

Test Report

Product	Transportable Base Station System
Name and address of the applicant	EXFO Finland Elektroniikkatie 2 FI-90590 Oulo, Finland
Name and address of the manufacturer	EXFO Finland Elektroniikkatie 2 FI-90590 Oulo, Finland
Model	FXm-NR
Rating	See clause 1.1
Trademark	EXFO
Additional information	5G NR (New Radio)
Tested according to	FCC Part 15, subpart B Other Class A Digital Device Industry Canada ICES-003, Issue 7 Information Technology Equipment (ITE)
Order number	PRJ0025485
Tested in period	2023-02-10 to 2023-03-27
Issue date	2023-03-30
Name and address of the testing laboratory	 Instituttveien 6 Kjeller, Norway www.nemko.com CAB Number: FCC: NO0001 ISED: NO0470   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
A	2023-03-30	First edition	FS
B	2023-11-22	Editorial updates	FS

GENERAL REMARKS

This report applies only to the sample(s) tested. It is the manufacturer's responsibility to ensure the additional production units of this product are manufactured with identical electrical and mechanical components. The manufacturer is solely responsible for any modifications to the product that could result in non-compliance with the relevant regulations.

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Opinions expressed within this report regarding general assessments and qualifications for PASS or FAIL to the standards limits and requirements, are not part of the current accreditation. Neither are opinions expressed regarding model variants covered by the testing of this report.

CALIBRATION

All instruments used in the tests given in this test report are calibrated and traceable to national or international standards. Between calibrations all test set-ups are controlled and verified on a regular basis by periodic checks to ensure, with 95% confidence, that the instruments remain within the calibrated levels.

MEASUREMENT UNCERTAINTY

Measurement uncertainties are calculated or considered for all instruments and instrument set-ups used during these tests. Uncertainty figures are found in a separate clause in this report.

1 INFORMATION

1.1 Tested Item

Name	EXFO
Model Number	FXm-NR
FCC ID	2A7IGEXCBTSNR
ISED ID	28799-EXCBTSNR
Power Supplies	TDK-Lambda Model: DTM300PW280D1 (Input 100-240V~3.3-1.4A, 50-60Hz, Output: 28.0V=10.71A, Max 300W)

Model	FXm-C	FXm-NR
Description	Controller	Main Unit
Serial Number	1669356	1685787
HW Version	3.0	1.0
SW Version	2023-01-25	/
Input Voltage	10-32 V _{DC}	N/A
Antenna Conn.	N/A	QMA
Power Supply	TDK-Lambda DTM300PW280D1	Powered from FXm-C

Characteristics	Description
Radio System Type	5G NR
Channel Spacing	0.005 or 0.015 MHz
Channel Bandwidths	10 / 15 / 20 / 25 / 30 / 40 MHz
Type of Modulation	QPSK
Description of Product	Transportable Base Station System
Type of Device	Class A Digital Device and External Switching Power Supply

1.2 Test Environment

Temperature:	21 - 24 °C
Relative humidity:	30 - 50 %
Normal test voltage:	120 V 60Hz AC

The values are the limit registered during the test period.

All tests were performed with the listed power supplies powered from a regulated AC Power Source.

1.3 Test Engineers

Frode Sveinsen

1.4 Test Configurations

Test Configuration	Tested with the EUT in standby mode.
Description of Test Set-up	The Controller is latched on to the Main Unit. The Main Unit has antenna connectors for TX and RX antennas.

1.5 Other Comments

The system consists of Main Unit and Controller Unit.

All tests were performed with the EUT in standby mode.

2 TEST REPORT SUMMARY

2.1 General

All measurements are traceable to national standards.

All tests were performed in accordance with ANSI C63.4-2014 where applicable. Radiated emissions are made in a 10m semi-anechoic chamber. A description of the test facility is on file with FCC and Industry Canada.

