

# TEST REPORT No.: 6-0520-14-1-7b

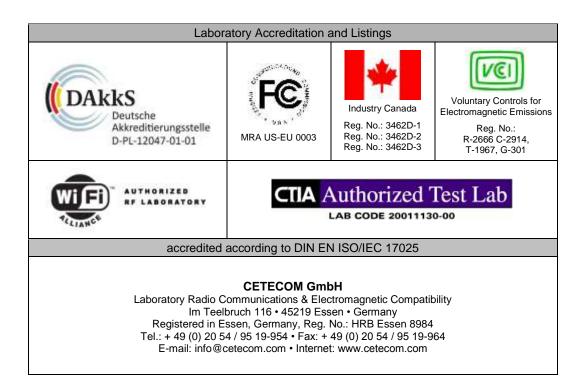
According to: FCC Regulations Part 15.207 / 15.209 Part 15.247

for

Leica Camera AG

Digital Camera Leica S (Typ 007)

FCC-ID: N5AS007



The test results relate only to the individual items which have been tested. This report shall not be reproduced in parts without the written approval of the testing laboratory © Copyright: All rights reserved by CETECOM

Page 1 of 39



# **Table of contents**

1.1. Tests measurement overview according of US CFR Title 47, Subpart C.       3         2. ADMINISTRATIVE DATA       5         2.1. Identification of the testing laboratory.       5         2.2. Test location       5         2.3. Organizational items       5         2.4. Applicant's details       5         2.5. Manufacturer's details       5         3. EQUIPMENT UNDER TEST (EUT)       6         3.1. TECHNICAL DATA OF MAIN EUT DECLARED BY APPLICANT       6         3.1. TECHNICAL DATA OF MAIN EUT DECLARED BY APPLICANT       6         3.1. TECHNICAL DATA OF MAIN EUT DECLARED BY APPLICANT       6         3.1. TECHNICAL DATA OF MAIN EUT DECLARED BY APPLICANT       6         3.1. TECHNICAL DATA OF MAIN EUT DECLARED BY APPLICANT       6         3.1. TECHNICAL DATA OF MAIN EUT DECLARED BY APPLICANT       6         3.1. TECHNICAL DATA OF MAIN EUT DECLARED BY APPLICANT       6         3.1. TECHNICAL DATA OF MAIN EUT DECLARED BY APPLICANT       6         3.1. TECHNICAL DATA OF MAIN EUT DECLARED BY APPLICANT       6         3.1. TECHNICAL DATA OF MAIN EUT DECLARED BY APPLICANT       6         3.1. TECHNICAL DATA OF MAIN EUT DECLARED BY APPLICANT       6         3.1. TECHNICAL DATA OF MAIN EUT DECLARED BY APPLICANT       6         3.1. Tectrype, S/N tetc. and short descriptions used in this test report <th>1. SUMMARY OF TEST RESULTS</th> <th>3</th>	1. SUMMARY OF TEST RESULTS	3
2.1. Identification of the testing laboratory       5         2.2. Test location       5         2.3. Organizational items       5         2.4. Applicant's details       5         2.5. Manufacturer's details       5         3.6. EQUIPMENT UNDER TEST (EUT)       6         3.1. TECHNICAL DATA OF MAIN EUT DECLARED BY APPLICANT       6         3.2. IEEE 802.11 OVERVIEW: MODULATION AND DATA RATES       6         3.3. EUT: Type, S/N etc. and short descriptions used in this test report       7         3.4. Auxiliary Equipment (AE): Type, S/N etc. and short descriptions       7         3.6. EUT operating modes       8         3.7. Configuration of cables used for testing       8         4. DESCRIPTION OF TEST SYSTEM SET-UP'S       9         4.1. Test system set-up for AC power-line conducted emission measurements       9         4.2. Test system set-up for radiated magnetic field measurement at antenna port.       10         4.3. Test system set-up for radiated magnetic field measurement below 30 MHz.       12         4.4. Test system set-up for radiated magnetic field measurements below 30 MHz.       12         5.1. Duty-Cycle.       15         5.1. Duty-Cycle.       15         5.2. General Limit - Conducted emissions on AC-Power lines.       16         5.3. General Limit - Radiated field strength emi	1.1. Tests measurement overview according of US CFR Title 47, Subpart C	3
2.2. Test location       5         2.3. Organizational items       5         2.4. Applicant's details       5         2.5. Manufacturer's details       5         3. EQUIPMENT UNDER TEST (EUT)       6         3.1. TECHNICAL DATA OF MAIN EUT DECLARED BY APPLICANT       6         3.2. IEEE 802.11 OVER VIEW: MODULATION AND DATA RATES       6         3.3. EUT: Type, S/N etc. and short descriptions used in this test report       7         3.4. Auxiliary Equipment (AE): Type, S/N etc. and short descriptions       7         3.6. EUT operating modes       8         3.7. Configuration of cables used for testing       8         4. DESCRIPTION OF TEST SYSTEM SET-UP'S       9         4.1. Test system set-up for AC power-line conducted emission measurements       9         4.2. Test system set-up for radiated magnetic field measurement at antenna port.       10         4.3. Test system set-up for radiated magnetic field measurement below 30 MHz.       12         4.4. Test system set-up for radiated electric field measurement above 1 GHz.       14         5.1. Duty-Cycle.       15         5.2. General Limit - Conducted emissions on AC-Power lines.       16         5.3. General Limit - Radiated field strength emissions blow 30 MHz.       17         5.4. General Limit - Radiated field strengthe missions blow 30 MHz.       15 </td <td>2. ADMINISTRATIVE DATA</td> <td>5</td>	2. ADMINISTRATIVE DATA	5
3.1. TECHNICAL DATA OF MAIN EUT DECLARED BY APPLICANT       6         3.2. IEEE 802.11 OVERVIEW: MODULATION AND DATA RATES       6         3.3. EUT: Type, S/N etc. and short descriptions used in this test report       7         3.4. Auxiliary Equipment (AE): Type, S/N etc. and short descriptions       7         3.4. Auxiliary Equipment (AE): Type, S/N etc. and short descriptions       7         3.5. EUT set-ups       7         3.6. EUT operating modes       8         3.7. Configuration of cables used for testing       8         4. DESCRIPTION OF TEST SYSTEM SET-UP'S       9         4.1. Test system set-up for AC power-line conducted emission measurements       9         4.2. Test system set-up for radiated magnetic field measurements below 30 MHz       12         4.4. Test system set-up for radiated electric field measurement above 1 GHz       14         5. MEASUREMENTS       15         5.1. Duty-Cycle       15         5.2. General Limit - Conducted field strength emissions below 30 MHz       17         5.4. General Limit - Radiated field strength emissions, 30 MHz       12         5.5. General Limit - Radiated field strength emissions, 30 MHz       12         5.6. RF-Parameter - Radiated field strength emissions, 30 MHz       12         5.6. RF-Parameter - Badiated Band Edge compliance measurements       23         5.7. Maximum	<ul> <li>2.2. Test location</li></ul>	5 5 5 5
3.2. IEEE 802.11 OVERVIEW: MODULATION AND DATA RATES       6         3.3. EUT: Type, S/N etc. and short descriptions used in this test report       7         3.4. Auxiliary Equipment (AE): Type, S/N etc. and short descriptions       7         3.5. EUT set-ups       7         3.6. EUT operating modes       8         3.7. Configuration of cables used for testing       8         4. DESCRIPTION OF TEST SYSTEM SET-UP'S       9         4.1. Test system set-up for AC power-line conducted emission measurements       9         4.2. Test system set-up for conducted Regretion measurements below 30 MHz       12         4.3. Test system set-up for radiated magnetic field measurements below 30 MHz       12         4.4. Test system set-up for radiated electric field measurements below 30 MHz       12         4.5. Test system set-up for radiated electric field measurement above 1 GHz       13         5.1. Duty-Cycle       15         5.2. General Limit - Conducted emissions on AC-Power lines       16         5.3. General Limit - Radiated field strength emissions below 30 MHz       17         5.4. General Limit - Radiated field strength emissions below 30 MHz       17         5.4. General Limit - Radiated field strength emissions, 30 MHz - 1 GHz       12         5.5. General Limit - Radiated field strength emissions, 30 MHz - 1 GHz       21         5.6. RF-Parameter - 8dB Bandwidt	3. EQUIPMENT UNDER TEST (EUT)	6
4.1. Test system set-up for AC power-line conducted emission measurements	<ul> <li>3.2. IEEE 802.11 OVERVIEW: MODULATION AND DATA RATES</li> <li>3.3. EUT: Type, S/N etc. and short descriptions used in this test report</li> <li>3.4. Auxiliary Equipment (AE): Type, S/N etc. and short descriptions</li> <li>3.5. EUT set-ups</li> <li>3.6. EUT operating modes</li> </ul>	6 7 7 7 
4.2. Test system set-up for conducted RF-measurement at antenna port.       10         4.3. Test system set-up for radiated magnetic field measurements below 30 MHz       12         4.4. Test system set-up for radiated electric field measurement 30 MHz to 1 GHz       13         4.5. Test system set-up for radiated electric field measurement above 1 GHz       14         5. MEASUREMENTS       15         5.1. Duty-Cycle.       15         5.2. General Limit - Conducted emissions on AC-Power lines       16         5.3. General Limit - Radiated field strength emissions below 30 MHz       17         5.4. General Limit - Radiated field strength emissions below 30 MHz       17         5.4. General Limit - Radiated field strength emissions below 30 MHz       19         5.5. General Limit - Radiated Band Edge compliance measurements       21         5.6. RF-Parameter - Radiated Band Edge compliance measurements       22         5.8. RF-Parameter - 6 dB Bandwidth and 99% occupied Bandwith       27         5.9. RF-Parameter - Power Spectral Density       22         5.10. 20 dBc power specification       31         5.11. Measurement uncertainties       34         6. ABBREVIATIONS USED IN THIS REPORT       35         7. ACCREDITATION DETAILS OF CETECOM'S LABORATORIES AND TEST SITES       36         8. INSTRUMENTS AND ANCILLARY       36 <td< td=""><td>4. DESCRIPTION OF TEST SYSTEM SET-UP'S</td><td>9</td></td<>	4. DESCRIPTION OF TEST SYSTEM SET-UP'S	9
5.1. Duty-Cycle.       15         5.2. General Limit - Conducted emissions on AC-Power lines       16         5.3. General Limit - Radiated field strength emissions below 30 MHz       17         5.4. General Limit - Radiated field strength emissions, 30 MHz - 1 GHz       19         5.5. General Limit - Radiated missions, above 1 GHz       21         5.6. RF-Parameter - Radiated Band Edge compliance measurements       23         5.7. Maximum peak conducted output power       25         5.8. RF-Parameter - 6 dB Bandwidth and 99% occupied Bandwith       27         5.9. RF-Parameter - Power Spectral Density       29         5.10. 20 dBc power specification       31         5.11. Measurement uncertainties       34         6. ABBREVIATIONS USED IN THIS REPORT       35         7. ACCREDITATION DETAILS OF CETECOM'S LABORATORIES AND TEST SITES       36         8.1. Used equipment "CTC"       36	<ul> <li>4.2. Test system set-up for conducted RF-measurement at antenna port</li> <li>4.3. Test system set-up for radiated magnetic field measurements below 30 MHz</li> <li>4.4. Test system set-up for radiated electric field measurement 30 MHz to 1 GHz</li> </ul>	10 12 13
5.2. General Limit - Conducted emissions on AC-Power lines       16         5.3. General Limit - Radiated field strength emissions below 30 MHz       17         5.4. General Limit - Radiated field strength emissions, 30 MHz - 1 GHz       19         5.5. General Limit - Radiated emissions, above 1 GHz       21         5.6. RF-Parameter - Radiated Band Edge compliance measurements       23         5.7. Maximum peak conducted output power       25         5.8. RF-Parameter - 6 dB Bandwidth and 99% occupied Bandwith       27         5.9. RF-Parameter - Power Spectral Density       29         5.10. 20 dBc power specification       31         5.11. Measurement uncertainties       34         6. ABBREVIATIONS USED IN THIS REPORT       35         7. ACCREDITATION DETAILS OF CETECOM'S LABORATORIES AND TEST SITES       36         8. INSTRUMENTS AND ANCILLARY       36         8.1. Used equipment "CTC"       36	5. MEASUREMENTS	15
7. ACCREDITATION DETAILS OF CETECOM'S LABORATORIES AND TEST SITES	<ul> <li>5.2. General Limit - Conducted emissions on AC-Power lines</li> <li>5.3. General Limit - Radiated field strength emissions below 30 MHz</li> <li>5.4. General Limit - Radiated field strength emissions, 30 MHz - 1 GHz</li> <li>5.5. General Limit - Radiated emissions, above 1 GHz</li> <li>5.6. RF-Parameter - Radiated Band Edge compliance measurements</li> <li>5.7. Maximum peak conducted output power</li> <li>5.8. RF-Parameter - 6 dB Bandwidth and 99% occupied Bandwith</li> <li>5.9. RF-Parameter - Power Spectral Density</li> <li>5.10. 20 dBc power specification</li> </ul>	
8. INSTRUMENTS AND ANCILLARY	6. ABBREVIATIONS USED IN THIS REPORT	35
8.1. Used equipment "CTC"	7. ACCREDITATION DETAILS OF CETECOM'S LABORATORIES AND TEST SITES	35
9. VERSIONS OF TEST REPORTS (CHANGE HISTORY)		
· - /	9. VERSIONS OF TEST REPORTS (CHANGE HISTORY)	

Table of annex	Total pages
Annex 1 - Separate document: measurement diagrams	64
Annex 2 - Separate document: Test set-up photographs External photograph	hs of EUT 4
Annex 3 - Separate document: External photographs of EUT	7
Annex 4: Separate document: Internal photographs of EUT	TO BE SUPPLIED BY APPLICANT
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 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. Also we refer on special conditions which the applicant should fulfill according §2.927 to §2.948, special focus regarding modification of the equipment and availability of sample equipment for market surveilance tests.

The presented <u>Equipment Under Test</u> (in this report, hereinafter referred as EUT) supports radiofrequency technologies with WLAN technology and operating frequency range at 2.412 to 2.462 GHz according to IEE 802.11b/g/n. Other implemented wireless technologies were not considered within this test report.

Following test cases have been performed to show compliance with valid Part 15.207/15.209/15.247 of the FCC CFR Title 47 Rules, Edition 4<sup>th</sup> November 2014.

1.1. Tests	measuremen	t overview according	of US CFR	Title	47, Su	bpart C
		References & Li	nits		EUT	
Test cases	Port	FCC Standard	Test Limit	EUT set-up	opera- ting mode	Result
		TX-Mode	-			
Timing of transmitter (pulsed operation)	Antenna Terminal or enclosure	§15.35		1	1	
6 dB bandwidth	Antenna terminal (conducted)	§15.247(a)(2)	≥ 500 kHz for DTS systems	1	1	passed
99% occupied bandwidth	Antenna terminal (conducted)	2.1049(h)	99% Power bandwidth	1	1	for Information only
Transmitter Peak output power	Antenna terminal (conducted)	§15.247(b)(3)	1 Watt Peak	1	1	passed
Transmitter Peak output power radiated	Enclosure + Inter- connecting cables (radiated)	§15.247(b)(4)	<4 Watt (EIRP) for antenna with directional gain less 6dBi	2	1	passed
Out-Of-Band RF- emissions Band-Edge emissions	Antenna terminal (conducted)	§15.247 (d)	20 dBc	1	1	passed
Power spectral density	Antenna terminal (conducted)	§15.247(e)	8dBm in any 3 kHz band	1	1	passed
General field strength emissions + restricted bands	Enclosure + Inter- connecting cables (radiated)	\$15.247 (d) \$15.205 \$15.209	Emissions in restricted bands must meet the general field- strength radiated limits	2	1	passed



AC-Power Lines Conducted Emissions	AC-Power lines	§15.207	FCC §15.207 class B limits §15.207 limits	3	2	passed
	1	RX M	ode			
RECEIVER Radiated emissions	Enclosure + Inter- connecting cables (radiated)	\$15.109 \$15.33 \$15.35	FCC 15.109 class B limits			See separate test report 2.)

Remark: TR6-0520-14-1-7a for Measurements according Part 15B

		References & Limits		EUT	EUT opera-	
Test cases	Port	FCC Standard	Test Limit	set-up	ting mode	Result
Radio	Cabinet		<b>SAR-Limits</b> <b>FCC:</b> 1.1310(b)			See separate test report/ evaluation
frequency radiation exposure requirements	Inter- connecting cables (radiated)	\$1.1310(b) \$2.1091 \$2.1093	RF-Field Strength Limits: FCC: "general population/ uncontrolled" environment Table 1			Not applicable

Remark: --

.....

Dipl.-Ing. Niels Jeß 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

Company name:	CETECOM GmbH	
Address:	Im Teelbruch 116	
	45219 Essen - Kettwig	
	Germany	
Responsible for testing laboratory:	DiplIng. Niels Jeß	
Deputy:	DiplIng. Rachid Acharkaoui	

# 2.1. Identification of the testing laboratory

# 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:	DiplIng. C. Lorenz
Receipt of EUT:	2015-05-02
Date(s) of test:	2015-05-02 to 2015-06-25
Date of report:	2015-07-06
Version of template: 13.02	

# 2.4. Applicant's details

Applicant's name:	Leica Camera AG	
Address:	Am Leitz-Park 5 35578 Wetzlar	
	Germany	
Contact person:	Mr. Peter Schober	

# 2.5. Manufacturer's details



# **3.** Equipment under test (EUT)

# 3.1. TECHNICAL DATA OF MAIN EUT DECLARED BY APPLICANT

Main function:	Photo-Camera with integrated IEEE 802.11b/g/n W-LAN Transceiver			
Туре:	Leica S (Typ 007)			
Frequency range:	2412 MHz (Channel 1) to 2462	2 MHz (Channel 11)		
(US/Canada -bands)				
Type of modulation:	See chapter 3.2			
Number of channels:	1 to 11			
(USA/Canada -bands)				
Antenna Type:	Integrated			
	External, no RF- connector			
	External, separate RF-connector			
Antenna Gain:	Max10 dBi gain according applicants information in 2.4 GHz band			
MAX Field strength (radiated):	98.46 dBµV/m@3m distance on nominal 2462 MHz			
Maximum 6dB BW:	17.756410256MHz			
FCC-ID:	N5AS007			
Installed options:	☑ GPS (not tested within this test report)			
Power supply:	Internal battery Li-Io			
	Sover AC/DC adapter: 120V/60 Hz			
Special EMI components:				
EUT sample type:	□ Production	Pre-Production	□ Engineering	
FCC label attached:	□ yes	🗴 no		

# 3.2. IEEE 802.11 OVERVIEW: MODULATION AND DATA RATES

The modulations and data rates defined for 802.11 b/g/n transmitters are identified in the table below. Also it shows which operational mode is possible for the device under test (EUT) according applicant's information.

802.11b-Mode (DSSS System)			
Data rate [MBps]	Modulation type	Supported by EUT	
1	DBPSK (Differential binary phase shift keying)	YES	
2	DQPSK (Differential quadrature phase shift keying)	YES	
5.5 / 11	CCK/PBCC (8-chip complementary code keying)	YES	
22	ERP-PBCC (Packet binary convolutional coding)	YES	

802.11g-Mode (OFDM system)			
Brutto data rate [MBps]	Brutto data rate [MBps] Modulation type of subcarriers Supported by EUT		
6	BPSK	YES	
12 /18	QPSK	YES	
24 / 36	16-QAM	YES	
48 / 54	64-QAM	YES	

Remark: 52 sub-carriers which can be modulated at different data-rates.

802.11 <b>n</b> -Mode (OFDM)		
Brutto data rate [MBps]	Modulation type	Supported by EUT
7.2/14.4/21.7/28.9/43.3/57.8/65/72.2 Mbps	HT20 (MCS0MCS7)	Yes



Short descrip- tion*)	EUT	Туре	S/N serial number	HW hardware status	SW software status
EUT A	Digital Camera	Leica S (Typ 007)	P-072	302	0.15.25.0 (0.0.9.7 <sup>1.)</sup> )
EUT B	Digital Camera	Leica S (Typ 007)	P-108	302	0.15.19.2

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

\*) EUT short description is used to simplify the identification of the EUT in this test report. Remark1: see aplicants declaration for firmware type designation

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

AE short descrip- tion *)	Auxiliary Equipment	Туре	S/N serial number	HW hardware status	SW software status
AE 1	AC-Adapter S	ACA-SCL3		Prototype with two ferrites Cable length 1.88m	
AE 2	Li-Io battery	BP-PRO1	No. 020/100	2. Prototype	
AE 3	Wi-Fi Wireless Router	D-Link DI-254	CTC#1		

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

# 3.5. EUT set-ups

EUT set-up no.*)	Combination of EUT and AE	Remarks
set. 1	EUT A + AE 1	Used for conducted RF-tests
set. 2	EUT B + AE 2	Used for radiated RF-tests
set. 3	EUT B + AE1 + (AE 3)	Set-up used for conducted emission tests on AC- mains. AE3 used as client.

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



# **3.6. EUT operating modes**

EUT operating mode no.*)	Description of operating modes	Additional information
op. 1	WLAN Continuous TX-Mode	The EUT was put to continuous transmissions mode with help of a special firmware software command. The modulation and specifica data rate are mentioned in the results.
op. 2	WLAN TX on	Wi-Fi functionality turned on, EUT in Access-Point mode. Sending of SSID broadcast.

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

# **3.7.** Configuration of cables used for testing

Cable number	Item	Туре	S/N serial number	HW hardware status	Cable length
Cable 1	AC-Adapter S	ACA-SCL3		Prototype with two ferrites	1.88m



# 4. Description of test system set-up's

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

Specification:

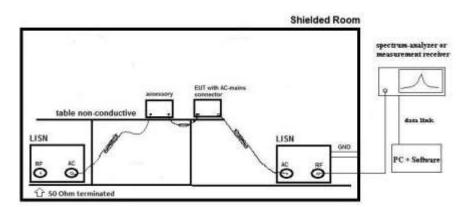
ANSI C63.4-2014 chapter 7, ANSI C63.10-2013 chapter 6.2

**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  $\mu$ 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 120 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 measure-Final testing for power phases and ments as a first step, determines the critical frequencies (Margin to AV- or worst-case phase line (neutral or phase) OP limit lower than 3 dB) as a second as well as the most critical operating step includes measurements with mode of the equipment. A complete receivers detector set to Quasi-Peak and frequency-sweep with PK-Detector is Average. performed on each current-carrying conductor.  $V_{\rm C} = V_{\rm R} + C_{\rm L} \quad (1)$ Formula: V<sub>C</sub> = measured Voltage –corrected value  $M = L_T - V_C \quad (2)$  $V_R$  = Receiver reading  $C_L = Cable loss$ M = Margin $L_T = Limit$ 

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

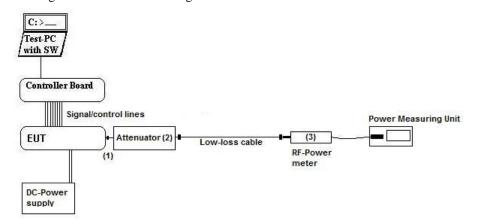


### 4.2. Test system set-up for conducted RF-measurement at antenna port W-LAN/Zigbee conducted RF-Setup 1 (W1 Set-up)

**General description:** 

The EUT's RF-signal is coupled out by a suitable antenna coupling connector (1). The signal is first attenuated (2) then connected to the power meter (3) for conducted power measurements. The specific attenuation loss is determined prior to the measurement within a set-up attenuation measurement. These are then taken into account by correcting the measurement readings.

