
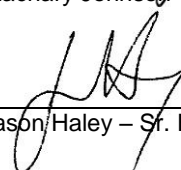




Test Report

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

| | |
|---------------------|---|
| Report No | ER0115-8 |
| Client | Hanchett Entry Systems, Inc. |
| Address | 10027 S. 51st Street Suite 102 Phoenix, AZ 85044 |
| Phone | 623-582-4626 |
| Items tested | Aperio V3 Wireless Reader (Model: R100-V3) |
| FCC ID | VC3-R100V3 |
| IC | 7160A-R100V3 |
| FRN | 0026838094 |
| Equipment Type | Digital Transmission System |
| Equipment Code | DTS |
| Emission Designator | 2M84F1D |
| FCC/IC Rule Parts | CFR Title 47 FCC Part 15.247, ISSED Canada RSS-247 Issue 1 |
| Test Dates | February 24 to March 24 and August 3, 2017 |
| Results | As detailed within this report |
| Prepared by |  Zachary Johnson – EMC Engineer |
| Authorized by |  Jason Haley – Sr. EMC Supervisor |
| Issue Date | 12/11/2017 |
| Conditions of Issue | This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 22 of this report. |

Curtis-Straus LLC is accredited by the American Association for Laboratory Accreditation for the specific scope of accreditation under Certificate Number 1627-01. This report may contain data which is not covered by the A2LA accreditation.



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Form Final Report REV 12-07-15



Summary and Test Methodology

This test report supports a “Limited Modular Approval” certification application for Aperio V3 Wireless Reader (Model: R100-V3) operating under:

CFR Title 47 FCC Part 15.247, ISED Canada RSS-247 Issue 1

EUT is an RFID reader module that communicates reading activity to a remote unit over the 2405MHz - 2480MHz frequency band.

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.

Emissions were maximized around 3 orthogonal planes (X, Y and Z).

EUT operating voltage is 3V DC via 2xAA batteries. It has an internal PCB surface mount antenna with 3.45dBi gain.

The following bandwidths were used during emissions testing.

| Frequency | RBW | VBW |
|------------|--------|------|
| 30MHz-1GHz | 120kHz | 1MHz |
| 1GHz-25GHz | 1MHz | 3MHz |

3 channels were tested as follows:

- 2405MHz: Low Channel
- 2440MHz: Mid Channel
- 2480MHz: High Channel

The environmental conditions during testing are documented on the associated data tables.

We found that the product complied with the requirements above without modification. Test sample was received in good condition.

Product Tested - Configuration Documentation

| EUT Configuration | | | | | | | | | | |
|--|----------------------------|----------------|--------------------|-------------------|-----------------|-----------------|-------------------|---------------|-------------------|----------------|
| Work Order: | R0115 | | | | | | | | | |
| Company: | AssaAbloy | | | | | | | | | |
| Company Address: | 10027 S. 51st St. Ste. 102 | | | | | | | | | |
| | Phoenix, AZ 85044 | | | | | | | | | |
| Contact: | Baruch Spence | | | | | | | | | |
| | | | | | | | | | | |
| | MN | | | PN | | | SN | | | |
| EUT: | R100-V3 | | | -- | | | Test Sample 1 | | | |
| EUT Description: | Aperio V3 Wireless Reader | | | | | | | | | |
| EUT Max Frequency: | 2480MHz | | | | | | | | | |
| | | | | | | | | | | |
| Port Label | Port Type | # ports | # populated | cable type | shielded | ferrites | length (m) | in/out | under test | comment |
| | | | | | | | | | | |
| Software Operating Mode Description: | | | | | | | | | | |
| The EUT is a battery powered RFID reader which dumps collected data over 2.4GHz. | | | | | | | | | | |



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Statement of Conformity

Aperio V3 Wireless Reader (Model: R100-V3) complied with the following requirements:

| 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. |
| | 3.2 | | 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, 6.5 | | | 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 antenna for this device is an internal PCB surface mount antenna with 3.45dBi gain. |
| 8.10 | | | 15.205 15.209 | The fundamental is not in a Restricted band and the spurious and harmonic emissions in the Restricted bands comply with the general emission limits of 15.209 or RSS-Gen as applicable |
| 8.8 | | | 15.207 | N/A. EUT 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

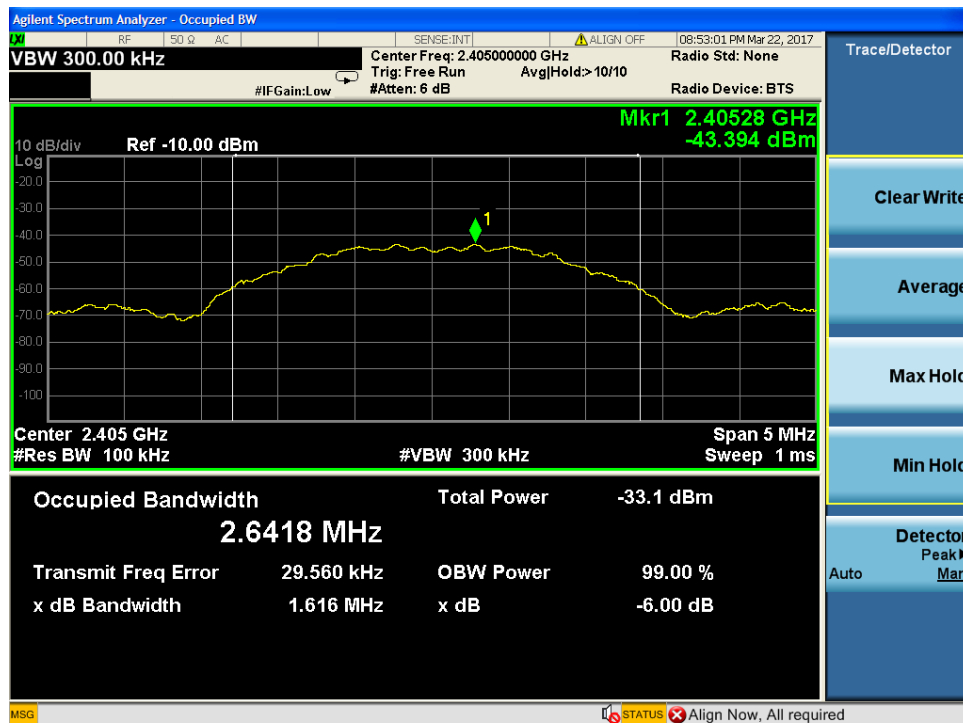
Limit: The minimum 6 dB bandwidth shall be at least 500 kHz.

[15.247(a) (2)]

