

Test Report

Electromagnetic Compatibility

Test Report – No.: 2227660KAU-005

Date of issue: 2016-10-24

Type: Slim Card Reader SCR708

Description: MFP RFID Reader

Serial number: 05E343075025, 05DF43075126

Manufacturer: Inepro BV

Applicant: Inepro BV

Address (Applicant): Pondweg 7
NL - 2153 PK Nieuw-Vennep
The Netherlands

Test result: The FCC, Part 15 B, Class A, verification / and ICES-003, Class A requirements are fulfilled.

Test laboratory: Intertek Deutschland GmbH
Innovapark 20, 87600 Kaufbeuren
Germany

FCC designation number: DE0014

FCC test firm registration number: 359260

Industry Canada registration: 8882A-1; 8882A-2

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Approved by: R. Dressler
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Uwe Gronert
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This test report consists of 25 pages. All measurement results exclusively refer to the equipment which was tested.
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Details about Accreditations/ Acceptances

EMC/ Radio National



The Intertek Deutschland EMC-Lab is accredited by the Deutsche Akkreditierungsstelle GmbH (DAkkS)

Registration Number (EMC general): **D-PL-12085-01-01**

Registration Number (EMC Med): **D-PL-12085-01-03**

International



The Intertek Deutschland EMC-Lab is accepted by the Worldwide System for Conformity Testing and Certification of Electrotechnical Equipment and Components (IECEE)

CB Test Laboratory: **TL118**



The Intertek Deutschland EMC-Lab is accredited at the Federal Communications Commission (FCC)

Designation Number: **DE0014**

Test Firm Registration Number: **359260**



BNetzA-CAB-16/21-10

The *Bundesnetzagentur* recognizes Intertek Deutschland GmbH as Conformity Assessment Body in the sector electromagnetic compatibility (EMC).



The Intertek Deutschland EMC-Lab is listed at Industry Canada

No.**8882A-1** (OATS) and **8882A-2** (3 m alternative test site)

Automotive



Anerkannt unter
KBA-P 00046-03

The Intertek Deutschland EMC-Lab is recognized as technical service of the Kraftfahrt-Bundesamt (KBA)

Registration Number: **KBA-P 00046-03**

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1 Measurements and test specifications

- FCC, Part 15 B, Class A, verification
- FCC, Part 15 B, Class A, DoC
- FCC, Part 15 B, Class A, certification
- The test setup $f \leq 1000$ MHz and test was done according to: **ANSI C63.4: 2014** and **CISPR 22, 3rd Edition**.
Compliance with CISPR 22 is being used to demonstrate conformity with FCC verification / DoC requirements. This conforms with FCC Part 15.107(e) and 15.109(g).
- The test setup and test was done according to: **ANSI C63.4: 2014**
American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

Emission - Requirements according to

- ICES-003, Issue 6, Januar 2016
- Canadian Standards Association Standard CAN/CSA-CISPR 22-10, Information technology equipment — Radio disturbance characteristics — Limits and methods of measurement**
This is an adoption with Canadian deviations of the identically titled IEC (International Electrotechnical Commission) Standard CISPR (International Special Committee on Radio Interference) 22, Sixth edition, 2008-09.
- ANSI C63.4, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz**, ANSI C63.4-2014 (Revision of ANSI C63.4-2009).

The test results detailed in this report apply only to the Slim Card Reader SCR708 with the test setup described. Any modification such as a change, addition to or inclusion of another device into this product will require an additional evaluation.

The support equipment listed as part of the emission tests is required to properly exercise and test the device under test.

2 General Information

Possible test case verdicts:	
Test case does not apply to the test object:	N/A (Not Applicable)
Test object does meet the requirement:	P (Pass)
Test object does not meet the requirements:	F (Fail)
Samples arrived:	2016-09-05
Testing:	2016-09-05 and 2016-09-13
Decimal separator:	Point

3 Summary of testing

3.1 General annotation

The tests were performed in the order of the right column in the “Test Results – Overview” table.

No specifications concerning the highest clock frequencies of the EUT could be made by the manufacturer respectively by the customer.

3.2 Measurement uncertainty

For each in this test report described test method an uncertainty evaluation was done. The results of the evaluation can be provided upon request from Intertek Deutschland GmbH.

