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TEST REPORT

Report Number: 3193461LEX-001
Project Number: 3193461

Evaluation of the Universal Procedure Table
Model Number: 9A408T

FCC ID: U399A408T1
Industry Canada: 6978A-9A408T1

FCC Part 15 Subpart B & FCC Part 15 Subpart C
ICES-003 & RSS-210 Issue 7

For

Midmark Corporation

Test Performed by:

Intertek
731 Enterprise Drive
Lexington, KY 40510

Test Authorized by:

Midmark Corporation
60 Vista Drive

PO Box 286
Versailles, OH 45380

Prepared By: _____ **Date:** 11/29/2009

Jason Centers, Senior Project Engineer

Approved By: _____ **Date:** 11/29/2009

Bryan C. Taylor, Team Leader

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1 JOB DESCRIPTION

1.1 Company Information

Company Information	
Manufacturer:	Midmark Corporation
Address:	60 Vista Drive PO Box 286 Versailles, OH 45380
Contact Name:	Randall Evers
Telephone Number:	(937) 526-8711
Email Address:	revers@midmark.com

1.2 Test Sample Information

The Universal Procedure Table Model 9A408T is a powered examination chair for medical use. The chair can be controlled with either wired or wireless remotes. This report pertains only to the transmitter and receiver section of the Universal Procedure Table Model 9A408T.

Test sample	
Model Number:	9A408T
Serial Number:	Test Sample 1
FCC ID:	U399A408T1
Device Category:	Mobile
RF Exposure Category:	General Population/Uncontrolled Environment
Transmission:	Zigbee, 0-QPSK Modulation
Frequency Range (MHz)	2405-2480
Antenna Type:	Maxrad Model # MMSO2300 (Gain = 0dBi) with 8 inch RG-188/AU cable
Antenna Location:	External

1.3 System Support Equipment

No support equipment was necessary for evaluation.

1.4 Cables Used During Testing

Table 1-1 contains the details of the cables used during the testing.

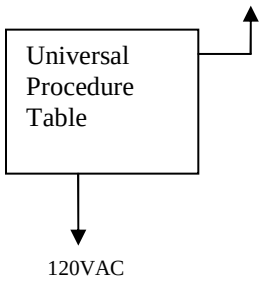
Table 1-1: Interconnecting Cables Used During Testing

Cables					
Description	**Length**	**Shielding**	**Ferrites**	**Connection**	
				From	**To**
AC Power Cable	6 ft	None	None	AC Power Source	AC Power Input

1.5 System Block Diagram(s)

The diagrams below detail the interconnection of the EUT and its accessories during the testing.

Figure 1-1: Test Configuration



1.6 Mode(s) of operation / Engineering Judgments

The Universal Procedure Table was powered by 120VAC. Midmark Corporation provided a sample with special firmware that allowed constant transmission at the maximum duty cycle that will be used in normal operation. Tests were performed on the high, middle, and lowest channels at maximum output power.

2 EXECUTIVE SUMMARY

Testing performed for: Midmark Corporation

Equipment Under Test: 9A408T

Receipt of Test Sample: 11/11/2009

Test Start Date: 11/11/2009

Test End Date: 11/20/2009

FCC RULE	IC RULE	DESCRIPTION OF TEST	RESULT	PAGE
§15.249, §15.209	RSS-210:2.6, RSS-210:A2.9	Field Strength of Spurious Radiation	**Compliant**	8
§15.109	ICES-003, RSS-Gen 6a	Radiated Receiver Emissions	**Compliant**	15
§15.107, §15.207	ICES-003, RSS-Gen	Conducted Voltage Emissions	**Compliant**	17

2.1 Modifications required for compliance

No modifications were implemented by Intertek. All results in this report pertain to the un-modified sample provided to Intertek.

3 TEST FACILITY

All testing was completed at the INTERTEK-Lexington location at 731 Enterprise Drive, Lexington Kentucky, 40510. The radiated emission test site is a 10-meter semi-anechoic chamber. The chamber meets the characteristics of CISPR 16-1and ANSI C63.4. For measurements, a remotely controlled flush-mount metal-top turntable is used to rotate the EUT a full 360 degrees. A remote controlled non-conductive antenna mast is used to scan the antenna height from one to four meters.

For radiated immunity testing, removable ferrite tiles are positioned between the transmitting antenna and the area occupied by the equipment under test. The remaining tests typically are performed outside the chamber on the conducting ground reference plane.

The test site is listed with the FCC under registration number 485103. The test site is listed with Industry Canada under site number 2042M-1.

3.1 Test Equipment

Description	Manufacturer	Model Number	Serial Number	Calibration due date
Horn Antenna	EMCO	3115	6556	8/4/2010
Horn Antenna	EMCO	3116	9310-2222	5/18/2010
EMC Analyzer	HP	E7405A	2142	8/21/2010
EMI Receiver	Rohde & Schwarz	ESI 26	1088.7490	9/14/2010
Bilog Antenna	EMCO	3142C	00051864	12/24/2009
Preamplifier	Miteq	JS418004000	965178	9/21/2010
Preamplifier	Miteq	AFS44-00102000-30-10P-44	987410	6/17/2010
LISN	Fischer Custom Communication	FCC-LISN-50-50-2M	1026	5/12/2010
Powermeter	Boonton	5232	2115	6/16/2010
Power Sensor	Boonton	51033-6E	3185	4/7/2010

