

TEST REPORT

No.: 2-0037-12-1-1i

According to:
FCC Regulations
 Part 15.107, Part 15.109

IC-Regulations
 RSS-Gen, Issue 3
 RSS-210, Issue 8

for

Research In Motion Limited

Mobile Phone RFG81UW

FCC-ID: L6ARFG80UW
 IC: 2503A-RFG80UW

Laboratory Accreditation and Listings			
 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
 AUTHORIZED RF LABORATORY	 LAB CODE 20011130-00		
accredited according to DIN EN ISO/IEC 17025			
CETECOM GmbH Laboratory Radio Communications & Electromagnetic Compatibility Im Teelbruch 116 • 45219 Essen • Germany Registered in Essen, Germany, Reg. No.: HRB Essen 8984 Tel.: + 49 (0) 20 54 / 95 19-954 • Fax: + 49 (0) 20 54 / 95 19-964 E-mail: info@cetecom.com • Internet: www.cetecom.com			

Table of contents

1. SUMMARY OF TEST RESULTS.....	3
1.1. TEST OVERVIEW	3
2. ADMINISTRATIVE DATA	4
2.1. Identification of the testing laboratory	4
2.2. Test location	4
2.3. Organizational items	4
2.4. Applicant's details	4
2.5. Manufacturer's details	4
3. EQUIPMENT UNDER TEST (EUT).....	5
3.1. EUT: Type, S/N etc. and short descriptions used in this test report	5
3.2. Auxiliary Equipment (AE): Type, S/N etc. and short descriptions	6
3.3. EUT set-ups	7
3.4. EUT operating modes	8
3.5. Additional declaration and description of EUT	9
3.6. Configuration of cables used for testing	9
4. DESCRIPTION OF TEST SYSTEM SET-UP'S	10
4.1. Test system set-up for AC power-line conducted emission measurements	10
4.2. Test system set-up for electric field measurement in the range 30 MHz to 1 GHz	11
4.3. Test system set-up for electric field measurement above 1 GHz	12
5. MEASUREMENTS	13
5.1. General Limit - Conducted emissions on AC-Power lines	13
5.2. General Limit - Radiated field strength emissions, 30 MHz - 1 GHz.....	15
5.3. General Limit - Radiated emissions, above 1 GHz.....	16
5.4. Measurement uncertainties	18
6. ABBREVIATIONS USED IN THIS REPORT	18
7. ACCREDITATION DETAILS OF CETECOM'S LABORATORIES AND TEST SITES	19
8. INSTRUMENTS AND ANCILLARY.....	20
8.1. Used equipment "CTC"	20

Table of annex

Total pages

ANNEX 1: EXTERNAL PHOTOS OF EUT	TO BE SUPPLIED BY APPLICANT	
ANNEX 2: INTERNAL PHOTOS OF EUT	TO BE SUPPLIED BY APPLICANT	
ANNEX 3: TEST SET-UP PHOTOS		4
ANNEX 4: DIAGRAM OF TESTING		38

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.

Following tests have been performed to show compliance with applicable FCC Part 15, Subpart B (Unintentional Radiators) of the CFR 47 FCC Rules, Edition 1st October 2011 and RSS-Gen., Issue 3 Canadian standard.

1.1. Test overview

No. of Diagram group	Test Cases	Port	References & Limits			EUT set-up	EUT op-mode	Result
			FCC Standard	IC Standard	Test Limits			
1	AC Power Lines Conducted emissions	AC Power lines	§15.107	-	FCC §15.107 ☐ Class A ☒ Class B	1 to 6	1 to 6	passed
			-	RSS-Gen., Issue 3	Chapter 7.2.4 Table 4			
2&8	Radiated emissions	Cabinet + Interconnecting cables	§15.109	-	FCC 15.109 ☐ Class A ☒ Class B	7 to 13	1 to 6	passed
			-	RSS-Gen., Issue 3	Chapter 6.1			

Remark:



Dipl.-Ing. W. Richter
Responsible for test section



GmbH
Im Teelbruch 116
45219 Essen
Tel.: + 49 (0) 20 54 / 95 19 - 0
Fax: + 49 (0) 20 54 / 95 19 - 997



Dipl.-Ing. C. Lorenz
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. W. Richter
Deputy:	Dipl.-Ing. J. Schmitt

