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# EMC TEST REPORT – 359320-1TRFEMC

Applicant:

Gemalto Inc.

Product name:

Intelligent Document Reader AT10Ki

Model:

PV71-02-00-00-01

Model variants:

PV76-02-00-00-01

Specifications:

- FCC 47 CFR Part 15, Subpart B – Verification
- ICES-003 Issue 6 January 2016

Date of issue: October 12, 2018

| | | | |
|---|---|---|---|
| Test engineer(s): | Shawn He, Senior EMC Specialist | Signature: | Shawn He |
| Reviewed by: | Predrag Golic, EMC Specialist | Signature: | |

## Lab and test locations

| | | | |
|---|---|---|---|
| Company name | Nemko Canada Inc. | | |
| Facilities | Ottawa site:<br>303 River Road, Ottawa, ON, Canada, K1V 1H2<br><br>Tel: +1 613 737 9680<br>Fax: +1 613 737 9691 | Montreal site:<br>292 Labrosse Avenue, Pointe-Claire, QC, Canada, H9R 5L8<br><br>Tel: +1 514 694 2684<br>Fax: +1 514 694 3528 | Almonte site:<br>1500 Peter Robinson Road, West Carleton, ON, Canada, K0A 1L0<br><br>Tel: +1 613 256-9117<br>Fax: +1 613 256-8848 |
| Test site registration | **Organization** | **Recognition numbers and location** | |
| | FCC | CA2040 (Ottawa); CA2041 (Montreal) | |
| | ISED | CA2040A-4 (Ottawa); CA2040G-5 (Montreal); CA2040A-3 (Almonte) | |
| Website | www.nemko.com | | |

## Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.
This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contained in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

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# Section 1 Report summary

## 1.1 Test specifications

| | |
|---|---|
| FCC 47 CFR Part 15, Subpart B – Verification | Title 47: Telecommunication; Part 15—Radio Frequency Devices |
| ICES-003 Issue 6 January 2016 | Information Technology Equipment (ITE) – Limits and methods of measurement |

## 1.2 Exclusions

None

## 1.3 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was performed against all relevant requirements of the test standard except as noted in section 1.2 above. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

*See "Summary of test results" for full details.*

## 1.4 Test report revision history

***Table 1.4-1:*** *Test report revision history*

| Revision # | Date of issue | Details of changes made to test report |
|---|---|---|
| TRF | October 12, 2018 | Original report issued |

# Section 2 Summary of test results

## 2.1 Testing period

| | |
|---|---|
| Test start date | August 29, 2018 |
| Test end date | August 29, 2018 |

## 2.2 North America test results

***Table 2.2-1:*** *Result summary for emissions*

| Standard | Clause | Test description | Verdict |
|---|---|---|---|
| FCC 47 CFR Part 15, Subpart B | §15.109 | Radiated emissions limits[1] | Pass |
| FCC 47 CFR Part 15, Subpart B | §15.107 | Conducted emissions limits (AC mains) [1] | Pass |
| ICES-003 Issue 6 | 6.1 | AC Power Line Conducted Emissions Limits[1] | Pass |
| ICES-003 Issue 6 | 6.2 | Radiated Emissions Limits[1] | Pass |

Notes: [1] Product classification A

# Section 3 Equipment under test (EUT) details

## 3.1 Applicant

| | |
|---|---|
| Company name | Gemalto Inc. |
| Address | Arboretum Plaza II, 9442 N. Capital of Texas Hwy<br>Austin, TX<br>78759 USA |

## 3.2 Manufacturer

| | |
|---|---|
| Company name | Cogent Systems (Shenzhen) Inc. |
| Address | 2F East Part, 9F, Tinwe Industrial Park Phase 2<br>Liufang Road No. 6, Area 67<br>Baoan District<br>Shenzhen City, Guangdong Province<br>China |
| Company name | Gemalto Cogent, Inc. |
| Address | Gemalto Cogent, Inc.<br>639 Rosemead Blvd.<br>Pasadena, CA 91107<br>USA |

## 3.3 Sample information

| | |
|---|---|
| Receipt date | August 29, 2018 |
| Nemko sample ID number | # 1 |

## 3.4 EUT information

| | |
|---|---|
| Product name | Intelligent Document Reader AT10Ki |
| Model | PV76-02-00-00-01 |
| Serial number | 75A18140009 |
| Part number | XSPV7602000001 |
| Model variants | PV76-02-00-00-01 |
| Power requirements | 5 $V_{DC}$ (via external 100–240 VAC, 50/60 Hz power adapter) |
| Description/theory of operation | The AT10Ki Reader is an optical imaging reader designed to capture images of an ID document, for example a passport, and extract the data using Optical Character Recognition onboard software. The data and images can then be transferred over WiFi to a PC. In addition to acquiring images of the document, the reader is also capable of reading data encoded into a contactless RFID tag. |
| Operational frequencies | 8 MHz, 27.12 MHz and 50 MHz crystals or oscillators are contained within the unit |
| Software details | Bootloader firmware FW00278_1.70.0<br>Application firmware FW00275_1.60.0<br>USB firmware FW00266_0.15.0<br>PC Software SDK 3.4.2.5 |

## 3.5 EUT setup details

**EUT description of the methods used to exercise the EUT and all relevant ports:**

- The EUT was setup as shown in figure 3.5-1. Both the UUT and the laptop connected via WiFi to the WiFi router. A sample passport was placed on the EUT and test software on the PC was used to continuously scan the sample passport once every approx. 5 seconds, transferring optical and RFID data from the UUT, through the WiFi router to the PC.

