CERTIFICATION TEST REPORT

Report Number. : 11536164-E1V6

Applicant	:	SONOS INC. 614 CHAPALA STREET SANTA BARBARA, CA 93101, U.S.A.
Model	:	S15
FCC ID	:	SBVRM013
IC	:	5373A-RM013
EUT Description	:	802.11 b/g/n, 3x3, HT20 device
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:
March 28, 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	02/27/17	Initial Issue	D. Coronia
V2	03/16/17	Updated Section 5.2, 5.5, 5.6, Output power section updated to “chains are correlated” and PSD sections added KDB 662911 D01	D. Coronia
V3	03/21/17	Updated Directional Gain and Output Power Section	D. Coronia
V4	03/24/17	Update antenna gain and max power table	P. Zhang
V5	03/28/17	Update antenna gain and max power table	P. Zhang
V6	03/28/17	Updated Section 5.5 and 11	D. Coronia

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UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701J
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SONOS INC.

EUT DESCRIPTION: 802.11 b/g/n, 3x3, HT20 device

MODEL: S15

SERIAL NUMBER: 1612 94-9F-3E-B0-00-D0-4 (Conducted + Radiated)

DATE TESTED: January 9 – 12, 2017

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
CONSUMER TECHNOLOGY DIVISION
WiSE PROJECT LEAD
UL VERIFICATION SERVICES INC

Tested By:

JONATHAN HSU
CONSUMER TECHNOLOGY DIVISION
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, KDB 662911 D01 Multiple Transmitter Output v02r01, 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.

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

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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 an 802.11 b/g/n, 3x3, HT20 device.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Measured Output Power (dBm)	Measured Output Power (mW)
2412 - 2462	802.11b 3TX CDD	24.74	297.85
2412 - 2462	802.11g 3TX CDD	23.76	237.68
2412 - 2462	802.11n HT20 3TX CDD	23.81	240.44

The transmitter has a maximum EIRP output power as follows:

Frequency Range (MHz)	Mode	EIRP Power (dBm)	EIRP Power (mW)
2412 - 2462	802.11b 3TX CDD	29.04	801.68
2412 - 2462	802.11g 3TX CDD	28.06	639.73
2412 - 2462	802.11n HT20 3TX CDD	28.11	647.14

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The EUT utilizes wire monopole antennas on FR4 substrate with maximum gain as table below:

Frequency Band (GHz)	Antenna Gain (dBi)		
	Chain 0	Chain 1	Chain 2
2.4 GHz	4.30	3.50	1.60

5.4. SOFTWARE AND FIRMWARE

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

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 EUT can only be setup in desktop orientation; therefore, all radiated testing was performed with the EUT in desktop orientation.

Worst-case data rates as provided by the client were:

All final tests in the 802.11b mode were made at 11 Mb/s.
All final tests in the 802.11g mode were made at 24 Mb/s.
All final tests in the 802.11n HT20 mode were made at MCS0.

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Lenovo	X201	R9-3V9&R	NA
AC/DC Adapter	Lenovo	92P1156	11S92P1156Z1ZDXN81NG1W	NA

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 Power	1	AC	Unshielded	1	AC Mains to AC/DC Adapter
2	DC Power	1	DC	Shielded	1.2	AC/DC Adapter to Laptop
3	Ethernet	1	RJ45	Unshielded	1.5	Laptop to EUT
4	AC Power	1	AC	Unshielded	1.2	AC Mains to EUT

TEST SETUP

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

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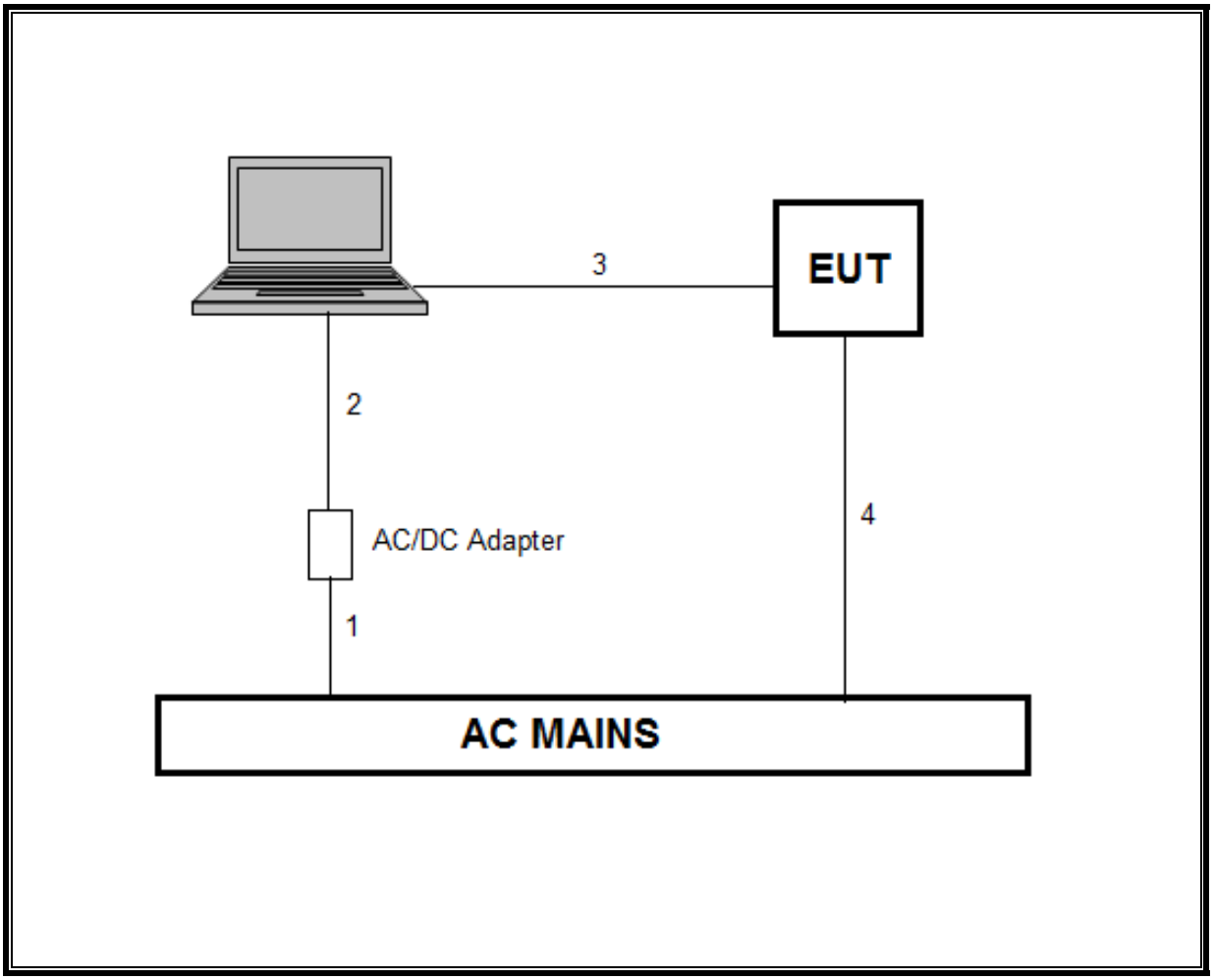
SETUP DIAGRAM



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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**
Amplifier, 1 to 18GHz	Miteq	AFS42-00101800-25-S-42	1165	8/01/2016	8/01/2017
Amplifier, 1 to 8 GHz	Miteq	AMF-4D-01000800-30-29P	1170	4/28/2016	4/28/2017
Pre-Amp 1-26.5GHz	Agilent	8449B	404	7/05/2016	7/05/2017
Amplifier, 10KHz to 1GHz, 32dB	Sonoma	310	300	11/10/2016	11/10/2017
Antenna, Broadband Hybrid 30MHz to 2000MHz	Sunol Sciences	JB3	899	5/26/2016	5/26/2017
Antenna, Horn 1-18GHz	ETS Lindgren	3117	346	2/22/2016	2/22/2017
18 - 26.5 GHz Horn Antenna	Seavey Division	MWH-1826/B	449	5/26/2016	5/26/2017
Spectrum Analyzer, PXA, 3Hz to 44GHz	Agilent	N9030A	908	4/13/2016	4/13/2017
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences	JB1	130	9/29/2016	9/29/2017
Loop Antenna	EMCO	6502	35	3/24/2016	3/24/2017
PSA Series Spectrum Analyzer, 3Hz - 44GHz	Agilent	E4446A	146	7/13/2016	7/13/2017
P-Series Power Meter	Agilent	N1911A	229	7/28/2016	7/28/2017
Wideband Power Sensor 50MHz - 18GHz	Agilent	N1921A	750	10/17/2016	10/17/2017
EMI Receiver	Rohde & Schwarz	ESR-EMI	1436	12/19/2016	12/19/2017
LISN	FISCHER	FCC-LISN-50/250-25-2-01	1310	6/08/2016	06/08/2017

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

Test Software List			
Description	**Manufacturer**	**Model**	**Version**
Radiated Software	UL	UL EMC	Ver 9.5, June 24, 2015
Antenna Port Software	UL	UL RF	Ver 5.8, Dec 07, 2016

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7. MEASUREMENT METHODS

On Time and Duty Cycle: KDB 558074 D01 v03r05, Section 6.

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

99% BW: ANSI C63.10-2013, Section 6.9.3.

Output Power: KDB 558074 D01 v03r05, Section 9.2.3.2.

Power Spectral Density: KDB 558074 D01 v03r05, Section 10.3.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v03r05, Section 11.1 (b).

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. ON TIME AND DUTY CYCLE MEASUREMENTS

ON TIME AND 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)
11b 2.4GHz CDD	1.281	1.326	0.966	97.0	0.150	0.78
11g 2.4GHz CDD	0.523	0.574	0.911	91.0	0.404	1.912
11n HT20 2.4GHz CDD	1.887	1.938	0.973	97.0	0.115	0.529

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DUTY CYCLE PLOTS

DUTY CYCLE 802.11b MIMO MODE

DUTY CYCLE 802.11g MIMO MODE

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DUTY CYCLE 802.11n HT20 CDD MODE

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10. ANTENNA PORT TEST RESULTS

10.1. 11b 3TX CDD MIMO MODE IN THE 2.4GHz BAND

10.1.1. 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

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	6 dB BW Chain 2 (MHz)	Minimum Limit (MHz)
Low_1	2412	10.185	9.375	9.365	0.5
Middle_6	2437	9.440	10.095	9.020	0.5
High_11	2462	9.060	9.370	9.430	0.5

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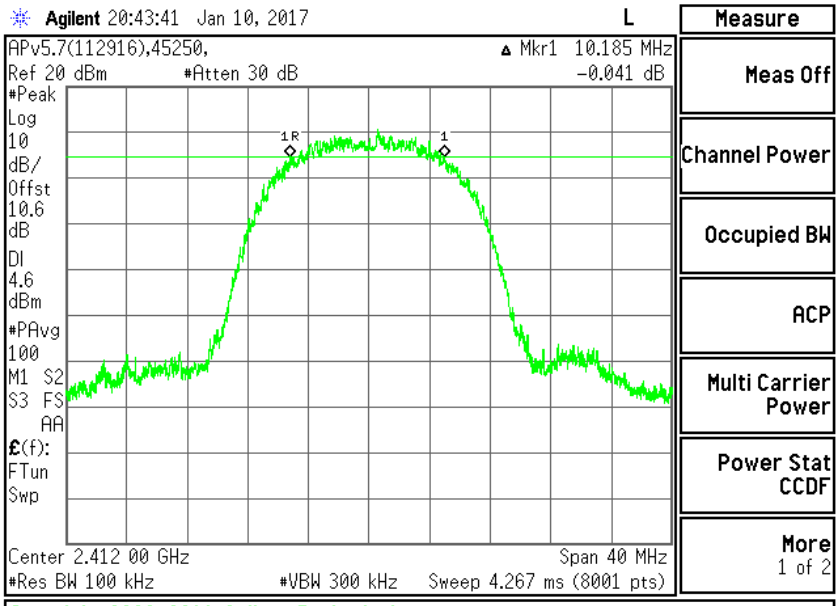
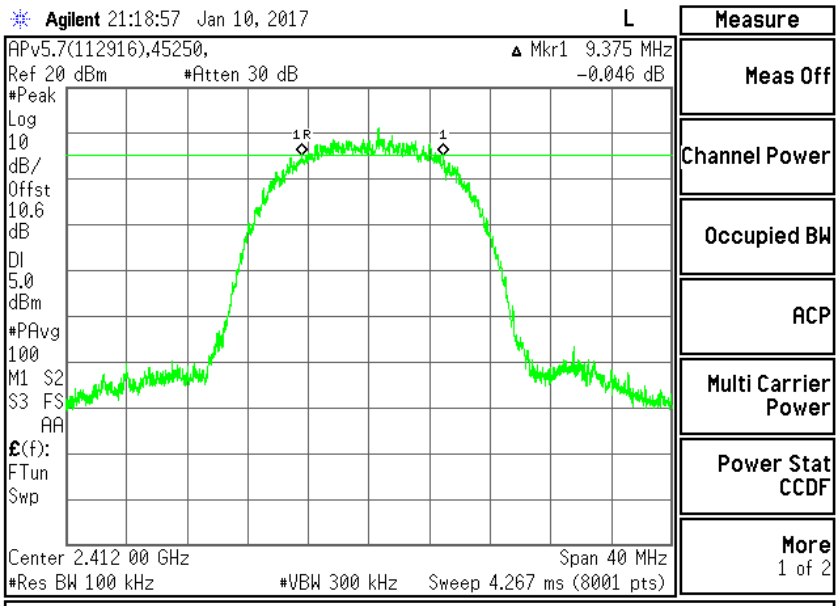
6dB 3TX Chain 0 CDD LOW CH



6dB 3TX Chain 1 CDD LOW CH



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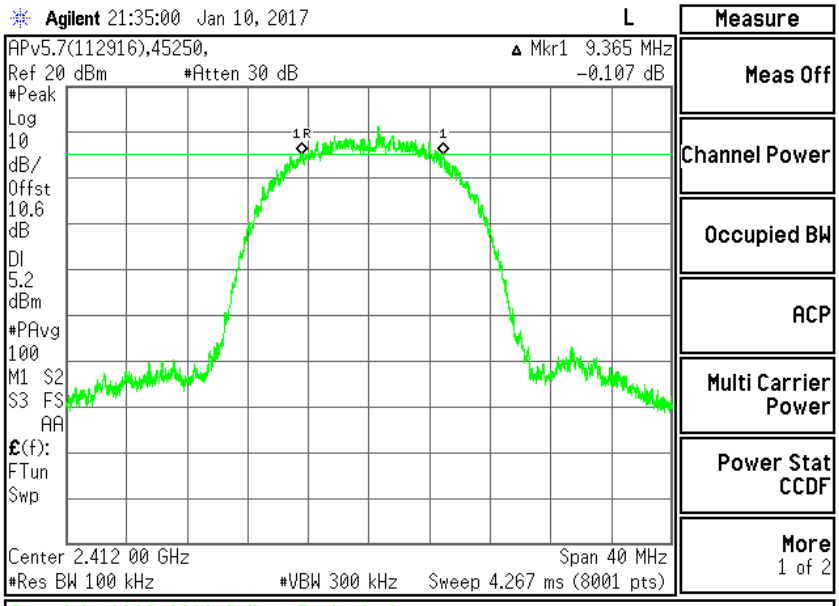
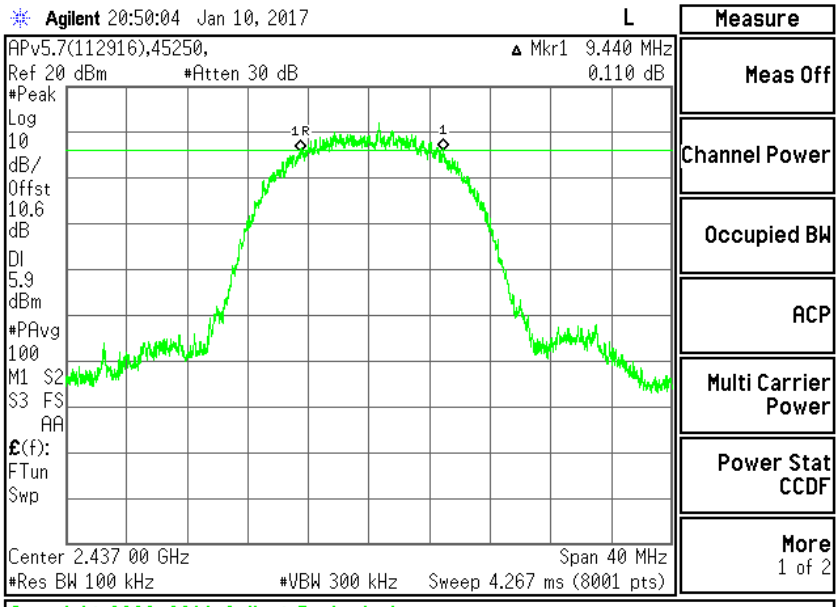
6dB 3TX Chain 2 CDD LOW CH



6dB 3TX Chain 0 CDD MID CH



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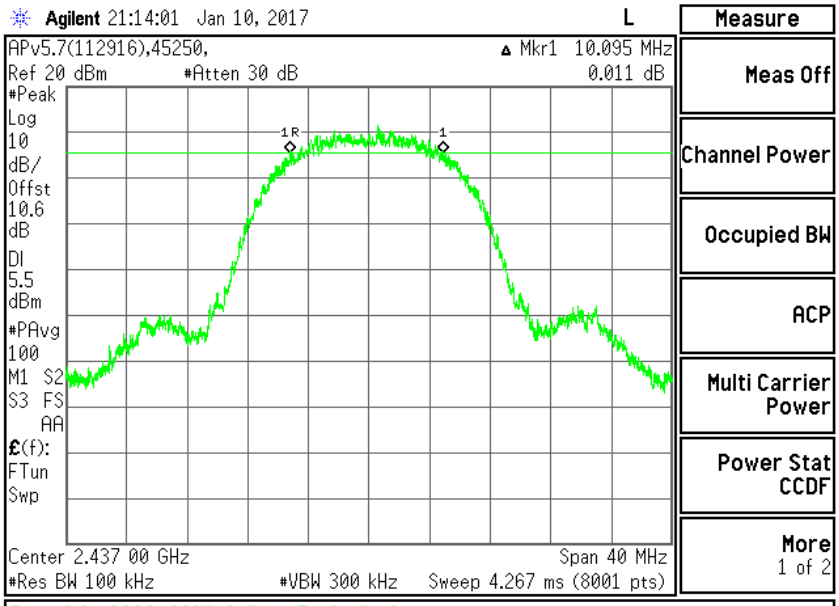
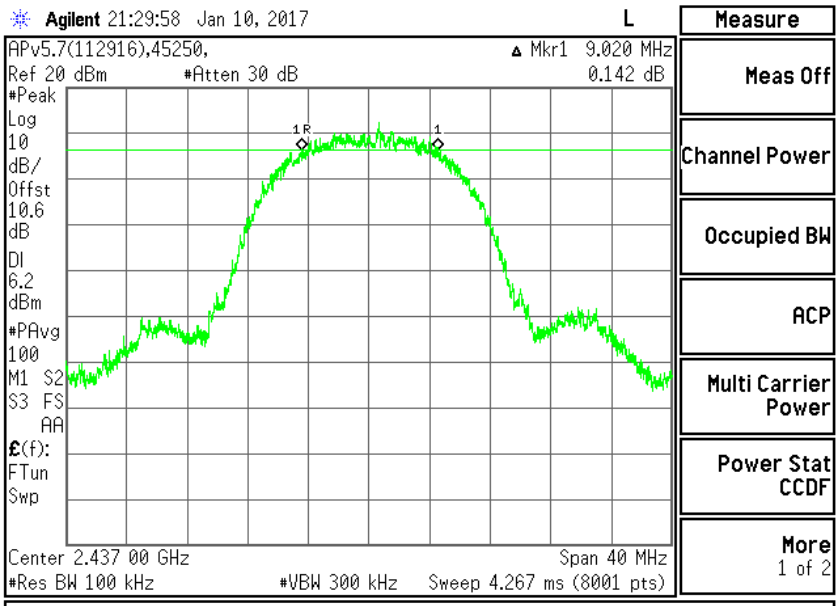
6dB 3TX Chain 1 CDD MID CH



6dB 3TX Chain 2 CDD MID CH



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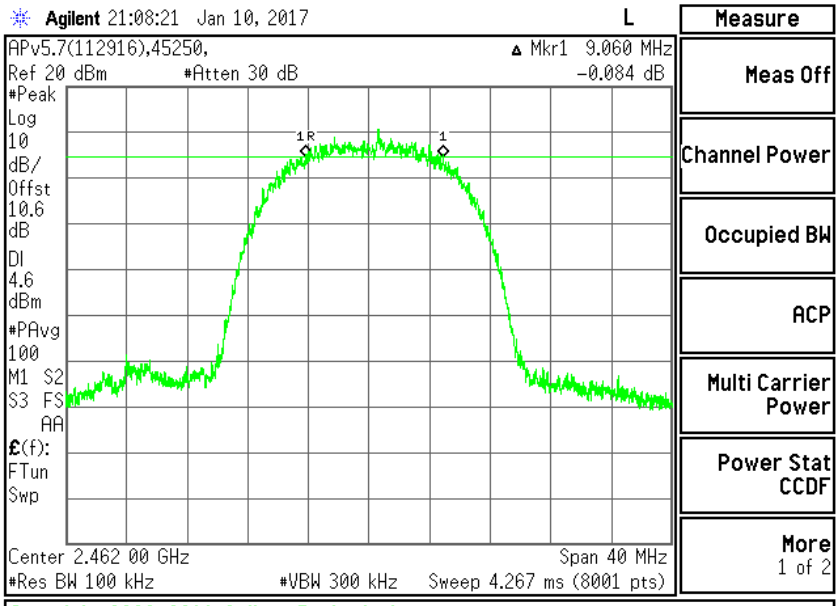
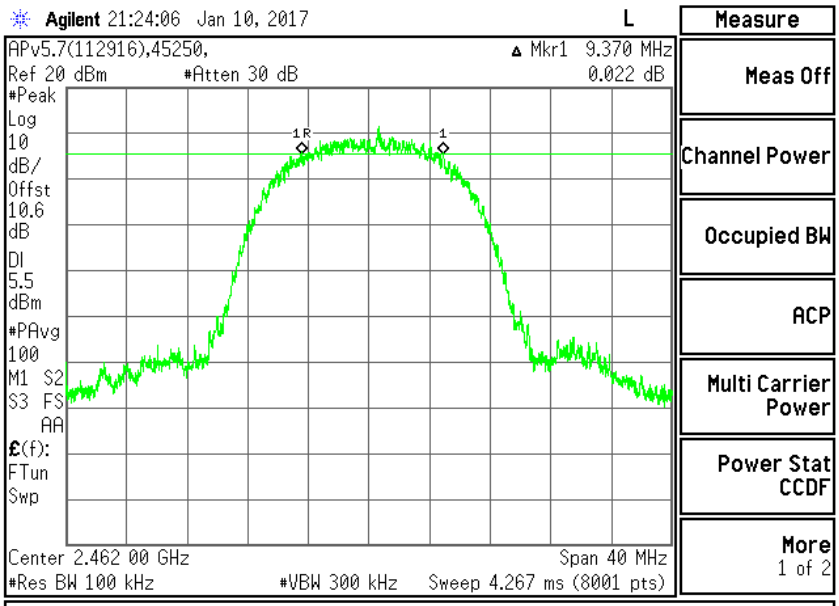
6dB 3TX Chain 0 CDD HIGH CH



6dB 3TX Chain 1 CDD HIGH CH



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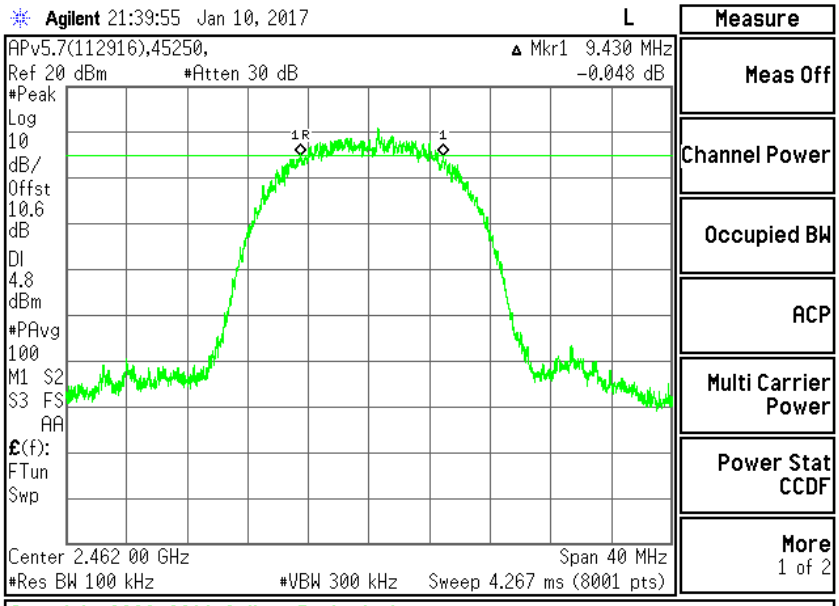
6dB 3TX Chain 2 CDD HIGH CH



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10.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

ANSI C63.10: 2013 Section 6.9.3

RESULTS

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)	99% Bandwidth Chain 2 (MHz)
Low_1	2412	13.8038	13.7287	13.8466
Middle_6	2437	13.8576	13.9113	13.8464
High_11	2462	13.7553	13.7690	13.7547

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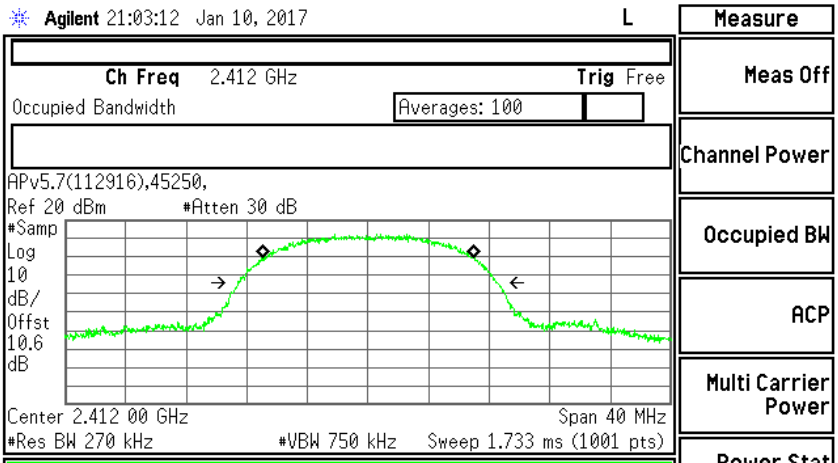
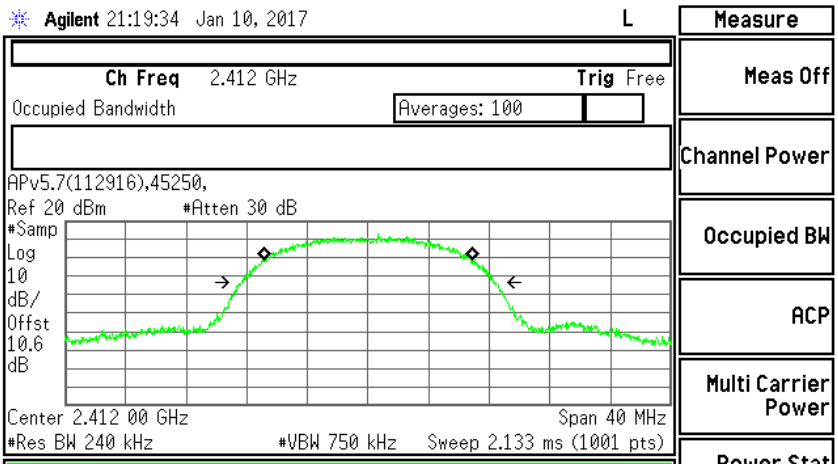
99% OBW 3TX Chain 0 CDD LOW CH



99% OBW 3TX Chain 1 CDD LOW CH



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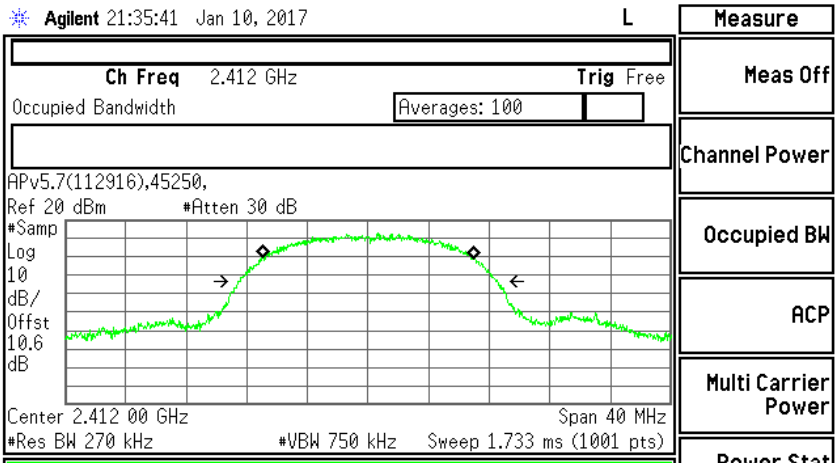
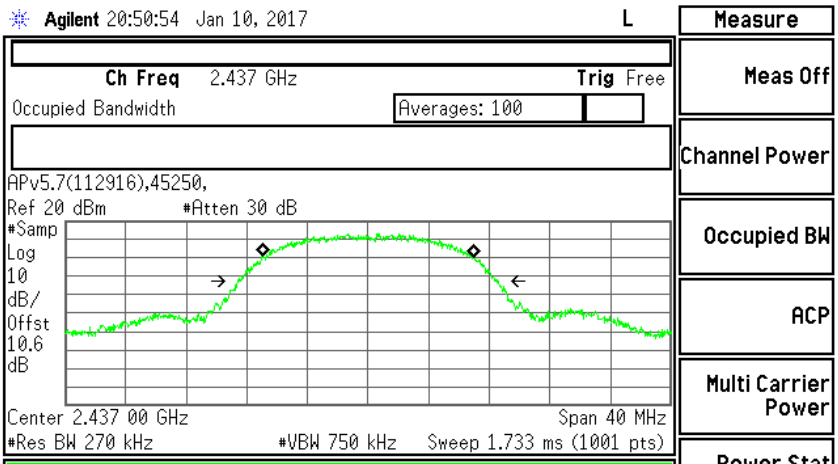
99% OBW 3TX Chain 2 CDD LOW CH



99% OBW 3TX Chain 0 CDD MID CH



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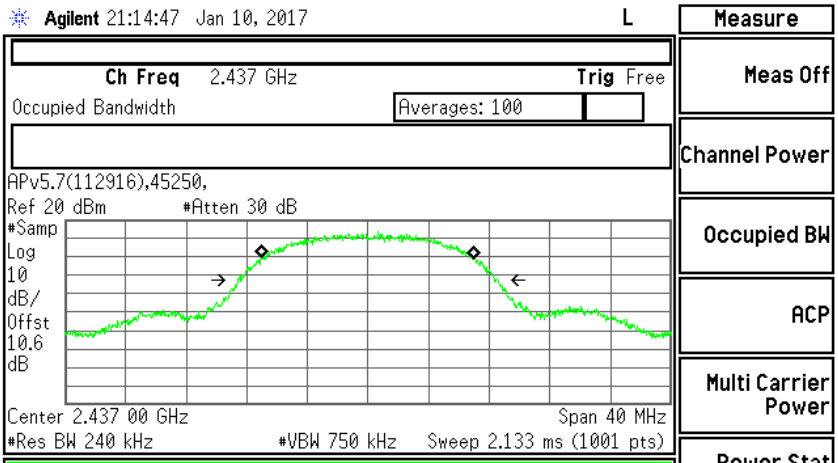
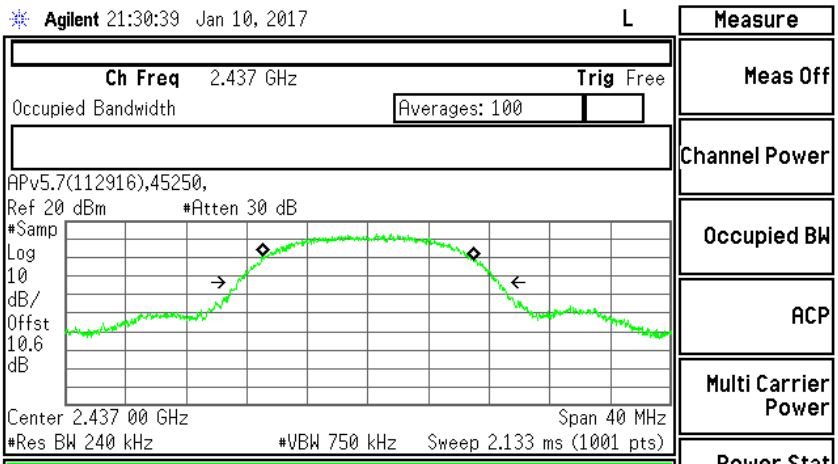
99% OBW 3TX Chain 1 CDD MID CH



99% OBW 3TX Chain 2 CDD MID CH



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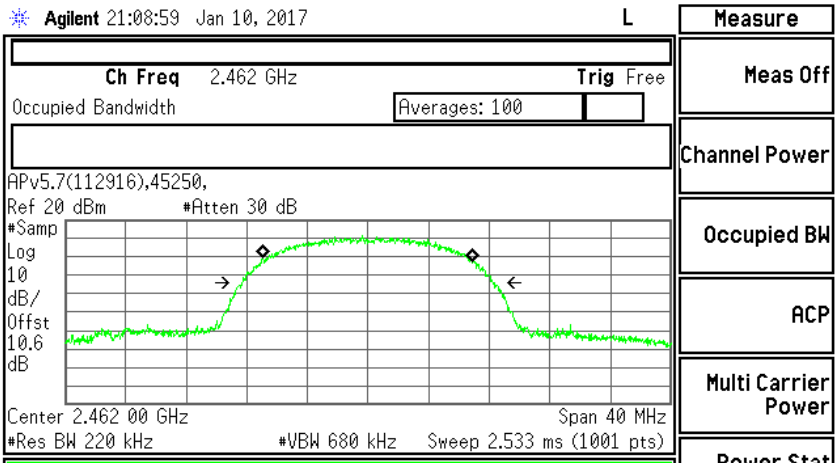
99% OBW 3TX Chain 0 CDD HIGH CH



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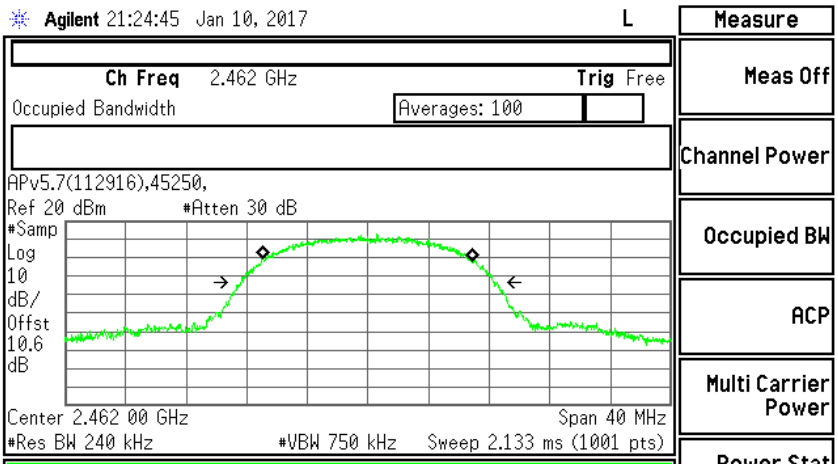

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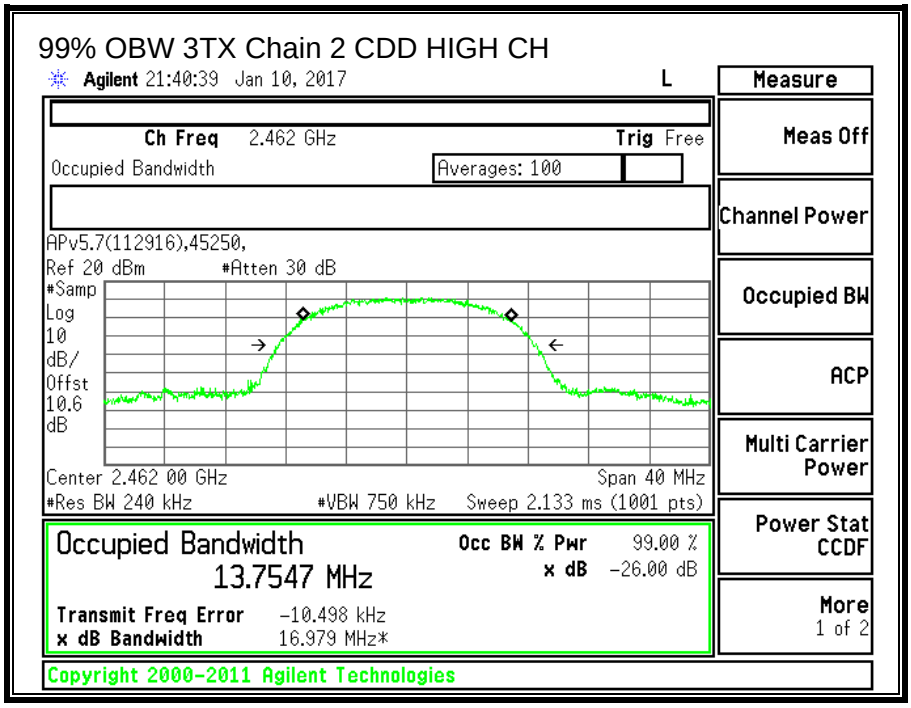

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10.1.3. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-247 (5.4) (4)

For systems using digital modulation in the 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

Each transmit antenna is driven by only one spatial stream

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

Chain 0 Gain (dBi)	Chain 1 Gain (dBi)	Chain 2 Gain (dBi)	Correlated Chains Directional Gain (dBi)
4.3	3.5	1.6	4.3

Directional Antenna Gain Calculation: KDB 662911 D01 Section F) 2) f) (ii)
Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain

TEST PROCEDURE

KDB 58074 D01 v03r05 Section 9.2.3.2

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RESULTS

ID:	45250	Date:	01/10/2017

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	4.30	30.00	30	36	30.00
Mid	2437	4.30	30.00	30	36	30.00
High	2462	4.30	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Chain 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	18.92	18.70	18.82	23.59	30.00	-6.41
Mid	2437	19.94	20.02	19.95	24.74	30.00	-5.26
High	2462	18.75	19.02	18.74	23.61	30.00	-6.39

Note: the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

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10.1.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-247 (5.2) (2)

For digitally modulated systems, the power spectral density conducted form the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 KHz band during any time interval of continuous transmissions.

TEST PROCEDURE

KDB 58074 D01 v03r05 Section 10.3

RESULTS

Duty Cycle CF (dB)	0.149	Included in Calculations of Corr'd PSD

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Chain 2 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-3.12	-3.35	-2.93	1.79	8.0	-6.2
Mid	2437	-2.66	-2.81	-2.66	2.21	8.0	-5.8
High	2462	-4.05	-3.57	-3.57	1.19	8.0	-6.8

Correlated PSD Calculation Method: KDB 662911 D01 Section E) 2) c)

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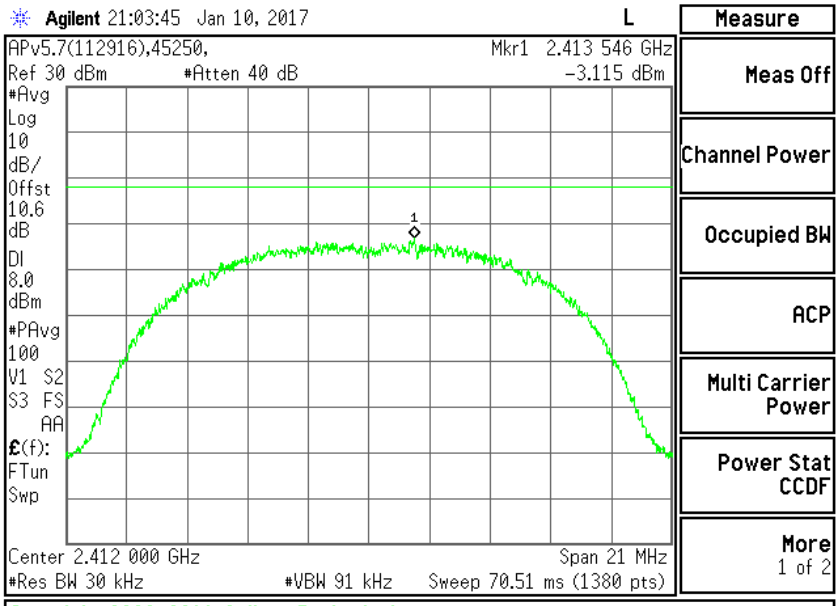
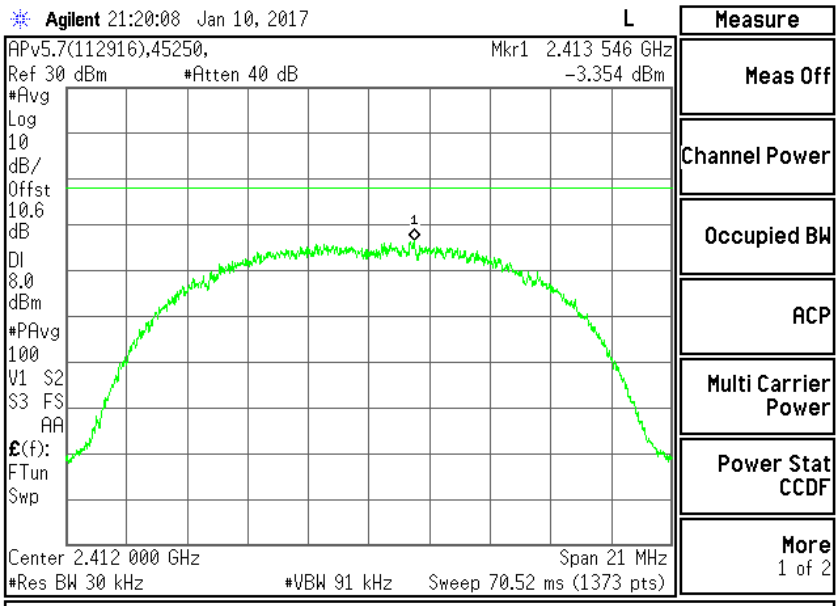
CPSD 3TX Chain 0 CDD LOW CH



CPSD 3TX Chain 1 CDD LOW CH



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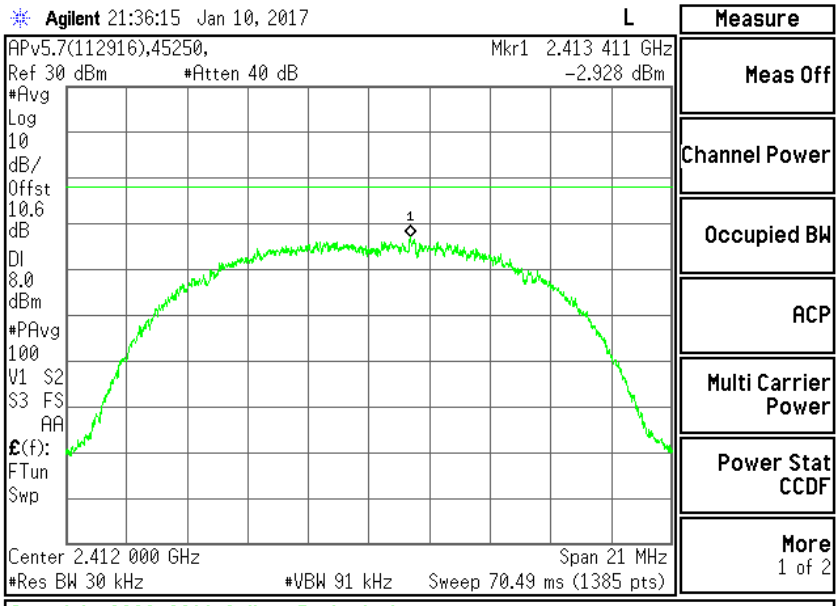
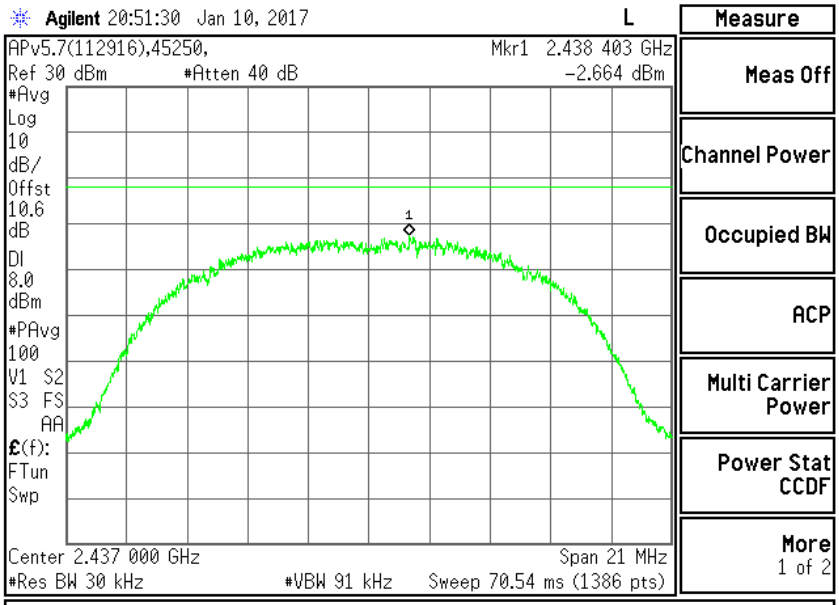


CPSD 3TX Chain 0 CDD MID CH



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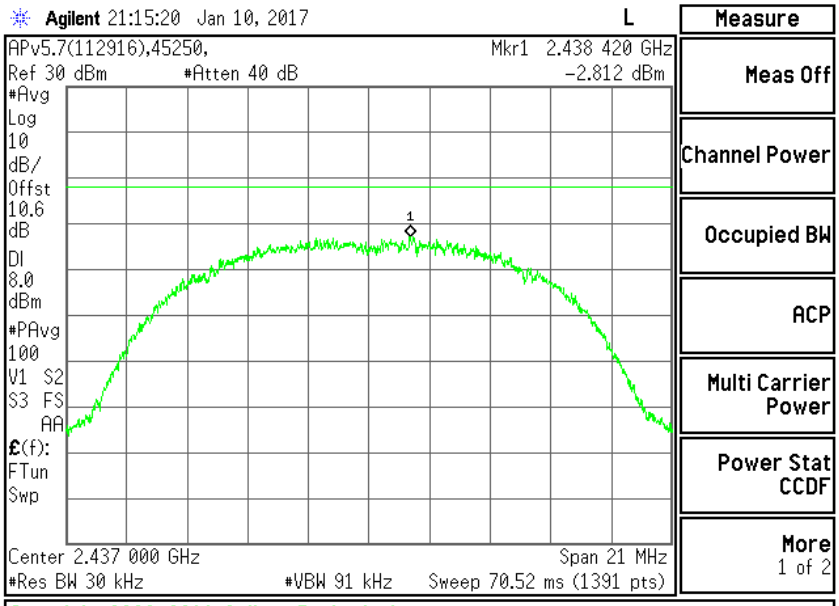
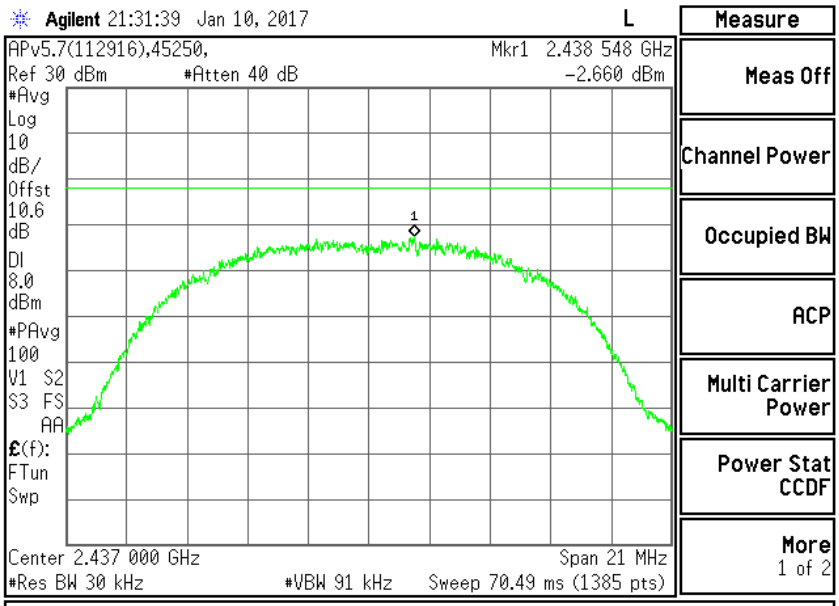
CPSD 3TX Chain 1 CDD MID CH