3.3 Document history

Document History				
Revision	Date	Report	Changes	Author
Initial Release	2016-10-24	2227660KAU-005	Initial Issues	UGR

4 Test results - Overview

Emission	requested	Verdict	Date	No
Conducted emissions (0,15 MHz - 30 MHz)	Class A	P	2016-09-13	2
Radiated emissions (30 MHz - 1000 MHz)	Class A	P	2016-09-05	1

5 Information about the EUT

5.1 Description of the EUT

 table-top EUT floor-standing EUT

Dimensions:	Height: 0.015 m	Width: 0.05 m	Length: 0.08 m
Software version:	“default.readerconfig” used for testing		
Prototype or Product version:	Product version		
Description: The purpose of the Slim Card Reader is to read the unique ID contained in 13.56 MHz and 125 kHz card and tags that are presented to the reader. In most cases this data will be the card serial number. To facilitate this a variety of card reader software modules have been developed. The SCR708 transfers the read-out identifier and transfer this to terminals and Multi-Functional printers (MDP) via a standard USB interface. By default the SCR708 will act as a standard HID device.			

5.2 Photos of the device and the rating plate

Draft of rating plate:



Front view:



USB socket of EUT:



EUT with connected USB cable:



5.3 Power interface

Mode	Voltage (V)	Frequency (Hz)	Comment
1	5	DC	Connected to Notebooks USB Port

5.4 Configuration mode

Mode	Description
1	RFID reader (05E343075025) connected to the Notebook
2	RFID reader (005DF43075126) connected to the Notebook

5.5 Operating mode

Mode	Description
1	RFID reader does not recognize the RFID tag (no tag placed on the reader), standby mode (reader waiting for tag) The RFID reader transmit at 125 kHz and 13.56 MHz
	RFID reader does not recognize the RFID tag (no tag placed on the reader), standby mode (reader waiting for tag) The RFID reader transmit at 13.56 MHz

5.6 Peripheral devices used for testing

Device	Manufacturer	Type	SN	FCC ID
Notebook	HP	ProBook 6550v	CNU1163495	----

5.7 Supply- and interconnection cables used for testing

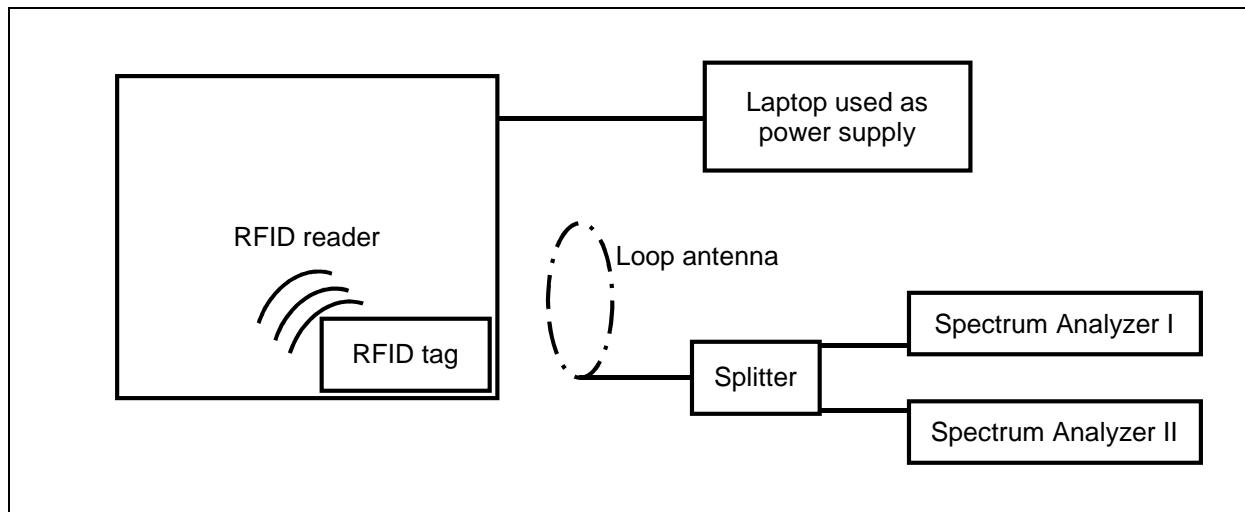
Line	Length	shielded	non shielded	Shield on GND/PE
SCR Micro USB to Mini USB cable (shorter version) with ferrite core for round cables 227 Ohm (100 MHz)	50 cm	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Adapter Mini USB to USB	---	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

