Test Report

Curtis-Straus LLC, *a wholly owned subsidiary of BV CPS*

Report No	EN1337-1 Issue 1
Client	Thales Visionix Robert Hommel
Address	700 Technology Park Drive, Suite 102 Billerica, MA 01821
Phone	781-541-7616
Items tested	IS-900 SIMTRACKER LT- 2.4GHZ
FCC ID	TK5-9SMLW
IC	6414A-9SMLW
FRN	0013917356
Equipment Type	Part 15.247 Digitally Modulated
Equipment Code	DTS
FCC/IC Rule Parts	47 CFR 15.247, RSS-210
Test Dates	Jun 17- 21, 2013
Results	As detailed within this report
Prepared by	Christopher Reynolds – Test Engineer
Authorized by	Mairaj Hussain – EMC Supervisor
Issue Date	9/11/2013
Conditions of Issue	This Test Report is issued subject to the conditions stated in the '*Conditions of Testing*' section on page 45 of this report.

Contents

Form Final Report REV 7-20-07 (DW)

Summary

This test report supports an application for certification of a transmitter operating pursuant to 47 CFR 15.247. The product is the IS-900 SIMTRACKER LT- 2.4GHZ. It is a digitally modulated transmitter that operates in the range 2400-2483.5MHz. Product was tested with an on board inverted F antenna with a gain of +3.3dBi.

We found that the product met the above requirements without modification. Robert Hommel from Thales Visionix was present during the testing. The test sample was received in good condition.

Release Control Record

Issue No.	Reason for change	Date Issued
1	Original Release	November 10, 2012

Test Methodology

Radiated emission and AC Line conducted testing was performed according to the procedures specified in ANSI C63.10 (2009) and C63.4 (2009). Radiated Emissions were maximized by rotating the device around its axes as well as varying the test antenna's height and polarity. The device antenna cannot be maximized separately.

Conducted emission at the antenna port was performed, as required by rule section.

The EUT operating voltage is 120VAC, 60Hz

Low operating channel frequency = 2405MHz
Mid operating channel frequency = 2445MHz
High operating channel frequency = 2480MHz

The following bandwidths were used during radiated spurious and line conducted emissions.

Frequency	RBW	VBW
0.15-30MHz	9kHz	30kHz
30-1000MHz	120kHz	300kHz
1-25GHz	1MHz	3MHz

Product Tested - Configuration Documentation

EUT Configuration

Work Order: N1337
Company: Thales Visionix
Company Address: 700 Technology Park Drive, Suite 102
Billerica, MA 01821
Contact: Bob Hommel
Person Present: Bob Hommel

	MN	PN	SN
EUT:	100-9SMLW-0020		386971001
Volgen power Supply	KTPS24-0540DT		1
EUT Description:	Ultrasonic Tracking Device		
EUT Max Frequency:	25MHz		

Support Equipment:	MN	SN
Head Tracker	100-91035-AWHT	UHT-1302127-A
Head Tracker	100-91035-AWHT	UHT-1302126-A
Head Tracker	100-91035-AWHT	UHT-1305321-A
Wire Wand	100-91035-AWWD	WWD-1012331-C
Wireless Wand	100-91900-EWWD	EWW-0709332-A
Soniwing	100-SWING-R301	SW3-1211529-B
Compaq/HP Laptop/w pwr supply	NC6220	CNU641OXQB
Charger Cradle PWR Supply	EPA-121SDA-05	Not Listed

EUT Ports:

Port Label	Port Type	No. of ports	No. Populated	Cable Type	Shielded	Ferrites	Length	Max Length	In/Out NEBS Type	Unpopulated Reason
Serial	Serial	4	4	Serial	Yes	None	35'	35'	Indoor	
USB	USB	1	1	USB	Yes	None	2m	<3m	Indoor	
Ethernet	Ethernet	1	1	Ethernet	No	None	25'	100'	Indoor	
AC Power	AC Power	1	1	Coaxial	Yes	None	1.5m	NA	Indoor	
Soni Strips	Ethernet	1	1	Ethernet	No	None	10m	10m	Indoor	

Software / Operating Mode Description:

EUT is set to transmit continuously

Statement of Conformity

The IS-900 SIMTRACKER LT- 2.4GHZ has been found to conform to the following parts of 47 CFR and as detailed below:

RSS-GEN	RSS 210	Part 15	Comments
5.3		15.15(b)	There are no controls accessible to the user that varies the output power above specified limits.
5.2		15.19	The label is shown in the label exhibit.
7.1.5		15.21	Information to the user is shown in the instruction manual exhibit.
		15.27	No special accessories are required for compliance.
		15.31	The EUT was tested in accordance with the measurement standards in this section.
		15.33	Frequency range was investigated according to this section, unless noted in specific rule section under which the equipment operates.
		15.35	The EUT emissions were measured using the measurement detector and bandwidth specified in this section, unless noted in specific rule section under which the equipment operates.
7.1.4		15.203	EUT employs a unique antenna connector.
	2.6	15.205 15.209	The fundamental is not in a Restricted band and the spurious and harmonic emissions in the Restricted bands comply with the general emission limits of 15.209.
7.2.2		15.207	EUT meets the AC Line conducted emissions requirements of 15.207.
	Annex 8	15.247	The unit complies with the requirements of 15.247
4.6.1			Occupied Bandwidth measurements were made.

Test Results

Bandwidth

LIMIT

The minimum 6 dB bandwidth shall be at least 500 kHz. [15.247(a) (2)]

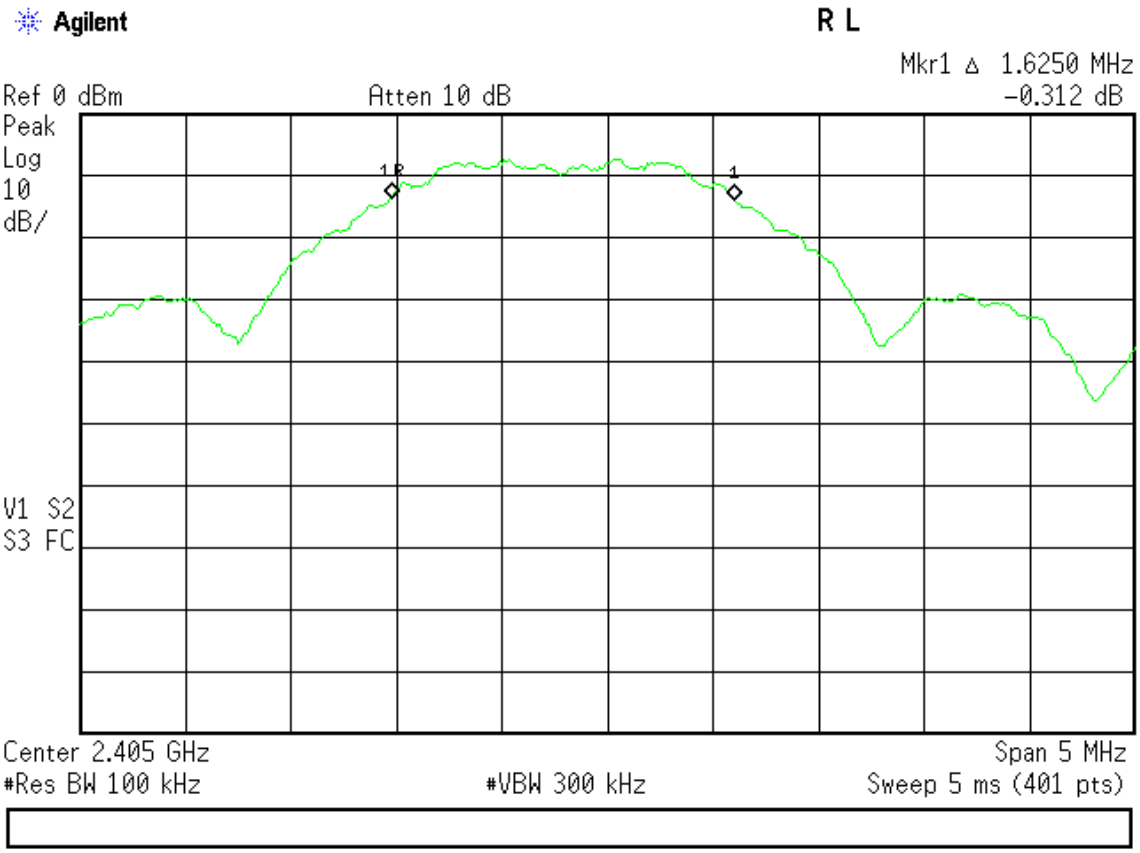
MEASUREMENTS / RESULTS

Engineer	Christopher Reynolds
Date	6/19/13
Site	3M OATS
Environmental Conditions	22.4°C, 34%, 1013mb

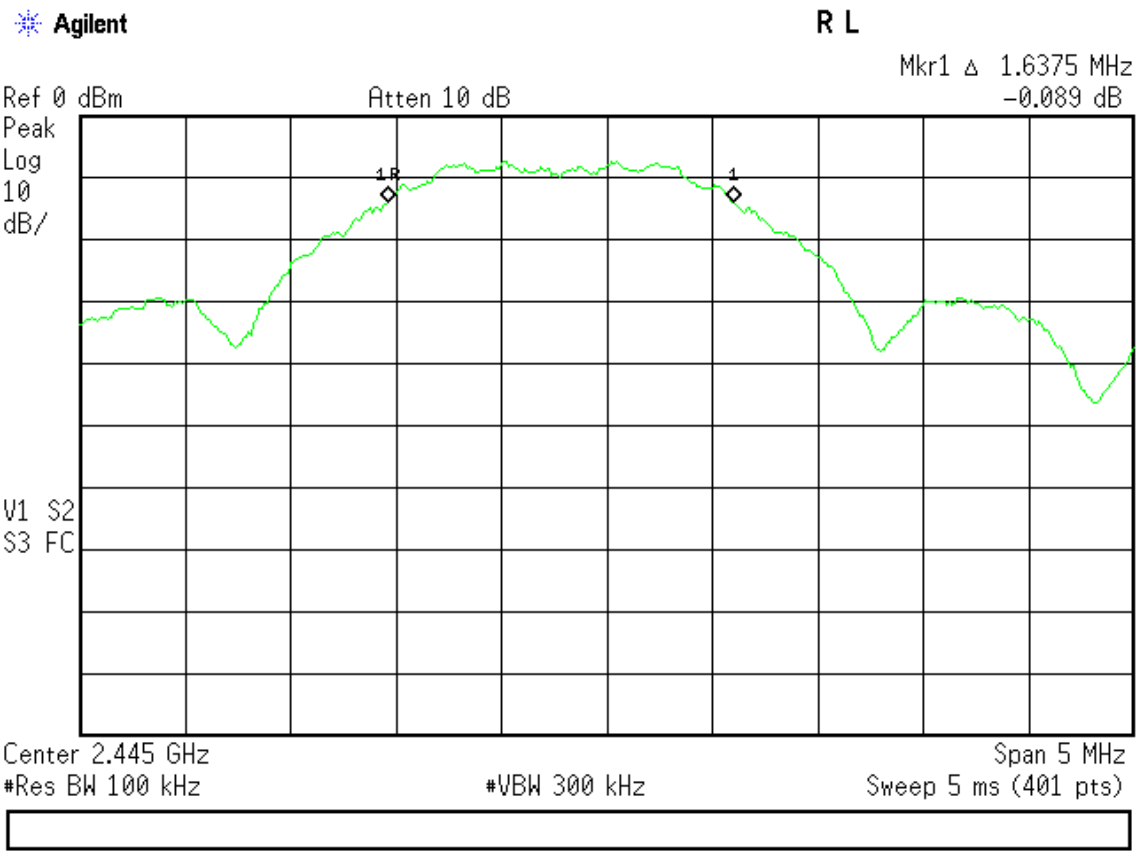
Channel	6dB BW (MHz)
Low	1.625
Mid	1.6375
Hi	1.6125

Measured 6dB bandwidth = 1.6375MHz

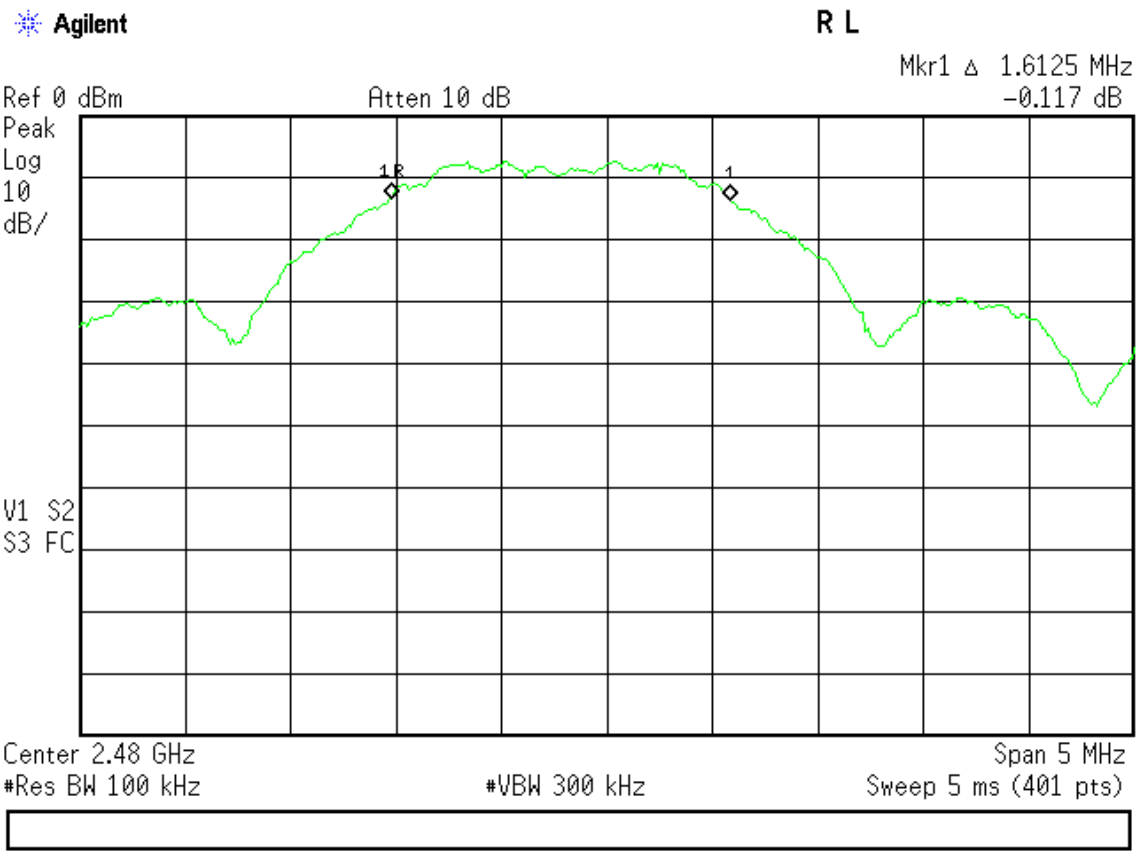
PLOT



Low Channel – 6dB Bandwidth



Mid Channel – 6dB Bandwidth



High Channel – 6 dB Bandwidth

Rev. 8/14/2013

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental SA #1 (Brown)	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	4/15/2014	4/15/2013
Preamps /Couplers Attenuators / Filters	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
HF 20dB 50W Attenuator	0.009-18 GHz	PE 7019-20	Pasternack	1	791	II	7/13/2014	7/13/2013
Meteorological Meters		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Temp./Humidity/Atm. Pressure Gauge		7400 Perception II	Davis	N/A	965	I	5/29/2014	5/29/2013
CEMI6 Thermohygrometer		35519-044	Control Company	72457730	1344	II	Retired	Retired

