FCC CFR47 PART 15 SUBPART C

CERTIFICATION TEST REPORT

FOR

BT3.0, 802.11 B/G/N 1X1 HT20, GSM850/1900, WCDMA850/1900MHZ, BAR PHONE WITH HOTSPOTS. AND VOIP SUPPORTED

MODEL NUMBER: GT-B5330L

FCC ID: A3LGTB5330L

REPORT NUMBER: 12I14431-1

ISSUE DATE: JUNE 15, 2012

Prepared for
SAMSUNG ELECTRONICS CO., LTD.
416, MAETAN 3-DONG, YEONGTONG-GU
SUWON-CITY, GYEONGGI-DO 443-742, SOUTH KOREA

Prepared by
COMPLIANCE CERTIFICATION SERVICES (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

Rev.	Issue Date	Revisions	Revised By
	06/15/12	Original	T. LEE

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	SAMSUNG ELECTRONICS CO., LTD. 416, MAETAN 3-DONG, YEONGTONG-GU SUWON-CITY, GYEONGGI-DO 443-742, SOUTH KOREA
EUT DESCRIPTION:	BT3.0, 802.11 B/G/N 1X1 HT20, GSM850/1900, WCDMA850/1900MHZ, BAR PHONE WITH HOTSPOTS. AND VOIP SUPPORTED
MODEL:	GT-B5330L
SERIAL NUMBER:	FJ-161-D (CONDUCTED), FJ-161-B (RADIATED)
DATE TESTED:	JUNE 08-JUNE 16, 2012

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

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

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

Approved & Released For UL CCS By:

TIM LEE
STAFF ENGINEER
UL CCS

Tested By:

CHIN PANG
EMC ENGINEER
UL CCS

2. TEST METHODOLOGY

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

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:

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

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is BT3.0, 802.11 B/G/N 1X1 HT20, GSM850/1900, WCDMA850/1900MHZ, Bar Phone with HOTSPOTS. AND VOIP supported.

The manufacturer of the radio module is Samsung Electronics Co., Ltd.

5.2. 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	802.11b	17.56	57.02
2412 - 2462	802.11g	21.97	157.40
2412 - 2462	802.11n HT20	20.02	100.46

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna, with a maximum gain of -4.3 dBi.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was S6102E.001.

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emission below 1 GHz and power line conducted emission tests were performed with the EUT transmitting at the channel with highest output power as worst-case scenario.

The fundamental frequency was investigated for the EUT in three orthogonal orientations X,Y, and Z (battery-operated), also for EUT with AC/DC adapter and with headset connected; it was found that the worst-case orientation among them was X orientation with AC/DC adapter and with headset. All final radiated emission testing was performed using the worst-case orientation.

Based on the manufacturer's attestation that the nominal output power is reduced as the data rate increases, the data rates tested represent the highest power and worst-case with respect to EMC performance.

Worst-case data rates were as follows:
802.11b Mode: 1Mbps
802.11g Mode: 6Mbps
802.11n HT20 Mode: MCS0

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

CONDUCTED SETUP:

Band	Mode	Separation Distance (m)	Output AV Power (dBm)	Antenna Gain (dBi)	IC Power Density (W/m^2)	FCC Power Density (mW/cm^2)
2.4 GHz	WLAN	0.20	14.70	-4.30	0.022	0.0022

RADIATED SETUP:

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC Adapter	Samsung	ATADS20C	01047	DoC
Heasdset	Samsung	FS-050-B	01049	N/A

I/O CABLES

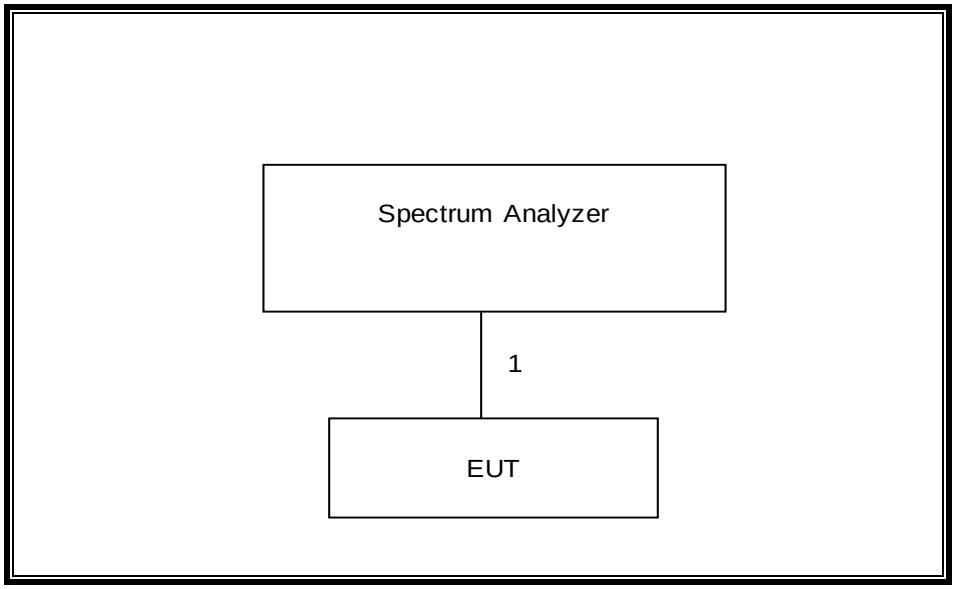
CONDUCTED SETUP:

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	Antenna	1	SMA	Shielded	0.10m	NA

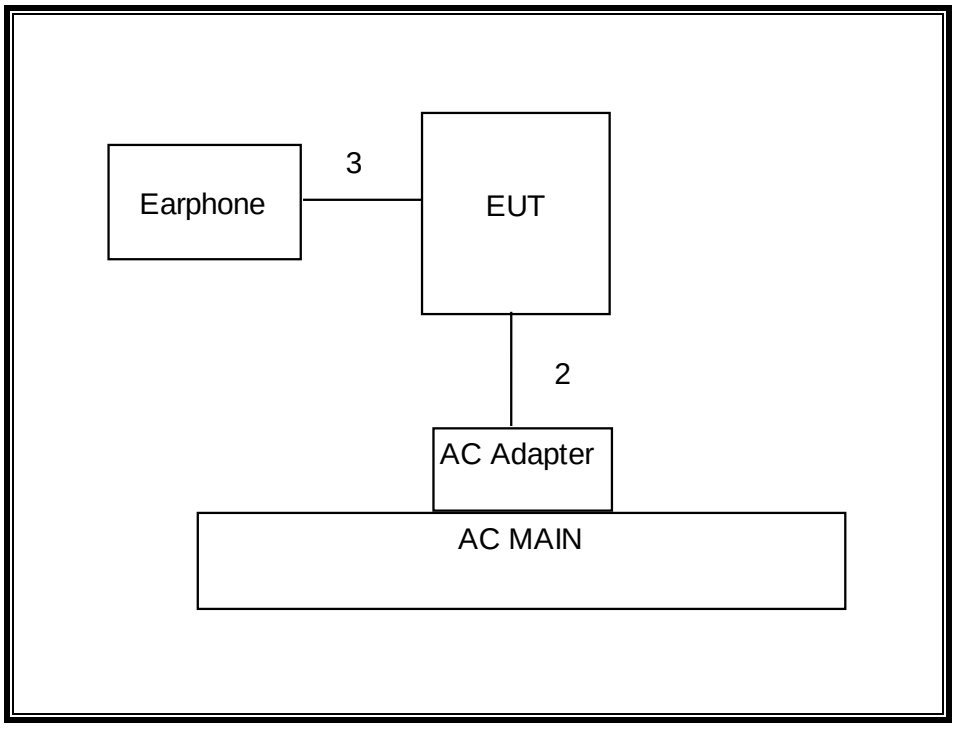
RADIATED SETUP:

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
2	DC Power/USB	1	Mini-USB	Shielded	1.2 m	NA
3	Audio	1	Mini-Jack	Un-Shielded	1.5 m	NA

SETUP DIAGRAM FOR CONDUCTED TESTS



RADIATED SETUP:



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 Date**	**Cal Due**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	09/02/11	09/02/12
Antenna, Horn, 18 GHz	EMCO	3115	C00872	09/20/11	09/20/12
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	07/18/11	07/18/12
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01179	02/16/12	02/16/13
Antenna, Bilog, 2MHz	Sunol Sciences	JB1	N/A	02/07/12	02/07/13
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	11/11/11	11/11/12
Antenna, Horn, 18 GHz	EMCO	3115	C00945	10/06/11	10/06/12
Antenna, Horn, 18 GHz	EMCO	3115	C00872	09/20/11	09/20/12
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	07/18/11	07/18/12
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00980	07/28/11	07/28/12
Antenna, Bilog, 2MHz	Sunol Sciences	JB1	N/A	02/07/12	02/07/13
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	07/12/11	07/12/12
Reject Filter, 2.4GHz	Micro-Tronics	BRM50702	N02684	CNR	CNR
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	08/15/11	08/15/12
P-Seies Single Channel Power Meter	Agilent / HP	N1911A	N/A	08/04/11	08/04/12
Peak / Average Power Sensor	Agilent / HP	E9323A	N/A	08/04/11	08/04/12

7. ANTENNA PORT TEST RESULTS

7.1. 802.11b MODE IN THE 2.4 GHz BAND

7.1.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

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

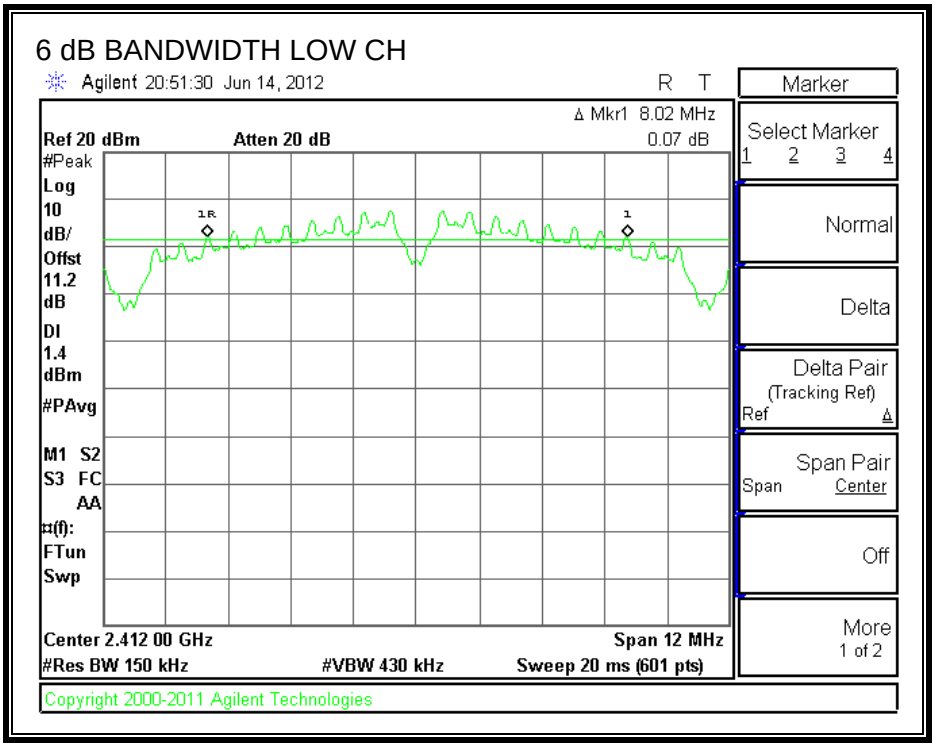
TEST PROCEDURE

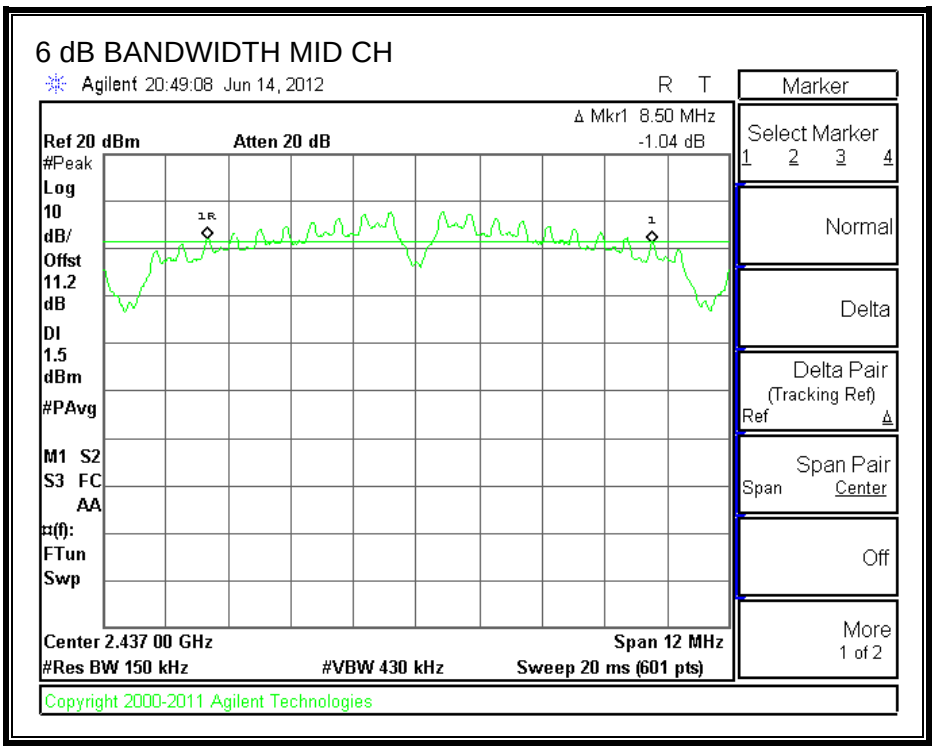
KDB 558074 D01 DTS Measurement Guidance V01 dated 01-18-12.

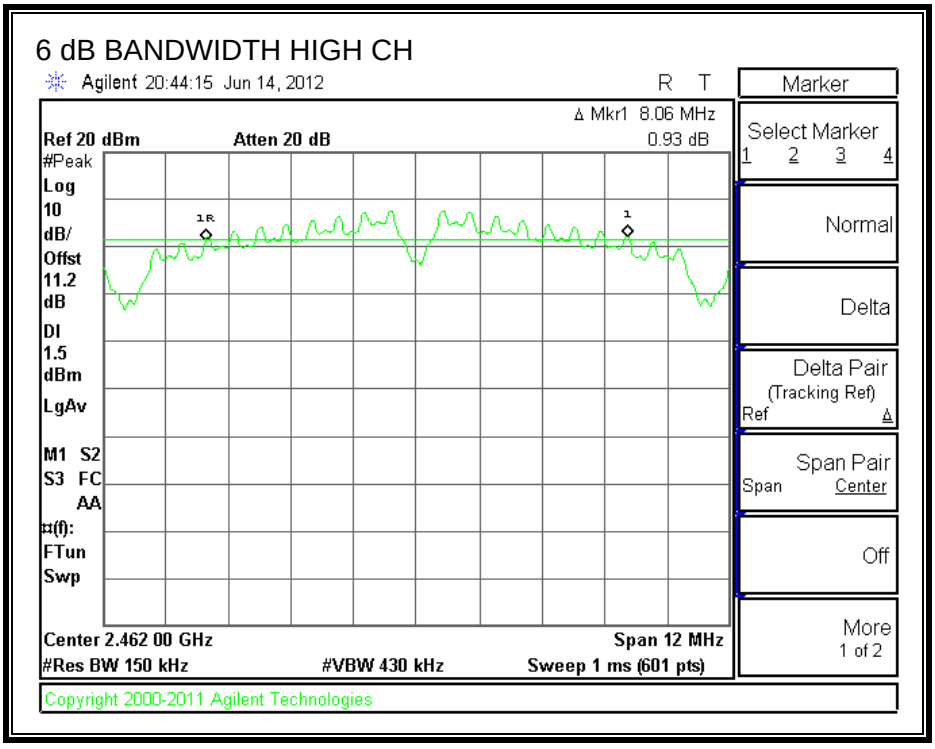
RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	8.02	0.5
Middle	2437	8.50	0.5
High	2462	8.06	0.5

6 dB BANDWIDTH







7.1.2. OUTPUT POWER

LIMITS

FCC §15.247 (b)

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

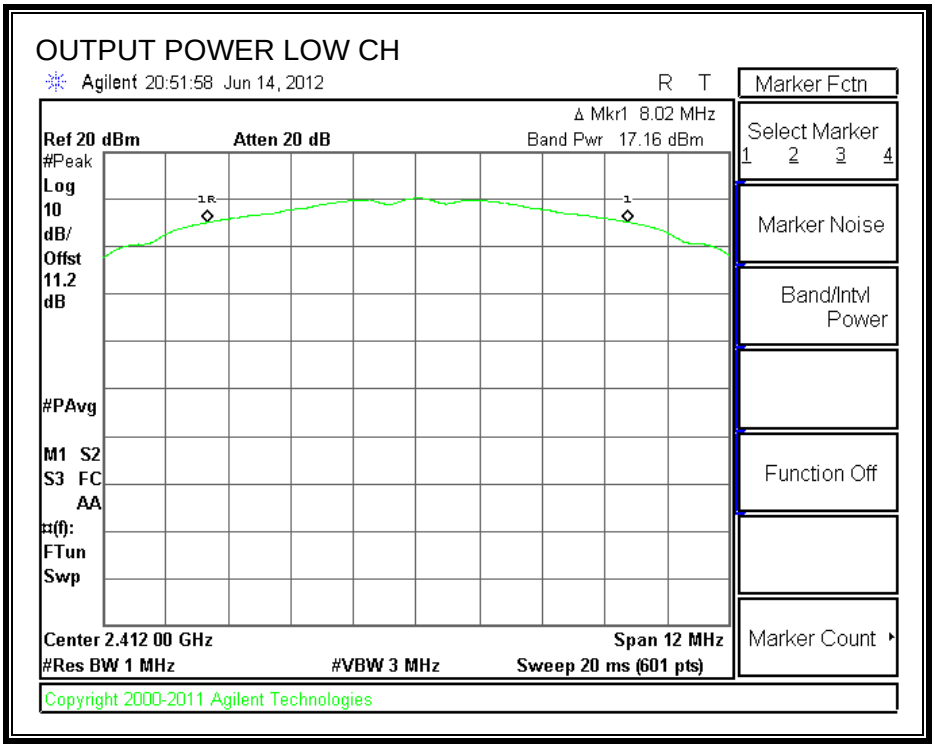
TEST PROCEDURE

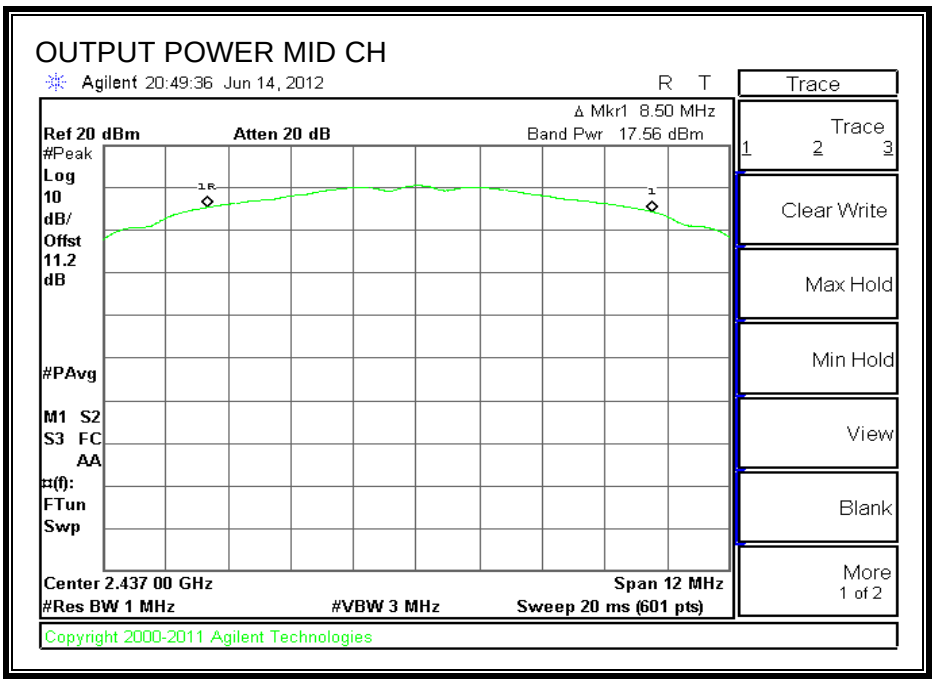
KDB 558074 D01 DTS Measurement Guidance V01 dated 01-18-12.

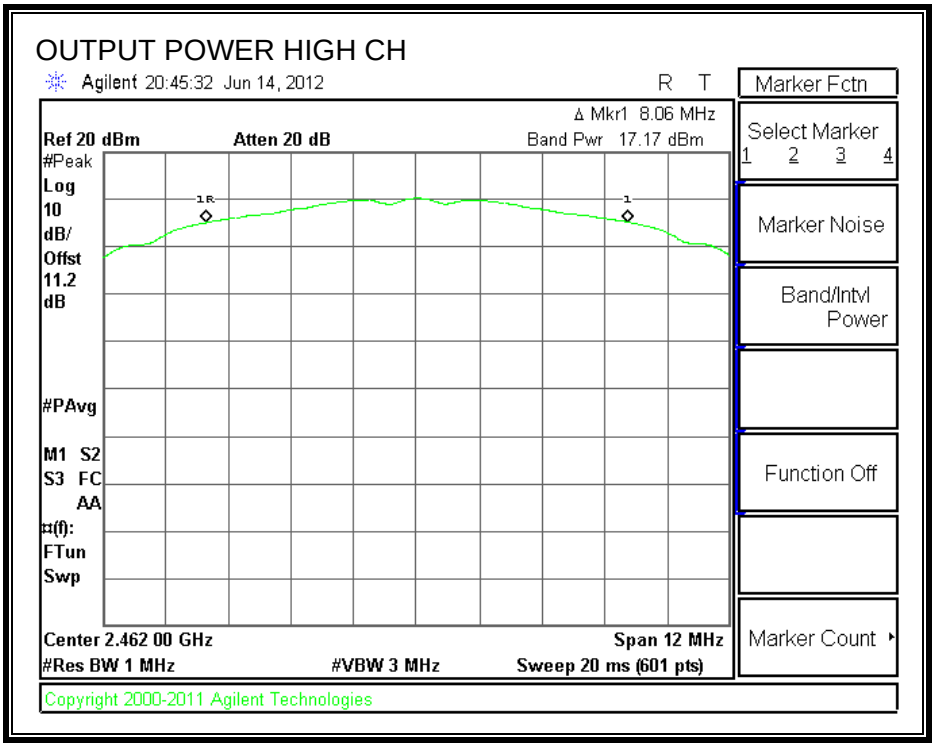
RESULTS

Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
2412	17.16	30	-12.84
2437	17.56	30	-12.44
2462	17.17	30	-12.83

OUTPUT POWER







7.1.3. 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 11.2 dB (including 10 dB pad and 1.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	2412	14.60
Middle	2437	14.70
High	2462	14.70

7.1.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

TEST PROCEDURE

KDB 558074 D01 DTS Measurement Guidance V01 dated 01-18-12.

