



FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

GSM/WCDMA BAND PHONE WITH BT, WLAN, AND NFC

MODEL NUMBER: LG-P880g, LGP880g, P880g, LG-P880G, LGP880G, P880G

FCC ID: ZNFP880G

REPORT NUMBER: 12U14550-4, REVISION A

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Prepared for
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NVLAP LAB CODE 200065-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	08/27/2012	Initial Issue	T. LEE
A	09/19/2012	Corrected Antenna Gains	T. LEE

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ATTESTATION OF TEST RESULTS

COMPANY NAME: LG ELECTRONICS MOBILECOMM U.S.A., INC.
1000 SYLVAN AVE.
ENGLEWOODS CLIFFS, NJ 07632

EUT DESCRIPTION: GSM/WCDMA DUAL-BAND PHONE WITH BT, WLAN, AND NFC

MODEL: LG-P880g, LGP880g, P880g, LG-P880G, LGP880G, P880G

SERIAL NUMBER: 207KPLC217104 for Conducted, 207KPED217106 for Emissions

DATE TESTED: August 9 to August 24, 2012

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	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:



TIM LEE
STAFF ENGINEER
UL CCS

Tested By:



THANH NGUYEN
EMC ENGINEER
UL CCS

1. TEST METHODOLOGY

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

2. 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>.

3. CALIBRATION AND UNCERTAINTY

3.1. 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.

3.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

3.3. 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%.

4. EQUIPMENT UNDER TEST

4.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA Tri-Band Phone that also supports BLUETOOTH, WLAN and NFC operating at 13.56MHz.

The EUT is manufactured by LG Electronics.

4.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	Bluetooth Low Energy	6.49	4.46

4.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna, with a maximum gain of -2.19 dBi.

4.1. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was Kernel, Version 2.6.39.4

The test utility software used during testing was LG-P880g-V09a July 3, 2012.

The driver installed was Android Version 2.6.39.4

4.2. MODEL DIFFERENCES

Model P880G is identical to Models LGP880G and LG-P880G except for model designation.

4.3. WORST-CASE CONFIGURATION AND MODE

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

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

4.1. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	LG	MCS-01WD	DA260003271	DoC
Earphone	LG	N/A	N/A	N/A

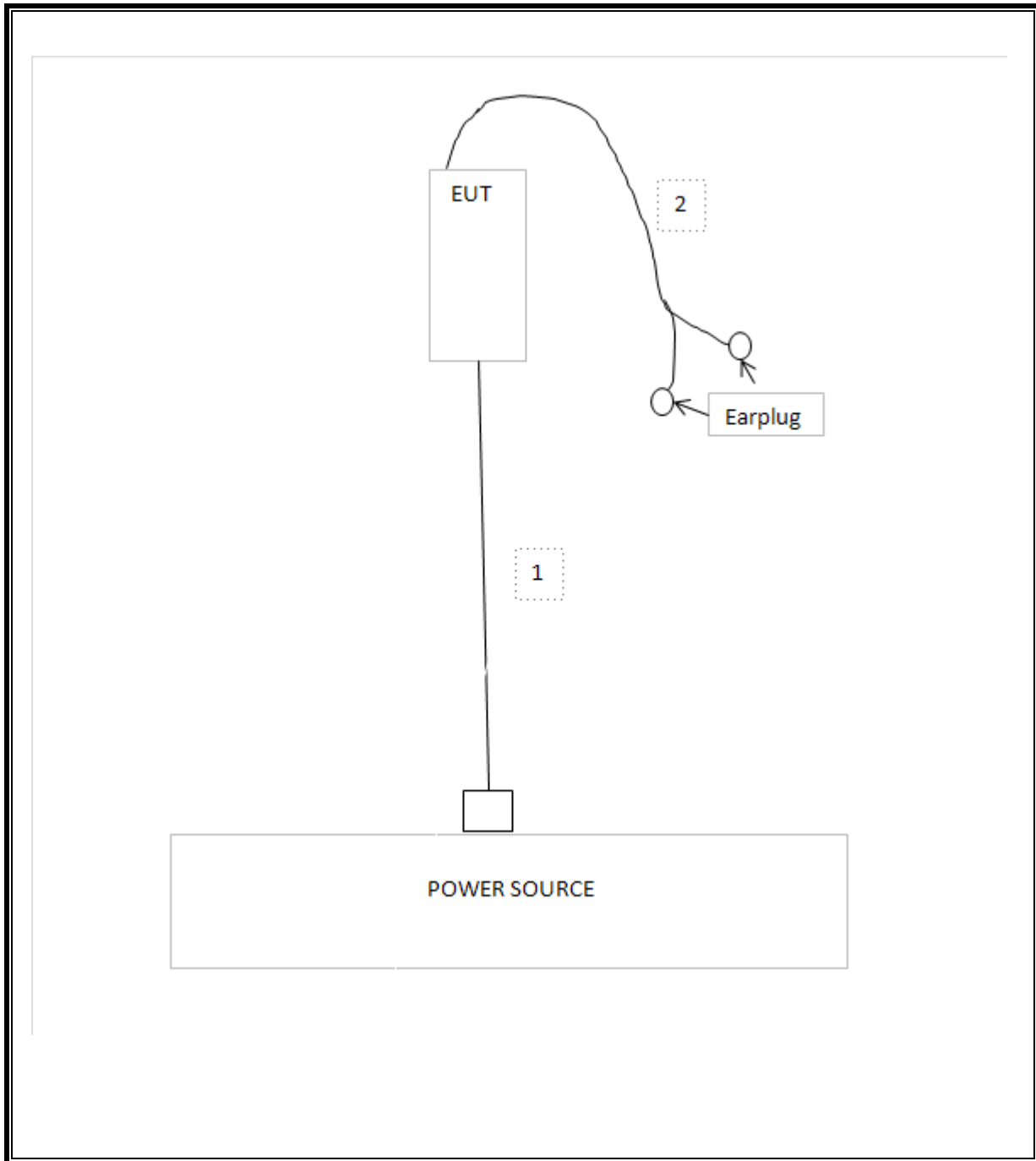
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	Mini-USB	Shielded	1.2 m	NA
2	Audio	1	Mini-Jack	Un-Shielded	1.5 m	NA

TEST SETUP

The EUT is setup to transmit continuously.

SETUP DIAGRAM FOR TESTS



5. 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 Date	Cal Due
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	01/00/00	10/13/12
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	11/11/11	11/11/12
1-18GHz Horn Ant	EMCO	3115	C00783	04/15/12	04/15/13
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	09/27/11	09/27/12
Antenna, Horn, 26.5 GHz	ARA	SWH-28	C01015	10/06/11	10/06/12
PSA	Agilent / HP	E4446A	C01012	09/02/11	12/02/12
Power Meter	HP	437B	T226	07/25/12	07/25/13
Power Sensor	HP	HP8481A	T269	07/26/12	07/26/13
Power Meter	Agilent	E4416A	T84	12/13/11	12/13/13
Power Sensor	HP	E93273	T117	12/13/11	12/13/13
LISN, 30 MHz	FCC	LISN-50/250-25-	N02625	11/15/11	11/15/12
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BN	N02481	11/16/11	11/16/12
EMI Test Receiver	R&S	ESHS 20	N02396	08/06/12	08/06/13

6. ANTENNA PORT TEST RESULTS

6.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

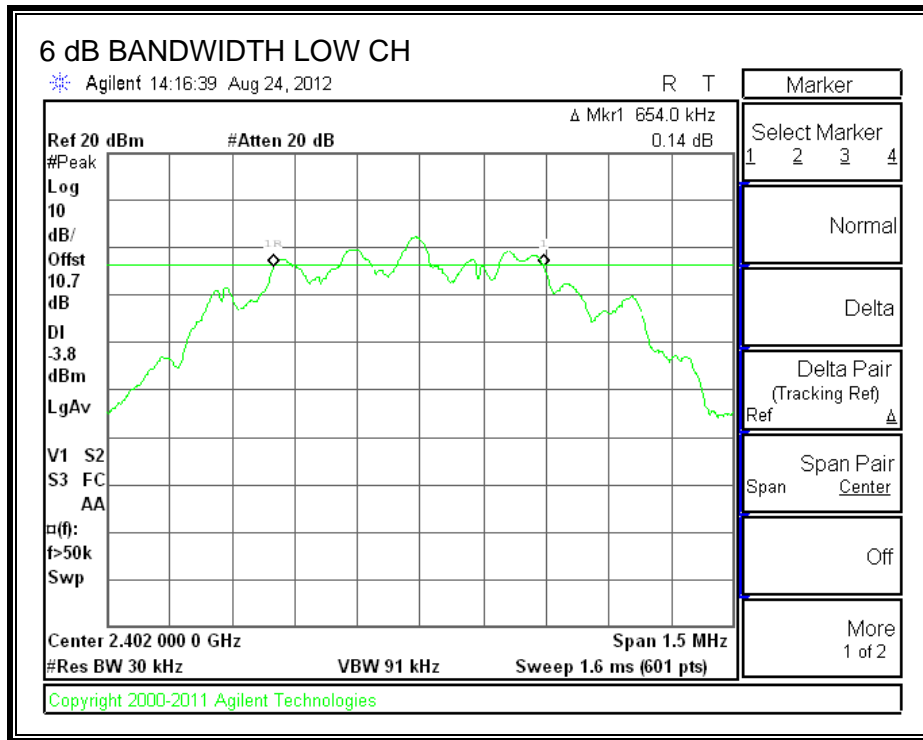
TEST PROCEDURE

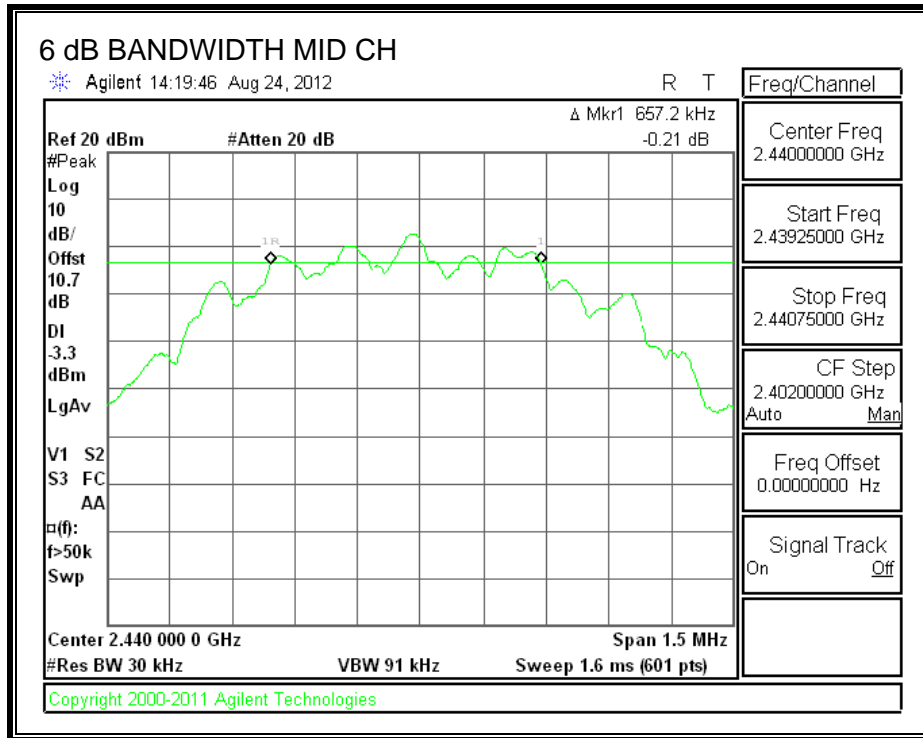
KDB 558074 D01 v01 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247".

