

TEST REPORT
No.: 2-20759504c/09

According to
FCC Regulations
Part 15.109

for
OPTION N.V.

GSM/(E)GPRS USB Data Stick GI0505
(iCON505)





Laboratory Accreditation and Listings			
 Deutscher Akkreditierungs Rat DAT-P176/94-02	 FEDERAL COMMUNICATIONS COMMISSION USA Reg. No.: 99538 MRA US-EU 0003	 Industry Canada Reg. No.: IC 3465	 Reg. No.: R-2665, R-2666 C-2914, T-339
accredited according to DIN EN ISO/IEC 17025			
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1. Summary of test results

The test results apply exclusively to the test samples as presented in chapter 3.1. The CETECOM GmbH does not assume responsibility for any conclusions and generalizations taken in conjunction with other specimens or samples of the type of the item presented to tests.


Following tests have been performed to show compliance with applicable FCC 15 of the FCC CFR 47 Rules (2008-10-01)

The device iCON505 is a USB stick which offers GSM/(E)GPRS data transfer possibility to the host in which is inserted. Typically hosts are PC's or notebooks.


1.1. TESTS OVERVIEW Part 15.109, RSS-Gen

TEST CASES	PORT	REFERENCES & LIMITS			EUT set-up	EUT operating mode	Result
		FCC Standard	RSS Section	TEST LIMIT			
RX Mode							
AC-Power Lines Conducted Emissions	AC-Power lines	§15.107 §15.207	RSS-Gen, Issue 2: Chapter 7.2.2	FCC §15.107&15.209 Limits IC: Table 2, Chapter 7.2.2	--	--	Not applicable, no direct connection to AC-mains
RECEIVER Spurious emissions	Cabinet + Interconnecting cables (radiated)	§15.109 §15.33 §15.35	RSS-Gen, Issue 2: Chapter 6(a)	FCC 15.109 Limits IC-Limits: Chapter 6, Table 1	1	1+2	Passed


Remark: --



.....
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.....
Dipl.-Ing. C. Lorenz
Responsible for test report

2. Administrative Data

2.1. Identification of the testing laboratory

Company name:	CETECOM GmbH
Address:	Im Teelbruch 116 45219 Essen - Kettwig Germany
Laboratory accreditations/Listings:	DAR-Registration No. DAT-P176/94-02 FCC-Registration No. 99538, MRA US-EU 0003 IC-Registration No. 3465 VCCI Registration No. R-2665,R-2666,C-2914,T-339
Responsible for testing laboratory:	Dipl.-Ing. W. Richter
Deputies:	Dipl.-Ing. H. Strehlow, D. Franke

2.2. Test location

2.2.1. Test laboratory "CTC"

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

Order No.:	20759504
Responsible for test report and project leader:	Dipl.-Ing. C. Lorenz
Receipt of EUT:	2009-03-05
Date(s) of test:	2009-03-10 to 2009-03-11
Date of report:	2009-03-26

Version of template:	08.08

2.4. Applicant's details

Applicant's name:	OPTION N.V.
Address:	Gastoon Geenslaan 14 3001 Leuven Belgium
Contact person:	Mr. Thomas Gulinck

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. Additional declaration and description of main EUT