CPSD 3TX Chain 2 CDD MID CH



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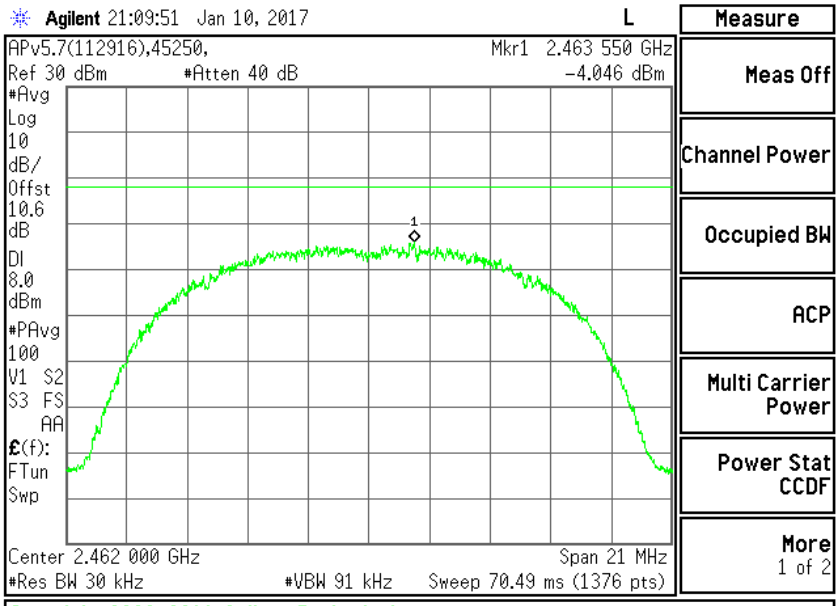
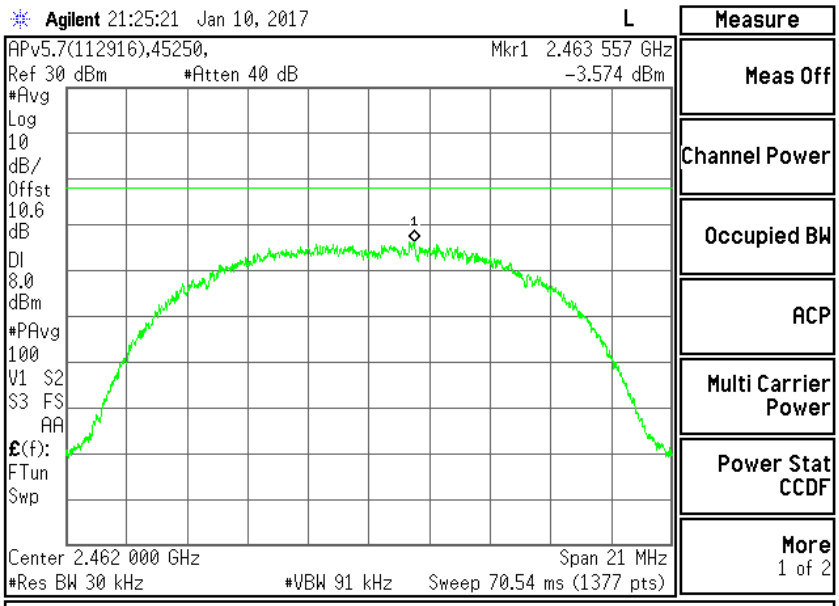
CPSD 3TX Chain 0 CDD HIGH CH



CPSD 3TX Chain 1 CDD HIGH CH



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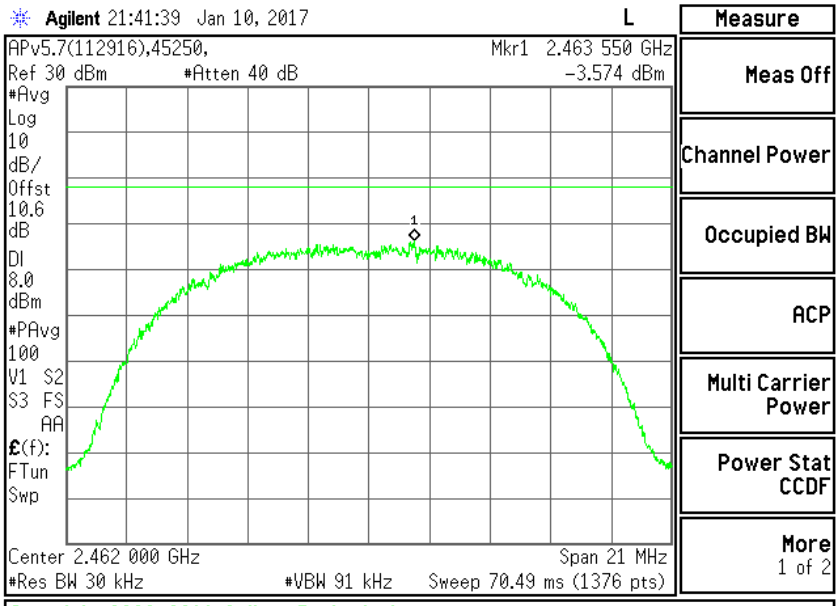
CPSD 3TX Chain 2 CDD HIGH CH



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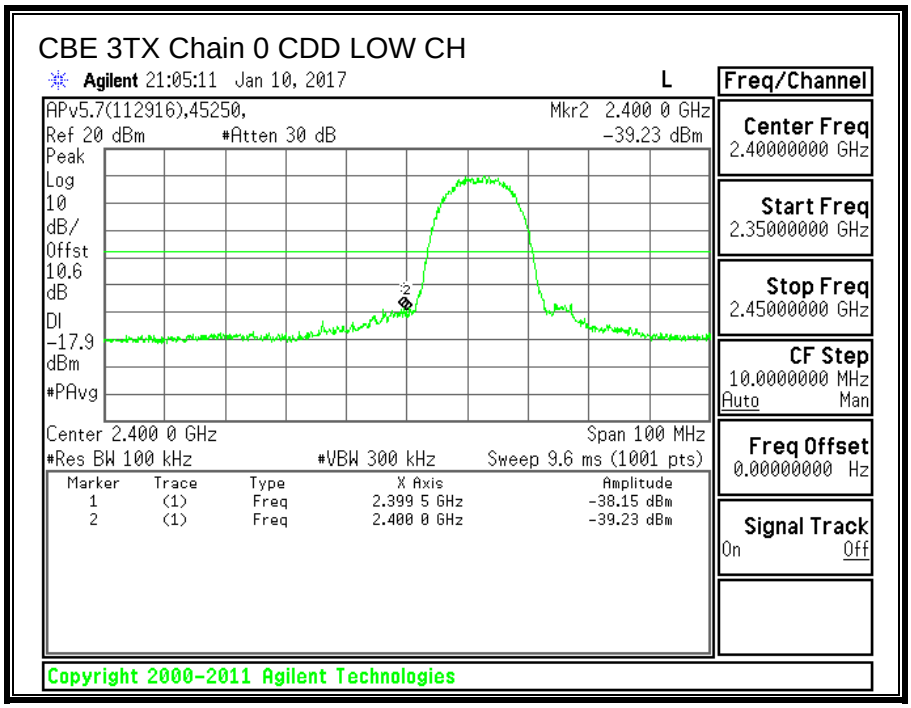
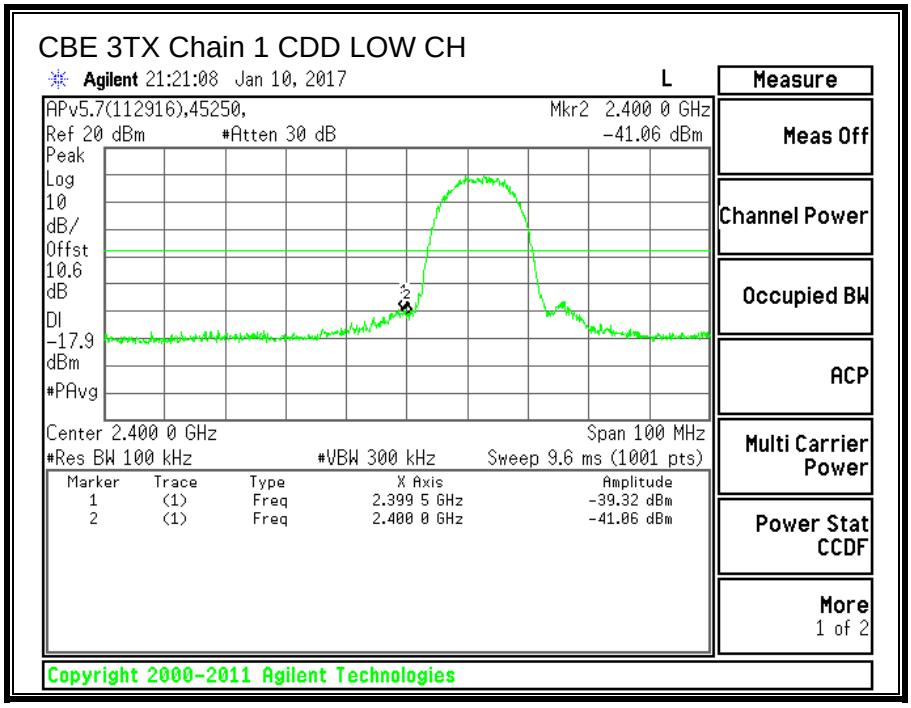
10.1.5. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS





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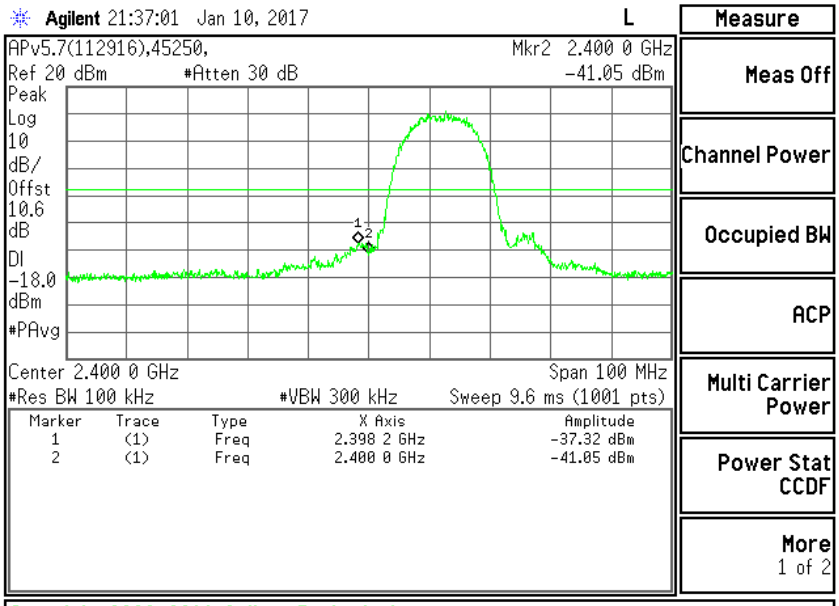
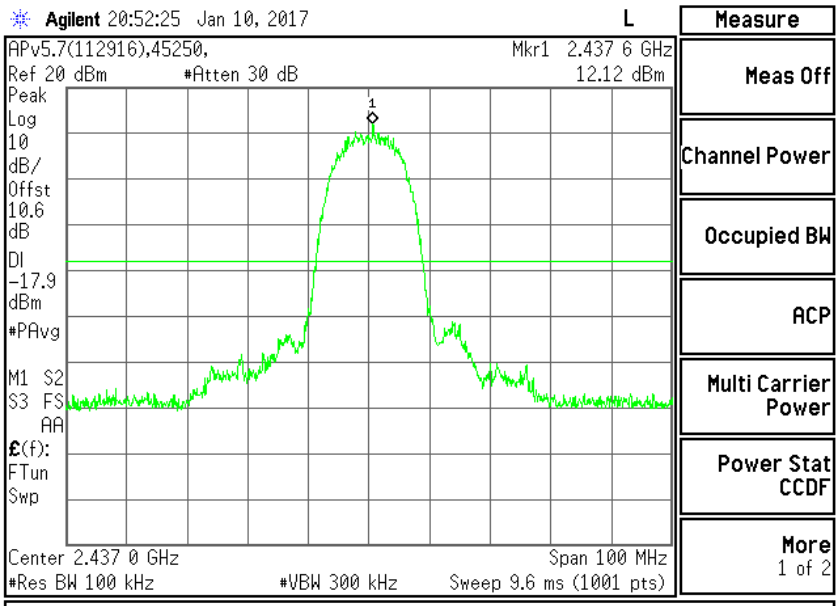
CBE 3TX Chain 2 CDD LOW CH



CBE 3TX Chain 0 CDD MID CH



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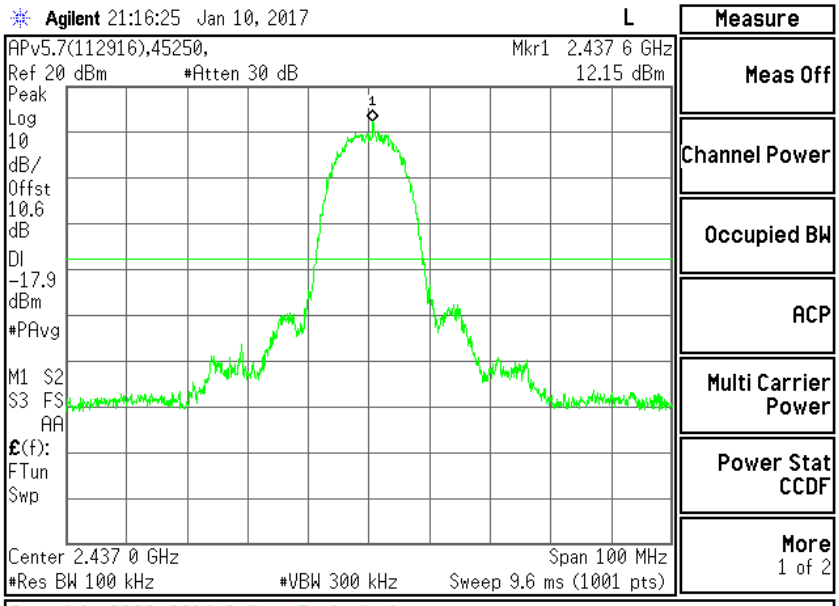
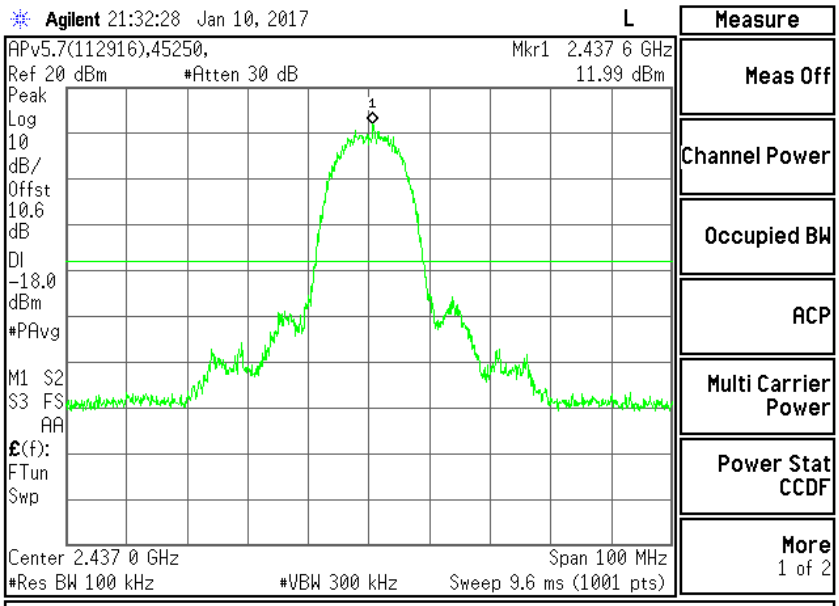
CBE 3TX Chain 1 CDD MID CH



CBE 3TX Chain 2 CDD MID CH



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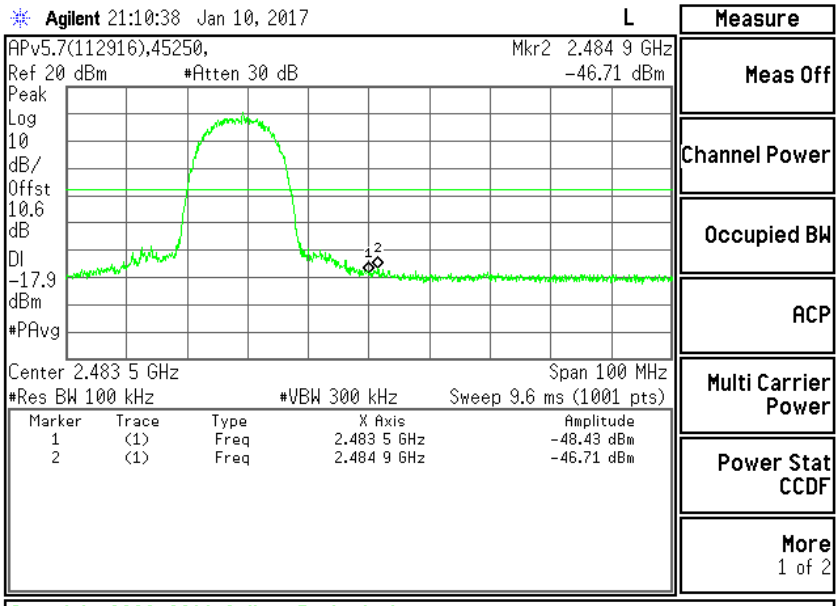
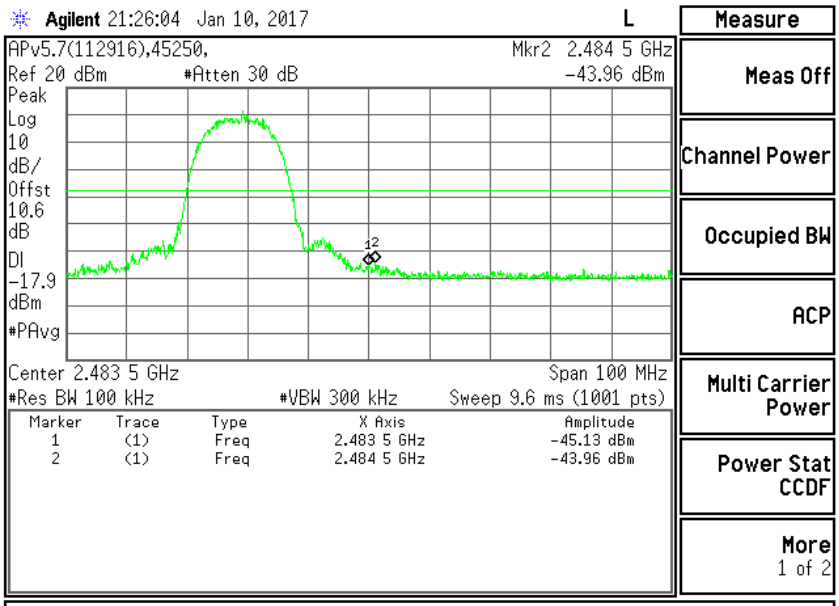
CBE 3TX Chain 0 CDD HIGH CH



CBE 3TX Chain 1 CDD HIGH CH



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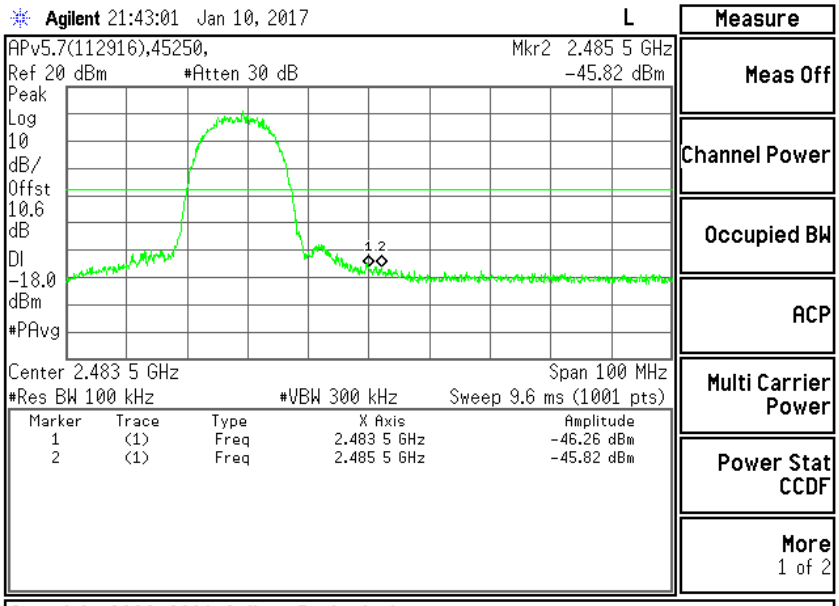

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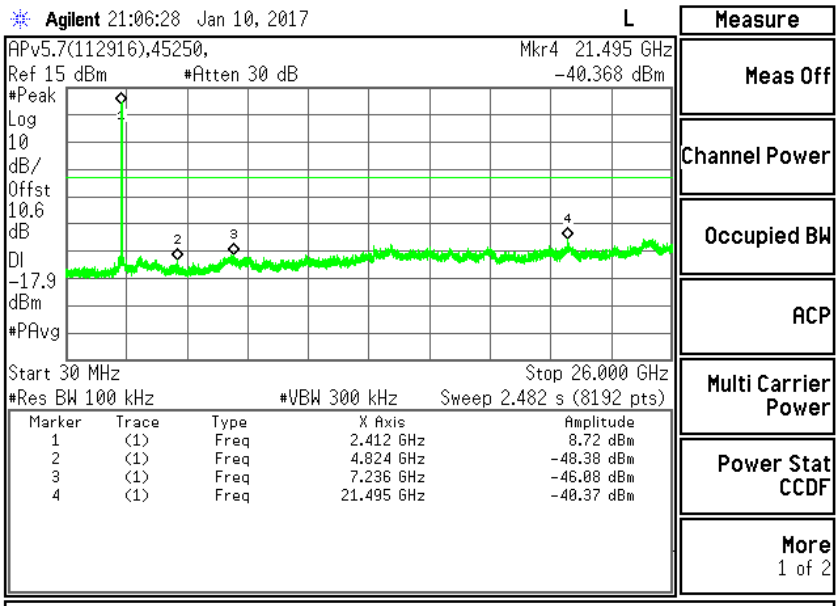

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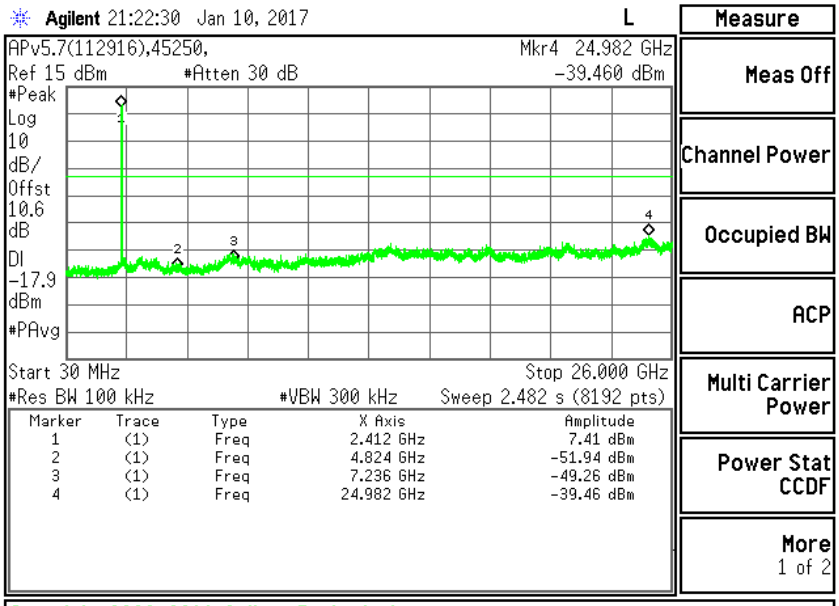
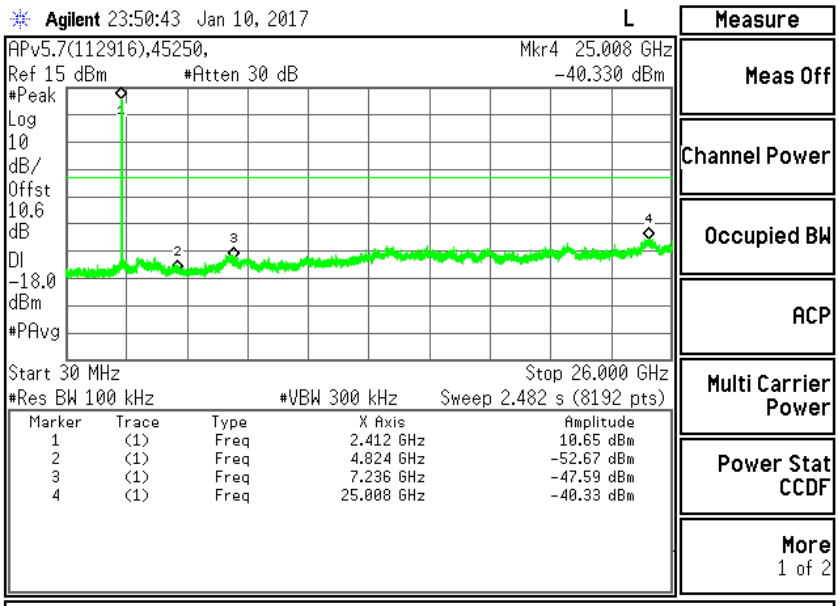


CSPUR 3TX Chain 2 CDD LOW CH



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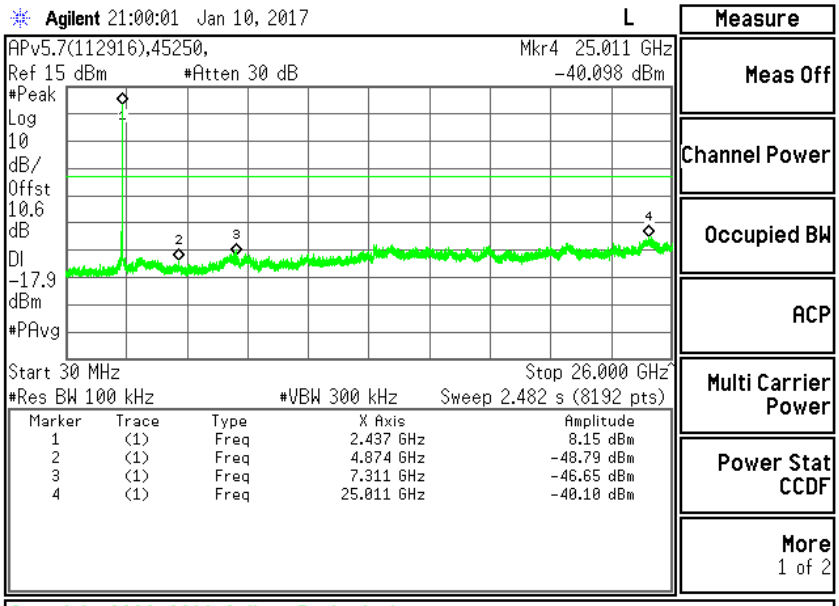
CSPUR 3TX Chain 0 CDD MID CH



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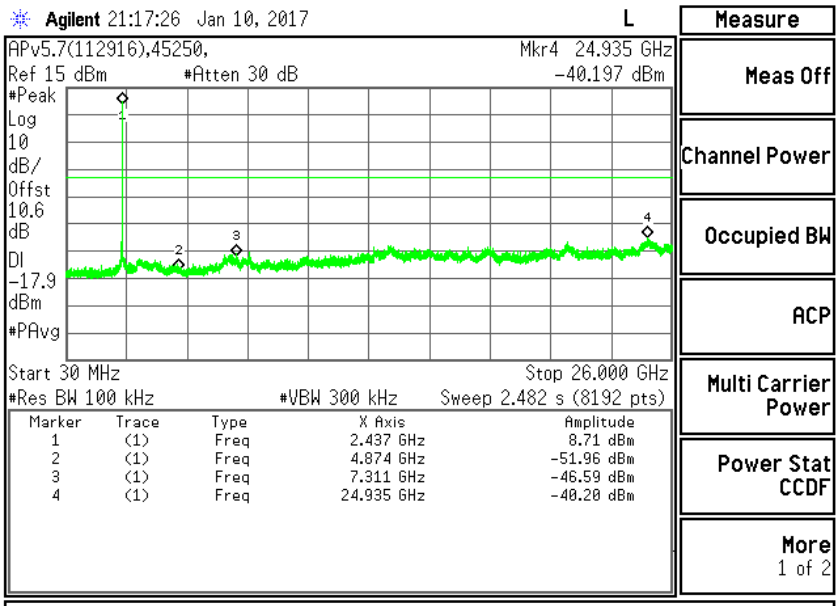

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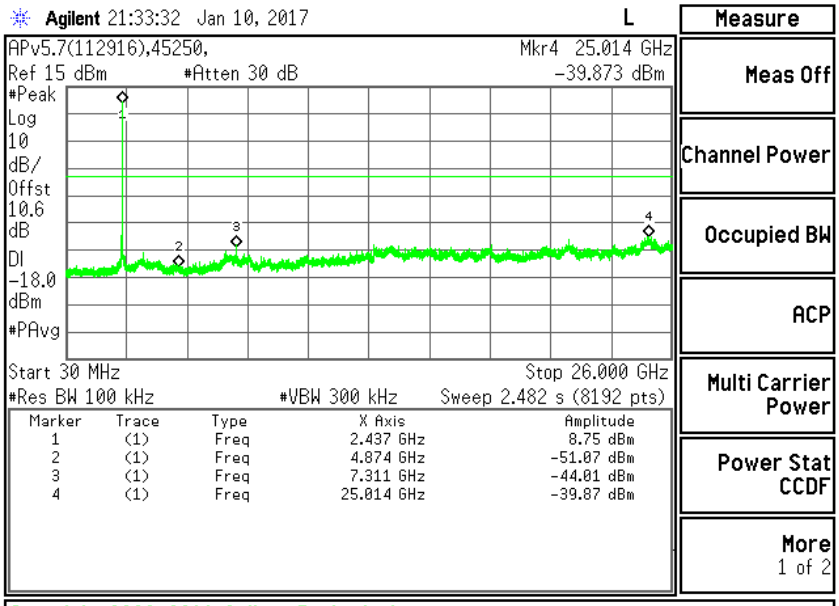
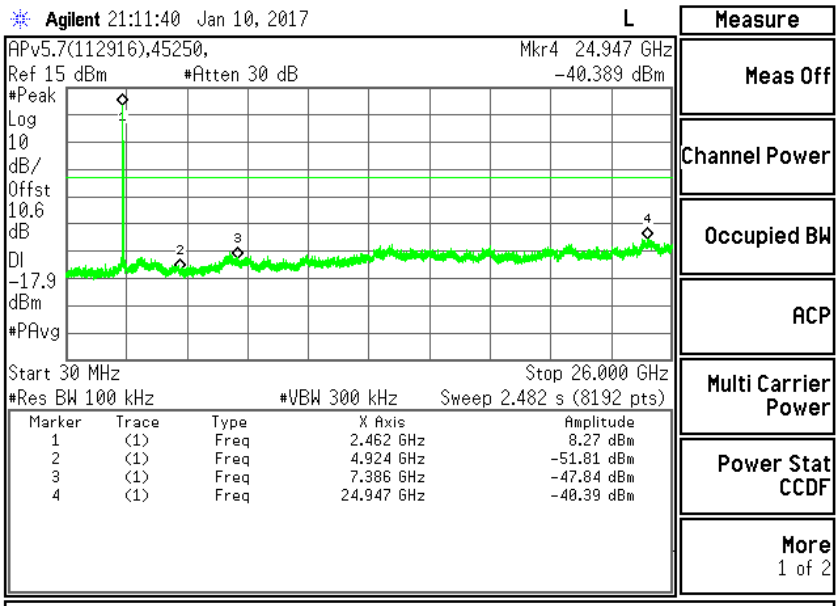
CSPUR 3TX Chain 2 CDD MID CH



CSPUR 3TX Chain 0 CDD HIGH CH



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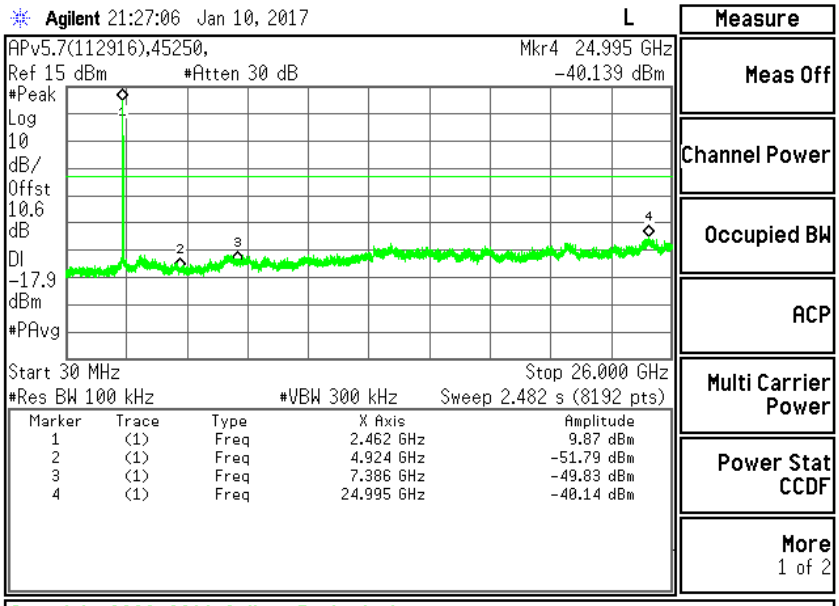
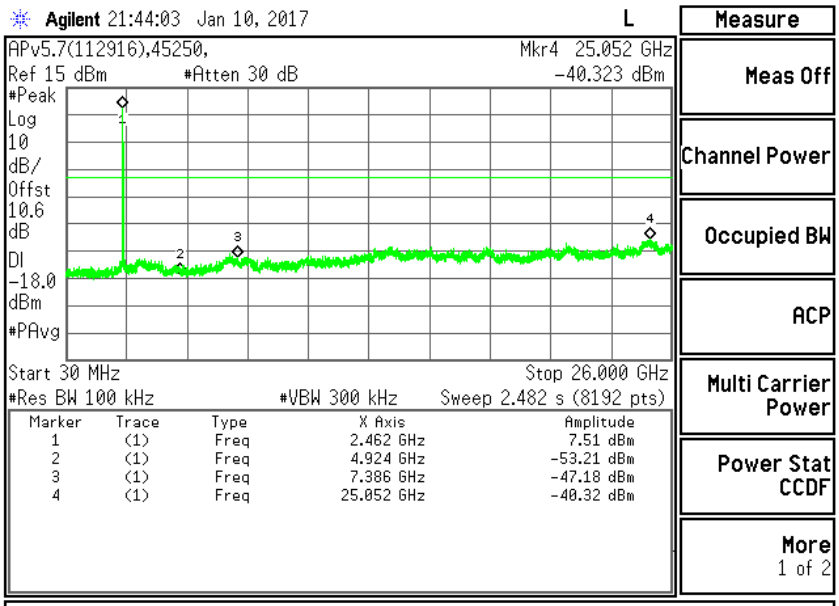
CSPUR 3TX Chain 1 CDD HIGH CH



CSPUR 3TX Chain 2 CDD HIGH CH



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10.2. 11g 3TX CDD MIMO MODE IN THE 2.4GHz BAND

10.2.1. 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

Channel	Frequency	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	6 dB BW Chain 2 (MHz)	Minimum Limit (MHz)
Low_1	2412	16.475	16.470	16.445	0.5
Middle_6	2437	16.450	16.430	16.400	0.5
High_11	2462	16.445	16.445	16.450	0.5

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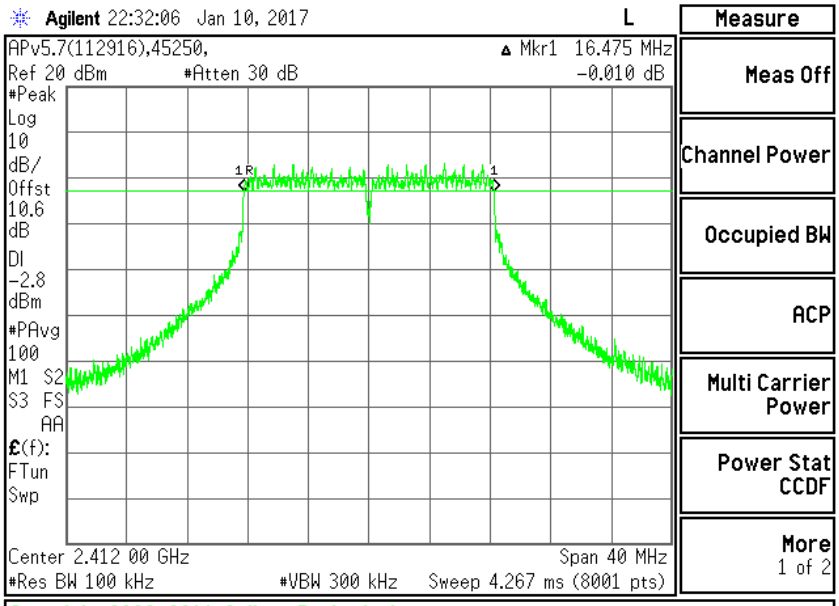
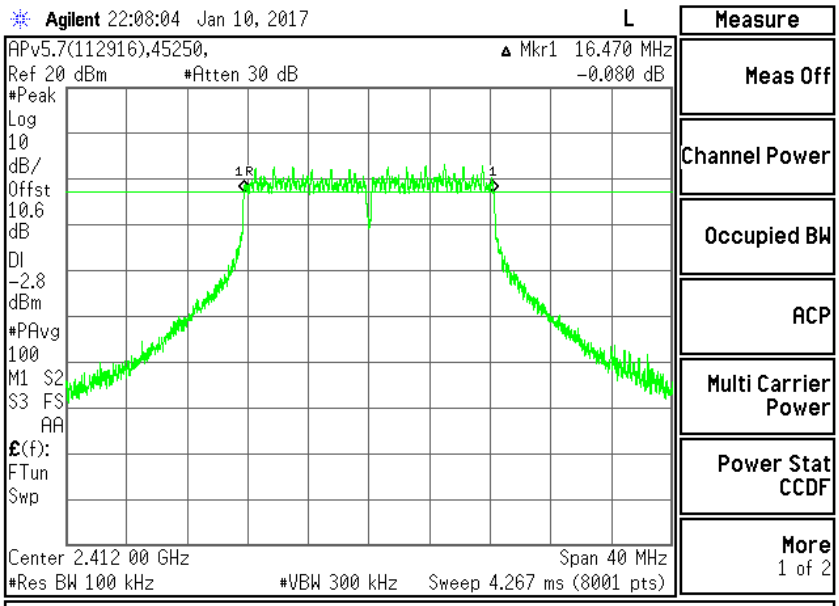
6dB 3TX Chain 0 CDD LOW CH



6dB 3TX Chain 1 CDD LOW CH



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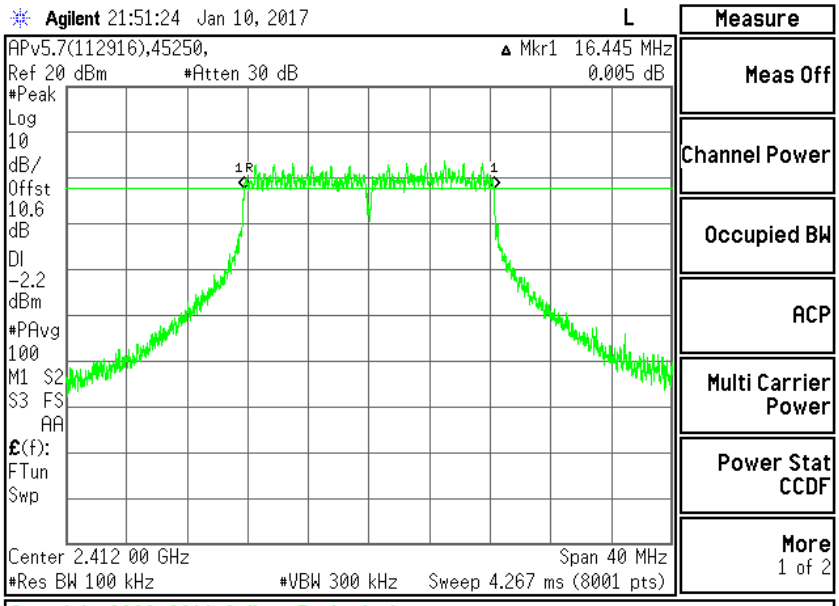
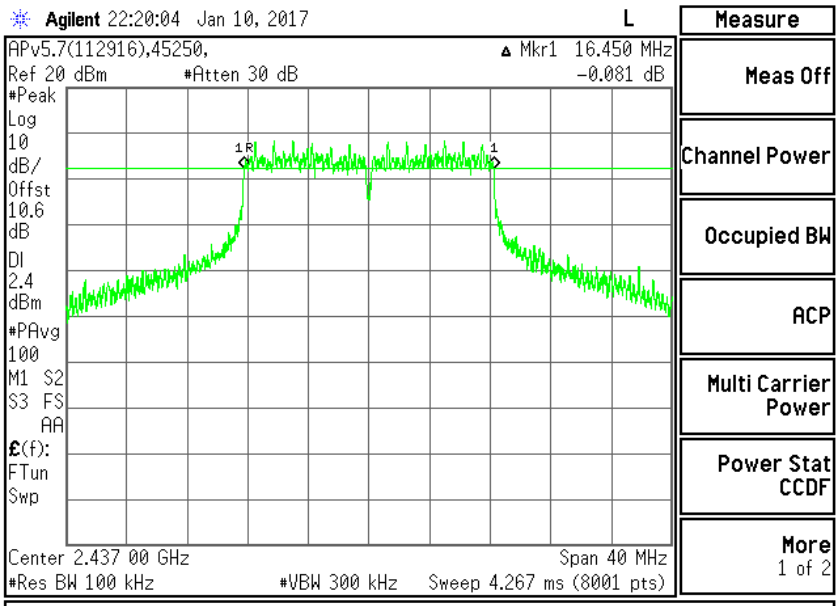
26dB 3TX Chain 2 CDD LOW CH



6dB 3TX Chain 0 CDD MID CH



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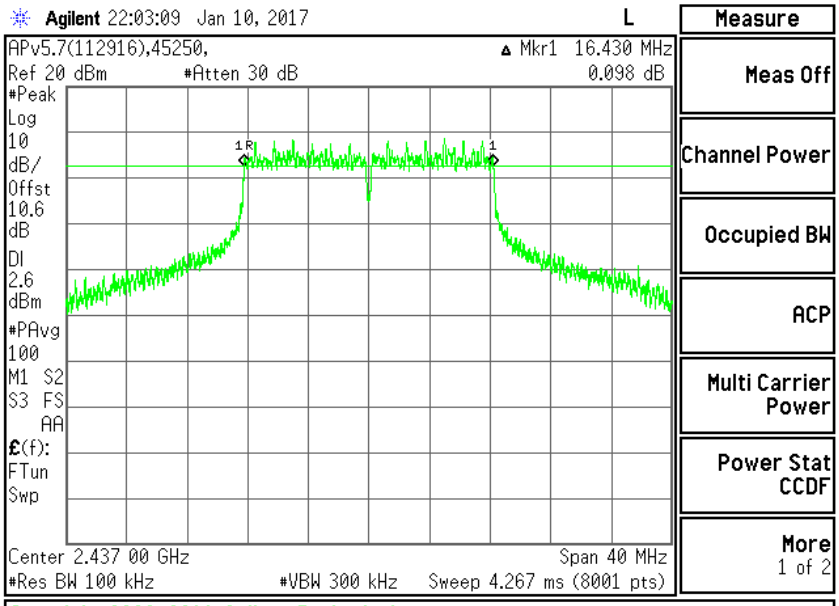
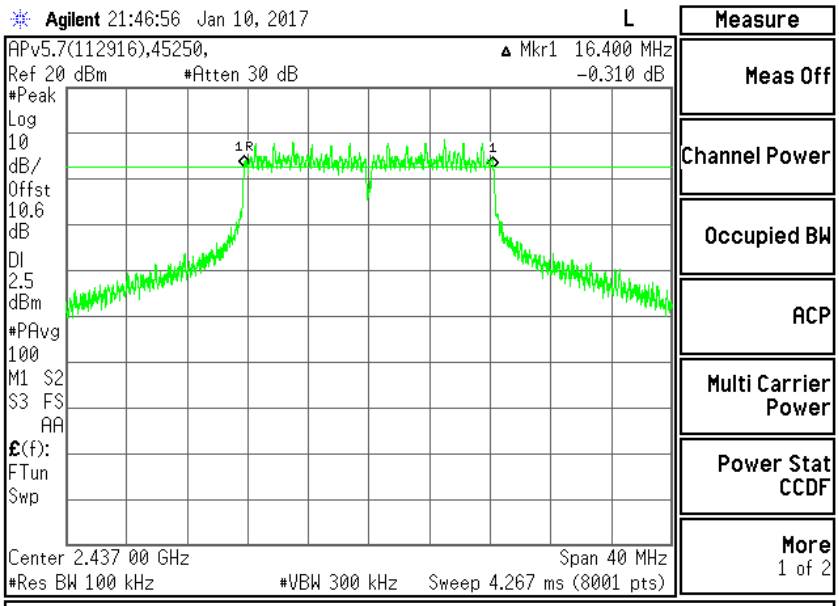
6dB 3TX Chain 1 CDD MID CH