4 FIELD STRENGTH OF SPURIOUS RADIATION

FCC §15.209, §15.249

RSS-210:2.6, RSS-210:A2.9

4.1 Test Procedure

- Measurements are made over the frequency range of 30 MHz to ten times the highest frequency operating within the device.
- The measuring receiver meets the requirements of Section One of CISPR 16 and the measuring antenna correlates to a balanced dipole.
- From 30 to 1000 MHz, a quasi-peak detector was used for measurement. Above 1000 MHz, average measurements were performed.
- The antenna is adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.
- The antenna-to-EUT azimuth is varied during the measurement to find the maximum field-strength readings.
- The antenna-to-EUT polarization (horizontal and vertical) is varied during the measurements to find the maximum field-strength readings.
- The EUT was a floor standing device so it was placed on the ground on a thin insulating support.
- Equipment setup for radiated disturbance tests followed the guidelines of ANSI C63.4.
- The test was performed on the low, middle, and highest transmitting frequencies at maximum output power.
- For fundamental emissions near the restricted bands of §15.205, measurements were performed to show compliance with the limits in the restricted band. If the fundamental emission is within two standard bandwidths of the restricted band, the “marker delta-method” was performed. The EUT azimuth and antenna height were varied to obtain a maximum field-strength reading. The analyzer reading was corrected for cable loss, antenna factor, and pre-amp gain. Using bandwidths and detectors required by ANSI C63.4 an in-band measurement of the fundamental emission was performed. After obtaining a corrected reading for the fundamental emission, the spectrum analyzer was setup with a span large enough to capture the fundamental emission and the band-edge under investigation. A resolution bandwidth of 1% of the span (not less than 30kHz) was used. Several sweeps were performed in peak-hold mode. The amplitude delta between the peak of the fundamental emission and the peak emission at the restricted band edge was recorded. The amplitude delta is subtracted from the maximized field strength reading to determine compliance at the band-edge.
- If the fundamental emission is more than two standard bandwidths from the restricted band, a spectrum analyzer was setup to sweep through the restricted band. The analyzer reading was corrected for cable loss, antenna factor, and pre-amp gain. The EUT azimuth and antenna height were varied to obtain a maximum field-strength reading. Several sweeps were performed in max-hold mode and the result was compared to the limits of §15.209.
- The readings obtained from the measurement receiver were corrected for antenna factor, cable loss, and pre-amp gain. An example calculation is shown below.

Example of Field Strength Calculation Method:

The measured field strength was calculated by summing the readings taken from the spectrum analyzer with the appropriate correction factors associated with the antenna losses and cable losses. The calculation formula and sample calculation are listed below.

Formula:

FS = RA + AF + CF

FS = Field Strength in dBµV/m

RA = Receiver Amplitude (Quasi-Peak) in dBµV

AF = Antenna Factor in dB

CF = Cable Attenuation Factor in dB

Example Calculation:

RA = 19.48 dBµV

AF = 18.52 dB

CF = 0.78 dB

FS = 19.48 + 18.52 + 0.78 = 38.78 dBµV/m

Level in µV/m = Common Antilogarithm [(38.78 dBµV/m)/20] = 86.89 µV/m

4.2 Test Results

The Universal Procedure Table met the field strength requirements of FCC §15.249 for the fundamental, harmonics and spurious emissions. See Table 4-1 and for the measured fundamental and spurious emissions. All other spurious emissions not shown below were greater than 20dB below the limit.

Table 4-1: Field Strength of Spurious Radiation

TX Channel	Frequency	Polarity	Corr. Peak Reading. (dBuV/m)	Corr. Avg Reading. (dBuV/m)	Peak Limit (dBuV/m)	Avg. Limit (dBuV/m)	Results	Comments
Low Channel	2.4047 GHz	H	87.211	63.271	114	94	**Compliant**	Fundamental
Low Channel	2.4046 GHz	V	88.063	67.643	114	94	**Compliant**	Fundamental
Low Channel	4.8095 GHz	H	45.184	29.714	74	54	**Compliant**	
Low Channel	7.215 GHz	H	45.227	32.437	74	54	**Compliant**	
Low Channel	4.8092 GHz	V	44.246	32.85	74	54	**Compliant**	
Low Channel	7.2151 GHz	V	46.226	36.151	74	54	**Compliant**	
Mid Channel	2.4447 GHz	H	90.582	69.292	114	94	**Compliant**	Fundamental
Mid Channel	2.4457 GHz	V	89.749	70.279	114	94	**Compliant**	Fundamental
Mid Channel	4.8914 GHz	H	44.579	29.459	74	54	**Compliant**	
Mid Channel	7.334 GHz	H	46.617	32.287	74	54	**Compliant**	
Mid Channel	4.8893 GHz	V	45.59	32.951	74	54	**Compliant**	
Mid Channel	7.3337 GHz	V	46.224	36.608	74	54	**Compliant**	
High Channel	2.4797 GHz	H	85.189	70.469	114	94	**Compliant**	Fundamental
High Channel	2.4806 GHz	V	83.067	72.627	114	94	**Compliant**	Fundamental
High Channel	4.9596 GHz	H	47.5	31.24	74	54	**Compliant**	
High Channel	7.442 GHz	H	46.947	33.367	74	54	**Compliant**	
High Channel	4.9593 GHz	V	47.299	33.172	74	54	**Compliant**	
High Channel	7.4419 GHz	V	47.015	36.681	74	54	**Compliant**	

Band-Edge Compliance: 2310MHz – 2390MHz Restricted Band, Low Channel, Peak Detector