Schematic:



Testing method:	ANSI C63.10:2009, KDB 558074 D01 DTS Meas.Guidance v03r02		
Used Equipment	Passive Elements	Test Equipment	Remark:
	<ul> <li>☑ 20 dB Attenuator</li> <li>☑ Low loss RF- cables</li> </ul>	<ul><li>☑ Power Meter</li><li>☑ DC-Power Supply</li></ul>	See List of equipment under each test case and chapter 5.11 for calibration info

Measurement uncertainty

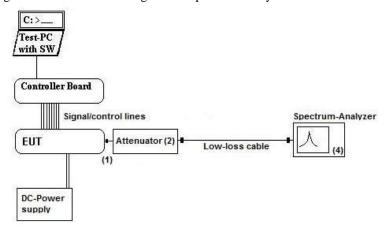
See chapter 5.11



#### W-LAN/Zigbee conducted RF-Setup 2 (W2 Set-up)

**General description:** 

The EUT's RF-signal is coupled out by a suitable antenna coupling connector (1). The signal is first attenuated (2) then connected to spectrum-analyzer (4) for RF-conducted measurements. The specific attenuation loss is determined prior to the measurement within a set-up attenuation measurement. These are then taken into account by correcting the measurement readings of the spectrum-analyzer.



Testing method:	ANSI C63.10:2009, KDB 558074 D01 DTS Meas.Guidance v03r02		
Used Equipment	Passive Elements Test Equipment Remark:		Remark:
	<ul> <li>I0 dB Attenuator</li> <li>Low loss RF- cables</li> </ul>	☑ Power Meter ☑ DC-Power Supply	See List of equipment under each test case and chapter 5.11 for calibration info
		Spectrum-Analyser	

Measurement uncertainty

See chapter 5.11

# Schematic:



Receiver

# 4.3. 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 are done first by an exploratory emission measurement and a final measurement for most critical frequencies determined.

3 m distance

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 commission.

#### Schematic:

Senematici	*	· · · · · · · · · · · · · · · · · · ·
	Anechoic Roor	n magnetiz artimise PC with measurement software Positioning Controller unit (if needed)
Testing method:	<b>Exploratory, preliminary measurement</b> 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 was recorded. 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. Also the interconnection cables and equipment position were varied in order to maximize the emissions.	<ul> <li>Final measurement on critical frequencies</li> <li>Based on the exploratory measurements, the most critical frequencies are re-measured by maintaining the EUT's worst-case operation mode, cable position, etc.</li> <li>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.</li> <li>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).</li> <li>On the determined worst-case position, a final measurement with necessary bandwidth and detector according standard has been carried out.</li> </ul>
Formula:	$E_C = E_R + AF + C_L + D_F - G_A$ $M = L_T - E_C$ All units are dB-units, positive margin m	$\label{eq:starses} \begin{array}{l} AF = & Antenna \ factor \\ C_L = & Cable \ loss \\ D_F = & Distance \ correction \ factor \\ E_C = & Electrical \ field \ - \ corrected \ value \\ E_R = & Receiver \ reading \\ G_A = & Gain \ of \ pre-amplifier \ (if \ used) \\ L_T = & Limit \\ M = & Margin \\ eans \ value \ is \ below \ limit. \end{array}$
Distance correction:	Reference for applied correction (extrapo IEEC Transaction EMC, Vol. 47, No. 3, <i>"Extrapolating Near-field emissions of lo</i>	Aug. 2005, Journal Paper



## 4.4. Test system set-up for radiated electric field measurement 30 MHz to 1 GHz

**Specification:** 

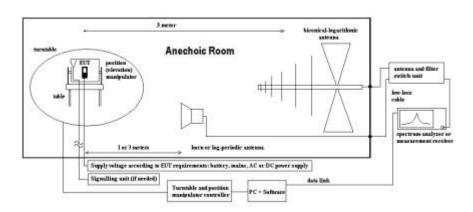
ANSI C63.4-2009 chapter 8, ANSI C63.10-2009 chapter 6.5

**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  $0^{\circ}$  to 360°, step 90°) and the EUT itself either on 3-orthogonal axis (portable equipment) or 2orthogonal axis (defined operational position of EUT) the emission spectrum and it's characteristics was recorded with an EMIreceiver, broadband antenna and software.

Measurement antenna: horizontal and vertical, heights: 1,0 m and 1,82 m as worst-case determined by an exploratory emission measurements. 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.

$E_{\rm C} = E_{\rm R} + AF + C_{\rm L} + D_{\rm F} - G_{\rm A}  (1)$	AF = Antenna factor
	$C_L = Cable loss$
$\mathbf{M} = \mathbf{L}_{\mathrm{T}} - \mathbf{E}_{\mathrm{C}} \tag{2}$	$D_F$ = Distance correction factor (if used)
	$E_C$ = Electrical field – corrected value
	$E_R = Receiver reading$
	$G_A = Gain of pre-amplifier (if used)$
	$L_{T} = Limit$
	M = Margin
All units are dR units positive margin m	agene value is below limit

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

Formula:

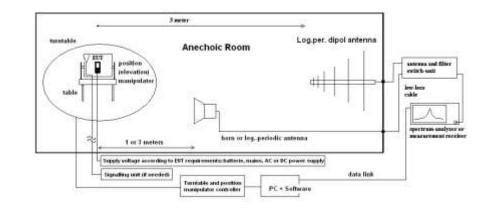


# 4.5. Test system set-up for radiated electric field measurement above 1 GHz

#### 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 2 meter above 18 GHz. A bicon-log or 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. The EUT is aligned within 3 dB beamwidth of the measurement antenna, on big EUTs several surface measurements are performed.

#### 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  $0^{\circ}$  to  $360^{\circ}$ , step  $15^{\circ}$ ) 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.

(2)

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

 $M = L_T - E_C$ 

#### **Final measurement on critical frequencies** Based on the exploratory measurements, the r

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.

$E_C$ = 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.

Formula:

# **5.** Measurements

# 5.1. Duty-Cycle

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

Ambient Clima	tic conditions	Temperatu	re: (22±2)°C	Rel. humidity: (45±1	5)%	
test site	🗆 441 EMI SAR	□ 348 EMI cond.	□ 443 EMI FAR	🗷 347 Radio.lab.	□ 337 OATS	
equipment	□ 331 HC 4055					
spectr. analys.	🗷 583 FSU26	□ 120 FSEM	□ 264 FSEK			
antenna meas	🗆 574 BTA-L	289 CBL 6141	🗆 608 HL 562	□ 133 EMCO3115	□ 302 BBHA9170	
antenna meas	□ 123 HUF-Z2	□ 132 HUF-Z3	□ 030 HFH-Z2			
multimeter	□ 341 Fluke 112					
DC power	🗆 086 LNG50-10	□087 EA3013	□ 354 NGPE 40	□ 349 car battery	□ 350 Car battery	
line voltage	🗆 230 V 50 Hz via j	public mains	□060 120 V 60 I	Hz via PAS 5000		
otherwise	☑ 613 Attenuator	K4 Cable				

Method of measurement:

 $\mathbf{x}$  conducted  $\Box$  radiated

#### A special firmware program is used for test purposes. In opposite to normal operating mode a higher dutycycle is set in order to facilitate the measurements. This is maximized at the extent possible.

The necessary duty-cycle correction factor is determined on nominal conditions on middle channel only. It is assumed that no noticable changes occur when tested on other channels or climatic conditions. The Duty-Cycle was constant, means without variations.

WLAN-	Marker 1 [BTS ON']	Marker 2 [BTS ON']	TX on	TX off	Converted to	10log(1/DC)
Modes	us	us	us	us	DC	1010g(17.00)
			b-Mode			
1MBit	8189,103000	8237,179000	8189,10300	48,07600	0,99416	0,02542
2MBit	4201,603000	4235,256000	4201,60300	33,65300	0,99205	0,03465
5.5MBit	1653,846000	1698,718000	1653,84600	44,87200	0,97358	0,11626
11MBit	923,076923	967,948718	923,07692	44,87180	0,95364	0,20614
			b-Mode			
6MBit	1366,667000	1417,949000	1366,66700	51,28200	0,9638	0,1600
9MBit	not applicable	not applicable	not applicable	not applicable	not applicable	not applicabl
12MBit	695,192308	744,871795	695,19231	49,67949	0,9333	0,2998
18MBit	469,230769	520,512821	469,23077	51,28205	0,9015	0,4504
24MBit	355,448718	405,448718	355,44872	50,00000	0,8767	0,5716
36MBit	243,269231	294,070513	243,26923	50,80128	0,8272	0,8236
48MBit	187,179487	236,858974	187,17949	49,67949	0,7903	1,0223
54MBit	171,153846	221,634615	171,15385	50,48077	0,7722	1,1225
						-
			n-Mode			
MCS0	1277,564000	1325,641000	1277,56400	48,07700	0,9637	0,1604
MCS1	658,333333	709,615385	658,33333	51,28205	0,9277	0,3258
MCS2	450,000000	499,679487	450,00000	49,67949	0,9006	0,4548
MCS3	347,756410	397,916667	347,75641	50,16026	0,8739	0,5852
MCS4	243,589744	293,750000	243,58974	50,16026	0,8292	0,8132
MCS5	192,307692	240,865385	192,30769	48,55769	0,7984	0,9778
MCS6	175,160256	225,641026	175,16026	50,48077	0,7763	1,0998
MCS7	159,935897	208,814103	159,93590	48,87821	0,7659	1,1581

#### **Results:**

Remark: according KDB558074 D01 v03r02 is it necessary to correct the measurement results

Calculated with following formulas:

Duty cycle: $x = \frac{Tx_{on}}{Tx_{on} + Tx_{off}}$	Duty cycle factor [dB]:	$10\log\left(\frac{1}{x}\right)$	
--	-------------------------	----------------------------------	--

The results were corrected in order to evaluate for worst-case result each time when average values are necessary for example average radiated emissions or similar.



# 5.2. General Limit - Conducted emissions on AC-Power lines

# 5.2.1. Test location and equipment

	<b>12.11</b> Test location and equipment								
test location	CETECOM Esser	n (Chapter 2.2.1)	Please see Chapte	er 2.2.2	□ Please see Chapte	r 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 p	public mains	🗷 060 120 V 60 H	Iz via PAS 5000					

### 5.2.2. Requirements

enancial more									
F	CC	§15.207	15.207						
Al	NSI	C63.10-2009							
Limit	Frequency [MHz]	QUASI-Peak [dBµV]	AVERAGE [dBµV]						
	0.15 - 0.5	66 to 56*	56 to 46*						
	0.5 - 5	56	46						
	5-30	60	50						
Remark: * d	ecreases with t	he logarithm of the frequency							

# 5.2.3. Test condition and test set-up

Signal link to test sy	stem (if used):	$\blacksquare$ air link $\square$ cable connection			
EUT-grounding		■ none □ with power supply	□ additional connection		
Equipment set up		☑ table top	□ floor standing		
		(40 cm distance to reference	EUT stands isolated on reference ground plane (floor)		
		ground plane (wall)			
Climatic conditions		Temperature: (22±3°C)	Rel. humidity: (40±20)%		
		$\Box$ 9 – 150 kHz, RBW = 2	200  Hz,  Step = 61  Hz		
	Scan data	☑ 150 kHz – 30 MHz RBW = 9	$\blacksquare$ 150 kHz – 30 MHz RBW = 9 kHz, Step = 4 kHz		
EMI-Receiver or		□ other:			
Analyzer settings	Scan-Mode	6 dB EMI-Receiver Mode			
Pre-measurement		Peak detector, Repetitive-Scan, max-hold, sweep-time 50 µs per frequency point			
	Final measurement	Average & Quasi-peak detector at critical frequencies			
General measurement	nt procedures	Please see chapter "Test system set-up for AC power line conducted emissions measurements"			

#### 5.2.4. Measurement results

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

EUT	set-up no.:	:	set-up 3		
Diagram No.	EUT operating mode no. or commend	Used Detector	Power line	Additional (scan-) information or remarks	Result
1.01	EUT operating mode 2	<ul><li>☑ Peak (pre-scan)</li><li>☑ CAV (final)</li><li>□ QP (final)</li></ul>	L1/ N	b-Mode, 5.5Mbit	passed
1.02	EUT operating mode 2	<ul><li>☑ Peak (pre-scan)</li><li>☑ CAV (final)</li><li>□ QP (final)</li></ul>	L1/ N	g-Mode, 6Mbit	passed
1.03	EUT operating mode 2	<ul><li>☑ Peak (pre-scan)</li><li>☑ CAV (final)</li><li>□ QP (final)</li></ul>	L1/ N	n-Mode, MCS0	passed

Remark:--



# 5.3. General Limit - Radiated field strength emissions below 30 MHz

# 5.3.1. Test location and equipment

	is it rest iocution and equipment								
test location	CETECOM Esser	n (Chapter. 2.2.1)	□ Please see Chapte	er. 2.2.2	Please see Chapt	er. 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	□ 371 CBT32	□ 547 CMU	□ 594 CMW					
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 j	public mains	🗆 060 120 V 60 Hz	via PAS 5000					

#### 5.3.2. Requirements

FCC	Part 15, Subpart 0	Part 15, Subpart C, §15.205 & §15.209							
ANSI	C63.10-2009								
Frequency	Field	strength limit	Distance	Remarks					
[MHz]	[µV/m]	[dBµV/m]	[m]	ixtinarks					
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					

#### 5.3.3. Test condition and test set-up

cicici i cor coma	mion and test set-	4P				
Signal link to test s	ystem (if used):	🗆 air link	□ cable connection	🗷 none		
EUT-grounding		🗷 none	with power supply	additional connection		
Equipment set up		🗷 table top		□ floor standing		
Climatic conditions	3	Temperature:	(22±3°C)	Rel. humidity: (40±20)%		
	Scan data	☑ 9 – 150 kHz ☑ 150 kHz – 3 □ other:		The second		
	Scan-Mode		Receiver Mode $\Box$ 3dB Sp			
Analyzer Settings		a a	, .	Average (final if applicable)		
		Repetitive-Scan, max-hold				
	Sweep-Time	Coupled – cali	brated display if continue	us signal otherwise adapted to EUT's individual		
		transmission duty-cycle				
General measurement	nt procedures	Please see cha	pter "Test system set-up	adiated magnetic field measurements below 30 MHz"		

## 5.3.4. Measurement Results

The results are presented below in summary form only.

#### Table of measurement results:

Diagram No.	Carr Char		Frequency range	Set- up no.	OP- mode	Remark	Use	ed dete	ector	Result
	Range	No.		110.	no.		PK	AV	QP	
2.01a	Low	1	9 kHz-30 MHz	2	1	1Mbit, EUT standing	×			passed
2.01b	Low	1	9 kHz-30 MHz	2	1	1Mbit EUT laying	×			passed
2.02a	Middle	6	9 kHz-30 MHz	2	1	54Mbit, EUT standing	×			passed
2.02b	Middle	6	9 kHz-30 MHz	2	1	54Mbit EUT laying	×			passed
2.03a	High	11	9 kHz-30 MHz	2	1	MCS6, EUT standing	×			passed
2.03b	High	11	9 kHz-30 MHz	2	1	MCS6, EUT laying	×			passed



## 5.3.5. Correction factors due to reduced meas. distance (f< 30 MHz)

The used correction factors when the measurement distance is reduced, are taken from IEEC Transaction EMC, Vol 47, No.3, Aug. 2005, Journal Paper "*EXTRAPOLATING NEAR-FIELD EMISSIONS OF LOW-FREQUENCY LOOP TRANSMITTERS*".

<b>kHz</b> 9,0 10,6 12,6	Antenna factor	3 Corection	4	. 5	=2+3+4+5
9,0 10,6 12,6		Corection			1=2+3+4+5
<b>kHz</b> 9,0 10,6 12,6			a factor	Cable loss	Transducer factor
9,0 10,6 12,6		300m to 3m	30m to 3m	Cable 1055	Transuucer lactor
9,0 10,6 12,6	dB µV/m	dB	dB	dB	dB µV/m
10,6 12,6	20,0	-116.7		0,0	-96,7
12,6	20,0	-116,7		0,0	-96,7
	20,0	-116,7		0,0	-96,7
14,8	20,0	-116,7		0,0	-96,7
17,5	20,0	-116,6		0,0	-96,6
20,7	20,0	-116,6		0,0	-96,6
24,4	20,0	-116,6		0,0	-96,6
28,9	20,0	-116,6		0,0	-96,6
34,1	20,0	-116,5		0,0	-96,5
40,3 47,6	20,0 20,0	-116,4 -116,3		0,0 0,0	-96,4
56,2	20,0	-116,2		0,0	-96,3 -96,2
66,4	20,0	-116,0		0,0	-96,0
78,4	20,0	-115,8		0,0	-95,8
92,7	20,0	-115,4		0,0	-95,4
109,4	20,0	-115,0		0,0	-95,0
129,3	20,0	-114,5		0,0	-94,5
152,7	20,0	-113,9		0,0	-93,9
180,4	20,0	-113,1		0,0	-93,1
213,1	20,0	-112,2		0,0	-92,2
251,7	20,0	-111,3		0,0	-91,3
297,3 351,2	20,0 20,0	-108,3 -105,2		0,0 0,0	-88,3 -85,2
414,8	20,0	-103,2		0,0	-85,2
490,0	20,0	-99,1		0,0	-79,1
490,0	20.0		-56,4	0,1	-36,3
582,0	20,0		-56,2	0,1	-36,1
690,0	20,0		-56,0	0,2	-35,8
820,0	20,0		-55,7	0,2	-35,5
973,0	20,0		-55,4	0,2	-35,2
1.155,0	20,0		-54,9	0,3	-34,6
1.371,0	20,0		-54,4	0,3	-34,1
1.627,0	20,0		-53,7	0,3	-33,4
1.931,0 2.292,0	20,0 20,0		-52,9 -52,0	0,4 0,4	-32,5 -31,6
2.721,0	20,0		-49,8	0,4	-29,3
3.230,0	20,0		-46,6	0,5	-26,1
3.834,0	20,0		-43,3	0,6	-22,7
4.551,0	20,0		-40,1	0,6	-19,5
5.402,0	20,0		-36,8	0,7	-16,1
6.412,0	20,0		-33,5	0,7	-12,8
7.612,0	20,0		-30,3	0,8	-9,5
9.035,0	20,0		-27,0	0,8	-6,2
10.725,0	20,0		-23,9	0,9	-3,0
12.730,0 15.111,0	20,0 20,0		-21,2 -19,3	0,9 1,0	-0,3 1,7
17.937,0	20,0		-19,3	1,0	2,6
21.292,0	20,0		-18,2	1,0	2,0
25.274,0	20,0		-18,3	1,1	2,8
30.000,0	20,0		-18,4	1,2	2,8
					1



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

# 5.4.1. Test location and equipment

stati test location and equipment									
test location	CETECOM Esser	n (Chapter. 2.2.1)	Please see Chapte	r. 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	□ 371 CBT32	□ 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 p	public mains	□ 060 120 V 60 Hz via PAS 5000						

## 5.4.2. Requirements/Limits

	FCC	<ul> <li>Part 15 Subpart B, §15.109, class B</li> <li>Part 15 Subpart C, §15.209 @ frequencies defined in §15.205</li> </ul>				
ANSI		☑ C63.4-2009 □ C63.10-2009 □ C63.10-2013				
	Frequency [MHz]	Radiated emissions limits, 3 meters				
	Trequency [WITZ]	QUASI Peak [µV/m]	QUASI-Peak [dBµV/m]			
Limit	30 - 88	100	40.0			
Linnt	88 - 216	150	43.5			
	216 - 960	200	46.0			
	above 960	500	49.0			

## 5.4.3. Restricted bands of operation, §15.205

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.20725-4.20775	37.5-38.25	1645.5-1646.5	9.3-9.5
6.215-6.218	73-74.6	1660-1710	10.6-12.7
6.26775-6.26825	74.8-75.2	1718.8-1722.2	13.25-13.4
6.31175-6.31225	108-121.94	2200-2300	14.47-14.5
8.291-8.294	123-138	2310-2390	15.35-16.2
8.362-8.366	149.9-150.05	2483.5-2500	17.7-21.4
8.37625-8.38675	156.52475-156.52525	2690-2900	22.01-23.12
8.41425-8.41475	156.7-156.9	3260-3267	23.6-24.0
12.29-12.293	162.0125-167.17	3332-3339	31.2-31.8
12.51975-12.52025	167.72-173.2	3345.8-3358	36.43-36.5
12.57675-12.57725	240-285	3600-4400	
13.36-13.41	322-335.4		
Remark: only spurious emis	sions are allowed within these freque	ency bands not exceeding the limits	per §15.209



Signal link to test sy	vstem (if used):	🗆 air link	□ cable connection	🗵 none				
EUT-grounding		🗷 none	□ with power supply	□ additional connection				
Equipment set up		☑ table top 0.8	8m height	□ floor standing				
Climatic conditions	5	Temperature: (	(22±3°C)	Rel. humidity: (40±20)%				
EMI-Receiver	Scan frequency range:	🗷 30 – 1000 M	1Hz 🗆 other:					
(Analyzer) Settings	Scan-Mode	🗷 6 dB EMI-R	leceiver Mode 🗆 3 dB sp	bectrum analyser mode				
	Detector	Peak / Quasi-peak						
	RBW/VBW	100 kHz/300 kHz						
	Mode:	Repetitive-Scan, max-hold						
	Scan step	80 kHz						
	Sweep-Time	Coupled - cali	brated display if continue	ous tx-signal otherwise adapted to EUT's individual				
		duty-cycle	uty-cycle					
General measureme	ent procedures	Please see chapter "Test system set-up for electric field measurement in the range 30 MHz						
		to 1 GHz"						

