PARTIAL Test Report
18-1-0097202T01a

D-PL-12047-01-01
D-PL-12047-01-03
D-PL-12047-01-04

Number of pages:	17	**Date of Report:**	2021-May-31
Testing company:	CETECOM GmbH Im Teelbruch 116 45219 Essen Germany Tel. + 49 (0) 20 54 / 95 19-0 Fax: + 49 (0) 20 54 / 95 19-150	**Applicant:**	ACTIA Nordic AB
Product: **Model:**	**Telematics Device** **103360002**		
FCC ID:	2AGKK103360002	**IC:**	20839-103360002
Testing has been carried out in accordance with:	Title 47 CFR, Chapter I FCC Regulations, Subchapter B Part 22, Part 24, Part 27 RSS-132, Issue 3; RSS-133, Issue 6; RSS-130, Issue 2; RSS-139, Issue 3 Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".		
Tested Technology:	GSM + WLAN2.4GHZ, WCDMA + WLAN2.4GHZ LTE + WLAN2.4GHZ, GSM + WLAN5GHZ, GSM + BT		
Test Results:	**☒ The EUT complies with the requirements in respect of selected parameters subject to the test.** The test results relate only to devices specified in this document		

Signatures:

Ninovic Perez
2021.05.31 10:31:47 +02'00'

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Dipl.-Ing. Ninovic Perez	B.Sc. Mohamed Ahmed
Test Lab Manager	Test manager
Authorization of test report	Responsible of test report

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1 General information

1.1 Disclaimer and Notes

The test results of this test report relate exclusively to the test item specified in this test report as specified in chapter 2.7. CETECOM does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.
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Also we refer on special conditions which the applicant should fulfill according §2.927 to §2.948, special focus regarding modification of the equipment and availability of sample equipment for market surveillance tests.

1.2 Disclaimer and Notes

I declare that all measurements were performed by me or under my supervision and that all measurements have been performed and are correct to my best knowledge and belief to Industry Canada standards. All of the above requirements are met in accordance with enumerated standards.

This test report check for emissions generated by the device if operated on the intended typical way. The usual testcase is simulated by switching-on all wireless modular transmitters (allready approved) and checking for different GSM, WCDMA and LTE band combinations of the cellular part together with the transmitter WLAN and Bluetooth® LE Part.

For the emissions generated by the host and the composite system, the less stringent limits requirements, as presented below, are valid. (Cellular limits Part 22/24/27 less stringent than Part 15.247 limits valid for the un-licensed transmitter part)

