



TEST REPORT

Report Number: 100457230DEN-002

Project Number: G100457230

Report Issue Date: 08/24/2011

Product Designation: Model DE52

Standards: FCC 47 CFR Part 15.247
IC RSS 210: Issue 8:2010
IC RSS-GEN Issue 3:2010

Tested by:
Intertek Testing Services NA, Inc.
1795 Dogwood St. Suite 200
Louisville, CO 80027

Client:
EchoStar Corporation dba
EchoStar Technologies LLC
90 Inverness Circle East
Englewood, CO 80112

Report prepared by

Michael Kanda
EMC Team Leader

Report reviewed by

Michael Spataro
Engineering Team Leader

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1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 3.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded **the product tested complies with the requirements of the standard(s) indicated**. The results obtained in this test report pertain only to the item(s) tested.

2 Test Summary

Section	Test full name	Test date	Result
5	Radiated Emissions – Field Strength of the Fundamental & Harmonics of the Fundamental – FCC 247(b)(3)(d)/15.205/209 (Covers RSS-210 A8.4(4) & A8.5)	08/03/2011 08/09/2011	Pass
6	Radiated Emissions – Unintentional and Spurious of the Transmitter - FCC 15.209/15.247(d)/15.205 (Covers RSS-210 A8.5, & RSS-GEN 7.2.2)	08/04/2011 08/09/2011	Pass
7	Radiated Emissions – Unintentional and Spurious – Band Edge FCC 15.209/15.247(d)/15.205 (Covers RSS-210 A8.5, & RSS-GEN 7.2.2)	08/04/2011	Pass
8	Radiated Emissions – Unintentional – Receiver FCC 5.209/15.247(d)/15.205 (Covers RSS-GEN Section 6)	08/05/2011 08/10/2011	Pass
9	6dB Bandwidth – FCC 15.247(a)(2) (Covers RSS-210 A8.2(a))	08/05/2011	Pass
10	Power Spectral Density (PSD) – FCC 15.247(e) (Covers RSS-210 A8.2(b))	08/05/2011	Pass
11	Occupied Bandwidth – RSS-GEN, Section 4.6.1	08/05/2011	Pass
12	AC Conducted Emissions – FCC 15.207 (Covers RSS-GEN Section 7.2.4)	08/03/2011	Pass

Notes:

- 1) Product FCC Model DE52

2.1 Test Facility

Intertek Denver's testing facilities are located at 1795 Dogwood St. Suite 200 Louisville, CO 80027. The testing facility is ISO17025:2005 accredited by A2LA, our lab code is 2506.02, our VCCI registration numbers are. R-1643, C-1752 and T-1558, our FCC designation no. US1121 and our IC lab no. 2042N.

Testing contained in this test report may not be covered under the laboratories scope of accreditation. A note will be placed in the specific test section for testing not covered under the laboratories scope.

General Radio Remarks:

FCC CFR Part 15.31(e): For a product with an ac voltage supply, the ac voltage was varied between 85% and 115% of the nominal rated supply voltage to determine worst-case fundamental frequency level.

FCC CFR Part 15.35: Measurement Detector Functions and Bandwidths: FCC Part 15.35 was utilized when performing measurements within this report.

Whenever possible the approved test procedures specified in ANSI C63.10 – 2009 for DTS devices were used for testing.

When the field strength (or envelope power) is not constant or when it pulses, and an average detector/limit is specified to be used, a duty cycle correction factor may be utilized to determine the pulsed "average" of the field strength or power.

The product tested was configured with an integral antenna – therefore all measurements are radiated field strength measurements. If antenna conducted port tests cannot be performed, radiated field strength measurements may be taken to demonstrate compliance with the various conducted port power requirements of FCC 15.247.

Product-Specific Radio Remarks:

- 1) The product has an integral on-board RF4CE antenna. The manufacturer has declared an antenna gain of 0dBi.
- 2) The product incorporates an RF transceiver which is an 802.15.4 standard compliant radio that operates in one of three channels (15, 20 and 25) in the 2.4GHz ISM frequency band. These three channels are at: 2.425GHz, 2.450GHz and 2.475GHz. The transceiver supports 250kbps O-QPSK data in 3.0MHz channels and full direct sequence spread-spectrum encode and decode.
- 3) Duty Cycle Correction Factors were not utilized in this testing and report per client request.

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3 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Delta Cable Box	EchoStar Technologies	DE52	EMC New

Receive Date:	08/03/2011
Received Condition:	Good
Type:	Production Sample

Description of Equipment Under Test (provided by client)

The Delta Cable box is an in home set top designed to be connected to a Tier 2 cable system and provide QAM, True 2-way, MoCa, Out of Band, and DOCSIS support.

The set top box provides various A/V outputs along with Ethernet and USB I/O.

The set top box is equipped with an internal hard drive for DVR functionality.

It also has a daughter card built in which allows for content place shifting.

The set top box is designed for US and Canadian markets using 120V/60Hz.

For remote control operations the set top box is equipped with a front panel mounted 2.4GHz Synkro radio. The radio does not have any external antenna port.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
Input: 100-120 VAC	0.5 A	60Hz	1

Operating modes of the EUT: Intentional Tx Testing

No.	Descriptions of EUT Exercising
1	HDD Read and Write
2	Ethernet data transfer
3	Video place shifting simulation
4	USB data transfer
5	Video tune and decode
6	Video output to all A/V connections
7	Cable MCard video loop through
8	Synkro radio functioning in continuous transmission with modulation enabled on one of the three fundamental frequencies (selectable)

Operating modes of the EUT: Unintentional Rx Testing

No.	Descriptions of EUT Exercising
1	2.4GHz RF4CE Radio transmit function disabled.
2	Product configured in receive/standby mode for unintentional testing.
3	Product configured in receive/standby mode of operation - Ethernet data transfer, USB data transfer, Video output to all A/V ports/cables.

Clock Frequencies of the EUT:

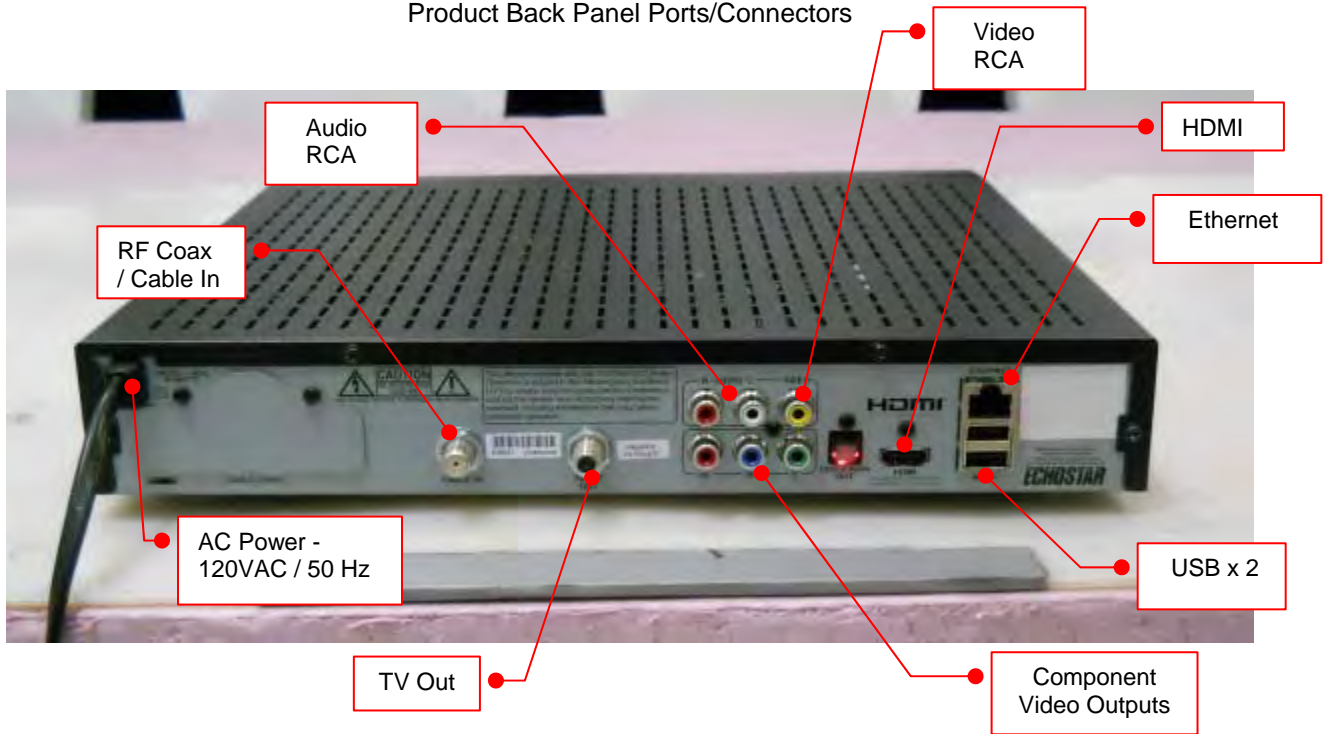
No.	Descriptions of EUT Exercising
1	Lowest frequency used or generated in the product: 60kHz (offline supply)
2	Highest frequency used or generated in the product: 3GHz (SATA)

3.1 Product Photo:

Product Tested – Model: DE52



Product Back Panel Ports/Connectors



Cables used during testing



USB Hard Drive

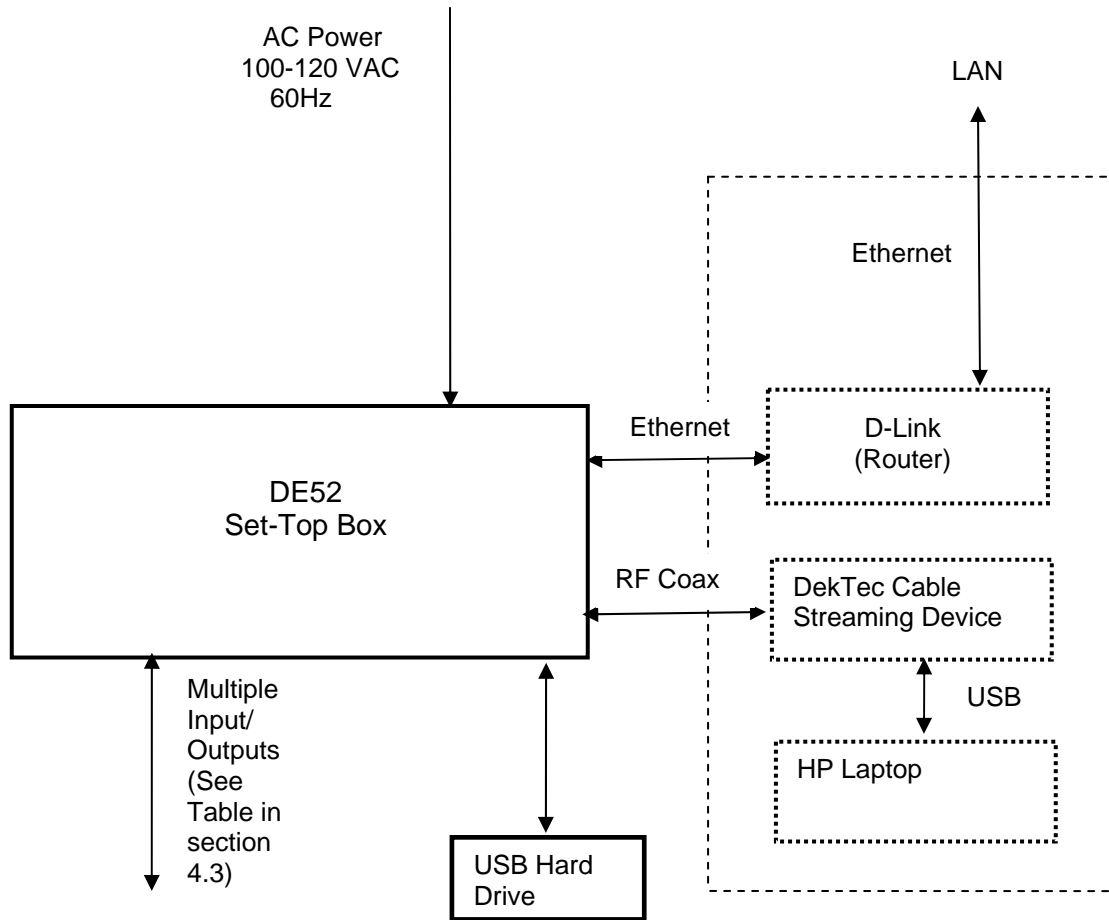


4 System setup including cable interconnection details, support equipment and simplified block diagram

4.1 Method:

Record the details of EUT cabling, document the support equipment, and show the interconnections in a block diagram.

4.2 EUT Block Diagram:



Note: Dashed lines indicate auxiliary/support equipment outside the test area

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4.3 Support Data:

ID	Description/ Function	Shield Type	Length	Connector	Connection	Ferrites
1	AC Power	None	1 meter	AC	DE52 Power In	No
2	Ethernet	None	> 3 meter	RJ-45	Router/Switch	No
3	USB	Foil	< 1 meter	USB	USB Drive	No
4	TV Output	Braid	>3 meter	Type F	Terminator	No
5	USB	Foil	< 1 meter	USB	Terminator	No
6	RCA A/V Outputs	Braid	1 meter	RCA	Matched Impedance Loads	No
7	HDMI Digital Video Out	Foil	1 meter	HDMI	EDIDI Simulation Box	No
8	RF Coax Cable	Braid	> 3 meter	Type F	External Cable Streaming Device	No
9	Component Video Out	Braid	< 1 meter	RCA	Terminator	No

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Router/Switch	D-Link	EBR-2310	----
Cable Streaming Device	DekTec	DTU-215	E0041868
Laptop	HP	nc 6220	CNU6131C3T

Notes:

- 1) The analog A/V outputs will be terminated to like impedance loads using supplied A/V cables.
- 2) The HDMI digital video output will be terminated into an EDIDI simulation box.
- 3) The Ethernet connector will be terminated into an Ethernet switch located outside of the test environment.
- 4) The USB connectors will be terminated to external peripherals within the test environment (External HDD, Wireless access stick).

5 Radiated Emissions – Fundamental Power & Harmonics of the Fundamental

5.1 Method

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from **FCC CFR47 15.247 & IC RSS-210**.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

5.2 Test Equipment Used:

<u>Asset ID:</u>	<u>Description:</u>	<u>Manufacturer:</u>	<u>Model:</u>	<u>Serial:</u>	<u>Cal Date</u>	<u>Cal Due</u>
18882	Spectrum Analyzer (dc-22 GHz)	Hewlett-Packard	8566B	2410A00154	12/06/2010	12/06/2011
18660	Spectrum Analyzer Display Section (set 1)	Hewlett-Packard	85662A	2318A04983	12/10/2010	12/10/2011
18880	Q.P Adapter	Hewlett-Packard	85650A	2811A01300	12/06/2010	12/06/2011
18913	Spectrum Analyzer	Hewlett-Packard	E7405A	My44211889	06/28/2011	06/28/2012
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	06/03/2011	06/03/2012
18906	Pre-Amplifier (1-4 GHz)	Mini-Circuits Lab	ZHL-42	N052792-2	06/03/2011	06/03/2012
18900	RF Pre-Amplifier (4-8 GHz)	Avantek	AFT97-8434-10F	1007	06/03/2011	06/03/2012
18901	RF Pre-Amplifier (8-18 GHz)	Avantek	AWT-18037	1002	06/03/2011	06/03/2012
18887	Horn Antenna 1-18GHz	EMCO	3115	9205-3886	12/09/2010	12/09/2011
18805	HF Antenna/Harmonic Mixer 18 GHz to 26.5 GHz	Hewlett-Packard	11970K	2332A01280	10/04/2010	10/04/2011
SW-6	Software application for Radiated and Conducted Emissions	Intertek	OATS_CVI	V.1.0	01/01/2011	01/01/2012

5.3 Results:

The sample tested was found to comply with the requirements of:

- FCC 247(b)(3) (d)/15.205/15.209
- RSS-210 A8.4(4) & A8.5

5.4 Setup Photographs:

Test setup – Field Strength Measurements (Front View)



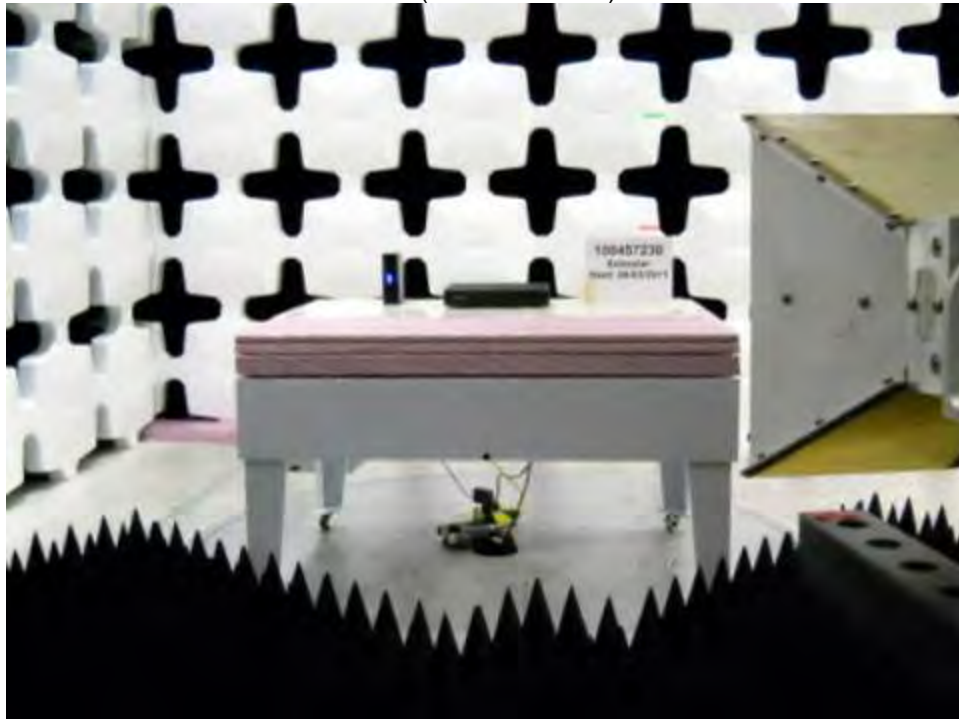
Test setup – Field Strength Measurements (Rear View)



Photo: Antenna Setups

Photo: Antenna Setups

Horn (1GHz – 18GHz)



HF Active Antenna/Harmonic Mixer (18GHz – 30GHz)



5.5 Test Data: AC Variation – Fundamental Frequency

Radiated Electromagnetic Emissions

Test Report #:	G100457230 Run 01	Test Area:	CC1 Radiated	Temperature:	22.4	°C
Test Method:	FCC Part 15.209	Test Date:	03-Aug-2011	Relative Humidity:	47.6	%
EUT Model #:	DE52	EUT Power:	120V, 60Hz	Air Pressure:	83.9	kPa
EUT Serial #:	EMC New					
Manufacturer:	Echostar					
EUT Description:	_____					
Notes:	_____					

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)
AC Nominal Voltage: 120V / 60Hz				
2450.00	104.7 Pk	3.6 / 29.6 / 37.4	90.5	H / 1.2 / 318.6
AC @ 115% Nominal Voltage: 138V / 60Hz				
2450.00	104.7 Pk	3.6 / 29.6 / 37.4	90.5	H / 1.2 / 318.6
AC @ 85% Nominal Voltage: 102V / 60Hz				
2450.00	104.6 Pk	3.6 / 29.6 / 37.4	90.4	H / 1.2 / 318.6

Conclusion:

There is no significant difference in the radiated field strength of the fundamental frequency with respect to varying the ac voltage. Therefore, all measurements will be taken using the nominal rated voltage of the product.

5.6 Test Data: Fundamental Power & Harmonics of the Fundamental

Test Report #:	G100457230 Run 2	Test Area:	CC1 Radiated	Temperature:	22.4 °C
Test Method:	FCC Part 15.209	Test Date:	03-Aug-2011	Relative Humidity:	47.6 %
EUT Model #:	DE52 (Delta)	EUT Power:	120V, 60Hz	Air Pressure:	83.9 kPa
EUT Serial #:	EMC New				
Manufacturer:	Echostar				
EUT Description:					
Notes:					

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	Duty Cycle Correction	Final Corrected	Limit FCC 15.247	DELTA
(MHz)	(dBuV)	(dB) (dBm) (dB)	(dBuV)	(m) (DEG)	(dB)	(dBuV/m)	(dBuV/m)	(dB)
EUT flat on the table								
CW Mode								
Fundamental Measurements								
Mid Channel								
2450	104.9 Pk	3.6 / 29.6 / 37.4	100.7	H / 1.2 / 324.4	0.0	100.7	125.2	-24.5
2450.03	98.6 Pk	3.6 / 29.6 / 37.4	94.4	V / 1.3 / 335.4	0.0	94.4	125.2	-30.8
Low Channel Fundamental								
2425.2	64.3 Pk	3.5 / 29.5 / 0.0	97.4	H / 1.2 / 318.1	0.0	97.4	125.2	-27.8
2425.19	62.4 Pk	3.5 / 29.5 / 0.0	95.5	V / 1.2 / 350.7	0.0	95.5	125.2	-29.7
High Channel Fundamental								
2475.24	58.0 Pk	3.6 / 29.7 / 0.0	91.3	V / 1.3 / 325.9	0.0	91.3	125.2	-33.9
2475.24	63.8 Pk	3.6 / 29.7 / 0.0	97.1	H / 1.1 / 317.6	0.0	97.1	125.2	-28.1

Note: Worst-Case Fundamental Measurement – Mid Channel – Axis 3: 100.7 dBuV/m (24.5 dBuV below Limit)

Electric Field to Power Conversion

From FCC KDB 558074 – Alternative Test Procedures.

If antenna conducted tests cannot be performed on this device, radiated tests to show compliance with the peak output power limit specified in Section 15.247(b) and the spurious RF conducted emission limit specified in Section 15.247(c) are acceptable. As stated previously, a pre-amp, and, in the latter case, a high pass filter, are required for the following measurements.

- 1) Calculate the transmitter's peak power using the following equation:

$$E = \frac{\sqrt{(30PG)}}{d}$$

Where: E is the measured maximum fundamental field strength in V/m, utilizing a RBW \geq the 6dB bandwidth of the emission, VBW > RBW, peak detector function. C63.10-2009 was followed to maximize the emission.

G: the numeric gain of the transmitting antenna with reference to an isotropic radiator.

D: the distance in meters from which the field strength was measured.

P: the power in watts

$$P = \frac{(E*d)^2}{30G}$$

In this case:

E = 100.7 dBuV/m (Mid Channel) = 0.108393 V/m

D = 3 meters

G = 1 (declared by manufacturer)

P = 0.003525 W

Limit from 15.247(b)(3) = 1.0 W

Delta from Limit = 0.00352 - 1.0 = -0.99648 W

Conversion of RF Port Output Power of the Fundamental Limit to Radiated Field Strength Limit

When limits are defined as conducted port power measurements and the product has an integral antenna, radiated field strength tests to demonstrate compliance are acceptable per FCC 15.247.

The following equation was used to convert RF Port Power (Watts) limit into a Radiated Field Strength (dBuV/m) limit:

$$P = \frac{(E*d)^2}{30G}$$

Therefore:

$$E = \frac{\sqrt{(30PG)}}{d}$$

Power Limit Fundamental Frequency = 1 W = 1.82574 V/m = 125.23 dBuV/m

Where:

E = Measured Field Strength in V/m (converted to dBuV/m in test data)

P = 1 Watt Fundamental Limit

G = Numeric Gain of transmitting antenna over an ideal isotropic radiator = 1 (declared by manufacturer)

d = EUT-to-Antenna Test Distance = 3-meters

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Harmonics of the Fundamental

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	Duty Cycle Correction	Final Corrected	Limit FCC 15.247	DELTA1 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	(dB)	(dBuV/m)	(dBuV/m)	15.209
Harmonics of the Fundamental								
Harmonics - Low Channel								
4848.98	41.5 Pk	5.2 / 35.0 / 38.9	42.8	V / 1.2 / 353.6	0	42.8	54	-11.2
4849.17	39.8 Pk	5.2 / 35.0 / 38.9	41.1	H / 1.5 / 11.0	0	41.1	54	-12.9
7275.6	29.8 Pk	6.4 / 38.7 / 39.3	35.5	H / 1.0 / 0.0	0	35.5	54	-18.5
7275.6	27.3 Pk	6.4 / 38.7 / 39.3	33.1	V / 1.0 / 0.0	0	33.1	54	-20.9
9700.8	37.1 Pk	7.6 / 40.8 / 48.7	36.9	V / 1.0 / 0.0	0	36.9	54	-17.1
9700.8	36.1 Pk	7.6 / 40.8 / 48.7	35.9	H / 1.0 / 0.0	0	35.9	54	-18.1
12126	28.4 Pk	8.8 / 40.8 / 45.6	32.4	H / 1.0 / 0.0	0	32.4	54	-21.6
12126	27.2 Pk	8.8 / 40.8 / 45.6	31.2	V / 1.0 / 0.0	0	31.2	54	-22.8
14551.2	27.6 Pk	9.5 / 42.9 / 47.9	32.1	V / 1.0 / 0.0	0	32.1	54	-21.9
14551.2	26.6 Pk	9.5 / 42.9 / 47.9	31.1	H / 1.0 / 0.0	0	31.1	54	-22.9
16976.4	26.2 Pk	10.5 / 43.4 / 47.9	32.3	H / 1.0 / 0.0	0	32.3	54	-21.7
16976.4	27.5 Pk	10.5 / 43.4 / 47.9	33.5	V / 1.0 / 0.0	0	33.5	54	-20.5
19400	6.6 Pk	0.0 / 22.2 / 0.0	28.8	V / 1.0 / 0.0	0	28.8	54	-25.2
19400	8.0 Pk	0.0 / 22.2 / 0.0	30.2	H / 1.0 / 0.0	0	30.2	54	-23.8
21825	6.8 Pk	0.0 / 21.4 / 0.0	28.2	V / 1.0 / 0.0	0	28.2	54	-25.8
21825	3.7 Pk	0.0 / 21.4 / 0.0	25.1	H / 1.0 / 0.0	0	25.1	54	-28.9
24250	5.2 Pk	0.0 / 21.4 / 0.0	26.6	V / 1.0 / 0.0	0	26.6	54	-27.4
24250	6.5 Pk	0.0 / 21.4 / 0.0	28	H / 1.0 / 0.0	0	28	54	-26.0
Harmonics - Mid Channel								
4899.97	45.9 Pk	5.2 / 35.1 / 38.8	47.4	H / 1.2 / 317.9	0	47.4	54	-6.6
4899.97	49.7 Pk	5.2 / 35.1 / 38.8	51.2	V / 1.3 / 337.2	0	51.2	54	-2.8
7349.97	34.6 Pk	6.5 / 38.7 / 39.2	40.7	H / 1.0 / 0.0	0	40.7	54	-13.3
7349.97	30.9 Pk	6.5 / 38.7 / 39.2	37	V / 1.0 / 0.0	0	37	54	-17.0
9799.97	27.3 Pk	7.7 / 40.8 / 48.7	27	V / 1.0 / 0.0	0	27	54	-27.0
9799.97	33.0 Pk	7.7 / 40.8 / 48.7	32.8	H / 1.0 / 0.0	0	32.8	54	-21.2
12250	26.7 Pk	8.8 / 41.0 / 45.6	30.9	H / 1.0 / 0.0	0	30.9	54	-23.1
12250	27.4 Pk	8.8 / 41.0 / 45.6	31.6	V / 1.0 / 0.0	0	31.6	54	-22.4
14700	30.8 Pk	9.5 / 43.2 / 47.8	35.6	V / 1.0 / 0.0	0	35.6	54	-18.4
14700	30.6 Pk	9.5 / 43.2 / 47.8	35.5	H / 1.0 / 0.0	0	35.5	54	-18.5
17150	31.1 Pk	10.6 / 44.0 / 47.2	38.4	H / 1.0 / 0.0	0	38.4	54	-15.6
17150	29.8 Pk	10.6 / 44.0 / 47.2	37.1	V / 1.0 / 0.0	0	37.1	54	-16.9
19600	8.2 Pk	0.0 / 22.0 / 0.0	30.2	H / 1.0 / 0.0	0	30.2	54	-23.8
19600	8.0 Pk	0.0 / 22.0 / 0.0	29.9	V / 1.0 / 0.0	0	29.9	54	-24.1
22050	6.0 Pk	0.0 / 21.3 / 0.0	27.4	H / 1.0 / 0.0	0	27.4	54	-26.6
22050	7.0 Pk	0.0 / 21.3 / 0.0	28.3	V / 1.0 / 0.0	0	28.3	54	-25.7
24500	6.2 Pk	0.0 / 21.7 / 0.0	27.9	H / 1.0 / 0.0	0	27.9	54	-26.1
24500	7.5 Pk	0.0 / 21.7 / 0.0	29.2	V / 1.0 / 0.0	0	29.2	54	-24.8

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(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	(dB)	(dBuV/m)	(dBuV/m)	15.209
Harmonics - High Channel								
4949.97	48.5 Pk	5.2 / 35.3 / 38.7	50.3	H / 1.1 / 318.7	0	50.3	54	-3.7
4949.97	43.2 Pk	5.2 / 35.3 / 38.7	45	V / 1.3 / 331.3	0	45	54	-9.0
7425.21	27.8 Pk	6.5 / 38.8 / 39.2	33.9	V / 1.0 / 0.0	0	33.9	54	-20.1
7425.21	26.8 Pk	6.5 / 38.8 / 39.2	32.8	H / 1.0 / 0.0	0	32.8	54	-21.2
9900.45	26.8 Pk	7.7 / 40.8 / 48.8	26.5	H / 1.0 / 0.0	0	26.5	54	-27.5
9900.45	26.3 Pk	7.7 / 40.8 / 48.8	26	V / 1.0 / 0.0	0	26	54	-28.0
12375.7	26.4 Pk	8.9 / 41.2 / 45.7	30.7	V / 1.0 / 0.0	0	30.7	54	-23.3
12375.7	22.7 Pk	8.9 / 41.2 / 45.7	27.1	H / 1.0 / 0.0	0	27.1	54	-26.9
14850.9	30.2 Pk	9.6 / 43.4 / 47.8	35.3	H / 1.0 / 0.0	0	35.3	54	-18.7
14850.9	30.2 Pk	9.6 / 43.4 / 47.8	35.3	V / 1.0 / 0.0	0	35.3	54	-18.7
17326.2	29.9 Pk	10.7 / 44.4 / 46.4	38.5	V / 1.0 / 0.0	0	38.5	54	-15.5
17326.2	30.6 Pk	10.7 / 44.4 / 46.4	39.3	H / 1.0 / 0.0	0	39.3	54	-14.7
19800	13.0 Pk	0.0 / 21.8 / 0.0	34.8	H / 1.0 / 0.0	0	34.8	54	-19.2
19800	7.8 Pk	0.0 / 21.8 / 0.0	29.6	V / 1.0 / 0.0	0	29.6	54	-24.4
22275	8.2 Pk	0.0 / 21.1 / 0.0	29.4	H / 1.0 / 0.0	0	29.4	54	-24.6
22275	7.4 Pk	0.0 / 21.1 / 0.0	28.5	V / 1.0 / 0.0	0	28.5	54	-25.5
24750	7.0 Pk	0.0 / 21.6 / 0.0	28.7	H / 1.0 / 0.0	0	28.7	54	-25.3
24750	7.2 Pk	0.0 / 21.6 / 0.0	28.8	V / 1.0 / 0.0	0	28.8	54	-25.2

Notes:

1. Worst-Case Harmonic within FCC Restricted Band: Mid Channel (4.89997 GHz) 51.2 dBuV/m (2.8 dBuV below FCC 15.209 Limit)
2. All harmonic measurements made with a RBW=1MHz and VBW=3MHz.
3. All above measurements are Radiated Field Strength measurements.
4. All measurements taken using a peak detector – no duty cycle correction is applicable to this product.
5. All measurements 10kHz to 18GHz taken at a 3-meter product-to-antenna test distance. All measurements above 18GHz are taken at a 1-meter product-to-antenna test distance then extrapolated to 3m. The FCC limits were not altered.
6. HF active horn antenna/harmonic mixer combination used for frequencies above 18GHz. Note cable loss and antenna factors are combined into a single correction factor during calibration.

