

TEST REPORT
No.: 18-1-0081001T22a-C1

According to:
FCC Regulations
 §1.1310
 § 2.1091 & 2.1093

for
peiker acoustic GmbH

Wireless Mobile Interface
WMI2-W167-M3
2609-090-554-51







Laboratory Accreditation and Listings		
 Deutsche Akkreditierungsstelle D-PL-12047-01-01 Accredited EMC-Test Laboratory	 Industry Canada Reg. No.: 3462D-1 Reg. No.: 3462D-2 Reg. No.: 3462D-3	 Voluntary Controls for Electromagnetic Emissions Reg. No.: R-4452, C-20009, T-20006, G-20013
 WiFi ALLIANCE	 ctia Authorized TM Test Lab <small>Lab Code: 20011130-00</small>	 FEDERAL COMMUNICATIONS COMMISSION • USA • MRA US-EU 0003
accredited according to DIN EN ISO/IEC 17025		
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The listed attachments are an integral part of this report.

1. Summary of test results

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

The Equipment Under Test (in this report, hereinafter referred as EUT) is a wireless Mobile Interface with NFC. The wireless charger is operated at Frequency 125kHz.

TEST OVERVIEW

No. of Diagram group	Test Cases	Port	References, Standards & Limits		EUT set-up	EUT op-mode	Measured values	Result
			FCC	Limits				
1.1	Electric field strength	5cm distance to EUT	§1.1310 §2.1091 §2.1093	614 (V/m)	1	1 + 2 + 3	all values are below the regulatory limits	passed
1.1	Electric field strength	15cm distance to EUT	§1.1310 §2.1091 §2.1093	614 (V/m)	1	1 + 2 + 3	all values are below the regulatory limits	passed
1.2	Magnetic field strength	5cm distance to EUT	§1.1310 §2.1091 §2.1093	1.63 (A/m)	1	1 + 2 + 3	all values are below the regulatory limits	passed
1.2	Magnetic field strength	15/20cm distance to EUT	§1.1310 §2.1091 §2.1093	1.63 (A/m)	1	1 + 2 + 3	all values are more than 50% below the regulatory limits	passed

Remark:

Following tests have been performed to show compliance with applicable Standards:

FCC §1.1310, §2.1091 §2.1093

OET Bulletin 65 Supplement C

KDB 680106 D01 V03.

Additional to KDB 680106 D01 V03 tests were performed due to customer declaration with 5cm distance between edge and top of EUT and probe.

The current version of CETECOM Test Report 18-1-0081001T22a-C1 replaces the Test Report CETECOM 18-1-00810T22a dated 2018-06-13. The replaced Test Report is herewith invalid



.....
Dipl.-Ing. Rachid Acharkaoui
Responsible for test section



.....
W. Markus
Responsible for project

2. Administrative Data

2.1. Identification of the testing laboratory

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

2.2. Test location

2.2.1. Test laboratory "CTC"

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

Responsible for test report :	W. Markus
Receipt of EUT:	2018-06-08
Date(s) of test:	2018-06-12
Date of report:	2018-07-16

Version of template:	12.11

2.4. Applicant's details

Applicant's name:	peiker acoustic GmbH
Address:	Max-Planck-Str. 28-32 61381 Friedrichsdorf Germany
Contact person:	Mr. Uwe Hännig

2.5. Manufacturer's details

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

3. Equipment under test (EUT)

3.1. TECHNICAL DATA OF MAIN EUT DECLARED BY APPLICANT

Main function	WMI – Wireless Mobile Interface		
Type	W205		
Frequency range	Fixed frequency 125kHz for wireless charging, 13,56MHz for NFC		
Max. nominal power	9,25W each Coil		
Antenna Type	PCB antenna - R = 4.0 Ohm - jZ= 58 Ohm - L = 0.68uH		
Power supply	<input checked="" type="checkbox"/> 12V DC		
Special EMI components	--		
EUT sample type	<input type="checkbox"/> Production	<input checked="" type="checkbox"/> Pre-Production	<input type="checkbox"/> Engineering
FCC label attached	<input type="checkbox"/> yes	<input checked="" type="checkbox"/> no	

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

Short description*)	EUT	Type	S/N serial number	HW hardware status	SW software status
EUT A	Wireless Mobile Interface	WMI2-W167-M3 2609-090-554-51	P18001040749	0000 17/40.01	E005.5 17/40.01

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

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

AE short description *)	Auxiliary Equipment	Type	S/N serial number	HW hardware status	SW software status
AE 1	Main Harness	--	--	--	--
AE 2	VScom USB-CAN Adapter	USB-CAN Plus	380101643	--	--
AE 3	USB cable	--	--	--	--
AE 4	AVID Qi Receiver Simulator	102-01	00000337	--	--
AE 5	OSRAM PointLED	LA P47F-AABA	--	430 OHM, 550mW	--

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

3.4. EUT set-ups

EUT set-up no.*)	Combination of EUT and AE	Remarks
Set. 1	EUT A + AE 1 + AE 2 + AE 3 + AE 4 + AE 5	for wireless charging

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

3.5. EUT operating modes

EUT operating mode no.*)	Description of operating modes	Additional information
op. 1	Wireless charging	Wireless charging was activated with special customer SW. The EUT is transferring power to AE4 With 900mA LOAD (90% charging level)
op. 2	Wireless charging	Wireless charging was activated with special customer SW. The EUT is transferring power to AE4 with 500mA LOAD (50% charging level)
op. 3	Wireless charging	Wireless charging was activated with special customer SW. The EUT is transferring power to AE4 with 50 mA LOAD (5% charging level)

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

Less than 5% charging level is not possible due to technical reasons with the Qi Receiver Simulator

3.6. Additional declaration and description of EUT

Set up 1	<input type="checkbox"/> table-top <input type="checkbox"/> floor-standing <input type="checkbox"/> wall-mounted <input checked="" type="checkbox"/> not defined	typical use <input type="checkbox"/> portable use <input type="checkbox"/> fixed use <input checked="" type="checkbox"/> vehicular use		
Place of use	<input type="checkbox"/> Residential, commercial and light industry <input type="checkbox"/> Industrial environment <input checked="" type="checkbox"/> vehicular use			
typical operating cycle of EUT	<input type="checkbox"/> < 0,5 sec. <input type="checkbox"/> :			
Power line: <input type="checkbox"/> AC <input type="checkbox"/> 120V, <input type="checkbox"/> 230V, <input type="checkbox"/> 400V <input type="checkbox"/> PE, <input type="checkbox"/> N, <input type="checkbox"/> L1, <input type="checkbox"/> L2 <input type="checkbox"/> L3 <input type="checkbox"/> __ Hz <input checked="" type="checkbox"/> DC <input checked="" type="checkbox"/> 12.0V <input type="checkbox"/> 24V	EUT-grounding: <input checked="" type="checkbox"/> none <input type="checkbox"/> with power supply <input type="checkbox"/> additional: (in case of deviation during tests the single details are described on chapter 4)			
Other Ports (description of interconnecting cables) Description Connector	possible total cable length	shielding	connected during test	
1. Main	Multi pin	<input checked="" type="checkbox"/> < 3m <input type="checkbox"/> > 3m <input type="checkbox"/> : other	<input type="checkbox"/> screened <input checked="" type="checkbox"/> unscreened	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
Does EUT contain devices susceptible to magnetic fields, e.g. Hall elements, electro-dynamics microphones, etc.?			<input type="checkbox"/> yes <input checked="" type="checkbox"/> no	
Is mounting position / usual operating position defined?			<input type="checkbox"/> yes <input checked="" type="checkbox"/> no	