1.3 Summary of Test Results

Test case in GSM850 band	Reference Clause FCC	Reference Clause ISED	Page	Remark	Result
AC-Power Lines Conducted Emissions	§15.207(a)	RSS-Gen Issue 5:§8.8	--	NP	--
Conducted RF output power	§2.1046(a)	RSS-132: 5.4 + SRSP 503 :5.1.3	--	NP	--
Radiated RF output power	§22.913(a)	4.4	--	NP	--
Occupied Channel Bandwidth 99%	§22.917(b), §2.202(a), §2.1049(h)	RSS-Gen, Issue 4: §6.7	--	NP	--
26dB Emission bandwidth	§22.917(b), §2.202(a), §2.1049(h)	RSS-Gen, Issue 4: §6.7	--	NP	--
Radiated Band Edge	§2.1053(a), §2.1057(a)(1) §22.917(a)(b)	RSS-132, Issue 3: 5.5(i)(ii)	--	NP	--
Conducted RF Band Edge	§22.917(a)(b)(c)(d) §2.1051, §2.1057(a)(1)	RSS-132, Issue 3: 5.5(i)(ii)	--	NP	--
Peak to Average ratio (PAPR)	§2.1046(a)	RSS-132: 5.4 + SRSP 503 :5.1.3	--	NP	--
Radiated field strength emissions below 30 MHz	§15.205, §15.209	RSS-Gen: Issue 5:	--	NP	--
Spurious emissions at antenna terminals	§22.917(a)(b)(c)(d) §2.1051, §2.1057(a)(1)	RSS-132, Issue 3: 5.5(i)(ii)	--	NP	--
Radiated spurious emissions	§2.1053(a), §2.1057(a)(1) §22.917(a)(b)	RSS-132, Issue 3: 5.5(i)(ii)	12	--	PASSED
Frequency stability, temperature variation	§22.355, §2.1055(a)(1) (d)	RSS-Gen, Issue 5 RSS-132: 5.3	--	NP	--
Frequency stability, voltage variation	§22.355, §2.1055(a)(1) (d)	RSS-Gen, Issue 5 RSS-132: 5.3	--	NP	--
Test case in GSM1900 band	**Reference Clause FCC**	**Reference Clause ISED**	**Page**	**Remark**	**Result**
AC-Power Lines Conducted Emissions	§15.207(a)	RSS-Gen Issue 5:§8.8	--	NP	--
Conducted RF output power	§2.1046(a)	RSS-133 4.1/6.4 + SRSP-510 :5.1.2	--	NP	--
Radiated RF output power	§24.232(b)	6.4	--	NP	--
Occupied Channel Bandwidth 99%	§24.238(b), §2.202(a), §2.1049(h)	RSS-Gen, Issue 4: §6.7	--	NP	--
26dB Emission bandwidth	§24.238(b), §2.202(a), §2.1049(h)	RSS-Gen, Issue 4: §6.7	--	NP	--
Radiated Band Edge	§2.1053(a), §2.1057(a)(1) §24.238(a)(b)	RSS-133, Issue 6: 6.5.1(i)(ii)	--	NP	--
Conducted RF Band Edge	§24.238(a)(b)(c)(d) §2.1051, §2.1057(a)(1)	RSS-133, Issue 6: 6.5.1(i)(ii)	--	NP	--
Peak to Average ratio (PAPR)	§2.1046(a)	RSS-133 4.1/6.4 + SRSP-510 :5.1.2	--	NP	--
Radiated field strength emissions below 30 MHz	§15.205, §15.209	RSS-Gen: Issue 5:	--	NP	--
Spurious emissions at antenna terminals	§24.238(a)(b)(c)(d) §2.1051, §2.1057(a)(1)	RSS-133, Issue 6: 6.5.1(i)(ii)	--	NP	--
Radiated spurious emissions	§2.1053(a), §2.1057(a)(1) §24.238(a)(b)	RSS-133, Issue 6: 6.5.1(i)(ii)	12	--	PASSED
Frequency stability, temperature variation	§24.235, §2.1055(a)(1) (d)	RSS-Gen, Issue 5 RSS-133: 6.3	--	NP	--

Frequency stability, voltage variation	§24.235, §2.1055(a)(1) (d)	RSS-Gen, Issue 5, RSS-133: 6.3	--	NP	--
Test case in UMTS FDD IV band	**Reference Clause FCC**	**Reference Clause ISED**	**Page**	**Remark**	**Result**
AC-Power Lines Conducted Emissions	§15.207(a)	RSS-Gen, Issue 5:§8.8	--	NP	--
Conducted RF output power	§27.50(d)(4), §2.1046	RSS-139, Issue 3:§6.5	--	NP	--
Radiated RF output power	§27.50(d)(4), §2.1046(a)	RSS-139, Issue 3: 6.5 + SRSP-513	--	NP	--
26dB Emission bandwidth	§27.53(h)(3), §2.202(a)	RSS-Gen, Issue 5:§6.6	--	NP	--
Occupied Channel Bandwidth 99%	§27.53(h)(3), §2.202(a)	RSS-Gen, Issue 5:§6.6	--	NP	--
Radiated Band Edge	§27.53(h), §2.1053(a) §2.1057(a)	RSS-139, Issue 3: 6.6 (i)(ii)	--	NP	--
Conducted RF Band Edge	§27.53(h), §2.1051	RSS-139, Issue 3: §6.6 (i)(ii)	--	NP	--
Peak to Average ratio (PAPR)	§27.50(d)(4), §2.1046	RSS-139, Issue 3:§6.5	--	NP	--
Radiated field strength emissions below 30 MHz	§15.205, §15.209	RSS-Gen: Issue 5: §8.9 Table 6	--	NP	--
Spurious emissions at antenna terminals	§27.53(h), §2.1051	RSS-139, Issue 3: §6.6 (i)(ii)	--	NP	--
Radiated spurious emissions	§27.53(h), §2.1053(a)	RSS-139, Issue 3: §6.6 (i)(ii)	12	--	PASSED
Frequency stability, temperature variation	§27.54, §2.1055(a)(1)	RSS-139, Issue 3:§6.4	--	NP	--
Frequency stability, voltage variation	§27.54, §2.1055(a)(1)	RSS-139, Issue 3:§6.4	--	NP	
Test case in LTE12 band	**Reference Clause FCC**	**Reference Clause ISED**	**Page**	**Remark**	**Result**
AC-Power Lines Conducted Emissions	§15.207(a)	RSS-Gen, Issue 5:§8.8	--	NP	--
Conducted RF output power	§27.50(c)(10), §2.1046	RSS-130, Issue 2: §4.6.1/ §4.6.3	--	NP	--
Radiated RF output power	§27.50(c)(10), §2.1046(a)	RSS-130, Issue 2: §4.6.1/ §4.6.3	--	NP	--
26dB Emission bandwidth	§2.202(a)	RSS-Gen, Issue 5:§6.7	--	NP	--
Occupied Channel Bandwidth 99%	§2.202(a)	RSS-130, Issue 1:§4.5 RSS-Gen, Issue 5:§6.7	--	NP	--
Radiated Band Edge	§27.53(g), §2.1053(a) §2.1057(a)	RSS-130, Issue 1:§4.7.1	--	NP	--
Conducted RF Band Edge	§27.53(g), §2.1053(a) §2.1057(a)	RSS-130, Issue 1:§4.7.1	--	NP	--
Peak to Average ratio (PAPR)	§27.50(c)(10), §2.1046	RSS-130, Issue 2: §4.6.1	--	NP	--
Radiated field strength emissions below 30 MHz	§15.205, §15.209	RSS-Gen: Issue 5: §8.9 Table 6	--	NP	--

