FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-247 ISSUE 1

BLUETOOTH LOW ENERGY CERTIFICATION TEST REPORT

FOR

WLAN 2X2 MIMO 802.11a/b/g/n/ac with BLUETOOTH

MODEL NUMBER: P2180

FCC ID: VOB-P2180
IC: 7361A-P2180

REPORT NUMBER: 15U21878-E2V1

ISSUE DATE: OCTOBER 23, 2015

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	10/23/15	Initial Issue	

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	NVIDIA CORP.
EUT DESCRIPTION:	WLAN 2x2 MIMO 802.11a/b/g/n/ac with Bluetooth
MODEL:	P2180
SERIAL NUMBER:	333715030009, 333615050430, 333715030024, 333815010589
DATE TESTED:	OCTOBER 09 TO 16, 2015

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Pass
INDUSTRY CANADA RSS-247 Issue 1	Pass
INDUSTRY CANADA RSS-GEN Issue 4	Pass

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

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

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009 for FCC and ANSI C63.10-2013 for IC, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 4, and RSS-247 Issue 1.

3. FACILITIES AND ACCREDITATION

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

47173 Benicia Street	47266 Benicia Street
☐ Chamber A(IC: 2324B-1)	☐ Chamber D(IC: 2324B-4)
☒ Chamber B(IC: 2324B-2)	☐ Chamber E(IC: 2324B-5)
☐ Chamber C(IC: 2324B-3)	☐ Chamber F(IC: 2324B-6)
	☐ Chamber G(IC: 2324B-7)
	☐ Chamber H(IC: 2324B-8)

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

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

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 18000 MHz	4.94 dB

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

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a WLAN 2x2 MIMO 802.11a/b/g/n/ac with Bluetooth

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	8.10	6.46

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a dual band dipole antenna, with a maximum gain of 2.86 dBi.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was Nvidia Rev. 7.10.RC 0.0

The EUT driver software installed during testing Nvidia Rev 7.35 2200 <r532988 wltest>

5.5. WORST-CASE CONFIGURATION AND MODE

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

The fundamental of the EUT was investigated in three transmitting antenna degrees: 0, 45, and 90. It was determined that 90 degrees was the worst case antenna position; therefore all final radiated testing was performed with the antenna position at 90 degrees.

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Base board	NVIDIA	P2597	333715040297	DoC
AC Adapter	Mean Well	GST90A19	EB58E32121	N/A
Laptop	Lenovo	T430	PFB1R5R	N/A

I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC	1	US115V	Unshielded	0.5	
2	DC	1	19 Vdc	Unshielded	1	Ferrite Attached
3	USB	1	USB	Shielded	1.5	

TEST SETUP

The EUT is a stand-alone unit during the tests. Test software exercised the radio card.

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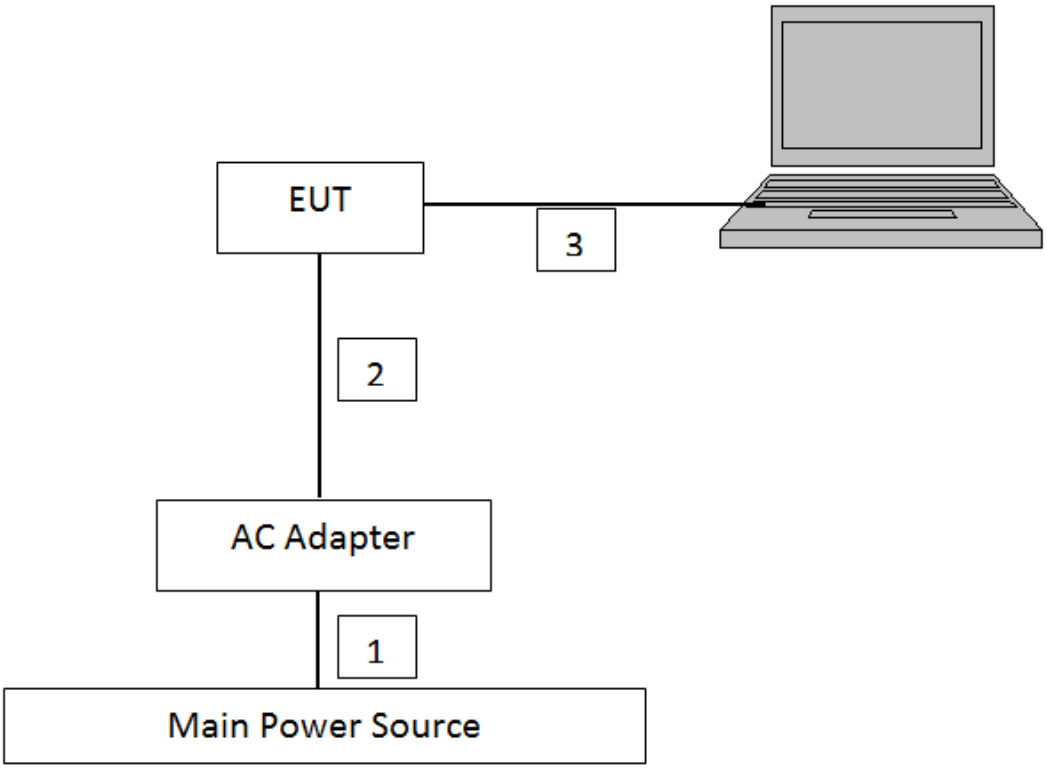
SETUP DIAGRAM FOR TESTS



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6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00986	04/01/16
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01179	02/26/16
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/08/16
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	05/08/16
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	10/22/15
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	C01171	02/13/16
Antenna, Horn, 18 GHz	ETS	3117	C01022	02/21/16
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	12/17/15
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/15
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/15
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/14/16
NOTE: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NIST USA.				

Test Software List			
Description	**Manufacturer**	**Model**	**Version**
Radiated Software	UL	UL EMC	Version 9.5, 07/22/14
Conducted Software	UL	UL EMC	Version 9.5, 05/17/14
CLT Software	UL	UL RF	Version 1.0, 02/02/15
Antenna Port Software	UL	UL RF	Version 2.1.1.1, 1/20/15

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7. SUMMARY TABLE

FCC Part Section	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Worst Case
15.247 (a)(2)	RSS-247 5.2.1	Occupied Band width (6dB)	>500KHz	Conducted	Pass	0.625 MHz
2.1051, 15.247 (d)	RSS-247 5.5	Band Edge / Conducted Spurious Emission	-20dBc		Pass	-49.69 dBm
15.247	RSS-247 5.4.4	TX conducted output power	<30dBm		Pass	8.1 dBm
15.247	RSS-247 5.2.2	PSD	<8dBm		Pass	6.77 dBm
15.207 (a)	RSS-GEN 8.8	AC Power Line conducted emissions	Section 10	Radiated	Pass	34.28dBuV(PK)
15.205, 15.209	RSS-GEN 8.9/7	Radiated Spurious Emission	< 54dBuV/m		Pass	41.63 dBuV/m

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8. ANTENNA PORT TEST RESULTS

8.1. ON TIME, DUTY CYCLE

LIMITS

None; for reporting purposes only.

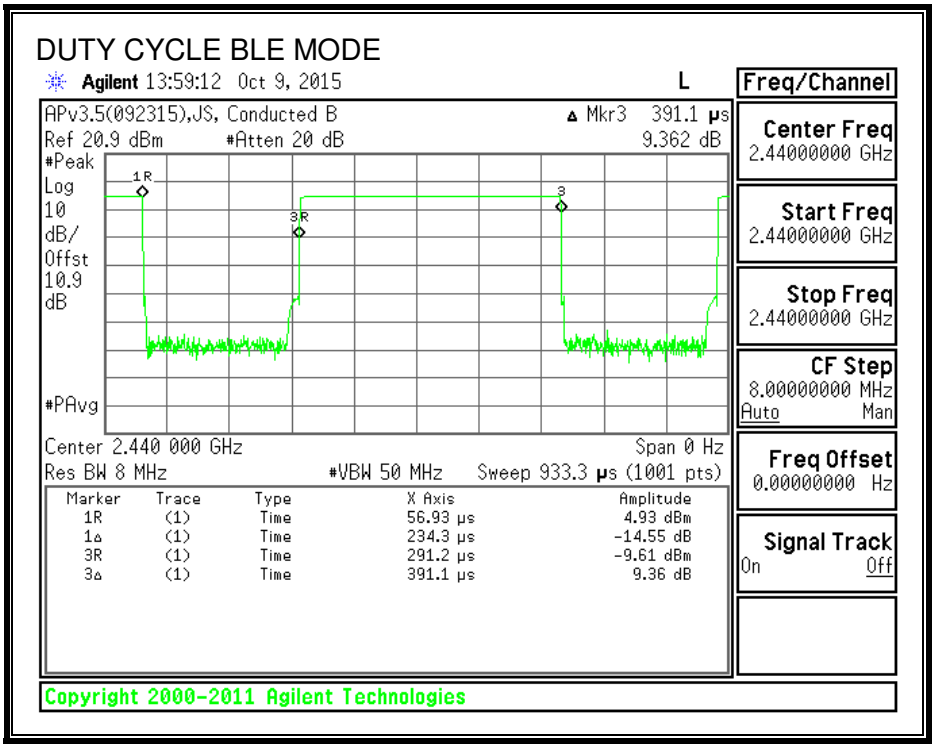
PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
BLE	0.391	0.625	0.625	62.54%	2.04	2.557

DUTY CYCLE PLOTS



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8.2. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-247 5.2.1

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

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2402	0.6350	0.5
Middle	2440	0.6330	0.5
High	2480	0.6250	0.5

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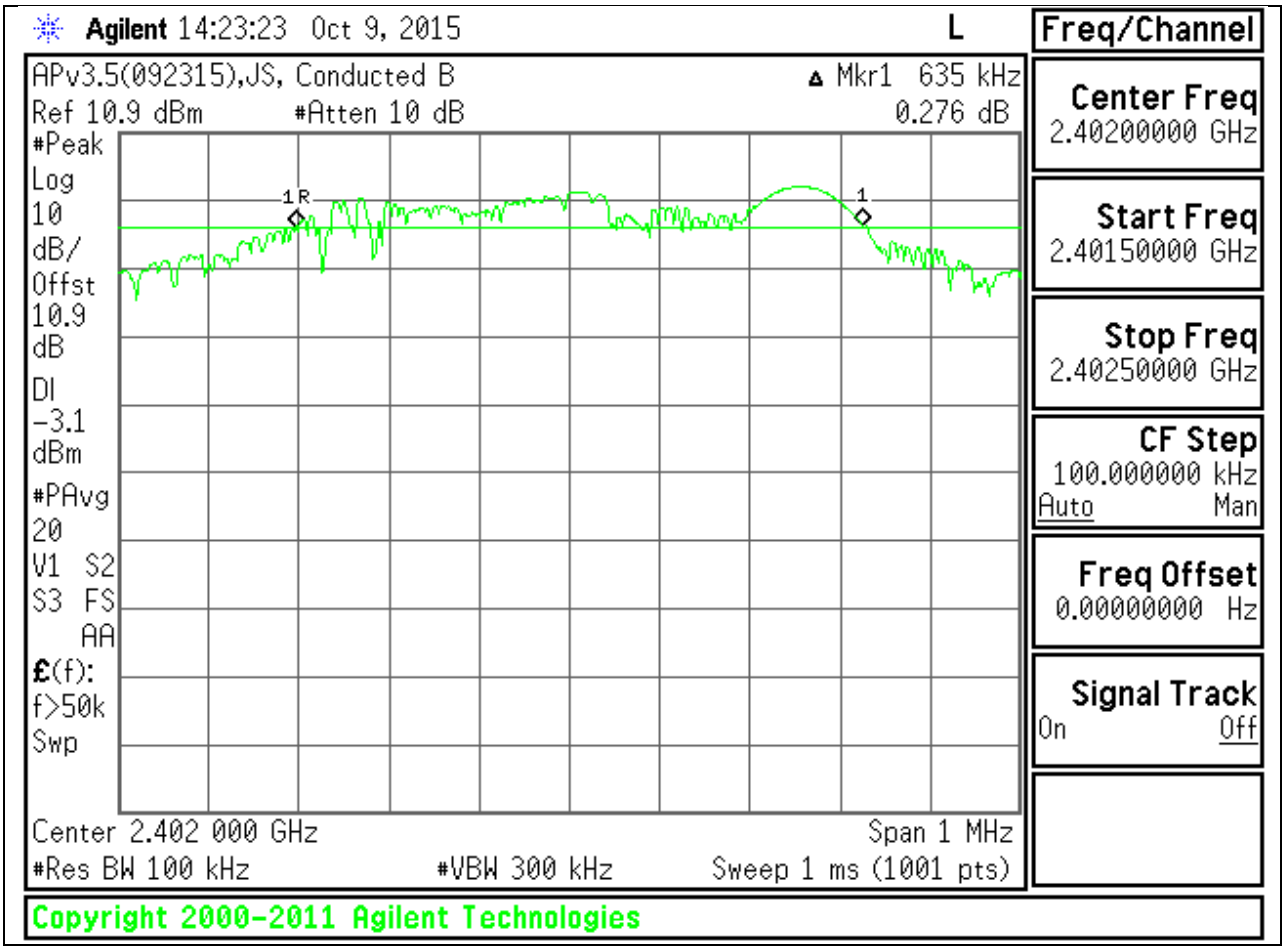
6 dB BANDWIDTH PLOTS

LOW CHANNEL



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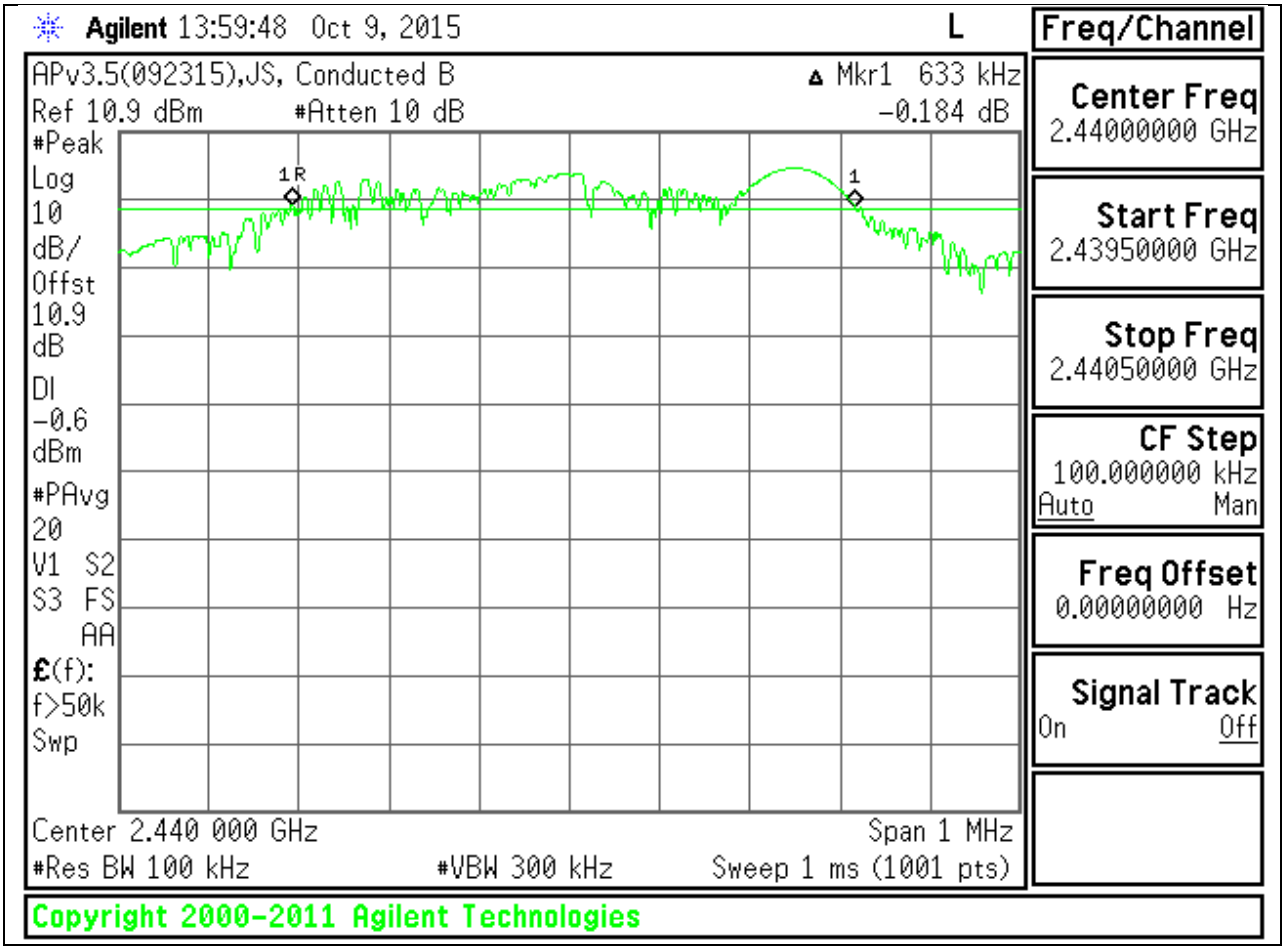
MID CHANNEL