Main function	GSM/(E)GPRS USB Data Stick		
Commercial name	iCON505		
Type name	GI0505		
GSM Frequency range	GSM 850: 824 – 849MHz (Uplink), 869-894MHz (Downlink) GSM1900: 1850-1910MHz (Uplink), 1930-1990MHz (Downlink)		
Type of modulation	GMSK/8-PSK		
Number of channels	GSM 850: 128 – 251, 125 channels GSM1900: 512 – 810, 300 channels		
EMISSION DESIGNATOR(S)	300KGXW (GSM) 300KG7W (EDGE)		
Antenna Type	<input checked="" type="checkbox"/> Integrated <input type="checkbox"/> External, no RF- connector <input type="checkbox"/> External, separate RF-connector		
Antenna Gain	--		
MAX PEAK Output Power: Radiated (Peak Values)	GSM 850	27.8 dBm	
	E-GPRS 850	25.2 dBm	
	GSM 1900	28.3 dBm	
	E-GPRS 1900	26.5 dBm	
MAX PEAK Output Power: Conducted (Peak values)	GSM 850	32.4 dBm	
	E-GPRS 850	29.4 dBm	
	GSM 1900	29.8 dBm	
	E-GPRS 1900	28.7 dBm	
FCC-ID	NCMOGI0505		
IC	--		
Installed option	WCDMA FDD I + VIII (not operable in USA/Canada)		
Special EMI components	--		
Power supply	Nominal USB voltage 5.0V		
EUT sample type	<input type="checkbox"/> Production	<input checked="" type="checkbox"/> Pre-Production	<input type="checkbox"/> Engineering

3.2. Configuration of cables used for testing

Cable number	Item	Type	S/N serial number	HW hardware status	Cable length
Cable 1	USB cable	unshielded	--	--	around 2m, folded

3.3. 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	GSM/(E)GPRS USB Data Stick	GI0505	IMEI: 004401441092703 UCC: 14592-11881-2857	1.1	0.15.2

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

3.4. 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	Notebook Dell	Latitude D610	CTC#4 (CTC082006)	--	Windows XP + Terminal Program
AE 2	USB-Converter	OLS-1	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 + AE 2	AE 2 outside the anechoic chamber

*) 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	GSM 850 Idle mode BCCH 182	The mobile station is synchronized to the Broadcast Control Channel (BCCH) and listening to the Common Control Channel (CCCH). Periodic location update is disabled.
op. 2	GSM 1900 Idle mode BCCH 651	The mobile station is synchronized to the Broadcast Control Channel (BCCH) and listening to the Common Control Channel (CCCH).

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

3.7. Parameter Settings on mobile phone and base station CMU200

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

Parameter	Traffic Mode	Idle Mode
Traffic Channels mobile station (EUT)	GSM 850 TCH _{MS} = 128/ 192 /251 GSM 1900 TCH _{MS} = 512 / 681 / 810	--
maximum power level (PCL)	GSM 850: PCL = 5 (2 Watt) GSM 1900: PCL = 0 (1 Watt)	--
Modulation	GSM: GMSK-Modulation Scheme EDGE: 8-PSK Modulation Scheme	--
DTX	off	--
Bitstream	PRBS 2E9-1 (pseudo-random-sequence) – CCITT 0.153	
Timeslot	3	
Hopping	off	
Timeslot (slot mode)	GSM-Mode: single GPRS-Mode: maximum allowed uplink slots no. according MS class	
MS slot class	Class 12	
Maximum data transmission rate, single time slot	GSM: 17,6 kBit/s Slot EDGE: 59,2 kBit/s Slot	
Speech transcoding (Traffic Mode)	Full rate Version 1	
Mode	BCCH and TCH	
BCCH – base station (CMU,CMD)		GSM 850: 182 GSM 1900: 651
TCH – base station (CMD, CMU)	auto	
Power level TCH – base station (used timeslot level)	- 70 dBm	
Power level BCCH – base station (control channel level)	- 80 dBm	
External attenuation RF/AF-Input/Output	Accord. calibration prior to measurements	
Mobile Country Code	310	310
BS_AG_BLK_RES		0
Paging reorganisation		Off (0)
Signalling channel	Not applicable	SDCCH
Location Update		Auto
Cell access		Disabled (barred)

Settings for CMU (general)

Repetition	Continuous	
Stop condition	None	
Display mode	Max./Min	
Statistic Count	1000 Bursts	
Decoder	Standard	

Additional settings on the base stations CMU200 for frequency stability measurements

4. DESCRIPTION OF TEST SET-UP'S

4.1. Test set-up for radiated measurements

The radiated emissions from the test device are measured first as exploratory measurement in a FCC recognized semi anechoic chamber or fully anechoic chamber with the dimensions of 8.05m x 6.85m x 5.48m. Very critical frequencies within a defined range, can be re-checked on CETECOM's Open Area Test side, recognized by the FCC to be compliant with ANSI 63.4: 2001 according registration no. 99538.

