



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

Report No EQ0559-1

Client Durham Geo Enterprises, Inc.

Address 2175 West Park Court

Stone Mountain, GA 30087

Phone 770-465-7557

Items tested HERMES Radio Module

FCC ID 2AFGQ-HERMES1 20515-HERMES1

HVIN | HERMES1

Equipment Type | Digital Transmission System

Equipment Code DTS T69KG1D

FCC/IC Rule Parts 47 CFR 15.247, RSS-247 Issue 1

Test Dates April 26 to 28, 2016

Prepared by

Tuyen A. Truong - Test Engineer

Authorized by

Yunys Fazilogly - Sr. EMC Engineer

Issue Date

6/1/2016

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

Conditions of Issue

This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 37 of this report.





One Distribution Center Circle, #1 • Littleton, MA • TEL (978) 486-8880 • FAX (978) 486-8828

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



Summary

This test report supports a "Limited Modular Approval" certification application of a transmitter operating pursuant to 47 CFR 15.247 and RSS-247. The product is the "HERMES Radio Module" (Model: HERMES1). It is a digitally modulated transmitter that operates in the 906MHz to 924MHz frequency range. Product was separately set up and tested with 4 different detachable antennas; LINX ¼ Wave Mini Whip Antenna (M/N: ANT-916-CW-RCS) with 3.3dBi gain, TAOGLAS Manhole Lid Antenna (M/N: RG.02.01.3000W) with 2.5dBi gain, LAIRD Omnidirectional Collinear Outdoor Antenna (M/N: FG9023) with 5.15dBi gain and NEARSON ½ Wave Loaded Whip Antenna (M/N: S161AH-915R) with 2.5dBi gain.

We found that the product met the above requirements without modification. The test sample was received in good condition.

Please note that the module was set up in USB configuration (stand-alone) and separately tested with each of the 4 different antennas. Testing was repeated with EUT set up in Serial configuration (inside the host "V-logger") with only one antenna (LAIRD Omnidirectional Collinear Outdoor Antenna) where the result was found as worst case in the USB configuration.

Issue No.

Reason for change Original Release Date Issued June 1, 2016





Test Methodology

All testing was performed according to the following rules/procedures/documents; CFR 47 Part 15.247, RSS-247 Issue 1, RSS-Gen Issue 4, FCC KDB 558074 D01 DTS Measurement Guidance v03r05 and ANSI C63.10-2013.

Radiated emissions were maximized by rotating the device and its antennas around 3 orthogonal planes (X, Y and Z) as well as varying the test antenna's height and polarity.

RF measurements were performed at the antenna port. 3 channels were tested as follows: Low: 906 MHz, Middle: 914MHz, High: 924MHz

When EUT was set up in USB configuration, AC mains conducted emissions was performed with a $50\Omega/50\mu H$ LISN at 120Vac/60Hz on support PC which provided power to the EUT via USB connection. When EUT was set up in Serial configuration, AC line conducted emissions testing was not applicable since the device is powered by battery.

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

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



Product Tested - Configuration Documentation

	EUT Configuration (USB Connection)													
Work O	rder:	Q0559					•							
Comp	pany:	Durhan	Geo Enterp	orises Inc.										
Company Add	dress:	12123 H	Harbour Rea	ch Drive, Suite	106									
•		Mukilte	eo, WA 982	75										
Cor	ntact:	Brad Ba	arnicoat											
Person Pres	ence:	Chris K	rstanovic											
				MN			PN			SN				
	EUT:		HE	ERMES1						Sampl	e #2			
EUT Descrip	otion:	HERMES Radio Module												
EUT TX Frequ	ency:	906 to 924 MHz												
EUT Max Frequency: 16 MHz (associated circuitry)														
•				-										
EUT Components			MN SN											
Hermes Radio Module		HERMES1 Sample 2												
LINX 1/4 Wave Mini V	Whip	ANT-916-CW-RCS Sample 1												
Antenna	-													
Taoglas Manhole Lid		RG.02.01.3000W 142200085												
Antenna														
LAIRD Omnidirections				FG9	023				020416	509				
Collinear Outdoor Ante														
Nearson 1/2 Wave Load				S161AF	I-915R				Not Lis	ted				
Whip, Fixed Rt. Angle														
Antenna														
Support Equipment				M				SN 00919						
Curtis Straus Dell PC				Dimensio										
Lenovo Mouse				M-UA					NLZ830A					
Dell Keyboard				SK-8					DJ331-716					
Dell LCD Monitor				1704I	rvt			CN-O	J6642-7161	18-331-AD	14			
D4 T -b-1	D (/	т Т	Ш4	#1-4 3	1-1- 4	42.14.3	64-	141- 6	: / ·	1	T4			
Port Label	Port '	1 ype	# ports	# populated	cable type	shielded	ferrites	length (m)	in/out	under test	comment			
USB	USB		1	1	USB	Yes	No	1	in	yes	Only use for set up			
Antenna (LINX Mini	SMA		1	1	Coaxial	Yes	No	0.09	in	yes	Antenna connector			
Whip Antenna)	51111		•	1	Countri	100	110	3.07		,00	is RP SMA			
Antenna (Taoglas Manhole Lid	SMA		1	1	Coaxial	Yes	No	3	in	yes	Antenna connector is SMA			
Antenna)											19 DIVIA			
Antenna (LAIRD	SMA		1	1	Coaxial	Yes	No	1.8	in	yes	Antenna connector			
Omnidirectional Antenna)											is N-Female to RP SMA.			
Antenna)	CNAA			1	C	V	NT-	0.2	+.	_	SIVIA.			

Software Operating Mode Description:

SMA

RS232

1

0

Antenna (Nearson 1/2

Wave Loaded Whip

Antenna)

Serial

EUT is set to transmit on Low (906 MHz), Mid (914 MHz) and High (924 MHz). Please note that HERMES radio module is separately set up via USB connection and tested with each of 4 different antennas listed in the EUT Components section above, only one tested at time during Radiated Emission and AC Mains Conducted Emission (worst case).

Yes

No

0.2

in

yes

Coaxial





Antenna connector

Serial port is not

is RP SMA

use in this configuration

Work Order: Q0559					Ţ	EUT Configurati	on (Serial Con	nection)									
Company Address: Durbam Geo Enterprises Inc.	Work ()rder:	O0559		-	or comigurati	on (octial con	incerion)									
Contact: Brad Barnicoat Ferson Presence: Chris Kistanovic Chris Kistanovic Ferson Presence: Chris Kistanovic Chris			,		prises Inc.												
Mulitteo, WA, 98275 Contact Brail Barracoat						106											
Contact: Brad Barnicoat Person Presence: Chris Kristanovic																	
Person Presence: Chris Krstanovic																	
MN	Co	ntact:	Brad B														
EUT HERMES	Person Pre	sence:	Chris I	is Krstanovic													
EUT HERMES																	
EUT Description: EERMES Radio Module																	
EUT TX Frequency: 16 MHz (associated circuitry)											Samp	ole #2					
EUT Max Frequency: 16 MHz (associated circuitry)	EUT Descri	ption:			odule												
EUT Components	EUT TX Frequ	uency:	906 to	924 MHz													
Hermes Radio Module	EUT Max Frequ	iency:	16 MH	z (associated	d circuitry)												
Hermes Radio Module																	
Sample																	
Support Equipment																	
Support Equipment					FG9	023				Sar	nple 1						
Curtis Straus Dell PC	Collinear Outdoor Ant	tenna							·								
Curtis Straus Dell PC																	
Curtis Straus Dell PC	a .= .										a						
Lenovo Mouse																	
Dell Keyboard																	
Dell LCD Monitor												***					
Antenna																	
Battery									C.	N-OJ6642-7)A4					
Rot Label Port Type # ports # populated Cable type Shielded Ferrites length (m) in/out under test test		n			PL-/54	18168											
Port Label Port Type # ports # populated cable type shielded ferrites length (m) in/out test test Antenna SMA 1 1 1 Coaxial Yes No 1.8 in yes Laird FG9023 - n Female Connector to RP SMA Serial RS-232 1 1 1 RS-232 No No No in yes HERMES1 is installed into the V-logger Main board via Serial slot USB USB 1 0 USB port is not use in this configuration Host Port Label Port Type # ports # populated cable type shielded ferrites length (m) length (m) length (m) V-logger Sensor other 8 8 8 other No No 3 in 5 wire cable USB USB USB 1 1 1 USB Yes No 1 12 in Only use for set up		Uost								163	22002						
Port Label Port Type # ports # populated cable type shielded ferrites length (m) in/out test test Antenna SMA 1 1 1 Coaxial Yes No 1.8 in yes Laird FG9023 - n Female Connector to RP SMA Serial RS-232 1 1 1 RS-232 No No No in yes HERMES1 is installed into the V-logger Main board via Serial slot USB USB 1 0 USB port is not use in this configuration Host Port Label Port Type # ports # populated cable type shielded ferrites length (m) lin/out comment V-logger Sensor other 8 8 8 other No No 3 in 5 wire cable USB USB 1 1 USB Yes No 1 12 in Only use for set up		HOSt								10.	32092						
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Serial RS-232 1 1 1 RS-232 No No No in yes HERMES1 is installed into the V-logger Main board via Serial slot USB USB 1 0 USB port is not use in this configuration Host Port Label Port Type # ports # populated cable type shielded ferrites length (m) max length (m) mount length (m) len	Antenna	SMA		1	1	Coaxial	Yes	No	1.8	in	yes						
Serial RS-232 1 1 1 RS-232 No No No in yes HERMES1 is installed into the V-logger Main board via Serial slot USB USB 1 0 USB port is not use in this configuration Host Port Label Port Type # ports # populated cable type shielded ferrites length (m) length (m) in 5 wire cable V-logger Sensor other 8 8 8 other No No 3 in 5 wire cable USB USB 1 1 USB Yes No 1 12 in Only use for set up																	
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USB USB 1 0 USB port is not use in this configuration Host Port Label Port Type # ports # populated cable type shielded ferrites length (m) length (m) volument V-logger Sensor other 8 8 8 other No No 3 in 5 wire cable USB USB 1 1 USB Yes No 1 12 in Only use for set up	Serial	RS-2	32	1	1	RS-232	No	No		in	yes						
USB USB 1 0 USB port is not use in this configuration Host Port Label Port Type # ports # populated cable type shielded ferrites length (m) max length (m) mount V-logger Sensor other 8 8 8 other No No 3 in 5 wire cable USB USB 1 1 1 USB Yes No 1 12 in Only use for set up																	
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USB USB 1 0 USB port is not use in this configuration Host Port Label Port Type # ports # populated cable type shielded ferrites length (m) length (m) V-logger Sensor other 8 8 8 other No No 3 in 5 wire cable USB USB 1 1 1 USB Yes No 1 12 in Only use for set up																	
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Host Port Label Port Type # ports # populated cable type shielded ferrites length (m) max length (m) comment V-logger Sensor other 8 8 8 other No No 3 in 5 wire cable USB USB 1 1 1 USB Yes No 1 12 in Only use for set up																	
V-logger Sensor Other 8 8 Other No No 3 In 5 wire cable USB USB 1 1 USB Yes No 1 12 In Only use for set up												configuration					
V-logger Sensor Other 8 8 Other No No 3 In 5 wire cable USB USB 1 1 USB Yes No 1 12 In Only use for set up																	
V-logger Sensor Other 8 8 Other No No 3 In 5 wire cable USB USB 1 1 USB Yes No 1 12 In Only use for set up	Host Port Label	Port	Type	# ports	# populated	cable type	shielded	ferrites			in/out	comment					
V-logger Sensor other 8 8 other No No 3 in 5 wire cable USB USB 1 1 USB Yes No 1 12 in Only use for set up									(m)								
USB USB 1 1 USB Yes No 1 12 in Only use for set up	X 1 C	L .,			0	.1	N.	N		(m)							
										12							
C. Sterry Occupation M. J. Downston	OSR	USB		1	1	USB	Yes	No	1	12	ın	Only use for set up					
	Coftware Onesati	Mode P	oconinti -	n.													

Software Operating Mode Description:

EUT is set to transmit on Low (906 MHz), Mid (914 MHz) and High (924 MHz). Please note that HERMES radio module is set up via Serial connection and tested with LAIRD Omnidirectional Antenna listed in the EUT Components section above.





