# Test Report

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

| | |
|---|---|
| Report No | EQ0559-1 |
| Client | Durham Geo Enterprises, Inc. |
| Address | 2175 West Park Court<br>Stone Mountain, GA 30087 |
| Phone | 770-465-7557 |
| Items tested | HERMES Radio Module |
| FCC ID | 2AFGQ-HERMES1 |
| IC | 20515-HERMES1 |
| HVIN | HERMES1 |
| Equipment Type | Digital Transmission System |
| Equipment Code | DTS |
| Emission Designator | 769KG1D |
| FCC/IC Rule Parts | 47 CFR 15.247, RSS-247 Issue 1 |
| Test Dates | April 26 to 28, 2016 |
| Results | As detailed within this report |
| Prepared by | Tuyen A. Truong – Test Engineer |
| Authorized by | Yunus Faziloglu – Sr. EMC Engineer |
| Issue Date | 6/1/2016 |
| 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. |

## *Contents*



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 | Date Issued |
|---|---|---|
| 1 | Original Release | June 1, 2016 |



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## *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 50Ω/50μH 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 Order:** | Q0559 | | |
| **Company:** | Durham Geo Enterprises Inc. | | |
| **Company Address:** | 12123 Harbour Reach Drive, Suite 106 | | |
| | Mukilteo, WA 98275 | | |
| | | | |
| **Contact:** | Brad Barnicoat | | |
| **Person Presence:** | Chris Krstanovic | | |
| | | | |
| | **MN** | **PN** | **SN** |
| **EUT:** | HERMES1 | -- | Sample #2 |
| **EUT Description:** | HERMES Radio Module | | |
| **EUT TX Frequency:** | 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 Whip Antenna | ANT-916-CW-RCS | Sample 1 |
| Taoglas Manhole Lid Antenna | RG.02.01.3000W | 142200085 |
| LAIRD Omnidirectional Collinear Outdoor Antenna | FG9023 | 02041609 |
| Nearson ½ Wave Loaded Whip, Fixed Rt. Angle Antenna | S161AH-915R | Not Listed |

| **Support Equipment** | **MN** | **SN** |
|---|---|---|
| Curtis Straus Dell PC | Dimension 4550 | 00919 |
| Lenovo Mouse | M-UAE119 | SNLZ830ASONMS |
| Dell Keyboard | SK-8115 | CN-ODJ331-71616-88IT7H6 |
| Dell LCD Monitor | 1704FPVt | CN-OJ6642-71618-53I-ADA4 |

| **Port Label** | **Port Type** | **# 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 Whip Antenna) | SMA | 1 | 1 | Coaxial | Yes | No | 0.09 | in | yes | Antenna connector is RP SMA |
| Antenna (Taoglas Manhole Lid Antenna) | SMA | 1 | 1 | Coaxial | Yes | No | 3 | in | yes | Antenna connector is SMA |
| Antenna (LAIRD Omnidirectional Antenna) | SMA | 1 | 1 | Coaxial | Yes | No | 1.8 | in | yes | Antenna connector is N-Female to RP SMA. |
| Antenna (Nearson ½ Wave Loaded Whip Antenna) | SMA | 1 | 1 | Coaxial | Yes | No | 0.2 | in | yes | Antenna connector is RP SMA |
| Serial | RS232 | 1 | 0 | | | | | | | Serial port is not use in this configuration |

**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 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).

| EUT Configuration (Serial Connection) | | | |
|---|---|---|---|
| **Work Order:** | Q0559 | | |
| **Company:** | Durham Geo Enterprises Inc. | | |
| **Company Address:** | 12123 Harbour Reach Drive, Suite 106 | | |
| | Mukilteo, WA, 98275 | | |
| | | | |
| **Contact:** | Brad Barnicoat | | |
| **Person Presence:** | Chris Krstanovic | | |
| | | | |
| | **MN** | **PN** | **SN** |
| **EUT:** | HERMES1 | -- | Sample #2 |
| **EUT Description:** | HERMES Radio Module | | |
| **EUT TX Frequency:** | 906 to 924 MHz | | |
| **EUT Max Frequency:** | 16 MHz (associated circuitry) | | |

| **EUT Components** | **MN** | **SN** |
|---|---|---|
| Hermes Radio Module | HERMES1 | Sample 2 |
| LAIRD Omnidirectional Collinear Outdoor Antenna | FG9023 | Sample 1 |
| | | |

| **Support Equipment** | **MN** | **SN** |
|---|---|---|
| Curtis Straus Dell PC | Dimension 4550 | 00919 |
| Lenovo Mouse | M-UAE119 | SNLZ830ASONMS |
| Dell Keyboard | SK-8115 | CN-ODJ331-71616-88IT7H6 |
| Dell LCD Monitor | 1704FPVt | CN-OJ6642-71618-53I-ADA4 |
| 3.7Vdc Polymer Li-ion Battery | PL-7548168 | -- |
| 8 Channel V-Logger (Host device) | -- | 1632092 |

| **Port Label** | **Port Type** | **# ports** | **# populated** | **cable type** | **shielded** | **ferrites** | **length (m)** | **in/out** | **under test** | **comment** |
|---|---|---|---|---|---|---|---|---|---|---|
| Antenna | SMA | 1 | 1 | Coaxial | Yes | No | 1.8 | in | yes | Laird FG9023 - n Female Connector to RP SMA |
| Serial | RS-232 | 1 | 1 | RS-232 | 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)** | **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 |

**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 under which the equipment operates. |
| 8.3 | | | 15.203 | The module has a RP-SMA connector. |
| 8.10 | | | 15.205<br>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 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 powered. |
| | | | 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

**6dB BANDWIDTH**

**Date:** 26-Apr-16 **Company:** Durham Geo Enterprises **Work Order:** Q0559
**Engineer:** Tuyen Truong **EUT Desc:** HERMES1 **EUT Operating Voltage/Frequency:** USB Power (5Vdc)
**Temp:** 22°C **Humidity:** 27% **Pressure:** 998mBar
**Frequency Range:** 906 to 924 MHz
**Notes:**

| Frequency (MHz) | Reading (KHz) | 6dB BW Limit (KHz) | 6dB BW Margin (KHz) | 6dB BW Result (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
**Analyzer:** Gold

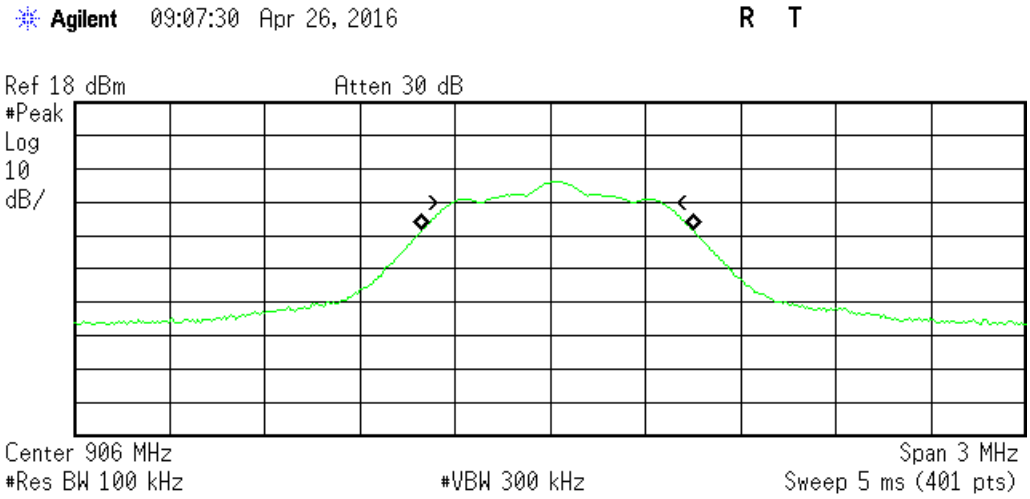


Rev. 4/24/2016

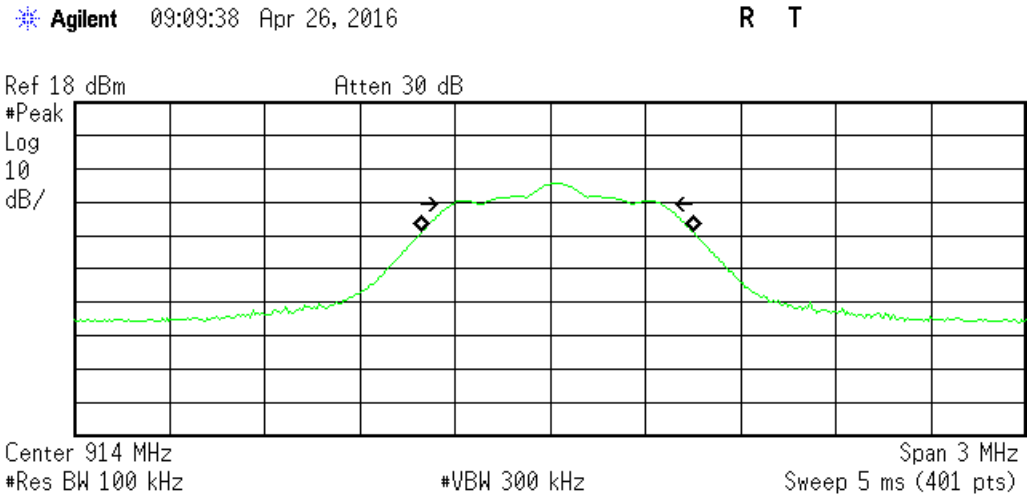
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Spectrum Analyzers / Receivers /Preselectors** | **Range** | **MN** | **Mfr** | **SN** | **Asset** | **Cat** | **Calibration Due** | **Calibrated on** |
| Gold | 100Hz-26.5 GHz | E4407B | Agilent | MY45113816 | 1284 | I | 1/13/2017 | 1/13/2016 |
| **Radiated Emissions Sites** | **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 | Monarch Instruments | 4000060 | 2160 | I | 3/7/2017 | 3/7/2016 |