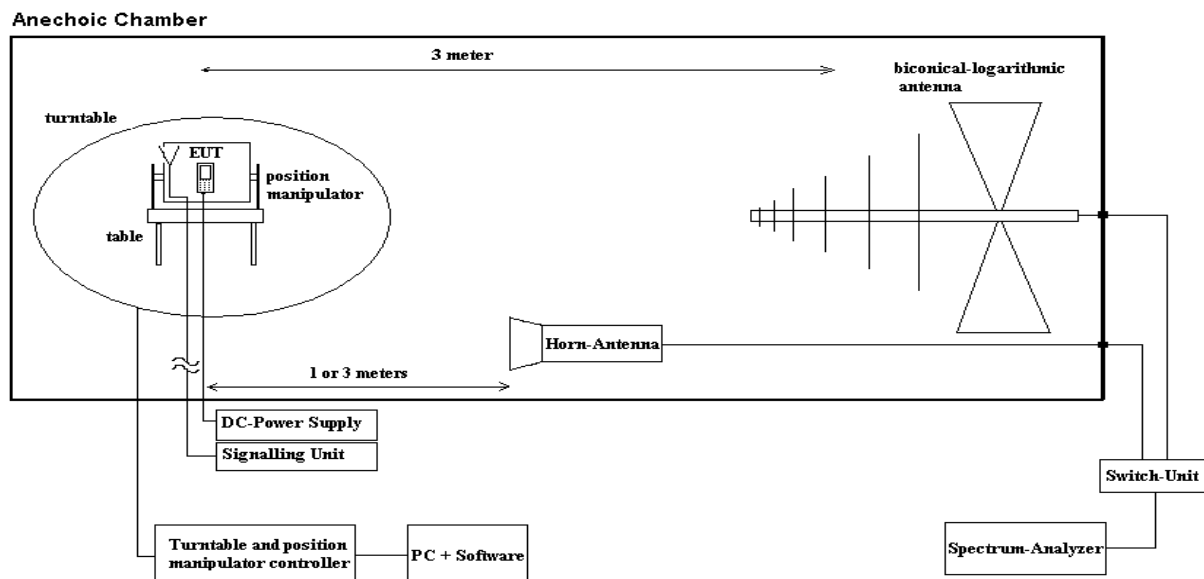
The EUT and accessories are placed on a non-conducting tipping table of 0.8 meter height (semi-anechoic chamber) or 1.55m height (fully-anechoic chamber) which is situated in the middle of the turntable. The turntable can rotate the device under test 360 degree, the position manipulator can rotate the device from laid to standing position. This way the device under test can be rotated in all three orthogonal planes in order to maximize the detected emissions. The turn- and position manipulator are controlled by a controller unit. All positions manipulations are software controlled from a operator PC.

The measurements are performed for both receiving antenna polarisations: vertical and horizontal.

Up to 18GHz a measurement distance of 3 meters is used, above 18GHz the distance is 1 meter. A biconical-logarithmic antenna up to 1 GHz and a horn antenna for frequencies above 1 GHz was used. (see equipment list)

The EUT is powered 5V DC by a an Host PC (AE1) with nominal 5V DC.

The communication signalling is performed from outside the chamber with a communication test simulator (CMU200 from Rohde&Schwarz or Anritsu MT8820).