Statement of Conformity

The HERMES1 has been found to conform to the following parts of 47 CFR and as detailed below:

RSS-GEN	RSP-100	RSS 247	Part 15	Comments
6.3			15.15(b)	There are no controls accessible to the user that
				varies the output power to operate in violation of the
				regulatory requirements.
	3.1		15.19	The label is shown in the label exhibit.
	4		15.21	Information to the user is shown in the instruction
				manual exhibit.
			15.27	No special accessories are required for compliance.
3, 6.1			15.31	The EUT was tested in accordance with the
				measurement standards in this section.
6.13			15.33	Frequency range was investigated according to this
				section, unless noted in specific rule section under
				which the equipment operates.
8.1			15.35	The EUT emissions were measured using the
				measurement detector and bandwidth specified in
				this section, unless noted in specific rule section
0.2			15.203	under which the equipment operates. The module has a RP-SMA connector.
8.3				
8.10			15.205	The fundamental is not in a Restricted band and the
			15.209	spurious and harmonic emissions in the Restricted
				bands comply with the general emission limits of
				15.209 or RSS-Gen as applicable
8.8			15.207	In USB configuration, the unit complies with the
				requirements of 15.207. In Serial configuration,
				15.207 is not applicable since the unit is battery
			45.045	powered.
		D00.047	15.247	The unit complies with the requirements of 15.247
		RSS 247		The unit complies with the requirements of RSS-247
6.6				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

Date: 26-Apr-16	Company: Durham Geo Er	nterprises	Work Order: Q0559						
Engineer: Tuyen Truong	EUT Desc: HERMES1		EUT Operating Voltage/Frequency: USB Power (5Vd						
Temp: 22°C	Humidity: 27%	Pressure: 998mBar							
Frequency F	Range: 906 to 924 MHz								
Notes:									
i			T T						
					6dB BW				
Frequency		Reading	Ī	Limit	Margin	Result			
(MHz)		(KHz)		(KHz)	(KHz)	(Pass/Fail)			
906		654.733		≥500	+154.733	Pass			
914		654.332		≥500	+154.332	Pass			
924		656.120		≥500	+156.120	Pass			
Test Site: Chamber 2	Attenuation: Asset#791								

Rev. 4/24/2016								
Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	1/13/2017	1/13/2016
Radiated Emissions Sites EMI Chamber 2	FCC Code 719150	IC Code 2762A-7	VCCI Code A-0015	Range 30-1000MHz		Cat II	Calibration Due 3/22/2017	Calibrated on 3/22/2015
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	7/31/2016	7/31/2015
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
TH A#2081		HTC-1	HDE		2081	II .	4/5/2017	4/5/2016
111 A#2001		HIC-I	UDE		2001		4/5/2017	4/5/2016

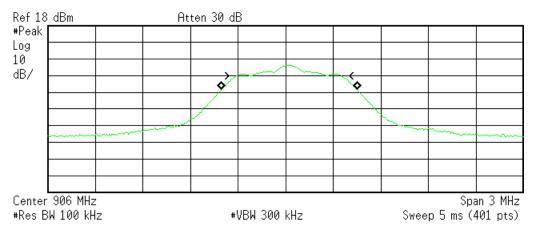




PLOT(s)

* Agilent 09:07:30 Apr 26, 2016

R T



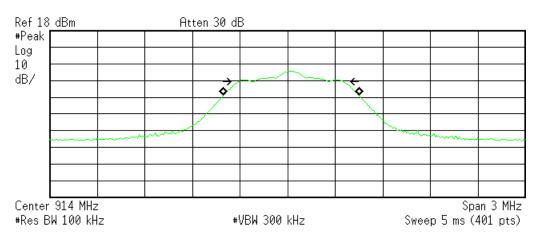
Occupied Bandwidth 852.9585 kHz Occ BW % Pwr 99.00 % x dB -6.00 dB

Transmit Freq Error 23.058 kHz x dB Bandwidth 654.733 kHz

906 MHz - 6dB Bandwidth

Agilent 09:09:38 Apr 26, 2016

R T



Occupied Bandwidth 854.3773 kHz

Occ BW % Pwr 99.00 % x dB -6.00 dB

Transmit Freq Error 22.605 kHz x dB Bandwidth 654.332 kHz

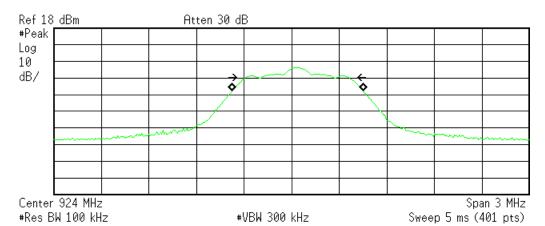
C:temp.gif file saved

914 MHz - 6dB Bandwidth





R T



Occupied Bandwidth 827.4253 kHz

Occ BW % Pwr 99.00 % x dB -6.00 dB

Transmit Freq Error 37.796 kHz x dB Bandwidth 656.120 kHz

924 MHz - 6dB Bandwidth



Fundamental Emission Output Power

LIMIT

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

Per 558074 D01 DTS Measurement Guidance v03r05 Section 9.1 (Maximum Peak Conducted Output Power)

MEASUREMENTS / RESULTS

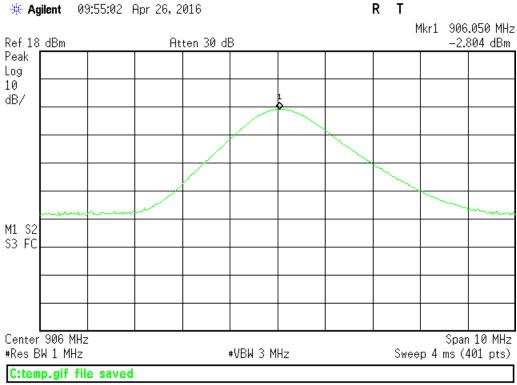
Date: 26-Apr-16		Company: Durham Geo I	•		Nork Order: (
Engineer: Tuyen Truong	9	EUT Desc: HERMES1		JT Operating Voltage/	Frequency: \	JSB Power (
Temp: 22°C		Humidity: 27%	Pressure: 998mBar			
Freq	uency Range	e: 906 to 924 MHz				
Notes:						
					FCC 15.2	47
Frequency	Reading	Attenuation	Final Conducted Reading	g Limit	Margin	Result
(MHz)	(dBm)	(dB)	(dBm)	(dBm)	(dB)	(Pass/Fa
906	-2.804	19.55	16.746	30.0	-13.25	Pass
914	-3.137	19.55	16.413	30.0	-13.59	Pass
924	-3.558	19.55	15.992	30.0	-14.01	Pass
Table Result:	Pass	by -13.25 dB		Worst Freq:	906.0	ИНz

Rev. 4/24/2016 Spectrum Analyzers / Receivers / Preselectors Gold	Range 100Hz-26.5 GHz	MN E4407B	Mfr Agilent	SN MY45113816	Asset 1284	Cat 	Calibration Due 1/13/2017	Calibrated on 1/13/2016
Radiated Emissions Sites EMI Chamber 2	FCC Code 719150	IC Code 2762A-7	VCCI Code A-0015	Range 30-1000MHz		Cat II	Calibration Due 3/22/2017	Calibrated on 3/22/2015
Preamps/Couplers Attenuators / Filters HF 20dB 50W Attenuator	Range 0.009-18 GHz	MN PE 7019-20	Mfr Pasternack	SN 1	Asset 791	Cat II	Calibration Due 7/31/2016	Calibrated on 7/31/2015
Meteorological Meters TH A#2081 Barometric A#2160		MN HTC-1 5396-0321	Mfr HDE Monarch Instruments	SN 4000060	Asset 2081 2160	Cat II	Calibration Due 4/5/2017 3/7/2017	Calibrated on 4/5/2016 3/7/2016

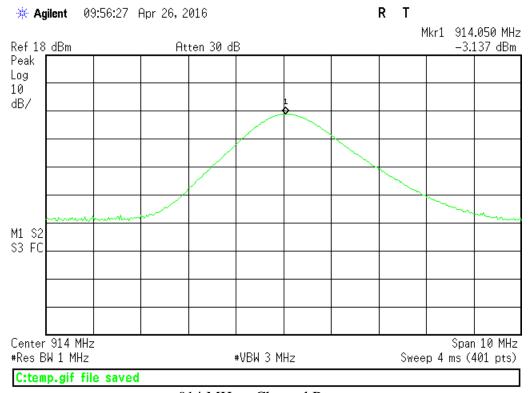




PLOTS



906 MHz - Channel Power



914 MHz – Channel Power



R T * Agilent 09:57:30 Apr 26, 2016 Mkr1 924.050 MHz -3.558 dBm Ref 18 dBm Atten 30 dB Peak Log 10 dB/ M1 S2 S3 FC Center 924 MHz Span 10 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 4 ms (401 pts) C:temp.gif file saved

924 MHz - Channel Power



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)]

Radiated emissions were maximized by rotating the device around 3 orthogonal planes (X, Y and Z) and worst case emissions observed in Z orientation (configuration #2: HERMES1 with LINX Mini Whip Antenna), in X orientation (configuration #3: HERMES1 with Taoglas Antenna) and in Y orientations (configuration #4: HERMES1 with LAIRD Antenna, configuration #5: HERMES1 with NEARSON Antenna and configuration #6: HERMES1 with LAIRD Antenna and V-logger). All the results below are for the worst case orientations only.

MEASUREMENTS / RESULTS

	26-Apr-16 Chris Bramley		Company: EUT Desc:			rises Inc.	c. Work Or EUT Operating Voltage/Freque						
Temp:	,		Humidity:			Pressure: 994mBar	201 00010	ung vonagen	roquerioy.	0001000			
	Freque	ncy Range:	30-1000MH	łz			Measureme	ent Distance:	3 m				
Notes:	Config #2: 1/4 V					ologies Inc. ANT-916-CW- ded.		EUT Max Freq: 16 MHz EUT TX Freq: 906-924MHz					
Antenna			Preamp	Antenna	Cable	Adjusted			FCC 15.209				
Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Factor (dB/m)	Factor (dB)	Reading (dBµV/m)		Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail			
٧	36.0	33.4	25.2	17.1	0.4	25.7		40.0	-14.3	Pass			
v	48.0	47.4	25.2	9.2	0.4	31.8		40.0	-8.2	Pass			
v	120.0	47.3	25.2	14.2	0.9	37.2		43.5	-6.3	Pass			
V	240.0	41.3	25.1	11.9	1.1	29.2		46.0	-16.8	Pass			
v	335.4	29.9	25.2	14.1	1.3	20.1		46.0	-25.9	Pass			
V	360.0	43.5	25.0	14.9	1.3	34.7		46.0	-11.3	Pass			
V	480.0	38.2	25.5	17.8	1.8	32.3		46.0	-13.7	Pass			
v	842.0	37.3	25.1	21.8	2.3	36.3		46.0	-9.7	Pass			
V	966.0	33.1	24.5	23.0	2.3	33.9		54.0	-20.1	Pass			
Table	e Result:	Pass	by	-6.3	dB		И	orst Freq:	120.0	MHz			
Analyzer:	EMI Chamber Gold d Emissions C		Cable 1: Preamp: v 1.017.161		52		Cable 2: Asset #150 Antenna: Red-Black	7		s-Straus LLC			

Rev.	4/24/2016								
	Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	1	1/13/2017	1/13/2016
	Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
	EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz		II	3/22/2017	3/22/2015
	Preamps /Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	Blue-Black	0.009-2000MHz	ZFL-1000-LN	CS	N/A	800	II	12/27/2016	12/27/2015
	Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	Red-Black Bilog	30-2000MHz	JB1	Sunol	A091604-2	1106	- 1	2/9/2017	2/9/2015
	Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	TH A#2081		HTC-1	HDE		2081	II	4/5/2017	4/5/2016
	Barometric A#2160		5396-0321	Monarch Instruments	4000060	2160	- 1	3/7/2017	3/7/2016
	Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
	Asset #1507	9kHz - 18GHz		Florida RF			II	2/14/2017	2/14/2016
	Asset #2052	9kHz - 18GHz		Florida RF			II	3/2/2017	3/2/2016





