REP008745

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	Nemko Instituttveien 6 Kjeller, Norway www.nemko.com CAB Number: FCC: NO0001 ISED: NO0470 ilac-MRA NORWEGIAN ACCREDITATION TEST 033 **An accredited technical test executed under the Norwegian accreditation scheme**

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Template version: C

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 is 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 µH/50 ohms LISN.

Test Results: **Complies**

Measurement Data: **See attached plots.**

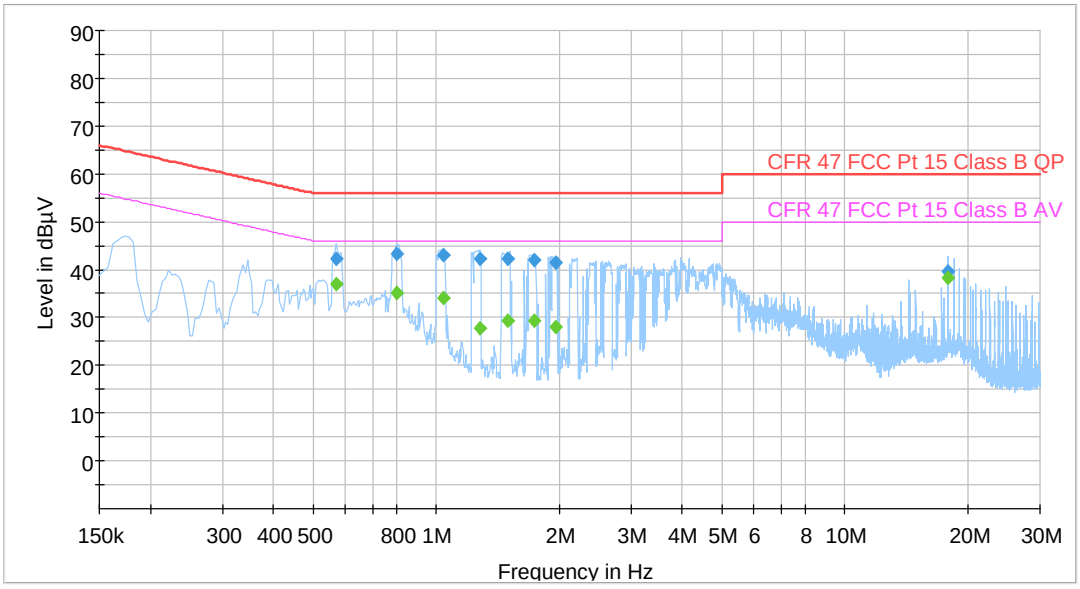
The test was performed to Class B limits.

All tests were performed with 120V 60Hz AC.

Highest measured value (L1 and N):

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	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



Preview Result 1-PK+
CFR 47 FCC Pt 15 Class B AV
Final_Result CAV
CFR 47 FCC Pt 15 Class B QP
Final_Result QPK

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.

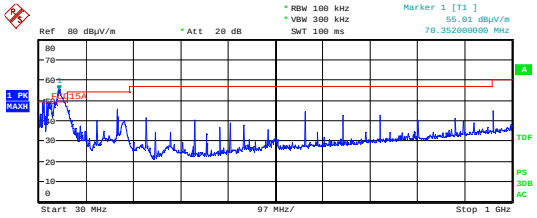
B100 J					
Measured Frequency (MHz)	Measuring Distance (m)	Detector	Measured Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
73.3	3	QP	47.2	50	2.8
75.68	3	QP	47.4	50	2.6
192.0	3	QP	49.5	54	4.5
30-88	3	PK	< 50	50	> 0
88-216	3	PK	< 54	54	> 0
216-960*	3	PK	< 50	57	> 7
960-1000	3	PK	< 50	60	> 10

*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.