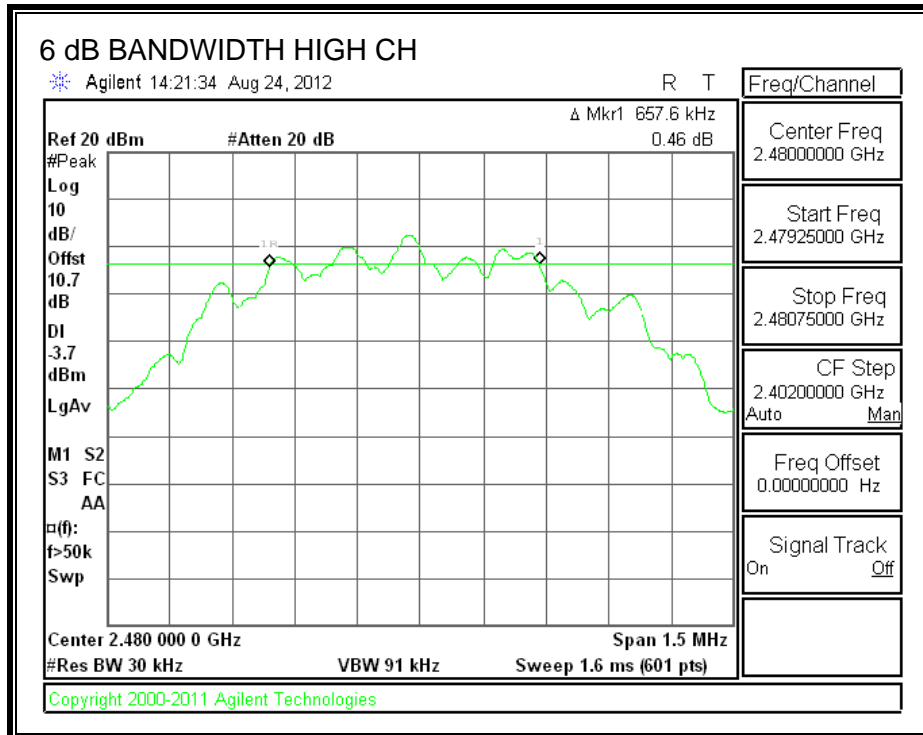
RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.654	0.5
Middle	2440	0.6572	0.5
High	2480	0.6576	0.5

6 dB BANDWIDTH







6.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

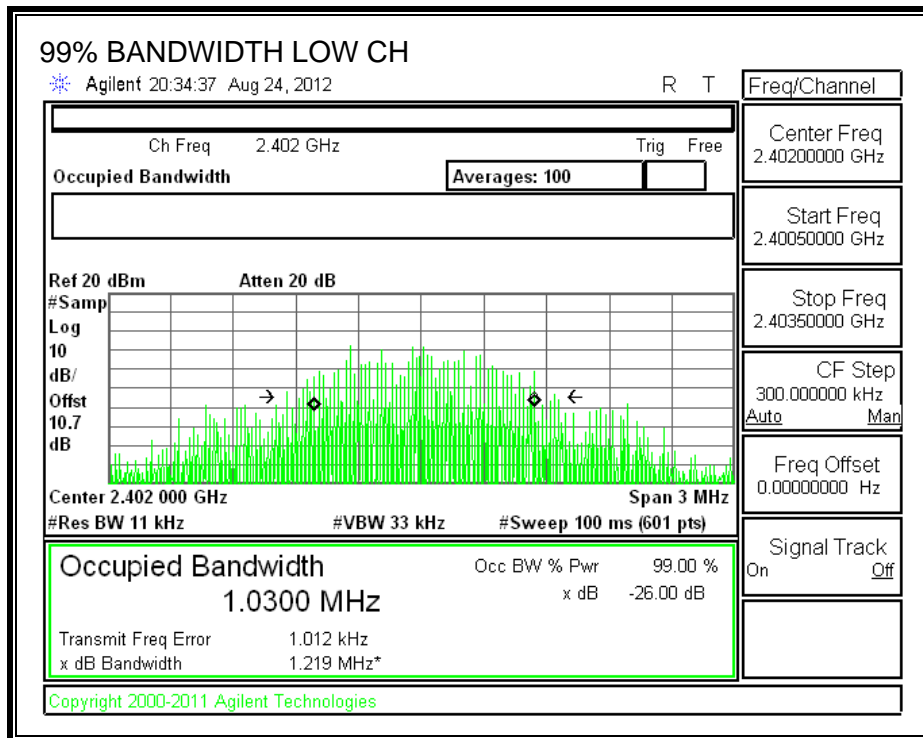
TEST PROCEDURE

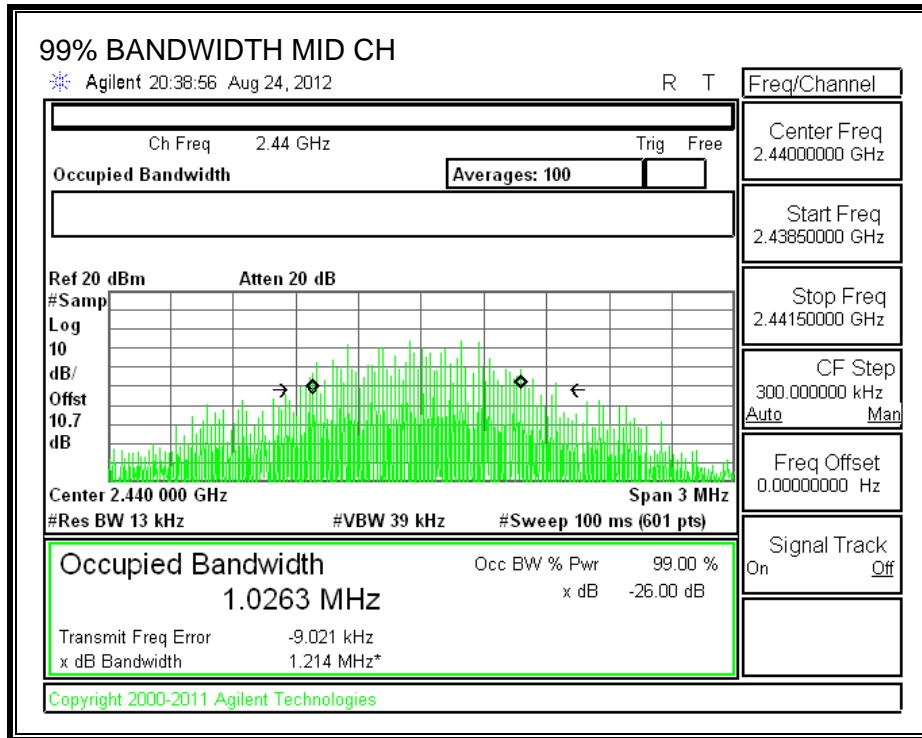
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

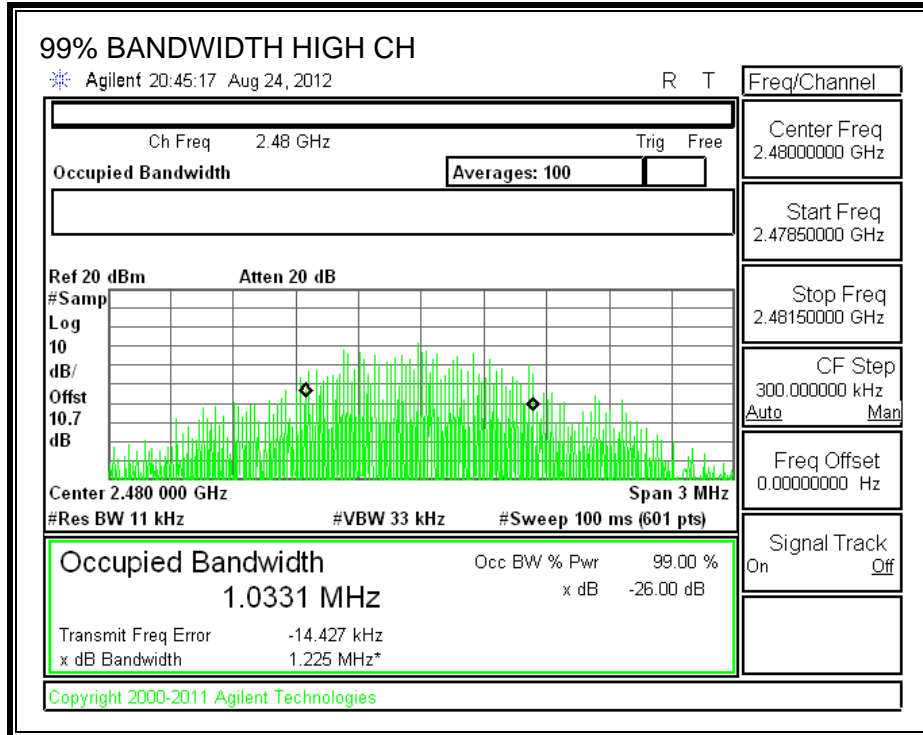
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0300
Middle	2440	1.0263
High	2480	1.0331