Example calculation for Intentional Radiated Emissions:

Measured Level	+	Transducer, Cable Loss Pre-Amplifier	=	Corrected Reading	-	Duty Cycle Correction	=	FINAL Measurement	-	Specification Limit	=	Delta from Specification Limit
(dB μ V)		(dB)		(dB μ V/m)		(dB μ V/m)		(dB μ V/m)		(dB μ V/m)		
24.0		14.9		38.9		10.0		28.9		40.0		-11.1

Deviations, Additions, or Exclusions: None

6 Radiated Emissions – Unintentional and Spurious of the Transmitter

6.1 Method

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from **FCC 15.247 & IC RSS-210**.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

6.2 Test Equipment Used:

<u>Asset ID:</u>	<u>Description:</u>	<u>Manufacturer:</u>	<u>Model:</u>	<u>Serial:</u>	<u>Cal Date</u>	<u>Cal Due</u>
18882	Spectrum Analyzer (dc-22 GHz)	Hewlett-Packard	8566B	2410A00154	12/06/2010	12/06/2011
18660	Spectrum Analyzer Display Section (set 1)	Hewlett-Packard	85662A	2318A04983	12/10/2010	12/10/2011
18880	Q.P Adapter	Hewlett-Packard	85650A	2811A01300	12/06/2010	12/06/2011
18913	Spectrum Analyzer	Hewlett-Packard	E7405A	My44211889	06/28/2011	06/28/2012
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	06/03/2011	06/03/2012
18906	Pre-Amplifier (1-4 GHz)	Mini-Circuits Lab	ZHL-42	N052792-2	06/03/2011	06/03/2012
18900	RF Pre-Amplifier (4-8 GHz)	Avantek	AFT97-8434-10F	1007	06/03/2011	06/03/2012
18901	RF Pre-Amplifier (8-18 GHz)	Avantek	AWT-18037	1002	06/03/2011	06/03/2012
18897	Magnetic loop antenna 10kHz-30MHz	EMCO	6502	9205-2738	11/18/2010	11/18/2011
19936	Bilog Antenna 30MHz - 6GHz	Sunol Sciences	JB6	A050707-1	10/11/2010	10/11/2011
18887	Horn Antenna 1-18GHz	EMCO	3115	9205-3886	12/09/2010	12/09/2011
18805	HF Active Antenna/Harmonic Mixer 18 GHz to 26.5 GHz	Hewlett-Packard	11970K	2332A01280	10/04/2010	10/04/2011
SW-6	Software application for Radiated and Conducted Emissions	Intertek	OATS_CVI	V.1.0	01/01/2011	01/01/2012

6.3 Results:

The sample tested was found to comply with the requirements of:

- FCC 15.209/ 15.247(d)
- Covers RSS-210 A8.5, & RSS-GEN 7.2.2

6.4 Setup Photographs:

Test setup – Field Strength Measurements (Front View)

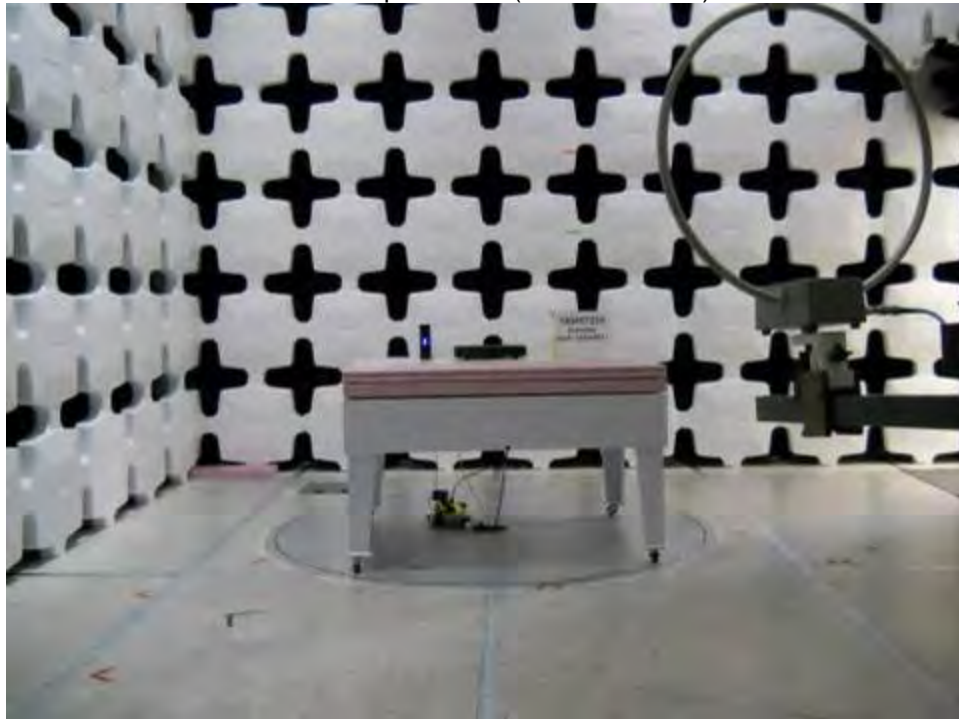


Test setup – Field Strength Measurements (Rear View)



Photo: Antenna Setups

Active Loop Antenna (9kHz to 30MHz)



BiLog Antenna (30MHz to 1000MHz)

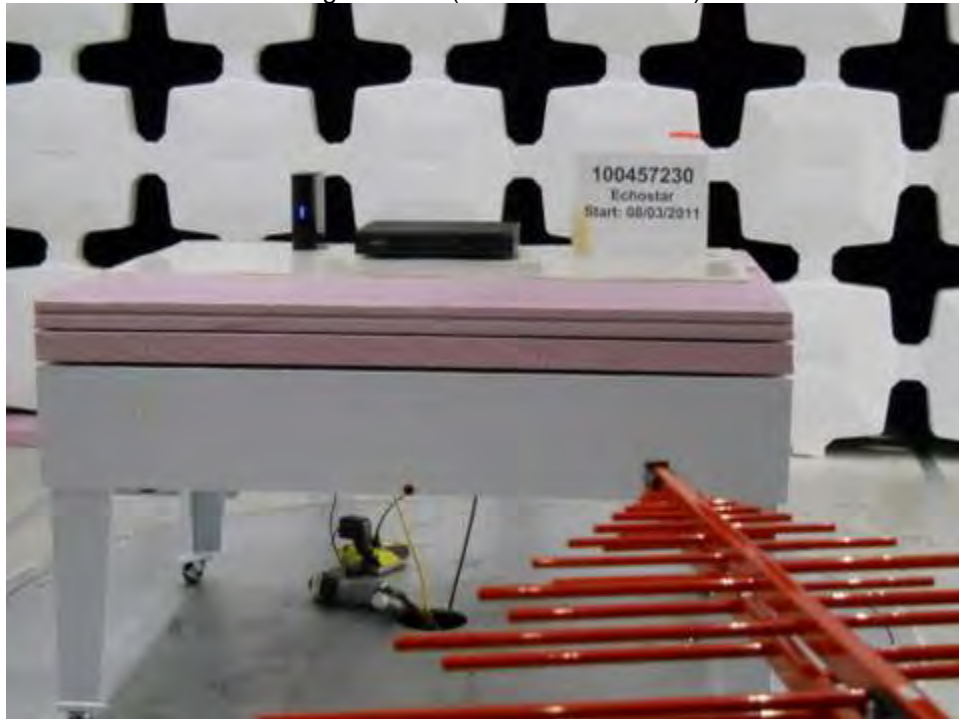


Photo: Antenna Setups

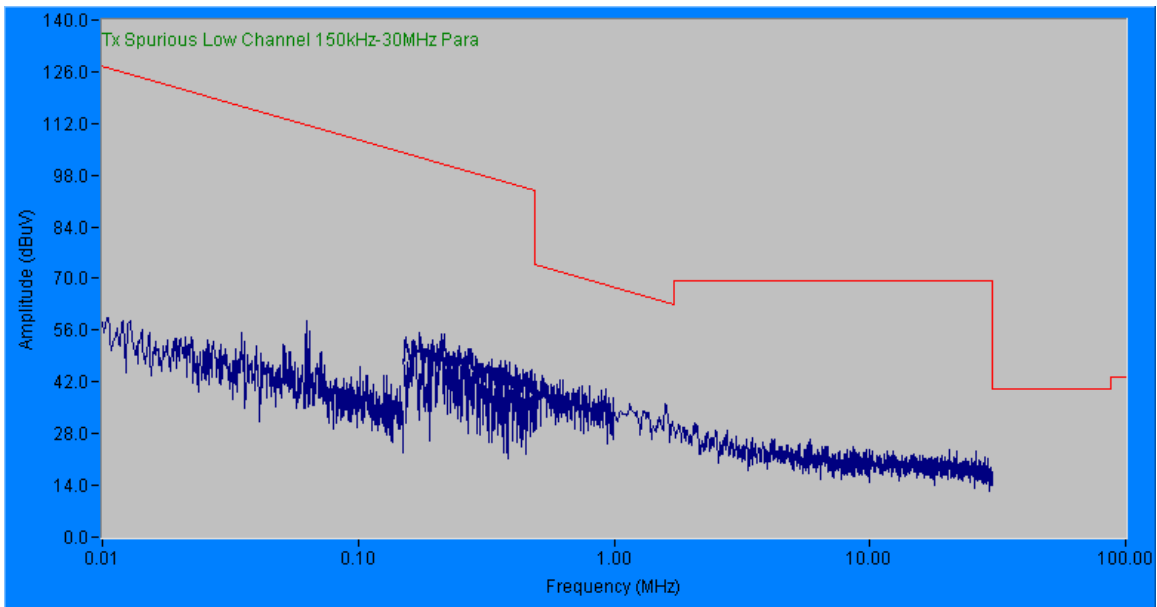
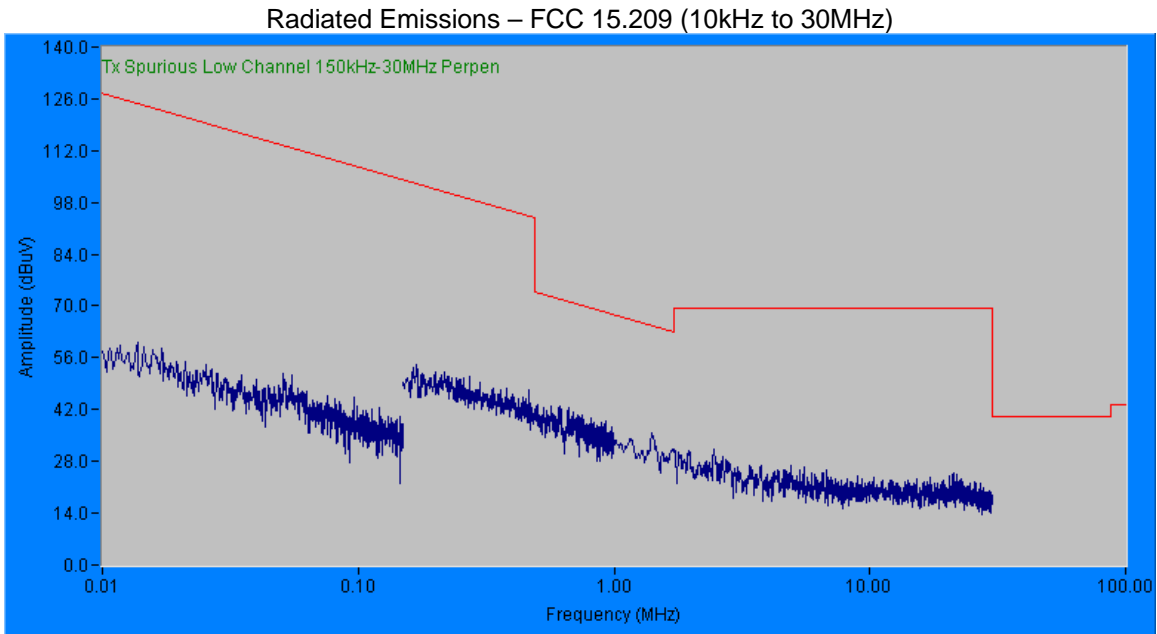
Horn (1GHz – 18GHz)



HF Active Antenna/Harmonic Mixer (18GHz – 26.5GHz)

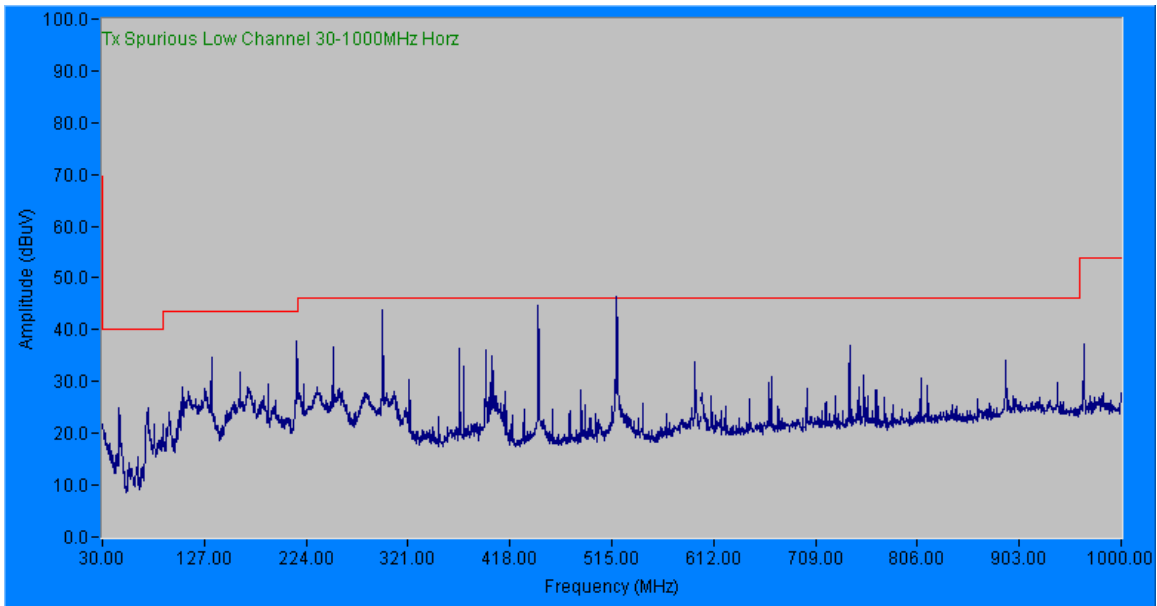
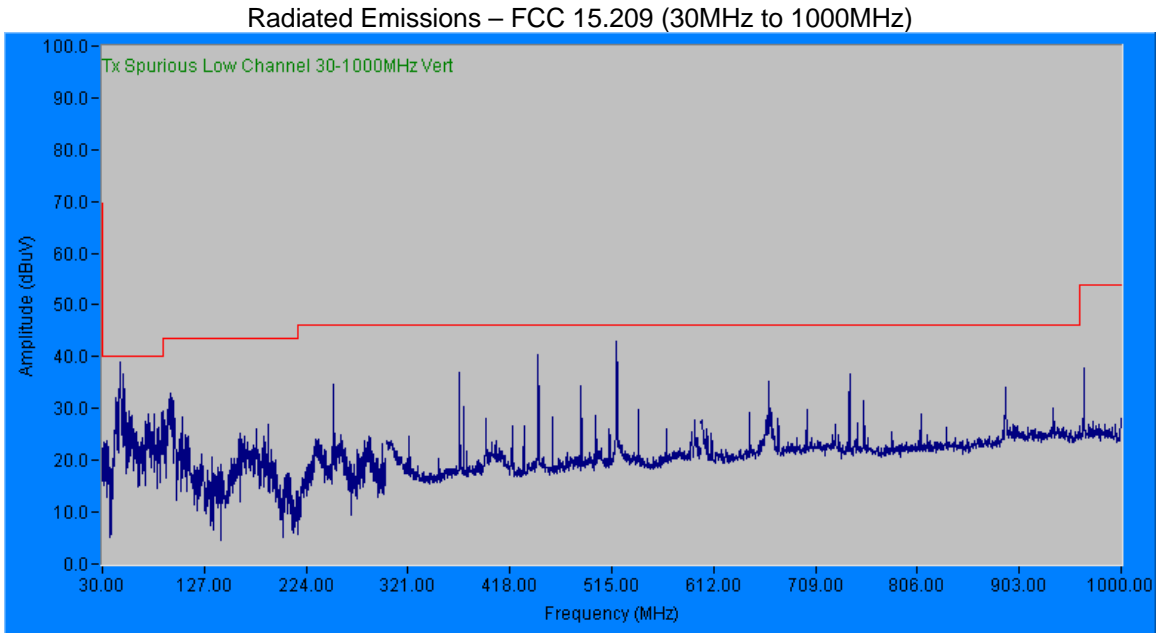


6.5 Plots: Pre-Scan Peak Measurements – Not Final Data – Tx Low Channel



Note: Peak measurements plotted against FCC 15.209 Quasi-Peak Limit

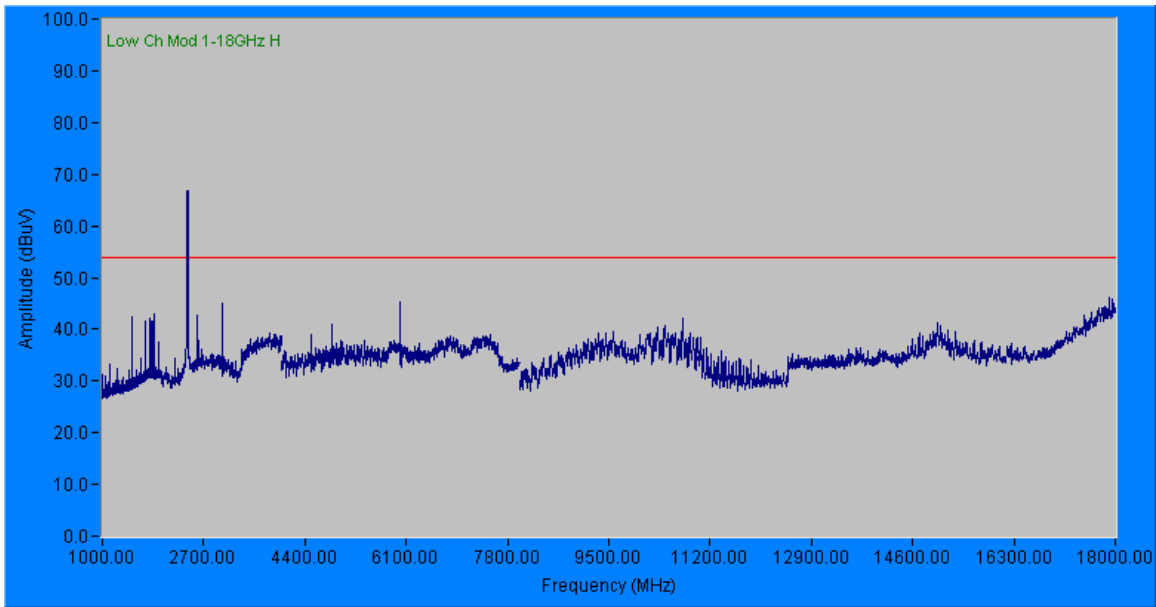
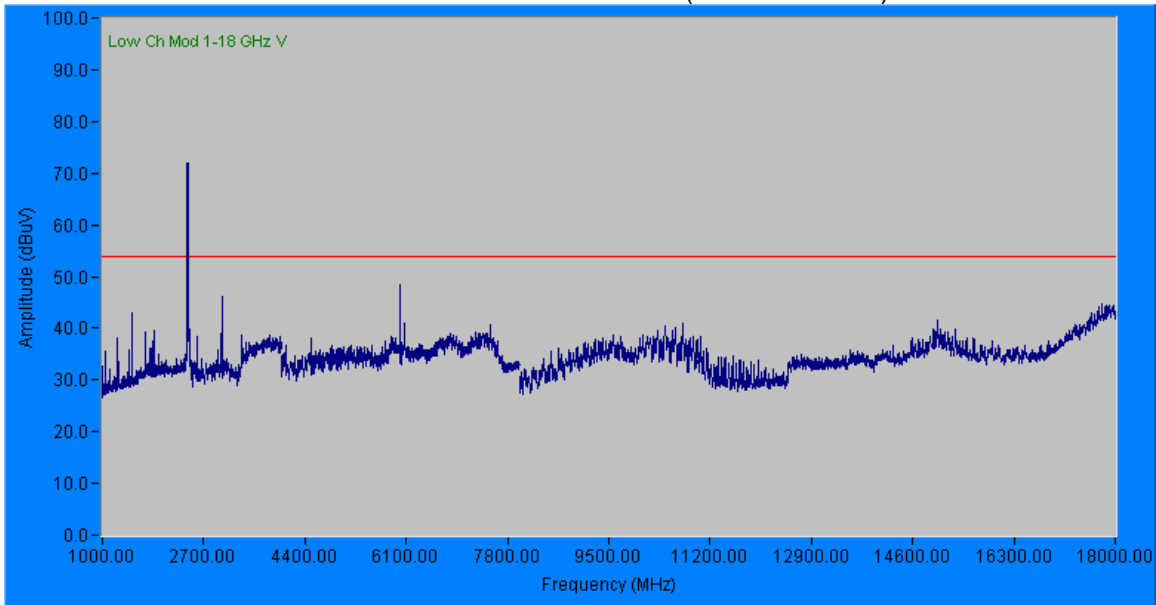
Plots: Pre-Scan Peak Measurements - Not Final Data – Tx Low Channel



Note: Peak measurements plotted against FCC 15.209 Quasi-Peak Limit

Plots: Pre-Scan Peak Measurements - Not Final Data – Low Channel

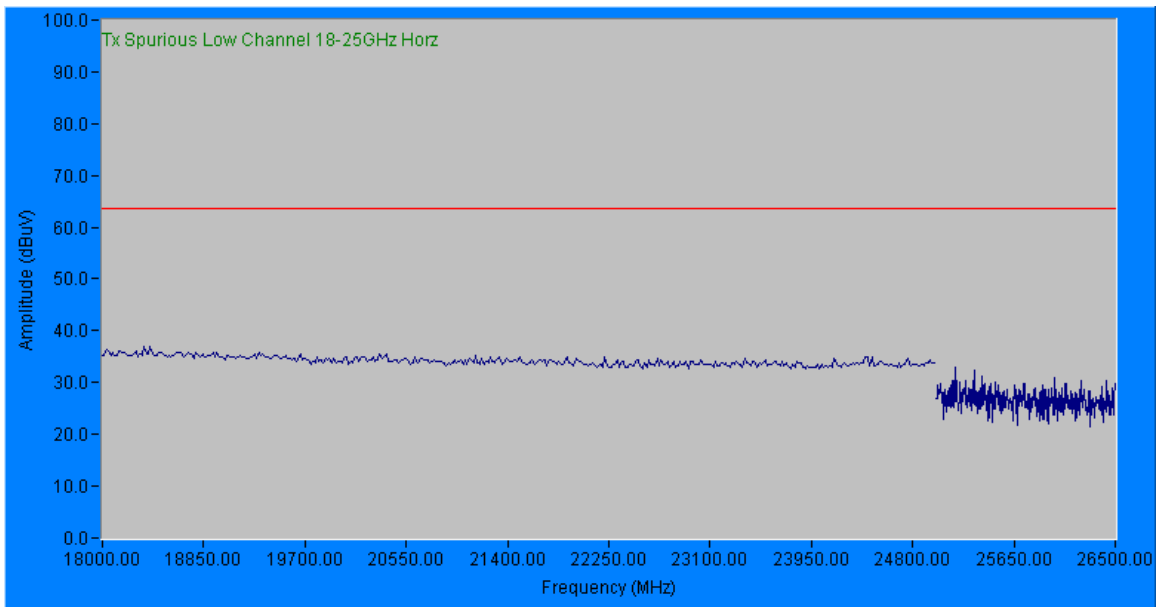
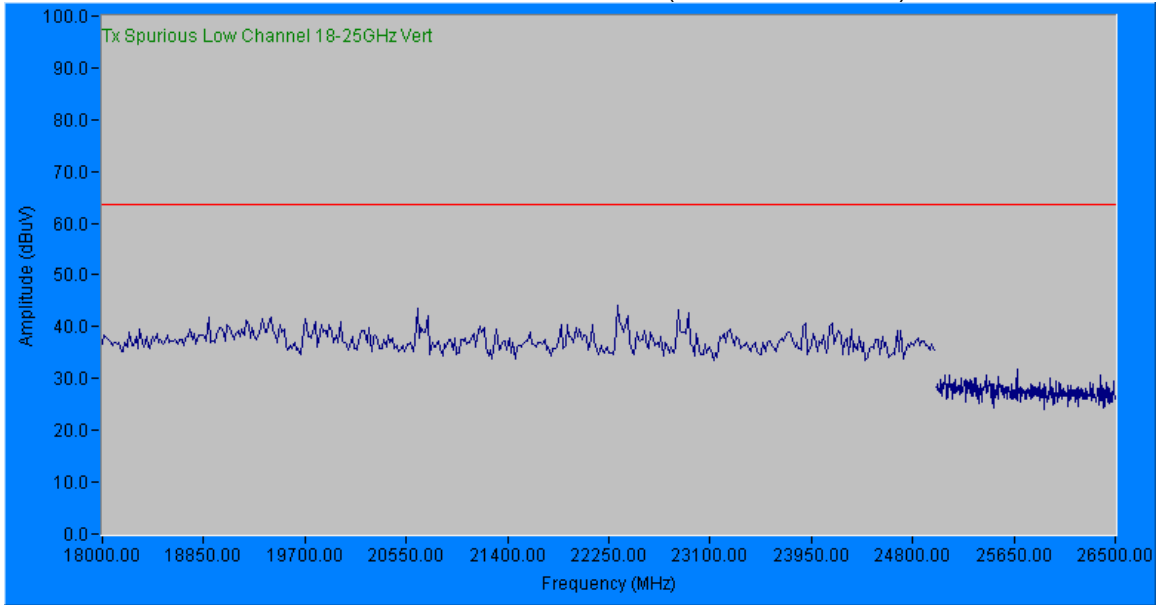
Radiated Emissions – FCC 15.209 (1GHz to 18GHz)



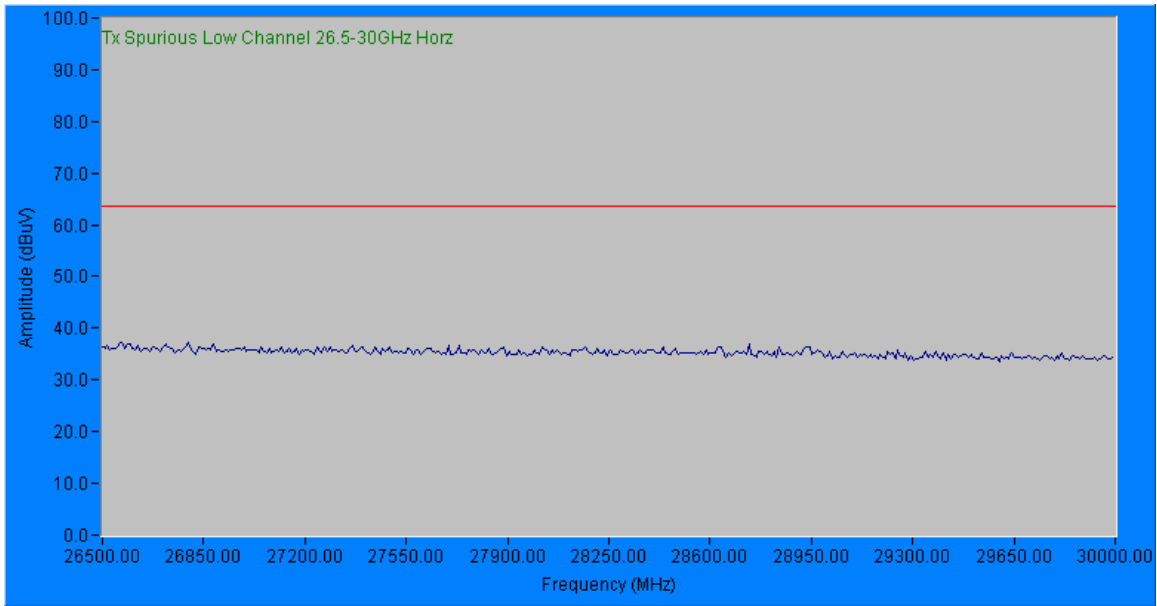
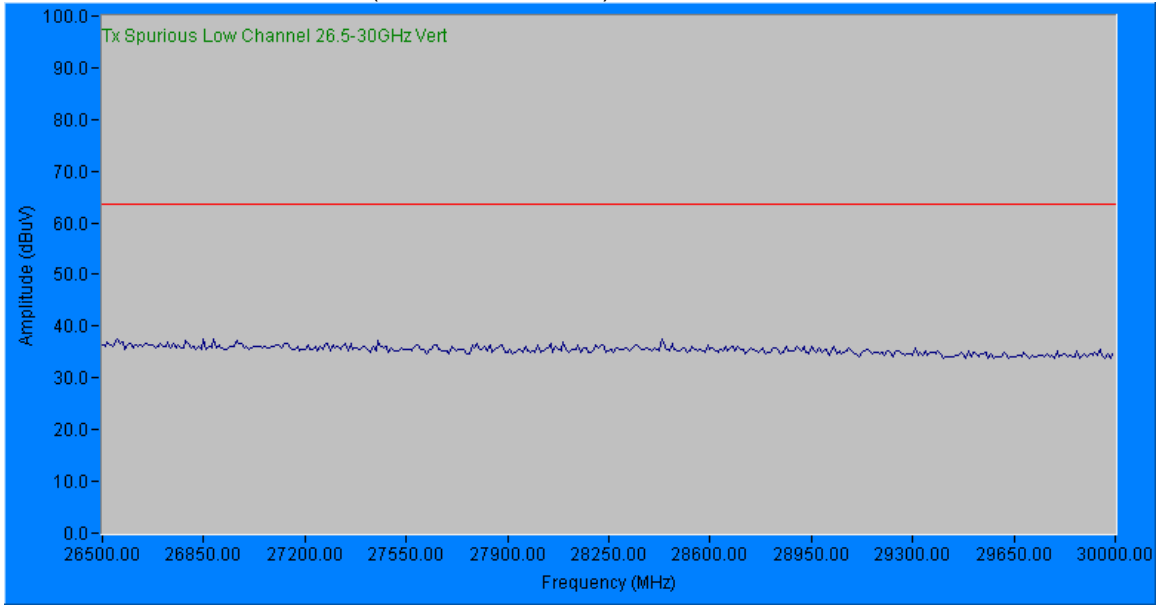
Note: Peak measurements plotted against FCC 15.209 Average Limit

Plots: Pre-Scan Peak Measurements - Not Final Data – Low Channel

Radiated Emissions – FCC 15.209 (18GHz to 26.5GHz)

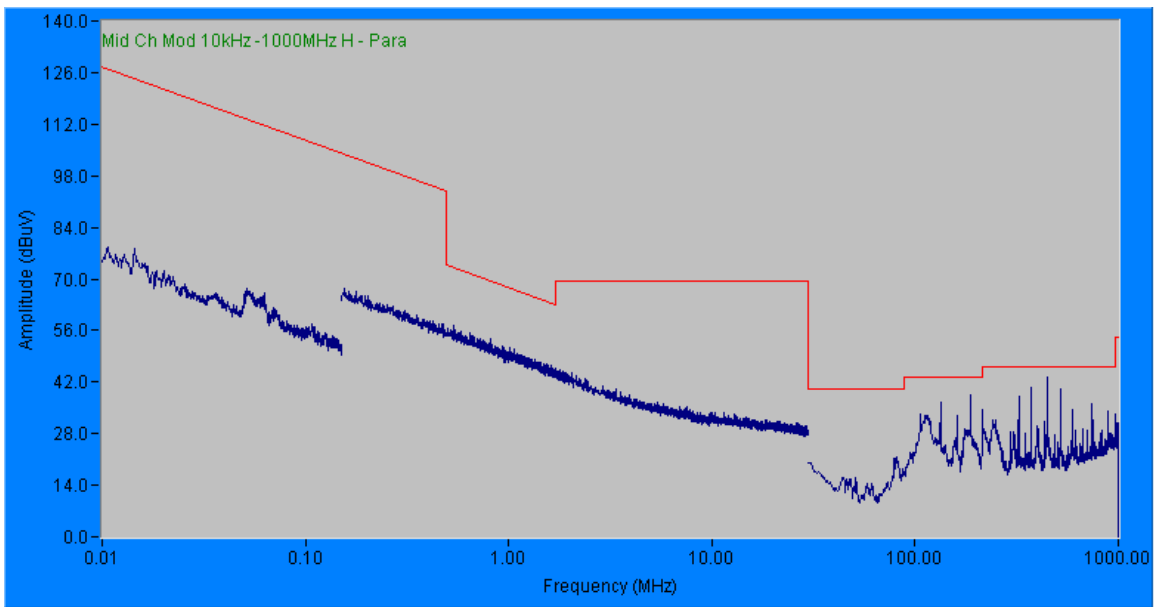
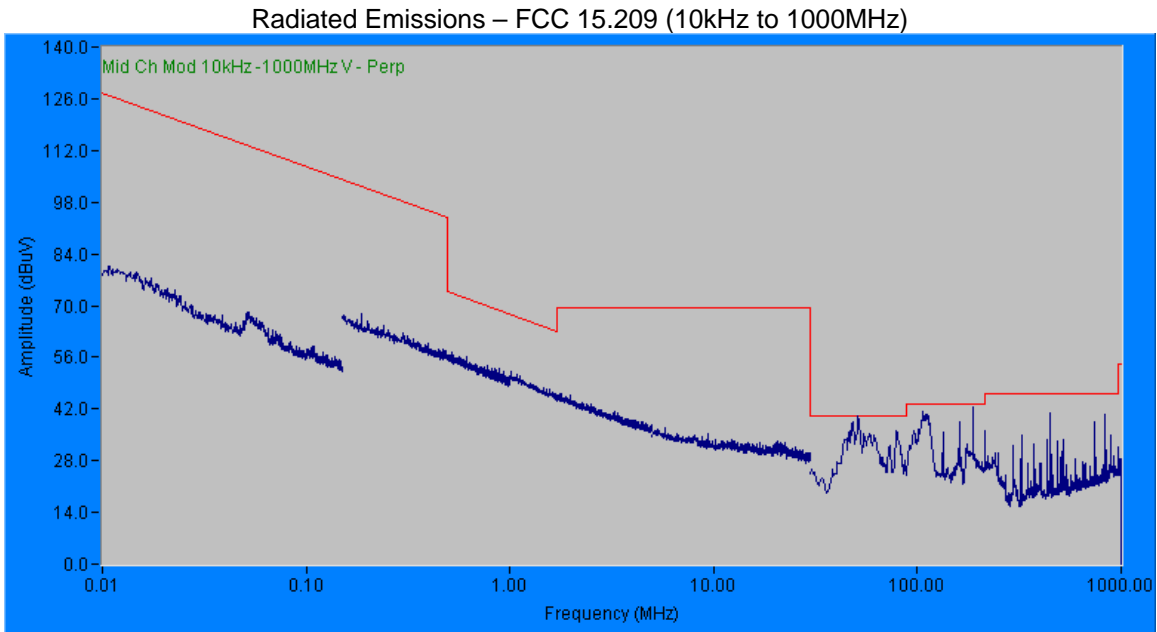


Radiated Emissions – FCC 15.209 (26.5GHz to 30GHz)



Note: Peak measurements plotted against FCC 15.209 Average Limit (extrapolated from 3-meter to 1-meter test distance)

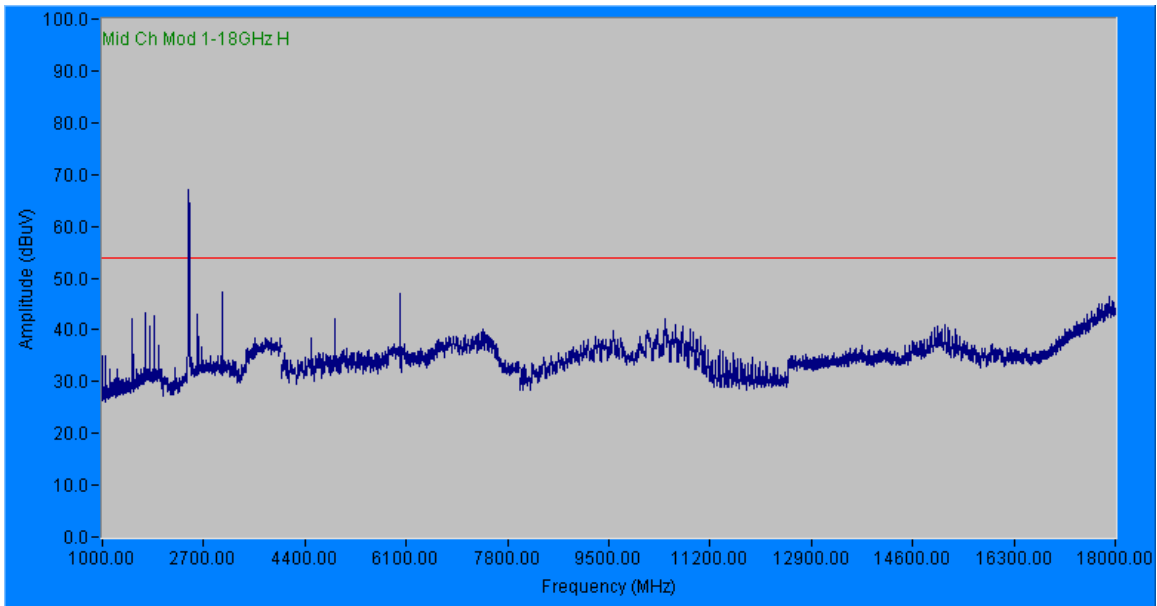
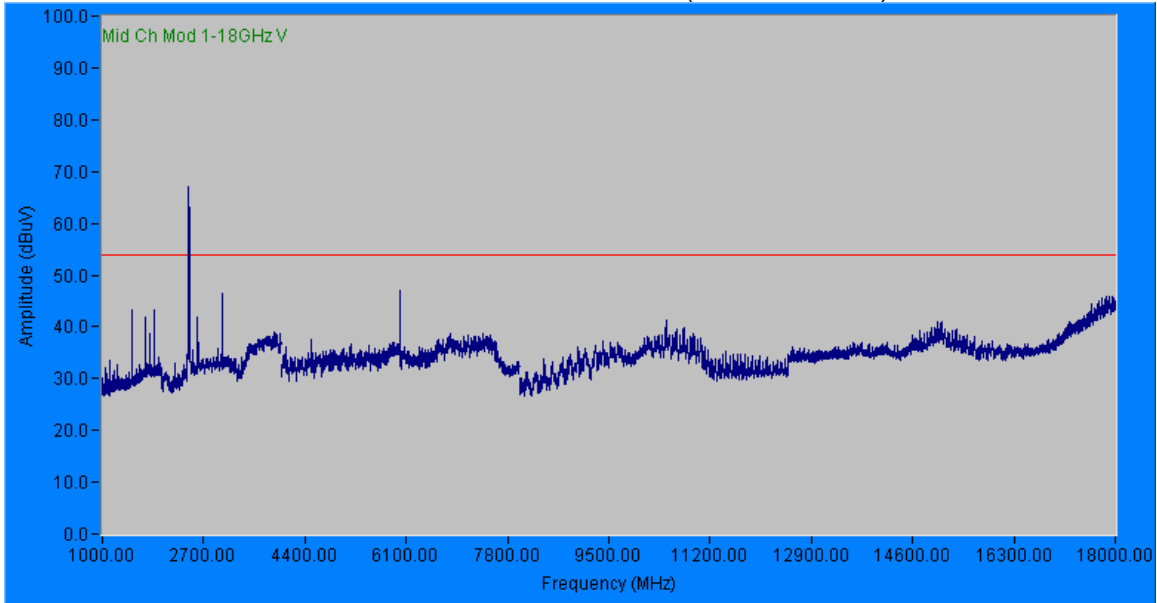
6.6 Plots: Pre-Scan Peak Measurements – Not Final Data – Tx Mid Channel