2.2. Test location

2.2.1. Test laboratory "CTC"

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

Order No.: [automatisch!]	2-0037-12-1
Responsible for test report and project leader:	Dipl.-Ing. C. Lorenz
Receipt of EUT:	June 2012
Date(s) of test:	June – August 2012
Date of report:	2012-09-14

Version of template:	12.08

2.4. Applicant's details

Applicant's name:	Research In Motion Limited
Address:	440 Phillip Street Waterloo, Ontario NL2 5R9 Canada
Contact person:	Mr. Masud S. Attayi

2.5. Manufacturer's details

Manufacturer's name:	Research In Motion Limited
Address:	440 Phillip Street Waterloo, Ontario NL2 3W8 Canada

3. Equipment under test (EUT)

3.1. 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	Mobile Phone	RFG81UW	IMEI: 004401138946757	CER-48928-001 Rev 1	10.0.5.224
EUT B	Mobile Phone	RFG81UW	IMEI: 004401138946435	CER-48928-001 Rev 1	10.0.5.224
EUT C	Mobile phone	RFG81UW	IMEI: 004401139037002	CER-48928-001 Rev 2 PIN: 2A47CC42	10.0.6.420
EUT D	Mobile phone	RFG81UW	IMEI: 004401139036996	CER-48928-001 Rev 2 PIN: 2A47CC31	10.0.6.420
EUT E	Mobile phone	RFG81UW	IMEI: 004401139036988	CER-48928-001 Rev 2 PIN: 2A47CC22	10.0.6.420
EUT F	Mobile phone	RFG81UW	IMEI: 004401139036970	CER-48928-001 Rev 2 PIN: 2A47CC10	10.0.6.420
EUT G	Mobile phone	RFG81UW	IMEI: 004401139037010	CER-48928-001 Rev 2 PIN: 2A47CC45	10.0.6.420
EUT H	Li-Io Battery	BAT-47277-001	--	--	--

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

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

Below an overview of all accessories available to this project are enclosed. Nevertheless not all accessories were used and tested in this report (covered by other set-ups/test reports), used accessories in this test report are high lined.

AE short description *)	Auxiliary Equipment	Type	S/N serial number	HW hardware status	SW software status
AE 1	HS1	HDW-44306-001	--	--	--
AE 2	HS2	HDW-44306-001	--	--	--
AE 3	CH1	HDW-24481-001	--	--	--
AE 4	CH2	HDW-24481-001	--	--	--
AE 5	CH3	HDW-47725-001	--	--	--
AE 6	CH4	HDW-47725-001	--	--	--
AE 7	CH5	HDW-34724-001	--	--	--
AE 8	CH6	HDW-44303-001	--	--	--
AE 9	CH7	HDW-17957-003	--	--	--
AE 10	CH8	HDW-29713-001	--	--	--
AE 11	CH9	HDW-29713-001	--	--	--
AE 12	CH10	HDW-29714-001	--	--	--
AE 13	CH11	HDW-44303-002	--	--	--
AE 14	CH12	HDW-44303-003	--	--	--
AE 15	CH13	HDW-34725-001	--	--	--
AE 16	CH14	HDW-34725-002	--	--	--
AE 17	USB1	HDW-28109-003	--	--	--
AE 18	USB2	HDW-48415-001	--	--	--
AE 19	USB3	N/A	--	--	--
AE 20	HDMI cable	HDW-29572-001	--	--	--
AE 21	ACC1	N/A	--	--	--
AE 22	HDMI-monitor		#CTC1	--	--

