



TEST REPORT – EMC Emissions

Report Number: 100320162DEN-001

Project Number: G100320162

Report Issue Date: 02/28/2011

Product Designation: Model: Magic Closer (Base and Remote)

Standards: FCC 47 CFR Part 15.247

Tested by:

Intertek Testing Services NA, Inc.
1795 Dogwood Street, Suite 200
Louisville, CO 80027

Client:

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Centennial, CO 80122

Report prepared by

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A handwritten signature in black ink that reads "Michael Spataro".

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Product Tested:

Magic Closer
(Automatic Garage Door Closer)



Base Product



Remote Product

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 – Output Power of the Fundamental & Harmonics of the Fundamental - FCC 247(b)(3) (d)/15.205	02/07/2011 02/08/2011 02/11/2011	Pass
6	Radiated Emissions – Unintentional & Spurious - FCC 15.209/ 15.247(d)	02/07/2011 02/08/2011 02/11/2011	Pass
7	6dB Bandwidth – FCC 15.247 (a)(2)	02/08/2011	Pass
8	Power Spectral Density (PSD) – FCC 15.247(e)	02/08/2011	Pass
9	Band Edge Measurements – FCC 15.247(d) / 15.209	02/08/2011	Pass
10	Duty Cycle & Duty Cycle Correction Factor	02/07/2011	N/A
11	AC Conducted Emissions – FCC 15.107/15.207	04/01/2011	Pass

Notes:

- 1) Both the Base and Remote product have integral antennas – therefore, all measurements are radiated field strength.

General Remarks:

The following remarks are to be considered as “where applicable” and are taken into account while completing any FCC/IC/ETSI Radio tests at Intertek-Louisville.

Testing was performed in 3 different orthogonal axes to determine the worst-case emissions from the device. The worst-case axis and emissions are shown in this report.

FCC CFR47 Part 15.31: Measurement Standards: In any case where the device is powered off a battery, a fresh battery was used during testing. In cases where the device is powered of an AC Supply, voltage was varied per Part 15.31 to find worst-case emissions.

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 FCC KDB 558074 for DTS devices was used for testing.

The products tested were configured with integral antennas – 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. When applicable, the following equation was utilized to covert measurements from conducted port power to radiated field strength for a given test distance.

Limit Calculation:

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

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

If the antenna gain is not known (declared by the client) at the time of testing, unity gain is assumed in all calculations for worst-case.

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3 Description of Equipment Under Test

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Automatic Garage Door Closer	JCV Enterprises	Magic Closer Base	28
Automatic Garage Door Closer	JCV Enterprises	Magic Closer Remote	29

Receive Date:	02/08/2011
Received Condition:	Good
Type:	Production Samples

Description of Equipment Under Test (provided by client)

The Magic Closer is an automated/ programmable garage door closer.

The following products were tested:

1. Base unit
2. Remote unit

Both products operate in the frequency range of: 2.425 GHz – 2.475 GHz.
Both products are DTS utilizing digital modulation.

The products will be marketed initially in the US.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
Remote 3.0 VDC Battery	unknown	----	----
Base ac adapter Input: 120Vac Output: 12Vdc	unknown 200mA	60Hz ---	1 ---

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Tx - Product set up in transmit mode at full power, CW mode (for testing only)
2	Rx – Product set up in “standby” receive mode

Clock Frequencies of the EUT:

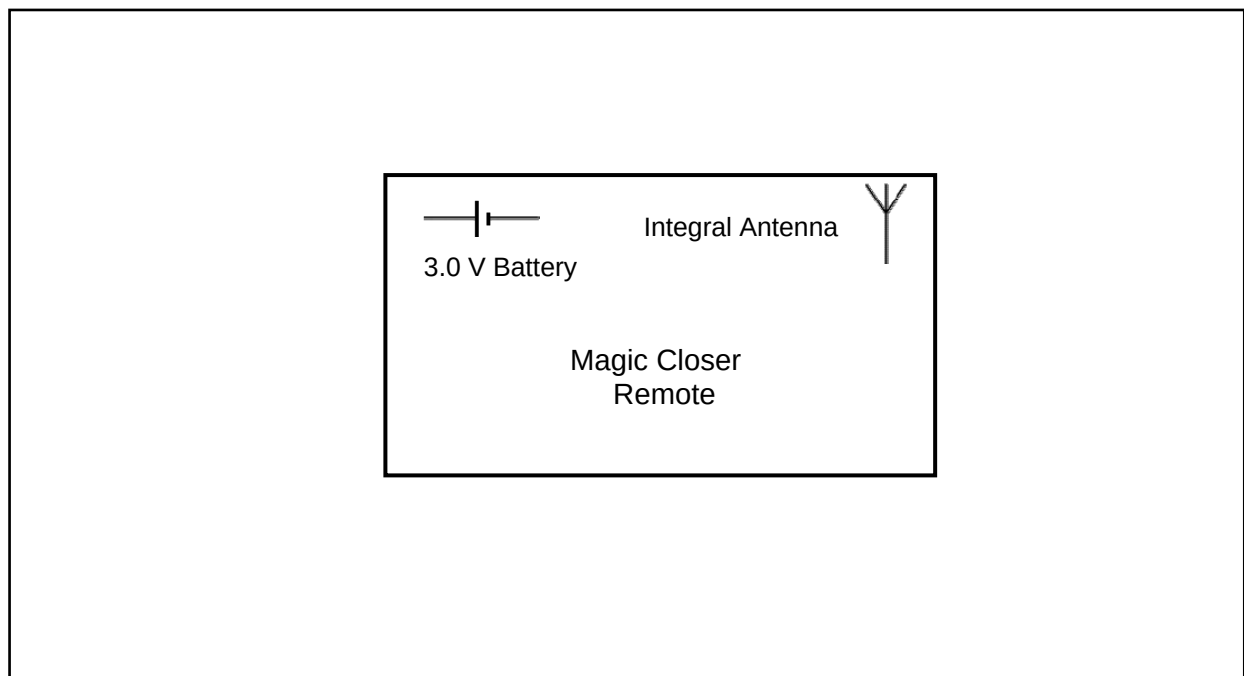
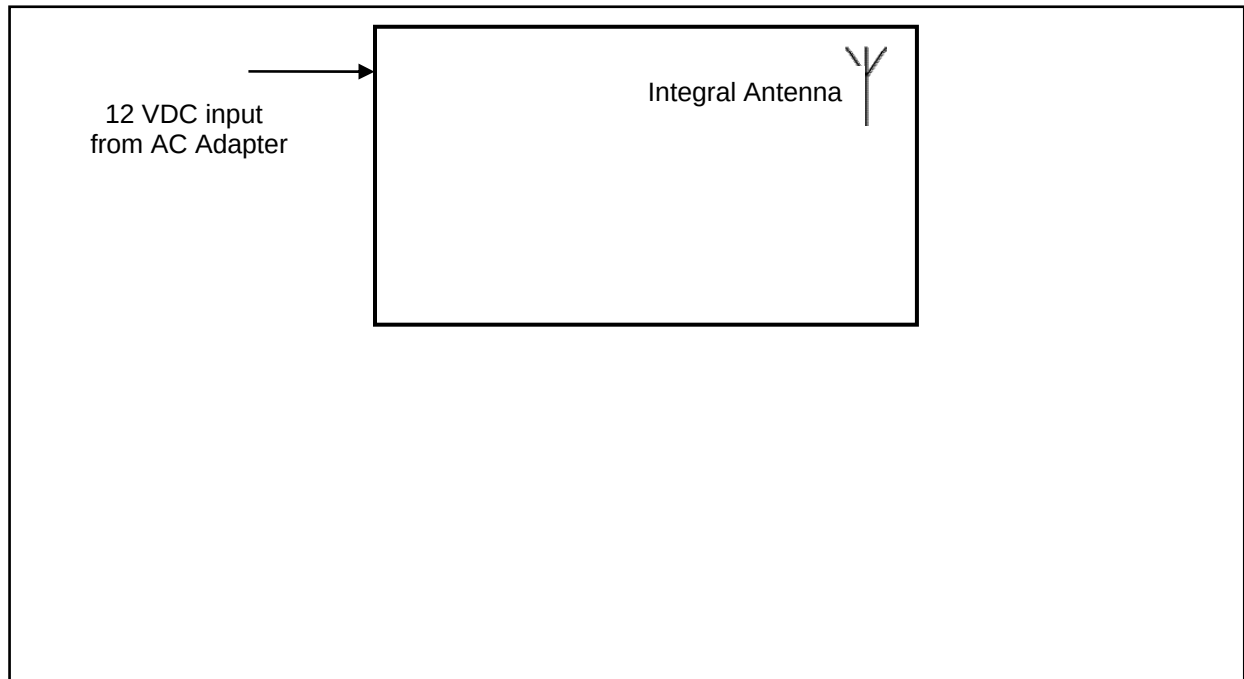
No.	Descriptions of Product Clocks
1	Transmit Frequency: 2.425 GHz, 2.450GHz and 2.475GHz (Low, Mid and High Channels)
2	Lowest Frequency Utilized: 16 MHz

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:



4.3 Data:

ID	Cable Description	Length	Shielding	Ferrites
1	None	----	----	----

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
AC Adapter Base Product Only	Radio Shack	Cat No. 43-1008	06945

General notes:

1. Product did not require any support equipment other than the above ac adapter

5 Radiated Emissions – Intentional Radiators: Output Power - Fundamental & Harmonics of the Fundamental

Unless otherwise stated no deviations were made from ANSI C63.10 and FCC publication KDB 558074 for DTS devices.

Intertek Louisville's emissions testing facility is located at 1795 Dogwood Street, Suite 200, Louisville, CO 80027. The emissions testing facility is ISO17025:2005 accredited.

5.1 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	12/06/2010	12/06/2011
18880	Q.P Adapter	Hewlett-Packard	85650A	2811A01300	12/06/2010	12/06/2011
18913	Spectrum Analyzer	Hewlett-Packard	E7405A	My44211889	05/07/2010	05/07/2011
18906	Pre-Amplifier (1-4 GHz)	Mini-Circuits Lab	ZHL-42	N052792-2	06/11/2010	06/11/2011
18900	RF Pre-Amplifier (4-8 GHz)	Avantek	AFT97-8434-10F	1007	06/07/2010	06/07/2011
18901	RF Pre-Amplifier (8-18 GHz)	Avantek	AWT-18037	1002	06/07/2010	06/07/2011
18886	Ridged Guide Antenna 1-18GHz	TENSOR	4105	2020	10/08/2010	10/08/2011
18805	HF Antenna/Harmonic Mixer 18 GHz to 26.5 GHz	Hewlett-Packard	11970K	2332A01280	10/04/2010	10/04/2011

5.2 Results:

The sample tested was found to Comply.

- FCC 247(b)(3) (d)/15.205

5.3 Setup Photographs – Base Product:

Test setup – Front View



Photo:

Test setup – Rear View



Photo:

Worst-Case Axis 1 (EUT Flat on Table)



Axis 2 (EUT Vertical)



Axis 3 (EUT Vertical & Rotated 90 degrees)

5.4 Setup Photographs – Remote Product:

Test setup – Front View



Photo:

Test setup – Rear View



Photo:

Worst-Case Axis 1 (EUT Flat on Table)



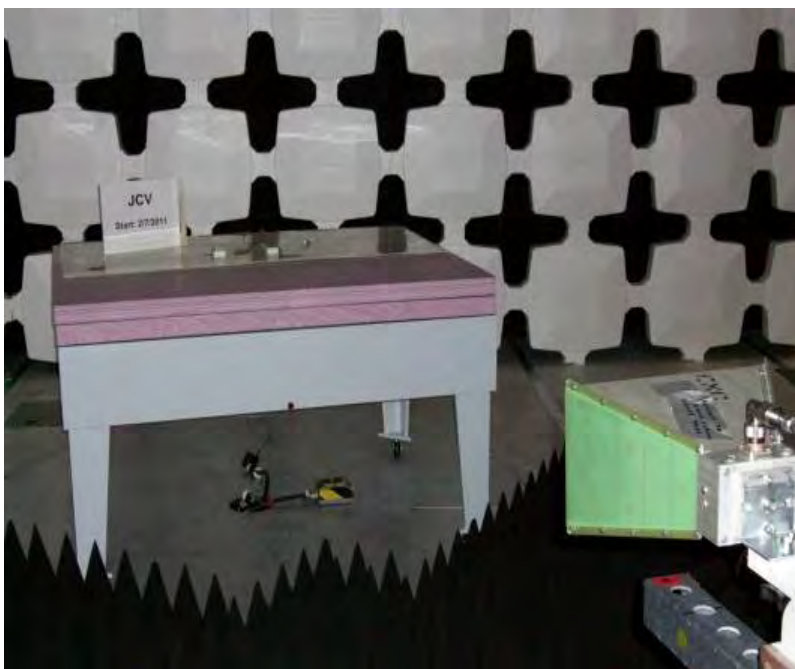
Axis 2 (EUT Vertical)



Axis 3 (EUT Vertical & Rotated 90 degrees)

Photo: Antenna Setups

Ridge Guide Horn (1 GHz to 18GHz)

HF Harmonic Mixer (antenna/pre-amp/cables
(18 GHz to 26.5 GHz)

5.5 Test Data – Base Product:

Fundamental and Spurious of the Transmitter

Test Report #:	100320162	Test Area:	CC1 Radiated (3m)	Temperature:	22.4 °C
Test Method:	FCC 15.247	Test Date:	08-Feb-2011	Relative Humidity:	27.1 %
EUT Model #:	Magic Closer - Base	EUT Power:	12 VDC AC Adapter	Air Pressure:	81.7 kPa
EUT Serial #:	29				

Manufacturer:	JCV Enterprises	Level Key	
EUT Description:	Garage Door Closer	Pk – Peak	Nb – Narrow Band
Notes:	Testing Base Product – Product transmitting full power CW	Qp – QuasiPeak	Bb – Broad Band
	Note: Product configured specifically for this test – not normal operation	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)
The following Duty Cycle was determined from actual measurements by Intertek:								
5.2%								
Averaging method for pulsed signals and calculation in accordance to FCC CFR47 Part 15.35 utilized to calculate field strength emissions.								
The testing performed in accordance to FCC CFR47 Part 15.205 (restricted bands of operation) and 15.247 emissions and delta limits were calculated as follows:								
Final Corrected Peak Measurement – Duty Cycle Correction Factor* = Final Calculated Emission								
The Final Calculated Emission was then compared to the Limits in CFR47 Part 15.209 and 15.247 and the emission/limit delta was calculated.								
DTCF is calculated as follows $20 \cdot \log_{10}(\text{duty cycle in 100ms})$.								
Part 15.247 and 15.205 Respectively								
Fundamental Measurements								
Fundamental - Low Channel – Axis 1 (EUT Flat on Table)								
2475.4	96.5 Pk	3.6 / 28.4 / 37.7	90.7	V / 2.1 / 168.0	0.0	90.7	125.2	-34.5
2475.4	107.5 Pk	3.6 / 28.4 / 37.7	101.8	H / 1.6 / 145.0	0.0	101.8	125.2	-23.4
Axis 2 (EUT Vertical)								
2475.4	98.2 Pk	3.6 / 28.4 / 37.7	92.4	H / 2.2 / 140.0	0.0	92.4	125.2	-32.8
2475.4	97.2 Pk	3.6 / 28.4 / 37.7	91.4	V / 1.4 / 158.0	0.0	91.4	125.2	-33.8
Axis 3 (EUT Vertical & Rotated 90 degrees)								
2475.4	102.4 Pk	3.6 / 28.4 / 37.7	96.6	V / 2.4 / 98.0	0.0	96.6	125.2	-28.6
2475.4	103.2 Pk	3.6 / 28.4 / 37.7	97.4	H / 1.6 / 148.0	0.0	97.4	125.2	-27.8
Fundamental - Mid Channel – Axis 1 (EUT Flat on Table)								
2450.4	106.5 Pk	3.6 / 28.3 / 37.7	100.6	H / 1.7 / 142.0	0.0	100.6	125.2	-24.6
2450.4	99.0 Pk	3.6 / 28.3 / 37.7	93.2	V / 2.1 / 202.0	0.0	93.2	125.2	-32.0
Axis 2 (EUT Vertical)								
2450.4	96.2 Pk	3.6 / 28.3 / 37.7	90.4	V / 1.4 / 146.0	0.0	90.4	125.2	-34.8
2450.4	94.9 Pk	3.6 / 28.3 / 37.7	89.1	H / 1.9 / 146.0	0.0	89.1	125.2	-36.1

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)
Axis 3 (EUT Vertical & Rotated 90 degrees)								
2450.4	100.8 Pk	3.6 / 28.3 / 37.7	95	H / 1.7 / 159.0	0.0	95.0	125.2	-30.2
2450.4	101.0 Pk	3.6 / 28.3 / 37.7	95.2	V / 2.4 / 92.0	0.0	95.2	125.2	-30.0
Fundamental - High Channel – Axis 1 (EUT Flat on Table)								
2425.4	96.3 Pk	3.5 / 28.3 / 37.7	90.5	V / 2.2 / 184.0	0.0	90.5	125.2	-34.7
2425.4	102.7 Pk	3.5 / 28.3 / 37.7	96.9	H / 1.5 / 254.0	0.0	96.9	125.2	-28.3
Axis 2 (EUT Vertical)								
2425.4	93.3 Pk	3.5 / 28.3 / 37.7	87.5	H / 1.9 / 142.0	0.0	87.5	125.2	-37.7
2425.4	96.6 Pk	3.5 / 28.3 / 37.7	90.8	V / 1.4 / 152.0	0.0	90.8	125.2	-34.4
Axis 3 (EUT Vertical & Rotated 90 degrees)								
2425.4	99.7 Pk	3.5 / 28.3 / 37.7	93.9	V / 2.4 / 96.0	0.0	93.9	125.2	-31.3
2425.4	99.8 Pk	3.5 / 28.3 / 37.7	93.9	H / 1.7 / 164.0	0.0	93.9	125.2	-31.3

Electric Field to Power Conversion - Base Product

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 20 dB bandwidth of the emission, VBW > RBW, peak detector function. Follow the procedures in C63.4-1992 with respect to maximizing the emission.

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

d is the distance in meters from which the field strength was measured.

P is the power in watts for which you are solving:

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

In this case:

E = 101.8 dBuV (from above low channel - axis 1) = 0.1230 V/m

D = 3 meters

G = 1 (unity, worst-case)

P = 0.0045 W

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

Delta = 0.0045 – 1.0 = -0.9955 W

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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)
Harmonics of the Fundamental - Worst-Case Axis 1 – FCC Restricted Bands are Highlighted in Yellow								
Harmonics - Low Channel								
4850.81	57.1 Pk	5.2 / 33.3 / 39.2	56.4	H / 1.3 / 140.0	25.7	30.7	54.0	-23.3
4850.81	51.1 Pk	5.2 / 33.3 / 39.2	50.4	V / 1.6 / 218.0	25.7	24.7	54.0	-29.3
7276.21	45.5 Pk	6.4 / 36.3 / 39.6	48.6	H / 1.5 / 212.0	25.7	22.9	54.0	-31.1
7276.21	46.0 Pk	6.4 / 36.3 / 39.6	49.1	V / 1.6 / 218.0	25.7	23.4	54.0	-30.6
9701.6	46.1 Pk	7.6 / 37.7 / 47.9	43.6	V / 1.7 / 1.4	25.7	17.9	81.8	-63.9
9701.63	39.1 Pk	7.6 / 37.7 / 47.9	36.5	H / 1.4 / 164.0	25.7	10.8	81.8	-71.0
12127	46.0 Pk	8.8 / 40.1 / 45.4	49.4	V / 1.3 / 156.0	25.7	23.7	54.0	-30.3
12127	32.5 Pk	8.8 / 40.1 / 45.4	35.9	H / 1.4 / 164.0	25.7	10.2	54.0	-43.8
14552.4	31.1 Pk	9.5 / 49.2 / 47.5	42.3	V / 1.3 / 156.0	25.7	16.6	81.8	-65.2
14552.4	31.4 Pk	9.5 / 49.2 / 47.5	42.6	H / 1.4 / 212.0	25.7	16.9	81.8	-64.9
16977.8	48.8 Pk	10.5 / 41.5 / 47.2	53.7	V / 1.3 / 156.0	25.7	28.0	81.8	-53.8
16977.8	27.6 Pk	10.5 / 41.5 / 47.2	32.5	H / 1.3 / 192.0	25.7	6.8	81.8	-75.0
19400	35.2 Pk	0.0 / 22.2 / 0.0	57.4	V / 1.0 / 0.0	25.7	31.7	54.0	-22.3
21825.1	36.4 Pk	0.0 / 21.4 / 0.0	57.8	V / 1.0 / 0.0	25.7	32.1	81.8	-49.7
24250	35.9 Pk	0.0 / 21.4 / 0.0	57.3	V / 1.0 / 0.0	25.7	31.6	81.8	-50.2
Harmonics - Mid Channel								
4900.81	49.1 Pk	5.2 / 33.4 / 39.2	48.6	V / 1.8 / 210.0	25.7	22.9	54.0	-31.1
4900.81	59.3 Pk	5.2 / 33.4 / 39.2	58.7	H / 1.4 / 138.0	25.7	33.0	54.0	-21.0
7351.24	47.4 Pk	6.5 / 36.4 / 39.4	50.8	V / 1.6 / 224.0	25.7	25.1	54.0	-28.9
7351.24	47.6 Pk	6.5 / 36.4 / 39.4	51	H / 1.5 / 182.0	25.7	25.3	54.0	-28.7
9801.65	39.9 Pk	7.7 / 37.8 / 48.0	37.3	H / 1.5 / 176.0	25.7	11.6	80.6	-69.0
9801.65	41.6 Pk	7.7 / 37.8 / 48.0	39.1	V / 1.3 / 210.0	25.7	13.4	80.6	-67.2
12252	32.0 Pk	8.8 / 41.0 / 45.2	36.6	H / 1.4 / 210.0	25.7	10.9	54.0	-43.1
12252	30.6 Pk	8.8 / 41.0 / 45.2	35.1	V / 1.4 / 216.0	25.7	9.4	54.0	-44.6
14702.4	33.0 Pk	9.5 / 46.7 / 47.4	41.8	H / 1.4 / 198.0	25.7	16.1	80.6	-64.5
14702.4	31.4 Pk	9.5 / 46.7 / 47.4	40.1	V / 1.3 / 154.0	25.7	14.4	80.6	-66.2
17152.8	34.8 Pk	10.6 / 43.2 / 46.6	42.1	H / 1.3 / 168.0	25.7	16.4	80.6	-64.2
17152.8	33.9 Pk	10.6 / 43.2 / 46.6	41.2	V / 1.3 / 154.0	25.7	15.5	80.6	-65.1
19600	35.0 Pk	0.0 / 22.0 / 0.0	57	V / 1.0 / 0.0	25.7	31.3	54.0	-22.7
22050	36.7 Pk	0.0 / 21.3 / 0.0	58	V / 1.0 / 0.0	25.7	32.3	54.0	-21.7
24500	36.1 Pk	0.0 / 21.7 / 0.0	57.8	V / 1.0 / 0.0	25.7	32.1	80.6	-48.5

Harmonics - High Channel								
4950.82	57.7 Pk	5.2 / 33.5 / 39.1	57.3	H / 1.4 / 138.0	25.7	31.6	54.0	-22.4
4950.82	48.9 Pk	5.2 / 33.5 / 39.1	48.4	V / 1.7 / 208.0	25.7	22.7	54.0	-31.3
7426.22	45.9 Pk	6.5 / 36.4 / 39.4	49.4	H / 1.4 / 188.0	25.7	23.7	54.0	-30.3
7426.24	47.5 Pk	6.5 / 36.4 / 39.4	51	V / 1.6 / 236.0	25.7	25.3	54.0	-28.7
9901.6	39.5 Pk	7.7 / 37.8 / 48.1	36.9	V / 1.3 / 198.0	25.7	11.2	76.9	-65.7
9901.6	37.8 Pk	7.7 / 37.8 / 48.1	35.2	H / 1.4 / 198.0	25.7	9.5	76.9	-67.4
12377	25.2 Pk	8.9 / 41.9 / 45.0	31.1	V / 1.3 / 168.0	25.7	5.4	54.0	-48.6
12377	24.2 Pk	8.9 / 41.9 / 45.0	30.1	H / 1.4 / 204.0	25.7	4.4	54.0	-49.6
14852.4	30.2 Pk	9.6 / 45.0 / 47.4	37.4	V / 1.3 / 168.0	25.7	11.7	76.9	-65.2
14852.4	31.2 Pk	9.6 / 45.0 / 47.4	38.4	H / 1.4 / 204.0	25.7	12.7	76.9	-64.2
17327.8	36.7 Pk	10.7 / 44.7 / 45.9	46.1	V / 1.3 / 170.0	25.7	20.4	76.9	-56.5
17327.8	35.5 Pk	10.7 / 44.7 / 45.9	45	H / 1.3 / 204.0	25.7	19.3	76.9	-57.6
19800	35.2 Pk	0.0 / 21.8 / 0.0	57	V / 1.0 / 0.0	25.7	31.3	54.0	-22.7
22275	36.3 Pk	0.0 / 21.1 / 0.0	57.4	V / 1.0 / 0.0	25.7	31.7	54.0	-22.3
24750	35.9 Pk	0.0 / 21.6 / 0.0	57.5	V / 1.0 / 0.0	25.7	31.8	76.9	-45.1

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
(dBμV)		(dB)		(dBμV/m)		(dBμV/m)		(dBμV/m)		(dBμV/m)		
24.0		14.9		38.9		10.0		28.9		40.0		-11.1

Notes:

1. All above measurements are peak detector measurements
2. Worst-Case Harmonic Duty-Cycle Corrected Measurement – Mid Channel @ 4900.81 MHz, 33.0 dBuV/m (21.0 dB below Limit). This signal was within the FCC Restricted Band, where the limit is 54dBuV/m.
3. Worst-Case Harmonic outside the FCC Restricted Band – High Channel @ 24750MHz, 31.8 dBuV/m (- 45.1 dBc). The limit is -20 dBc

Deviations, Additions, or Exclusions: None

5.6 Test Data – Remote Product:

Fundamental and Spurious of the Transmitter

Test Report #:	100320162	Test Area:	CC1 Radiated (3m)	Temperature:	21.2 °C
Test Method:	FCC 15.247	Test Date:	07-Feb-2011	Relative Humidity:	25.8 %
EUT Model #:	Magic Closer - Remote	EUT Power:	3 VDC Battery	Air Pressure:	81.2 kPa
EUT Serial #:	28				

Manufacturer:	JCV Enterprises	Level Key	
EUT Description:	Garage Door Closer	Pk – Peak	Nb – Narrow Band
Notes:	Testing Remote Product – Product transmitting full power CW	Qp – QuasiPeak	Bb – Broad Band
	Note: Product configured specifically for this test – not normal operation	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)
The following Duty Cycle was determined from actual measurements by Intertek:								
3.2%								
Averaging method for pulsed signals and calculation in accordance to FCC CFR47 Part 15.35 utilized to calculate field strength emissions.								
The testing performed in accordance to FCC CFR47 Part 15.205 (restricted bands of operation) and 15.247 emissions and delta limits were calculated as follows:								
Final Corrected Peak Measurement – Duty Cycle Correction Factor* = Final Calculated Emission								
The Final Calculated Emission was then compared to the Limits in CFR47 Part 15.209 and 15.247 and the emission/limit delta was calculated. the DTCF is calculated as follows $20 \cdot \log_{10}(\text{duty cycle in } 100\text{ms})$.								
Part 15.247 and 15.205 Respectively								
Fundamental Measurements								
Fundamental - Low Channel – Axis 1 (EUT Flat on Table)								
2425.37	105.3 Pk	3.5 / 28.3 / 37.7	99.5	H / 1.7 / 124.0	0.0	99.5	125.2	-25.7
2425.37	100.5 Pk	3.5 / 28.3 / 37.7	94.7	V / 2.1 / 204.0	0.0	94.7	125.2	-30.5
Axis 2 (EUT Vertical)								
2425.37	97.3 Pk	3.5 / 28.3 / 37.7	91.5	V / 2.1 / 144.0	0.0	91.5	125.2	-33.7
2425.37	92.8 Pk	3.5 / 28.3 / 37.7	86.9	H / 1.7 / 148.0	0.0	86.9	125.2	-38.3
Axis 3 (EUT Vertical & Rotated 90 degrees)								
2425.37	100.3 Pk	3.5 / 28.3 / 37.7	94.5	H / 1.5 / 145.0	0.0	94.5	125.2	-30.7
2425.37	100.1 Pk	3.5 / 28.3 / 37.7	94.3	V / 1.9 / 98.0	0.0	94.3	125.2	-30.9
Fundamental - Mid Channel – Axis 1 (EUT Flat on Table)								
2450.4	101.1 Pk	3.6 / 28.3 / 37.7	95.3	V / 2.0 / 210.0	0.0	95.3	125.2	-29.9
2450.4	105.8 Pk	3.6 / 28.3 / 37.7	100	H / 1.7 / 125.0	0.0	100.0	125.2	-25.2
Axis 2 (EUT Vertical)								
2450.4	96.6 Pk	3.6 / 28.3 / 37.7	90.8	H / 1.7 / 212.0	0.0	90.8	125.2	-34.4
2450.4	98.7 Pk	3.6 / 28.3 / 37.7	92.8	V / 2.3 / 210.0	0.0	92.8	125.2	-32.4

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)
Axis 3 (EUT Vertical & Rotated 90 degrees)								
2450.4	100.0 Pk	3.6 / 28.3 / 37.7	94.2	V / 1.9 / 98.0	0.0	94.2	125.2	-31.0
2450.4	100.4 Pk	3.6 / 28.3 / 37.7	94.6	H / 1.5 / 142.0	0.0	94.6	125.2	-30.6
Fundamental - High Channel – Axis 1 (EUT Flat on Table)								
2475.4	106.0 Pk	3.6 / 28.4 / 37.7	100.3	H / 1.7 / 120.0	0.0	100.3	125.2	-24.9
2475.4	101.8 Pk	3.6 / 28.4 / 37.7	96	V / 1.9 / 212.0	0.0	96.0	125.2	-29.2
Axis 2 (EUT Vertical)								
2475.4	100.3 Pk	3.6 / 28.4 / 37.7	94.6	V / 2.3 / 210.0	0.0	94.6	125.2	-30.6
2475.4	96.3 Pk	3.6 / 28.4 / 37.7	90.6	H / 1.7 / 217.0	0.0	90.6	125.2	-34.6
Axis 3 (EUT Vertical & Rotated 90 degrees)								
2475.4	102.0 Pk	3.6 / 28.4 / 37.7	96.3	H / 1.4 / 144.0	0.0	96.3	125.2	-28.9
2475.4	99.8 Pk	3.6 / 28.4 / 37.7	94.1	V / 1.9 / 92.0	0.0	94.1	125.2	-31.1

Electric Field to Power Conversion - Remote Product

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 ≥ the 20 dB bandwidth of the emission, VBW > RBW, peak detector function. Follow the procedures in C63.4-1992 with respect to maximizing the emission.