Note: Peak measurements plotted against FCC 15.209 Quasi-Peak Limit

Plots: Pre-Scan Peak Measurements - Not Final Data – Mid Channel

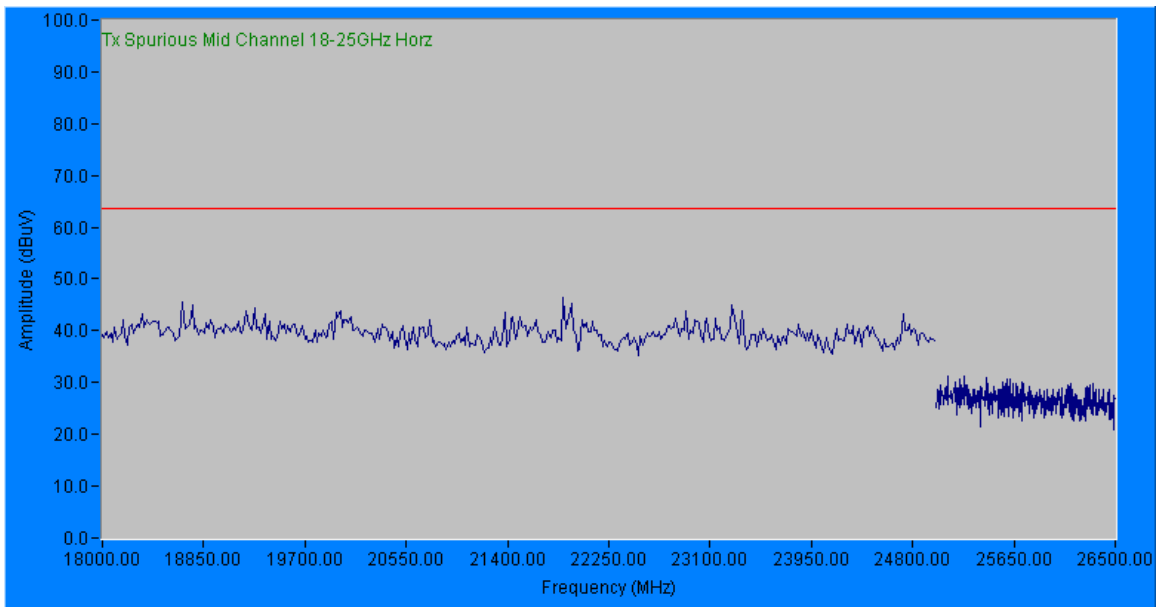
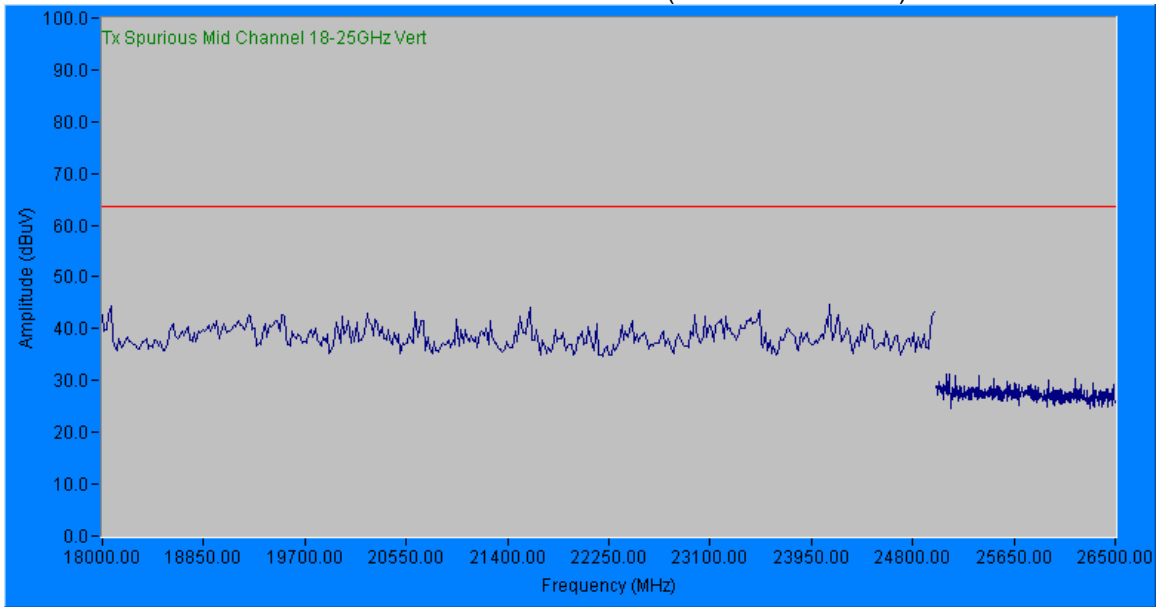
Radiated Emissions – FCC 15.209 (1GHz to 18GHz)



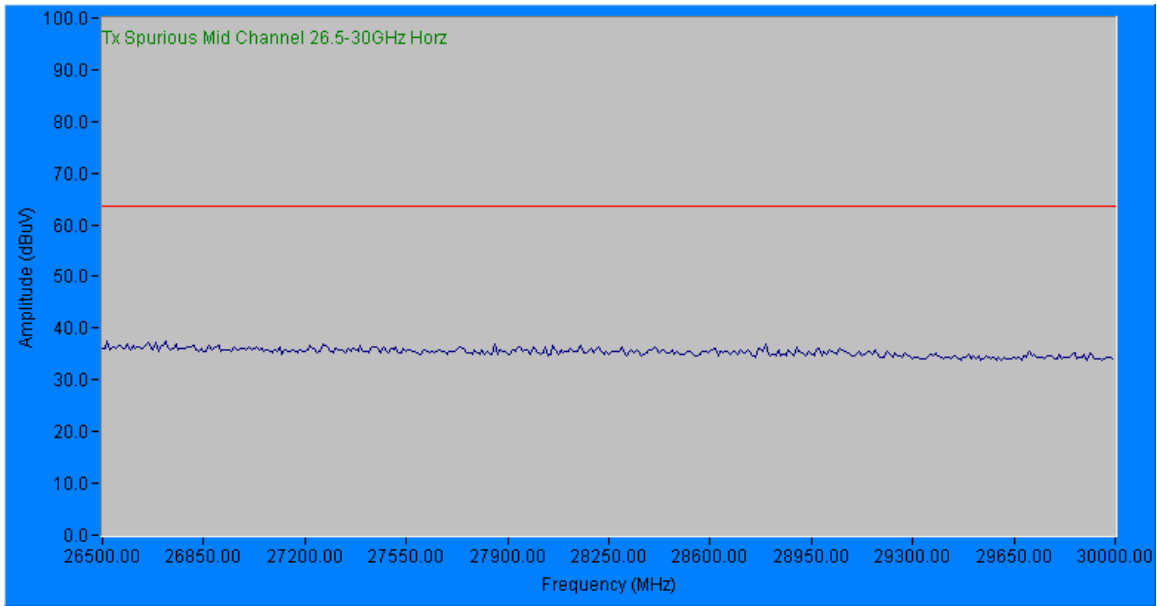
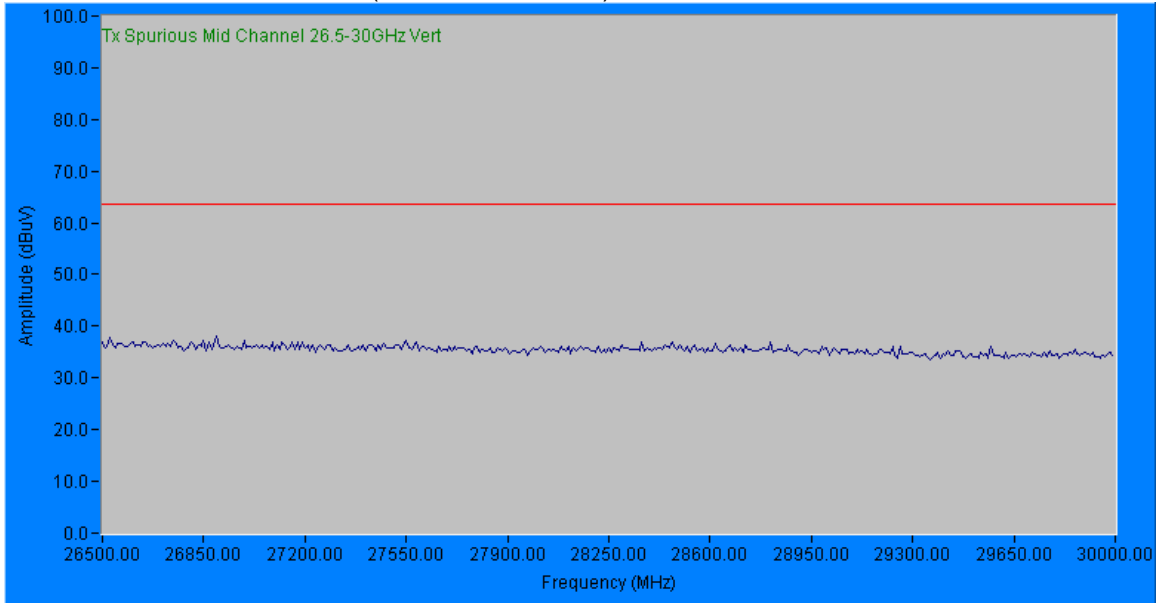
Note: Peak measurements plotted against FCC 15.209 Average Limit

Plots: Pre-Scan Peak Measurements - Not Final Data – Mid Channel

Radiated Emissions – FCC 15.209 (18GHz to 26.5GHz)



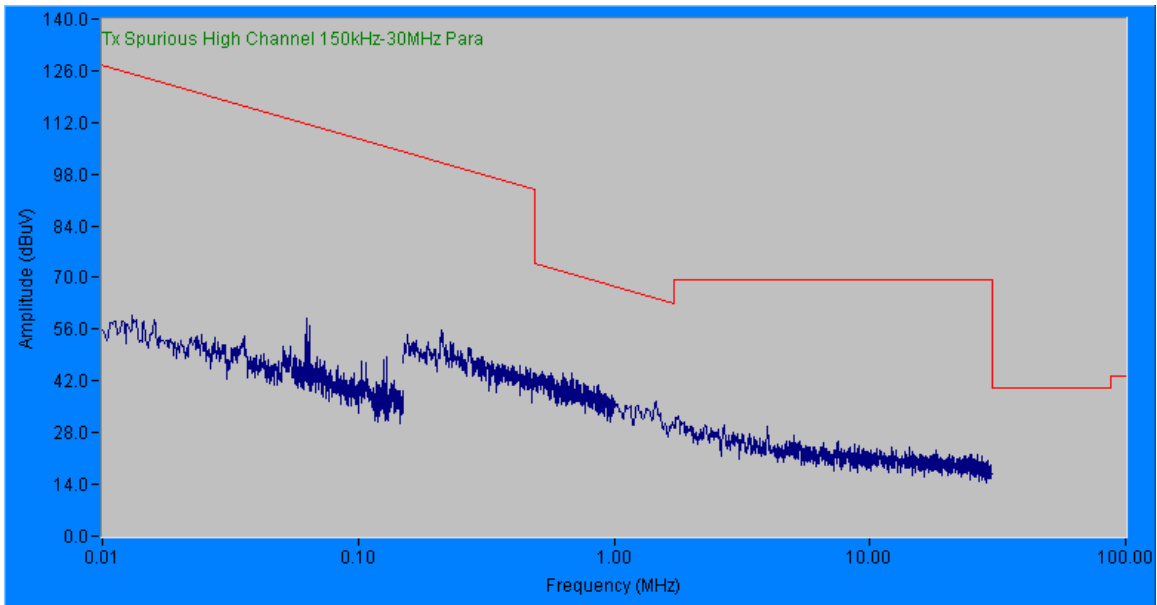
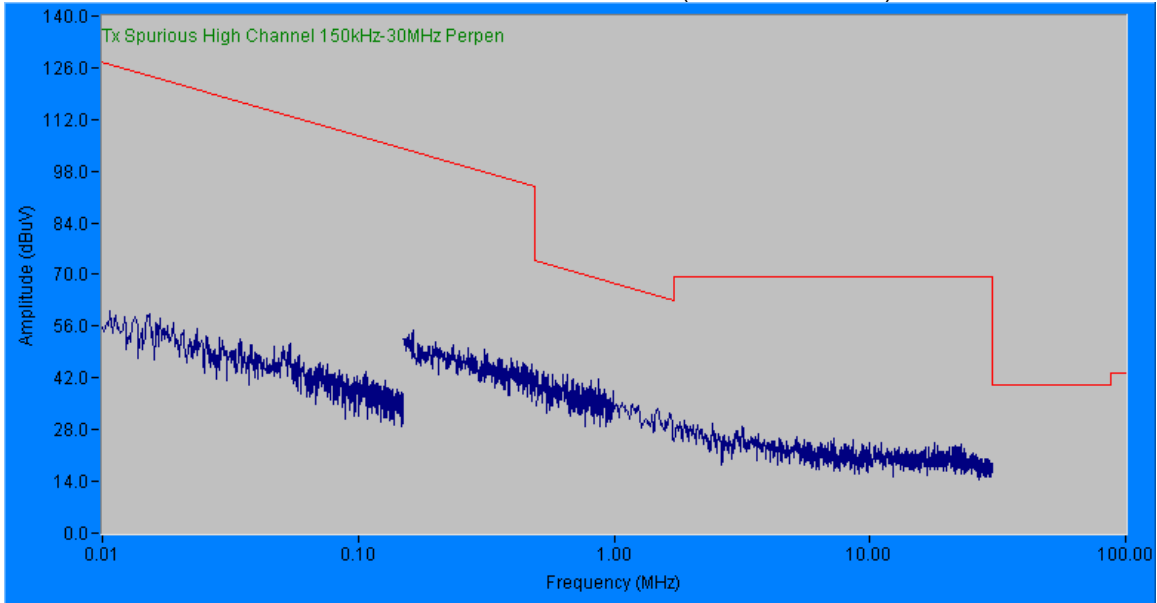
Radiated Emissions – FCC 15.209 (26.5GHz to 30GHz)



Note: Peak measurements plotted against FCC 15.209 Average Limit
(extrapolated from 3-meter to 1-meter test distance)

Plots: Pre-Scan Peak Measurements – Not Final Data – Tx High Channel

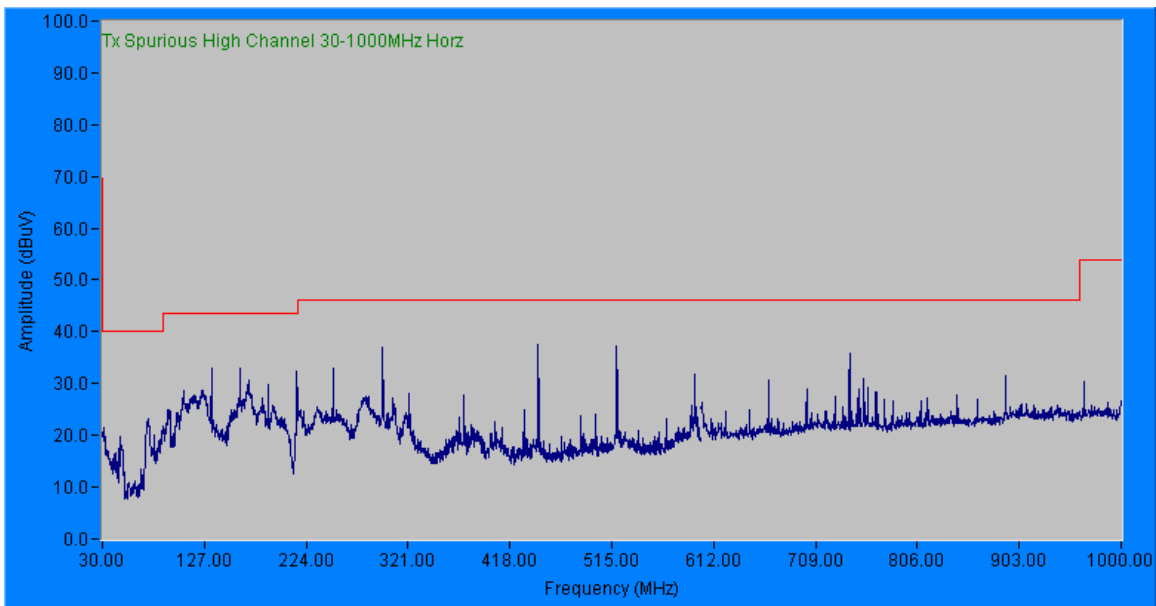
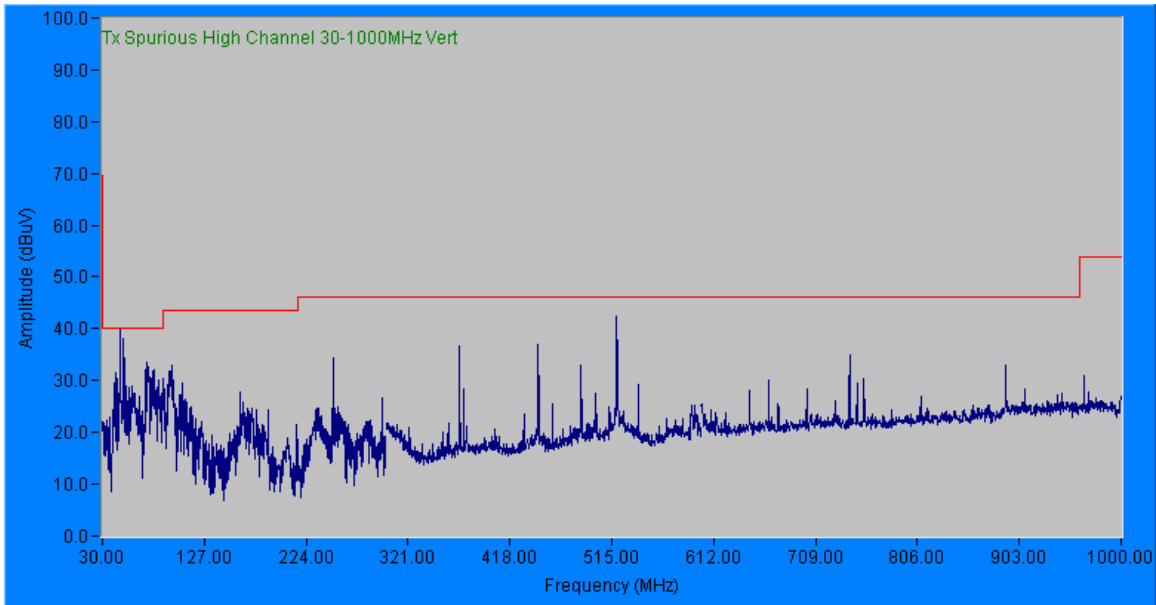
Radiated Emissions – FCC 15.209 (10kHz to 30MHz)



Note: Peak measurements plotted against FCC 15.209 Quasi-Peak Limit

Plots: Pre-Scan Peak Measurements - Not Final Data – Tx High Channel

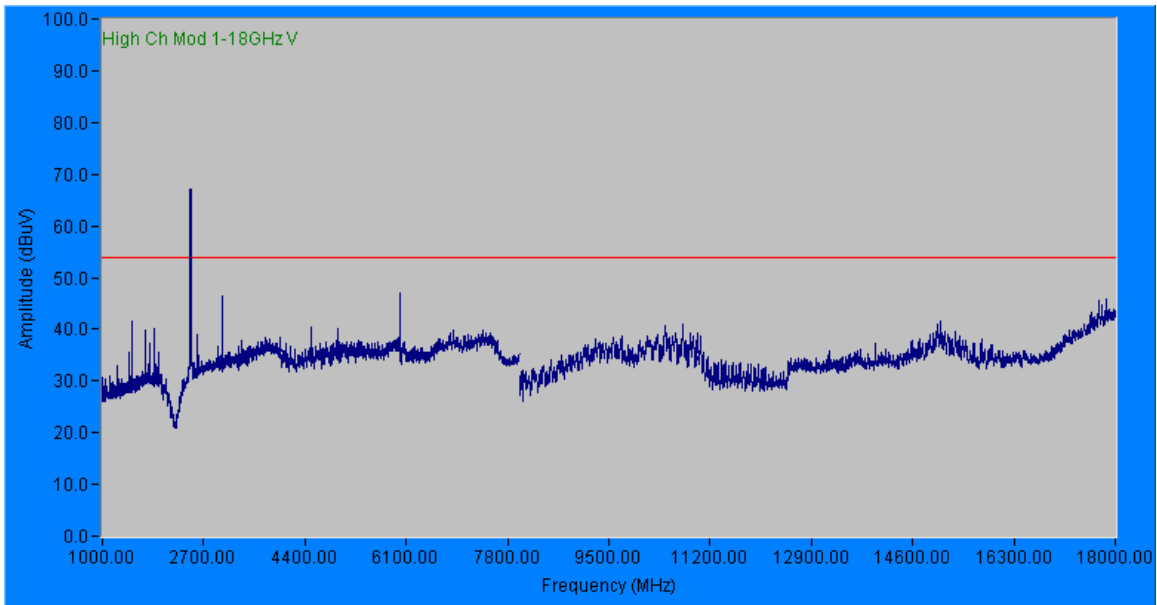
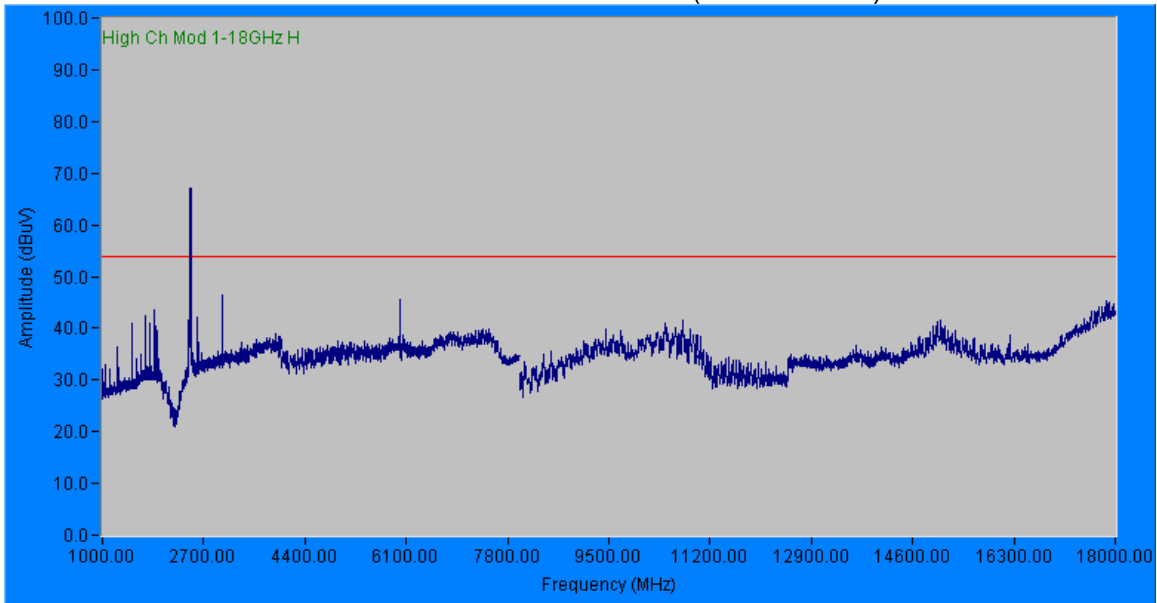
Radiated Emissions – FCC 15.209 (30MHz to 1000MHz)



Note: Peak measurements plotted against FCC 15.209 Quasi-Peak Limit

Plots: Pre-Scan Peak Measurements - Not Final Data – High Channel

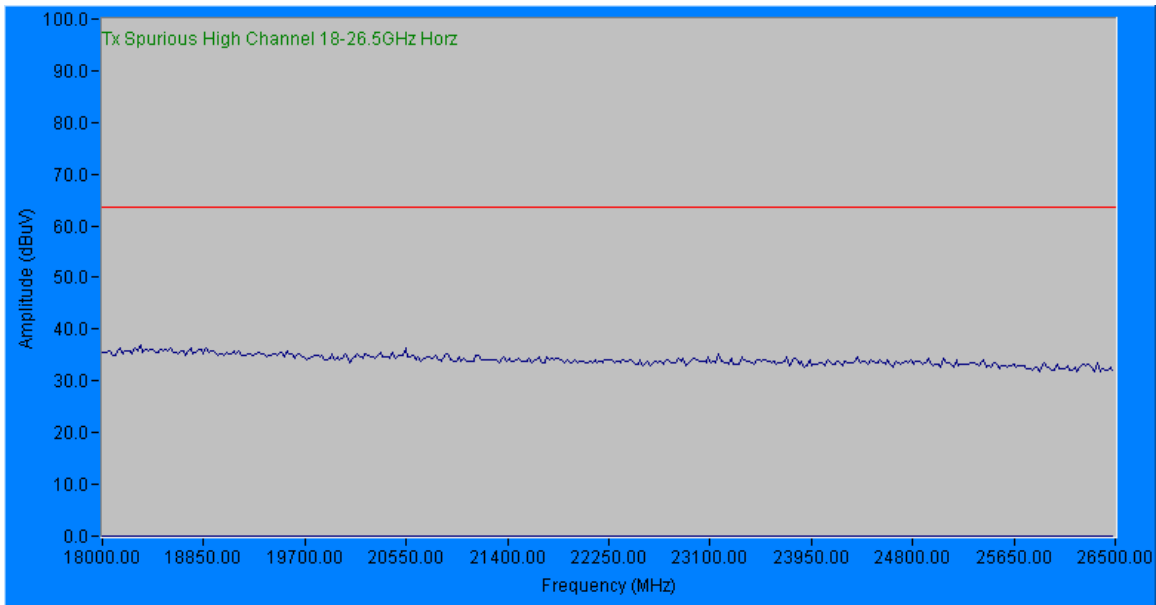
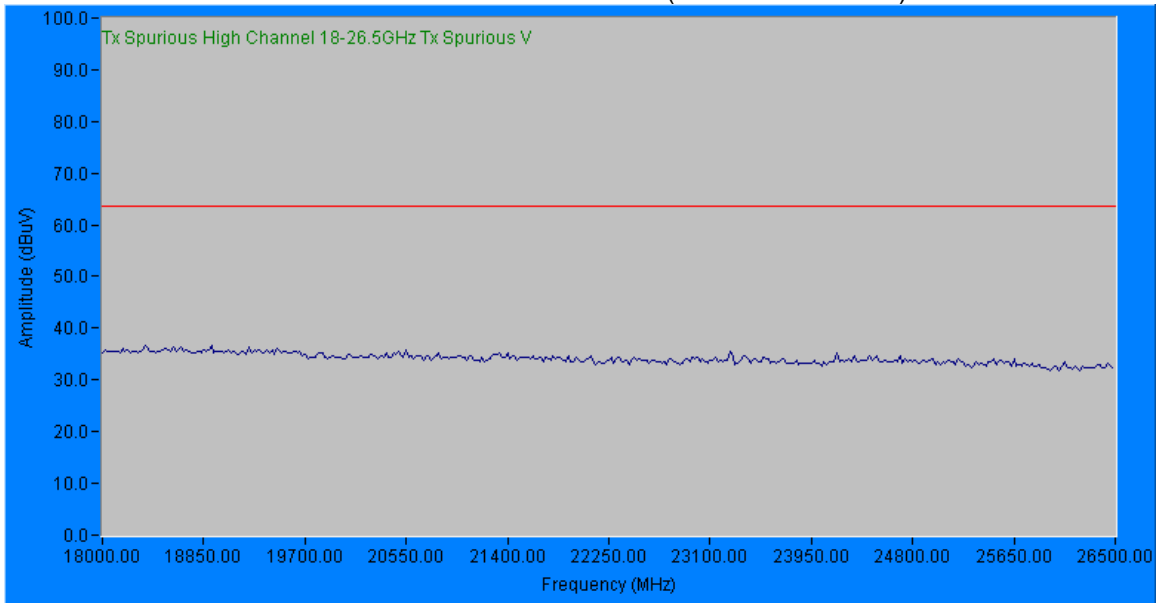
Radiated Emissions – FCC 15.209 (1GHz to 4GHz)



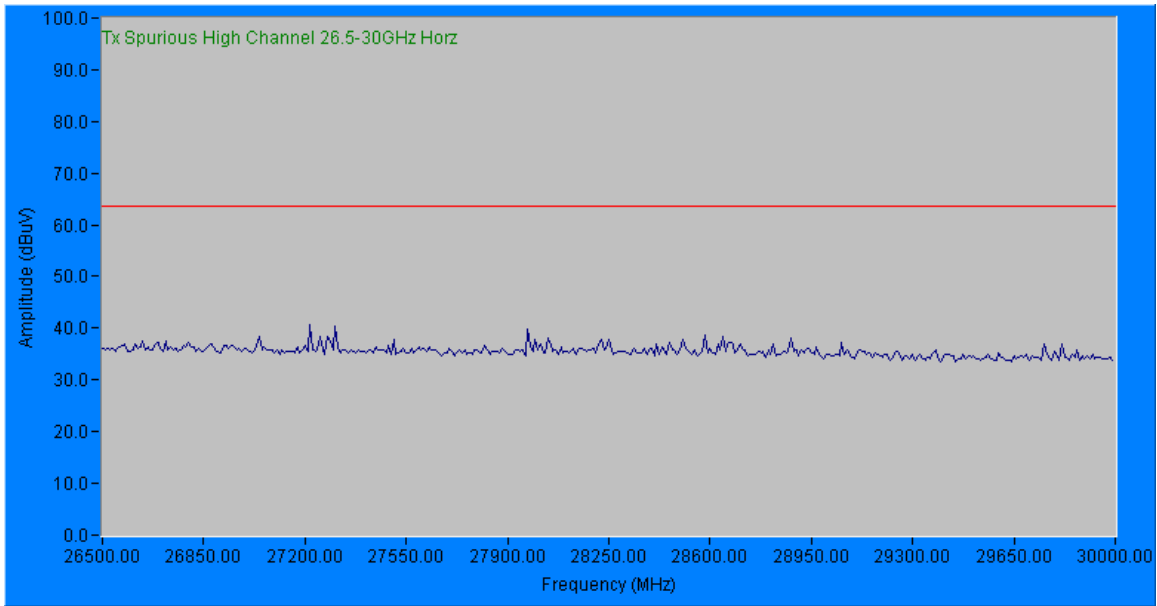
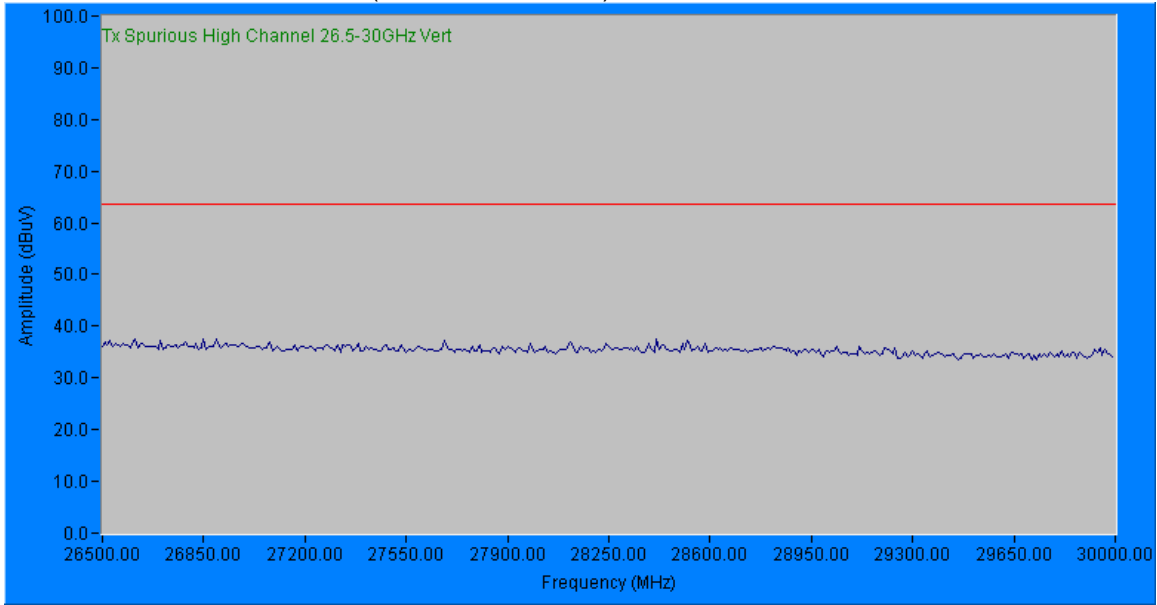
Note: Peak measurements plotted against FCC 15.209 Average Limit

Plots: Pre-Scan Peak Measurements - Not Final Data – High Channel

Radiated Emissions – FCC 15.209 (18GHz to 26.5GHz)



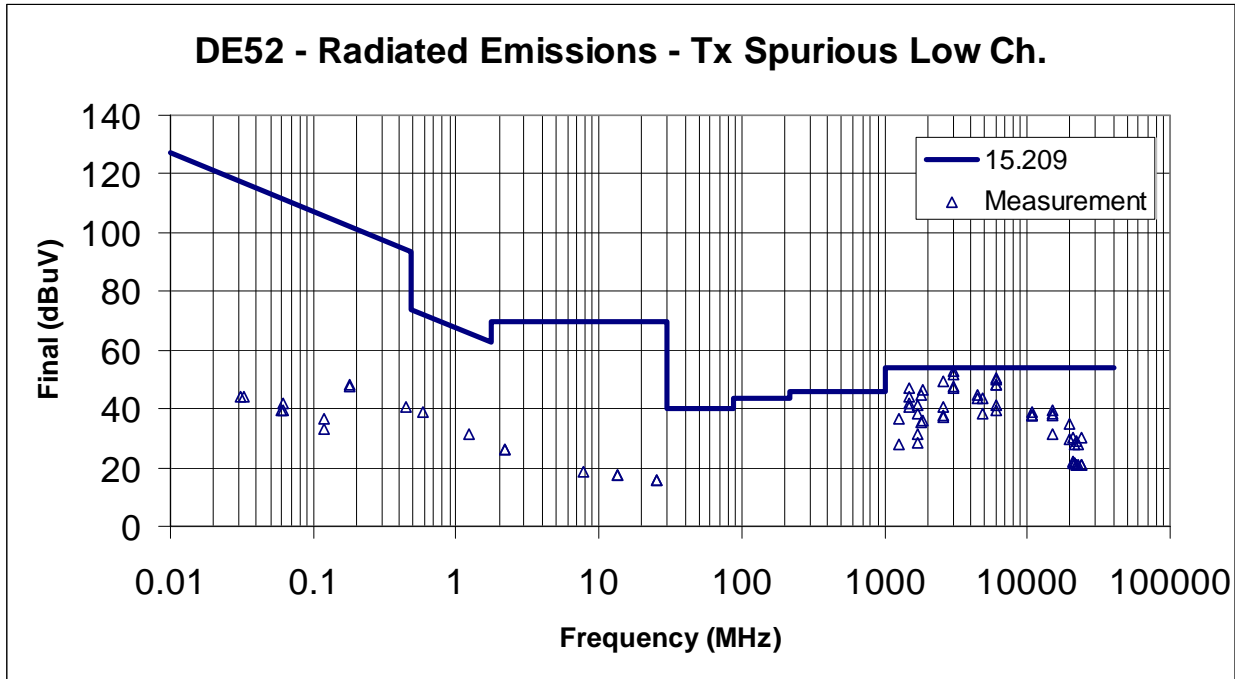
Radiated Emissions – FCC 15.209 (26.5GHz to 30GHz)