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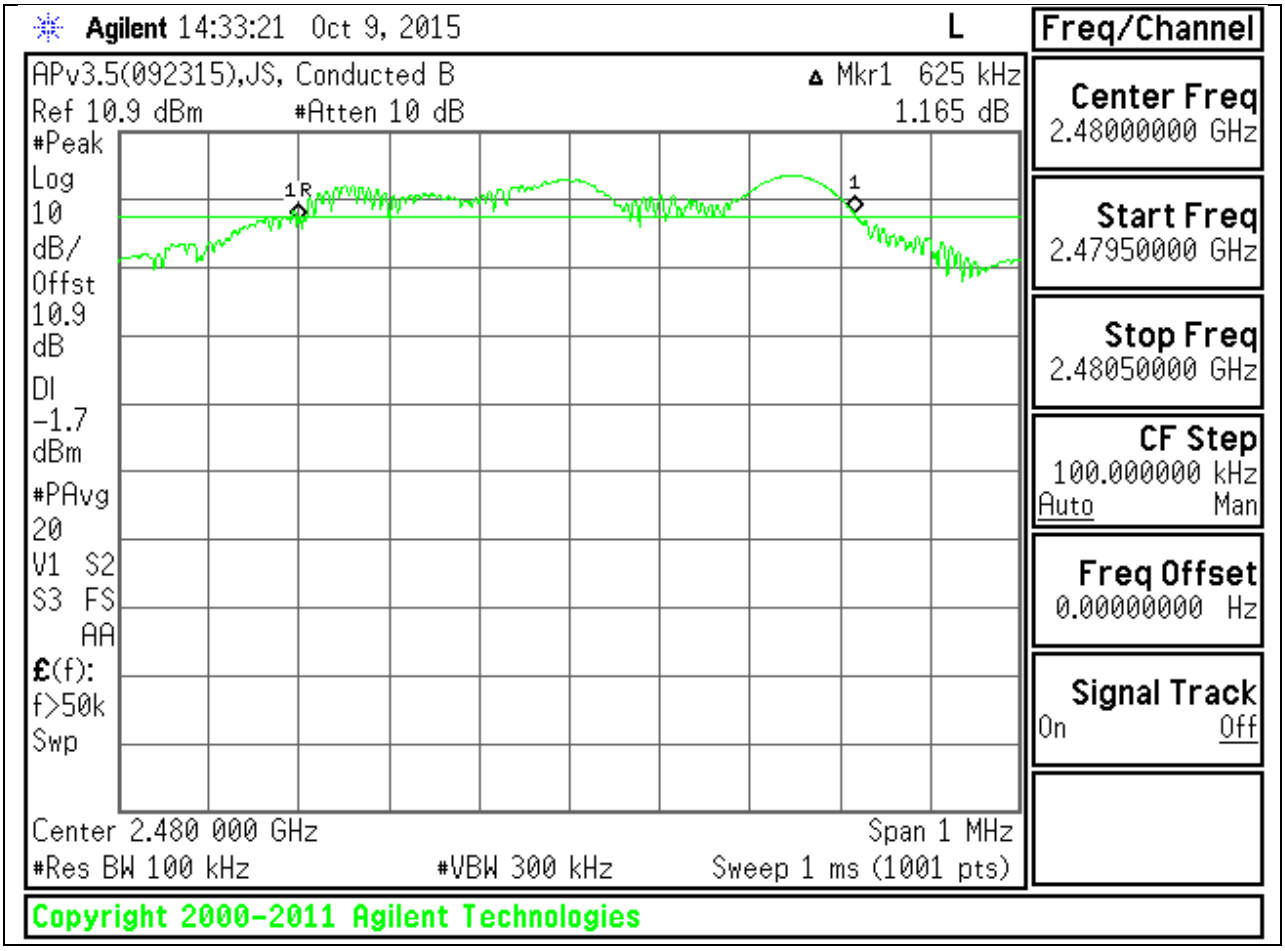
HIGH CHANNEL



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8.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

Reference to KDB558074 D01 DTS Meas Guidance v03r02: 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	904.2345
Middle	2440	885.2546
High	2480	904.2616

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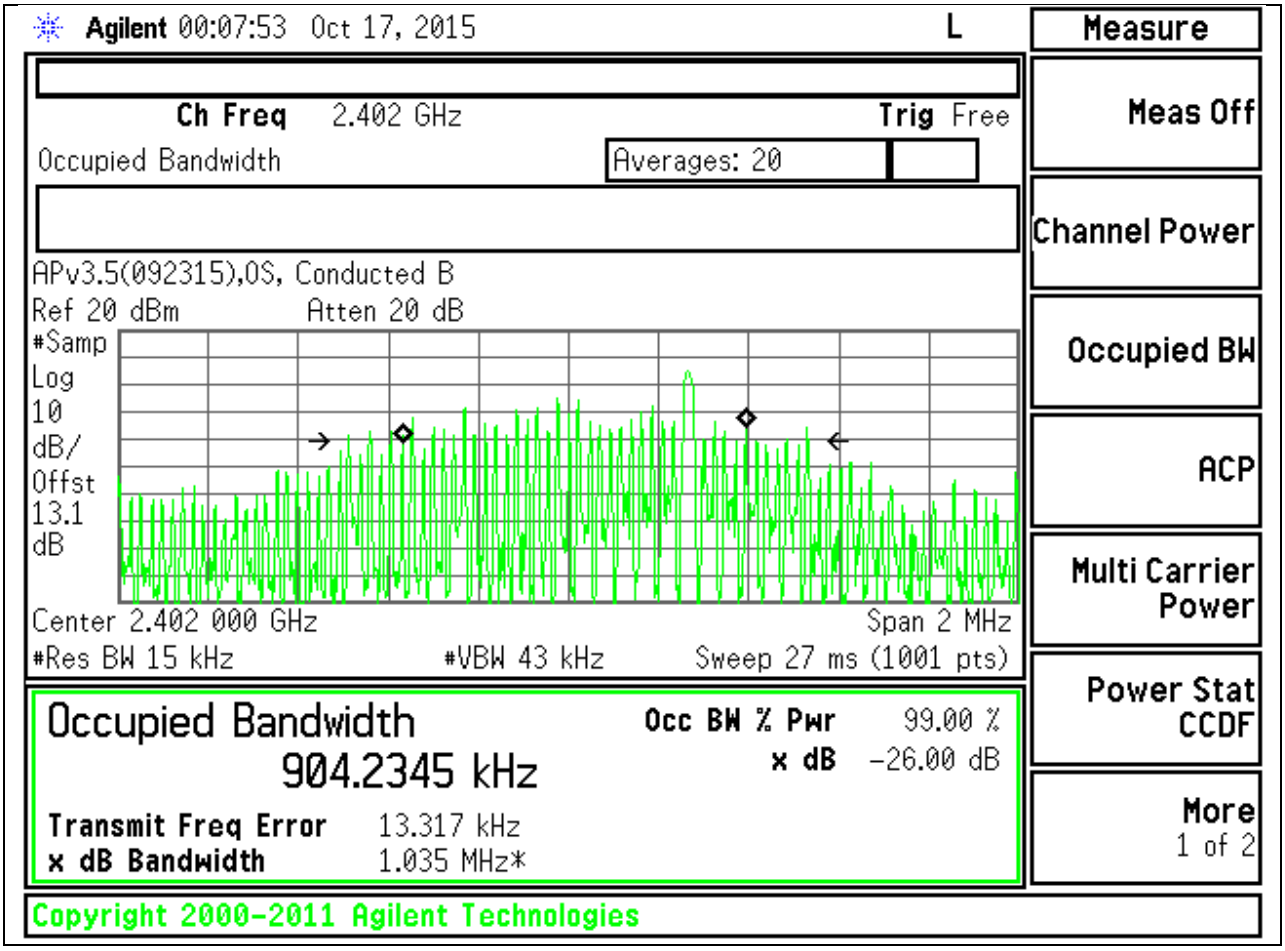
99% BANDWIDTH PLOTS

LOW CHANNEL



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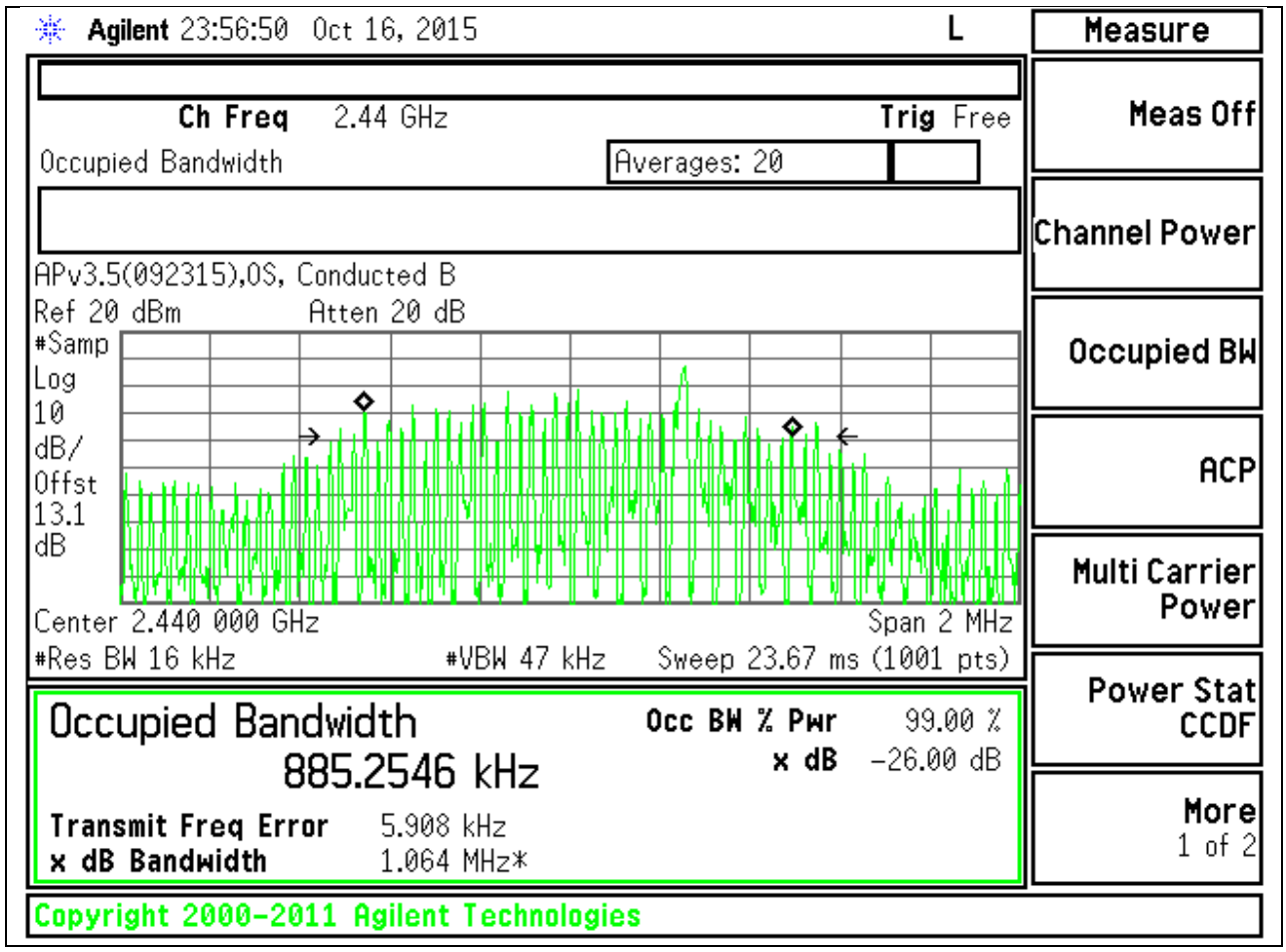
MID CHANNEL



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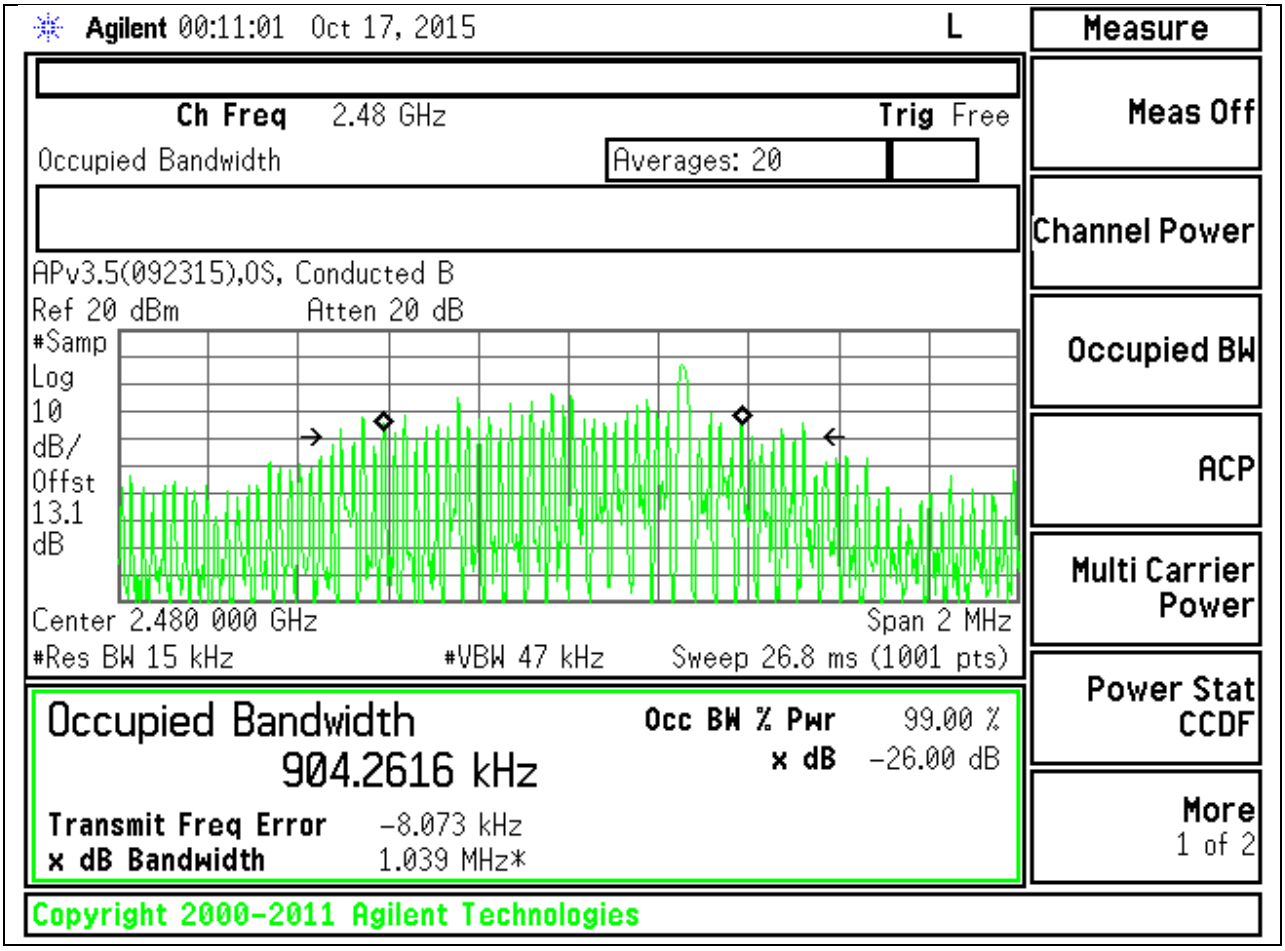
HIGH CHANNEL



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8.4. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-247 5.4.4

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

TEST PROCEDURE

Peak power is measured using KDB558074 D01 DTS Meas Guidance v03r02.