Schematic: radiated measurements test set-up

5. Measurements

5.1. Radiated emissions, 30 MHz - 1 GHz, §15.109, RSS-gen

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
test site	<input checked="" type="checkbox"/> 441 EMI SAR	<input type="checkbox"/> 487 SAR NSA	<input type="checkbox"/> 337 OATS
receiver	<input type="checkbox"/> 377 ESCS30	<input checked="" type="checkbox"/> 001 ESS	<input type="checkbox"/> 347 Radio.lab.
spectr. analys.	<input type="checkbox"/> 381 380 FSBS	<input type="checkbox"/> 120 FSEM	<input type="checkbox"/> 264 FSEK
antenna	<input checked="" type="checkbox"/> 048 EMCO3143	<input type="checkbox"/> 133 EMCO3115	<input type="checkbox"/> 302 BBHA9170
signaling	<input type="checkbox"/> 298 CMU	<input type="checkbox"/> 460 CMU	<input type="checkbox"/> 289 CBL 6141
power supply	<input type="checkbox"/> 456 EA 3013A	<input type="checkbox"/> 457 EA 3013A	<input type="checkbox"/> 295 RACAL
otherwise	<input type="checkbox"/> 400 FTC40x15E	<input type="checkbox"/> 401 FTC40x15E	<input checked="" type="checkbox"/> 392 MT8820A
		<input type="checkbox"/> 110 USB LWL	<input type="checkbox"/> 268 EA- 3050
			<input type="checkbox"/> 494 AG6632A
			<input type="checkbox"/> 498 NGPE 40

STANDARDS AND LIMITS: CFR 47, PART 15, SUBPART B, §15.109 (CLASS B), §15.209, ANSI C63.4

Frequency [MHz]	Radiated emission limits [dBµV] Class B, 3 meters	
	QUASI-Peak [microvolts/meter]	QUASI-Peak [dBµV/m]
30-88	100	40.0
88-216	150	43.5
216-960	200	46.0
above 960	500	54.0

TEST CONDITION AND MEASUREMENT TEST SET-UP

link to test system (if used):	<input checked="" type="checkbox"/> air link	<input type="checkbox"/> cable connection	<input type="checkbox"/>
EUT-grounding	<input checked="" type="checkbox"/> none	<input type="checkbox"/> with power supply	<input type="checkbox"/> additional connection
Equipment set up	<input checked="" type="checkbox"/> table top 0.8m height	<input type="checkbox"/> floor standing	
Climatic conditions	Temperature: (21.4°C)	Rel. humidity: (33)%	Air pressure: (994hPa)
EMI-Receiver (Analyzer) Settings	Span/Range: 30 MHz to 1 GHz RBW/VBW: 120 kHz / (auto) Detector/ Mode: PEAK, TRACE max-hold mode, repetitive scan Quasi-Peak, for final measurement for critical measurements		

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	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	--
13.36-13.41	--	--	--

Remark: only spurious emissions are allowed within these frequency bands not exceeding the limits per §15.209

GENERAL MEASUREMENT PROCEDURES:

The measurement test set-up and test procedure are in accordance with the provisions described in ANSI 63.4: 2003

The *Equipment under Test* (EUT) set-up to defined operating mode and installed (connected) to accessory equipment according the general description of use given by the applicant.

MEASUREMENT METHOD (30 MHz <math>f < 1 \text{ GHz}</math>):

A EMI analyzer together with a broadband antenna was used in order to identify the emissions from the EUT by positioning the antenna close to the EUT surfaces. The interconnecting cables and equipment position were varied in order to maximize the emissions. Then most critical frequencies are recorded for further investigations. Based on the exploratory measurements, the most critical frequencies are re-measured by maintaining the EUT's operating mode, cable position, etc. The EUT was placed on a non-conductive support of 0.8 m height. By rotating the turntable angle 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) and the measurement antenna height from 1 meter to 4 meters, the maximized emissions are recorded. The measurements are performed for both polarizations of the measuring antenna: horizontal and vertical.