2.2 Test Summary

Name of test	FCC CFR 47, Paragraph #	ISED ICES-003, Issue 7, Paragraph #	Verdict
Power Line Conducted Emission	15.107(a)	3.2.1	Complies
Spurious Emissions (Radiated)	15.109	3.2.2	Complies

3 TEST RESULTS

3.1 Power Line Conducted Emissions

FCC Part 15.107 (a)

ISED ICES-003 Issue 7, Clause 3.2.1

Test Method: ANSI C63.4-2014 using 50 μ H/50 ohms LISN.

Test Results: **Complies**

Measurement Data: **See attached plots.**

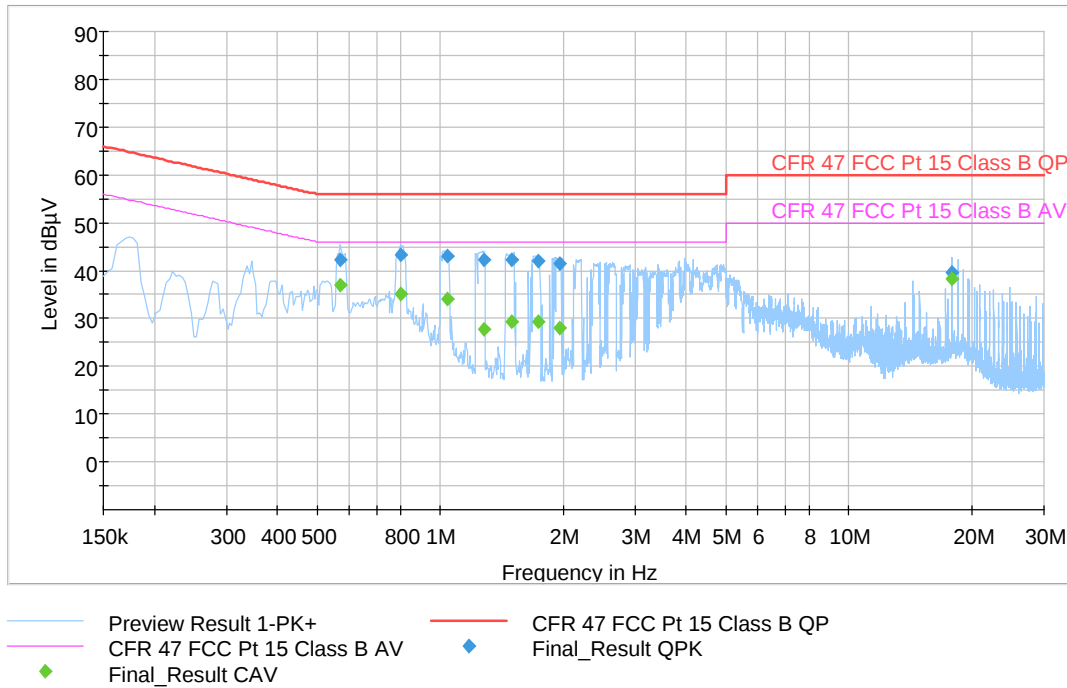
The test was performed to Class B limits.

All tests were performed with 120V 60Hz AC.

Highest measured value (L1 and N):

Frequency (MHz)	QuasiPeak (dB μ V)	CAverage (dB μ V)	Limit (dB μ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.570000	---	36.85	46.00	9.15	15000.0	9.000	L1	OFF	9.6
0.570000	42.30	---	56.00	13.70	15000.0	9.000	L1	OFF	9.6
0.802000	43.17	---	56.00	12.83	15000.0	9.000	N	OFF	9.5
0.802000	---	35.23	46.00	10.77	15000.0	9.000	N	OFF	9.5
1.042000	42.99	---	56.00	13.01	15000.0	9.000	N	OFF	9.5
1.042000	---	34.10	46.00	11.90	15000.0	9.000	N	OFF	9.5
1.282000	42.27	---	56.00	13.73	15000.0	9.000	L1	OFF	9.7
1.282000	---	27.77	46.00	18.23	15000.0	9.000	L1	OFF	9.7
1.494000	42.18	---	56.00	13.82	15000.0	9.000	L1	OFF	9.7
1.494000	---	29.26	46.00	16.74	15000.0	9.000	L1	OFF	9.7
1.734000	---	29.28	46.00	16.72	15000.0	9.000	L1	OFF	9.7
1.734000	41.85	---	56.00	14.15	15000.0	9.000	L1	OFF	9.7
1.966000	41.37	---	56.00	14.63	15000.0	9.000	L1	OFF	9.7
1.966000	---	28.05	46.00	17.95	15000.0	9.000	L1	OFF	9.7
17.882000	39.59	---	60.00	20.41	15000.0	9.000	L1	OFF	9.9
17.882000	---	38.39	50.00	11.61	15000.0	9.000	L1	OFF	9.9

