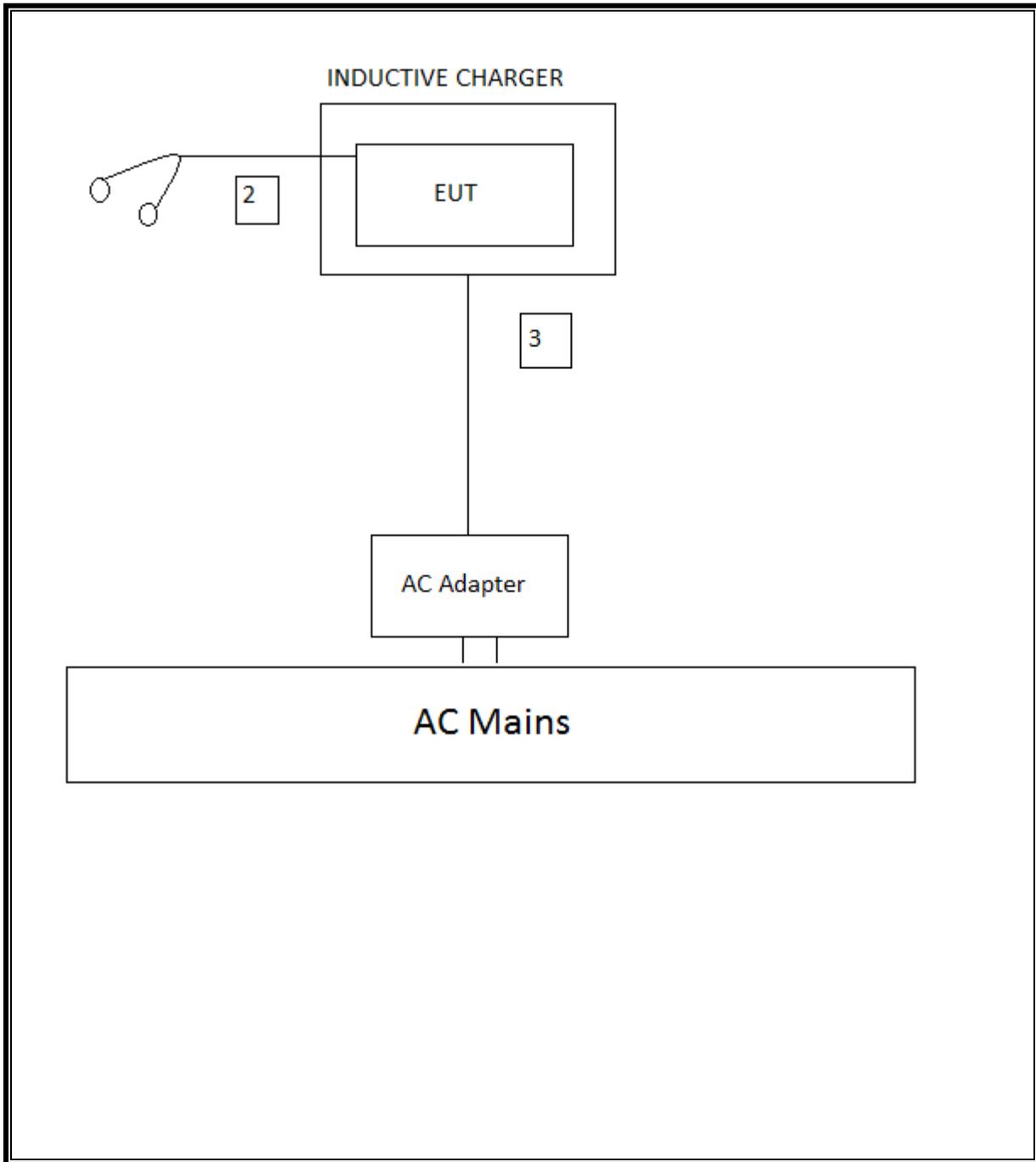
I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	MINI USB	UN-SHELDED	1.0m	N/A
2	AUDIO	1	MINI JACK	UN-SHELDED	1.2m	N/A
3	DC	1	MINI JACK	UN-SHELDED	1.5m	N/A

TEST SETUP

SETUP DIAGRAM WITH USB CHARGER



SETUP DIAGRAM WITH INDUCTIVE CHARGER



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	Asset	Cal Due
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	11/11/12
Antenna, Horn, 18 GHz	EMCO	3115	C00945	10/06/12
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	11/11/12
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01016	02/07/13
Horn Antenna, 26.5 GHz	ARA	MWH-1826/B	C00589	04/23/13
Horn Antenna, 40 GHz	ARA	MWH-2640/B	C00981	06/14/13
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	03/14/13
Reject Filter, 2.0-2.9 GHz	Micro-Tronics	BRM50702	N02684	CNR
High Pass Filter, 7.6 GHz	Micro-Tronics	HPM13195	N02682	CNR
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/15/12
E-Series Power Sensor 9 kHz~18 GHz	Agilent	E9304A	1260847C	05/23/13
P-Series single channel Power Meter	Agilent / HP	N1911A	C00963	07/27/13
Reject Filter, 5.725-5.825 GHz	Micro-Tronics	BRC13192	N02676	CNR
Reject Filter, 2.4-2.5 GHz	Micro-Tronics	BRM50702	N02685	CNR
Highpass Filter, 7.6 GHz	Micro-Tronics	HPM13195	N02682	CNR
EMI Test Receiver, 30MHz	R & S	ESHS 20	N02396	08/19/13
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	12/13/12

7. ANTENNA PORT TEST RESULTS

7.1. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 789033 Zero-Span Spectrum Analyzer Method.

7.1.1. 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 20 MHz	2.03	2.13	0.953	95.3%	0.21	0.493
802.11n HT20	1.89	1.99	0.950	95.0%	0.22	0.528

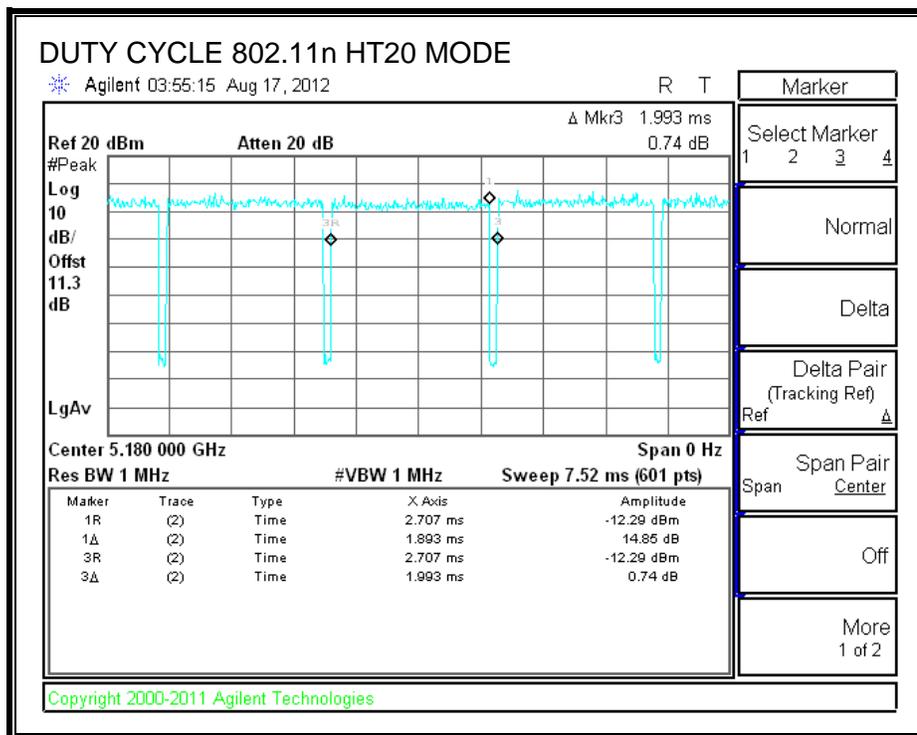
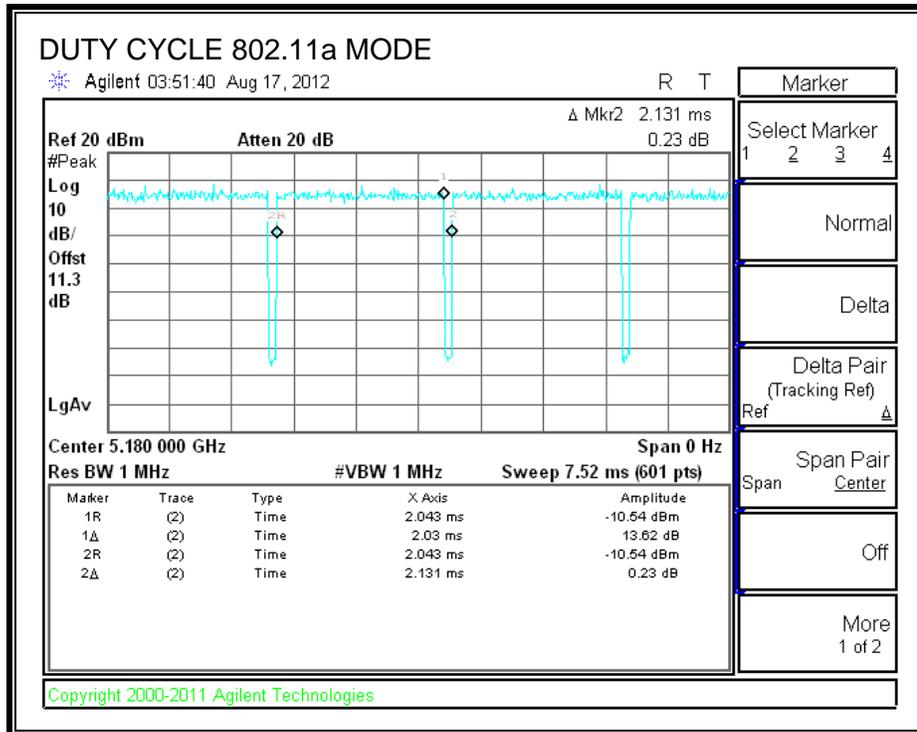
7.1.2. MEASUREMENT METHOD FOR POWER AND PPSD

The Duty Cycle is less than 98% and consistent therefore KDB 789033 Method SA-2 is used.

7.1.3. MEASUREMENT METHOD FOR AVERAGE SPURIOUS EMISSIONS ABOVE 1 GHz

The Duty Cycle is less than 98% and consistent, KDB 789033 Method VB with Power RMS Averaging is used.

7.1.4. DUTY CYCLE PLOTS



7.2. 802.11a MODE IN THE 5.2 GHz BAND

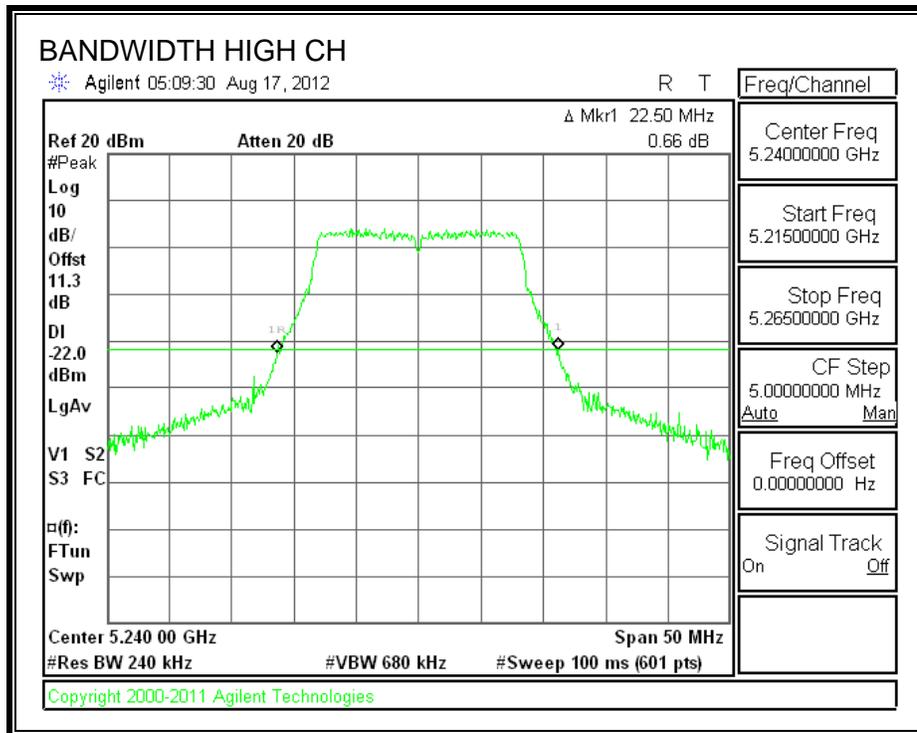
7.2.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5180	22.1700
Mid	5200	22.1700
High	5240	22.2500



7.2.2. 99% BANDWIDTH

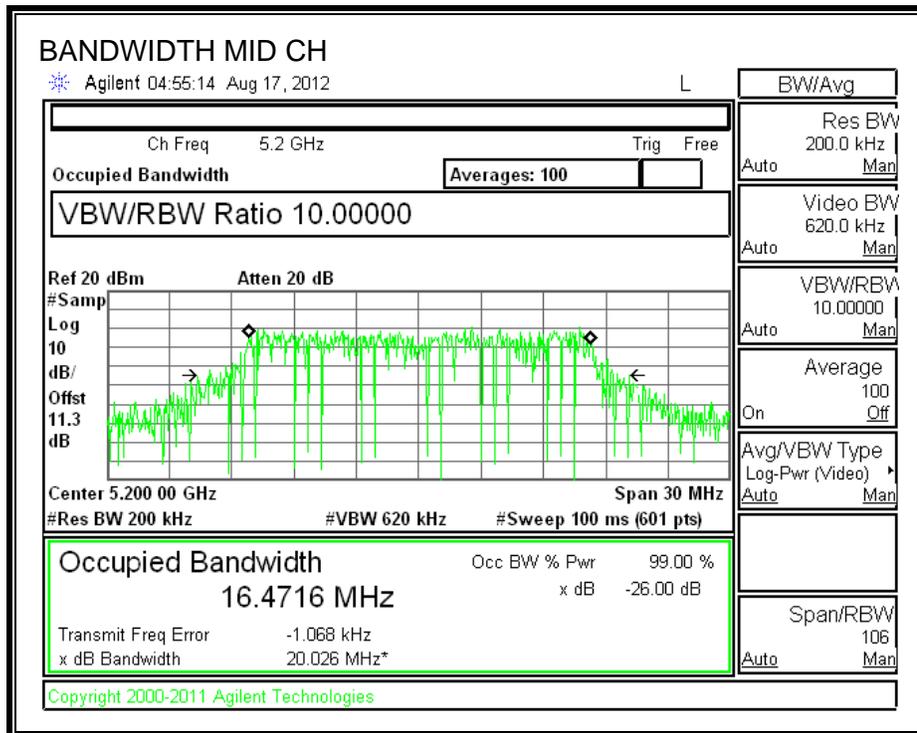
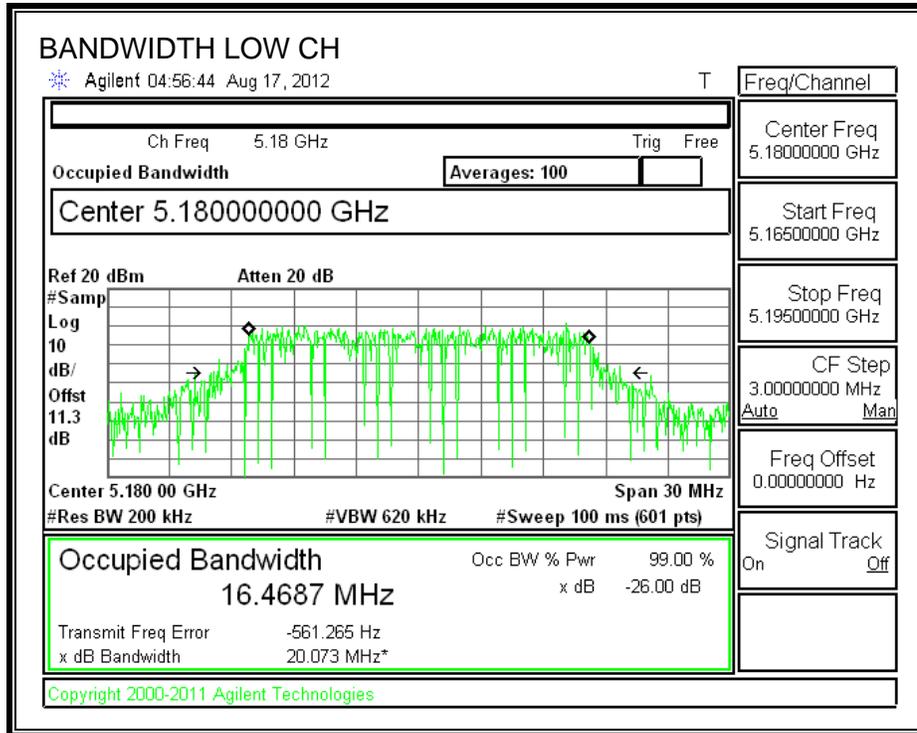
LIMITS

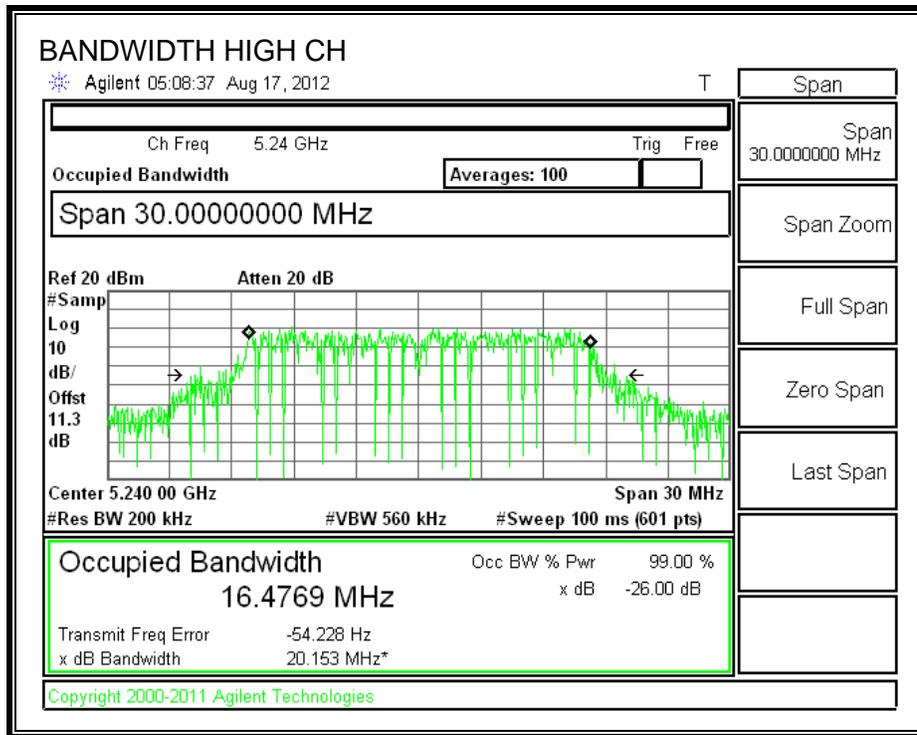
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5180	16.4687
Mid	5200	16.4716
High	5240	16.4769

99% BANDWIDTH





7.2.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.3 dB (including 10 dB pad and 1.3dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5180	13.3
Mid	5200	13.0
High	5240	13.1

7.2.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

FCC §15.407 (a) (1):

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10 \log B$, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 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.

IC RSS-210 A9.2 (1):

For the 5.15 – 5.25 GHz band, The maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

FCC Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5180	17	22.2	17.46	-3.33	17.00	4.00
Mid	5200	17	22.2	17.46	-3.33	17.00	4.00
High	5240	17	22.3	17.47	-3.33	17.00	4.00

Duty Cycle CF (dB)	0.21	Included in Calculations of Corr'd Power & PPSD
---------------------------	------	--

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	13.55	13.76	17.00	-3.24
Mid	5200	13.12	13.33	17.00	-3.67
High	5240	13.07	13.28	17.00	-3.72

PPSD Results

Channel	Frequency (MHz)	Meas PPSD (dBm)	Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5180	2.09	2.30	4.00	-1.70
Mid	5200	1.57	1.78	4.00	-2.22
High	5240	1.58	1.79	4.00	-2.21

RESULTS

IC Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5180	17	16.5	16.17	-3.33	16.17	4.00
Mid	5200	17	16.5	16.17	-3.33	16.17	4.00
High	5240	17	16.5	16.17	-3.33	16.17	4.00

Duty Cycle CF (dB)	0.21	Included in Calculations of Corr'd Power & PPSD
---------------------------	------	--

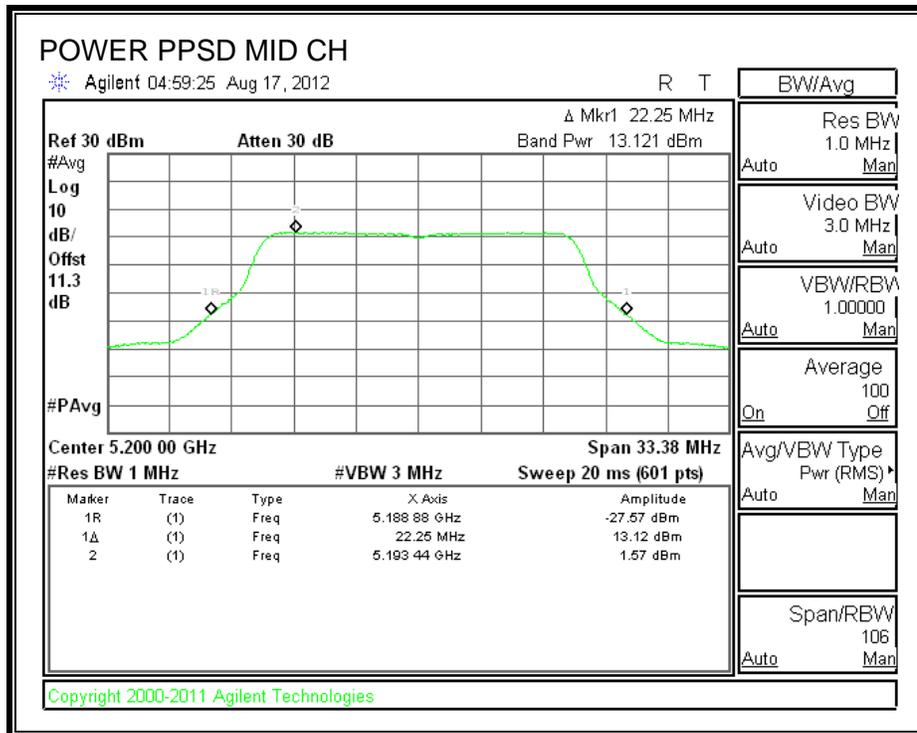
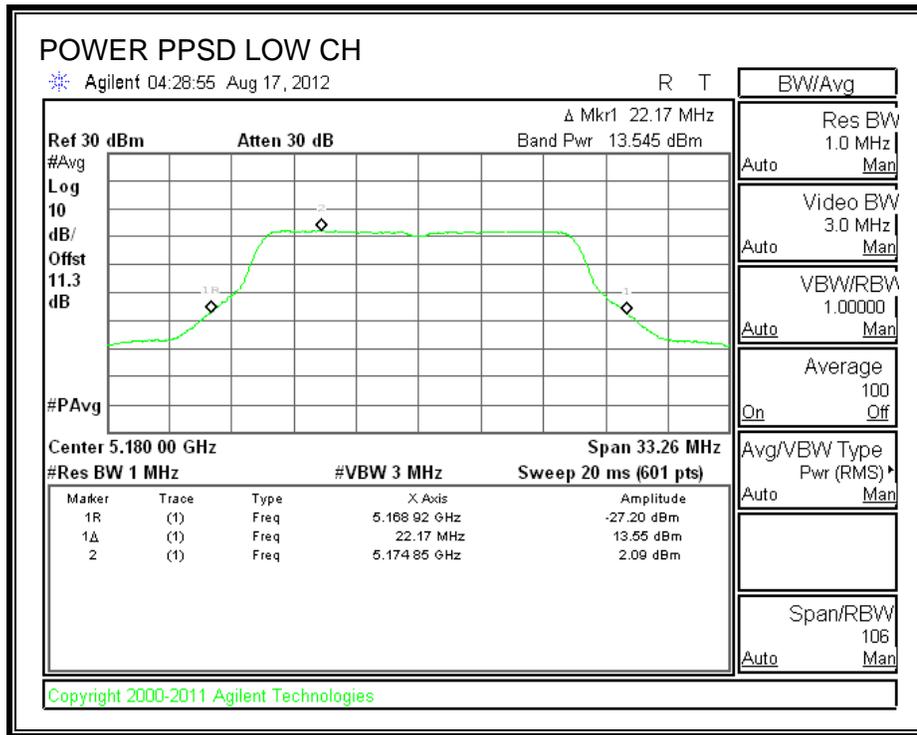
Output Power Results

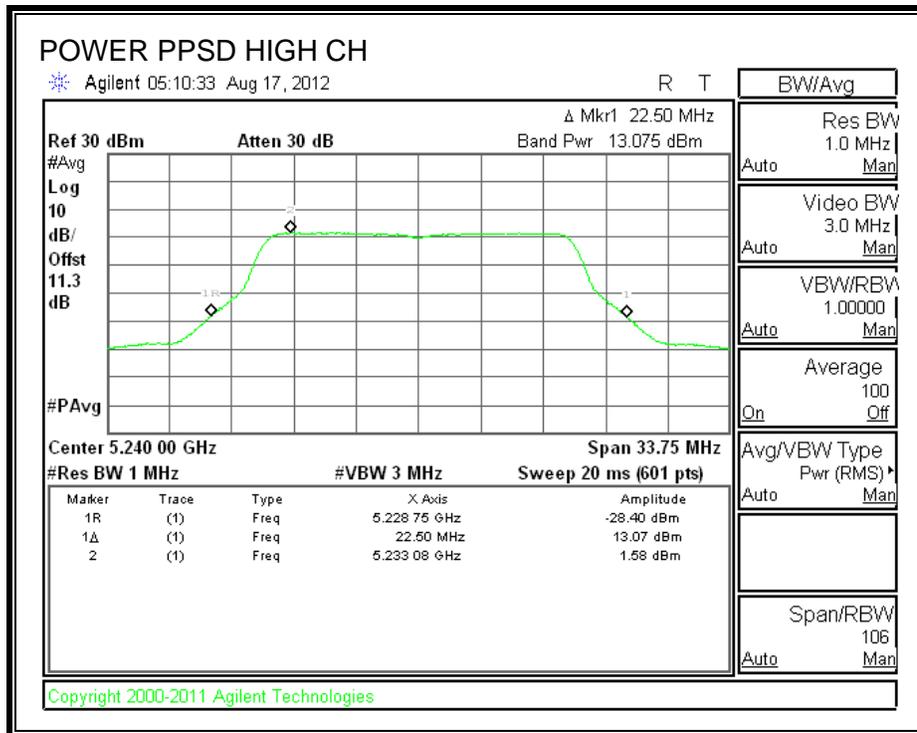
Channel	Frequency (MHz)	Meas Power (dBm)	Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	13.55	13.76	16.17	-2.41
Mid	5200	13.12	13.33	16.17	-2.84
High	5240	13.07	13.28	16.17	-2.89

PPSD Results

Channel	Frequency (MHz)	Meas PPSD (dBm)	Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5180	2.09	2.30	4.00	-1.70
Mid	5200	1.57	1.78	4.00	-2.22
High	5240	1.58	1.79	4.00	-2.21

OUTPUT POWER AND PPSD





7.2.5. PEAK EXCURSION

LIMITS

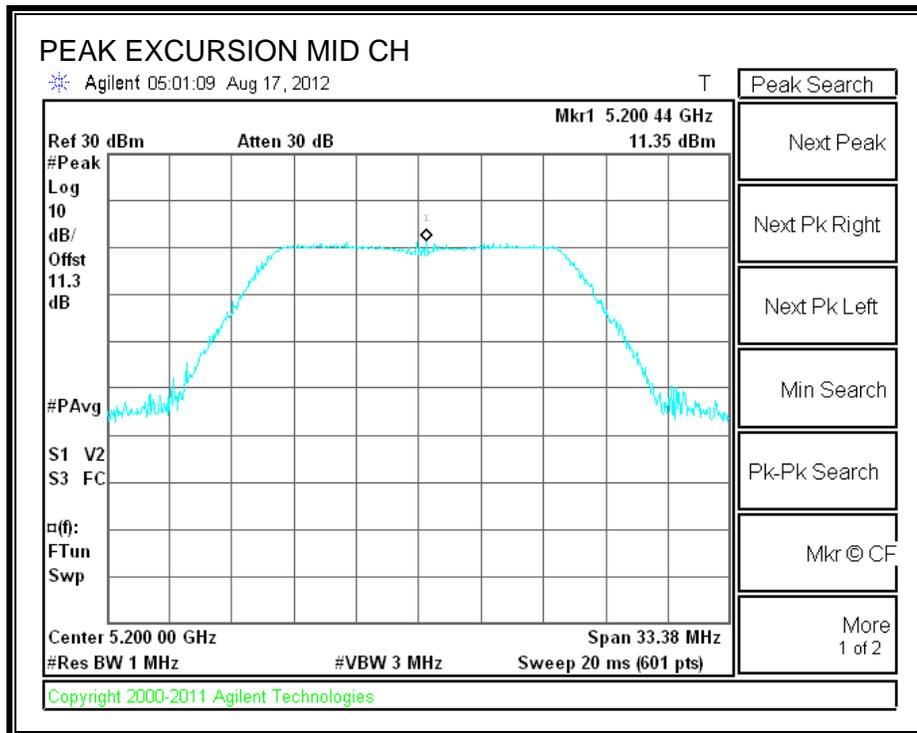
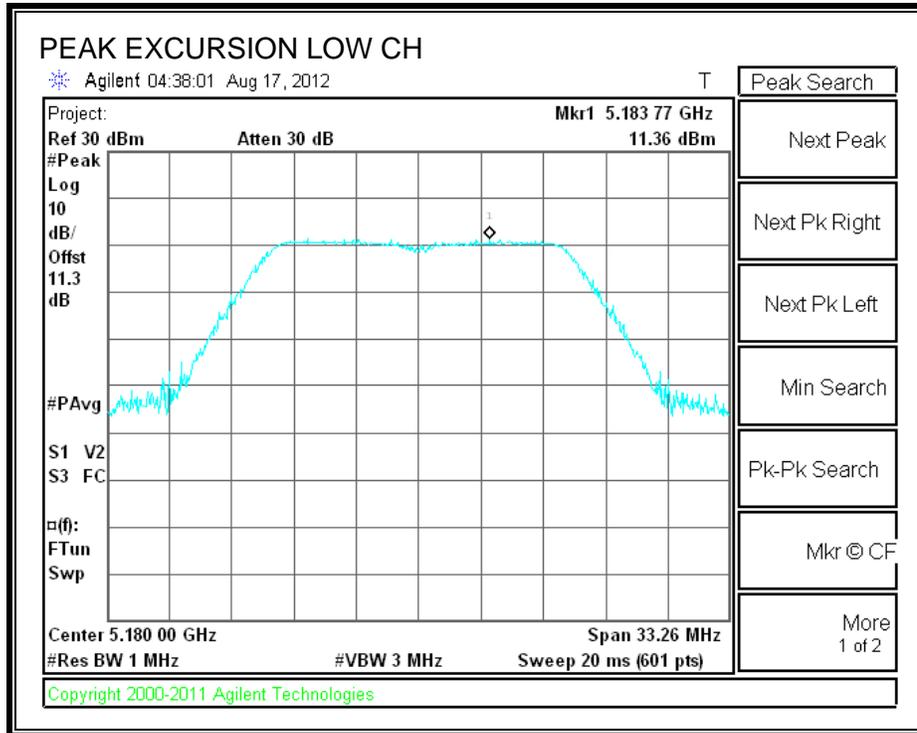
FCC §15.407 (a) (6)

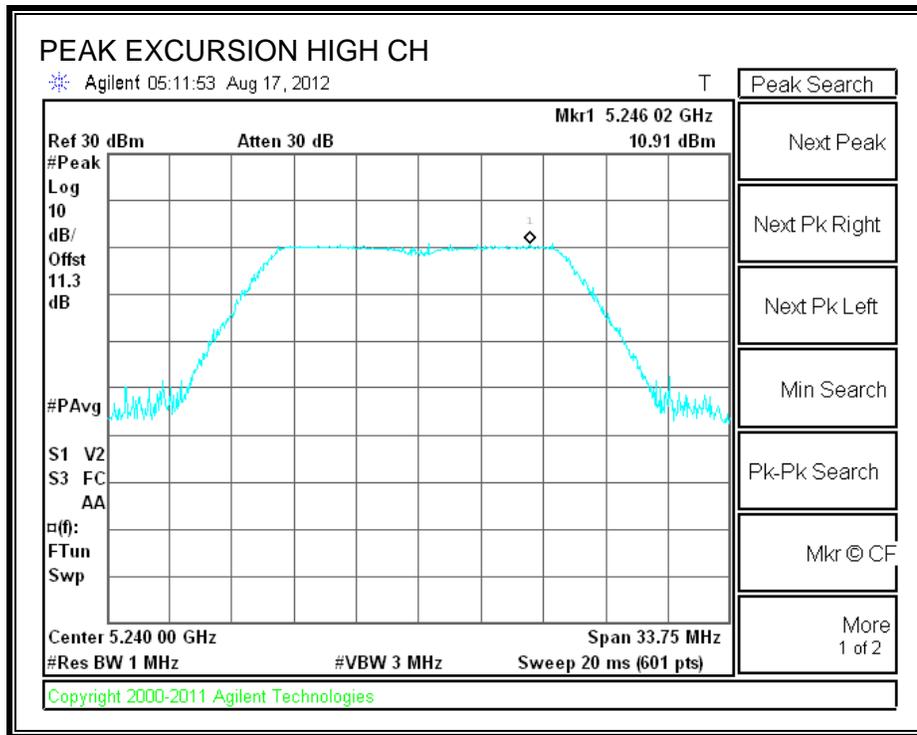
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5180	11.36	2.09	0.21	9.06	13	-3.94
Mid	5200	11.35	1.57	0.21	9.57	13	-3.43
High	5240	10.91	1.58	0.21	9.12	13	-3.88

PEAK EXCURSION





7.3. 802.11n HT20 MODE IN THE 5.2 GHz BAND

7.3.1. 26 dB BANDWIDTH

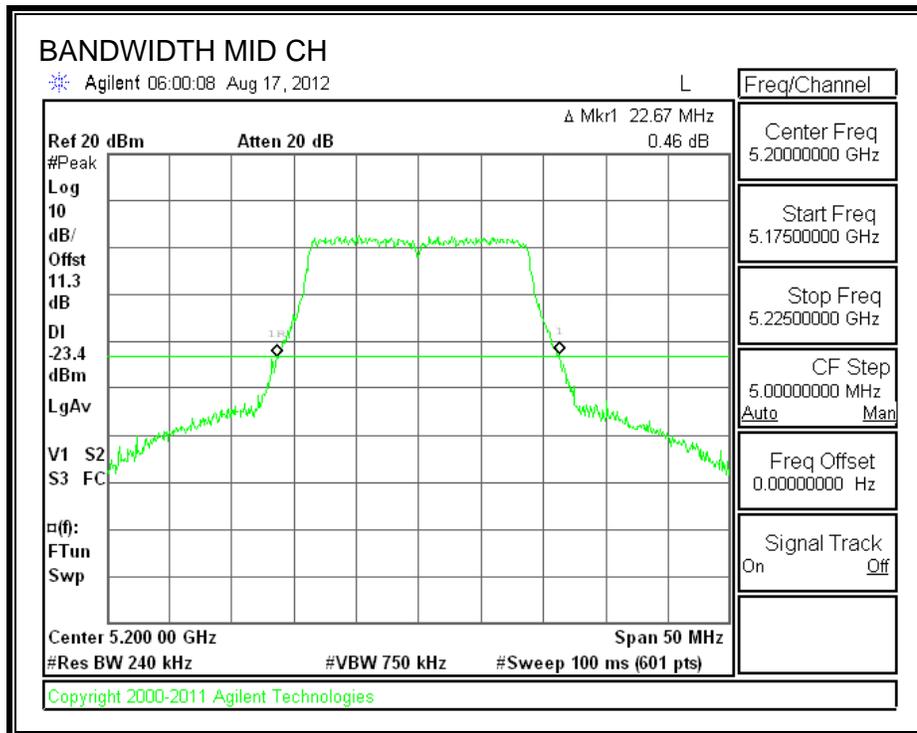
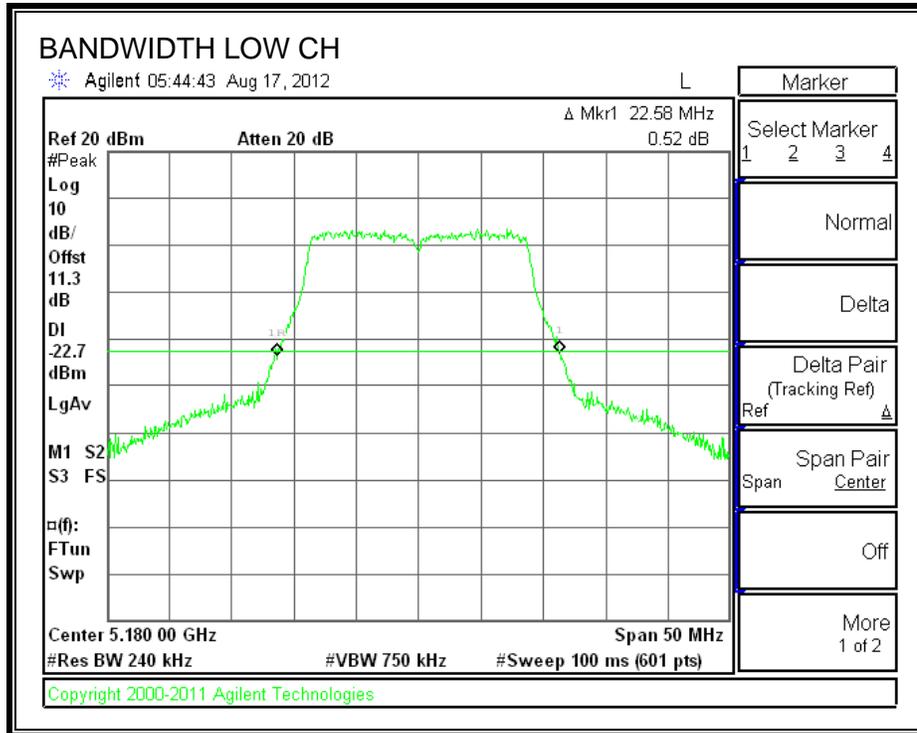
LIMITS

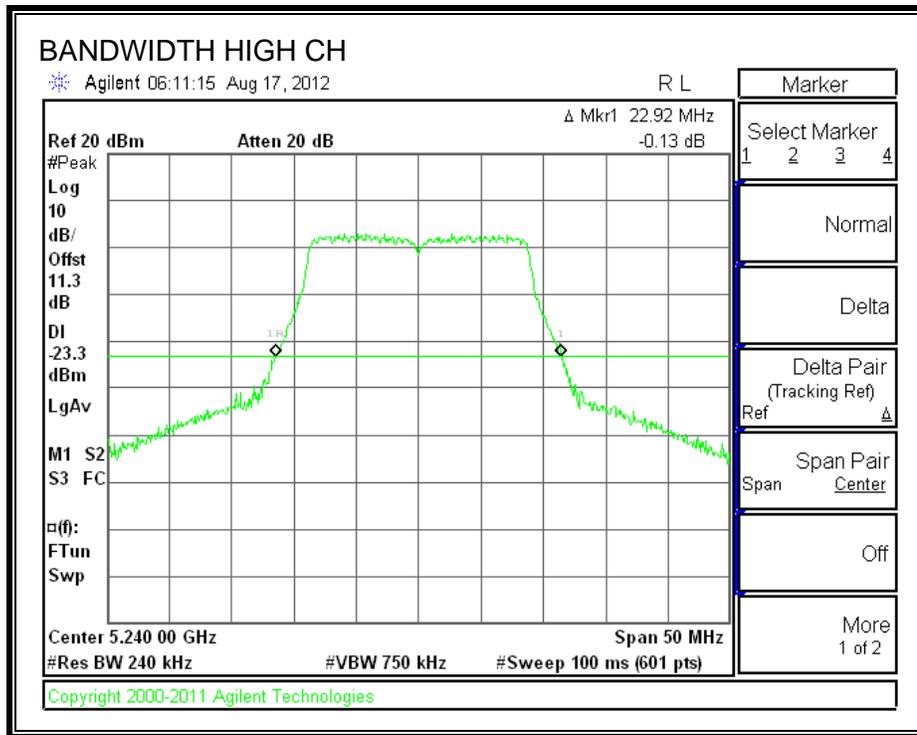
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5180	22.580
Mid	5200	22.670
High	5240	22.920

26 dB BANDWIDTH





7.3.2. 99% BANDWIDTH

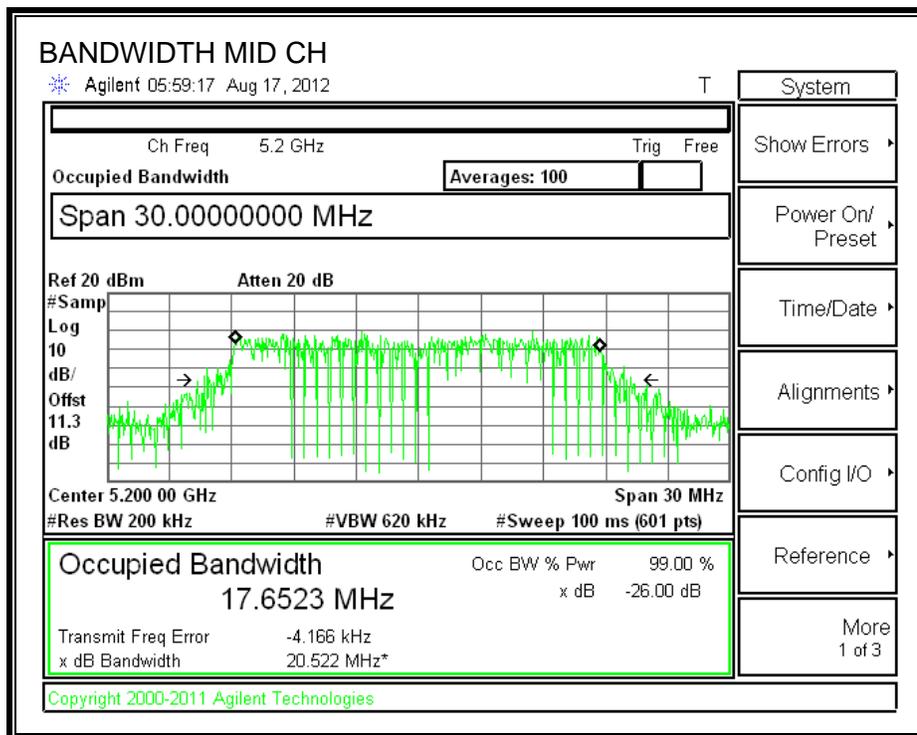
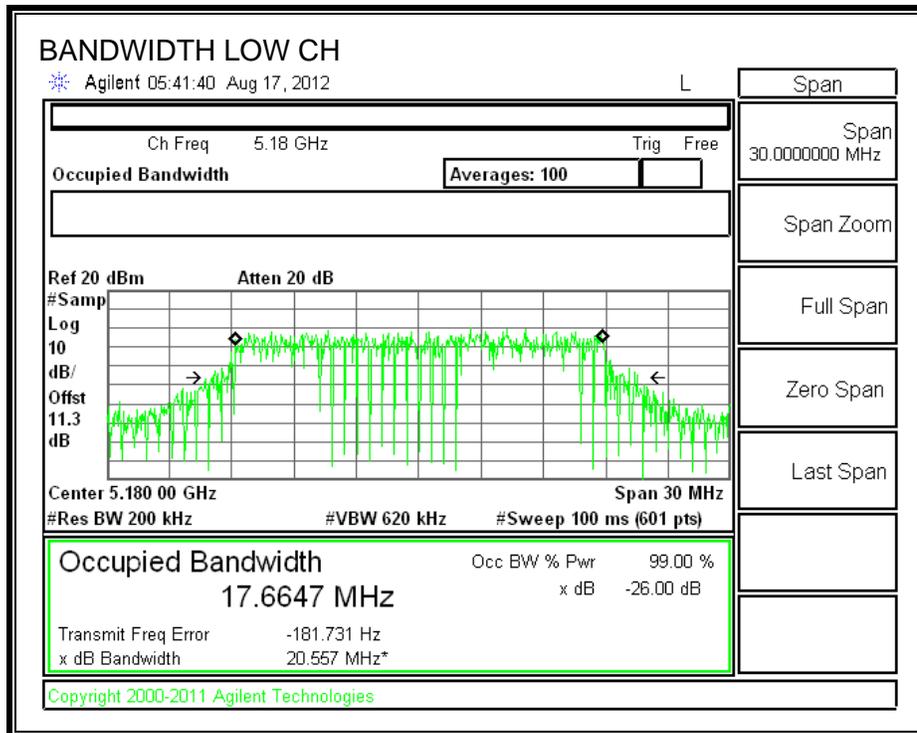
LIMITS

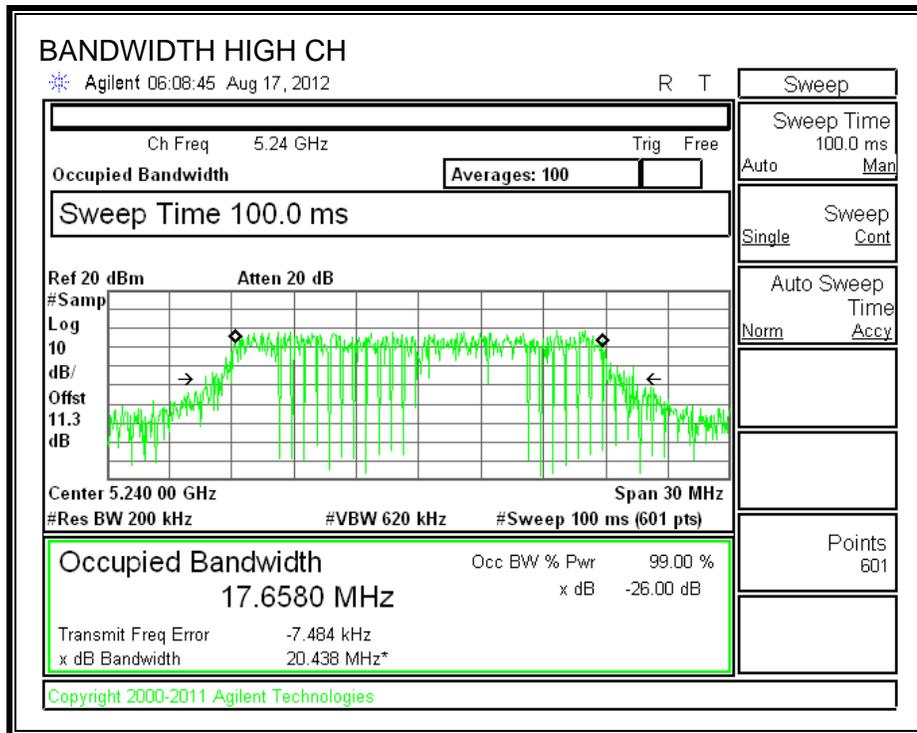
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5180	17.6647
Mid	5200	17.6523
High	5240	17.6580

99% BANDWIDTH





7.3.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.3 dB (including 10 dB pad and 1.3dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5180	11.95
Mid	5200	11.94
High	5240	11.93

7.3.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

FCC §15.407 (a) (1):

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10 \log B$, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 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.