RESULTS

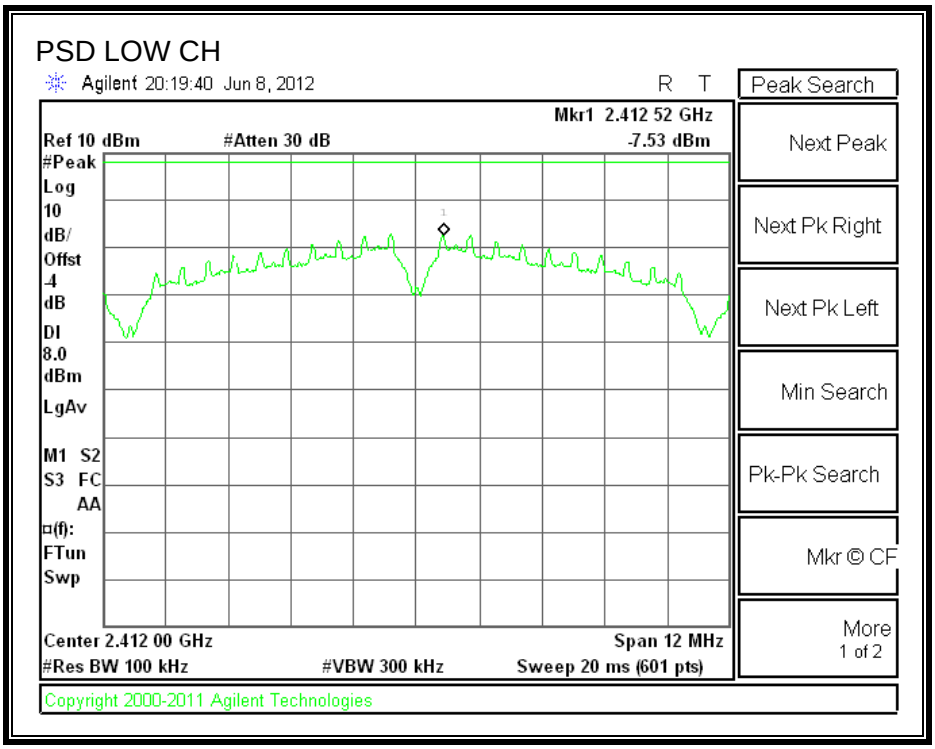
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-7.53	8	-15.53
Middle	2437	-7.29	8	-15.29
High	2462	-7.32	8	-15.32

Note: For this test the total reference level offset is:

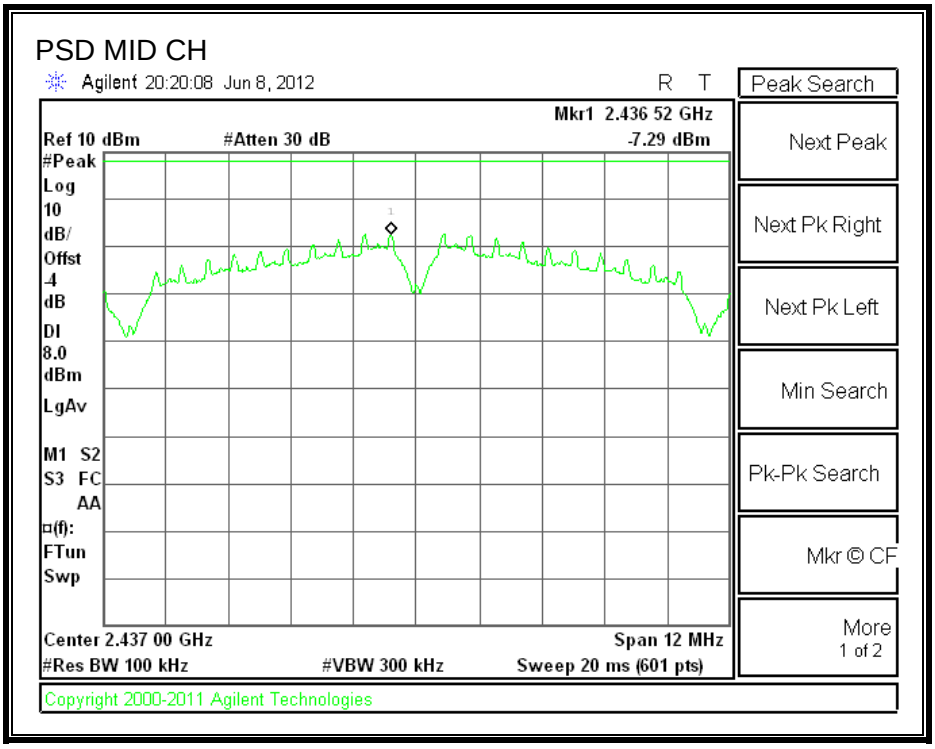
Attenuator + Cable Loss -15.2dBm= 11.2 – 15.2 = -4.0dBm

POWER SPECTRAL DENSITY

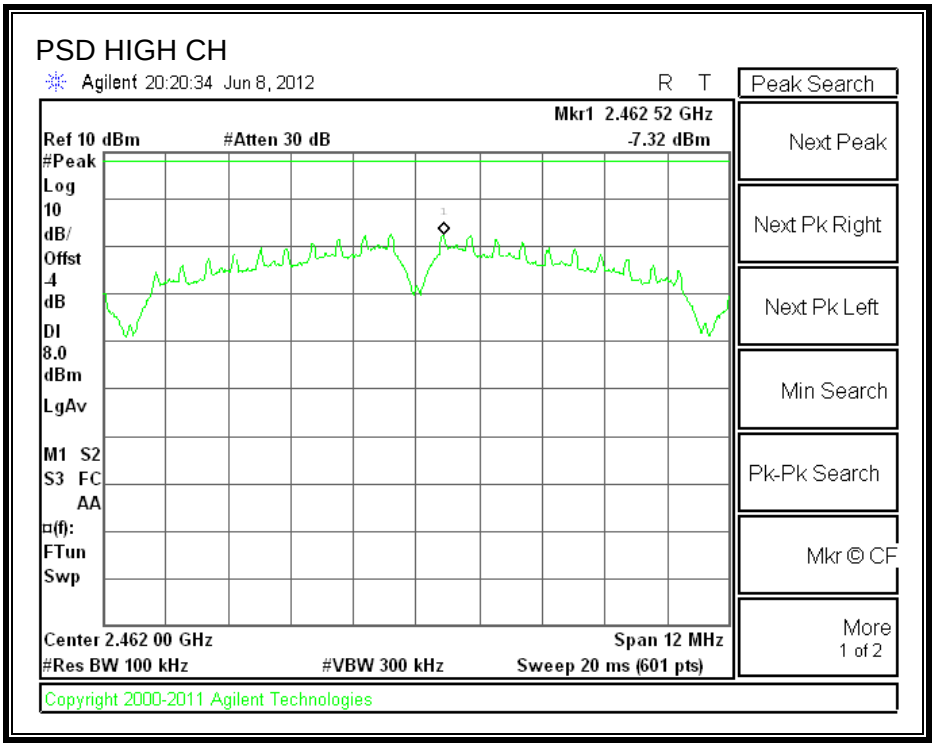
PSD LOW CH



PSD MID CH



PSD HIGH CH



7.1.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

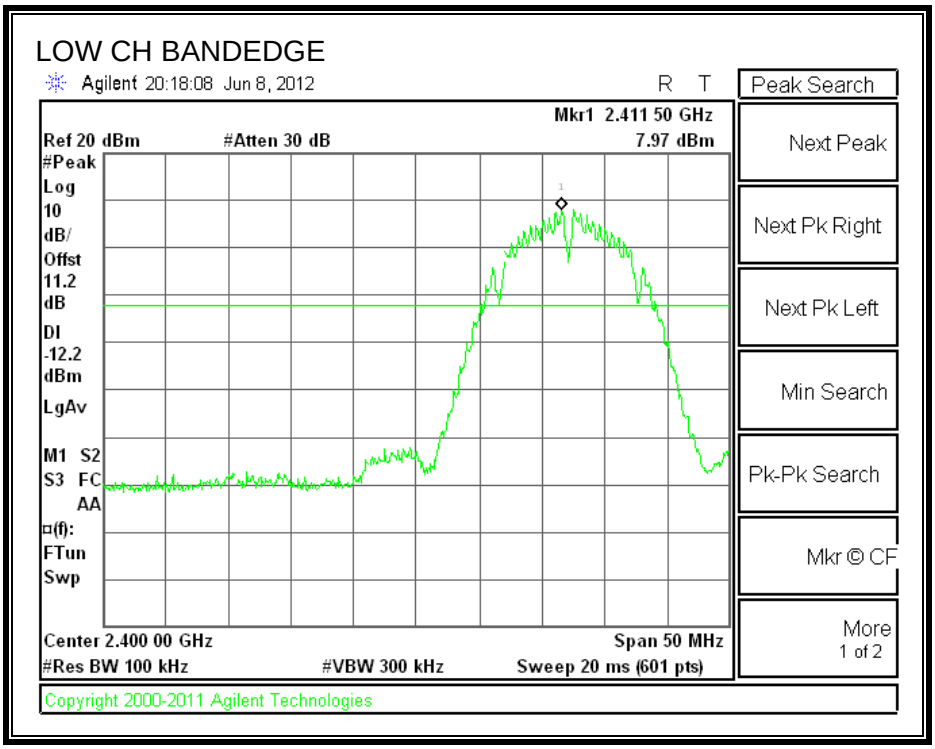
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

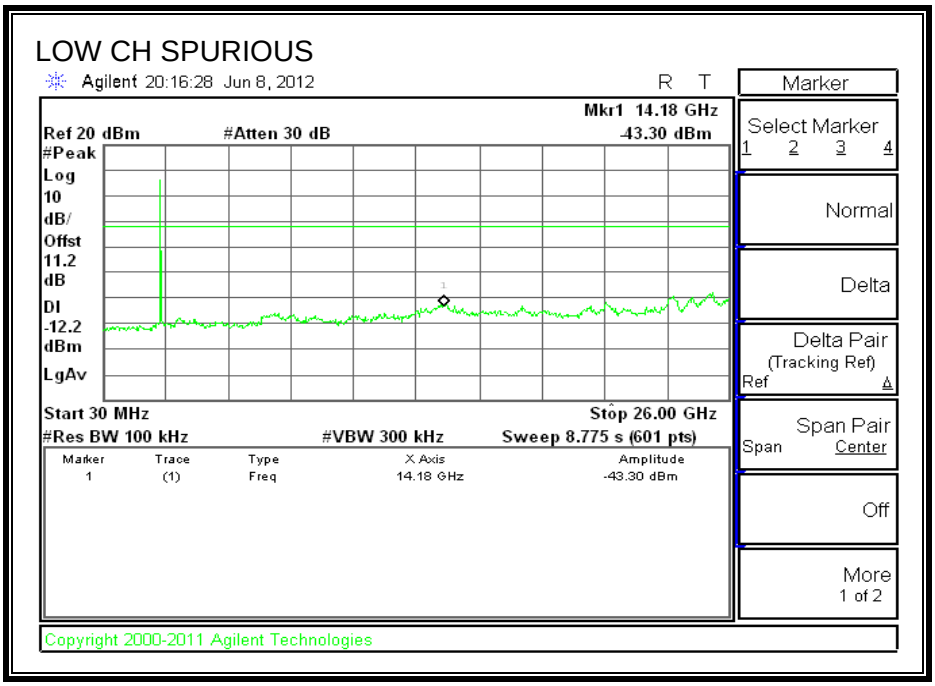
TEST PROCEDURE

KDB 558074 D01 DTS Measurement Guidance V01 dated 01-18-12.

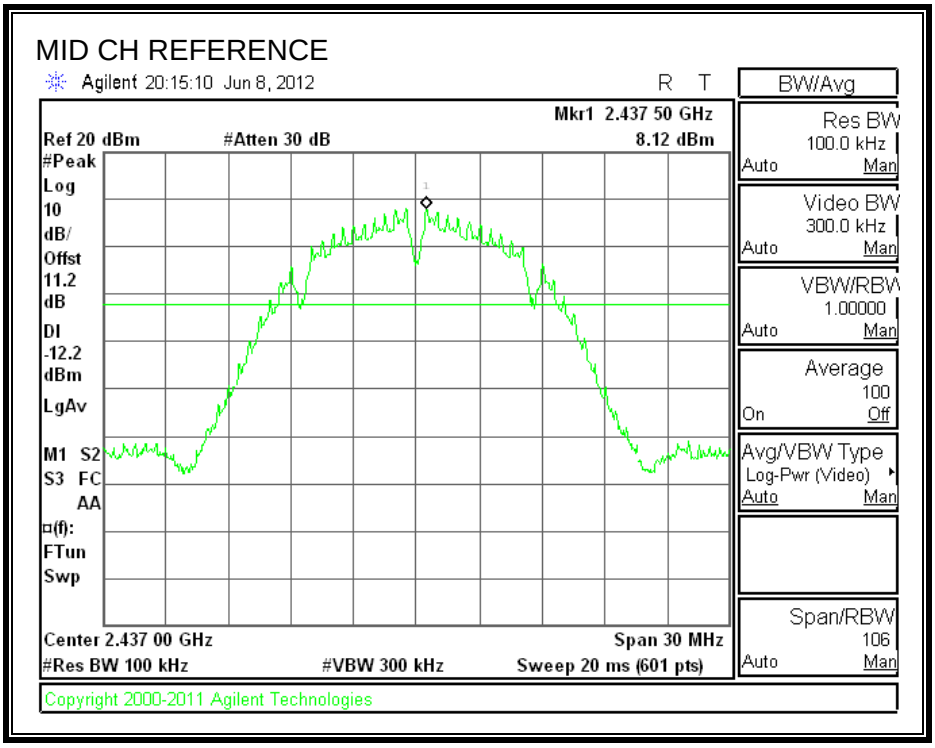
RESULTS

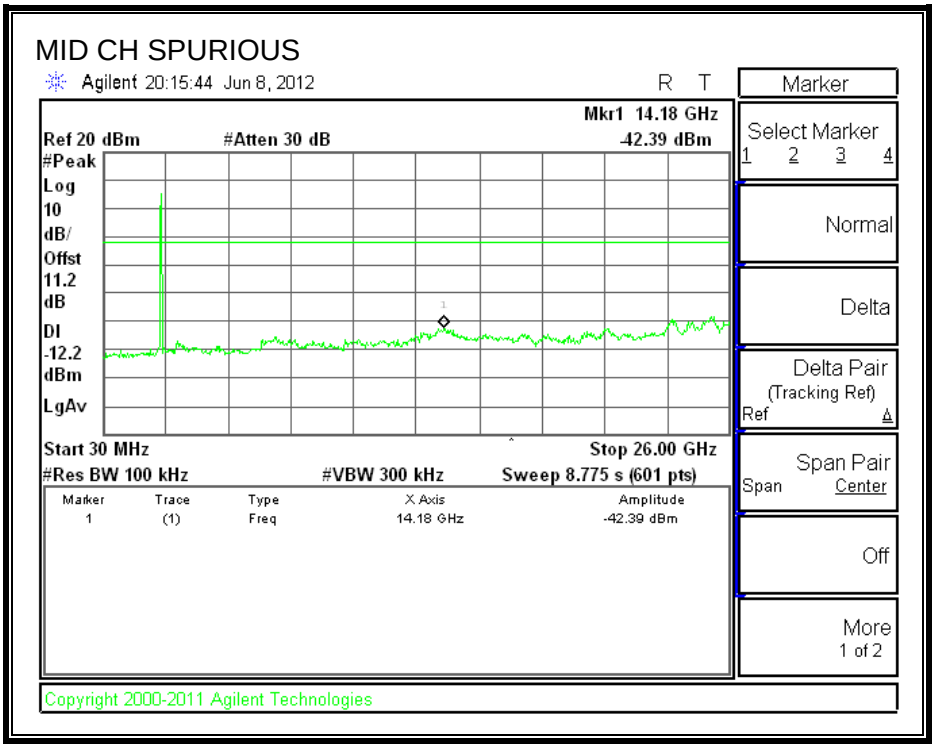
SPURIOUS EMISSIONS, LOW CHANNEL



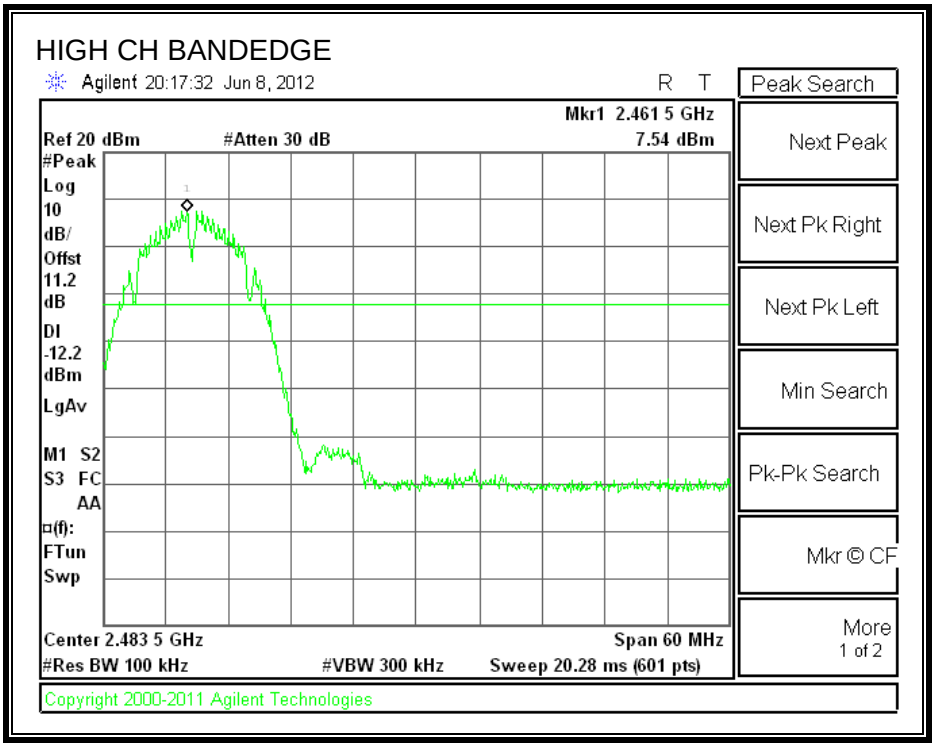


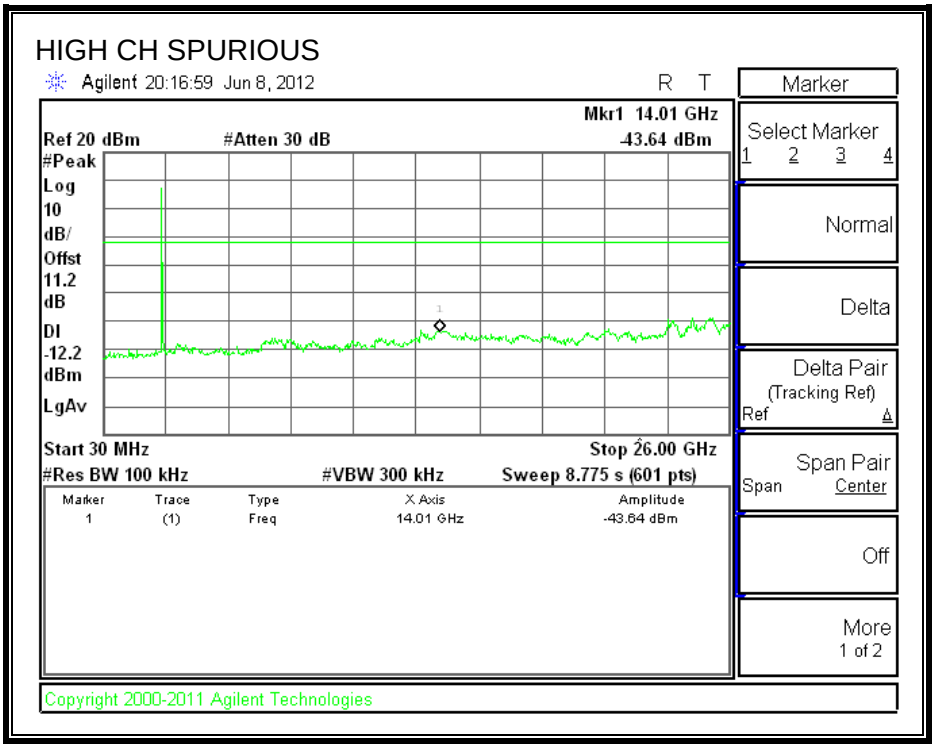
SPURIOUS EMISSIONS, MID CHANNEL





SPURIOUS EMISSIONS, HIGH CHANNEL





7.2. 802.11g MODE IN THE 2.4 GHz BAND

7.2.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

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

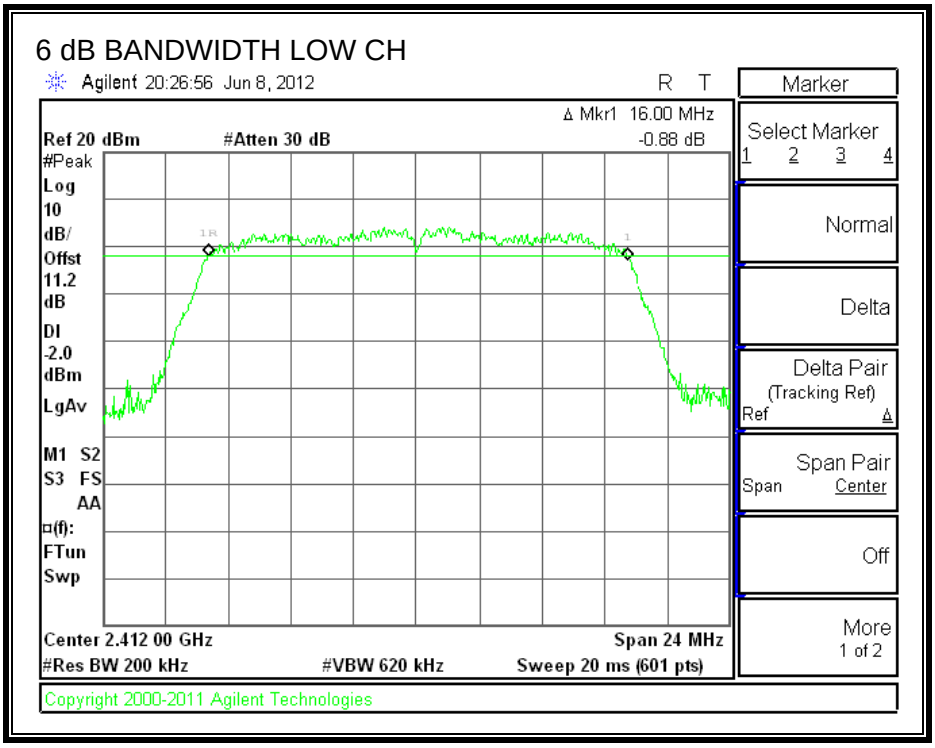
TEST PROCEDURE

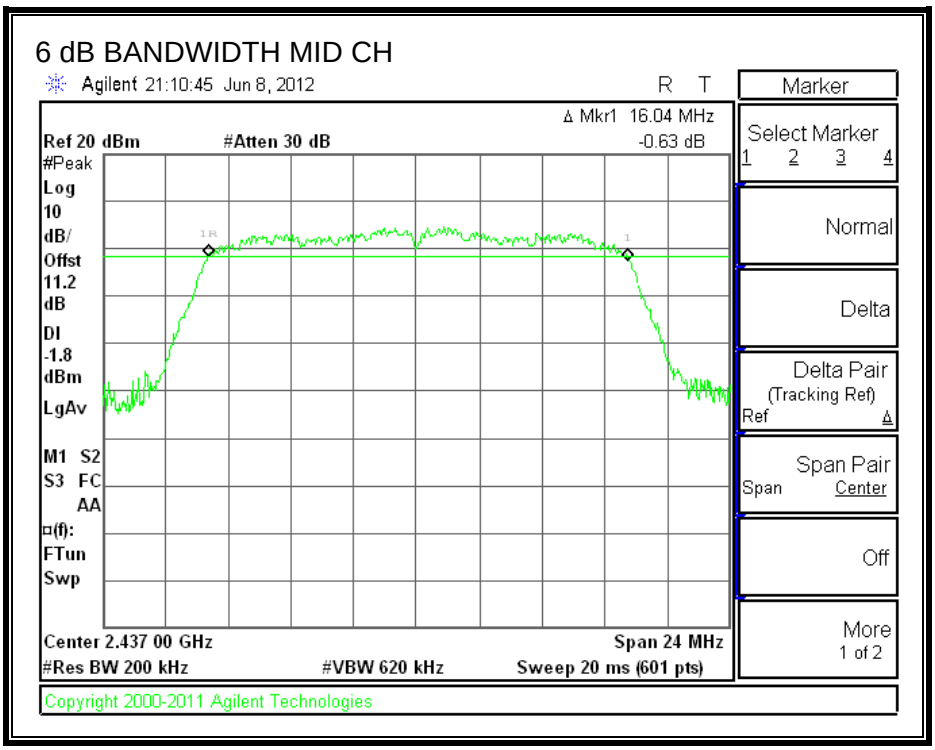
KDB 558074 D01 DTS Measurement Guidance V01 dated 01-18-12.