99% BANDWIDTH







6.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

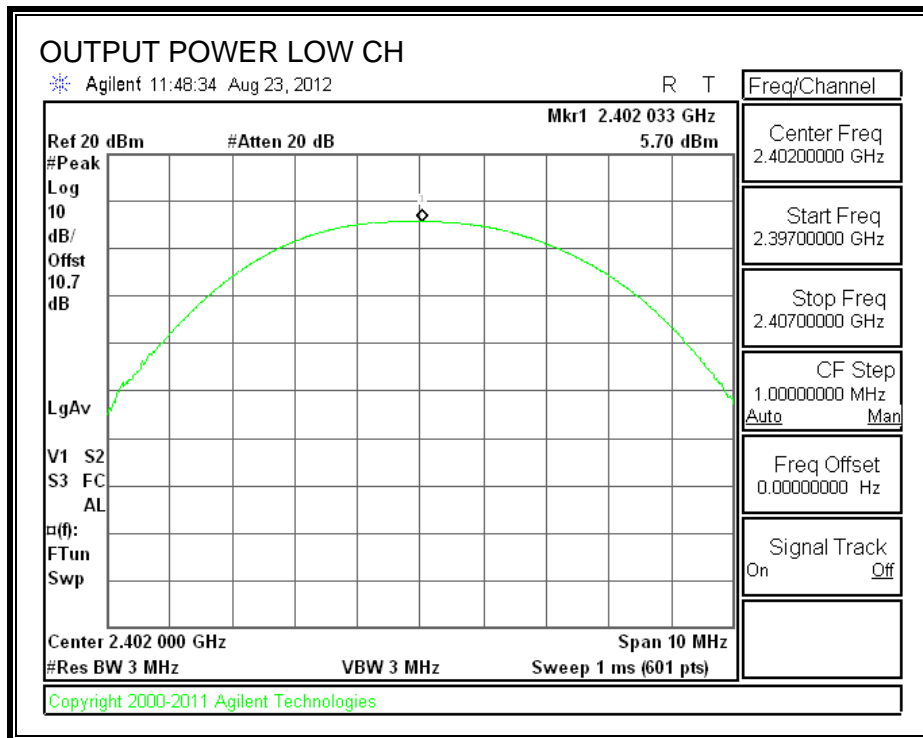
TEST PROCEDURE

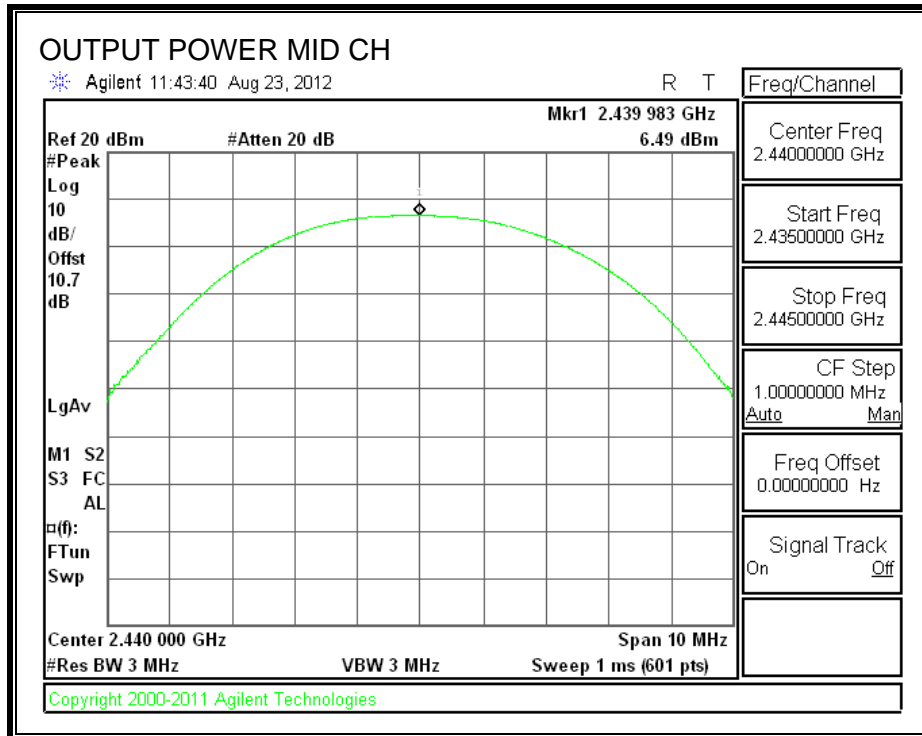
KDB 558074 D01 v01 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247".

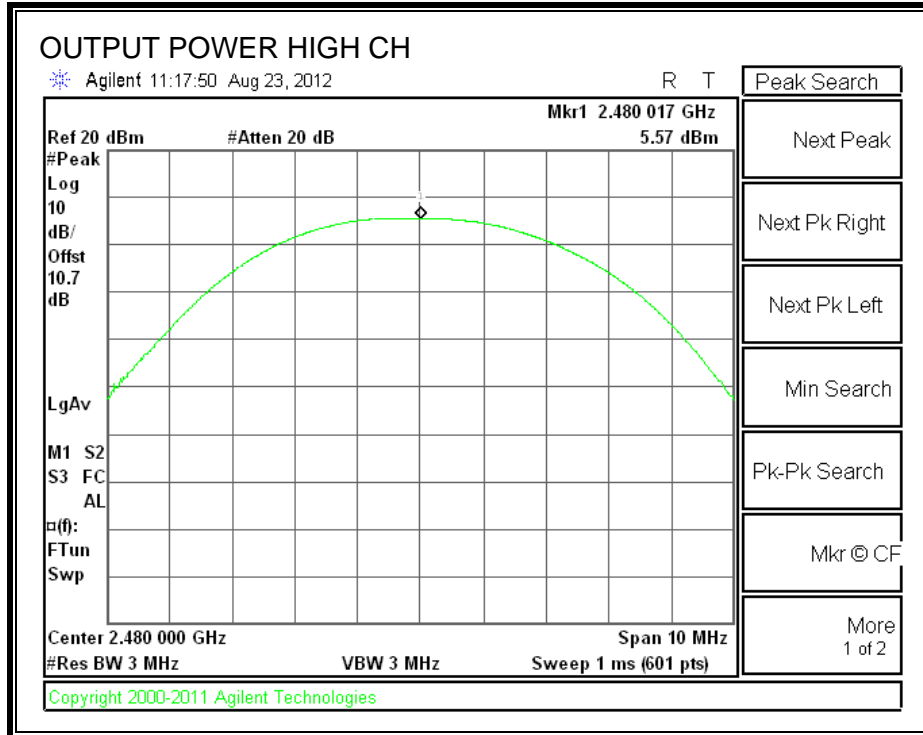
RESULTS

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	5.7	5.70	30	-24.30
Middle	2440	6.49	6.49	30	-23.51
High	2480	5.57	5.57	30	-24.43

OUTPUT POWER







6.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 10.7 dB (including 10 dB pad and .7 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	2402	5.51
Middle	2440	6.27
High	2480	5.13