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

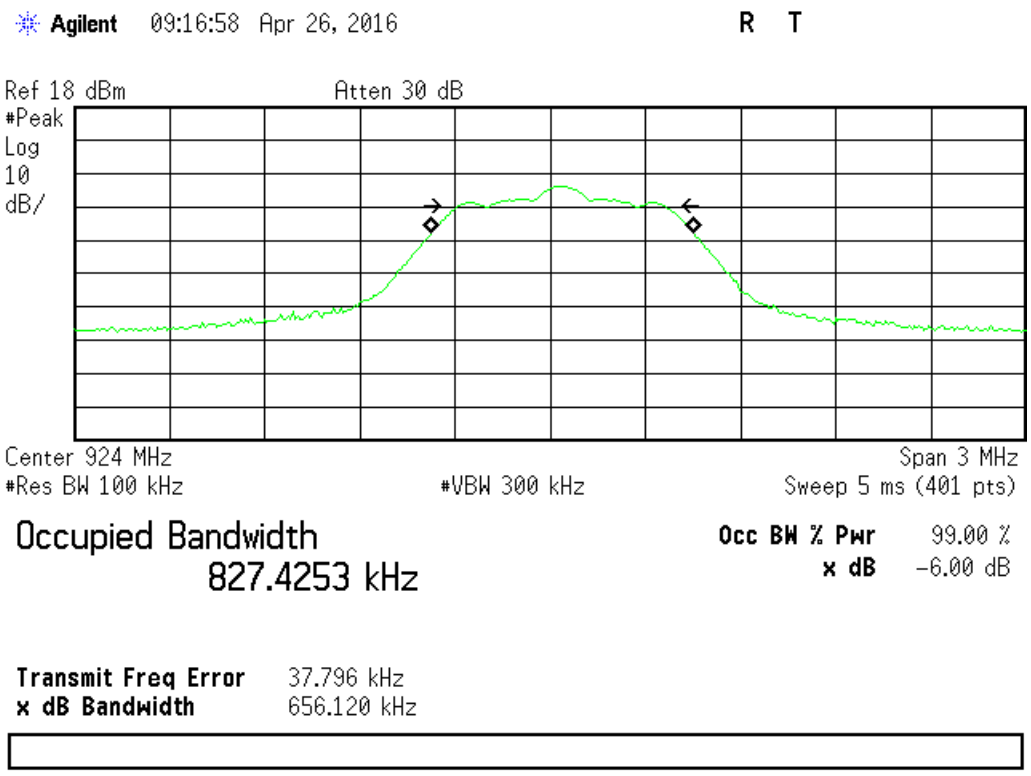
**PLOT(s)**




906 MHz – 6dB Bandwidth




914 MHz – 6dB Bandwidth




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

**Fundamental Emission Output Power**

**Date:** 26-Apr-16 **Company:** Durham Geo Enterprises **Work Order:** Q0559
**Engineer:** Tuyen Truong **EUT Desc:** HERMES1 **EUT Operating Voltage/Frequency:** USB Power (5Vdc)
**Temp:** 22°C **Humidity:** 27% **Pressure:** 998mBar
**Frequency Range:** 906 to 924 MHz
**Notes:**

| Frequency (MHz) | Reading (dBm) | Attenuation (dB) | Final Conducted Reading (dBm) | FCC 15.247 Limit (dBm) | Margin (dB) | Result (Pass/Fail) |
|---|---|---|---|---|---|---|
| 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 MHz

**Test Site:** Chamber 2 **Attenuation:** Asset#791
**Analyzer:** Gold



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 |

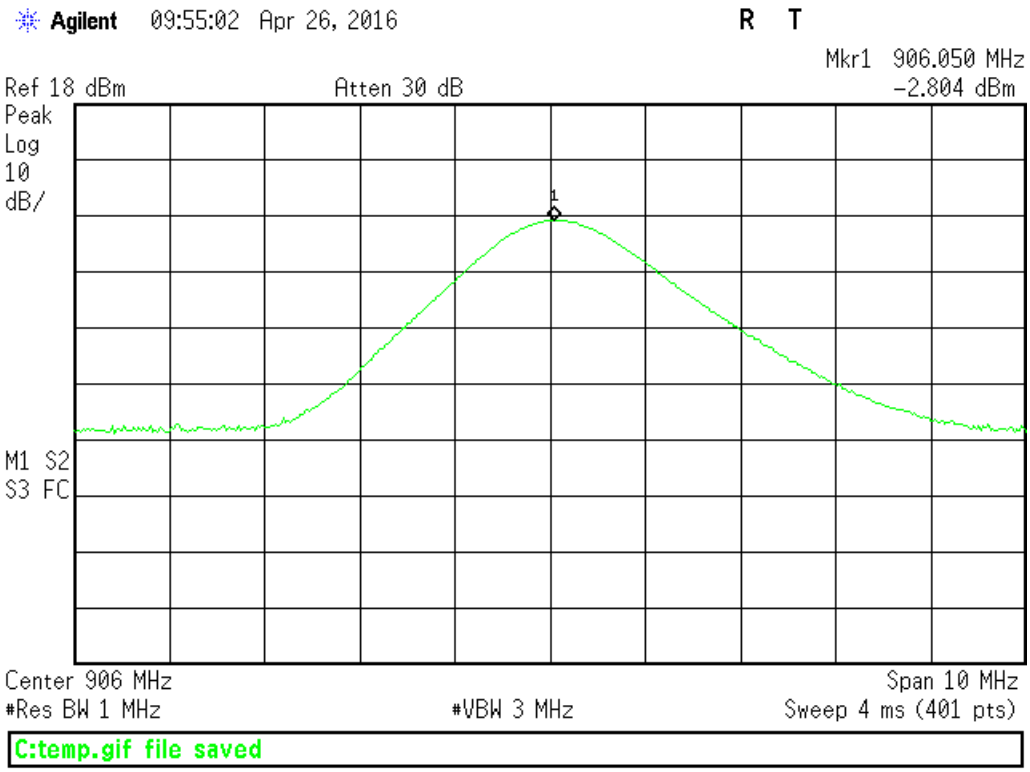
| Radiated Emissions Sites | FCC Code | IC Code | VCCI Code | Range | | Cat | Calibration Due | Calibrated on |
|---|---|---|---|---|---|---|---|---|
| EMI Chamber 2 | 719150 | 2762A-7 | A-0015 | 30-1000MHz | | II | 3/22/2017 | 3/22/2015 |

| 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 |

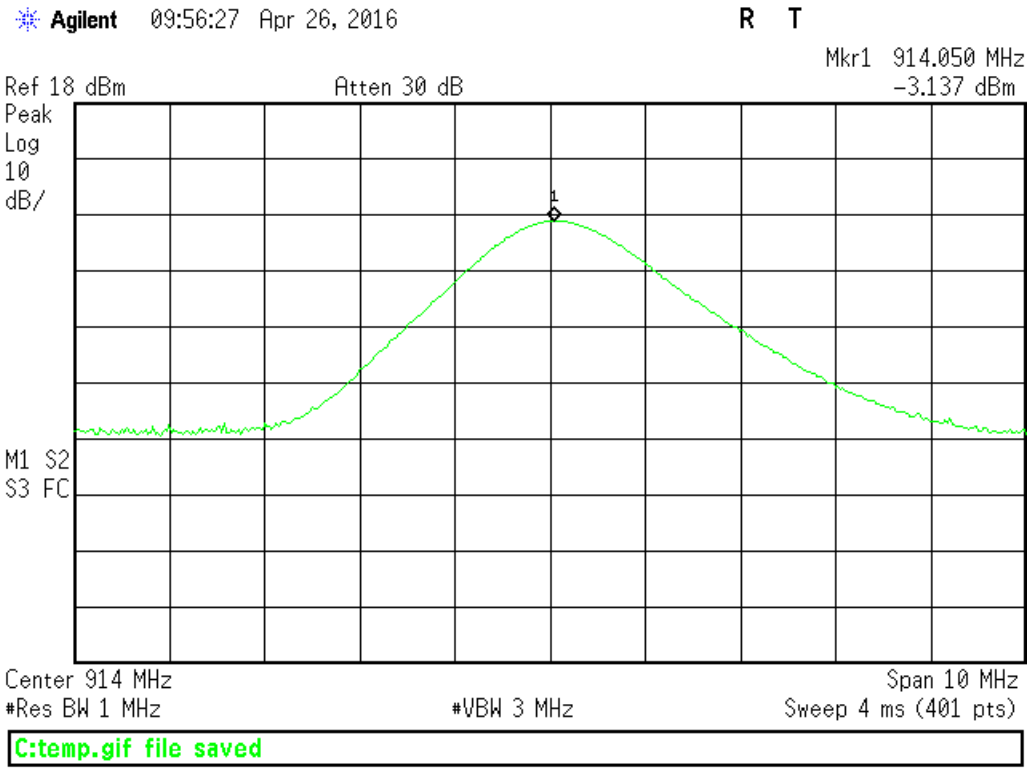
| Meteorological Meters | MN | Mfr | SN | Asset | Cat | Calibration Due | Calibrated on |
|---|---|---|---|---|---|---|---|
| TH A#2081 | HTC-1 | HDE | | 2081 | II | 4/5/2017 | 4/5/2016 |
| Barometric A#2160 | 5396-0321 | Monarch Instruments | 4000060 | 2160 | I | 3/7/2017 | 3/7/2016 |