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

d is the distance in meters from which the field strength was measured.

P is the power in watts for which you are solving:

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

In this case:

E = 100.3 dB/uV (from above high channel - axis 1) = 0.1035 V/m

D = 3 meters

G = 1 (unity, worst-case)

P = 0.0032 W

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

Delta = 0.0032 – 1.0 = -0.9968 W

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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)
Harmonics of the Fundamental - Worst-Case Axis 1 - FCC Restricted Bands are Highlighted in Yellow								
Harmonics - Low Channel								
4850.8	51.0 Pk	5.2 / 33.3 / 39.2	50.3	V / 2.0 / 208.0	29.9	20.4	54.0	-33.6
4850.8	59.2 Pk	5.2 / 33.3 / 39.2	58.5	H / 1.4 / 136.0	29.9	28.6	54.0	-25.4
7276.2	45.6 Pk	6.4 / 36.3 / 39.6	48.8	V / 1.7 / 220.0	29.9	18.9	54.0	-35.1
7276.2	47.2 Pk	6.4 / 36.3 / 39.6	50.3	H / 1.6 / 192.0	29.9	20.4	54.0	-33.6
9701.57	36.6 Pk	7.6 / 37.7 / 47.9	34	H / 1.5 / 212.0	29.9	4.1	79.5	-75.4
9701.57	38.6 Pk	7.6 / 37.7 / 47.9	36	V / 1.4 / 204.0	29.9	6.1	79.5	-73.4
12127	29.2 Pk	8.8 / 40.1 / 45.4	32.7	H / 1.4 / 210.0	29.9	2.8	54.0	-51.2
12127	32.1 Pk	8.8 / 40.1 / 45.4	35.6	V / 1.3 / 194.0	29.9	5.7	54.0	-48.3
14552.4	32.1 Pk	9.5 / 49.2 / 47.5	43.3	H / 1.4 / 210.0	29.9	13.4	79.5	-66.1
14552.4	31.9 Pk	9.5 / 49.2 / 47.5	43.1	V / 1.3 / 190.0	29.9	13.2	79.5	-66.3
16977.8	32.5 Pk	10.5 / 41.5 / 47.2	37.5	H / 1.3 / 188.0	29.9	7.6	79.5	-71.9
16977.8	32.4 Pk	10.5 / 41.5 / 47.2	37.3	V / 1.3 / 190.0	29.9	7.4	79.5	-72.1
19398	35.6 Pk	0.0 / 22.2 / 0.0	57.8	V / 1.0 / 0.0	29.9	27.9	54.0	-26.1
21824	35.8 Pk	0.0 / 21.4 / 0.0	57.2	V / 1.0 / 0.0	29.9	27.3	79.5	-52.2
24249	35.1 Pk	0.0 / 21.4 / 0.0	56.6	V / 1.0 / 0.0	29.9	26.7	79.5	-52.8
Harmonics - Mid Channel								
4900.8	60.5 Pk	5.2 / 33.4 / 39.2	60	H / 1.3 / 140.0	29.9	30.1	54.0	-23.9
4900.8	48.0 Pk	5.2 / 33.4 / 39.2	47.5	V / 1.9 / 204.0	29.9	17.6	54.0	-36.4
7351.2	46.1 Pk	6.5 / 36.4 / 39.4	49.6	H / 1.6 / 188.0	29.9	19.7	54.0	-34.3
7351.2	45.5 Pk	6.5 / 36.4 / 39.4	49	V / 1.6 / 228.0	29.9	19.1	54.0	-34.9
9801.61	40.4 Pk	7.7 / 37.8 / 48.0	37.8	V / 1.5 / 184.0	29.9	7.9	80.0	-72.1
9801.61	42.1 Pk	7.7 / 37.8 / 48.0	39.6	H / 1.4 / 216.0	29.9	9.7	80.0	-70.3
12252	32.3 Pk	8.8 / 41.0 / 45.2	36.9	V / 1.4 / 202.0	29.9	7.0	54.0	-47.0
12252	31.4 Pk	8.8 / 41.0 / 45.2	36	H / 1.3 / 212.0	29.9	6.1	54.0	-47.9
14702.4	32.4 Pk	9.5 / 46.7 / 47.4	41.2	V / 1.4 / 202.0	29.9	11.3	80.0	-68.7
14702.4	33.2 Pk	9.5 / 46.7 / 47.4	42	H / 1.3 / 212.0	29.9	12.1	80.0	-67.9
17152.8	33.0 Pk	10.6 / 43.2 / 46.6	40.3	V / 1.3 / 198.0	29.9	10.4	80.0	-69.6
17152.8	34.0 Pk	10.6 / 43.2 / 46.6	41.3	H / 1.3 / 204.0	29.9	11.4	80.0	-68.6
19598	36.1 Pk	0.0 / 22.0 / 0.0	58.1	V / 1.0 / 0.0	29.9	28.2	54.0	-25.8
22050	36.7 Pk	0.0 / 21.3 / 0.0	58.1	V / 1.0 / 0.0	29.9	28.2	54.0	-25.8
24499	35.6 Pk	0.0 / 21.7 / 0.0	57.3	V / 1.0 / 0.0	29.9	27.4	80.0	-52.6

Harmonics - High Channel								
4950.8	51.7 Pk	5.2 / 33.5 / 39.1	51.3	V / 2.0 / 208.0	29.9	21.4	54.0	-32.6
4950.8	61.5 Pk	5.2 / 33.5 / 39.1	61.1	H / 1.4 / 143.0	29.9	31.2	54.0	-22.8
7426.2	44.9 Pk	6.5 / 36.4 / 39.4	48.4	V / 1.6 / 220.0	29.9	18.5	54.0	-35.5
7426.2	47.8 Pk	6.5 / 36.4 / 39.4	51.3	H / 1.6 / 179.0	29.9	21.4	54.0	-32.6
9901.6	39.4 Pk	7.7 / 37.8 / 48.1	36.8	H / 1.5 / 201.0	29.9	6.9	80.3	-73.4
9901.6	32.4 Pk	7.7 / 37.8 / 48.1	29.8	V / 1.6 / 211.0	29.9	-0.1	80.3	-80.4
12377	30.4 Pk	8.9 / 41.9 / 45.0	36.2	H / 1.4 / 187.0	29.9	6.3	54.0	-47.7
12377	27.6 Pk	8.9 / 41.9 / 45.0	33.4	V / 1.4 / 168.0	29.9	3.5	54.0	-50.5
14852.4	33.5 Pk	9.6 / 45.0 / 47.4	40.7	H / 1.4 / 187.0	29.9	10.8	80.3	-69.5
14852.4	33.0 Pk	9.6 / 45.0 / 47.4	40.2	V / 1.3 / 212.0	29.9	10.3	80.3	-70.0
17327.8	37.3 Pk	10.7 / 44.7 / 45.9	46.7	H / 1.3 / 196.0	29.9	16.8	80.3	-63.5
17327.8	35.8 Pk	10.7 / 44.7 / 45.9	45.2	V / 1.3 / 210.0	29.9	15.3	80.3	-65.0
19799.1	35.8 Pk	0.0 / 21.8 / 0.0	57.6	V / 1.0 / 0.0	29.9	27.7	54.0	-26.3
22274.2	37.0 Pk	0.0 / 21.1 / 0.0	58.1	V / 1.0 / 0.0	29.9	28.2	54.0	-25.8
24749.8	35.9 Pk	0.0 / 21.7 / 0.0	57.5	V / 1.0 / 0.0	29.9	27.6	80.3	-52.7

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
(dBμV)		(dB)		(dBμV/m)		(dBμV/m)		(dBμV/m)		(dBμV/m)		
24.0		14.9		38.9		10.0		28.9		40.0		-11.1

Notes:

1. All above measurements are peak detector measurements.
2. Worst-Case Harmonic Duty-Cycle Corrected Measurement – High Channel @ 4950.80 MHz, 31.2 dBuV/m (22.8 dB below Limit). This signal was within the FCC Restricted Band, where the limit is 54dBuV/m.
3. Worst-Case Harmonic outside the FCC Restricted Band – Low Channel @ 21824MHz, 27.3 dBuV/m (- 52.2 dBc). The limit is -20 dBc

Deviations, Additions, or Exclusions: None

Conversion of Output Power of the Fundamental Limit to 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 power (Watts) limit into 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

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

6 Radiated Emissions – Unintentional and Spurious

6.1 Method

Unless otherwise stated no deviations were made from ANSI C63.10 and FCC publication KDB 558074 for DTS devices.

Intertek Louisville's emissions testing facility is located at 1795 Dogwood Street, Suite 200, Louisville, CO 80027. The emissions testing facility is ISO17025:2005 accredited.

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	12/06/2010	12/06/2011
18880	Q.P Adapter	Hewlett-Packard	85650A	2811A01300	12/06/2010	12/06/2011
18913	Spectrum Analyzer	Hewlett-Packard	E7405A	My44211889	05/07/2010	05/07/2011
18912	9 kHz- 1.3GHz Pre Amp	Hewlett-Packard	8447F	3113A05545	06/04/2010	06/04/2011
18906	Pre-Amplifier (1-4 GHz)	Mini-Circuits Lab	ZHL-42	N052792-2	06/11/2010	06/11/2011
18900	RF Pre-Amplifier (4-8 GHz)	Avantek	AFT97-8434-10F	1007	06/07/2010	06/07/2011
18901	RF Pre-Amplifier (8-18 GHz)	Avantek	AWT-18037	1002	06/07/2010	06/07/2011
18897	Magnetic loop antenna 10kHz-30MHz	EMCO	6502	9205-2738	11/18/2010	11/18/2011
19936	Bilog Antenna 30 MHz - 6GHz	Sunol Sciences	JB6	A050707-1	10/11/2010	10/11/2011
18886	Ridged Guide Antenna 1-18GHz	TENSOR	4105	2020	10/08/2010	10/08/2011
18805	HF Antenna/Harmonic Mixer 18 GHz to 26.5 GHz	Hewlett-Packard	11970K	2332A01280	10/04/2010	10/04/2011

6.3 Results:

The sample tested was found to Comply.

- FCC 15.209/ 15.247(d)

6.4 Setup Photographs – Base Product and Remote Product:

Test setup – Front View



Photo:

Test setup – Rear View



Photo: Antenna Setups

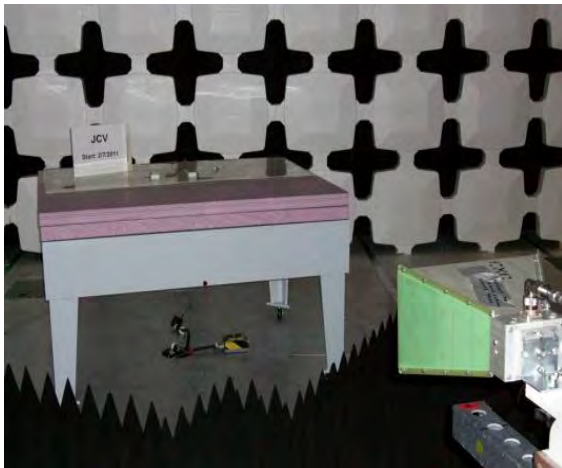
Active Loop (9kHz to 30MHz)



BiLog (30MHz to 1000MHz)

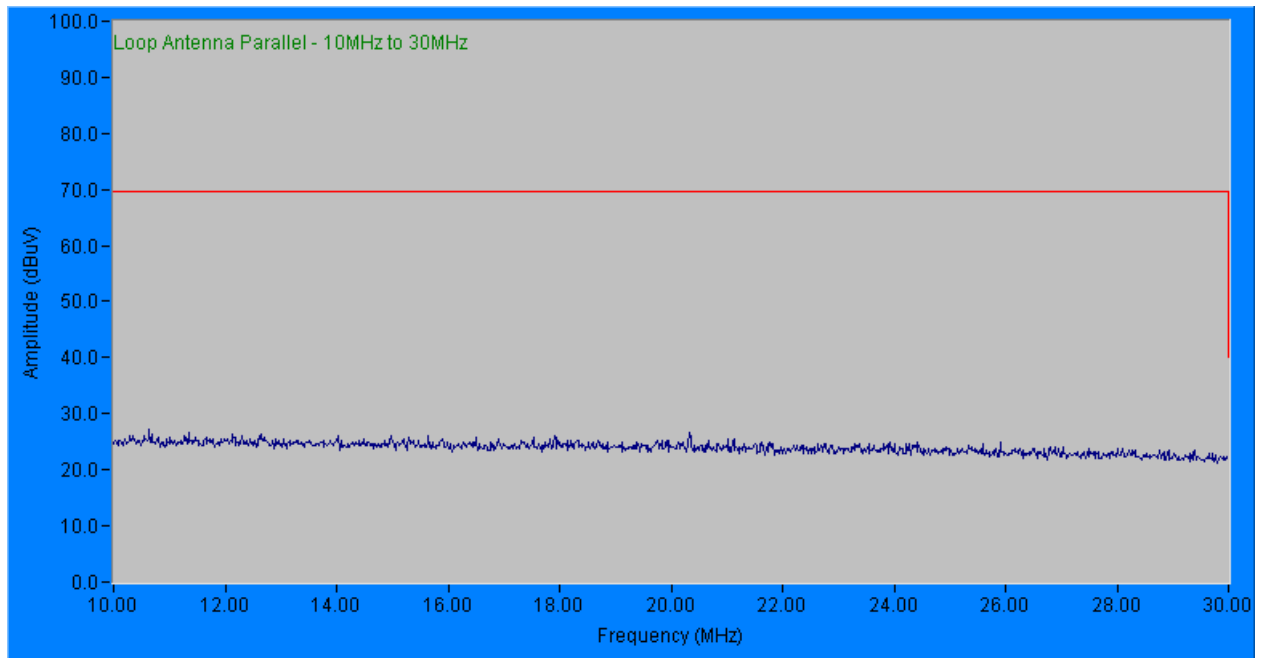


Ridged Guide Horn (1 GHz to 18GHz)

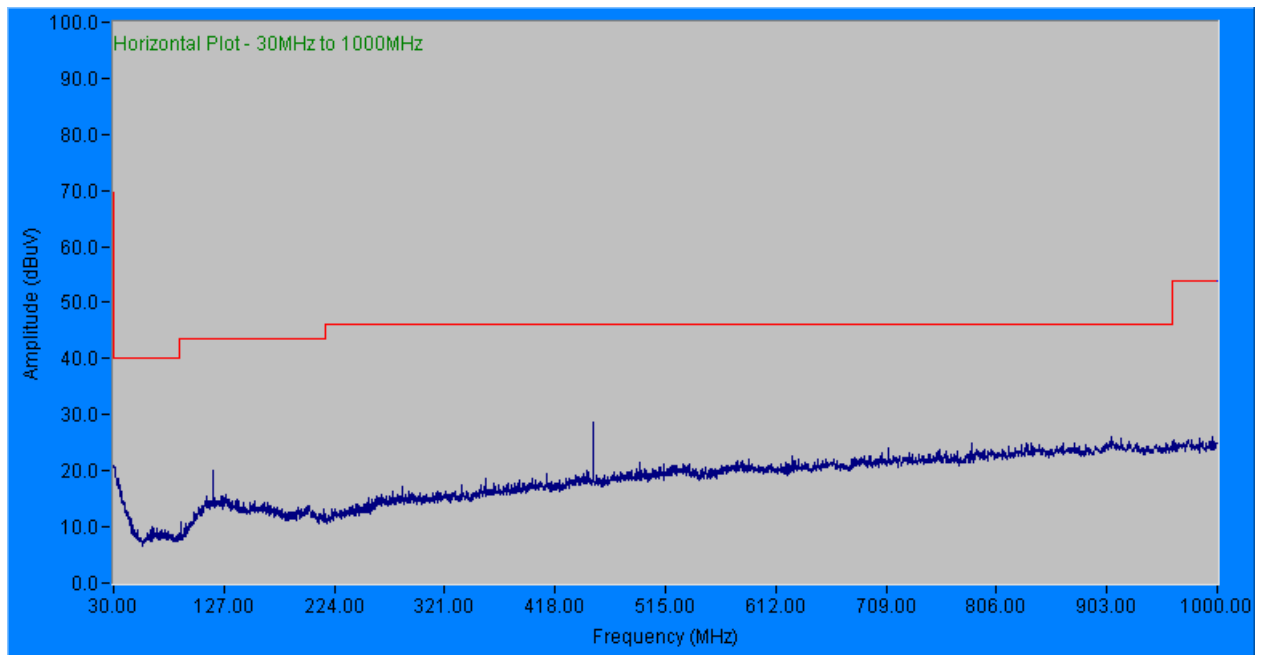
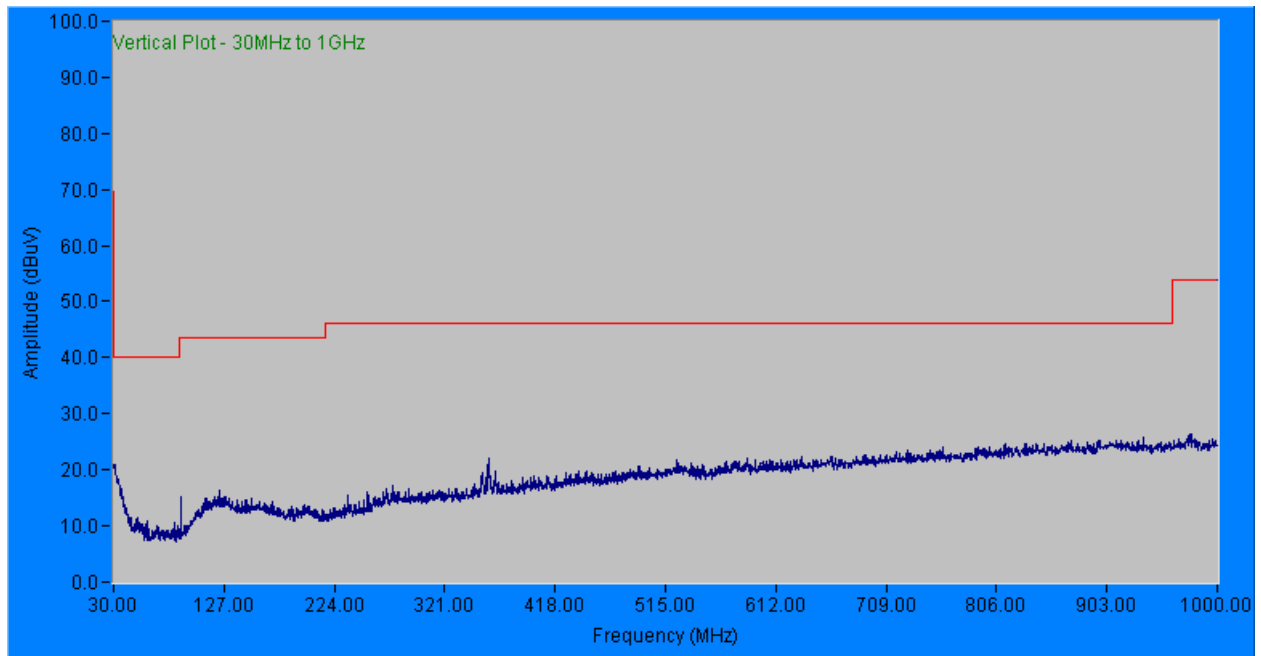


HF Harmonic Mixer (antenna/pre-amp/cables)
(18 GHz to 26.5 GHz)

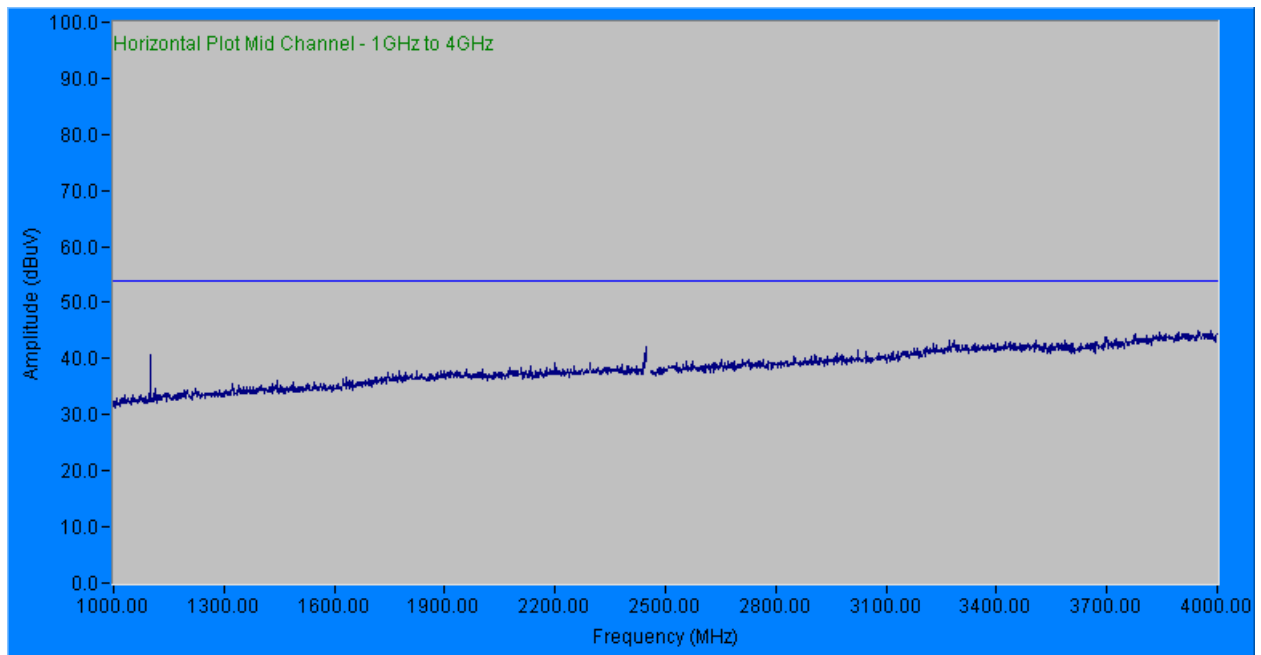
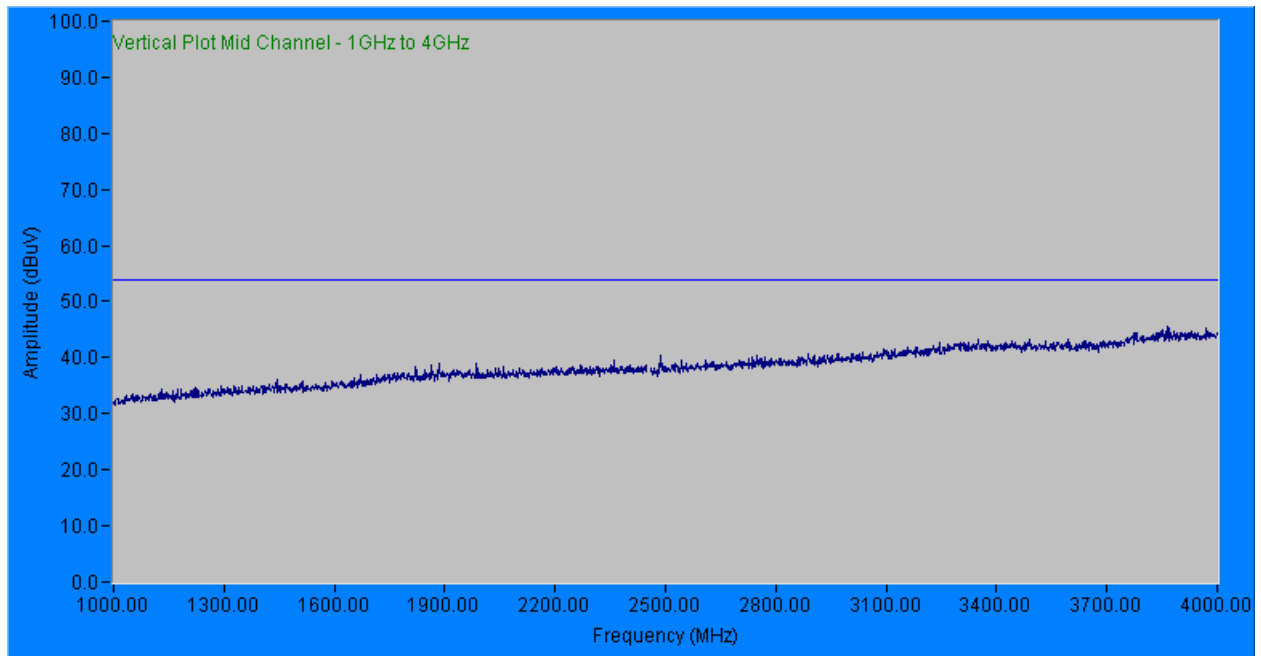


