



FCC CFR47 PART 15 SUBPART H

CERTIFICATION TEST REPORT

FOR

TV BAND DEVICE

MODEL NUMBER: ACRS 1.0

REPORT NUMBER: 11U13701-3, Revision B

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Prepared for

ADAPTRUM

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	11/22/2011	Initial Issue	M. Heckrotte
A	02/29/2012	Revised radiated results below 1 GHz	M. Heckrotte
A1	03/01/2012	Revised the serial number of the radiated test sample and list of modifications	M. Heckrotte
B	04/13/2012	Revised description of available antennas	M. Heckrotte

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Adaptrum
25 E. Trimble Road
San Jose, CA 95131

EUT DESCRIPTION: TV Band Device

MODEL: ACRS 1.0

SERIAL NUMBER: Conducted Tests: U0003
Radiated Tests: U0009

DATE TESTED: November 3-13, 2011 and February 23-24, 2012

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART H	Pass

Compliance Certification Services (UL CCS) 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 CCS 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.

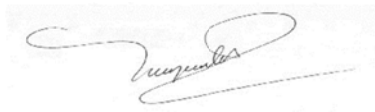
Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS 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 CCS By:

Tested By:



MICHAEL HECKROTTE
DIRECTOR OF ENGINEERING
UL CCS



VIEN TRAN
EMC ENGINEER
UL CCS

2. SCOPE

This report documents the results of RF and emissions tests. It does not include database test results.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 15 Subpart H, KDB 416271 R2, and ANSI C63.4-2009.

4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

UL CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

5. CALIBRATION AND UNCERTAINTY

5.1. 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.

5.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

5.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

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

6. EQUIPMENT UNDER TEST

6.1. DESCRIPTION OF EUT

The EUT is a TV Band Device. Available modulations are QPSK, 16QAM and 64QAM. The EUT can be configured as a Fixed TVBD, a Mode I Personal TVBD, or a Mode II Personal TVBD.

6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
473 - 695	QPSK	27.90	616.60
473 - 695	16QAM	27.75	595.66
473 - 695	64QAM	27.71	590.20

The maximum output power reported above is applicable to configuration as a Fixed TVBD with an antenna gain less than or equal to 7 dBi.

The EUT output power is adjusted lower by 1 dB from these levels for use as a Fixed device with an 8 dBi antenna gain, to comply with the PSD limits.

The output power is adjustable to comply with the lower power limits applicable for configuration as a Mode I device and/or configuration as a Mode II device.

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio can be configured with the following antenna types, and highest gain for each type:

Log Periodic (Flag) 8 dBi Assembly Gain (combination of 10 dBi antenna gain and 2 dB pad)

6.4. SOFTWARE AND FIRMWARE

The software installed in the EUT during testing was 3.3.0.0.

6.5. WORST-CASE CONFIGURATION AND MODE

Preliminary baseline tests were performed at all data rates for all modulations.

The worst case conducted mode was determined to be the lowest data rate for QPSK and the lowest data rate for 16QAM. Additional test results for the highest data rate for 64QAM are also presented in this report.

The worst case radiated mode was determined to be the lowest data rate for QPSK.

6.6. DIGITAL DEVICE MODIFICATIONS

For reference, the following modifications were made to meet FCC Part 15 Subpart B requirements for the Digital Device portion of the EUT.

Added ferrite beads on AC Mains Power Cable

6.7. TRANSMITTER MODIFICATIONS

For reference, the following modifications were made to meet FCC Part 15 Subpart H radiated emissions requirements for the 602 to 620 MHz band.

A notch filter, manufactured by K&L Microwave, model number 5N40-611/E16.2-0/0, was added between the RF output port and the antenna.

6.8. DETAILS OF TESTED SYSTEM

SUPPORT EQUIPMENT & PERIPHERALS

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Dell	E6510	CFGY2AA00	DoC
AC Adapter	Dell	FA09PE1-00	CN-OCM889-73245-08S-4965-A01	N/A

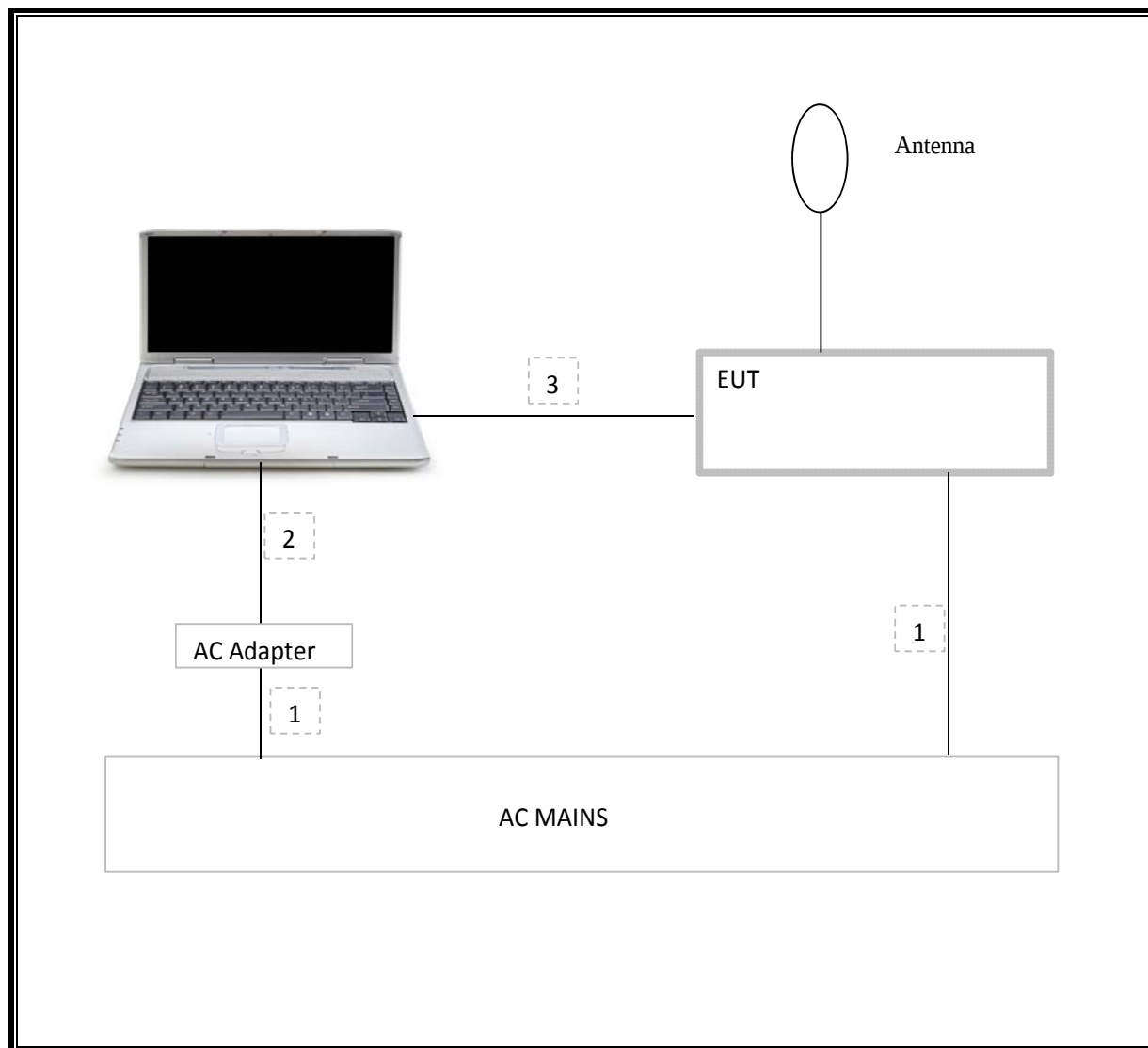
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identic Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	2	US115V	Un-shielded	1.5m	
2	DC	1	DC	Un-shielded	1.5m	a ferrite at EUT end

TEST SETUP

The laptop is connected to the EUT via Ethernet to control the radio functions. Transmitter tests were made in a continuous transmission mode, with the device operating at the only source-based TDD duty cycle.

TEST SETUP DIAGRAM



7. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01171	07/11/12
Antenna, Horn, 18 GHz	EMCO	3115	C00872	06/29/12
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	07/18/12
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00558	01/27/12
Notch Filter, 473 MHz	EWT	EWT-14-0337	337	02/15/12
Notch Filter, 587 MHz	EWT	EWT-14-0338	338	02/15/12
Notch Filter, 695 MHz	EWT	EWT-14-0339	339	02/15/12
Bandpass Filter, 611 MHz	EWT	EWT-11-0780	780	02/20/12
Highpass Filter, 2.7 GHz	Micro-Tronics	HPM13194	N02686	NCR
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	12/02/12
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00986	03/17/12
EMI Test Receiver, 7 GHz	R & S	ESCI 7	1000741	07/06/12
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/19/13
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	N02481	11/10/12
Power Meter	Agilent / HP	437B	#N/A	07/28/12
Power Sensor, 18 GHz	Agilent / HP	8481A	N02782	07/29/13

8. APPLICABLE LIMITS AND TEST RESULTS

8.1. ANTENNA PORT TEST RESULTS (QPSK)

8.1.1. CONDUCTED AVERAGE POWER

LIMITS

None, for reporting and reference purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter via a power splitter and 10 dB pad.

RESULTS

Channel	Frequency (MHz)	Measured Power (dBm)
Low	473	26.4
Middle	581	27.1
High	695	27.0

8.1.2. OUTPUT POWER

LIMITS

For configuration as a Fixed TVBD with Antenna Gain ≤ 8 dBi, Limit = 28 dBm

TEST PROCEDURE

KDB 416271 R2

RESULTS

Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Delta (dB)
473	27.13	28.00	-0.87
581	27.90	28.00	-0.10
695	27.42	28.00	-0.58

Notes: The output power reported above is applicable for use as a Fixed device with an antenna gain less than or equal to 7 dBi and still provide margin to the PSD limits. The EUT output power is adjusted lower by 1 dB from these levels for use as a Fixed device with an 8 dBi antenna gain, to comply with PSD limits.

The EUT output power is adjustable to comply with the lower power and PSD limits applicable for configuration as a Mode I device and/or configuration as a Mode II device.

8.1.3. POWER SPECTRAL DENSITY

LIMITS

For configuration as a Fixed TVBD, Limit = 12.2 dBm / 100 kHz for antenna gain $\leq$ 6 dBi.

TEST PROCEDURE

KDB 416271 R2

RESULTS

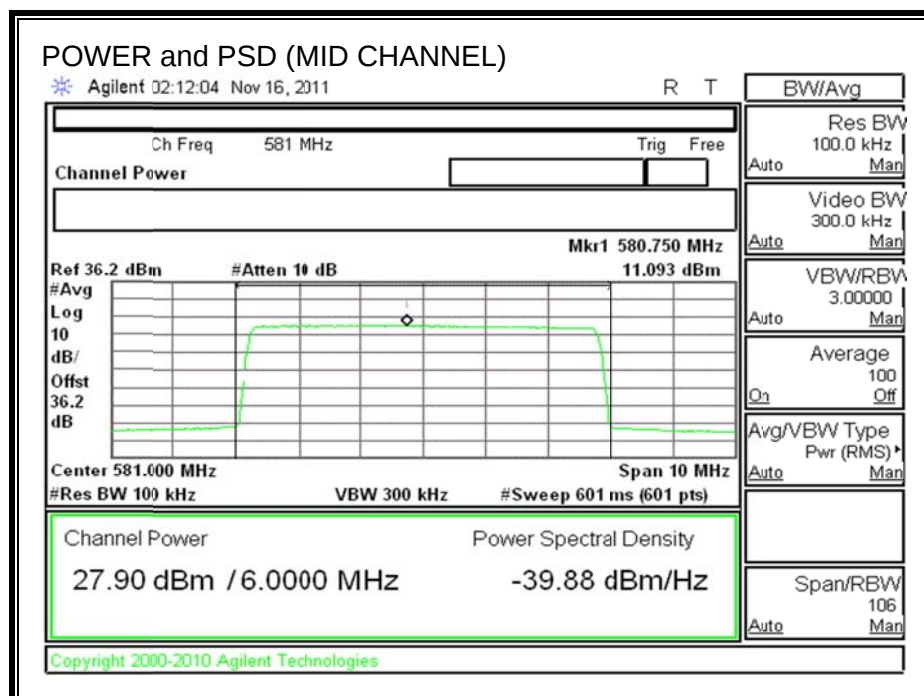
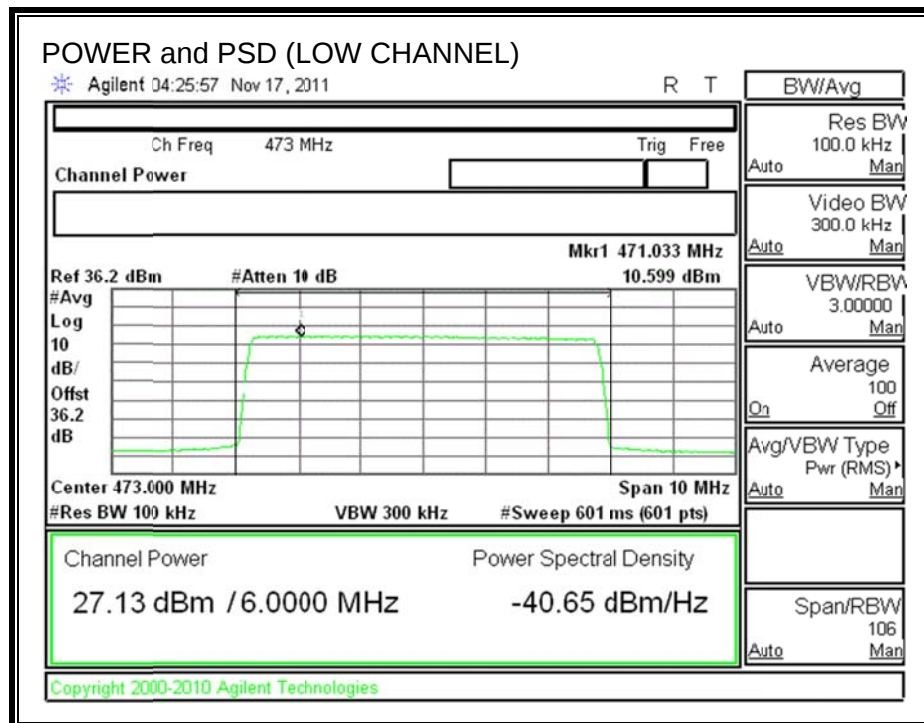
Frequency (MHz)	PSD (dBm/100 kHz)	PSD Limit (dBm/100 kHz)	Delta (dB)
473	10.60	12.20	-1.60
581	11.09	12.20	-1.11
695	10.68	12.20	-1.52

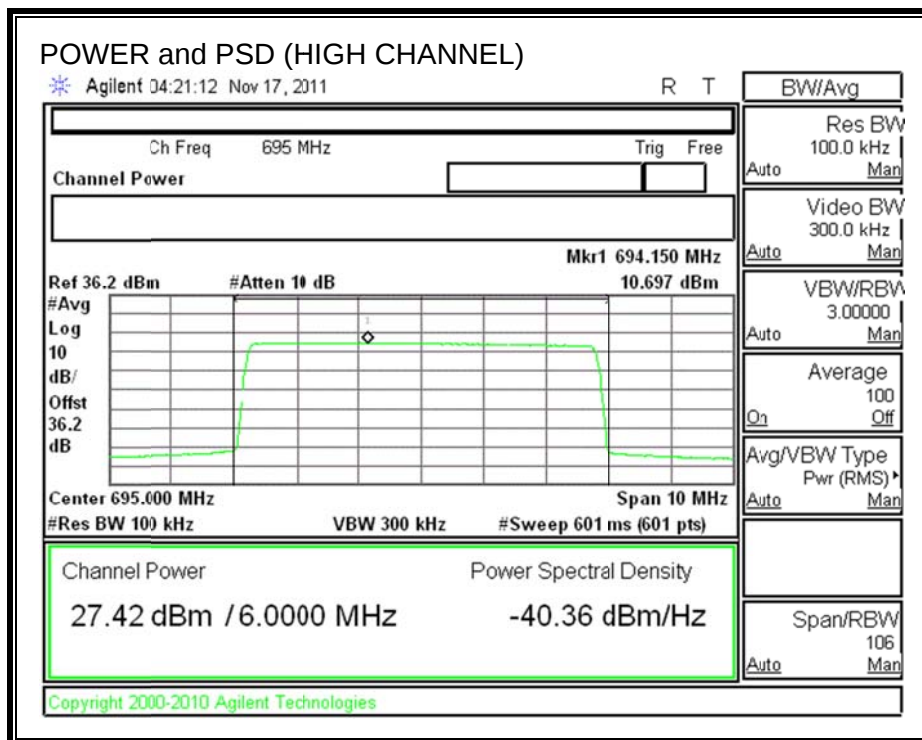
Notes: The output power associated with the above PSD result is applicable for use as a Fixed device with an antenna gain less than or equal to 7 dBi, and still provide margin to the PSD limits. The EUT output power is adjusted lower by 1 dB from these levels for use as a Fixed device with an 8 dBi antenna gain, to comply with the PSD limits.

The EUT output power is adjustable to comply with the lower power and PSD limits applicable for configuration as a Mode I device and/or configuration as a Mode II device.

8.1.4. POWER / POWER SPECTRAL DENSITY PLOTS

PLOTS FOR POWER AND PSD





8.1.5. BANDEDGES

LIMITS

Power/100 kHz = Power/6 MHz - 72.8

where Power/6 MHz is the measured output power

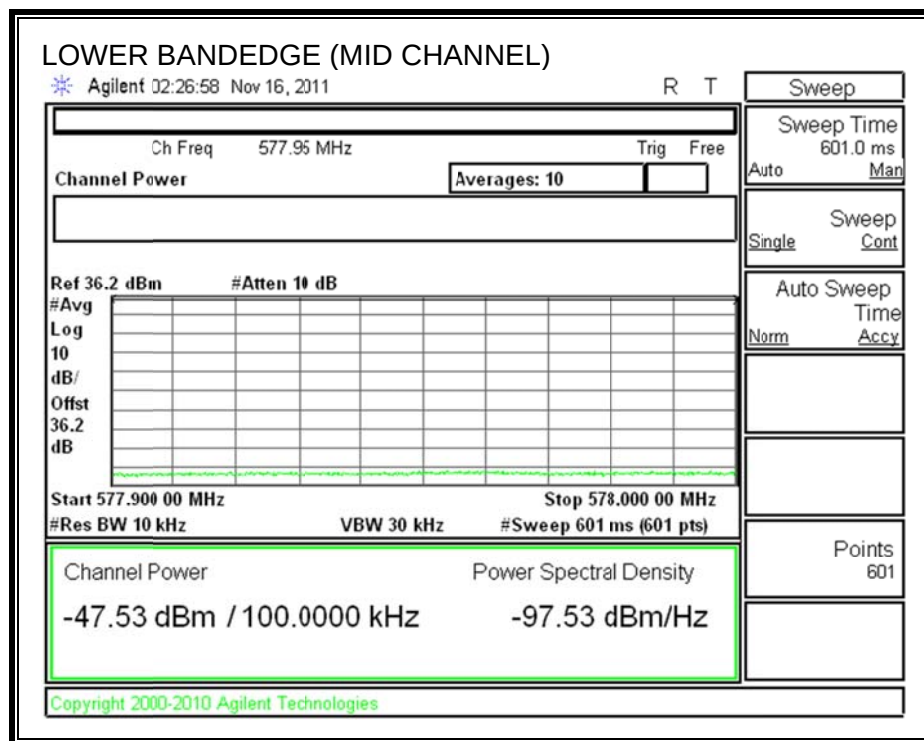
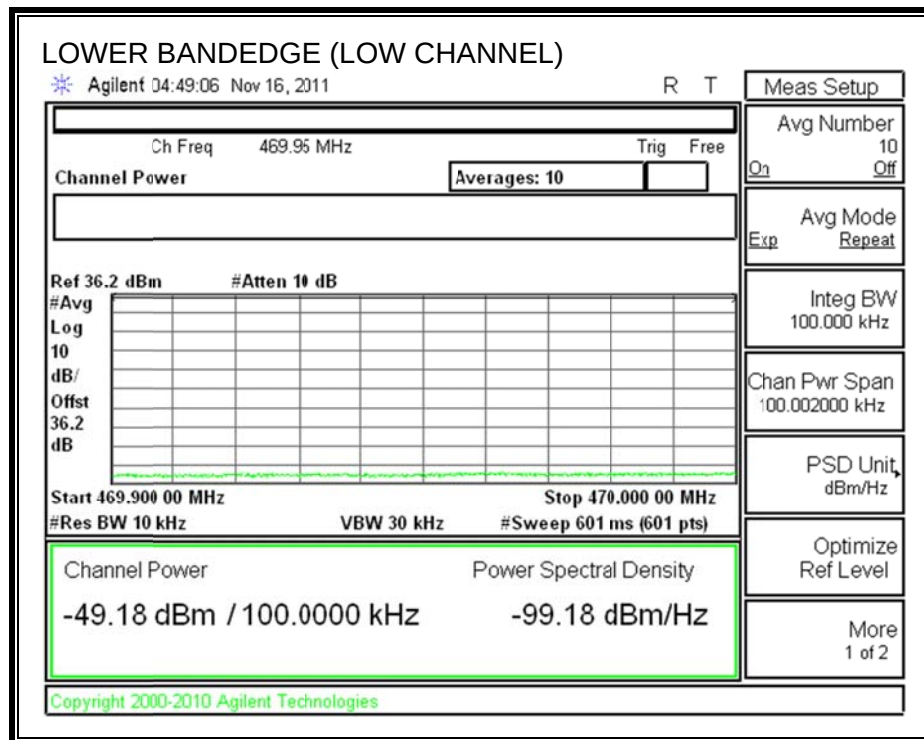
TEST PROCEDURE