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

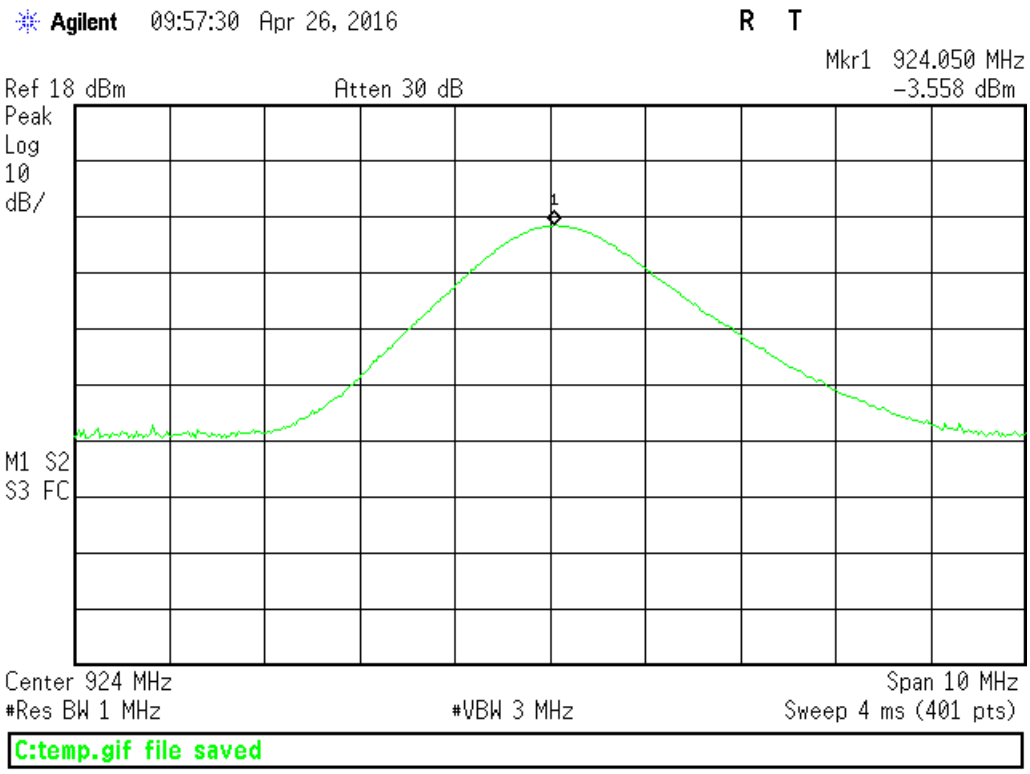
## PLOTS




906 MHz – Channel Power




914 MHz – Channel Power




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

### 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:** 30-1000MHz **Measurement Distance:** 3 m

**Notes:** Config #2: ¼ Wave Mini Whip, Fixed Rt. Angle (Linx Technologies Inc. ANT-916-CW-RCS) all three channels were investigated; only worst case recorded.
**EUT Max Freq:** 16 MHz
**EUT TX Freq:** 906-924MHz

| Antenna Polarization (H / V) | Frequency (MHz) | Reading (dBµV) | Preamp Factor (dB) | Antenna Factor (dB/m) | Cable Factor (dB) | Adjusted Reading (dBµV/m) | | | | FCC 15.209 Limit (dBµV/m) | FCC 15.209 Margin (dB) | FCC 15.209 Result (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| v | 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 Result:*** Pass by -6.3 dB ***Worst Freq:*** 120.0 MHz

**Test Site:** EMI Chamber 2 **Cable 1:** Asset #2052 **Cable 2:** Asset #1507
**Analyzer:** Gold **Preamp:** Blue-Blk **Antenna:** Red-Black
CSsoft Radiated Emissions Calculator v 1.017.161

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

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 | 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 | I | 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 | I | 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 |

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

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

| 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 15.209 High Frequency - Peak Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) | FCC 15.209 High Frequency - Average Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TX on Low Channel - 906MHz | | | | | | | | | | | | | | |
| v | 1812.0 | 33.12 | 21.4 | 18.8 | 30.6 | 3.2 | 48.1 | 36.4 | 74.0 | -25.9 | Pass | 54.0 | -17.6 | Pass |
| h | 1812.0 | 34.74 | 23.1 | 18.8 | 30.6 | 3.2 | 49.7 | 38.1 | 74.0 | -24.3 | Pass | 54.0 | -15.9 | Pass |

***Table Result:*** Pass by -15.9 dB ***Worst Freq:*** 1812.0 MHz

**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 v 1.017.161
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor


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

| 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 15.209 High Frequency - Peak Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) | FCC 15.209 High Frequency - Average Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TX on Mid Channel - 914MHz | | | | | | | | | | | | | | |
| v | 1828.0 | 34.41 | 22.2 | 18.8 | 30.7 | 3.2 | 49.5 | 37.3 | 74.0 | -24.5 | Pass | 54.0 | -16.7 | Pass |
| h | 1828.0 | 35.72 | 25.7 | 18.8 | 30.7 | 3.2 | 50.8 | 40.8 | 74.0 | -23.2 | Pass | 54.0 | -13.2 | Pass |

***Table Result:*** Pass by -13.2 dB ***Worst Freq:*** 1828.0 MHz

**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 v 1.017.161
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor


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

| 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 15.209 High Frequency - Peak Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) | FCC 15.209 High Frequency - Average Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TX on High Channel - 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 ***Worst Freq:*** 1848.0 MHz

**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 v 1.017.161
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor


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 | 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 | I | 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 | I | 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 |

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

## 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
**Temp:** 23.8°C **Humidity:** 25% **Pressure:** 993mBar
**Frequency Range:** 30-1000MHz **Measurement Distance:** 3 m
**Notes:** Config#3: Manhole Lid Antenna (by Taoglas Limited RG.02.01.3000W) **EUT Max Freq:** 16MHz
EUT Tx on Channel 1 (906MHz) - worst case **EUT TX Freq:** 906-924MHz

| Antenna Polarization (H / V) | Frequency (MHz) | Reading (dBµV) | Preamp Factor (dB) | Antenna Factor (dB/m) | Cable Factor (dB) | Adjusted Reading (dBµV/m) | | | | FCC 15.209 Limit (dBµV/m) | FCC 15.209 Margin (dB) | FCC 15.209 Result (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 by -8.2 dB ***Worst Freq:*** 120.0 MHz

**Test Site:** EMI Chamber 2 **Cable 1:** Asset #2052 **Cable 2:** Asset #1507
**Analyzer:** Gold **Preamp:** Blue-Blk **Antenna:** Red-Black
CSsoft Radiated Emissions Calculator v 1.017.161

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

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** | **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 | I | 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 | I | 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 |

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

## 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
**Temp:** 23.8°C **Humidity:** 25% **Pressure:** 993mBar
**Frequency Range:** 1-10GHz **Measurement Distance:** 3 m (1-6GHz), 1m (6-10GHz)
**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

| 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 15.209 High Frequency - Peak Limit (dBµV/m) | Peak Margin (dB) | Peak Result (Pass/Fail) | FCC 15.209 High Frequency - Average Limit (dBµV/m) | Average Margin (dB) | Average Result (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TX on Low Channel - 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 by -7.2 dB ***Worst Freq:*** 2742.0 MHz

**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 v 1.017.161

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

## 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
**Temp:** 23.8°C **Humidity:** 25% **Pressure:** 993mBar
**Frequency Range:** 1-10GHz **Measurement Distance:** 3 m (1-6GHz), 1m (6-10GHz)
**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

| 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 15.209 High Frequency - Peak Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) | FCC 15.209 High Frequency - Average Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TX on Mid Channel - 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 by -7.2 dB ***Worst Freq:*** 2742.0 MHz

**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 v 1.017.161

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

## 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
**Temp:** 23.8°C **Humidity:** 25% **Pressure:** 993mBar
**Frequency Range:** 1-10GHz **Measurement Distance:** 3 m (1-6GHz), 1m (6-10GHz)
**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

| 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 15.209 High Frequency - Peak Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) | FCC 15.209 High Frequency - Average Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TX on High Channel - 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 by -7.2 dB ***Worst Freq:*** 2742.0 MHz

**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 v 1.017.161

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

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 | 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 | I | 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 | I | 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 |

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

## 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 **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

| Antenna Polarization (H / V) | Frequency (MHz) | Reading (dBµV) | Preamp Factor (dB) | Antenna Factor (dB/m) | Cable Factor (dB) | Adjusted Reading (dBµV/m) | --- Limit (dBµV/m) | --- Margin (dB) | --- Result (Pass/Fail) | FCC 15.209 Limit (dBµV/m) | FCC 15.209 Margin (dB) | FCC 15.209 Result (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| v | 35.95 | 34.3 | 25.2 | 17.1 | 0.4 | 26.6 | --- | --- | --- | 40.0 | -13.4 | Pass |
| v | 48.0 | 49.5 | 25.2 | 9.2 | 0.4 | 33.9 | --- | --- | --- | 40.0 | -6.1 | Pass |
| h | 48.0 | 43.0 | 25.2 | 9.2 | 0.4 | 27.4 | --- | --- | --- | 40.0 | -12.6 | Pass |
| v | 72.0 | 40.3 | 25.3 | 8.9 | 0.6 | 24.5 | --- | --- | --- | 40.0 | -15.5 | Pass |
| v | 120.0 | 49.4 | 25.2 | 14.2 | 0.9 | 39.3 | --- | --- | --- | 43.5 | -4.2 | Pass |
| h | 120.0 | 48.8 | 25.2 | 14.2 | 0.9 | 38.7 | --- | --- | --- | 43.5 | -4.8 | Pass |
| h | 192.0 | 39.0 | 24.9 | 11.6 | 1.1 | 26.8 | --- | --- | --- | 43.5 | -16.7 | Pass |
| h | 205.0 | 39.6 | 25.0 | 11.4 | 0.9 | 26.9 | --- | --- | --- | 43.5 | -16.6 | Pass |
| h | 240.0 | 39.1 | 25.1 | 11.9 | 1.1 | 27.0 | --- | --- | --- | 46.0 | -19.0 | Pass |
| h | 360.0 | 36.0 | 25.0 | 14.9 | 1.3 | 27.2 | --- | --- | --- | 46.0 | -18.8 | Pass |
| h | 420.0 | 35.9 | 25.5 | 16.5 | 1.7 | 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:** ---
CSsoft Radiated Emissions Calculator v 1.017.161

