



**FCC 47 CFR PART 15 SUBPART C  
INDUSTRY CANADA RSS-210 ISSUE 8**

**BLUETOOTH LOW ENERGY  
CERTIFICATION TEST REPORT**

**FOR**

**FITNESS TRACKING DEVICE WITH BLE**

**MODEL NUMBER: BASIS PEAK**

**FCC ID: 2AB8ZMRA  
IC: 1000X-MRA**

**REPORT NUMBER: 14U18649-E1, REVISION B**

**ISSUE DATE: SEPTEMBER 14, 2014**

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**NVLAP LAB CODE 200065-0**

Revision History

Rev.	Issue Date	Revisions	Revised By
--	09/08/14	Initial Issue	G. Victorine
A	09/09/14	Updated with generic descriptions	G. Victorine
B	09/14/14	Updated with TCB review comments	G. Victorine

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** INTEL CORPORATION  
2200 MISSION COLLEGE BOULEVARD  
SANTA CLARA, CA 95052, U.S.A

**EUT DESCRIPTION:** FITNESS TRACKING DEVICE WITH BLE

**MODEL:** BASIS PEAK

**SERIAL NUMBER:** Conducted Unit #: A4000F1BZ131 DVT  
Radiated Unit #: A4000AA1EZ131 DVT

**DATE TESTED:** August 27, 2014 to September 5, 2014

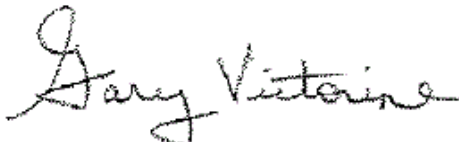
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 8	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

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

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

Approved & Released For  
UL Verification Services Inc. By:

Tested By:



GARY VICTORINE  
PROJECT LEAD  
UL Verification Services Inc.



JOE VANG  
EMC ENGINEER  
UL Verification Services Inc.

## 2. TEST METHODOLOGY

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

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

47173 Benicia Street	47266 Benicia Street
<input type="checkbox"/> Chamber A	<input type="checkbox"/> Chamber D
<input type="checkbox"/> Chamber B	<input type="checkbox"/> Chamber E
<input type="checkbox"/> Chamber C	<input checked="" type="checkbox"/> Chamber F
	<input type="checkbox"/> Chamber G
	<input type="checkbox"/> Chamber H

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers A through H are covered under Industry Canada company address code 2324B with site numbers 2324B-1 through 2324B-8, respectively.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/2000650.htm>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

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

### 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

### 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	$\pm 3.52$ dB
Radiated Disturbance, 30 to 1000 MHz	$\pm 4.94$ dB
Radiated Disturbance, 1 to 6 GHz	$\pm 3.86$ dB
Radiated Disturbance, 6 to 18 GHz	$\pm 4.23$ dB
Radiated Disturbance, 18 to 26 GHz	$\pm 5.30$ dB

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

## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is fitness tracking device with a 2.4 GHz BLE transceiver.

The radio module is manufactured by Nordic Semiconductor.

### 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)
2402 - 2480	BLE	3.07	2.03

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PCB antenna with a maximum gain of 0.0 dBi.

### 5.4. SOFTWARE AND FIRMWARE

The EUT firmware used during test was 0.6.3.200

The communications software used during test was Python 2.7.8.

The EUT driver software installed during testing was USB driver CDM v2.10.00 WHQL.

### 5.5. WORST-CASE CONFIGURATION AND MODE

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

The fundamental of the EUT was investigated in three orthogonal orientations X, Y, Z. It was determined that X (flat) orientation was worst-case orientation. Therefore, all final radiated testing was performed with the EUT in X orientation.



## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Lenovo	20332	YB04282152	PPD-QCWB335
AC adapter (Laptop)	Lenovo	ADLX45NCC3A	11S45N0297ZSH443G0XE	N/A
Debug board	Intel	14090040	175-00007-01	N/A

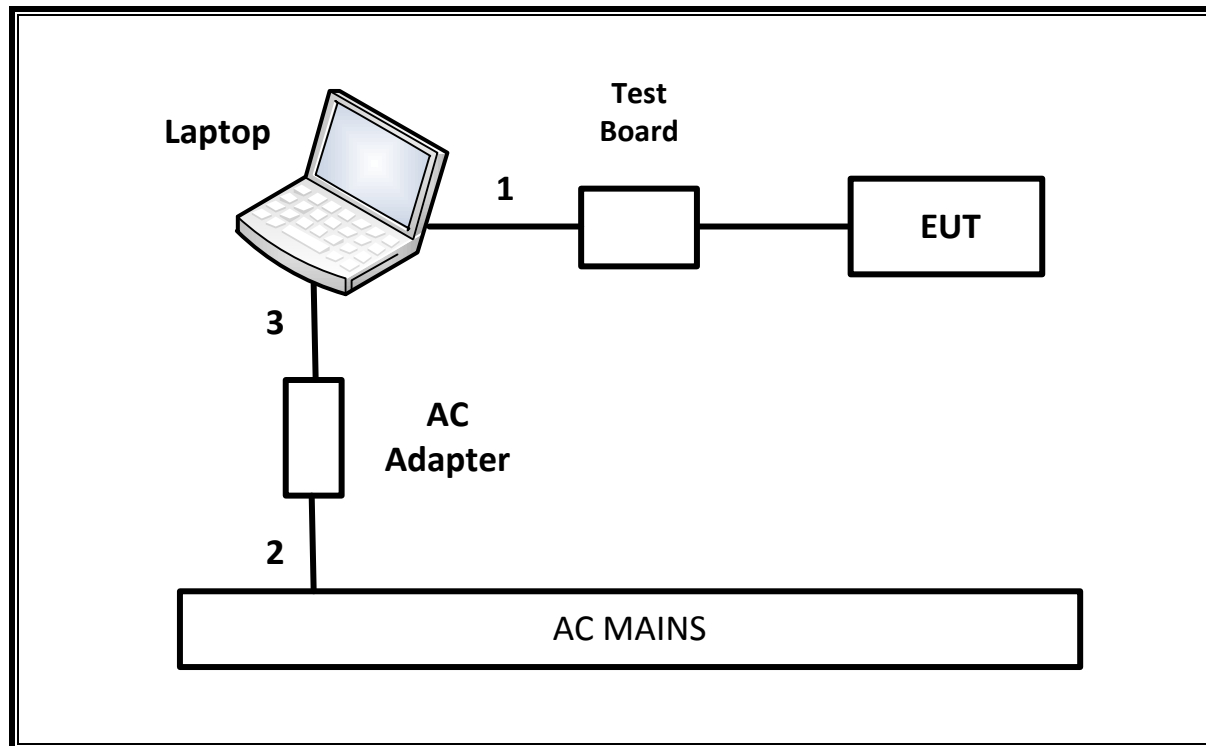
### I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	USB	1	USB Micro	Shielded	0.35	
2	AC	1	3-Wire	Unshielded	0.9	
3	DC	1	Barrel	Unshielded	1.8	

### TEST SETUP

The EUT is connected to a test board, which is connected to the USB port of a laptop computer during test. Test software exercised the EUT.

**SETUP DIAGRAM FOR TESTS**



## 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
Single Channel PK Power Meter	Agilent	N1911A	F00022	4/9/2014	4/9/2015
Wideband Power Sensor, 30MHz VBW	Agilent	N1921A	F00360	9/30/2013	9/30/2014
Spectrum Analyzer	Agilent	N9030A	F00127	3/11/2014	3/11/2015
Antenna, Horn, 18 GHz	ETS Lindgren	3117	C01005	3/20/2014	3/20/2015
Antenna, Biconolog, 30MHz-1 GHz	Sunol Sciences	JB1	C01011	4/22/2014	4/22/2015
High Pass Filter, fc: 3.0GHz, 50 Ohms	Micro-Tronics	HPM17543	F00181	1/20/2014	1/20/2015
RF PreAmplifier, 1-18GHz	Miteq	AFS42-00101800-25-S-42	F00354	1/20/2014	1/21/2015
Preamp, 1000MHz	Sonoma	310N	N02891	12/30/2013	12/30/2014
Spectrum Analyzer	Agilent	N9030A	F00128	2/12/2014	2/12/2015
Spectrum Analyzer, 40 GHz	Agilent	8564E	C00951	8/6/2014	8/6/2015
Amplifier, 1 to 26.5GHz	Agilent	8449B	F00167	3/25/2014	3/25/2015
Antenna, Horn 18 to 26.5GHz	ARA	MWH-1826/B	C00980	11/26/2013	11/26/2014
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	F00092	9/9/2013	9/9/2014
LISN, 30 MHz	FCC	50/250-25-2	C00626	1/17/2014	1/17/2015

## 7. ANTENNA PORT TEST RESULTS

### 7.1. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

#### LIMITS

None; for reporting purposes only.

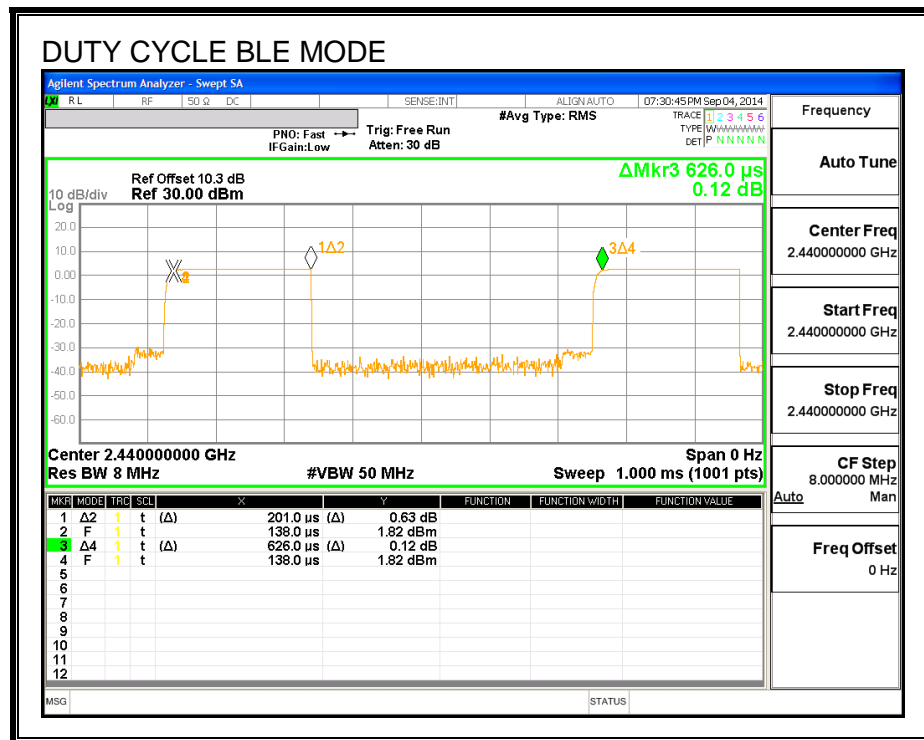
#### PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

### 7.2. 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)
BLE	0.201	0.626	0.321	32.11%	4.93	4.975

### 7.3. DUTY CYCLE PLOTS



## **7.4. MEASUREMENT METHODS**

6 dB BW: KDB 558074 D01 v03r02, Section 8.1.

Output Power: KDB 558074 D01 v03r02, Section 9.1.2.

Power Spectral Density: KDB 558074 D01 v03r02, Section 10.2.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v03r02, Section 11.0.

Out-of-band emissions in restricted bands: KDB 558074 D01 v03r02, Section 12.1.