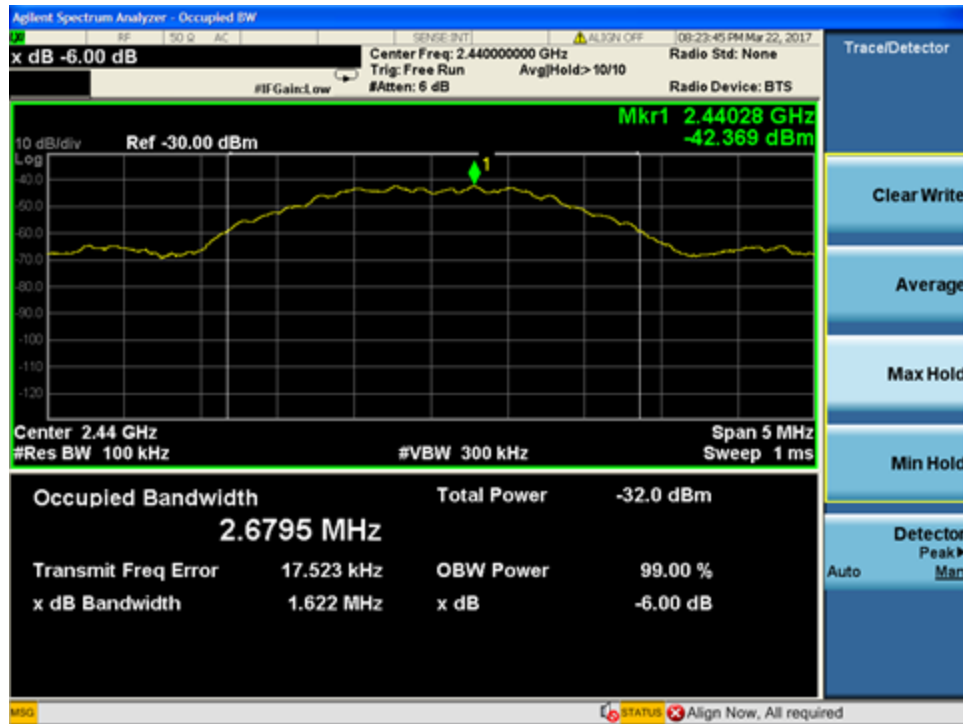
MEASUREMENTS / RESULTS

| 6dB Bandwidth | | | | |
|--|------------------|---------------------|---------------------------|--|
| Date: 6/19/2017 & 8/3/2017 | | Company: Assa Abloy | | Work Order: R0115 |
| Engineer: Zac Johnson | | EUT Desc: R100 | | EUT Operating Voltage/Frequency: 3V DC |
| Temp: 24.8°C / 24.8°C | | Humidity: 50% / 46% | | Pressure: 999mBar / 1004mBar |
| | | | | Battery |
| Frequency Range: 2405-2475MHz | | | Measurement Distance: 3 m | |
| Notes: | | | EUT Tx Freq: 2440MHz | |
| Frequency (MHz) | Reading (KHz) | 6dB BW | | |
| | | Limit (KHz) | Margin (KHz) | Result (Pass/Fail) |
| 2405 | 1616 | ≥500 | -1116 | Pass |
| 2440 | 1622 | ≥500 | -1122 | Pass |
| 2480 | 1629 | ≥500 | -1129 | Pass |
| Test Site: EMI Chamber 2 | | | | |
| Analyzer: 1199509 SA | | Cable 1: 2286 cbl | | Cable 2: --- |
| | | Preamp: None | | Cable 3: --- |
| | | Antenna: --- | | Preselector: --- |
| CSsoft Radiated Emissions Calculator v 1.017.156 | | | | |
| Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor | | | | |
| Copyright Curtis-Straus LLC 2000 | | | | |