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

3.3. EUT set-ups

EUT set-up no. *)	Combination of EUT and AE	Remarks
Set. 1	EUT A + EUT H + AE 1 + AE 3 + AE 17	Used for conducted EMI-AC tests
Set. 2	EUT A + EUT H + AE 2 + AE 5 + AE 18	Used for conducted EMI-AC tests
Set. 3	EUT A + EUT H + AE 1 + AE 7	Used for conducted EMI-AC tests
Set. 4	EUT A + EUT H + AE 2 + AE 8 + AE 17	Used for conducted EMI-AC tests
Set. 5	EUT F ++ EUT H + AE 1 + AE 15 + AE 21	Used for conducted EMI-AC tests
Set. 6	EUT G + EUT H + AE2 + AE 16 + AE 20 + AE 22	Used for conducted EMI-AC tests
Set. 7	EUT G + EUT H + AE 1 + AE 3 + AE 17	Used for radiated EMI-measurements
Set. 8	EUT G + EUT H + AE 2 + AE 5 + AE 18	Used for radiated EMI-measurements
Set. 9	EUT F + EUT H + AE1 + AE 7	Used for radiated EMI-measurements
Set. 10	EUT F + EUT H + AE 2 + AE 8 + AE 17	Used for radiated EMI-measurements
Set. 11	EUT E + EUT H + AE 1 + AE 15	Used for radiated EMI-measurements
Set. 12	EUT G + EUT H + AE1 + AE 7	Used for radiated EMI-measurements
Set. 13	EUT A + EUT H + AE 2 + AE 8 + AE 17	Used for radiated EMI-measurements

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

3.4. EUT operating modes

EUT operating mode no. *)	Description of operating modes	Additional information
op. 1	IDLE (RX-MODE) GSM850 Middle channel=192	Phone is registered to base station and location periodic update is switched-off. A test sim card is used.
op. 2	IDLE (RX-MODE) GSM1900 Middle channel 661	Phone is registered to base station and location periodic update is switched-off. A test sim card is used.
op. 3	IDLE (RX-MODE) FDD Band 2 Middle channel=9400	Phone is registered to base station with a test sim card.
op. 4	IDLE (RX-MODE) FDD Band 5 Middle channel 4183	Phone is registered to base station with a test sim card.
op. 5	Charging battery	This operating mode applies to all other operating modes.
op. 6	Mirror Screen duplicate	Mirroring mobile phone's display on external HDMI-monitor

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

3.5. Additional declaration and description of EUT

(Applicant's declaration, ☐ = not selected, ☒ = selected)

EUT A .. EUT G		☐ table-top ☐ floor-standing ☐ wall-mounted ☒ not defined	typical use ☒ portable use ☐ fixed use ☐ vehicular use	typical operating cycle of EUT. ☒ < 0,5 sec. ☐ :
Place of use		☒ Residential, commercial and light industry ☐ Industrial environment ☐ vehicular use		
Highest frequency generated or used in the device or on which the device operates or tunes		☐ below 1.705 MHz -> up to 30 MHz ☐ 1.705 MHz – 108 MHz -> up to 1 GHz ☐ 108 MHz -500 MHz -> up to 2 GHz ☐ 500 MHz 1000 MHz -> up to 5 GHz ☒ Above 1000 MHz -> 5 th harmonic or 40 GHz		
Power line: ☐ AC ☐ L1, ☐ L2, ☐ L3, ☐ N _____ Hz ☐ 12V, ☐ 24V, ☐ 230V, ☐ 400V ☒ DC ☒ Li-Io battery		EUT-grounding: ☒ none ☐ with power supply ☐ additional:		
Other Ports (description of interconnecting cables) Connector		possible total cable length	shielding	connected during test
1. HDMI		☒ < 3m ☐ > 3m ☐ : other	☒ screened ☐ unscreened	☒ yes ☐ no
2. AC-power line via AC-charger		☒ < 3m ☐ > 3m ☐ : other	☐ screened ☒ unscreened	☒ yes ☐ no
2. USB		☒ < 3m ☐ > 3m ☐ : other	☒ screened ☐ unscreened	☒ yes ☐ no
Does EUT contain devices susceptible to magnetic fields, e.g. Hall elements, electrodynamics microphones, etc.?				☐ yes ☒ no
Is mounting position / usual operating position defined?				☐ yes ☒ no

3.6. Configuration of cables used for testing

Cable number	Item	Type	S/N serial number	HW hardware status	Cable length
Cable 1	HDMI cable*	--	--	--	--
Cable 2	USB cable *	--	--	--	1 to 1.2m*

