PARTIAL - T E S T R E P O R T
No.: 6-0330-13-3-6a

According to:
FCC Regulations
Part 15C, Part 22, Part 24 & Part 27
IC-Regulations
RSS-132 Issue 3, RSS-133 Issue 6, RSS-139 Issue 2
RSS-Gen Issue 3

for

u-blox AG

RF-Module LISA-U200-01

FCC-ID: *XPYLISAU200*
IC*: 8595A-LISAU200N*

Laboratory Accreditation and Listings			
DAkkS Deutsche Akkreditierungsstelle D-PL-12047-01-01	Reg. No.: 736496 MRA US-EU 0003	Industry Canada Reg. No.: 3462D-1 Reg. No.: 3462D-2 Reg. No.: 3462D-3	Voluntary Controls for Electromagnetic Emissions Reg. No.: R-2665, R-2666 C-2914, T-1967, G-301
Wi Fi ALLIANCE AUTHORIZED RF LABORATORY	CTIA Authorized Test Lab LAB CODE 20011130-00		
accredited according to DIN EN ISO/IEC 17025			

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The listed attachments are an integral part of this report.

1. Summary of test results

The test results apply exclusively to the test samples as presented in this Report. The CETECOM GmbH does not assume responsibility for any conclusions and generalizations taken in conjunction with other specimens or samples of the type of the item presented to tests.

The Equipment Under Test (in this report, hereinafter referred as EUT) supports radiofrequency technologies. This test report shows results for GSM/(E)GPRS Band 850 and 1900, W-CDMA Band II, IV and V technologies only. Other implemented wireless technologies were not considered within this test report.

Following tests have been performed to show compliance with applicable FCC Part 2, Part 22, Subpart H, Part 24, Subpart E (Broadband PCS) and Part 27, Subpart C of the FCC CFR 47 Rules, annual Edition 1st October 2013 and Canada RSS-132 Issue 3, RSS-133 Issue 6, RSS-139 issue 2 and RSS-Gen Issue 3 standards.

1.1. TX mode, tests overview of US CFR (FCC) and Canada IC (RSS) Standards

No. of Diagram chapter	Test Cases	Port	References & Limits			EUT set-up	EUT op-mode	Result
			FCC Standard	RSS Section	Test limit			
--	Emissions AC-Power lines 0,15-30 MHz conducted	AC-Power lines	§15.207	RSS-Gen, Issue 3: Chapter 7.2.4	§15.207 limits IC: Table 4, Chapter 7.2.4	--	--	Remark 1.)
--	RF Power conducted	Antenna terminal	§2.1046	--	N/A	2	1 + 2+ 3 + 4+ 5 +6+ 7+ 8+ 9+ 10	passed
--	RF-Power (ERP/EIRP) radiated	Cabinet	§2.1046 §22.913(a)(2) §24.232(c) §27.50(d)(4)	RSS-132: 5.4+ SRSP-503: 5.1.3 RSS-133:4.1/6.4+ SRSP-510: 5.1.2 RSS-139: 6.4+ SRSP-513:5.1.2	< 7 Watt (ERP) < 2 Watt (EIRP) < 1 Watt (EIRP)	1	1 + 3 + 4 + 5 + 6 +7	passed
--	26dB Emission bandwith & 99% Occupied bandwith	Antenna terminal	§2.202 §2.1049 §22.917(a) §24.238(a)	RSS/Gen:4.6.1	99% Power	--	--	Remark 1.)
36.x	Spurious emissions conducted	Antenna terminal	§2.1051 §2.1057 §22.917(a)(b) §24.238(a)(b) §27.53 (h)(3)	RSS-132: 4.5.1 RSS-133:6.5.1(a)(b) RSS-139: 6.5(i)(ii)	43+10log(P) dBc	1	1 + 3 + 4+ 5 + 6 + 7	passed
2.x	General field strength emissions (9 kHz - 30 MHz)	Cabinet + Inter-connect cables	§15.209(a)	RSS-Gen, Chapter 4.11 Chapter 7.2.5, Table 5+6	2400/F(kHz)µV/m2 4000/F(kHz) µV/m 30 µV/m	1	1 + 3 + 4+ 5 + 6 + 7	passed
8.x	Spurious emissions radiated		§2.1053(a) §2.1057 §22.917(a)(b) §24.238(a)(b) §27.53(h)(3)	RSS-132: 4.5.1 & 4.5.2 RSS-133: 6.5.1(a)(b) RSS-139: 6.5(i)(ii)	43+10log(P) dBc	1		passed
--	Frequency stability conducted	Antenna terminal	§2.1055(a)(2) §22.355, table C-1 §24.235, §27.54	RSS-132: 4.3 RSS-133: 6.3 RSS-139: 6.3	< ±2.5ppm <±0.1 ppm <±0.1 ppm	--	--	Remark 1.)

General remark: GSM/(E)GPRS Band 850 and 1900 and the FDD bands 2/ 4/ 5 only partial done. Due to customer declaration RF module LISA-U200-01 is based on parent module of certified LISA-U200. Please refer at annex 6 the declaration of identical products. Therefore spot-check tests are performed.

Remark: 1.) Those tests already performed for the new activated FDD 4 band. Please refer 'TR6-0143-12-11-2a'.

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Responsible for test report

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:	Dipl.-Ing. N. Jeß
Deputy:	Dipl.-Ing. R. Acharkaoui

2.2. Test location

2.2.1. Test laboratory "CTC"

Company name:	see chapter 2.1. Identification of the testing laboratory

2.3. Organizational items

Responsible for test report and project leader:	Dipl.-Ing. B. Taslica
Receipt of EUT:	2013-06-03
Date(s) of test:	2013-10-17- 2013-10-18
Date of report:	2013-10-19
Version of template:	12.08 ,Bircan [CETECOM]

2.4. Applicant's details

Applicant's name:	u-blox AG
Address:	Zürcherstrasse 68 8800 Thalwil Switzerland
Contact person:	Mr. Giulio Comar

2.5. Manufacturer's details

Manufacturer's name:	please see Appllicant's details
Address:	please see Appllicant's details

3. Equipment under test (EUT)

3.1. Technical data of main EUT declared by applicant

Main function	GSM/GPRS/WCDMA RF Module (Data/Voice)
Type	LISA-U200-01-01
GSM/FDD Frequency range (US/Canada -bands)	GSM 850: 824 – 849 MHz (Uplink), 869-894 MHz (Downlink) GSM1900: 1850-1910 MHz (Uplink), 1930-1990 MHz (Downlink) FDD Band 2: 1852.4–1907.6 MHz (Uplink), 1930-1990MHz (Downlink) FDD Band 4: 1712.4–1752.6 MHz (Uplink), 2110-2155MHZ (Downlink) FDD Band 5: 826.4-846.6 MHz (Uplink), 869-894MHz (Downlink)
Type of modulation	GSM, GPRS, GMSK EGPRS-Mode: 8-PSK FDD-Mode Release99: QPSK FDD Mode Release 5+6: DL 16 QAM, UL QPSK/BPSK additionally
Number of channels (USA/Canada -bands)	GSM 850: 128 – 251, 125 channels GSM1900: 512 – 810, 300 channels FDD Band 2: UARFCN range 9262 – 9400 – 9538 FDD Band 4: UARFCN range 1312 – 1413 – 1513 FDD Band 5: UARFCN range 4132 – 4183 – 4233
Antenna Type	☒ Integrated ☐ External, no RF- connector ☐ External, separate RF-connector
Antenna Gain	☒ radiated:.3.0 dBi average gain
Max. Output Power (conducted): GSM 850 EDGE 850	 32.4 dBm (PK) / 32.2 dBm (AV) 29.6 dBm (PK) / 27.0 dBm (AV)
Max. Output Power (radiated): 850 band	 32.40 dBm (PK)
Max Output Power (conducted): GSM 1900 EDGE 1900	 29.1 dBm (PK) / 29.0 dBm (AV) 28.6 dBm (PK) / 25.8 dBm (AV)
Max Output Power (radiated): 1900 band	 32.10 dBm (PK)
Max Output Power (radiated) 1700 band	 29.2 dBm (PK)
Max Output Power (conducted) FDD-Mode 2 FDD-Mode 4 FDD-Mode 5	 26.0 dBm (PK) / 22.6 dBm (AV) 26.2 dBm (PK) / 22.9 dBm (AV) 26.4 dBm (PK) / 23.1 dBm (AV)
FCC-ID	*XPYLISAU200*
IC	*8595A-LISAU200N*
Installed options	☒ GSM 900 and GSM 1800 Bands (not usable in USA/Canada) ☒ FDD VIII Bands (not usable in USA/Canada) ☐ W-LAN, Bluetooth© wireless technologies ☐ battery charging option ☐ GPS (not tested within this test report) ☐ FM-Radio (Receiver only) ☐ NFC (not tested within this test report)
Power supply	☒ 3.8 V DC (nominal), 3.4 V DC (minimum) and 4.2 V DC (maximum) ☒ over AC/DC adapter: 120V/60 Hz
Lowest radio frequency signal	Master clock 26 MHz
EUT sample type	☒ Pre-Production
FCC label attached	☒ yes ☐ no

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

Short description*)	EUT	Type	S/N serial number	HW hardware status	SW software status
EUT A	RF-Module	LISA-U200-01	IMEI: 358901-04-594324-5	146AB2	22.90
EUT B	Adapter Board	LISA-U200 FAE	279	IP02_HW_CS_150000	--

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

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

AE short description *)	Auxiliary Equipment	Type	S/N serial number	HW hardware status	SW software status
AE 1	Magnetic Mount Antenna	Taoglas GA.107	#1	Ant. Gain 3.0 dBi	--
AE 2	Amplus AC/DC Charger with additional ferrite on AC-line (AC 120V/60Hz, DC 12 V)	NTS 30W EuP 5-12, max 4000mA	# 1	--	--
AE 3	USB cable	Mini USB to USB	#1	1,8m	--
AE 4	Laptop	CTC #7	--	--	--