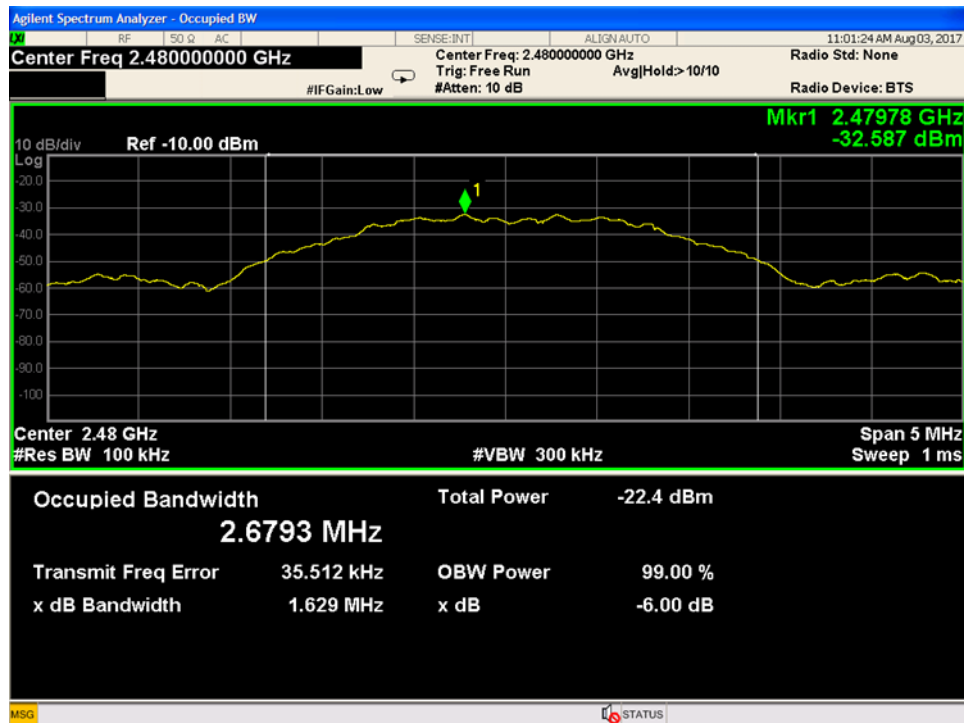
PLOTS



Low Channel DTS Bandwidth



Middle Channel DTS Bandwidth



High Channel DTS Bandwidth

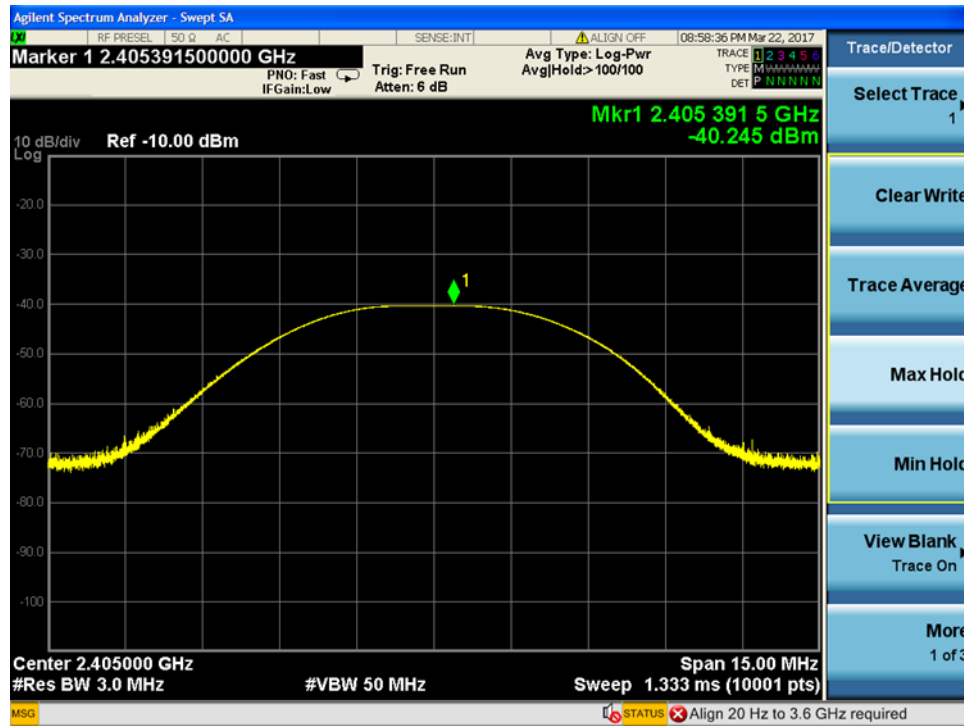
Peak Power

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

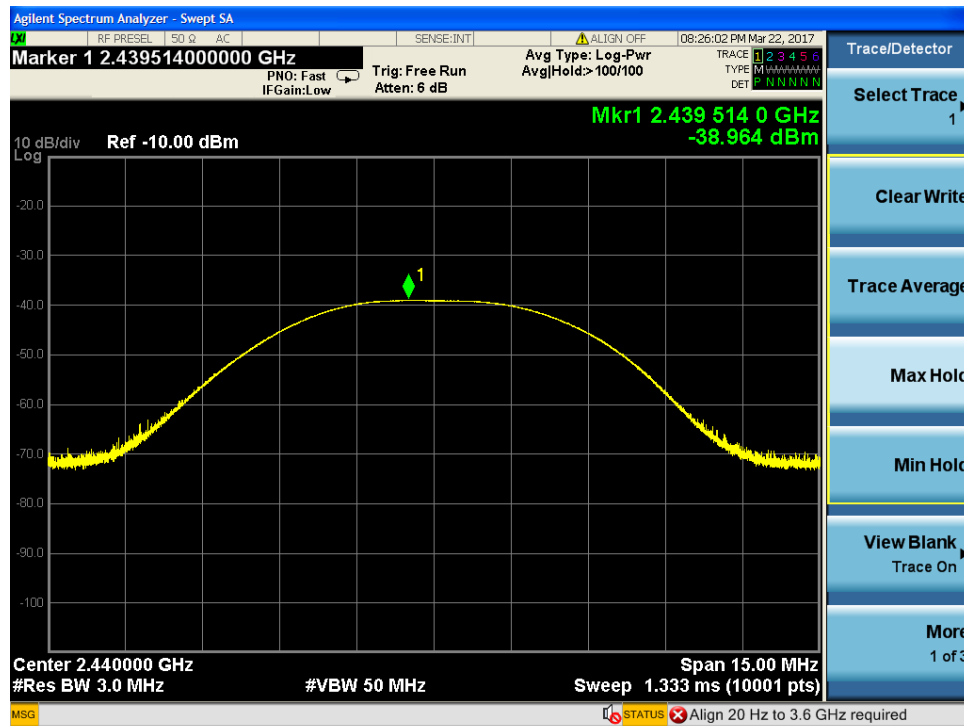
MEASUREMENTS / RESULTS

| EIRP | | | | | | | | | |
|---|--------------|---------------------|-----------------|--|------------------|--|-------|--------|-------------|
| Date: 6/19/2017 & 8/3/2017 | | Company: Assa Abloy | | | | Work Order: R0115 | | | |
| Engineer: Zac Johnson | | EUT Desc: R100 | | | | EUT Operating Voltage/Frequency: 3V DC | | | |
| Temp: 24.8°C / 24.8°C | | Humidity: 50% / 46% | | Pressure: 999mBar / 1004mBar | | Battery | | | |
| Frequency Range: 2405-2480 MHz | | | | Measurement Type: Conducted Antenna Port | | | | | |
| Notes: Tested Channel 26 on separate date with different attenuator | | | | | | | | | |
| Frequency | Peak Reading | Cable Loss | Attenuator Loss | Peak Output Power | EUT Antenna Gain | ERP | Limit | Margin | Result |
| (MHz) | (dBm) | (dB) | (dB) | (dBm) | (dBi) | (dBm) | (dBm) | (dB) | (Pass/Fail) |
| 2405.0 | -40.24 | 1.88 | 39.99 | 1.63 | 3.45 | 5.08 | 10.00 | -4.92 | Pass |
| 2440.0 | -38.96 | 1.88 | 39.99 | 2.91 | 3.45 | 6.36 | 10.00 | -3.64 | Pass |
| 2480.0 | -30.10 | 1.88 | 29.61 | 1.39 | 3.45 | 4.84 | 10.00 | -5.16 | Pass |
| Test Site: EMI Chamber 2 | | Cable 1: 2286 cbl | | | | | | | |
| Analyzer: 1199509 SA | | | | | | | | | |

PLOTS



Low Channel Peak Output Power



Middle Channel Peak Output Power



High Channel Peak Output 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)]

**Note, channel 26 tested separately, all data which is noted to include a notch filter has the factor accounted for in the raw reading

| Radiated Emissions Table | | | | | | | | | | | | | | | | |
|---|-----------------|---------------------|------------------------|-----------------------------|-----------------------|-------------------|--------------------------------|--|-----------------------------------|-------------|--------------------|--------------------------------------|-------------|--------------------|------------------|--|
| Date: 8/2/2017 & 2/28/2017 | | | | Company: Assa Abloy | | | | Work Order: R0115 | | | | | | | | |
| Engineer: Zac Johnson | | | | EUT Desc: R100 | | | | EUT Operating Voltage/Frequency: 3V DC | | | | | | | | |
| Temp: 24.8 / 22.9 | | | | Humidity: 46% / 25% | | | | Pressure: 1004mBar / 1020mBar | | | | | | | | |
| Frequency Range: 1-6GHz | | | | | | | | | Measurement Distance: 3 m | | | | | | | |
| Notes: Tested on 2 dates due to channel change, newest date has values listed first | | | | | | | | | EUT Max Freq: 2480MHz | | | | | | | |
| Antenna Polarization (H/V) | Frequency (MHz) | Peak Reading (dBuV) | Average Reading (dBuV) | Preamp Factor (dB) | Antenna Factor (dB/m) | Cable Factor (dB) | Adjusted Peak Reading (dBuV/m) | Adjusted Avg Reading (dBuV/m) | FCC Class B High Frequency - Peak | | | FCC Class B High Frequency - Average | | | | |
| | | | | | | | | | Limit (dBuV/m) | Margin (dB) | Result (Pass/Fail) | Limit (dBuV/m) | Margin (dB) | Result (Pass/Fail) | | |
| | | | | | | | | | | | | | | | | |
| H | 2483.5 | 35.1 | 17.8 | 0.0 | 28.6 | 3.2 | 66.9 | 49.6 | 74.0 | -7.1 | Pass | 54.0 | -4.4 | Pass | | |
| H | 2390.0 | 14.3 | 14.3 | 0.0 | 28.1 | 3.2 | 45.6 | 45.6 | 74.0 | -28.4 | Pass | 54.0 | -8.4 | Pass | | |
| Table Result: | | | | Pass by -4.4 dB | | | | Worst Freq: 2483.5 MHz | | | | | | | | |
| Test Site: EMI Chamber 1 | | | | Cable 1: Asset #2051 / 2052 | | | | Cable 2: Asset #2054 / 2053 | | | | Cable 3: --- | | | | |
| Analyzer: A2093 SA | | | | Preamp: none | | | | Antenna: Black Horn / Yellow / Horn | | | | | | | Preselector: --- | |
| CSsoft Radiated Emissions Calculator v 1.017.188 | | | | | | | | | | | | | | | | |
| Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor | | | | | | | | | | | | | | | | |
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Rev. 7/29/2017

| | | | | | | | | |
|--|-----------------|----------------|-------------------|--------------|--------------|------------|------------------------|----------------------|
| Spectrum Analyzers / Receivers / Preselectors | Range | MN | Mfr | SN | Asset | Cat | Calibration Due | Calibrated on |
| 2093 MXE EMI Receiver | 20Hz-26.5GHz | N9038A | Agilent | MY51210181 | 2093 | I | 8/9/2017 | 8/9/2016 |
| Radiated Emissions Sites | FCC Code | IC Code | VCCI Code | Range | Asset | Cat | Calibration Due | Calibrated on |
| EMI Chamber 1 | 719150 | 2762A-6 | A-0015 | 1-18GHz | 1685 | I | 12/21/2018 | 12/21/2016 |
| Antennas | Range | MN | Mfr | SN | Asset | Cat | Calibration Due | Calibrated on |
| Black Horn | 1-18GHz | 3115 | EMCO | 9703-5148 | 56 | I | 8/29/2018 | 8/29/2016 |
| Meteorological Meters | | MN | Mfr | SN | Asset | Cat | Calibration Due | Calibrated on |
| Weather Clock (Pressure Only) | | BA928 | Oregon Scientific | C3166-1 | 831 | I | 4/28/2018 | 4/28/2016 |
| TH A#2084 | | HTC-1 | HDE | | 2084 | II | 3/23/2018 | 3/23/2017 |
| Cables | Range | | Mfr | | | Cat | Calibration Due | Calibrated on |
| Asset #2051 | 9kHz - 18GHz | | Florida RF | | | II | 3/5/2018 | 3/5/2017 |
| Asset #2054 | 9kHz - 18GHz | | Florida RF | | | II | 10/30/2017 | 10/30/2016 |

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

Rev. 2/26/2017

| | | | | | | | | |
|--|-----------------|----------------|-------------------|--------------|--------------|------------|------------------------|----------------------|
| Spectrum Analyzers / Receivers / Preselectors | Range | MN | Mfr | SN | Asset | Cat | Calibration Due | Calibrated on |
| 2093 MXE EMI Receiver | 20Hz-26.5GHz | N9038A | Agilent | MY51210181 | 2093 | I | 8/9/2017 | 8/9/2016 |
| 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 |
| Antennas | Range | MN | Mfr | SN | Asset | Cat | Calibration Due | Calibrated on |
| Yellow Horn | 1-18GHz | 3115 | EMCO | 9608-4898 | 37 | I | 8/9/2018 | 8/6/2016 |
| Meteorological Meters | | MN | Mfr | SN | Asset | Cat | Calibration Due | Calibrated on |
| Weather Clock (Pressure Only) | | BA928 | Oregon Scientific | C3166-1 | 831 | I | 4/28/2018 | 4/28/2016 |
| TH A#2081 | | HTC-1 | HDE | | 2081 | II | 4/5/2017 | 4/5/2016 |
| Cables | Range | | Mfr | | | Cat | Calibration Due | Calibrated on |
| Asset #2052 | 9kHz - 18GHz | | Florida RF | | | II | 3/2/2017 | 3/2/2016 |
| Asset #2053 | 9kHz - 18GHz | | Florida RF | | | II | 10/1/2017 | 10/30/2016 |