#### 5.4.4. Test condition and measurement test set-up

# 5.4.5. MEASUREMENT RESULTS

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

Table of	measurement resu	ilts:

Dia- gram	Carrier Channel		Frequency range	Set- OP- up mode Remark		Use	d detec	tor	Result	
no.	Range	No.		no.	no.		РК	AV	QP	
3.01	Low	1		2	1	b-Mode, 1MBit	×		×	passed
3.02	Middle	6	30 MHz – 1 GHz	2	1	g-Mode, 54MBit	×		×	passed
3.03	High	11		2	1	n-Mode, MCS6	×			passed

Remark: see diagrams in annex 1 for more details



# 5.5. General Limit - Radiated emissions, above 1 GHz

5.5.1. I Cot R	1.5.1. Test location and equipment 171K							
test site	□441 EMISAR	□ 348 EMI cond.	🗷 443 EMI FAR	□ 347 Radio.lab.	⊑337 OATS			
spectr. analys.	□584 FSU	□ 120 FSEM	□ 264 FSEK	🗷 489 ESU 40	C			
antenna meas	□574 BTA-L	289 CBL 6141	🗆 608 HL 562	🗷 549 HL025	C302 BBHA9170	□ 477 GPS		
antenna meas	□123 HUF-Z2	□ 132 HUF-Z3	□ 030 HFH-Z2	☑ 376 BBHA9120E				
antenna subst	□071 HUF-Z2	□ 020 EMCO3115	🗆 063 LP 3146	□ 303 BBHA9170	C			
multimeter	□341 Fluke 112				C			
signaling	□392 MT8820A	□ 371 CBT32	□ 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	🗆 060 120 V 60 Hz	z via PAS 5000				

## 5.5.1. Test location and equipment FAR

## 5.5.2. Requirements/Limits

FCC	Z Part 15 Subpart C, §15.209	□ Part 15 Subpart B, §15.109 class B ☑ Part 15 Subpart C, §15.209 for frequencies defined in §15.205 □ Part 15 Subpart C, §15.407(b)(1)(2)(3)						
ANSI	<ul> <li>☑ C63.4-2009</li> <li>□ C63.10-2009</li> <li>□ C63.10-2013</li> </ul>							
		Limits	s					
Frequency [MHz]	AV [μV/m]	AV [dBµV/m]	Peak [µV/m]	Peak [dBµV/m] or [dBm/MHz]				
above 1 GHz for frequencies as defined in §15.205 or RSS-Gen., Issue 4, §8.10 - Table 6	500	54.0	5000	74.0 dBµV/m				

#### 5.5.3. Test condition and measurement test set-up

	telet rest condition and measurement test set up							
Signal ink	Signal ink to test system (if used):		□ cable connection	⊠ none				
EUT-groun	ding	🗷 none	□ with power supply	□ additional connection				
Equipment	set up	■ table top 1.	5m height	□ floor standing				
Climatic co	onditions	Temperature:	(22±3°C)	Rel. humidity: (40±20)%				
Spectrum-	Scan frequency range:	equency range: $\blacksquare 1 - 18 \text{ GHz} \ \Box 18 - 25 \text{ GHz} \ \Box 18 - 40 \text{ GHz} \ \Box \text{ other:}$						
Analyzer	Scan-Mode	🗷 6 dB EMI-I	Receiver Mode 🗆 3 dB S	pectrum analyser Mode				
settings	Detector	Peak and Aver	rage					
	RBW/VBW	1 MHz / 3 MH	Iz					
	Mode:	Repetitive-Sca	an, max-hold					
	Scan step	400 kHz	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 above 1 GHz"						



## 5.5.4. Measurement Results

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

Dia- gram no.	Carrier (		Frequency range	Set- up no.	OP- mode no.	Remark	Use PK	d detec		Result
	Range	No.					PK	AV	QP	
4.04	Low	1	1-18GHz	2	1	b-Mode, 1MBit	X	×		passed
4.04a	Low	1	4.5-5.2GHz	2	1	b-Mode, 1Mbit 1 <sup>st</sup> harmonic measurement	×	×		passed
4.04b	Low	1	18-25GHz	2	1	b-Mode, 1MBit	×	×		passed
4.05a	Middle	6	1-18GHz	2	1	M 1 54MD'	×	×		passed
4.05b	Middle	6	18-25GHz	2	1	g-Mode, 54MBit	×	×		passed
4.06a	High	11	1-18GHz	2	1	- Mada MCSC	×	×		passed
4.06b	High	11	18-25GHz	2	1	n-Mode, MCS6	×	×		passed

Remark: see diagrams in annex 1 for more details



# 5.6. RF-Parameter - Radiated Band Edge compliance measurements

# 5.6.1. TEST LOCATION AND EQUIPMENT FAR

test site	□441 EMISAR	□ 348 EMI cond.	🗷 443 EMI FAR	□ 347 Radio.lab.	□ 337 OATS			
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				
multimeter	□ 341 Fluke 112							
signaling	□392 MT8820A	□ 371 CBT32	□ 547 CMU	□ 594 CMW				
DC power	□086 LNG50-10	087 EA3013	354 NGPE 40	□ 349 car battery	□ 350 Car battery			
line voltage	🗆 230 V 50 Hz via	public mains	🗆 060 120 V 60 Hz	z via PAS 5000				

#### 5.6.2. REQUIREMENTS/LIMITS

FCC	□ Part 15 Subpart B, §15.109 class B ☑ Part 15 subpart C, §15.209 @ frequencies defined in §15.205
ANSI	□ C63.4-2009 □ C63.4-2014 ⊠ C63.10-2009 □ C63.10-2013

#### 5.6.3. TEST CONDITION AND MEASUREMENT TEST SET-UP

Signal ink t	o test system (if used):	🗆 air link	□ cable connection	x none		
EUT-groun	ding	🗷 none	□ with power supply	□ additional connection		
Equipment	set up	☑ table top 1.5	5m height	□ floor standing		
Climatic co	nditions	Temperature: (	(22±3°C)	Rel. humidity: (40±20)%		
Spectrum-	Scan frequency range:	□ 1 – 18 GHz	□ 18 – 25 GHz □ 18 -	- 40 GHz 🗷 other: see diagrams		
Analyzer	Scan-Mode	🗆 6 dB EMI-F	Receiver Mode 🗷 3 dB S	pectrum analyser Mode		
settings	Detector	Peak and Average				
	RBW/VBW		e: 100kHz/300kHz			
		Right band-edg	ge: 1 MHz / 3 MHz			
	Mode:	Repetitive-Sca	n, max-hold			
	Scan step	40kHz or 400	kHz			
	Sweep-Time	Coupled – calibrated display if CW signal otherwise adapted to EUT's individual duty-cycle				
General mea	surement procedures	Please see chapter "Test system set-up for radiated electric field measurements above 1 GHz"				
		for general measurements procedures in anechoic chamber.				

#### **5.6.4. MEASUREMENT METHOD**

For <u>uncritical results</u> where a measurement resolution bandwidth of 1MHz can clearly show the compliance without influencing the results, a field strength measurement was performed to show compliance.

For <u>critical results</u> a Marker-Delta marker method was used for showing compliance to restricted bands according §15.205. The method is according ANSI 63.10:2009 Chapter §6.9.3 Chapter 6.10.6 "Marker-Delta method", The method consists of three independent steps:

- **1. Step:** Prior to the measurement the fundamental radiated In-Band field strength was performed. The determined value is used as reference value.
- **2. Step:** Second step consist of finding the relative attenuation between the fundamental emission and the maximum local out-of-band emission (within 2 MHz range around the band edge either on the band-edge directly or some modulation product if the level is greater than that on the band-edge) when measured with lower resolution bandwidth.
- **3. Step:** The delta value recorded in step 2 will be subtracted from value recorded in step 1, thus giving the required field strength at the band-edge. This value must fulfil the requirements for radiated spurious emissions in restricted bands in §15.205 with the general limits of §15.209.

#### 5.6.5. EUT settings

A fully loaded battery was used and changed if required in order to keep the voltage constant over the test time. The EUT was instructed to send with maximum power (if adjustable) according to applicants instructions.



## 5.6.6. RESULTS

## 5.6.6.1. Non-restricted bands near-by - limits according §15.247

Channel	Restricted		ental Value uV/m]			Margin	Verdict	Remark:		
no.	band ?	Peak-Value	Average-Value	Edge [dBuV/m]	[dB]	[dBc]	[dBc] [dB]		remark.	
1	no	84,99	80,55	51,13	33,86	20	13,86	PASS	b-Modulation	
1	no	85,15	78,84	55,65	29,5	20	9,5	PASS	g-Modulation	
1	no	84,96	79,33	56,19	28,77	20	8,77	PASS	n-Modulation	

Remark:--

## 5.6.6.2. Restricted bands near-by (§15.205 with limits accord. §15.209)

Channel	Restricted band ?		ental Value uV/m]	Value at B [dBu\		Duty-Cycle Corection AV	Lim [dBu			ırgin IB]	Verdict	Remark:
110.	Dana :	Peak-Value	Average-Value	Peak -Value	Average -Value	Average Value	Peak -Value	Average -Value	Peak	Average		
				-value	-value	value	-value	-value				
11	yes	97,19	87,18	68,77	52,48	1,09	74	54	5,23	0,43	PASS	n-Modulation, MCS6
11	yes	98,46	88,13	69,56	51,68	1,12	74	54	4,44	1,2	PASS	g-Modulation, 54MBit
11	yes	94,11	89,51	60,28	48,5	0,02	74	54	13,72	5,48	PASS	b-Modulation, 1MBit

Remark: Pls. see chapter 5.1 for applicable duty-cycle correction factor

5.6.7. VERDICT: passed



# 5.7. Maximum peak conducted output power

5.7.1. TEST LOCATION AND E	QUIPMENT (for reference number	s please see chapter	'List of test equipment')

	TEST EDENTION IN DEQUI MENT (16) reference numbers please see enapter Else of test equipment						quipinent)			
test location	CETECOM Essen (Chapter. 2.2.1)		□ 443 System CTC-FAR-EMI-			□ Please see Chapter. 2.2.3				
test site	🗆 441 EMI SAR	487 SAR NSA	<b>×</b> 347	Radio.lab.						
receiver	□ 377 ESCS30	□ 001 ESS	□ 489	ESU 40						
spectr. analys.	□ 584 FSU	□ 120 FSEM	264	FSEK	□ 489	ESU 40				
antenna	🗆 574 BTA-L	□ 133 EMCO3115	$\Box$ 302	BBHA9170	□ 289	CBL 6141	□ 030	HFH-Z2	□ 477	GPS
signaling	□ 392 MT8820A	□ 436 CMU	□ 547	CMU						
otherwise	🗷 266 NRV-Z31	🗷 600 NRVD	$\Box 110$	USB LWL	$\Box 482$	Filter Matrix	□ 378	RadiSense	<b>×</b> 693	TS8997
DC power	🗆 456 EA 3013A			EA 2032-50	$\Box 268$	EA- 3050	□ 494	AG6632A	□ 498	NGPE 40
otherwise	□ 331 HC 4055	$\square 248 \begin{array}{c} 6 \text{ dB} \\ \text{Attenuator} \end{array}$	□ 529	Power divider	× -	cable OTA20				
	🗷 613 20dB Attenua	ator	□ K 4	Cable kit						
line voltage	🗆 230 V 50 Hz via p	oublic mains	🗵 060 110 V 60 Hz via PAS 5000							

## **5.7.2. REFERENCES**

FCC	☑ §15.247(b) (3) + KDB 558074 D01 DTS Meas Guidance v03r02
ANSI	🗷 ANSI 63.10: 2013
Remark	For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

#### 5.7.3. TEST CONDITION AND MEASUREMENT TEST SET-UP

Signal ink to test system (if used):	🗆 air link	$\Box$ 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)%		
General measurement procedures	Please see cha Set-up)	Please see chapter "Test system set-up for conducted RF-measurement at antenna Port" (W1 Set-up)			

## 5.7.4. EUT SETTINGS

The EUT was instructed to send with maximum power (if adjustable) according applicants instructions. Different modulation characteristics have been checked, e.g. data rates which EUT can operate.



#### 5.7.5. MEASUREMENT METHOD AND ANALYZER SETTINGS

The measurement was performed in non-hopping transmission mode with the carrier set to lowest/middle and highest channel. The power was also checked for different data rates, modulation scheme or packet types if applicable.

Measurement Method <sup>1.)</sup>	<ul> <li>§15.247(b)(3)</li> <li>☑ Maximum Peak</li> <li>□ §15.247(b)(3) Maximum Average</li> </ul>	<ul> <li>1.) □ PK1-Method (§9.1.1): RBW &gt; 6dB-bandwidth of the signal</li> <li>2.) ☑ PK1-Method (§9.1.2): Peak Power Meter Method</li> </ul>			
	MIMO	<ol> <li>3.) □ Method as described in Chapter 3.8 was used for measurements on two available RF-Antenna ports.</li> </ol>			
Center Frequency		Nominal channel frequency			
Span		30% higher then the EBW measured before			
Resolution Bandwidth (RE	BW)	1MHz			
Video Bandwidth (VBW)		3MHz			
Sweep time		coupled			
Detector		Peak, Max hold mode for method PK1/PK2 or RMS and trace average for method AVG1/AVG2			
Sweep Mode		Repetitive mode, allow trace to stabilize			
Analyzer-Mode		normal			
		□ activated channel integration method with limits set to the EBW of the signal			

Remark 1: guidance 558074 D01 measurement DTS guidance V03r02

## 5.7.6. RESULTS

#### APLICANT'S DECLARED ANTENNA CHARACTERISTICS:

Directional Gain < 6 dBi (measured: difference between measured conducted and radiated eirp. power)

Directional Gain > 6 dBi (measured / applicant's declaration) -> conducted power reduction necessary

• Maximum declared antenna gain [isotropic]: -10dBi for ISM 2.4GHz band

Different modulation types and data rates were tested in order to find the maximum peak conducted output power. **Enclosed are only the maximum values for each modulation format**, pls. compare separate document A1 for all results.

	Max. Peak power (conducted)							
	[dBm]							
Set-up no: 1	Low channel $= 1$	Middle channel $= 6$	High channel $= 11$					
Op-Mode: 1	(2412 MHz)	(2437 MHz)	(2462 MHz)					
Measured Level	11.76	15.24	14.49					
b-Mode	(1Mbit)	(1Mbit)	(11 <b>M</b> bit)					
Measured Level	14.48	17.15	16.80					
g-Mode	(48Mbit)	( <b>36Mbit</b> )	(36Mbit)					
Measured Level	14.66	16.98	16.63					
n-Mode (MCS7)		(MCS6)	(MCS5)					
Limit		1 Watt (30dBm) Peak	•					

Remark: 9Mbit Mode not supported

1.) External Path Loss -> set as either as correction factor in spectrum-analyzer or activated as transducer table

2.) at this place only each maximum power reported, pls. compare separate annex 1 for more details

3.) maximum value among all data rates and modulations, pls. compare separate annex 1 for more details

# 5.7.7. VERDICT: Maximum value of 17.15 dBm Peak (51.88 mW) passed



5.0.1. IESI	LUCATIONA	ND EQUIF MEI		e numbers please	see chapter List	of test equipme		
test site	□ 441 EMI SAR	□ 348 EMI cond.	443 EMI FAR	🗷 347 Radio.lab.	□ 337 OATS			
spectr. analys.	🗷 683 FSU26	□ 120 FSEM	□ 264 FSEK	🗆 489 ESU				
attenuator	□ 530 10 dB							
signaling	□ 392 MT8820A	□ 436 CMU	□ 547 CMU					
DC power	$\square 463 \frac{\text{Power}}{\text{source}}$		□ 354 NGPE 40	□ 086 LNG50-10				
Power supply voltage	□ 230 V 50 Hz via public mains		🗷 060 110 V 60 Hz via PAS 5000					
Others	■ 613 20dB Attenuator		🗷 cable K5					

#### **5.8. RF-Parameter - 6 dB Bandwidth and 99% occupied Bandwith 5.8.1. TEST LOCATION AND EQUIPMENT** (for reference numbers please see chapter 'List of test equipment')

#### **5.8.2. REFERENCES**

#### §15.247(a)(2)

<u>Frequency hopping systems</u> shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.
 (2) DSSS Systems using <u>digital modulation techniques</u> may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

### 5.8.3. TEST CONDITION AND MEASUREMENT TEST SET-UP

Signal ink to test system (if used):	$\Box$ air link $\Box$ 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)%		
General measurement procedures	Please see chapter "Test system set-up for conducted RF-measurement at antenna Port" (W				
	Set-up)				

#### 5.8.4. EUT SETTINGS

The EUT was instructed to send with maximum power (if adjustable) according applicants instructions. Different modulation characteristics have been checked, e.g. data rates which EUT can operate.

#### 5.8.5. MEASUREMENT METHOD

**6-dB Emission bandwidth:** three carrier frequencies (low/middle/high) were used for showing the compliance with this requirement. A DELTA Marker method was set to measure the bandwidth compared to the highest In-Band power. The operating modes have been varied (e.g. data rate, modulation scheme, etc.).

Also the **99% occupied bandwidth** was measured. Two markers are placed on frequency points such that left to lower f-marker and right to higher f-marker only 1% of the TX-power is contained. Between the markers, 99% of the power is laying. The RBW value is readjusted and the measurement repeated until the RBW/EBW ratio is at least 1%.

Span	Set as to fully display the emissions, OBW: minimum 2times OBW
Scale y display	approximate 30dB below the maximum PEAK level
Resolution Bandwidth	ANSI 63.10:2009 Set to initial value approx 1% to 5% of the emission bandwidth, re-adjust
(RBW)	and proof that RBW/EBW is between 1% and 5%
	KDB558074V03r02
Video Bandwidth (VBW)	Minimum 3 times the resolution bandwidth
Sweep time	Auto -coupled
Detector	Peak detector
Sweep mode	Repetitive Mode, MAX-HOLD, trace stabilization

#### 5.8.6. SPECTRUM-ANALYZER SETTINGS



## 5.8.7. RESULTS:

For graphical results pls. see annex 4 to this test report.

#### 6dB BANDWIDTH:

Set-up no.: 1 Op. Mode: 1	6dB BANDWIDTH [MHz]						
$T_{NOM} = 21^{\circ}C, V_{NOM}$	Low channel = 1 (2412 MHz)Middle channel = 6 (2437 MHz)High channel = 11 (2462 MHz)						
Measured Level b-Mode @11Mbps	10.096153846	10.136217949	10.153846154				
Measured Level g-Mode @54Mbps	16.532852564	16.538461538	16.506410256				
Measured Level n-Mode @MCS7	17.56410256	17.756410256	17.756410256				

#### **Remark:**

Additional also the 99% occupied bandwidth were measured for worst-case 6dB bandwidth for each modulation type.

### 99% OCCUPIED BANDWIDTH:

Set-up no.: 1	99% Bandwidth							
Op. Mode: 1	[MHz]							
$T_{NOM} = 21^{\circ}C, V_{NOM} = 3V$	Low channel = 1 (2412 MHz)	Middle channel = 6 (2437 MHz)	High channel = 11 (2462 MHz)					
Measured Level b-Mode @11Mbps	13.888	13.968	13.896					
Measured Level g-Mode @54Mbps	16.904	20.144	18.680					
Measured Level n-Mode @MCS7	18.024	21.177	19.611					

**Remark:** 

# 5.8.8. VERDICT: DTS system requirements for 6dB-bandwidth according §15.247 (BW > 500kHz)

Passed



numbers places see chapter "List of test aquinment"

# 5.9. RF-Parameter - Power Spectral Density

<b>5.9.1. TEST LOCATION AND EQUIPMENT</b> (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 EMISAR	□487 SAR NSA	□ 337 OATS	🗷 347 Radio.lab.				
receiver	□ 377 ESCS30	□ 001 ESS	□489 ESU					
spectr. analys.	□ 489 ESU	□ 120 FSEM	□ 264 FSEK	🗷 683 FSU26				
power supply	🗆 456 EA 3013A	□ 457 EA 3013A	□ 463	□ 268 EA- 3050	□ 494 AG6632A	□ 498 NGPE 40		
otherwise	⊠530 10dB Attenuator			🗷 cable K4				

### 5.9.2. REFERENCES: §15.247(e)

(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

### 5.9.3. TEST CONDITION AND MEASUREMENT TEST SET-UP

Signal ink to test system (if used):	🗆 air link	$\Box$ 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)%		
General measurement procedures	Please see cha	Please see chapter "Test system set-up for conducted RF-measurement at antenna Port" (W2			
	Set-up)				

#### 5.9.4. EUT SETTINGS

The EUT was instructed to send with maximum power (if adjustable) according applicants instructions. Different modulation characteristics have been checked, e.g. data rates which EUT can operate.

### 5.9.5. MEASUREMENT METHOD/ SPECTRUM-ANALYZER SETTINGS

□ ANSI 63.10:2009	■ PKPSD-Method     □ AVGPSD Method				
E guidance 558074 D01 measurement DTS guidance V03r02					
Nominal channel frequency	Nominal channel frequency				
530% higher then the EBW	530% higher then the EBW measured before				
> 3 kHz (at least 3 times RB	W) - pls. see diagram				
> 10 kHz - pls. see diagram					
coupled					
Peak, Max hold mode for m	ethod PKPSD or RMS method AVGPSD				
Repetitive mode, allow trace	Repetitive mode, allow trace to stabilize (PKPSD) or single (AVGPSD)				
external measuring set-up path-loss					
	<ul> <li>guidance 558074 D01</li> <li>Nominal channel frequency</li> <li>530% higher then the EBW</li> <li>&gt; 3 kHz (at least 3 times RB</li> <li>&gt; 10 kHz - pls. see diagram</li> <li>coupled</li> <li>Peak, Max hold mode for m</li> <li>Repetitive mode, allow trace</li> </ul>				

Remarks:--



# 5.9.6. **RESULTS**:

Set-up no.: 1	POWER SPECTRAL DENSITY [dBm/3 kHz]						
Op. Mode: 1	Low channel = 1 (2412 MHz)	Middle channel = 6 (2437 MHz)	High channel = 11 (2462 MHz)				
Measured Level	-3.0	0.62	0.54				
b-Mode	(1Mbit)	(1Mbit)	(11Mbit)				
Measured Level	-2.61	0.55	-0.37				
g-Mode	(48Mbit)	(36Mbit)	(36Mbit)				
Measured Level	-3.78	0.09	-0.21				
n-Mode	(MCS7)	(MCS6)	(MCS5)				
Correction factor-[dB]	11.8						
(Path loss+cable attenuation)	(set as TDF correction factor in SA-> readings = final result)						
Limit	< 8dBm/3 kHz						

**Remark:** see diagrams for details on frequency in separate annex A1

# 5.9.7. VERDICT: PASSED



# 5.10. 20 dBc power specification

5.10.1. TEST LOCATION AND EQ	<b>DUIPMENT</b> (	for reference numbers	please see chapte	er 'List of test equip	ment')

test location	CETECOM Essen (Chapter. 2.2.1)		☑ 443 System CTC-FAR-EMI-		□ Please see Chapter. 2.2.3	
test site	□ 441 EMI SAR	487 SAR NSA	□ 337 OATS	🗷 347 Radio.lab.		
receiver	□ 377 ESCS30	□ 001 ESS	🗷 683 FSU26			
spectr. analys.	🗆 489 ESU	□ 120 FSEM	□ 264 FSEK			
power supply	🗆 456 EA 3013A	🗆 457 EA 3013A	□ 459 EA 2032-50	268 EA- 3050	□ 494 AG6632A	□ 498 NGPE 40
otherwise	■ 530 10 dB Attenuator			🗷 cable K4		

#### 5.10.2. REFERENCE: §15.247, §15.205

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

#### 5.10.3. TEST CONDITION AND MEASUREMENT TEST SET-UP

Signal ink to test system (if used):	□ air link	$\Box$ 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)%	
General measurement procedures	Please see cha	Please see chapter "Test system set-up for conducted RF-measurement at anten		
_	Set-up)			

#### 5.10.4. EUT SETTINGS

EUT was instructed to send with maximum power (if adjustable) according to applicants instructions.