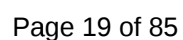
KDB 416271 R2

RESULTS

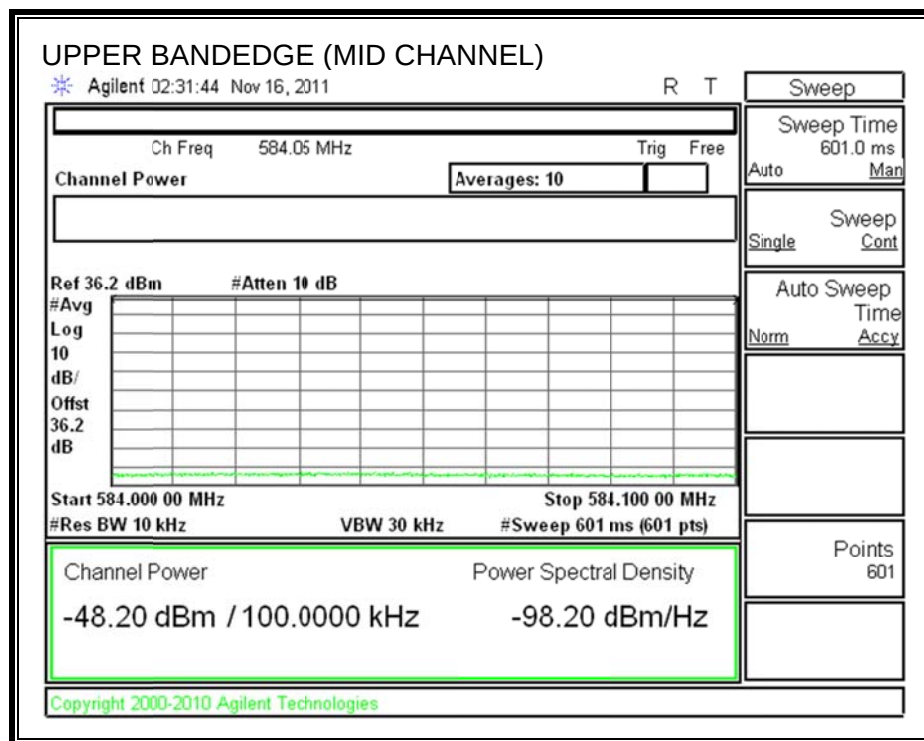
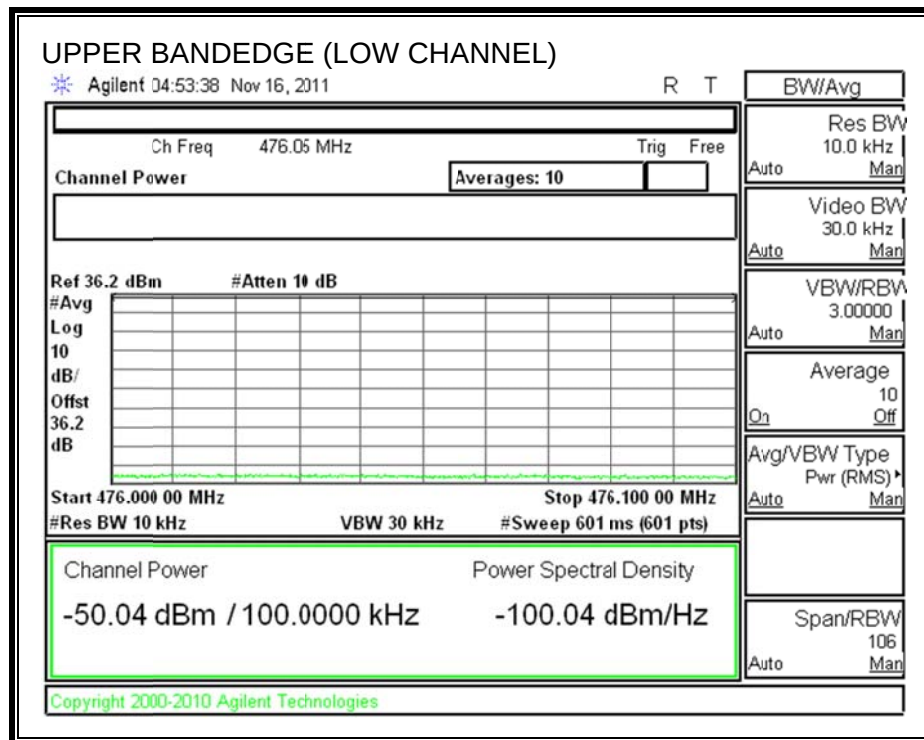
Frequency (MHz)	Output Power (dBm/6 MHz)	Bandedge Limit (dBm/100 kHz)	Lower Bandedge (dBm/100 kHz)	Lower Delta (dB)	Upper Bandedge (dBm/100 kHz)	Upper Delta (dB)
473	27.13	-45.67	-49.18	-3.51	-50.04	-4.37
581	27.90	-44.90	-47.53	-2.63	-48.20	-3.30
695	27.42	-45.38	-47.02	-1.64	-48.36	-2.98

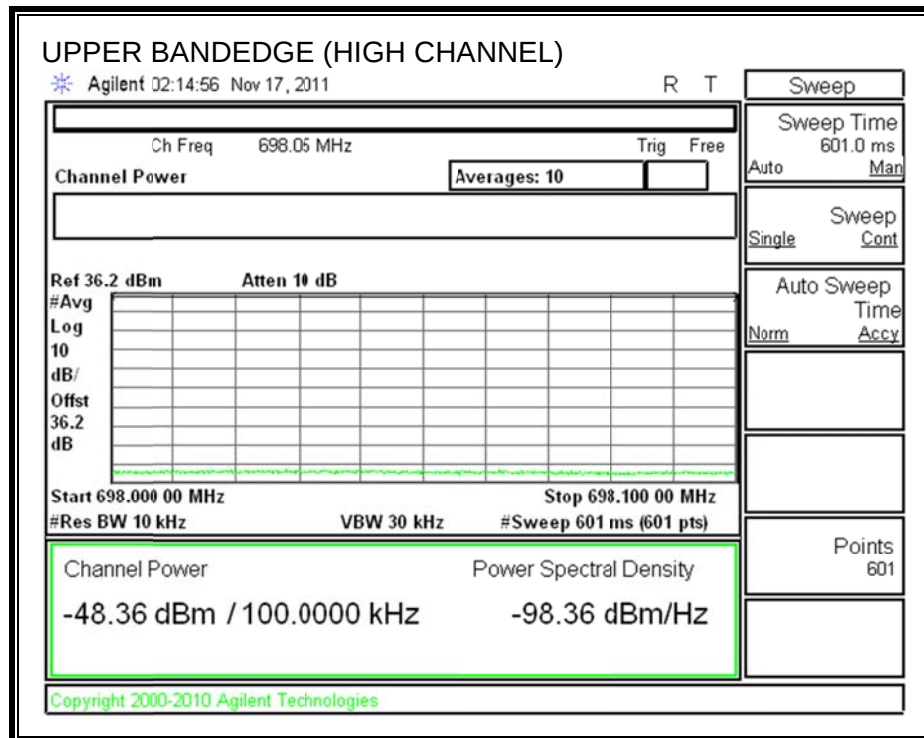
LOWER BANDEDGE





UPPER BANDEDGE





8.1.6. ADJACENT CHANNEL EMISSIONS

LIMITS

$\text{Power}/100 \text{ kHz} = \text{Power}/6 \text{ MHz} - 72.8$

where Power/6 MHz is the measured output power

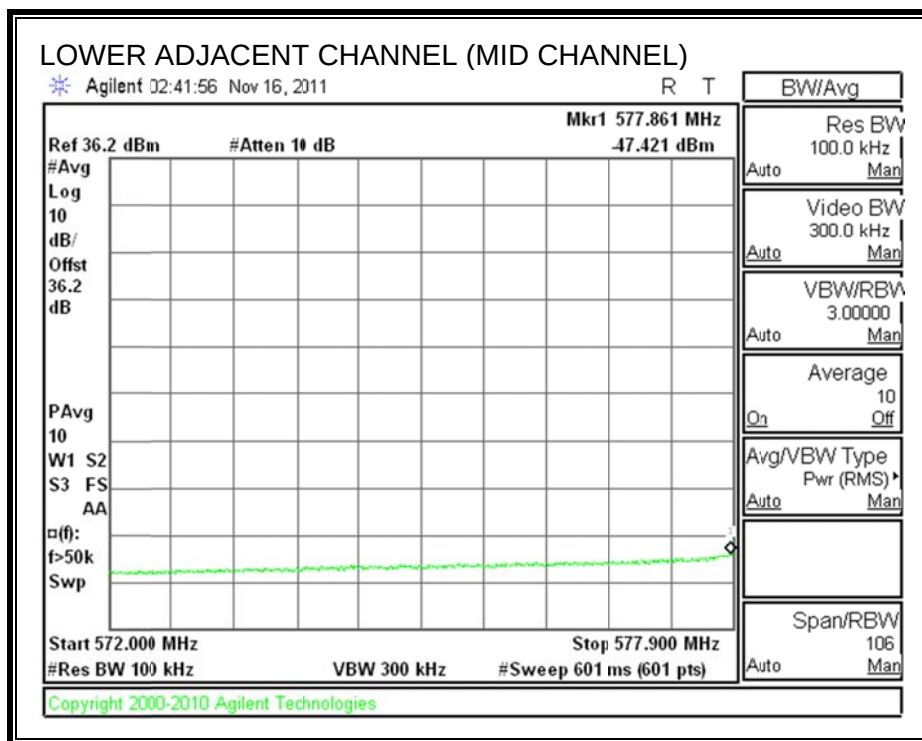
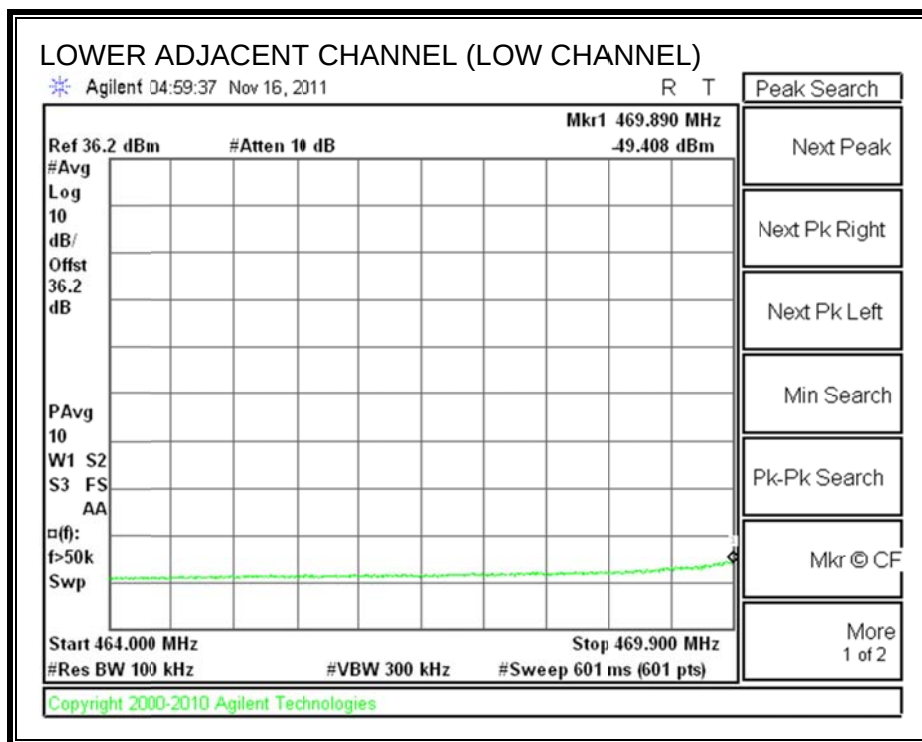
TEST PROCEDURE

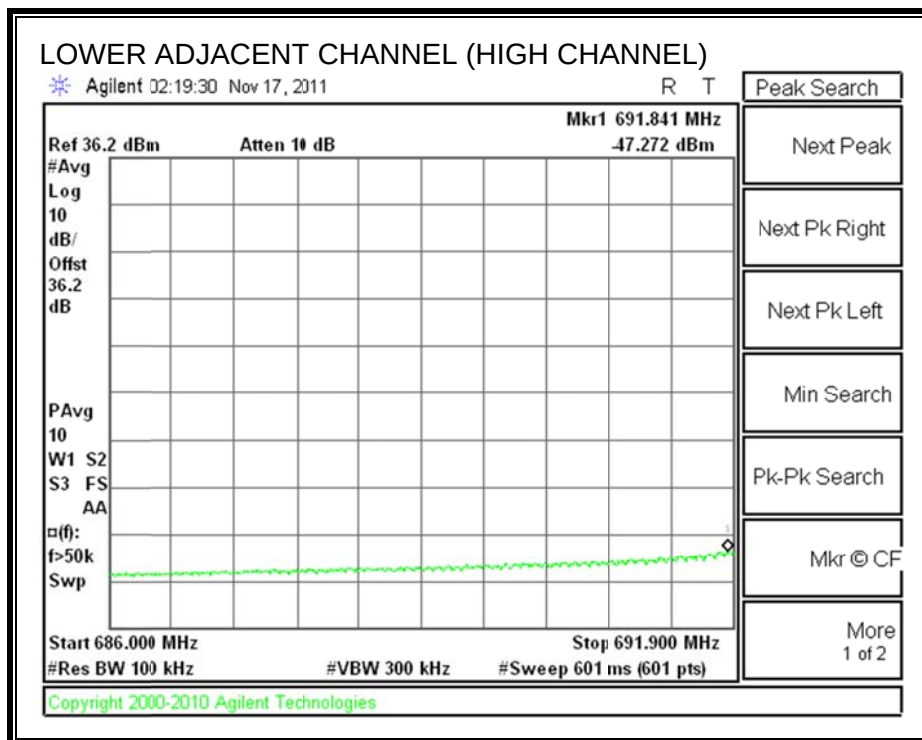
KDB 416271 R2

RESULTS

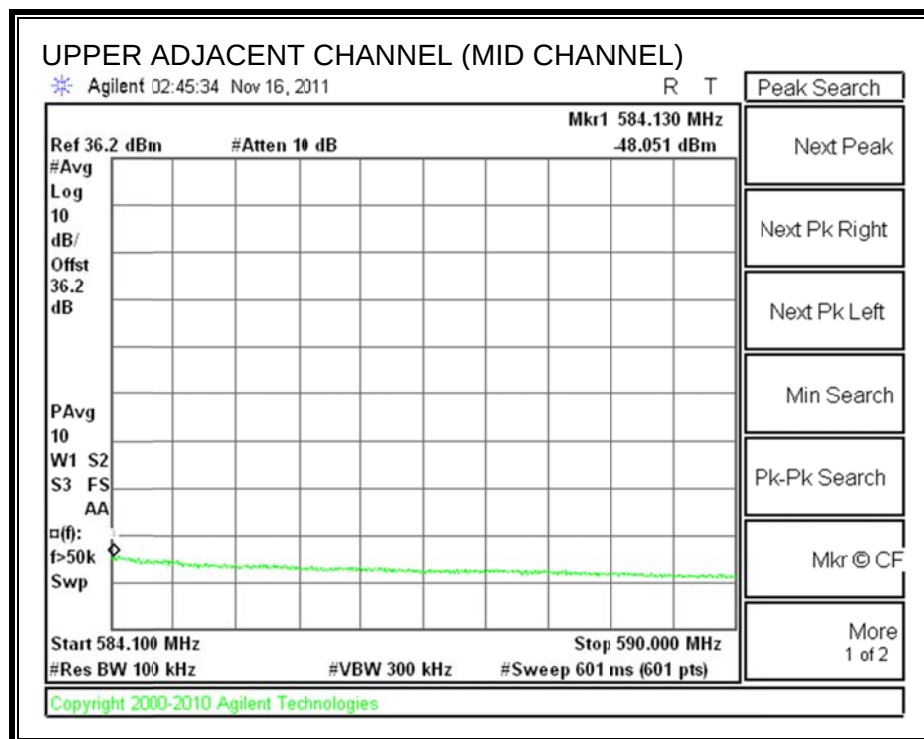
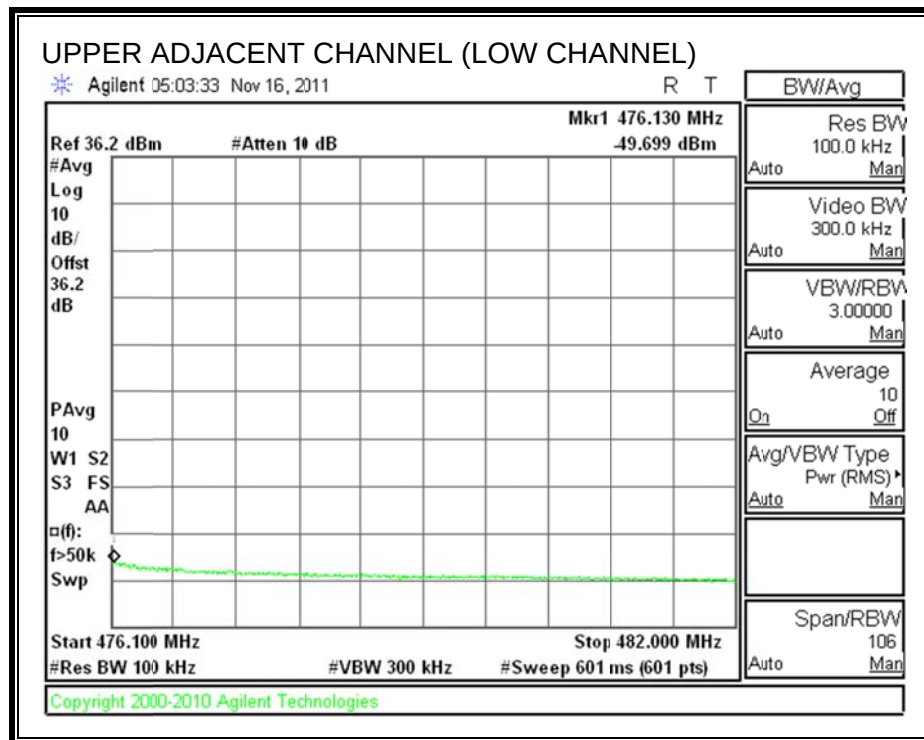
Frequency (MHz)	Output Power (dBm/6 MHz)	Emissions Limit (dBm/100 kHz)	Lower Adjacent Channel Emissions (dBm/100 kHz)	Lower Delta (dB)	Upper Adjacent Channel Emissions (dBm/100 kHz)	Upper Delta (dB)
473	27.13	-45.67	-49.41	-3.74	-49.70	-4.03
581	27.90	-44.90	-47.42	-2.52	-48.05	-3.15
695	27.42	-45.38	-47.27	-1.89	-48.24	-2.86

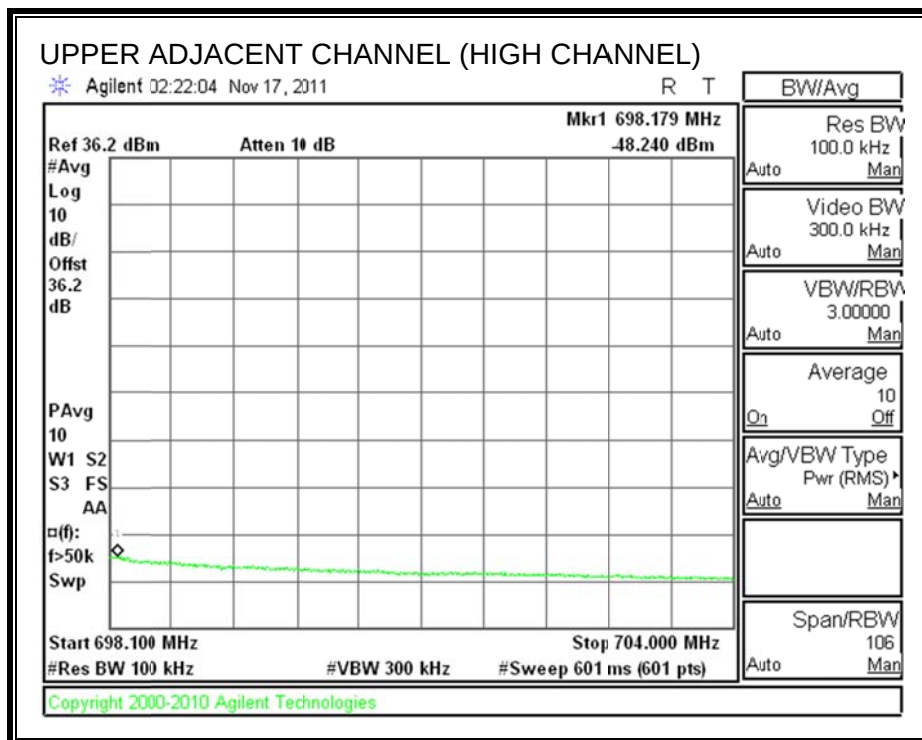
LOWER ADJACENT CHANNEL





UPPER ADJACENT CHANNEL





8.2. ANTENNA PORT TEST RESULTS (16QAM)

8.2.1. CONDUCTED AVERAGE OUTPUT POWER

LIMITS

None, for reporting and reference purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter via a power splitter and 10 dB pad.