RESULTS

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	5.130	30	-24.870
Middle	2440	8.100	30	-21.900
High	2480	7.160	30	-22.840

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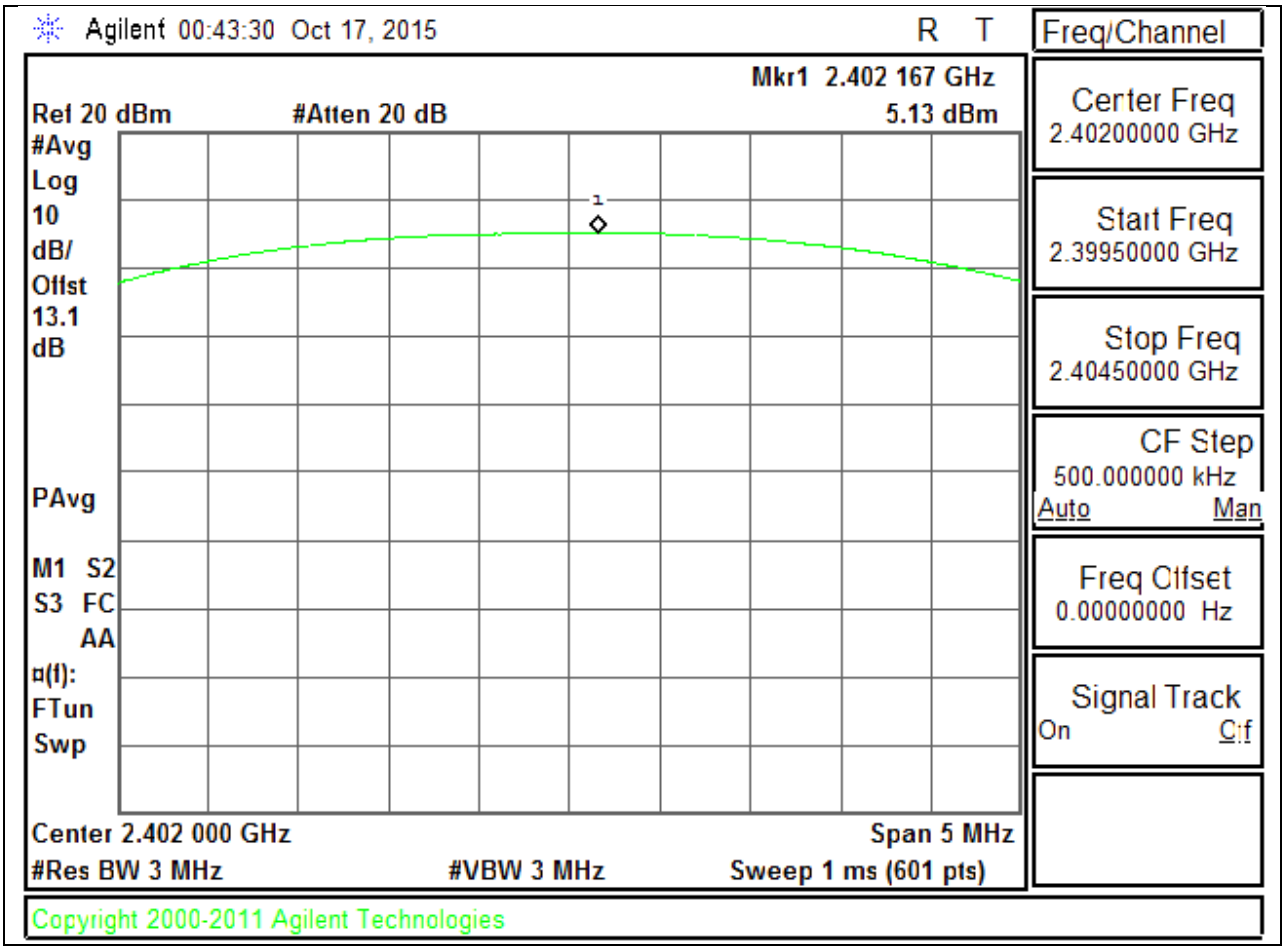
OUTPUT POWER PLOTS

LOW CHANNEL



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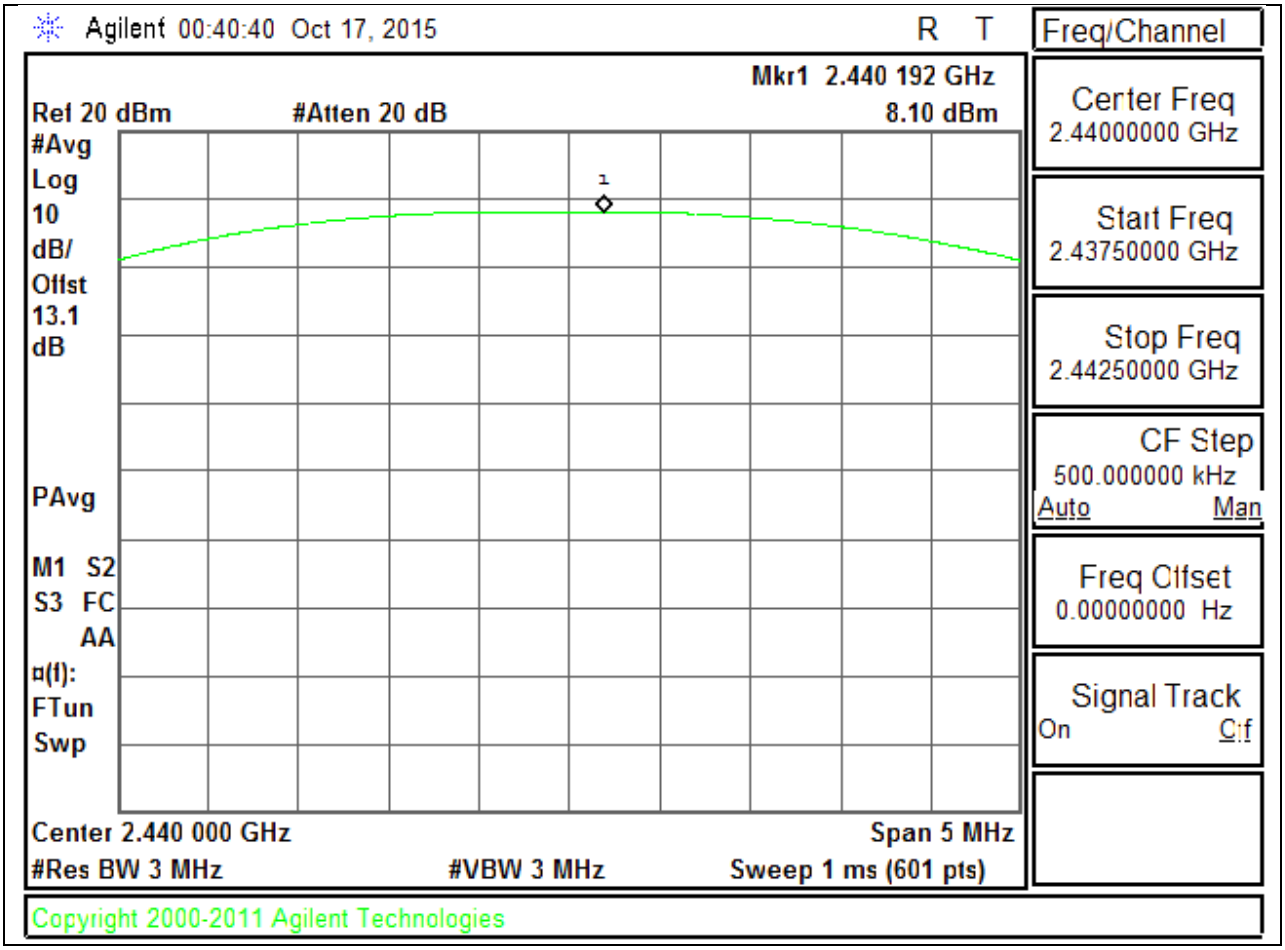
MID CHANNEL



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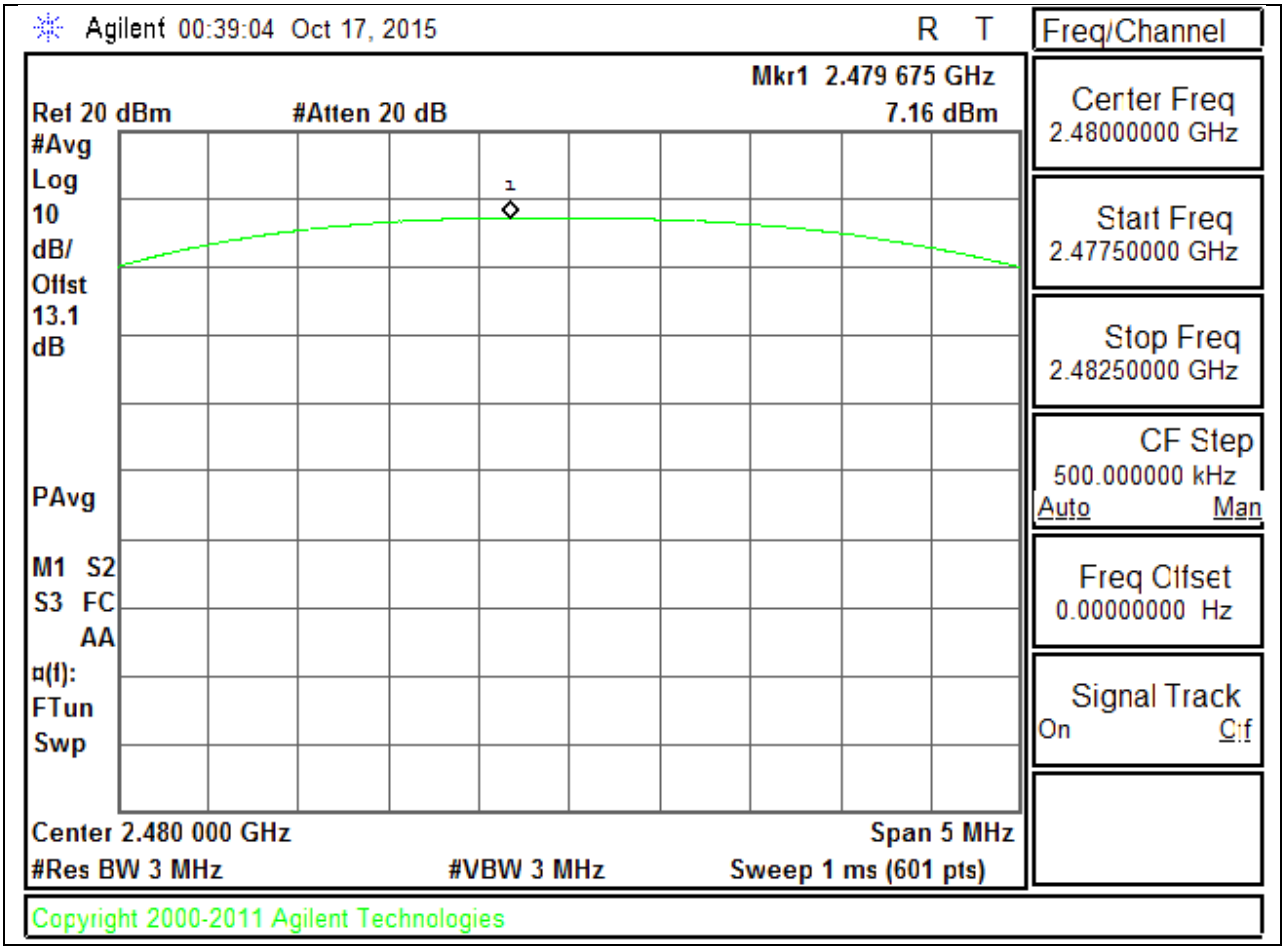
HIGH CHANNEL



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8.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-247 5.2.2

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

Power Spectral Density was performed utilizing the "Method PKPSD (Peak PSD)" under KDB558074 D01 DTS Meas Guidance v03r02.

RESULTS

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2402	3.89	8	-4.11
Middle	2440	6.77	8	-1.23
High	2480	4.71	8	-3.29

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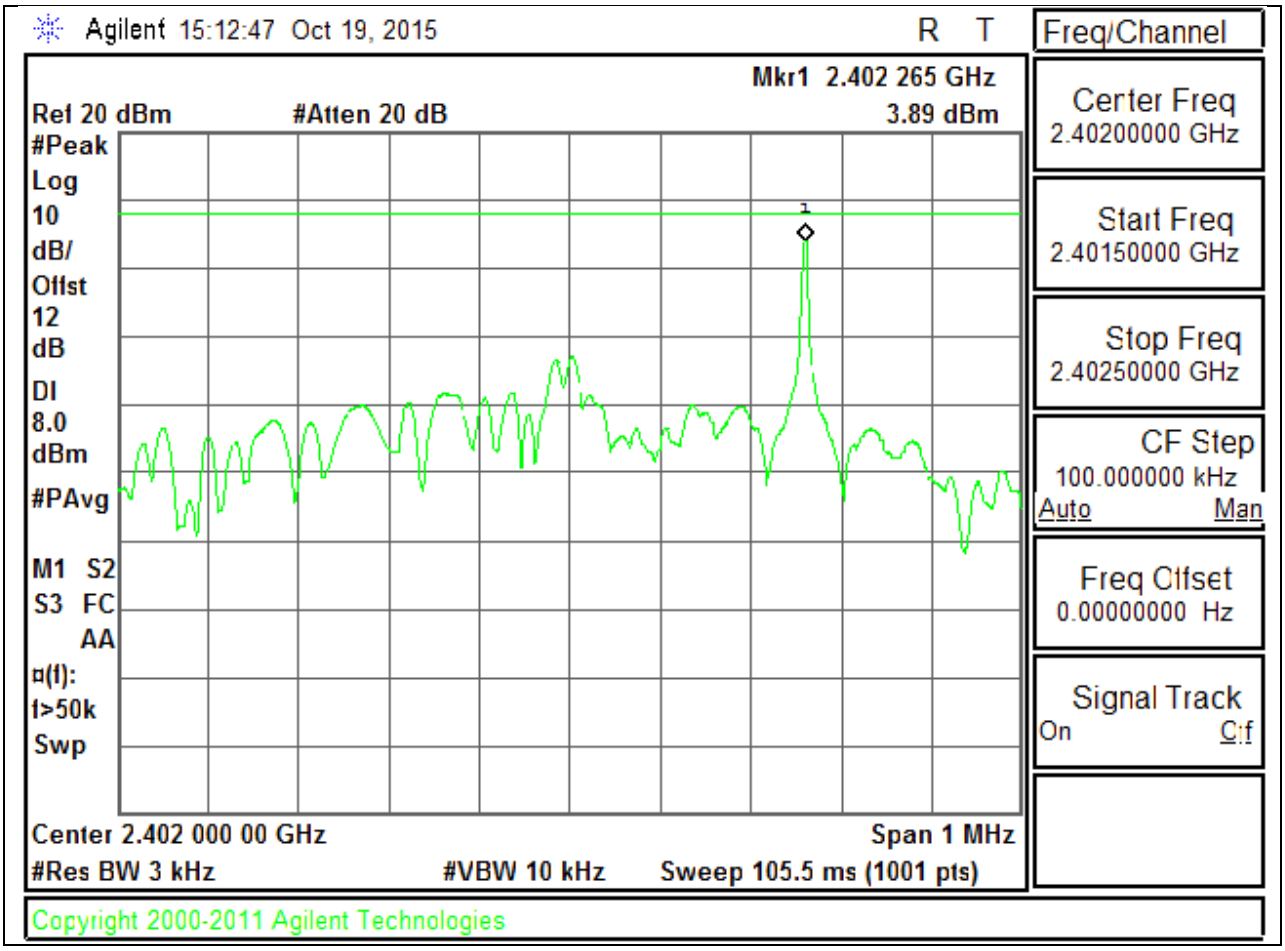
POWER SPECTRAL DENSITY PLOTS

