

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 Display Unit
Rating	PoE (24-54 V _{DC})
Trademark	Defigo
Serial number	865546044948145; MPQ21AN03002978; 58D3913F39C6
Additional information	NFC, WCDMA, 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	 Instituttveien 6 Kjeller, Norway www.nemko.com CAB Number: FCC: NO0001 ISED: NO0470   NORWEGIAN ACCREDITATION TEST 033 An accredited technical test executed under the Norwegian accreditation scheme
 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 Display Unit
FCC ID	2A4C8DEFIGOG5D
Serial number	865546044948145; MPQ21AN03002978; 58D3913F39C6
Hardware identity and/or version	v4
Software identity and/or version	v2.0.2
Power Supply	Power over Ethernet (24-54 V _{DC})
Conformance Class	Class B

Description of Test Item

The EUT is a display unit with NFC reader for a digital intercom and access control system.

The EUT also contains a certified LTE Module from Quectel. See information below.

Certified Modules				
Manufacturer	Model No	Approval Numbers	Supported Frequency Bands	Uplink Freq
Quectel Wireless Solutions Co., Ltd	EG25-G	FCC ID: XMR201903EG25G IC: 10224A-201903EG25G	Band 02 – WCDMA, LTE Band 04 – WCDMA, LTE Band 05 – WCDMA, LTE Band 12 – LTE Band 13 – LTE Band 14 – LTE Band 66 – LTE Band 71 – LTE	1850-1910 MHz 1710-1755 MHz 824-849 MHz 699-716 MHz 777-787 MHz 788-798 MHz 1710-1780 MHz 663-698 MHz

1.2 Normal test condition

Temperature:	20 - 24 °C
Relative humidity:	20 - 50 %
Normal test voltage:	48 V _{DC} (Nominal Voltage, PoE)

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 mode with connection to Control Unit powered from Power over Ethernet.
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1.5 Comments

None.

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.

☒ New Submission	☒ Production Unit
☐ Class II Permissive Change	☐ Pre-production Unit
JAB Equipment Code	☐ 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.

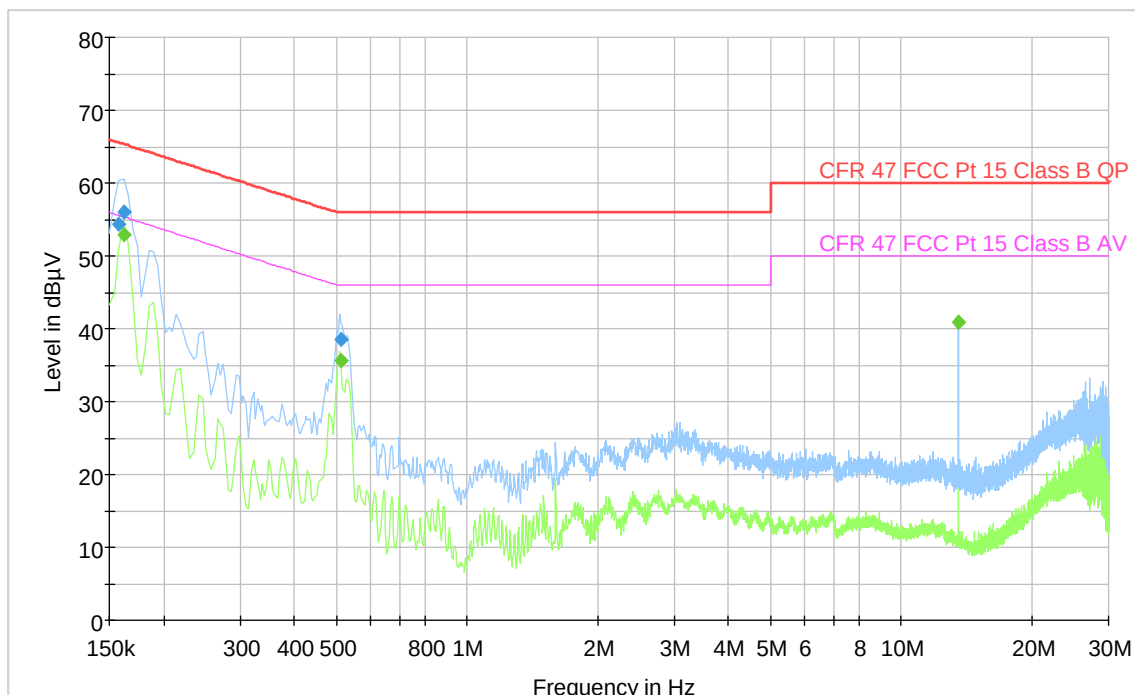
Test Results: Complies with Class B limits

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:

Measuring distance 3m

This is a Class B device.