RESULTS

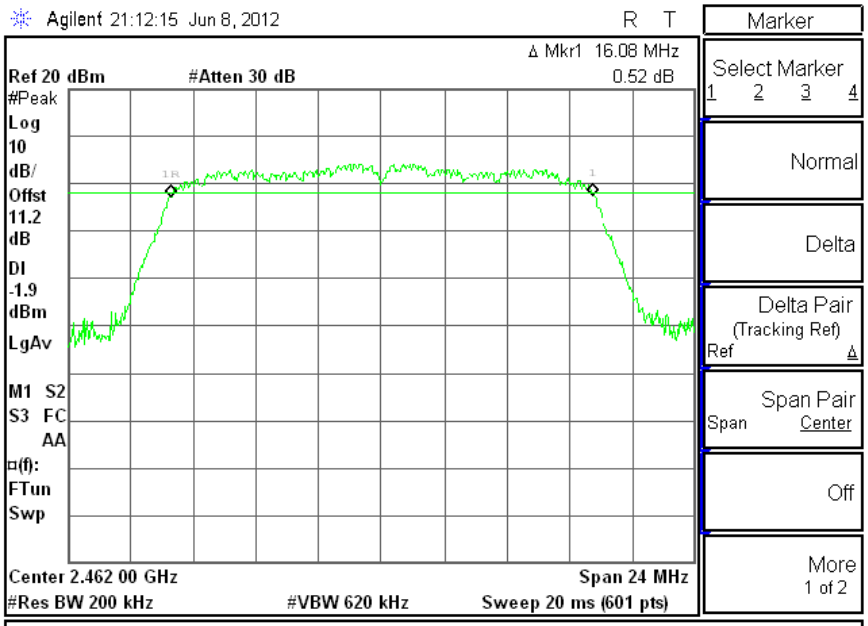
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.00	0.5
Middle	2437	16.04	0.5
High	2462	16.08	0.5

6 dB BANDWIDTH





6 dB BANDWIDTH HIGH CH



7.2.2. OUTPUT POWER

LIMITS

FCC §15.247 (b)

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

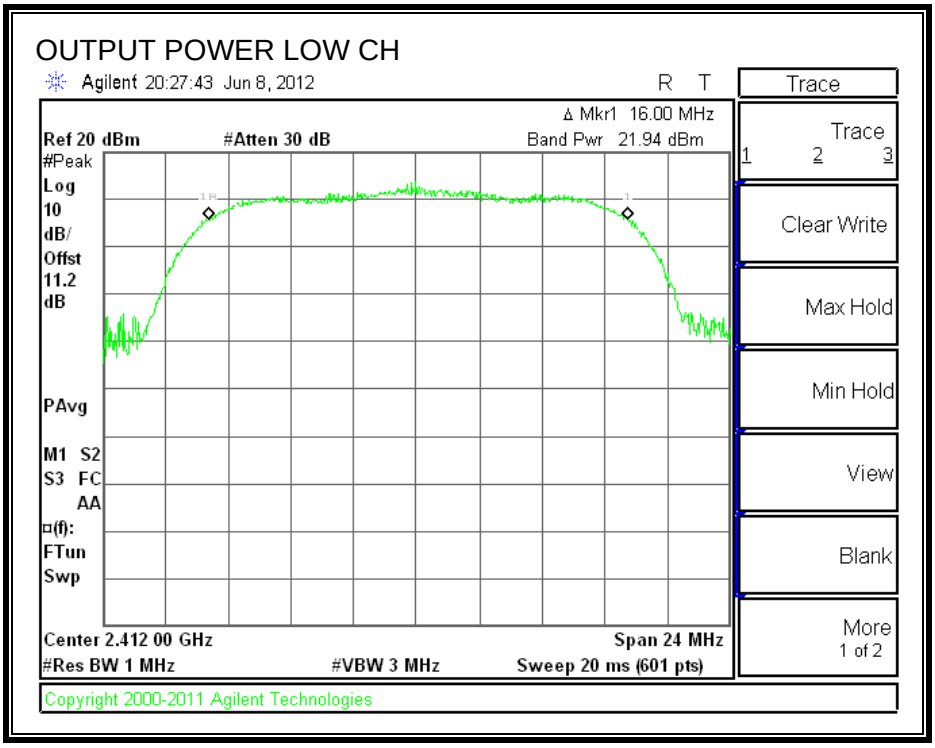
TEST PROCEDURE

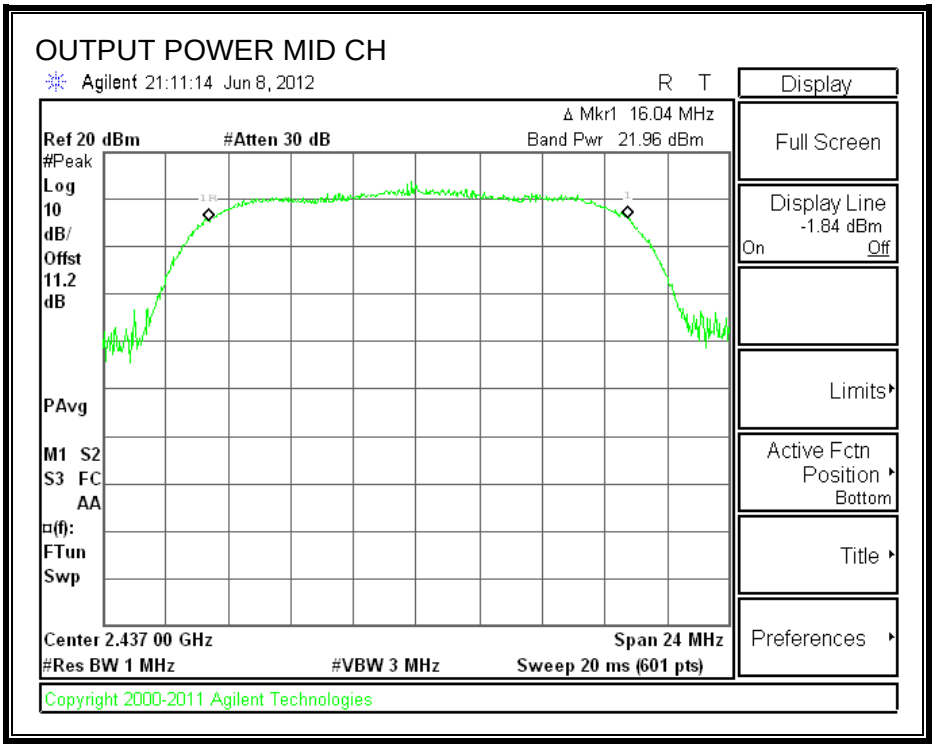
KDB 558074 D01 DTS Measurement Guidance V01 dated 01-18-12.

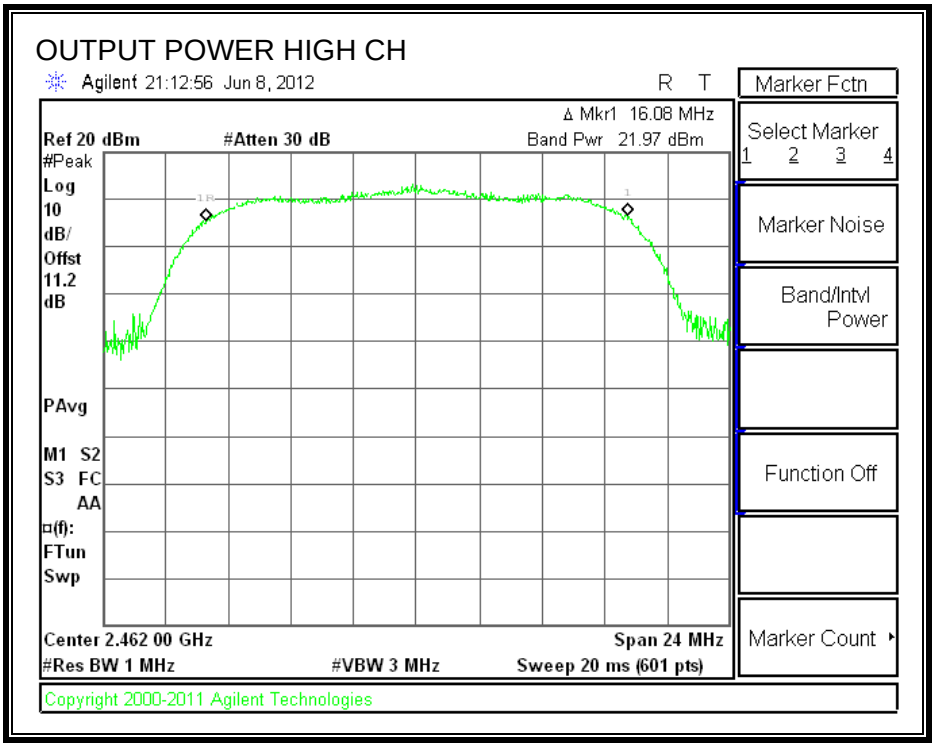
RESULTS

Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
2412	21.94	30	-8.06
2437	21.96	30	-8.04
2462	21.97	30	-8.03

OUTPUT POWER







7.2.3. 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 11.2 dB (including 10 dB pad and 1.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	2412	13.30
Middle	2437	13.15
High	2462	13.11

7.2.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

TEST PROCEDURE

KDB 558074 D01 DTS Measurement Guidance V01 dated 01-18-12.

RESULTS

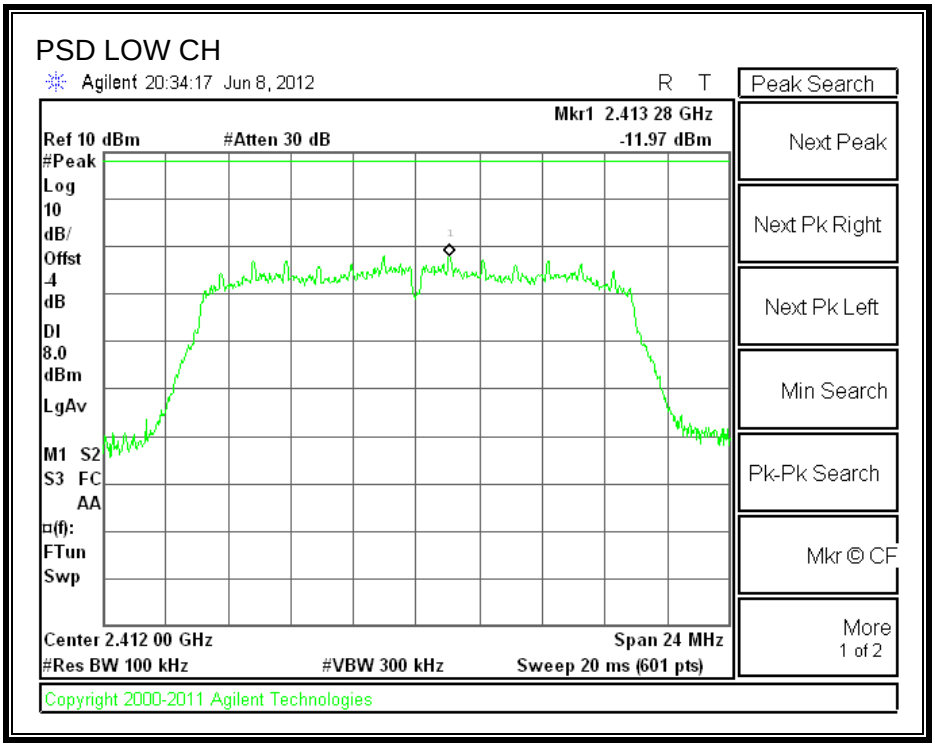
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-11.97	8	-19.97
Middle	2437	-11.88	8	-19.88
High	2462	-11.83	8	-19.83

Note: For this test the total reference level offset is:

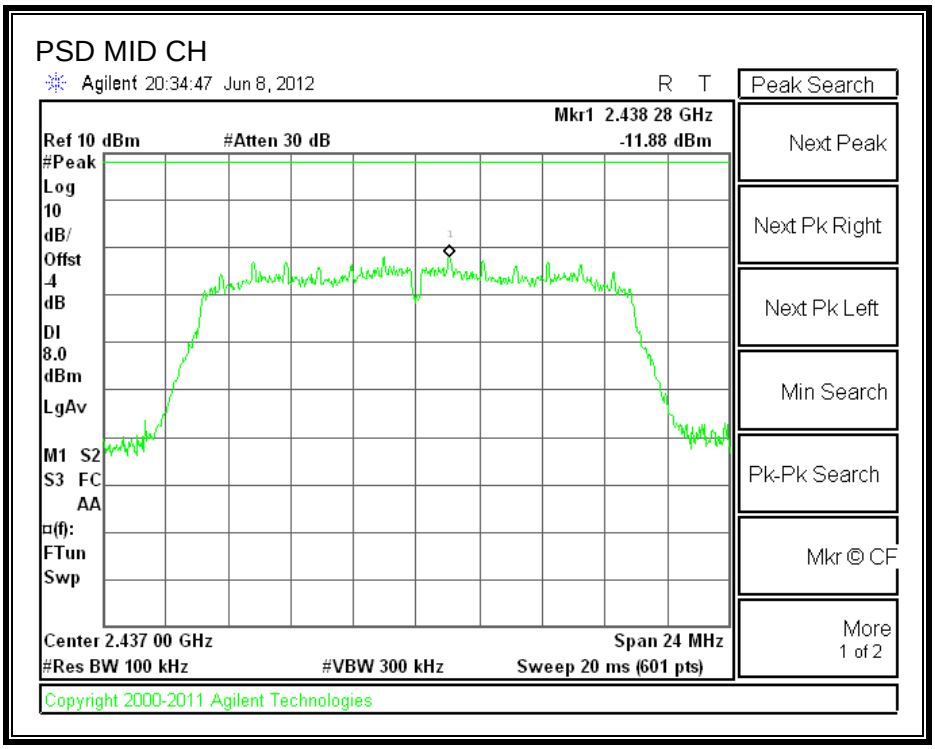
Attenuator + Cable Loss -15.2dBm= 11.2 – 15.2 = -4.0dBm

POWER SPECTRAL DENSITY

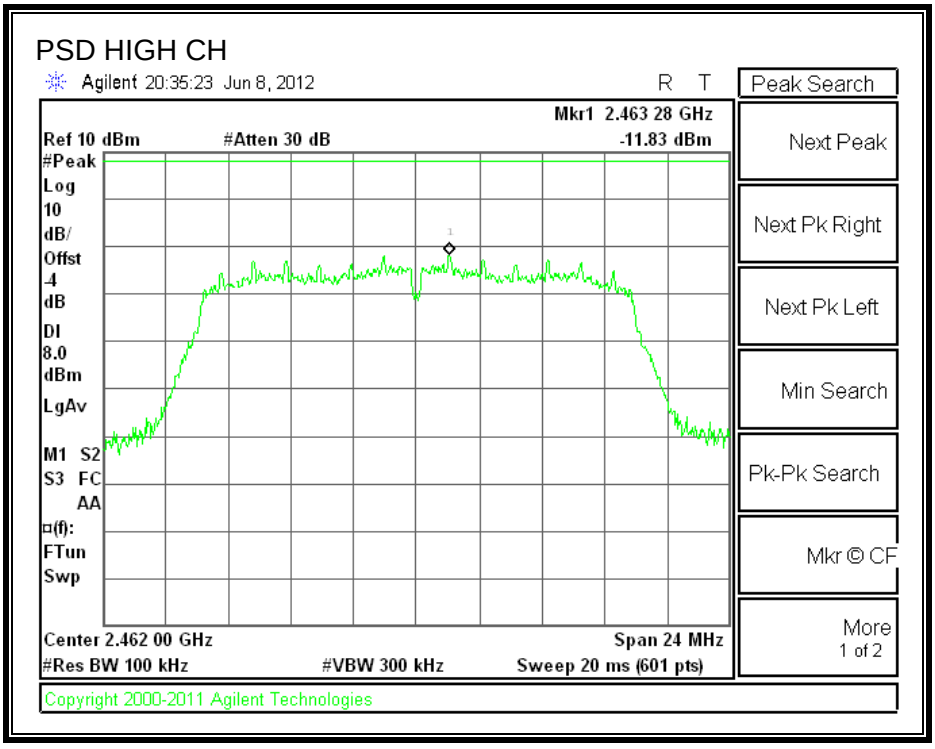
PSD LOW CH



PSD MID CH



PSD HIGH CH



7.2.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

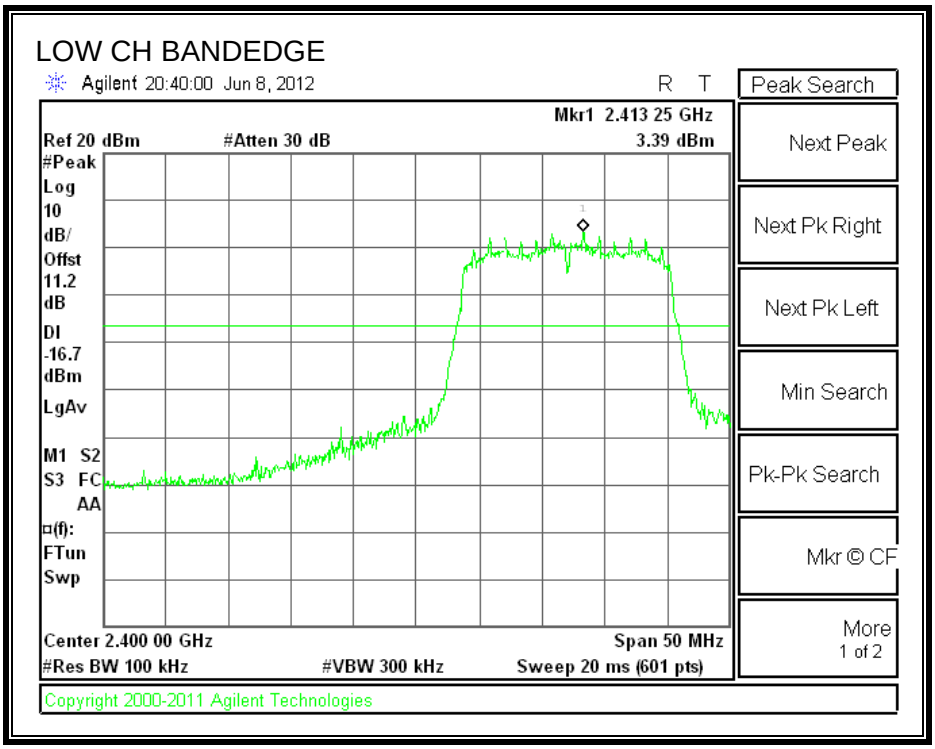
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

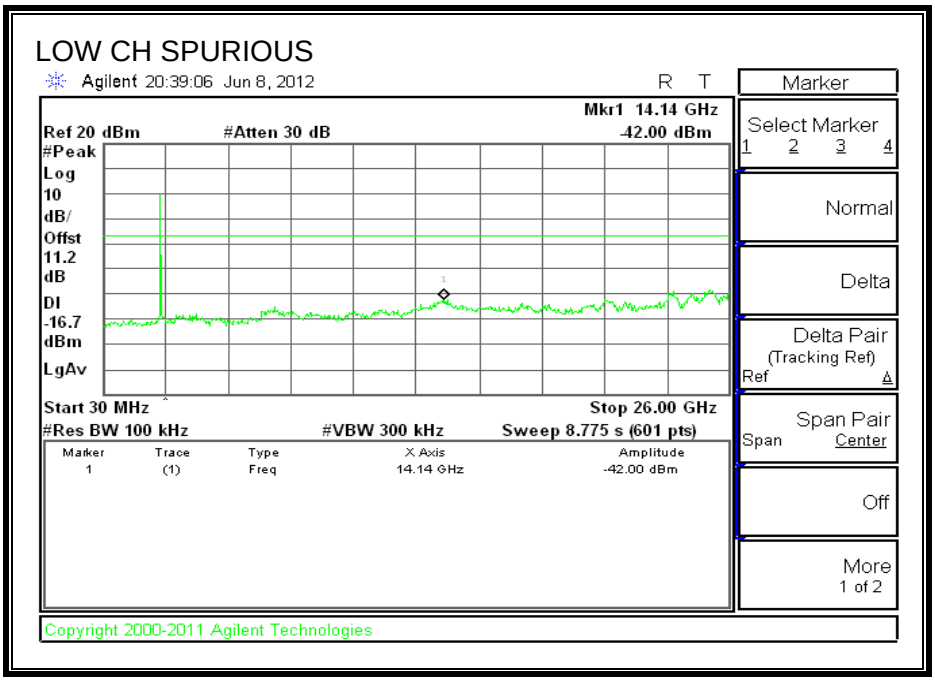
TEST PROCEDURE

KDB 558074 D01 DTS Measurement Guidance V01 dated 01-18-12.