Full Spectrum



120V 60Hz

Blue is Peak Det
Green is Average Det

3.2 Spurious Emissions (Radiated), Class A

FCC Part 15.109

ISED ICES-003 Issue 7, Clause 3.2.2

Test method: ANSI C63.4-2014, Class A @10m

Test Results:

Radiated Emissions 30 - 1000 MHz

Detector: Peak (found frequencies were measured with Quasi-Peak Detector)

Measuring distance 3 m

The EUT were rotated 360 degrees and the antenna height varied between 1 and 4 m.

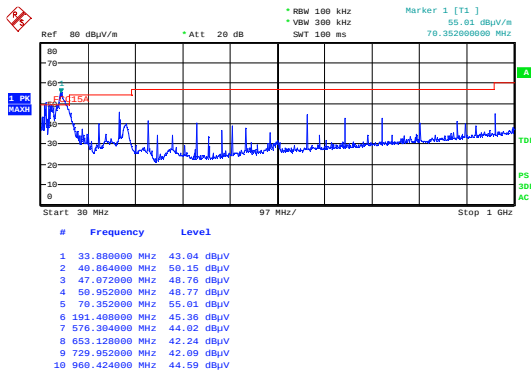
B100 J					
Measured Frequency (MHz)	Measuring Distance (m)	Detector	Measured Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
73.3	3	QP	47.2	50	2.8
75.68	3	QP	47.4	50	2.6
192.0	3	QP	49.5	54	4.5
30-88	3	PK	< 50	50	> 0
88-216	3	PK	< 54	54	> 0
216-960*	3	PK	< 50	57	> 7
960-1000	3	PK	< 50	60	> 10

*Except 192.0 MHz

Limits, Class A

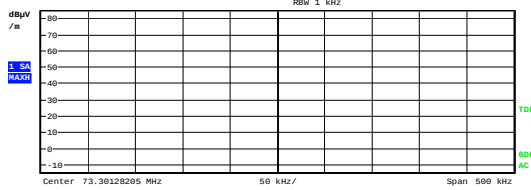
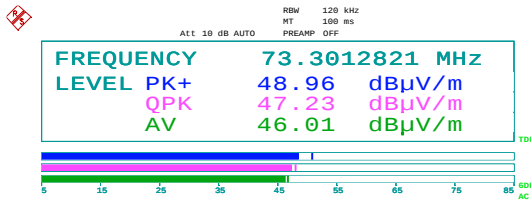
FCC	Part 15.109	
ISED	ICES-003 Issue 7, Clause 3.2.2	
	Radiated emission limit @3 meters	
Frequency (MHz)	FCC Part 15B QP (dBµV/m)	ISED ICES-003 QP (dBµV/m)
30 – 88	50	50
88 – 216	54	54
216 – 230	57	57
230 – 960	57	57.5
Above 960	60	60

¹ The limit above 1000 MHz is specified for Average Detector, when the measurement is performed with a Peak Detector a Duty-Cycle Correction Factor has to be calculated to find the corresponding Average Detector value.