6.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

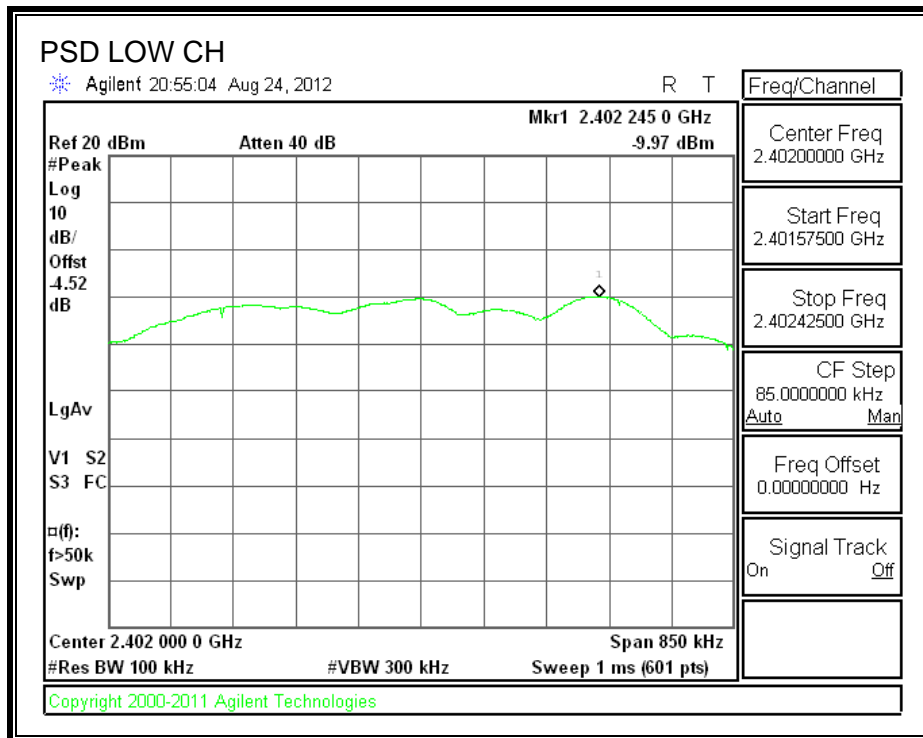
TEST PROCEDURE

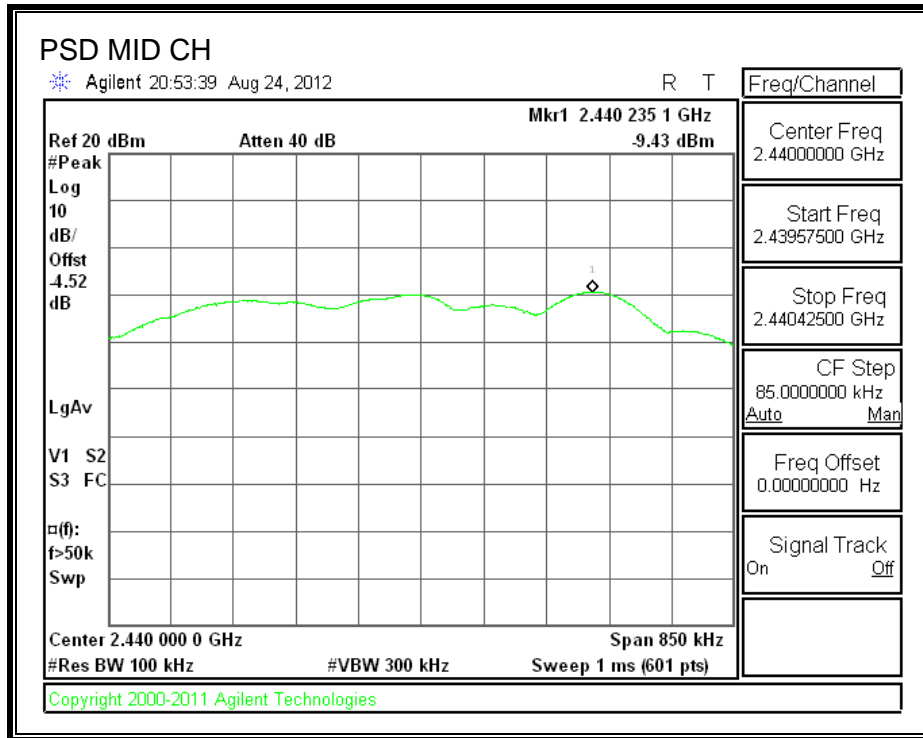
KDB 558074 D01 v01 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247".

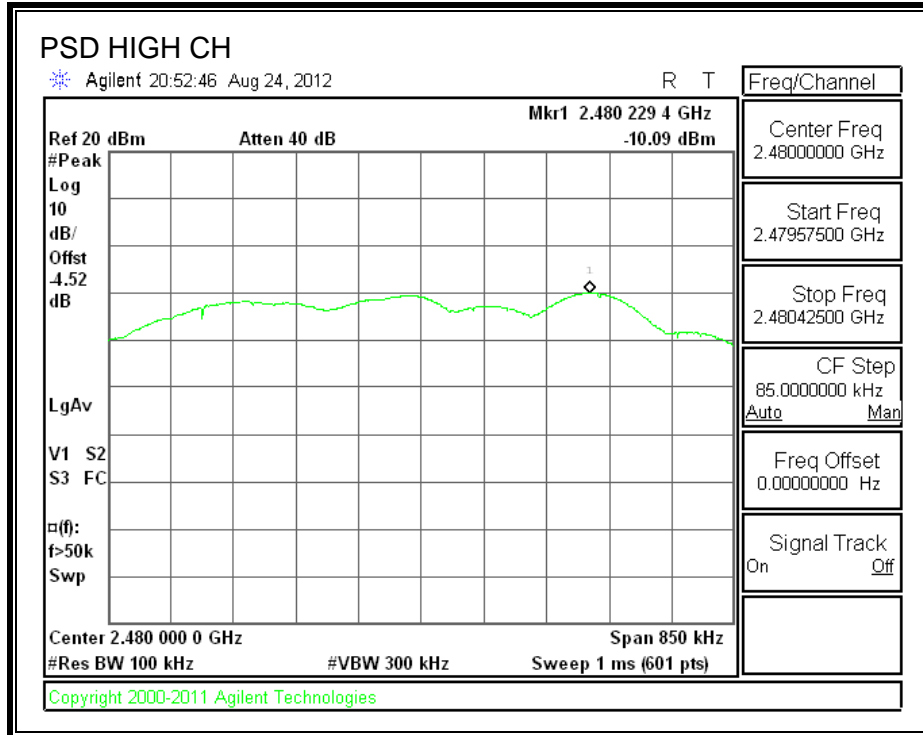
RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-9.97	8	-17.97
Middle	2440	-9.43	8	-17.43
High	2480	-10.09	8	-18.09

POWER SPECTRAL DENSITY







6.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

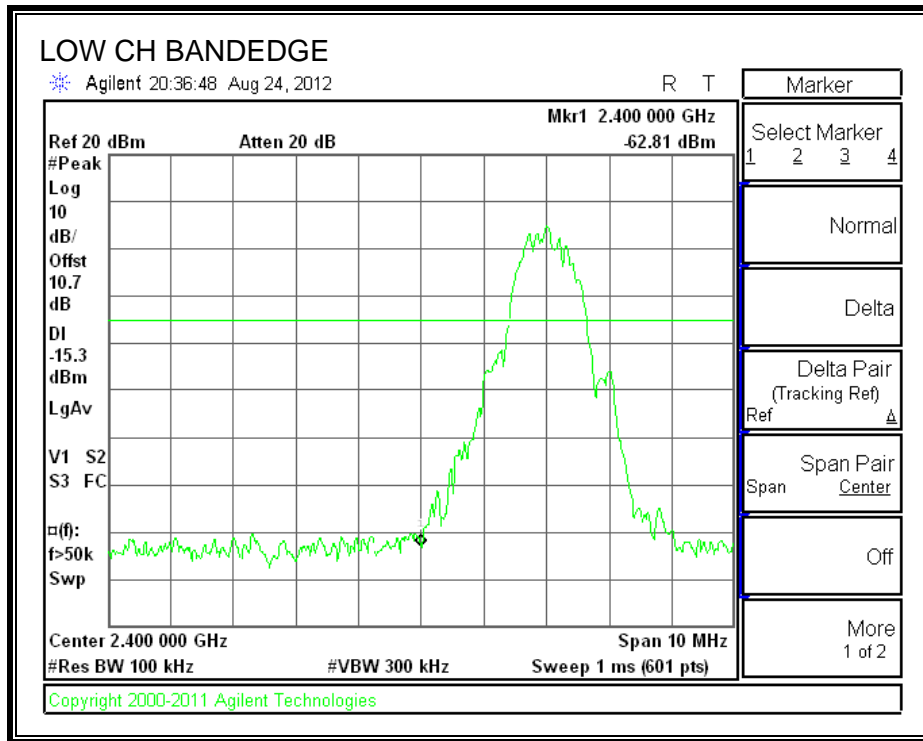
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

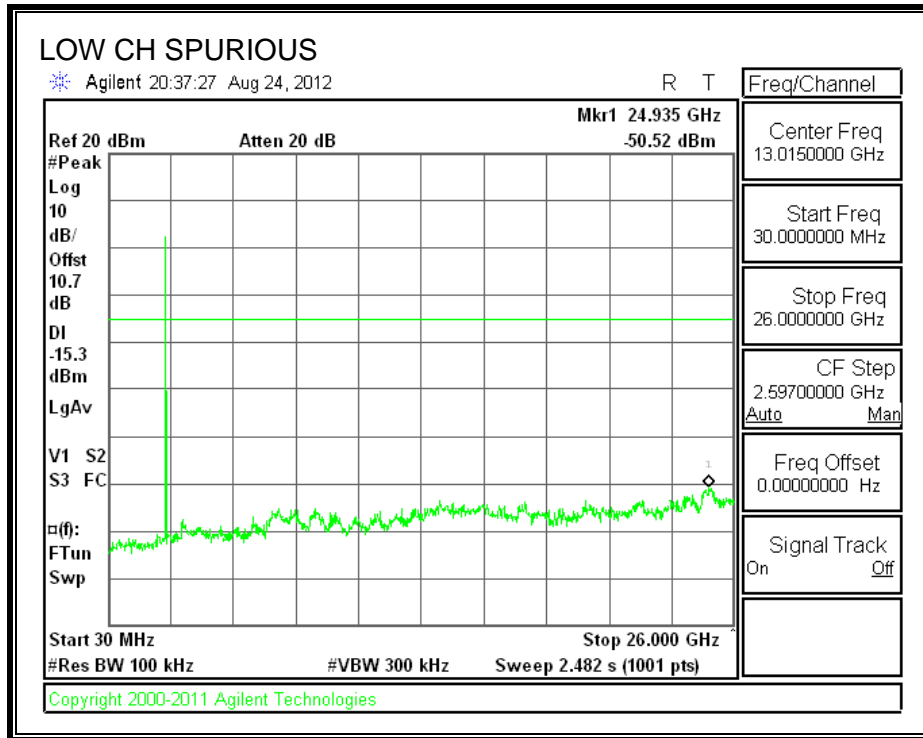
TEST PROCEDURE

KDB 558074 D01 v01 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247".