Spurious emissions at antenna terminals	§27.53(g), §2.1051, §2.1057(a)	RSS-130, Issue 2:§4.7.1	--	NP	--
Radiated spurious emissions	§27.53(g), §2.1053(a) §2.1057(1)	RSS-130, Issue 2:§4.7.1	12	--	PASSED
Frequency stability, temperature variation	§27.54 §2.1055(a)(1)	RSS-130, Issue 2:§4.5	--	NP	--
Frequency stability, voltage variation	§27.54 §2.1055(a)(1)	RSS-130, Issue 2:§4.5	--	NP	--

PASSED The EUT complies with the essential requirements in the standard.
FAILED The EUT does not comply with the essential requirements in the standard.
NP The test was not performed by the CETECOM Laboratory.

*The calculation of the measurement uncertainty shows compliance with the "maximum measurement uncertainties" of the tested standard and therefore for result evaluation the stated uncertainties will not be additionally added to the measured results.

1.4 Summary of Test Methods

Test case	Test method
AC-Power Lines Conducted Emissions	ANSI C63.4-2014 § 7, ANSI C63.10-2013 § 6.2
Conducted RF output power	ANSI C63.26:2015, §5.2, KDB 971168 D01 v03r01
Radiated RF output power	ANSI C63.26:2015, §5.2.7, KDB 971168 D01 v03r01
Occupied Channel Bandwidth 99%	ANSI C63.26:2015, §5.4.4, KDB 971168 D01 v03r01
26dB Emission bandwidth	ANSI C63.26:2015, §5.4.3, KDB 971168 D01 v03r01
Modulation characteristics	ANSI C63.26:2015, §5.3
Radiated Band Edge	ANSI C63.26:2015, §5.5, KDB 971168 D01 v03r01
Conducted RF Band Edge	ANSI C63.26:2015, §5.7, KDB 971168 D01 v03r01
Peak to Average ratio (PAPR)	ANSI C63.26:2015, §5.2.6
Result calculated with measured conducted RF-power value and stated/measured antenna gain for band of interest	
Radiated field strength emissions below 30 MHz	ANSI C63.4-2014 §5.3, §8.2.1, §8.3.1.1+§8.3.2.1
Spurious emissions at antenna terminals	ANSI C63.26:2015, §5.7, KDB 971168 D01 v03r01
Radiated spurious emissions	ANSI C63.26:2015, §5.5, KDB 971168 D01 v03r01, ANSI C63.26.1:2018

2 Administrative Data

2.1 Identification of the Testing Laboratory

Company name:	CETECOM GmbH
Address:	Im Teelbruch 116 45219 Essen - Kettwig Germany
Responsible for testing laboratory:	Ninovic Perez
Accreditation scope:	DAkkS Webpage
Test location:	CETECOM GmbH; Im Teelbruch 116; 45219 Essen - Kettwig