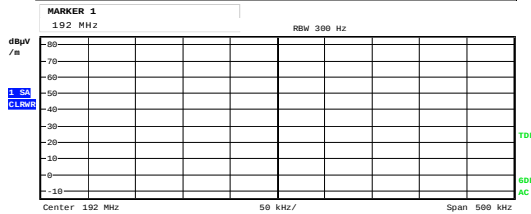
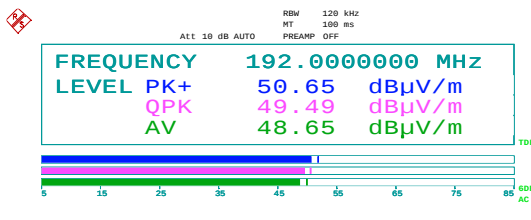
Date: 10.FEB.2023 15:49:38

Radiated Emissions 30 - 1000 MHz, VP



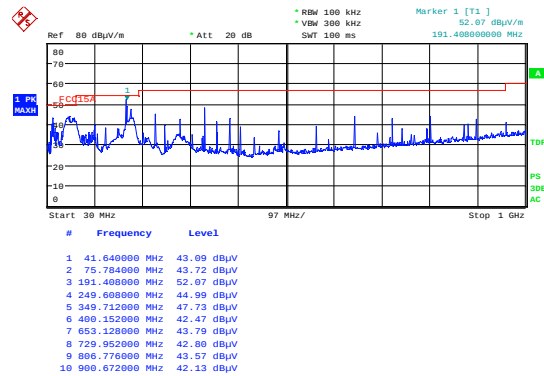
Date: 10.FEB.2023 15:58:34

Radiated Emissions 73.3 MHz, Max: VP



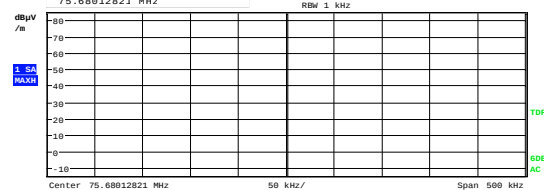
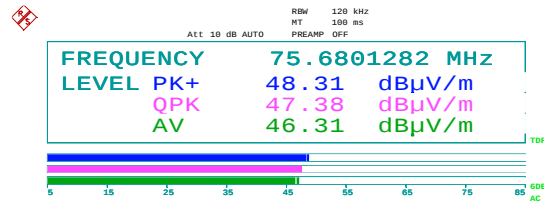
Date: 10.FEB.2023 15:13:08