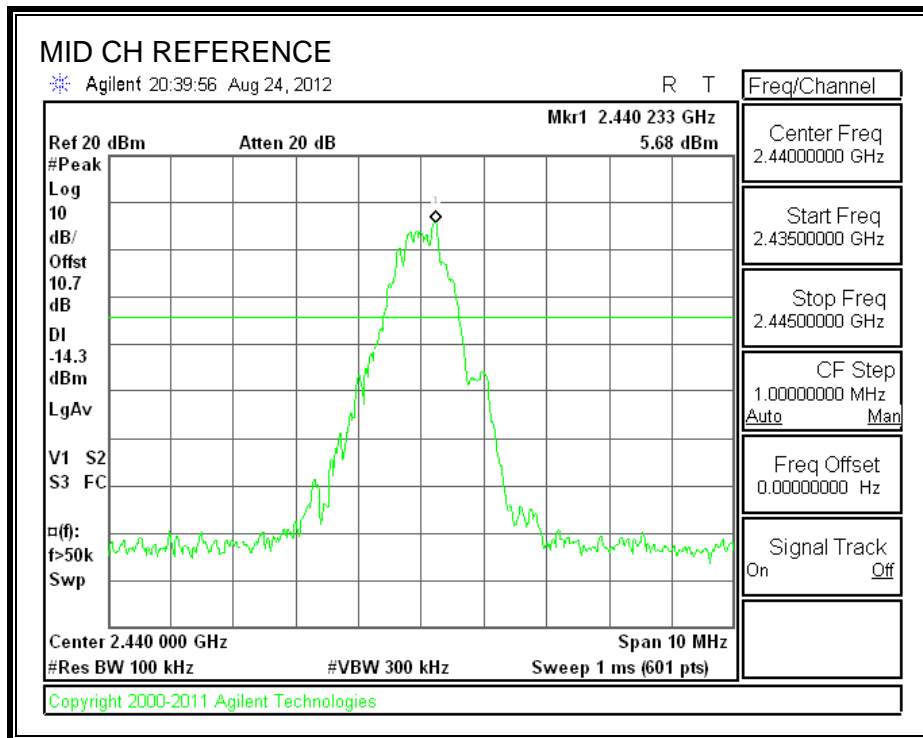
RESULTS

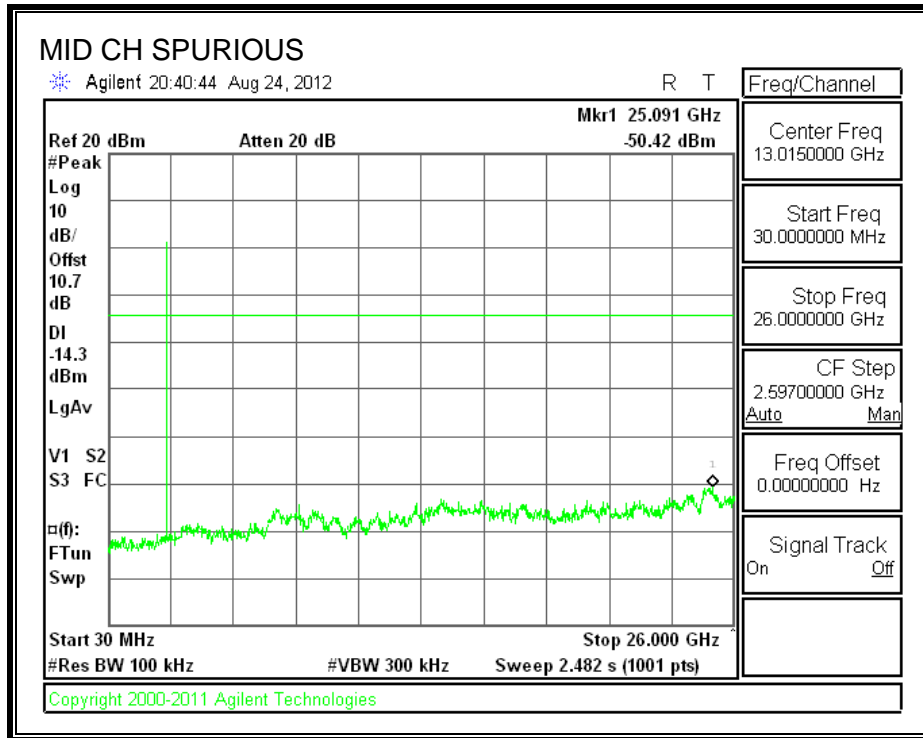
SPURIOUS EMISSIONS, LOW CHANNEL



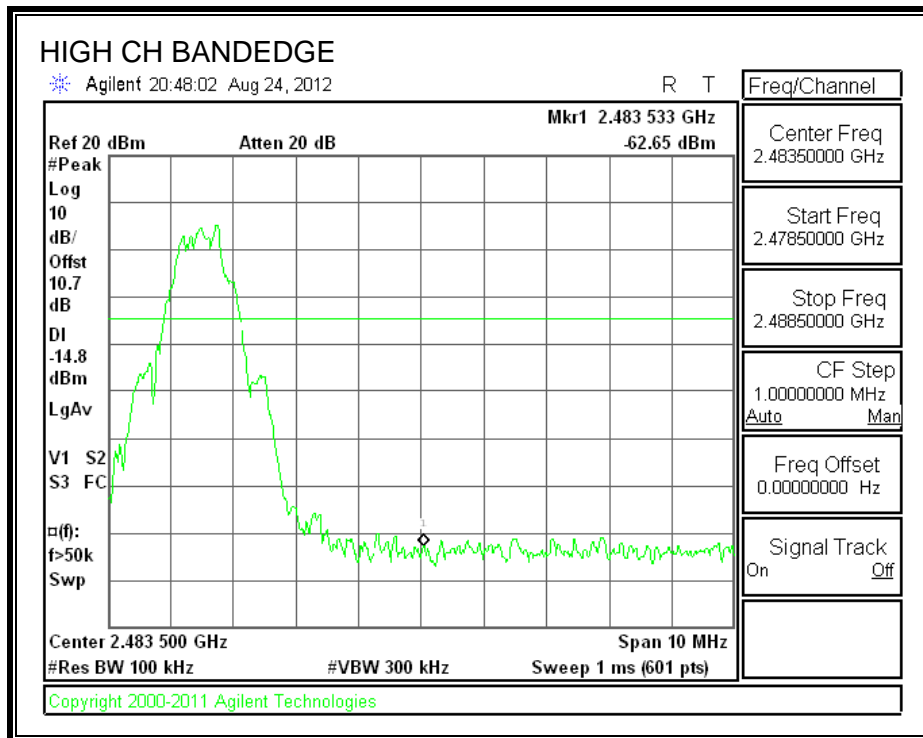


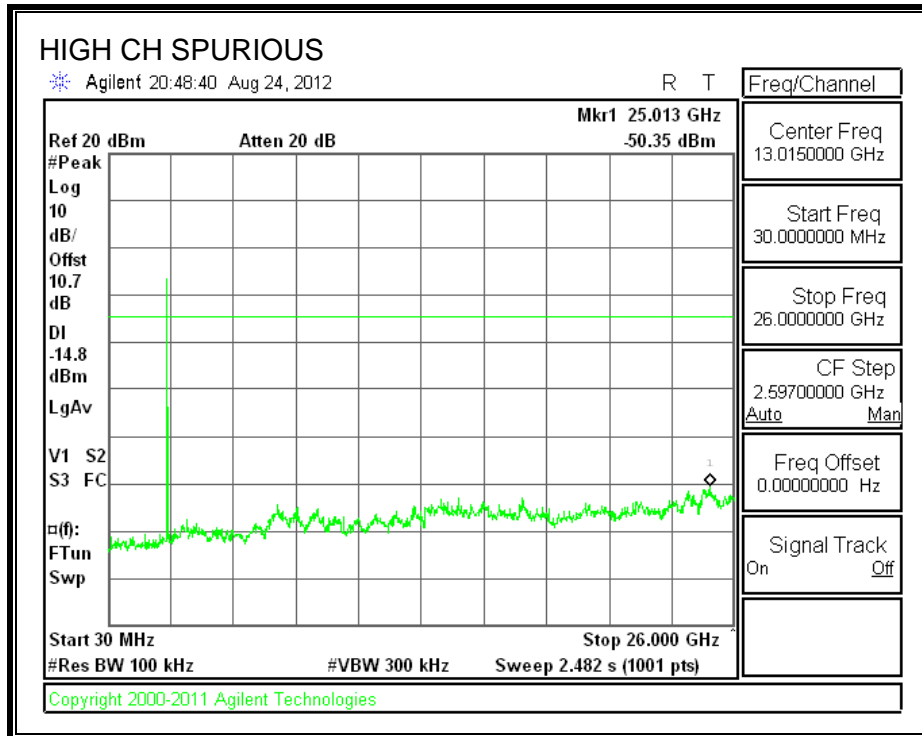
SPURIOUS EMISSIONS, MID CHANNEL





SPURIOUS EMISSIONS, HIGH CHANNEL





7. RADIATED TEST RESULTS

7.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

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. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

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, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

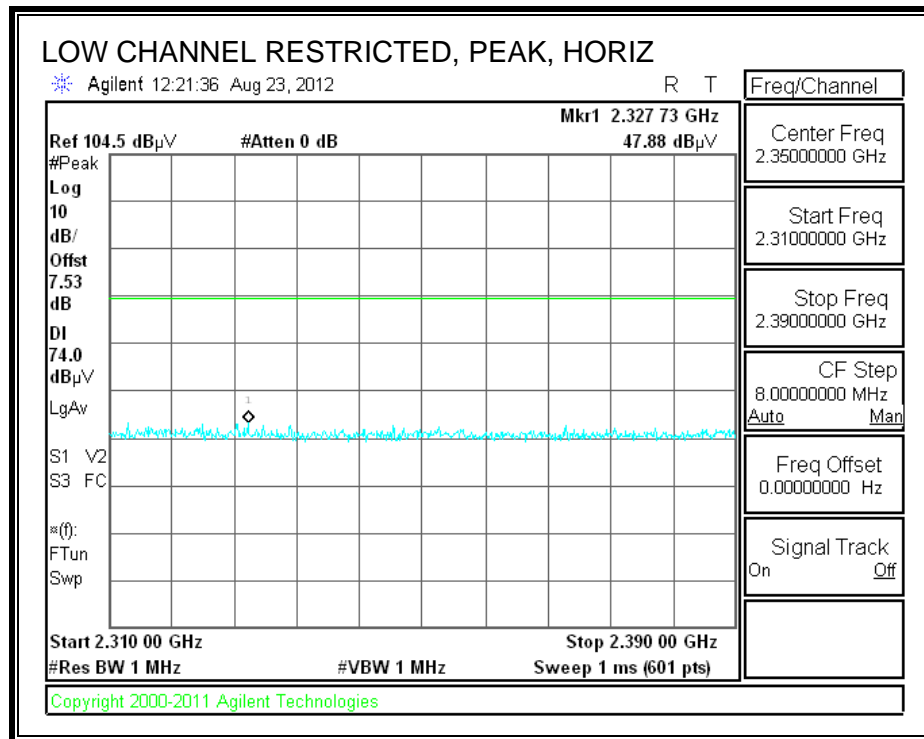
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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.