LOW CHANNEL



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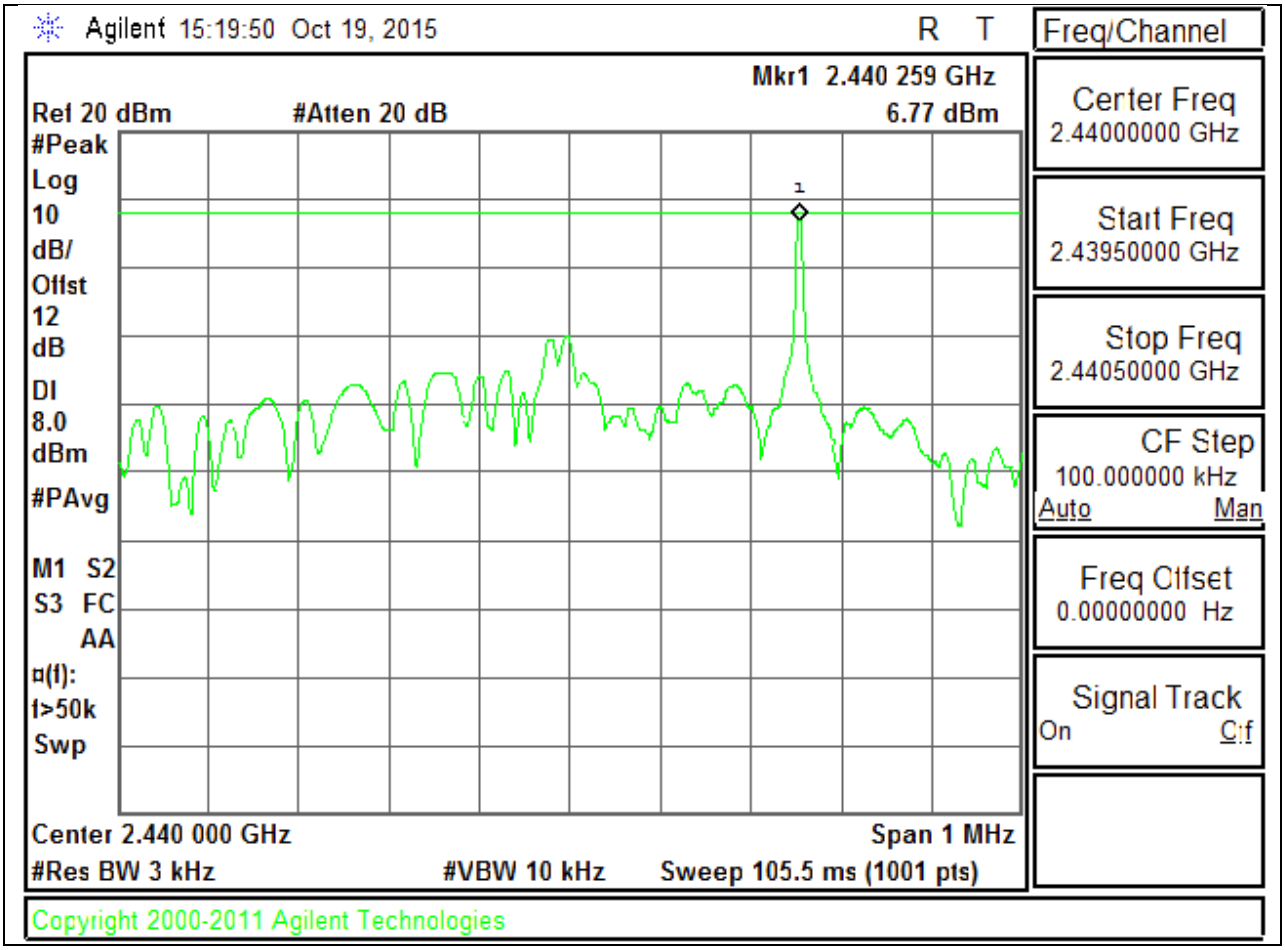
MID CHANNEL



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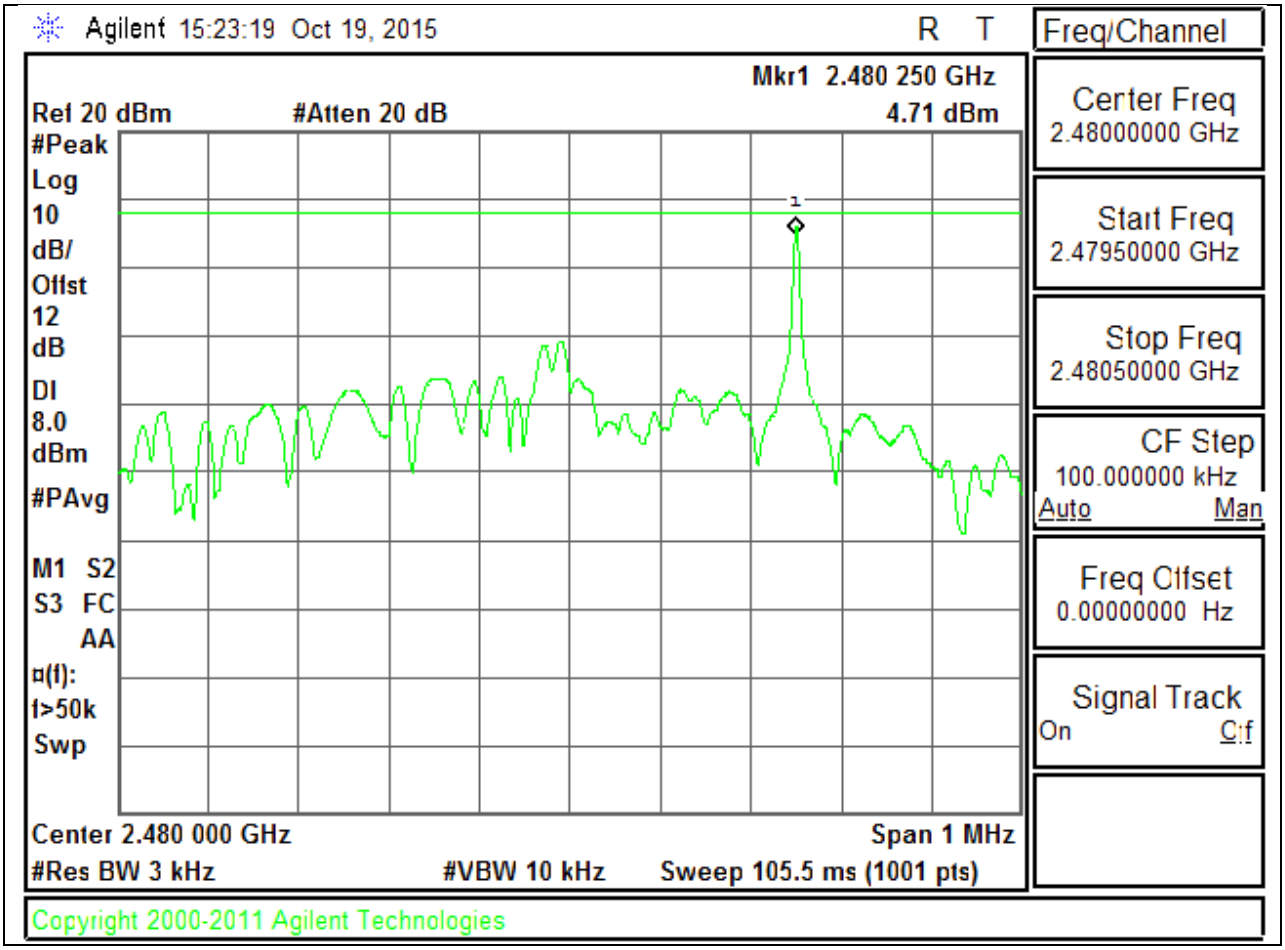
HIGH CHANNEL



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8.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-247 5.5

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

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

RESULTS

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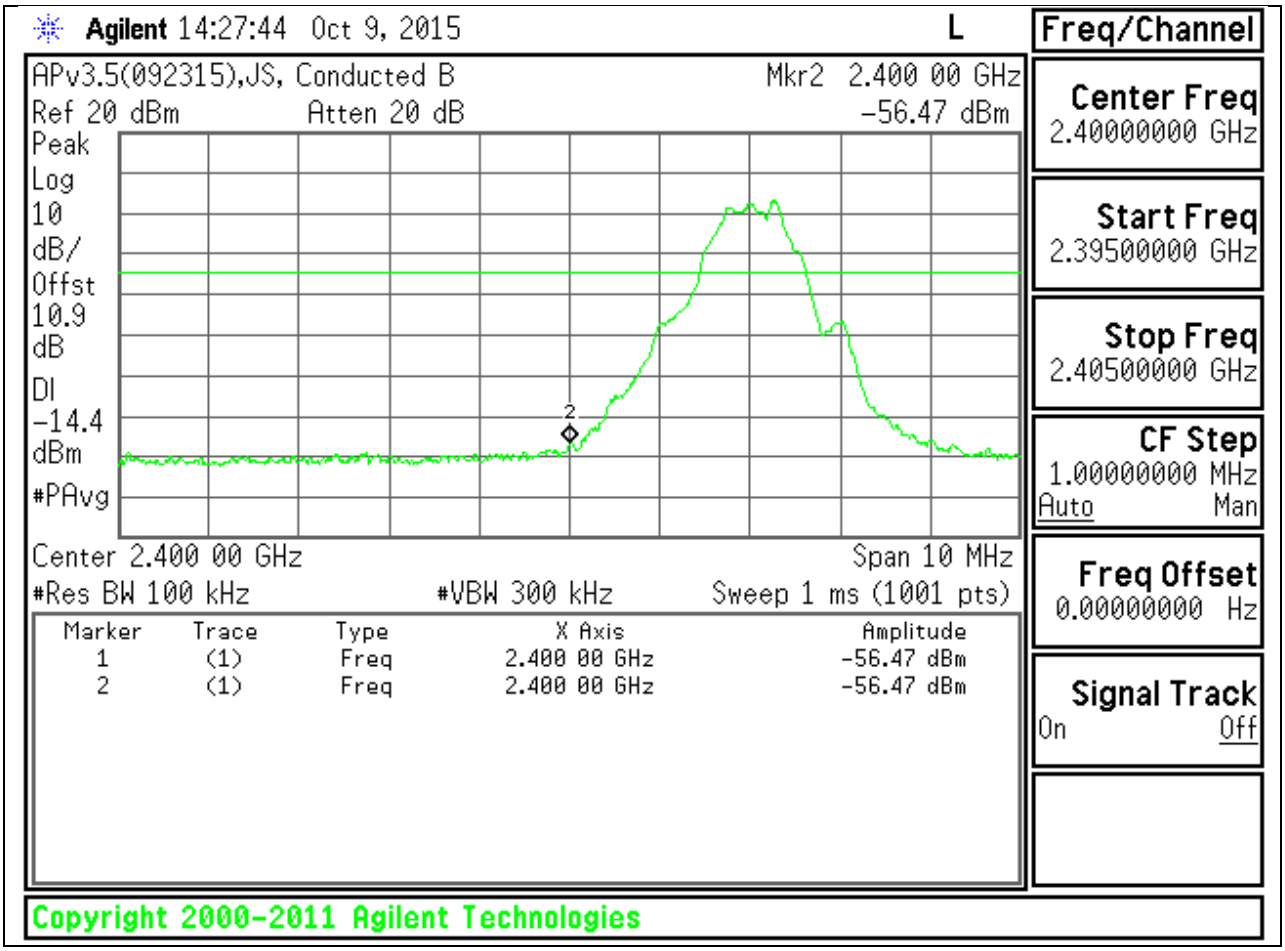
SPURIOUS EMISSIONS, LOW CHANNEL

LOW CHANNEL BANDEDGE



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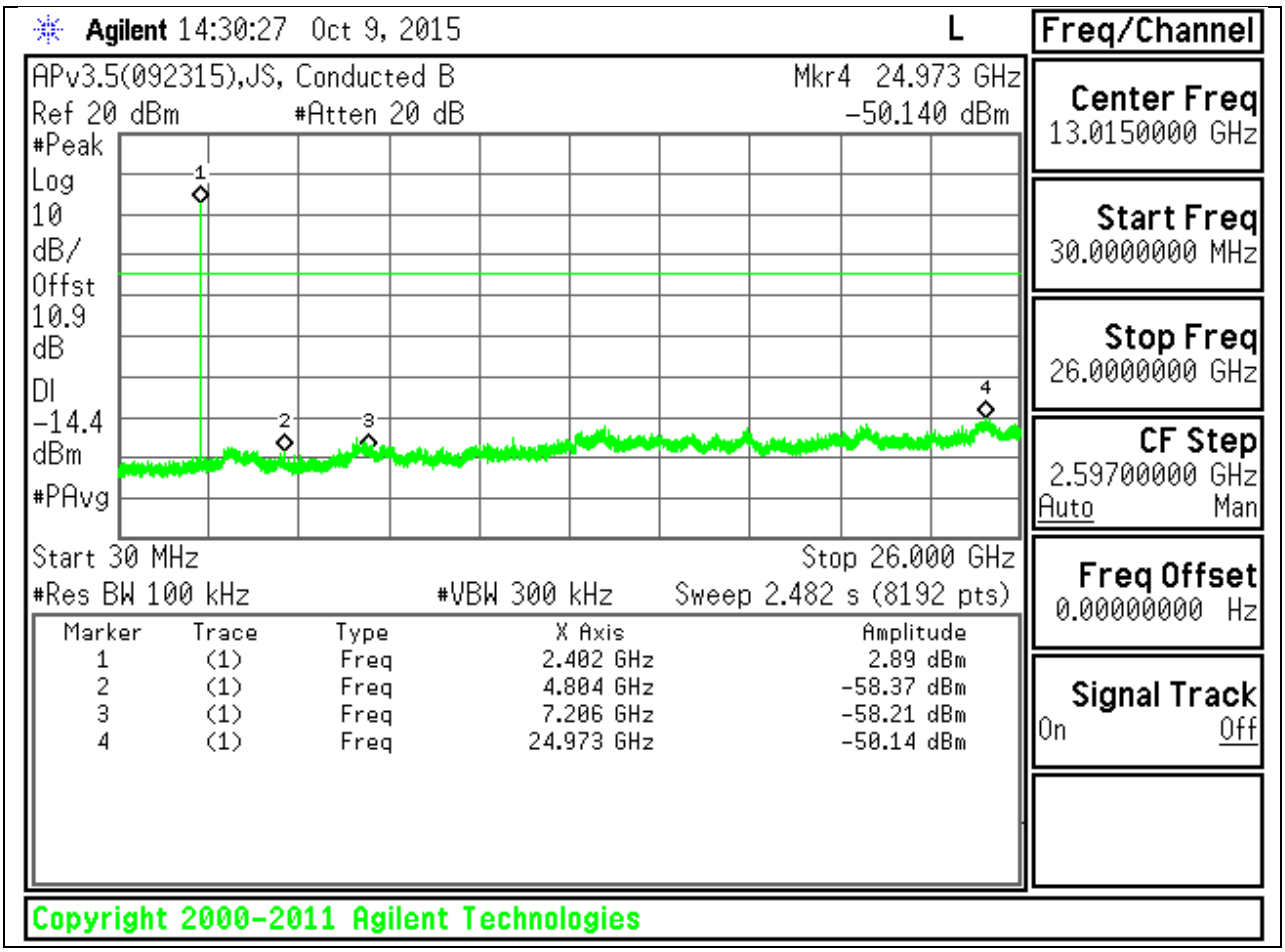
LOW CHANNEL SPURIOUS