4. DESCRIPTION OF TEST SET-UP'S

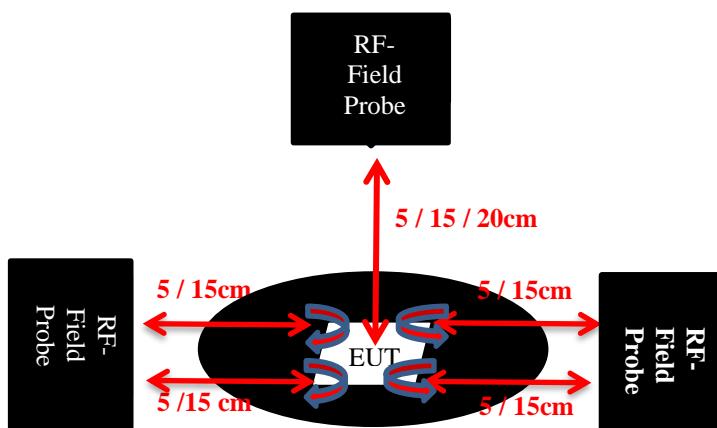
4.1. Test Set-up for configuration

The RF exposure test is performed in shielded room.

The EUT was placed on a table.

The measurement probe was surrounding point 1 to point 4 at a distance of 5cm and 15cm from the EUT and 5cm and 20 cm above the top surface (point 5) for H-filed strength

The measurement probe was surrounding point 1 to point 4 at a distance of 5cm and 15cm from the EUT and 5cm and 15cm above the top surface (point 5) for E-filed strength



Schematic: Test set-up for Rf exposure measurements

5. Maximum Permissible RF Exposure

5.1.FCC References & Limits

FCC Rules: §1.1310, § 2.1093

The criteria used for the evaluation of human exposure to radio frequency radiation is listed in table 1 according FCC §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this.

Note 1 to table 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provide those persons are fully aware for a exposure and can control over their exposure. Limits for occupational/controlled exposures also apply in situations when an individual is transient through a location where occupational/controlled apply provided he or she is made aware of the potential for exposure.

Note 2 to table 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
30–300	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

f = frequency in MHz

So applicable limits in this case are as follows:

§1.1310 LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Table 1(B) Limits for General Population/Uncontrolled Exposure

0.3–1,34 MHz: Electric field: 614 V/m

0.3–1,34 MHz: Magnetic field: 1.63 A/m

5.2. E-Field Results

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

test location	<input checked="" type="checkbox"/> CETECOM Essen (Chapter 2.2.1)	<input type="checkbox"/> Please see Chapter 2.2.2	<input type="checkbox"/> Please see Chapter 2.2.3
equipment	<input checked="" type="checkbox"/> 686 EHP-200A	<input type="checkbox"/>	<input type="checkbox"/>
signaling	<input type="checkbox"/> 017 CMD 65	<input type="checkbox"/> 323 CMD 55	<input type="checkbox"/> 340 CMD 55
signaling	<input type="checkbox"/> 298 CMU	<input type="checkbox"/> 460 CMU	<input type="checkbox"/> 295 RACAL
line voltage	<input checked="" type="checkbox"/> 12V DC		

5.2.2. Test condition and test set-up

link to test system (if used):	<input type="checkbox"/> air link	<input type="checkbox"/> cable connection
EUT-grounding (if different to chapter 3.5)	<input type="checkbox"/> none	<input type="checkbox"/> with power supply
Equipment set up	-	-
Climatic conditions	Temperature: 24 °C	Rel. humidity: 31 %

5.2.3. Results

Table 1:
The aggregate E-Field strenghts at 15cm surrounding the device:

EUT Type and S/N or EUT set-up no.			Set- up 1	
EUT operating mode or operating mode no.			EUT operating mode 1 (90% charging level)	
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	E-field (V/m)	E-field Limit (V/m)
125	1	0.15	0,84	614
125	2	0.15	1,21	614
125	3	0.15	1,0	614
125	4	0.15	0,86	614

Remarks:

EUT Type and S/N or EUT set-up no.			Set- up 1	
EUT operating mode or operating mode no.			EUT operating mode 2 (50% charging level)	
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	E-field (V/m)	E-field Limit (V/m)
125	1	0.15	0,54	614
125	2	0.15	0,89	614
125	3	0.15	0,65	614
125	4	0.15	0,59	614

Remarks:

EUT Type and S/N or EUT set-up no.			Set- up 1	
EUT operating mode or operating mode no.			EUT operating mode 3 (5% charging level)	
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	E-field (V/m)	E-field Limit (V/m)
125	1	0.15	0,43	614
125	2	0.15	0,42	614
125	3	0.15	0,33	614
125	4	0.15	0,35	614

Remarks:

Table 2:
The aggregate E-Field strenghts at 15cm above the top of the device:

EUT Type and S/N or EUT set-up no.			Set- up 1	
EUT operating mode or operating mode no.			EUT operating mode 1 (5% charging level)	
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	E-field (V/m)	E-field Limit (V/m)
125	5	0.15	6,94	614

Remarks:

EUT Type and S/N or EUT set-up no.			Set- up 1	
EUT operating mode or operating mode no.			EUT operating mode 2 (50% charging level)	
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	E-field (V/m)	E-field Limit (V/m)
125	5	0.15	4,57	614

Remarks:

EUT Type and S/N or EUT set-up no.			Set- up 1	
EUT operating mode or operating mode no.			EUT operating mode 3 (90% charging level)	
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	E-field (V/m)	E-field Limit (V/m)
125	5	0.15	1,33	614

Remarks:

Table 3:
The aggregate E-Field strenghts at 5cm surrounding the device:

EUT Type and S/N or EUT set-up no.			Set- up 1	
EUT operating mode or operating mode no.			EUT operating mode 1 (90% charging level)	
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	E-field (V/m)	E-field Limit (V/m)
125	1	0.05	1,87	614
125	2	0.05	2,51	614
125	3	0.05	1,99	614
125	4	0.05	1,69	614

Remarks:

EUT Type and S/N or EUT set-up no.			Set- up 1	
EUT operating mode or operating mode no.			EUT operating mode 2 (50% charging level)	
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	E-field (V/m)	E-field Limit (V/m)
125	1	0.05	1,4	614
125	2	0.05	1,82	614
125	3	0.05	1,11	614
125	4	0.05	1,19	614

Remarks:

EUT Type and S/N or EUT set-up no.			Set- up 1	
EUT operating mode or operating mode no.			EUT operating mode 3 (5% charging level)	
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	E-field (V/m)	E-field Limit (V/m)
125	1	0.05	1,05	614
125	2	0.05	1,07	614
125	3	0.05	0,53	614
125	4	0.05	0,70	614

Remarks:

Table 4:
The aggregate E-Field strenghts at 5cm above the top of the device:

EUT Type and S/N or EUT set-up no.			Set- up 1	
EUT operating mode or operating mode no.			EUT operating mode 1 (5% charging level)	
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	E-field (V/m)	E-field Limit (V/m)
125	5	0.05	12,5	614

Remarks:

EUT Type and S/N or EUT set-up no.			Set- up 1	
EUT operating mode or operating mode no.			EUT operating mode 1 (5% charging level)	
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	E-field (V/m)	E-field Limit (V/m)
125	5	0.05	8,76	614