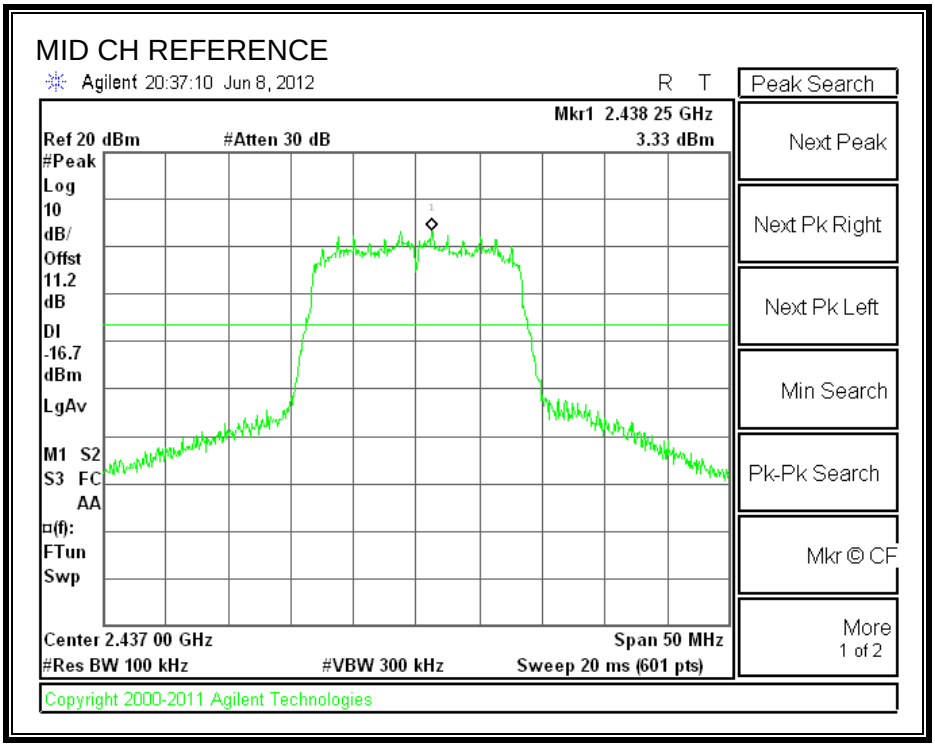
RESULTS

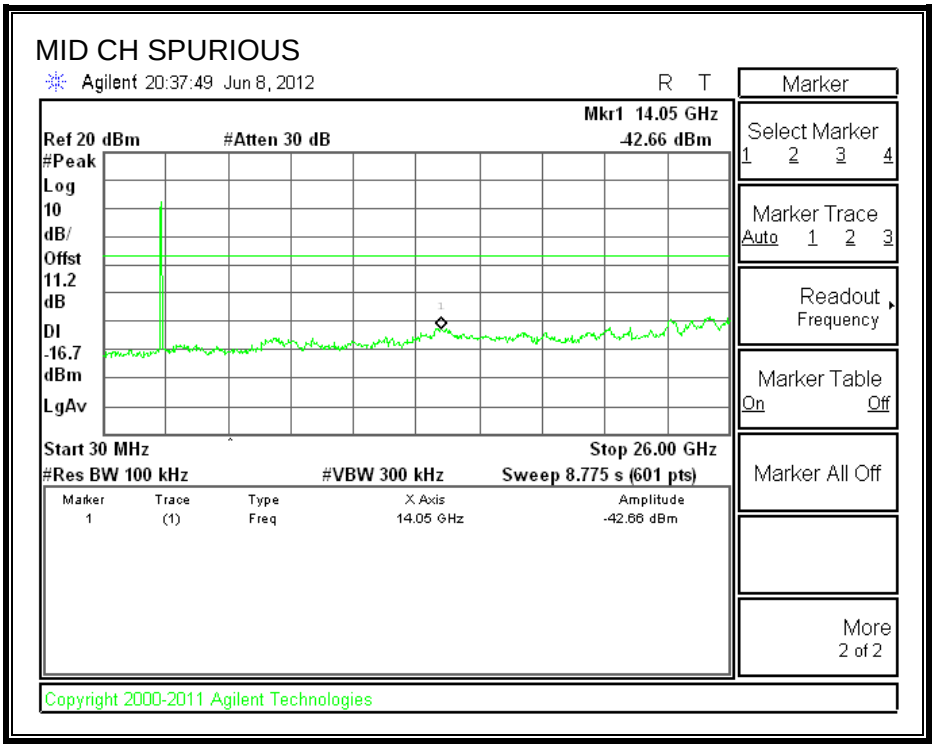
SPURIOUS EMISSIONS, LOW CHANNEL



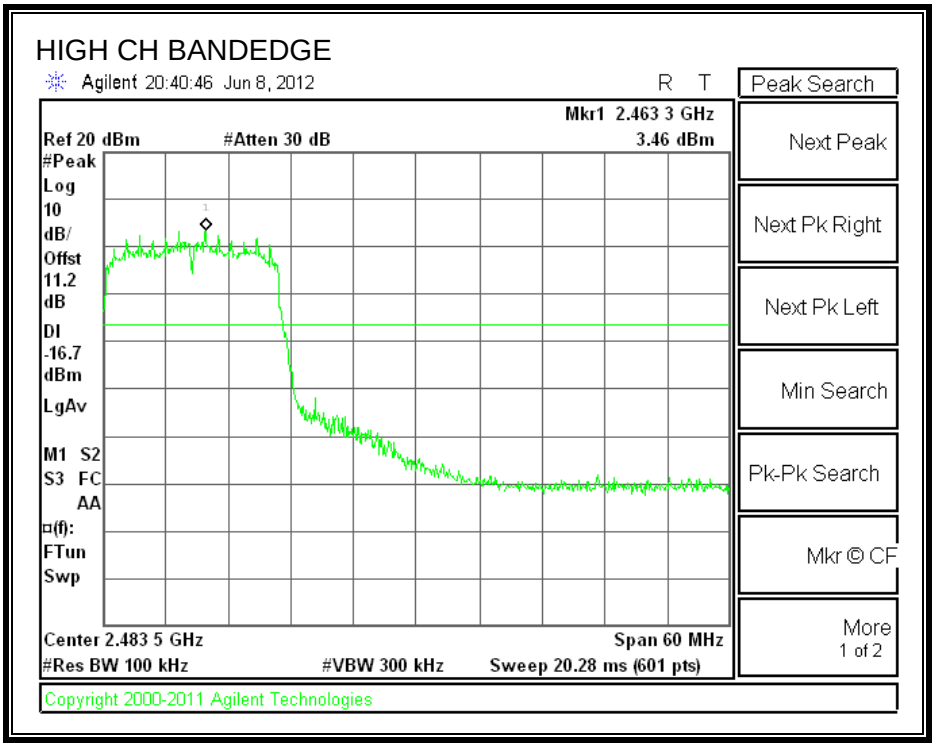


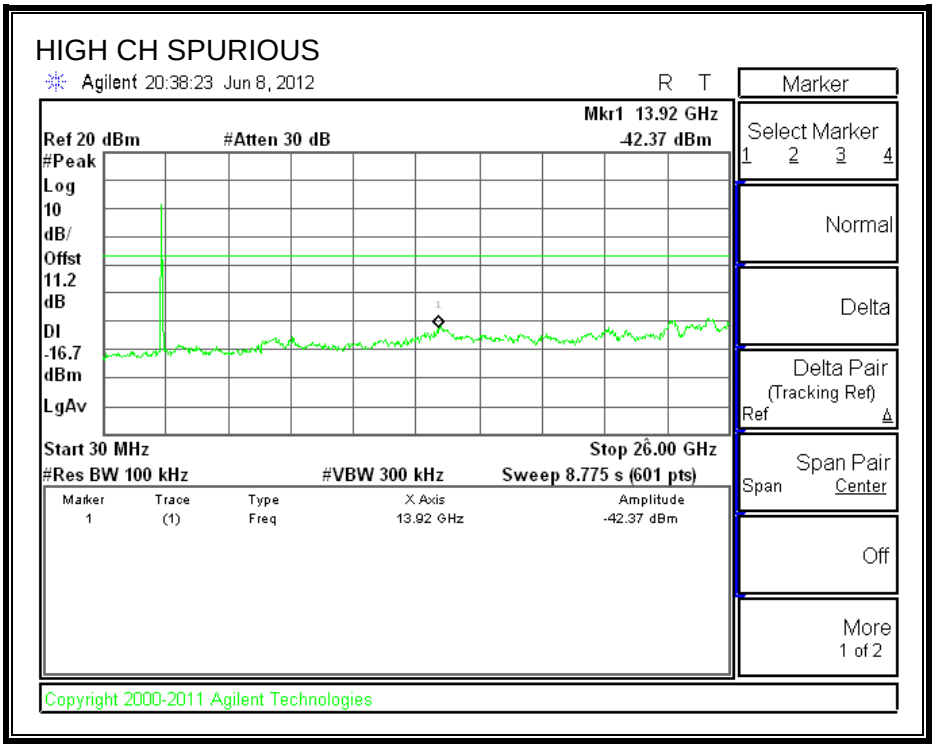
SPURIOUS EMISSIONS, MID CHANNEL





SPURIOUS EMISSIONS, HIGH CHANNEL





7.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

7.3.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

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

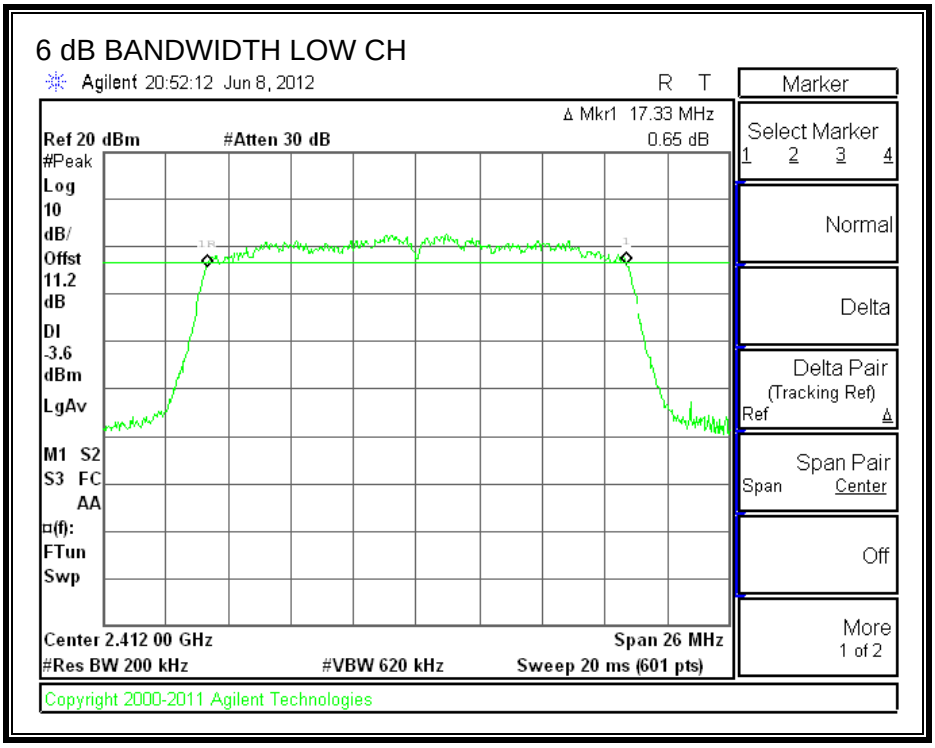
TEST PROCEDURE

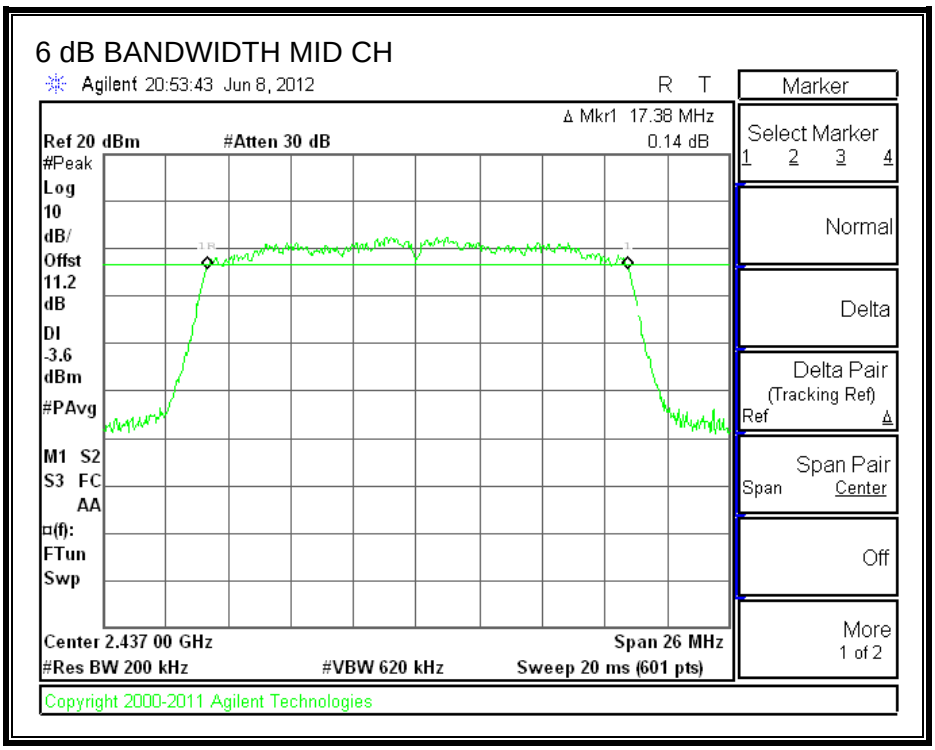
KDB 558074 D01 DTS Measurement Guidance V01 dated 01-18-12.

RESULTS

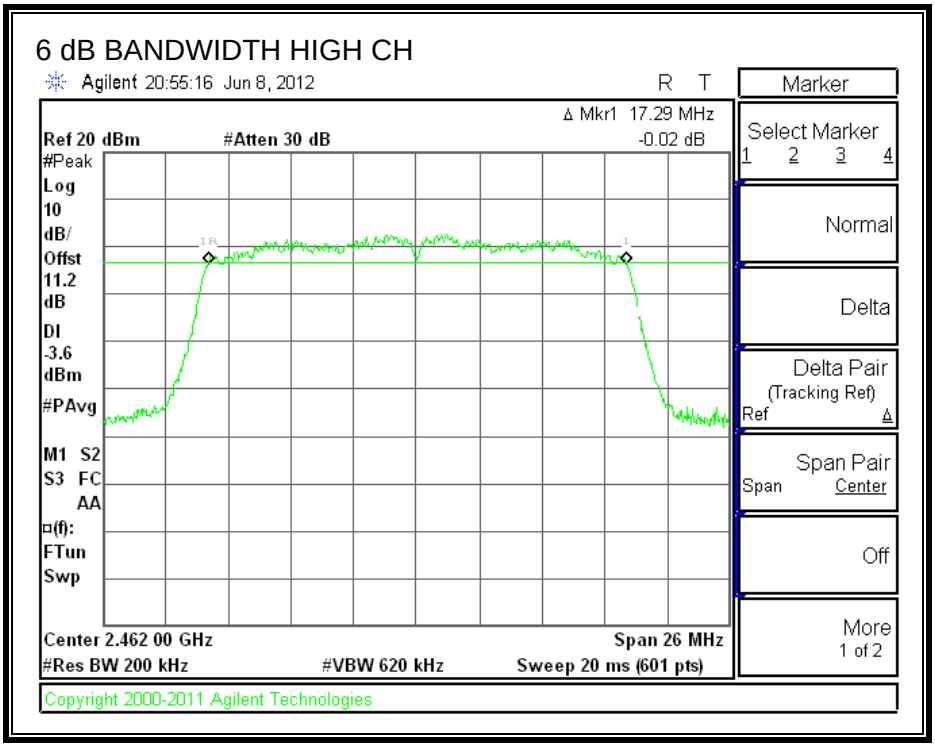
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	17.33	0.5
Middle	2437	17.38	0.5
High	2462	17.29	0.5

6 dB BANDWIDTH





6 dB BANDWIDTH HIGH CH



7.3.2. OUTPUT POWER

LIMITS

FCC §15.247 (b)

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

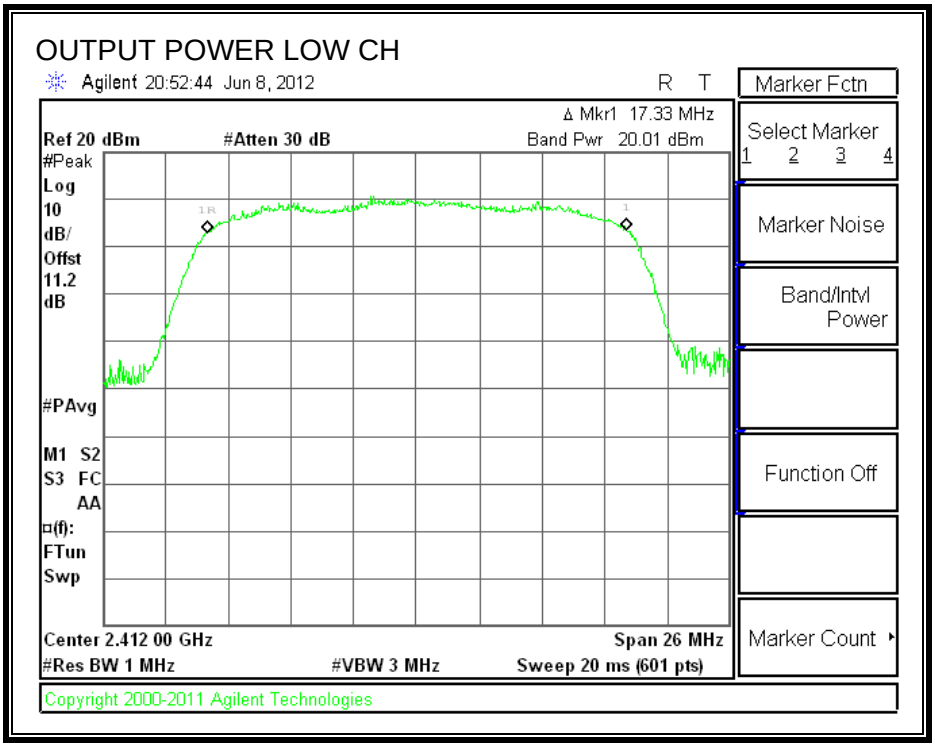
TEST PROCEDURE

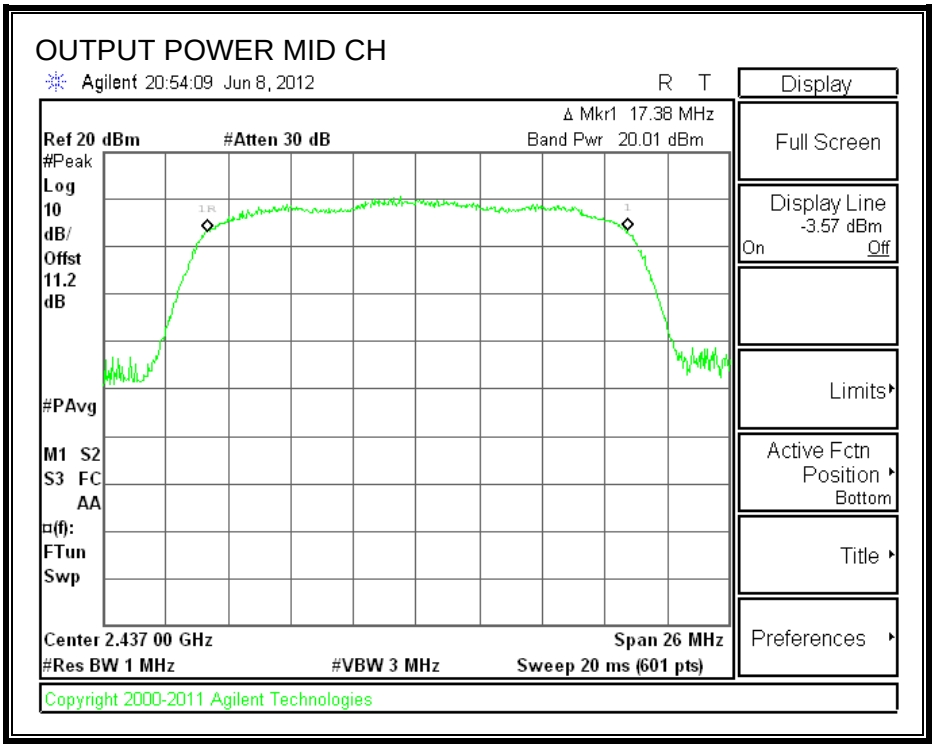
KDB 558074 D01 DTS Measurement Guidance V01 dated 01-18-12.

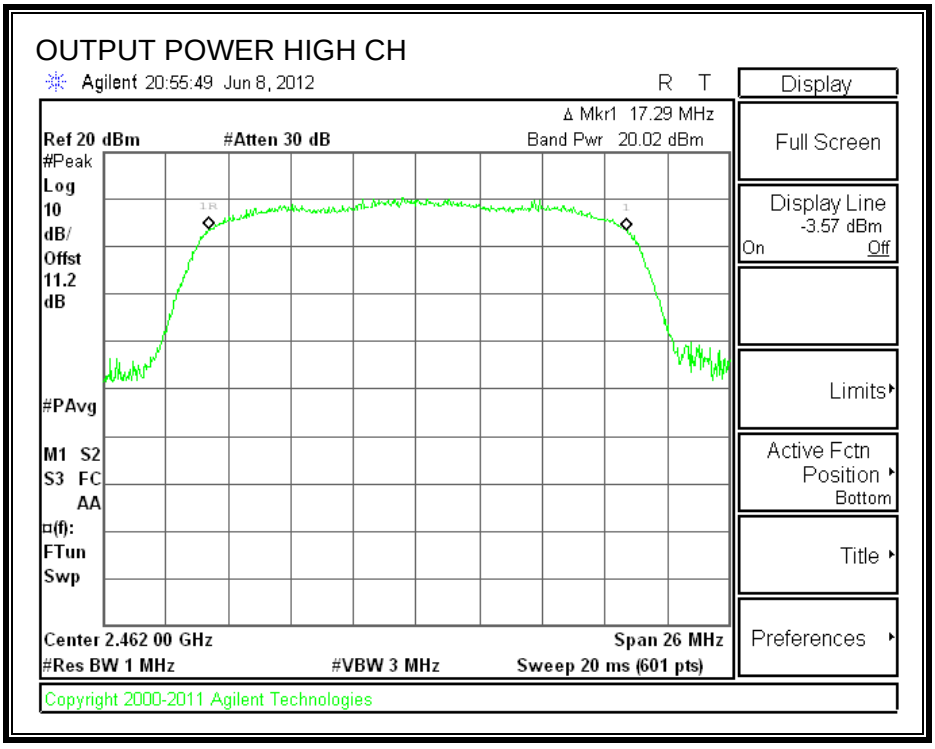
RESULTS

Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
2412	20.01	30	-9.99
2437	20.01	30	-9.99
2462	20.02	30	-9.98

OUTPUT POWER







7.3.3. 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 11.2 dB (including 10 dB pad and 1.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Power (dBm)
Low	2412	11.17
Middle	2437	11.17
High	2462	11.20

7.3.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

TEST PROCEDURE

KDB 558074 D01 DTS Measurement Guidance V01 dated 01-18-12.

RESULTS

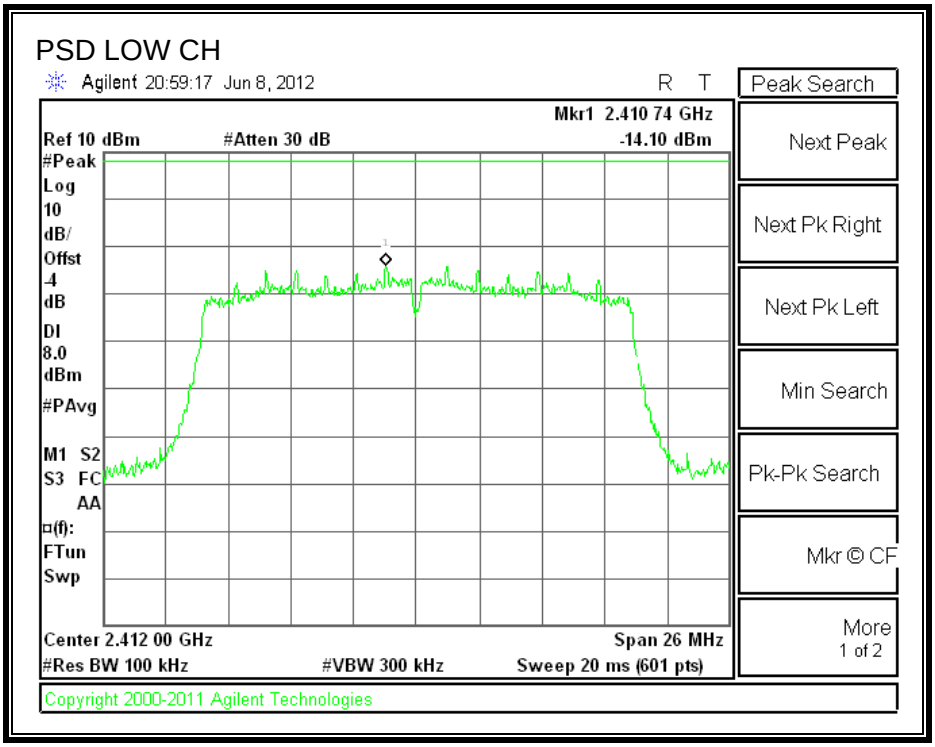
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-14.10	8	-22.10
Middle	2437	-13.87	8	-21.87
High	2462	-13.92	8	-21.92

Note: For this test the total reference level offset is:

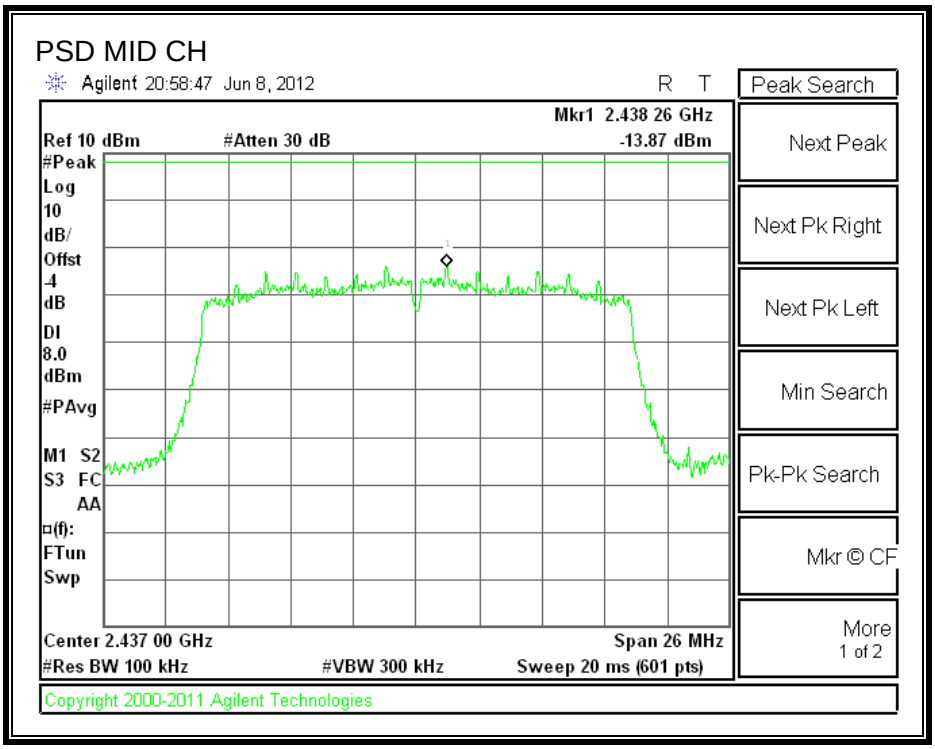
Attenuator + Cable Loss -15.2dBm= 11.2 – 15.2 = -4.0dBm

