



**FCC 47 CFR PART 15 SUBPART E
INDUSTRY CANADA RSS-247 ISSUE 1
CLASS II PERMISSIVE CHANGE
TEST REPORT
FOR
PLAYBAR**

MODEL NUMBER: PLAYBAR

**FCC ID: SBVRM006
IC: 5373A-RM006**

REPORT NUMBER: 15U21517- E1V3

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NVLAP LAB CODE 200065-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
V1	11/16/15	Initial Issue	H. Mustapha
V2	2/10/16	Updated section 9 with radiated harmonics and spurious data for UNII-1, UNII-2A and UNII-2C bands.	H. Mustapha
V3	2/15/16	Updated Test and Measurement Equipment List (Section 6) Updated results table under section 8.2 for identification of chains Updated plot headers in section 8.3 for identification of chains	H. Mustapha

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Sonos, Inc.
614 Chapala Street
Santa Barbara, CA 93101, U.S.A.

EUT DESCRIPTION: PLAYBAR

MODEL: PLAYBAR

SERIAL NUMBER: 1502-B8-E9-37-7F-De-02-F

DATE TESTED: OCTOBER 21 to NOVEMBER 02, 2015
FEBRUARY 8~9, 2016
MAY 18-JUNE 20, 2012

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

Tested By:

Huda Mustapha



HUDA MUSTAPHA
PROJECT LEAD
UL Verification Services Inc.

DANNY VU
EMC ENGINEER
UL Verification Services Inc.



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PROGRAM MANAGER
UL Verification Services Inc.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 06-96, FCC KDB 789033 D02 v01r01, 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 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 checked="" type="checkbox"/> Chamber A	<input type="checkbox"/> Chamber D
<input checked="" type="checkbox"/> Chamber B	<input type="checkbox"/> Chamber E
<input type="checkbox"/> Chamber C	<input 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:

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

4.1. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	± 3.52 dB
Radiated Disturbance, 30 to 1000 MHz	± 4.94 dB
Radiated Disturbance, 1 to 6 GHz	± 3.86 dB
Radiated Disturbance, 6 to 18 GHz	± 4.23 dB
Radiated Disturbance, 18 to 26 GHz	± 5.30 dB
Radiated Disturbance, 26 to 40 GHz	± 5.23 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT possesses an 802.11g/n wireless card. It is a 2.4/5GHz dual band concurrent module based on two Atheros' Osprey chipsets, AR9381 for 2GHz radio and AR9382 for 5GHz radio. The wireless card supports 802.11g/n functionality for 2.4GHz and 802.11n for 5GHz. The 2.4GHz radio supports (3x3) MIMO, the 5GHz radio support (2x2) MIMO.

The wireless card is manufactured by Alpha Networks, and the model number of this card is WMC-ND06.

5.2. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The purpose of this C2PC is to upgrade the device described under section 5.1 of this report to the new rules per KDB 789033 D02 v01r01 and RSS-247.

Except for radiated spurious emissions, for UNII-1, UNII-2 and UNII-2C bands, we have reviewed the original test report (report no. 12U14339-2) and are hereby attesting that all the current technical requirements are still met and all applicable test procedures remain the same. Therefore, the original test report is still applicable and further no additional testing is done.

The retesting of radiated spurious emissions in the UNII-1, UNII-2 and UNII-2C bands did not result in any change in output power levels from the original test report (report no. 12U14339-2).

5.3. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5745 - 5825	802.11n HT20	18.29	67.45

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes the following antennas. The antenna gains are as follows:

	Antenna A	Antenna B	Antenna D
5180-5240MHz	4.5dBi	N/A	5.4dBi
5260-5320MHz	4.1dBi	N/A	5.9dBi
5500-5700MHz	4.9dBi	N/A	6.0dBi
5745-5825MHz	4.3dBi	N/A	5.5dBi
Antenna A: Monopole Antenna B: Monopole Antenna D: Dipole			

5.5. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was Atheros Radio Test 2 (ART2-GUI).

5.6. WORST-CASE CONFIGURATION AND MODE

For Radiated Emissions below 1 GHz and Power line Conducted Emissions, the channel with the highest conducted output power was selected as worst-case scenario.

Worst-case data rate as provided by the manufacturer was:

For 11n HT20 (5.8 GHz band): MCS9

In accordance with the original reports 12U14339-1C and 12U14339-2, the worst-case EUT orientation was x (table-top). Therefore, all final radiated testing was performed with the EUT in X orientation.

This report covers only 802.11n HT20 mode.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Lenovo	X201	R9-6KTFV	N/A
Laptop AC Adapter	Lenovo	ADLX65NCT2A	11S45N0323Z1ZH3B4HPD	N/A

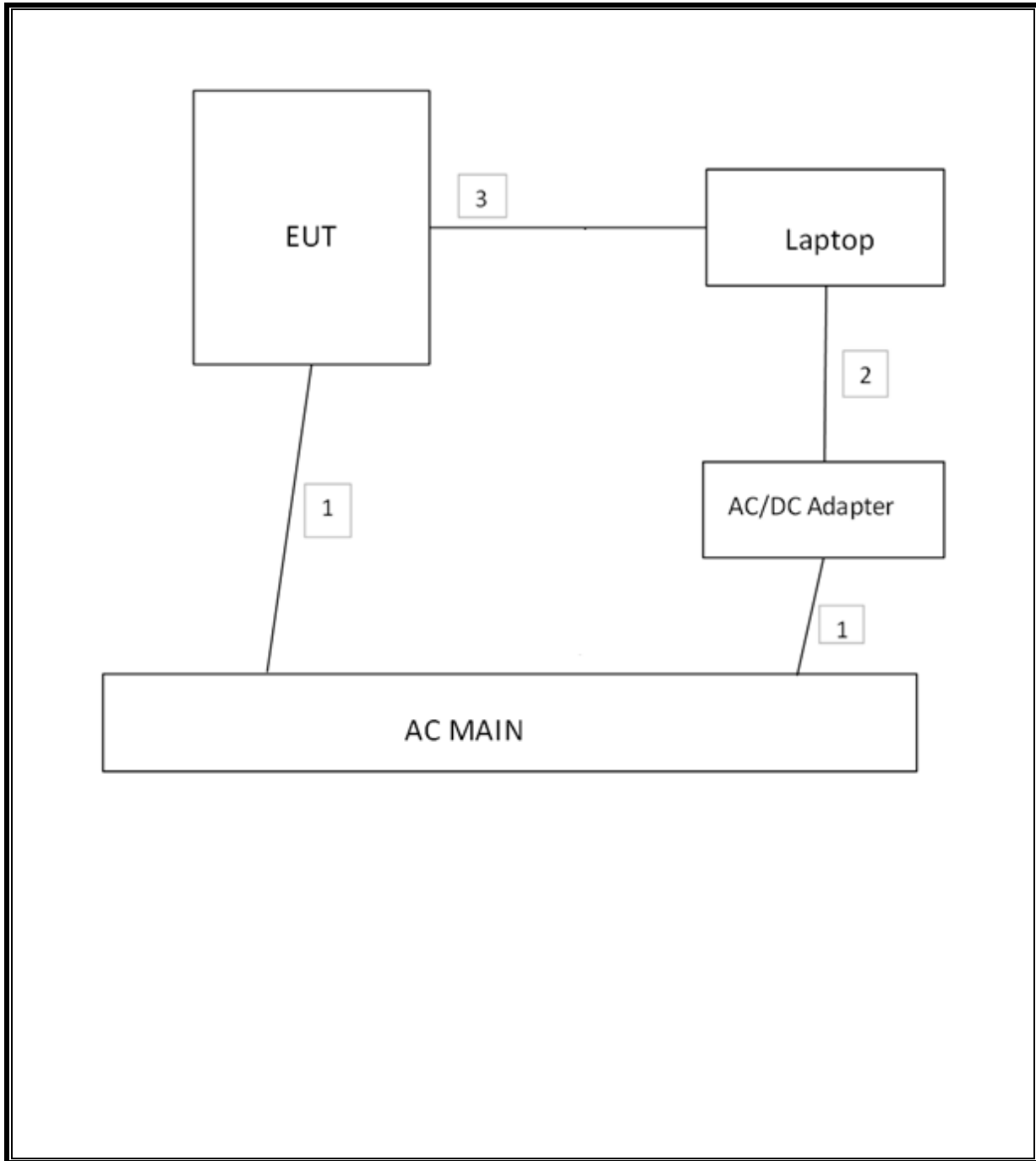
I/O CABLES

I/O Cable List						
Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	2	US 115V	Un-shielded	1.8m	N/A
2	DC	1	DC	Un-shielded	1.8m	N/A
3	Ethernet	1	RJ45	Un-shielded	1.5m	N/A

TEST SETUP

The EUT is connected to a laptop via an Ethernet cable during the tests and software exercised the radio card

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	T No.	Cal Date	Cal Due
Radiated Software	UL	UL EMC	Ver 9.5, June 6, 2015		
Conducted Software	UL	UL EMC	Ver 9.5, May 17 2012		
Bilog Antenna 30-1000MHz	Sunol	JB1	130	09/01/15	09/01/16
Horn Antenna 1-18GHz	ETS	3117	136	03/03/15	03/03/16
Horn Antenna 1-18GHz	ETS	3117	345	03/03/15	03/03/16
Horn Antenna 18-26GHz	ARA	SWH-28	125	05/12/15	05/12/16
Horn Antenna 26.5- 40GHz	ARA	MWH-2640/B	90	07/28/15	07/28/16
Preamp 10kHz-1000MHz	Sonoma	310	300	11/05/15	11/05/16
Preamp 1-8GHz	Miteq	AMF-4D-01000800-30-29P	782	12/17/15	12/17/16
Preamp 1-18GHz	Miteq	AFS42-00101800-25-2-42	492	12/17/15	12/17/16
Preamp 1-26.5GHz	Agilent	8449B	404	04/13/15	04/13/16
Amplifier, 26-40GHz	Miteq	NSP4000-SP2	88	04/07/15	04/07/16
Spectrum Analyzer 3kHz - 44GHz	Agilent	N9030A	907	05/15/15	05/15/16
Spectrum Analyzer 9kHz - 40GHz	HP	8564E	106	08/14/15	08/14/16
Coaxial Switchbox	Agilent	SP6T	927	03/03/15	03/03/16
3GHz HPF	Micro-Tronics	HPM17543	487	01/26/16	01/26/17
EMI Test Receiver	Rohde & Schwarz	ECSI 7	212	08/07/15	08/07/16
Power Meter	Agilent	N1911A	T1268	06/07/15	06/07/16
Power Sensor	Agilent	N1921A	1224	07/06/15	03/06/16

7. MEASUREMENT METHODS

On Time and Duty Cycle: KDB 789033 D02 v01r01, Section B.

6 dB Emission BW: KDB 789033 D02 v01r01, Section C.2.

99% Occupied BW: KDB 789033 D02 v01r01, Section D.

Conducted Output Power: KDB 789033 D02 v01r01, Section E.3.a (Method PM), and KDB 662911 D01 v02r01.

Power Spectral Density: KDB 789033 D02 v01r01, Section F.

Unwanted emissions in restricted bands: KDB 789033 D02 v01r01, Sections G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v01r01, Sections G.3, G.4, and G.5.

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

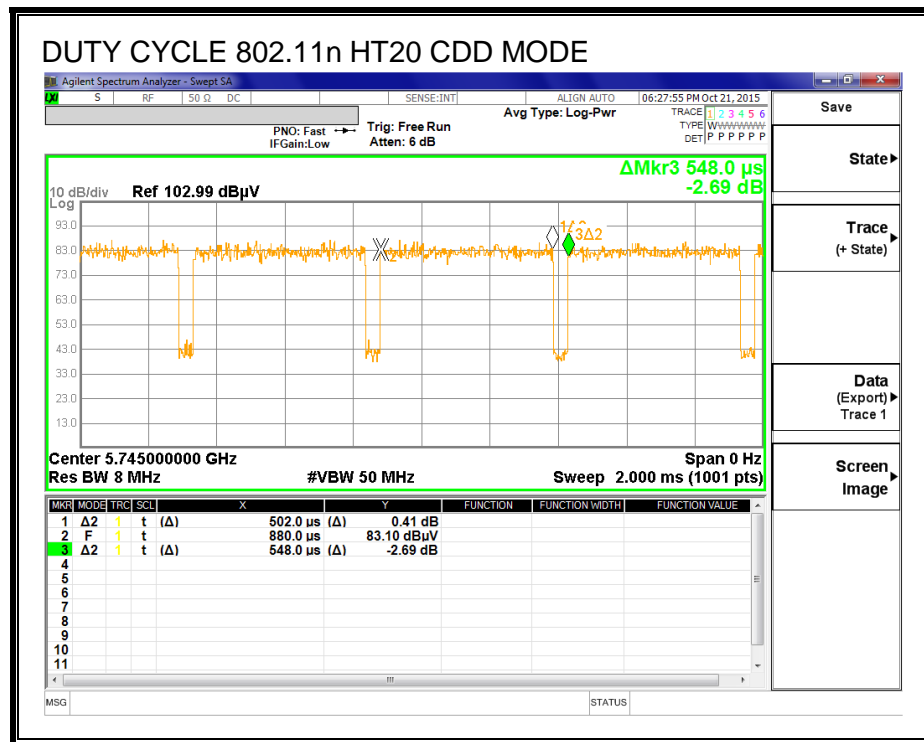
LIMITS

None; for reporting purposes only.

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)
802.11n HT20 CDD	0.502	0.548	0.916	91.61%	0.38	1.992

DUTY CYCLE PLOTS



8.2. 6 dB BANDWIDTH

LIMITS

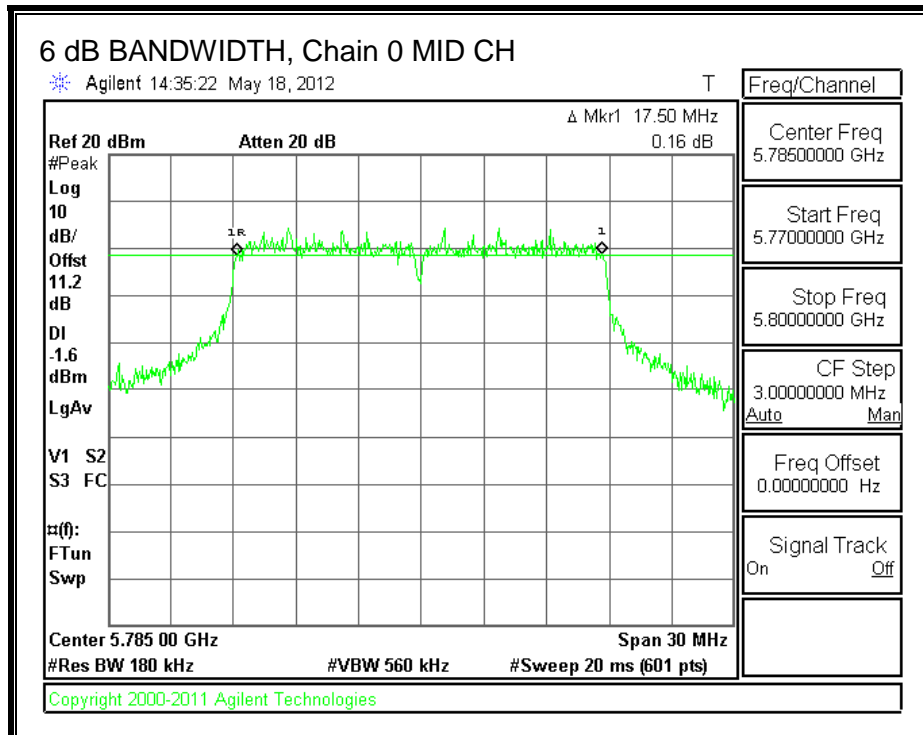
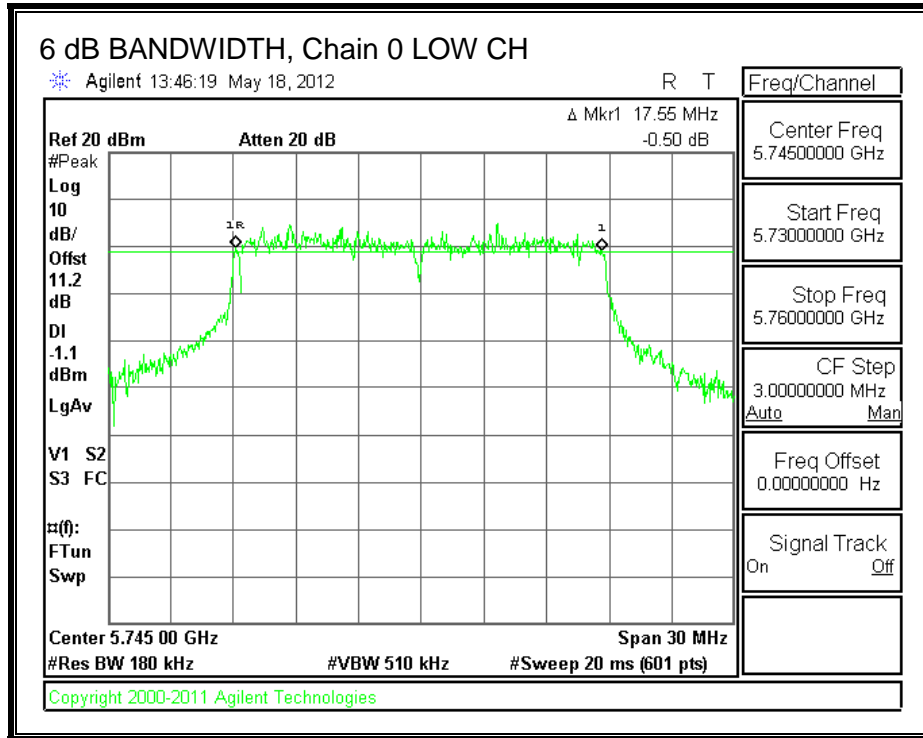
FCC §15.247 (a) (2)

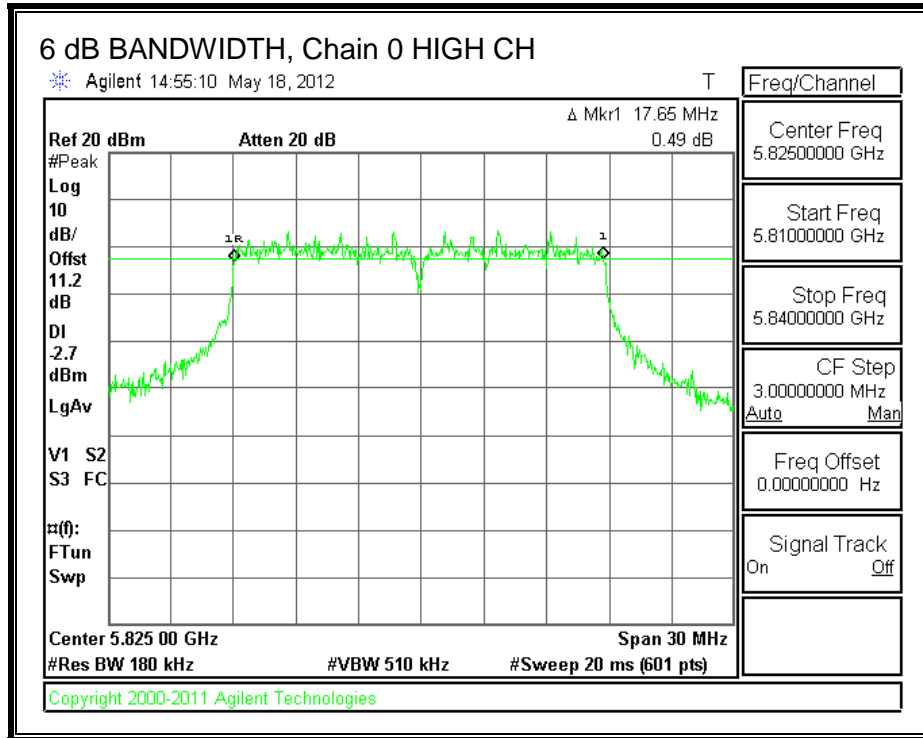
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

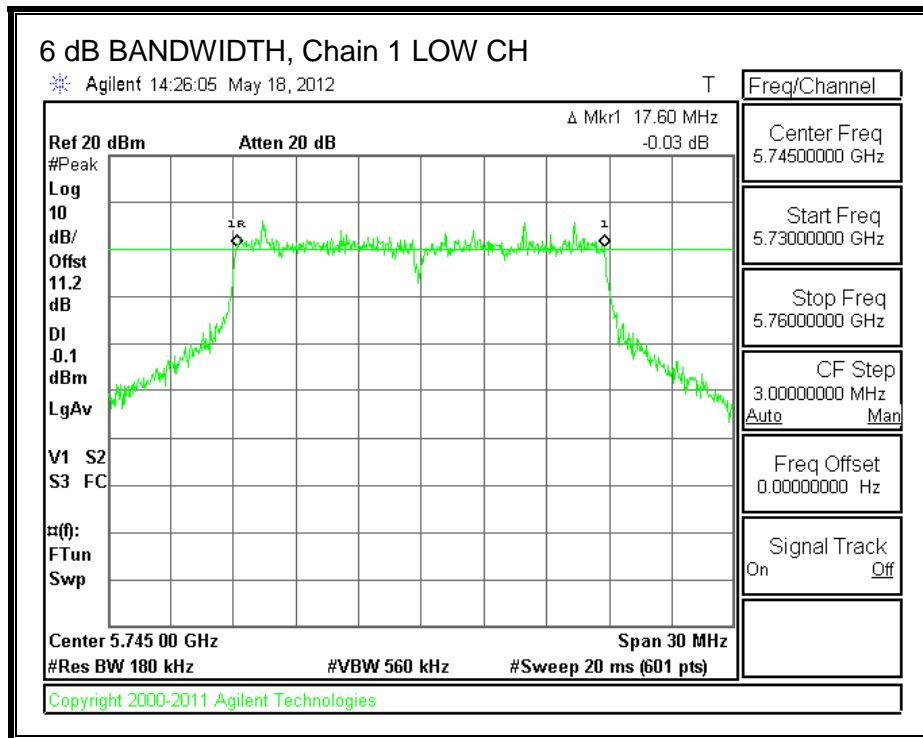
Channel	Frequency (MHz)	Chain 0 6 dB BW (MHz)	Chain 1 6 dB BW (MHz)	Minimum Limit (MHz)
Low	5745	17.55	17.60	0.5
Middle	5785	17.50	17.35	0.5
High	5825	17.65	17.20	0.5

