

Test Report on

LTE Cat M1 external Modem

according to NAPRD03 v5.35

HW:1
SW: 0 (SVN:03)

Test Report Reference: MDE_MIXTEL_1803_01

Date: 2019-04-04

Test Laboratory:

7layers GmbH
Borsigstraße 11
40880 Ratingen
Germany



Deutsche
Akkreditierungsstelle
D-PL-12140-01-00

Note:

The following test results relate only to the devices specified in this document. This report shall not be reproduced in parts without the written approval of the test laboratory.

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1 Administrative Data

1.1 Project Information

Project Name	MDE_MIXTEL_1803
Responsible for Testing	Andreas Tübel
Date of Report	2019-04-04
Testing Time Frame	2019-03-05 to 2019-03-11

Note: All date and time information is reported in UTC.

1.2 Applicant Information

Company	MiX Telematics International (Pty) Ltd
Address	Blaauwklip Office Park 2 Cnr Strand Str and Webers Valley Stellenbosch South Africa
Contact Person	Christo Bothma
Phone	+27 21 8805559
Email	Christo.Bothma@mixtelematics.com

1.3 Test Laboratory Information

The following list shows all Locations and Test Resources involved in the generation of test results:

7layers DE, Ratingen, Germany

Company Name	7layers GmbH
Address	Borsigstr. 11 40880 Ratingen NRW Germany
Contact	Michael Albert
Phone	+49 2102 749 201
Email	Michael.Albert@7layers.com
Laboratory accreditation no.	DAkKS D-PL-12140-01-00

List of Test Resources

ID	Name	Responsible	Accreditation Info
1	Radiated Emissions	Marco Kullik Jens Doerwald	DAkKS-Registration no. D-PL-12140-01-00, ISEDC OATS registration number 3699A-1, FCC accreditation registration number 929146
2	TP118 - COMPRION UT3	Michael Urlich Holger Reinke	DAkKS D-PL-12140-01-00

1.4 Signature of responsible for testing



Andreas Tübel

1.5 Signature of responsible(s) for accreditation scope



Holger Reinke

2 Test Object Data

2.1 Object Under Test (OUT) Description(s)

The following section lists all Objects Under Test (OUTs) involved during testing.

Object Under Test: LTE Cat M1 External Modem

Type / Model	LTE CAT M1 External Modem
Description	Cat M1
Normal Temperature	23 °C
Normal Voltage	12 V

Manufacturer:

Company	MiX Telematics International (Pty) Ltd
Address	Blauwklip Office Park 2 Cnr Strand Str and Webers Valley Stellenbosch South Africa
Contact Person	Christo Bothma
Phone	+27 21 8805559
Email	Christo.Bothma@mixtelematics.com

3 Results

3.1 General

Documentation of tested devices

Available at the test laboratory.

Interpretation of the test results

The results of the inspection are described on the following pages, where 'Conformity' or 'Passed' means that the certification criteria were verified and that the tested device conforms to the applied standard.

In cases where 'Declaration' is stated, the required documents are available in the manufacturer's product documentation.

In cases where 'not applicable' is stated, the test case requirements are not relevant to the specific equipment implementation.

Notes

1. This report contains the abbreviated information content pertaining to services rendered. Supporting documentation not included herein is maintained and available at the test laboratory.
2. All tests are performed under environmental conditions within the requirements of the specifications. Environmental condition records are available at the test laboratory.
3. Device contains integrated module u-blox Sara-R410M-52B (SW: L0.0.00.00.06.05 SVN:03)

3.2 Applicable Quality Policies

Quality Policy	Version	Expiration Date
NAPRD03	5.35	

3.3 Applicable Test Specification(s)

Test Specification	3GPP TS 36.124
Version	V16.0.0
Description	ElectroMagnetic Compatibility (EMC) requirements for mobile terminals and ancillary equipment (Release 16)
Test Specification	ETSI TS 102 230-1
Version	V11.0.0
Description	Smart Cards; UICC-Terminal interface; Physical, electrical and logical test specification (Release 11)