**EUT setup/configuration rationale:**

- The EUT setup in a configuration that was expected to produce the highest amplitude emissions relative to the limit and that satisfy normal operation/installation practice by the end user.
- The type and construction of cables used in the measurement set-up were consistent with normal or typical use. Cables with mitigation features (for example, screening, tighter/more twists per length, ferrite beads) have been noted below:
  - None
- The EUT was setup in a manner that was consistent with its typical arrangement and use. The measurement arrangement of the EUT, local AE and associated cabling was representative of normal practice. Any deviations from typical arrangements have been noted below:
  - None

**EUT monitoring method:**

- The EUT was continuously monitored by observing successful scanning on the test laptop PC. Video surveillance of the unit in the test chamber was also used to monitor status LEDs for correct and continuous operation.

## 3.5 EUT setup details, continued

***Table 3.5-1:*** *EUT sub assemblies*

| Description | Brand name | Model, Part number, Serial number, Revision level |
|---|---|---|
| Passport reader | Gemalto | MN: AT10Ki, PN: XSPV7602000001 SN: 75A18140009 |
| ITE power supply | GlobTek | MN: GT-46181-1605-T3, PN: TR9CA3200SHY-N (R6B), SN: None |

***Table 3.5-2:*** *EUT interface ports*

| Description | Qty. |
|---|---|
| AC input of ITE power supply | 1 |
| Ethernet | 1 |
| USB | 4 |

***Table 3.5-3:*** *Support equipment*

| Description | Brand name | Model, Part number, Serial number, Revision level |
|---|---|---|
| Laptop | HP | MN: Eliteboo, SN: None |
| Smartcard reader | SCM Microsystems | MN: SCR3310, SN: 2112051902570 |
| Smartcard reader | SCM Microsystems | MN: SCR335, PN: 905249, SN: 21121103204726 |

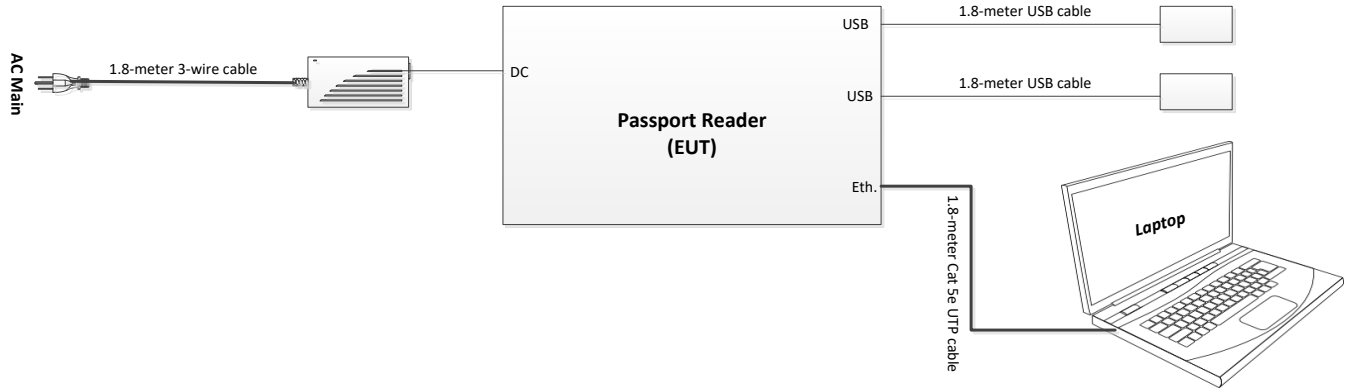



***Figure 3.5-1:*** *block diagram*

# Section 4 Engineering considerations

## 4.1 Modifications incorporated in the EUT for compliance

The following modifications were performed by client for compliance with Radio frequency electromagnetic field and Fast transients, common mode:

- A ferrite PN# 742 711 12 was installed on Ethernet cable close to EUT Ethernet port
- A ferrite PN# 742 711 12 was installed on DC cable with one loop close to EUT DC port

## 4.2 Technical judgment

None

## 4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

# Section 5 Test conditions

## 5.1 Atmospheric conditions

| | |
|---|---|
| Temperature | 15–30 °C |
| Relative humidity | 20–75 % |
| Air pressure | 86–106 kPa |

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

## 5.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages ±5 %, for which the equipment was designed.

# Section 6 Measurement uncertainty

## 6.1 Uncertainty of measurement

Nemko Canada Inc. has calculated measurement uncertainty and is documented in EMC/MUC/001 "Uncertainty in EMC measurements." Measurement uncertainty was calculated using the methods described in CISPR 16-4 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC measurements; as well as described in UKAS LAB34: The expression of Uncertainty in EMC Testing. Measurement uncertainty calculations assume a coverage factor of K=2 with 95% certainty.