5.8 Clock frequencies of the EUT

Source	Frequency
Internal clock	16 MHz
CPU	72 MHz
SPI bus	12 MHz

We use a 16 Mhz internal clock. This clock will be used for the CPU which is running on 72MHz. Our SPI bus is getting a 12MHz clock

5.9 Block diagram of the test setup



6 Emissions

6.1 Conducted emissions

Normative references			Result
Limits according to Product Family Standard:		FCC, Part 15 B	
Methods of measurement according to:		ANSI C63.4	
Laboratory parameters	Ambient temperature	25.4°C	
	Relative humidity	47%	
	Atmospheric pressure	938 mbar	
Equipment mode	Power interface mode	1	
	EUT configurations mode	1	
	Operation mode	1	
Test requirements	Frequency range	150 kHz - 30 MHz	
	Class	A	

Test equipment						
Measurement device	Manufacturer	Type	SN	Asset No.	Last Calibr.	Interval
Shielded cabin	ETS LINDGREN	RFSD 100	3598	PM KF 2955-2	-	-
Receiver 9 kHz – 30 MHz	Rohde & Schwarz	ESHS10	837356/012	PM KF 0134	2014-07	2
V-Artifical mains-network, 2 Line	Rohde & Schwarz	ESH3-Z5	863367/018	PM KF 0142	2015-10	2
V-Artifical mains-network, 4/2 Line	Schwarzbeck	NSLK8126	8126230	PM KF 0136	2015-01	2
Test software	Rohde & Schwarz	EMC 32 V.8.54	-	PM KF 2983	-	-

Comment

The measurement was performed at the AC adaptor of the notebook. The EUT was connected to the notebooks USB port.

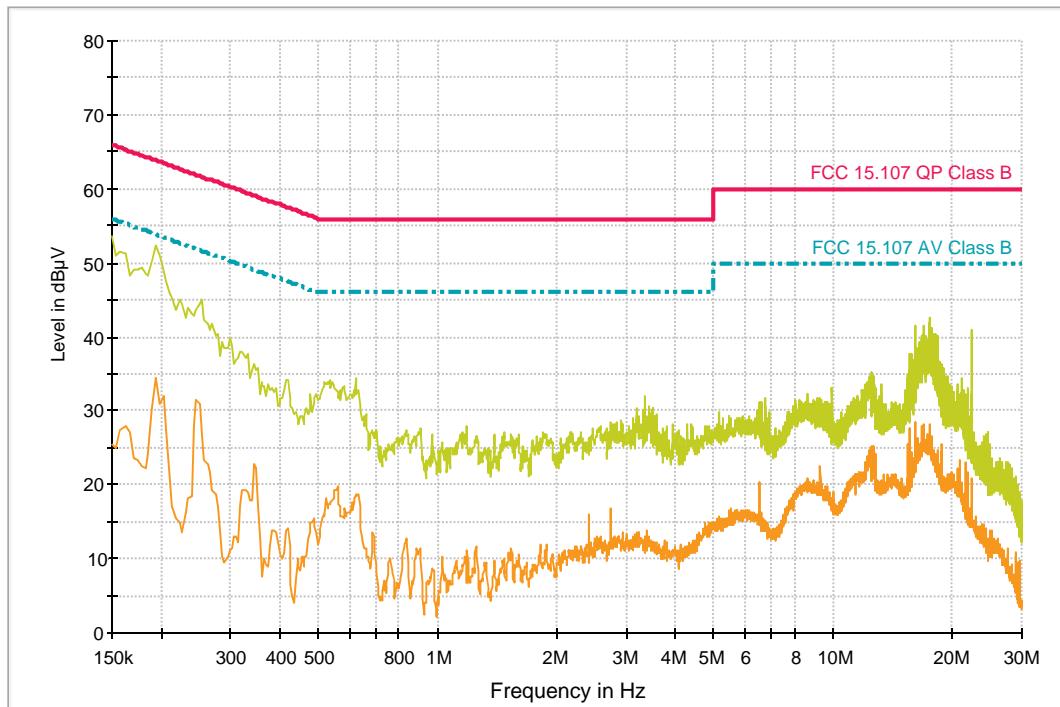
In the following diagram the N and L line are merged.