Remarks:

EUT Type and S/N or EUT set-up no.			Set- up 1	
EUT operating mode or operating mode no.			EUT operating mode 1 (5% charging level)	
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	E-field (V/m)	E-field Limit (V/m)
125	5	0.05	3,93	614

Remarks:

5.3. H-Field Results

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

test location	<input checked="" type="checkbox"/> CETECOM Essen (Chapter 2.2.1)	<input type="checkbox"/> Please see Chapter 2.2.2		<input type="checkbox"/> Please see Chapter 2.2.3	
equipment	<input checked="" type="checkbox"/> 686 EHP-200A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
signaling	<input type="checkbox"/> 017 CMD 65	<input type="checkbox"/> 323 CMD 55	<input type="checkbox"/> 340 CMD 55		
signaling	<input type="checkbox"/> 298 CMU	<input type="checkbox"/> 460 CMU	<input type="checkbox"/> 295 RACAL	<input type="checkbox"/> 392 MT8820A	
line voltage	<input checked="" type="checkbox"/> 12V DC				

5.3.2. Test condition and test set-up

link to test system (if used):	<input type="checkbox"/> air link	<input type="checkbox"/> cable connection	
EUT-grounding (if different to chapter 3.5)	<input type="checkbox"/> none	<input type="checkbox"/> with power supply	<input type="checkbox"/> additional connection
Equipment set up	-		-
Climatic conditions	Temperature: 24 °C		Rel. humidity: 31 %

Table 5:
The aggregate H-Field strenghts at 15cm surrounding the device:

EUT Type and S/N or EUT set-up no.			Set-up 1			
EUT operating mode or operating mode no.			EUT operating mode 1 (90% charging level)			
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	H-field (A/m)	H-field Limit (A/m)	H-field Limit – 50% (A/m) ¹⁾	Result
125	1	0.15	0,21	1.63	0,815	passed
125	2	0.15	0,25	1.63	0,815	passed
125	3	0.15	0,16	1.63	0,815	passed
125	4	0.15	0,16	1.63	0,815	passed
125	5	0.15	0,45	1.63	--	passed

Remarks: ¹⁾ according KDB 680106 D01 V03

EUT Type and S/N or EUT set-up no.			Set-up 1			
EUT operating mode or operating mode no.			EUT operating mode 2 (50% charging level)			
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	H-field (A/m)	H-field Limit (A/m)	H-field Limit – 50% (A/m) ¹⁾	Result
125	1	0.15	0,17	1.63	0,815	passed
125	2	0.15	0,16	1.63	0,815	passed
125	3	0.15	0,10	1.63	0,815	passed
125	4	0.15	0,11	1.63	0,815	passed
125	5	0.15	0,65	1.63	--	passed

Remarks: ¹⁾ according KDB 680106 D01 V03

EUT Type and S/N or EUT set-up no.			Set-up 1			
EUT operating mode or operating mode no.			EUT operating mode 3 (5% charging level)			
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	H-field (A/m)	H-field Limit (A/m)	H-field Limit – 50% (A/m) ¹⁾	Result
125	1	0.15	0,12	1.63	0,815	passed
125	2	0.15	0,11	1.63	0,815	passed
125	3	0.15	0,06	1.63	0,815	passed
125	4	0.15	0,09	1.63	0,815	passed
125	5	0.15	0,95	1.63	--	passed

Remarks: ¹⁾ according KDB 680106 D01 V03

Table 6:
The aggregate H-Field strenghts at 20cm above the top of the device:

EUT Type and S/N or EUT set-up no.			Set-up 1			
EUT operating mode or operating mode no.			EUT operating mode 1 (90% charging level)			
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	H-field (A/m)	H-field Limit (A/m)	H-field Limit – 50% (A/m) ¹⁾	Result
125	5	0.2	0,54	1.63	0,815	passed

Remarks: ¹⁾ according KDB 680106 D01 V03

EUT Type and S/N or EUT set-up no.			Set-up 1			
EUT operating mode or operating mode no.			EUT operating mode 2 (50% charging level)			
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	H-field (A/m)	H-field Limit (A/m)	H-field Limit – 50% (A/m) ¹⁾	Result
125	5	0.2	0,43	1.63	0,815	passed

Remarks: ¹⁾ according KDB 680106 D01 V03

EUT Type and S/N or EUT set-up no.			Set-up 1			
EUT operating mode or operating mode no.			EUT operating mode 3 (5% charging level)			
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	H-field (A/m)	H-field Limit (A/m)	H-field Limit – 50% (A/m) ¹⁾	Result
125	5	0.2	0,29	1.63	0,815	passed

Remarks: ¹⁾ according KDB 680106 D01 V03

Table 7:
The aggregate H-Field strenghts at 5cm surrounding the device:

EUT Type and S/N or EUT set-up no.			Set-up 1			
EUT operating mode or operating mode no.			EUT operating mode 1 (90% charging level)			
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	H-field (A/m)	H-field Limit (A/m)	H-field Limit – 50% (A/m) ¹⁾	Result
125	1	0.05	0,36	1.63	0,815	passed
125	2	0.05	0,40	1.63	0,815	passed
125	3	0.05	0,25	1.63	0,815	passed
125	4	0.05	0,25	1.63	0,815	passed

Remarks: ¹⁾ according KDB 680106 D01 V03

EUT Type and S/N or EUT set-up no.			Set-up 1			
EUT operating mode or operating mode no.			EUT operating mode 2 (50% charging level)			
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	H-field (A/m)	H-field Limit (A/m)	H-field Limit – 50% (A/m) ¹⁾	Result
125	1	0.05	0,17	1.63	0,815	passed
125	2	0.05	0,21	1.63	0,815	passed
125	3	0.05	0,24	1.63	0,815	passed
125	4	0.05	0,25	1.63	0,815	passed

Remarks: ¹⁾ according KDB 680106 D01 V03

EUT Type and S/N or EUT set-up no.			Set-up 1			
EUT operating mode or operating mode no.			EUT operating mode 3 (5% charging level)			
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	H-field (A/m)	H-field Limit (A/m)	H-field Limit – 50% (A/m) ¹⁾	Result
125	1	0.05	0,15	1.63	0,815	passed
125	2	0.05	0,17	1.63	0,815	passed
125	3	0.05	0,18	1.63	0,815	passed
125	4	0.05	0,21	1.63	0,815	passed

Remarks: ¹⁾ according KDB 680106 D01 V03

Table 8:
The aggregate H-Field strenghts at 5cm above the top of the device:

EUT Type and S/N or EUT set-up no.			Set-up 1			
EUT operating mode or operating mode no.			EUT operating mode 1 (90% charging level)			
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	H-field (A/m)	H-field Limit (A/m)	H-field Limit – 50% (A/m) ¹⁾	Result
125	5	0.05	1,30	1.63	0,815	passed

Remarks: ¹⁾ according KDB 680106 D01 V03

EUT Type and S/N or EUT set-up no.			Set-up 1			
EUT operating mode or operating mode no.			EUT operating mode 2 (50% charging level)			
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	H-field (A/m)	H-field Limit (A/m)	H-field Limit – 50% (A/m) ¹⁾	Result
125	5	0.05	0,43	1.63	0,815	passed

Remarks: ¹⁾ according KDB 680106 D01 V03

EUT Type and S/N or EUT set-up no.			Set-up 1			
EUT operating mode or operating mode no.			EUT operating mode 3 (5% charging level)			
Frequency Range (kHz)	Position	Distance between EUT and Field probe (m)	H-field (A/m)	H-field Limit (A/m)	H-field Limit – 50% (A/m) ¹⁾	Result
125	5	0.05	0,29	1.63	0,815	passed

Remarks: ¹⁾ according KDB 680106 D01 V03

6. Measurement uncertainties

The reported uncertainties are calculated based on the standard uncertainty multiplied with the appropriate coverage factor **k**, such that a confidence level of approximately 95% is achieved.