#### 5.10.5. MEASUREMENT METHOD

According guidance 558074 D01 measurement DTS guidance V03r02: The frequency spectrum was investigated for conducted spurious emissions values lower than 20dB related to the RF-carrier power value. Three carrier frequencies (low/middle/high channel) were used for showing the compliance with this requirement. First a In-Band Reference level measurement of the carrier was performed. The video bandwidth (VBW) was chosen 10 times the resolution bandwidth (RBW). The frequency scan was up to 10 times the highest channel frequency within the operational mode. The spectrum-analyzer was set to MAX-PEAK Detector, MAX-Hold Mode, trace stabilisation or long sweep time depending of the TX off-time of the EUT.

# 5.10.6. TABLE OF MEASUREMENT RESULTS

Set-up no.: 1 Op-Mode: 1		<b>RF-Conducted test: 20 dBc spurious emissions</b>							
•	Low chan	nel =1	Middle ch	annel = 6	High chai	nnel = 11			
	(2412 MHz,	1MBit)	(2437 MH	z, 1MBit)	(2462 MHz	z, 11MBit)			
Englisher	Level Refe	erence	Level Re	eference	Level Re	eference			
Frequency	(In-Band) = 1	(In-Band) = 1.86 dBm $(In-Band) = 3$		(In-Band) = 5.74 dBm		= 5.70 dBm			
Range	Limit = -18.14 dBm		Limit = -18.14 dBm Limit = -14.66 dBm		Limit = -1	4.3 dBm			
	Frequency	Value	Frequency	Value	Frequency	Value			
	[MHz]	[dBc]	[MHz]	[dBc]	[MHz]	[dBc]			
150kHz to	Peaks from	>40	Peaks from	>40	Peaks from	>40			
30MHz	set-up (AE-		set-up (AE-		set-up (AE-				
JOININZ	equipment)		equipment)		equipment)				
30MHz to 2.8		>35		>40		>40			
GHz									
2.8 to 25 GHz		>35		>35		>40			
Band-Edge		39.98		-		40.45			

# 5.10.6.1. Op. Mode: b-Mode

**Remark**: see diagrams in separate document annex 1

The limit on the diagrams is 20dB under the reference level measured In-Band for each channel Maximum power of modulation schemes (data rate) chosen

# 5.10.6.2. Op. Mode: g-Mode

Set-up no.: 1 Op-Mode: 1	RF-Conducted test: 20 dBc spurious emissions						
	Low channel =1 (2412 MHz, 54Mbit))		Middle channel = $6$ (2437 MHz, 36Mbit))		High channel $= 11$ (2462 MHz, 36Mbit)		
Frequency Range	Level Reference (In-Band)= 1.51 dBm Limit = -18.49 dBm		Level Reference (In-Band) = 4.79 dBm Limit = -15.21 dBm		Level Reference (In-Band) = 4.24dBm Limit = -15.76 dBm		
	Frequency [MHz]	Value [dBc]	Frequency [MHz]	Value [dBc]	Frequency [MHz]	Value [dBc]	
150kHz to 30MHz	Peaks from set-up (AE- equipment)	>40	Peaks from set-up (AE- equipment)	>40	Peaks from set-up (AE- equipment)	>40	
30MHz to 2.8 GHz		>35		>40		>40	
2.8 to 25 GHz		>35		>40		>35	
Band-Edge		24.48				32.61	

**Remark**: see diagrams in separate document annex 1

The limit on the diagrams is 20dB under the reference level measured In-Band for each channel For channel 1, MCS7 was determined as lowest margin regarding band-edge value within premeasurements. Channel 6 and 11 chosen according maximum power modulation schemes (data rate)

Set-up no.: 1 Op-Mode: 1	<b>RF-Conducted test: 20 dBc spurious emissions</b>						
	Low chan	nel =1	Middle ch	annel = 6	High char	nnel = $11$	
	(2412 MHz	. MCS7)	(2437 MH	z, MCS6)	(2462 MH	z, MCS5)	
Frequency	Level Ref	erence	Level Re	eference	Level Re	eference	
	(In-Band) = 1.60  dBm		(In-Band) =		(In-Band) =		
Range	Limit = -18.4  dBm		Limit = -14.97 dBm		Limit= -15.66 dBm		
	Frequency	Value	Frequency	Value	Frequency	Value	
	[MHz]	[dBc]	[MHz]	[dBc]	[MHz]	[dBc]	
150kHz to	Peaks from		Peaks from		Peaks from		
30MHz	set-up (AE-	>40	set-up (AE-	>40	set-up (AE-	>40	
JOININZ	equipment)		equipment)		equipment)		
30MHz to 2.8		>40		>40		>40	
GHz		240					
2.8 to 25 GHz		>35		>35		>35	
Band-Edge		25.02		-		31.69	

# 5.10.6.3. Op. Mode: n-Mode

Remark: see diagrams in separate document annex 1

The limit on the diagrams is 20dB under the reference level measured In-Band for each channel For channel 1, MCS7 was determined as lowest margin regarding band-edge value within premeasurements. Channel 6 and 11 chosen according maximum power modulation schemes (data rate)

# 5.10.7. TEST RESULT: PASSED



# **5.11. Measurement uncertainties**

The reported uncertainties are calculated based on the standard uncertainty multiplied with the appropriate coverage factor  $\mathbf{k}$ , 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	Reference	Frequency range	Calculated uncertainty based on a confidence level of 95%						Remarks
Conducted emissions (U <sub>CISPR</sub> )	CISPR 16-2-1	9 kHz - 150 kHz 150 kHz - 30 MHz	4.0 dE 3.6 dE	3	-				
Radiated emissions Enclosure	CISPR 16-2-3	30 MHz - 1 GHz 1 GHz - 18 GHz	4.2 dE 5.1 dE		E-Field				
Disturbance power	CISPR 16-2-2	30 MHz - 300 MHz	-						-
Power Output radiated	-	30 MHz - 4 GHz	3.17 d	В					Substitution method
Denne Ordenst een ducted		Set-up No.	Cel- C1	Cel- C2	BT1	W1	W2		
Power Output conducted	-	9 kHz - 12.75 GHz	N/A	0.60		0.25			-
		12.75 - 26.5GHz	N/A	0.82					
Conducted emissions	-	9 kHz - 2.8 GHz	0.70	N/A	0.70		0.69		N/A - not
on RF-port		2.8 GHz - 12.75GHz	1.48	N/A	1.51		1.43		applicable
		12.75 GHz - 18GHz	1.81	N/A	1.83		1.77		
		18 GHz - 26.5GHz	1.83	N/A	1.85		1.79		
Occupied bandwidth	-	9 kHz - 4 GHz	0.1272 1.0 dE	••	(Delta M	Marker)	)		Frequency error Power
Emission bandwidth	-	9 kHz - 4 GHz	0.1272 ppm (Delta Marker) See above: 0.70 dB					Frequency error Power	
Frequency stability	-	9 kHz - 20 GHz	0.0636 ppm					-	
Radiated emissions Enclosure	-	150 kHz - 30 MHz 30 MHz - 1 GHz 1 GHz - 20 GHz	5.0 dB 4.2 dB 3.17 dB					Magnetic field E-field Substitution	

Table: measurement uncertainties, valid for conducted/radiated measurements



The abbreviations						
ANSI	American National Standards Institute					
AV, AVG, 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					
РК	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					

# 6. Abbreviations used in this report

# 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	MRA US-EU 0003	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
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
487 550 348 348	R-2666 G-301 C-2914 T-1967	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. st Site, SAR = Semi Anechoic Room, FAR = Fully Anechoic Room	VCCI, Voluntary Control Council for Interference by Information Technology Equipment, Japan



# 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

RefNo.	Equipment	Туре	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
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	-	EMC 32 Ver. 9.15.00
444	CTC-FAR-EMS field	System-EMS-Field (FAR)	-	EMC 32 Version 9.15.00
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
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	Setup V03.26, Test programm component V03.02.20
042				CBT V 5.40, FW: V.2.41 (FPGA Digital, V. 3.09 FPGA