Radiated Emissions Table Date: 26-Apr-16 Company: Durham Geo Enterprises Inc. Work Order: Q0559 Engineer: Chris Bramley EUT Desc: HERMES1 EUT Operating Voltage/Frequency: USB Power Temp: 23.8°C Humidity: 25% Pressure: 994mBar Frequency Range: 1-10GHz Measurement Distance: 3 m (1-6GHz), 1m (6-10GHz)Notes: Config #2: ¼ Wave Mini Whip, Fixed Rt. Angle (Linx Technologies Inc. ANT-916-CW-RCS) RBF Asset 2130 - Rejection Band 900-930MHz (Added 0.4dB Factor) EUT Max Freq: 16 MHz EUT TX Freq: 906-924MHz FCC 15.209 High Frequency - Peak FCC 15.209 High Frequency - Average Antenna Average Preamp Adjusted Adjusted Peak Reading Limit Lim it Margin Result (H/V) (MHz) (dBµV) (dBµV) (dB) (dB/m) (dB) (dBµV/m) (dBµV/m) dBµV/m dBµV/m 1812.0 33.12 21.4 30.6 3.2 48.1 36.4 74.0 -25.9 54.0 -17.6 1812.0 18.8 30.6 -24.3Pass Pass 1812.0 MHz Table Result: by -15.9 dB Worst Freq: Test Site: EMI Chamber 2 Cable 1: Asset #2052 Cable 2: Asset #1507 Analyzer: Gold Preamp: Asset #1517 Antenna: Blue Horn CSsoft Radiated Emissions Calculator v1.017.161
Adjusted Reading = Reading - Preamp Factor + Antenr Copyright Curtis-Straus LLC 2

Date:	26-Apr-16			Company:	Durham Ge	eo Enterp	rises Inc.					1	Vork Order:	Q0559
Engineer:	Chris Bramley	,		EUT Desc:	HERMES1						EUT Operati	ng Voltage	Frequency:	USB Power
Temp:	23.8°C			Humidity:	25%			Pressure:	994mBar					
Frequency Range: 1-10GHz Measurement Distance: 3 m (1 Notes: Config #2: ¼ Wave Mini Whip, Fixed Rt. Angle (Linx Technologies Inc. ANT-916-CW-RCS) EUT Max Freq: 16 MH												3 m (1-6GHz), 1m (6-10GHz)	
Notes:							ANT-916-CW-RO	CS)				Max Freq: JT TX Freq:	16 MHz 906-924MHz	
RBF Asset 2130 - Rejection Band 900-930MHz (Added 0.4dB Factor) Antenna Peak Average Preamp Antenna Cable							Adjusted	Adjusted	FCC 15.209	High Frequ	ency - Peak	FCC 15.20	9 High Frequ	uency - Average
Polarization (H/V)	Frequency (MHz)	Reading (dBµV)	Reading (dBµV)	Factor (dB)	Factor (dB/m)	Factor (dB)	Peak Reading (dBµV/m)	Avg Reading (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
TX on Mid Chan	nel - 914MHz													
v h	1828.0 1828.0	34.41 35.72	22.2 25.7	18.8 18.8	30.7 30.7	3.2 3.2	49.5 50.8	37.3 40.8	74.0 74.0	-24.5 -23.2	Pass Pass	54.0 54.0	-16.7 -13.2	Pass Pass
Table	e Result:		Pass	by	-13.2	dB					Wo	rst Freq:	1828.0	MHz

Cable 2: Asset #1507 Analyzer: Gold Antenna: Blue Horn v 1.017.161 Ssoft Radiated Emissions Calculator

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Radiated	l Emissio	ons Tab	ole											
Date:	26-Apr-16			Company:	Durham G	eo Enterp	orises Inc.					1	Work Order:	Q0559
Engineer:	Chris Bramley			EUT Desc:	HERMES1	1					EUT Operati	ing Voltage	Frequency:	USB Power
Temp:	23.8°C			Humidity:	25%			Pressure:	994mBar					
		Freque	ncy Range:	1-10GHz							Measureme	nt Distance:	3 m (1-6GHz), 1m (6-10GHz)
	Notes: Config #2: ¼ Wave Mini Whip, Fixed Rt. Angle (Linx Technologies Inc. ANT-916-CW-RCS) RBF Asset 2130 - Rejection Band 900-930MHz (Added 0.4dB Factor) EUT TX Freq: 906-924MHz FCC 15.209 High Frequency - Peak FCC 15.209 High Frequency - Average													
Antenna	FCC 15.209 High Frequency - Peak FCC 15.209 High									9 High Frequ	ency - Average			
Polarization	Frequency	Reading	Reading	Factor	Factor	Factor	Peak Reading	Avg Reading	Limit	Margin	Result	Limit	Margin	Result
(H/V)	(MHz)	(dBµV)	(dBµV)	(dB)	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dBµV/m)	(dB)	(Pass/Fail)
TX on High Cha	nnel - 924MHz													
v	1848.0	34.56	21.8	18.8	30.8	3.2	49.8	37.0	74.0	-24.2	Pass	54.0	-17.0	Pass
h	1848.0	34.39	23.6	18.8	30.8	3.2	49.6	38.8	74.0	-24.4	Pass	54.0	-15.2	Pass
Table Result: Pass by -15.2 dB											Wo	orst Freq:	1848.0	MHz

Test Site: EMI Chamber 2 Cable 1: Asset #205 Cable 2: Asset #1507 Analyzer: Gold Preamp: Asset #1517
CSsoft Radiated Emissions Calculator v1.017.161
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor Antenna: Blue Horn

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Spectrum Analyzers / Receivers / Preselectors Gold	Range 100Hz-26.5 GHz	MN E4407B	M fr Agilent	SN MY45113816	Asset 1284	Cat I	Calibration Due 1/13/2017	Calibrated on 1/13/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz		II	3/22/2017	3/22/2015
Preamps/Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
1517 HF Preamp	1-20GHz	CS	CS	N/A	1517	II	8/6/2016	8/6/2015
2130 BRF	0.009-18000MHz	BRM18770	Micro-Tronics	1	2130	II	1/6/2017	1/6/2016
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Blue Horn	1-18Ghz	3117	ETS	157647	1861	1	2/8/2017	2/8/2015
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
TH A#2081		HTC-1	HDE		2081	II	4/5/2017	4/5/2016
Barometric A#2160		5396-0321	Monarch Instruments	4000060	2160	1	3/7/2017	3/7/2016
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #1507	9kHz - 18GHz		Florida RF			II	2/14/2017	2/14/2016
Accet #2052	0kHz - 18GHz		Florida PF			п	3/2/2017	3/2/2016





Radiated Emissions Table Date: 27-Apr-16 Work Order: Q0559 Company: Durham Geo Enterprises Inc. Engineer: Chris Bramley EUT Desc: HERMES1 EUT Operating Voltage/Frequency: USB Power Temp: 23.8°C Humidity: 25% Pressure: 993mBar Frequency Range: 30-1000MHz Measurement Distance: 3 m EUT Max Freq: 16MHz

Notes: Config#3: Manhole Lid Antenna (by Taoglas Limited RG.02.01.3000W)

EUT Tx on Channel 1 (906MHz) - worst case EUT TX Freq: 906-924MHz

									FCC 15.209	١
Antenna			Preamp	Antenna	Cable	Adjusted				
Polarization	Frequency	Reading	Factor	Factor	Factor	Reading		Limit	Margin	Result
(H/V)	(MHz)	(dBµV)	(dB)	(dB/m)	(dB)	(dBµV/m)		(dBµV/m)	(dB)	(Pass/Fail)
V	36.0	31.0	25.2	17.1	0.4	23.3		40.0	-16.7	Pass
V	48.0	44.7	25.2	9.2	0.4	29.1		40.0	-10.9	Pass
V	60.0	44.2	25.3	7.6	0.5	27.0		40.0	-13.0	Pass
v	72.0	39.2	25.3	8.9	0.6	23.4		40.0	-16.6	Pass
V	120.0	45.4	25.2	14.2	0.9	35.3		43.5	-8.2	Pass
v	240.0	37.1	25.1	11.9	1.1	25.0		46.0	-21.0	Pass
h	276.0	31.0	25.2	13.3	1.2	20.3		46.0	-25.7	Pass

Table Result: Pass -8.2 dB Worst Freq: 120.0 MHz bv

Test Site: EMI Chamber 2 Cable 1: Asset #2052 Cable 2: Asset #1507 Antenna: Red-Black Analyzer: Gold Preamp: Blue-Blk

CSsoft Radiated Emissions Calculator v 1.017.161

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Spectrum Analyzers / Receivers / Preselectors MN Mfr SN Cat Calibration Due Calibrated on 100Hz-26.5 GHz Gold E4407B Agilent MY45113816 1284 1/13/2017 1/13/2016 **Radiated Emissions Sites** FCC Code IC Code **VCCI Code** Cat **Calibration Due** Calibrated on Range EMI Chamber 2 719150 A-0015 30-1000MHz 3/22/2017 3/22/2015 Preamps/Couplers Attenuators / Filters Range SN Cat **Calibration Due** Calibrated on Blue-Black 0.009-2000MHz ZFL-1000-LN N/A 800 12/27/2016 12/27/2015 MN Mfr SN Calibrated on Antennas Range Cat **Calibration Due** Asset Red-Black Bilog 30-2000MHz A091604-2 Meteorological Meters MN Mfr SN Cat Calibration Due Calibrated on Asset 2081 TH A#2081 HTC-1 HDE 4/5/2017 4/5/2016 Barometric A#2160 5396-0321 Monarch Instruments 4000060 2160 3/7/2017 3/7/2016 Cables Calibrated on Range Mfr Cat **Calibration Due** Florida RF 2/14/2017 2/14/2016 Asset #2052 9kHz - 18GHz Florida RF 3/2/2017 3/2/2016

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

Radiated Emissions Tab	le		
Date: 27-Apr-16	Company: Durham Geo Enterprises Inc.		Work Order: Q0559
Engineer: Chris Bramley	EUT Desc: HERMES1		EUT Operating Voltage/Frequency: USB Power
Temp: 23.8°C	Humidity: 25%	Pressure: 993mBar	
Freque	ncy Range: 1-10GHz		Measurement Distance: 3 m (1-6GHz), 1m (6-10GHz)
Notes: Config#3: Manhole Lid Anto	enna (by Taoglas Limited RG.02.01.3000W)		EUT Max Freq: 16MHz
RBF Asset 2130 - Rejection	n Band 900-930MHz (Added 0.4dB Factor)		EUT TX Frea: 906-924MHz

	RBF Asset 21	I30 - Rejecti	on Band 900	-930MHz (A	dded 0.4dE				E	UT TX Freq:	906-924MHz	•		
Antenna		Peak	Average	Preamp	Antenna	Cable	Adjusted	Adjusted	FCC 15.209	High Frequ	ency - Peak	FCC 15.209	High Frequ	ency - Average
Polarization	Frequency	Reading	Reading	Factor	Factor	Factor	Peak Reading	Avg Reading	Limit	Margin	Result	Limit	Margin	Result
(H/V)	(MHz)	(dBµV)	(dBµV)	(dB)	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dBµV/m)	(dB)	(Pass/Fail)
TX on Low Cha	nnel - 906MHz													
v	1812.0	34.41	23.7	18.8	30.6	3.2	49.4	38.7	74.0	-24.6	Pass	54.0	-15.3	Pass
h	1812.0	33.75	23.2	18.8	30.6	3.2	48.8	38.2	74.0	-25.2	Pass	54.0	-15.8	Pass
v	2718.0	35.39	24.1	20.2	32.9	3.6	51.7	40.4	74.0	-22.3	Pass	54.0	-13.6	Pass
h	2718.0	36.21	27.0	20.2	32.9	3.6	52.5	43.3	74.0	-21.5	Pass	54.0	-10.7	Pass
v	3624.0	34.75	25.1	19.1	33.3	4.4	53.4	43.7	74.0	-20.6	Pass	54.0	-10.3	Pass
h	3624.0	35.59	27.2	19.1	33.3	4.4	54.2	45.8	74.0	-19.8	Pass	54.0	-8.2	Pass

Table Result: Pass -7.2 dB Worst Freq: 2742.0 MHz

Test Site: EMI Chambe Cable 2: Asset #150 Analyzer: Gold Ssoft Radiated Emissions Calculator Preamp: Asset #1517 Antenna: Blue Hom v 1.017.161 Copyright Curtis-Straus LLC 20





Radiated Emissions Table

Date: 27-Apr-16 Company: Durham Geo Enterprises Inc. Work Order: Q0559 Engineer: Chris Bramley EUT Desc: HERMES1 EUT Operating Voltage/Frequency: USB Power

Pressure: 993mBar Temp: 23.8°C Humidity: 25%

Measurement Distance: 3 m (1-6GHz), 1m (6-10GHz) Frequency Range: 1-10GHz

Notes: Config#3: Manhole Lid Antenna (by Taoglas Limited RG.02.01.3000W)

EUT Max Freq: 16MHz RBF Asset 2130 - Rejection Band 900-930MHz (Added 0.4dB Factor) EUT TX Freq: 906-924MHz

									FCC 15.209 High Frequency - P			FCC 15.209	High Frequ	ency - Average
Antenna		Peak	Average	Preamp	Antenna	Cable	Adjusted	Adjusted						
Polarization	Frequency	Reading	Reading	Factor	Factor	Factor	Peak Reading	Avg Reading	Limit	Margin	Result	Limit	Margin	Result
(H/V)	(MHz)	(dBµV)	(dBµV)	(dB)	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dBµV/m)	(dB)	(Pass/Fail)
TX on Mid Chan	nel - 914MHz													
v	1828.0	36.45	29.1	18.8	30.7	3.2	51.6	44.2	74.0	-22.4	Pass	54.0	-9.8	Pass
h	1828.0	35.53	27.0	18.8	30.7	3.2	50.6	42.1	74.0	-23.4	Pass	54.0	-11.9	Pass
v	2742.0	36.58	28.0	20.2	33.0	3.7	53.1	44.5	74.0	-20.9	Pass	54.0	-9.5	Pass
h	2742.0	37.37	30.3	20.2	33.0	3.7	53.9	46.8	74.0	-20.1	Pass	54.0	-7.2	Pass
v	3656.0	34.82	24.5	19.1	33.3	4.3	53.3	43.0	74.0	-20.7	Pass	54.0	-11.0	Pass
h	3656.0	36.05	26.3	19.1	33.3	4.3	54.6	44.8	74.0	-19.4	Pass	54.0	-9.2	Pass

Table Result: Pass Worst Freq: 2742.0 MHz

Test Site: EMI Chamber 2

Cable 2: Asset #150

Antenna: Blue Hom

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Analyzer: Gold Ssoft Radiated Emissions Calculator

Date: 27-Apr-16

Preamp: Asset #1517

Pressure: 993mBar

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Radiated Emissions Table

Company: Durham Geo Enterprises Inc.