Note: Peak measurements plotted against FCC 15.209 Average Limit
(extrapolated from 3-meter to 1-meter test distance)

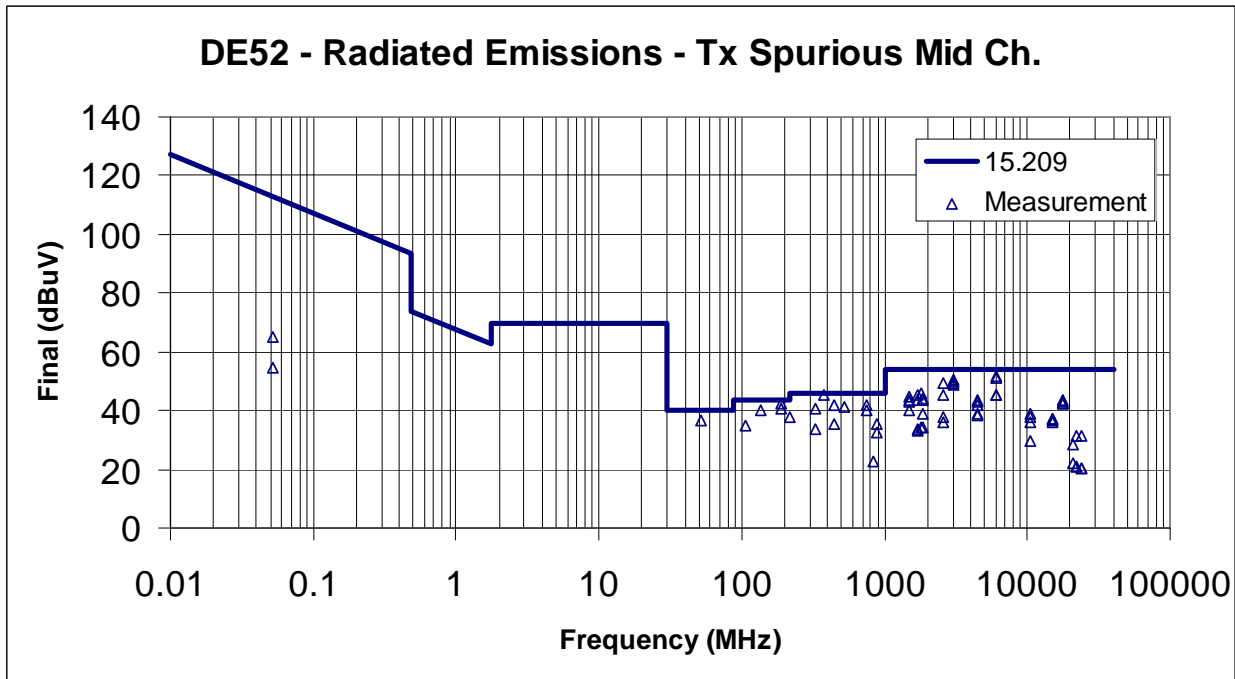
6.7 Plots: Final Peak Measurements – Tx Low Channel

Radiated Emissions – FCC 15.209 (10kHz to 30GHz)



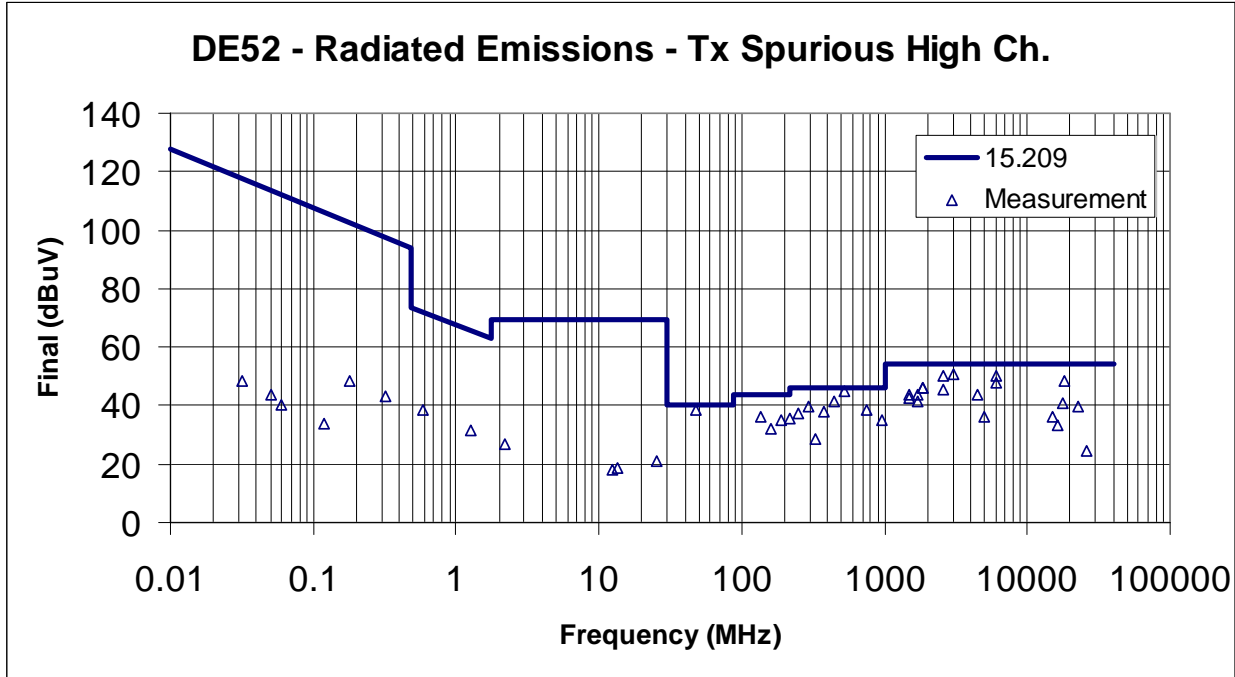
6.8 Plots: Final Peak Measurements – Tx Mid Channel

Radiated Emissions – FCC 15.209 (10kHz to 30GHz)



6.9 Plots: Final Peak Measurements – Tx High Channel

Radiated Emissions – FCC 15.209 (10kHz to 30GHz)



6.10 Test Data: Tx Low Channel

Radiated Electromagnetic Emissions

Test Report #:	G100457230 Run 4	Test Area:	CC1 Radiated	Temperature:	22.7 °C
Test Method:	FCC Part 15.209	Test Date:	04-Aug-2011	Relative Humidity:	45.1 %
EUT Model #:	DE52	EUT Power:	120V, 60Hz	Air Pressure:	83.79 kPa
EUT Serial #:	EMC New				
Manufacturer:	Echostar				
EUT Description:					
Notes:					

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dBm) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) FCC 15.209
FCC Restricted Bands are Highlighted in Yellow					
0.0308	31.4 Qp	0.0 / 12.7 / 0.0	44.1	PARA / 1.0 / 0.0	-73.7
0.0326	31.4 Qp	0.0 / 12.5 / 0.0	43.9	PERP / 1.0 / 46.0	-73.4
0.06	28.9 Qp	0.0 / 10.8 / 0.0	39.7	PARA / 1.0 / 28.0	-72.3
0.0606	30.8 Qp	0.0 / 10.8 / 0.0	41.6	PARA / 1.0 / 127.0	-70.3
0.0606	28.7 Qp	0.0 / 10.8 / 0.0	39.5	PERP / 1.0 / 254.0	-72.4
0.12	22.6 Qp	0.0 / 10.5 / 0.0	33.1	PARA / 1.0 / 127.0	-72.9
0.12	25.9 Qp	0.0 / 10.5 / 0.0	36.4	PERP / 1.0 / 152.0	-69.6
0.18	37.6 Qp	0.0 / 10.4 / 0.0	48	PERP / 1.0 / 104.0	-54.5
0.181	37.3 Qp	0.0 / 10.4 / 0.0	47.7	PARA / 1.0 / 0.0	-54.8
0.44	30.1 Qp	0.1 / 10.3 / 0.0	40.5	PERP / 1.0 / 104.0	-54.2
0.584	28.3 Qp	0.1 / 10.3 / 0.0	38.7	PARA / 1.0 / 28.0	-33.6
1.24	20.8 Qp	0.1 / 10.4 / 0.0	31.3	PARA / 1.0 / 56.0	-34.4
2.18	15.6 Qp	0.1 / 10.5 / 0.0	26.2	PARA / 1.0 / 168.0	-43.3
2.18	15.8 Qp	0.1 / 10.5 / 0.0	26.4	PERP / 1.0 / 12.0	-43.1
7.72	7.5 Qp	0.2 / 10.7 / 0.0	18.4	PARA / 1.0 / 56.0	-51.1
13.4	6.3 Qp	0.3 / 10.7 / 0.0	17.3	PARA / 1.0 / 356.0	-52.2
13.4	6.3 Qp	0.3 / 10.7 / 0.0	17.3	PERP / 1.0 / 356.0	-52.2
25.68	6.0 Qp	0.4 / 9.4 / 0.0	15.8	PARA / 1.0 / 168.0	-53.7
25.68	5.8 Qp	0.4 / 9.4 / 0.0	15.6	PERP / 1.0 / 356.0	-53.9
1259.92	45.1 Pk	2.5 / 26.1 / 37.1	36.6	V / 1.9 / 278.2	-17.4
1260.05	36.5 Av	2.5 / 26.1 / 37.1	27.9	V / 1.9 / 278.2	-26.1
1500.04	51.4 Av	2.7 / 26.7 / 36.6	44.1	H / 1.1 / 219.0	-9.9
1500.04	54.1 Pk	2.7 / 26.7 / 36.6	46.8	H / 1.1 / 219.0	-7.2
1500.05	48.0 Av	2.7 / 26.7 / 36.6	40.7	V / 1.5 / 31.9	-13.3
1500.05	49.4 Pk	2.7 / 26.7 / 36.6	42.1	V / 1.5 / 31.9	-11.9
1707.71	44.1 Av	2.9 / 27.8 / 36.8	38.1	H / 1.1 / 65.4	-15.9
1707.71	47.3 Pk	2.9 / 27.8 / 36.8	41.3	H / 1.1 / 65.4	-12.7
1715.12	34.6 Av	2.9 / 27.8 / 36.8	28.6	V / 1.0 / 0.0	-25.4

Intertek

Report Number: 100457230DEN-002

Issued:08/24/2011

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB\m) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) FCC 15.209
1715.33	37.2 Pk	2.9 / 27.8 / 36.8	31.2	V / 1.0 / 0.0	-22.8
1782.01	41.0 Av	3.0 / 28.1 / 36.9	35.2	H / 1.1 / 279.9	-18.8
1782.01	50.5 Pk	3.0 / 28.1 / 36.9	44.7	H / 1.1 / 279.9	-9.3
1856.22	42.0 Av	3.1 / 28.2 / 37.0	36.3	H / 1.4 / 182.0	-17.7
1856.22	52.2 Pk	3.1 / 28.2 / 37.0	46.5	H / 1.4 / 182.0	-7.5
2598.75	40.6 Av	3.7 / 30.0 / 37.4	36.9	H / 1.0 / 209.2	-17.1
2598.75	52.9 Pk	3.7 / 30.0 / 37.4	49.1	H / 1.0 / 209.2	-4.9
2598.76	41.6 Av	3.7 / 30.0 / 37.4	37.8	V / 1.1 / 186.8	-16.2
2598.76	44.1 Pk	3.7 / 30.0 / 37.4	40.4	V / 1.1 / 186.8	-13.6
3000.06	48.5 Av	4.0 / 31.6 / 37.3	46.8	H / 1.2 / 293.2	-7.2
3000.06	49.5 Pk	4.0 / 31.6 / 37.3	47.8	H / 1.2 / 293.2	-6.2
3000.07	54.3 Pk	4.0 / 31.6 / 37.3	52.6	V / 1.2 / 318.8	-1.4
3000.25	53.4 Av	4.0 / 31.6 / 37.3	51.7	V / 1.2 / 318.8	-2.3
4500.13	44.2 Av	5.0 / 34.3 / 39.8	43.7	V / 1.0 / 286.2	-10.3
4500.13	45.5 Pk	5.0 / 34.3 / 39.8	45	V / 1.0 / 286.2	-9
4850.95	36.9 Av	5.2 / 35.0 / 38.9	38.2	H / 1.2 / 323.8	-15.8
4850.95	42.4 Pk	5.2 / 35.0 / 38.9	43.7	H / 1.2 / 323.8	-10.3
6000.11	46.3 Av	5.8 / 36.7 / 39.1	49.7	V / 1.9 / 125.2	-4.3
6000.11	47.0 Pk	5.8 / 36.7 / 39.1	50.3	V / 1.9 / 125.2	-3.7
6000.13	44.6 Av	5.8 / 36.7 / 39.1	48	H / 1.5 / 324.1	-6
6000.13	44.9 Pk	5.8 / 36.7 / 39.1	48.2	H / 1.5 / 324.1	-5.8
6075.15	36.2 Av	5.8 / 36.9 / 39.2	39.7	V / 1.6 / 102.2	-14.3
6075.15	38.1 Pk	5.8 / 36.9 / 39.2	41.5	V / 1.6 / 102.2	-12.5
10742.7	37.6 Av	8.1 / 40.8 / 48.7	37.7	V / 1.0 / 0.0	-16.3
10742.7	38.8 Pk	8.1 / 40.8 / 48.7	38.9	V / 1.0 / 0.0	-15.1
10742.7	37.6 Av	8.1 / 40.8 / 48.7	37.8	H / 1.0 / 0.0	-16.2
10742.7	37.5 Pk	8.1 / 40.8 / 48.7	37.7	H / 1.0 / 0.0	-16.3
15017.5	26.2 Av	9.7 / 43.4 / 47.8	31.4	V / 1.0 / 0.0	-22.6
15017.5	34.4 Pk	9.7 / 43.4 / 47.8	39.6	V / 1.0 / 0.0	-14.4
15017.5	32.2 Av	9.7 / 43.4 / 47.8	37.5	H / 1.0 / 0.0	-16.5
15017.5	33.2 Pk	9.7 / 43.4 / 47.8	38.4	H / 1.0 / 0.0	-15.6
19802.5	8.1 Pk	0.0 / 21.8 / 0.0	29.9	H / 1.0 / 0.0	-33.6
19802.5	13.0 Pk	0.0 / 21.8 / 0.0	34.8	H / 1.0 / 0.0	-28.7
20625	8.6 Pk	0.0 / 21.8 / 0.0	30.4	V / 1.0 / 0.0	-33.1
20625	0.0 Pk	0.0 / 21.8 / 0.0	21.8	V / 1.0 / 0.0	-41.7
20625	-0.0 Av	0.0 / 21.8 / 0.0	21.7	V / 1.0 / 0.0	-41.8
21176.5	-0.0 Av	0.0 / 21.5 / 0.0	21.5	H / 1.0 / 0.0	-42
21377.5	6.4 Pk	0.0 / 21.4 / 0.0	27.8	H / 1.0 / 0.0	-35.7
21377.5	0.1 Pk	0.0 / 21.4 / 0.0	21.5	H / 1.0 / 0.0	-42
22147.5	7.5 Pk	0.0 / 21.3 / 0.0	28.8	V / 1.0 / 0.0	-34.7
22147.5	-0.3 Pk	0.0 / 21.3 / 0.0	20.9	V / 1.0 / 0.0	-42.6
22147.5	-0.3 Av	0.0 / 21.3 / 0.0	20.9	V / 1.0 / 0.0	-42.6
22550	6.8 Pk	0.0 / 20.9 / 0.0	27.8	H / 1.0 / 0.0	-35.7
22550	-0.2 Pk	0.0 / 20.9 / 0.0	20.7	H / 1.0 / 0.0	-42.8

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FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB\m) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) FCC 15.209
23757.5	9.1 Pk	0.0 / 21.3 / 0.0	30.4	V / 1.0 / 0.0	-33.1
23757.5	-0.5 Pk	0.0 / 21.3 / 0.0	20.8	V / 1.0 / 0.0	
23757.5	-0.5 Av	0.0 / 21.3 / 0.0	20.8	V / 1.0 / 0.0	

***** Measurement Summary *****

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB\m) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) 15.209
3000.07	54.3 Pk	4.0 / 31.6 / 37.3	52.6	V / 1.2 / 318.8	-1.4
3000.25	53.4 Av	4.0 / 31.6 / 37.3	51.7	V / 1.2 / 318.8	-2.3
6000.11	47.0 Pk	5.8 / 36.7 / 39.1	50.3	V / 1.9 / 125.2	-3.7
2598.75	52.9 Pk	3.7 / 30.0 / 37.4	49.1	H / 1.0 / 209.2	-4.9
6000.13	44.9 Pk	5.8 / 36.7 / 39.1	48.2	H / 1.5 / 324.1	-5.8
3000.06	49.5 Pk	4.0 / 31.6 / 37.3	47.8	H / 1.2 / 293.2	-6.2
1500.04	54.1 Pk	2.7 / 26.7 / 36.6	46.8	H / 1.1 / 219.0	-7.2
1856.22	52.2 Pk	3.1 / 28.2 / 37.0	46.5	H / 1.4 / 182.0	-7.5
4500.13	45.5 Pk	5.0 / 34.3 / 39.8	45	V / 1.0 / 286.2	-9
1782.01	50.5 Pk	3.0 / 28.1 / 36.9	44.7	H / 1.1 / 279.9	-9.3
4850.95	42.4 Pk	5.2 / 35.0 / 38.9	43.7	H / 1.2 / 323.8	-10.3
1500.05	49.4 Pk	2.7 / 26.7 / 36.6	42.1	V / 1.5 / 31.9	-11.9
6075.15	38.1 Pk	5.8 / 36.9 / 39.2	41.5	V / 1.6 / 102.2	-12.5
1707.71	47.3 Pk	2.9 / 27.8 / 36.8	41.3	H / 1.1 / 65.4	-12.7
2598.76	44.1 Pk	3.7 / 30.0 / 37.4	40.4	V / 1.1 / 186.8	-13.6
15017.5	34.4 Pk	9.7 / 43.4 / 47.8	39.6	V / 1.0 / 0.0	-14.4
10742.7	38.8 Pk	8.1 / 40.8 / 48.7	38.9	V / 1.0 / 0.0	-15.1
1259.92	45.1 Pk	2.5 / 26.1 / 37.1	36.6	V / 1.9 / 278.2	-17.4
1715.33	37.2 Pk	2.9 / 27.8 / 36.8	31.2	V / 1.0 / 0.0	-22.8
1715.12	34.6 Av	2.9 / 27.8 / 36.8	28.6	V / 1.0 / 0.0	-25.4
1260.05	36.5 Av	2.5 / 26.1 / 37.1	27.9	V / 1.9 / 278.2	-26.1
19802.5	13.0 Pk	0.0 / 21.8 / 0.0	34.8	H / 1.0 / 0.0	-28.7
20625	8.6 Pk	0.0 / 21.8 / 0.0	30.4	V / 1.0 / 0.0	-33.1
23757.5	9.1 Pk	0.0 / 21.3 / 0.0	30.4	V / 1.0 / 0.0	-33.1
0.584	28.3 Qp	0.1 / 10.3 / 0.0	38.7	PARA / 1.0 / 28.0	-33.6
1.24	20.8 Qp	0.1 / 10.4 / 0.0	31.3	PARA / 1.0 / 56.0	-34.4
22147.5	7.5 Pk	0.0 / 21.3 / 0.0	28.8	V / 1.0 / 0.0	-34.7
21377.5	6.4 Pk	0.0 / 21.4 / 0.0	27.8	H / 1.0 / 0.0	-35.7
22550	6.8 Pk	0.0 / 20.9 / 0.0	27.8	H / 1.0 / 0.0	-35.7
21176.5	-0.0 Av	0.0 / 21.5 / 0.0	21.5	H / 1.0 / 0.0	-42
2.18	15.8 Qp	0.1 / 10.5 / 0.0	26.4	PERP / 1.0 / 12.0	-43.1
7.72	7.5 Qp	0.2 / 10.7 / 0.0	18.4	PARA / 1.0 / 56.0	-51.1
13.4	6.3 Qp	0.3 / 10.7 / 0.0	17.3	PARA / 1.0 / 356.0	-52.2
25.68	6.0 Qp	0.4 / 9.4 / 0.0	15.8	PARA / 1.0 / 168.0	-53.7
0.44	30.1 Qp	0.1 / 10.3 / 0.0	40.5	PERP / 1.0 / 104.0	-54.2
0.18	37.6 Qp	0.0 / 10.4 / 0.0	48	PERP / 1.0 / 104.0	-54.5
0.181	37.3 Qp	0.0 / 10.4 / 0.0	47.7	PARA / 1.0 / 0.0	-54.8

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0.12	25.9 Qp	0.0 / 10.5 / 0.0	36.4	PERP / 1.0 / 152.0	-69.6
0.0606	30.8 Qp	0.0 / 10.8 / 0.0	41.6	PARA / 1.0 / 127.0	-70.3
0.06	28.9 Qp	0.0 / 10.8 / 0.0	39.7	PARA / 1.0 / 28.0	-72.3
0.0326	31.4 Qp	0.0 / 12.5 / 0.0	43.9	PERP / 1.0 / 46.0	-73.4
0.0308	31.4 Qp	0.0 / 12.7 / 0.0	44.1	PARA / 1.0 / 0.0	-73.7

6.11 Test Data: Tx Mid Channel

Radiated Electromagnetic Emissions

Test Report #: G100457230 Run 7	Test Area: CC1 Radiated	Temperature: 22.7 °C
Test Method: FCC Part 15.209	Test Date: 04-Aug-2011	Relative Humidity: 45.1 %
EUT Model #: DE52	EUT Power: 120V, 60Hz	Air Pressure: 83.79 kPa
EUT Serial #: EMC New		

Manufacturer: Echostar

EUT Description:

Notes:

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dBm) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) 15.209
FCC Restricted Bands are Highlighted in Yellow					
0.0515	43.7 Av	0.0 / 10.8 / 0.0	54.5	PARA / 1.2 / 10.9	N/A
0.0515	54.4 Pk	0.0 / 10.8 / 0.0	65.2	PARA / 1.2 / 10.9	-48.1
51.87	56.2 Qp	0.8 / 7.7 / 28.2	36.5	V / 1.0 / 1.4	-3.5
106.43	49.8 Qp	0.8 / 12.1 / 27.9	34.7	V / 1.0 / 49.3	-8.8
135.01	54.2 Qp	0.8 / 12.9 / 27.8	40.1	H / 3.1 / 330.8	-3.4
189	57.7 Qp	0.9 / 11.2 / 27.5	42.3	H / 1.8 / 81.2	-1.2
189.01	56.2 Qp	0.9 / 11.2 / 27.5	40.8	V / 1.0 / 62.6	-2.7
216.02	53.5 Qp	1.0 / 10.5 / 27.4	37.6	H / 1.4 / 43.6	-8.4
324	52.5 Qp	1.2 / 14.1 / 27.3	40.5	H / 1.0 / 347.9	-5.5
324.01	45.6 Qp	1.2 / 14.1 / 27.3	33.7	V / 1.0 / 211.9	-12.3
371.24	56.4 Qp	1.3 / 15.1 / 27.6	45.2	H / 1.0 / 155.8	-0.8
445.5	51.8 Qp	1.4 / 17.0 / 28.1	42.1	V / 2.6 / 28.8	-3.9
445.58	45.1 Qp	1.4 / 17.0 / 28.1	35.4	H / 1.0 / 56.7	-10.6
519.79	50.0 Qp	1.6 / 18.3 / 28.4	41.5	H / 1.0 / 261.9	-4.5
742.47	45.9 Qp	1.9 / 20.4 / 28.1	40.1	H / 1.8 / 216.6	-5.9
742.5	47.9 Qp	1.9 / 20.5 / 28.1	42.1	V / 1.0 / 158.1	-3.9
837.06	26.7 Qp	2.0 / 21.7 / 27.8	22.6	V / 1.6 / 343.5	-23.4
890.97	36.1 Qp	2.1 / 21.9 / 27.7	32.3	V / 1.2 / 10.9	-13.7
891.03	39.0 Qp	2.1 / 21.9 / 27.7	35.3	H / 2.5 / 198.3	-10.7
1500.03	47.5 Av	2.7 / 26.7 / 36.6	40.2	H / 1.6 / 255.2	-13.8
1500.03	52.0 Pk	2.7 / 26.7 / 36.6	44.7	H / 1.6 / 255.2	-9.3
1500.04	50.2 Av	2.7 / 26.7 / 36.6	43	V / 2.1 / 15.5	-11
1500.04	50.9 Pk	2.7 / 26.7 / 36.6	43.6	V / 2.1 / 15.5	-10.4
1707.76	39.9 Av	2.9 / 27.8 / 36.8	33.8	H / 1.0 / 233.1	-20.2
1707.76	51.6 Pk	2.9 / 27.8 / 36.8	45.5	H / 1.0 / 233.1	-8.5
1707.76	39.0 Av	2.9 / 27.8 / 36.8	32.9	V / 1.3 / 230.0	-21.1
1707.76	49.8 Pk	2.9 / 27.8 / 36.8	43.7	V / 1.3 / 230.0	-10.3
1781.98	40.1 Av	3.0 / 28.1 / 36.9	34.3	H / 1.5 / 275.0	-19.7
1781.98	51.5 Pk	3.0 / 28.1 / 36.9	45.7	H / 1.5 / 275.0	-8.3

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FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dBm) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) 15.209
1856.24	40.1 Av	3.1 / 28.2 / 37.0	34.4	V / 1.3 / 131.0	-19.6
1856.24	49.9 Pk	3.1 / 28.2 / 37.0	44.2	V / 1.3 / 131.0	-9.8
1864.93	44.4 Av	3.1 / 28.2 / 37.0	38.7	H / 1.2 / 321.3	-15.3
1864.93	49.0 Pk	3.1 / 28.2 / 37.0	43.3	H / 1.2 / 321.3	-10.7
2598.72	41.2 Av	3.7 / 30.0 / 37.4	37.5	H / 1.0 / 209.2	-16.5
2598.72	53.4 Pk	3.7 / 30.0 / 37.4	49.6	H / 1.0 / 209.2	-4.4
2598.72	39.6 Av	3.7 / 30.0 / 37.4	35.8	V / 1.7 / 209.0	-18.2
2598.72	48.8 Pk	3.7 / 30.0 / 37.4	45.1	V / 1.7 / 209.0	-8.9
3000.05	50.3 Av	4.0 / 31.6 / 37.3	48.6	H / 1.3 / 5.4	-5.4
3000.05	51.2 Pk	4.0 / 31.6 / 37.3	49.5	H / 1.3 / 5.4	-4.5
3000.06	51.8 Av	4.0 / 31.6 / 37.3	50.1	V / 1.7 / 353.5	-3.9
3000.06	52.2 Pk	4.0 / 31.6 / 37.3	50.5	V / 1.7 / 353.5	-3.5
4500.1	42.1 Pk	5.0 / 34.3 / 39.8	41.6	H / 1.3 / 206.6	-12.4
4500.1	39.1 Av	5.0 / 34.3 / 39.8	38.5	H / 1.3 / 206.6	-15.5
4500.13	44.0 Av	5.0 / 34.3 / 39.8	43.4	V / 1.1 / 284.8	-10.6
4500.13	43.6 Pk	5.0 / 34.3 / 39.8	43.1	V / 1.1 / 284.8	-10.9
4500.16	39.7 Av	5.0 / 34.3 / 39.8	39.2	H / 1.3 / 206.6	-14.8
6000.13	42.1 Av	5.8 / 36.7 / 39.1	45.4	H / 1.1 / 194.7	-8.6
6000.13	42.1 Pk	5.8 / 36.7 / 39.1	45.4	H / 1.1 / 194.7	-8.6
6000.14	48.1 Pk	5.8 / 36.7 / 39.1	51.5	V / 1.1 / 264.5	-2.5
6000.19	47.6 Av	5.8 / 36.7 / 39.1	51	V / 1.1 / 264.5	-3
10444.4	37.8 Av	8.0 / 40.8 / 48.9	37.7	H / 1.0 / 0.0	-16.3
10444.4	39.0 Pk	8.0 / 40.8 / 48.9	38.9	H / 1.0 / 0.0	-15.1
10469.3	29.6 Av	8.0 / 40.8 / 48.9	29.5	V / 1.0 / 0.0	-24.5
10469.3	35.9 Pk	8.0 / 40.8 / 48.9	35.8	V / 1.0 / 0.0	-18.2
15092.1	31.9 Av	9.7 / 42.9 / 47.8	36.7	V / 1.0 / 0.0	-17.3
15092.1	31.2 Pk	9.7 / 42.9 / 47.8	36.1	V / 1.0 / 0.0	-17.9
15141.8	32.6 Av	9.7 / 42.7 / 47.8	37.2	H / 1.0 / 0.0	-16.8
15141.8	32.9 Pk	9.7 / 42.7 / 47.8	37.4	H / 1.0 / 0.0	-16.6
17900.6	30.1 Av	10.9 / 46.6 / 45.3	42.3	V / 1.0 / 0.0	-11.7
17900.6	30.6 Pk	10.9 / 46.6 / 45.3	42.8	V / 1.0 / 0.0	-11.2
17900.6	30.1 Av	10.9 / 46.6 / 45.3	42.3	H / 1.0 / 0.0	-11.7
17900.6	31.4 Pk	10.9 / 46.6 / 45.3	43.7	H / 1.0 / 0.0	-10.3
20642.5	0.1 Pk	0.0 / 21.7 / 0.0	21.8	V / 1.0 / 0.0	-41.7
20642.5	6.7 Pk	0.0 / 21.7 / 0.0	28.4	V / 1.0 / 0.0	-35.1
22322.5	-0.1 Pk	0.0 / 21.1 / 0.0	21	V / 1.0 / 0.0	-42.5
22322.5	-0.1 Av	0.0 / 21.1 / 0.0	21	V / 1.0 / 0.0	-42.5
22322.5	10.3 Pk	0.0 / 21.1 / 0.0	31.3	V / 1.0 / 0.0	-32.2
23897	10.1 Pk	0.0 / 21.2 / 0.0	31.4	V / 1.0 / 0.0	-32.1
23897.5	-0.6 Pk	0.0 / 21.2 / 0.0	20.6	V / 1.0 / 0.0	-42.9
23897.5	-0.6 Av	0.0 / 21.2 / 0.0	20.6	V / 1.0 / 0.0	-42.9

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FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dBm) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) FCC 15.209
***** Measurement Summary *****					
371.24	56.4 Qp	1.3 / 15.1 / 27.6	45.2	H / 1.0 / 155.8	-0.8
189	57.7 Qp	0.9 / 11.2 / 27.5	42.3	H / 1.8 / 81.2	-1.2
6000.14	48.1 Pk	5.8 / 36.7 / 39.1	51.5	V / 1.1 / 264.5	-2.5
189.01	56.2 Qp	0.9 / 11.2 / 27.5	40.8	V / 1.0 / 62.6	-2.7
6000.19	47.6 Av	5.8 / 36.7 / 39.1	51	V / 1.1 / 264.5	-3
135.01	54.2 Qp	0.8 / 12.9 / 27.8	40.1	H / 3.1 / 330.8	-3.4
51.87	56.2 Qp	0.8 / 7.7 / 28.2	36.5	V / 1.0 / 1.4	-3.5
3000.06	52.2 Pk	4.0 / 31.6 / 37.3	50.5	V / 1.7 / 353.5	-3.5
445.5	51.8 Qp	1.4 / 17.0 / 28.1	42.1	V / 2.6 / 28.8	-3.9
742.5	47.9 Qp	1.9 / 20.5 / 28.1	42.1	V / 1.0 / 158.1	-3.9
2598.72	53.4 Pk	3.7 / 30.0 / 37.4	49.6	H / 1.0 / 209.2	-4.4
519.79	50.0 Qp	1.6 / 18.3 / 28.4	41.5	H / 1.0 / 261.9	-4.5
3000.05	51.2 Pk	4.0 / 31.6 / 37.3	49.5	H / 1.3 / 5.4	-4.5
324	52.5 Qp	1.2 / 14.1 / 27.3	40.5	H / 1.0 / 347.9	-5.5
742.47	45.9 Qp	1.9 / 20.4 / 28.1	40.1	H / 1.8 / 216.6	-5.9
1781.98	51.5 Pk	3.0 / 28.1 / 36.9	45.7	H / 1.5 / 275.0	-8.3
216.02	53.5 Qp	1.0 / 10.5 / 27.4	37.6	H / 1.4 / 43.6	-8.4
1707.76	51.6 Pk	2.9 / 27.8 / 36.8	45.5	H / 1.0 / 233.1	-8.5
6000.13	42.1 Av	5.8 / 36.7 / 39.1	45.4	H / 1.1 / 194.7	-8.6
106.43	49.8 Qp	0.8 / 12.1 / 27.9	34.7	V / 1.0 / 49.3	-8.8
1500.03	52.0 Pk	2.7 / 26.7 / 36.6	44.7	H / 1.6 / 255.2	-9.3
1856.24	49.9 Pk	3.1 / 28.2 / 37.0	44.2	V / 1.3 / 131.0	-9.8
17900.6	31.4 Pk	10.9 / 46.6 / 45.3	43.7	H / 1.0 / 0.0	-10.3
1500.04	50.9 Pk	2.7 / 26.7 / 36.6	43.6	V / 2.1 / 15.5	-10.4
445.58	45.1 Qp	1.4 / 17.0 / 28.1	35.4	H / 1.0 / 56.7	-10.6
4500.13	44.0 Av	5.0 / 34.3 / 39.8	43.4	V / 1.1 / 284.8	-10.6
891.03	39.0 Qp	2.1 / 21.9 / 27.7	35.3	H / 2.5 / 198.3	-10.7
1864.93	49.0 Pk	3.1 / 28.2 / 37.0	43.3	H / 1.2 / 321.3	-10.7
324.01	45.6 Qp	1.2 / 14.1 / 27.3	33.7	V / 1.0 / 211.9	-12.3
4500.1	42.1 Pk	5.0 / 34.3 / 39.8	41.6	H / 1.3 / 206.6	-12.4
890.97	36.1 Qp	2.1 / 21.9 / 27.7	32.3	V / 1.2 / 10.9	-13.7
4500.16	39.7 Av	5.0 / 34.3 / 39.8	39.2	H / 1.3 / 206.6	-14.8
10444.4	39.0 Pk	8.0 / 40.8 / 48.9	38.9	H / 1.0 / 0.0	-15.1
15141.8	32.9 Pk	9.7 / 42.7 / 47.8	37.4	H / 1.0 / 0.0	-16.6
15092.1	31.9 Av	9.7 / 42.9 / 47.8	36.7	V / 1.0 / 0.0	-17.3
10469.3	35.9 Pk	8.0 / 40.8 / 48.9	35.8	V / 1.0 / 0.0	-18.2
837.06	26.7 Qp	2.0 / 21.7 / 27.8	22.6	V / 1.6 / 343.5	-23.4
23897	10.1 Pk	0.0 / 21.2 / 0.0	31.4	V / 1.0 / 0.0	-32.1
22322.5	10.3 Pk	0.0 / 21.1 / 0.0	31.3	V / 1.0 / 0.0	-32.2
20642.5	6.7 Pk	0.0 / 21.7 / 0.0	28.4	V / 1.0 / 0.0	-35.1
23897.5	-0.6 Pk	0.0 / 21.2 / 0.0	20.6	V / 1.0 / 0.0	-42.9
0.0515	54.4 Pk	0.0 / 10.8 / 0.0	65.2	PARA / 1.2 / 10.9	-48.1