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

3.4. EUT set-ups

EUT set-up no.*)	Combination of EUT and AE	Remarks
Set. 1	EUT A + EUT B + AE 1 + AE 2 + (AE 3 + AE 4)	Used only for radiated tests (AE 3 + AE 4: used outside of the chamber)
Set. 2	EUT A + EUT B	Used only for conducted tests (power supply cables at EUT A for nominal voltage)

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

3.5. EUT operating modes

GSM modes

EUT operating mode no.*)	Description of operating modes	Additional information
op. 1	GSM 850 TCH mode TCH=128/192/251	A communication link is established between the mobile station and the test simulator. The transmitter is operated at its maximum rated output power: 33 dBm (power class 4; power control level 5). The input signal to the receiver is modulated with normal test modulation. The wanted RF input signal level to the receiver of the mobile station is set to a level to provide a stable communication link.
op. 2	EGPRS 850 TCH mode TCH=128/192/251	A communication link is established between the mobile station and the test simulator. The transmitter is operated at its maximum rated output power: 33 dBm (power class 4; power control level 5). USF_Duty CYCLE set to 100%, coding scheme MCS-5 for 8PSK modulation, slot 3 active, uplink gamma: 6 (27dBm). The input signal to the receiver is modulated with normal test modulation. The wanted RF input signal level to the receiver of the mobile station is set to a level to provide a stable communication link.
op. 3	GSM 1900 TCH mode TCH=512/661/810	A communication link is established between the mobile station and the test simulator. The transmitter is operated at its maximum rated output power: 30 dBm (power class 1; power control level 0). The input signal to the receiver is modulated with normal test modulation. The wanted RF input signal level to the receiver of the mobile station is set to a level to provide a stable communication link
op. 4	EGPRS 1900 TCH mode TCH=512/661/810	A communication link is established between the mobile station and the test simulator. The transmitter is operated at its maximum rated output power: 30 dBm (power class 1; power control level 0). USF_Duty CYCLE set to 100%, coding scheme MCS-5 for 8-PSK modulation, slot 3 active, uplink gamma: 5 (26 dBm). The input signal to the receiver is modulated with normal test modulation. The wanted RF input signal level to the receiver of the mobile station is set to a level to provide a stable communication link.

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

FDD modes

op. 5	FDD-Mode 2 12.2 kbps RMC	A communication link is established between the mobile station (UE) and the test simulator. The transmitter is operated on its maximum rated output power class: 24dBm. The input signal to the receiver is modulated with normal test modulation. The wanted RF input signal level to the receiver of the mobile station is set to a level to provide a stable communication link according Table E5.1/Table E5.1A as described in 3GPP TS34.121, Annex E.
op. 6	FDD-Mode 4 12.2 kbps RMC	
op. 7	FDD-Mode 5 12.2 kbps RMC	
op. 8	FDD Mode 2 HSUPA	In addition to normal FDD-Mode, the UE was set to operate in HSDPA and HSUPA Mode too. Chosen settings: 12.2kbps RMC + HSPA 34.108 This setting was chosen for all release 6 mobile equipment.
op. 9	FDD Mode 4 HSUPA	
op. 10	FDD Mode 5 HSUPA	

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

3.6. Parameter Settings on mobile phone and base station CMU200

Following settings apply to the MS during the measurements in **GSM/GPRS/(E)GPRS**-Mode only:

Parameter	Traffic Mode	Idle Mode
Traffic Channels mobile station (EUT)	GSM 850: TCH_{MS}= 128/ 190 /251 GSM 1900: TCH_{MS} = 512 / 661 / 810	--
maximum power level (PCL)	GSM 850: PCL = 5 (2 Watt) GSM 1900: PCL = 0 (1 Watt)	--
Modulation	GSM/GPRS: GMSK-Modulation Scheme EDGE: 8-PSK Modulation Scheme	--
DTX	off	--
Bitstream	PRBS 2E9-1 (pseudo-random-sequence) – CCITT 0.153	
Timeslot(s) in Uplink	3	
Hopping	off	
Timeslot (slot mode)	GSM-Mode: single GPRS-Mode: maximum allowed uplink slots no. according MS class	
MS slot class	Class 12	
Maximum data transmission rate, single time slot	GSM: 9,6 kbit/s Slot GPRS: 17,6 kbit/s Slot EDGE: 59,2 kBit/s Slot	
Speech transcoding (Traffic Mode)	Full rate Version 1	
Speed rate	130 Kb/s	
Mode	BCCH and TCH	
BCCH – base station (CMU,CMD)	GSM 850: 182 GSM 1900: 651	
TCH – base station (CMD, CMU)	auto	
Power level TCH – base station (used timeslot level)	- 70 dBm	
Power level BCCH – base station (control channel level)	- 80 dBm	
External attenuation RF/AF-Input/Output	Accord. calibration prior to measurements	
Mobile Country Code	310	310
Domain	PS	
BS_AG_BLKS_RES	Not applicable	0
Paging reorganisation		Off (0)
Signalling channel		SDCCH
Location Update		Auto
Cell access		Disabled (barred)

Following settings apply to the UE (EUT) during the measurements in **FDD-Mode** only:

Parameter	Traffic Mode	Idle Mode
UARFCN UE Uplink (EUT) (according TS34.108)	FDD 2 = 9262/ 9400/ 9538 FDD 4 = 1312/1413/1513 FDD 5 = 4132/ 4182/ 4233	--
UARFCN Node B (downlink) (according TS34.108)	FDD 2 = 9663/ 9800/ 9937 FDD 4 = 1537/1675/1738 FDD 5 = 4358/ 4040/ 4457	
UE power class	Class 3 (+24dBm) nominal	
HSDPA UE category/ HSUPA category	8/6	
Maximum power	FDD 2/4/5 12.2kbps RMC -> all TPC bits up ("1") HSDPA-mode = accord. in 3GPP TS34.108 HSUPA mode = accord. in 3GPP TS34.108	--
Modulation	12.2kbps RMC-mode: (UL) QPSK-Modulation Scheme HSDPA/HSUPA= (UL) BPSK/QPSK, (DL) 16 QAM Modulation Scheme is applicable	--
Compression mode	Off	--
Bitstream	PRBS 2E9-1 (pseudo-random-sequence) – CCITT 0.153	
Maximum data transmission rate:	GSM: 17,6 kbps Slot EDGE: 59,2 kbps Slot FDD: QPSK 5,76 Mbps (UL) 16 QAM 14,4 Mbps (DL)	
Node B Downlink physical channels settings	According Table E.5.1/E.5.1A in 3GPP TS34.121	
External attenuation RF/AF-Input/Output	Accord. Set-up calibration prior to measurements	

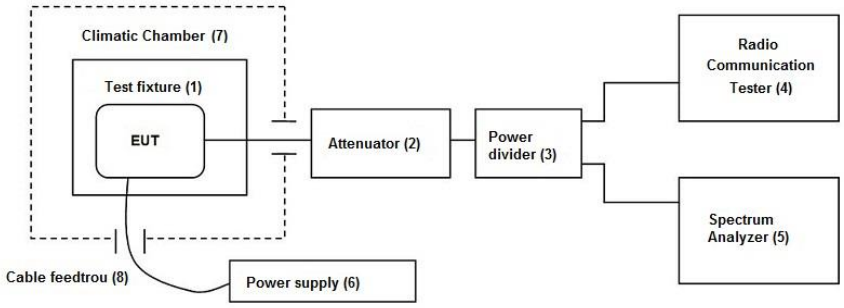
4. Description of test system set-up's

4.1. Test system set-up for conducted RF-measurement at antenna port

Specification: ANSI C63.10-2009

General Description: The EUT's RF-signal is first attenuated before it is connected to the spectrum – analyzer to avoid overload. The specific attenuation is determined prior to the measurement within a set-up calibration. The value is taken into account by correcting the measurement readings on the spectrum-analyzer either by a transducer factor (TDF) or an relative offset to reference level.

Schematic:



Testing method: According to ANSI C63.10-2009 for each individual test, see details in each chapter.

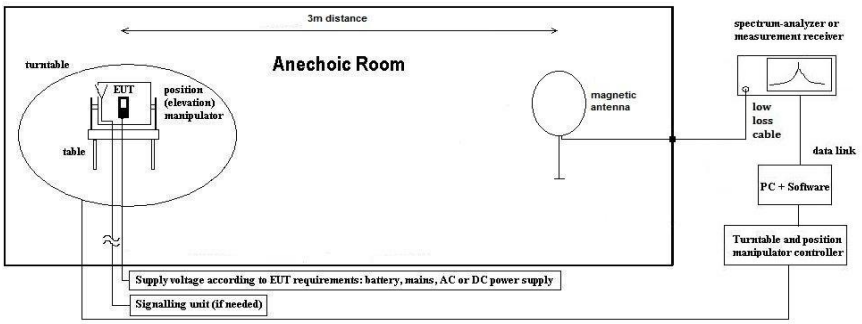
4.2. Test system set-up for radiated magnetic field measurements below 30 MHz

Specification: ANSI C63.4-2009 chapter 8.2.1, ANSI C63.10-2009 chapter 6.4

General Description: Evaluating the radiated field emissions to be done first by an exploratory emissions measurement and a final measurement for most critical frequencies.

The loop antenna was placed at 1 m height above ground plane and 3 m measurement distance from set-up for investigations. Because of reduced measurement distance, correction data were applied, as stated in chapter "General Limit - Radiated field strength emissions below 30 MHz". The tests are performed in the semi anechoic room recognized by the regulatory commissions.