6.5 Plot Summary: PreScan Plots – Not Final Data - Reference Only

Peak Measurements plotted against QP Limit

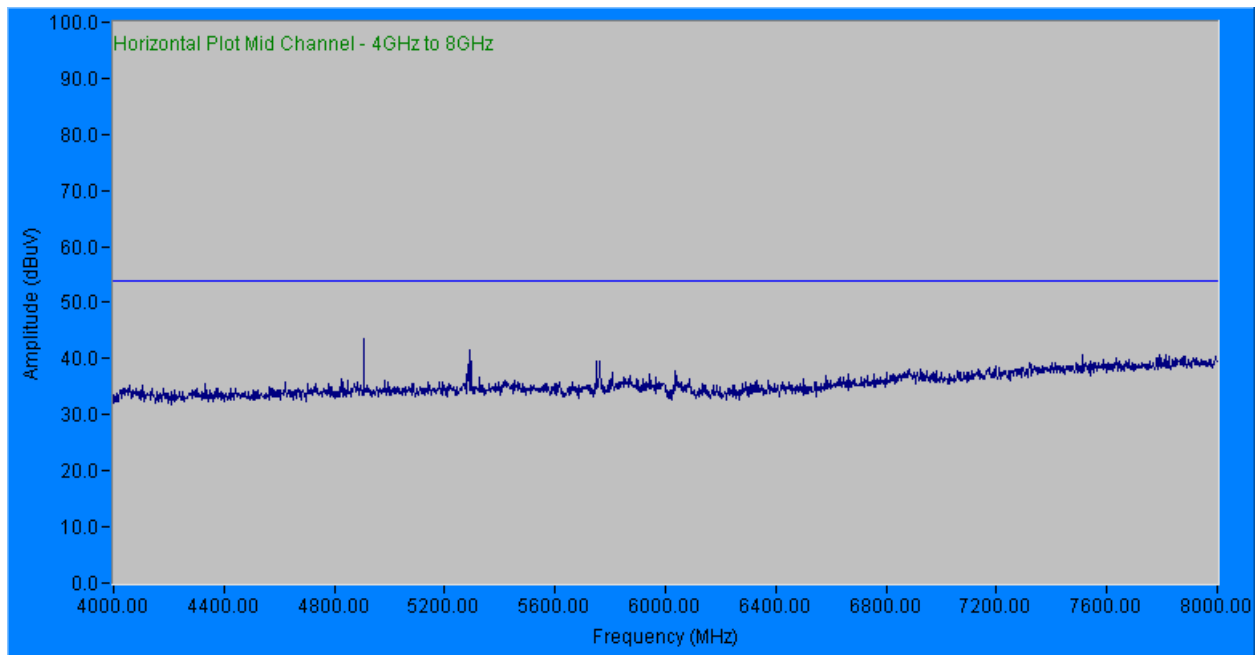
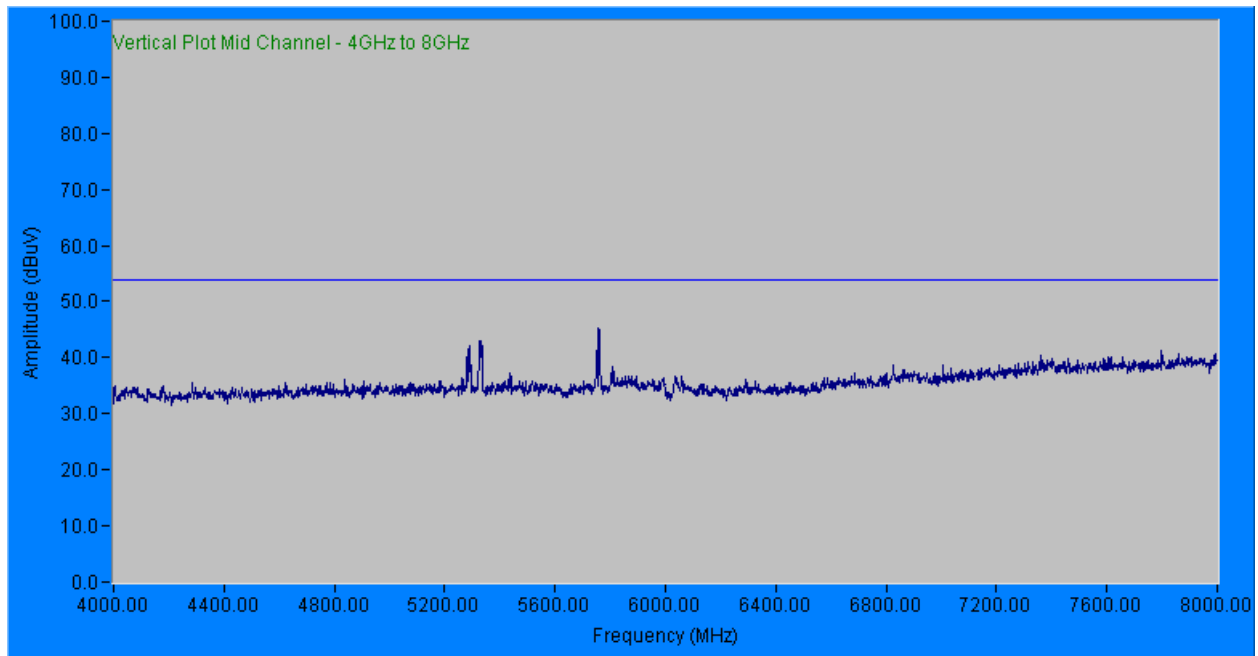
Plot – PreScan Plots – Not Final Data - Reference Only

Peak Measurements plotted against QP Limit

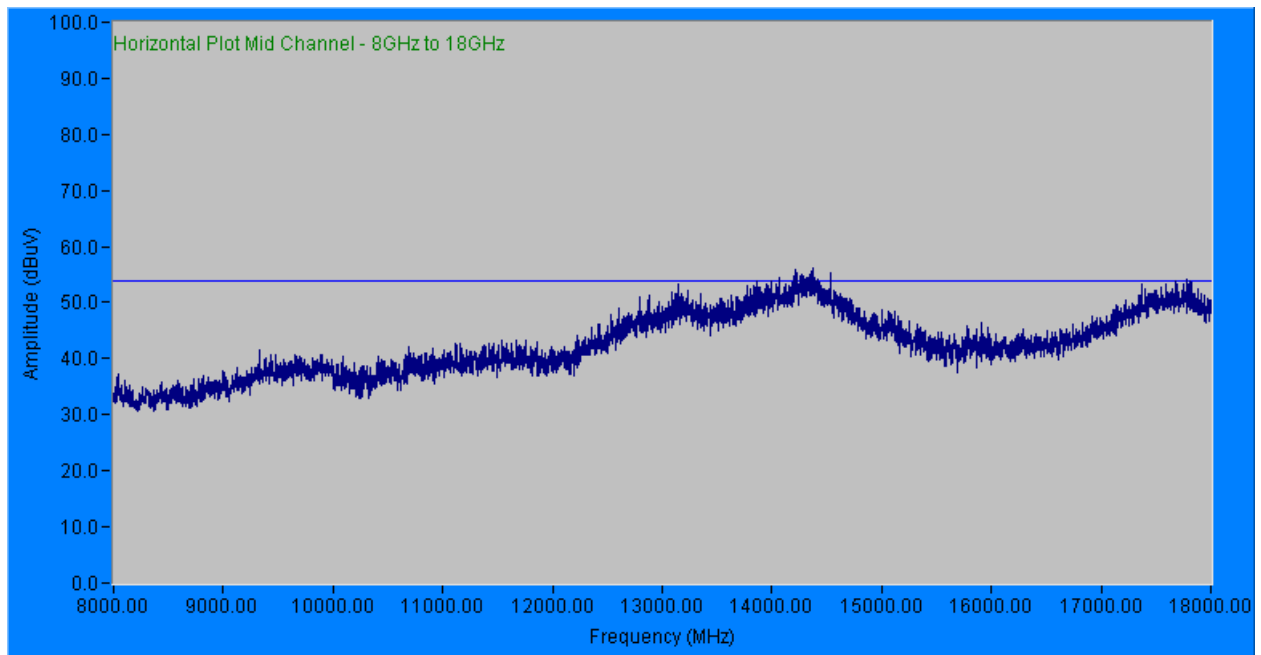
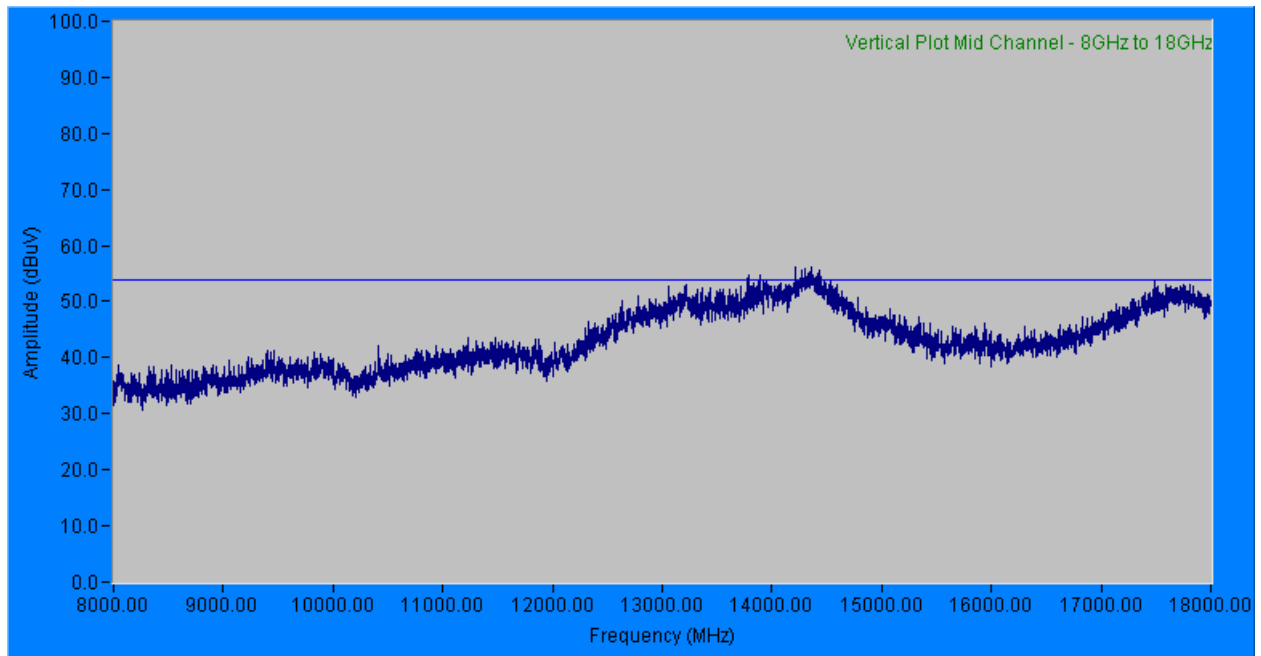
Plot: PreScan Plots – Not Final Data - Reference Only

Peak Measurements plotted against Average Limit

Plot: PreScan Plots – Not Final Data - Reference Only

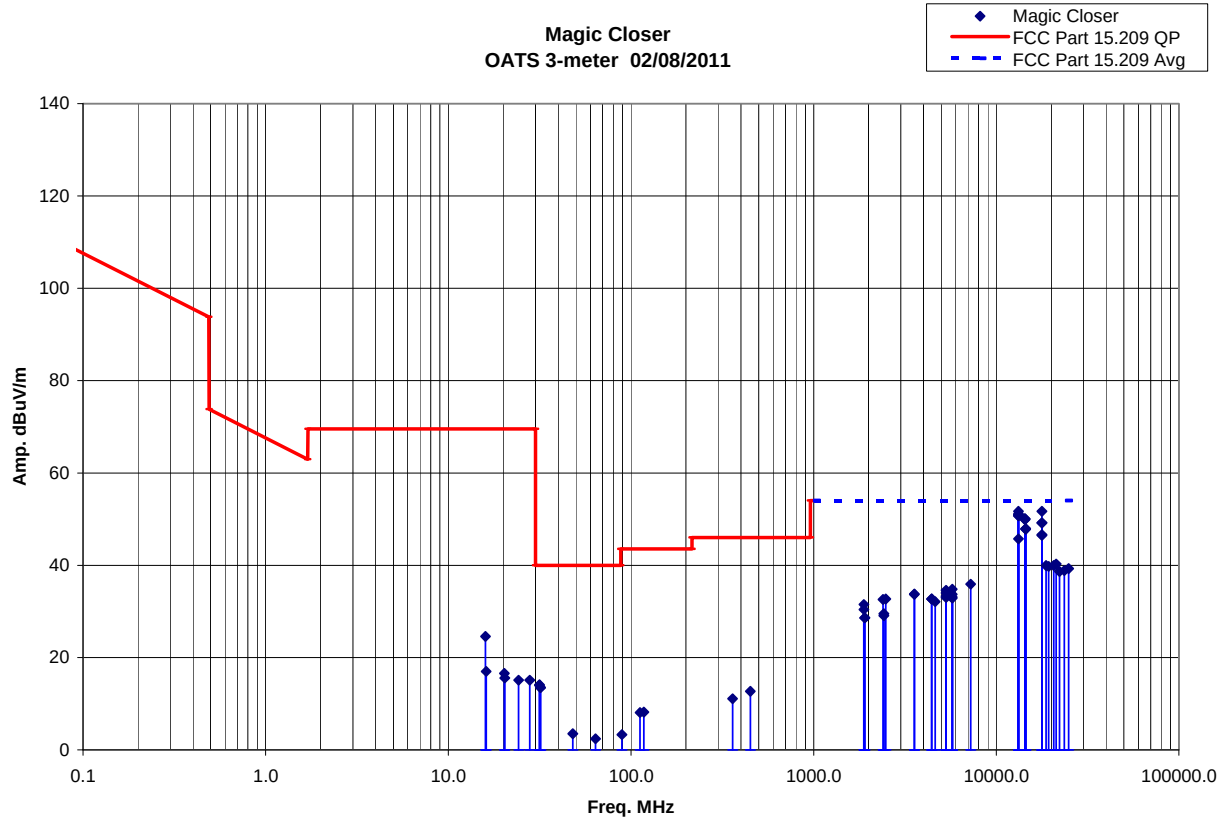


Peak Measurements plotted against Average Limit

Plot: PreScan Plots – Not Final Data - Reference Only

Peak Measurements plotted against Average Limit

6.6 Plot Summary – Final Plot 16 MHz to 25 GHz



6.7 Test Data – Base Product and Remote Product

Radiated Electromagnetic Emissions - Unintentional

Test Report #:	Unintentional Run 1	Test Area:	CC1 Radiated	Temperature:	22.3	°C
Test Method:	FCC Part 15.209	Test Date:	08-Feb-2011	Relative Humidity:	34.8	%
EUT Model #:	Magic Closer	EUT Power:	3VDC Battery/ 12VDC Adapter	Air Pressure:	80.8	kPa
EUT Serial #:	28 & 29					

Manufacturer:	JCV Enterprises	Level Key	
EUT Description:	Garage Door Closer	Pk – Peak	Nb – Narrow Band
Notes:	Products tested include: Base & Remote	Qp – QuasiPeak	Bb – Broad Band
	Both products tested simultaneously on table	Av - Average	

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB) (dB/m) (dB)	(dBuV)	(m) (DEG)	15.209 <1GHz	15.209 >1GHz
Loop Antenna Parallel - 16MHz to 30MHz						
16.10	6.2 Qp	0.3 / 10.6 / 0.0	17.0	H / 1.0 / 186.0	-52.5	N/A
20.28	6.0 Qp	0.3 / 10.4 / 0.0	16.6	H / 1.0 / 212.0	-52.9	N/A
27.94	6.0 Qp	0.4 / 8.7 / 0.0	15.1	H / 1.0 / 212.0	-54.4	N/A
Loop Antenna Perpendicular – 16MHz to 30MHz						
16.00	13.7 Qp	0.3 / 10.6 / 0.0	24.6	V / 1.0 / 212.0	-44.9	N/A
20.38	5.0 Qp	0.3 / 10.4 / 0.0	15.6	V / 1.0 / 210.0	-53.9	N/A
24.29	5.0 Qp	0.4 / 9.7 / 0.0	15.1	V / 1.0 / 210.0	-54.4	N/A
Bilog Vertical 30MHz to 1000MHz						
31.50	21.9 Qp	0.4 / 19.9 / 28.1	14.1	V / 1.0 / 18.0	-25.9	N/A
32.00	21.7 Qp	0.4 / 19.5 / 28.1	13.5	V / 1.0 / 18.0	-26.5	N/A
48.02	21.9 Qp	0.8 / 8.9 / 28.0	3.5	V / 1.0 / 164.0	-36.5	N/A
64.04	21.8 Qp	0.8 / 7.7 / 27.9	2.4	V / 1.0 / 147.0	-37.6	N/A
89.21	22.3 Qp	0.8 / 8.0 / 27.8	3.3	V / 1.0 / 116.0	-40.2	N/A
117.53	21.7 Qp	0.8 / 13.5 / 27.7	8.2	V / 1.0 / 228.0	-35.3	N/A
360.17	22.3 Qp	1.3 / 14.9 / 27.4	11.1	V / 1.1 / 186.0	-34.9	N/A
450.47	22.2 Qp	1.5 / 17.0 / 27.9	12.7	V / 2.4 / 212.0	-33.3	N/A
Bilog Horizontal 30MHz to 1000MHz						
31.50	21.8 Qp	0.4 / 19.9 / 28.1	14.0	H / 2.2 / 36.0	-26.0	N/A
32.00	21.8 Qp	0.4 / 19.5 / 28.1	13.5	H / 2.4 / 136.0	-26.5	N/A
112.00	22.0 Qp	0.8 / 13.0 / 27.7	8.1	H / 2.1 / 12.0	-35.4	N/A
Horn Vertical 1GHz to 4GHz						
1885.18	38.2 Av	3.1 / 27.3 / 37.1	31.5	V / 1.3 / 176.0	N/A	-22.5

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Report Number: 100320162DEN-001

Issued: 02/28/2011

FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB) (dB/m) (dB)	(dBuV)	(m) (DEG)	15.209 <1GHz	15.209 >1GHz
2399.15	38.5 Av	3.5 / 28.3 / 37.6	32.6	V / 1.5 / 221.0	N/A	-21.4
Upper Band Edge Signal-Restricted Band						
2485.52	38.5 Av	3.6 / 28.4 / 37.7	32.7	V / 1.4 / 96.0	N/A	-21.3
1906.00	35.2 Av	3.1 / 27.5 / 37.2	28.6	V / 1.4 / 216.0	N/A	-25.4
2421.00	34.9 Av	3.5 / 28.3 / 37.6	29.1	V / 1.4 / 88.0	N/A	-24.9
3562.20	35.3 Av	4.4 / 31.6 / 37.6	33.7	V / 1.4 / 88.0	N/A	-20.3
Horn Horizontal 1GHz to 4GHz						
1885.18	37.1 Av	3.1 / 27.3 / 37.1	30.4	H / 1.4 / 208.0	N/A	-23.6
1906.00	35.1 Av	3.1 / 27.5 / 37.2	28.6	H / 1.4 / 222.0	N/A	-25.4
2421.00	35.4 Av	3.5 / 28.3 / 37.6	29.5	H / 1.3 / 164.0	N/A	-24.5
3562.20	35.4 Av	4.4 / 31.6 / 37.6	33.8	H / 1.3 / 36.0	N/A	-20.2
Horn Vertical 4GHz to 8GHz						
4426.00	34.4 Av	4.9 / 32.4 / 39.0	32.7	V / 1.5 / 68.0	N/A	-21.3
5313.39	33.5 Av	5.4 / 34.2 / 39.1	34.0	V / 1.4 / 232.0	N/A	-20.0
5745.45	32.9 Av	5.6 / 34.1 / 39.0	33.7	V / 1.4 / 74.0	N/A	-20.3
4626.64	33.6 Av	5.1 / 32.5 / 39.1	32.1	V / 1.4 / 74.0	N/A	-21.9
5314.27	32.4 Av	5.4 / 34.2 / 39.1	33.0	V / 1.3 / 147.0	N/A	-21.0
5745.45	32.4 Av	5.6 / 34.1 / 39.0	33.1	V / 1.3 / 136.0	N/A	-20.9
Horn Horizontal 4GHz to 8GHz						
5313.39	34.0 Av	5.4 / 34.2 / 39.1	34.6	H / 1.4 / 65.0	N/A	-19.4
5745.45	34.0 Av	5.6 / 34.1 / 39.0	34.8	H / 1.5 / 134.0	N/A	-19.2
7248.10	33.0 Av	6.4 / 36.2 / 39.6	35.9	H / 1.5 / 112.0	N/A	-18.1
4426.00	34.4 Av	4.9 / 32.4 / 39.0	32.7	H / 1.5 / 216.0	N/A	-21.3
5745.45	32.1 Av	5.6 / 34.1 / 39.0	32.9	H / 1.3 / 136.0	N/A	-21.1
5313.39	32.7 Av	5.4 / 34.2 / 39.1	33.3	H / 1.3 / 33.0	N/A	-20.7
Horn Vertical 8GHz to 18GHz						
13220.6	40.6 Av	9.0 / 47.4 / 45.9	51.0	V / 1.2 / 31.0	N/A	-3.0
14494.9	35.5 Av	9.4 / 50.5 / 47.5	47.9	V / 1.2 / 31.0	N/A	-6.1
17773.6	35.2 Av	10.9 / 45.9 / 45.4	46.5	V / 1.2 / 31.0	N/A	-7.5
13220.7	40.5 Av	9.0 / 47.4 / 45.9	50.8	V / 1.3 / 12.0	N/A	-3.2
14375.2	36.0 Av	9.4 / 52.3 / 47.6	50.1	V / 1.3 / 12.0	N/A	-3.9
17766.5	37.9 Av	10.9 / 45.9 / 45.4	49.2	V / 1.1 / 46.0	N/A	-4.8
13219.6	41.2 Av	9.0 / 47.4 / 45.9	51.7	V / 1.2 / 14.0	N/A	-2.3
14494.9	35.5 Av	9.4 / 50.5 / 47.5	47.8	V / 1.2 / 17.0	N/A	-6.2
17766.9	40.4 Av	10.9 / 45.9 / 45.4	51.7	V / 1.2 / 43.0	N/A	-2.3
Horn Horizontal 8GHz to 18GHz						
13219.6	40.2 Av	9.0 / 47.4 / 45.9	50.7	H / 1.2 / 17.0	N/A	-3.3
14375.2	35.9 Av	9.4 / 52.3 / 47.6	49.9	H / 1.2 / 17.0	N/A	-4.1
14375.2	35.9 Av	9.4 / 52.3 / 47.6	50.0	H / 1.2 / 16.0	N/A	-4.0
13220.6	35.3 Av	9.0 / 47.4 / 45.9	45.7	H / 1.2 / 16.0	N/A	-8.3

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FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.209 <1GHz	15.209 >1GHz
14494.9	35.5 Av	9.4 / 50.5 / 47.5	47.9	H / 1.2 / 16.0	N/A	-6.1
17773.6	35.2 Av	10.9 / 45.9 / 45.4	46.6	H / 1.2 / 16.0	N/A	-7.4
13220.6	40.8 Av	9.0 / 47.4 / 45.9	51.1	H / 1.2 / 32.0	N/A	-2.9
14375.2	36.0 Av	9.4 / 52.3 / 47.6	50.1	H / 1.2 / 12.0	N/A	-3.9
17766.5	37.9 Av	10.9 / 45.9 / 45.4	49.2	H / 1.2 / 62.0	N/A	-4.8
HF Horn/Mixer 18GHz to 25GHz						
18710.1	17.56 Av	0.0 / 22.4 / 0.0	39.96	V / 1.0 / 0.0	N/A	-14.0
19380.2	17.66 Av	0.0 / 22.2 / 0.0	39.76	V / 1.0 / 0.0	N/A	-14.2
20650.3	18.26 Av	0.0 / 21.7 / 0.0	39.96	V / 1.0 / 0.0	N/A	-14.0
21250.7	18.76 Av	0.0 / 21.5 / 0.0	40.26	V / 1.0 / 0.0	N/A	-13.7
22180.3	17.46 Av	0.0 / 21.2 / 0.0	38.66	V / 1.0 / 0.0	N/A	-15.3
23560.1	17.46 Av	0.0 / 21.4 / 0.0	38.86	V / 1.0 / 0.0	N/A	-15.1
24910.8	17.66 Av	0.0 / 21.6 / 0.0	39.26	V / 1.0 / 0.0	N/A	-14.7
18532.0	18.46 Av	0.0 / 22.4 / 0.0	40.86	V / 1.0 / 0.0	N/A	-13.1
19342.0	18.36 Av	0.0 / 22.2 / 0.0	40.56	V / 1.0 / 0.0	N/A	-13.4
20538.0	17.86 Av	0.0 / 21.8 / 0.0	39.66	V / 1.0 / 0.0	N/A	-14.3
21648.0	19.36 Av	0.0 / 21.4 / 0.0	40.76	V / 1.0 / 0.0	N/A	-13.2
22749.0	18.16 Av	0.0 / 21.1 / 0.0	39.26	V / 1.0 / 0.0	N/A	-14.7
23845.0	18.16 Av	0.0 / 21.3 / 0.0	39.46	V / 1.0 / 0.0	N/A	-14.5
24964.0	18.26 Av	0.0 / 21.6 / 0.0	39.86	V / 1.0 / 0.0	N/A	-14.1