RESULTS

Channel	Frequency (MHz)	Measured Power (dBm)
Low	473	26.4
Middle	581	27.0
High	695	27.0

8.2.2. POWER

LIMITS

For configuration as a Fixed TVBD with Antenna Gain = 8 dBi, Limit = 28 dBm

TEST PROCEDURE

KDB 416271 R2

RESULTS

Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Delta (dB)
473	27.11	28.00	-0.89
581	27.75	28.00	-0.25
695	27.32	28.00	-0.68

Notes: The output power reported above is applicable for use as a Fixed device with an antenna gain less than or equal to 7 dBi and still provide margin to the PSD limits. The EUT output power is adjusted lower by 1 dB from these levels for use as a Fixed device with an 8 dBi antenna gain, to comply with PSD limits.

The EUT output power is adjustable to comply with the lower power and PSD limits applicable for configuration as a Mode I device and/or configuration as a Mode II device.

8.2.3. POWER SPECTRAL DENSITY

LIMITS

For configuration as a Fixed TVBD, Limit = 12.2 dBm / 100 kHz for antenna gain $\leq$ 6 dBi.

TEST PROCEDURE

KDB 416271 R2

RESULTS

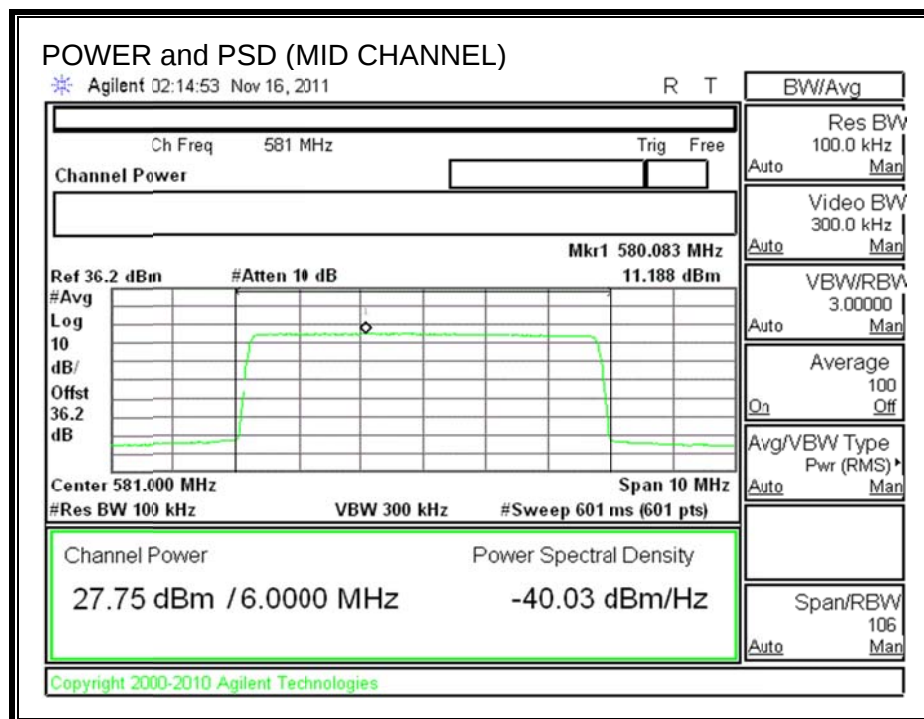
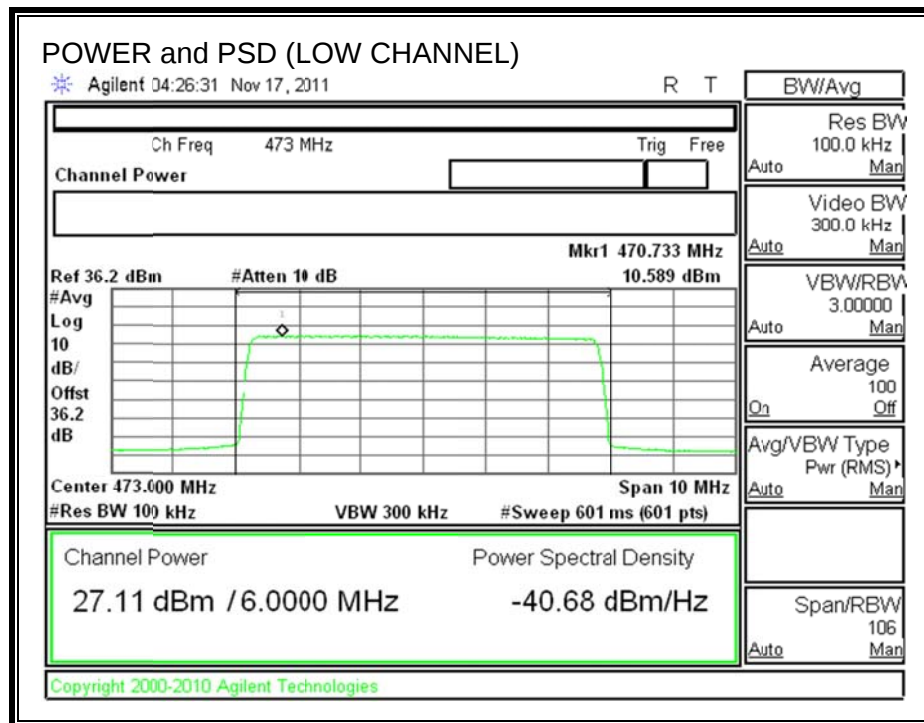
Frequency (MHz)	PSD (dBm/100 kHz)	PSD Limit (dBm/100 kHz)	Delta (dB)
473	10.59	12.20	-1.61
581	11.19	12.20	-1.01
695	10.44	12.20	-1.76

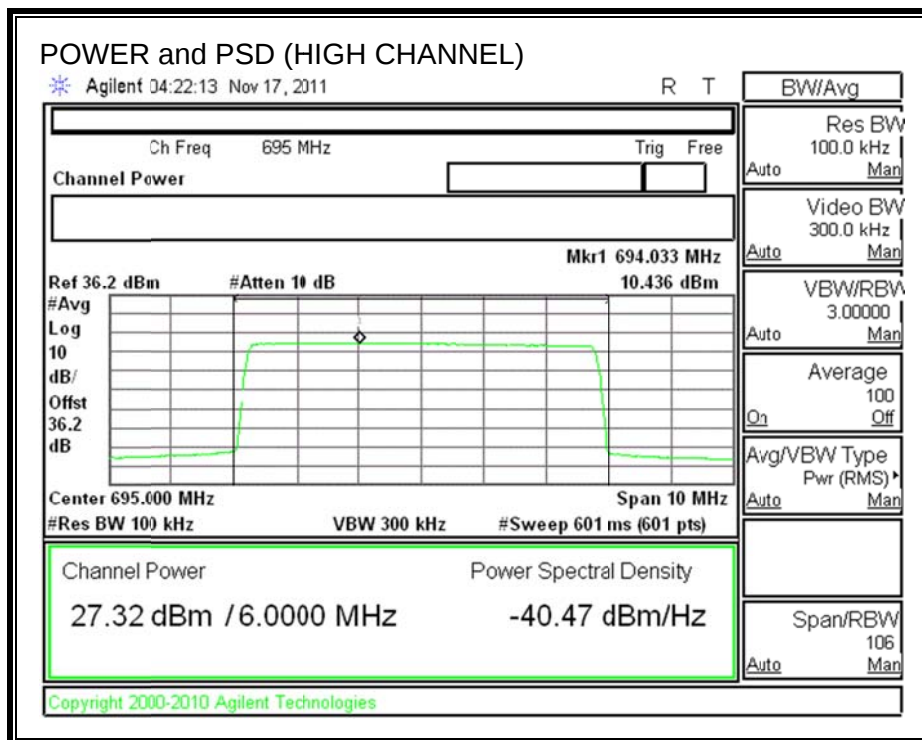
Notes: The output power associated with the above PSD result is applicable for use as a Fixed device with an antenna gain less than or equal to 7 dBi, and still provide margin to the PSD limits. The EUT output power is adjusted lower by 1 dB from these levels for use as a Fixed device with an 8 dBi antenna gain, to comply with the PSD limits.

The EUT output power is adjustable to comply with the lower power and PSD limits applicable for configuration as a Mode I device and/or configuration as a Mode II device.

8.2.4. POWER / POWER SPECTRAL DENSITY PLOTS

PLOTS FOR POWER AND PSD





8.2.5. BANDEDGES

LIMITS

Power/100 kHz = Power/6 MHz -72.8MHz

where Power/6 MHz is the measured output power

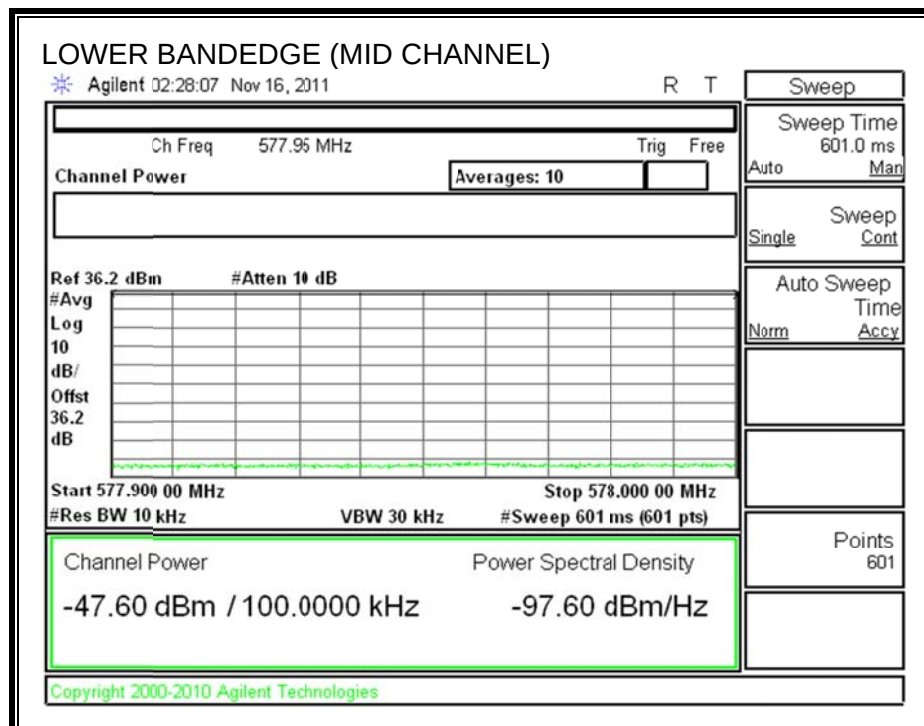
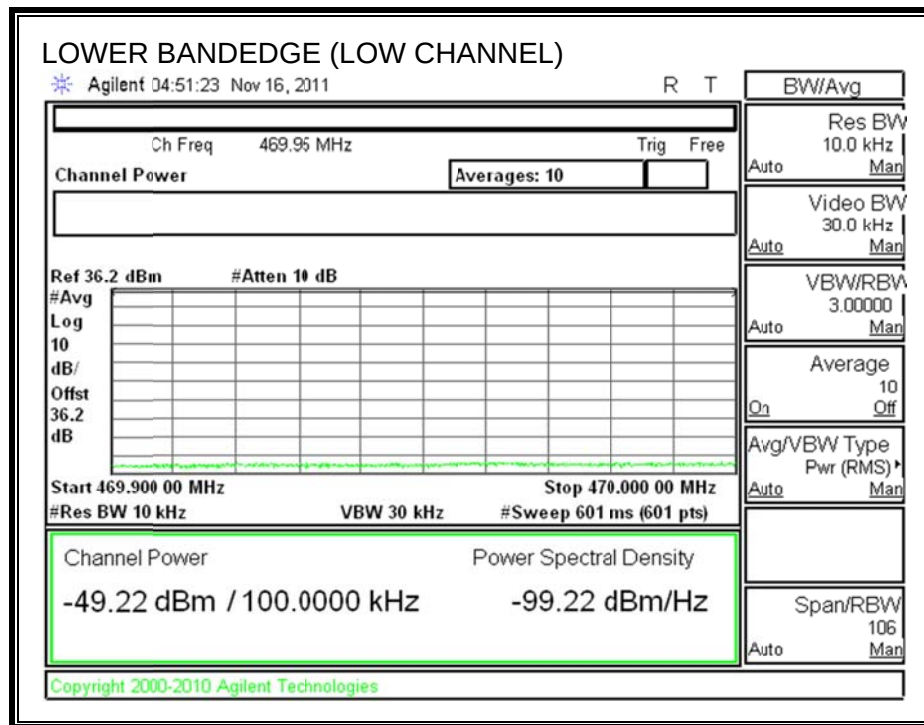
TEST PROCEDURE

KDB 416271 R2

RESULTS

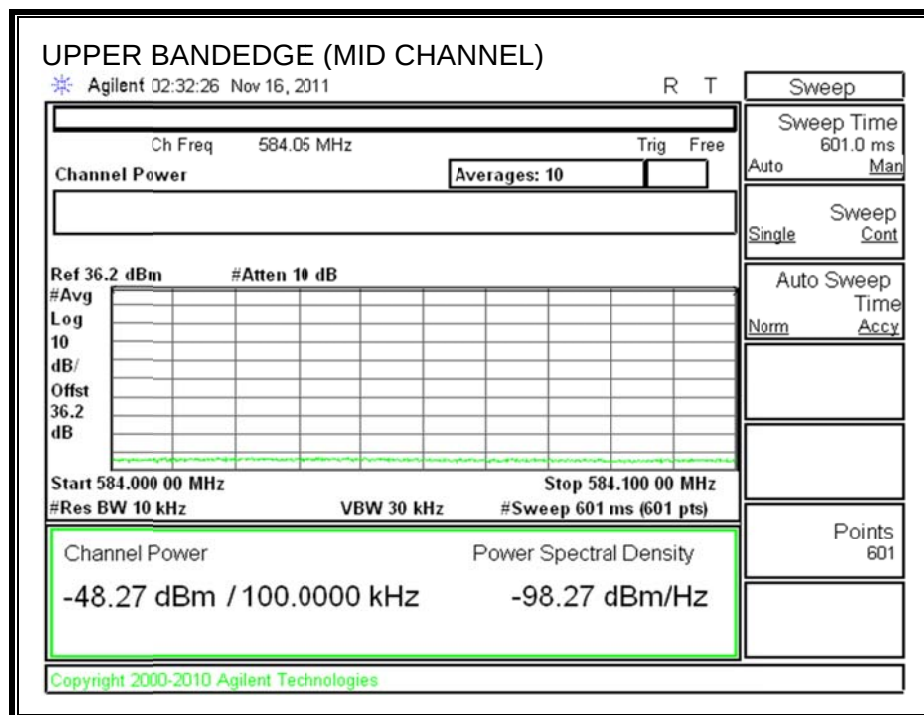
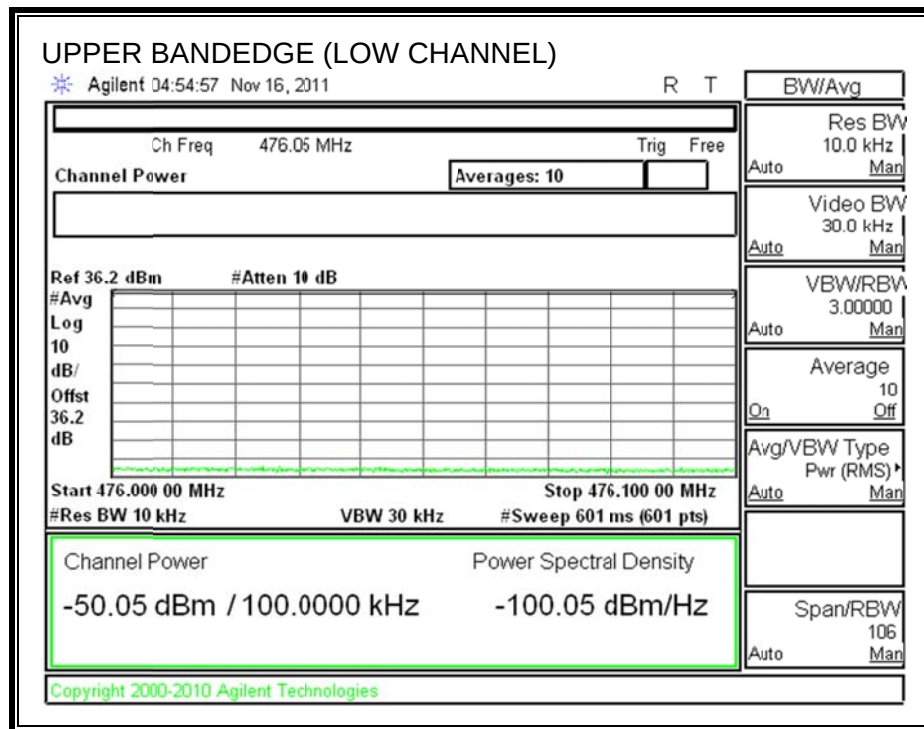
Frequency (MHz)	Output Power (dBm/6 MHz)	Bandedge Limit (dBm/100 kHz)	Lower Bandedge (dBm/100 kHz)	Lower Delta (dB)	Upper Bandedge (dBm/100 kHz)	Upper Delta (dB)
473	27.11	-45.69	-49.22	-3.53	-50.05	-4.36
581	27.75	-45.05	-47.60	-2.55	-48.37	-3.32
695	27.32	-45.48	-47.17	-1.69	-48.39	-2.91

LOWER BANDEDGE





UPPER BANDEDGE



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8.2.6. ADJACENT CHANNEL EMISSIONS

LIMITS

Power/100 kHz = Power/6 MHz -72.8MHz

where Power/6 MHz is the measured output power

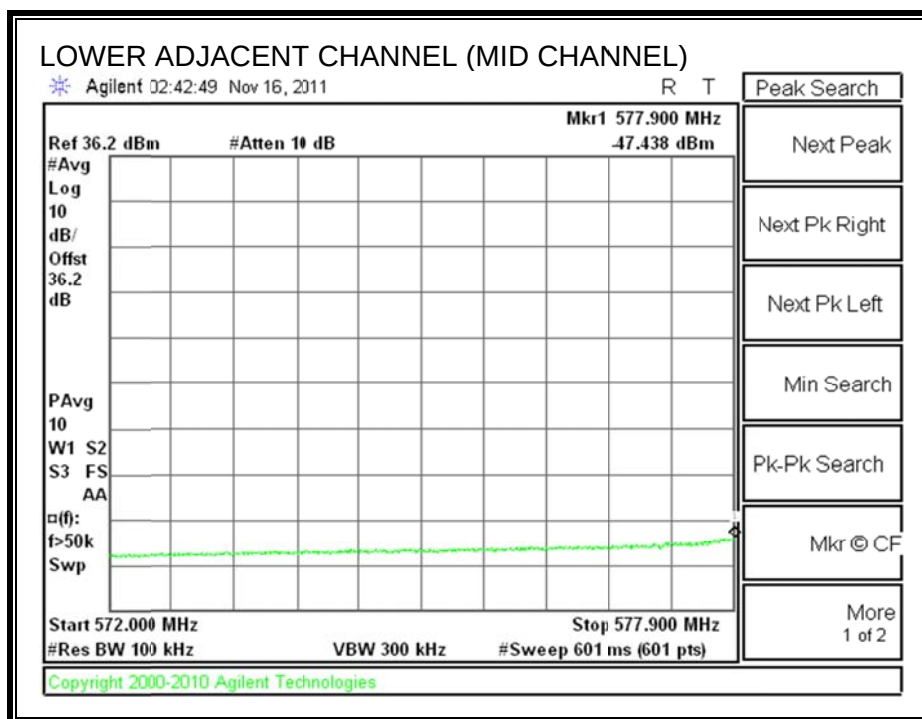
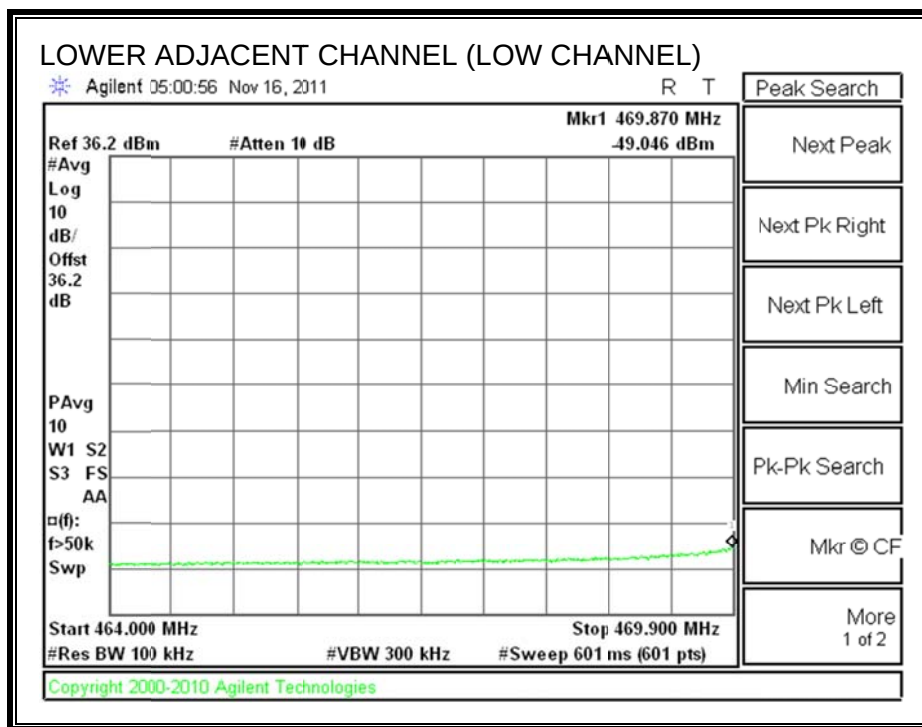
TEST PROCEDURE