3.4 Result Statistics

Test Specification	Total	Pass	Result Verdict		Performed	Pass ratio
			Fail	Declaration		
3GPP TS 36.124	5	5	0	0	0	100.00 %
ETSI TS 102 230-1	26	26	0	0	0	100.00 %

Note: Pass, Declaration, Performed, Fail and Inconclusive results are regarded for the pass ratio calculation.
 Pass, Performed and Declaration are summarized as Pass results. Fail and Inconclusive are summarized as Fail results.
 All are summarized as total count (Pass + Declaration + Performed + Fail + Inconclusive).
 The pass ratio is calculated by the number of Pass results divided by the number of total results.
 All other results like Error or Not Tested are not regarded for the calculation.

3.5 Result Summary

Test Specification: 3GPP TS 36.124

Test Case Name / Description Test Condition	Category	Verdict	Date	Test Res. ID	Sample/Setup
8.2 / Radiated Emission Band = eFDD12, Part = traffic	A	Passed footnote:1	2019-03-11	TR 1	aa01
Band = eFDD2, Part = traffic	A	Passed footnote:1	2019-03-11	TR 1	aa01
Band = eFDD4, Part = traffic	A	Passed footnote:1	2019-03-11	TR 1	aa01
Band = eFDD4, Part = idle	A	Passed	2019-03-11	TR 1	aa01
Band = eFDD5, Part = traffic	A	Passed footnote:1	2019-03-11	TR 1	aa01

Test Specification: ETSI TS 102 230-1

Test Case Name / Description Test Condition	Category	Verdict	Date	Test Res. ID	Sample/Setup
5.1.1 / Phase preceding Terminal power on	A	Passed	2019-03-05	TR 2	aa01
5.1.2.2 / Phase during UICC power on: 1,8 V - 3 V	A	Passed	2019-03-05	TR 2	aa01
5.1.3.2 / Phase during Terminal power off: 1,8 V - 3 V	A	Passed	2019-03-05	TR 2	aa01
5.1.5.3 / Reaction of 1,8 V technology Terminals on type recognition of 1,8 V technology UICCs Parameter = 1.8V-3V	A	Passed	2019-03-05	TR 2	aa01
5.1.5.4 / Reaction of 1,8 V technology Terminals on type recognition of 3V technology UICCs Parameter = 1.8V-3V	A	Passed	2019-03-05	TR 2	aa01
5.1.5.6.2 / Reaction of Terminals receiving no ATR, 1,8 V - 3 V	A	Passed	2019-03-05	TR 2	aa01
5.2.2.3 / Electrical tests on contact C1, Test 1: 1,8 V - 3 V Parameter = 1.8V-3V (1.8V mode)	A	Passed	2019-03-05	TR 2	aa01
Parameter = 1.8V-3V (3V mode)	A	Passed	2019-03-05	TR 2	aa01
5.2.2.4 / Electrical tests on contact C1, Test 2: 1,8 V - 3 V Parameter = 1.8V-3V (1.8V mode), Procedure = 3	A	Passed	2019-03-05	TR 2	aa01