6dB 3TX Chain 2 CDD MID CH



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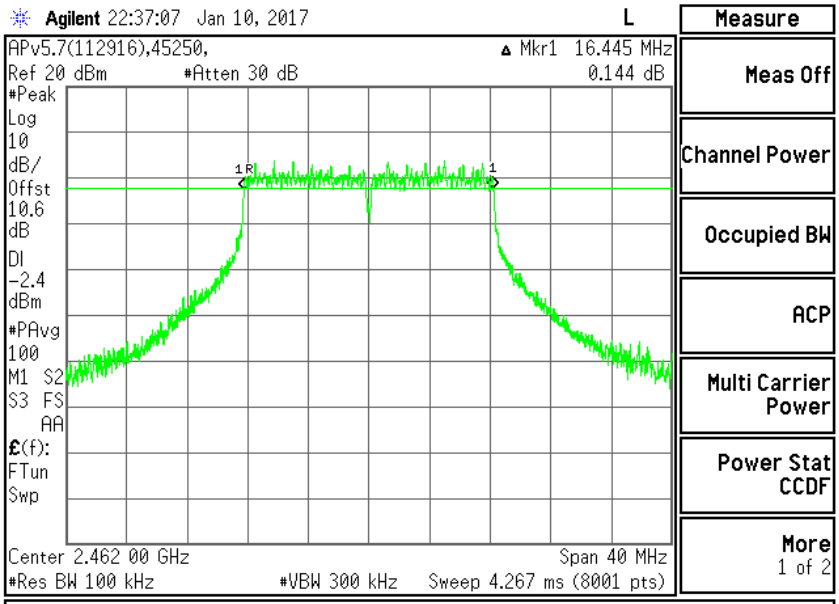
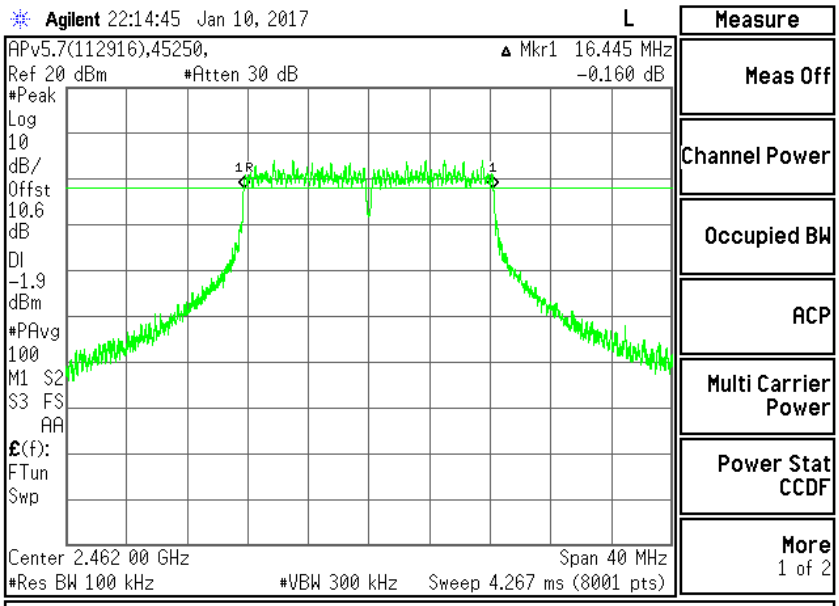
6dB 3TX Chain 0 CDD HIGH CH



6dB 3TX Chain 1 CDD HIGH CH



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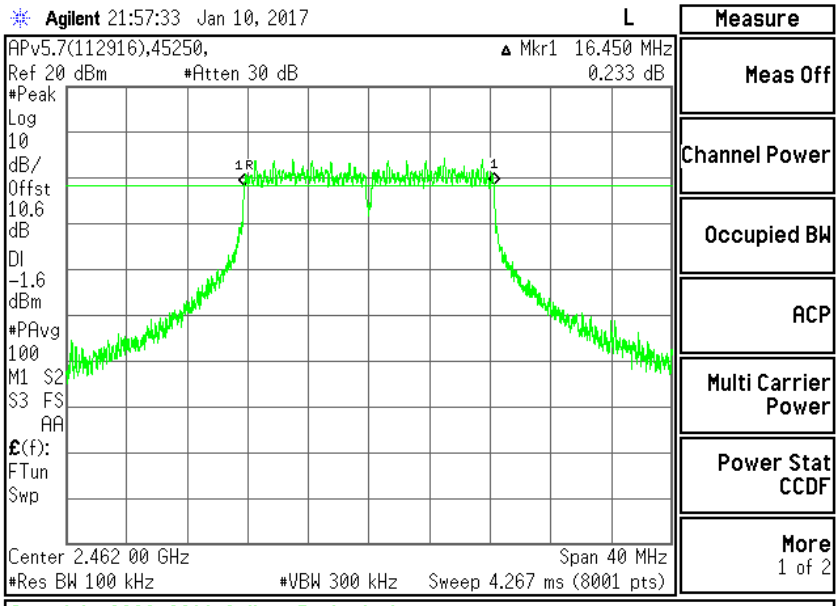
6dB 3TX Chain 2 CDD HIGH CH



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10.2.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

ANSI C63.10: 2013 Section 6.9.3

RESULTS

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)	99% Bandwidth Chain 2 (MHz)
Low_1	2412	16.6594	16.7113	16.7452
Middle_6	2437	16.9661	16.9758	17.0427
High_11	2462	16.7644	16.6855	16.7318

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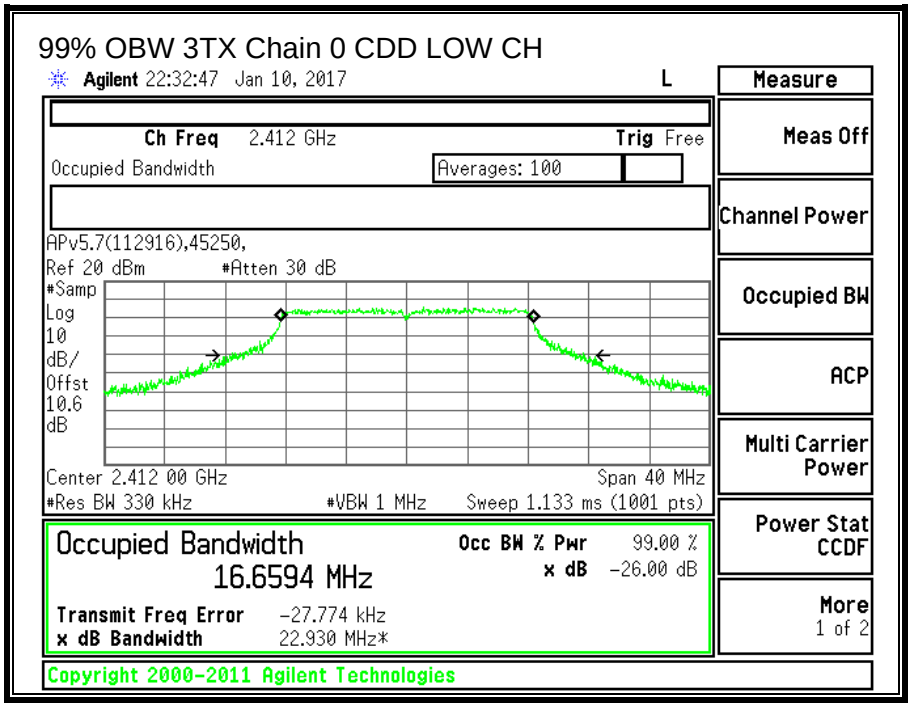
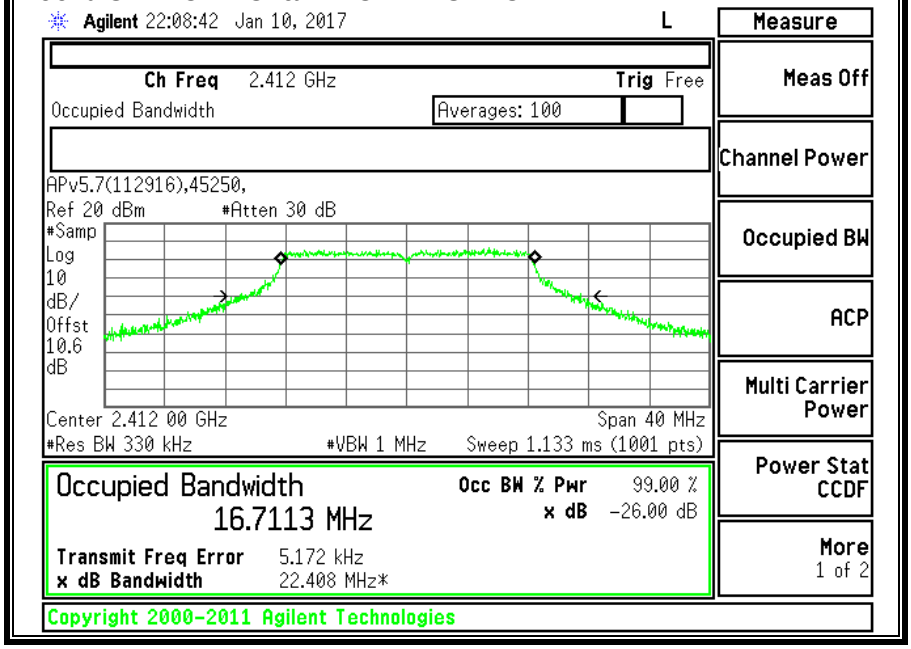
99% OBW 3TX Chain 0 CDD LOW CH



99% OBW 3TX Chain 1 CDD LOW CH



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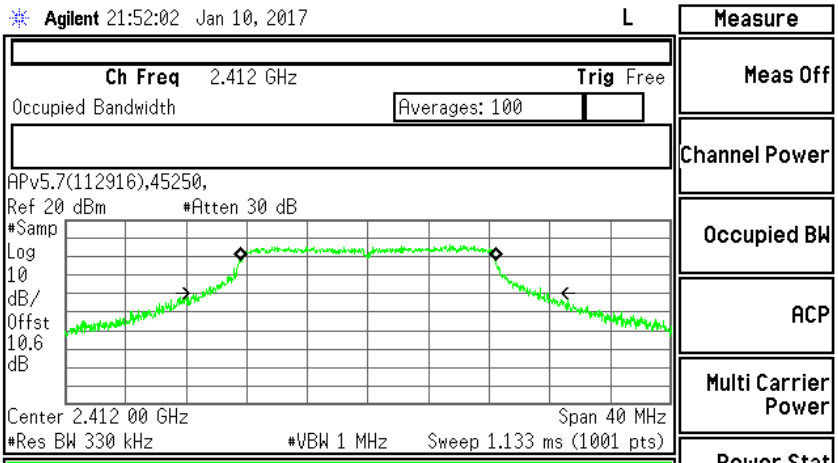
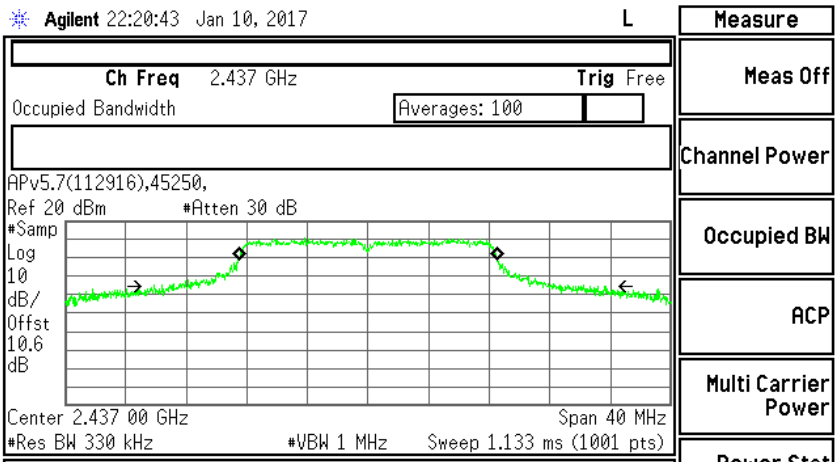
99% OBW 3TX Chain 2 CDD LOW CH



99% OBW 3TX Chain 0 CDD MID CH



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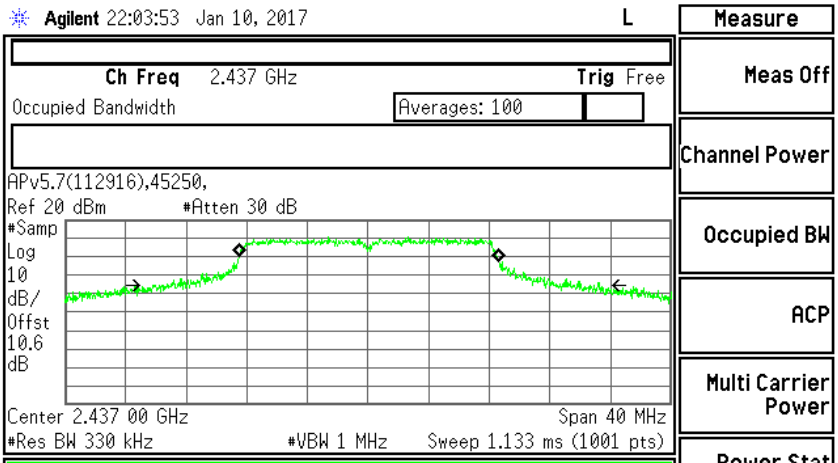
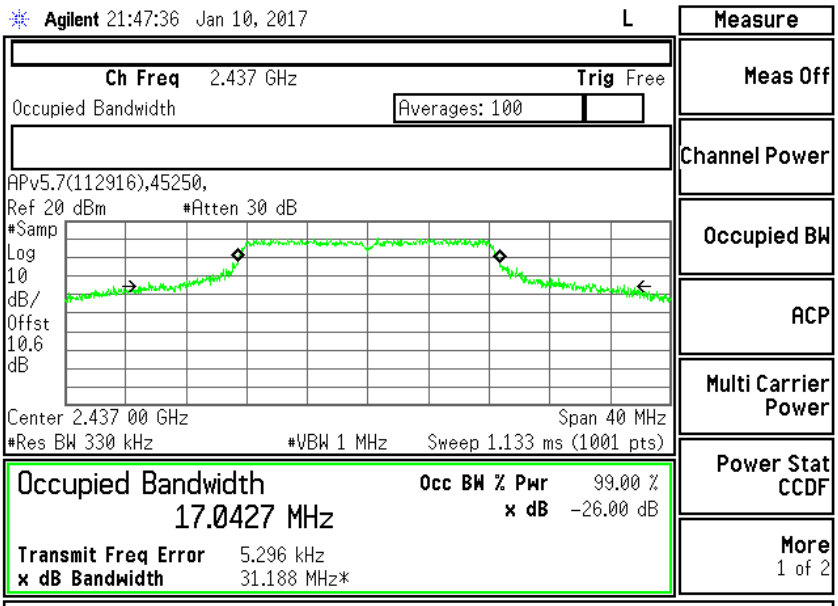
99% OBW 3TX Chain 1 CDD MID CH



99% OBW 3TX Chain 2 CDD MID CH



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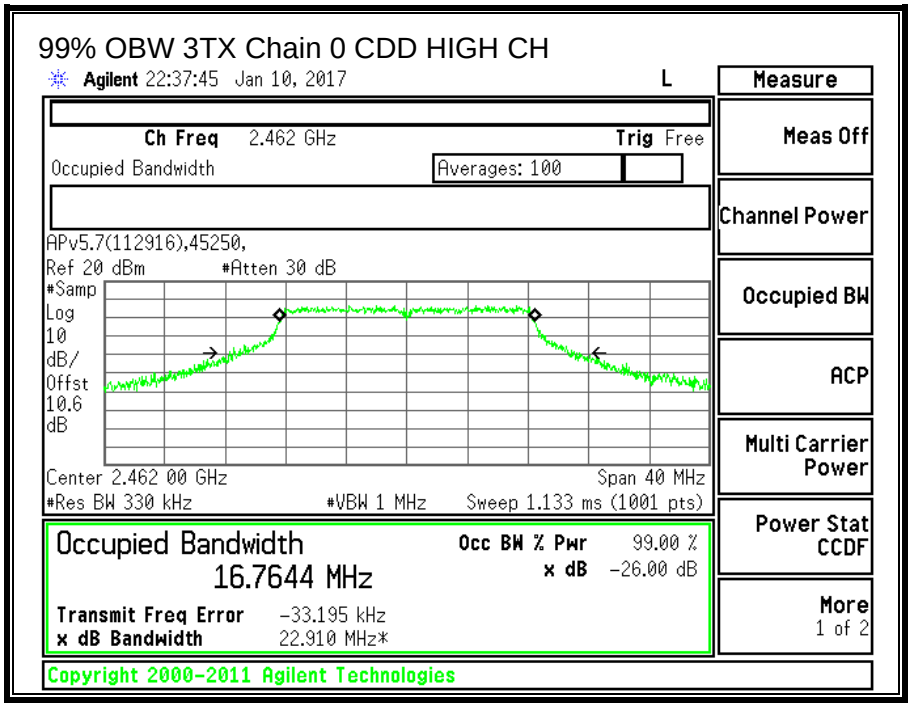

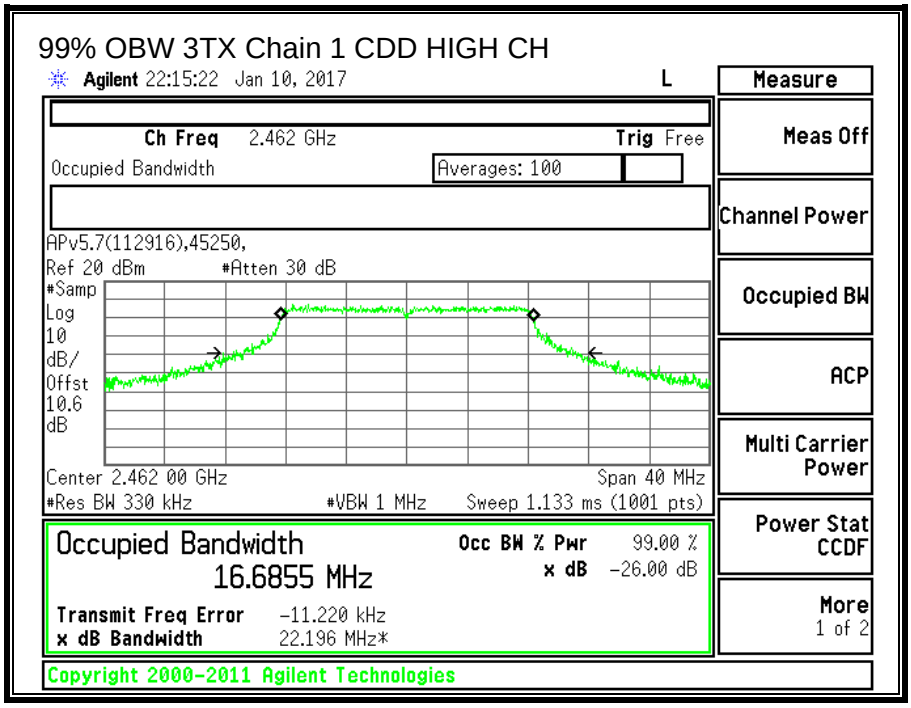

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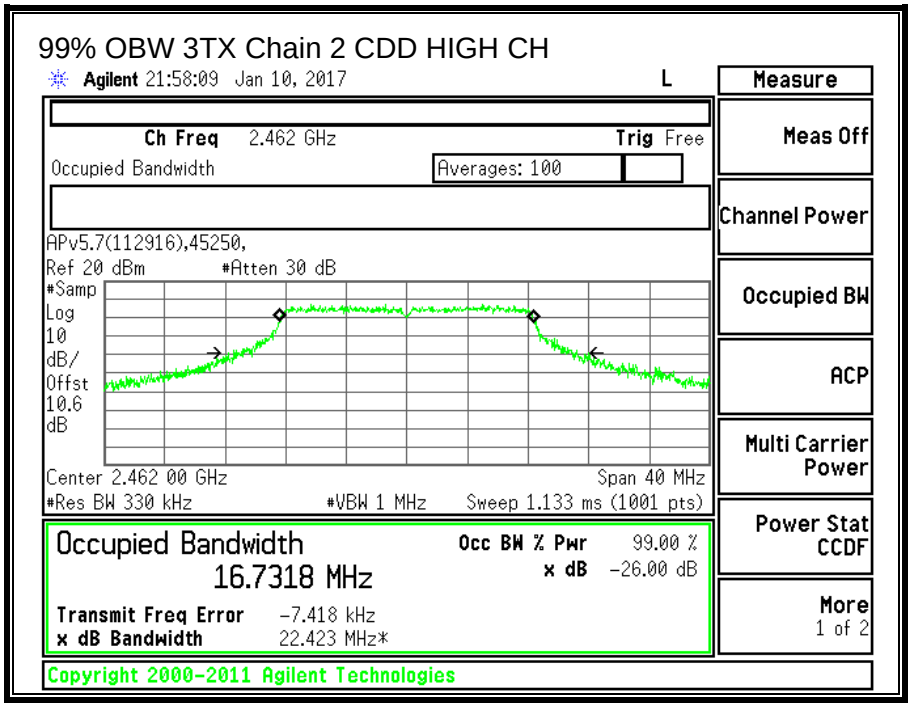

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10.2.3. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-247 (5.4) (4)

For systems using digital modulation in the 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

Each transmit antenna is driven by only one spatial stream

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

Chain 0 Gain (dBi)	Chain 1 Gain (dBi)	Chain 2 Gain (dBi)	Correlated Chains Directional Gain (dBi)
4.3	3.5	1.6	4.3

Directional Antenna Gain Calculation: KDB 662911 D01 Section F) 2) f) (ii)
Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain

TEST PROCEDURE

KDB 58074 D01 v03r05 Section 9.2.3.2

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701J
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
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RESULTS

ID:	45250	Date:	01/10/2017

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	4.30	30.00	30	36	30.00
Mid	2437	4.30	30.00	30	36	30.00
High	2462	4.30	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Chain 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	14.10	13.95	14.20	18.86	30.00	-11.14
Mid	2437	18.95	18.97	19.05	23.76	30.00	-6.24
High	2462	15.14	15.21	15.23	19.96	30.00	-10.04

Note: the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

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10.2.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-247 (5.2) (2)

For digitally modulated systems, the power spectral density conducted form the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 KHz band during any time interval of continuous transmissions.

TEST PROCEDURE

KDB 58074 D01 v03r05 Section 10.3

RESULTS

Duty Cycle CF (dB)	0.404	Included in Calculations of Corr'd PSD

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Chain 2 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-10.50	-10.39	-9.87	-5.07	8.0	-13.1
Mid	2437	-5.07	-5.47	-4.97	0.01	8.0	-8.0
High	2462	-9.73	-9.43	-9.40	-4.34	8.0	-12.3

Correlated PSD Calculation Method: KDB 662911 D01 Section E) 2) c)

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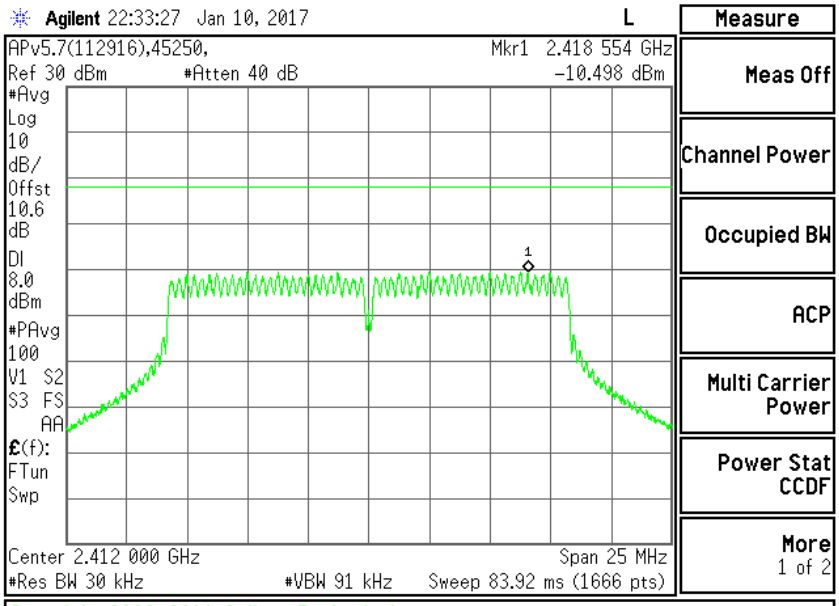
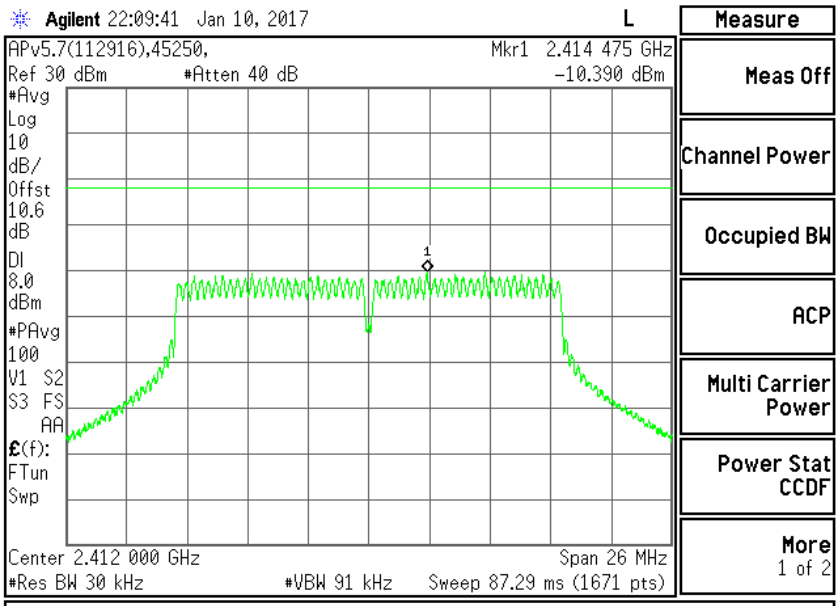
CPSD 3TX Chain 0 CDD LOW CH



CPSD 3TX Chain 1 CDD LOW CH



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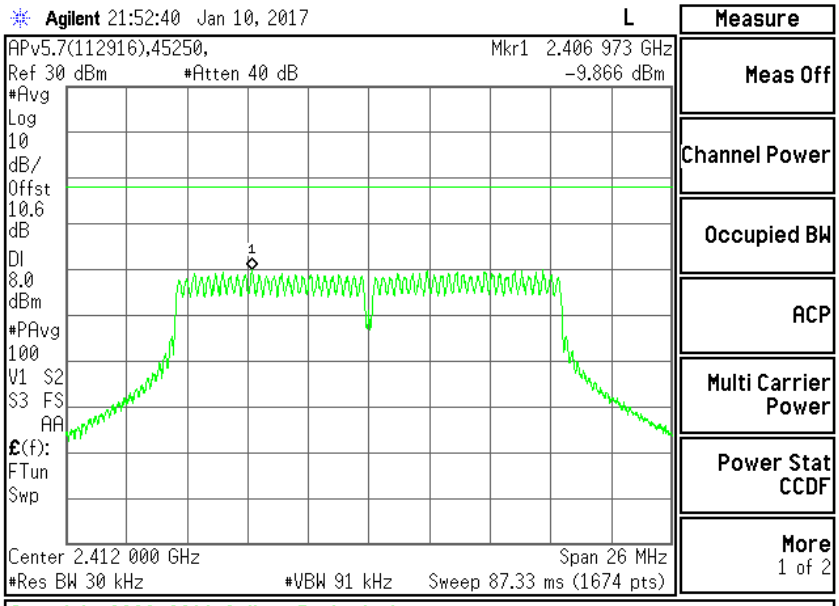
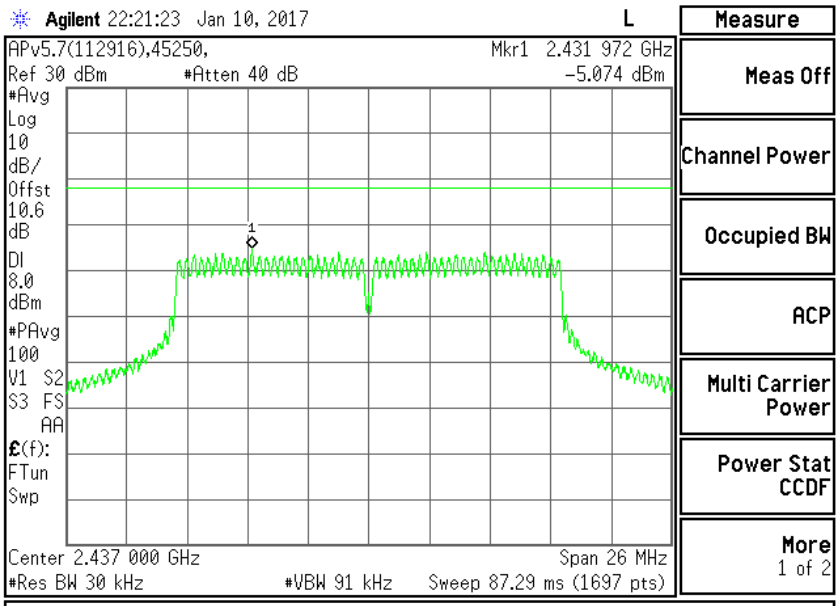
CPSD 3TX Chain 2 CDD LOW CH



CPSD 3TX Chain 0 CDD MID CH



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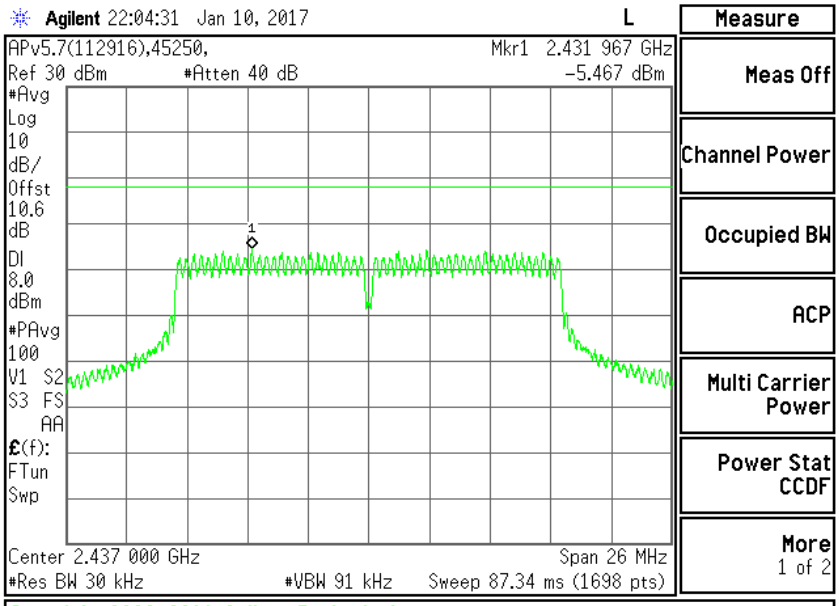
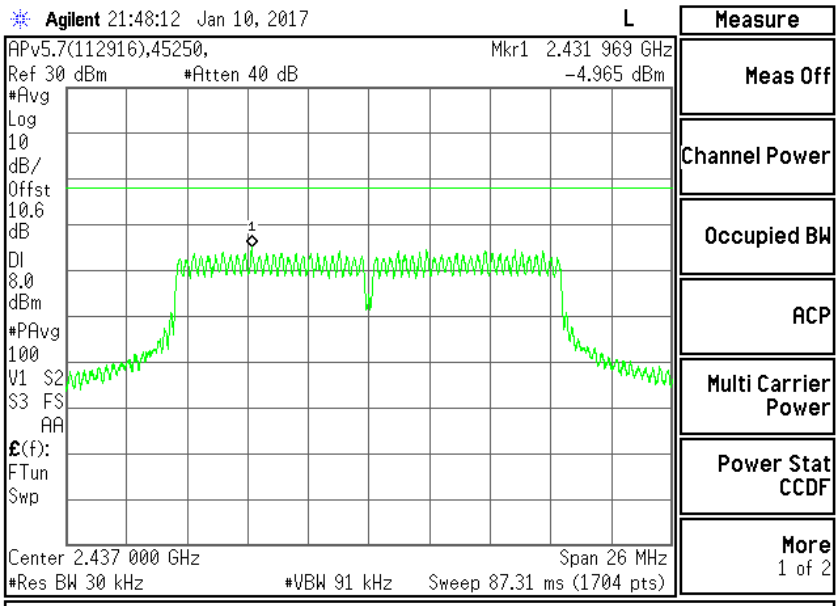
CPSD 3TX Chain 1 CDD MID CH



CPSD 3TX Chain 2 CDD MID CH



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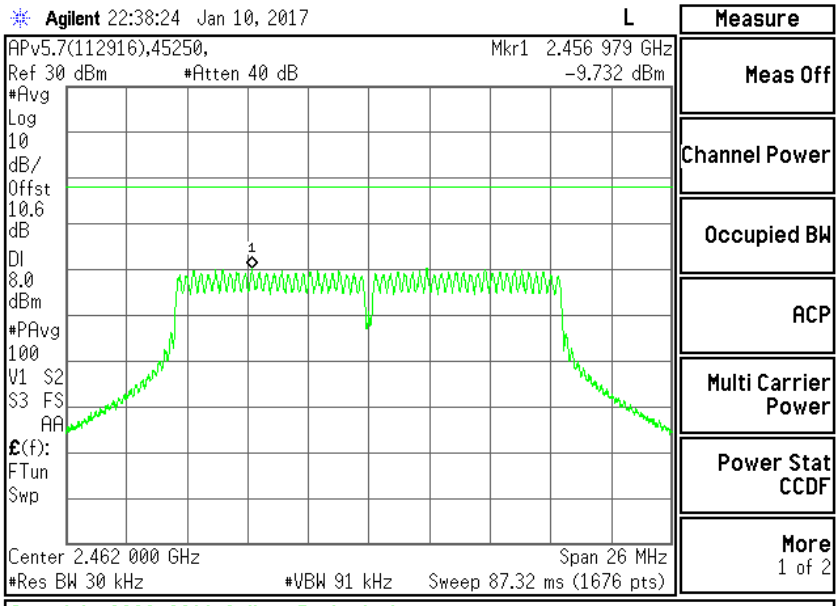
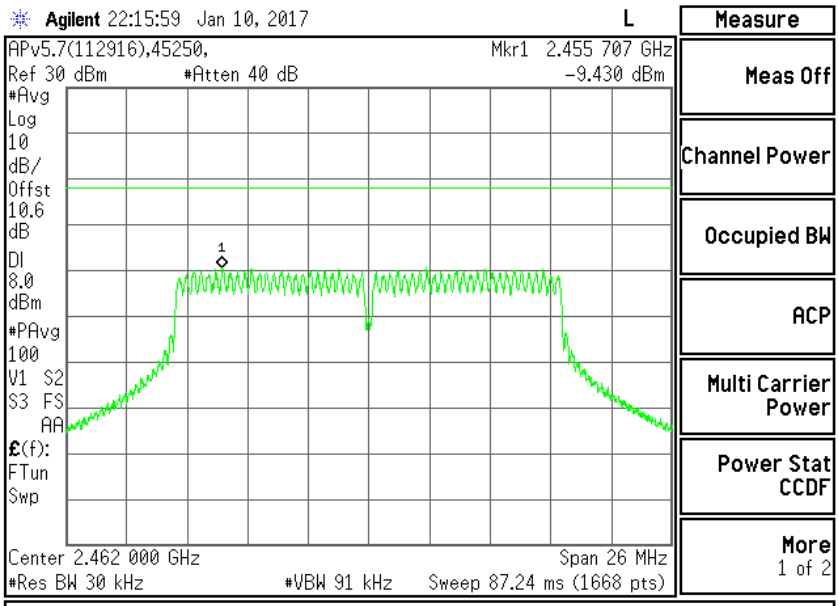
CPSD 3TX Chain 0 CDD HIGH CH



CPSD 3TX Chain 1 CDD HIGH CH



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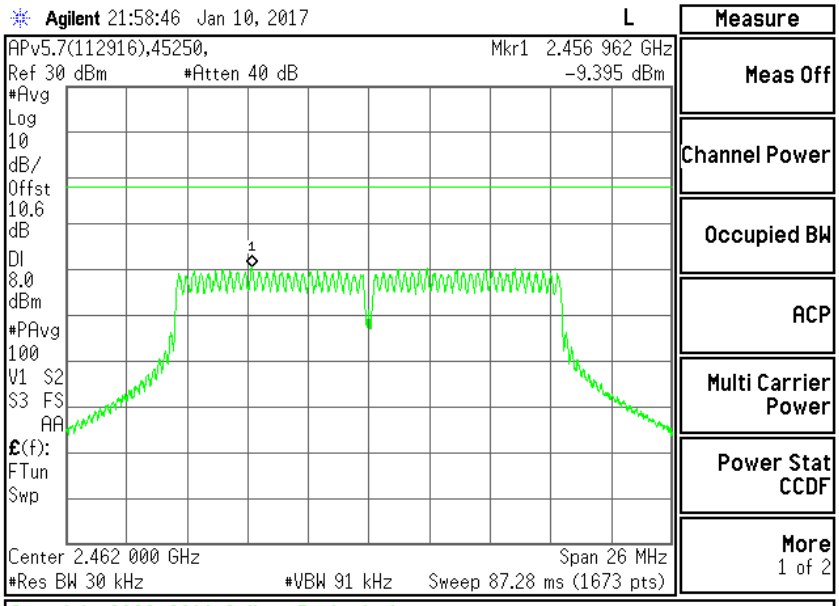
CPSD 3TX Chain 2 CDD HIGH CH



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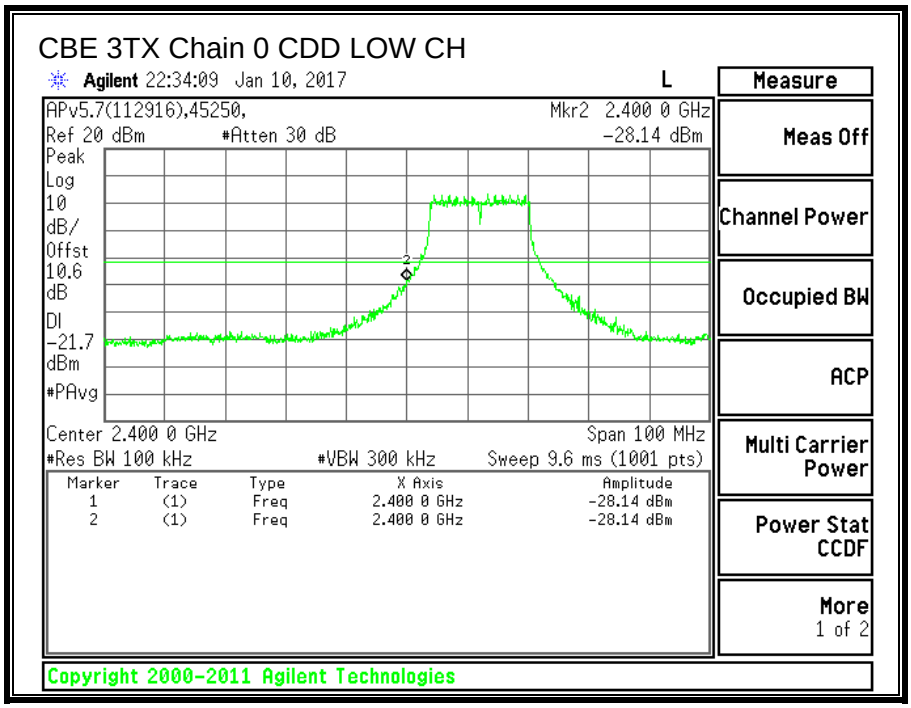
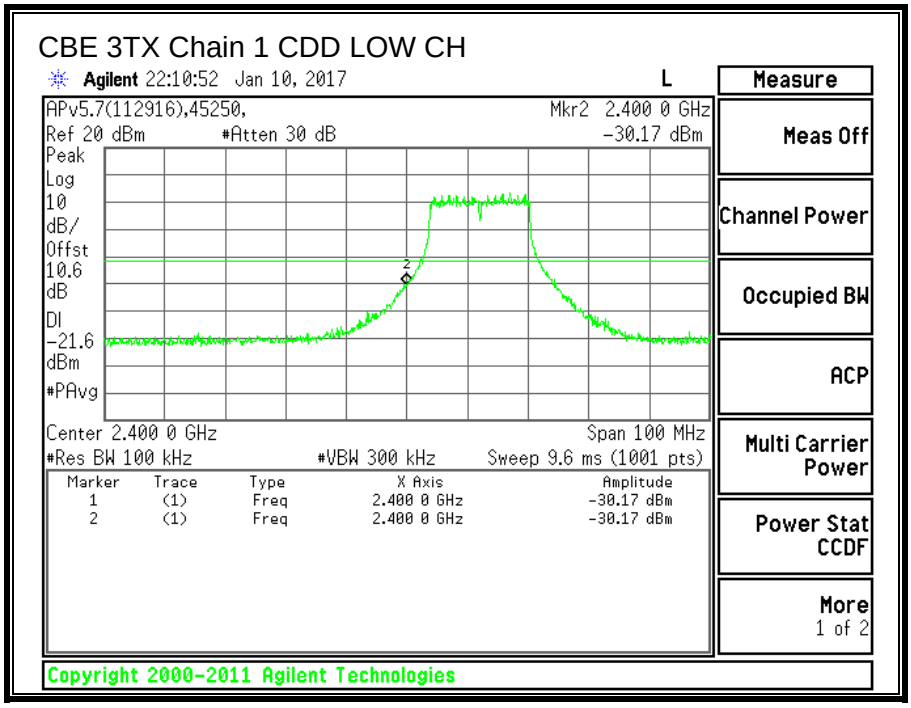
10.2.5. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS





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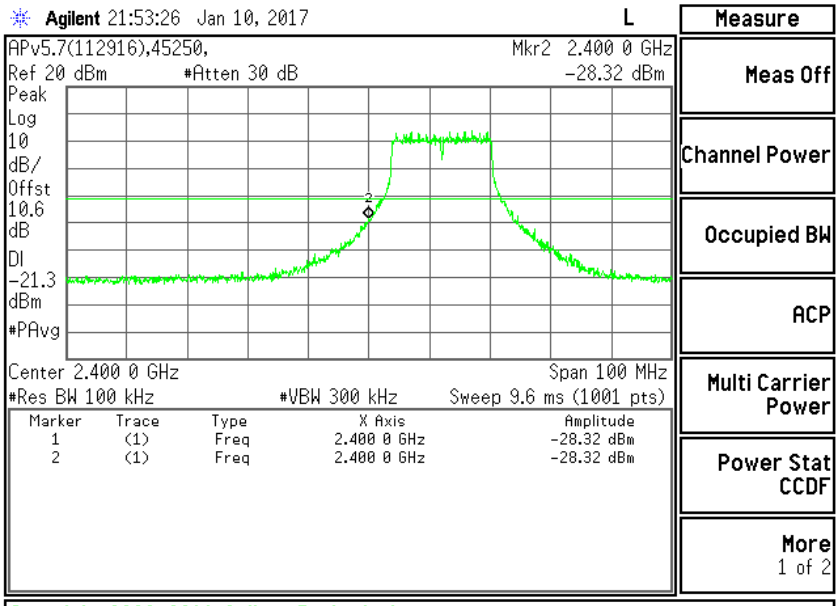
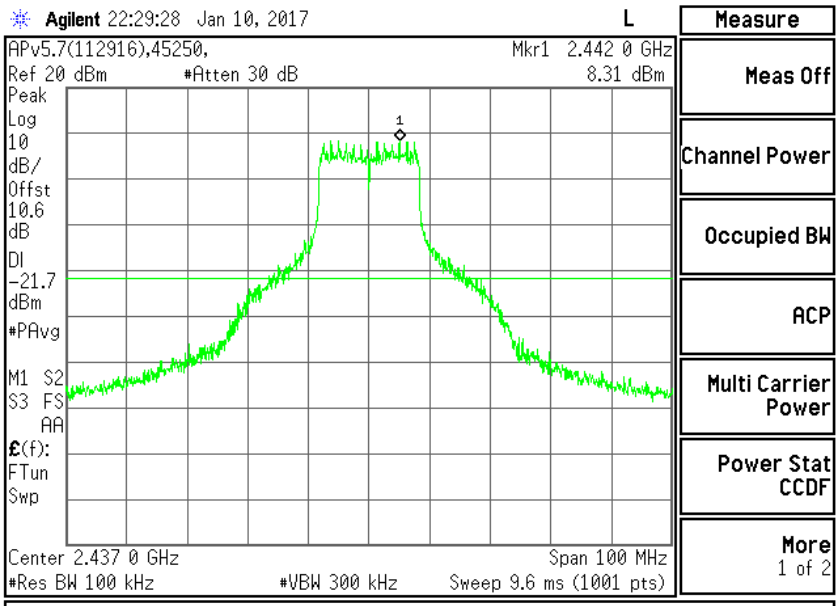
CBE 3TX Chain 2 CDD LOW CH



CBE 3TX Chain 0 CDD MID CH



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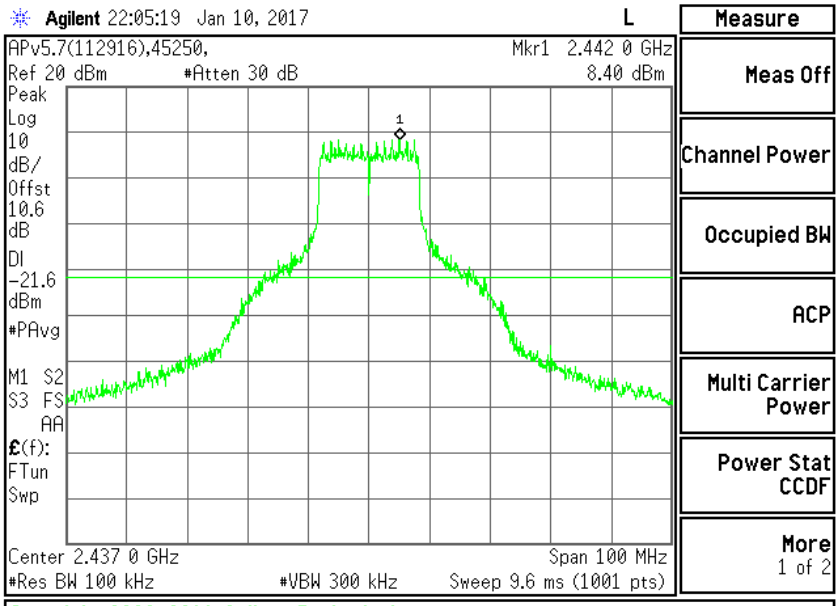
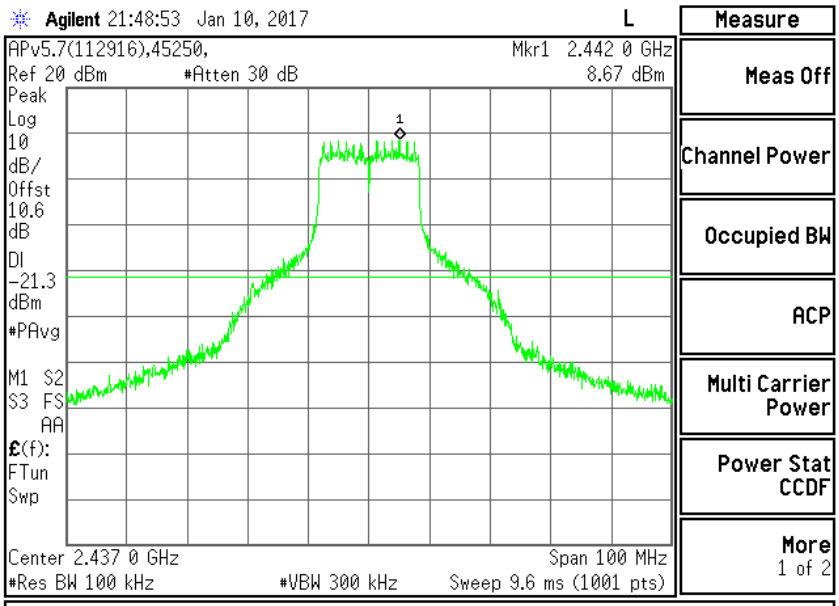
CBE 3TX Chain 1 CDD MID CH