# Section 7 Terms and definitions

## 7.1 Product classifications definitions

### 7.1.1 Title 47: Telecommunication – Part 15-Radio Frequency devices, Subpart A – General – Equipment classification

| | |
|---|---|
| Class A digital device | A digital device that is marketed for use in a commercial, industrial or business environment, exclusive of a device which is marketed for use by the general public or is intended to be used in the home. |
| Class B digital device | A digital device that is marketed for use in a residential environment notwithstanding use in commercial, business and industrial environments. Examples of such devices include, but are not limited to, personal computers, calculators, and similar electronic devices that are marketed for use by the general public.<br><br>Note: The responsible party may also qualify a device intended to be marketed in a commercial, business or industrial environment as a Class B device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B digital device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B digital device, regardless of its intended use. |

### 7.1.2 ICES-003 – Equipment classification

| | |
|---|---|
| Class B ITE | limits of radio noise for ITE for residential operation |
| Class A ITE | limits of radio noise for ITE for non-residential operation |
| Conditions | Only ITE intended strictly for non-residential use in commercial, industrial or business environments, and whose design or other characteristics strongly preclude the possibility of its use in a residential environment, shall be permitted to comply with the less stringent Class A limits.<br><br>All ITE that cannot meet the conditions for Class A operation shall comply with the Class B limits.<br><br>The ITE shall comply with both the power line – conducted and the radiated emissions limits within the same Class, with no intermixing. |

## 7.2 General definitions

### 7.2.1 Title 47: Telecommunication – Part 15-Radio Frequency devices, Subpart A – General – Digital device definitions

| | |
|---|---|
| Digital device (Previously defined as a computing device) | An unintentional radiator (device or system) that generates and uses timing signals or pulses at a rate in excess of 9,000 pulses (cycles) per second and uses digital techniques; inclusive of telephone equipment that uses digital techniques or any device or system that generates and uses radio frequency energy for the purpose of performing data processing functions, such as electronic computations, operations, transformations, recording, filing, sorting, storage, retrieval, or transfer. A radio frequency device that is specifically subject to an emanation requirement in any other FCC Rule part or an intentional radiator subject to subpart C of this part that contains a digital device is not subject to the standards for digital devices, provided the digital device is used only to enable operation of the radio frequency device and the digital device does not control additional functions or capabilities.<br><br>Note: Computer terminals and peripherals that are intended to be connected to a computer are digital devices. |

### 7.2.2 ICES-003 – Definitions

| | |
|---|---|
| Information technology equipment (ITE) | Information Technology Equipment (ITE) is defined as devices or systems that use digital techniques for purposes such as data processing and computation. ITE is any unintentional radiator (device or system) that generates and/or uses timing signals or pulses having a rate of at least 9 kHz and employs digital techniques for purposes such as computation, display, data processing and storage, and control. |

# Section 8 Testing data

## 8.1 Radiated emissions

### 8.1.1 References and limits

- FCC 47 CFR Part 15, Subpart B: Clause §15.109 (Test method ANSI C63.4:2014)
- ICES-003: Section 6.2

***Table 8.1-1:*** *Requirements as per FCC Part 15 Subpart B and ICES-003 for radiated emissions for Class A*

| Frequency range [MHz] | Measurement | | limits |
|---|---|---|---|
| | Distance [m] | Detector type/ bandwidth | [dBµV/m] |
| 30–88 | 10 | Quasi Peak/120 kHz | 39.0 |
| 88–216 | | | 43.5 |
| 216–960 | | | 46.4 |
| 960–1000 | | | 49.5 |
| 30–88 | 3 | Quasi Peak/120 kHz | 49.5 |
| 88–216 | | | 54.0 |
| 216–960 | | | 56.9 |
| 960–1000 | | | 60.0 |
| >1000 | 10 | Linear average/1 MHz | 49.5 |
| | | Peak/1 MHz | 69.5 |
| >1000 | 3 | Linear average/1 MHz | 60.0 |
| | | Peak/1 MHz | 80.0 |

Notes: Where there is a step in the relevant limit, the lower value was applied at the transition frequency.

### 8.1.2 Test summary

| | | | |
|---|---|---|---|
| Verdict | Pass | | |
| Test date | August 29, 2018 | Temperature | 23 °C |
| Test engineer | Shawn He | Air pressure | 992 mbar |
| Test location | Ottawa | Relative humidity | 59 % |

### 8.1.3 Notes

- Where tabular data has not been provided, no emissions were observed within 10 dB of the specified limit when measured with the appropriate detector.
- Where less than 6 measurements per detector has been provided, fewer than 6 emissions were observed within 10 dB of the specified limit when measured with the appropriate detector.
- The highest digital operating frequency of the EUT as provided by the client was 50 MHz. The spectrum was scanned to 1GHz according to the EUT highest digital operating frequency.