The emissions in this operation mode represent worst case emissions.

Measurement results - Conducted emissions:**Intertek Conducted Emission Test Report****Common Information**

EUT Name: Card reader SCR708
Test Verdict: Passed
Test Description: Disturbance Voltage Test (Conducted Emissions Test) CE
Operating Conditions: Continuous operation and working voltage: 120Vac; 60Hz
Operator Name: UGR
Project Number: 27660
Comment: 13.56 MHz RFID transmitter off
Test date: 2016-09-13

EN-CE-R33-LN01



Hardware Setup: EMI conducted\EN-CE-R33-LN01 - [EMI conducted]

Subrange 1

Frequency Range: 9 kHz - 30 MHz

Receiver: R33 ESHS [ESHS]

@ GPIB0 (ADR 20), SN 0, FW 2.31 02.01

Signal Path: R3X - LNXX

FW 1.0

Correction Table: ATT09_PulsLimiter

Correction Table: PM-KF-2056_9k-3_3G_2016-08-31

Correction Table: PM-KF-1103_9k-3_3G_2016-08-31

LISN: LN01c 2line ESH3-Z5

Correction Table (Line 0): LN01_9k-30M_N_r_2015-10-07

Correction Table (Line 1): LN01_9k-30M_L1_r_2015-10-07

EMI Auto Test Template: EN-CE-R33-LN01

Hardware Setup: EN-CE-R33-LN01

Measurement Type: 2 Line LISN

Frequency Range: 150 kHz - 30 MHz

Graphics Level Range: 0 dB μ V - 80 dB μ V

Preview Measurements:

LISN Lines: N,L1,PE Grounded

Scan Test Template: EN-CE-R33-LN01_PRE

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	80 Hz	PK+; AVG	200 Hz	0,05 s	10 dB
150 kHz - 30 MHz	4 kHz	PK+; AVG	10 kHz	0,01 s	10 dB

Receiver: [ESHS]

Data Reduction:

Limit Line #1: FCC 15.107 QP Class B

Limit Line #2: FCC 15.107 AV Class B

Peak Search: 6 dB, Maximum Results: 10

Subrange Maxima: 10 Subranges, Maxima per Subrange: 1

Acceptance Offset: -10 dB

Maximum Number of Results: 20

Maximization Measurements:

LISN Lines: N,L1,PE Grounded

Template for Single Meas.: EN-CE-R33-LN01_MAX

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	80 Hz	PK+; AVG	200 Hz	0,1 s	0 dB
150 kHz - 30 MHz	4 kHz	PK+; AVG	10 kHz	0,1 s	10 dB

Receiver: [ESHS]

Final Measurements:

Template for Single Meas.: EN-CE-R33-LN01_FIN

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
9 kHz - 150 kHz	80 Hz	QPK; AVG	200 Hz	1 s	0 dB
150 kHz - 30 MHz	4 kHz	QPK; AVG	10 kHz	1 s	10 dB

Receiver: [ESHS]