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



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Radiated Emissions Table

| | | | | | | | | | | | | |
|--|--------------------|----------------------|-----------------------|--------------------------|----------------------|--|-------------------|----------------|-----------------------|-------------------|----------------|-----------------------|
| Date: 27-Feb-17 | | Company: Assa Abloy | | | | Work Order: R0115 | | | | | | |
| Engineer: Zac Johnson | | EUT Desc: R100 | | | | EUT Operating Voltage/Frequency: 3V DC | | | | | | |
| Temp: 23.7C | | Humidity: 26% | | Pressure: 1017 | | Battery | | | | | | |
| Frequency Range: 30-1000MHz | | | | | | Measurement Distance: 3 m | | | | | | |
| Notes: Worst Case Orientation Y | | | | | | | | | | | | |
| Antenna Polarization (H / V) | Frequency (MHz) | Reading (dBuV) | Preamp Factor (dB) | Antenna Factor (dB/m) | Cable Factor (dB) | Adjusted Reading (dBuV/m) | --- | | | FCC Class B | | |
| | | | | | | | Limit (dBuV/m) | Margin (dB) | Result (Pass/Fail) | Limit (dBuV/m) | Margin (dB) | Result (Pass/Fail) |
| V | 67.8 | 36.6 | 25.4 | 7.9 | 0.5 | 19.6 | --- | --- | --- | 40.0 | -20.4 | Pass |
| V | 98.9 | 33.8 | 25.4 | 9.4 | 0.6 | 18.4 | --- | --- | --- | 43.5 | -25.1 | Pass |
| H | 149.3 | 34.0 | 25.4 | 12.2 | 0.9 | 21.7 | --- | --- | --- | 43.5 | -21.8 | Pass |
| V | 151.2 | 36.6 | 25.4 | 12.2 | 0.9 | 24.3 | --- | --- | --- | 43.5 | -19.2 | Pass |
| V | 164.8 | 39.5 | 25.5 | 12.0 | 0.8 | 26.8 | --- | --- | --- | 43.5 | -16.7 | Pass |
| H | 339.4 | 38.0 | 25.6 | 14.1 | 1.2 | 27.7 | --- | --- | --- | 46.0 | -18.3 | Pass |
| H | 353.0 | 34.1 | 25.6 | 14.3 | 1.1 | 23.9 | --- | --- | --- | 46.0 | -22.1 | Pass |
| H | 522.8 | 34.0 | 25.6 | 17.7 | 1.5 | 27.6 | --- | --- | --- | 46.0 | -18.4 | Pass |
| Table Result: Pass by -16.7 dB Worst Freq: 164.8 MHz | | | | | | | | | | | | |
| Test Site: EMI Chamber 1 | | Cable 1: Asset #2051 | | | | Cable 2: Asset #2054 | | | | Cable 3: --- | | |
| Analyzer: Rental SA#2 | | Preamp: Red-Brown | | | | Antenna: Red-White | | | | Preselector: --- | | |
| CSsoft Radiated Emissions Calculator v 1.017.183 | | | | | | | | | | | | |
| Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor | | | | | | | | | | | | |
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Radiated Emissions Table

| Date: 24-Mar-17 | | Company: Assa Abloy | | | | | | Work Order: R0115 | | | | | | | |
|--|--------------------|------------------------|---------------------------|-----------------------|--------------------------|----------------------|-----------------------------------|--|-----------------------------------|----------------|-----------------------|--------------------------------------|----------------|-----------------------|--|
| Engineer: Zac Johnson | | EUT Desc: R100 | | | | | | EUT Operating Voltage/Frequency: 3V DC | | | | | | | |
| Temp: 22.9C | | Humidity: 25% | | | | | | Pressure: 1021 | | | Battery | | | | |
| Frequency Range: 1GHz - 6GHz | | | | | | | | | Measurement Distance: 3 m | | | | | | |
| Notes: Worst case orientation Y DCCF = -17.3dB | | | | | | | | | EUT Max Freq: 2475MHz | | | | | | |
| Antenna Polarization (H / V) | Frequency (MHz) | Peak Reading (dBµV) | Average Reading (dBµV) | Preamp Factor (dB) | Antenna Factor (dB/m) | Cable Factor (dB) | Adjusted Peak Reading (dBµV/m) | Adjusted Avg Reading (dBµV/m) | FCC Class B High Frequency - Peak | | | FCC Class B High Frequency - Average | | | |
| | | | | | | | | | Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) | Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) | |
| Low Channel V | 4810.0 | 53.5 | 36.2 | 37.0 | 33.0 | 6.1 | 55.6 | 38.3 | 74.0 | -18.4 | Pass | 54.0 | -15.7 | Pass | |
| Center Channel V | 4880.0 | 50.8 | 33.5 | 37.1 | 33.0 | 5.9 | 52.6 | 35.3 | 74.0 | -21.4 | Pass | 54.0 | -18.7 | Pass | |
| | | | | 37.1 | 33.1 | 5.8 | 54.0 | 36.7 | 74.0 | -20.0 | Pass | 54.0 | -17.3 | Pass | |
| High Channel V | 4950.0 | 52.2 | 34.9 | 37.1 | 33.1 | 5.8 | 54.0 | 36.7 | 74.0 | -20.0 | Pass | 54.0 | -17.3 | Pass | |
| Table Result: | | | | Pass | | by | | -15.7 dB | | Worst Freq: | | | | 4810.0 MHz | |
| Test Site: EMI Chamber 2 | | Cable 1: Asset #2053 | | | | | | Cable 2: Asset #2052 | | | Cable 3: --- | | | | |
| Analyzer: Rental SA#2 | | Preamp: Asset #2111 | | | | | | Antenna: Orange Horn | | | Preselector: --- | | | | |
| CSsoft Radiated Emissions Calculator v 1.017.185 | | | | | | | | | | | | | | | |
| Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor | | | | | | | | | | | | | | | |
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Radiated Emissions Table

| | | | | | | | | | | | | | | | |
|--|--------------------|------------------------|---------------------------|-----------------------|--------------------------|--|-----------------------------------|----------------------------------|-----------------------------------|----------------|-----------------------|--------------------------------------|----------------|-----------------------|--|
| Date: 02-Aug-17 | | Company: Assa Abloy | | | | Work Order: R0115 | | | | | | | | | |
| Engineer: Zac Johnson | | EUT Desc: R100 | | | | EUT Operating Voltage/Frequency: 3V DC | | | | | | | | | |
| Temp: 24.8 | | Humidity: 46% | | | | Pressure: 1004mBar | | | | | | | | | |
| Frequency Range: 1-6GHz | | | | | | Measurement Distance: 3 m | | | | | | | | | |
| Notes: Channel 26 2400-2500MHz Notch Filter Used | | | | | | EUT Max Freq: 2480MHz | | | | | | | | | |
| Antenna Polarization (H / V) | Frequency (MHz) | Peak Reading (dBuV) | Average Reading (dBuV) | Preamp Factor (dB) | Antenna Factor (dB/m) | Cable Factor (dB) | Adjusted Peak Reading (dBuV/m) | Adjusted Avg Reading (dBuV/m) | FCC Class B High Frequency - Peak | | | FCC Class B High Frequency - Average | | | |
| | | | | | | | | | Limit (dBuV/m) | Margin (dB) | Result (Pass/Fail) | Limit (dBuV/m) | Margin (dB) | Result (Pass/Fail) | |
| | | | | | | | | | | | | | | | |
| V | 4959.0 | 52.7 | 35.4 | 37.1 | 33.3 | 6.2 | 55.1 | 37.8 | 74.0 | -18.9 | Pass | 54.0 | -16.2 | Pass | |
| H | 4959.0 | 48.1 | 30.8 | 37.1 | 33.3 | 6.2 | 50.5 | 33.2 | 74.0 | -23.5 | Pass | 54.0 | -20.8 | Pass | |
| Table Result: | | | | Pass | | by | | -16.2 dB | | Worst Freq: | | | | 4959.0 MHz | |
| Test Site: EMI Chamber 1 | | | | Cable 1: Asset #2051 | | | | Cable 2: Asset #2054 | | | | Cable 3: --- | | | |
| Analyzer: Rental SA#1 | | | | Preamp: Asset #2111 | | | | Antenna: Black Horn | | | | Preselector: --- | | | |
| CSsoft Radiated Emissions Calculator v 1.017.188 | | | | | | | | | | | | | | | |
| Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor | | | | | | | | | | | | | | | |
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Radiated Emissions Table