Work Order: Q0559 EUT Operating Voltage/Frequency: USB Power

Engineer: Chris Bramley EUT Desc: HERMES1 Temp: 23.8°C Humidity: 25%

Frequency Range: 1-10GHz Notes: Config#3: Manhole Lid Antenna (by Taoglas Limited RG.02.01.3000W)

EUT Max Freq: 16MHz

RBF Asset 2130 - Rejection Band 900-930MHz (Added 0.4dB Factor)

Measurement Distance: 3 m (1-6GHz), 1m (6-10GHz)EUT TX Freq: 906-924MHz

		,				,						or ix ricq.	300 324WII 12	
									FCC 15.209	High Freque	ency - Peak	FCC 15.209	High Frequ	ency - Average
Antenna		Peak	Average	Preamp	Antenna	Cable	Adjusted	Adjusted						
Polarization	Frequency	Reading	Reading	Factor	Factor	Factor	Peak Reading	Avg Reading	Limit	Margin	Result	Limit	Margin	Result
(H/V)	(MHz)	(dBµV)	(dBµV)	(dB)	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dBµV/m)	(dB)	(Pass/Fail)
TX on High Cha	nnel - 924MHz													
V	1848.0	35.0	25.3	18.8	30.8	3.2	50.2	40.5	74.0	-23.8	Pass	54.0	-13.5	Pass
h	1848.0	34.86	24.7	18.8	30.8	3.2	50.1	39.9	74.0	-23.9	Pass	54.0	-14.1	Pass
v	2772.0	34.36	22.8	20.1	33.0	3.7	51.0	39.4	74.0	-23.0	Pass	54.0	-14.6	Pass
h	2772.0	35.07	23.6	20.1	33.0	3.7	51.7	40.2	74.0	-22.3	Pass	54.0	-13.8	Pass
v	3696.0	35.32	25.1	19.1	33.4	4.2	53.8	43.6	74.0	-20.2	Pass	54.0	-10.4	Pass
h	3696.0	35.69	27.2	19.1	33.4	4.2	54.2	45.7	74.0	-19.8	Pass	54.0	-8.3	Pass

Table Result: Pass -7.2 dB 2742.0 MHz Worst Freq:

Test Site: EMI Chamber 2 Analyzer: Gold

CSsoft Radiated Emissions Calculator v 1.017.161

djusted Reading = Reading - Preamp Factor + Ar

Cable 2: Asset #1507

Antenna: Blue Hom

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Rev.	4/24/2016								
	Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	- 1	1/13/2017	1/13/2016
	Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
	EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz		II	3/22/2017	3/22/2015
	Preamps/Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	1517 HF Preamp	1-20GHz	CS	CS	N/A	1517	Ш	8/6/2016	8/6/2015
	2130 BRF	0.009-18000MHz	BRM18770	Micro-Tronics	1	2130	II	1/6/2017	1/6/2016
	Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	Blue Horn	1-18Ghz	3117	ETS	157647	1861	- 1	2/8/2017	2/8/2015
	Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	TH A#2081		HTC-1	HDE		2081	Ш	4/5/2017	4/5/2016
	Barometric A#2160		5396-0321	Monarch Instruments	4000060	2160	- 1	3/7/2017	3/7/2016
	Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
	Asset #1507	9kHz - 18GHz		Florida RF			Ш	2/14/2017	2/14/2016
	Asset #2052	9kHz - 18GHz		Florida RF			II	3/2/2017	3/2/2016





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Radiated Emissions Table Company: Durham Geo Enterprises Date: 27-Apr-16 Work Order: Q0559 Engineer: Tuyen Truong EUT Desc: HERMES1 EUT Operating Voltage/Frequency: USB Power Temp: 22.4°C Humidity: 24% Pressure: 994mBar Frequency Range: 30 to 1000 MHz Measurement Distance: 3 m Notes: Hermes1 with LAIRD Antenna - configuration #4 EUT Max Freq: 16 MHz all three channels were investigated; only worst case recorded EUT TX Freq: 906 to 924 MHz FCC 15.209 Antenna Preamp Antenna Cable Adjusted Reading Limit Polarization Frequency Factor Factor Factor Reading Margin Result Limit Margin Result (H/V) (dBuV) (dB/m) (dBuV/m) (dBµV/m (dBuV/m) (Pass/Fail) (MHz) (dB) (dB) (dB) (Pass/Fail) (dB) 35.95 34.3 25.2 17.1 0.4 26.6 40.0 -13.4 Pass 48.0 49.5 25.2 9.2 0.4 33.9 40.0 -6.1 Pass 48.0 43.0 25.2 9.2 0.4 27.4 40.0 -12.6 Pass h 40.3 25.3 8.9 0.6 24.5 40.0 -15.5 Pass 72.0 120.0 49.4 25.2 14.2 39.3 43.5 -4.2 Pass 0.9 ---38.7 --h 120.0 48.8 25.2 14.2 0.9 ---43.5 -4.8 Pass -16.7 11.6 h 192.0 39.0 24.9 1.1 26.8 43.5 Pass h 205.0 39.6 25.0 11.4 0.9 26.9 ---------43.5 -16.6**Pass** 240.0 ----19 0 h 39 1 25.1 119 1 1 27.0 46.0 Pass h 360.0 36.0 25.0 14.9 1.3 27.2 ---46.0 -18.8 Pass 420.0 35.9 25.5 16.5 28.6 46.0 -17.4 Pass Table Result: Pass by -4.2 dB Worst Freq: 120.0 MHz Test Site: EMI Chamber 2 Cable 1: Asset #2052 Cable 2: Asset #1507 Cable 3: -Analyzer: Gold Preamp: Blue-Blk Antenna: Red-Black Preselector: ---

Rev. 4/24/2016								
Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	- 1	1/13/2017	1/13/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz		II	3/22/2017	3/22/2015
Preamps/Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Blue-Black	0.009-2000MHz	ZFL-1000-LN	CS	N/A	800	Ш	12/27/2016	12/27/2015
2130 BRF	0.009-18000MHz	BRM18770	Micro-Tronics	1	2130	II	1/6/2017	1/6/2016
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Red-Black Bilog	30-2000MHz	JB1	Sunol	A091604-2	1106	- 1	2/9/2017	2/9/2015
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
TH A#2081		HTC-1	HDE		2081	Ш	4/5/2017	4/5/2016
Barometric A#2160		5396-0321	Monarch Instruments	4000060	2160	- 1	3/7/2017	3/7/2016
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #1507	9kHz - 18GHz		Florida RF			Ш	2/14/2017	2/14/2016
Asset #2052	9kHz - 18GHz		Florida RF			II	3/2/2017	3/2/2016

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

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Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

CSsoft Radiated Emissions Calculator

Date:	27-Apr-16			Company:	Durham Ge	eo Enterp	rises					١	Nork Order: C	0559
Engineer:	Tuyen Truong			EUT Desc:	HERMES1						EUT Operati	ing Voltage/	Frequency: U	ISB Power
Temp:	22.4°C			Humidity:	24%			Pressure	994mBar					
		Freque	ncy Range:	1 to 10 GF	z						Measureme	nt Distance:	3 m (1 to 6 GF	lz), 1m (6 to 10 GHz
Notes:	Hermes1 with	LAIRD Ante	nna - configu	ration #4							EU1	Max Freq:	16 MHz	
	TX on Low Cha	annel -1.08d	B attenuation	n loss was a	added to rea	adings (H	PF - 1288)				El	JT TX Freq:	906 to 924 MH	łz
									FCC 15.209	High Frequ	ency - Peak	FCC 15	.209 High Fred	quency - Average
Antenna Peak Average Preamp Antenna Cable						Adjusted	Adjusted							
olarization (H/V)	Frequency (MHz)	Reading (dBµV)	Reading (dBµV)	Factor (dB)	Factor (dB/m)	Factor (dB)	Peak Reading (dBµV/m)	Avg Reading (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
(H/V)	1812.0	34.36	25.2	18.8	30.6	3.2	49.4	40.2	74.0	-24.6	Pass	54.0	-13.9	Pass
h	1812.0	35.58	24.7	18.8	30.6	3.2	50.6	39.7	74.0	-23.4	Pass	54.0	-14.4	Pass
Table	e Result:		Pass	by	-13.9	dB					Wo	orst Freq:	1812.0 M	1Hz
Test Site:	EMI Chamber	2		Cable 1:	Asset #205	52				Cable 2	: Asset #1507		Cable 3:	-
	Gold				Asset #15	4-7					Blue Horn		Preselector:	





Radiated Emissions Table Date: 27-Apr-16 Company: Durham Geo Enterprises Work Order: Q0559 Engineer: Tuyen Truong EUT Desc: HERMES1 EUT Operating Voltage/Frequency: USB Power Temp: 22.4°C Pressure: 994mBar Humidity: 24% Frequency Range: 1 to 10 GHz Measurement Distance: 3 m (1 to 6 GHz), 1m (6 to 10 GHz) Notes: Hermes1 with LAIRD Antenna - configuration #4 EUT Max Freq: 16 MHz TX on Mid Channel - 1.08dB attenuation loss was idded to readings (HPF - 1288) EUT TX Freq: 906 to 924 MHz

k FCC 15.209 High Frequency - Average CC 15.209 High Frequency - Pea Antenna Average Pream Antenna Cable Adjusted Adjusted Reading Factor Avg Reading (H/V) (MHz) (dBµV) (dBµV) (dB) (dB/m) (dB) (dBµV/m) (dBµV/m) dBµV/m (dBµV/m) (Pass/Fail) 1828.0 18.8 30.7 3.2 -23.4 -13.8 35.48 25.1 40.2 74.0 Pass 54.0 Pass 50.6 1828.0 36.84 24.8 18.8 30.7 51.9 74.0 54.0 -14.1 Pass Worst Freq: Table Result: Pass by -13.8 dB 1828.0 MHz Fest Site: EMI Chamber 2 Cable 2: Asset #150 Analyzer: Gold Preamp: Asset #1517 Antenna: Blue Hom Ssoft Radiated Emissions Calculator v1.017.161 djusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor Copyright Curtis-Straus LLC 20 **Radiated Emissions Table** Company: Durham Geo Enterprises Work Order: Q0559 Date: 27-Apr-16 Engineer: Tuven Truona EUT Operating Voltage/Frequency: USB Power EUT Desc: HERMES1 Temp: 22.4°C Humidity: 24% Pressure: 994mBar Frequency Range: 1 to 10 GHz Measurement Distance: 3 m (1 to 6 GHz), 1m (6 to 10 GHz) Notes: Hermes1 with LAIRD Antenna - configuration #4

TX on High Channel - 1.08dB attenuation loss was added to readings (HPF - 1288) EUT Max Freq: 16 MHz EUT TX Freq: 906 to 924 MHz k FCC 15.209 High Frequency - Average CC 15.209 High Frequency - Pea Average Polarization Frequency Reading Reading Factor Factor Factor Peak Reading Avg Reading Limit Margin Result Limit Margin Result 25.1 24.9 3.2 3.2 1848 0 35 48 18.8 30.8 50.7 40.3 74.0 -23.3 Pass 54.0 -13 7 Pass 1848.0 18.8 30.8 48.7 Pass

Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated or
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	1/13/2017	1/13/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated or
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz		I	4/29/2017	4/29/2015
Preamps /Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
1517 HF Preamp	1-20GHz	CS	CS	N/A	1517	II	8/6/2016	8/6/2015
High Pass Filter	0.03-9 GHz	VHP-16	Mini-Circuits	NA	1288	II	1/7/2017	1/7/2016
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Blue Horn	1-18Ghz	3117	ETS	157647	1861	1	2/8/2017	2/8/2015
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
TH A#2081		HTC-1	HDE		2081	II	4/5/2017	4/5/2016
Barometric A#2160		5396-0321	Monarch Instruments	4000060	2160	- 1	3/7/2017	3/7/2016

Mfr

Florida RF

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



Table Result:

Analyzer: Gold Ssoft Radiated Emissions Calculator

iusted Reading = Reading - Preamp Factor + An

Cables

Asset #1507

Pass

v 1.017.161

by

Preamp: Asset #1517

-13.7 dB

Range

9kHz - 18GHz



Worst Freq:

Cat

Calibration Due

2/14/2017

3/2/2017

Antenna: Blue Hom

1848.0 MHz

Copyright Curtis-Straus LLC 20

Calibrated on

2/14/2016

3/2/2016

Preselector:

Radiated Emissions Table Company: Durham Geo Enterprises Date: 26-Apr-16 Work Order: Q0559 Engineer: Tuyen Truong EUT Desc: HERMES1 EUT Operating Voltage/Frequency: USB Power Temp: 22°C Humidity: 25% Pressure: 998mBar Frequency Range: 30 to 1000 MHz Measurement Distance: 3 m Notes: Hermes1 with Nearson Antenna - configuration #5 EUT Max Freq: 16 MHz all three channels were investigated; only worst case recorded. EUT TX Frequency: 906 to 924 MHz FCC 15.209 Antenna Preamp Antenna Cable Adjusted Reading Polarization Reading Limit Result Frequency Factor Factor Factor Margin Result Limit Margin (H/V) (dBuV) (dB/m) (dB) (dBuV/m) (dBµV/m (dBuV/m) (Pass/Fail) (MHz) (dB) (dB) (Pass/Fail) (dB) 120.0 38.0 25.2 14.2 0.9 27.9 43.5 -15.6 Pass 168.0 32.4 25.0 11.9 0.9 20.2 43.5 -23.3 Pass 240.0 40.4 25.1 11.9 1.1 28.3 46.0 -17.7 Pass 276.4 31.5 25.2 13.3 1.2 20.8 46.0 -25.2 Pass 614.0 29.0 24.8 19.0 2.0 25.2 46.0 -20.8 Pass h 978.0 -29.9 Pass 24.1 Table Result: Pass by -15.6 dB Worst Freg: 120.0 MHz Test Site: EMI Chamber 2 Cable 1: Asset #2052 Cable 2: Asset #1507 Cable 3: -Analyzer: Gold Preamp: Blue-Blk Antenna: Red-Black Preselector: ---CSsoft Radiated Emissions Calculator v 1.017.161 Copyright Curtis-Straus LLC 200 Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	1	1/13/2017	1/13/2016
FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
719150	2762A-7	A-0015	30-1000MHz		II	3/22/2017	3/22/2015
Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
0.009-2000MHz	ZFL-1000-LN	CS	N/A	800	II	12/27/2016	12/27/2015
0.009-18000MHz	BRM18770	Micro-Tronics	1	2130	II	1/6/2017	1/6/2016
Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
30-2000MHz	JB1	Sunol	A091604-2	1106	I	2/9/2017	2/9/2015
	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
	HTC-1	HDE		2081	II	4/5/2017	4/5/2016
	5396-0321	Monarch Instruments	4000060	2160	1	3/7/2017	3/7/2016
Range		Mfr			Cat	Calibration Due	Calibrated on
9kHz - 18GHz		Florida RF			II	2/14/2017	2/14/2016
9kHz - 18GHz		Florida RF			II	3/2/2017	3/2/2016
	100Hz-26.5 GHz FCC Code 719150 Range 0.009-2000MHz 0.009-18000MHz Range 30-2000MHz Range 9kHz - 18GHz	100Hz-26.5 GHz E4407B FCC Code 719150 2762A-7 Range 0.009-2000MHz ZFL-1000-LN BRM18770 Range 30-2000MHz JB1 MN JB1 MN HTC-1 5396-0321 Range 9kHz - 18GHz	TooHz-26.5 GHz	100Hz-26.5 GHz E4407B Aglient MY45113816 FCC Code 719150 IC Code 2762A-7 VCCI Code A-0015 Range 30-1000MHz Range 0.009-2000MHz MN ZFL-1000-L	TooHz-26.5 GHz	Toolhz-26.5 GHz	Tooltz-26.5 GHz

Date:	26-Apr-16			Company:	Durham Ge	eo Enterp	rises					V	Vork Order: C	0559
Engineer:	Tuyen Truong			EUT Desc:	HERMES1						EUT Operati	ng Voltage/	Frequency: U	SB Power
Temp:	22°C			Humidity:	25%			Pressure:	: 998mBar					
		Freque	ncy Range:	1 to 10 GH	lz						Measuremen	nt Distance:	3 m (1 to 6 GF	lz), 1m (6 to 10 GHz
Notes:	Hermes1 with	Nearson Ar	itenna - confi	guration #5							EUT	Max Freq:	16 MHz	
	TX on low cha	nnel - 1.08d	dB attenuatio	n loss was	added to re	adings (H	IPF - 1288)				El	JT TX Freq:	906 to 924 MH	Iz
									FCC 15.209	High Frequ	ency - Peak	FCC 15	.209 High Fre	quency - Average
Antenna	_	Peak	Average	Preamp	Antenna	Cable	Adjusted	Adjusted	L					
Polarization (H/V)	Frequency (MHz)	Reading (dBµV)	Reading (dBµV)	Factor (dB)	Factor (dB/m)	Factor (dB)	Peak Reading (dBµV/m)	Avg Reading (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
٧	1812.0	36.11	25.9	18.8	30.6	3.2	51.1	40.9	74.0	-22.9	Pass	54.0	-13.2	Pass
Table	e Result:		Pass	by	-13.2	dB					Wo	orst Freq:	1812.0 M	lHz
Test Site:	EMI Chamber	2		Cable 1:	Asset #208	52				Cable 2:	Asset #1507		Cable 3:	-
Analyzer:	Gold			Preamn:	Asset #15	17				Antenna	Blue Horn		reselector:	





Radiated Emissions Table Date: 26-Apr-16 Company: Durham Geo Enterprises Work Order: Q0559 Engineer: Tuyen Truong EUT Desc: HERMES1 EUT Operating Voltage/Frequency: USB Power Pressure: 998mBar Temp: 22°C Humidity: 25% Frequency Range: 1 to 10 GHz Measurement Distance: 3 m (1 to 6 GHz), 1m (6 to 10 GHz)Notes: Hermes1 with Nearson Antenna - configuration #5
TX on mid channel - 1.08dB attenuation loss was added to readings (HPF - 1288) EUT Max Freq: 16 MHz EUT TX Freq: 906 to 924 MHz

K FCC 15.209 High Frequency - Average CC 15.209 High Frequency - Peal Cable Adjusted Avg Reading Polarization Frequency Reading Reading Factor Factor Factor Peak Reading Limit Margin Result Limit Margin Result (MHz) (dBµV (dBµV) (dB/m) (dBµV/m) 1828.0 34.64 27.2 18.8 30.7 3.2 49.7 42.3 74.0 -24.3 Pass 54.0 -11.7 Pass 1828.0 MHz Table Result: Pass Worst Freq: by -11 7 dB Cable 2: Asset #1507 Cable 3: Analyzer: Gold
CSsoft Radiated Emissions Calculator v1.017.161 Asset #1517 Copyright Curtis-Straus LLC 2 Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

Radiated Emissions Table Date: 26-Apr-16 Company: Durham Geo Enterprises Work Order: Q0559 Engineer: Tuyen Truong EUT Desc: HERMES1 EUT Operating Voltage/Frequency: USB Power Temp: 22°C Humidity: 25% Pressure: 998mBar Frequency Range: 1 to 10 GHz Measurement Distance: 3 m (1 to 6 GHz), 1m (6 to 10 GHz) EUT Max Freq: 16 MH Notes: Hermes1 with Nearson Antenna - configuration #5 TX on high channel - 1.08dB attenuation loss was added to readings (HPF - 1288) EUT TX Freq: 906 to 924 MHz CC 15.209 High Frequency - Peal FCC 15.209 High Frequency - Average Cable Adjusted Adjusted Antenna Average Antenna Polarization Frequency Reading Reading Factor Factor Factor Peak Reading Avg Reading (dBµV/m) Limit Margin Result Limit Result (MHz) (dB/m) (dBµV/m) (dBµV) (dBµV) 1848.0 41.8 Worst Freq: Table Result: by -12.3 dB 1848.0 MHz Test Site: EMI Chamber 2 Cable 1: Asset #2052 Cable 2: Asset #1507 Cable 3: --Preamp: Asset #1517 Antenna: Blue Horn Analyzer: Gold Preselector: -Ssoft Radiated Emissions Calculator v 1.017.161 Copyright Curtis-Straus LLC 2

Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Facto

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Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	1	1/13/2017	1/13/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	1-18GHz		I	4/29/2017	4/29/2015
Preamps /Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
1517 HF Preamp	1-20GHz	CS	CS	N/A	1517	II	8/6/2016	8/6/2015
High Pass Filter	0.03-9 GHz	VHP-16	Mini-Circuits	NA	1288	II	1/7/2017	1/7/2016
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Blue Horn	1-18Ghz	3117	ETS	157647	1861	1	2/8/2017	2/8/2015
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
TH A#2081		HTC-1	HDE		2081	II	4/5/2017	4/5/2016
Barometric A#2160		5396-0321	Monarch Instruments	4000060	2160	1	3/7/2017	3/7/2016
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #1507	9kHz - 18GHz		Florida RF			II	2/14/2017	2/14/2016
Asset #2052	9kHz - 18GHz		Florida RF			II	3/2/2017	3/2/2016





Radiated Emissions Table Date: 28-Apr-16 Company: Durham Geo Enterprises Work Order: Q0559 EUT Operating Voltage/Frequency: 3.7Vdc (battery power Engineer: Tuyen Truong EUT Desc: HERMES1 Temp: 22°C Humidity: 24% Pressure: 1000.4mBar Frequency Range: 30 to 1000 MHz Measurement Distance: 3 m Notes: Configuration #6: Serial Configuration (HERMES1 with V-logger and LAIRD antenna) EUT Max Freq: 16 MHz EUT TX Freq: 906 to 924 MHz FCC 15.209 all three channels were investigated; only worst case recorded Adjusted Polarization Frequency Reading Factor Factor Factor Reading Limit Margin Result Limit Margin Result (H/V) (MHz) (dBµV) (dBµV/n (dBµV/m (dB) (dBµV/n 15.2 7.6 9.1 9.2 vbb 38 45 40.6 25.2 0.4 31.0 40.0 -9.0 Pass 0.5 -4.8 -17.5 35.2 40.0 Pass 60.0 52.4 25.3 95.5 41.4 25.2 26.0 ---------43.5 Pass 96.1 49.1 25.2 0.7 33.8 ------43.5 -9.7 Pass ---------14.2 14.2 11.9 11.9 120.0 49.0 25.2 0.9 0.9 38.9 35.7 43.5 43.5 -4.6 -7.8 Pass 120.0 45.8 25.2 Pass 1.1 1.1 1.1 ---240.0 45.1 25.1 33.0 46.0 -13.0 Pass 240.0 258.0 45.0 32.9 27.9 ---46.0 -13.1 -18.1 h h 40.3 25.3 46.0 Pass 310.8 33.8 25.3 13.7 1.3 23.5 46.0 -22.5 Pass -16.4 Pass Table Result: Pass -4.6 dB Worst Freq: 120.0 MHz by Cable 3: Analyzer: Gold Ssoft Radiated Emissions Calculator Preamp: Blue-Blk v 1.017.161 Antenna: Red-Black Preselector: --Copyright Curtis-Straus LLC 20 na Factor + Cable Factor Adjusted Reading - Preamp Fa