CBE 3TX Chain 2 CDD MID CH



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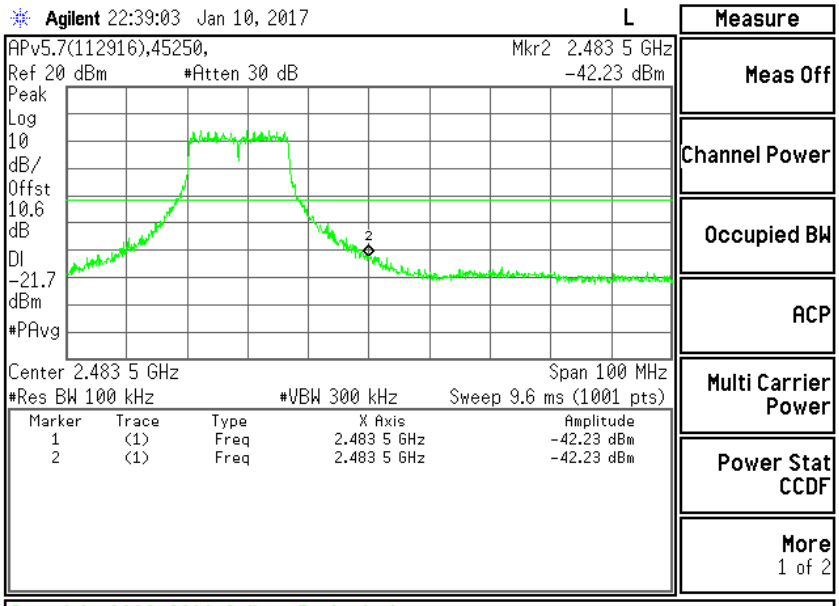
CBE 3TX Chain 0 CDD HIGH CH



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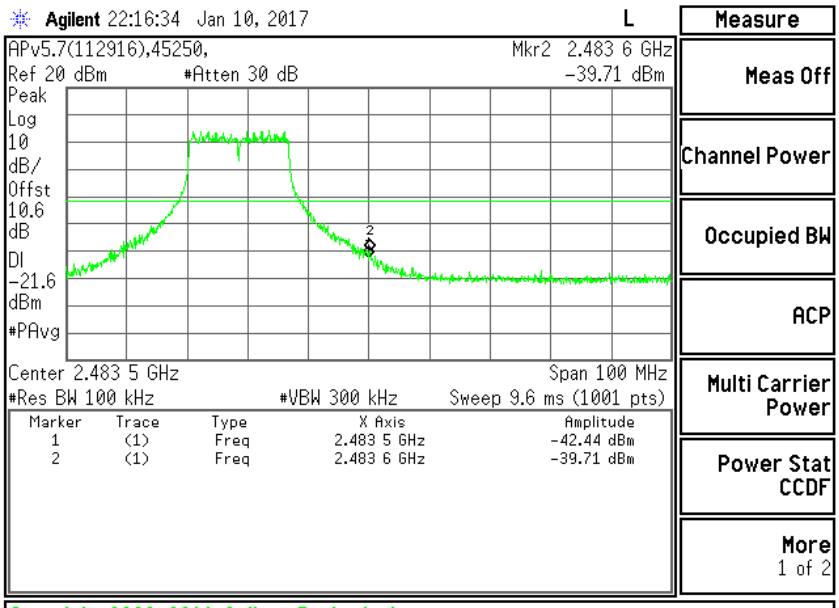

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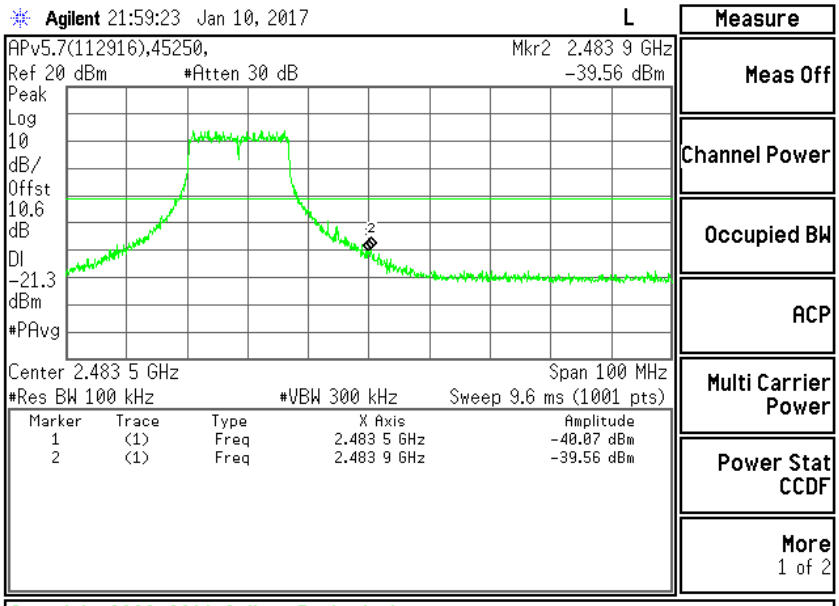
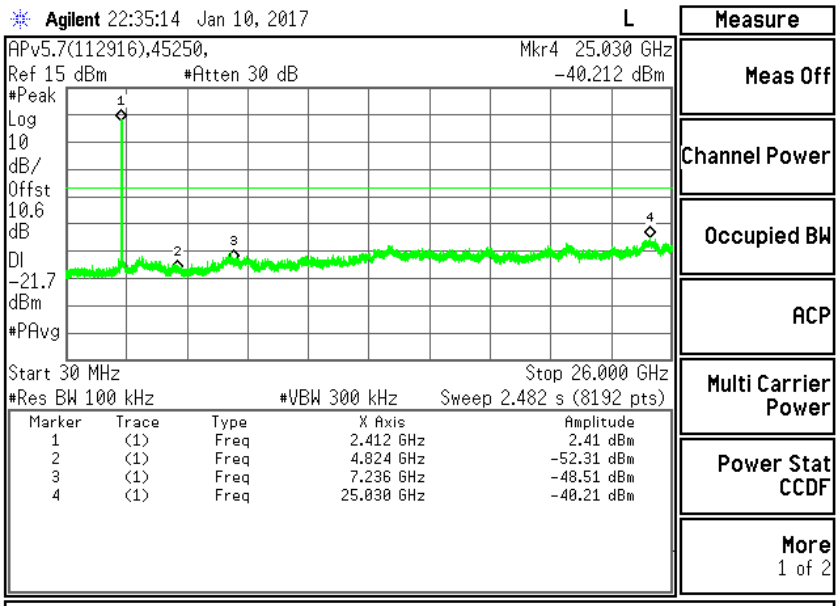
CBE 3TX Chain 2 CDD HIGH CH



CSPUR 3TX Chain 0 CDD LOW CH



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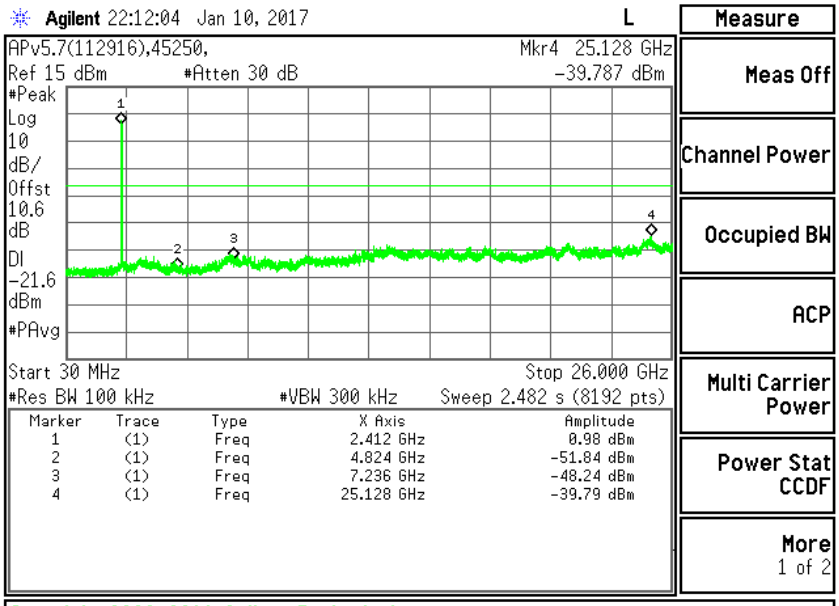
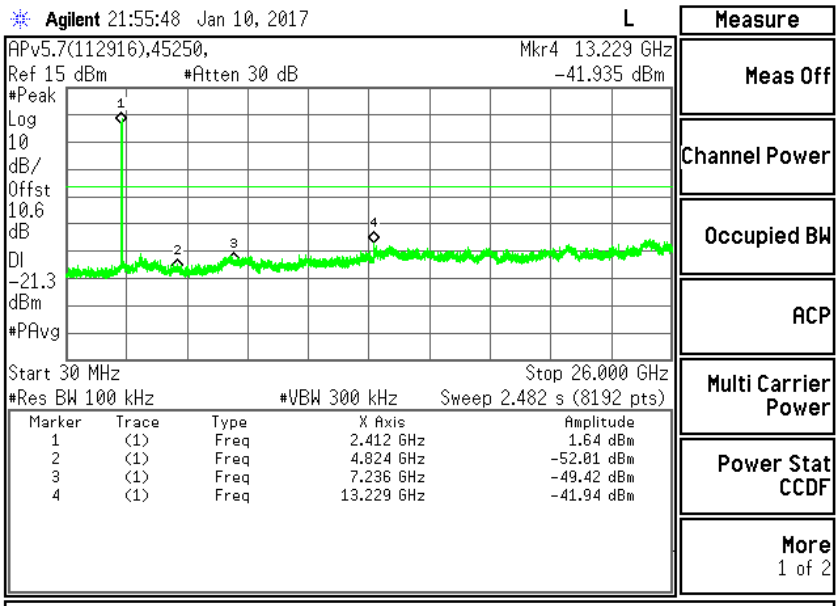
CSPUR 3TX Chain 1 CDD LOW CH



CSPUR 3TX Chain 2 CDD LOW CH



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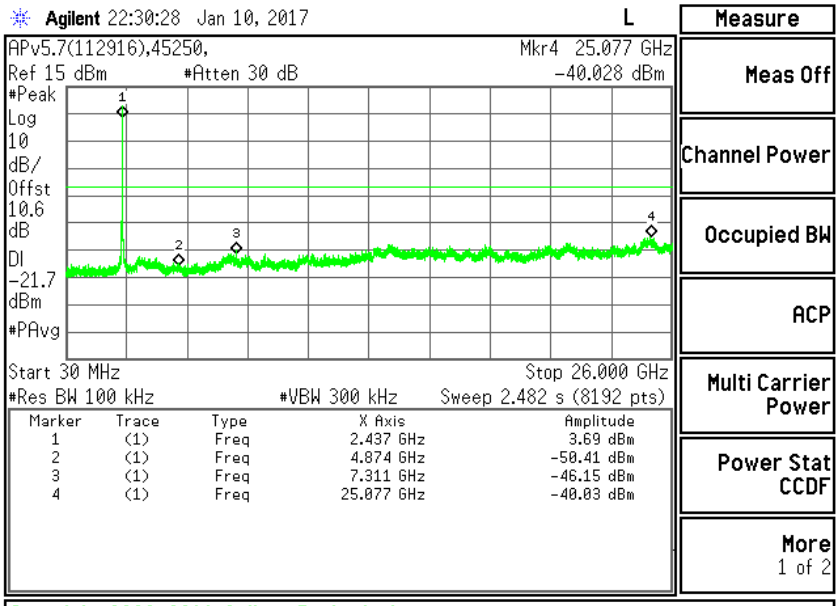
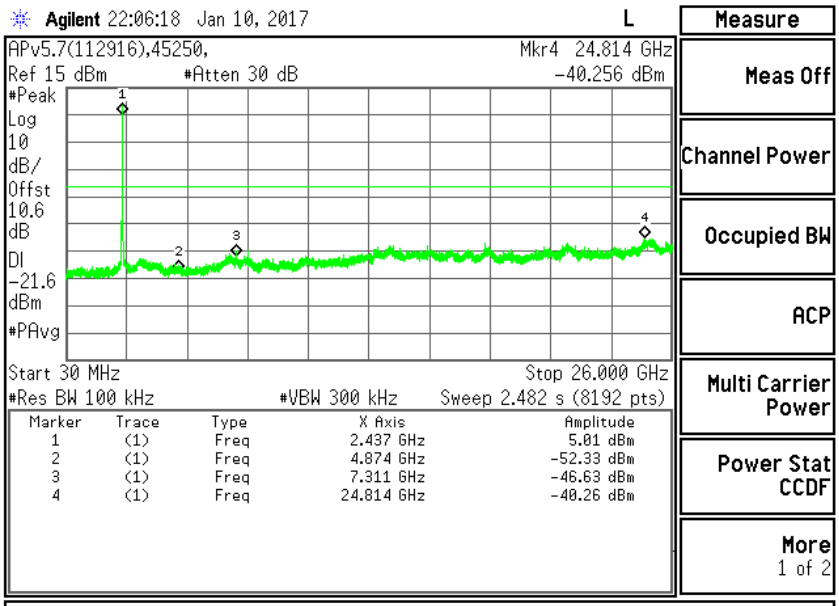
CSPUR 3TX Chain 0 CDD MIDDLE CH



CSPUR 3TX Chain 1 CDD MIDDLE CH



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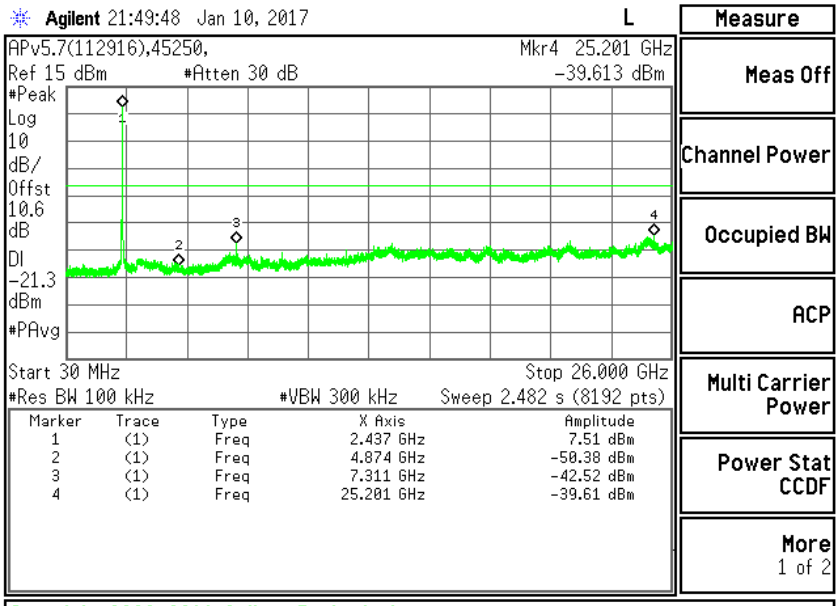
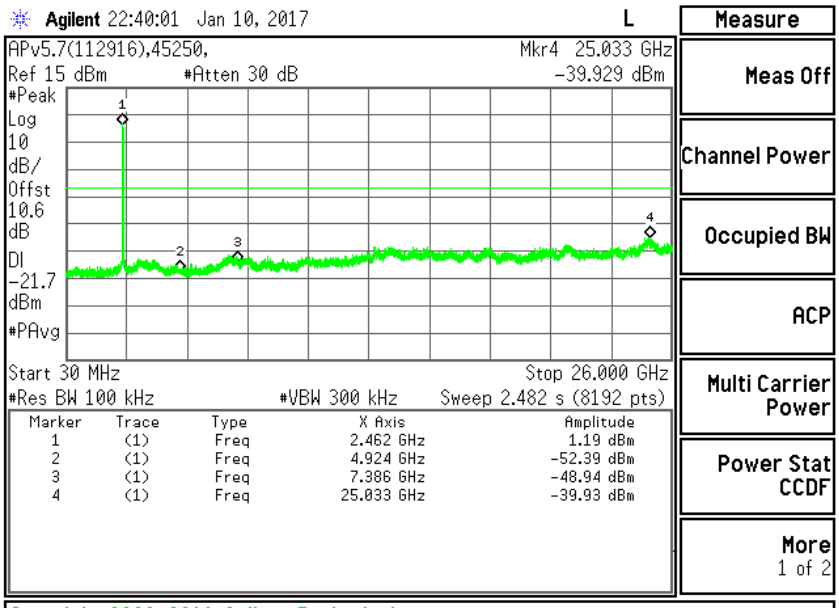
CSPUR 3TX Chain 2 CDD MIDDLE CH



CSPUR 3TX Chain 0 CDD HIGH CH



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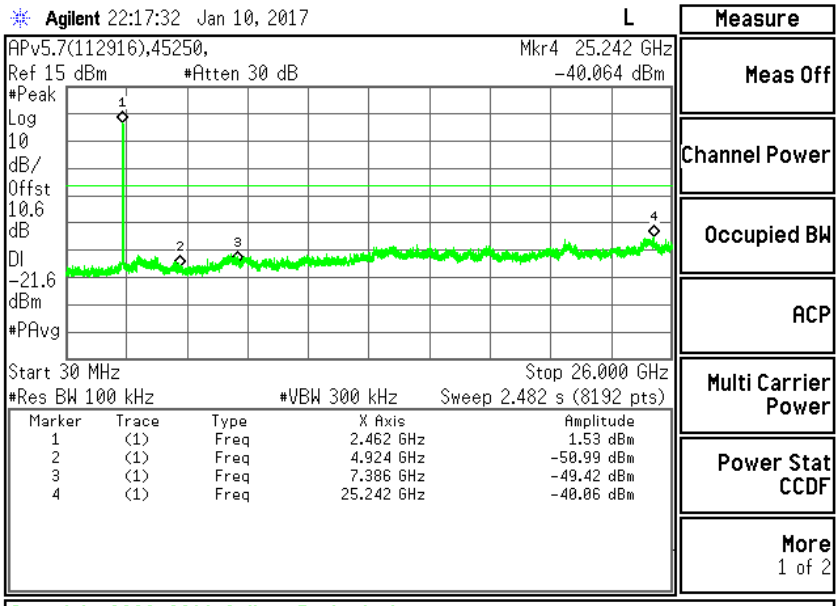
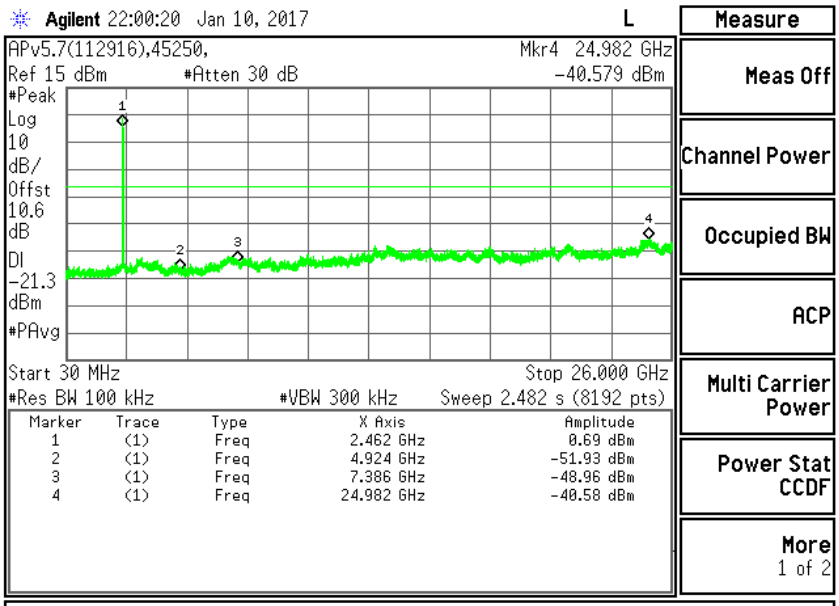
CSPUR 3TX Chain 1 CDD HIGH CH



CSPUR 3TX Chain 2 CDD HIGH CH



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10.3. 11n HT20 3TX CDD MIMO MODE IN THE 2.4GHz BAND

10.3.1. 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

Channel	Frequency	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	6 dB BW Chain 2 (MHz)	Minimum Limit (MHz)
Low_1	2412	17.590	17.560	17.570	0.5
Middle_6	2437	17.535	17.560	17.545	0.5
High_11	2462	17.580	17.580	17.565	0.5

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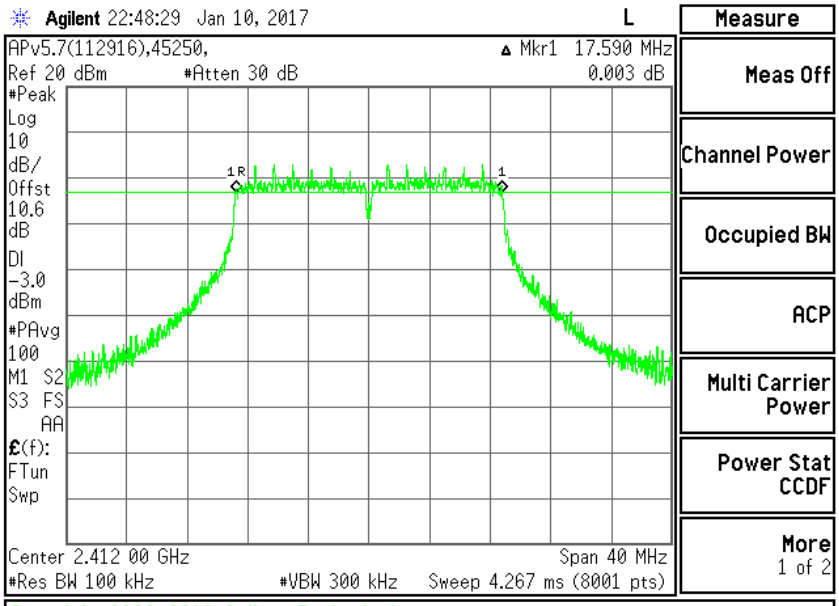
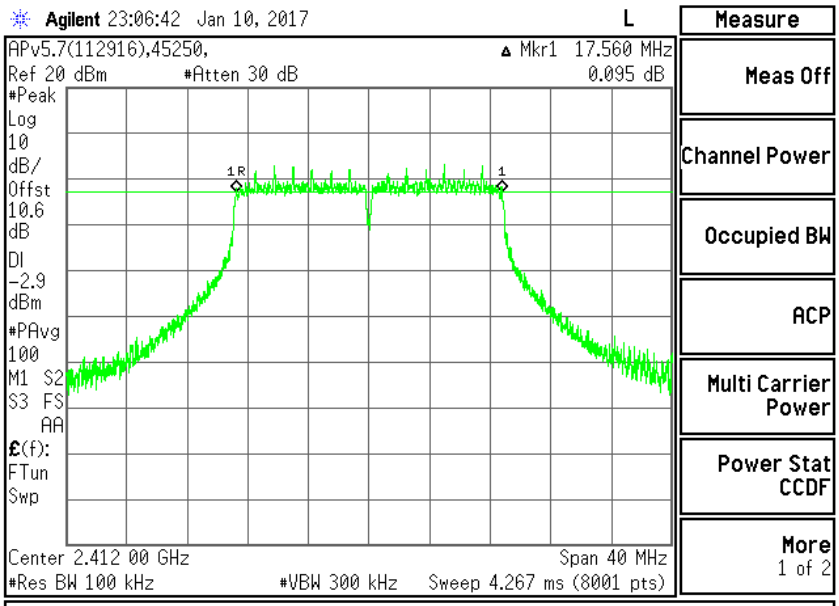
6dB 3TX Chain 0 CDD LOW CH



6dB 3TX Chain 1 CDD LOW CH



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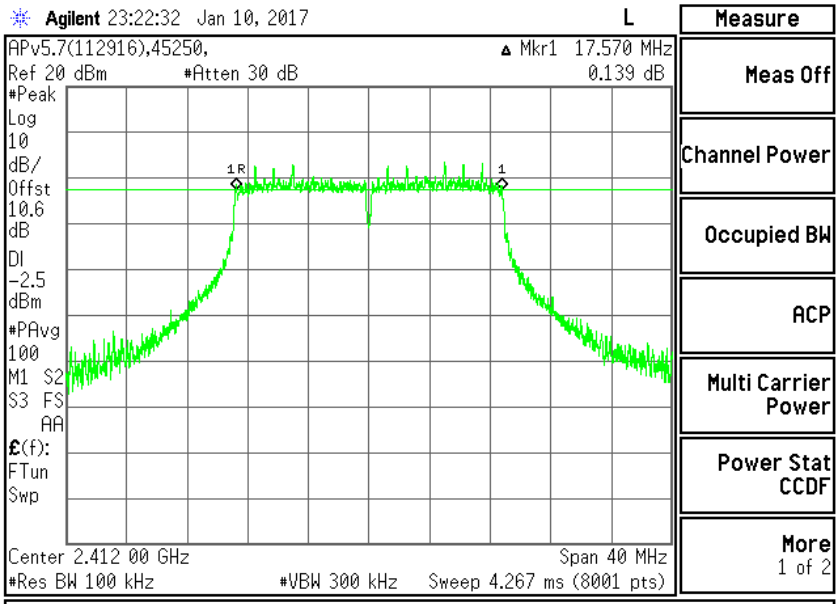
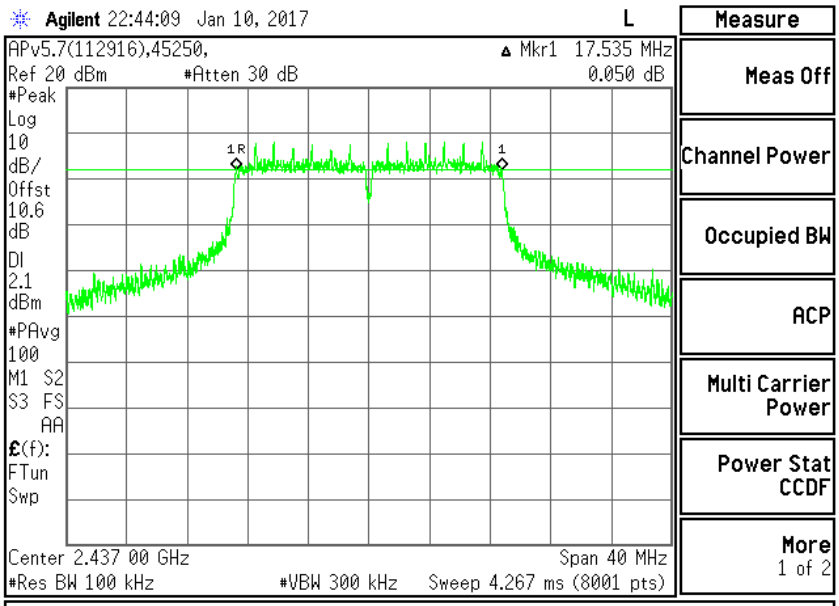
6dB 3TX Chain 2 CDD LOW CH



6dB 3TX Chain 0 CDD MID CH



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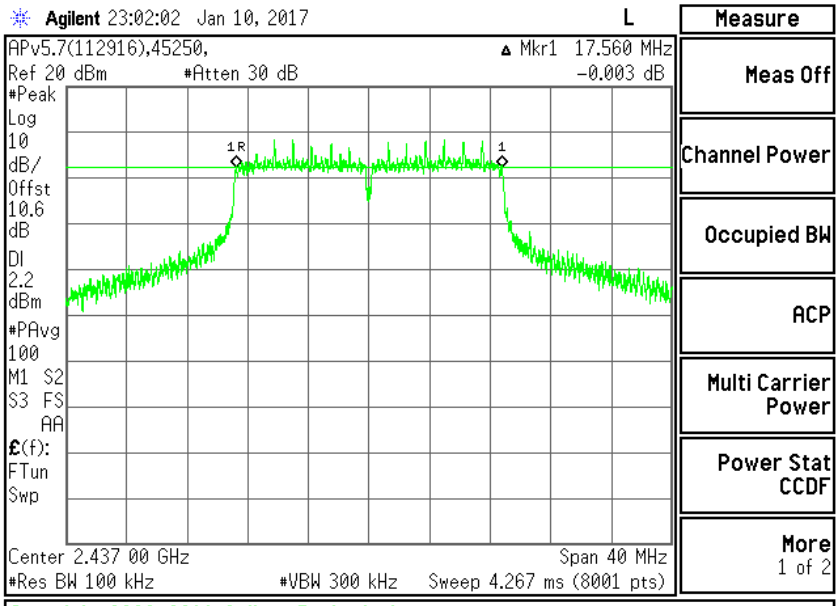
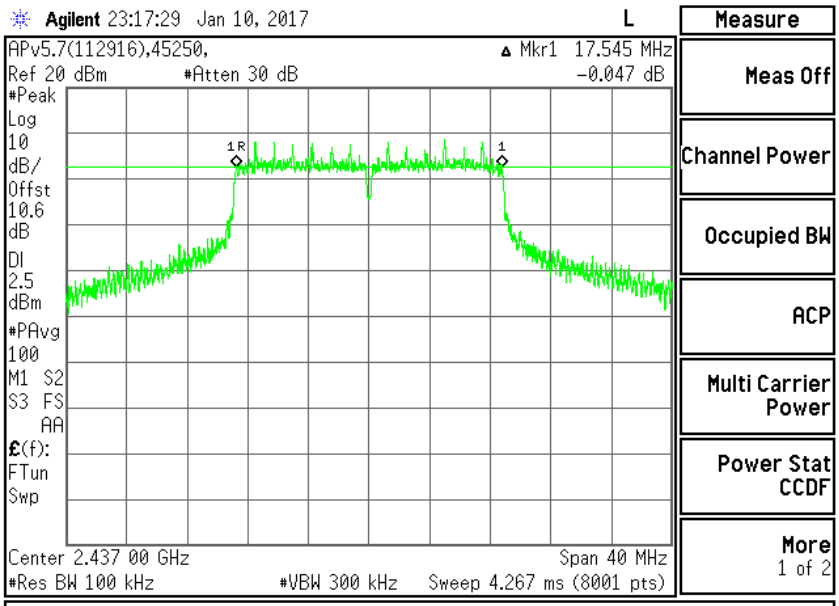
6dB 3TX Chain 1 CDD MID CH



6dB 3TX Chain 2 CDD MID CH



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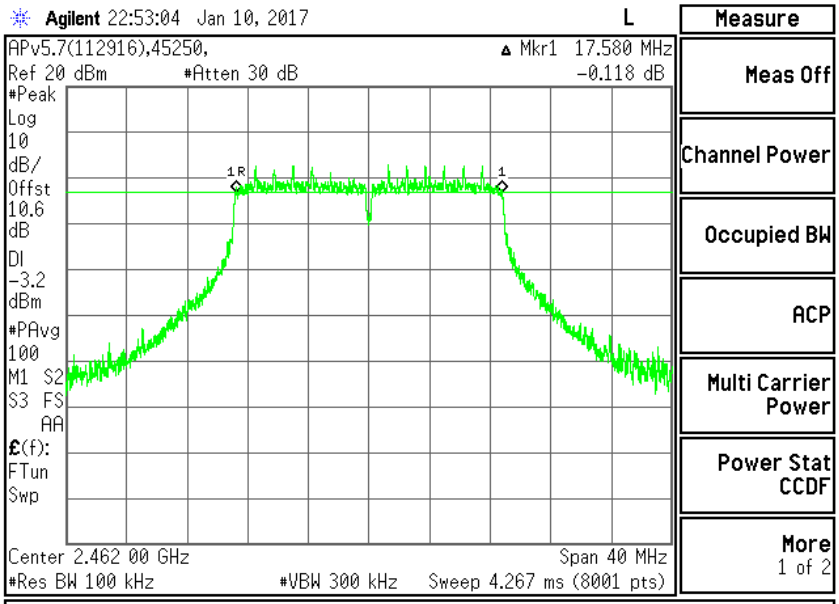
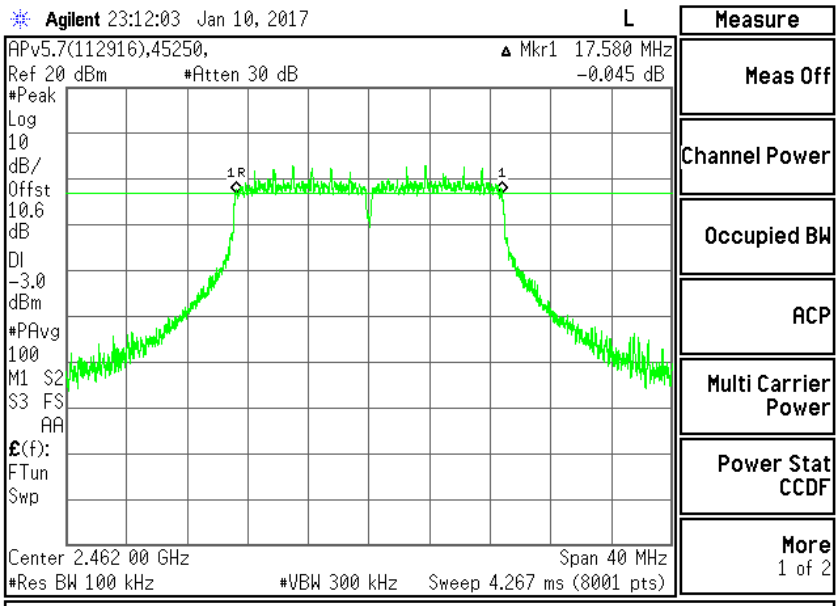
6dB 3TX Chain 0 CDD HIGH CH



6dB 3TX Chain 1 CDD HIGH CH



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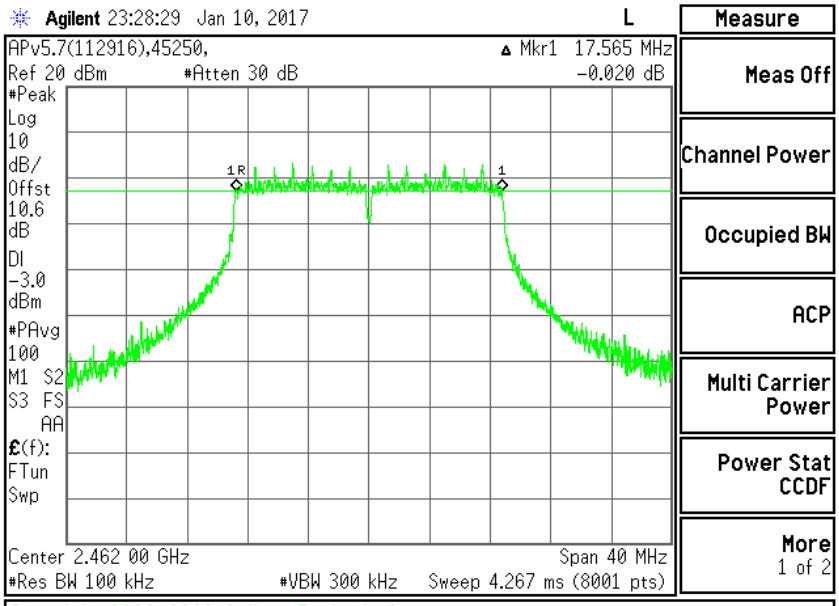
6dB 3TX Chain 2 CDD HIGH CH



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10.3.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

ANSI C63.10: 2013 Section 6.9.3

RESULTS

Channel	Frequency (MHz)	99% Bandwidth Chain 0 (MHz)	99% Bandwidth Chain 1 (MHz)	99% Bandwidth Chain 2 (MHz)
Low_1	2412	18.0247	17.9230	17.9751
Middle_6	2437	18.2539	18.3582	18.3922
High_11	2462	18.0001	17.9724	17.9983

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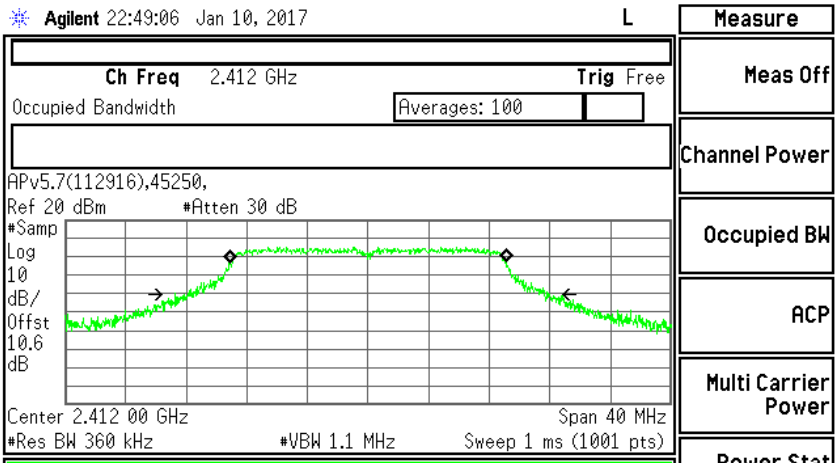
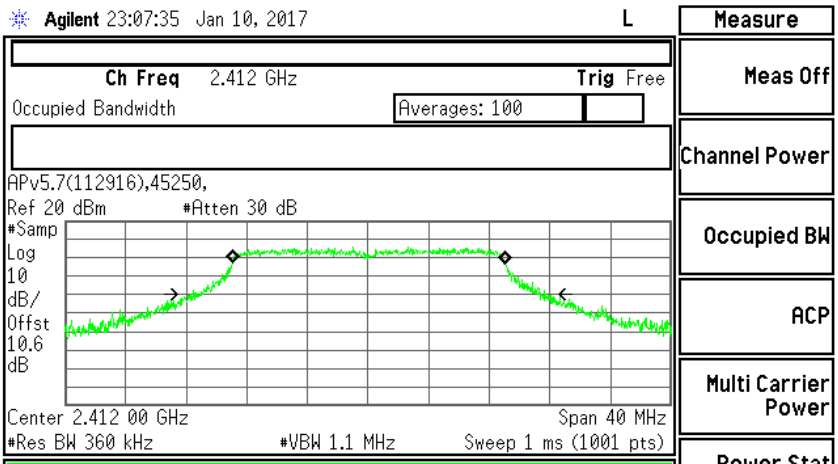
99% OBW 3TX Chain 0 CDD LOW CH



99% OBW 3TX Chain 1 CDD LOW CH



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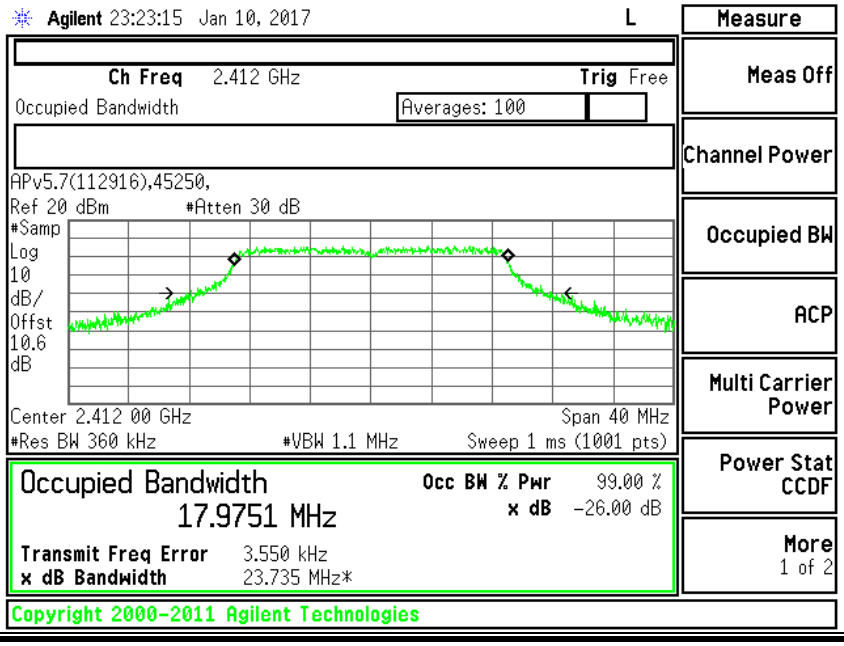
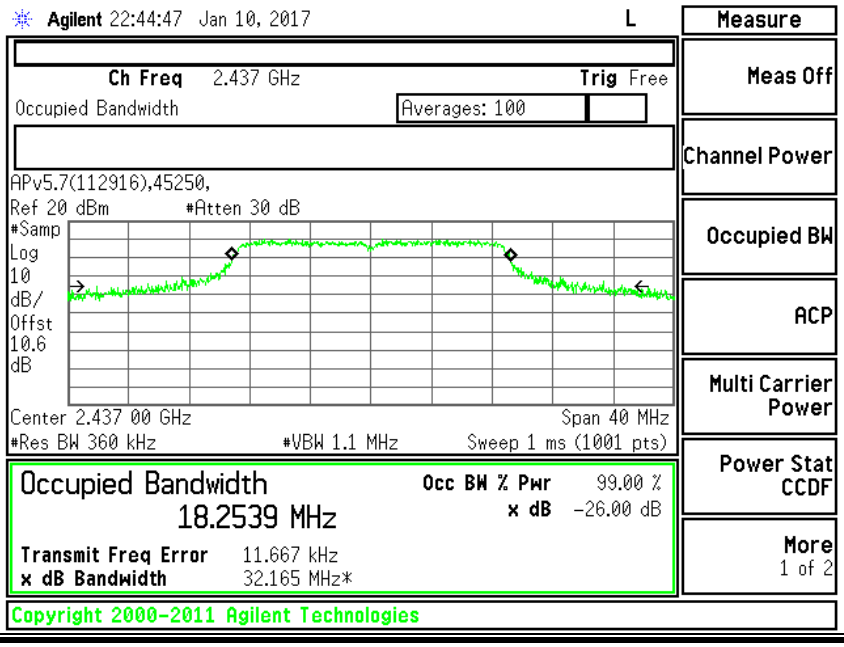
99% OBW 3TX Chain 2 CDD LOW CH



99% OBW 3TX Chain 0 CDD MID CH



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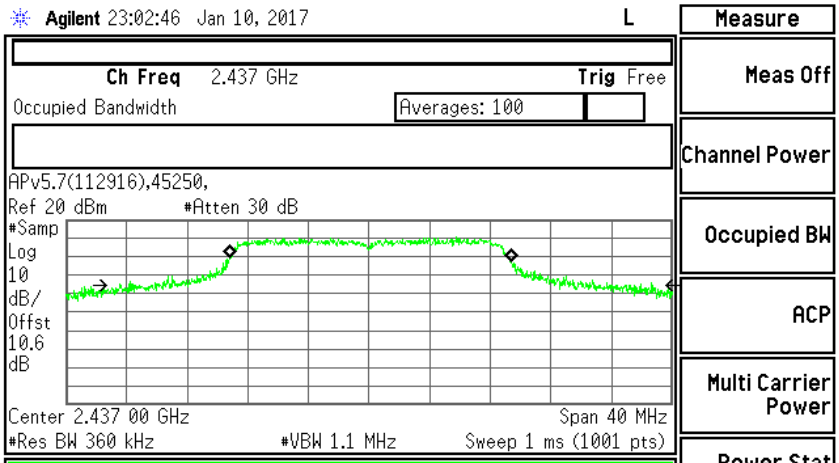
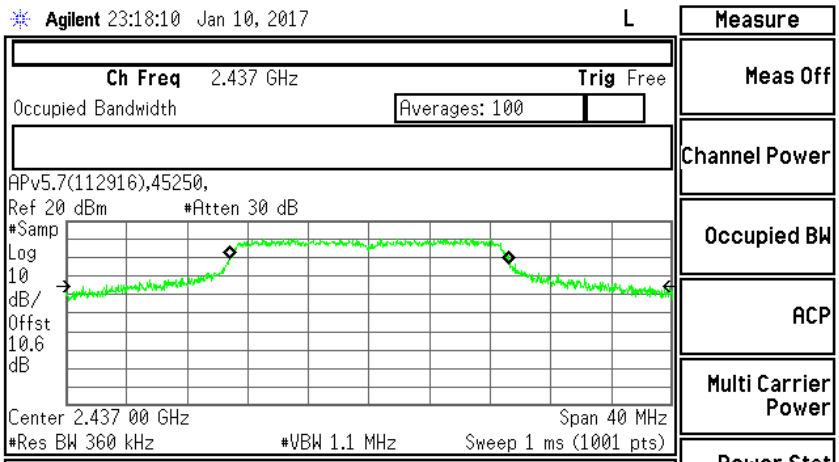
99% OBW 3TX Chain 1 CDD MID CH



99% OBW 3TX Chain 2 CDD MID CH



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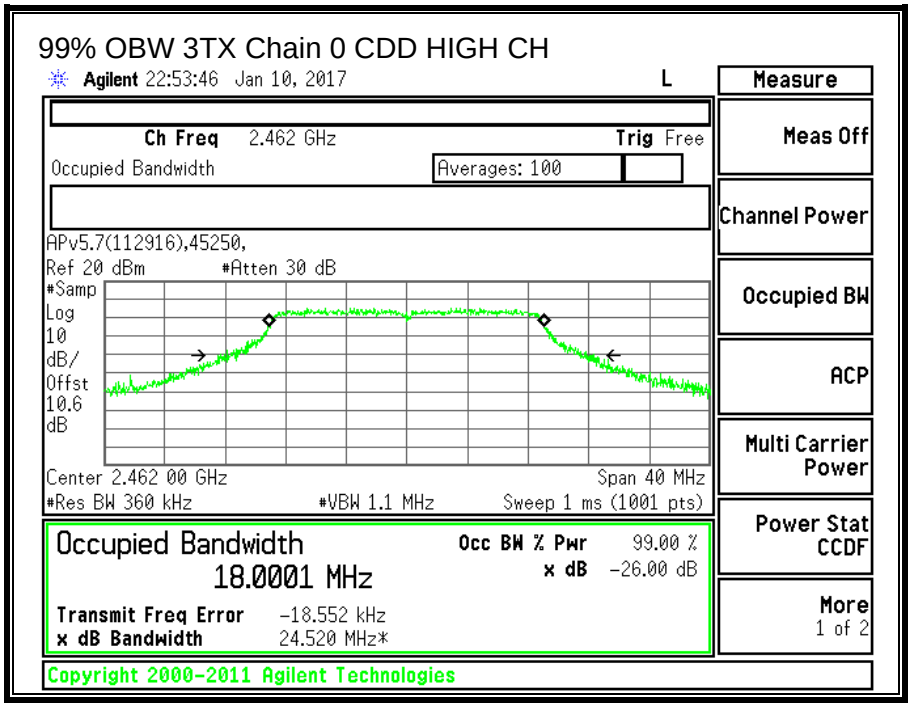
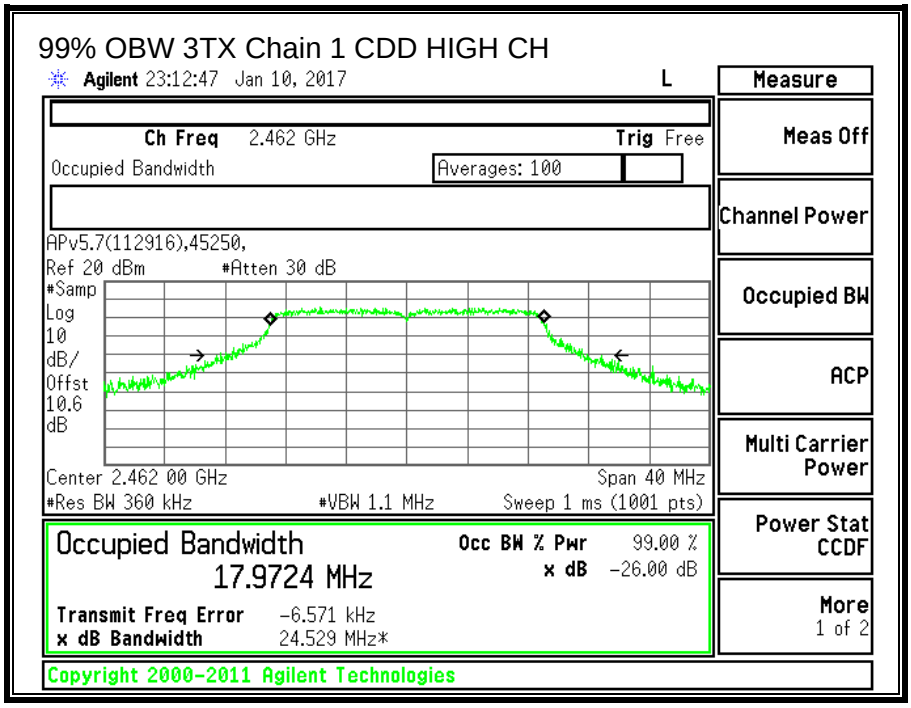
99% OBW 3TX Chain 0 CDD HIGH CH



99% OBW 3TX Chain 1 CDD HIGH CH



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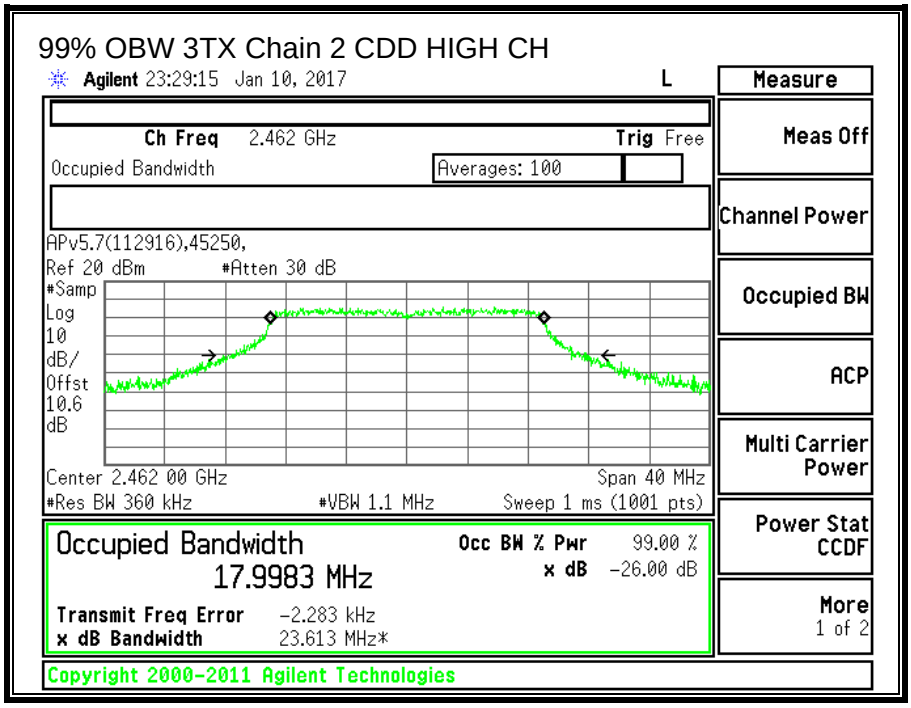

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10.3.3. OUTPUT POWER

LIMITS

FCC §15.247

IC RSS-247 (5.4) (4)

For systems using digital modulation in the 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

Each transmit antenna is driven by only one spatial stream

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

Chain 0 Gain (dBi)	Chain 1 Gain (dBi)	Chain 2 Gain (dBi)	Correlated Chains Directional Gain (dBi)
4.3	3.5	1.6	4.3

Directional Antenna Gain Calculation: KDB 662911 D01 Section F) 2) f) (ii)
Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain

TEST PROCEDURE

KDB 58074 D01 v03r05 Section 9.2.3.2

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701J
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
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RESULTS

ID:	45250	Date:	01/10/2017

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low	2412	4.30	30.00	30	36	30.00
Mid	2437	4.30	30.00	30	36	30.00
High	2462	4.30	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Chain 2 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low	2412	14.16	14.03	14.21	18.91	30.00	-11.09
Mid	2437	18.95	19.07	19.10	23.81	30.00	-6.19
High	2462	14.17	14.32	14.25	19.02	30.00	-10.98

Note: the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

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10.3.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-247 (5.2) (2)

For digitally modulated systems, the power spectral density conducted form the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 KHz band during any time interval of continuous transmissions.