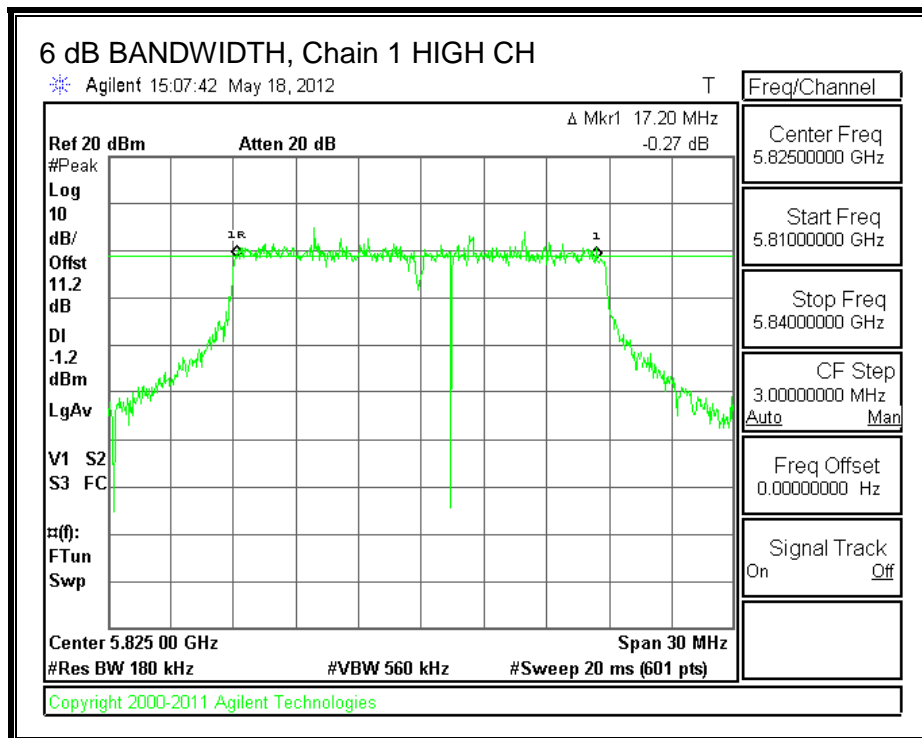
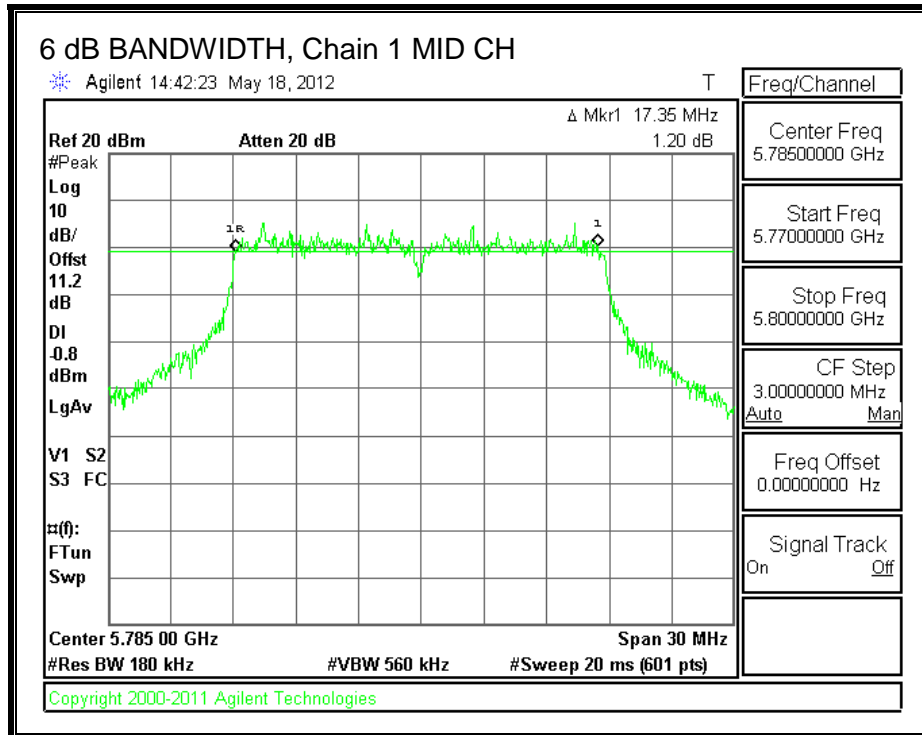
6 dB BANDWIDTH, Chain 0





6 dB BANDWIDTH, Chain 1





8.3. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

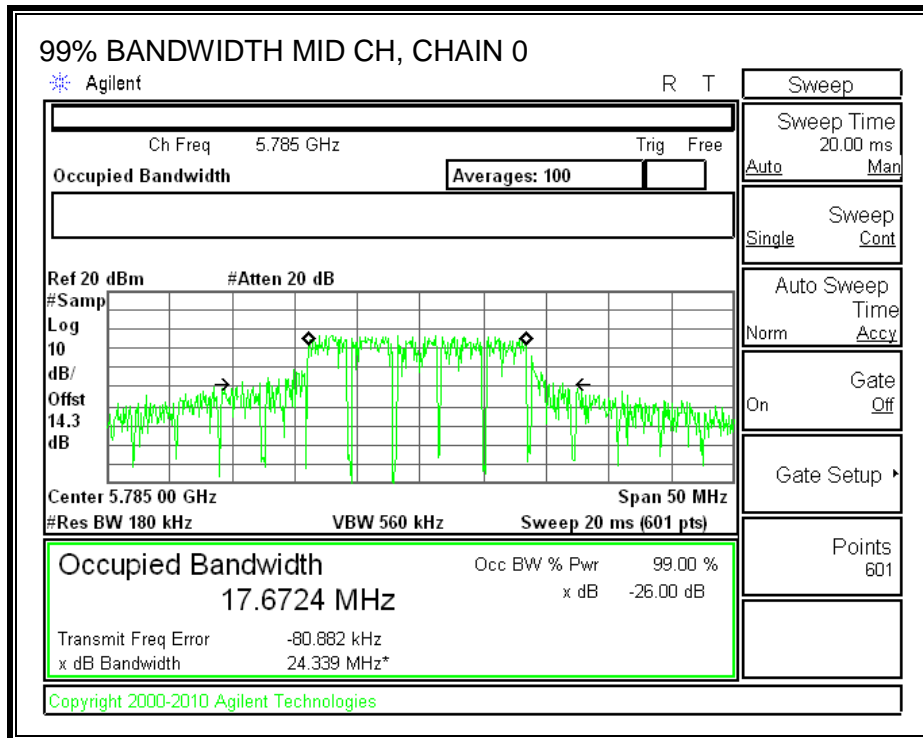
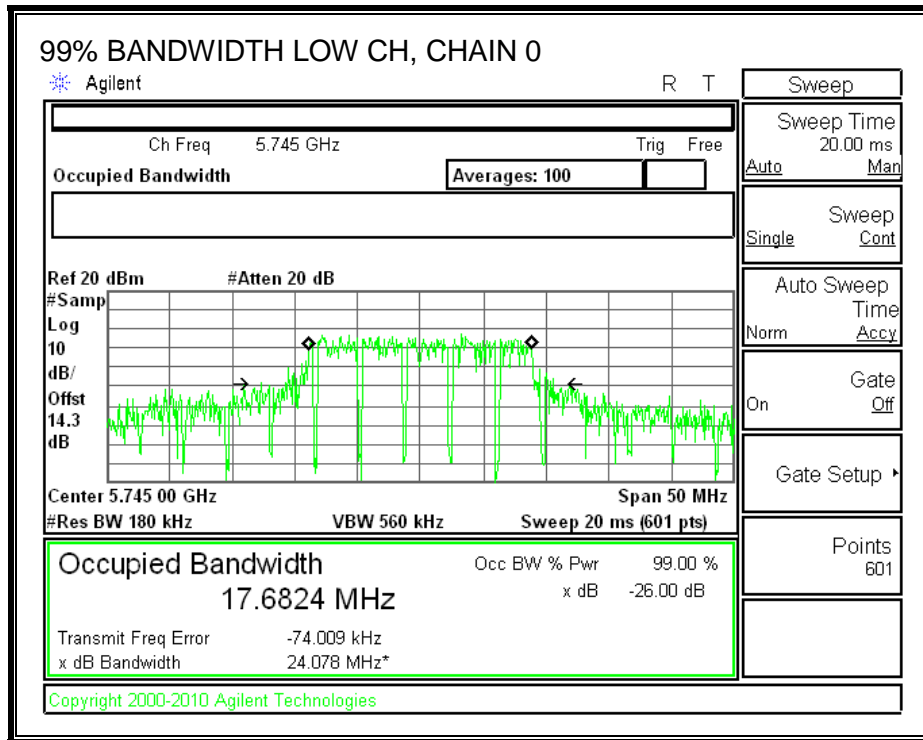
TEST PROCEDURE

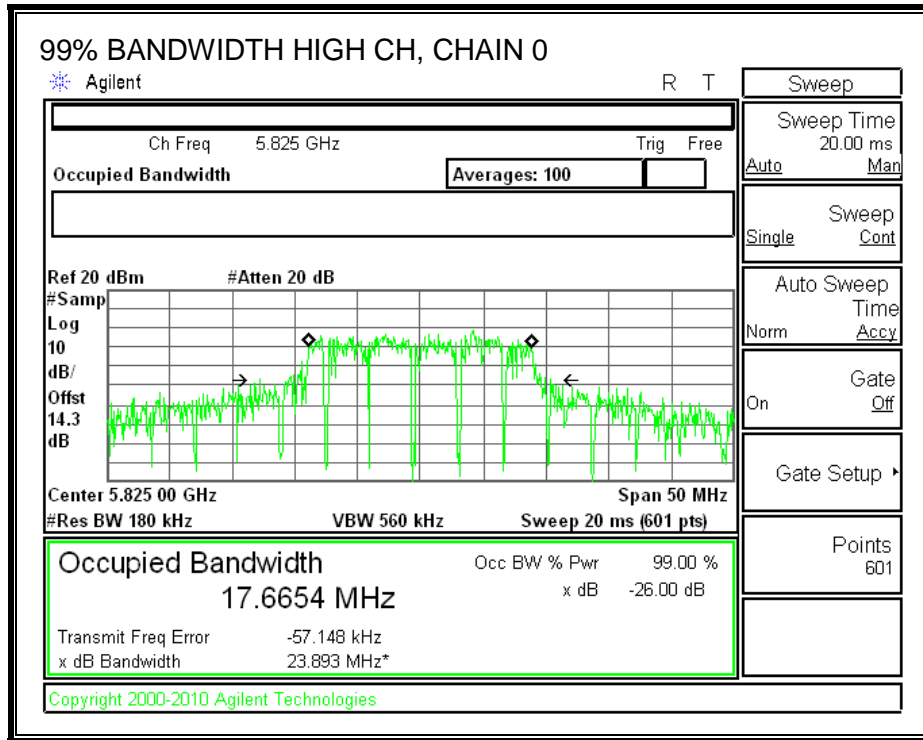
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

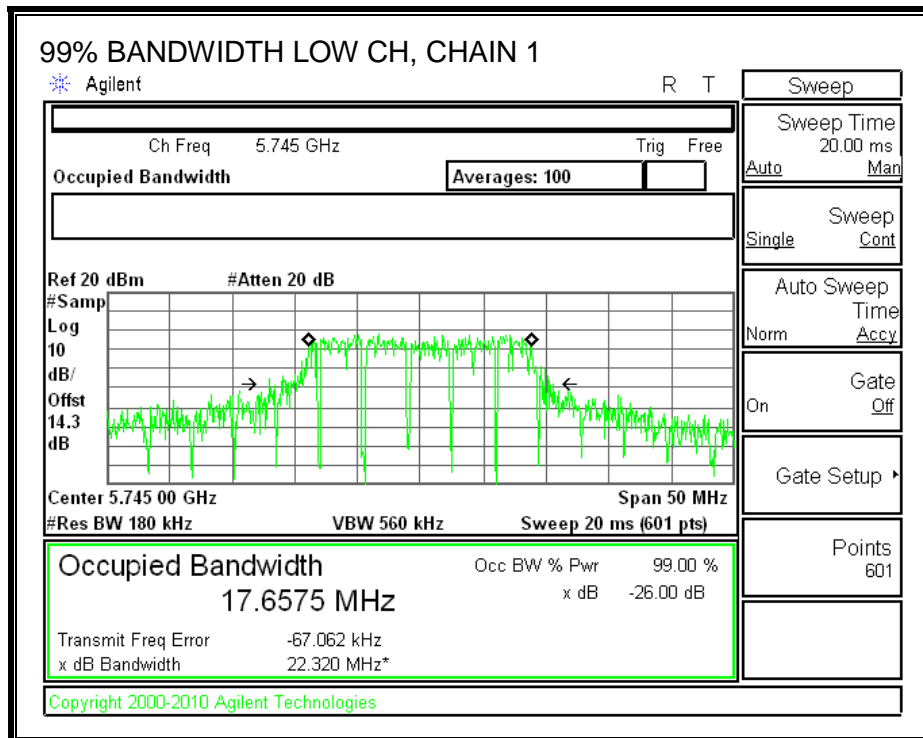
Channel	Frequency (MHz)	Chain 0 99% Bandwidth (MHz)	Chain 1 99% Bandwidth (MHz)
Low	5745	17.6824	17.6575
Middle	5785	17.6724	17.6323
High	5825	17.6654	17.6452

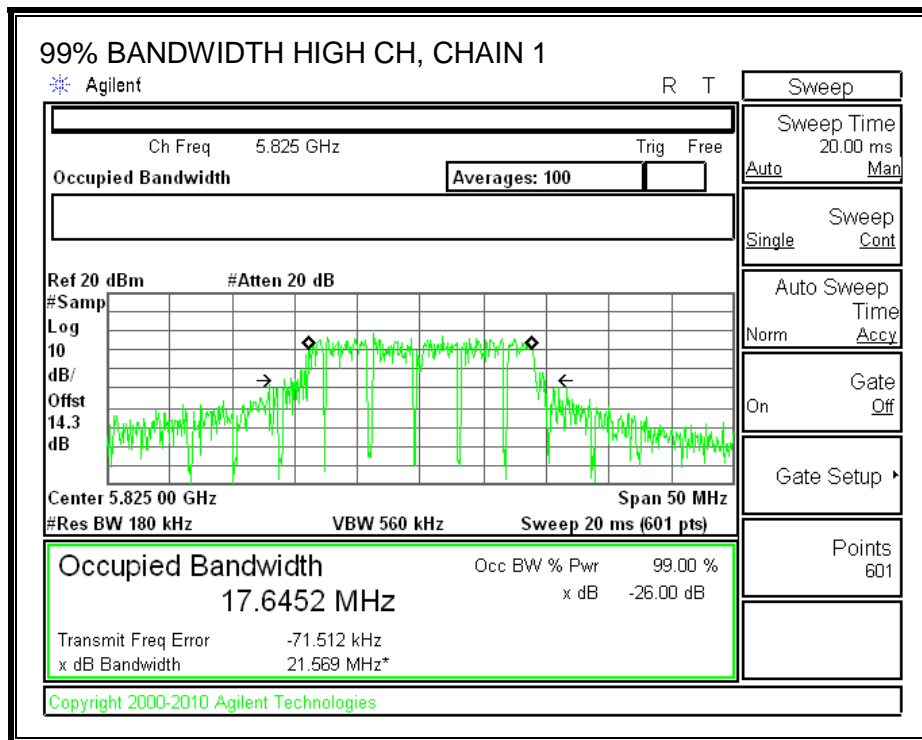
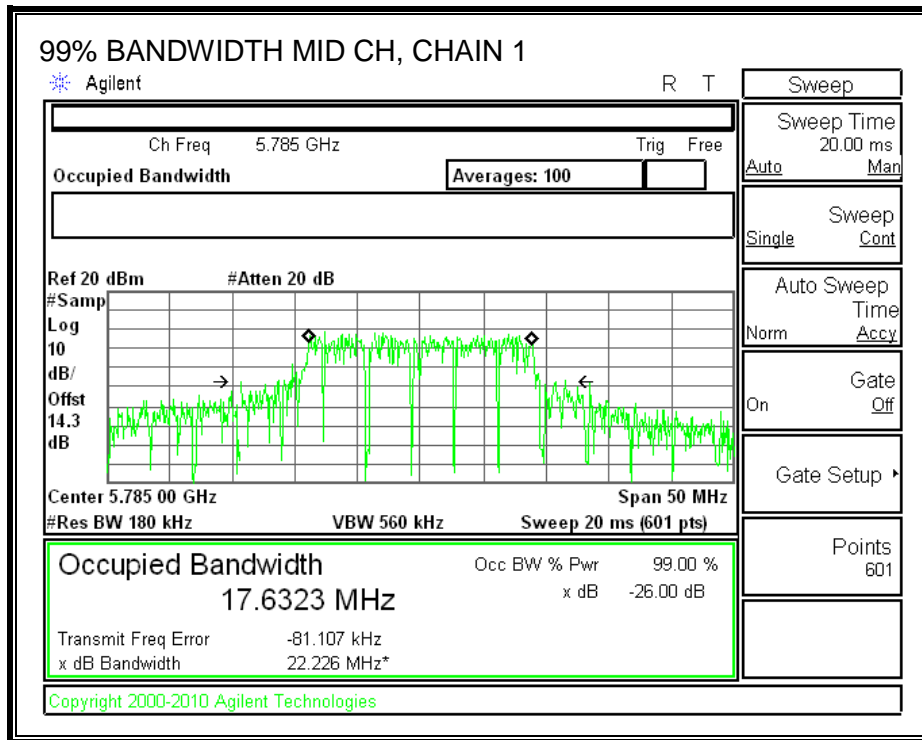
99% BANDWIDTH, Chain 0





99% BANDWIDTH, Chain 1





8.4. OUTPUT POWER

LIMITS

FCC §15.407 (a) (3)

IC RSS-247 6.2.4 (1)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
4.30	5.50	4.94

RESULTS

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Power Limit (dBm)
Low	5745	4.94	30.00
Mid	5785	4.94	30.00
High	5825	4.94	30.00

Duty Cycle CF (dB)	0.38	Included in Calculations of Corr'd Power
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Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	12.00	12.80	15.81	30.00	-14.19
Mid	5785	15.08	14.71	18.29	30.00	-11.71
High	5825	14.95	13.67	17.75	30.00	-12.25

8.5. MAXIMUM POWER SPECTRAL DENSITY (PSD)

LIMITS

FCC §15.407 (a) (3)

IC RSS-247 6.2.4 (1)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are correlated and the antenna gain is unequal among the chains. The directional gain is:

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Correlated Chains Directional Gain (dBi)
4.30	5.50	7.93

RESULTS

Antenna Gain and Limits

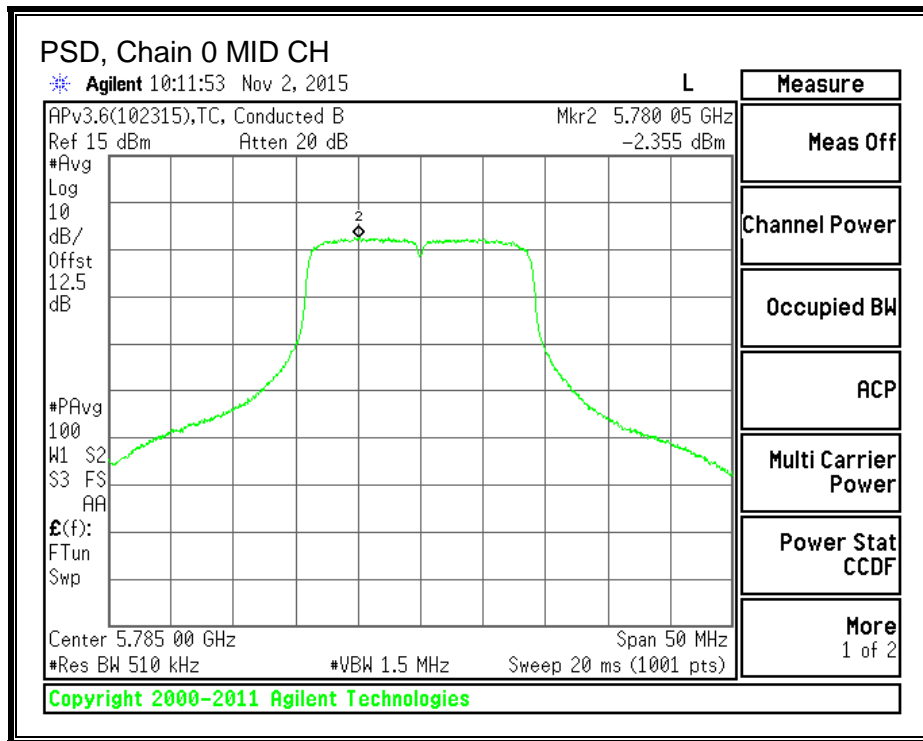
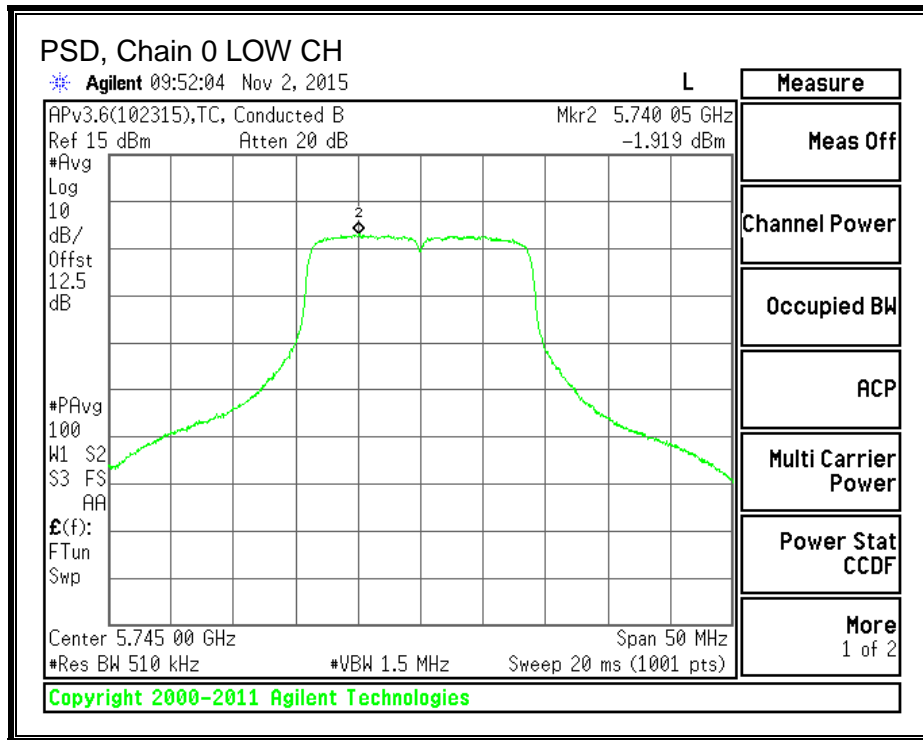
Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Low	5745	7.93	28.07
Mid	5785	7.93	28.07
High	5825	7.93	28.07