IC RSS-210 A9.2 (1):

For the 5.15 – 5.25 GHz band, The maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

FCC Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5180	17	22.58	17.54	-3.33	17.00	4.00
Mid	5200	17	22.67	17.55	-3.33	17.00	4.00
High	5240	17	22.92	17.60	-3.33	17.00	4.00

Duty Cycle CF (dB)	0.22	Included in Calculations of Corr'd Power & PPSD
---------------------------	------	--

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	12.30	12.52	17.00	-4.48
Mid	5200	11.89	12.11	17.00	-4.89
High	5240	11.96	12.18	17.00	-4.82

PPSD Results

Channel	Frequency (MHz)	Meas PPSD (dBm)	Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5180	0.46	0.68	4.00	-3.32
Mid	5200	0.05	0.27	4.00	-3.73
High	5240	0.18	0.40	4.00	-3.60

IC Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5180	17	17.66	16.47	-3.33	16.47	4.00
Mid	5200	17	17.65	16.47	-3.33	16.47	4.00
High	5240	17	17.66	16.47	-3.33	16.47	4.00

Duty Cycle CF (dB)	0.22	Included in Calculations of Corr'd Power & PPSD
---------------------------	------	--

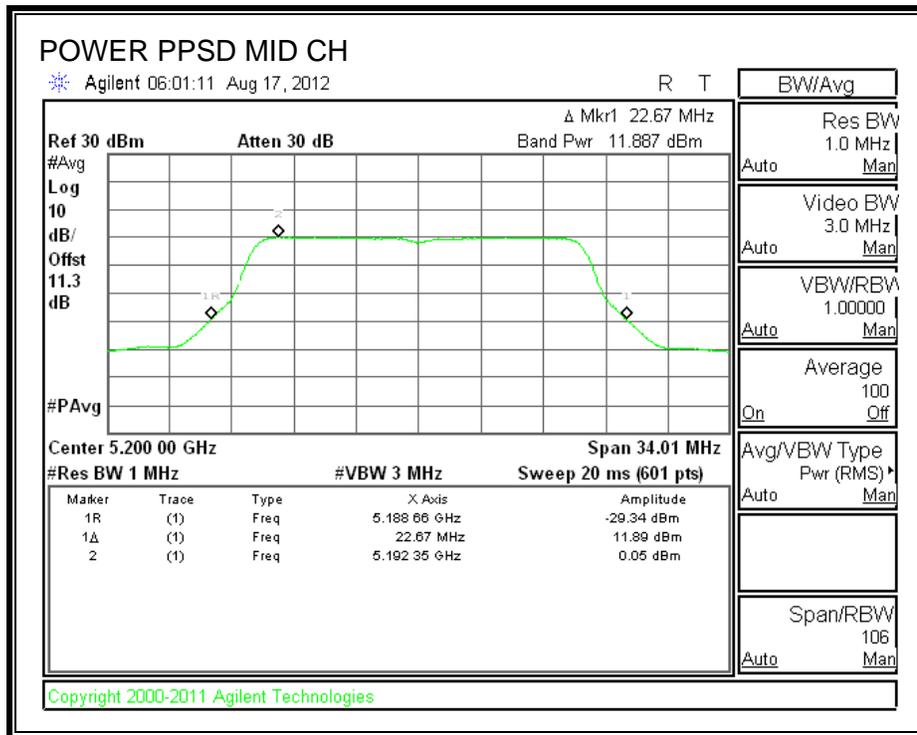
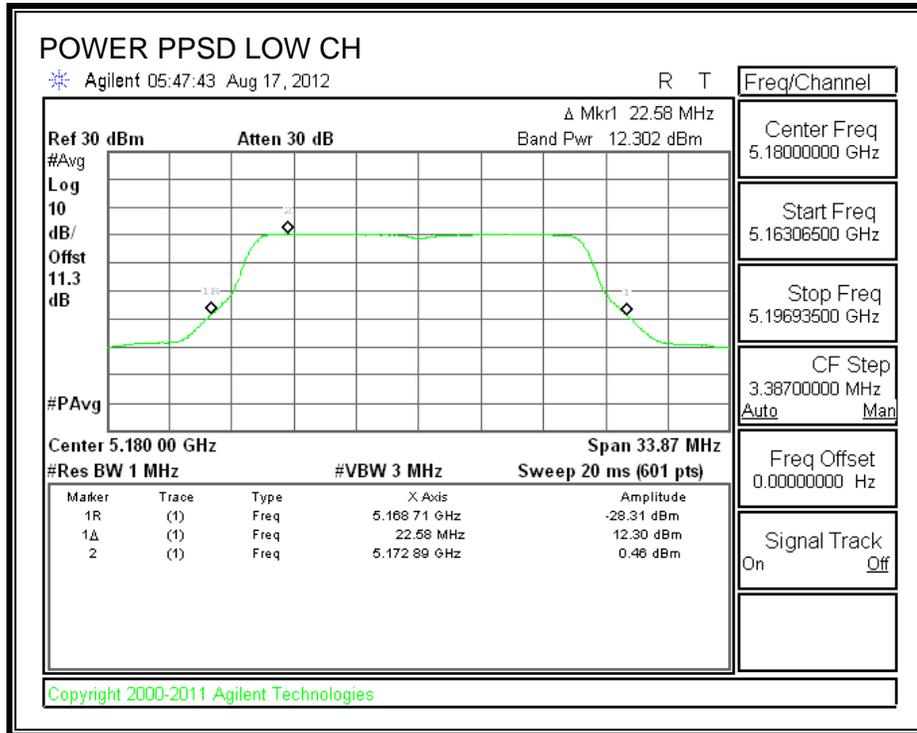
Output Power Results

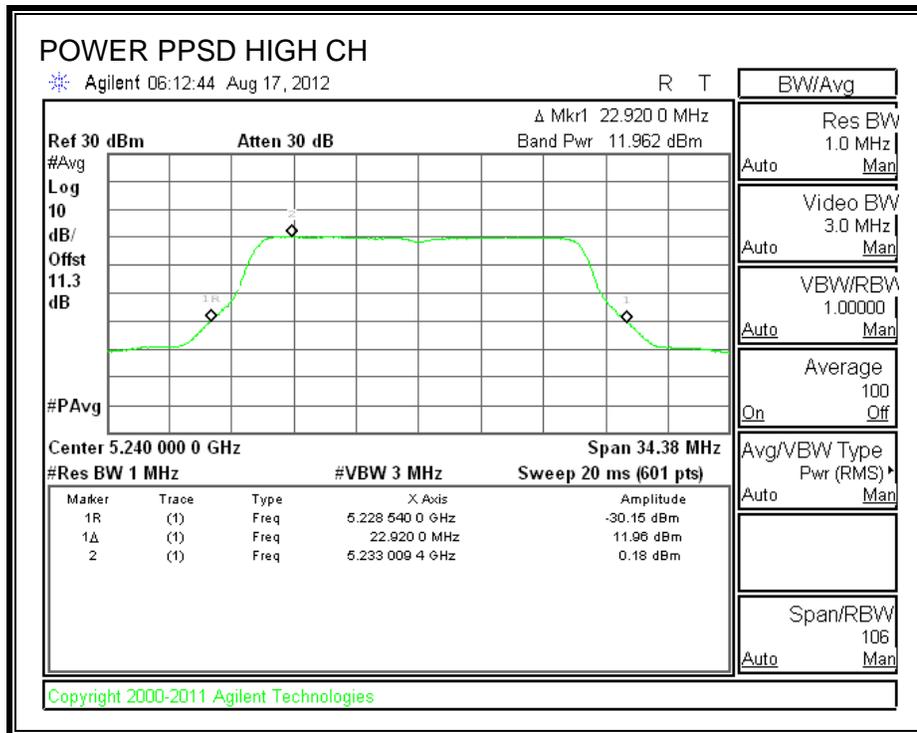
Channel	Frequency (MHz)	Meas Power (dBm)	Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	12.30	12.52	16.47	-3.95
Mid	5200	11.89	12.11	16.47	-4.36
High	5240	11.96	12.18	16.47	-4.29

PPSD Results

Channel	Frequency (MHz)	Meas PPSD (dBm)	Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5180	0.46	0.68	4.00	-3.32
Mid	5200	0.05	0.27	4.00	-3.73
High	5240	0.18	0.40	4.00	-3.60

OUTPUT POWER AND PPSD





7.3.5. PEAK EXCURSION

LIMITS

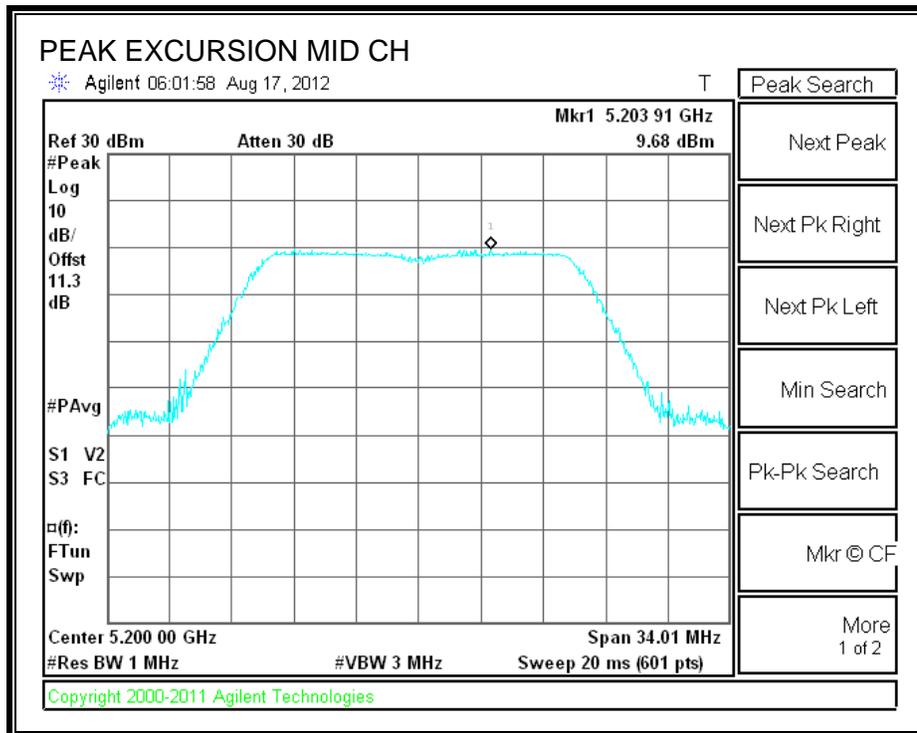
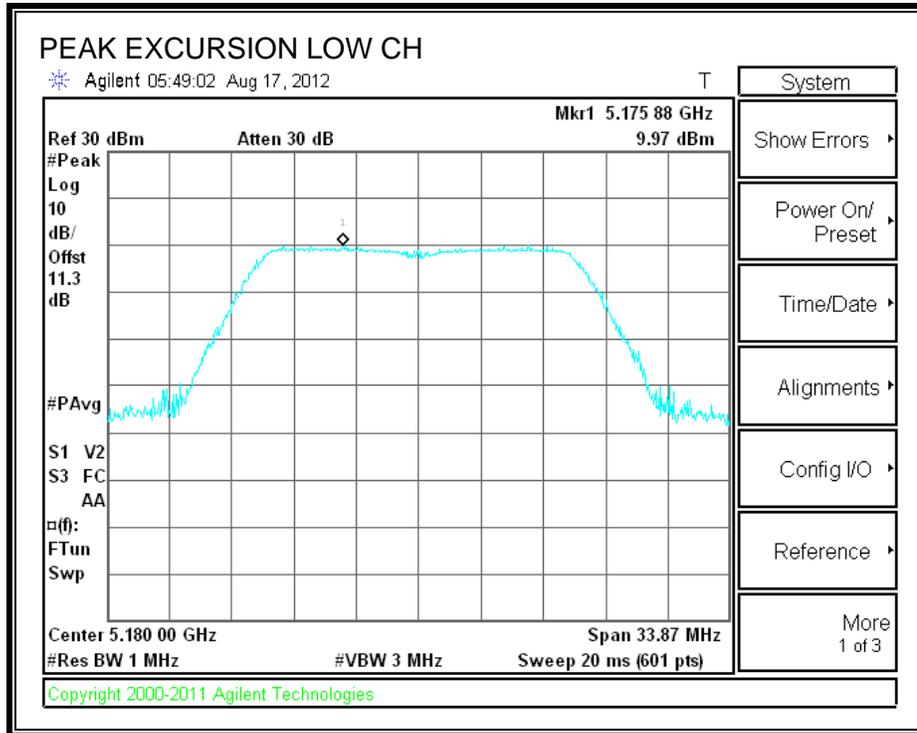
FCC §15.407 (a) (6)

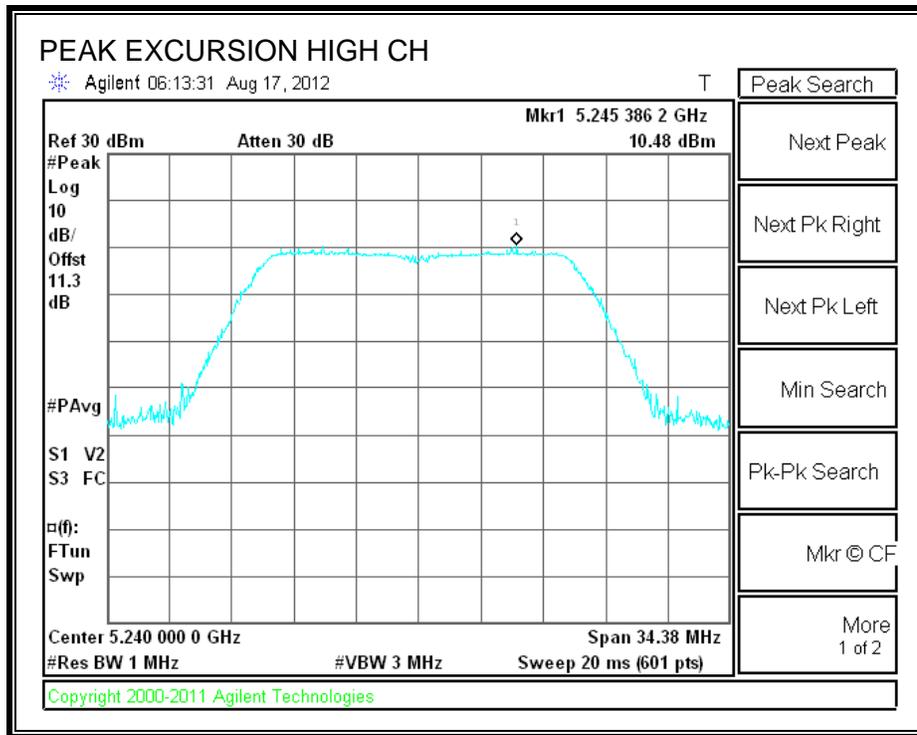
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5180	9.97	0.46	0.22	9.29	13	-3.71
Mid	5200	9.68	0.05	0.22	9.41	13	-3.59
High	5240	10.48	0.18	0.22	10.08	13	-2.92

PEAK EXCURSION





7.4. 802.11a MODE IN THE 5.3 GHz BAND

7.4.1. 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5260	22.58
Mid	5300	22.58
High	5320	22.58

7.4.2. 99% BANDWIDTH

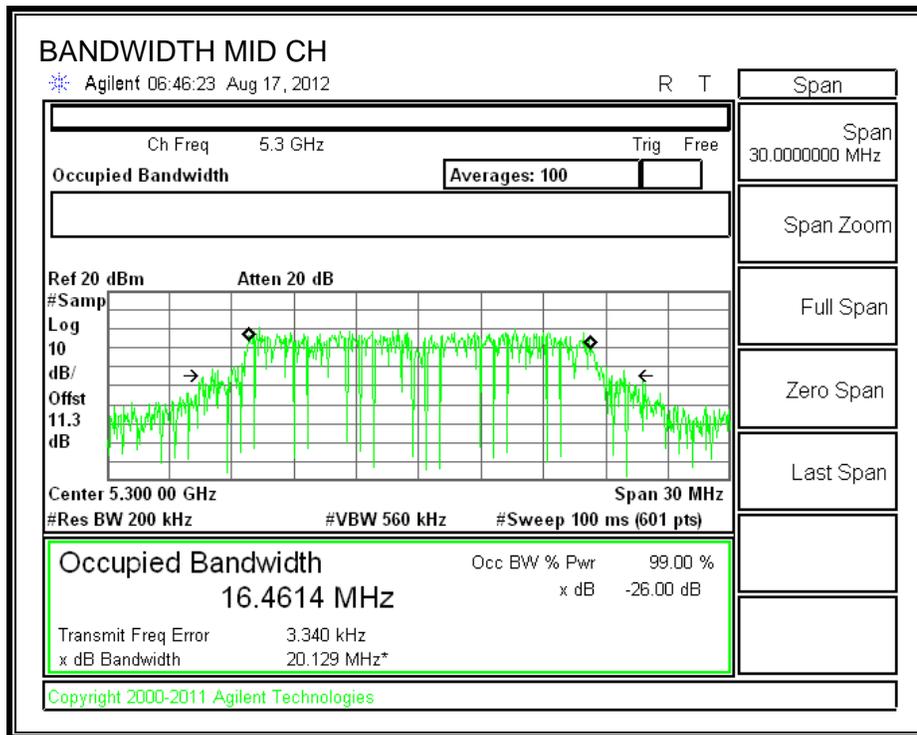
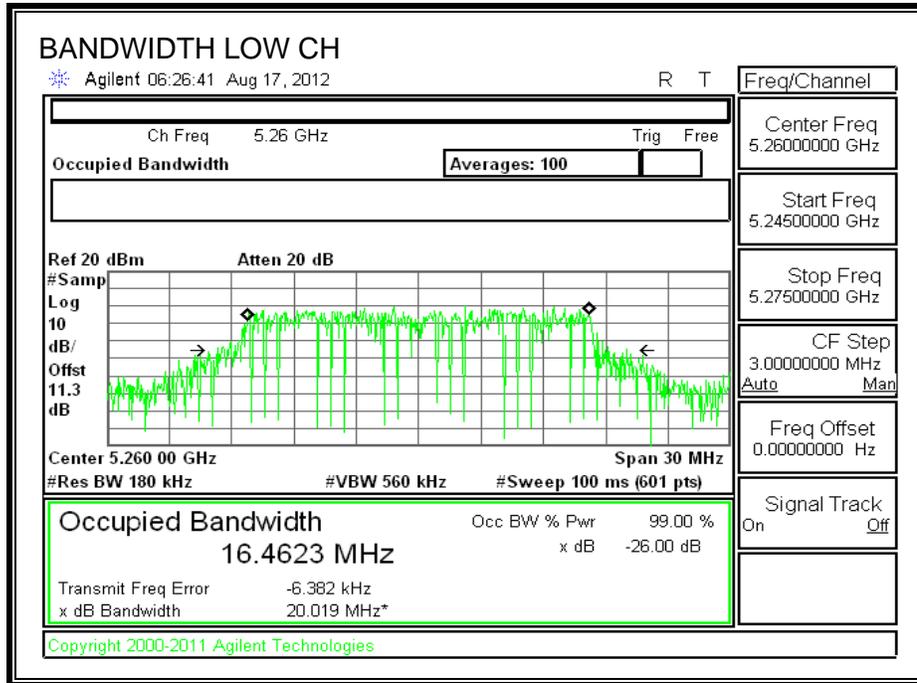
LIMITS

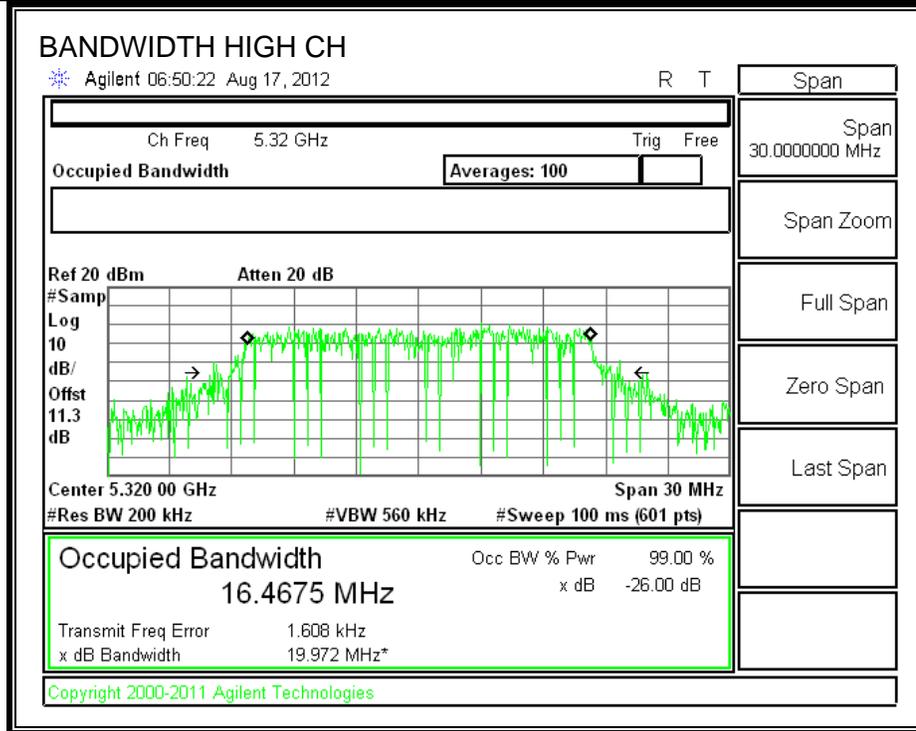
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5260	16.4623
Mid	5300	16.4614
High	5320	16.4675

99% BANDWIDTH





7.4.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.3 dB (including 10 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5260	12.65
Mid	5300	12.67
High	5320	12.45

7.4.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz 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.

99% bandwidth was used to calculate the power limit which was considered the worst case.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5260	24	16.46	23.16	-3.33	23.16	11.00
Mid	5300	24	16.46	23.16	-3.33	23.16	11.00
High	5320	24	16.47	23.17	-3.33	23.17	11.00

Duty Cycle CF (dB)	0.21	Included in Calculations of Corr'd Power & PPSD
---------------------------	------	--

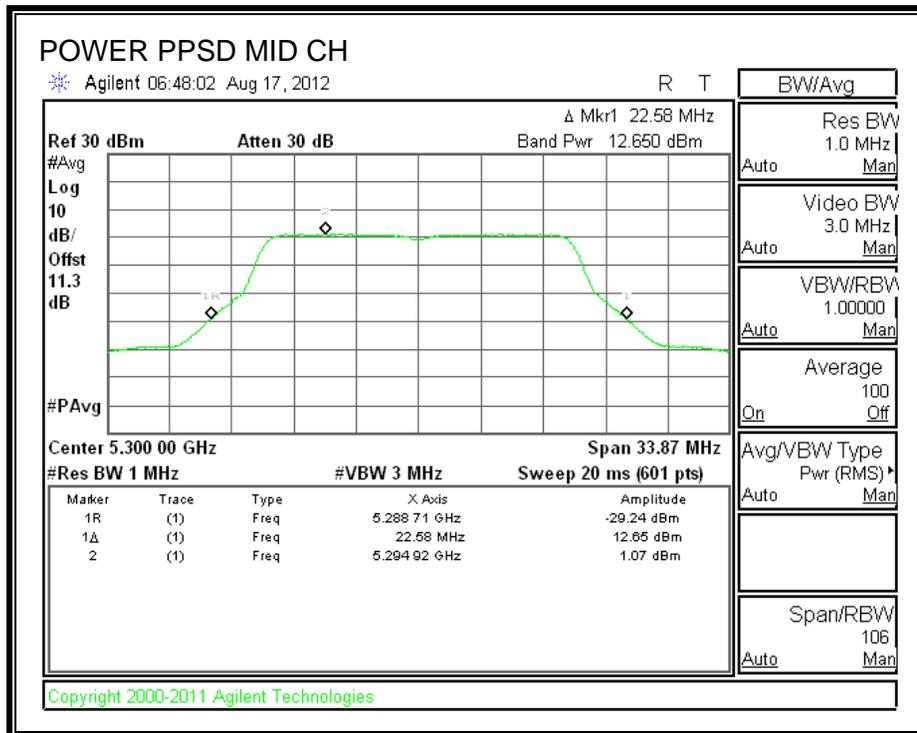
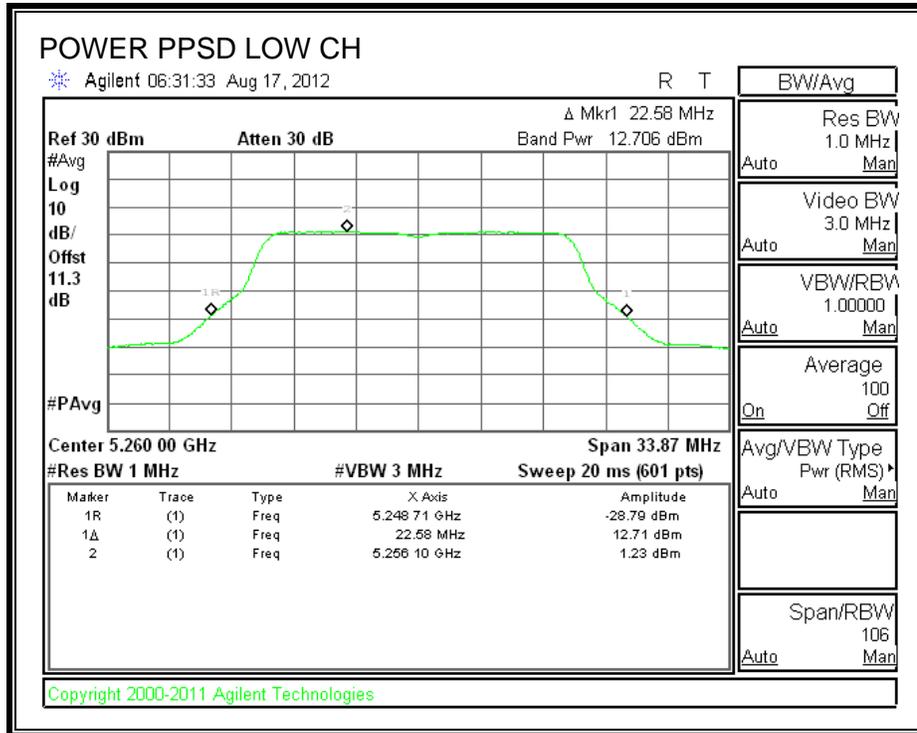
Output Power Results

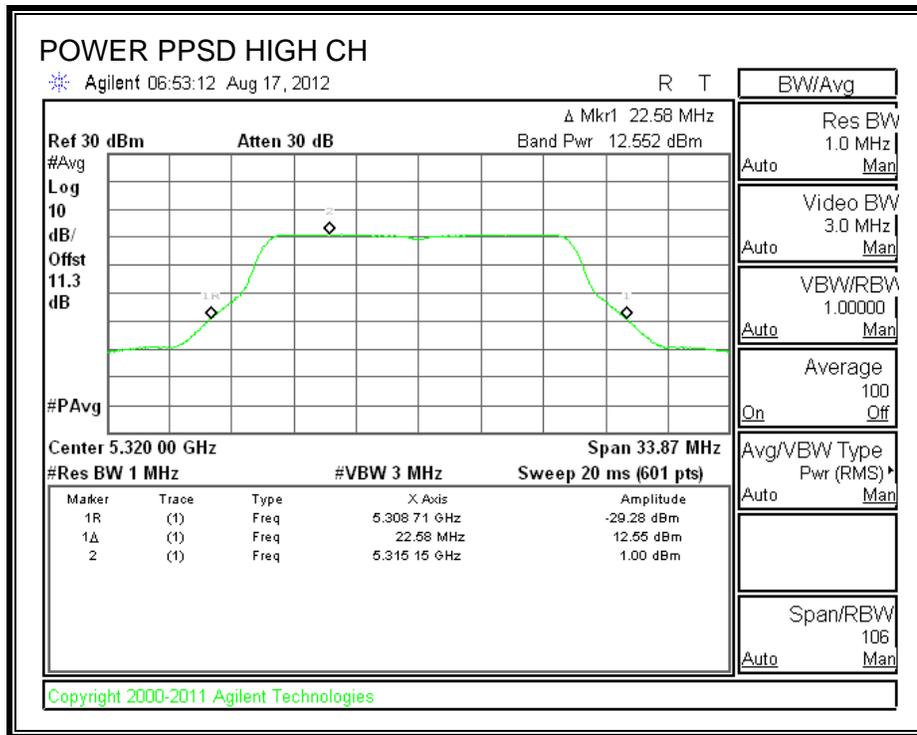
Channel	Frequency (MHz)	Meas Power (dBm)	Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	12.71	12.92	23.16	-10.24
Mid	5300	12.65	12.86	23.16	-10.30
High	5320	12.55	12.76	23.17	-10.41

PPSD Results

Channel	Frequency (MHz)	Meas PPSD (dBm)	Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5260	1.23	1.44	11.00	-9.56
Mid	5300	1.07	1.28	11.00	-9.72
High	5320	1.00	1.21	11.00	-9.79

OUTPUT POWER AND PPSD





7.4.5. PEAK EXCURSION

LIMITS

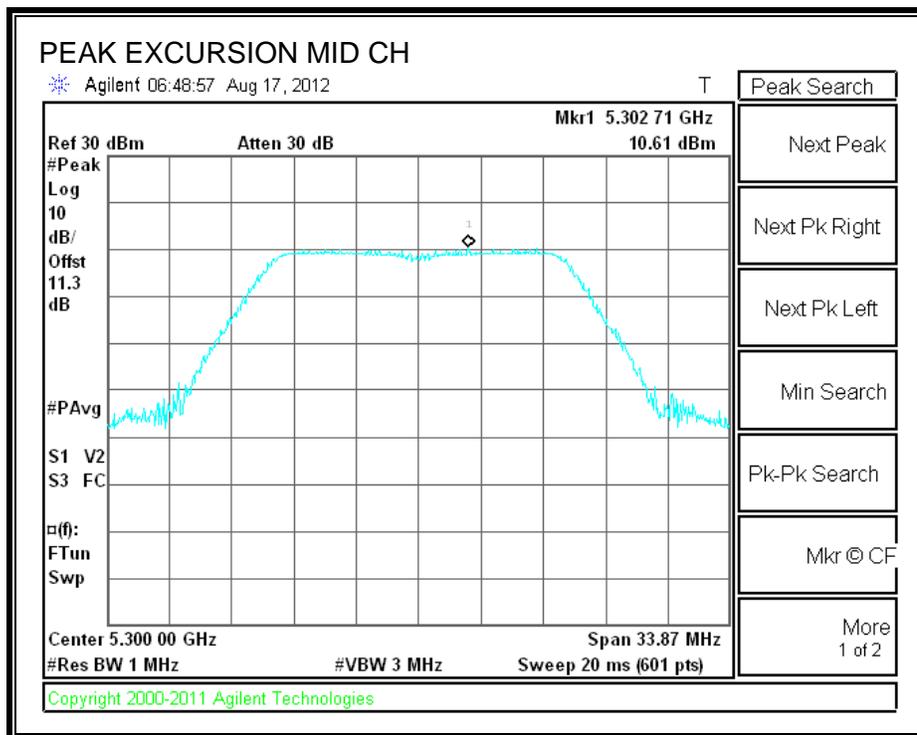
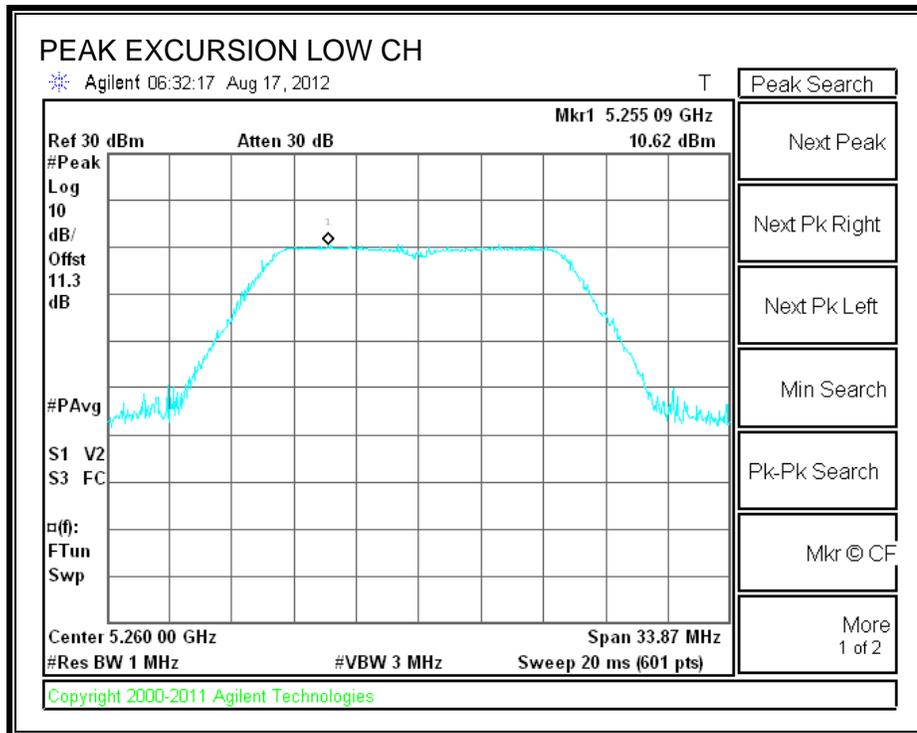
FCC §15.407 (a) (6)

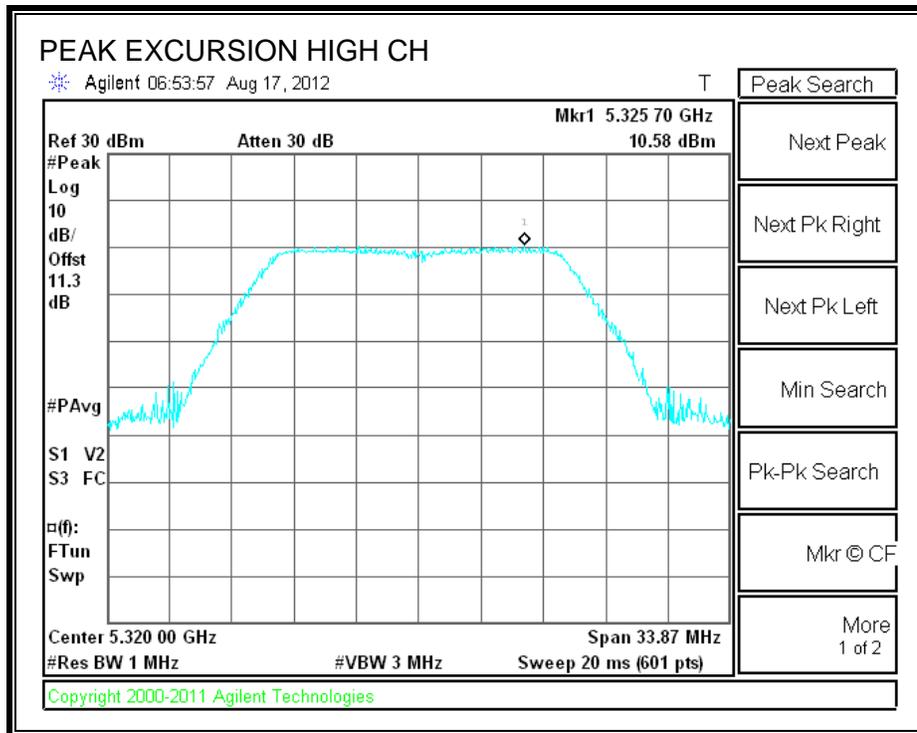
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5260	10.62	1.23	0.21	9.18	13	-3.82
Mid	5300	10.61	1.07	0.21	9.33	13	-3.67
High	5320	10.58	1.00	0.21	9.37	13	-3.63

PEAK EXCURSION





7.5. 802.11n HT20 MODE IN THE 5.3 GHz BAND

7.5.1. 26 dB BANDWIDTH

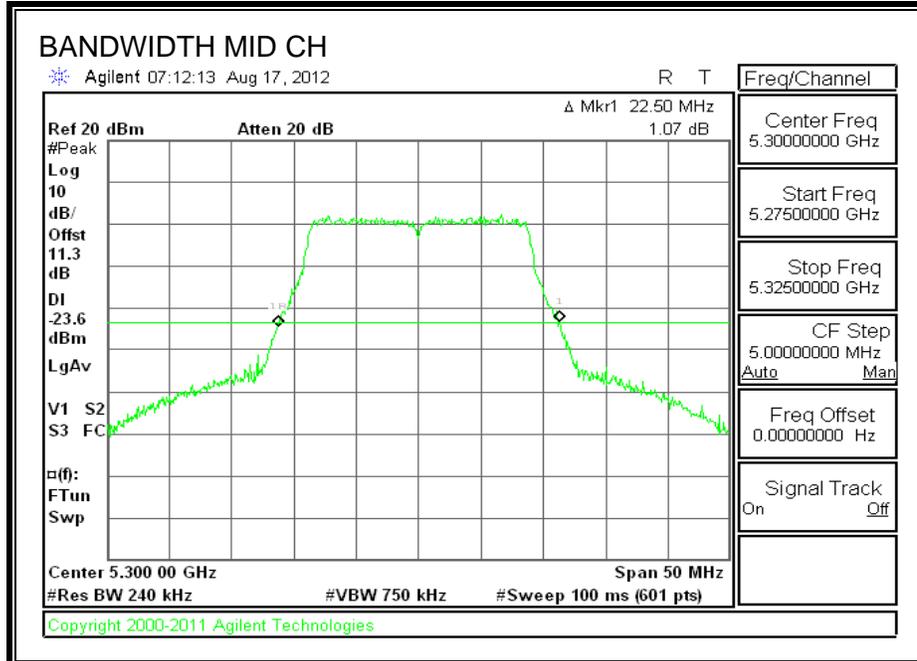
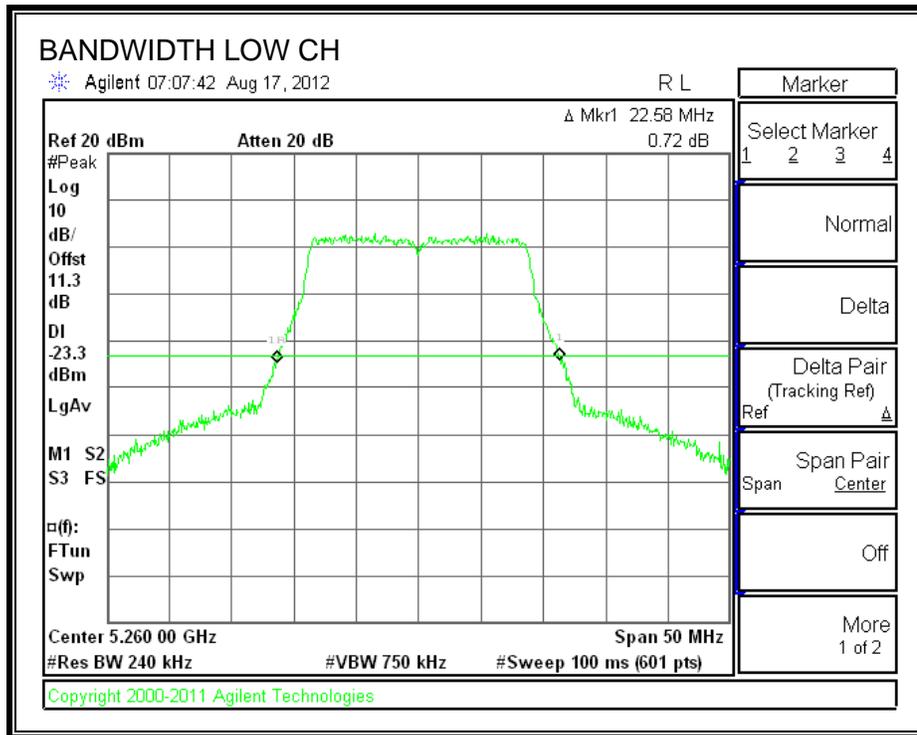
LIMITS

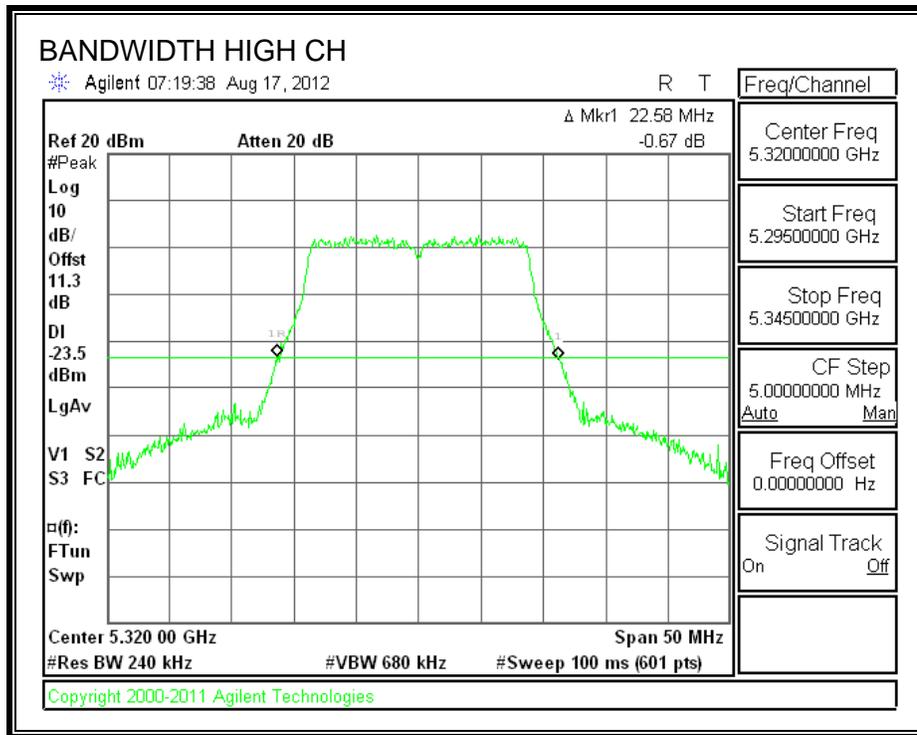
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5260	22.58
Mid	5300	22.50
High	5320	22.58

26 dB BANDWIDTH





7.5.2. 99% BANDWIDTH

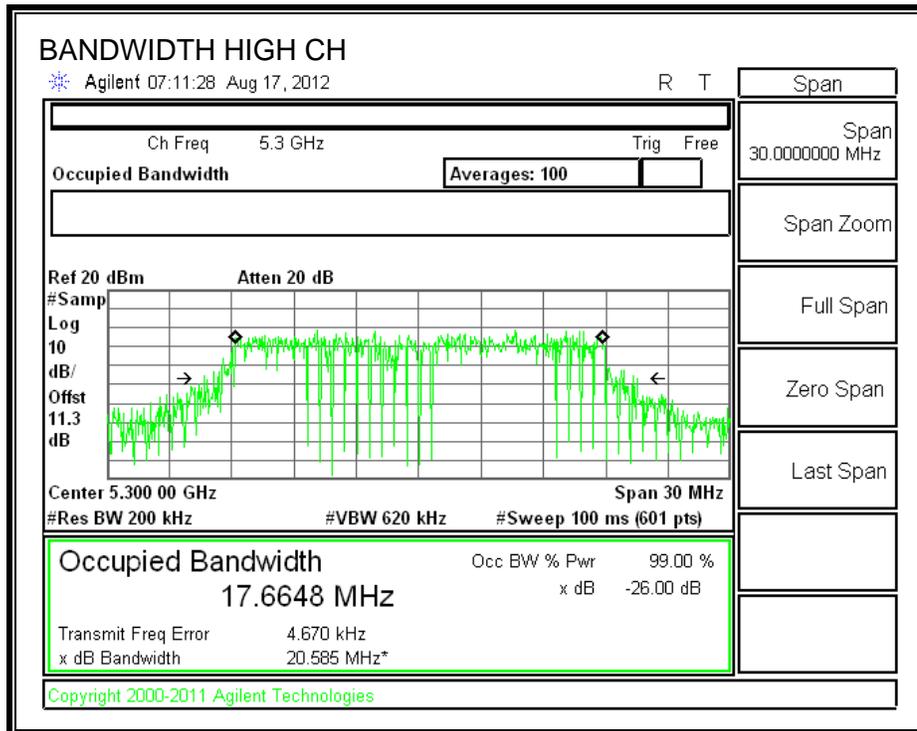
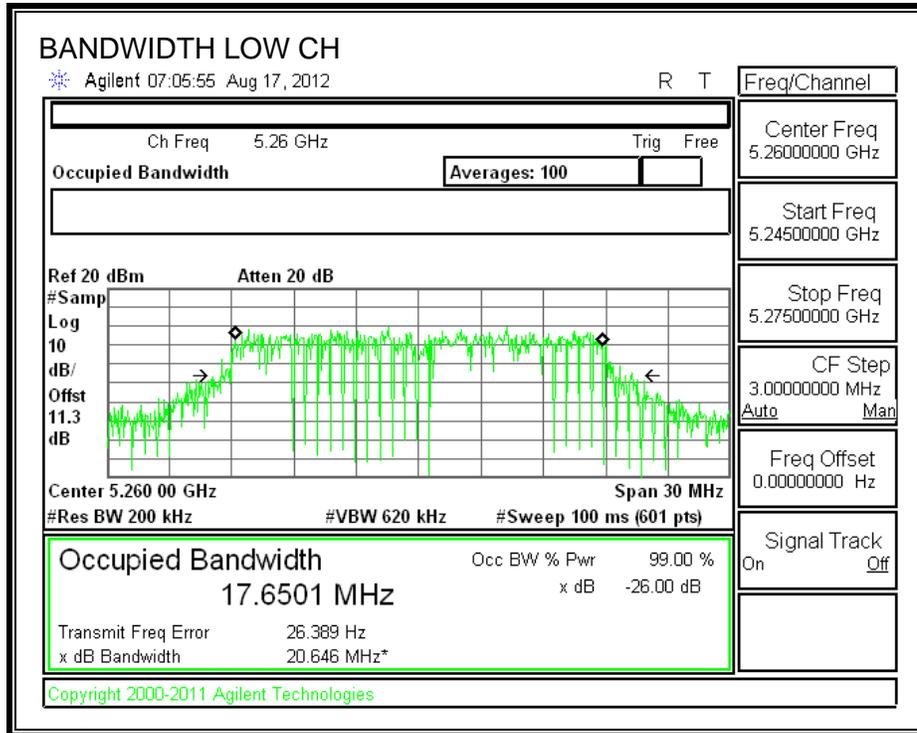
LIMITS

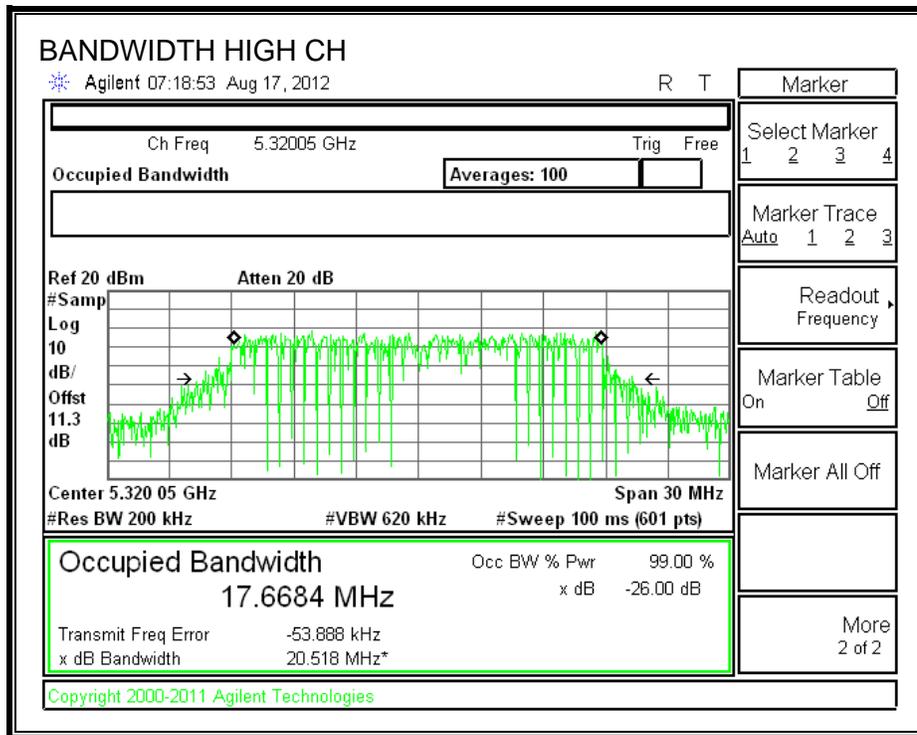
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5260	17.6501
Mid	5300	17.6648
High	5320	17.6684

99% BANDWIDTH





7.5.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.3 dB (including 10 dB pad and 1.3dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5260	11.87
Mid	5300	11.61
High	5320	11.96

7.5.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz 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.