POWER SPECTRAL DENSITY

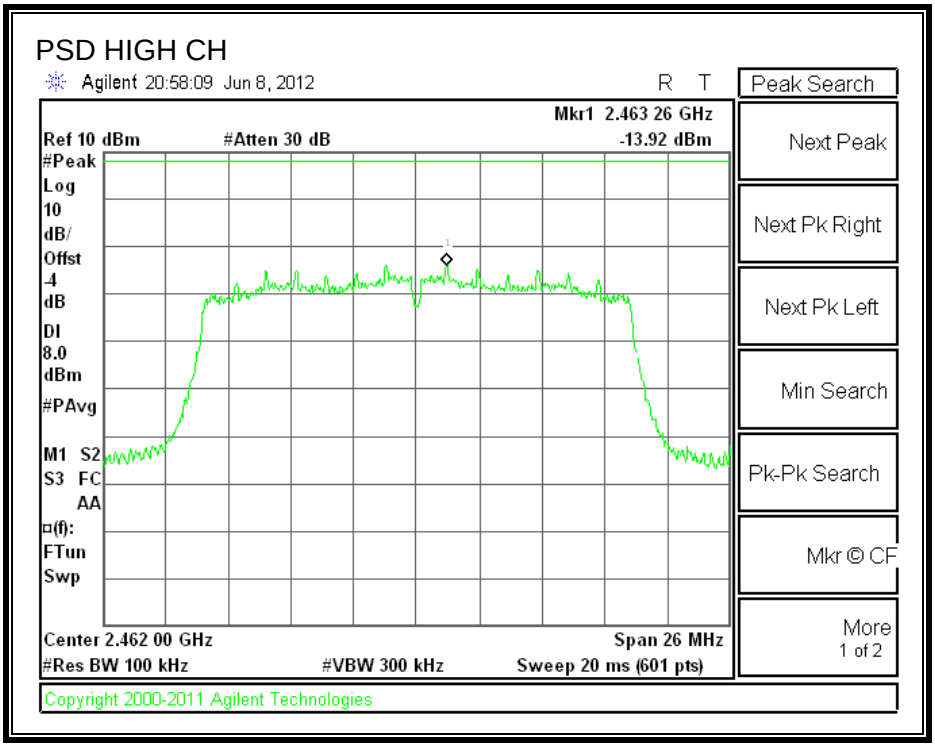
PSD LOW CH



PSD MID CH



PSD HIGH CH



7.3.5. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

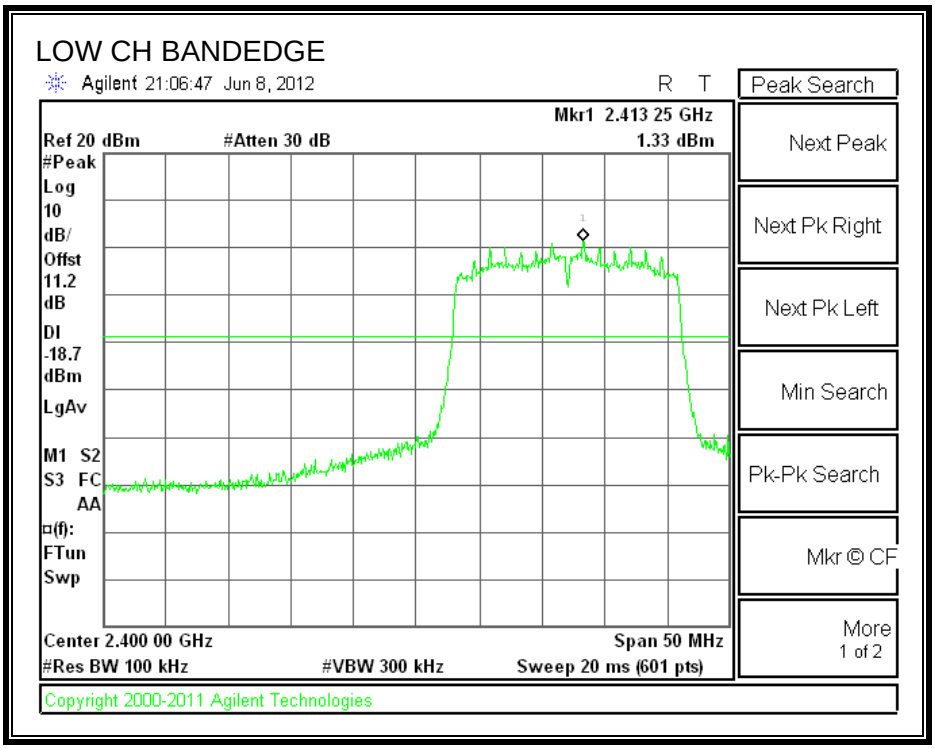
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

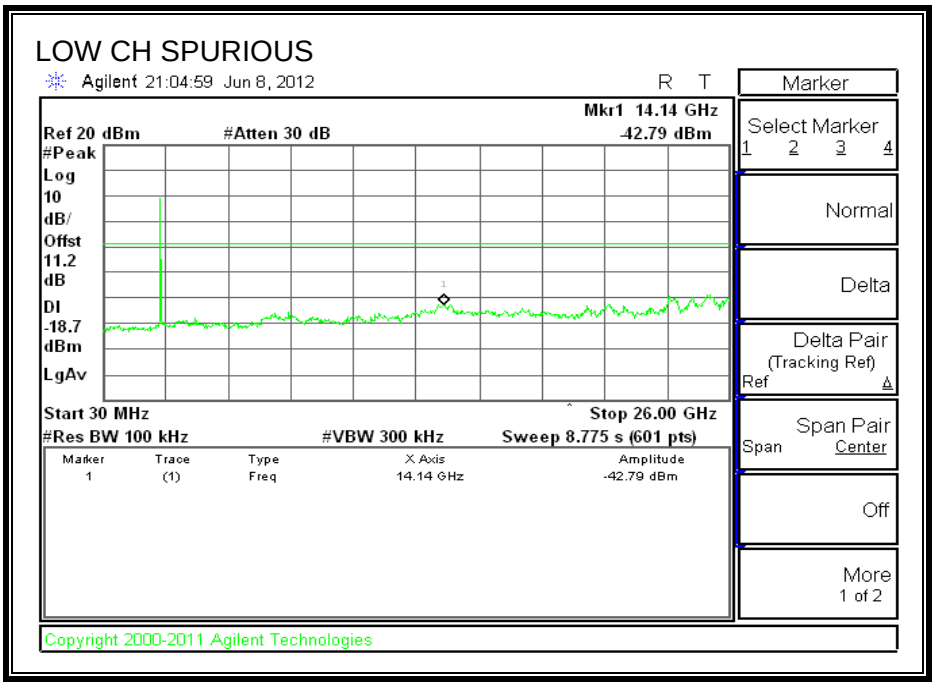
TEST PROCEDURE

KDB 558074 D01 DTS Measurement Guidance V01 dated 01-18-12.

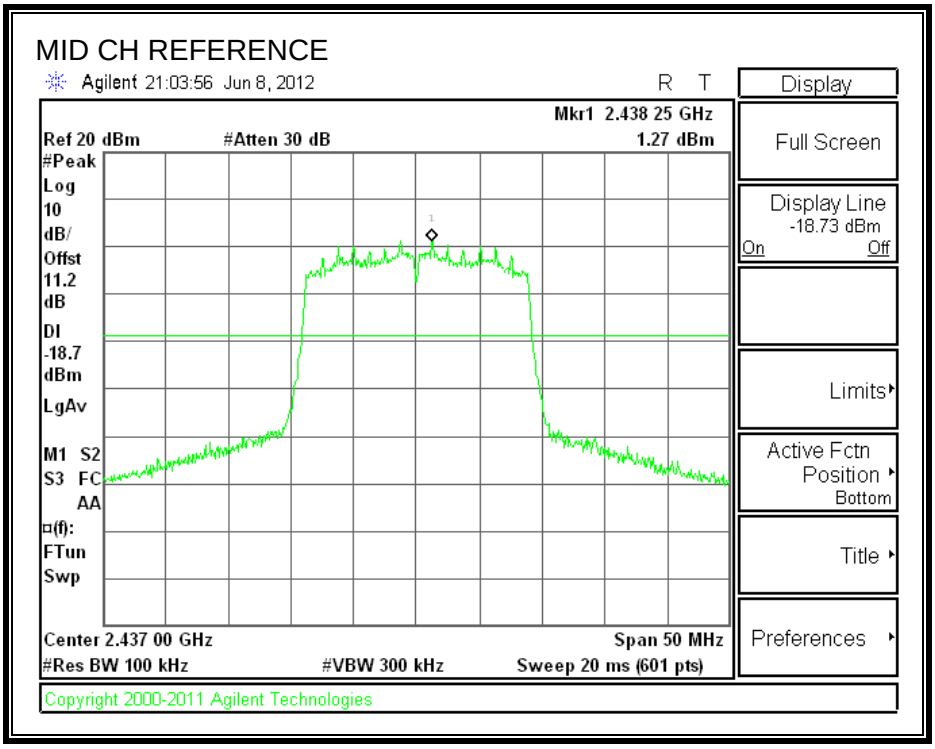
RESULTS

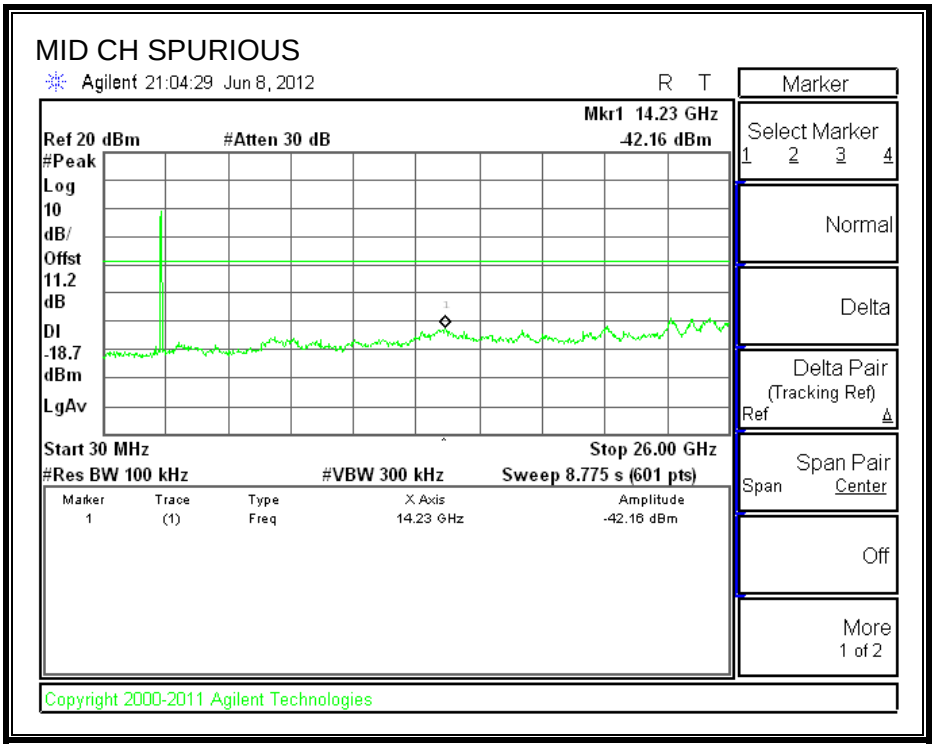
SPURIOUS EMISSIONS, LOW CHANNEL



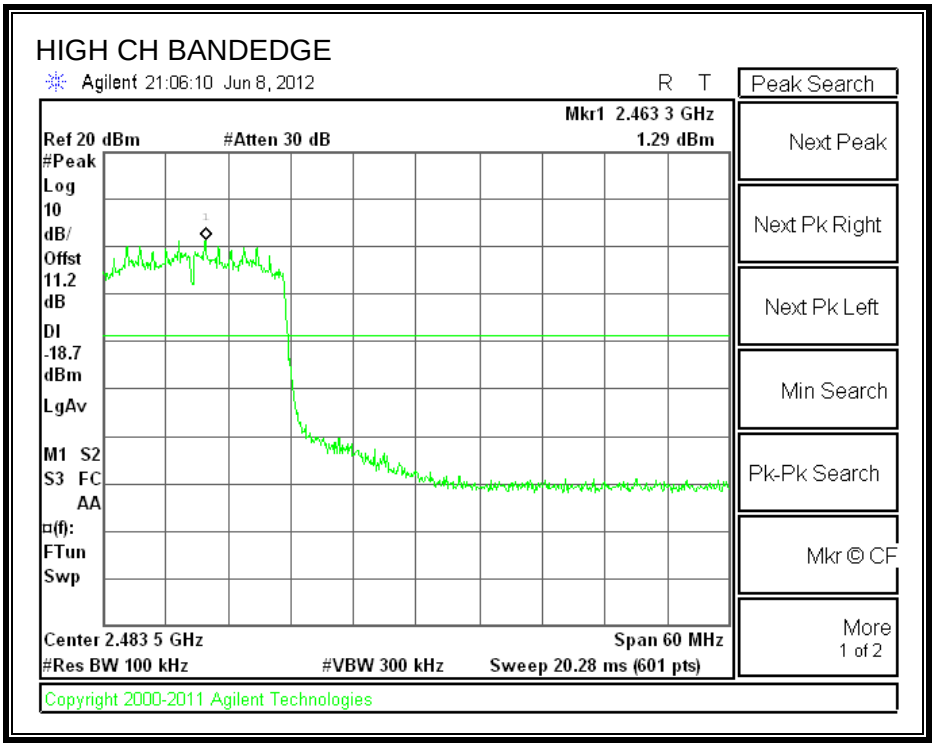


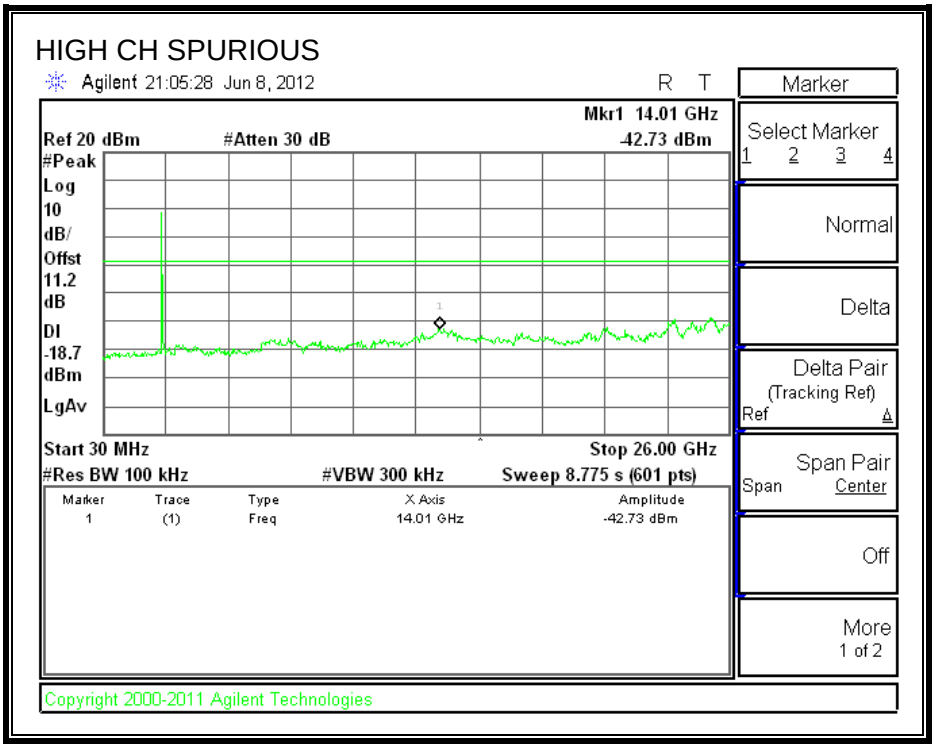
SPURIOUS EMISSIONS, MID CHANNEL





SPURIOUS EMISSIONS, HIGH CHANNEL





8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

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

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.

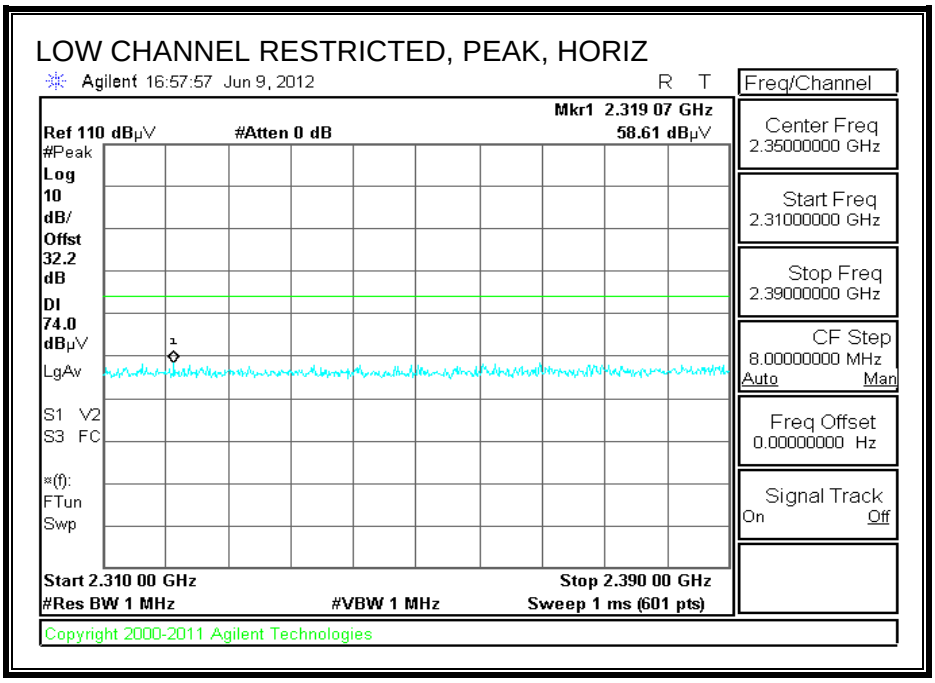
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

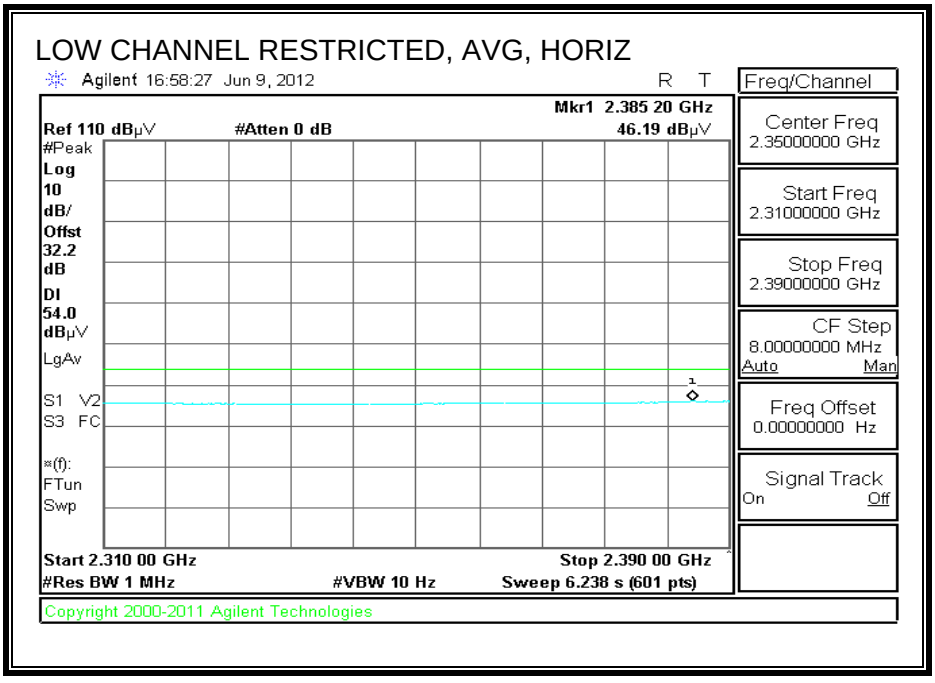
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

8.2. TRANSMITTER ABOVE 1 GHz

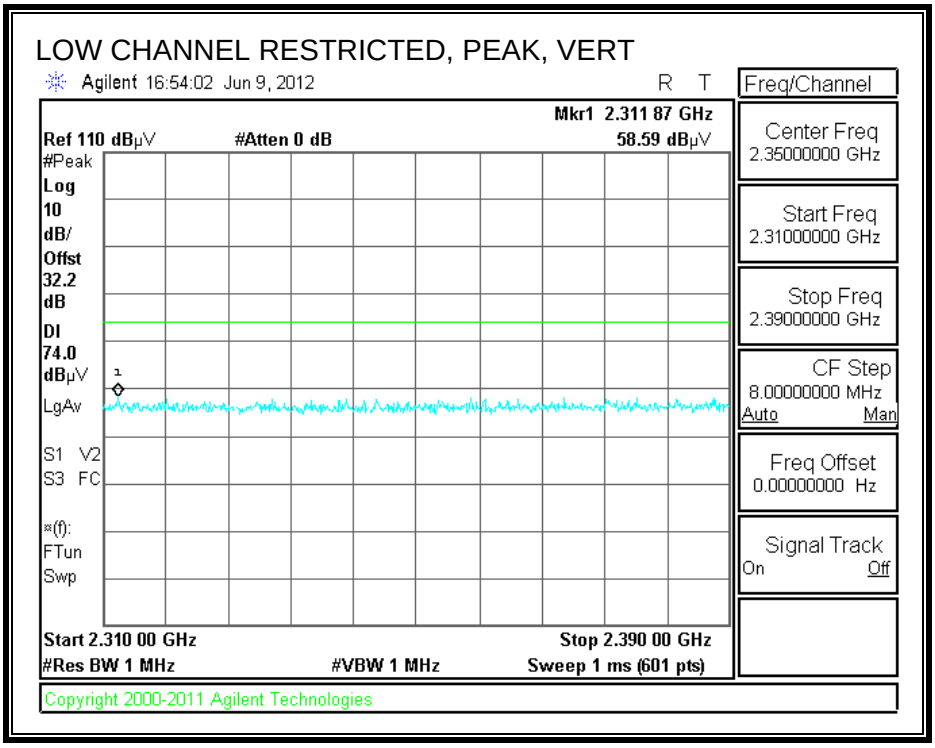
8.2.1. TX ABOVE 1 GHz FOR 802.11b 1TX MODE IN THE 2.4 GHz BAND

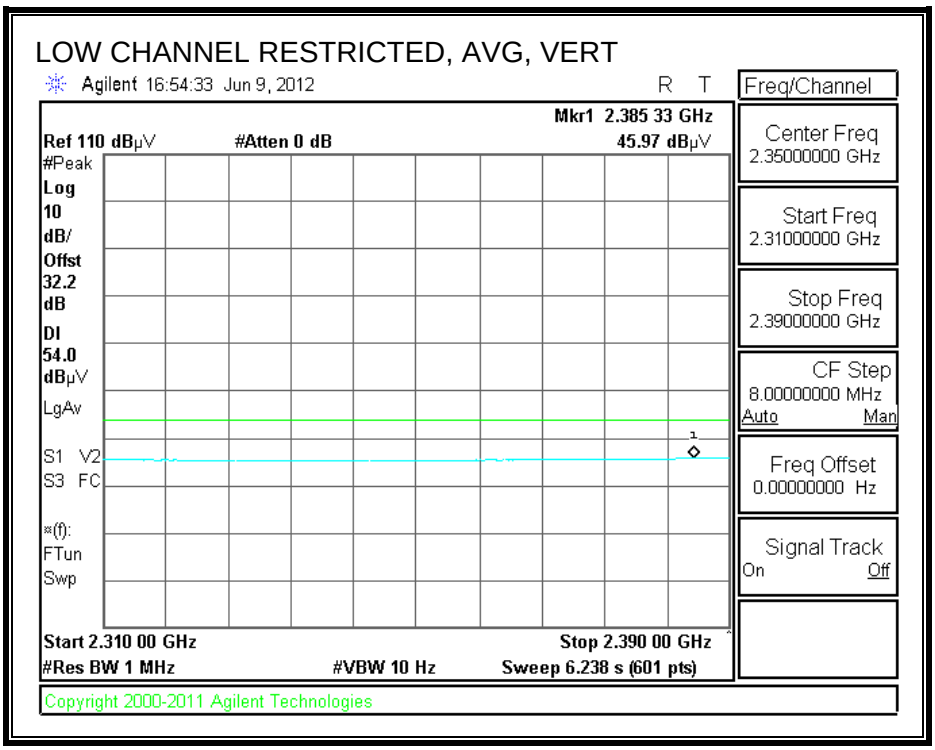
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