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FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB) (dBm) (dB)	(dBuV)	(m) (DEG)	15.209 <1GHz	15.209 >1GHz
***** Measurement Summary *****						
13219.6	41.2 Av	9.0 / 47.4 / 45.9	51.7	V / 1.2 / 14.0	N/A	-2.3
17766.9	40.4 Av	10.9 / 45.9 / 45.4	51.7	H / 1.2 / 43.0	N/A	-2.3
13220.6	40.8 Av	9.0 / 47.4 / 45.9	51.1	H / 1.2 / 32.0	N/A	-2.9
14375.2	35.9 Av	9.4 / 52.3 / 47.6	50.0	H / 1.2 / 16.0	N/A	-4.0
14494.9	35.5 Av	9.4 / 50.5 / 47.5	47.9	H / 1.2 / 16.0	N/A	-6.1
17773.6	35.2 Av	10.9 / 45.9 / 45.4	46.6	H / 1.2 / 16.0	N/A	-7.4
18532.0	18.5 Av	0.0 / 22.4 / 0.0	40.9	V / 1.0 / 0.0	N/A	-13.1
21648.0	19.4 Av	0.0 / 21.4 / 0.0	40.8	V / 1.0 / 0.0	N/A	-13.2
19342.0	18.4 Av	0.0 / 22.2 / 0.0	40.6	V / 1.0 / 0.0	N/A	-13.4
21250.7	18.8 Av	0.0 / 21.5 / 0.0	40.3	V / 1.0 / 0.0	N/A	-13.7
18710.1	17.6 Av	0.0 / 22.4 / 0.0	39.9	V / 1.0 / 0.0	N/A	-14.0
20650.3	18.3 Av	0.0 / 21.7 / 0.0	39.9	V / 1.0 / 0.0	N/A	-14.0
24964.0	18.3 Av	0.0 / 21.6 / 0.0	39.8	V / 1.0 / 0.0	N/A	-14.1
19380.2	17.7 Av	0.0 / 22.2 / 0.0	39.8	V / 1.0 / 0.0	N/A	-14.2
20538.0	17.9 Av	0.0 / 21.8 / 0.0	39.7	V / 1.0 / 0.0	N/A	-14.3
23845.0	18.2 Av	0.0 / 21.3 / 0.0	39.5	V / 1.0 / 0.0	N/A	-14.5
24910.8	17.7 Av	0.0 / 21.6 / 0.0	39.3	V / 1.0 / 0.0	N/A	-14.7
22749.0	18.2 Av	0.0 / 21.1 / 0.0	39.3	V / 1.0 / 0.0	N/A	-14.7
23560.1	17.5 Av	0.0 / 21.4 / 0.0	38.9	V / 1.0 / 0.0	N/A	-15.1
22180.3	17.5 Av	0.0 / 21.2 / 0.0	38.7	V / 1.0 / 0.0	N/A	-15.3
7248.1	33.0 Av	6.4 / 36.2 / 39.6	35.9	H / 1.5 / 112.0	N/A	-18.1
5745.5	34.0 Av	5.6 / 34.1 / 39.0	34.8	H / 1.5 / 134.0	N/A	-19.2
5313.4	34.0 Av	5.4 / 34.2 / 39.1	34.6	H / 1.4 / 65.0	N/A	-19.4
3562.2	35.4 Av	4.4 / 31.6 / 37.6	33.8	H / 1.3 / 36.0	N/A	-20.2
5314.3	32.4 Av	5.4 / 34.2 / 39.1	33.0	V / 1.3 / 147.0	N/A	-21.0
2485.5	38.5 Av	3.6 / 28.4 / 37.7	32.7	V / 1.4 / 96.0	N/A	-21.3
4426.0	34.4 Av	4.9 / 32.4 / 39.0	32.7	V / 1.5 / 68.0	N/A	-21.3
2399.1	38.5 Av	3.5 / 28.3 / 37.6	32.6	V / 1.5 / 221.0	N/A	-21.4
4626.6	33.6 Av	5.1 / 32.5 / 39.1	32.1	V / 1.4 / 74.0	N/A	-21.9
1885.1	38.2 Av	3.1 / 27.3 / 37.1	31.5	V / 1.3 / 176.0	N/A	-22.5
2421.0	35.4 Av	3.5 / 28.3 / 37.6	29.5	H / 1.3 / 164.0	N/A	-24.5
1906.0	35.1 Av	3.1 / 27.5 / 37.2	28.6	H / 1.4 / 222.0	N/A	-25.4
31.50	21.9 Qp	0.4 / 19.9 / 28.1	14.1	V / 1.0 / 18.0	-25.9	N/A
32.00	21.8 Qp	0.4 / 19.5 / 28.1	13.5	H / 2.4 / 136.0	-26.5	N/A
450.47	22.2 Qp	1.5 / 17.0 / 27.9	12.7	V / 2.4 / 212.0	-33.3	N/A
360.17	22.3 Qp	1.3 / 14.9 / 27.4	11.1	V / 1.1 / 186.0	-34.9	N/A
117.53	21.7 Qp	0.8 / 13.5 / 27.7	8.2	V / 1.0 / 228.0	-35.3	N/A
112.00	22.0 Qp	0.8 / 13.0 / 27.7	8.1	H / 2.1 / 12.0	-35.4	N/A
48.02	21.9 Qp	0.8 / 8.9 / 28.0	3.5	V / 1.0 / 164.0	-36.5	N/A
64.04	21.8 Qp	0.8 / 7.7 / 27.9	2.4	V / 1.0 / 147.0	-37.6	N/A

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FREQ	LEVEL	CABLE / ANT / PREAMP	FINAL	POL / HGT / AZ	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB) (dB\m) (dB)	(dBuV)	(m) (DEG)	15.209 <1GHz	15.209 >1GHz
89.21	22.3 Qp	0.8 / 8.0 / 27.8	3.3	V / 1.0 / 116.0	-40.2	N/A
16.00	13.7 Qp	0.3 / 10.6 / 0.0	24.6	V / 1.0 / 212.0	-44.9	N/A
20.28	6.0 Qp	0.3 / 10.4 / 0.0	16.6	H / 1.0 / 212.0	-52.9	N/A
24.29	5.0 Qp	0.4 / 9.7 / 0.0	15.1	V / 1.0 / 210.0	-54.4	N/A
27.94	6.0 Qp	0.4 / 8.7 / 0.0	15.1	H / 1.0 / 212.0	-54.4	N/A

Example 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:

- (1) All measurements 16 MHz to 18 GHz are field strength measurements taken at 3-meter product-to-antenna.
- (2) All measurements 18GHz to 25GHz are field strength measurements taken at 1-meter product-to-antenna. The measured value was then extrapolated to a 3-meter measurement for reference to the limit.
- (3) Quasi-peak detector measurements up to 1GHz – Average detector measurements above 1 GHz.

Deviations, Additions, or Exclusions: None

7 6dB Bandwidth

7.1 Method

Unless otherwise stated no deviations were made from ANSI C63.10 and FCC publication KDB 558074 for DTS devices.

Intertek Louisville's emissions testing facility is located at 1795 Dogwood Street, Suite 200, Louisville, CO 80027. The emissions testing facility is ISO17025:2005 accredited.

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>
18913	Spectrum Analyzer with Pre-Amp	Hewlett-Packard	E7405A	My44211889	05/11/2010	05/11/2011
18886	Ridged Guide Antenna 1-18GHz	TENSOR	4105	2020	10/08/2010	10/08/2011

7.3 Results:

The sample tested was found to Comply.

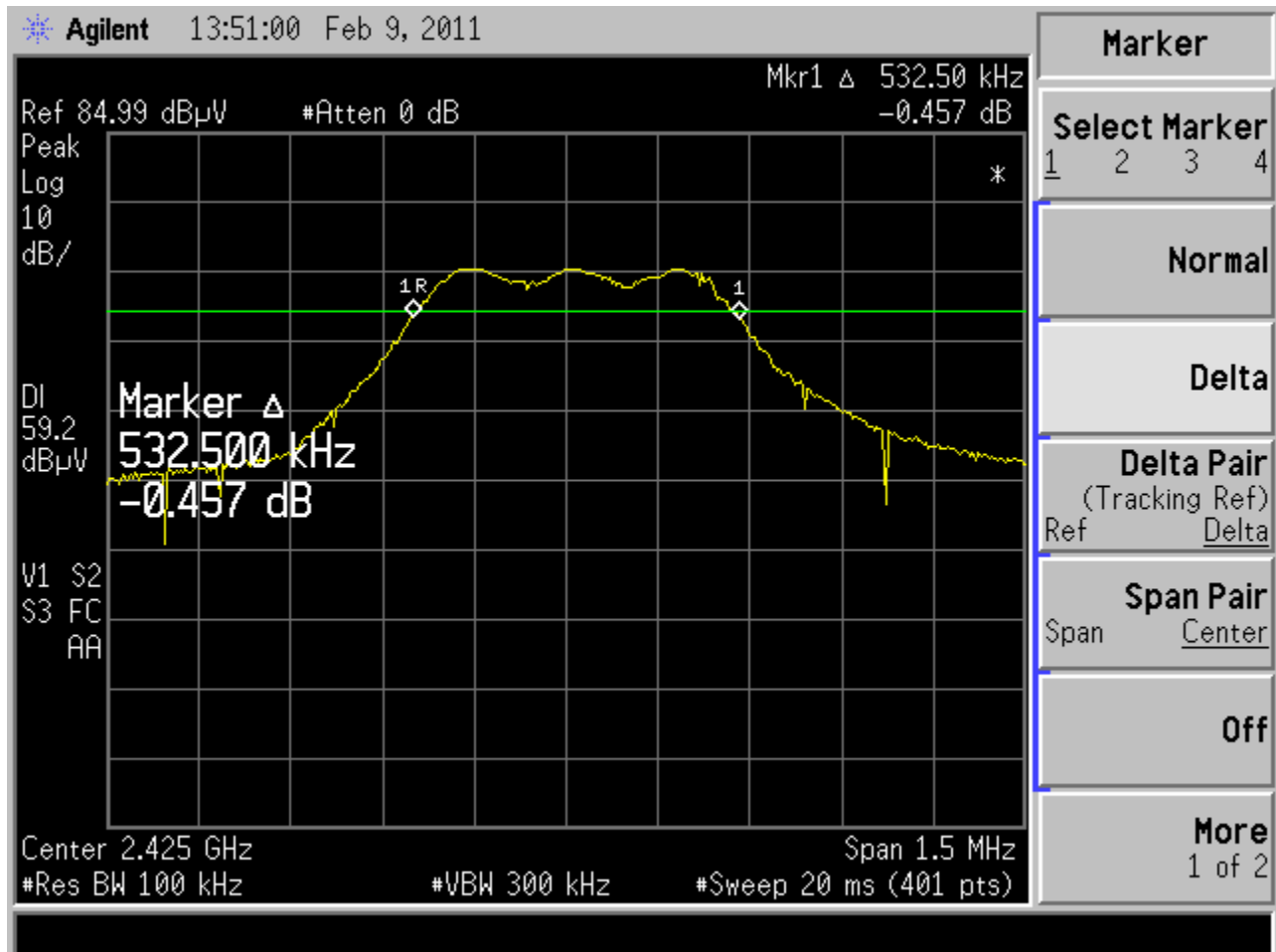
- FCC 15.247 (a)(2)

7.4 Test Data: Base Product

6 dB Bandwidth – Base Product

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

Channel 1 – 2.425 GHz

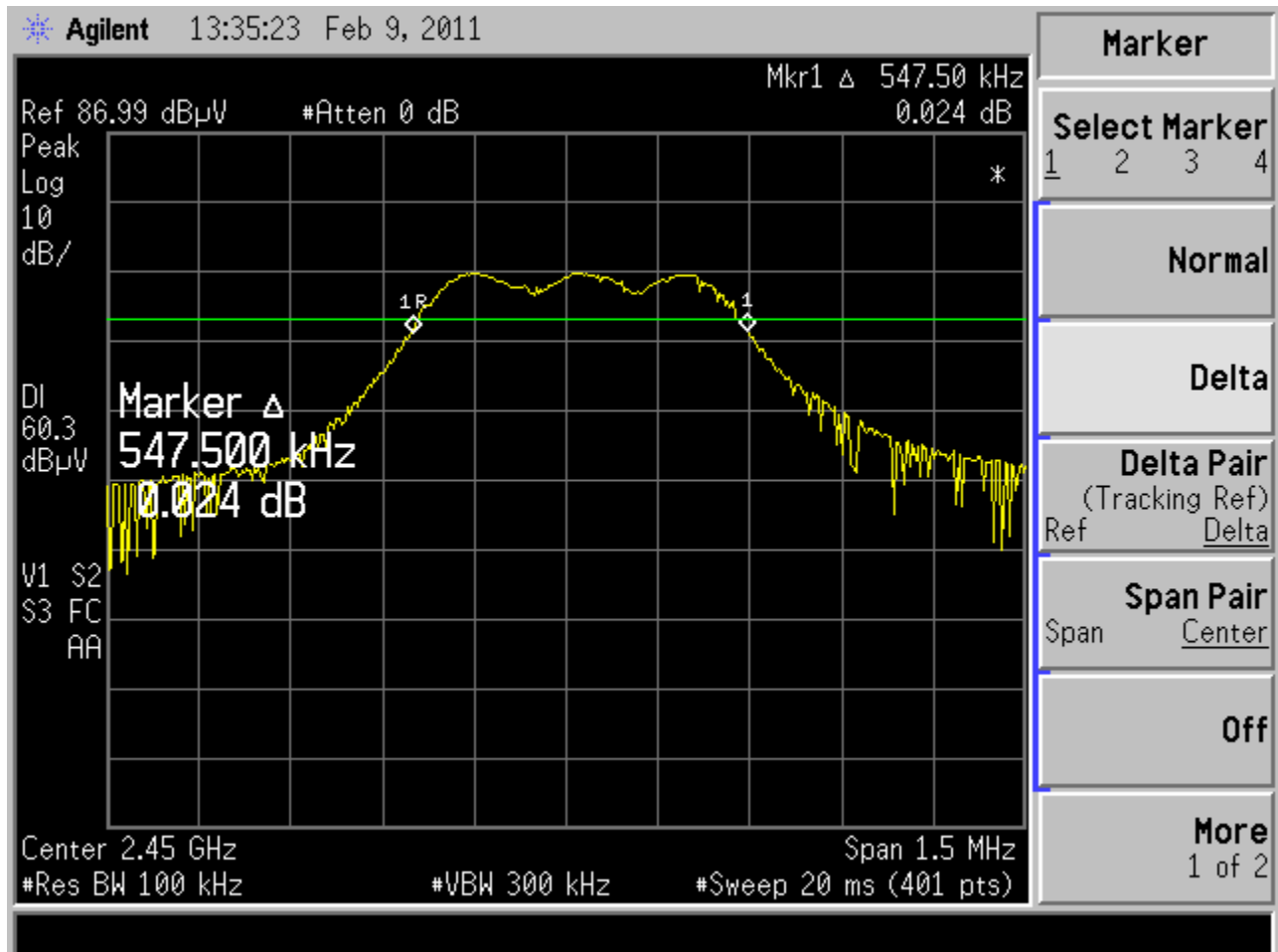


Specification: 6dB Bandwidth > 500 kHz

6 dB Bandwidth

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

Channel 2 – 2.450 GHz

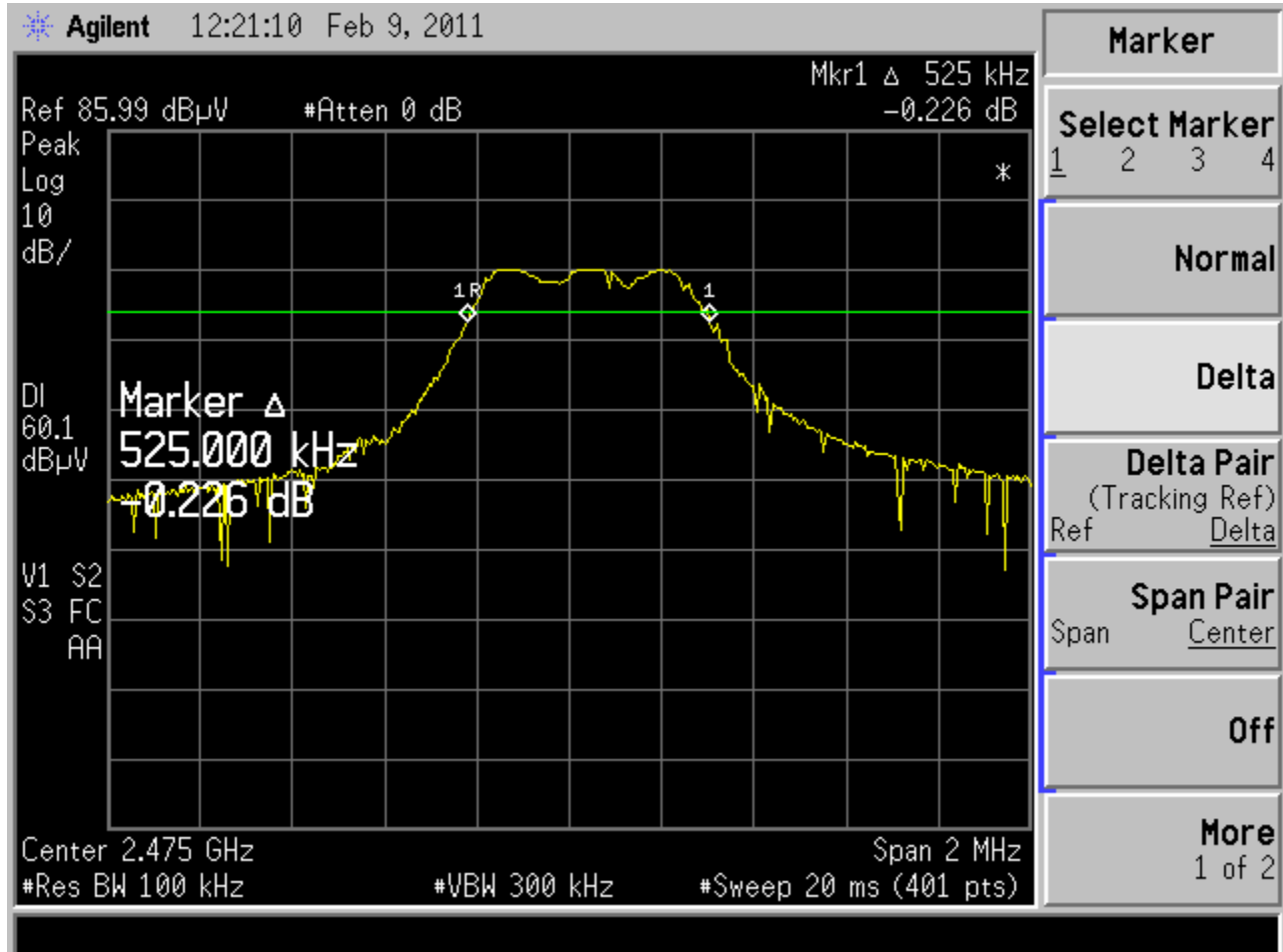


Specification: 6dB Bandwidth > 500 kHz

6 dB Bandwidth

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

Channel 3 – 2.475 GHz



Specification: 6dB Bandwidth > 500 kHz

Notes:

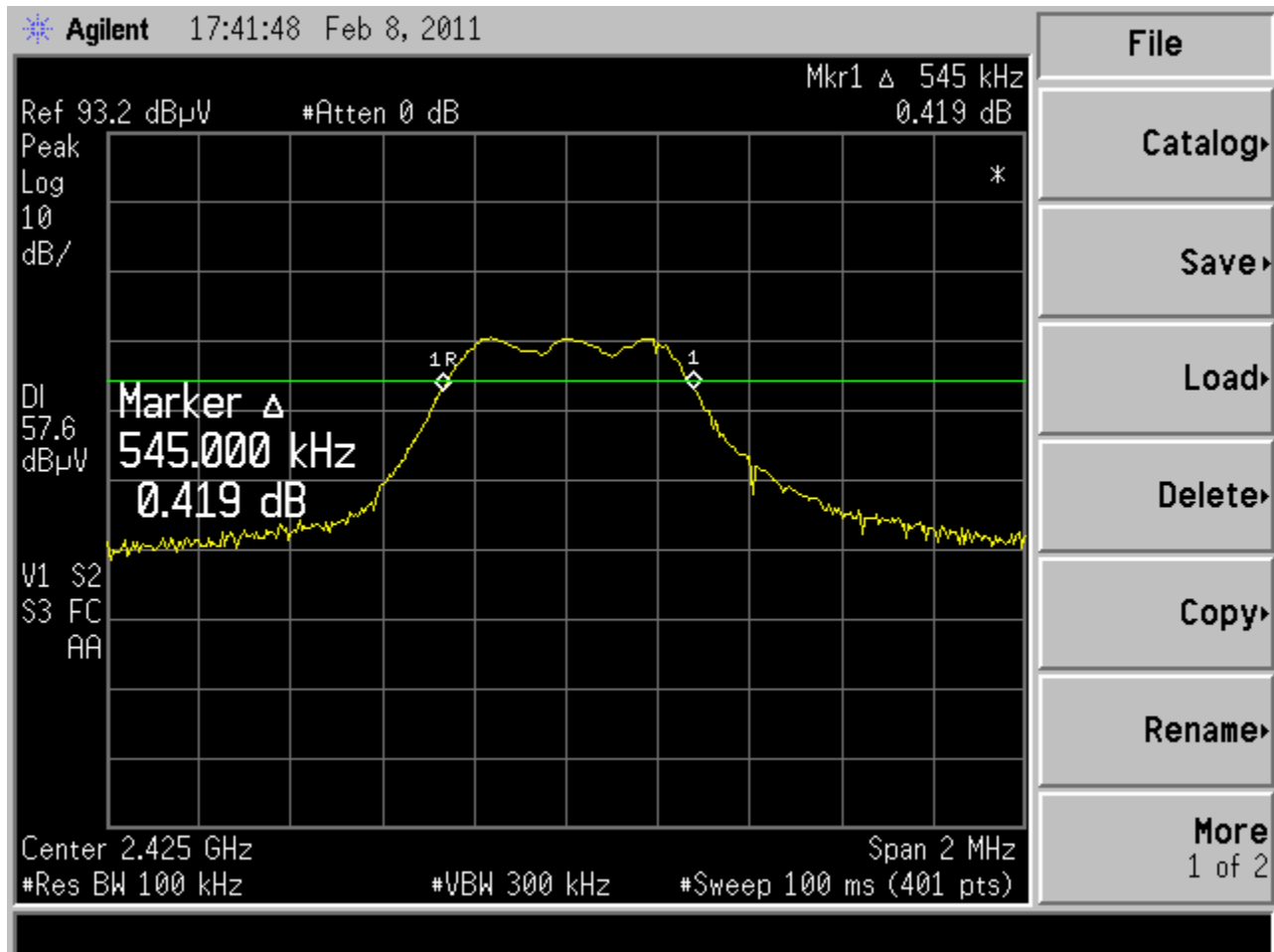
- (1) All measurements are Radiated Field Strength
- (2) **Worst-case – High Channel – 6dB Bandwidth 525 kHz**

7.5 Test Data: Remote Product

6 dB Bandwidth – Remote Product

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

Channel 1 – 2.425 GHz

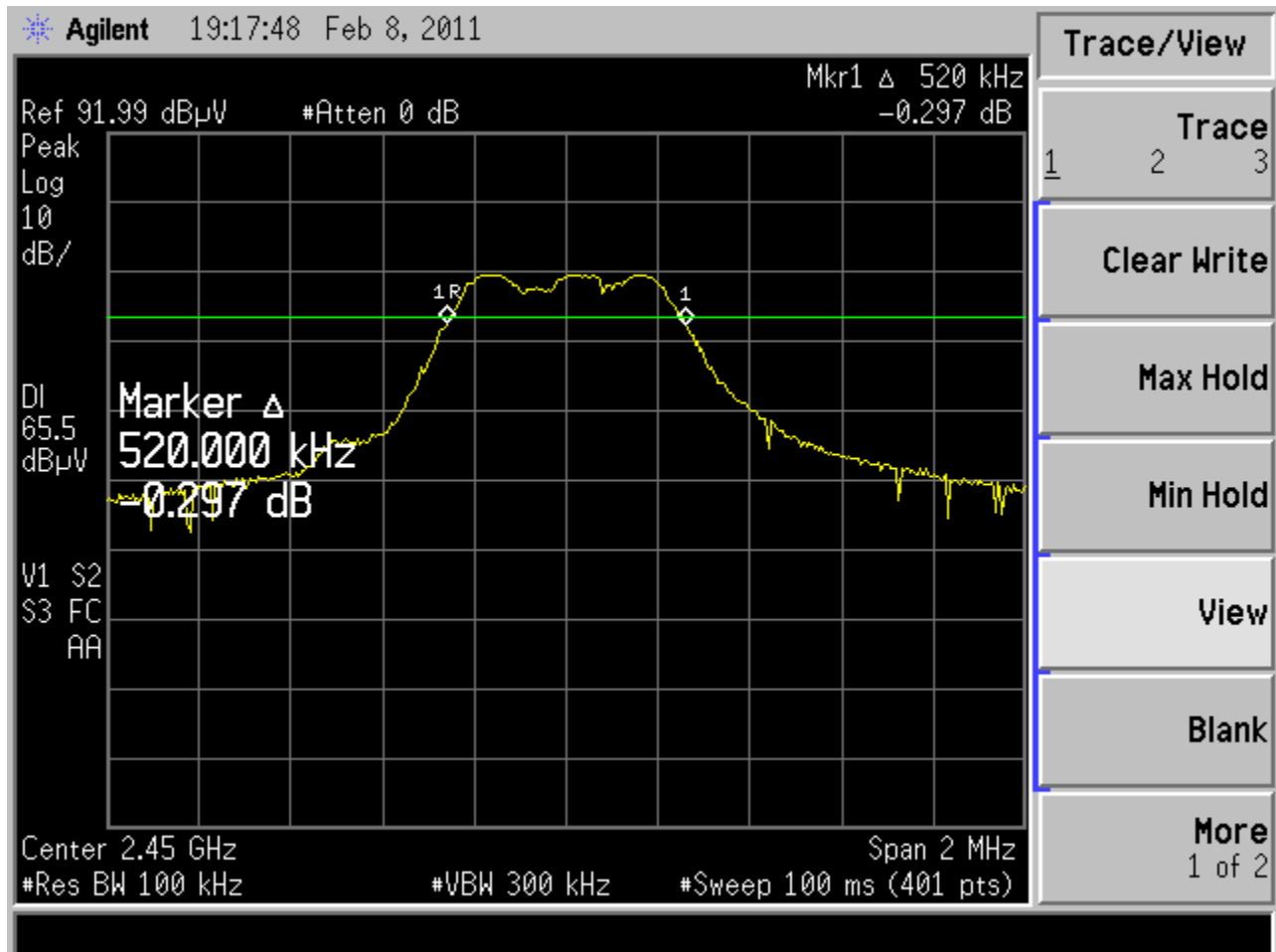


Specification: 6dB Bandwidth > 500 kHz

6 dB Bandwidth

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

Channel 2 – 2.450 GHz

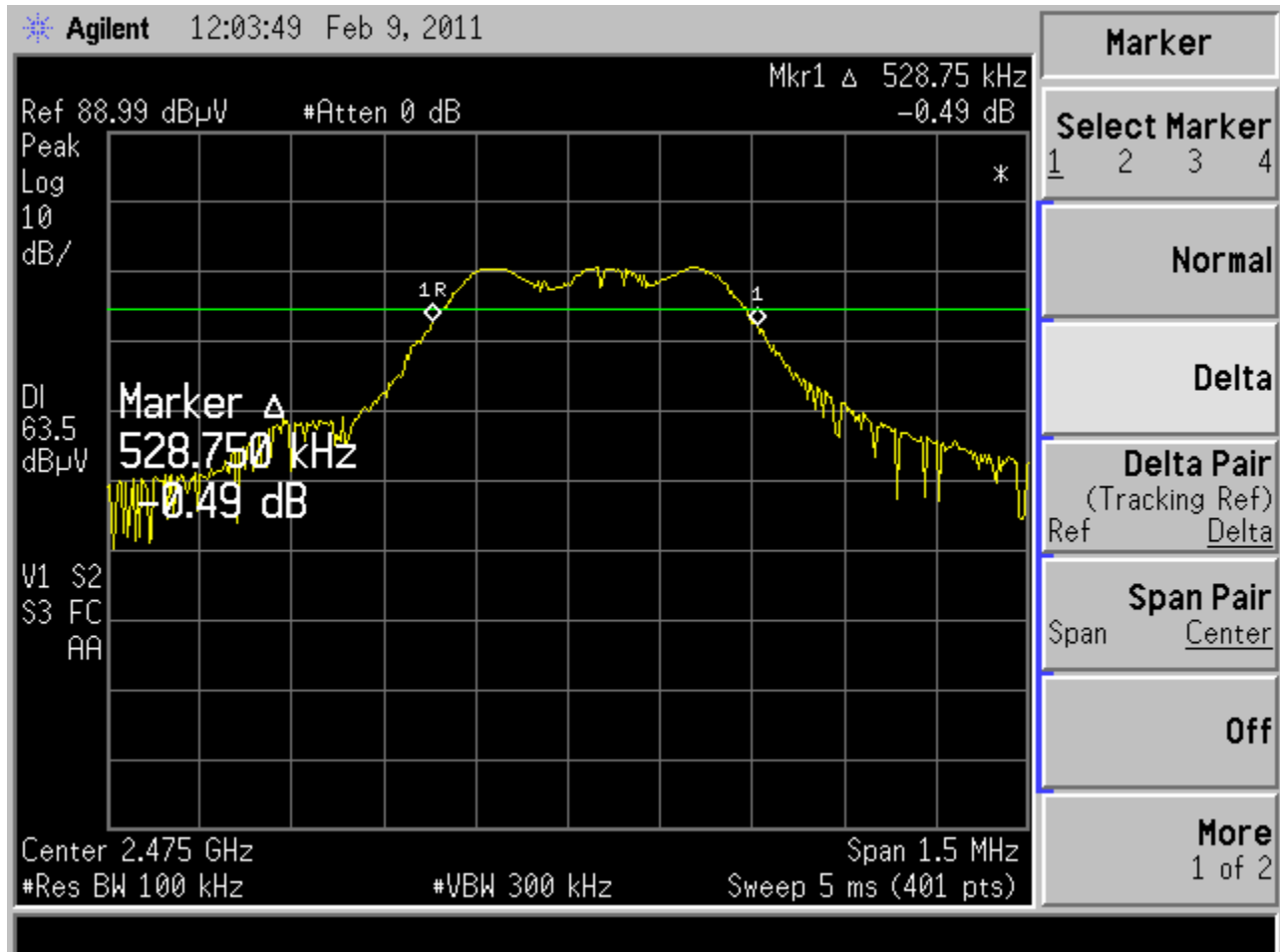


Specification: 6dB Bandwidth > 500 kHz

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 – Mid Channel – 6dB Bandwidth 520 kHz**

Deviations, Additions, or Exclusions: None

8 Power Spectral Density (PSD)

8.1 Method

Unless otherwise stated no deviations were made from ANSI C63.10 and FCC publication KDB 558074 for DTS devices.