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Peak Power

LIMIT

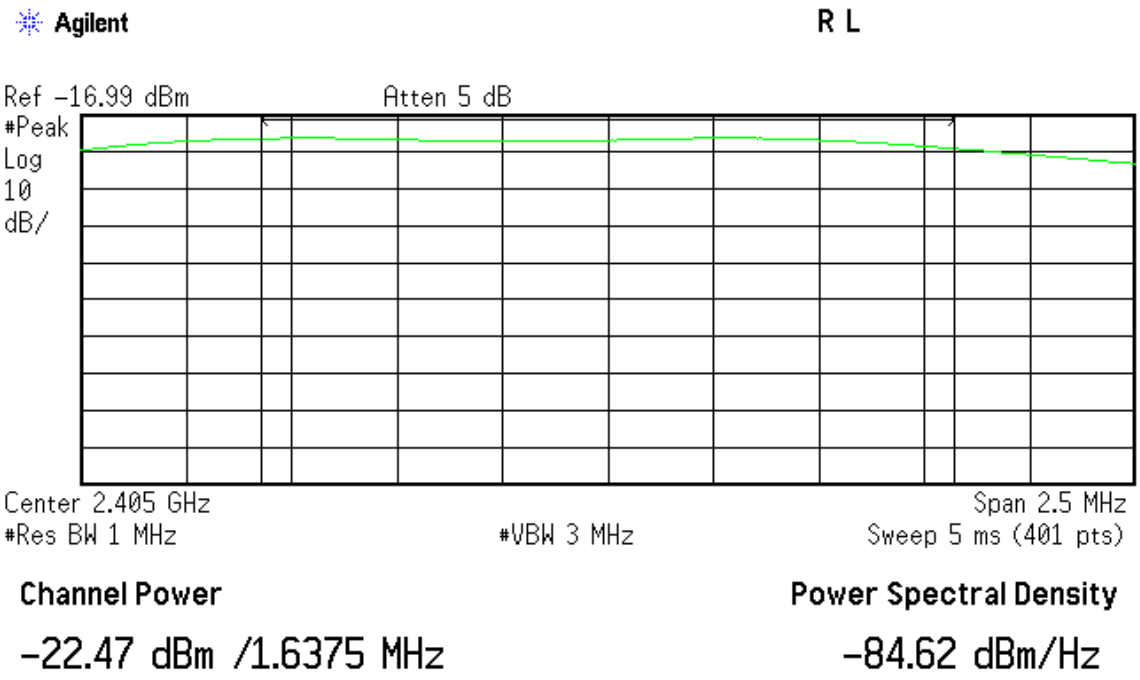
Conducted Output Power
1 Watt
[15.247(b) (3)]

MEASUREMENTS / RESULTS

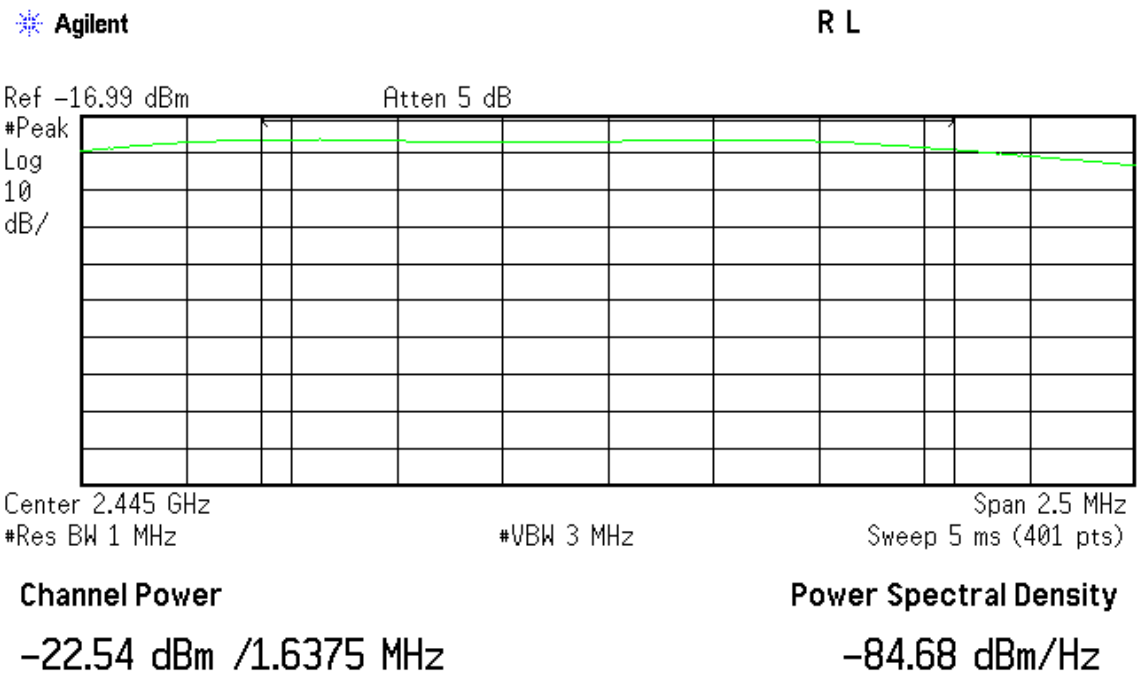
Engineer	Christopher Reynolds
Date	6/18/13
Site	3M OATS
Environmental Conditions	23.9°C, 25%, 1015mb

Channel Frequency (MHz)	Channel Power Reading (dBm)	Pad & Dongle (dB)	Adjusted Reading (dBm)	Limit (dBm)	Result
2405	-22.47	20.52	-1.95	30	Pass
2445	-22.54	20.52	-2.02	30	Pass
2480	-22.59	20.52	-2.07	30	Pass

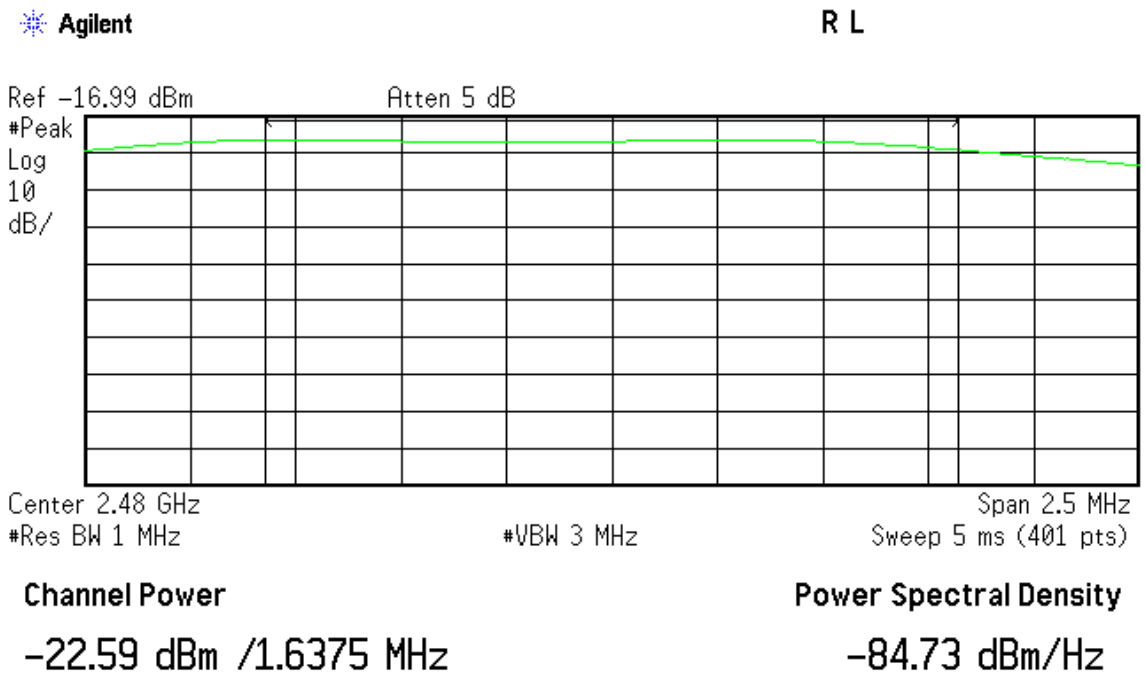
PLOTS



Channel 0 – Channel Power



Channel 8 – Channel Power



Channel 15 – Channel Power

Rev. 8/14/2013

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental SA #1 (Brown)	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	4/15/2014	4/15/2013
Preamps /Couplers Attenuators / Filters	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
HF 20dB 50W Attenuator	0.009-18 GHz	PE 7019-20	Pasternack	1	791	II	7/13/2014	7/13/2013
Meteorological Meters		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Temp./Humidity/Atm. Pressure Gauge		7400 Perception II	Davis	N/A	965	I	5/29/2014	5/29/2013
CEMI6 Thermohygrometer		35519-044	Control Company	72457730	1344	II	Retired	Retired

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Band Edge Measurements

LIMITS

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).
[15.247(d)]

MEASUREMENTS / RESULTS

Engineer	Christopher Reynolds
Date	6/18/2013
Site	3M OATS
Environmental Conditions	24.1°C, 31%, 1005mb

Band Edge - Radiated Emissions Table

Date: 18-Jun-13 **Company:** Thales Visionix **Work Order:** N1337
Engineer: Chris Reynolds **EUT Desc:** IS-900 SIMTRACKER LT - 2.4GHz **EUT Operating Voltage/Frequency:** 120VAC. 60Hz
Temp: 24.1°C **Humidity:** 31% **Pressure:** 1005mBar
Frequency Range: 2390 and 2483.5 MHz (Band Edge Only) **Measurement Distance:** 3 m
Notes: Bandedge Readings **EUT Max Freq:** 25MHz
DCCF = -32.6dB

Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak: Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	FCC Class B High Frequency - Average: Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
				---	---	---	---	---	---	---	---	---	---	---
Set to High Channel				---	---	---	---	---	---	---	---	---	---	---
h	2483.5	50.93	18.3	18.8	29.0	3.3	64.4	31.8	74.0	-9.6	Pass	54.0	-22.2	Pass
v	2483.5	52.77	20.2	18.8	29.0	3.3	66.3	33.7	74.0	-7.7	Pass	54.0	-20.3	Pass
Set to Low Channel				---	---	---	---		---	---	---	---	---	---
v	2400.0	41.24	8.6	18.7	28.7	3.3	54.5	21.9	74.0	-19.5	Pass	54.0	-32.1	Pass
h	2400.0	40.72	8.1	18.7	28.7	3.3	54.0	21.4	74.0	-20.0	Pass	54.0	-32.6	Pass
				---	---	---	---		---	---	---	---	---	---
v	2390.0	36.91	4.3	18.7	28.6	3.2	50.0	17.4	74.0	-24.0	Pass	54.0	-36.6	Pass
h	2390.0	35.3	2.7	18.7	28.6	3.2	48.4	15.8	74.0	-25.6	Pass	54.0	-38.2	Pass

Table Result: Fail by 5.3 dB ***Worst Freq:*** 2483.5 MHz

Test Site: EMI Chamber 1 **Cable 1:** Asset #1781 **Cable 2:** Asset #1785 **Cable 3:** ---
Analyzer: Gold **Preamp:** Brown **Antenna:** Black Horn **Preselector:** ---

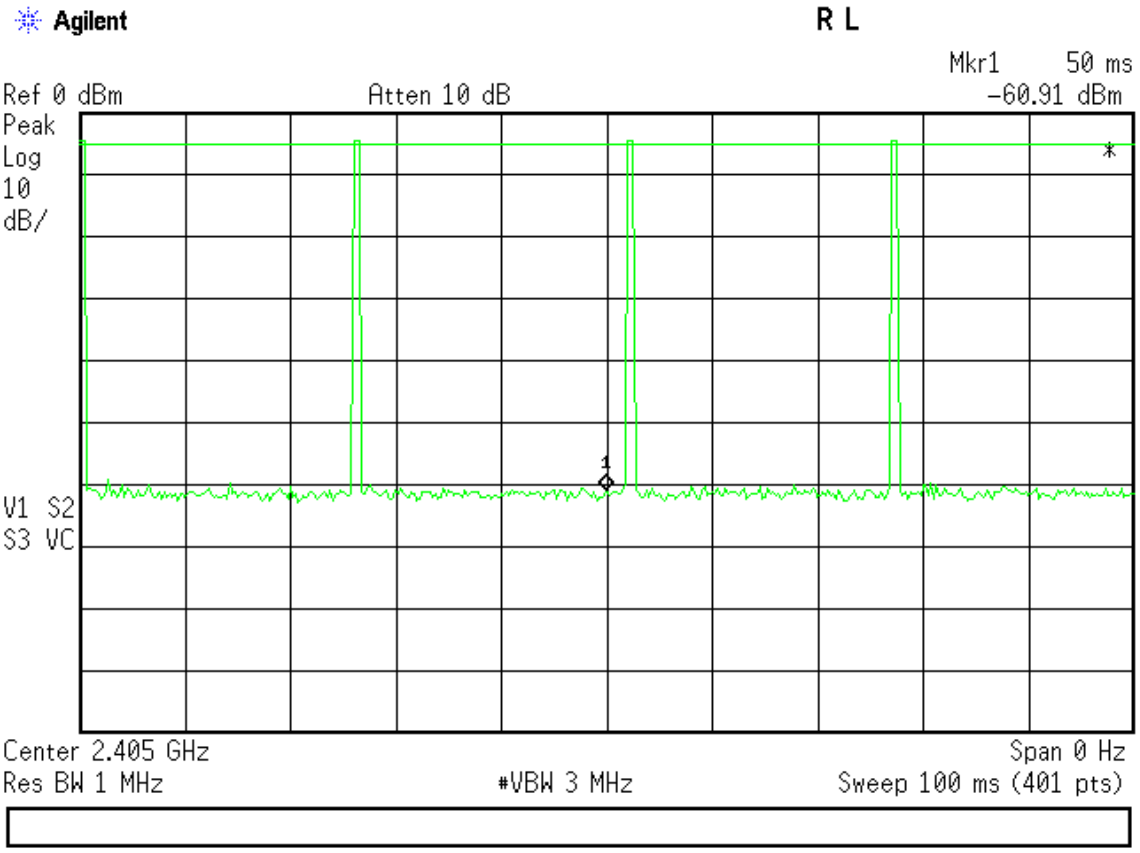
Duty Cycle Correction Calculation

MEASUREMENTS / CALCULATIONS

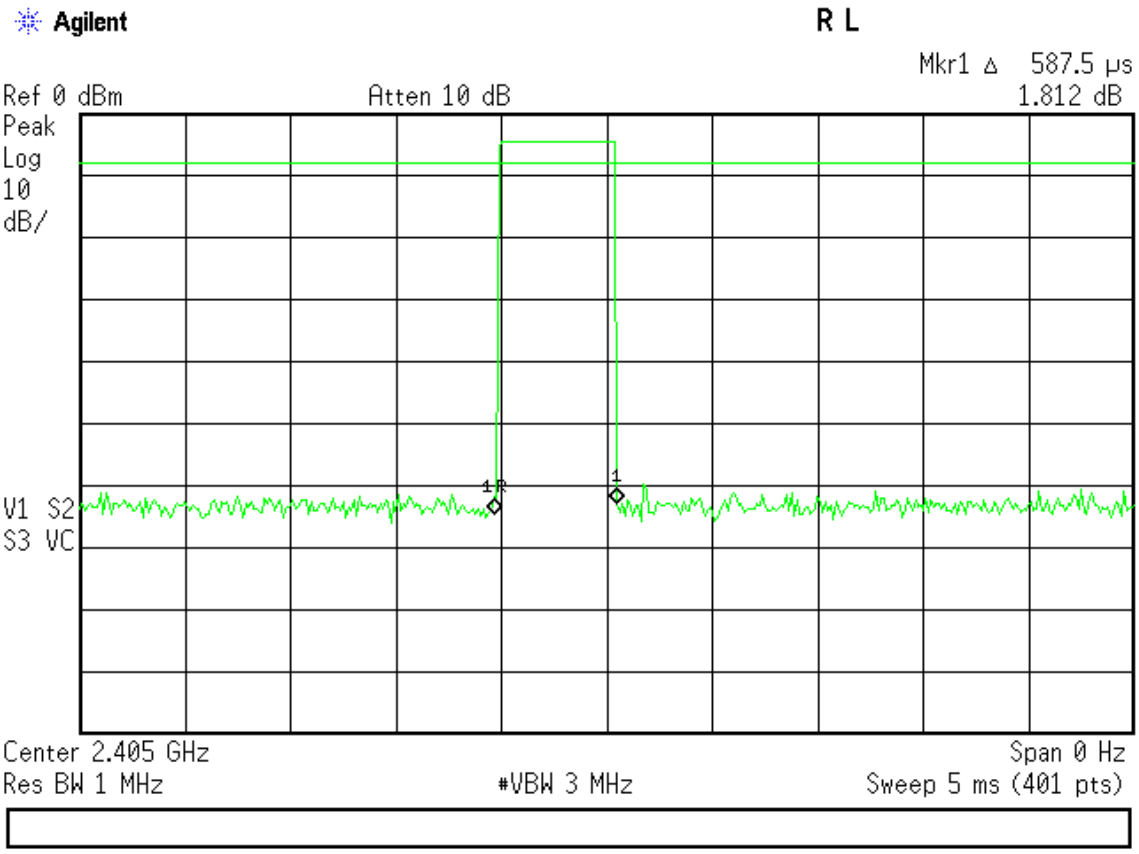
Engineer	Christopher Reynolds
Date	7/12/2013
Site	3M OATS
Environmental Conditions	24.1°C, 31%, 1005mb

DCCF = 20*log (total On Time /100ms)
= 20*log (4*587.5/100)
= -32.61568285

PLOTS



Duty Cycle Correction Factor – 100mS window



Individual Pulse On time – 587.5uS

Rev. 6/16/2013

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental SA #1 (Brown)	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	4/15/2014	4/15/2013

Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)	BA928	Oregon Scientific	C3166-1	831	I	3/20/2014	3/20/2013
CEMI3 Thermohygrometer	35519-044	Control Company	72457729	1338	II	8/19/2013	8/19/2011

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Radiated Spurious Emissions

LIMITS

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).
[15.247(d)]

MEASUREMENTS / RESULTS

Radiated Emissions Table

Date: 17-Jun-13 **Company:** Thales Visionix **Work Order:** N1337
Engineer: Chris Reynolds **EUT Desc:** Ultrasonic Tracking Device **EUT Operating Voltage/Frequency:** 120VAC, 60Hz
Temp: 24.1°C **Humidity:** 27% **Pressure:** 1006mBar
Frequency Range: 30 - 1000 MHz **Measurement Distance:** 3 m
Notes: USB Mode **EUT Max Freq:** 25MHz

Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)				FCC Class B Limit (dBµV/m)	FCC Class B Margin (dB)	FCC Class B Result (Pass/Fail)
v	64.925	47.7	22.5	8.0	0.6	33.8				40.0	-6.2	Pass
v	85.35	54.2	22.5	7.4	0.7	39.8				40.0	-0.2	Pass
v	85.7	52.9	22.5	7.4	0.7	38.5				40.0	-1.5	Pass
v	84.275	51.8	22.5	7.4	0.7	37.4				40.0	-2.6	Pass
v	31.08	33.9	22.5	20.3	0.4	32.1				40.0	-7.9	Pass
v	31.5	34.1	22.5	20.0	0.4	32.0				40.0	-8.0	Pass
v	95.7	48.7	22.5	8.9	0.7	35.8				43.5	-7.7	Pass
h	220.9	44.2	22.4	10.6	1.1	33.5				46.0	-12.5	Pass
h	478.54	40.3	22.1	17.6	1.6	37.4				46.0	-8.6	Pass
h	220.0	43.1	22.4	10.6	1.1	32.4				46.0	-13.6	Pass
h	240.0	44.6	22.5	11.6	1.1	34.8				46.0	-11.2	Pass

Table Result: Pass by -0.2 dB ***Worst Freq:*** 85.35 MHz

Test Site: EMI Chamber 1 **Cable 1:** Asset #1781 **Cable 2:** Asset #1785 **Cable 3:** ---
Analyzer: Asset #1328 **Preamp:** Blue **Antenna:** Red-Black **Preselector:** ---

Rev.6/16/2013

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
SA EMI Chamber (1328)	9kHz-13.2 GHz	E4405B	Agilent	MY44210241	1328	I	12/19/2013

Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz		II	2/16/2014

Preamps /Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Blue	0.009-2000MHz	ZFL-1000-LN	CS	N/A	759	II	5/31/2014

Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Red-Black Bilog	30-2000MHz	JB1	Sunol	A091604-2	1106	I	1/28/2015

Cables	Range	Mfr	Cat	Calibration Due
Asset #1781	9kHz - 18GHz	Florida RF	II	3/6/2014
Asset #1785	9kHz - 18GHz	Florida RF	II	3/14/2014

Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due
Weather Clock (Pressure Only)	BA928	Oregon Scientific	C3166-1	831	I	3/20/2014
CHAMBER1 Thermohygrometer	35519-044	Control Company	72457642	1345	II	8/19/2013

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Radiated Emissions Table

Date: 17-Jun-13 **Company:** Thales Visionix **Work Order:** N1337
Engineer: Arik Zwirner **EUT Desc:** Ultrasonic Tracking Device **EUT Operating Voltage/Frequency:** 120VAC, 60Hz
Temp: 24.1°C **Humidity:** 27% **Pressure:** 1006mBar
Frequency Range: 30-1000MHz **Measurement Distance:** 3 m
Notes: Ethernet mode **EUT Max Freq:** 25MHz

Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)				FCC Class B Limit (dBµV/m)	FCC Class B Margin (dB)	FCC Class B Result (Pass/Fail)
v	31.1	28.6	22.5	20.2	0.4	26.7				40.0	-13.3	Pass
v	40.65	27.9	22.5	13.2	0.5	19.1				40.0	-20.9	Pass
v	48.55	30.9	22.5	8.5	0.5	17.4				40.0	-22.6	Pass
v	58.7	29.7	22.5	7.4	0.6	15.2				40.0	-24.8	Pass
v	65.28	37.4	22.5	8.0	0.6	23.5				40.0	-16.5	Pass
v	88.85	38.3	22.5	7.5	0.7	24.0				43.5	-19.5	Pass
h	220.0	38.7	22.4	10.6	1.1	28.0				46.0	-18.0	Pass
v	250.675	54.8	22.4	11.5	1.1	45.0				46.0	-1.0	Pass
h	500.0	36.9	22.3	17.6	1.4	33.6				46.0	-12.4	Pass
h	625.0	30.4	22.6	19.2	1.8	28.8				46.0	-17.2	Pass
h	1000.0	39.4	22.0	23.0	2.2	42.6	47.5	-4.9	Pass	54.0	-11.4	Pass

Table Result: Pass by -1.0 dB ***Worst Freq:*** 250.675 MHz

Test Site: EMI Chamber 1 **Cable 1:** Asset #1781 **Cable 2:** Asset #1785
Analyzer: Asset #1328 **Preamp:** Blue **Antenna:** Red-Black

Rev.6/16/2013

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
SA EMI Chamber (1328)	9kHz-13.2 GHz	E4405B	Agilent	MY44210241	1328	I	12/19/2013

Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range	Cat	Calibration Due
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz	II	2/16/2014

Preamps /Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Blue	0.009-2000MHz	ZFL-1000-LN	CS	N/A	759	II	5/31/2014

Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Red-Black Bilog	30-2000MHz	JB1	Sunol	A091604-2	1106	I	1/28/2015

Cables	Range	Mfr	Cat	Calibration Due
Asset #1781	9kHz - 18GHz	Florida RF	II	3/6/2014
Asset #1785	9kHz - 18GHz	Florida RF	II	3/14/2014

Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due
Weather Clock (Pressure Only)	BA928	Oregon Scientific	C3166-1	831	I	3/20/2014
CHAMBER1 Thermohygrometer	35519-044	Control Company	72457642	1345	II	8/19/2013

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Radiated Emissions Table

Date: 18-Jun-13 **Company:** Thales Visionix **Work Order:** N1337
Engineer: Chris Reynolds **EUT Desc:** IS-900 SIMTRACKER LT - 2.4GHz **EUT Operating Voltage/Frequency:** 120VAC. 60Hz
Temp: 24.1°C **Humidity:** 31% **Pressure:** 1005mBar
Frequency Range: 1-5GHz **Measurement Distance:** 3 m
Notes: **EUT Max Freq:** 25MHz

Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak Limit (dBµV/m)	FCC Class B High Frequency - Peak Margin (dB)	FCC Class B High Frequency - Peak Result (Pass/Fail)	FCC Class B High Frequency - Average Limit (dBµV/m)	FCC Class B High Frequency - Average Margin (dB)	FCC Class B High Frequency - Average Result (Pass/Fail)
Set to Low Channel (0)				---	---	---	---	---	---	---	---	---	---	---
v	4809.95	38.08	26.7	17.3	33.3	4.9	59.0	47.6	74.0	-15.0	Pass	54.0	-6.4	Pass
h	4809.95	38.08	26.8	17.3	33.3	4.9	59.0	47.7	74.0	-15.0	Pass	54.0	-6.3	Pass
Set to Middle Channel (8)				---	---	---	---	---	---	---	---	---	---	---
v	4890.0	38.71	29.0	17.3	33.5	5.0	59.9	50.2	74.0	-14.1	Pass	54.0	-3.8	Pass
h	4890.0	39.73	28.6	17.3	33.5	5.0	60.9	49.8	74.0	-13.1	Pass	54.0	-4.2	Pass
Set to High Channel (15)				---	---	---	---	---	---	---	---	---	---	---
v	4960.0	39.37	31.4	17.3	33.6	5.1	60.8	52.8	74.0	-13.2	Pass	54.0	-1.2	Pass
h	4960.0	39.73	29.7	17.3	33.6	5.1	61.1	51.1	74.0	-12.9	Pass	54.0	-2.9	Pass
				---	---	---	---	---	---	---	---	---	---	---
h	1125.0	44.01	37.6	19.5	26.1	2.3	52.9	46.5	74.0	-21.1	Pass	54.0	-7.5	Pass
v	1125.0	45.47	38.0	19.5	26.1	2.3	54.4	46.9	74.0	-19.6	Pass	54.0	-7.1	Pass
v	1330.0	44.94	23.6	18.8	26.1	2.6	54.8	33.5	74.0	-19.2	Pass	54.0	-20.5	Pass
				---	---	---	---	---	---	---	---	---	---	---
v	1865.0	42.48	24.7	17.9	27.6	3.1	55.3	37.5	74.0	-18.7	Pass	54.0	-16.5	Pass

Table Result: Pass by -1.2 dB ***Worst Freq:*** 4960.0 MHz

Test Site: EMI Chamber 1 **Cable 1:** Asset #1781 **Cable 2:** Asset #1785 **Cable 3:** ---
Analyzer: Gold **Preamp:** Brown **Antenna:** Black Horn **Preselector:** ---

Rev.6/16/2013

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	3/18/2014
Radiated Emissions Sites	**FCC Code**	**IC Code**	**VCCI Code**	**Range**		**Cat**	**Calibration Due**
EMI Chamber 1	719150	2762A-6	A-0015	30-1000MHz		II	2/16/2014
Preamps /Couplers Attenuators / Filters	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
Brown	1-18GHz	CS	CS	N/A	1523	II	2/27/2014
Antennas	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
Black Horn	1-18GHz	3115	EMCO	9703-5148	56	I	6/29/2013
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**
Asset #1781	9kHz - 18GHz		Florida RF			II	3/6/2014
Asset #1785	9kHz - 18GHz		Florida RF			II	3/14/2014
Meteorological Meters		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
Weather Clock (Pressure Only)		BA928	Oregon Scientific	C3166-1	831	I	3/20/2014
CHAMBER1 Thermohygrometer		35519-044	Control Company	72457642	1345	II	8/19/2013

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Radiated Emissions Table

Date: 19-Jun-13 **Company:** Thales Visionix **Work Order:** N1337
Engineer: Chris Reynolds **EUT Desc:** IS-900 SIMTRACKER LT - 2.4GHz **EUT Operating Voltage/Frequency:** 120VAC, 60Hz
Temp: 22.4°C **Humidity:** 34% **Pressure:** 1013mBar
Frequency Range: 5-7.44GHz **Measurement Distance:** 1 m
Notes: **EUT Max Freq:** 25MHz

Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average		
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
No emissions found				---	---	---	---	---	---	---	---	---	---	---

Table Result: --- by --- dB ***Worst Freq:*** --- MHz

Test Site: 1DCC-OATS-3M-II **Cable 1:** EMIR-HIGH-21 **Cable 2:** --- **Cable 3:** ---
Analyzer: Rental SA#1 **Preamp:** Asset #1517 **Antenna:** Black Horn **Preselector:** ---

Rev.6/16/2013

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Rental SA #1 (Brown)	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	4/15/2014
Radiated Emissions Sites	**FCC Code**	**IC Code**	**VCCI Code**	**Range**		**Cat**	**Calibration Due**
1DCC-OATS-3M-II	719150	2762A-10	A-0015	30-1000MHz		II	5/11/2015
Preamps /Couplers Attenuators / Filters	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
1517 HF Preamp	1-20GHz	CS	CS	N/A	1517	II	4/15/2014
Antennas	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
Black Horn	1-18GHz	3115	EMCO	9703-5148	56	I	6/29/2013
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**
REMI-High-21	9kHz - 26.5GHz		C-S			II	2/2/2014
Meteorological Meters		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
Temp./Humidity/Atm. Pressure Gauge		7400 Perception II	Davis	N/A	965	I	5/29/2014

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Radiated Emissions Table

Date: 19-Jun-13 **Company:** Thales Visionix **Work Order:** N1337
Engineer: Chris Reynolds **EUT Desc:** IS-900 SIMTRACKER LT - 2.4GHz **EUT Operating Voltage/Frequency:** 120VAC, 60Hz
Temp: 22.4°C **Humidity:** 34% **Pressure:** 1013mBar
Frequency Range: 7.44-18GHz **Measurement Distance:** 1 m
Notes: **EUT Max Freq:** 25MHz

Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average		
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
No emissions found in this range				---	---	---	---	---	---	---	---	---	---	---

Table Result: --- by --- dB ***Worst Freq:*** --- MHz

Test Site: 1DCC-OATS-3M-II **Cable 1:** EMIR-HIGH-21 **Cable 2:** --- **Cable 3:** ---
Analyzer: Rental SA#1 **Preamp:** Red-Blue **Antenna:** Black Horn **Preselector:** ---

Rev.6/16/2013

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Rental SA #1 (Brown)	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	4/15/2014
Radiated Emissions Sites	**FCC Code**	**IC Code**	**VCCI Code**	**Range**		**Cat**	**Calibration Due**
1DCC-OATS-3M-II	719150	2762A-10	A-0015	30-1000MHz		II	5/11/2015
Preamps /Couplers Attenuators / Filters	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
Red-Blue	1-18GHz	PE2-38-218-4R5-17-15-SFF	CS	NA	1257	II	11/2/2013
Antennas	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
Black Horn	1-18GHz	3115	EMCO	9703-5148	56	I	6/29/2013
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**
REMI-High-21	9kHz - 26.5GHz		C-S			II	2/2/2014
Meteorological Meters		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
Temp./Humidity/Atm. Pressure Gauge		7400 Perception II	Davis	N/A	965	I	5/29/2014

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Radiated Emissions Table

Date: 19-Jun-13 **Company:** Thales Visionix **Work Order:** N1337

Engineer: Chris Reynolds **EUT Desc:** IS-900 SIMTRACKER LT - 2.4GHz **EUT Operating Voltage/Frequency:** 120VAC, 60Hz

Temp: 22.4°C **Humidity:** 34% **Pressure:** 1013mBar

Frequency Range: 18-25GHz **Measurement Distance:** 0.3 m

Notes: **EUT Max Freq:** 25MHz

Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dBµV)	Average Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Peak Reading (dBµV/m)	Adjusted Avg Reading (dBµV/m)	FCC Class B High Frequency - Peak			FCC Class B High Frequency - Average		
									Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
No Emissions found in this range				---	---	---	---	---	---	---	---	---	---	---

Table Result: --- by --- dB ***Worst Freq:*** --- MHz

Test Site: 1DCC-OATS-3M-II **Cable 1:** EMIR-HIGH-21 **Cable 2:** --- **Cable 3:** ---

Analyzer: Rental SA#1 **Preamp:** 18-26.5GHz **Antenna:** 18-26.5GHz Horn **Preselector:** ---

Rev.6/16/2013

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Rental SA #1 (Brown)	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	4/15/2014
Radiated Emissions Sites	**FCC Code**	**IC Code**	**VCCI Code**	**Range**		**Cat**	**Calibration Due**
1DCC-OATS-3M-II	719150	2762A-10	A-0015	30-1000MHz		II	5/11/2015
Preamps /Couplers Attenuators / Filters	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
HF (Yellow)	18-26.5GHz	AFS4-18002650-60-8P-4	CS	467559	1266	I	10/13/2013
Antennas	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
HF (White) Horn	18-26.5GHz	801-WLM	Waveline	758	758	I	Verify before Use
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**
REMI-High-21	9kHz - 26.5GHz		C-S			II	2/2/2014
Meteorological Meters		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
Temp./Humidity/Atm. Pressure Gauge		7400 Perception II	Davis	N/A	965	I	5/29/2014

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Conducted Spurious Emissions

