Report No. 450342-05-R00

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-C, FXm-XG, FXm-B100 Model I
Rating	See clause 1.1
Trademark	EXFO
Serial number	See clause 1.1
Additional information	GSM, WCDMA, LTE
Tested according to	**FCC Part 15, subpart B** Other Class B Digital Device **Industry Canada ICES-003, Issue 7** Information Technology Equipment (ITE)
Order number	450342
Tested in period	2022-01- to 2022-02-09
Issue date	2022-09-15
Name and address of the testing laboratory	Instituttveien 6 Kjeller, Norway www.nemko.com CAB Number: FCC: NO0001 ISED: NO470 An accredited technical test executed under the Norwegian accreditation scheme

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Revision history

Revision	Date	Comment	Sign
00	2022-09-15	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”.

CONTENTS

1 INFORMATION

1.1 Tested Item

Name	**EXFO**
Model Number	**FXm-C** **FXm-XG** **FXm-B100 Model I**
FCC ID	**2A7IGEXCBTS100I**
Power Supplies	**PowerStax Model: MS1U-6M-444400** **(Input: 100-240V~50-60Hz, Output: 10A, Max 900W)** **TDK-Lambda Model: DTM300PW280D1** **(Input 100-240V~3.3-1.4A, 50-60Hz, Output: 28.0V=10.71A, Max 300W)**

Model	**FXm-C**	**FXm-XG**	**FXm-B100 Model I**
Description	**Controller**	**Main Unit**	**Amplifier Unit**
Serial Number	**1353058**	**1359742**	**1362272**
HW Version	**3.0**	**4.1**	**4.0**
SW Version	**BSP 01.14.04-B328**	**/**	**/**
Input Voltage	**10-32 V_{DC}**	**N/A**	**24-32 V_{DC}**
Antenna Conn.	**N/A**	**N/A**	**N-Female**
RF-Coupler	**N/A**	**N/A**	**JFCC0699T2690NF-2-EXF-A** **S/N: 20101000126**
Power Supply	**TDK-Lambda** **DTM300PW280D1**	**Powered from** **FXm-C**	**PowerStax**

Characteristics	**Description**	
Radio System Type*	**GSM, WCDMA, LTE**	
Channel Spacing	**GSM, WCDMA**	**0.2 MHz**
	LTE	**0.1 MHz**
Channel Bandwidths	**GSM**	**0.2 MHz**
	WCDMA, LTE	**5 MHz**
Type of Modulation	**GSM**	**8-PSK**
	WCDMA	**QPSK**
	LTE	**QPSK**

1.2 Test Environment

Temperature:	**20 – 23 °C**
Relative humidity:	**30 – 50 %**
Normal test voltage:	**120V 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 / Daniel Weber

1.4 Test Equipment

See list of test equipment in clause 6.

1.5 Test Configurations

Test Configuration	**Tested with the EUT in standby mode.**

1.6 Other Comments

The system consists of Main Unit, Controller Unit and Amplifier Unit.

All three combinations have been tested with the listed power supplies.

For the Part 15B tests, the Power Supply cables were modified with ferrites, as shown in clause 4.

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 tests were performed to Class B limits.

All tests were performed with 120V 60Hz AC.

Highest measured value (L1 and N):

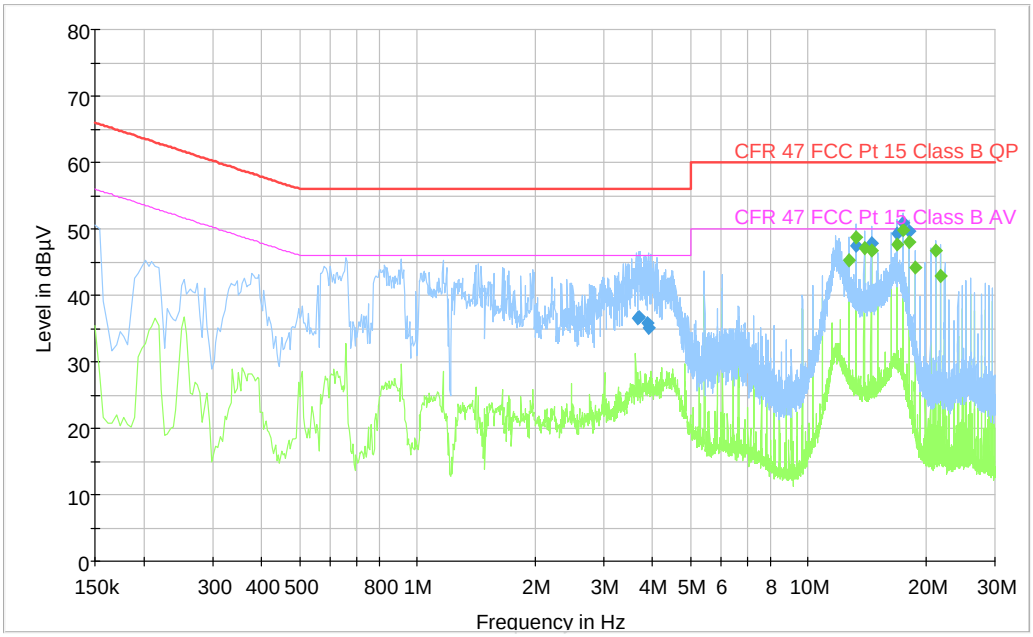
B100 Controller:

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter
12.680	---	45.32	50.00	4.68	1000	9	L1	OFF
13.284	---	48.70	50.00	1.30	1000	9	L1	OFF
13.888	---	47.18	50.00	2.82	1000	9	L1	OFF
14.492	---	46.82	50.00	3.18	1000	9	N	OFF
16.908	---	47.58	50.00	2.42	1000	9	N	OFF
16.908	49.29	---	60.00	10.71	1000	9	L1	OFF
17.512	---	49.73	50.00	0.27	1000	9	N	OFF
17.512	50.83	---	60.00	9.17	1000	9	L1	OFF
18.112	---	47.95	50.00	2.05	1000	9	L1	OFF
18.116	49.66	---	60.00	10.34	1000	9	L1	OFF
18.720	---	44.27	50.00	5.73	1000	9	L1	OFF
21.132	---	46.75	50.00	3.25	1000	9	L1	OFF
21.740	---	42.97	50.00	7.03	1000	9	L1	OFF

B100 I:

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter
9.056	---	45.46	50.00	4.54	1000	9	L1	OFF
9.660	---	48.26	50.00	1.74	1000	9	L1	OFF
10.264	---	44.59	50.00	5.41	1000	9	L1	OFF
11.748	50.56	---	60.00	9.44	1000	9	L1	OFF
12.680	50.03	---	60.00	9.97	1000	9	L1	OFF
12.680	---	47.46	50.00	2.54	1000	9	L1	OFF
13.284	---	48.63	50.00	1.37	1000	9	N	OFF
13.284	50.64	---	60.00	9.36	1000	9	L1	OFF
13.888	---	46.70	50.00	3.30	1000	9	L1	OFF
14.492	---	46.52	50.00	3.48	1000	9	L1	OFF
21.132	---	48.11	50.00	1.89	1000	9	N	OFF
21.736	---	48.02	50.00	1.98	1000	9	N	OFF
22.340	---	46.01	50.00	3.99	1000	9	L1	OFF

