CERTIFICATION TEST REPORT

Report Number. : 11526345-E1V2

Applicant	:	NVIDIA CORP. 2701 SAN TOMAS EXPY SANTA CLARA, CA 95050
Model	:	P3310
FCC ID	:	VOB-P3310
IC	:	7361A-P3310
EUT Description	:	WLAN 2x2 MIMO 802.11a/b/g/n/ac with Bluetooth
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C INDUSTRY CANADA RSS - 247 ISSUE 1 INDUSTRY CANADA RSS-GEN Issue 4

Date Of Issue:
January 14, 2017

Prepared by:
UL Verification Services Inc.
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
V1	01/06/17	Initial Issue	D. Coronia
V2	01/14/17	Updated Section 1, 6, 9.6, 10.2 & header date	D. Coronia

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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: P3310

SERIAL NUMBER: 0334916000038

DATE TESTED: DECEMBER 19 - 28, 2016

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.

Approved & Released For
UL Verification Services Inc. By:

DAN CORONIA
WiSE Project Lead
UL VERIFICATION SERVICES INC.

Prepared By:

KIYA KEDIDA
WiSE Lab Engineer
UL VERIFICATION SERVICES INC.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, KDB 558074 D01 v03r05, ANSI C63.10-2013, 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)

The above test sites and facilities are covered under FCC Test Firm Registration # 208313.

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.

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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
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	3.15 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	5.36 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.32 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.45 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.24 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	5.26	3.36

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The EUT utilizes a Dipole antenna, with a maximum gain of 2.86dBi across operation frequency 2.4GHz band.

5.4. SOFTWARE AND FIRMWARE

The software and firmware in the EUT during testing was C03A10387.0700.

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated bandedge, harmonics, and spurious emissions from 1 GHz to 18GHz were performed. The EUT was set to transmit at the Low/Middle/High channels with designed (target) output powers.

Radiated emission below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT was 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.

Worst-case data rates were:

BLE: 1 Mbps.

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Description	Manufacturer	Model	Serial Number	FCC ID
EUT AC/DC Adapter	Mean Well Enterprises	GST90A19	EB68F90444	NA
Laptop	Lenovo	7659	L3-AL664 08/03	NA
Base Board	NVIDIA	P2597		DoC

I/O CABLES (CONDUCTED & RADIATED TEST)

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	For EUT
2	DC	1	19 Vdc	Unshielded	1	For EUT
3	USB	1	USB	Shielded	1.5	

TEST SETUP

The EUT was connected to a host Laptop via USB cable adapter. Test software exercised the EUT.

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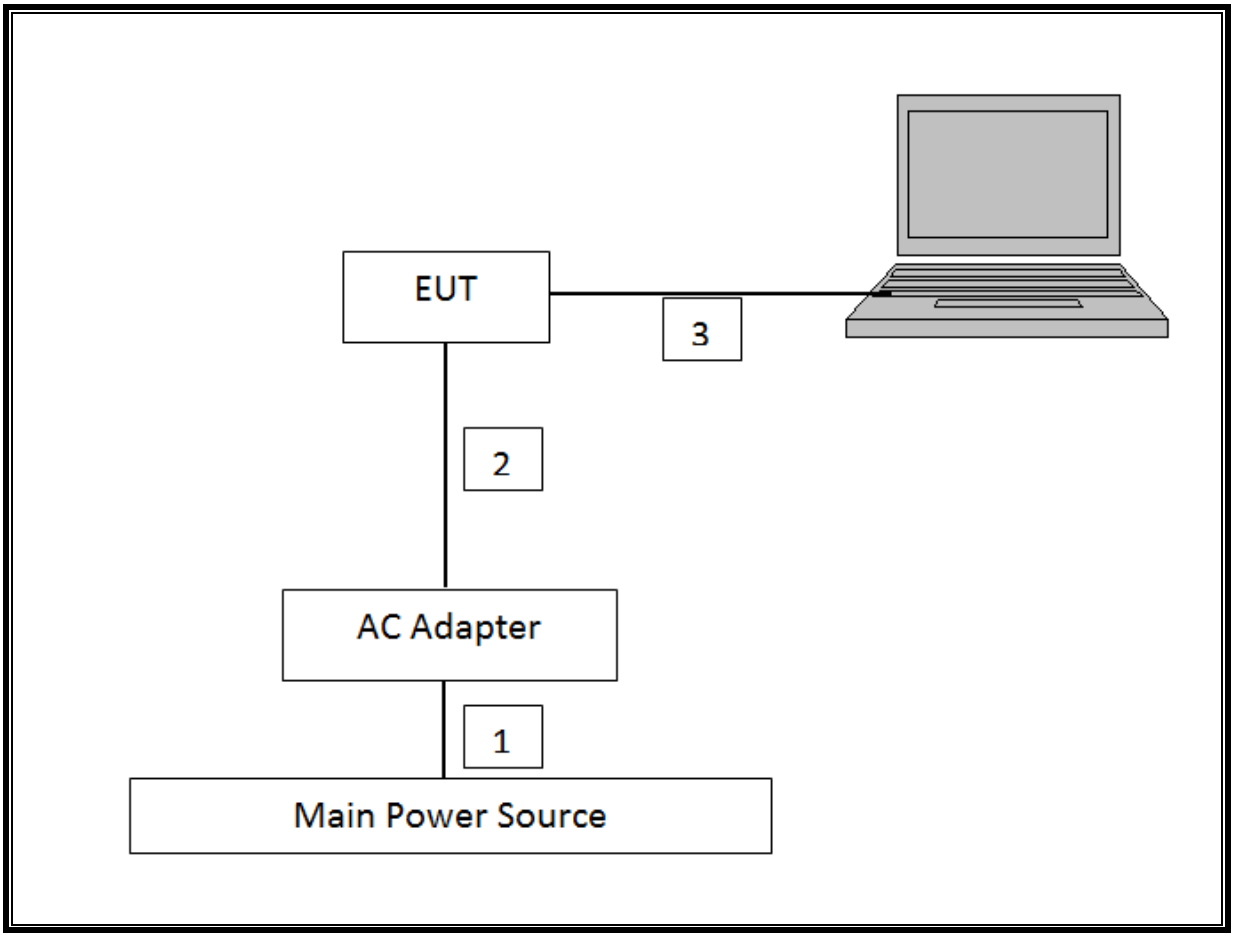
SETUP DIAGRAM



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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**	**T Number**	**Cal Date**	**Cal Due**
PSA Series Spectrum Analyzer, 3Hz - 26.5GHz	Agilent	E4440A	199	07/22/16	07/22/17
PSA Series Spectrum Analyzer, 3Hz - 44GHz	Agilent	E4446A	146	07/13/16	07/13/17
Horn Antenna, 18 - 26.5 GHz	Seavey Division	MWH-1826/B	449	05/26/16	5/26/2017
Antenna, Horn 1-18GHz	ETS Lindgren	3117	119	02/04/16	02/04/17
Antenna, Broadband Hybrid 30MHz to 2000MHz	Sunol Sciences	JB1	122	01/29/16	01/29/17
Loop Antenna	EMCO	6502	35	03/24/16	03/24/17
Amplifier, 1-26.5GHz	Miteq	AFS42-00101800-25-S-42	931	08/26/16	08/26/17
Amplifier, 1 to 8GHz	Miteq	AMF-4D-01000800-30-29P	1170	04/28/16	04/28/17
Amplifier, 10KHz to 1GHz, 32dB	Keysight	8447D	15	08/26/16	08/26/17
P-Series Power Meter	Keysight	N1911A	1264	07/08/16	07/08/17
Wideband Power Sensor 50MHz - 18GHz	Agilent	N1921A	1224	03/22/16	03/22/17
EMI Receiver	Rohde & Schwarz	ESR-EMI	1436	12/19/16	12/19/17
LISN	FISCHER	FCC-LISN-50/250-25-2-01	1310	06/08/16	06/08/17

Test Software List			
Description	**Manufacturer**	**Model**	**Version**
Radiated Software	UL	UL EMC	Ver 9.5, Apr 26, 2016
Conducted Software	UL	UL EMC	Ver 9.5, May 26, 2015
Antenna Port Software	UL	UL RF	Ver 5.1.1, July 15, 2016

NOTE: *testing is completed before equipment calibration expiration date.

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7. MEASUREMENT METHODS

6 dB BW: KDB 558074 D01 v03r05, Section 8.1.

Output Power: KDB 558074 D01 v03r05, Section 9.1.1.

Power Spectral Density: KDB 558074 D01 v03r05, Section 10.2.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v03r05, Section 11.0.

Out-of-band emissions in restricted bands: KDB 558074 D01 v03r05, Section 12.1.

Band-edge: KDB 558074 D01 v03r05, Section 12.1.

AC Power Line Conducted Emissions: ANSI C63.10-2013, Section 6.2.

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8. SUMMARY TABLE

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

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9. ANTENNA PORT TEST RESULTS

9.1. ON TIME, DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

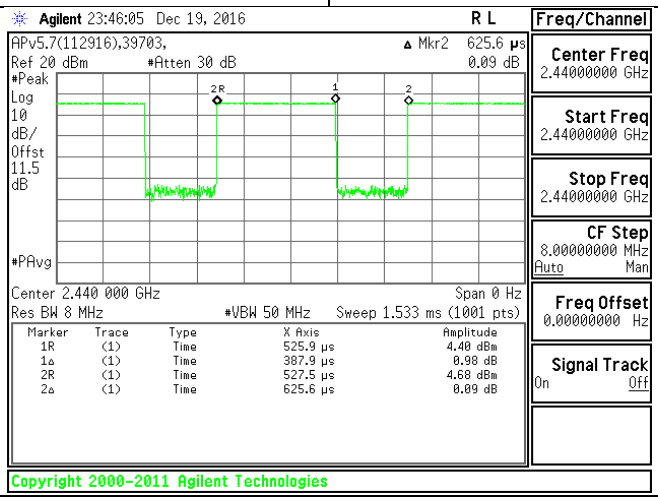
KDB 58074 D01 v03r05 Section 6

ON TIME AND DUTY CYCLE RESULTS

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	0.388	0.626	0.620	62.00%	2.08	2.578

DUTY CYCLE PLOTS



NOTE: --

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9.2. 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