| | | | | | | | | | | | | | | |
|--|-----------------|---------------------|------------------------|----------------------|-----------------------|--|--------------------------------|-------------------------------|-----------------------------------|------------------------|--------------------|--------------------------------------|-------------|--------------------|
| Date: 28-Feb-17 | | Company: Assa Abloy | | | | Work Order: R0115 | | | | | | | | |
| Engineer: Zac Johnson | | EUT Desc: R100 | | | | EUT Operating Voltage/Frequency: 3V DC | | | | | | | | |
| Temp: 22.9C | | Humidity: 25% | | | | Pressure: 1020 | | Battery | | | | | | |
| Frequency Range: 6GHz-18GHz | | | | | | Measurement Distance: 1 m | | | | | | | | |
| Notes: Worst case orientation Y DCCF = -17.3dB | | | | | | EUT Max Freq: 2475MHz | | | | | | | | |
| Antenna Polarization (H/V) | Frequency (MHz) | Peak Reading (dBuV) | Average Reading (dBuV) | Preamp Factor (dB) | Antenna Factor (dB/m) | Cable Factor (dB) | Adjusted Peak Reading (dBuV/m) | Adjusted Avg Reading (dBuV/m) | FCC Class B High Frequency - Peak | | | FCC Class B High Frequency - Average | | |
| | | | | | | | | | Limit (dBuV/m) | Margin (dB) | Result (Pass/Fail) | Limit (dBuV/m) | Margin (dB) | Result (Pass/Fail) |
| Low Channel H | 7215.0 | 20.4 | 3.1 | 0.0 | 37.2 | 6.4 | 64.0 | 46.7 | 83.5 | -19.5 | Pass | 63.5 | -16.8 | --- |
| Center Channel H | 7320.0 | 27.0 | 9.7 | 0.0 | 37.6 | 6.3 | 70.9 | 53.6 | 83.5 | -12.6 | Pass | 63.5 | -9.9 | --- |
| | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |
| High Channel H | 7425.0 | 22.3 | 5.0 | 0.0 | 37.6 | 6.3 | 66.2 | 48.9 | 83.5 | -17.3 | Pass | 63.5 | -14.6 | --- |
| | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table Result: | | | | Pass | | by | | -9.9 dB | | Worst Freq: 7320.0 MHz | | | | |
| Test Site: EMI Chamber 1 | | | | Cable 1: Asset #2051 | | | | Cable 2: Asset #2054 | | | | Cable 3: --- | | |
| Analyzer: Rental SA#2 | | | | Preamp: none | | | | Antenna: Orange Horn | | | | Preselector: --- | | |
| CSsoft Radiated Emissions Calculator v 1.017.183 | | | | | | | | | | | | | | |
| Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor | | | | | | | | | | | | | | |
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Radiated Emissions Table

| Date: 02-Aug-17 | | Company: Assa Abloy | | | | Work Order: R0115 | | | | | | | | | |
|--|-----------------|---------------------|------------------------|----------------------|-----------------------|--|--------------------------------|-------------------------------|-----------------------------------|------------------------|--------------------|--------------------------------------|-------------|--------------------|--|
| Engineer: Zac Johnson | | EUT Desc: R100 | | | | EUT Operating Voltage/Frequency: 3V DC | | | | | | | | | |
| Temp: 24.8 | | Humidity: 46% | | | | Pressure: 1004mBar | | | | | | | | | |
| Frequency Range: 6-18GHz | | | | | | Measurement Distance: 3 m | | | | | | | | | |
| Notes: Channel 26 2400-2500MHz Notch Filter Used | | | | | | EUT Max Freq: 2480MHz | | | | | | | | | |
| Antenna Polarization (H/V) | Frequency (MHz) | Peak Reading (dBμV) | Average Reading (dBμV) | Preamp Factor (dB) | Antenna Factor (dB/m) | Cable Factor (dB) | Adjusted Peak Reading (dBμV/m) | Adjusted Avg Reading (dBμV/m) | FCC Class B High Frequency - Peak | | | FCC Class B High Frequency - Average | | | |
| | | | | | | | | | Limit (dBμV/m) | Margin (dB) | Result (Pass/Fail) | Limit (dBμV/m) | Margin (dB) | Result (Pass/Fail) | |
| V | 7440.0 | 51.6 | 34.3 | 36.9 | 37.8 | 8.5 | 61.0 | 43.7 | 83.5 | -22.5 | Pass | 63.5 | -19.8 | Pass | |
| H | 7440.0 | 56.3 | 39.0 | 36.9 | 37.8 | 8.5 | 65.7 | 48.4 | 83.5 | -17.8 | Pass | 63.5 | -15.1 | Pass | |
| Table Result: | | | | Pass | | by | | -15.1 dB | | Worst Freq: 7440.0 MHz | | | | | |
| Test Site: EMI Chamber 1 | | | | Cable 1: Asset #2051 | | | | Cable 2: Asset #2054 | | | | Cable 3: Asset #1522 | | | |
| Analyzer: Rental SA#2 | | | | Preamp: Asset #2111 | | | | Antenna: Black Horn | | | | Preselector: --- | | | |
| CSsoft Radiated Emissions Calculator v 1.017.188 | | | | | | | | | | | | | | | |
| Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor | | | | | | | | | | | | | | | |
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| | | | | | | | | |
|--|-----------------|----------------|-------------------|--------------|--------------|------------|------------------------|----------------------|
| Spectrum Analyzers / Receivers/Preselectors | Range | MN | Mfr | SN | Asset | Cat | Calibration Due | Calibrated on |
| 2093 MXE EMI Receiver | 20Hz-26.5GHz | N9038A | Agilent | MY51210181 | 2093 | I | 8/9/2017 | 8/9/2016 |
| Radiated Emissions Sites | FCC Code | IC Code | VCCI Code | Range | | Cat | Calibration Due | Calibrated on |
| EMI Chamber 1 | 719150 | 2762A-6 | A-0015 | 30-1000MHz | | II | 3/21/2017 | 3/21/2015 |
| EMI Chamber 1 | 719150 | 2762A-6 | A-0015 | 1-18GHz | | I | 5/23/2017 | 5/23/2015 |
| Preamps/Couplers Attenuators / Filters | Range | MN | Mfr | SN | Asset | Cat | Calibration Due | Calibrated on |
| Red-White | 0.009-2000MHz | ZFL-1000-LN | CS | N/A | 1258 | II | 10/30/2017 | 10/30/2016 |
| A#2111 HF Preamp | 0.5-18GHz | PAM-118A | COM-POWER | 551063 | 2111 | II | 11/5/2017 | 11/5/2016 |
| Antennas | Range | MN | Mfr | SN | Asset | Cat | Calibration Due | Calibrated on |
| Red-Brown Bilog | 30-2000MHz | JB1 | Sunol | A0032406 | 1218 | I | 1/13/2019 | 1/13/2017 |
| Orange Horn | 1-18GHz | 3115 | EMCO | 0004-6123 | 390 | I | 10/13/2018 | 10/13/2016 |
| Meteorological Meters | | MN | Mfr | SN | Asset | Cat | Calibration Due | Calibrated on |
| Weather Clock (Pressure Only) | | BA928 | Oregon Scientific | C3166-1 | 831 | I | 4/28/2018 | 4/28/2016 |
| TH A#2080 | | HTC-1 | HDE | | 2080 | II | 4/5/2017 | 4/5/2016 |
| Cables | Range | | Mfr | | | Cat | Calibration Due | Calibrated on |
| Asset #1505 | 9kHz - 18GHz | | Florida RF | | | II | 3/2/2017 | 3/2/2016 |
| Asset #2051 | 9kHz - 18GHz | | Florida RF | | | II | 3/2/2017 | 3/2/2016 |
| Asset #2054 | 9kHz - 18GHz | | Florida RF | | | II | 10/1/2017 | 10/30/2016 |

Test equipment 30MHz to 18GHz

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| | | | | | | | | |
|---|--|-----------------------------------|--|-----------------------------|------------------------------|------------------------------|---|---|
| Spectrum Analyzers / Receivers / Preselectors 2093 MXE EMI Receiver | Range 20Hz-26.5GHz | MN N9038A | Mfr Agilent | SN MY51210181 | Asset 2093 | Cat I | Calibration Due 8/9/2017 | Calibrated on 8/9/2016 |
| Radiated Emissions Sites EMI Chamber 1 | FCC Code 719150 | IC Code 2762A-6 | VCCI Code A-0015 | Range 1-18GHz | Asset 1685 | Cat I | Calibration Due 12/21/2018 | Calibrated on 12/21/2016 |
| Preamps / Couplers Attenuators / Filters 2111 HF Preamp 2116 BRF | Range 0.5-18GHz 0.009-18000MHz | MN PAM-118A BRM50702 | Mfr COM-POWER Micro-Tronics | SN 551063 G226 | Asset 2111 2116 | Cat II II | Calibration Due 11/5/2017 11/26/2017 | Calibrated on 11/5/2016 11/26/2016 |
| Antennas Black Horn | Range 1-18GHz | MN 3115 | Mfr EMCO | SN 9703-5148 | Asset 56 | Cat I | Calibration Due 8/29/2018 | Calibrated on 8/29/2016 |
| Meteorological Meters Weather Clock (Pressure Only) TH A#2084 | | MN BA928 HTC-1 | Mfr Oregon Scientific HDE | SN C3166-1 | Asset 831 2084 | Cat I II | Calibration Due 4/28/2018 3/23/2018 | Calibrated on 4/28/2016 3/23/2017 |
| Cables Asset #1522 Asset #2051 Asset #2054 | Range 9kHz - 18GHz 9kHz - 18GHz 9kHz - 18GHz | | Mfr Florida RF Florida RF Florida RF | | | Cat II II II | Calibration Due 2/11/2018 3/5/2018 10/30/2017 | Calibrated on 2/11/2017 3/5/2017 10/30/2016 |