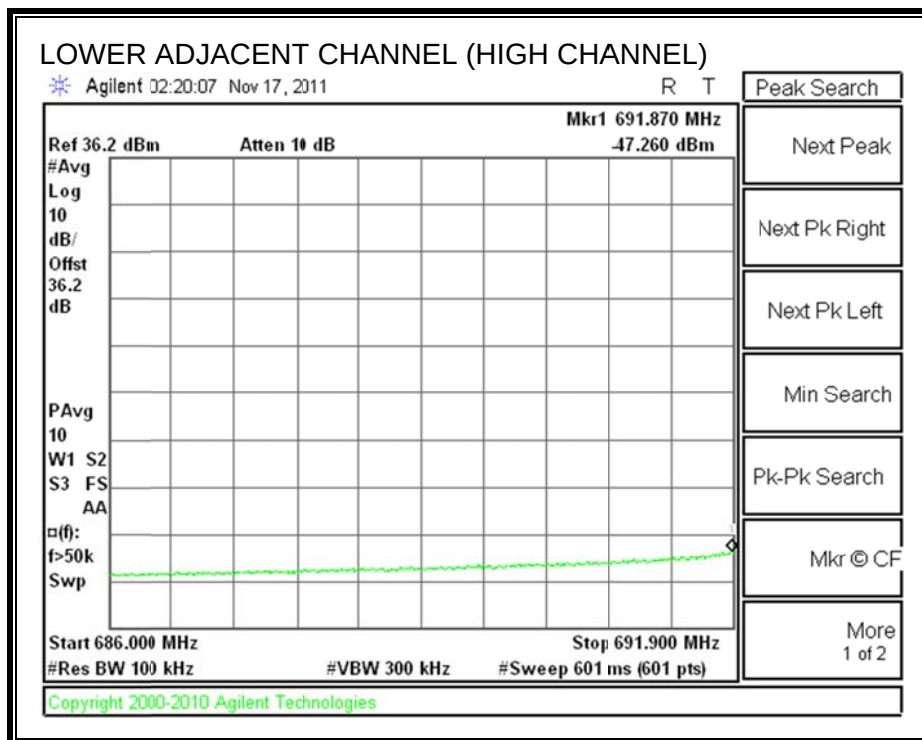
KDB 416271 R2

RESULTS

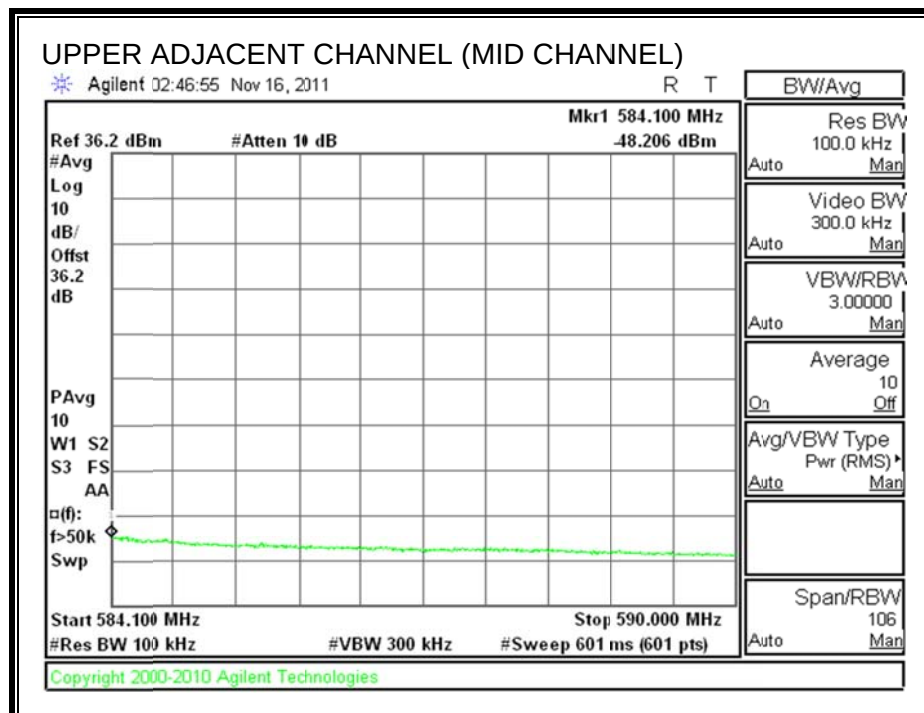
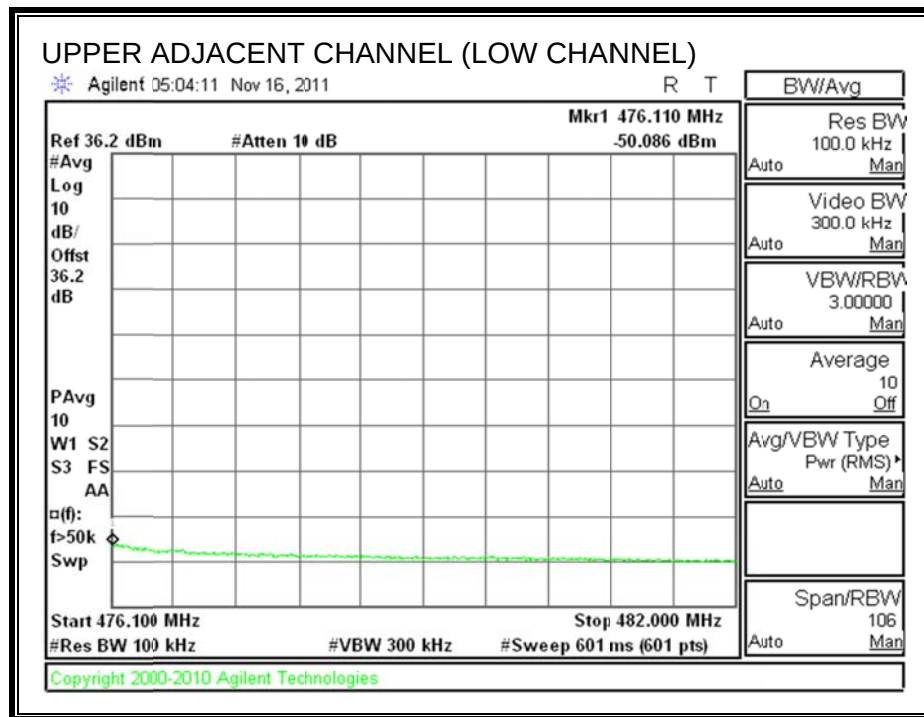
Frequency (MHz)	Output Power (dBm/6 MHz)	Emissions Limit (dBm/100 kHz)	Lower Adjacent Channel Emissions (dBm/100 kHz)	Lower Delta (dB)	Upper Adjacent Channel Emissions (dBm/100 kHz)	Upper Delta (dB)
473	27.11	-45.69	-49.05	-3.36	-50.09	-4.40
581	27.75	-45.05	-47.44	-2.39	-48.21	-3.16
695	27.32	-45.48	-47.26	-1.78	-48.27	-2.79

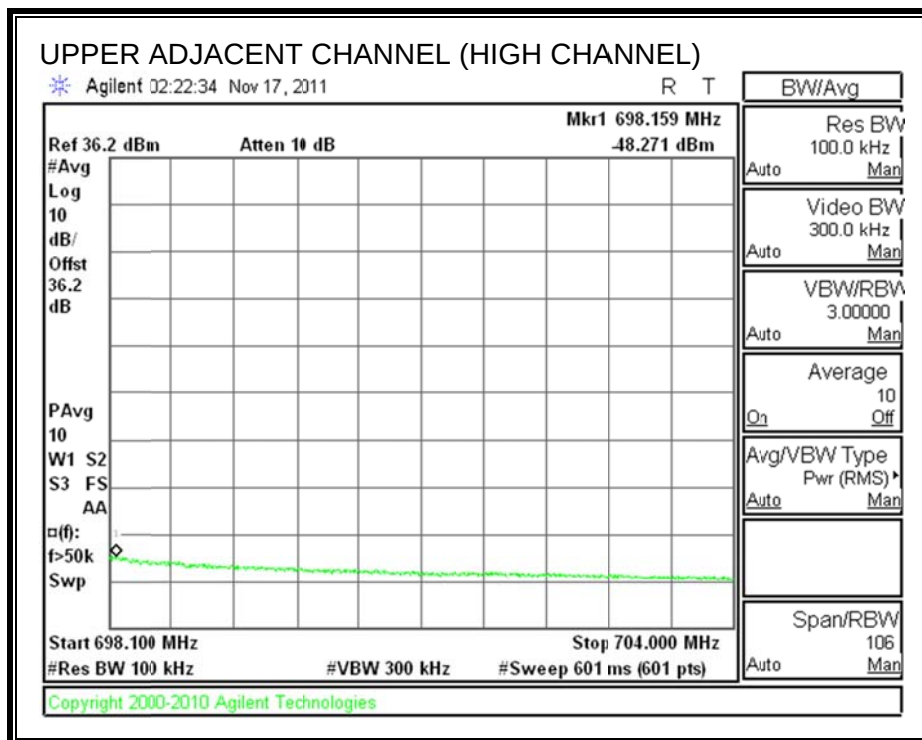
LOWER ADJACENT CHANNEL





UPPER ADJACENT CHANNEL





8.3. ANTENNA PORT TEST RESULTS (64QAM)

8.3.1. CONDUCTED AVERAGE OUTPUT POWER

LIMITS

None, for reporting and reference purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter via a power splitter and 10 dB pad.

RESULTS

Channel	Frequency (MHz)	Measured Power (dBm)
Low	473	26.8
Middle	581	27.7
High	695	27.3

8.3.2. POWER

LIMITS

For configuration as a Fixed TVBD with Antenna Gain = 8 dBi, Limit = 28 dBm

TEST PROCEDURE

KDB 416271 R2

RESULTS

Frequency (MHz)	Output Power (dBm)	Power Limit (dBm)	Delta (dB)
473	27.08	28.00	-0.92
581	27.71	28.00	-0.29
695	27.25	28.00	-0.75

Notes: The output power reported above is applicable for use as a Fixed device with an antenna gain less than or equal to 7 dBi and still provide margin to the PSD limits. The EUT output power is adjusted lower by 1 dB from these levels for use as a Fixed device with an 8 dBi antenna gain, to comply with PSD limits.

The EUT output power is adjustable to comply with the lower power and PSD limits applicable for configuration as a Mode I device and/or configuration as a Mode II device.

8.3.3. POWER SPECTRAL DENSITY

LIMITS

For configuration as a Fixed TVBD, Limit = 12.2 dBm / 100 kHz for antenna gain $\leq$ 6 dBi.

TEST PROCEDURE

KDB 416271 R2

RESULTS

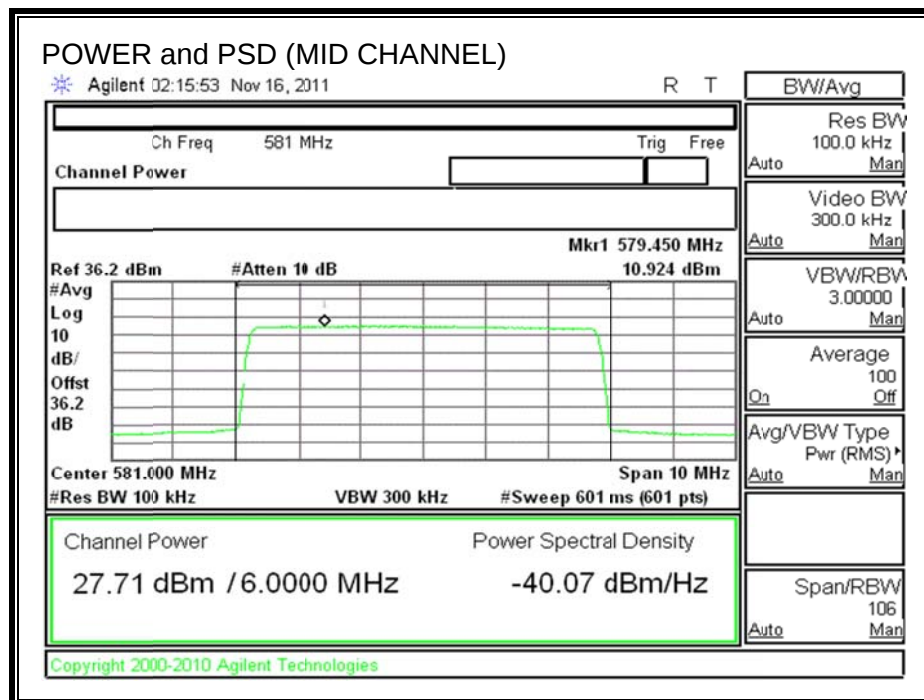
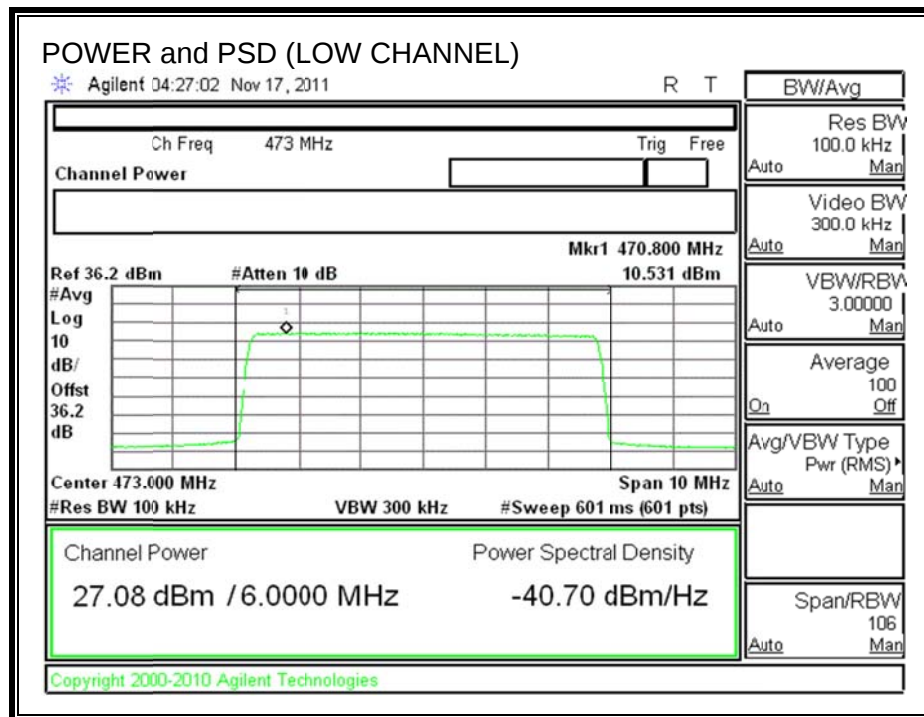
Frequency (MHz)	PSD (dBm/100 kHz)	PSD Limit (dBm/100 kHz)	Delta (dB)
473	10.53	12.20	-1.67
581	10.92	12.20	-1.28
695	10.45	12.20	-1.75

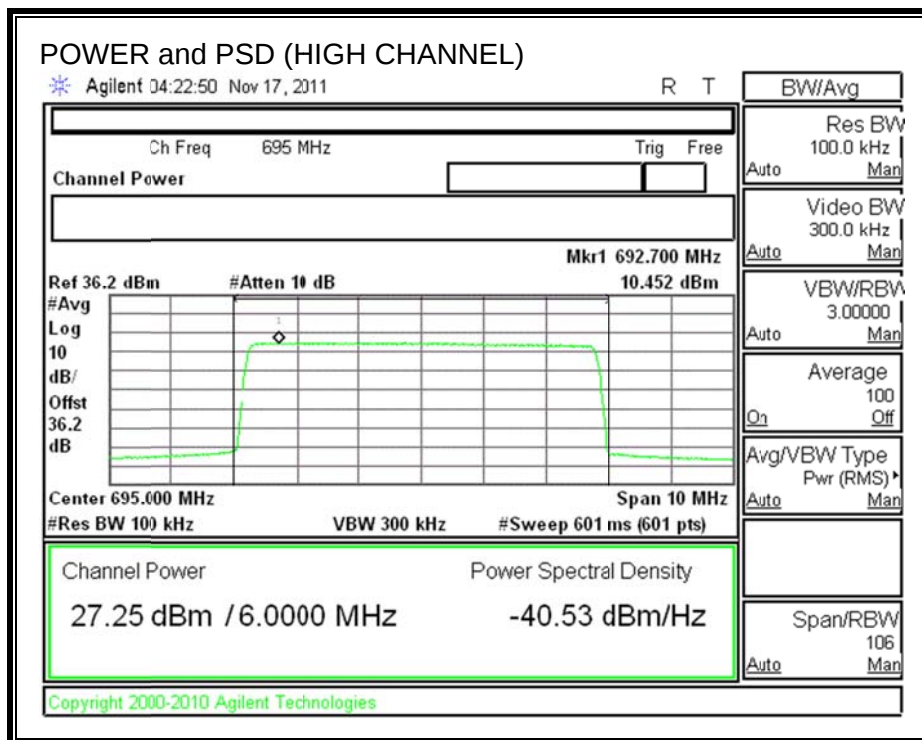
Notes: The output power associated with the above PSD result is applicable for use as a Fixed device with an antenna gain less than or equal to 7 dBi, and still provide margin to the PSD limits. The EUT output power is adjusted lower by 1 dB from these levels for use as a Fixed device with an 8 dBi antenna gain, to comply with the PSD limits.

The EUT output power is adjustable to comply with the lower power and PSD limits applicable for configuration as a Mode I device and/or configuration as a Mode II device.