KDB 58074 D01 v03r05 Section 8.1

RESULTS

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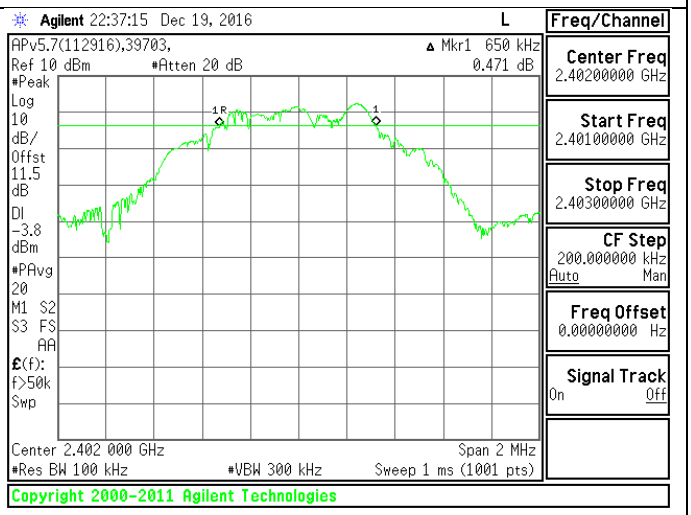
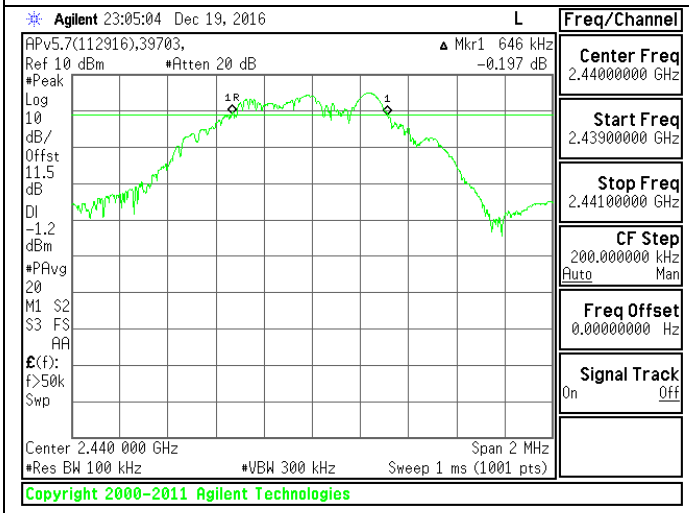
TEST RESULT TABLE

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)
Low	2402	0.650
Middle	2440	0.646
High	2480	0.636

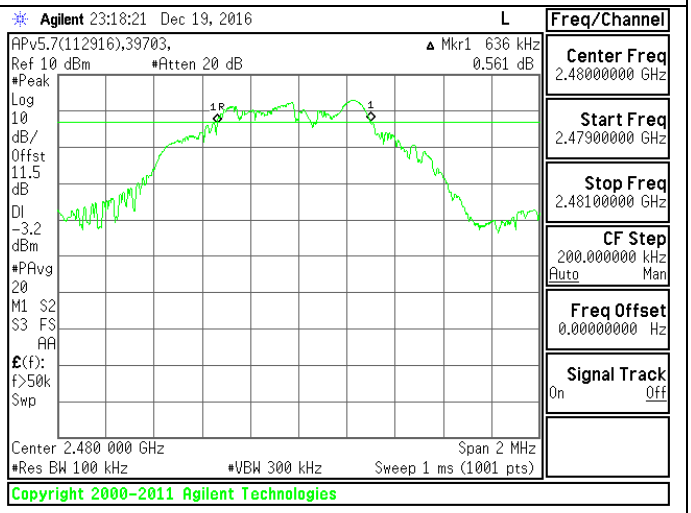
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



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9.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

ANSI C63.10: 2013 Section 6.9.3
.

RESULTS

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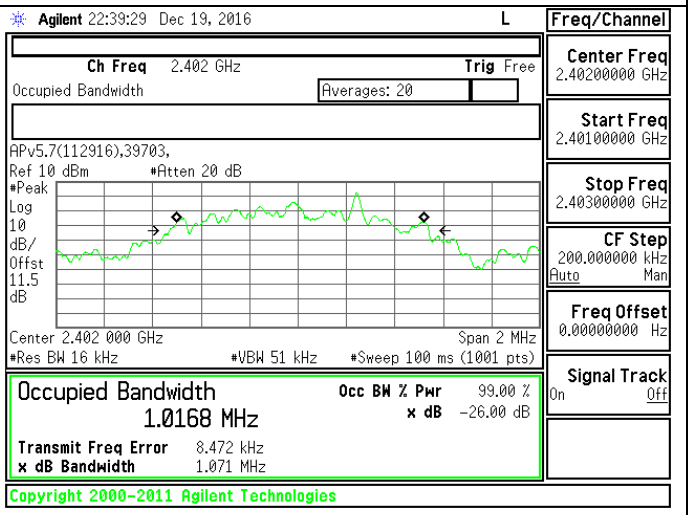
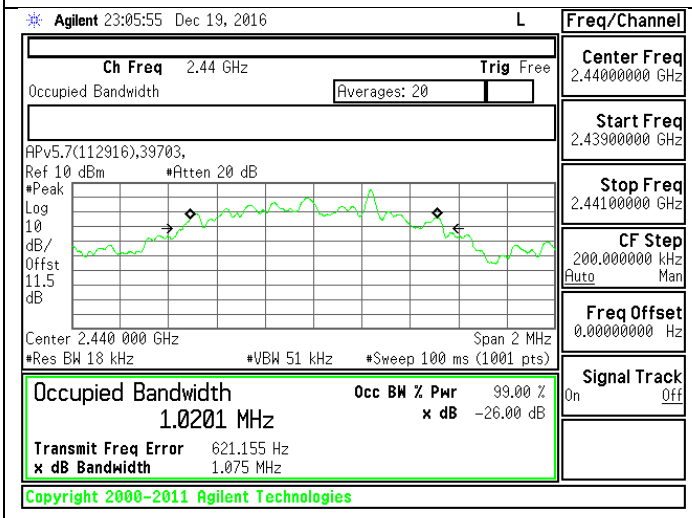
TEST RESULT TABLE

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2402	1.0168
Middle	2440	1.0200
High	2480	1.0190

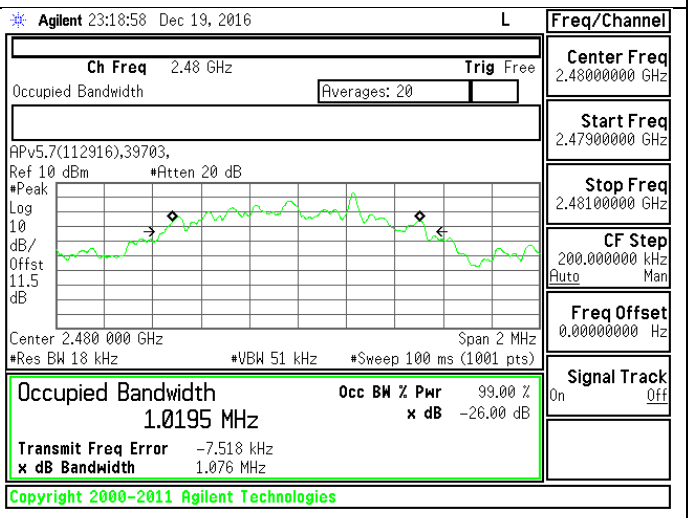
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



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9.4. 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

KDB 58074 D01 v03r05 Section 9.1.1

RESULTS

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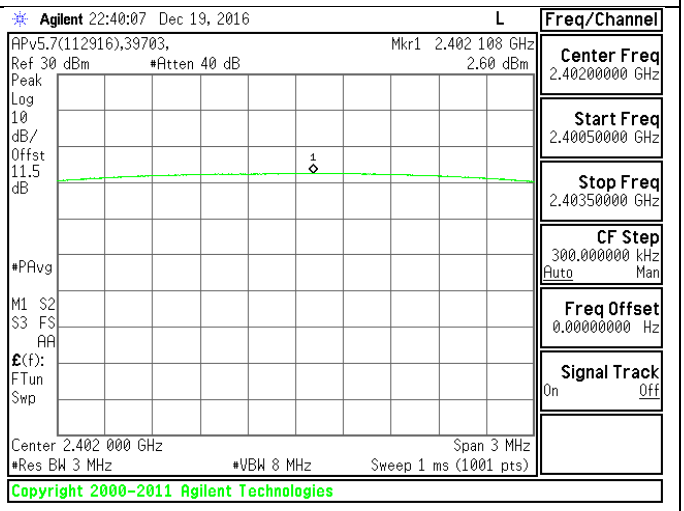
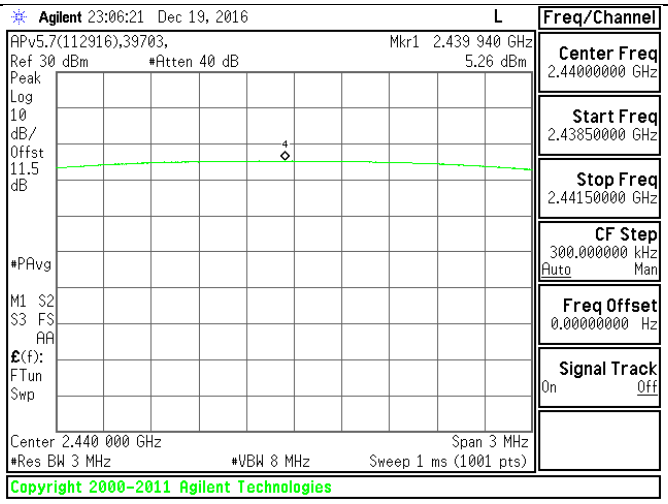
TEST RESULT TABLE

Channel	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Margin (dB)
Low	2402	2.600	30	-27.40
Middle	2440	5.260	30	-24.74
High	2480	3.260	30	-26.74

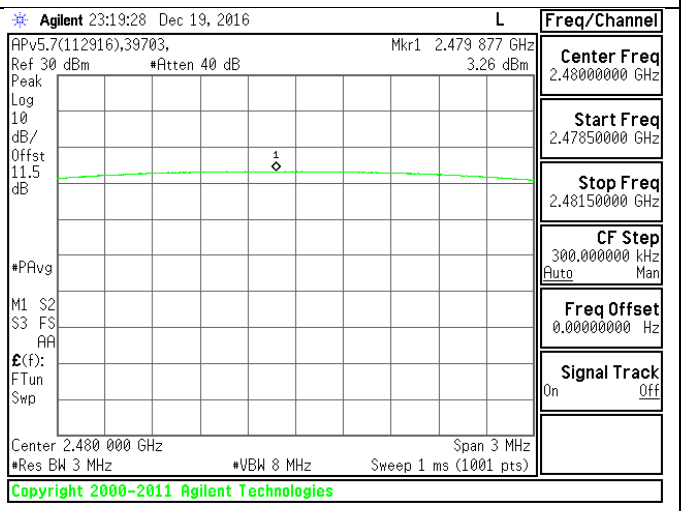
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



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9.5. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

Channel	Frequency (MHz)	Average Power (dBm)
Low	2402	1.98
Middle	2440	5.05
High	2480	2.61

NOTE: --

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9.6. 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

KDB 58074 D01 v03r05 Section 10.2
.

