

Gantner Electronic **TEST REPORT**

SCOPE OF WORK

EMC TESTING – GAT ECO. Side Lock 7000 NW BA

REPORT NUMBER

2231426KAU-009

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MODEL: GAT ECO.Side Lock 7000
TYPE: NW BA
DESCRIPTION: Battery Powered RFID Lock with Bluetooth
SERIAL NO: 1734040076

All measurement results refer to the equipment which was tested

MANUFACTURER: Gantner Electronic GmbH
CUSTOMER NAME: Gantner Electronic GmbH
ADDRESS (CUSTOMER): Montafonerstrasse 8
AT-6780 SCHRUNS
AUSTRIA

REPORT NO: 2231426KAU-009

TEST RESULT: The FCC, part 15 B, Class B, verification and ICES-003,
Class B 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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Technical Manager EMC/Radio

APPROVED BY: U. Gronert
Senior Project Engineer



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
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International

	The Intertek Deutschland EMC-Lab is accepted to participate in the IECEE (IEC Conformity assessment for Electrotechnical Equipment and Components) CB-Scheme CB Test Laboratory: TL118
	The Intertek Deutschland EMC-Lab is listed at the Federal Communications Commission (FCC) Designation Number: DE0014 Test Firm Registration Number: 359260
	The <i>Bundesnetzagentur</i> 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

 Anerkennungsstelle 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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SECTION 1 CONTENTS

SECTION 2	MEASUREMENT AND TEST SPECIFICATION	5
SECTION 3	GENERAL INFORMATION	6
SECTION 4	SUMMARY OF TESTING	7
4.1	General annotation.....	7
4.2	Measurement uncertainty.....	7
4.3	Document History.....	7
SECTION 5	TEST RESULTS – OVERVIEW	8
SECTION 6	INFORMATION ABOUT THE EUT	9
6.1	Description of the EUT	9
6.2	Power interface	9
6.3	Configuration mode.....	10
6.4	Operation mode.....	10
6.5	Peripheral devices used for testing	10
6.6	Supply and interconnecting cables used for testing.....	10
6.7	Block diagram of the EUT with clock frequencies.....	10
SECTION 7	EMISSIONS.....	11
7.1	Radiated emissions – Electric field strength	11
SECTION 8	Product labelling	20

SECTION 2

MEASUREMENT AND TEST SPECIFICATION

☒ FCC, Part 15 B, Class B, verification

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.

ISED Canada

ICES-003, Issue 6, January 2016

Information Technology Equipment (Including
digital apparatus) – Limits and methods of
measurement

Tests according to:

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 GAT ECO.Side Lock 7000 NW BA 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.

SECTION 3

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: 2018-01-31

Testing: 2018-02-02 to 2018-02-06

Decimal separator: ☒ Point ☐ Comma

	Temperature:	15 °C - 35 °C
	Humidity:	20 % - 60 %
	Atmospheric pressure:	900 mbar - 1000 mbar
Environmental conditions during testing:	If explicitly required by a basic standard the measured climatic conditions are documented in the corresponding test section.	

SECTION 4

SUMMARY OF TESTING

4.1 General annotation

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

4.2 Measurement uncertainty

For each test method, an uncertainty evaluation was carried out. The results of the evaluation can be provided upon request from Intertek Deutschland GmbH.

4.3 Document History

REVISION	DATE	REPORT	CHANGES	AUTHOR
Initial release	2018-02-26	2231426KAU-009	Initial issue	RDR

SECTION 5

TEST RESULTS – OVERVIEW

EMISSION	REQUESTED	VERDICT	DATE	NO
Radiated emissions (30 MHz - 1 GHz)	Class B	P	2018-02-02	1
Radiated emissions (1 GHz - 7 GHz)	Class B	P	2018-02-02	2
Radiated emissions (7 GHz – 12.5 GHz)	Class B	P	2018-02-06	3

Omission of tests:

Conducted emissions is not applicable, because the EUT is battery operated.