## 7.5. 6 dB BANDWIDTH

### LIMITS

FCC §15.247 (a) (2)

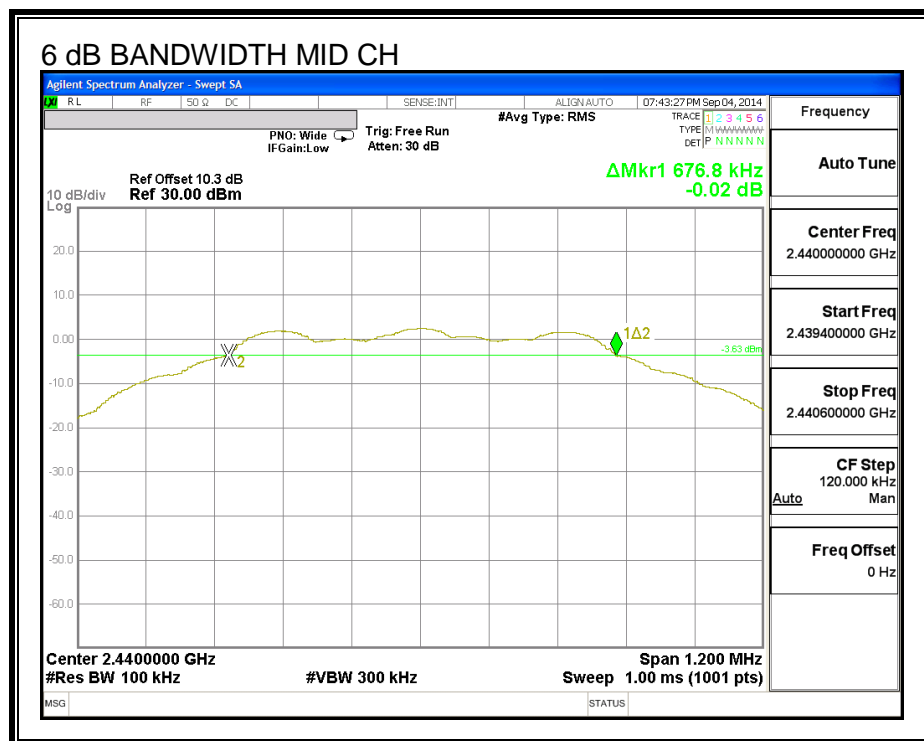
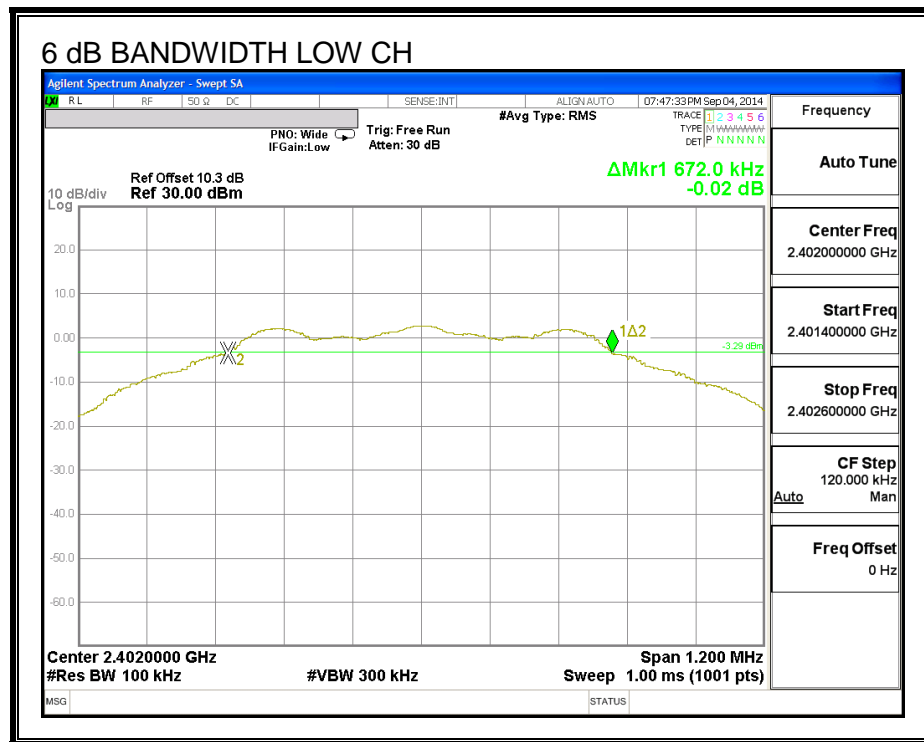
IC RSS-210 A8.2 (a)

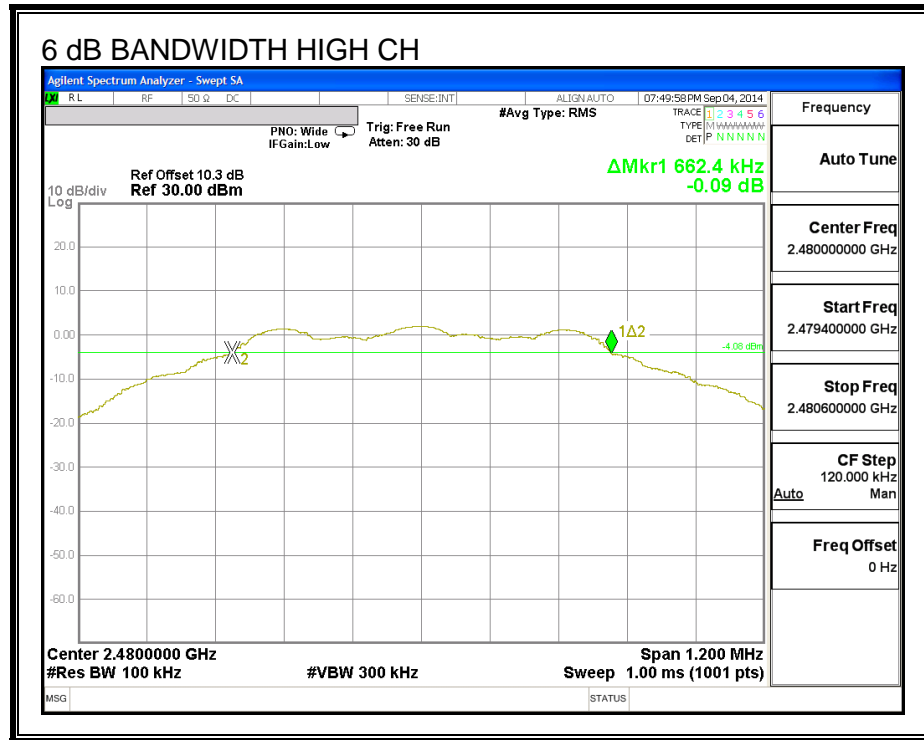
The minimum 6 dB bandwidth shall be at least 500 kHz.

### RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.672	0.5
Middle	2440	0.677	0.5
High	2480	0.662	0.5

**6 dB BANDWIDTH**







## 7.6. 99% BANDWIDTH

### LIMITS

None; for reporting purposes only.

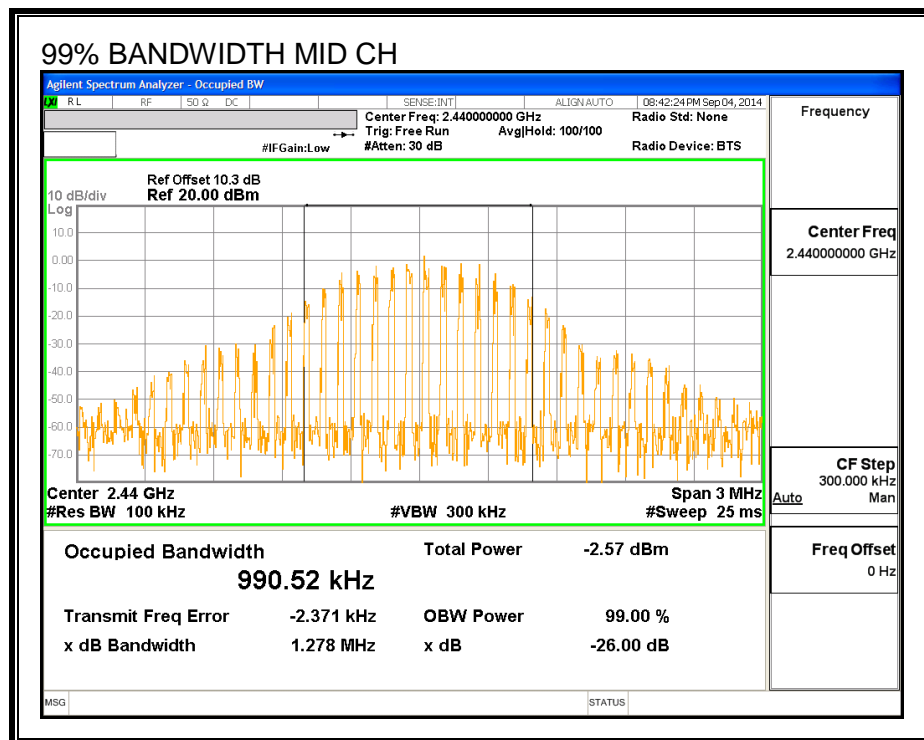
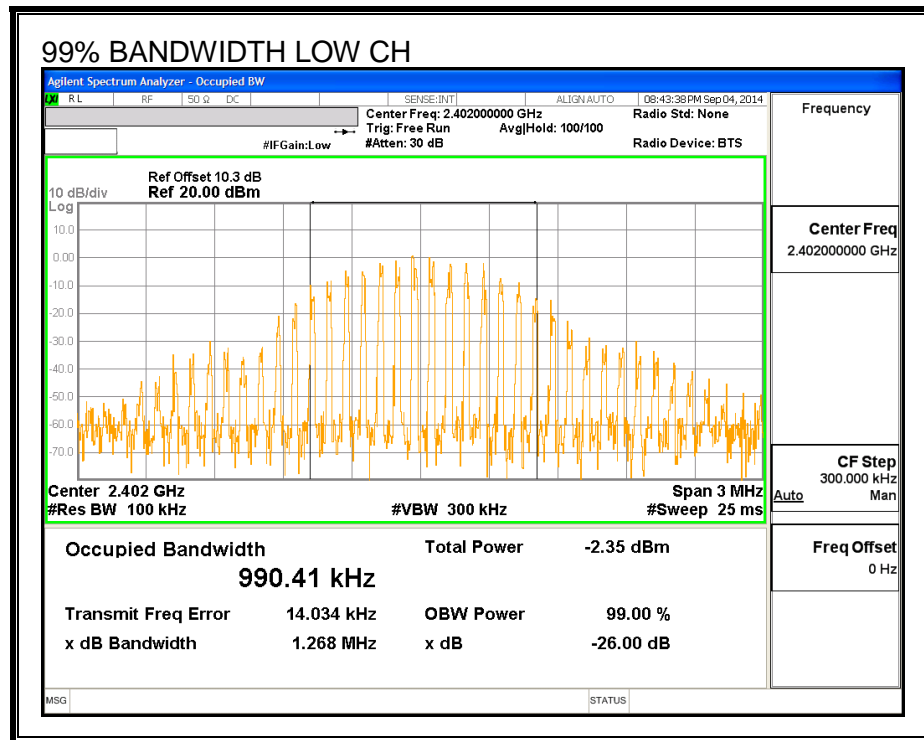
### TEST PROCEDURE

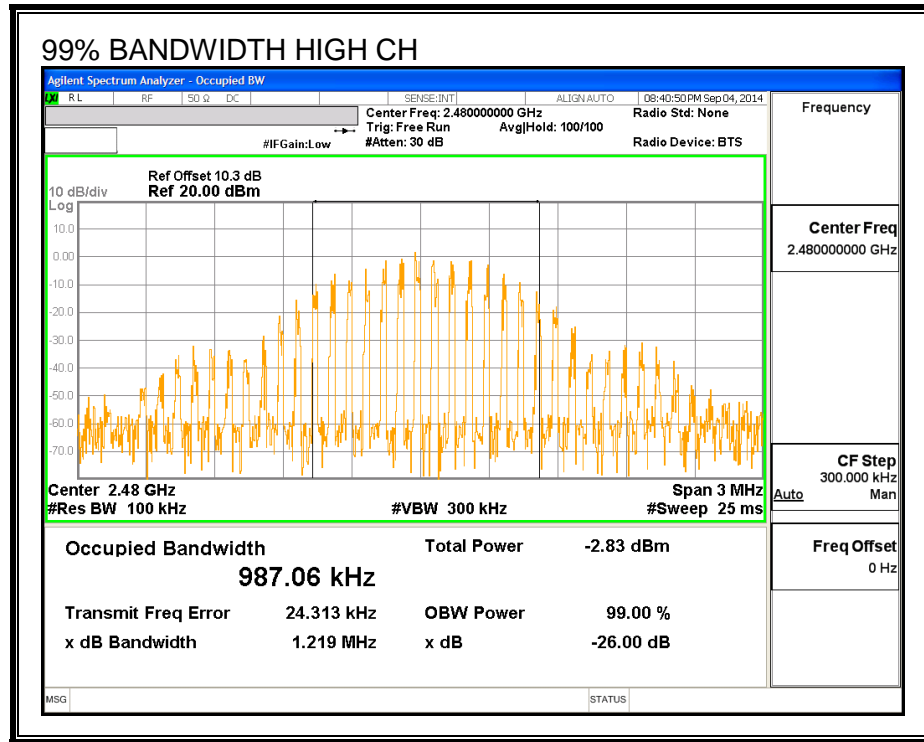
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth and to 1% of the span. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

### RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	0.990
Middle	2440	0.991
High	2480	0.987

**99% BANDWIDTH**





## 7.7. 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.

### RESULTS

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	3.07	30	-26.930
Middle	2440	2.76	30	-27.240
High	2480	2.40	30	-27.600

## 7.8. AVERAGE POWER

### LIMITS

None; for reporting purposes only.