RESULTS

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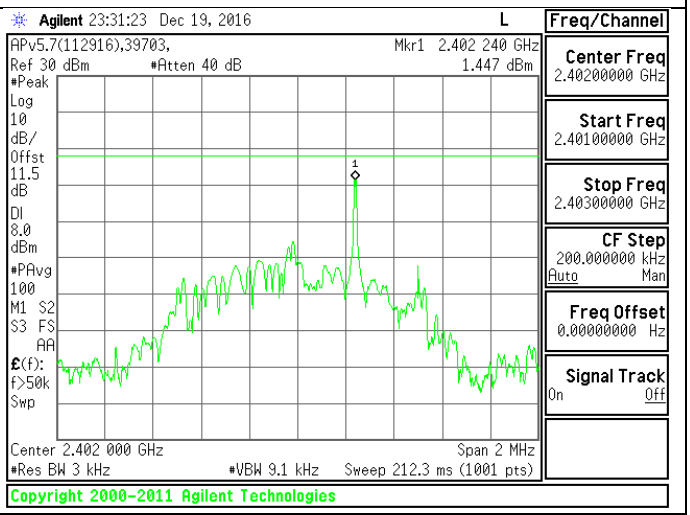
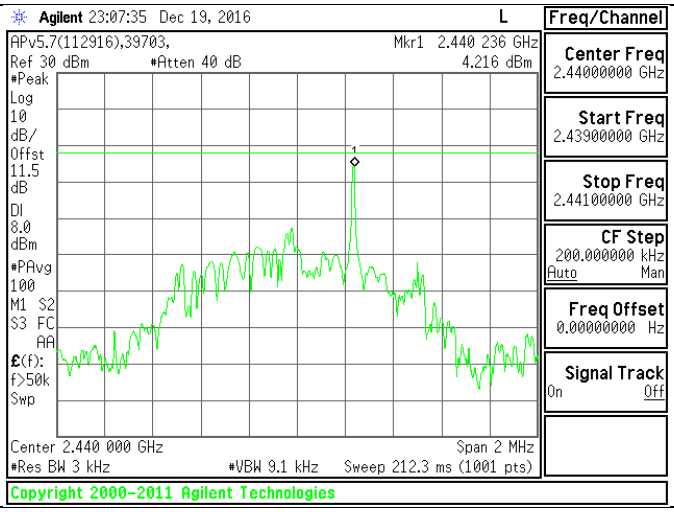
TEST RESULT TABLE

Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2402	1.45	8	-6.553
Middle	2440	4.216	8	-3.784
High	2480	2.166	8	-5.834

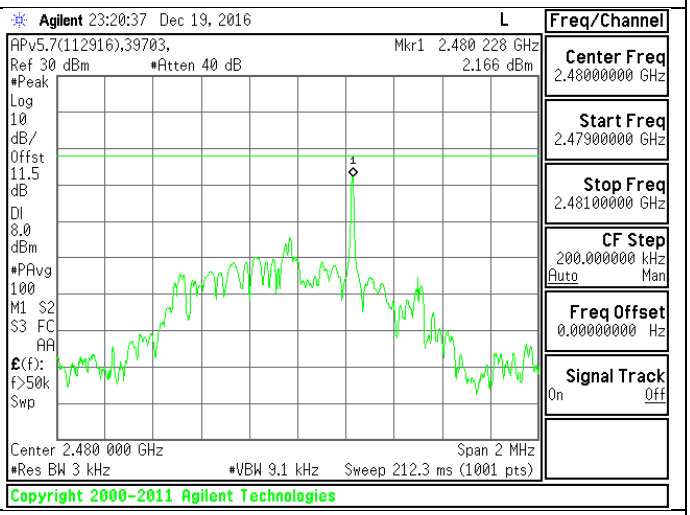
LOW CHANNEL



MID CHANNEL



HIGH CHANNEL



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9.7. CONDUCTED BANDEDGE AND 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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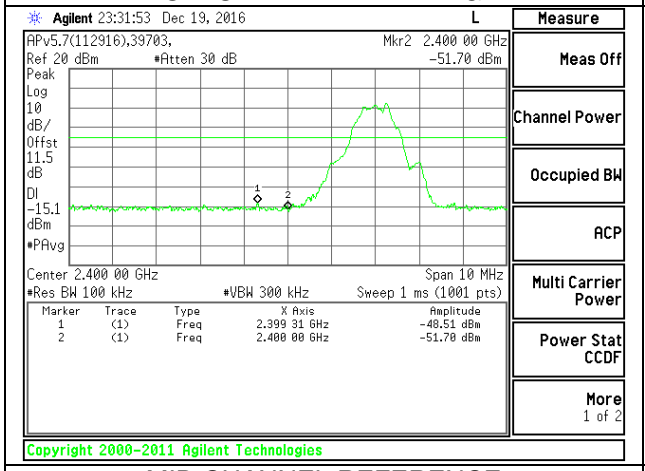
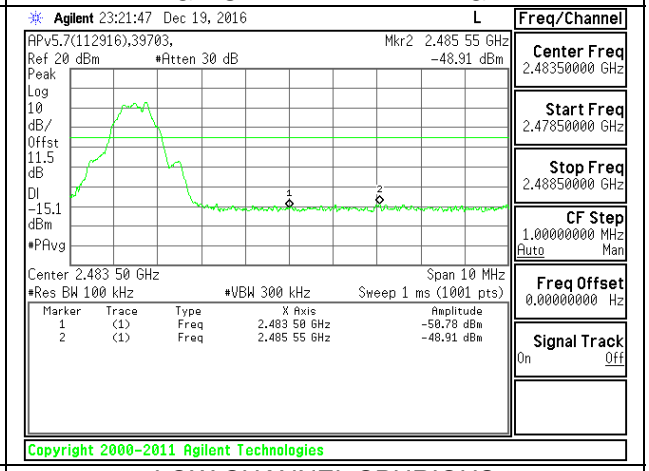
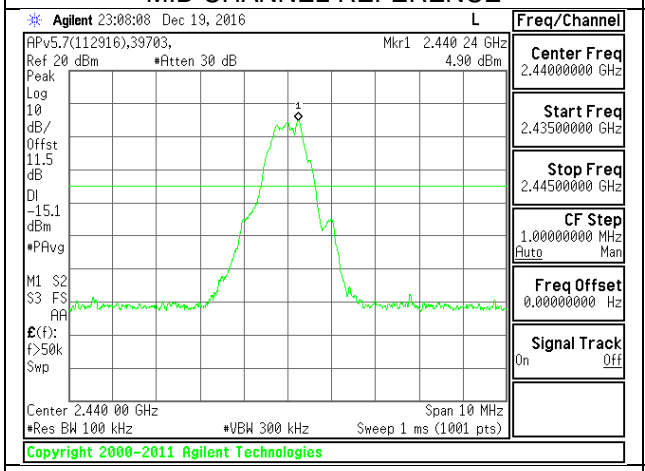
LOW CHANNEL BANDEDGE



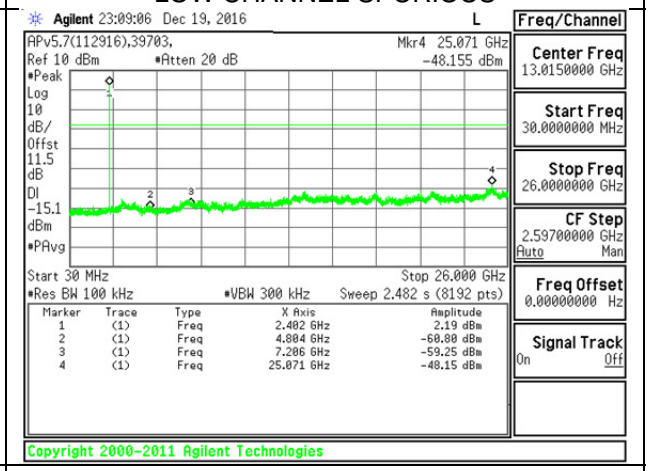
HIGH CHANNEL BANDEDGE



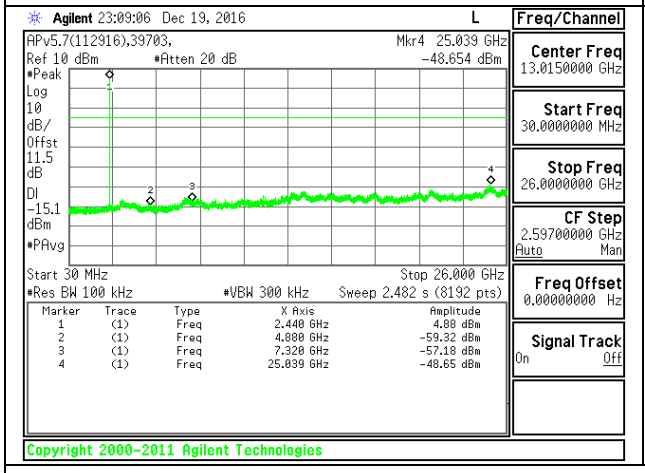
MID CHANNEL REFERENCE



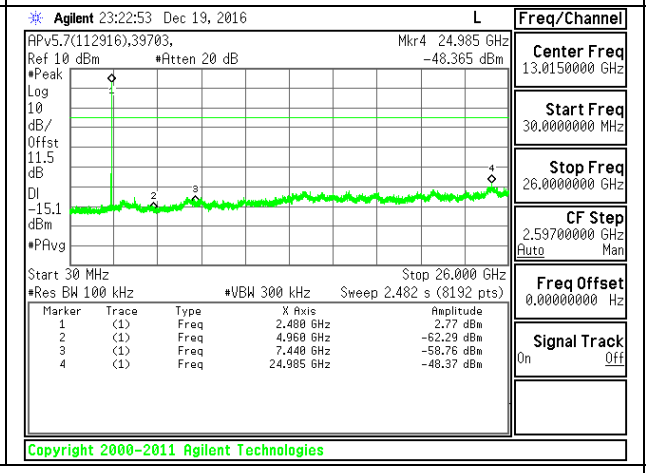
LOW CHANNEL SPURIOUS



MID CHANNEL SPURIOUS



HIGH CHANNEL SPURIOUS



NOTE:--

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10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-GEN, Section 8.9 and 8.10.

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300m	2400/F(kHz) @ 300m
0.490-1.705	24000/F(kHz) @ 30m	24000/F(kHz) @ 30m
1.705-30.0	30 @ 30m	30 @ 30m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

NOTE: KDB 937606 OATS and Chamber Correlation Justification

- Based on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.
- OATs and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement 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 pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

For final 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 9 kHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.
Note: The pre-scan measurements above 1GHz the VBW is set to 30 kHz.