***Table 8.1-2:*** *Frequency range for FCC Part 15 Subpart B and ICES-003 Issue 6*

| Highest internal frequency [$F_X$] | Highest measured frequency |
|---|---|
| $F_X \leq 108$ MHz | 1 GHz |
| 108 MHz < $F_X \leq 500$ MHz | 2 GHz |
| 500 MHz < $F_X \leq 1$ GHz | 5 GHz |
| $F_X > 1$ GHz | $5 \times F_X$ up to a maximum of 40 GHz |

Notes: Highest internal frequency [$F_X$] – highest fundamental frequency generated or used within the EUT or highest frequency at which it operates. This includes frequencies which are solely used within an integrated circuit.
For FM and TV broadcast receivers $F_X$ is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies.

### 8.1.4 Setup details

| | |
|---|---|
| Port under test | Enclosure Port |
| EUT power input during test | 5 $V_{DC}$ (via external 100–240 VAC, 50/60 Hz power adapter) |
| EUT setup configuration | Table top |
| Test facility | Semi anechoic chamber |
| Measuring distance | 3 m |
| Antenna height variation | 1–4 m |
| Turn table position | 0–360° |
| Measurement details | A preview measurement was generated with receiver in continuous scan or sweep mode while the EUT was rotated and antenna adjusted to maximize radiated emission. Emissions detected within 10 dB or above the limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement. |

Receiver/spectrum analyzer settings for frequencies below 1 GHz:

| | |
|---|---|
| Resolution bandwidth | 120 kHz |
| Video bandwidth | 300 kHz |
| Detector mode | Peak (Preview measurement), Quasi-peak (Final measurement) |
| Trace mode | Max Hold |
| Measurement time | 100 ms (Peak preview measurement), 100 ms (Quasi-peak final measurement) |

Receiver/spectrum analyzer settings for frequencies above 1 GHz:

| | |
|---|---|
| Resolution bandwidth | 1 MHz |
| Video bandwidth | 3 MHz |
| Detector mode | Peak (Preview measurement)<br>Peak and CAverage (Final measurement) |
| Trace mode | Max Hold |
| Measurement time | 100 ms (Peak preview measurement), 100 ms (Peak and CAverage final measurement) |

***Table 8.1-3:*** *Radiated emissions equipment list*

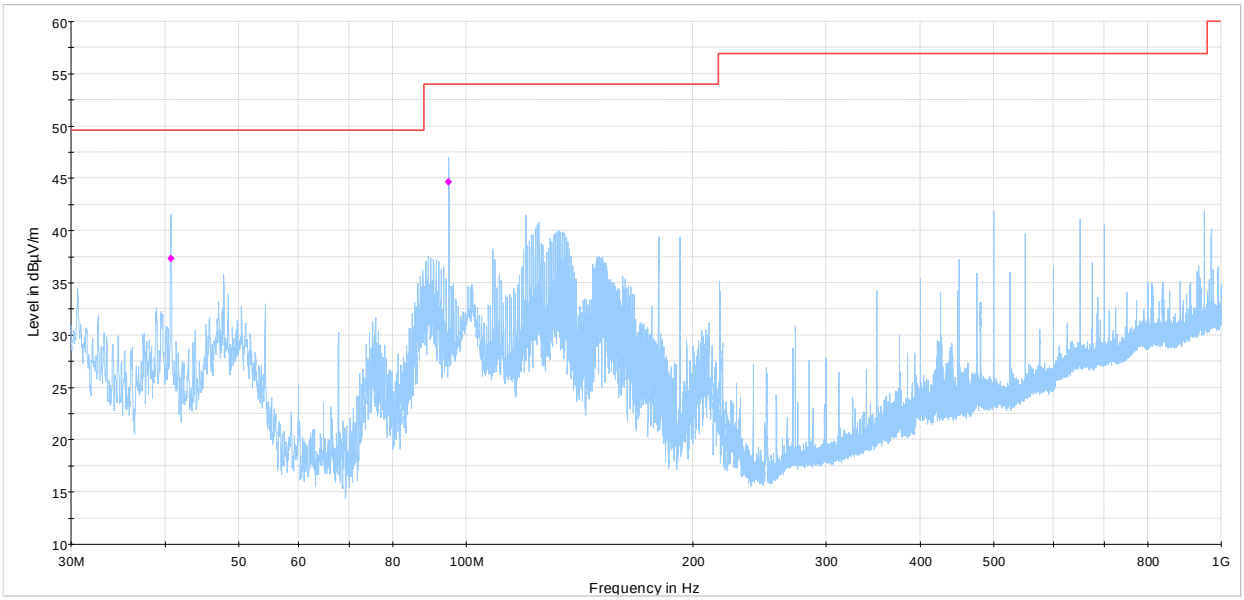
| Equipment | Manufacturer | Model no. | Asset no. | Cal cycle | Next cal. |
|---|---|---|---|---|---|
| 3 m EMI test chamber | TDK | SAC-3 | FA002047 | 1 year | Dec. 09/18 |
| Flush mount turntable | Sunol | FM2022 | FA002082 | — | NCR |
| Controller | Sunol | SC104V | FA002060 | — | NCR |
| Antenna mast | Sunol | TLT2 | FA002061 | — | NCR |
| Receiver/spectrum analyzer | Rohde & Schwarz | ESU 26 | FA002043 | 1 year | March 26/19 |
| Bilog antenna (20–3000 MHz) | Sunol | JB3 | FA002108 | 1 year | Aug. 31/18 |
| 50 Ω coax cable | C.C.A. | None | FA002555 | 1 year | May 01/19 |
| 50 Ω coax cable | Huber + Suhner | None | FA002830 | 1 year | May 08/19 |