SECTION 6

INFORMATION ABOUT THE EUT

6.1 Description of the EUT

☒ table-top EUT	☐ floor-standing EUT		
Dimensions:	Height: 100 mm	Width: 25 mm	Length: 125 mm
Software version:	A special test firmware was written for the EMC/Radio tests, to have a continuous transmission with a 80 ms interval. In reality the RFID and Bluetooth modules are just transmitting, when the lock button is pushed. They are never transmitting at the same time.		
Prototype or Product version: 2.3			
Description: With the GAT ECO.Side Lock 7xxx (NW) xx, lockers and depot boxes can be electronically locked and unlocked. The user simply presses the locker door shut and holds their data carrier next to the RFID reading center on the locker door. This action activates the lock electronics and the authorization of the user's data carrier is checked. If the authorization is valid, the locker door is locked or unlocked by the GAT ECO.Side Lock 7xxx (NW) xx accordingly. System users are identified at the lock using contactless RFID data carriers (Radio Frequency Identification).			

6.1.1 Photo of the rating plate



6.2 Power interface

MODE	VOLTAGE (V)	FREQUENCY (Hz)	COMMENT
1	3.6 V	DC	SIZE AA

Power sources/associated test equipment				
DESCRIPTION	MANUFACTURER	TYPE	SN	ASSET NO.
Lithium battery	TADIRAN	High Energy, 3.6 V	-	-

6.3 Configuration mode

MODE	DESCRIPTION
1	The lock and the booster were fixed with a cable tie (the push button was pushed). The test card was placed in front of the lock, thus the light went green and the beep was hearable.

6.4 Operation mode

MODE	DESCRIPTION
1	RFID pulse mode with tag, Bluetooth module supplied but not transmitting.