For uncertainty determination, each component used in the concrete measurement set-up was taken in account and its contribution to the overall uncertainty according to its statistical distribution calculated.

Following table shows expectable uncertainties for each measurement type performed.

RF-Measurement	Frequency range	Calculated uncertainty based on a confidence level of 95%	Remarks:
Power Output conducted	9 kHz .. 20 GHz	1.0 dB	--
Power Output radiated	30 MHz .. 4 GHz	3.17 dB	Substitution method
Conducted emissions on antenna ports	9 kHz .. 20 GHz	1.0 dB	--
Radiated emissions enclosure	9 kHz .. 30 MHz	5.0 dB	Magnetic field
	9 MHz .. 1 GHz	5.0 dB	E-Field
	30 MHz .. 1 GHz	4.2 dB	E-Field
	1 GHz .. 20 GHz	3.17 dB	Substitution method
Occupied bandwidth	9 kHz .. 4 GHz	0.1272 ppm (Delta Marker)	Frequency error
		1.0 dB	Power
Emission bandwidth	9 kHz .. 4 GHz	0.1272 ppm (Delta Marker)	Frequency error
		1.0 dB	Power
Frequency stability	9 kHz .. 20 GHz	0.0636 ppm	--
Conducted emissions on AC-mains port (U _{CISPR})	9 kHz .. 150 kHz	4.0 dB	--
	150 kHz .. 30 MHz	3.6 dB	--

Table: measurement uncertainties, valid for conducted/radiated measurements

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 Measurement.	FCC, Federal Communications Commission Laboratory Division, USA (MRA US-EU 0003)
337 487 550 558	3462D-1 3462D-2 3462D-2 3462D-3	Radiated Measurements 30 MHz to 1 GHz, 3 m / 10 m (OATS) Radiated Measurements 30 MHz to 1 GHz, 3 m (SAR) Radiated Measurements 1 GHz to 6 GHz, 3 m (SAR) Radiated Measurements above 1 GHz, 3 m (FAR)	IC, Industry Canada Certification and Engineering Bureau
337 487 550 348	R-20013 G-20013 C-20009 T-20006	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 Measurement.	VCCI, Voluntary Control Council for Interference by Information Technology Equipment, Japan

OATS = Open Area Test Site, SAR = Semi Anechoic Room, FAR = Fully Anechoic Room

8. Instruments and Ancillary

8.1. Used equipment “CTC”

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

8.1.1. Test software and firmware of equipment

Ref.-No.	Equipment	Type	Serial-No.	Version of Firmware or Software during the test
001	EMI Test Receiver	ESS	825132/017	Firm.= 1.21 , OTP=2.0, GRA=2.0
012	Signal Generator (EMS-cond.)	SMY 01	839069/027	Firm.= V 2.02
013	Power Meter (EMS cond.)	NRVD	839111/003	Firm.= V 1.51
017	Digital Radiocommunication Tester	CMD 60 M	844365/014	Firmware = V 3.52 .22.01.99, DECT = D2.87 13.01.99
053	Audio Analyzer	UPA3	860612/022	Firm. V 4.3
119	RT Harmonics Analyzer dig. Flickermeter	B10	G60547	Firm.= V 3.1DHG
140	Signal Generator	SMHU	831314/006	Firm.= 3.21
261	Thermal Power Sensor	NRV-Z55	825083/0008	EPROM-Datum 02.12.04, SE EE 1 B
262	Power Meter	NRV-S	825770/0010	Firm.= 2.6
263	Signal Generator	SMP 04	826190/0007	Firm.=3.21
264	Spectrum Analyzer	FSEK 30	826939/005	Bios=2.1, Analyzer= 3.20
295	Racal Digital Radio Test Set	6103	1572	UNIT Firmware= 4.04, SW-Main=4.04, SW-BBP=1.04, SW-DSP=1.02, Hardboot=1.02, Softboot=2.02
298	Univ. Radio Communication Tester	CMU 200	832221/091	R&S Test Firmware =3.53 /3.54 (current Testsoftw. f. all band used
323	Digital Radiocommunication Tester	CMD 55	825878/0034	Firm.= 3.52 .22.01.99
331	Climatic Test Chamber -40/+80 Grad	HC 4055	43146	TSI 1.53
335	CTC-EMS-Conducted	System EMS Conducted	-	EMC 32 V 8.52
340	Digital Radiocommunication Tester	CMD 55	849709/037	Firm.= 3.52 .22.01.99
355	Power Meter	URV 5	891310/027	Firm.= 1.31
365	10V Insertion Unit 50 Ohm	URV5-Z2	100880	Eprom Data = 31.03.08
366	Ultra Compact Simulator	UCS 500 M4	V0531100594	Firm. UCS 500=001925/3.06a02, rc=ISMIEC 4.10
371	Bluetooth Tester	CBT32	100153	CBT V5.30+ SW-Option K55, K57
377	EMI Test Receiver	ESCS 30	100160	Firm.= 2.30, OTP= 02.01, GRA= 02.36
378	Broadband RF Field Monitor	RadiSense III	03D00013SNO-08	Firm.= V.03D13
389	Digital Multimeter	Keithley 2000	0583926	Firm. = A13 (Mainboard) A02 (Display)
392	Radio Communication Tester	MT8820A	6K00000788	Firm.= 4.50 #005, IPL=4.01#001, OS=4.02#001, GSM=4.41#013, W-CDMA= 4.54#004, scenario= 4.52#002
436	Univ. Radio Communication Tester	CMU 200	103083	R&S Test Firmware Base=5.14, Mess-Software= GSM:5.14 WCDMA:5.14 (current Testsoftw. F. all band
441	CTC-SAR-EMI Cable Loss	System EMI field (SAR)	-	EMC 32 Version 8.52
442	CTC-SAR-EMS	System EMS field (SAR)	-	EMC 32 Version 8.40
443	CTC-FAR-EMI-RSE	System CTC-FAR-EMI-RSE	-	Spuri 7.2.5 or EMC 32 Ver. 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
692	Bluetooth Tester	CBT 32	100236	CBT V 5.40, FW: V.2.41 (FPGA Digital, V. 3.09 FPGA RF)