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

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 | 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 | I | 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 | I | 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 |

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

## 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 **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 **EUT Max Freq:** 16 MHz
TX on Low Channel -1.08dB attenuation loss was added to readings (HPF - 1288) **EUT TX Freq:** 906 to 924 MHz

| 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 15.209 High Frequency - Peak Limit (dBµV/m) | Peak Margin (dB) | Peak Result (Pass/Fail) | FCC 15.209 High Frequency - Average Limit (dBµV/m) | Average Margin (dB) | Average Result (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 Result:*** Pass by -13.9 dB ***Worst Freq:*** 1812.0 MHz

**Test Site:** EMI Chamber 2 **Cable 1:** Asset #2052 **Cable 2:** Asset #1507 **Cable 3:** ---
**Analyzer:** Gold **Preamp:** Asset #1517 **Antenna:** Blue Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.161

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

## 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 **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 **EUT Max Freq:** 16 MHz
TX on Mid Channel - 1.08dB attenuation loss was added to readings (HPF - 1288) **EUT TX Freq:** 906 to 924 MHz

| 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 15.209 High Frequency - Peak Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) | FCC 15.209 High Frequency - Average Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| v | 1828.0 | 35.48 | 25.1 | 18.8 | 30.7 | 3.2 | 50.6 | 40.2 | 74.0 | -23.4 | Pass | 54.0 | -13.8 | Pass |
| h | 1828.0 | 36.84 | 24.8 | 18.8 | 30.7 | 3.2 | 51.9 | 39.9 | 74.0 | -22.1 | Pass | 54.0 | -14.1 | Pass |

***Table Result:*** Pass by -13.8 dB ***Worst Freq:*** 1828.0 MHz

**Test Site:** EMI Chamber 2 **Cable 1:** Asset #2052 **Cable 2:** Asset #1507 **Cable 3:** ---
**Analyzer:** Gold **Preamp:** Asset #1517 **Antenna:** Blue Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.161

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

## 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 **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 **EUT Max Freq:** 16 MHz
TX on High Channel - 1.08dB attenuation loss was added to readings (HPF - 1288) **EUT TX Freq:** 906 to 924 MHz

| 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 15.209 High Frequency - Peak Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) | FCC 15.209 High Frequency - Average Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| v | 1848.0 | 35.48 | 25.1 | 18.8 | 30.8 | 3.2 | 50.7 | 40.3 | 74.0 | -23.3 | Pass | 54.0 | -13.7 | Pass |
| h | 1848.0 | 33.49 | 24.9 | 18.8 | 30.8 | 3.2 | 48.7 | 40.1 | 74.0 | -25.3 | Pass | 54.0 | -13.9 | Pass |

***Table Result:*** Pass by -13.7 dB ***Worst Freq:*** 1848.0 MHz

**Test Site:** EMI Chamber 2 **Cable 1:** Asset #2052 **Cable 2:** Asset #1507 **Cable 3:** ---
**Analyzer:** Gold **Preamp:** Asset #1517 **Antenna:** Blue Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.161

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

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 | 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 | I | 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 | I | 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 |

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

## 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:** 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

| Antenna Polarization (H / V) | Frequency (MHz) | Reading (dBµV) | Preamp Factor (dB) | Antenna Factor (dB/m) | Cable Factor (dB) | Adjusted Reading (dBµV/m) | --- Limit (dBµV/m) | --- Margin (dB) | --- Result (Pass/Fail) | FCC 15.209 Limit (dBµV/m) | FCC 15.209 Margin (dB) | FCC 15.209 Result (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| v | 120.0 | 38.0 | 25.2 | 14.2 | 0.9 | 27.9 | --- | --- | --- | 43.5 | -15.6 | Pass |
| v | 168.0 | 32.4 | 25.0 | 11.9 | 0.9 | 20.2 | --- | --- | --- | 43.5 | -23.3 | Pass |
| v | 240.0 | 40.4 | 25.1 | 11.9 | 1.1 | 28.3 | --- | --- | --- | 46.0 | -17.7 | Pass |
| v | 276.4 | 31.5 | 25.2 | 13.3 | 1.2 | 20.8 | --- | --- | --- | 46.0 | -25.2 | Pass |
| h | 614.0 | 29.0 | 24.8 | 19.0 | 2.0 | 25.2 | --- | --- | --- | 46.0 | -20.8 | Pass |
| v | 978.0 | 23.2 | 24.4 | 23.0 | 2.3 | 24.1 | --- | --- | --- | 54.0 | -29.9 | Pass |

***Table Result:*** Pass by -15.6 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:** ---
CSsoft Radiated Emissions Calculator v 1.017.161 
Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor

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 | 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 | I | 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 | I | 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 |

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

## 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)

**Notes:** Hermes1 with Nearson Antenna - configuration #5 **EUT Max Freq:** 16 MHz
TX on low channel - 1.08dB attenuation loss was added to readings (HPF - 1288) **EUT TX Freq:** 906 to 924 MHz

| 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 15.209 High Frequency - Peak Limit (dBµV/m) | Peak Margin (dB) | Peak Result (Pass/Fail) | FCC 15.209 High Frequency - Average Limit (dBµV/m) | Average Margin (dB) | Average Result (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| v | 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 Result:*** Pass by -13.2 dB ***Worst Freq:*** 1812.0 MHz

**Test Site:** EMI Chamber 2 **Cable 1:** Asset #2052 **Cable 2:** Asset #1507 **Cable 3:** ---
**Analyzer:** Gold **Preamp:** Asset #1517 **Antenna:** Blue Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.161 
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)
**Notes:** Hermes1 with Nearson Antenna - configuration #5 **EUT Max Freq:** 16 MHz
TX on mid channel - 1.08dB attenuation loss was added to readings (HPF - 1288) **EUT TX Freq:** 906 to 924 MHz

| 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 15.209 High Frequency - Peak | | | FCC 15.209 High Frequency - Average | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) | Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) |
| v | 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 |

***Table Result:*** Pass by -11.7 dB ***Worst Freq:*** 1828.0 MHz

**Test Site:** EMI Chamber 2 **Cable 1:** Asset #2052 **Cable 2:** Asset #1507 **Cable 3:** ---
**Analyzer:** Gold **Preamp:** Asset #1517 **Antenna:** Blue Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.161

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)
**Notes:** Hermes1 with Nearson Antenna - configuration #5 **EUT Max Freq:** 16 MHz
TX on high channel - 1.08dB attenuation loss was added to readings (HPF - 1288) **EUT TX Freq:** 906 to 924 MHz

| 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 15.209 High Frequency - Peak | | | FCC 15.209 High Frequency - Average | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) | Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) |
| v | 1848.0 | 35.2 | 26.6 | 18.8 | 30.8 | 3.2 | 50.4 | 41.8 | 74.0 | -23.6 | Pass | 54.0 | -12.3 | Pass |

***Table Result:*** Pass by -12.3 dB ***Worst Freq:*** 1848.0 MHz

**Test Site:** EMI Chamber 2 **Cable 1:** Asset #2052 **Cable 2:** Asset #1507 **Cable 3:** ---
**Analyzer:** Gold **Preamp:** Asset #1517 **Antenna:** Blue Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.161

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

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 | 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 | I | 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 | I | 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 |

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

## Radiated Emissions Table

**Date:** 28-Apr-16 **Company:** Durham Geo Enterprises **Work Order:** Q0559
**Engineer:** Tuyen Truong **EUT Desc:** HERMES1 **EUT Operating Voltage/Frequency:** 3.7Vdc (battery power)
**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) all three channels were investigated; only worst case recorded. **EUT Max Freq:** 16 MHz **EUT TX Freq:** 906 to 924 MHz

| Antenna Polarization (H / V) | Frequency (MHz) | Reading (dBµV) | Preamp Factor (dB) | Antenna Factor (dB/m) | Cable Factor (dB) | Adjusted Reading (dBµV/m) | --- Limit (dBµV/m) | --- Margin (dB) | --- Result (Pass/Fail) | FCC 15.209 Limit (dBµV/m) | FCC 15.209 Margin (dB) | FCC 15.209 Result (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| vbb | 38.45 | 40.6 | 25.2 | 15.2 | 0.4 | 31.0 | --- | --- | --- | 40.0 | -9.0 | Pass |
| v | 60.0 | 52.4 | 25.3 | 7.6 | 0.5 | 35.2 | --- | --- | --- | 40.0 | -4.8 | Pass |
| h | 95.5 | 41.4 | 25.2 | 9.1 | 0.7 | 26.0 | --- | --- | --- | 43.5 | -17.5 | Pass |
| v | 96.1 | 49.1 | 25.2 | 9.2 | 0.7 | 33.8 | --- | --- | --- | 43.5 | -9.7 | Pass |
| v | 120.0 | 49.0 | 25.2 | 14.2 | 0.9 | 38.9 | --- | --- | --- | 43.5 | -4.6 | Pass |
| h | 120.0 | 45.8 | 25.2 | 14.2 | 0.9 | 35.7 | --- | --- | --- | 43.5 | -7.8 | Pass |
| v | 240.0 | 45.1 | 25.1 | 11.9 | 1.1 | 33.0 | --- | --- | --- | 46.0 | -13.0 | Pass |
| h | 240.0 | 45.0 | 25.1 | 11.9 | 1.1 | 32.9 | --- | --- | --- | 46.0 | -13.1 | Pass |
| h | 258.0 | 40.3 | 25.3 | 11.8 | 1.1 | 27.9 | --- | --- | --- | 46.0 | -18.1 | Pass |
| v | 310.8 | 33.8 | 25.3 | 13.7 | 1.3 | 23.5 | --- | --- | --- | 46.0 | -22.5 | Pass |
| h | 311.3 | 39.9 | 25.3 | 13.7 | 1.3 | 29.6 | --- | --- | --- | 46.0 | -16.4 | Pass |