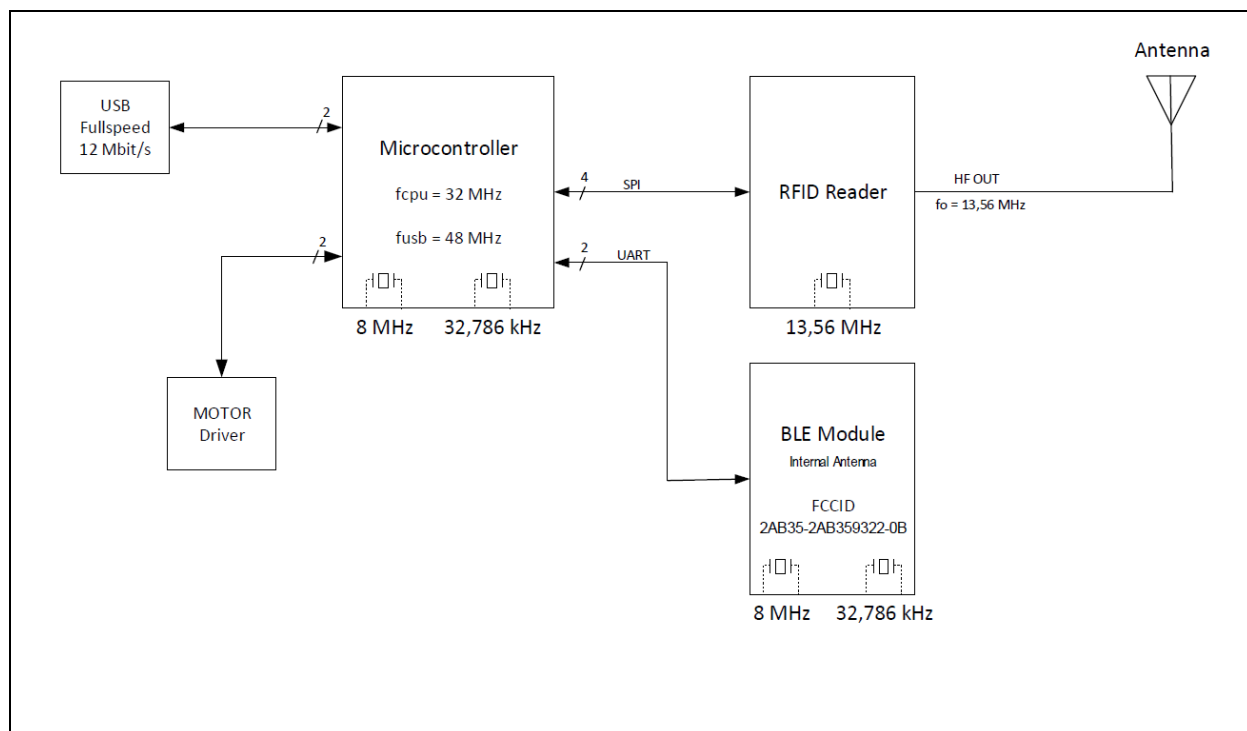
6.5 Peripheral devices used for testing

DEVICE	MANUFACTURER	TYPE	SN	FCC ID
none				

6.6 Supply and interconnecting cables used for testing

LINE	LENGTH (cm)	SHIELDING
none		

6.7 Block diagram of the EUT with clock frequencies



SECTION 7 EMISSIONS

7.1 Radiated emissions – Electric field strength

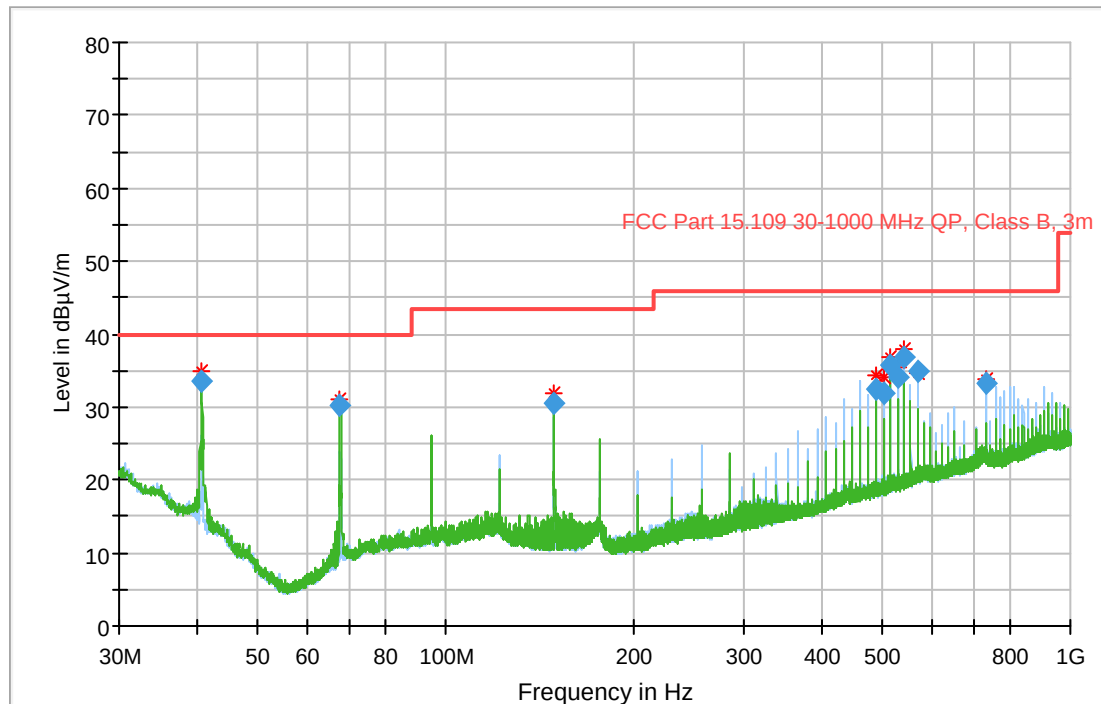
NORMATIVE REFERENCES			RESULT
Limits according to:	FCC, Part 15 B		P
Methods of measurement according to:	ANSI C63.4		
Equipment mode	Power interface	1	
	EUT configuration mode	1	
	Operation mode	1	
Test requirements	Frequency range	30 MHz – 12.5 GHz	
	Antenna distance	3 m	
	Class	B	

Test equipment

DESCRIPTION	MANUFACTURER	TYPE	SN	ASSET NO.	CALIBRATION
Semi-Anechoic chamber	Siepel	REF W460SLB	-	PM KF 1150-01	2016-12 (3 years)
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	-
Receiver 10 Hz - 7 GHz	Rohde & Schwarz	ESR7	101095	PM KF 2441	2017-10 (1 year)
Spectrum analyser	Rohde & Schwarz	FSV40	837356/012	PM KF 2783	2017-09 (1 year)
Antenna 30 MHz - 3GHz	Rohde & Schwarz	HL 562	100354	PM KF 1123	2016-02 (2 years)
Horn antenna 1 - 18 GHz	Rohde & Schwarz	HF906	100188	PM KF 0947	2016-04 (2 years)
Horn antenna preamp. 1 - 18 GHz	Bonn	BLMA0118-4A	35352	PM KF 0946	2017-07 (2 years)
Test software	Rohde & Schwarz	EMC 32 V.10.01.00	-	PM KF 2983-2	-