MEASUREMENT RESULTS**OPERATING MODE: IDLE GSM850**

Set-up No.		1								
Operating Mode		1								
Diagram no.	Frequency (MHz)	MaxPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB) (C _F)	Margin (dB) (M)	Limit (dB μ V/m) (L _T)
2.05	32.57	19.9	1000.0	120.0	100.0	V	57.0	13.6	20.1	40.0
	60.00	26.5	1000.0	120.0	330.0	H	342.0	6.5	13.5	40.0
	96.01	22.6	1000.0	120.0	212.0	H	352.0	7.7	20.9	43.5
	131.99	17.8	1000.0	120.0	187.0	H	184.0	9.4	25.7	43.5
	179.98	25.1	1000.0	120.0	156.0	H	202.0	10.5	18.4	43.5
	202.88	23.5	1000.0	120.0	193.0	H	210.0	11.6	20.0	43.5
	946.08	30.3	1000.0	120.0	304.0	V	323.0	27.1	15.7	46.0

Remark: *.) see diagrams in annex 2_20759504c_09-A1.pdf

OPERATING MODE: IDLE GSM1900

Set-up No.		1								
Operating Mode		2								
Diagram no.	Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB) (C _F)	Margin (dB) (M)	Limit (dBµV/m) (L _T)
2.06	33.11	22.0	1000.0	120.0	100.0	V	303.0	13.2	18.0	40.0
	59.98	26.6	1000.0	120.0	345.0	H	153.0	6.5	13.4	40.0
	96.03	21.0	1000.0	120.0	218.0	H	340.0	7.7	22.5	43.5
	202.87	28.2	1000.0	120.0	140.0	H	206.0	11.6	15.3	43.5
	949.18	30.3	1000.0	120.0	240.0	V	209.0	27.1	15.7	46.0

Remark: *.) see diagrams in annex 2_20759504c_09-A1.pdf

<p>Margin to Limit:</p> $M = L_T - R_R + C_F + D_F$ $= L_T - R_R + (AF_{ANTENNA} + Cable_{LOSS}) + D_F$ <p>Remark: positive margin means passed result</p>	<p>Abbreviations used:</p> <ul style="list-style-type: none"> • R_R: Receiver readings in dBµV/m • C_F: Transducer in dB = AF (antenna factor) + CL (cable loss) • D_F: distance correction factor (if different measurement distance used than specified in the standard)
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VERDICT

Summary of measurement results for radiated emissions above 30 MHz and below 1 GHz : Passed

5.2. Radiated emissions, above 1GHz, §15.109, RSS210, RSS132, RSS133, RSS-gen

TEST LOCATION AND EQUIPMENT (for reference numbers please see chapter 'List of test equipment')

test site	<input type="checkbox"/> 441 EMI SAR	<input type="checkbox"/> 348 EMI cond.	<input checked="" type="checkbox"/> 443 EMI FARr	<input type="checkbox"/> 347 Radio.lab.	<input type="checkbox"/> 337 OATS	<input type="checkbox"/>
equipment	<input type="checkbox"/> 331 HC 4055	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Spectr. analys.	<input type="checkbox"/> 138 139 FSBS	<input type="checkbox"/> 120 FSEM	<input type="checkbox"/> 264 FSEK	<input checked="" type="checkbox"/> 489 ESU	<input type="checkbox"/>	<input type="checkbox"/>
antenna meas	<input type="checkbox"/> 048 3143	<input checked="" type="checkbox"/> 289 CBL 6141	<input type="checkbox"/> 439 HL 562	<input checked="" type="checkbox"/> 133 EMCO3115	<input checked="" type="checkbox"/> 302 BBHA9170	<input type="checkbox"/> 477 GPS
antenna meas	<input type="checkbox"/> 123 HUF-Z2	<input type="checkbox"/> 132 HUF-Z3	<input type="checkbox"/> 030 HFH-Z2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
antenna subst	<input type="checkbox"/> 071 HUF-Z2	<input type="checkbox"/> 020 EMCO3115	<input type="checkbox"/> 063 LP 3146	<input type="checkbox"/> 303 BBHA9170	<input type="checkbox"/>	<input type="checkbox"/>
power meter	<input type="checkbox"/> 009 NRV	<input type="checkbox"/> 010 URV5-Z2	<input type="checkbox"/> 011 URV5-Z2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Signalgener.	<input type="checkbox"/> 008 SMG	<input type="checkbox"/> 140 SMHU	<input type="checkbox"/> 263 SMP04	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
power meter	<input type="checkbox"/> 262 NRV-S	<input type="checkbox"/> 266 NRV-Z31	<input type="checkbox"/> 265 NRV-Z33	<input type="checkbox"/> 261 NRV-Z55	<input type="checkbox"/> 356 NRV-Z1	<input type="checkbox"/>
DC power	<input type="checkbox"/> 086 LNG50-10	<input type="checkbox"/> 087 EA3013	<input type="checkbox"/> 354 NGPE 40	<input type="checkbox"/> 349 car battery	<input type="checkbox"/> 350 Car battery	<input type="checkbox"/>
multimeter	<input type="checkbox"/> 341 Fluke 112	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
signaling	<input type="checkbox"/> 298 CMU	<input checked="" type="checkbox"/> 460 CMU	<input type="checkbox"/> 295 RACAL	<input type="checkbox"/> 392 MT8820A		