Intertek Louisville's emissions testing facility is located at 1795 Dogwood Street, Suite 200, Louisville, CO 80027. The emissions testing facility is ISO17025:2005 accredited.

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>
18913	Spectrum Analyzer with Pre-Amp	Hewlett-Packard	E7405A	My44211889	05/11/2010	05/11/2011
18886	Ridged Guide Antenna 1-18GHz	TENSOR	4105	2020	10/08/2010	10/08/2011

8.3 Results:

The sample tested was found to Comply.

- FCC 15.247(e)

8.4 Test Data: Base Product

Power Spectral Density (PSD) – Base Product

FCC 15.247(e)



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

$$58.40 + 28.4 + 3.6 = 90.40 \text{ dBuV/m}$$

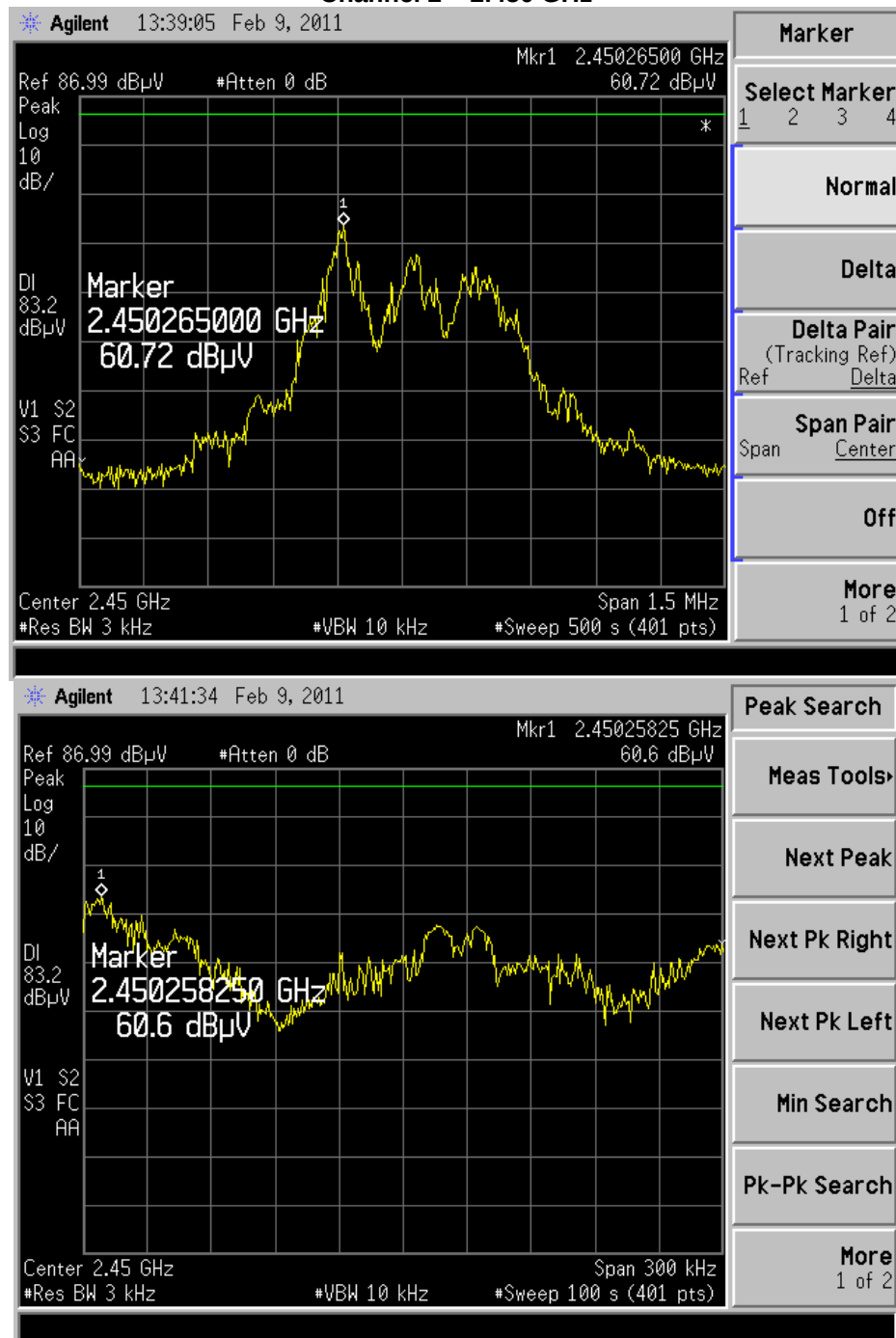
$$P \text{ dBm} = 90.40 - 95.2289 = -4.83 \text{ dBm}$$

Specification: PSD < 8 dBm

Power Spectral Density (PSD)

FCC 15.247(e)

Channel 2 – 2.450 GHz



Measured field strength + antenna factor + cable loss = Final corrected field strength (dBuV/m)
 $60.72 + 28.4 + 3.6 = 92.72 \text{ dBuV/m}$
 $P \text{ dBm} = 92.72 - 95.2289 = -2.51 \text{ dBm}$

Specification: PSD < 8 dBm

Power Spectral Density (PSD)

FCC 15.247(e)

Channel 3 – 2.475 GHz



Measured field strength + antenna factor + cable loss = Final corrected field strength (dBuV/m)
 $61.13 + 28.4 + 3.6 = 93.13 \text{ dBuV/m}$
 $P \text{ dBm} = 93.13 - 95.2289 = -2.10 \text{ dBm}$

Specification: PSD < 8 dBm

Notes:

- (1) All measurements are Radiated Field Strength – worst-case maximized signal
- (2) **Worst-case High Channel PSD: - 2.10 dBm**
- (3) The following equation was used to convert field strength (dBuV/m) into power (dBm).
This calculation assumes ideal isotropic radiation from the source and a test distance of 3-meters.

$$P = 20 \cdot \log(E) - 95.2289$$

P is power in dBm
E is uV/m

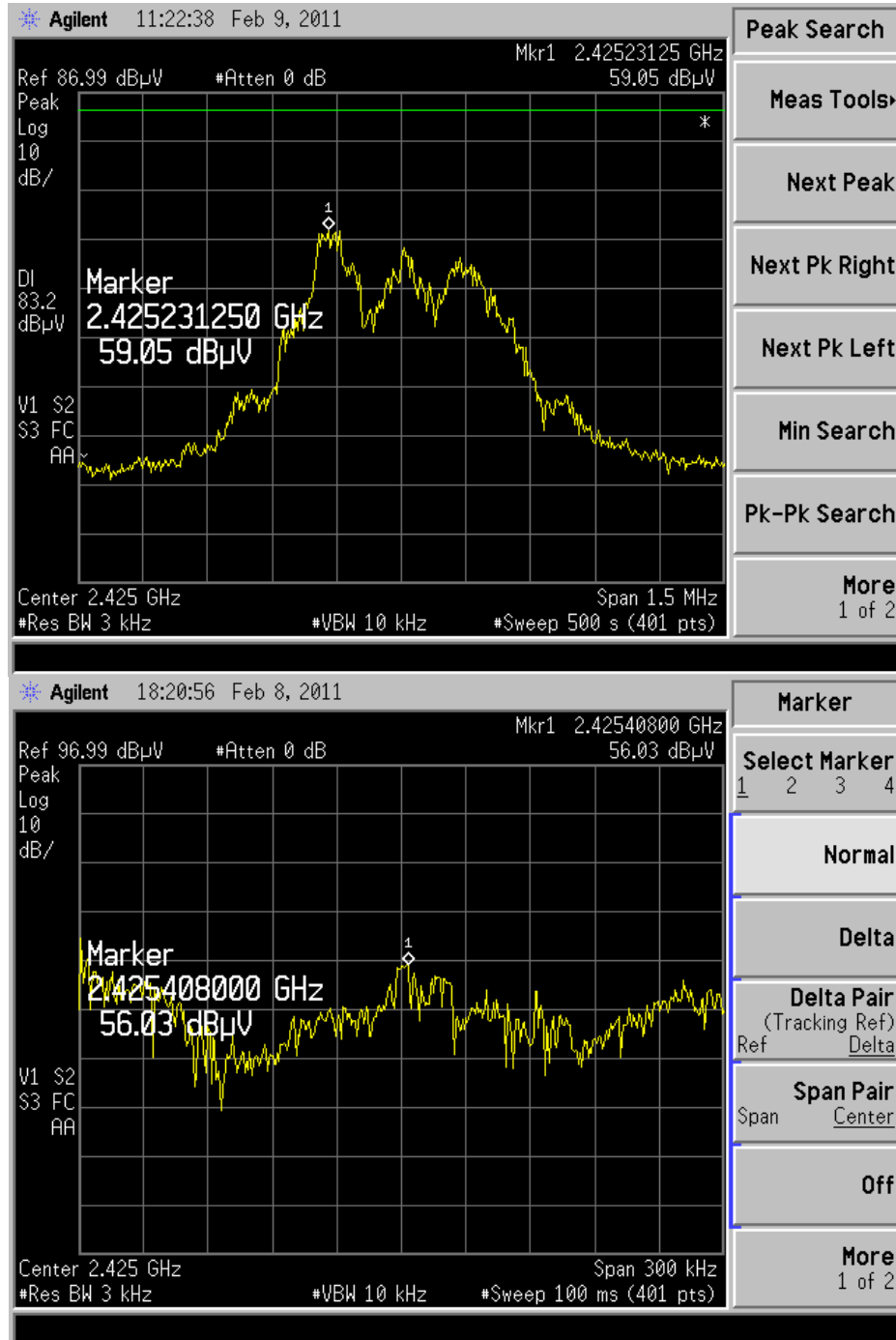
Deviations, Additions, or Exclusions: None

8.5 Test Data: Remote Product

Power Spectral Density (PSD) – Remote Product

FCC 15.247(e)

Channel 1 – 2.425 GHz



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

$$59.05 + 28.4 + 3.6 = 91.05 \text{ dBuV/m}$$

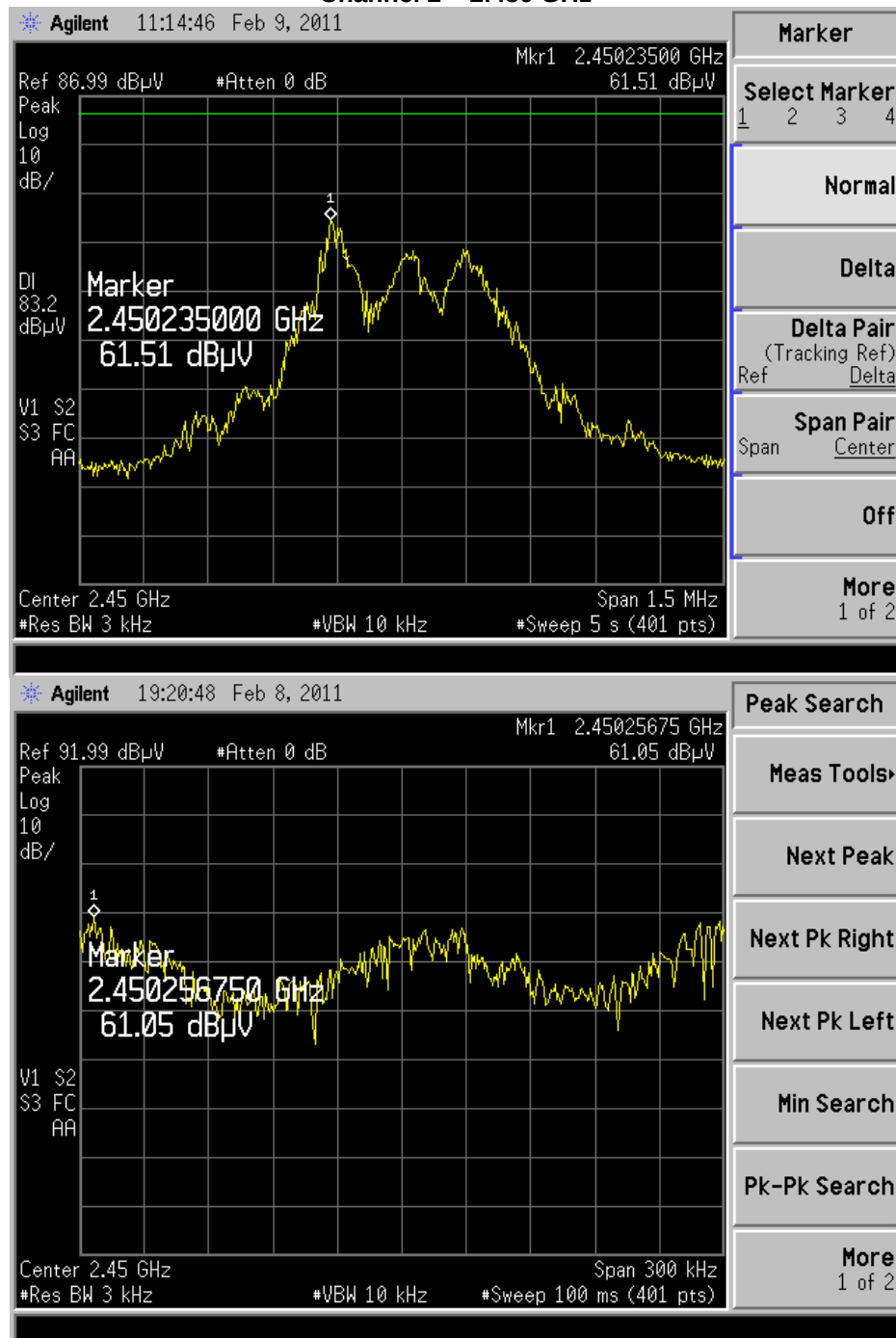
$$P \text{ dBm} = 91.05 - 95.2289 = -4.12 \text{ dBm}$$

Specification: PSD < 8 dBm

Power Spectral Density (PSD)

FCC 15.247(e)

Channel 2 – 2.450 GHz



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

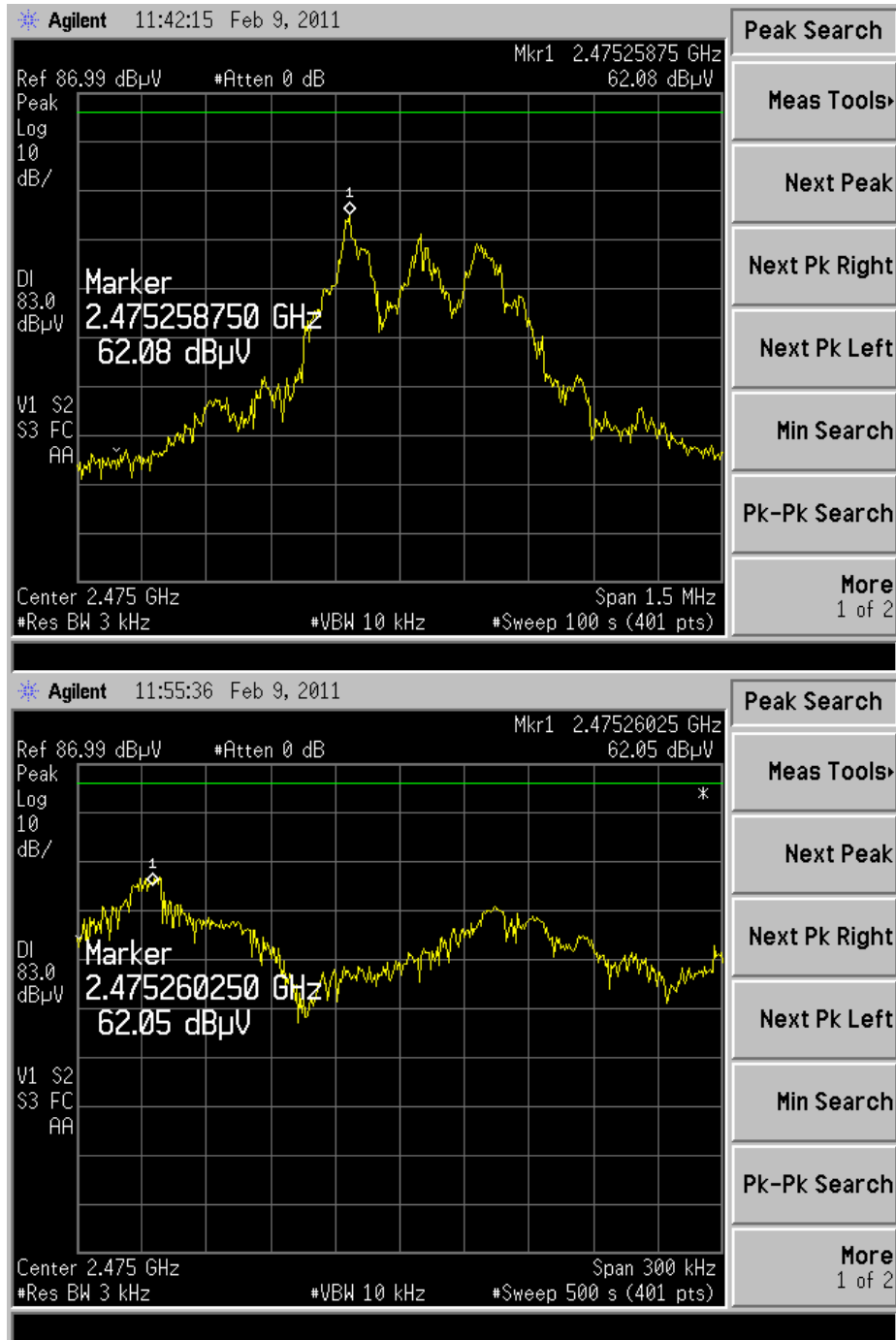
$$61.51 + 28.4 + 3.6 = 93.51 \text{ dBuV/m}$$

$$P \text{ dBm} = 93.51 - 95.2289 = -1.72 \text{ dBm}$$

Specification: PSD < 8 dBm

Power Spectral Density (PSD) FCC 15.247(e)

Channel 3 – 2.475 GHz



Measured field strength + antenna factor + cable loss = Final corrected field strength (dBuV/m)
 $62.08 + 28.4 + 3.6 = 94.08 \text{ dBuV/m}$
 $P \text{ dBm} = 94.08 - 95.2289 = -1.15 \text{ dBm}$

Specification: PSD < 8 dBm

Notes:

- (1) All measurements are Radiated Field Strength – worst-case maximized signal.
- (2) **Worst-case High Channel PSD: - 1.15 dBm (PSD Limit = +8dBm)**
- (3) The following equation was used to convert field strength (dBuV/m) into power (dBm).
This calculation assumes ideal isotropic radiation from the source and a test distance of 3-meters.

$$P = 20 \cdot \log(E) - 95.2289$$

P is power in dBm
E is uV/m

Deviations, Additions, or Exclusions: None

9 Band Edge Measurements

9.1 Method

Unless otherwise stated no deviations were made from ANSI C63.10 and FCC publication KDB 558074 for DTS devices.

Intertek Louisville's emissions testing facility is located at 1795 Dogwood Street, Suite 200, Louisville, CO 80027. The emissions testing facility is ISO17025:2005 accredited.

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	05/11/2010	05/11/2011
18886	Ridged Guide Antenna 1-18GHz	TENSOR	4105	2020	10/08/2010	10/08/2011

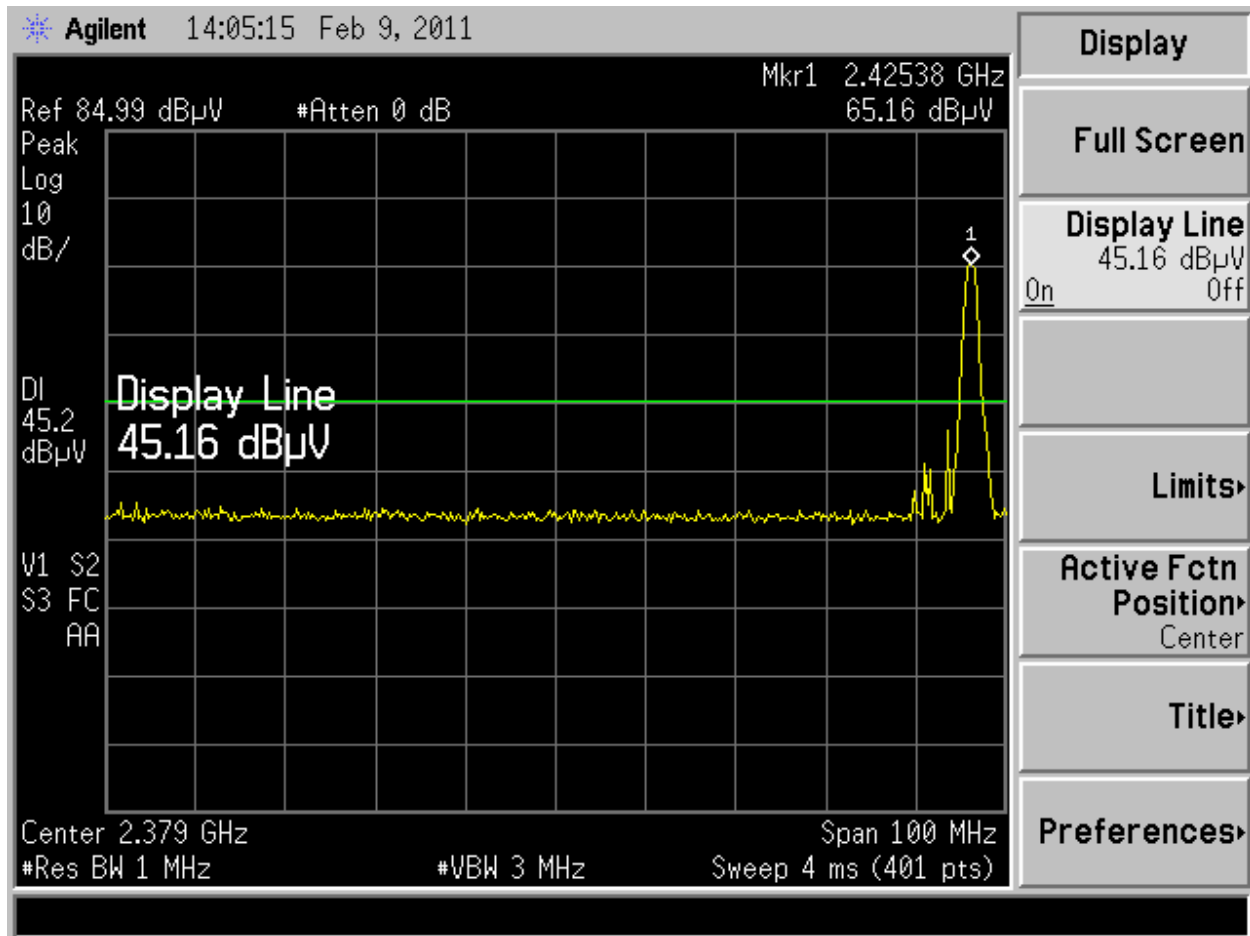
9.3 Results:

The sample tested was found to Comply.