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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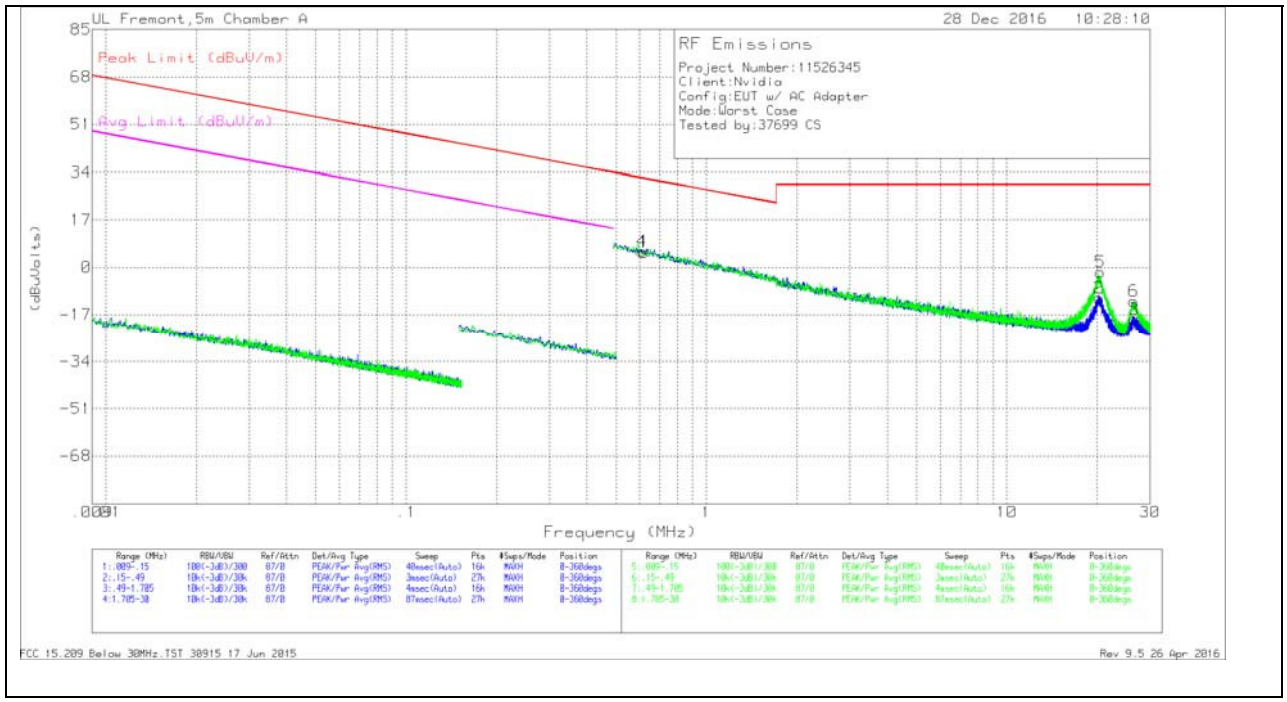
10.3. WORST-CASE BELOW 30 MHz

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cbl (dB)	Dist Corr 30m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
4	.61084	4.85	Pk	10.6	.1	-40	-24.45	31.89	-56.34	-	-	0-360
1	.61973	34.73	Pk	10.6	.1	-40	5.43	31.76	-26.33	-	-	0-360
2	20.2829	18.27	Pk	10	.7	-40	-11.03	29.54	-40.57	-	-	0-360
5	20.47258	-4.89	Pk	10	.7	-40	-34.19	29.54	-63.73	-	-	0-360
6	26.40164	18.22	Pk	8.9	.8	-40	-12.08	29.54	-41.62	-	-	0-360
3	26.57247	11.87	Pk	8.8	.8	-40	-18.53	29.54	-48.07	-	-	0-360

Pk - Peak detector

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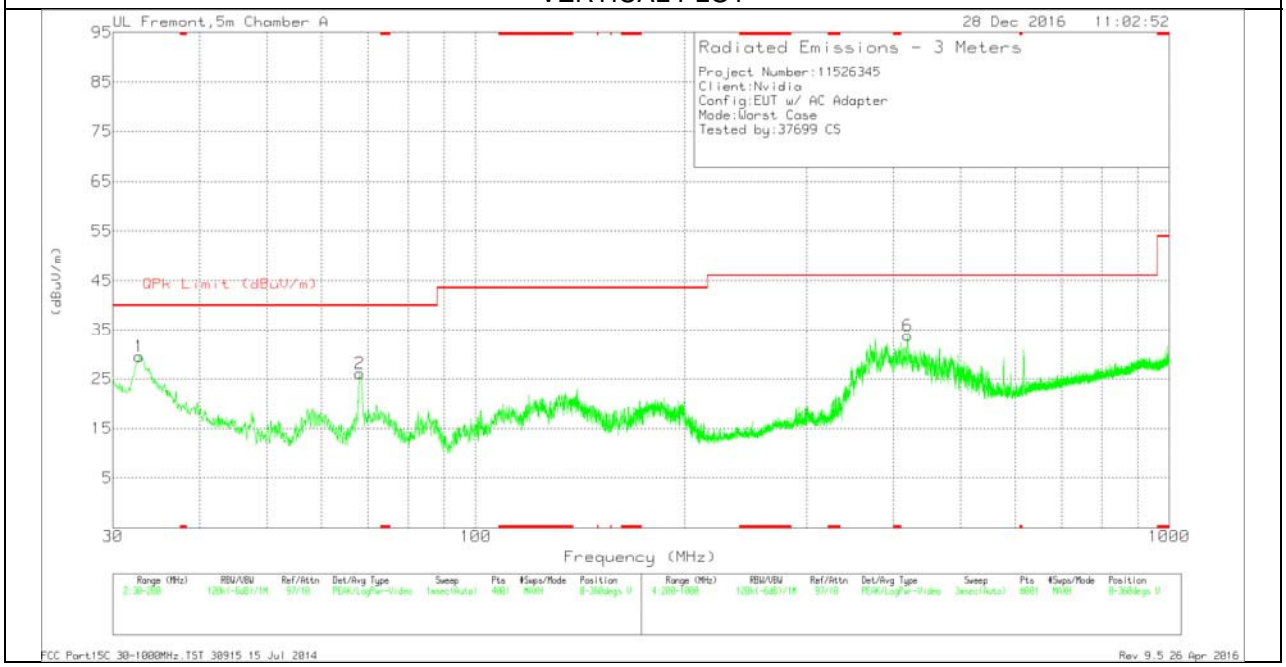
10.4. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT

VERTICAL PLOT



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BELOW 1 GHz TABLE

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	32.7625	37.01	Pk	23.7	-31.2	29.51	40	-10.49	0-360	100	V
3	60.8975	44.39	Pk	11.9	-30.8	25.49	40	-14.51	0-360	300	H
2	68.08	44.39	Pk	12.5	-30.8	26.09	40	-13.91	0-360	100	V
4	385.75	47.72	Pk	19.1	-29.1	37.72	46.02	-8.3	0-360	100	H
6	419.7	42.51	Pk	20.3	-28.9	33.91	46.02	-12.11	0-360	200	V
5	436.1	47.28	Pk	20.7	-28.8	39.18	46.02	-6.84	0-360	100	H

* - indicates frequency in CFR15.205/RSS-GEN 8.10 Restricted Band

Pk - Peak detector

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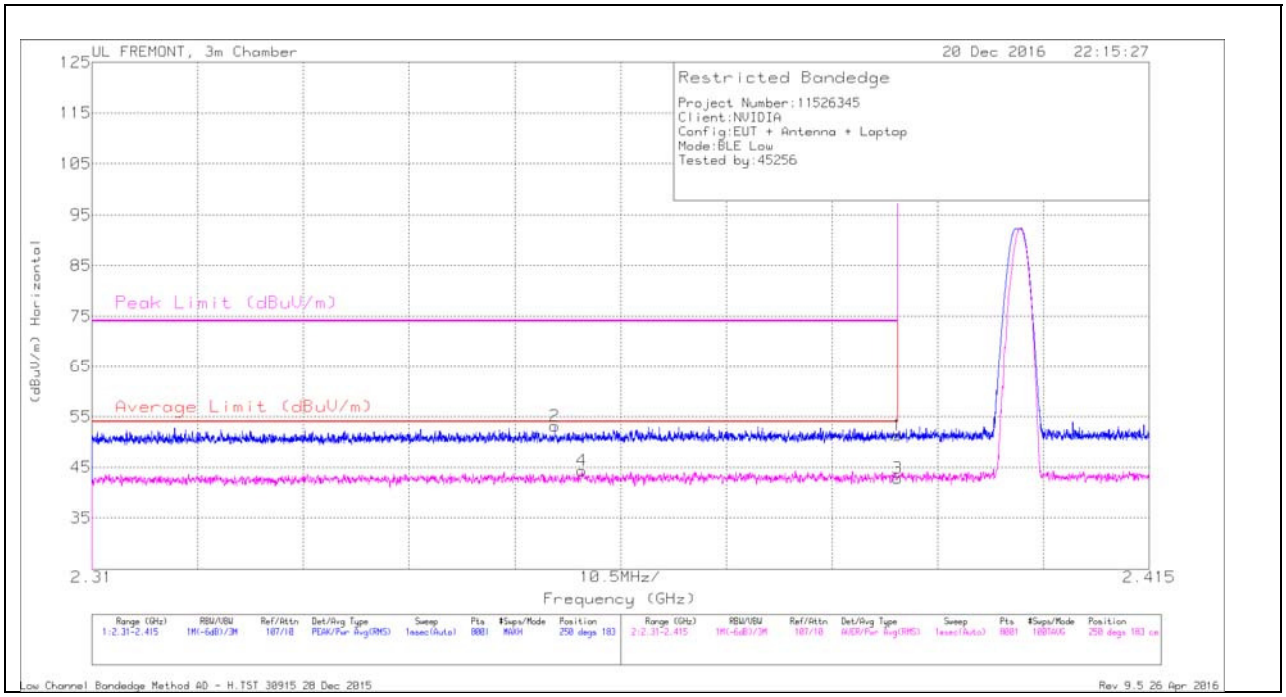
10.1. TRANSMITTER ABOVE 1 GHz

RESTRICTED BANDEDGE (LOW CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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
2	2.356	42.05	Pk	31.9	-20.8	0	53.15	-	-	74	-20.85	250	183	H
4	2.359	31.23	RMS	31.9	-20.9	2.08	44.31	54	-9.69	-	-	250	183	H
1	2.39	40.01	Pk	32.1	-20.8	0	51.31	-	-	74	-22.69	250	183	H
3	2.39	29.46	RMS	32.1	-20.8	2.08	42.84	54	-11.16	-	-	250	183	H

* - indicates frequency in CFR15.205/RSS-GEN 8.10 Restricted Band

Pk - Peak detector

RMS - RMS detection

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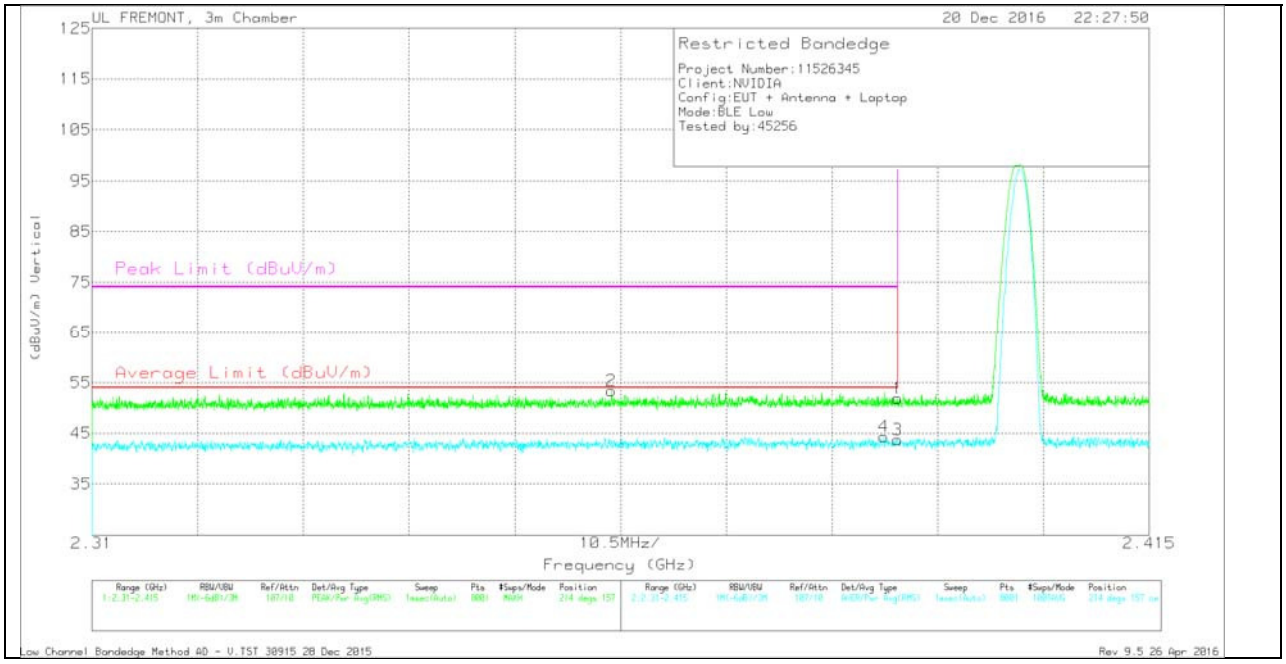
VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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
2	2.362	42.26	Pk	31.9	-20.8	0	53.36	-	-	74	-20.64	214	157	V
4	2.389	30.95	RMS	32.1	-20.8	2.08	44.33	54	-9.67	-	-	214	157	V
1	2.39	40.56	Pk	32.1	-20.8	0	51.86	-	-	74	-22.14	214	157	V
3	2.39	30.36	RMS	32.1	-20.8	2.08	43.74	54	-10.26	-	-	214	157	V