8.1.2. Single instruments and test systems

Ref.-No.	Equipment	Type	Serial-No.	Version of Firmware or Software during the test
001	EMI Test Receiver	ESS	825132/017	Firm.= 1.21 , OTP=2.0, GRA=2.0
012	Signal Generator (EMS-cond.)	SMY 01	839069/027	Firm.= V 2.02
013	Power Meter (EMS cond.)	NRVD	839111/003	Firm.= V 1.51
017	Digital Radiocommunication Tester	CMD 60 M	844365/014	Firmware = V 3.52 .22.01.99, DECT = D2.87 13.01.99
053	Audio Analyzer	UPA3	860612/022	Firm. V 4.3
119	RT Harmonics Analyzer dig. Flickermeter	B10	G60547	Firm.= V 3.1DHG
140	Signal Generator	SMHU	831314/006	Firm.= 3.21
261	Thermal Power Sensor	NRV-Z55	825083/0008	EPROM-Datum 02.12.04, SE EE 1 B
262	Power Meter	NRV-S	825770/0010	Firm.= 2.6
263	Signal Generator	SMP 04	826190/0007	Firm.=3.21
264	Spectrum Analyzer	FSEK 30	826939/005	Bios=2.1, Analyzer= 3.20
295	Racal Digital Radio Test Set	6103	1572	UNIT Firmware= 4.04, SW-Main=4.04, SW-BBP=1.04, SW-DSP=1.02, Hardboot=1.02, Softboot=2.02
298	Univ. Radio Communication Tester	CMU 200	832221/091	R&S Test Firmware =3.53 /3.54 (current Testsoftw. f. all band used
323	Digital Radiocommunication Tester	CMD 55	825878/0034	Firm.= 3.52 .22.01.99
331	Climatic Test Chamber -40/+80 Grad	HC 4055	43146	TSI 1.53
335	CTC-EMS-Conducted	System EMS Conducted	-	EMC 32 V 8.52
340	Digital Radiocommunication Tester	CMD 55	849709/037	Firm.= 3.52 .22.01.99
355	Power Meter	URV 5	891310/027	Firm.= 1.31
365	10V Insertion Unit 50 Ohm	URV5-Z2	100880	Eprom Data = 31.03.08
366	Ultra Compact Simulator	UCS 500 M4	V0531100594	Firm. UCS 500=001925/3.06a02, re=ISMIEC 4.10
371	Bluetooth Tester	CBT32	100153	CBT V5.30+ SW-Option K55, K57
377	EMI Test Receiver	ESCS 30	100160	Firm.= 2.30, OTP= 02.01, GRA= 02.36
378	Broadband RF Field Monitor	RadiSense III	03D00013SNO-08	Firm.= V.03D13
383	Signal Generator	SME 03	842 828 /034	Firm.= 4.61
389	Digital Multimeter	Keithley 2000	0583926	Firm. = A13 (Mainboard) A02 (Display)
392	Radio Communication Tester	MT8820A	6K00000788	Firm.= 4.50 #005, IPL=4.01#001, OS=4.02#001, GSM=4.41#013, W-CDMA= 4.54#004, scenario= 4.52#002
436	Univ. Radio Communication Tester	CMU 200	103083	R&S Test Firmware Base=5.14, Mess-Software= GSM:5.14 WCDMA:5.14 (current Testsoftw. F. all band
441	CTC-SAR-EMI Cable Loss	System EMI field (SAR)	-	EMC 32 Version 8.52
442	CTC-SAR-EMS	System EMS field (SAR)	-	EMC 32 Version 8.40
443	CTC-FAR-EMI-RSE	System CTC-FAR-EMI-RSE	-	Spuri 7.2.5 or EMC 32 Ver. 8.53
444	CTC-FAR-EMS field	System-EMS-Field (FAR)	-	EMC 32 Version 8.40
460	Univ. Radio Communication Tester	CMU 200	108901	R&S Test Firmware Base=5.14, GSM=5.14 WCDMA=5.14 (current Testsoftw.,f. all band to be used,
489	EMI Test Receiver	ESU40	1000-30	Firmware=4.43 SP3, Bios=V5.1-16-3, Spec. =01.00
491	ESD Simulator dito	ESD dito	dito307022	V 2.30
524	Voltage Drop Simulator	VDS 200	0196-16	Software Nr: 000037 Version V4.20a01
526	Burst Generator	EFT 200 A	0496-06	Software Nr. 000034 Version V2.32
527	Micro Pulse Generator	MPG 200 B	0496-05	Software-Nr. 000030 Version V2.43
528	Load Dump Simulator	LD 200B	0496-06	Software-Nr. 000031 Version V2.35a01
546	Univ. Radio Communication Tester	CMU 200	106436	R&S Test Firmware Base=5.14, GSM=5.14 WCDMA=5.14 (current Testsoftw.,f. all band to be used
547	Univ. Radio Communication Tester	CMU 200	835390/014	R&S Test Firmware Base=V5.1403 (current Testsoftw., f. all band used, GSM = 5.14 WCDMA: = 5.14
584	Spectrum Analyzer	FSU 8	100248	2.82_SP3
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
692	Bluetooth Tester	CBT 32	100236	CBT V 5.40, FW: V.2.41 (FPGA Digital, V. 3.09 FPGA RF)