### RESULTS

The cable assembly insertion loss of 10.3 dB (including 10 dB pad and 0.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	2.66
Middle	2440	2.60
High	2480	2.24

## 7.9. POWER SPECTRAL DENSITY

### LIMITS

FCC §15.247 (e)

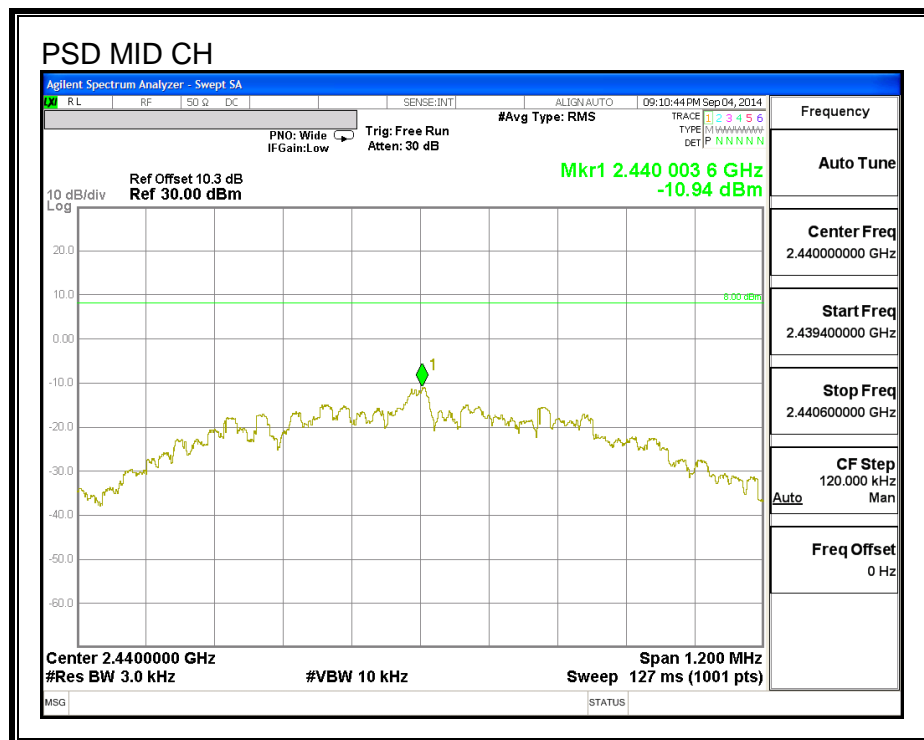
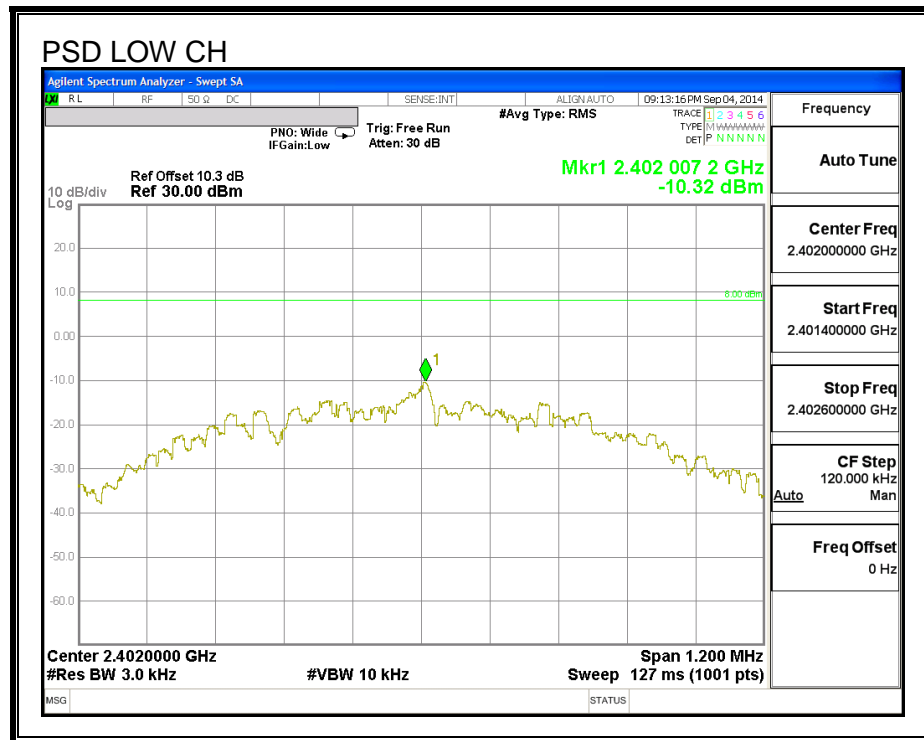
IC RSS-210 A8.2 (b)

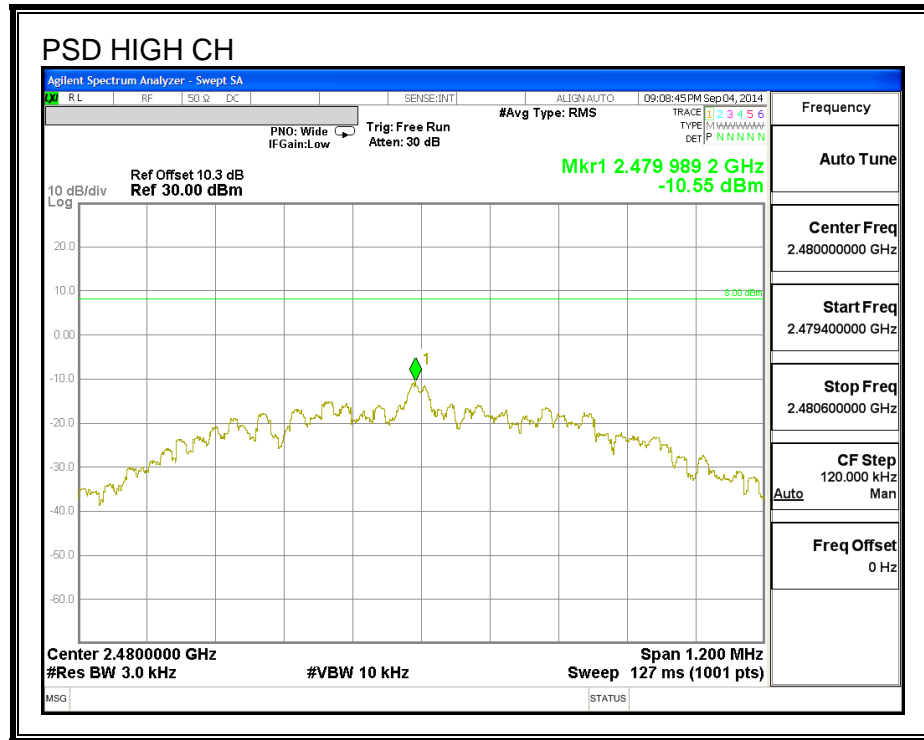
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

### RESULTS

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2402	-10.32	8	-18.32
Middle	2440	-10.94	8	-18.94
High	2480	-10.55	8	-18.55

## POWER SPECTRAL DENSITY







## **7.10. CONDUCTED SPURIOUS EMISSIONS**

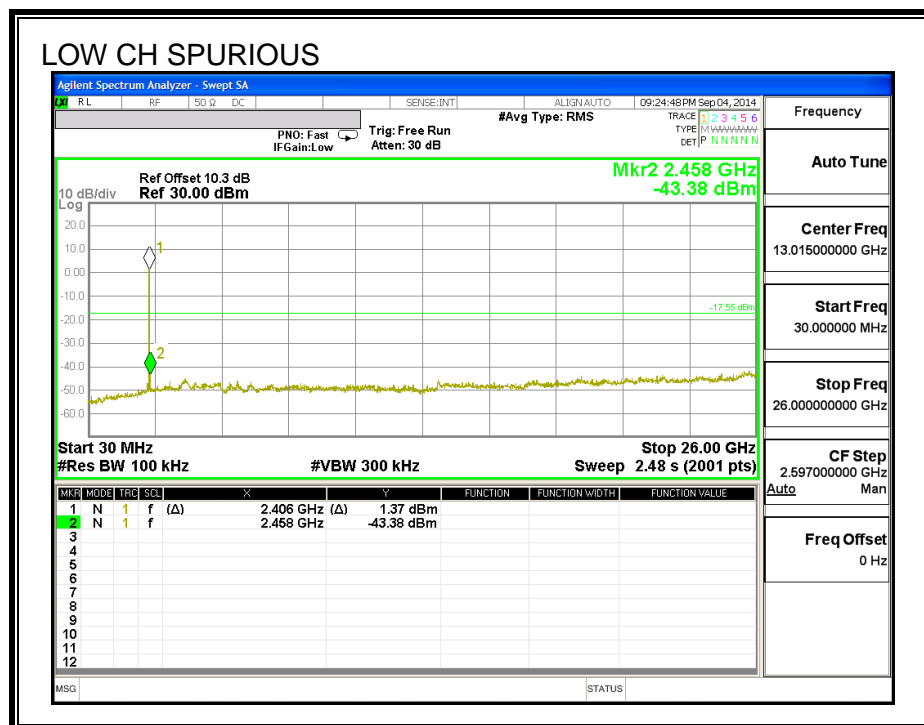
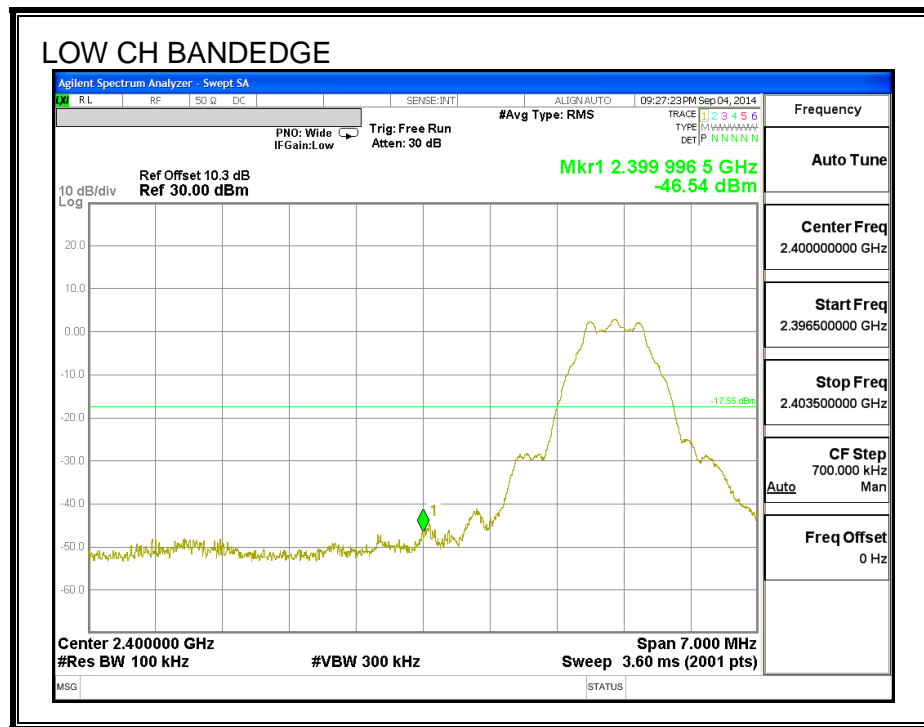
### **LIMITS**

FCC §15.247 (d)  
IC RSS-210 A8.5

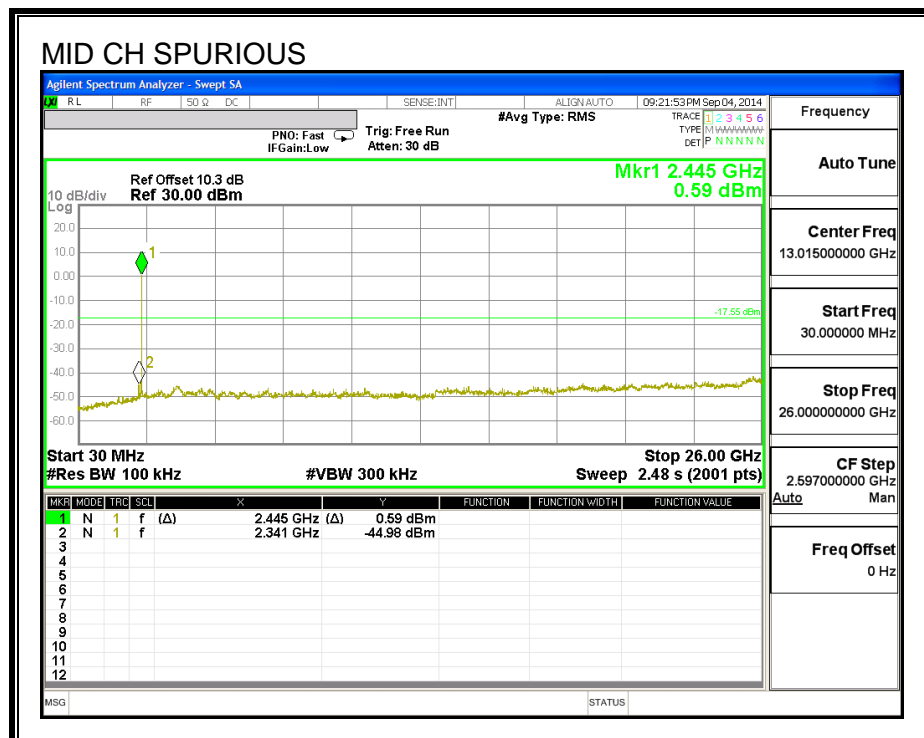
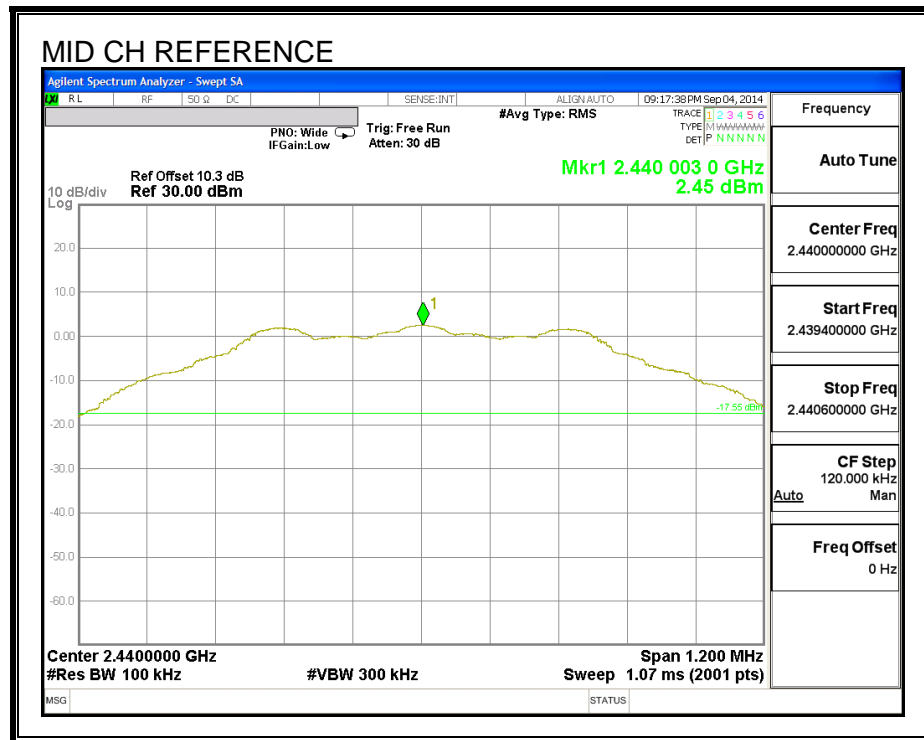
Output power was measured based on the use of a peak measurement. Therefore, the required attenuation is 20 dB.