99% bandwidth was used to calculate the power limit which was considered the worst case.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5260	24	17.65	23.47	-3.33	23.47	11.00
Mid	5300	24	17.66	23.47	-3.33	23.47	11.00
High	5320	24	17.67	23.47	-3.33	23.47	11.00

Duty Cycle CF (dB)	0.22	Included in Calculations of Corr'd Power & PPSD
---------------------------	------	--

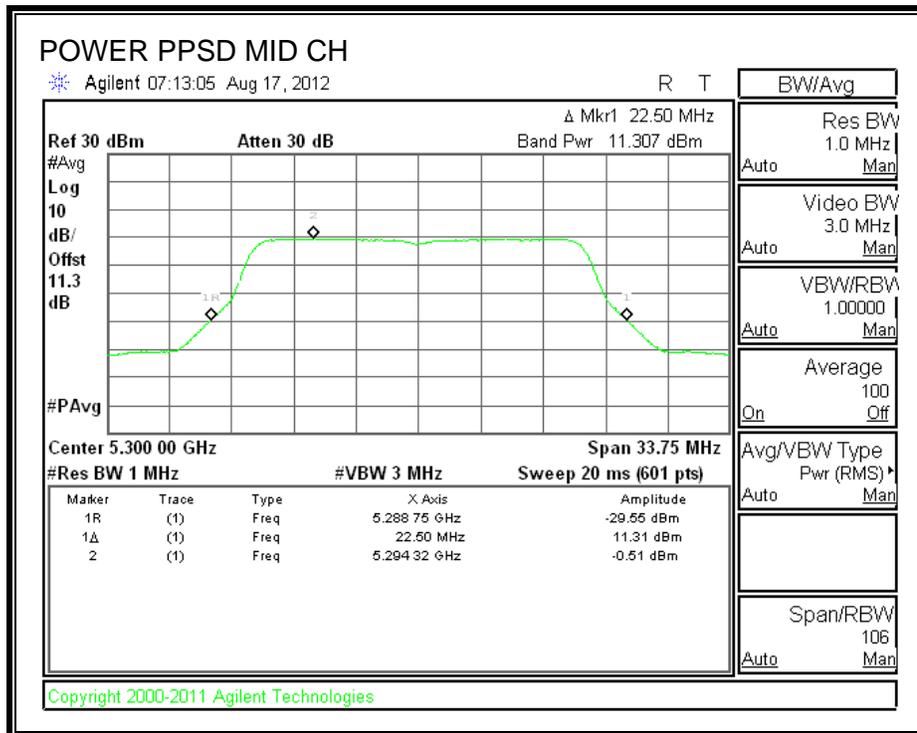
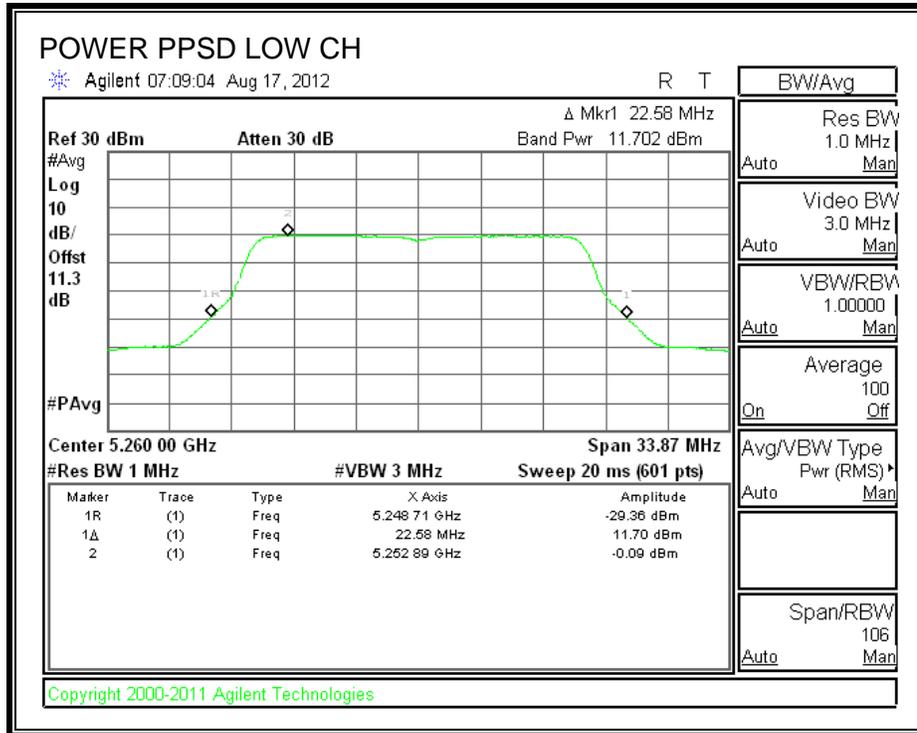
Output Power Results

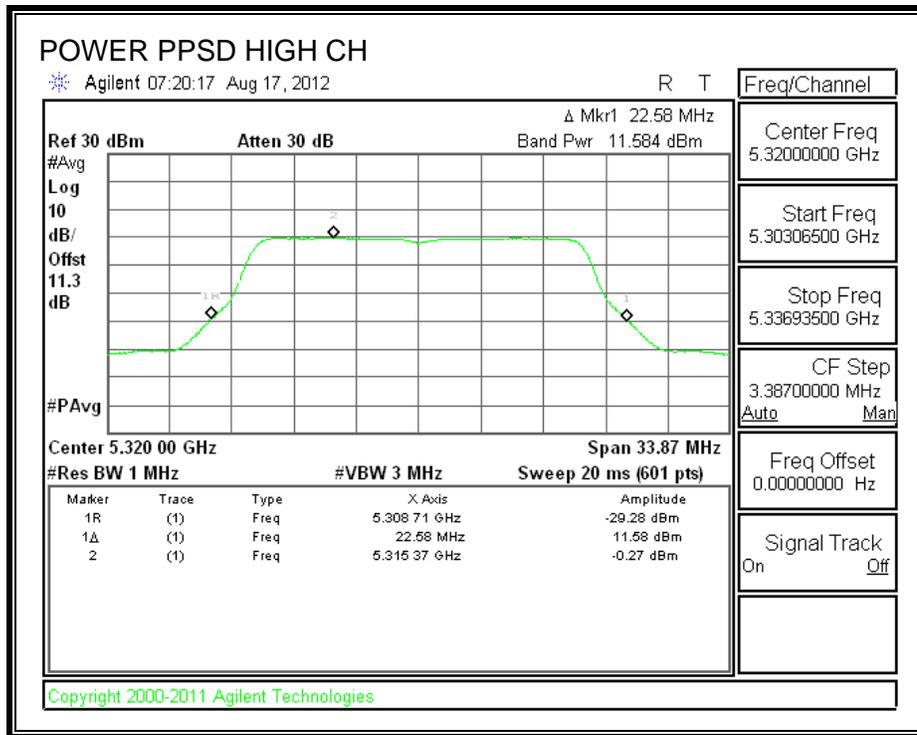
Channel	Frequency (MHz)	Meas Power (dBm)	Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	11.70	11.92	23.47	-11.55
Mid	5300	11.31	11.53	23.47	-11.94
High	5320	11.58	11.80	23.47	-11.67

PPSD Results

Channel	Frequency (MHz)	Meas PPSD (dBm)	Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5260	-0.09	0.13	11.00	-10.87
Mid	5300	-0.51	-0.29	11.00	-11.29
High	5320	-0.27	-0.05	11.00	-11.05

OUTPUT POWER AND PPSD





7.5.5. PEAK EXCURSION

LIMITS

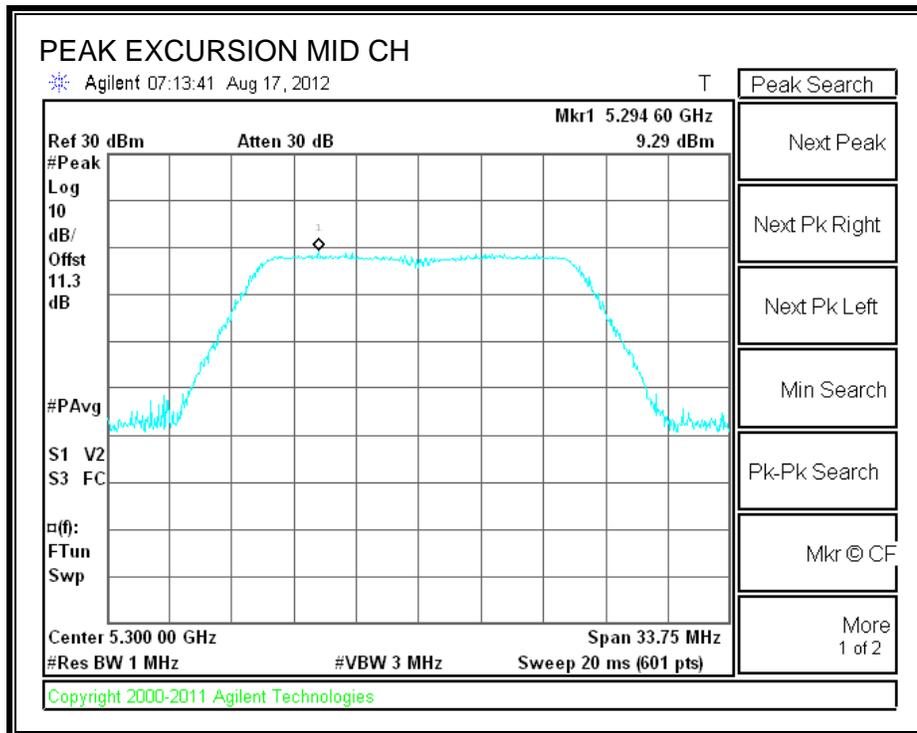
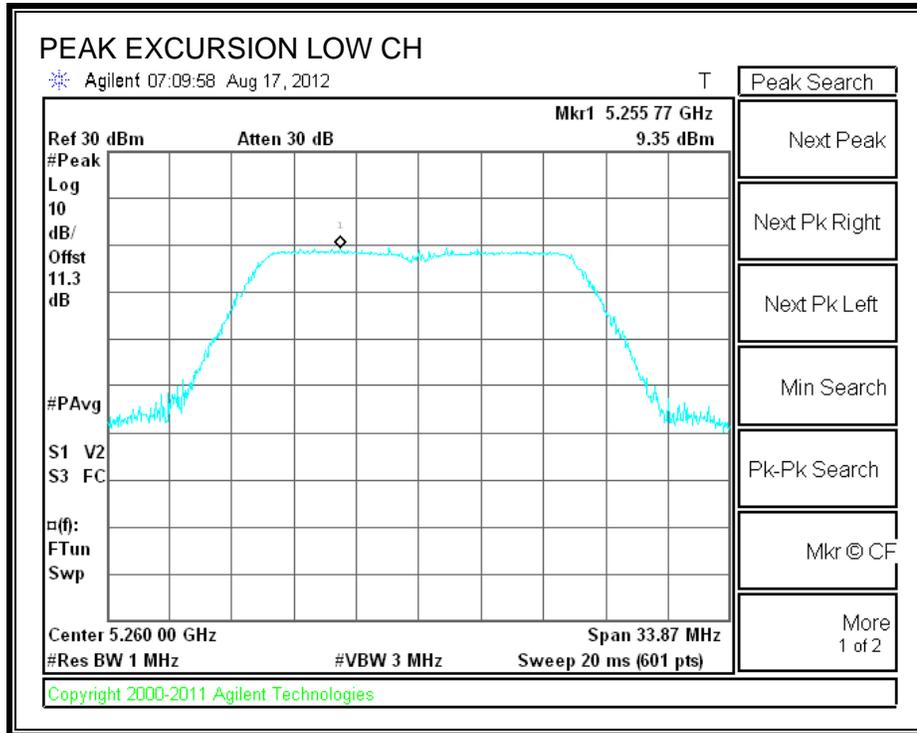
FCC §15.407 (a) (6)

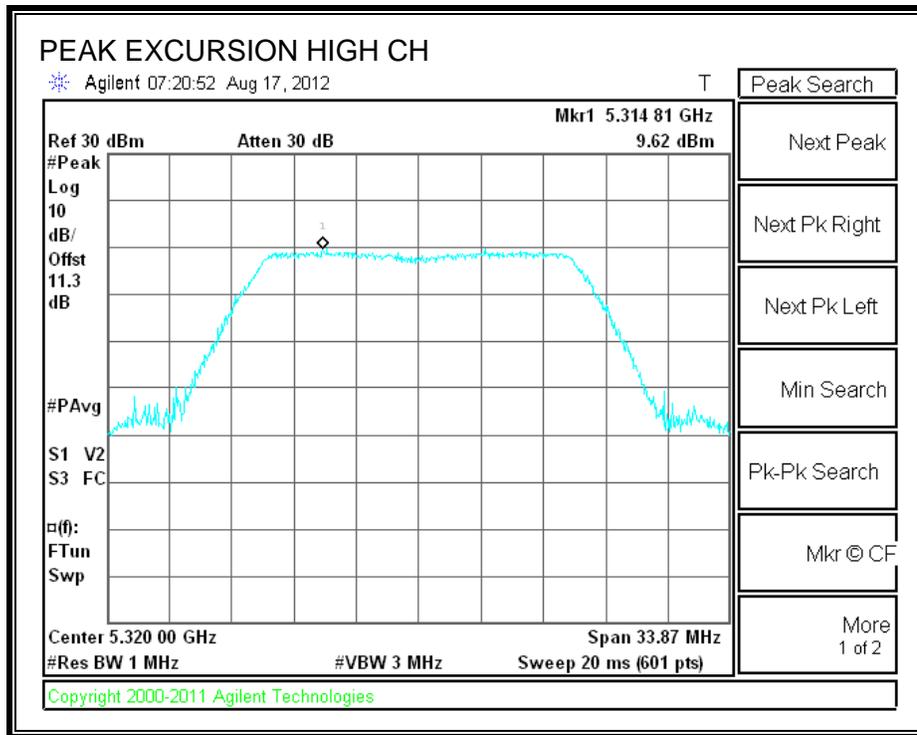
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5260	9.35	-0.09	0.22	9.22	13	-3.78
Mid	5300	9.29	-0.51	0.22	9.58	13	-3.42
High	5320	9.62	-0.27	0.22	9.67	13	-3.33

PEAK EXCURSION





7.6. 802.11a MODE IN THE 5.6 GHz BAND

7.6.1. 26 dB BANDWIDTH

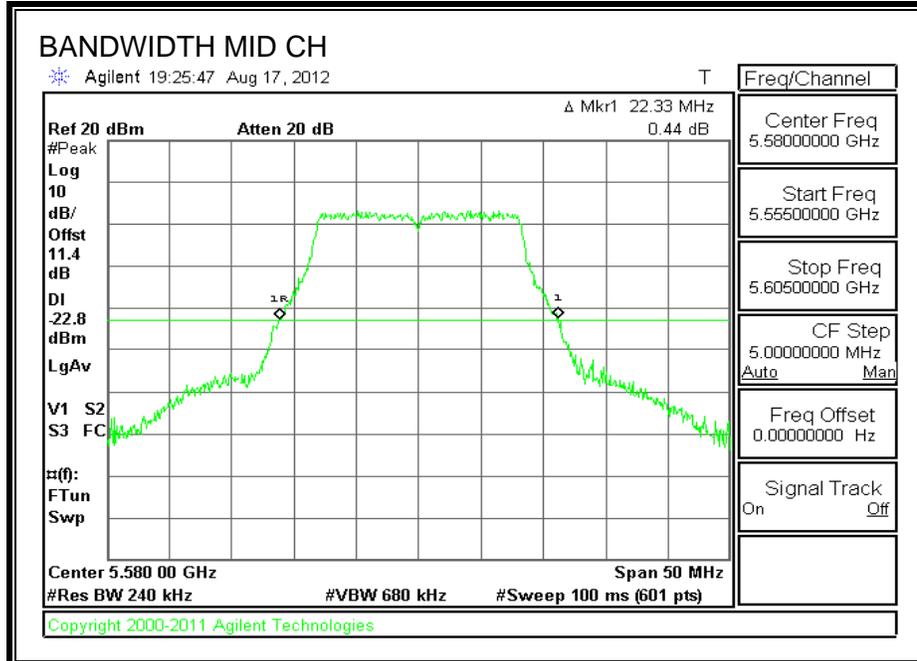
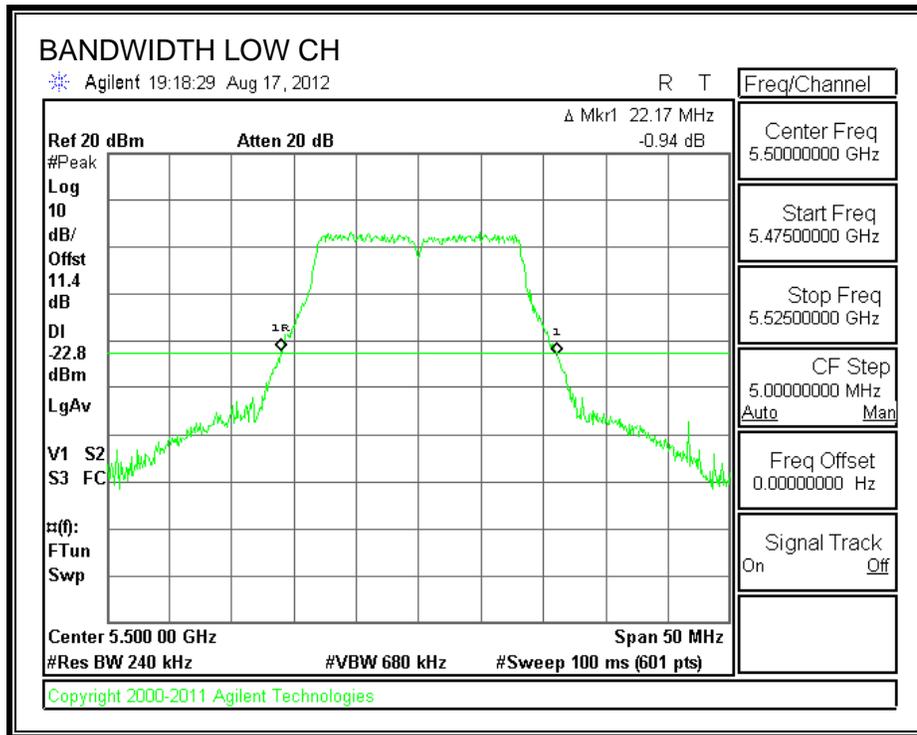
LIMITS

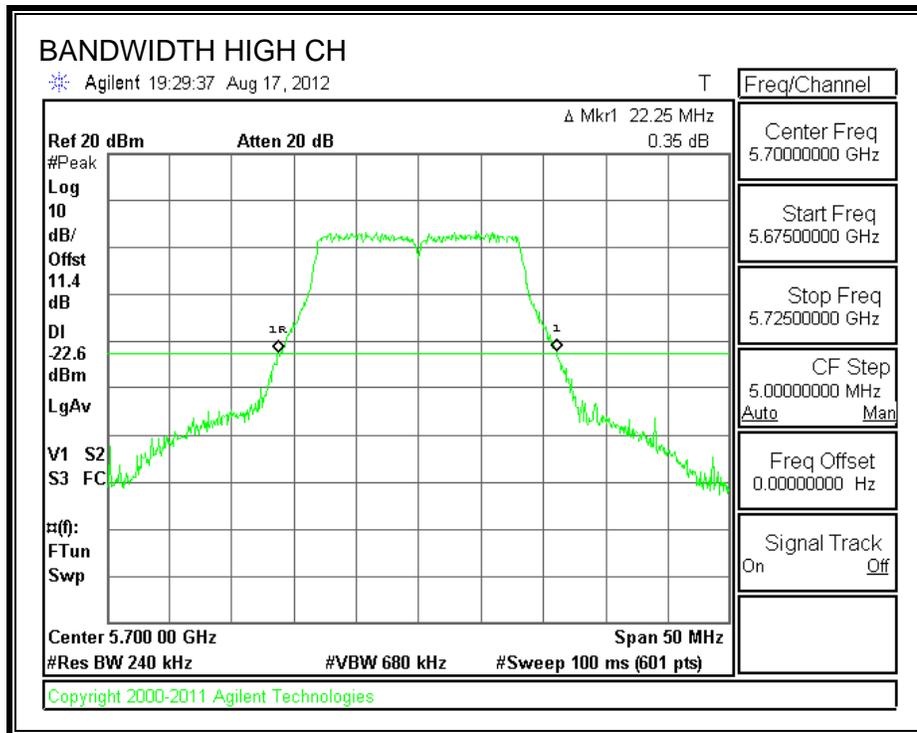
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5500	22.17
Mid	5580	22.33
High	5700	22.25

26 dB BANDWIDTH





7.6.2. 99% BANDWIDTH

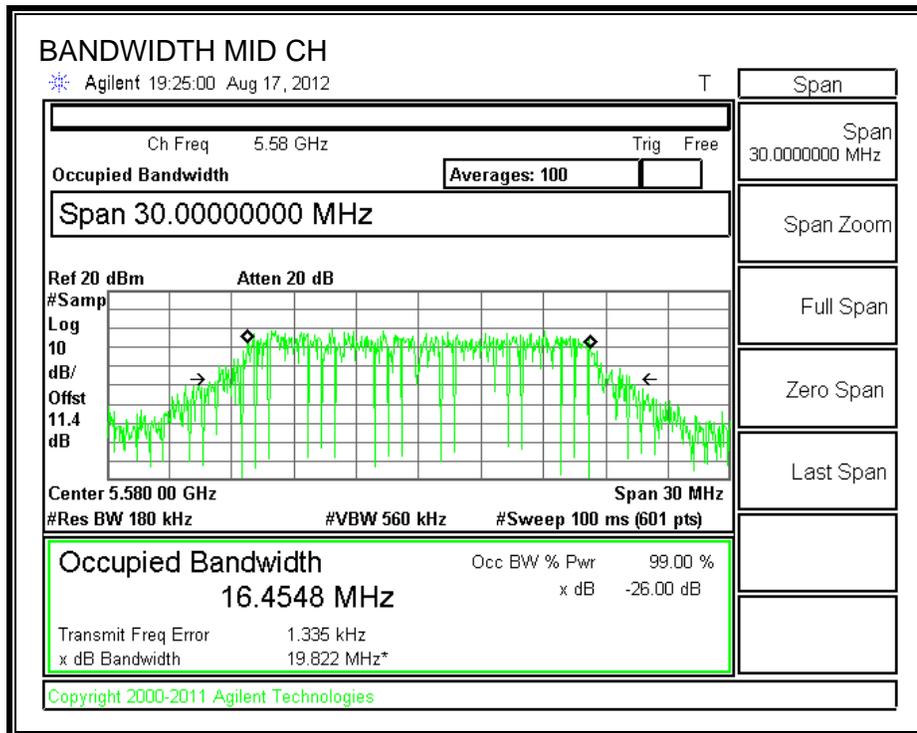
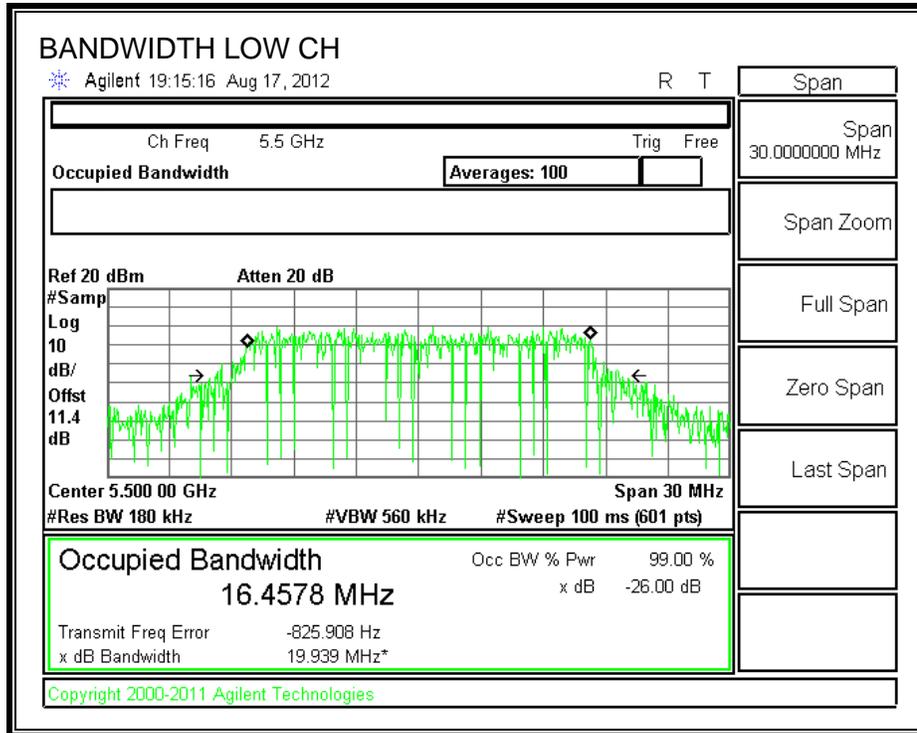
LIMITS

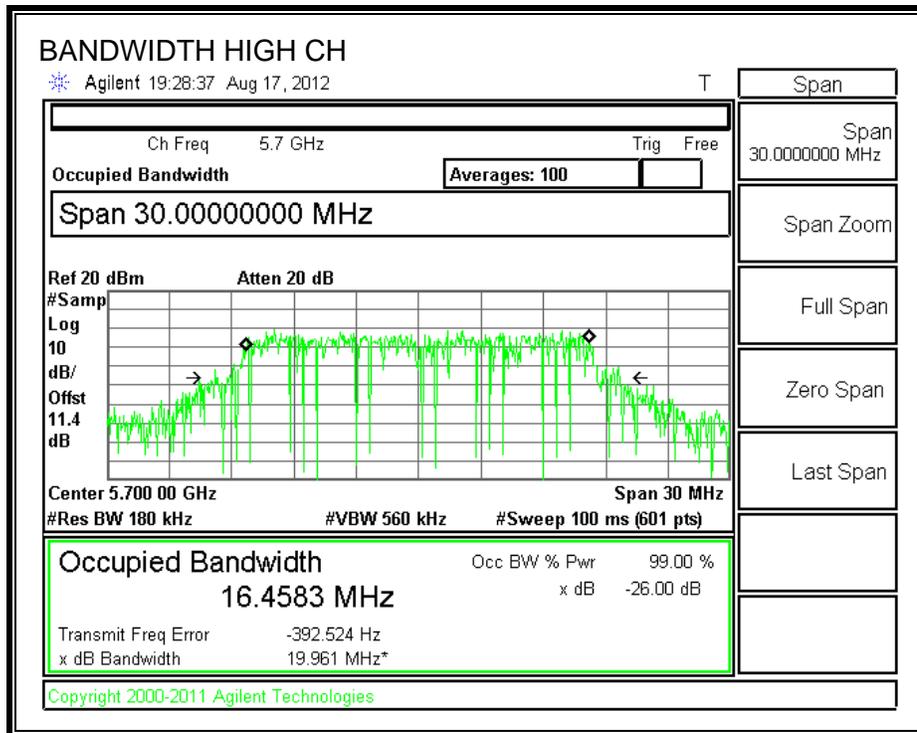
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5500	16.4578
Mid	5580	16.4548
High	5700	16.4583

99% BANDWIDTH





7.6.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.3 dB (including 10 dB pad and 1.3dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5500	11.3
Mid	5580	11.2
High	5700	11.2

7.6.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (3)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz 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.

99% bandwidth was used to calculate the power limit which was considered the worst case.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5500	24	16.46	23.16	-3.33	23.16	11.00
Mid	5580	24	16.45	23.16	-3.33	23.16	11.00
High	5700	24	16.46	23.16	-3.33	23.16	11.00

Duty Cycle CF (dB)	0.21	Included in Calculations of Corr'd Power & PPSD
---------------------------	------	--

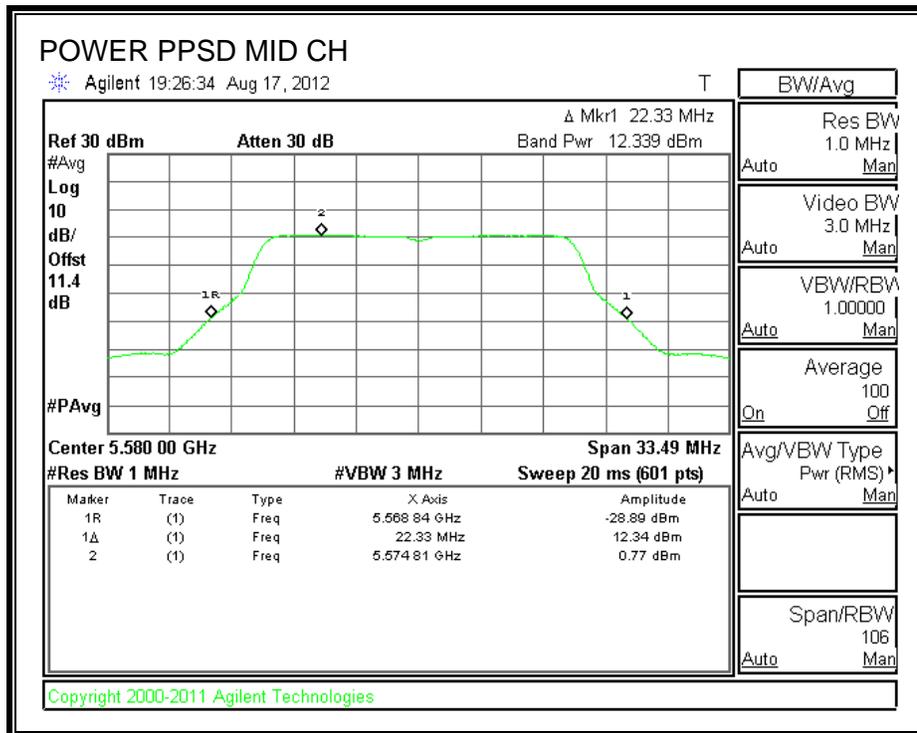
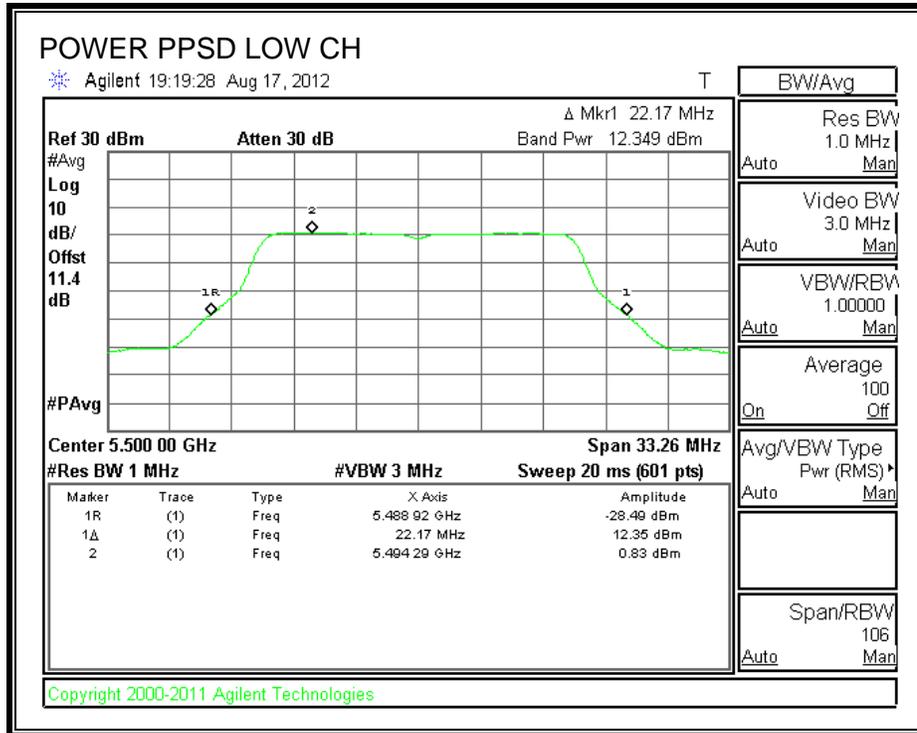
Output Power Results

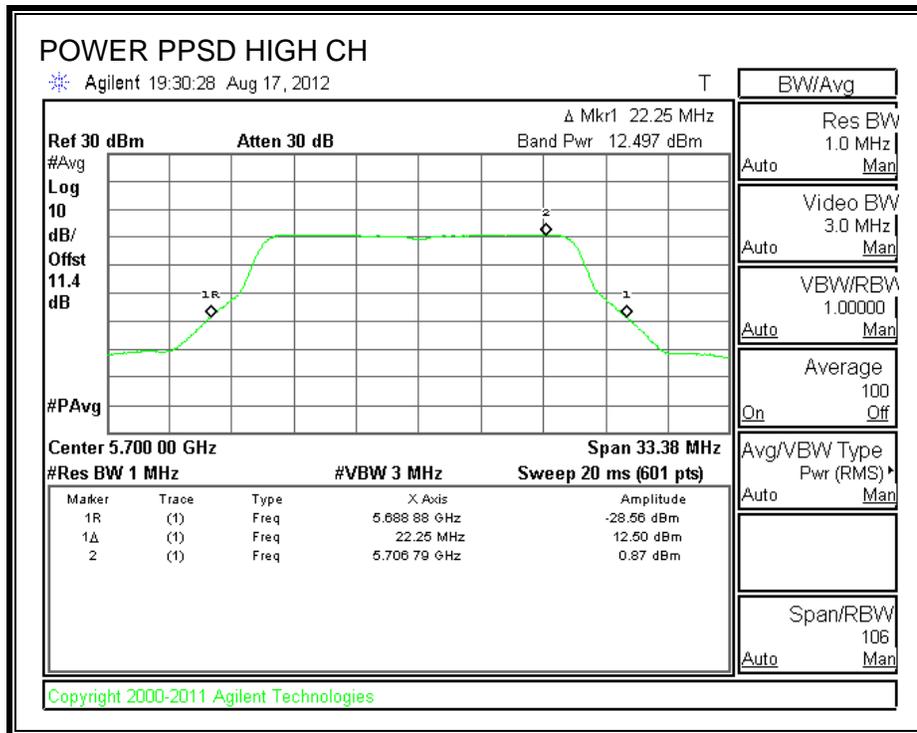
Channel	Frequency (MHz)	Meas Power (dBm)	Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	12.35	12.56	23.16	-10.60
Mid	5580	12.34	12.55	23.16	-10.61
High	5700	12.50	12.71	23.16	-10.45

PPSD Results

Channel	Frequency (MHz)	Meas PPSD (dBm)	Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5500	0.83	1.04	11.00	-9.96
Mid	5580	0.77	0.98	11.00	-10.02
High	5700	0.87	1.08	11.00	-9.92

OUTPUT POWER AND PPSD





7.6.5. PEAK EXCURSION

LIMITS

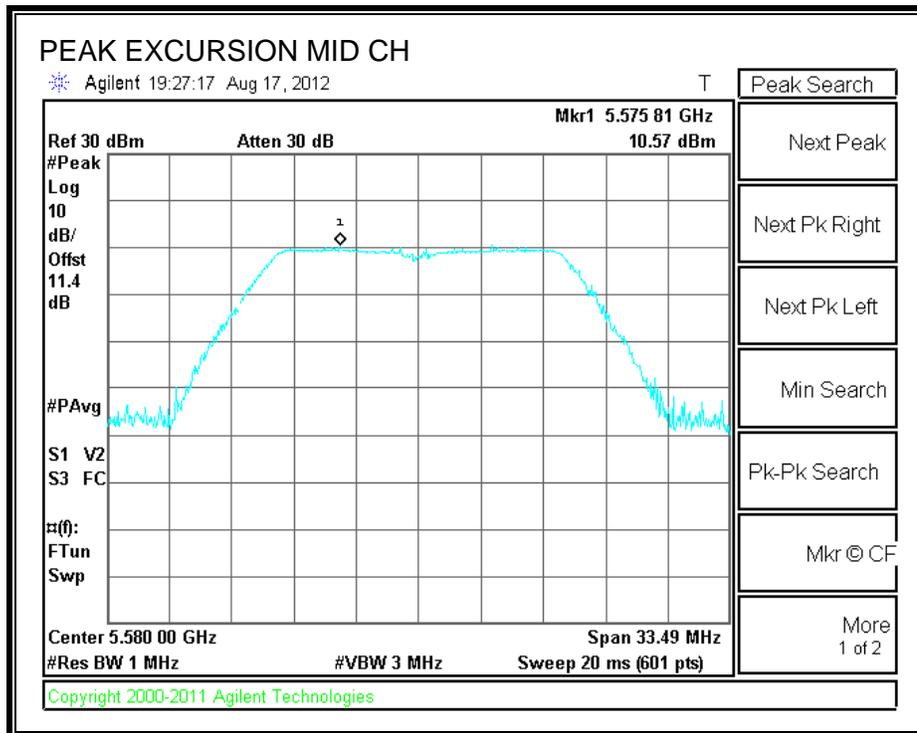
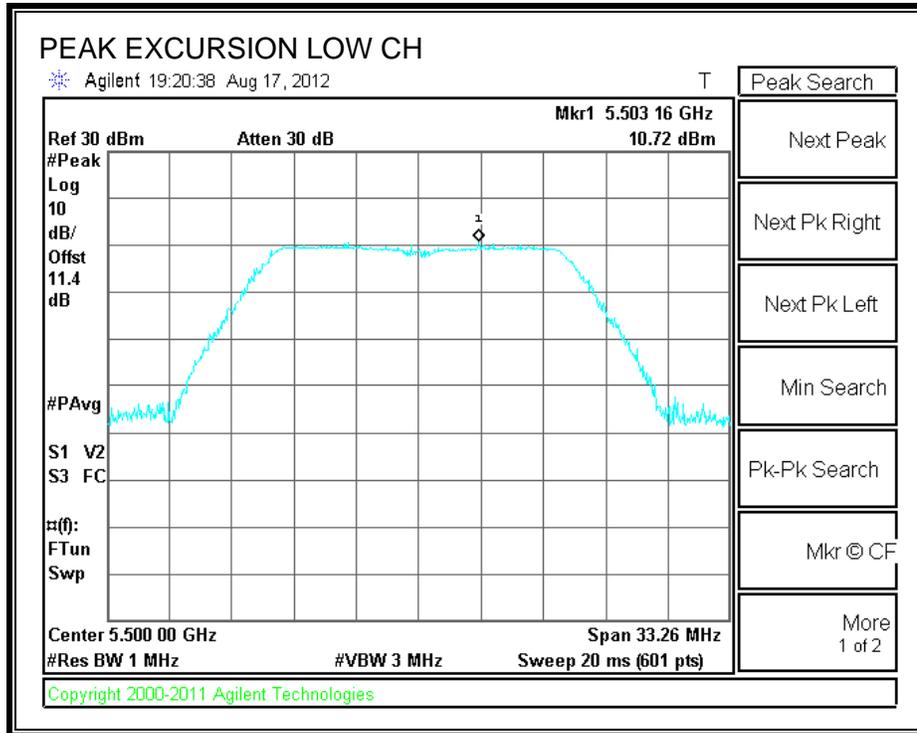
FCC §15.407 (a) (6)

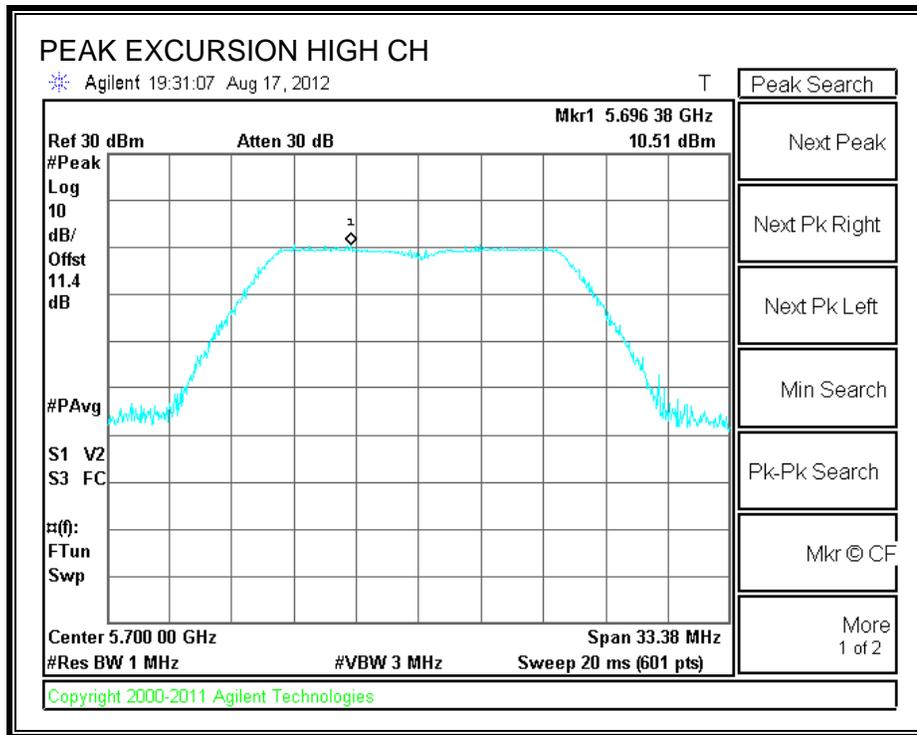
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	10.72	0.83	0.21	9.68	13	-3.32
Mid	5580	10.57	0.77	0.21	9.59	13	-3.41
High	5700	10.51	0.87	0.21	9.43	13	-3.57