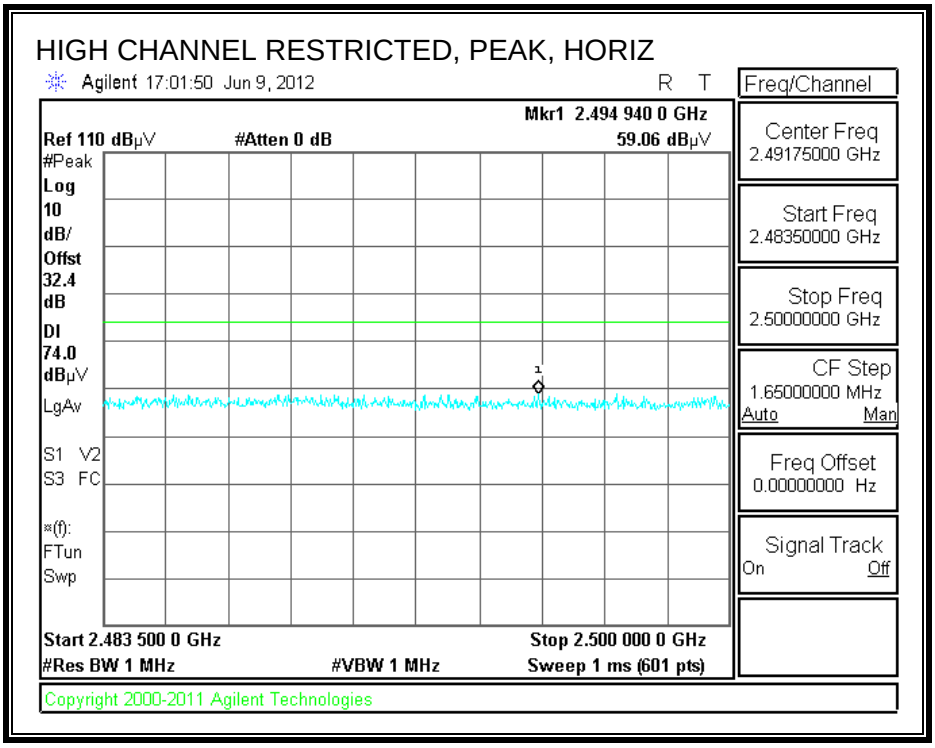


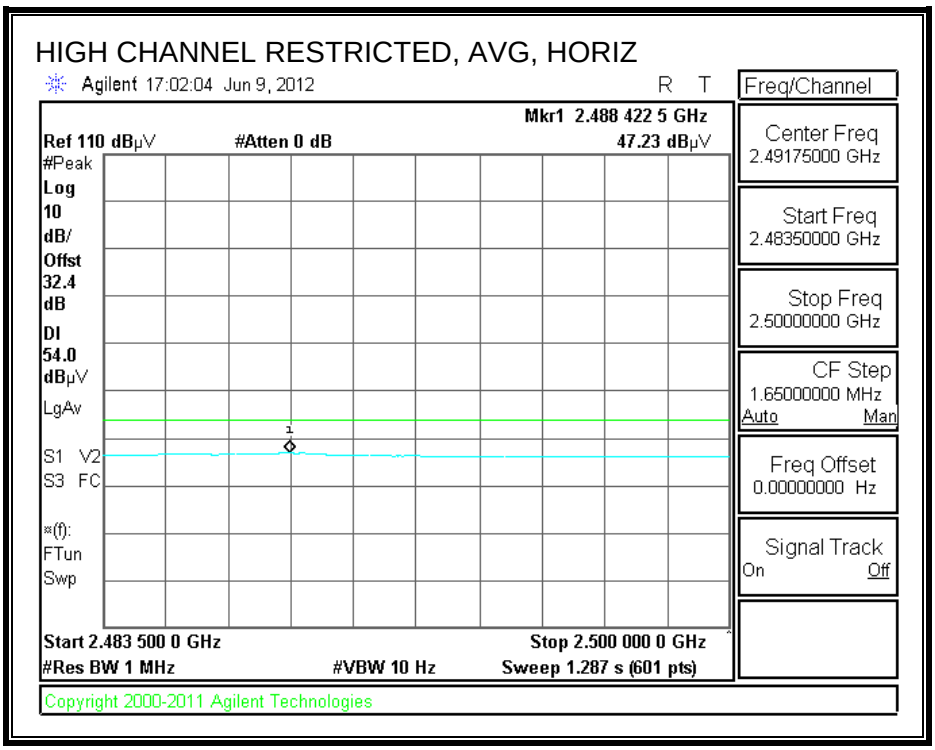
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



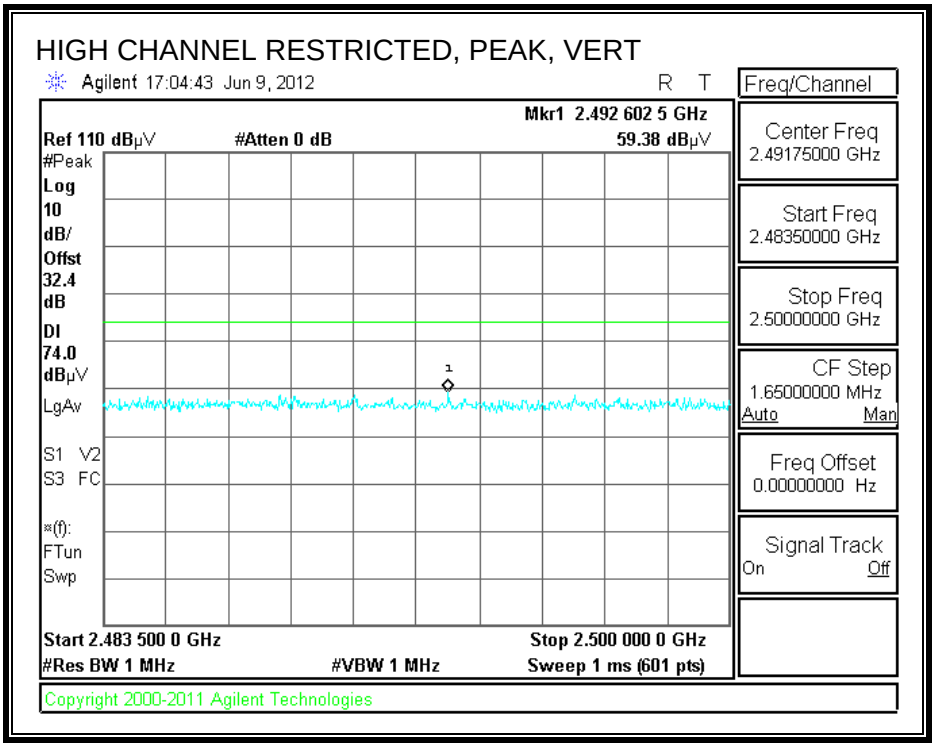


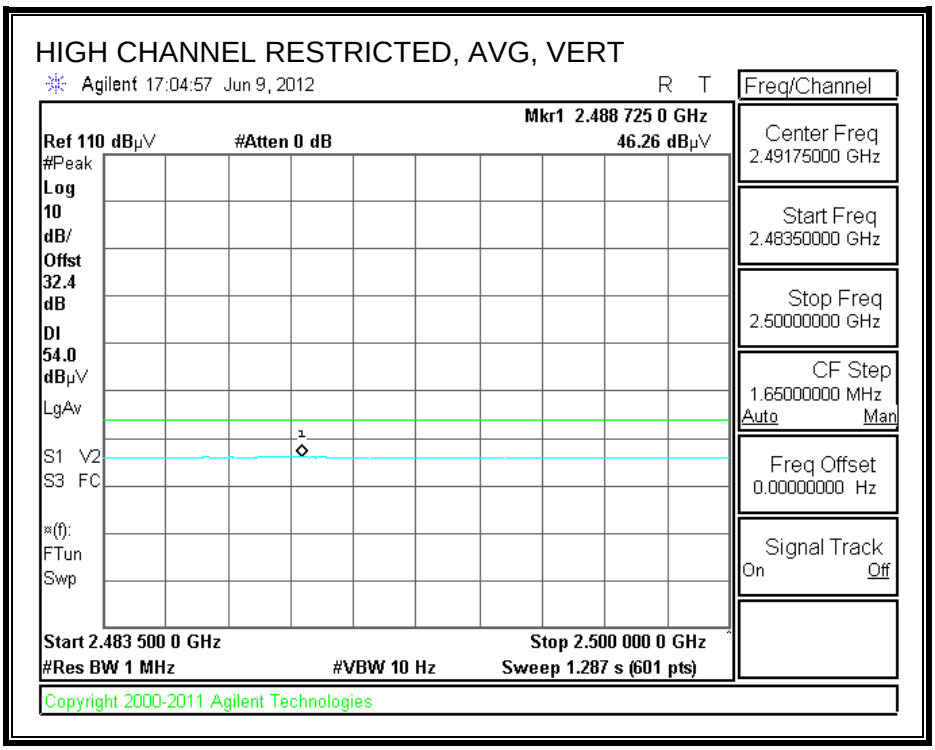
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
Date: 06/14/12
Project #: 12I14431
Company: Samsung
Test Target: FCC 15.247
Mode Oper: b mode, TX

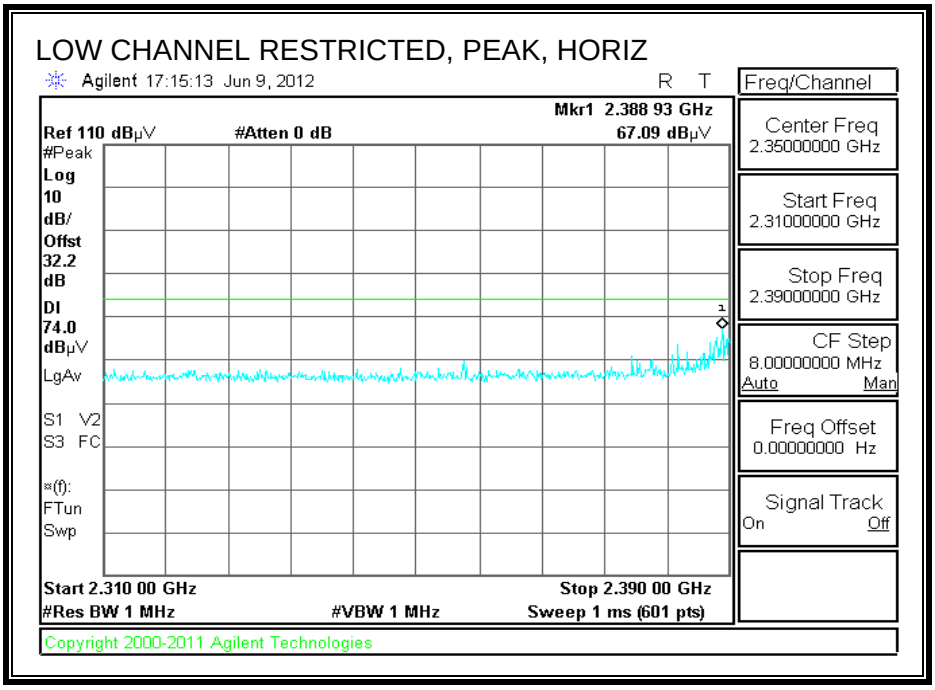
f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin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

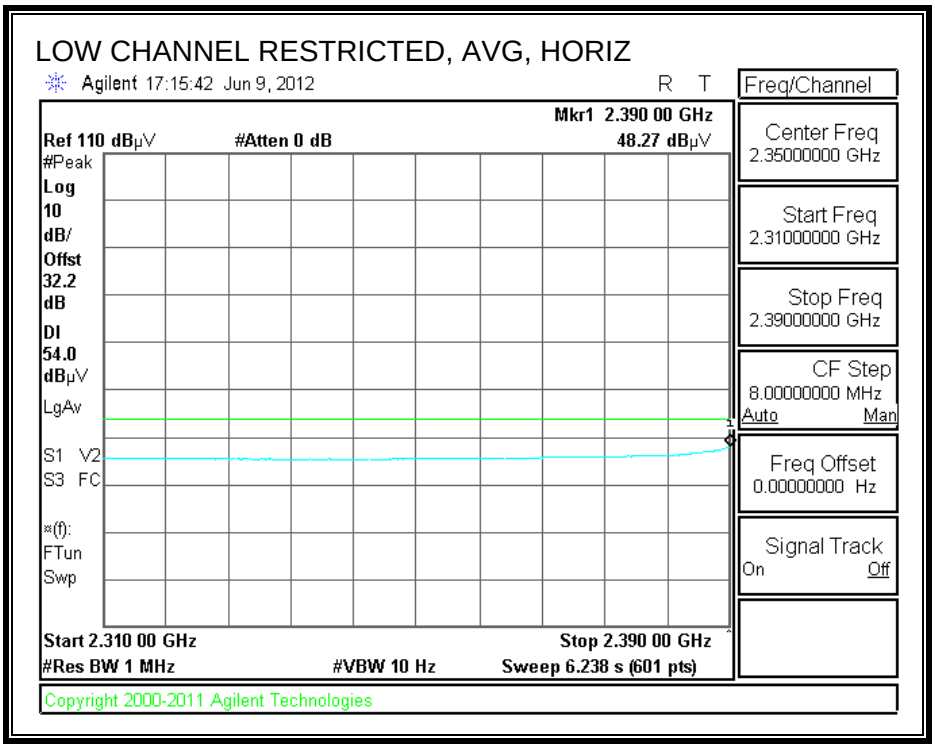
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Ch, 2412MHz													
4.824	3.0	50.4	33.1	6.3	-34.8	0.0	0.0	54.9	74.0	-19.1	V	P	
4.824	3.0	46.2	33.1	6.3	-34.8	0.0	0.0	50.7	54.0	-3.3	V	A	
4.824	3.0	50.6	33.1	6.3	-34.8	0.0	0.0	55.1	74.0	-18.9	H	P	
4.824	3.0	48.0	33.1	6.3	-34.8	0.0	0.0	52.6	54.0	-1.4	H	A	
Mid Ch, 2437MHz													
4.874	3.0	48.5	33.1	6.3	-34.8	0.0	0.0	53.2	74.0	-20.8	V	P	
4.874	3.0	43.7	33.1	6.3	-34.8	0.0	0.0	48.3	54.0	-5.7	V	A	
7.311	3.0	44.8	35.8	8.5	-34.9	0.0	0.0	54.2	74.0	-19.8	V	P	
7.311	3.0	39.0	35.8	8.5	-34.9	0.0	0.0	48.5	54.0	-5.6	V	A	
4.874	3.0	48.7	33.1	6.3	-34.8	0.0	0.0	53.3	74.0	-20.7	H	P	
4.874	3.0	45.0	33.1	6.3	-34.8	0.0	0.0	49.6	54.0	-4.4	H	A	
7.311	3.0	43.6	35.8	8.5	-34.9	0.0	0.0	53.0	74.0	-21.0	H	P	
7.311	3.0	38.5	35.8	8.5	-34.9	0.0	0.0	47.9	54.0	-6.1	H	A	
High Ch, 2462MHz													
4.924	3.0	48.4	33.2	6.3	-34.8	0.0	0.0	53.1	74.0	-20.9	V	P	
4.924	3.0	46.1	33.2	6.3	-34.8	0.0	0.0	50.8	54.0	-3.2	V	A	
7.386	3.0	45.8	35.9	8.5	-34.9	0.0	0.0	55.3	74.0	-18.7	V	P	
7.386	3.0	40.0	35.9	8.5	-34.9	0.0	0.0	49.6	54.0	-4.4	V	A	
4.924	3.0	37.7	33.2	6.3	-34.8	0.0	0.0	42.4	74.0	-31.6	H	P	
4.924	3.0	25.8	33.2	6.3	-34.8	0.0	0.0	30.5	54.0	-23.5	H	A	
7.386	3.0	43.8	35.9	8.5	-34.9	0.0	0.0	53.3	74.0	-20.7	H	P	
7.386	3.0	38.5	35.9	8.5	-34.9	0.0	0.0	48.0	54.0	-6.0	H	A	

Rev. 4.1.2.7
Note: No other emissions were detected above the system noise floor.

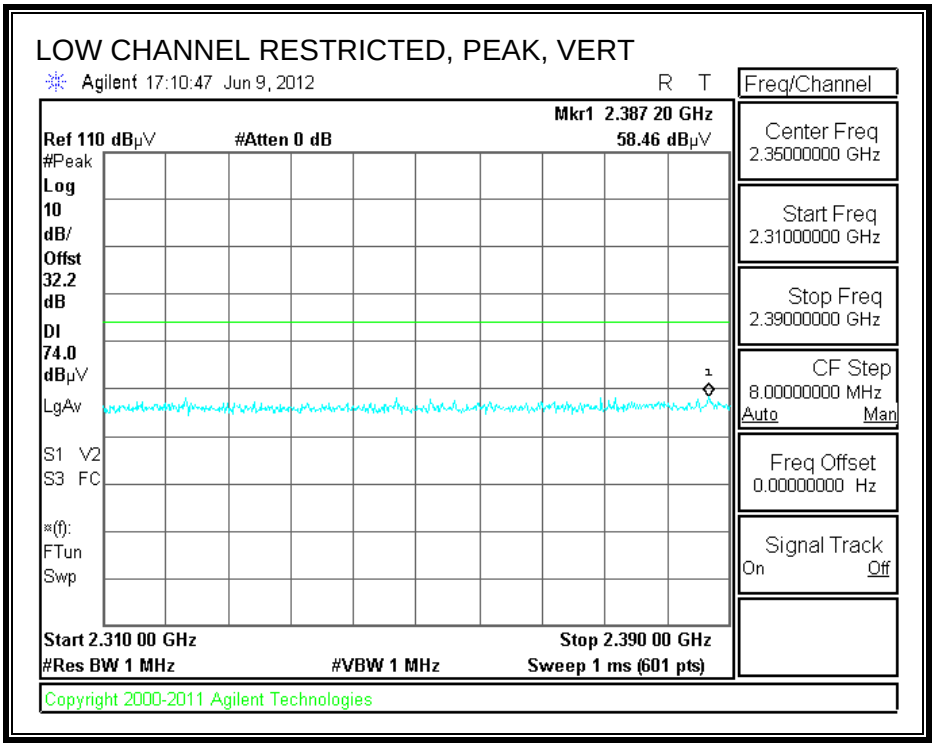
8.2.2. TX ABOVE 1 GHz FOR 802.11g 1TX MODE IN THE 2.4 GHz BAND

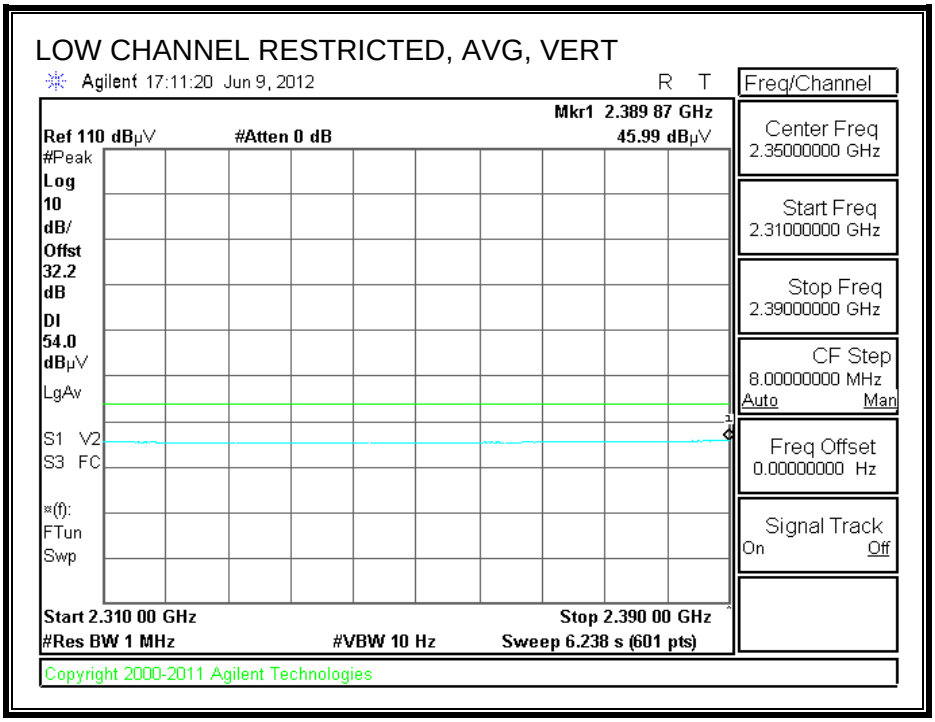
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



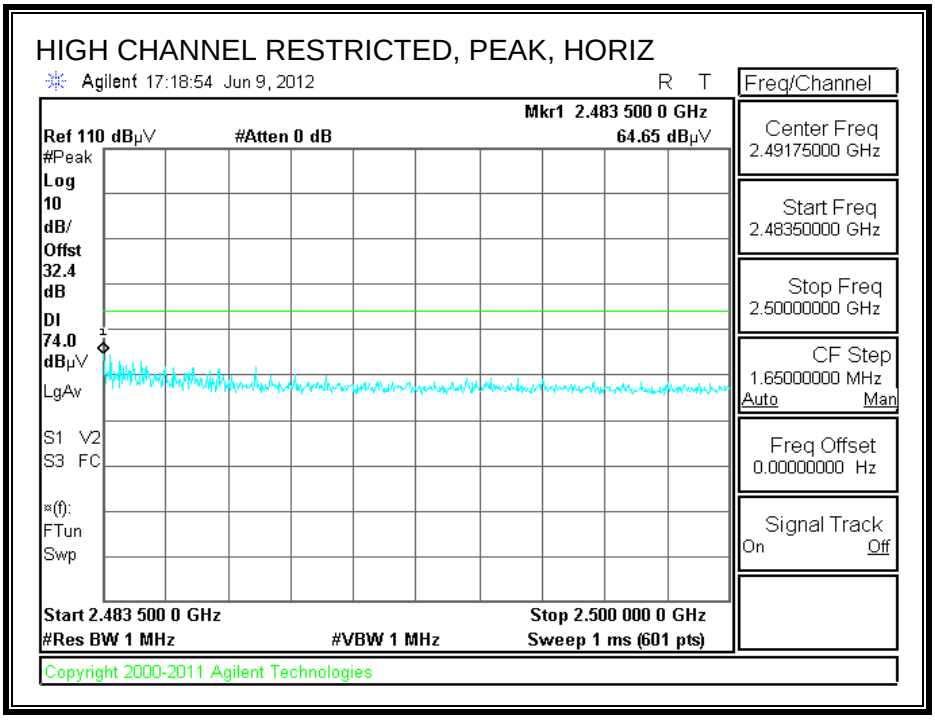


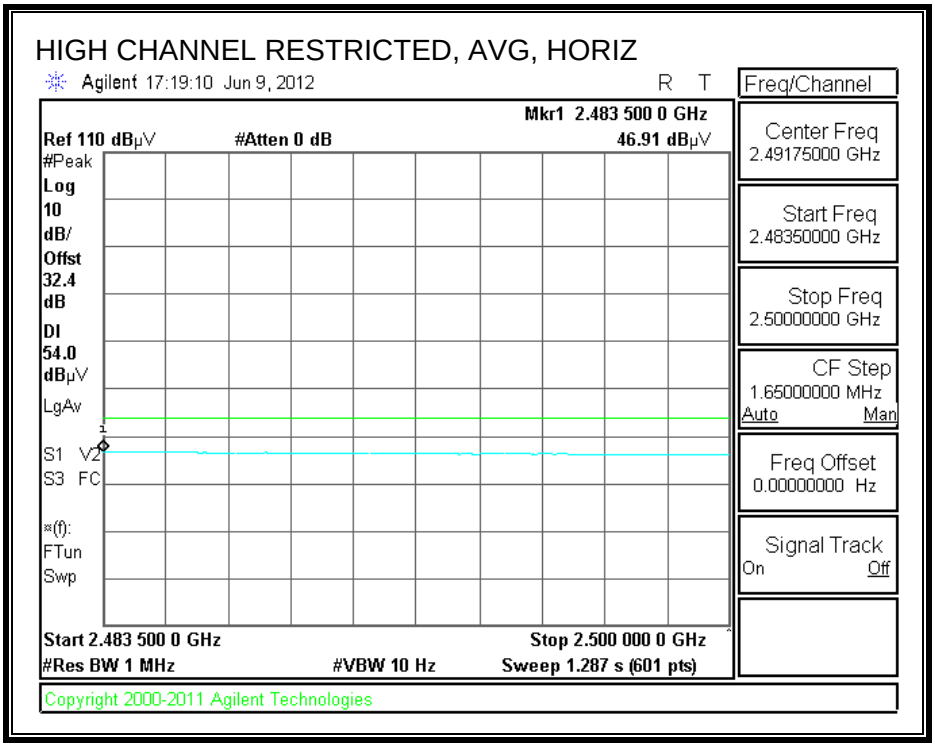
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