Rev.	4/24	/201	6
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. 4/24/2016								
Spectrum Analyzers / Receivers / Preselectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Gold	100Hz-26.5 GHz	E4407B	Agilent	MY45113816	1284	I	1/13/2017	1/13/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz		II	3/22/2017	3/22/2015
Preamps/Couplers Attenuators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Blue-Black	0.009-2000MHz	ZFL-1000-LN	CS	N/A	800	II	12/27/2016	12/27/2015
2130 BRF	0.009-18000MHz	BRM18770	Micro-Tronics	1	2130	II	1/6/2017	1/6/2016
Antennas	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
Red-Black Bilog	30-2000MHz	JB1	Sunol	A091604-2	1106	- 1	2/9/2017	2/9/2015
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
TH A#2081		HTC-1	HDE		2081	II	4/5/2017	4/5/2016
Barometric A#2160		5396-0321	Monarch Instruments	4000060	2160	- 1	3/7/2017	3/7/2016
Cables	Range		Mfr			Cat	Calibration Due	Calibrated on
Asset #1507	9kHz - 18GHz		Florida RF			II	2/14/2017	2/14/2016
Asset #2052	9kHz - 18GHz		Florida RF			II	3/2/2017	3/2/2016

Radiated	l Emissio	ons Tab	ole											
Date:	28-Apr-16			Company:	Durham G	eo Enterp	rises					١	Work Order:	Q0559
Engineer:	Tuyen Truong			EUT Desc:	HERMES1						EUT Operat	ing Voltage/	Frequency:	3.7Vdc (battery power)
Temp:	22°C			Humidity:	24%			Pressure	: 1000.4mBar					
		Freque	ncy Range:	1 to 10 GH	z						Measureme	nt Distance:	3 m (1 to 6 G	GHz), 1m (6 to 10 GHz)
Notes:	Config#6: Seri	al Configura	tion (HERME	S1 with V-I	ogger and L	AIRD ant	tenna)				EU	Γ Max Freq:	16 MHz	
	TX on Low Ch	annel / 0.4dl	B attenuation	loss was a	dded to rea	idings (BF	RF - 2130)				E	JT TX Freq:	906 to 924 M	1Hz
									FCC 15.209	High Frequ	ency - Peak	FCC 15.	.209 High Fre	equency - Average
Antenna		Peak	Average	Preamp	Antenna	Cable	Adjusted	Adjusted						
Polarization	Frequency	Reading	Reading	Factor	Factor	Factor	Peak Reading	Avg Reading	Limit	Margin	Result	Limit	Margin	Result
(H/V)	(MHz)	(dBµV)	(dBµV)	(dB)	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dBµV/m)	(dB)	(Pass/Fail)
V	1812.0	36.62	28.0	18.8	30.6	3.2	51.6	43.0	74.0	-22.4	Pass	54.0	-11.0	Pass
h	1812.0	38.46	28.9	18.8	30.6	3.2	53.5	43.9	74.0	-20.5	Pass	54.0	-10.1	Pass
Tabl	e Result:		Pass	by	-10.1	dB					We	orst Freq:	1812.0	MHz
Test Site:	EMI Chamber	2		Cable 1:	Asset #20	52				Cable 2	: Asset #1507		Cable 3:	
Analyzer:				Preamp:	Asset #15	17				Antenna	: Blue Horn		Preselector:	
Ssoft Radiate	ed Emissions C	Calculator	v 1.017.161											Copyright Curtis-Straus LLC 20
djusted Read	ing = Reading	 Preamp Fa 	actor + Anten	na Factor +	Cable Fac	tor								



Date:	28-Apr-16			Company:	Durham G	eo Enterp	rises					V	Vork Order:	Q0559
Engineer:	Tuyen Truong			EUT Desc:	HERMES1						EUT Operat	ing Voltage/	Frequency: 3	3.7Vdc (battery powe
Temp:	22°C			Humidity:	24%			Pressure	: 1000.4mBar					
		Freque	ncy Range:	1 to 10 GH	lz						Measureme	nt Distance:	3 m (1 to 6 G	Hz), 1m (6 to 10 GH
Notes:	Config#6: Seri TX on mid cha											Max Freq: JT TX Freq:	16 MHz 906 to 924 M	Hz
									FCC 15.209	High Frequ	ency - Peak	FCC 15.	209 High Fre	quency - Average
Antenna		Peak	Average	Preamp	Antenna	Cable	Adjusted	Adjusted						
Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Reading (dBµV)	Factor (dB)	Factor (dB/m)	Factor (dB)	Peak Reading (dBµV/m)	Avg Reading (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)
٧	1828.0	38.5	29.6	18.8	30.7	3.2	53.6	44.7	74.0	-20.4	Pass	54.0	-9.3	Pass
h	1828.0	40.68	32.2	18.8	30.7	3.2	55.8	47.3	74.0	-18.2	Pass	54.0	-6.7	Pass
Tabl	e Result:		Pass	by	-6.7	dB					We	orst Freq:	1828.0	MHz
Test Site:	EMI Chamber	2		Cable 1:	Asset #20	52				Cable 2	: Asset #1507		Cable 3:	
Analyzer:	Gold			Preamp:	Asset #15	17				Antenna	Blue Horn	F	reselector:	

Radiated	d Emissi	ons Tal	ble											
Date	: 28-Apr-16			Company:	Durham G	eo Enterpri	ses						Work Order: Q0)559
Engineer	: Tuyen Truong			EUT Desc:	HERMES1	ı					UT Opera	ting Voltag	e/Frequency: 3.7	7Vdc (battery power)
Temp	: 22°C			Humidity:	24%			Pressure: 10	000.4mBa	ar				
		Freque	ency Range:	1 to 10 GH	łz					N	leasureme	nt Distance	e: 3 m (1 to 6 GHz	z), 1m (6 to 10 GHz)
Notes	: Config#6: Ser										EU	T Max Free	q: 16 MHz	
	TX on high ch	annel / 0.4d	dB attenuatio	n loss was	added to rea	adings (BR	F - 2130)						q: 906 to 924 MHz	
									CC 15.20	9 High Freque	ncy - Peak	FCC 1	5.209 High Frequency	uency - Average
Antenna Polarization	F	Peak Reading	Average Reading	Preamp Factor	Antenna Factor	Cable Factor	Adjusted Peak Reading	Adjusted Avg Reading	Limit	Margin	Result	Limit	Margin	Result
(H/V)	Frequency (MHz)	(dBµV)	(dBµV)	(dB)	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	(dBµV/m)	(dB)	(Pass/Fail)	(dBµV/m)	(dB)	(Pass/Fail)
v	1848.0	36.14	27.7	18.8	30.8	3.2	51.3	42.9	74.0	-22.7	Pass	54.0	-11.2	Pass
h	1848.0	39.35	30.9	18.8	30.8	3.2	54.6	46.1	74.0	-19.5	Pass	54.0	-7.9	Pass
Tabl	le Result:		Pass	by	-7.9	dB					W	orst Freq	: 1848.0 MI	Нz
Test Site:	: EMI Chamber	2		Cable 1:	Asset #20	52				Cable 2: /	Asset #150	7	Cable 3:	
Analyzer	: Gold			Preamp:	Asset #15	17				Antenna: E	Blue Horn		Preselector:	
	ed Emissions (v 1.017.161										Cop	oyright Curtis-Straus LLC 200
Adjusted Read	ding = Reading	- Preamp Fa	actor + Anter	nna Factor -	- Cable Fac	tor								
Rev. 4/24/20	16													
	rum Analyzer	s / Receiv	ers /Presel	ectors	Ra	ange	MN	Mfr		SN	Asset	Cat C	alibration Due	Calibrated on
•	•	Gold			100Hz-	26.5 GHz	E4407B	Agilen	t	MY45113816	1284	1	1/13/2017	1/13/2016
	Radiated	l Emission	s Sites		FCC	Code	IC Code	VCCI Co	de	Range		Cat C	alibration Due	Calibrated on
		I Chamber				9150	2762A-7	A-0015		1-18GHz		I	4/29/2017	4/29/2015
Pre	amps/Coupl	ers Attenu	uators / Filte	ers	Ra	inge	MN	Mfr		SN	Asset	Cat C	alibration Due	Calibrated on
		2130 BRF				8000MHz	BRM18770	Micro-Tro	nics	1	2130	II	1/6/2017	1/6/2016
	1517	7 HF Pream	np		1-2	0GHz	CS	CS		N/A	1517	II	8/6/2016	8/6/2015
		Antennas			Ra	ange	MN	Mfr		SN	Asset	Cat C	alibration Due	Calibrated on
	Е	Blue Horn				8Ghz	3117	ETS		157647	1861	1	2/8/2017	2/8/2015
	Meteor	ological M	leters				MN	Mfr		SN	Asset	Cat C	alibration Due	Calibrated on
	Т	H A#2081					HTC-1	HDE			2081	II	4/5/2017	4/5/2016
	Baror	netric A#21	160				5396-0321	Monarch Instr	uments	4000060	2160	1	3/7/2017	3/7/2016
		Cables			Ra	ange		Mfr				Cat C	alibration Due	Calibrated on
	As	sset #1507			9kHz	- 18GHz		Florida F	RF			II	2/14/2017	2/14/2016
	As	sset #2052			9kHz	- 18GHz		Florida F	2F			II.	3/2/2017	3/2/2016





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 based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB ... [15.247(d)]

MEASUREMENTS / RESULTS

Conducted Band Edges

Date: 26-Apr-16	Company: Durham Geo Ent	erprises	Work Order: Q0559
ngineer: Tuyen Truong	EUT Desc: HERMES1		EUT Operating Voltage/Frequency: USB Power (5Vdc
Temp: 22°C	Humidity: 27%	Pressure: 998mBar	
Frequency Ra	nge: 902 to 928 MHz		
Notes:			
Frequency	Reading	Attenuation	Adjusted Reading
(MHz)	(dBm)	(dB)	(dBm)
906	-5.430	19.55	14.1
est Site: Chamber 2	Attenuation: Asset#791		
nalyzer: Gold			Copyright Curtis-Straus LLC 20
			Copyright Cultis-Chaus EEC 20

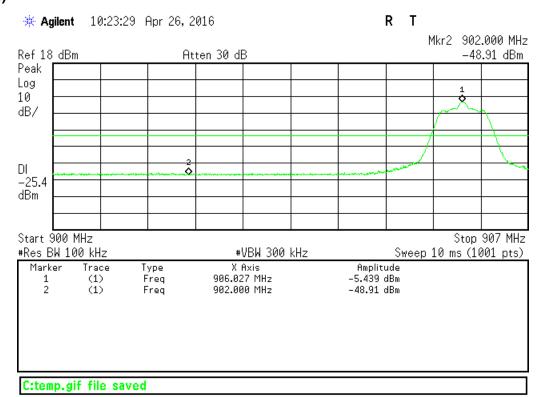
Date: 26-Apr-16		Company: Durham Geo E	nterprises	V	Vork Order: (20559		
Engineer: Tuyen Truong		EUT Desc: HERMES1	EUT	Operating Voltage/	Frequency: \	JSB Power (5		
Temp: 22°C		Humidity: 27%	Pressure: 998mBar					
Freque	ency Range:	902 to 928 MHz						
Notes: The Limit here	is set to -20d	IB from the max in-band pe	k PSD level in 100kHz RBW (Attenuation factor	included or 19.55dB	,			
					FCC 15.247			
Frequency (MHz)	Reading (dBm)	Attenuation (dB)	Final Conducted Reading (dBm)	Limit (dBm)	Margin (dB)	Result (Pass/Fa		
902.0	-48.91	19.55	-29.36	-5.90	-23.46	Pass		
928.0	-49.27	19.55	-29.72	-5.90	-23.82	Pass		
Table Result:	Pass	by -23,46 dB		Worst Freg:	902.0	ИНz		

Rev. 4/24/2016 Spectrum Analyzers / Receivers / Preselectors Gold	Range 100Hz-26.5 GHz	MN E4407B	Mfr Agilent	SN MY45113816	Asset 1284	Cat 	Calibration Due 1/13/2017	Calibrated on 1/13/2016
Radiated Emissions Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated on
EMI Chamber 2	719150	2762A-7	A-0015	30-1000MHz		II	3/22/2017	3/22/2015
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	7/31/2016	7/31/2015
Meteorological Meters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated on
TH A#2081		HTC-1	HDE		2081	II	4/5/2017	4/5/2016
Barometric A#2160		5396-0321 A	onarch Instrument:	4000060	2160	- 1	3/7/2017	3/7/2016

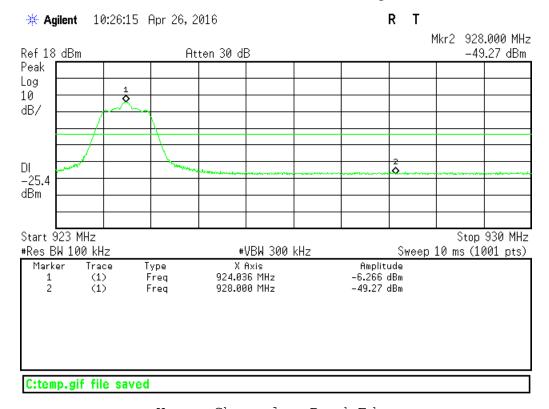




Plot(s)



Lower Channel - Band Edge



Upper Channel - Band Edge



Conducted Spurious Emission

9 kHz -10 GHz frequency range was investigated for all 3 channels (low, middle and high) at the EUT antenna port. Except for the fundamental, all emissions were at instrument noise floor. Highest noise floor level was less than -20dBm for the entire frequency range, which is more than 20dB below the fundamental.