TEST PROCEDURE

KDB 58074 D01 v03r05 Section 10.3

RESULTS

Duty Cycle CF (dB)	0.115	Included in Calculations of Corr'd PSD

PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm)	Chain 1 Meas (dBm)	Chain 2 Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-10.93	-10.76	-10.61	-5.88	8.0	-13.9
Mid	2437	-5.69	-6.14	-6.37	-1.17	8.0	-9.2
High	2462	-10.86	-10.51	-11.12	-5.94	8.0	-13.9

Correlated PSD Calculation Method: KDB 662911 D01 Section E) 2) c)

UL VERIFICATION SERVICES INC. FORM NO: CCSUP4701J
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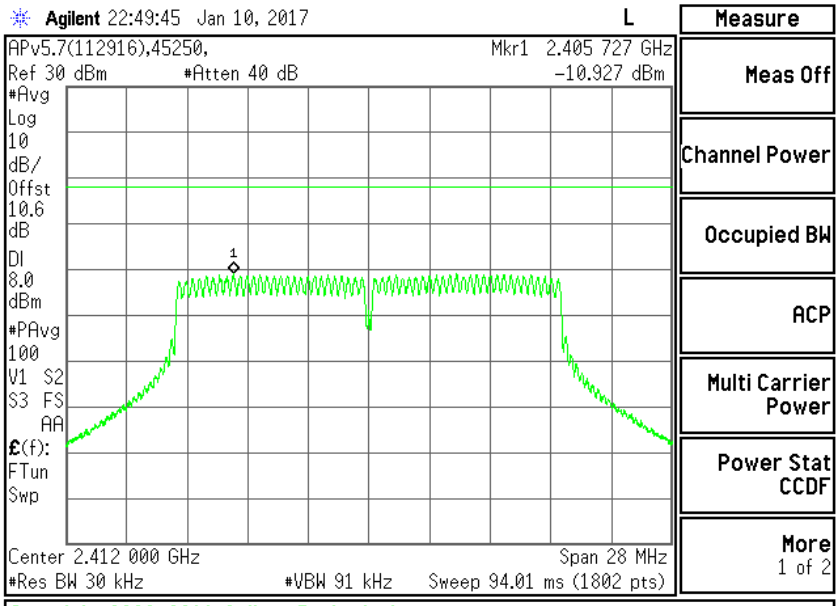
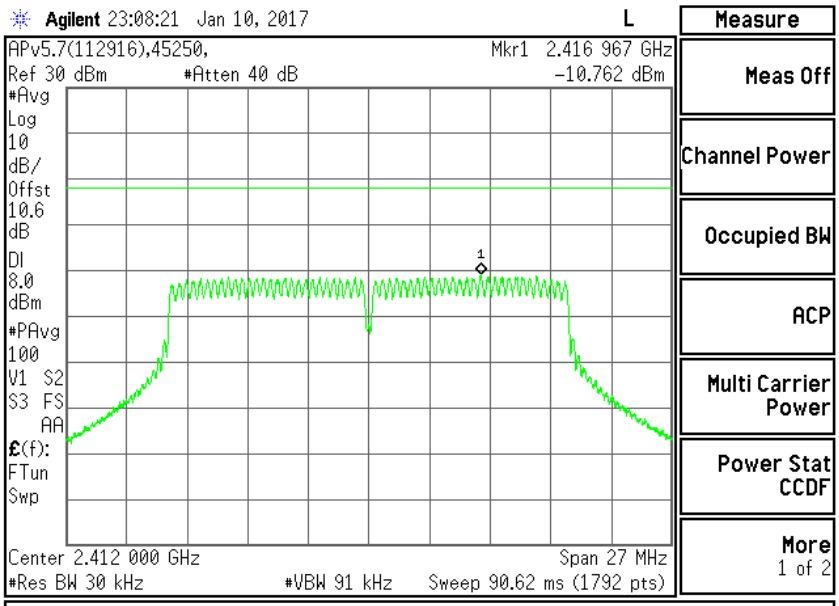
CPSD 3TX Chain 0 CDD LOW CH



CPSD 3TX Chain 1 CDD LOW CH



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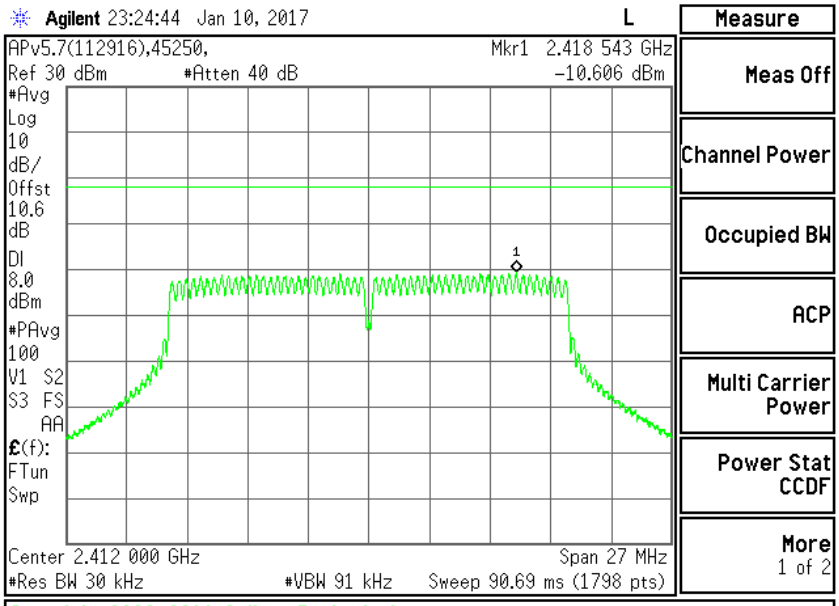
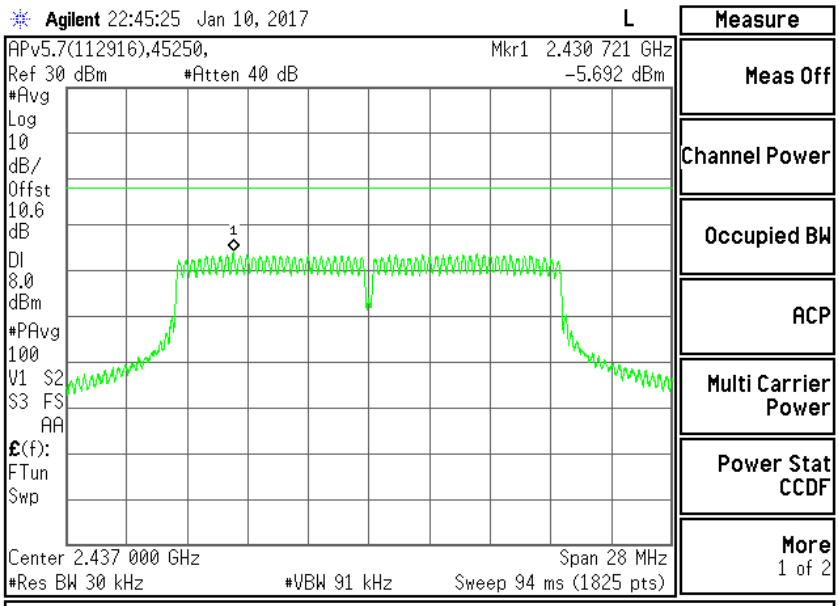
CPSD 3TX Chain 2 CDD LOW CH



CPSD 3TX Chain 0 CDD MID CH



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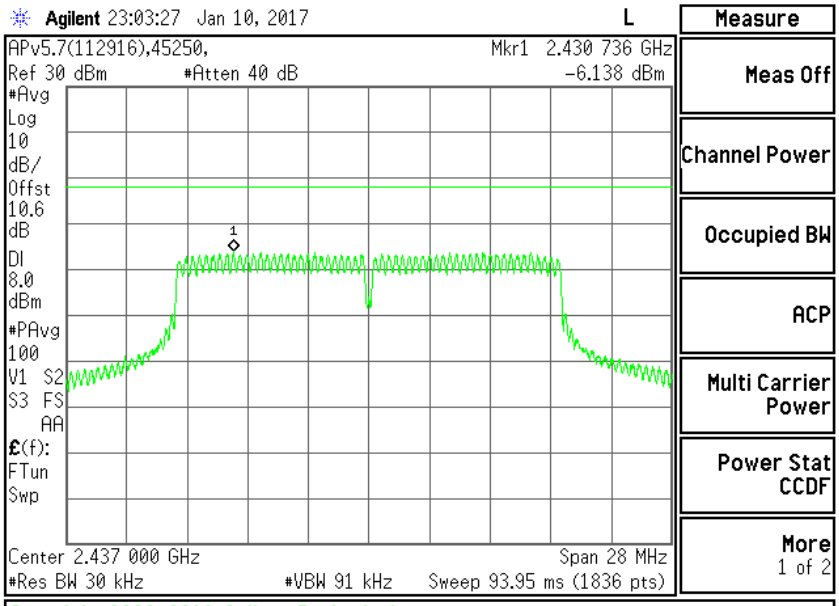
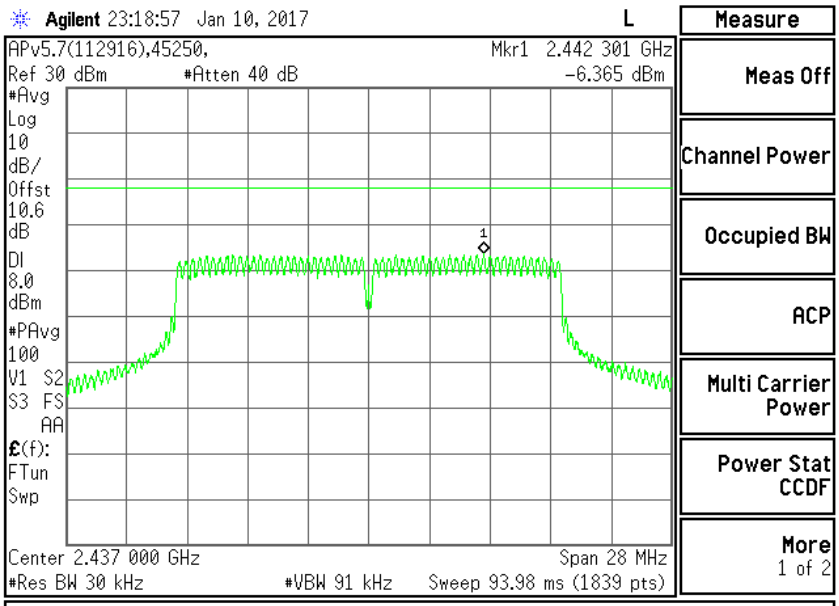
CPSD 3TX Chain 1 CDD MID CH



CPSD 3TX Chain 2 CDD MID CH



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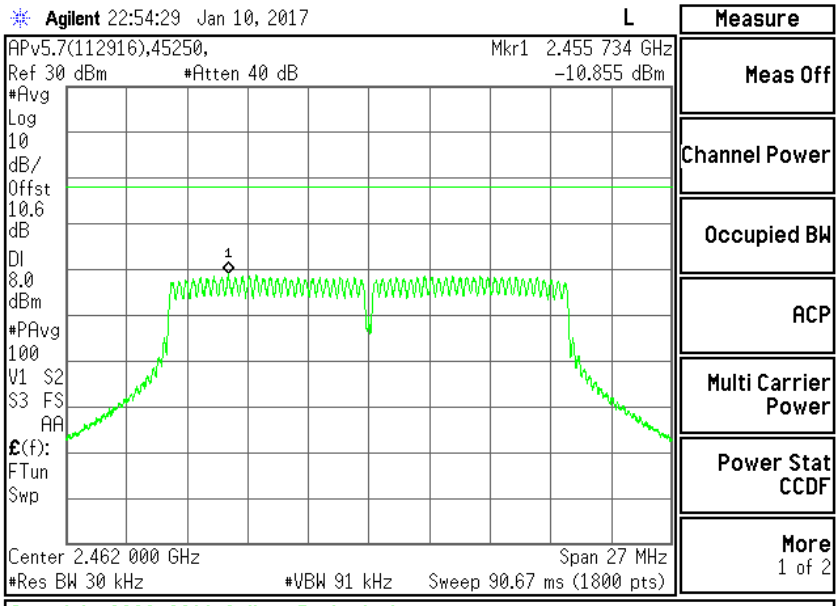
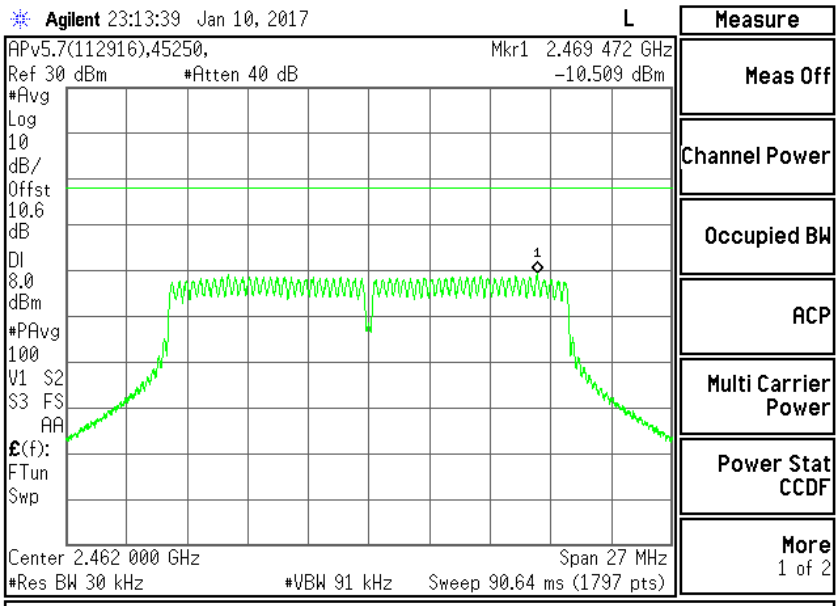
CPSD 3TX Chain 0 CDD HIGH CH



CPSD 3TX Chain 1 CDD HIGH CH



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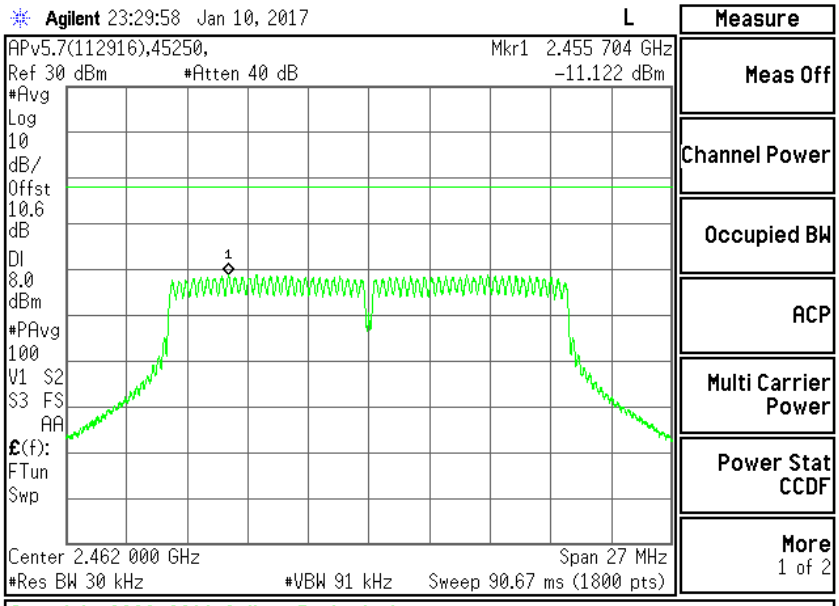
CPSD 3TX Chain 2 CDD HIGH CH



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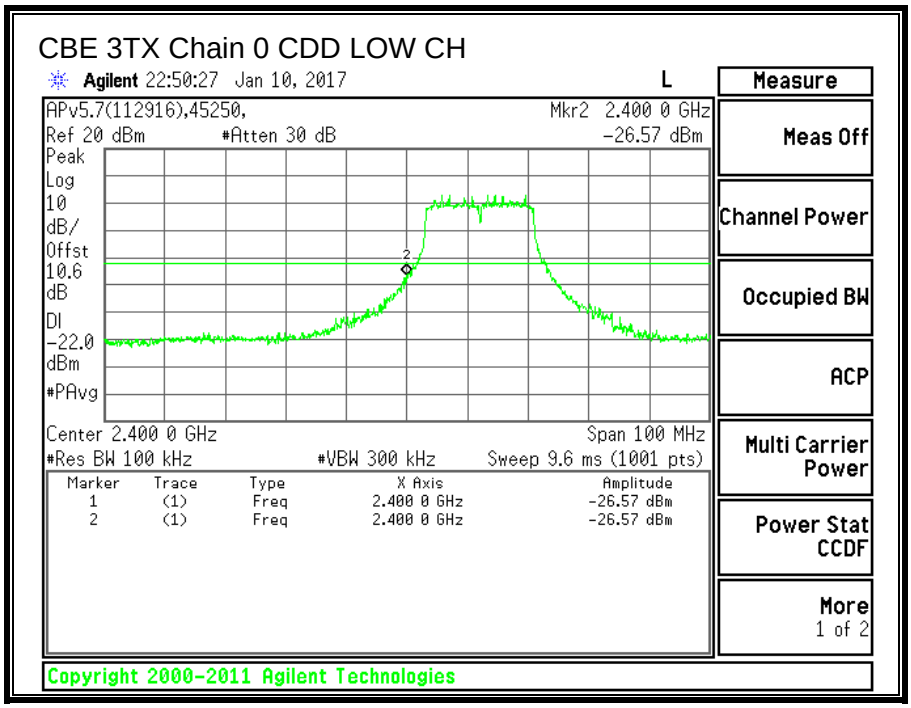
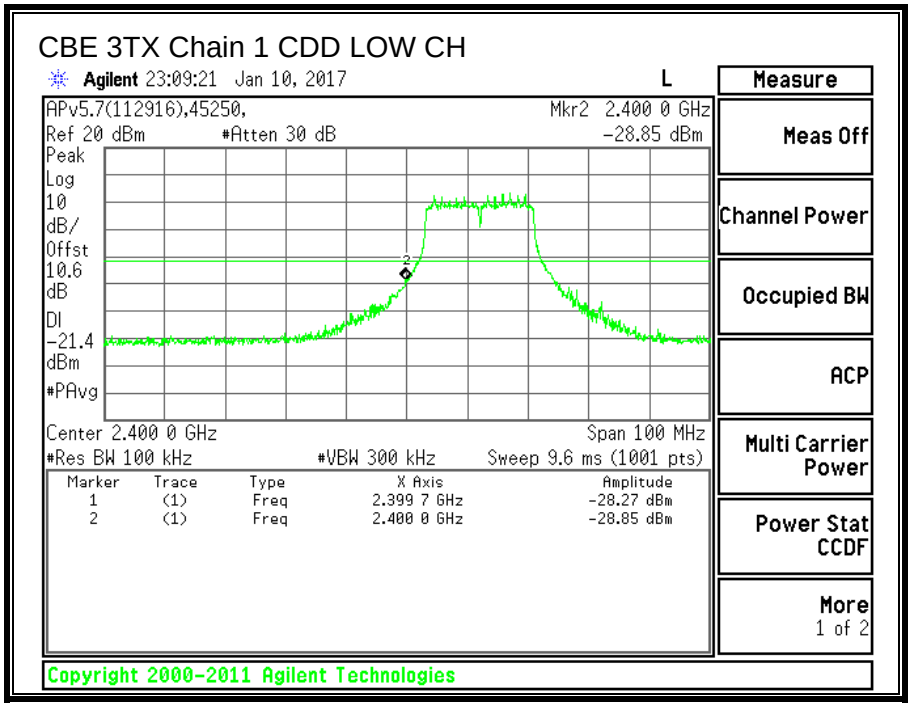
10.3.5. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS





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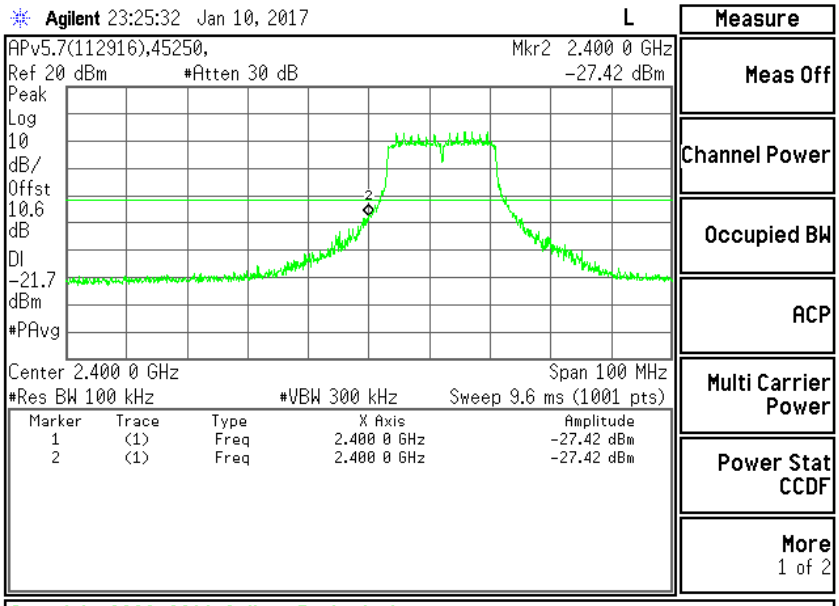
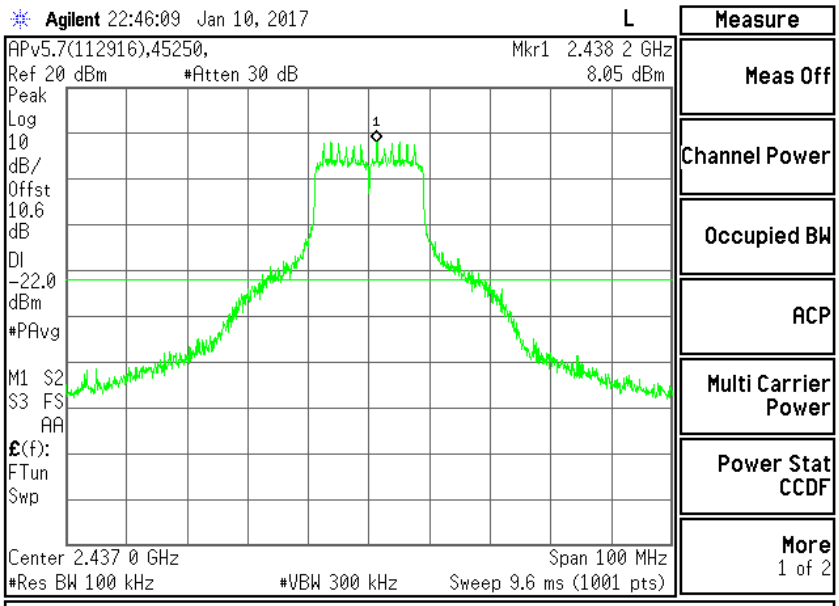
CBE 3TX Chain 2 CDD LOW CH



CBE 3TX Chain 0 CDD MID CH



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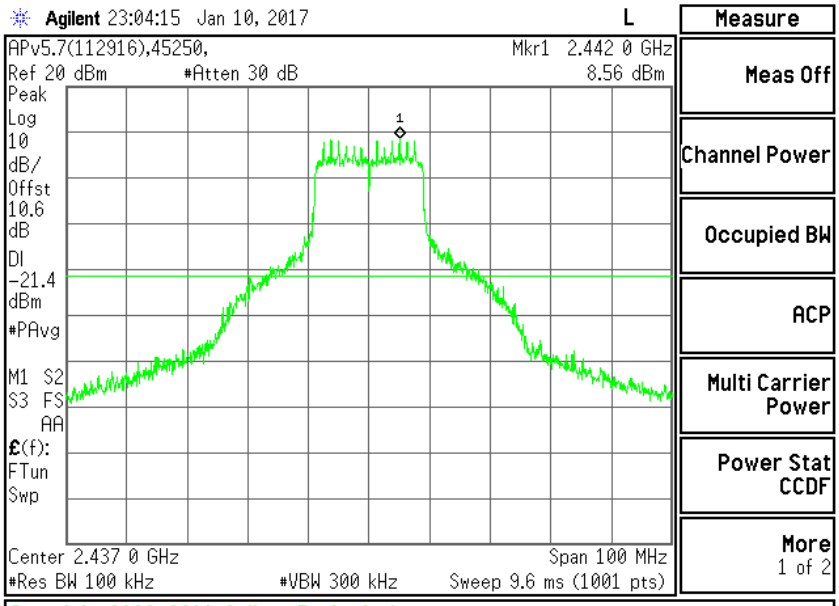
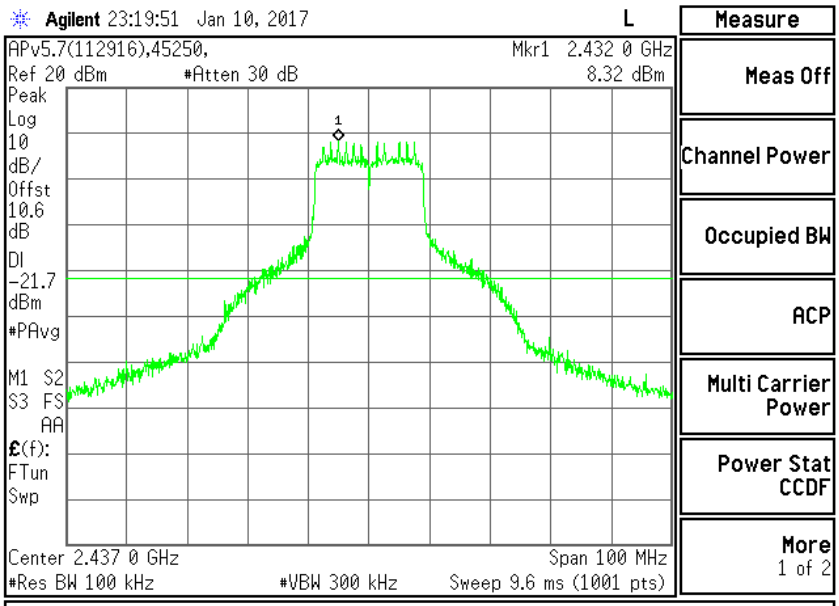
CBE 3TX Chain 1 CDD MID CH



CBE 3TX Chain 2 CDD MID CH



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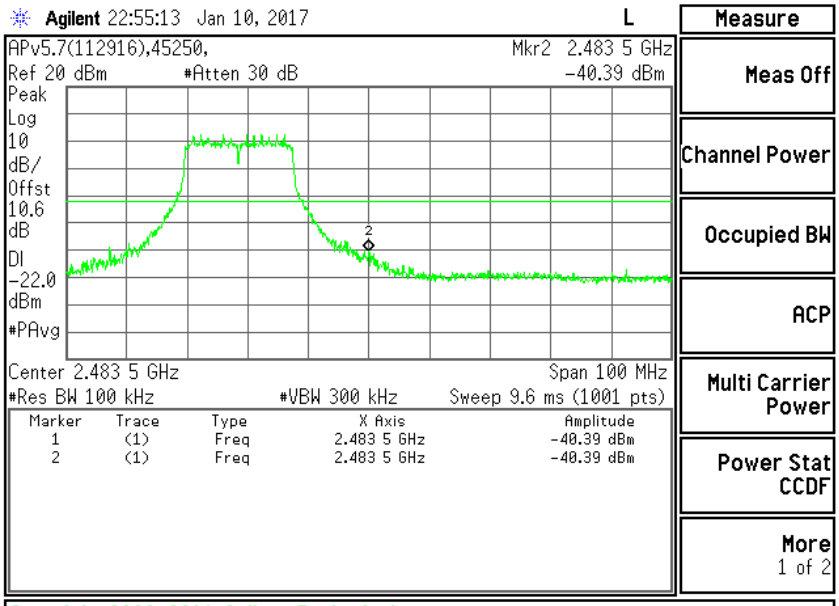
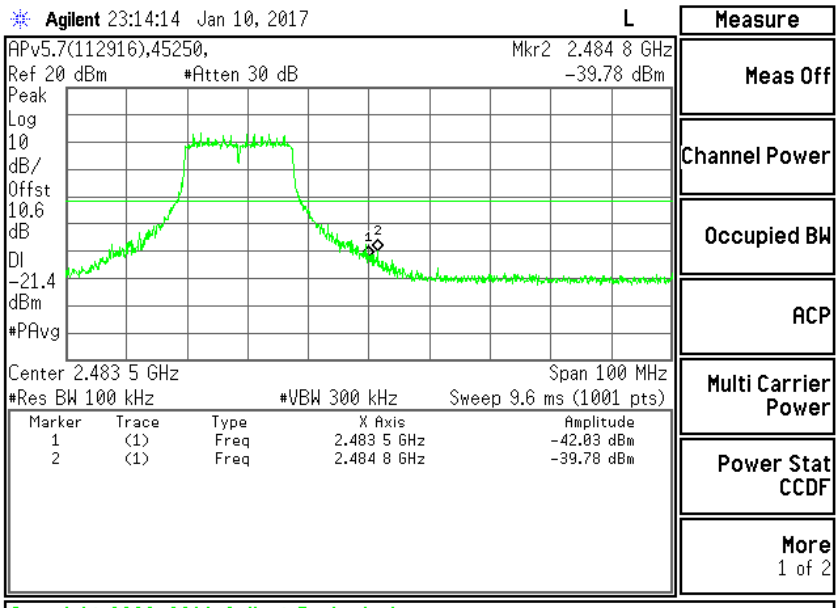
CBE 3TX Chain 0 CDD HIGH CH



CBE 3TX Chain 1 CDD HIGH CH



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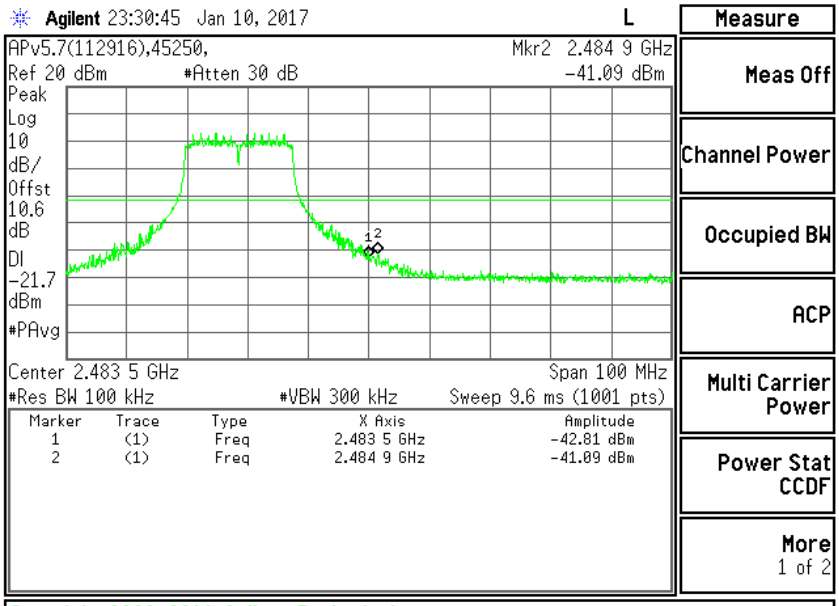
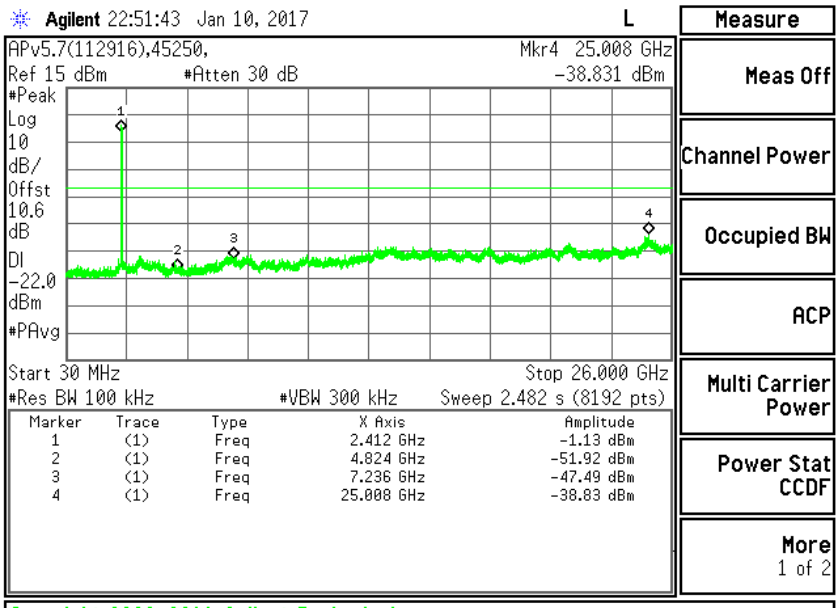
CBE 3TX Chain 2 CDD HIGH CH



CSPUR 3TX Chain 0 CDD LOW CH



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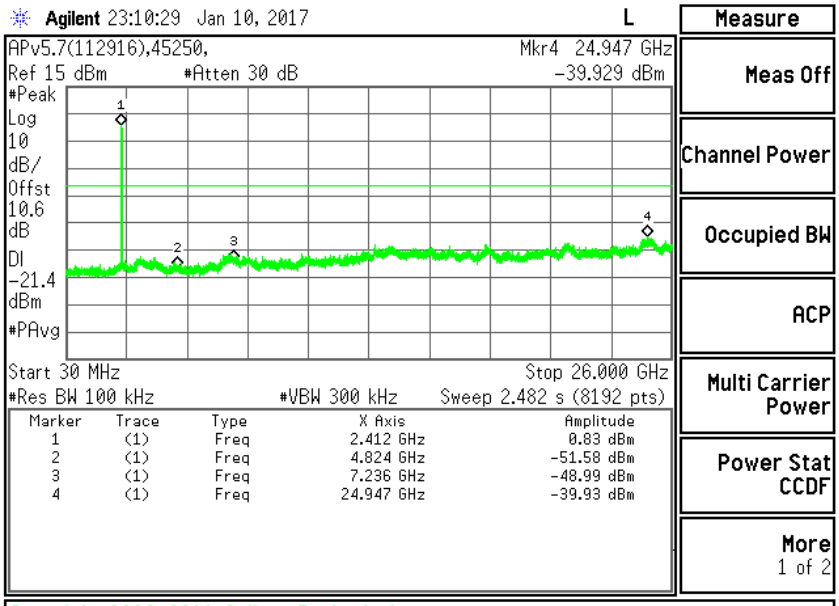
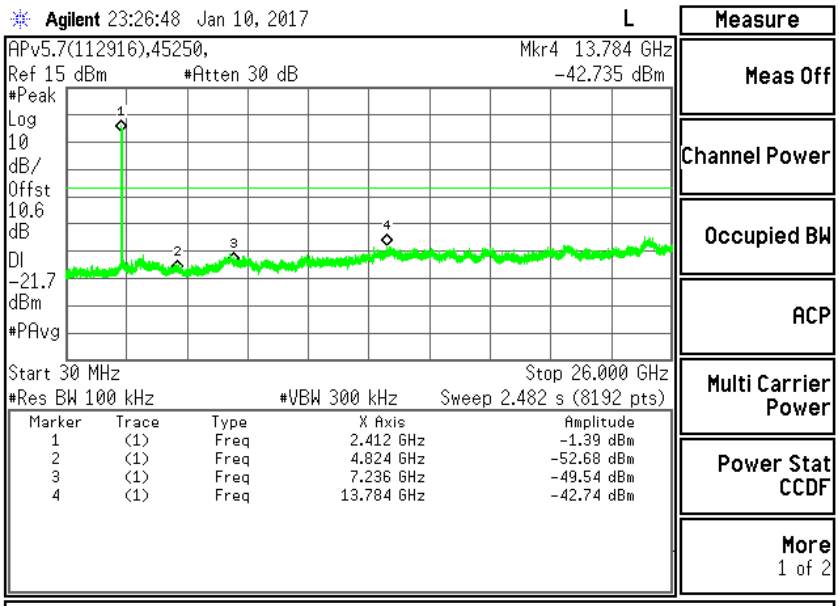
CSPUR 3TX Chain 1 CDD LOW CH



CSPUR 3TX Chain 2 CDD LOW CH



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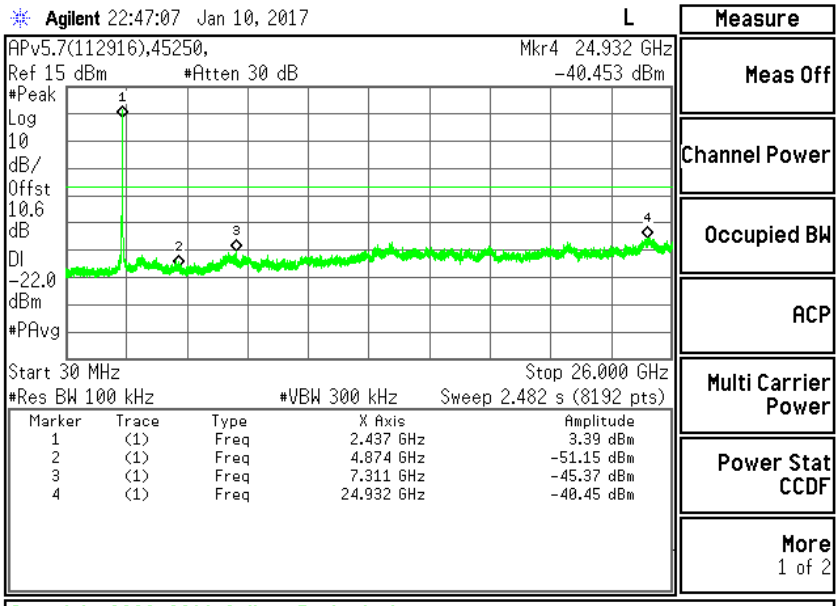
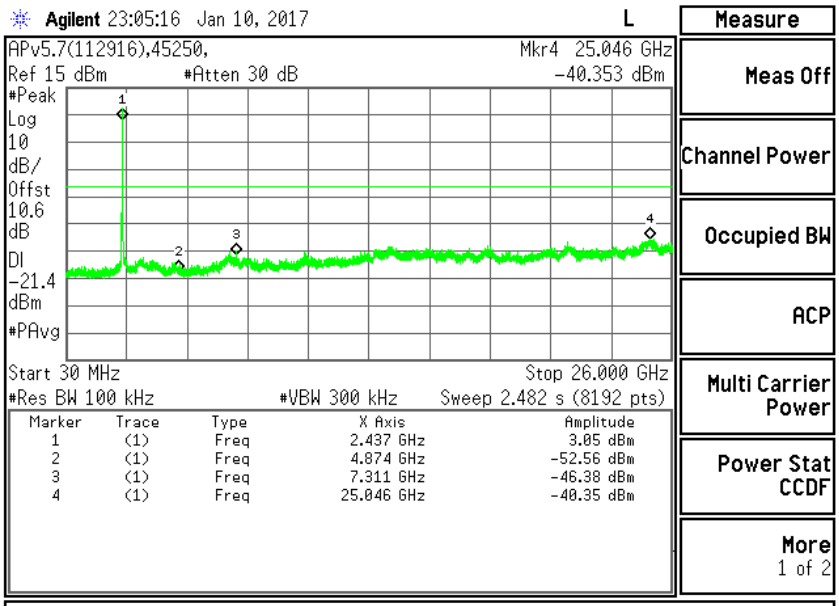
CSPUR 3TX Chain 0 CDD MID CH



CSPUR 3TX Chain 1 CDD MID CH



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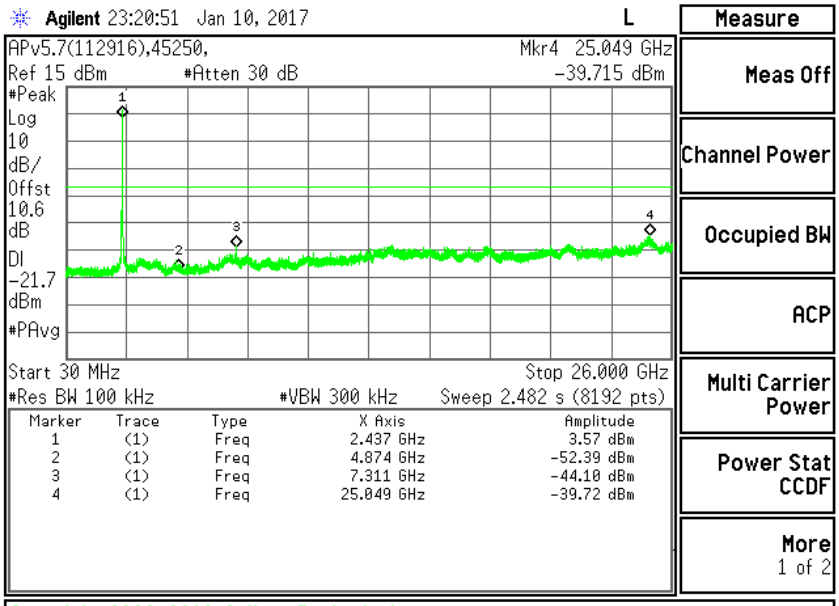
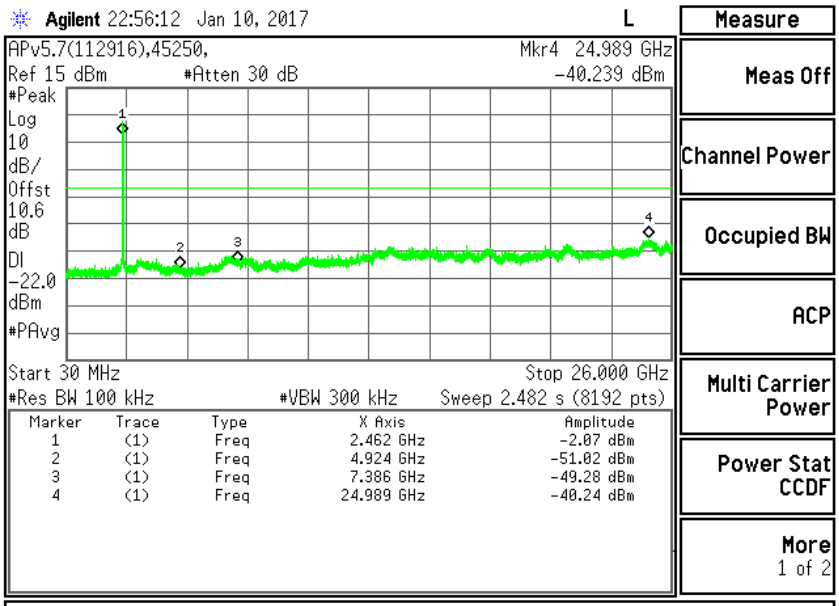
CSPUR 3TX Chain 2 CDD MID CH



CSPUR 3TX Chain 0 CDD HIGH CH



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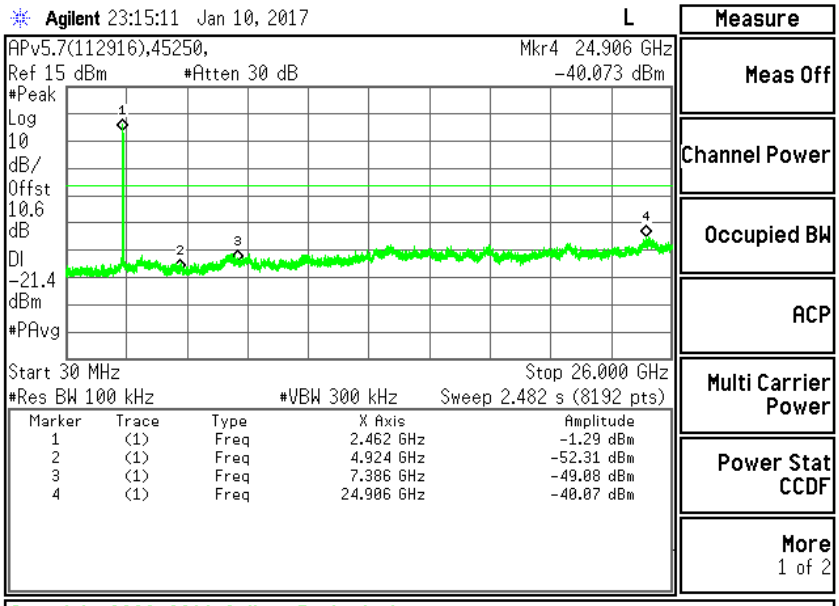
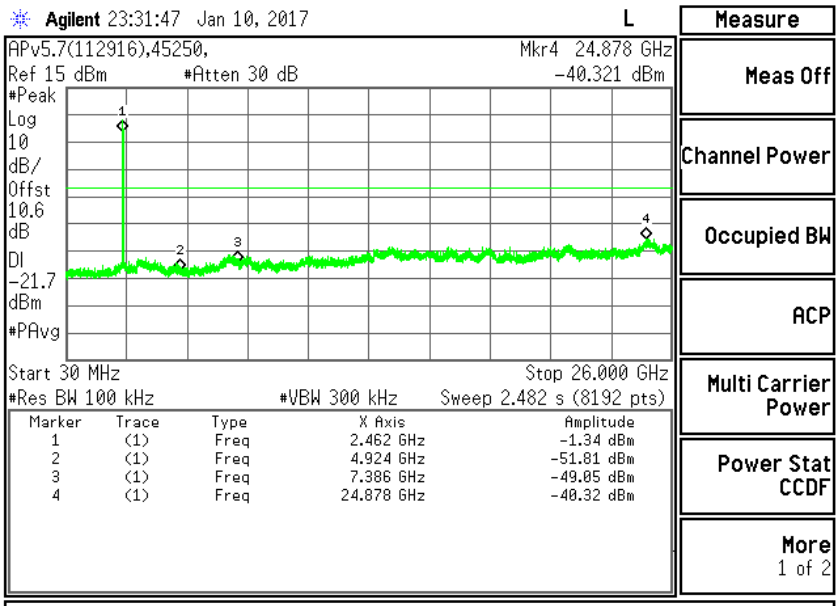
CSPUR 3TX Chain 1 CDD HIGH CH



CSPUR 3TX Chain 2 CDD HIGH CH



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11. RADIATED TEST RESULTS

11.1. 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 120 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements for the 30-1000 MHz range, 9 kHz for peak detection measurements or 9 kHz for quasi-peak detection measurements for the 0.15-30 MHz range and 200 Hz for peak detection measurements or 200 Hz for quasi-peak detection measurements for the 9 to 150 kHz range. 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.