- FCC 15.247(d) / 15.209

9.4 Plots: Band Edge – Base Product

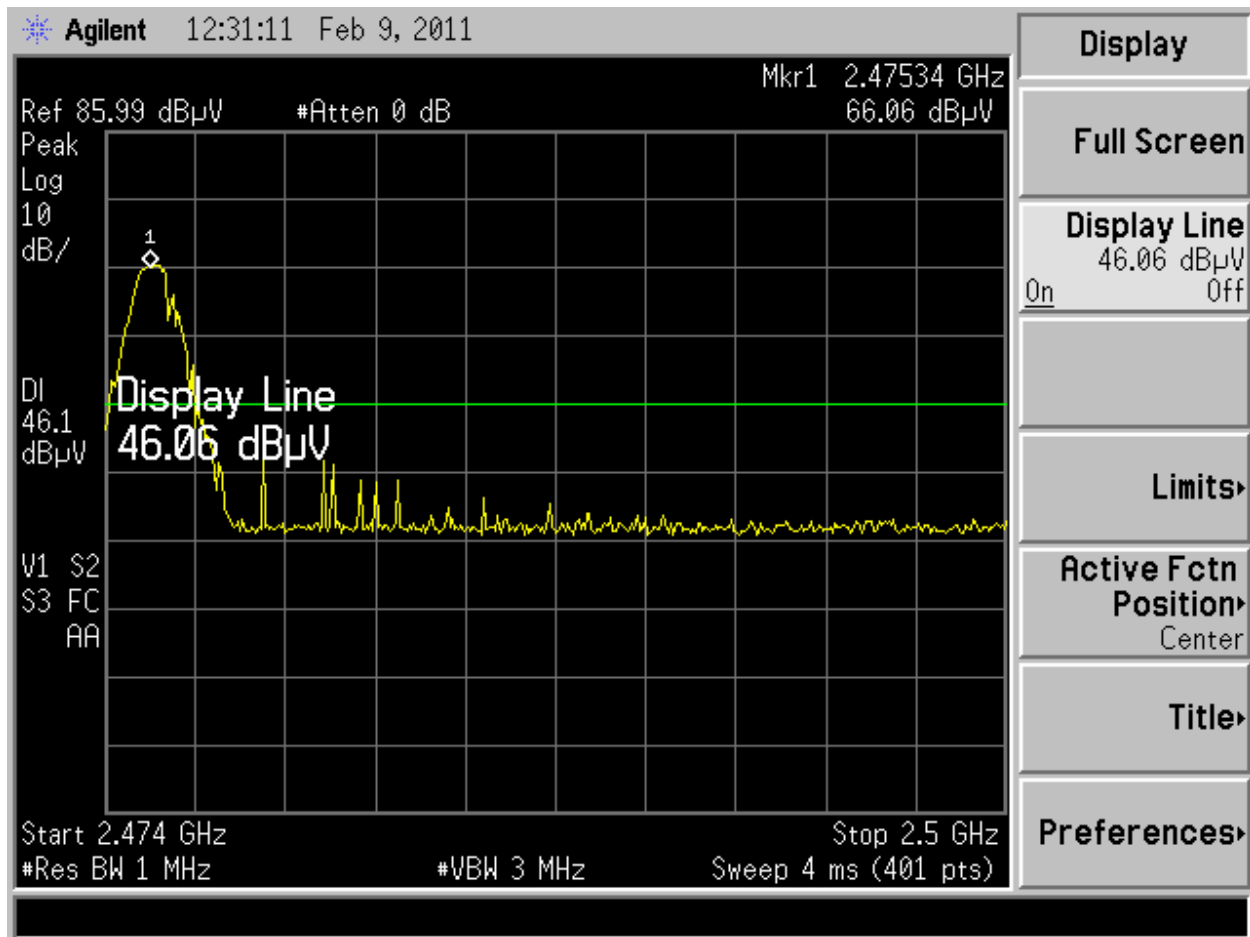
Low Channel Band Edge



Specification: Spurious - 20dBc

Plots: Band Edge – Base Product

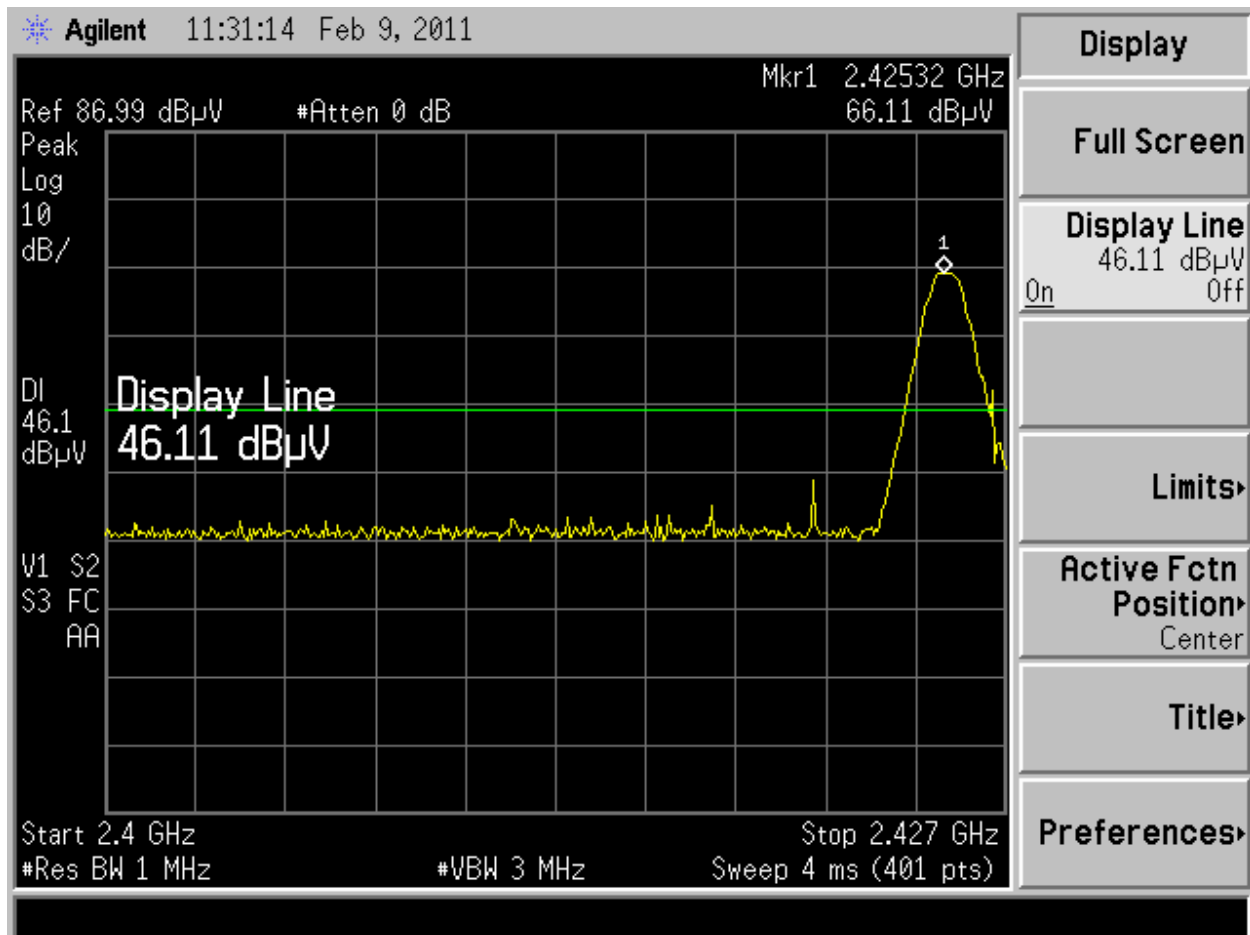
High Channel Band Edge



Specification: Spurious - 20dBc

Plots: Band Edge Remote Product

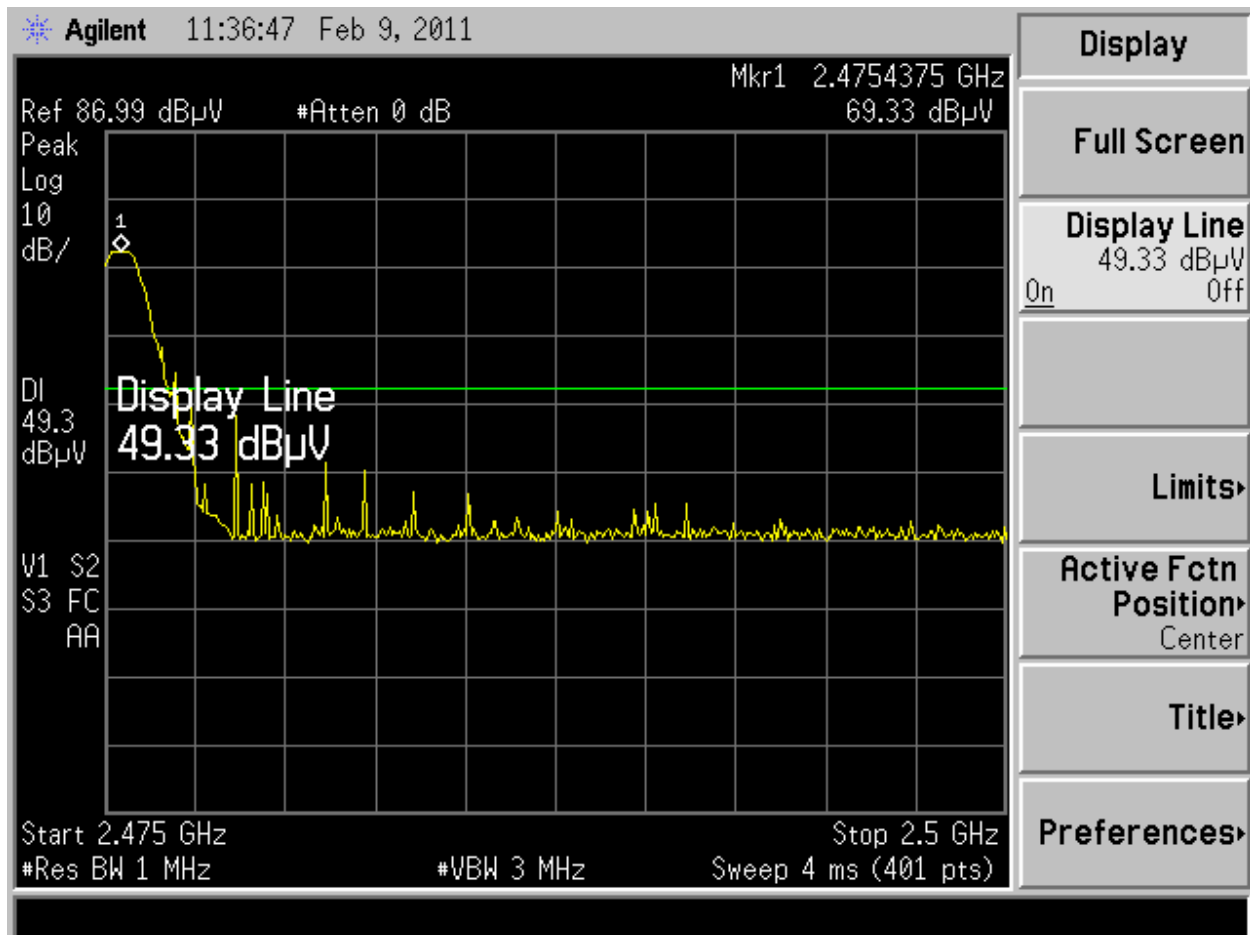
Low Channel Band Edge



Specification: Spurious - 20dBc

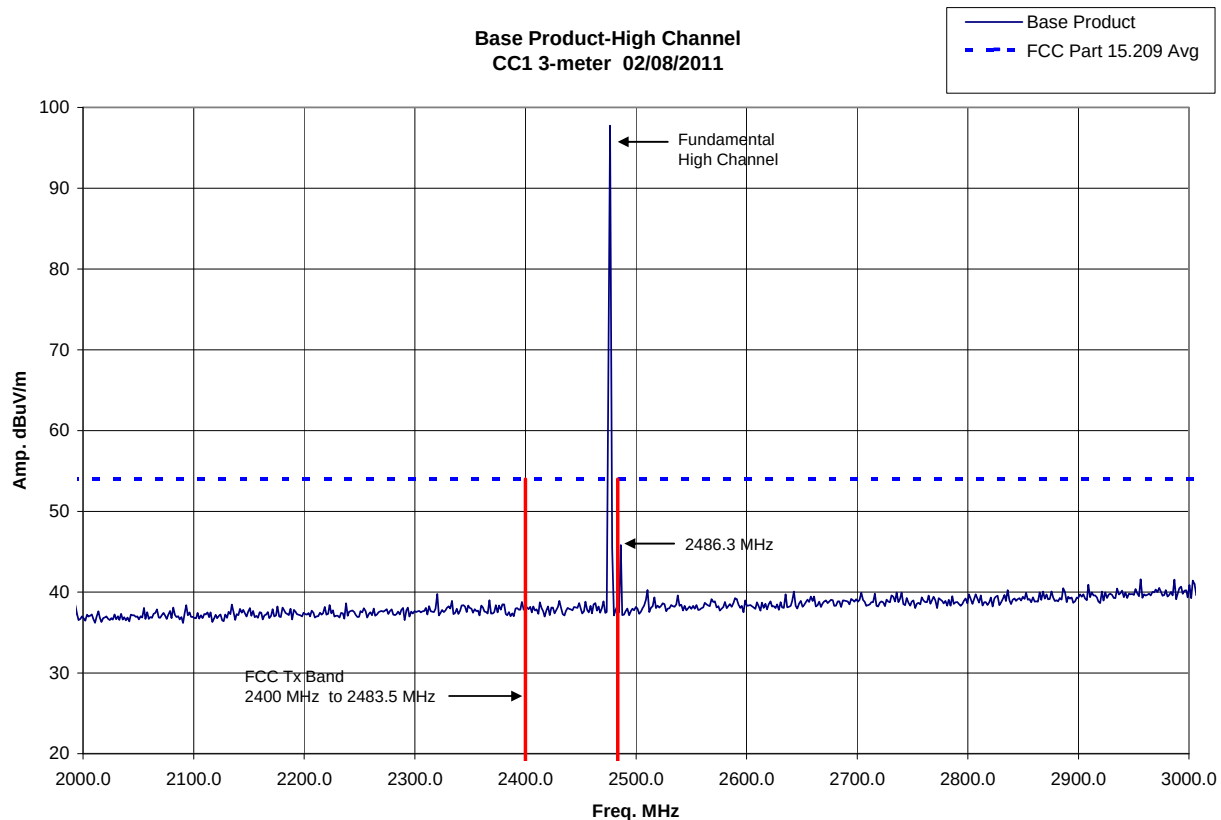
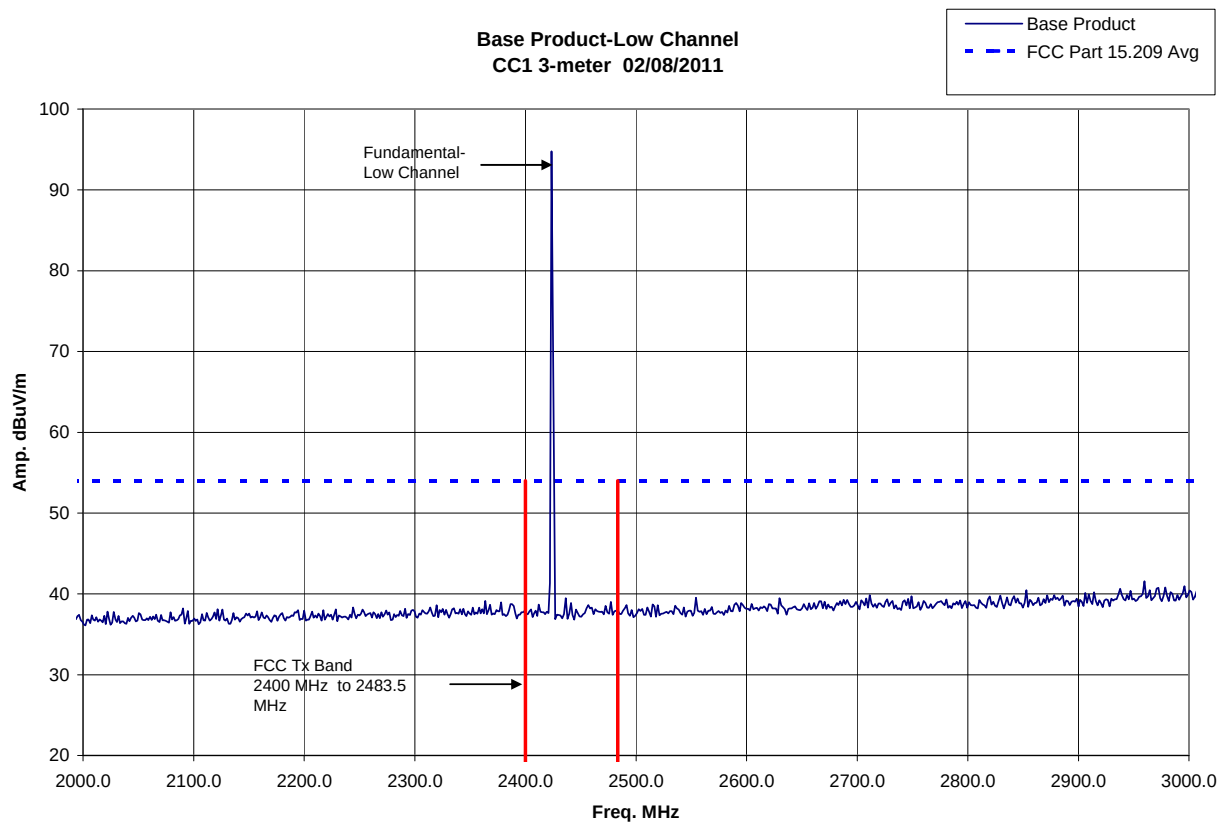
Plots: Band Edge Remote Product

High Channel Band Edge



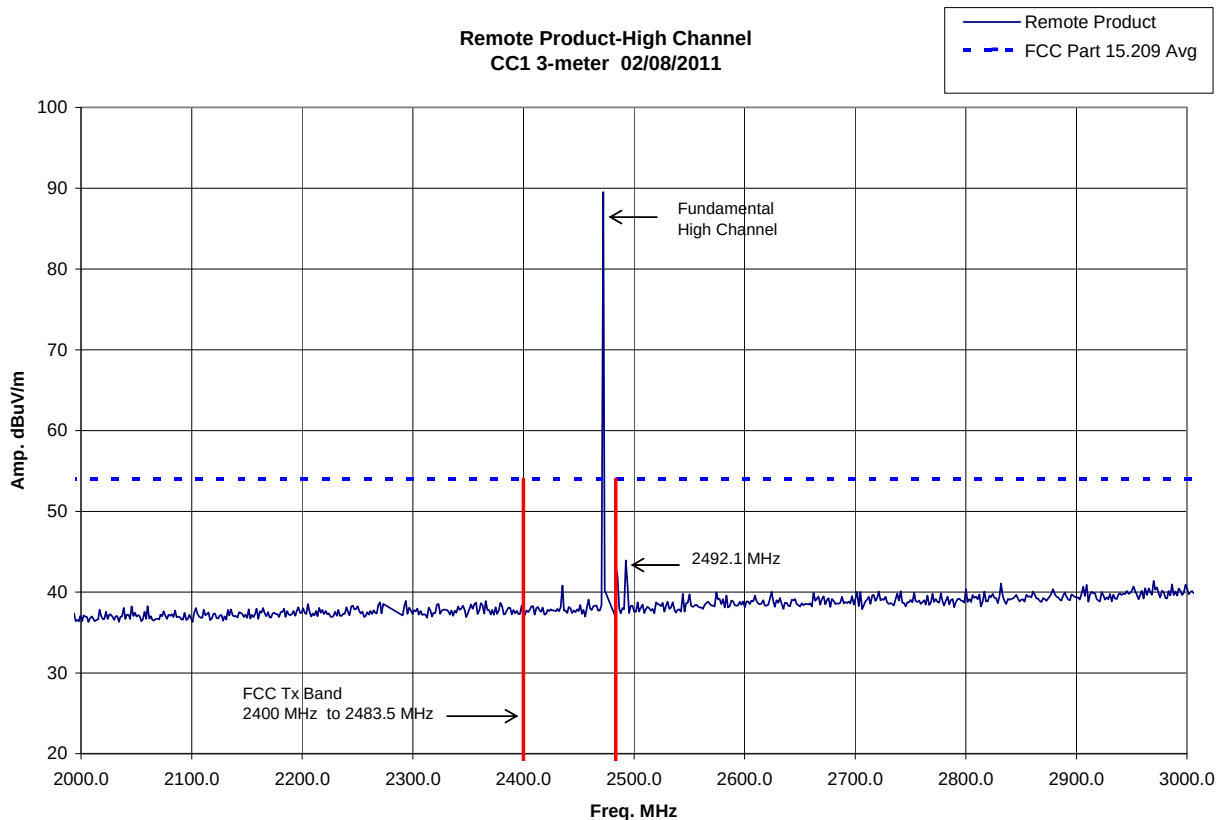
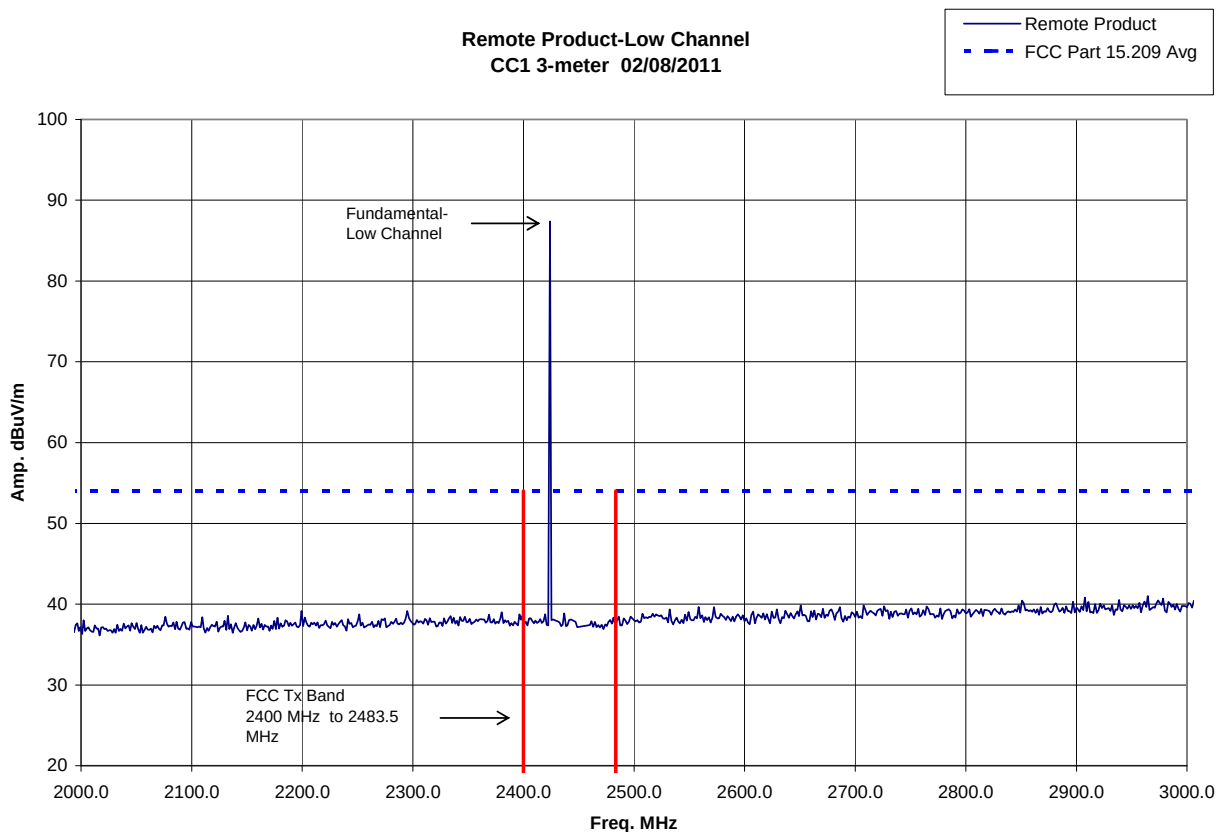
Specification: Spurious - 20dBc

9.5 Band Edge Base Product – Tx in Restricted Bands



Note: Above charts are peak detector scans relative to average limit

9.6 Band Edge Remote Product – Tx in Restricted Bands



V

Note: Above charts are peak detector scans relative to average limit

10 Duty Cycle & Duty Cycle Correction Factor

10.1 Method

Unless otherwise stated no deviations were made from ANSI C63.10 and FCC publication KDB 558074 for DTS devices.

Intertek Louisville's emissions testing facility is located at 1795 Dogwood Street, Suite 200, Louisville, CO 80027. The emissions testing facility is ISO17025:2005 accredited.