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)
30.577300	31.18	40.00	8.82	1000.0	120.000	103.0	V	278.0
38.943250	32.52	40.00	7.48	1000.0	120.000	102.0	V	11.0
56.258450	32.32	40.00	7.68	1000.0	120.000	100.0	V	220.0
149.814050	19.16	43.50	24.34	1000.0	120.000	215.0	H	254.0
209.093450	32.38	43.50	11.12	1000.0	120.000	258.0	V	177.0
350.184300	34.99	46.00	11.01	1000.0	120.000	200.0	V	0.0
450.043000	29.22	46.00	16.78	1000.0	120.000	131.0	V	192.0
696.600450	44.84	46.00	1.16	1000.0	120.000	117.0	H	0.0
766.260750	45.75	46.00	0.25	1000.0	120.000	114.0	H	154.0
905.580600	45.21	46.00	0.79	1000.0	120.000	374.0	H	0.0

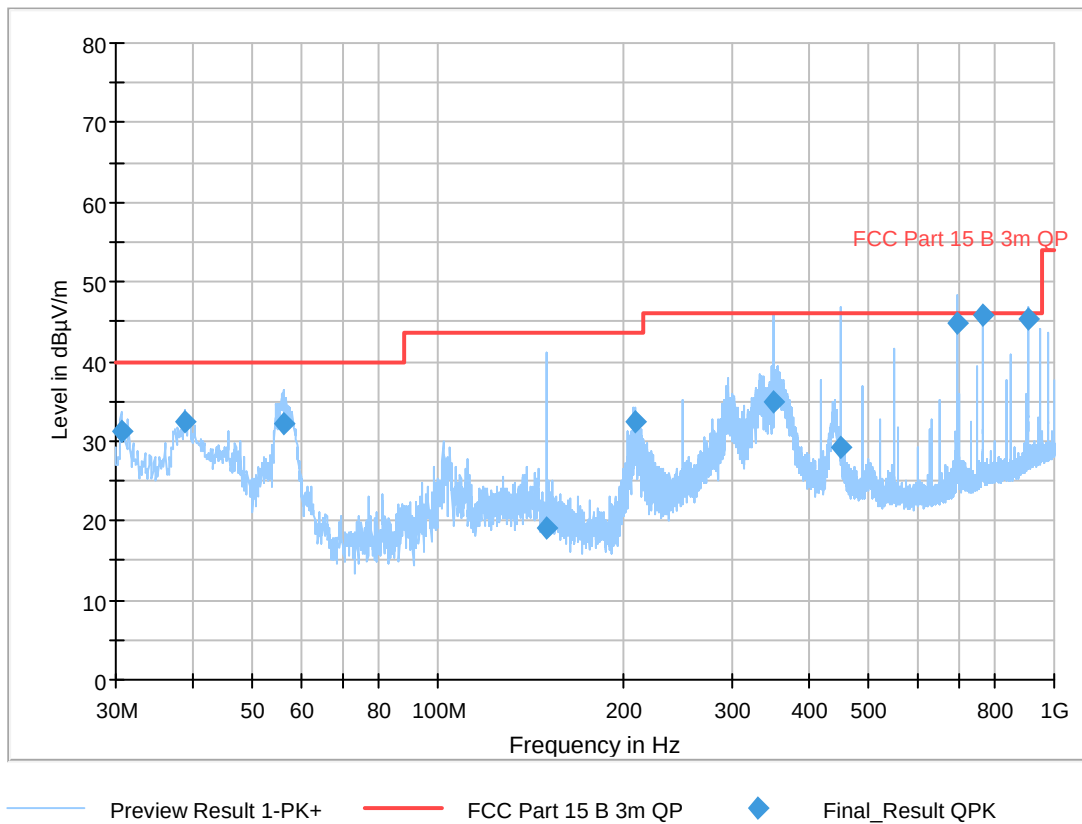
A low Pass Filter at 1GHz was used for measurements below 1 GHz.

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



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:

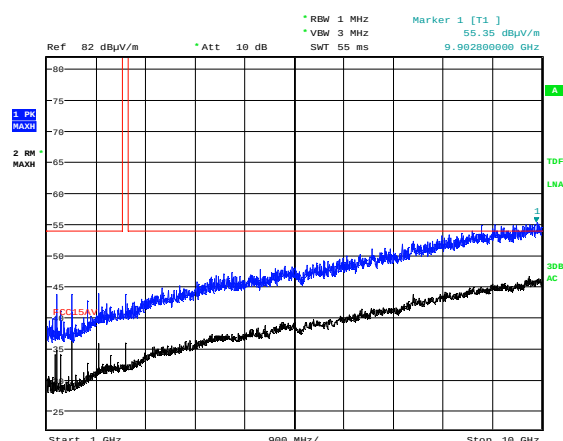
Measuring distance: 3m (1 – 18 GHz)

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

See plots.