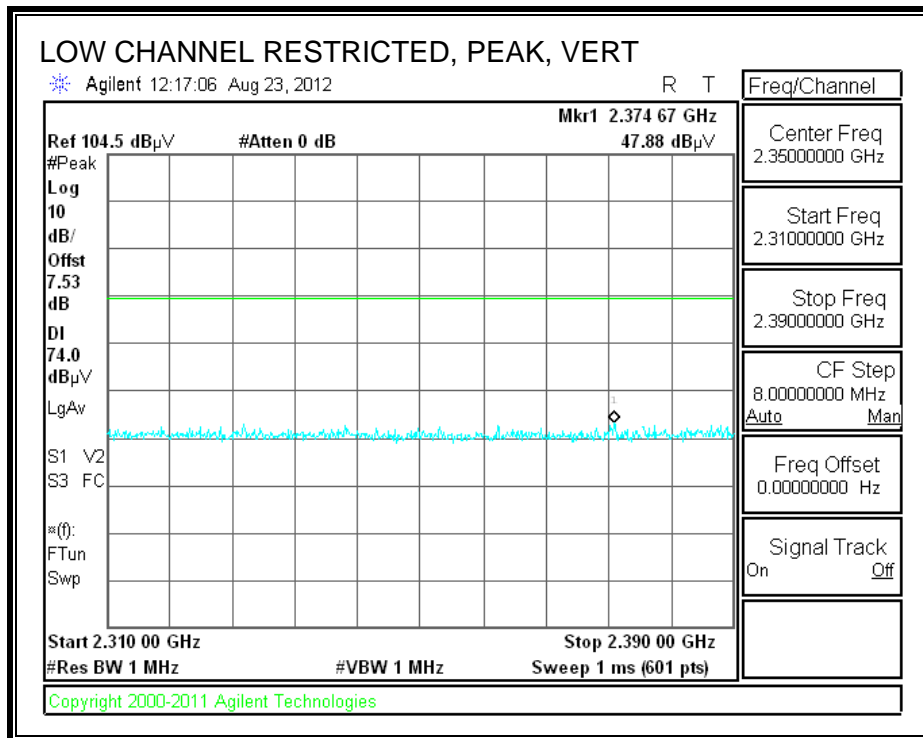
7.2. TRANSMITTER ABOVE 1 GHz

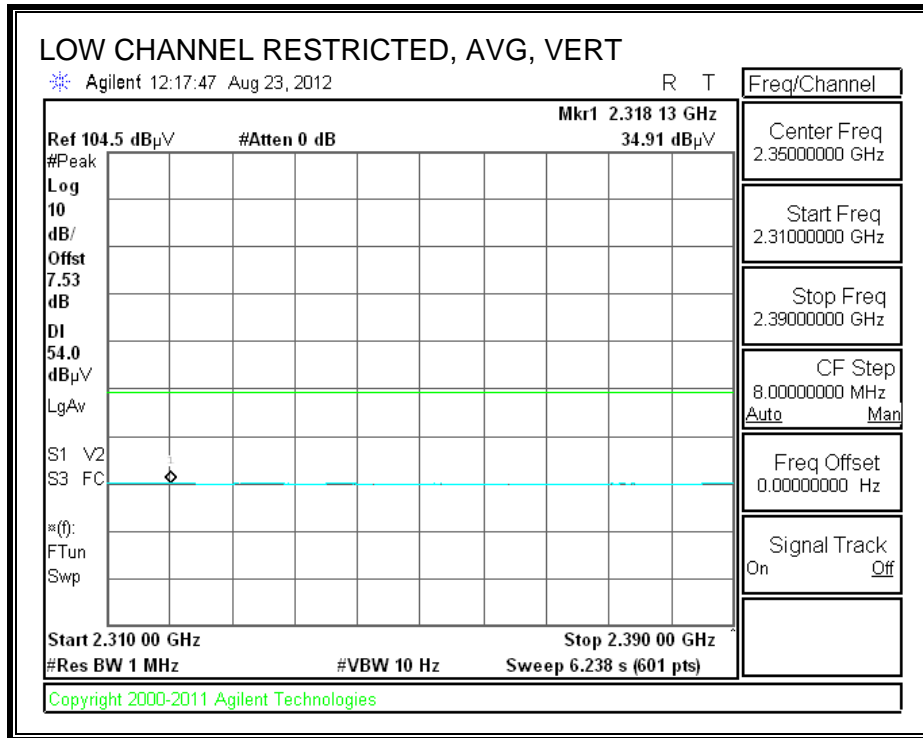
7.2.1. TX ABOVE 1 GHz FOR BLE MODE

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

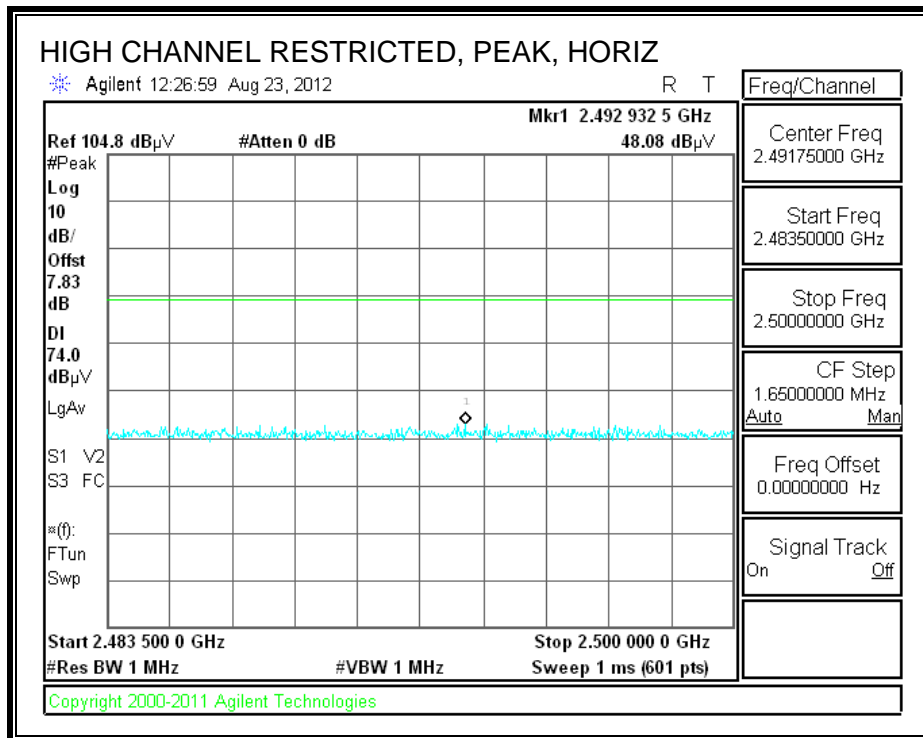


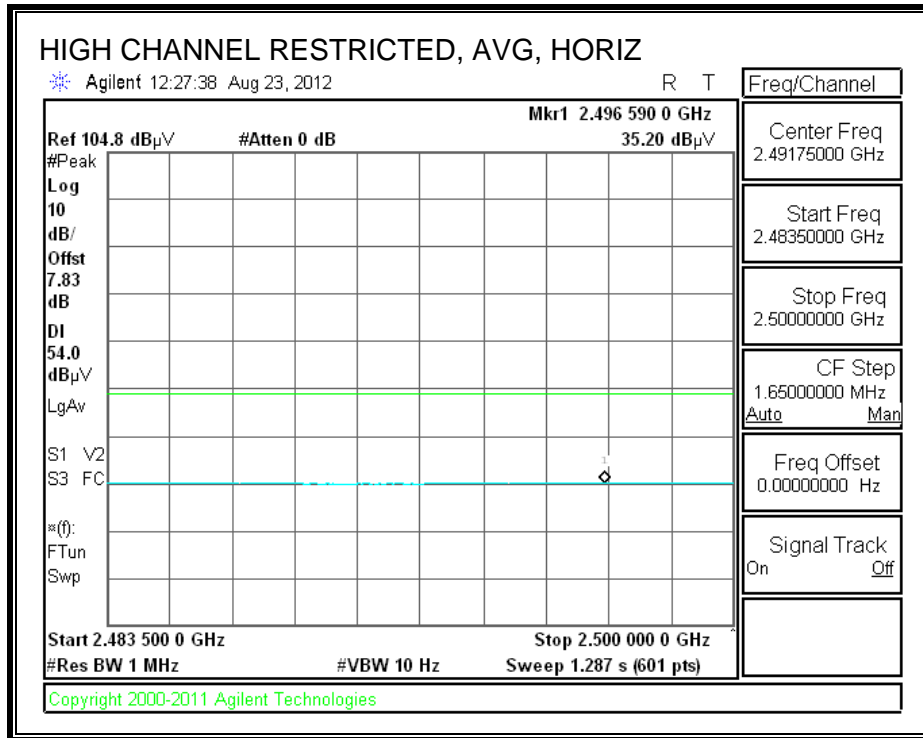
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