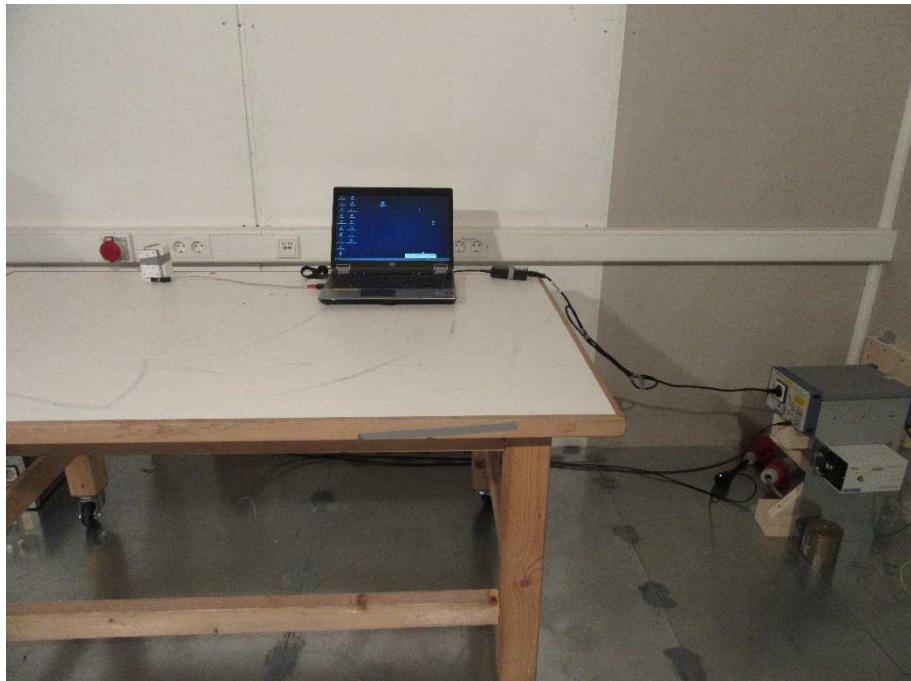
Report Settings:

Report Template: Standard Report_EMC KF_Conducted Emission

Create Electronic Report: RTF PDF

Document Name: EN-CE-R33-LN01_

Photos of the test setup:



6.2 Radiated emissions

Normative references			Result
Limits according to Product Family Standard:			
Methods of measurement according to:			P
Laboratory parameters	Ambient temperature	25°C	
	Relative humidity	44%	
	Atmospheric pressure	941 mbar	
Equipment mode	Power interface mode	1	
	EUT configurations mode	1	
	Operation mode	1	
Test requirements	Frequency range	30 MHz - 1000 MHz	
	Antenna distance	3 m	
	Class	A	

Test equipment						
Measurement device	Manufacturer	Type	SN	Asset No.	Last Calibr.	Inter-val
Semi-Anechoic chamber	Siepel	REF W460SLB	-	PM KF 1150		
Turntable	Inn-Co	-	-	PM KF 2949-04	-	-
Tower	Inn-Co	MA4484-XPET	-	PM KF 2949-03	-	-
Controller	Inn-Co	CO 3000	4970815	PM KF 2949	-	-
Open area test site						
Receiver 10Hz – 7GHz	Rohde & Schwarz	ESR7	101095	PM KF 2441	2015-12	1
Receiver 20 Hz – 26.5 GHz	Rohde & Schwarz	ESIB26	100150	PM KF 0948	2015-03	1
Antenna 30 – 3000 MHz	Rohde & Schwarz	HL 562	100354	PM KF 1123	2016-02	2
Horn antenna 1 – 18 GHz	Rohde & Schwarz	HF906	100188	PM KF 0947	2016-04	2
Horn antenna preamp. 1 – 18 GHz	Bonn	BLMA0118-4A	35352	PM KF 0946	2015-07	2
Test software	Rohde & Schwarz	EMC 32 V.8.54	-	PM KF 2983	-	-
Test software	Rohde & Schwarz	EMC 32 Vers. 9.25	-	PM KF 2983-1	-	-