Measurement results – Radiated emissions:

EUT: GAT ECO.Side Lock 7000 NW BA
Test Verdict: Passed
Test Description: Radiated emissions, FCC Part 15.109
Operating Conditions: Pulse mode with tag
Operator Name: RDR
Project Number: 31426
Date: 2018-02-02
Comment: No.: 1734040076



— Preview Result 1H-PK+ [Preview Result 1H.Result:2]
— Preview Result 1V-PK+ [Preview Result 1V.Result:2]
* Critical_Freqs PK+ [Critical_Freqs.Result:4]
— FCC Part 15.109 30-1000 MHz QP, Class B, 3m [..\EMI radiated\FCC Part 15B]
◆ Final_Result QPK [Final_Result.Result:4]

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
40.680000	33.57	40.00	6.43	1000.0	120.000	100.0	V	352.0	14.4
67.800000	30.12	40.00	9.88	1000.0	120.000	145.0	V	352.0	9.1
149.160000	30.61	43.50	12.89	1000.0	120.000	100.0	V	165.0	10.3
488.160000	32.50	46.00	13.50	1000.0	120.000	180.0	H	-12.0	17.5
501.720000	31.89	46.00	14.11	1000.0	120.000	174.0	H	5.0	17.7
515.280000	35.82	46.00	10.18	1000.0	120.000	171.0	H	-5.0	18.0
528.840000	34.04	46.00	11.96	1000.0	120.000	171.0	H	345.0	18.2
542.400000	36.92	46.00	9.08	1000.0	120.000	169.0	H	356.0	18.3
569.520000	34.95	46.00	11.05	1000.0	120.000	148.0	H	-6.0	18.9
732.240000	33.37	46.00	12.63	1000.0	120.000	117.0	H	-14.0	21.4

EMI Auto Test Template: FCC-RE-R12-AN08

Hardware Setup: EN-RE-R12-AN08
Measurement Type: Open-Area-Test-Site
Frequency Range: 30 MHz - 1 GHz
Graphics Level Range: 0 dB μ V/m - 80 dB μ V/m

Preview Measurements:
Antenna height: 100 - 355 cm , Step Size = 85 cm , Positioning Speed = 8
Polarization: H + V
Turntable position: 0 - 352 deg , Step Size = 22 deg , Positioning Speed = 8
Graphics Display: Show separate traces for horizontal and vertical polarization
Scan Test Template: EN-RE-R12-AN08_PRE

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
Receiver: [ESR 7]					
30 MHz - 1 GHz	30 kHz	PK+	120 kHz	0,1 s	20 dB
1 GHz - 3 GHz	250 kHz	PK+	1 MHz	0,1 s	20 dB

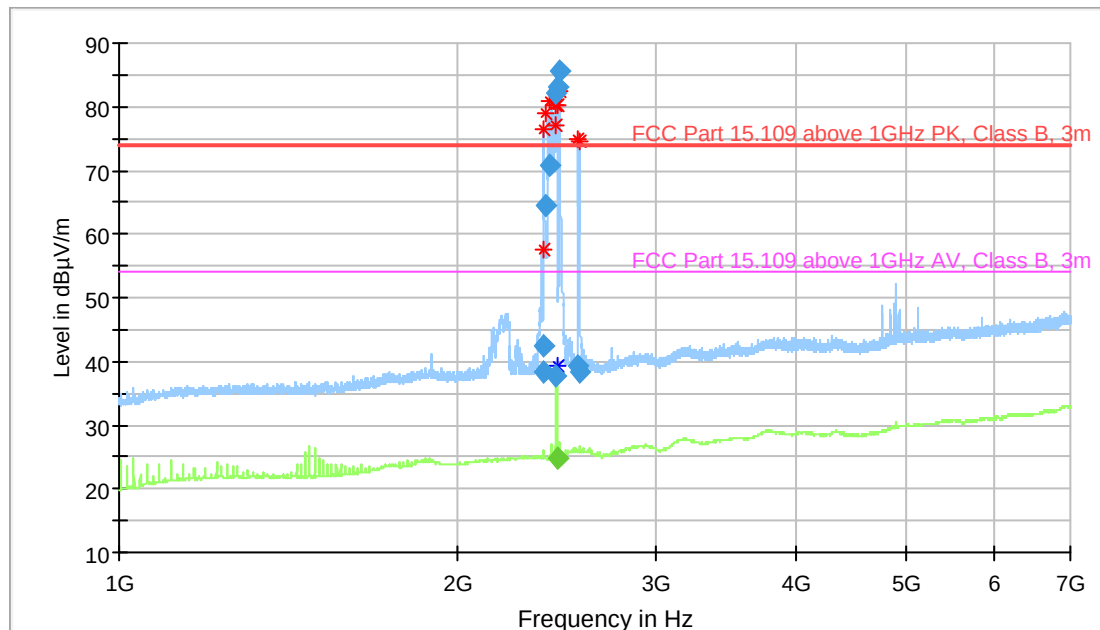
Frequency Zoom:
Zoom Scan Template: EN-RE-R12-AN08_ZOOM