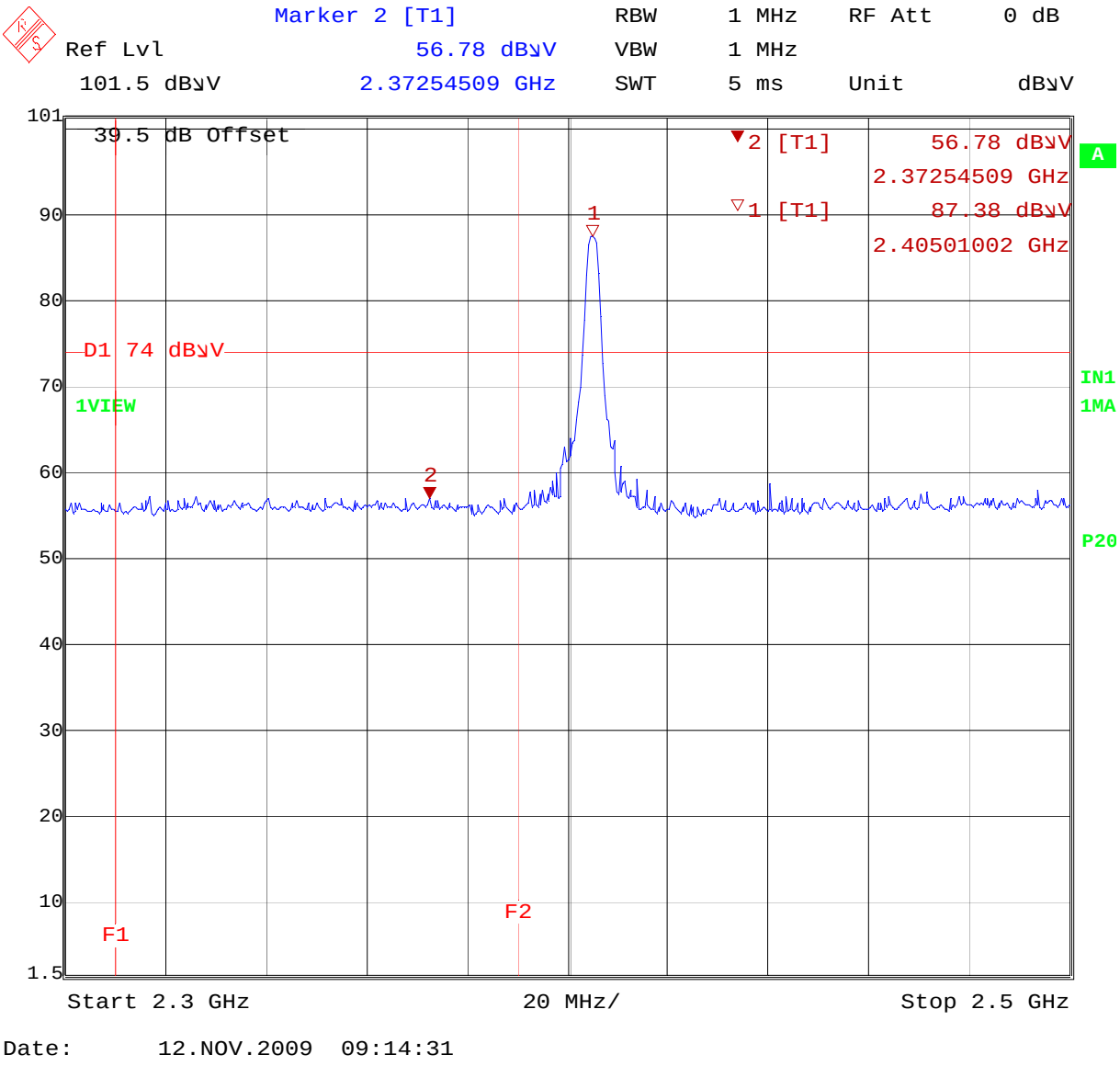


Exhibit 1

Evaluation For: Midmark Corporation FCC ID: U399A408T1
Model No: 9A408T IC ID: 6978A-9A408T1

Band-Edge Compliance: 2310MHz – 2390MHz Restricted Band, Low Channel, Average Detector