PEAK EXCURSION





7.7. 802.11n HT20 MODE IN THE 5.6 GHz BAND

7.7.1. 26 dB BANDWIDTH

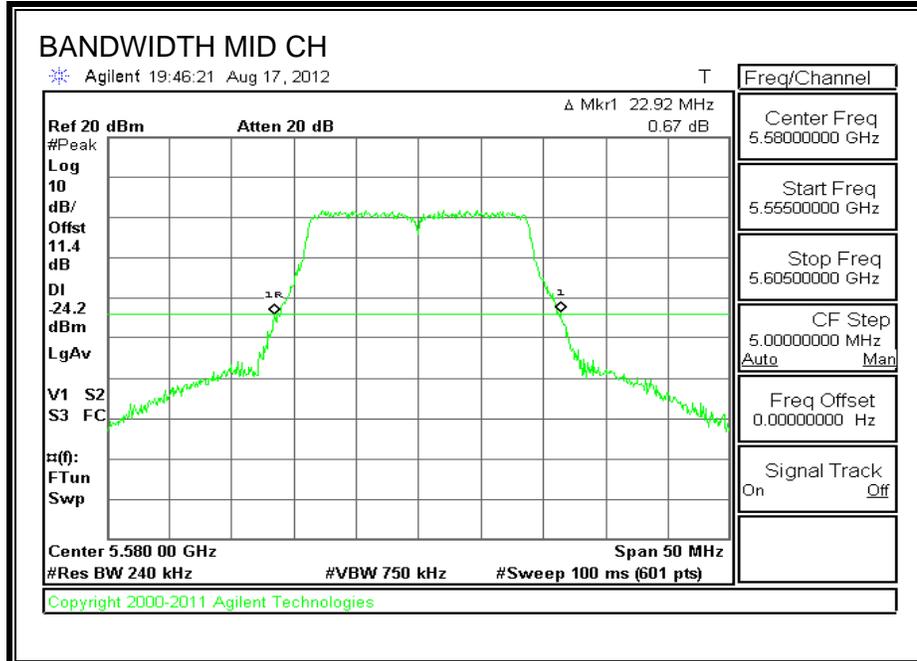
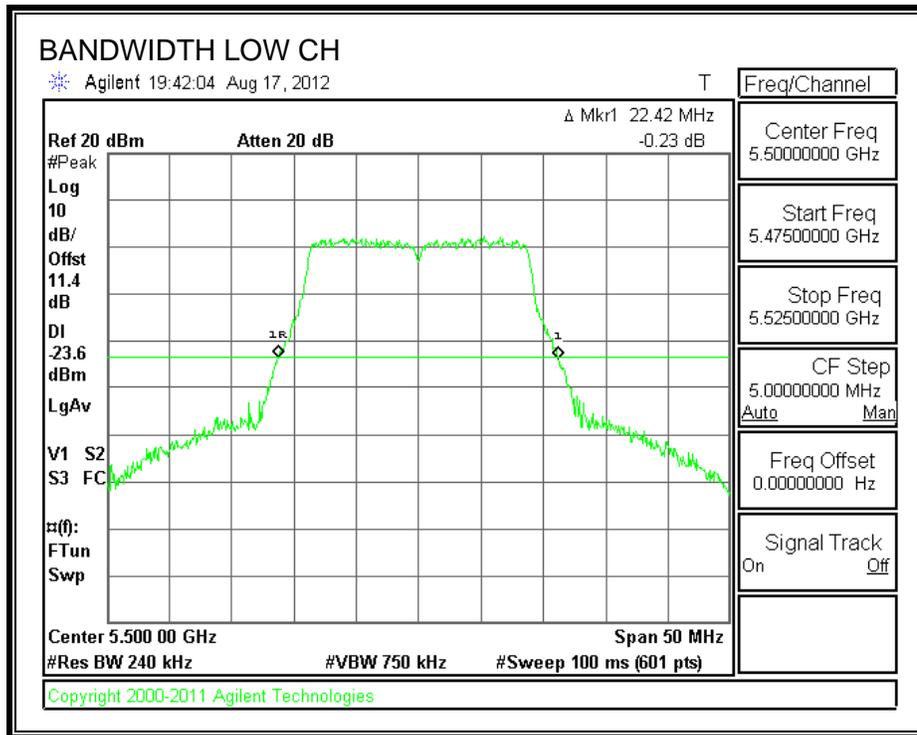
LIMITS

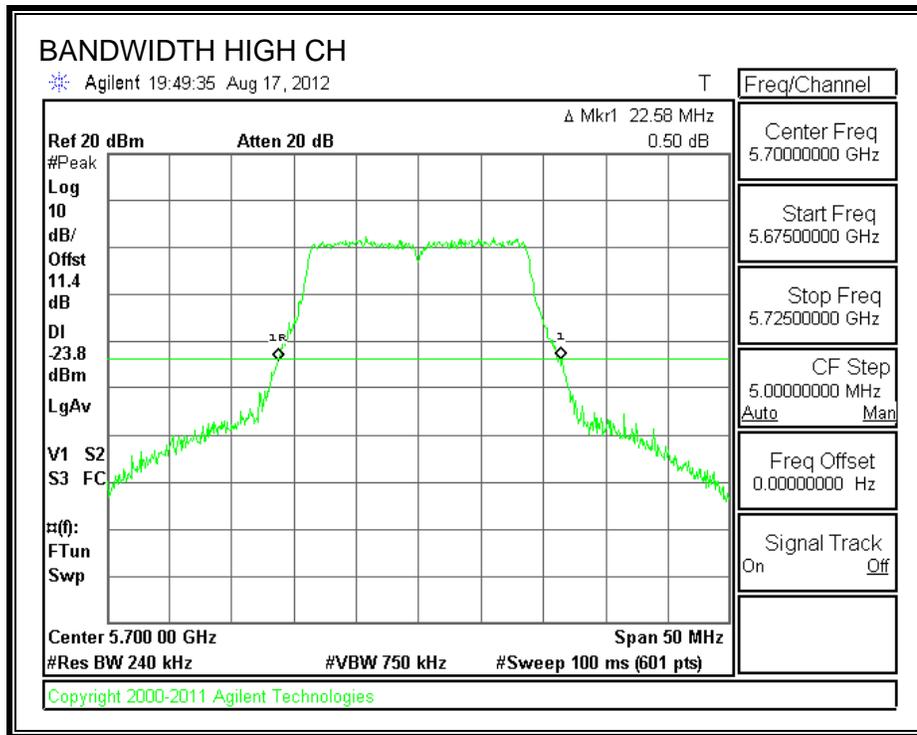
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5500	22.42
Mid	5580	22.92
High	5700	22.58

26 dB BANDWIDTH





7.7.2. 99% BANDWIDTH

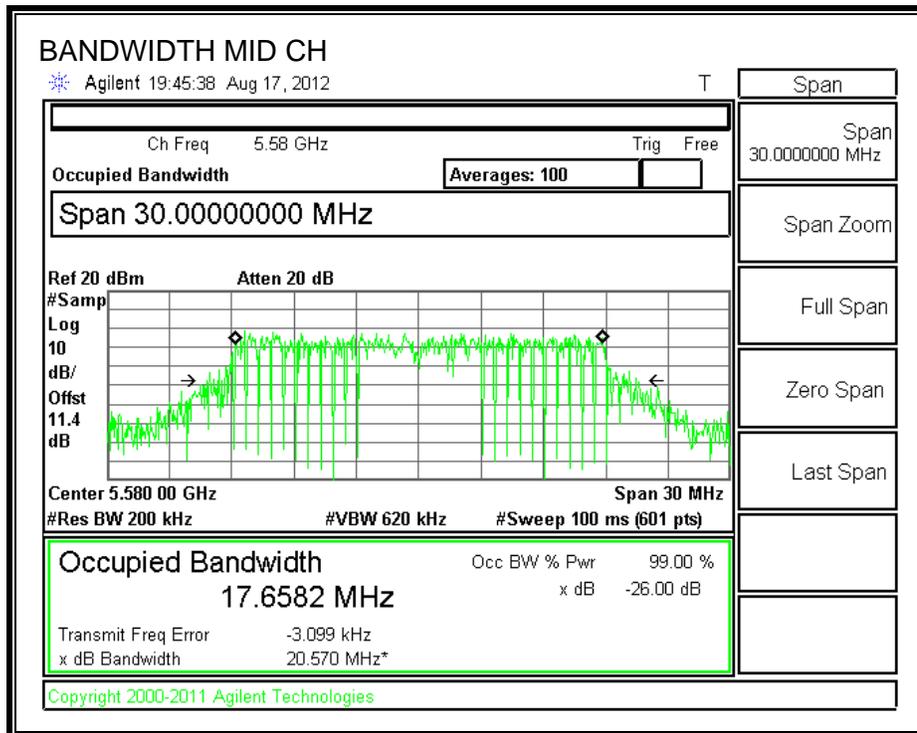
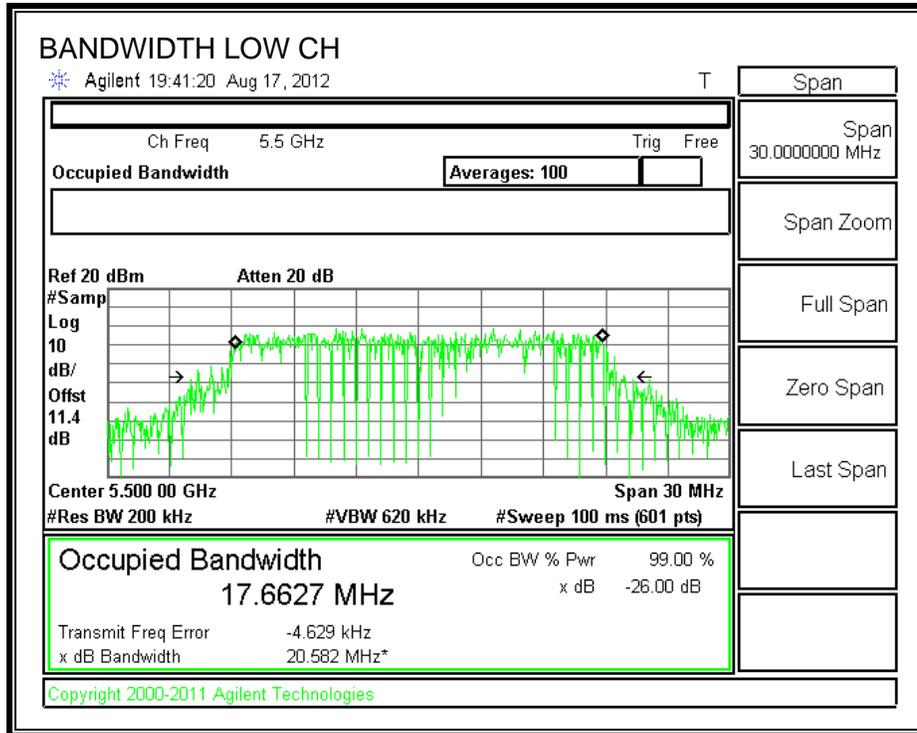
LIMITS

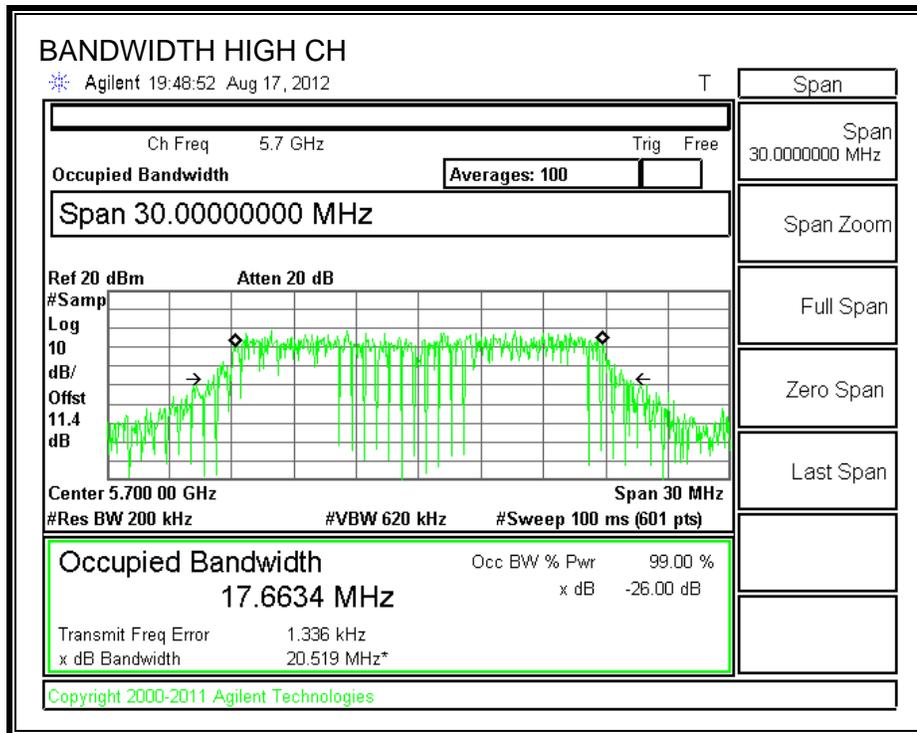
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5500	17.6627
Mid	5580	17.6582
High	5700	17.6634

99% BANDWIDTH





7.7.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.4 dB (including 10 dB pad and 1.4dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5500	11.61
Mid	5580	11.38
High	5700	11.45

7.7.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (3)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz 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.

99% bandwidth was used to calculate the power limit which was considered the worst case.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5500	24	17.66	23.47	-3.33	23.47	11.00
Mid	5580	24	17.66	23.47	-3.33	23.47	11.00
High	5700	24	17.66	23.47	-3.33	23.47	11.00

Duty Cycle CF (dB)	0.22	Included in Calculations of Corr'd Power & PPSD
---------------------------	------	--

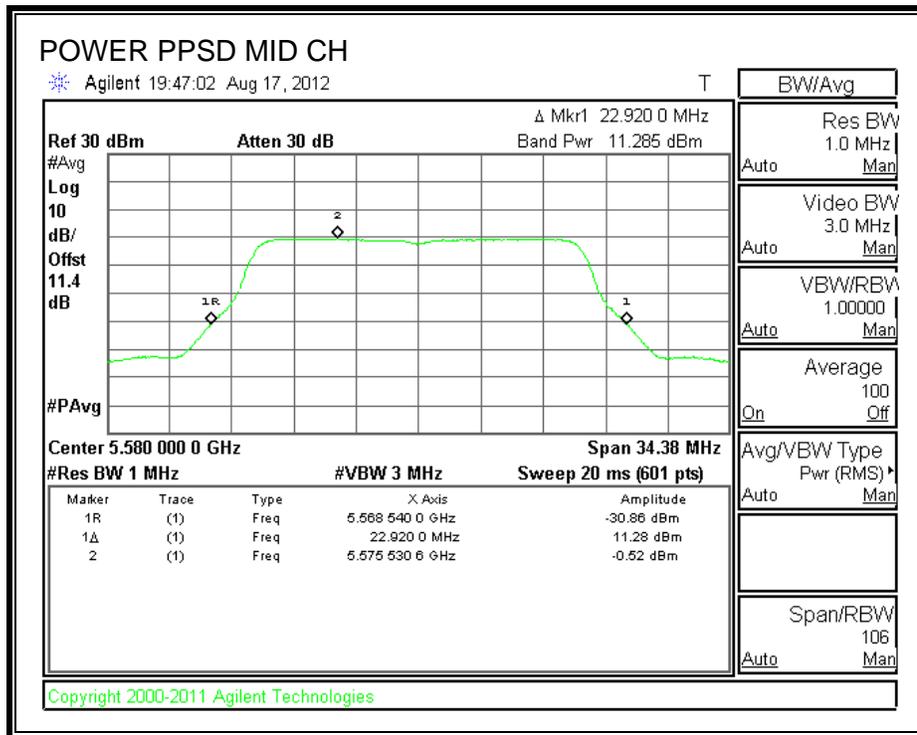
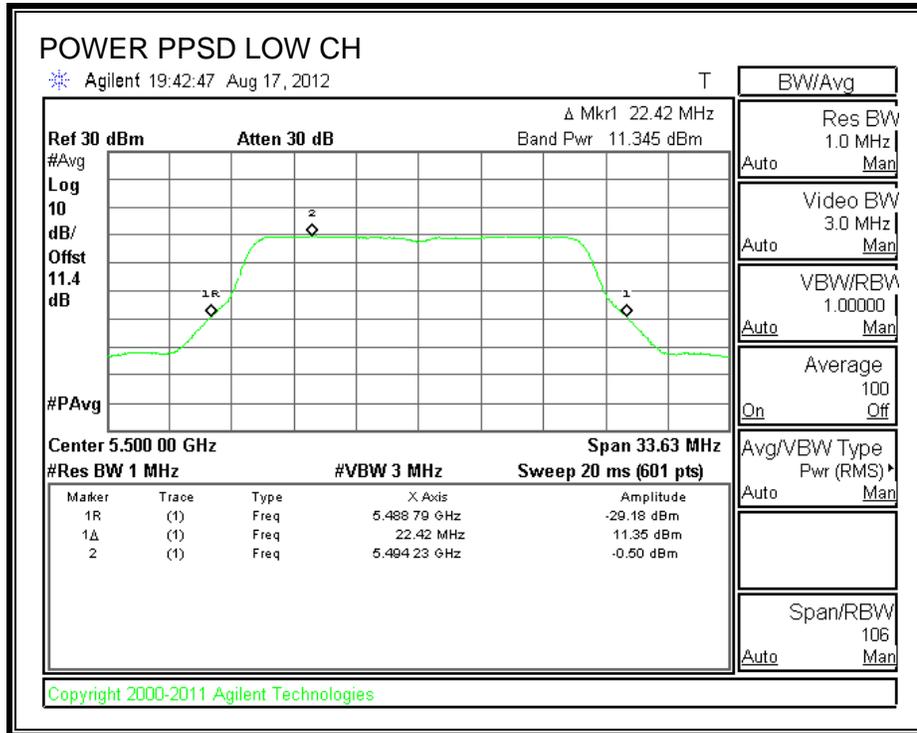
Output Power Results

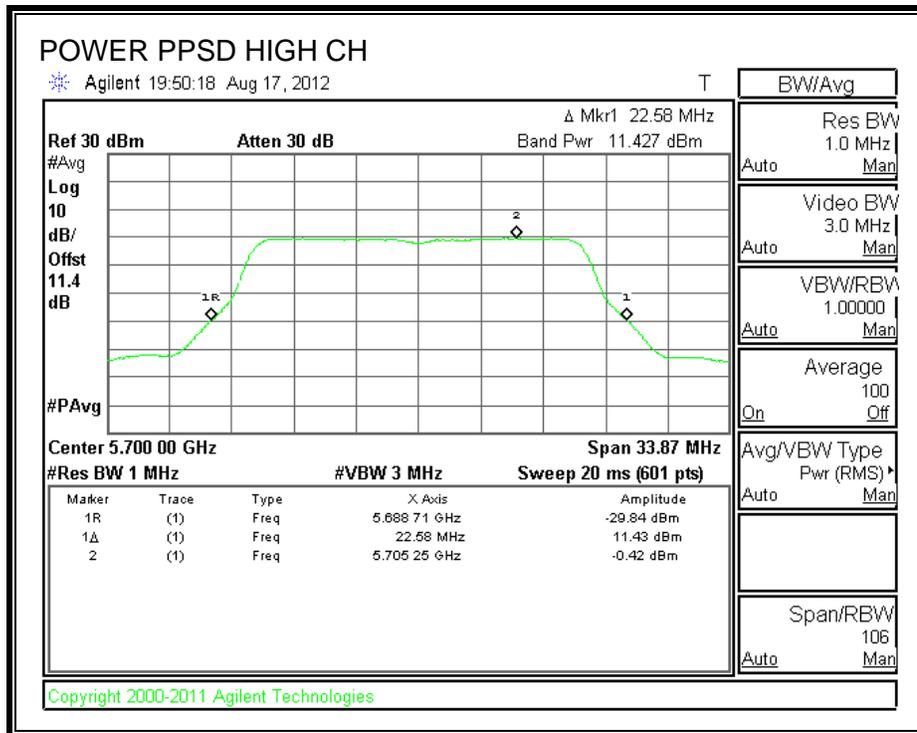
Channel	Frequency (MHz)	Meas Power (dBm)	Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	11.35	11.57	23.47	-11.90
Mid	5580	11.20	11.42	23.47	-12.05
High	5700	11.43	11.65	23.47	-11.82

PPSD Results

Channel	Frequency (MHz)	Meas PPSD (dBm)	Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5500	-0.50	-0.28	11.00	-11.28
Mid	5580	-0.52	-0.30	11.00	-11.30
High	5700	-0.42	-0.20	11.00	-11.20

OUTPUT POWER AND PPSD





7.7.5. PEAK EXCURSION

LIMITS

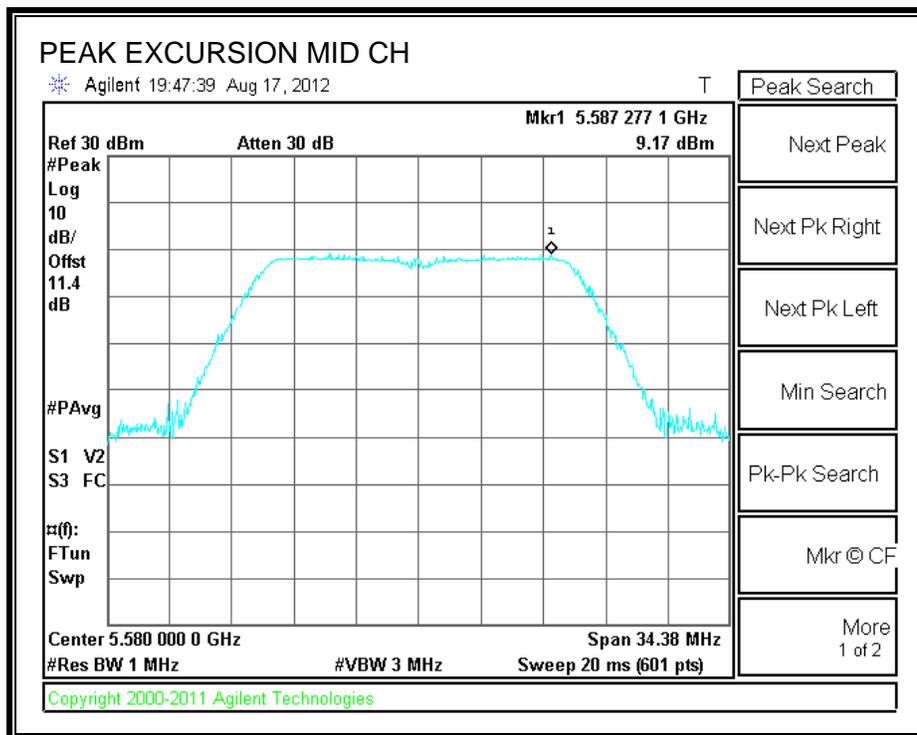
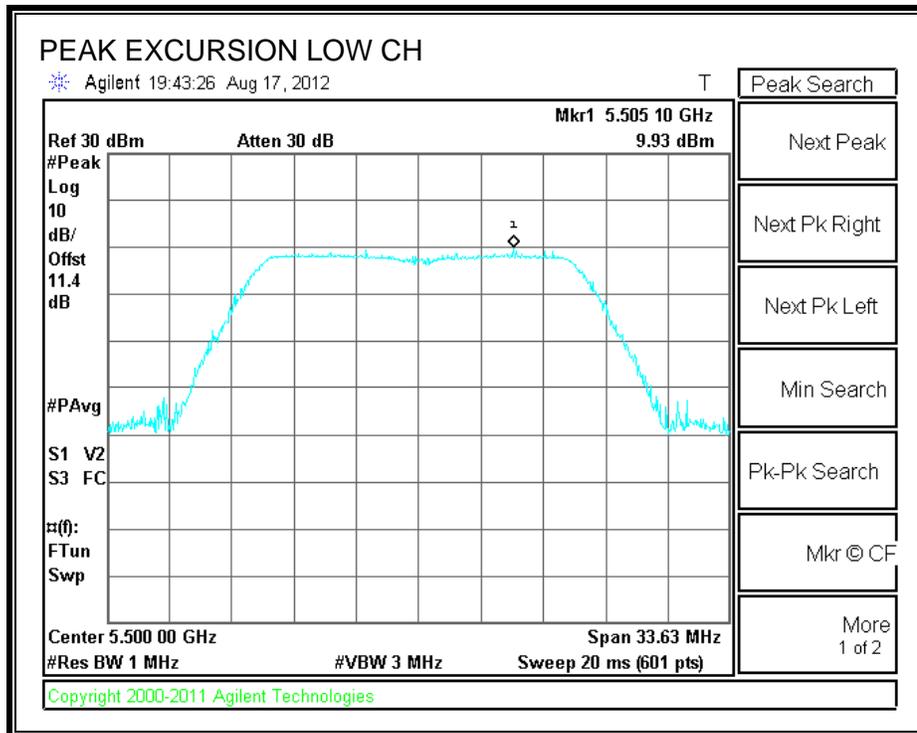
FCC §15.407 (a) (6)

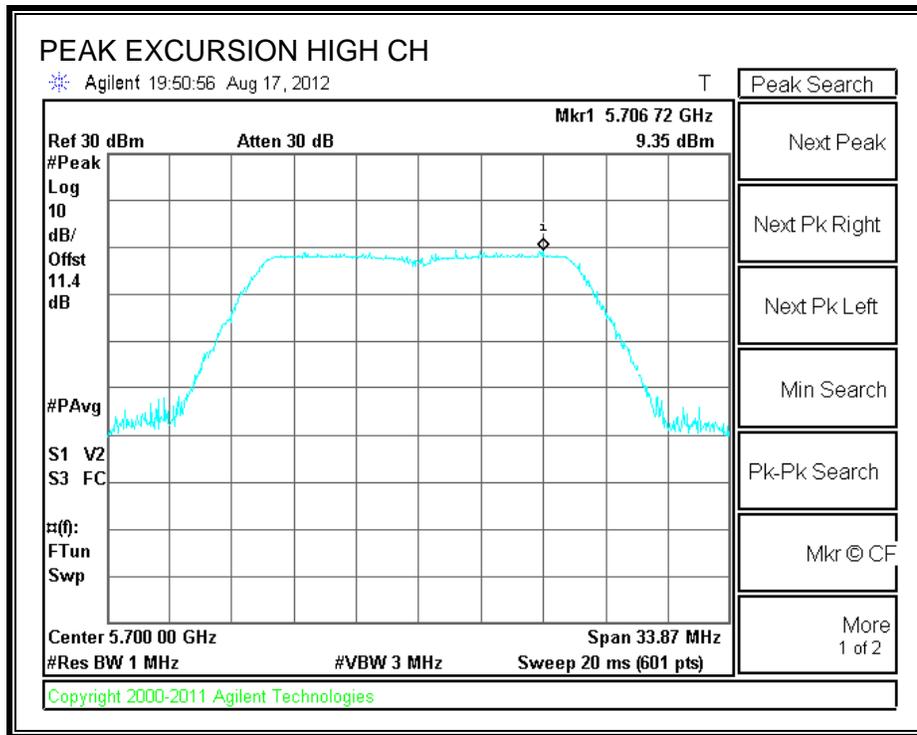
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	9.93	-0.50	0.22	10.21	13	-2.79
Mid	5580	9.17	-0.52	0.22	9.47	13	-3.53
High	5700	9.35	-0.42	0.22	9.55	13	-3.45

PEAK EXCURSION





8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

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

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 1 MHz for peak measurements and as applicable for average measurements.

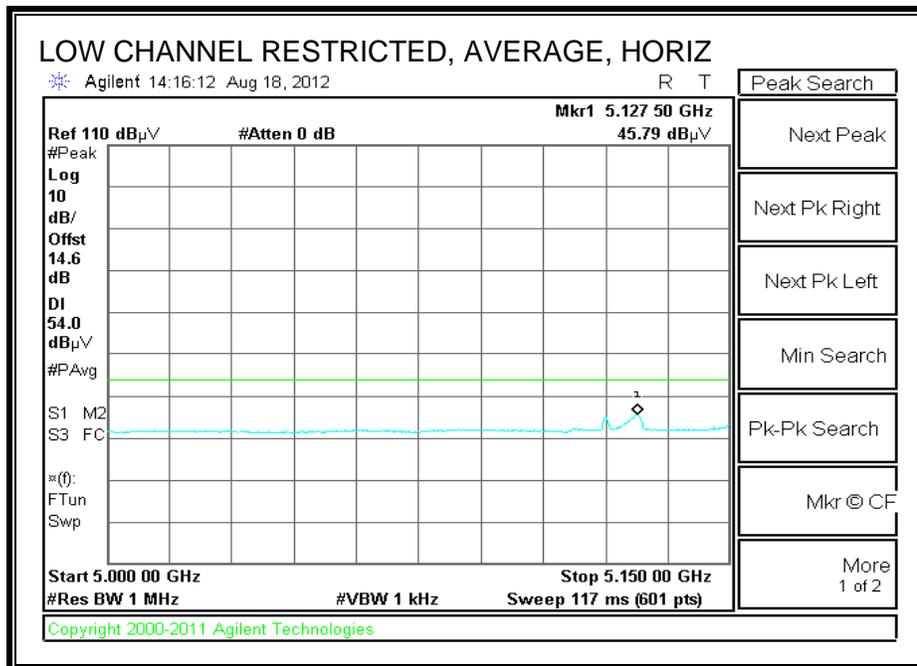
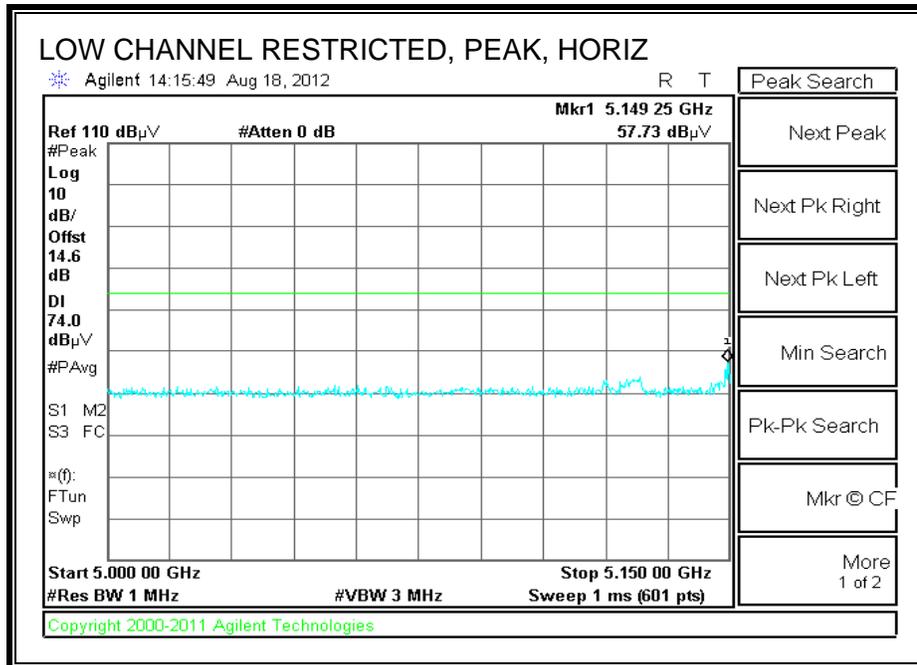
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

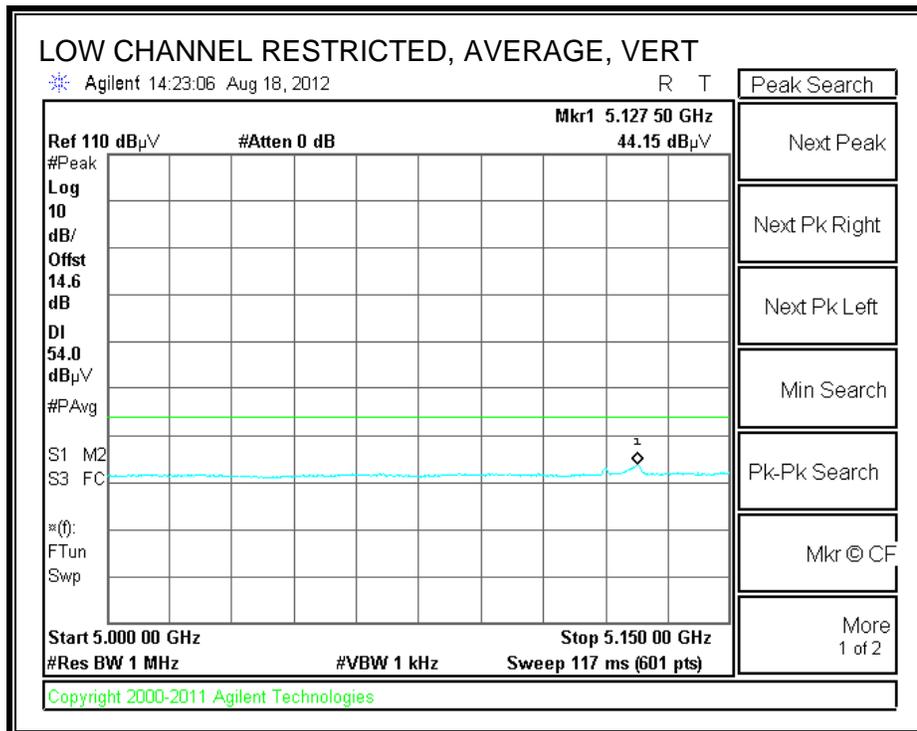
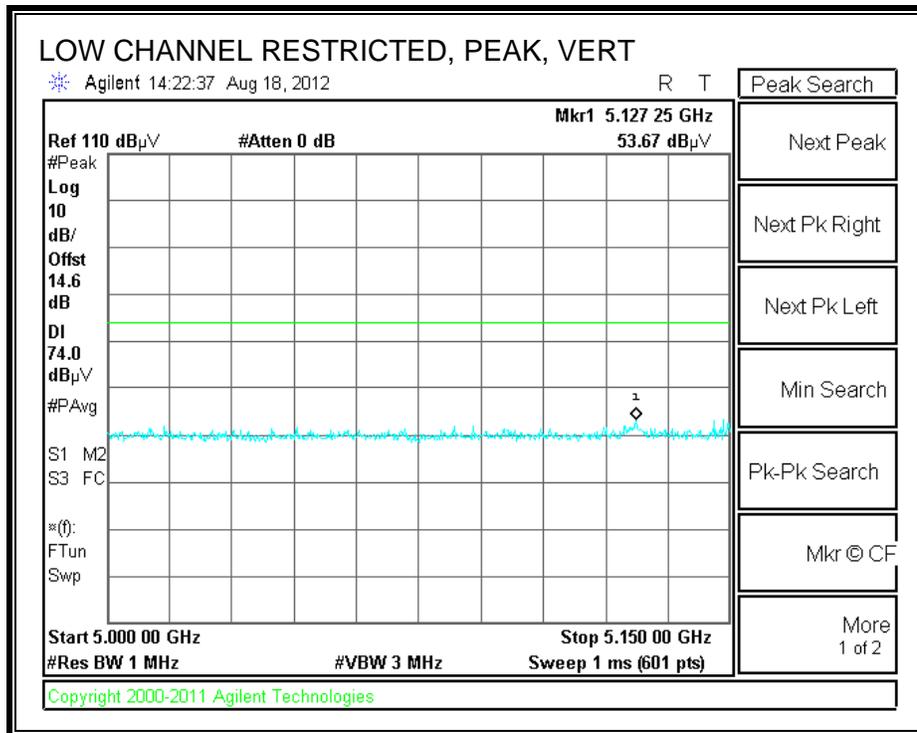
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

8.2. TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND

EUT with USB CHARGER

RESTRICTED BANDEDGE (LOW CHANNEL)





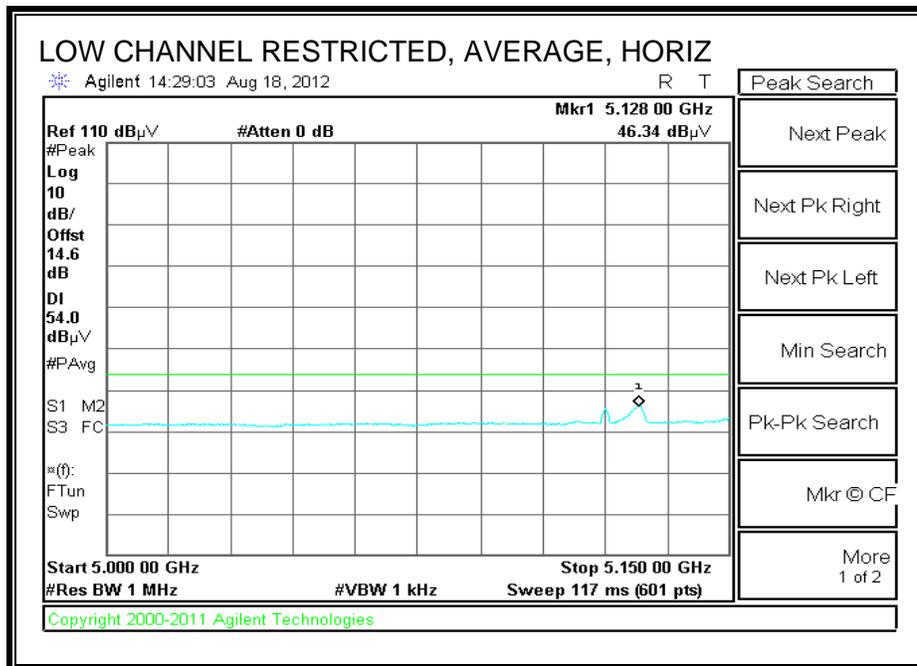
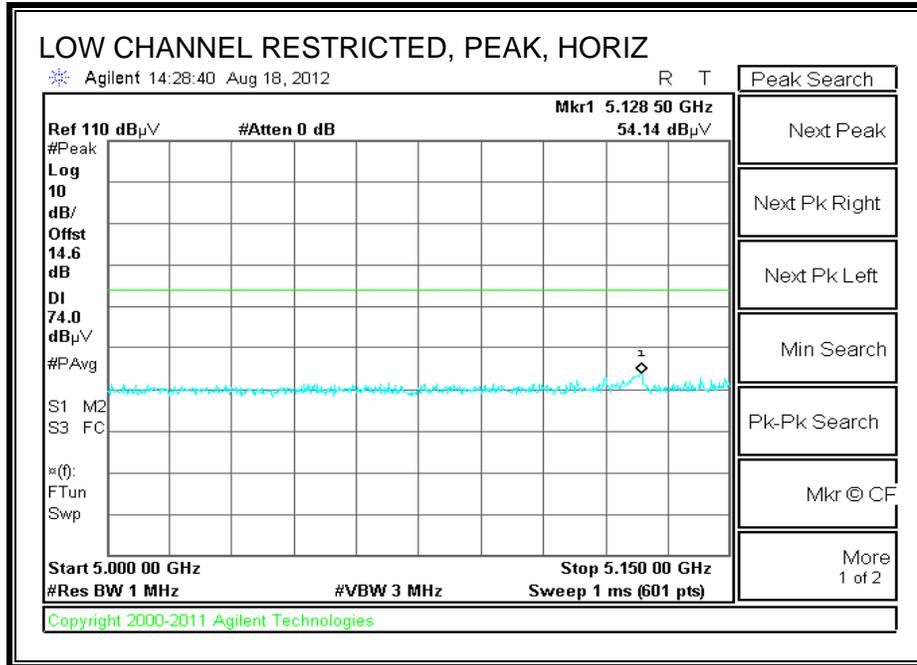
HARMONICS AND SPURIOUS EMISSIONS

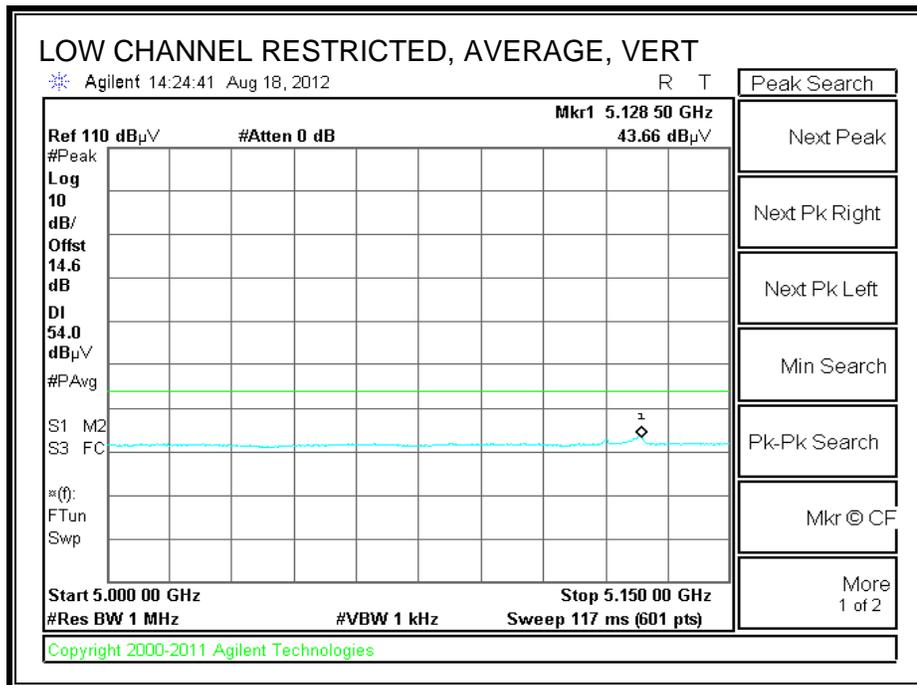
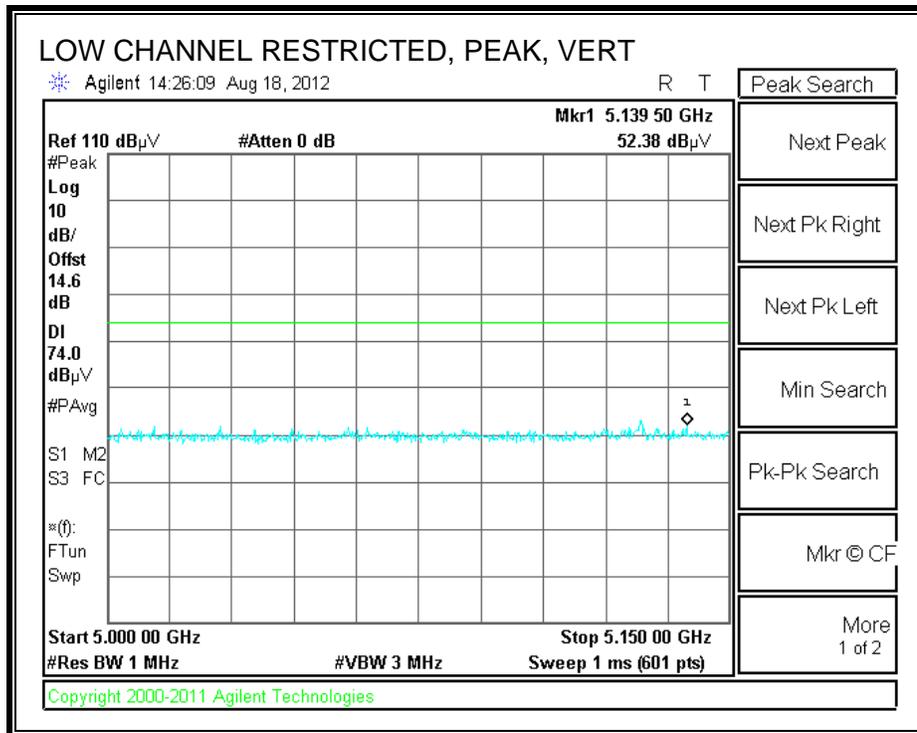
High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Tony & Roy											
Date:		08/23/12											
Project #:		12U14580											
Company:		LG											
Test Target:		FCC Class B											
Mode Oper:		11a 5.2GHz Tx Continuously EUT with USB Charger											
f	Measurement Frequency			Amp	Preamp Gain			Average Field Strength Limit					
Dist	Distance to Antenna			D Corr	Distance Correct to 3 meters			Peak Field Strength Limit					
Read	Analyzer Reading			Avg	Average Field Strength @ 3 m			Margin vs. Average Limit					
AF	Antenna Factor			Peak	Calculated Peak Field Strength			Margin vs. Peak Limit					
CL	Cable Loss			HPF	High Pass Filter								
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
5180 MHz 11a													
15.540	3.0	35.8	39.0	12.5	-34.0	0.0	0.7	54.0	74.0	-20.0	V	P	
15.540	3.0	25.3	39.0	12.5	-34.0	0.0	0.7	43.5	54.0	-10.5	V	A	
15.540	3.0	34.9	39.0	12.5	-34.0	0.0	0.7	53.1	74.0	-20.9	H	P	
15.540	3.0	25.3	39.0	12.5	-34.0	0.0	0.7	43.6	54.0	-10.4	H	A	
5200 MHz 11a													
15.600	3.0	34.9	38.8	12.5	-34.0	0.0	0.7	53.0	74.0	-21.0	V	P	
15.600	3.0	25.0	38.8	12.5	-34.0	0.0	0.7	43.1	54.0	-10.9	V	A	
15.600	3.0	34.9	38.8	12.5	-34.0	0.0	0.7	52.9	74.0	-21.1	H	P	
15.600	3.0	24.9	38.8	12.5	-34.0	0.0	0.7	43.0	54.0	-11.0	H	A	
5240 MHz 11a													
15.720	3.0	35.5	38.4	12.6	-34.0	0.0	0.7	53.2	74.0	-20.8	V	P	
15.720	3.0	25.0	38.4	12.6	-34.0	0.0	0.7	42.7	54.0	-11.3	V	A	
15.720	3.0	36.4	38.4	12.6	-34.0	0.0	0.7	54.2	74.0	-19.8	H	P	
15.720	3.0	25.1	38.4	12.6	-34.0	0.0	0.7	42.8	54.0	-11.2	H	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

8.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND

EUT WITH USB CHARGER

RESTRICTED BANDEDGE (LOW CHANNEL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Tony & Roy
 Date: 08/23/12
 Project #: 12U14580
 Company: LG
 Test Target: FCC Class B
 Mode Oper: 11n 5.2 Tx Continuously
 EUT WITH USB CHARGER

f Measurement Frequency Amp Preamp Gain Average Field Strength Limit
 Dist Distance to Antenna D Corr Distance Correct to 3 meters Peak Field Strength Limit
 Read Analyzer Reading Avg Average Field Strength @ 3 m Margin vs. Average Limit
 AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit
 CL Cable Loss HPF High Pass Filter