Remark: use of cable depends of tested EUT set-up

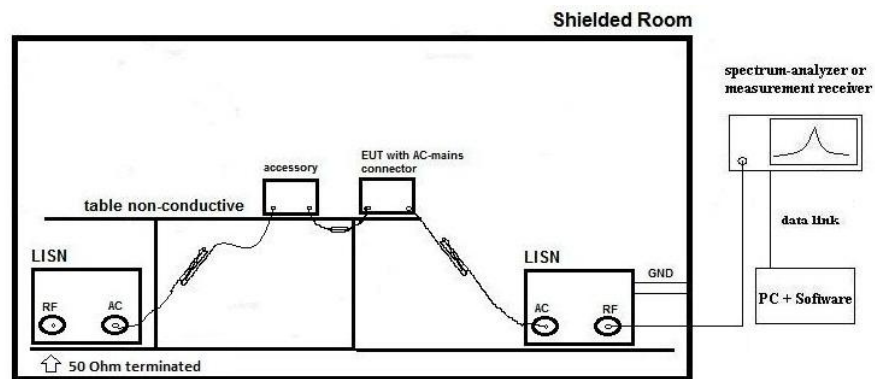
4. Description of test system set-up's

4.1. Test system set-up for AC power-line conducted emission measurements

Specification: ANSI C63.4-2009 chapter 7, ANSI C63.10-2009 chapter 6.2

General Description: The radio frequency voltage conducted back into the AC power line in the frequency range 150 kHz to 30 MHz has to be investigated. Compliance should be tested by measuring the radio frequency voltage between each power line and ground at the power terminals in the stated frequency range. A 50 Ohm / 50 μ H line impedance stabilization network (LISN) is used coupling the interface to the measurement equipment. The EUT power input leads are connected through the LISN to the AC-power source. The LISN enclosure is electrically connected to the ground plane. The measuring instrument is connected to the coaxial output of the LISN. Tabletop devices were set-up on a 80 cm height above reference ground plane, floor standing equipment 10 cm raised above ground plane. Measurements have been performed on each phase line and neutral line of the devices AC-power lines. The EUT was power supplied with 110 V/60 Hz. The EUT was tested in the defined operating mode and installed (connected) to accessory equipment according the general description of use given by the applicant.

Schematic:



Only schematic view, we refer to figure 6, 7 and 8 of ANSI C63.4-2009 for more details.

Testing method:

Exploratory, preliminary measurements as a first step, determines the worst-case phase line (neutral or phase) as well as the most critical operating mode of the equipment. A complete frequency-sweep with PK-Detector is performed on each current-carrying conductor.

Final testing for power phases and critical frequencies (Margin to AV- or QP limit lower than 3 dB) as a second step includes measurements with receivers detector set to Quasi-Peak and Average.

Formula:

$$V_C = V_R + C_L \quad (1)$$

$$M = L_T - V_C \quad (2)$$

V_C = measured Voltage –corrected value

V_R = Receiver reading

C_L = Cable loss

M = Margin

L_T = Limit

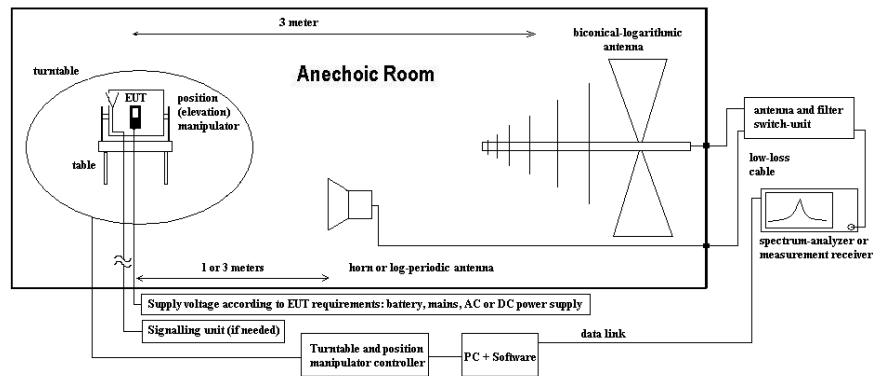
Values are in dB, positive margin means value is below limit.

4.2. Test system set-up for electric field measurement in the range 30 MHz to 1 GHz

Specification: ANSI C63.4-2009 chapter 8, ANSI C63.10-2009 chapter 6.5

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 NSA-compliant semi anechoic room (SAR) recognized by the regulatory commissions.

Schematic:



Testing method:

Exploratory, preliminary measurements

The EUT and its 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 (range 0° to 360°, step 90°) and the EUT itself either on 3-orthogonal axis (portable equipment) or 2-orthogonal axis (defined operational position of EUT) the emission spectrum and its characteristics was recorded with an EMI-receiver, broadband antenna and software.