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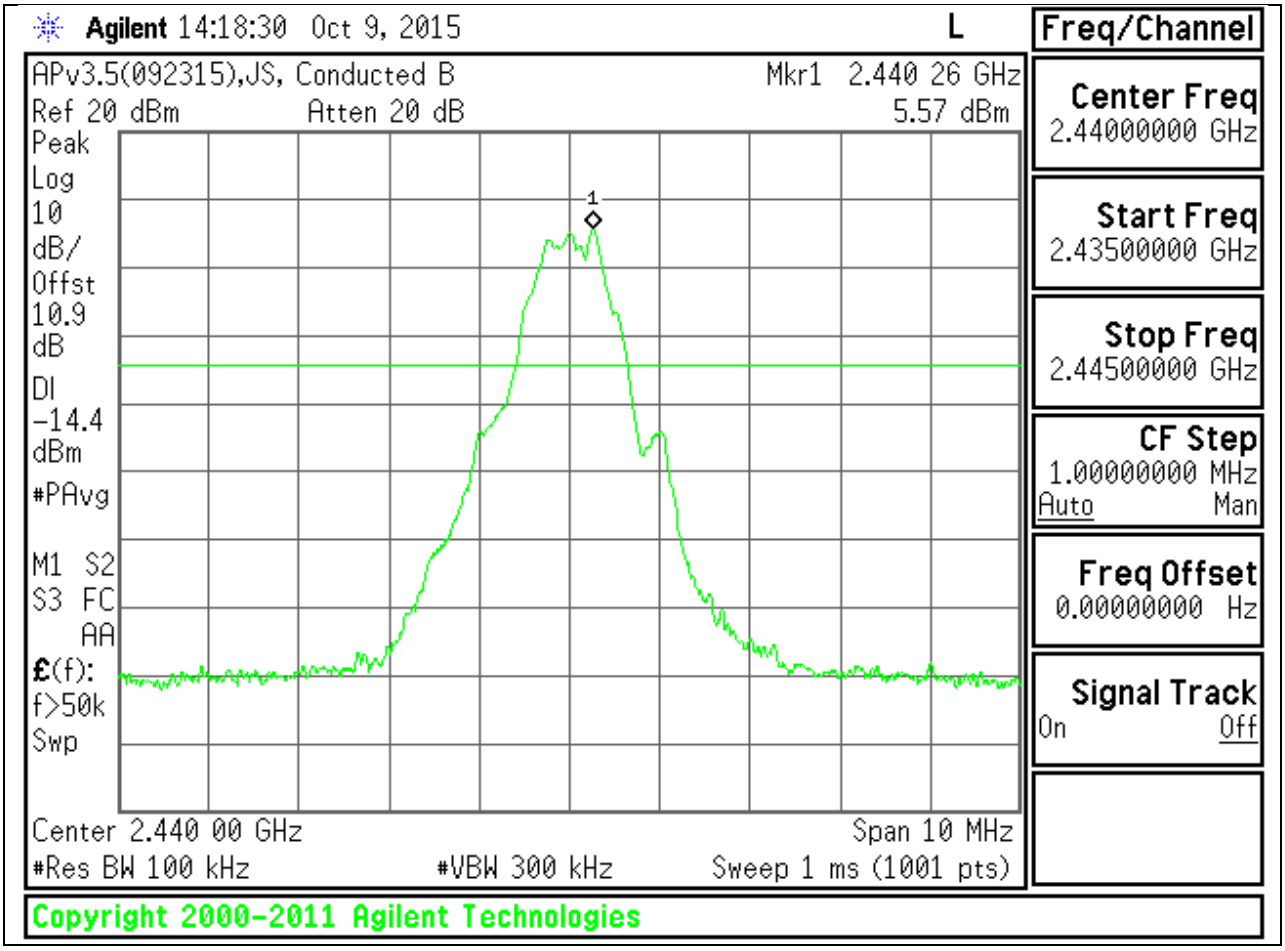
SPURIOUS EMISSIONS, MID CHANNEL

MID CHANNEL REFERENCE



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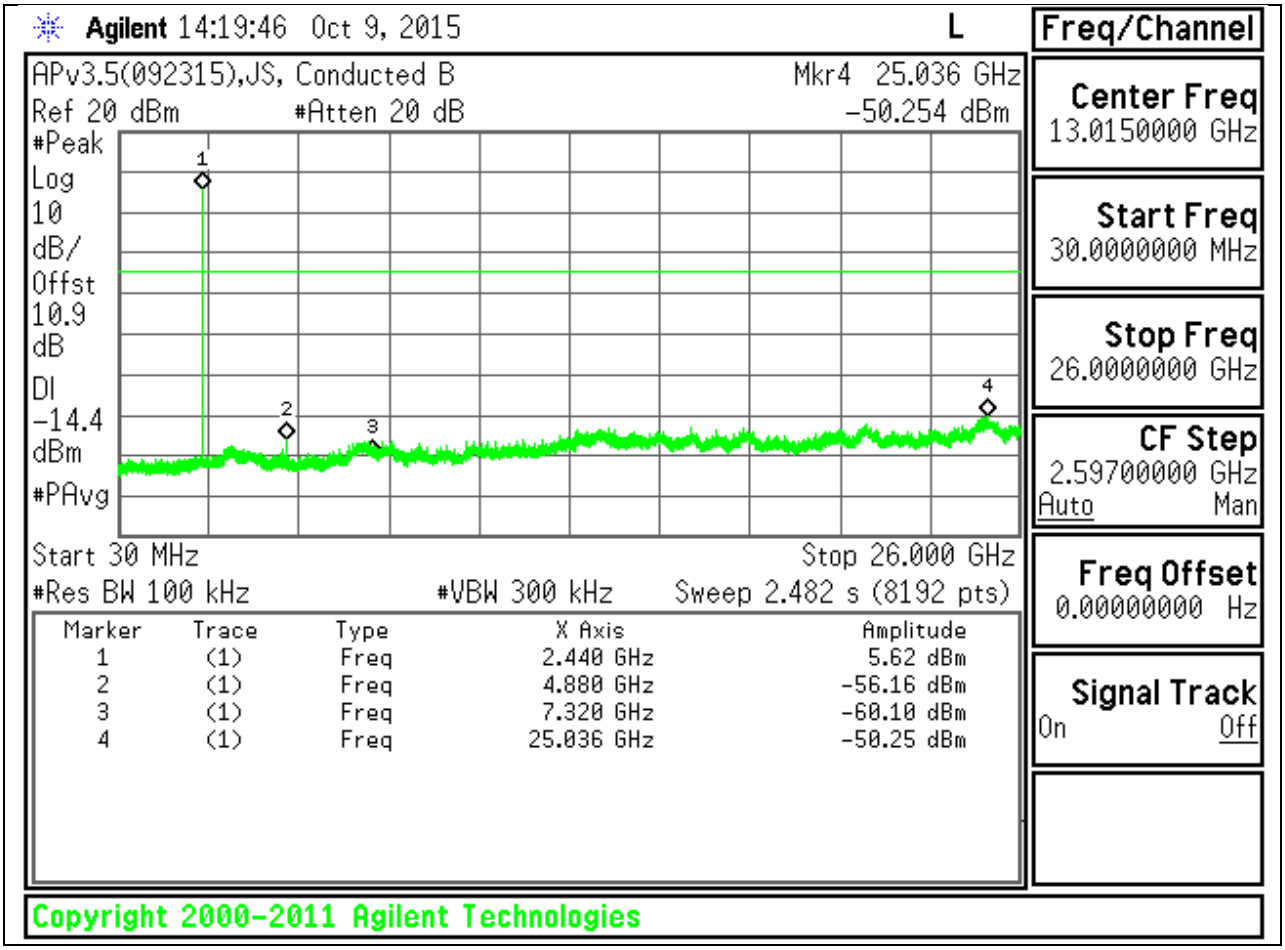
MID CHANNEL SPURIOUS



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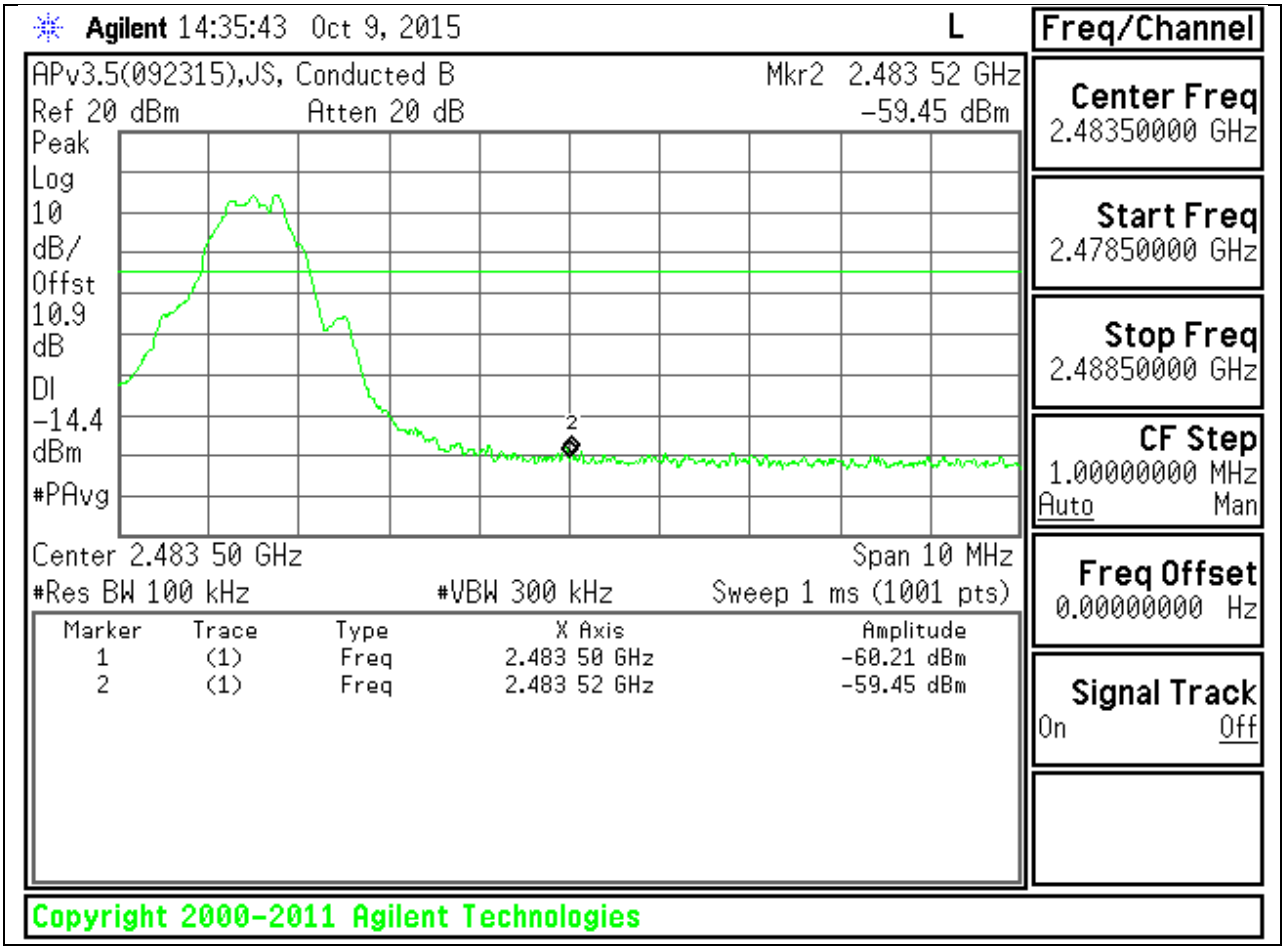
SPURIOUS EMISSIONS, HIGH CHANNEL

HIGH CHANNEL BANDEDGE



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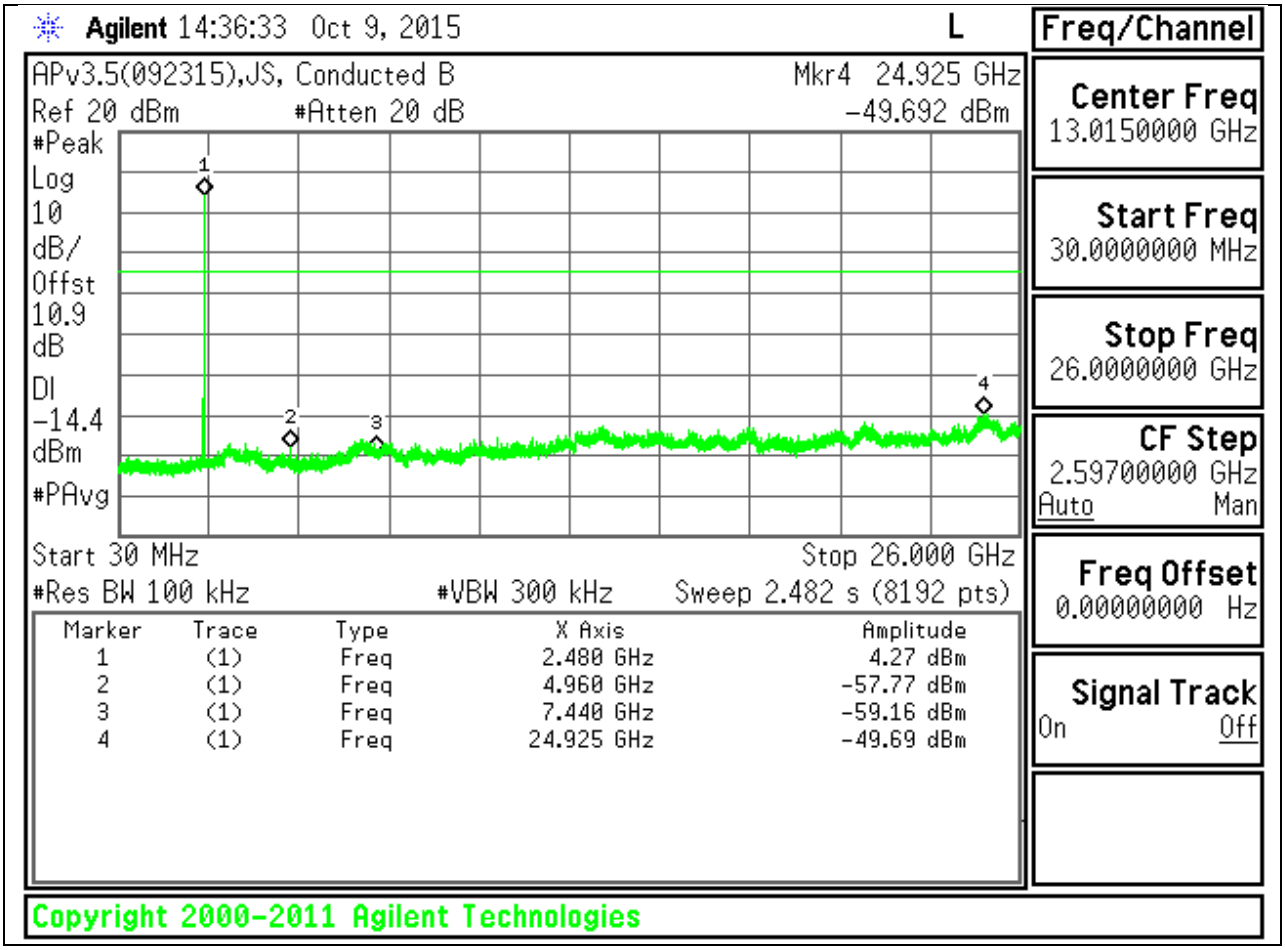
HIGH CHANNEL SPURIOUS



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9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-GEN Clause 8.9 (Transmitter)

IC RSS-GEN Clause 7 (Receiver)

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

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 150cm for above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. 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 add duty cycle factor for average measurements. Duty cycle factor = 10 log (1/x). For this sample: DCF = 10log (1/0.625)=2.04dB

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.