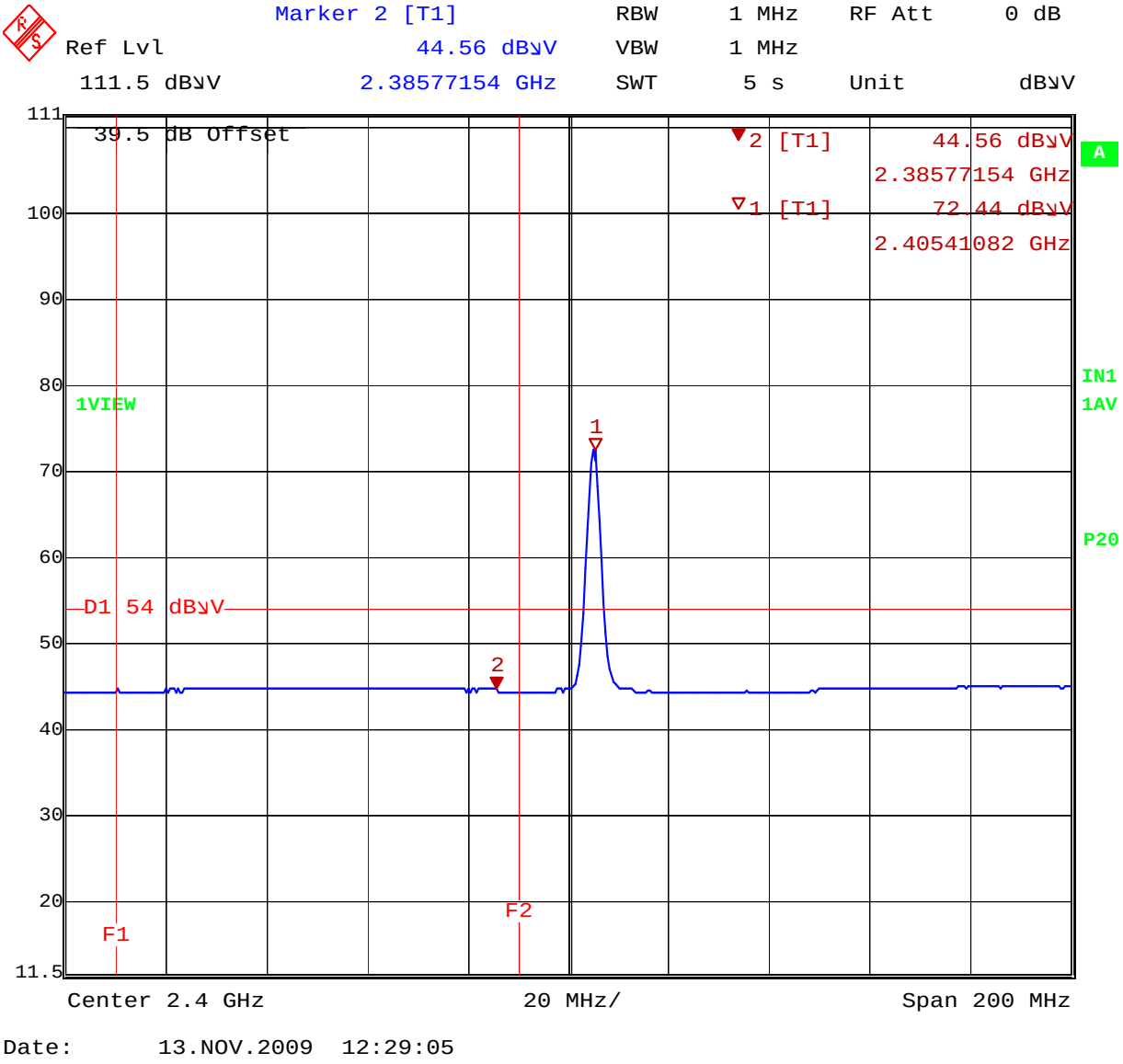


Exhibit 2

Band-Edge Compliance (Marker-Delta Method): 2483.5MHz – 2500MHz Restricted Band, High Channel
Peak Detector

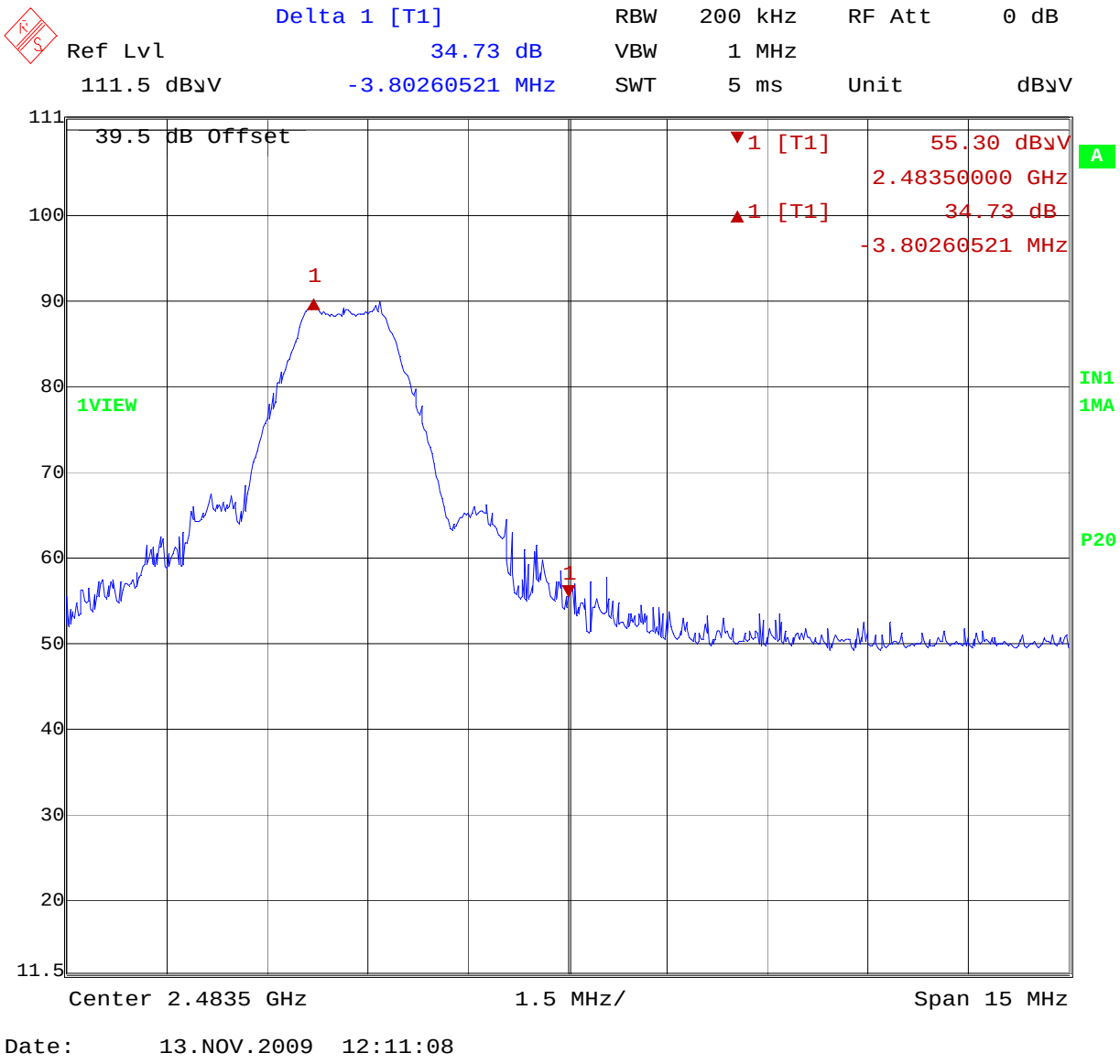


Exhibit 3

Peak Field Strength: 85.189 dBuV/m

Marker Delta = 34.73dB

Band Edge Measurement = 85.189dBuV/m - 34.73dB = 50.459dBuV/m

Band-Edge Compliance (Marker-Delta Method): 2483.5MHz – 2500MHz Restricted Band, High Channel
Average Detector