2.2 General limits for environmental conditions

Temperature:	22±2 °C
Relative. humidity:	45±15% rH

2.3 Test Laboratories sub-contracted

Company name:	--

2.4 Organizational Items

Responsible test manager:	Mohamed Ahmed
Receipt of EUT:	2021-Jan-06
Date(s) of test:	2021-Mar-31 – 2021-Apr-23
Version of template:	14.7

2.5 Applicant's details

Applicant's name:	ACTIA Nordic AB
Address:	Hammarbacken 4A, 3tr SE-19149 Sollentuna Sweden
Contact Person:	Salah Alazawi
Contact Person's Email:	salah.alazawi@actia.se

2.6 Manufacturer's details

Manufacturer's name:	Same as Applicant's details
Address:	Same as Applicant's details

2.7 EUT: Type, S/N etc. and short descriptions used in this test report

Short description*)	PMT Sample No.	EUT	Type	S/N	HW status	SW status
EUT 01	18-1-00972S20_C03	103360002	Telematics Device	AN103350101B160	H1	1

*) EUT short description is used to simplify the identification of the EUT in this test report.

2.8 Auxiliary Equipment (AE): Type, S/N etc. and short descriptions

Short description*)	Auxiliary Equipment	Type	S/N	HW status	SW status
AE1	Cable Harness	Power Cable	--	--	--
AE2	Fakra Cable	--	--	--	--
AE3	Fakra Cable	--	--	--	--
AE4	Fakra Cable	--	--	--	--
AE5	Cable	USB Cable	--	--	--
AE6	Cellular Antenna	CALEARO LTE Antenna	7680588	16MA800CP	--
AE7	Cellular Antenna	CALEARO LTE Antenna	C-37	16MA800CP	--
AE8	WLAN Antenna	CALEARO Wifi Antenna	7750162	16MA396CP	--
AE9	Fakra Cable	--	--	--	--
AE10	GNSS Antenna	CALEARO GNSS Antenna	7750161	16MA439CP	--
AE11	DELL Laptop	Latitude E6420	DPN:VVF52 A01	Intel core i5	Windows 7

*) AE short description is used to simplify the identification of the auxiliary equipment in this test report.

2.9 EUT set-ups

set-up no.*)	Combination of EUT and AE	Description
1	EUT A + AE1 + AE2 + AE3 + AE4 + AE5 + AE6 + AE7 + AE8 + AE9 + AE10 + (AE11)	➔ Used for Radiated measurements. ➔ EUT Position Standing. ➔ AE11 was used to setup the operating mode and was removed during measurements.
2	EUT A + AE1 + AE2 + AE3 + AE4 + AE5 + AE6 + AE7 + AE8 + AE9 + AE10 + (AE11)	➔ Used for Radiated measurements. ➔ EUT Position Laying. ➔ AE11 was used to setup the operating mode and was removed during measurements.

*) EUT set-up no. is used to simplify the identification of the EUT set-up in this test report.

2.10 Test tool information

ACU certification v1.5.0.18 stored on AE 11 was used to set test mode.

2.11 EUT operation modes

EUT operating mode no.*)	Operating modes	Additional information
1	Simultaneous mode-1 GSM850 WLAN 2.4 GHz	➢ GSM 850, Uplink channel-128 ➢ WLAN 2.4 GHz, channel-6 (2437 MHz), b-mode, 1MBps-20 MHz, Power Setting 13 has beed activated through Customer provided test software. A communication link has been established via GSM 850 + WLAN 2.4 GHz running
2	Simultaneous mode-2 GSM1900 WLAN 2.4 GHz	➢ GSM 1900, Uplink channel-810, ➢ WLAN 2.4 GHz, channel-6 (2437 MHz), b-mode, 1MBps-20 MHz, Power Setting 13 has beed activated through Customer provided test software. A communication link has been established via GSM 1900 + WLAN 2.4 GHz running
3	Simultaneous mode-3 WCDMA FDD IV, WLAN 2.4 GHz	➢ WCDMA FDD Band IV, Uplink channel-1512 ➢ WLAN 2.4 GHz, channel-6 (2437 MHz), b-mode, 1MBps-20 MHz, Power Setting 13 has beed activated through Customer provided test software. A communication link has been established via WCDMA FDD Band IV + WLAN 2.4 GHz running
4	Simultaneous mode-4 LTE FDD 12, WLAN 2.4 GHz	➢ LTE FDD 12, Uplink channel-23155 ➢ WLAN 2.4 GHz, channel-6 (2437 MHz), b-mode, 1MBps-20 MHz, Power Setting 13 has beed activated through Customer provided test software. A communication link has been established via LTE FDD Band 12 + WLAN 2.4 GHz running
5	Simultaneous mode-7 GSM850 WLAN 5 GHz	➢ GSM 850, Uplink channel-128 ➢ WLAN 5 GHz, channel-159 (5785 MHz), ac-mode, MCS0-40 MHz, Power Setting 17 has beed activated through Customer provided test software. A communication link has been established via GSM 850 + WLAN 5 GHz running
6	Simultaneous mode-8 GSM850 BT	➢ GSM 850, Uplink channel-128 ➢ BT, Channel 2441, DH5 has beed activated through Customer provided test software. A communication link has been established via GSM 850 + BT running