Measurement antenna: horizontal and vertical, heights: 1,0 m and 1,82 m. 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 between 1 m and 4 m.

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

Formula:

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

$$M = L_T - E_C \quad (2)$$

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

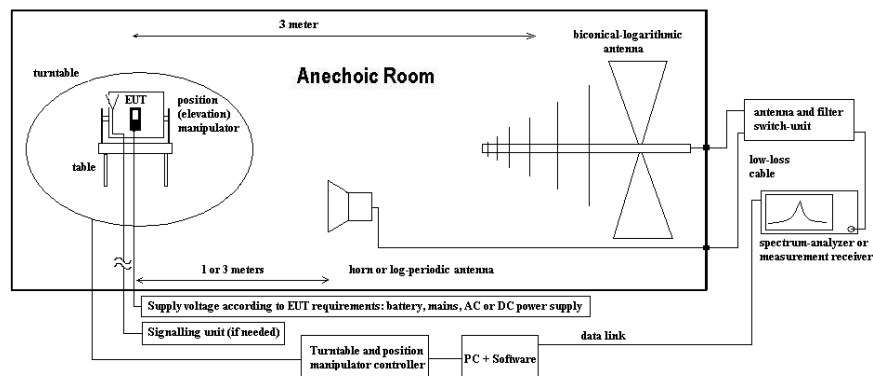
All units are dB-units, positive margin means value is below limit.

4.3. Test system set-up for electric field measurement above 1 GHz

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 18 GHz and 1 meter above 18 GHz. Logarithmic periodic antenna is used for frequency range 1 GHz to 18 GHz, above 18 GHz a horn antenna is used. The antennas are set to fixed antenna height of 1.55 m and the EUT aligned within 3 dB cone of radiation pattern.

Schematic:



Testing method:

Exploratory, preliminary measurements

The EUT and its 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 its 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.

Formula:

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

$$M = L_T - E_C \quad (2)$$

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)

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

5. Measurements

5.1. General Limit - Conducted emissions on AC-Power lines

5.1.1. Test location and equipment

test location	☒ CETECOM Essen (Chapter 2.2.1)	☐ Please see Chapter 2.2.2	☐ Please see Chapter 2.2.3
test site	☐ 333 EMI field	☒ 348 EMI cond.	
receiver	☐ 001 ESS	☒ 377 ESCS 30	☐ 489 ESU 40 ☐ 620 ESU 26
LISN	☒ 005 ESH2-Z5	☐ 007 ESH3-Z6	☐ 300 ESH3-Z5 & 50Ω used for AE ☐ no LISN for AE
signaling	☒ 392 MT8820A	☒ 436 CMU	☐ 547 CMU ☐ 594 CMW
line voltage	☐ 230 V 50 Hz via public mains	☒ 060 110 V 60 Hz via PAS 5000	

5.1.2. Requirements

FCC	Part 15, Subpart B, §15.107				
IC	RSS-Gen., § 7.2.4				
ANSI	C63.4-2009, § 5.2, 6, 7				
Limit	Frequency [MHz]	☒ Conducted limit Class B		☐ Conducted limit Class A	
		QUASI-Peak [dBμV]	AVERAGE [dBμV]	QUASI-Peak [dBμV]	AVERAGE [dBμV]
	0.15 – 0.5	66 to 56*	56 to 46*	79	66
	0.5 – 5	56	46	73	60
	5 – 30	60	50	73	60

Remark: * decreases with the logarithm of the frequency

5.1.3. Test condition and 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 (40 cm distance to reference ground plane (wall))	☐ floor standing EUT stands isolated on reference ground plane (floor)	
Climatic conditions	Temperature: (22±3°C)		Rel. humidity: (40±20)%
EMI-Receiver or Analyzer settings	Scan data	☒ 9 – 150 kHz, RBW = 200 Hz, Step = 61 Hz ☒ 150 kHz – 30 MHz RBW = 9 kHz, Step = 4 kHz ☐ other:	
	Scan-Mode	6 dB EMI-Receiver Mode	
	Pre-measurement Final measurement	Peak detector, Repetitive-Scan, max-hold, sweep-time 50 μs per frequency point Average & Quasi-peak detector at critical frequencies	
General measurement procedures		Please see chapter "Test system set-up for AC power line conducted emissions measurements"	