STANDARDS AND LIMITS: CFR 47, PART 15, SUBPART B, §15.109 (CLASS B), §15.209, ANSI C63.4

Frequency [MHz]	Radiated emission limits [dBµV], 3 meters measurement distance			
	AV [microvolts/meter]	AV [dBµV/m]	Peak [microvolts/meter]	Peak [dBµV/m]
above 1GHz	500	54.0	5000	74.0

TEST CONDITION AND MEASUREMENT TEST SET-UP

link to test system (if used):	<input checked="" type="checkbox"/> air link	<input type="checkbox"/> cable connection	<input type="checkbox"/>
EUT-grounding	<input checked="" type="checkbox"/> none	<input type="checkbox"/> with power supply	<input type="checkbox"/> additional connection
Equipment set up	<input checked="" type="checkbox"/> table top 1.5m height	<input type="checkbox"/> floor standing	
Climatic conditions	Temperature: (22±3°C)	Rel. humidity: (40±20)%	Air pressure: (1000±20)hPa
Spectrum-Analyzer settings	Span/Frequency range : 1..18 GHz +single frequencies determined in step 1 RBW/VBW: 1 MHz / 3 MHz Detector/ Mode: Peak, MAX-hold, repetitive scan for exploratory measurement PEAK/ AVERAGE, for final measurement for critical frequencies Antenna Polarisation Horizontal / Vertical		

GENERAL MEASUREMENT PROCEDURES:

The measurement test set-up and test procedure are in accordance with the provisions described in ANSI 63.4: 2003

The *Equipment under Test* (EUT) was placed on a non-conductive positioning table of 0.8 or 1.5 meter height depending from the frequency range. The measuring distance was set to 3 meter for frequencies up to 18GHz and 1 meter above 18GHz.

The EUT was set-up to defined operating mode and installed (connected) to accessory equipment according the general description of use given by the applicant.

1. Step Exploratory measurement: see above description as in the frequency range lower 1GHz.

2. Step Final Measurement(1 GHz<f <18 GHz): On the Worst-Case EUT configuration, frequency components with a margin lower than 6 dB to the limits, will be re-measured by maintaining the EUT's operating mode, cable position, etc.. For find the worst-case emission, the turntable was changed in the range 0 to 360 degree and the EUT itself either over 3-orthogonal axis (not defined usage position) or 2-orthogonal axis (defined usage position). The measurements are performed for both polarizations of the measuring antenna: horizontal and vertical.

MEASUREMENT RESULTS:

OPERATING MODE: IDLE GSM850

Set-up No.		1								
Operating Mode		1								
Diagram no.	Frequency (MHz)	MaxPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB) (C _F)	Margin (dB) (M)	Limit (dB μ V/m) (L _T)
2.01	1794.5	38.83	10.0	1000	1.55	H/V	0..360°	--	> 20	74.0 (PK)
	1296.1	24.27	10.0	1000	1.55	H/V	0..360°	--	> 20	54.0 (AV)
2.02	4368.0	44.09	10.0	1000	1.55	H/V	0..360°	--	>20	74.0 (PK)
	3520.3	29.23	10.0	1000	1.55	H/V	0..360°	--	>20	54.0 (AV)