*) EUT operating mode no. is used to simplify the test report.

It was followed according to the UserGuide provided by the customer to activate the EUT cellular and WiFi test mode.
Since the BT works with one Antenna the Worstcase from BT and BLE was used, for this Report BT was the Worstcase
Please refer for Specific Radio Technologies following Reports:

- WLAN 2.4GHz: 18-1-0097201T24a Issued on 2020-Jul-23
- WLAN 5 GHz: 18-1-0097201T22a Issued on 2020-Jul-30 (FCC)
- WLAN 5 GHz: 18-1-0097201T22b Issued on 2020-Jul-30 (ISED)
- BT: 18-1-0097201T23a Issued on 2020-Jul-23
- BLE: 18-1-0097201T25a Issued on 2021-May-03
- GSM: 18-1-0097201T21a Issued on 2020-Apr-08
- WCDMA: 18-1-0097201T20a Issued on 2020-Apr-08
- LTE: 18-1-0097201T19a Issued on 2020-Apr-08

WLAN test mode has been confirmed via ACU certification v1.5.0.18 and monitored via Spectrum Analyzer
EUT has been connected to CMU 200 and CMW 500 Radio Communication Tester (GSM,WCDMA and LTE)

BT = Channel 2441 MHz
BT-LE = Channel 2442 MHz
WLAN 2.4 = External Antenna g-mode | CH 6 (2437MHz) | 6Mbps | PWR Setting 13
WLAN 5 = Internal Antenna ac-mode | CH159 BW40 | MCS0 | PWR Setting 17

GSM 850 = External Antenna Channel 128
GSM 1900 = External Antenna Channel 810
WCDMA 4 = External Antenna Channel 1512
LTE 12 = Internal Antenna | BW 5 | 23155 | QPSK | RB Size 1 | RB all. 24

3 Equipment under test (EUT)

3.1 General Data of Main EUT as Declared by Applicant

Product name	103360002		
Main function	Telematics Device		
Firmware	☐ normal use	☒ Special version for test execution	
	☐ AC Mains	-	
	☒ DC Mains	**13.8** V DC	
	☒ Battery	-	
Operational conditions	T_{nom} =22 °C	T_{min} =-20 °C	T_{max} =+55 °C
EUT sample type	**Pre-Production**		
Interfaces/Ports	**Please refer to document 103360001 Europe block diagram**		
For further details refer Applicants Declaration & following technical documents			
Description of Reference Document (supplied by applicant)		**Version**	**Total Pages**
ACU6 Technical Description 103360002 (US-Canada)_0.3		**0.3 Draft**	**14**