6.12 Test Data: Tx High Channel

Radiated Electromagnetic Emissions

Test Report #: G100457230 Run 6	Test Area: CC1 Radiated	Temperature: 22.7 °C
Test Method: FCC Part 15.209	Test Date: 04-Aug-2011	Relative Humidity: 45.1 %
EUT Model #: DE52	EUT Power: 120V, 60Hz	Air Pressure: 83.79 kPa
EUT Serial #: EMC New		

Manufacturer: Echostar

EUT Description:

Notes:

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB\m) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) 15.209
FCC Restricted Bands are Highlighted in Yellow					
0.032	36.0 Qp	0.0 / 12.6 / 0.0	48.6	Perp / 1.0 / 26.0	-68.9
0.032	32.7 Qp	0.0 / 12.6 / 0.0	45.3	Para / 1.0 / 264.0	-72.2
0.0512	32.6 Qp	0.0 / 10.8 / 0.0	43.5	Perp / 1.0 / 208.0	-69.9
0.06	29.2 Qp	0.0 / 10.8 / 0.0	40	Perp / 1.0 / 116.0	-72
0.06	29.1 Qp	0.0 / 10.8 / 0.0	40	Para / 1.0 / 312.0	-72
0.12	23.1 Qp	0.0 / 10.5 / 0.0	33.6	Perp / 1.0 / 208.0	-72.4
0.12	23.5 Qp	0.0 / 10.5 / 0.0	34	Para / 1.0 / 186.0	-72
0.18	37.4 Qp	0.0 / 10.4 / 0.0	47.8	Perp / 1.0 / 164.0	-54.7
0.18	37.9 Qp	0.0 / 10.4 / 0.0	48.3	Para / 1.0 / 164.0	-54.2
0.32	32.9 Qp	0.0 / 10.3 / 0.0	43.2	Perp / 1.0 / 216.0	-54.3
0.584	28.1 Qp	0.1 / 10.3 / 0.0	38.5	Perp / 1.0 / 33.0	-33.8
1.26	21.1 Qp	0.1 / 10.4 / 0.0	31.6	Perp / 1.0 / 242.0	-33.9
2.18	16.1 Qp	0.1 / 10.5 / 0.0	26.7	Perp / 1.0 / 88.0	-42.8
12.52	7.3 Qp	0.3 / 10.7 / 0.0	18.3	Para / 1.0 / 32.0	-51.2
13.4	7.5 Qp	0.3 / 10.7 / 0.0	18.4	Perp / 1.0 / 12.0	-51.1
25.67	11.2 Qp	0.4 / 9.4 / 0.0	21	Perp / 1.0 / 264.0	-48.5
47.81	57.2 Qp	0.8 / 9.0 / 28.2	38.7	V / 1.0 / 182.0	-1.3
47.81	46.0 Qp	0.8 / 9.0 / 28.2	27.6	H / 1.9 / 260.0	-12.4
134.99	50.0 Qp	0.8 / 12.9 / 27.8	35.9	V / 1.1 / 195.0	-7.6
134.99	49.6 Qp	0.8 / 12.9 / 27.8	35.5	H / 2.3 / 312.0	-8
161.99	42.8 Qp	0.9 / 12.6 / 27.7	28.5	V / 1.1 / 278.0	-15
161.99	46.5 Qp	0.9 / 12.6 / 27.7	32.3	H / 2.4 / 82.0	-11.2
188.99	50.6 Qp	0.9 / 11.2 / 27.5	35.2	V / 1.1 / 120.0	-8.3
216	51.5 Qp	1.0 / 10.5 / 27.4	35.6	V / 1.1 / 167.0	-7.9
216	47.2 Qp	1.0 / 10.5 / 27.4	31.4	H / 1.5 / 108.0	-12.1
250.02	52.0 Qp	1.1 / 11.7 / 27.2	37.5	V / 1.1 / 320.0	-8.5
250.02	50.9 Qp	1.1 / 11.7 / 27.2	36.4	H / 1.5 / 323.0	-9.6
297	46.3 Qp	1.2 / 13.6 / 27.2	34	V / 1.1 / 320.0	-12
297	51.7 Qp	1.2 / 13.6 / 27.2	39.4	H / 1.3 / 157.0	-6.6

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FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB\m) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	DELTA1 (dB) 15.209
323.99	40.5 Qp	1.2 / 14.1 / 27.3	28.6	H / 2.9 / 17.0	-17.4
371.24	49.4 Qp	1.3 / 15.1 / 27.6	38.2	V / 1.2 / 78.0	-7.8
445.48	48.0 Qp	1.4 / 17.0 / 28.1	38.3	V / 1.6 / 150.0	-7.7
445.48	51.1 Qp	1.4 / 17.0 / 28.1	41.5	H / 1.2 / 254.0	-4.5
519.74	47.8 Qp	1.6 / 18.3 / 28.4	39.2	V / 2.2 / 153.0	-6.8
519.74	53.3 Qp	1.6 / 18.3 / 28.4	44.8	H / 1.2 / 211.0	-1.2
742.49	41.1 Qp	1.9 / 20.4 / 28.1	35.3	V / 1.7 / 88.0	-10.7
742.49	44.5 Qp	1.9 / 20.4 / 28.1	38.7	H / 1.3 / 96.0	-7.3
965.24	34.8 Qp	2.2 / 22.5 / 27.4	32	V / 1.8 / 228.0	-22
965.24	37.8 Qp	2.2 / 22.5 / 27.4	35.1	H / 1.4 / 25.0	-18.9
1500.03	50.9 Av	2.7 / 26.7 / 36.6	43.6	V / 2.0 / 187.5	-10.4
1500.03	49.9 Pk	2.7 / 26.7 / 36.6	42.6	V / 2.0 / 187.5	-11.4
1500.04	47.6 Av	2.7 / 26.7 / 36.6	40.3	H / 1.5 / 254.8	-13.7
1500.04	49.6 Pk	2.7 / 26.7 / 36.6	42.4	H / 1.5 / 254.8	-11.6
1707.72	41.1 Av	2.9 / 27.8 / 36.8	35	V / 1.7 / 320.0	-19
1707.72	47.2 Pk	2.9 / 27.8 / 36.8	41.2	V / 1.7 / 320.0	-12.8
1707.77	43.1 Av	2.9 / 27.8 / 36.8	37	H / 1.0 / 263.9	-17
1707.77	49.6 Pk	2.9 / 27.8 / 36.8	43.6	H / 1.0 / 263.9	-10.4
1856.23	42.6 Av	3.1 / 28.2 / 37.0	36.9	H / 1.0 / 0.0	-17.1
1856.23	52.0 Pk	3.1 / 28.2 / 37.0	46.3	H / 1.0 / 0.0	-7.7
1856.24	42.1 Av	3.1 / 28.2 / 37.0	36.4	V / 1.5 / 349.6	-17.6
1856.24	52.0 Pk	3.1 / 28.2 / 37.0	46.3	V / 1.5 / 349.6	-7.7
2598.73	45.6 Av	3.7 / 30.0 / 37.4	41.9	H / 1.1 / 219.3	-12.1
2598.73	53.6 Pk	3.7 / 30.0 / 37.4	49.9	H / 1.1 / 219.3	-4.1
2598.74	40.5 Av	3.7 / 30.0 / 37.4	36.7	V / 1.4 / 29.1	-17.3
2598.74	49.1 Pk	3.7 / 30.0 / 37.4	45.4	V / 1.4 / 29.1	-8.6
3000.06	50.7 Av	4.0 / 31.6 / 37.3	49	H / 1.3 / 296.4	-5
3000.06	51.6 Pk	4.0 / 31.6 / 37.3	50	H / 1.3 / 296.4	-4
3000.06	52.6 Av	4.0 / 31.6 / 37.3	50.9	V / 1.4 / 355.8	-3.1
3000.06	52.6 Pk	4.0 / 31.6 / 37.3	50.9	V / 1.4 / 355.8	-3.1
4500.1	44.0 Av	5.0 / 34.3 / 39.8	43.5	V / 1.0 / 284.4	-10.5
4500.1	43.9 Pk	5.0 / 34.3 / 39.8	43.3	V / 1.0 / 284.4	-10.7
4958.92	34.0 Pk	5.2 / 35.3 / 38.7	35.9	H / 1.0 / 0.0	-18.1
4958.92	33.3 Pk	5.2 / 35.3 / 38.7	35.1	H / 1.0 / 0.0	-18.9
6000.13	46.8 Av	5.8 / 36.7 / 39.1	50.1	V / 1.0 / 12.1	-3.9
6000.13	46.6 Pk	5.8 / 36.7 / 39.1	50	V / 1.0 / 12.1	-4
6000.14	44.0 Av	5.8 / 36.7 / 39.1	47.3	H / 2.2 / 36.5	-6.7
6000.14	44.6 Pk	5.8 / 36.7 / 39.1	48	H / 2.2 / 36.5	-6
15067.3	31.3 Av	9.7 / 43.1 / 47.8	36.3	V / 1.0 / 0.0	-17.7
15067.3	31.4 Pk	9.7 / 43.1 / 47.8	36.3	V / 1.0 / 0.0	-17.7
16235.4	30.2 Av	10.2 / 40.9 / 48.3	33	H / 1.0 / 0.0	-21
16235.4	30.3 Pk	10.2 / 40.9 / 48.3	33.1	H / 1.0 / 0.0	-20.9
17850.9	28.9 Av	10.9 / 46.4 / 45.4	40.9	V / 1.0 / 0.0	-13.1
17850.9	29.0 Pk	10.9 / 46.4 / 45.4	40.9	V / 1.0 / 0.0	-13.1

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FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)
(MHz)	(dBuV)	(dB) (dBm) (dB)	(dBuV)	(m) (DEG)	15.209
18300.2	8.7 Pk	0.0 / 22.3 / 0.0	30.9	V / 1.0 / 0.0	-32.6
18300.2	26.0 Av	0.0 / 22.3 / 0.0	48.3	V / 1.0 / 0.0	-15.2
18300.2	6.8 Pk	0.0 / 22.3 / 0.0	29.1	H / 1.0 / 0.0	-34.4
18300.2	1.6 Av	0.0 / 22.3 / 0.0	23.9	H / 1.0 / 0.0	-39.6
22500	6.9 Pk	0.0 / 20.9 / 0.0	27.8	V / 1.0 / 0.0	-35.7
22500	19.0 Av	0.0 / 20.9 / 0.0	39.9	V / 1.0 / 0.0	-23.6
22500	5.1 Pk	0.0 / 20.9 / 0.0	26	H / 1.0 / 0.0	-37.5
22500	12.0 Av	0.0 / 20.9 / 0.0	32.9	H / 1.0 / 0.0	-30.6
26075	3.8 Pk	0.0 / 20.8 / 0.0	24.5	V / 1.0 / 0.0	-39
26075	-0.6 Av	0.0 / 20.8 / 0.0	20.1	V / 1.0 / 0.0	-43.4

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)
(MHz)	(dBuV)	(dB) (dBm) (dB)	(dBuV)	(m) (DEG)	FCC 15.209

******* Measurement Summary *******

519.74	53.3 Qp	1.6 / 18.3 / 28.4	44.8	H / 1.2 / 211.0	-1.2
47.81	57.2 Qp	0.8 / 9.0 / 28.2	38.7	V / 1.0 / 182.0	-1.3
3000.06	52.6 Av	4.0 / 31.6 / 37.3	50.9	V / 1.4 / 355.8	-3.1
6000.13	46.8 Av	5.8 / 36.7 / 39.1	50.1	V / 1.0 / 12.1	-3.9
2598.73	53.6 Pk	3.7 / 30.0 / 37.4	49.9	H / 1.1 / 219.3	-4.1
445.48	51.1 Qp	1.4 / 17.0 / 28.1	41.5	H / 1.2 / 254.0	-4.5
6000.14	44.6 Pk	5.8 / 36.7 / 39.1	48	H / 2.2 / 36.5	-6
297	51.7 Qp	1.2 / 13.6 / 27.2	39.4	H / 1.3 / 157.0	-6.6
742.49	44.5 Qp	1.9 / 20.4 / 28.1	38.7	H / 1.3 / 96.0	-7.3
134.99	50.0 Qp	0.8 / 12.9 / 27.8	35.9	V / 1.1 / 195.0	-7.6
1856.23	52.0 Pk	3.1 / 28.2 / 37.0	46.3	H / 1.0 / 0.0	-7.7
1856.24	52.0 Pk	3.1 / 28.2 / 37.0	46.3	V / 1.5 / 349.6	-7.7
371.24	49.4 Qp	1.3 / 15.1 / 27.6	38.2	V / 1.2 / 78.0	-7.8
216	51.5 Qp	1.0 / 10.5 / 27.4	35.6	V / 1.1 / 167.0	-7.9
188.99	50.6 Qp	0.9 / 11.2 / 27.5	35.2	V / 1.1 / 120.0	-8.3
250.02	52.0 Qp	1.1 / 11.7 / 27.2	37.5	V / 1.1 / 320.0	-8.5
2598.74	49.1 Pk	3.7 / 30.0 / 37.4	45.4	V / 1.4 / 29.1	-8.6
1500.03	50.9 Av	2.7 / 26.7 / 36.6	43.6	V / 2.0 / 187.5	-10.4
1707.77	49.6 Pk	2.9 / 27.8 / 36.8	43.6	H / 1.0 / 263.9	-10.4
4500.1	44.0 Av	5.0 / 34.3 / 39.8	43.5	V / 1.0 / 284.4	-10.5
161.99	46.5 Qp	0.9 / 12.6 / 27.7	32.3	H / 2.4 / 82.0	-11.2
1500.04	49.6 Pk	2.7 / 26.7 / 36.6	42.4	H / 1.5 / 254.8	-11.6
1707.72	47.2 Pk	2.9 / 27.8 / 36.8	41.2	V / 1.7 / 320.0	-12.8
17850.9	28.9 Av	10.9 / 46.4 / 45.4	40.9	V / 1.0 / 0.0	-13.1
18300.2	26.0 Av	0.0 / 22.3 / 0.0	48.3	V / 1.0 / 0.0	-15.2
323.99	40.5 Qp	1.2 / 14.1 / 27.3	28.6	H / 2.9 / 17.0	-17.4
15067.3	31.3 Av	9.7 / 43.1 / 47.8	36.3	V / 1.0 / 0.0	-17.7
4958.92	34.0 Pk	5.2 / 35.3 / 38.7	35.9	H / 1.0 / 0.0	-18.1
965.24	37.8 Qp	2.2 / 22.5 / 27.4	35.1	H / 1.4 / 25.0	-18.9
16235.4	30.3 Pk	10.2 / 40.9 / 48.3	33.1	H / 1.0 / 0.0	-20.9

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FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)
(MHz)	(dBuV)	(dB) (dBm) (dB)	(dBuV)	(m) (DEG)	FCC 15.209
22500	19.0 Av	0.0 / 20.9 / 0.0	39.9	V / 1.0 / 0.0	-23.6
0.584	28.1 Qp	0.1 / 10.3 / 0.0	38.5	Perp / 1.0 / 33.0	-33.8
1.26	21.1 Qp	0.1 / 10.4 / 0.0	31.6	Perp / 1.0 / 242.0	-33.9
26075	3.8 Pk	0.0 / 20.8 / 0.0	24.5	V / 1.0 / 0.0	-39
2.18	16.1 Qp	0.1 / 10.5 / 0.0	26.7	Perp / 1.0 / 88.0	-42.8
25.67	11.2 Qp	0.4 / 9.4 / 0.0	21	Perp / 1.0 / 264.0	-48.5
13.4	7.5 Qp	0.3 / 10.7 / 0.0	18.4	Perp / 1.0 / 12.0	-51.1
12.52	7.3 Qp	0.3 / 10.7 / 0.0	18.3	Para / 1.0 / 32.0	-51.2
0.18	37.9 Qp	0.0 / 10.4 / 0.0	48.3	Para / 1.0 / 164.0	-54.2
0.32	32.9 Qp	0.0 / 10.3 / 0.0	43.2	Perp / 1.0 / 216.0	-54.3
0.032	36.0 Qp	0.0 / 12.6 / 0.0	48.6	Perp / 1.0 / 26.0	-68.9
0.0512	32.6 Qp	0.0 / 10.8 / 0.0	43.5	Perp / 1.0 / 208.0	-69.9
0.06	29.2 Qp	0.0 / 10.8 / 0.0	40	Perp / 1.0 / 116.0	-72
0.12	23.5 Qp	0.0 / 10.5 / 0.0	34	Para / 1.0 / 186.0	-72

Example Unintentional Radiated Emissions Calculation:

Measured Level	+	Transducer, Cable Loss & Amplifier corrections	=	Corrected Reading	Specification Limit	-	Corrected Reading	=	Delta Specification
(dBμV)		(dB)		(dBμV/m)	(dBμV/m)		(dBμV/m)		
14.0		14.9		28.9	40.0		28.9		-11.1

Notes: Measurements made >18GHz were made at a test distance of 1m and the measurement data was extrapolated to 3m. The FCC limits were not changed.

Deviations, Additions, or Exclusions: None

7 Band Edge Measurements – Unintentional and Spurious of the Transmitter

7.1 Method

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from **FCC 15.247 & IC RSS-210**.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

7.2 Test Equipment Used:

<u>Asset ID:</u>	<u>Description:</u>	<u>Manufacturer:</u>	<u>Model:</u>	<u>Serial:</u>	<u>Cal Date</u>	<u>Cal Due</u>
18882	Spectrum Analyzer (dc-22 GHz)	Hewlett-Packard	8566B	2410A00154	12/06/2010	12/06/2011
18660	Spectrum Analyzer Display Section (set 1)	Hewlett-Packard	85662A	2318A04983	12/10/2010	12/10/2011
18880	Q.P Adapter	Hewlett-Packard	85650A	2811A01300	12/06/2010	12/06/2011
18906	Pre-Amplifier (1-4 GHz)	Mini-Circuits Lab	ZHL-42	N052792-2	06/03/2011	06/03/2012
SW-6	Software application for Radiated and Conducted Emissions	Intertek	OATS_CVI	V.1.0	01/01/2011	01/01/2012

7.3 Results:

The sample tested was found to comply with the requirements of:

- FCC 15.209/ 15.247(d)
- Covers RSS-210 A8.5, & RSS-GEN 7.2.2

7.4 Setup Photographs:

Test setup – Field Strength Measurements (Front View)



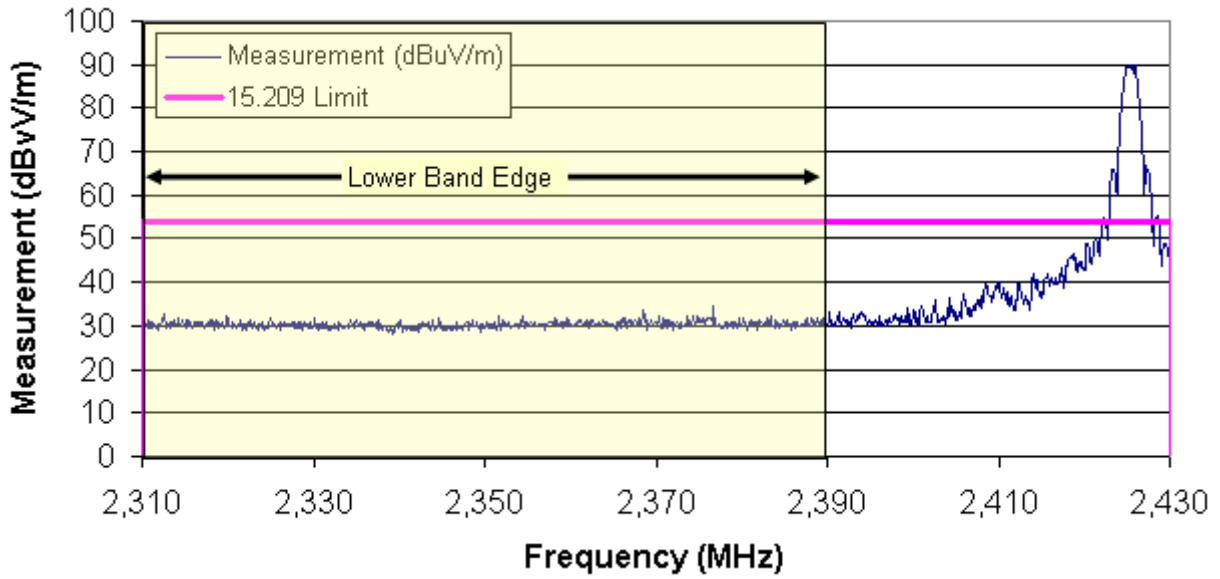
Test setup – Field Strength Measurements (Rear View)



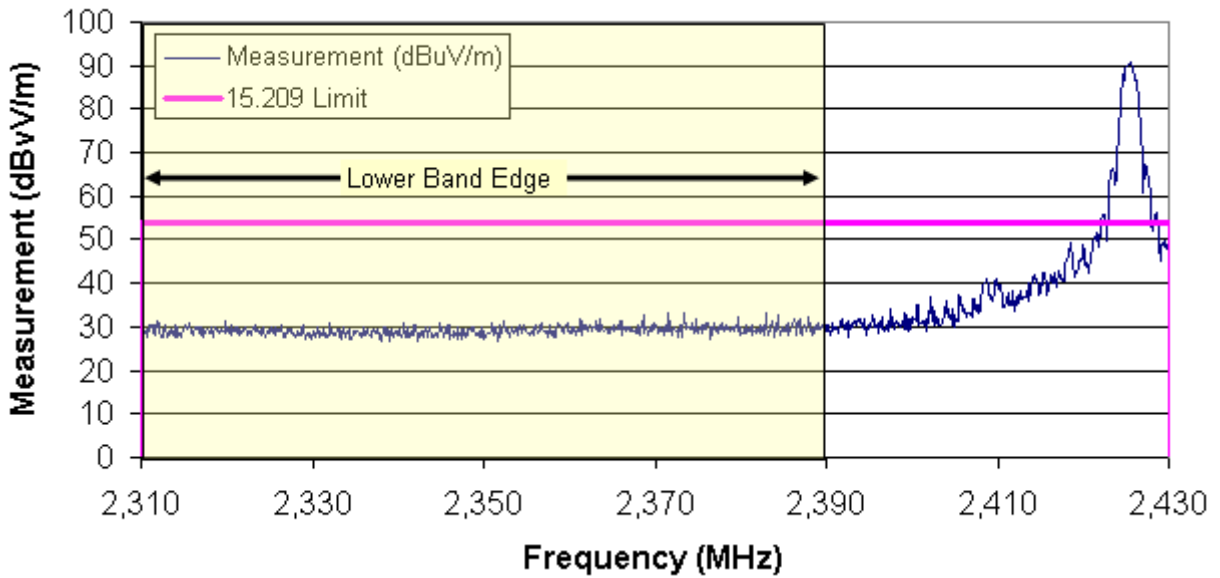
7.5 Band Edge Plot – Low Channel

FCC 15.247(d) / 15.205/209/ RSS-210 A8.5

DE52 – Band Edge Vertical Polarization



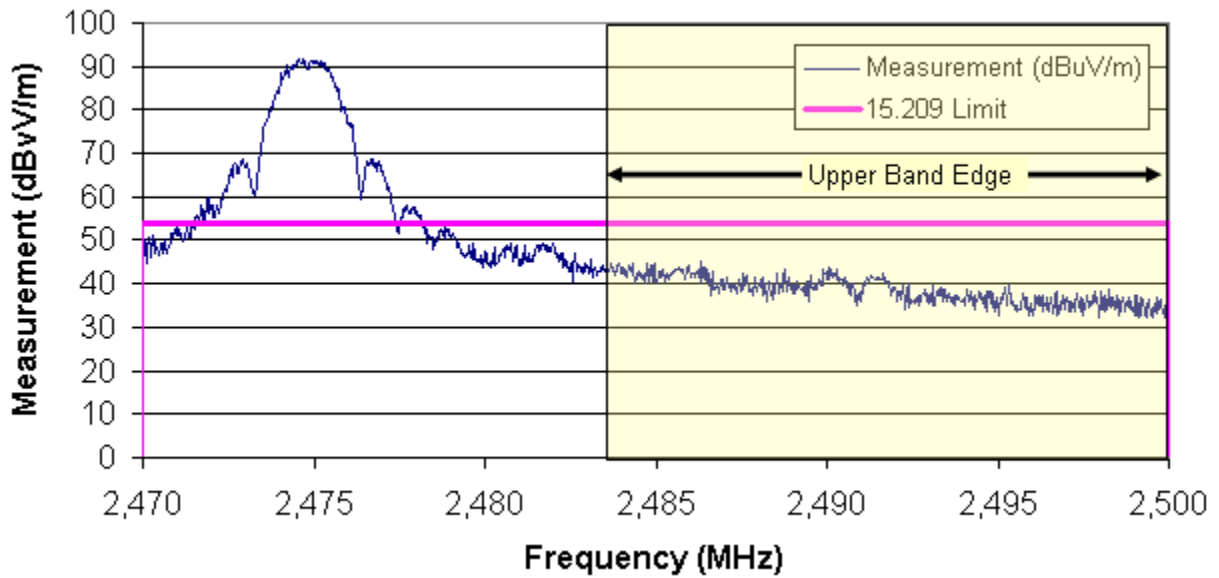
DE52 – Band Edge Horizontal Polarization



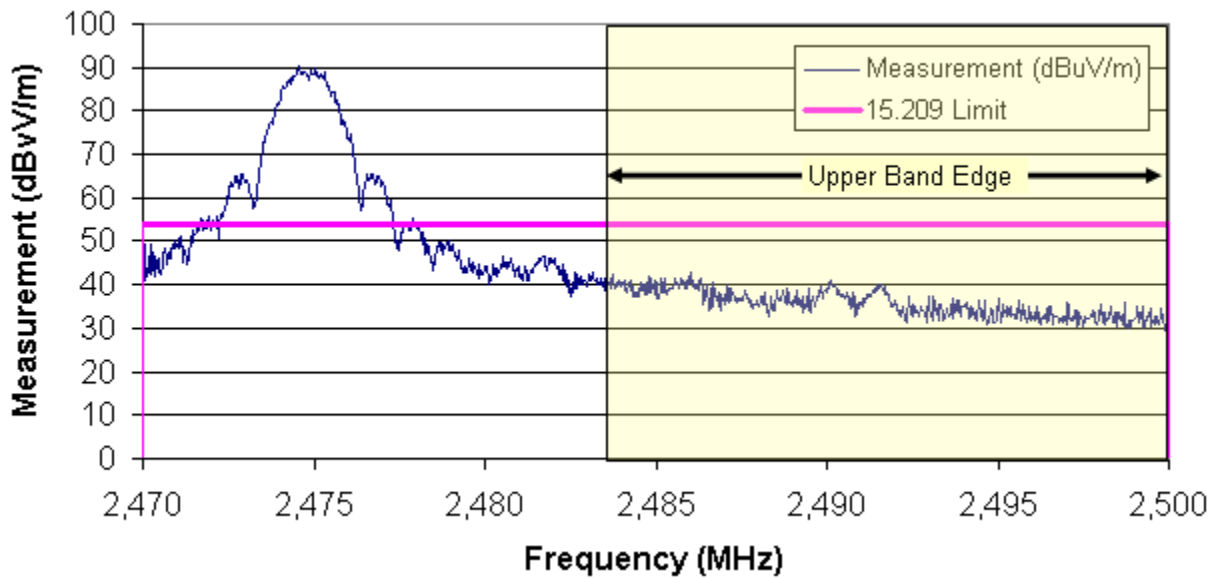
7.6 Band Edge Plot – High Channel

FCC 15.247(d) / 15.205/15.209/ RSS-210 A8.5

DE52 – Band Edge Vertical Polarization



DE52 – Band Edge Horizontal Polarization



7.7 Test Data: Band Edge

Radiated Electromagnetic Emissions

Test Report #:	G100457230 Run 5	Test Area:	CC1 Radiated	Temperature:	22.7	°C
Test Method:	FCC Part 15.209	Test Date:	04-Aug-2011	Relative Humidity:	45.1	%
EUT Model #:	DE52	EUT Power:	120V, 60Hz	Air Pressure:	83.79	kPa
EUT Serial #:	EMC New					
Manufacturer:	Echostar					

EUT Description: _____

Notes: _____

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.209 >1GHz
Lower Band Edge					
Low Ch Modulated					
FCC Restricted Bands are Highlighted in Yellow					
2376.80	34.6 Av	3.5 / 29.3 / 37.4	30.1	V / 1.0 / 0.0	-23.9
2376.80	33.4 Pk	3.5 / 29.3 / 37.4	28.9	V / 1.0 / 0.0	-25.1
2312.44	34.2 Av	3.4 / 29.1 / 37.3	29.4	V / 1.0 / 0.0	-24.6
2312.44	33.9 Pk	3.4 / 29.1 / 37.3	29.1	V / 1.0 / 0.0	-24.9
2351.69	33.8 Av	3.5 / 29.2 / 37.3	29.2	V / 1.0 / 0.0	-24.8
2351.69	33.6 Pk	3.5 / 29.2 / 37.3	29.0	V / 1.0 / 0.0	-25.0
2384.30	34.3 Av	3.5 / 29.4 / 37.4	29.8	H / 1.0 / 0.0	-24.2
2384.30	32.0 Pk	3.5 / 29.4 / 37.4	27.5	H / 1.0 / 0.0	-26.5
2311.74	34.2 Av	3.4 / 29.1 / 37.3	29.4	H / 1.0 / 0.0	-24.6
2311.74	35.0 Pk	3.4 / 29.1 / 37.3	30.2	H / 1.0 / 0.0	-23.8
2352.38	33.9 Av	3.5 / 29.2 / 37.3	29.3	H / 1.0 / 0.0	-24.7
2352.38	34.1 Pk	3.5 / 29.2 / 37.3	29.5	H / 1.0 / 0.0	-24.5
Upper Band Edge					
High Ch Modulated					
2483.74	48.0 Av	3.6 / 29.8 / 37.5	43.9	H / 1.2 / 324.0	-10.1
2483.74	50.9 Pk	3.6 / 29.8 / 37.5	46.8	H / 1.2 / 324.0	-7.2
2486.11	47.0 Av	3.6 / 29.8 / 37.5	42.9	H / 1.1 / 327.0	-11.1
2486.11	50.0 Pk	3.6 / 29.8 / 37.5	45.9	H / 1.1 / 327.0	-8.1
2490.33	46.7 Av	3.6 / 29.8 / 37.5	42.6	H / 1.1 / 317.5	-11.4
2490.33	49.3 Pk	3.6 / 29.8 / 37.5	45.2	H / 1.1 / 317.5	-8.8
2491.63	45.8 Av	3.6 / 29.8 / 37.5	41.7	H / 1.2 / 323.6	-12.3

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FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.209 >1GHz
2491.63	48.0 Pk	3.6 / 29.8 / 37.5	43.9	H / 1.2 / 323.6	-10.1
2490.18	44.0 Av	3.6 / 29.8 / 37.5	39.9	V / 1.2 / 347.3	-14.1
2490.18	45.0 Pk	3.6 / 29.8 / 37.5	40.9	V / 1.2 / 347.3	-13.1
2486.35	44.8 Av	3.6 / 29.8 / 37.5	40.7	V / 1.3 / 338.1	-13.3
2486.35	49.4 Pk	3.6 / 29.8 / 37.5	45.3	V / 1.3 / 338.1	-8.7
2490.30	44.7 Av	3.6 / 29.8 / 37.5	40.6	V / 1.3 / 340.5	-13.4
2490.30	45.1 Pk	3.6 / 29.8 / 37.5	41.0	V / 1.3 / 340.5	-13.0
2491.63	44.0 Av	3.6 / 29.8 / 37.5	39.9	V / 1.3 / 339.9	-14.1
2491.63	46.1 Pk	3.6 / 29.8 / 37.5	42.0	V / 1.3 / 339.9	-12.0

Notes:

- 1) All measurements are Radiated Field Strength peak measurements taken at 3-meter product-to-antenna.