Adjustment:
Antenna height: Range = 90 cm , Measuring Speed = 3
Turntable position: Range = 30 deg , Measuring Speed = 3
Template for Single Meas.: EN-RE-R12-AN08_MAX

Final Measurements:
Template for Single Meas.: EN-RE-R12-AN08_FIN

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
Receiver: [ESR 7]					
30 MHz - 1 GHz	40 kHz	QPK	120 kHz	1 s	20 dB
1 GHz - 3 GHz	40 kHz	QPK	1 MHz	1 s	20 dB

EUT: GAT ECO.Side Lock 7000 NW BA
Test Verdict: Pass
Test Description: Radiated emissions, FCC Part 15.109
Operating Conditions: Pulse mode with tag
Operator Name: RDR
Project Number: 31426
Date: 2018-02-02
Comment: No.: 1734040076



Preview Result 2-AVG [Preview Result 2.Result:2]
Preview Result 1-PK+ [Preview Result 1.Result:1]
Critical_Freqs AVG [Critical_Freqs.Result:5]
Critical_Freqs PK+ [Critical_Freqs.Result:4]
FCC Part 15.109 above 1GHz PK, Class B, 3m [..\EMI radiated\FCC Part 15B\
FCC Part 15.109 above 1GHz AV, Class B, 3m [..\EMI radiated\FCC Part 15B\
Final_Result PK+ [Final_Result.Result:4]
Final_Result AVG [Final_Result.Result:5]

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
2378.500000	42.47	---	74.00	31.53	1000.0	1000.000	203.0	V	178.0
2386.250000	38.49	---	74.00	35.51	1000.0	1000.000	280.0	H	198.0
2398.000000	64.42	---	74.00	9.58	1000.0	1000.000	375.0	V	216.0
2409.000000	70.88	---	74.00	3.12	1000.0	1000.000	321.0	V	220.0
2441.500000	37.84	---	74.00	36.16	1000.0	1000.000	375.0	H	317.0
2447.000000	82.09	---	74.00	-8.09	1000.0	1000.000	333.0	H	323.0
2448.000000	---	24.92	54.00	29.08	1000.0	1000.000	268.0	V	316.0
2455.750000	83.08	---	74.00	-9.08	1000.0	1000.000	308.0	H	323.0
2465.750000	85.45	---	74.00	-11.45	1000.0	1000.000	275.0	H	323.0
2551.500000	39.20	---	74.00	34.80	1000.0	1000.000	180.0	H	162.0
2562.750000	38.44	---	74.00	35.56	1000.0	1000.000	155.0	H	49.0

The signals between 2400 MHz and 2480 MHz are of the Bluetooth module, therefore the test results are not relevant at the EMC test.

EMI Auto Test Template: FCC-RE-R12-AN20

Hardware Setup: EN-RE-R12-AN20
Measurement Type: Open-Area-Test-Site
Frequency Range: 1 GHz - 7 GHz
Graphics Level Range: 10 dB μ V/m - 90 dB μ V/m

Preview Measurements:
Antenna height: 100 - 355 cm , Step Size = 85 cm , Positioning Speed = 8
Polarization: H + V
Turntable position: 0 - 352 deg , Step Size = 22 deg , Positioning Speed = 8
Scan Test Template: EN-RE-R12-AN20_PRE

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
Receiver: [ESR 7] 1 GHz - 7 GHz	250 kHz	PK+ ; AVG	1 MHz	0,1 s	0 dB