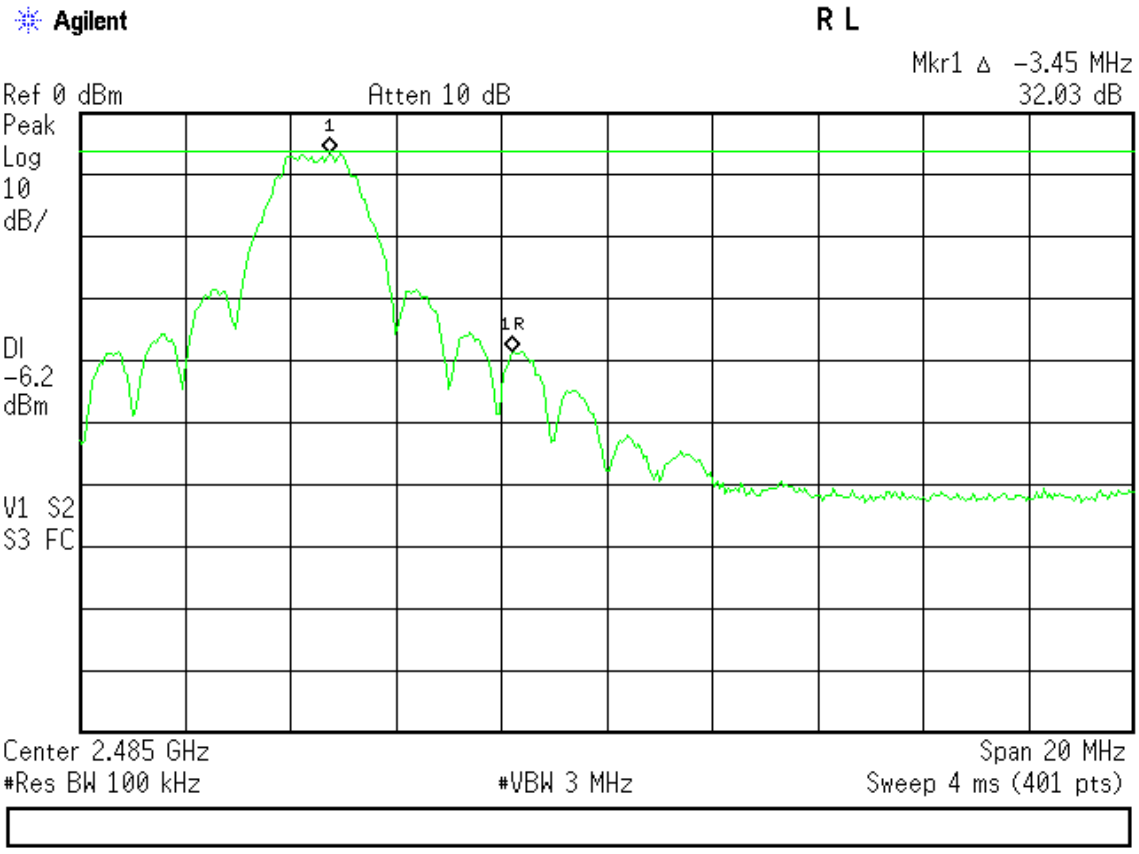
LIMITS

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth that contains the highest level of desired power…
[15.247(d)]