* - indicates frequency in CFR15.205/RSS-GEN 8.10 Restricted Band

Pk - Peak detector

RMS - RMS detection

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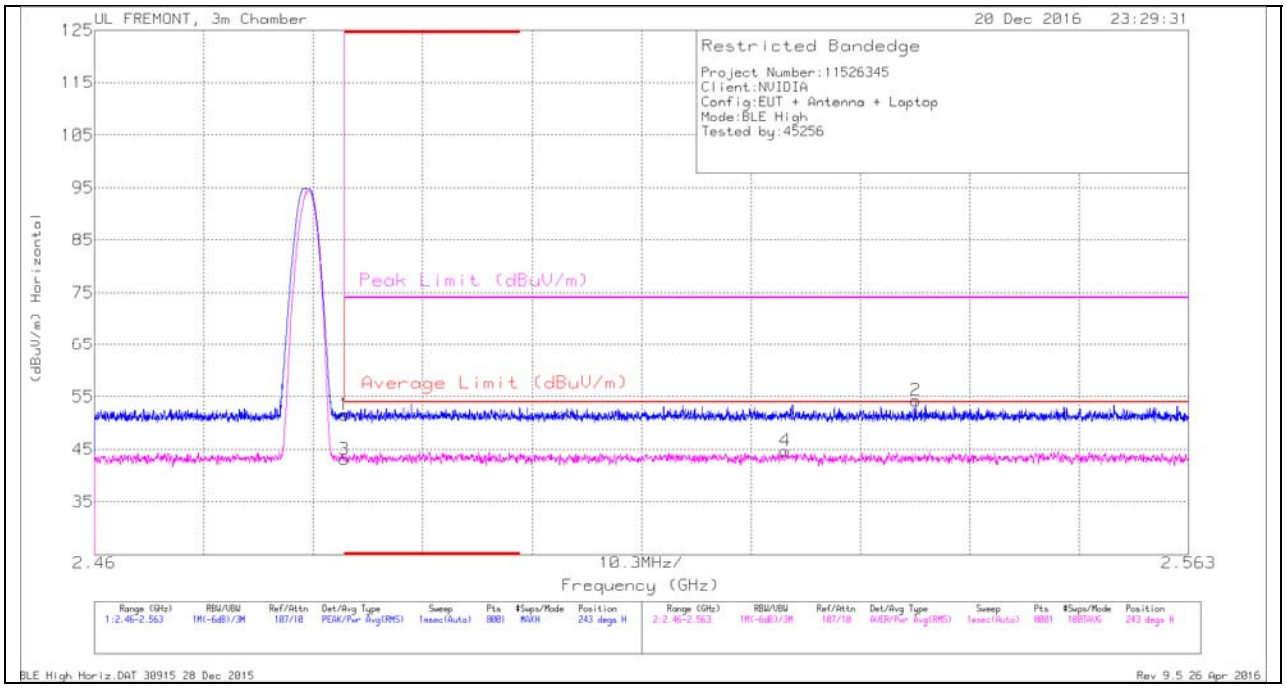
AUTHORIZED BANDEDGE (HIGH CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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	39.91	Pk	32.4	-20.8	0	51.51	-	-	74	-22.49	243	257	H
3	* 2.484	29.39	RMS	32.4	-20.8	2.08	43.07	54	-10.93	-	-	243	257	H
4	2.525	30.81	RMS	32.4	-20.6	2.08	44.69	54	-9.31	-	-	243	257	H
2	2.537	42.74	Pk	32.4	-20.9	0	54.24	-	-	74	-19.76	243	257	H

* - indicates frequency in CFR15.205/RSS-GEN 8.10 Restricted Band

Pk - Peak detector

RMS - RMS detection

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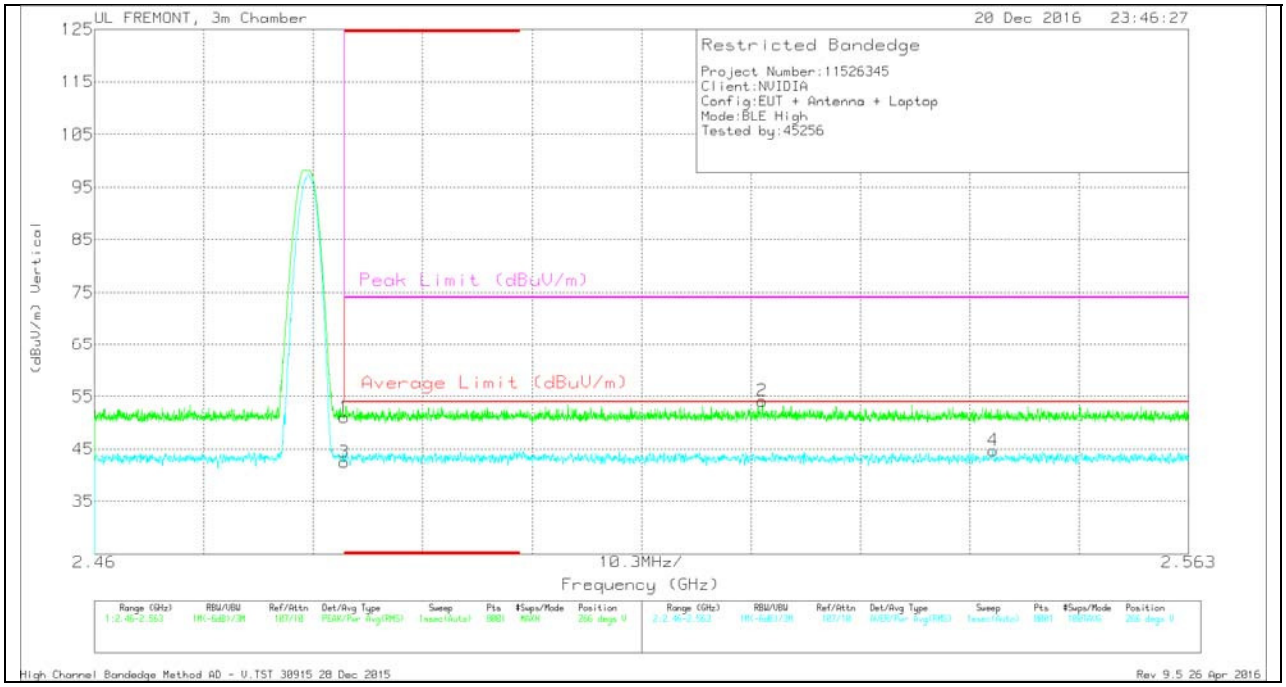
VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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	39.39	Pk	32.4	-20.8	0	50.99	-	-	74	-23.01	266	266	V
3	* 2.484	28.75	RMS	32.4	-20.8	2.08	42.43	54	-11.57	-	-	266	266	V
2	2.523	42.49	Pk	32.4	-20.7	0	54.19	-	-	74	-19.81	266	266	V
4	2.545	31.03	RMS	32.4	-20.8	2.08	44.71	54	-9.29	-	-	266	266	V

* - indicates frequency in CFR15.205/RSS-GEN 8.10 Restricted Band

Pk - Peak detector

RMS - RMS detection

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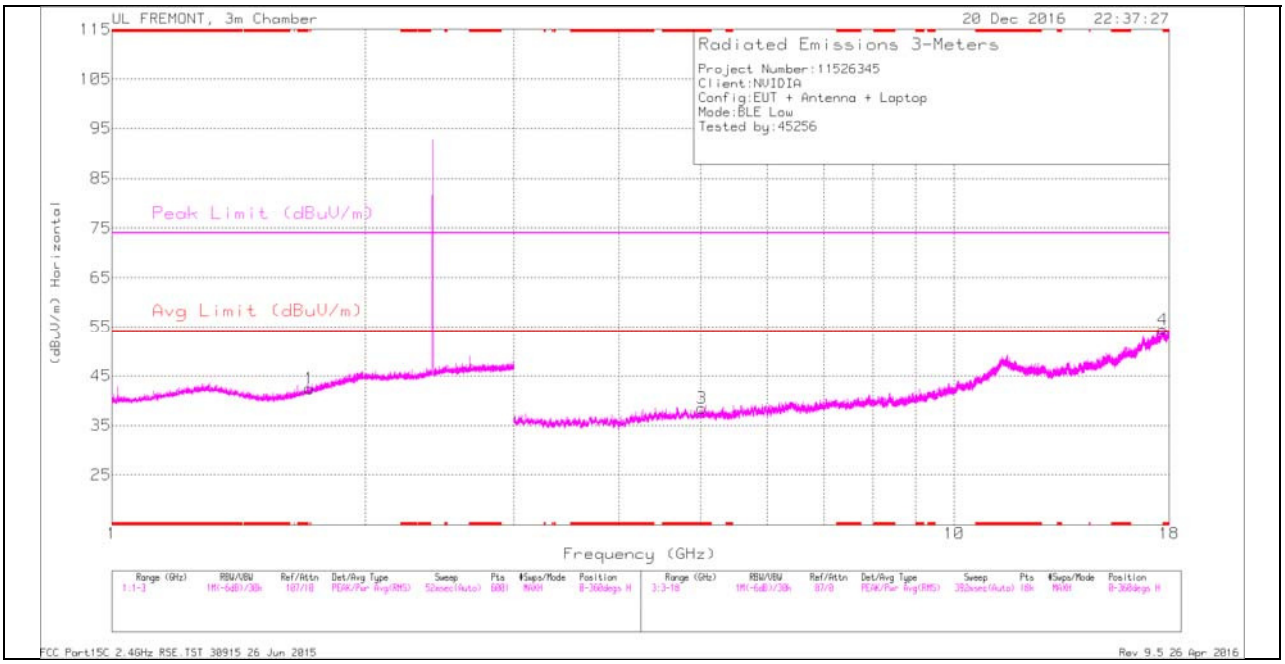
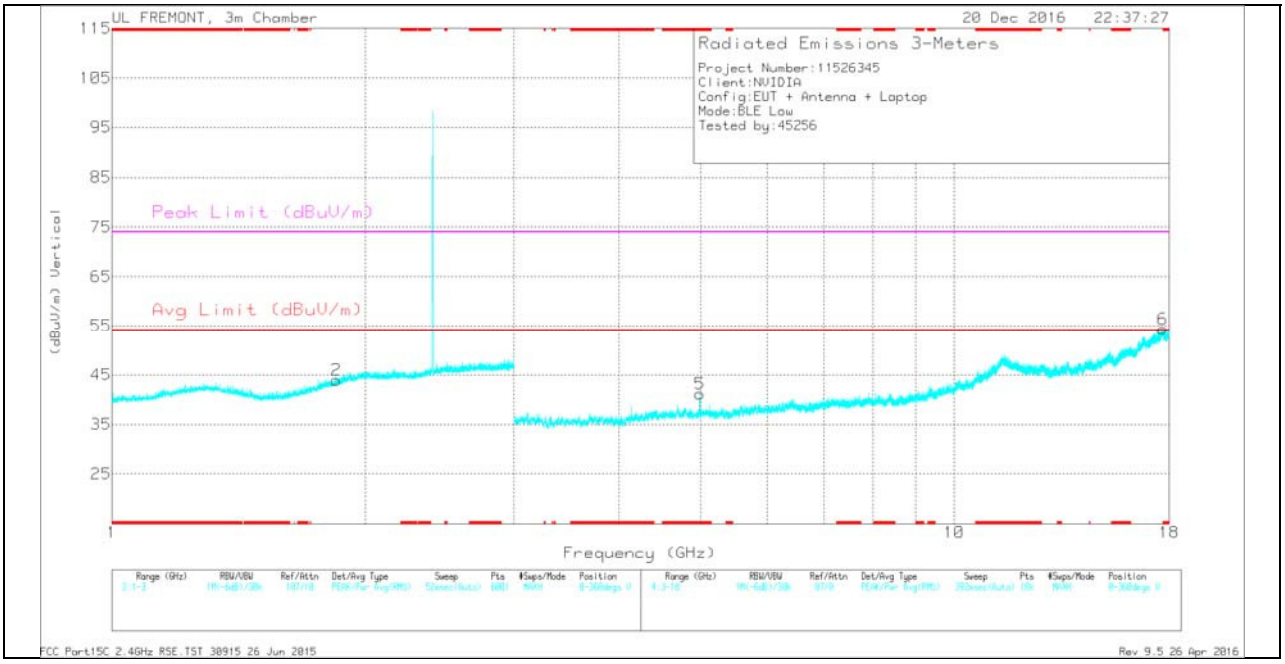
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