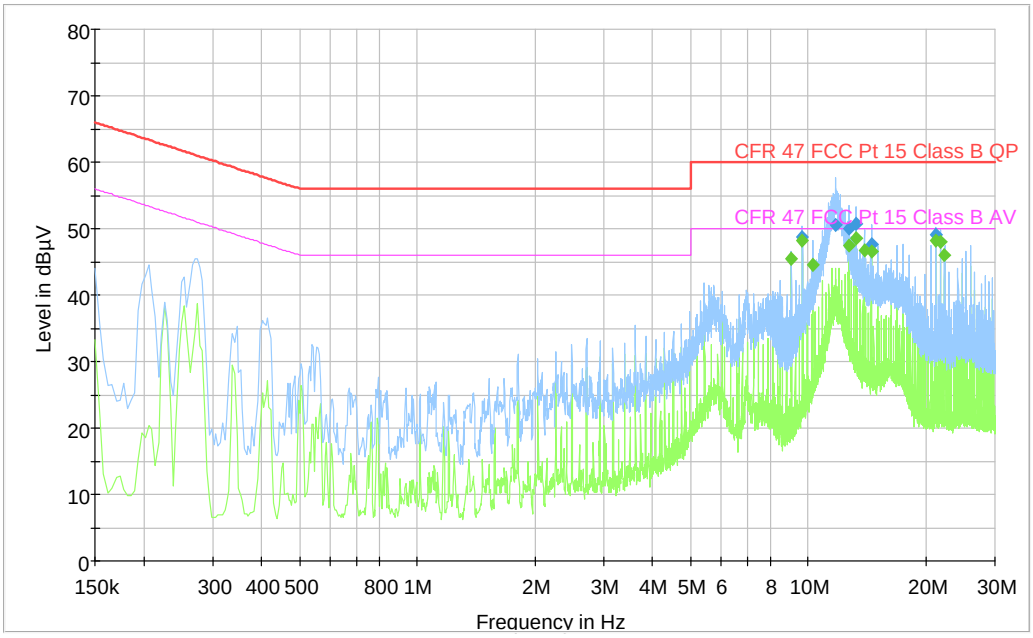
Full Spectrum



B100 Controller, 120V 60Hz

Blue is Peak Det
Green is Average Det

Full Spectrum



B100 I, 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 10m

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

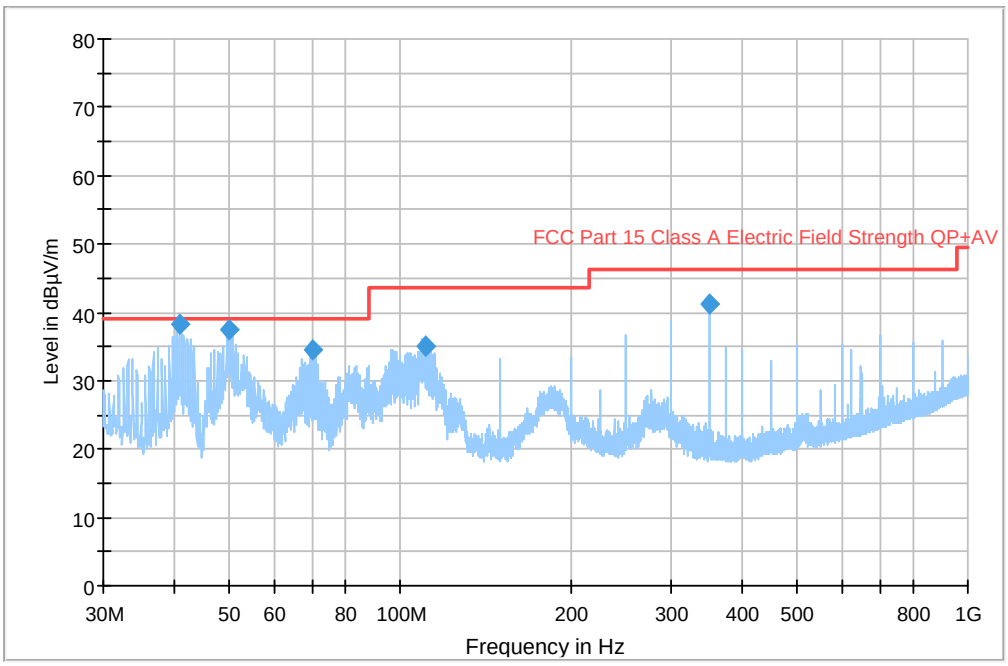
B100 I					
Measured Frequency (MHz)	Measuring Distance (m)	Detector	Measured Emission (dBµV/m)	Limit (dBµV/m)	Margin (dB)
41.05	10	QP	38.2	39.1	0.8
50.10	10	QP	37.3	39.1	1.7
70.04	10	QP	34.5	39.1	4.5
110.45	10	QP	35.0	43.5	8.5
349.98	10	QP	41.1	46.4	5.3

Limits, Class A

FCC	Part 15.109	
ISED	ICES-003 Issue 7, Clause 3.2.2	
	Radiated emission limit @10 meters	
Frequency (MHz)	FCC Part 15B QP (dBµV/m)	ISED ICES-003 QP (dBµV/m)
30 – 88	39.1	40.0
88 – 216	43.5	43.5
216 – 230	46.4	46.4
230 – 960	46.4	47.0
Above 960	49.5	49.5

[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.

Full Spectrum



Preview Result 1-PK+
FCC Part 15 Class A Electric Field Strength QP+AV
Final_Result QPK

Radiated Emissions 30 – 1000 MHz, B100 I

4 Modifications to PSU Cables

For Part 15B test ferrites had to be applied to the Power Supply cables as shown below.