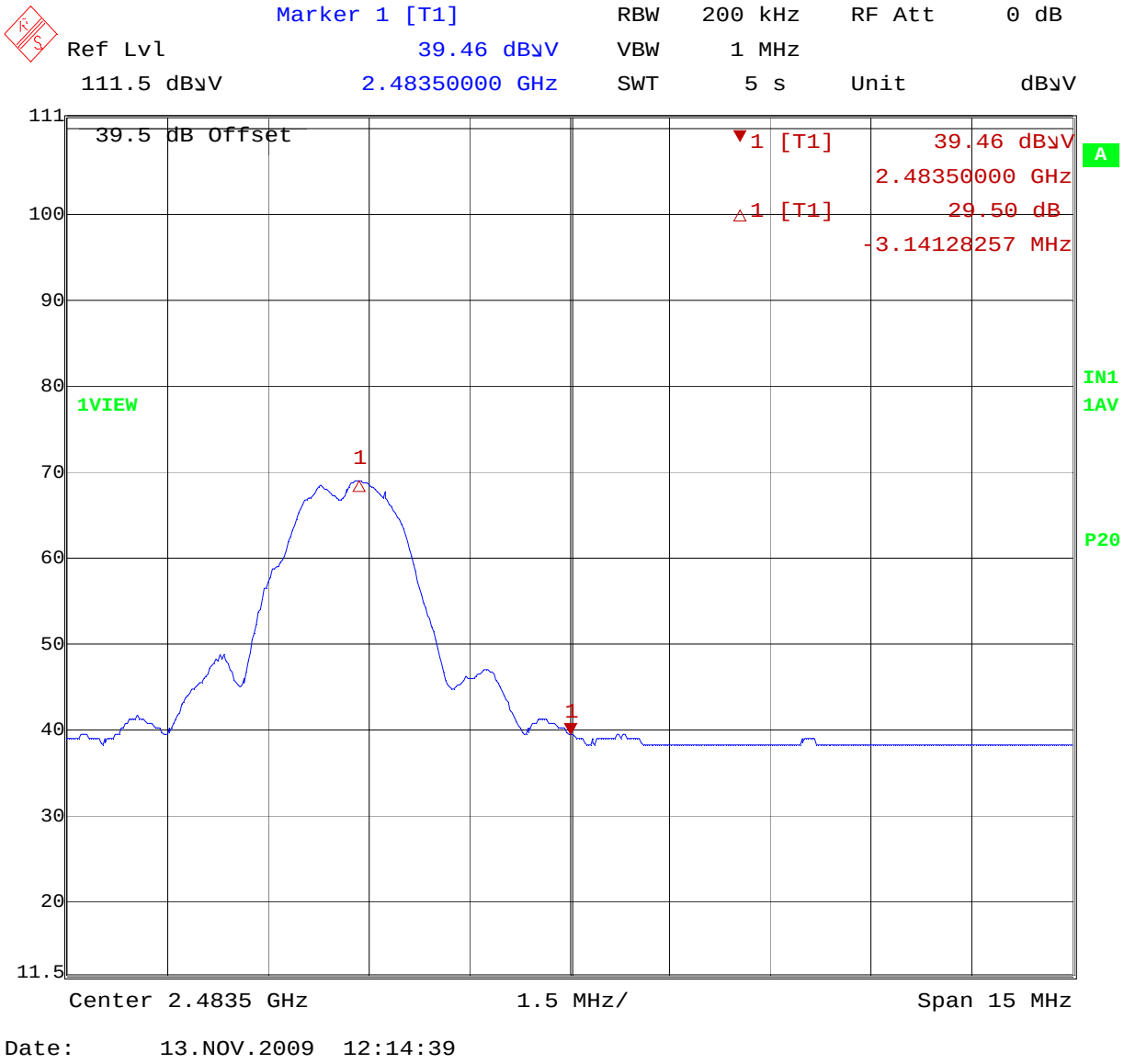


Exhibit 4

Average Field Strength: 72.627 dBuV/m

Marker Delta = 29.5dB

Band Edge Measurement = 72.627dbuV/m - 29.5dB = 43.127dBuV/m

5 RADIATED RECEIVER EMISSIONS

FCC §15.109

ICES-003, RSS-Gen 6a

5.1 Test Procedure

- Measurements are made over the frequency range of 30 MHz to five times the highest frequency operating within the device.
- The measuring receiver meets the requirements of Section One of CISPR 16 and the measuring antenna correlates to a balanced dipole.
- From 30 to 1000 MHz, a quasi-peak detector was used for measurement. Above 1000 MHz, average measurements were performed.
- The antenna is adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.
- The antenna-to-EUT azimuth is varied during the measurement to find the maximum field-strength readings.
- The antenna-to-EUT polarization (horizontal and vertical) is varied during the measurements to find the maximum field-strength readings.
- The EUT was a floor standing device so it was placed on the ground on a thin insulating support.
- The test was performed on the device while in receive mode.
- Equipment setup for radiated disturbance tests followed the guidelines of ANSI C63.4.
- The readings obtained from the measurement receiver were corrected for antenna factor, cable loss, and pre-amp gain. An example calculation is shown below.

Example of Field Strength Calculation Method:

The measured field strength was calculated by summing the readings taken from the spectrum analyzer with the appropriate correction factors associated with the antenna losses and cable losses. The calculation formula and sample calculation are listed below.