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LOW CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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
3	* 5.014	32.24	Pk	34.2	-28	0	38.44	-	-	74	-35.56	0-360	200	H
5	* 4.988	35.5	Pk	34.2	-28.5	0	41.2	-	-	74	-32.8	0-360	100	V
1	1.715	34.82	Pk	29.2	-21.6	0	42.42	-	-	-	-	0-360	200	H
2	1.848	34.62	Pk	30.7	-21.4	0	43.92	-	-	-	-	0-360	200	V
4	17.679	24.23	Pk	41.3	-11	0	54.53	-	-	-	-	0-360	100	H
6	17.681	24.03	Pk	41.3	-11	0	54.33	-	-	-	-	0-360	200	V

* - indicates frequency in CFR15.205/RSS-GEN 8.10 Restricted Band

Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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
* 5.014	38.05	PK2	34.2	-28	0	44.25	-	-	74	-29.75	190	204	H
* 5.012	27.79	MAv1	34.2	-28	2.08	36.07	54	-17.93	-	-	190	204	H
* 4.988	41.33	PK2	34.2	-28.5	0	47.03	-	-	74	-26.97	293	227	V
* 4.988	28.57	MAv1	34.2	-28.5	2.08	36.35	54	-17.65	-	-	293	227	V
1.713	42.57	PK2	29.2	-21.6	0	50.17	-	-	-	-	156	228	H
1.716	30.64	MAv1	29.2	-21.6	2.08	40.32	-	-	-	-	156	228	H
1.849	42.28	PK2	30.8	-21.4	0	51.68	-	-	-	-	246	395	V
1.85	30.41	MAv1	30.8	-21.4	2.08	41.89	-	-	-	-	246	395	V
17.677	20.35	MAv1	41.3	-11	2.08	52.73	-	-	-	-	0	158	H
17.68	30.7	PK2	41.3	-11	0	61	-	-	-	-	0	158	H
17.68	20.18	MAv1	41.3	-11	2.08	52.56	-	-	-	-	8	236	V
17.683	31.44	PK2	41.3	-11	0	61.74	-	-	-	-	8	236	V

* - indicates frequency in CFR15.205/RSS-GEN 8.10 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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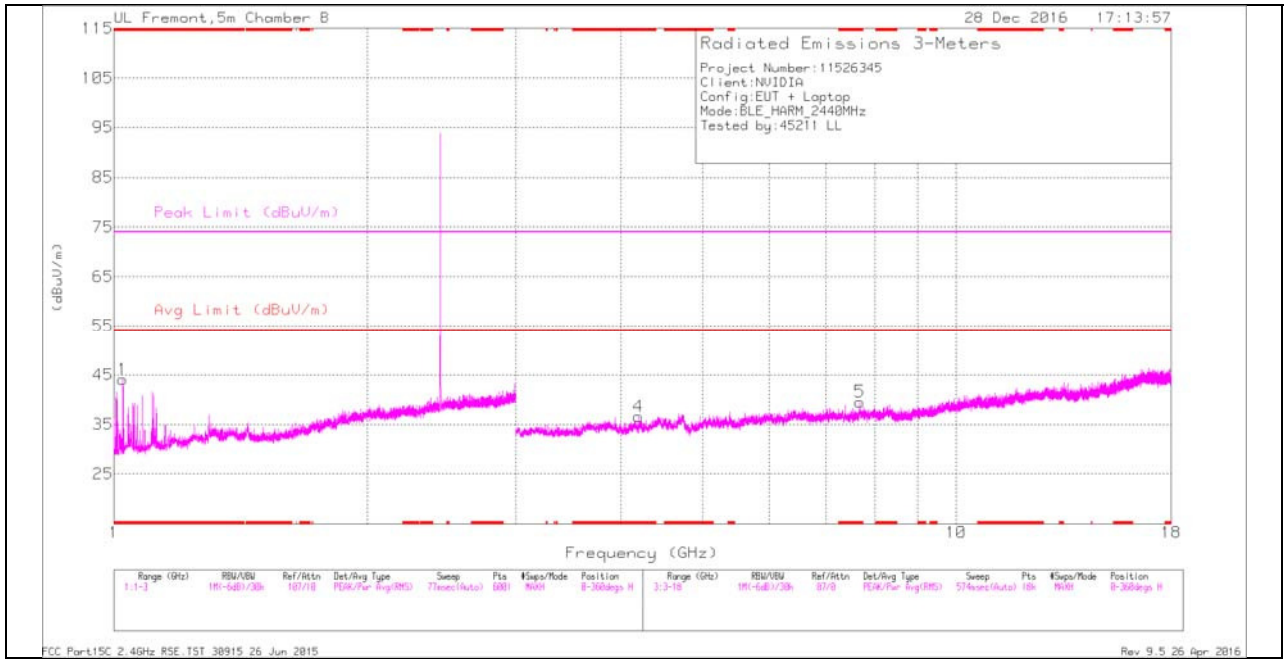
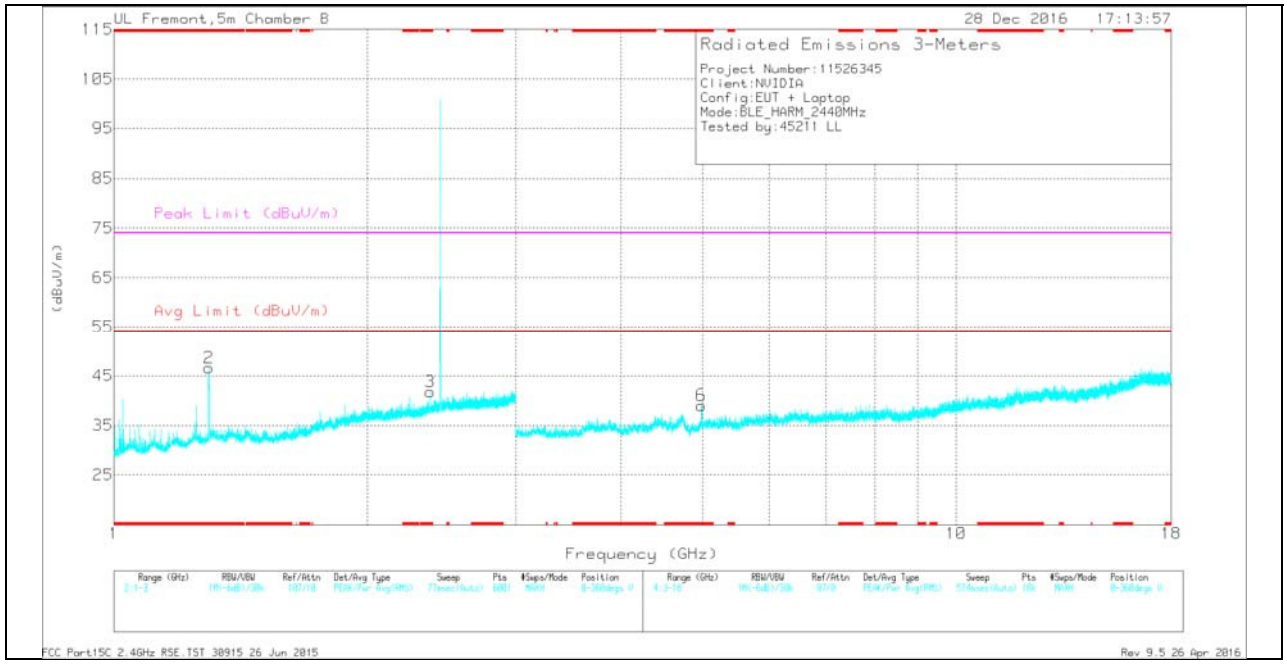
MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL



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MID 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	* 1.025	40.75	Pk	27.8	-24.5	0	44.05	-	-	74	-29.95	0-360	201	H
2	* 1.296	40.76	Pk	29	-23.1	0	46.66	-	-	74	-27.34	0-360	98	V
3	* 2.375	32.1	Pk	32	-22.3	0	41.8	-	-	74	-32.2	0-360	98	V
4	* 4.192	34.81	Pk	33.7	-31.9	0	36.61	-	-	74	-37.39	0-360	98	H
5	* 7.677	32.67	Pk	35.7	-28.8	0	39.57	-	-	74	-34.43	0-360	201	H
6	* 4.982	36.86	Pk	34	-31.8	0	39.06	-	-	74	-34.94	0-360	201	V