#	Frequency	Level
1	33.880000 MHz	43.04 dBµV
2	40.864000 MHz	50.15 dBµV
3	47.072000 MHz	48.76 dBµV
4	50.952000 MHz	48.77 dBµV
5	70.352000 MHz	55.01 dBµV
6	191.408000 MHz	45.36 dBµV
7	576.304000 MHz	44.02 dBµV
8	653.128000 MHz	42.24 dBµV
9	729.952000 MHz	42.09 dBµV
10	960.424000 MHz	44.59 dBµV

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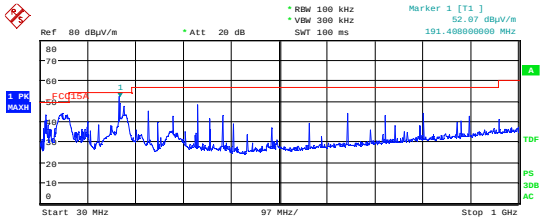

#	Frequency	Level
1	41.640000 MHz	43.09 dBµV
2	75.784000 MHz	43.72 dBµV
3	191.408000 MHz	52.07 dBµV
4	249.608000 MHz	44.99 dBµV
5	349.712000 MHz	47.73 dBµV
6	400.152000 MHz	42.47 dBµV
7	653.128000 MHz	43.79 dBµV
8	729.952000 MHz	42.80 dBµV
9	806.776000 MHz	43.57 dBµV
10	900.672000 MHz	42.13 dBµV

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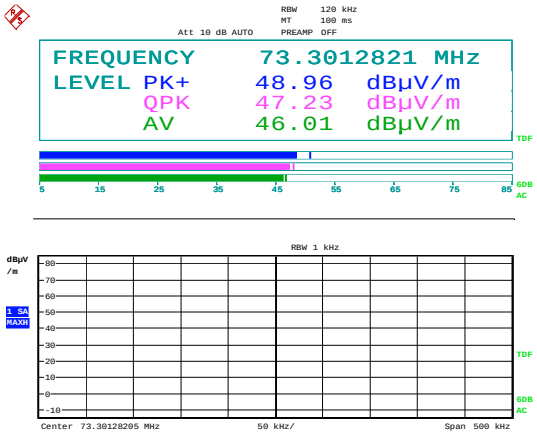
Radiated Emissions 30 – 1000 MHz, VP

HP



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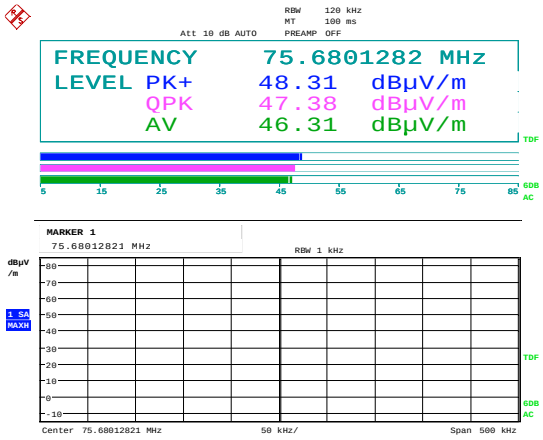
Radiated Emissions 73.3 MHz, Max: VP



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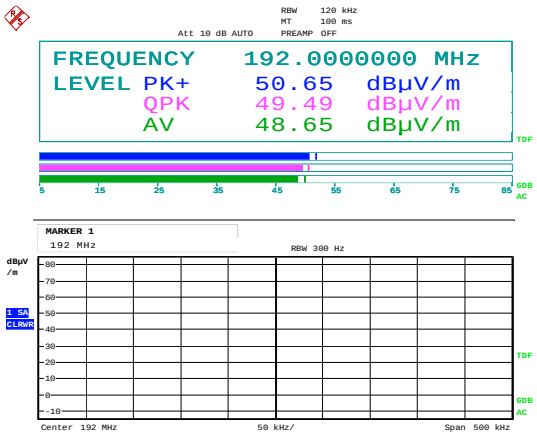
Radiated Emissions 75.7 MHz, Max: VP



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Radiated Emissions 192 MHz, Max: HP