Formula:

FS = RA + AF + CF

FS = Field Strength in dBµV/m

RA = Receiver Amplitude (Quasi-Peak) in dBµV

AF = Antenna Factor in dB

CF = Cable Attenuation Factor in dB

Example Calculation:

RA = 19.48 dBµV

AF = 18.52 dB

CF = 0.78 dB

FS = 19.48 + 18.52 + 0.78 = 38.78 dBµV/m

Level in µV/m = Common Antilogarithm [(38.78 dBµV/m)/20] = 86.89 µV/m

5.2 Test Results

The Universal Procedure Table was **compliant** with the radiated emissions requirements of FCC §15.109 of Class B limits. The maximized radiated emissions data can be found in Exhibit 5. Graphical results are shown in Exhibit 6.

Maximized Quasi Peak and Average Emissions

Test Engineer: Bryan Taylor
Test Start Date: 11/13/2009 **Test End Date:** 11/13/2009
Emission Limit Tested To: Class B **Test Distance (EUT to Antenna):** 3m
All radiated emissions above the noise floor from the device were greater than 10dB below the limit when measured with a peak detector.

Exhibit 5

Graphical Peak Scan

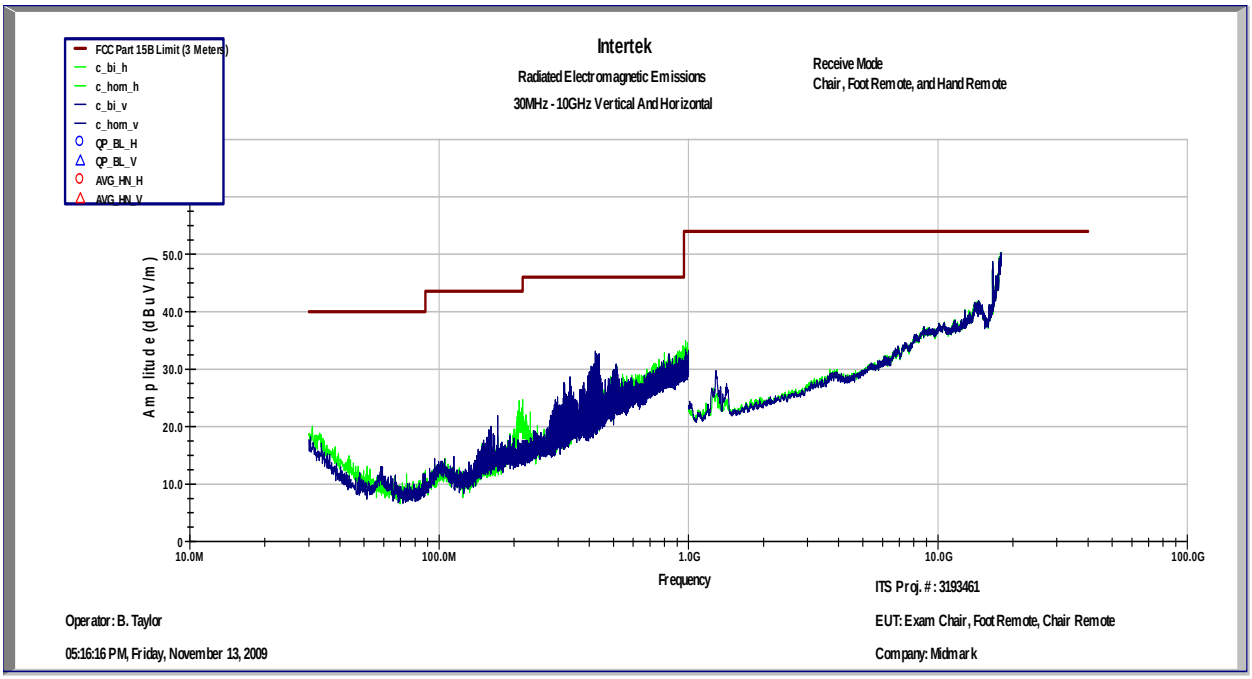


Exhibit 6

6 CONDUCTED VOLTAGE EMISSIONS

§15.107

§15.207

ICES-003

RSS-Gen 7.2.2

6.1 Test Method:

Conducted voltage emission measurements were performed as follows:

- The Universal Procedure Table was connected to the power source using a Line Impedance Stabilization Network (LISN) in line with each current carrying conductor.
- A spectrum analyzer was connected to the RF port of the LISN installed on the line under test.
- The LISNs installed on all lines not under test were terminated into 50 Ω.
- The Universal Procedure Table was powered.
- The orientation of each connecting cable was varied to find the configuration that maximized the conducted emission.
- The insertion loss of the measurement cable, the LISN insertion loss, and the output of the spectrum analyzer were added together to give a corrected reading in dBuV.
- The corrected reading was compared to the limit above to determine compliance.
- A quasi-peak and/or average detector was used for measurements close to or exceeding the limit with a peak detector.
- The test was performed on the low, middle and highest transmitting frequencies at maximum output power and in receive mode.

6.2 Test Results:

The Universal Procedure Table was **compliant** with conducted voltage emissions requirements of Part 15.207. No conducted voltage emissions on the AC power interface exceeded the quasi-peak or average limits. See Exhibit 7 for tabular results of conducted voltage emissions and Exhibit 8 through Exhibit 11 for graphical test results.

Conducted Voltage Emissions Tabular Data

Test Engineer: Bryan Taylor
Test Start Date: 11/13/2009 **Test End Date:** 11/13/2009
Emission Limit Tested To: 15.207 / 15.107
General Notes / Comments / Performance Monitoring Method: Device powered by 120VAC, 60Hz
All emissions were greater than 20dB below the average limit when measured with the peak detector.