## RESULTS

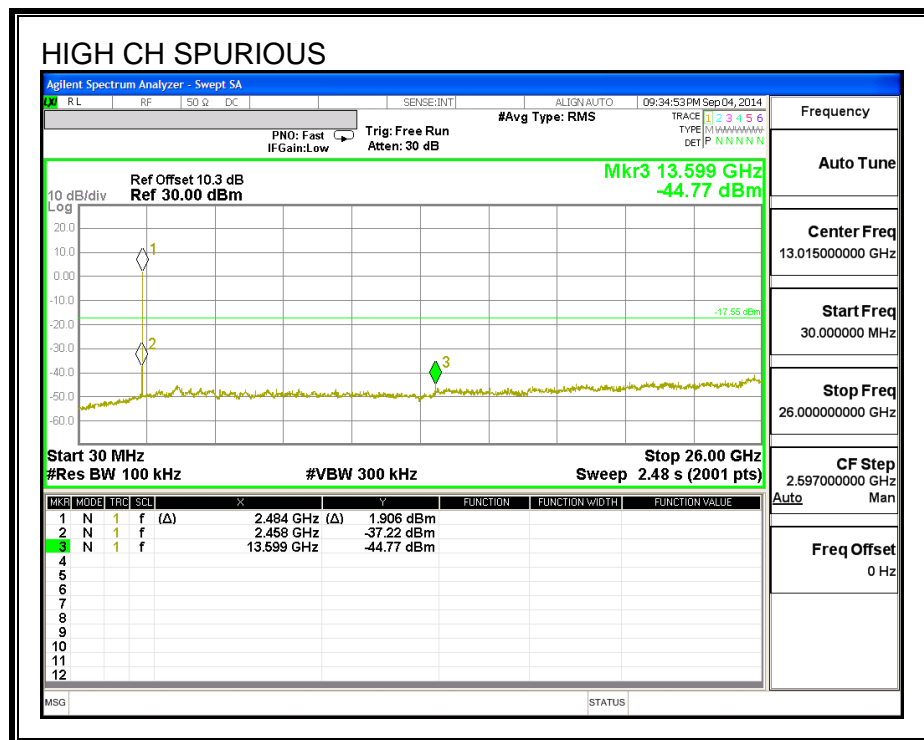
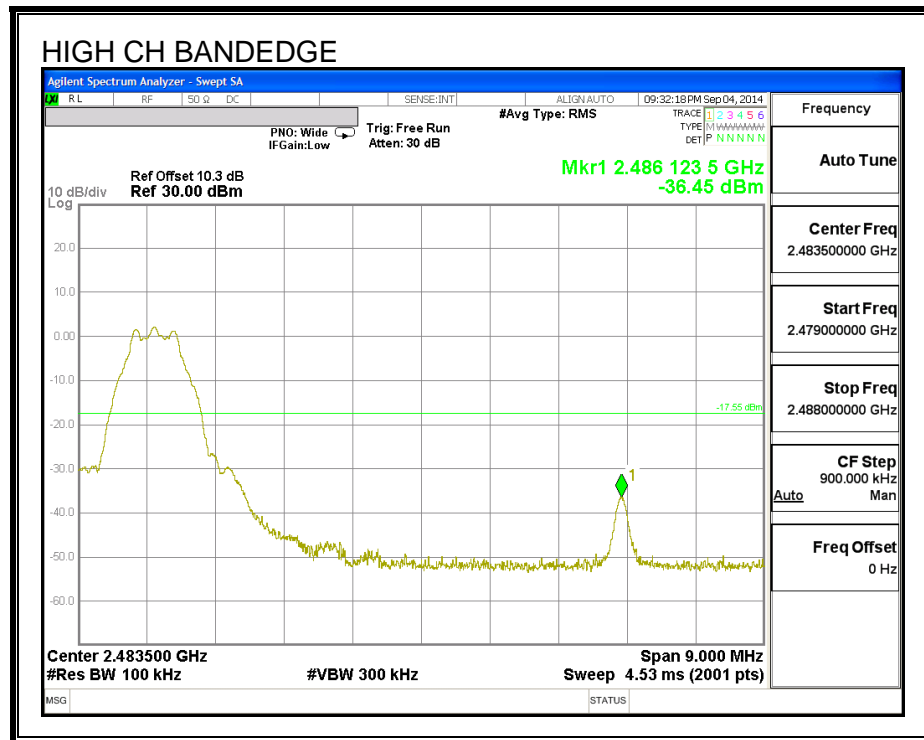
### SPURIOUS EMISSIONS, LOW CHANNEL



# SPURIOUS EMISSIONS, MID CHANNEL



## SPURIOUS EMISSIONS, HIGH CHANNEL



## 8. RADIATED TEST RESULTS

### 8.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

Frequency Range (MHz)	Field Strength Limit ( $\mu\text{V/m}$ ) at 3 m	Field Strength Limit ( $\text{dB}\mu\text{V/m}$ ) 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.

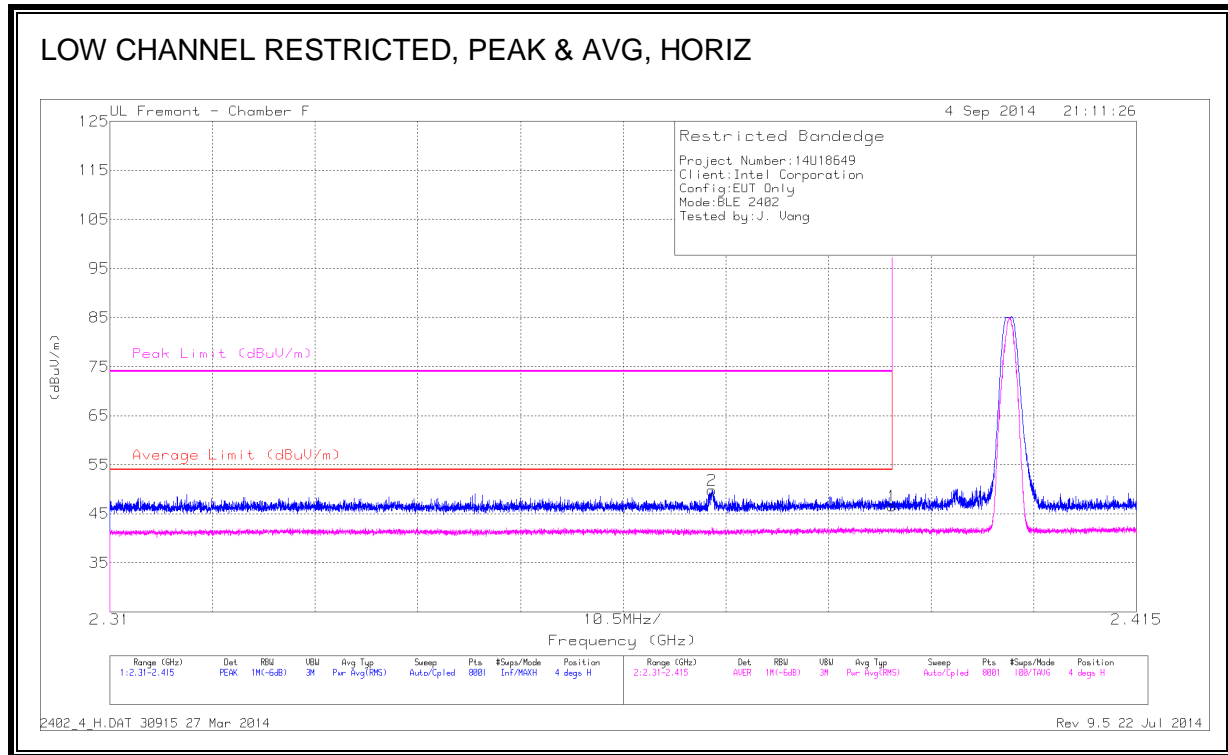
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements.

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in 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 FOR BLUETOOTH LOW ENERGY MODE

### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

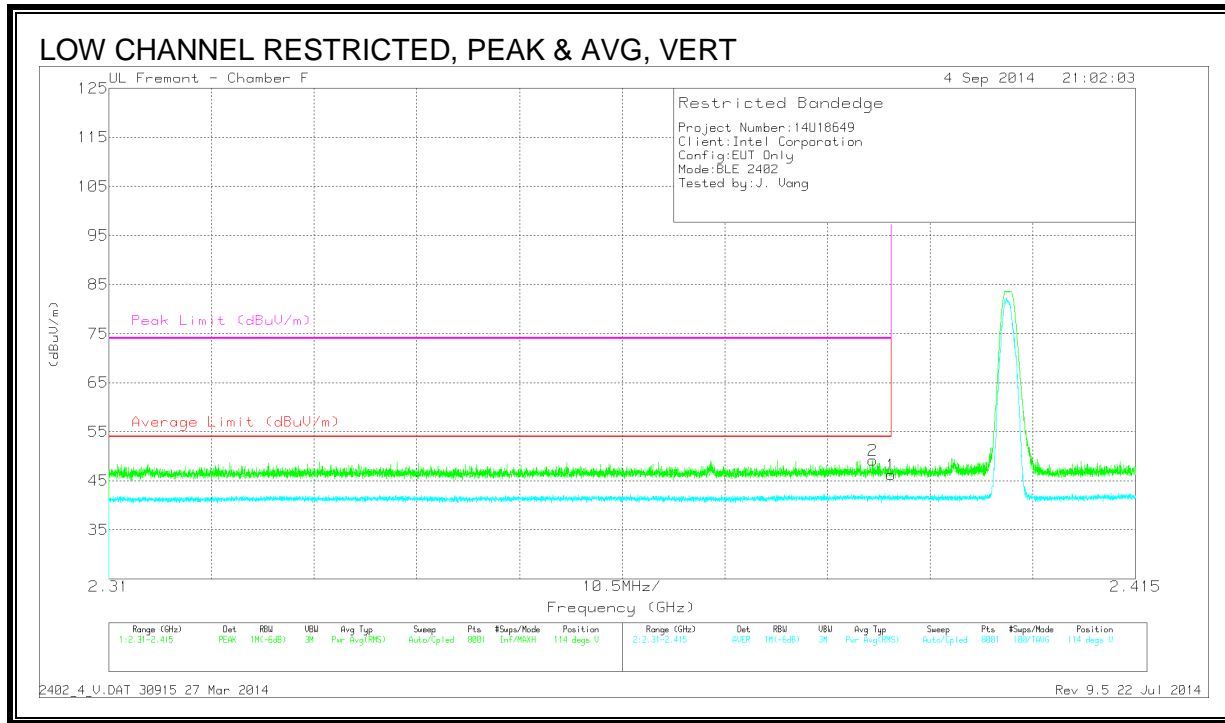


Marker	Frequency (GHz)	Meter Reading (dBμV)	Det	AF T120 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Peak Limit (dBμV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	38.16	PK	32.2	-23.8	0	46.56	-	-	74	-27.44	4	321	H
2	* 2.372	41.74	PK	32.1	-24	0	49.84	-	-	74	-24.16	4	321	H
3	* 2.39	27.89	RMS	32.2	-23.8	4.95	41.24	54	-12.76	-	-	4	321	H
4	* 2.385	29.05	RMS	32.1	-23.8	4.95	42.3	54	-11.7	-	-	4	321	H