Notes: NCR - no calibration required

***Table 8.1-4:*** *Radiated emissions test software details*

| Manufacturer of Software | Details |
|---|---|
| Rohde & Schwarz | EMC32, Software for EMC Measurements, Version 9.26.01 |

### 8.1.5 Test data




Wired Ethernet Connection
FCC Part 15 and ICES - Class A 3m Q-Peak Limit
Preview Result 1-PK+
Final_Result QPK

The spectral plot is a summation of a vertical and horizontal scan. The spectral scan has been corrected with the associated transducer factors (i.e. antenna factors, cable loss, amplifier gains, and attenuators.

***Figure 8.1-1:*** *Radiated emissions spectral plot (30 to 1000 MHz)*

***Table 8.1-5:*** *Radiated emissions (Quasi-Peak) results*

| Frequency (MHz) | Quasi-Peak field strength[1] (dBµV/m) | 3 m Quasi-Peak limit [3] (dBµV/m) | Margin (dB) | Measurement time (ms) | Bandwidth (kHz) | Antenna height (cm) | Pol. (V/H) | Turn table position (°) | Correction factor[2] (dB) |
|---|---|---|---|---|---|---|---|---|---|
| 40.6750 | 37.3 | 49.6 | 12.3 | 100 | 120 | 109 | V | 103 | 14.8 |
| 94.9250 | 44.6 | 54.0 | 9.4 | 100 | 120 | 104 | V | 322 | 10.5 |

Notes: [1] Field strength (dBµV/m) = receiver/spectrum analyzer value (dBµV) + correction factor (dB)
[2] Correction factor = antenna factor ACF (dB) + cable loss (dB)
[3] Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

Sample calculation: 37.3 dBµV/m (field strength) = 22.5 dBµV (receiver reading) + 14.8 dB (Correction factor)