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

Test equipment 1GHz to 18GHz Channel 26 Only

Radiated Emissions Table

| | | | | | | | | | | | | | | | |
|--|--------------------|------------------------|---------------------------|-----------------------|--------------------------|----------------------|-----------------------------------|--|-----------------------------------|----------------|-----------------------|--------------------------------------|----------------|-----------------------|--|
| Date: 01-Mar-17 | | | | Company: Assa Abloy | | | | Work Order: R0115 | | | | | | | |
| Engineer: Zac Johnson | | | | EUT Desc: R100 | | | | EUT Operating Voltage/Frequency: 3V DC | | | | | | | |
| Temp: 22.2C | | | | Humidity: 33% | | | | Pressure: 985 | | | | | | | |
| Frequency Range: 18GHz-25GHz | | | | | | | | Measurement Distance: 0.1 m | | | | | | | |
| Notes: Worst case orientation Y | | | | | | | | EUT Max Freq: 2475MHz | | | | | | | |
| Antenna Polarization (H/V) | Frequency (MHz) | Peak Reading (dBuV) | Average Reading (dBuV) | Preamp Factor (dB) | Antenna Factor (dB/m) | Cable Factor (dB) | Adjusted Peak Reading (dBuV/m) | Adjusted Avg Reading (dBuV/m) | FCC Class B High Frequency - Peak | | | FCC Class B High Frequency - Average | | | |
| | | | | | | | | | Limit (dBuV/m) | Margin (dB) | Result (Pass/Fail) | Limit (dBuV/m) | Margin (dB) | Result (Pass/Fail) | |
| No Emissions Found | | | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |
| Table Result: | | | | Pass by --- dB | | | | Worst Freq: | | | | --- MHz | | | |
| Test Site: EMI Chamber 2 | | | | Cable 1: EMIR-HIGH-07 | | | | Cable 2: --- | | | | Cable 3: --- | | | |
| Analyzer: Rental SA#2 | | | | Preamp: 18-26.5GHz | | | | Antenna: 18-26.5GHz Horn | | | | Preselector: --- | | | |
| CSsoft Radiated Emissions Calculator v 1.017.183 | | | | | | | | | | | | | | | |
| Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor | | | | | | | | | | | | | | | |
| | | | | | | | | Copyright Curtis-Straus LLC 200 | | | | | | | |

| | | | | | | | | |
|---|------------------------------|------------------------------------|--|-------------------------|-----------------------------|-----------------------|---|---|
| Spectrum Analyzers / Receivers / Preselectors 2093 MXE EMI Receiver | Range 20Hz-26.5GHz | MN N9038A | Mfr Agilent | SN MY51210181 | Asset 2093 | Cat I | Calibration Due 8/9/2017 | Calibrated on 8/9/2016 |
| Radiated Emissions Sites EMI Chamber 2 | FCC Code 719150 | IC Code 2762A-7 | VCCI Code A-0015 | Range 1-18GHz | | Cat I | Calibration Due 4/29/2017 | Calibrated on 4/29/2015 |
| Preamps / Couplers Attenuators / Filters HF (Yellow) | Range 18-26.5GHz | MN AFS4-18002650-60-8P-4 | Mfr CS | SN 467559 | Asset 1266 | Cat II | Calibration Due 9/16/2017 | Calibrated on 9/16/2016 |
| Antennas HF (White) Horn | Range 18-26.5GHz | MN 801-WLM | Mfr Waveline | SN 758 | Asset 758 | Cat III | Calibration Due Verify before Use | Calibrated on date of test |
| Meteorological Meters Weather Clock (Pressure Only) TH A#2081 | | MN BA928 HTC-1 | Mfr Oregon Scientific HDE | SN C3166-1 | Asset 831 2081 | Cat I II | Calibration Due 4/28/2018 4/5/2017 | Calibrated on 4/28/2016 4/5/2016 |
| Cables REM-High-07 | Range 1 - 26.5GHz | | Mfr TRU | | | Cat II | Calibration Due 8/14/2017 | Calibrated on 8/14/2016 |

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



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| Radiated Emissions Table | | | | | | | | | | | | | | | |
|--|--------------------|---------------------|------------------------|----------------------|-----------------------|-------------------|--------------------------------|--|-----------------------------------|-------------|--------------------|--------------------------------------|-------------|--------------------|-----|
| Date: 02-Aug-17 | | | | Company: Assa Abloy | | | | Work Order: R0115 | | | | | | | |
| Engineer: Zac Johnson | | | | EUT Desc: R100 | | | | EUT Operating Voltage/Frequency: 3V DC | | | | | | | |
| Temp: 24.8 | | | | Humidity: 46% | | | | Pressure: 1004mBar | | | | | | | |
| Frequency Range: 18-26.5GHz | | | | | | | | Measurement Distance: 3 m | | | | | | | |
| Notes: Channel 26 | | | | | | | | EUT Max Freq: 2480MHz | | | | | | | |
| Antenna Polarization (H/V) | Frequency (MHz) | Peak Reading (dBµV) | Average Reading (dBµV) | Preamp Factor (dB) | Antenna Factor (dB/m) | Cable Factor (dB) | Adjusted Peak Reading (dBµV/m) | Adjusted Avg Reading (dBµV/m) | FCC Class B High Frequency - Peak | | | FCC Class B High Frequency - Average | | | |
| | | | | | | | | | Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) | Limit (dBµV/m) | Margin (dB) | Result (Pass/Fail) | |
| H/V | No Emissions Found | | | | | | | --- | --- | --- | --- | --- | --- | --- | --- |
| Table Result: Pass by --- dB Worst Freq: --- MHz | | | | | | | | | | | | | | | |
| Test Site: EMI Chamber 1 | | | | Cable 1: Asset #2329 | | | | Cable 2: --- | | | | Cable 3: --- | | | |
| Analyzer: Rental SA#3 | | | | Preamp: 18-26.5GHz | | | | Antenna: 18-26.5GHz Horn | | | | Preselector: --- | | | |
| CSsoft Radiated Emissions Calculator v 1.017.188 | | | | | | | | | | | | | | | |
| Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor | | | | | | | | | | | | | | | |
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| | | | | | | | | |
|--|-----------------|-----------------------|-------------------|--------------|--------------|------------|------------------------|----------------------|
| Spectrum Analyzers / Receivers/Preselectors | Range | MN | Mfr | SN | Asset | Cat | Calibration Due | Calibrated on |
| Rental EXA Signal Analyzer(1118473) | 9KHz-26.5GHz | N9010A-526;N | AT | MY51170076 | 1118473 | I | 5/19/2018 | 5/19/2017 |
| Radiated Emissions Sites | FCC Code | IC Code | VCCI Code | Range | Asset | Cat | Calibration Due | Calibrated on |
| EMI Chamber 1 | 719150 | 2762A-6 | A-0015 | 1-18GHz | 1685 | I | 12/21/2018 | 12/21/2016 |
| Preamps/Couplers Attenuators / Filters | Range | MN | Mfr | SN | Asset | Cat | Calibration Due | Calibrated on |
| HF (Yellow) | 18-26.5GHz | AFS4-18002650-60-8P-4 | CS | 467559 | 1266 | II | 9/16/2017 | 9/16/2016 |
| Antennas | Range | MN | Mfr | SN | Asset | Cat | Calibration Due | Calibrated on |
| HF (White) Horn | 18-26.5GHz | 801-WLM | Waveline | 758 | 758 | III | Verify before Use | date of test |
| Meteorological Meters | | MN | Mfr | SN | Asset | Cat | Calibration Due | Calibrated on |
| Weather Clock (Pressure Only) | | BA928 | Oregon Scientific | C3166-1 | 831 | I | 4/28/2018 | 4/28/2016 |
| TH A#2084 | | HTC-1 | HDE | | 2084 | II | 3/23/2018 | 3/23/2017 |
| Cables | Range | | Mfr | | | Cat | Calibration Due | Calibrated on |
| Asset #2329 | 1 - 26.5GHz | PE350-120 | Pasternack | 1545 | | II | Damaged | |