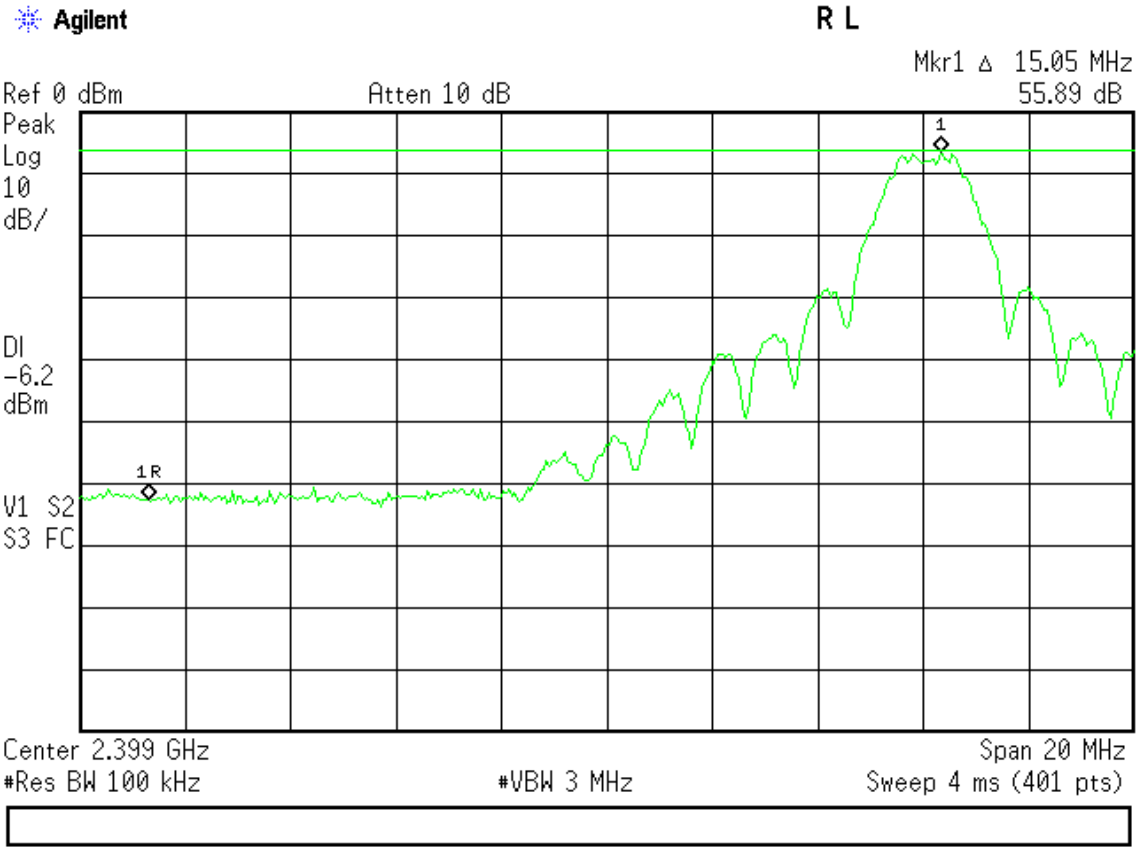
MEASUREMENTS / RESULTS

Plots

Conducted Band Edge

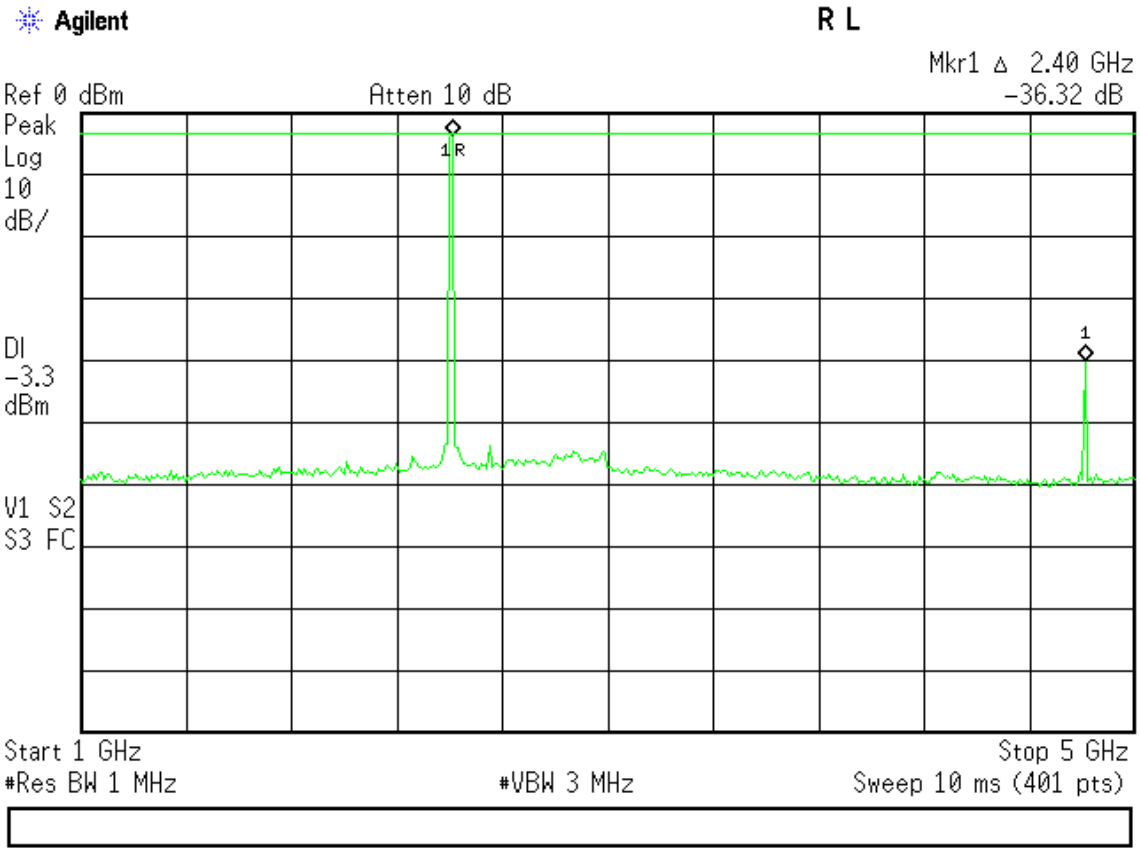


Channel 16 – Band-edge >-20dB

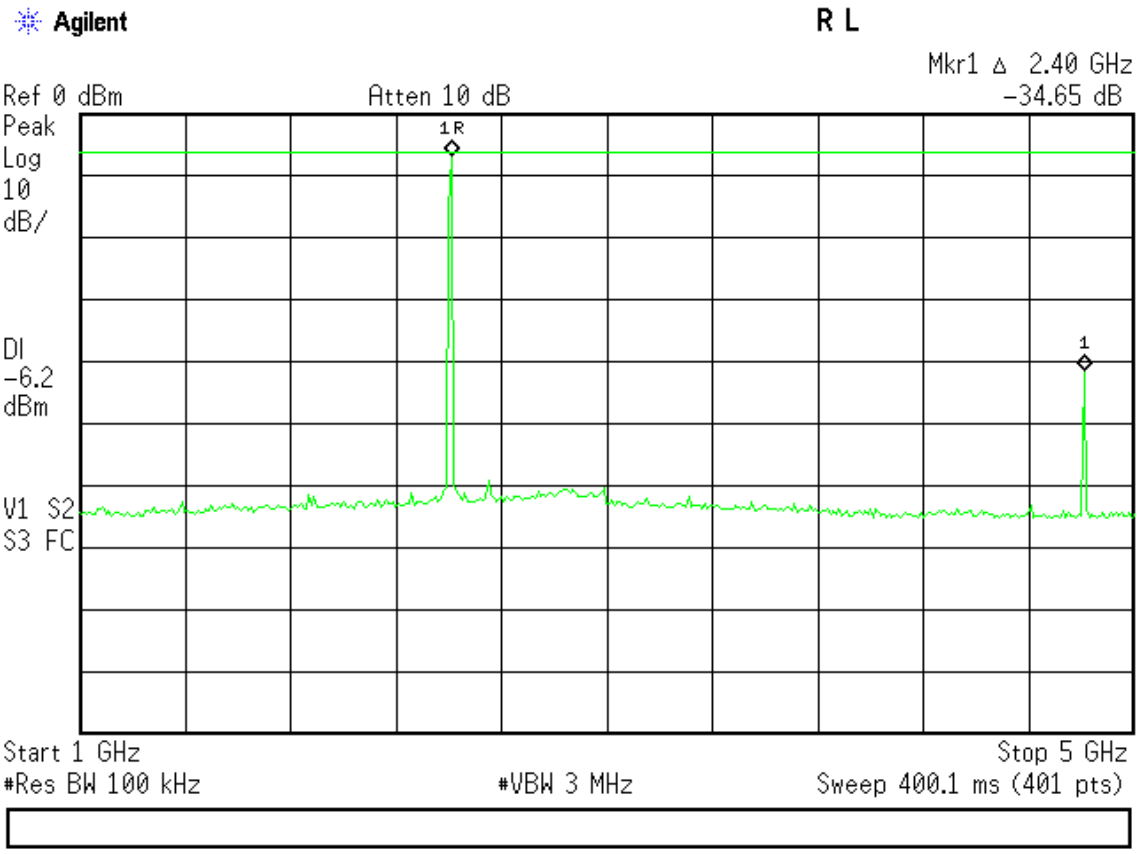


Channel 0 – Band-edge >20dB down

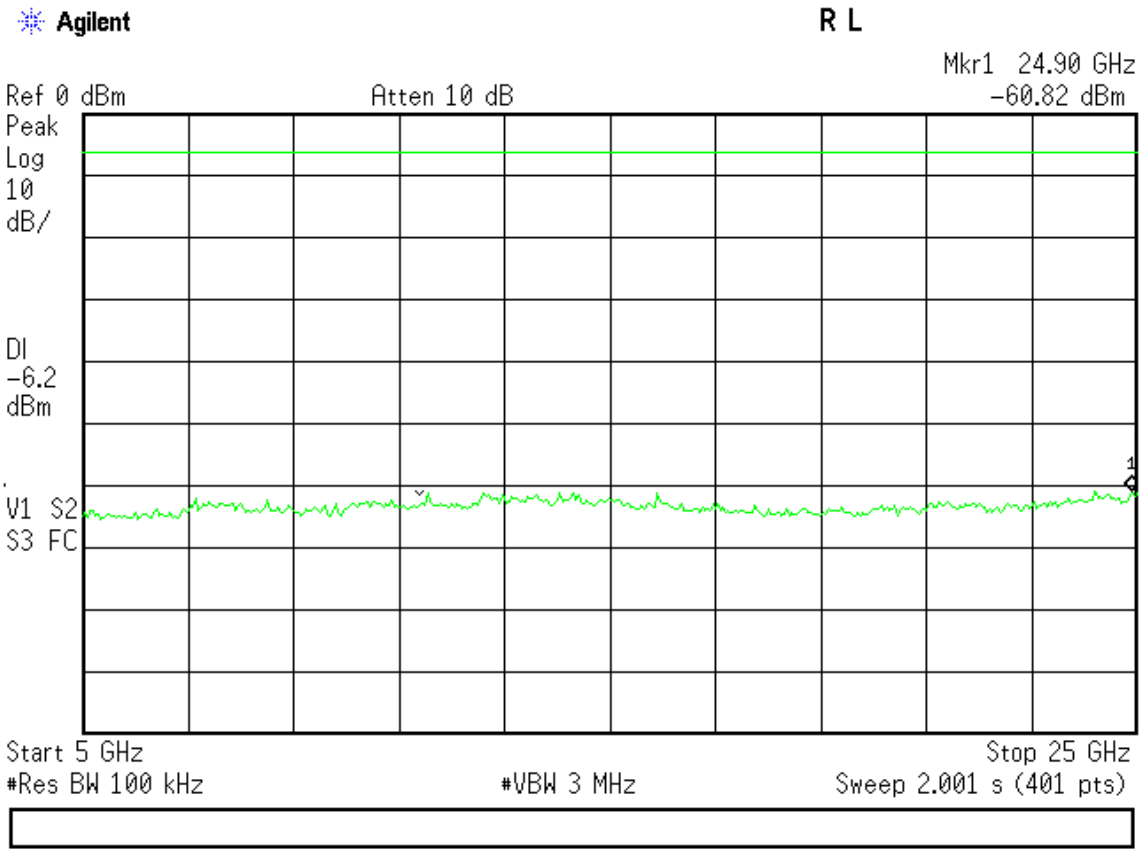
Conducted Spurious Emission



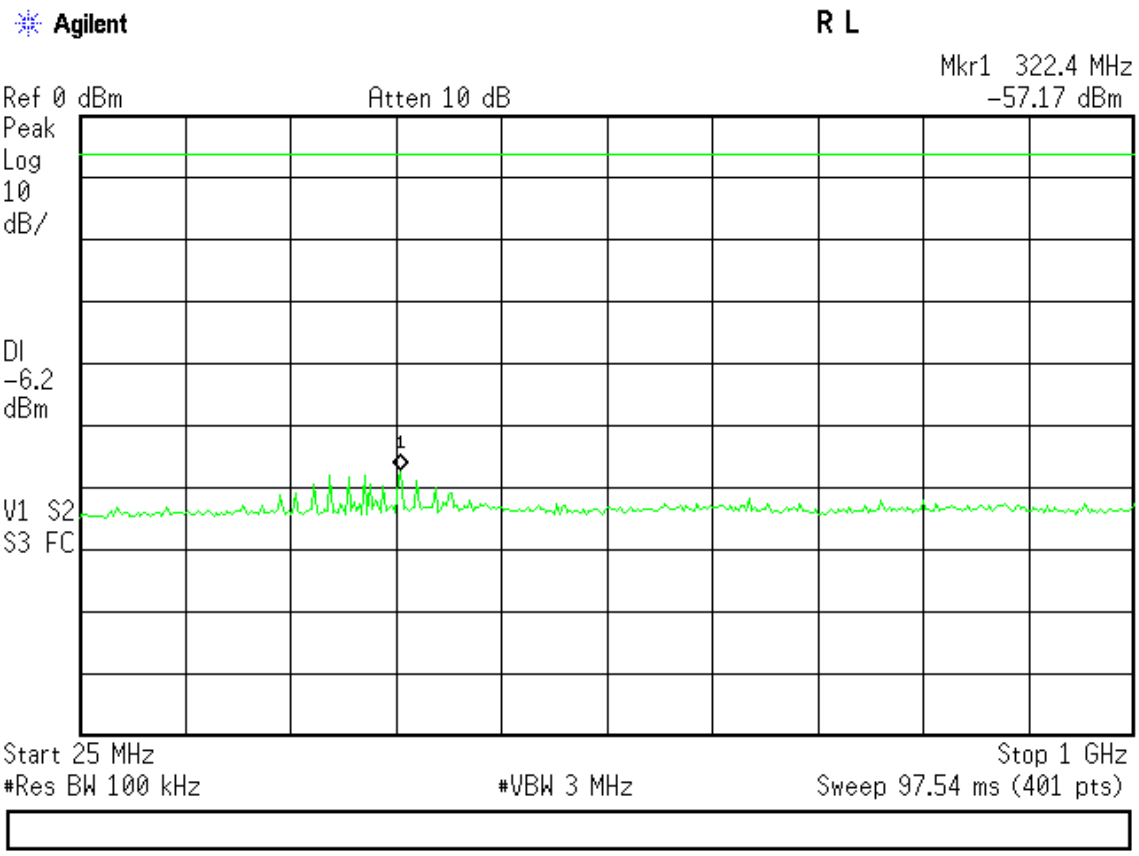
Channel 0 – 1-5GHz



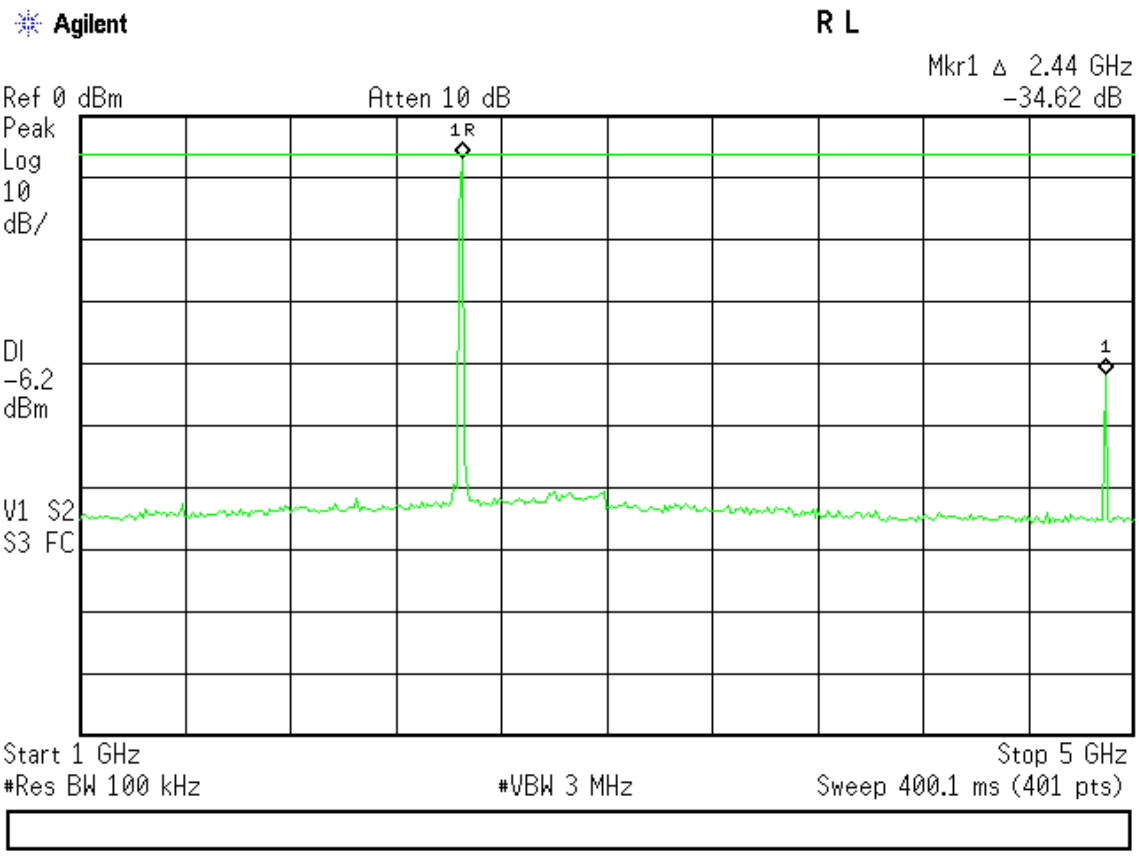
Channel 0 – 1-5GHz



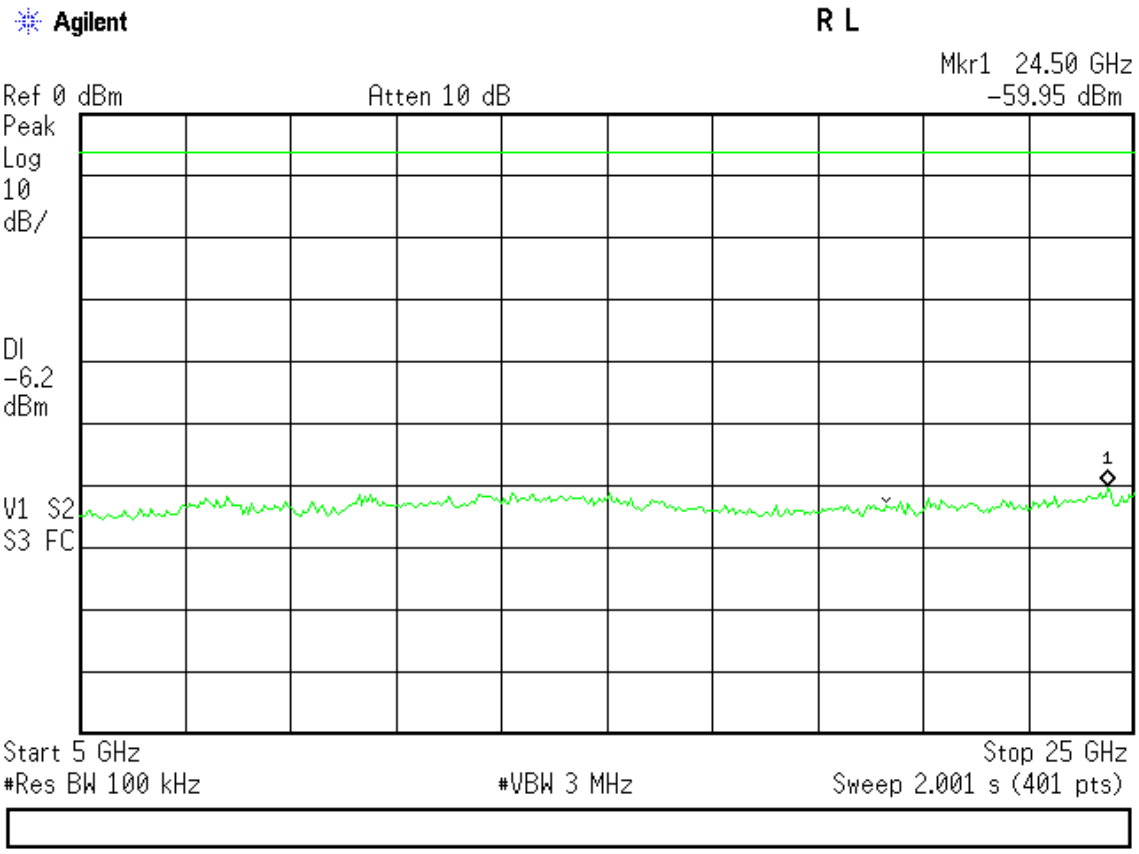
Channel 0 – 5-25GHz



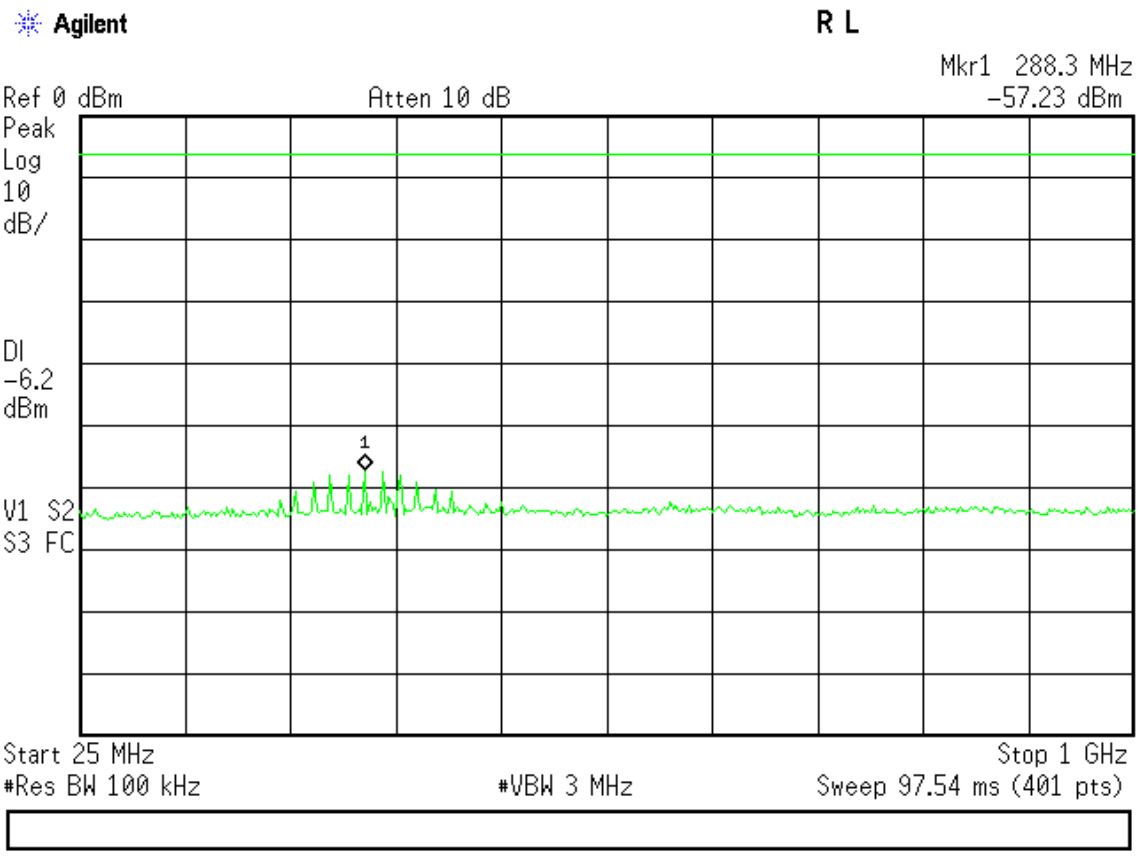
Channel 0 – 25-1000MHz



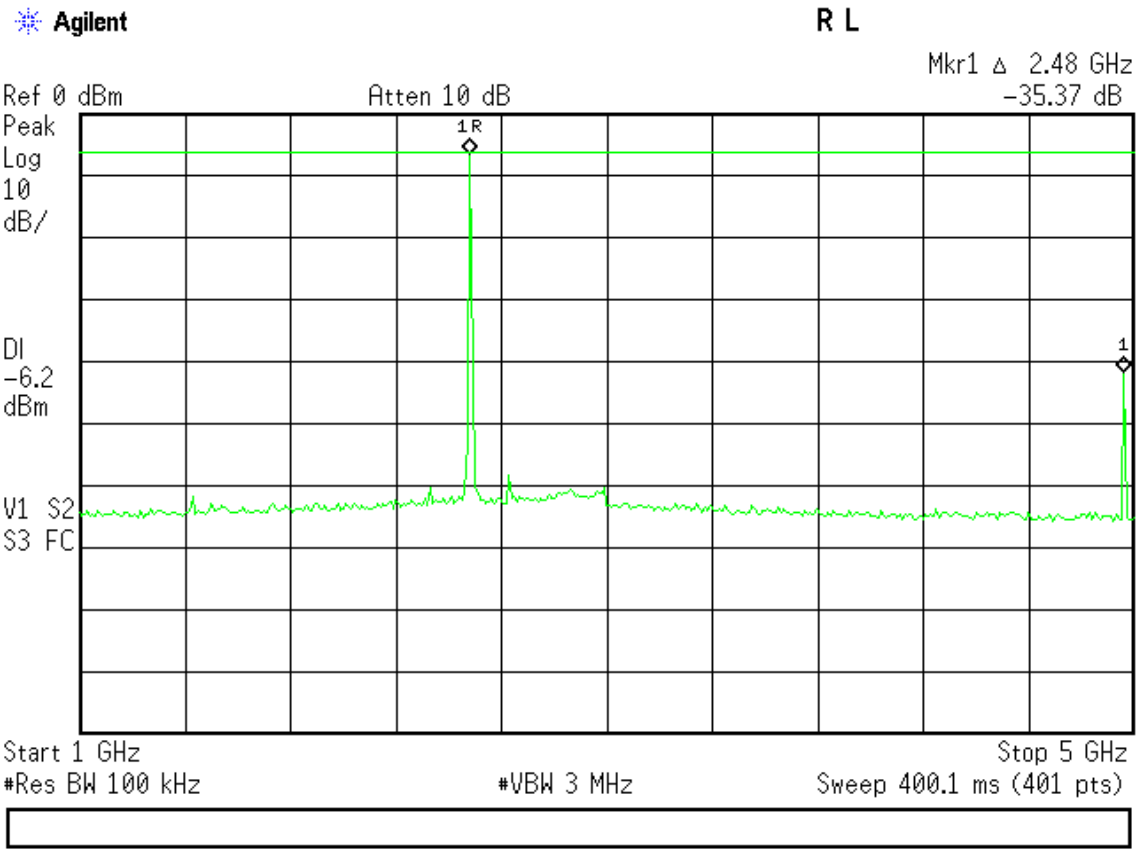
Channel 8 – 1-5GHz



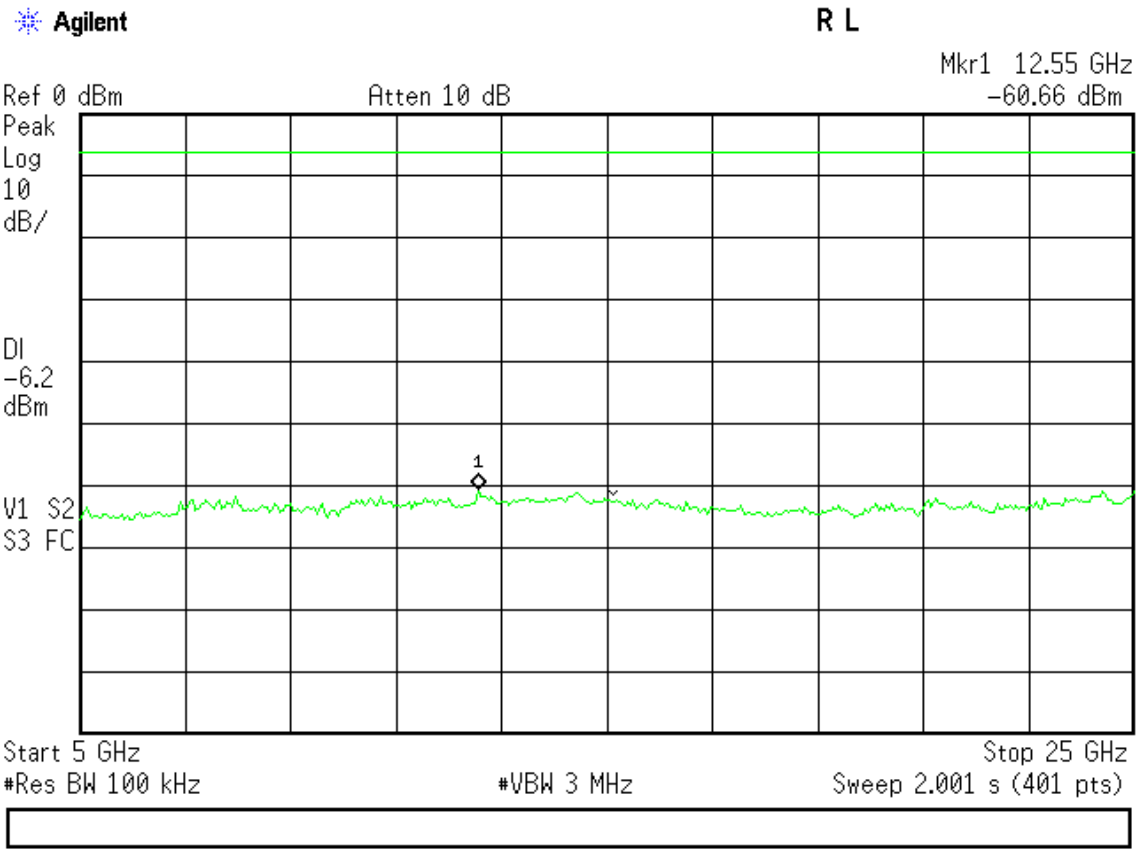
Channel 8 – 5-25GHz



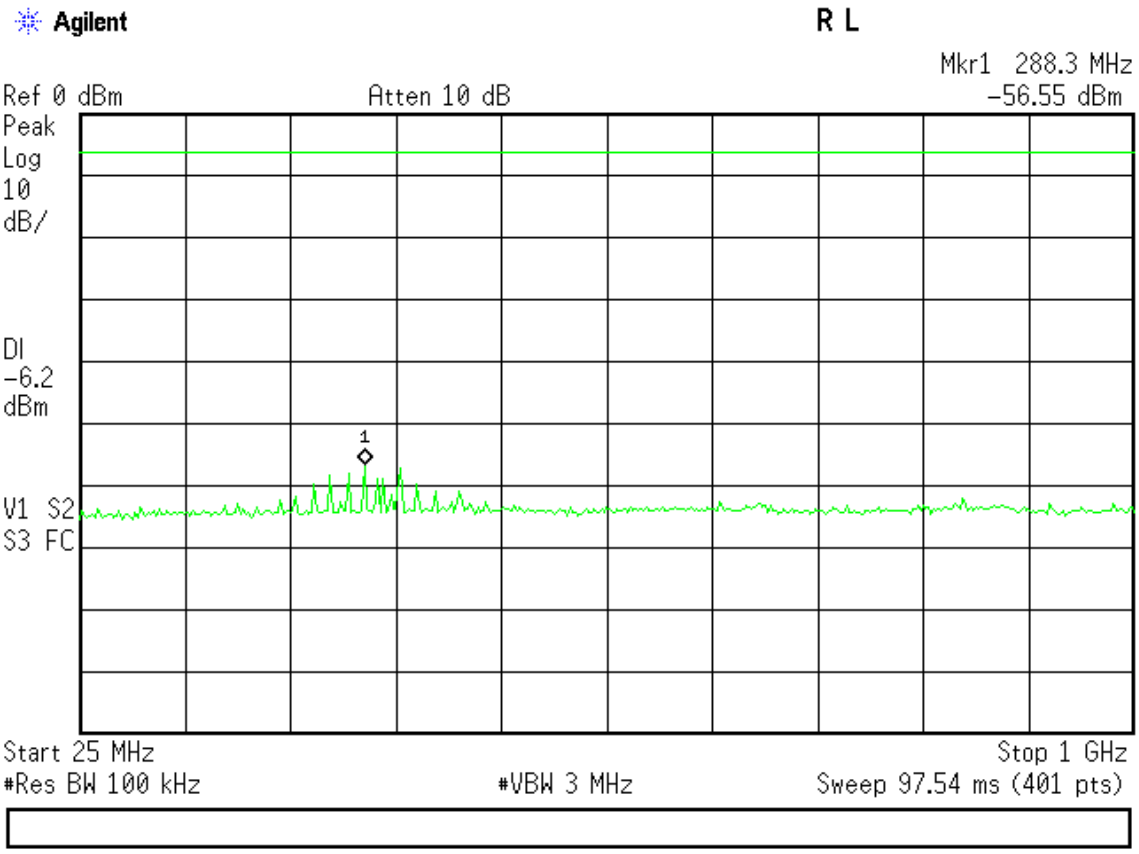
Channel 8 - 25-1000MHz



Channel 16 – 1-5GHz



Channel 16 – 5-25GHz



Channel 16 – 25-1000MHz

Rev. 6/16/2013

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental SA #1 (Brown)	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	4/15/2014	4/15/2013

Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)	BA928	Oregon Scientific	C3166-1	831	I	3/20/2014	3/20/2013
CEMI3 Thermohygrometer	35519-044	Control Company	72457729	1338	II	8/19/2013	8/19/2011

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Power Spectral Density

LIMIT

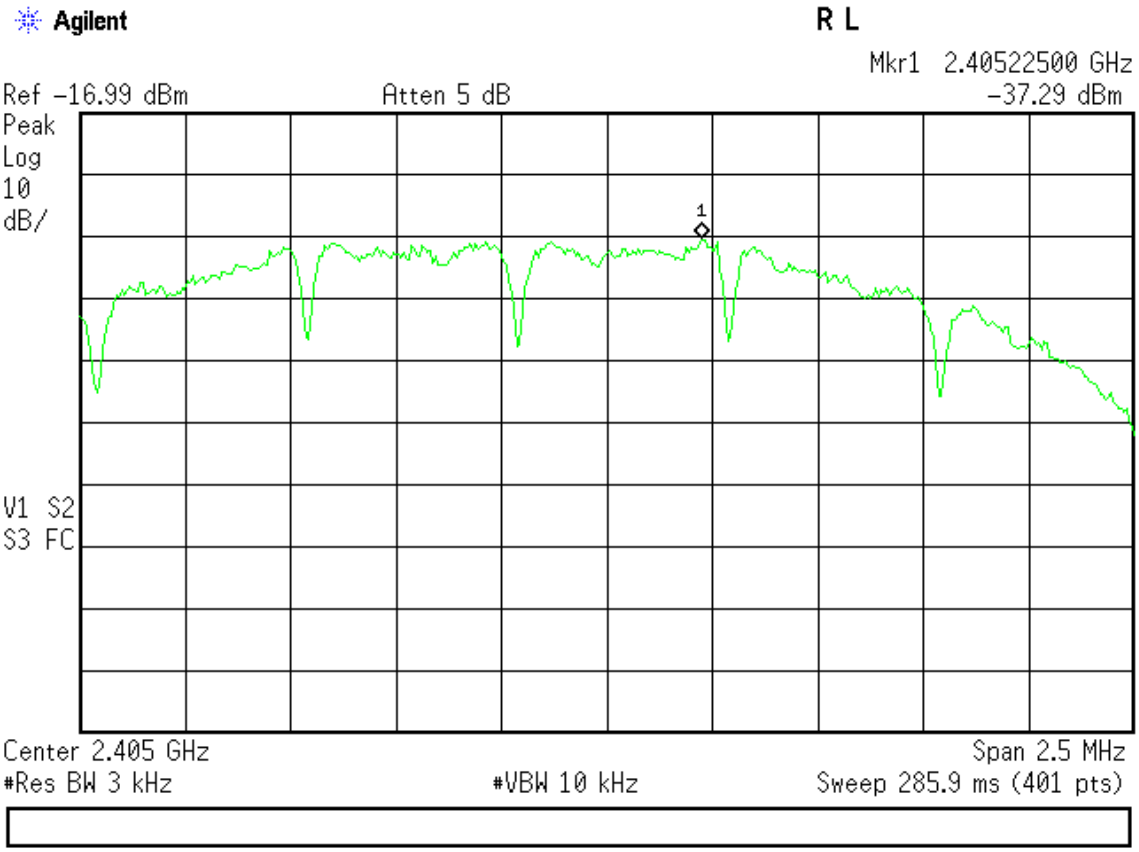
…the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission. [15.247(e)]

MEASUREMENTS / RESULTS

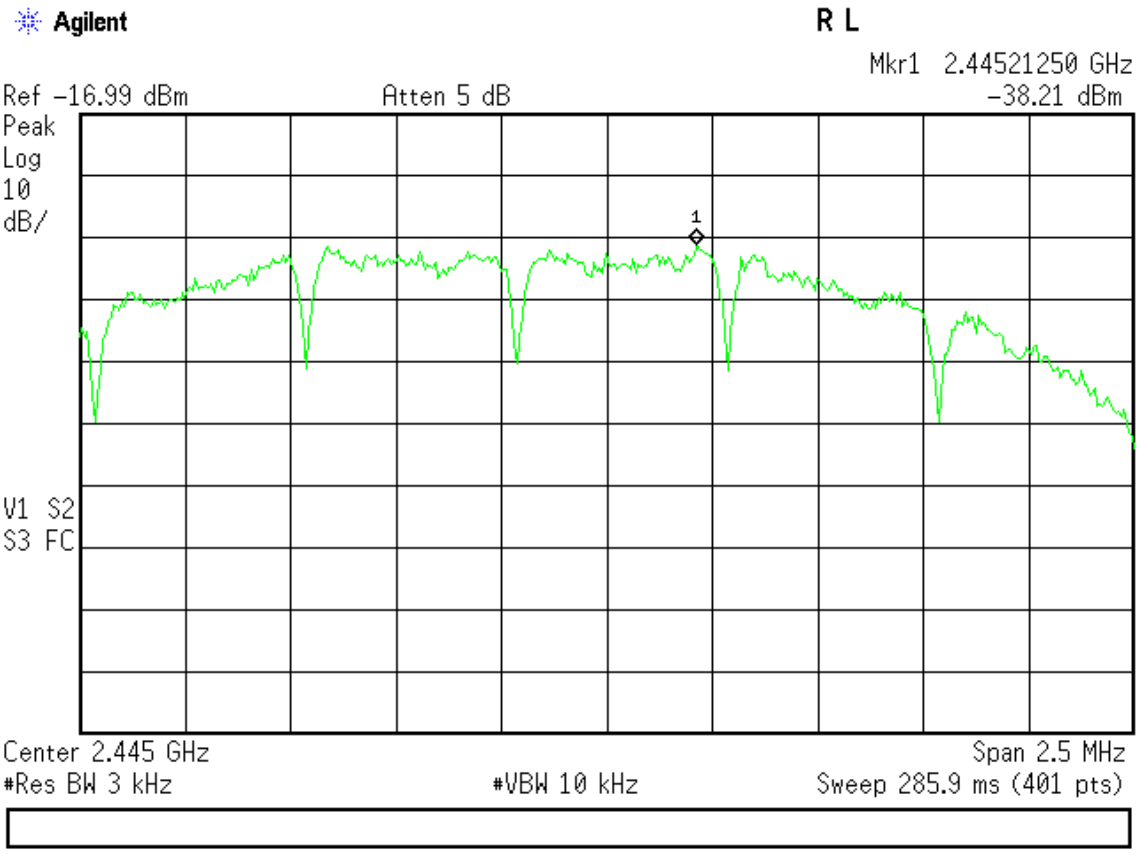
Engineer	Christopher Reynolds
Date	6/18/13
Site	3M OATS
Environmental Conditions	23.1°C, 31%, 1005mb

Channel Frequency (MHz)	3kHz RBW Reading (dBm)	Pad & Dongle (dB)	Adjusted Reading (dBm)	Limit (dBm)	Result
2405	-37.29	20.52	-16.77	8	Pass
2445	-38.21	20.52	-17.61	8	Pass
2480	-38.13	20.52	-17.69	8	Pass

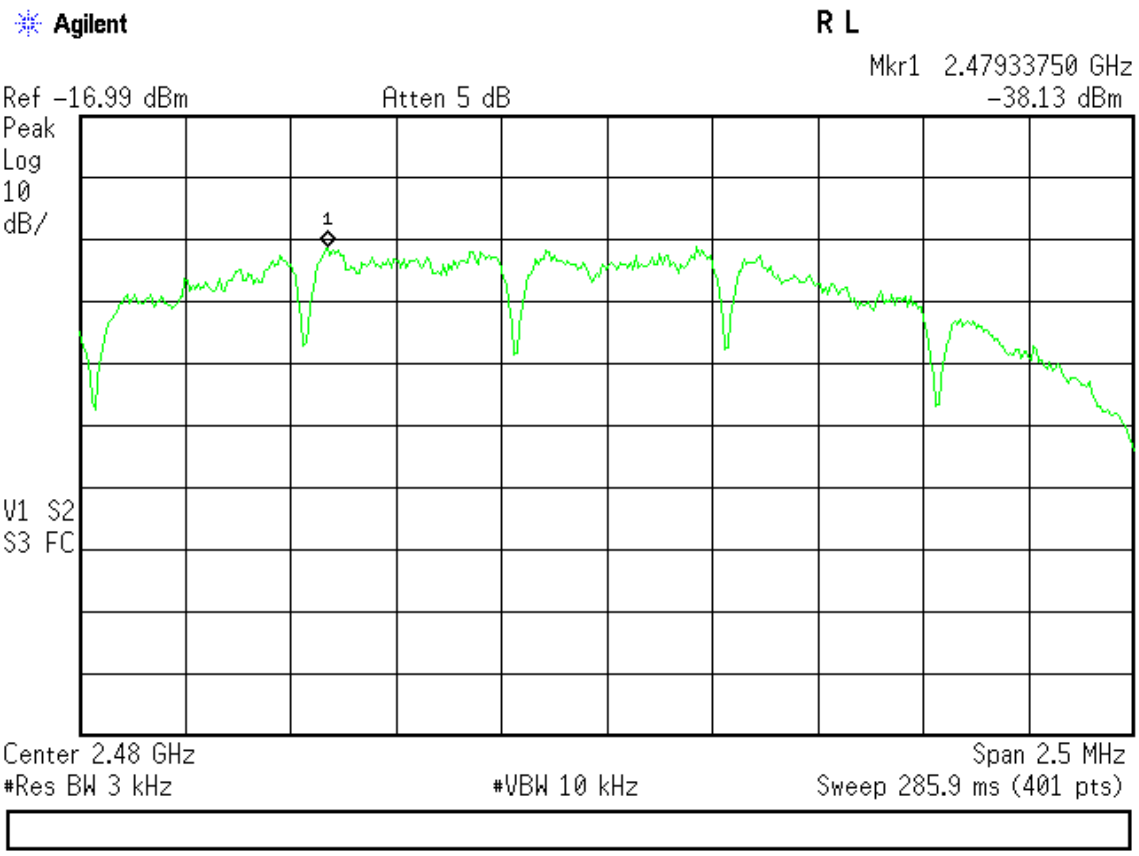
PLOTS



Channel 0 – PSD



Channel 8 – PSD



Channel 15 – PSD

Rev. 8/14/2013

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental SA #1 (Brown)	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	4/15/2014	4/15/2013