### 8.1.6 Setup photos

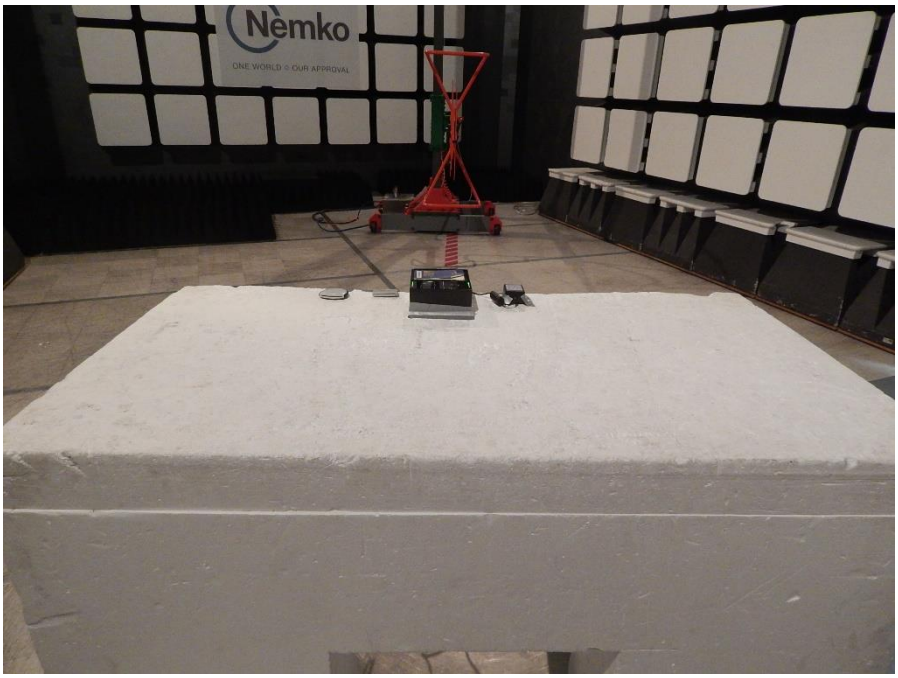



***Figure 8.1-2:*** *Radiated emissions setup photo*

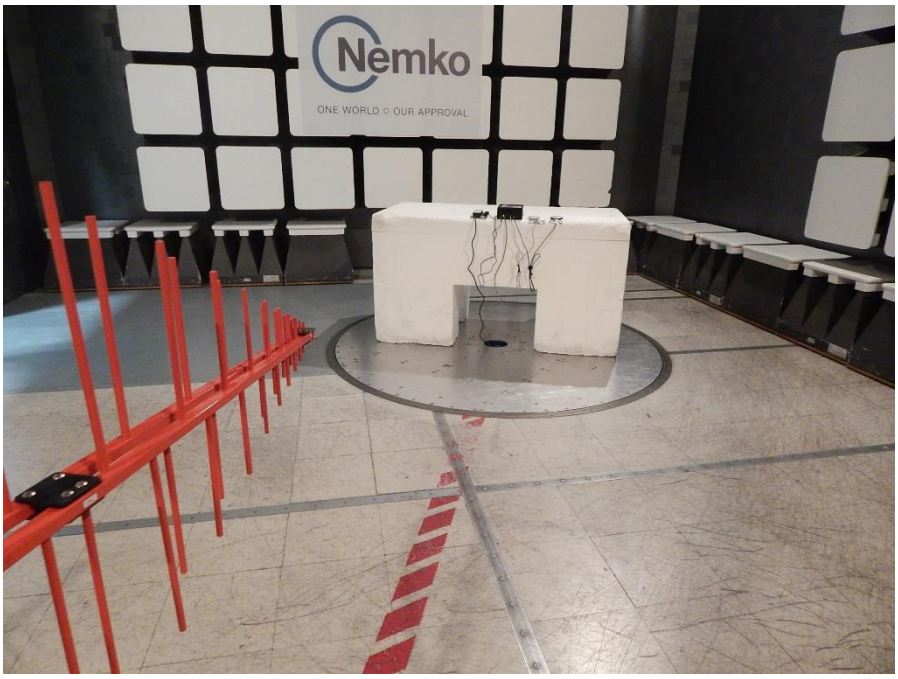



***Figure 8.1-3:*** *Radiated emissions setup photo*

## 8.2 Conducted emissions – from AC mains power ports

### 8.2.1 References and limits

- FCC 47 CFR Part 15, Subpart B: Clause §15.107 (Test method ANSI C63.4:2014)
- ICES-003: Section 6.1

***Table 8.2-1:*** *Requirements for conducted emissions from the AC mains power ports for Class A*

| Frequency range [MHz] | Measurement | | Limits |
|---|---|---|---|
| | **Coupling device** | **Detector type/ bandwidth** | **[dBµV]** |
| 0.15–0.5 | AMN | Quasi Peak/9 kHz | 79 |
| 0.5–30 | | | 73 |
| 0.15–0.5 | AMN | CAverage/9 kHz | 66 |
| 0.5–30 | | | 60 |

Notes: The lower limit shall apply at the transition frequency.

### 8.2.2 Test summary

| | | | |
|---|---|---|---|
| Verdict | Pass | | |
| Test date | August 29, 2018 | Temperature | 23 °C |
| Test engineer | Shawn He | Air pressure | 992 mbar |
| Test location | Ottawa | Relative humidity | 59 % |

### 8.2.3 Notes

- Where tabular data has not been provided, no emissions were observed within 10 dB of the specified limit when measured with the appropriate detector.
- Where less than 6 measurements per detector has been provided, fewer than 6 emissions were observed within 10 dB of the specified limit when measured with the appropriate detector.
- Equipment with a DC power port powered by a dedicated AC/DC power converter is considered to be AC mains powered equipment and was tested with a power converter. Where the power converter was provided by the manufacturer, the provided converter was used.

### 8.2.4 Setup details

| | |
|---|---|
| Port under test – Coupling device | AC input – Artificial Mains Network (AMN) |
| EUT power input during test | 120 $V_{AC}$, 60 Hz |
| EUT setup configuration | Table top |
| Measurement details | A preview measurement was generated with the receiver in continuous scan mode. Emissions detected within 10 dB or above the limit were re-measured with the appropriate detector against the correlating limit and recorded as the final measurement. |

Receiver settings:

| | |
|---|---|
| Resolution bandwidth | 9 kHz |
| Video bandwidth | 30 kHz |
| Detector mode | Peak and Average (Preview measurement), Quasi-peak and CAverage (Final measurement) |
| Trace mode | Max Hold |
| Measurement time | – 100 ms (Peak and Average preview measurement)<br>– 160 ms (Quasi-peak final measurement)<br>– 160 ms (CAverage final measurement) |