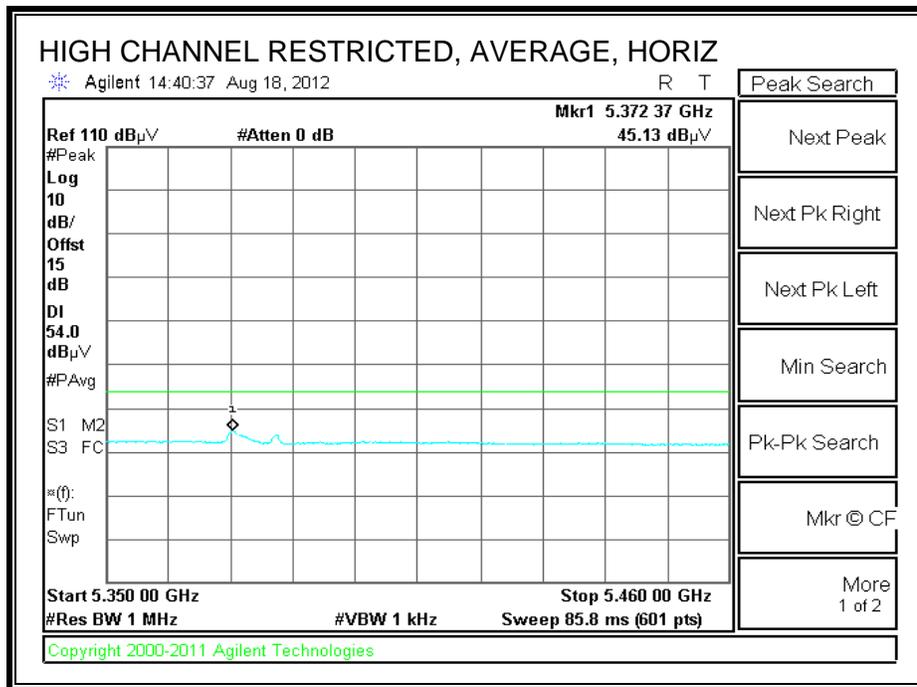
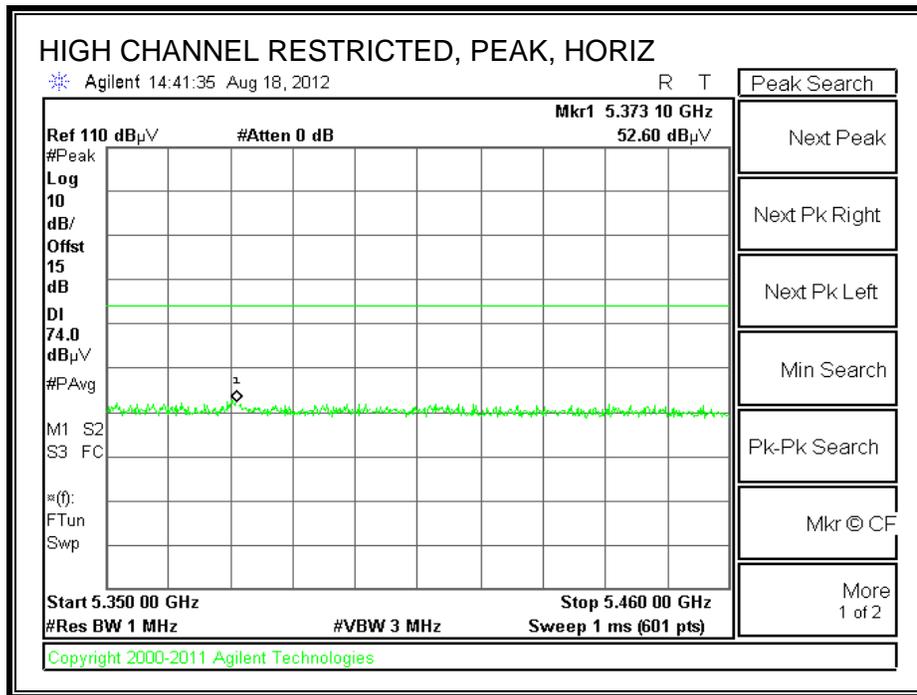
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
5180 MHz 11n													
15.540	3.0	35.3	39.0	12.5	-34.0	0.0	0.7	53.5	74.0	-20.5	V	P	
15.540	3.0	25.3	39.0	12.5	-34.0	0.0	0.7	43.5	54.0	-10.5	V	A	
15.540	3.0	35.4	39.0	12.5	-34.0	0.0	0.7	53.6	74.0	-20.4	H	P	
15.540	3.0	25.3	39.0	12.5	-34.0	0.0	0.7	43.5	54.0	-10.5	H	A	
5200 MHz 11n													
15.600	3.0	34.7	38.8	12.5	-34.0	0.0	0.7	52.8	74.0	-21.2	V	P	
15.600	3.0	25.1	38.8	12.5	-34.0	0.0	0.7	43.2	54.0	-10.8	V	A	
15.600	3.0	35.1	38.8	12.5	-34.0	0.0	0.7	53.2	74.0	-20.8	H	P	
15.600	3.0	25.0	38.8	12.5	-34.0	0.0	0.7	43.0	54.0	-11.0	H	A	
5240 MHz 11n													
15.720	3.0	35.4	38.4	12.6	-34.0	0.0	0.7	53.2	74.0	-20.8	V	P	
15.720	3.0	25.1	38.4	12.6	-34.0	0.0	0.7	42.9	54.0	-11.1	V	A	
15.720	3.0	35.1	38.4	12.6	-34.0	0.0	0.7	52.8	74.0	-21.2	H	P	
15.720	3.0	25.1	38.4	12.6	-34.0	0.0	0.7	42.8	54.0	-11.2	H	A	

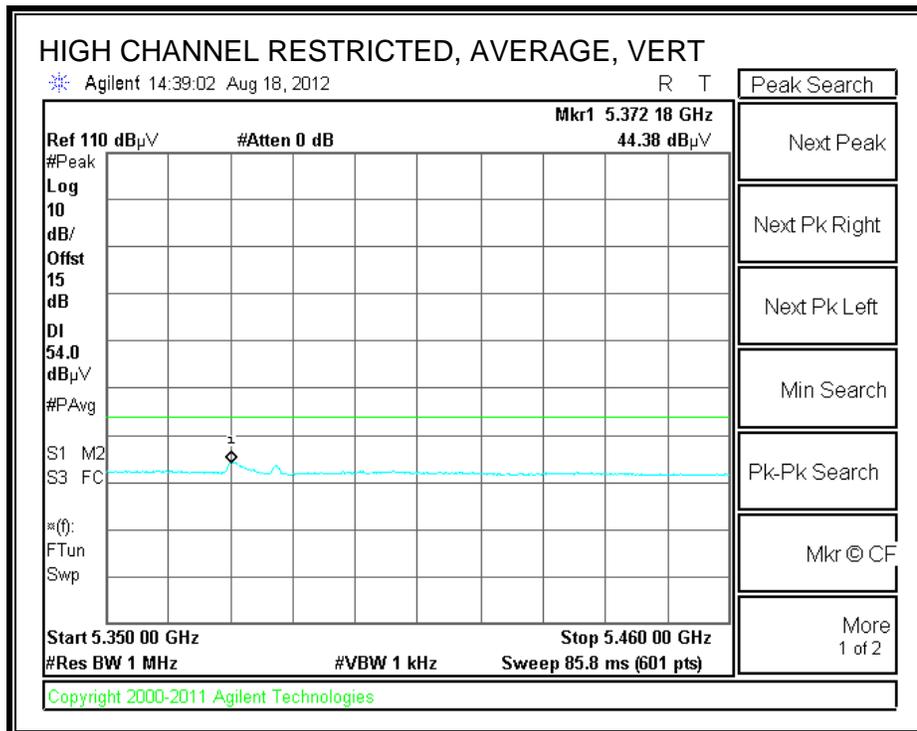
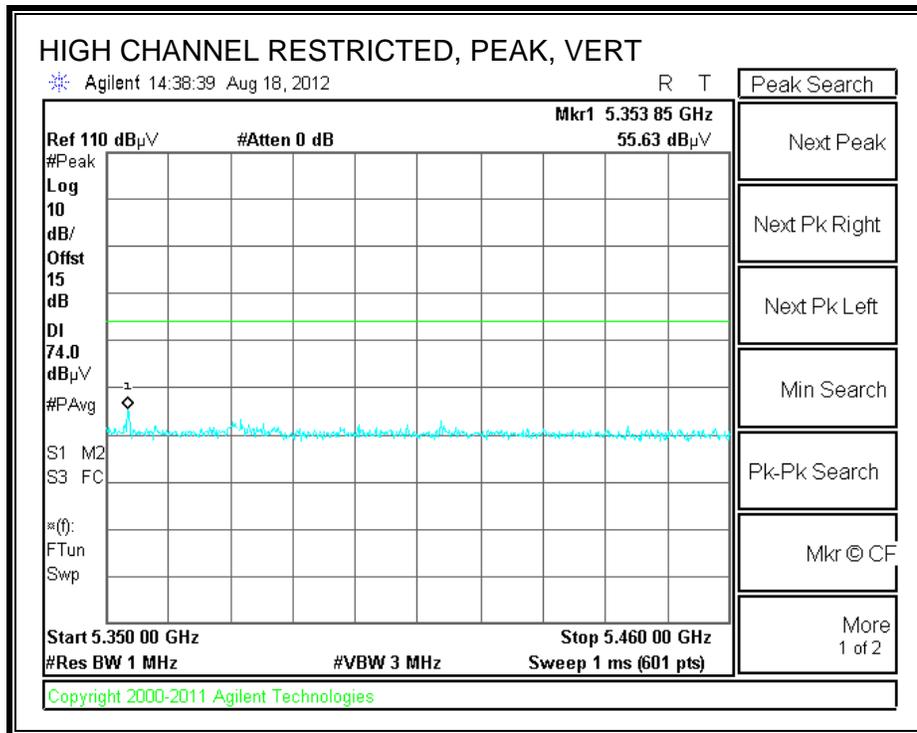
Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

8.4. TX ABOVE 1 GHz 802.11a MODE IN THE 5.3 GHz BAND

RESTRICTED BANEDGE (HIGH CHANNEL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Tony & Roy
 Date: 08/23/12
 Project #: 12U14580
 Company: LG
 Test Target: FCC Class B
 Mode Oper: 11a 5.3 GHz Tx Continuously
 EUT with USB Charger

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter	

f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
5260 MHz 11a													
15.780	3.0	35.2	38.2	12.6	-33.9	0.0	0.7	52.8	74.0	-21.2	H	P	
15.780	3.0	25.1	38.2	12.6	-33.9	0.0	0.7	42.7	54.0	-11.3	H	A	
15.780	3.0	35.7	38.2	12.6	-33.9	0.0	0.7	53.3	74.0	-20.7	V	P	
15.780	3.0	25.0	38.2	12.6	-33.9	0.0	0.7	42.6	54.0	-11.4	V	A	
5300 MHz 11a													
15.900	3.0	34.9	37.8	12.7	-33.9	0.0	0.7	52.2	74.0	-21.8	H	P	
15.900	3.0	25.4	37.8	12.7	-33.9	0.0	0.7	42.7	54.0	-11.3	H	A	
15.900	3.0	36.3	37.8	12.7	-33.9	0.0	0.7	53.6	74.0	-20.4	V	P	
15.900	3.0	25.4	37.8	12.7	-33.9	0.0	0.7	42.7	54.0	-11.3	V	A	
5320 MHz 11a													
15.960	3.0	35.0	37.6	12.7	-33.9	0.0	0.7	52.1	74.0	-21.9	H	P	
15.960	3.0	25.3	37.6	12.7	-33.9	0.0	0.7	42.4	54.0	-11.6	H	A	
15.960	3.0	36.3	37.6	12.7	-33.9	0.0	0.7	53.5	74.0	-20.6	V	P	
15.960	3.0	25.2	37.6	12.7	-33.9	0.0	0.7	42.4	54.0	-11.6	V	A	

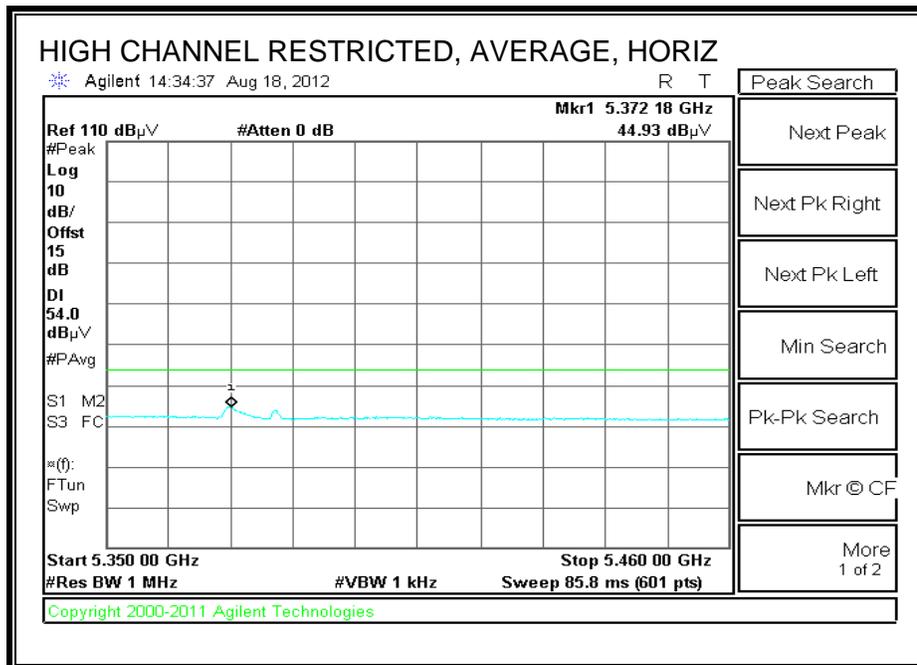
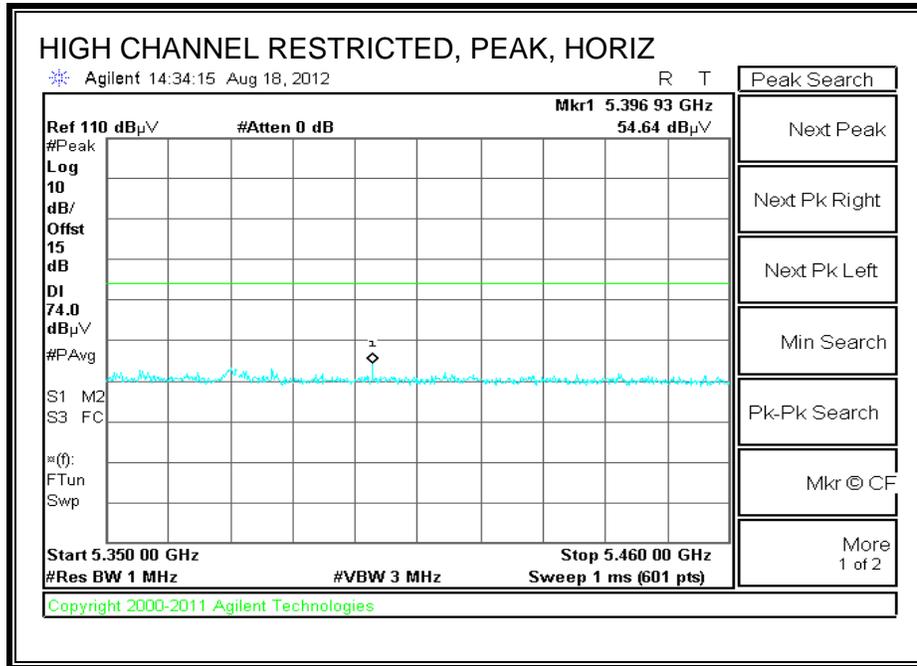
Rev. 4.1.2.7

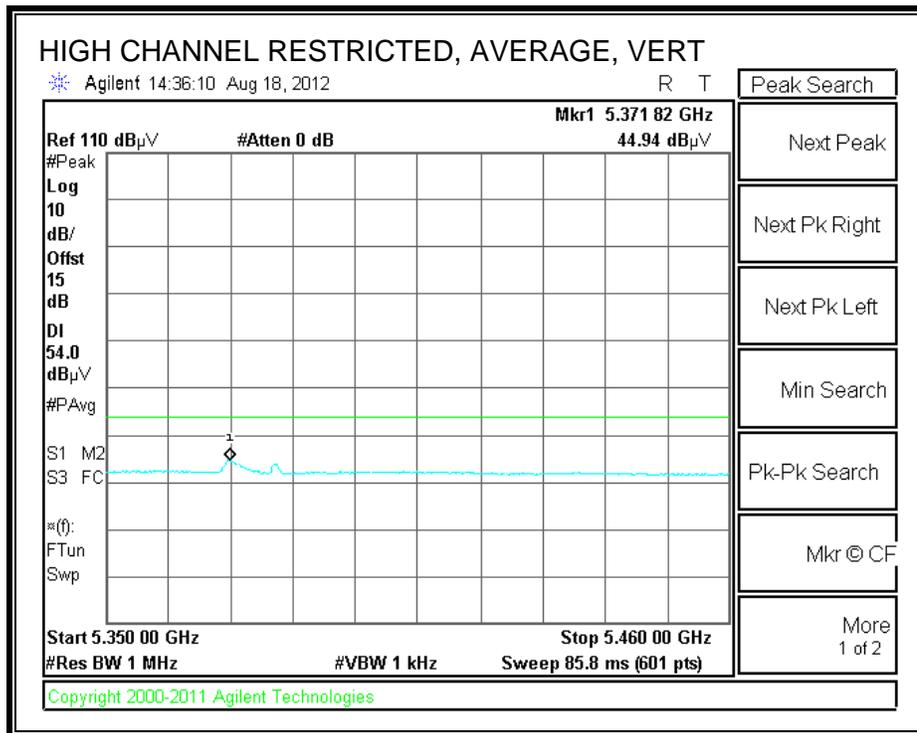
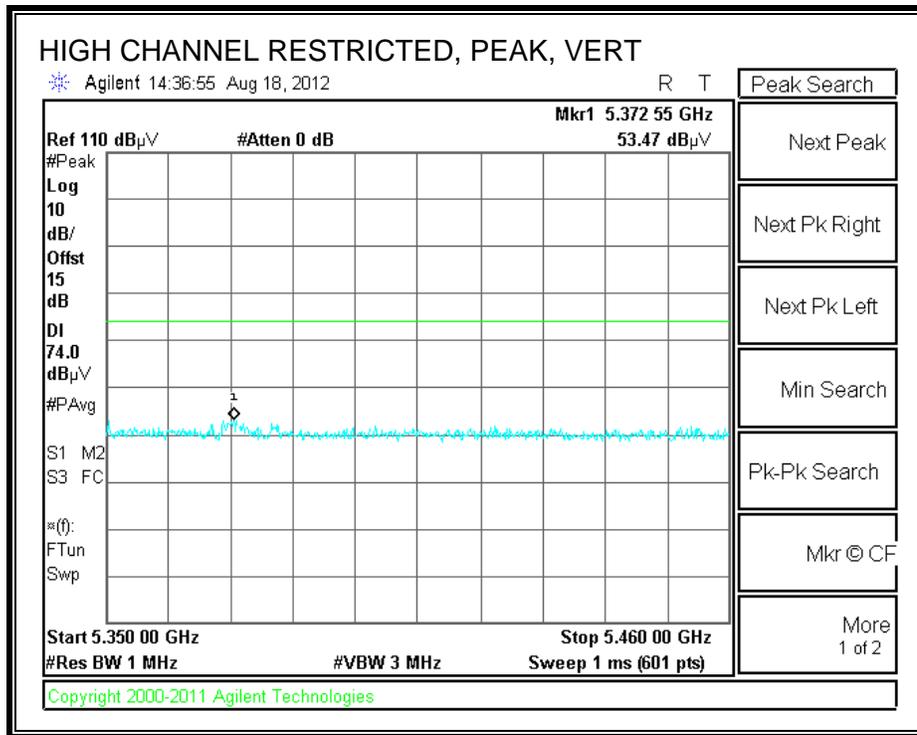
Note: No other emissions were detected above the system noise floor.

8.5. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.3 GHz BAND

EUT WITH USB CHARGER

RESTRICTED BANEDGE (HIGH CHANNEL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Tony & Roy
 Date: 08/23/12
 Project #: 12U14580
 Company: LG
 Test Target: FCC Class B
 Mode Oper: 11n 5.3GHz Tx Continuously
 EUT WITH USB CHARGER

f Measurement Frequency Amp Preamp Gain Average Field Strength Limit
 Dist Distance to Antenna D Corr Distance Correct to 3 meters Peak Field Strength Limit
 Read Analyzer Reading Avg Average Field Strength @ 3 m Margin vs. Average Limit
 AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit
 CL Cable Loss HPF High Pass Filter

f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
5260 MHz 11n													
15.780	3.0	35.0	38.2	12.6	-33.9	0.0	0.7	52.6	74.0	-21.4	H	P	
15.780	3.0	25.1	38.2	12.6	-33.9	0.0	0.7	42.7	54.0	-11.3	H	A	
15.780	3.0	35.3	38.2	12.6	-33.9	0.0	0.7	52.9	74.0	-21.1	V	P	
15.780	3.0	25.1	38.2	12.6	-33.9	0.0	0.7	42.7	54.0	-11.3	V	A	
5300 MHz 11n													
15.900	3.0	35.3	37.8	12.7	-33.9	0.0	0.7	52.6	74.0	-21.4	H	P	
15.900	3.0	25.4	37.8	12.7	-33.9	0.0	0.7	42.7	54.0	-11.3	H	A	
15.900	3.0	36.0	37.8	12.7	-33.9	0.0	0.7	53.3	74.0	-20.7	V	P	
15.900	3.0	25.5	37.8	12.7	-33.9	0.0	0.7	42.8	54.0	-11.2	V	A	
5320 MHz 11n													
15.960	3.0	35.3	37.6	12.7	-33.9	0.0	0.7	52.4	74.0	-21.6	H	P	
15.960	3.0	25.4	37.6	12.7	-33.9	0.0	0.7	42.5	54.0	-11.5	H	A	
15.960	3.0	35.7	37.6	12.7	-33.9	0.0	0.7	52.8	74.0	-21.2	V	P	
15.960	3.0	25.6	37.6	12.7	-33.9	0.0	0.7	42.7	54.0	-11.3	V	A	

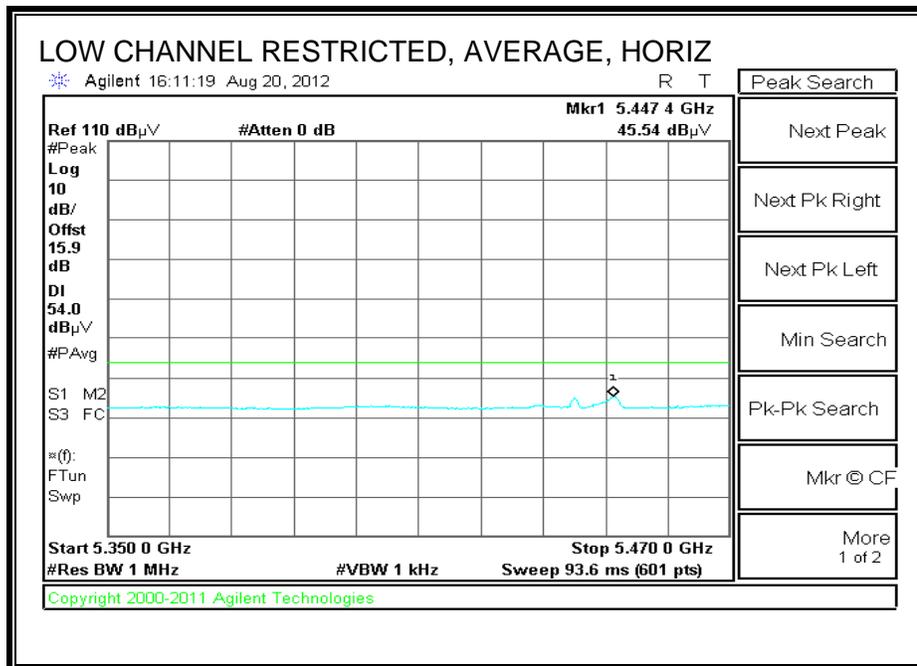
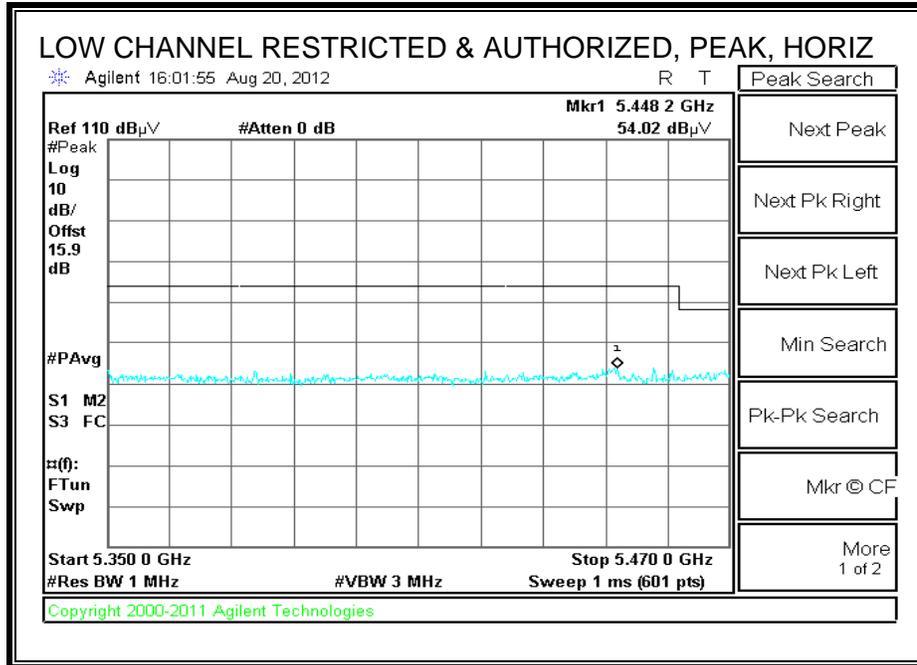
Rev. 4.1.2.7

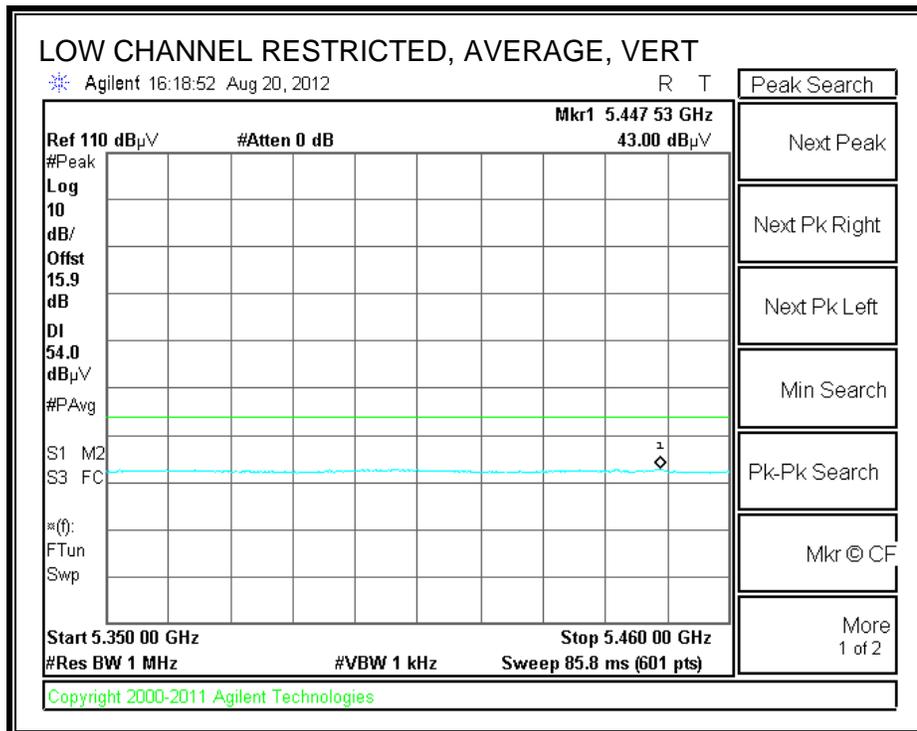
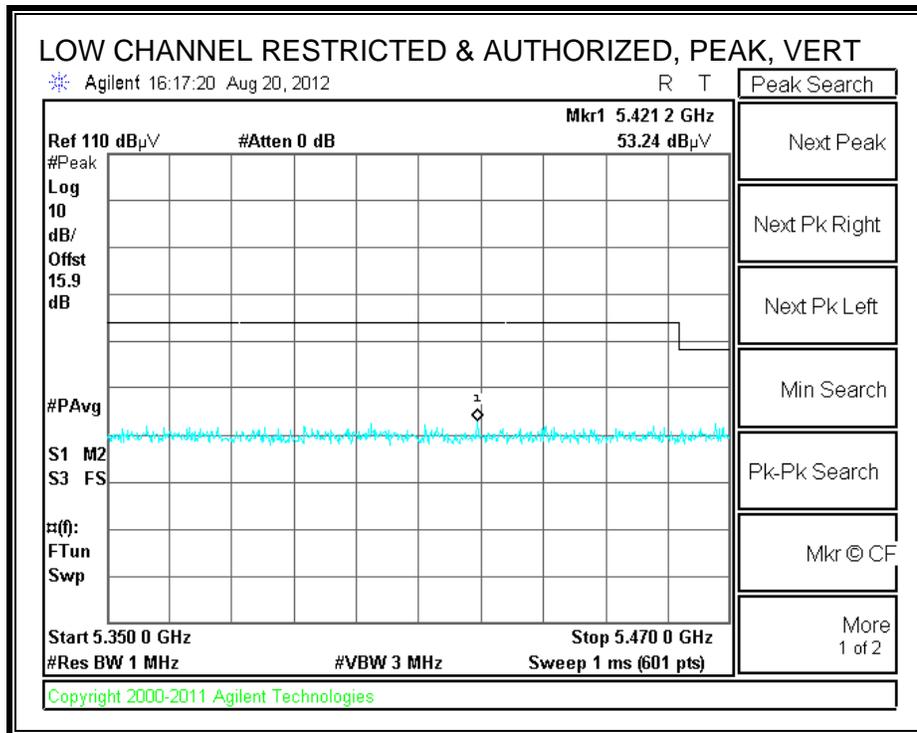
Note: No other emissions were detected above the system noise floor.

8.6. TX ABOVE 1 GHz 802.11a MODE IN THE 5.6 GHz BAND

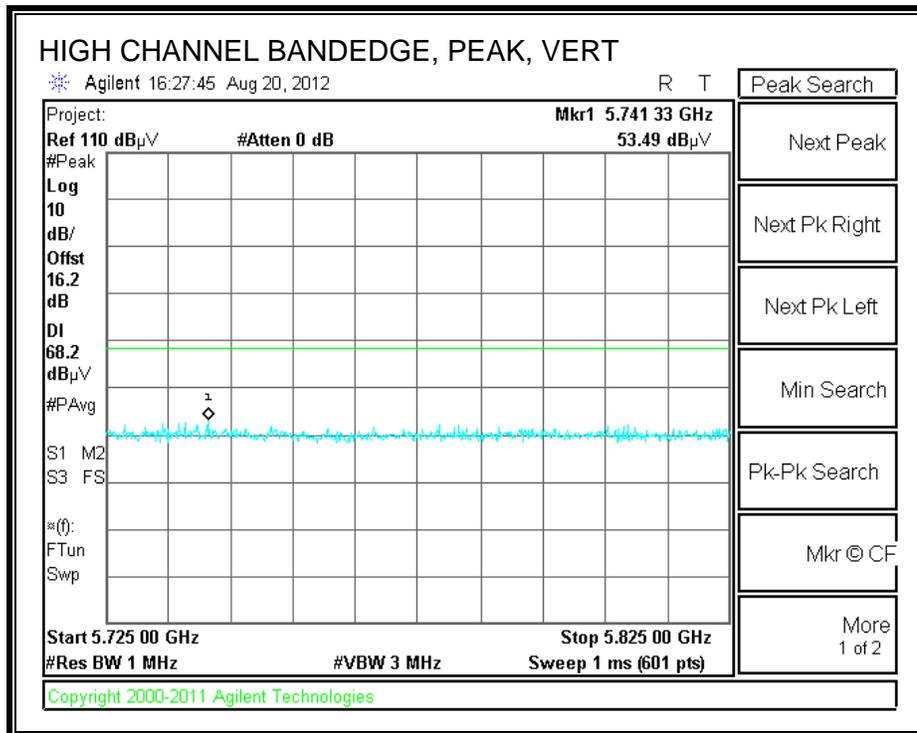
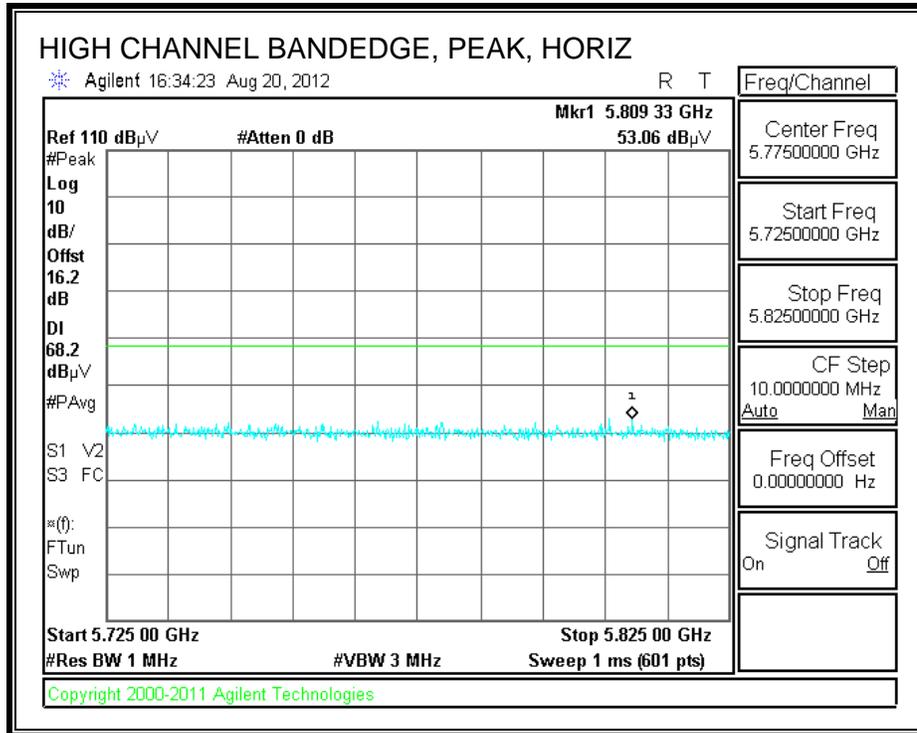
EUT WITH USB CHARGER

RESTRICTED & AUTHORIZED BANDEDGE (LOW CHANNEL)





AUTHORIZED BANDEGE (HIGH CHANNEL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
 Date: 08/20/12
 Project #: 12U14580
 Company: LG
 Test Target: FCC 15.407
 Mode Oper: a mode, 5.6GHz
 Configuration: EUT with USB Charger

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter	

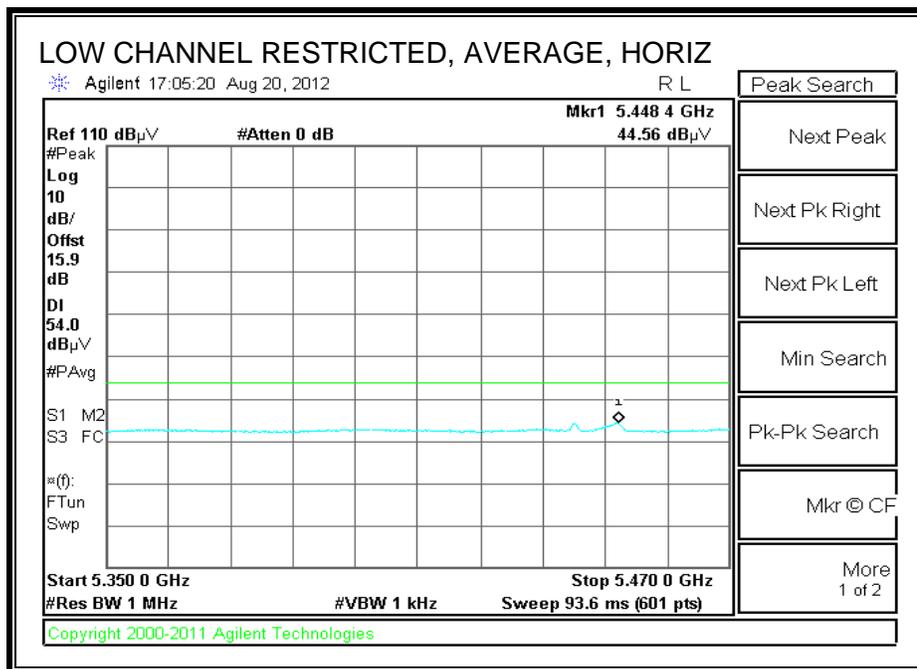
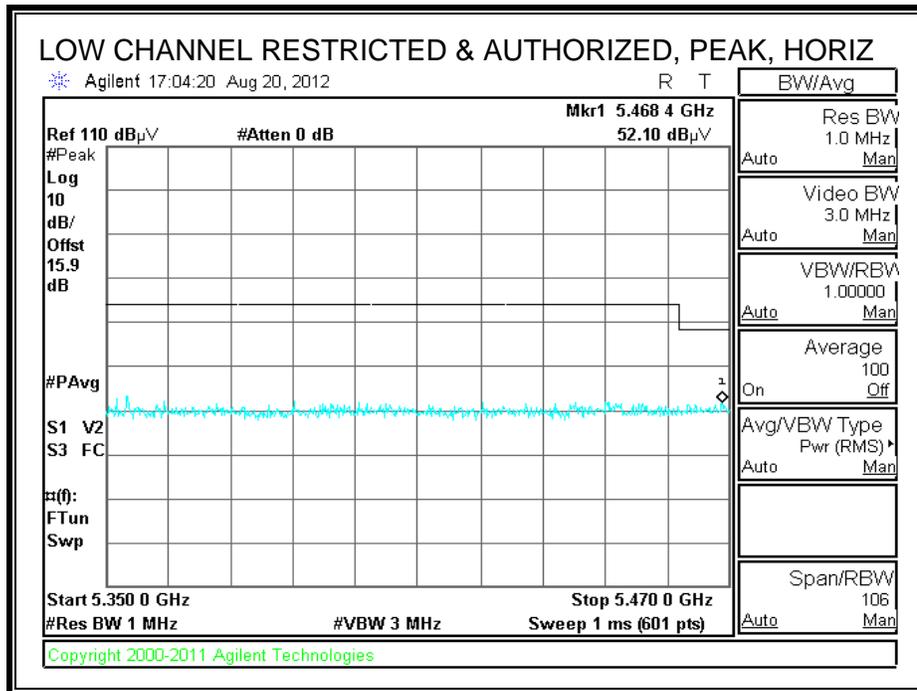
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Ch. 5500MHz													
11.000	3.0	34.1	38.3	10.1	-35.6	0.0	0.7	47.6	74.0	-26.4	V	P	
11.000	3.0	24.4	38.3	10.1	-35.6	0.0	0.7	37.9	54.0	-16.1	V	A	
11.000	3.0	34.3	38.3	10.1	-35.6	0.0	0.7	47.7	74.0	-26.3	H	P	
11.000	3.0	25.3	38.3	10.1	-35.6	0.0	0.7	38.8	54.0	-15.2	H	A	
Mid Ch. 5580MHz													
11.160	3.0	35.0	38.5	10.2	-35.6	0.0	0.7	48.8	74.0	-25.2	V	P	
11.160	3.0	26.4	38.5	10.2	-35.6	0.0	0.7	40.2	54.0	-13.8	V	A	
11.160	3.0	36.6	38.5	10.2	-35.6	0.0	0.7	50.4	74.0	-23.6	H	P	
11.160	3.0	27.7	38.5	10.2	-35.6	0.0	0.7	41.5	54.0	-12.5	H	A	
High Ch. 5700MHz													
11.400	3.0	36.1	38.7	10.4	-35.6	0.0	0.7	50.4	74.0	-23.6	V	P	
11.400	3.0	25.9	38.7	10.4	-35.6	0.0	0.7	40.2	54.0	-13.8	V	A	
11.400	3.0	37.5	38.7	10.4	-35.6	0.0	0.7	51.8	74.0	-22.2	H	P	
11.400	3.0	28.0	38.7	10.4	-35.6	0.0	0.7	42.4	54.0	-11.6	H	A	

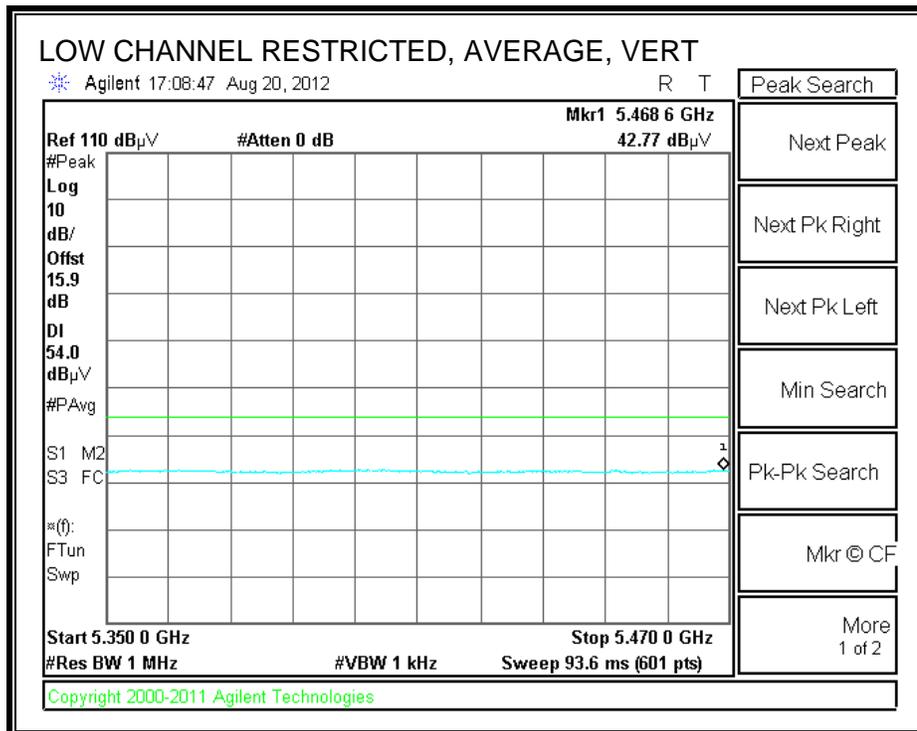
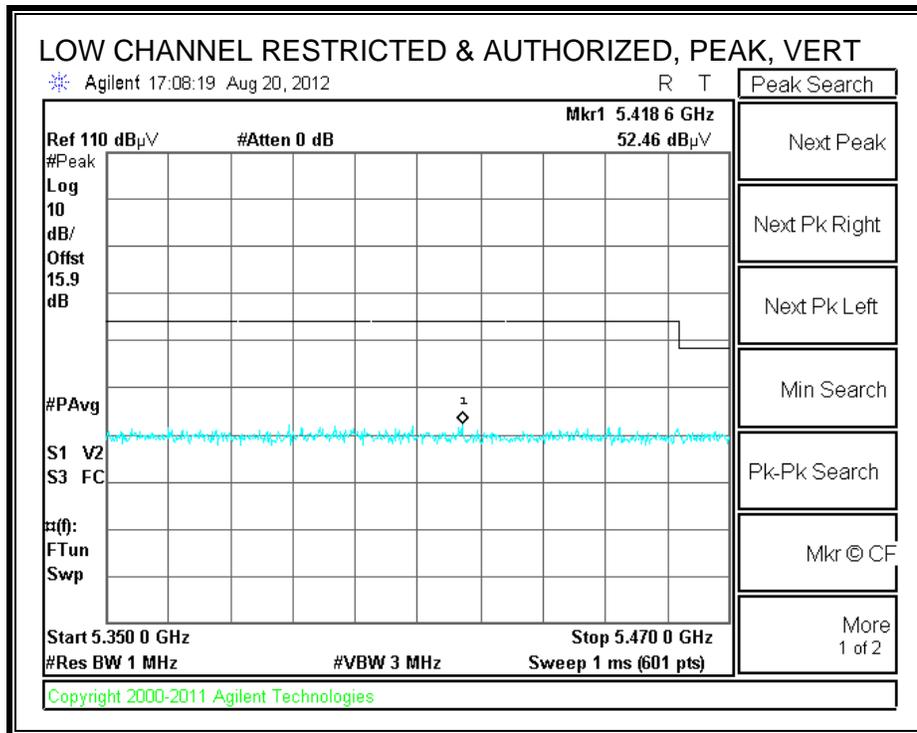
Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