# 8.1.2. Single instruments and test systems

105         AC: LINK 30 Ohm 50/HL         ESIL-25         807141005         Robbet & Schwarz         12 M         -         30.0           007         Single-Line Vectored, COM 57/HL         ESIL-26         89253002         Robbet & Schwarz         12 M         -         30.0           007         Invest Meet (EMS-malled)         NRV         963656017         Robbet & Schwarz         54 M         -         31.0           001         Invest Meet (EMS-malled)         INV         963656017         Robbet & Schwarz         54 M         -         31.0           001         Invest Meet (EMS-malled)         INV         2007270         EMSO         54 M         -         30.0           010         Invest Meet (IMSM)         INV1-2         87998410.8         Robbet & Schwarz         15 M         -         30.0           010         Invest Meet (IMSM)         INV1-2         87998410.8         Robbet & Schwarz         16 M         -         30.0           010         Invest Meet (IMSM)         INV1-2         87998410.8         Robbet & Schwarz         12 M         4         30.0           010         Invest Meet (IMSM)         INV1-1         INV1-1         INV1-1         INV1-1         INV1-1         INV1-1         INV1-1	RefNo.	Equipment	Туре	Serial-No.	Manufacturer	Interval of calibration	Remark	Cal due
0707         Singl-Line V-Nerson (20 Ohn 5pH)         ENH-26         902584002         Roke & Schwarz         12 M         -         30.0           016         Line Impedence Simulating Network         Op. 24-D         B6466         Spitzenbergers/spits         31.0         -         31.0           016         Line Amenual IS (LR) (SMH)         1115         91073600         FMMCO         36724         -         30.0           016         Line Amenual IS (LR) (SMH)         B511221         929931130         FMMCO         36846 & Schwarz         324M         -         30.0           017         Relay switch-unit (INK system)         RS11         24144002         Rohde & Schwarz         12 M         -         30.0           016         not-filler (WCDAL)         PAS 5000         B6463         Spitzenbergers/sins         -         3           016         not-filler (WCDAL)         PAS 5000         B6463         Spitzenbergers/sins         -         8           017         Relay switch-unit (Nr System)         RS11         10163         -         B463         Spitzenbergers/sins         -         3         7           016         not-filler (WCDAL)         FMM 10         Witch 10         -         B463         Spitzenbergers/sins							-	30.04.2016
1009         Power Neter (EMS-Failured)         NRV         803056017         Rohde & Schwarz         4 M         -         30.0           1016         Lang Andenae Sinudiag Werew         Op. 24-D         B6366         Splatzedfergrespiss         5 M         -         31.0           1020         Horn Antexna 18 GHz (Subt 1)         3115         9107:5009         EMCO         36 M         -         30.0           1031         Loop Antesna (H+feld)         4002         9206:270         EMCO         36 M         -         30.0           1031         Loop Antesna (H+feld)         4001         1001         Sinth (H+feld)         30.0         1001         1001         30.0         1001         30.0         1001							-	30.04.2016
Dife         Line Impedance Simulating Network:         Op. 24-D         B6766         Spitzenberger-Spiss         Soil 1         - 310.           Old         Loop Antenna (H-Ridu)         6N2         907-3009         EMCO         36 (12 M)         - 310.           Old         Loop Antenna (H-Ridu)         HFH-122         879801025         Rohde & Schwarz         36 M         - 300.           Diss         Description (RM-Schwarz)         FMA         - 300.         Rohde & Schwarz         36 M         - 300.           Diss         Description (RM-Schwarz)         FMA         200.         Rohde & Schwarz         36 M         - 300.           Diss         Description (RCMDA)         FDS100         Description (RM-Schwarz)         Pre-m         1         4         310.           Diss         Description (RCMDA)         FDS102         S         Wainwright CmBH         12 M         1         310.         4         310.         310							-	30.04.2016
100         Horn Anterna 18 (File Slobat )         3115         9107.3009         EMCO         567.21         4.         3.0.           010         Loop Anterna (H-Reld)         HFI L/Z         87964/025         Rohde & Schwarz         34 M         -3.0.           037         Reguesting (H-Reld)         HFI L/Z         87964/025         Rohde & Schwarz         24 M         -3.0.           038         Rescure projec (1008H-2004H)         ESI2-21         87958/1/8         Rohde & Schwarz         24 M         -3.0.           040         power ample(-0.2.341/9)         PKS 5000         BoSt3         Spritzentergreprise         -3         1           056         noch-filter (WCDMA, FDD1)         WRCT 1900/2005/40-         5         Willwrydgt GmbH         12 M         1g         3.0           056         DC - power anply, 0-10 A         LNG 50.10         -         Relmos Schwarz         36 M         -         4.0           059         Dessibus voltage probe         DSH 223         209.7310.52         Rohde & Schwarz         36 M         -         30.0           059         Dessibus voltage probe         DSH 223         209.7310.52         Rohde & Schwarz         36 M         -         30.0           010         USB-UX-Convecter							-	30.04.2017
Total         Loop Auternal (H-Feld)         6502         9906-9270         EMCO         86M         -         30.00           031         Loop Auternal (H-Feld)         HTH-Z2         \$79064026         Rohde & Schwarz         30.M         -         30.00           037         Ref-warening mole         ROML         \$8040420         Rohde & Schwarz         pre-m         1a           036         prevar ampfifer (DC-Zhitz)         PAS 5000         B6363         Spitzenberger-Spitz         -         3           040         prevar ampfifer (DC-Zhitz)         PAS 5000         B6363         Spitzenberger-Spitz         -         3           056         DC _ prover supply, 0 -10 A         LDE 101         ZM         Heinbitz orditz         Ige 101         Ige 140         Ige 140         10         Ige 140         Ige 140         10         Ige 140         Ige 140         10         Ige 140         10         Ige 140         10         10         Ige 140         30.0         10         Ige 340         30.0         10         Ige 340         30.0         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10	016		Op. 24-D		Spitzenberger+Spies	36 M	-	31.03.2016
1030         Loop Autema (H-field)         HH-H22         \$79904026         Rohde & Schwarz         24 M         -         30.0           0137         Requered probe (100HL X-MNH)         FISIL2.01         \$795811.02         Rohde & Schwarz         24 M         -         30.0           0157         relay-switch-unit (CMS system)         RSU         494440002         Rohde & Schwarz         24 M         18         31.0           0160         Der, prover angely, 0-10 A         LNG 50-10         -         Heinringer Restronic         pre-m         2         1           0161         Der, prover angely, 0-10 A         LNG 50-10         -         Rekro Automatik         pre-m         2         1         4         4         10           0161         Der, prover angely, 0-10 A         LNG 50-10         -         Rekro Automatik         pre-m         2         4         4         10         10         110	020	Horn Antenna 18 GHz (Subst 1)				36/12 M	-	31.03.2017
1033         Ref-arrent probe (100RHz-300Hz)         ESH2-21         Stypes (1)         Rohat & Schwarz         24 M         -         3           1060         prover amplifier (UC-201k)         PAS 5000         B6363         Spitzerberger Spies         -         3           1066         noth filter (WCDMA; FDD1)         WRCT 15002200-5400         5         Wainwright GmbH         12 M         1g         31.07           1076         DC - power supply, 0: 0 A         LXG 50:10         -         Heinboltz coll: 2,100 colls in series         Heinboltz coll: 2,101 colls in series         Heinboltz coll: 2,101 colls in series         4         31.07           101         USB-LVA-Converter         OLS-1         007/2006         Ing. Huro Scheiba         -         4         30.0         -         30.0 </td <td>021</td> <td></td> <td></td> <td>9206-2770</td> <td></td> <td>36 M</td> <td>-</td> <td>30.04.2018</td>	021			9206-2770		36 M	-	30.04.2018
107         Indug-worke-sair EAS system)         RSU         4044002         Robak & Schwarz         pe-m         Ia           060         prover angiptic UC2.2015;         Value         S         Wainwright GmbH         12 M         Ig         31.0           076         noch filter (WCDMA; FDD1)         WECT 1900:2200.5400         S         Wainwright GmbH         12 M         Ig         31.0           078         DC - power supply, 0.5 A         EA-3013 S         -         Elektro Automatik         pre-m         2           070         Helmholtz coll: 2:01 colls         -         RWTUV         24 M         4         30.0           071         USB-LWL-Converter         OLS-1         007.2006         Ing. Biro Scherba         -         4           070         pasive voltage probe         Probe TK 9416         without         Schwarz2 ek         36 M         -         30.0           100         USB-LWL-Converter         OLS-1         -         Ing. Biro Scherba         -         4         -         30.0         -         30.0         -         30.0         -         30.0         -         30.0         -         30.0         -         30.0         -         30.0         -         30.0         -	030			879604/026	Rohde & Schwarz		-	30.04.2018
100         pwer amplifier (DC 24Hz)         PAS 500         B6563         Spitzenberger-Spies         i         3           106         noch filter (WCDMA; IDD1)         WRT 1990/200-540.         5         Wainwight GmbH         12 M         1g         31.07           1087         DC ; power supply, 0-0 A         LSG 50-10         -         Helmholt zonit 24.07 cold         12 M         4         3         31.07           109         Helmholt zonit 24.07 cold         A         H Sale         WTTOV         24 M         4         31.01           100         USB-LWL-Converter         OLS-1         007/2006         Ing, Bito Scheba         -         4         -         30.0           101         USB-LWL-Converter         OLS-1         007/2006         Ing, Bitor Scheba         -         4         -         30.0           101         USB-LWL-Converter         OLS-1         007/2006         Rold & Schwarz         24 M         -         30.0         -         30.0         -         30.0         -         30.0         -         30.0         -         30.0         -         30.0         -         30.0         -         30.0         -         30.0         -         30.0         -         30.0	033	RF-current probe (100kHz-30MHz)	ESH2-Z1	879581/18	Rohde & Schwarz	24 M	-	30.04.2017
both         function         WKCT 1900/2200-540- 10FEK         5         Wainwright GmbH         12 M         1g         31.07           1066         DC - power supply, 0-10 A         LNG 50-10         -         Heinzinger Electronic         pre-m         2           107         DC - power supply, 0-5 A         EA Sol 33 S         -         Elektro Automatik         pre-m         2           1090         IBSH-WI-Converter         OLS-1         007/2006         Ing. Bito Scheiha         -         30.0           1000         passive voltage probe         ESH ZZ         299,7810.52         Rohde & Schwarz         30.0         30.0           1010         USB-LWI-Converter         OLS-1         -         Ing. Bito Scheiha         -         4         30.0           119         RT Harmonics Analyzer dig. Flickermetr         B10         GG6047         BOCONSULT         36.0         30.0           1240         sittemator         SMA 468 2W         -         Radiall         pre-m         2         2           243         attemator         SMA 468 2W         -         Radiall         pre-m         2         2         31.0           244         attemator         SMA 4812W         -         Radiall <td< td=""><td>057</td><td>relay-switch-unit (EMS system)</td><td>RSU</td><td>494440/002</td><td>Rohde &amp; Schwarz</td><td>pre-m</td><td>1a</td><td></td></td<>	057	relay-switch-unit (EMS system)	RSU	494440/002	Rohde & Schwarz	pre-m	1a	
106         106         107         Warringt Control         117         118         31.0           108         DC - power supply, 0 - 0 A         LAS 30.10         -         Elektro Automatik         pr=m         2           109         Heinholtz coil: 2x10 coils         -         Elektro Automatik         pr=m         2           109         Heinholtz coil: 2x10 coils         -         Elektro Automatik         pr=m         2           100         USS-L-WL-Converter         OLS-1         007/2006         Ing. Bito Scheiha         -         4           100         passive voltage probe         Pobe TK 9416         without         Schwarzbeck         30.0         30.0           101         USS-LWL-Converter         OLS-1         -         Ing. Bito Scheiha         -         4           101         USS-LWL-Converter         OLS-1         -         Ing. Bito Scheiha         -         30.0           103         Galastabé dipole antema Olpole 1         3121C-DB4         9105-007         EMCO         30.0         2           25         attenautor         SMA 6dB 2W         -         Radial         pr=m         2           25         attenautor         SMA 6dB 2W         -         Radial	060	power amplifier (DC-2kHz)	PAS 5000	B6363	Spitzenberger+Spies	-	3	
107         DC:         power supply. 0.5 A         EA:3013 S         :         Electro Automatik         pre-m         2           09         Helmholtz coli: 2x10 colis         .         RWTUV         24 M         4         31.0           109         Issuit-Un-Converter         OLS-1         007/2006         Ing. Bino Schelba         .         4           109         passive voltage probe         Probe TK 9416         without         Schwarzbeck         30 M         .         30.0           110         ISB1-WL-Converter         OLS-1         .         Ing. Bino Schelba         .         4         .         .         30.0           110         ISB1-WL-Converter         OLS-1         . <td>066</td> <td>notch filter (WCDMA; FDD1)</td> <td></td> <td>5</td> <td>Wainwright GmbH</td> <td>12 M</td> <td>1g</td> <td>31.07.2015</td>	066	notch filter (WCDMA; FDD1)		5	Wainwright GmbH	12 M	1g	31.07.2015
1687         DC - pover supply, 0. 5 A         EA. 301.3 S         :         Electro Automulk         pre-m         2           1090         Helmholtz coil: 210 coils in series         in hubbatic coil: 210 coils         .         RWTUV         24 M         4         31.0.           1097         INSIL-UL-Converter         OLS-1         2097 310.32         Roke & Schwarz         30 M         30.0           100         nassive voltage probe         Probe: TK 9416         without         Schwarzbock         30 M         30.0           110         USB-LWL-Converter         OLS-1         -         Ing. B0ro Scheiba         -         4         30.0           110         USB-LWL-Converter         OLS-1         -         Ing. B0ro Scheiba         -         4         30.0           113         Ratinanics         Antyras         B10         G66347         ROCONSULT         36 M         30.0           124         atternator         SMA 64B 2W         -         Radiall         pre-m         2         2         2         atternator         N 64B 12W         -         Radiall         pre-m         2         2         2         atternator         N 64B 12W         -         Radiall         pre-m         2         2<	086	DC - power supply, 0 -10 A	LNG 50-10	-	Heinzinger Electronic	pre-m	2	
On         Helmholtz coli: 2x10 colis in series         Helmholtz coli: 2x10 colis in series         RWTÜV         24 M         4         31.0           019         USB-LWL-Converter         OLS-1         007/2006         Ing. Bito Scheiba         -         4           0100         passive voltage probe         ENEL 2/3         299/2810 52         Rohde & Schwarz         30 M         -         30.0           1010         USB-LWL-Converter         OLS-1         -         Ing. Bito Scheiba         -         4           119         RT Harmonics Analyzer dig. Thickemeer         BIO         G60547         BOCONSULT         30 M         -         31.0           136         adjustable dipole anterna (Dipole 1)         3121C-D194         9105-0697         EMCOO         30 M         -         30.0           140         Signal Generator         SMA 104B 10W         -         Radial         pre-m         2         2         2         2         31.0         -         31.0         -         31.0         31.0         31.0         -         31.0         31.0         -         31.0         -         31.0         -         31.0         -         31.0         -         31.0         -         31.0         -         31.				-	8	•		
101         USE-1-WL-Converter         OLS-1         007/2006         Ing. Bitor Schelbah         -         4         300           100         passive voltage probe         Probe TK 9416         without         Schwarzbeck         36 M         -         300           101         USE-1-WL-Converter         OLS-1         -         Ing. Bitor Schelba         -         4           119         RT Harmonics Analyzer dig. Flickermeter         R10         G60547         BOCONSULT         36 M         -         31.0           126         adignanthid dyole amerna Objook         SMIHU         831314006         Rohn & & Stato         30.0         -         Radiall         pre-m         2           249         attenautor         SMA 1046 10W         -         Radiall         pre-m         2         -           252         attenautor         SMA 34B 2W         -         Radiall         pre-m         2         -         -         Radiall         pre-m         2         -         -         Radiall         pre-m         2         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -			Helmholtz coil: 2x10 coils	-		•		31.03.2016
1999         massive valtage probe         ESIL2-23         299 7810.52         Rohde & Schwarz, 26 Mar, 27 30.0         30.0         -         30.0           100         bussive valtage probe         Probe TK 941.6         without         Schwarzheck         30.0         -         30.0           110         BKB LWL-Converter         OLS-1         -         Ing. Bürs Schwarz         34.0         -         31.0           119         RT Harmonics Analyzer dig. Flickerneet         1010         G66547         D0CONSULT         36.M         -         31.0           240         attenuator         SMA 6dB 2W         -         Radiall         pre-m         2           244         attenuator         SMA 6dB 12W         -         Radiall         pre-m         2           254         attenuator         SMA 34B 2W         -         Radiall         pre-m         2           256         hybrid (copler         4031C         0.4491         Narda         pre-m         2         1           260         hybrid copper         A031C         0.4491         Narda         pre-m         2         1         0.31.0           261         Thermal Drever Sansor         NRV-253         8208000007         Rohade & Sc	091	USB-LWL-Converter		007/2006	Ing Bijro Scheiba	-	4	
100					-	36 M		30.04.2018
110         USB-LW-Converter         OLS-1         -         Ing. Bino Scheiha         -         4           1136         adjustable dipole sumenna (Dipole 1)         3121-CDB4         9105-0697         EMCO.         36 M         -         31.01           148         attenuator         SMA 6dB 2W         -         Radiall         pre-m         2           249         attenuator         SMA 6dB 2W         -         Radiall         pre-m         2           240         attenuator         SMA 10dB 10W         -         Radiall         pre-m         2           253         attenuator         SMA 10dB 10W         -         Radiall         pre-m         2           254         attenuator         SMA 3dB 2W         -         Radiall         pre-m         2           256         hybrid coupler         4031C         01491         Narda         pre-m         2           256         hybrid coupler         4032C         11342         Narda         pre-m         2           261         Thermal Power Sensor         NRV-25         825980008         Rohde & Schwarz         24 M         31.0           263         Signal Generator         NRV-23.3         Mode140140090		1 61					-	30.04.2018
119         RT Harmonics Analyzer dig. Flickermeter         B10         66647         BOCONSULT         66 M         30.0           1136         adjustable dipole antenna (Dipole 1)         311(C-DB4         9165-6907         FMCO         36 M         30.0           1248         attenuator         SMH (0B 2W         -         Radial1         pre-m         2           248         attenuator         SMA 10dB 10W         -         Radial1         pre-m         2           252         attenuator         SMA 30B 2W         -         Radial1         pre-m         2           255         attenuator         SMA 30B 2W         -         Radial1         pre-m         2           256         attenuator         SMA 30B 2W         -         Radial1         pre-m         2           257         tybrid         4031C         04491         Narda         pre-m         2           260         tybrid coupler         4033C         1142         Narda         pre-m         2           261         bybrid coupler         9130         2508         25080007         Rohde & Schwarz         24 M         31.0           262         Fower Meter         NKV-233         Model 104         84014				-			4	50.07.2010
136         adjustable dipole amerana (Dipole 1)         3121C-DB4         9105-6697         EMCO         36 M         .         300           148         attenuator         SMA 60B 2W         -         Radiall         pre-m         2           249         attenuator         SMA 100B 10W         -         Radiall         pre-m         2           251         attenuator         N 64B 12W         -         Radiall         pre-m         2           252         attenuator         SMA 34B 2W         -         Radiall         pre-m         2           256         hybrid         4031C         Ot4491         Narda         pre-m         2           260         hybrid coupler         4032C         11342         Narda         pre-m         2           261         Thermal Power Sensor         NRV-253         8250830008         Rolde & Schwarz         24 M         3.10.           262         Power Meter         NRV-253. Model 04         8204900007         Rolde & Schwarz         24 M         3.10.           265         Pesk Power Sensor         NRV-233. Model 04         843383016         Rolde & Schwarz         24 M         3.10.           266         Pesk Power Sensor         NRV-233. Mode	-			- C60547	Ū			21.02.2016
140         Signal Generator         SMHU         \$3314.006         Rohe R. Schwarz.         24 M.         -         31.00           248         attenuator         SMA 64B 2W         -         Radiall         pre-m         2           252         attenuator         SMA 10dB 10W         -         Radiall         pre-m         2           255         attenuator         SMA 30B 2W         -         Radiall         pre-m         2           255         thybrid         4031C         04491         Narda         pre-m         2           256         attenuator         SMA 30B 2W         -         Radiall         pre-m         2           257         hybrid coupler         4033C         1142         Narda         pre-m         2           260         hybrid coupler         4033C         1142         Narda         pre-m         2           261         bybrid coupler         4033C         1142         Narda         Schwarz         24 M         31.0           262         Power Meter         NKV 53         82093005         Rohde & Schwarz         24 M         31.0           263         Feak Power Sensor         NKV-233, Model 04         M4014009         Rohde & S								31.03.2016
1245         attenuator         SMA 6dB 2W         .         Radiall         pre-m         2           249         attenuator         SMA 10dB 10W         .         Radiall         pre-m         2           250         attenuator         SMA 30B 2W         .         Radiall         pre-m         2           251         hybrid         4031C         04491         Narda         pre-m         2           260         hybrid coupler         4033C         11342         Narda         pre-m         2           261         Thermal Power Sensor         NRV-255         8259833008         Rohde & Schwarz         24 M         -         31.0           263         Signal Generator         SMP 04         8261900007         Rohde & Schwarz         24 M         -         31.0           264         Spectrum Analyzer         FSEX 30         S040104         83433010         Rohde & Schwarz         24 M         -         31.0           267         Deak power sensor         NRV-231, Model 04         83433010         Rohde & Schwarz         24 M         -         31.0           266         Peak Power Sensor         NRV-231, Model 04         834383016         Rohde & Schwarz         24 M         -								30.04.2018 31.03.2016
249         attenuator         SMA 10dB 10W         .         Radiall         pre-m         2           252         attenuator         N 6dB 12W         -         Radiall         pre-m         2           255         attenuator         SMA 3dB 2W         -         Radiall         pre-m         2           257         hybrid         4031C         04491         Narda         pre-m         2           261         Thernal Power Sensor         NRV-Z55         8250830008         Rolde & Schwarz         24 M         -         31.0           262         Power Meter         NRV-S         8250700010         Rolde & Schwarz         24 M         -         31.0           263         Signal Generator         SNP 04         8269390005         Rolde & Schwarz         12 M         -         30.0           266         Peak Power Sensor         NRV-Z33, Model 04         840414009         Rolde & Schwarz         24 M         -         31.0           267         totch filter GSM 830         WRCA 800/960EEK         9         Wainwright GmbH         pre-m         2         2           273         attenuator (10 dB) 100 W         Model 47         BF6239         Weinschel         pre-m         2         <								51.05.2010
252         attenuator         N 6dB 12W         .         Radiall         pre-m         2           256         attenuator         SMA 30B 2W         -         Radiall         pre-m         2           257         hybrid         4031C         04491         Narda         pre-m         2           260         hybrid coupler         4033C         11342         Narda         pre-m         2           261         Thermal Power Sensor         NRV-255         8250830008         Rohde & Schwarz         24 M         -3         31.0           263         Signal Generator         SNP 04         820930005         Rohde & Schwarz         24 M         -3         31.0           264         Peak power Sensor         NRV-231, Model 04         840144009         Rohde & Schwarz         24 M         -3         31.0           267         noch filter GSM 800         WRCA 800.900-6EEK         9         Wainright GmbH         pre-m         2         2           271         termination         1418 N         BE6384         Weinschel         pre-m         2         2           273         attenuator (10 dB) 50 W         Model 47         BF6239         Weinschel         pre-m         2         2				-		•		<u> </u>
256         attenuator         SMA 3dB 2W         i         Radiall         pre-m         2           257         hybrid         4031C         04491         Narda         pre-m         2           261         hybrid coupler         4032C         11342         Narda         pre-m         2           261         Thermal Power Sensor         NRV-Z55         8250830008         Rohde & Schwarz         24 M         -         31.0           263         Signal Generator         SMP 04         8261900007         Rohde & Schwarz         36 M         -         31.0           263         peak power sensor         NRV-Z31, Model 04         8426939005         Rohde & Schwarz         24 M         -         31.0           266         Peak Power Sensor         NRV-Z31, Model 04         843383016         Rohde & Schwarz         24 M         -         31.0           270         termination         1418 N         BB6384         Weinschel         pre-m         2           271         termination         1418 N         B60321         Weinschel         pre-m         2           273         attenuator (10 dB) 10 W         Model 47         045950         Weinschel         pre-m         2				-		pre-m		
257         hybrid         4031C         04491         Narda         pre-m         2           260         hybrid coupler         4032C         1142         Narda         pre-m         2           261         Thermal Power Sensor         NRV-255         825083.0008         Rohde & Schwarz         24 M         -         31.02           263         Signal Generator         SMP 04         826190.0007         Rohde & Schwarz         24 M         -         31.02           264         Spectrum Analyzer         FSIE 30         82693.0005         Rohde & Schwarz         24 M         -         31.02           266         Peak Power Sensor         NRV-Z33. Model 04         8403383016         Rohde & Schwarz         24 M         -         31.02           267         norch filter GSM 850         WRCA 800960-6EEK         9         Weinschel         pre-m         2         2           271         termination         1418 N         BE6239         Weinschel         pre-m         2         2           2721         attenuator (10 dB) 50 W         Model 47         BF6239         Weinschel         pre-m         2         2           274         attenuator (10 dB) 50 W         Model 4700 (0 S/A)         C7061	252	attenuator	N 6dB 12W	-	Radiall	pre-m	2	
260         hybrid coupler         4032C         11342         Narda         pre-m         2           261         Thermal Power Sensor         NRV-Z55         8250830008         Rohde & Schwarz         24 M         -         31.0           262         Power Meter         NRV-S         8257700010         Rohde & Schwarz         24 M         -         31.0           263         Signal Generator         SMP 04         826939005         Rohde & Schwarz         24 M         -         31.0           264         Spectrum Analyzer         FSEK 30         826939005         Rohde & Schwarz         24 M         -         31.0           266         peak power sensor         NRV-233, Model 04         8434381016         Rohde & Schwarz         24 M         -         31.0           267         termination         1418 N         BB6935         Weinschel         pre-m         2           271         termination         1418 N         BF6239         Weinschel         pre-m         2         2           273         attenuator (10 dB) 50 W         Model 43         BF9229         Weinschel         pre-m         2         2           274         attenuator (10 dB) 50 W         Model 7006 (SMA)         CT169	256	attenuator	SMA 3dB 2W	-	Radiall	pre-m	2	
261         Thermal Power Sensor         NRV-Z55         8250730000         Rohde & Schwarz         24 M         -         31.0           262         Power Meter         NRV-S         8257700010         Rohde & Schwarz         24 M         -         31.0           264         Signal Generator         SMP 04         8261900007         Rohde & Schwarz         12 M         -         30.0           265         peak power sensor         NRV-Z33, Model 04         840414009         Rohde & Schwarz         24 M         -         31.0           266         Peak power sensor         NRV-Z33, Model 04         84333016         Rohde & Schwarz         24 M         -         31.0           267         retrnination         1418 N         BE6935         Weinschel         pre-m         2           271         termination         1418 N         BE6384         Weinschel         pre-m         2           272         attenuator (20 dB) 50 W         Model 470         BF6239         Weinschel         pre-m         2           273         attenuator (10 dB) 50 W         Model 4703 (N)         C5129         Weinschel         pre-m         2           275         DC-Block         Model 7006 (SMA)         C7061         Weinschel<	257	hybrid	4031C	04491	Narda	pre-m	2	