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

PK - Peak detector  
RMS - RMS detection

**RESTRICTED BANEDGE (LOW CHANNEL, VERTICAL)**

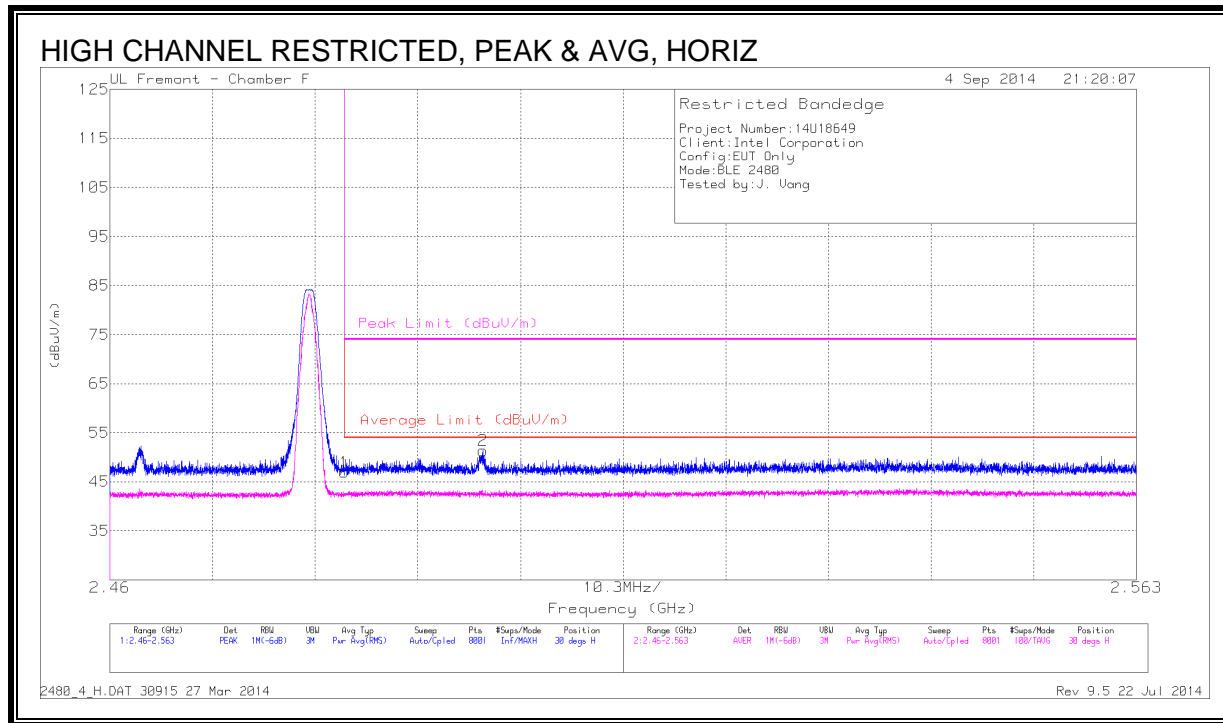


Marker	Frequency (GHz)	Meter Reading (dBμV)	Det	AF T120 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Peak Limit (dBμV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	37.82	PK	32.2	-23.8	0	46.22	-	-	74	-27.78	114	390	V
2	* 2.388	40.77	PK	32.2	-23.8	0	49.17	-	-	74	-24.83	114	390	V
3	* 2.39	28.28	RMS	32.2	-23.8	4.95	41.63	54	-12.37	-	-	114	390	V
4	* 2.389	29.12	RMS	32.2	-23.8	4.95	42.47	54	-11.53	-	-	114	390	V

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

PK - Peak detector  
RMS - RMS detection

**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



Marker	Frequency (GHz)	Meter Reading (dBμV)	Det	AF T120 (dB/m)	Amp/Cbl /Fitr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Peak Limit (dBμV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	37.36	PK	32.6	-23	0	46.96	-	-	74	-27.04	30	325	H
2	* 2.497	41.75	PK	32.6	-23	0	51.35	-	-	74	-22.65	30	325	H
3	* 2.484	27.86	RMS	32.6	-23	4.95	42.41	54	-11.59	-	-	30	325	H
4	2.541	28.82	RMS	32.7	-22.8	4.95	43.67	54	-10.33	-	-	30	325	H

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

PK - Peak detector  
RMS - RMS detection



UL Fremont - Chamber F 4 Sep 2014 21:27:04

Restricted Bandedge  
Project Number: 14U18649  
Client: Intel Corporation  
Config: EUT Only  
Mode: BLE 2480  
Tested by: J. Uong

Peak Limit (dBuU/m)

Average Limit (dBuU/m)

10.3MHz/

Frequency (GHz)

Range (GHz) 2.46 2.563  
Det FEM  
RBW 1M(-6dB)  
VBW 3K  
Avg Type Pur Avg(RMS)  
Sweep Auto/Plotted  
Pls 800  
#Spts/Mode 100/1000  
Position 241 degs V

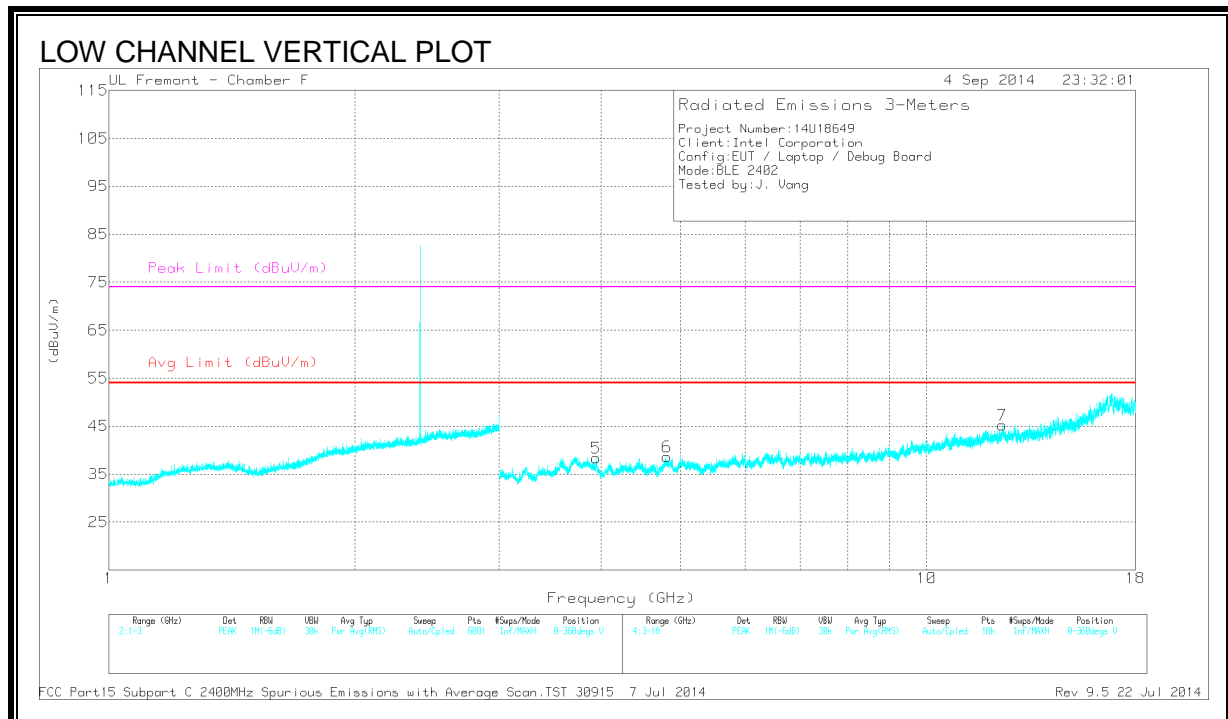
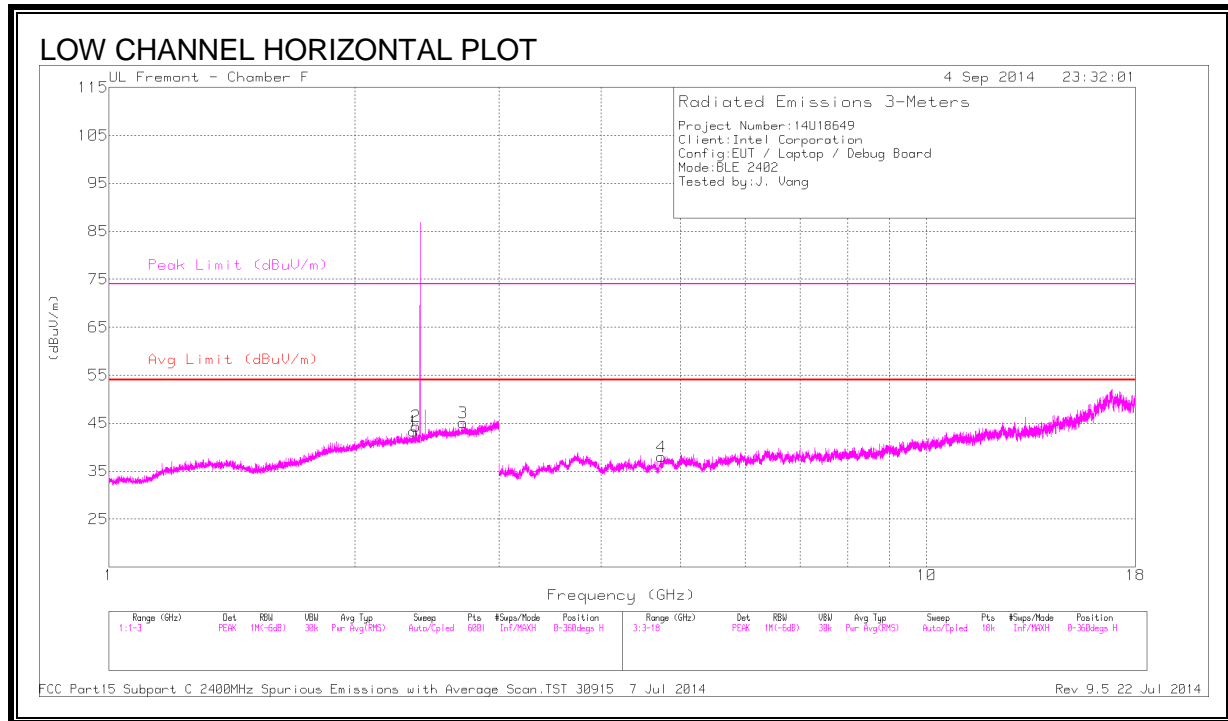
Range (GHz) 2.46 2.563  
Det AVER  
RBW 1M(-6dB)  
VBW 3K  
Avg Type Pur Avg(RMS)  
Sweep Auto/Plotted  
Pls 800  
#Spts/Mode 100/1000  
Position 241 degs V

2480\_4\_U.DAT 30915 27 Mar 2014 Rev 9.5 22 Jul 2014

Marker	Frequency (GHz)	Meter Reading (dBμV)	Det	AF T120 (dB/m)	Amp/Cbl /Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBμV/m)	Average Limit (dBμV/m)	Margin (dB)	Peak Limit (dBμV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	37.82	PK	32.6	-23	0	47.42	-	-	74	-26.58	241	312	V
2	* 2.485	40.41	PK	32.6	-22.9	0	50.11	-	-	74	-23.89	241	312	V
3	* 2.484	27.61	RMS	32.6	-23	4.95	42.16	54	-11.84	-	-	241	312	V
4	2.539	28.7	RMS	32.7	-22.8	4.95	43.55	54	-10.45	-	-	241	312	V