Deviations, Additions, or Exclusions: None

8 Unintentional Radiated Emissions - Receiver

8.1 Method

The test methods used comply with ANSI C63.4 and CISPR 16. Unless otherwise stated no deviations were made from **FCC CFR47 15.247(d)15.209/15.109/RSS-GEN Section 6**.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

8.2 Test Equipment Used:

<u>Asset ID:</u>	<u>Description:</u>	<u>Manufacturer:</u>	<u>Model:</u>	<u>Serial:</u>	<u>Cal Date</u>	<u>Cal Due</u>
18882	Spectrum Analyzer (dc-22 GHz)	Hewlett-Packard	8566B	2410A00154	12/06/2010	12/06/2011
18660	Spectrum Analyzer Display Section (set 1)	Hewlett-Packard	85662A	2318A04983	12/10/2010	12/10/2011
18880	Q.P Adapter	Hewlett-Packard	85650A	2811A01300	12/06/2010	12/06/2011
18913	Spectrum Analyzer	Hewlett-Packard	E7405A	My44211889	06/28/2011	06/28/2012
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	06/03/2011	06/03/2012
18906	RF Pre-Amplifier (1-4 GHz)	Mini-Circuits Lab	ZHL-42	N052792-2	06/03/2011	06/03/2012
18900	RF Pre-Amplifier (4-8 GHz)	Avantek	AFT97-8434-10F	1007	06/03/2011	06/03/2012
18901	RF Pre-Amplifier (8-18 GHz)	Avantek	AWT-18037	1002	06/03/2011	06/03/2012
19936	Bilog Antenna 30MHz - 6GHz	Sunol Sciences	JB6	A050707-1	10/11/2010	10/11/2011
18887	Horn Antenna 1-18GHz	EMCO	3115	9205-3886	12/09/2010	12/09/2011
18805	HF Active Antenna/Harmonic Mixer 18 GHz to 26.5 GHz	Hewlett-Packard	11970K	2332A01280	10/04/2010	10/04/2011
SW-6	Software application for Radiated and Conducted Emissions	Intertek	OATS_CVI	V.1.0	01/01/2011	01/01/2012

8.3 Results:

The sample tested was found to comply with the requirements of:

- **FCC 15.209/15.109**
- **RSS-GEN Section 6**

8.4 Setup Photographs:

Test setup – Field Strength Measurements (Front View)



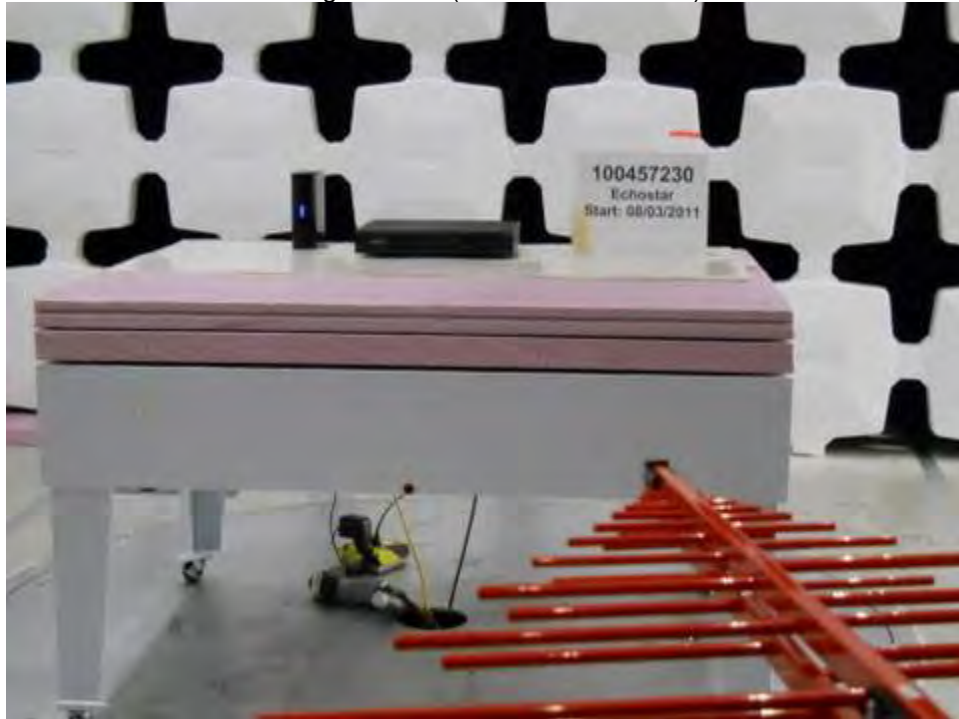
Test setup – Field Strength Measurements (Rear View)



Photo: Test Antennas

Photo: Antenna Setups

BiLog Antenna (30MHz to 1000MHz)

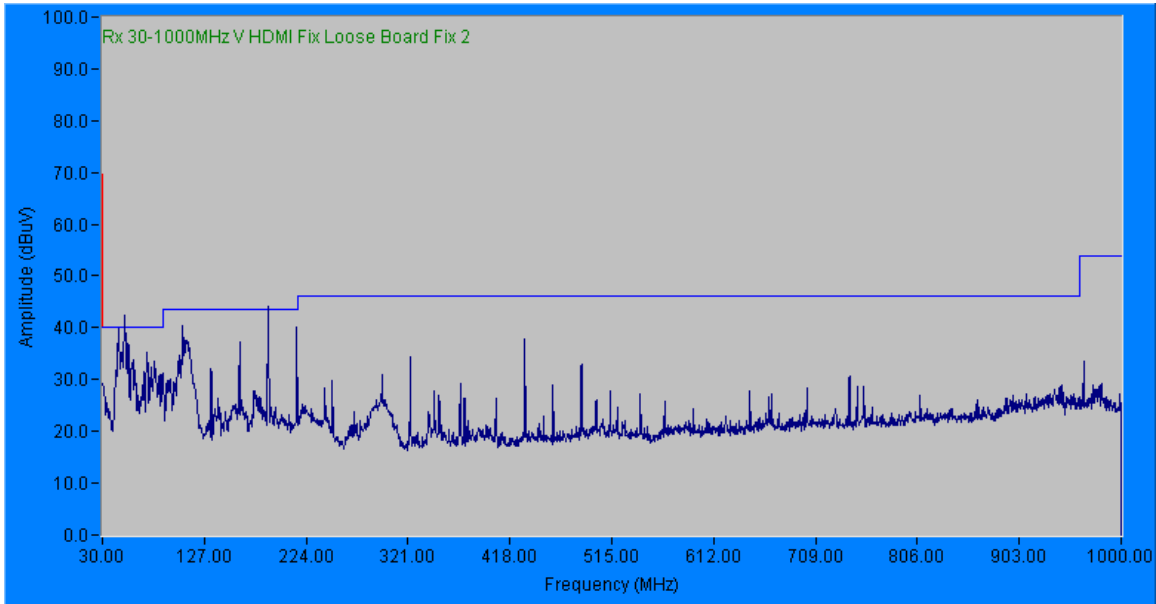


Horn (1GHz – 18GHz)

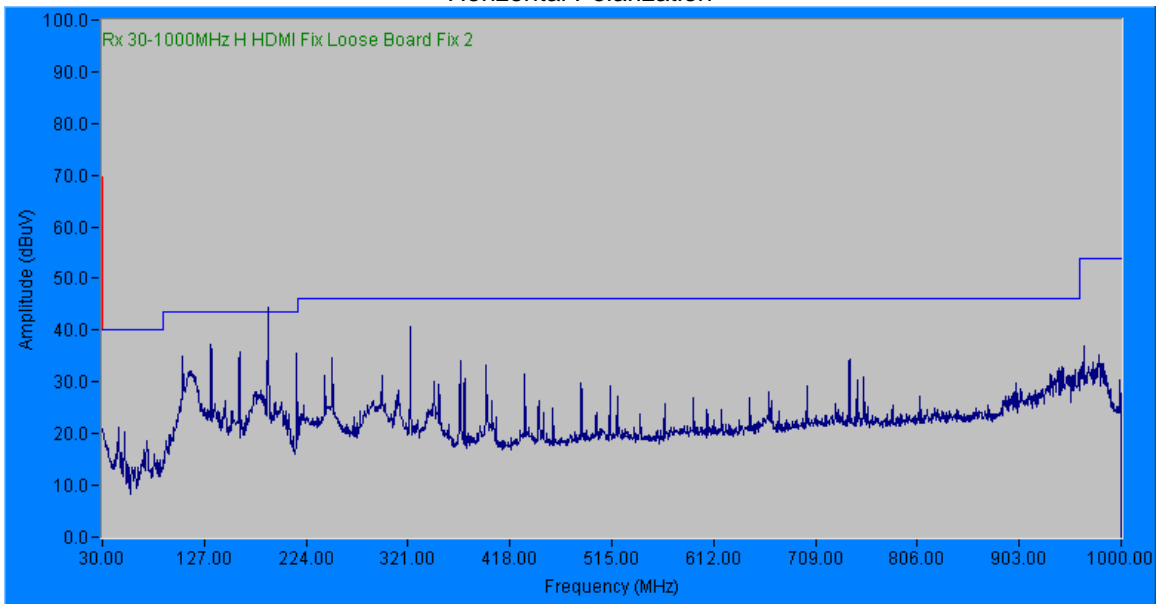


8.5 Plots: Pre-Scan Peak Measurements - Not Final Data

Radiated Emissions – FCC 15.209 (30MHz to 1000MHz)
Vertical Polarization



Horizontal Polarization

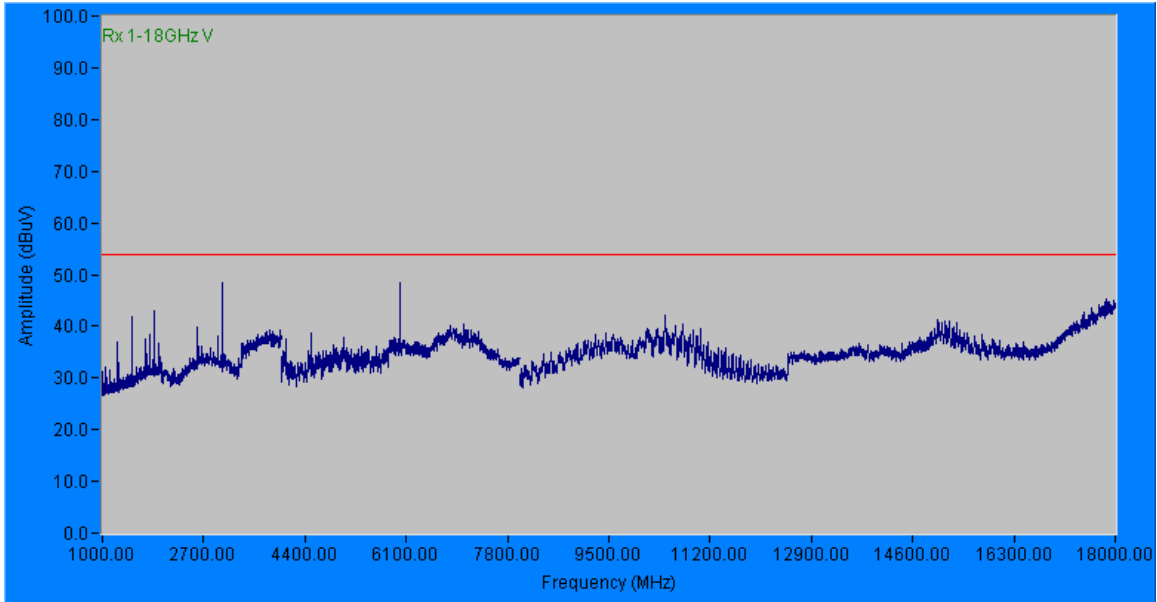


Note: Peak measurements plotted against FCC 15.209 Quasi-Peak Limit

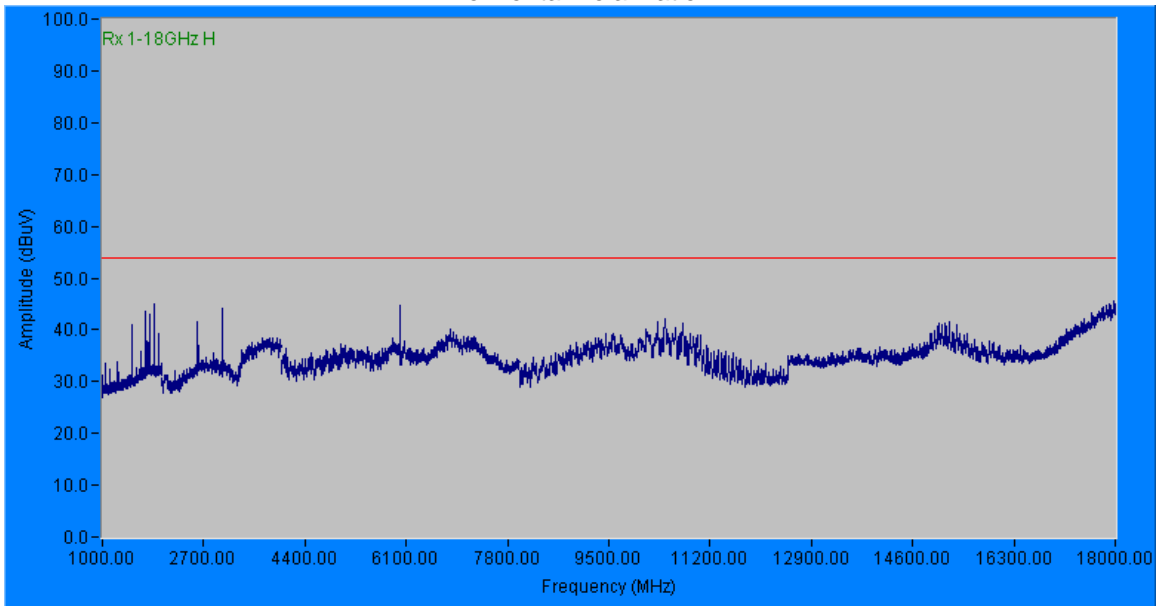
Plots: Pre-Scan Peak Measurements - Not Final Data

Radiated Emissions – FCC 15.209 (1GHz to 18GHz)

Vertical Polarization



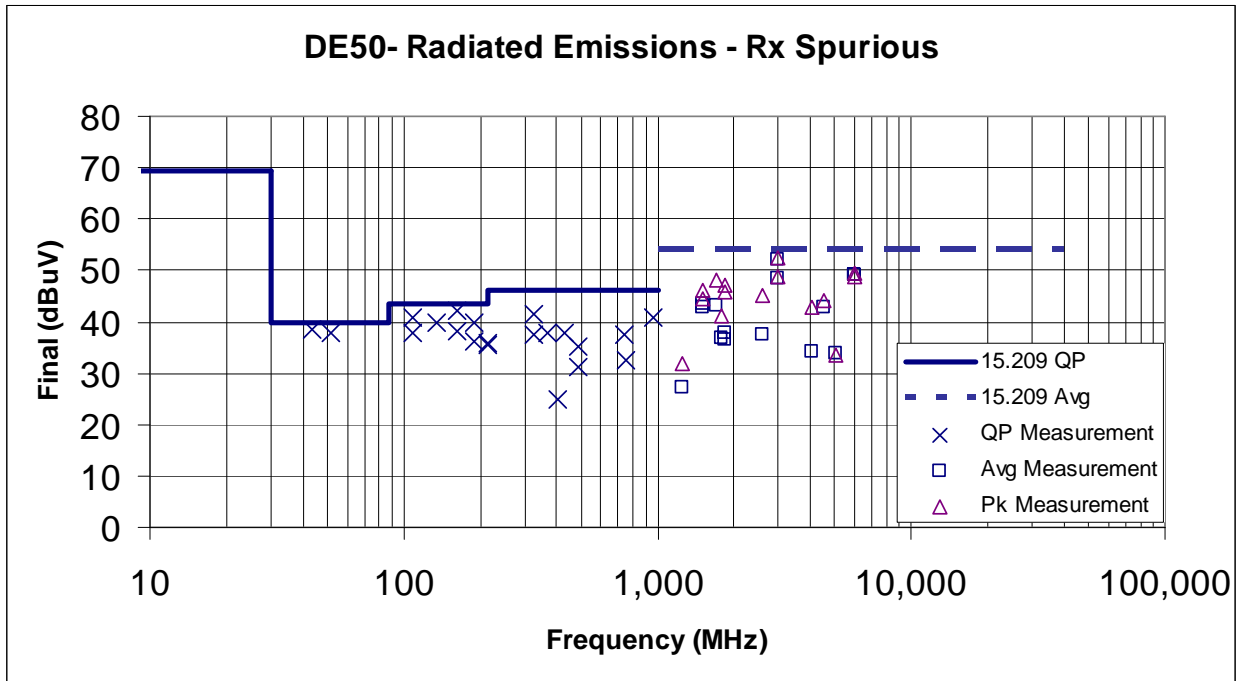
Horizontal Polarization



Note: Peak measurements plotted against FCC 15.209 Average Limit

Plots: Final Quasi-Peak & Average Measurements

Radiated Emissions – FCC 15.209 (30MHz to 18GHz)
Vertical and Horizontal Combined



8.6 Test Data: 30MHz to 18GHz

Radiated Electromagnetic Emissions

Test Report #:	G100457230 Run 10	Test Area:	CC1 Radiated	Temperature:	22.7	°C
Test Method:	FCC Part 15.209	Test Date:	10-Aug-2011	Relative Humidity:	43.5	%
EUT Model #:	DE52	EUT Power:	120V, 60Hz	Air Pressure:	83.79	kPa
EUT Serial #:	EMC New					
Manufacturer:	Echostar					

EUT Description: _____

Notes: _____

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.209
43.8	54.9 Qp	0.8 / 11.0 / 28.2	38.5	V / 1.0 / 337.6	-1.5
51.84	57.4 Qp	0.8 / 7.7 / 28.2	37.7	V / 1.0 / 214.5	-2.3
108.01	52.6 Qp	0.8 / 12.4 / 27.9	37.9	H / 2.7 / 0.0	-5.6
108.02	55.5 Qp	0.8 / 12.4 / 27.9	40.8	V / 1.9 / 0.0	-2.7
135.02	54.1 Qp	0.8 / 12.9 / 27.8	40	H / 2.7 / 0.0	-3.5
162	56.2 Qp	0.9 / 12.6 / 27.7	42	H / 2.0 / 103.7	-1.5
162.02	52.5 Qp	0.9 / 12.6 / 27.7	38.3	V / 1.0 / 65.9	-5.2
188.99	51.5 Qp	0.9 / 11.2 / 27.5	36.1	V / 1.0 / 262.9	-7.4
189.02	55.1 Qp	0.9 / 11.2 / 27.5	39.7	H / 1.0 / 203.0	-3.8
215.99	51.6 Qp	1.0 / 10.5 / 27.4	35.7	V / 1.0 / 300.8	-7.8
215.99	51.5 Qp	1.0 / 10.5 / 27.4	35.6	H / 1.3 / 80.8	-7.9
323.99	49.3 Qp	1.2 / 14.1 / 27.3	37.4	V / 1.0 / 225.8	-8.6
324.01	53.5 Qp	1.2 / 14.1 / 27.3	41.6	H / 1.0 / 0.0	-4.4
371.23	49.0 Qp	1.3 / 15.1 / 27.6	37.9	H / 1.0 / 316.0	-8.1
405.01	35.5 Qp	1.4 / 15.9 / 27.8	25	H / 1.9 / 233.0	-21
432	48.0 Qp	1.4 / 16.6 / 28.0	38	V / 1.3 / 85.4	-8
486	40.5 Qp	1.5 / 17.6 / 28.3	31.3	H / 1.0 / 193.8	-14.7
486.02	44.2 Qp	1.5 / 17.6 / 28.3	35.1	V / 1.0 / 119.3	-10.9
742.49	43.2 Qp	1.9 / 20.4 / 28.1	37.5	H / 1.1 / 177.7	-8.5
756.03	37.8 Qp	1.9 / 20.9 / 28.1	32.5	V / 1.3 / 345.7	-13.5
965.21	43.6 Qp	2.2 / 22.5 / 27.4	40.9	H / 1.0 / 178.0	-13.1
1260.04	35.8 Av	2.5 / 26.1 / 37.1	27.2	V / 1.2 / 305.5	-26.8
1260.04	40.4 Pk	2.5 / 26.1 / 37.1	31.9	V / 1.2 / 305.5	-22.1
1500.03	50.1 Av	2.7 / 26.7 / 36.6	42.8	V / 1.3 / 233.1	-11.2
1500.03	51.8 Pk	2.7 / 26.7 / 36.6	44.5	V / 1.3 / 233.1	-9.5
1500.03	50.7 Av	2.7 / 26.7 / 36.6	43.4	H / 1.6 / 221.0	-10.6
1500.03	53.4 Pk	2.7 / 26.7 / 36.6	46.1	H / 1.6 / 221.0	-7.9
1707.76	49.4 Av	2.9 / 27.8 / 36.8	43.3	H / 1.3 / 231.4	-10.7
1707.76	54.2 Pk	2.9 / 27.8 / 36.8	48.2	H / 1.3 / 231.4	-5.8

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1782.02	42.7 Av	3.0 / 28.1 / 36.9	36.9	H / 1.0 / 337.2	-17.1
1782.02	46.9 Pk	3.0 / 28.1 / 36.9	41.1	H / 1.0 / 337.2	-12.9
1856.23	43.7 Av	3.1 / 28.2 / 37.0	38	V / 1.3 / 0.0	-16
1856.23	52.9 Pk	3.1 / 28.2 / 37.0	47.2	V / 1.3 / 0.0	-6.8
1856.26	42.3 Av	3.1 / 28.2 / 37.0	36.6	H / 1.2 / 0.0	-17.4
1856.26	51.4 Pk	3.1 / 28.2 / 37.0	45.7	H / 1.2 / 0.0	-8.3
2598.73	41.1 Av	3.7 / 30.0 / 37.4	37.4	V / 1.0 / 195.1	-16.6
2598.73	48.9 Pk	3.7 / 30.0 / 37.4	45.1	V / 1.0 / 195.1	-8.9
3000.06	53.8 Av	4.0 / 31.6 / 37.3	52.1	V / 1.2 / 316.7	-1.9
3000.06	54.0 Pk	4.0 / 31.6 / 37.3	52.4	V / 1.2 / 316.7	-1.6
3000.07	50.0 Av	4.0 / 31.6 / 37.3	48.3	H / 1.1 / 266.9	-5.7
3000.07	50.6 Pk	4.0 / 31.6 / 37.3	48.9	H / 1.1 / 266.9	-5.1
4083.75	34.4 Av	4.7 / 33.9 / 38.8	34.2	H / 1.2 / 154.1	-19.8
4083.75	43.1 Pk	4.7 / 33.9 / 38.8	42.9	H / 1.2 / 154.1	-11.1
4500.1	43.5 Av	5.0 / 34.3 / 39.8	42.9	H / 1.1 / 285.2	-11.1
4500.1	44.6 Pk	5.0 / 34.3 / 39.8	44	H / 1.1 / 285.2	-10
5042.84	31.5 Pk	5.3 / 35.5 / 38.5	33.7	H / 1.0 / 0.0	-20.3
5042.84	31.4 Av	5.3 / 35.5 / 38.5	33.6	H / 1.0 / 0.0	-20.4
6000.13	45.6 Av	5.8 / 36.7 / 39.1	49	V / 1.0 / 124.4	-5
6000.13	46.0 Pk	5.8 / 36.7 / 39.1	49.4	V / 1.0 / 124.4	-4.6
6000.14	45.7 Av	5.8 / 36.7 / 39.1	49.1	H / 1.0 / 303.4	-4.9
6000.14	45.6 Pk	5.8 / 36.7 / 39.1	48.9	H / 1.0 / 303.4	-5.1

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)
(MHz)	(dBuV)	(dB) (dBm) (dB)	(dBuV)	(m) (DEG)	15.209
***** Measurement Summary *****					
43.8	54.9 Qp	0.8 / 11.0 / 28.2	38.5	V / 1.0 / 337.6	-1.5
162	56.2 Qp	0.9 / 12.6 / 27.7	42	H / 2.0 / 103.7	-1.5
3000.06	53.8 Av	4.0 / 31.6 / 37.3	52.1	V / 1.2 / 316.7	-1.9
51.84	57.4 Qp	0.8 / 7.7 / 28.2	37.7	V / 1.0 / 214.5	-2.3
108.02	55.5 Qp	0.8 / 12.4 / 27.9	40.8	V / 1.9 / 0.0	-2.7
135.02	54.1 Qp	0.8 / 12.9 / 27.8	40	H / 2.7 / 0.0	-3.5
189.02	55.1 Qp	0.9 / 11.2 / 27.5	39.7	H / 1.0 / 203.0	-3.8
324.01	53.5 Qp	1.2 / 14.1 / 27.3	41.6	H / 1.0 / 0.0	-4.4
6000.14	45.7 Av	5.8 / 36.7 / 39.1	49.1	H / 1.0 / 303.4	-4.9
6000.13	45.6 Av	5.8 / 36.7 / 39.1	49	V / 1.0 / 124.4	-5
162.02	52.5 Qp	0.9 / 12.6 / 27.7	38.3	V / 1.0 / 65.9	-5.2
108.01	52.6 Qp	0.8 / 12.4 / 27.9	37.9	H / 2.7 / 0.0	-5.6
3000.07	50.0 Av	4.0 / 31.6 / 37.3	48.3	H / 1.1 / 266.9	-5.7
188.99	51.5 Qp	0.9 / 11.2 / 27.5	36.1	V / 1.0 / 262.9	-7.4
215.99	51.6 Qp	1.0 / 10.5 / 27.4	35.7	V / 1.0 / 300.8	-7.8
432	48.0 Qp	1.4 / 16.6 / 28.0	38	V / 1.3 / 85.4	-8
371.23	49.0 Qp	1.3 / 15.1 / 27.6	37.9	H / 1.0 / 316.0	-8.1
742.49	43.2 Qp	1.9 / 20.4 / 28.1	37.5	H / 1.1 / 177.7	-8.5
323.99	49.3 Qp	1.2 / 14.1 / 27.3	37.4	V / 1.0 / 225.8	-8.6

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1707.76	49.4 Av	2.9 / 27.8 / 36.8	43.3	H / 1.3 / 231.4	-10.7
486.02	44.2 Qp	1.5 / 17.6 / 28.3	35.1	V / 1.0 / 119.3	-10.9
4500.1	43.5 Av	5.0 / 34.3 / 39.8	42.9	H / 1.1 / 285.2	-11.1
1500.03	50.1 Av	2.7 / 26.7 / 36.6	42.8	V / 1.3 / 233.1	-11.2
965.21	43.6 Qp	2.2 / 22.5 / 27.4	40.9	H / 1.0 / 178.0	-13.1
756.03	37.8 Qp	1.9 / 20.9 / 28.1	32.5	V / 1.3 / 345.7	-13.5
486	40.5 Qp	1.5 / 17.6 / 28.3	31.3	H / 1.0 / 193.8	-14.7
1856.23	43.7 Av	3.1 / 28.2 / 37.0	38	V / 1.3 / 0.0	-16
2598.73	41.1 Av	3.7 / 30.0 / 37.4	37.4	V / 1.0 / 195.1	-16.6
1782.02	42.7 Av	3.0 / 28.1 / 36.9	36.9	H / 1.0 / 337.2	-17.1
1856.26	42.3 Av	3.1 / 28.2 / 37.0	36.6	H / 1.2 / 0.0	-17.4
4083.75	34.4 Av	4.7 / 33.9 / 38.8	34.2	H / 1.2 / 154.1	-19.8
5042.84	31.5 Pk	5.3 / 35.5 / 38.5	33.7	H / 1.0 / 0.0	-20.3
405.01	35.5 Qp	1.4 / 15.9 / 27.8	25	H / 1.9 / 233.0	-21
1260.04	35.8 Av	2.5 / 26.1 / 37.1	27.2	V / 1.2 / 305.5	-26.8

Example Unintentional Radiated Emissions Calculation:

Measured Level	+	Transducer, Cable Loss & Amplifier corrections	=	Corrected Reading	Specification Limit	-	Corrected Reading	=	Delta Specification
(dB μ V)		(dB)		(dB μ V/m)	(dB μ V/m)		(dB μ V/m)		
14.0		14.9		28.9	40.0		28.9		-11.1

Notes:

- (1) All measurements taken a 3-meter test distance.
- (2) Measurements 30MHz to 1000MHz are quasi-peak detector
- (3) Measurements above 1GHz are average detector

Deviations, Additions, or Exclusions: None

9 6dB Bandwidth**9.1 Method**

The test methods used comply with ANSI C63.0. Unless otherwise stated no deviations were made from **FCC 15.247 & IC RSS-210**.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

9.2 Test Equipment Used:

<u>Asset ID:</u>	<u>Description:</u>	<u>Manufacturer:</u>	<u>Model:</u>	<u>Serial:</u>	<u>Cal Date</u>	<u>Cal Due</u>
18913	Spectrum Analyzer with Pre-Amp	Hewlett-Packard	E7405A	My44211889	06/28/2011	06/28/2012
18887	Horn Antenna 1-18GHz	EMCO	3115	9205-3886	12/09/2010	12/09/2011

9.3 Results:

The sample tested was found to comply with the requirements of:

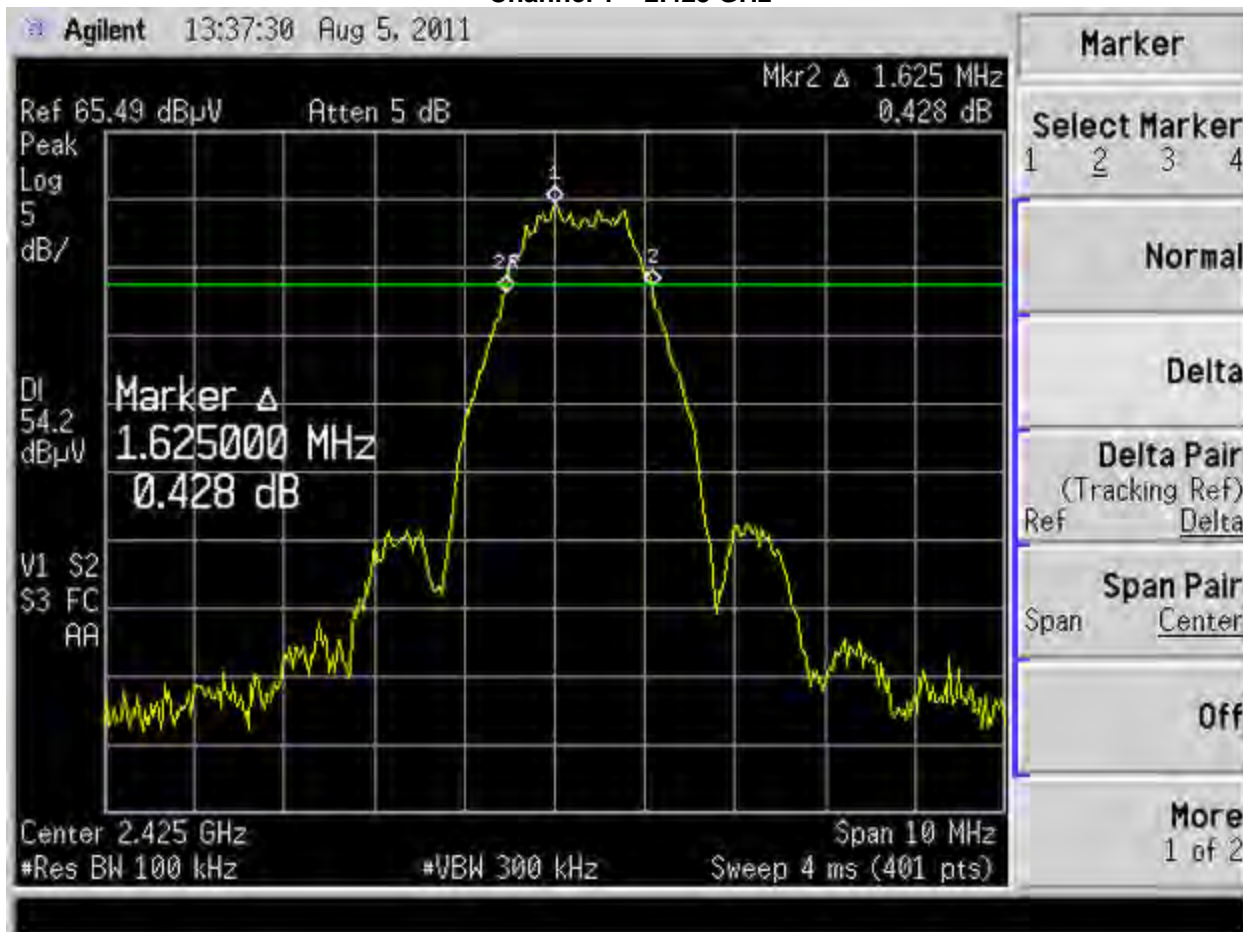
- FCC 15.247 (a)(2)
- IC RSS-210 A8.2(a)

9.4 Test Data:

6 dB Bandwidth – DE51 Product

FCC 15.247(a)(2) / RSS-210 A8.2(a)

Channel 1 – 2.425 GHz

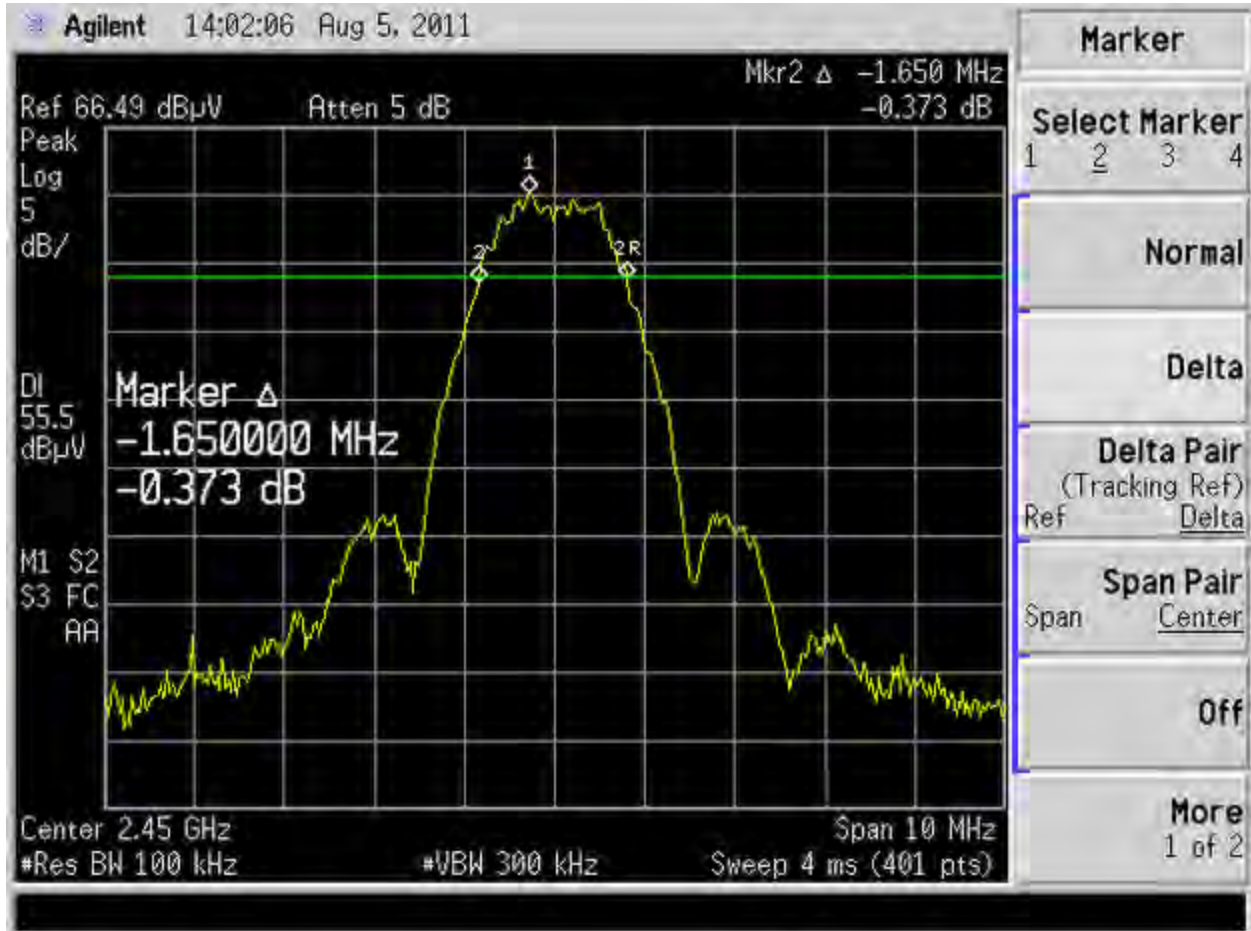


Specification: 6dB Bandwidth > 500 kHz

6 dB Bandwidth

FCC 15.247(a)(2) / RSS-210 A8.2(a)

Channel 2 – 2.450 GHz

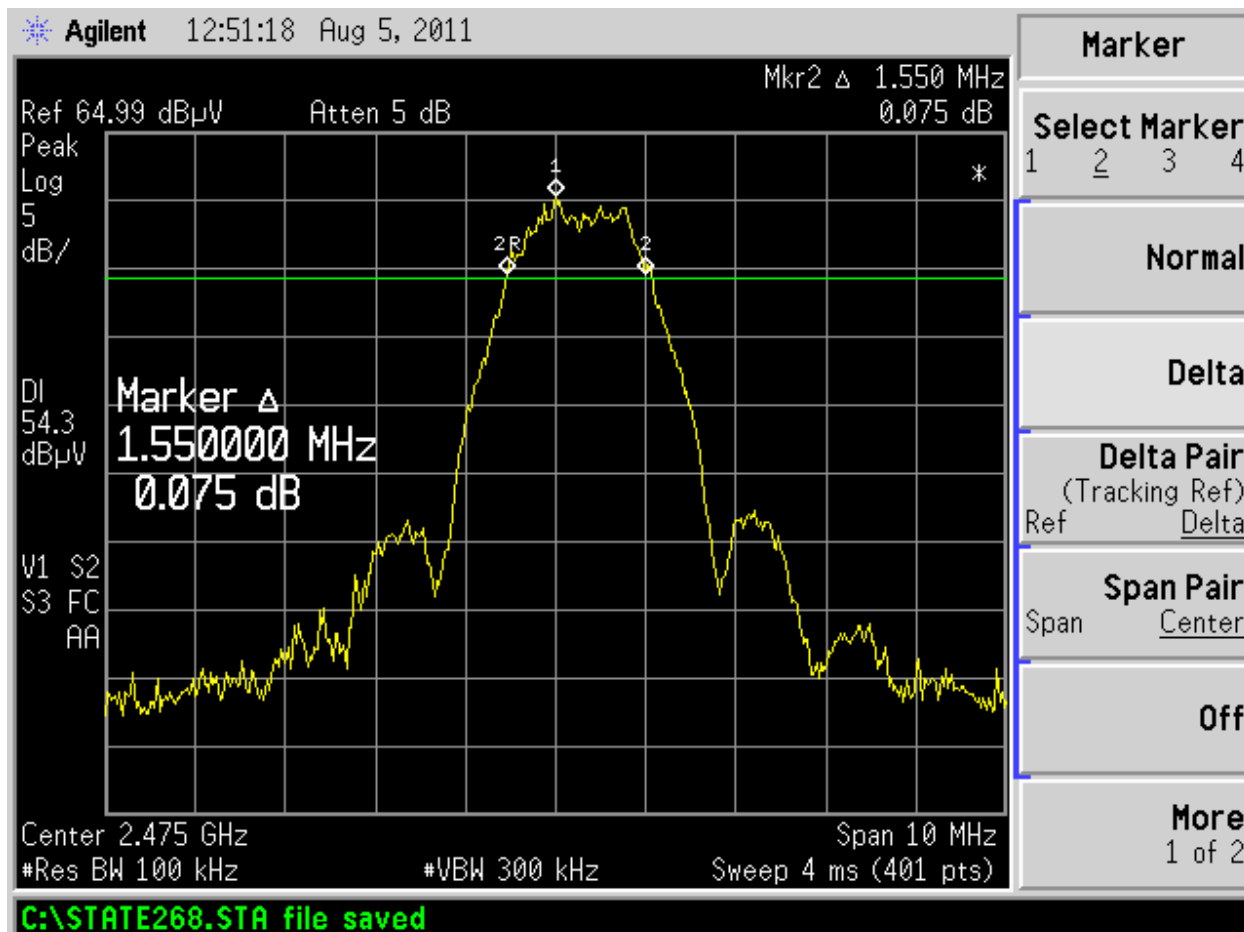


Specification: 6dB Bandwidth > 500 kHz

6 dB Bandwidth

FCC 15.247(a)(2) / RSS-210 A8.2(a)