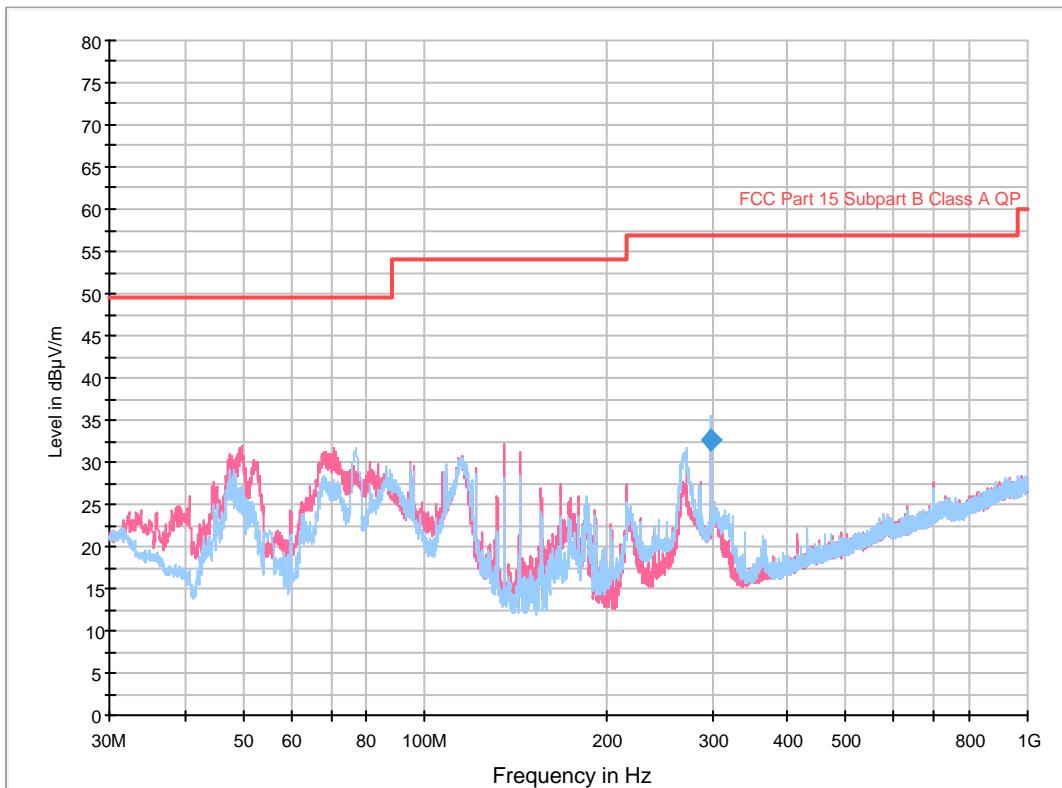
Comment:

Due to the reduced antenna to EUT- distance of 3 m the limit meant for the 10 m distance was increased by 10 dB.

The emissions in this operation mode represent worst case emissions.

Measurement results - Radiated emissions:**Intertek Emission Report****Common Information**

Test Description: Radiated Spurious Emission
Tested Device: Slim Card Reader SCR708
Test Standard: FCC part 15.109
Operating Conditions: normal operation
Operator Name: UGR
Comments:
Project Number: 27660
Test Date: 2016-09-05

**Final Result 1**

Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
298.320000	32.5	1000.0	120.000	122.1	H	111.0	13.7	24.4	56.9

Photos of the test setup:

Photo 1: front view

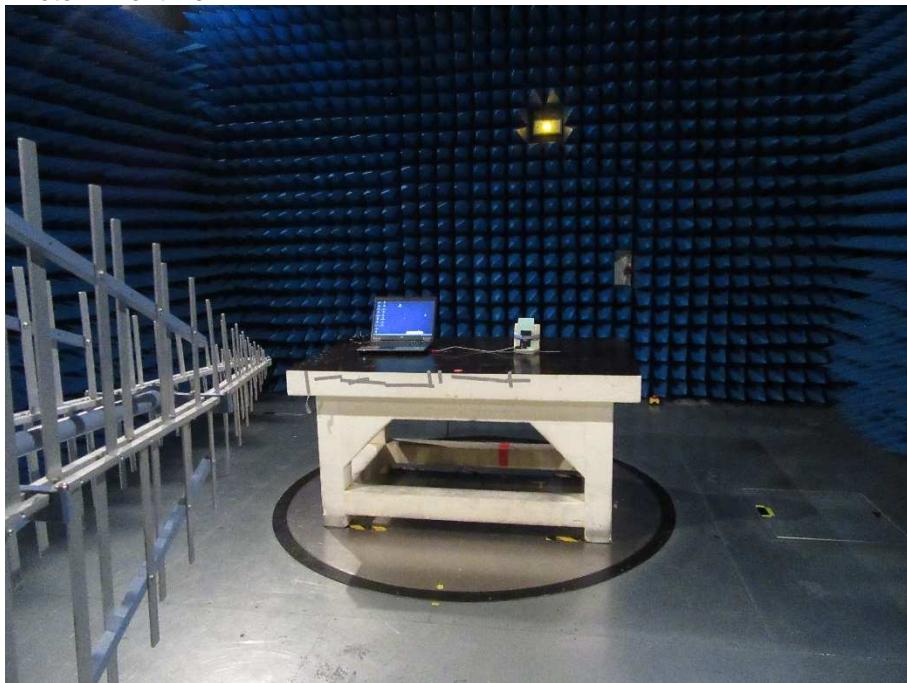


Photo 2: rear view



Anechoic chamber 1

Test procedure

The test site is an anechoic chamber suitable for radiated emission measurements in the frequency range of 30 MHz – 18 GHz (26 GHz). It includes automatic antenna mast of height 4 m and turntable of radius 2 m. It enables both manual and fully automatic measurements.

To find the highest level of radiation

- the height of the antenna is scanned in range 1m to 4 m with antenna in horizontal and vertical polarization;
- the turntable is rotated in range from 0° to 360°.

The system was configured for testing in a typical worst case fashion (as a customer may use it). All interface cables were moved to determine the position which resulted in the highest emission levels.

Correction factors

The field strength is calculated by adding the antenna factor and cable attenuation. The calculations are performed automatically by the measurement software EMC 32. As example consider the following input values and result:

Frequency (MHz)	Receiver reading U (dB μ V)	Antenna factor AF (dB/m)	Cable attenuation A (dB)	Correction antenna + cable (dB)	Radiated field strength E (dB μ V/m)
30.0	20	19,1	0.7	19,8	39,8

$$E = U + AF + A$$

7 Product labelling

FCC, Part 15 B, Class A verification

Information to the user:

For a **Class A** digital device or peripheral, the instructions furnished the user shall include the following or similar statement, **placed in a prominent location in the text of the manual:**

NOTE: This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of these equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Systems incorporating several digital devices:

For systems incorporating several digital devices, the above mentioned statement needs to be contained only in the instruction manual for the main control unit.

Manual is provided in a form other than paper:

In cases where the manual is provided only in a form other than paper, such as on a computer disk or over the internet, the information required by this section may be included in the manual in that alternative form, provided the user can reasonably be expected to have the capability to access information in that form.

Label on the device:

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

(Where a device is constructed in two or more sections connected by wires and marketed together, the statement of this section is required to be affixed only on the main control unit.)

Small devices:

When the device is so small or for such use that it is not practicable to place the statement specified under paragraph "Label on the device" of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed.

Canadian ICES-003, Labelling Requirements

Self-Declaration of Compliance (SDoC):

ITE subject to ICES-003 is approved through the method of Self-Declaration of Compliance (SDoC) by the manufacturer, importer or distributor of ITE who shall ensure that compliance with all technical requirements prescribed by ICES-003 has been demonstrated and the results compiled into a test report.

Test Report:

The test report shall be **retained** by the manufacturer or importer **for a minimum period of five years** from the date the model of ITE is first offered for sale, distributed and/or leased in Canada, and shall be made available to Industry Canada upon request.

Industry Canada ICES-003 Compliance Label:

CAN ICES-3 ()/NMB-3(*)*

* Insert either "A" or "B" but not both to identify the applicable Class of ITE.

The label shall be permanently affixed to the ITE or displayed electronically and its text must be clearly legible. When the dimension of the device is too small or it is otherwise not practical to place the label on the ITE, the label shall be placed in a prominent location in the user manual supplied with the ITE. The user manual may be in an electronic format and must be readily available.

The manufacturer, importer or supplier shall meet the labelling requirements set out in this section for every ITE unit ³:

- (i) Prior to marketing in Canada, for ITE manufactured in Canada, and;
- (ii) Prior to importation into Canada, for imported ITE.

The presence of the label on the ITE represents the manufacturer's or importer's Self-Declaration of Compliance (SDoC) to Industry Canada ICES-003.

Each unit of an ITE model shall bear a label indicating the model's compliance with ICES-003.

³ The labelling requirements apply to new models. Existing models may continue with the requirements in Issue 4 or adopt the requirements in Issue 5.

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