PK - Peak detector  
RMS - RMS detection

## 8.2.1. LOW CHANNEL HARMONICS AND SPURIOUS EMISSIONS



## DATA

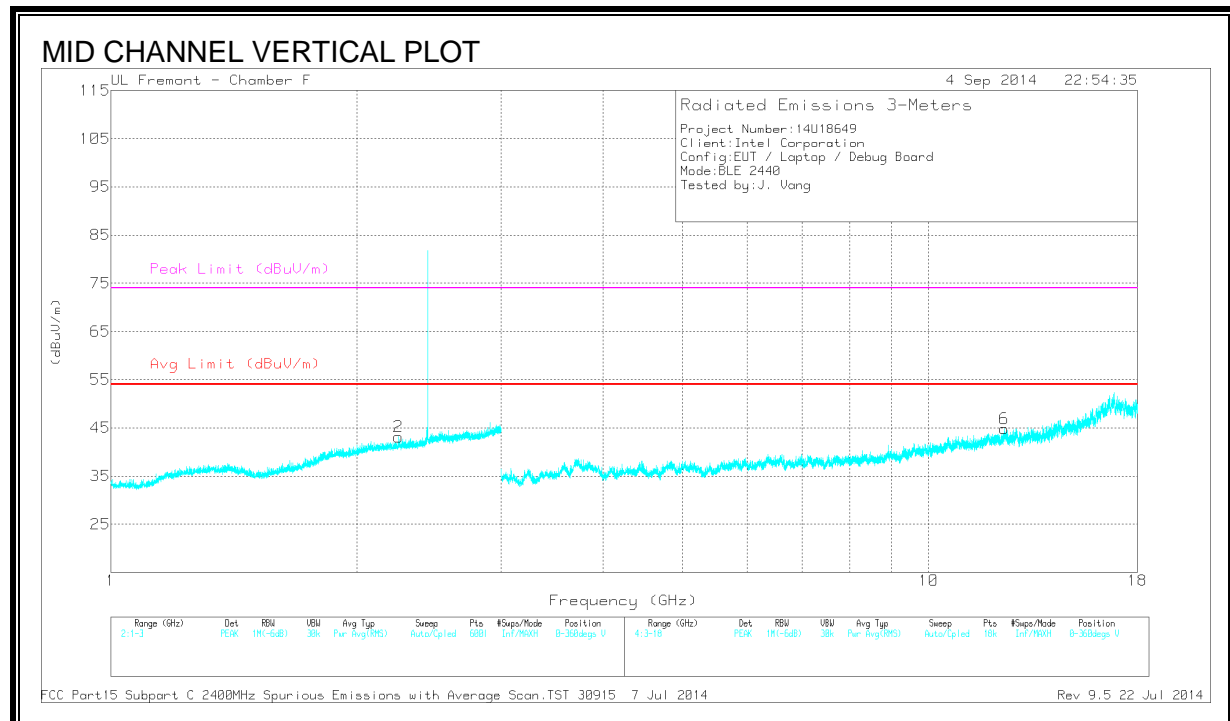
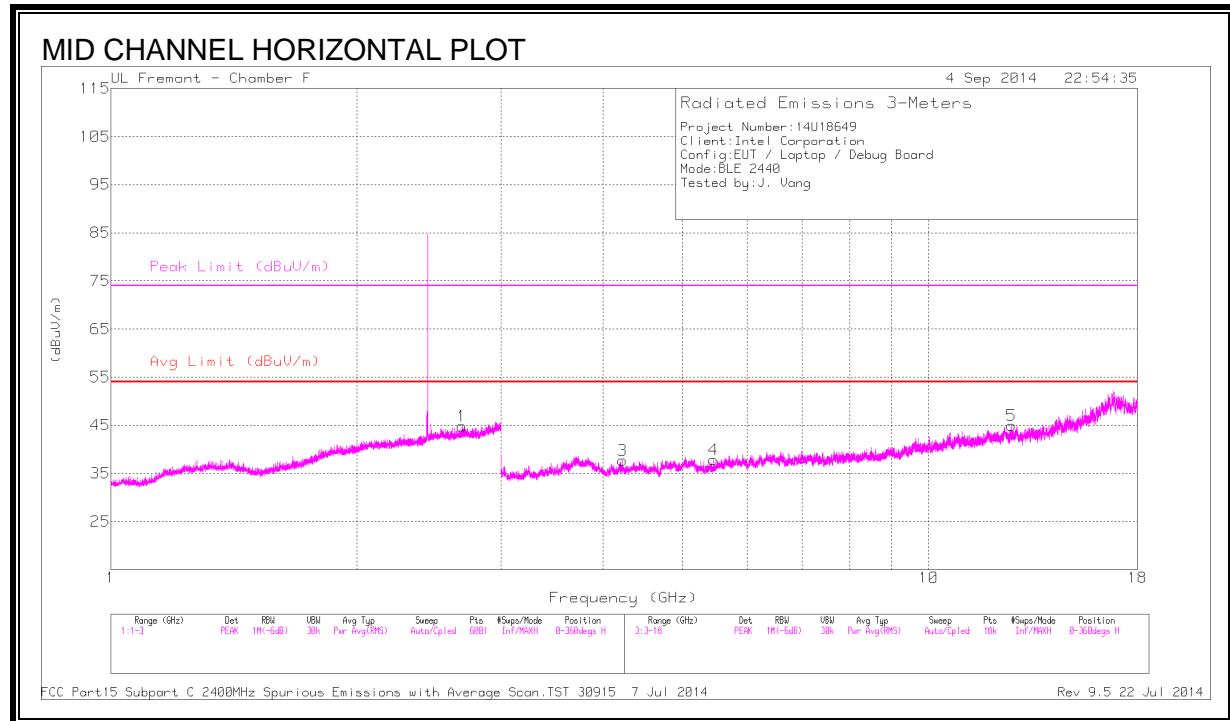
### Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBμV)	Det	AF T120 (dB/m)	Amp/Cbl/ Fitr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBμV/m)	Avg Limit (dBμV/m)	Margin (dB)	Peak Limit (dBμV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.359	42.17	PK2	32	-23.6	0	50.57	-	-	74	-23.43	256	264	H
	* 2.361	29.9	MAv1	32	-23.7	4.95	43.15	54	-10.85	-	-	256	264	H
2	* 2.373	46.87	PK2	32.1	-23.9	0	55.07	-	-	74	-18.93	248	223	H
	* 2.373	30.49	MAv1	32.1	-23.9	4.95	43.64	54	-10.36	-	-	248	223	H
3	* 2.71	42.03	PK2	32.7	-22.6	0	52.13	-	-	74	-21.87	5	298	H
	* 2.71	29.76	MAv1	32.7	-22.6	4.95	44.81	54	-9.19	-	-	5	298	H
4	* 4.742	38.09	PK2	34.1	-28.3	0	43.89	-	-	74	-30.11	98	270	H
	* 4.742	26.41	MAv1	34.1	-28.3	4.95	37.16	54	-16.84	-	-	98	270	H
5	* 3.946	39.77	PK2	33.9	-29	0	44.67	-	-	74	-29.33	163	330	V
	* 3.946	27.43	MAv1	33.9	-29	4.95	37.28	54	-16.72	-	-	163	330	V
6	* 4.816	37.7	PK2	34.1	-27.3	0	44.5	-	-	74	-29.5	79	309	V
	* 4.814	25.91	MAv1	34.1	-27.3	4.95	37.66	54	-16.34	-	-	79	309	V
7	* 12.371	35.82	PK2	38.9	-21.2	0	53.52	-	-	74	-20.48	80	334	V
	* 12.37	23.51	MAv1	38.9	-21.1	4.95	46.26	54	-7.74	-	-	80	334	V

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

PK2 - KDB558074 Method: Maximum Peak  
MAv1 - KDB558074 Option 1 Maximum RMS Average

## 8.2.2. MID CHANNEL HARMONICS AND SPURIOUS EMISSIONS



## DATA

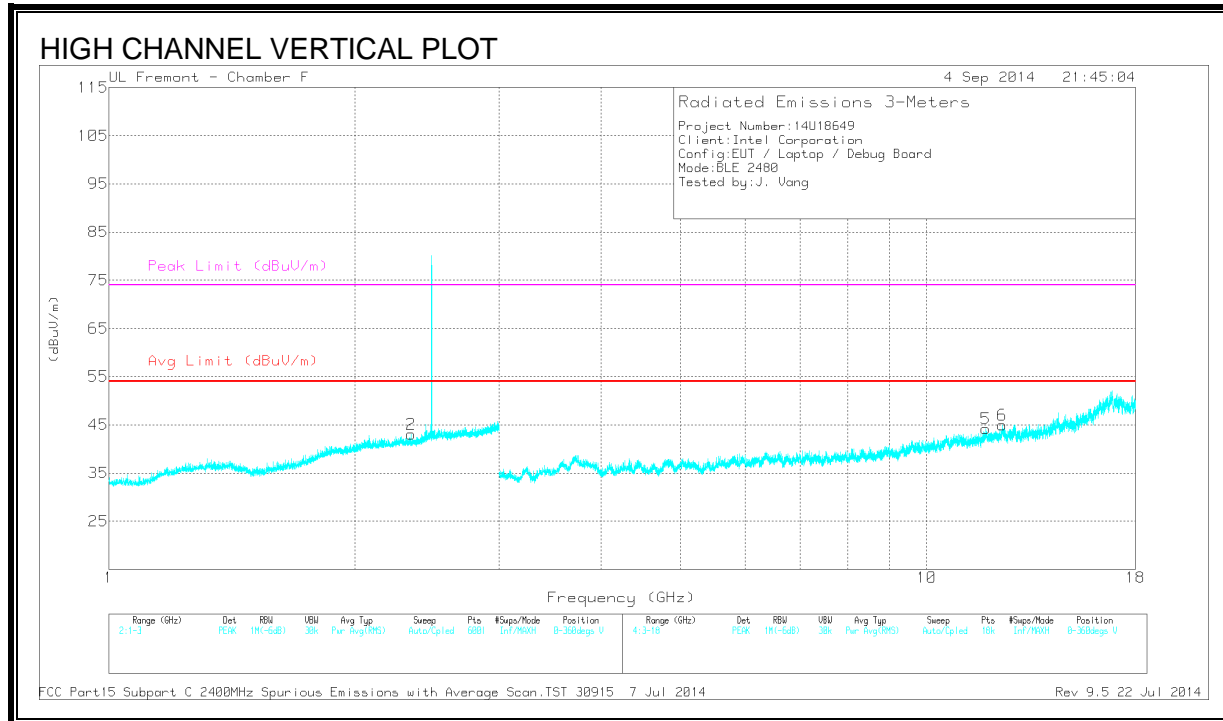
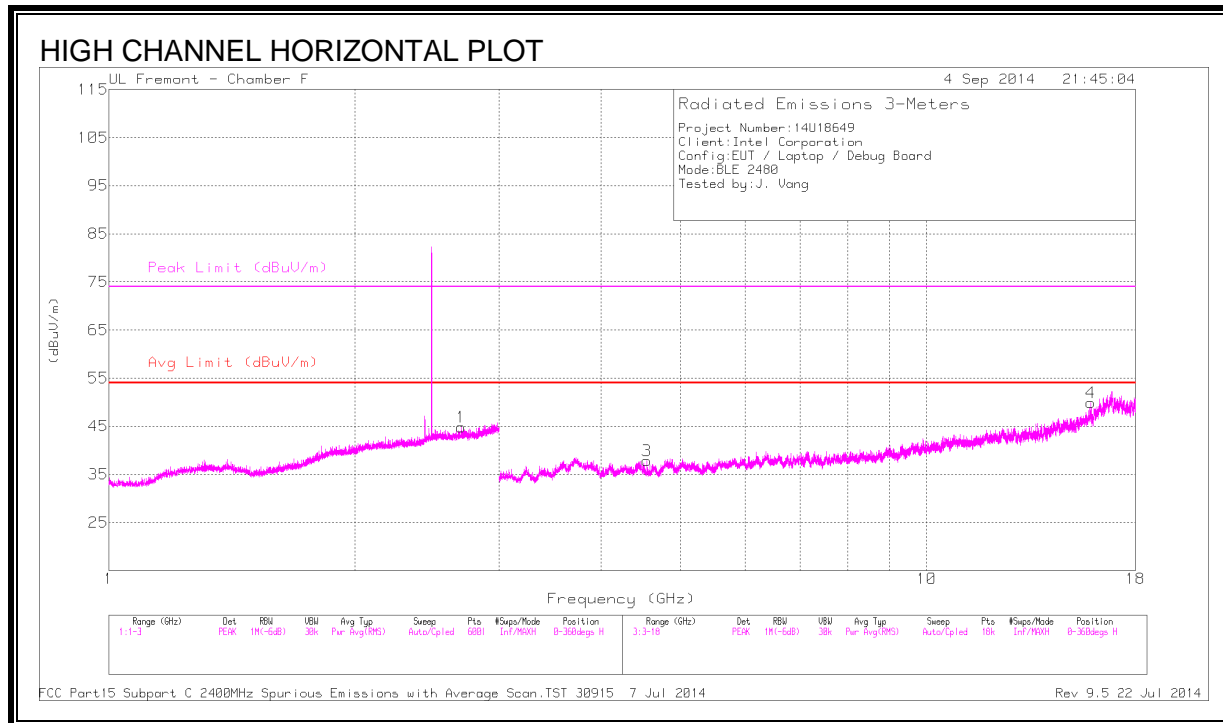
### Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBμV)	Det	AF T120 (dB/m)	Amp/Cbl/ Fitr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBμV/m)	Avg Limit (dBμV/m)	Margin (dB)	Peak Limit (dBμV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.686	41.8	PK2	32.7	-22.8	0	51.7	-	-	74	-22.3	176	287	H
	* 2.687	29.97	MAv1	32.7	-22.8	4.95	44.82	54	-9.18	-	-	176	287	H
2	* 2.246	41.46	PK2	31.8	-23.5	0	49.76	-	-	74	-24.24	237	216	V
	* 2.247	29.85	MAv1	31.8	-23.5	4.95	43.1	54	-10.9	-	-	237	216	V
3	* 4.222	39.11	PK2	33.6	-28.4	0	44.31	-	-	74	-29.69	96	248	H
	* 4.222	26.65	MAv1	33.6	-28.4	4.95	36.8	54	-17.2	-	-	96	248	H
4	* 5.455	38.5	PK2	34.6	-27.8	0	45.3	-	-	74	-28.7	347	110	H
	* 5.455	26.18	MAv1	34.6	-27.8	4.95	37.93	54	-16.07	-	-	347	110	H
5	* 12.619	35.77	PK2	39.1	-23	0	51.87	-	-	74	-22.13	127	255	H
	* 12.621	23.99	MAv1	39.1	-23	4.95	45.04	54	-8.96	-	-	127	255	H
6	* 12.364	35.42	PK2	38.9	-21.4	0	52.92	-	-	74	-21.08	256	162	V
	* 12.363	23.35	MAv1	38.9	-21.5	4.95	45.7	54	-8.3	-	-	256	162	V

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

PK2 - KDB558074 Method: Maximum Peak  
MAv1 - KDB558074 Option 1 Maximum RMS Average