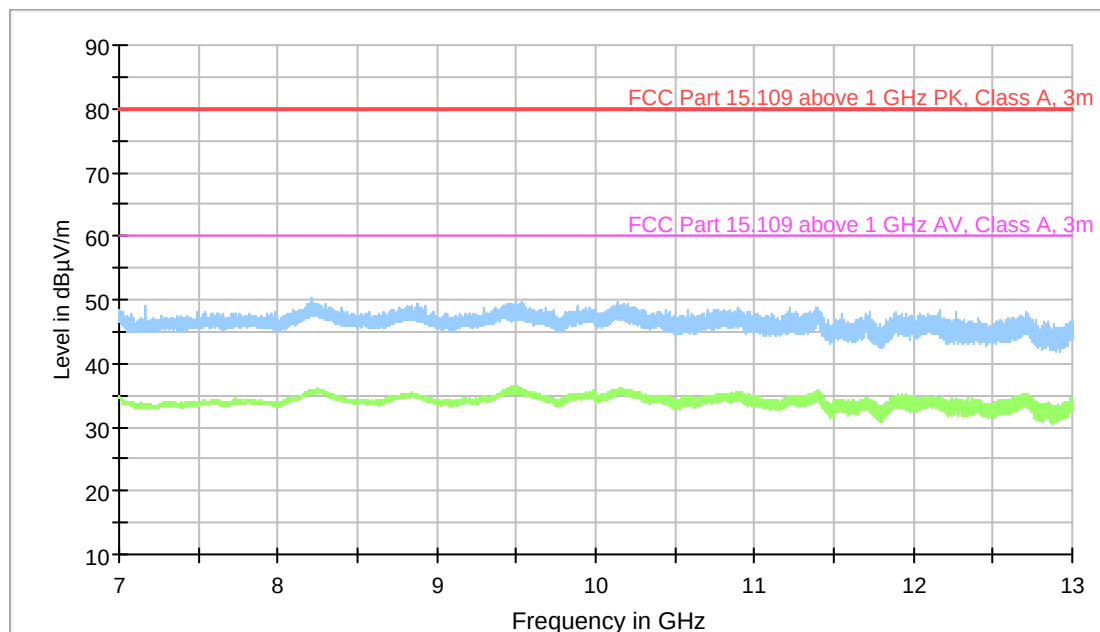
Frequency Zoom:
Zoom Scan Template: EN-RE-R12-AN20_ZOOM

Adjustment:
Antenna height: Range = 90 cm , Measuring Speed = 3
Turntable position: Range = 30 deg , Measuring Speed = 3
Template for Single Meas.: EN-RE-R12-AN20_MAX

Final Measurements:
Template for Single Meas.: EN-RE-R12-AN20_FIN

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
Receiver: [ESR 7] 1 GHz - 7 GHz	100 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

EUT:	GAT ECO.Side Lock 7000 NW BA
Test Verdict:	Pass
Test Description:	Radiated emissions, FCC Part 15.109
Operating Conditions:	Pulse mode with tag / Bluetooth supplied
Operator Name:	RDR
Project Number:	31426
Date:	2018-02-05
Comment:	No.: 1734040076



- Preview Result 2-AVG [Preview Result 2.Result:2]
- Preview Result 1-PK+ [Preview Result 1.Result:1]
- * MaxPeak-PK+ [Critical_Freqs.Result:4]
- * Average-AVG [Critical_Freqs.Result:5]
- FCC Part 15.109 above 1 GHz PK, Class A, 3m [..\EMI radiated\FCC Part 15B\]
- FCC Part 15.109 above 1 GHz AV, Class A, 3m [..\EMI radiated\FCC Part 15B\]
- ◆ Final_Result PK+ [Final_Result.Result:4]
- ◆ Final_Result AVG [Final_Result.Result:5]

EMI Auto Test Template: zF-RE-R15-PAMXX-AN20

Hardware Setup: zF-RE-R15-PAMXX-AN20
Measurement Type: Open-Area-Test-Site
Frequency Range: 7 GHz - 13 GHz
Graphics Level Range: 10 dB μ V/m - 90 dB μ V/m

Preview Measurements:
Antenna height: 100 - 355 cm , Step Size = 85 cm , Positioning Speed = 8
Polarization: H + V
Turntable position: 0 - 352 deg , Step Size = 22 deg , Positioning Speed = 8
Sweep Test Template: zF-RE-R15-PAMXX_AN20_PRE