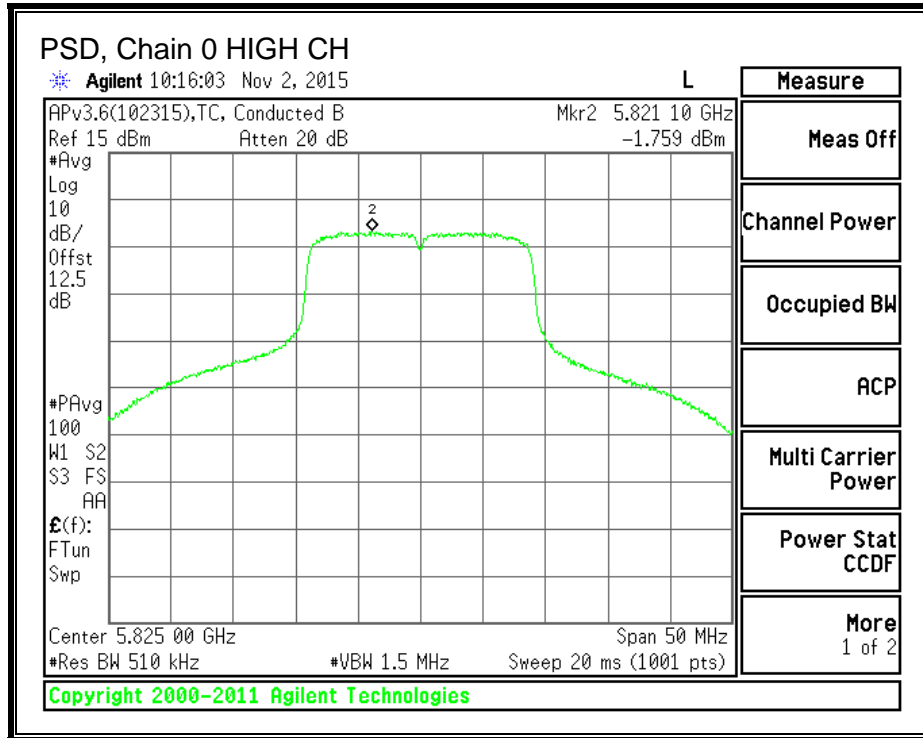
Duty Cycle CF (dB)	0.38	Included in Calculations of Corr'd PSD
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PSD Results

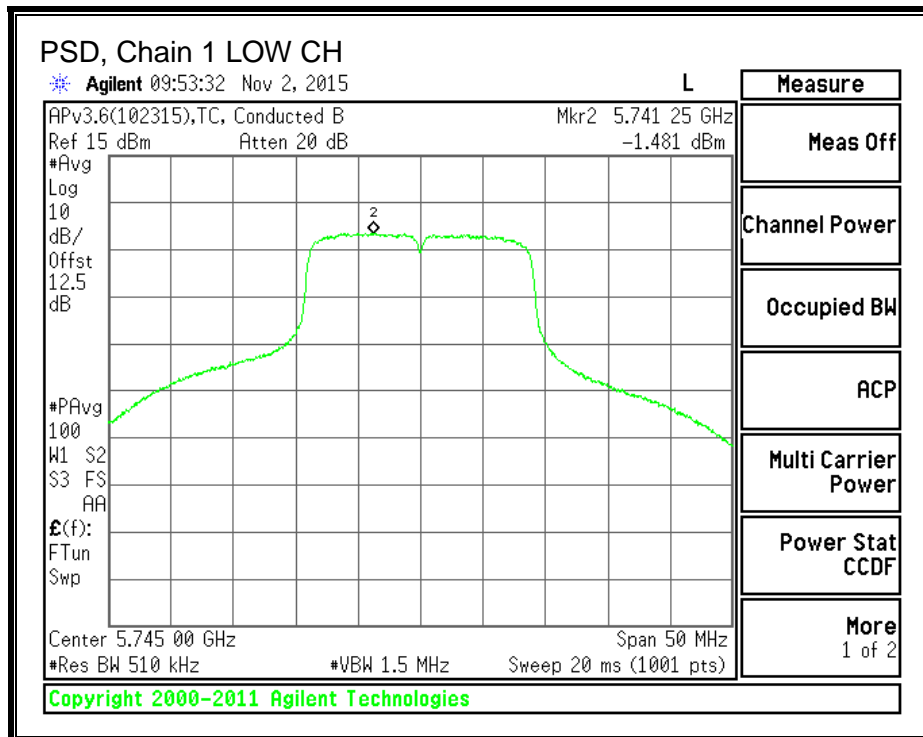
Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5745	-1.919	-1.481	1.696	28.070	-26.374
Mid	5785	-2.355	-2.497	0.965	28.070	-27.105
High	5825	-1.759	-2.439	1.305	28.070	-26.765

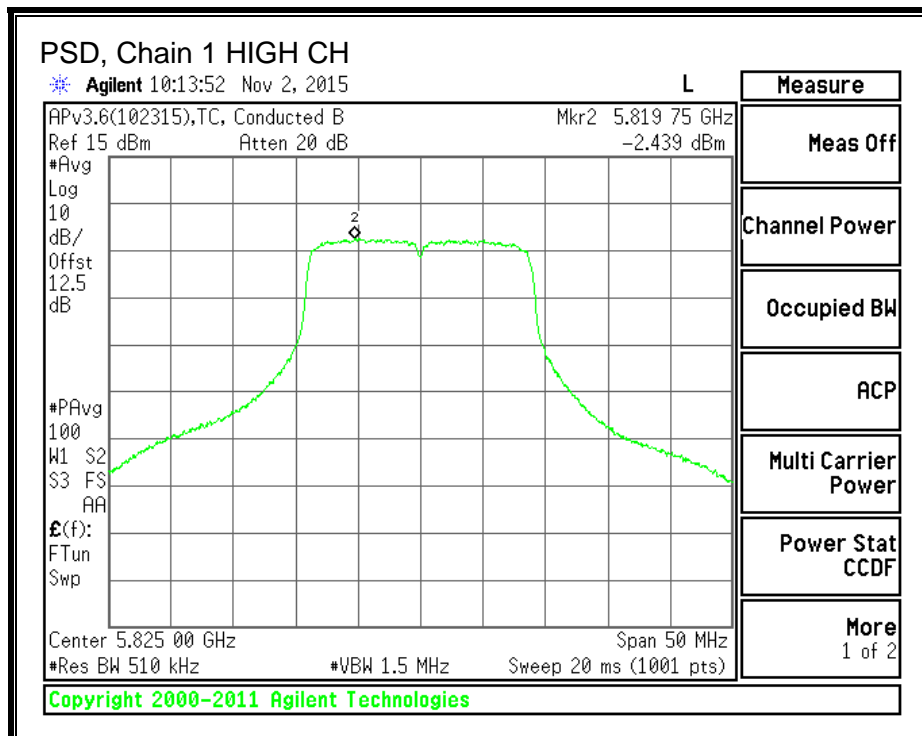
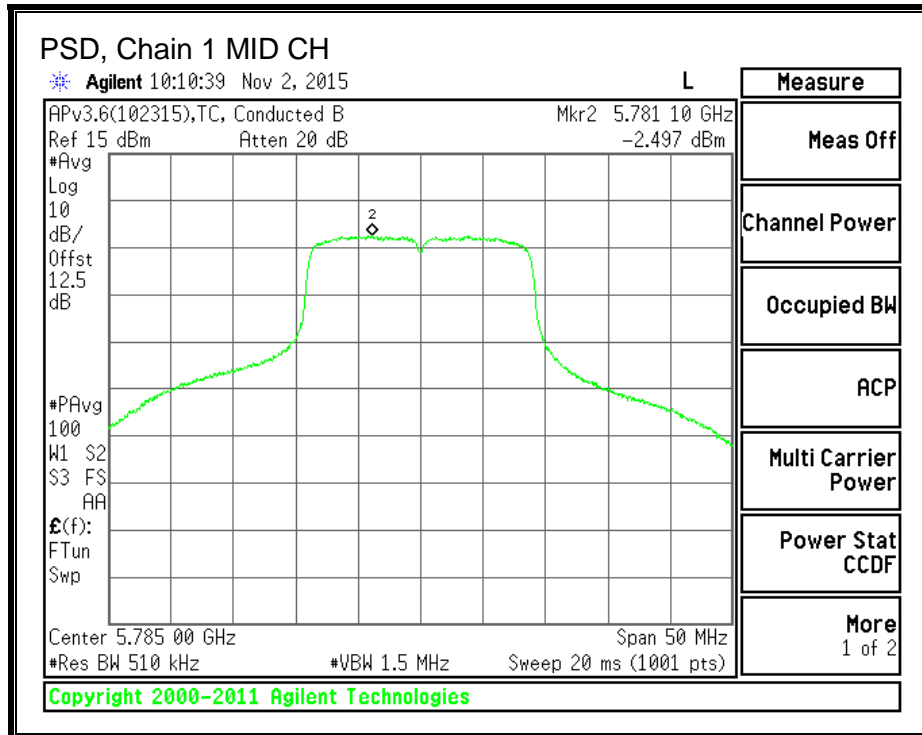
PSD, Chain 0





PSD, Chain 1





9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-GEN Clause 8.9 (Transmitter)

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

For non-restricted out-of-band emissions in the 5.725-5.85 GHz band, the applied limits were either in accordance with the ones above or with FCC §15.407(b)(4). See below.

§15.407(b)(4)

For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 150 cm for above 1GHz. 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.

Reference to KDB KD789033 D02 v01r01 UNII part G) 6) c) Method AD:

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 add duty cycle factor to the reading offset for average measurements.

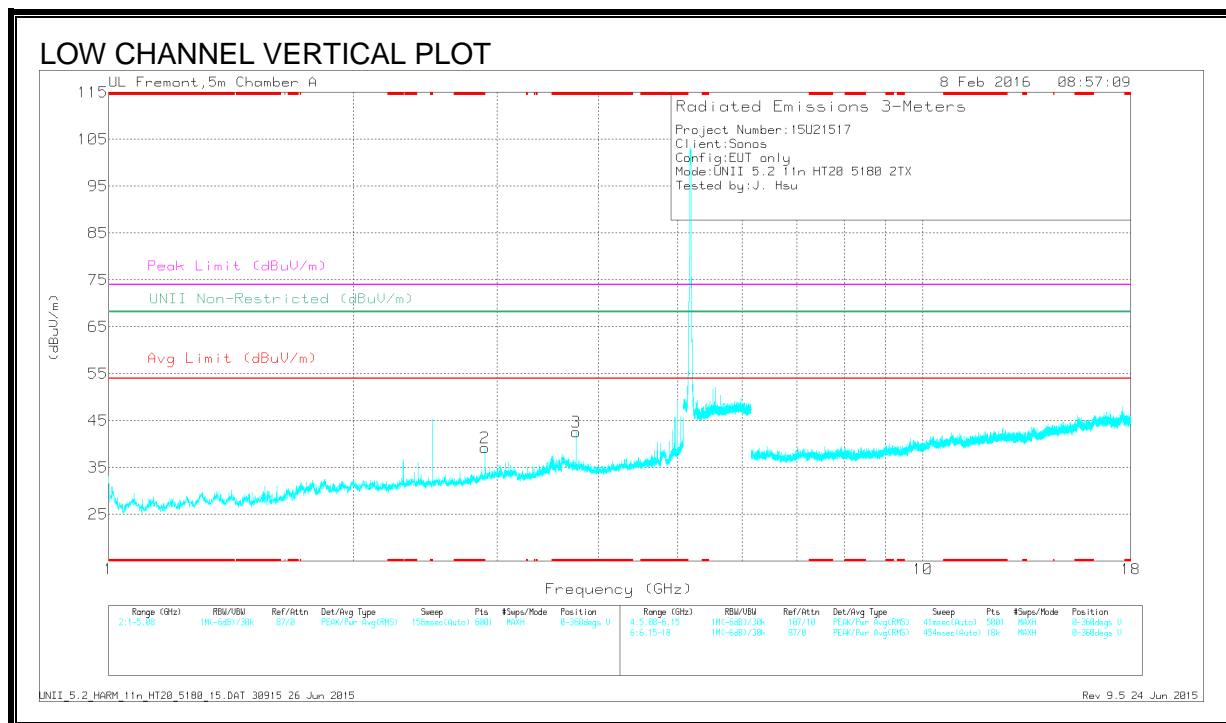
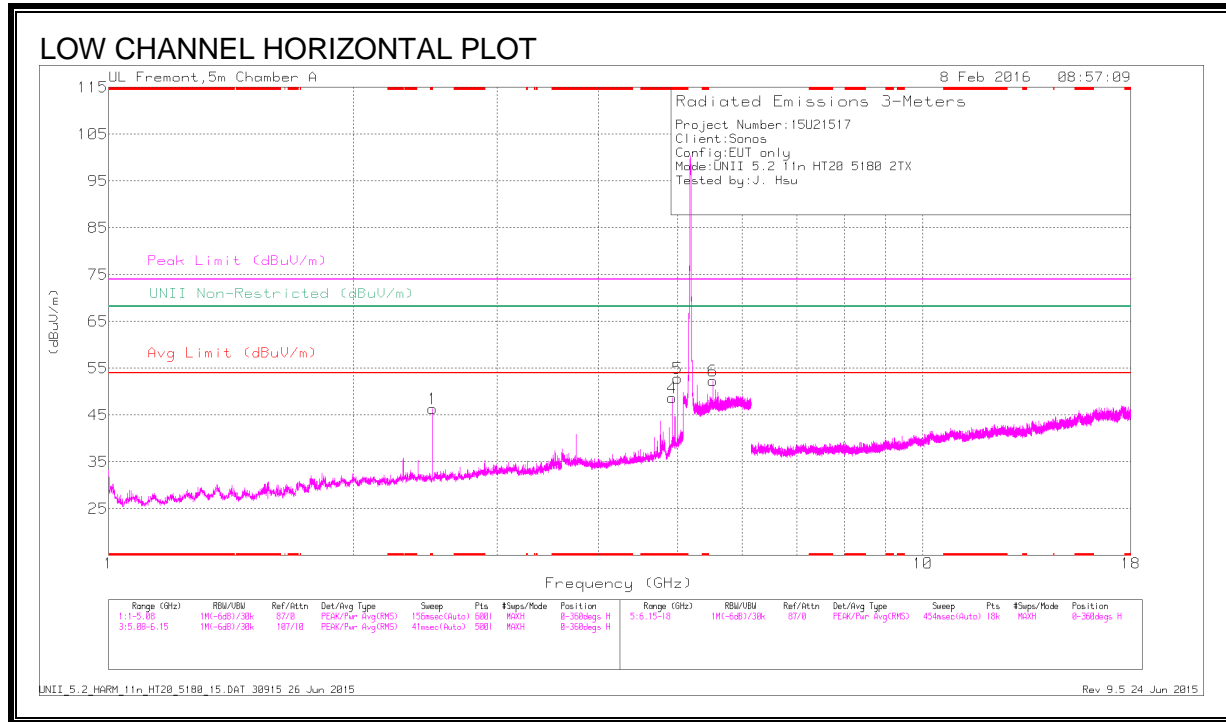
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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.

9.2. TX RADIATED EMISSIONS 5.2 GHz Band (1 GHz – 18 GHz)

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL



Radiated Emissions

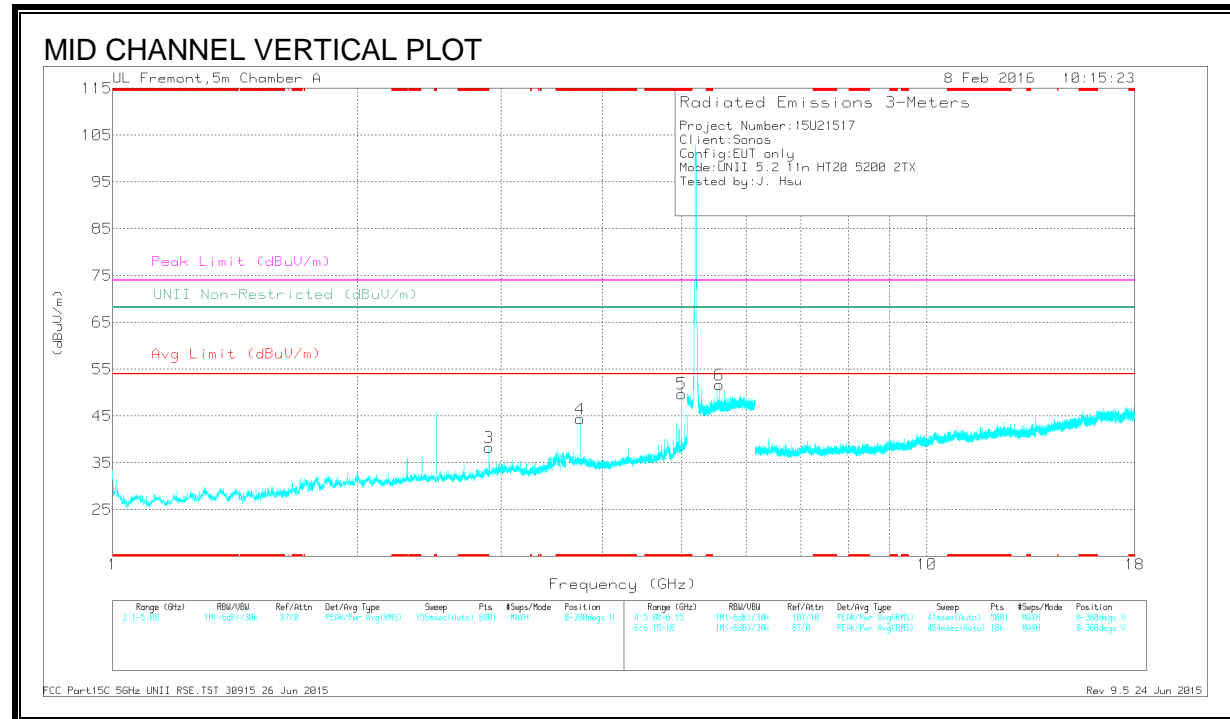
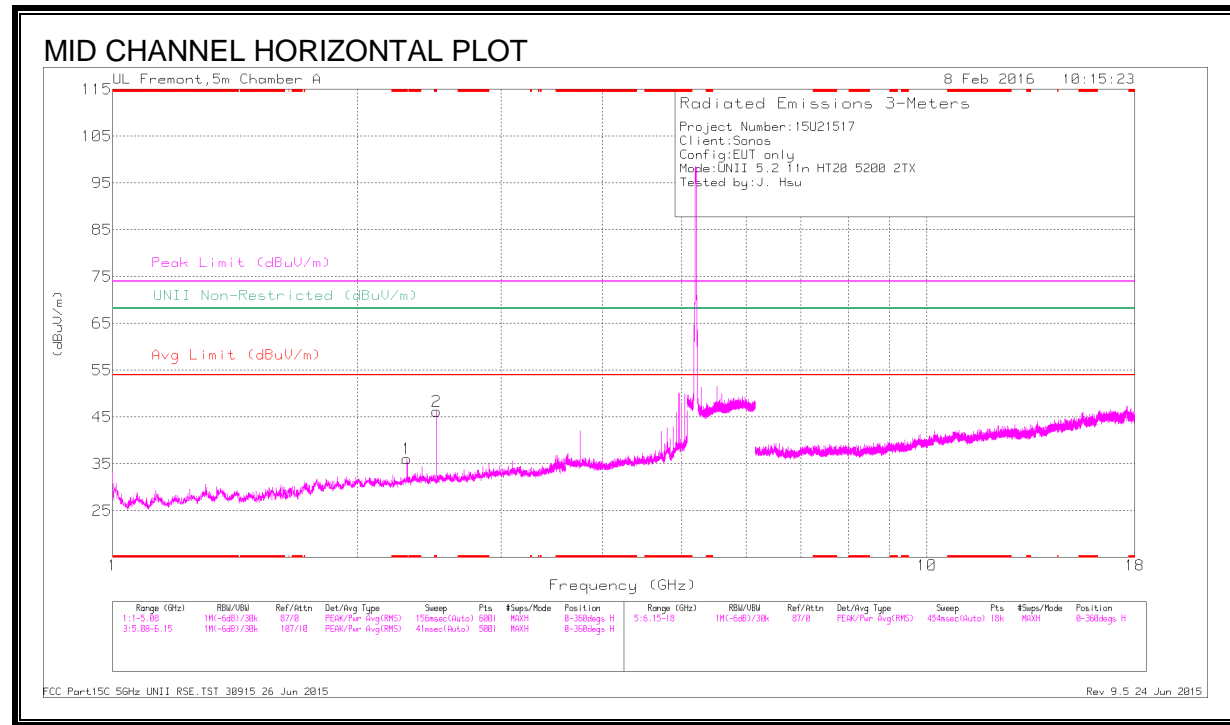
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 4.92	45.99	PK-U	33.9	-29.4	0	50.49	-	-	74	-23.51	-	-	230	163	H
	* 4.92	37.86	ADR	33.9	-29.4	.38	42.74	54	-11.26	-	-	-	-	230	163	H
5	* 5	48.99	PK-U	34	-28.9	0	54.09	-	-	74	-19.91	-	-	230	142	H
	* 5	40.47	ADR	34	-28.9	.38	45.95	54	-8.05	-	-	-	-	230	142	H
2	* 2.9	46.8	PK-U	32.6	-33.3	0	46.1	-	-	74	-27.9	-	-	276	102	V
	* 2.9	38.44	ADR	32.6	-33.3	.38	38.12	54	-15.88	-	-	-	-	276	102	V
3	* 3.75	47.65	PK-U	33.3	-32.1	0	48.85	-	-	74	-25.15	-	-	33	221	V
	* 3.75	41.42	ADR	33.3	-32.1	.38	43	54	-11	-	-	-	-	33	221	V
1	2.5	52.23	PK-U	32.1	-34.4	0	49.93	-	-	-	-	68.2	-18.27	59	156	H
6	5.56	45.15	PK-U	34.5	-20.4	0	59.25	-	-	-	-	68.2	-8.95	264	231	V