### 8.2.3. HIGH CHANNEL HARMONICS AND SPURIOUS EMISSIONS



## DATA

### Radiated Emissions

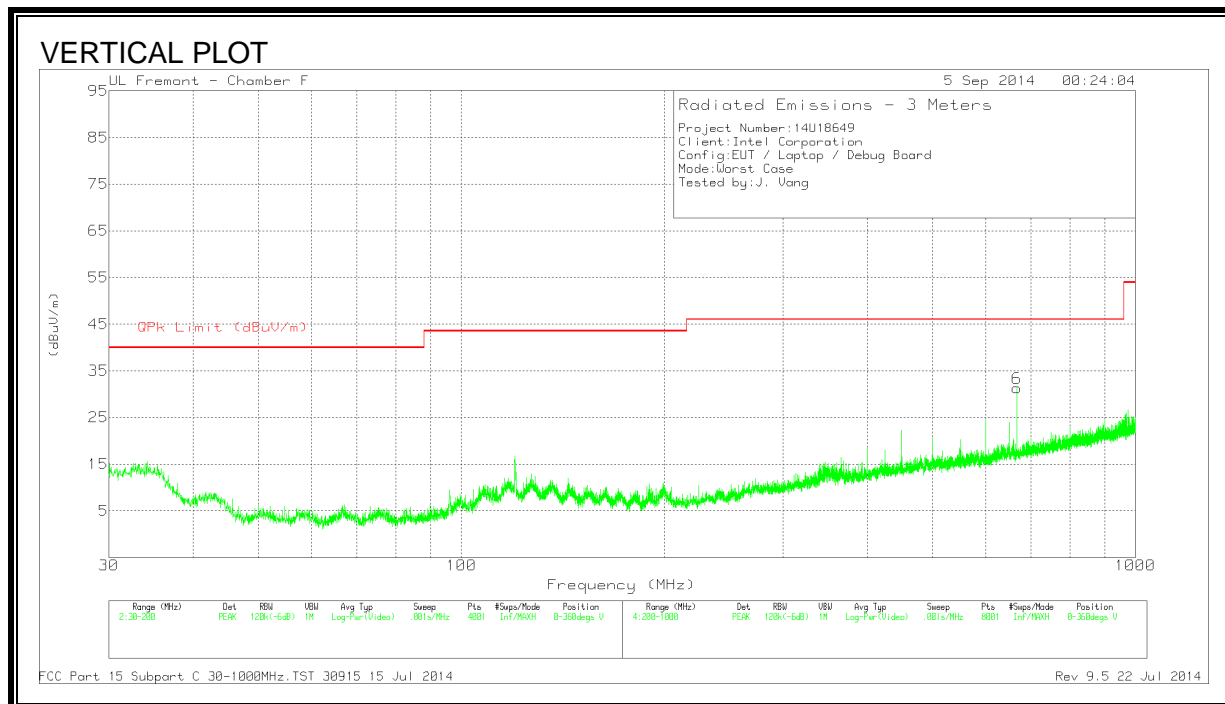
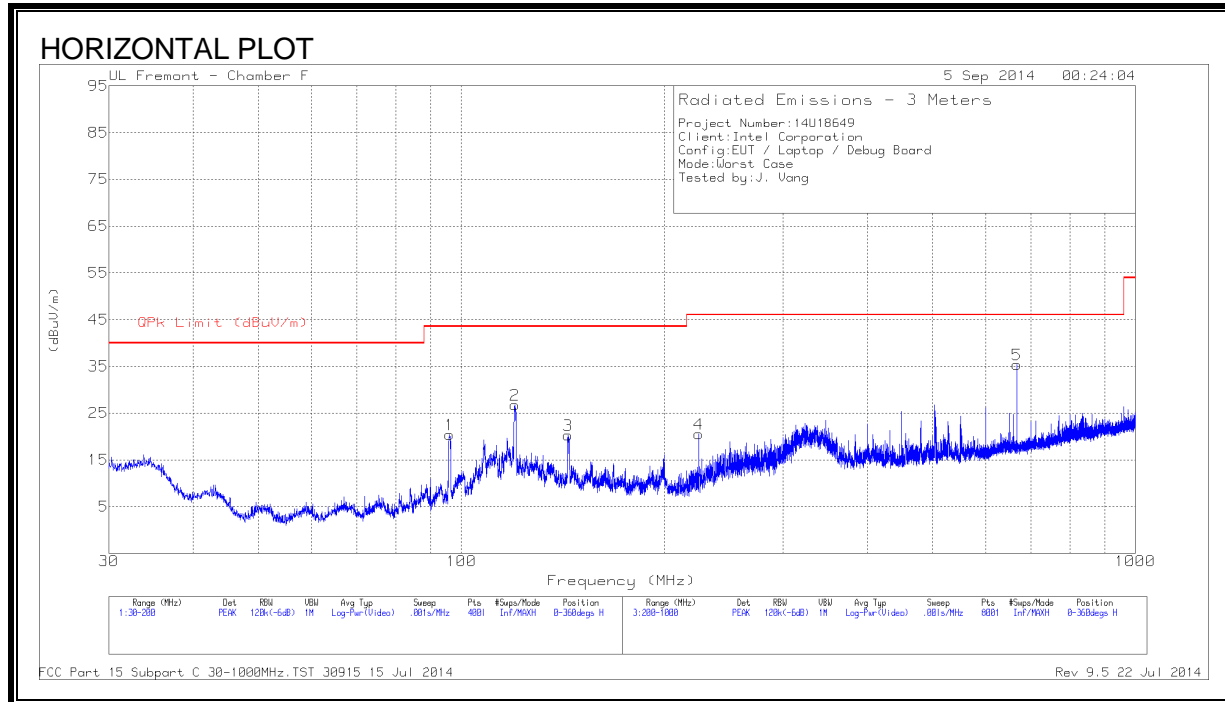
Marker	Frequency (GHz)	Meter Reading (dBμV)	Det	AF T120 (dB/m)	Amp/Cbl/ Filt/Pad (dB)	DC Corr (dB)	Corrected Reading (dBμV/m)	Avg Limit (dBμV/m)	Margin (dB)	Peak Limit (dBμV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.696	41.52	PK2	32.7	-22.6	0	51.62	-	-	74	-22.38	103	375	H
	* 2.696	29.8	MAv1	32.7	-22.6	4.95	44.85	54	-9.15	-	-	103	375	H
2	* 2.341	41.92	PK2	32	-23.6	0	50.32	-	-	74	-23.68	206	296	V
	* 2.34	29.83	MAv1	32	-23.6	4.95	43.18	54	-10.82	-	-	206	296	V
3	* 4.551	38.22	PK2	34	-28.3	0	43.92	-	-	74	-30.08	160	174	H
	* 4.55	26.33	MAv1	34	-28.3	4.95	36.98	54	-17.02	-	-	160	174	H
4	* 15.867	35.95	PK2	40.4	-19.7	0	56.65	-	-	74	-17.35	98	234	H
	* 15.866	24.21	MAv1	40.4	-19.6	4.95	49.96	54	-4.04	-	-	98	234	H
5	* 11.809	34.89	PK2	38.7	-21.6	0	51.99	-	-	74	-22.01	256	265	V
	* 11.81	22.7	MAv1	38.7	-21.6	4.95	44.75	54	-9.25	-	-	256	265	V
6	* 12.373	35.32	PK2	38.9	-21.3	0	52.92	-	-	74	-21.08	256	374	V
	* 12.373	23.44	MAv1	38.9	-21.3	4.95	45.99	54	-8.01	-	-	256	374	V

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

PK2 - KDB558074 Method: Maximum Peak  
MAv1 - KDB558074 Option 1 Maximum RMS Average

### 8.3. WORST-CASE BELOW 1 GHz

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





## **HORIZONTAL & VERTICAL DATA**

### Radiated Emissions

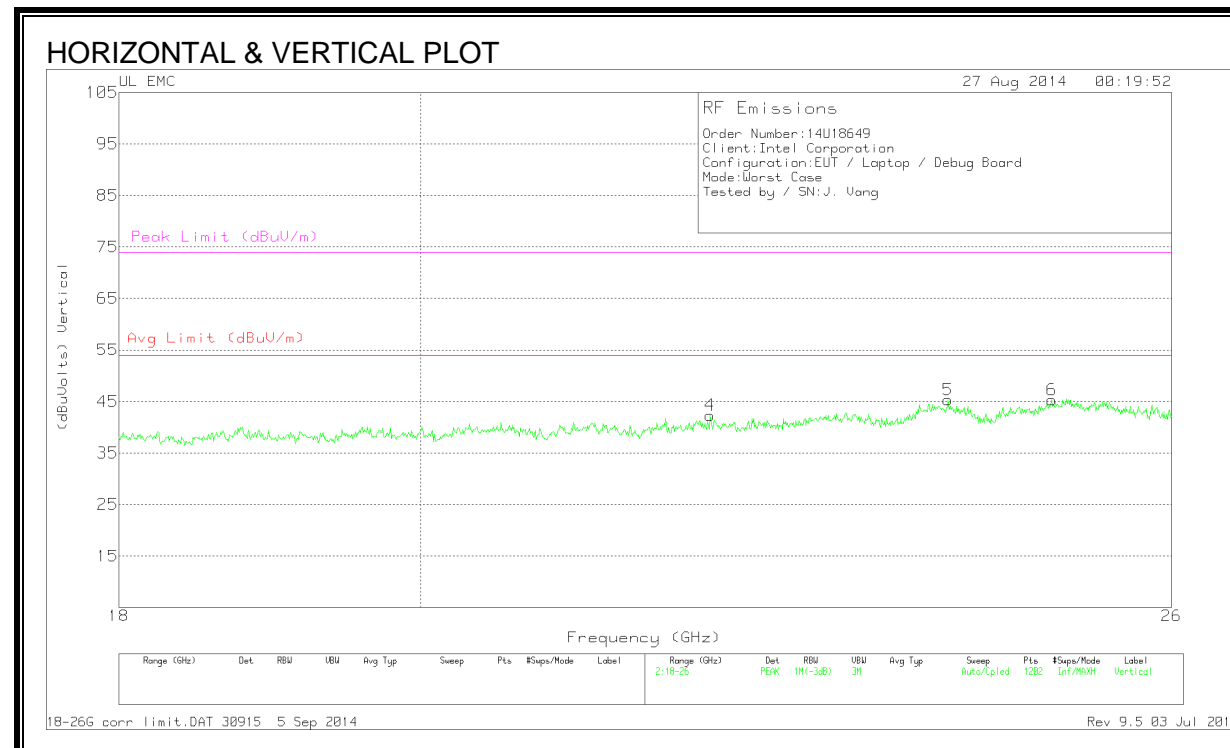
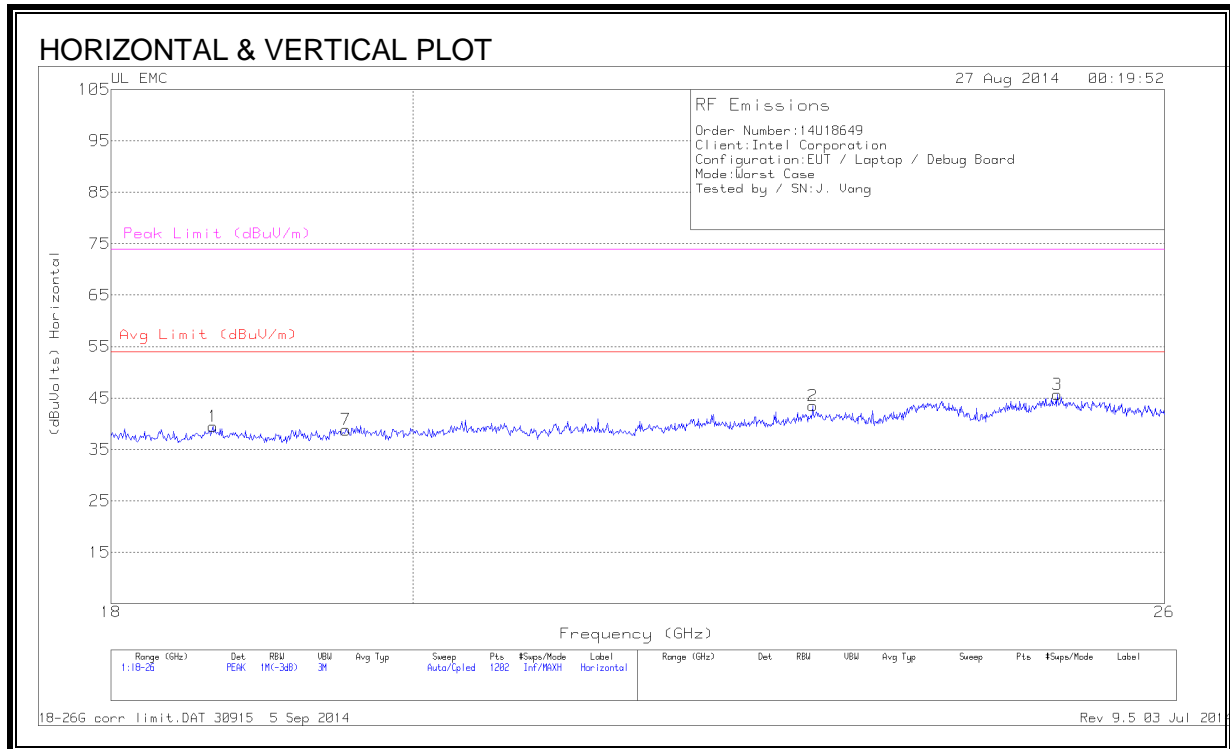
Marker	Frequency (MHz)	Meter Reading (dBμV)	Det	AF T122 (dB/m)	Amp/Cbl (dB)	DC Corr (dB)	Corrected Reading (dBμV/m)	QPk Limit (dBμV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	91.15	24.19	QP	7.9	-31.6	0	.49	43.52	-43.03	142	157	H
2	* 119.305	24.18	QP	13.9	-31.3	0	6.78	43.52	-36.74	132	131	H
3	145.12	24.25	QP	12.8	-31.3	0	5.75	43.52	-37.77	159	301	H
4	225.79	23.39	QP	10.9	-31	0	3.29	46.02	-42.73	232	350	H
5	670.56	23.53	QP	19.8	-29.8	0	13.53	46.02	-32.49	167	196	H
6	662.08	23.39	QP	19.8	-29.8	0	13.39	46.02	-32.63	251	318	V