3.2 Modifications on Test sample

Additions/deviations or exclusions	--

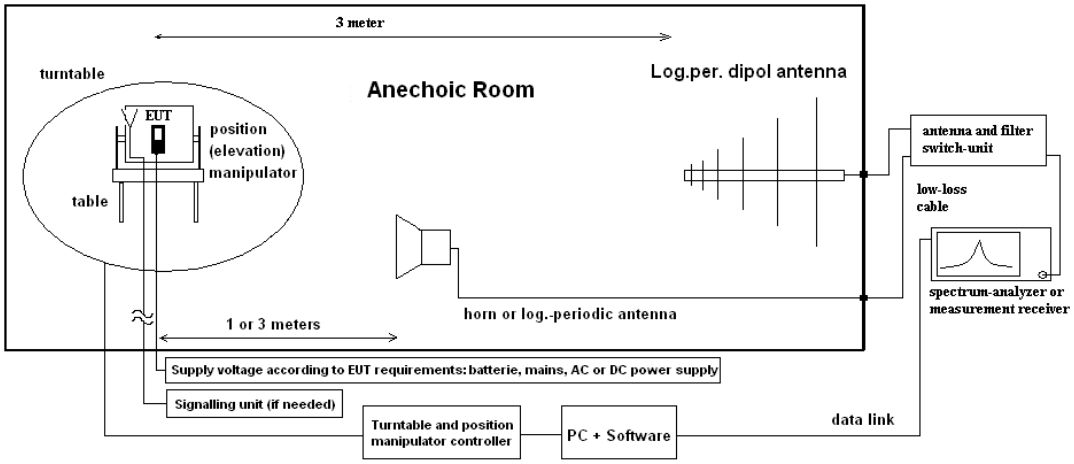
4 Measurements

4.1 Radiated spurious emissions

4.1.1 Description of the general test setup and methodology, see below example:

Evaluating the emissions have to be done first by an exploratory emissions measurement and a final measurement for most critical frequencies. The tests are performed in a CISPR 16-1-4:2010 compliant fully anechoic room (FAR) recognized by the regulatory commission. The measurement distance was set to 3 meter for frequencies up to 18 GHz and 2 meter above 18 GHz. A logarithmic periodic antenna is used for the frequency range 30 MHz to 1 GHz. Horn antennas are used for frequency range 1 GHz to 40 GHz. The EUT is aligned within 3 dB beam width of the measurement antenna with three orthogonal axis measurements on the EUT.

Schematic:



Testing method:

The measurement is made according to relevant reference clauses:
(See Tables *Summary of Test Results* and *Summary of Test Methods* on page 5)

Exploratory, preliminary measurements

The EUT and its associated accessories are placed on a non-conductive position manipulator (tipping device) of 1.50 m height which is placed on the turntable. By rotating the turntable (range 0° to 360°, step 45°) and the EUT itself on 3-orthogonal axis (the emission spectrum and it's characteristics was recorded with an EMI-receiver, broadband antenna and software.

The measurements are performed in horizontal and vertical polarization of the measurement antennas. The results are documented in a diagram. Critical frequencies (low margin to limit) are saved within a table for further investigations. If various operating modes are supported, further investigations are made to find the worst-case of them. Also the interconnection cables and equipment position were varied in order to maximize the emissions.

Final measurement on critical frequencies

Based on the exploratory measurements, the most critical frequencies are re-measured by main-taining the EUT's worst-case operation mode, cable position, etc.

First a frequency zoom around the critical frequency is done to locate the frequency more precisely. After this step, for all identified critical frequencies, the maximum peak was determined.

Following parameters were varied: the turntable angle continuously in the range 0 to 360 degree, the EUT itself over 3-orthogonal axis and the height for EUT with large dimensions.
On the determined worst-case position, a final measurement with necessary bandwidth and detector according standard has been carried out.
The readings on the spectrum analyzer are corrected with conversion value between field strength and E(I)RP, so the readings shown are equivalent to ERP/EIRP values. Critical measurements near the limit are re-measured with a substitution method accord. ANSI/TIA/EIA 603 C/D

Formula:

$P_{EIRP} = P_{MEAS} + C_L + FSL - G_{PreA} - G_{ANT}$ (1)

P_{MEAS} = measured power at instrument
M = Margin
L_T = Limit

FSL = Free Space loss = Function(frequency, measurement distance)

$M = L_T - P_{EIRP}$

C_L = cable loss
G_{PreA} = Gain of pre-amplifier (if used)
G_{ANT} = Gain of antenna in [dBi]

All units are dB-units, positive margin means value is below limit.