Test Case Name / Description Test Condition	Category	Verdict	Date	Test Res. ID	Sample/Setup
Parameter = 1.8V-3V (1.8V mode), Procedure = 5	A	Passed	2019-03-05	TR 2	aa01
Parameter = 1.8V-3V (1.8V mode), Procedure = 4	A	Passed	2019-03-05	TR 2	aa01
Parameter = 1.8V-3V (1.8V mode), Procedure = 2	A	Passed	2019-03-05	TR 2	aa01
Parameter = 1.8V-3V (1.8V mode), Procedure = 6	A	Passed	2019-03-05	TR 2	aa01
Parameter = 1.8V-3V (1.8V mode), Procedure = 1	A	Passed	2019-03-05	TR 2	aa01
Parameter = 1.8V-3V (3V mode), Procedure = 3	A	Passed	2019-03-05	TR 2	aa01
Parameter = 1.8V-3V (3V mode), Procedure = 5	A	Passed	2019-03-05	TR 2	aa01
Parameter = 1.8V-3V (3V mode), Procedure = 4	A	Passed	2019-03-05	TR 2	aa01
Parameter = 1.8V-3V (3V mode), Procedure = 2	A	Passed	2019-03-05	TR 2	aa01
Parameter = 1.8V-3V (3V mode), Procedure = 6	A	Passed	2019-03-05	TR 2	aa01
Parameter = 1.8V-3V (3V mode), Procedure = 1	A	Passed	2019-03-05	TR 2	aa01
5.2.3.2 / Electrical tests on contact C2: 1,8 V - 3 V					
Parameter = 1.8V-3V (1.8V mode)	A	Passed	2019-03-05	TR 2	aa01
Parameter = 1.8V-3V (3V mode)	A	Passed	2019-03-05	TR 2	aa01
5.2.4.2 / Electrical tests on contact C3: 1,8 V - 3 V					
Parameter = 1.8V-3V (1.8V mode)	A	Passed	2019-03-05	TR 2	aa01
Parameter = 1.8V-3V (3V mode)	A	Passed	2019-03-05	TR 2	aa01
5.2.5.3 / Electrical tests on contact C7, Test 1: 1,8 V - 3 V					
Parameter = 1.8V-3V (1.8V mode)	A	Passed	2019-03-05	TR 2	aa01
Parameter = 1.8V-3V (3V mode)	A	Passed	2019-03-05	TR 2	aa01

3.6 Detailed Footnotes

Footnote 1: According to PTCRB rules only frequency ranges for harmonics were checked for this test.

4 Test Equipment Details

4.1 List of Test Equipment

The information shown below is valid for the testing time frame of this test report.

Test Resource 1: Radiated Emissions

Description: Lab to perform radiated emission tests

Single Devices of Test Resource Radiated Emissions

Name	Serial Number	Manufacturer
3160-09	00083069	EMCO Elektronik GmbH
3160-10	00086675	EMCO Elektronik GmbH
4HC1600/12750-1.5-KK	9942011	Trilithic
5HC2700/12750-1.5-KK	9942012	Trilithic
5HC3500/18000-1.2-KK	200035008	Trilithic
AM 4.0	AM4.0/180/11920513	Maturo GmbH
Anechoic Chamber	none	Frankonia
<i>Event</i>		<i>Execution Date</i>
Calibration		2018-06
Calibration		2018-06
		<i>Next Execution</i>
		2020-06
		2020-06
Name	Serial Number	Manufacturer
AS 620 P	620/37	HD GmbH
Chroma 6404	64040001304	Chroma ATE INC.
ESIB 26	830482/004	Rohde & Schwarz
<i>Event</i>		<i>Execution Date</i>
Calibration		2018-01
		<i>Next Execution</i>
		2020-01
Name	Serial Number	Manufacturer
ESR 7	101424	Rohde & Schwarz
<i>Event</i>		<i>Execution Date</i>
Calibration		2019-01
		<i>Next Execution</i>
		2020-01
<i>Software Version</i>		<i>Start Date</i>
Firmware 3.46SP1		2019-01-07
		<i>End Date</i>
Name	Serial Number	Manufacturer
ESW44	101603	Rohde & Schwarz GmbH & Co. KG
<i>Event</i>		<i>Execution Date</i>
Calibration		2018-05
		<i>Next Execution</i>
		2019-05
Name	Serial Number	Manufacturer
Fluke 177	86670383	Fluke Europe B.V.
<i>Event</i>		<i>Execution Date</i>
Calibration		2018-04
		<i>Next Execution</i>
		2020-04
Name	Serial Number	Manufacturer
FSW 43	103779	Rohde & Schwarz