5.1.4. Measurement results

The results are presented below in summary form only. For more information please see the diagrams

EUT Type and S/N or EUT set-up no.		See information under relevant column "additional scan information"			
Diagram No.	EUT operating mode no. or comment	Used Detector	Power line	Additional (scan-) information or remarks	Result
1.1	EUT operating mode 1+5	☒ Peak ☒ CAV ☐ QP	L1/ N	Set-up 1	passed
1.2	EUT operating mode 2+5	☒ Peak ☒ CAV ☐ QP	L1/ N	Set-up2	passed
1.3	EUT operating mode 3+5	☒ Peak ☒ CAV ☐ QP	L1/ N	Set-up 3	passed
1.4	EUT operating mode 4+5	☒ Peak ☒ CAV ☐ QP	L1/ N	Set-up 4	passed
1.5a	EUT operating mode 1+5	☒ Peak ☒ CAV ☐ QP	L1/ N	Set-up 5	passed
1.6	EUT operating mode 2+5+6	☒ Peak ☒ CAV ☐ QP	L1/ N	Set-up 6	passed

5.2. General Limit - Radiated field strength emissions, 30 MHz - 1 GHz

5.2.1. TEST LOCATION AND 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		
receiver	☐ 377 ESCS30 ☒ 001 ESS	☐ 489 ESU 40 ☐ 620 ESU 26	
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 ☐ 594 CMW	
otherwise	☐ 400 FTC40x15E ☐ 401 FTC40x15E	☐ 110 USB LWL ☒ 482 Filter Matrix	
DC power	☐ 456 EA 3013A ☐ 457 EA 3013A	☐ 459 EA 2032-50 ☐ 268 EA- 3050	☐ 494 AG6632A ☐ 498 NGPE
line voltage	☐ 230 V 50 Hz via public mains	☒ 060 110 V 60 Hz via PAS 5000	

5.2.2. Requirements/Limits

FCC		☒ Part 15 Subpart B, §15.109, class B ☐ Part 15 Subpart C, §15.209 @ frequencies defined in §15.205	
IC		RSS-Gen., Issue 3	
ANSI		☒ C63.4-2009 ☐ C63.10-2009	
Limit	Frequency [MHz]	Radiated emissions limits, 3 meters	
		QUASI Peak [µV/m]	QUASI-Peak [dBµV/m]
	30 - 88	100	40.0
	88 - 216	150	43.5
	216 - 960	200	46.0
	above 960	500	54.0

5.2.3. 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 0.8m height	☐ floor standing	
Climatic conditions		Temperature: (22±3°C) Rel. humidity: (40±20)%		
EMI-Receiver (Analyzer) Settings	Scan frequency range: Scan-Mode Detector RBW/VBW Mode: Scan step Sweep-Time	☒ 30 – 1000 MHz ☐ other: ☒ 6dB EMI-Receiver Mode ☐ 3dB spectrum analyser mode Peak / Quasi-peak 100 kHz/300 kHz Repetitive-Scan, max-hold 80 kHz Coupled – calibrated display if continuous tx-signal otherwise adapted to EUT's individual duty-cycle		
General measurement procedures		Please see chapter "Test system set-up for radiated electric field measurements in the range 30-1000 MHz"		

5.2.4. MEASUREMENT RESULTS

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

Dia-gram no.	Carrier Channel		Frequency range	Set-up no.	OP-mode no.	Remark	Used detector			Result
	Range	No.					PK	AV	QP	
2.01a	Middle	182	30 – 1000 MHz	7	1+5	Downlink carrier of Base station on diagram and excluded from judgment	☒	☐	☒	passed
2.02a	Middle	661		8	2+5	--	☒	☐	☐	passed
2.03a	Middle	9400		9	3+5	--	☒	☐	☐	passed
2.04a	Middle	4183		10	4+5	--	☒	☐	☐	passed
2.05ad	Middle	182		11	1+5	Downlink carrier of Base station on diagram and excluded from judgment	☒	☐	☐	passed
2.06a	Middle	661		6	2+5+6	--	☒	☐	☒	passed