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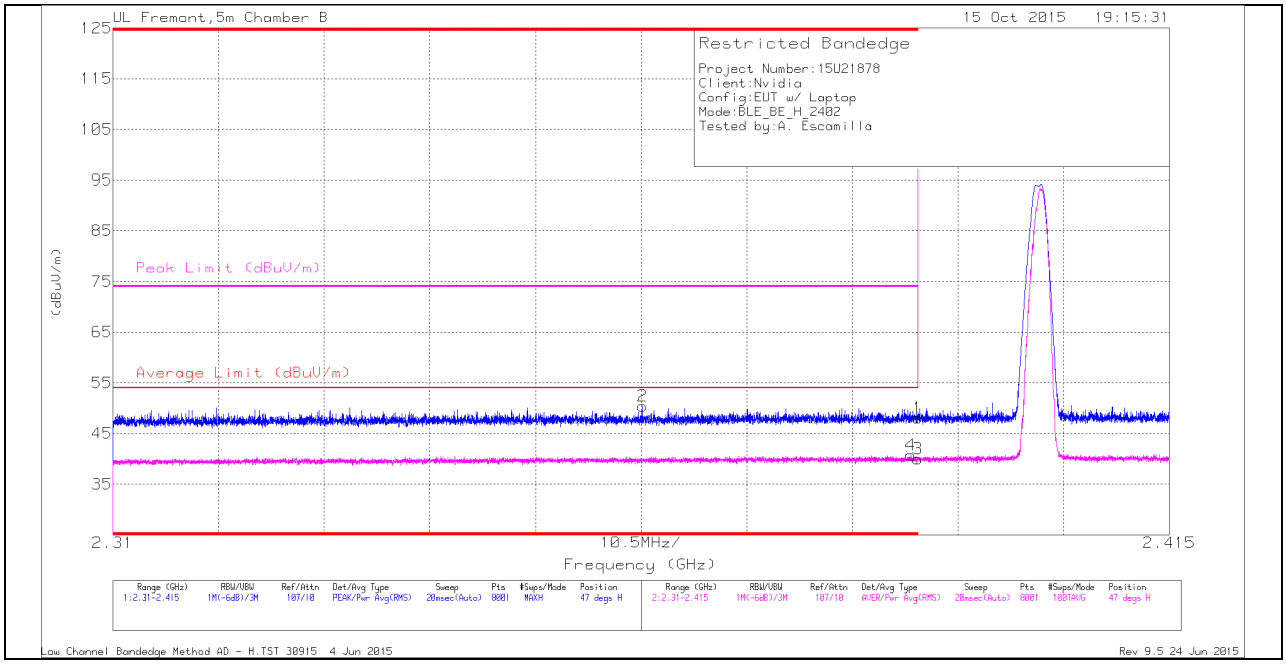
9.2. TRANSMITTER ABOVE 1 GHz

RESTRICTED BANDEDGE (LOW CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.15	Pk	32	-24.1	0	48.05	-	-	74	-25.95	47	158	H
2	* 2.363	42.74	Pk	31.9	-24.2	0	50.44	-	-	74	-23.56	47	158	H
3	* 2.39	30.01	RMS	32	-24.1	2.04	39.95	54	-14.05	-	-	47	158	H
4	* 2.389	30.79	RMS	32	-24.1	2.04	40.73	54	-13.27	-	-	47	158	H

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

Pk - Peak detector

RMS - RMS detection

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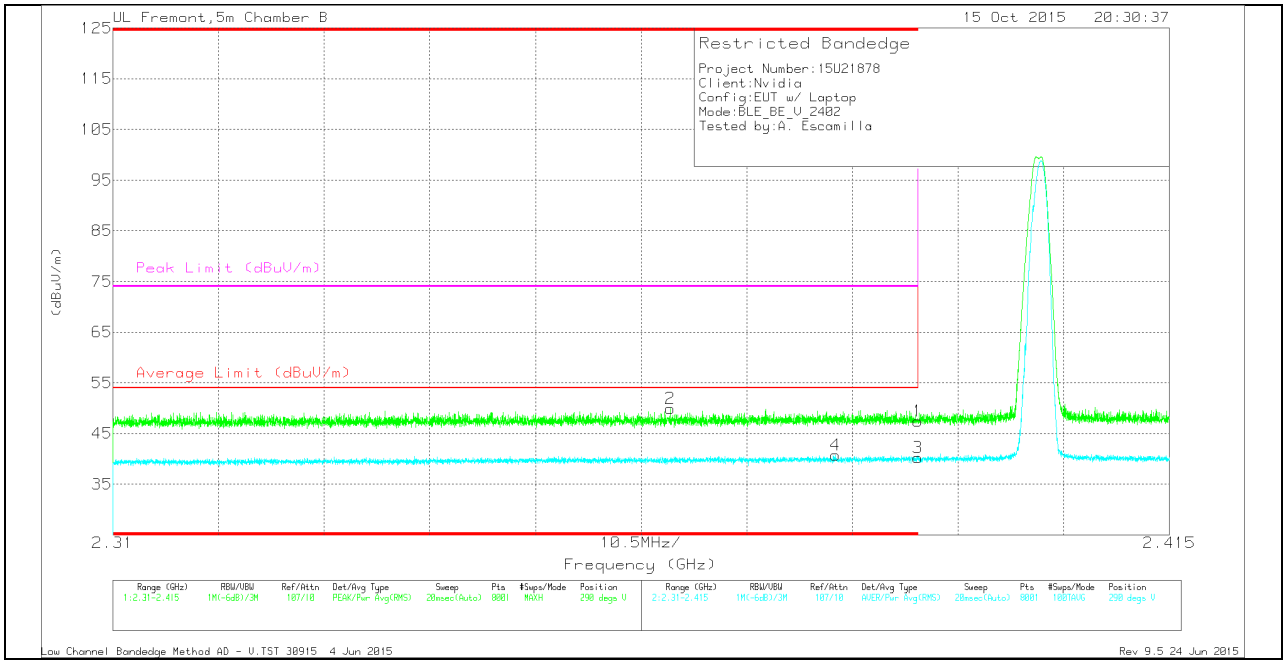
VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	39.56	Pk	32	-24.1	0	47.46	-	-	74	-26.54	290	133	V
2	* 2.365	42.25	Pk	31.9	-24.2	0	49.95	-	-	74	-24.05	290	133	V
3	* 2.39	30.31	RMS	32	-24.1	2.04	40.25	54	-13.75	-	-	290	133	V
4	* 2.382	30.72	RMS	32	-24.1	2.04	40.66	54	-13.34	-	-	290	133	V

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

Pk - Peak detector

RMS - RMS detection

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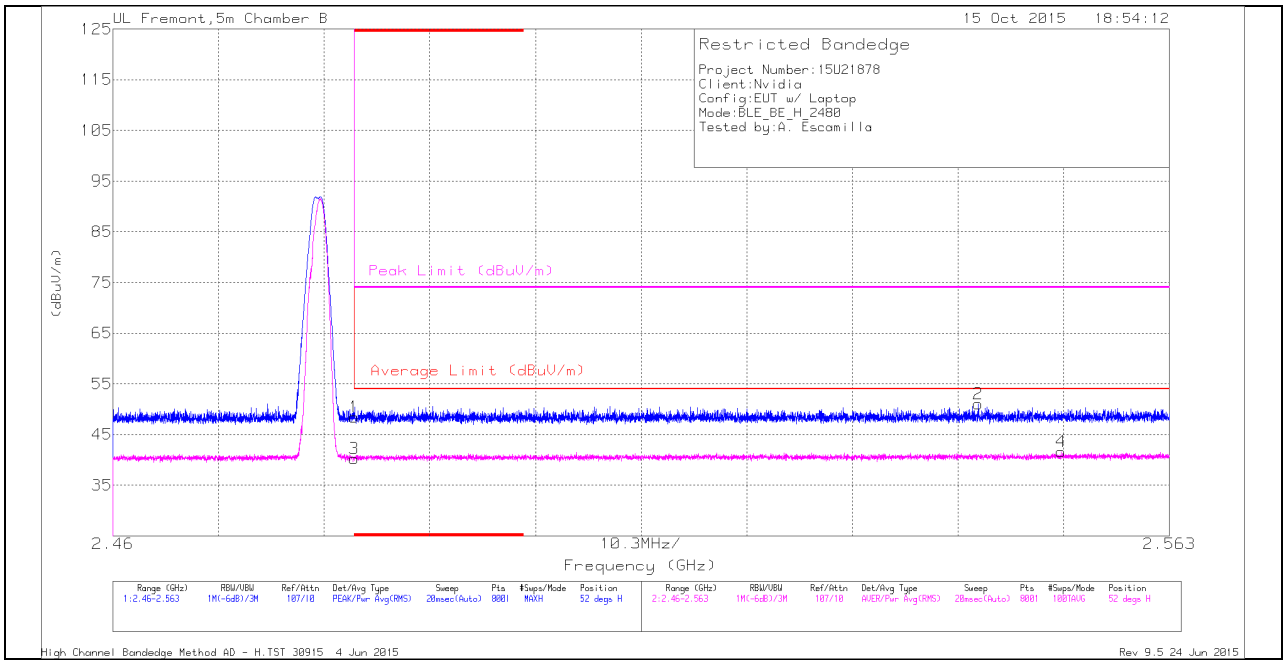
AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	39.94	Pk	32.5	-24	0	48.44	-	-	74	-25.56	52	193	H
3	* 2.484	29.69	RMS	32.5	-24	2.04	40.23	54	-13.77	-	-	52	193	H
2	2.544	42.37	Pk	32.6	-23.9	0	51.07	-	-	74	-22.93	52	193	H
4	2.552	30.7	RMS	32.7	-23.9	2.04	41.54	54	-12.46	-	-	52	193	H

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

Pk - Peak detector

RMS - RMS detection

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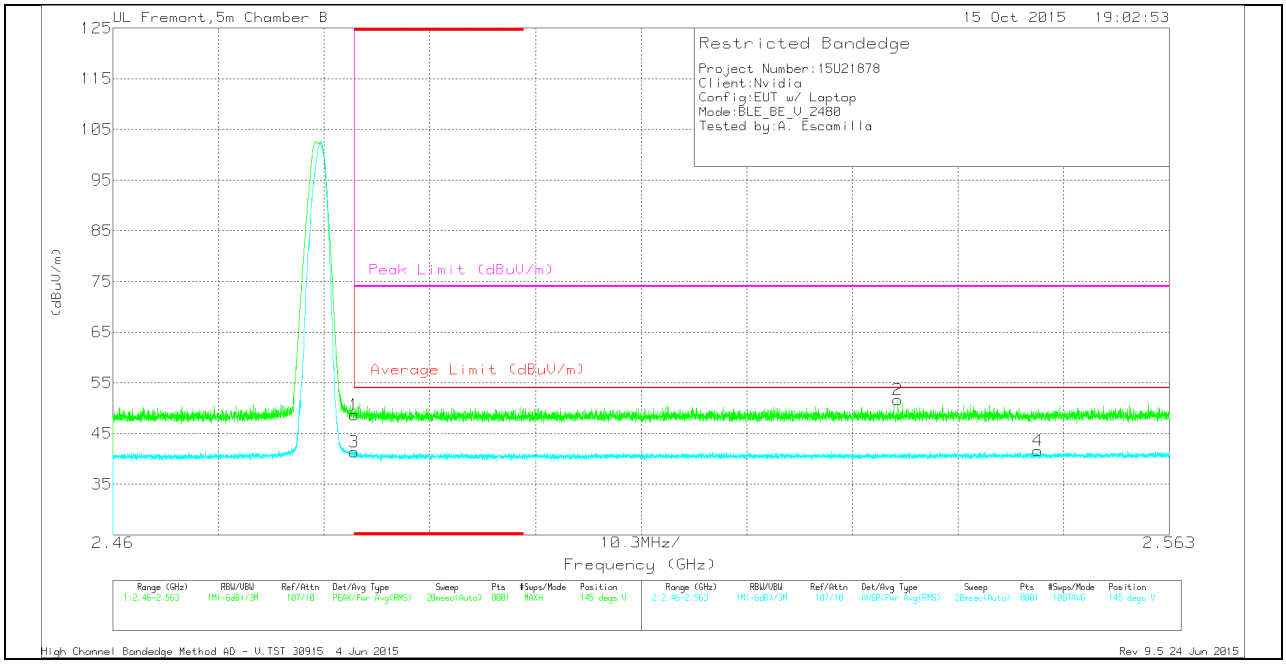
VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Flt r/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	40.19	Pk	32.5	-24	0	48.69	-	-	74	-25.31	145	155	V
3	* 2.484	30.79	RMS	32.5	-24	2.04	41.33	54	-12.67	-	-	145	155	V
2	2.537	42.98	Pk	32.6	-23.9	0	51.68	-	-	74	-22.32	145	155	V
4	2.55	30.79	RMS	32.7	-23.9	2.04	41.63	54	-12.37	-	-	145	155	V

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

Pk - Peak detector

RMS - RMS detection

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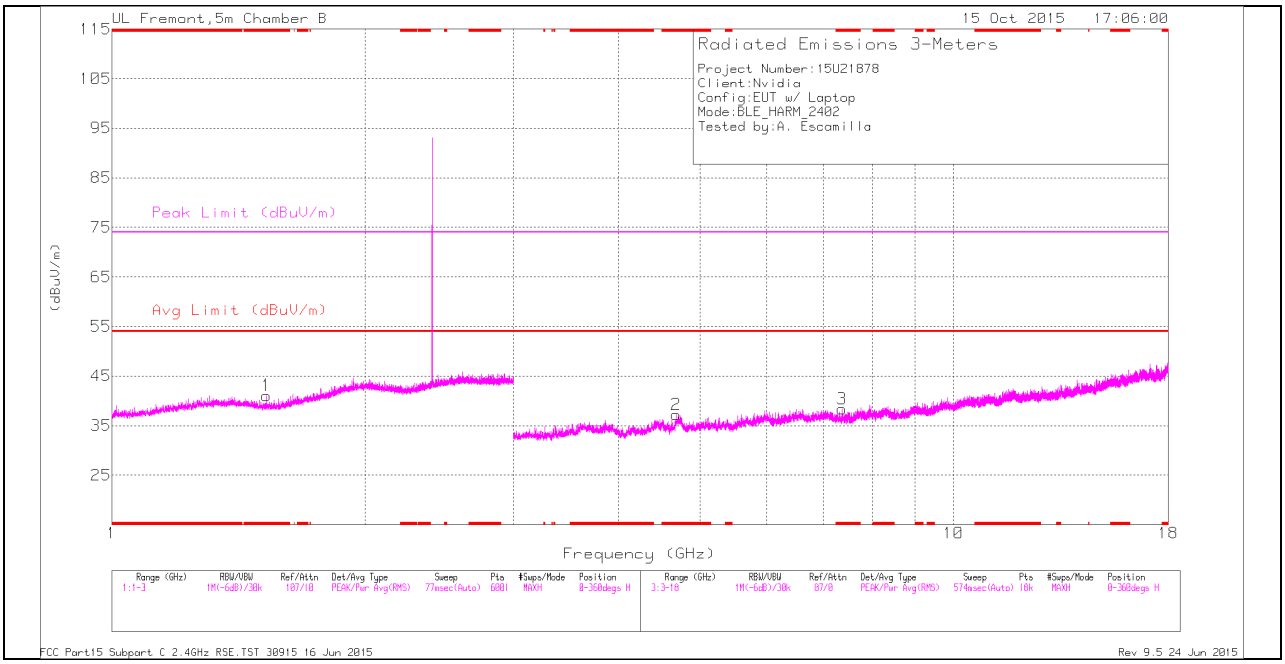
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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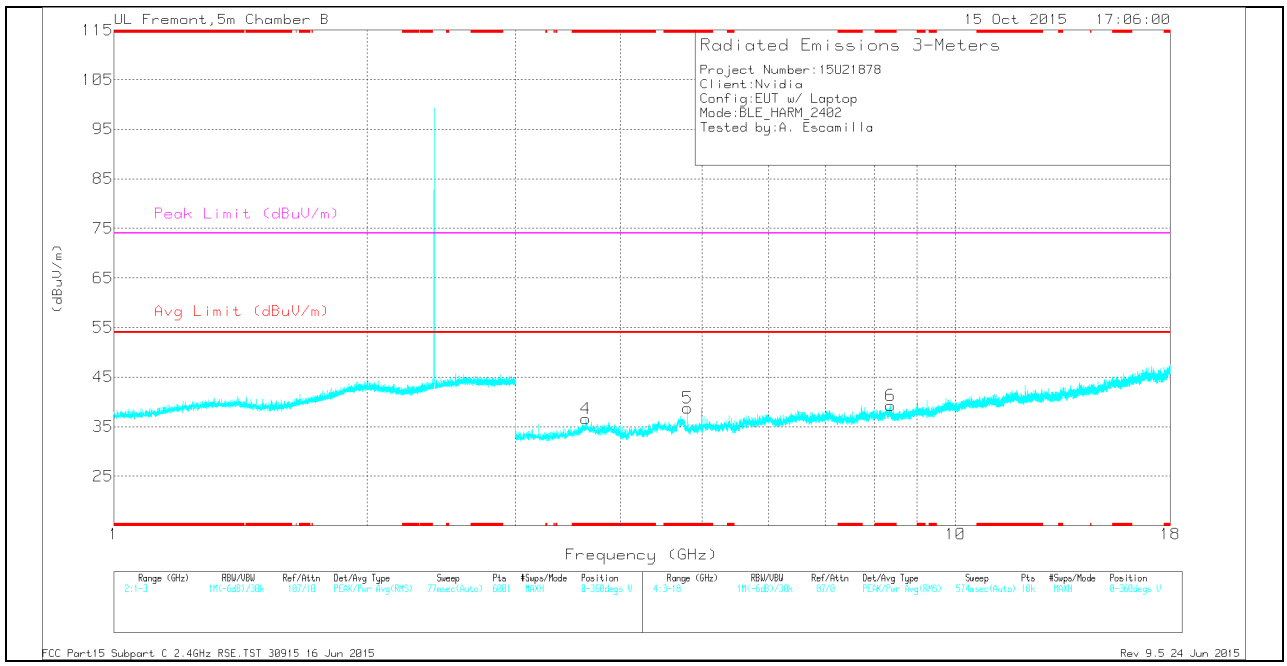
LOW CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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LOW CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.527	37.49	Pk	28.7	-25.1	0	41.09	-	-	74	-32.91	0-360	101	H
2	* 4.684	34.87	Pk	34.2	-31.8	0	37.27	-	-	74	-36.73	0-360	101	H
3	* 7.374	32.36	Pk	35.4	-29.4	0	38.36	-	-	74	-35.64	0-360	200	H
4	* 3.639	35.44	Pk	33.8	-32.7	0	36.54	-	-	74	-37.46	0-360	101	V
5	* 4.805	35.6	Pk	34.3	-31.1	0	38.8	-	-	74	-35.2	0-360	200	V
6	* 8.376	31.22	Pk	35.7	-27.7	0	39.22	-	-	74	-34.78	0-360	101	V