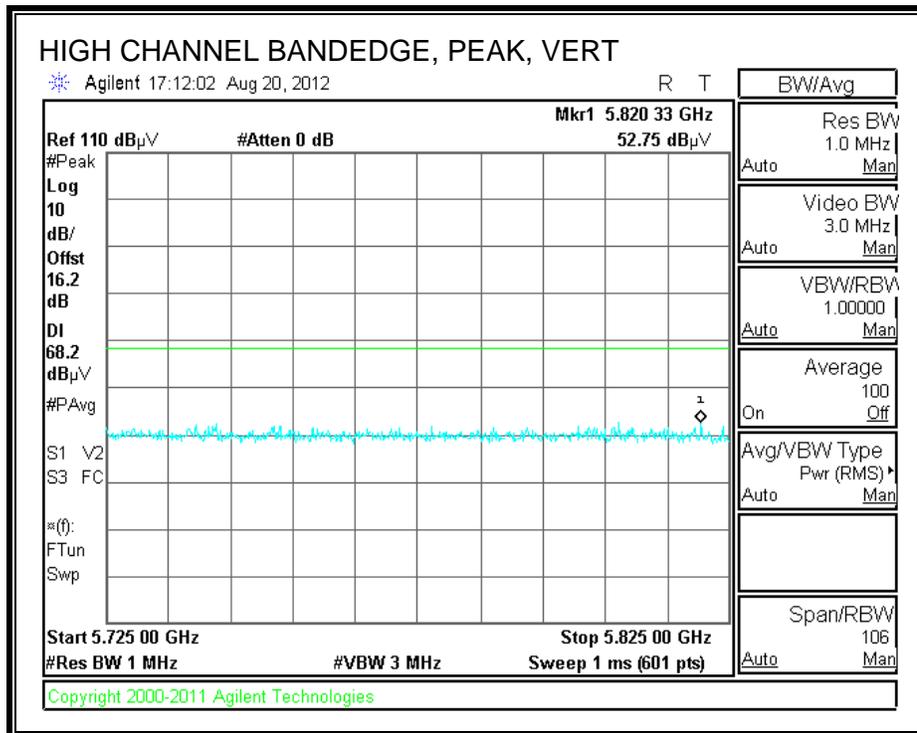
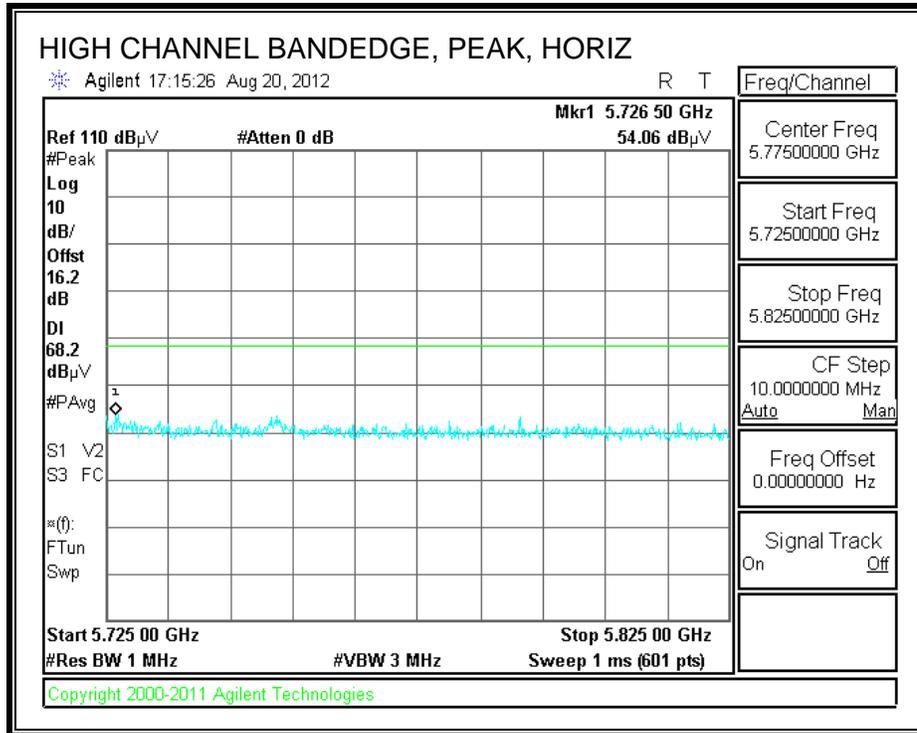
8.7. TX ABOVE 1GHz 802.11n HT20 MODE IN THE 5.6 GHz BAND

RESTRICTED & AUTHORIZED BANDEDGE (LOW CHANNEL)





AUTHORIZED BANDEGE (HIGH CHANNEL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
 Date: 08/20/12
 Project #: 12U14580
 Company: LG
 Test Target: FCC 15.407
 Mode Oper: HT20 mode, 5.6GHz
 Configuration: EUT with USB Charger

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter	

f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dB	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Ch. 5500MHz													
11.000	3.0	34.5	38.3	10.1	-35.6	0.0	0.7	48.0	74.0	-26.0	H	P	
11.000	3.0	25.3	38.3	10.1	-35.6	0.0	0.7	38.8	54.0	-15.2	H	A	
11.000	3.0	34.5	38.3	10.1	-35.6	0.0	0.7	48.0	74.0	-26.0	V	P	
11.000	3.0	25.0	38.3	10.1	-35.6	0.0	0.7	38.4	54.0	-15.6	V	A	
Mid Ch. 5580MHz													
11.160	3.0	35.7	38.5	10.2	-35.6	0.0	0.7	49.5	74.0	-24.5	H	P	
11.160	3.0	26.3	38.5	10.2	-35.6	0.0	0.7	40.1	54.0	-13.9	H	A	
11.160	3.0	35.8	38.5	10.2	-35.6	0.0	0.7	49.6	74.0	-24.4	V	P	
11.160	3.0	26.5	38.5	10.2	-35.6	0.0	0.7	40.3	54.0	-13.7	V	A	
High Ch. 5700MHz													
11.400	3.0	36.6	38.7	10.4	-35.6	0.0	0.7	50.9	74.0	-23.1	H	P	
11.400	3.0	26.7	38.7	10.4	-35.6	0.0	0.7	41.0	54.0	-13.0	H	A	
11.400	3.0	34.9	38.7	10.4	-35.6	0.0	0.7	49.2	74.0	-24.8	V	P	
11.400	3.0	25.9	38.7	10.4	-35.6	0.0	0.7	40.2	54.0	-13.8	V	A	

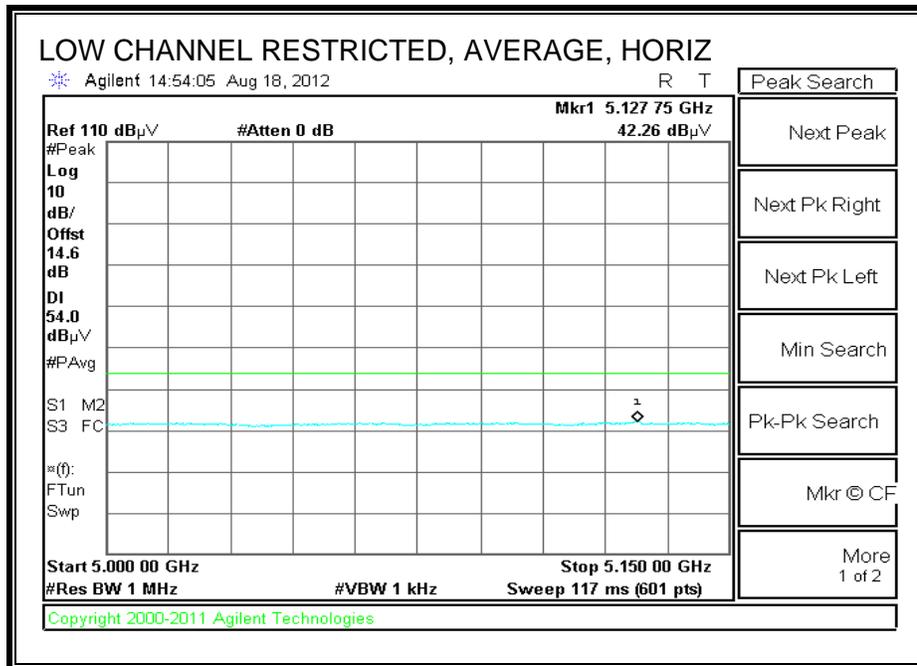
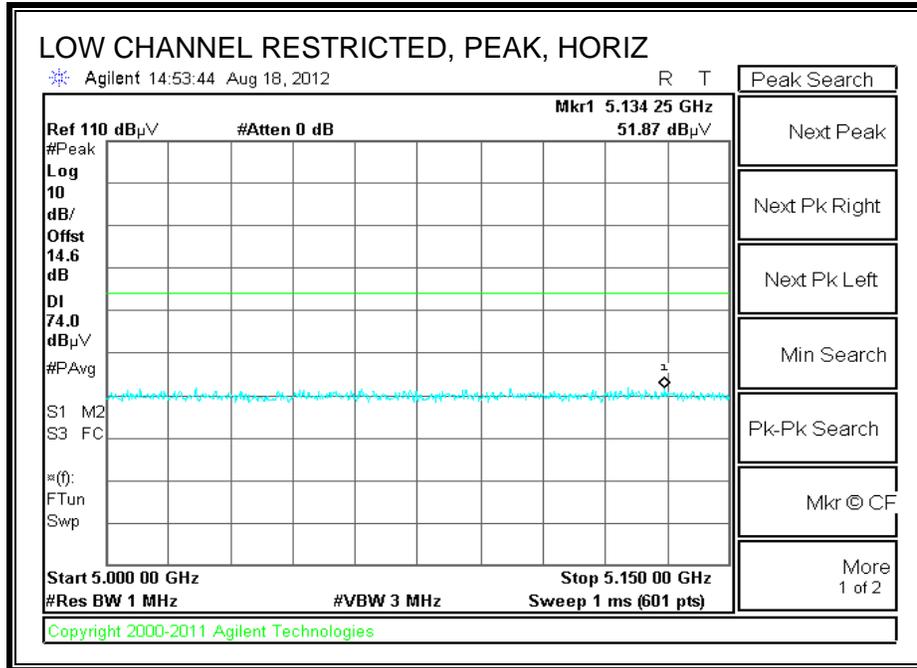
Rev. 4.1.2.7

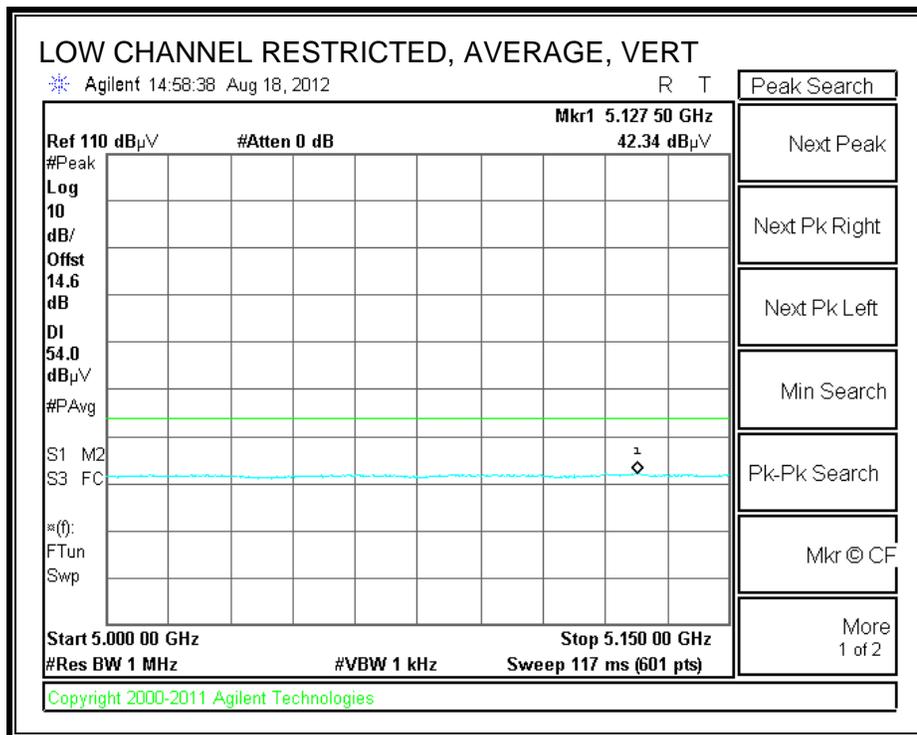
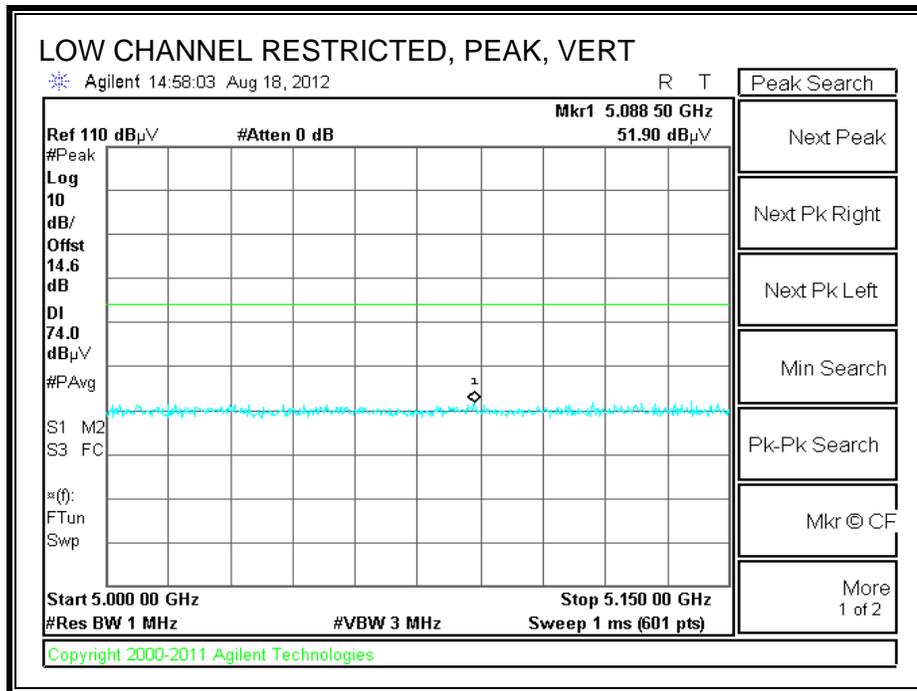
Note: No other emissions were detected above the system noise floor.

8.8. TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND

EUT with Inductive Charger

RESTRICTED BANDEDGE (LOW CHANNEL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Tony & Roy
 Date: 08/23/12
 Project #: 12U14580
 Company: LG
 Test Target: FCC Class B
 Mode Oper: 11a 5.2 GHz Tx Continuously
 EUT with Inductive Charger

f Measurement Frequency Amp Preamp Gain Average Field Strength Limit
 Dist Distance to Antenna D Corr Distance Correct to 3 meters Peak Field Strength Limit
 Read Analyzer Reading Avg Average Field Strength @ 3 m Margin vs. Average Limit
 AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit
 CL Cable Loss HPF High Pass Filter

f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
5180 MHz 11a													
15.540	3.0	35.0	39.0	12.5	-34.0	0.0	0.7	53.2	74.0	-20.8	H	P	
15.540	3.0	25.4	39.0	12.5	-34.0	0.0	0.7	43.6	54.0	-10.4	H	A	
15.540	3.0	36.0	39.0	12.5	-34.0	0.0	0.7	54.3	74.0	-19.7	V	P	
15.540	3.0	25.4	39.0	12.5	-34.0	0.0	0.7	43.6	54.0	-10.4	V	A	
5200 MHz 11a													
15.600	3.0	35.2	38.8	12.5	-34.0	0.0	0.7	53.3	74.0	-20.7	H	P	
15.600	3.0	25.2	38.8	12.5	-34.0	0.0	0.7	43.2	54.0	-10.8	H	A	
15.600	3.0	35.0	38.8	12.5	-34.0	0.0	0.7	53.1	74.0	-20.9	V	P	
15.600	3.0	25.2	38.8	12.5	-34.0	0.0	0.7	43.3	54.0	-10.7	V	A	
5240 MHz 11a													
15.720	3.0	35.0	38.4	12.6	-34.0	0.0	0.7	52.8	74.0	-21.2	H	P	
15.720	3.0	25.1	38.4	12.6	-34.0	0.0	0.7	42.9	54.0	-11.1	H	A	
15.720	3.0	34.9	38.4	12.6	-34.0	0.0	0.7	52.7	74.0	-21.3	V	P	
15.720	3.0	25.2	38.4	12.6	-34.0	0.0	0.7	42.9	54.0	-11.1	V	A	

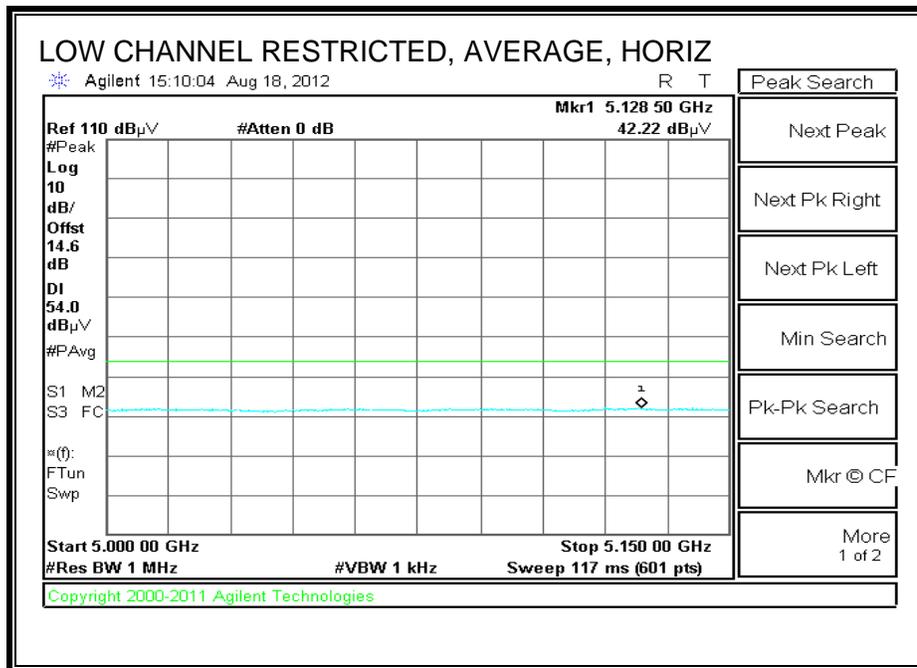
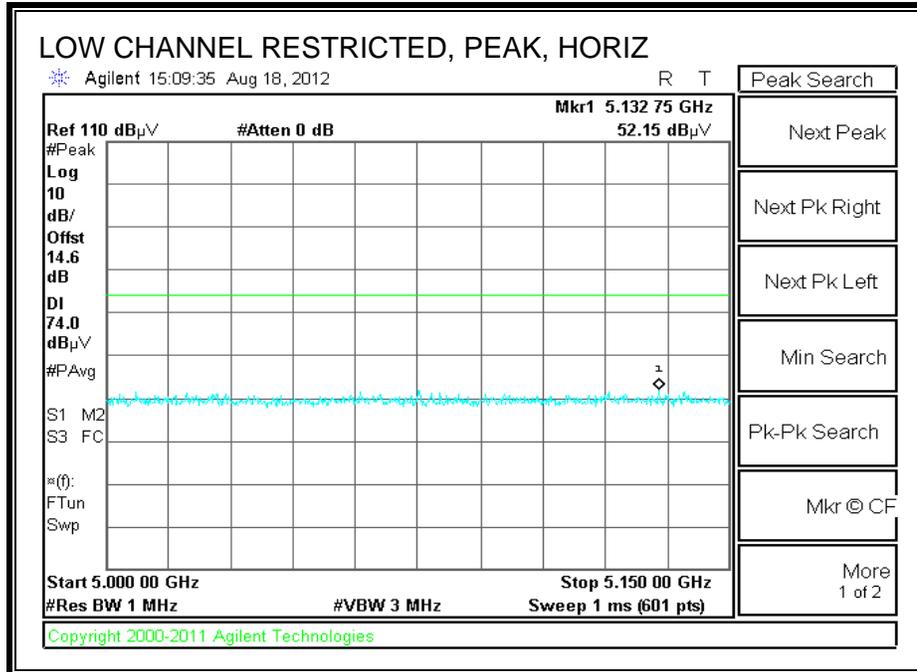
Rev. 4.1.2.7

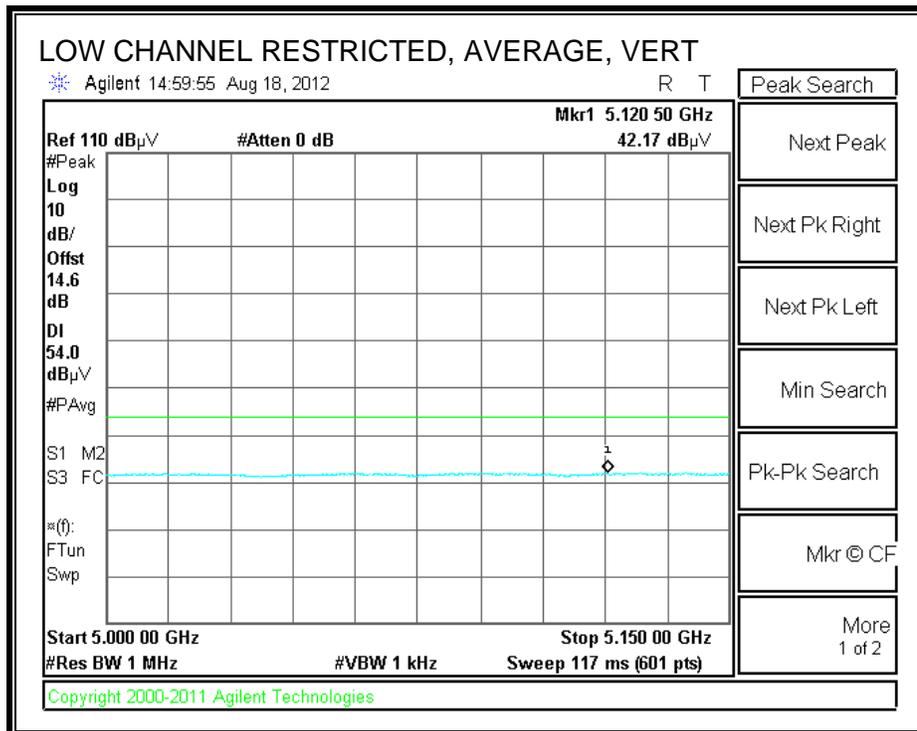
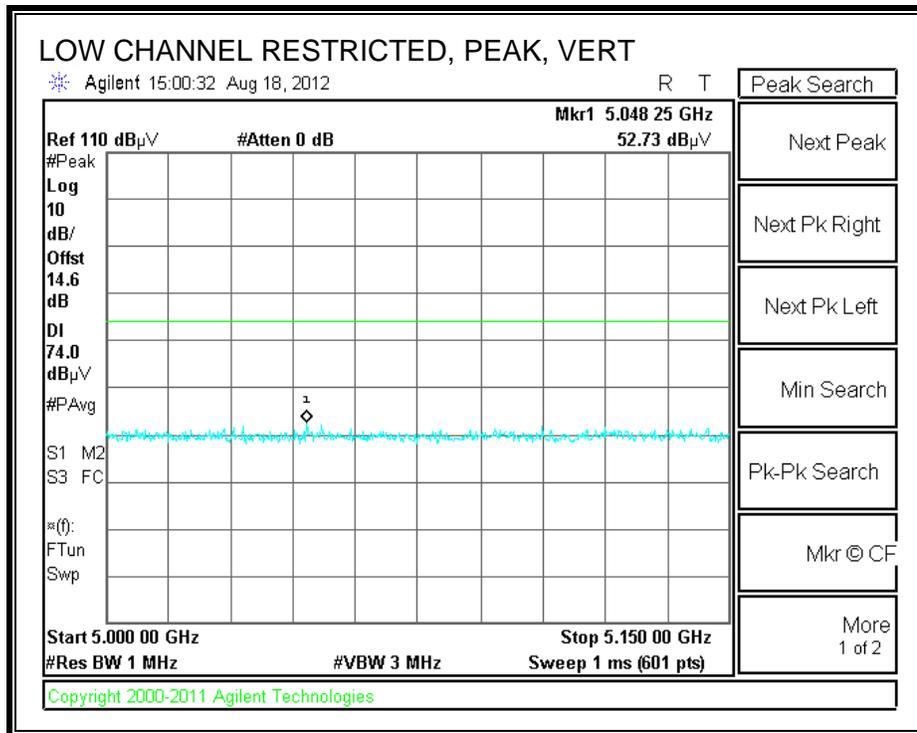
Note: No other emissions were detected above the system noise floor.

8.9. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND

EUT with Inductive Charger

RESTRICTED BANDEDGE (LOW CHANNEL)





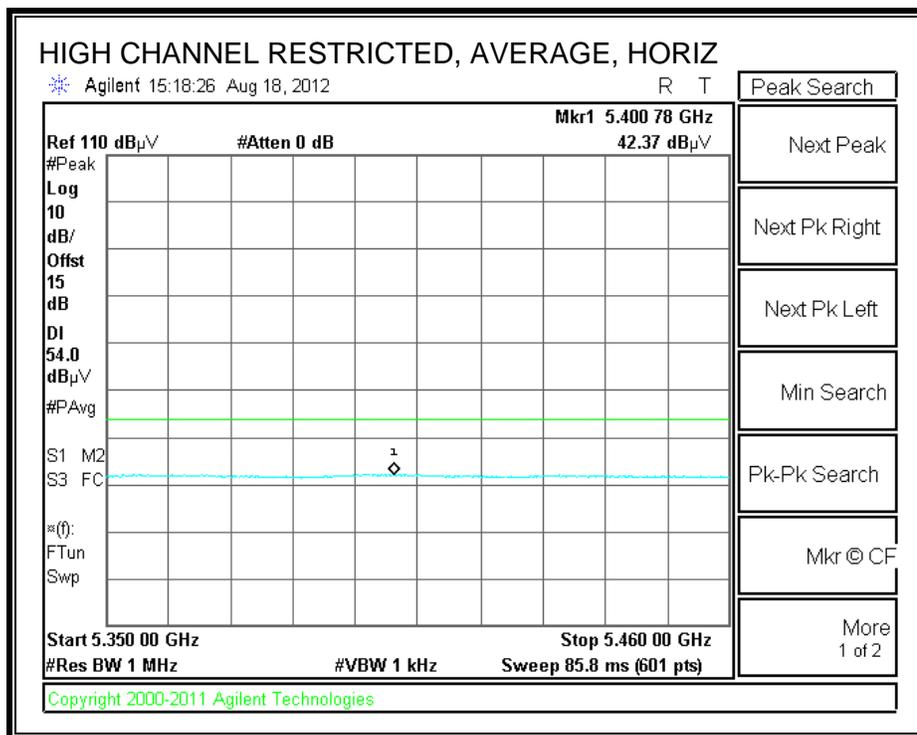
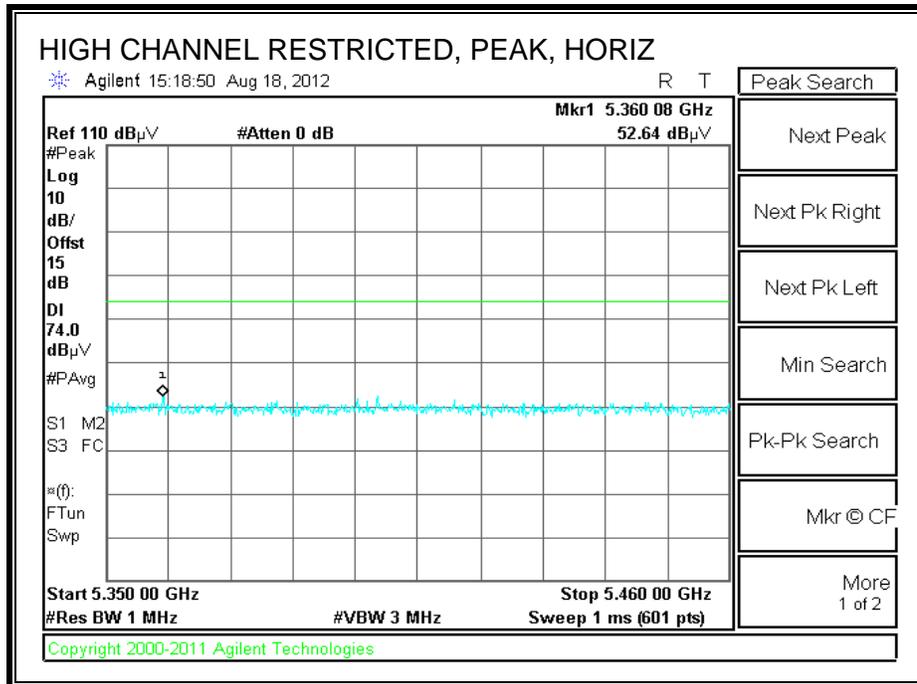
HARMONICS AND SPURIOUS EMISSIONS

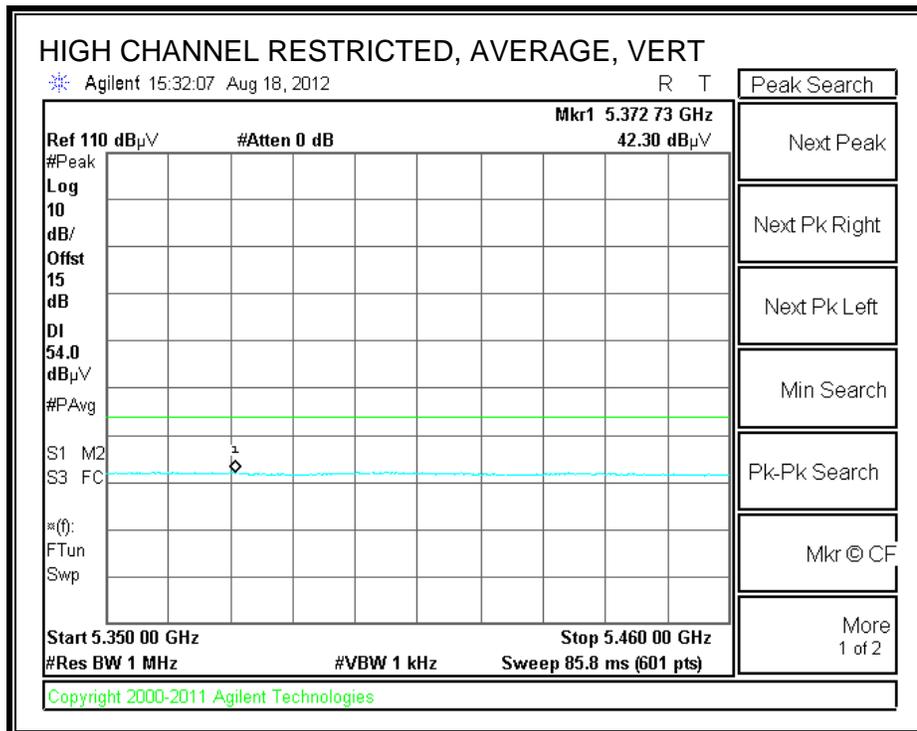
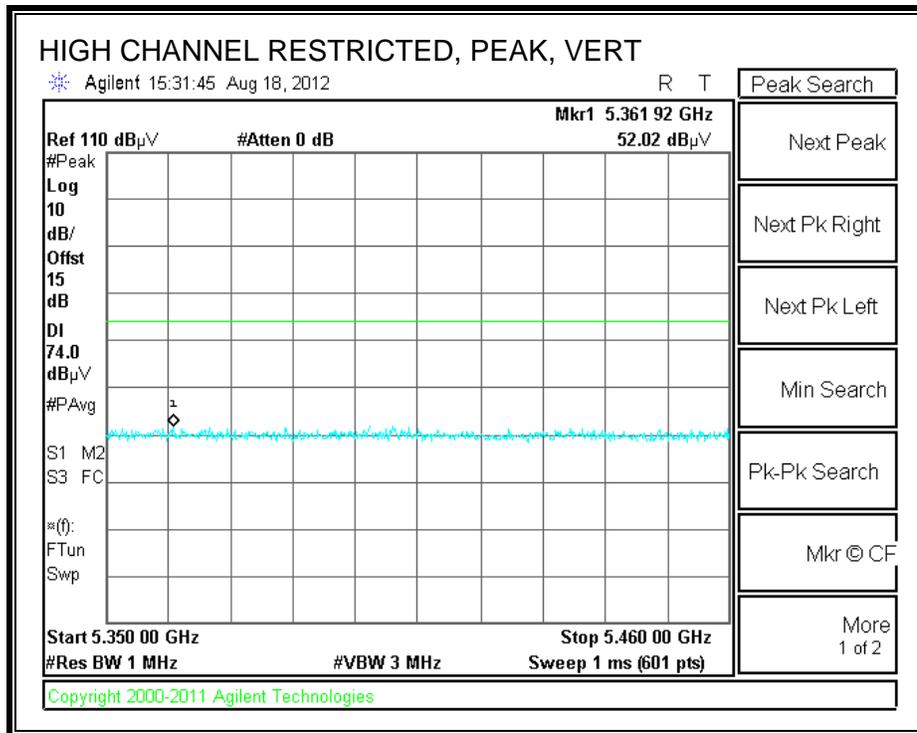
High Frequency Measurement													
Compliance Certification Services, Fremont 5m Chamber													
Test Engr:		Tony & Roy											
Date:		08/23/12											
Project #:		12U14580											
Company:		LG											
Test Target:		FCC Class B											
Mode Oper:		11n 5.2GHz Tx Continuously											
f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit									
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit									
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit									
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit									
CL	Cable Loss	HPF	High Pass Filter										
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP
5180 MHz 11n													
15.540	3.0	35.4	39.0	12.5	-34.0	0.0	0.7	53.7	74.0	-20.3	V	P	
15.540	3.0	25.4	39.0	12.5	-34.0	0.0	0.7	43.7	54.0	-10.3	V	A	
15.540	3.0	34.9	39.0	12.5	-34.0	0.0	0.7	53.1	74.0	-20.9	H	P	
15.540	3.0	25.5	39.0	12.5	-34.0	0.0	0.7	43.7	54.0	-10.3	H	A	
5200 MHz 11n													
15.540	3.0	36.5	39.0	12.5	-34.0	0.0	0.7	54.7	74.0	-19.3	V	P	
15.540	3.0	25.5	39.0	12.5	-34.0	0.0	0.7	43.7	54.0	-10.3	V	A	
15.540	3.0	36.7	39.0	12.5	-34.0	0.0	0.7	54.9	74.0	-19.1	H	P	
15.540	3.0	25.4	39.0	12.5	-34.0	0.0	0.7	43.6	54.0	-10.4	H	A	
5240 MHz 11n													
15.720	3.0	35.3	38.4	12.6	-34.0	0.0	0.7	53.1	74.0	-20.9	V	P	
15.720	3.0	25.1	38.4	12.6	-34.0	0.0	0.7	42.9	54.0	-11.1	V	A	
15.720	3.0	35.1	38.4	12.6	-34.0	0.0	0.7	52.9	74.0	-21.1	H	P	
15.720	3.0	25.2	38.4	12.6	-34.0	0.0	0.7	42.9	54.0	-11.1	H	A	
Rev. 4.1.2.7													
Note: No other emissions were detected above the system noise floor.													

8.10. TX ABOVE 1 GHz 802.11a MODE IN THE 5.3 GHz BAND

EUT with Inductive Charger

RESTRICTED BANEDGE (HIGH CHANNEL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Tony & Roy
 Date: 08/23/12
 Project #: 12U14580
 Company: LG
 Test Target: FCC Class B
 Mode Oper: 11a 5.3 GHz Tx Continuously

f Measurement Frequency Amp Preamp Gain Average Field Strength Limit
 Dist Distance to Antenna D Corr Distance Correct to 3 meters Peak Field Strength Limit
 Read Analyzer Reading Avg Average Field Strength @ 3 m Margin vs. Average Limit
 AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit
 CL Cable Loss HPF High Pass Filter

f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
5260 MHz 11a													
15.780	3.0	35.6	38.2	12.6	-33.9	0.0	0.7	53.2	74.0	-20.8	H	P	
15.780	3.0	25.3	38.2	12.6	-33.9	0.0	0.7	42.9	54.0	-11.1	H	A	
15.780	3.0	35.3	38.2	12.6	-33.9	0.0	0.7	52.9	74.0	-21.1	V	P	
15.780	3.0	25.2	38.2	12.6	-33.9	0.0	0.7	42.8	54.0	-11.2	V	A	
5300 MHz 11a													
15.900	3.0	35.0	37.8	12.7	-33.9	0.0	0.7	52.2	74.0	-21.8	H	P	
15.900	3.0	25.5	37.8	12.7	-33.9	0.0	0.7	42.7	54.0	-11.3	H	A	
15.900	3.0	35.1	37.8	12.7	-33.9	0.0	0.7	52.4	74.0	-21.6	V	P	
15.900	3.0	25.7	37.8	12.7	-33.9	0.0	0.7	42.9	54.0	-11.1	V	A	
5320 MHz 11a													
15.960	3.0	35.9	37.6	12.7	-33.9	0.0	0.7	53.0	74.0	-21.0	H	P	
15.960	3.0	25.5	37.6	12.7	-33.9	0.0	0.7	42.6	54.0	-11.4	H	A	
15.960	3.0	35.8	37.6	12.7	-33.9	0.0	0.7	53.0	74.0	-21.0	V	P	
15.960	3.0	25.4	37.6	12.7	-33.9	0.0	0.7	42.6	54.0	-11.4	V	A	

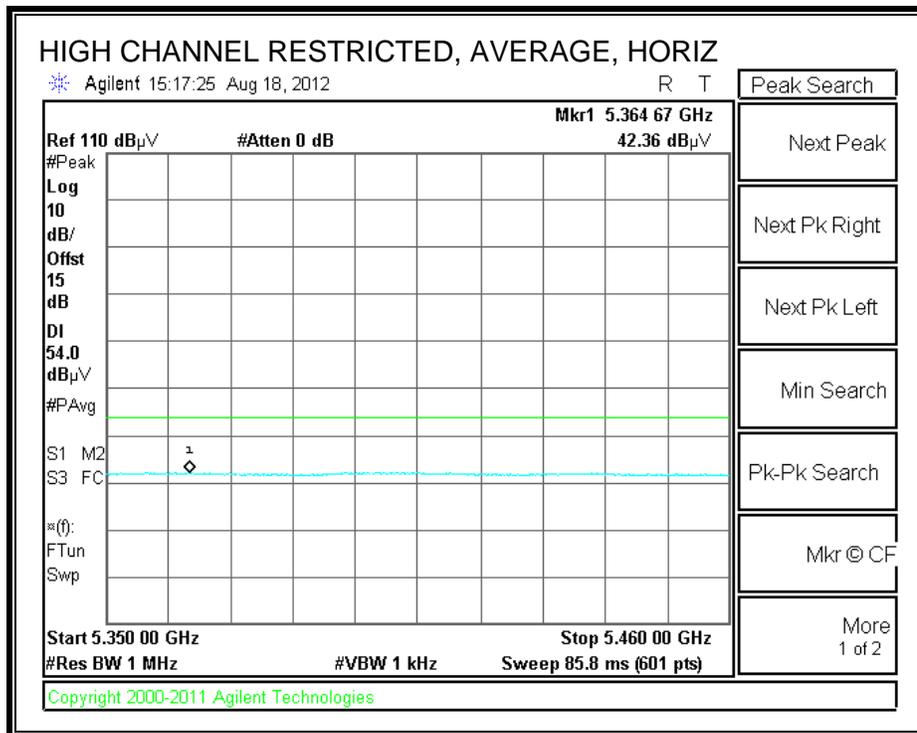
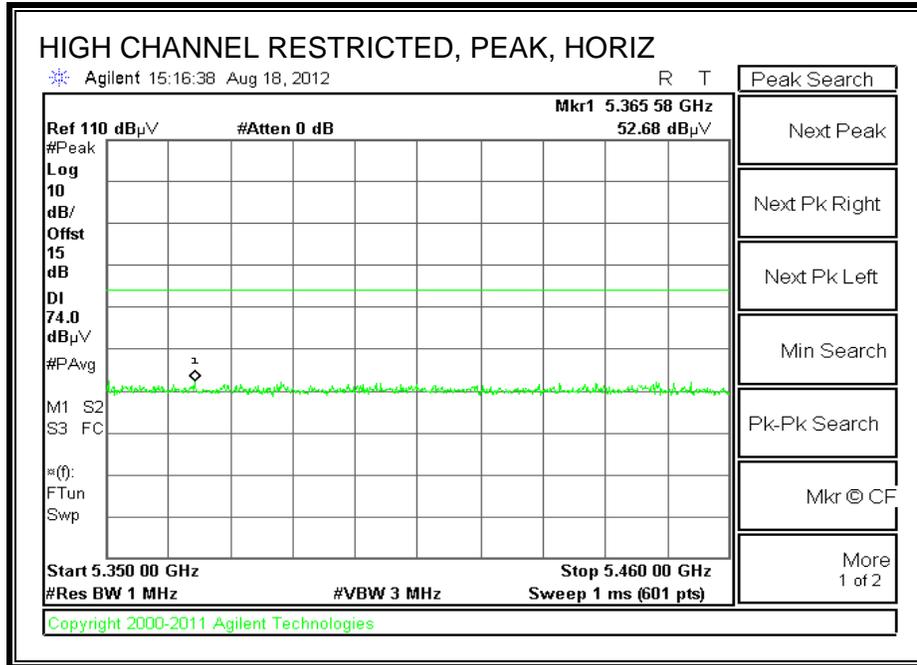
Rev. 4.1.2.7

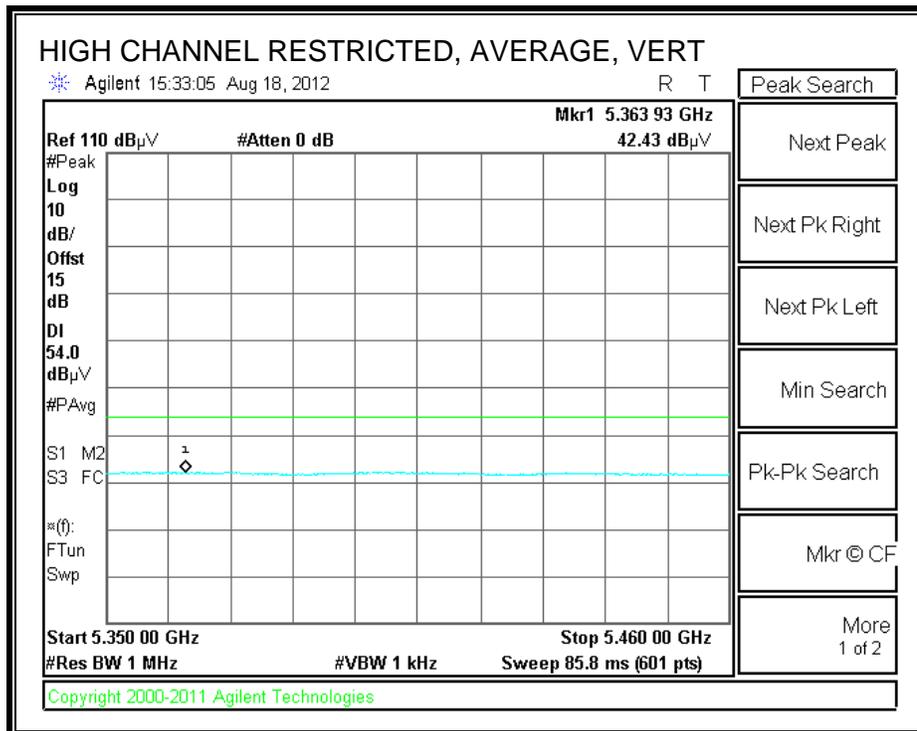
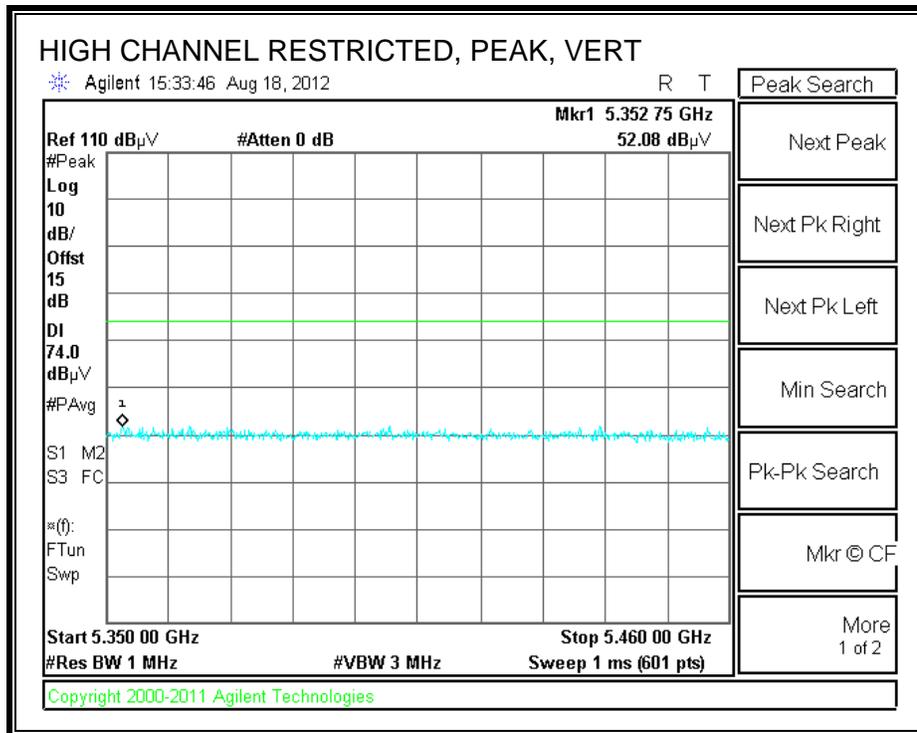
Note: No other emissions were detected above the system noise floor.