8.3.4. POWER / POWER SPECTRAL DENSITY PLOTS

PLOTS FOR POWER AND PSD





8.3.5. BANDEDGES

LIMITS

Power/100 kHz = Power/6 MHz -72.8MHz

where Power/6 MHz is the measured output power

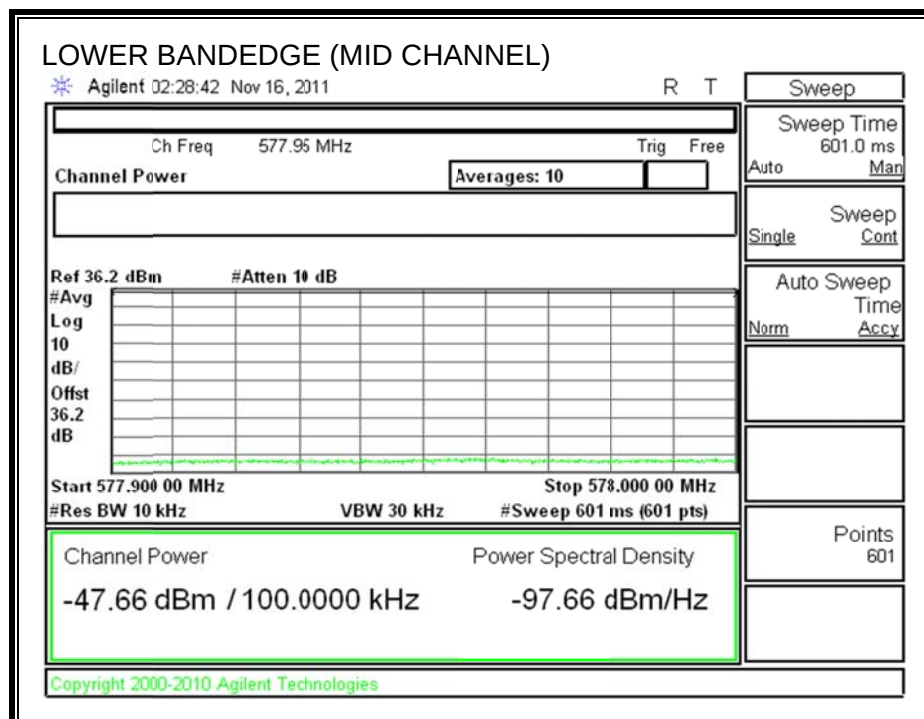
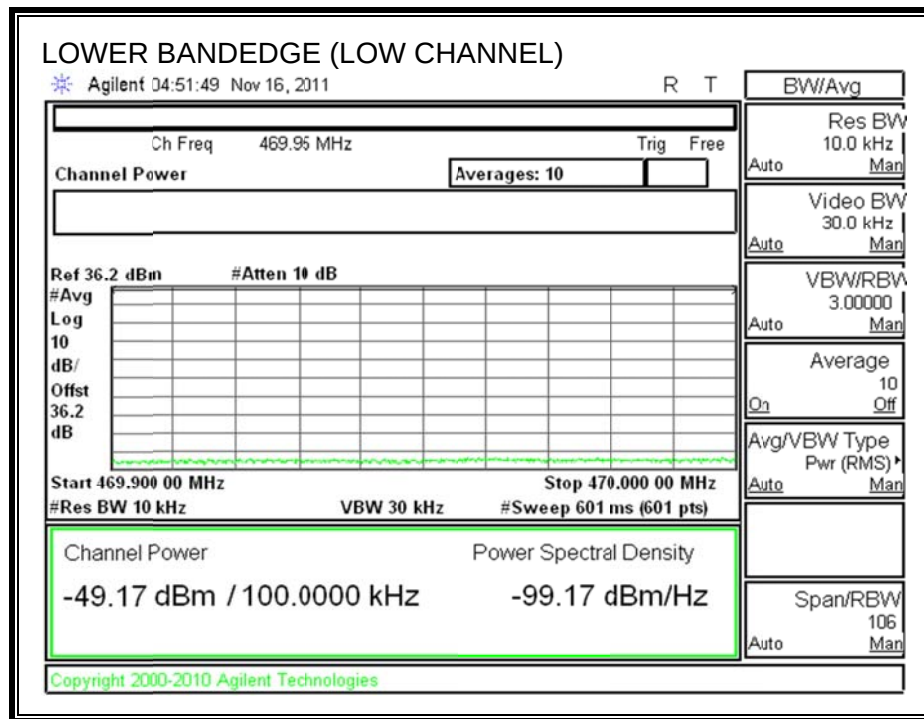
TEST PROCEDURE

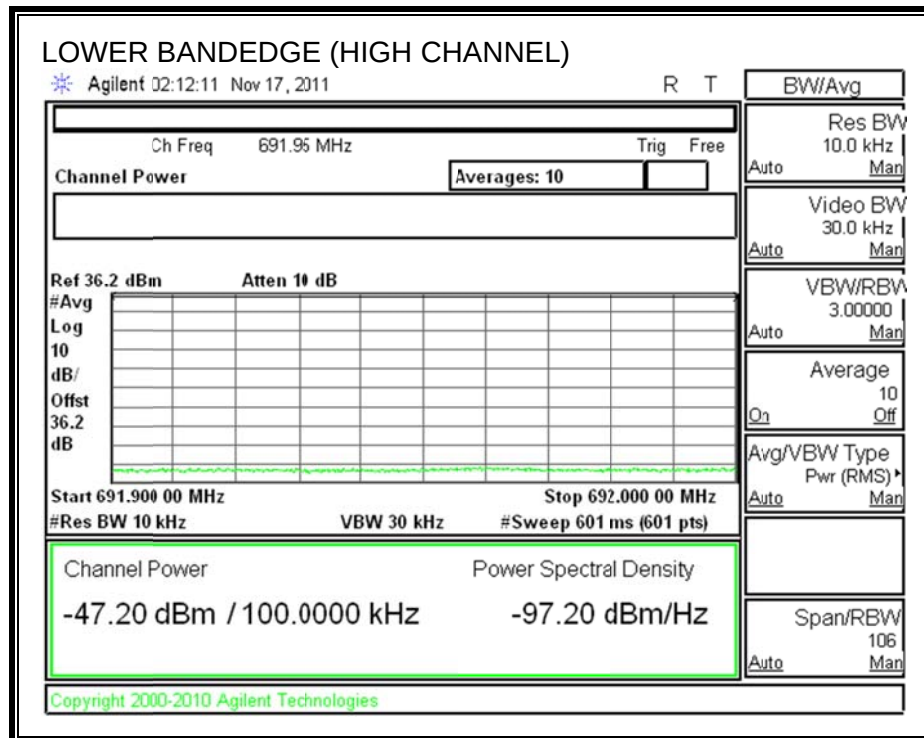
KDB 416271 R2

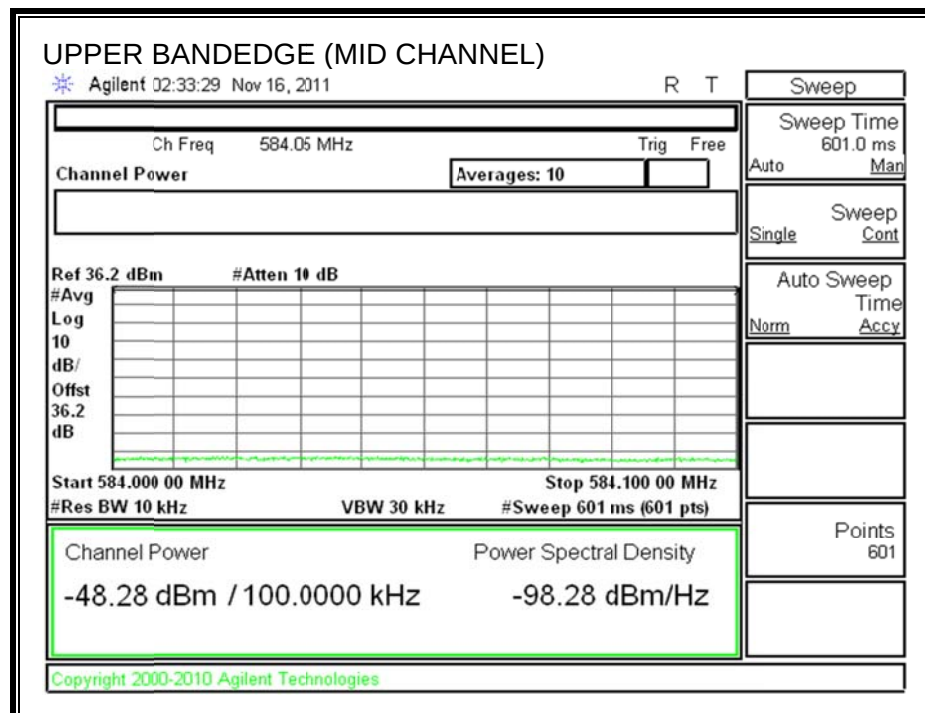
RESULTS

Frequency (MHz)	Output Power (dBm/6 MHz)	Bandedge Limit (dBm/100 kHz)	Lower Bandedge (dBm/100 kHz)	Lower Delta (dB)	Upper Bandedge (dBm/100 kHz)	Upper Delta (dB)
473	27.08	-45.72	-49.17	-3.45	-50.34	-4.62
581	27.71	-45.09	-47.66	-2.57	-48.28	-3.19
695	27.25	-45.55	-47.20	-1.65	-48.47	-2.92

LOWER BANDEDGE







UPPER BANDEDGE (HIGH CHANNEL)

Agilent 02:16:17 Nov 17, 2011

R

F

Freq/Channel

Ch Freq 698.05 MHz

Trig	Free
------	------

Channel Power

Averages: 10

Center Freq
698.050000 MHz

Start Freq
698.000000 MHz

Stop Freq
698.100000 MHz

CF Step
10.0000000 kHz
Auto Man

Freq Offset
0.00000000 Hz

Signal Track
On Off

Ref 36.2 dBm	
#Avg	
Log	
10	
dB/	
Offst	
36.2	
dB	

Atten 10 dB

Start 698.000 00 MHz

Stop 698.100 00 MHz

#Res BW 10 kHz

VBW 30 kHz

#Sweep 601 ms (601 pts)

Channel Power

Power Spectral Density

-48.47 dBm / 100.0000 kHz

-98.47 dBm/Hz

Copyright 2000-2010 Agilent Technologies

8.3.6. ADJACENT CHANNEL EMISSIONS

LIMITS

Power/100 kHz = Power/6 MHz -72.8MHz

where Power/6 MHz is the measured output power

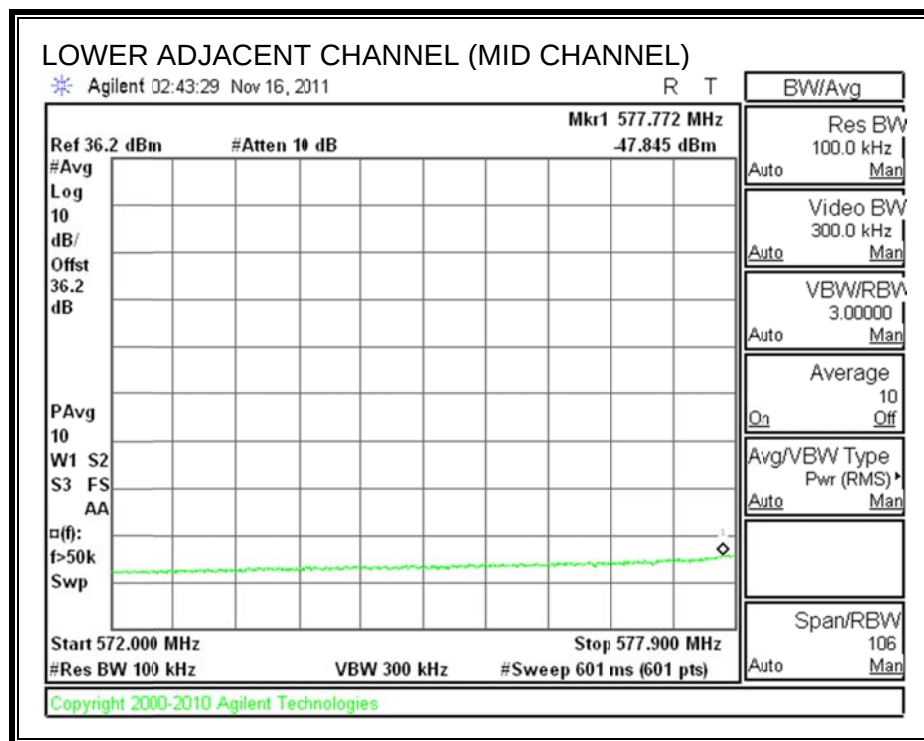
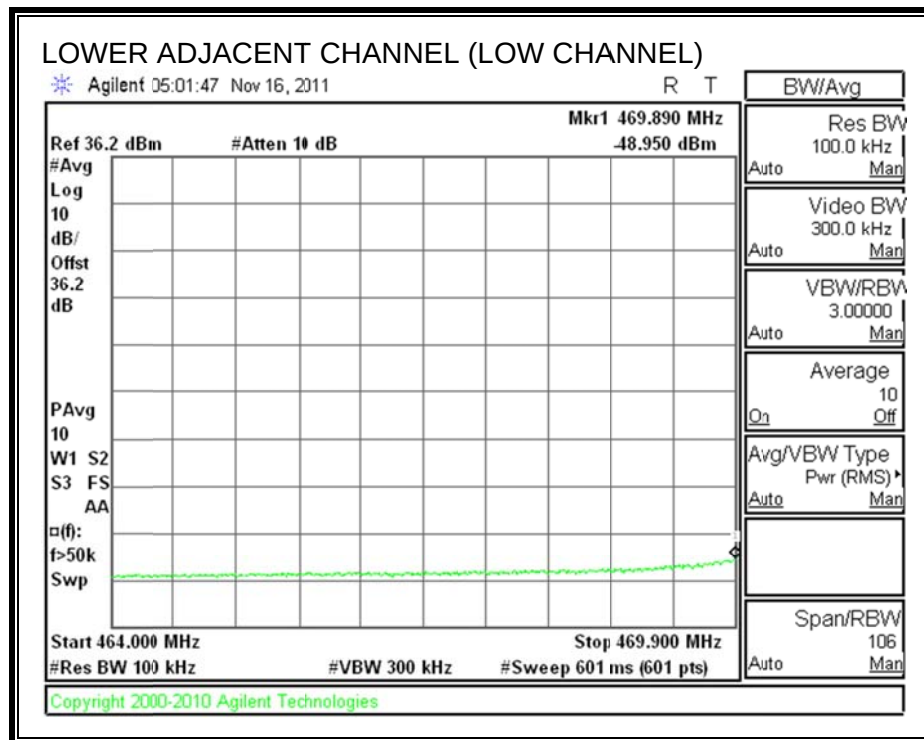
TEST PROCEDURE

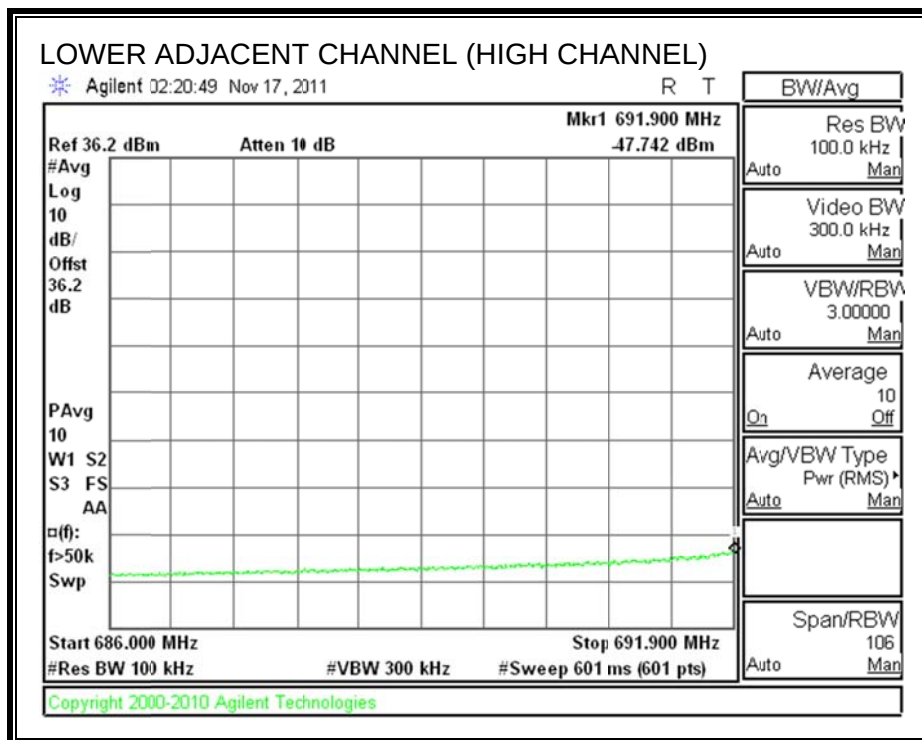
KDB 416271 R2

RESULTS

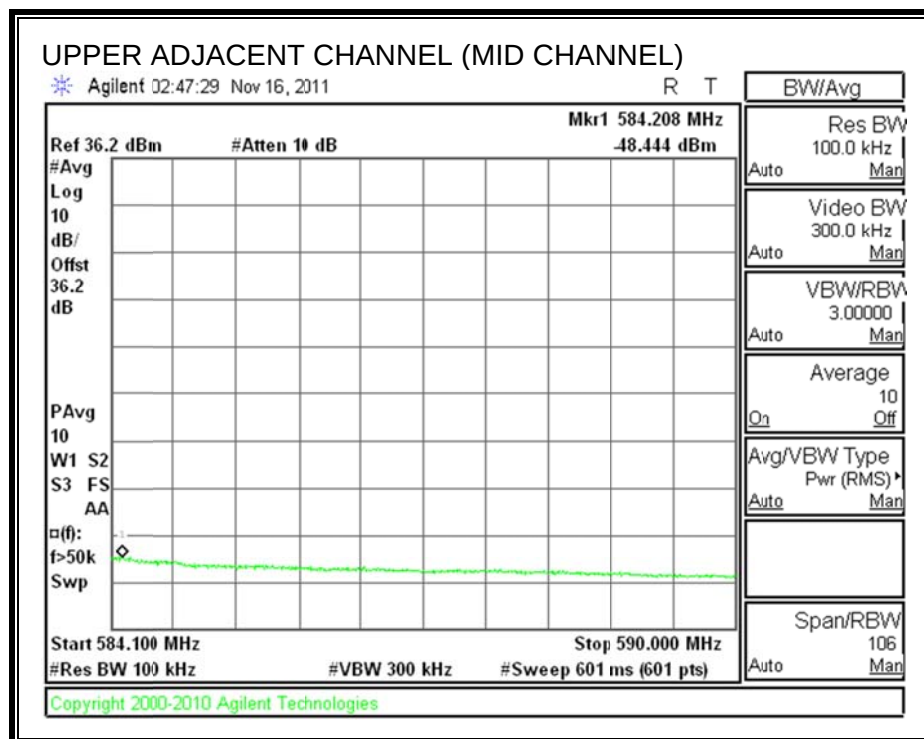
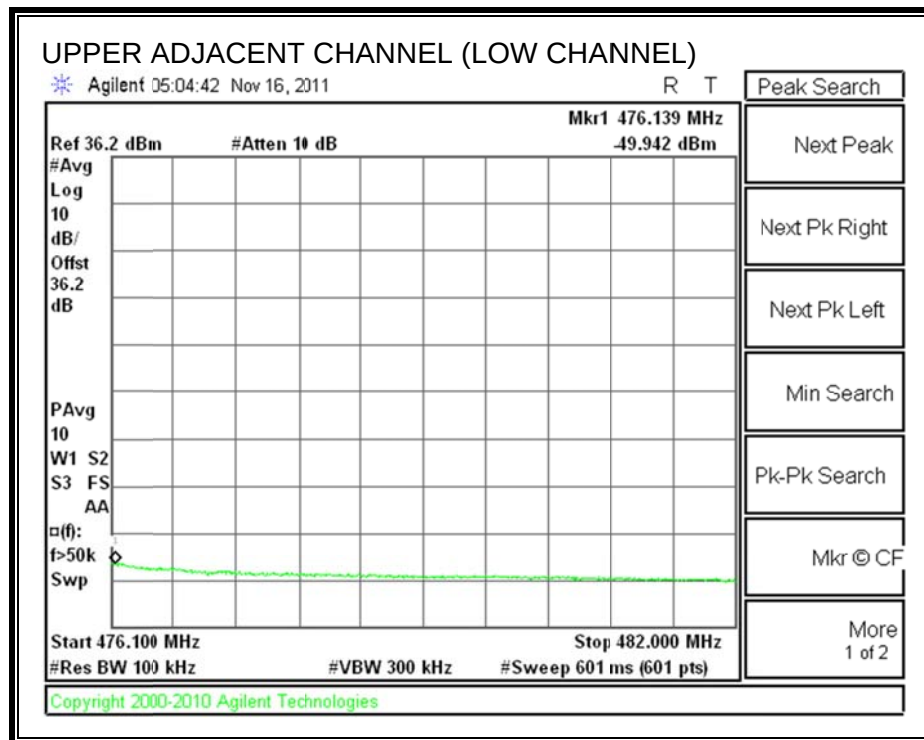
Frequency (MHz)	Output Power (dBm/6 MHz)	Emissions Limit (dBm/100 kHz)	Lower Adjacent Channel Emissions (dBm/100 kHz)	Lower Delta (dB)	Upper Adjacent Channel Emissions (dBm/100 kHz)	Upper Delta (dB)
473	27.08	-45.72	-48.95	-3.23	-49.94	-4.22
581	27.71	-45.1	-47.85	-2.76	-48.44	-3.35
695	27.25	-45.55	-47.74	-2.19	-48.29	-2.74

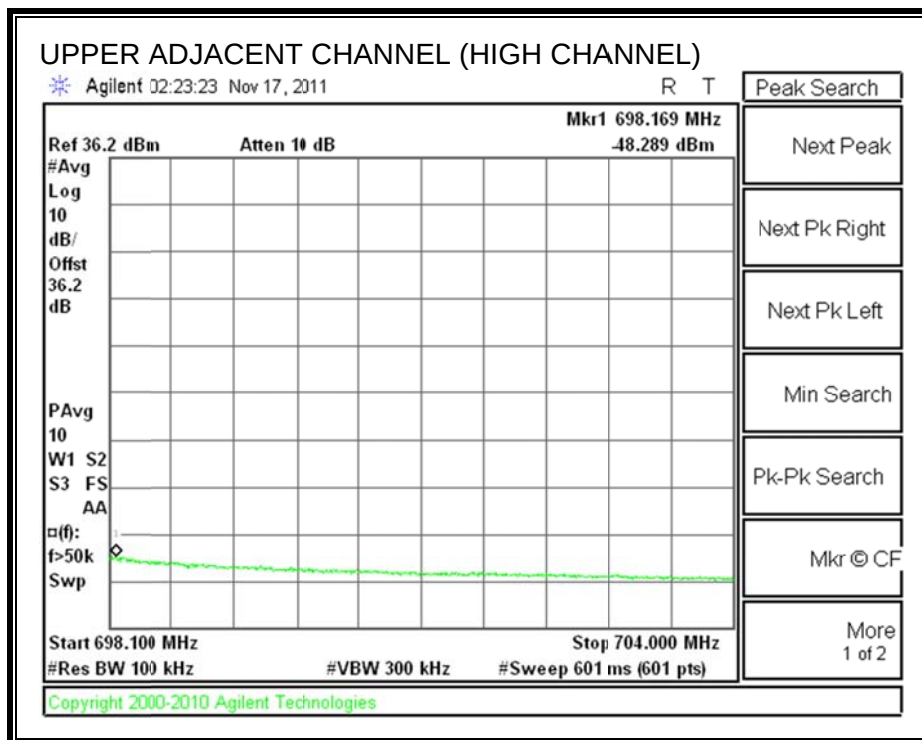
LOWER ADJACENT CHANNEL





UPPER ADJACENT CHANNEL





8.4. RADIATED EMISSIONS

LIMITS

FCC §15.709 (c) (3) At frequencies beyond the television channels immediately adjacent to the channel in which the TVBD is operating, the radiated emissions from TVBDs shall meet the requirements of §15.209.