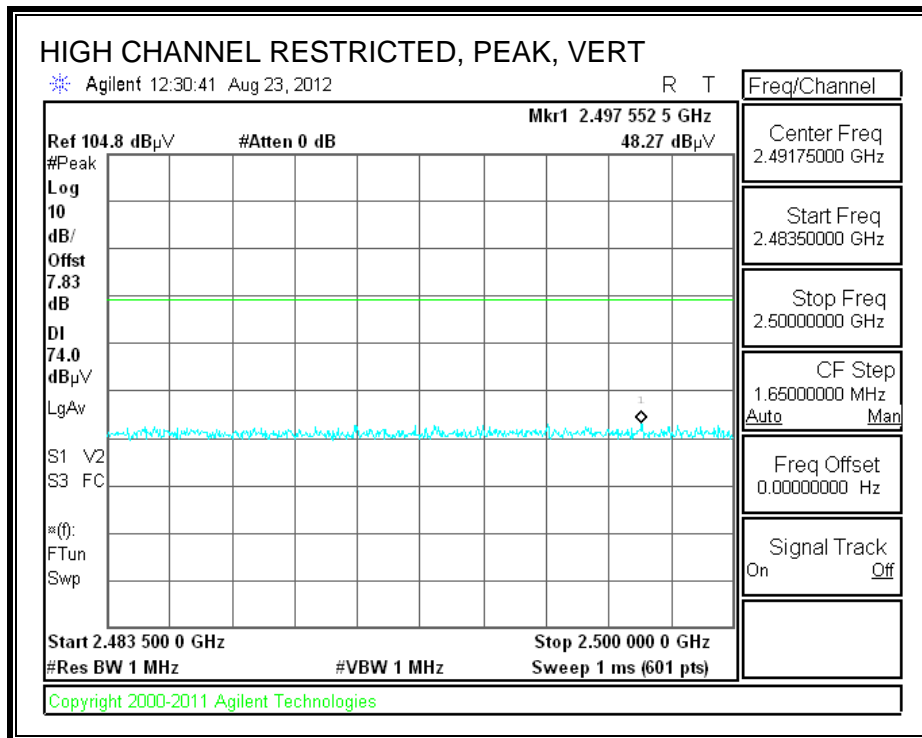


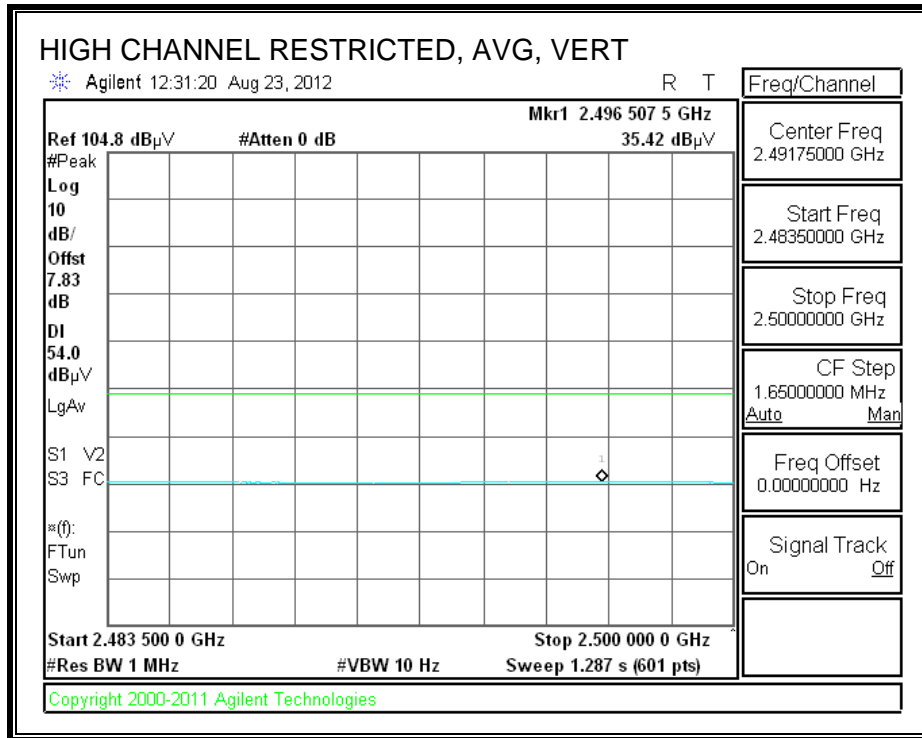
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



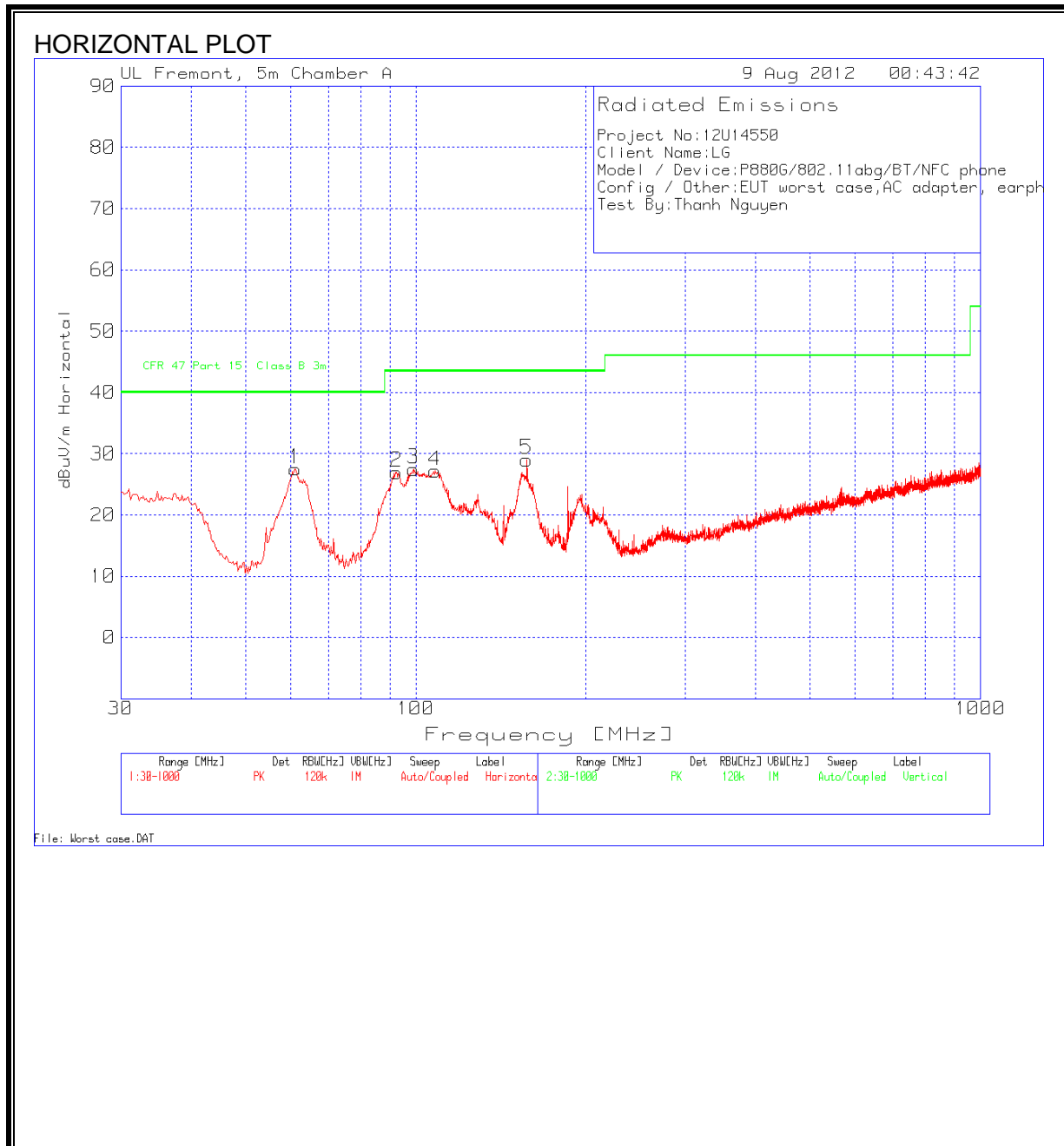


HARMONICS AND SPURIOUS EMISSIONS

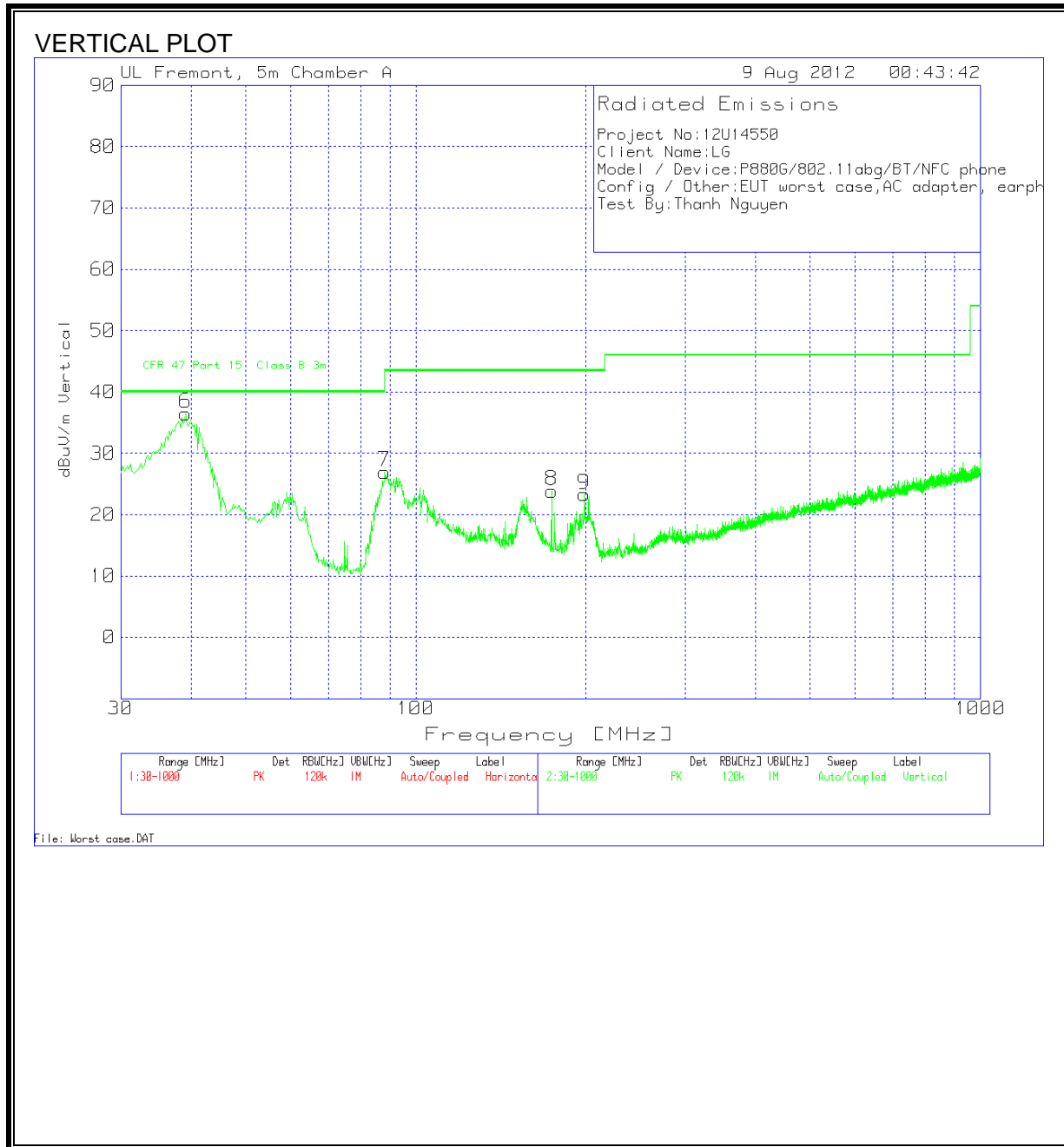
High Frequency Measurement																
Compliance Certification Services, Fremont 5m Chamber-A																
Company:		LG Electronics Mobilecomm U.S.A														
Project #:		12U14550														
Date:		8/23/2012														
Test Engineer:		Thanh Nguyen														
Configuration:		EUT at worst position														
Mode:		Transmit BT LE														
Test Equipment:																
Horn 1-18GHz			Pre-amplifier 1-26GHz			Pre-amplifier 26-40GHz			Horn > 18GHz			Limit				
T59; S/N: 3245 @3m			T145 Agilent 3008A0056						T39; ARA 18-26GHz; S/N:1013			FCC 15.205				
Hi Frequency Cables																
3' cable 22807700		12' cable 22807600		20' cable 22807500		HPF		Reject Filter		Peak Measurements RBW=VBW=1MHz Average Measurements RBW=1MHz ; VBW=10Hz						
3' cable 22807700		12' cable 22807600		20' cable 22807500				R_001								
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)	
Low ch																
4.804	3.0	37.19	25.43	33.1	6.2	-34.8	0.0	0.0	41.7	30.0	74	54	-32.3	-24.0	Noise floor/V	
4.804	3.0	37.65	25.46	33.1	6.2	-34.8	0.0	0.0	42.2	30.0	74	54	-31.8	-24.0	Noise floor/H	
Mid Ch																
4.880	3.0	38.28	25.78	33.2	6.2	-34.8	0.0	0.0	43.0	30.5	74	54	-31.0	-23.5	Noise floor/V	
4.880	3.0	38.46	25.56	33.2	6.2	-34.8	0.0	0.0	43.1	30.2	74	54	-30.9	-23.8	Noise floor/H	
High ch																
4.960	3.0	38.97	25.46	33.3	6.3	-34.8	0.0	0.0	43.8	30.3	74	54	-30.2	-23.7	Noise floor/V	
4.960	3.0	37.85	25.10	33.3	6.3	-34.8	0.0	0.0	42.7	29.9	74	54	-31.3	-24.1	Noise floor/H	
Rev. 10.24.11																
f	Measurement Frequency					Amp	Preamp Gain					Avg Lim	Average Field Strength Limit			
Dist	Distance to Antenna					D Corr	Distance Correct to 3 meters					Pk Lim	Peak Field Strength Limit			
Read	Analyzer Reading					Avg	Average Field Strength @ 3 m					Avg Mar	Margin vs. Average Limit			
AF	Antenna Factor					Peak	Calculated Peak Field Strength					Pk Mar	Margin vs. Peak Limit			
CL	Cable Loss					HPF	High Pass Filter									