Exhibit 7

Conducted Voltage Emissions Graphical Data – Low Channel

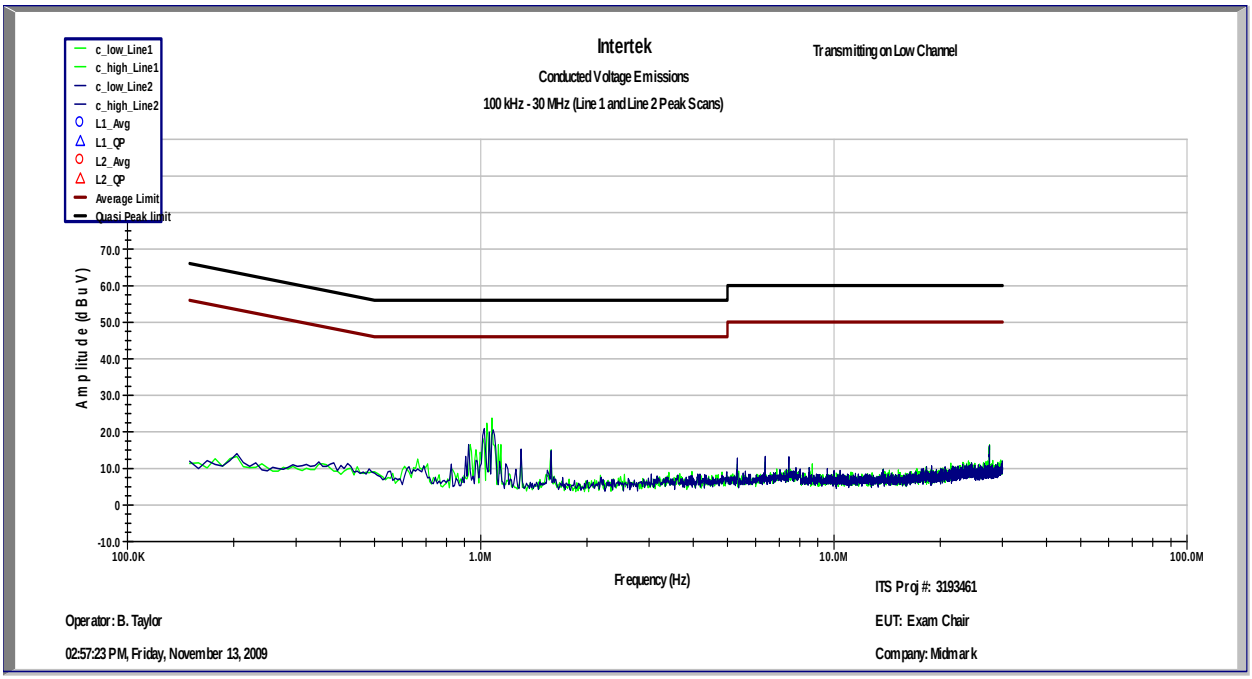


Exhibit 8

Conducted Voltage Emissions Graphical Data – Middle Channel

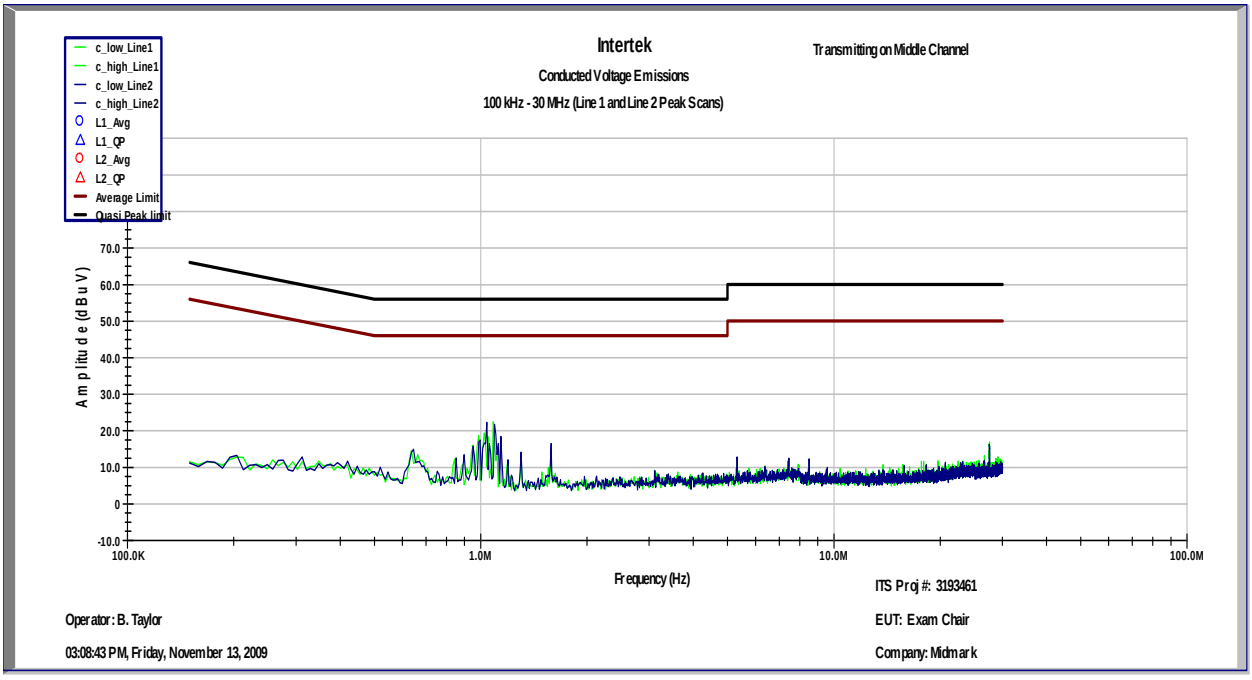