8.1.3. Single instruments and test systems

Ref.-No.	Equipment	Type	Serial-No.	Manufacturer	Interval of calibration	Remark	Cal due
001	EMI Test Receiver	ESS	825132/017	Rohde & Schwarz	12 M	-	16.05.2019
005	AC - LISN (50 Ohm/50µH, test site 1)	ESH2-Z5	861741/005	Rohde & Schwarz	12 M	-	16.05.2019
007	Single-Line V-Network (50 Ohm/5µH)	ESH3-Z6	892563/002	Rohde & Schwarz	12 M	-	16.05.2019
009	Power Meter (EMS-radiated)	NRV	863056/017	Rohde & Schwarz	24 M	-	15.05.2019
011	Insertion Unit (EMS-radiated)	URV5-Z2	864169/004	Rohde & Schwarz	24 M	-	
012	Signal Generator (EMS-cond.)	SMY 01	839069/027	Rohde & Schwarz	24 M	-	15.05.2019
013	Power Meter (EMS cond.)	NRVD	839111/003	Rohde & Schwarz	24 M	-	15.05.2019
014	Insertion Unit (EMS cond.)	URV5-Z2	838519/029	Rohde & Schwarz	24 M	-	15.05.2019
015	Insertion Unit (EMS cond.)	URV5-Z4	838570/024	Rohde & Schwarz	24 M	-	15.05.2019
016	Line Impedance Simulating Network	Op. 24-D	B6366	Spitzenberger+Spies	36 M	-	30.05.2019
017	Digital Radiocommunication Tester	CMD 60 M	844365/014	Rohde & Schwarz	pre-m	3	
021	Loop Antenna (H-Field)	6502	9206-2770	EMCO	36 M	-	30.05.2021
031	Absorbing Clamp	MDS-21	863325/015	Rohde & Schwarz	36 M	-	30.05.2021
033	RF-current probe (100kHz-30MHz)	ESH2-Z1	879581/18	Rohde & Schwarz	24 M	-	15.05.2019
049	Current Clamp (injection)	F-120-2	48	FCC	24 M	-	30.05.2020
050	3-ph Coupling Decoupling Netw. (Burst)	CDN 300	176	Schaffner	36 M	-	30.05.2021
051	VHF-Current Probe 20-300 MHz	ESV-Z1	872421	Rohde & Schwarz	36 M	-	30.05.2021
052	Notch Filter DECT	WRCB 1887,82/1889,55SS	12	Wainwright Industries	pre-m	2	
057	relay-switch-unit (EMS system)	RSU	494440/002	Rohde & Schwarz	pre-m	1a	
058	capacitive clamp (Burst)	IP 4	99	Haefely	36 M	-	30.05.2021
060	power amplifier (DC-2kHz)	PAS 5000	B6363	Spitzenberger+Spies	-	3	
067	coupling decoupling-network	CDN 801-M2/M3	272	Lüthi	36 M	-	15.05.2020
068	coupling decoupling-network	CDN 801-M5	95226	Lüthi	36 M	-	17.05.2020
069	EM - clamp	EM101	9535159	Lüthi	36 M	-	30.05.2019
072	coupling decoupling-network	CDN 801-M2/M3	276	Lüthi	36 M	-	17.05.2020
083	AC - power supply, 0-10 A	EAC/MT 27010	910502096	EURO TEST	pre-m	2	
084	AC - power supply, 0-5 A	ELABO-8-34214	-	ELABO	pre-m	2	
085	AC - power supply, 0-10 A	R250	-	Schunterm.&Benningh.	pre-m	2	
086	DC - power supply, 0 -10 A	LNG 50-10	-	Heinzinger Electronic	pre-m	2	
087	DC - power supply, 0 -5 A	EA-3013 S	-	Elektro Automatik	pre-m	2	
091	USB-LWL-Converter	OLS-1	007/2006	Ing. Büro Scheiba	-	4	
094	artificial head (No.1)	4905	1566990	Brüel & Kjaer	pre-m	2	
099	passive voltage probe	ESH2-Z3	299.7810.52	Rohde & Schwarz	36 M	-	30.05.2021
100	passive voltage probe	Probe TK 9416	without	Schwarzbeck	36 M	-	30.05.2021
110	USB-LWL-Converter	OLS-1	-	Ing. Büro Scheiba	-	4	
119	RT Harmonics Analyzer dig. Flickermeter	B10	G60547	BOCONSULT	36 M	-	30.05.2019
131	RF-Current Probe	F-52	19	FCC	36 M	-	17.05.2020
133	horn antenna 18 GHz (Meas 1)	3115	9012-3629	EMCO	36 M	1c	10.03.2020
134	horn antenna 18 GHz (Subst 2)	3115	9005-3414	EMCO	36 M	-	10.03.2020
248	attenuator	SMA 6dB 2W	-	Radiall	pre-m	2	
249	attenuator	SMA 10dB 10W	-	Radiall	pre-m	2	
252	attenuator	N 6dB 12W	-	Radiall	pre-m	2	
256	attenuator	SMA 3dB 2W	-	Radiall	pre-m	2	
257	hybrid	4031C	04491	Narda	pre-m	2	
260	hybrid coupler	4032C	11342	Narda	pre-m	2	
261	Thermal Power Sensor	NRV-Z55	825083/0008	Rohde & Schwarz	24 M	-	30.05.2020
262	Power Meter	NRV-S	825770/0010	Rohde & Schwarz	24 M	-	30.05.2019
263	Signal Generator	SMP 04	826190/0007	Rohde & Schwarz	36 M	-	30.05.2019
265	peak power sensor	NRV-Z33, Model 04	840414/009	Rohde & Schwarz	24 M	-	30.05.2020
266	Peak Power Sensor	NRV-Z31, Model 04	843383/016	Rohde & Schwarz	24 M	-	30.05.2020
267	notch filter GSM 850	WRCA 800/960-6EEK	9	Wainwright GmbH	pre-m	2	
268	AC/DC power supply	EA 3050-A	9823636	Elektro Automatik	pre-m	-	
270	termination	1418 N	BB6935	Weinschel	pre-m	2	
271	termination	1418 N	BE6384	Weinschel	pre-m	2	
272	attenuator (20 dB) 50 W	Model 47	BF6239	Weinschel	pre-m	2	
273	attenuator (10 dB) 100 W	Model 48	BF9229	Weinschel	pre-m	2	
274	attenuator (10 dB) 50 W	Model 47 (10 dB) 50 W	BG0321	Weinschel	pre-m	2	
275	DC-Block	Model 7003 (N)	C5129	Weinschel	pre-m	2	
276	DC-Block	Model 7006 (SMA)	C7061	Weinschel	pre-m	2	
279	power divider	1515 (SMA)	LH855	Weinschel	pre-m	2	
284	coupling decoupling network	CDN 801-M1	1661	Lüthi	36 M	-	17.05.2020
285	coupling decoupling network	CDN 801-S1	1642	Lüthi	36 M	-	17.05.2020
295	Racal Digital Radio Test Set	6103	1572	Racal	pre-m	3	
296	audio measurement amplifier	2636C (Reserve)	R=316568/004 B=1537541	Brüel & Kjaer	pre-m	2	
298	Univ. Radio Communication Tester	CMU 200	832221/091	Rohde & Schwarz	pre-m	3	
299	audio microphone	134	-	Brüel & Kjaer	pre-m	2	
300	AC LISN (50 Ohm/50µH, 1-phase)	ESH3-Z5	892 239/020	Rohde & Schwarz	12 M	-	17.05.2019
301	attenuator (20 dB) 50W, 18GHz	47-20-33	AW0272	Lucas Weinschel	pre-m	2	