4.1.2 Measurement Location

Test site	FAC1

4.1.3 Limit

Operation band	Frequency Range [MHz]	Limit [dBm]	Detector [MaxHold]	RBW / VBW [MHz]
GSM 850	30 - 9000	-13	Peak	0.1 / 3
GSM 850	9000 - 40000	-13	Peak	1 / 3
GSM 1900	30 - 26000	-13	Peak	1 / 3
WCDMA IV	30 - 26000	-13	Peak	1 / 3
LTE12	30 - 9000	-13	RMS	0.1 / 3
LTE12	9000 - 26000	-13	RMS	1 / 3

4.1.4 Result

Diagram	Frequency Range	Operation Mode	Set up No.	Max Peak to Limit line, Margin [dB]	Frequency [MHz]	Result
8.01a	30MHz to 9GHz	1	EUT Standing	No peaks within 10 dB Margin	--	Passed
8.01b	9 GHz to 18GHz	1	EUT Standing	No peaks within 10 dB Margin	--	Passed
8.01c	18 GHz to 26GHz	1	EUT Standing	No peaks within 10 dB Margin	--	Passed
8.02a	30MHz to 9GHz	1	EUT Laying	No peaks within 10 dB Margin	--	Passed
8.02b	9 GHz to 18GHz	1	EUT Laying	No peaks within 10 dB Margin	--	Passed
8.02c	18 GHz to 26GHz	1	EUT Laying	No peaks within 10 dB Margin	--	Passed
8.03a	30MHz to 18GHz	2	EUT Standing	No peaks within 10 dB Margin	--	Passed
8.03b	18 GHz to 26GHz	2	EUT Standing	No peaks within 10 dB Margin	--	Passed
8.04a	30MHz to 18GHz	2	EUT Laying	No peaks within 10 dB Margin	--	Passed
8.04b	18 GHz to 26GHz	2	EUT Laying	No peaks within 10 dB Margin	--	Passed
8.05a	30MHz to 9GHz	3	EUT Standing	No peaks within 10 dB Margin	--	Passed
8.05b	9 GHz to 18GHz	3	EUT Standing	No peaks within 10 dB Margin	--	Passed
8.05c	18 GHz to 26GHz	3	EUT Standing	No peaks within 10 dB Margin	--	Passed
8.06a	30MHz to 18GHz	3	EUT Laying	No peaks within 10 dB Margin	--	Passed
8.06b	18 GHz to 26GHz	3	EUT Laying	No peaks within 10 dB Margin	--	Passed
8.07a	30MHz to 9GHz	4	EUT Standing	No peaks within 10 dB Margin	--	Passed
8.07b	9 GHz to 18GHz	4	EUT Standing	No peaks within 10 dB Margin	--	Passed
8.07c	18 GHz to 26GHz	4	EUT Standing	No peaks within 10 dB Margin	--	Passed
8.08a	30MHz to 9GHz	4	EUT Laying	No peaks within 10 dB Margin	--	Passed
8.08b	9 GHz to 18GHz	4	EUT Laying	No peaks within 10 dB Margin	--	Passed
8.08c	18 GHz to 26GHz	4	EUT Laying	No peaks within 10 dB Margin	--	Passed
8.09a	30MHz to 9GHz	5	EUT Standing	No peaks within 10 dB Margin	--	Passed
8.09b	9 GHz to 18GHz	5	EUT Standing	No peaks within 10 dB Margin	--	Passed
8.09c	18 GHz to 40GHz	5	EUT Standing	No peaks within 10 dB Margin	--	Passed
8.10a	30MHz to 9GHz	5	EUT Laying	No peaks within 10 dB Margin	--	Passed
8.10b	9 GHz to 18GHz	5	EUT Laying	No peaks within 10 dB Margin	--	Passed
8.10c	18 GHz to 40GHz	5	EUT Laying	No peaks within 10 dB Margin	--	Passed
8.11a	30MHz to 9GHz	6	EUT Standing	No peaks within 10 dB Margin	--	Passed
8.11b	9 GHz to 18GHz	6	EUT Standing	No peaks within 10 dB Margin	--	Passed
8.11c	18 GHz to 26GHz	6	EUT Standing	No peaks within 10 dB Margin	--	Passed
8.12a	30MHz to 9GHz	6	EUT Laying	No peaks within 10 dB Margin	--	Passed
8.12b	9 GHz to 18GHz	6	EUT Laying	No peaks within 10 dB Margin	--	Passed
8.12c	18 GHz to 26GHz	6	EUT Laying	No peaks within 10 dB Margin	--	Passed

Remark: for more informations and graphical plot see annex A1
For Operation mode please see Chapter 2.11 for details