Remark: 1.) diagrams shows PK/AV detector measurements, see diagrams in annex 2_20759504c_09-A1.pdf

OPERATING MODE: IDLE GSM1900

Set-up No.		1								
Operating Mode		2								
Diagram no.	Frequency (MHz)	MaxPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB) (C _F)	Margin (dB) (M)	Limit (dBµV/m) (L _T)
2.03*	1296.1	24.28	10.0	1000.0	155.0	H/V	0..360°	--	> 20	54.0 (AV)
	1958.3*	53.32	10.0	1000.0	155.0	H/V	0..360°	--	--	--
2.04	3831.8	43.21	10.0	1000.0	155.0	H/V	0..360°	--	> 20	74.0 (PK)
	7327.6	49.83	10.0	1000.0	155.0	H/V	0..360°	--	>20	74.0 (PK)
	3665.9	29.07	10.0	1000.0	155.0	H/V	0..360°	--	>20	54.0 (AV)

Remark: * Signal on 1958.3MHz due to BCCH signal of the base signaling station
 1.) diagrams shows PK/AV detector measurements see diagrams in annex 2_20759504c_09-A1.pdf

<p>Margin to Limit:</p> $M = L_T - R_R + C_F + D_F$ $= L_T - R_R + (AF_{ANTENNA} + Cable_{LOSS}) + D_F$ <p>Remark: positive margin means passed result</p>	<p>Abbreviations used:</p> <ul style="list-style-type: none"> • R_R : Receiver readings in dBµV/m • C_F: Transducer in dB = AF (antenna factor) + CL (cable loss) • D_F : distance correction factor (if different measurement distance used than specified in the standard) • L_T : Limit in dBµV/m
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VERDICT

Summary of measurement results for radiated emissions above 1 GHz: Passed

5.3. Measurement uncertainties

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

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

Following table shows expectable uncertainties for each measurement type performed.

Measurement	Frequency range	Calculated uncertainty based on a confidence level of 95%	Remarks:
RF-Power Output conducted	9 kHz .. 20 GHz	1 dB	--
RF-Power Output radiated	30 MHz .. 4 GHz	3,17 dB	Substitution method
Conducted RF-emissions on antenna ports	9 kHz .. 20 GHz	1 dB	--
Radiated RF-emissions enclosure	150 kHz .. 30 MHz	5 dB	Magnetic field
	30 MHz .. 1 GHz	4,2 dB	E-Field
	1 GHz .. 18GHz	4.8 dB	E-Field
	1 GHz .. 20 GHz	3.17 dB	Substitution method
Occupied bandwidth	9 kHz .. 4 GHz	0,1272 ppm (Delta Marker method)	Frequency error
		1 dB	Power
Emission bandwidth	9 kHz .. 4 GHz	0,1272 ppm (Delta Marker method)	Frequency error
		1 dB	Power
Frequency stability	9 kHz .. 20 GHz	0,0636 ppm	--
Conducted emissions on AC-mains port (U _{CISPR})	9 kHz .. 150 kHz	4 dB	--
	150 kHz .. 30 MHz	3.6 dB	