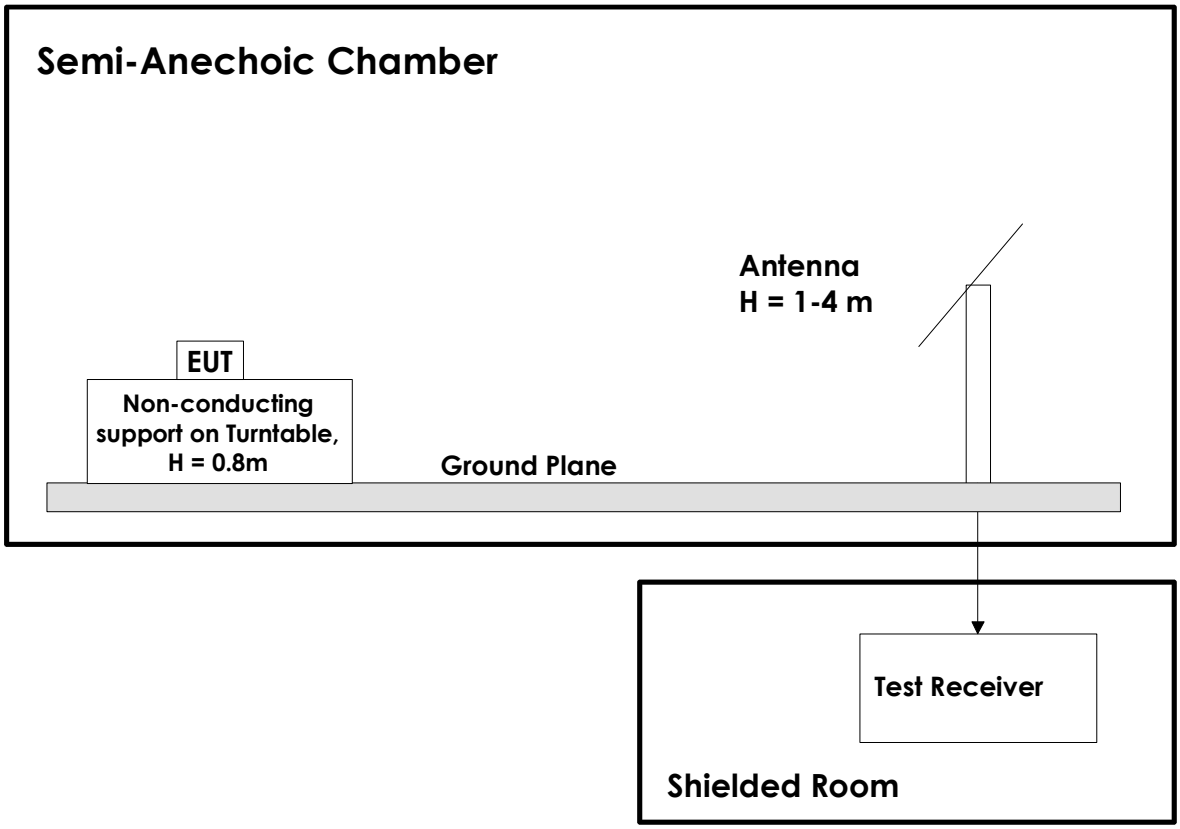
4 Measurement Uncertainty

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

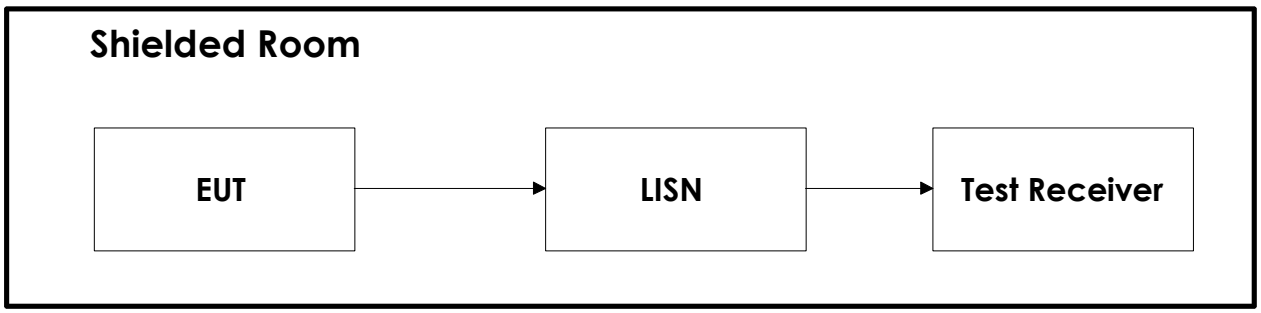
5.1 Radiated Emissions Test



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	ESCI3	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