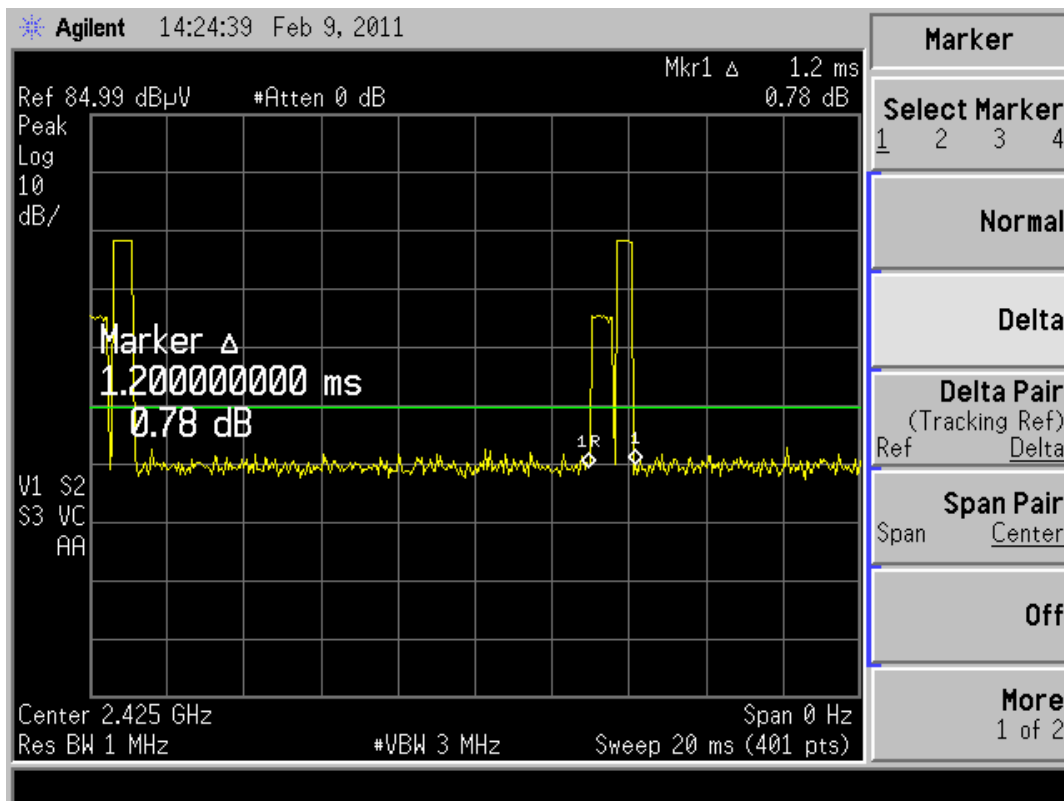
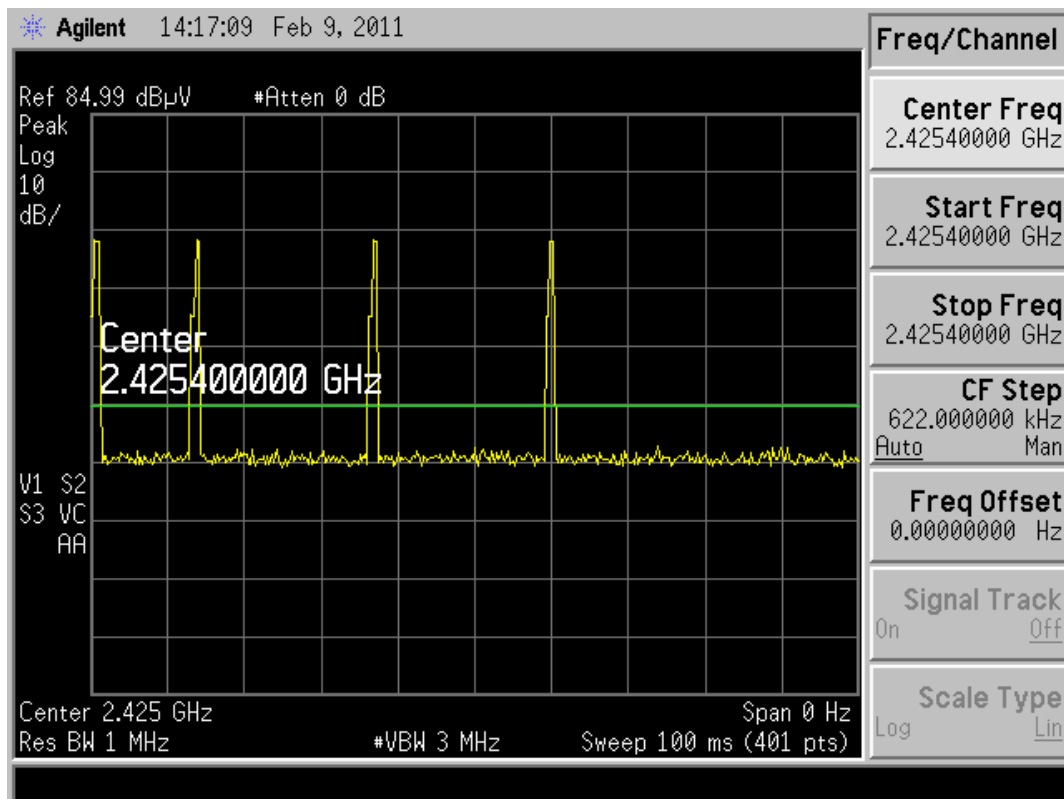
10.2 Test Equipment Used:

<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	05/11/2010	05/11/2011
18886	Ridged Guide Antenna 1-18GHz	TENSOR	4105	2020	10/08/2010	10/08/2011

10.3 Results:

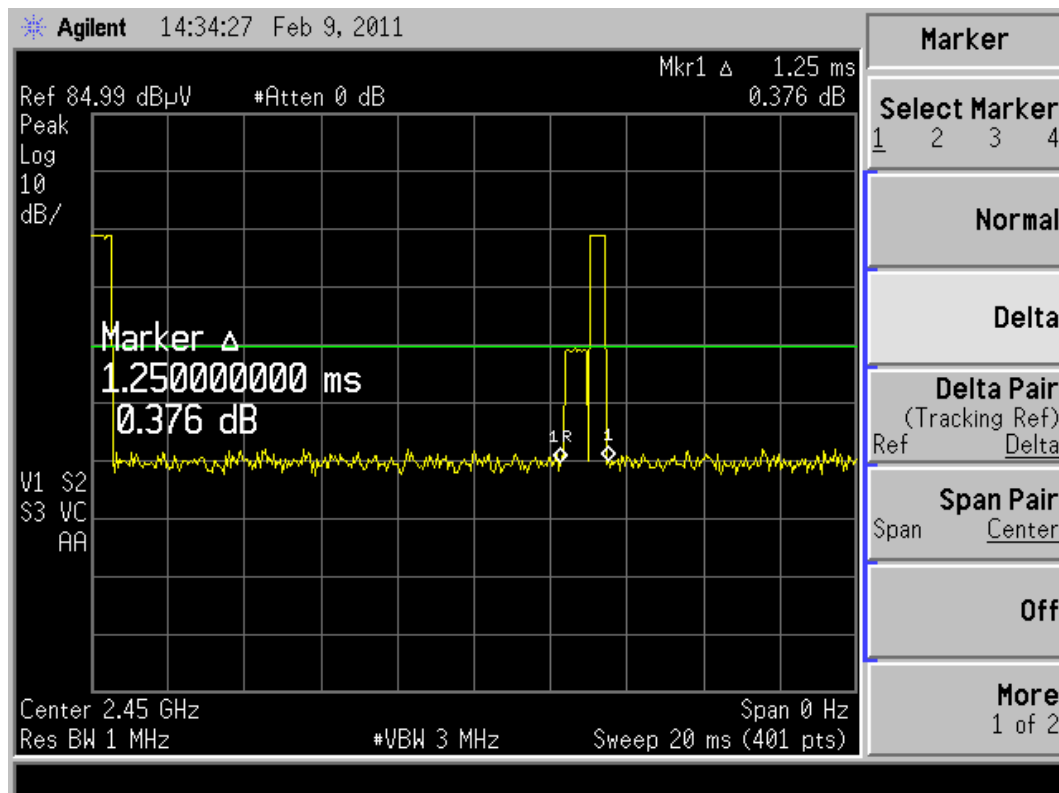
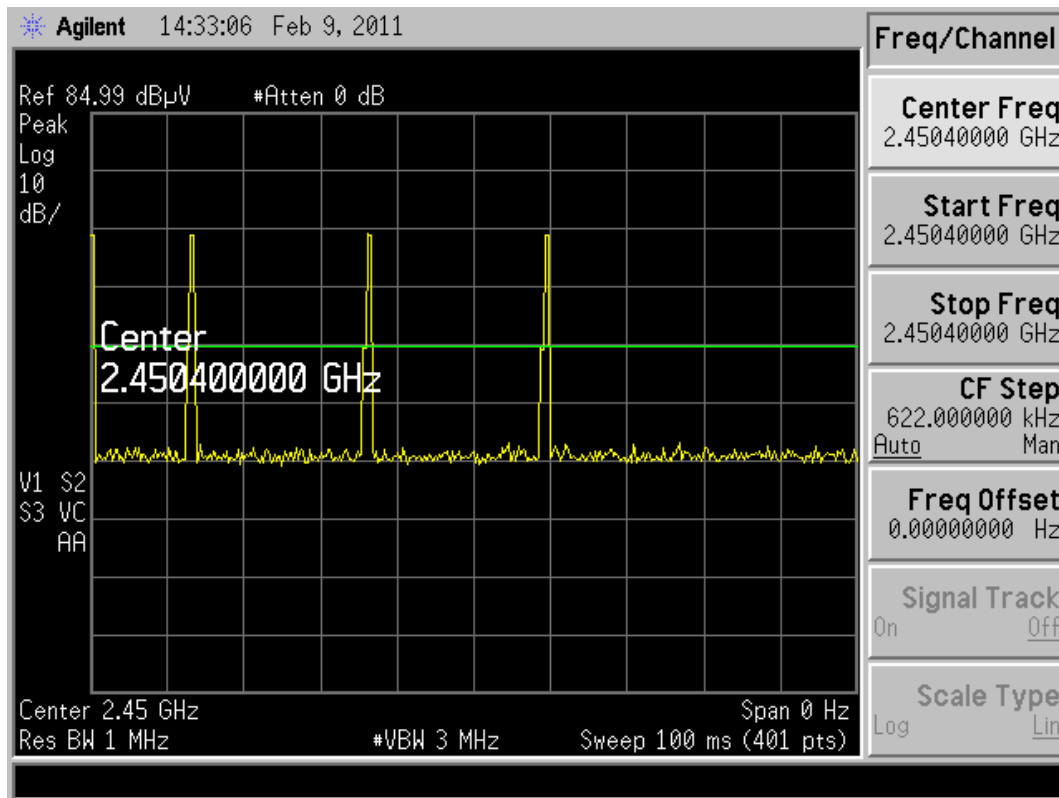
- Base Product worst-case measured Duty Cycle: 5.2 mS
- **Base Product Duty Cycle Correction Factor: - 25.7 dB**
- Remote Product worst-case measured Duty Cycle: 3.2 mS
- **Remote Product Duty Cycle Correction Factor: - 29.9 dB**

10.4 Test Data: Base Product – Low Channel



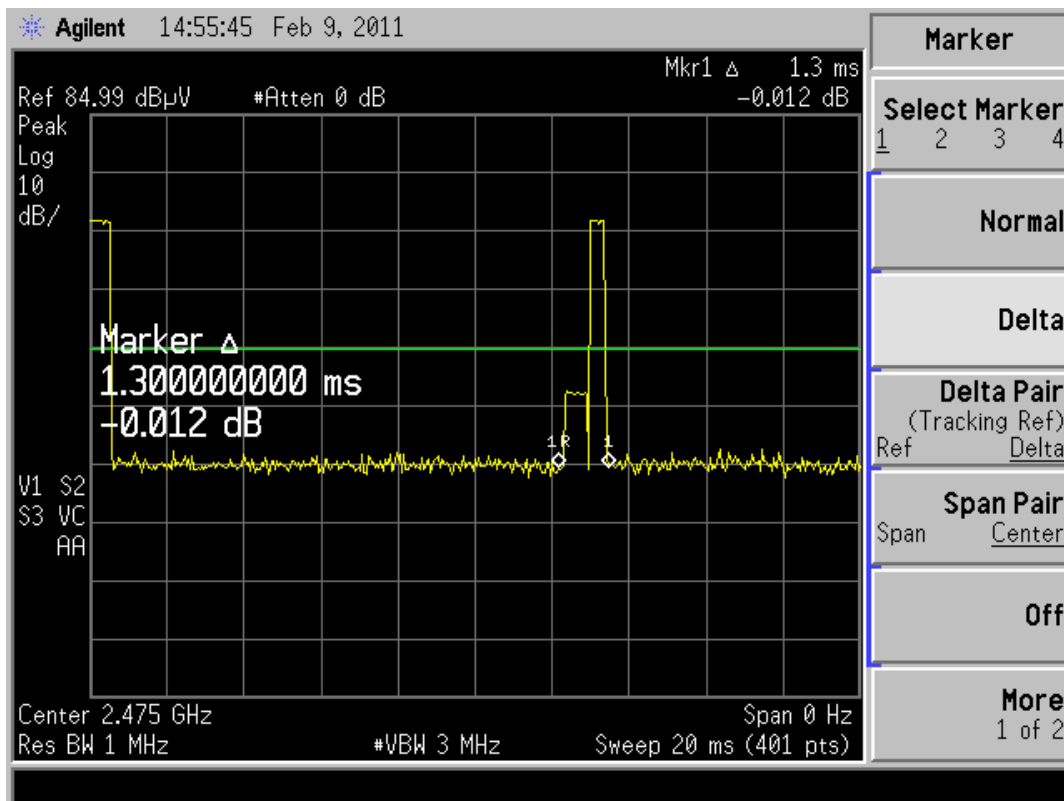
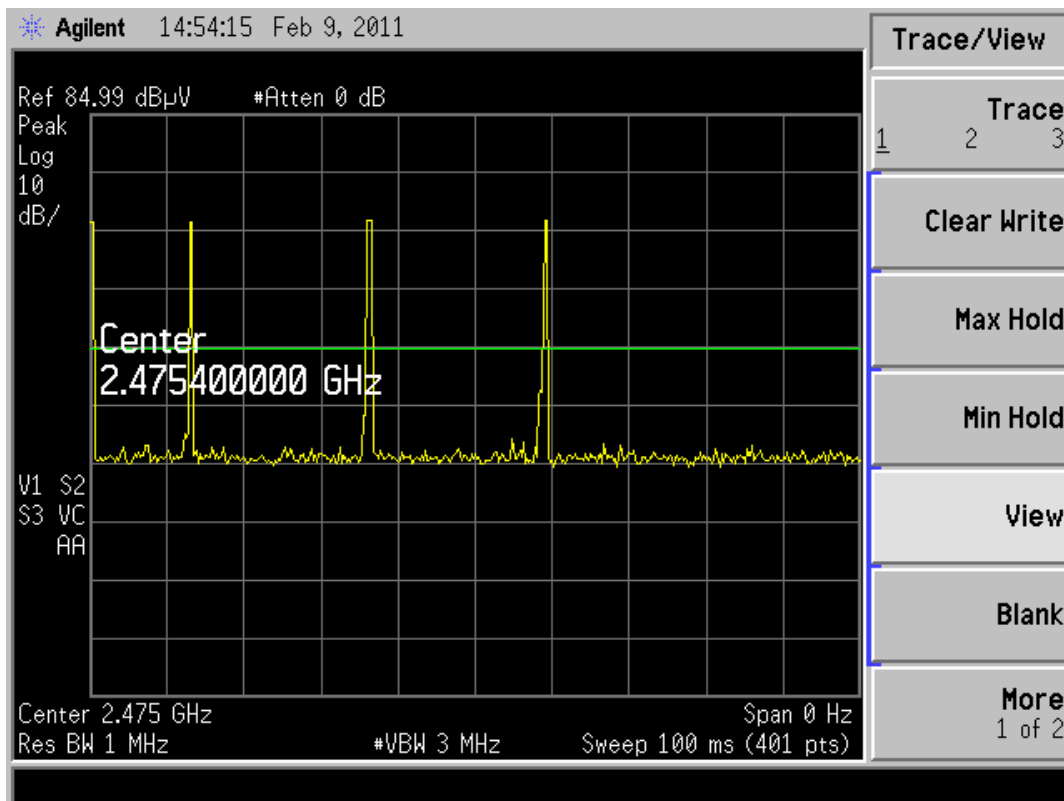
Duty Cycle: 4.8 ms

Test Data: Base Product – Mid Channel



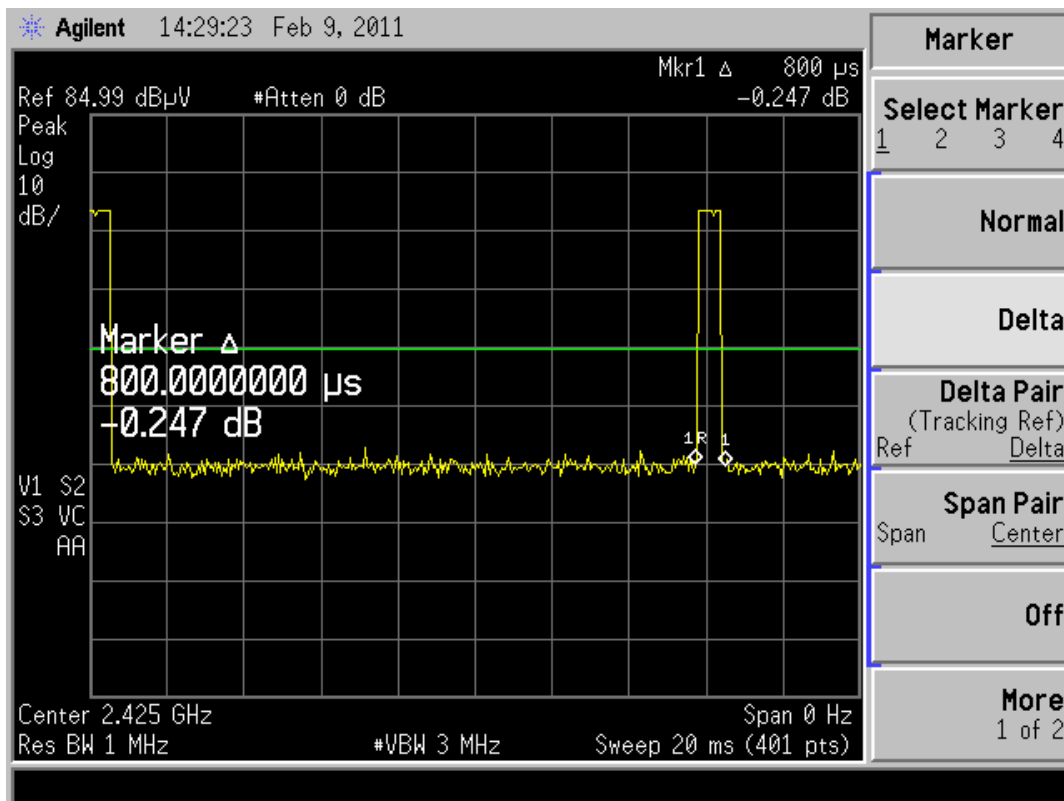
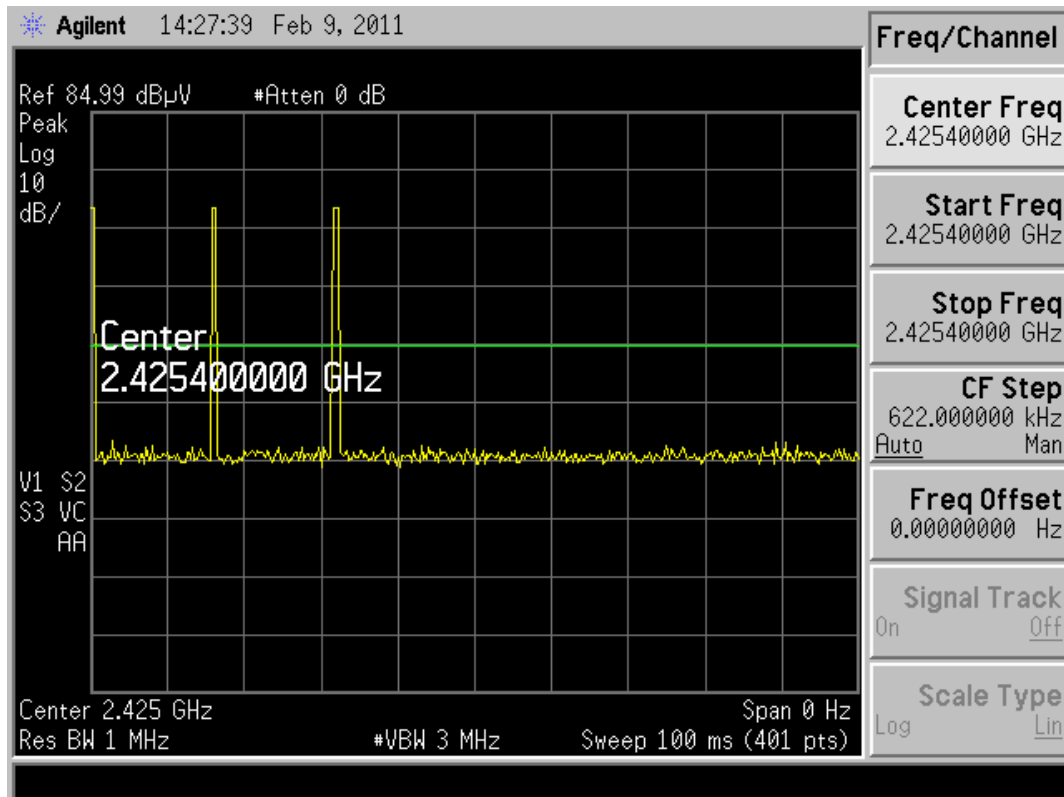
Duty Cycle: 5.0 ms

Test Data: Base Product – High Channel



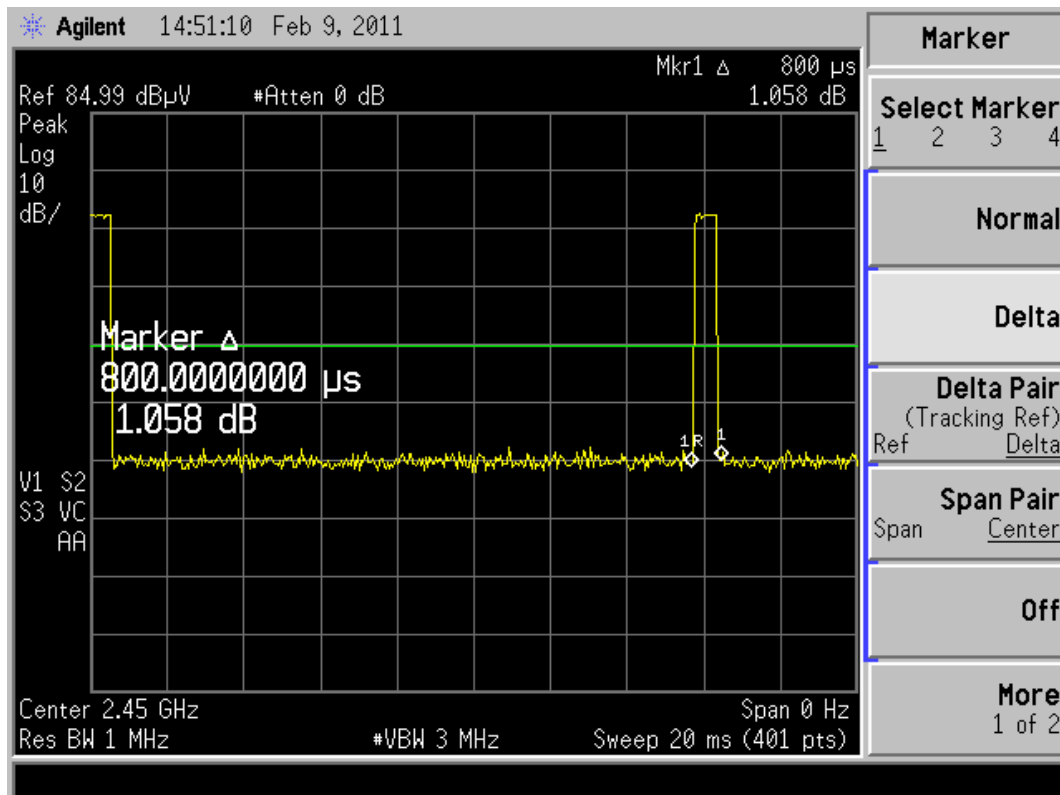
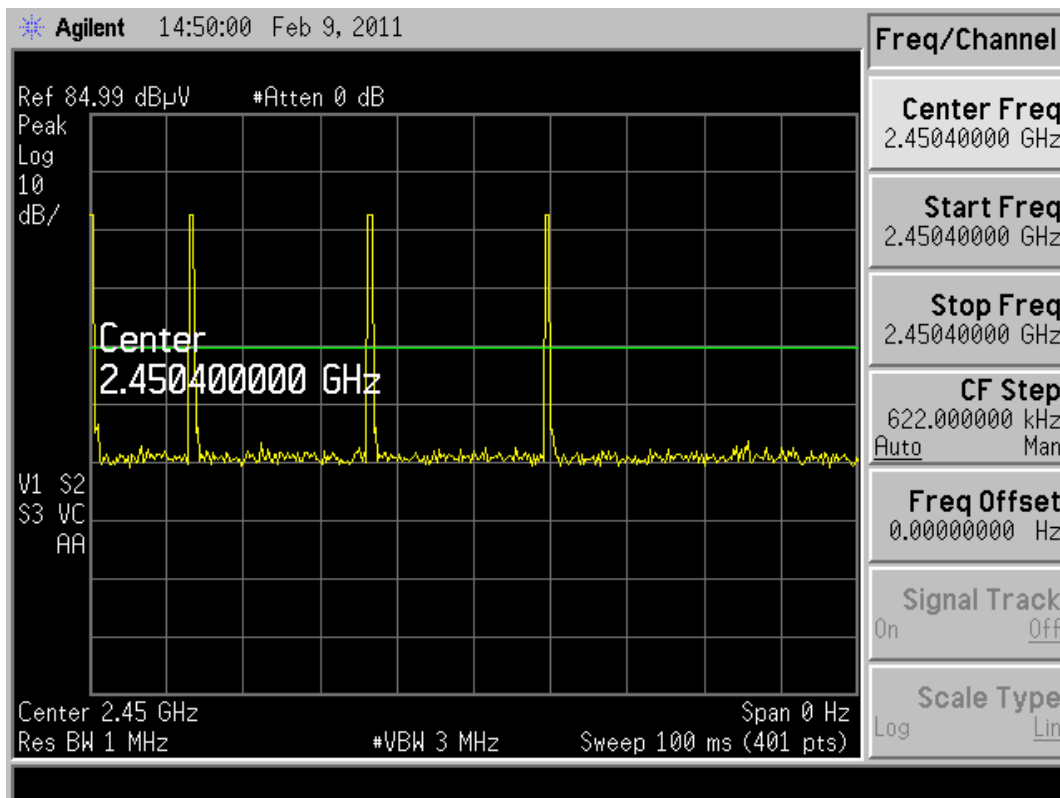
Duty Cycle: 5.2 ms

10.5 Test Data: Remote Product – Low Channel



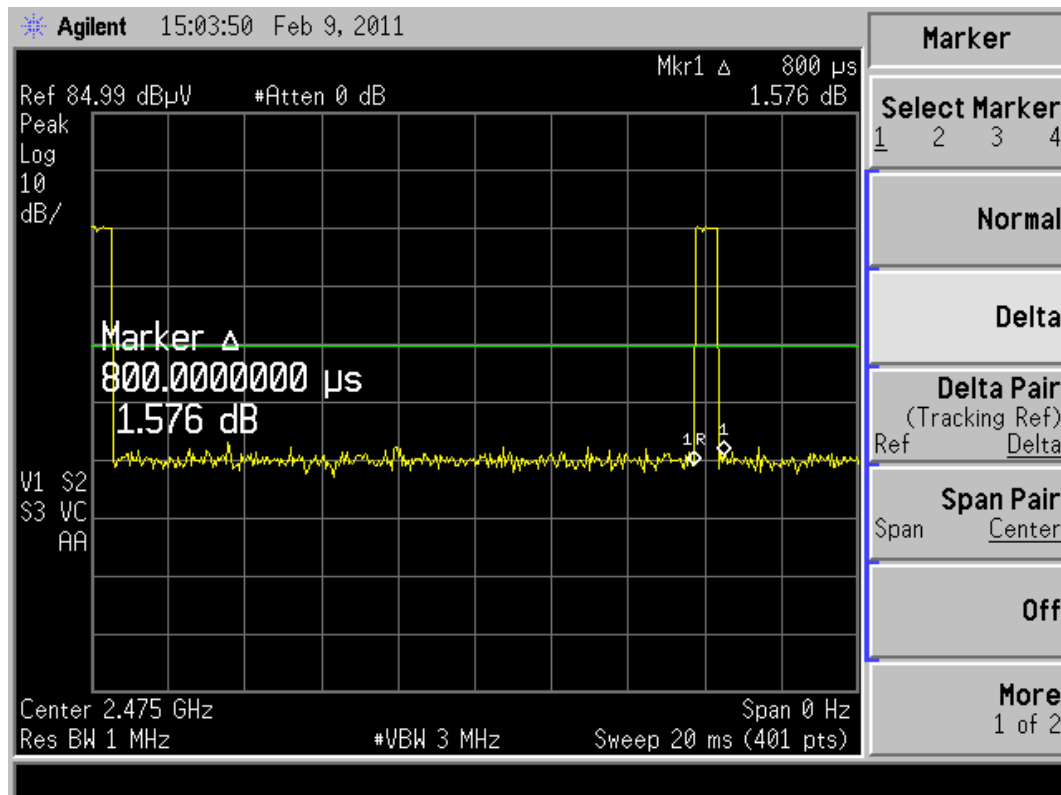
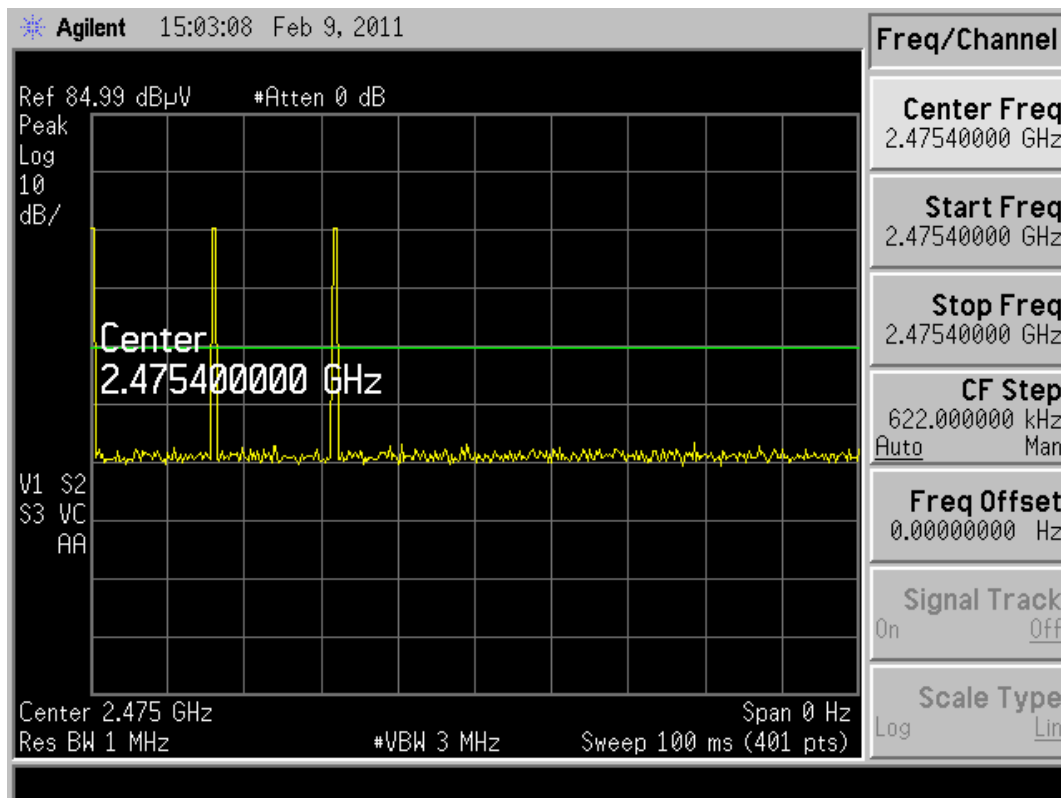
Duty Cycle: 2.4 ms

Test Data: Remote Product – Mid Channel



Duty Cycle: 3.2 ms

Test Data: Remote Product – High Channel



Duty Cycle: 2.4 ms

11 AC Conducted Emissions

11.1 Method

Unless otherwise stated no deviations were made from ANSI C63.10 and FCC publication KDB 558074 for DTS devices.