Schematic:



Testing method:

Exploratory, preliminary measurement
The EUT and it's associated accessories are placed on a non-conductive position manipulator (tipping device) of 0.8 m height which is placed on the turntable. By rotating the turntable (step 90°, range 0°to 360°) and the EUT itself either on 3-orthogonal axis (portable equipment) or 2-orthogonal axis (defined operational position of EUT), the emission spectrum and it's characteristics was recorded with an EMI-receiver, broadband loop antenna and software.
The loop antenna was moved at least to 2-perpendicular axes (antenna vector in direction of EUT and parallel to EUT) in order to maximize the emissions. The results are documented in a diagram. Critical frequencies (low margin to limit) are saved within a data reduction 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 eut 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 either over 3-orthogonal axis (not defined usage position) or 2-orthogonal axis (defined usage position).

On the determined worst-case position, a final measurement with necessary bandwidth and detector according standard has been carried out.

Formula:

$E_C = E_R + AF + C_L + D_F - G_A$

$M = L_T - E_C$

AF =Antenna factor
C_L = Cable loss
D_F= Distance correction factor
E_C = Electrical field – corrected value
E_R = Receiver reading
G_A= Gain of pre-amplifier (if used)
L_T = Limit
M = Margin
All units are dB-units, positive margin means value is below limit.

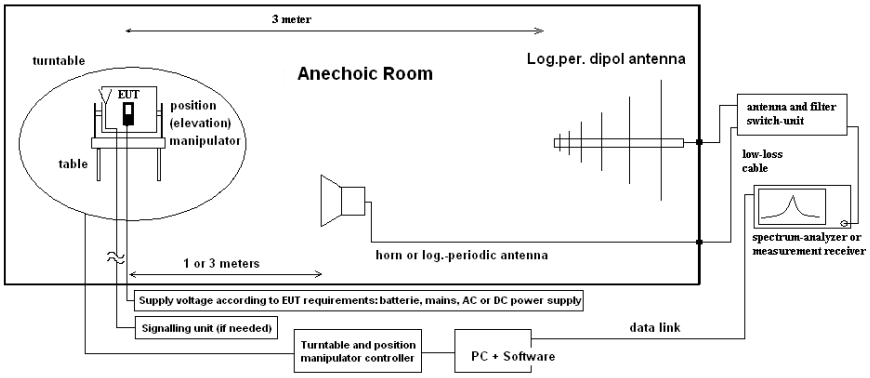
Distance correction: Reference for applied correction (extrapolating) factors:
IEEC Transaction EMC, Vol. 47, No. 3 , Aug. 2005, Journal Paper "*Extrapolating Near-field emissions of low frequency loop transmitters".*

4.3. Test system set-up for radiated spurious emission measurements

Specification: ANSI C63.4-2009 chapter 8, ANSI C63.10-2009 chapter 6.6

General Description: Evaluating the field 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 16-4 compliant fully anechoic room (FAR) recognized by the regulatory commissions. The measurement distance was set to 3 meter for frequencies up to 20 GHz and 1 meter above 20 GHz. The horn antenna is used for frequency range 1 GHz to 40 GHz. Due to use of a fully anechoic room the measurement antennas are set to fixed antenna height of 1.55 m (no height scan necessary) and the site validation criteria accord. ANSI63.10:2009 is fulfilled. The EUT is aligned within 3 dB beam width of the measurement antenna, on big EUTs several surface measurements are performed.

Schematic:



Testing method:

Exploratory, preliminary measurements
The EUT and it's associated accessories are placed on a non-conductive position manipulator (tipping device) of 1.55 m height which is placed on the turntable. By rotating the turntable (range 0° to 360°, step 45°) and the EUT itself either on 3-orthogonal axis (portable equipment) or 2-orthogonal axis (defined operational position of EUT) 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 maintaining 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 either over 3-orthogonal axis (not defined usage position) or 2-orthogonal axis (defined usage position). The measurement antenna height is fixed to 1.55 m.
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.

Formula:

$E_C = E_R + AF + C_L + D_F - G_A$ (1)

$Ec_{E(I)RP} = Ec - 95.2\ dB|_{3m}$

$M = L_T - Ec_{E(I)RP}$

E_C = Electrical field – corrected value
E_R = Receiver reading
M = Margin
L_T = Limit
AF = Antenna factor
C_L = Cable loss
D_F = Distance correction factor (if used)
G_A = Gain of pre-amplifier (if used)
$Ec_{E(I)RP}$ = Electrical field corrected for E(I)RP

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

5. Measurements

5.1. RF Parameter – Power Conducted and Radiated - E.I.R.P.

5.1.1. Test location and equipment (for reference numbers please see chapter 'List of test equipment')

test location	☒ CETECOM Essen (Chapter. 2.2.1)		☐ Please see Chapter. 2.2.2		☐ Please see Chapter. 2.2.3	
test site	☐ 441 EMI SAR	☐ 487 SAR NSA	☒ 347 Radio.lab.		☐ 420 OTA	☐
receiver	☐ 377 ESCS30	☐ 001 ESS	☐ 489 ESU 40	☐	☐	☐
spectr. analys.	☐ 584 FSU	☐ 120 FSEM	☐ 264 FSEK	☐	☐	☐
antenna	☐ 574 BTA-L	☐ 133 EMCO3115	☐ 302 BBHA9170	☐ 289 CBL 6141	☐ HFH-Z2	☐ 477 GPS
signaling	☐ 392 MT8820A	☐ 436 CMU	☒ 547 CMU			
otherwise	☐ 400 FTC40x15E	☐ 401 FTC40x15E	☐ 110 USB LWL	☐ 482 Filter Matrix	☐ 378 RadiSense	
DC power	☐ 456 EA 3013A	☒ 463 HP3245A	☐ 459 EA 2032-50	☐ 268 EA- 3050	☐ 494 AG6632A	☐ 498 NGPE 40
otherwise	☐ 331 HC 4055	☒ 530 10 dB Attenuator	☐ 529 Power divider	☐ - cable OTA20		
line voltage	☐ 230 V 50 Hz via public mains		☐060 110 V 60 Hz via PAS 5000			

5.1.2. Requirements

FCC	☒ §2.1046 ☒ §22.913(a)(2) ☒ § 24.232(c) ☒ § 27.50(d)(4)
IC	☒ RSS-132:4.4 + SRSP 503:5.1.3 ☒ RSS-133:4.1/6.4 + SRSP-510:5.1.2; ☒ RSS-139: 6.4+SRSP-513:5.1.2
Limit	Maximum Power Output of the mobile phone should be determined while measured radiated E(I)RP.
	Limit FDD Band 5: 7 Watt ERP (38.4 dBm)
	Limit FDD Band 2: 2 Watt EIRP (33.0 dBm)
	Limit FDD Band 4: 1 Watt EIRP (30.0 dBm)

Remark: PAR (PEAK-AVERAGE-RATIO) ≤ 13 dB

5.1.3 Test condition and measurement test set-up

Climatic conditions	Temperature: (22±3°C)	Rel. humidity: (40±20)%
Test system set-up	Please see chapter "Test system set-up for conducted measurements on antenna port" ANRITSU	
Measurement method	The measurements were performed with the integrated power measurement function of the „radio communication tester CMU200 from Rohde&Schwarz company. In this way spectrum-analyzers instrument limitations can be avoided or minimized. Instead, CMU manufacturers declared measurement error can be considered for this measurement. The attenuation (insertion loss) at the RF Inputs/Outputs of CMU were set according the path loss of the test set-up, determined in a step before starting the measurements. A suitable artificial antenna or RF-connector is provided by the applicant in order to perform the conducted measurements. Any data provided with the artificial antenna or connector, have been taken in account in order to correct the measurement data. (typical 0.3dB for attenuation of antenna connector) Peak and Average Values have been recorded for each channel and band.	
Mobile phone settings	A call was established on highest power transmit conditions in GMSK and RMC99 mode. UE is set TX mode, highest transmit power conditions, DTX, MPR or other power saving techniques have been disabled The measurements were made at the low, middle and high carrier frequencies of each of the supported operating band. Choosing three TX-carrier frequencies of the mobile phone, should be sufficient to demonstrate compliance.	

5.1.8 Test results

GSM/GPRS mode

GMSK-Modulation 850MHz Band	CS Mode 1Slot			
	ARFCN-Frequency [MHz]	Peak detektor [dBm]	RMS detektor [dBm]	PAR Factor [dB]
Channel 128	824.2	32,4	32,2	0,2
Channel 192	837.0	32,4	32,3	0,1
Channel 251	848.8	32,3	32,2	0,1

E-GPRS mode

8-PSK 850MHz Band	EGPRS (PS)			
	ARFCN-Frequency [MHz]	Peak detektor [dBm]	RMS detektor [dBm]	PAR Factor [dB]
Channel 128	824.2	29,6	27,0	2,6
Channel 192	837	29,7	27,0	2,7
Channel 251	848.8	29,7	27,1	2,6

GSM/GPRS mode

GMSK-Modulation 1900MHz Band	CS Mode, 1 Slot			
	ARFCN-Frequency [MHz]	Peak detektor [dBm]	RMS detektor [dBm]	PAR Factor [dB]
Channel 512	1850.2	28,9	28,8	0,1
Channel 661	1880.0	29,1	29	0,1
Channel 810	1909.8	29	28,8	0,2

E-GPRS mode

8-PSK 1900MHz Band	EGPRS (PS)			
	ARFCN-Frequency [MHz]	Peak detektor [dBm]	RMS detektor [dBm]	PAR Factor [dB]
Channel 512	1850.2	28,5	25,6	2,9
Channel 661	1880.0	28,6	25,8	2,8
Channel 810	1909.8	28,5	25,7	2,8

RMC99-FDD5				
	ARFCN-Frequency [MHz]	Peak detektor [dBm]	RMS detektor [dBm]	PAR Factor [dB]
Channel 4132	826.4	26,0	23,1	2,9
Channel 4183	836.6	25,9	23,0	2,9
Channel 4233	846.6	25,9	23,0	2,9