Preamps /Couplers Attenuators / Filters	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
HF 20dB 50W Attenuator	0.009-18 GHz	PE 7019-20	Pasternack	1	791	II	7/13/2014	7/13/2013
Meteorological Meters		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**	**Calibrated on**
Temp./Humidity/Atm. Pressure Gauge		7400 Perception II	Davis	N/A	965	I	5/29/2014	5/29/2013
CEMI6 Thermohygrometer		35519-044	Control Company	72457730	1344	II	Retired	Retired

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

AC Line Conducted Emissions

LIMITS

Frequency of emission (MHz)	Quasi-peak limit (dBµV)	Average limit (dBµV)
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

[47 CFR 15.207(a)]

MEASUREMENTS / RESULTS

Engineer	Chris Bramley, Saida Elfaquir and Ahmed Ahmed
Date	Jun 19 – 21, 2013
Site	3M OATS
Environmental Conditions	25.8°C, 24%, 1009mb (Jun 19, 2013) 25.8°C, 30%, 1009mb (Jun 19, 2013) 26.0°C, 20%, 1005mb (Jun 20, 2013) 24.5°C, 29%, 1005mb (Jun 21, 2013)

AC Conducted Emissions Data Table

Date: 21-Jun-13 **Company:** Thales Visionix **Work Order:** N1337
Engineer: SE **EUT Desc:** Ultrasonic Tracking Device
Temp: 24.5 ºC **Humidity:** 29% **Pressure:** 1005 mBar
Notes: TX Mode
Frequency Range: 150KHz-30MHz **EUT Input Voltage/Frequency:** 120V,60Hz

	Quasi-Peak Readings		Average Readings		LISN Factors		Cable	ATTN	FCC/CISPR Class B			FCC/CISPR Class B		
Frequency (MHz)	QP1 (dBµV)	QP2 (dBµV)	AVG1 (dBµV)	AVG2 (dBµV)	L1 (dB)	L2 (dB)	Factor (dB)	Factor (dB)	QP Limit (dBµV)	Margin (dB)	Result (Pass/Fail)	AVG Limit (dBµV)	Margin (dB)	Result (Pass/Fail)
0.17	26.6	20.3	13.3	11.3	-0.1	-0.1	0.0	-20.7	64.8	-17.5	Pass	54.8	-20.8	Pass
0.21	20.3	16.9	12.1	10.8	0.0	-0.1	0.0	-20.7	63.2	-22.3	Pass	53.2	-20.5	Pass
0.52	18.9	18.9	15.7	16.0	0.0	-0.1	0.0	-20.6	56.0	-16.4	Pass	46.0	-9.3	Pass
4.35	13.3	13.4	7.3	7.0	0.0	-0.1	-0.1	-20.6	56.0	-21.9	Pass	46.0	-18.0	Pass
9.80	15.1	14.1	9.4	7.2	-0.1	-0.1	-0.1	-20.6	60.0	-24.2	Pass	50.0	-19.9	Pass
16.79	10.4	9.0	3.5	2.8	-0.1	-0.2	-0.2	-20.6	60.0	-28.7	Pass	50.0	-25.7	Pass
24.99	10.3	9.9	3.3	3.9	-0.1	-0.2	-0.3	-20.6	60.0	-28.8	Pass	50.0	-25.0	Pass