7.3. WORST-CASE BELOW 1 GHz

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:12U14550									
Client Name:LG									
Model / Device:P880G/802.11abg/BT/NFC phone									
Config / Other:EUT worst case,AC adapter, earph									
Test By:Thanh Nguyen									
Horizontal 30 - 1000MHz									
Test Frequency	Meter Reading	Detector	25MHz-1GHz ChmbrA Amplifie d.TX (dB)	T243 Sunol Bilog.TXT (dB)	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
61.209	47.33	PK	-27.2	7.4	27.53	40	-12.47	300	Horz
92.4181	45.89	PK	-27	8.1	26.99	43.5	-16.51	200	Horz
99.0088	44.42	PK	-26.9	9.9	27.42	43.5	-16.08	300	Horz
108.3133	41.65	PK	-26.8	12.3	27.15	43.5	-16.35	300	Horz
157.3561	43.49	PK	-26.5	12	28.99	43.5	-14.51	200	Horz
Vertical 30 - 1000MHz									
Test Frequency	Meter Reading	Detector	25MHz-1GHz ChmbrA Amplifie d.TX (dB)	T243 Sunol Bilog.TXT (dB)	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
39.1107	49.24	PK	-27.4	14.6	36.44	40	-3.56	100	Vert
39.117	43.71	QP	-27.4	14.6	30.91	40	-9.09	344	Vert
88.1535	46.52	PK	-27	7.4	26.92	43.5	-16.58	100	Vert
174.2206	38.85	PK	-26.4	11.4	23.85	43.5	-19.65	100	Vert
199.0328	37.28	PK	-26.2	12.2	23.28	43.5	-20.22	100	Vert

8. 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

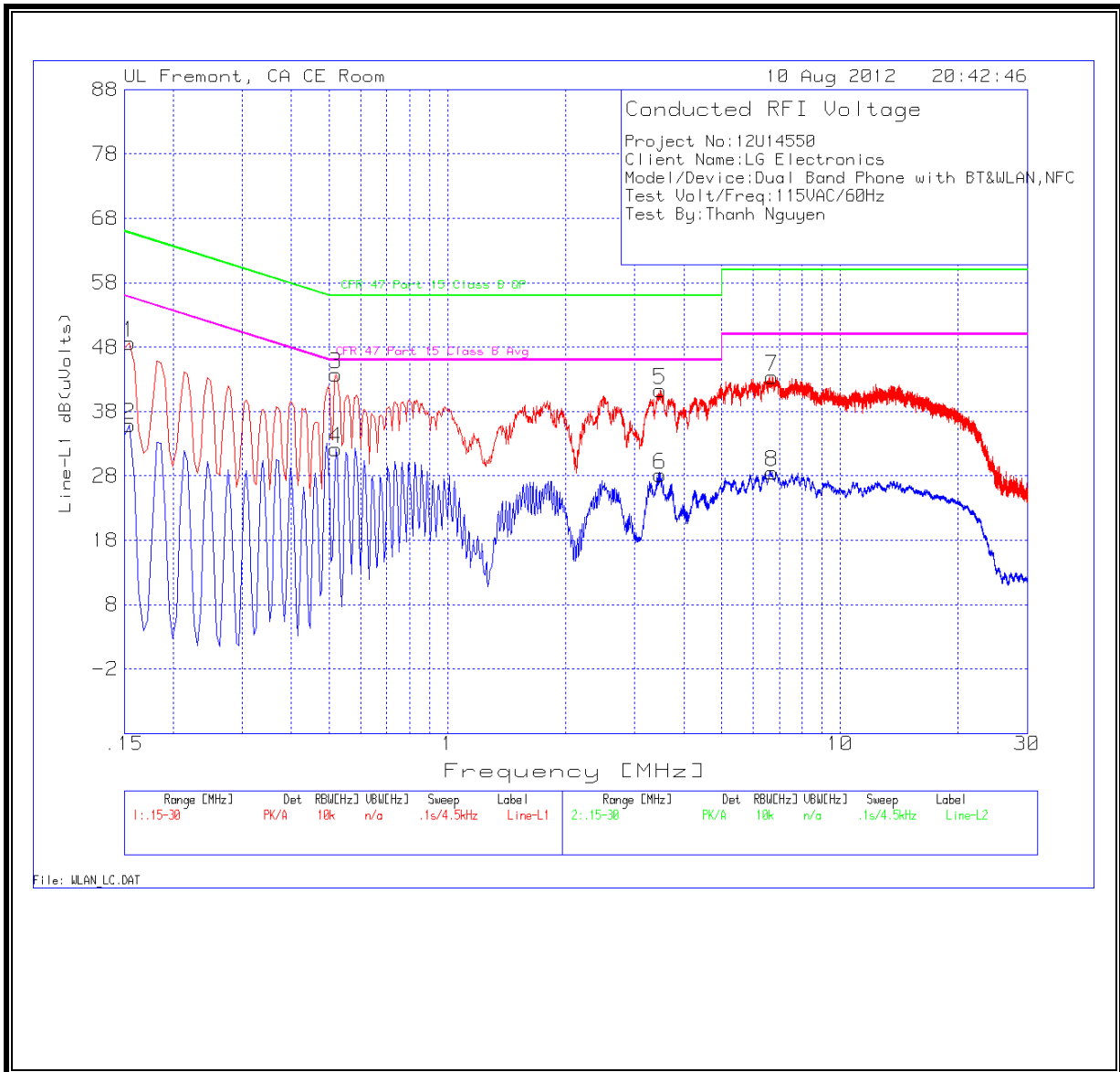
ANSI C63.4

RESULTS

6 WORST EMISSIONS

Project No:12U14550									
Client Name:LG Electronics									
Model/Device:Dual Band Phone with BT&WLAN,NFC									
Test Volt/Freq:115VAC/60Hz									
Test By:Thanh Nguyen									
Line-L1 .15 - 30MHz									
Test Frequency	Meter Reading	Detector	T24 IL L1.TXT (dB)	LC Cables 1&3.TXT (dB)	dB(uVolts)	CFR 47 Part 15 Class B QP	Margin	CFR 47 Part 15 Class B Avg	Margin
0.1545	48.52	PK	0.1	0	48.62	65.8	-17.18	-	-
0.1545	35.78	Av	0.1	0	35.88	-	-	55.8	-19.92
0.519	43.72	PK	0.1	0	43.82	56	-12.18	-	-
0.519	32.03	Av	0.1	0	32.13	-	-	46	-13.87
3.489	41.11	PK	0.1	0.1	41.31	56	-14.69	-	-
3.489	27.99	Av	0.1	0.1	28.19	-	-	46	-17.81
6.7155	43.15	PK	0.1	0.1	43.35	60	-16.65	-	-
6.7155	28.33	Av	0.1	0.1	28.53	-	-	50	-21.47
Line-L2 .15 - 30MHz									
Test Frequency	Meter Reading	Detector	T24 IL L1.TXT (dB)	LC Cables 1&3.TXT (dB)	dB(uVolts)	CFR 47 Part 15 Class B QP	Margin	CFR 47 Part 15 Class B Avg	Margin
0.3705	41.86	PK	0.1	0	41.96	58.5	-16.54	-	-
0.3705	28.8	Av	0.1	0	28.9	-	-	48.5	-19.6
0.555	42.36	PK	0.1	0	42.46	56	-13.54	-	-
0.555	30.17	Av	0.1	0	30.27	-	-	46	-15.73
0.681	41.83	PK	0.1	0	41.93	56	-14.07	-	-
0.681	29.44	Av	0.1	0	29.54	-	-	46	-16.46
6.153	39.25	PK	0.1	0.1	39.45	60	-20.55	-	-
6.153	23.77	Av	0.1	0.1	23.97	-	-	50	-26.03

LINE 1 RESULTS



LINE 2 RESULTS