Subrange	Step Size	Detectors	Bandwidth	Sweep Time	Preamp
Receiver: [FSV 40] 1 GHz - 18 GHz	531,25 kHz	PK+ ; AVG	1 MHz	70 s	0 dB

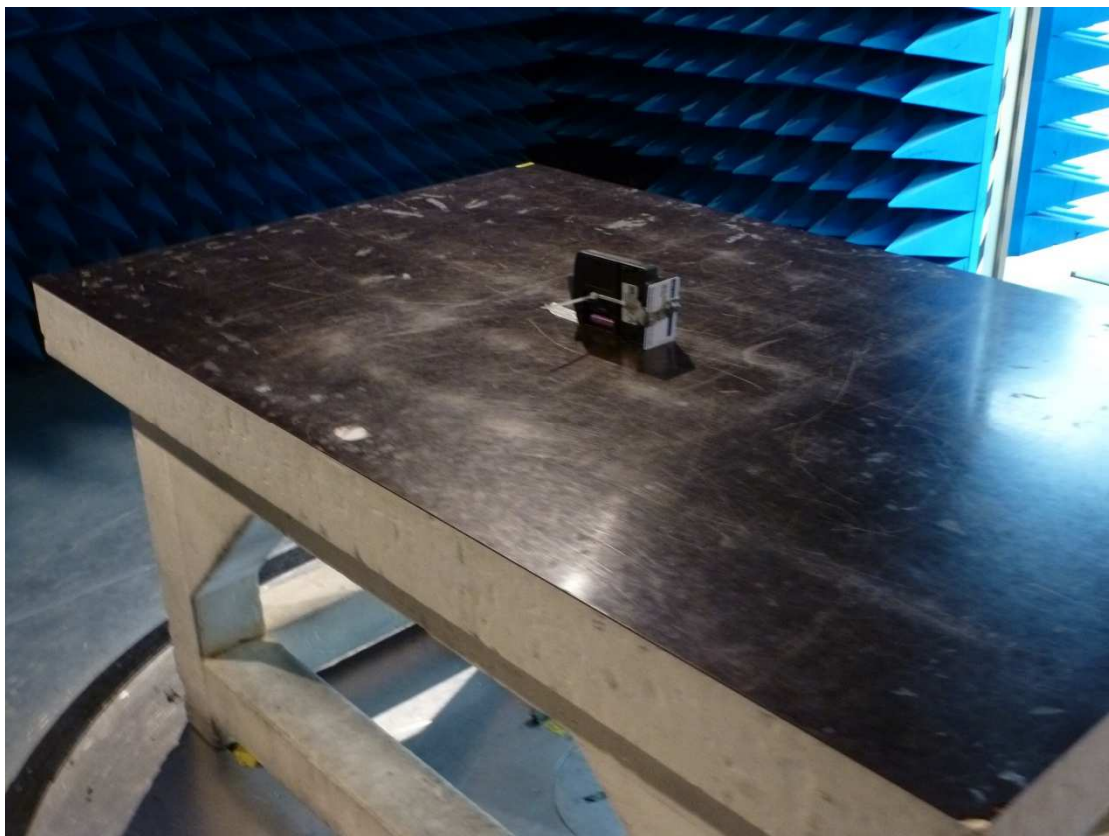
Frequency Zoom:
Zoom Sweep Template: zF-RE-R15-PAMXX_AN20_MAX

Adjustment:
Antenna height: Range = 90 cm , Measuring Speed = 3
Turntable position: Range = 30 deg , Measuring Speed = 3
Template for Single Meas.: zF-RE-R15-PAMXX-AN20_ADJ

Final Measurements:
Template for Single Meas.: zF-RE-R15-PAMXX-AN20_FIN

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
Receiver: [FSV 40] 1 GHz - 18 GHz	100 kHz	PK+ ; AVG	1 MHz	1 s	0 dB

Photos of the test setup:



Anechoic chamber

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 (dBμV)	ANTENNA FACTOR AF (dB/m)	CABLE ATTENUATION A (dB)	CORRECTION ANTENNA + CABLE (dB)	RADIATED FIELD STRENGTH E (dBμV/m)
30.0	20	20.6	0.8	21.4	41.4

$$E = U + AF + A$$

SECTION 8

Product labelling

FCC, Part 15 B, Class A/ B 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.

For a **Class B** 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 B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/ TV technician for help

Systems incorporating several digital devices:

For systems incorporating several digital devices, the statement mentioned above 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.

End of test report