For 2.4 GHz band, the spectrum from 9 kHz to 26 GHz is investigated with the EUT was set to transmit on the channel with higher output power as worst-case scenario.

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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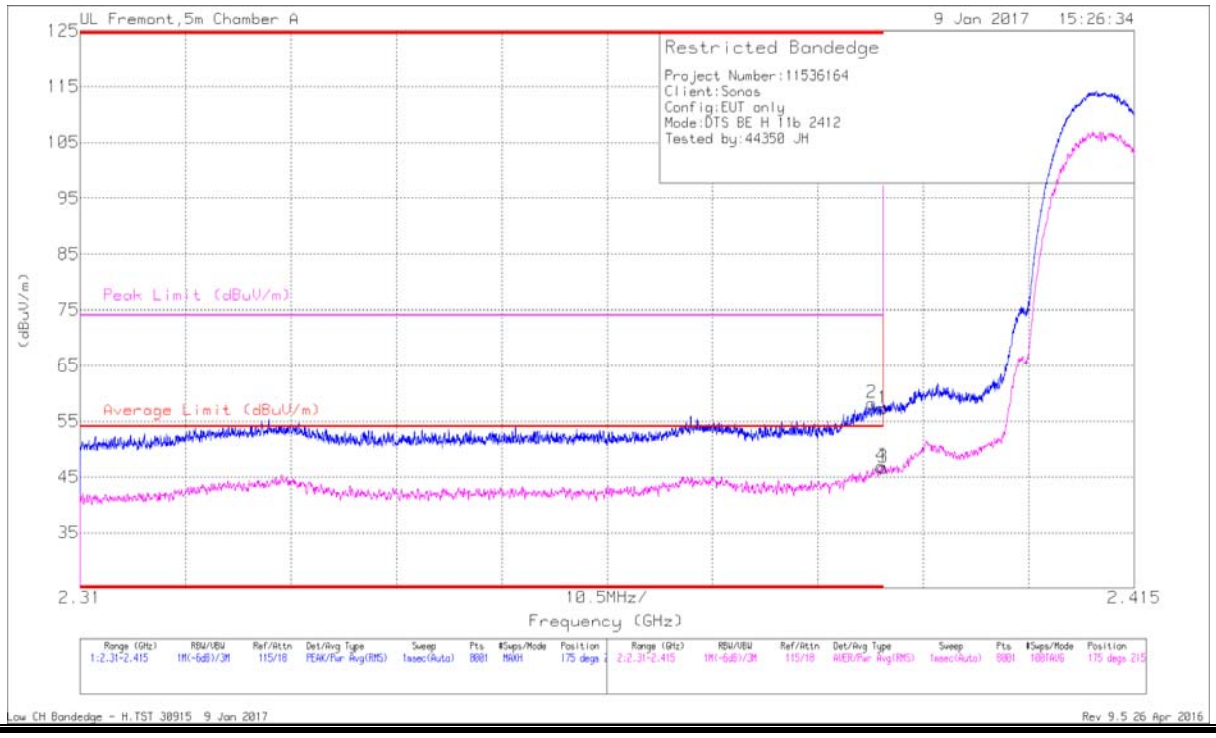
11.2. TRANSMITTER ABOVE 1 GHz

11.2.1. 11b 3TX CDD MIMO MODE IN THE 2.4GHz BAND

AUTHORIZED BANDEDGE (LOW CHANNEL, CH 1)

LOW CHANNEL HORIZONTAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	48.69	Pk	32.3	-23.7	0	57.29	-	-	74	-16.71	175	215	H
2	* 2.389	49.62	Pk	32.3	-23.7	0	58.22	-	-	74	-15.78	175	215	H
3	* 2.39	37.96	RMS	32.3	-23.7	.15	46.71	54	-7.29	-	-	175	215	H
4	* 2.39	38.13	RMS	32.3	-23.7	.15	46.88	54	-7.12	-	-	175	215	H

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector
RMS - RMS detection

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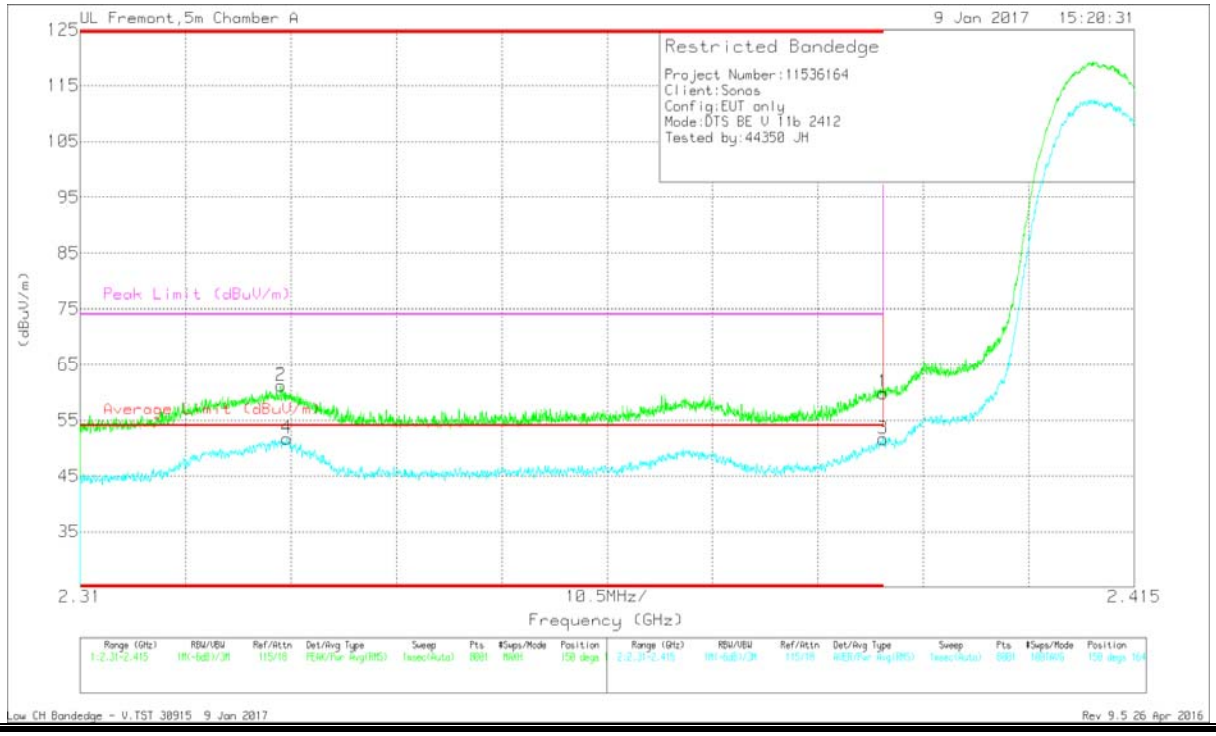
LOW CHANNEL VERTICAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	51.32	Pk	32.3	-23.7	0	59.92	-	-	74	-14.08	150	164	V
2	* 2.33	53	Pk	31.9	-23.7	0	61.2	-	-	74	-12.8	150	164	V
3	* 2.39	42.87	RMS	32.3	-23.7	.15	51.62	54	-2.38	-	-	150	164	V
4	* 2.331	43.36	RMS	31.9	-23.7	.15	51.71	54	-2.29	-	-	150	164	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector
RMS - RMS detection

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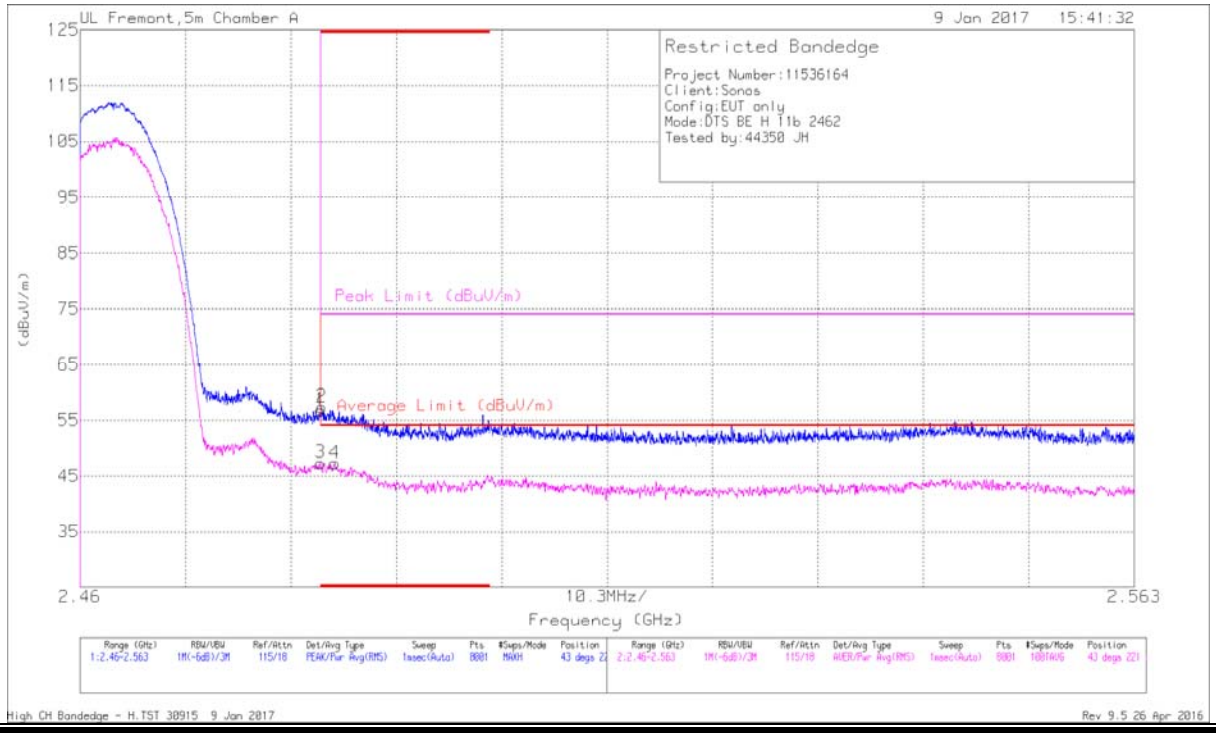
AUTHORIZED BANDEDGE (HIGH CHANNEL, CH 11)

HIGH CHANNEL HORIZONTAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	47.98	Pk	32.4	-23.6	0	56.78	-	-	74	-17.22	43	221	H
2	* 2.484	48.51	Pk	32.4	-23.6	0	57.31	-	-	74	-16.69	43	221	H
3	* 2.484	38.38	RMS	32.4	-23.6	.15	47.33	54	-6.67	-	-	43	221	H
4	* 2.485	38.42	RMS	32.4	-23.7	.15	47.27	54	-6.73	-	-	43	221	H

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector
RMS - RMS detection

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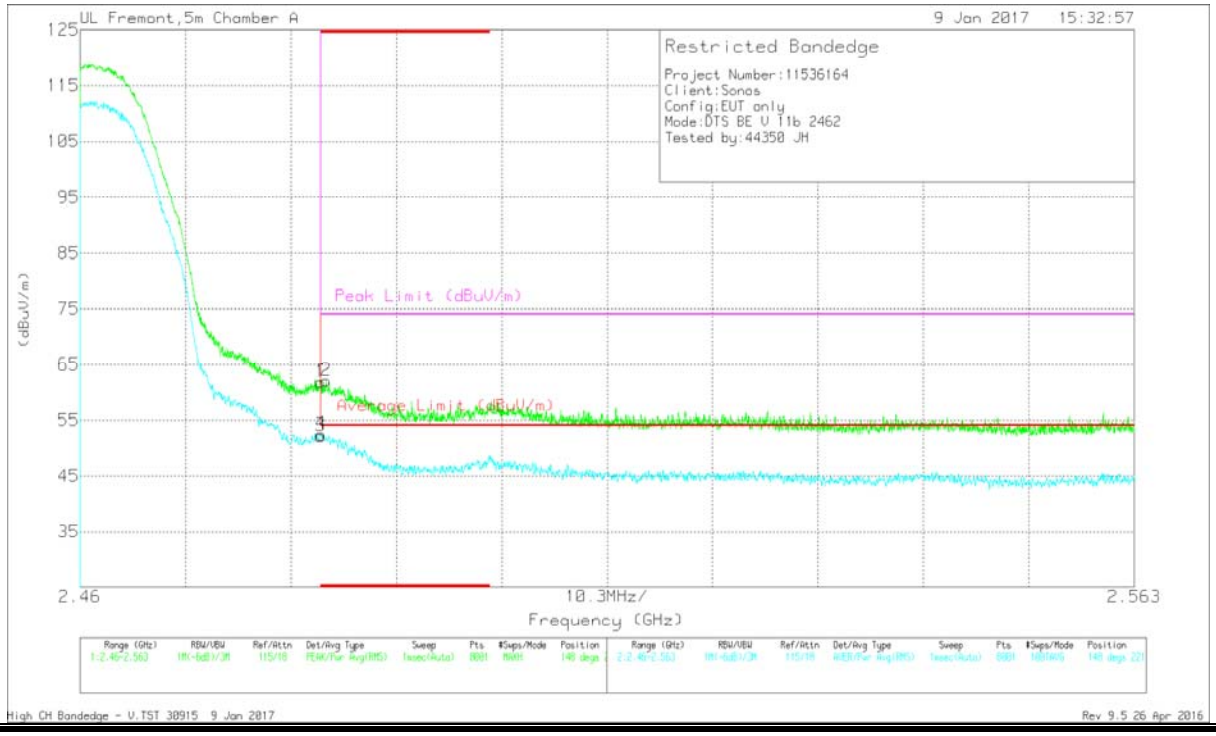
HIGH CHANNEL VERTICAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	53.03	Pk	32.4	-23.6	0	61.83	-	-	74	-12.17	148	221	V
2	* 2.484	53.25	Pk	32.4	-23.6	0	62.05	-	-	74	-11.95	148	221	V
3	* 2.484	43.25	RMS	32.4	-23.6	.15	52.2	54	-1.8	-	-	148	221	V
4	* 2.484	43.51	RMS	32.4	-23.6	.15	52.46	54	-1.54	-	-	148	221	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector
RMS - RMS detection

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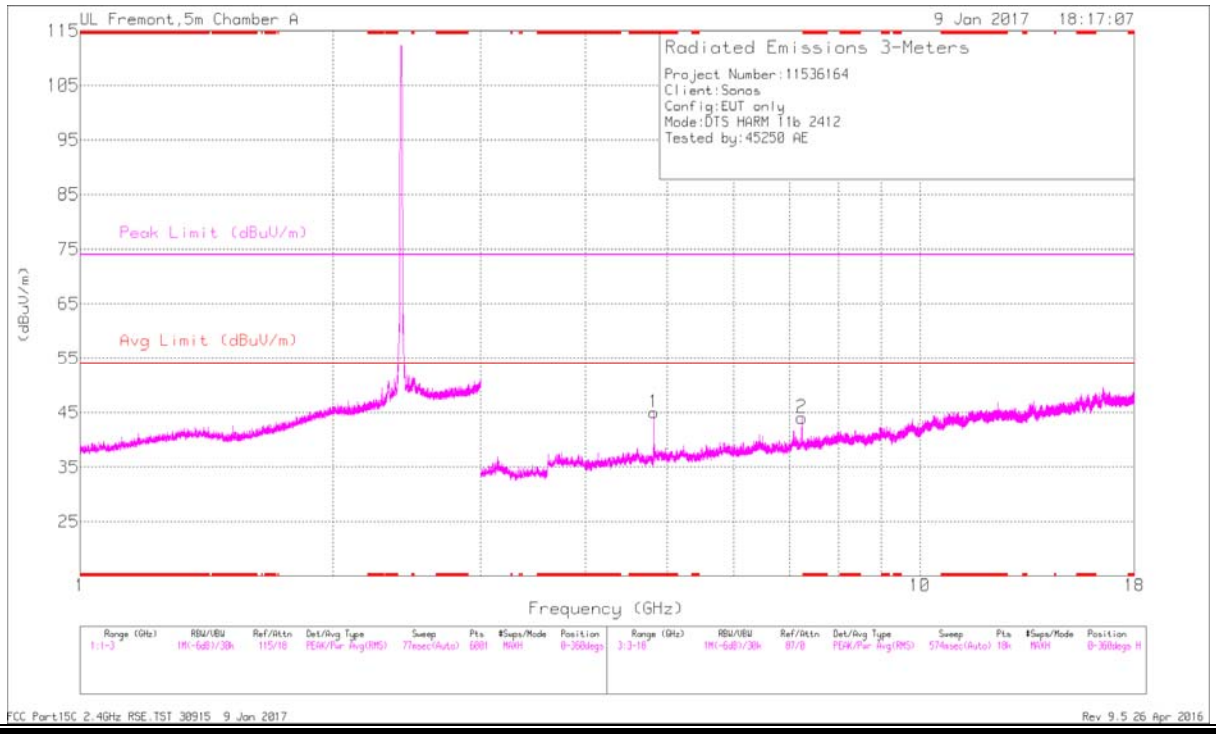
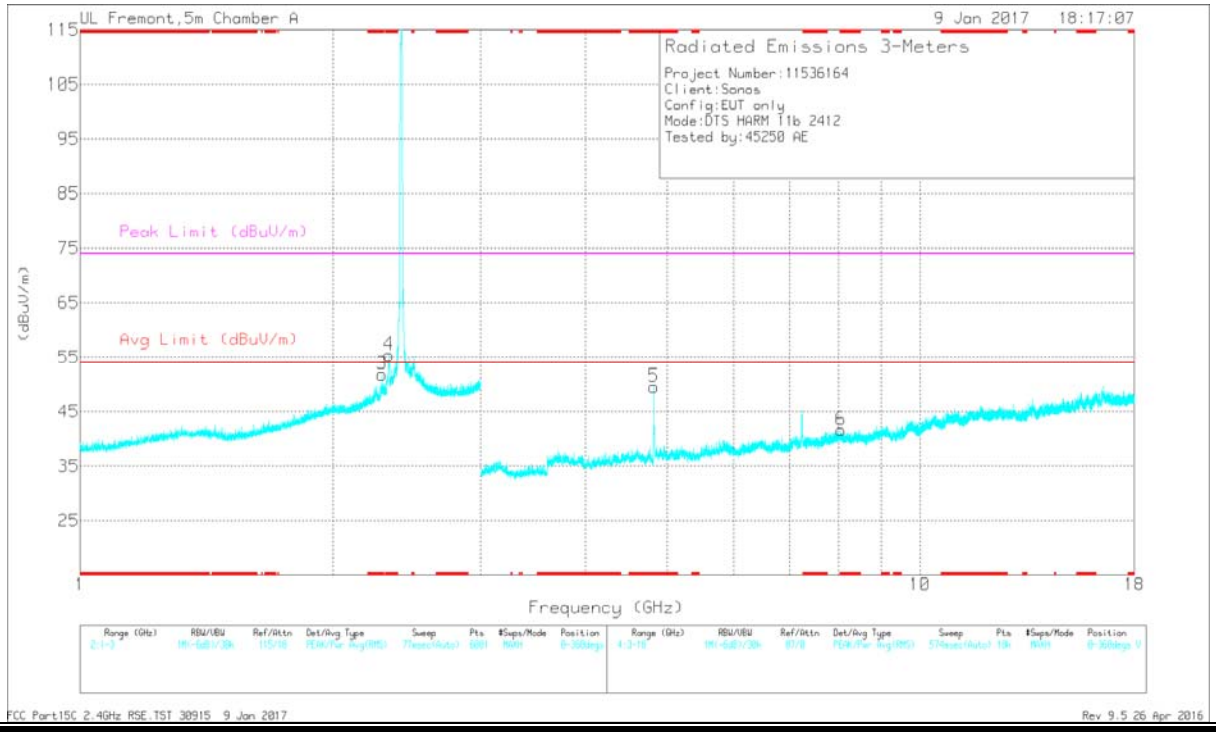
HARMONICS AND SPURIOUS EMISSIONS LOW CHANNEL, CH 1)

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



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Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	* 2.288	43.94	Pk	31.8	-23.9	0	51.84	-	-	74	-22.16	0-360	199	V
4	* 2.333	47.23	Pk	32	-23.8	0	55.43	-	-	74	-18.57	0-360	101	V
1	* 4.824	38.92	Pk	34.3	-28.2	0	45.02	-	-	74	-28.98	0-360	101	H
5	* 4.824	43.44	Pk	34.3	-28.2	0	49.54	-	-	74	-24.46	0-360	101	V
6	* 8.051	28.58	Pk	35.9	-22.8	0	41.68	-	-	74	-32.32	0-360	199	V
2	7.235	33.28	Pk	35.7	-24.9	0	44.08	-	-	-	-	0-360	101	H

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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
* 2.333	53.32	PK2	31.9	-23.8	0	61.42	-	-	74	-12.58	152	151	V
* 2.333	43.52	MAv1	31.9	-23.8	.15	51.77	54	-2.23	-	-	152	151	V
* 2.288	52.3	PK2	31.8	-23.9	0	60.2	-	-	74	-13.8	147	154	V
* 2.288	40.89	MAv1	31.8	-23.9	.15	48.94	54	-5.06	-	-	147	154	V
* 4.824	42.1	PK2	34.3	-28.2	0	48.2	-	-	74	-25.8	6	205	H
* 4.824	31.93	MAv1	34.3	-28.2	.15	38.18	54	-15.82	-	-	6	205	H
* 4.824	46.53	PK2	34.3	-28.2	0	52.63	-	-	74	-21.37	82	132	V
* 4.824	37.04	MAv1	34.3	-28.2	.15	43.29	54	-10.71	-	-	82	132	V
* 8.053	34.16	PK2	35.9	-22.7	0	47.36	-	-	74	-26.64	1	210	V
* 8.05	23.56	MAv1	35.9	-22.9	.15	36.71	54	-17.29	-	-	1	210	V
7.235	39.48	PK2	35.7	-24.9	0	50.28	-	-	-	-	349	101	H
7.237	29.81	MAv1	35.7	-24.9	.15	40.76	-	-	-	-	349	101	H

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

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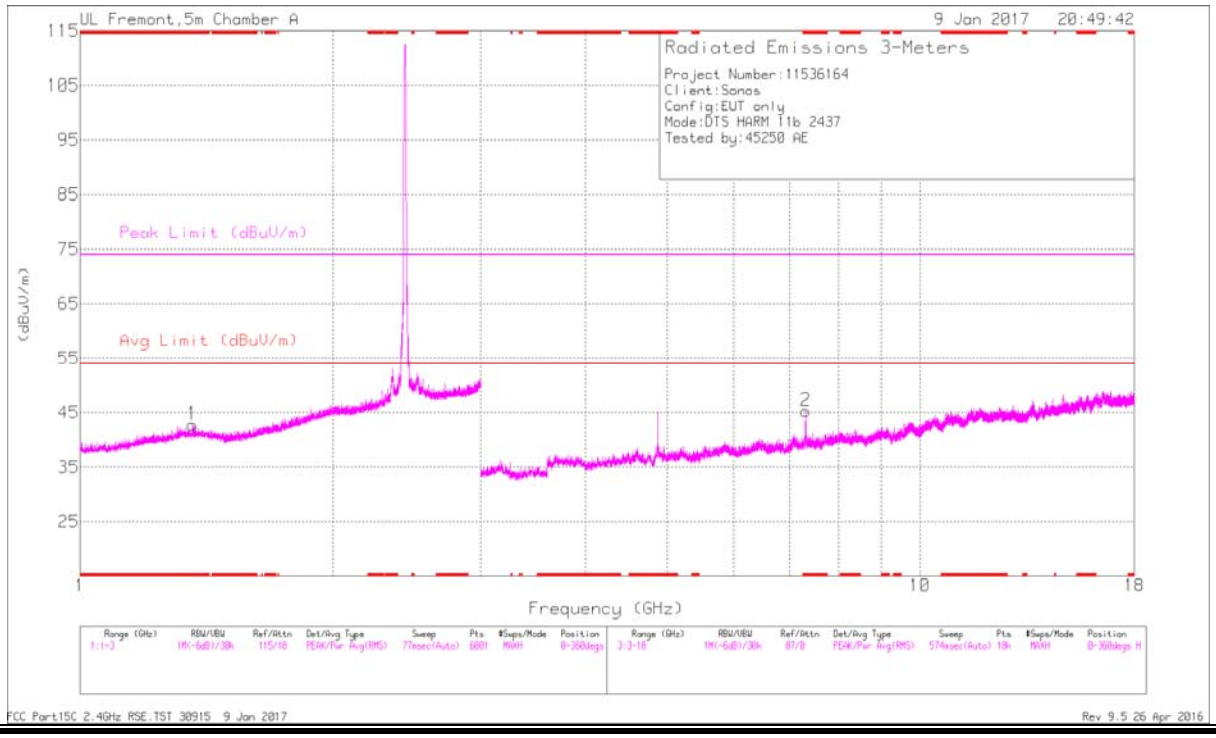
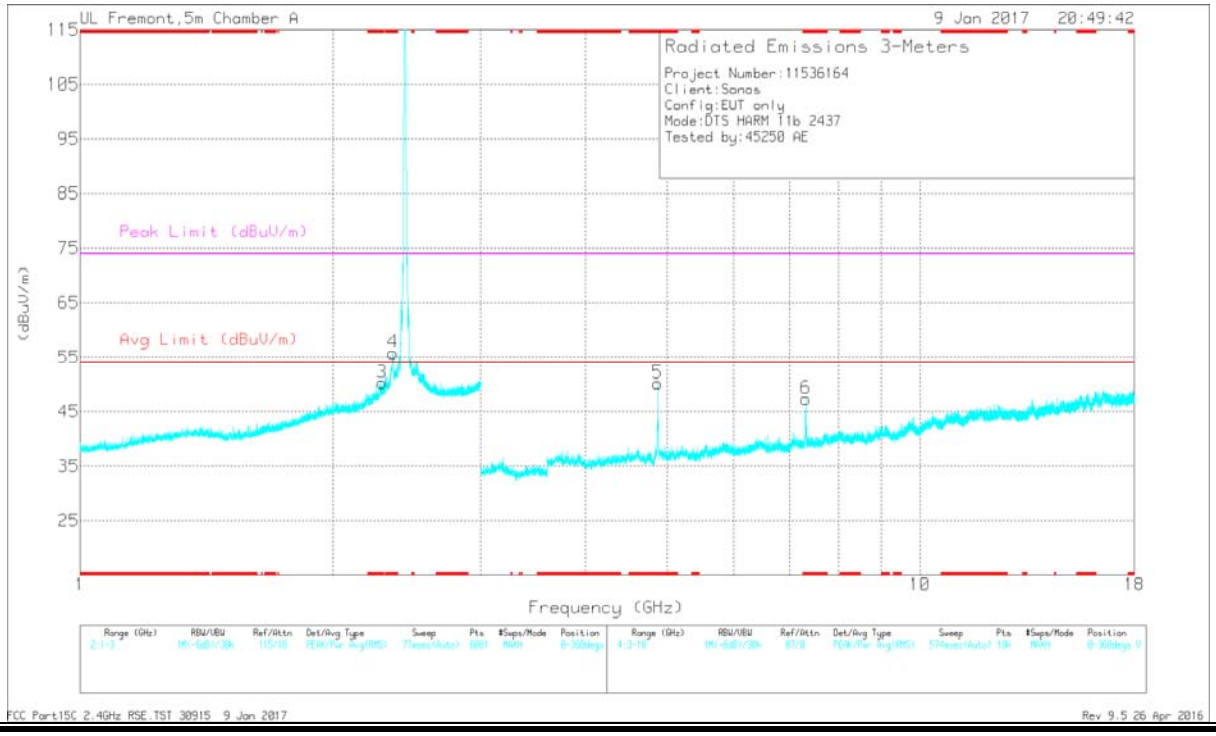
HARMONICS AND SPURIOUS EMISSIONS MID CHANNEL, CH 6)

MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL



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Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	* 1.362	37.72	Pk	29	-23.9	0	42.82	-	-	74	-31.18	0-360	101	H
3	* 2.288	42.38	Pk	31.8	-23.9	0	50.28	-	-	74	-23.72	0-360	199	V
4	* 2.359	47.43	Pk	32.1	-23.7	0	55.83	-	-	74	-18.17	0-360	99	V
2	* 7.311	34.6	Pk	35.7	-25	0	45.3	-	-	74	-28.7	0-360	101	H
5	* 4.874	43.68	Pk	34.3	-27.8	0	50.18	-	-	74	-23.82	0-360	199	V
6	* 7.311	36.66	Pk	35.7	-25	0	47.36	-	-	74	-26.64	0-360	199	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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
* 1.364	41.88	PK2	29	-23.8	0	47.08	-	-	74	-26.92	72	168	H
* 1.363	31.77	MAv1	29	-23.8	.15	37.12	54	-16.88	-	-	72	168	H
* 2.288	49.07	PK2	31.8	-23.9	0	56.97	-	-	74	-17.03	128	208	V
* 2.288	39.57	MAv1	31.8	-23.9	.15	47.62	54	-6.38	-	-	128	208	V
* 2.359	54.05	PK2	32.1	-23.7	0	62.45	-	-	74	-11.55	154	128	V
* 2.359	44.05	MAv1	32.1	-23.7	.15	52.6	54	-1.4	-	-	154	128	V
* 7.312	40.55	PK2	35.7	-25	0	51.25	-	-	74	-22.75	347	114	H
* 7.312	31.22	MAv1	35.7	-25	.15	42.07	54	-11.93	-	-	347	114	H
* 4.874	47.36	PK2	34.3	-27.8	0	53.86	-	-	74	-20.14	47	159	V
* 4.874	37.77	MAv1	34.3	-27.8	.15	44.42	54	-9.58	-	-	47	159	V
* 7.309	41.76	PK2	35.7	-25	0	52.46	-	-	74	-21.54	17	212	V
* 7.31	33.08	MAv1	35.7	-25	.15	43.93	54	-10.07	-	-	17	212	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

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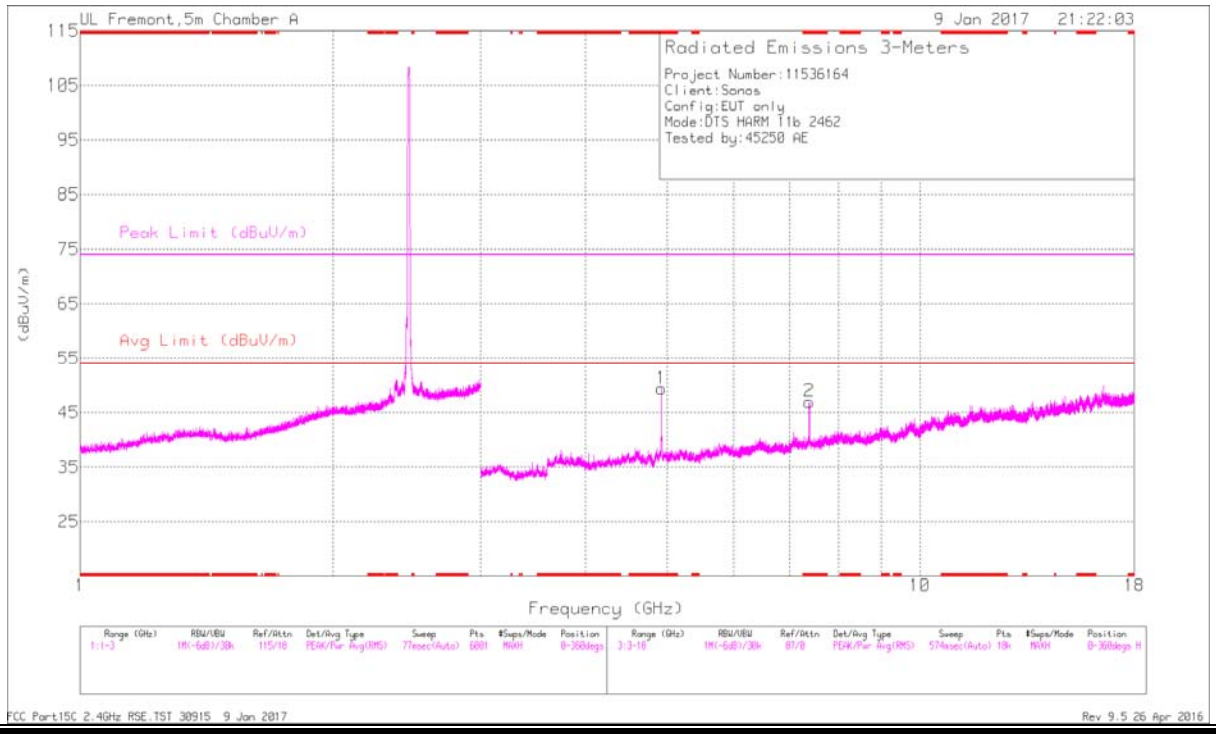
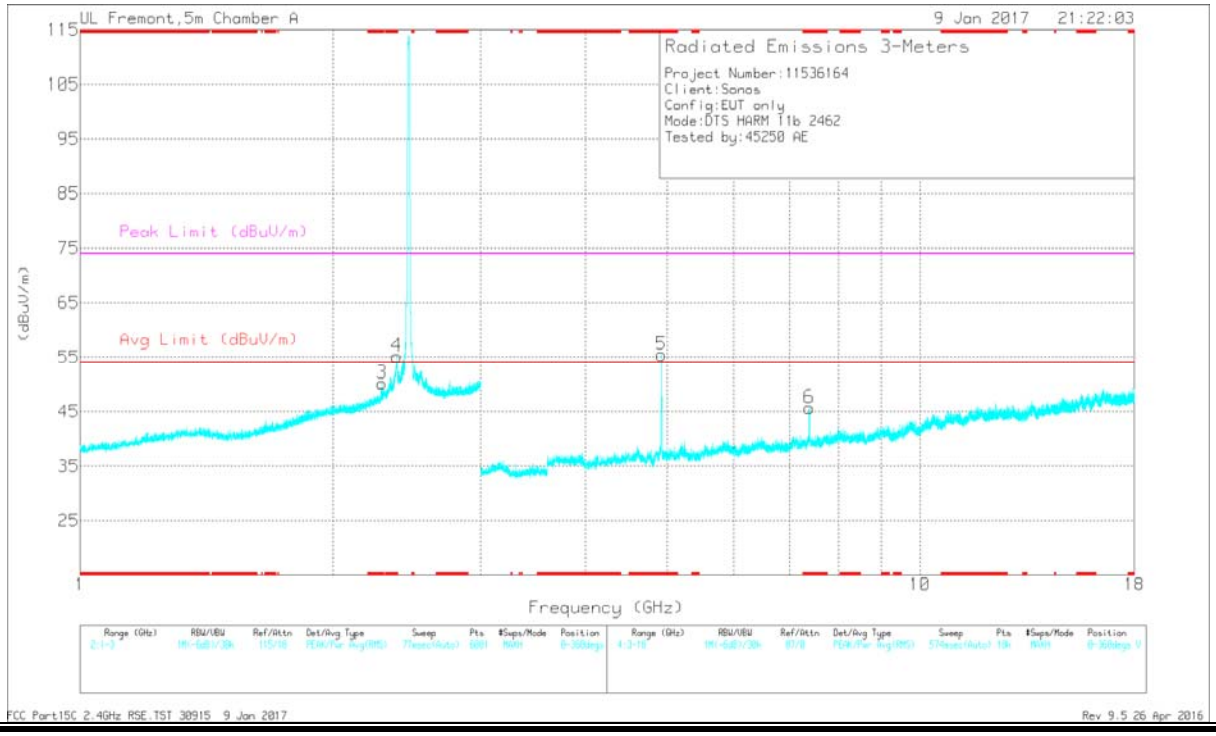
HARMONICS AND SPURIOUS EMISSIONS HIGH CHANNEL, CH 11)

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



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Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	* 2.288	42.29	Pk	31.8	-23.9	0	50.19	-	-	74	-23.81	0-360	199	V
4	* 2.384	46.69	Pk	32.2	-23.7	0	55.19	-	-	74	-18.81	0-360	101	V
1	* 4.924	42.88	Pk	34.3	-27.8	0	49.38	-	-	74	-24.62	0-360	101	H
2	* 7.384	35.17	Pk	35.7	-23.9	0	46.97	-	-	74	-27.03	0-360	101	H
5	* 4.924	48.98	Pk	34.3	-27.8	0	55.48	-	-	74	-18.52	0-360	101	V
6	* 7.384	33.88	Pk	35.7	-23.9	0	45.68	-	-	74	-28.32	0-360	101	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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
* 2.288	48.58	PK2	31.8	-23.9	0	56.48	-	-	74	-17.52	188	195	V
* 2.288	38.89	MAv1	31.8	-23.9	.15	46.94	54	-7.06	-	-	188	195	V
* 2.384	52.2	PK2	32.2	-23.7	0	60.7	-	-	74	-13.3	286	106	V
* 2.384	42.69	MAv1	32.2	-23.7	.15	51.34	54	-2.66	-	-	286	106	V
* 4.924	44.62	PK2	34.3	-27.8	0	51.12	-	-	74	-22.88	4	284	H
* 4.924	36.64	MAv1	34.3	-27.8	.15	43.29	54	-10.71	-	-	4	284	H
* 7.384	40.49	PK2	35.7	-23.9	0	52.29	-	-	74	-21.71	25	140	H
* 7.385	30.76	MAv1	35.7	-23.9	.15	42.71	54	-11.29	-	-	25	140	H
* 4.924	51.11	PK2	34.3	-27.8	0	57.61	-	-	74	-16.39	301	112	V
* 4.924	42.26	MAv1	34.3	-27.8	.15	48.91	54	-5.09	-	-	301	112	V
* 7.384	39.76	PK2	35.7	-23.9	0	51.56	-	-	74	-22.44	1	223	V
* 7.385	30.62	MAv1	35.7	-23.9	.15	42.57	54	-11.43	-	-	1	223	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

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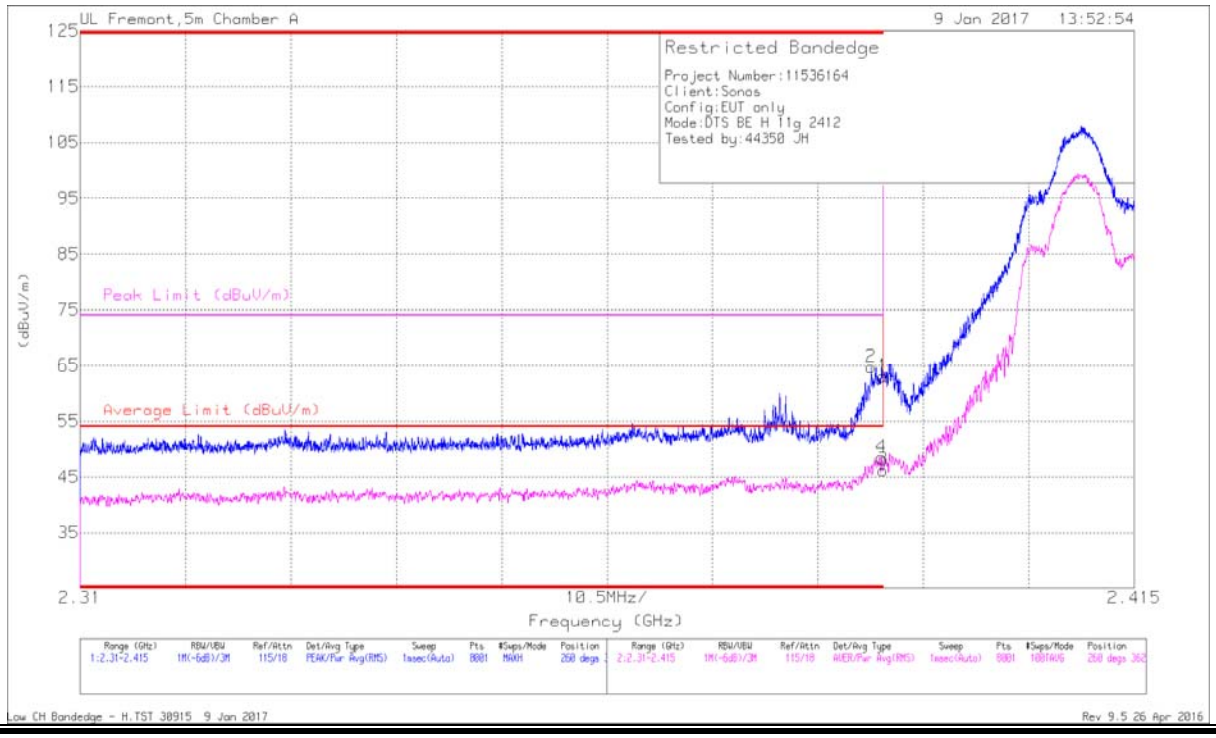
11.2.2. 11g 3TX CDD MIMO MODE IN THE 2.4GHz BAND

AUTHORIZED BANDEDGE (LOW CHANNEL, CH 1)

LOW CHANNEL HORIZONTAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	54.44	Pk	32.3	-23.7	0	63.04	-	-	74	-10.96	260	362	H
2	* 2.389	56.14	Pk	32.3	-23.7	0	64.74	-	-	74	-9.26	260	362	H
3	* 2.39	37.21	RMS	32.3	-23.7	.4	46.21	54	-7.79	-	-	260	362	H
4	* 2.39	39.49	RMS	32.3	-23.7	.4	48.49	54	-5.51	-	-	260	362	H

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector
RMS - RMS detection

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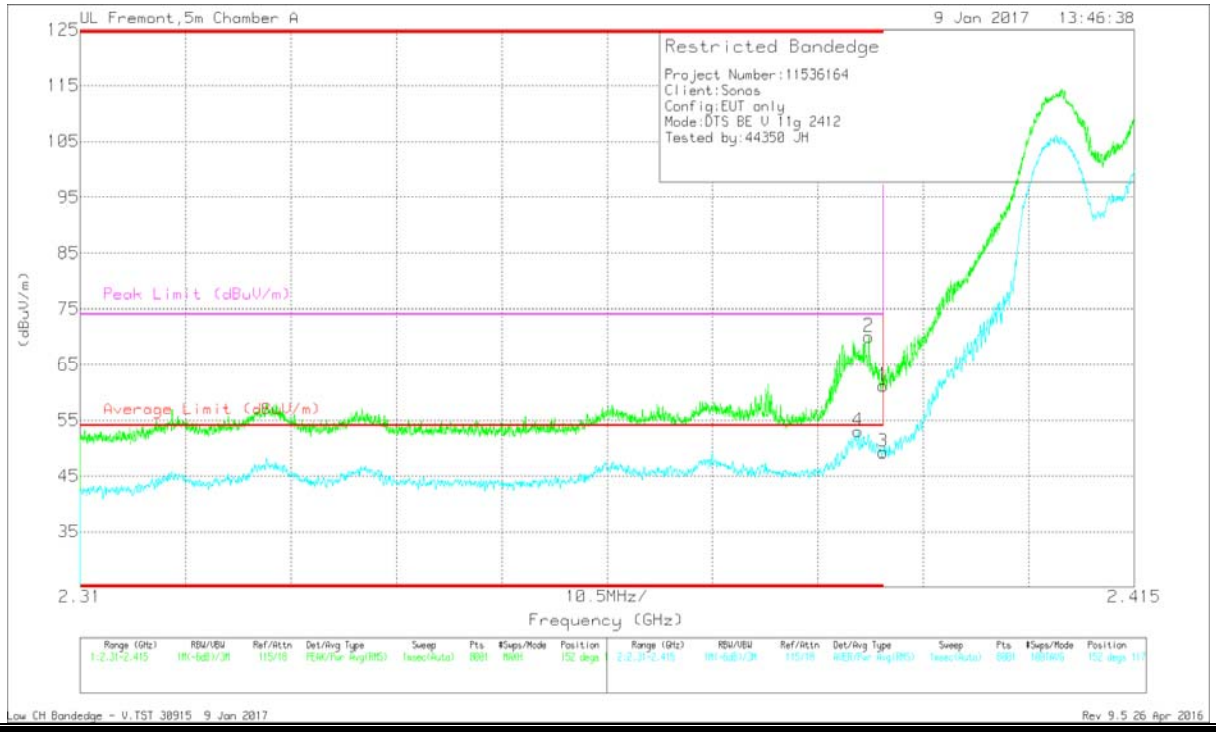
LOW CHANNEL VERTICAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	52.62	Pk	32.3	-23.7	0	61.22	-	-	74	-12.78	152	117	V
2	* 2.389	61.42	Pk	32.3	-23.7	0	70.02	-	-	74	-3.98	152	117	V
3	* 2.39	40.3	RMS	32.3	-23.7	.4	49.3	54	-4.7	-	-	152	117	V
4	* 2.388	44.05	RMS	32.3	-23.7	.4	53.05	54	-.95	-	-	152	117	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector
RMS - RMS detection