8.11. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.3 GHz BAND

EUT with Inductive Charger

RESTRICTED BANDEDGE (HIGH CHANNEL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Tony & Roy
 Date: 08/23/12
 Project #: 12U14580
 Company: LG
 Test Target: FCC Class B
 Mode Oper: 11n 5.3GHz Tx Continuously
 EUT with Inductive Charger

f Measurement Frequency Amp Preamp Gain Average Field Strength Limit
 Dist Distance to Antenna D Corr Distance Correct to 3 meters Peak Field Strength Limit
 Read Analyzer Reading Avg Average Field Strength @ 3 m Margin vs. Average Limit
 AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit
 CL Cable Loss HPF High Pass Filter

f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
5260 MHz 11n													
15.780	3.0	35.7	38.2	12.6	-33.9	0.0	0.7	53.3	74.0	-20.7	H	P	
15.780	3.0	25.2	38.2	12.6	-33.9	0.0	0.7	42.8	54.0	-11.2	H	A	
15.780	3.0	34.8	38.2	12.6	-33.9	0.0	0.7	52.4	74.0	-21.6	V	P	
15.780	3.0	25.2	38.2	12.6	-33.9	0.0	0.7	42.8	54.0	-11.2	V	A	
5300 MHz 11n													
15.900	3.0	36.3	37.8	12.7	-33.9	0.0	0.7	53.6	74.0	-20.4	H	P	
15.900	3.0	25.5	37.8	12.7	-33.9	0.0	0.7	42.8	54.0	-11.2	H	A	
15.900	3.0	36.1	37.8	12.7	-33.9	0.0	0.7	53.4	74.0	-20.6	V	P	
15.900	3.0	25.5	37.8	12.7	-33.9	0.0	0.7	42.8	54.0	-11.2	V	A	
5320 MHz 11n													
15.960	3.0	35.8	37.6	12.7	-33.9	0.0	0.7	52.9	74.0	-21.1	H	P	
15.960	3.0	25.4	37.6	12.7	-33.9	0.0	0.7	42.5	54.0	-11.5	H	A	
15.960	3.0	35.8	37.6	12.7	-33.9	0.0	0.7	52.9	74.0	-21.1	V	P	
15.960	3.0	25.4	37.6	12.7	-33.9	0.0	0.7	42.6	54.0	-11.4	V	A	

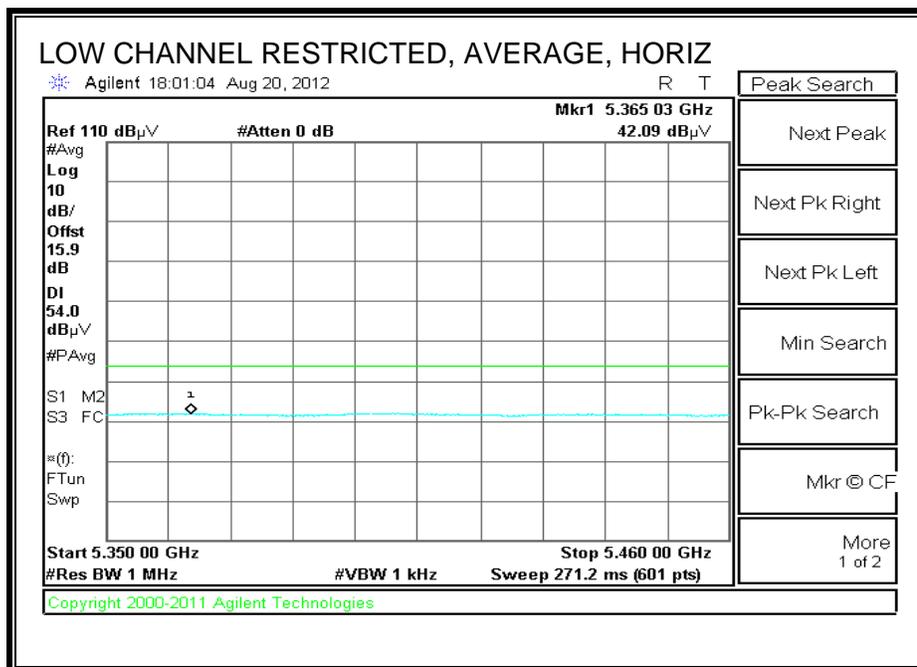
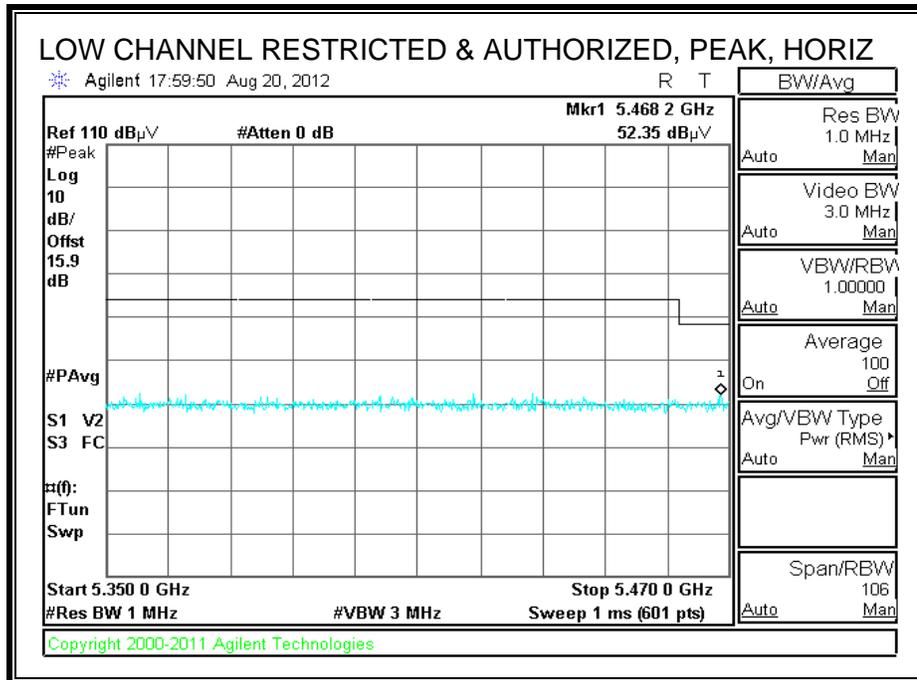
Rev. 4.1.2.7

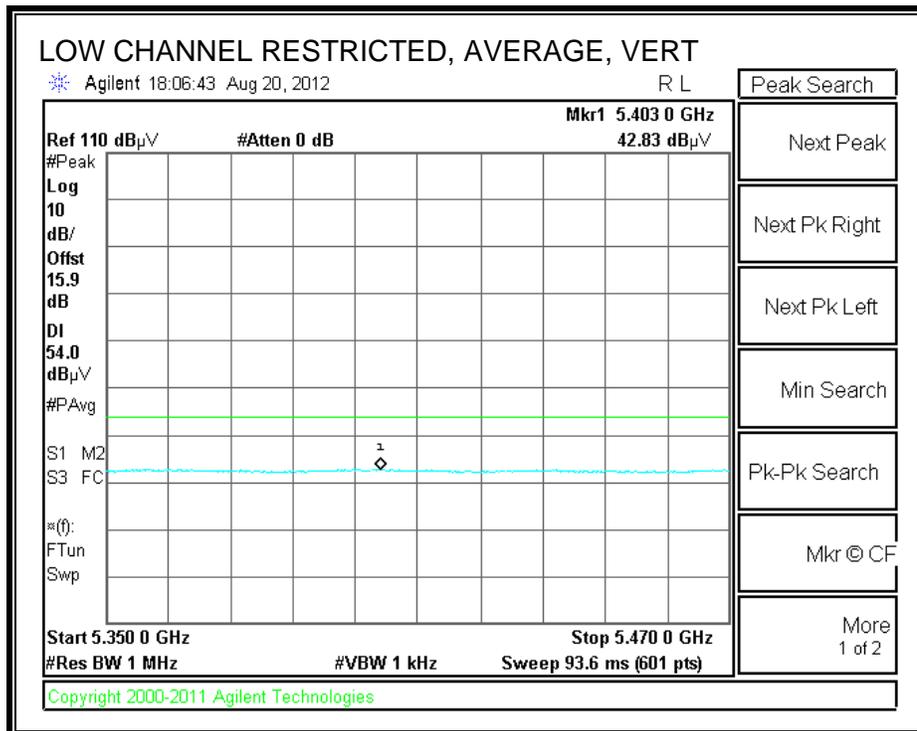
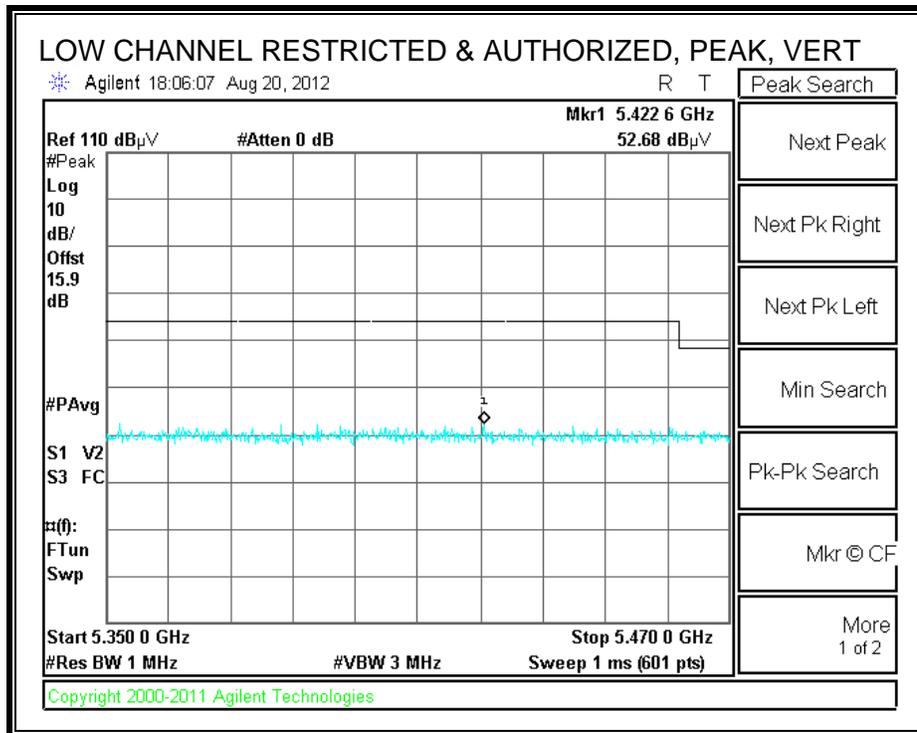
Note: No other emissions were detected above the system noise floor.

8.12. TX ABOVE 1 GHz 802.11a MODE IN THE 5.6 GHz BAND

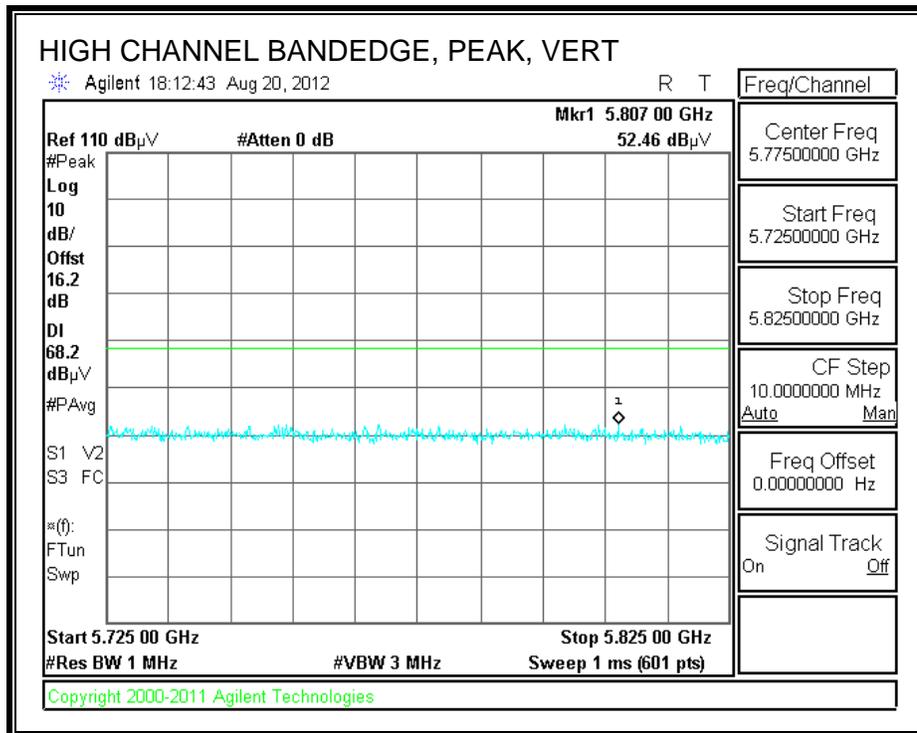
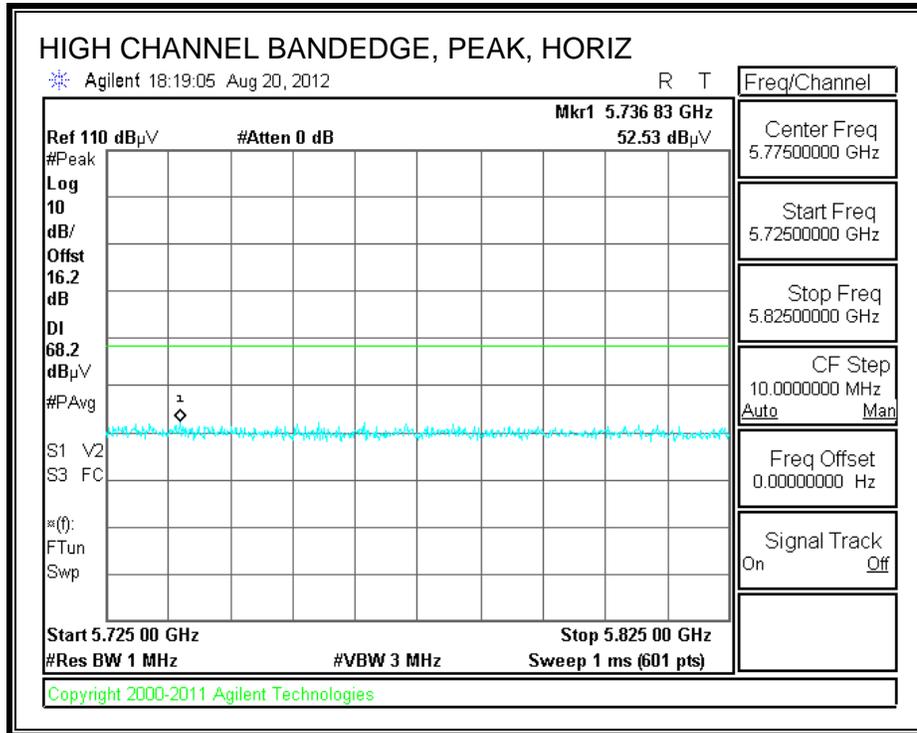
EUT with Inductive Charger

RESTRICTED & AUTHORIZED BANDEDGE (LOW CHANNEL)





AUTHORIZED BANDEGE (HIGH CHANNEL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
 Date: 08/20/12
 Project #: 12U14580
 Company: LG
 Test Target: FCC 15.407
 Mode Oper: a mode, 5.6GHz
 Configuration: EUT with Inductive Charger

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter	

f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Ch. 5500MHz													
11.000	3.0	34.3	38.3	10.1	-35.6	0.0	0.7	47.8	74.0	-26.2	V	P	
11.000	3.0	24.3	38.3	10.1	-35.6	0.0	0.7	37.7	54.0	-16.3	V	A	
11.000	3.0	34.1	38.3	10.1	-35.6	0.0	0.7	47.5	74.0	-26.5	H	P	
11.000	3.0	24.3	38.3	10.1	-35.6	0.0	0.7	37.7	54.0	-16.3	H	A	
Mid Ch. 5580MHz													
11.160	3.0	34.9	38.5	10.2	-35.6	0.0	0.7	48.7	74.0	-25.3	V	P	
11.160	3.0	25.6	38.5	10.2	-35.6	0.0	0.7	39.4	54.0	-14.6	V	A	
11.160	3.0	35.1	38.5	10.2	-35.6	0.0	0.7	48.9	74.0	-25.1	H	P	
11.160	3.0	25.1	38.5	10.2	-35.6	0.0	0.7	38.9	54.0	-15.1	H	A	
High Ch. 5700MHz													
11.400	3.0	35.1	38.7	10.4	-35.6	0.0	0.7	49.4	74.0	-24.6	V	P	
11.400	3.0	25.3	38.7	10.4	-35.6	0.0	0.7	39.6	54.0	-14.4	V	A	
11.400	3.0	34.7	38.7	10.4	-35.6	0.0	0.7	49.1	74.0	-24.9	H	P	
11.400	3.0	24.9	38.7	10.4	-35.6	0.0	0.7	39.2	54.0	-14.8	H	A	

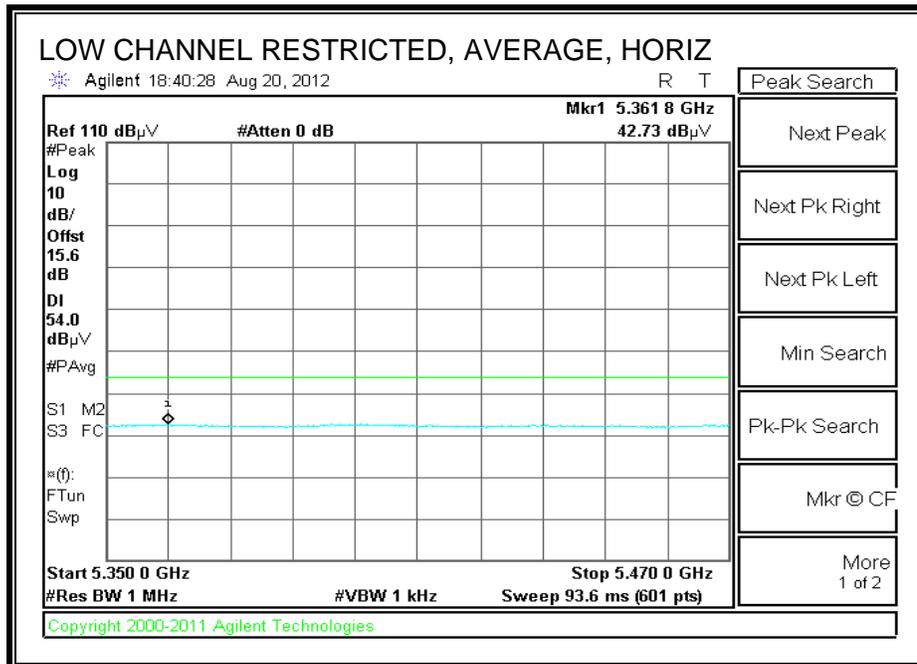
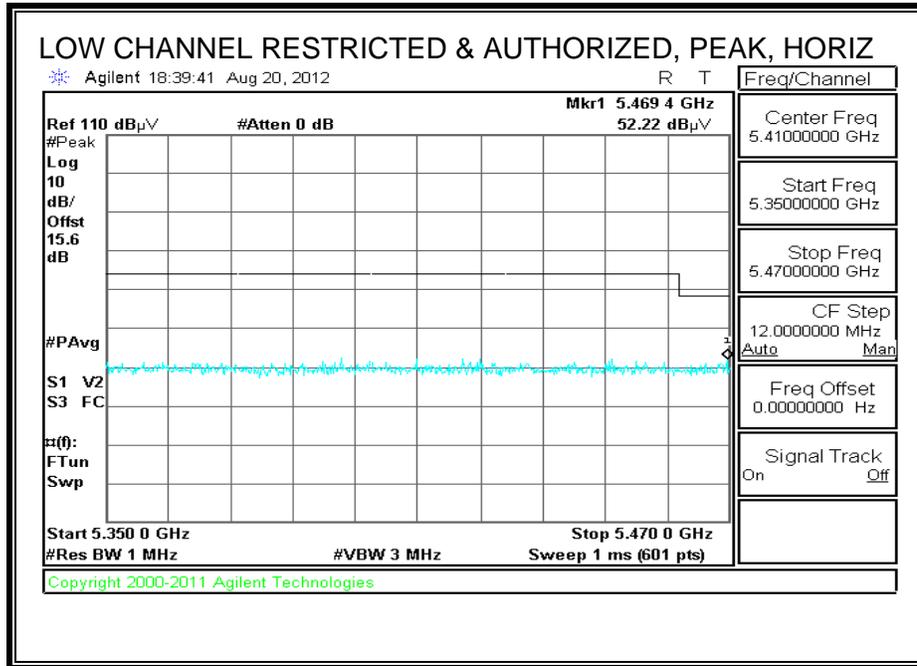
Rev. 4.1.2.7

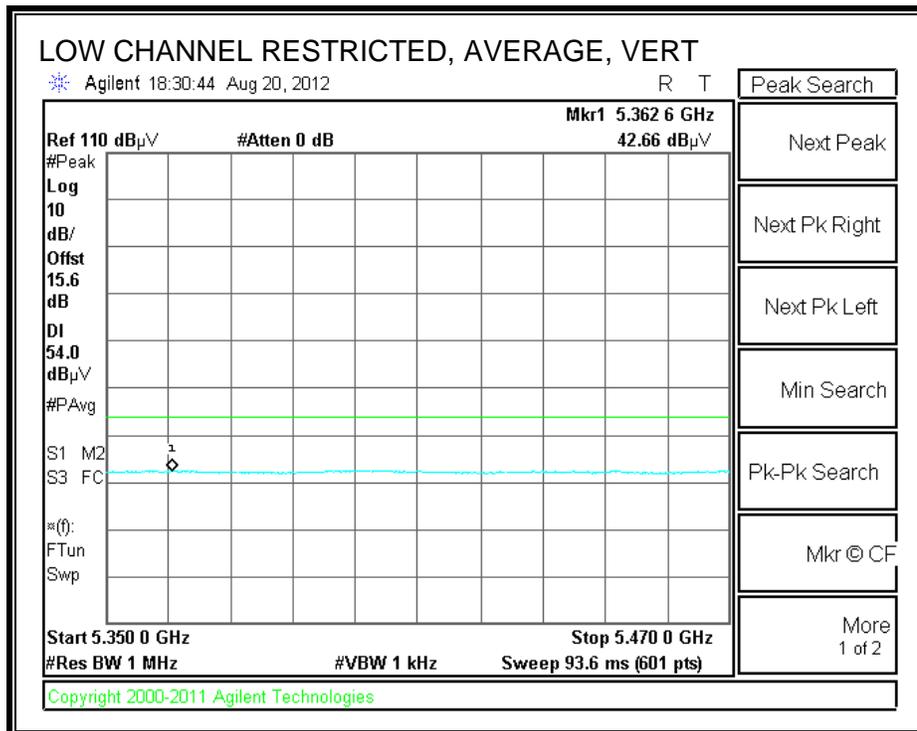
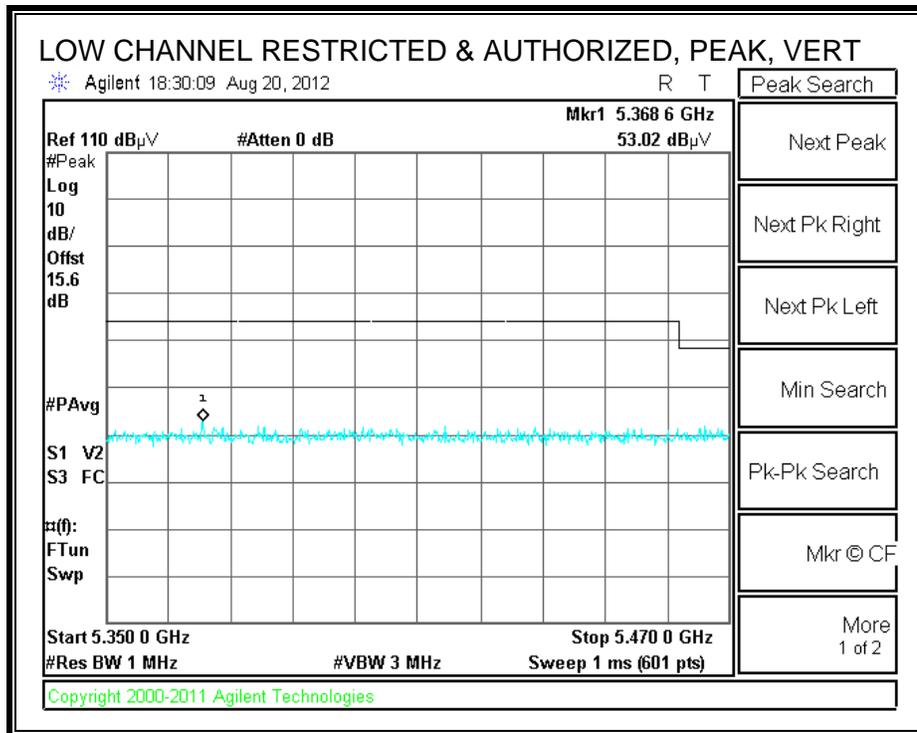
Note: No other emissions were detected above the system noise floor.

8.13. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.6 GHz BAND

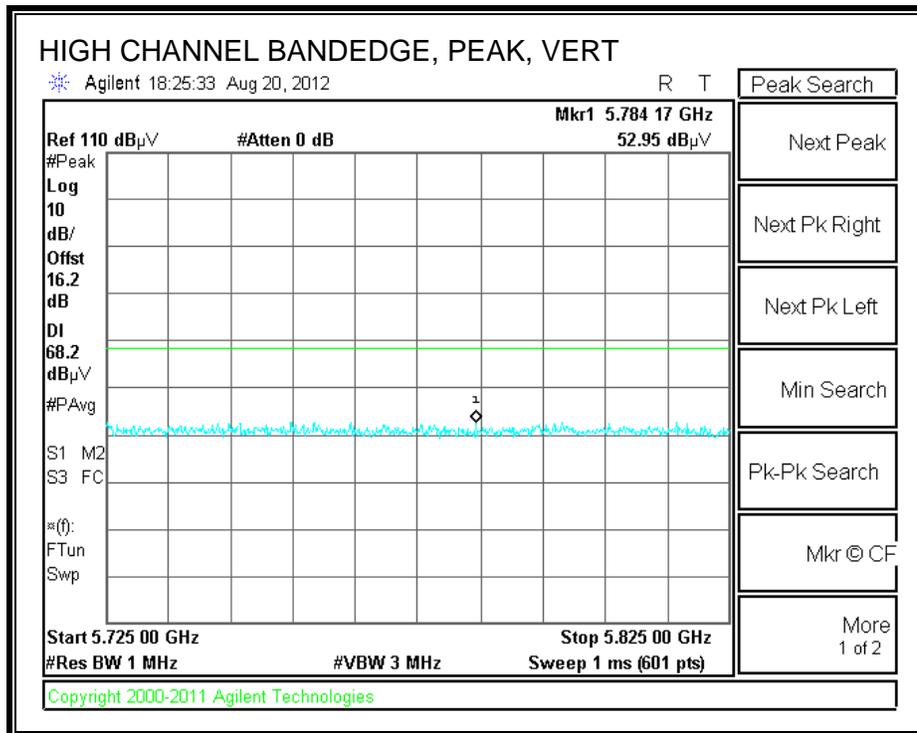
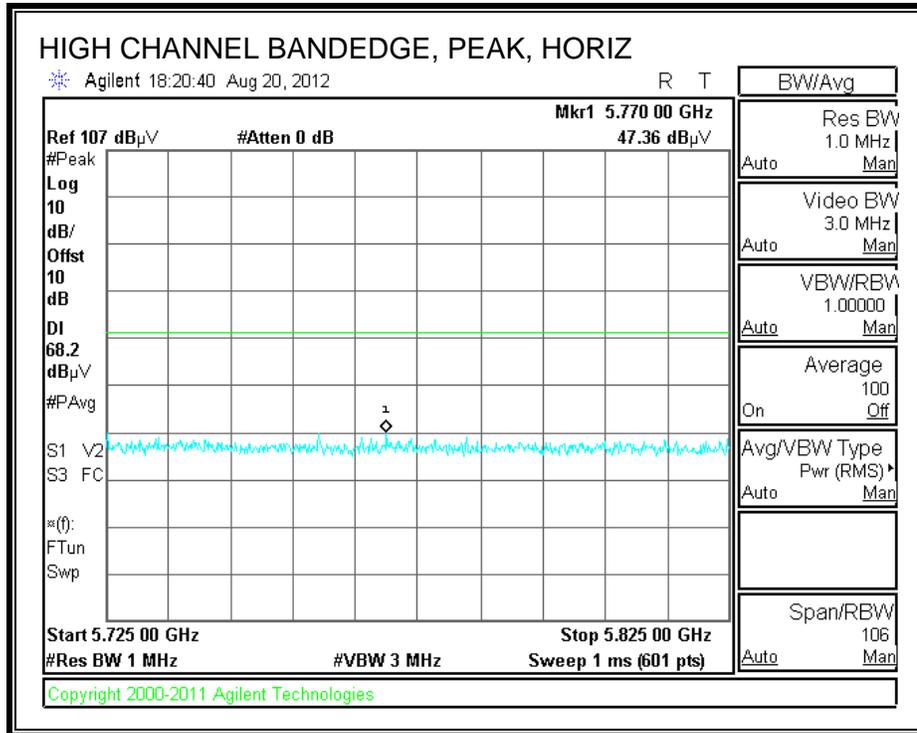
EUT With Inductive Charger

RESTRICTED & AUTHORIZED BANDEDGE (LOW CHANNEL)





AUTHORIZED BANDEDGE (HIGH CHANNEL)



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
 Date: 08/20/12
 Project #: 12U14580
 Company: LG
 Test Target: FCC 15.407
 Mode Oper: HT20, 5.6GHz
 Configuration: EUT with Inductive Charger

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter	

f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filtr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Ch. 5500MHz													
11.000	3.0	34.1	38.3	10.1	-35.6	0.0	0.7	47.5	74.0	-26.5	V	P	
11.000	3.0	23.7	38.3	10.1	-35.6	0.0	0.7	37.2	54.0	-16.8	V	A	
11.000	3.0	34.5	38.3	10.1	-35.6	0.0	0.7	47.9	74.0	-26.1	H	P	
11.000	3.0	24.4	38.3	10.1	-35.6	0.0	0.7	37.9	54.0	-16.1	H	A	
Mid Ch. 5580MHz													
11.160	3.0	35.0	38.5	10.2	-35.6	0.0	0.7	48.8	74.0	-25.2	V	P	
11.160	3.0	25.4	38.5	10.2	-35.6	0.0	0.7	39.2	54.0	-14.8	V	A	
11.160	3.0	35.0	38.5	10.2	-35.6	0.0	0.7	48.8	74.0	-25.2	H	P	
11.160	3.0	25.2	38.5	10.2	-35.6	0.0	0.7	39.0	54.0	-15.0	H	A	
High Ch. 5700MHz													
11.400	3.0	34.8	38.7	10.4	-35.6	0.0	0.7	49.1	74.0	-24.9	V	P	
11.400	3.0	25.1	38.7	10.4	-35.6	0.0	0.7	39.4	54.0	-14.6	V	A	
11.400	3.0	34.9	38.7	10.4	-35.6	0.0	0.7	49.2	74.0	-24.8	H	P	
11.400	3.0	24.9	38.7	10.4	-35.6	0.0	0.7	39.2	54.0	-14.8	H	A	

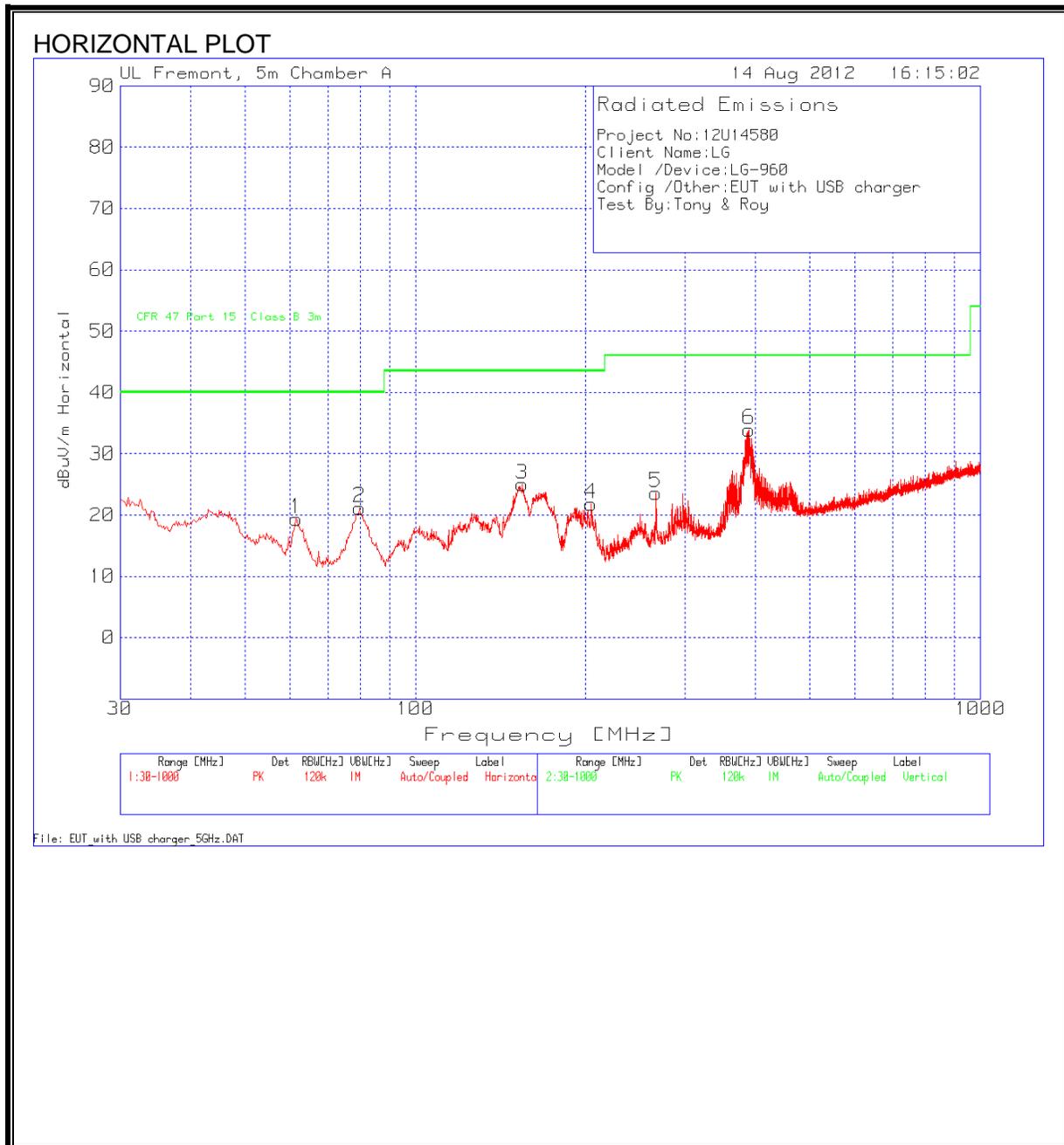
Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

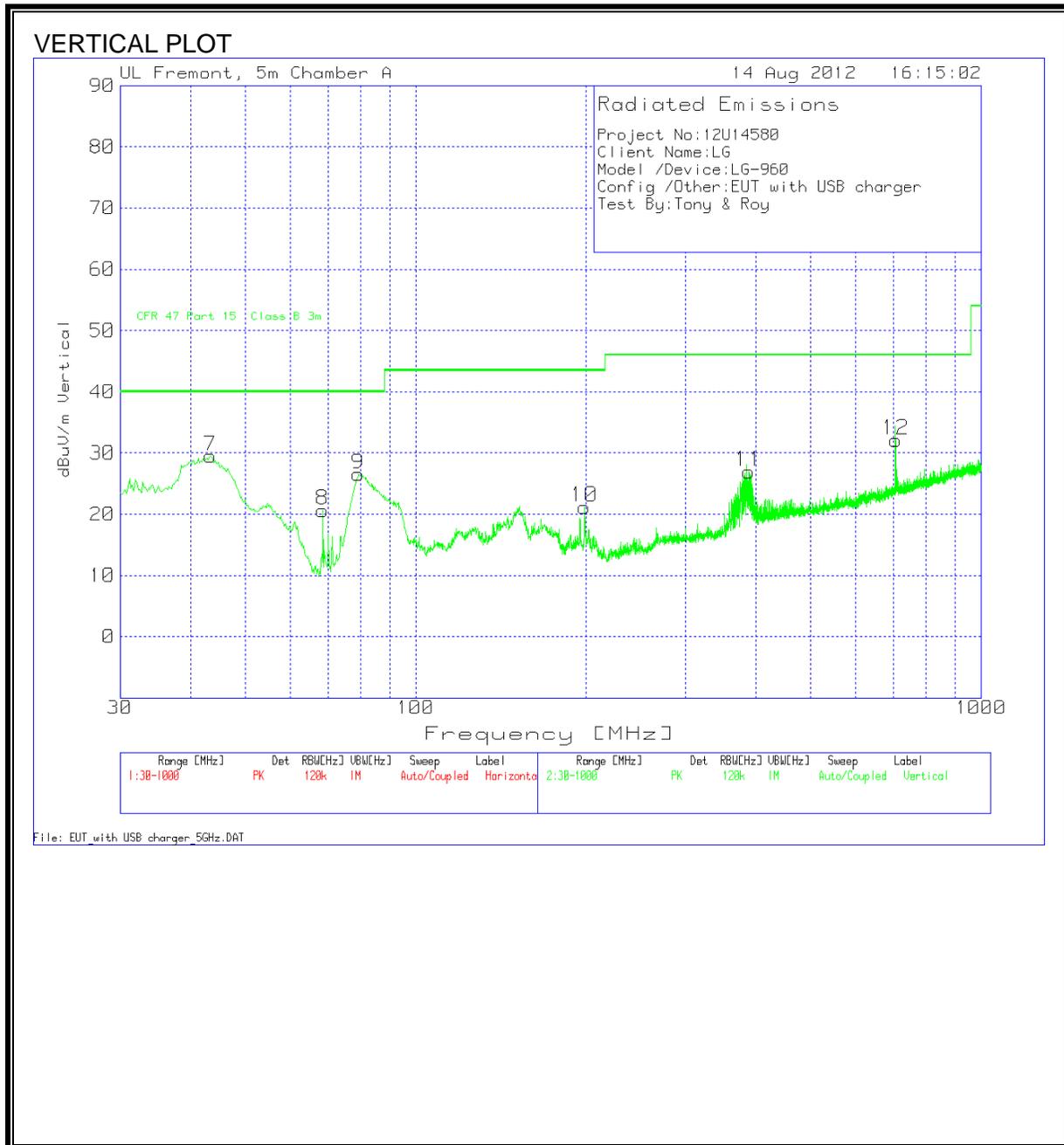
8.14. WORST-CASE BELOW 1 GHz

WITH USB Charger

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



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



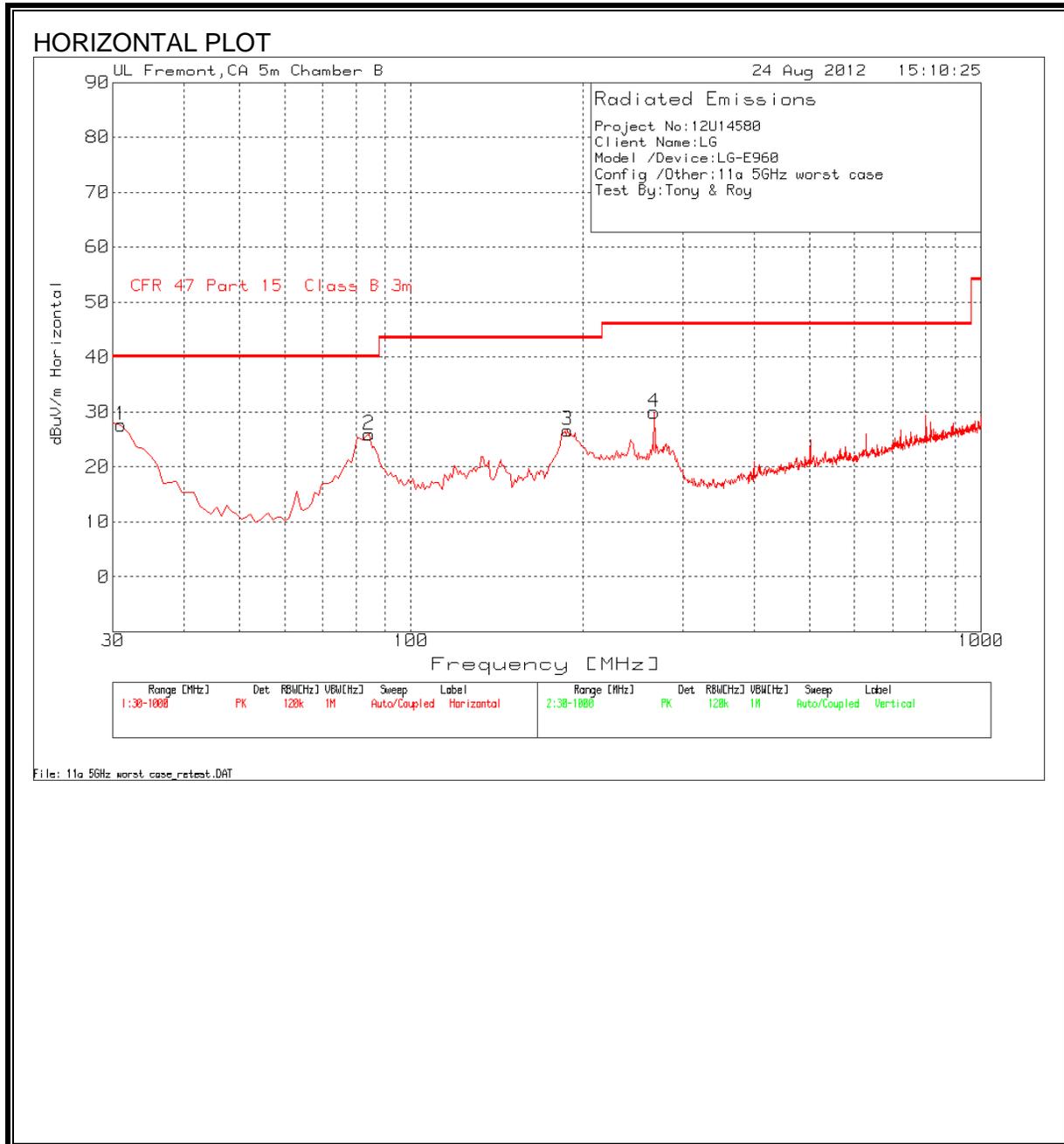
HORIZONTAL AND VERTICAL DATA

Project No:	12U14580							
Client Name:	LG							
Model /Device:	LG-960							
Config /Other:	EUT with USB charger							
Test By:	Tony & Roy							

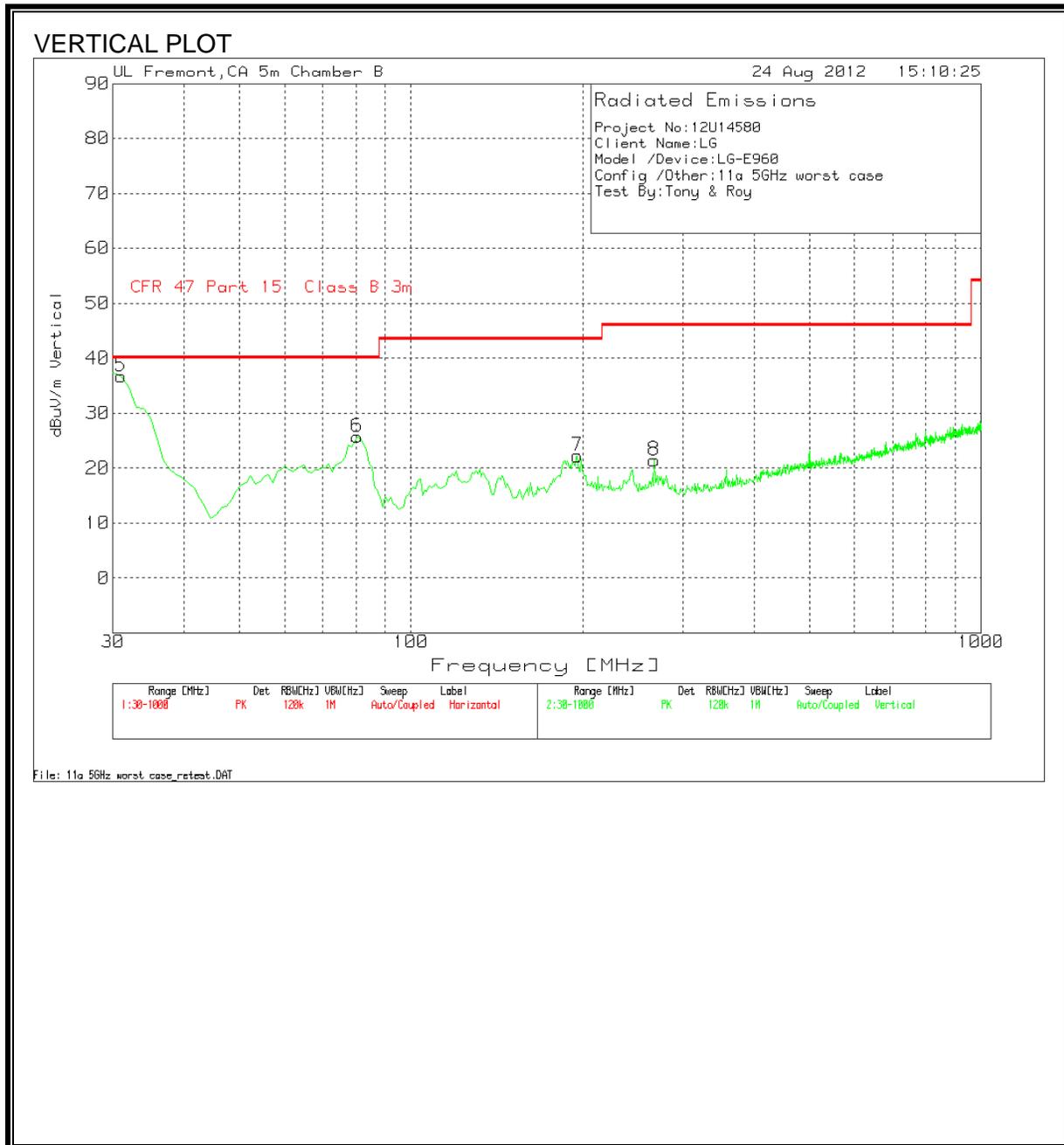
Test Frequency	Meter Reading	Detector	T122 Sunol Bilog.TXT (dB)	5mB Amp Path 30-1000MHz (dB)	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Polarity
61.5967	40.67	PK	7.6	-28.9	19.37	40	-20.63	Horz
79.6243	42.1	PK	7.8	-28.8	21.1	40	-18.9	Horz
154.8361	40.46	PK	12.5	-28	24.96	43.5	-18.54	Horz
204.6543	38.3	PK	11.1	-27.6	21.8	43.5	-21.7	Horz
266.6847	37.74	PK	12.9	-27	23.64	46	-22.36	Horz
389.97	45.7	PK	15.1	-26.9	33.9	46	-12.1	Horz
43.3753	47.37	PK	11.3	-29.2	29.47	40	-10.53	Vert
68.5751	41.45	PK	8.1	-28.9	20.65	40	-19.35	Vert
79.2366	47.41	PK	7.9	-28.8	26.51	40	-13.49	Vert
199.0328	36.04	PK	12.7	-27.6	21.14	43.5	-22.36	Vert
387.8377	38.81	PK	15.1	-26.9	27.01	46	-18.99	Vert
706.9065	37.89	PK	20.3	-26.1	32.09	46	-13.91	Vert

WITH INDUCTIVE Charger

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



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



HORIZONTAL AND VERTICAL DATA

Project No:	12U14580
Client Name:	LG
Model /Device:	LG-E960
Config /Other:	EUT with Inductive Charger
Test By:	Tony & Roy
Test Date:	8/24/12