261         Thermal Power Sensor         NRV.255         8250830008         Rohde & Schwarz         24 M         -         31.0           262         Power Meter         NRV-S         8257700010         Rohde & Schwarz         24 M         -         31.0           263         Signal Generator         SMP 04         8261900007         Rohde & Schwarz         12 M         -         30.0           264         Spectrum Analyzer         FSEK 30         8269930005         Rohde & Schwarz         24 M         -         31.0           266         Peak Power Sensor         NRV-233, Model 04         84333016         Rohde & Schwarz         24 M         -         31.0           267         notsch filter GSM 850         WRCA S00900-6EEK         9         Wainwright GmbH         pre-m         2           271         termination         1418 N         BE6334         Weinschel         pre-m         2           272         attenuator (20 dB) 50 W         Model 47         BF6239         Weinschel         pre-m         2           273         attenuator (10 dB) 50 W         Model 4700 8() C         C5129         Weinschel         pre-m         2           275         DC-Block         Model 7003 (N)         C5129	260	hybrid coupler	4032C	11342	Narda	pre-m	2	
263         Signal Generator         SMP 04         8261900007         Rohde & Schwarz         16 M         -         31.0           264         Spectrum Analyzer         FSEK 30         826939.0005         Rohde & Schwarz         12 M         -         30.0           265         peak power sensor         NRV-Z33, Model 04         840414.009         Rohde & Schwarz         24 M         -         31.0           266         Peak power sensor         NRV-Z31, Model 04         843383.016         Rohde & Schwarz         24 M         -         31.0           267         Potch filter GSM 850         WRCA 800.960-GEEK         9         Wainwright GmbH         pre-m         2         2           271         termination         1418 N         BE6384         Weinschel         pre-m         2         2           273         attenuator (10 dB) 50 W         Model 47         BE6329         Weinschel         pre-m         2<	261	Thermal Power Sensor	NRV-Z55	825083/0008	Rohde & Schwarz	24 M	-	31.03.2016
263         Signal Generator         SMP 04         8261900007         Rohde & Schwarz         16 Mode         -         31.02           264         Spectrum Analyzer         FSEK 30         826939.0005         Rohde & Schwarz         12 M         -         30.02           265         peak power sensor         NRV-Z33, Model 04         840414.009         Rohde & Schwarz         24 M         -         31.02           266         Peak Power Sensor         NRV-Z33, Model 04         843383.016         Rohde & Schwarz         24 M         -         31.02           267         notch filter GSM 850         WRCAS 8000960-6EEK         9         Wainwright GmbH         pre-m         2         2           271         ttermination         1418 N         BE6384         Weinschel         pre-m         2         2           272         attenuator (10 dB) 50 W         Model 47         BE6329         Weinschel         pre-m         2	262	Power Meter	NRV-S	825770/0010	Rohde & Schwarz	24 M	-	31.03.2016
2e4         Spectrum Analyzer         FSEK 30         826939005         Rohde & Schwarz         12 M         -         30.0           265         peak power sensor         NRV-Z33, Model 04         84014/009         Rohde & Schwarz         24 M         -         31.0           266         Peak Power Sensor         NRV-Z31, Model 04         84338/016         Rohde & Schwarz         24 M         -         31.0           267         notch filter CSM 850         WRCA 800/960-GEEK         9         Wainwright GmbH         pre-m         2         2           270         termination         1418 N         BB6384         Weinschel         pre-m         2         2           271         termination         1418 N         BB6384         Weinschel         pre-m         2         2           273         attenuator (10 dB) 50 W         Model 47003 (N)         CS129         Weinschel         pre-m         2         2           274         attenuator (10 dB) 50 W         Model 7006 (SMA)         C7061         Weinschel         pre-m         2         2           275         DC-Block         Model 7006 (SMA)         C7061         Weinschel         pre-m         2         2           279         power divider </td <td></td> <td>Signal Generator</td> <td>SMP 04</td> <td>826190/0007</td> <td>Rohde &amp; Schwarz</td> <td>36 M</td> <td>-</td> <td>31.03.2016</td>		Signal Generator	SMP 04	826190/0007	Rohde & Schwarz	36 M	-	31.03.2016
266         Peak Power Sensor         NRV-Z31, Model 04         843383/016         Rohde & Schwarz         24 M         -         31.03           267         notch filter GSM 850         WRCA 800/960-GEEK         9         Wainwright GmbH         pre-m         2           270         termination         1418 N         BE6384         Weinschel         pre-m         2           271         termination         1418 N         BE6384         Weinschel         pre-m         2           273         attenuator (10 dB) 100 W         Model 47         BF6239         Weinschel         pre-m         2           274         attenuator (10 dB) 50 W         Model 48         BF9229         Weinschel         pre-m         2         2           275         DC-Block         Model 7003 (N)         C5129         Weinschel         pre-m         2         2           276         DC-Block         Model 7006 (SMA)         L1855         Weinschel         pre-m         2         2           279         power divider         1515 (SMA)         L1855         Weinschel         pre-m         2           280         DC-Block         Model 7006 (SMA)         C000         83221/091         Rohde & Schwarz         12 M	264	Spectrum Analyzer	FSEK 30	826939/005	Rohde & Schwarz	12 M	-	30.04.2016
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 (10 dB) 50 W         Model 47         BF6239         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 7006 (SMA)         C7161         Weinschel         pre-m         2           276         DC-Block         Model 7006 (SMA)         C7061         Weinschel         pre-m         2           277         pre-dmjffer 25MHz - 4GHz         AMF-2D-100M4G-35-10P         379418         Miteq         12 M         1c         31.0           281         pre-ampiffer 25MHz - 4GHz         AMF-2D-100M4G-35-10P         379418         Miteq         12 M         1c         31.0           293         Derionationation fester         CMU 200         832221/091         Rohde & Schwarz         1z M         -	265	peak power sensor	NRV-Z33, Model 04	840414/009	Rohde & Schwarz	24 M	1	31.03.2016
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 7003 (N)         CS129         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         Ic 31.07           298         Univ. Radio Communication Tester         CMU 200         832221/091         Rohde & Schwarz         pre-m         3           300         AC LISN (50 Ohm/S0H, 1-phase)         ESH3-Z5         892 239/020         Rohde & Schwarz         12 M         30.00           301 <td>266</td> <td>Peak Power Sensor</td> <td>NRV-Z31, Model 04</td> <td>843383/016</td> <td>Rohde &amp; Schwarz</td> <td>24 M</td> <td>1</td> <td>31.03.2016</td>	266	Peak Power Sensor	NRV-Z31, Model 04	843383/016	Rohde & Schwarz	24 M	1	31.03.2016
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 47         BF6239         Weinschel         pre-m         2           274         attenuator (10 dB) 50 W         Model 47         Model 700 S0         Weinschel         pre-m         2           274         attenuator (10 dB) 50 W         Model 700 G(SMA)         C5129         Weinschel         pre-m         2           275         DC-Block         Model 7006 (SMA)         C7061         Weinschel         pre-m         2           276         power divider         1515 (SMA)         LH855         Weinschel         pre-m         2           277         power divider         1515 (SMA)         LH855         Weinschel         pre-m         2           276         pre-miplifier 25MHz - 4GHz         AMF-2D-100M4G-35-10P         379418         Miteq         12 M         1c         31.07           298         Univ. Radio Communication Tester         CMU 200         832221/091         Rohde & Schwarz         pre-m         2         30.0	267	notch filter GSM 850	WRCA 800/960-6EEK	9	Wainwright GmbH	pre-m	2	
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	270	termination	1418 N	BB6935	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 7003 (N)         C5129         Weinschel         pre-m         2           277         power divider         1515 (SMA)         LH855         Weinschel         pre-m         2           279         power divider         1515 (SMA)         LH855         Weinschel         pre-m         2           271         pre-mapifier 25MHz - 4GHz         AMF-2D-100M4G-35-10P         379418         Miteq         12 M         1c         31.07           281         Univ. Radio Communication Tester         CMU 200         832221/091         Rohde & Schwarz         pre-m         3           300         AC LISN (50 Ohm/SopH.1-phase)         ESH3-Z5         892 239/020         Rohde & Schwarz         30.0         30.02 <td>271</td> <td>termination</td> <td>1418 N</td> <td>BE6384</td> <td>Weinschel</td> <td>pre-m</td> <td>2</td> <td></td>	271	termination	1418 N	BE6384	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           277         power divider         1515 (SMA)         LH855         Weinschel         pre-m         2           287         pre-amplifier 25MHz - 4GHz         AMF-2D-100M4G-35-10P         379418         Miteq         12 M         1c         31.0           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         12 M         -         30.0-           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	272	attenuator (20 dB) 50 W	Model 47	BF6239	Weinschel	pre-m	2	
274         attenuator (10 dB) 50 W         Model 7 (10 dB) 50 W         BG0321         Weinschel         pre-m         2           275         DC-Block         Model 7006 (SMA)         C7061         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         Mireq         12 M         1c         31.07           291         high pass filter GSM 850'900         WHJ 2200-4EE         14         Wainwright GmbH         12 M         1c         31.07           300         AC LISN (50 Ohm/S0µH, 1-phase)         ESH3-Z5         892 239/020         Rohde & Schwarz         12 M         -         30.04           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         -         31.07           312         Climatic Test Chamber -40/+80 Grad         H 24055					Weinschel	•		
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 2SMHz - 4GHz         AMF-2D-100M4G-35-10P         379418         Miteq         12 M         1c         31.07           291         high pass filter GSM 850/900         WHJ 2200-4EE         14         Wainwright GmbH         12 M         1c         31.07           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         12 M         -         30.04           301         attenator (20 B) 50W, ISGHz         47-20-33         AW0272         Lucas Weinschel         pre-m         2         30.07           302         horn antenna 40 GHz (Meas 1)         BBHA9170         155         Schwarzbeck         36 M         -         31.02           3031         Climatic Test Chamber -40/+80 Grad						•		
276         DC-Block         Model 7006 (SMA)         C7061         Weinschel         pre-m         2           279         power divider         1515 (SMA)         LH855         Weinschel         pre-m         2           287         pre-amplifier 2SMHz - 4GHz         AMF-2D-100M4G-35-10P         379418         Miteq         12 M         1c         31.07           291         high pass filter GSM 850/900         WHJ 2200-4EE         14         Wainwright GmbH         12 M         1c         31.07           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         12 M         -         30.04           301         attenuator (20 dB) 50W, 18GHz         47-20-33         AW0272         Lucas Weinschel         pre-m         2         30.04         31.02         30.04         31.02         30.04         31.02         30.04         31.02         30.04         31.02         30.04         31.02         30.04         31.02         30.04         31.02         30.04         31.02         30.04         31.02         30.01         31.02         30.04			· · · /			•		
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         31.07           291         high pass filter GSM 850/900         WHJ 2200-4EE         14         Wainwright GmbH         12 M         1c         31.07           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         12 M         -         30.04           301         attenuator (20 dB) 50W, 18GHz         47-20-33         AW0272         Lucas Weinschel         pre-m         2           302         horn antenna 40 GHz (Meas 1)         BBHA9170         156         Schwarzbeck         36 M         -         31.07           303         horn antenna 40 GHz (Meas 1)         BBHA9170         156         Schwarzbeck         36 M         -         31.07           311         Digital Multimeter         Fluke 112         81650455         Fluke         24 M         -         31.07           347         labora								
287         pre-amplifier 25MHz - 4GHz         AMF-2D-100M4G-35-10P         379418         Miteq         12 M         1c         31.07           291         high pass filter GSM 850/900         WHJ 2200-4EE         14         Wainwright GmbH         12 M         1c         31.07           298         Univ. Radio Communication Tester         CMU 200         832221/091         Rohde & Schwarz         pre-m         3           300         AC LISN (50 Ohn/50µH, 1-phase)         ESH3-Z5         892 239/020         Rohde & Schwarz         12 M         -         30.04           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         -         31.07           303         horn antenna 40 GHz (Subst 1)         BBHA9170         156         Schwarzbeck         36 M         -         31.07           3141         Digital Multimeter         Voltcraft M-4660A         IB 255466         Voltcraft         24 M         -         30.04           324         laboratory site         radio lab.         -         -         -         5         5           348 <td></td> <td></td> <td>· · · · ·</td> <td></td> <td></td> <td>•</td> <td></td> <td>┢─────┨</td>			· · · · ·			•		┢─────┨
291         high pass filter GSM 850/900         WHJ 2200-4EE         14         Wainwright GmbH         12 M         1c         31.07           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         12 M         -         30.0           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         -         31.07           303         horn antenna 40 GHz (Subst 1)         BBHA9170         156         Schwarzbeck         36 M         -         31.07           311         Climatic Test Chamber -40/+80 Grad         HC 4055         43146         Heraeus Vötsch         24 M         -         30.0           342         Digital Multimeter         Fluke 112         81650455         Fluke         24 M         -         31.07           342         Iaboratory site         radio lab.         -         -         -         -         5         -         -         -<		1				1		21.07.0017
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         12 M         -         30.0           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         -         31.0           303         horn antenna 40 GHz (Subst 1)         BBHA9170         156         Schwarzbeck         36 M         -         31.0           311         Climatic Test Chamber -40/+80 Grad         HC 4055         43146         Heraeus Vötsch         24 M         -         30.0           341         Digital Multimeter         Voltcraft M-4660A         IB 255466         Voltcraft         24 M         -         31.0           342         Digital Multimeter         Voltcraft M-4600A         IB 255466         Voltcraft         24 M         -         30.0           343         laboratory site         EMI conducted         -         -         -         5         5           354								31.07.2015
300         AC LISN (50 Ohm/50µH, 1-phase)         ESH3-Z5         892 239/020         Rohde & Schwarz         12 M         -         30.0           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         -         31.0           303         horn antenna 40 GHz (Subst 1)         BBHA9170         156         Schwarzbeck         36 M         -         31.0           311         Climatic Test Chamber -40/+80 Grad         HC 4055         43146         Heraeus Vötsch         24 M         -         30.1           341         Digital Multimeter         Fluke 112         81650455         Fluke         24 M         -         30.0           342         Digital Multimeter         Voltcraft M-4660A         IB 255466         Voltcraft         24 M         -         30.0           344         laboratory site         radio lab.         -         -         -         5            354         DC - Power Supply 40A         NGFE 40/40         448         Rohde & Schwarz         24 M         -         31.0           355         pow					ě			31.07.2015
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           303         horn antenna 40 GHz (Subst 1)         BBHA9170         156         Schwarzbeck         36 M         -         31.03           311         Climatic Test Chamber -40/+80 Grad         HC 4055         43146         Heraeus Vötsch         24 M         -         30.01           341         Digital Multimeter         Fluke 112         81650455         Fluke         24 M         -         30.02           342         Digital Multimeter         Voltcraft M-4660A         IB 255466         Voltcraft         24 M         -         30.02           343         laboratory site         radio lab.         -         -         -         -         5         5           344         laboratory site         EMI conducted         -         -         -         5         5           354         DC - Power Supply 40A         NGPE 40/40         448         Rohde & Schwarz         24 M         -         31.02           355         power sensor <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td>						-		
302         horn antenna 40 GHz (Meas 1)         BBHA9170         155         Schwarzbeck         36 M         -         31.03           303         horn antenna 40 GHz (Subst 1)         BBHA9170         156         Schwarzbeck         36 M         -         31.03           331         Climatic Test Chamber -40/+80 Grad         HC 4055         43146         Heraeus Vötsch         24 M         -         30.13           341         Digital Multimeter         Fluke 112         81650455         Fluke         24 M         -         30.04           342         Digital Multimeter         Voltcraft M-4660A         IB 255466         Voltcraft         24 M         -         30.04           347         laboratory site         radio lab.         -         -         -         5         -           354         DC - Power Supply 40A         NGPE 40/40         448         Rohde & Schwarz         24 M         -         31.02           355         Power Meter         URV 5         891310/027         Rohde & Schwarz         24 M         -         31.02           356         power sensor         NRV-Z1         882322/014         Rohde & Schwarz         24 M         -         31.02           357         power senso								30.04.2016
303         horn antenna 40 GHz (Subst 1)         BBHA9170         156         Schwarzbeck         36 M         -         31.02           331         Climatic Test Chamber -40/+80 Grad         HC 4055         43146         Heraeus Vötsch         24 M         -         30.11           341         Digital Multimeter         Fluke 112         81650455         Fluke         24 M         -         31.02           342         Digital Multimeter         Voltcraft M-4660A         IB 255466         Voltcraft         24 M         -         30.04           347         laboratory site         radio lab.         -         -         -         5         -           348         laboratory site         EMI conducted         -         -         -         5         -           354         DC - Power Supply 40A         NGPE 40/40         448         Rohde & Schwarz         24 M         -         31.02           355         Power Meter         URV 5         891310/027         Rohde & Schwarz         24 M         -         31.02           356         power sensor         NRV-Z1         882322/014         Rohde & Schwarz         24 M         -         31.02           357         power sensor         NRV-Z1<						-		
331       Climatic Test Chamber -40/+80 Grad       HC 4055       43146       Heraeus Vötsch       24 M       -       30.1         341       Digital Multimeter       Fluke 112       81650455       Fluke       24 M       -       31.0         342       Digital Multimeter       Voltcraft M-4660A       IB 255466       Voltcraft       24 M       -       30.0         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       -       31.0         356       power sensor       NRV-Z1       882322/014       Rohde & Schwarz       24 M       -       31.0         371       Bluetooth Tester       CBT32       100153       R&S       24 M       -       30.0         373       Single-Line V-Network (50 Ohm/5µH)       ESH3-Z6       100535       Rohde & Schwarz       12 M       -       30.0         389<							-	31.03.2017
341       Digital Multimeter       Fluke 112       81650455       Fluke       24 M       -       31.02         342       Digital Multimeter       Voltcraft M-4660A       IB 255466       Voltcraft       24 M       -       30.04         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       -       31.02         356       power sensor       NRV-Z1       882322/014       Rohde & Schwarz       24 M       -       31.02         357       power sensor       NRV-Z1       861761/002       Rohde & Schwarz       24 M       -       31.02         371       Bluetooth Tester       CBT32       100153       R&S       24 M       -       30.04         377       EMI Test Receiver       ESCS 30       100160       Rohde & Schwarz       12 M       -       30.04         392       Radio Communication Tester <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td>31.03.2017</td>							-	31.03.2017
342       Digital Multimeter       Voltcraft M-4660A       IB 255466       Voltcraft       24 M       -       30.04         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       -       31.02         356       power sensor       NRV-Z1       882322/014       Rohde & Schwarz       24 M       -       31.02         357       power sensor       NRV-Z1       881761/002       Rohde & Schwarz       24 M       -       31.02         371       Bluetooth Tester       CBT32       100153       R&S       24 M       -       31.02         377       EMI Test Receiver       ESCS 30       100160       Rohde & Schwarz       12 M       -       30.04         389       Digital Multimeter       Keithley 2000       0583926       Keithley       24 M       -       30.04         392       Radio Communication Tester       MT8820A							-	30.11.2014
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       -       31.02         356       power sensor       NRV-Z1       882322/014       Rohde & Schwarz       24 M       -       31.02         357       power sensor       NRV-Z1       882322/014       Rohde & Schwarz       24 M       -       31.02         357       power sensor       NRV-Z1       861761/002       Rohde & Schwarz       24 M       -       31.02         371       Bluetooth Tester       CBT32       100153       R&S       24 M       -       30.04         377       EMI Test Receiver       ESCS 30       100160       Rohde & Schwarz       12 M       -       30.04         389       Digital Multimeter       Keithley 2000       0583926       Keithley       24 M       -       30.04         392       Radio Communication Tester       MT8820A       6K00000788       Anritsu </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>-</td> <td>31.03.2016 30.04.2017</td>							-	31.03.2016 30.04.2017
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         -         31.02           356         power sensor         NRV-Z1         882322/014         Rohde & Schwarz         24 M         -         31.02           357         power sensor         NRV-Z1         882322/014         Rohde & Schwarz         24 M         -         31.02           357         power sensor         NRV-Z1         861761/002         Rohde & Schwarz         24 M         -         31.02           371         Bluetooth Tester         CBT32         100153         R&S         24 M         -         30.04           377         EMI Test Receiver         ESCS 30         100160         Rohde & Schwarz         12 M         -         30.04           389         Digital Multimeter         Keithley 2000         0583926         Keithley         24 M         -         30.04           392         Radio Communication Tester         MT8820A         6K00000788         Anritsu				ID 253400	volician	24 IVI	-	50.04.2017
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         -         31.02           356         power sensor         NRV-Z1         882322/014         Rohde & Schwarz         24 M         -         31.02           357         power sensor         NRV-Z1         882322/014         Rohde & Schwarz         24 M         -         31.02           357         power sensor         NRV-Z1         861761/002         Rohde & Schwarz         24 M         -         30.02           371         Bluetooth Tester         CBT32         100153         R&S         24 M         -         30.02           373         Single-Line V-Network (50 Ohm/5µH)         ESH3-Z6         100535         Rohde & Schwarz         24 M         -         30.02           377         EMI Test Receiver         ESCS 30         100160         Rohde & Schwarz         12 M         -         30.02           389         Digital Multimeter         Keithley 2000         0583926         Keithley         24 M         -         30.02           392         Radio Communication Tester				-	-	-		
355         Power Meter         URV 5         891310/027         Rohde & Schwarz         24 M         -         31.02           356         power sensor         NRV-Z1         882322/014         Rohde & Schwarz         24 M         -         31.02           357         power sensor         NRV-Z1         882322/014         Rohde & Schwarz         24 M         -         31.02           357         power sensor         NRV-Z1         861761/002         Rohde & Schwarz         24 M         -         30.02           371         Bluetooth Tester         CBT32         100153         R&S         24 M         -         30.02           373         Single-Line V-Network (50 Ohm/5µH)         ESH3-Z6         100535         Rohde & Schwarz         24 M         -         30.02           377         EMI Test Receiver         ESCS 30         100160         Rohde & Schwarz         12 M         -         30.02           389         Digital Multimeter         Keithley 2000         0583926         Keithley         24 M         -         30.02           392         Radio Communication Tester         MT8820A         6K00000788         Anritsu         12 M         -         30.02           431         Model 7405					- Dahda & Cal	-		<u> </u>
356         power sensor         NRV-Z1         882322/014         Rohde & Schwarz         24 M         -         31.03           357         power sensor         NRV-Z1         861761/002         Rohde & Schwarz         24 M         -         30.04           371         Bluetooth Tester         CBT32         100153         R&S         24 M         -         31.02           373         Single-Line V-Network (50 Ohm/5µH)         ESH3-Z6         100535         Rohde & Schwarz         24 M         -         30.04           377         EMI Test Receiver         ESCS 30         100160         Rohde & Schwarz         12 M         -         30.04           389         Digital Multimeter         Keithley 2000         0583926         Keithley         24 M         -         30.04           392         Radio Communication Tester         MT8820A         6K00000788         Anritsu         12 M         -         30.04           431         Model 7405         Near-Field Probe Set         9305-2457         EMCO         -         4           436         Univ. Radio Communication Tester         CMU 200         103083         Rohde & Schwarz         12 M         -         30.04						-	2	21.02.201.5
357         power sensor         NRV-Z1         861761/002         Rohde & Schwarz         24 M         -         30.04           371         Bluetooth Tester         CBT32         100153         R&S         24 M         -         31.02           373         Single-Line V-Network (50 Ohm/5µH)         ESH3-Z6         100535         Rohde & Schwarz         24 M         -         30.04           377         EMI Test Receiver         ESCS 30         100160         Rohde & Schwarz         12 M         -         30.04           389         Digital Multimeter         Keithley 2000         0583926         Keithley         24 M         -         30.04           392         Radio Communication Tester         MT8820A         6K00000788         Anritsu         12 M         -         30.04           431         Model 7405         Near-Field Probe Set         9305-2457         EMCO         -         4           436         Univ. Radio Communication Tester         CMU 200         103083         Rohde & Schwarz         12 M         -         30.04							-	31.03.2016
371         Bluetooth Tester         CBT32         100153         R&S         24 M         -         31.03           373         Single-Line V-Network (50 Ohm/5µH)         ESH3-Z6         100535         Rohde & Schwarz         24 M         -         30.04           377         EMI Test Receiver         ESCS 30         100160         Rohde & Schwarz         12 M         -         30.04           389         Digital Multimeter         Keithley 2000         0583926         Keithley         24 M         -         30.04           392         Radio Communication Tester         MT8820A         6K00000788         Anritsu         12 M         -         30.04           431         Model 7405         Near-Field Probe Set         9305-2457         EMCO         -         4           436         Univ. Radio Communication Tester         CMU 200         103083         Rohde & Schwarz         12 M         -         30.04		•					-	31.03.2015
373         Single-Line V-Network (50 Ohm/5µH)         ESH3-Z6         100535         Rohde & Schwarz         24 M         -         30.04           377         EMI Test Receiver         ESCS 30         100160         Rohde & Schwarz         12 M         -         30.04           389         Digital Multimeter         Keithley 2000         0583926         Keithley         24 M         -         30.04           392         Radio Communication Tester         MT8820A         6K00000788         Anritsu         12 M         -         30.04           431         Model 7405         Near-Field Probe Set         9305-2457         EMCO         -         4           436         Univ. Radio Communication Tester         CMU 200         103083         Rohde & Schwarz         12 M         -         30.04		•					-	30.04.2017 31.03.2016
377         EMI Test Receiver         ESCS 30         100160         Rohde & Schwarz         12 M         -         30.04           389         Digital Multimeter         Keithley 2000         0583926         Keithley         24 M         -         30.04           392         Radio Communication Tester         MT8820A         6K00000788         Anritsu         12 M         -         30.04           431         Model 7405         Near-Field Probe Set         9305-2457         EMCO         -         4           436         Univ. Radio Communication Tester         CMU 200         103083         Rohde & Schwarz         12 M         -         30.04							-	30.04.2017
389         Digital Multimeter         Keithley 2000         0583926         Keithley         24 M         -         30.04           392         Radio Communication Tester         MT8820A         6K00000788         Anritsu         12 M         -         30.04           431         Model 7405         Near-Field Probe Set         9305-2457         EMCO         -         4           436         Univ. Radio Communication Tester         CMU 200         103083         Rohde & Schwarz         12 M         -         30.04		-					-	
392         Radio Communication Tester         MT8820A         6K0000788         Anritsu         12 M         -         30.04           431         Model 7405         Near-Field Probe Set         9305-2457         EMCO         -         4           436         Univ. Radio Communication Tester         CMU 200         103083         Rohde & Schwarz         12 M         -         30.04							-	30.04.2016 30.04.2017
431         Model 7405         Near-Field Probe Set         9305-2457         EMCO         -         4           436         Univ. Radio Communication Tester         CMU 200         103083         Rohde & Schwarz         12 M         -         30.04								30.04.2017
436         Univ. Radio Communication Tester         CMU 200         103083         Rohde & Schwarz         12 M         -         30.04								30.04.2010
						12 M		30.04.2016
10/ Childs Fillenna 112 502 100240 Kolide & Schwarz 50 M - 51.0.							-	31.03.2017
441 CTC-SAR-EMI Cable Loss System EMI field (SAR) - CETECOM 12 M 5 30.01							5	30.01.2016