HSUPA - FDD 5				
	ARFCN-Frequency [MHz]	Peak detektor [dBm]	RMS detektor [dBm]	PAR Factor [dB]
Channel 4132	826.4	26,4	22,5	3,9
Channel 4183	836.6	26,4	22,5	3,9
Channel 4233	846.6	26,4	22,4	4,0

RMC99 - FDD4				
	ARFCN-Frequency [MHz]	Peak detektor [dBm]	RMS detektor [dBm]	PAR Factor [dB]
Channel 1312	1712,4	26,0	22,9	3,1
Channel 1450	1740	26,0	22,9	3,1
Channel 1513	1752,6	25,8	22,7	3,1

HSUPA – FDD 4				
	ARFCN-Frequency [MHz]	Peak detektor [dBm]	RMS detektor [dBm]	PAR Factor [dB]
Channel 1312	1712,4	26,16	22,4	3,8
Channel 1450	1740	26,05	22,3	3,8
Channel 1513	1752,6	25,76	22,1	3,6

RMC99 - FDD2				
	ARFCN-Frequency [MHz]	Peak detektor [dBm]	RMS detektor [dBm]	PAR Factor [dB]
Channel 9262	1852,4	25,7	22,6	3,1
Channel 9400	1880.0	25,8	22,9	2,9
Channel 9538	1907,6	25,6	22,6	3,0

HSUPA - FDD2				
	ARFCN-Frequency [MHz]	Peak detektor [dBm]	RMS detektor [dBm]	PAR Factor [dB]
Channel 9262	1852,4	25,7	22,1	3,7
Channel 9400	1880.0	26,0	22,2	3,8
Channel 9538	1907,6	25,8	22,0	3,8

5.1.0.1. Max. calculated ERP 850 band result

Set-up 2 & op. modes 1			Peak Output Power [dBm]		Limit	Result
Band area	Antenna gain [dBi]	ARFCN no./ Frequency	PK	ERP-Value calc.		
850	3.0	128/ 824.2 MHz	32.4	35.4	38.45 dBm	passed

5.1.0.1.1. Max. calculated EIRP 1700 band result

Set-up 2 & op. modes 9			Peak Output Power [dBm]		Limit	Result
Band area	Antenna gain [dBi]	U-ARFCN no./ Frequency	PK	EIRP-Value calc.		
1700	3.0	1312/ 1712.4 MHz	26.2	29.2	30.00 dBm	passed

5.1.0.1.2. Max. calculated EIRP 1900 band result

Set-up 2 & op. modes 3			Peak Output Power [dBm]		Limit	Result
Band area	Antenna gain [dBi]	ARFCN no./ Frequency	PK	EIRP-Value calc.		
1900	3.0	661/ 1880 MHz	29.1	32.1	33.00 dBm	passed

5.2. Radiated field strength emissions below 30 MHz

5.2.1. Test location and equipment (for reference numbers please see chapter 'List of test equipment')

test location	☒ CETECOM Essen (Chapter. 2.2.1)		☐ Please see Chapter. 2.2.2		☐ Please see Chapter. 2.2.3	
test site	☒ 441 EMI SAR	☐ 487 SAR NSA	☐ 347 Radio.lab.		☐	☐
receiver	☐ 377 ESCS30	☒ 001 ESS	☐	☐	☐	☐
spectr. analys.	☐ 584 FSU	☐ 120 FSEM	☐ 264 FSEK	☐	☐	☐
antenna	☐ 574 BTA-L	☐ 133 EMCO3115	☐ 302 BBHA9170	☐ 289 CBL 6141	☒ 030 HFH-Z2	☐ 477 GPS
signaling	☐ 392 MT8820A	☐ 436 CMU	☐ 547 CMU			
otherwise	☐ 400 FTC40x15E	☐ 401 FTC40x15E	☐ 110 USB LWL	☐ 482 Filter Matrix	☐ 378 RadiSense	
DC power	☐ 456 EA 3013A	☐ 457 EA 3013A	☐ 459 EA 2032-50	☐ 268 EA- 3050	☐ 494 AG6632A	☐ 498 NGPE 40
line voltage	☐ 230 V 50 Hz via public mains		☒060 120 V 60 Hz via PAS 5000			

5.2.2. Requirements

FCC	Part 15, Subpart C, §15.205 & §15.209			
IC	RSS-Gen., Issue 3			
ANSI	C63.10-2009			
Frequency [MHz]	Field strength limit [µV/m]	[dBµV/m]	Distance [m]	Remarks
0.009 – 0.490	2400/f (kHz)	67.6 – 20Log(f) (kHz)	300	Correction factor used due to measurement distance of 3 m
0.490 – 1.705	24000/f (kHz)	87.6 – 20Log(f) (kHz)	30	Correction factor used due to measurement distance of 3 m
1.705 – 30	30	29.5	30	Correction factor used due to measurement distance of 3 m

5.2.3.Test condition and measurement test set-up

Signal link to test system (if used):		☒ air link	☐ cable connection	☐ none
EUT-grounding		☐ none	☒ with power supply	☐ additional connection
Equipment set up		☒ table top		☐ floor standing
Climatic conditions		Temperature: (22±3°C)		Rel. humidity: (40±20)%
EMI-Receiver or Analyzer Settings	Scan data	☒ 9 – 150 kHz RBW/VBW = 200 Hz Scan step = 80 Hz ☒ 150 kHz – 30 MHz RBW/VBW = 9 kHz Scan step = 4 kHz ☐ other:		
	Scan-Mode Detector Mode: Sweep-Time	☒ 6 dB EMI-Receiver Mode ☐ 3dB Spectrum analyser Mode Peak (pre-measurement) and Quasi-PK/Average (final if applicable) Repetitive-Scan, max-hold Coupled – calibrated display if continuous signal otherwise adapted to EUT's individual transmission duty-cycle		
General measurement procedures		Please see chapter "Test system set-up radiated magnetic field measurements below 30 MHz"		

5.2.4. Measurement Results

The results are presented below in summary form only. The EUT performed on middle channel. If critical peaks found (Margin <10 dB) the lowest and highest channels will be performed too.
Table of measurement results:

Diagram No.	Carrier Channel Range	No.	Frequency range	Set-up no.	OP-mode no.	Remark	Used detector P	A	QP	Result
2.01	Middle	192	9 kHz-30	1	1	--	☒	☐	☐	passed
2.02	Middle	661	9 kHz-30			--	☒	☐	☐	passed
2.03	Middle	9400	9 kHz-30			--	☒	☐	☐	passed
2.04	Middle	1413	9 kHz-30			--	☒	☐	☐	passed
2.05	Middle	4182	9 kHz-30			--	☒	☐	☐	passed

5.2.5. General Limit - Conducted out of Band RF emissions

5.2.6. Test location and equipment (for reference numbers please see chapter 'List of test equipment')

test location	☒ CETECOM Essen (Chapter. 2.2.1)		☐ Please see Chapter. 2.2.2		☐ Please see Chapter. 2.2.3	
test site	☐ 441 EMI SAR	☐ 487 SAR NSA	☐ 337 OATS	☒ 347 Radio.lab.	☒ 443 FAR	
receiver	☐ 377 ESCS30	☐ 001 ESS	☒ 489 ESU			
spectr. analys.	☐ 584 FSU	☐ 120 FSEM	☐ 264 FSEK			
antenna	☐ 574 BTA-L	☐ 133 EMCO3115	☐ 302 BBHA9170	☒ 608 HL 562	☒ 549 HL025	☐ 477 GPS
signaling	☐ 017 CMD 65	☐ 323 CMD 55	☐ 340 CMD 55			
signaling	☐ 392 MT8820A	☐ 436 CMU	☒ 547 CMU			
power supply	☐ 463 HP3245A	☐ 457 EA 3013A	☐ 459 EA 2032-50	☐ 268 EA- 3050	☐ 494 AG6632A	☒ 498 NGPE 40
otherwise	☒ 529 6dB divider	☒ 530 10dB Att.	☐ 110 USB LWL	☐ 482 Filter Matrix	☐ 431 Near field	
line voltage	☐ via public mains		☒060 120 V 60 Hz via PAS 5000 bei Bedarf andere Werte einsetzen			

5.2.7. Requirements and limits

FCC		☒ Part 2.1053(a), Part2.1057 ☐ Part 15 Subpart C, §15.209 @ frequencies defined in §15.205 ☒ Part 22 Subpart H, §22.917(a)(b ☒ Part 24 Subpart E, §24.238(a)(b) ☒ Part 27 Subpart C, §27.53(h)(3)
IC		☒ RSS-132, Issue 2: 4.5.1.1, ☒ RSS-133, Issue 5: 6.5.1(a)(b) ☒ RSS-139, Issue 2: 6.5
Limit	Frequency [MHz]	Condcuted emissions limits
		Peak [dBm]
	≥ 30	-13

5.2.8. Test condition and test set-up

Climatic conditions	Temperature: (22±3°C)	Rel. humidity: (40±20)%
Test system set-up	Please see chapter "Test system set-up for conducted measurements on antenna port"	
Measurement method	*"§ 2.1057 Frequency spectrum to be investigated. (a) In all of the measurements set forth in § 2.1051 and 2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 kHz"* The spectrum was scanned from 9 kHz (depend on the equipment, s. §2.1057) to the 10th harmonic of the highest frequency generated within the equipment. A PEAK detector was used except measurements near the block-edge where a AVERAGE detector applied. A suitable artificial antenna or RF-connector is provided by the applicant in order to perform the conducted measurements. Any data provided with the artificial antenna or connector, have been taken in account in order to correct the measurement data. (typical 0.3dB for attenuation of antenna connector)	
Spectrum-Analyzer settings	See below tables	
Mobile phone settings	A call was established with settings according chapter "Parameter settings on mobile phone and base station CMU200" UE Power should be set to maximum, continuous transmission. DTX or other power saving techniques have been disabled The measurements were made at the low, middle and high carrier frequencies of each of the supported operating band. Choosing three TX-carrier frequencies of the mobile phone, should be sufficient to demonstrate compliance.	