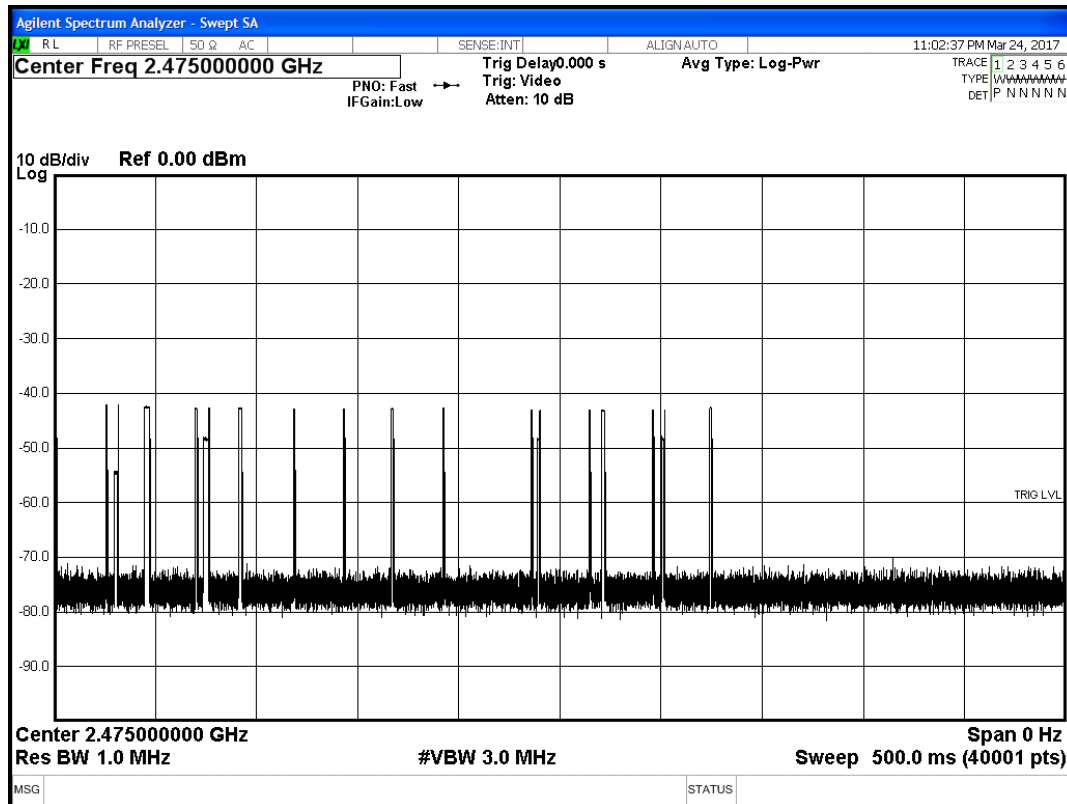
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Duty-Cycle Correction Factor



Software used to calculate duty-cycle over worst case 100ms window from trace data points of the plot above.

Duty-Cycle = 13.6%

DCCF = $20 \cdot \log(13.6/100) = -17.3\text{dB}$

Power Spectral Density

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

MEASUREMENTS / RESULTS

| Peak Power Spectral Density | | | | | | | | | | | | |
|--|--------------------|-------------------|-----------------------|--------------------------|----------------------|--|-------------------------------|---------------------------|-------------------------------------|----------------|----------------|-----------------------|
| Date: 01-Mar-17 | | | Company: Assa Abloy | | | | | | Work Order: R0115 | | | |
| Engineer: Zac Johnson | | | EUT Desc: R100 | | | EUT Operating Voltage/Frequency: 3V DC | | | | | | |
| Temp: 22.2°C | | | Humidity: 33% | | | Pressure: 985mbar | | | Battery | | | |
| Frequency Range: 2405-2475MHz | | | | | | | | Measurement Distance: 3 m | | | | |
| Notes: Per FCC KDB 558074 D01 DTS Meas Guidance v03r05 Section 10.2 | | | | | | | | | | | | |
| Antenna Polarization (H/V) | Frequency (MHz) | Reading (dBμV) | Preamp Factor (dB) | Antenna Factor (dB/m) | Cable Factor (dB) | Adjusted Reading (dBμV/m) | Adjusted BRP Reading (dBm) | Antenna Gain (dBi) | Adjusted Conducted Reading (dBm) | FCC 15.247 | | |
| | | | | | | | | | | Limit (dBm) | Margin (dB) | Result (Pass/Fail) |
| H | 2405 | 53.2 | 0.0 | 28.2 | 3.2 | 84.6 | -10.6 | 3.45 | -14.05 | 8.0 | -22.05 | Pass |
| H | 2440 | 52.9 | 0.0 | 28.2 | 3.2 | 84.3 | -10.9 | 3.45 | -14.35 | 8.0 | -22.35 | Pass |
| Table Result: Pass by -21.95 dB Worst Freq: 2475.0 MHz | | | | | | | | | | | | |
| Test Site: EMI Chamber 2 | | | Cable 1: 2052 cbl | | | Cable 2: 2053 cbl | | | Cable 3: --- | | | |
| Analyzer: 2093 SA | | | Preamp: None | | | Antenna: Yellow Horn | | | Preselector: --- | | | |
| Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor | | | | | | | | | | | | |
| Adjusted EIRP = Adjusted Reading - 104.77 + 20*log(3) | | | | | | | | | | | | |
| Adjusted Conducted Reading = Adjusted EIRP - Antenna Gain | | | | | | | | | | | | |

| Peak Power Spectral Density | | | | | | | |
|--|--------------|---------------------|-----------------|-----------------------------|------------------------------------|---------|--------|
| Date: 8/3/2017 | | Company: Assa Abloy | | | Work Order: R0115 | | |
| Engineer: Zac Johnson | | EUT: R100 | | | Operating Voltage/Frequency: 3V DC | | |
| Temp: 24.8°C | | Humidity: 46% | | Pressure: 1004mBar | | Battery | |
| Frequency Range: 2402-2480 MHz | | | | Measurement Type: Conducted | | | |
| Notes: | | | | | | | |
| Frequency | Peak Reading | Cable Loss | Attenuator Loss | Peak PSD | Limit | Margin | Result |
| (MHz) | (dBm) | (dB) | (dB) | (dBm) | (dBm) | (dB) | |
| 2480 | -46.94 | 1.88 | 29.61 | -15.45 | 8.0 | -23.45 | |
| Test Site: EMI Chamber 2 | | Cable 1: 2286 cbl | | Attenuator: A2121 Pad | | | |
| Analyzer: 1199509 SA | | | | | | | |
| PSD(dBm) = Reading (dBm) + Cable Loss (dB) + Attenuator Loss (dBm) | | | | | | | |