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

QP - Quasi-Peak detector

## 8.4. WORST-CASE EMISSION 18-26 GHz

### SPURIOUS EMISSIONS 18-26 GHz (WORST-CASE CONFIGURATION, HORIZONTAL & VERTICAL)



**DATA**

Marker	Frequency (GHz)	Meter Reading (dBμV)	Det	AF T89 (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBμVolts)	Avg Limit (dBμV/m)	Margin (dB)	Peak Limit (dBμV/m)	PK Margin (dB)
1	18.653	40.4	PK	32.5	-23.9	-9.5	39.5	54	-14.5	74	-34.5
2	22.996	42.6	PK	33.6	-23.2	-9.5	43.5	54	-10.5	74	-30.5
3	25.047	43.77	PK	34	-22.6	-9.5	45.7	54	-8.3	74	-28.3
7	19.539	40.03	PK	32.5	-24.2	-9.5	38.8	54	-15.2	74	-35.2
4	22.13	42.03	PK	33.3	-23.5	-9.5	42.3	54	-11.7	74	-31.7
5	24.048	44.03	PK	33.6	-22.8	-9.5	45.3	54	-8.7	74	-28.7
6	24.934	43.43	PK	34	-22.6	-9.5	45.33	54	-8.7	74	-28.7

PK - Peak detector

18-26G corr limit.DAT 30915 5 Sep 2014  
Rev 9.5 03 Jul 2014

Note: Tests were performed with the antenna at a 1m test distance from the EUT.

## 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 <sup>*</sup>	56 to 46 <sup>*</sup>
0.5-5	56	46
5-30	60	50

<sup>\*</sup> Decreases with the logarithm of the frequency.

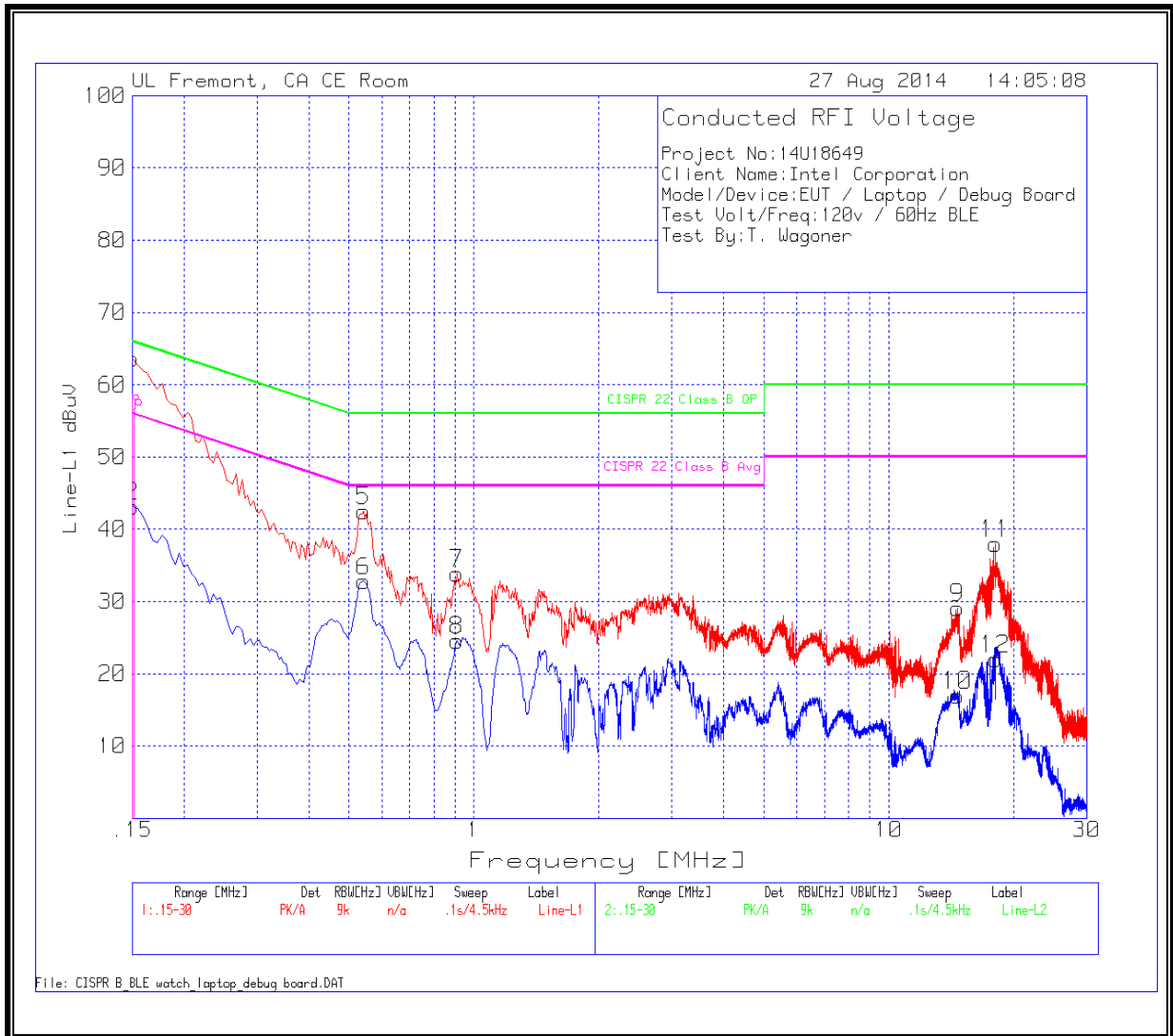
### TEST PROCEDURE

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 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.

**LINE 1 RESULTS**



## **WORST EMISSIONS**

### **LINE 1 DATA**

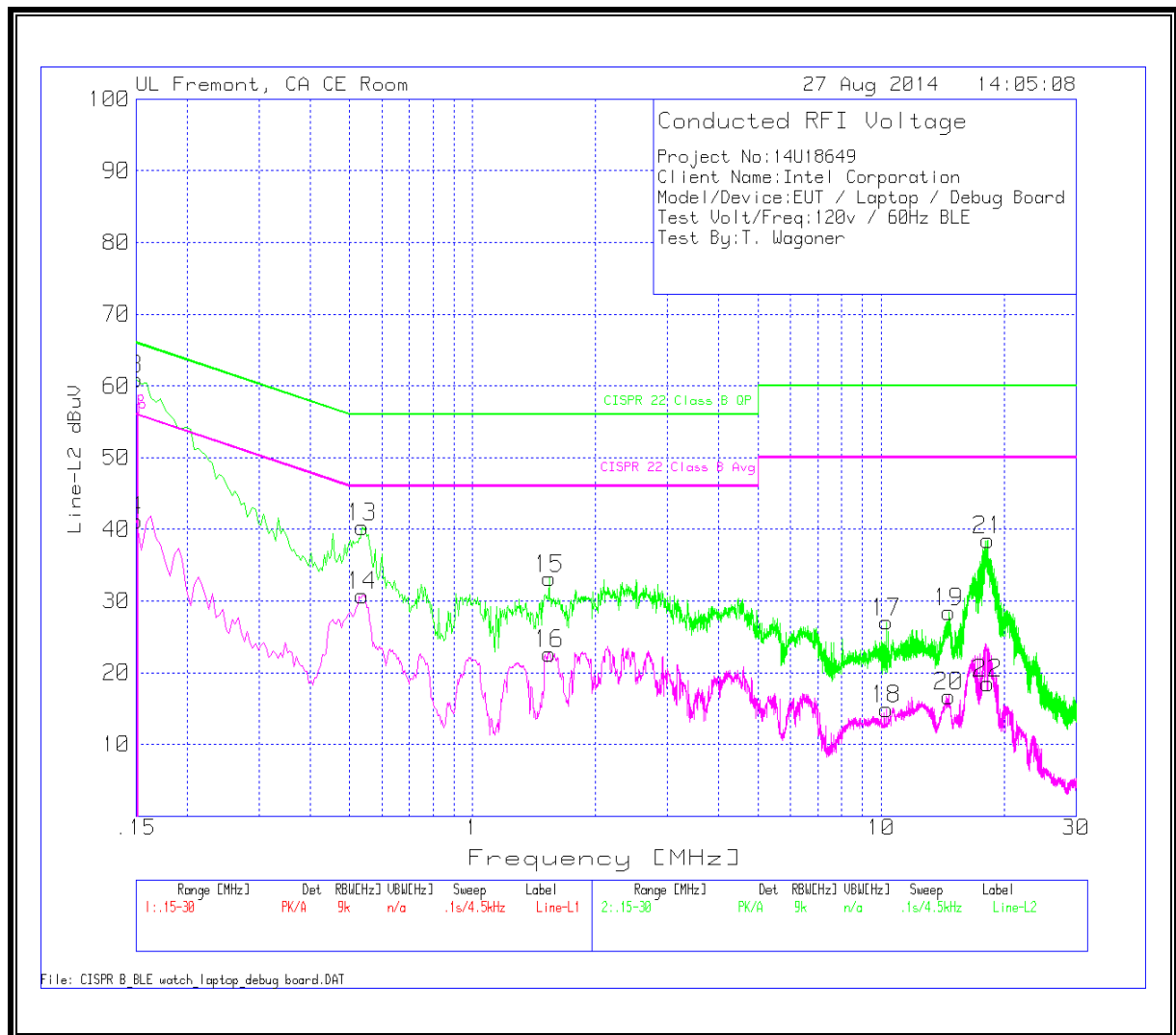
Line-L1 0.15 - 30MHz

#### **Trace Markers**

Marker	Frequency (MHz)	Meter Reading (dBμV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dBμV	CISPR 22 Class B QP Limit	Margin to Limit (dB)	CISPR 22 Class B Avg Limit	Margin to Limit (dB)
1	.15	55.92	QP	1.4	0	57.32	66	-8.68	-	-
2	.15	41.74	Av	1.4	0	43.14	-	-	56	-12.86
5	.5415	42.16	PK	.3	0	42.46	56	-13.54	-	-
6	.5415	32.47	Av	.3	0	32.77	-	-	46	-13.23
7	.9105	33.51	PK	.3	0	33.81	56	-22.19	-	-
8	.9105	24.3	Av	.3	0	24.6	-	-	46	-21.4
9	14.613	28.75	PK	.2	.2	29.15	60	-30.85	-	-
10	14.613	16.57	Av	.2	.2	16.97	-	-	50	-33.03
11	18.06	37.53	PK	.3	.2	38.03	60	-21.97	-	-
12	18.06	21.54	Av	.3	.2	22.04	-	-	50	-27.96

PK – Peak detector  
Av – Average detector  
QP - Quasi-Peak detector

## LINE 2 RESULTS



# **WORST EMISSIONS**

Line-L2 0.15 - 30MHz

## **Trace Markers**

Marker	Frequency (MHz)	Meter Reading (dBμV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dBμV	CISPR 22 Class B QP Limit	Margin to Limit (dB)	CISPR 22 Class B Avg Limit	Margin to Limit (dB)
3	.15	55.91	QP	1.5	0	57.41	66	-8.59	-	-
4	.15	39.71	Av	1.5	0	41.21	-	-	56	-14.79
13	.537	40.04	PK	.3	0	40.34	56	-15.66	-	-
14	.537	30.42	Av	.3	0	30.72	-	-	46	-15.28
15	1.5405	32.85	PK	.2	.1	33.15	56	-22.85	-	-
16	1.5405	22.32	Av	.2	.1	22.62	-	-	46	-23.38
17	10.3155	26.69	PK	.2	.2	27.09	60	-32.91	-	-
18	10.3155	14.53	Av	.2	.2	14.93	-	-	50	-35.07
19	14.658	28	PK	.3	.2	28.5	60	-31.5	-	-
20	14.658	16.24	Av	.3	.2	16.74	-	-	50	-33.26
21	18.1995	37.99	PK	.3	.2	38.49	60	-21.51	-	-
22	18.1995	18.02	Av	.3	.2	18.52	-	-	50	-31.48

PK – Peak detector  
Av – Average detector  
QP - Quasi-Peak detector