5.3. General Limit - Radiated emissions, above 1 GHz

5.3.1. Test location and equipment

test site	☐ 441 EMI SAR	☐ 348 EMI cond.	☒ 443 EMI FAR	☐ 347 Radio.lab.	☐ 337 OATS	☐
equipment	☐ 331 HC 4055	☐	☐	☐	☐	☐
spectr. analys.	☐ 584 FSU	☐ 120 FSEM	☒ 264 FSEK	☒ 489 ESU 40	☐	☐
antenna meas	☐ 574 BTA-L	☐ 289 CBL 6141	☒ 608 HL 562	☒ 549 HL025	☐ 302 BBHA9170	☐ 477 GPS
antenna meas	☐ 123 HUF-Z2	☐ 132 HUF-Z3	☐ 030 HFH-Z2	☐	☐	☐
antenna subst	☐ 071 HUF-Z2	☐ 020 EMCO3115	☐ 063 LP 3146	☐ 303 BBHA9170	☐	☐
power meter	☐ 009 NRV	☐ 010 URV5-Z2	☐ 011 URV5-Z2	☐	☐	☐
signalgener.	☐ 008 SMG	☐ 140 SMHU	☐ 263 SMP04	☐	☐	☐
power meter	☐ 262 NRV-S	☐ 266 NRV-Z31	☐ 265 NRV-Z33	☐ 261 NRV-Z55	☐ 356 NRV-Z1	☐
multimeter	☐ 341 Fluke 112	☐	☐	☐	☐	☐
signaling	☐ 392 MT8820A	☐ 436 CMU	☐ 547 CMU	☐ 594 CMW		
DCpower	☐ 086 LNG50-10	☐ 087 EA3013	☐ 354 NGPE 40	☐ 349 car battery	☐ 350 Car battery	☐
line voltage	☐ 230 V 50 Hz via public mains ☒ 060 110 V 60 Hz via PAS 5000					

5.3.2. Requirements/Limits

FCC	☒ Part 15 Subpart B, §15.109 class B ☐ Part 15 subpart C, §15.209 @ frequencies defined in §15.205			
IC	RSS-Gen., Issue 3			
ANSI	☒ C63.4-2009 ☐ C63.10-2009			
Frequency [MHz]	Limits			
	AV [μV/m]	AV [dBμV/m]	Peak [μV/m]	Peak [dBμV/m]
above 1 GHz	500	54.0	5000	74.0

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 1.5m height	☐ floor standing
Climatic conditions		Temperature: (22±3°C)	Rel. humidity: (40±20)%
Spectrum-Analyzer settings	Scan frequency range:	☐ 1 – 18 GHz ☐ 18 – 25 GHz ☐ 18 – 40 GHz ☒ other: see table below	
	Scan-Mode	☐ 6 dB EMI-Receiver Mode ☒ 3 dB Spectrum analyser Mode	
	Detector	Peak and Average	
	RBW/VBW	1 MHz / 3 MHz	
	Mode:	Repetitive-Scan, max-hold	
	Scan step	400 kHz	
	Sweep-Time	Coupled – calibrated display if CW signal otherwise adapted to EUT's individual duty-cycle	
General measurement procedures		Please see chapter "Test system set-up for radiated electric field measurements in the range 1000-40000 MHz"	