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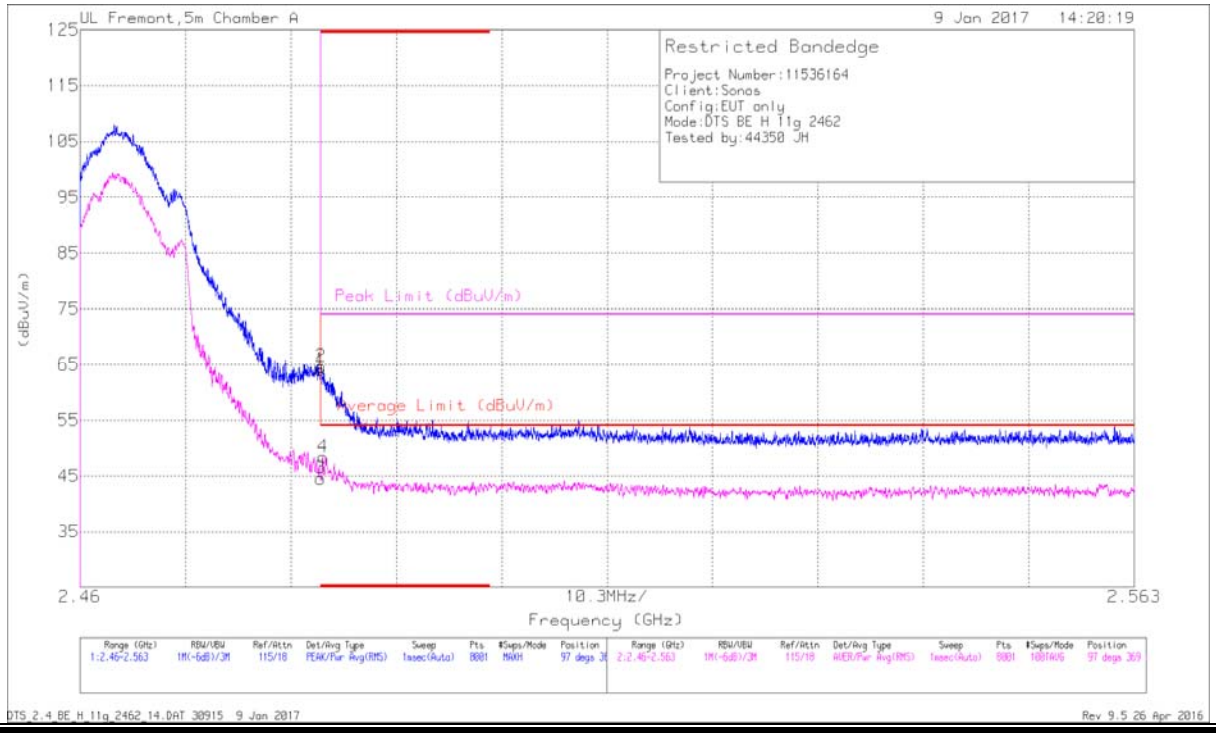
AUTHORIZED BANDEDGE (HIGH CHANNEL, CH 11)

HIGH CHANNEL HORIZONTAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	55.21	Pk	32.4	-23.6	0	64.01	-	-	74	-9.99	97	369	H
2	* 2.484	55.77	Pk	32.4	-23.6	0	64.57	-	-	74	-9.43	97	369	H
3	* 2.484	35.34	RMS	32.4	-23.6	.4	44.54	54	-9.46	-	-	97	369	H
4	* 2.484	39.18	RMS	32.4	-23.6	.4	48.38	54	-5.62	-	-	97	369	H

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector
RMS - RMS detection

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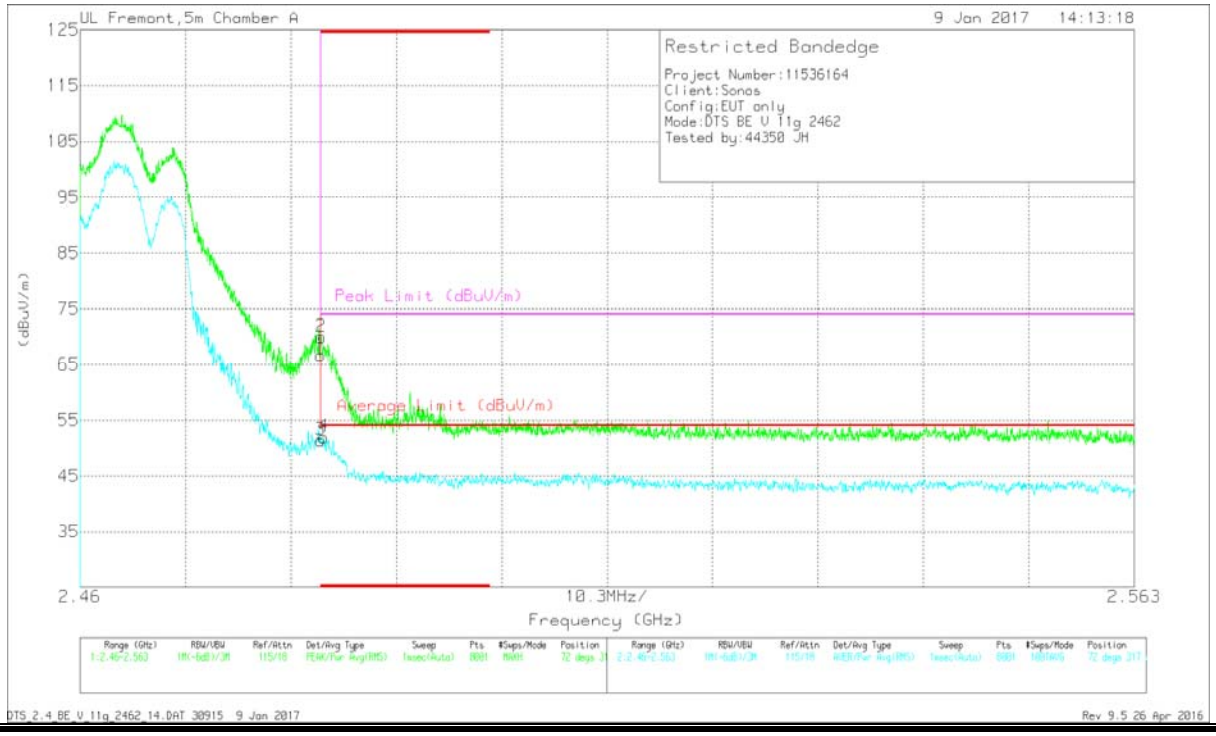
HIGH CHANNEL VERTICAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	57.92	Pk	32.4	-23.6	0	66.72	-	-	74	-7.28	72	317	V
2	* 2.484	61.15	Pk	32.4	-23.6	0	69.95	-	-	74	-4.05	72	317	V
3	* 2.484	42.19	RMS	32.4	-23.6	.4	51.39	54	-2.61	-	-	72	317	V
4	* 2.484	42.78	RMS	32.4	-23.6	.4	51.98	54	-2.02	-	-	72	317	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector
RMS - RMS detection

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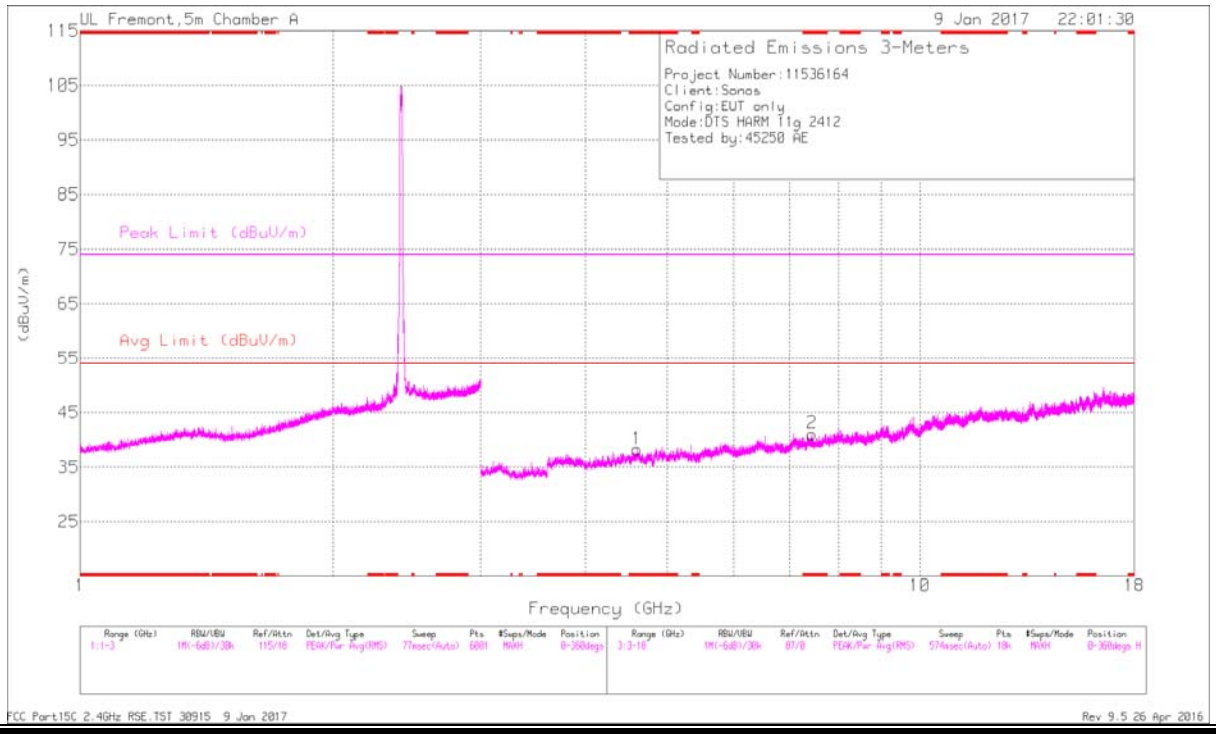
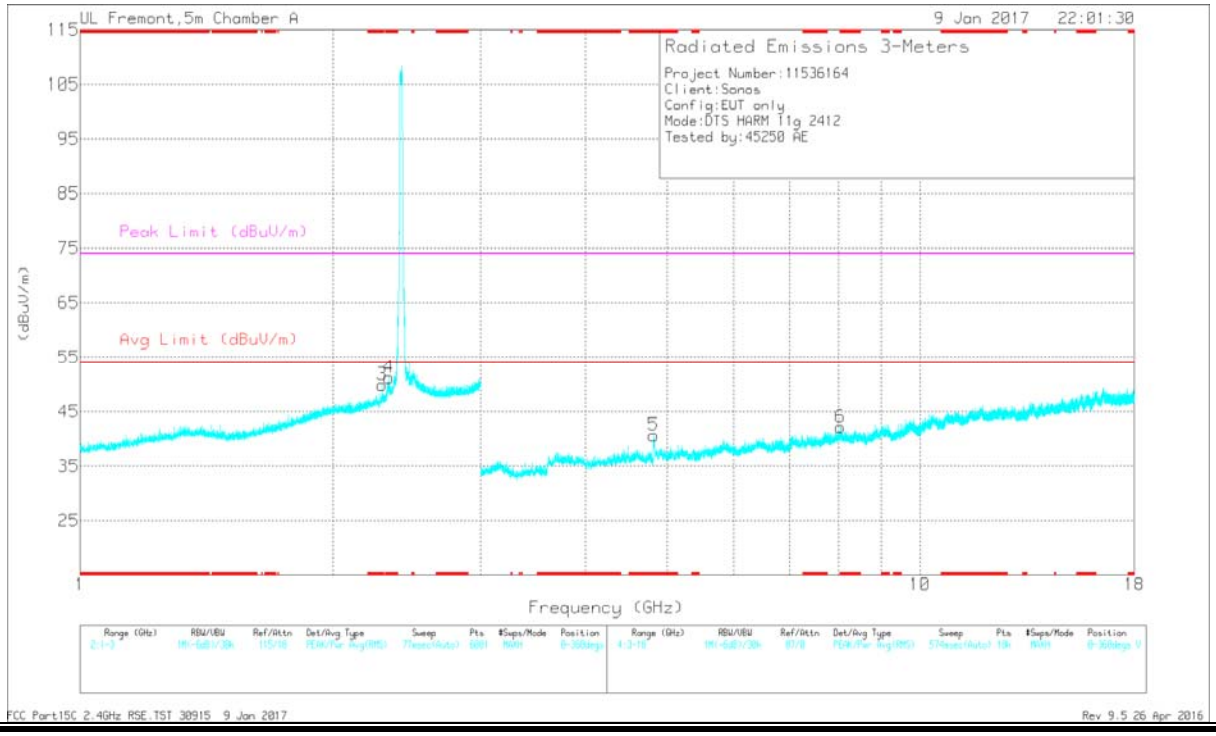
HARMONICS AND SPURIOUS EMISSIONS LOW CHANNEL, CH 1)

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



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Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	* 2.288	42	Pk	31.8	-23.9	0	49.9	-	-	74	-24.1	0-360	199	V
4	* 2.331	43.02	Pk	31.9	-23.7	0	51.22	-	-	74	-22.78	0-360	199	V
1	* 4.602	32.29	Pk	34.4	-28.4	0	38.29	-	-	74	-35.71	0-360	101	H
2	* 7.442	28.49	Pk	35.8	-23.2	0	41.09	-	-	74	-32.91	0-360	101	H
5	* 4.82	34.64	Pk	34.3	-28.3	0	40.64	-	-	74	-33.36	0-360	101	V
6	* 8.047	29.24	Pk	35.9	-23	0	42.14	-	-	74	-31.86	0-360	101	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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
* 2.288	48.32	PK2	31.8	-23.9	0	56.22	-	-	74	-17.78	135	153	V
* 2.288	37.91	MAv1	31.8	-23.9	.4	46.21	54	-7.79	-	-	135	153	V
* 2.331	49.73	PK2	31.9	-23.7	0	57.93	-	-	74	-16.07	175	196	V
* 2.331	38.69	MAv1	31.9	-23.7	.4	47.29	54	-6.71	-	-	175	196	V
* 4.602	37.29	PK2	34.4	-28.4	0	43.29	-	-	74	-30.71	348	120	H
* 4.602	27.9	MAv1	34.4	-28.4	.4	34.3	54	-19.7	-	-	348	120	H
* 7.442	33.57	PK2	35.8	-23.2	0	46.17	-	-	74	-27.83	358	106	H
* 7.444	23.53	MAv1	35.8	-23.2	.4	36.53	54	-17.47	-	-	358	106	H
* 4.82	41.91	PK2	34.3	-28.3	0	47.91	-	-	74	-26.09	87	119	V
* 4.82	30.15	MAv1	34.3	-28.3	.4	36.55	54	-17.45	-	-	87	119	V
* 8.046	33.37	PK2	35.9	-23.1	0	46.17	-	-	74	-27.83	10	215	V
* 8.047	24	MAv1	35.9	-23.1	.4	37.2	54	-16.8	-	-	10	215	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

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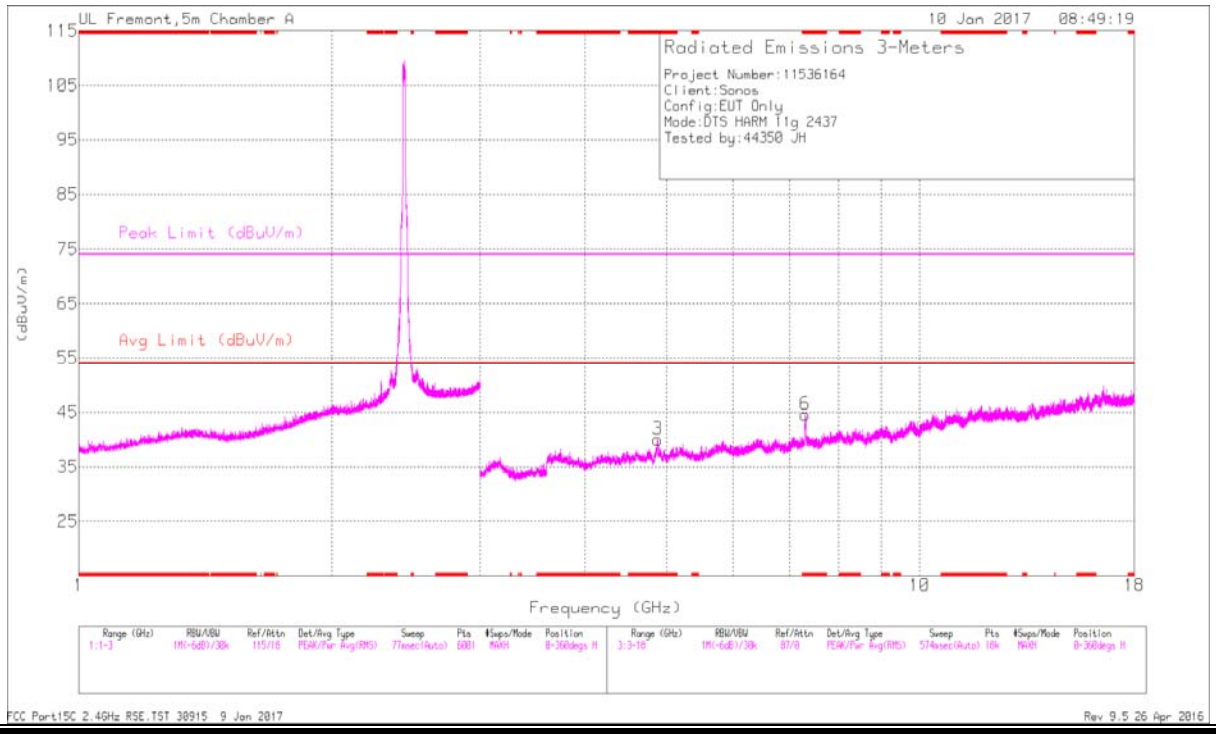
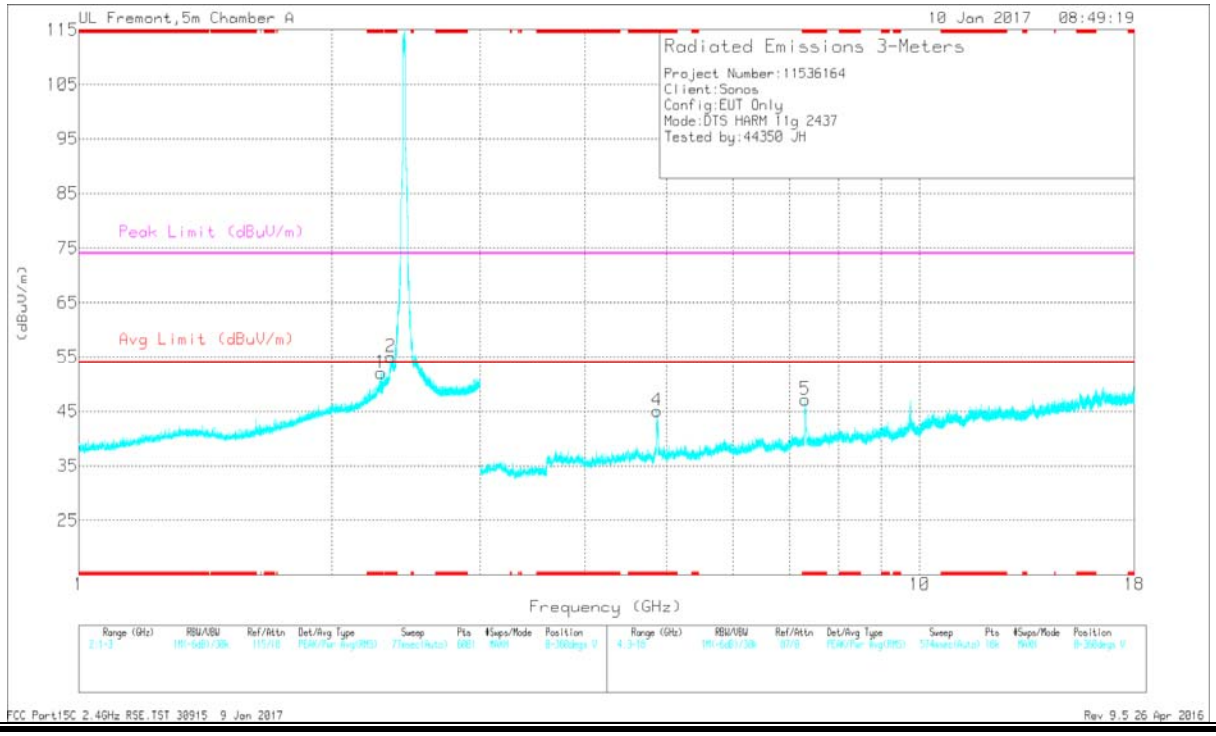
HARMONICS AND SPURIOUS EMISSIONS MID CHANNEL, CH 6)

MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL



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Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	* 2.288	44.23	Pk	31.8	-23.9	0	52.13	-	-	74	-21.87	0-360	199	V
2	* 2.35	46.72	Pk	32	-23.7	0	55.02	-	-	74	-18.98	0-360	101	V
3	* 4.876	33.5	Pk	34.3	-27.8	0	40	-	-	74	-34	0-360	199	H
6	* 7.311	33.89	Pk	35.7	-25	0	44.59	-	-	74	-29.41	0-360	199	H
4	* 4.874	38.64	Pk	34.3	-27.8	0	45.14	-	-	74	-28.86	0-360	101	V
5	* 7.314	36.4	Pk	35.7	-25	0	47.1	-	-	74	-26.9	0-360	101	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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
* 2.288	49.4	PK2	31.8	-23.9	0	57.3	-	-	74	-16.7	42	198	V
* 2.288	39.83	MAv1	31.8	-23.9	.4	48.13	54	-5.87	-	-	42	198	V
* 2.351	54.57	PK2	32	-23.7	0	62.87	-	-	74	-11.13	152	159	V
* 2.349	42.92	MAv1	32	-23.8	.4	51.52	54	-2.48	-	-	152	159	V
* 4.874	41.71	PK2	34.3	-27.8	0	48.21	-	-	74	-25.79	41	181	H
* 4.874	30.39	MAv1	34.3	-27.8	.4	37.29	54	-16.71	-	-	41	181	H
* 7.31	43.21	PK2	35.7	-25	0	53.91	-	-	74	-20.09	13	111	H
* 7.311	31.28	MAv1	35.7	-25	.4	42.38	54	-11.62	-	-	13	111	H
* 4.875	47.55	PK2	34.3	-27.8	0	54.05	-	-	74	-19.95	76	102	V
* 4.874	36.99	MAv1	34.3	-27.8	.4	43.89	54	-10.11	-	-	76	102	V
* 7.304	41.74	PK2	35.7	-25	0	52.44	-	-	74	-21.56	192	139	V
* 7.314	29.93	MAv1	35.7	-25	.4	41.03	54	-12.97	-	-	192	139	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

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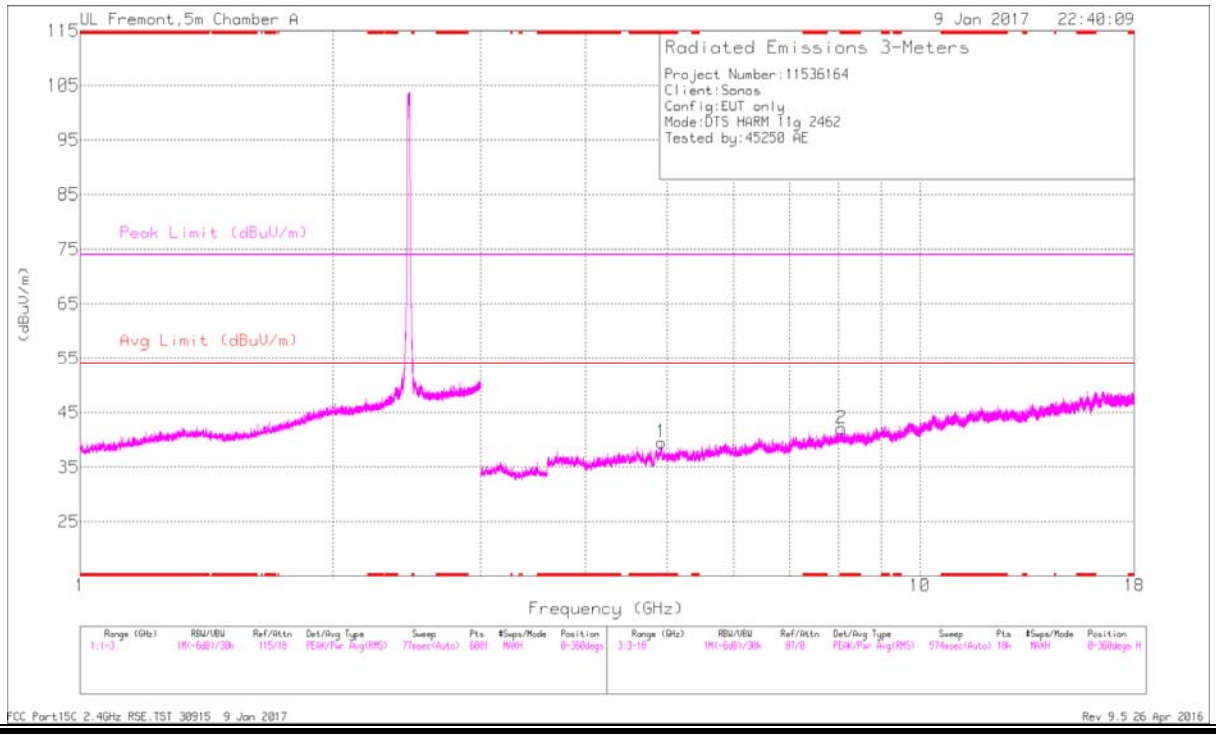
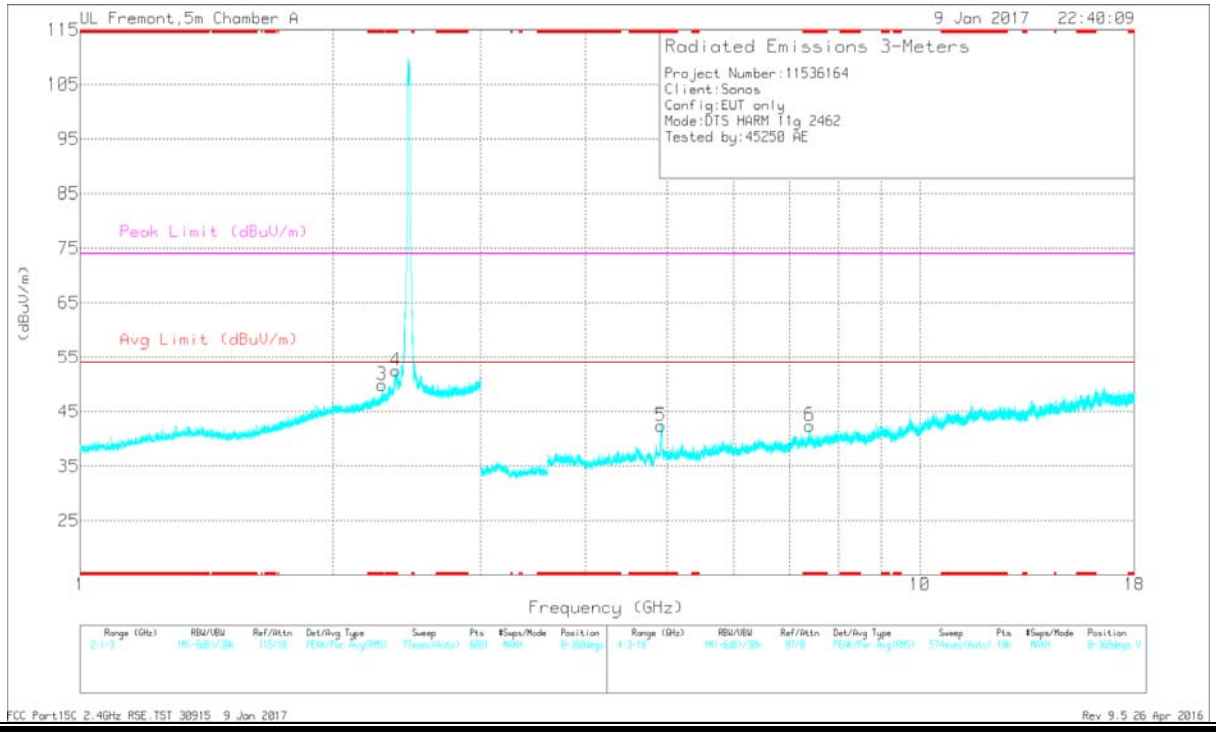
HARMONICS AND SPURIOUS EMISSIONS HIGH CHANNEL, CH 11)

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



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Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	* 2.288	42.01	Pk	31.8	-23.9	0	49.91	-	-	74	-24.09	0-360	199	V
4	* 2.379	44.04	Pk	32.2	-23.7	0	52.54	-	-	74	-21.46	0-360	199	V
1	* 4.922	32.95	Pk	34.3	-27.7	0	39.55	-	-	74	-34.45	0-360	101	H
2	* 8.064	28.9	Pk	35.9	-22.7	0	42.1	-	-	74	-31.9	0-360	199	H
5	* 4.918	35.79	Pk	34.3	-27.7	0	42.39	-	-	74	-31.61	0-360	101	V
6	* 7.387	30.65	Pk	35.7	-23.9	0	42.45	-	-	74	-31.55	0-360	101	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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
* 2.288	47.47	PK2	31.8	-23.9	0	55.37	-	-	74	-18.63	68	110	V
* 2.288	38.12	MAv1	31.8	-23.9	.4	46.42	54	-7.58	-	-	68	110	V
* 2.379	51.64	PK2	32.2	-23.7	0	60.14	-	-	74	-13.86	153	178	V
* 2.378	40.87	MAv1	32.2	-23.7	.4	49.77	54	-4.23	-	-	153	178	V
* 4.921	39.7	PK2	34.3	-27.6	0	46.4	-	-	74	-27.6	8	281	H
* 4.923	28.72	MAv1	34.3	-27.7	.4	35.72	54	-18.28	-	-	8	281	H
* 8.062	33.13	PK2	35.9	-22.7	0	46.33	-	-	74	-27.67	36	212	H
* 8.064	23.82	MAv1	35.9	-22.7	.4	37.42	54	-16.58	-	-	36	212	H
* 4.92	43.77	PK2	34.3	-27.6	0	50.47	-	-	74	-23.53	52	128	V
* 4.92	31.53	MAv1	34.3	-27.6	.4	38.63	54	-15.37	-	-	52	128	V
* 7.387	36.95	PK2	35.7	-23.9	0	48.75	-	-	74	-25.25	141	103	V
* 7.387	25.63	MAv1	35.7	-23.9	.4	37.83	54	-16.17	-	-	141	103	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

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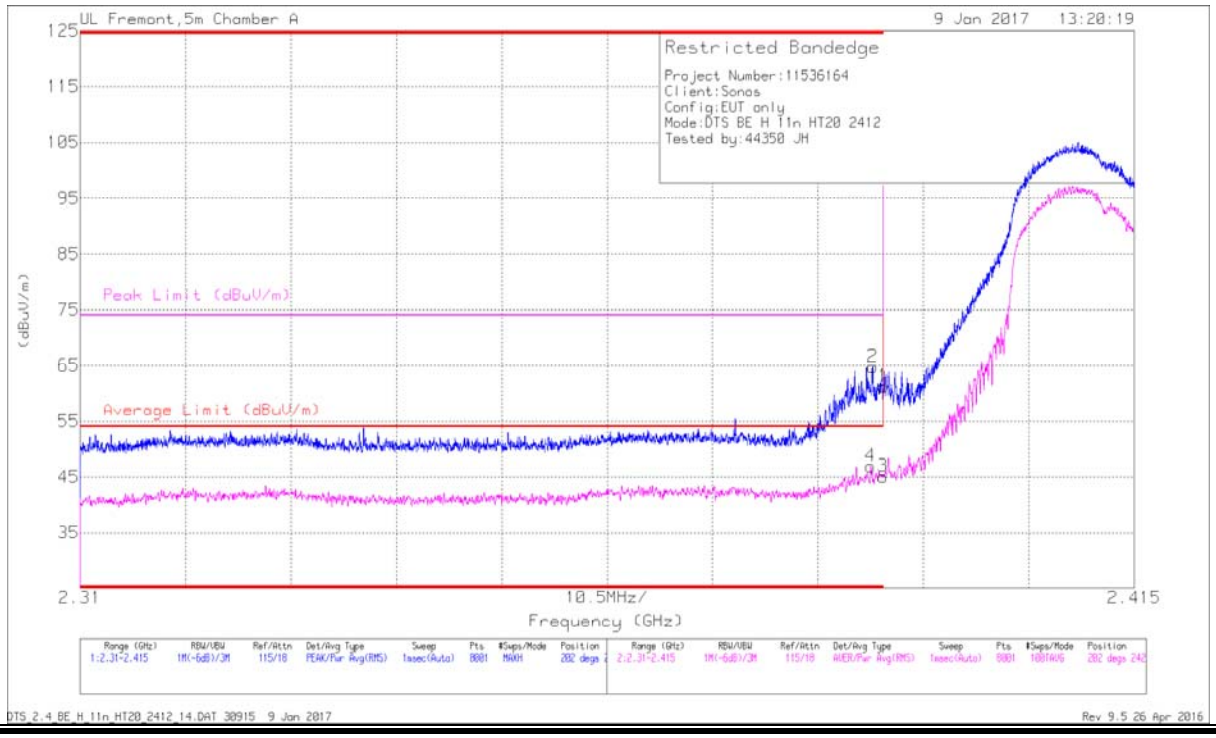
11.2.3. 11n HT20 3TX CDD MIMO MODE IN THE 2.4GHz BAND

AUTHORIZED BANDEDGE (LOW CHANNEL, CH 1)

LOW CHANNEL HORIZONTAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	52.6	Pk	32.3	-23.7	0	61.2	-	-	74	-12.8	202	242	H
2	* 2.389	56.11	Pk	32.3	-23.7	0	64.71	-	-	74	-9.29	202	242	H
3	* 2.39	36.34	RMS	32.3	-23.7	.12	45.06	54	-8.94	-	-	202	242	H
4	* 2.389	38.16	RMS	32.3	-23.7	.12	46.88	54	-7.12	-	-	202	242	H

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector
RMS - RMS detection

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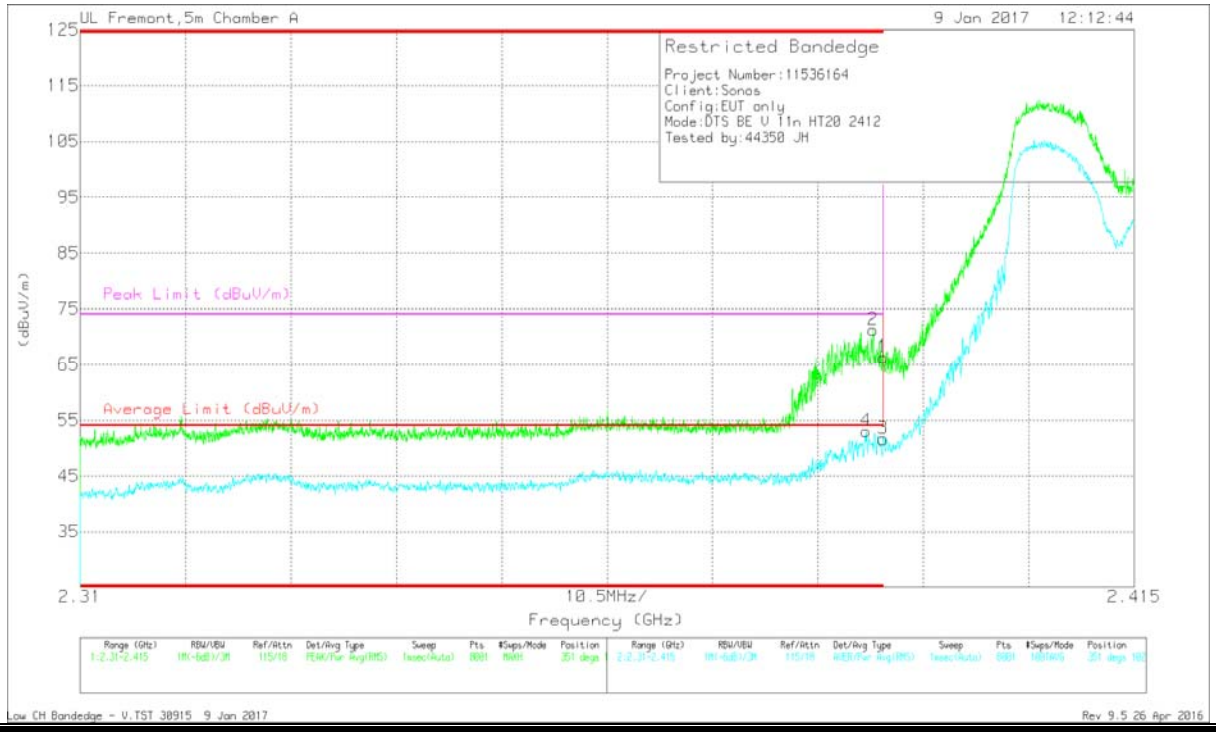
LOW CHANNEL VERTICAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	57.67	Pk	32.3	-23.7	0	66.27	-	-	74	-7.73	351	102	V
2	* 2.389	62.62	Pk	32.3	-23.7	0	71.22	-	-	74	-2.78	351	102	V
3	* 2.39	42.9	RMS	32.3	-23.7	.12	51.62	54	-2.38	-	-	351	102	V
4	* 2.388	44.29	RMS	32.3	-23.7	.12	53.01	54	-.99	-	-	351	102	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector
RMS - RMS detection

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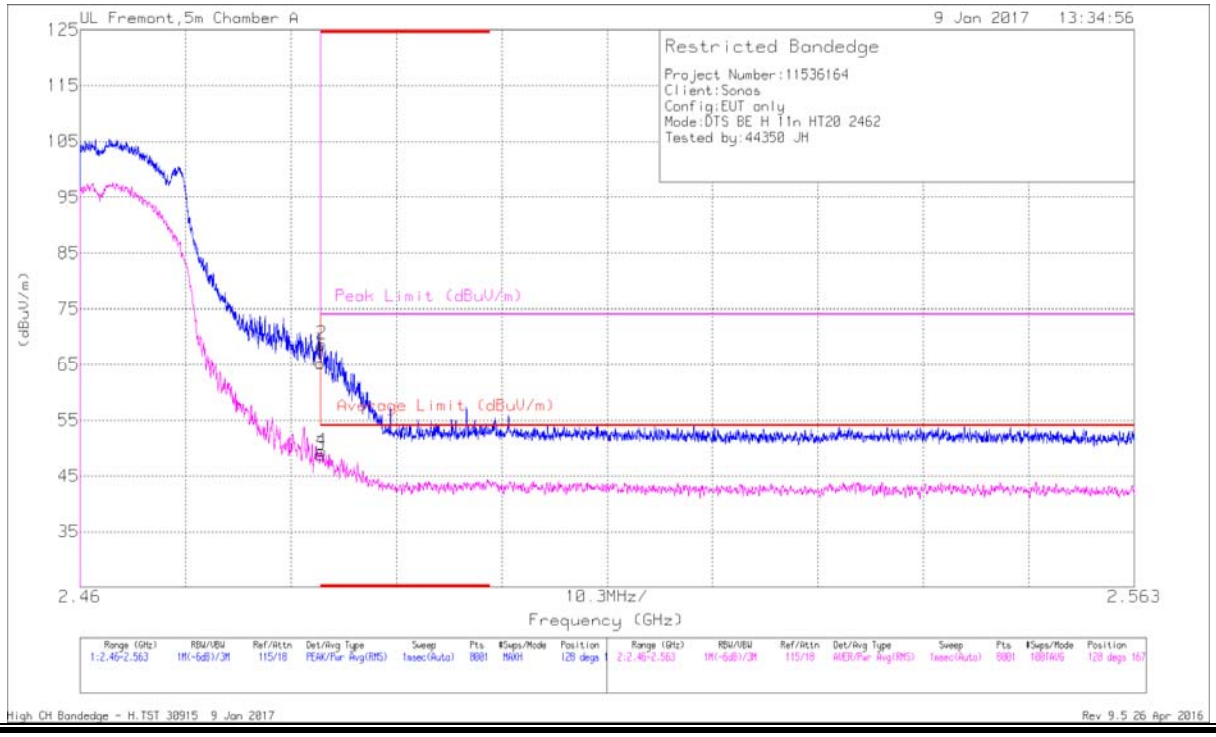
AUTHORIZED BANDEDGE (HIGH CHANNEL, CH 11)

HIGH CHANNEL HORIZONTAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	56.43	Pk	32.4	-23.6	0	65.23	-	-	74	-8.77	128	167	H
2	* 2.484	59.89	Pk	32.4	-23.6	0	68.69	-	-	74	-5.31	128	167	H
3	* 2.484	39.92	RMS	32.4	-23.6	.12	48.84	54	-5.16	-	-	128	167	H
4	* 2.484	40.52	RMS	32.4	-23.6	.12	49.44	54	-4.56	-	-	128	167	H

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector
RMS - RMS detection

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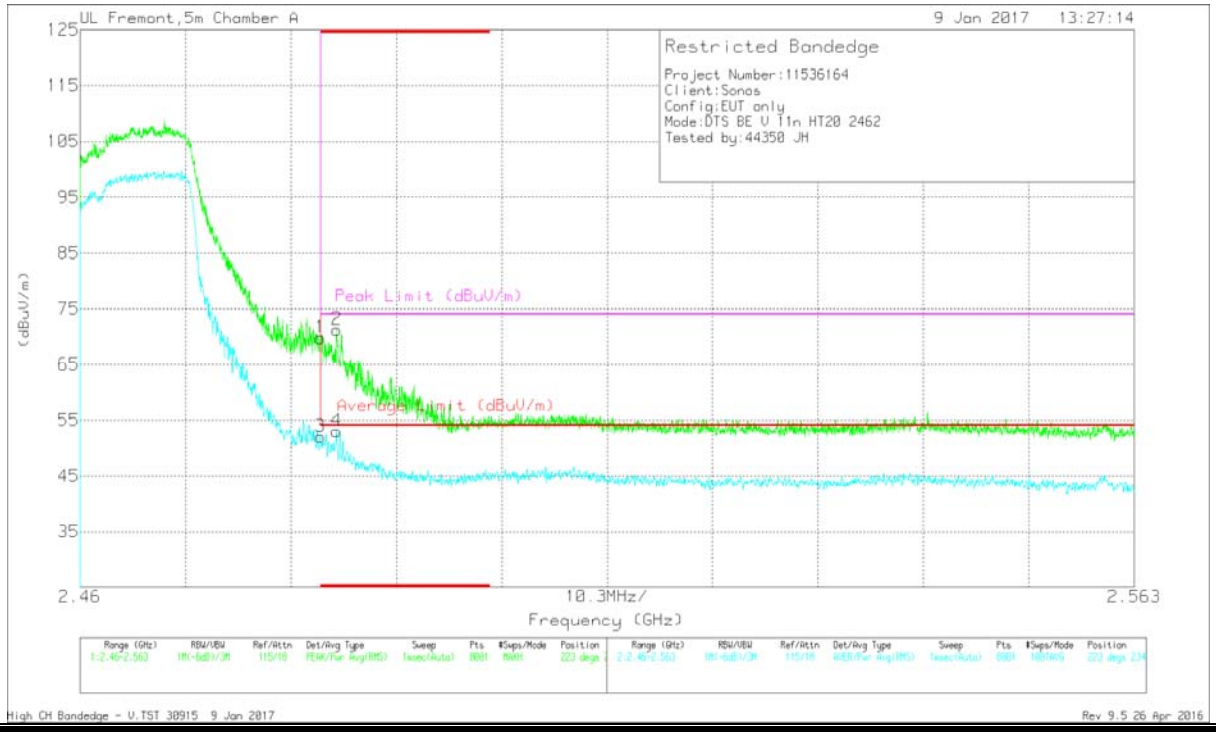
HIGH CHANNEL VERTICAL



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	61.02	Pk	32.4	-23.6	0	69.82	-	-	74	-4.18	223	234	V
2	* 2.485	62.57	Pk	32.4	-23.7	0	71.27	-	-	74	-2.73	223	234	V
3	* 2.484	43.11	RMS	32.4	-23.6	.12	52.03	54	-1.97	-	-	223	234	V
4	* 2.485	44.19	RMS	32.4	-23.7	.12	53.01	54	-.99	-	-	223	234	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector
RMS - RMS detection

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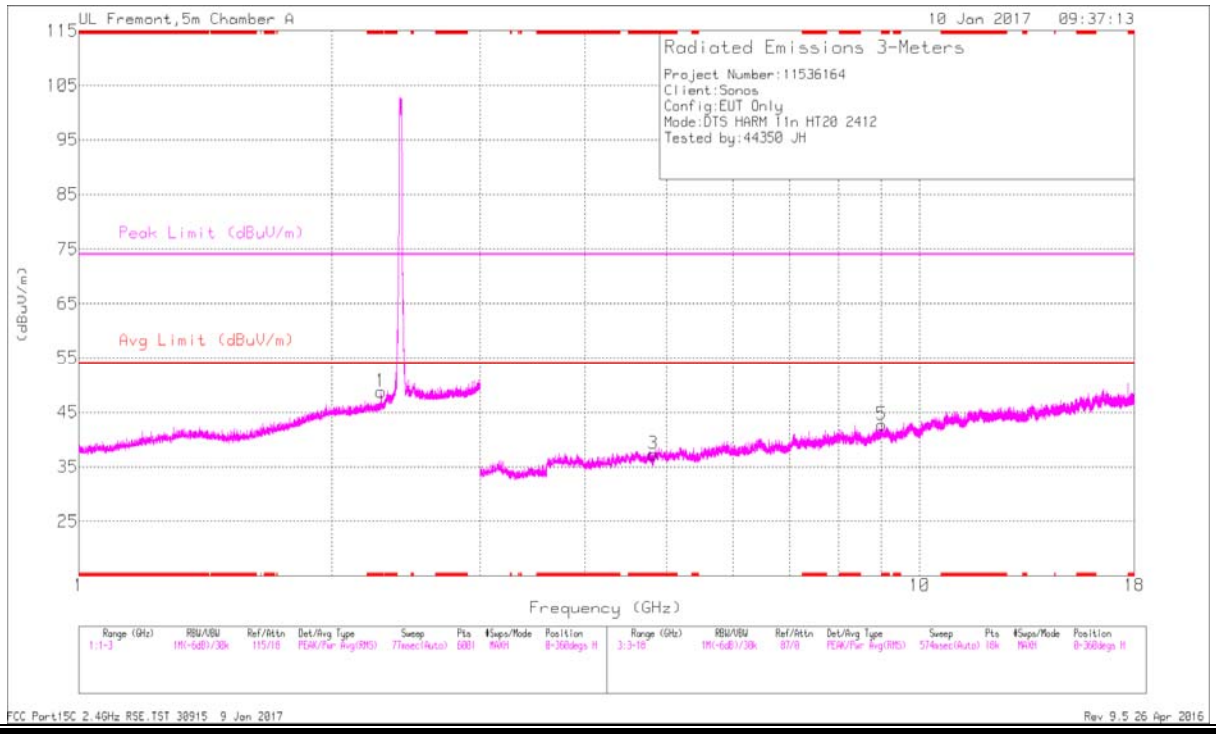
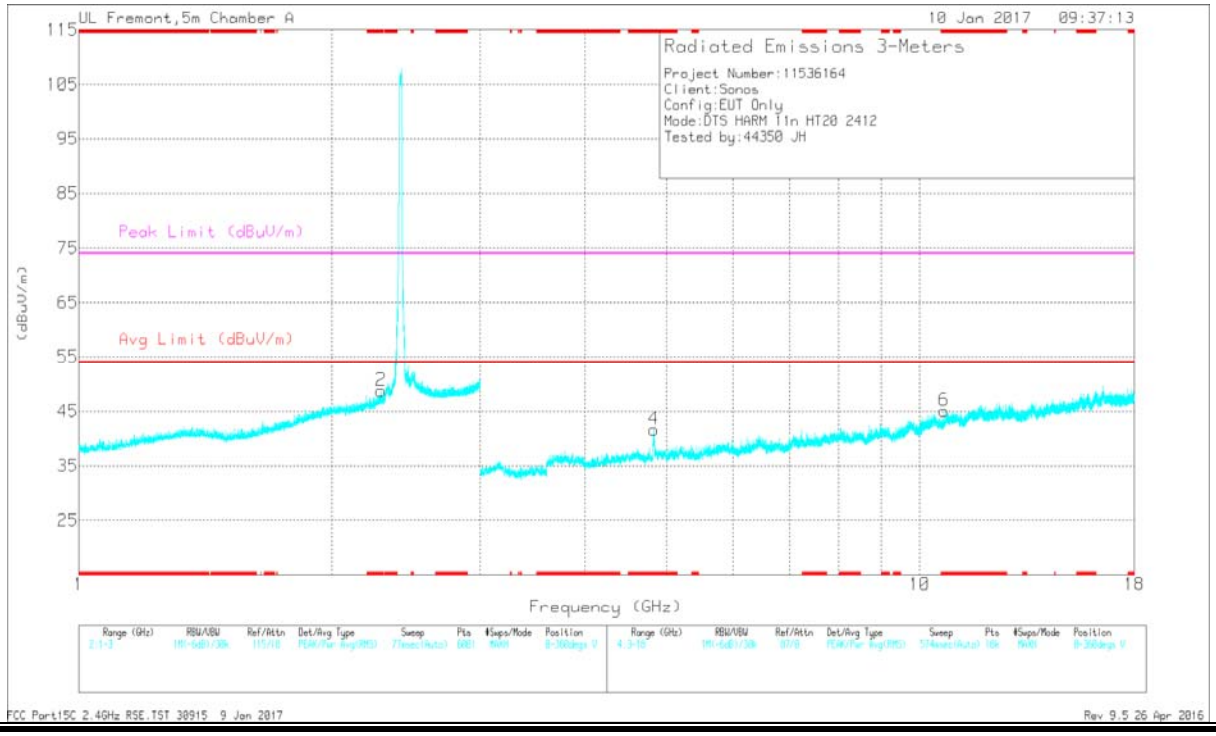
HARMONICS AND SPURIOUS EMISSIONS LOW CHANNEL, CH 1)