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

MID CHANNEL



Radiated Emissions

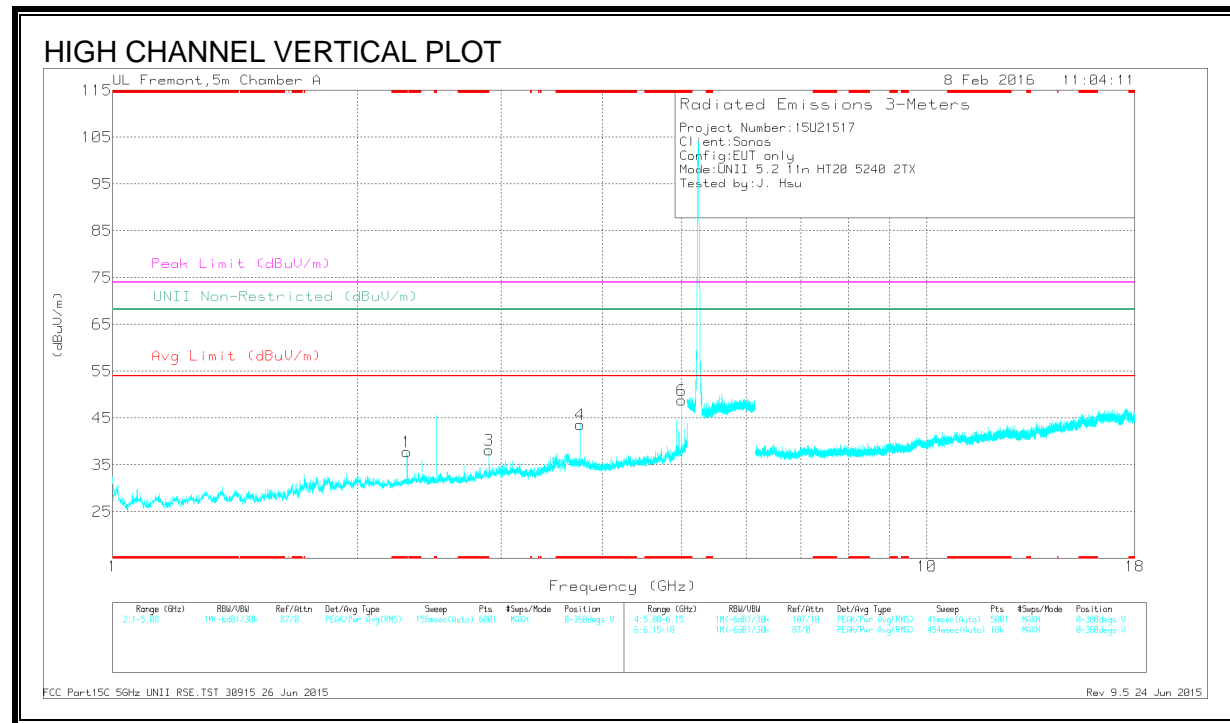
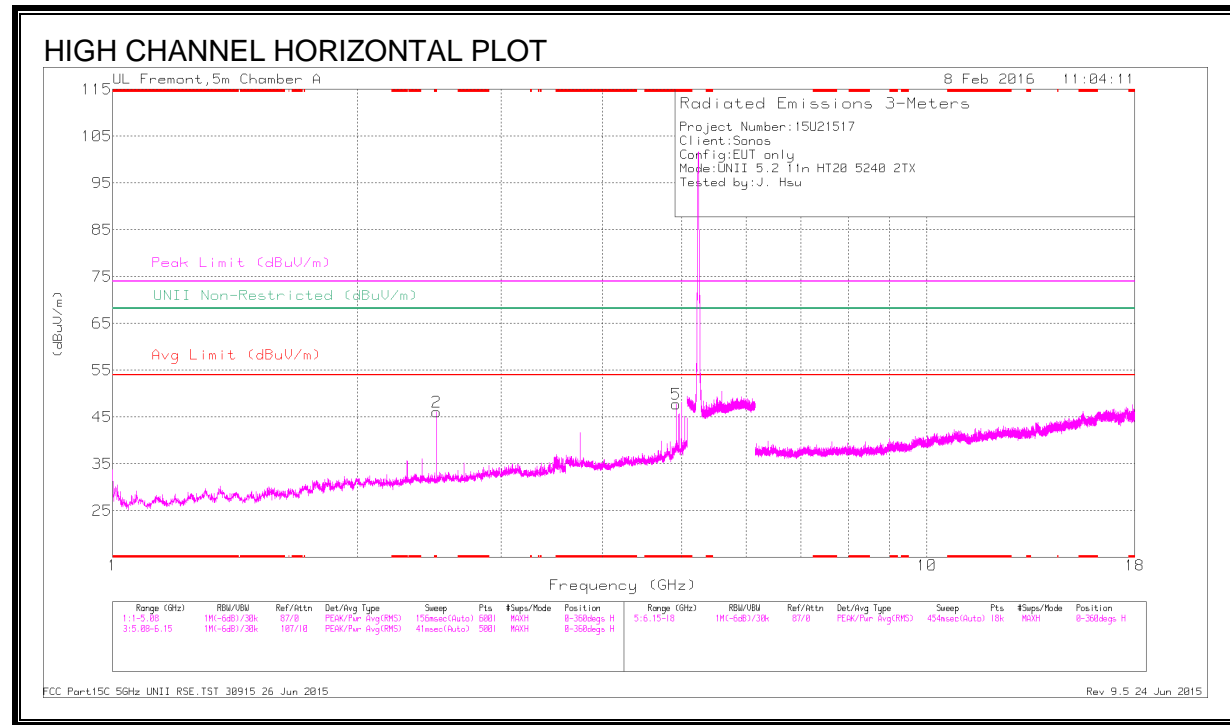
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.3	45.57	PK-U	31.9	-34.3	0	43.17	-	-	-	-	68.2	-25.03	53	196	H
3	* 2.9	45.93	PK-U	32.6	-33.3	0	45.23	-	-	74	-28.77	-	-	18	233	V
	* 2.9	37.59	ADR	32.6	-33.3	.38	37.27	54	-16.73	-	-	-	-	18	233	V
4	* 3.75	47.99	PK-U	33.3	-32.1	0	49.19	-	-	74	-24.81	-	-	33	228	V
	* 3.75	42.36	ADR	33.3	-32.1	-38	43.94	54	-10.06	-	-	-	-	33	228	V
5	* 4.999	50.45	PK-U	34	-28.9	0	55.55	-	-	74	-18.45	-	-	31	240	V
	* 5	46.16	ADR	34	-28.9	.38	51.64	54	-2.36	-	-	-	-	31	240	V
2	2.5	51.95	PK-U	32.1	-34.4	0	49.65	-	-	-	-	68.2	-18.55	57	129	H
6	5.56	45.15	PK-U	34.5	-20.4	0	59.25	-	-	-	-	68.2	-8.95	264	231	V

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

HIGH CHANNEL



Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 4.92	47.64	PK-U	33.9	-29.4	0	52.14	-	-	74	-21.86	-	-	224	110	H
	* 4.92	41.04	ADR	33.9	-29.4	.38	45.92	54	-8.08	-	-	-	-	224	110	H
1	* 2.3	47.03	PK-U	31.9	-34.3	0	44.63	-	-	74	-29.37	-	-	346	104	V
	* 2.3	38.88	ADR	31.9	-34.3	.38	36.86	54	-17.14	-	-	-	-	346	104	V
3	* 2.9	45.93	PK-U	32.6	-33.3	0	45.23	-	-	74	-28.77	-	-	48	112	V
	* 2.9	37.84	ADR	32.6	-33.3	.38	37.52	54	-16.48	-	-	-	-	48	112	V
4	* 3.749	47.75	PK-U	33.3	-32.1	0	48.95	-	-	74	-25.05	-	-	34	235	V
	* 3.75	42.41	ADR	33.3	-32.1	.38	43.99	54	-10.01	-	-	-	-	34	235	V
6	* 4.999	50.33	PK-U	34	-28.9	0	55.43	-	-	74	-18.57	-	-	31	254	V
	* 5	46.06	ADR	34	-28.9	.38	51.54	54	-2.46	-	-	-	-	31	254	V
2	* 2.5	52.18	PK-U	32.1	-34.4	0	49.88	-	-	74	-24.12	-	-	58	156	H
	* 2.5	48.57	ADR	32.1	-34.4	.38	46.65	54	-7.35	-	-	-	-	58	156	H

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

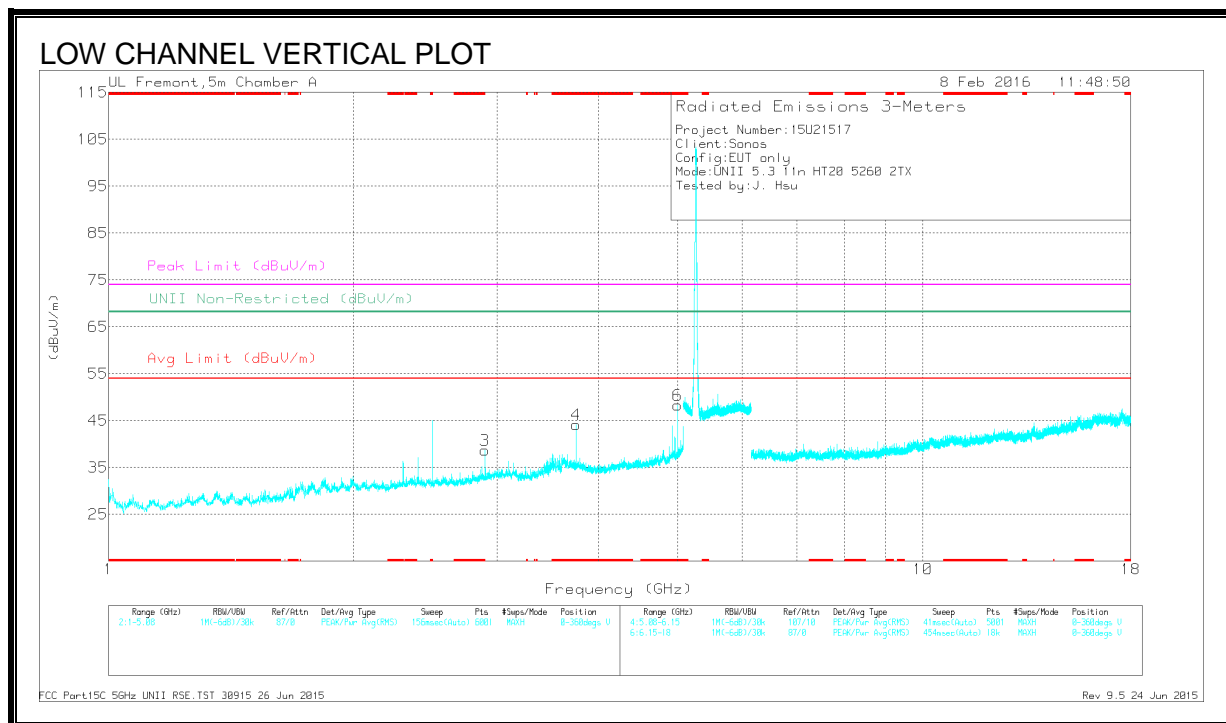
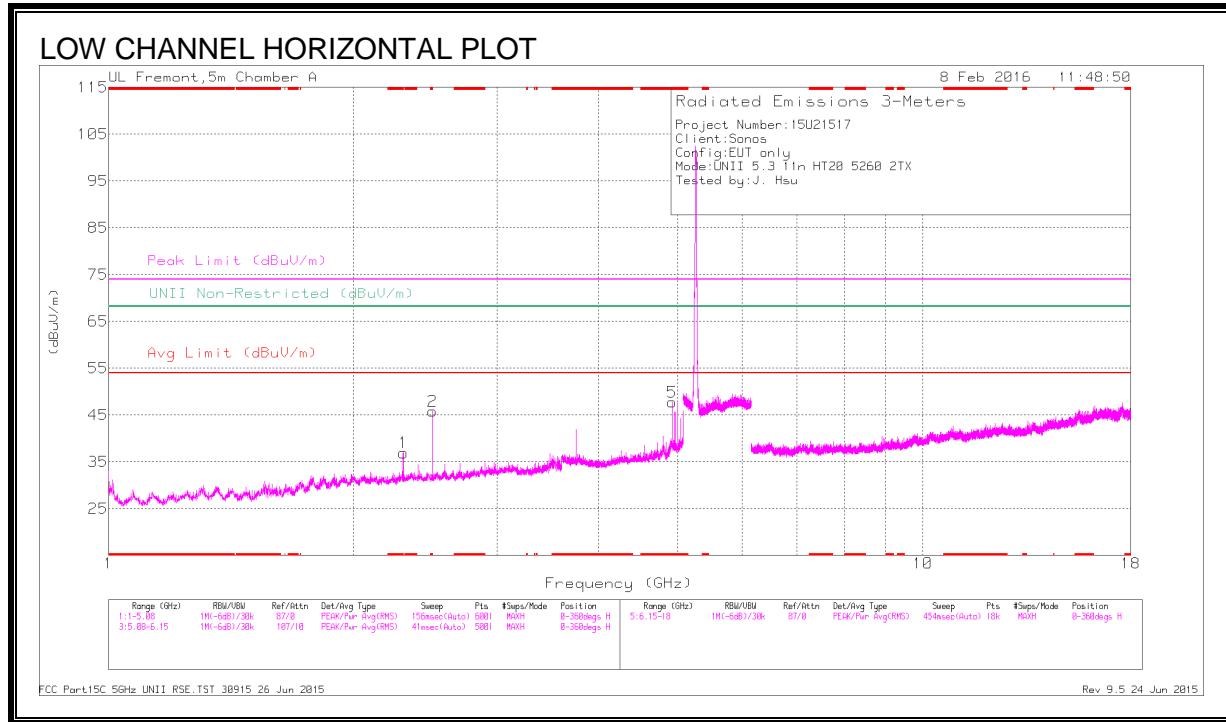
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

9.3. TX RADIATED EMISSIONS 5.3 GHz Band (1 GHz – 18 GHz)

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL



Radiated Emissions

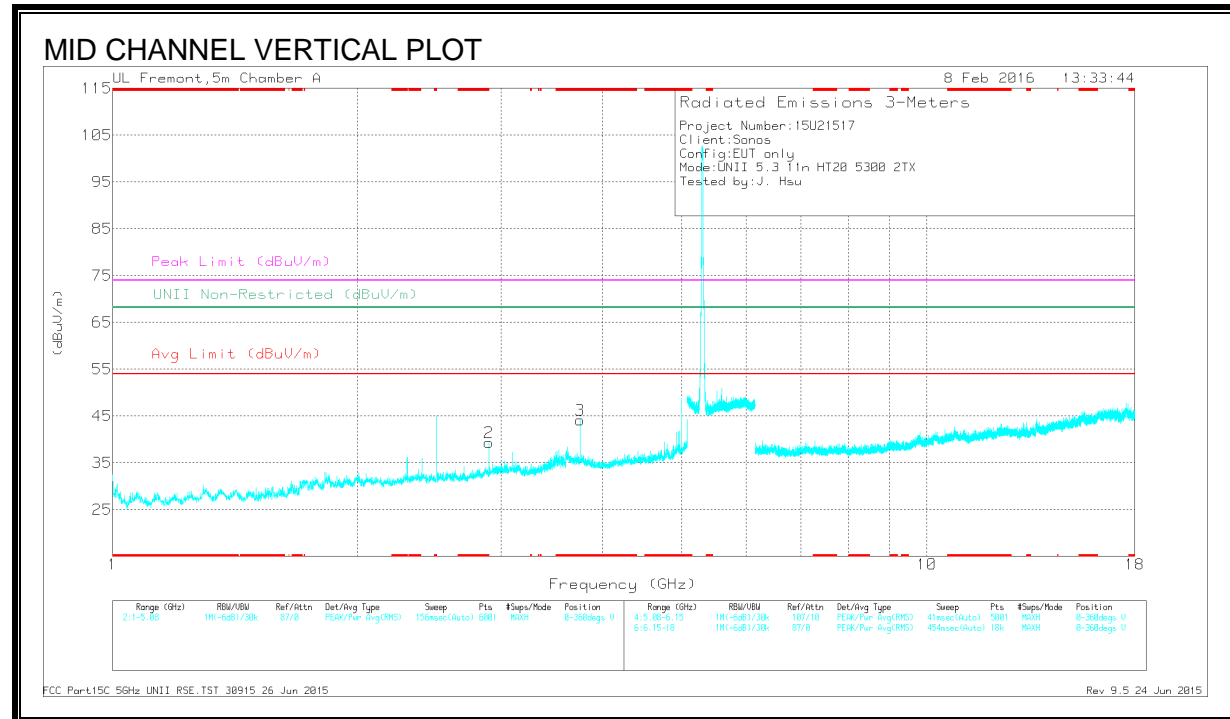
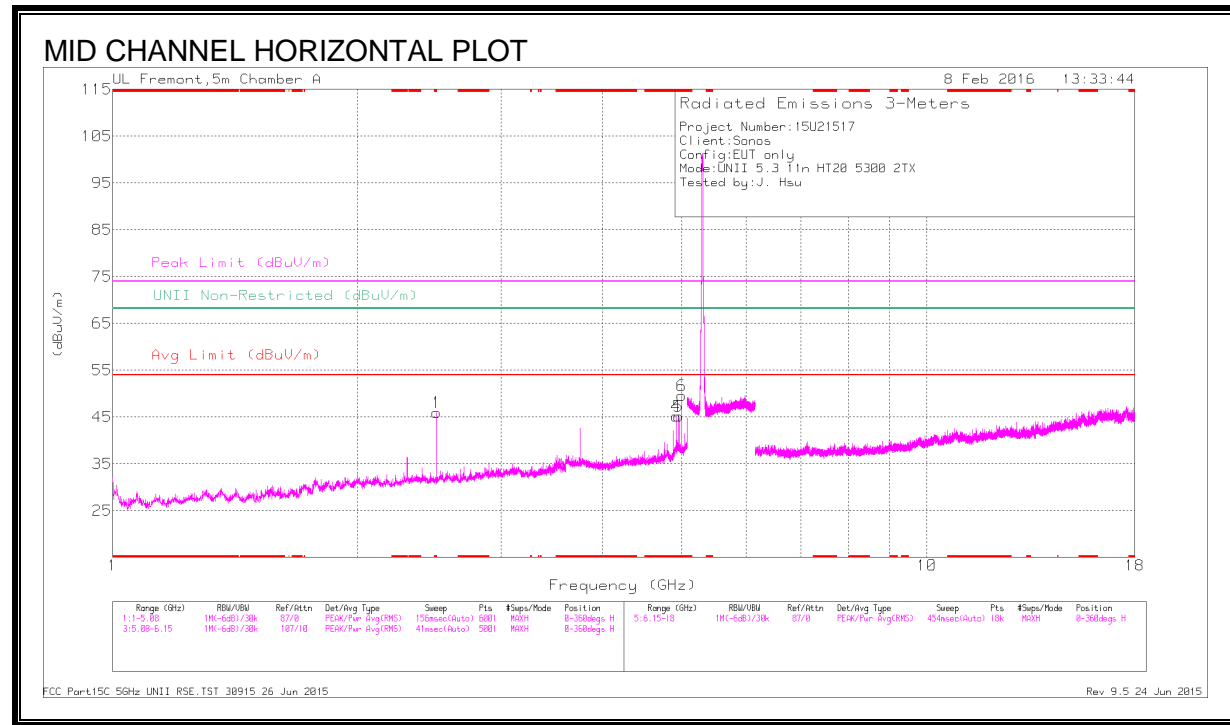
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 4.92	46.3	PK-U	33.9	-29.4	0	50.8	-	-	74	-23.2	-	-	228	162	H
	* 4.92	38.62	ADR	33.9	-29.4	.38	43.5	54	-10.5	-	-	-	-	228	162	H
3	* 2.9	46.12	PK-U	32.6	-33.3	0	45.42	-	-	74	-28.58	-	-	276	100	V
	* 2.9	38.67	ADR	32.6	-33.3	.38	38.35	54	-15.65	-	-	-	-	276	100	V
4	* 3.75	46.09	PK-U	33.3	-32.1	0	47.29	-	-	74	-26.71	-	-	31	224	V
	* 3.75	39.49	ADR	33.3	-32.1	.38	41.07	54	-12.93	-	-	-	-	31	224	V
6	* 5	50.09	PK-U	34	-28.9	0	55.19	-	-	74	-18.81	-	-	32	260	V
	* 5	45.83	ADR	34	-28.9	.38	51.31	54	-2.69	-	-	-	-	32	260	V
1	* 2.3	45.82	PK-U	31.9	-34.3	0	43.42	-	-	74	-30.58	-	-	50	176	H
	* 2.3	36.7	ADR	31.9	-34.3	.38	34.68	54	-19.32	-	-	-	-	50	176	H
2	* 2.5	52.24	PK-U	32.1	-34.4	0	49.94	-	-	74	-24.06	-	-	61	220	H
	* 2.5	47.95	ADR	32.1	-34.4	.38	46.03	54	-7.97	-	-	-	-	61	220	H