	<i>Event</i>	<i>Execution Date</i>	<i>Next Execution</i>
	Calibration	2019-02	2021-02
Name	Serial Number	Manufacturer	
FS-Z140	101007	Rohde & Schwarz Messgerätebau GmbH	
	<i>Event</i>	<i>Execution Date</i>	<i>Next Execution</i>
	Calibration	2017-02	2020-02
Name	Serial Number	Manufacturer	
FS-Z220	101005	Rohde & Schwarz Messgerätebau GmbH	
	<i>Event</i>	<i>Execution Date</i>	<i>Next Execution</i>
	Calibration	2017-03	2020-03
Name	Serial Number	Manufacturer	
FS-Z325	101006	Rohde & Schwarz Messgerätebau GmbH	
	<i>Event</i>	<i>Execution Date</i>	<i>Next Execution</i>
	Calibration	2017-03	2020-03
Name	Serial Number	Manufacturer	
FS-Z60	100178	Rohde & Schwarz Messgerätebau GmbH	
	<i>Event</i>	<i>Execution Date</i>	<i>Next Execution</i>
	Calibration	2016-12	2019-12
Name	Serial Number	Manufacturer	
FS-Z90	101686	Rohde & Schwarz Messgerätebau GmbH	
	<i>Event</i>	<i>Execution Date</i>	<i>Next Execution</i>
	Calibration	2017-03	2020-03
Name	Serial Number	Manufacturer	
HF 906	357357/001	Rohde & Schwarz	
	<i>Event</i>	<i>Execution Date</i>	<i>Next Execution</i>
	Calibration	2018-03	2021-03
Name	Serial Number	Manufacturer	
HF 906	357357/002	Rohde & Schwarz	
	<i>Event</i>	<i>Execution Date</i>	<i>Next Execution</i>
	Calibration	2018-09	2021-09
Name	Serial Number	Manufacturer	
HF 907	102444	Rohde & Schwarz	
	<i>Event</i>	<i>Execution Date</i>	<i>Next Execution</i>
	Calibration	2018-07	2021-07
Name	Serial Number	Manufacturer	
HFH2-Z2	829324/006	Rohde & Schwarz	
	<i>Event</i>	<i>Execution Date</i>	<i>Next Execution</i>
	Calibration	2018-01	2021-01

Name	Serial Number	Manufacturer
HL 562	830547/003	Rohde & Schwarz
	<i>Event</i>	<i>Execution Date</i> <i>Next Execution</i>
	Calibration	2018-07 2021-07
Name	Serial Number	Manufacturer
HL 562 Ultralog	100609	Rohde & Schwarz
	<i>Event</i>	<i>Execution Date</i> <i>Next Execution</i>
	Calibration	2016-04 2019-04
Name	Serial Number	Manufacturer
JS4-00101800-35-5P	896037	Miteq
JS4-00102600-42-5A	619368	Miteq
JS4-18002600-32-5P	849785	Miteq
MFS	002	Datum GmbH
	<i>Event</i>	<i>Execution Date</i> <i>Next Execution</i>
	Calibration	2018-10 2020-10
Name	Serial Number	Manufacturer
NRVD	828110/016	Rohde & Schwarz GmbH & Co. KG
	<i>Event</i>	<i>Execution Date</i> <i>Next Execution</i>
	Calibration	2018-07 2019-07
Name	Serial Number	Manufacturer
NRV-Z1	827753/005	Rohde & Schwarz GmbH & Co. KG
	<i>Event</i>	<i>Execution Date</i> <i>Next Execution</i>
	Calibration	2018-07 2019-07
Name	Serial Number	Manufacturer
Opus10 THI (8152.00)	12482	Lufft Mess- und Regeltechnik GmbH
	<i>Event</i>	<i>Execution Date</i> <i>Next Execution</i>
	Calibration	2017-03 2019-03
Name	Serial Number	Manufacturer
Opus10 TPR (8253.00)	13936	Lufft Mess- und Regeltechnik GmbH
	<i>Event</i>	<i>Execution Date</i> <i>Next Execution</i>
	Calibration	2017-04 2019-04
Name	Serial Number	Manufacturer
SGH-03	060	RPG-Radiometer Physics GmbH
SGH-05	075	RPG-Radiometer Physics GmbH
SGH-08	064	RPG-Radiometer Physics GmbH
SGH-12	326	RPG-Radiometer Physics GmbH
SGH-19	093	RPG-Radiometer Physics GmbH
Tilt device Maturo (Rohacell)	TD1.5-10kg/024/3790709	Maturo GmbH
WHKX 7.0/18G-8SS	09	Wainwright