FXm-B100 Model I	
	
6 Ferrites type Würth 742 711 32 were added to the PSU cables, as shown on above photos	

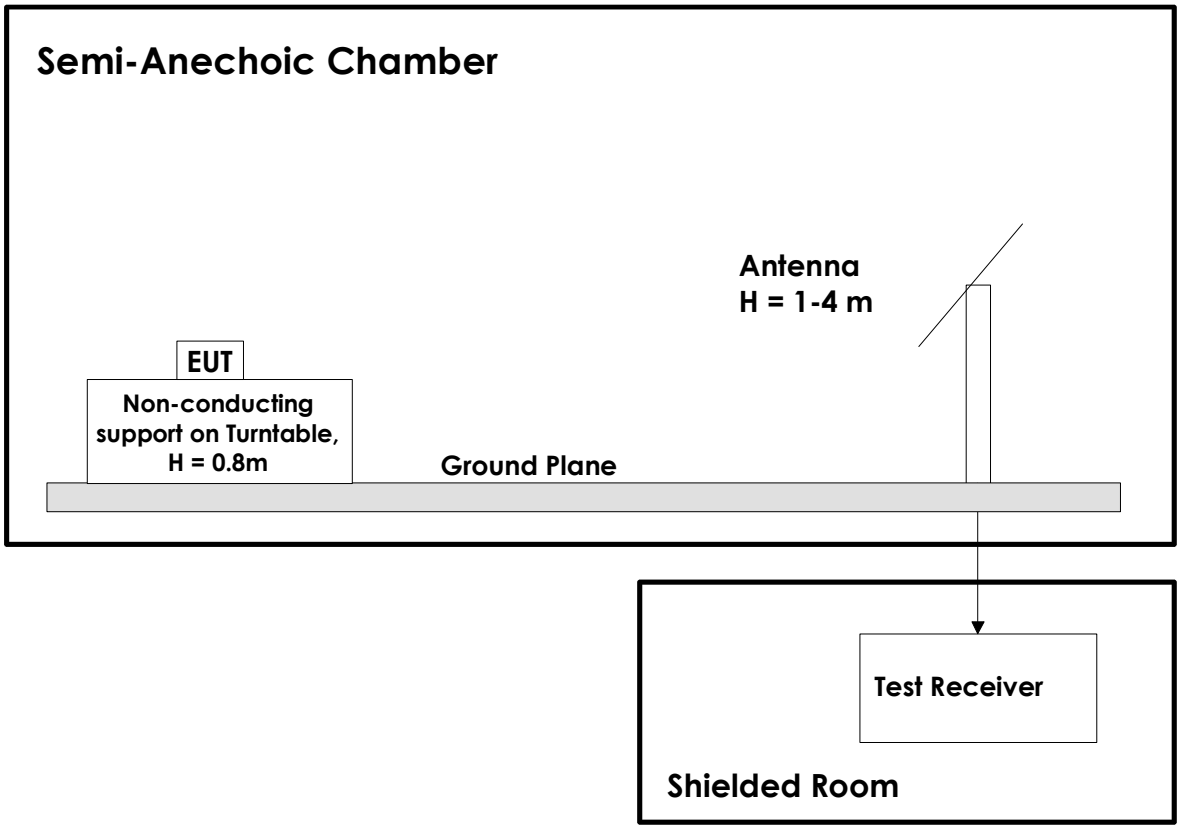
5 Measurement Uncertainty

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

6 Test Setups

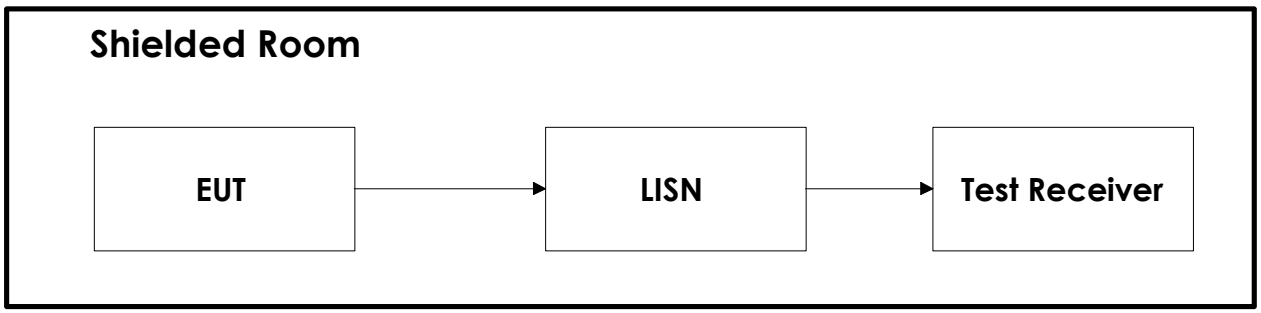
6.1 Radiated Emissions Test



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.

6.2 Power Line Conducted Emissions Test



Test Set-Up 2

7 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	2022-01	2023-01
2	L01G18G1	Low Pass Filter (1 GHz)	Microwave Circuits	LR 1768	2021-08	2022-08
3	JB3	BiLog Antenna	Sunol	N-4525	2020-03	2023-03
4	310	Preamplifier	Sonoma Inst.	LR 1686	2021-08	2022-08
5	6812B	AC Power Source	Agilent	LR 1515	2020-04	2022-04
6	ESCI3	Measuring Receiver	Rohde & Schwarz	N-4259	2021.10	2023-10
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