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

MID CHANNEL



Radiated Emissions

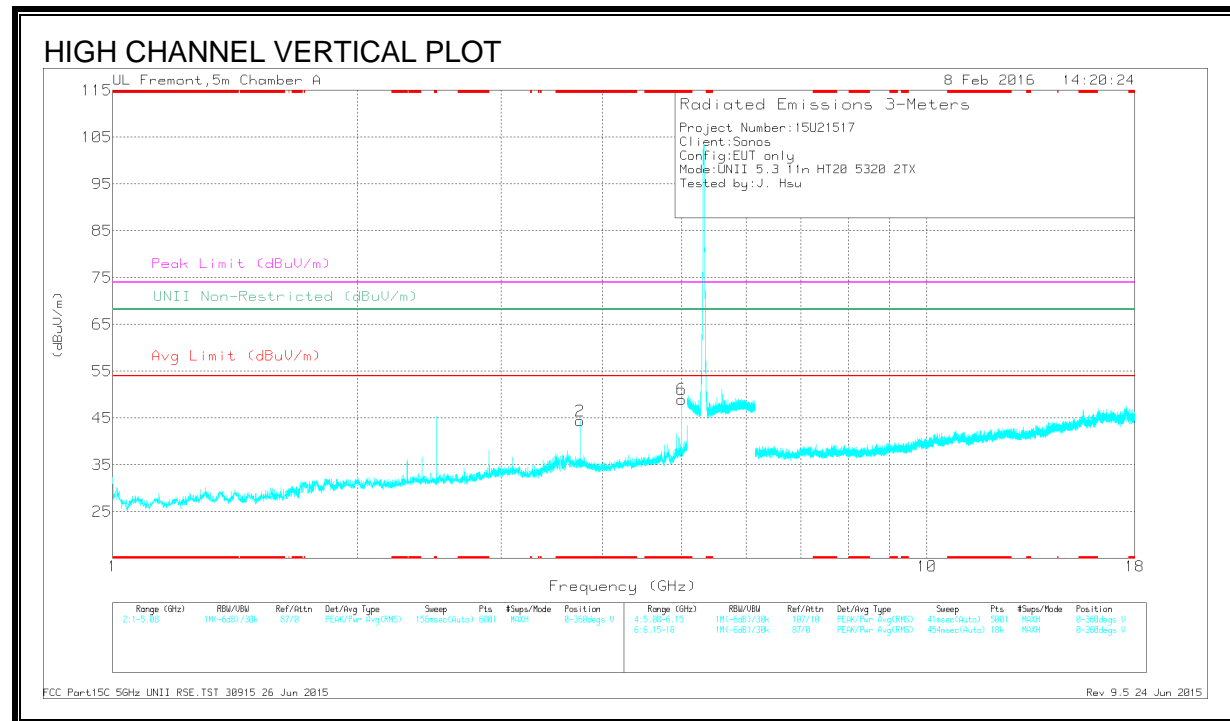
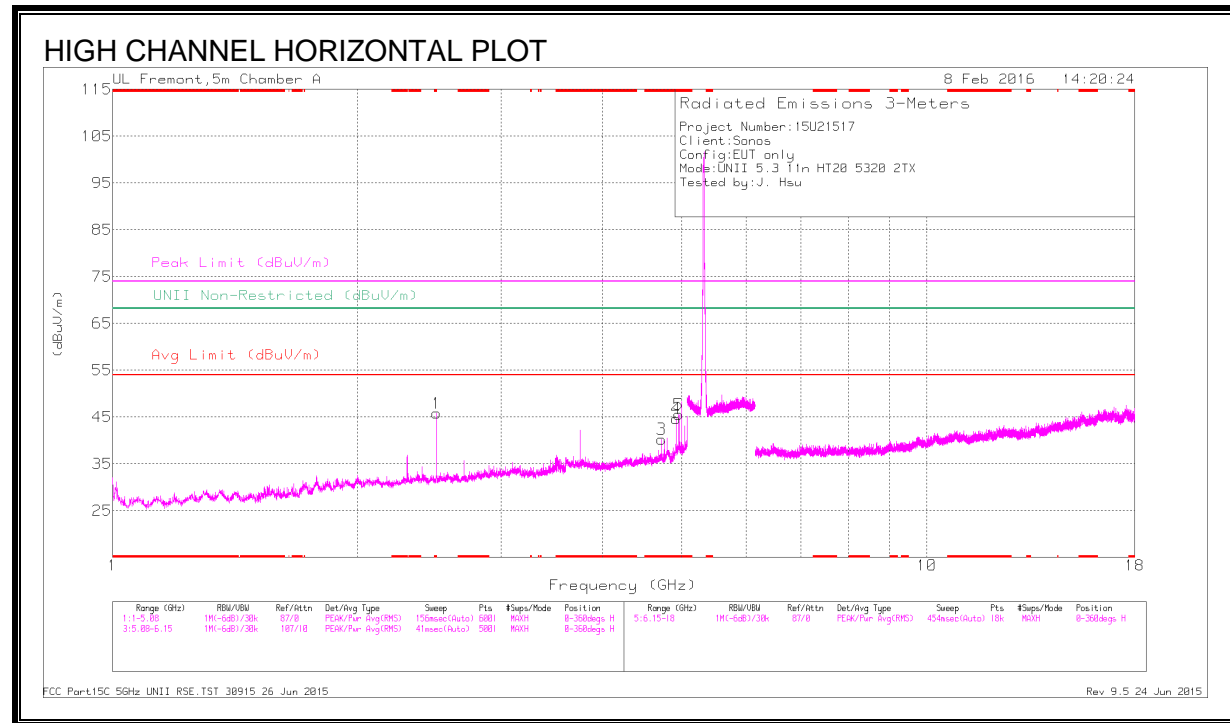
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.5	52.03	PK-U	32.1	-34.4	0	49.73	-	-	-	-	68.2	-18.47	59	160	H
4	* 4.92	45.1	PK-U	33.9	-29.4	0	49.6	-	-	74	-24.4	-	-	234	131	H
	* 4.92	36.85	ADR	33.9	-29.4	.38	41.73	54	-12.27	-	-	-	-	234	131	H
5	* 4.96	47.11	PK-U	33.9	-29.6	0	51.41	-	-	74	-22.59	-	-	227	124	H
	* 4.96	38.54	ADR	33.9	-29.6	.38	43.22	54	-10.78	-	-	-	-	227	124	H
6	* 5	48.61	PK-U	34	-28.9	0	53.71	-	-	74	-20.29	-	-	19	322	H
	* 5	42.77	ADR	34	-28.9	.38	48.25	54	-5.75	-	-	-	-	19	322	H
2	* 2.9	45.88	PK-U	32.6	-33.3	0	45.18	-	-	74	-28.82	-	-	277	117	V
	* 2.9	37.84	ADR	32.6	-33.3	.38	37.52	54	-16.48	-	-	-	-	277	117	V
3	* 3.749	47.29	PK-U	33.3	-32.1	0	48.49	-	-	74	-25.51	-	-	32	203	V
	* 3.75	40.97	ADR	33.3	-32.1	.38	42.55	54	-11.45	-	-	-	-	32	203	V

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

HIGH CHANNEL



Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 4.72	43.01	PK-U	34.1	-30.4	0	46.71	-	-	74	-27.29	-	-	217	122	H
	* 4.72	31.64	ADR	34.1	-30.4	.38	35.72	54	-18.28	-	-	-	-	217	122	H
4	* 4.92	45.03	PK-U	33.9	-29.4	0	49.53	-	-	74	-24.47	-	-	228	129	H
	* 4.92	37.05	ADR	33.9	-29.4	.38	41.93	54	-12.07	-	-	-	-	228	129	H
5	* 4.96	45.76	PK-U	33.9	-29.6	0	50.06	-	-	74	-23.94	-	-	227	133	H
	* 4.96	37.43	ADR	33.9	-29.6	.38	42.11	54	-11.89	-	-	-	-	227	133	H
2	* 3.75	47.02	PK-U	33.3	-32.1	0	48.22	-	-	74	-25.78	-	-	33	216	V
	* 3.75	41.57	ADR	33.3	-32.1	.38	43.15	54	-10.85	-	-	-	-	33	216	V
6	* 5	50.13	PK-U	34	-28.9	0	55.23	-	-	74	-18.77	-	-	32	285	V
	* 5	45.95	ADR	34	-28.9	.38	51.43	54	-2.57	-	-	-	-	32	285	V
1	* 2.5	51.97	PK-U	32.1	-34.4	0	49.67	-	-	74	-24.33	-	-	59	158	H
	* 2.5	48.17	ADR	32.1	-34.4	.38	46.25	54	-7.75	-	-	-	-	59	158	H

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

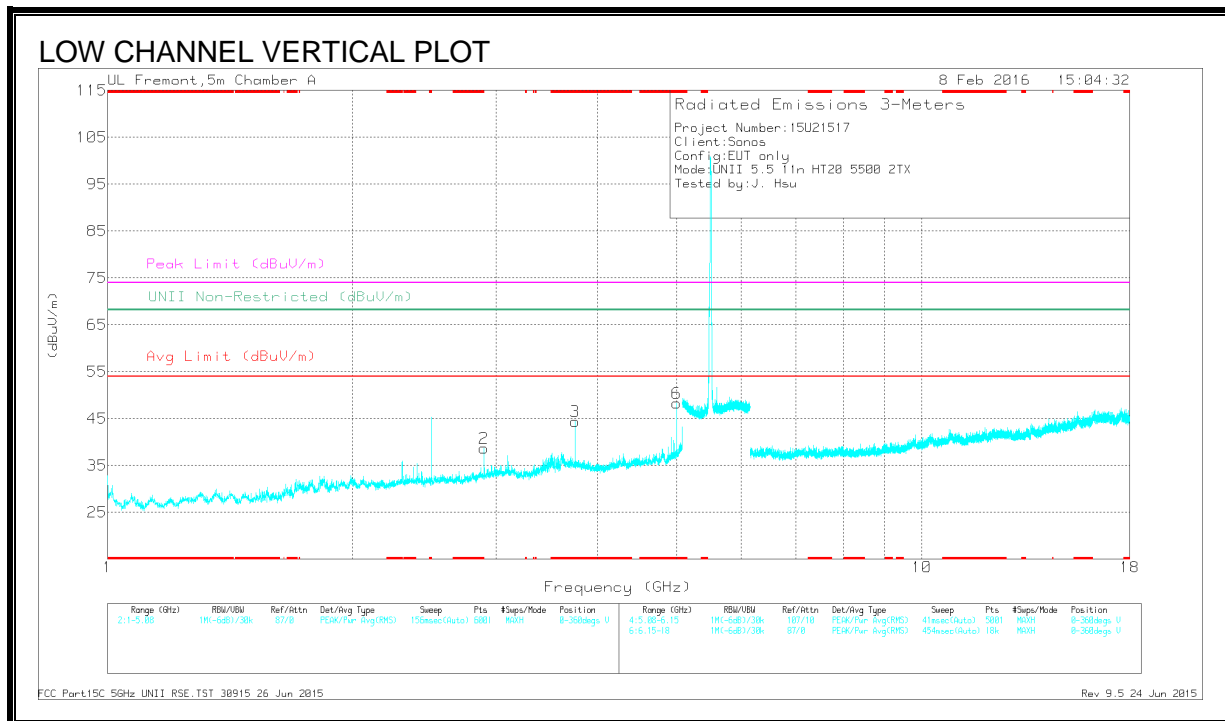
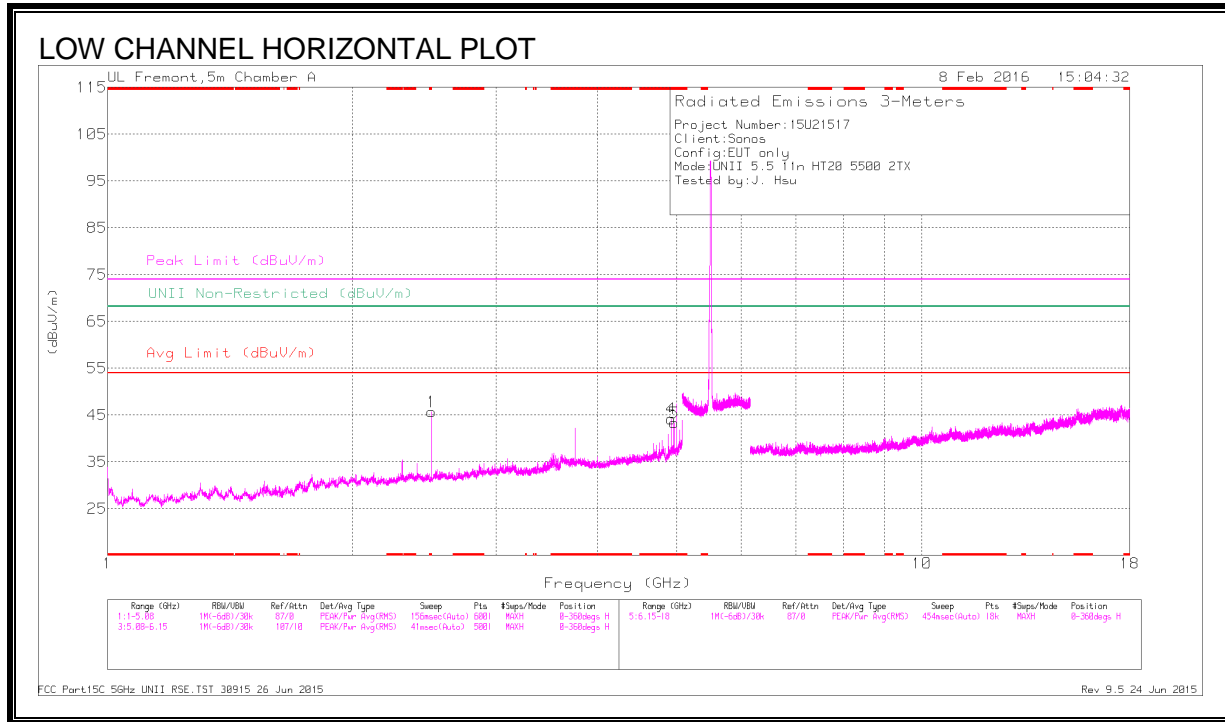
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

9.4. TX RADIATED EMISSIONS 5.6 GHz Band (1 GHz – 18 GHz)

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL



Radiated Emissions

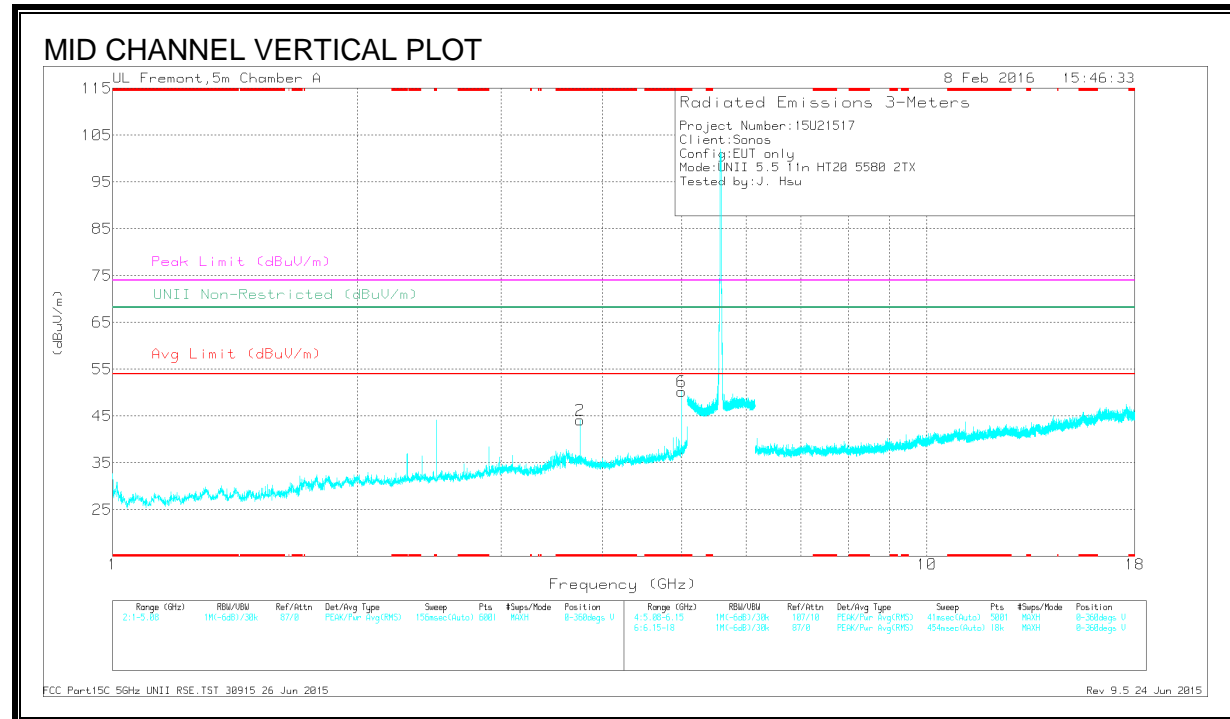
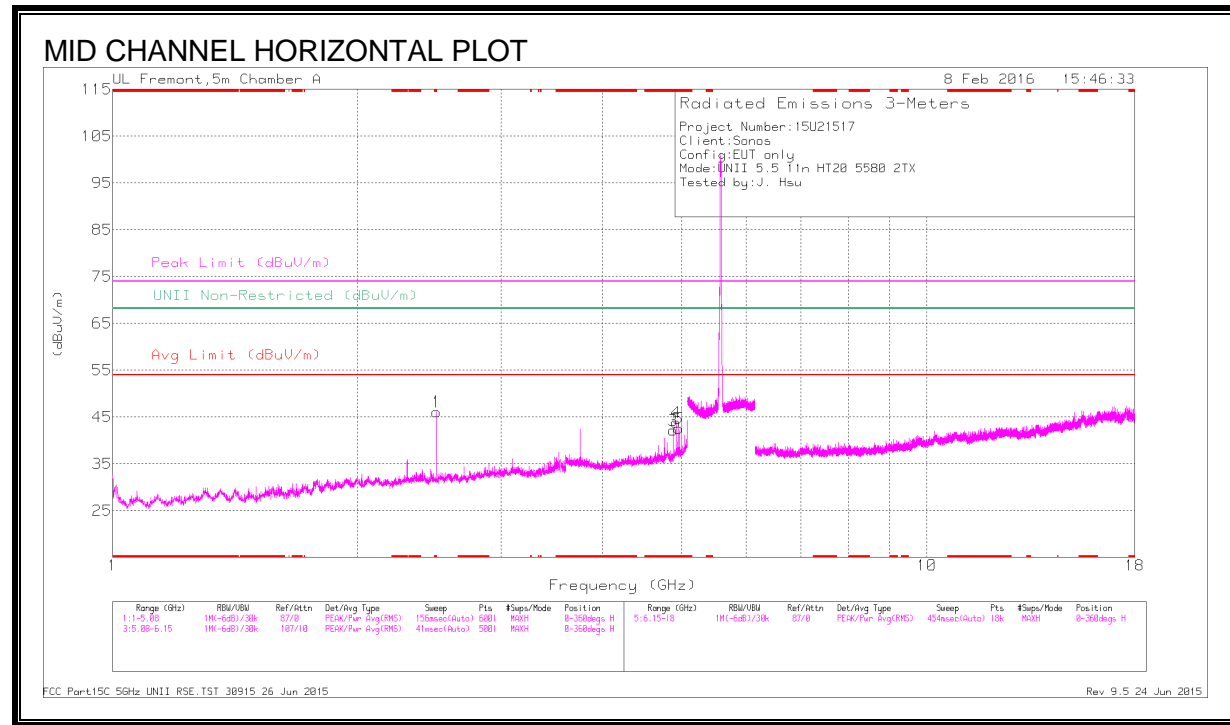
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 4.92	45.11	PK-U	33.9	-29.4	0	49.61	-	-	74	-24.39	-	-	218	100	H
	* 4.92	37.32	ADR	33.9	-29.4	.38	42.2	54	-11.8	-	-	-	-	218	100	H
5	* 4.96	45.89	PK-U	33.9	-29.6	0	50.19	-	-	74	-23.81	-	-	226	137	H
	* 4.96	37.44	ADR	33.9	-29.6	.38	42.12	54	-11.88	-	-	-	-	226	137	H
2	2.9	45.81	PK-U	32.6	-33.3	0	45.11	-	-	-	-	68.2	-23.09	270	121	V
	* 3.75	47.67	PK-U	33.3	-32.1	0	48.87	-	-	74	-25.13	-	-	27	223	V
3	* 3.75	41.28	ADR	33.3	-32.1	.38	42.86	54	-11.14	-	-	-	-	27	223	V
	* 5	49.89	PK-U	34	-28.9	0	54.99	-	-	74	-19.01	-	-	25	250	V
6	* 5	45.51	ADR	34	-28.9	.38	50.99	54	-3.01	-	-	-	-	25	250	V
	* 2.5	52.4	PK-U	32.1	-34.4	0	50.1	-	-	74	-23.9	-	-	53	159	H
1	* 2.5	48.45	ADR	32.1	-34.4	.38	46.53	54	-7.47	-	-	-	-	53	159	H