* - indicates frequency in CFR15.205/RSS-GEN 8.10 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
* 1.025	41.8	PK2	27.8	-24.5	0	45.1	-	-	74	-28.9	216	285	H
* 1.024	19.62	MAv1	27.8	-24.5	2.08	25	54	-29	-	-	216	285	H
* 1.297	39.89	PK2	29	-23.1	0	45.79	-	-	74	-28.21	298	112	V
* 1.3	19.2	MAv1	29	-23	2.08	27.28	54	-26.72	-	-	298	112	V
* 2.375	37.83	PK2	32	-22.3	0	47.53	-	-	74	-26.47	65	313	V
* 2.375	30.1	MAv1	32	-22.3	2.08	41.88	54	-12.12	-	-	65	313	V
* 4.193	39.22	PK2	33.7	-31.9	0	41.02	-	-	74	-32.98	67	226	H
* 4.195	28.45	MAv1	33.7	-31.9	2.08	32.33	54	-21.67	-	-	67	226	H
* 7.679	37.21	PK2	35.7	-28.8	0	44.11	-	-	74	-29.89	301	273	H
* 7.675	26.21	MAv1	35.7	-28.8	2.08	35.19	54	-18.81	-	-	301	273	H
* 4.978	43.31	PK2	34	-31.9	0	45.41	-	-	74	-28.59	360	105	V
* 4.979	29.81	MAv1	34	-31.9	2.08	33.99	54	-20.01	-	-	360	105	V

* - indicates frequency in CFR15.205/RSS-GEN 8.10 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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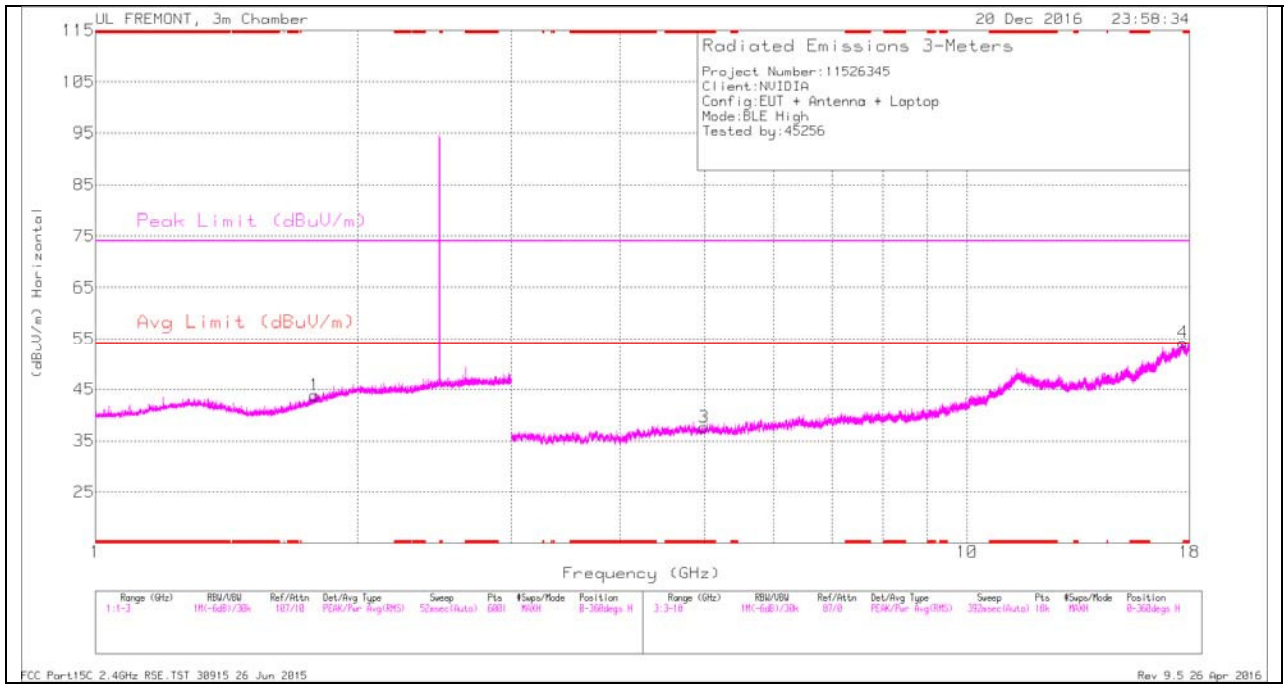
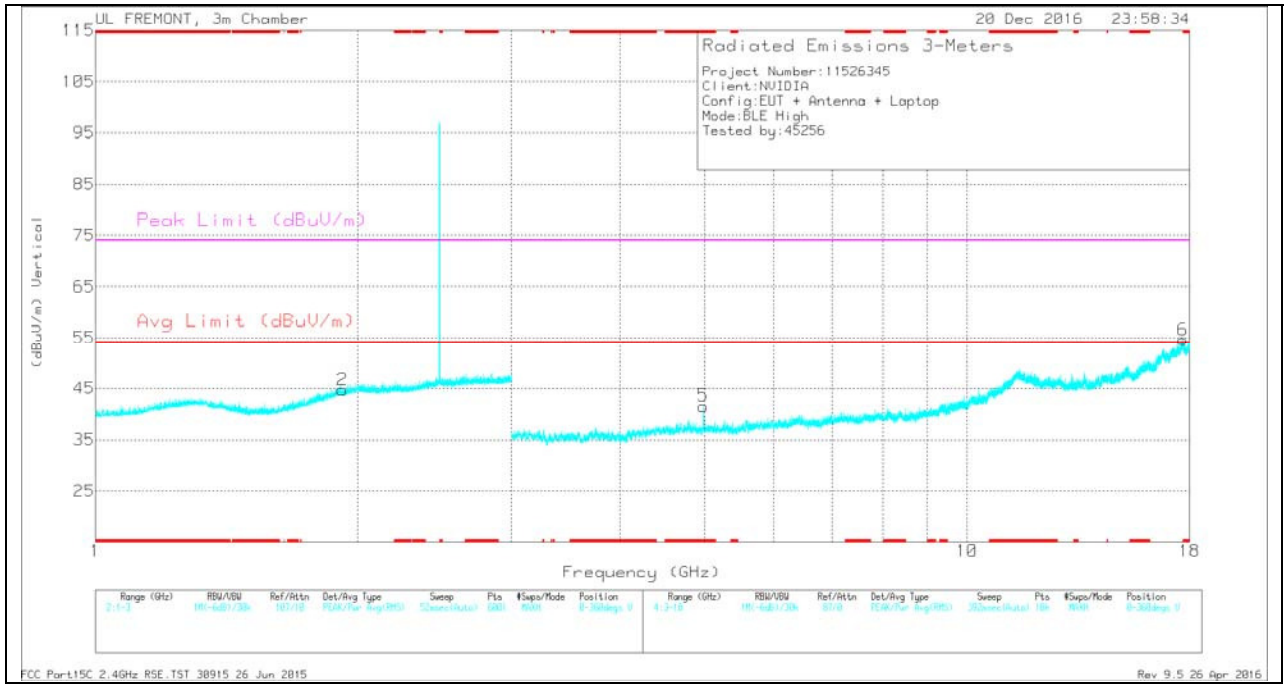
HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



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HIGH CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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
3	* 4.991	31.83	Pk	34.2	-28.4	0	37.63	-	-	74	-36.37	0-360	200	H
5	* 4.978	35.8	Pk	34.2	-28.4	0	41.6	-	-	74	-32.4	0-360	100	V
1	1.785	35.2	Pk	30.1	-21.5	0	43.8	-	-	-	-	0-360	200	H
2	1.92	34.49	Pk	31.4	-21.2	0	44.69	-	-	-	-	0-360	200	V
4	17.684	24.09	Pk	41.3	-11.1	0	54.29	-	-	-	-	0-360	200	H
6	17.684	24.42	Pk	41.3	-11.1	0	54.62	-	-	-	-	0-360	200	V

* - indicates frequency in CFR15.205/RSS-GEN 8.10 Restricted Band

Pk - Peak detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (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
* 4.99	39.16	PK2	34.2	-28.4	0	44.96	-	-	74	-29.04	133	228	H
* 4.989	27.77	MAv1	34.2	-28.5	2.18	35.65	54	-18.35	-	-	133	228	H
* 4.979	43.39	PK2	34.2	-28.4	0	49.19	-	-	74	-24.81	298	198	V
* 4.979	29.42	MAv1	34.2	-28.4	2.18	37.4	54	-16.6	-	-	298	198	V
1.784	41.86	PK2	30	-21.5	0	50.36	-	-	-	-	210	249	H
1.786	30.62	MAv1	30.1	-21.5	2.18	41.4	-	-	-	-	210	249	H
1.919	41.88	PK2	31.4	-21.2	0	52.08	-	-	-	-	91	325	V
1.919	30.27	MAv1	31.4	-21.2	2.18	42.65	-	-	-	-	91	325	V
17.683	20.44	MAv1	41.3	-11.1	2.18	52.82	-	-	-	-	155	175	H
17.684	30.53	PK2	41.3	-11.1	0	60.73	-	-	-	-	255	359	V
17.685	20.03	MAv1	41.3	-11.1	2.18	52.41	-	-	-	-	255	359	V
17.686	30.83	PK2	41.3	-11.1	0	61.03	-	-	-	-	155	175	H

* - indicates frequency in CFR15.205/RSS-GEN 8.10 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