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

Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.527	44.1	PK2	28.7	-25.1	0	47.7	-	-	74	-26.3	31	179	H
* 1.528	32.49	MAv1	28.7	-25.1	2.04	38.13	54	-15.87	-	-	31	179	H
* 4.685	42.79	PK2	34.2	-31.8	0	45.19	-	-	74	-28.81	104	171	H
* 4.685	31.43	MAv1	34.2	-31.8	2.04	35.87	54	-18.13	-	-	104	171	H
* 7.373	39.2	PK2	35.3	-29.4	0	45.1	-	-	74	-28.9	73	197	H
* 7.376	28.22	MAv1	35.4	-29.3	2.04	36.36	54	-17.65	-	-	73	197	H
* 3.64	42.32	PK2	33.7	-32.7	0	43.32	-	-	74	-30.68	182	216	V
* 3.639	31.06	MAv1	33.8	-32.7	2.04	34.20	54	-19.80	-	-	182	216	V
* 4.804	42.68	PK2	34.3	-31	0	45.98	-	-	74	-28.02	152	210	V
* 4.804	33.41	MAv1	34.3	-31	2.04	38.75	54	-15.25	-	-	152	210	V
* 8.378	38.7	PK2	35.7	-27.8	0	46.6	-	-	74	-27.4	354	162	V
* 8.378	27.07	MAv1	35.7	-27.8	2.04	37.01	54	-16.99	-	-	354	162	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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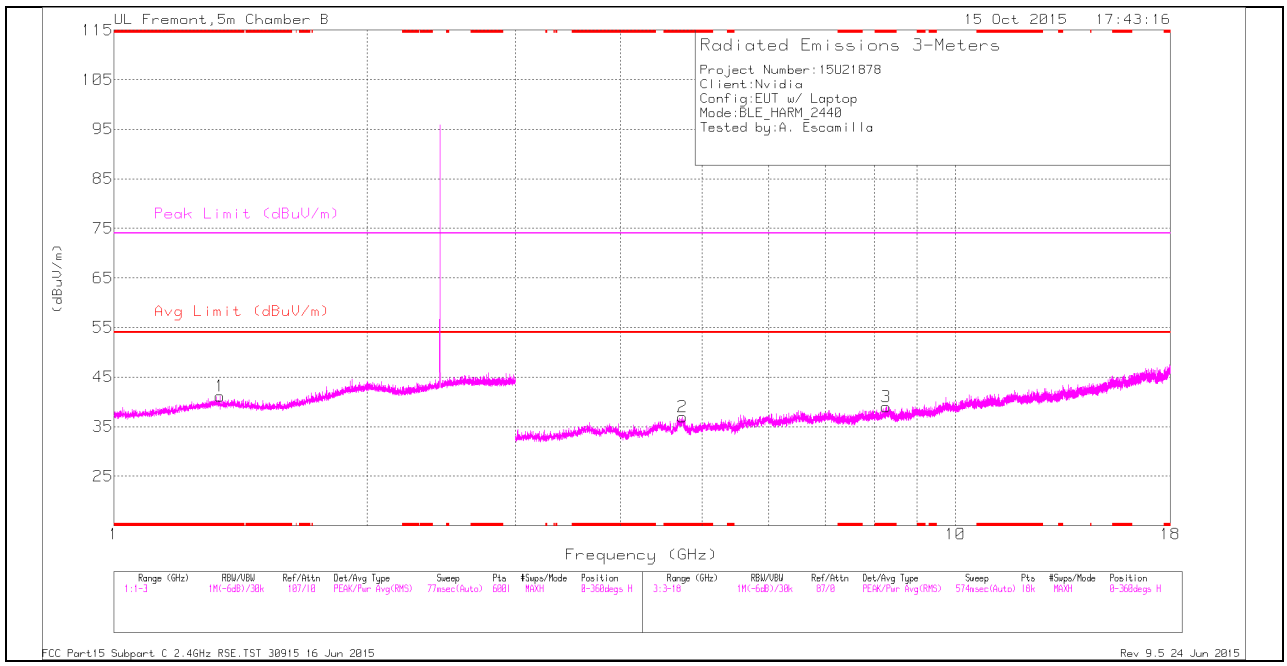
MID CHANNEL HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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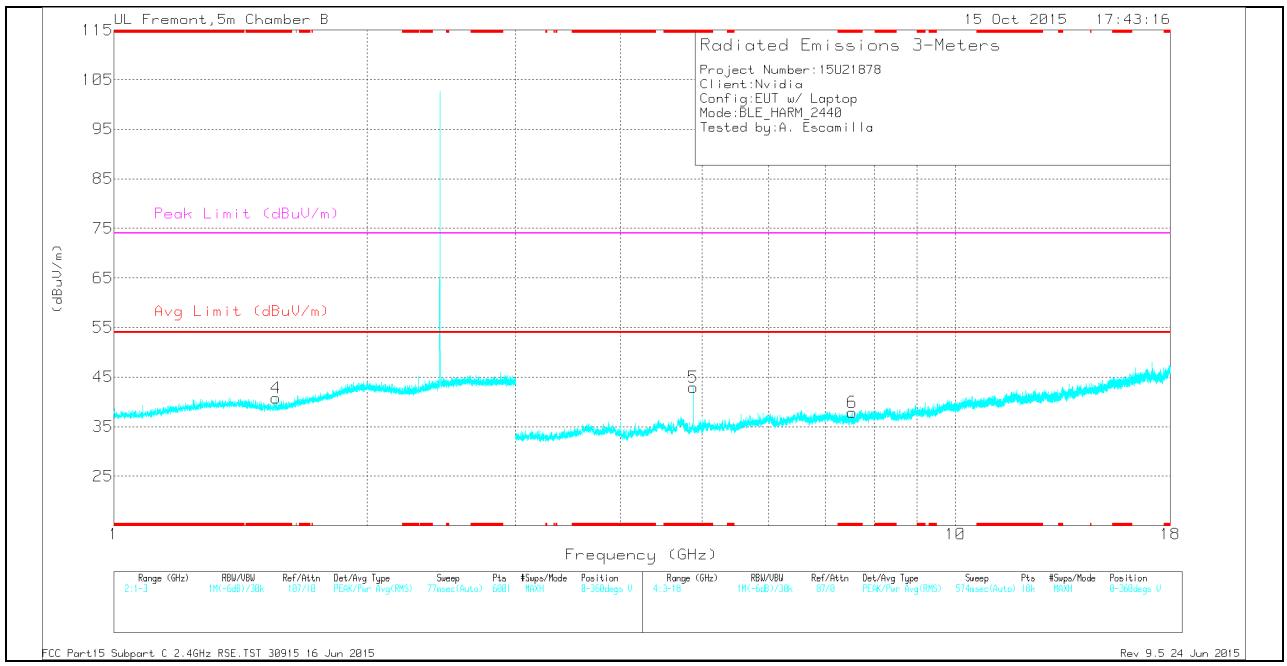
MID CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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MID CHANNEL DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.338	37.18	Pk	29.4	-25.4	0	41.18	-	-	74	-32.82	0-360	101	H
4	* 1.557	37.2	Pk	28.7	-25.1	0	40.8	-	-	74	-33.2	0-360	101	V
2	* 4.742	33.33	Pk	34.3	-30.7	0	36.93	-	-	74	-37.07	0-360	101	H
3	* 8.27	31.32	Pk	35.7	-28	0	39.02	-	-	74	-34.98	0-360	199	H
5	* 4.881	41.25	Pk	34.2	-32.5	0	42.95	-	-	74	-31.05	0-360	199	V
6	* 7.543	32.13	Pk	35.4	-29.7	0	37.83	-	-	74	-36.17	0-360	101	V

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

Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.336	44.58	PK2	29.4	-25.4	0	48.58	-	-	74	-25.42	340	151	H
* 1.337	32.9	MAv1	29.4	-25.4	2.04	38.94	54	-15.06	-	-	340	151	H
* 1.558	44.36	PK2	28.7	-25.1	0	47.96	-	-	74	-26.04	256	204	V
* 1.555	32.59	MAv1	28.7	-25.1	2.04	38.23	54	-15.77	-	-	256	204	V
* 4.744	41.8	PK2	34.3	-30.7	0	45.4	-	-	74	-28.6	176	192	H
* 4.742	30.76	MAv1	34.3	-30.7	2.04	36.40	54	-17.60	-	-	176	192	H
* 8.27	39.29	PK2	35.7	-28	0	46.99	-	-	74	-27.01	14	217	H
* 8.269	27.95	MAv1	35.7	-28	2.04	37.69	54	-16.31	-	-	14	217	H
* 4.88	45.29	PK2	34.2	-32.5	0	46.99	-	-	74	-27.01	127	239	V
* 4.88	37.54	MAv1	34.2	-32.5	2.04	41.28	54	-12.72	-	-	127	239	V
* 7.542	39.46	PK2	35.3	-29.7	0	45.06	-	-	74	-28.94	101	140	V
* 7.545	28.13	MAv1	35.4	-29.7	2.04	35.87	54	-18.13	-	-	101	140	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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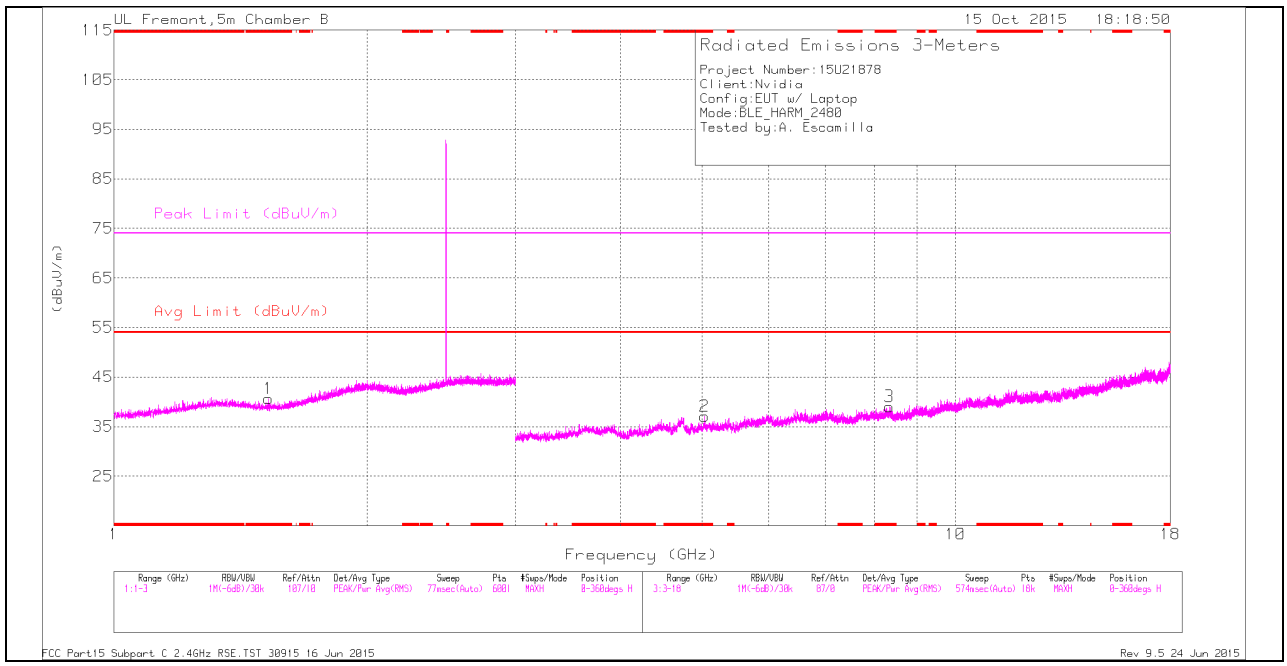
HIGH CHANNEL HORIZONTAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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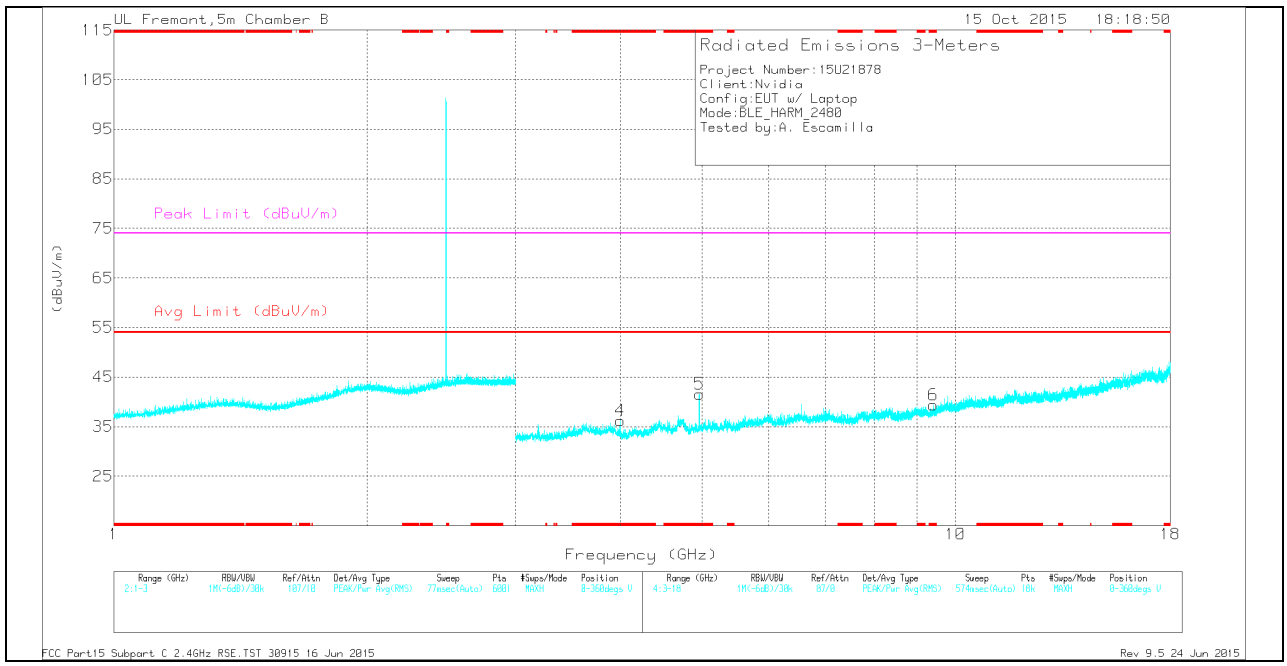
HIGH CHANNEL VERTICAL



Note: Emission was scanned up to 26GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