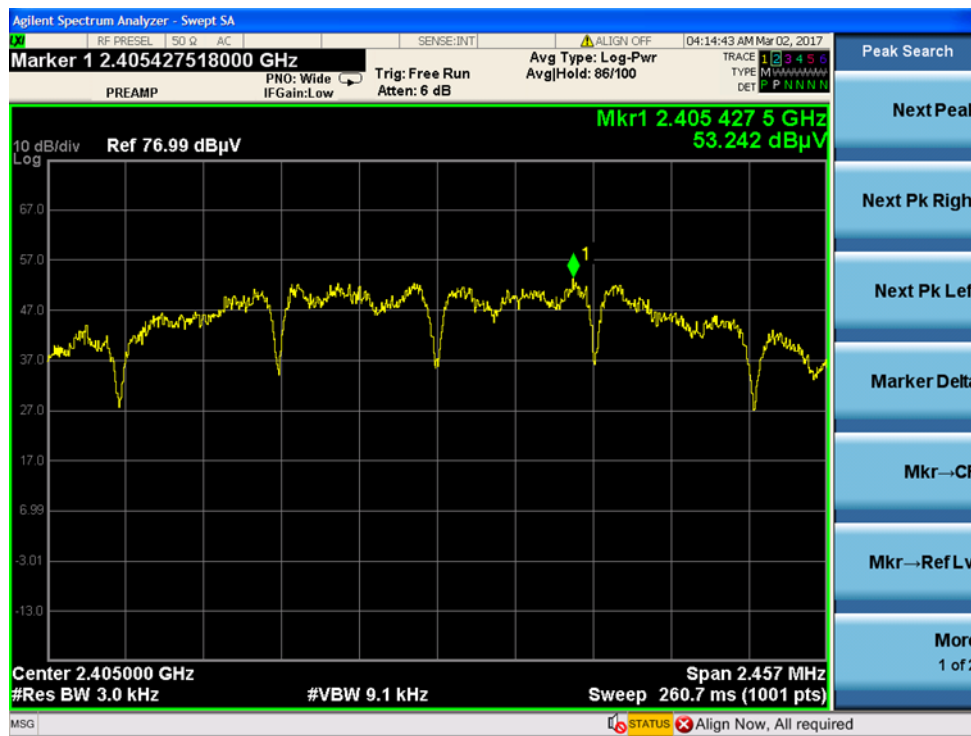


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PLOTS



PSD Low Channel



PSD Mid Channel



PSD High Channel

Occupied Bandwidth

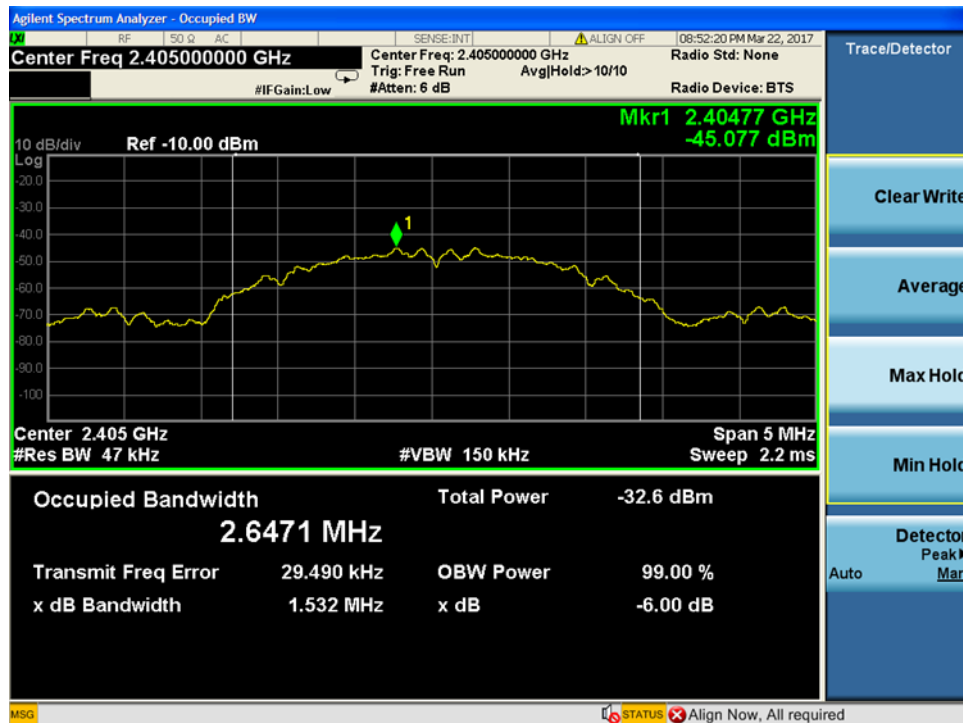
Requirement: When an occupied bandwidth is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

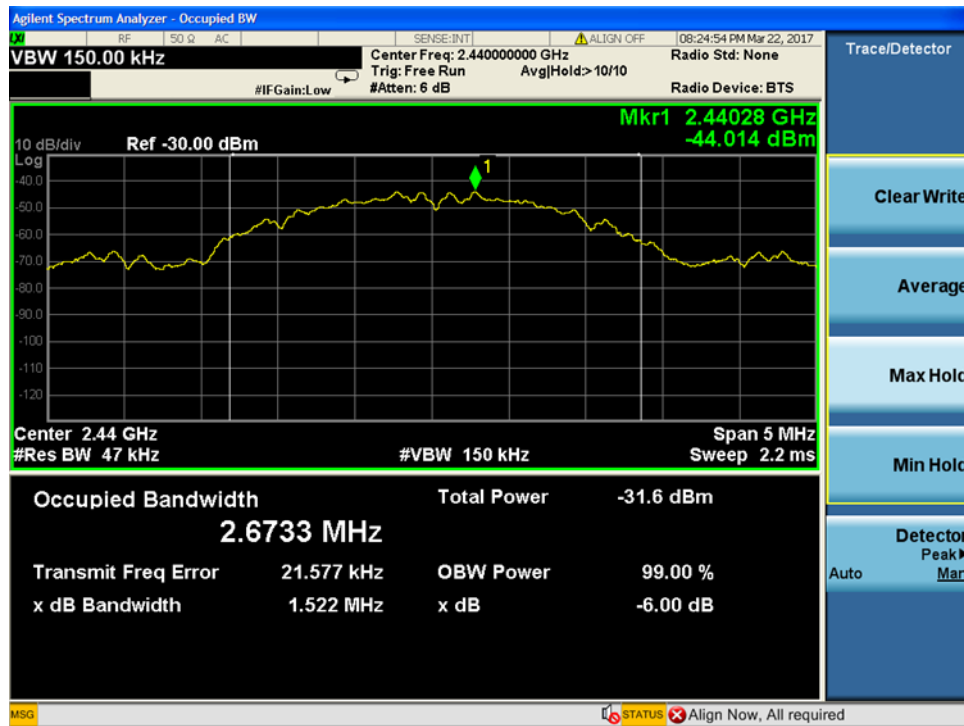
[RSS-GEN 6.6]

MEASUREMENTS / RESULTS

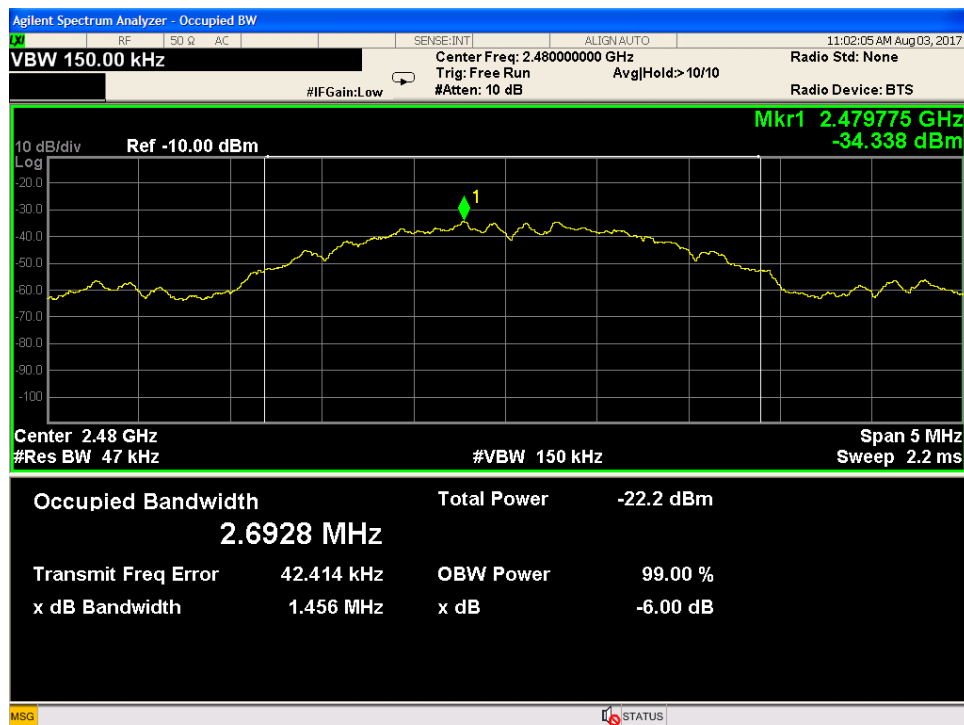
| 99% Occupied Bandwidth | | | |
|--|--|---------------------------------------|--|
| Date: 6/19/2017 & 8/3/2017 | | Company: Assa Abloy | Work Order: R0115 |
| Engineer: Zac Johnson | | EUT Desc: R100 | EUT Operating Voltage/Frequency: 3V DC |
| Temp: 24.8°C / 24.8°C | | Humidity: 50% / 46% | Pressure: 999mBar / 1004mBar Battery |
| Frequency Range: 2405-2480MHz | | Measurement Distance: 3 m | |
| Notes: | | EUT Tx Freq: 2440MHz | |
| Frequency (MHz) | | Occupied Bandwidth - Reading (KHz) | |
| 2405 | | 2647 | |
| 2440 | | 2673 | |
| 2480 | | 2693 | |
| Test Site: EMI Chamber 2 | | Cable 1: 2286 cbl | Cable 2: --- |
| Analyzer: 1199509 SA | | Preamp: None | Cable 3: --- |
| CSsoft Radiated Emissions Calculator v 1.017.156 | | Antenna: --- | Preselector: --- |
| Adjusted Reading = Reading - Preamp Factor + Antenna Factor + Cable Factor | | Copyright Curtis-Straus LLC 2000 | |

PLOTS





Occupied Bandwidth Center Channel



Occupied Bandwidth High Channel

Measurement Uncertainty

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

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

Conditions of Testing

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

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



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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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