Channel 3 – 2.475 GHz



Specification: 6dB Bandwidth > 500 kHz

Notes:

- (1) All measurements are Radiated Field Strength.
- (2) **Worst-case Channel(s): 3 (6dB Bandwidth 1.55 MHz)**

Deviations, Additions, or Exclusions: None

10 Power Spectral Density (PSD)**10.1 Method**

The test methods used comply with ANSI C63.10. Unless otherwise stated no deviations were made from **FCC 15.247 & IC RSS-210**.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

10.2 Test Equipment Used:

<u>Asset ID:</u>	<u>Description:</u>	<u>Manufacturer:</u>	<u>Model:</u>	<u>Serial:</u>	<u>Cal Date</u>	<u>Cal Due</u>
18913	Spectrum Analyzer with Pre-Amp	Hewlett-Packard	E7405A	My44211889	06/28/2011	06/28/2012
18887	Horn Antenna 1-18GHz	EMCO	3115	9205-3886	12/09/2010	12/09/2011

10.3 Results:

The sample tested was found to comply with the requirements of:

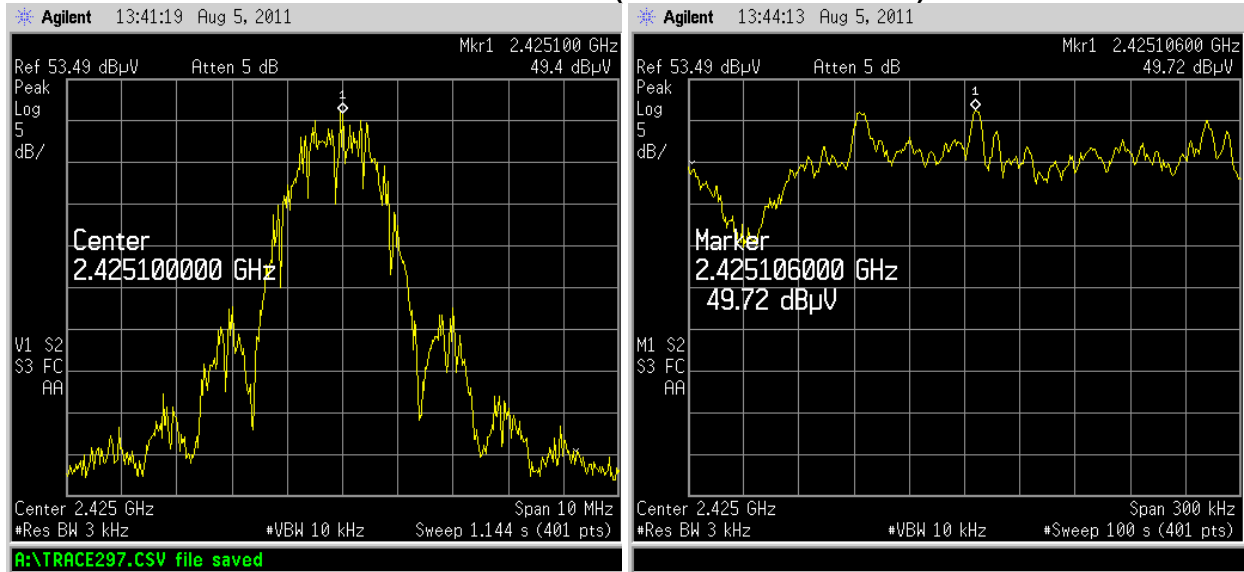
- FCC 15.247(e)
- IC RSS-210 A8.2(b)

10.4 Test Data:

Power Spectral Density (PSD) – DE51 Product

FCC 15.247(e) / RSS-210 A8.2(b)

Channel 1 – 2.425 GHz (Macro and Micro Views)



Measured field strength + antenna factor + cable loss = Final corrected field strength (dBuV/m)
 49.72 + 29.5 + 3.5 = 82.72 dBuV/m

$$82.72 \text{ dBuV/m} = 0.01368 \text{ V/m}$$

$$P = .0000561 \text{ W} = -12.509 \text{ dBm}$$

Specification: PSD < +8 dBm

Conversion of radiated field strength to power:

$$P = (E \times d)^2 / (30 \times G)$$

Whereby:

P = Power in watts

E= measured maximum field strength in V/m

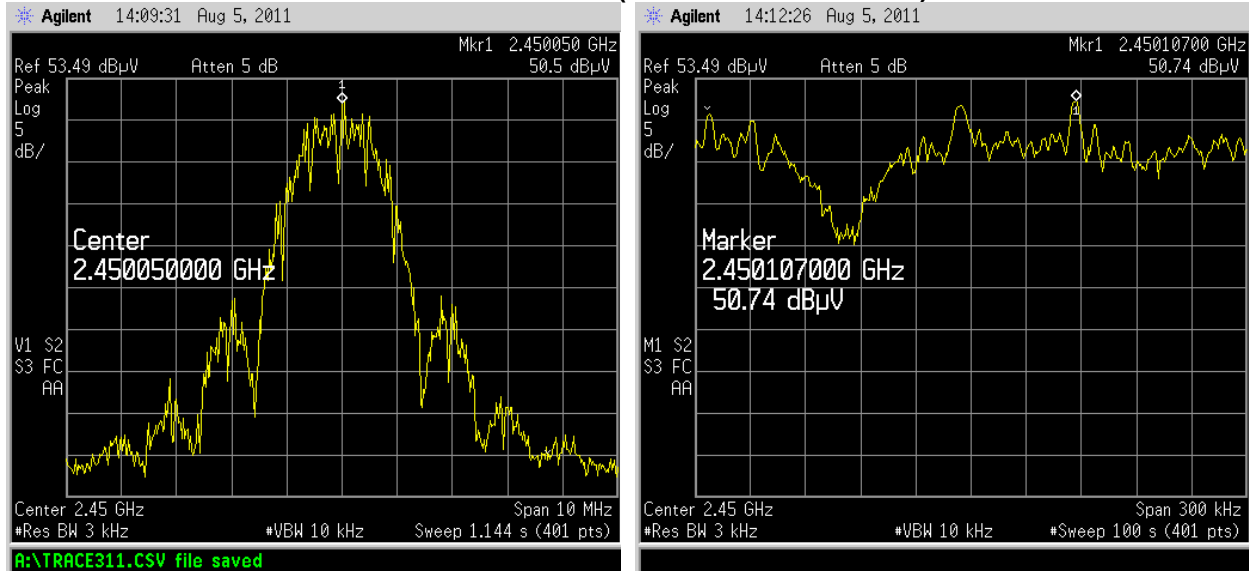
d = test distance in meters from which the field strength was measured = 3-meters

G = numeric gain of the transmitting antenna over an isotropic radiator = 1

Power Spectral Density (PSD)

FCC 15.247(e) / RSS-210 A8.2(b)

Channel 2 – 2.450 GHz (Macro and Micro Views)



Measured field strength + antenna factor + cable loss = Final corrected field strength (dBuV/m)
 $50.74 + 29.6 + 3.6 = 83.94$ dBuV/m

83.94 dBuV/m = 0.01574 V/m

$P = .0000743$ W = -11.289 dBm

Specification: PSD < +8 dBm

Conversion of radiated field strength to power:

$$P = (E \times d)^2 / (30 \times G)$$

Whereby:

P = Power in watts

E = measured maximum field strength in Volts/meter

d = test distance in meters from which the field strength was measured

G = numeric gain of the transmitting antenna over an isotropic radiator

Power Spectral Density (PSD)

FCC 15.247(e) / RSS-210 A8.2(b)

Channel 3 – 2.475 GHz (Macro and Micro Views)



Measured field strength + antenna factor + cable loss = Final corrected field strength (dBuV/m)
 49.88 + 29.7 + 3.6 = 83.18 dBuV/m

83.18 dBuV/m = 0.014421 V/m

P = 0.000062 W = **-12.05 dBm**

Specification: PSD < +8 dBm

Conversion of radiated field strength to power:

$$P = (E \times d)^2 / (30 \times G)$$

Whereby:

P = Power in watts

E= measured maximum field strength in Volts/meter

d = test distance in meters from which the field strength was measured = 3-meters

G = numeric gain of the transmitting antenna over an isotropic radiator = 1

Notes:

- (1) All measurements are Radiated Field Strength – worst-case maximized signal
- (2) **Worst-case High Channel PSD: -11.29 dBm**

Deviations, Additions, or Exclusions: None

11 Occupied Bandwidth (OBW)

11.1 Method

The test methods used comply with ANSI C63.0. Unless otherwise stated no deviations were made from **IC RSS-GEN**.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

11.2 Test Equipment Used:

<u>Asset ID:</u>	<u>Description:</u>	<u>Manufacturer:</u>	<u>Model:</u>	<u>Serial:</u>	<u>Cal Date</u>	<u>Cal Due</u>
18913	Spectrum Analyzer with Pre-Amp	Hewlett-Packard	E7405A	My44211889	06/28/2011	06/28/2012
18887	Horn Antenna 1-18GHz	EMCO	3115	9205-3886	12/09/2010	12/09/2011

11.3 Results:

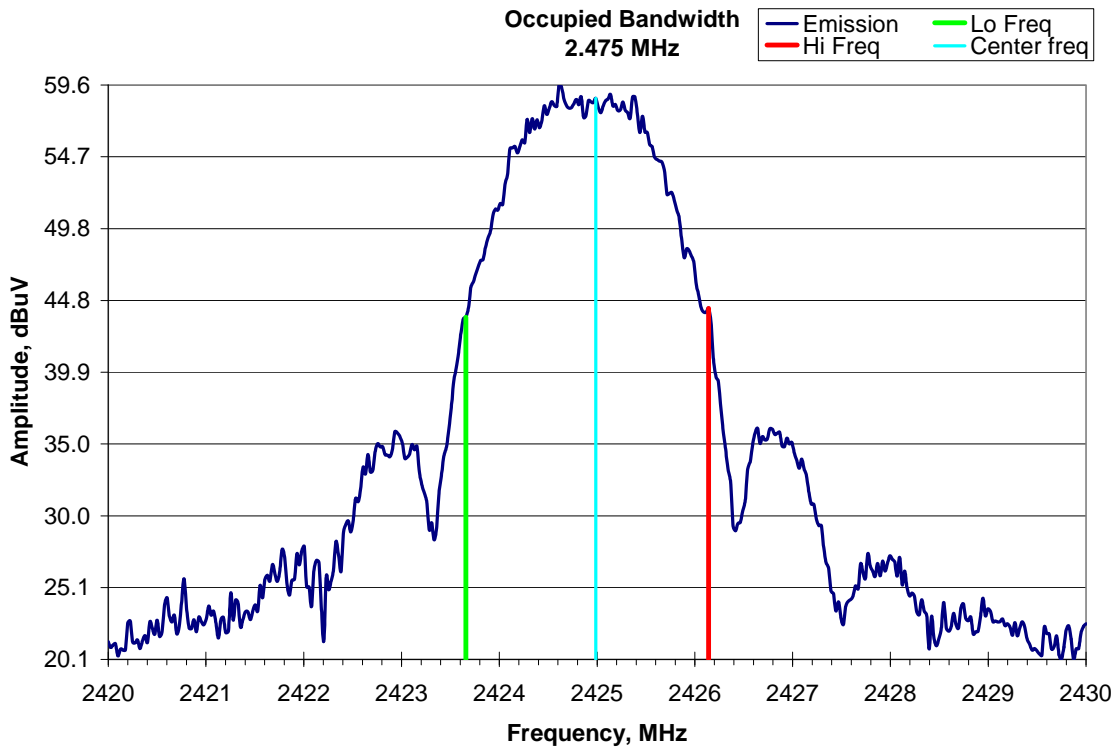
The sample tested was found to comply with the requirements of:

- RSS-GEN, Section 4.6.1

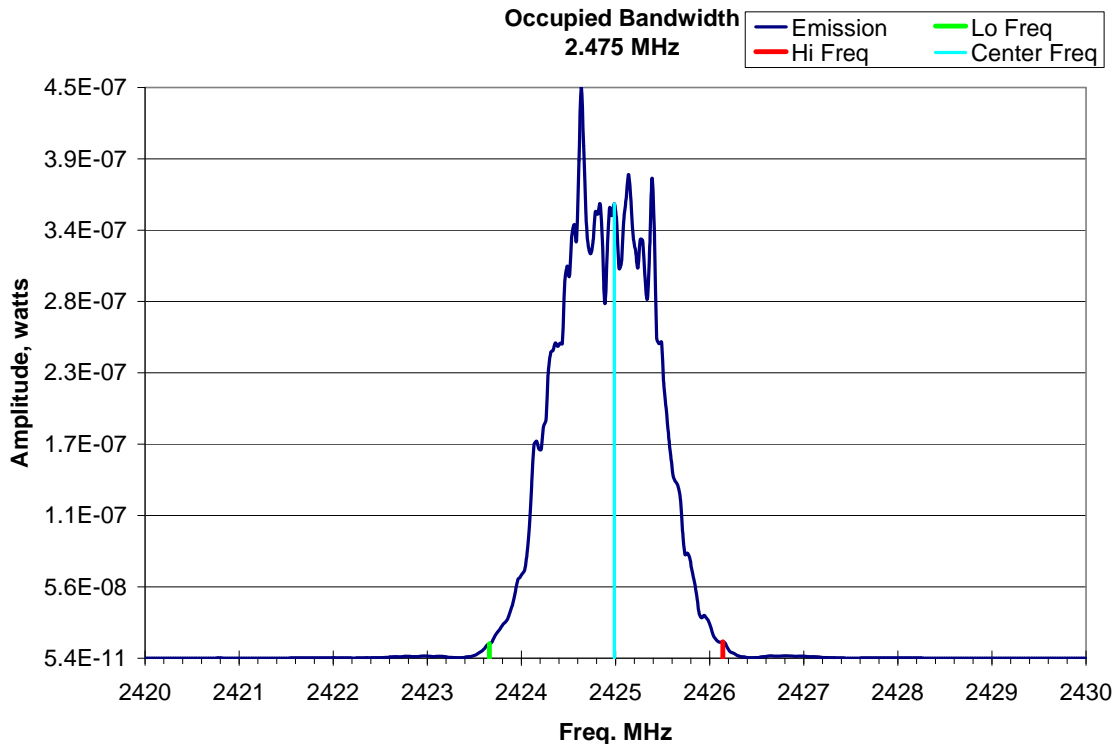
11.4 Test Data:

Occupied Bandwidth - (RSS-GEN, Section 4.6.1)

Low Channel – 2.425 GHz: Field Strength Graph

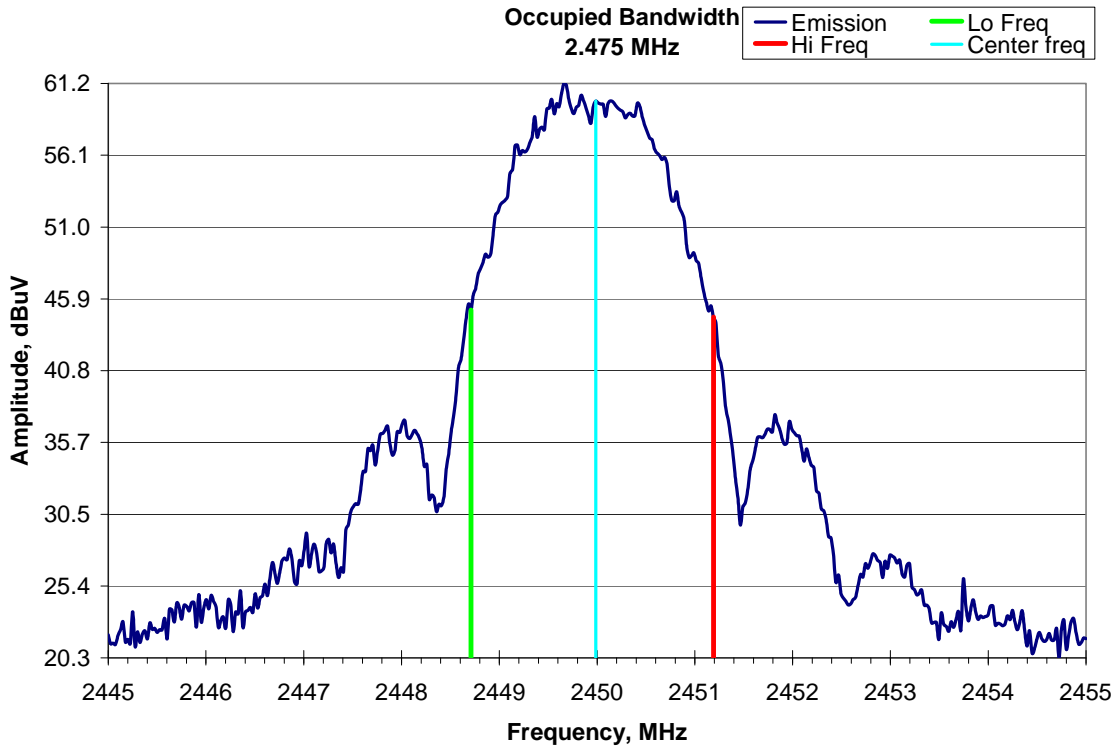


Power Graph

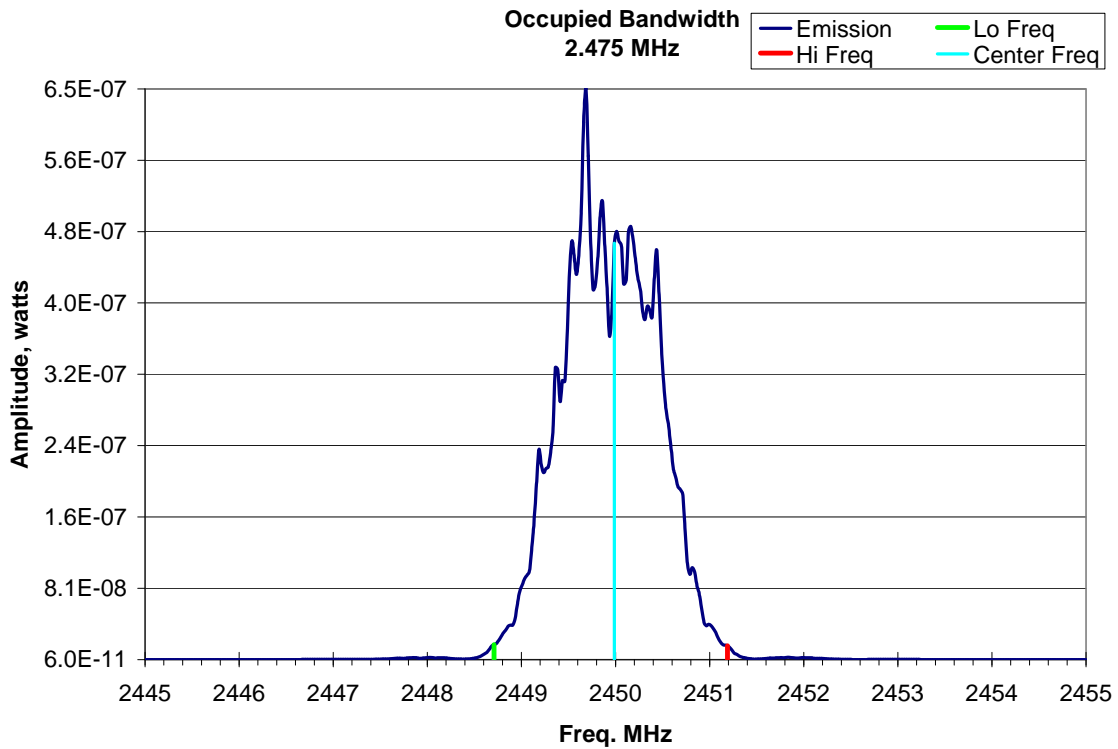


Occupied Bandwidth - (RSS-GEN, Section 4.6.1)

Mid Channel – 2.450 GHz: Field Strength Graph

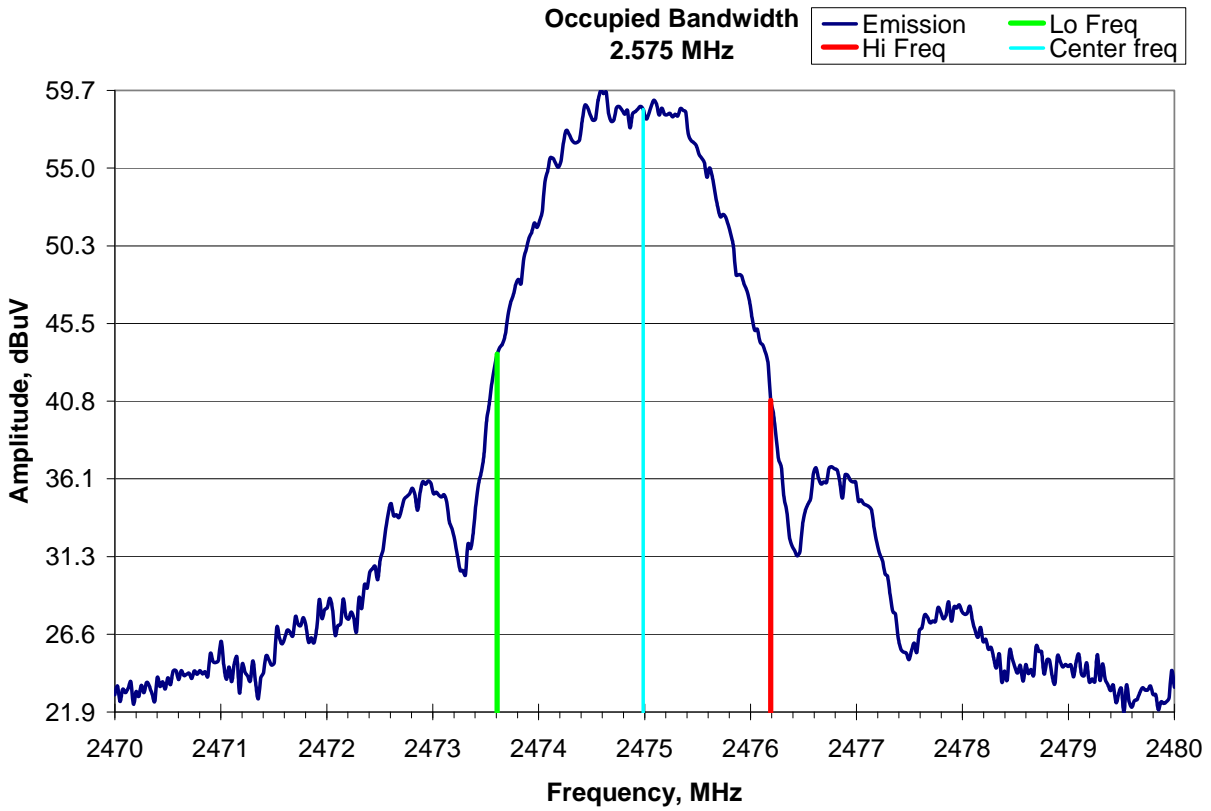


Power Graph

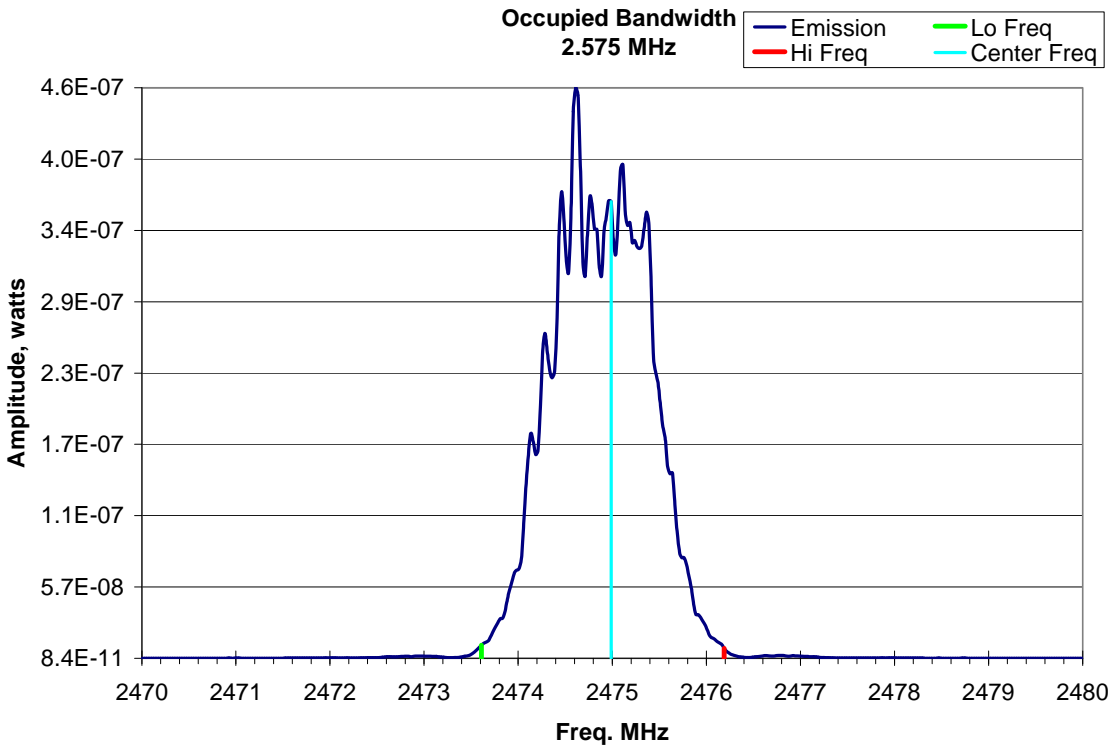


Occupied Bandwidth - (RSS-GEN, Section 4.6.1)

High Channel – 2.475 GHz: Field Strength Graph



Power Graph



Notes:

- (1) All measurements are Radiated Field Strength at 3-meters.
- (2) Worst-case Occupied Bandwidth (OBW): High Channel – 2.5125 MHz**

Deviations, Additions, or Exclusions: None

12 AC Mains Conducted Emissions**12.1 Method**

The test methods used comply with ANSI C63.4 and CISPR 16. Unless otherwise stated no deviations were made from **FCC 15.207/RSS-GEN**.

This testing was performed at Intertek Denver, located at 1795 Dogwood St. Suite 200, Louisville, CO 80027.

12.2 Test Equipment Used:

<u>Asset ID:</u>	<u>Description:</u>	<u>Manufacturer:</u>	<u>Model:</u>	<u>Serial:</u>	<u>Cal Date</u>	<u>Cal Due</u>
18909	EMI Test Receiver	RHODE & SCHWARZ	ESHS 30	842806/001	06/29/2011	06/29/2012
18765	LISN	EMCO	3825/2	9202-1945	01/31/2011	01/31/2012
18885	Transient Limiter	Hewlett-Packard	11947A	3107A00700	04/28/2011	04/28/2012
SW-6	Software application for Radiated and Conducted Emissions	Intertek	OATS_CVI	V.1.0	01/01/2011	01/01/2012

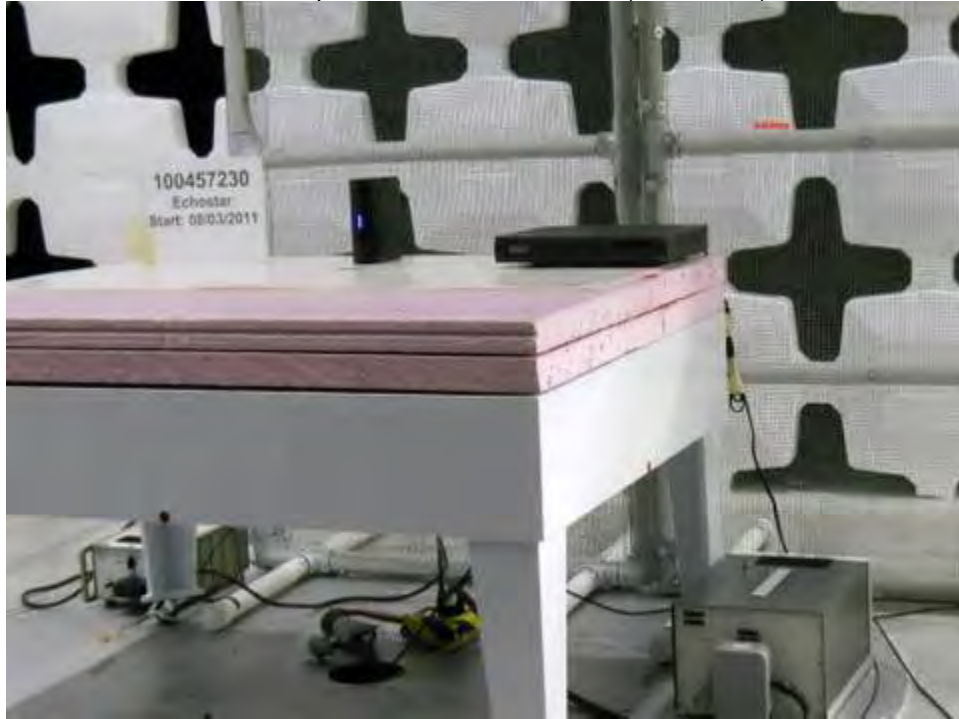
12.3 Results:

The sample tested was found to comply with the requirements of:

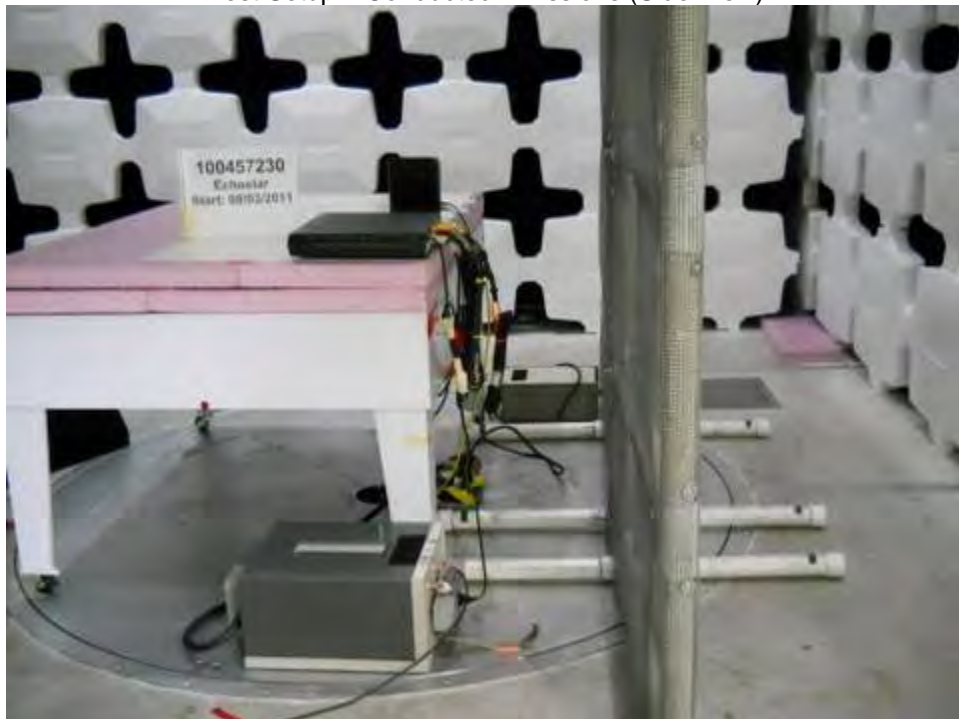
- **FCC 15.207/15.107 Class B**
- **RSS-GEN Section 7.2.4**

12.4 Setup Photographs:

Test Setup – Conducted Emissions (Front View)

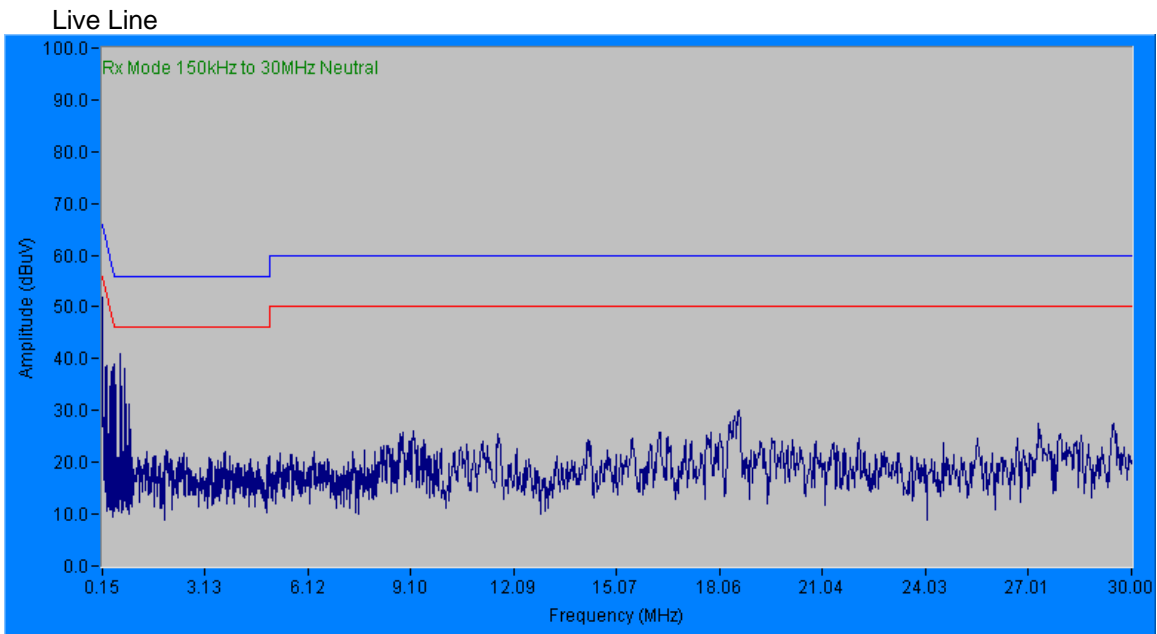
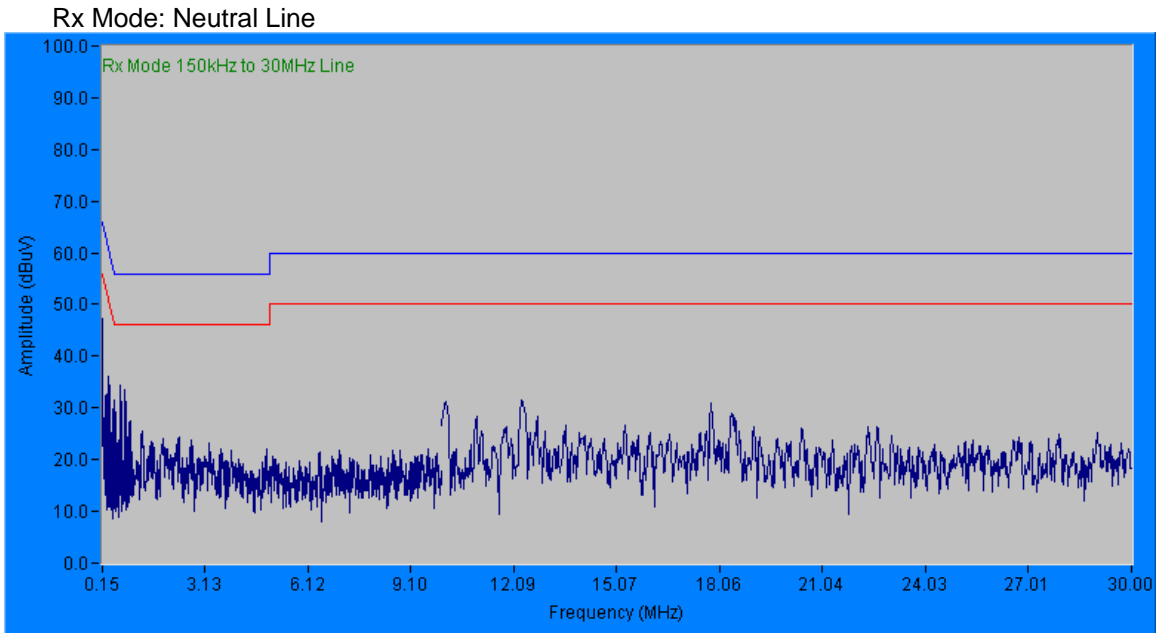