***Table 8.2-2:*** *Conducted emissions – from AC mains power ports equipment list*

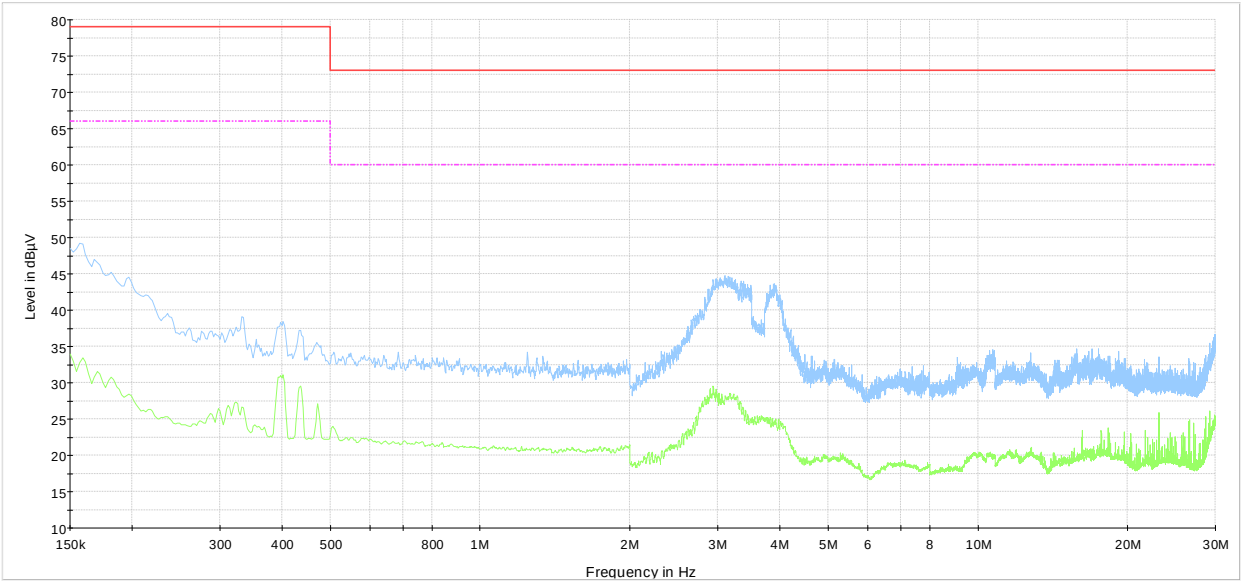
| Equipment | Manufacturer | Model no. | Asset no. | Cal cycle | Next cal. |
|---|---|---|---|---|---|
| Receiver/spectrum analyzer | Rohde & Schwarz | ESU 26 | FA002043 | 1 year | March 26/19 |
| AC Power source | Chenwa | 2700M-10k | FA002716 | — | VOU |
| LISN | Rohde & Schwarz | ENV216 | FA002514 | 1 year | Dec. 15/18 |
| 50 Ω coax cable | C.C.A. | None | FA002556 | 1 year | May 01/19 |

Notes: VOU - verify on use

***Table 8.2-3:*** *Conducted emissions – from AC mains power ports test software details*

| Manufacturer of Software | Details |
|---|---|
| Rohde & Schwarz | EMC32, Software for EMC Measurements, Version 9.26.01 |

### 8.2.5 Test data

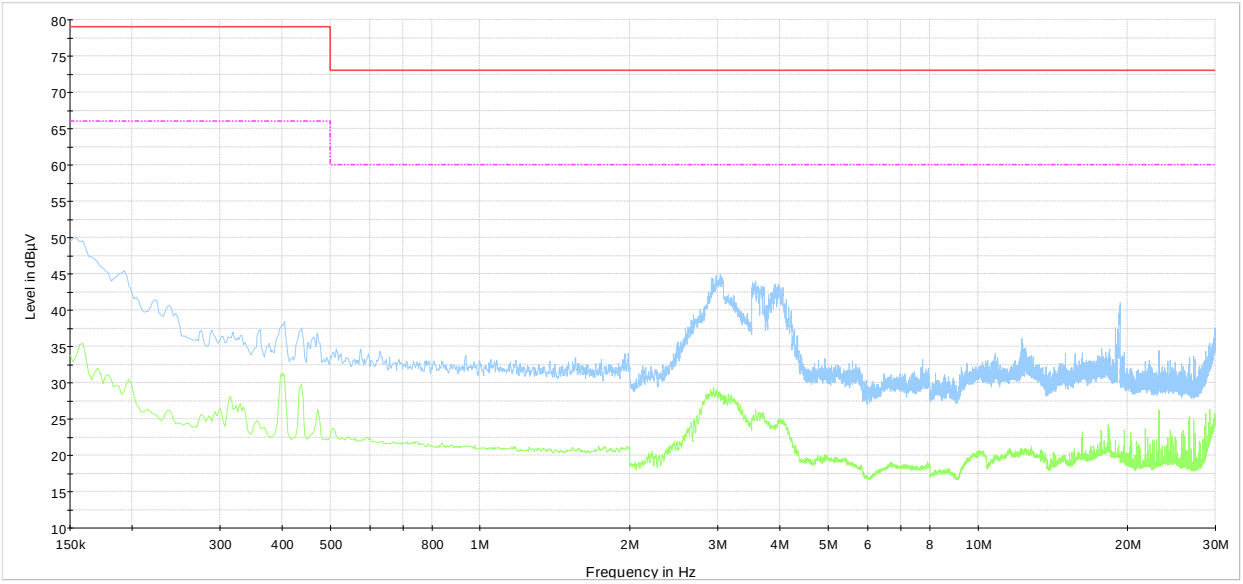



120V 60Hz Phase
CISPR 32 Mains Q-Peak Class A Limit
CISPR 32 Mains Average Class A Limit
Preview Result 1-PK+
Preview Result 2-AVG

The spectral plot has been corrected with transducer factors. (i.e. cable loss, LISN factors, and attenuators)