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

MID CHANNEL



Radiated Emissions

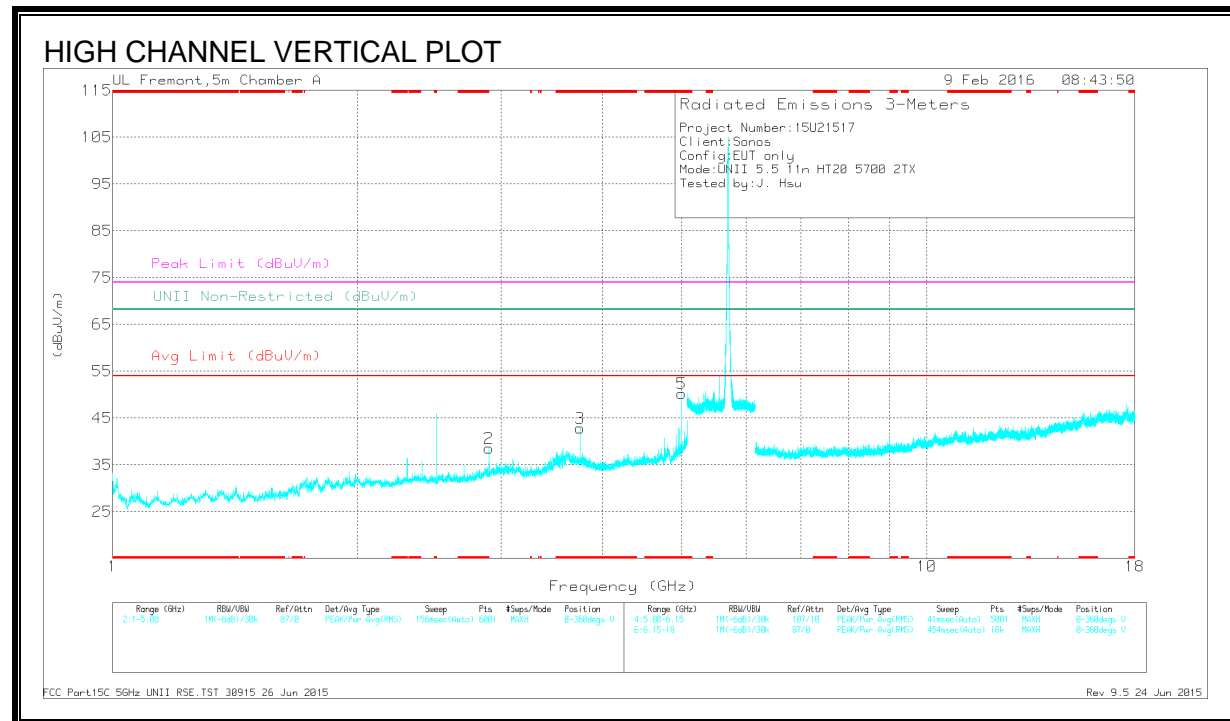
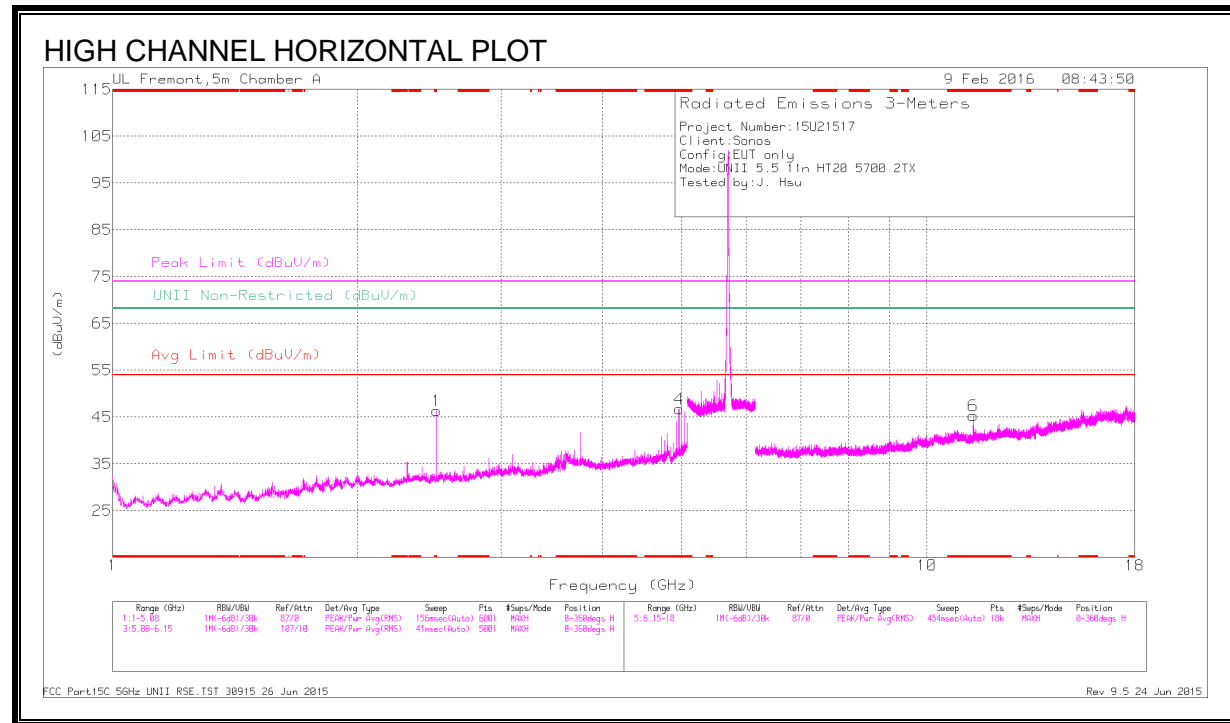
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 4.88	44.5	PK-U	33.9	-29.7	0	48.7	-	-	74	-25.3	-	-	225	112	H
	* 4.88	37.2	ADR	33.9	-29.7	.38	41.78	54	-12.22	-	-	-	-	225	112	H
4	* 4.92	44.66	PK-U	33.9	-29.4	0	49.16	-	-	74	-24.84	-	-	225	169	H
	* 4.92	35.95	ADR	33.9	-29.4	.38	40.83	54	-13.17	-	-	-	-	225	169	H
5	* 4.96	45.91	PK-U	33.9	-29.6	0	50.21	-	-	74	-23.79	-	-	227	115	H
	* 4.96	37.69	ADR	33.9	-29.6	.38	42.37	54	-11.63	-	-	-	-	227	115	H
2	* 3.75	47.85	PK-U	33.3	-32.1	0	49.05	-	-	74	-24.95	-	-	28	230	V
	* 3.75	42.07	ADR	33.3	-32.1	.38	43.65	54	-10.35	-	-	-	-	28	230	V
6	* 5	48.99	PK-U	34	-28.9	0	54.09	-	-	74	-19.91	-	-	24	222	V
	* 5	44.28	ADR	34	-28.9	.38	49.76	54	-4.24	-	-	-	-	24	222	V
1	* 2.5	52.33	PK-U	32.1	-34.4	0	50.03	-	-	74	-23.97	-	-	52	160	H
	* 2.5	48.68	ADR	32.1	-34.4	.38	46.76	54	-7.24	-	-	-	-	52	160	H

* - indicates frequency in CFR15.205/IC8.10 Restricted Band

PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

HIGH CHANNEL



Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/ Ftr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 4.96	47.33	PK-U	33.9	-29.6	0	51.63	-	-	74	-22.37	-	-	224	132	H
	* 4.96	40.72	ADR	33.9	-29.6	.38	45.4	54	-8.6	-	-	-	-	224	132	H
2	2.9	45.94	PK-U	32.6	-33.3	0	45.24	-	-	-	-	68.2	-22.96	42	122	V
3	* 3.75	46.89	PK-U	33.3	-32.1	0	48.09	-	-	74	-25.91	-	-	176	101	V
	* 3.75	40.47	ADR	33.3	-32.1	-38	42.05	54	-11.95	-	-	-	-	176	101	V
5	* 4.999	52.67	PK-U	34	-28.9	0	57.77	-	-	74	-16.23	-	-	25	266	V
	* 5	46.43	ADR	34	-28.9	.38	51.91	54	-2.09	-	-	-	-	315	214	V
6	* 11.4	37.36	PK-U	37.9	-22.4	0	52.86	-	-	74	-21.14	-	-	1	239	H
	* 11.4	24.01	ADR	37.9	-22.4	-38	39.89	54	-14.11	-	-	-	-	1	239	H
1	* 2.5	52.53	PK-U	32.1	-34.4	0	50.23	-	-	74	-23.77	-	-	51	156	H
	* 2.5	48.79	ADR	32.1	-34.4	.38	46.87	54	-7.13	-	-	-	-	51	156	H

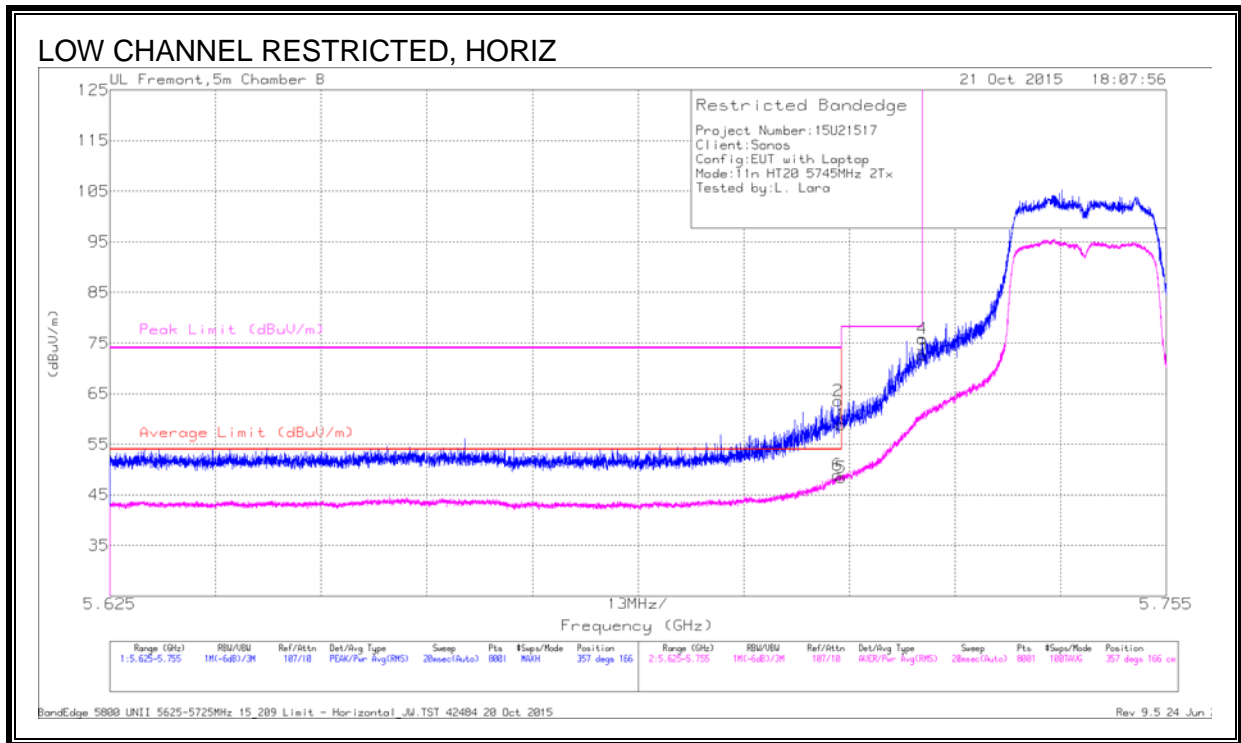
* - indicates frequency in CFR15.205/IC8.10 Restricted Band

PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

9.5. TX RADIATED EMISSIONS 5.8 GHz Band (1 GHz – 18 GHz)

RESTRICTED BANDEDGE (LOW CHANNEL 149)

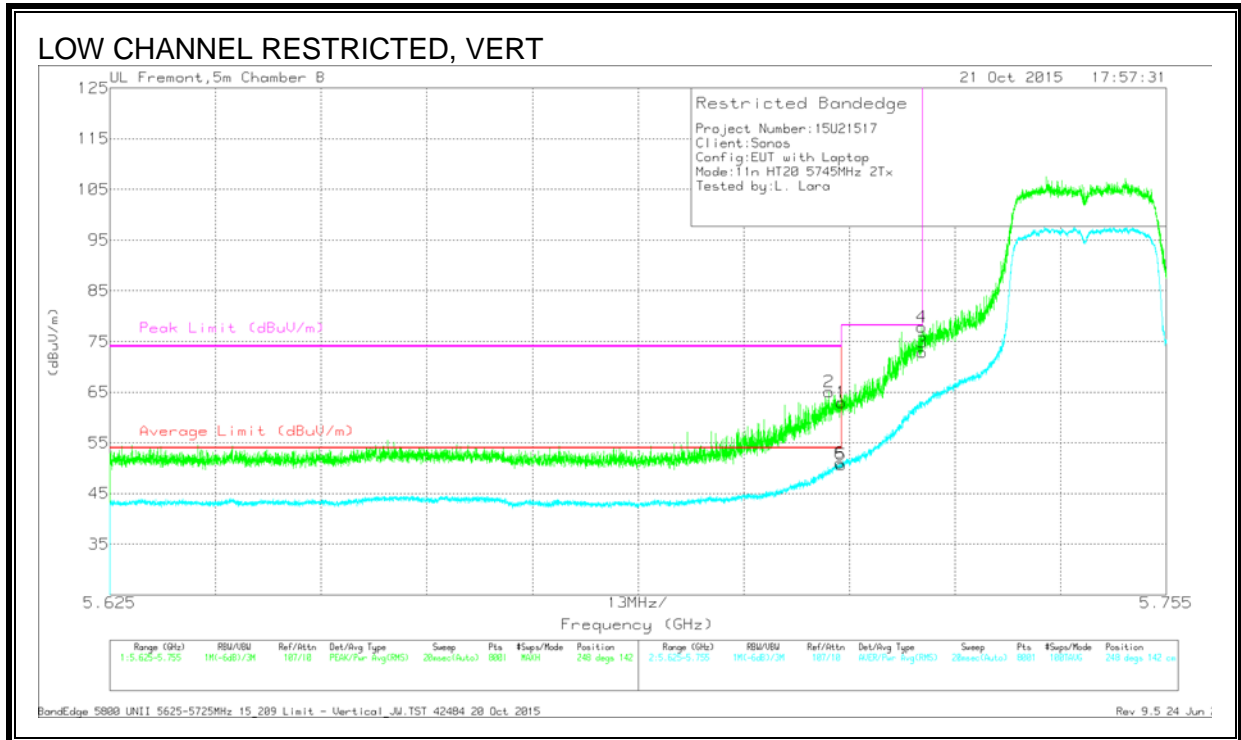


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Filt 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	5.715	44.81	Pk	35	-21	0	58.81	-	-	74	-15.19	357	166	H
2	5.715	49.46	Pk	35	-20.9	0	63.56	-	-	74	-10.44	357	166	H
5	5.715	34.01	RMS	35	-21	.38	48.39	54	-5.61	-	-	357	166	H
6	5.715	34.43	RMS	35	-20.9	.38	48.91	54	-5.09	-	-	357	166	H
3	5.725	58.5	Pk	35	-20.8	0	72.7	-	-	78.2	-5.5	357	166	H
4	5.725	61.82	Pk	35	-20.9	0	75.92	-	-	78.2	-2.28	357	166	H

Pk - Peak detector

RMS - RMS detection

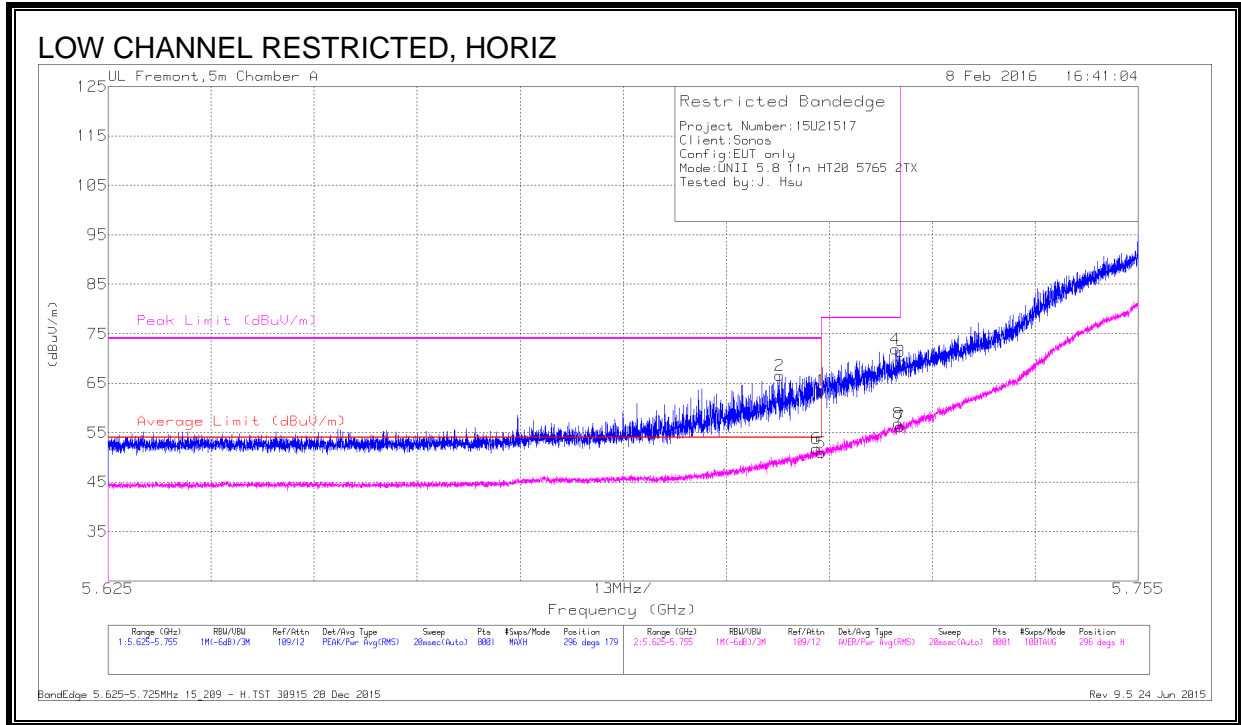


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/FI tr/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	5.713	50.91	Pk	35	-20.9	0	65.01	-	-	74	-8.99	248	142	V
1	5.715	48.95	Pk	35	-21	0	62.95	-	-	74	-11.05	248	142	V
5	5.715	36.24	RMS	35	-21	.38	50.62	54	-3.38	-	-	248	142	V
6	5.715	36.57	RMS	35	-20.9	.38	51.05	54	-2.95	-	-	248	142	V
3	5.725	58.64	Pk	35	-20.8	0	72.84	-	-	78.2	-5.36	248	142	V
4	5.725	63.71	Pk	35	-20.9	0	77.81	-	-	78.2	-.39	248	142	V

Pk - Peak detector
 RMS - RMS detection

RESTRICTED BANDEDGE (LOW CHANNEL 153)

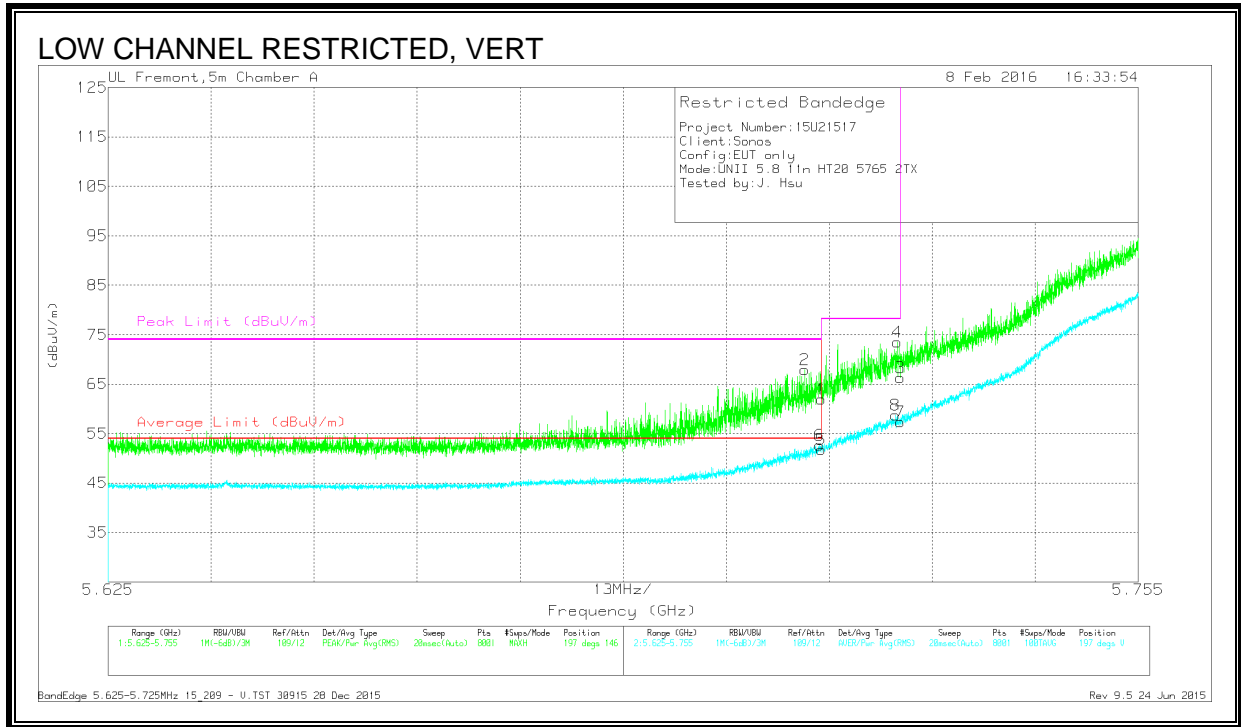


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cb/Fit 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
2	5.71	51.94	Pk	34.7	-20.1	0	66.54	-	-	74	-7.46	296	179	H
6	5.714	36.85	RMS	34.7	-20.1	.38	51.83	54	-2.17	-	-	296	179	H
1	5.715	48.93	Pk	34.7	-20.1	0	63.53	-	-	74	-10.47	296	179	H
5	5.715	35.96	RMS	34.7	-20.1	.38	50.94	54	-3.06	-	-	296	179	H
4	5.724	57.26	Pk	34.7	-20.1	0	71.86	-	-	78.2	-6.34	296	179	H
3	5.725	54.82	Pk	34.7	-20.1	0	69.42	-	-	78.2	-8.78	296	179	H
7	5.725	41.29	RMS	34.7	-20.1	.38	56.27	-	-	-	-	296	179	H
8	5.725	41.89	RMS	34.7	-20.1	.38	56.87	-	-	-	-	296	179	H

Pk - Peak detector

RMS - RMS detection



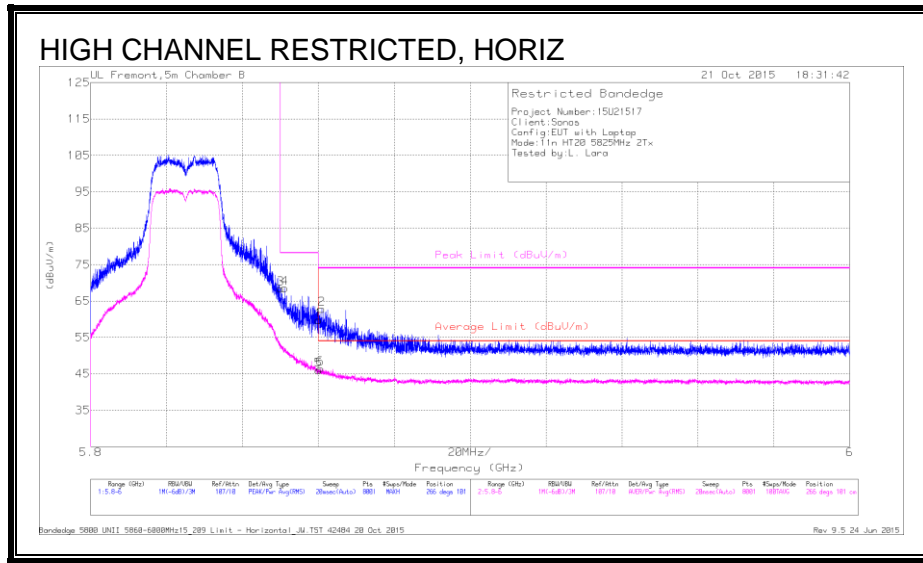
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T136 (dB/m)	Amp/Cbl/Fitter/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	5.713	53.31	Pk	34.7	-20.1	0	67.91	-	-	74	-6.09	197	146	V
1	5.715	47.39	Pk	34.7	-20.1	0	61.99	-	-	74	-12.01	197	146	V
5	5.715	36.76	RMS	34.7	-20.1	.38	51.74	54	-2.26	-	-	197	146	V
6	5.715	37.65	RMS	34.7	-20.1	.38	52.63	54	-1.37	-	-	197	146	V
8	5.724	43.7	RMS	34.7	-20.1	.38	58.68	-	-	-	-	197	146	V
3	5.725	51.76	Pk	34.7	-20.1	0	66.36	-	-	78.2	-11.84	197	146	V
4	5.725	58.86	Pk	34.7	-20.1	0	73.46	-	-	78.2	-4.74	197	146	V
7	5.725	42.44	RMS	34.7	-20.1	.38	57.42	-	-	-	-	197	146	V