Ref.-No.	Equipment	Type	Serial-No.	Manufacturer	Interval of calibration	Remark	Cal due
302	horn antenna 40 GHz (Meas 1)	BBHA9170	155	Schwarzbeck	36 M	-	14.03.2020
303	horn antenna 40 GHz (Subst 1)	BBHA9170	156	Schwarzbeck	36 M	-	20.03.2020
304	fix dipole antenna 1,6 GHz	EMCO 3125-307	9907-1001	ETS	pre-m	-	
305	fix dipole antenna 1,8-2,0 GHz	EMCO 3125-306	9907-1001	ETS	pre-m	-	
306	fix dipole antenna 2,45 GHz	EMCO 3125-308	9907-1001	ETS	pre-m	-	
307	fix dipole antenna 3 GHz	EMCO 3125-309	9907-1001	ETS	pre-m	-	
317	1000 Hz calibrator 94 dB SPL	4230 94dB	1542286	Brüel & Kjaer	12 M	-	
323	Digital Radiocommunication Tester	CMD 55	825878/0034	Rohde & Schwarz	pre-m	3	
337	System CTC OATS NSA	System EMI OATS NSA	-	HD GmbH	24 M	5	12.04.2019
340	Digital Radiocommunication Tester	CMD 55	849709/037	Rohde & Schwarz	pre-m	3	
341	Digital Multimeter	Fluke 112	81650455	Fluke	24 M	-	30.05.2020
342	Digital Multimeter	Voltcraft M-4660A	IB 255466	Voltcraft	24 M	-	17.05.2019
344	adaptor 150/50 Ohm	150/50	-	Krohne	36 M	-	17.05.2020
345	adaptor 150/50 Ohm	150/50	-	Krohne	36 M	-	17.05.2020
347	laboratory site	radio lab.	-	-	-	5	
348	laboratory site	EMI conducted	-	-	-	5	
349	car battery 12 V	car battery 12 V	without	-	-	3	
350	car battery 12 V	car battery 12 V	without	-	-	3	
354	DC - Power Supply 40A	NGPE 40/40	448	Rohde & Schwarz	pre-m	2	
357	power sensor	NRV-Z1	861761/002	Rohde & Schwarz	24 M	-	24.05.2019
363	Kalibrieradapter HF-uns.	CR 100 A	without	Lüthi	24 M	-	30.05.2020
364	Kalibrieradapter HF-uns.	CR 100 A	128	Lüthi	24 M	-	30.05.2020
366	Ultra Compact Simulator	UCS 500 M4	V0531100594	EM-Test	12 M	-	30.05.2019
368	ROD-Antenna	HFH 2-Z1	879283/31	Rohde & Schwarz	60 M	-	17.07.2019
371	Bluetooth Tester	CBT32	100153	R&S	36 M	-	30.05.2019
373	Single-Line V-Network (50 Ohm/5µH)	ESH3-Z6	100535	Rohde & Schwarz	12 M	-	17.05.2019
374	Power Amplifier 0,8-3 GHz	60S1G3	306528	Amplifier Research	12 M	1a	20.03.2018
375	Directional Coupler	DC7144M1	306498	Amplifier Research	12 M	1a	20.03.2018
376	Horn Antenna 6 GHz	BBHA9120 E	BBHA 9120 E 179	Schwarzbeck	36 M	-	28.02.2020
377	EMI Test Receiver	ESCS 30	100160	Rohde & Schwarz	12 M	-	30.05.2019
386	Coupling Decoupling Network	CDN USB/p	19397	Schaffner	36 M	-	17.05.2020
387	Coupling Decoupling Network	CDN L-801 M2	2051	Lüthi	36 M	-	18.05.2020
388	Coupling Decoupling Network	CDN L-801 T2	1929	Lüthi	36 M	-	18.05.2020
389	Digital Multimeter	Keithley 2000	0583926	Keithley	pre-m	-	
390	Industry Acoustic System	MO 2000 Set	2127100123	Sennheiser	pre-m	2	
392	Radio Communication Tester	MT8820A	6K00000788	Anritsu	12 M	-	18.05.2018
399	Sound Calibrator	Sound Calibrator 4231	2665101	Brüel & Kjaer	12 M	-	30.05.2019
431	Model 7405	Near-Field Probe Set	9305-2457	EMCO	-	4	
436	Univ. Radio Communication Tester	CMU 200	103083	Rohde & Schwarz	12 M	-	06.03.2019
439	UltraLog-Antenna	HL 562	100248	Rohde & Schwarz	36 M	-	10.03.2020
440	CDN for Datacable	CDN-UTP	CDN-UTP 029	EMC Partner AG, CH	36 M	-	30.05.2019
442	CTC-SAR-EMS	System EMS field (SAR)	-	ETS-Lindgren / CETECOM	12 M	5	20.03.2018
450	6dB attenuator N/N	6806.17B 6dB	-	Huber & Suhner	12 M	-	20.05.2019
454	Oscilloscope	HM 205-3	9210 P 29661	Hameg	-	4	
455	Oscilloscope	HP 54602B	US 350 336 45	Hawlett Packard	-	4	
456	DC-Power supply 0-5 A	EA 3013 S	207810	Elektro Automatik	pre-m	2	
459	DC -Power supply 0-5 A , 0-32 V	EA-PS 2032-50	910722	Elektro Automatik	pre-m	2	
460	Univ. Radio Communication Tester	CMU 200	108901	Rohde & Schwarz	12 M	-	30.05.2019
462	AF-Generator	MX-2020	-	Conrad	-	4	
463	Universal source	HP3245A	2831A03472	Agilent	-	4	
466	Digital Multimeter	Fluke 112	89210157	Fluke USA	24 M	-	30.05.2020
467	Digital Multimeter	Fluke 112	89680306	Fluke USA	36 M	-	30.05.2019
468	Digital Multimeter	Fluke 112	90090455	Fluke USA	36 M	-	30.04.2021
477	ReRadiating GPS-System	AS-47	-	Automotive Cons. Fink	-	3	
480	power meter (Fula)	NRVS	838392/031	Rohde & Schwarz	24 M	-	16.05.2019
482	filter matrix	Filter matrix SAR 1	-	CETECOM (Brl)	-	1d	
487	System CTC NSA-Verification SAR-EMI	System EMI field (SAR) NSA	-	ETS Lindgren / CETECOM	24 M	-	31.03.2019
489	EMI Test Receiver	ESU40	1000-30	Rohde & Schwarz	12 M	-	18.05.2018
491	ESD Simulator dito	ESD dito	ditto307022	EM-Test	12 M	-	30.05.2019
498	Power Supply	NGPE 40/40	402	Rohde & Schwarz	pre-m	2	
500	Industry Acoustic System	MO 2000 Set	100048	Sennheiser	pre-m	2	
502	band reject filter	WRCG 1709/1786-1699/1796-	SN 9	Wainwright	pre-m	2	
503	band reject filter	WRCG 824/849-814/859-	SN 5	Wainwright	pre-m	2	
517	relais switch matrix	HF Relais Box Keithley	SE 04	Keithley	pre-m	2	
523	Digital Multimeter	L4411A	MY46000154	Agilent	24 M	-	18.05.2019
524	Voltage Drop Simulator	VDS 200	0196-16	EM Test	24 M	-	16.05.2019
525	CDN coupling network	CNA 200	1196-01	EM Test	24 M	-	16.05.2019
526	Burst Generator	EFT 200 A	0496-06	EM Test	24 M	-	16.05.2019
527	Micro Pulse Generator	MPG 200 B	0496-05	EM Test	24 M	-	16.05.2019
528	Load Dump Simulator	LD 200B	0496-06	EM Test	24 M	-	16.05.2019
529	6 dB Broadband resistive power divider	Model 1515	LH 855	Weinschel	pre-m	2	