Test Frequency	Meter Reading	Detector	T122 Sunol Bilog.TXT (dB)	5mB Amp Path 30-1000MHz (dB)	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
30.97	36.22	PK	20.7	-29.3	27.62	40	-12.38	200	Horz
84.32	46.91	PK	7.7	-28.7	25.91	40	-14.09	200	Horz
188.11	43.15	PK	11.2	-27.7	26.65	43.5	-16.85	100	Horz
266.68	44.09	PK	12.9	-27	29.99	46	-16.01	100	Horz
30.97	45.31	PK	20.7	-29.3	36.71	40	-3.29	100	Vert
80.44	46.6	PK	7.8	-28.7	25.7	40	-14.3	200	Vert
195.87	37.72	PK	12.1	-27.6	22.22	43.5	-21.28	200	Vert
266.68	35.5	PK	12.9	-27	21.4	46	-24.6	100	Vert

PK - Peak detector
 QP - Quasi-Peak detector
 LnAv - Linear Average detector
 LgAv - Log Average detector
 Av - Average detector
 CAV - CISPR Average detector
 RMS - RMS detection
 CRMS - CISPR RMS detection
 Text File: EUT_with Inductive charger_5GHz.TXT
 File: EUT_with Inductive charger_5GHz.DAT

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

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

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

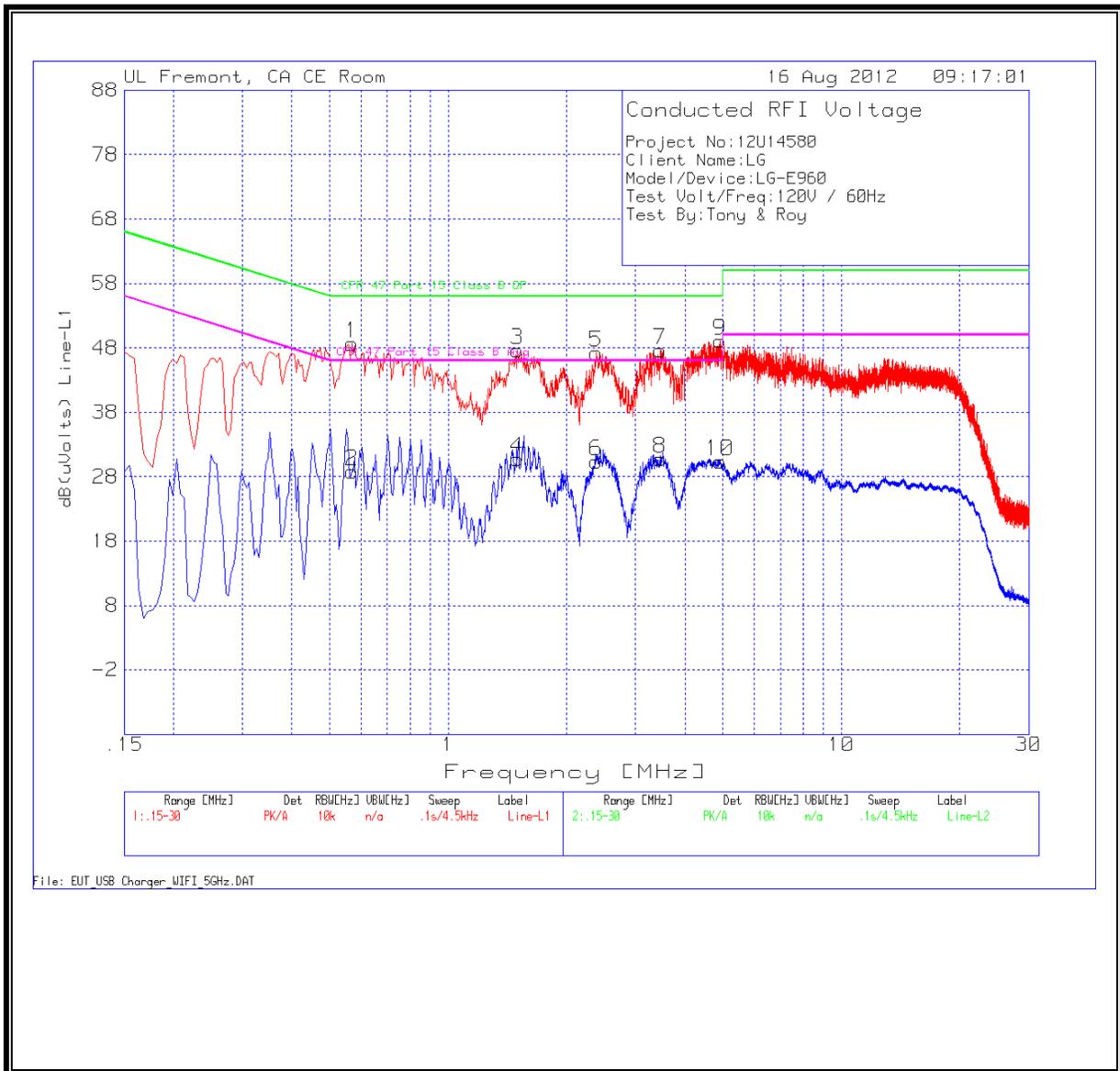
RESULTS

WITH USB Charger

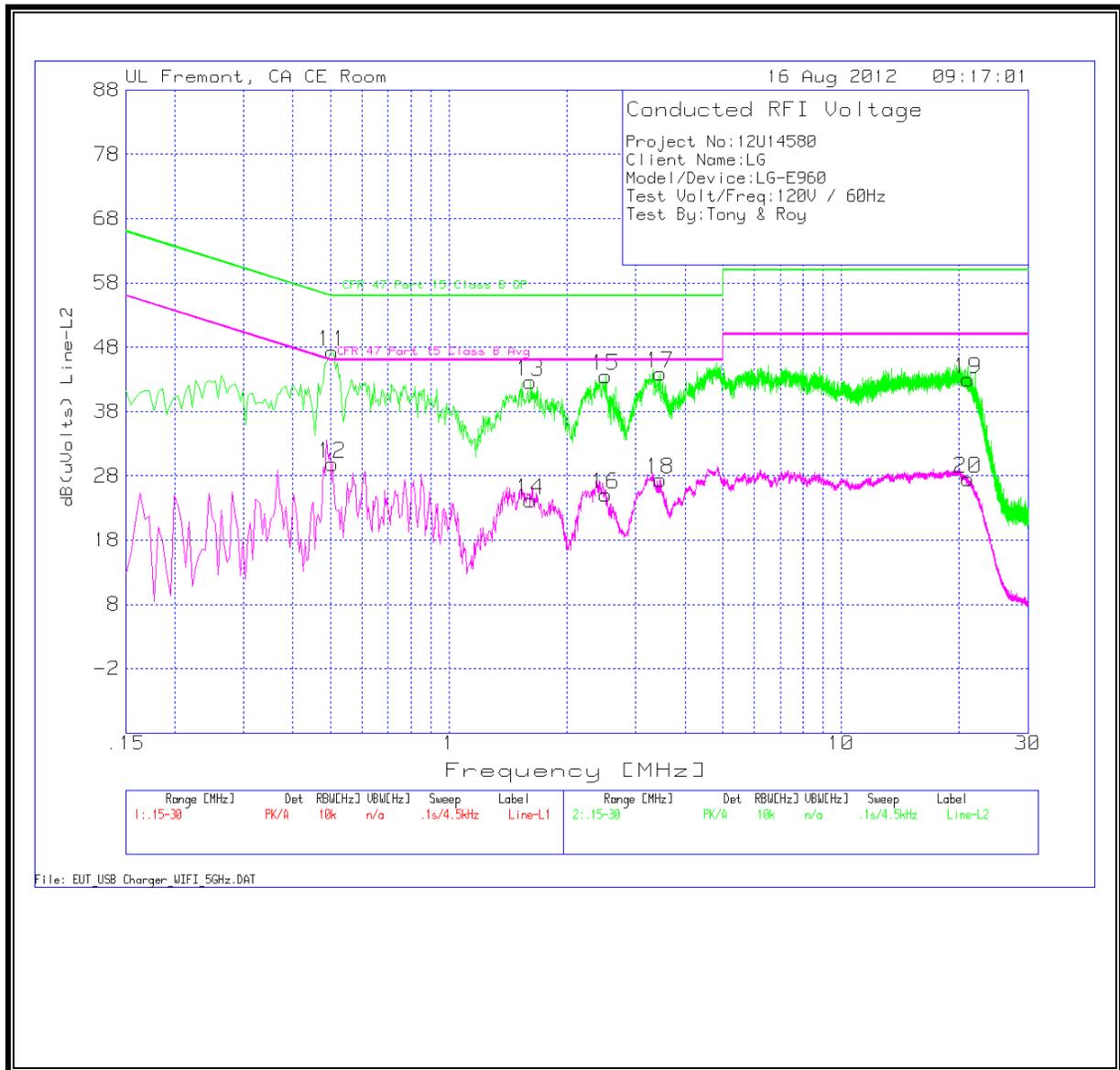
6 WORST EMISSIONS

Project No:12U14580									
Client Name:LG									
Model/Device:LG-E960									
Test Volt/Freq:120V / 60Hz									
Test By:Tony & Roy									
Line-L1 .15 - 30MHz									
Test Freq	Meter Rea	Detector	T24 IL L1.T	LC Cables	dB(uVolts	CFR 47 Par	Margin	CFR 47 Par	Margin
0.5685	48.56	PK	0.1	0	48.66	56	-7.34	-	-
0.5685	28.72	Av	0.1	0	28.82	-	-	46	-17.18
1.5	47.43	PK	0.1	0.1	47.63	56	-8.37	-	-
1.5	30.55	Av	0.1	0.1	30.75	-	-	46	-15.25
2.3775	47.09	PK	0.1	0.1	47.29	56	-8.71	-	-
2.3775	30.17	Av	0.1	0.1	30.37	-	-	46	-15.63
3.462	47.4	PK	0.1	0.1	47.6	56	-8.4	-	-
3.462	30.58	Av	0.1	0.1	30.78	-	-	46	-15.22
4.92	48.92	PK	0.1	0.1	49.12	56	-6.88	-	-
4.92	30.15	Av	0.1	0.1	30.35	-	-	46	-15.65
Line-L2 .15 - 30MHz									
Test Freq	Meter Rea	Detector	T24 IL L2.T	LC Cables	dB(uVolts	CFR 47 Par	Margin	CFR 47 Par	Margin
0.5055	47.19	PK	0.1	0	47.29	56	-8.71	-	-
0.5055	29.73	Av	0.1	0	29.83	-	-	46	-16.17
1.617	42.47	PK	0.1	0.1	42.67	56	-13.33	-	-
1.617	23.93	Av	0.1	0.1	24.13	-	-	46	-21.87
2.508	43.35	PK	0.1	0.1	43.55	56	-12.45	-	-
2.508	24.87	Av	0.1	0.1	25.07	-	-	46	-20.93
3.4575	43.75	PK	0.1	0.1	43.95	56	-12.05	-	-
3.4575	27.26	Av	0.1	0.1	27.46	-	-	46	-18.54
21.039	42.5	PK	0.3	0.2	43	60	-17	-	-
21.039	27.04	Av	0.3	0.2	27.54	-	-	50	-22.46

LINE 1 RESULTS



LINE 2 RESULTS

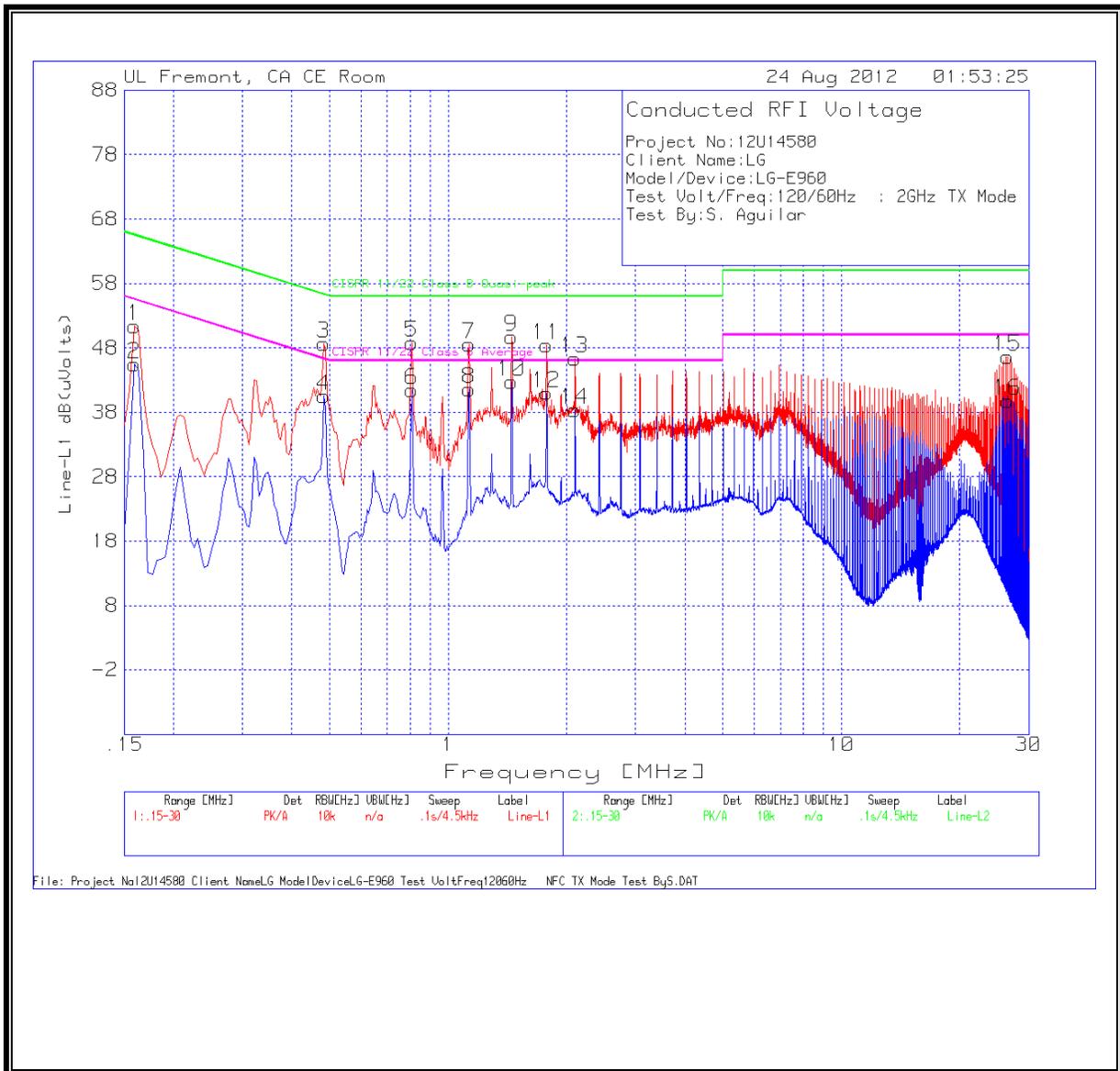


WITH INDUCTIVE Charger

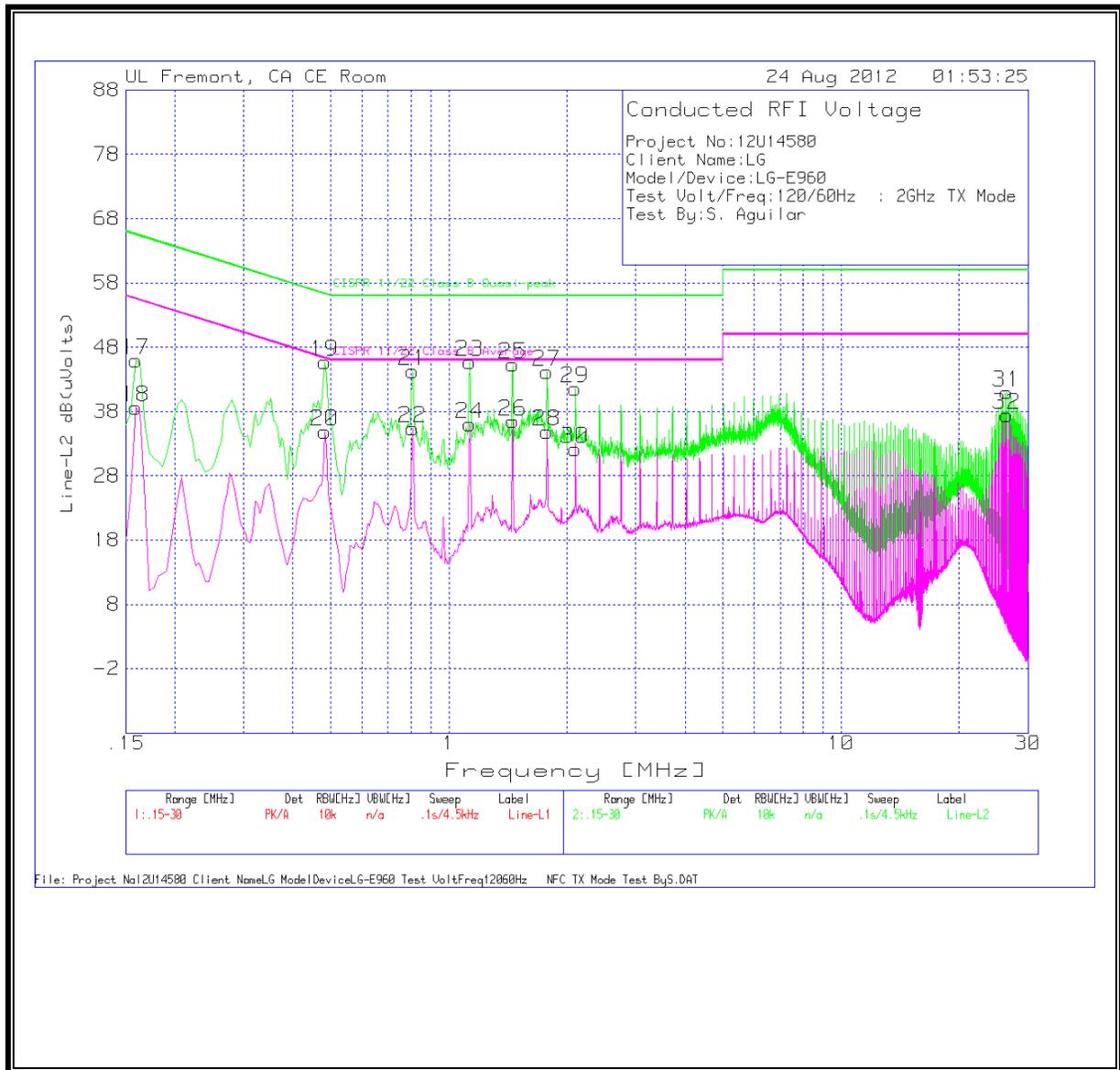
6 WORST EMISSIONS

Project No:12U14580									
Client Name:LG									
Model/Device:LG-E960									
Test Volt/Freq:120/60Hz : 2GHz TX Mode									
Test By:S. Aguilar									
Line-L1 .15 - 30MHz									
Test Freq	Meter Rea	Detector	T24 IL L1.T	LC Cables	dB(uVolts	CISPR 11/	Margin	CISPR 11/	Margin
0.159	51.33	PK	0.1	0	51.43	65.5	-14.07	-	-
0.159	45.33	Av	0.1	0	45.43	-	-	55.5	-10.07
0.483	48.58	PK	0.1	0	48.68	56.3	-7.62	-	-
0.483	40.39	Av	0.1	0	40.49	-	-	46.3	-5.81
0.807	48.74	PK	0.1	0	48.84	56	-7.16	-	-
0.807	41.33	Av	0.1	0	41.43	-	-	46	-4.57
1.131	48.41	PK	0.1	0	48.51	56	-7.49	-	-
1.131	41.45	Av	0.1	0	41.55	-	-	46	-4.45
1.4505	49.54	PK	0.1	0.1	49.74	56	-6.26	-	-
1.4505	42.54	Av	0.1	0.1	42.74	-	-	46	-3.26
1.779	48.26	PK	0.1	0.1	48.46	56	-7.54	-	-
1.779	40.8	Av	0.1	0.1	41	-	-	46	-5
2.103	46.12	PK	0.1	0.1	46.32	56	-9.68	-	-
2.103	38.2	Av	0.1	0.1	38.4	-	-	46	-7.6
26.5065	45.84	PK	0.5	0.3	46.64	60	-13.36	-	-
26.5065	38.99	Av	0.5	0.3	39.79	-	-	50	-10.21
Line-L2 .15 - 30MHz									
Test Freq	Meter Rea	Detector	T24 IL L2.T	LC Cables	dB(uVolts	CISPR 11/	Margin	CISPR 11/	Margin
0.159	45.85	PK	0.1	0	45.95	65.5	-19.55	-	-
0.159	38.53	Av	0.1	0	38.63	-	-	55.5	-16.87
0.483	45.64	PK	0.1	0	45.74	56.3	-10.56	-	-
0.483	34.74	Av	0.1	0	34.84	-	-	46.3	-11.46
0.807	44.2	PK	0.1	0	44.3	56	-11.7	-	-
0.807	35.29	Av	0.1	0	35.39	-	-	46	-10.61
1.131	45.56	PK	0.1	0.1	45.76	56	-10.24	-	-
1.131	35.85	Av	0.1	0.1	36.05	-	-	46	-9.95
1.455	45.15	PK	0.1	0.1	45.35	56	-10.65	-	-
1.455	36.29	Av	0.1	0.1	36.49	-	-	46	-9.51
1.779	43.94	PK	0.1	0.1	44.14	56	-11.86	-	-
1.779	34.73	Av	0.1	0.1	34.93	-	-	46	-11.07
2.103	41.35	PK	0.1	0.1	41.55	56	-14.45	-	-
2.103	32.02	Av	0.1	0.1	32.22	-	-	46	-13.78
26.5155	40.2	PK	0.5	0.3	41	60	-19	-	-
26.5155	36.61	Av	0.5	0.3	37.41	-	-	50	-12.59

LINE 1 RESULTS



LINE 2 RESULTS



10. DYNAMIC FREQUENCY SELECTION

10.1. OVERVIEW

10.1.1. LIMITS

INDUSTRY CANADA

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

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

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

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

FCC

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

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

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

Table 2: Applicability of DFS requirements during normal operation

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

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

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

Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna
 Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.

Table 4: DFS Response requirement values

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

Table 5 – Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (Microseconds)	PRI (Microseconds)	Pulses	Minimum Percentage of Successful Detection	Minimum Trials
1	1	1428	18	60%	30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

Table 6 – Long Pulse Radar Test Signal

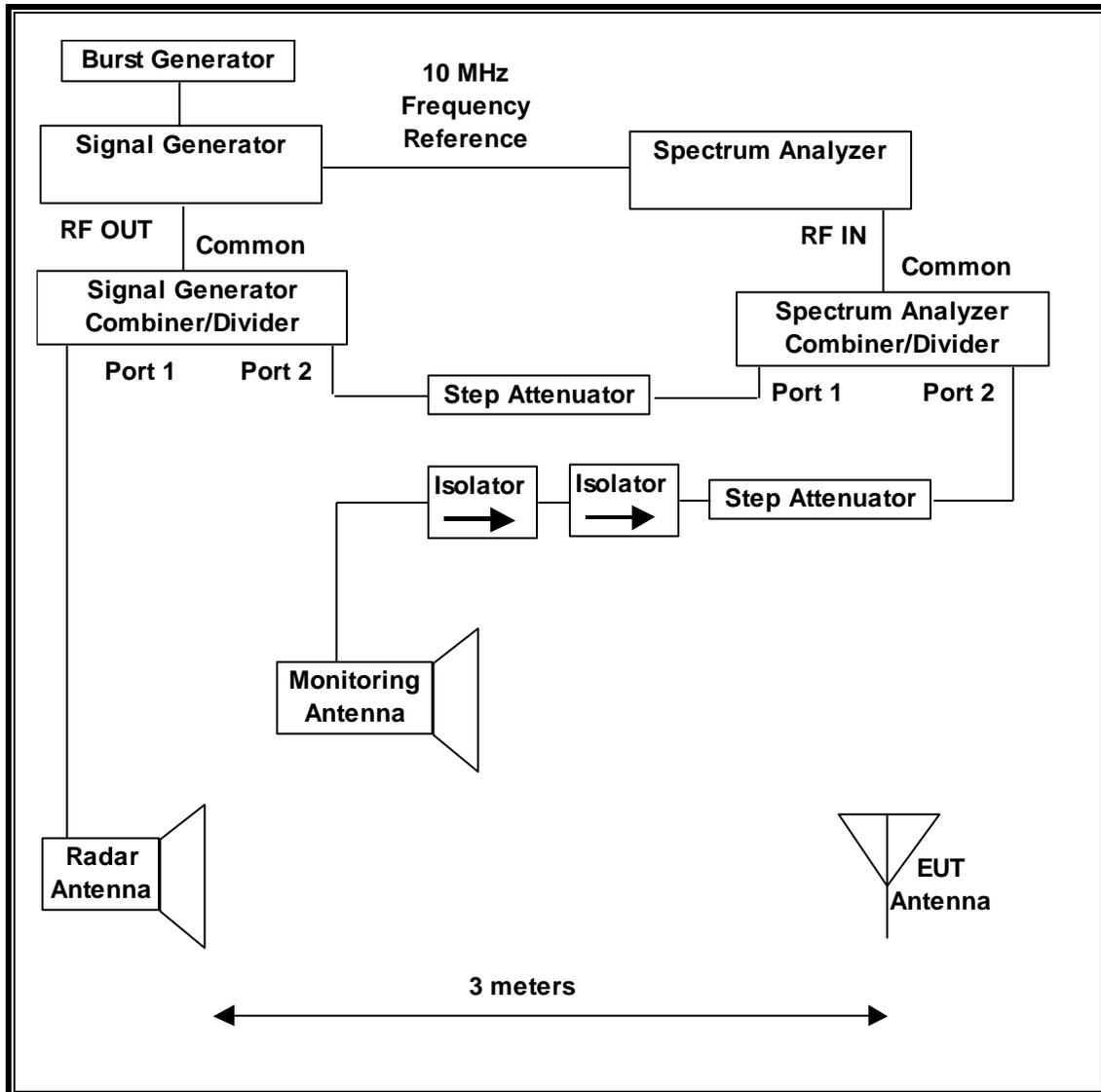
Radar Waveform	Bursts	Pulses per Burst	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Minimum Percentage of Successful Detection	Minimum Trials
5	8-20	1-3	50-100	5-20	1000-2000	80%	30

Table 7 – Frequency Hopping Radar Test Signal

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

10.1.2. TEST AND MEASUREMENT SYSTEM

RADIATED METHOD SYSTEM BLOCK DIAGRAM



SYSTEM OVERVIEW

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

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

The hopping type 6 pulse parameters are fixed while the hopping sequence is based on the August 2005 NTIA Hopping Frequency List. The initial starting point randomized at run-time and each subsequent starting point is incremented by 475. Each frequency in the 100-length segment is compared to the boundaries of the EUT Detection Bandwidth and the software creates a hopping burst pattern in accordance with Section 7.4.1.3 Method #2 Simulated Frequency Hopping Radar Waveform Generating Subsystem of FCC 06-96 APPENDIX. The frequency of the signal generator is incremented in 1 MHz steps from F_L to F_H for each successive trial. This incremental sequence is repeated as required to generate a minimum of 30 total trials and to maintain a uniform frequency distribution over the entire Detection Bandwidth.

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

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.

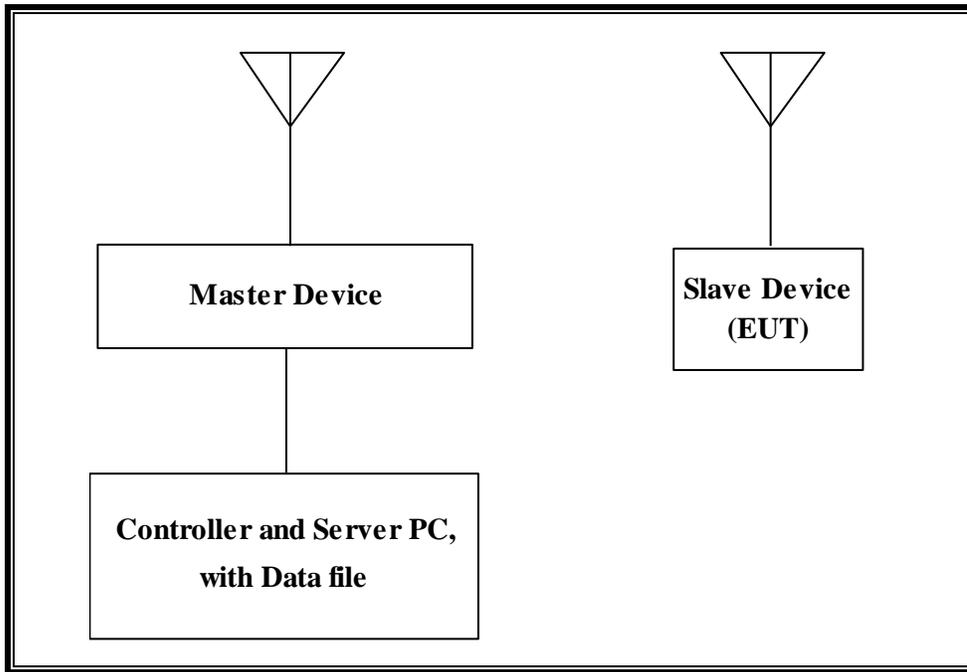
TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	Cal Due
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00996	05/11/13
Vector Signal Generator, 20GHz	Agilent / HP	E8267C	C01066	11/17/12

10.1.3. SETUP OF EUT

RADIATED METHOD EUT TEST SETUP



SUPPORT EQUIPMENT

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

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Wireless Access Point	Cisco	AIR-AP1252AG-A-K9	FTX120690N2	LDK102061
AC Adapter (AP)	Delta Electronics	EADP-45BB B	DTH112490BD	DoC
Notebook PC (Server/Controller)	Dell	PP18L	10657517725	DoC
AC Adapter (Server PC)	Dell	LA65SN0-00	CN-ODF263-71615-6AU-1019	DoC

10.1.4. DESCRIPTION OF EUT

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

The EUT is a Slave Device without Radar Detection.

The highest power level within these bands is 9.59 dBm EIRP in the 5250-5350 MHz band and 9.38 dBm EIRP in the 5470-5725 MHz band.

The only antenna assembly utilized with the EUT has a gain of -3.33 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 margin to the limit.

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

WLAN Traffic that meets or exceeds the minimum required loading is generated by transferring a 4.1Gbyte file from the controller/server PC to the EUT using FTP software package FileZilla version 3.5.0. Traffic was generated per KDB 315937.

TPC is not required since the maximum EIRP is less than 500 mW (27 dBm).

The EUT utilizes the 802.11a/n architecture. One nominal channel bandwidth, 20 MHz, is implemented.

The kernel version installed in the EUT during testing was 3.0.21 Jh.koo@fanta #1 SMP PREEMPT Tue Jul 17 13:18:23 KST 2012.

The Build number installed in the EUT during testing was geeb_att_us-eng 4.0.4 IMM76L b85552b7e test-keys.

The software installed in the access point is revision 12.4(25d)JA1.

UNIFORM CHANNEL SPREADING

This requirement is not applicable to Slave radio devices.

OVERVIEW OF MASTER DEVICE WITH RESPECT TO §15.407 (h) REQUIREMENTS

The Master Device is a Cisco Access Point, FCC ID: LDK102061. The minimum antenna gain for the Master Device is 3.5 dBi.

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

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

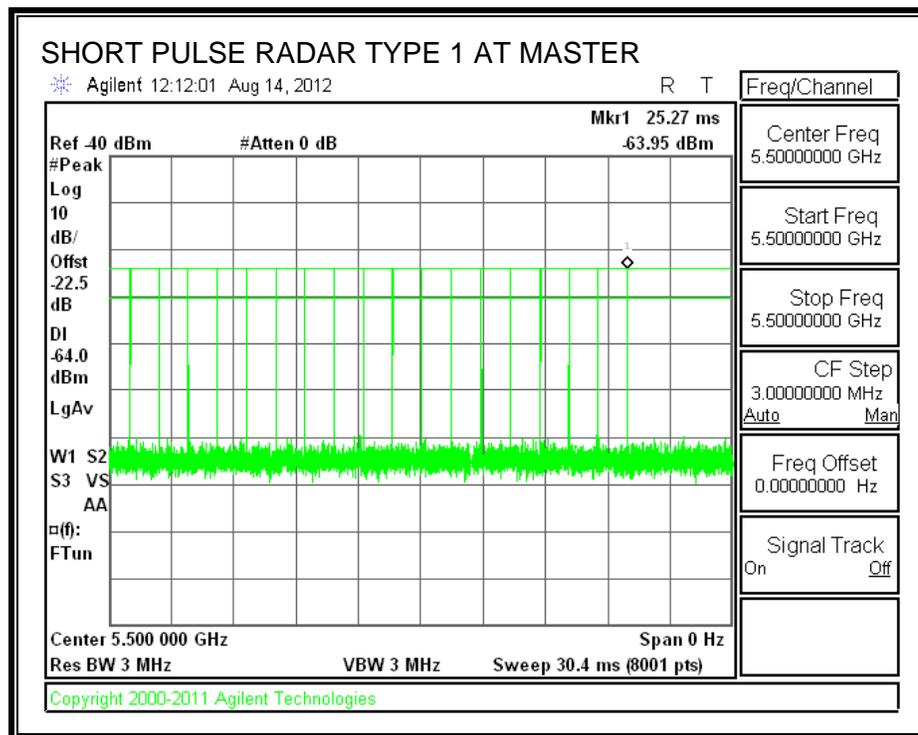
10.2. RESULTS FOR 20 MHz BANDWIDTH

10.2.1. TEST CHANNEL

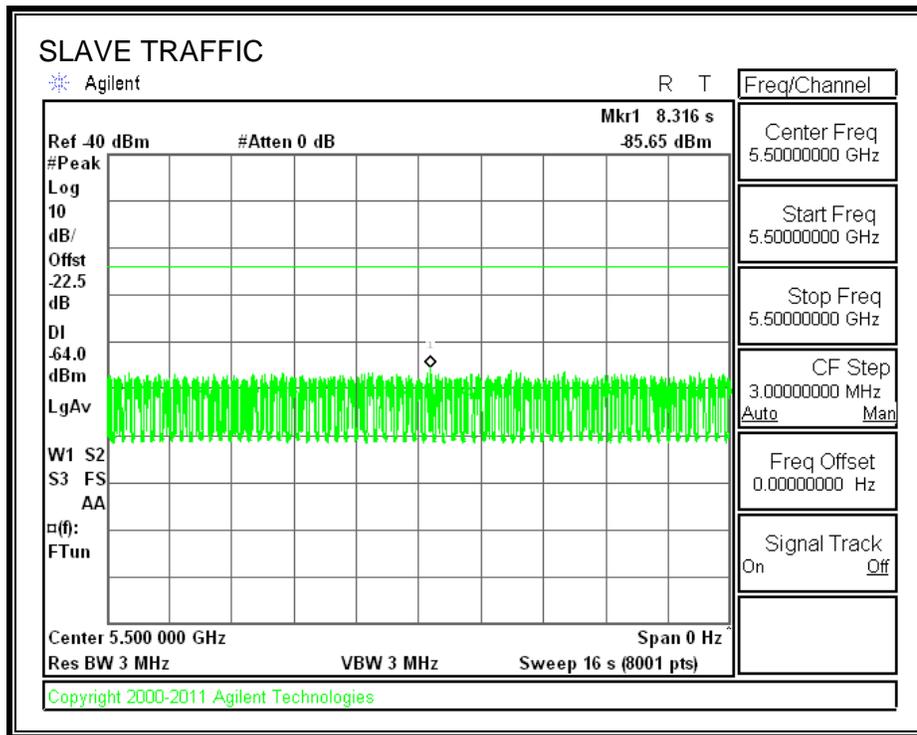
All tests were performed at a channel center frequency of 5500 MHz.

10.2.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



TRAFFIC



10.2.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

10.2.4. 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).

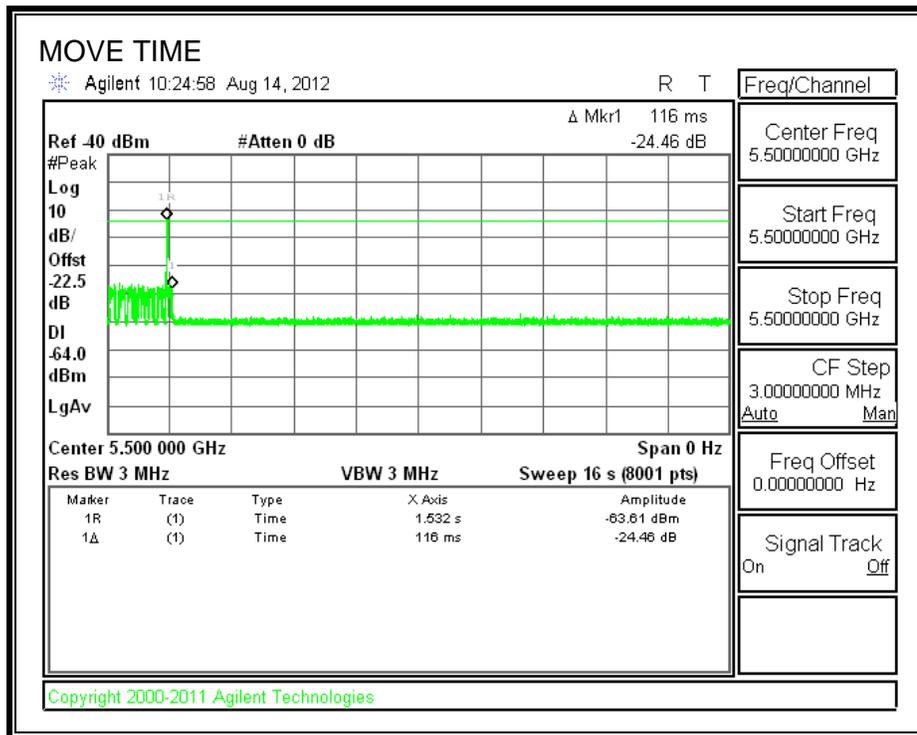
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

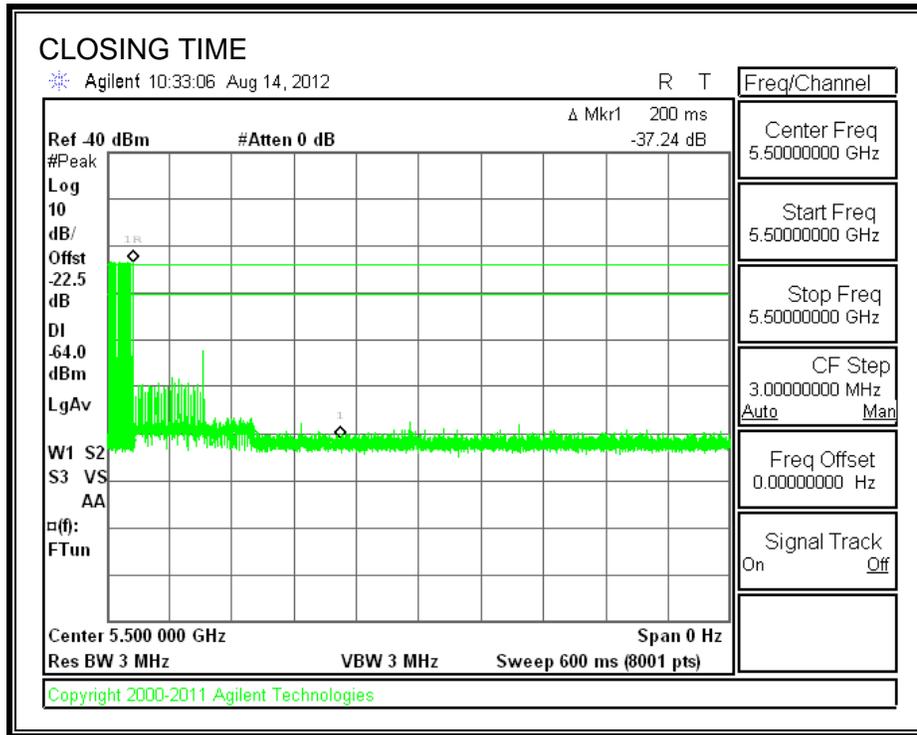
Agency	Channel Move Time (sec)	Limit (sec)
FCC / IC	0.116	10

Agency	Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
FCC	0.0	60
IC	116.0	260

MOVE TIME

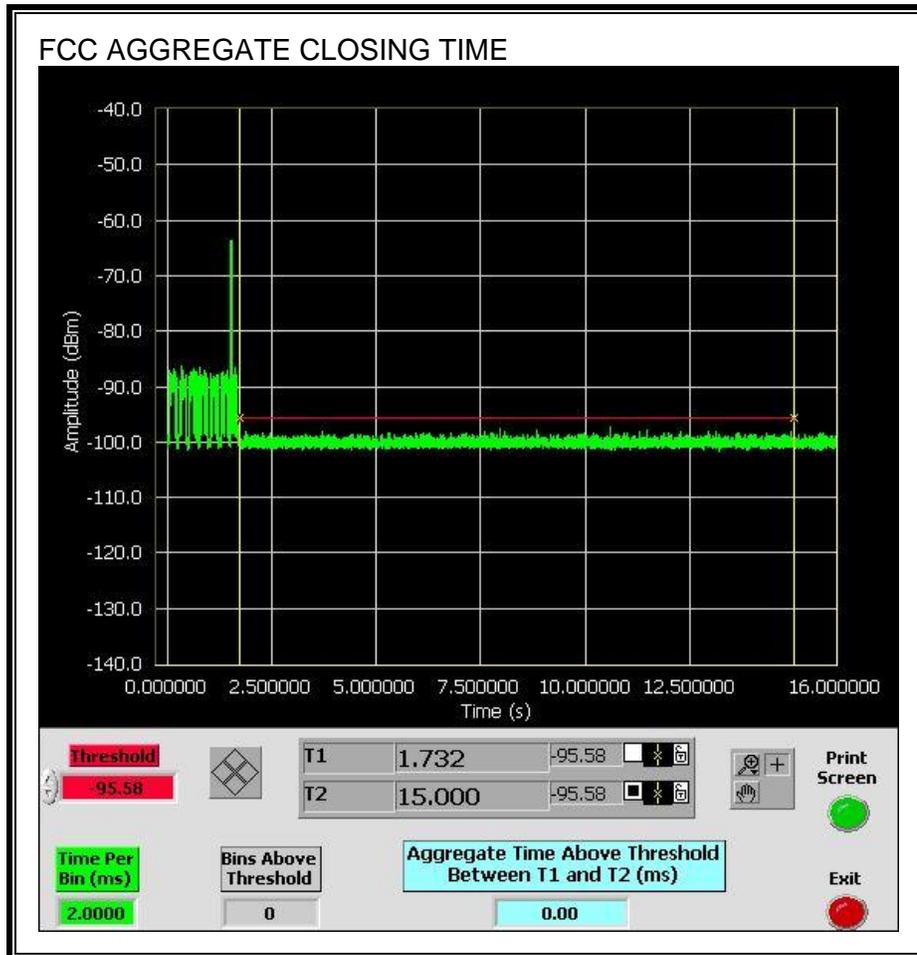


CHANNEL CLOSING TIME

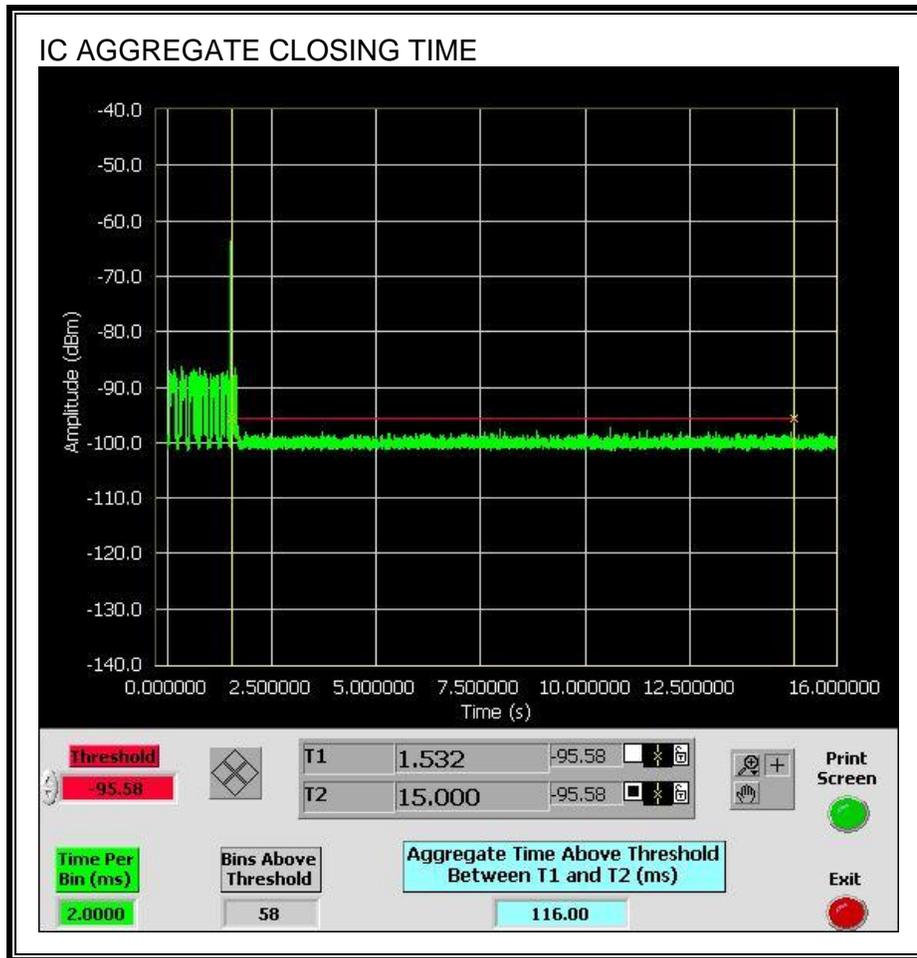


AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

No transmissions are observed during the FCC aggregate monitoring period.



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



10.2.5. NON-OCCUPANCY PERIOD

RESULTS

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