Pk - Peak detector

RMS - RMS detection

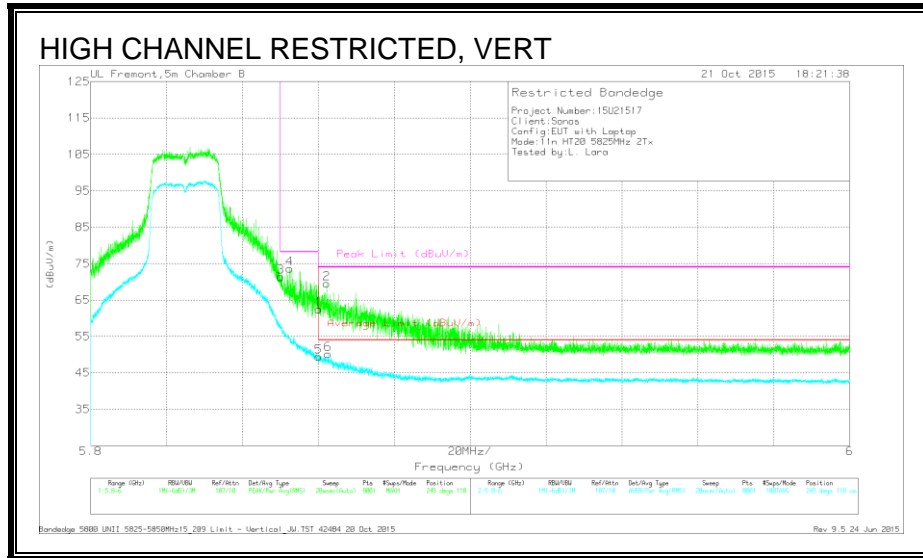
RESTRICTED BANDEDGE (HIGH CHANNEL)



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Ch/Fl tr/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
3	5.85	53.93	Pk	35.4	-20.9	0	68.43	-	-	78.2	-9.77	266	101	H
4	5.851	53.96	Pk	35.4	-20.8	0	68.56	-	-	78.2	-9.64	266	101	H
1	5.86	45.24	Pk	35.4	-20.9	0	59.74	-	-	74	-14.26	266	101	H
5	5.86	31.13	RMS	35.4	-20.9	.38	46.01	54	-7.99	-	-	266	101	H
2	5.861	48.42	Pk	35.4	-21	0	62.82	-	-	74	-11.18	266	101	H
6	5.861	31.62	RMS	35.4	-21	.38	46.4	54	-7.6	-	-	266	101	H

Pk - Peak detector
 RMS - RMS detection



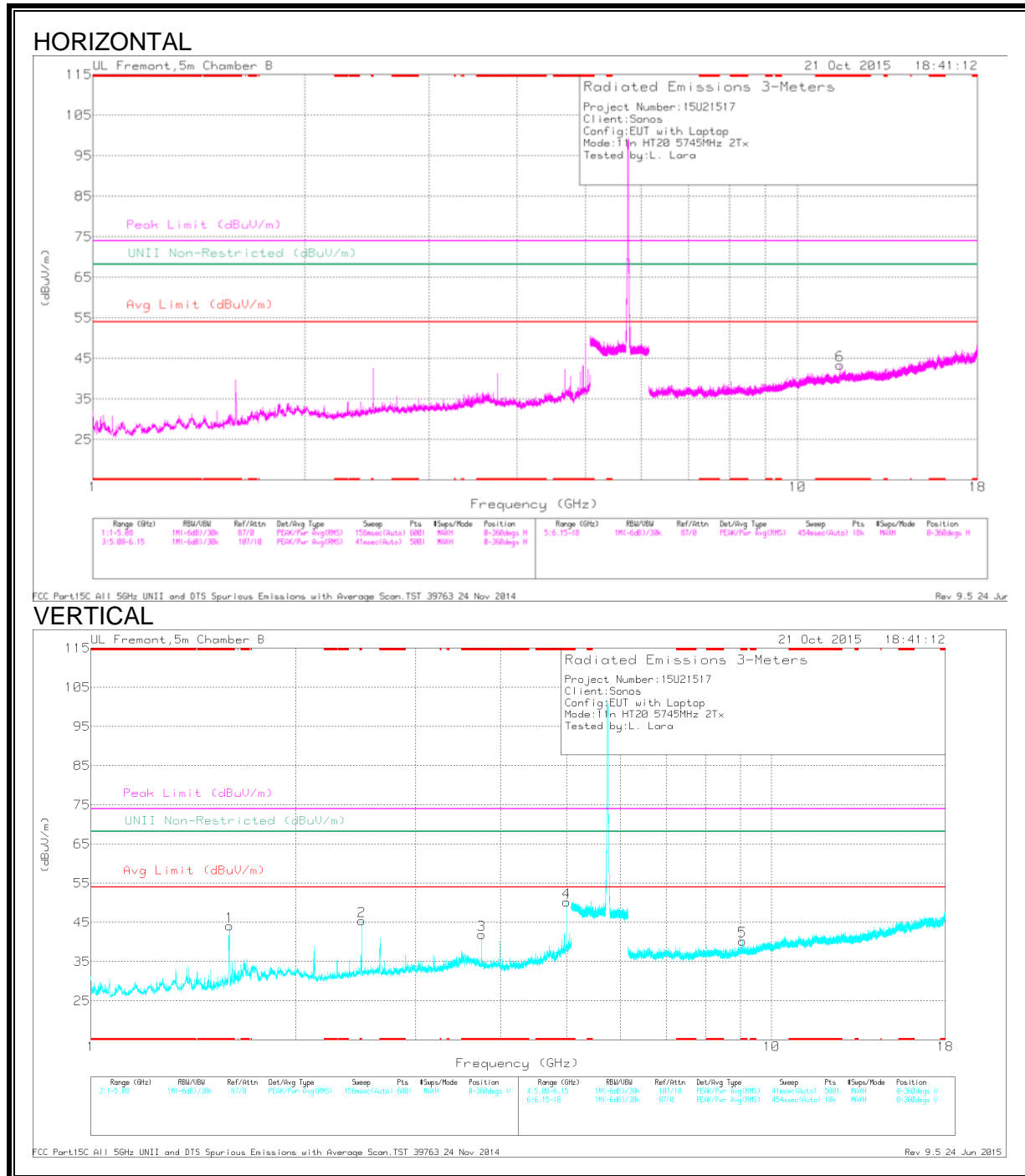
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/Fit 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
3	5.85	56.84	Pk	35.4	-20.9	0	71.34	-	-	78.2	-6.86	245	118	V
4	5.853	58.89	Pk	35.4	-20.7	0	73.59	-	-	78.2	-4.61	245	118	V
1	5.86	47.94	Pk	35.4	-20.9	0	62.44	-	-	74	-11.56	245	118	V
5	5.86	34.58	RMS	35.4	-20.9	.38	49.46	54	-4.54	-	-	245	118	V
2	5.862	54.82	Pk	35.4	-20.7	0	69.52	-	-	74	-4.48	245	118	V
6	5.863	35.08	RMS	35.4	-20.7	.38	50.16	54	-3.84	-	-	245	118	V

Pk - Peak detector
 RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL



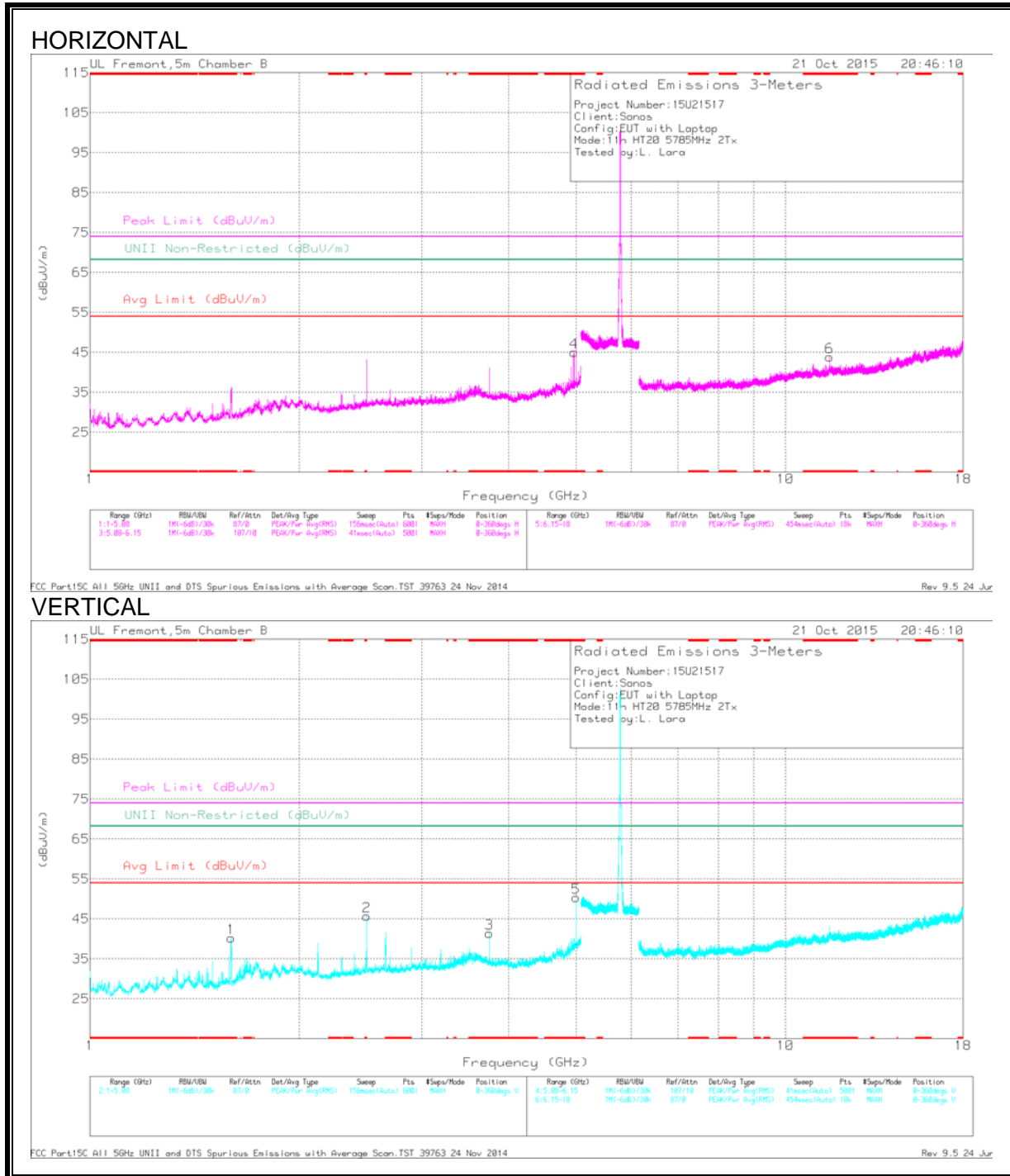
Radiated Emissions

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/FI tr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.594	60.5	PK-U	28.8	-35.3	0	54	-	-	74	-20	-	-	193	248	V
	* 1.594	38.49	ADR	28.8	-35.2	.38	32.47	54	-21.53	-	-	-	-	193	248	V
3	* 3.75	46.92	PK-U	33.5	-32.7	0	47.72	-	-	74	-26.28	-	-	45	160	V
	* 3.75	40.96	ADR	33.5	-32.7	.38	42.14	54	-11.86	-	-	-	-	45	160	V
4	* 5	50.7	PK-U	34	-29.9	0	54.8	-	-	74	-19.2	-	-	1	105	V
	* 5	45.04	ADR	34	-29.9	.38	49.52	54	-4.48	-	-	-	-	1	105	V
6	* 11.49	38.24	PK-U	38.3	-25.4	0	51.14	-	-	74	-22.86	-	-	297	101	H
	* 11.49	26.48	ADR	38.3	-25.4	.38	39.76	54	-14.24	-	-	-	-	297	101	H
5	* 9.056	37.83	PK-U	36.1	-27.6	0	46.33	-	-	74	-27.67	-	-	211	278	V
	* 9.054	26.35	ADR	36.1	-27.6	.38	35.23	54	-18.77	-	-	-	-	211	278	V
2	2.5	50.38	PK-U	32.5	-34.1	0	48.78	-	-	-	-	68.2	-19.42	26	154	V

* - indicates frequency in CFR15.205/IC8.10 Restricted Band.
 ** - indicates frequency covered by the radiated band edge.

PK-U - U-NII: Maximum Peak
 ADR - U-NII AD primary method, RMS average

MID CHANNEL



Radiated Emissions

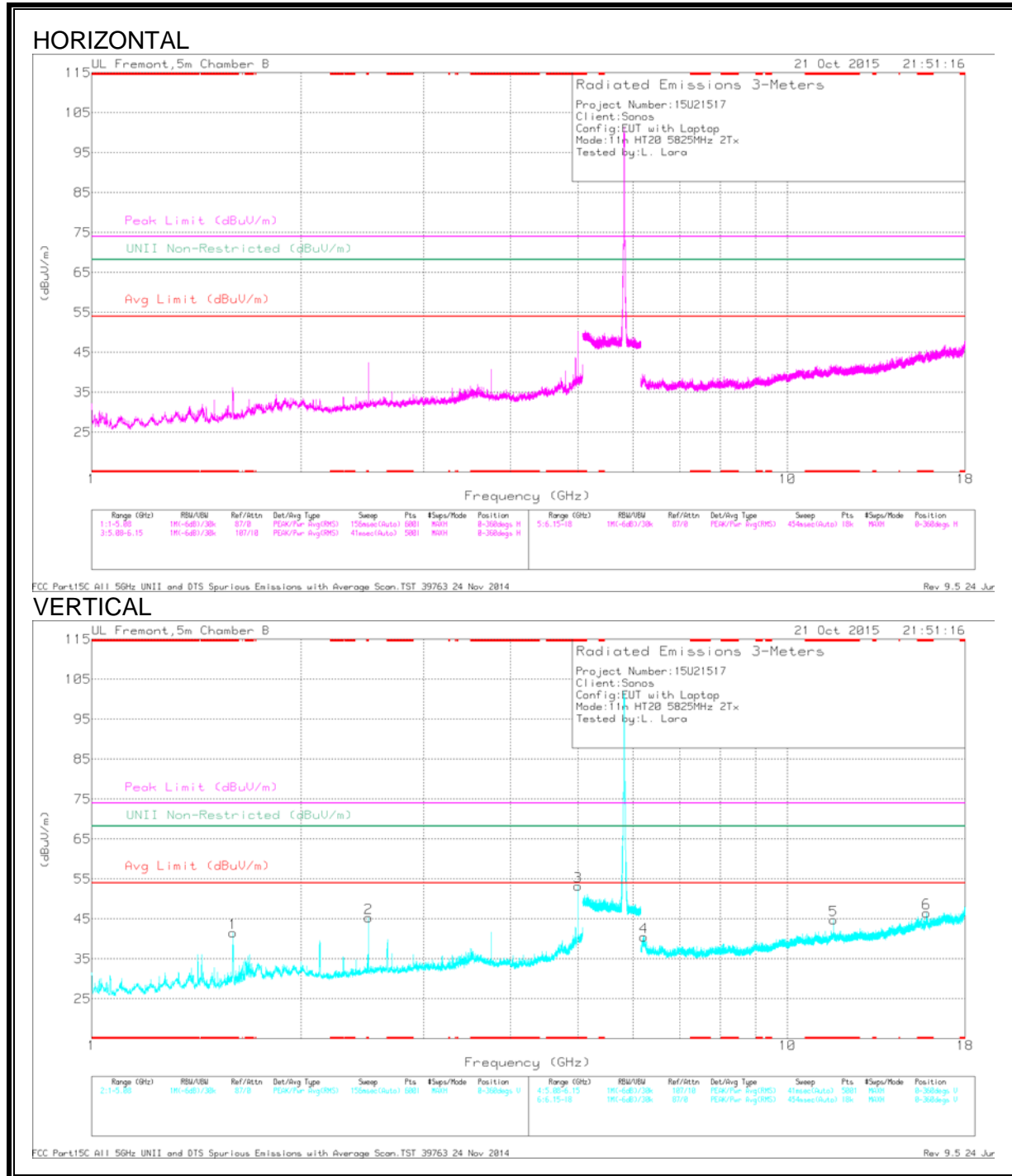
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cb/FI tr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 4.96	47.73	PK-U	34.1	-31	0	50.83	-	-	74	-23.17	-	-	282	130	H
	* 4.96	40.48	ADR	34.1	-31	.38	43.96	54	-10.04	-	-	-	-	282	130	H
1	* 1.597	58.24	PK-U	28.8	-35.2	0	51.84	-	-	74	-22.16	-	-	177	326	V
	* 1.598	38.03	ADR	28.8	-35.2	.38	32.01	54	-21.99	-	-	-	-	177	326	V
2	* 2.5	50.58	PK-U	32.5	-34.1	0	48.98	-	-	74	-25.02	-	-	28	152	V
	* 2.5	46.85	ADR	32.5	-34.1	.38	45.63	54	-8.37	-	-	-	-	28	152	V
3	* 3.749	47.38	PK-U	33.5	-32.7	0	48.18	-	-	74	-25.82	-	-	88	246	V
	* 3.75	41.42	ADR	33.5	-32.7	.38	42.6	54	-11.4	-	-	-	-	88	246	V
5	* 5	50.28	PK-U	34	-29.9	0	54.38	-	-	74	-19.62	-	-	0	104	V
	* 5	44.84	ADR	34	-29.9	.38	49.32	54	-4.68	-	-	-	-	0	104	V
6	* 11.571	36.1	PK-U	38.4	-24.6	0	49.9	-	-	74	-24.1	-	-	293	133	H
	* 11.57	24.84	ADR	38.4	-24.6	.38	39.02	54	-14.98	-	-	-	-	293	133	H

* - indicates frequency in CFR15.205/IC8.10 Restricted Band.

** - indicates frequency covered by the radiated band edge.

PK-U - U-NII: Maximum Peak
 ADR - U-NII AD primary method, RMS average

HIGH CHANNEL



Radiated Emissions

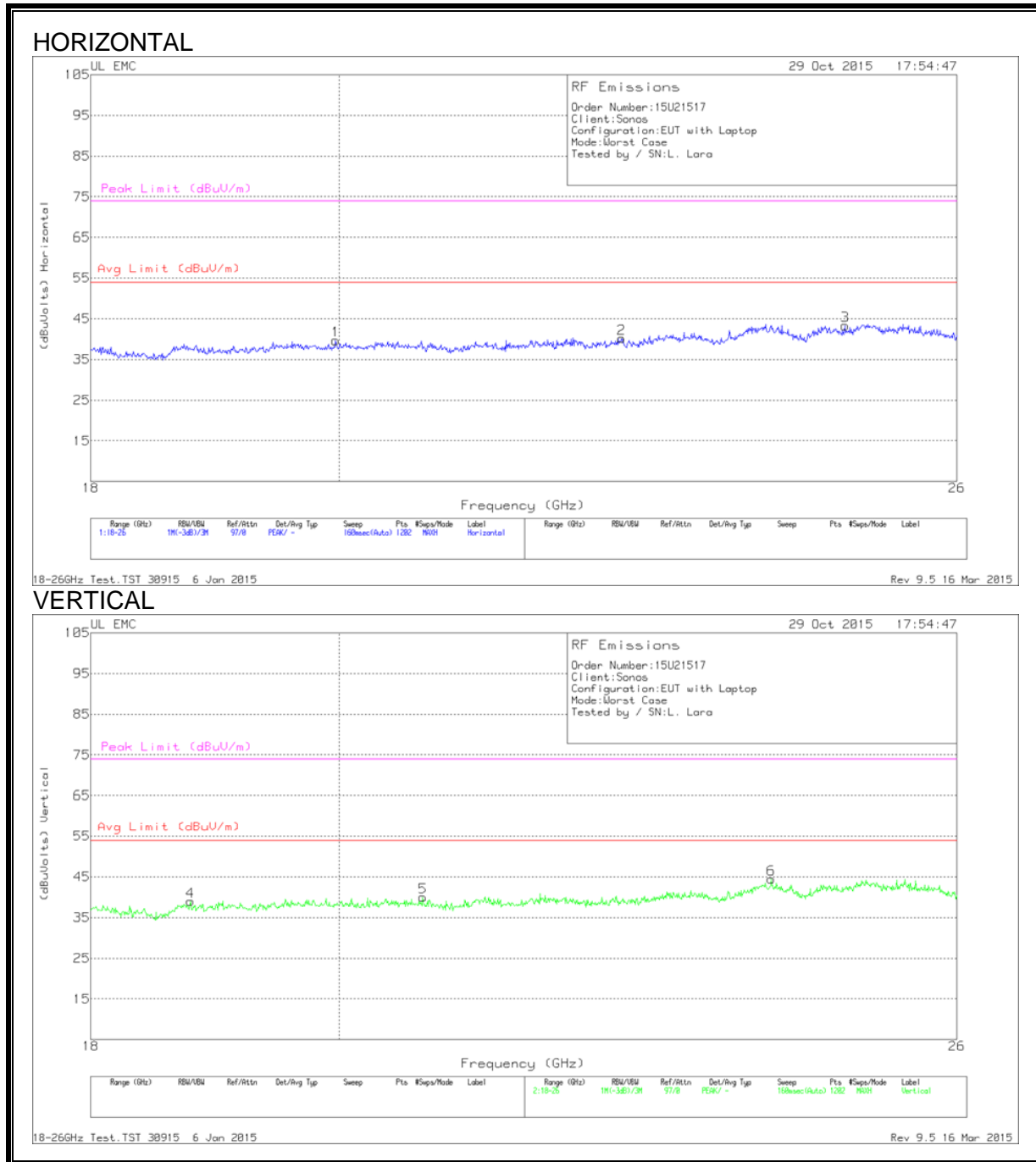
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/FI tr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.597	59.41	PK-U	28.8	-35.2	0	53.01	-	-	74	-20.99	-	-	181	288	V
	* 1.598	38.49	ADR	28.8	-35.2	.38	32.47	54	-21.53	-	-	-	-	181	288	V
3	* 4.999	52.3	PK-U	34	-29.9	0	56.4	-	-	74	-17.6	-	-	359	107	V
	* 5	47.29	ADR	34	-29.9	.38	51.77	54	-2.23	-	-	-	-	359	107	V
5	* 11.65	36.85	PK-U	38.5	-24.8	0	50.55	-	-	74	-23.45	-	-	76	124	V
	* 11.649	25.12	ADR	38.5	-24.8	.38	39.2	54	-14.8	-	-	-	-	76	124	V
6	* 15.857	33.79	PK-U	40.6	-20.7	0	53.69	-	-	74	-20.31	-	-	101	223	V
	* 15.852	22.11	ADR	40.6	-20.7	.38	42.39	54	-11.61	-	-	-	-	101	223	V
2	2.5	50.65	PK-U	32.5	-34.1	0	49.05	-	-	-	-	68.2	-19.15	28	154	V
4	6.224	46.29	PK-U	35.5	-31.5	0	50.29	-	-	-	-	68.2	-17.91	238	317	V

* - indicates frequency in CFR15.205/IC8.10 Restricted Band.
 ** - indicates frequency covered by the radiated band edge.