Radiated Emissions 192 MHz, Max: HP



Date: 10.FEB.2023 15:51:29

HP



Date: 10.FEB.2023 15:20:54

Radiated Emissions 75.7 MHz, Max: VP



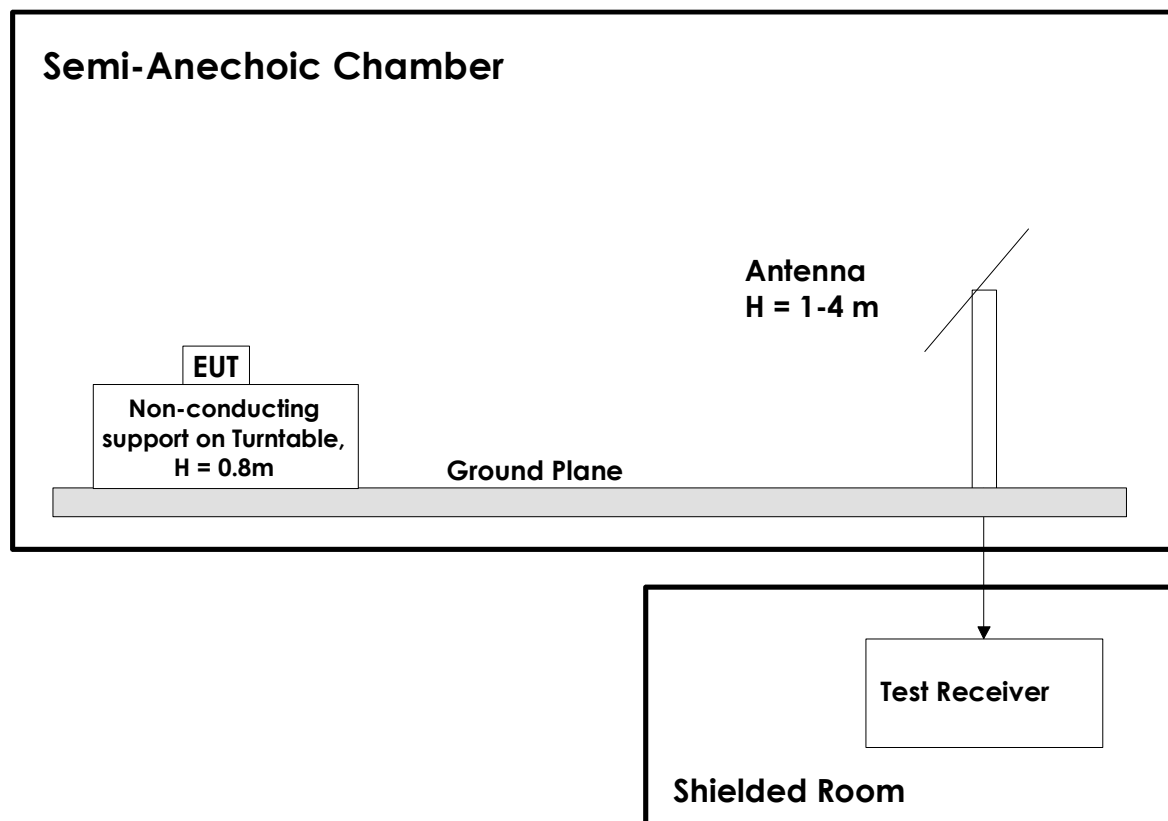
4 Measurement Uncertainty

Measurement Uncertainty Values		
Test Item		Uncertainty
Spurious Emissions, Radiated	< 1 GHz	±2.5 dB
	> 1 GHz	±2.2 dB
Power Line Conducted Emissions		+2.9 / -4.1 dB
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 Test Setups

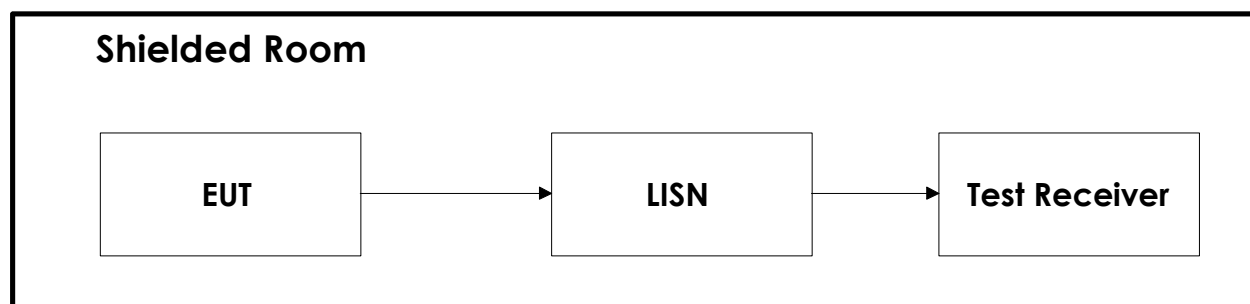
5.1 Radiated Emissions Test



Test Set-Up 1

This test setup is used for all radiated emissions tests. For frequencies below 30 MHz the measuring distance is 10m, for all other frequencies it 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.

5.2 Power Line Conducted Emissions Test



Test Set-Up 2

6 Test Equipment Used

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 Testhouse.

No.	Model number	Description	Manufacturer	Ref. no.	Cal. date	Cal. Due
1	ESU40	Measuring Receiver	Rohde & Schwarz	LR 1639	2023-01	2024-01
3	JB3	BiLog Antenna	Sunol	N-4525	2022-09	2025-09
4	310	Preamplifier	Sonoma Inst.	LR 1686	2022-08	2023-08
5	6812B	AC Power Source	Agilent	LR 1515	2022-11	2024-11
6	ESC13	Measuring Receiver	Rohde & Schwarz	N-4259	2021-11	2023-11
7	ENV216	Two Line V-Network	Rohde & Schwarz	LR 1665	2021-12	2023-12

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
3	Nemko AS	RSPlot	1.0.8.0	Screenshots from R&S Spectrum Analyzers