Ref.-No.	Equipment	Type	Serial-No.	Manufacturer	Interval of calibration	Remark	Cal due
530	10 dB Broadband resistive power divider	R 416110000	LOT 9828	-	pre-m	2	
533	Impedance Stabilization Network	ISN T200A	25706	Teseq	36 M	-	18.05.2020
534	Impedance Stabilization Network	ISN T400A	24881	Teseq	36 M	-	18.05.2020
535	Impedance Stabilization Network	ISN T800	26321	Teseq	36 M	-	18.05.2020
536	Impedance Stabilization Network	ISN ST08	25867	Teseq	36 M	-	18.05.2020
541	Impedance Stabilization Network	ISN T8-Cat6	26373	Teseq Berlin	36 M	-	18.05.2020
546	Univ. Radio Communication Tester	CMU 200	106436	R&S	12 M	-	30.03.2018
547	Univ. Radio Communication Tester	CMU 200	835390/014	Rohde & Schwarz	12 M	-	05.07.2018
549	Log.Per-Antenna	HL025	1000060	Rohde & Schwarz	36/12 M	-	31.07.2018
550	System CTC S-VSWR Verification SAR-EMI	System EMI Field SAR S-VSWR	-	ETS Lindgren/CETECOM	24 M	-	30.03.2019
558	System CTC FAR S-VSWR	System CTC FAR S-VSWR	-	CTC	24 M	-	08.08.2019
574	Biconilog Hybrid Antenna	BTA-L	980026L	Frankonia	36/12 M	-	31.03.2019
584	Spectrum Analyzer	FSU 8	100248	Rohde & Schwarz	pre-m	-	
592	CDN-HDMI	CDN-HDMI	A3029004	Frankonia / Dr.Hubert	36 M	-	18.05.2020
595	Analog Adder	TS8910	-	Rohde & Schwarz	pre-m	2	
597	Univ. Radio Communication Tester	CMU 200	100347	Rohde & Schwarz	pre-m	-	
600	power meter	NRVD (Reserve)	834501/018	Rohde & Schwarz	24 M	-	17.05.2019
602	peak power sensor	NRV-Z32 (Reserve)	835080	Rohde & Schwarz	24 M	-	
607	Signal Generator	SMR 20	832033/011	Rohde & Schwarz	36 M	-	18.05.2020
611	DC power supply	E3632A	KR 75305854	Agilent	pre-m	2	
612	DC power supply	E3632A	MY 40001321	Agilent	pre-m	2	
613	Attenuator	R416120000 20dB 10W	Lot. 9828	Radiall	pre-m	2	
615	Analog Adder	TS8920	-	Rohde & Schwarz	pre-m	2	
616	Digitalmultimeter	Fluke 177	88900339	Fluke	24 M	-	30.05.2020
620	EMI Test Receiver	ESU 26	100362	Rohde-Schwarz	12 M	-	30.05.2019
625	Generic Test Load USB	Generic Test Load USB	-	CETECOM	-	2	
627	data logger	OPUS 1	201.0999.9302.6.4.1.43	G. Luftt GmbH	24 M	-	30.03.2019
637	High Speed HDMI with Ethernet 1m	HDMI cable with Ethernet 1m	-	Kogilink	-	2	
638	HDMI Kabel with Ethernet 1,5 m flach	HDMI cable with Ethernet	-	Reichelt	-	2	
640	HDMI cable 2m rund	HDMI cable 2m rund	-	Reichelt	-	2	
641	HDMI cable with Ethernet	Certified HDMI cable with	-	PureLink	-	2	
642	Wideband Radio Communication Tester	CMW 500	126089	Rohde&Schwarz	24 M	-	24.05.2019
644	Amplifierer	ZX60-2534M+	SN865701299	Mini-Circuits	-	-	
645	Power Amplifier	CBA 230M-080	T44236	TESEQ	-	1g	
670	Univ. Radio Communication Tester	CMU 200	106833	Rohde & Schwarz	24 M	-	30.05.2020
671	DC-power supply 0-5 A	EA-3013S	-	Elektro Automatik	pre-m	2	
672	Digitalmultimeter	Keithley 2700	1182075	Keithley	pre-m	-	
673	Diditalmultimeter	Keithley 2700	1181408	Keithley	pre-m	-	
674	Digitalmultimeter	Keithley 2700	1182090	Keithley	pre-m	-	
675	Digitalmultimeter	Keithley 2700	1162865	Keithley	pre-m	-	
676	Digitalmultimeter	Keithley 2700	1182092	Keithley	24 M	-	16.05.2019
677	Digitalmultimeter	Keithley 2700	1182089	Keithley	pre-m	-	
678	Power Meter	NRP	101638	Rohde&Schwarz	pre-m	-	
679	Power Supply	High Speed Power Supply	0783417	Keithley	pre-m	-	
680	Power Sensor	NRP-Z21	100622	Rohde & Schwarz	pre-m	-	
682	Vector Signal Generator	SMU 200A	101319	Rohde & Schwarz	pre-m	-	
683	Spectrum Analyzer	FSU 26	200571	Rohde & Schwarz	12 M	-	30.05.2019
684	Widerstand 100 Ohm	SL 403-403	72973	Teseq	pre-m	-	
685	Widerstand 100 OHM	SL 403-403	72974	Teseq	pre-m	-	
686	Field Analyzer	EHP-200A	160WX30702	Narda Safety Test Solutions	24 M	-	29.03.2019
687	Signal Generator	SMF 100A	102073	Rohde&Schwarz	12 M	-	30.05.2019
689	Vector Signal Generator	SMU200	100970	Rohde&Schwarz	24 M	-	30.05.2020
690	Spectrum Analyzer	FSU	100302/026	Rohde&Schwarz	24 M	-	16.05.2019
692	Bluetooth Tester	CBT 32	100236	Rohde & Schwarz	36 M	-	29.05.2020
695	ReRadiating GPS-System	AS-47	G1406003500001	Automotive Cons. Fink	-	3	
698	Sound Calibrator	Sound Calibrator 4231	2035208	Brüel & Kjaer	12 M	-	30.05.2019
700	Audio Analyzer	UPL 16	830695/0016	Rohde&Schwarz	24 M	-	30.04.2020
705	NRV-Z1	Power Sensor	893350/020	Rohde & Schwarz	12 M	-	30.05.2019
706	NRV-Z1	Power Sensor	830961/001	Rohde & Schwarz	12 M	-	30.05.2019
707	RadiCentre	CTR-1004B	10100037SN038-1	D.A.R.E!! Instruments	24 M	-	
708	Laser powered Electrical Field Strength Probe	RadiSense 6	10100037SN038	D.A.R.E!! Instruments BV	24 M	-	31.03.2019
710	RF Power Amplifier	BLMA 2560-100	1610879	Bonn Elektronik	12 M	-	20.03.2018
711	Harmonic Mixer 90 GHz - 140GHz	RPG FS-Z140	101004	RPG	24 M	-	22.02.2019
712	Harmonic Mixer 75 GHz - 110GHz	FS-Z110	101468	Rohde & Schwarz	24 M	-	22.02.2019
713	Harmonic Mixer, 50 GHz - 75GHz	FS-Z75	101022	Rohde & Schwarz	24 M	-	22.05.2019
714	Signal Analyzer 67GHz	FSW67	104023	Rohde & Schwarz	24 M	-	28.02.2020
715	Harmonic Mixer, 140 GHz - 220GHz	FS-Z220	101009	RPG Radiometer Physics	24 M	-	03.08.2019
716	Harmonic Mixer 220 GHz to 325 GHz	FS-Z325	101005	RPG Radiometer Physics	24 M	-	13.02.2019

Ref.-No.	Equipment	Type	Serial-No.	Manufacturer	Interval of calibration	Remark	Cal due
717	Signal Generator	SMP02	830682/005	Rohde&Schwarz	36 M	-	
718	Robot	Dasy 5 / TX90	F11/5GM9A1/A/01	Stäubli	pre-m	-	
747	Spectrum Analyzer	FSU 26	200152	Rohde & Schwarz	12 M	-	30.05.2019
751	Digital Optical System	optoCAN-FD Transceiver	17-010416	mk-messtechnik GmbH	-	-	
752	Digital Optical System	optoCAN-FD Transceiver	17-010083	mk-messtechnik GmbH	-	-	
753	Digital Optical System	optoCAN-FD Transceiver	17-010084	mk-messtechnik GmbH	-	-	
754	Digital Optical System	optoCAN-FD Transceiver	17-010415	mk-messtechnik GmbH	-	-	
755	Digital Optical System	optoLAN-100-MAX	17-010795	mk-messtechnik GmbH	-	-	
757	WIDEBAND RADIO COMMUNICATION	CMW500	163673	Rohde&Schwarz	12 M	-	20.07.2018
758	Signal Generator	SMU 200A	100754	Rohde & Schwarz	24 M	-	11.10.2019
780	Spectrum Analyzer	FSH3	101726	Rohde & Schwarz	12 M	-	19.07.2018
781	Power Supply	PS 2042-10 B	2815450369	Elektro-Automatik GmbH	-	-	
782	Power Supply	PS 2042-10 B	2815450348	lektro-Automatik GmbH & Co.KG	-	-	
783	Spectrum Analyzer	FSU 26	100414	Rohde & Schwarz	12 M	-	30.05.2019
784	Power Supply	NGSM 32/10	00196	Rohde & Schwarz	12 M	-	
785	RSP	RF Step Attenuator	860712/012	Rohde & Schwarz	12 M	-	

8.1.4. Legend

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

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

9. Versions of test reports (change history)

Version	Applied changes	Date of release
--	Initial release	2018-06-13
C1	Additional test H-Field 15cm top side	2018-07-16