PK-U - U-NII: Maximum Peak
 ADR - U-NII AD primary method, RMS average

9.6. WORST-CASE TX RADIATED EMISSIONS (18 GHz – 40 GHz)

SPURIOUS EMISSIONS 18 – 26 GHz

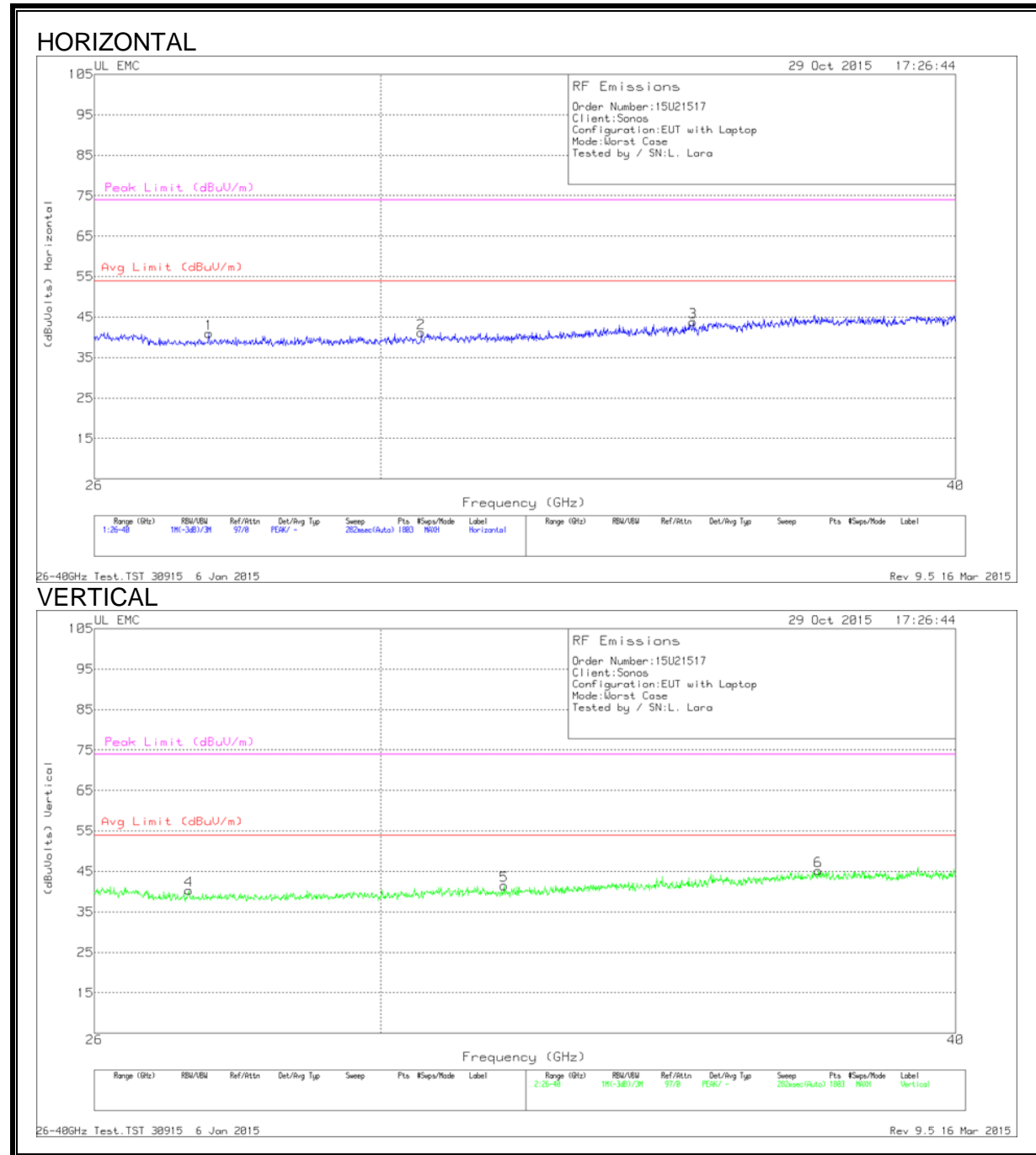


Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T89 AF (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	19.972	41.27	Pk	33	-25.1	-9.5	39.67	54	-14.33	74	-34.33
2	22.55	41.17	Pk	33.4	-24.9	-9.5	40.167	54	-13.83	74	-33.83
3	24.794	43.43	Pk	33.9	-24.5	-9.5	43.33	54	-10.67	74	-30.67
4	18.779	41.1	Pk	32.5	-25.1	-9.5	39	54	-15	74	-35
5	20.724	41.9	Pk	32.8	-25.2	-9.5	40	54	-14	74	-34
6	24.028	44.8	Pk	33.3	-24.1	-9.5	44.5	54	-9.5	74	-29.5

Pk - Peak detector

SPURIOUS EMISSIONS 26 – 40GHz



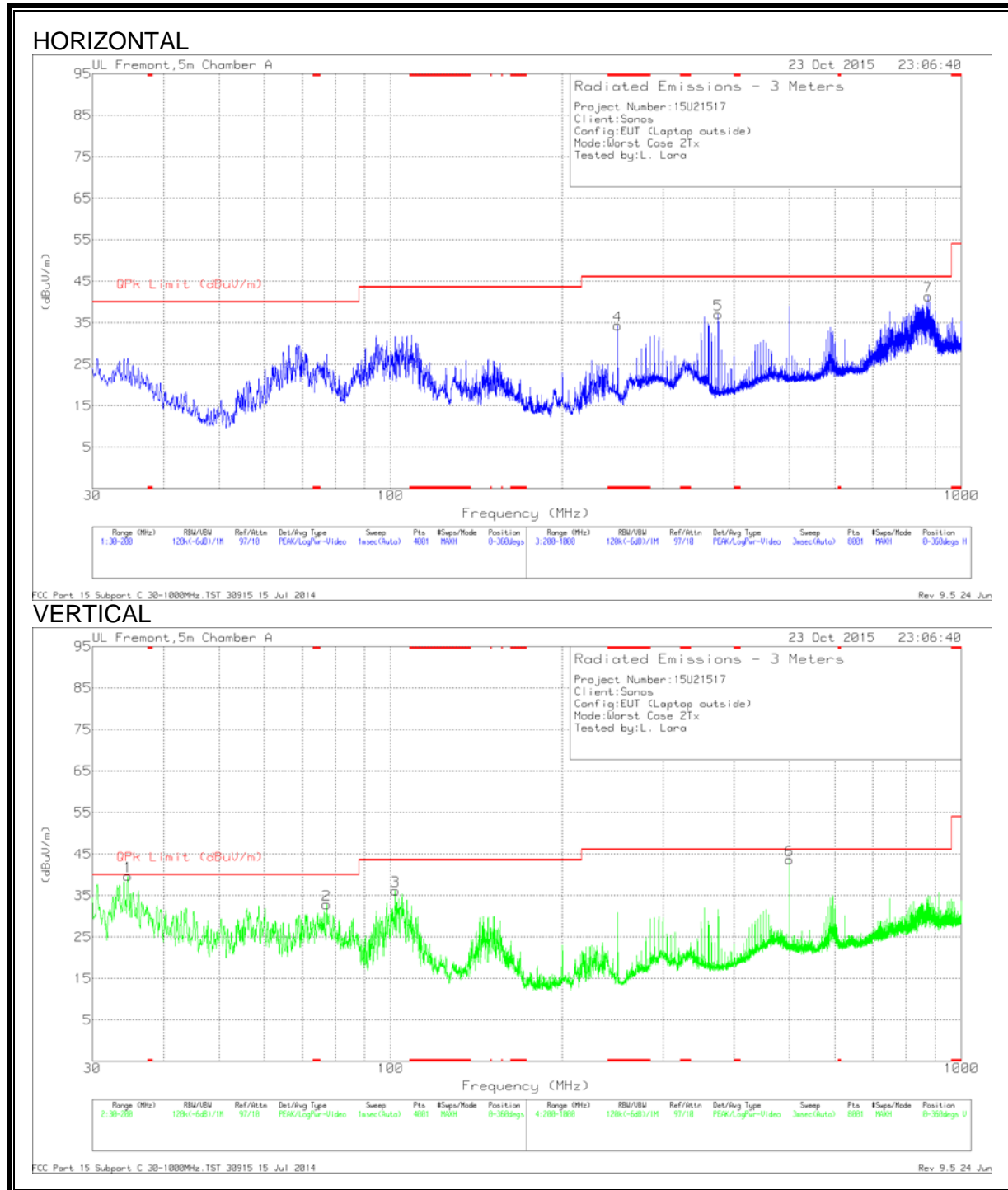
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T90 AF (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	27.531	46.3	Pk	35.7	-31.5	-9.5	41	54	-13	74	-33
2	30.615	47.07	Pk	36.1	-32.5	-9.5	41.17	54	-12.83	74	-32.83
3	35.074	49.33	Pk	37.3	-33.3	-9.5	43.83	54	-10.17	74	-30.17
4	27.259	45.23	Pk	35.6	-31	-9.5	40.33	54	-13.67	74	-33.67
5	31.912	47.6	Pk	36.2	-32.8	-9.5	41.5	54	-12.5	74	-32.5
6	37.343	50.37	Pk	37.3	-33	-9.5	45.17	54	-8.83	74	-28.83

Pk - Peak detector

9.7. WORST-CASE BELOW 1 GHz

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



Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T477 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 250	48.55	Pk	15.4	-29.6	34.35	46.02	-11.67	0-360	101	H
1	34.63	49.08	Pk	21.8	-31.2	39.68	40	-.32	0-360	101	V
2	77.20	51.95	Pk	11.7	-30.8	32.85	40	-7.15	0-360	101	V
3	101.91	51.89	Pk	14.8	-30.5	36.19	43.52	-7.33	0-360	101	V
5	375	47.16	Pk	19	-29.1	37.06	46.02	-8.96	0-360	101	H
6	500	50.65	Pk	21.7	-28.7	43.65	46.02	-2.37	0-360	101	V
7	875	42.85	Pk	26	-27.5	41.35	46.02	-4.67	0-360	101	H

Radiated Emissions

Frequency (MHz)	Meter Reading (dBuV)	Det	AF T477 (dB/m)	Amp/Cbl (dB/m)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
34.63	46.29	Qp	21.8	-31.2	36.89	40	-3.11	141	114	V
500.01	49.67	Qp	21.7	-28.7	42.67	46.02	-3.35	167	107	V
874.98	40.03	Qp	26	-27.5	38.53	46.02	-7.49	73	170	H

* - indicates frequency in CFR15.205 Restricted Band

Pk - Peak detector

Qp - Quasi-Peak detector

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-GEN Clause 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.

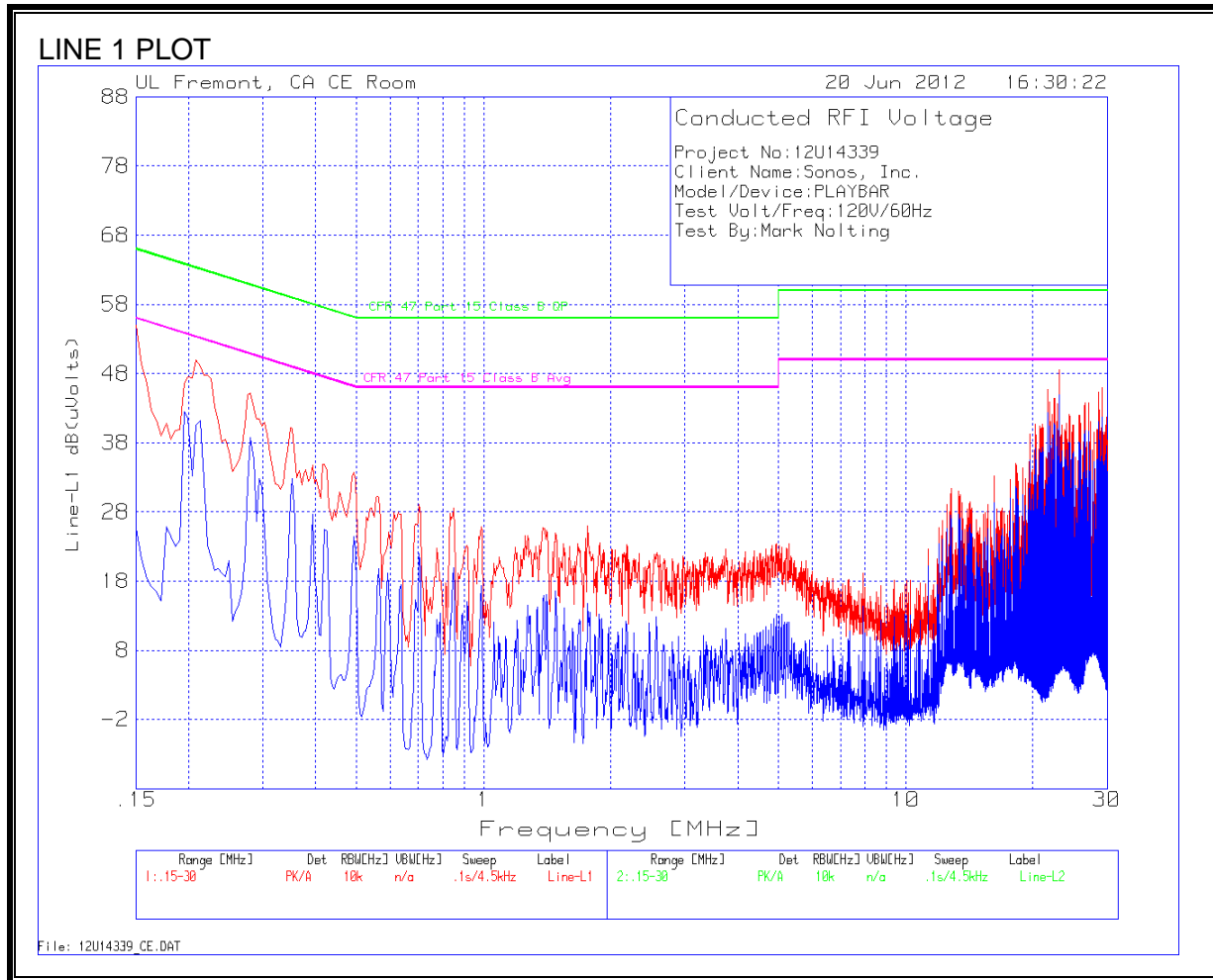
TEST PROCEDURE

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 C63.10-2013.

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

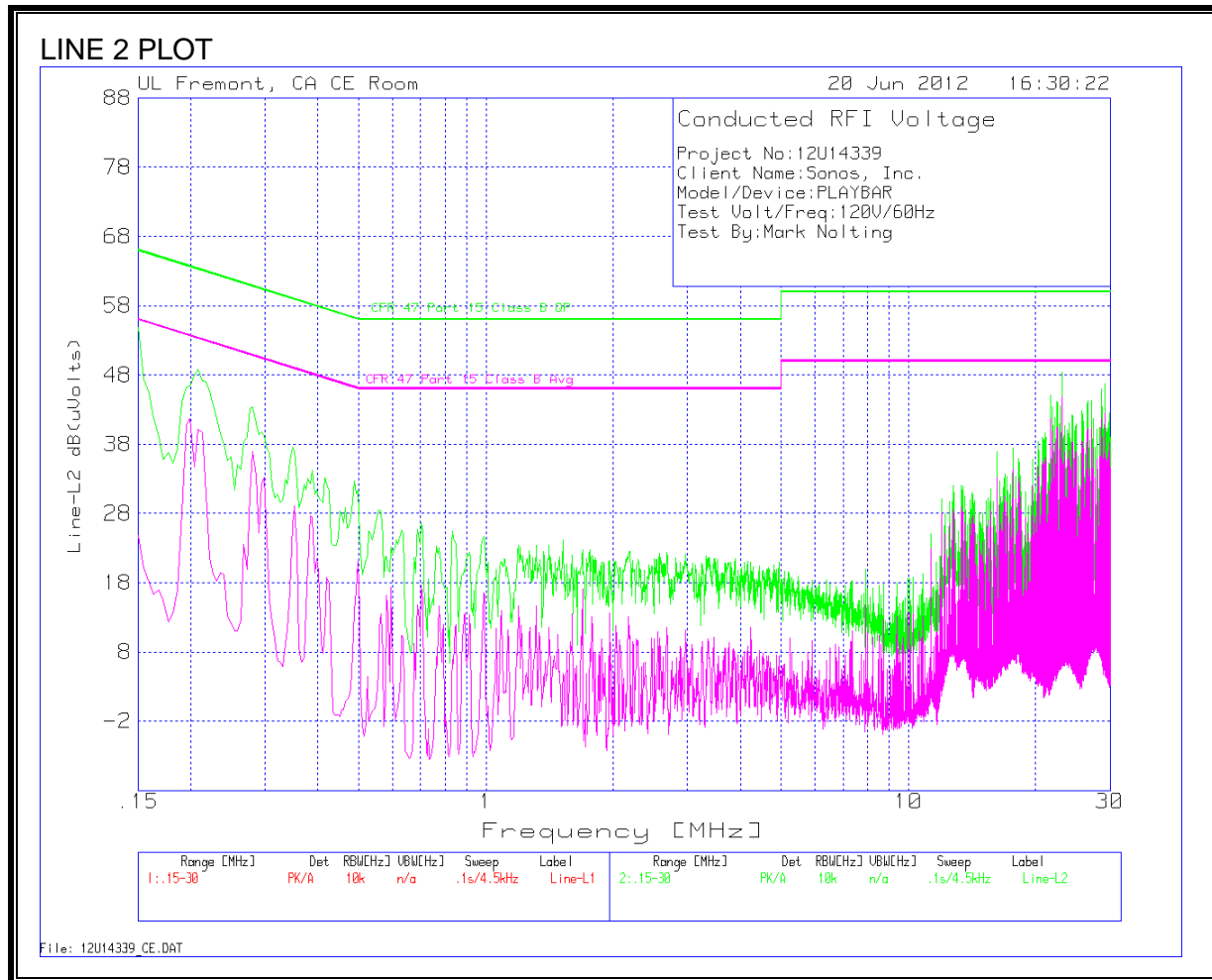
Line conducted data is recorded for both NEUTRAL and HOT lines

RESULTS



WORST EMISSIONS

LINE 1 DATA									
Project No: 12U14339									
Client Name: Sonos, Inc.									
Model/Device: PLAYBAR									
Test Volt/Freq: 120V/60Hz									
Tested By: Mark Nolting									
Frequency [MHz]	Meter Reading [dBuV]	Detector	T24 AMN Factor [dB]	Cable Loss [dB]	Corrected Reading [dBuV]	FCC Class-B QP Limit [dBuV]	Margin [dB]	FCC Class-B Av Limit [dBuV]	Margin [dB]
0.1500	54.9	PK	0.1	0.0	55.0	66.0	-11.0	-	-
0.2085	49.9	PK	0.1	0.0	50.0	63.3	-13.4	-	-
0.2805	45.0	PK	0.1	0.0	45.1	60.8	-15.7	-	-
21.6600	45.2	PK	0.3	0.2	45.7	60.0	-14.3	-	-
23.1270	47.9	PK	0.4	0.2	48.5	60.0	-11.5	-	-
29.2335	45.2	PK	0.5	0.3	46.0	60.0	-14.0	-	-
0.1500	25.5	Av	0.1	0.0	25.6	-	-	56.0	-30.4
0.2085	40.5	Av	0.1	0.0	40.6	-	-	53.3	-12.8
0.2805	38.6	Av	0.1	0.0	38.7	-	-	50.8	-12.1
21.6600	41.9	Av	0.3	0.2	42.4	-	-	50.0	-7.6
23.1270	44.3	Av	0.4	0.2	44.9	-	-	50.0	-5.1
29.2335	41.0	Av	0.5	0.3	41.8	-	-	50.0	-8.3
PK - Peak detector									
QP - Quasi-Peak detector									
Av - Average detector									



WORST EMISSIONS

LINE 2 DATA									
Project No: 12U14339									
Client Name: Sonos, Inc.									
Model/Device: PLAYBAR									
Test Volt/Freq: 120V/60Hz									
Tested By: Mark Nolting									
Frequency [MHz]	Meter Reading [dBuV]	Detector	T24 AMN Factor [dB]	Cable Loss [dB]	Corrected Reading [dBuV]	FCC Class-B QP Limit [dBuV]	Margin [dB]	FCC Class-B Av Limit [dBuV]	Margin [dB]
0.1500	54.8	PK	0.1	0.0	54.9	66.0	-11.2	-	-
0.2085	48.7	PK	0.1	0.0	48.8	63.3	-14.5	-	-
0.2805	43.3	PK	0.1	0.0	43.4	60.8	-17.4	-	-
21.6600	44.6	PK	0.3	0.2	45.1	60.0	-14.9	-	-
23.1270	47.9	PK	0.4	0.2	48.5	60.0	-11.5	-	-
29.2335	45.9	PK	0.5	0.3	46.7	60.0	-13.3	-	-
0.1500	24.8	Av	0.1	0.0	24.9	-	-	56.0	-31.1
0.2085	40.1	Av	0.1	0.0	40.2	-	-	53.3	-13.1
0.2805	36.8	Av	0.1	0.0	36.9	-	-	50.8	-13.9
21.6600	41.2	Av	0.3	0.2	41.7	-	-	50.0	-8.3
23.1270	44.2	Av	0.4	0.2	44.8	-	-	50.0	-5.2
29.2335	41.7	Av	0.5	0.3	42.5	-	-	50.0	-7.6
PK - Peak detector									
QP - Quasi-Peak detector									
Av - Average detector									

12. ART POWER SETTINGS TABLE

Channel	Frequency	FCC (Region 1)		
		11b	11g	11n
149	5745			13.5
153	5765			15
157	5785			15
161	5805			15
165	5825			15

END OF REPORT