Engineer: Tuyen Truong	EUT	Desc: HERMES1	nterprises E	UT Operating Voltage/	Frequency: L	0559 JSB Power (5V
Temp: 22°C	Hum	idity: 27%	Pressure: 998mBar			
Frequer	ncy Range: 9KH	z to 10GHz				
Notes: TX on low chann The Limit here is		n the max in-band pea	k PSD level in 100kHz RBW (Attenuation fa	actor included or 19.55dB)	
					FCC 15.24	47
Frequency (MHz)	Reading (dBm)	Attenuation (dB)	Final Conducted Readii (dBm)	ng Limit (dBm)	Margin (dB)	Result (Pass/Fail)
30.0	-48.51	19.55	-28.96	-5.90	-23.06	Pass
1812.0	-49.36	19.55	-29.81	-5.90	-23.91	Pass
2718.0	-49.13	19.55	-29.58	-5.90	-23.68	Pass
Table Result:	Pass t	y -23.06 dB		Worst Freg:	30.0 N	ИHz

Date: 26-Apr-16		Company: Durham Geo	nterprises	1	Work Order:	Q0559
Engineer: Tuyen Truong		EUT Desc: HERMES1	EUT	Operating Voltage	Frequency:	USB Power
Temp: 22°C		Humidity: 27%	Pressure: 998mBar			
Freque	ency Range	e: 9KHz to 10GHz				
Notes: TX on mid char The Limit here		dB from the max in-band p	ak PSD level in 100kHz RBW (Attenuation facto	r included or 19.55dB	3)	
					FCC 15.2	247
Frequency (MHz)	Reading (dBm)	Attenuation (dB)	Final Conducted Reading (dBm)	Limit (dBm)	Margin (dB)	Resul (Pass/Fa
30.0	-49.29	19.55	-29.74	-5.90	-23.84	Pass
1828.0	-48.34	19.55	-28.79	-5.90	-22.89	Pass
2742.0	-50.22	19.55	-30.67	-5.90	-24.77	Pass
Table Result:	Pass	by -23.84 dE		Worst Freq:	30.0	MHz
Test Site: Chamber 2		Attenuation: Asset#791				

Date: 26-Apr-16		Company: Durham Geo Enterprises Work Orde						
Engineer: Tuyen Truong		EUT Desc: HERMES1	EU	T Operating Voltage	rating Voltage/Frequency: USB Power (
Temp: 22°C		Humidity: 27%	Pressure: 998mBar					
Freque	ency Range	: 9KHz to 10GHz						
Notes: TX on high cha The Limit here		dB from the max in-band per	ak PSD level in 100kHz RBW (Attenuation fac	or included or 19.55dB	3)			
					FCC 15.2	47		
Frequency (MHz)	Reading (dBm)	Attenuation (dB)	Final Conducted Reading (dBm)	Limit (dBm)	Margin (dB)	Resul (Pass/Fa		
30.0	-49.87	19.55	-30.32	-5.90	-24.42	Pass		
1848.0	-49.11	19.55	-29.56	-5.90	-23.66	Pass		
2772.0	-49.31	19.55	-29.76	-5.90	-23.86	Pass		
Table Result:	Pass	by -23.66 dB		Worst Freq:	1848.0 N	ИHz		
Test Site: Chamber 2	Δ	ttenuation: Asset#791				ſ		





Rev. 4/24/2016 Spectrum Analyzers / Receivers / Preselectors Gold	Range 100Hz-26.5 GHz	MN 2 E4407B	Mfr Agilent	SN MY45113816	Asset 1284	Cat 	Calibration Due 1/13/2017	Calibrated on 1/13/2016
Radiated Emissions Sites EMI Chamber 2	FCC Code 719150	IC Code 2762A-7	VCCI Code A-0015	Range 30-1000MHz		Cat II	Calibration Due 3/22/2017	Calibrated on 3/22/2015
Preamps /Couplers Attenuators / Filters HF 20dB 50W Attenuator	Range 0.009-18 GHz	MN PE 7019-20	Mfr Pasternack	SN 1	Asset 791	Cat II	Calibration Due 7/31/2016	Calibrated on 7/31/2015
Meteorological Meters TH A#2081 Barometric A#2160		MN HTC-1 5396-0321	Mfr HDE /lonarch Instrument:	SN 4000060	Asset 2081 2160	Cat II	Calibration Due 4/5/2017 3/7/2017	Calibrated on 4/5/2016 3/7/2016





Power Spectral Density

LIMIT

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

Per 558074 D01 DTS Measurement Guidance v03r05 Section 10.2 (Peak PSD)

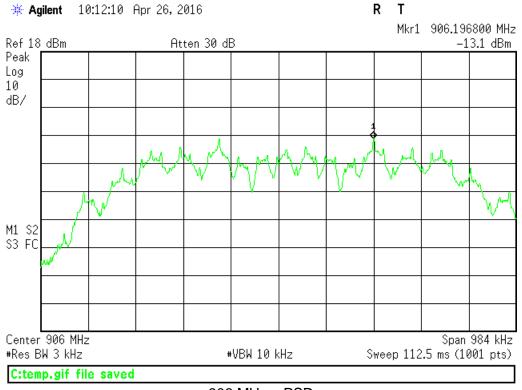
MEASUREMENTS / RESULTS

Power Spectral Dens	ity										
Date: 26-Apr-16		Compan	y: Durham Geo E	nterprises		Work Order: Q0559					
Engineer: Tuyen Truong		EUT Des	c: HERMES1	EUT Operating				ing Vol	g Voltage/Frequency: USB Power (5Vdc)		
Temp: 22°C		Humidit	y : 27%	Pressure:	998mBar						
Frequ	ency Range	: 906 to 92	24 MHz								
Notes:											
									FCC 15.2	247	
Frequency	Reading		Attenuation		Final Cor	ducted Readir	ng	Lim		Result	
(MHz) 906	(dBm) -13.10		(dB) 19.55		,	(dBm) 6.45		(dBr		(Pass/Fail) Pass	
914	-13.10		19.55		,	6.14		8.0		Pass	
924	-13.41		19.55		•	5.67		8.0		Pass	
Table Result:	Pass	by	-1.55 dB		и		W	orst Fi			
Test Site: Chamber 2 Analyzer: Gold	ļ	Attenuatio	n: Asset#791						Соруг	ight Curtis-Straus LLC 2000	
Rev. 4/24/2016 Spectrum Analyzers / Recein Gold	vers/Presel	ectors	Range 100Hz-26.5 GHz	MN E4407B	Mfr Agilent	SN MY45113816	Asset 1284	Cat 	Calibration Due 1/13/2017	Calibrated on 1/13/2016	
	Radiated Emissions Sites F EMI Chamber 2			IC Code 2762A-7	VCCI Code A-0015	Range 30-1000MHz		Cat II	Calibration Due 3/22/2017	Calibrated on 3/22/2015	
	Preamps / Couplers Attenuators / Filters Range HF 20dB 50W Attenuator 0.009-18 0			MN PE 7019-20	Mfr Pasternack	SN 1	Asset 791	Cat II	Calibration Due 7/31/2016	Calibrated on 7/31/2015	
Meteorological M TH A#2081	Meters			MN HTC-1	Mfr HDE	SN	Asset 2081	Cat	Calibration Due	Calibrated on	
Barometric A#2	160				onarch Instrument:	4000060	2160	ıı I	3/7/2017	3/7/2016	

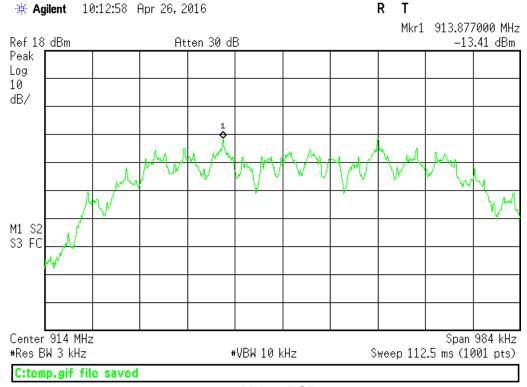




PLOTS

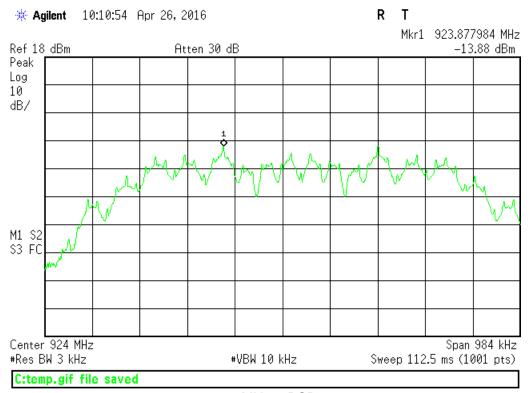


906 MHz - PSD



914 MHz - PSD





924 MHz - PSD



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

Please note that AC Conducted Emissions was performed on EUT with LAIRD Antenna (M/N: FG9023) where the result was found to be worst case during Radiated Emissions.