RSE         CEPECOM         CEPECOM           444         notch filter WCDMA_FDD II         %KCT 1850.02170.0- 5         5         GmbH           444         notch filter WCDMA FDD V         %KCT 824.0894.0-5.40- 1         1         Wainwright Instruments GmbH         1           454         Oxcilloscope         HM 205.3         9210 P 29661         Haneg         -           456         DC-Power supply 0-5 A         EA X013 S         207810         Elektro Automatik         1           450         DC-Power supply 0-5 A         A.0.32 V         EA-PS 203.2-0         910722         Elektro Automatik         1           460         Liniv. Radio Communication Tester         CRU 200         108801         Rohe & Schwarz         1           463         Digital Multimeter         Fluke 112         8906036         Fluke 118.4         1           464         Digital Multimeter         Fluke 112         806036         Fluke USA         2           471         Rekafading GPS System         AS47         -         Automotive Cons. Fluk         1           486         Enter matrix SA 1         -         CETECOM (BrI)         4           487         Pa-anglifier 2.5 - 18 GHz         J0P         1244554         Miteq         1 <th>Interval of calibration</th> <th>Remark</th> <th>Cal due</th>	Interval of calibration	Remark	Cal due
448         noch filter WCDMA_FDD II         WRCT 1850.02170.0- 5         5         Wainwright           449         noch filter WCDMA FDD V         885K         Watter 24.0394.0.540- 1         Wainwright         I           454         Oscilloscope         HM 205.3         2210 P 29661         Haneg         I           455         DC-Power supply 0.5 A         EA 3013 S         207810         Elektro Automatik         I           461         Universal communication Tester         CHU 200         108901         Rohde & Schwarz         I           462         Universal source         Flude 112         89080206         Fluke USA         2           463         Dipital Multimeter         Flude 112         89080206         Fluke USA         2           478         Rokadating GPS System         AS-47         -         Automative Cons. Fluk         1           480         power meter (Hula)         NRVS         818392/031         Rohde & Schwarz         1           481         pre-amplifer 2.5 18 GHz         GME         -         CETRCOM (Be)         2           483         power meter (Hula)         NWCG 324849.814829.         SN 5         Wainwright         1           484         System CTC NSA-Verification SAR-EMI	12 M	5	31.07.2015
449         Inch filler WCDAR FDD V         858K         1         Wanwright         1           454         Oscilloscope         HM 205-3         9210 P 29661         Hameg         1           455         DC-Power supply 0-5 A         EA APS 202-50         910722         Elektro Automatik         1           450         DUriversal source         HP3245A         2831A03472         Agilent         -           461         Digital Multimeter         Fluke 112         8960306         Fluke USA         2           462         Digital Multimeter         Fluke 112         9090455         Fluke USA         2           477         Rekadiating GPS-System         AS-47         -         Automotive Cons. Fluk         12           480         pover metry (Fulu)         NEVS         83382031         Rohde & Schwarz         1           482         filter matrix         Filter matrix SAR 1         -         CETECOM (Br)         2           484         system CT NSA-Verification SAR-EMI         System CT	12 M	1c	31.07.2015
156         DC-Power supply 0-5 A         EA APS 2032-50         910722         Elektro Automatik         I           459         DC-Power supply 0-5 A         0-32 V         EA-PS 2032-50         910722         Elektro Automatik         I           460         Univ. Radio Communication Tester         CMU 200         118901         Rohde & Schwarz         I           461         Digital Multimeter         Fluke 112         89201057         Fluke USA         2           463         Digital Multimeter         Fluke 112         9090455         Fluke USA         2           470         Readiating GPS-System         AS-47         -         Automotive Cons. Fink         3           480         poier metric (Pula)         NRVS         838320031         Rohde & Schwarz         1           481         pre-amplifier 2.5 · 18 GHz         IOP         1024554         Mieq         1           478         System CT NSA-Verification SAR-EMI         System CT NSA-Verification SAR-EMI         System CT NSA-Verification SAR-EMI         NSA           479         Edit Test Endegret         10991796         SN 9         Wainwright         1           512         notch filter GSM 880         @EEE K         SN 5         Wainwright         1	12 M	1c	31.07.2015
159         DC: Power supply 0:5 A, 0-32 V         EA-PS 2032:50         910722         Elektron Automatik           460         Univ, Radio Communication Tester         CNU 200         108901         Rohde & Schwarz         1           461         Universal source         HP3245A         2831A03472         Agilent         -           466         Digital Multimeter         Fluke 112         8860306         Fluke USA         2           467         ReRafinging GPS-System         AS-47         -         -         Automotive Cons. Fink           478         ReRafinging GPS-System         AS-47         -         Automotive Cons. Fink         4           478         Restanting GPS-System         AS-47         -         CETECOM (Br)         4           478         Right matrix         Filter matrix SAR I         -         CETECOM (Cons. Fink         4           478         System CTC NSA-Verification SAR-EMI         System EMI field (SAR)         -         CETECOM (2         5           502         band reject filter         IGM/9/1766-         SN 9         Wainwright         1           512         notch filter GSM 850         WRCA 82/449-814/89-S         SN 5         Wainwright         1           512         bald roband resis	-	4	
160         Univ. Radio Communication Tester         CMU 200         108901         Rohde & Schwarz           163         Universal source         HP3245A         2831A03472         Agilent           164         Universal source         HP3245A         2831A03472         Agilent           164         Digital Multimeter         Fluke 112         89680306         Fluke USA         7           165         Digital Multimeter         Fluke 112         90090455         Fluke USA         7           164         Digital Multimeter         Fluke 112         90090455         Fluke USA         7           167         Rekaditing GFS-System         AS-47         -         Autonotive Cons. Fluk         4           168         pover meter (Fula)         NRVS         88392031         Rohde & Schwarz         2           168         EMI Test Receiver         ESU40         1000-30         Rohde & Schwarz         2           169         Test Receiver         ESU40         1000-30         Rohde & Schwarz         1           171         Fluke matrix         HF Relais Box Keithley         SN 5         Wainwright         1           171         relais swich matrix         HF Relais Box Keithley         SN 24         Wainwright	pre-m	2	
463         Universal source         HP245A         2831A03472         Aglent           466         Digital Multimeter         Fluke 112         89210157         Fluke USA         2           467         Digital Multimeter         Fluke 112         8960306         Fluke USA         2           468         Digital Multimeter         Fluke 112         90090455         Fluke USA         2           477         ReRading GPS-System         AS-47         -         Automotive Cons. Fink         2           480         power meter (Flula)         NR VS         838392031         Rohde & Schwarz         2           481         filter matrix         Fliter matrix SAR 1         -         CETECOM (Br)         4           482         filter matrix         System EMI field (SAR)         -         EETECOM (Br)         4           483         system CTC NSA-Verification SAR-EM         NSA         -         CETECOM (Br)         1           502         band reject filter         WRCG 1709/1786-         SN 9         Wainwright         1           512         noch filter GSM 850         GEE K         SN 5         Wainwright         1           523         fult Broadband resistive power divider         Hef Relias Box Keithley	pre-m	2	
166         Digital Multimeter         Fluke 112         89210137         Fluke USA         1           167         Digital Multimeter         Fluke 112         89680306         Fluke USA         1           168         Digital Multimeter         Fluke 112         90090455         Fluke USA         1           167         ReRadiating OPS-System         AS-47         -         Automotive Cons. Fink         4           480         power meter (Fula)         NRVS         83892/031         Rohde & Schwarz         4           480         power meter (Fula)         NRVS         83892/031         Rohde & Schwarz         1           481         pre-amplifier 2,5 - 18 GHz         MF-SD-O2051800.25-         1244554         Miteq         1           487         System CTC NSA-Verification SAR-EMI         System EMI field (SAR)         -         CETECOM         2           502         bad reject filter         WRC0 1709/1786-         SN 9         Wainwright         1           512         notch filter GSM 850         GEEK         SN 24         Wainwright         1           512         noich Multimeter         L4411A         MY46000154         Agilent         2           520         fold Multimeter         HF Relais	12 M	-	30.04.2016
467         Digital Multimeter         Fluke 112         \$96603066         Fluke USA         1           468         Digital Multimeter         Fluke 112         90090455         Fluke USA         1           477         ReRadiating GPS-System         AS-47         -         Automotive Cons. Fink.         1           480         power meter (Fula)         NRVS         \$83892031         Rohde & Schwarz         2           481         flort matrix         Filter matrix SAR 1         -         CETECOM (Brl)         -           482         filter matrix         AMF-SD-02501800-22-         1244554         Miteq         1           483         System CTC NSA-Verification SAR-EMI         System EMI field (SAR)         -         CETECOM (Brl)         -           489         EMI Test Receiver         ESU40         1000-30         Rohde & Schwarz         1           502         band reject filter         WRCA 80096-00240-         SN 5         Wainwright         1           512         notch filter GSM 850         WRCA 80096-00240-         SN 24         Wainwright         1           512         notch filter GSM 850         WRCA 80096-00240-         SN 24         Wainwright         1           512         notch filter GSM 85	-	4	
468Digital MultimeterFluke 11290000455Fluke USA477ReRadiating GPS SystemAS 47-Automotive Cons. Fink480pover meter (Fula)NRVS838392.031Rohde & Schwarz482filter matrixFilter matrix SAR 1-CETECOM (Brl)484pre-amplifier 2.5 - 18 GHzAMF-5D 02501800-25-1244554Miteq487System CTC NSA-Verification SAR-EMISystem EMI field (SAR)-ETTS Lindgren /488EMI Test ReceiverESU401000-30Rohde & Schwarz502band reject filterWRCG 1700/1786-SN 9Wainwright1512noch filter GSM 850WRCA 800960-0240-SN 24Wainwright1512noch filter GSM 850WRCA 800960-0240-SN 24Wainwright1523Digital MultimeterL4411AMY 44000154Agilent2523Digital MultimeterCMU 200106436R&S153010 dB Broadband resistive power dividerModel 1515LH 855Weinschel1541Univ. Radio Communication TesterCMU 200185390014Rohde & Schwarz5542Ligg Per-AntennaHL0251000000Rohde & Schwarz5543System CTC GTA-2R&S75891-CTC2544Spectrum AnalyzerFSU 8100248Rohde & Schwarz5545System CTC GTA-2R&S75891-CTC2546Spectrum AnalyzerF	24 M	-	31.03.2016
177       ReRadiating GPS System       AS 4-7       -       Automotive Cons. Fink.         480       power meter (Fula)       NRVS       838392/031       Rohde & Schwarz         482       filter matrix       Filter matrix SAR 1       -       CETECOM (Bri)         484       pre-amplifier 2,5 - 18 GHz       AMF-SD-02501800-25-       1244554       Miteq       I         487       System CTC NSA-Verification SAR-EMI       System EMI field (SAR)       -       CETECOM       2         489       EMI Test Receiver       ESU40       1000-30       Rohde & Schwarz       1         502       band reject filter       WRCC 1709/1786-       SN 9       Wainwright       1         512       notch filter GSM 850       WRCA 800960-02-40-       SN 24       Wainwright       1         512       notch filter GSM 850       WRCA 800960-02-40-       SN 24       Wainwright       1         529       6 dB Broadband resistive power divider       Model 1515       LH 855       Weinschel       1         530       10 dB Broadband resistive power divider       R 416110000       LOT 982.8       -       1         540       Univ. Radio Communication Tester       CMU 200       835390014       Rohde & Schwarz       1	36 M	-	30.04.2018
180       power meter (Fula)       NRVS       838392.031       Rohde & Schwarz       2         482       filter matrix       Filter matrix SAR 1       -       CETECOM (Br)       -         484       pre-amplifier 2,5 - 18 GHz       AMF-5D-02501800-25-       1244554       Miteq       1         487       System CTC NSA-Verification SAR-EMI       System EMI field (SAR)       -       CETECOM       2         488       EMI Test Receiver       ESU40       1000-30       Rohde & Schwarz       1         503       band reject filter       WRCG 1709/1786-       SN 9       Wainwright       1         512       notch filter GSM 850       WRCA 824/849-814/859-       SN 5       Wainwright       1         512       notch filter GSM 850       WRCA 800/960-02/40-       SN 24       Wainwright       1         523       Digital Multimeter       L4411A       MY4600154       Agilent       2         524       B Broadband resistive power divider       Model 1515       LH 855       Weinschel       1         530       10 dB Broadband resistive power divider       CMU 200       83390/014       Rohde & Schwarz       2         544       Univ. Radio Communication Tester       CMU 200       833390/014       Rohde	36 M	- 3	30.04.2018
482       filter matrix       Filter matrix SAR 1       CETECOM (Brl)         484       pre-amplifier 2,5 - 18 GHz       AMF-5D-02501800-25- 10P       1244554       Miteq       1         487       System CTC NSA-Verification SAR-EMI       System EMI field (SAR)       CETECOM       CETECOM         488       EMI Test Receiver       ESU40       1000-30       Rohde & Schwarz       1         502       band reject filter       WRCG 1709/1786- 1099/1796-       SN 9       Wainwright       1         503       band reject filter       WRCG 824849-914359-       SN 5       Wainwright       1         512       noch filter GSM 850       GEEK       SE 04       Keithley       1         512       noch filter GSM 850       GEEK       SE 04       Keithley       1         526       64B Broadband resistive power divider       R 416110000       LOT 9828       -       1         530       10 dB Broadband resistive power divider       R 416110000       LOT 9828       -       1         540       Univ. Radio Communication Tester       CMU 200       835300014       Rohde & Schwarz       1         543       biginal-Barometer       GBP 2300       without       Greisinger GmbH       2         544	- 24 M	-	20.04.2017
484 Pre-amplifier 2, 5 - 18 GHzAMF-5D-02501800-25- 10P1244554Miteq1478System CTC NSA-Verification SAR-EMI NSASystem EMI field (SAR) NSAETS Lindgren / CETECOM478EMI Test ReceiverESU401000-30Rohde & Schwarz1502band reject filterWRCG 1709/1786- 1099/1796-SN 9Wainwright1503band reject filterWRCG 824/849-814/859- 6EEKSN 5Wainwright1512notch filter GSM 850WRCA 800 960-0240- 6EEKSN 24Wainwright1512notch filter GSM 850MRCA 800 960-0240- 6EEKSN 24Wainwright1520joild MultimeterL4411AMY40000154Agilent253010 dB Broadband resistive power dividerModel 1515LH 855Weinschel1541Univ. Radio Communication TesterCMU 200106436R&S1542Univ. Radio Communication TesterCMU 200835390014Rohde & Schwarz2543high ass filter 2,8-18GHzWHX 2,8/18G-10854Wainwright1544Lug-Per-AntennaHL0251000060Rohde & Schwarz1545System CTC FAR S-VSWRSystem CTC FAR S- VSWRCTC22545System CTC FAR S-VSWRSystem CTC FAR S- VSWRCTC22545System CTC FAR S-VSWRSystem CTC FAR S- VSWRCTC22545System CTC FAR S-VSWR	24 M	- 1d	30.04.2017
487         System CTC NSA-Verification SAR-EMI         System EMI field (SAR) NSA         -         ETS Lindgren / CETECOM         2           489         EMI Test Receiver         ESU40         1000-30         Rohde & Schwarz         1           502         band reject filter         WRCG 1709/1786- 1699/1796-         SN 9         Wainwright         1           503         band reject filter         WRCG 824/849-814/859- MRCA 800/960-0240- GEEK         SN 24         Wainwright         1           512         notch filter GSM 850         WRCA 800/960-0240- GEEK         SN 24         Wainwright         1           523         Digital Multimeter         L4411A         MY46000154         Agient         2           526         GB Broadband resistive power divider         Mdel 1515         LH 855         Weinschel         1           530         10 dB Broadband resistive power divider         CMU 200         1064363         R&8         1           544         Univ. Radio Communication Tester         CMU 200         835390/014         Rohde & Schwarz         2           545         Digital-Barometer         GBP 2300         without         Greisinger GmbH         2           557         System CTC OTA-2         R&8 T88991         -         Rohde & Schwarz	- 12 M	-	31.07.2015
489       EMI Test Receiver       ESU40       1000-30       Rohde & Schwarz       1         502       band reject filter       WRCG 1709/1786- 1699/1796-       SN 9       Wainwright       1         503       band reject filter       WRCG 8247849-814/859-       SN 5       Wainwright       1         511       notch filter GSM 850       WRCG 8247849-814/859-       SN 5       Wainwright       1         512       notch filter GSM 850       WRCG 8247849-814/859-       SN 24       Wainwright       1         521       pigital Multimeter       L4411A       MY46000154       Agilent       2         522       6 dB Broadband resistive power divider       Model 1515       LH 855       Weinschel       1         530       10 dB Broadband resistive power divider       CMU 200       106436       R&S       1         544       Univ. Radio Communication Tester       CMU 200       106436       R&S       1         544       bigital-Barometer       GBP 2300       without       Greisinger GmbH       2         552       high pass filter 2,8-18GH2       WHKX 2,8/18G-10SS       4       Wainwright       1         553       System CTC FAR S- VSWR       System CTC FAR S- VSWR       -       CTC       2	24 M	-	30.06.2015
502         band reject filter         1699/1796.         SN 9         Wainwright         1           503         band reject filter         WRCG 824/849-814/859-         SN 5         Wainwright         1           512         notch filter GSM 850         WRCA 800/960/02/40- GEEK         SN 24         Wainwright         1           517         relais switch matrix         HF Relais Box Keithley         SE 04         Keithley         1           520         6 dB Broadband resistive power divider         L4411A         MY46000154         Agilent         2           530         10 dB Broadband resistive power divider         R 416110000         LOT 9828         -         1           541         Univ. Radio Communication Tester         CMU 200         1835390/014         Rohde & Schwarz         1           542         Jug.Per-Antenna         HL025         1000060         Rohde & Schwarz         1           543         System CTC CTA-2         R & ST88991         -         Rohde & Schwarz         1           544         Bionilog Hybrid Antenna         BTA-1         980026L         Frankonia         2           545         System CTC FAR S- VSWR         System CTC FAR S- VSWR         CTC C         2           547         Biconil	12 M	-	30.04.2016
112         notch filter GSM 850         WRCA 800'960-02/40- GEEK         SN 24         Wainwrght           517         relais switch matrix         HF Relais Box Keithley         SE 04         Keithley         I           529         6 dB Broadband resistive power divider         L4411A         MY46000154         Agilent         I           530         10 dB Broadband resistive power divider         R 416110000         LOT 9828         -         I           546         Univ. Radio Communication Tester         CMU 200         106436         R&S         I           547         Univ. Radio Communication Tester         CMU 200         835390014         Rohde & Schwarz         I           548         Digital-Barometer         GBP 2300         without         Greisinger GmbH         I           551         high pass filter 2,8-18GHz         WHKX 2.8/18G-10SS         4         Wainwright         I           557         System CTC FAR S-VSWR         System CTC FAR S-         CTC         I         CT         I           574         Biconilog Hybrid Antenna         BTA-L         980026L         Frankonia         I           574         Biconilog Hybrid Antenna         BTA-L         980026L         Frankonia         I           597<	pre-m	2	
512         notch fuler GSM 850         6EEK         SN 24         Wauwrght         I           517         relais switch matrix         HF Relais Box Keithley         SE 04         Keithley         I           523         Digital Multimeter         L411A         MY46000154         Agilent         2           529         6 dB Broadband resistive power divider         Model 1515         LH 855         Weinschel         1           530         10 dB Broadband resistive power divider         R 416110000         LOT 9828         -         -           544         Univ. Radio Communication Tester         CMU 200         835390/014         Rohde & Schwarz         1           544         Digital-Barometer         GBP 2300         without         Greisinger GmbH         2           552         high pass filter 2,8-18GHz         WHKX 2,8/18G-10SS         4         Wainwright         1           557         System CTC FAR S- VSWR         System CTC FAR S-         -         CTC         2           568         System CTC FAR S- VSWR         System CTC FAR S-         -         CTC         2           574         Biconilog Hybrid Antenna         BTA-L         98002GL         Frankonia         2           584         Spectrum Ana	pre-m	2	