5.3.4. Measurement Results:

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

Diagram no.	Carrier Channel		Frequency range	Set-up no.	OP-mode no.	Remark	Used detector			Result
	Range	No.					PK	AV	QP	
8.01	Middle	182	1-5GHz	7	1+5	--	☒	☒	☐	passed
8.02	Middle	661		8	2+5	Downlink carrier of Base station on diagram and excluded from judgment	☒	☒	☐	passed
8.03	Middle	9400	1-12.75 GHz	12	3+5	Downlink carrier of Base station on diagram and excluded from judgment	☒	☒	☐	passed
8.04	Middle	4182	1-5GHz	13	4+5	--	☒	☒	☐	passed
8.05_a	Middle	182	1-5GHz	11	1+5	--	☒	☒	☐	passed
8.06_1 8.06_2	Middle	661	1-2.8GHz 2.8-12.75 GHz	6	2+5+6	Downlink carrier of Base station on diagram (1.948MHz) and excluded from judgment	☒	☒	☐	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 to its 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 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= uP1=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	-	31.03.2013
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	-	31.03.2013
016	Line Impedance Simulating Network	Op. 24-D	B6366	Spitzenberger+Spies	36 M	-	31.03.2013
020	Horn Antenna 18 GHz (Subst 1)	3115	9107-3699	EMCO	36/12 M	-	31.03.2013
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	-	31.03.2013
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	30.06.2013
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	-	31.03.2013
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	-	31.03.2013
264	Spectrum Analyzer	FSEK 30	826939/005	Rohde & Schwarz	12 M	-	31.03.2013
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	30.06.2013
291	high pass filter GSM 850/900	WHJ 2200-4EE	14	Wainwright GmbH	12 M	1c	30.06.2013
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	-	31.03.2013
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	-	31.03.2013
357	power sensor	NRV-Z1	861761/002	Rohde & Schwarz	24 M	-	31.03.2013
371	Bluetooth Tester	CBT32	100153	R&S	12 M	-	31.03.2013
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	-	31.03.2013
377	EMI Test Receiver	ESCS 30	100160	Rohde & Schwarz	12 M	-	31.03.2013
389	Digital Multimeter	Keithley 2000	0583926	Keithley	24 M	-	31.03.2013
392	Radio Communication Tester	MT8820A	6K00000788	Anritsu	12 M	-	31.03.2013
431	Model 7405	Near-Field Probe Set	9305-2457	EMCO	-	4	
436	Univ. Radio Communication Tester	CMU 200	103083	Rohde & Schwarz	12 M	-	31.03.2013
441	CTC-SAR-EMI Cable Loss	System EMI field (SAR)	-	CETECOM	12 M	5	31.10.2012

Ref.-No.	Equipment	Type	Serial-No.	Manufacturer	Interval of calibration	Remark	Cal due
		Cable					
443	CTC-FAR-EMI-RSE	System CTC-FAR-EMI-RSE	-	ETS-Lindgren / CETECOM	12 M	5	30.06.2013
448	notch filter WCDMA_FDD II	WRCT 1850.0/2170.0-5/40-	5	Wainwright Instruments GmbH	12 M	1c	30.06.2013
449	notch filter WCDMA FDD V	WRCT 824.0/894.0-5/40-8SSK	1	Wainwright	12 M	1c	30.06.2013
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	-	31.03.2013
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	-	31.03.2013
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	-	30.06.2013
487	System CTC NSA-Verification SAR-EMI	System EMI field (SAR) NSA	-	ETS Lindgren / CETECOM	24 M	-	30.09.2013
489	EMI Test Receiver	ESU40	1000-30	Rohde & Schwarz	12 M	-	31.03.2013
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	Wainwright	12 M	1c	30.06.2013
517	relais switch matrix	HF Relais Box Keithley	SE 04	Keithley	pre-m	2	
523	Digital Multimeter	L4411A	MY46000154	Agilent	24 M	-	31.03.2013
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	-	31.03.2013
547	Univ. Radio Communication Tester	CMU 200	835390/014	Rohde & Schwarz	12 M	-	31.03.2013
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	30.06.2013
558	System CTC FAR S-VSWR	System CTC FAR S-VSWR	-	CTC	24 M	-	31.07.2013
574	Biconilog Hybrid Antenna	BTA-L	980026L	Frankonia	36/12 M	-	30.03.2013
584	Spectrum Analyzer	FSU 8	100248	Rohde & Schwarz	12 M	-	31.03.2013
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	-	31.03.2013
598	Spectrum Analyzer	FSEM 30 (Reserve)	831259/013	Rohde & Schwarz	24 M	-	13.01.2013
600	power meter	NRVD (Reserve)	834501/018	Rohde & Schwarz	24 M	-	31.03.2013
601	medium-sensitivity diode sensor	NRV-Z5 (Reserve)	8435323/003	Rohde & Schwarz	24 M	-	12.01.2013
602	peak power sensor	NRV-Z32 (Reserve)	835080	Rohde & Schwarz	24 M	-	12.01.2013
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	
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	-	01.01.2013
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	201.0999.9302.6.4.1.4 3	G. Lufft GmbH	24 M	-	30.05.2014
634	Spectrum Analyzer	FSM (HF-Unit)	826188/010	Rohde & Schwarz	pre-m	2	
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:
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	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