***Table Result:*** Pass by -4.6 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:** ---
CSsoft Radiated Emissions Calculator v 1.017.161

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

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 | 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 | I | 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 | I | 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 |

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

## Radiated Emissions Table

**Date:** 28-Apr-16 **Company:** Durham Geo Enterprises **Work Order:** Q0559
**Engineer:** Tuyen Truong **EUT Desc:** HERMES1 **EUT Operating Voltage/Frequency:** 3.7Vdc (battery power)
**Temp:** 22°C **Humidity:** 24% **Pressure:** 1000.4mBar
**Frequency Range:** 1 to 10 GHz **Measurement Distance:** 3 m (1 to 6 GHz), 1m (6 to 10 GHz)
**Notes:** Config#6: Serial Configuration (HERMES1 with V-logger and LAIRD antenna) TX on Low Channel / 0.4dB attenuation loss was added to readings (BRF - 2130) **EUT Max Freq:** 16 MHz **EUT TX Freq:** 906 to 924 MHz

| 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 15.209 High Frequency - Peak Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) | FCC 15.209 High Frequency - Average Limit (dBµV/m) | Margin (dB) | Result (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 |

***Table Result:*** Pass by -10.1 dB ***Worst Freq:*** 1812.0 MHz

**Test Site:** EMI Chamber 2 **Cable 1:** Asset #2052 **Cable 2:** Asset #1507 **Cable 3:** ---
**Analyzer:** Gold **Preamp:** Asset #1517 **Antenna:** Blue Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.161

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

## Radiated Emissions Table

**Date:** 28-Apr-16 **Company:** Durham Geo Enterprises **Work Order:** Q0559
**Engineer:** Tuyen Truong **EUT Desc:** HERMES1 **EUT Operating Voltage/Frequency:** 3.7Vdc (battery power)
**Temp:** 22°C **Humidity:** 24% **Pressure:** 1000.4mBar
**Frequency Range:** 1 to 10 GHz **Measurement Distance:** 3 m (1 to 6 GHz), 1m (6 to 10 GHz)
**Notes:** Config#6: Serial Configuration (HERMES1 with V-logger and LAIRD antenna) **EUT Max Freq:** 16 MHz
TX on mid channel / 0.4dB attenuation loss was added to readings (BRF - 2130) **EUT TX Freq:** 906 to 924 MHz

| 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 15.209 High Frequency - Peak Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) | FCC 15.209 High Frequency - Average Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| v | 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 |

***Table Result:*** Pass by -6.7 dB ***Worst Freq:*** 1828.0 MHz

**Test Site:** EMI Chamber 2 **Cable 1:** Asset #2052 **Cable 2:** Asset #1507 **Cable 3:** ---
**Analyzer:** Gold **Preamp:** Asset #1517 **Antenna:** Blue Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.161

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

## Radiated Emissions Table

**Date:** 28-Apr-16 **Company:** Durham Geo Enterprises **Work Order:** Q0559
**Engineer:** Tuyen Truong **EUT Desc:** HERMES1 **EUT Operating Voltage/Frequency:** 3.7Vdc (battery power)
**Temp:** 22°C **Humidity:** 24% **Pressure:** 1000.4mBar
**Frequency Range:** 1 to 10 GHz **Measurement Distance:** 3 m (1 to 6 GHz), 1m (6 to 10 GHz)
**Notes:** Config#6: Serial Configuration (HERMES1 with V-logger and LAIRD antenna) **EUT Max Freq:** 16 MHz
TX on high channel / 0.4dB attenuation loss was added to readings (BRF - 2130) **EUT TX Freq:** 906 to 924 MHz

| 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 15.209 High Frequency - Peak Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) | FCC 15.209 High Frequency - Average Limit (dBµV/m) | Margin (dB) | Result (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 |

***Table Result:*** Pass by -7.9 dB ***Worst Freq:*** 1848.0 MHz

**Test Site:** EMI Chamber 2 **Cable 1:** Asset #2052 **Cable 2:** Asset #1507 **Cable 3:** ---
**Analyzer:** Gold **Preamp:** Asset #1517 **Antenna:** Blue Horn **Preselector:** ---
CSsoft Radiated Emissions Calculator v 1.017.161

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

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** | **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** |
| 2130 BRF | 0.009-18000MHz | BRM18770 | Micro-Tronics | 1 | 2130 | II | 1/6/2017 | 1/6/2016 |
| 1517 HF Preamp | 1-20GHz | CS | CS | N/A | 1517 | II | 8/6/2016 | 8/6/2015 |
| **Antennas** | **Range** | **MN** | **Mfr** | **SN** | **Asset** | **Cat** | **Calibration Due** | **Calibrated on** |
| Blue Horn | 1-18Ghz | 3117 | ETS | 157647 | 1861 | I | 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 | I | 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 |

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 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

**Spurious Conducted Emissions - Maximum In Band (Peak PSD in 100 KHz RBW)**

**Date:** 26-Apr-16 **Company:** Durham Geo Enterprises **Work Order:** Q0559
**Engineer:** Tuyen Truong **EUT Desc:** HERMES1 **EUT Operating Voltage/Frequency:** USB Power (5Vdc)
**Temp:** 22°C **Humidity:** 27% **Pressure:** 998mBar
**Frequency Range:** 902 to 928 MHz
**Notes:**

| Frequency (MHz) | Reading (dBm) | Attenuation (dB) | Adjusted Reading (dBm) |
|---|---|---|---|
| 906 | -5.430 | 19.55 | 14.1 |

**Test Site:** Chamber 2 **Attenuation:** Asset#791
**Analyzer:** Gold



**Band Edge**

**Date:** 26-Apr-16 **Company:** Durham Geo Enterprises **Work Order:** Q0559
**Engineer:** Tuyen Truong **EUT Desc:** HERMES1 **EUT Operating Voltage/Frequency:** USB Power (5Vdc)
**Temp:** 22°C **Humidity:** 27% **Pressure:** 998mBar
**Frequency Range:** 902 to 928 MHz
**Notes:**
The Limit here is set to -20dB from the max in-band peak PSD level in 100kHz RBW (Attenuation factor included or 19.55dB)

| Frequency (MHz) | Reading (dBm) | Attenuation (dB) | Final Conducted Reading (dBm) | FCC 15.247 Limit (dBm) | Margin (dB) | Result (Pass/Fail) |
|---|---|---|---|---|---|---|
| 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 Freq:*** 902.0 MHz

**Test Site:** Chamber 2 **Attenuation:** Asset#791
**Analyzer:** Gold

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 |

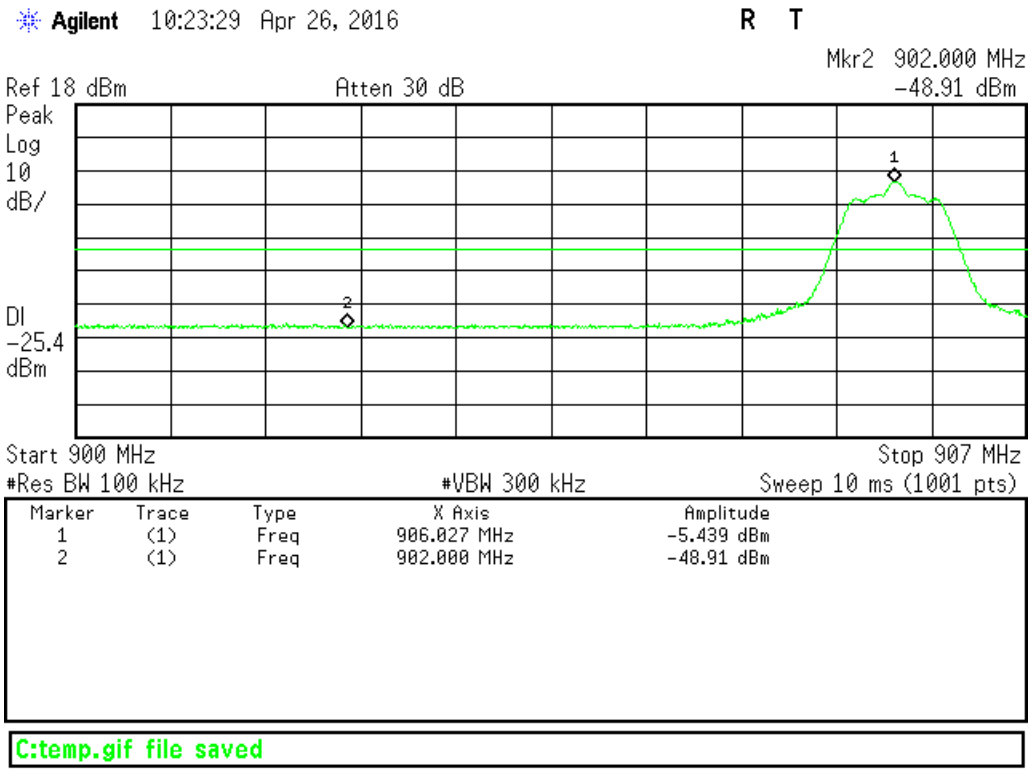
| Radiated Emissions Sites | FCC Code | IC Code | VCCI Code | Range | | Cat | Calibration Due | Calibrated on |
|---|---|---|---|---|---|---|---|---|
| EMI Chamber 2 | 719150 | 2762A-7 | A-0015 | 30-1000MHz | | II | 3/22/2017 | 3/22/2015 |