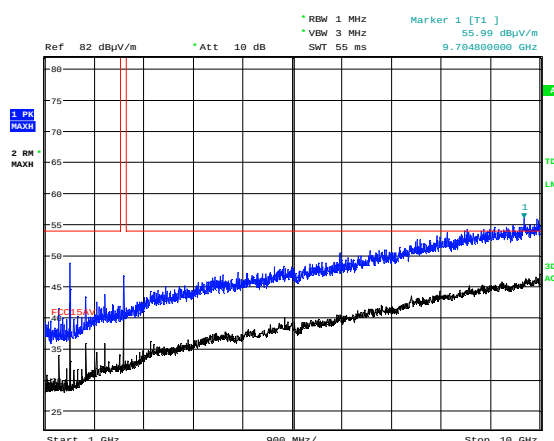
Requirements/Limit

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 dBuV/m	74.0 dBuV/m



Date: 2.FEB.2022 14:17:05

Radiated Emissions 1 - 10 GHz, HP @3m



Date: 2.FEB.2022 14:14:49

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	ESCI3	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	

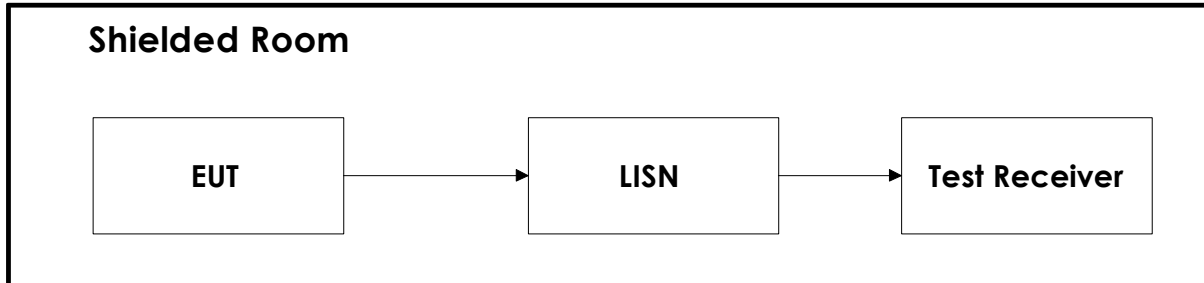
COU = Calibrate on Use

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

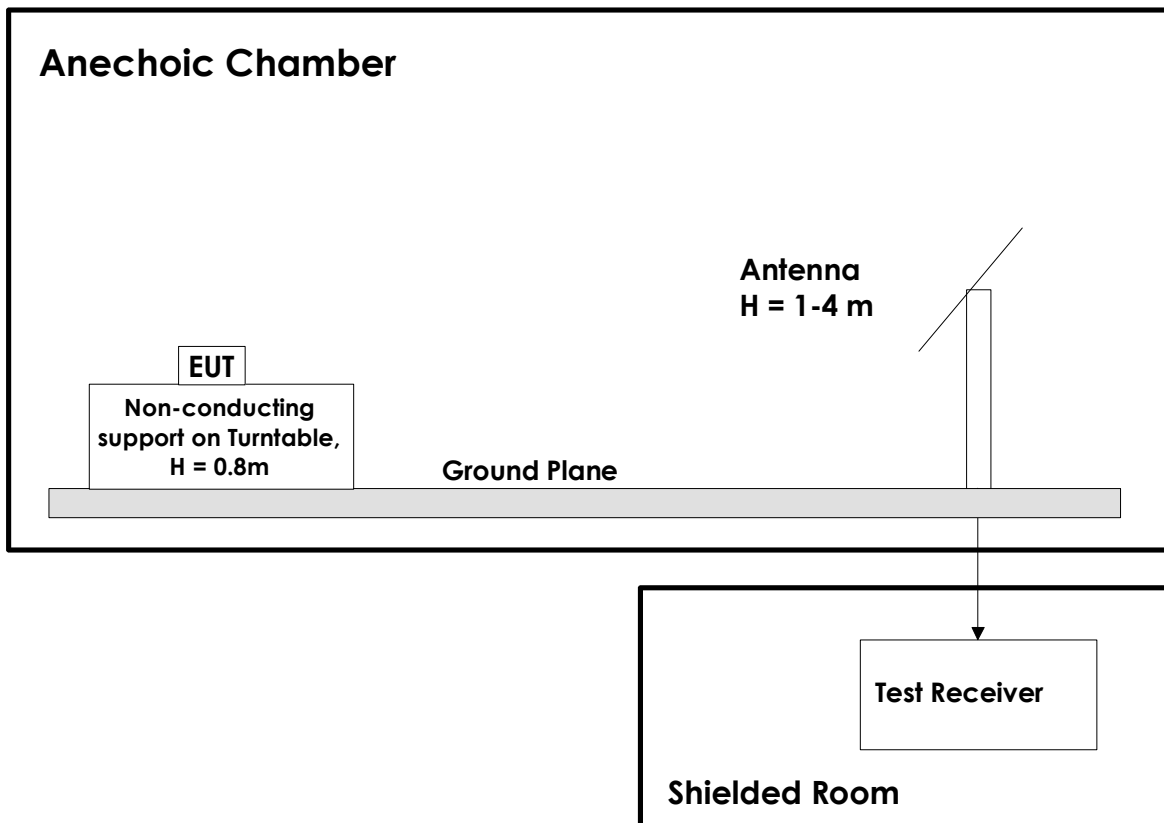
No.	Manufacturer	Name	Version	Comment
1	Rohde & Schwarz	EMC32	10.50.40	EMC test software
2	Nemko AS	RSPlot	1.0.8.0	Screenshots from R&S Spectrum Analyzers

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.