Test System Anechoic Chamber 1 of Test Resource Radiated Emissions

Description: Anechoic Chamber for radiated testing, 10.58x6.38x6.00 m³
 Manufacturer:
 Serial Number:

Software Version	Start Date	End Date
SW Update to EMC32 v10.35.01	2018-01-23	

Single Devices of Test System Anechoic Chamber 1

Name	Serial Number	Manufacturer
Anechoic Chamber	none	Frankonia
	<i>Event</i>	<i>Execution Date</i> <i>Next Execution</i>
	Calibration	2018-06 2020-06
	Calibration	2018-06 2020-06

Test System Anechoic Chamber 2 of Test Resource Radiated Emissions

Description: Anechoic Chamber; 8.8 m x 4.6 m x 4.05 m for Radiated Spurious Emissions and Output Power Measurements
 Manufacturer: see single devices
 Serial Number: see single devices

Software Version	Start Date	End Date
SW Update to EMC32 v10.35.01	2018-01-23	

Single Devices of Test System Anechoic Chamber 2

Name	Serial Number	Manufacturer
AFS42-00101800-25-S-42	2035324	Miteq
ASP 1.2/1.8-10 kg	-	Maturo GmbH
Fully Anechoic Room	P26971-647-001-PRB	Albatross Projects
	<i>Event</i>	<i>Execution Date</i> <i>Next Execution</i>
	Calibration	2018-06 2020-06
Name	Serial Number	Manufacturer
PAS 2.5 - 10 kg	-	Maturo GmbH
Tilt device Maturo (Rohacell)	TD1.5-10kg/024/3790709	Maturo GmbH
TT 1.5 WI	-	Maturo GmbH

Test Resource 2: TP118 - COMPRION UT3

Description:

Test System Comprion UT3 of Test Resource TP118 - COMPRION UT3

Description:
 Manufacturer: COMPRION GmbH
 Serial Number:

Single Devices of Test System Comprion UT3

Name	Serial Number	Manufacturer
Analog Probe	45168	COMPRION GmbH
	<i>Event</i>	<i>Execution Date</i> <i>Next Execution</i>
	Calibration	2018-03 2019-03
Name	Serial Number	Manufacturer
UT3	40292	COMPRION GmbH
	<i>Event</i>	<i>Execution Date</i> <i>Next Execution</i>
	Calibration	2018-03 2019-03
	<i>Software Version</i>	<i>Start Date</i> <i>End Date</i>
	DTC R7.4 IT3 Test Platform 6.0.0.1 ---	2018-03-19

5 Annex

5.1 Object Under Test (OUT) Features

Supported Features for Object Under Test: LTE Cat M1 External Modem

Name	Short Description
3GPP TS 36.521-2	
A.0/6	Rel-13
A.4.3-3/2	eFDD2
A.4.3-3/4	eFDD4
A.4.3-3/5	eFDD5
A.4.3-3/12	eFDD12
3GPP TS 36.523-2	
A.4.3.1-1/2	eFDD2
A.4.3.1-1/4	eFDD4
A.4.3.1-1/5	eFDD5
A.4.3.1-1/12	eFDD12
A.4.3.2-2A/1	Category DL M1
A.4.3.2-3A/1	Category UL M1
ETSI TS 102 230-1	
A.1/4	Class B
A.1/5	Class C
A.1/6	Compliant to ETSI TS 121 111 [3]

5.2 Sample aa01

Sample Name: aa01	
Object Under Test	LTE Cat M1 External Modem
Description	Cat M1
Serial Number	0077BA000230
Hardware Version	1
Software Version	0
IMEISV	3578120908541003

End of Test Report