Result: Pass ***Worst Margin:*** -9.3 dB ***Frequency:*** 0.525 MHz

Measurement Device: LISN ASSET 1726(Line 1) LISN ASSET 1727(Line 2) **Cable:** CEMI-10 **Spectrum Analyzer:** Black
Attenuator: 20dB Attenuator-74 **Site:** CEMI 3

C-S CEMI Calculator Version 3.0.11 *Equipment Factor Sheet rev: 5/4/2013*

Rev.6/16/2013

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Black	9kHz-12.8GHz	8596E	Agilent	3710A00944	337	I	1/17/2014
LISNs/Measurement Probes	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
LISN Asset 1726	150kHz-30MHz	LI-150A	Com-Power	201092	1726	I	1/11/2014
LISN Asset 1727	150kHz-30MHz	LI-150A	Com-Power	201093	1727	I	1/2/2014
Conducted Test Sites (Mains / Telco)	**FCC Code**		**VCCI Code**			**Cat**	**Calibration Due**
CEMI-03	9kHz - 2GHz		C-S			II	10/13/2013
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**
CEMI-10	9kHz - 2GHz		C-S			II	5/9/2014
Attenuators	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
20dB Attenuator-74	9kHz-2GHz			N/A		II	10/4/2013
Meteorological Meters		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
Temp./Humidity/Atm. Pressure Gauge		7400 Perception II	Davis	N/A	965	I	5/29/2014

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

AC Conducted Emissions Data Table

Date: 20-Jun-13 **Company:** Thales Visionix **Work Order:** N1337
Engineer: Ahmed Ahmed **EUT Desc:** Ultrasonic Tracking Device
Temp: 26.0 ºC **Humidity:** 23% **Pressure:** 1005 mBar
Notes: TX mode
Frequency Range: 0.15-30MHz **EUT Input Voltage/Frequency:** 230Vac/50Hz

Frequency (MHz)	Quasi-Peak Readings QP1 (dBµV)	QP2 (dBµV)	Average Readings AVG1 (dBµV)	AVG2 (dBµV)	LISN Factors L1 (dB)	L2 (dB)	Cable Factor (dB)	ATTN Factor (dB)	FCC/CISPR Class B QP Limit (dBµV)	Margin (dB)	Result (Pass/Fail)	FCC/CISPR Class B AVG Limit (dBµV)	Margin (dB)	Result (Pass/Fail)
0.15	28.4	28.7	8.3	10.5	-0.1	-0.1	0.0	-20.2	66.0	-17.0	Pass	56.0	-25.2	Pass
0.68	19.4	19.4	17.3	16.9	0.0	-0.1	-0.1	-20.2	56.0	-16.3	Pass	46.0	-8.4	Pass
4.95	18.1	17.0	13.8	13.8	0.0	-0.1	-0.1	-20.2	56.0	-17.6	Pass	46.0	-11.8	Pass
9.61	16.4	17.9	12.8	12.7	-0.1	-0.1	-0.1	-20.2	60.0	-21.7	Pass	50.0	-16.9	Pass
13.30	24.5	23.3	19.7	18.1	-0.1	-0.1	-0.1	-20.2	60.0	-15.1	Pass	50.0	-9.9	Pass
25.16	7.0	7.5	3.0	3.6	-0.1	-0.2	-0.1	-20.2	60.0	-32.0	Pass	50.0	-25.9	Pass

Result: Pass ***Worst Margin:*** -8.4 dB ***Frequency:*** 0.679 MHz

Measurement Device: LISN ASSET 1726(Line 1) LISN ASSET 1727(Line 2) **Cable:** CEMI-11 **Spectrum Analyzer:** SA EMI Chamber (1328)
Attenuator: 20dB ATTEN-03 **Site:** CEMI 3

C-S CEMI Calculator Version 3.0.11 *Equipment Factor Sheet rev: 5/4/2013*

Rev.6/16/2013

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
SA EMI Chamber (1328)	9kHz-13.2 GHz	E4405B	Agilent	MY44210241	1328	I	12/19/2013

LISNs/Measurement Probes	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
LISN Asset 1726	150kHz-30MHz	LI-150A	Com-Power	201092	1726	I	1/11/2014
LISN Asset 1727	150kHz-30MHz	LI-150A	Com-Power	201093	1727	I	1/2/2014

Conducted Test Sites (Mains / Telco)	FCC Code	VCCI Code	Cat	Calibration Due
CEMI-03	9kHz - 2GHz	C-S	II	10/13/2013

Cables	Range	Mfr	Cat	Calibration Due
CEMI-11	9kHz - 2GHz	C-S	II	5/4/2014

Attenuators	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
20dB ATTEN-03	9kHz-2GHz			N/A		II	12/3/2013

Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due
Temp./Humidity/Atm. Pressure Gauge	7400 Perception II	Davis	N/A	965	I	5/29/2014

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

AC Conducted Emissions Data Table

Date: 19-Jun-13 **Company:** Thales Visionix **Work Order:** N1337
Engineer: Chris Bramley **EUT Desc:** Ultrasonic Tracking Device
Temp: 25.8 ºC **Humidity:** 24% **Pressure:** 1009 mBar
Notes: Receive Mode - Ethernet and USB active simultaneously
Frequency Range: 0.15-30MHz **EUT Input Voltage/Frequency:** 120V/60Hz

Frequency (MHz)	Quasi-Peak Readings QP1 (dBµV)	QP2 (dBµV)	Average Readings AVG1 (dBµV)	AVG2 (dBµV)	LISN Factors L1 (dB)	L2 (dB)	Cable Factor (dB)	ATTN Factor (dB)	FCC/CISPR Class B QP Limit (dBµV)	Margin (dB)	Result (Pass/Fail)	FCC/CISPR Class B AVG Limit (dBµV)	Margin (dB)	Result (Pass/Fail)
0.154	27.9	27.8	15.5	16.0	-0.1	-0.1	0.0	-20.2	65.8	-17.5	Pass	55.8	-19.5	Pass
0.394	16.8	17.3	11.9	12.7	-0.1	0.0	0.0	-20.2	58.0	-20.4	Pass	48.0	-15.1	Pass
0.525	19.1	19.5	16.1	16.5	0.0	0.0	0.0	-20.2	56.0	-16.3	Pass	46.0	-9.3	Pass
0.657	20.5	20.6	14.9	15.2	0.0	0.0	0.0	-20.2	56.0	-15.1	Pass	46.0	-10.5	Pass
9.155	17.1	17.1	11.5	11.5	0.0	0.0	-0.1	-20.2	60.0	-22.5	Pass	50.0	-18.1	Pass
24.105	13.2	13.6	7.5	7.7	-0.1	-0.1	-0.3	-20.2	60.0	-25.8	Pass	50.0	-21.7	Pass

Result: Pass ***Worst Margin:*** -9.3 dB ***Frequency:*** 0.525 MHz

Measurement Device: LISN ASSET 1728(Line 1) LISN ASSET 1729(Line 2) **Cable:** CEMI-09 **Spectrum Analyzer:** Black
Attenuator: 20dB ATTEN-03 **Site:** CEMI 3

C-S CEMI Calculator Version 3.0.11 *Equipment Factor Sheet rev: 5/4/2013*

Rev.6/16/2013

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Black	9kHz-12.8GHz	8596E	Agilent	3710A00944	337	I	1/17/2014
LISNs/Measurement Probes	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
LISN Asset 1728	150kHz-30MHz	LI-150A	Com-Power	201084	1728	I	1/28/2014
LISN Asset 1729	150kHz-30MHz	LI-150A	Com-Power	201085	1729	I	1/28/2014
Conducted Test Sites (Mains / Telco)	**FCC Code**		**VCCI Code**			**Cat**	**Calibration Due**
CEMI-03	9kHz - 2GHz		C-S			II	10/13/2013
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**
CEMI-09	9kHz - 2GHz		C-S			II	5/9/2014
Attenuators	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
20dB ATTEN-03	9kHz-2GHz			N/A		II	12/3/2013
Meteorological Meters		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
Temp./Humidity/Atm. Pressure Gauge		7400 Perception II	Davis	N/A	965	I	5/29/2014

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

AC Conducted Emissions Data Table

Date: 19-Jul-13 **Company:** Thales Visionix Inc. **Work Order:** N1337
Engineer: Chris Bramley **EUT Desc:** Ultrasonic Tracking Device
Temp: 26.8 ºC **Humidity:** 30% **Pressure:** 1004 mBar
Notes: Receive Mode - Ethernet and USB active simultaneously
Frequency Range: 0.15-30MHz **EUT Input Voltage/Frequency:** 230V/50Hz

	Quasi-Peak Readings		Average Readings		LISN Factors				FCC/CISPR Class B			FCC/CISPR Class B		
Frequency	QP1	QP2	AVG1	AVG2	L1	L2	Cable Factor	ATTN Factor	QP Limit	Margin	Result	AVG Limit	Margin	Result
(MHz)	(dBµV)	(dBµV)	(dBµV)	(dBµV)	(dB)	(dB)	(dB)	(dB)	(dBµV)	(dB)	(Pass/Fail)	(dBµV)	(dB)	(Pass/Fail)
0.158	30.1	30.6	12.9	12.4	-0.1	-0.1	-0.2	-20.4	65.6	-14.4	Pass	55.6	-22.1	Pass
0.665	19.1	18.5	14.1	13.1	0.0	0.0	-0.2	-20.4	56.0	-16.3	Pass	46.0	-11.3	Pass
0.691	19.2	18.8	14.0	13.0	0.0	0.0	-0.2	-20.4	56.0	-16.2	Pass	46.0	-11.4	Pass
9.950	17.1	16.5	12.3	11.7	-0.1	0.0	-0.3	-20.4	60.0	-22.2	Pass	50.0	-17.0	Pass
13.462	21.0	19.3	13.8	11.4	-0.1	-0.1	-0.3	-20.4	60.0	-18.2	Pass	50.0	-15.5	Pass
15.507	18.2	16.8	10.3	8.6	-0.1	-0.1	-0.3	-20.3	60.0	-21.1	Pass	50.0	-18.9	Pass

Result: Pass ***Worst Margin:*** -11.3 dB ***Frequency:*** 0.665 MHz

Measurement Device: LISN ASSET 1732(Line 1) LISN ASSET 1733(Line 2) **Cable:** CEMI-02 **Spectrum Analyzer:** Yellow
Attenuator: 20dB Atten-4 **Site:** CEMI 3

C-S CEMI Calculator Version 3.0.12 *Equipment Factor Sheet rev: 7/13/2013*

Rev.6/16/2013

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due
SA EMI Chamber (1328)	9kHz-13.2 GHz	E4405B	Agilent	MY44210241	1328	I	12/19/2013
LISNs/Measurement Probes	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
LISN Asset 1726	150kHz-30MHz	LI-150A	Com-Power	201092	1726	I	1/11/2014
LISN Asset 1727	150kHz-30MHz	LI-150A	Com-Power	201093	1727	I	1/2/2014
Conducted Test Sites (Mains / Telco)	**FCC Code**		**VCCI Code**			**Cat**	**Calibration Due**
CEMI-03	9kHz - 2GHz		C-S			II	10/13/2013
Cables	**Range**		**Mfr**			**Cat**	**Calibration Due**
CEMI-11	9kHz - 2GHz		C-S			II	5/4/2014
Attenuators	**Range**	**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
20dB ATTEN-03	9kHz-2GHz			N/A		II	12/3/2013
Meteorological Meters		**MN**	**Mfr**	**SN**	**Asset**	**Cat**	**Calibration Due**
Temp./Humidity/Atm. Pressure Gauge		7400 Perception II	Davis	N/A	965	I	5/29/2014

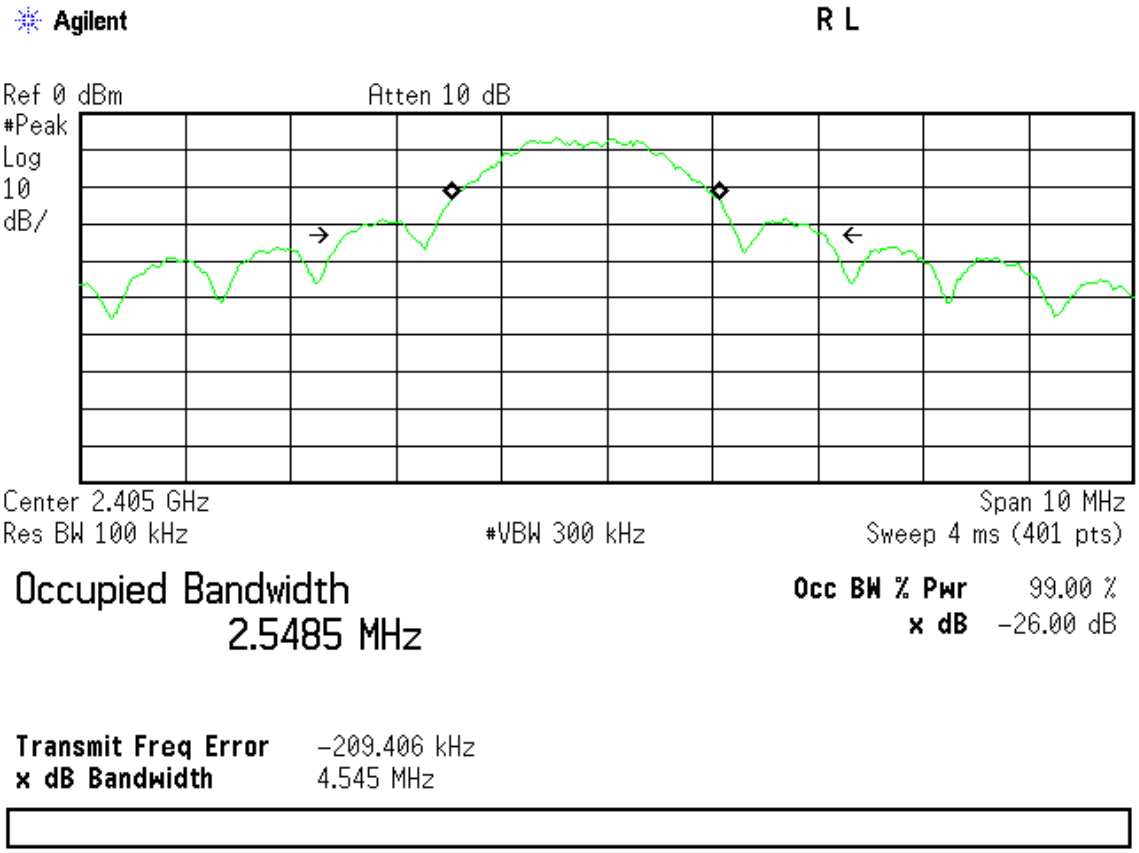
All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Occupied Bandwidth

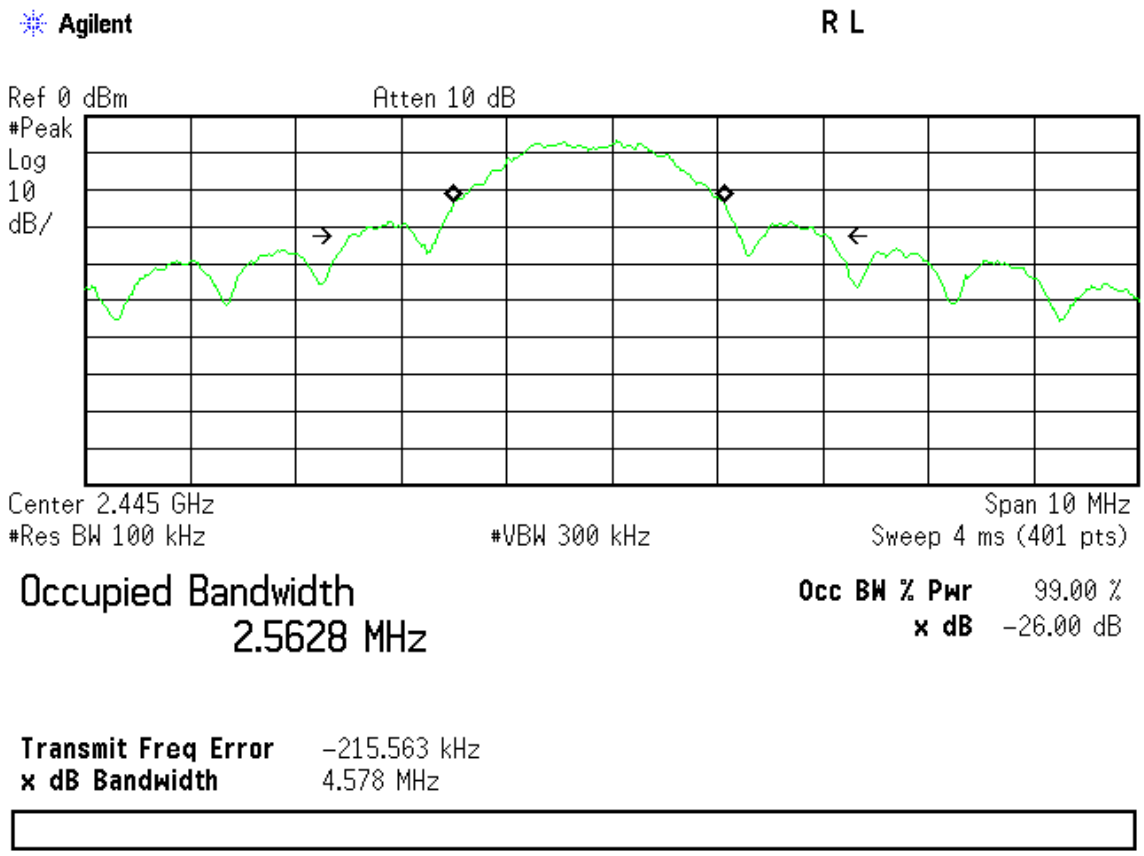
REQUIREMENT

When an occupied bandwidth is no specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured. [RSS-GEN 4.6.1]