| 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 |

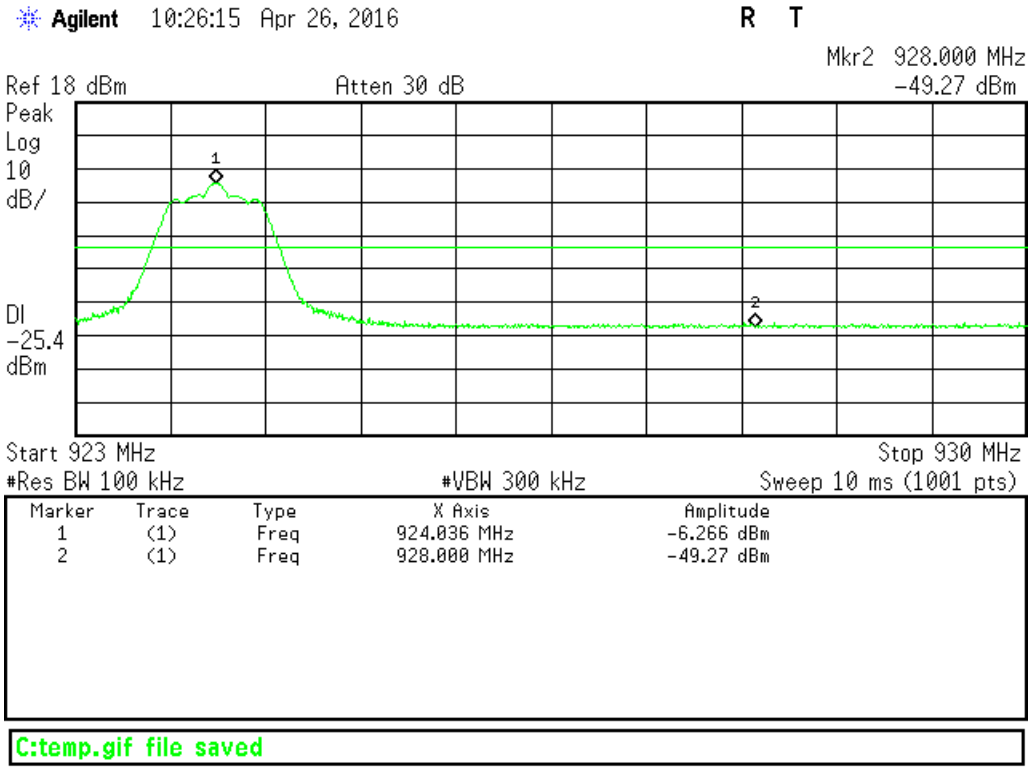
| Meteorological Meters | | MN | Mfr | SN | Asset | Cat | Calibration Due | Calibrated on |
|---|---|---|---|---|---|---|---|---|
| TH A#2081 | | HTC-1 | HDE | | 2081 | II | 4/5/2017 | 4/5/2016 |
| Barometric A#2160 | | 5396-0321 | Monarch Instrument | 4000060 | 2160 | I | 3/7/2017 | 3/7/2016 |

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

## 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.

### Conducted Spurious Emission

**Date:** 26-Apr-16 **Company:** Durham Geo Enterprises **Work Order:** Q0559
**Engineer:** Tuyen Truong **EUT Desc:** HERMES1 **EUT Operating Voltage/Frequency:** USB Power (5Vdc)
**Temp:** 22°C **Humidity:** 27% **Pressure:** 998mBar

**Frequency Range:** 9KHz to 10GHz

**Notes:** TX on low channel
The Limit here is set to -20dB from the max in-band peak PSD level in 100kHz RBW (Attenuation factor included or 19.55dB)

| Frequency (MHz) | Reading (dBm) | Attenuation (dB) | Final Conducted Reading (dBm) | FCC 15.247 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 by -23.06 dB ***Worst Freq:*** 30.0 MHz

**Test Site:** Chamber 2 **Attenuation:** Asset#791
**Analyzer:** Gold



### Conducted Spurious Emission

**Date:** 26-Apr-16 **Company:** Durham Geo Enterprises **Work Order:** Q0559
**Engineer:** Tuyen Truong **EUT Desc:** HERMES1 **EUT Operating Voltage/Frequency:** USB Power (5Vdc)
**Temp:** 22°C **Humidity:** 27% **Pressure:** 998mBar

**Frequency Range:** 9KHz to 10GHz

**Notes:** TX on mid channel
The Limit here is set to -20dB from the max in-band peak PSD level in 100kHz RBW (Attenuation factor included or 19.55dB)

| Frequency (MHz) | Reading (dBm) | Attenuation (dB) | Final Conducted Reading (dBm) | FCC 15.247 Limit (dBm) | Margin (dB) | Result (Pass/Fail) |
|---|---|---|---|---|---|---|
| 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 dB ***Worst Freq:*** 30.0 MHz

**Test Site:** Chamber 2 **Attenuation:** Asset#791
**Analyzer:** Gold



### Conducted Spurious Emission

**Date:** 26-Apr-16 **Company:** Durham Geo Enterprises **Work Order:** Q0559
**Engineer:** Tuyen Truong **EUT Desc:** HERMES1 **EUT Operating Voltage/Frequency:** USB Power (5Vdc)
**Temp:** 22°C **Humidity:** 27% **Pressure:** 998mBar

**Frequency Range:** 9KHz to 10GHz

**Notes:** TX on high channel
The Limit here is set to -20dB from the max in-band peak PSD level in 100kHz RBW (Attenuation factor included or 19.55dB)

| Frequency (MHz) | Reading (dBm) | Attenuation (dB) | Final Conducted Reading (dBm) | FCC 15.247 Limit (dBm) | Margin (dB) | Result (Pass/Fail) |
|---|---|---|---|---|---|---|
| 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 MHz

**Test Site:** Chamber 2 **Attenuation:** Asset#791
**Analyzer:** Gold

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 | 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 | Monarch Instrument | 4000060 | 2160 | I | 3/7/2017 | 3/7/2016 |

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 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 Density**

**Date:** 26-Apr-16 **Company:** Durham Geo Enterprises **Work Order:** Q0559
**Engineer:** Tuyen Truong **EUT Desc:** HERMES1 **EUT Operating Voltage/Frequency:** USB Power (5Vdc)
**Temp:** 22°C **Humidity:** 27% **Pressure:** 998mBar
**Frequency Range:** 906 to 924 MHz
**Notes:**

| Frequency (MHz) | Reading (dBm) | Attenuation (dB) | Final Conducted Reading (dBm) | FCC 15.247 Limit (dBm) | Margin (dB) | Result (Pass/Fail) |
|---|---|---|---|---|---|---|
| 906 | -13.10 | 19.55 | 6.45 | 8.0 | -1.55 | Pass |
| 914 | -13.41 | 19.55 | 6.14 | 8.0 | -1.86 | Pass |
| 924 | -13.88 | 19.55 | 5.67 | 8.0 | -2.33 | Pass |

***Table Result:*** Pass by -1.55 dB ***Worst Freq:*** 906.0 MHz

**Test Site:** Chamber 2 **Attenuation:** Asset#791
**Analyzer:** Gold



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 |

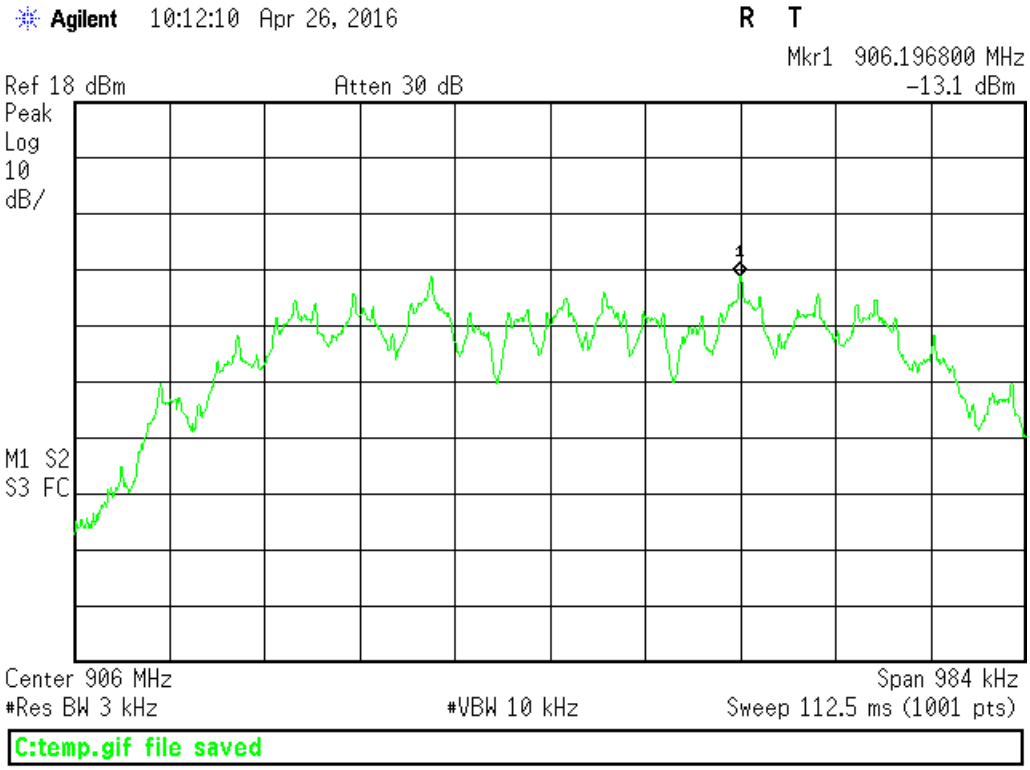
| Radiated Emissions Sites | FCC Code | IC Code | VCCI Code | Range | Cat | Calibration Due | Calibrated on |
|---|---|---|---|---|---|---|---|
| EMI Chamber 2 | 719150 | 2762A-7 | A-0015 | 30-1000MHz | II | 3/22/2017 | 3/22/2015 |