4.2 Results from external laboratory

None	-

4.3 Opinions and interpretations

None	-

4.4 List of abbreviations

None	-

5 Equipment lists

ID	Description	Manufacturer	SerNo	Cal due date
120904 - FAC1 - Radiated Emissions				
20720	EMC32 [FAC]	Rohde & Schwarz Messgerätebau GmbH	V10.50.00	
20254	High Pass Filter 5HC 2600/12750-1.5KK (GSM1800/1900/DECT)	Trilithic	23042	20.03.2022
20868	High Pass Filter AFH-07000	AtlanTecRF	16071300004	20.03.2022
20291	High Pass Filter WHJ 2200-4EE (GSM 850/900)	Wainwright Instruments GmbH	14	20.03.2022
20020	Horn Antenna 3115 (Subst 1)	EMCO Elektronik GmbH	9107-3699	19.07.2021
20549	Log.Per-Antenna HL025	Rohde & Schwarz Messgerätebau GmbH	1000060	31.07.2021
20302	Horn Antenna BBHA9170 (Meas 1)	Schwarzbeck Mess-Elektronik OHG	155	15.04.2023
20700	PC ctc662012 [FAC]	Dell Inc.		
20338	Pre-Amplifier 100MHz - 26GHz JS4-00102600-38-5P	Miteq Inc.	838697	20.03.2022
20484	Pre-Amplifier 2,5GHz - 18GHz AMF-5D-02501800-25-10P	Miteq Inc.	1244554	20.03.2022
20287	Pre-Amplifier 25MHz - 4GHz AMF-2D-100M4G-35-10P	Miteq Inc.	379418	20.03.2022
20690	Spectrum Analyzer FSU	Rohde & Schwarz Messgerätebau GmbH	100302/026	23.05.2021
20341	Digital Multimeter Fluke 112	Fluke Deutschland GmbH	81650455	25.05.2022
20885	Power Supply EA3632A	Agilent Technologies Deutschland GmbH	75305850	--
20670	Radio Communication Tester CMU200	Rohde & Schwarz Messgerätebau GmbH	106833	16.06.2022
20793	Wideband Radio Communication Tester CMW500	Rohde & Schwarz Messgerätebau GmbH	163673	22.05.2021
20732	Signal- and Spectrum Analyzer FSW67	Rohde & Schwarz Messgerätebau GmbH	104023	27.05.2021

6 Measurement Uncertainty valid for conducted/radiated measurements

The reported uncertainties are calculated based on the standard uncertainty multiplied with the appropriate coverage factor **k**, such that a confidence level of approximately 95% is achieved. For uncertainty determination, each component used in the concrete measurement set-up was taken in account and it contribution to the overall uncertainty according its statistical distribution calculated.

RF-Measurement	Reference	Frequency range	Calculated uncertainty based on a confidence level of 95%						Remarks
Conducted emissions (U_{CISPR})	-	9 kHz - 150 kHz 150 kHz - 30 MHz	4.0 dB 3.6 dB						-
Power Output radiated	-	30 MHz - 4 GHz	3.17 dB						Substitution method
Power Output conducted	-	Set-up No.	Cel-C1	Cel-C2	BT1	W1	W2	--	
		9 kHz - 12.75 GHz	N/A	0.60	0.7	0.25	N/A	--	-
		12.75 GHz - 26.5 GHz	N/A	0.82	--	N/A	N/A	--	
Conducted emissions on RF-port	-	9 kHz - 2.8 GHz	0.70	N/A	0.70	N/A	0.69	--	N/A - not applicable
		2.8 GHz - 12.75 GHz	1.48	N/A	1.51	N/A	1.43	--	
		12.75 GHz – 18 GHz	1.81	N/A	1.83	N/A	1.77	--	
		18 GHz - 26.5 GHz	1.83	N/A	1.85	N/A	1.79	--	
Occupied bandwidth	-	9 kHz - 4 GHz	0.1272 ppm (Delta Marker)						Frequency error
			1.0 dB						Power
Emission bandwidth	-	9 kHz - 4 GHz	0.1272 ppm (Delta Marker)						Frequency error
	-		See above: 0.70 dB						Power
Frequency stability	-	9 kHz - 20 GHz	0.0636 ppm						-
Radiated emissions Enclosure	-	150 kHz - 30 MHz	5.01dB						Magnetic field strength
		30 MHz - 1 GHz 1 GHz - 18 GHz 18-26.5 GHz	5.83 dB 4.91 dB 5.06 dB						Electrical Field strength

7 Versions of test reports (change history)

Version	Applied changes	Date of release
--	Initial release	2021-May-31

End Of Test Report