Intertek Louisville's emissions testing facility is located at 1795 Dogwood Street, Suite 200, Louisville, CO 80027. The emissions testing facility is ISO17025:2005 accredited.

11.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
18909	EMI Test Receiver	RHODE & SCHWARZ	ESHS 30	842806/001	06/15/2010	06/15/2011
18914	Single Phase LISN	EMCO	3816/NM	9408-1003	06/08/2010	06/08/2011
18730	Transient Limiter	Hewlett-Packard	11947A	2820A00277	04/27/2010	04/27/2011

11.3 Results:

The sample tested was found to Comply.

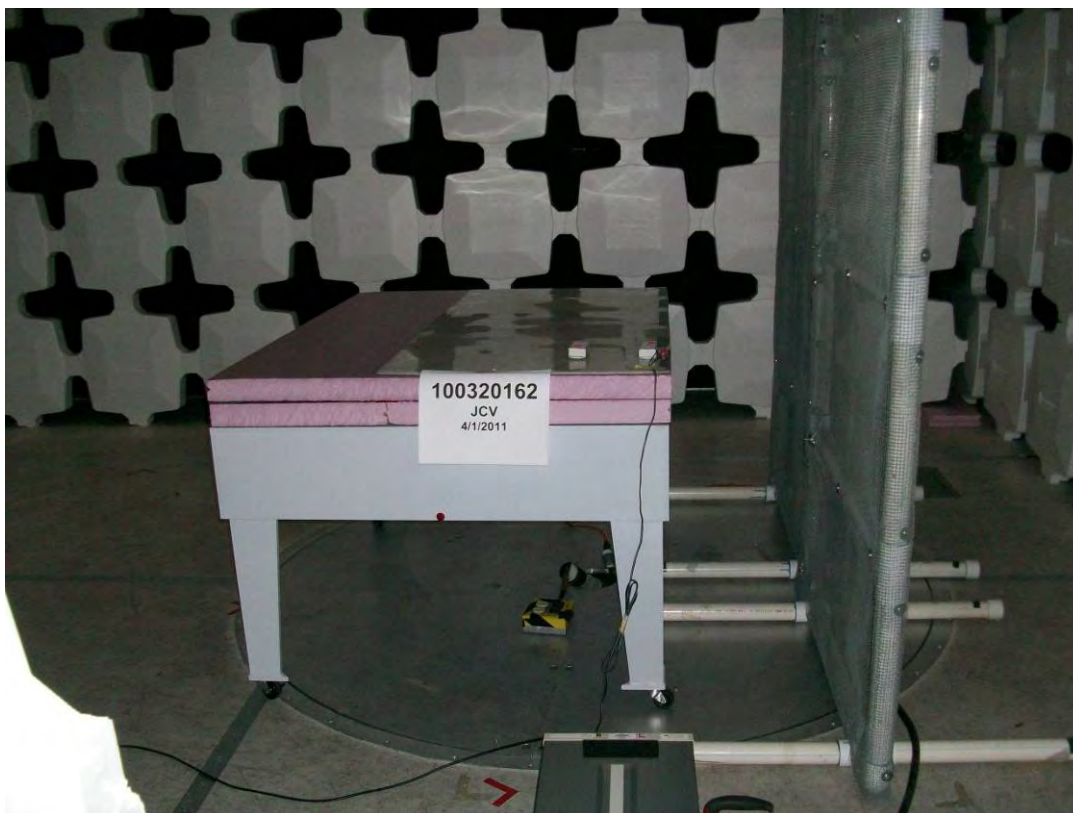
11.4 Setup Photographs:

Front View



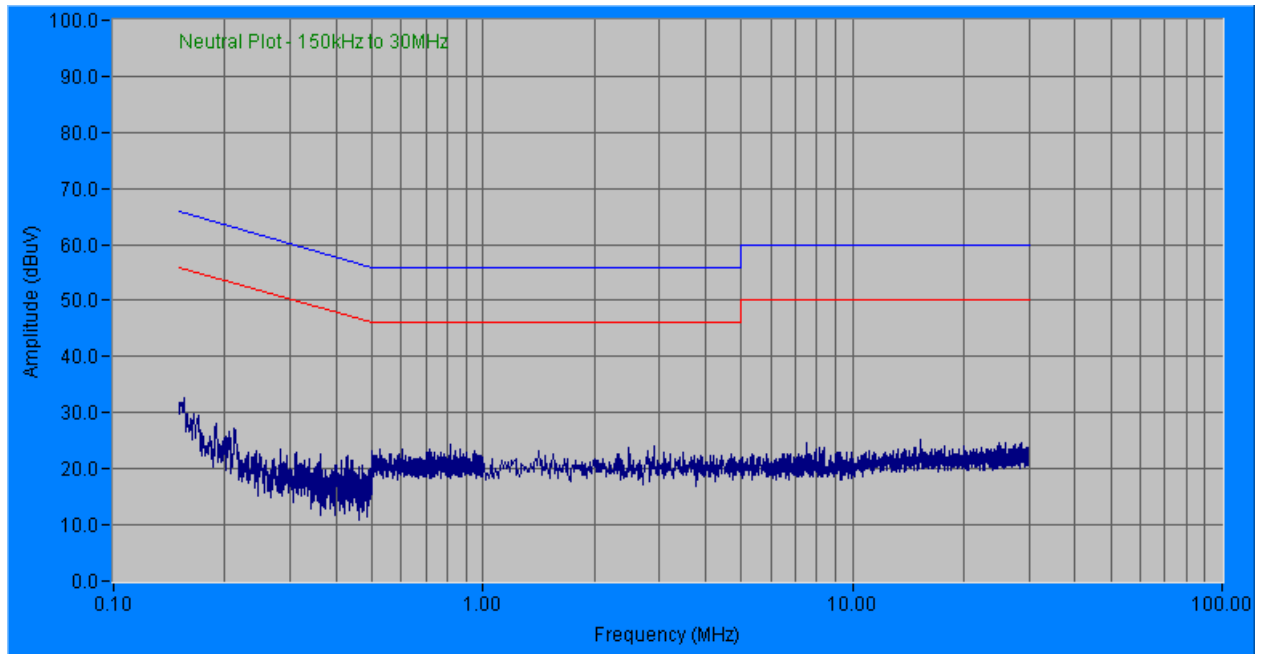
Photo:

Side View

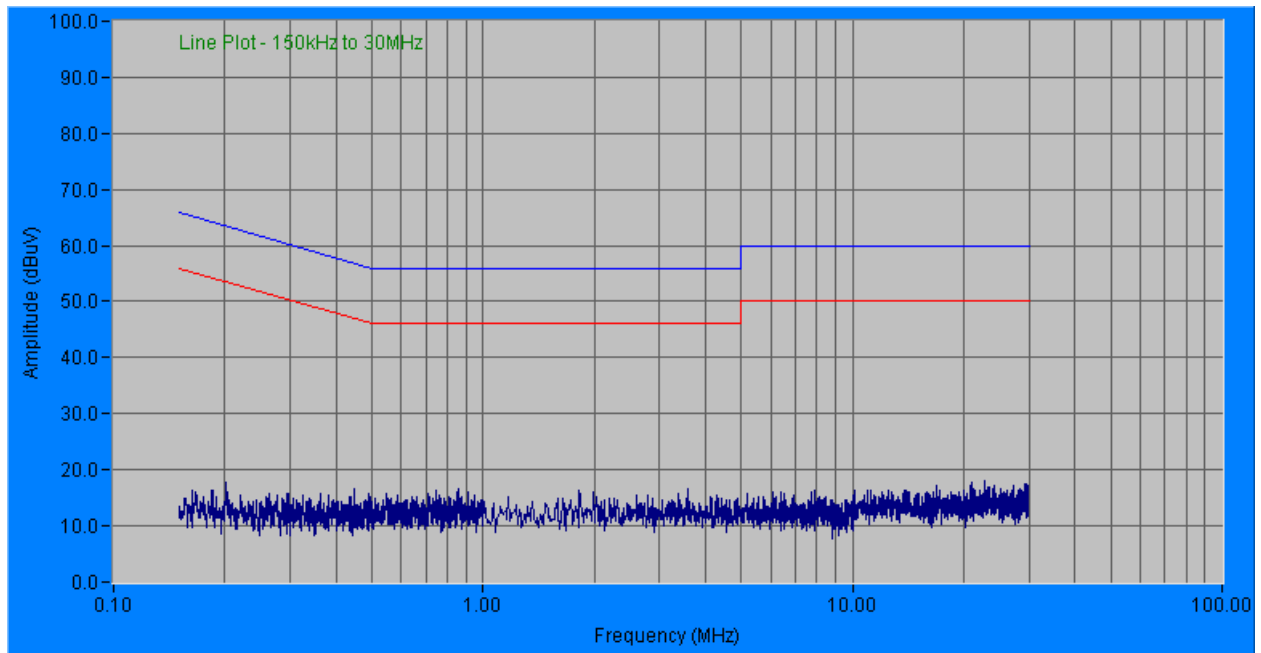


11.5 Prescan Plots: Not Final Data

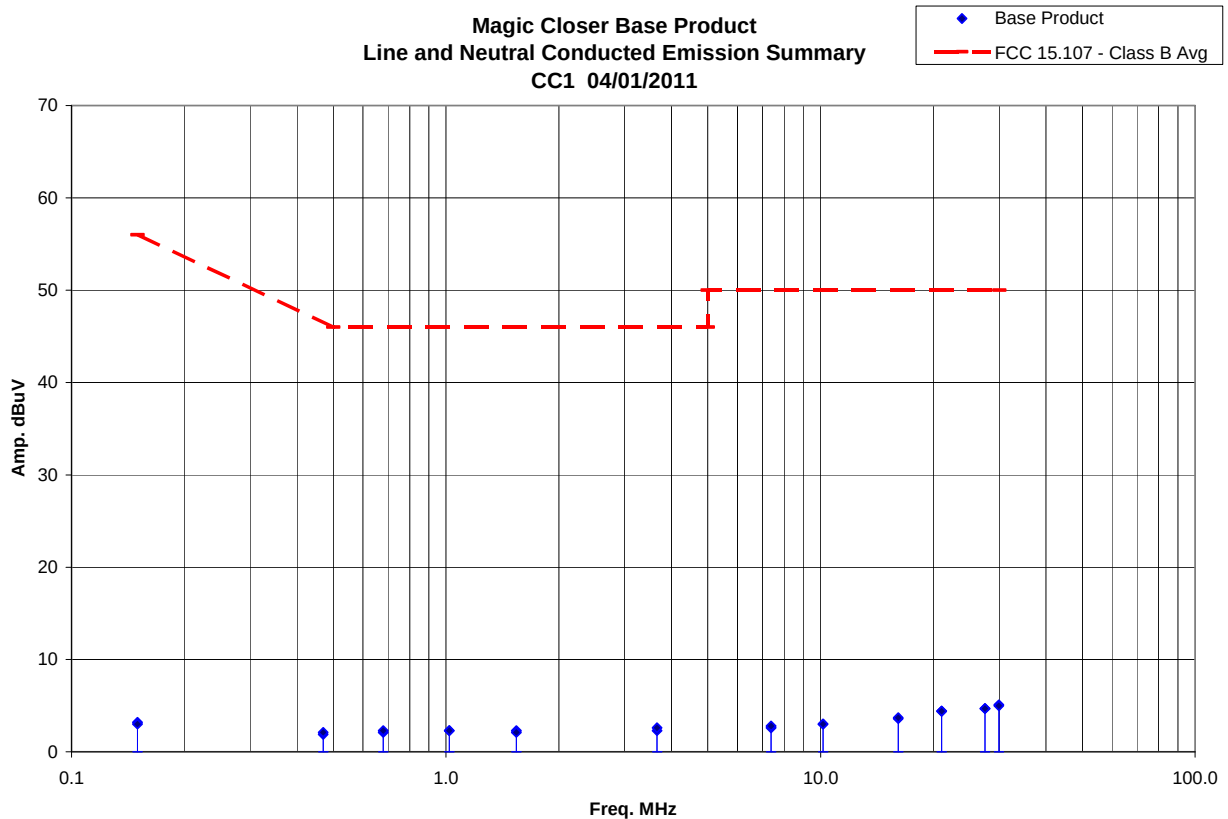
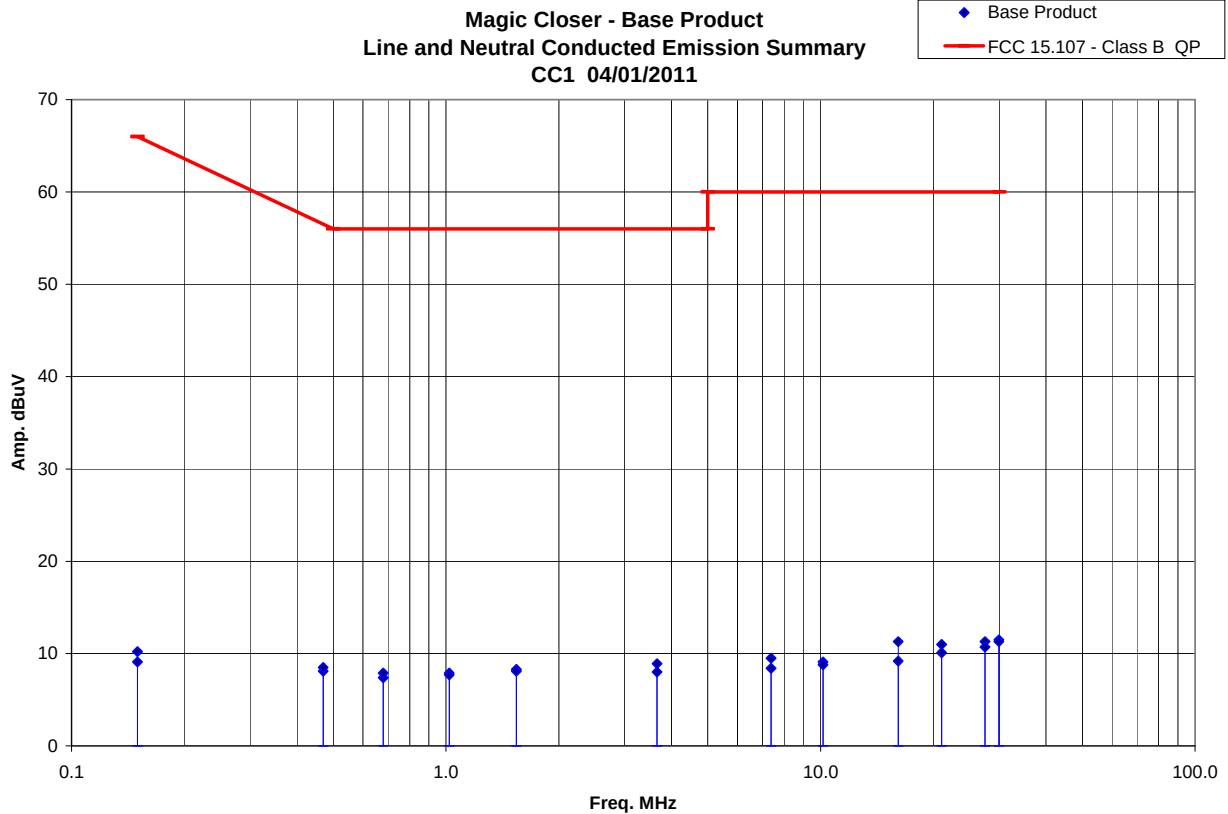
Neutral - 150kHz to 30MHz



Line - 150kHz to 30MHz



11.6 Final Plots:



11.7 Test Data:

Conducted Electromagnetic Emissions

Test Report #: **100320162 Run 01** Test Area: CC1 Conducted Temperature: 23.1 °C
 Test Method: FCC Part 15.107 Class B Test Date: 01-Apr-2011 Relative Humidity: 22.4 %
 EUT Model #: Magic Closer EUT Power: 115VAC/60Hz Air Pressure: 82.1 kPa
 EUT Serial #: _____
 Manufacturer: JCV Enterprises
 EUT Description: Garage Door Closer
 Notes: Test of Base Product with AC Adapter

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

FREQ	LEVEL	CABLE / LISN / ATTN	FINAL	TEST POINT	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB)	(dBuV)		AV15.107B	QP15.107B
0.150	-7.0 Av	0.1 / 0.2 / -9.9	3.2	Line 1	-52.8	N/A
0.150	-1.1 Qp	0.1 / 0.2 / -9.9	9.1	Line 1	N/A	-56.9
0.470	-8.3 Av	0.1 / 0.1 / -10.0	1.9	Line 1	-44.6	N/A
0.470	-2.1 Qp	0.1 / 0.1 / -10.0	8.1	Line 1	N/A	-48.4
0.680	-8.1 Av	0.1 / 0.1 / -10.0	2.1	Line 1	-43.9	N/A
0.680	-2.8 Qp	0.1 / 0.1 / -10.0	7.4	Line 1	N/A	-48.6
1.02	-8.0 Av	0.2 / 0.1 / -10.0	2.3	Line 1	-43.7	N/A
1.02	-2.4 Qp	0.2 / 0.1 / -10.0	7.9	Line 1	N/A	-48.1
1.54	-8.0 Av	0.2 / 0.1 / -10.0	2.3	Line 1	-43.7	N/A
1.54	-2.0 Qp	0.2 / 0.1 / -10.0	8.3	Line 1	N/A	-47.7
3.66	-8.1 Av	0.3 / 0.1 / -10.0	2.3	Line 1	-43.7	N/A
3.66	-1.5 Qp	0.3 / 0.1 / -10.0	8.9	Line 1	N/A	-47.1
7.38	-7.9 Av	0.4 / 0.1 / -10.0	2.6	Line 1	-47.4	N/A
7.38	-1.0 Qp	0.4 / 0.1 / -10.0	9.5	Line 1	N/A	-50.5
10.16	-7.7 Av	0.6 / 0.1 / -10.0	3.0	Line 1	-47.0	N/A
10.16	-1.6 Qp	0.6 / 0.1 / -10.0	9.1	Line 1	N/A	-50.9
16.12	-7.7 Av	1.1 / 0.2 / -10.0	3.6	Line 1	-46.4	N/A
16.12	0.0 Qp	1.1 / 0.2 / -10.0	11.3	Line 1	N/A	-48.7
21.06	-7.2 Av	1.1 / 0.5 / -10.0	4.4	Line 1	-45.6	N/A
21.06	-0.6 Qp	1.1 / 0.5 / -10.0	11.0	Line 1	N/A	-49.0
27.48	-7.3 Av	1.3 / 0.7 / -10.0	4.7	Line 1	-45.3	N/A
27.48	-0.7 Qp	1.3 / 0.7 / -10.0	11.3	Line 1	N/A	-48.7
29.91	-7.1 Av	1.4 / 0.8 / -10.0	5.1	Line 1	-44.9	N/A
29.91	-0.7 Qp	1.4 / 0.8 / -10.0	11.5	Line 1	N/A	-48.5
0.150	-7.2 Av	0.1 / 0.2 / -9.9	3.0	Neutral	-53.0	N/A
0.150	0.0 Qp	0.1 / 0.2 / -9.9	10.2	Neutral	N/A	-55.8
0.470	-8.1 Av	0.1 / 0.1 / -10.0	2.1	Neutral	-44.4	N/A
0.470	-1.7 Qp	0.1 / 0.1 / -10.0	8.5	Neutral	N/A	-48.0
0.680	-7.9 Av	0.1 / 0.1 / -10.0	2.3	Neutral	-43.7	N/A

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FREQ	LEVEL	CABLE / LISN / ATTEN	FINAL	TEST POINT	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB)	(dBuV)		AV15.107B	QP15.107B
0.680	-2.3 Qp	0.1 / 0.1 / -10.0	7.9	Neutral	N/A	-48.1
1.02	-8.0 Av	0.2 / 0.1 / -10.0	2.3	Neutral	-43.7	N/A
1.02	-2.6 Qp	0.2 / 0.1 / -10.0	7.7	Neutral	N/A	-48.3
1.54	-8.2 Av	0.2 / 0.1 / -10.0	2.1	Neutral	-43.9	N/A
1.54	-2.2 Qp	0.2 / 0.1 / -10.0	8.1	Neutral	N/A	-47.9
3.66	-7.8 Av	0.3 / 0.1 / -10.0	2.6	Neutral	-43.4	N/A
3.66	-2.4 Qp	0.3 / 0.1 / -10.0	8.0	Neutral	N/A	-48.0
7.38	-7.7 Av	0.4 / 0.1 / -10.0	2.8	Neutral	-47.2	N/A
7.38	-2.1 Qp	0.4 / 0.1 / -10.0	8.4	Neutral	N/A	-51.6
10.16	-7.7 Av	0.6 / 0.1 / -10.0	3.0	Neutral	-47.0	N/A
10.16	-1.9 Qp	0.6 / 0.1 / -10.0	8.8	Neutral	N/A	-51.2
16.12	-7.6 Av	1.1 / 0.2 / -10.0	3.7	Neutral	-46.3	N/A
16.12	-2.1 Qp	1.1 / 0.2 / -10.0	9.2	Neutral	N/A	-50.8
21.06	-7.2 Av	1.1 / 0.5 / -10.0	4.4	Neutral	-45.6	N/A
21.06	-1.5 Qp	1.1 / 0.5 / -10.0	10.1	Neutral	N/A	-49.9
27.48	-7.3 Av	1.3 / 0.7 / -10.0	4.7	Neutral	-45.3	N/A
27.48	-1.3 Qp	1.3 / 0.7 / -10.0	10.7	Neutral	N/A	-49.3
29.91	-7.2 Av	1.4 / 0.8 / -10.0	5.0	Neutral	-45.0	N/A
29.91	-0.9 Qp	1.4 / 0.8 / -10.0	11.3	Neutral	N/A	-48.7

Intertek

Report Number: 100320162DEN-001

Issued: 02/28/2011

FREQ	LEVEL	CABLE / LISN / ATTEN	FINAL	TEST POINT	DELTA1 (dB)	DELTA2 (dB)
(MHz)	(dBuV)	(dB)	(dBuV)		AV15.107B	QP15.107B
***** Measurement Summary *****						
3.66	-7.8 Av	0.3 / 0.1 / -10.0	2.6	Neutral	-43.4	N/A
0.680	-7.9 Av	0.1 / 0.1 / -10.0	2.3	Neutral	-43.7	N/A
1.02	-8.0 Av	0.2 / 0.1 / -10.0	2.3	Neutral	-43.7	N/A
1.54	-8.0 Av	0.2 / 0.1 / -10.0	2.3	Line 1	-43.7	N/A
0.470	-8.1 Av	0.1 / 0.1 / -10.0	2.1	Neutral	-44.4	N/A
29.91	-7.1 Av	1.4 / 0.8 / -10.0	5.1	Line 1	-44.9	N/A
27.48	-7.3 Av	1.3 / 0.7 / -10.0	4.7	Neutral	-45.3	N/A
21.06	-7.2 Av	1.1 / 0.5 / -10.0	4.4	Neutral	-45.6	N/A
16.12	-7.6 Av	1.1 / 0.2 / -10.0	3.7	Neutral	-46.3	N/A
10.16	-7.7 Av	0.6 / 0.1 / -10.0	3.0	Neutral	-47.0	N/A
7.38	-7.7 Av	0.4 / 0.1 / -10.0	2.8	Neutral	-47.2	N/A
0.150	-7.0 Av	0.1 / 0.2 / -9.9	3.2	Line 1	-52.8	N/A

Example 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) Remote product is battery only – no conducted emissions applicable.

12 Measurement Uncertainty

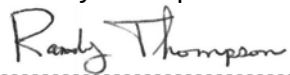
The measured value related to the corresponding limit will be used to decide whether the equipment meets the requirements.

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	4.8 dB	
Radiated emissions, 1 to 18 GHz	4.9 dB	
AC mains Conducted emissions, 150kHz to 30 MHz	3.14 dB	

13 Revision History

Revision Level	Date	Report Number	Notes
0	02/28/2011	100320162DEN-001	Original Issue
1	04/04/2011	100320162DEN-001	Revised report per TCB reviewer requests 1. added conducted emissions data – pg 70 2. removed duty cycle correction from fundamental measurements – pg 17-18 & 21-22. 3. revised conversion from field strength (dBuV/m) to power (W) to demonstrate compliance to fundamental output power limit – pg 18 & 22. 4. added plots for Tx spurious in restricted bands – pg 62. Randy Thompson 
2	04/07/2011	100320162DEN-001	Added remote band edge plots- pg 63 Added ac adapter details – pg 8 per TCB R.T.