***Figure 8.2-1:*** *Conducted emissions – from AC mains power ports spectral plot on phase line*

## 8.2.5 Test data, continued




120V 60Hz Neutral
CISPR 32 Mains Q-Peak Class A Limit
CISPR 32 Mains Average Class A Limit
Preview Result 1-PK+
Preview Result 2-AVG

The spectral plot has been corrected with transducer factors. (i.e. cable loss, LISN factors, and attenuators)

***Figure 8.2-2:*** *Conducted emissions – from AC mains power ports spectral plot on neutral line*

### 8.2.6 Setup photos

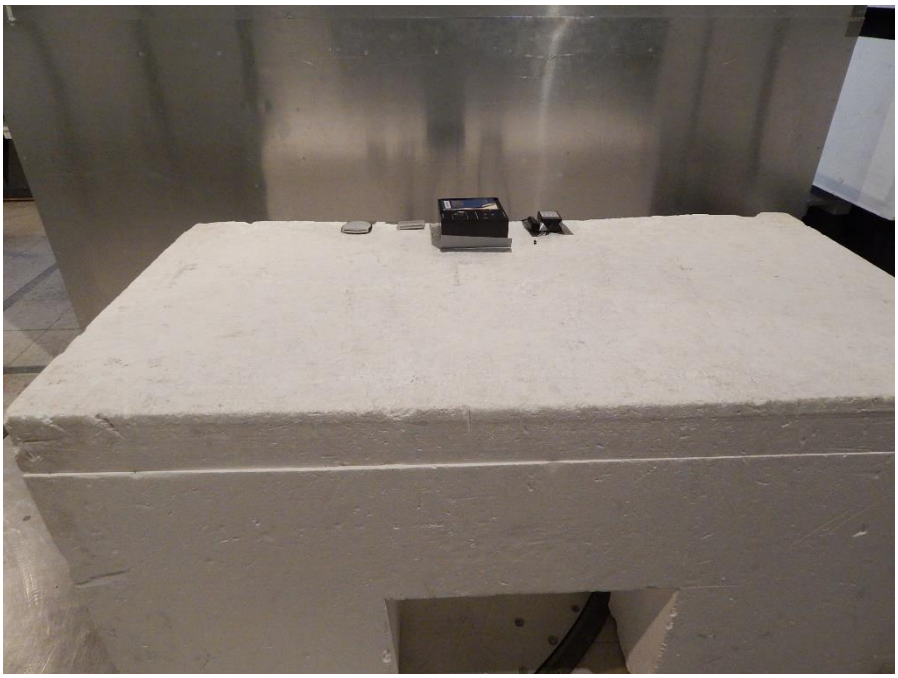


***Figure 8.2-3:*** *Conducted emissions – from AC mains power ports setup photo*

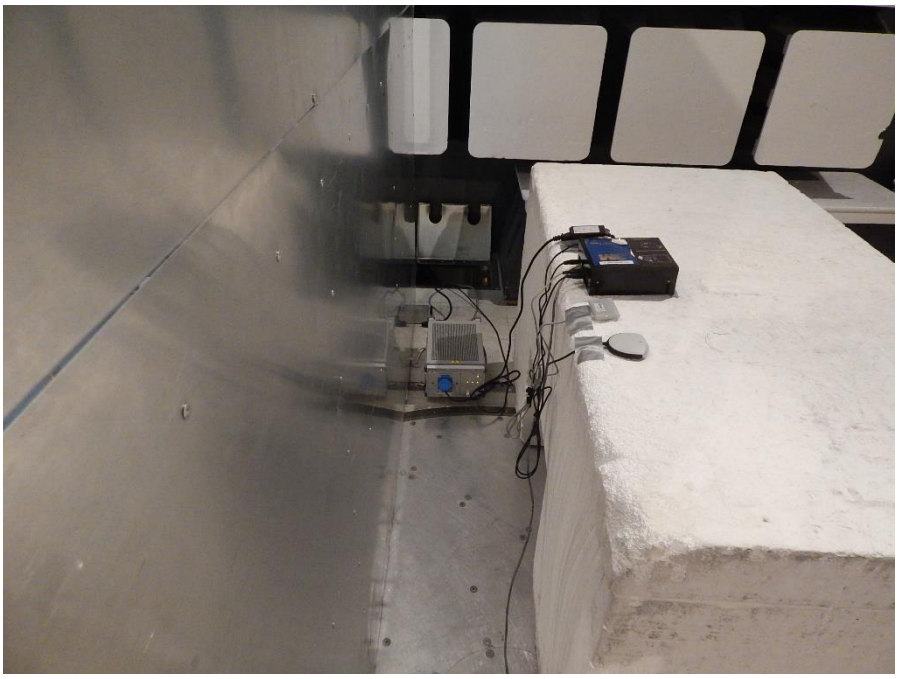


***Figure 8.2-4:*** *Conducted emissions – from AC mains power ports setup photo*

# Section 9 EUT photos

## 9.1 External photos

***Figure 9.1-1:*** *Front view photo*

***Figure 9.1-2:*** *Rear view photo*

***Figure 9.1-3:*** *Side view photo*

***Figure 9.1-4:*** *Side view photo*

**End of the test report**