Excluding Carrier Frequency +/- 9 MHz, the §15.209 limits are:

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

FCC §15.701 (c) (4) Emissions in the band 602–620 MHz must also comply with the following field strength limits at a distance of one meter.

Frequency (MHz)	Field strength dBuV/meter/120 kHz
602–607	$120-5[F(\text{MHz})-602]$
607–608	95
608–614	30
614–615	95
615–620	$120-5[620-F(\text{MHz})]$

STANDARD TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to either 100 kHz, or CISPR 120 kHz, for peak detection measurements, and always set to CISPR 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 7 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

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.

High-Q Cavity Notch filters are used to reduce the amplitude of the intentional transmitter and prevent overload of the system preamplifier.

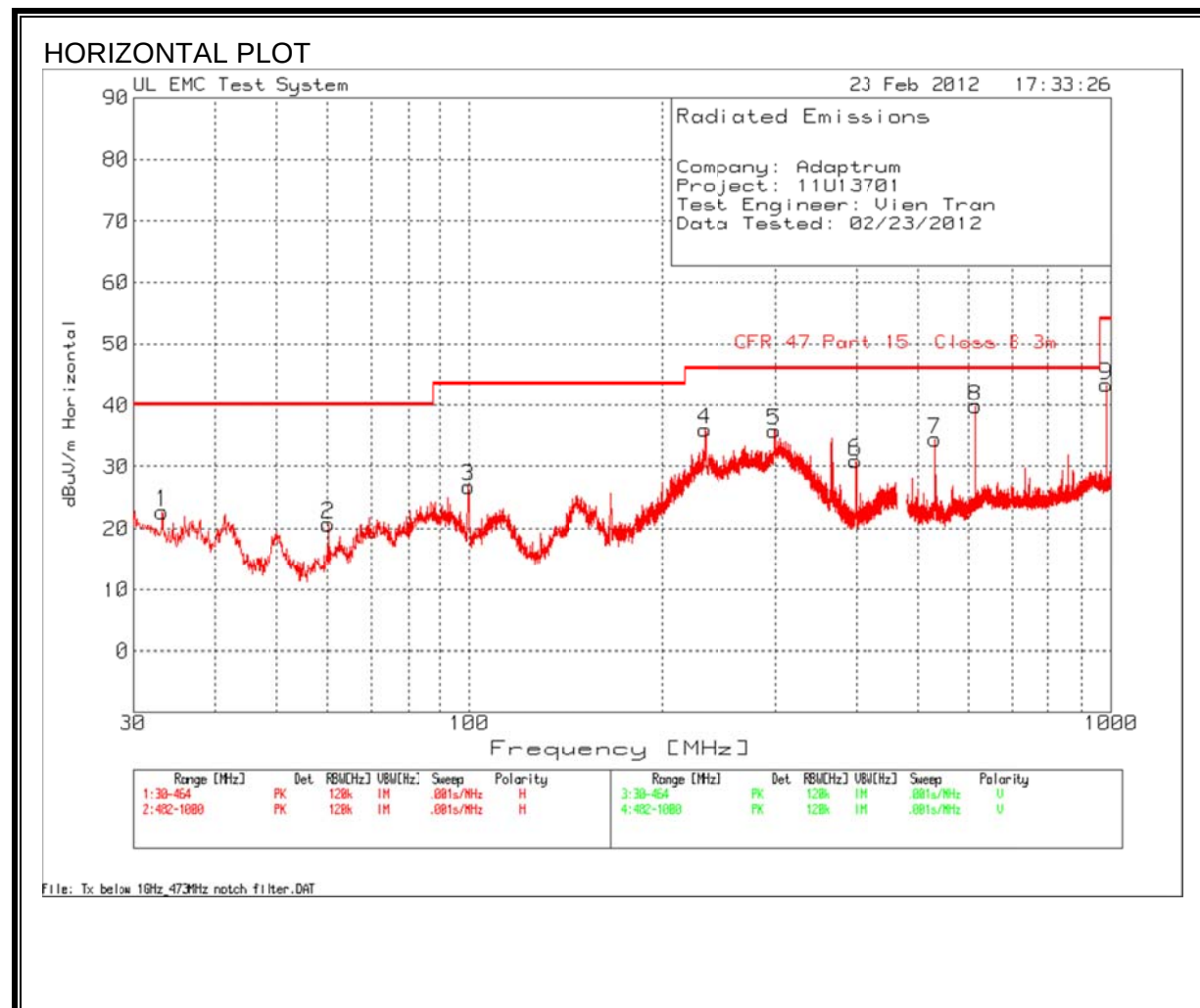
INSTRUMENTATION SETUP FOR 1-METER LIMITS FROM 602 TO 620 MHz

A High-Q Cavity band pass filter is used to reduce the amplitude of the intentional transmitter and prevent overload of the system preamplifier.

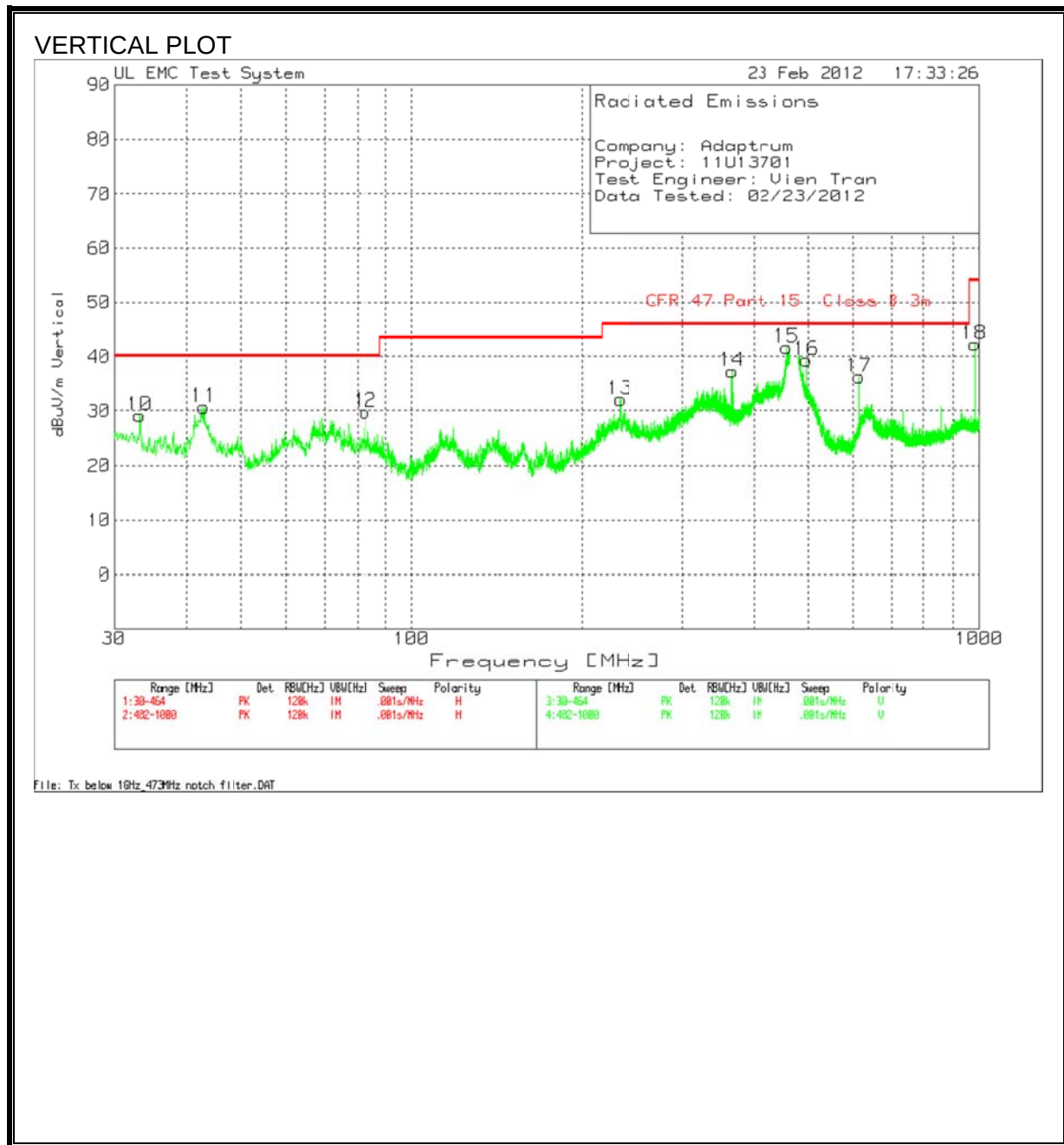
The standard test procedure, as otherwise documented above and modified only for the required antenna-to-EUT distance of 1 meter, is utilized.

8.4.1. RADIATED EMISSIONS BELOW 1 GHz (LOW CHANNEL)

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



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

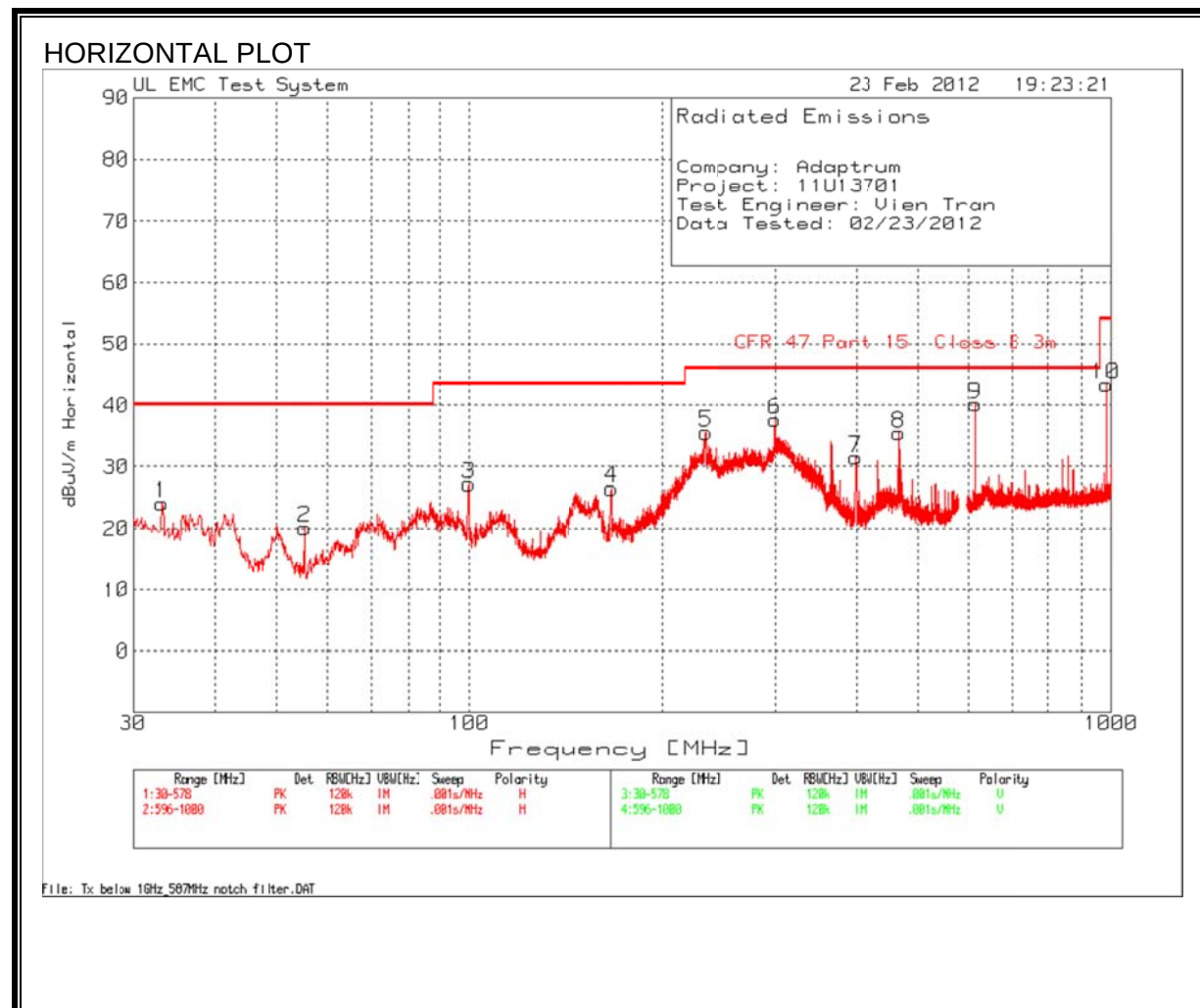


HORIZONTAL & VERTICAL DATA

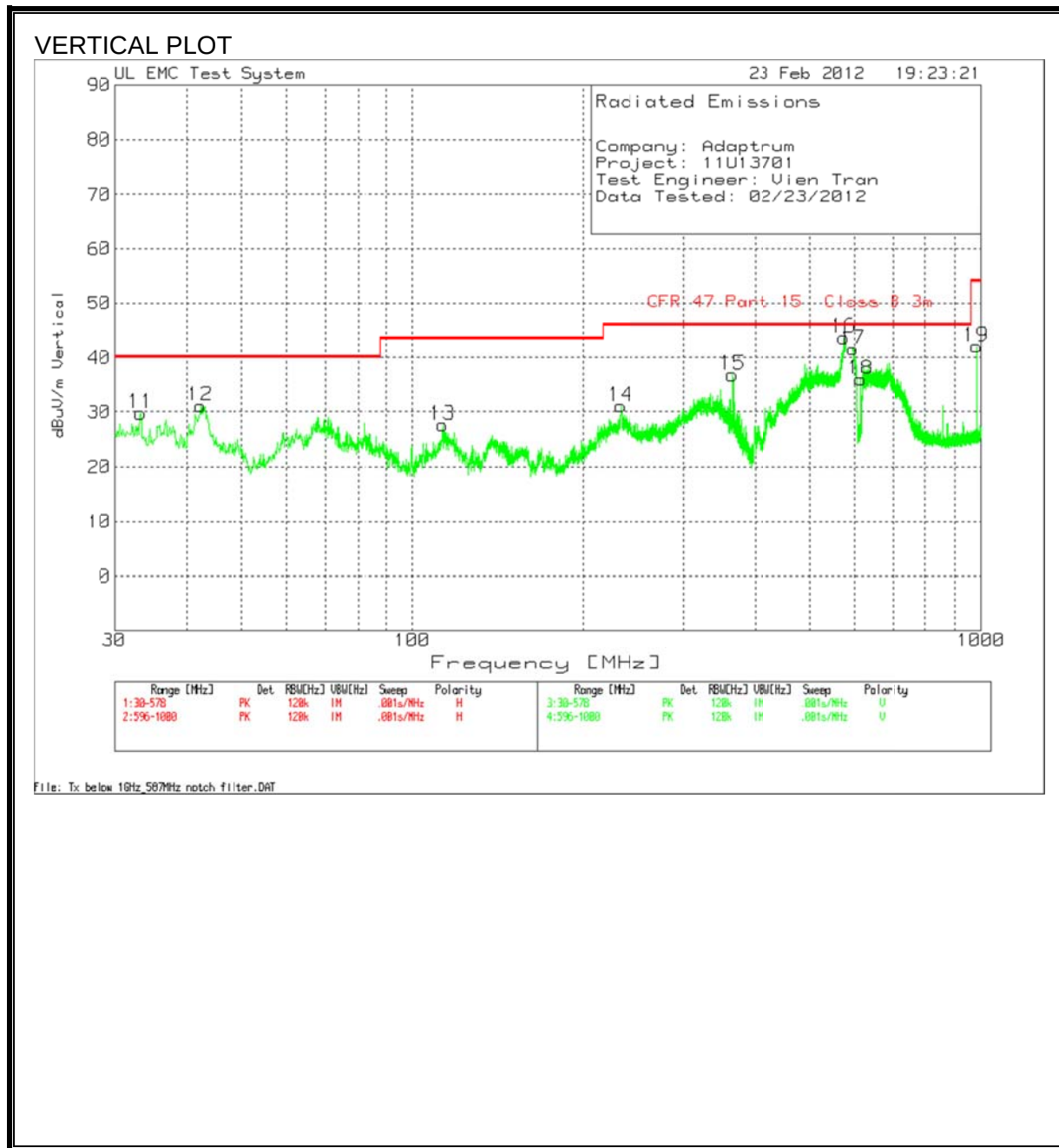
Company: Adaptrum										
Project: 11U13701										
Test Engineer: Vien Tran										
Date Tested: 02/23/2012										
LOW CHANNEL, 473MHz										
HORIZONTAL 30-1000MHz										
Test Frequency	Meter Reading	Detector	25MHz-1GHz ChmbrA Amplified. TX [dB]	T185 Sunol JB1.TXT [dB]	T242 Notch Filter 473MHz. TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
RANGE 1 30 - 464MHz										
70.243	43.28	PK	-27.1	8.2	0.0	24.38	40.0	-15.62	400	Horz
83.3393	49.36	PK	-27.1	7.5	0.1	29.86	40.0	-10.14	301	Horz
99.9049	45.79	PK	-26.9	9.9	0.1	28.89	43.5	-14.61	201	Horz
233.1231	51.80	PK	-26.0	11.2	0.1	37.10	46.0	-8.90	99	Horz
RANGE 2 482 - 1000MHz										
614.3985	48.03	PK	-23.9	18.9	0.2	43.23	46.0	-2.77	100	Horz
737.2734	37.92	PK	-23.2	20.4	0.3	35.42	46.0	-10.58	100	Horz
983.0232	41.04	PK	-23.1	23.0	2.4	43.34	54.0	-10.66	201	Horz
996.1699	33.82	PK	-23.1	23.2	2.1	36.02	54.0	-17.98	100	Horz
VERTICALL 30-1000MHz										
Test Frequency	Meter Reading	Detector	25MHz-1GHz ChmbrA Amplified. TX [dB]	T185 Sunol JB1.TXT [dB]	T242 Notch Filter 473MHz. TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
RANGE 1 30 - 464MHz										
33.2958	40.71	PK	-27.6	18.8	0.0	31.91	40.0	-8.09	100	Vert
42.9229	48.58	PK	-27.4	11.6	0.0	32.78	40.0	-7.22	100	Vert
99.9049	41.42	PK	-26.9	9.9	0.1	24.52	43.5	-18.98	301	Vert
116.1235	39.79	PK	-26.8	13.3	0.1	26.39	43.5	-17.11	100	Vert
232.6894	46.59	PK	-26.0	11.2	0.1	31.89	46.0	-14.11	201	Vert
365.0404	47.60	PK	-25.5	14.9	0.2	37.20	46.0	-8.80	100	Vert
RANGE 2 482 - 1000MHz										
491.5236	38.92	PK	-24.8	17.8	0.2	32.12	46.0	-13.88	201	Vert
614.3985	45.72	PK	-23.9	18.9	0.2	40.92	46.0	-5.08	100	Vert
737.2734	33.74	PK	-23.2	20.4	0.3	31.24	46.0	-14.76	100	Vert
983.1267	39.13	PK	-23.1	23.0	2.4	41.43	54.0	-12.57	100	Vert
PK - Peak detector QP - Quasi-Peak detector LnAv - Linear Average detector LgAv - Log Average detector Av - Average detector CAV - CISPR Average detector RMS - RMS detection CRMS - CISPR RMS detection										

8.4.2. RADIATED EMISSIONS BELOW 1 GHz (MID CHANNEL)

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



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



HORIZONTAL & VERTICAL DATA

Company: Adaptrum

Project: 11U13701

Test Engineer: Vien Tran

Data Tested: 02/23/2012

MID CHANNEL, 587MHz

HORIZONTAL 30-1000MHz

Test Frequency	Meter Reading	Detector	25MHz-1GHz ChmbrA Amplified. TX [dB]	T185 Sunol JB1.TXT [dB]	T239 Notch Filter 587MHz. TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
RANGE 1: 30 - 578MHz										
33.1759	32.75	PK	-27.6	18.9	0.0	24.05	40.0	-15.95	400	Horz
55.2974	40.36	PK	-27.3	7.0	0.0	20.06	40.0	-19.94	301	Horz
99.8689	44.19	PK	-26.9	9.8	0.1	27.19	43.5	-16.31	201	Horz
166.562	41.12	PK	-26.4	11.7	0.1	26.52	43.5	-16.98	100	Horz
233.1455	50.28	PK	-26.0	11.2	0.1	35.58	46.0	-10.42	100	Horz
299.729	50.05	PK	-25.8	13.3	0.1	37.65	46.0	-8.35	100	Horz
398.2902	41.34	PK	-25.3	15.3	0.1	31.44	46.0	-14.56	201	Horz
467.8305	43.12	PK	-25.1	17.3	0.1	35.42	46.0	-10.58	201	Horz
RANGE 2: 596 - 1000MHz										
614.4077	44.96	PK	-23.9	18.9	0.2	40.16	46.0	-5.84	100	Horz
983.0456	43.11	PK	-23.1	23.0	0.4	43.41	54.0	-10.59	201	Horz