| 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 |

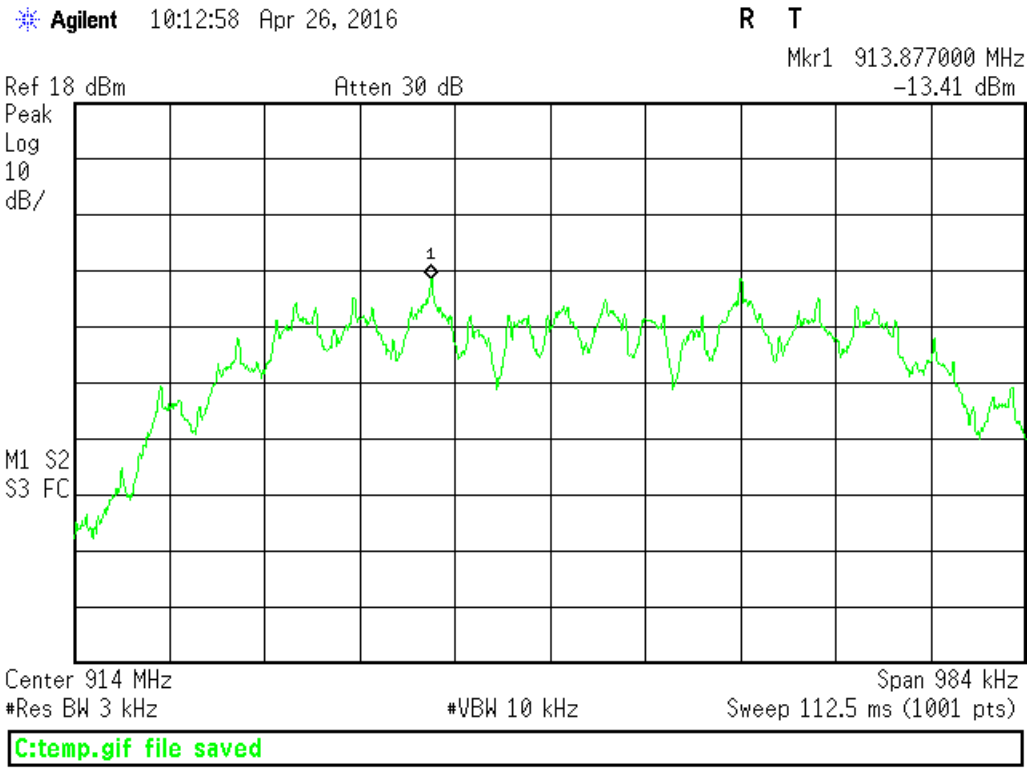
| Meteorological Meters | MN | Mfr | SN | Asset | Cat | Calibration Due | Calibrated on |
|---|---|---|---|---|---|---|---|
| TH A#2081 | HTC-1 | HDE | | 2081 | II | 4/5/2017 | 4/5/2016 |
| Barometric A#2160 | 5396-0321 | Monarch Instrument | 4000060 | 2160 | I | 3/7/2017 | 3/7/2016 |

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

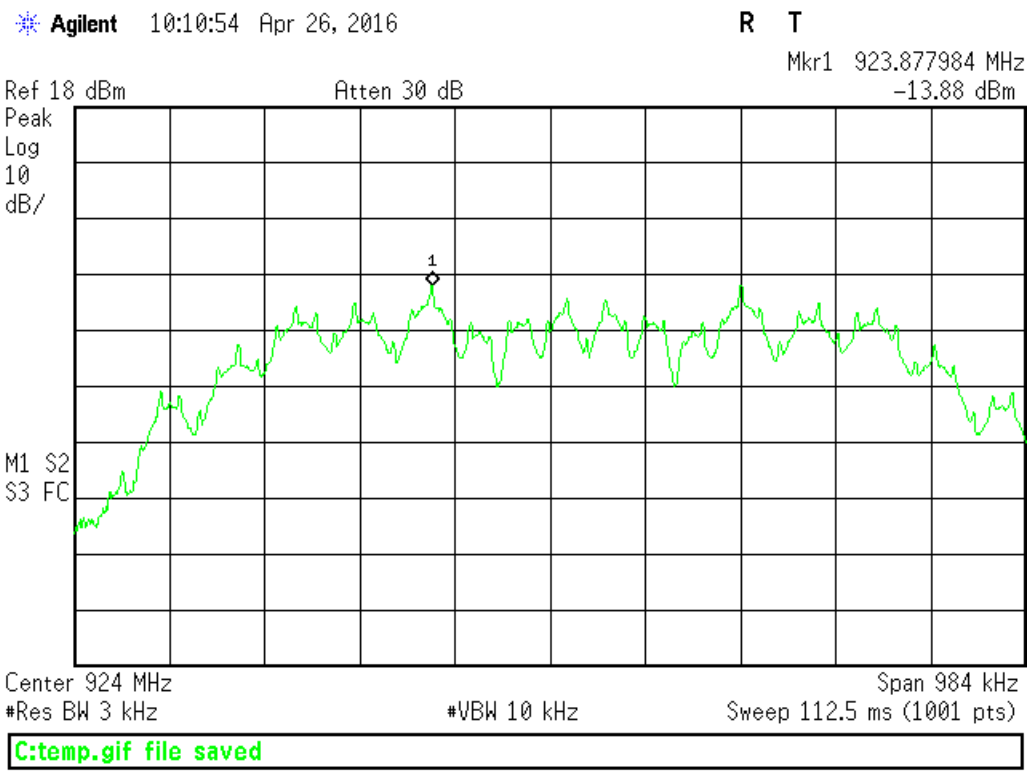
## PLOTS




906 MHz – PSD




914 MHz – PSD


Agilent 10:10:54 Apr 26, 2016
R T
Mkr1 923.877984 MHz
-13.88 dBm
Ref 18 dBm
Atten 30 dB
Peak
Log
10
dB/
1
M1 S2
S3 FC
Center 924 MHz
#Res BW 3 kHz
#VBW 10 kHz
Span 984 kHz
Sweep 112.5 ms (1001 pts)
C:temp.gif file saved

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.

**AC Conducted Emissions Data Table (support PC)**

**Date:** 28-Apr-16 **Company:** Durham Geo Enterprises Inc. **Work Order:** Q0559
**Engineer:** Chris Bramley **EUT Desc:** Hermes1
**Temp:** 21.8 ºC **Humidity:** 31% **Pressure:** 1000 mBar
**Notes:** Laird #FG9023 Antenna, Tx on Channel 1 (906MHz) / tested Support PC which provided power to the EUT via USB configuration at 120Vac/60Hz.
**Frequency Range:** 0.15-30MHz **EUT Input Voltage/Frequency:** 5Vdc (USB Power)

| | Quasi-Peak Readings | | Average Readings | | LISN Factors | | Cable | ATTN | FCC 15.207 | | | FCC 15.207 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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) |
| 0.194 | 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 | 0.0 | -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 | 0.0 | -0.1 | -20.8 | 56.0 | -11.0 | Pass | 46.0 | -5.2 | Pass |
| 13.400 | 25.7 | 24.5 | 24.5 | 21.6 | -0.1 | -0.1 | -0.2 | -20.9 | 60.0 | -13.1 | Pass | 50.0 | -4.4 | Pass |
| 13.500 | 27.0 | 24.3 | 24.9 | 21.5 | -0.1 | -0.1 | -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 |

***Result:*** Pass ***Worst Margin:*** -4.0 dB ***Frequency:*** 13.500 MHz

**Measurement Device:** LISN ASSET 1726(Line 1) LISN ASSET 1727(Line 2) **Cable:** CEMI-01 **Spectrum Analyzer:** SA EMI Chamber (1327)
**Attenuator:** 20dB Attenuator-07 **Site:** CEMI 6