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



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Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	* 2.288	40.9	Pk	31.8	-23.9	0	48.8	-	-	74	-25.2	0-360	101	H
2	* 2.288	40.93	Pk	31.8	-23.9	0	48.83	-	-	74	-25.17	0-360	101	V
3	* 4.822	31.3	Pk	34.3	-28.2	0	37.4	-	-	74	-36.6	0-360	199	H
5	* 9.014	28.71	Pk	36.1	-22.1	0	42.71	-	-	74	-31.29	0-360	101	H
4	* 4.826	35.43	Pk	34.3	-28.1	0	41.63	-	-	74	-32.37	0-360	101	V
6	* 10.694	27.84	Pk	37.7	-20.5	0	45.04	-	-	74	-28.96	0-360	101	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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
* 2.289	46.11	PK2	31.8	-23.9	0	54.01	-	-	74	-19.99	9	142	H
* 2.288	36.64	MAv1	31.8	-23.9	.12	44.66	54	-9.34	-	-	9	142	H
* 2.288	47.81	PK2	31.8	-23.9	0	55.71	-	-	74	-18.29	164	142	V
* 2.288	38.23	MAv1	31.8	-23.9	.12	46.25	54	-7.75	-	-	164	142	V
* 4.824	38.29	PK2	34.3	-28.2	0	44.39	-	-	74	-29.61	43	364	H
* 4.824	27.16	MAv1	34.3	-28.2	.12	33.38	54	-20.62	-	-	43	364	H
* 9.015	34.45	PK2	36.1	-22.1	0	48.45	-	-	74	-25.55	296	120	H
* 9.014	23.22	MAv1	36.1	-22.1	.12	37.34	54	-16.66	-	-	296	120	H
* 4.827	42.97	PK2	34.3	-28.1	0	49.17	-	-	74	-24.83	153	139	V
* 4.827	29.56	MAv1	34.3	-28.1	.12	35.88	54	-18.12	-	-	153	139	V
* 10.696	32.24	PK2	37.7	-20.5	0	49.44	-	-	74	-24.56	0	347	V
* 10.68	21.83	MAv1	37.7	-20.6	.12	39.05	54	-14.95	-	-	0	347	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

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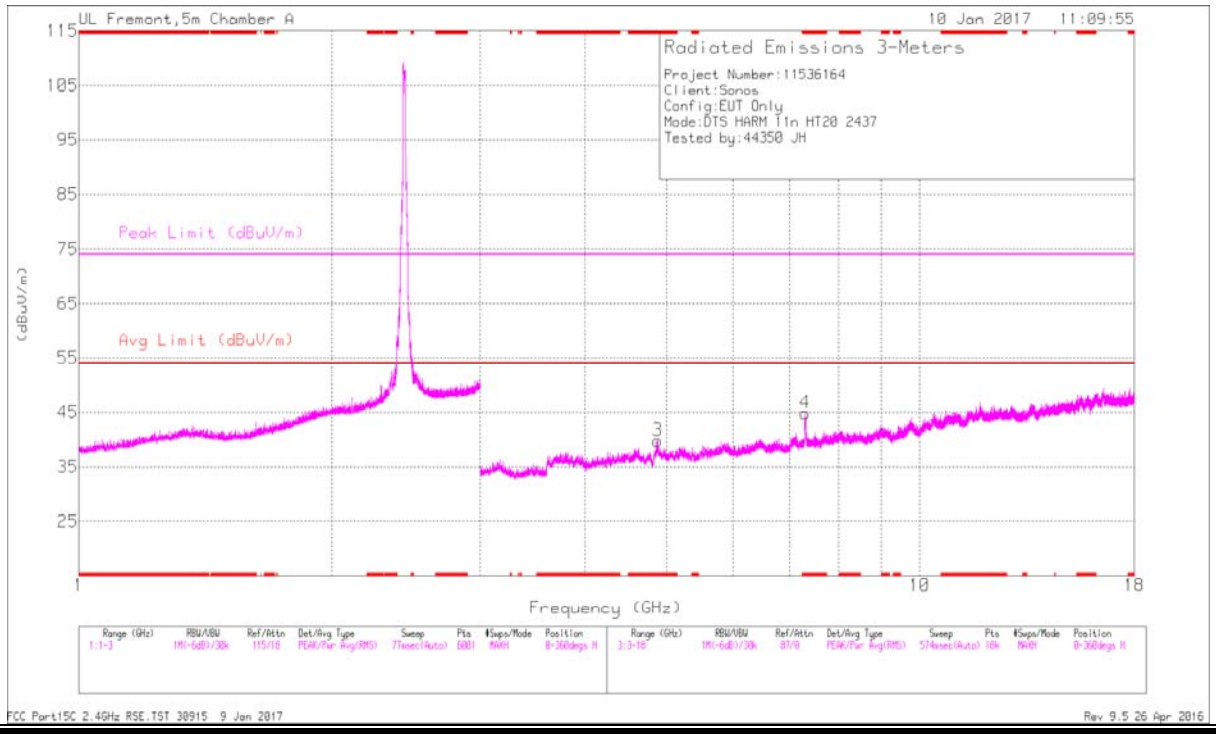
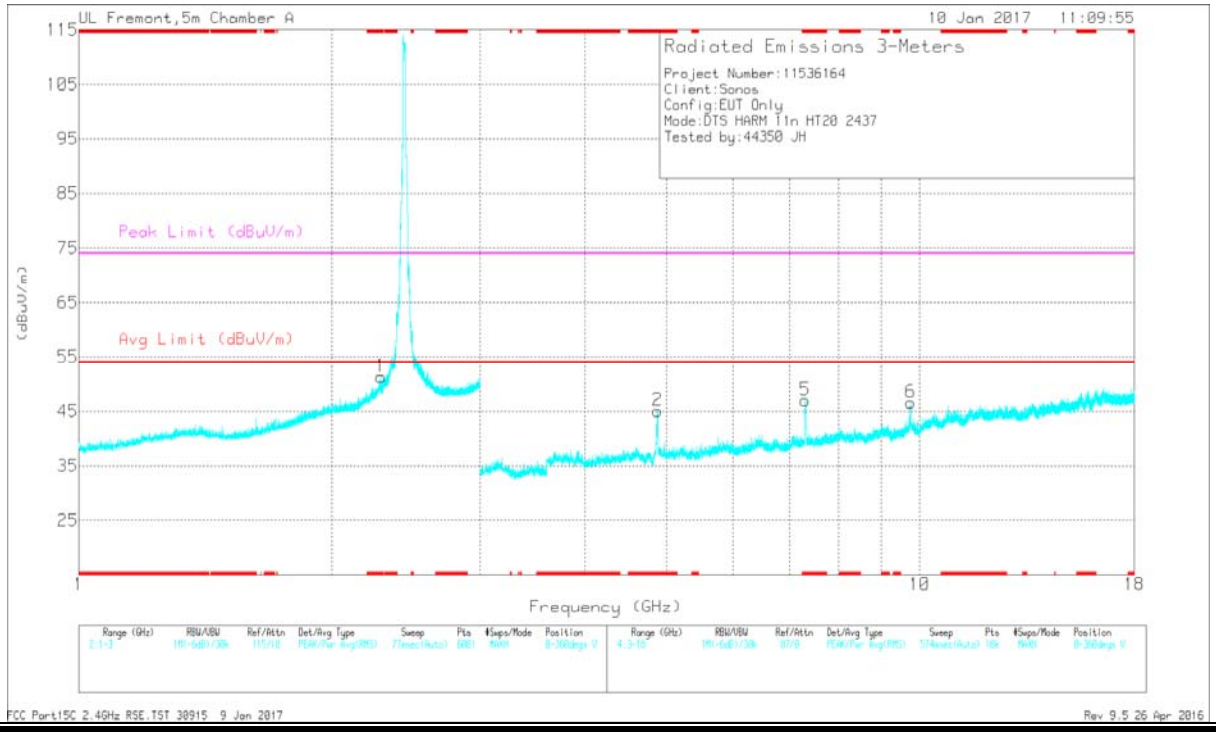
HARMONICS AND SPURIOUS EMISSIONS MID CHANNEL, CH 6)

MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL



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Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	* 2.288	43.4	Pk	31.8	-23.9	0	51.3	-	-	74	-22.7	0-360	199	V
3	* 4.876	33.28	Pk	34.3	-27.8	0	39.78	-	-	74	-34.22	0-360	101	H
4	* 7.312	34.19	Pk	35.7	-25	0	44.89	-	-	74	-29.11	0-360	101	H
2	* 4.876	38.65	Pk	34.3	-27.8	0	45.15	-	-	74	-28.85	0-360	101	V
5	* 7.315	36.26	Pk	35.7	-25	0	46.96	-	-	74	-27.04	0-360	101	V
6	9.755	31.07	Pk	36.7	-21.2	0	46.57	-	-	-	-	0-360	199	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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
* 2.288	49.94	PK2	31.8	-23.9	0	57.84	-	-	74	-16.16	53	199	V
* 2.288	40.22	MAv1	31.8	-23.9	.12	48.24	54	-5.76	-	-	53	199	V
* 4.875	41.14	PK2	34.3	-27.8	0	47.64	-	-	74	-26.36	11	143	H
* 4.874	29.64	MAv1	34.3	-27.8	.12	36.26	54	-17.74	-	-	11	143	H
* 7.303	43.31	PK2	35.7	-25	0	54.01	-	-	74	-19.99	19	126	H
* 7.311	30.97	MAv1	35.7	-25	.12	41.79	54	-12.21	-	-	19	126	H
* 4.875	47.33	PK2	34.3	-27.8	0	53.83	-	-	74	-20.17	81	123	V
* 4.876	36.21	MAv1	34.3	-27.8	.12	42.83	54	-11.17	-	-	81	123	V
* 7.316	42.91	PK2	35.7	-25	0	53.61	-	-	74	-20.39	141	106	V
* 7.314	32.84	MAv1	35.7	-25	.12	43.66	54	-10.34	-	-	141	106	V
9.732	39.98	PK2	36.6	-21.2	0	55.38	-	-	-	-	110	220	V
9.755	27.07	MAv1	36.7	-21.2	.12	42.69	-	-	-	-	110	220	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

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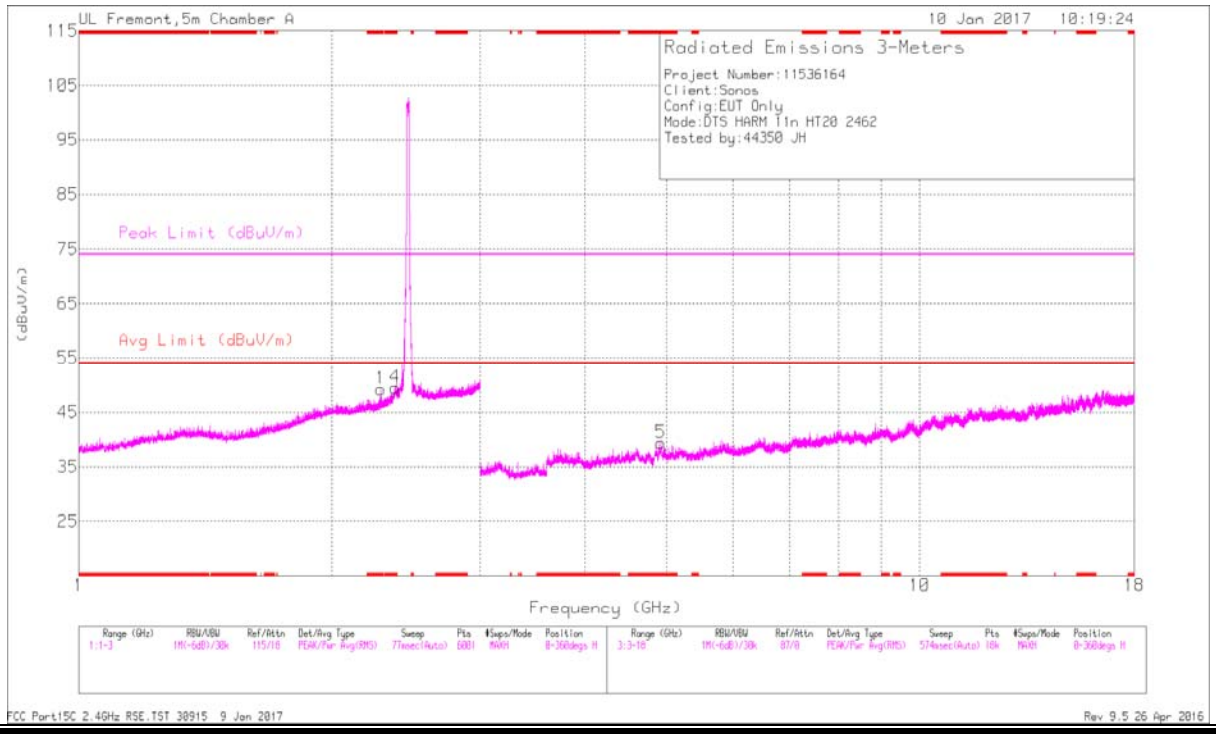
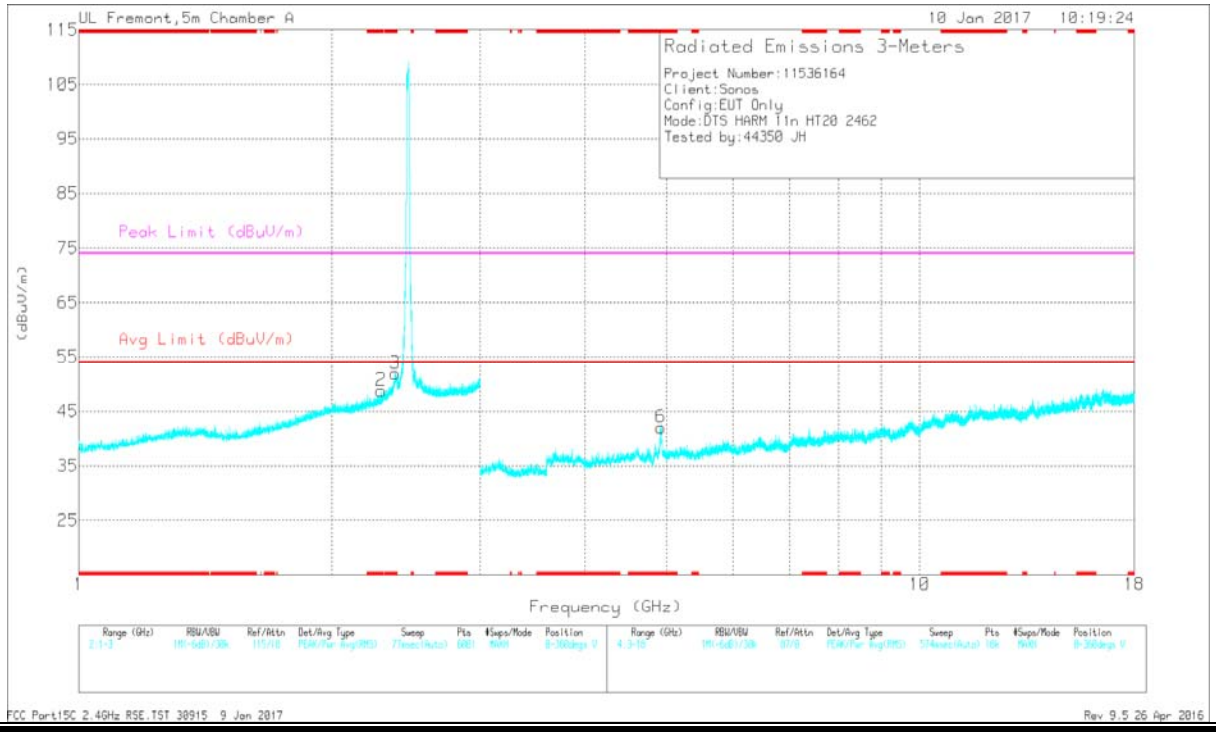
HARMONICS AND SPURIOUS EMISSIONS HIGH CHANNEL, CH 11)

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



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Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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	* 2.288	41.39	Pk	31.8	-23.9	0	49.29	-	-	74	-24.71	0-360	101	H
4	* 2.38	41.06	Pk	32.2	-23.7	0	49.56	-	-	74	-24.44	0-360	101	H
2	* 2.288	40.91	Pk	31.8	-23.9	0	48.81	-	-	74	-25.19	0-360	201	V
3	* 2.377	43.45	Pk	32.2	-23.7	0	51.95	-	-	74	-22.05	0-360	101	V
5	* 4.92	32.67	Pk	34.3	-27.6	0	39.37	-	-	74	-34.63	0-360	101	H
6	* 4.924	35.59	Pk	34.3	-27.8	0	42.09	-	-	74	-31.91	0-360	101	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector

Frequency (GHz)	Meter Reading (dBuV)	Det	AF T346 (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
* 2.288	45.69	PK2	31.8	-23.9	0	53.59	-	-	74	-20.41	8	105	H
* 2.288	36.83	MAv1	31.8	-23.9	.12	44.85	54	-9.15	-	-	8	105	H
* 2.379	47.27	PK2	32.2	-23.7	0	55.77	-	-	74	-18.23	357	185	H
* 2.378	36.5	MAv1	32.2	-23.7	.12	45.12	54	-8.88	-	-	357	185	H
* 2.288	46.78	PK2	31.8	-23.9	0	54.68	-	-	74	-19.32	64	151	V
* 2.288	37.1	MAv1	31.8	-23.9	.12	45.12	54	-8.88	-	-	64	151	V
* 2.377	50.29	PK2	32.2	-23.7	0	58.79	-	-	74	-15.21	317	103	V
* 2.376	39.35	MAv1	32.2	-23.7	.12	47.97	54	-6.03	-	-	317	103	V
* 4.921	39.08	PK2	34.3	-27.6	0	45.78	-	-	74	-28.22	5	124	H
* 4.921	28.21	MAv1	34.3	-27.6	.12	35.03	54	-18.97	-	-	5	124	H
* 4.924	46.12	PK2	34.3	-27.8	0	52.62	-	-	74	-21.38	77	112	V
* 4.923	32.15	MAv1	34.3	-27.7	.12	38.87	54	-15.13	-	-	77	112	V

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
PK2 - KDB558074 Method: Maximum Peak
MAv1 - KDB558074 Option 1 Maximum RMS Average

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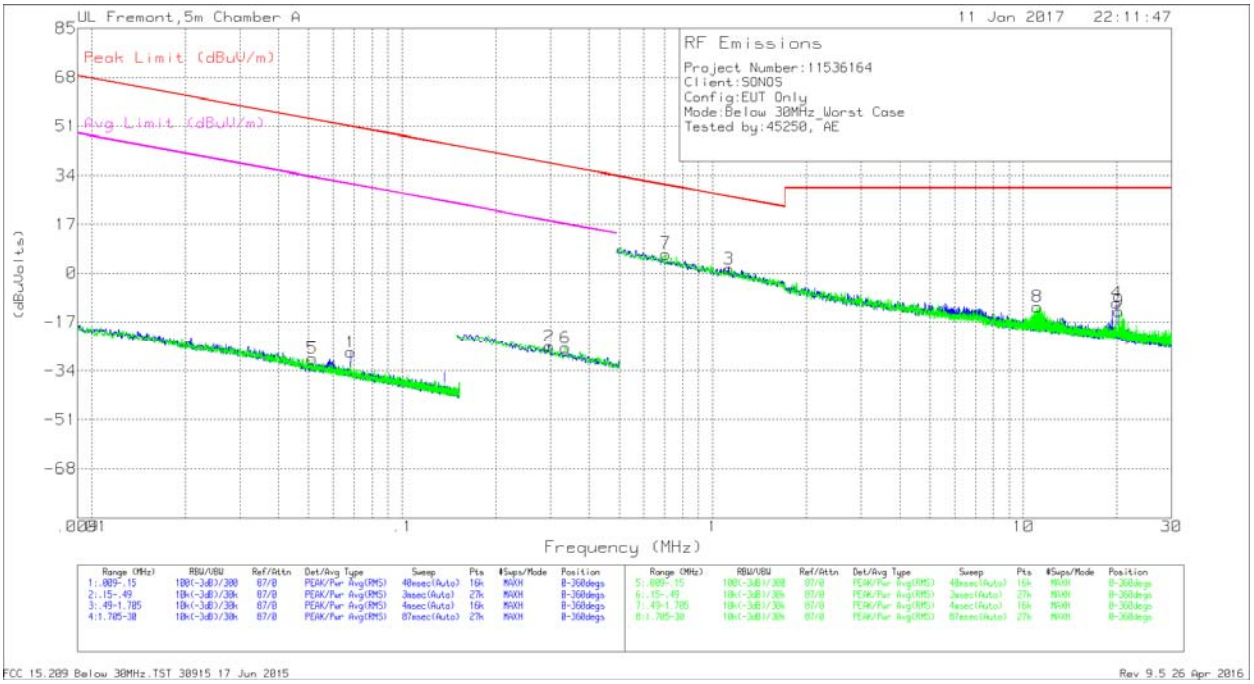
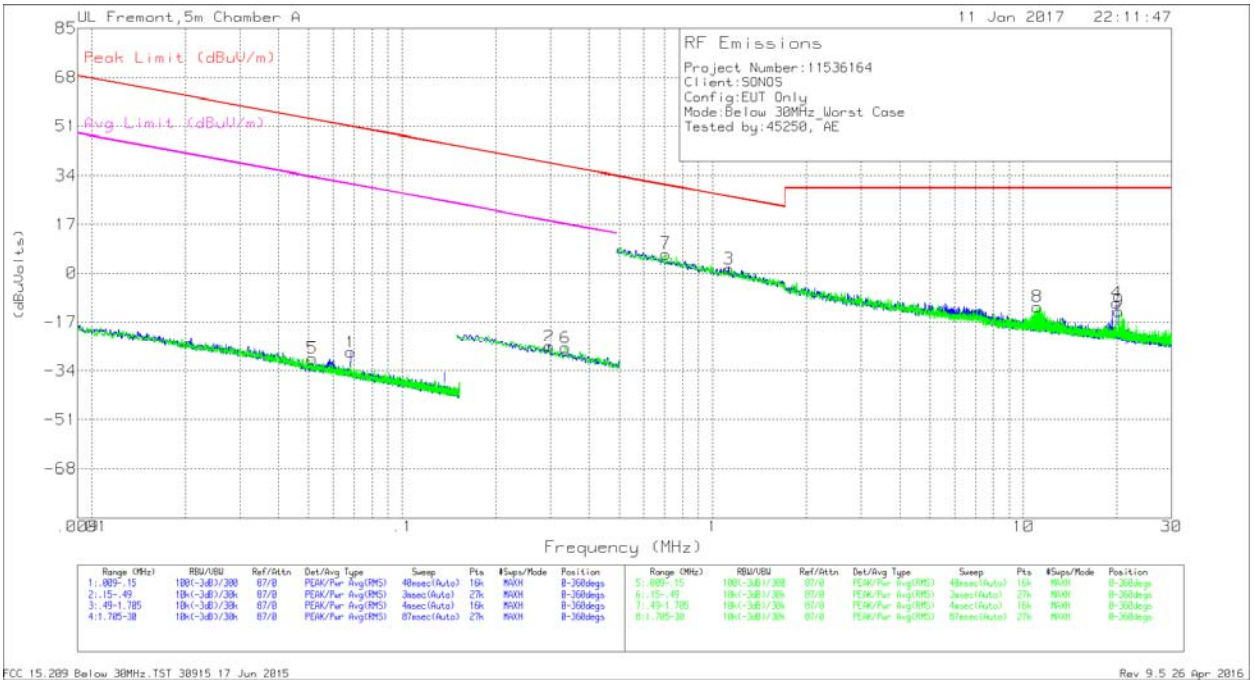
11.3. WORST-CASE BELOW 30 GHz

SPURIOUS EMISSIONS 9 KHz to 30 MHz (WORST-CASE CONFIGURATION)

HORIZONTAL PLOT



VERTICAL PLOT



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DATA

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cbl (dB)	Dist Corr 300m	Corrected Reading (dBuVolts)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
5	.05127	38.74	Pk	11.3	.1	-80	-29.86	53.41	-83.27	33.41	-63.27	0-360
1	.06817	41.14	Pk	11	.1	-80	-27.76	50.93	-78.69	30.93	-58.69	0-360
2	.29746	43.52	Pk	10.8	.1	-80	-25.58	38.14	-63.72	18.14	-43.72	0-360
6	.33526	43.08	Pk	10.7	.1	-80	-26.12	37.1	-63.22	17.1	-43.22	0-360

Pk - Peak detector

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)
7	.70565	36.09	Pk	10.6	.1	-40	6.79	30.63	-23.84	-	-	0-360
3	1.1265	30.56	Pk	10.7	.2	-40	1.46	26.57	-25.11	-	-	0-360
8	11.10242	16.99	Pk	10.8	.5	-40	-11.71	29.54	-41.25	-	-	0-360
4	19.9685	18.94	Pk	10.1	.7	-40	-10.26	29.54	-39.8	-	-	0-360
9	20.25879	15.98	Pk	10.1	.7	-40	-13.22	29.54	-42.76	-	-	0-360

Pk - Peak detector

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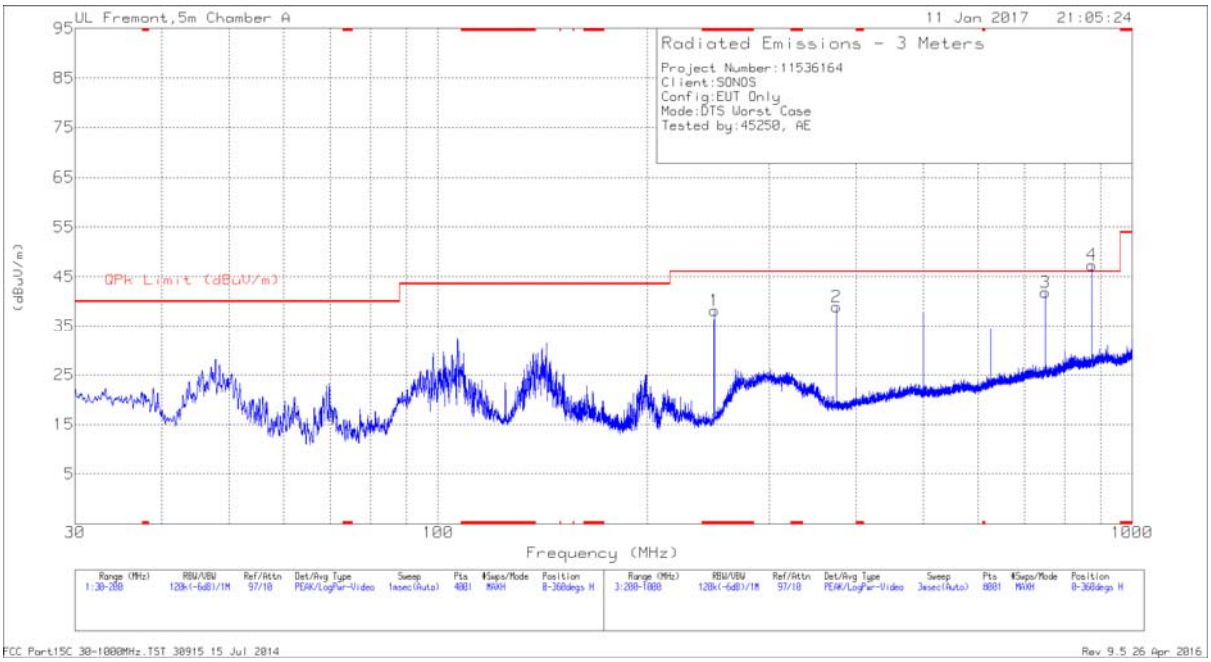
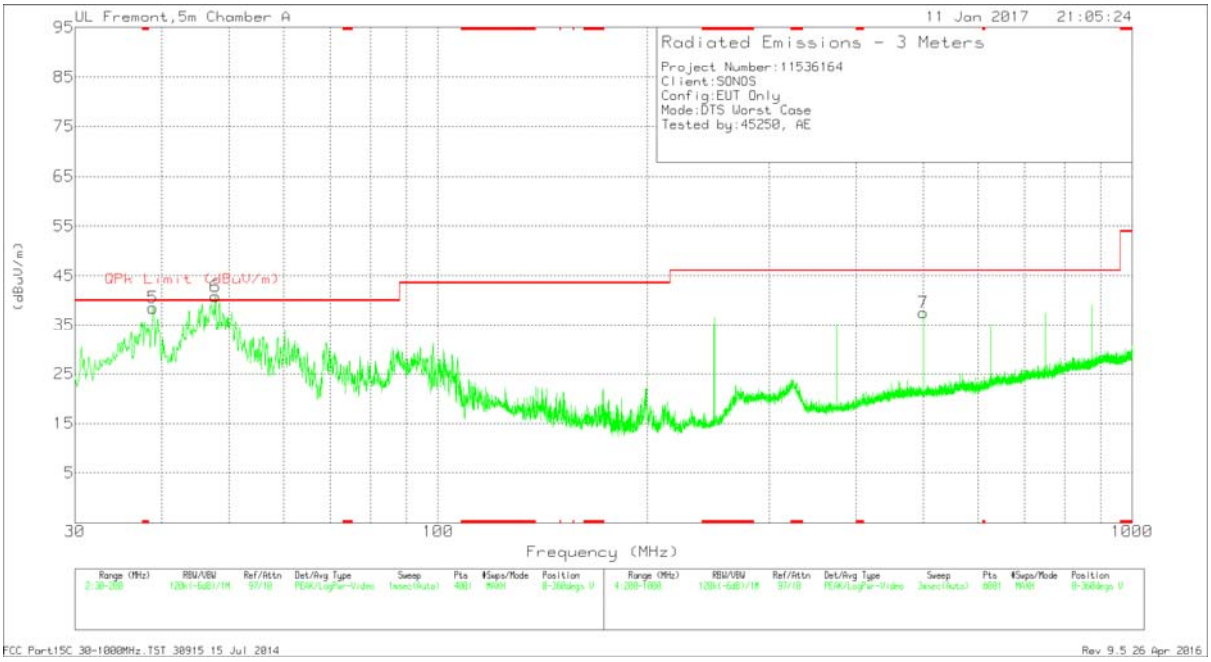
11.4. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



VERTICAL PLOT



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DATA

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	* 250	52.31	Pk	15.5	-29.6	38.21	46.02	-7.81	0-360	100	H
5	38.8825	50.79	Pk	18.8	-31.1	38.49	40	-1.51	0-360	100	V
6	47.8075	59.42	Pk	12.5	-31.1	40.82	40	.82	0-360	100	V
2	375	49.05	Pk	19	-29.1	38.95	46.02	-7.07	0-360	100	H
7	500	44.51	Pk	21.7	-28.7	37.51	46.02	-8.51	0-360	200	V
3	750	45.31	Pk	24.8	-28.3	41.81	46.02	-4.21	0-360	100	H
4	875	48.97	Pk	25.9	-27.5	47.37	46.02	1.35	0-360	100	H

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Pk - Peak detector

Radiated Emissions

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
38.9511	49.58	Qp	18.7	-31.1	37.18	40	-2.82	342	105	V
47.8022	57.23	Qp	12.5	-31.1	38.63	40	-1.37	6	104	V
749.9986	45.03	Qp	24.8	-28.3	41.53	46.02	-4.49	160	101	H
875.0024	44.58	Qp	25.9	-27.5	42.98	46.02	-3.04	165	101	H

* - indicates frequency in CFR47 Pt 15 / RSS-Gen 8.10 Restricted Band
Qp - Quasi-Peak detector

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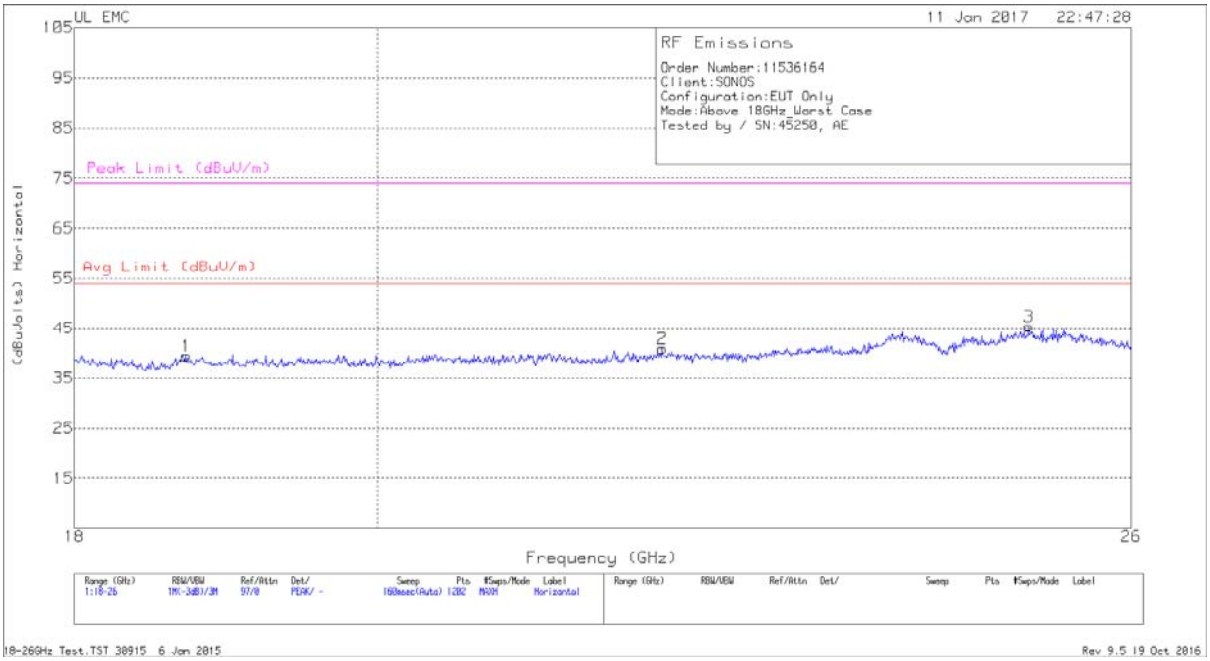
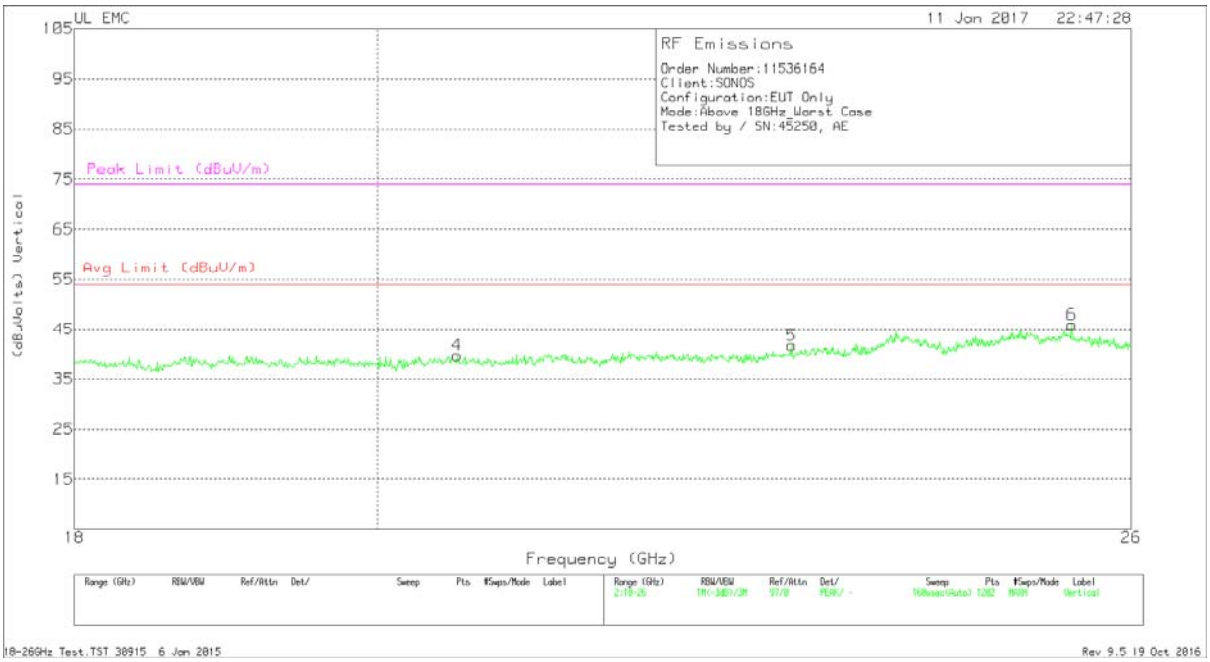
11.5. WORST-CASE 18 to 26 GHz

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

HORIZONTAL PLOT



VERTICAL PLOT



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DATA

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	18.713	40.93	Pk	32.4	-24.5	-9.5	39.33	54	-14.67	74	-34.67
2	22.083	42.13	Pk	33.5	-25.3	-9.5	40.83	54	-13.17	74	-33.17
3	25.087	45.03	Pk	34.3	-24.5	-9.5	45.33	54	-8.67	74	-28.67
4	20.565	41.67	Pk	32.9	-25.4	-9.5	39.67	54	-14.33	74	-34.33
5	23.102	42.77	Pk	33.5	-25.1	-9.5	41.67	54	-12.33	74	-32.33
6	25.467	45.7	Pk	34.4	-24.6	-9.5	46	54	-8	74	-28

Pk - Peak detector

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12. 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.

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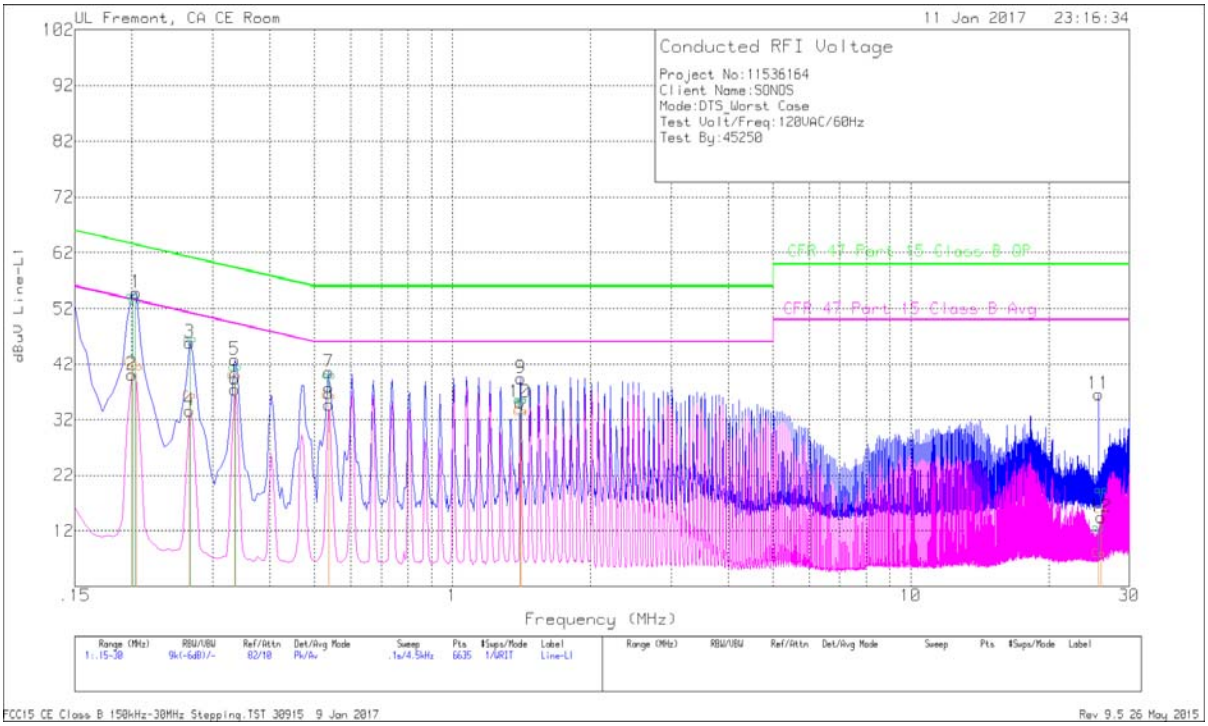
12.1. EUT IS POWERED BY LINE CORD CONNECTED TO AC MAINS

LINE 1 RESULTS



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WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz

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	Margin (dB)
.20288	30.29	Ca	0	0	10.1	40.39	-	-	53.49	-13.1
.20063	31.01	Ca	0	0	10.1	41.11	-	-	53.58	-12.47
.26813	25.12	Ca	0	0	10.1	35.22	-	-	51.18	-15.96
.33563	28.64	Ca	0	0	10.1	38.74	-	-	49.31	-10.57
.53813	25.02	Ca	0	0	10.1	35.12	-	-	46	-10.88
1.40978	22.27	Ca	0	.1	10.1	32.47	-	-	46	-13.53
1.40618	22.06	Ca	0	0	10.1	32.16	-	-	46	-13.84
25.7143	-4.09	Ca	.1	.3	10.5	6.81	-	-	50	-43.19
26.0171	3.69	Ca	.1	.3	10.5	14.59	-	-	50	-35.41

Ca - CISPR average detection

Range 1: Line-L1 .15 - 30MHz

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	Margin (dB)
.20288	42.32	Qp	0	0	10.1	52.42	63.49	-11.07	-	-
.20063	43.08	Qp	0	0	10.1	53.18	63.58	-10.4	-	-
.26813	35.35	Qp	0	0	10.1	45.45	61.18	-15.73	-	-
.33563	30.26	Qp	0	0	10.1	40.36	59.31	-18.95	-	-
.53813	28.73	Qp	0	0	10.1	38.83	56	-17.17	-	-
1.40978	24.34	Qp	0	.1	10.1	34.54	56	-21.46	-	-
1.40618	24.13	Qp	0	0	10.1	34.23	56	-21.77	-	-
25.7143	.62	Qp	.1	.3	10.5	11.52	60	-48.48	-	-
26.0171	7.37	Qp	.1	.3	10.5	18.27	60	-41.73	-	-

Qp - Quasi-Peak detector

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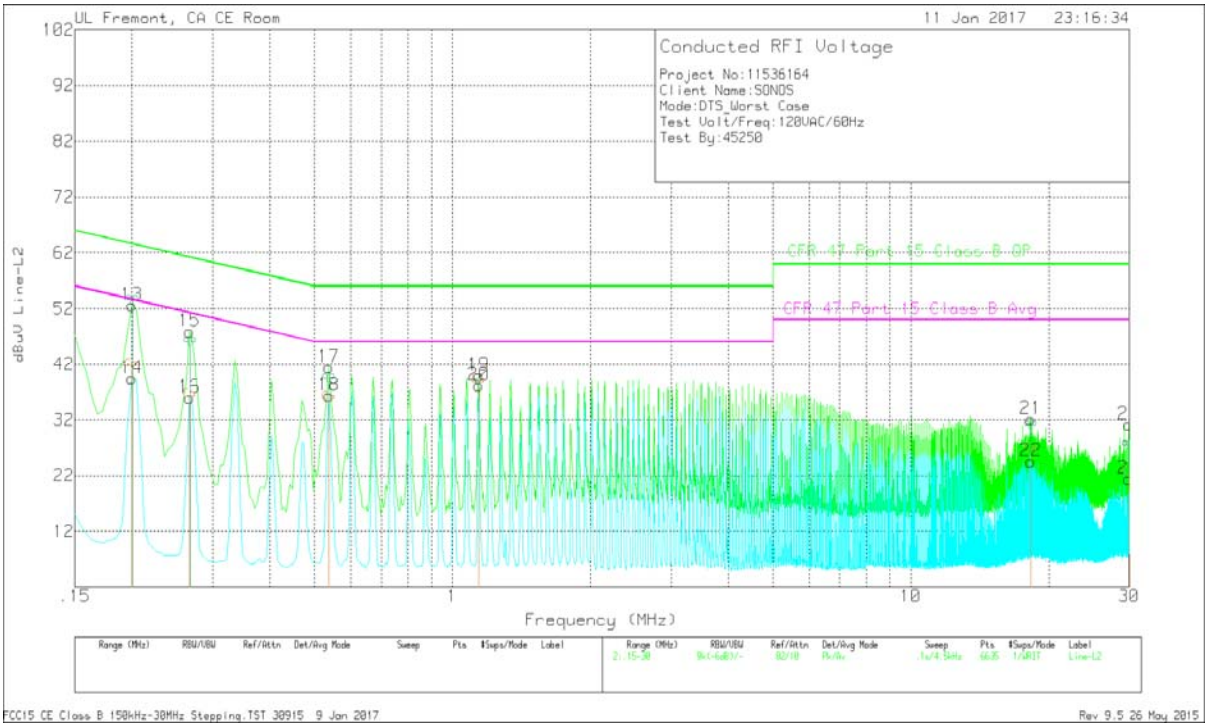
LINE 2 RESULTS



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WORST EMISSIONS

Range 2: Line-L2 .15 - 30MHz

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	Margin (dB)
.20063	30.94	Ca	0	0	10.1	41.04	-	-	53.58	-12.54
.26813	25.57	Ca	0	0	10.1	35.67	-	-	51.18	-15.51
.53768	24.99	Ca	0	0	10.1	35.09	-	-	46	-10.91
1.13978	28.01	Ca	0	0	10.1	38.11	-	-	46	-7.89
18.3041	15.48	Ca	0	.2	10.3	25.98	-	-	50	-24.02
29.9051	11.04	Ca	.1	.3	10.4	21.84	-	-	50	-28.16
29.9074	11.05	Ca	.1	.3	10.4	21.85	-	-	50	-28.15

Ca - CISPR average detection

Range 2: Line-L2 .15 - 30MHz

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	Margin (dB)
.20063	42.93	Qp	0	0	10.1	53.03	63.58	-10.55	-	-
.26813	35.33	Qp	0	0	10.1	45.43	61.18	-15.75	-	-
.53768	28.77	Qp	0	0	10.1	38.87	56	-17.13	-	-
1.13978	28.06	Qp	0	0	10.1	38.16	56	-17.84	-	-
18.3041	19.95	Qp	0	.2	10.3	30.45	60	-29.55	-	-
29.9051	16.08	Qp	.1	.3	10.4	26.88	60	-33.12	-	-
29.9074	15.99	Qp	.1	.3	10.4	26.79	60	-33.21	-	-

Qp - Quasi-Peak detector

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14. ART Power setting table based on Radiated Bandedge measurements:

Channel	Frequency			
		11b	11g	11n
1	2412	19	14	14
2	2417	20	15	15
3	2422	20	17	15
4	2427	20	18	17
5	2432	20	18	19
6	2437	20	19	19
7	2442	20	18	19
8	2447	20	17	17
9	2452	20	16.5	16.5
10	2457	20	15	15
11	2462	19	15	14

END OF REPORT

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