

Test Report

Product	Digital Intercom and Access Control System		
Name and address of the applicant	Defigo AS Bogstadveien 27B 0355 Oslo, NORWAY		
Name and address of the manufacturer	Defigo AS Bogstadveien 27B 0355 Oslo, NORWAY		
Model	G5 Control Unit		
Rating	Mains (120 V 60 Hz)		
Trademark	Defigo		
Serial number	B38SARA-R410M-02B-00_356726100931997_0215		
Additional information	LTE		
Tested according to	FCC Part 15B Unintentional Radiators Industry Canada ICES-003, Issue 7 Information Technology Equipment (including Digital Apparatus)		
Order number	452909		
Tested in period	2022-02-01 to 2022-02-03		
Issue date	2022-04-06		
Name and address of the testing laboratory	<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="text-align: center;">  Instituttveien 6 Kjeller, Norway www.nemko.com </div> <div style="text-align: center;"> CAB Number: FCC: NO0001 ISED: NO0470 </div> <div style="text-align: center;">   </div> </div> <p style="text-align: center; color: red; font-weight: bold;">An accredited technical test executed under the Norwegian accreditation scheme</p>		
	 Prepared by [Frode Sveinsen]	 Approved by [G.Suhanthakumar]	
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Revision history

Revision	Date	Comment	Sign
00	2022-04-06	First edition	FS



THIS TEST REPORT APPLIES ONLY TO THE ITEM(S) AND CONFIGURATIONS TESTED.

Deviations from, additions to, or exclusions from the test specifications are described in "Summary of Test Data".

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1 INFORMATION

1.1 Test Item

Name	Defigo
Model/version	G5 Control Unit
FCC ID	2A4C8DEFIGOG5C
Serial number	B38SARA-R410M-02B-00_356726100931997_0215
Hardware identity and/or version	v9
Software identity and/or version	V2.0.2
Power Supply	Mains (120V 60 Hz)
Conformance Class	Class B

Description of Test Item

The EUT is a control unit for a digital intercom and access control system.

The EUT also contains a certified LTE CAT-M1 Module from U-Blox. See information below.

Certified Modules				
Manufacturer	Model No	Approval Numbers	Supported Frequency Bands	Uplink Freq
Ublox	SARA-R410M-52B LTE CAT-M1	FCC ID: XPY2AGQN4NNN IC: 8595A-2AGQN4NNN	Band 02 Band 04 Band 05 Band 12 Band 13	1850.0 – 1910.0 1710.0 – 1755.0 824.0 – 849.0 699.0 – 716.0 777.0 – 787.0

1.2 Normal test condition

Temperature:	20 - 24 °C
Relative humidity:	20 - 50 %
Normal test voltage:	120 V AC

The values are the limit registered during the test period.

1.3 Test Engineer(s)

Frode Sveinsen / Daniel Weber

1.4 EUT Operating Modes

Description of operating modes	Standby with connection to Display Unit
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1.5 Comments

All measurements were done with the EUT powered from the AC power source.

2 TEST REPORT SUMMARY

2.1 General

All measurements are traceable to national standards.

The tests were conducted for demonstrating compliance with FCC CFR 47 Part 15B and Industry Canada ICES-003 Issue 7.

Tests were performed in accordance with ANSI C63.4-2014.

Radiated tests were made in a semi-anechoic chamber at measuring distance of 3m.

A description of the test facility is on file with FCC and ISED.

<input checked="" type="checkbox"/> New Submission	<input checked="" type="checkbox"/> Production Unit
<input type="checkbox"/> Class II Permissive Change	<input type="checkbox"/> Pre-production Unit
JAB Equipment Code	<input type="checkbox"/> Family Listing

2.2 Test Summary

Name of test	FCC Part 15B reference	ICES-003 Issue 7 RSS-GEN Issue 5 reference	ANSI C63.04-2014 Reference	Result
Power Line Conducted Emission	15.107	3.2 (ICES-003) 8.8 (RSS-GEN)	7.3	Complies
Spurious Emissions (Radiated)	15.109(a)	3.2 (ICES-003) 8.9 (RSS-GEN)	8.3	Complies

3 TEST RESULTS

3.1 Power Line Conducted Emissions

FCC Part 15.107

ISED ICES-003 Issue 7, clause 3.2.1

Measurement procedure: ANSI C63.4-2014 using 50 μ H/50 ohms LISN.