*C-S CEMI Calculator Version 3.0.14* *Equipment Factor Sheet rev: 4/16/2016*
Adjusted Reading = Raw Reading + LISN Insertion Loss + Cable Loss + Attenuation
Rev. 4/24/2016

| Spectrum Analyzers / Receivers /Preselectors | Range | MN | Mfr | SN | Asset | Cat | Calibration Due | Calibrated on |
|---|---|---|---|---|---|---|---|---|
| SA EMI Chamber (1327) | 9kHz-13.2 GHz | E4405B | Agilent | MY45103416 | 1327 | I | 7/10/2016 | 7/10/2015 |
| **LISNs/Measurement Probes** | **Range** | **MN** | **Mfr** | **SN** | **Asset** | **Cat** | **Calibration Due** | **Calibrated on** |
| LISN Asset 1726 | 150kHz-30MHz | LI-150A | Com-Power | 201092 | 1726 | I | 2/4/2017 | 2/4/2016 |
| LISN Asset 1727 | 150kHz-30MHz | LI-150A | Com-Power | 201093 | 1727 | I | 2/4/2017 | 2/4/2016 |
| **Conducted Test Sites (Mains / Telco)** | **FCC Code** | | **VCCI Code** | | | **Cat** | **Calibration Due** | **Calibrated on** |
| CEMI 6 | 719150 | | A-0015 | | | III | NA | N/A |
| **Meteorological Meters** | | **MN** | **Mfr** | **SN** | **Asset** | **Cat** | **Calibration Due** | **Calibrated on** |
| TH A#2082 | | HTC-1 | HDE | | 2082 | II | 4/5/2017 | 4/5/2016 |
| Barometric A#2160 | | 5396-0321 | Monarch Instruments | 4000060 | 2160 | I | 3/7/2017 | 3/7/2016 |
| **Cables** | **Range** | | **Mfr** | | | **Cat** | **Calibration Due** | **Calibrated on** |
| CEMI-01 | 9kHz - 2GHz | | C-S | | | II | 9/11/2016 | 9/11/2015 |
| **Attenuators** | **Range** | **MN** | **Mfr** | **SN** | **Asset** | **Cat** | **Calibration Due** | **Calibrated on** |
| 20dB Attenuator-07 | 9kHz-2GHz | BW-N20W+ | MCL | N/A | | II | 4/10/2017 | 4/10/2016 |

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

# 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

**99% OCCUPIED BANDWIDTH**

**Date:** 26-Apr-16 **Company:** Durham Geo Enterprises **Work Order:** Q0559

**Engineer:** Tuyen Truong **EUT Desc:** HERMES1 **EUT Operating Voltage/Frequency:** USB Power (5Vdc)

**Temp:** 22°C **Humidity:** 27% **Pressure:** 998mBar

**Frequency Range:** 906 to 924 MHz

**Notes:**

| Frequency (MHz) | Occupied Bandwidth Reading (KHz) |
|---|---|
| 906 | **768.7237** |
| 914 | **767.3712** |
| 924 | **767.1168** |

**Test Site:** Chamber 2 **Attenuation:** Asset#791

**Analyzer:** Gold



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 |

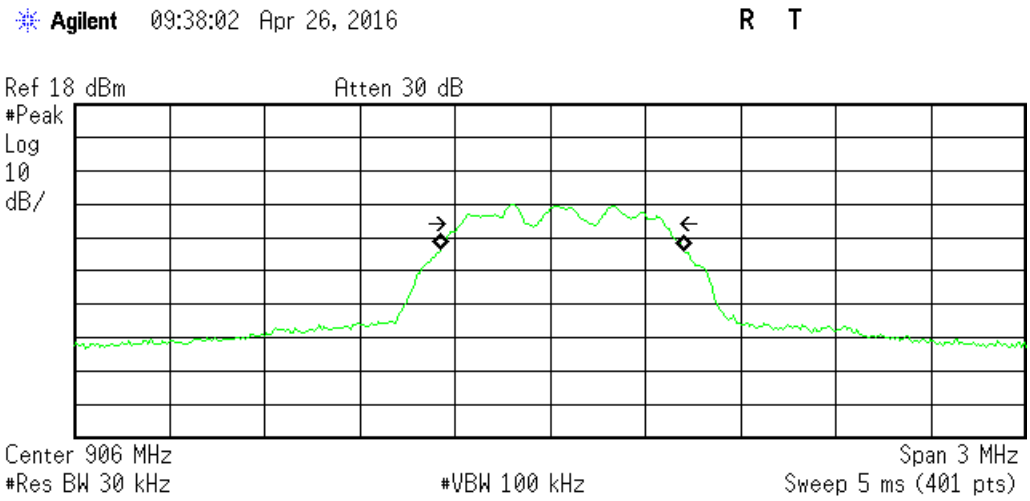
| Radiated Emissions Sites | FCC Code | IC Code | VCCI Code | Range | | Cat | Calibration Due | Calibrated on |
|---|---|---|---|---|---|---|---|---|
| EMI Chamber 2 | 719150 | 2762A-7 | A-0015 | 30-1000MHz | | II | 3/22/2017 | 3/22/2015 |

| 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 |

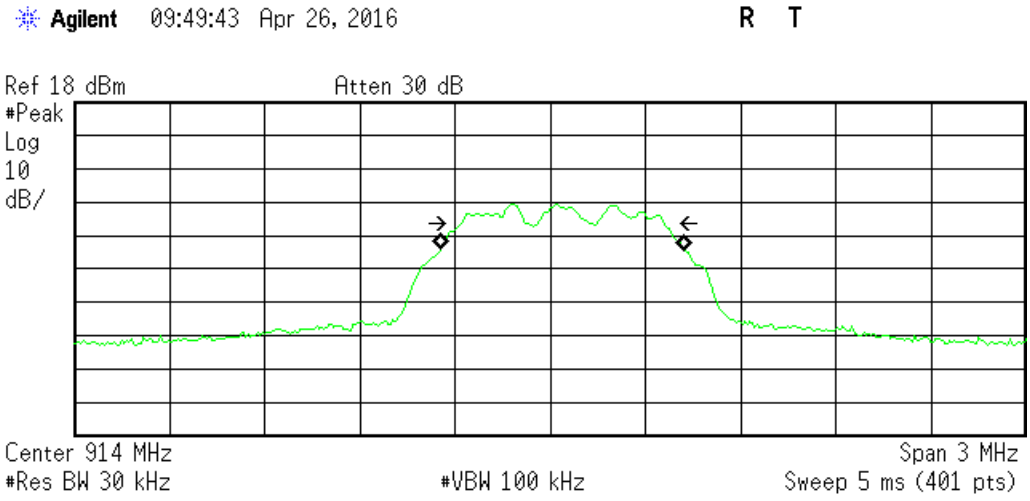
| Meteorological Meters | MN | Mfr | SN | Asset | Cat | Calibration Due | Calibrated on |
|---|---|---|---|---|---|---|---|
| TH A#2081 | HTC-1 | HDE | | 2081 | II | 4/5/2017 | 4/5/2016 |
| Barometric A#2160 | 5396-0321 | Monarch Instruments | 4000060 | 2160 | I | 3/7/2017 | 3/7/2016 |

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

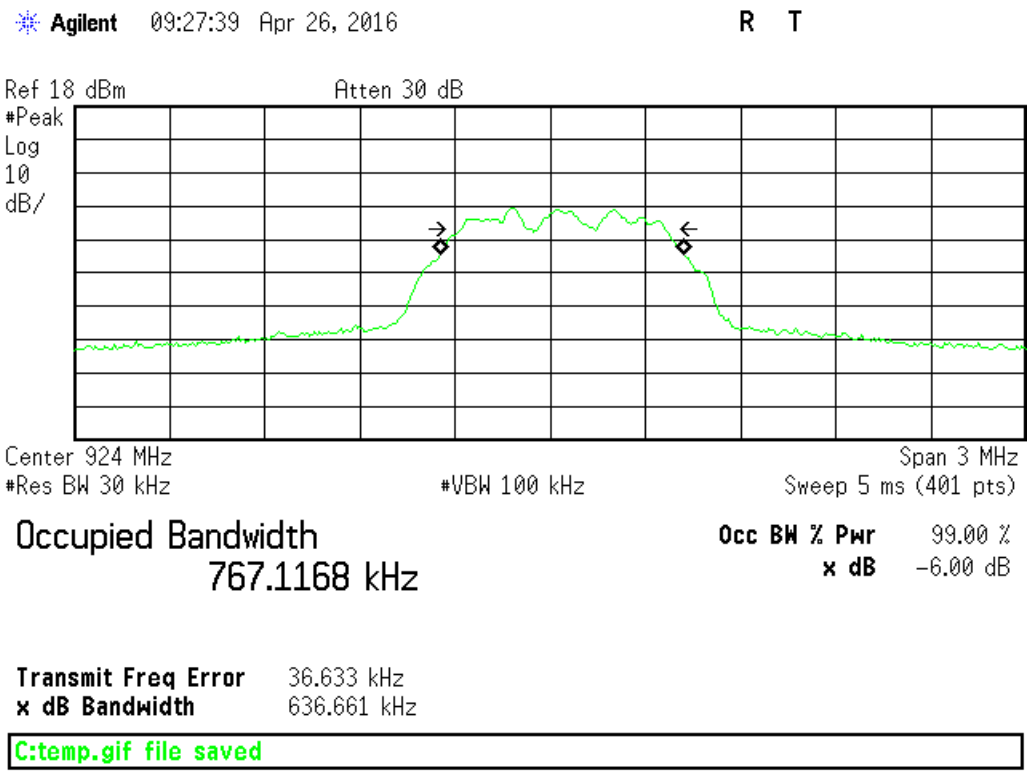
## Plot(s)




906 MHz – Occupied Bandwidth




914 MHz – Occupied Bandwidth




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)<br>NIST<br>CISPR | <br>5.6dB<br>4.6dB | <br>N/A<br>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<br>NIST<br>CISPR | <br>3.9dB<br>3.6dB | <br>N/A<br>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) | $3.23 \times 10^{-8}$ | $1 \times 10^{-7}$ |
| RF power, conducted | 0.40dB | 0.75dB |
| Maximum frequency deviation:<br>• Within 300Hz and 6kHz of audio frequency / Within 6kHz and 25kHz of audio frequency | <br>3.4%<br>0.3dB | <br>5%<br>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.

The complete list of the Approved Subcontractors Curtis-Straus may use to delegate the performance of work can be provided upon request.
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