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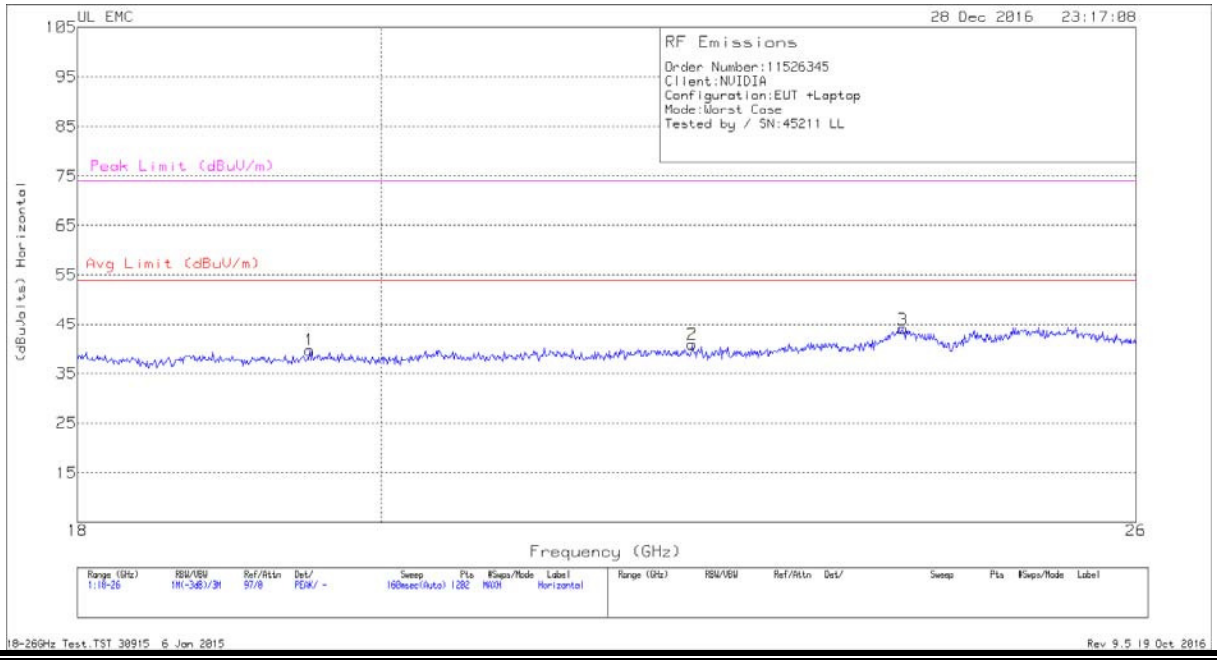
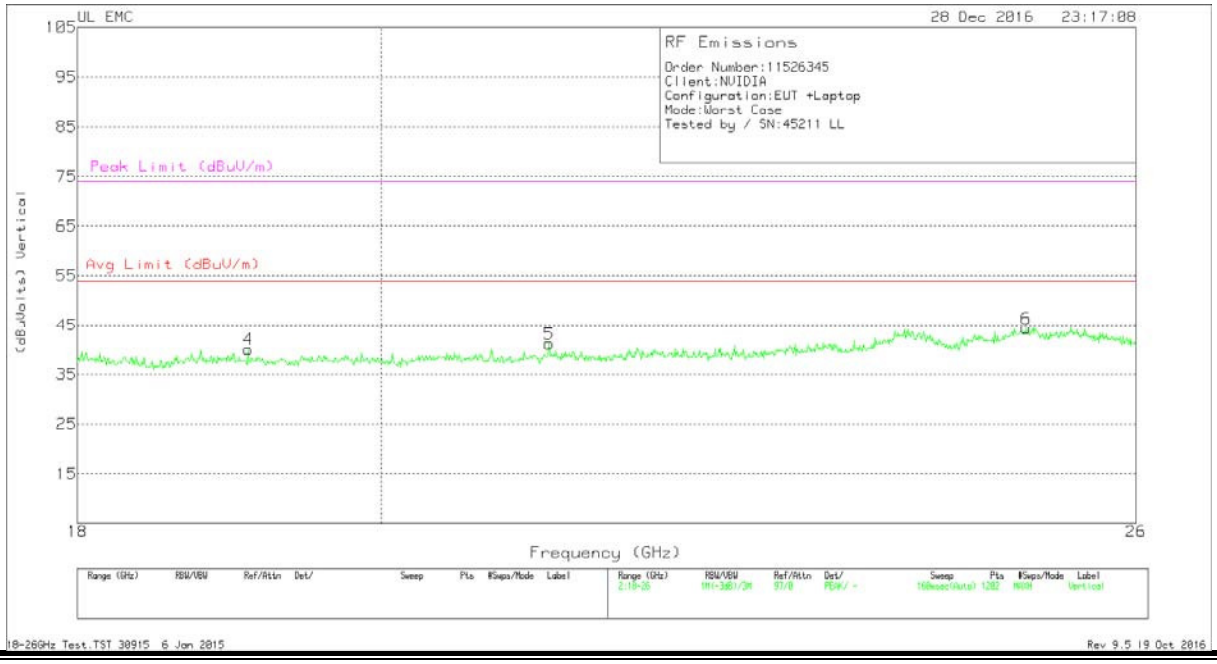
10.1. WORST-CASE 18 - 26 GHz

SPURIOUS EMISSIONS 18 TO 26 GHz (WORST-CASE CONFIGURATION)

HORIZONTAL PLOT



VERTICAL PLOT



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18 to 26 GHz TABLE

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T449 (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	19.512	41.57	Pk	32.7	-25.1	-9.5	39.67	54	-14.33	74	-34.33
2	22.283	41.43	Pk	33.5	-24.6	-9.5	40.83	54	-13.17	74	-33.17
3	23.975	43.7	Pk	34	-24.2	-9.5	44	54	-10	74	-30
4	19.099	41.8	Pk	32.7	-25	-9.5	40	54	-14	74	-34
5	21.204	42.27	Pk	33.1	-24.7	-9.5	41.17	54	-12.83	74	-32.83
6	25.027	44.33	Pk	34.2	-24.7	-9.5	44.33	54	-9.67	74	-29.67

Pk - Peak detector

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701I
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
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10.2. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

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

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

RESULTS

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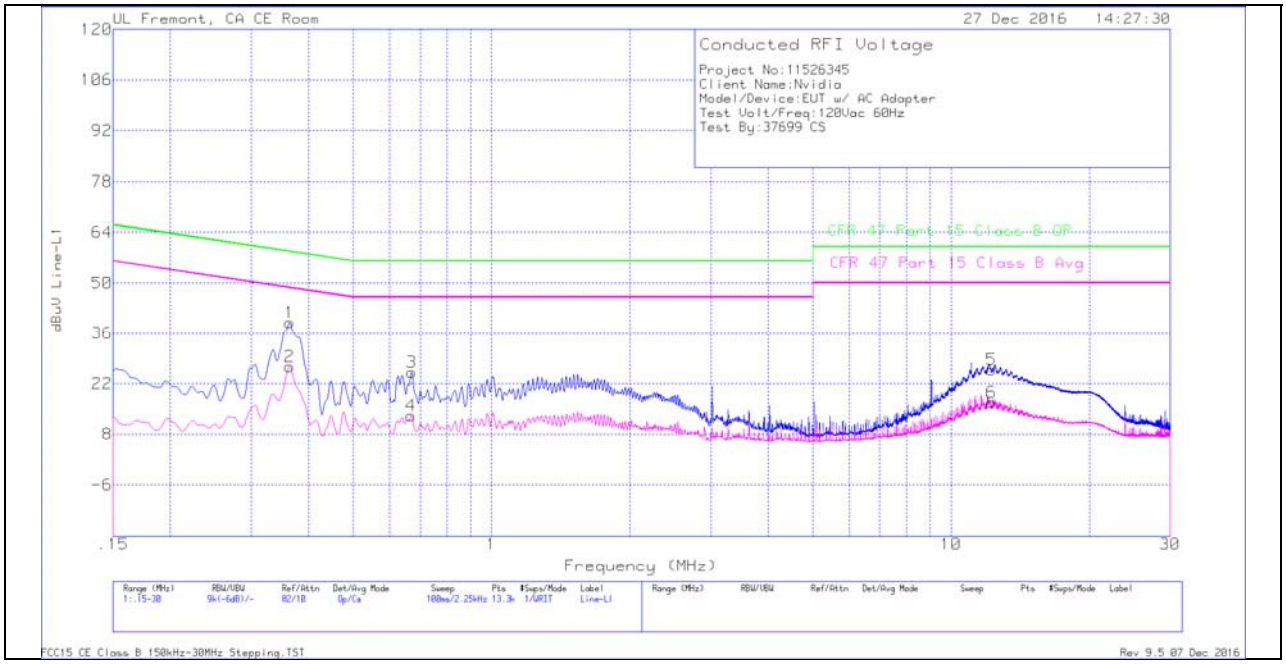
6 WORST EMISSIONS

LINE 1 PLOT



LINE 1 RESULT

Trace Markers

Range 1: Line-L1 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L1	LC Cables 1&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)Margin (dB)
1	.36375	28.97	Qp	0	0	10.1	39.07	58.64	-19.57	-	-
2	.36375	16.61	Ca	0	0	10.1	26.71	-	-	48.64	-21.93
3	.66975	15.12	Qp	0	0	10.1	25.22	56	-30.78	-	-
4	.6675	3.02	Ca	0	0	10.1	13.12	-	-	46	-32.88
5	12.25275	15.34	Qp	.1	.2	10.2	25.84	60	-34.16	-	-
6	12.25275	6.27	Ca	.1	.2	10.2	16.77	-	-	50	-33.23

Qp - Quasi-Peak detector

Ca - CISPR average detection

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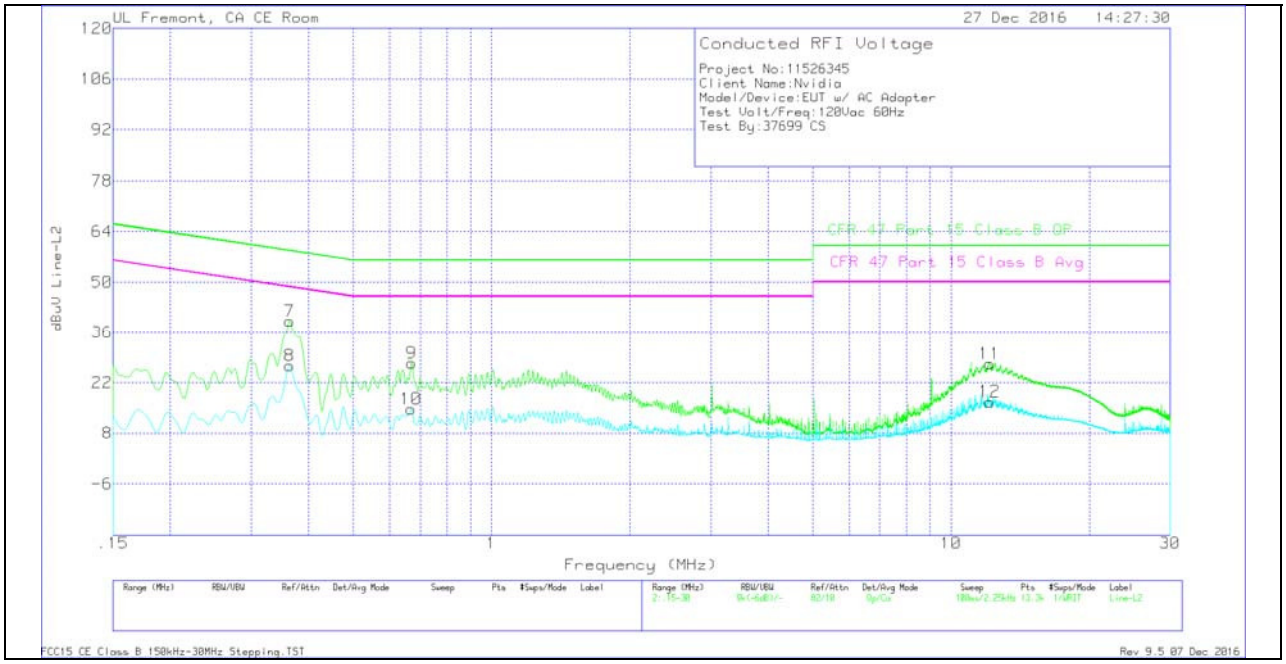
LINE 2 PLOT



LINE 2 RESULT

Trace Markers

Range 2: Line-L2 .15 - 30MHz

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN L2	LC Cables 2&3	Limiter (dB)	Corrected Reading dBuV	CFR 47 Part 15 Class B QP	QP Margin (dB)	CFR 47 Part 15 Class B Avg	Av(CISPR)Margin (dB)
7	.36375	29.1	Qp	0	0	10.1	39.2	58.64	-19.44	-	-
8	.36375	16.54	Ca	0	0	10.1	26.64	-	-	48.64	-22
9	.66975	17.31	Qp	0	0	10.1	27.41	56	-28.59	-	-
10	.6675	4.63	Ca	0	0	10.1	14.73	-	-	46	-31.27
11	12.12675	16.89	Qp	0	.2	10.2	27.29	60	-32.71	-	-
12	12.147	6.31	Ca	0	.2	10.2	16.71	-	-	50	-33.29

Qp - Quasi-Peak detector

Ca - CISPR average detection

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