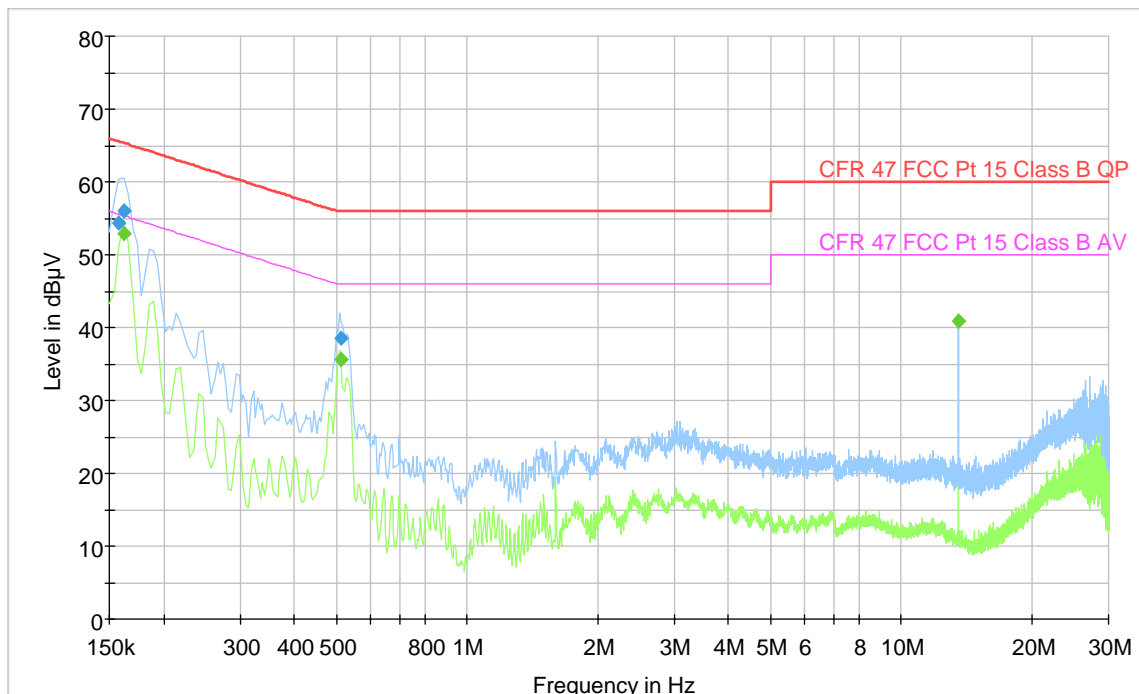
Test Results: Complies with Class B limits

Measurement Data: See attached plots.

Highest measured value (L1 and N):

Frequency (MHz)	QuasiPeak (dB μ V)	Average (dB μ V)	Limit (dB μ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter
0.158	54.32	---	65.57	11.25	1000	9	L1	OFF
0.162	---	52.99	55.36	2.37	1000	9	N	OFF
0.162	55.97	---	65.36	9.39	1000	9	N	OFF
0.512	---	35.70	46.00	10.30	1000	9	L1	OFF
0.512	38.60	---	56.00	17.40	1000	9	L1	OFF
13.560	---	40.99	50.00	9.01	1000	9	L1	OFF

Full Spectrum



Control Unit, EUT was connected to Control Unit by Power over Ethernet

3.2 Radiated Emissions, 30-1000 MHz

FCC Part 15.109 (a)

ISED Canada ICES-003 Issue 7, Clause 3.2

Measurement procedure: ANSI C63.4-2014 Clause 8.3

Test Results: Complies

Measurement Data:

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
43.830300	37.26	40.00	2.74	1000.0	120.000	103.0	V	1.0
145.261650	30.79	43.50	12.71	1000.0	120.000	335.0	H	100.0
356.768000	34.81	46.00	11.19	1000.0	120.000	100.0	H	59.0
725.023350	38.49	46.00	7.51	1000.0	120.000	125.0	H	158.0