VERTICALL 30-1000MHz

Test Frequency	Meter Reading	Detector	25MHz-1GHz ChmbrA Amplified. TX [dB]	T185 Sunol JB1.TXT [dB]	T242 Notch Filter 473MHz. TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
RANGE 1: 30 - 578MHz										
33.2854	38.55	PK	-27.6	18.8	0.0	29.75	40.0	-10.25	100	Vert
42.2654	46.31	PK	-27.4	12.2	0.0	31.11	40.0	-8.89	100	Vert
113.0104	41.42	PK	-26.8	12.9	0.1	27.62	43.5	-15.88	100	Vert
232.3789	45.76	PK	-26.0	11.2	0.1	31.06	46.0	-14.94	200	Vert
365.1079	47.35	PK	-25.5	14.9	0.1	36.85	46.0	-9.15	100	Vert
574.4956	48.49	PK	-24.1	18.7	0.6	43.69	46.0	-2.31	100	Vert
RANGE 2: 596 - 1000MHz										
596.0807	46.14	PK	-24.0	18.3	1.2	41.64	46.0	-4.36	101	Vert
614.4077	40.78	PK	-23.9	18.9	0.2	35.98	46.0	-10.02	101	Vert
983.0456	41.81	PK	-23.1	23.0	0.4	42.11	54.0	-11.89	101	Vert

PK - Peak detector

QP - Quasi-Peak detector

LnAv - Linear Average detector

LgAv - Log Average detector

Av - Average detector

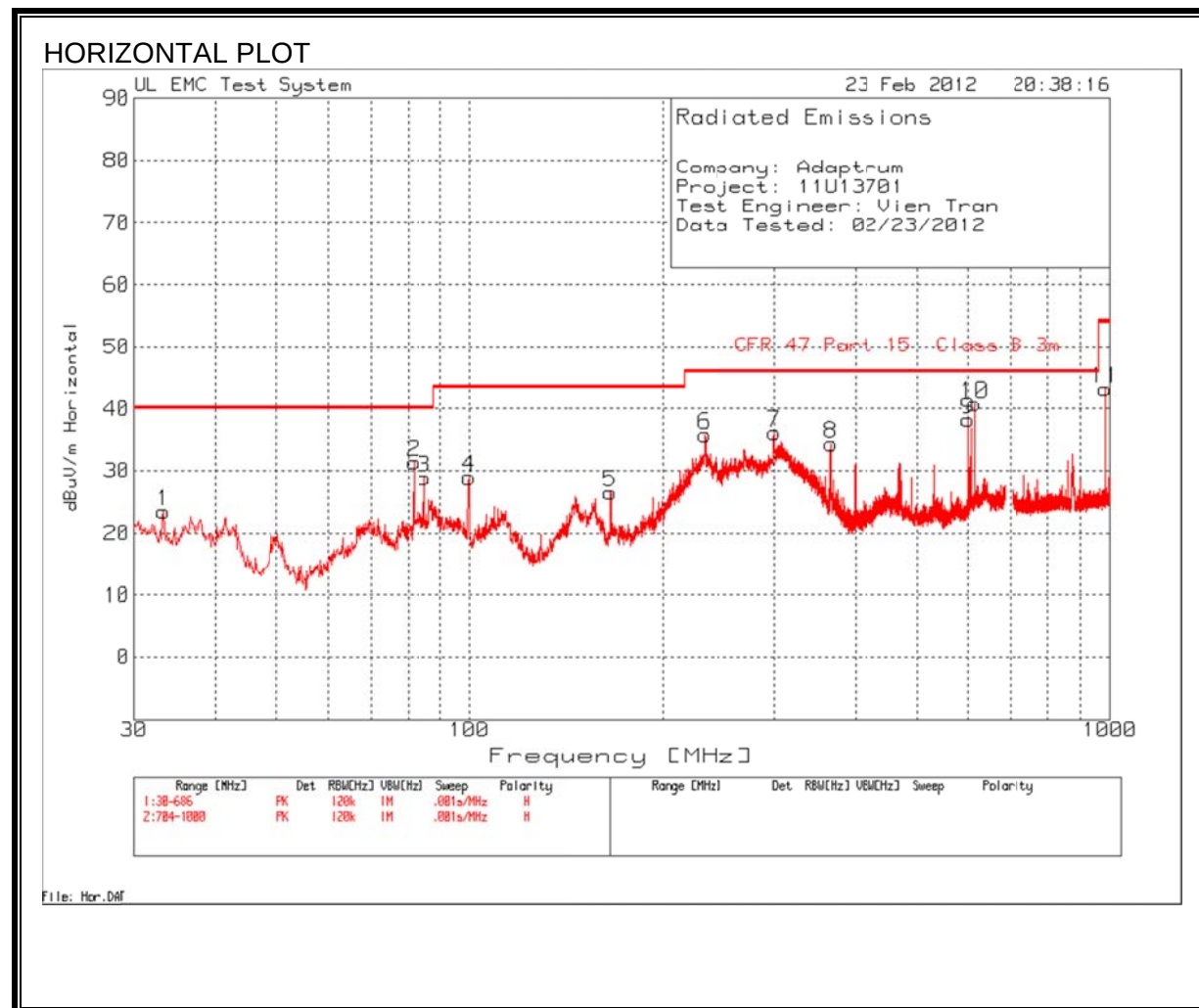
CAV - CISPR Average detector

RMS - RMS detection

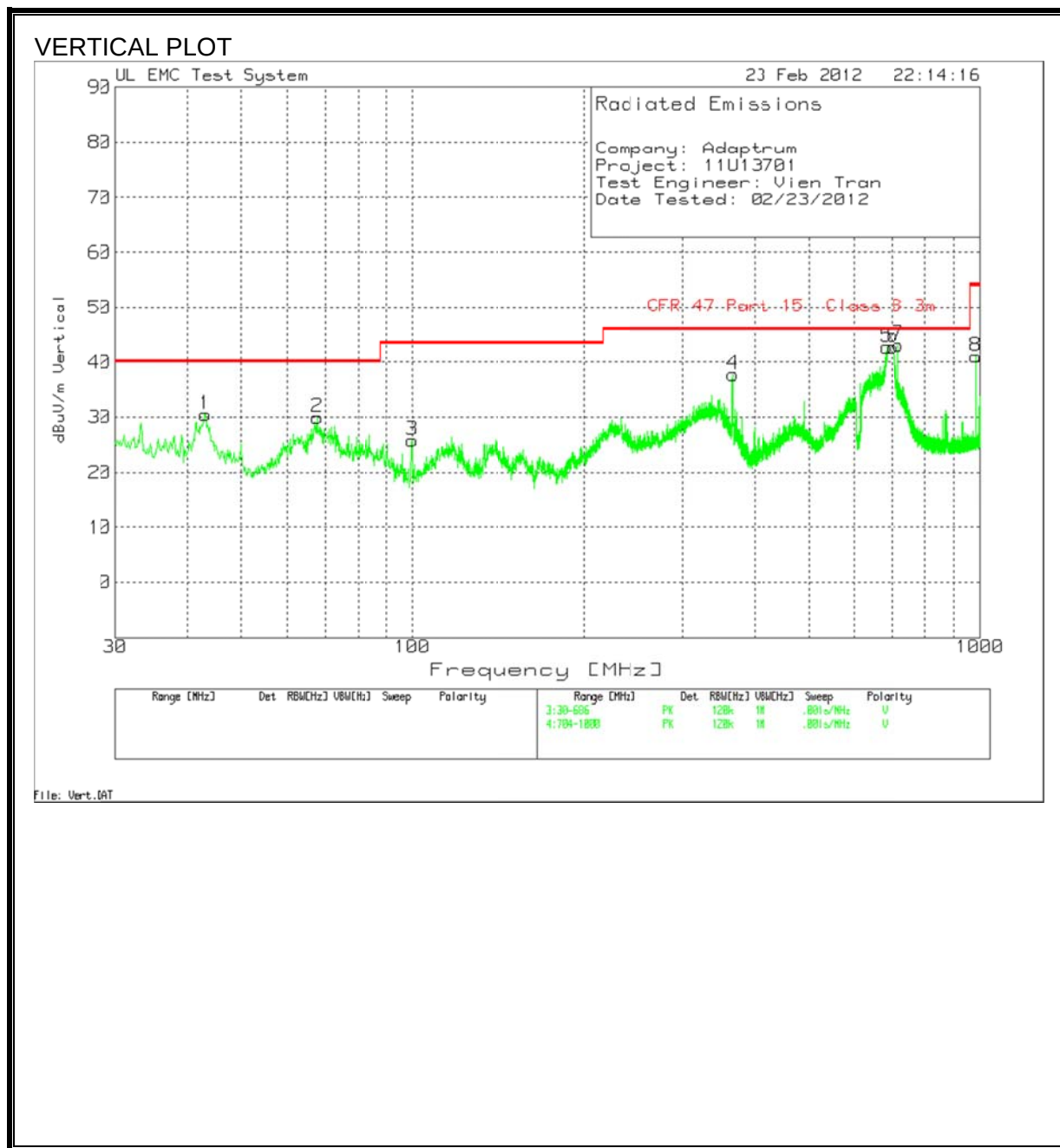
CRMS - CISPR RMS detection

8.4.3. RADIATED EMISSIONS BELOW 1 GHz (HIGH CHANNEL)

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



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



HORIZONTAL & VERTICAL DATA

Company: Adaptrum

Project: 11U13701

Test Engineer: Vien Tran

Data Tested: 02/24/2012

HIGH CHANNEL, 695MHz

HORIZONTAL 30-1000MHz

Test Frequency	Meter Reading	Detector	25MHz-1GHz ChmbrA Amplified. TX [dB]	T185 Sunol JB1.TXT [dB]	T238 Notch Filter 695MHz. TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
RANGE 1: 30 - 686MHz										
33.2774	32.27	PK	-27.60	18.80	0.00	23.47	40.0	-16.53	400	Horz
81.3893	50.67	PK	-27.00	7.70	0.00	31.37	40.0	-8.63	301	Horz
85.06	48.59	PK	-27.10	7.40	0.00	28.89	40.0	-11.11	100	Horz
99.8737	45.99	PK	-26.90	9.80	0.10	28.99	43.5	-14.51	201	Horz
165.9456	41.17	PK	-26.50	11.80	0.10	26.57	43.5	-16.93	201	Horz
232.8042	50.47	PK	-26.00	11.20	0.10	35.77	46.0	-10.23	100	Horz
299.7938	48.54	PK	-25.80	13.30	0.10	36.14	46.0	-9.86	100	Horz
366.3901	44.83	PK	-25.50	14.90	0.10	34.33	46.0	-11.67	100	Horz
600.1327	43.71	PK	-24.00	18.30	0.20	38.21	46.0	-7.79	100	Horz
614.4221	45.62	PK	-23.90	18.90	0.20	40.82	46.0	-5.18	100	Horz
RANGE 2: 704 - 1000MHz										
983.0823	43.08	PK	-23.10	23.00	0.30	43.28	54.0	-10.72	201	Horz

VERTICALL 30-1000MHz

Test Frequency	Meter Reading	Detector	25MHz-1GHz ChmbrA Amplified. TX [dB]	T185 Sunol JB1.TXT [dB]	T242 Notch Filter 473MHz. TXT [dB]	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
RANGE 1: 30 - 686MHz										
42.9784	46.4	PK	-27.4	11.50	0.00	30.5	40.0	-9.50	100	Vert
67.6243	49.12	PK	-27.2	8.00	0.00	29.92	40.0	-10.08	100	Vert
99.8737	42.85	PK	-26.9	9.80	0.10	25.85	43.5	-17.65	301	Vert
366.3901	48.25	PK	-25.5	14.90	0.10	37.75	46.0	-8.25	100	Vert
683.9025	44.92	PK	-23.3	19.90	1.30	42.82	46.0	-3.18	201	Vert
RANGE 2: 704 - 1000MHz										
704.4732	44.82	PK	-23.2	20.20	1.00	42.82	46.0	-3.18	200	Vert
719.8529	45.75	PK	-23.3	20.40	0.30	43.15	46.0	-2.85	200	Vert
983.0823	40.93	PK	-23.1	23.00	0.30	41.13	54.0	-12.87	100	Vert

PK - Peak detector

QP - Quasi-Peak detector

LnAv - Linear Average detector

LgAv - Log Average detector

Av - Average detector

CAV - CISPR Average detector

RMS - RMS detection

CRMS - CISPR RMS detection

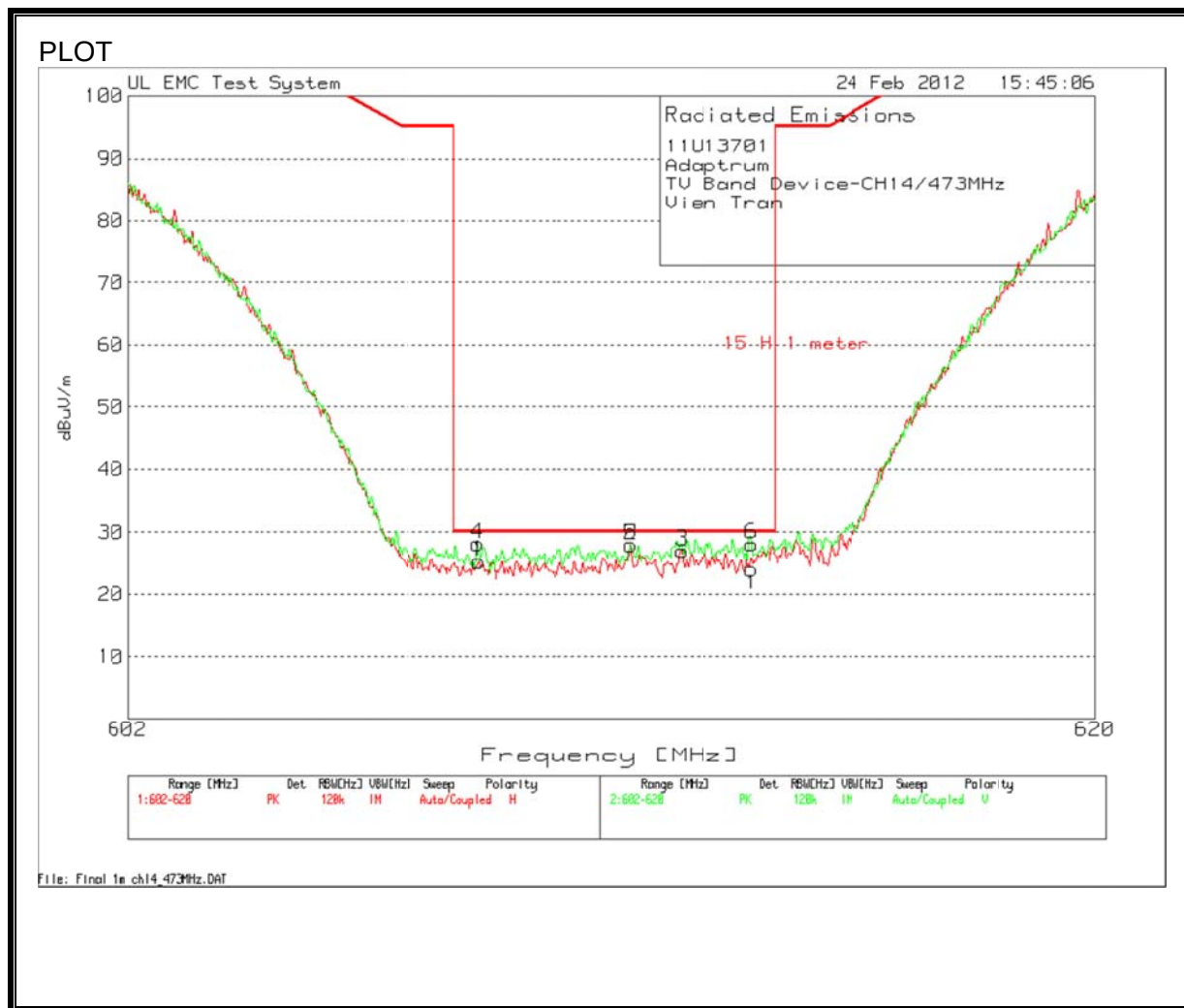
8.4.4. RADIATED EMISSIONS ABOVE 1 GHz

SPURIOUS AND HARMONIC EMISSIONS ABOVE 1 GHz (LOW, MID AND HIGH CHANNELS)

No spurious or harmonic emissions were detected above the system noise floor from 1 to 7 GHz, for any of the channels under test.

8.4.5. RADIATED EMISSIONS 602 TO 620 MHz

PLOT OF SPURIOUS EMISSIONS 602 TO 620 MHz (LOW CHANNEL)

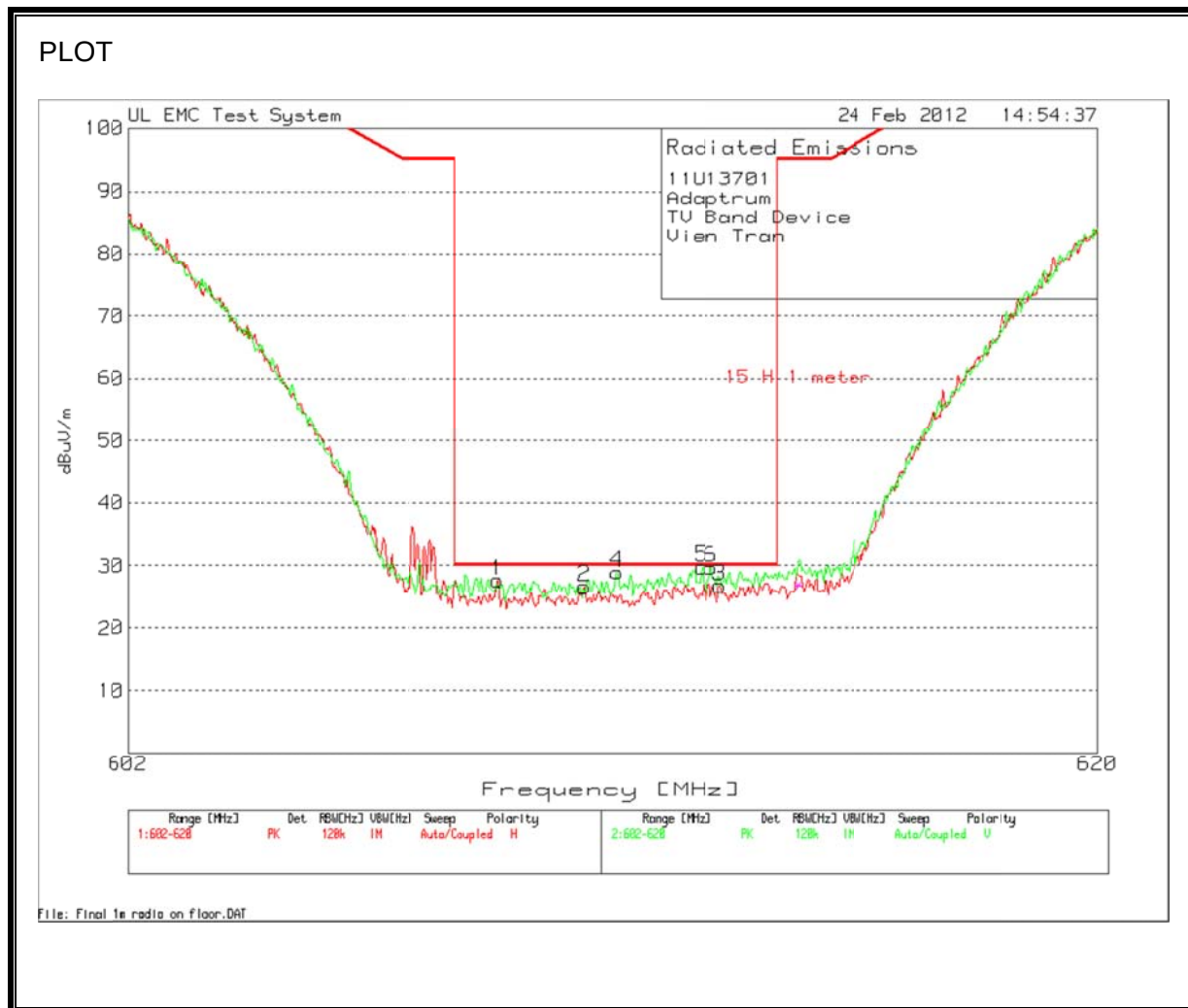


TABULAR LISTING OF SPURIOUS EMISSIONS 602 TO 620 MHz (LOW CHANNEL)

TABULAR LISTING

Company: Adaptrum											
Project 11U13701											
Test Engineer: Vien Tran											
Date Tested: 02/24/2012											
LOW CHANNEL, 473MHz											
Test Frequency	Meter Reading	Detector	T185 Sunol JB1.TXT [dB]	25MHz-1GHz Chamber 3m NonAmp [dB]	T173 Sonoma Preamp. TXT [dB]	T240 Band Pass Filter 611MHz [dB]	dBuV/m	15 H meter	Margin	Height [cm]	Polarity
Range: 1 602 - 620MHz HORIZONTAL											
608.462	33.91	PK	18.6	2.9	-32.6	2.5	25.31	30	-4.69	99	Horz
611.288	36.98	PK	18.8	2.9	-32.6	1.9	27.98	30	-2.02	99	Horz
612.242	35.89	PK	18.8	2.9	-32.6	2.0	26.99	30	-3.01	99	Horz
Range: 2 602 - 620MHz VERTICAL											
608.444	36.74	PK	18.6	2.9	-32.6	2.5	28.14	30	-1.86	102	Vert
611.288	36.98	PK	18.8	2.9	-32.6	1.9	27.98	30	-2.02	102	Vert
613.556	36.76	PK	18.8	2.9	-32.6	2.2	28.06	30	-1.94	102	Vert
PK - Peak detector											
QP - Quasi-Peak detector											
LnAv - Linear Average detector											
LgAv - Log Average detector											
Av - Average detector											
CAV - CISPR Average detector											
RMS - RMS detection											
CRMS - CISPR RMS detection											