Test Setup – Conducted Emissions (Side View)



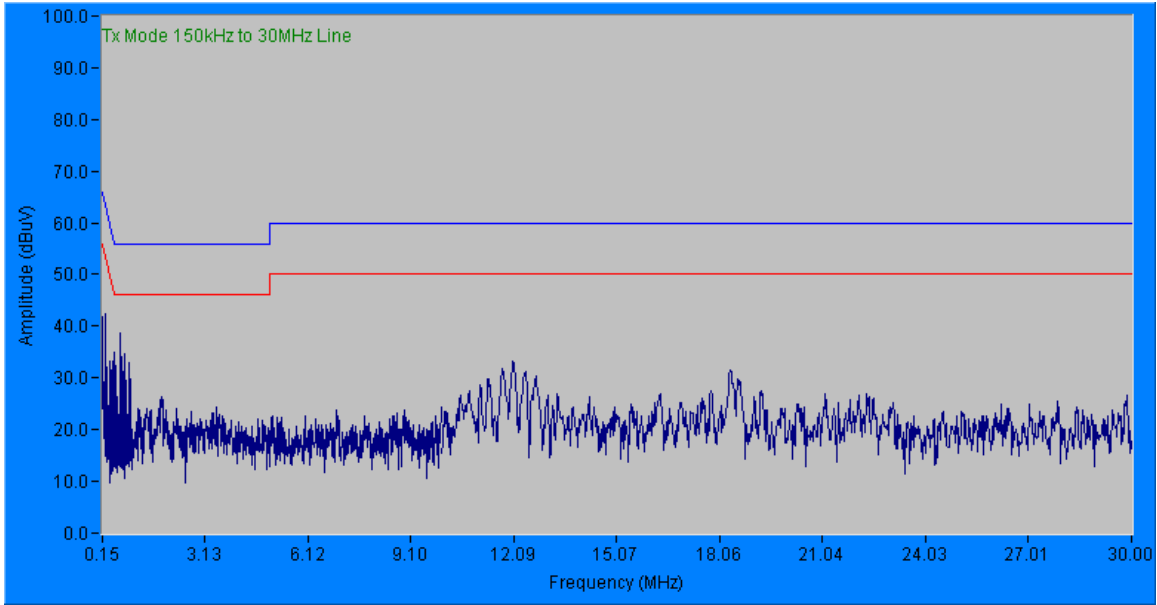
12.5 Plots: Pre-Scan Peak Measurements - Not Final Data

Conducted Emissions – FCC 15.107, Class B (150 kHz to 30 MHz)

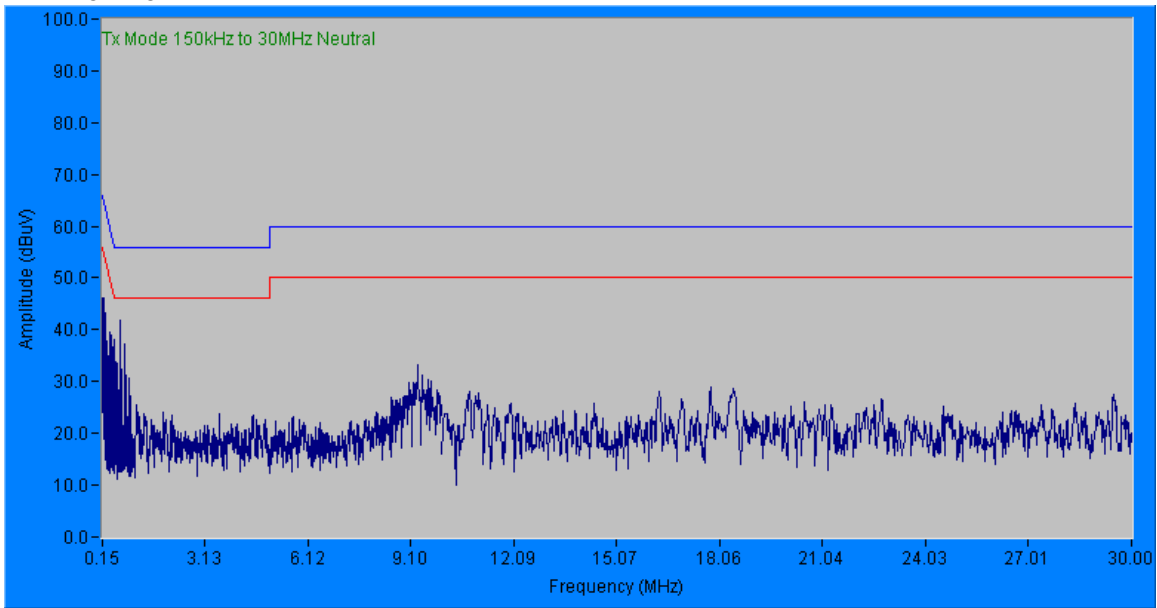


Note: Peak measurements plotted against FCC 15.107 Average & Quasi-Peak Limit

Tx Mode: Neutral Line



Live Line

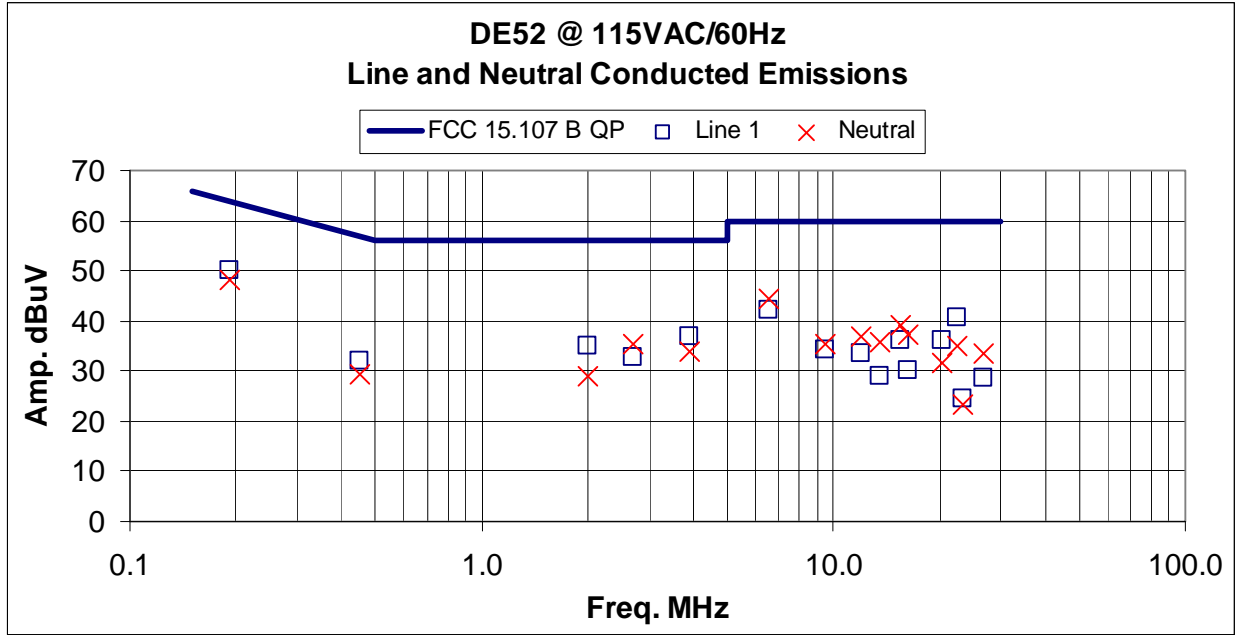


Note: Peak measurements plotted against FCC 15.107 Average & Quasi-Peak Limit

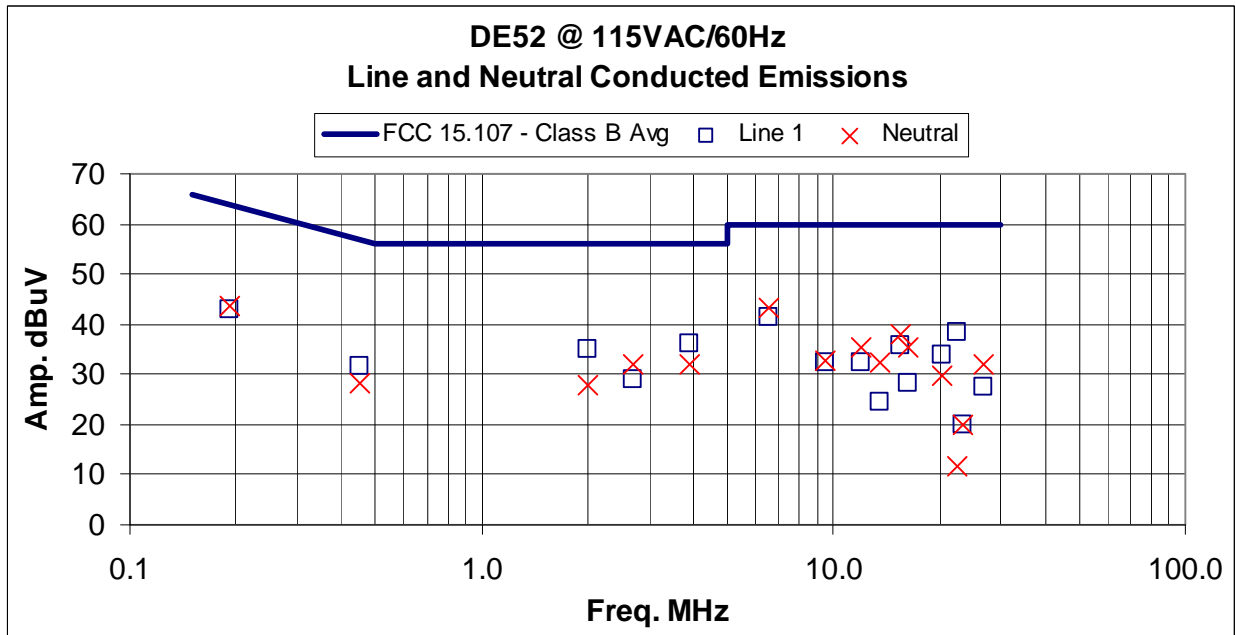
Plots: Rx Mode Final Quasi-Peak and Average Measurements

Conducted Emissions – FCC 15.107, Class B (150 kHz to 30 MHz)

Quasi Peak Measurements



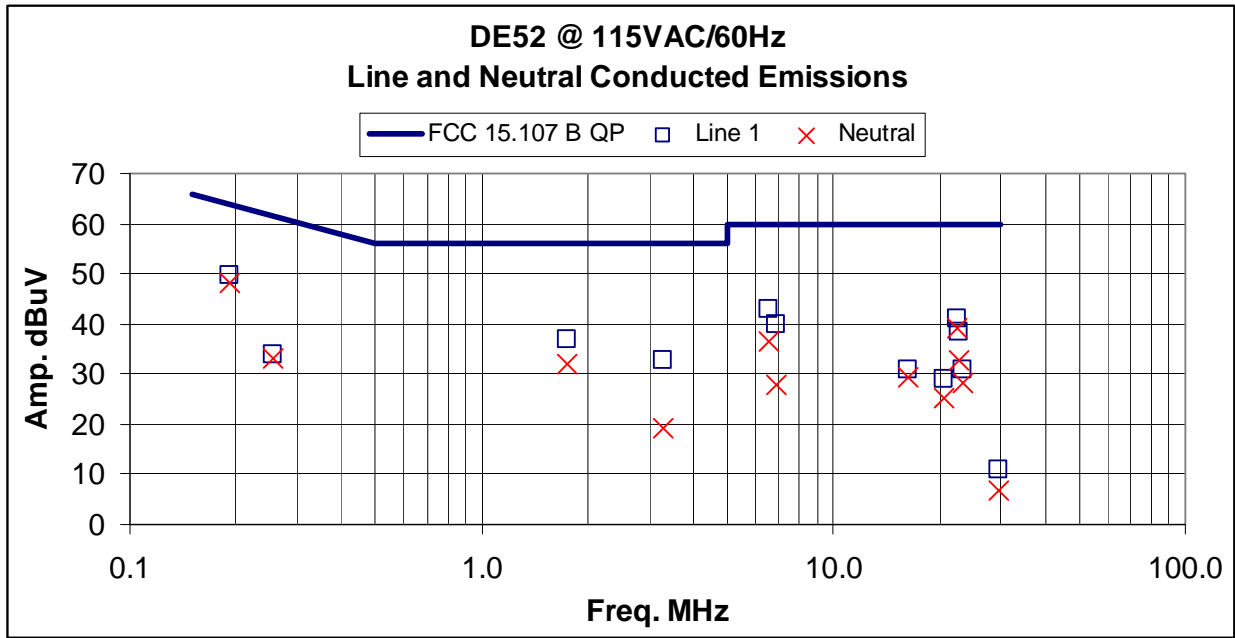
Average Measurements



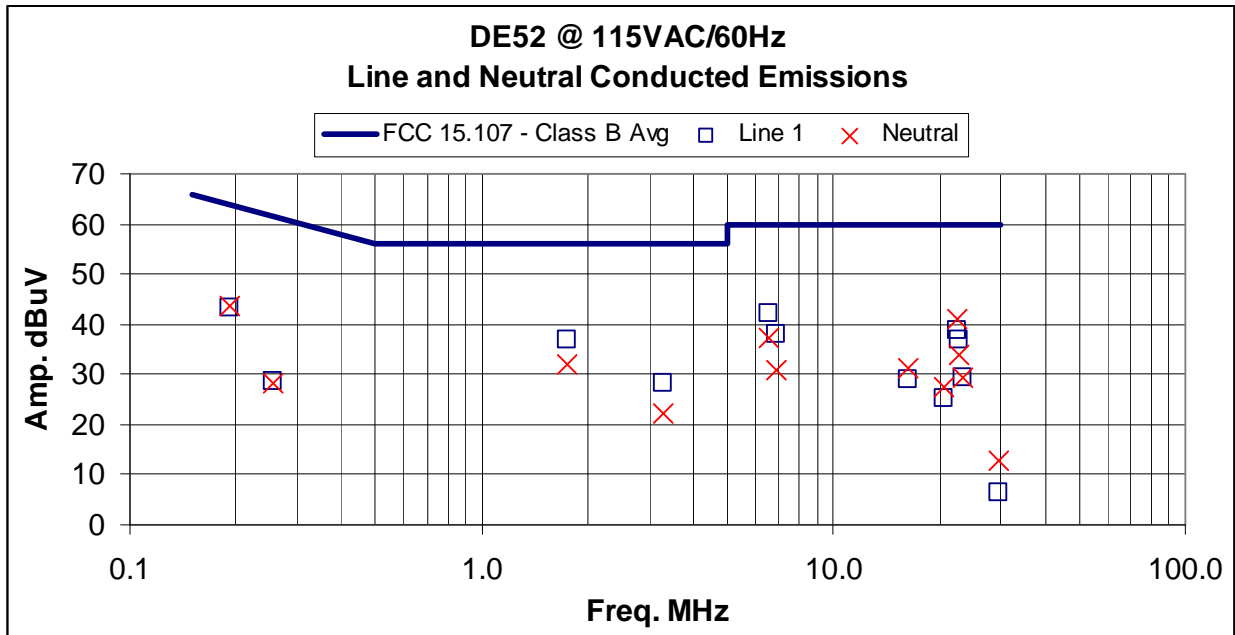
Plots: Tx Mode Final Quasi-Peak and Average Measurements

Conducted Emissions – FCC 15.107, Class B (150 kHz to 30 MHz)

Quasi Peak Measurements



Average Measurements



12.6 Test Data: 150kHz to 30MHz Rx Mode - Conducted Electromagnetic Emissions

Test Report #:	<u>100457230 Run 02</u>	Test Area:	<u>CC1 Conducted</u>	Temperature:	<u>22.4</u>	°C
Test Method:	<u>FCC Part 15.107 Class B</u>	Test Date:	<u>03-Aug-2011</u>	Relative Humidity:	<u>47.6</u>	%
EUT Model #:	<u>Delta - DE52</u>	EUT Power:	<u>120V, 60Hz</u>	Air Pressure:	<u>83.9</u>	kPa
EUT Serial #:	_____					
Manufacturer:	<u>Echostar</u>					

EUT Description: _____

Notes: _____

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / LISN / ATTEN	FINAL	TEST POINT	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB)	(dBuV)		AV15.107B	QP15.107B
Rx Mode						
0.193	32.9 Av	0.1 / 0.1 / -9.9	43.0	Line 1	-10.9	N/A
0.193	39.8 Qp	0.1 / 0.1 / -9.9	49.9	Line 1	N/A	-14.0
0.451	21.3 Av	0.1 / 0.1 / -10.0	31.5	Line 1	-15.4	N/A
0.451	21.8 Qp	0.1 / 0.1 / -10.0	32.0	Line 1	N/A	-24.9
2.70	18.7 Av	0.2 / 0.1 / -10.0	29.0	Line 1	-17.0	N/A
2.70	22.4 Qp	0.2 / 0.1 / -10.0	32.7	Line 1	N/A	-23.3
2.00	24.6 Av	0.2 / 0.1 / -10.0	34.9	Line 1	-11.1	N/A
2.00	24.8 Qp	0.2 / 0.1 / -10.0	35.1	Line 1	N/A	-20.9
3.92	25.7 Av	0.3 / 0.1 / -10.0	36.1	Line 1	-9.9	N/A
3.92	26.6 Qp	0.3 / 0.1 / -10.0	37.0	Line 1	N/A	-19.0
6.56	30.9 Av	0.4 / 0.1 / -10.0	41.4	Line 1	-8.6	N/A
6.56	31.7 Qp	0.4 / 0.1 / -10.0	42.2	Line 1	N/A	-17.8
9.46	21.8 Av	0.6 / 0.1 / -10.0	32.5	Line 1	-17.5	N/A
9.46	23.7 Qp	0.6 / 0.1 / -10.0	34.4	Line 1	N/A	-25.6
11.95	21.4 Av	0.8 / 0.2 / -10.0	32.4	Line 1	-17.6	N/A
11.95	22.5 Qp	0.8 / 0.2 / -10.0	33.5	Line 1	N/A	-26.5
13.51	13.3 Av	0.9 / 0.2 / -10.0	24.4	Line 1	-25.6	N/A
13.51	18.0 Qp	0.9 / 0.2 / -10.0	29.1	Line 1	N/A	-30.9
15.56	24.4 Av	1.0 / 0.2 / -10.0	35.6	Line 1	-14.4	N/A
15.56	25.0 Qp	1.0 / 0.2 / -10.0	36.2	Line 1	N/A	-23.8
16.35	16.9 Av	1.1 / 0.2 / -10.0	28.2	Line 1	-21.8	N/A
16.35	18.7 Qp	1.1 / 0.2 / -10.0	30.0	Line 1	N/A	-30.0
20.38	22.4 Av	1.1 / 0.2 / -10.0	33.7	Line 1	-16.3	N/A
20.38	24.9 Qp	1.1 / 0.2 / -10.0	36.2	Line 1	N/A	-23.8
22.58	26.5 Av	1.1 / 0.6 / -10.0	38.2	Line 1	-11.8	N/A
22.58	28.8 Qp	1.1 / 0.6 / -10.0	40.5	Line 1	N/A	-19.5
23.29	8.3 Av	1.1 / 0.6 / -10.0	20.0	Line 1	-30.0	N/A
23.29	12.7 Qp	1.1 / 0.6 / -10.0	24.4	Line 1	N/A	-35.6
26.61	15.4 Av	1.2 / 0.7 / -10.0	27.3	Line 1	-22.7	N/A
26.61	16.8 Qp	1.2 / 0.7 / -10.0	28.7	Line 1	N/A	-31.3

Intertek

Report Number: 100457230DEN-002

Issued:08/24/2011

FREQ	LEVEL	CABLE / LISN / ATTEN	FINAL	TEST POINT	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB)	(dBuV)		AV15.107B	QP15.107B
0.193	33.6 Av	0.1 / 0.1 / -9.9	43.7	Neutral	-10.2	N/A
0.193	38.2 Qp	0.1 / 0.1 / -9.9	48.3	Neutral	N/A	-15.6
0.451	18.1 Av	0.1 / 0.1 / -10.0	28.3	Neutral	-18.6	N/A
0.451	19.1 Qp	0.1 / 0.1 / -10.0	29.3	Neutral	N/A	-27.6
2.00	17.6 Av	0.2 / 0.1 / -10.0	27.9	Neutral	-18.1	N/A
2.00	18.7 Qp	0.2 / 0.1 / -10.0	29.0	Neutral	N/A	-27.0
2.70	21.7 Av	0.2 / 0.1 / -10.0	32.0	Neutral	-14.0	N/A
2.70	25.2 Qp	0.2 / 0.1 / -10.0	35.5	Neutral	N/A	-20.5
3.92	21.6 Av	0.3 / 0.1 / -10.0	32.0	Neutral	-14.0	N/A
3.92	23.3 Qp	0.3 / 0.1 / -10.0	33.7	Neutral	N/A	-22.3
6.56	32.8 Av	0.4 / 0.1 / -10.0	43.3	Neutral	-6.7	N/A
6.56	33.8 Qp	0.4 / 0.1 / -10.0	44.3	Neutral	N/A	-15.7
9.46	22.0 Av	0.6 / 0.1 / -10.0	32.7	Neutral	-17.3	N/A
9.46	24.8 Qp	0.6 / 0.1 / -10.0	35.5	Neutral	N/A	-24.5
11.95	24.5 Av	0.8 / 0.2 / -10.0	35.5	Neutral	-14.5	N/A
11.95	25.7 Qp	0.8 / 0.2 / -10.0	36.7	Neutral	N/A	-23.3
13.51	21.1 Av	0.9 / 0.2 / -10.0	32.2	Neutral	-17.8	N/A
13.51	24.8 Qp	0.9 / 0.2 / -10.0	35.9	Neutral	N/A	-24.1
15.56	26.8 Av	1.0 / 0.2 / -10.0	38.0	Neutral	-12.0	N/A
15.56	27.9 Qp	1.0 / 0.2 / -10.0	39.1	Neutral	N/A	-20.9
16.35	24.0 Av	1.1 / 0.2 / -10.0	35.3	Neutral	-14.7	N/A
16.35	26.0 Qp	1.1 / 0.2 / -10.0	37.3	Neutral	N/A	-22.7
20.38	18.5 Av	1.1 / 0.2 / -10.0	29.8	Neutral	-20.2	N/A
20.38	20.4 Qp	1.1 / 0.2 / -10.0	31.7	Neutral	N/A	-28.3
22.58	0.0 Av	1.1 / 0.6 / -10.0	11.7	Neutral	-38.3	N/A
22.58	23.3 Qp	1.1 / 0.6 / -10.0	35.0	Neutral	N/A	-25.0
23.29	8.4 Av	1.1 / 0.6 / -10.0	20.1	Neutral	-29.9	N/A
23.29	11.5 Qp	1.1 / 0.6 / -10.0	23.2	Neutral	N/A	-36.8
26.61	20.1 Av	1.2 / 0.7 / -10.0	32.0	Neutral	-18.0	N/A
26.61	21.5 Qp	1.2 / 0.7 / -10.0	33.4	Neutral	N/A	-26.6

FREQ	LEVEL	CABLE / LISN / ATTEN	FINAL	TEST POINT	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB)	(dBuV)		AV15.107B	QP15.107B
***** Measurement Summary *****						
6.56	32.8 Av	0.4 / 0.1 / -10.0	43.3	Neutral	-6.7	N/A
3.92	25.7 Av	0.3 / 0.1 / -10.0	36.1	Line 1	-9.9	N/A
0.193	33.6 Av	0.1 / 0.1 / -9.9	43.7	Neutral	-10.2	N/A
2.00	24.6 Av	0.2 / 0.1 / -10.0	34.9	Line 1	-11.1	N/A
22.58	26.5 Av	1.1 / 0.6 / -10.0	38.2	Line 1	-11.8	N/A
15.56	26.8 Av	1.0 / 0.2 / -10.0	38.0	Neutral	-12.0	N/A
11.95	24.5 Av	0.8 / 0.2 / -10.0	35.5	Neutral	-14.5	N/A
16.35	24.0 Av	1.1 / 0.2 / -10.0	35.3	Neutral	-14.7	N/A
0.451	21.3 Av	0.1 / 0.1 / -10.0	31.5	Line 1	-15.4	N/A

Intertek

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FREQ	LEVEL	CABLE / LISN / ATTEN	FINAL	TEST POINT	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB)	(dBuV)		AV15.107B	QP15.107B
20.38	22.4 Av	1.1 / 0.2 / -10.0	33.7	Line 1	-16.3	N/A
9.46	22.0 Av	0.6 / 0.1 / -10.0	32.7	Neutral	-17.3	N/A
13.51	21.1 Av	0.9 / 0.2 / -10.0	32.2	Neutral	-17.8	N/A
26.61	20.1 Av	1.2 / 0.7 / -10.0	32.0	Neutral	-18.0	N/A
23.29	8.4 Av	1.1 / 0.6 / -10.0	20.1	Neutral	-29.9	N/A

Tx Mode Modulated - Conducted Electromagnetic Emissions

Test Report #: 100457230 Run 01	Test Area: CC1 Conducted	Temperature: 22.4 °C
Test Method: FCC Part 15.107 Class B	Test Date: 03-Aug-2011	Relative Humidity: 47.6 %
EUT Model #: Delta - DE52	EUT Power: 120V, 60Hz	Air Pressure: 83.9 kPa

EUT Serial #: _____

Manufacturer: Echostar

EUT Description: _____

Notes: _____

Level Key	
Pk – Peak	Nb – Narrow Band
Qp – QuasiPeak	Bb – Broad Band
Av - Average	

FREQ	LEVEL	CABLE / LISN / ATTEN	FINAL	TEST POINT	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB)	(dBuV)		QP15.107B	AV15.107B
Tx Mode						
0.193	33.0 Av	0.1 / 0.1 / -9.9	43.1	Line 1	N/A	-10.8
0.193	39.7 Qp	0.1 / 0.1 / -9.9	49.8	Line 1	-14.1	N/A
0.256	18.5 Av	0.1 / 0.1 / -9.9	28.6	Line 1	N/A	-23.0
0.256	23.7 Qp	0.1 / 0.1 / -9.9	33.8	Line 1	-27.8	N/A
1.74	26.5 Av	0.2 / 0.1 / -10.0	36.8	Line 1	N/A	-9.2
1.74	26.6 Qp	0.2 / 0.1 / -10.0	36.9	Line 1	-19.1	N/A
3.28	17.9 Av	0.3 / 0.1 / -10.0	28.3	Line 1	N/A	-17.7
3.28	22.4 Qp	0.3 / 0.1 / -10.0	32.8	Line 1	-23.2	N/A
6.56	31.5 Av	0.4 / 0.1 / -10.0	42.0	Line 1	N/A	-8.0
6.56	32.3 Qp	0.4 / 0.1 / -10.0	42.8	Line 1	-17.2	N/A
6.88	27.6 Av	0.4 / 0.1 / -10.0	38.1	Line 1	N/A	-11.9
6.88	29.4 Qp	0.4 / 0.1 / -10.0	39.9	Line 1	-20.1	N/A
16.35	17.6 Av	1.1 / 0.2 / -10.0	28.9	Line 1	N/A	-21.1
16.35	19.4 Qp	1.1 / 0.2 / -10.0	30.7	Line 1	-29.3	N/A
20.51	14.1 Av	1.1 / 0.2 / -10.0	25.4	Line 1	N/A	-24.6
20.51	17.5 Qp	1.1 / 0.2 / -10.0	28.8	Line 1	-31.2	N/A
22.58	27.2 Av	1.1 / 0.6 / -10.0	38.9	Line 1	N/A	-11.1
22.58	29.5 Qp	1.1 / 0.6 / -10.0	41.2	Line 1	-18.8	N/A
22.89	25.2 Av	1.1 / 0.6 / -10.0	36.9	Line 1	N/A	-13.1
22.89	26.7 Qp	1.1 / 0.6 / -10.0	38.4	Line 1	-21.6	N/A
23.37	17.5 Av	1.1 / 0.6 / -10.0	29.2	Line 1	N/A	-20.8
23.37	19.3 Qp	1.1 / 0.6 / -10.0	31.0	Line 1	-29.0	N/A
29.35	-5.7 Av	1.4 / 0.7 / -10.0	6.4	Line 1	N/A	-43.6
29.35	-1.2 Qp	1.4 / 0.7 / -10.0	10.9	Line 1	-49.1	N/A
0.193	33.5 Av	0.1 / 0.1 / -9.9	43.6	Neutral	N/A	-10.3
0.193	37.9 Qp	0.1 / 0.1 / -9.9	48.0	Neutral	-15.9	N/A
0.256	18.2 Av	0.1 / 0.1 / -9.9	28.3	Neutral	N/A	-23.3
0.256	23.2 Qp	0.1 / 0.1 / -9.9	33.3	Neutral	-28.3	N/A
1.74	21.6 Av	0.2 / 0.1 / -10.0	31.9	Neutral	N/A	-14.1
1.74	21.8 Qp	0.2 / 0.1 / -10.0	32.1	Neutral	-23.9	N/A

Intertek

Report Number: 100457230DEN-002

Issued:08/24/2011

FREQ	LEVEL	CABLE / LISN / ATTEN	FINAL	TEST POINT	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB)	(dBuV)		QP15.107B	AV15.107B
3.28	8.8 Av	0.3 / 0.1 / -10.0	19.2	Neutral	N/A	-26.8
3.28	11.8 Qp	0.3 / 0.1 / -10.0	22.2	Neutral	-33.8	N/A
6.56	26.0 Av	0.4 / 0.1 / -10.0	36.5	Neutral	N/A	-13.5
6.56	26.9 Qp	0.4 / 0.1 / -10.0	37.4	Neutral	-22.6	N/A
6.88	17.3 Av	0.4 / 0.1 / -10.0	27.8	Neutral	N/A	-22.2
6.88	20.4 Qp	0.4 / 0.1 / -10.0	30.9	Neutral	-29.1	N/A
16.35	18.1 Av	1.1 / 0.2 / -10.0	29.4	Neutral	N/A	-20.6
16.35	19.8 Qp	1.1 / 0.2 / -10.0	31.1	Neutral	-28.9	N/A
20.50	14.0 Av	1.1 / 0.2 / -10.0	25.3	Neutral	N/A	-24.7
20.50	16.0 Qp	1.1 / 0.2 / -10.0	27.3	Neutral	-32.7	N/A
22.58	27.3 Av	1.1 / 0.6 / -10.0	39.0	Neutral	N/A	-11.0
22.58	29.5 Qp	1.1 / 0.6 / -10.0	41.2	Neutral	-18.8	N/A
22.88	21.1 Av	1.1 / 0.6 / -10.0	32.8	Neutral	N/A	-17.2
22.88	22.1 Qp	1.1 / 0.6 / -10.0	33.8	Neutral	-26.2	N/A
23.37	16.5 Av	1.1 / 0.6 / -10.0	28.2	Neutral	N/A	-21.8
23.37	17.8 Qp	1.1 / 0.6 / -10.0	29.5	Neutral	-30.5	N/A
29.35	-5.2 Av	1.4 / 0.7 / -10.0	6.9	Neutral	N/A	-43.1
29.35	0.6 Qp	1.4 / 0.7 / -10.0	12.7	Neutral	-47.3	N/A

FREQ	LEVEL	CABLE / LISN / ATTEN	FINAL	TEST POINT	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB)	(dBuV)		QP15.107B	AV15.107B
***** Measurement Summary *****						
6.56	31.5 Av	0.4 / 0.1 / -10.0	42.0	Line 1	N/A	-8.0
1.74	26.5 Av	0.2 / 0.1 / -10.0	36.8	Line 1	N/A	-9.2
0.193	33.5 Av	0.1 / 0.1 / -9.9	43.6	Neutral	N/A	-10.3
22.58	27.3 Av	1.1 / 0.6 / -10.0	39.0	Neutral	N/A	-11.0
6.88	27.6 Av	0.4 / 0.1 / -10.0	38.1	Line 1	N/A	-11.9
22.89	25.2 Av	1.1 / 0.6 / -10.0	36.9	Line 1	N/A	-13.1
22.88	21.1 Av	1.1 / 0.6 / -10.0	32.8	Neutral	N/A	-17.2
3.28	17.9 Av	0.3 / 0.1 / -10.0	28.3	Line 1	N/A	-17.7
16.35	18.1 Av	1.1 / 0.2 / -10.0	29.4	Neutral	N/A	-20.6
23.37	17.5 Av	1.1 / 0.6 / -10.0	29.2	Line 1	N/A	-20.8
22.89	26.7 Qp	1.1 / 0.6 / -10.0	38.4	Line 1	-21.6	N/A
0.256	18.5 Av	0.1 / 0.1 / -9.9	28.6	Line 1	N/A	-23.0
20.51	14.1 Av	1.1 / 0.2 / -10.0	25.4	Line 1	N/A	-24.6
20.50	14.0 Av	1.1 / 0.2 / -10.0	25.3	Neutral	N/A	-24.7
20.51	17.5 Qp	1.1 / 0.2 / -10.0	28.8	Line 1	-31.2	N/A
29.35	-5.2 Av	1.4 / 0.7 / -10.0	6.9	Neutral	N/A	-43.1

Example calculation:

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Measured Level		Transducer, Cable Loss & Amplifier corrections		Corrected Reading	Specification Limit		Corrected Reading		Delta Specification
(dB μ V)	+	(dB)	=	(dB μ V/m)	(dB μ V/m)	-	(dB μ V/m)	=	
14.0		14.9		28.9	40.0		28.9		-11.1

Notes:

- (1) All measurements taken with both Quasi-Peak and Average detectors.

Deviations, Additions, or Exclusions: None

13 Measurement Uncertainty

The measured value related to the corresponding limit will be used to decide whether the equipment meets the requirements.

The measurement uncertainty figures were calculated and correspond to a coverage factor of $k = 2$, providing a confidence level of respectively 95.45 % in the case where the distributions characterizing the actual measurement uncertainties are normal (Gaussian).

Measurement uncertainty Table

Parameter	Uncertainty \pm	Notes
Radiated emissions, 10kHz to 1000 MHz	4.4 dB	
Radiated emissions, 1 to 18 GHz	4.7 dB	
AC mains Conducted emissions, 9kHz to 30 MHz	3.14 dB	

14 Duty Cycle Correction Factor

No duty cycle correction factor was applied during this testing – therefore, no product Duty Cycle verification was applicable.

15 Revision History

Revision Level	Date	Report Number	Notes
0	08/24/2011	100457230DEN-002	Original Issue
1	08/30/2011	100457230DEN-002	Final corrected field strength used in PSD calculation for the high channel was corrected from 84.64 to 83.18 dBuV/m. The subsequent calculations were correct based on the correct measurement of 83.18 dBuV/m. Author: Mike Kanda <i>mk</i> Reviewer: Mike Spataro <i>MAS</i>