Measuring distance 3m

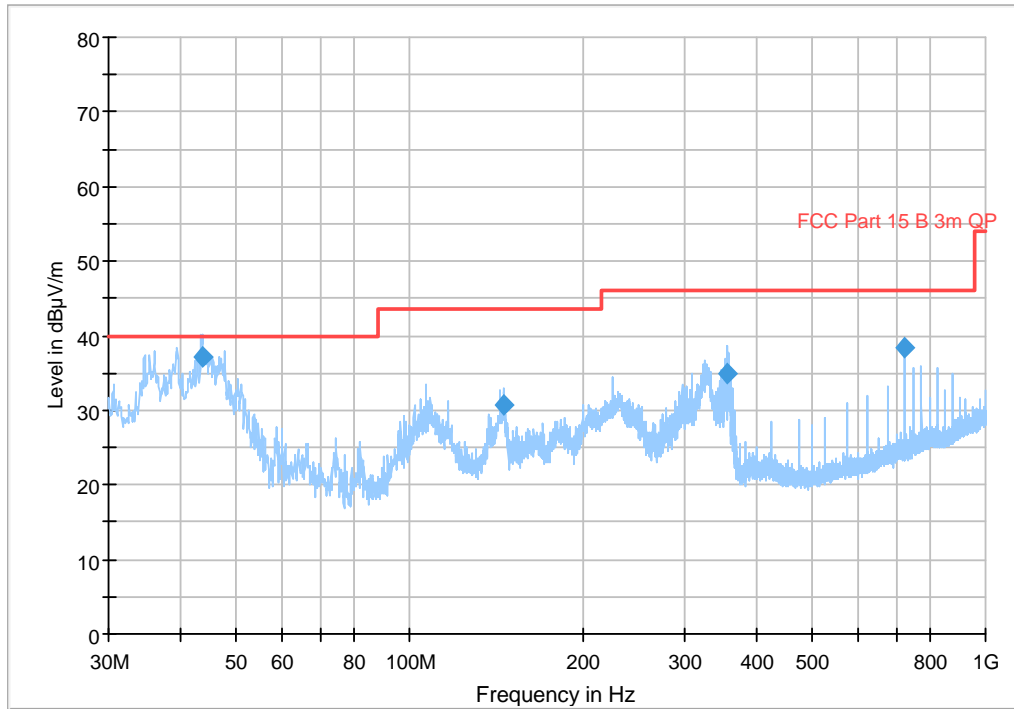
This is a Class B device.

See attached plots.

Requirements/Limit

FCC	Part 15.109	
ISED	ICES-003 Issue 7, Clause 3.2.2	
Radiated emission limit @3 meters		
Frequency (MHz)	FCC Quasi Peak (dBµV/m)	ISED Quasi Peak (dBµV/m)
30 – 88	40.0	40.0
88 – 216	43.5	43.5
216 – 230	46.0	46.0
230 – 960	46.0	47.0
Above 960	54.0	54.0

Full Spectrum



— Preview Result 1-PK+ — FCC Part 15 B 3m QP ◆ Final_Result QPK

Radiated Emissions 30 - 1000 MHz, @3m

3.3 Radiated Emissions, 1-10 GHz

FCC Part 15.109 (a)

ISED Canada ICES-003 Issue 7, Clause 3.2

Measurement procedure: ANSI C63.4-2014 Clause 8.3

Test Results: Complies with Class B limits

Measurement Data:

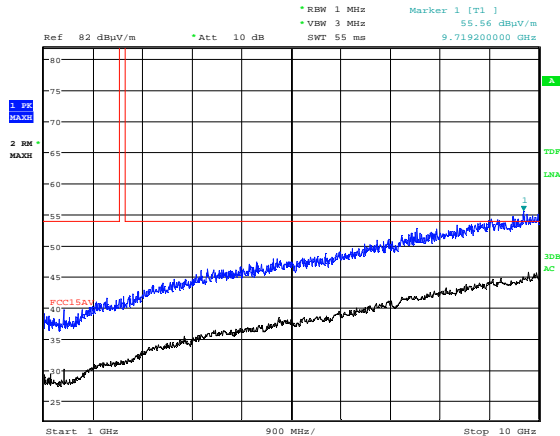
Measuring distance: 3m (1 – 18 GHz)

Antenna factor, amplifier gain and cable loss are included in spectrum analyzer "Transducer factor"

See plots.