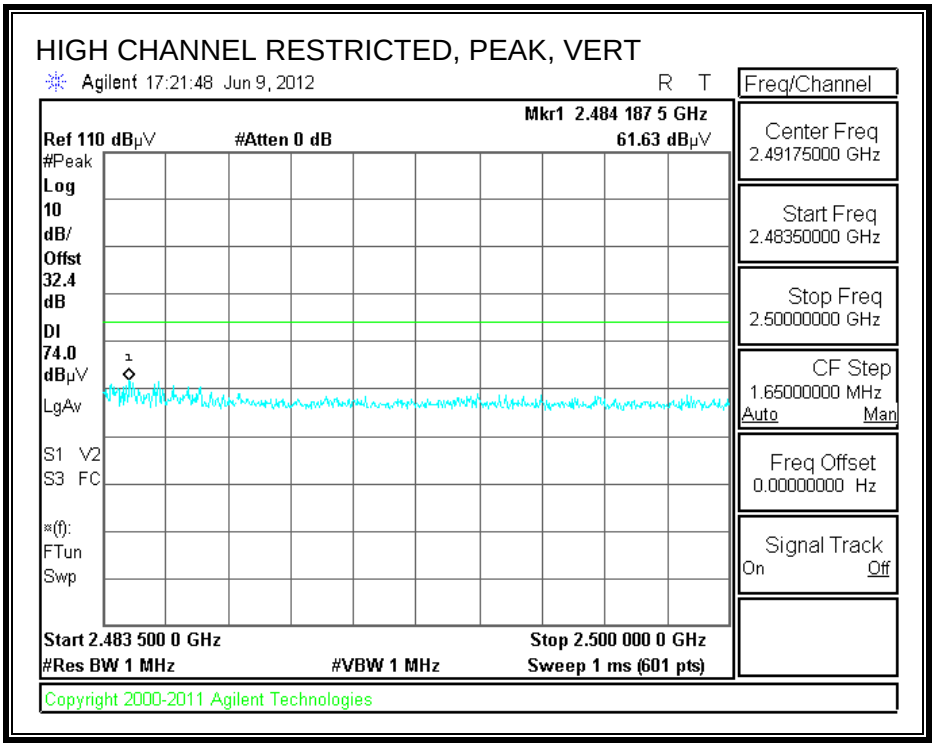


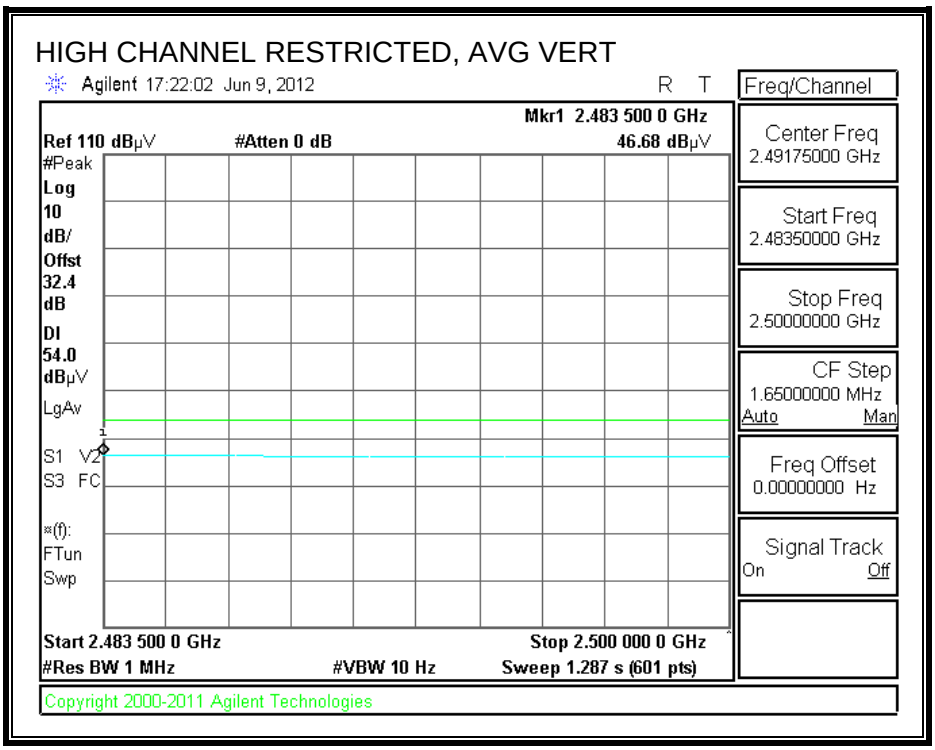
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
Date: 06/14/11
Project #: 12I14431
Company: Samsung
Test Target: FCC 15.247
Mode Oper: g mode TX

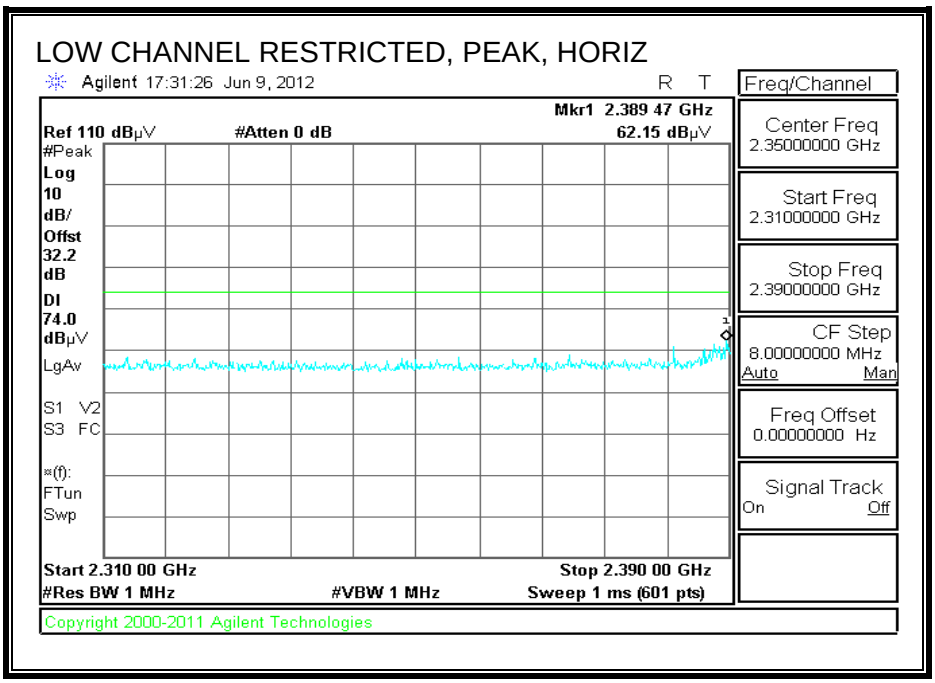
f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin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

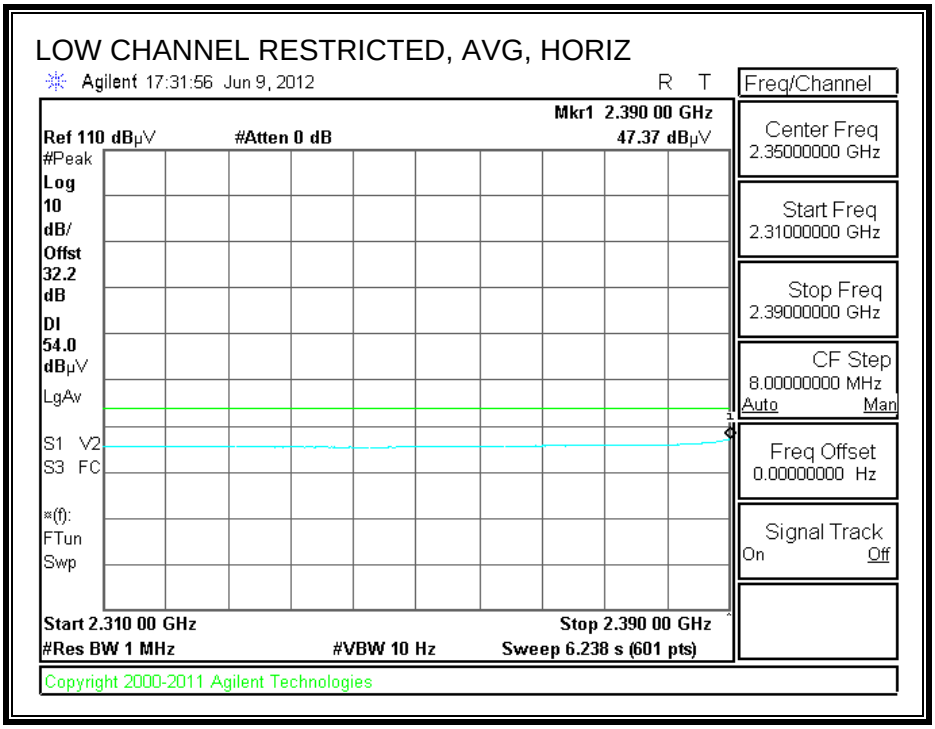
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Ch, 2412MHz													
4.824	3.0	40.3	33.1	6.3	-34.8	0.0	0.0	44.9	74.0	-29.1	V	P	
4.824	3.0	26.5	33.1	6.3	-34.8	0.0	0.0	31.0	54.0	-23.0	V	A	
4.824	3.0	45.0	33.1	6.3	-34.8	0.0	0.0	49.6	74.0	-24.4	H	P	
4.824	3.0	27.3	33.1	6.3	-34.8	0.0	0.0	31.9	54.0	-22.1	H	A	
Mid Ch, 2437MHz													
4.874	3.0	38.7	33.1	6.3	-34.8	0.0	0.0	43.4	74.0	-30.6	V	P	
4.874	3.0	26.1	33.1	6.3	-34.8	0.0	0.0	30.8	54.0	-23.2	V	A	
7.311	3.0	37.2	35.8	8.5	-34.9	0.0	0.0	46.6	74.0	-27.4	V	P	
7.311	3.0	24.1	35.8	8.5	-34.9	0.0	0.0	33.5	54.0	-20.5	V	A	
4.874	3.0	44.7	33.1	6.3	-34.8	0.0	0.0	49.3	74.0	-24.7	H	P	
4.874	3.0	27.2	33.1	6.3	-34.8	0.0	0.0	31.8	54.0	-22.2	H	A	
7.311	3.0	40.5	35.8	8.5	-34.9	0.0	0.0	49.9	74.0	-24.1	H	P	
7.311	3.0	24.5	35.8	8.5	-34.9	0.0	0.0	33.9	54.0	-20.1	H	A	
High Ch, 2462MHz													
4.924	3.0	41.4	33.2	6.3	-34.8	0.0	0.0	46.1	74.0	-27.9	V	P	
4.924	3.0	27.4	33.2	6.3	-34.8	0.0	0.0	32.1	54.0	-21.9	V	A	
7.386	3.0	38.6	35.9	8.5	-34.9	0.0	0.0	48.2	74.0	-25.8	V	P	
7.386	3.0	24.2	35.9	8.5	-34.9	0.0	0.0	33.7	54.0	-20.3	V	A	
4.924	3.0	48.0	33.2	6.3	-34.8	0.0	0.0	52.7	74.0	-21.3	H	P	
4.924	3.0	26.6	33.2	6.3	-34.8	0.0	0.0	31.3	54.0	-22.7	H	A	
7.386	3.0	42.5	35.9	8.5	-34.9	0.0	0.0	52.1	74.0	-21.9	H	P	
7.386	3.0	24.9	35.9	8.5	-34.9	0.0	0.0	34.5	54.0	-19.5	H	A	

Rev. 4.1.2.7
Note: No other emissions were detected above the system noise floor.

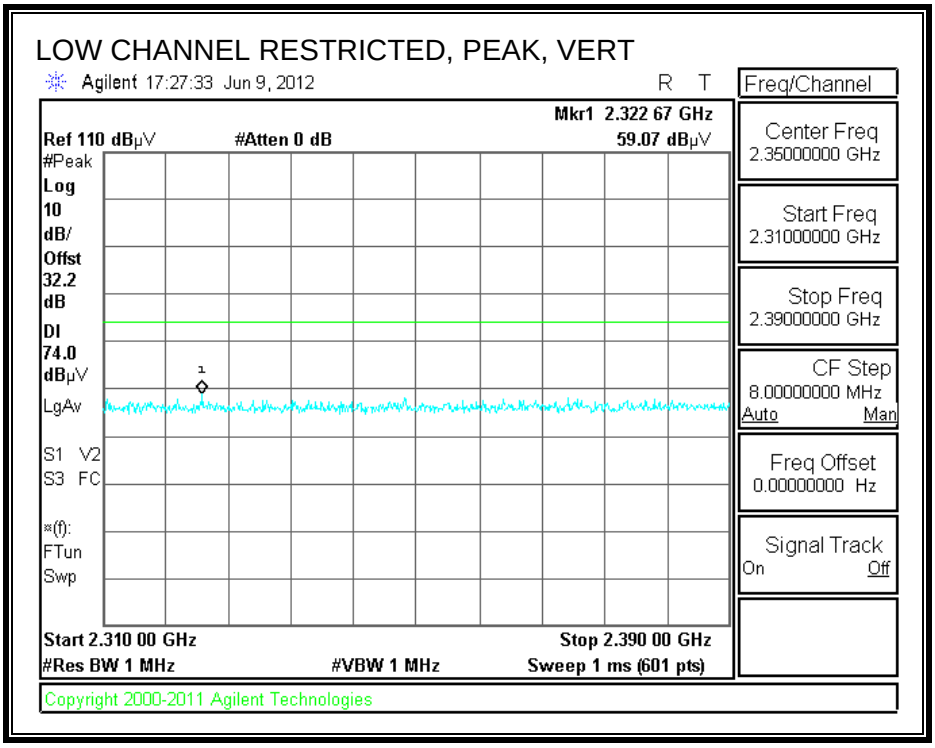
8.2.3. TX ABOVE 1 GHz FOR 802.11n HT20 1TX MODE IN THE 2.4 GHz BAND

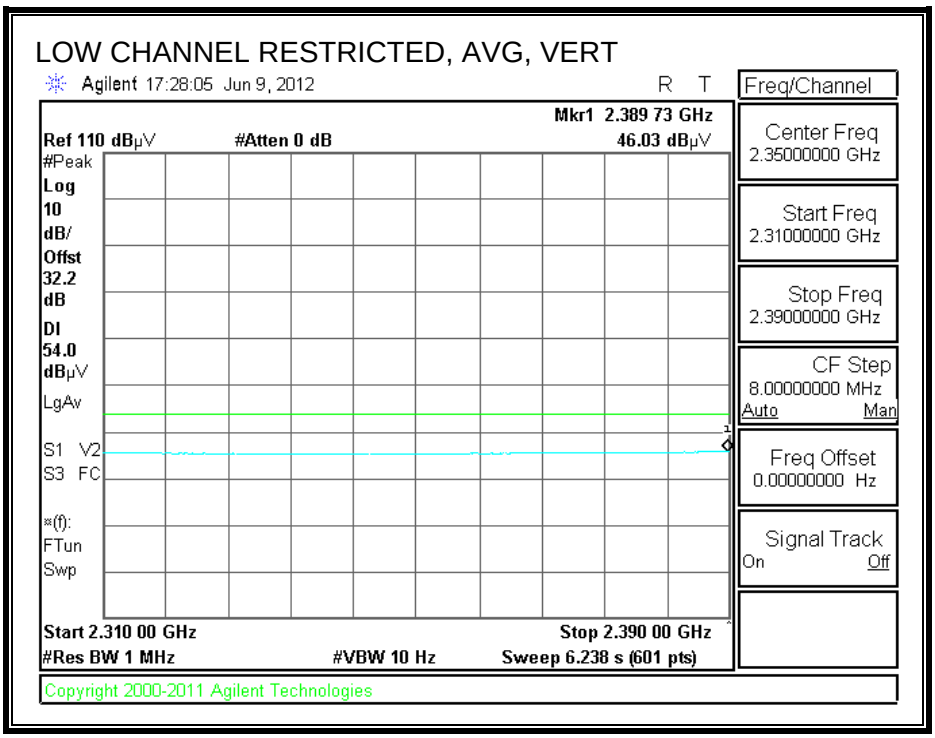
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



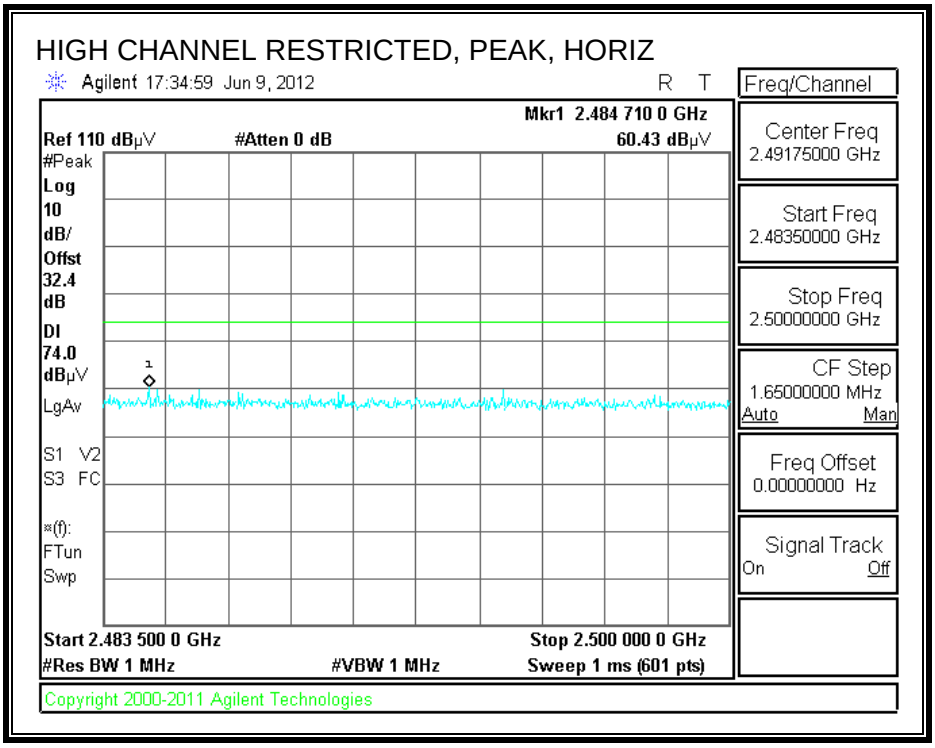


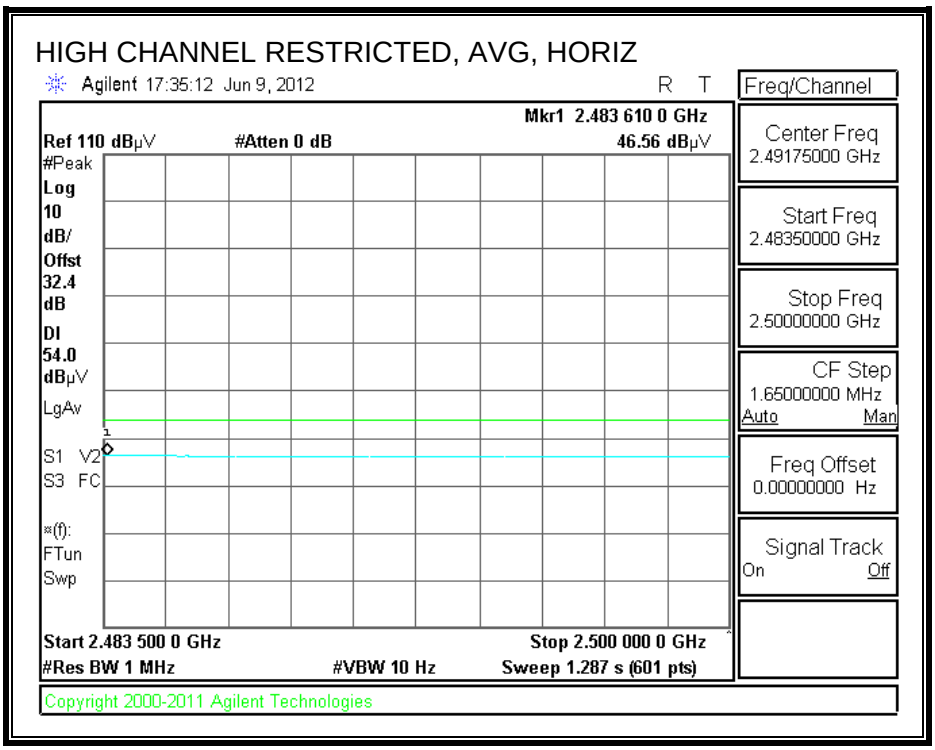
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



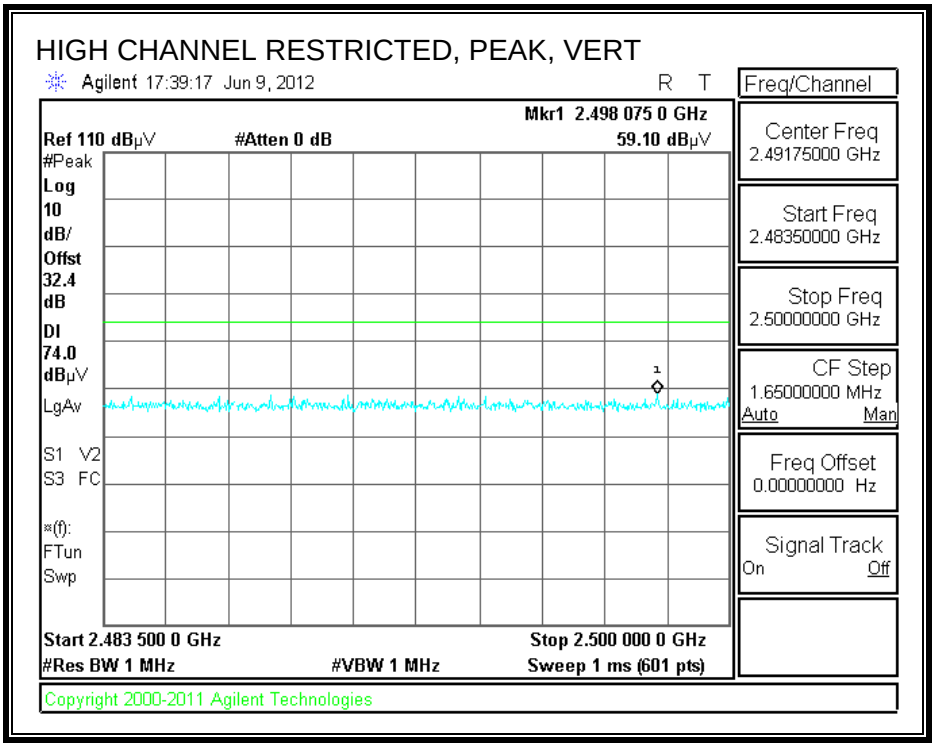


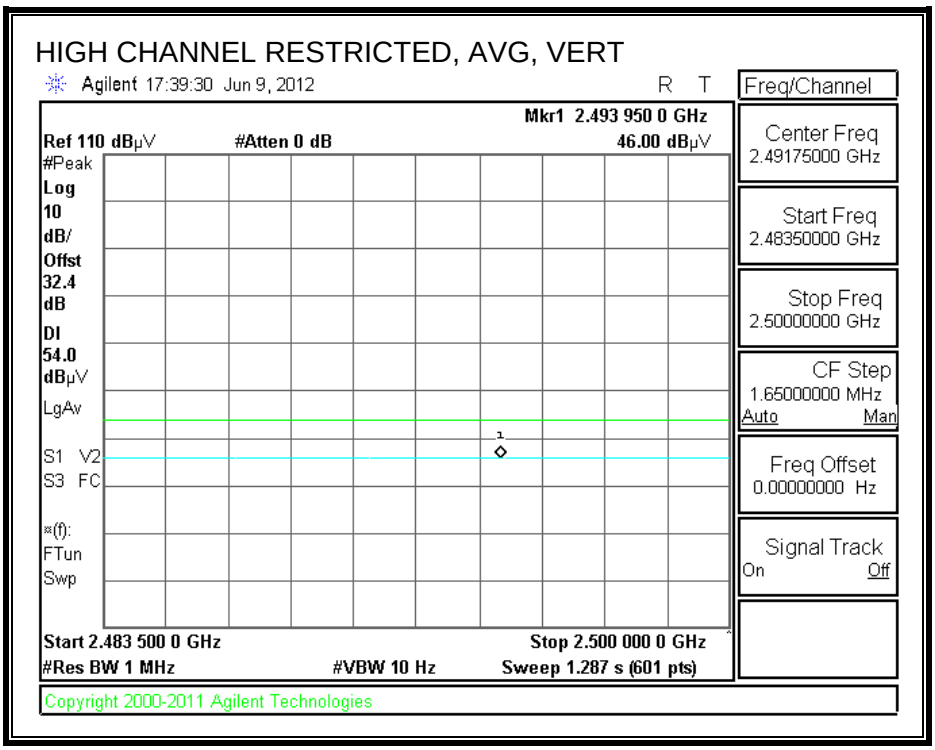
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang
Date: 06/14/12
Project #: 12I14431
Company: Samsung
Test Target: FCC 15.247
Mode Oper: HT20, TX