5.5.8.1 Settings for G850/FDDV Mode

	Start freq. MHz	Stop freq. MHz	R-BW MHz	V-BW MHz	Sweep time sec.	Att.	Detector
Sweep 1 (subrange 1)	0.009	1	0.001	0.01	10	25	MaxH-PK
Sweep 1 (subrange 2)	1	30	0.1	1	5	25	MaxH-PK
Sweep 2 (subrange 1)	30	1000	0.1	1	10	35	MaxH-PK
Sweep 2 (subrange 2)	1000	2500	1	1	15	35	MaxH-PK
Sweep 2 (subrange 3)	2500	9000	1	1	60	35	MaxH-PK
Sweep 3a (Block-Edge)	823	824	0.003(GSM) 0.03 (FDD)	0.01	30	35	MaxH-PK
Sweep 3b (Block-Edge)	823	824		0.01	30	35	MaxH-AV
Sweep 4a (Block-Edge)	850	851	0.003(GSM) 0.03 (FDD)	0.01	30	35	MaxH-PK
Sweep 4b (Block-Edge)	850	851		0.01	30	35	MaxH-AV

5.5.8.2 Settings for PCS1900/FDD II/ FDD IV Mode

	Start freq. MHz	Stop freq. MHz	R-BW MHz	V-BW MHz	Sweep time sec.	Att.	Detector
Sweep 1 (subrange 1)	0.009	1	0.001	0.01	10	25	MaxH-PK
Sweep 1 (subrange 2)	1	30	0.1	1	5	25	MaxH-PK
Sweep 2 (subrange 1)	30	1000	0.1	1	10	35	MaxH-PK
Sweep 2 (subrange 2)	1000	2500	1	1	15	35	MaxH-PK
Sweep 2 (subrange 3)	2500	19500	1	1	160	35	MaxH-PK
Sweep 3a (Block-Edge)	1849	1850	0.003(GSM) 0.03(FDD)	0.01	30	35	MaxH-PK
Sweep 3b (Block-Edge)	1849	1850		0.01	30	35	MaxH-AV
Sweep 4a (Block-Edge)	1910	1911		0.01	30	35	MaxH-PK
Sweep 4b (Block-Edge)	1910	1911		0.01	30	35	MaxH-AV

5.2.9. Results (conducted)

The EUT emissions were measured below 30 MHz on middle channel only, due to uncritical results.
If critical peaks found (Margin <20 dB) the lowest and highest channels will be performed, too.

The results are presented below in summary form only. For more information please see each diagram enclosed in annex diagrams.

5.2.10. GSM/GPRS TCH 850: Op. Mode 1, Set-up 2

Transmitting channels/ frequencies: TX = 128/ 824.2 MHz, 192/ 837 MHz, 251/ 848.8 MHz							
Sweep no.	Diagram numbers	Frequency of emission [MHz]	Range/ ARFCN	Frequency of worst-peak level [GHz]	Result [dBm]	Limit [dBm]	Verdict
Sweep 1	36.00	0.009 to 30	Middle/192	--	<-52.00	-13	Passed
Sweep 2	36.01	30 to 9000	Low/128	--	< -26.00		Passed
Sweep 2	36.02	30 to 9000	Middle/192	--	< -26.00		Passed
Sweep 2	36.03	30 to 9000	High/251	--	< -26.00		Passed

Remark: --

5.2.11. GSM/GPRS TCH 1900: Op. Mode 3, Set-up 2

Transmitting channels/ frequencies: TX = 512/ 1850.2 MHz, 661/ 1880 MHz, 810/ 1909.8 MHz							
Sweep no.	Diagram numbers	Frequency of emission [MHz]	Range/ ARFCN	Frequency of worst-peak level [GHz]	Result [dBm]	Limit [dBm]	Verdict
Sweep 1	36.07	0.009 to 30	Middle/661	--	<-51.00	-13	Passed
Sweep 2	36.08	30 to 19500	Low/512	--	< -27.00		Passed
Sweep 2	36.09	30 to 19500	Middle/661	--	< -27.00		Passed
Sweep 2	36.10	30 to 19500	High/810	--	< -27.00		Passed

Remark: --

5.2.12. FDD II : Op. Mode 5, Set-up 2

Transmitting channels/ frequencies: TX = 9262/ 1852.4 MHz, 9400/ 1880 MHz, 9538/ 1907.6 MHz							
Sweep no.	Diagram numbers	Frequency of emission [MHz]	Range/ U-ARFCN	Frequency of worst-peak level [GHz]	Result [dBm]	Limit [dBm]	Verdict
Sweep 1	36.14	0.009 to 30	Middle/9400	--	<-51.00	-13	Passed
Sweep 2	36.15	30 to 19500	Low/9262	--	< -29.00		Passed
Sweep 2	36.16	30 to 19500	Middle/9400	--	< -30.00		Passed
Sweep 2	36.17	30 to 19500	High/9538	--	< -29.00		Passed

5.2.13. FDD IV TCH : Op. Mode 6, Set-up 2

Transmitting channels/ frequencies: TX = 1312/ 1712.4 MHz, 1413/ 1732.6 MHz, 1513/ 1752.6 MHz							
Sweep no.	Diagram numbers	Frequency of emission [MHz]	Range/ U-ARFCN	Frequency of worst-peak level [GHz]	Result [dBm]	Limit [dBm]	Verdict
Sweep 1	36.18	0.009 to 30	Middle/1413	--	<-51.00	-13	Passed
Sweep 2	36.19	30 to 18000	Low/1312	--	< -29.00		Passed
Sweep 2	36.20	30 to 18000	Middle/1413	--	< -29.00		Passed
Sweep 2	36.21	30 to 18000	High/1513	--	< -30.00		Passed

5.2.14. FDD V TCH : Op. Mode 7, Set-up 2

Transmitting channels/ frequencies: TX = 4132/ 826.4 MHz, 4182/ 836.4 MHz, 4233/ 846.6 MHz							
Sweep no.	Diagram numbers	Frequency of emission [MHz]	Range/ U-ARFCN	Frequency of worst-peak level [GHz]	Result [dBm]	Limit [dBm]	Verdict
Sweep 1	36.22	0.009 to 30	Middle/4182	--	<-51.00	-13	Passed
Sweep 2	36.23	30 to 9000	Low/4132	--	< -29.00		Passed
Sweep 2	36.24	30 to 9000	Middle/4182	--	< -29.00		Passed
Sweep 2	36.25	30 to 9000	High/4233	--	< -30.00		Passed

5.3. RF Paramater - Radiated out of Band RF emissions

5.3.1. Test location and equipment (for reference numbers please see chapter 'List of test equipment')

test location	☒ CETECOM Essen (Chapter. 2.2.1)		☐ Please see Chapter. 2.2.2		☐ Please see Chapter. 2.2.3	
test site	☐ 441 EMI SAR	☐ 487 SAR NSA	☒ 443 FAR	☐ 347 Radio.lab.		
receiver	☐ 377 ESCS30	☐ 001 ESS	☐ 489 ESU			
spectr. analys.	☐ 584 FSU	☐ 120 FSEM	☒ 264 FSEK			
antenna	☒ 608 HL 562	☒ 549 HL 025	☐ 302 BBHA9170	☐ 289 CBL 6141	☐ 030 HL-025	☐ 477 GPS
signaling	☐ 017 CMD 65	☐ 323 CMD 55	☐ 340 CMD 55			
signaling	☐ 392 MT8820A	☒ 546 CMU	☐ 547 CMU			
power supply	☐ 463 HP3245A	☐ 457 EA 3013A	☐ 459 EA 2032-50	☐ 268 EA- 3050	☐ 494 AG6632A	☐ 498 NGPE 40
otherwise	☐ 529 6dB divider	☐ 530 10dB Att.	☐ 110 USB LWL	☐ 482 Filter Matrix	☐ 431 Near field	
line voltage	☐ 230 V 50 Hz via public mains		☒060 120 V 60 Hz via PAS 5000			

5.3.2. Requirements/Limits

FCC		☒ Part 2.1053(a), Part2.1057(a)(1) ☐ Part 15 Subpart C, §15.209 @ frequencies defined in §15.205 ☒ Part 22 Subpart H, §22.917(a)(b ☒ Part 24 Subpart E, §24.238(a)(b) ☒ Part 27 Subpart E, §27.53(h)(3)
IC		☒ RSS-132, Issue 2: 4.5.1.1, ☒ RSS-133, Issue 5: 6.5.1(a)(b) ☒ RSS-139, Issue 2: 6.5
Limit	Frequency [MHz]	Radiated emissions limits, 3 meters
		Peak [dBm]
	≥ 30	-13

5.3.3. Test condition and measurement test set-up

link to test system (if used):	☒ air link	☐ cable connection	
EUT-grounding	☒ none	☐ with power supply	☐ additional connection
Equipment set up	☒ table top		☐ floor standing
Climatic conditions	Temperature: (22±3°C)		Rel. humidity: (40±20)%
Test system set-up	Please see chapter "Test system set-up for spurious emission measurement"		
Measurement method	The spectrum was scanned from 9 kHz to the 10th harmonic of the highest frequency generated within the equipment. A PEAK detector was used except measurements near the block-edge where a AVERAGE detector applied. Below described settings for spectrum-analyzer applies.		
Mobile phone settings	A call was established with settings according chapter "Parameter settings on mobile phone and base station CMU200" The UE and used accessories (if any used) were set to work according their intended use/specification stated as by the applicant The measurements were made at the low, middle and high carrier frequencies of each of the supported operating band. Choosing three TX-carrier frequencies of the mobile phone, should be sufficient to demonstrate compliance.		