523         Digital Multimeter         L4411A         MY46000154         Agilent         4           529         6 dB Broadband resistive power divider         R 416110000         LOT 9828         -         -         1           530         10 dB Broadband resistive power divider         R 416110000         LOT 9828         -         -         1           540         Univ. Radio Communication Tester         CMU 200         835390/014         Rohde & Schwarz         1           541         Digital-Barometer         GBP 2300         without         Greisinger GmbH         2           542         Log.Per-Antenna         HL025         10000060         Rohde & Schwarz         1           553         System CTC OTA-2         R & St8991         -         Rohde & Schwarz         1           554         System CTC FAR S-VSWR         System CTC FAR S-         -         CTC         2           574         Biconilog Hybrid Antenna         BTA-L         980026L         Frankonia         2           584         Spectrum Analyzer         FSU 8         100248         Rohde & Schwarz         1           597         Univ. Radio Communication Tester         CMU 200         100347         Rohde & Schwarz         2	12 M	1c	31.07.2015
5296 dB Broadband resistive power dividerModel 1515LH 855Weinschel153010 dB Broadband resistive power dividerR 416110000LOT 9828-1546Univ. Radio Communication TesterCMU 200106436R&S1547Univ. Radio Communication TesterCMU 200835390/014Rohde & Schwarz1548Digital-BarometerGBP 2300withoutGreisinger GmbH5549Log.Per-AntennaHLO251000600Rohde & Schwarz15512high pass filter 2.8-18GHzWHKX 2.8/18G-10SS4Wainwright1557System CTC OTA-2R&S TS8991-Rohde & Schwarz1558System CTC FAR S-VSWRSystem CTC FAR SCTC2574Biconilog Hybrid AntennaBTA-L980026LFrankonia5584Spectrum AnalyzerFSU 8100248Rohde & Schwarz1594Wideband Radio Communication TesterCMU 200101757Rohde & Schwarz2601medium-sensitivity diode sensorNRV-Z5 (Reserve)8345501/018Rohde & Schwarz2601medium-sensitivity diode sensorNRV-Z3 (Reserve)835323/003Rohde & Schwarz2611DC power sensorNRV-Z3 (Reserve)835323/003Rohde & Schwarz2612DC power sensorNRV-Z3 (Reserve)835323/003Rohde & Schwarz2613AttenuatorR416120000 20dB 10WLot. 9828Radiall <td>pre-m 24 M</td> <td>2</td> <td>30.04.2017</td>	pre-m 24 M	2	30.04.2017
530         10 dB Broadband resistive power divider         R 416110000         LOT 9828         -         1           546         Univ. Radio Communication Tester         CMU 200         106436         R&S         1           547         Univ. Radio Communication Tester         CMU 200         835390/014         Rohde & Schwarz         1           548         Digital-Barometer         GBP 2300         without         Greisinger GmbH         1           559         high pass filter 2.8-18GHz         WHKX 2.8/18G-10SS         4         Wainwright         1           557         System CTC OTA-2         R&S TS8991         -         Rohde & Schwarz         1           578         System CTC FAR S-VSWR         System CTC FAR S-         CTC         2         1           584         Spectrum Analyzer         FSU 8         100248         Rohde & Schwarz         1           594         Wideband Radio Communication Tester         CMW 500         101757         Rohde & Schwarz         2           595         Spectrum Analyzer         FSEM 30 (Reserve)         834501/018         Rohde & Schwarz         2           600         nedium-sensitivity diode sensor         NRV-Z5 (Reserve)         834501/018         Rohde & Schwarz         2	pre-m	2	30.04.2017
546Univ. Radio Communication TesterCMU 200106436R&S547Univ. Radio Communication TesterCMU 200835390/014Rohde & Schwarz1548Digital-BarometerGBP 2300withoutGreisinger GmbH2549Log.Per-AntennaHL0251000060Rohde & Schwarz1551System CTC-OTA-2R&S TS8991-Rohde & Schwarz1552high pass filter 2.8-18GHzWHKX 2.8/18G-10SS4Wainwright1553System CTC-OTA-2R&S TS8991-Rohde & Schwarz1554System CTC-OTA-2R&S TS8991-CTC2554Biconilog Hybrid AntennaBTA-L980026LFrankonia2554Spectrum AnalyzerFSU 8100248Rohde & Schwarz1554Wideband Radio Communication TesterCMW 500101757Rohde & Schwarz2557Univ. Radio Communication TesterCMU 200100347Rohde & Schwarz2600power meterNRVD (Reserve)831259/013Rohde & Schwarz2601medium-sensitivity diode sensorNRV-Z32 (Reserve)83501/018Rohde & Schwarz2602peak power sensorNRV-Z32 (Reserve)835080Rohde & Schwarz2611DC power supplyE3632AKR 75305854Agilent1612DC power supplyE3632AMY 40001321Agilent1613AttenuatorR416120000 20dB 10WLor. 98	pre-m	2	
547         Univ. Radio Communication Tester         CMU 200         835390/014         Rohde & Schwarz         1           548         Digital-Barometer         GBP 2300         without         Greisinger GmbH         2           549         Log.Per-Antenna         HL025         1000060         Rohde & Schwarz         2           552         high pass filter 2,8-18GHz         WHKX 2.8/18G-10SS         4         Wainwright         1           557         System CTC-OTA-2         R&S TS8991         -         Rohde & Schwarz         1           558         System CTC FAR S-VSWR         System CTC FAR S-         CTC         2         2           574         Biconilog Hybrid Antenna         BTA-L         980026L         Frankonia         2           584         Spectrum Analyzer         FSU 8         100248         Rohde & Schwarz         1           594         Wideband Radio Communication Tester         CMU 200         100347         Rohde & Schwarz         2           597         Univ. Radio Communication Tester         CMU 200         100347         Rohde & Schwarz         2           600         pedium-sensitivity diode sensor         NRV-25 (Reserve)         834501/018         Rohde & Schwarz         2           601	12 M	-	30.04.2016
548Digital-BarometerGBP 2300withoutGreisinger GmbH1549Log.Per-AntennaHL0251000060Rohde & Schwarz1552high pass filter 2,8-18GHzWHKX 2,8/18G-10SS4Wainwright1557System CTC-OTA-2R&S TS8991-Rohde & Schwarz1558System CTC FAR S-VSWRSystem CTC FAR S- VSWR-CTC2574Biconilog Hybrid AntennaBTA-L980026LFrankonia1584Spectrum AnalyzerFSU 8100248Rohde & Schwarz1594Wideband Radio Communication TesterCMU 200100347Rohde & Schwarz1595Spectrum AnalyzerFSEM 30 (Reserve)831259/013Rohde & Schwarz2600power meterNRVD (Reserve)834501/018Rohde & Schwarz2601medium-sensitivity diode sensorNRV-Z3 (Reserve)835080Rohde & Schwarz2601power sensorNRV-Z32 (Reserve)835080Rohde & Schwarz2611DC power supplyE3632AMY 40001321Agilent1612DC power supplyE3632AMY 40001321Agilent1613AttenuatorR416120000 20dB 10WLot 9828Radiall1616DigitalmultimeterFluke 17788900339Fluke2617Power Splitter/CombinerZFSC-2-2-S+S 5987001108Mini Circuits-618Power Splitter/Combiner50PD-634	12 M	-	30.04.2016
549Log.Per-AntennaHL0251000060Rohde & Schwarz3552high pass filter 2,8-18GHzWHKX 2.8/18G-10SS4Wainwright1557System CTC-OTA-2R & STS8991-Rohde & Schwarz1558System CTC FAR S-VSWRSystem CTC FAR S- VSWR-CTC2574Biconilog Hybrid AntennaBTA-L980026LFrankonia3584Spectrum AnalyzerFSU 8100248Rohde & Schwarz1594Wideband Radio Communication TesterCMU 200100347Rohde & Schwarz2597Univ. Radio Communication TesterCMU 200100347Rohde & Schwarz2600power meterNRVD (Reserve)834501/018Rohde & Schwarz2601medium-sensitivity diode sensorNRV-Z3 (Reserve)834501/018Rohde & Schwarz2611DC power supplyE3632AKR 75305854Agilent1612DC power supplyE3632AMY 40001321Agilent1613AttenuatorR416120000 20dB 10WLot. 9828Radiall1616DigitalmultimeterFluke 17788900339Fluke2617Power Splitter/CombinerSOPD-634600994JFW Industries USA-618Power Splitter/CombinerSOPD-634600995JFW Industries, USA-620Edat AcceiverESU 26100362Rohde & Schwarz1620EM Test ReceiverESU 26100	36 M	-	30.06.2015
552high pass filter 2,8-18GHzWHKX 2.8/18G-10SS4Wainwright1557System CTC-OTA-2R&S TS8991-Rohde & Schwarz1558System CTC FAR S-VSWRSystem CTC FAR S- VSWR-CTC2574Biconilog Hybrid AntennaBTA-L980026LFrankonia3584Spectrum AnalyzerFSU 8100248Rohde & Schwarz1594Wideband Radio Communication TesterCMW 200100347Rohde & Schwarz3597Univ. Radio Communication TesterCMU 200100347Rohde & Schwarz2600power meterNRVD (Reserve)834501/018Rohde & Schwarz2601medium-sensitivity diode sensorNRV-Z5 (Reserve)8435323/003Rohde & Schwarz2602peak power sensorNRV-Z3 (Reserve)835080Rohde & Schwarz2611DC power supplyE3632AKR 75305854Agilent1612DC power supplyE3632AMY 40001321Agilent1613AttenuatorR416120000 20dB 10WLot. 9828Radiall1616DigitalmultimeterFluke 17788900339Fluke2617Power Splitter/CombinerSOPD-634600994JFW Industries USA6618Power Splitter/CombinerSOPD-634600995JFW Industries, USA6620EMI Test ReceiverESU 26100362Rohde & Schwarz1621Step Attenuator 0-139 dB <td>36/12 M</td> <td>-</td> <td>31.06.2015</td>	36/12 M	-	31.06.2015
558System CTC FAR S-VSWRSystem CTC FAR S- VSWR-CTC2574Biconilog Hybrid AntennaBTA-L980026LFrankonia3584Spectrum AnalyzerFSU 8100248Rohde & Schwarz1594Wideband Radio Communication TesterCMW 500101757Rohde & Schwarz1597Univ. Radio Communication TesterCMU 200100347Rohde & Schwarz2598Spectrum AnalyzerFSEM 30 (Reserve)831259/013Rohde & Schwarz2600power meterNRVD (Reserve)834501/018Rohde & Schwarz2601medium-sensitivity diode sensorNRV-Z5 (Reserve)8435323/003Rohde & Schwarz2602peak power sensorNRV-Z32 (Reserve)835080Rohde & Schwarz2611DC power supplyE3632AKR 75305854Agilent1612DC power supplyE3632AMY 40001321Agilent1613AttenuatorR4161200020dB 10WLot. 9828Radiall1616DigitalmultimeterFluke 17788900339Fluke2617Power Splitter/Combiner50PD-634600994JFW Industries USA-618Power Splitter/Combiner50PD-634600995JFW Industries USA-620EMI Test ReceiverESU 26100362Rohde & Schwarz1621Step Attenuator 0-139 dBRSP100017Rohde & Schwarz1622Generic Test Load	12 M	1c	31.07.2015
558System CTCFAR S-VSWRVSWR-CTC4574Biconilog Hybrid AntennaBTA-L980026LFrankonia3584Spectrum AnalyzerFSU 8100248Rohde & Schwarz1594Wideband Radio Communication TesterCMW 500101757Rohde & Schwarz1597Univ. Radio Communication TesterCMU 200100347Rohde & Schwarz2598Spectrum AnalyzerFSEM 30 (Reserve)831259/013Rohde & Schwarz2600power meterNRVD (Reserve)834501/018Rohde & Schwarz2601medium-sensitivity diode sensorNRV-Z5 (Reserve)8435323/003Rohde & Schwarz2602peak power sensorNRV-Z32 (Reserve)835080Rohde & Schwarz2611DC power supplyE3632AKR 75305854Agilent1612DC power supplyE3632AMY 40001321Agilent1613AttenuatorR416120000 20dB 10WLot. 9828Radiall1616DigitalmultimeterFluke 17788900339Fluke2617Power Splitter/Combiner20PC-634600994JFW Industries USA-618Power Splitter/Combiner50PD-634600995JFW Industries USA-620EMI Test ReceiverESU 26100362Rohde-Schwarz1621Step Attenuator 0-139 dBRSP100017Rohde & Schwarz1625Generic Test Load USB-C	12 M	5	30.09.2015
584Spectrum AnalyzerFSU 8100248Rohde & SchwarzI594Wideband Radio Communication TesterCMW 500101757Rohde & Schwarz1597Univ. Radio Communication TesterCMU 200100347Rohde & Schwarz2598Spectrum AnalyzerFSEM 30 (Reserve)831259/013Rohde & Schwarz2600power meterNRVD (Reserve)834501/018Rohde & Schwarz2601medium-sensitivity diode sensorNRV-Z5 (Reserve)8435323/003Rohde & Schwarz2611DC power sensorNRV-Z32 (Reserve)835080Rohde & Schwarz2611DC power supplyE3632AKR 75305854AgilentI612DC power supplyE3632AMY 40001321AgilentI613AttenuatorR416120000 20dB 10WLot. 9828RadiallI616DigitalmultimeterFluke 17788900339Fluke2617Power Splitter/CombinerZFSC-2-2-S+S F987001108Mini Circuits-618Power Splitter/Combiner50PD-634600994JFW Industries USA-620EMI Test ReceiverESU 26100362Rohde-Schwarz1621Step Attenuator 0-139 dBRSP100017Rohde & Schwarz1623Generic Test Load USB-CETECOM-624AgterOPUS 1201.0999.9302.6.4.1.4G. Lufft GmbH2634Spectrum AnalyzerFSM (HF-Unit) <td< td=""><td>24 M</td><td>-</td><td>31.07.2015</td></td<>	24 M	-	31.07.2015
594Wideband Radio Communication TesterCMW 500101757Rohde & Schwarz1597Univ. Radio Communication TesterCMU 200100347Rohde & Schwarz2598Spectrum AnalyzerFSEM 30 (Reserve)831259/013Rohde & Schwarz2600power meterNRVD (Reserve)834501/018Rohde & Schwarz2601medium-sensitivity diode sensorNRV-Z5 (Reserve)8435323/003Rohde & Schwarz2602peak power sensorNRV-Z32 (Reserve)835080Rohde & Schwarz2611DC power supplyE3632AKR 75305854Agilent1612DC power supplyE3632AMY 40001321Agilent1613AttenuatorR416120000 20dB 10WLot. 9828Radiall1616DigitalmultimeterFluke 17788900339Fluke2617Power Splitter/Combiner25PC-2-2-S+S F987001108Mini Circuits-618Power Splitter/Combiner50PD-634600994JFW Industries USA-620EMI Test ReceiverESU 26100362Rohde & Schwarz1621Step Attenuator 0-139 dBRSP100017Rohde & Schwarz1622data loggerOPUS 1201.0999.9302.6.4.1.43-634Spectrum AnalyzerFSM (HF-Unit)826188/010Rohde & Schwarz1	36/12 M	-	31.03.2016
597Univ. Radio Communication TesterCMU 200100347Rohde & Schwarz3598Spectrum AnalyzerFSEM 30 (Reserve)831259/013Rohde & Schwarz3600power meterNRVD (Reserve)834501/018Rohde & Schwarz3601medium-sensitivity diode sensorNRV-Z5 (Reserve)8435323/003Rohde & Schwarz3602peak power sensorNRV-Z3 (Reserve)835080Rohde & Schwarz3611DC power supplyE3632AKR 75305854Agilent1612DC power supplyE3632AMY 40001321Agilent1613AttenuatorR416120000 20dB 10WLot. 9828Radiall1616DigitalmultimeterFluke 17788900339Fluke3617Power Splitter/CombinerZFSC-2-2-S+S F987001108Mini Circuits-618Power Splitter/Combiner50PD-634600994JFW Industries USA-619Power Splitter/CombinerESU 26100362Rohde & Schwarz1620EMI Test ReceiverESU 26100362Rohde & Schwarz1621Step Attenuator 0-139 dBRSP100017Rohde & Schwarz1622data loggerOPUS 1201.0999.9302.6.4.1.433634Spectrum AnalyzerFSM (HF-Unit)826188/010Rohde & Schwarz1	pre-m	-	
598Spectrum AnalyzerFSEM 30 (Reserve)831259/013Rohde & Schwarz2600power meterNRVD (Reserve)834501/018Rohde & Schwarz2601medium-sensitivity diode sensorNRV-Z5 (Reserve)8435323/003Rohde & Schwarz2602peak power sensorNRV-Z32 (Reserve)835080Rohde & Schwarz2611DC power supplyE3632AKR 75305854AgilentI612DC power supplyE3632AMY 40001321AgilentI613AttenuatorR416120000 20dB 10WLot. 9828RadiallI616DigitalmultimeterFluke 17788900339Fluke2617Power Splitter/CombinerZFSC-2-2-S+S F987001108Mini Circuits-618Power Splitter/Combiner50PD-634600994JFW Industries USA-620EMI Test ReceiverESU 26100362Rohde-Schwarz1621Step Attenuator 0-139 dBRSP100017Rohde & Schwarz1625Generic Test Load USB-CETECOM-627data loggerOPUS 1201.0999.9302.6.4.1.436634Spectrum AnalyzerFSM (HF-Unit)826188/010Rohde & Schwarz1	12 M	-	30.04.2016
600power meterNRVD (Reserve)834501/018Rohde & Schwarz2601medium-sensitivity diode sensorNRV-Z5 (Reserve)8435323/003Rohde & Schwarz2602peak power sensorNRV-Z32 (Reserve)835080Rohde & Schwarz2611DC power supplyE3632AKR 75305854Agilent1612DC power supplyE3632AMY 40001321Agilent1613AttenuatorR416120000 20dB 10WLot. 9828Radiall1616DigitalmultimeterFluke 17788900339Fluke2617Power Splitter/CombinerZFSC-2-2-S+S F987001108Mini Circuits-618Power Splitter/Combiner50PD-634600994JFW Industries USA-620EMI Test ReceiverESU 26100362Rohde-Schwarz1621Step Attenuator 0-139 dBRSP100017Rohde & Schwarz1625Generic Test Load USB-CETECOM-627data loggerOPUS 1201.0999.9302.6.4.1.4G. Lufft GmbH2634Spectrum AnalyzerFSM (HF-Unit)826188/010Rohde & Schwarz1	36 M	-	31.03.2016
601medium-sensitivity diode sensorNRV-Z2 (Reserve)8435323/003Rohde & Schwarz2602peak power sensorNRV-Z32 (Reserve)835080Rohde & Schwarz2611DC power supplyE3632AKR 75305854AgilentI612DC power supplyE3632AMY 40001321AgilentI613AttenuatorR416120000 20dB 10WLot. 9828RadiallI616DigitalmultimeterFluke 17788900339Fluke2617Power Splitter/CombinerZFSC-2-2-S+S F987001108Mini Circuits-618Power Splitter/Combiner50PD-634600994JFW Industries USA-619Power Splitter/CombinerSDPD-634600995JFW Industries, USA-620EMI Test ReceiverESU 26100362Rohde-Schwarz1621Step Attenuator 0-139 dBRSP100017Rohde & Schwarz1625Generic Test Load USB-CETECOM-627data loggerOPUS 1201.0999.9302.6.4.1.4G. Lufft GmbH2634Spectrum AnalyzerFSM (HF-Unit)826188/010Rohde & SchwarzI	24 M 24 M	-	30.04.2017
602peak power sensorNRV-Z32 (Reserve) $835080$ Rohde & Schwarz2611DC power supplyE3632AKR 75305854AgilentI612DC power supplyE3632AMY 40001321AgilentI613AttenuatorR416120000 20dB 10WLot. 9828RadiallI616DigitalmultimeterFluke 17788900339Fluke2617Power Splitter/CombinerZFSC-2-2-S+S F987001108Mini Circuits-618Power Splitter/Combiner50PD-634600994JFW Industries USA-619Power Splitter/Combiner50PD-634600995JFW Industries, USA-620EMI Test ReceiverESU 26100362Rohde-Schwarz1621Step Attenuator 0-139 dBRSP100017Rohde & SchwarzI625Generic Test Load USB-CETECOM-627data loggerOPUS 1 $\frac{201.0999.9302.6.4.1.4}{3}$ G. Lufft GmbH2634Spectrum AnalyzerFSM (HF-Unit)826188/010Rohde & SchwarzI	24 M 24 M	-	30.04.2017 30.04.2017
611DC power supplyE3632AKR 75305854AgilentI612DC power supplyE3632AMY 40001321AgilentI613AttenuatorR416120000 20dB 10WLot. 9828RadiallI616DigitalmultimeterFluke 17788900339Fluke2617Power Splitter/CombinerZFSC-2-2-S+S F987001108Mini Circuits-618Power Splitter/Combiner50PD-634600994JFW Industries USA-619Power Splitter/Combiner50PD-634600995JFW Industries, USA-620EMI Test ReceiverESU 26100362Rohde-Schwarz1621Step Attenuator 0-139 dBRSP100017Rohde & SchwarzI625Generic Test Load USB-CETECOM-627data loggerOPUS 1 $\frac{201.0999.9302.6.4.1.4}{3}$ G. Lufft GmbH2634Spectrum AnalyzerFSM (HF-Unit)826188/010Rohde & SchwarzI	24 M		30.04.2017
612DC power supplyE3632AMY 40001321AgilentI613AttenuatorR416120000 20dB 10WLot. 9828RadiallI616DigitalmultimeterFluke 17788900339Fluke2617Power Splitter/CombinerZFSC-2-2-S+S F987001108Mini Circuits-618Power Splitter/Combiner50PD-634600994JFW Industries USA-619Power Splitter/Combiner50PD-634600995JFW Industries, USA-620EMI Test ReceiverESU 26100362Rohde-Schwarz1621Step Attenuator 0-139 dBRSP100017Rohde & SchwarzI625Generic Test Load USB-CETECOM-627data loggerOPUS 1201.0999.9302.6.4.1.4G. Lufft GmbH2634Spectrum AnalyzerFSM (HF-Unit)826188/010Rohde & SchwarzI	pre-m	2	
613AttenuatorR416120000 20dB 10WLot. 9828RadiallI616DigitalmultimeterFluke 17788900339Fluke2617Power Splitter/CombinerZFSC-2-2-S+S F987001108Mini Circuits618Power Splitter/Combiner50PD-634600994JFW Industries USA619Power Splitter/Combiner50PD-634600995JFW Industries, USA620EMI Test ReceiverESU 26100362Rohde-Schwarz1621Step Attenuator 0-139 dBRSP100017Rohde & SchwarzI625Generic Test Load USB-CETECOM-627data loggerOPUS 1201.0999.9302.6.4.1.4G. Lufft GmbH2634Spectrum AnalyzerFSM (HF-Unit)826188/010Rohde & SchwarzI	pre-m	2	<u> </u>
616DigitalmultimeterFluke 17788900339Fluke2617Power Splitter/CombinerZFSC-2-2-S+S F987001108Mini Circuits-618Power Splitter/Combiner50PD-634600994JFW Industries USA-619Power Splitter/Combiner50PD-634600995JFW Industries, USA-620EMI Test ReceiverESU 26100362Rohde-Schwarz1621Step Attenuator 0-139 dBRSP100017Rohde & SchwarzI625Generic Test Load USBGeneric Test Load USB-CETECOM-627data loggerOPUS 1201.0999.9302.6.4.1.4 3G. Lufft GmbH2634Spectrum AnalyzerFSM (HF-Unit)826188/010Rohde & SchwarzI	pre-m	2	
617         Power Splitter/Combiner         ZFSC-2-2-S+         S F987001108         Mini Circuits         -           618         Power Splitter/Combiner         50PD-634         600994         JFW Industries USA         -           619         Power Splitter/Combiner         50PD-634         600995         JFW Industries, USA         -           620         EMI Test Receiver         ESU 26         100362         Rohde-Schwarz         1           621         Step Attenuator 0-139 dB         RSP         100017         Rohde & Schwarz         I           625         Generic Test Load USB         Generic Test Load USB         -         CETECOM         -           627         data logger         OPUS 1         201.0999.9302.6.4.1.4 3         G. Lufft GmbH         2           634         Spectrum Analyzer         FSM (HF-Unit)         826188/010         Rohde & Schwarz         I	24 M	-	31.03.2016
618         Power Splitter/Combiner         50PD-634         600994         JFW Industries USA         -           619         Power Splitter/Combiner         50PD-634         600995         JFW Industries, USA         -           620         EMI Test Receiver         ESU 26         100362         Rohde-Schwarz         1           621         Step Attenuator 0-139 dB         RSP         100017         Rohde & Schwarz         1           625         Generic Test Load USB         Generic Test Load USB         -         CETECOM         -           627         data logger         OPUS 1         201.0999.9302.6.4.1.4 3         G. Lufft GmbH         2           634         Spectrum Analyzer         FSM (HF-Unit)         826188/010         Rohde & Schwarz         1	-	2	
619Power Splitter/Combiner50PD-634600995JFW Industries, USA620EMI Test ReceiverESU 26100362Rohde-Schwarz1621Step Attenuator 0-139 dBRSP100017Rohde & SchwarzI625Generic Test Load USBGeneric Test Load USB-CETECOM-627data loggerOPUS 1201.0999.9302.6.4.1.4 3G. Lufft GmbH2634Spectrum AnalyzerFSM (HF-Unit)826188/010Rohde & SchwarzI	-	2	
620         EMI Test Receiver         ESU 26         100362         Rohde-Schwarz         1           621         Step Attenuator 0-139 dB         RSP         100017         Rohde & Schwarz         I           625         Generic Test Load USB         Generic Test Load USB         -         CETECOM         -           627         data logger         OPUS 1         201.0999.9302.6.4.1.4 3         G. Lufft GmbH         2           634         Spectrum Analyzer         FSM (HF-Unit)         826188/010         Rohde & Schwarz         I	-	3	
621Step Attenuator 0-139 dBRSP100017Rohde & SchwarzI625Generic Test Load USBGeneric Test Load USB-CETECOM-627data loggerOPUS 1201.0999.9302.6.4.1.4 3G. Lufft GmbH2634Spectrum AnalyzerFSM (HF-Unit)826188/010Rohde & SchwarzI	12 M	-	01.12.2015
625     Generic Test Load USB     Generic Test Load USB     -     CETECOM     -       627     data logger     OPUS 1     201.0999.9302.6.4.1.4 3     G. Lufft GmbH     2       634     Spectrum Analyzer     FSM (HF-Unit)     826188/010     Rohde & Schwarz     I	pre-m	2	
62/data loggerOPUS I3G. Luft GmbH4634Spectrum AnalyzerFSM (HF-Unit)826188/010Rohde & SchwarzI	-	2	
	24 M	-	30.04.2017
	pre-m 36 M	2	31.07.2015
637 High Speed HDMI with Ethernet 1 m HDMI cable with Ethernet 1 m - 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   1	12 M	-	30.04.2016
644 Amplifierer ZX60-2534M+ SN865701299 Mini-Circuits -	-	<u> -</u>	
	24 M	-	31.03.2016
	pre-m	2	
	pre-m	-	
	12 M	<u> -</u>	30.04.2016
686 Field Analyzer EHP-200A 160WX30702 Narda Safety Test Solutions	24 M	-	30.04.2017
687Signal GeneratorSMF 100A102073Rohde&Schwarz11	12 M	-	30.04.2016



RefNo.	Equipment	Туре	Serial-No.	Manufacturer	Interval of calibration	Remark	Cal due
688	Pre Amp	JS-18004000-40-8P	1750117	Miteq	pre-m	-	
692	Bluetooth Tester	CBT 32	100236	Rohde & Schwarz	24 M	-	31.03.2016
693	TS8997	CTC-Radio Lab 1_TS8997	-	Rohde&Schwarz	12 M	5	01.05.2015
697	Power Splitter	ZN4PD-642W-S+	165001445	Mini-Circuits	-	2	

# 8.1.3. Legend

Note / remarks		Calibrated during system calibration:
	1a	System CTC-SAR-EMS (RefNo. 442)
	1b	System-CTC-EMS-Conducted (RefNo. 335)
	1c	System CTC-FAR-EMI-RSE (RefNo . 443)
	1d	System CTC-SAR-EMI (RefNo . 441)
	1e	System CTC-OATS (EMI radiated) (RefNo. 337)
	1 f	System CTC-CTIA-OTA (RefNo . 420)
	1 g	System CTC-FAR-EMS (RefNo . 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

# 9. Versions of test reports (change history)

Version	Applied changes	Date of release
	Initial release	2015-07-06