Exhibit 9

Conducted Voltage Emissions Graphical Data – High Channel

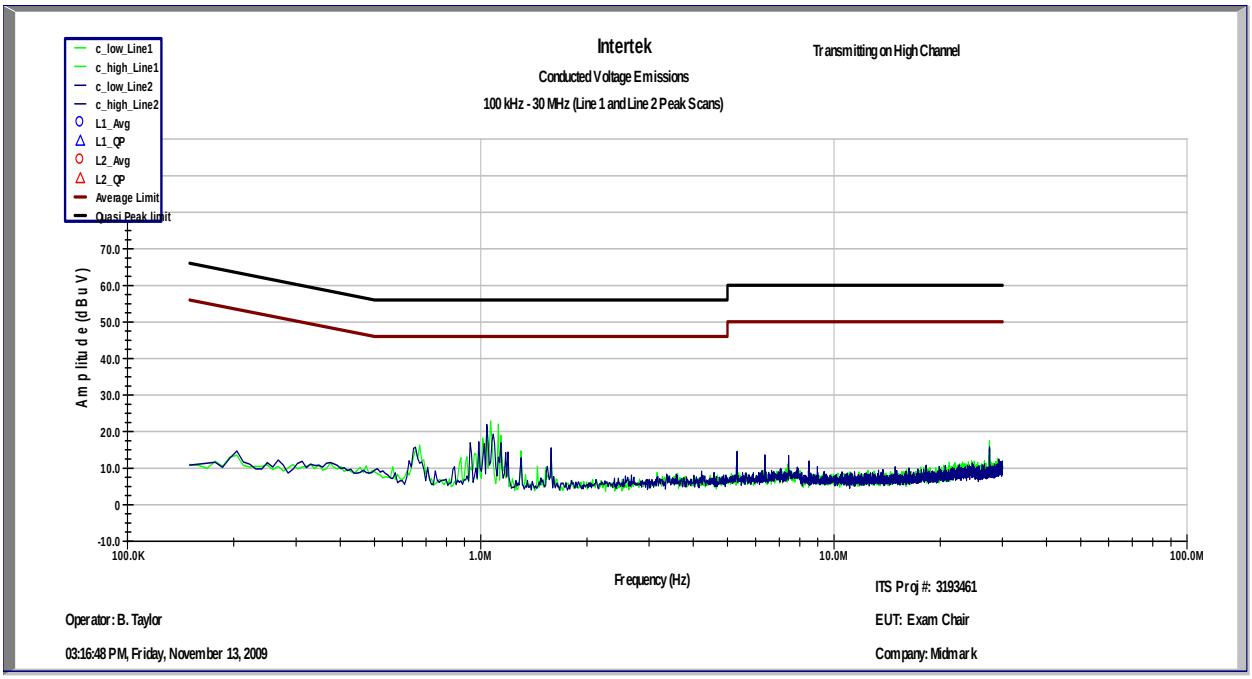


Exhibit 10

Conducted Voltage Emissions Graphical Data – Receive Mode

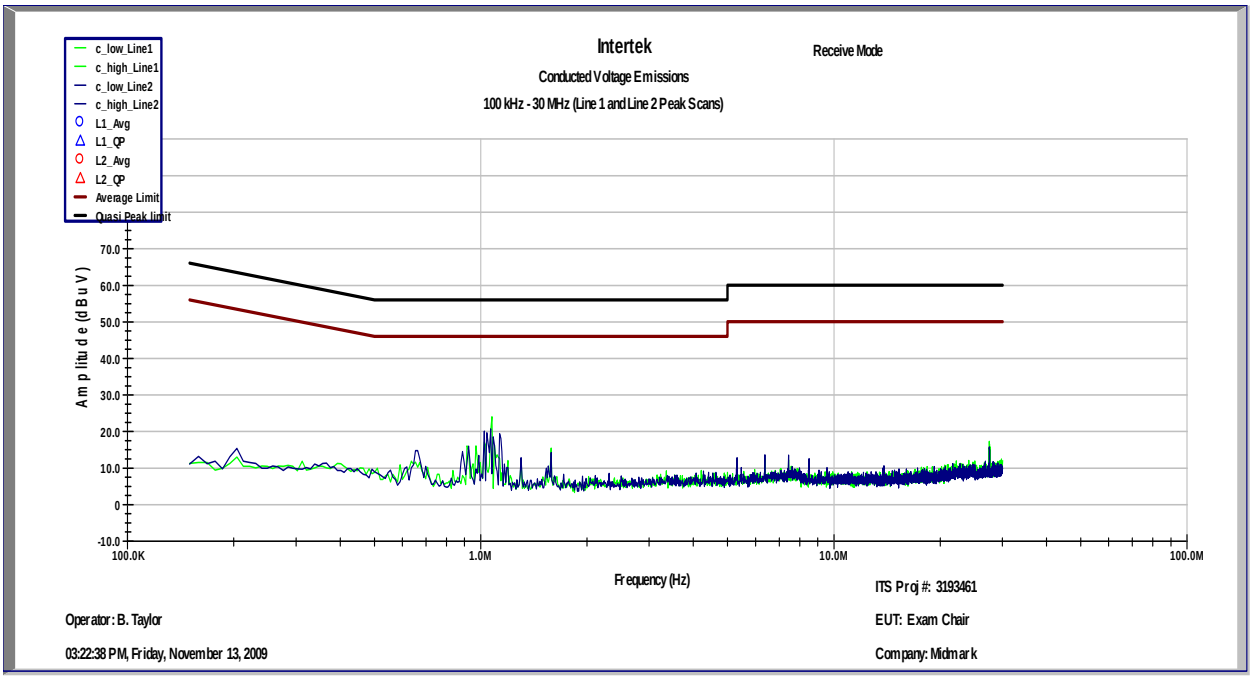


Exhibit 11