5.3.3.1. Spectrum-Analyzer settings for GSM/GPRS/E-GPRS 850 Mode/ FDD V Mode

	Start freq. MHz	Stop freq. MHz	R-BW MHz	V-BW MHz	Sweep time sec.	Att. [dB]	Detector
Sweep 1 (subrange 1)	30	1000	1	1	10	10	MaxH-PK
Sweep 2 (subrange 2)	1000	2800	1	1	15	10	MaxH-PK
Sweep 3 (subrange 3)	2800	9000	1	1	60	10	MaxH-PK
Sweep 4a (Block-Edge)	823	824	0.003(GSM)	0.01	30	10	MaxH-PK
Sweep 4b (Block-Edge)	849	850	0.03 (FDD)	0.1	30	10	MaxH-PK

5.3.3.2. Spectrum-analyzer settings for GSM/GPRS/E-GPRS 1900 Mode/ FDD II / FDD IV Mode

	Start freq. MHz	Stop freq. MHz	R-BW MHz	V-BW MHz	Sweep time sec.	Att.	Detector
Sweep 1 (subrange 1)	30	1000	1	1	10	10	MaxH-PK
Sweep 2 (subrange 2)	1000	2800	1	1	15	10	MaxH-PK
Sweep 3 (subrange 3)	2800	20000	1	1	160	10	MaxH-PK
Sweep 4a (Band-Edge)	1849	1850	0.003(GSM)	0.01	30	10	MaxH-PK
Sweep 4b (Band-Edge)	1910	1911	0.03 (FDD)	0.1	30	10	MaxH-AV

5.3.4. Results spurious emissions radiated

GSM and FDD modes selected which has the highest ERP and EIRP values and critical measured level (Margin < 6dB) will be notified, only.

The results are presented below in summary form only. For more information please see each diagram enclosed in annex diagrams.

5.3.4.1. G850

Diagram no.	Carrier Channel	Frequency range	Set-up no.	OP-mode no.	Remark	Used detector			Result
						PK	AV	QP	
8.01	Low	30 – 9000 MHz	1	1	Uplink carrier of GSM band on diagrams	☒	☐	☐	passed
8.02	Middle			1		☒	☐	☐	passed
8.03	High			1		☒	☐	☐	passed

5.3.4.2. PCS 1900

Diagram no.	Carrier Channel	Frequency range	Set-up no.	OP-mode no.	Remark	Used detector			Result
						PK	AV	QP	
8.04	Low	30 – 18000 MHz	1	3	Uplink carrier of GSM band on diagrams	☒	☐	☐	passed
8.05	Middle			3		☒	☐	☐	passed
8.06	High			3		☒	☐	☐	passed

5.3.4.3. FDD II

Diagram no.	Carrier Channel	Frequency range	Set-up no.	OP-mode no.	Remark	Used detector			Result
						PK	AV	QP	
8.20	Low	30 – 18000 MHz	1	5	Uplink carrier of FDD band on diagrams	☒	☐	☐	passed
8.21	Middle			5		☒	☐	☐	passed
8.22	High			5		☒	☐	☐	passed

5.3.4.4. FDD IV

Diagram no.	Carrier Channel	Frequency range	Set-up no.	OP-mode no.	Remark	Used detector			Result
						PK	AV	QP	
8.23	Low	30 – 17000 MHz	1	6	Uplink carrier of FDD band on diagrams	☒	☐	☐	passed
8.24	Middle			6		☒	☐	☐	passed
8.25	High			6		☒	☐	☐	passed

5.3.4.5. FDD V

Diagram no.	Carrier Channel	Frequency range	Set-up no.	OP-mode no.	Remark	Used detector			Result
						PK	AV	QP	
8.26	Low	30 – 9000 MHz	1	7	Uplink carrier of FDD band on diagrams	☒	☐	☐	passed
8.27	Middle			7		☒	☐	☐	passed
8.28	High			7		☒	☐	☐	passed

5.4. Measurement uncertainties

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's contribution to the overall uncertainty according it's statistical distribution calculated.

Following table shows expectable uncertainties for each measurement type performed.

RF-Measurement	Frequency range	Calculated uncertainty based on a confidence level of 95%	Remarks:
Power Output conducted	9 kHz .. 20 GHz	1.0 dB	--
Power Output radiated	30 MHz .. 4 GHz	3.17 dB	Substitution method
Conducted emissions on antenna ports	9 kHz .. 20 GHz	1.0 dB	--
Radiated emissions enclosure	150 kHz .. 30 MHz	5.0 dB	Magnetic field
	30 MHz .. 1 GHz	4.2 dB	E-Field
	1 GHz .. 20 GHz	3.17 dB	Substitution method
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
		1.0 dB	Power
Frequency stability	9 kHz .. 20 GHz	0.0636 ppm	--
Conducted emissions on AC-mains port (U_{CISPR})	9 kHz .. 150 kHz	4.0 dB	--
	150 kHz .. 30 MHz	3.6 dB	

Table: measurement uncertainties, valid for conducted/radiated measurements

6. Abbreviations used in this report

The abbreviations	
ANSI	American National Standards Institute
AV or AVG	Average detector
CAV	Average detector
EIRP	Equivalent isotropically radiated power, determined within a separate measurement
EGPRS	Enhanced General Packet Radio Service
EUT	Equipment Under Test
FCC	Federal Communications Commission, USA
IC	Industry Canada
n.a.	not applicable
Op-Mode	Operating mode of the equipment
PK	Peak
RBW	resolution bandwidth
RF	Radio frequency
RSS	Radio Standards Specification, Dokuments from Industry Canada
Rx	Receiver
TCH	Traffic channel
Tx	Transmitter
QP	Quasi peak detector
VBW	Video bandwidth
ERP	Effective radiated power

7. Accreditation details of CETECOM's laboratories and test sites

Ref.-No.	Accreditation Certificate	Valid for laboratory area or test site	Accreditation Body
-	D-PL-12047-01-01	All laboratories and test sites of CETECOM GmbH, Essen	DAkkS, Deutsche Akkreditierungsstelle GmbH
337 487 558 348 348	736496	Radiated Measurements 30 MHz to 1 GHz, 3 m / 10 m (OATS) Radiated Measurements 30 MHz to 1 GHz, 3 m (SAR) Radiated Measurements above 1 GHz, 3 m (FAR) Mains Ports Conducted Interference Measurements Telecommunication Ports Conducted Interference Measurem.	FCC, Federal Communications Commission Laboratory Division, USA (MRA US-EU 0003)
337 487 550 558	3462D-1 3462D-2 3462D-2 3462D-3	Radiated Measurements 30 MHz to 1 GHz, 3 m / 10 m (OATS) Radiated Measurements 30 MHz to 1 GHz, 3 m (SAR) Radiated Measurements 1 GHz to 6 GHz, 3 m (SAR) Radiated Measurements above 1 GHz, 3 m (FAR)	IC, Industry Canada Certification and Engineering Bureau
337 487 550 348 348	R-2665 R-2666 G-301 C-2914 T-1967	Radiated Measurements 30 MHz to 1 GHz, 3 m / 10 m (OATS) Radiated Measurements 30 MHz to 1 GHz, 3 m (SAR) Radiated Measurements 1 GHz to 6 GHz, 3 m (SAR) Mains Ports Conducted Interference Measurements Telecommunication Ports Conducted Interference Measurem.	VCCI, Voluntary Control Council for Interference by Information Technology Equipment, Japan
OATS = Open Area Test Site, SAR = Semi Anechoic Room, FAR = Fully Anechoic Room			

8. Instruments and Ancillary

8.1. Used equipment "CTC"

The "Ref.-No" in the left column of the following tables allows the clear identification of the laboratory equipment.

8.1.1. Test software and firmware of equipment

Ref.-No.	Equipment	Type	Serial-No.	Version of Firmware or Software during the test
001	EMI Test Receiver	ESS	825132/017	Firm.= 1.21 , OTP=2.0, GRA=2.0
012	Signal Generator (EMS-cond.)	SMY 01	839069/027	Firm.= V 2.02
013	Power Meter (EMS cond.)	NRVD	839111/003	Firm.= V 1.51
017	Digital Radiocommunication Tester	CMD 60 M	844365/014	Firmware = V 3.52 .22.01.99, DECT = D2.87 13.01.99
053	Audio Analyzer	UPA3	860612/022	Firm. V 4.3
119	RT Harmonics Analyzer dig. Flickermeter	B10	G60547	Firm.= V 3.1DHG
140	Signal Generator	SMHU	831314/006	Firm.= 3.21
261	Thermal Power Sensor	NRV-Z55	825083/0008	EPROM-Datum 02.12.04, SE EE 1 B
262	Power Meter	NRV-S	825770/0010	Firm.= 2.6
263	Signal Generator	SMP 04	826190/0007	Firm.=3.21
264	Spectrum Analyzer	FSEK 30	826939/005	Bios=2.1, Analyzer= 3.20
295	Racal Digital Radio Test Set	6103	1572	UNIT Firmware= 4.04, SW-Main=4.04, SW-BBP=1.04, SW-DSP=1.02, Hardboot=1.02, Softboot=2.02
298	Univ. Radio Communication Tester	CMU 200	832221/091	R&S Test Firmware =3.53 /3.54 (current Testsoftw. f. all band used
323	Digital Radiocommunication Tester	CMD 55	825878/0034	Firm.= 3.52 .22.01.99
331	Climatic Test Chamber -40/+80 Grad	HC 4055	43146	TSI 1.53
335	CTC-EMS-Conducted	System EMS Conducted	-	EMC 32 V 8.52
340	Digital Radiocommunication Tester	CMD 55	849709/037	Firm.= 3.52 .22.01.99
355	Power Meter	URV 5	891310/027	Firm.= 1.31
365	10V Insertion Unit 50 Ohm	URV5-Z2	100880	Eprom Data = 31.03.08
366	Ultra Compact Simulator	UCS 500 M4	V0531100594	Firm. UCS 500=001925/3.06a02, rc=ISMIEC 4.10
371	Bluetooth Tester	CBT32	100153	CBT V5,30+ SW-Option K55, K57
377	EMI Test Receiver	ESCS 30	100160	Firm.= 2.30, OTP= 02.01, GRA= 02.36
378	Broadband RF Field Monitor	RadiSense III	03D00013SNO-08	Firm.= V.03D13
383	Signal Generator	SME 03	842 828 /034	Firm.= 4.61
389	Digital Multimeter	Keithley 2000	0583926	Firm. = A13 (Mainboard) A02 (Display)
392	Radio Communication Tester	MT8820A	6K00000788	Firm.= 4.50 #005, IPL=4.01#001,OS=4.02#001, GSM=4.41#013, W-CDMA= 4.54#004, scenario= 4.52#002
436	Univ. Radio Communication Tester	CMU 200	103083	R&S Test Firmware Base=5.14, Mess-Software= GSM:5.14 WCDMA:5.14 (current Testsoftw. F. all band
441	CTC-SAR-EMI Cable Loss	System EMI field (SAR)	-	EMC 32 Version 8.52
442	CTC-SAR-EMS	System EMS field (SAR)	-	EMC 32 Version 8.40
443	CTC-FAR-EMI-RSE	System CTC-FAR-EMI-RSE	-	Spuri 7.2.5 or EMC 32 Ver. 8.53
444	CTC-FAR-EMS field	System-EMS-Field (FAR)	-	EMC 32 Version 8.40
460	Univ. Radio Communication Tester	CMU 200	108901	R&S Test Firmware Base=5.14, GSM=5.14