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HIGH CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fltr /Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.525	37.08	Pk	28.7	-25.1	0	40.68	-	-	74	-33.32	0-360	200	H
2	* 5.034	33.72	Pk	34	-30.6	0	37.12	-	-	74	-36.88	0-360	101	H
3	* 8.346	30.66	Pk	35.7	-27.3	0	39.06	-	-	74	-34.94	0-360	101	H
4	* 3.999	35.64	Pk	33.3	-32.7	0	36.24	-	-	74	-37.76	0-360	101	V
5	* 4.961	39.4	Pk	34.1	-31.9	0	41.6	-	-	74	-32.4	0-360	199	V
6	* 9.409	29.96	Pk	36.4	-27	0	39.36	-	-	74	-34.64	0-360	199	V

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

Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.526	43.85	PK2	28.7	-25.1	0	47.45	-	-	74	-26.55	47	174	H
* 1.524	32.53	MAv1	28.7	-25.1	2.04	38.17	54	-15.83	-	-	47	174	H
* 5.035	40.66	PK2	34	-30.6	0	44.06	-	-	74	-29.94	107	165	H
* 5.034	29.61	MAv1	34	-30.6	2.04	35.05	54	-18.95	-	-	107	165	H
* 8.345	39.07	PK2	35.7	-27.3	0	47.47	-	-	74	-26.53	66	136	H
* 8.345	27.18	MAv1	35.7	-27.3	2.04	37.62	54	-16.38	-	-	66	136	H
* 3.998	42.32	PK2	33.3	-32.7	0	42.92	-	-	74	-31.08	174	214	V
* 3.999	30.61	MAv1	33.3	-32.7	2.04	33.25	54	-20.75	-	-	174	214	V
* 4.961	45.21	PK2	34.1	-31.9	0	47.41	-	-	74	-26.59	162	209	V
* 4.96	37.05	MAv1	34.1	-31.9	2.04	41.29	54	-12.71	-	-	162	209	V
* 9.41	37.17	PK2	36.4	-27	0	46.57	-	-	74	-27.43	148	201	V
* 9.409	26.03	MAv1	36.4	-27	2.04	37.47	54	-16.53	-	-	148	201	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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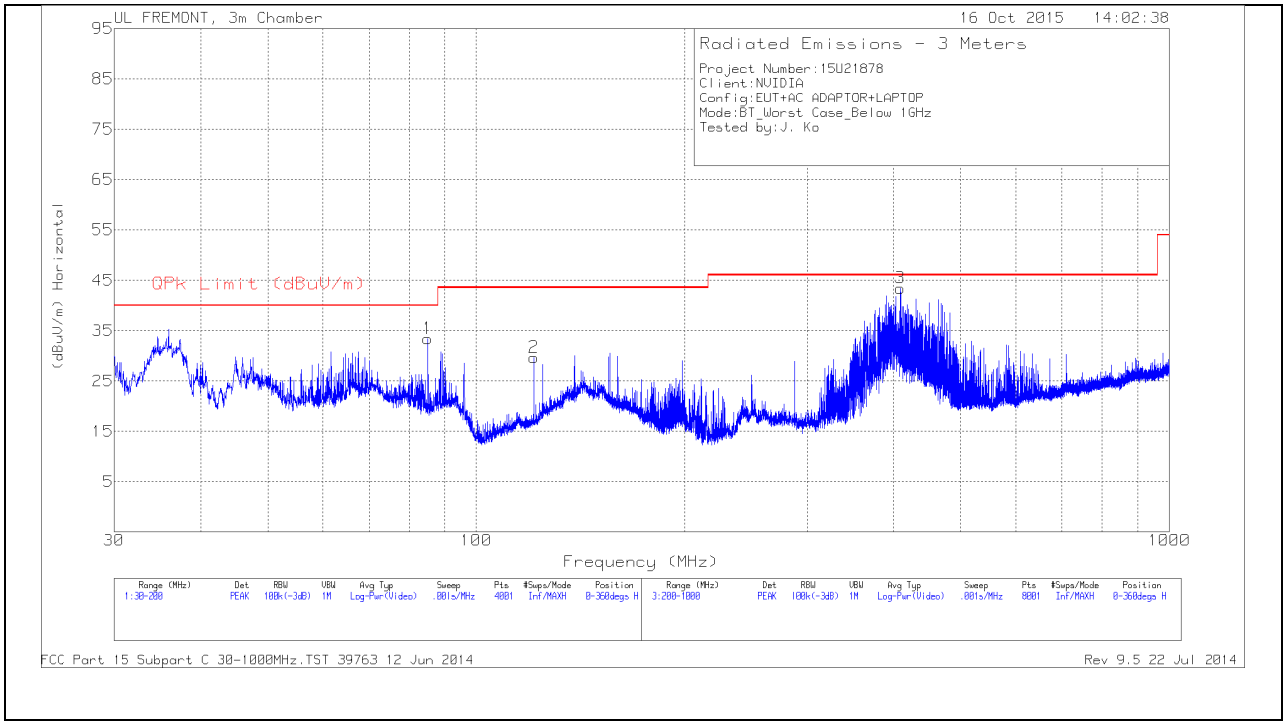
9.3. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



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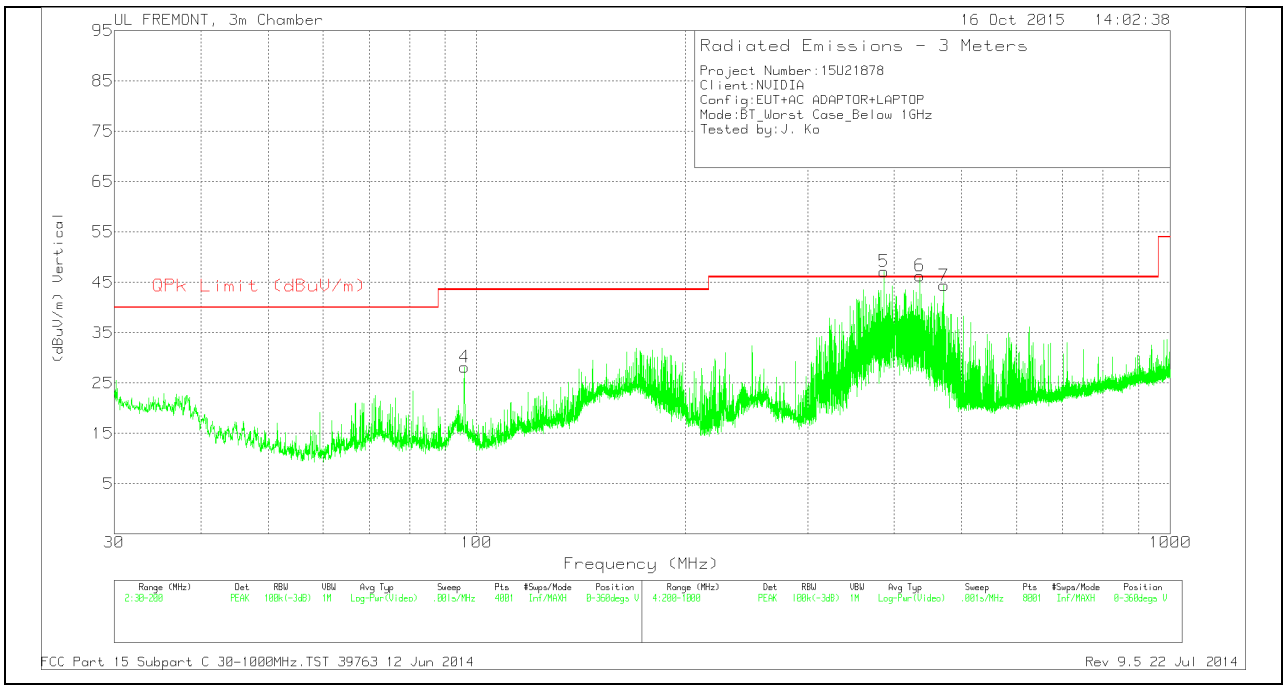
VERTICAL PLOT



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BELOW 1 GHz TABLE

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T185 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	85.1225	52.33	PK	7.6	-26.5	33.43	40	-6.57	0-360	200	H
4	96.0025	45.67	PK	8.8	-26.3	28.17	43.52	-15.35	0-360	100	V
2	121.035	41.99	PK	13.8	-26.1	29.69	43.52	-13.83	0-360	200	H
5	386.8	56.96	PK	15	-24.8	47.16	46.02	1.14	0-360	100	V
3	409.2	52.75	PK	15.5	-24.8	43.45	46.02	-2.57	0-360	100	H
6	435.3	54.51	PK	16.7	-24.9	46.31	46.02	.29	0-360	100	V
7	471.9	52.16	PK	17.2	-25	44.36	46.02	-1.66	0-360	200	V

PK - Peak detector

Radiated Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	AF T185 (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
386.33	38.93	QP	15	-24.7	29.23	46.02	-16.79	117	178	V
409.255	41.47	QP	15.5	-24.8	32.17	46.02	-13.85	294	105	H
435.512	39.68	QP	16.7	-24.9	31.48	46.02	-14.54	211	212	V
471.953	34.22	QP	17.2	-25	26.42	46.02	-19.6	327	105	V

QP - Quasi-Peak detector

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10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

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 C63.10

RESULTS

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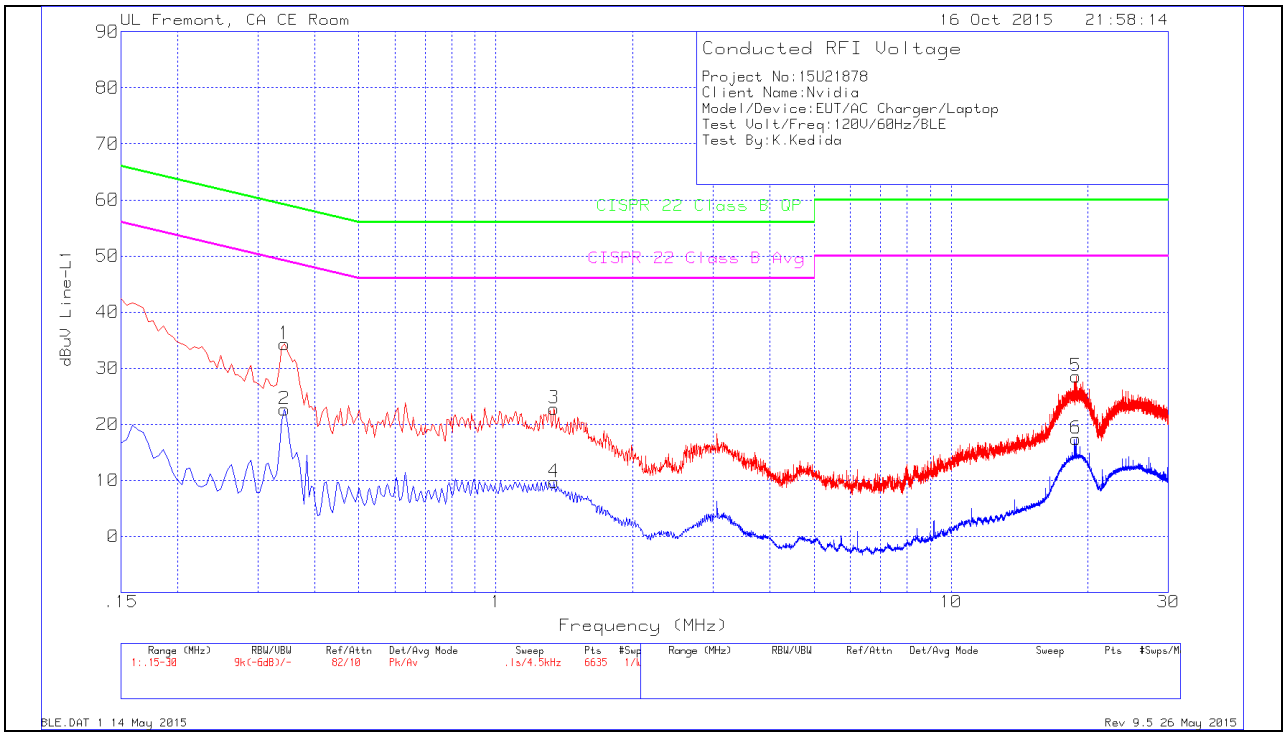
6 WORST EMISSIONS

LINE 1 PLOT



LINE 1 RESULTS

Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1	LC Cables 1&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
1	.3435	33.78	Pk	.5	0	34.28	59.12	-24.84		
2	.3435	22.14	Av	.5	0	22.64	-	-	49.12	-26.48
3	1.3425	22.52	Pk	.2	.1	22.82	56	-33.18		
4	1.3425	9.39	Av	.2	.1	9.69	-	-	46	-36.31
5	18.8115	28.04	Pk	.3	.2	28.54	60	-31.46		
6	18.8115	16.94	Av	.3	.2	17.44	-	-	50	-32.56

Pk - Peak detector

Av - Average detection

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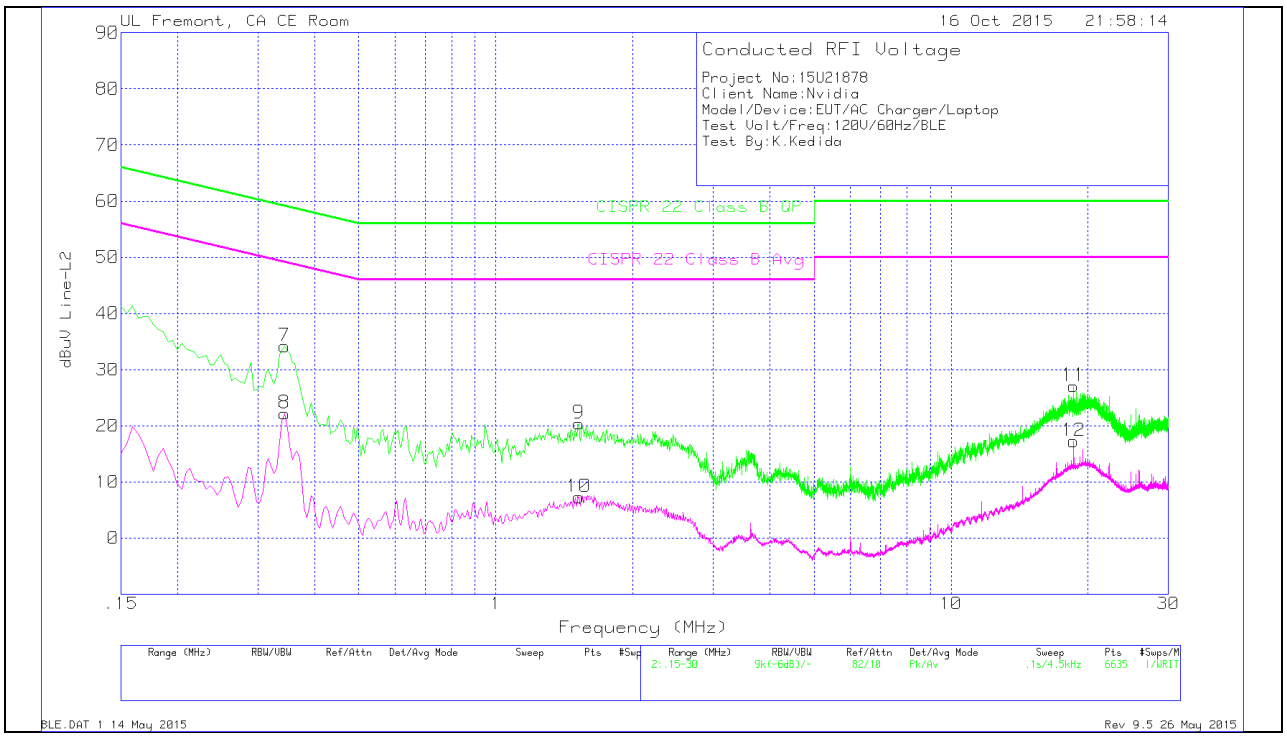
LINE 2 PLOT



LINE 2 RESULTS

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2	LC Cables 2&3	Corrected Reading dBuV	CISPR 22 Class B QP	Margin (dB)	CISPR 22 Class B Avg	Margin (dB)
7	.3435	33.67	Pk	.5	0	34.17	59.12	-24.95		
8	.3435	21.7	Av	.5	0	22.2	-	-	49.12	-26.92
9	1.5225	20.12	Pk	.2	.1	20.42	56	-35.58		
10	1.5225	7.03	Av	.2	.1	7.33	-	-	46	-38.67
11	18.591	26.59	Pk	.3	.2	27.09	60	-32.91		
12	18.591	16.76	Av	.3	.2	17.26	-	-	50	-32.74

Pk - Peak detector

Av - Average detection

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