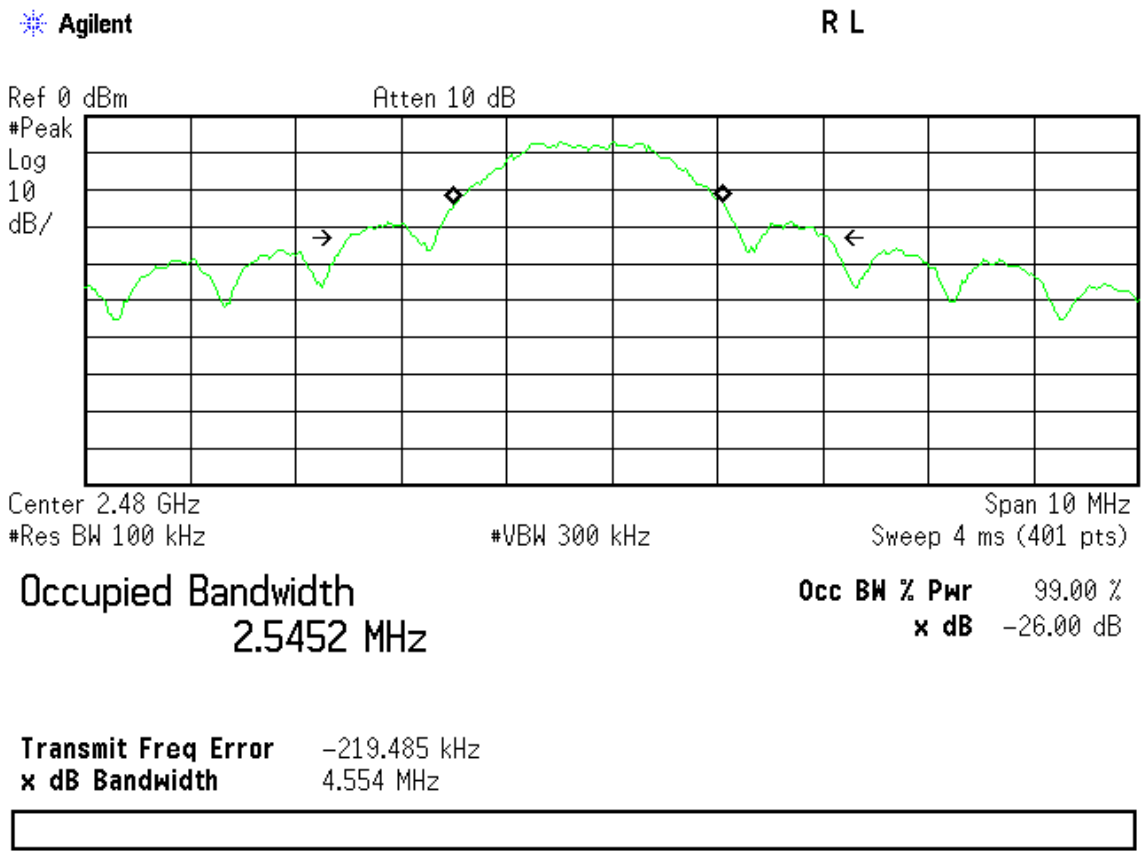
Engineer	Christopher Reynolds
Date	6/20/13
Site	3M OATS
Environmental Conditions	23.9°C, 25%, 1015mb



Low Channel – Occupied Bandwidth



Middle Channel – Occupied Bandwidth



High Channel – Occupied Bandwidth

Rev. 6/16/2013

Spectrum Analyzers / Receivers /Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Rental SA #1 (Brown)	9kHz-26.5GHz	E4407B	Agilent	SG44210511	1510	I	4/15/2014	4/15/2013

Meteorological Meters	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Weather Clock (Pressure Only)	BA928	Oregon Scientific	C3166-1	831	I	3/20/2014	3/20/2013
CEMI3 Thermohygrometer	35519-044	Control Company	72457729	1338	II	8/19/2013	8/19/2011

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Measurement Uncertainty

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Expanded Uncertainty k=2	Maximum allowable uncertainty
Radiated Emissions (30-1000MHz) NIST CISPR	 5.6dB 4.6dB	 N/A 5.2dB (Ucispr)
Radiated Emissions (1-26.5GHz)	4.6dB	N/A
Radiated Emissions (above 26.5GHz)	4.9dB	N/A
Magnetic Radiated Emissions	5.6dB	N/A
Conducted Emissions NIST CISPR	 3.9dB 3.6dB	 N/A 3.6dB (Ucispr)
Telco Conducted Emissions (Current)	2.9dB	N/A
Telco Conducted Emissions (Voltage)	4.4dB	N/A
Electrostatic Discharge	11.5%	N/A
Radiated RF Immunity (Uniform Field)	1.6dB	N/A
Electrical Fast Transients	23.1%	N/A
Surge	23.1%	N/A
Conducted RF Immunity	3dB	N/A
Magnetic Immunity	12.8%	N/A
Dips and Interrupts	2.3V	N/A
Harmonics	3.5%	N/A
Flicker	3.5%	N/A
Radio frequency (@ 2.4GHz)	3.23×10^{-8}	1×10^{-7}
RF power, conducted	0.40dB	0.75dB
Maximum frequency deviation: • Within 300Hz and 6kHz of audio frequency / Within 6kHz and 25kHz of audio frequency	 3.4% 0.3dB	 5% 3dB
Adjacent channel power	1.9dB	3dB
Conducted spurious emission of transmitter, valid up to 12.75GHz	2.39dB	3dB
Conducted emission of receivers	1.3dB	3dB
Radiated emission of transmitter, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of transmitter, valid up to 80GHz	3.3dB	6dB
Radiated emission of receiver, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of receiver, valid up to 80GHz	3.3dB	6dB
Humidity	2.37%	5%
Temperature	0.7°C	1.0°C
Time	4.1%	10%
RF Power Density, Conducted	0.4dB	3dB
DC and low frequency voltages	1.3%	3%
Voltage (AC, <10kHz)	1.3%	2%
Voltage (DC)	0.62%	1%
The above reflects a 95% confidence level		

Conditions Of Testing

[Bureau Veritas Consumer Products Services, Inc., a Massachusetts corporation], and/or its affiliates (collectively, the "Company") will conduct, at the request of the Submitter ("**Client**"), the tests specified on the submitted Test Request Form or equivalent in accordance with, and subject to, the following terms and conditions (collectively, "**Conditions**"):

1. All orders for tests are subject to acceptance by the Company, and no order will constitute a binding commitment of the Company unless and until such order is accepted by it, as evidenced by the issuance of a written report ("**Test Report**") by the Company. The Test Report is issued solely by the Company, is intended for the exclusive use of Client and shall not be published, used for advertising purposes, copied or replicated for distribution to any other person or entity or otherwise publicly disclosed without the prior written consent of the Company. By submitting a request for services to the Company, Client consents to the disclosure to accreditation bodies of those records of Client relevant to the accreditation body's assessment of the Company's competence and compliance with relevant accreditation criteria. The Company shall not be liable for any loss or damage whatsoever resulting from the failure of the Company to provide its services within any time period for completion estimated by the Company. If Client anticipates using the Test Report in any legal proceeding, arbitration, dispute resolution forum or other proceeding, it shall so notify the Company prior to submitting the Test Report in such proceeding. The Company has no obligation to provide a fact or expert witness at such proceeding unless the Company agrees in advance to do so for a separate and additional fee.
2. The Test Report will set forth the findings of the Company solely with respect to the test samples identified therein. Unless specifically and expressly indicated in the Test Report, the results set forth in such Test Report are not intended to be indicative or representative of the quality or characteristics of the lot from which a test sample is taken, and Client shall not rely upon the Test Report as being so indicative or representative of the lot or of the tested product in general. The Test Report will reflect the findings of the Company at the time of testing only, and the Company shall have no obligation to update the Test Report after its issuance. The Test Report will set forth the results of the tests performed by the Company based upon the written information provided to the Company. The Test Report will be based solely on the samples and written information submitted to the Company by Client, and the Company shall not be obligated to conduct any independent investigation or inquiry with respect thereto.
3. The Company may, in its sole discretion, destroy samples which have been furnished to the Company for testing and which have not been destroyed in the course of testing. The Company may delegate the performance of all or a portion of the services contemplated hereunder to an affiliate, agent or subcontractor of the Company, and Client consents to such delegation.
4. These Conditions and the Test Report represent the entire understanding of the parties hereto with respect to the subject matter hereof and of the Test Report, and no modification, variance or extrapolation with respect thereto shall be permitted without the prior written consent of the Company.
5. The names, service marks, trademarks and copyrights of the Company and its affiliates, including the names "**BUREAU VERITAS**," "**BUREAU VERITAS CONSUMER PRODUCTS SERVICES**," "**BVCPS**", "**MTL**", "**ACTS**", "**MTL-ACTS**" and **CURTIS-STRAUS** (collectively, the "**Marks**") are and shall remain the sole property of the Company or its affiliates and shall not be used by Client except solely to the extent that Client obtains the prior written approval of the Company and then only in the manner prescribed by the Company. Client shall not contest the validity of the Marks or take any action that might impair the value or goodwill associated with the Marks or the image or reputation of the Company or its affiliates.
6. Payment in full shall be due 30 days after the date of invoice. Interest shall be due on overdue amounts from the due date until paid at an interest rate of 1.5% per month or, if less, the maximum rate permitted by law. The Company reserves the right, at any time and from time to time, to revoke any credit extended to Client. Client shall reimburse the Company for any costs it incurs in collecting past due amounts, including court costs and fees and expenses of attorneys and collection agencies. The Test Report may not be used or relied upon by Client if and for so long as Client fails to pay when due any invoice issued by the Company or any affiliate of it to Client or any affiliate or subsidiary of Client together with interest and penalties, if any, accrued thereon.
7. The Company disclaims any and all responsibility or liability arising out of or in connection with e-mail transmissions of such information.
8. Client understands and agrees that the Company is neither an insurer nor a guarantor, that the Company does not take the place of Client or any designer, manufacturer, agent, buyer, distributor or transportation or shipping company, and that the Company disclaims all liability in such capacities. Client further understands that if it seeks assurance against loss or damage, it should obtain appropriate insurance.
9. Client agrees that the Company, by providing the services, does not take the place of Client nor any third party, nor does the Company release them from any of their obligations, nor does the Company otherwise assume, abridge, abrogate or undertake to discharge any duty of any third party to Client or any duty of Client or any third party to any other third party, and Client will not release any third party from its obligations and duties with respect to the tested goods.
10. Client shall, on a timely basis, (a) provide adequate instructions to the Company in order to enable the Company to perform properly its services, (b) provide, or cause Client's suppliers and contractors to provide, the Company with all documents necessary to enable the Company to perform its services, (c) furnish the Company with all relevant information regarding Client's intended use and purposes of the tested goods, (d) advise the Company of essential dates and deadlines relevant to the tested goods and (e) fully exercise all rights and remedies available to Client against third parties in respect of the tested goods.
11. The Company shall undertake due care and ordinary skill in the performance of its services to Client, and the Company shall accept responsibility only were such skill has not been exercised and, even in such event, only to the extent of the limitation of liability set forth herein.
12. If Client desires to assert a claim arising from or relating to (i) the performance, purported performance or non-performance of any services by the Company or (ii) the sale, resale, manufacture, distribution or use of any tested goods, it must submit that claim to the Company in a writing that sets forth with particularity the basis for such claim within 60 days from discovery of the potential claim and not more than six months after the date of issuance of the Test Report to Client. Client waives any and all such claims including, without limitation, claims that the Test Report is inaccurate, incomplete or misleading or that additional or different testing is required, unless and then only to the extent that Client submits a written claim to the Company within both such time periods.

13. CLIENT SHALL, EXCEPT TO THE EXTENT OF COMPANY'S LIABILITY TO CLIENT HEREUNDER (WHICH IN NO EVENT SHALL EXCEED THE LIMITATION OF LIABILITY HEREIN), HOLD HARMLESS AND INDEMNIFY THE COMPANY, ITS AFFILIATES AND THEIR RESPECTIVE DIRECTORS, OFFICERS, EMPLOYEES, AGENTS AND SUBCONTRACTORS AGAINST ALL ACTUAL OR ALLEGED THIRD PARTY CLAIMS FOR LOSS, DAMAGE OR EXPENSE OF WHATSOEVER NATURE AND HOWSOEVER ARISING FROM OR RELATING TO (i) THE PERFORMANCE, PURPORTED PERFORMANCE OR NON-PERFORMANCE OF ANY SERVICES BY THE COMPANY OR (ii) THE SALE, RESALE, MANUFACTURE, DISTRIBUTION OR USE OF ANY TESTED GOODS.
14. EXCEPT AS MAY OTHERWISE BE EXPRESSLY AGREED TO IN WRITING BY THE COMPANY AND NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN OR IN ANY TEST REPORT, NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, IS MADE.
15. (A) IN NO EVENT WHATSOEVER SHALL THE COMPANY BE LIABLE FOR ANY CONSEQUENTIAL, SPECIAL, INCIDENTAL, EXEMPLARY OR PUNITIVE DAMAGES IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE TEST REPORT OR THE SERVICES PROVIDED BY THE COMPANY HEREUNDER, INCLUDING WITHOUT LIMITATION LOSS OF OR DAMAGE TO PROPERTY; LOSS OF INCOME, PROFIT OR USE; OR ANY CLAIMS OR DEMANDS MADE AGAINST CLIENT OR ANY OTHER PERSON BY ANY THIRD PARTY IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE SERVICES PROVIDED BY THE COMPANY HEREUNDER.

(B)NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN, AND IN RECOGNITION OF THE RELATIVE RISKS AND BENEFITS TO CLIENT AND THE COMPANY ASSOCIATED WITH THE TESTING SERVICES CONTEMPLATED HEREBY, THE RISKS HAVE BEEN ALLOCATED SUCH THAT UNDER NO CIRCUMSTANCES WHATSOEVER SHALL THE LIABILITY OF THE COMPANY TO CLIENT OR ANY THIRD PARTY IN RESPECT OF ANY CLAIM FOR LOSS, DAMAGE OR EXPENSE, OF WHATSOEVER NATURE OR MAGNITUDE, AND HOWSOEVER ARISING, EXCEED AN AMOUNT EQUAL TO FIVE (5) TIMES THE AMOUNT OF THE FEES PAID TO THE COMPANY FOR THE SPECIFIC SERVICES WHICH GAVE RISE TO SUCH CLAIM OR U.S.$10,000, WHICHEVER IS THE LESSER AMOUNT.
16. The Company shall not be liable for any loss or damage resulting from any delay or failure in performance of its obligations hereunder resulting directly or indirectly from any event of force majeure or any event outside the control of the Company. If any such event occurs, the Company may immediately cancel or suspend its performance hereunder without incurring any liability whatsoever to Client.
17. Company's services, including these Conditions, shall be governed by, and construed in accordance with, the local laws of the country where the Company performs the tests or, in the case of tests performed in the United States of America, the laws of Massachusetts without regard to conflicts of laws principles. If any aspect(s) of these Conditions is found to be illegal or unenforceable, the validity, legality and enforceability of all remaining aspects of these Conditions shall not in any way be affected or impaired thereby. Any proceeding related to the subject matter hereof shall be brought, if at all, in the courts of the country where the Company performs the tests or, in the case of tests performed in the United States of America, in the courts of Massachusetts. Client waives the right to interpose any counterclaim or setoffs of any nature in any litigation arising hereunder.

Rev.160009121(2)_#684340 v13CS