Ref.-No.	Equipment	Type	Serial-No.	Version of Firmware or Software during the test
				WCDMA=5.14 (current Testsoftw.,f. all band to be used,
489	EMI Test Receiver	ESU40	1000-30	Firmware=4.43 SP3, Bios=V5.1-16-3, Spec. =01.00
491	ESD Simulator dito	ESD dito	dito307022	V 2.30
524	Voltage Drop Simulator	VDS 200	0196-16	Software Nr: 000037 Version V4.20a01
526	Burst Generator	EFT 200 A	0496-06	Software Nr. 000034 Version V2.32
527	Micro Pulse Generator	MPG 200 B	0496-05	Software-Nr. 000030 Version V2.43
528	Load Dump Simulator	LD 200B	0496-06	Software-Nr. 000031 Version V2.35a01
546	Univ. Radio Communication Tester	CMU 200	106436	R&S Test Firmware Base=5.14, GSM=5.14 WCDMA=5.14 (current Testsoftw.,f. all band to be used
547	Univ. Radio Communication Tester	CMU 200	835390/014	R&S Test Firmware Base=V5.1403 (current Testsoftw., f. all band used, GSM = 5.14 WCDMA: = 5.14
584	Spectrum Analyzer	FSU 8	100248	2.82_SP3
594	Wideband Radio Communication Tester	CMW500	101757	Firmware Base=2.0.20.9, LTE=2.0.20.8. CDMA= 2.0.10
597	Univ. Radio Communication Tester	CMU 200	100347	R&S Test Firmware Base=5.01, GSM=5.02 WCDMA= not installed, Mainboard= µP1=V.850
598	Spectrum Analyzer	FSEM 30 (Reserve)	831259/013	Firmware Bios 3.40 , Analyzer 3.40 Sp 2
620	EMI Test Receiver	ESU 26	100362	4.43_SP3
642	Wideband Radio Communication Tester	CMW 500	126089	

8.1.2. Single instruments and test systems

Ref.-No.	Equipment	Type	Serial-No.	Manufacturer	Interval of calibration	Remark	Cal due
001	EMI Test Receiver	ESS	825132/017	Rohde & Schwarz	12 M	-	31.03.2014
005	AC - LISN (50 Ohm/50µH, test site 1)	ESH2-Z5	861741/005	Rohde & Schwarz	24/12 M	-	31.03.2014
007	Single-Line V-Network (50 Ohm/5µH)	ESH3-Z6	892563/002	Rohde & Schwarz	24/12 M	-	31.03.2014
009	Power Meter (EMS-radiated)	NRV	863056/017	Rohde & Schwarz	24 M	-	31.03.2014
016	Line Impedance Simulating Network	Op. 24-D	B6366	Spitzenberger+Spies	36 M	-	31.03.2014
020	Horn Antenna 18 GHz (Subst 1)	3115	9107-3699	EMCO	36/12 M	-	31.03.2014
021	Loop Antenna (H-Field)	6502	9206-2770	EMCO	36 M	-	31.03.2015
030	Loop Antenna (H-field)	HFH-Z2	879604/026	Rohde & Schwarz	36 M	-	31.03.2015
033	RF-current probe (100kHz-30MHz)	ESH2-Z1	879581/18	Rohde & Schwarz	24 M	-	31.03.2014
057	relay-switch-unit (EMS system)	RSU	494440/002	Rohde & Schwarz	pre-m	1a	
060	power amplifier (DC-2kHz)	PAS 5000	B6363	Spitzenberger+Spies	-	3	
066	notch filter (WCDMA; FDD1)	WRCT 1900/2200-5/40-10EEK	5	Wainwright GmbH	12 M	1g	30.06.2014
086	DC - power supply, 0 -10 A	LNG 50-10	-	Heinzinger Electronic	pre-m	2	
087	DC - power supply, 0 -5 A	EA-3013 S	-	Elektro Automatik	pre-m	2	
090	Helmholtz coil: 2x10 coils in series	-	-	RWTÜV	-	4	
091	USB-LWL-Converter	OLS-1	007/2006	Ing. Büro Scheiba	-	4	
099	passive voltage probe	ESH2-Z3	299.7810.52	Rohde & Schwarz	36 M	-	31.03.2015
100	passive voltage probe	Probe TK 9416	without	Schwarzbeck	36 M	-	31.03.2015
110	USB-LWL-Converter	OLS-1	-	Ing. Büro Scheiba	-	4	
119	RT Harmonics Analyzer dig. Flickermeter	B10	G60547	BOCONSULT	36 M	-	31.03.2014
134	horn antenna 18 GHz (Subst 2)	3115	9005-3414	EMCO	12 M	-	31.03.2014
136	adjustable dipole antenna (Dipole 1)	3121C-DB4	9105-0697	EMCO	36 M	-	31.03.2015
140	Signal Generator	SMHU	831314/006	Rohde & Schwarz	24 M	-	31.03.2014
248	attenuator	SMA 6dB 2W	-	Radiall	pre-m	2	
249	attenuator	SMA 10dB 10W	-	Radiall	pre-m	2	
252	attenuator	N 6dB 12W	-	Radiall	pre-m	2	
256	attenuator	SMA 3dB 2W	-	Radiall	pre-m	2	
257	hybrid	4031C	04491	Narda	pre-m	2	
260	hybrid coupler	4032C	11342	Narda	pre-m	2	
261	Thermal Power Sensor	NRV-Z55	825083/0008	Rohde & Schwarz	24 M	-	31.03.2014
262	Power Meter	NRV-S	825770/0010	Rohde & Schwarz	24 M	-	31.03.2014
263	Signal Generator	SMP 04	826190/0007	Rohde & Schwarz	36 M	-	31.03.2014
264	Spectrum Analyzer	FSEK 30	826939/005	Rohde & Schwarz	12 M	-	31.03.2014
265	peak power sensor	NRV-Z33, Model 04	840414/009	Rohde & Schwarz	24 M	-	31.03.2014
266	peak power sensor	NRV-Z31, Model 04	843383/016	Rohde & Schwarz	24 M	-	31.03.2014
267	notch filter GSM 850	WRCA 800/960-6EEK	9	Wainwright GmbH	pre-m	2	
270	termination	1418 N	BB6935	Weinschel	pre-m	2	
271	termination	1418 N	BE6384	Weinschel	pre-m	2	
272	attenuator (20 dB) 50 W	Model 47	BF6239	Weinschel	pre-m	2	
273	attenuator (10 dB) 100 W	Model 48	BF9229	Weinschel	pre-m	2	
274	attenuator (10 dB) 50 W	Model 47 (10 dB) 50 W	BG0321	Weinschel	pre-m	2	
275	DC-Block	Model 7003 (N)	C5129	Weinschel	pre-m	2	
276	DC-Block	Model 7006 (SMA)	C7061	Weinschel	pre-m	2	
279	power divider	1515 (SMA)	LH855	Weinschel	pre-m	2	
287	pre-amplifier 25MHz - 4GHz	AMF-2D-100M4G-35-10P	379418	Miteq	12 M	1c	30.06.2014
291	high pass filter GSM 850/900	WHJ 2200-4EE	14	Wainwright GmbH	12 M	1c	30.06.2014