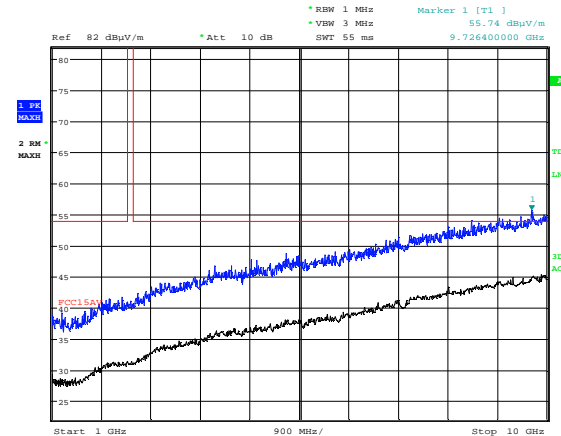
Requirements/Limit

FCC	Part 15.109 Class B Limits	
ISED	ICES-003 Issue 7, clause 3.2, Class B limits	
Radiated emission limit @3 meters		
Frequency	Average Detector	Peak Detector
Above 1 GHz	54.0 dB μ V/m	74.0 dB μ V/m



Date: 2.FEB.2022 15:17:17

Radiated Emissions 1 - 10 GHz, HP @3m



Date: 2.FEB.2022 15:15:00

Radiated Emissions 1 - 10GHz, VP @3m

4 Measurement Uncertainty

Measurement Uncertainty Values		
Test Item		Uncertainty
Output Power		±0.5 dB
Power Spectral Density		±0.5 dB
Out of Band Emissions, Conducted	< 3.6 GHz	±0.6 dB
	> 3.6 GHz	±0.9 dB
Spurious Emissions, Radiated	< 1 GHz	±2.5 dB
	> 1 GHz	±2.2 dB
Emission Bandwidth		±4 %
Power Line Conducted Emissions		+2.9 / -4.1 dB
Spectrum Mask Measurements	Frequency	±5 %
	Amplitude	±1.0 dB
Frequency Error		±0.6 ppm
Temperature Uncertainty		±1 °C

All uncertainty values are expanded standard uncertainty to give a confidence level of 95%, based on coverage factor k=2

5 LIST OF TEST EQUIPMENT

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment and ancillaries are identified (numbered) by the Test Laboratory.

No.	Model number	Description	Manufacturer	Ref. no.	Cal. date	Cal. Due
1	ESU40	Measuring Receiver	Rohde & Schwarz	LR 1639	2022-01	2023-01
2	JB3	Bilog Antenna	Sunol	N-4525	2020-03	2023-03
3	310	Preamplifier	Sonoma Inst.	LR 1686	2022-08	2023-08
4	3115	Horn Antenna	EMCO	LR 1330	2016-10	2026-10
5	8449B	Preamplifier	Hewlett Packard	LR 1322	2021-08	2022-08
6	ENV216	LISN	Rohde & Schwarz	LR 1665	2019-11	2021-11
7	ESC13	EMI Receiver	Rohde & Schwarz	N-4259	2019-10	2021-10
8	6812B	AC Power Source	Agilent	LR 1515	2020-04	2022-04
9	RG223	RF Cables	Suhner	N/A	COU	

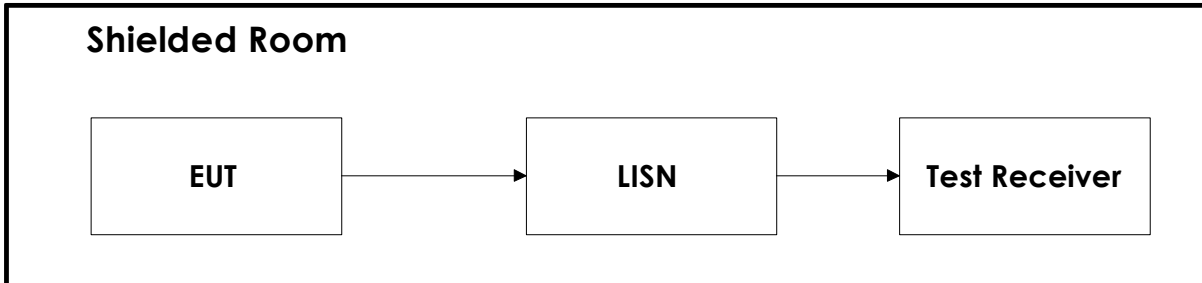
COU = Calibrate on Use

The software listed below has been used for one or more tests.