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		

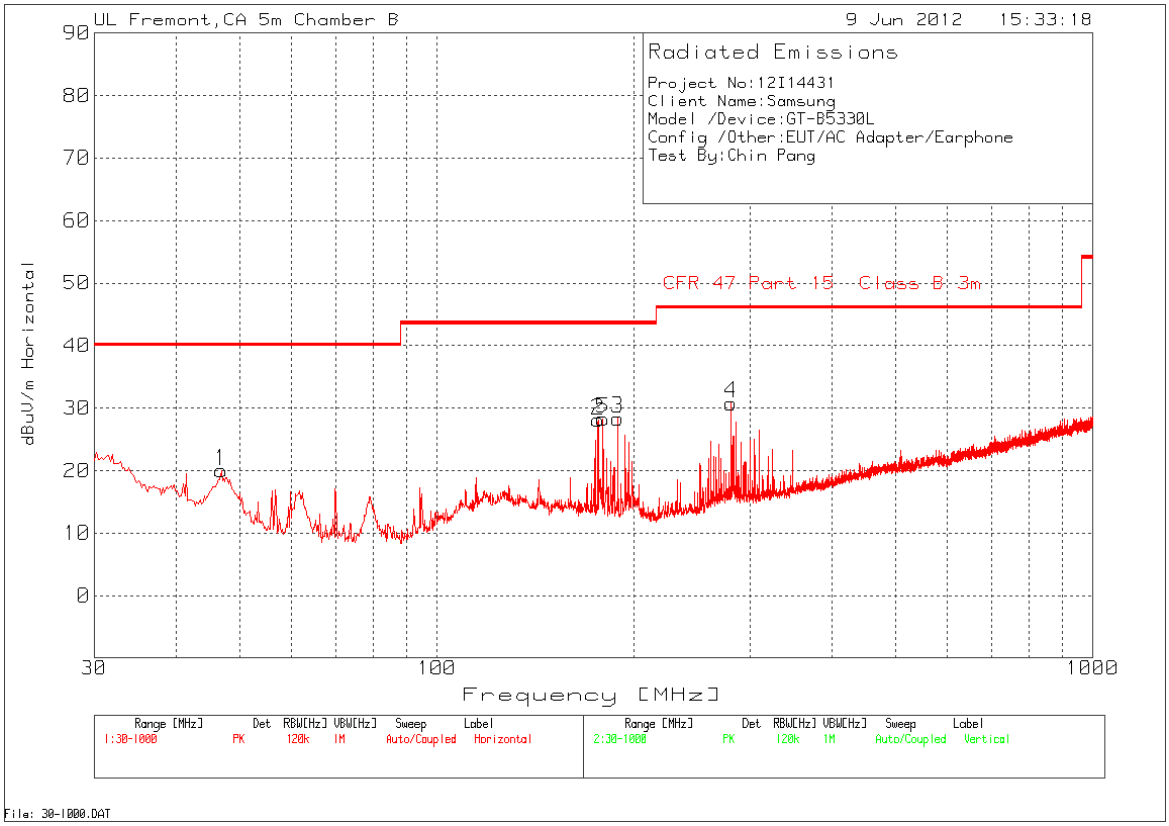
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
Low Ch, 2412MHz													
4.824	3.0	44.0	33.1	6.3	-34.8	0.0	0.0	48.5	74.0	-25.5	H	P	
4.824	3.0	25.9	33.1	6.3	-34.8	0.0	0.0	30.5	54.0	-23.5	H	A	
4.824	3.0	42.3	33.1	6.3	-34.8	0.0	0.0	46.8	74.0	-27.2	V	P	
4.824	3.0	26.0	33.1	6.3	-34.8	0.0	0.0	30.5	54.0	-23.5	V	A	
Mid Ch, 2437MHz													
4.874	3.0	43.8	33.1	6.3	-34.8	0.0	0.0	48.4	74.0	-25.6	H	P	
4.874	3.0	25.1	33.1	6.3	-34.8	0.0	0.0	29.7	54.0	-24.3	H	A	
7.311	3.0	37.5	35.8	8.5	-34.9	0.0	0.0	46.9	74.0	-27.1	H	P	
7.311	3.0	24.0	35.8	8.5	-34.9	0.0	0.0	33.4	54.0	-20.6	H	A	
4.874	3.0	40.4	33.1	6.3	-34.8	0.0	0.0	45.0	74.0	-29.0	V	P	
4.874	3.0	25.5	33.1	6.3	-34.8	0.0	0.0	30.1	54.0	-23.9	V	A	
7.311	3.0	36.8	35.8	8.5	-34.9	0.0	0.0	46.2	74.0	-27.8	V	P	
7.311	3.0	24.0	35.8	8.5	-34.9	0.0	0.0	33.4	54.0	-20.6	V	A	
High Ch, 2462MHz													
4.924	3.0	45.6	33.2	6.3	-34.8	0.0	0.0	50.4	74.0	-23.6	H	P	
4.924	3.0	26.6	33.2	6.3	-34.8	0.0	0.0	31.3	54.0	-22.7	H	A	
7.386	3.0	40.4	35.9	8.5	-34.9	0.0	0.0	50.0	74.0	-24.0	H	P	
7.386	3.0	24.5	35.9	8.5	-34.9	0.0	0.0	34.1	54.0	-19.9	H	A	
4.924	3.0	44.4	33.2	6.3	-34.8	0.0	0.0	49.1	74.0	-24.9	V	P	
4.924	3.0	26.7	33.2	6.3	-34.8	0.0	0.0	31.5	54.0	-22.5	V	A	
7.386	3.0	38.8	35.9	8.5	-34.9	0.0	0.0	48.4	74.0	-25.6	V	P	
7.386	3.0	24.5	35.9	8.5	-34.9	0.0	0.0	34.0	54.0	-20.0	V	A	

Rev. 4.1.2.7
Note: No other emissions were detected above the system noise floor.

8.3. WORST-CASE BELOW 1 GHz

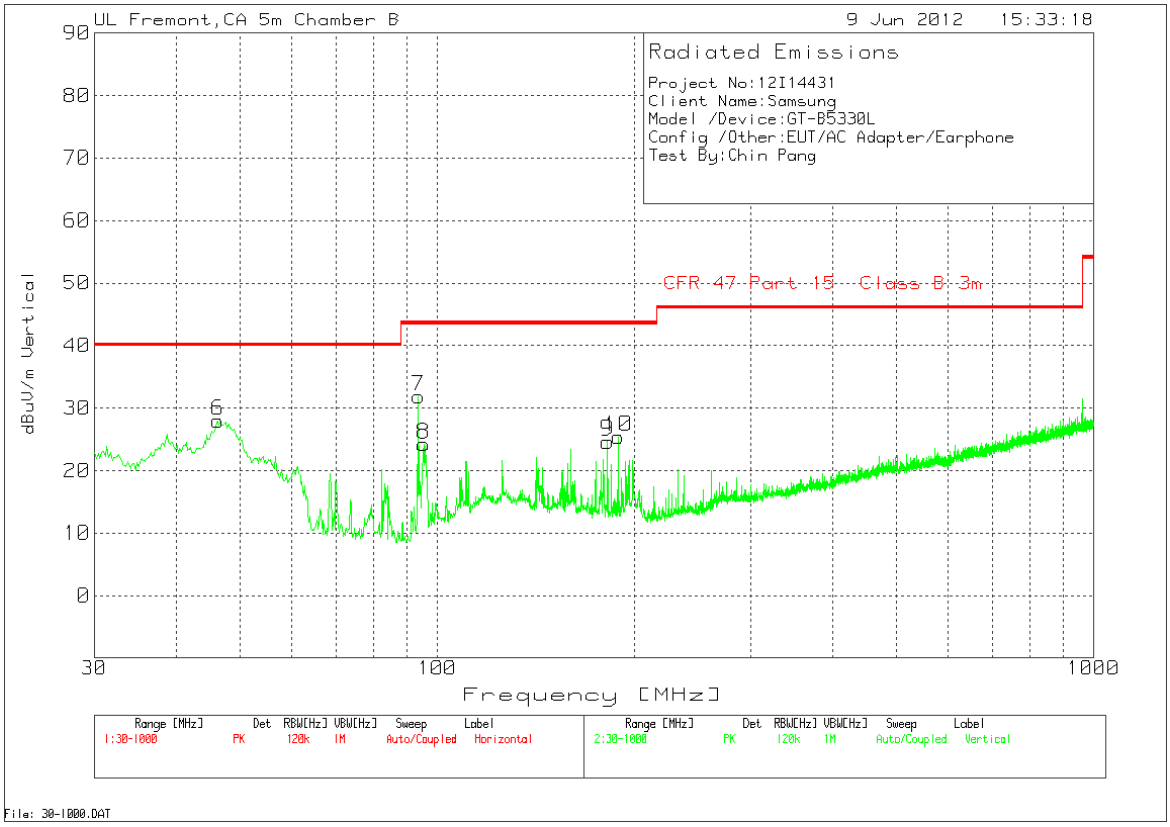
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



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

VERTICAL PLOT



HORIZONTAL AND VERTICAL DATA

Project No:12I14431								
Client Name:Samsung								
Model /Device:GT-B5330L								
Config /Other:EUT/AC Adapter/Earphone								
Test By:Chin Pang								
Horizontal 30 - 1000MHz								
Frequency	Reading	Detector	T122 Sunol	5mB Amp	dBuV/m	CFR 47 Part 15B	Margin	Polarity
46.8645	39.7	PK	9.4	-29.1	20	40	-20	Horz
176.1591	44.48	PK	11.4	-27.8	28.08	43.5	-15.42	Horz
188.759	44.88	PK	11.2	-27.7	28.38	43.5	-15.12	Horz
280.8353	44.38	PK	13.3	-26.9	30.78	46	-15.22	Horz
179.0667	44.87	PK	11.2	-27.8	28.27	43.5	-15.23	Horz
Vertical 30 - 1000MHz								
Frequency	Reading	Detector	T122 Sunol	5mB Amp	dBuV/m	CFR 47 Part 15B	Margin	Polarity
46.283	47.46	PK	9.6	-29.1	27.96	40	-12.04	Vert
93.5811	51.97	PK	8.5	-28.6	31.87	43.5	-11.63	Vert
95.3257	43.9	PK	8.9	-28.6	24.2	43.5	-19.3	Vert
181.5867	41.23	PK	11.1	-27.7	24.63	43.5	-18.87	Vert
188.759	41.9	PK	11.2	-27.7	25.4	43.5	-18.1	Vert

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

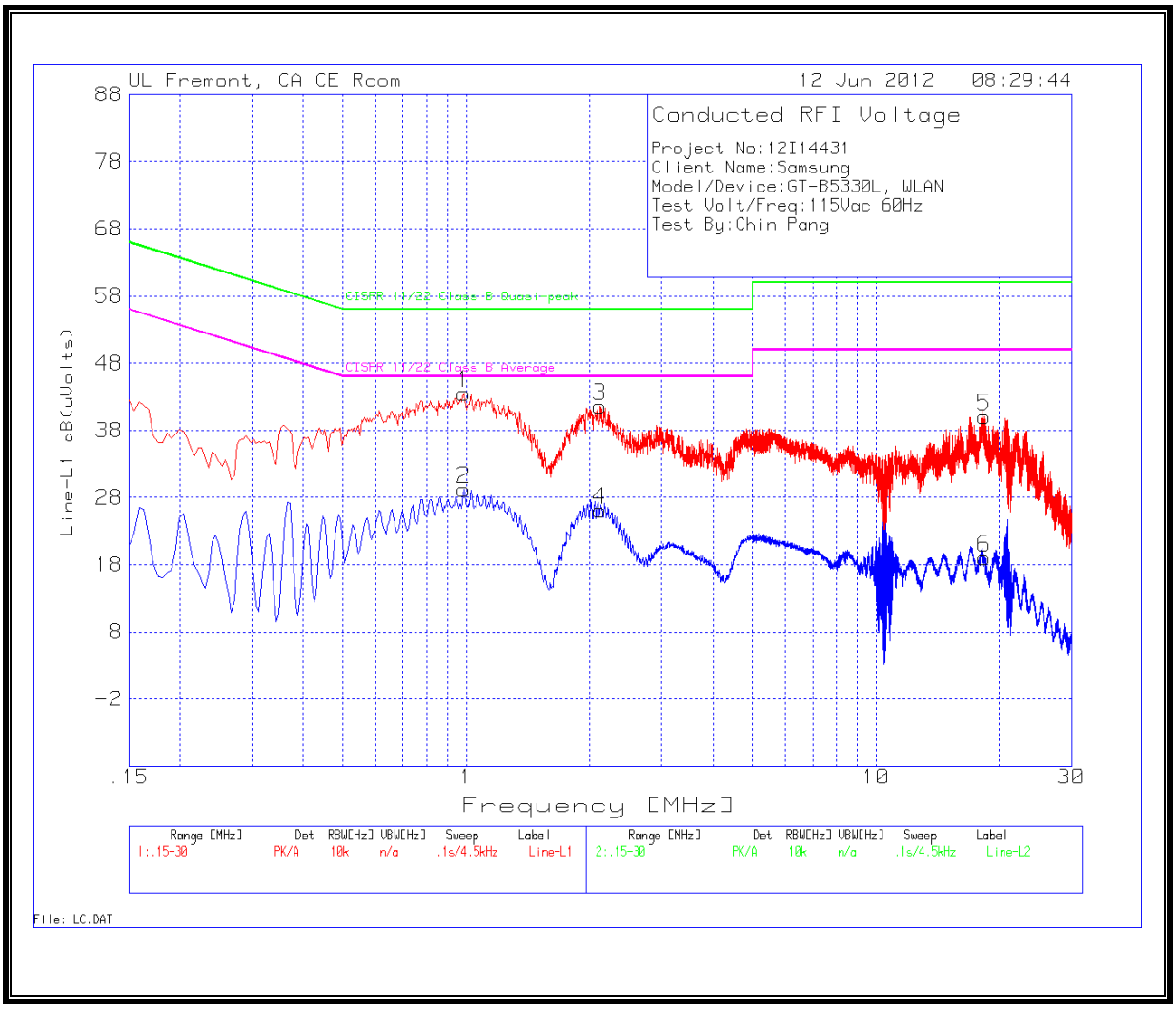
ANSI C63.4

RESULTS

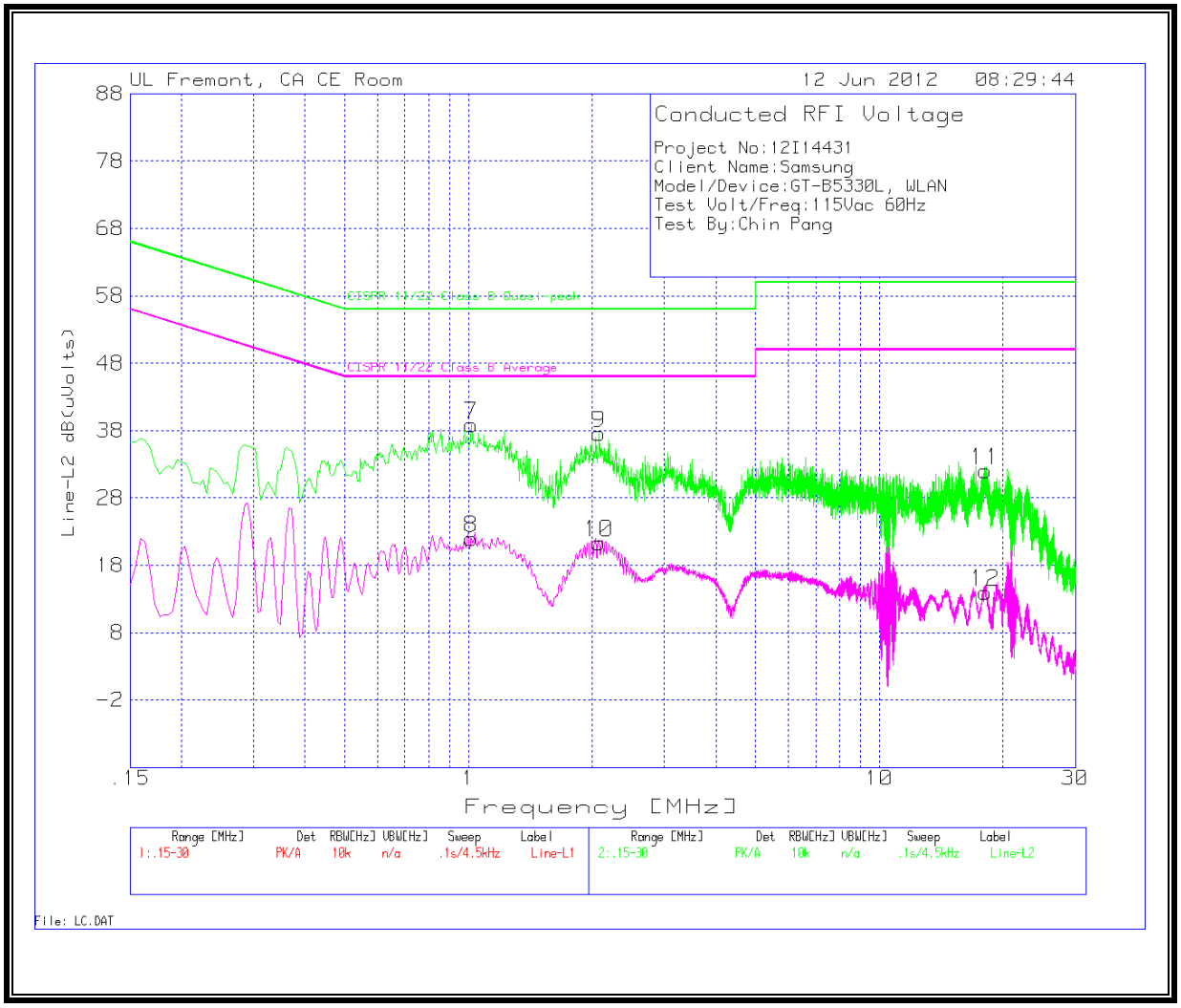
6 WORST EMISSIONS

Project No:12I14431									
Client Name:Samsung									
Model/Device:GT-B5330L, WLAN									
Test Volt/Freq:115Vac 60Hz									
Test By:Chin Pang									
Line-L1 .15 - 30MHz									
Frequency	Reading	Detector	T24 IL L1	LC Cables 1	dB(uVolts)	CISPR 11/22	Margin	CISPR 11/22	Margin
0.987	43.4	PK	0.1	0	43.5	56	-12.5	-	-
0.987	29.16	Av	0.1	0	29.26	-	-	46	-16.74
2.121	41.35	PK	0.1	0.1	41.55	56	-14.45	-	-
2.121	25.89	Av	0.1	0.1	26.09	-	-	46	-19.91
18.3975	39.61	PK	0.2	0.2	40.01	60	-19.99	-	-
18.3975	18.64	Av	0.2	0.2	19.04	-	-	50	-30.96
Line-L2 .15 - 30MHz									
Frequency	Reading	Detector	T24 IL L1	LC Cables 1	dB(uVolts)	CISPR 11/22	Margin	CISPR 11/22	Margin
1.0185	38.83	PK	0.1	0	38.93	56	-17.07	-	-
1.0185	21.85	Av	0.1	0	21.95	-	-	46	-24.05
2.0805	37.33	PK	0.1	0.1	37.53	56	-18.47	-	-
2.0805	21.17	Av	0.1	0.1	21.37	-	-	46	-24.63
18.0915	31.65	PK	0.2	0.2	32.05	60	-27.95	-	-
18.0915	13.61	Av	0.2	0.2	14.01	-	-	50	-35.99

LINE 1 RESULTS



LINE 2 RESULTS



10. MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*($900/f^2$)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*($180/f^2$)	30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

IC RULES

IC Safety Code 6, Section 2.2.1 (a) A person other than an RF and microwave exposed worker shall not be exposed to electromagnetic radiation in a frequency band listed in Column 1 of Table 5, if the field strength exceeds the value given in Column 2 or 3 of Table 5, when averaged spatially and over time, or if the power density exceeds the value given in Column 4 of Table 5, when averaged spatially and over time.

Table 5
Exposure Limits for Persons Not Classed As RF and Microwave Exposed Workers (Including the General Public)

1 Frequency (MHz)	2 Electric Field Strength; rms (V/m)	3 Magnetic Field Strength; rms (A/m)	4 Power Density (W/m^2)	5 Averaging Time (min)
0.003–1	280	2.19		6
1–10	$280/f$	$2.19/f$		6
10–30	28	$2.19/f$		6
30–300	28	0.073	2*	6
300–1 500	$1.585f^{0.5}$	$0.0042f^{0.5}$	$f/150$	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	$616\,000/f^{1.2}$
150 000–300 000	$0.158f^{0.5}$	$4.21 \times 10^{-4}f^{0.5}$	$6.67 \times 10^{-5}f$	$616\,000/f^{1.2}$

* Power density limit is applicable at frequencies greater than 100 MHz.

Notes: 1. Frequency, f, is in MHz.
2. A power density of 10 W/m^2 is equivalent to 1 mW/cm^2.
3. A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

EQUATIONS

Power density is given by:

S = EIRP / (4 * Pi * D^2)

where

S = Power density in W/m^2
EIRP = Equivalent Isotropic Radiated Power in W
D = Separation distance in m

Power density in units of W/m^2 is converted to units of mWc/m^2 by dividing by 10.

Distance is given by:

D = SQRT (EIRP / (4 * Pi * S))

where

D = Separation distance in m
EIRP = Equivalent Isotropic Radiated Power in W
S = Power density in W/m^2

For multiple colocated transmitters operating simultaneously in frequency bands where the limit is identical, the total power density is calculated using the total EIRP obtained by summing the Power * Gain product (in linear units) of each transmitter.

Total EIRP = (P1 * G1) + (P2 * G2) + ... + (Pn * Pn)

where

Px = Power of transmitter x
Gx = Numeric gain of antenna x

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

LIMITS

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm^2

RESULTS

Band	Mode	Separation Distance (m)	Output AV Power (dBm)	Antenna Gain (dBi)	IC Power Density (W/m^2)	FCC Power Density (mW/cm^2)
2.4 GHz	WLAN	0.20	14.70	-4.30	0.022	0.0022