Ref.-No.	Equipment	Type	Serial-No.	Manufacturer	Interval of calibration	Remark	Cal due
298	Univ. Radio Communication Tester	CMU 200	832221/091	Rohde & Schwarz	pre-m	3	
300	AC LISN (50 Ohm/50µH, 1-phase)	ESH3-Z5	892 239/020	Rohde & Schwarz	24/12 M	-	31.03.2014
301	attenuator (20 dB) 50W, 18GHz	47-20-33	AW0272	Lucas Weinschel	pre-m	2	
302	horn antenna 40 GHz (Meas 1)	BBHA9170	155	Schwarzbeck	36 M	-	31.03.2014
303	horn antenna 40 GHz (Subst 1)	BBHA9170	156	Schwarzbeck	36 M	-	31.03.2014
331	Climatic Test Chamber -40/+80 Grad	HC 4055	43146	Heraeus Vötsch	24 M	-	30.11.2012
341	Digital Multimeter	Fluke 112	81650455	Fluke	24 M	-	31.03.2014
342	Digital Multimeter	Voltcraft M-4660A	IB 255466	Voltcraft	24 M	-	31.03.2014
347	laboratory site	radio lab.	-	-	-	5	
348	laboratory site	EMI conducted	-	-	-	5	
354	DC - Power Supply 40A	NGPE 40/40	448	Rohde & Schwarz	pre-m	2	
355	Power Meter	URV 5	891310/027	Rohde & Schwarz	24 M	-	31.03.2014
356	power sensor	NRV-Z1	882322/014	Rohde & Schwarz	24 M	-	31.03.2014
357	power sensor	NRV-Z1	861761/002	Rohde & Schwarz	24 M	-	31.03.2014
371	Bluetooth Tester	CBT32	100153	R&S	12 M	-	31.03.2014
373	Single-Line V-Network (50 Ohm/5µH)	ESH3-Z6	100535	Rohde & Schwarz	24/12 M	-	31.03.2014
376	Horn Antenna 6 GHz	BBHA9120 E	BBHA 9120 E 179	Schwarzbeck	12 M	-	31.03.2014
377	EMI Test Receiver	ESCS 30	100160	Rohde & Schwarz	12 M	-	31.03.2014
389	Digital Multimeter	Keithley 2000	0583926	Keithley	24 M	-	31.03.2014
392	Radio Communication Tester	MT8820A	6K00000788	Anritsu	12 M	-	31.03.2014
431	Model 7405	Near-Field Probe Set	9305-2457	EMCO	-	4	
436	Univ. Radio Communication Tester	CMU 200	103083	Rohde & Schwarz	12 M	-	31.03.2014
441	CTC-SAR-EMI Cable Loss	System EMI field (SAR) Cable	-	CETECOM	12 M	5	31.10.2014
443	CTC-FAR-EMI-RSE	System CTC-FAR-EMI-RSE	-	ETS-Lindgren / CETECOM	12 M	5	30.06.2014
448	notch filter WCDMA_FDD II	WRCT 1850.0/2170.0-5/40-	5	Wainwright Instruments GmbH	12 M	1c	30.06.2014
449	notch filter WCDMA FDD V	WRCT 824.0/894.0-5/40-8SSK	1	Wainwright	12 M	1c	30.06.2014
454	Oscilloscope	HM 205-3	9210 P 29661	Hameg	-	4	
456	DC-Power supply 0-5 A	EA 3013 S	207810	Elektro Automatik	pre-m	2	
459	DC -Power supply 0-5 A , 0-32 V	EA-PS 2032-50	910722	Elektro Automatik	pre-m	2	
460	Univ. Radio Communication Tester	CMU 200	108901	Rohde & Schwarz	12 M	-	31.03.2014
463	Universal source	HP3245A	2831A03472	Agilent	-	4	
466	Digital Multimeter	Fluke 112	89210157	Fluke USA	24 M	-	31.03.2014
467	Digital Multimeter	Fluke 112	89680306	Fluke USA	24 M	-	31.03.2014
468	Digital Multimeter	Fluke 112	90090455	Fluke USA	24 M	-	31.03.2014
477	ReRadiating GPS-System	AS-47	-	Automotive Cons. Fink	-	3	
480	power meter (Fula)	NRVS	838392/031	Rohde & Schwarz	24 M	-	31.03.2014
482	filter matrix	Filter matrix SAR 1	-	CETECOM (Brl)	-	1d	
484	pre-amplifier 2,5 - 18 GHz	AMF-5D-02501800-25-10P	1244554	Miteq	12 M	-	30.06.2014
487	System CTC NSA-Verification SAR-EMI	System EMI field (SAR) NSA	-	ETS Lindgren / CETECOM	24 M	-	30.09.2014
489	EMI Test Receiver	ESU40	1000-30	Rohde & Schwarz	12 M	-	31.03.2014
502	band reject filter	WRCG 1709/1786-1699/1796-	SN 9	Wainwright	pre-m	2	
503	band reject filter	WRCG 824/849-814/859-	SN 5	Wainwright	pre-m	2	
512	notch filter GSM 850	WRCA 800/960-02/40-6EEK	SN 24	Wainwrght	12 M	1c	30.06.2014
517	relais switch matrix	HF Relais Box Keithley	SE 04	Keithley	pre-m	2	
523	Digital Multimeter	L4411A	MY46000154	Agilent	24 M	-	31.03.2014
529	6 dB Broadband resistive power divider	Model 1515	LH 855	Weinschel	pre-m	2	
530	10 dB Broadband resistive power divider	R 416110000	LOT 9828	-	pre-m	2	
546	Univ. Radio Communication Tester	CMU 200	106436	R&S	12 M	-	31.03.2014
547	Univ. Radio Communication Tester	CMU 200	835390/014	Rohde & Schwarz	12 M	-	31.03.2014
548	Digital-Barometer	GBP 2300	without	Greisinger GmbH	36 M	-	30.06.2015
549	Log.Per-Antenna	HL025	1000060	Rohde & Schwarz	36/12 M	-	31.03.2015
552	high pass filter 2,8-18GHz	WHKX 2.8/18G-10SS	4	Wainwright	12 M	1c	30.06.2014
558	System CTC FAR S-VSWR	System CTC FAR S-VSWR	-	CTC	24 M	-	31.07.2014
574	Biconilog Hybrid Antenna	BTA-L	980026L	Frankonia	36/12 M	-	30.03.2014
584	Spectrum Analyzer	FSU 8	100248	Rohde & Schwarz	12 M	-	31.03.2014
594	Wideband Radio Communication Tester	CMW500	101757	Rohde & Schwarz	24 M	-	31.03.2014
597	Univ. Radio Communication Tester	CMU 200	100347	Rohde & Schwarz	12 M	-	31.03.2014
598	Spectrum Analyzer	FSEM 30 (Reserve)	831259/013	Rohde & Schwarz	24 M	-	13.01.2014
600	power meter	NRVD (Reserve)	834501/018	Rohde & Schwarz	24 M	-	31.03.2014
601	medium-sensitivity diode sensor	NRV-Z5 (Reserve)	8435323/003	Rohde & Schwarz	24 M	-	12.01.2014
602	peak power sensor	NRV-Z32 (Reserve)	835080	Rohde & Schwarz	24 M	-	12.01.2014
608	UltraLog-Antenna	HL 562	830547/009	Rohde & Schwarz	36/12 M	-	31.03.2014
611	DC power supply	E3632A	KR 75305854	Agilent	pre-m	2	
612	DC power supply	E3632A	MY 40001321	Agilent	pre-m	2	
613	Attenuator	R416120000 20dB 10W	Lot. 9828	Radiall	pre-m	2	
616	Digitalmultimeter	Fluke 177	88900339	Fluke	24 M	-	31.03.2014
617	Power Splitter/Combiner	ZFSC-2-2-S+	S F987001108	Mini Circuits	-	2	

Ref.-No.	Equipment	Type	Serial-No.	Manufacturer	Interval of calibration	Remark	Cal due
618	Power Splitter/Combiner	50PD-634	600994	JFW Industries USA	-	2	
619	Power Splitter/Combiner	50PD-634	600995	JFW Industries, USA	-	3	
620	EMI Test Receiver	ESU 26	100362	Rohde-Schwarz	12 M	-	01.01.2014
621	Step Attenuator 0-139 dB	RSP	100017	Rohde & Schwarz	pre-m	2	
625	Generic Test Load USB	Generic Test Load USB	-	CETECOM	-	2	
627	data logger	OPUS 1	201.0999.9302.6.4.1.43	G. Lufft GmbH	24 M	-	30.05.2014
634	Spectrum Analyzer	FSM (HF-Unit)	826188/010	Rohde & Schwarz	pre-m	2	
635	DFS Testbox	DFS Testbox	2012 V01	CETECOM SHA	-	-	
636	Wärmebildkamera	Ti32	Ti32-12060213, Tele	Fluke Corporation	24 M	-	31.07.2014
637	High Speed HDMI with Ethernet 1m	HDMI cable with Ethernet 1m	-	KogiLink	-	2	
638	HDMI Kabel with Ethernet 1,5 m flach	HDMI cable with Ethernet	-	Reichelt	-	2	
640	HDMI cable 2m rund	HDMI cable 2m rund	-	Reichelt	-	2	
641	HDMI cable with Ethernet	Certified HDMI cable with	-	PureLink	-	2	
642	Wideband Radio Communication Tester	CMW 500	126089	Rohde&Schwarz	24 M	-	31.03.2014

8.1.3. Legend

Note / remarks		Calibrated during system calibration:
	1a	System CTC-SAR-EMS (Ref.-No. 442)
	1b	System-CTC-EMS-Conducted (Ref.-No. 335)
	1c	System CTC-FAR-EMI-RSE (Ref.-No . 443)
	1d	System CTC-SAR-EMI (Ref.-No . 441)
	1e	System CTC-OATS (EMI radiated) (Ref.-No. 337)
	1 f	System CTC-CTIA-OTA (Ref.-No . 420)
	1 g	System CTC-FAR-EMS (Ref.-No . 444)
	2	Calibration or equipment check immediately before measurement
	3	Regulatory maintained equipment for functional check or support purpose
	4	Ancillary equipment without calibration e.g. mechanical equipment or monitoring equipment
	5	Test System

Interval of calibration	12 M	12 month
	24 M	24 month
	36 M	36 month
	24/12 M	Calibration every 24 months, between this every 12 months internal validation
	36/12 M	Calibration every 36 months, between this every 12 months internal validation
	Pre-m	Check before starting the measurement
	-	Without calibration