PLOT OF SPURIOUS EMISSIONS 602 TO 620 MHz (MID CHANNEL)

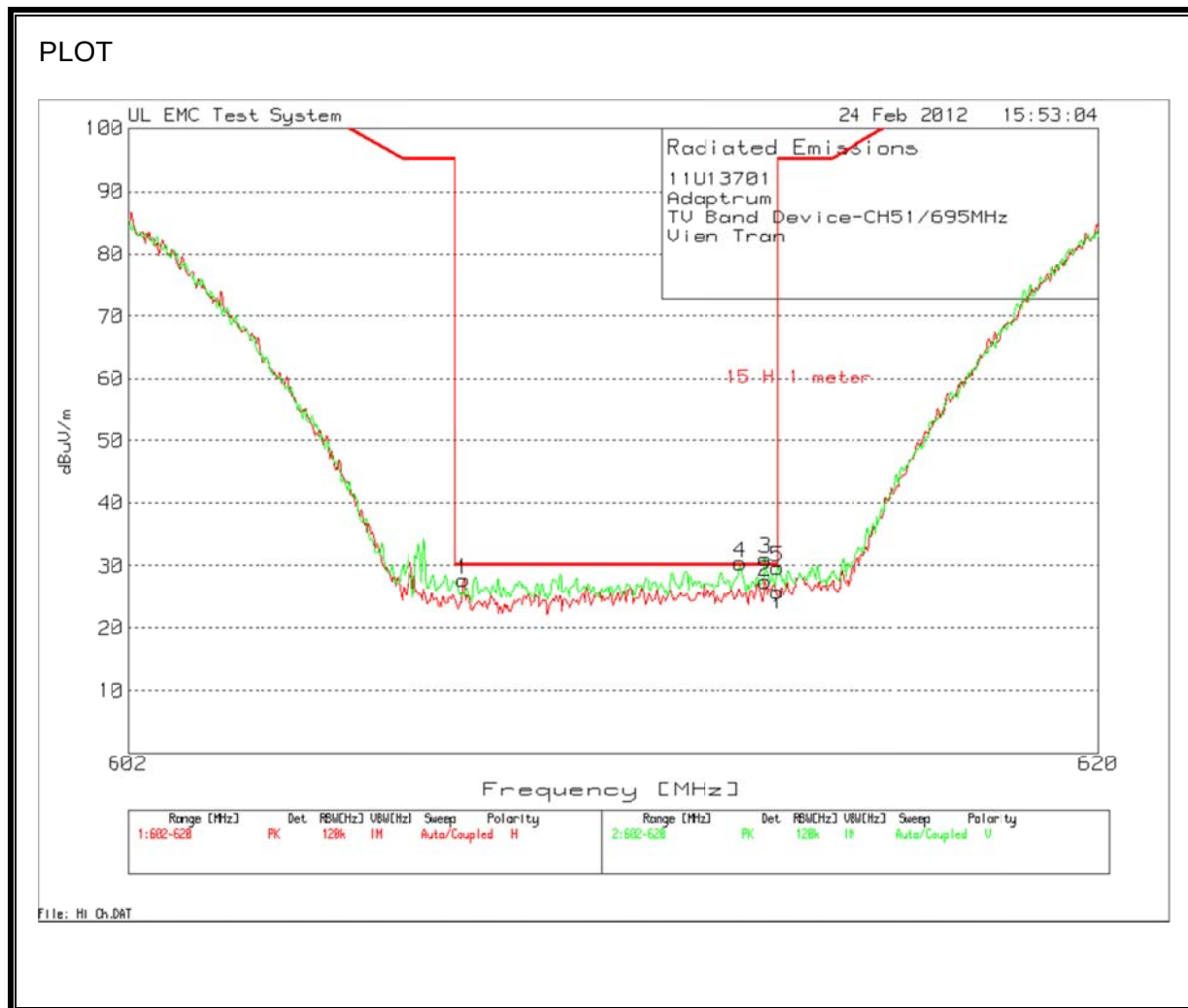


TABULAR LISTING OF SPURIOUS EMISSIONS 602 TO 620 MHz (MID CHANNEL)

TABULAR LISTING

Company: Adaptrum											
Project: 11U13701											
Test Engineer: Vien Tran											
Date Tested: 02/24/2012											
MID CHANNEL, 587MHz											
Test Frequency	Meter Reading	Detector	T185 Sunol JB1.TXT [dB]	25MHz-1GHz Chamber 3m NonAmp [dB]	T173 Sonoma Preamp. TXT [dB]	T240 Band Pass Filter 611MHz [dB]	dBuV/m	15 H meter	Margin	Height [cm]	Polarity
Range: 1 602 - 620MHz HORIZONTAL											
608.786	36.32	PK	18.7	2.9	-32.6	2.3	27.62	30	-2.38	100	Horz
610.406	35.62	PK	18.7	2.9	-32.6	2.0	26.62	30	-3.38	100	Horz
612.935	35.54	PK	18.8	2.9	-32.6	2.1	26.74	30	-3.26	100	Horz
Range: 2 602 - 620MHz VERTICAL											
611.018	38.03	PK	18.7	2.9	-32.6	1.9	28.93	30	-1.07	100	Vert
612.584	38.68	PK	18.8	2.9	-32.6	2.0	29.78	30	-0.22	100	Vert
612.584	35.38	QP	18.8	2.9	-32.6	2.0	26.48	30	-3.52	141	Vert
612.773	38.62	PK	18.8	2.9	-32.6	2.0	29.72	30	-0.28	100	Vert
612.773	35.32	QP	18.8	2.9	-32.6	2.0	26.6	30	-3.4	138	Vert
PK - Peak detector											
QP - Quasi-Peak detector											
LnAv - Linear Average detector											
LgAv - Log Average detector											
Av - Average detector											
CAV - CISPR Average detector											
RMS - RMS detection											
CRMS - CISPR RMS detection											

PLOT OF SPURIOUS EMISSIONS 602 TO 620 MHz (HIGH CHANNEL)



TABULAR LISTING OF SPURIOUS EMISSIONS 602 TO 620 MHz (HIGH CHANNEL)

TABULAR LISTING

Company: Adaptrum											
Project: 11U13701											
Test Engineer: Vien Tran											
Date Tested: 02/24/2012											
HIGH CHANNEL, 695MHz											
Test Frequency	Meter Reading	Detector	T185 Sunol JB1.TXT [dB]	25MHz-1GHz Chamber 3m NonAmp [dB]	T173 Sonoma Preamp. TXT [dB]	T240 Band Pass Filter 611MHz [dB]	dBuV/m	15 H meter	Margin	Height [cm]	Polarity
Range: 1 602 - 620MHz HORIZONTAL											
608.156	36.28	PK	18.6	2.9	-32.6	2.6	27.78	30	-2.22	99	Horz
613.772	35.95	PK	18.9	2.9	-32.6	2.3	27.45	30	-2.55	99	Horz
Range: 2 602 - 620MHz VERTICAL											
613.772	39.61	PK	18.9	2.9	-32.6	2.3	31.11	30	1.11	101	Vert
613.772	36.70	QP	18.9	2.9	-32.6	2.8	28.2	30	-1.80	136	Vert
613.304	39.27	PK	18.8	2.9	-32.6	2.1	30.47	30	0.47	101	Vert
612.9106	34.67	QP	18.8	2.9	-32.6	2.1	25.87	30	-4.13	144	Vert
613.988	38.03	PK	18.9	2.9	-32.6	2.5	29.73	30	-0.27	101	Vert
613.988	36.59	QP	18.9	2.9	-32.6	2.8	28.29	30	-1.71	140	Vert
PK - Peak detector											
QP - Quasi-Peak detector											
LnAv - Linear Average detector											
LgAv - Log Average detector											
Av - Average detector											
CAV - CISPR Average detector											

8.5. AC MAINS LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

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

^{*} Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

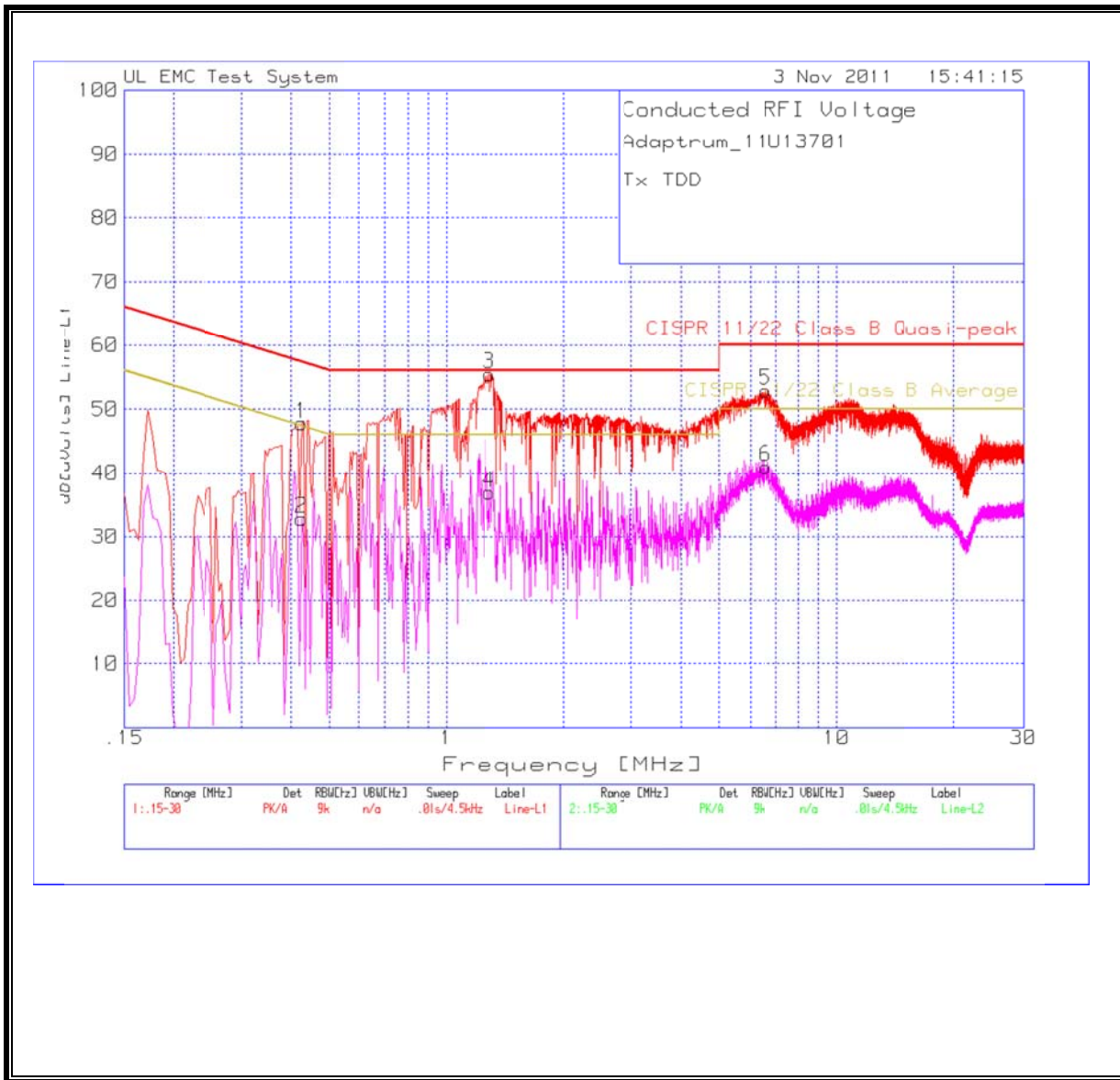
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

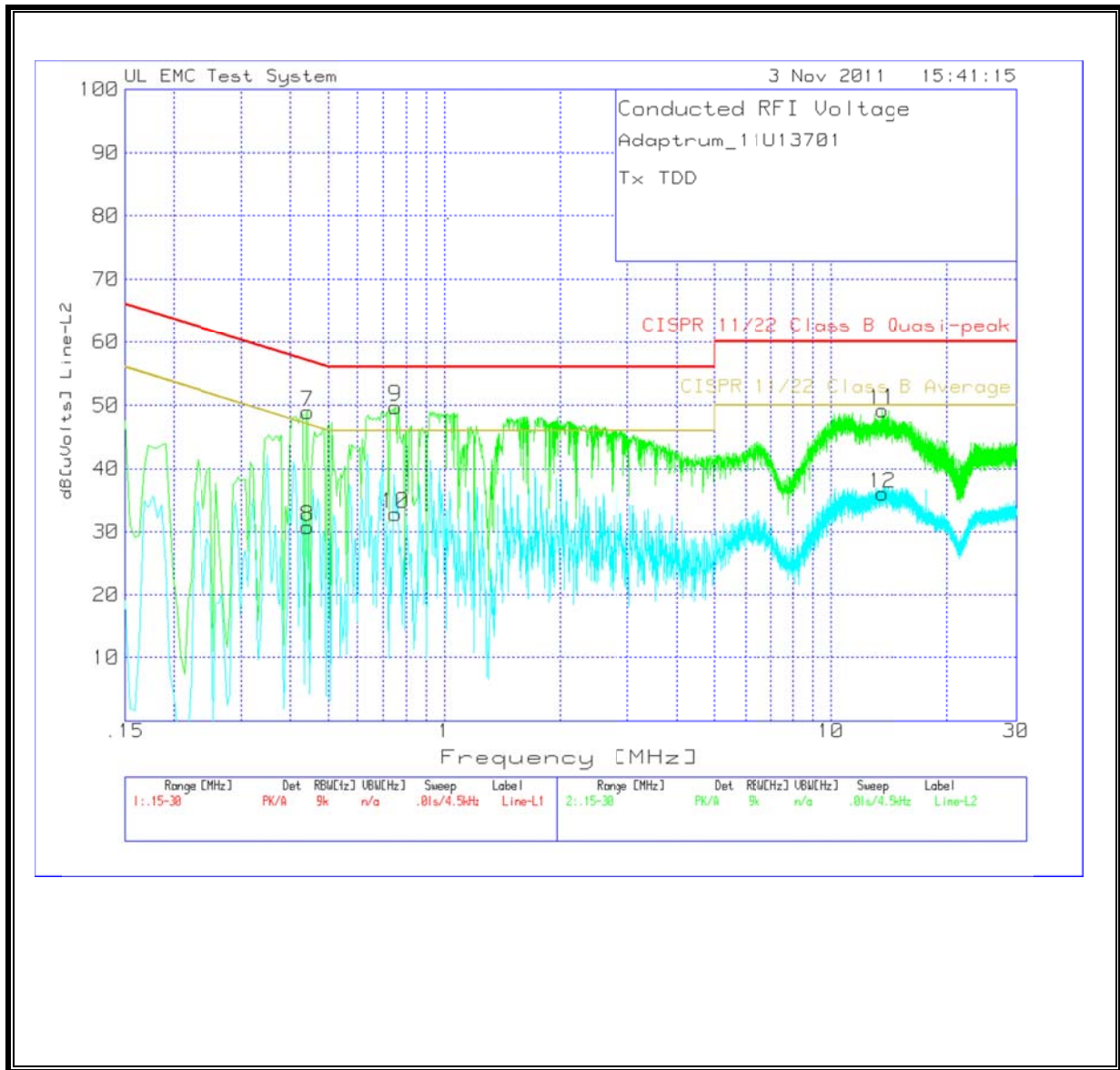
6 WORST EMISSIONS

Adaptrum				Test Enginner: Vien Tran			
11U13701				Date: 11/03/11			
Line-L1 .15 - 30MHz							
Test Frequency	Meter Reading	Detector	dB[uVolts]	Class B QP Limit	Margin	Class B Avg Limit	Margin
0.4245	47.77	PK	47.77	57.40	-9.63	47.40	0.37
0.4245	32.78	Av	32.78	-	-	47.40	-14.62
1.2885	55.43	PK	55.43	56.00	-0.57	46.00	9.43
1.2885	36.90	Av	36.90	-	-	46.00	-9.10
6.5895	52.84	PK	52.84	60.00	-7.16	50.00	2.84
6.5895	41.03	Av	41.03	-	-	50.00	-8.97
Line-L2 .15 - 30MHz							
Test Frequency	Meter Reading	Detector	dB[uVolts]	Class B QP Limit	Margin	Class B Avg Limit	Margin
0.4425	48.94	PK	48.94	57.00	-8.06	47.00	1.94
0.4425	30.74	Av	30.74	-	-	47.00	-16.26
0.753	49.74	PK	49.74	56.00	-6.26	46.00	3.74
0.753	32.88	Av	32.88	-	-	46.00	-13.12
13.56	49.22	PK	49.22	60.00	-10.78	50.00	-0.78
13.56	36	Av	36.00	-	-	50.00	-14.00
PK - Peak detector							
QP - Quasi-Peak detector							
LnAv - Linear Average detector							
LgAv - Log Average detector							
Av - Average detector							
CAV - CISPR Average detector							
RMS - RMS detection							
CRMS - CISPR RMS detection							

LINE 1 RESULTS



LINE 2 RESULTS



9. MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

EQUATIONS

Power density is given by:

$$S = \text{EIRP} / (4 * \text{Pi} * D^2)$$

where

S = Power density in mW/cm²

EIRP = Equivalent Isotropic Radiated Power in mW

D = Separation distance in cm

Distance is given by:

$$D = \text{SQRT} (\text{EIRP} / (4 * \text{Pi} * S))$$

where

D = Separation distance in cm

EIRP = Equivalent Isotropic Radiated Power in mW

S = Power density in mW/cm²

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

LIMITS

From FCC §1.1310 Table 1 (B), the maximum value of $S = f/1500 \text{ mW/cm}^2$, where f is the operating frequency in MHz.

MEASUREMENT NOTES

The conducted output power was measured with the device operating at the only source-based TDD duty cycle, therefore no duty cycle correction is applied to the RF Exposure calculations.

RESULTS FOR FIXED OPERATION

In accordance with §15.709 (d), the minimum separation distance for a Fixed TVBD is 40 cm.

RF Exposure for Maximum Output Power, antenna gain ≤ 8 dBi

Frequency (MHz)	Mode	Separation Distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	Power Density (mW/cm ²)	FCC Limit (mW/cm ²)
473.0	QPSK	40	27.00	8.00	0.157	0.315
581.0	QPSK	40	27.00	8.00	0.157	0.387
695.0	QPSK	40	27.00	8.00	0.157	0.463
473.0	16QAM	40	27.00	8.00	0.157	0.315
581.0	16QAM	40	27.00	8.00	0.157	0.387
695.0	16QAM	40	27.00	8.00	0.157	0.463
473.0	64QAM	40	27.00	8.00	0.157	0.315
581.0	64QAM	40	27.00	8.00	0.157	0.387
695.0	64QAM	40	27.00	8.00	0.157	0.463

RESULTS FOR PERSONAL OPERATION

The source-based time-averaged output for configuration as a Personal TVBD can be greater than 20 mW therefore the device is subject to routine RF exposure evaluation.

RF Exposure for Reduced Output Power, antenna gain ≤ 6 dBi
(Conducted output power is reduced to meet the Personal Device PSD and EIRP limits)

Frequency (MHz)	Mode	Separation Distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	Power Density (mW/cm ²)	FCC Limit (mW/cm ²)
473.0	QPSK	20	14.00	6.00	0.020	0.315
581.0	QPSK	20	14.00	6.00	0.020	0.387
695.0	QPSK	20	14.00	6.00	0.020	0.463
473.0	16QAM	20	14.00	6.00	0.020	0.315
581.0	16QAM	20	14.00	6.00	0.020	0.387
695.0	16QAM	20	14.00	6.00	0.020	0.463
473.0	64QAM	20	14.00	6.00	0.020	0.315
581.0	64QAM	20	14.00	6.00	0.020	0.387
695.0	64QAM	20	14.00	6.00	0.020	0.463

RF Exposure for Reduced Output Power, antenna gain ≤ 2 dBi
(Conducted output power is reduced to meet the Personal Device PSD and EIRP limits)

Frequency (MHz)	Mode	Separation Distance (cm)	Output Power (dBm)	Antenna Gain (dBi)	Power Density (mW/cm ²)	FCC Limit (mW/cm ²)
473.0	QPSK	20	16.40	2.00	0.014	0.315
581.0	QPSK	20	17.10	2.00	0.016	0.387
695.0	QPSK	20	17.00	2.00	0.016	0.463
473.0	16QAM	20	16.40	2.00	0.014	0.315
581.0	16QAM	20	17.00	2.00	0.016	0.387
695.0	16QAM	20	17.00	2.00	0.016	0.463
473.0	64QAM	20	16.80	2.00	0.015	0.315
581.0	64QAM	20	17.70	2.00	0.019	0.387
695.0	64QAM	20	17.30	2.00	0.017	0.463