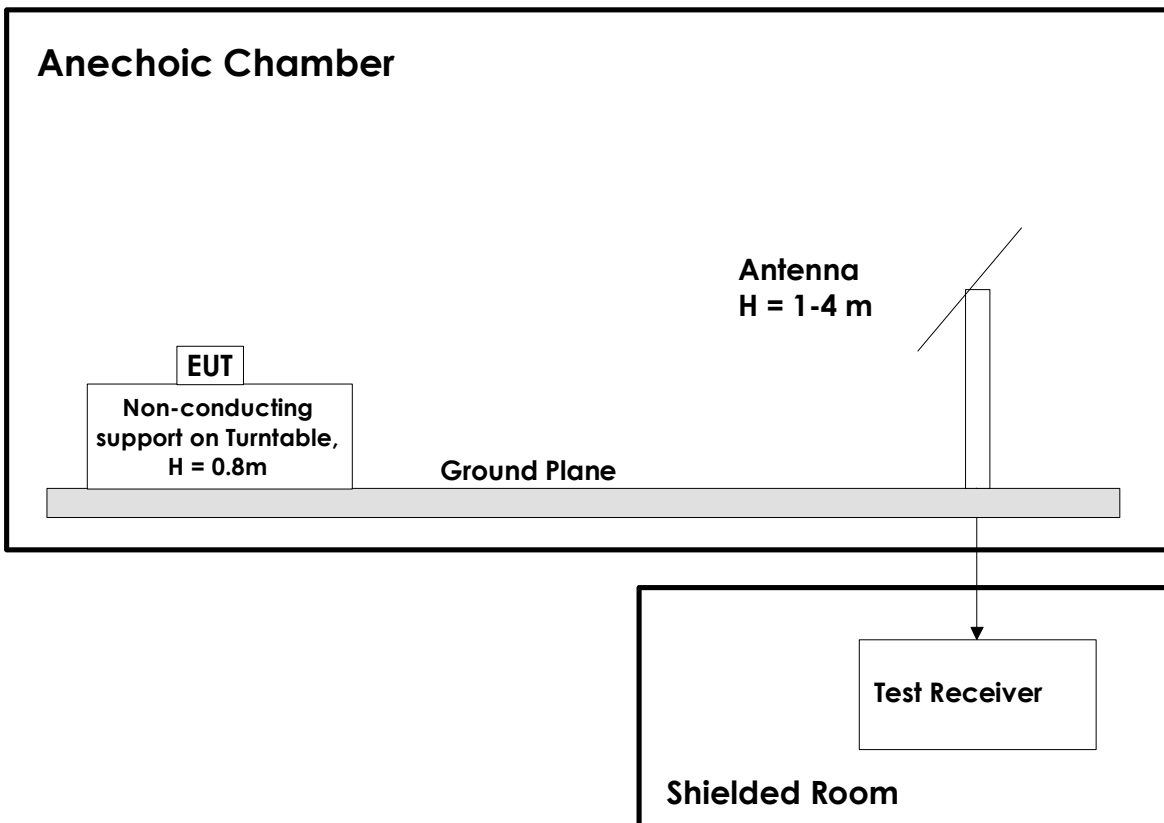
No.	Manufacturer	Name	Version	Comment
1	Rohde & Schwarz	EMC32	10.50.40	EMC test software
2	Nemko AS	RSPlot	1.0.8.0	Screenshots from R&S Spectrum Analyzers

6 Test Setups

6.1 Power Line Conducted Emission



6.2 Test Site Radiated Emission



This test setup is used for all radiated emissions tests. For all frequencies above 30 MHz test distance is 3m or 1m. Emissions above 1 GHz are measured with a Spectrum Analyzer and Horn Antenna. For measurements above 18 GHz the test receiver is moved inside the anechoic chamber and located next to the antenna to minimize the cable loss. All measurements at 1GHz and above were performed with turntable height 1.5m and with the ground plane covered by absorbers. A pre-amplifier is used for all measurements above 30 MHz, and High-Pass or Band-Pass filter is used for all harmonics.