Conducted E	Emissions [Data Tab	le (sup	port PC)										
	ate: 28-Apr-16								Enterprises Inc			1	Work Orde	er: Q0559
	er: Chris Bramley						EUT Desc: H Humidity: 3						Pressu	e: 1000 mBar
	tes: Laird #FG9023	Antenna, Tx o	n Channel 1	(906MHz) / te	sted S		ch provided powe	er to the EU	T via USB config	uration at	120Vac/60Hz			0. 1000 mba
							uency Range: 0	0.15-30MHz		EUT Ir	put Voltage	/Frequency:	5Vdc (USE	3 Power)
	Quasi- Read			erage dings		LISN Factors	Cable	ATTN	-	CC 15.207			FCC 15	207
Frequency	QP1	OP2	AVG1	AVG2	L1		Factor	Factor	OP Limit	Margin	Result	AVG Limit	Margin	Result
(MHz)	(dBµV)	(dBµV)	(dBµV)	(dBµV)	(dE		(dB)	(dB)	(dBµV)	(dB)	(Pass/Fail)	(dBµV)	(dB)	(Pass/Fail)
0.194	21.5	23.9	18.7	21.1	-0.	1 -0.1	-0.1	-20.8	63.9	-19.1	Pass	53.9	-11.9	Pass
0.700	20.5	19.8	17.9	17.1	0.0		-0.1	-20.8	56.0	-14.6	Pass	46.0	-7.2	Pass
2.690	23.0	24.0	19.5	19.9	0.0		-0.1	-20.8	56.0	-11.0	Pass	46.0	-5.2	Pass
13.400	25.7	24.5	24.5	21.6	-0.		-0.2	-20.9	60.0	-13.1	Pass	50.0	-4.4	Pass
13.500	27.0 26.1	24.3	24.9	21.5	-0.		-0.2	-20.9	60.0	-11.9	Pass	50.0	-4.0	Pass
13.600	26.1	25.2	24.7	21.5	-0.	1 -0.1	-0.2	-20.9	60.0	-12.7	Pass	50.0	-4.2	Pass
Resu	lt: Pass						Worst N	/largin:	-4.0 d	В	Freq	uency:	13.50	0 MHz
easurement Devic	e: LISN ASSE	T 1726(Line	1) LISN A	SSET 1727	(Line	2)	Cable: (CEMI-01			Spectrum	Analyzer:	SA EMI	Chamber (132
							Attanceston	00 ID A II -				Cito	CEMI6	
							Attenuator: 2	2υαΒ Απе	nuator-u /			Site.	CEIVII 6	
CEMI Calculator Version							Attenuator: 2	20aB Atte	nuator-07					Sheet rev: 4/16/20
ted Reading = Raw Re		tion Loss + Ca	ble Loss + A	Attenuation			Attenuator: 2	200B Atte	nuator-u/					Sheet rev: 4/16/20
ted Reading = Raw Re 4/24/2016	eading + LISN Inser											Equipmen	nt Factor S	
ted Reading = Raw Re	eading + LISN Inser			Attenuation Range		MN	Mfr		SN	Asset	Cat C		nt Factor S	
ted Reading = Raw Re 4/24/2016 Spectrum Analys	eading + LISN Inser	s/Preselect	ors		SHz						Cat C	Equipmen	nt Factor S	
ted Reading = Raw Re 4/24/2016 Spectrum Analy: SA E	eading + LISN Inser	s /Preselecto 27)	ors	Range	SHz	MN	Mfr	nt	SN		I	Equipment Calibration	nt Factor S Due	Calibrated or 7/10/2015
ted Reading = Raw Re 4/24/2016 Spectrum Analy: SA E	zers / Receivers MI Chamber (13:	s /Preselecto 27)	ors	Range 9kHz-13.2 G		MN E4405B	Mfr Agiler	nt	SN MY45103416	1327	I	Equipment Calibration 7/10/2010	Due Due Due	Calibrated or 7/10/2015
ted Reading = Raw Re 4/24/2016 Spectrum Analy: SA E LISNs/M	zers / Receivers MI Chamber (13:	s /Preselecto 27)	ors	Range 9kHz-13.2 G Range	1Hz	MN E4405B MN	Mfr Agiler Mfr	nt	SN MY45103416 SN	1327 Asset	Cat C	Equipment Calibration 7/10/2016 Calibration	Due Due	Calibrated or 7/10/2015
ted Reading = Raw Re 4/24/2016 Spectrum Analy: SA E LISNs/M L	zers / Receivers MI Chamber (13: Measurement Pi ISN Asset 1726	s/Preselecte 27) robes	ors	Range 9kHz-13.2 G Range 150kHz-30M	1Hz 1Hz	MN E4405B MN LI-150A	Mfr Agiler Mfr Com-Po	nt ower ower	SN MY45103416 SN 201092	1327 Asset 1726	Cat C	Equipment Transport Transp	Due 6 Due	Calibrated or 7/10/2015 Calibrated or 2/4/2016 2/4/2016
ted Reading = Raw Re 4/24/2016 Spectrum Analy: SA E LISNs/M L	zers / Receivers MI Chamber (13: Measurement Pr ISN Asset 1726 ISN Asset 1727	s/Preselecte 27) robes	ors	Range 9kHz-13.2 G Range 150kHz-30M 150kHz-30M	1Hz 1Hz	MN E4405B MN LI-150A	Mfr Agiler Mfr Com-Po Com-Po	nt ower ower ode	SN MY45103416 SN 201092	1327 Asset 1726	Cat C	Equipment Calibration 7/10/2016 Calibration 2/4/2017 2/4/2017	Due 6 Due	Calibrated or 7/10/2015 Calibrated or 2/4/2016 2/4/2016
ted Reading = Raw Re 4/24/2016 Spectrum Analy: SA E LISNs/M L Conducted	zers / Receivers MI Chamber (13: Measurement Pr ISN Asset 1726 ISN Asset 1727 Test Sites (Mair	s/Preselect 27) robes ns/Telco)	ors	Range 9kHz-13.2 G Range 150kHz-30M 150kHz-30M	1Hz 1Hz	MN E4405B MN LI-150A	Mfr Agiler Mfr Com-Po Com-Po	ower ower ode	SN MY45103416 SN 201092	1327 Asset 1726	Cat C	Equipment Calibration 7/10/2016 Calibration 2/4/2017 2/4/2017 Calibration	Due 6 Due 7	Calibrated or 7/10/2015 Calibrated or 2/4/2016 2/4/2016 Calibrated or N/A
ted Reading = Raw Re 4/24/2016 Spectrum Analy: SA E LISNs/M L Conducted	zers / Receivers MI Chamber (13: Measurement Pi ISN Asset 1726 ISN Asset 1727 Test Sites (Mair CEMI 6	s/Preselect 27) robes ns/Telco)	ors	Range 9kHz-13.2 G Range 150kHz-30M 150kHz-30M	1Hz 1Hz	MN E4405B MN LI-150A LI-150A	Mfr Agiler Mfr Com-Po Com-Po VCCI Co A-001	ower ower ode 5	SN MY45103416 SN 201092 201093	1327 Asset 1726 1727	Cat C	Equipment 7/10/2016 Calibration 2/4/2017 2/4/2017 Calibration NA	Due 6 Due 7 Due Due	Calibrated or 7/10/2015 Calibrated or 2/4/2016 2/4/2016 Calibrated or N/A
ted Reading = Raw Re 4/24/2016 Spectrum Analy: SA E LISNs/N L Conducted	zers / Receivers MI Chamber (13: Measurement Properties ISN Asset 1726 ISN Asset 1727 Test Sites (Mair CEMI 6 orological Mete	s /Preselecte 27) robes ns / Telco)	ors	Range 9kHz-13.2 G Range 150kHz-30M 150kHz-30M	1Hz 1Hz e	MN E4405B MN LI-150A LI-150A	Mfr Agiler Mfr Com-Po Com-Po VCCI Cc A-001:	ode 5	SN MY45103416 SN 201092 201093	1327 Asset 1726 1727 Asset	Cat	Equipment 7/10/2016 Calibration 2/4/2017 2/4/2017 Calibration NA Calibration	Due 6 Due 7	Calibrated or 7/10/2015 Calibrated or 2/4/2016 2/4/2016 Calibrated or N/A Calibrated or O
ted Reading = Raw Re 4/24/2016 Spectrum Analy: SA E LISNs/N L Conducted	zers / Receivers MI Chamber (13: Measurement Pi ISN Asset 1726 ISN Asset 1727 Test Sites (Mair CEMI 6 orological Meta TH A#2082	s /Preselecte 27) robes ns / Telco)	ors	Range 9kHz-13.2 G Range 150kHz-30M 150kHz-30M	1Hz 1Hz e	MN E4405B MN LI-150A LI-150A MN HTC-1	Mfr Agiler Mfr Com-Po Com-Po VCCI Co A-001	ode 5	SN MY45103416 SN 201092 201093	1327 Asset 1726 1727 Asset 2082	Cat	Equipment Calibration 7/10/2016 Calibration 2/4/2017 2/4/2017 Calibration NA Calibration 4/5/2017	Due 6 Due 7 Due Due	Calibrated or 7/10/2015 Calibrated or 2/4/2016 Calibrated or N/A Calibrated or N/A Calibrated or 4/5/2016
ted Reading = Raw Re 4/24/2016 Spectrum Analy: SA E LISNs/N L Conducted	zers / Receivers MI Chamber (13: Measurement P ISN Asset 1726 ISN Asset 1727 Test Sites (Mair CEMI 6 orological Meta TH A#2082 rometric A#2160	s /Preselecte 27) robes ns / Telco)	ors	Range 9kHz-13.2 G Range 150kHz-30M 150kHz-30M FCC Code 719150	1Hz 1Hz e	MN E4405B MN LI-150A LI-150A MN HTC-1	Mfr Agiler Mfr Com-Po Com-Po VCCI Cc A-001 Mfr HDE Monarch Inst	ower ode 5 ::truments	SN MY45103416 SN 201092 201093	1327 Asset 1726 1727 Asset 2082	Cat	Calibration 7/10/2010 Calibration 2/4/2017 2/4/2017 Calibration NA Calibration 4/5/2017 3/7/2017	Due 6 Due 7 Due Due Due	Calibrated o 7/10/2015 Calibrated o 2/4/2016 2/4/2016 Calibrated o N/A Calibrated o 4/5/2016 3/7/2016





Occupied Bandwidth REQUIREMENT

When an occupied bandwidth is not 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 6.6]

MEASUREMENTS / RESULTS

Date: 26-Apr-16	Company:	Durham Geo Enter	orises					Work Order: 0	20559
Engineer: Tuyen Truong	EUT Desc:				EU	T Operati	na Vol	tage/Frequency: L	JSB Power (5\
Temp: 22°C	Humidity:		Press	ure: 998mBar					
Frequency	Range: 906 to 924	MHz							
Notes:									
Frequency				Occupied Bandwidth	n Reading				
(MHz)				(KHz)					
906				768.7237	7				
914				767.3712	2				
924				767.1168	3				
Test Site: Chamber 2	Attenuation:	Asset#791							
Analyzer: Gold									
								Copyright	t Curtis-Straus LLC
4/24/2016 Spectrum Analyzers / Receive	are /Procelectors	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated
Gold	era /r reserectors	100Hz-26.5 GHz	E4407B	Agilent	MY4511381		I	1/13/2017	1/13/201
Radiated Emissions	s Sites	FCC Code	IC Code	VCCI Code	Range		Cat	Calibration Due	Calibrated
EMI Chamber 2	2	719150	2762A-7	A-0015	30-1000MH	Z	II	3/22/2017	3/22/201
Preamps /Couplers Attenu	ators / Filters	Range	MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated
HF 20dB 50W Atter	nuator	0.009-18 GHz	PE 7019-20	Pasternack	1	791	II	7/31/2016	7/31/201
Meteorological Me	eters		MN	Mfr	SN	Asset	Cat	Calibration Due	Calibrated
TH A#2081			HTC-1	HDE		2081	II	4/5/2017	4/5/2016
Barometric A#21	60		5396-0321	Monarch Instruments	4000060	2160	- 1	3/7/2017	3/7/2016

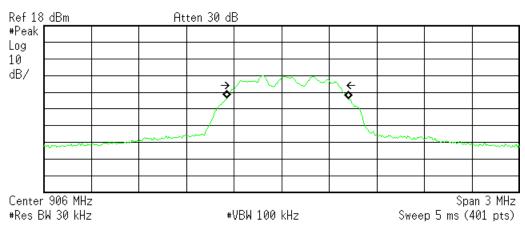




Plot(s)

* Agilent 09:38:02 Apr 26, 2016

R T



Occupied Bandwidth 768,7237 kHz Occ BW % Pwr 99.00 % x dB -6.00 dB

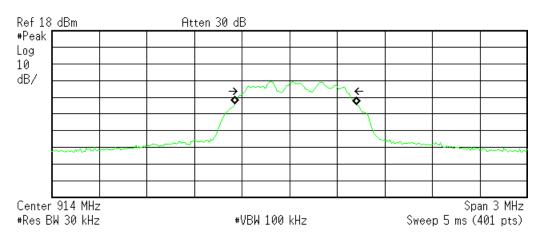
R T

Transmit Freq Error 36.705 kHz x dB Bandwidth 636.897 kHz

C:temp.gif file saved

906 MHz - Occupied Bandwidth

Agilent 09:49:43 Apr 26, 2016



Occupied Bandwidth 767.3712 kHz Occ BW % Pwr 99.00 % x dB -6.00 dB

Transmit Freq Error 36.731 kHz x dB Bandwidth 636.356 kHz

C:temp.gif file saved

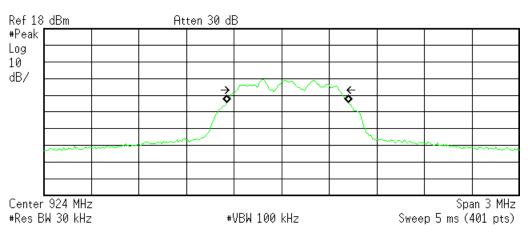
914 MHz - Occupied Bandwidth





09:27:39 Apr 26, 2016

* Agilent



Occupied Bandwidth 767.1168 kHz

Occ BW % Pwr 99.00 % x dB -6.00 dB

R T

Transmit Freq Error 36.633 kHz x dB Bandwidth 636.661 kHz

C:temp.gif file saved

924 MHz - Occupied Bandwidth



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	5.6dB	N/A
CISPR Radiated Emissions (1-26.5GHz)	4.6dB 4.6dB	5.2dB (Ucispr) N/A
Radiated Emissions (above 26.5GHz)	4.9dB	N/A
,		
Magnetic Radiated Emissions Conducted Emissions	5.6dB	N/A
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 x 10 ⁻⁸	1 x 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

- 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.
- 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.
 These Conditions and the Test Report represent the entire understanding of the parties hereto with respect to the subject matter hereof
- 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. CLIÉNT SHALL, EXCEPT TO THE EXTENT OF COMPANY'S LIABÍLITY 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 THE PRATY IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE SERVICES PROVIDED BY THE COMPANY HEREI INDER

(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.

The complete list of the Approved Subcontractors Curtis-Straus may use to delegate the performance of work can be provided upon request. Rev.160009121(2)_#684340 v14CS