Table : measurement uncertainties, valid for conducted/radiated measurements

6. Instruments and Ancillary

6.1. Used equipment "CTC"

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

6.1.1. 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	Communication Tester	CMD 60 M	844365/014	Firmware = V 3.52 .22.01.99, DECT Firmware D2.87
053	audio analyzer	UPA3	860612/022	Firm. V 4.3
119	RT harmonics analyser/dig. flickermeter	B10	G60547	Firm.= V 3.1DHG
120	spectrum analyzer	FSEM 30	845538/011	Bios=2.1, Analyzer-Firmware= 3.30.3
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
277	Vector-Networkanalyzer	ZVC	831363/0005	Bios= 3.3, Analyzer=3.52
295	Racal Digital Radio Test Set	6103	1572	UNIT Firmware= 4.04, SW-Main=4.04, SW-BBP=1.04,
298	Radio Communication Tester	CMU 200	832221/091	R&S Test Firmware =3.53 /3.54 (current Testsoftw. f.
323	Communication Tester	CMD 55	825878/034	Firm.= 3.52 .22.01.99
331	climatic test chamber -40/+80 Grad	HC 4055	43146	TSI 1.53
335	System-CTC-EMS-Conducted	System EMS Conducted	-	EMS-K1 Immunity Test-Software 1.20SR10
340	Communication 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 V4.6.1 + SW-Option K55
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,
420	System CTC CTIA-OTA	System CTC CTIA-OTA	-	EMQuest EMQ-100 Ver. 1.05
436	Radio Communication Tester	CMU 200	103083	R&S Test Firmware Base=5.01, Mess-Software=
441	System CTC-SAR-EMI	System EMI field (SAR)	-	EMC 32 Version 6.10, 3, ESXS-K1 Version 2.20
442	System CTC-SAR-EMS	System EMS field (SAR)	-	EMS-K1 Immunity-Software 1.20SR10
443	System CTC-FAR-EMI-Spuri	System CTC-FAR-EMI-	-	Spuri 6.4a und Spuri 7.0
444	System CTC FAR-EMS	System EMS-Field (FAR)	-	EMS-K1 Immunity-Software 1.20SR10
460	Radio Communication Tester	CMU 200	108901	R&S Test Firmware Base=5.01/Messsoftware=
489	emi test receiver	ESU40	1000-30	Firmware=4.33, Bios=V5.1-16-3, Specification=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
547	Universal Radiocommunikation Tester	CMU 200	835390/014	R&S Test Firmware =V5.03 (current Testsoftw. f. all

6.1.2. Single instruments and test systems

Ref.-No.	Equipment	Type	Serial-No.	Manufacturer	Interval of calibration	Remark	Cal due
001	emi test receiver	ESS	825132/017		12 M	-	31.03.2010
005	AC - LISN (50 Ohm/50µH, test site 1)	ESH2-Z5	861741/005		12 M	-	31.03.2009
007	DC - LISN (50 Ohm/5µH)	ESH3-Z6	892563/002		12 M	-	31.03.2009
009	power meter (EMS-radiated)	NRV	863056/017		12 M	-	31.03.2009
012	signal generator (EMS-cond.)	SMY 01	839069/027		36/12 M	-	31.03.2011
013	power meter (EMS cond.)	NRVD	839111/003		12 M	-	31.03.2009
014	insertion unit (EMS cond.)	URV5-Z2	838519/029		12 M	-	31.03.2009
015	insertion unit (EMS cond.)	URV5-Z4	838570/024		12 M	-	31.03.2009
016	line impedance simulating network	Op. 24-D	B6366		36 M	-	31.10.2010
017	Communication Tester	CMD 60 M	844365/014		12 M	-	31.03.2009
020	horn antenna 18 GHz (Subst 1)	3115	9107-3699		36/12 M	-	31.03.2010
021	loop antenna (H-Field)	6502	9206-2770		36 M	-	31.03.2010
022	audio measurement amplifier	2636C	1537643		12 M	-	31.03.2009
030	loop antenna (H-field)	HFH-Z2	879604/026		36 M	-	31.03.2012
031	absorbing clamp	MDS-21	863325/015		24 M	-	31.03.2011
033	RF-current probe (100kHz-30MHz)	ESH2-Z1	879581/18		12 M	-	31.03.2009
048	bicon. - log. antenna (SAR)	3143	1108		36/12 M	-	30.04.2011
049	current clamp (injection)	F-120-2	48		12 M	-	31.03.2009
050	3-ph coupling-decoupling-netw. (Burst)	CDN 300	176		12 M	-	31.03.2009
051	VHF-current probe 20-300 MHz	ESV-Z1	872421		12 M	-	31.03.2009
052	notch filter DECT	WRCB 1887.82/1889.55SS	12		12 M	-	31.03.2009
053	audio analyzer	UPA3	860612/022		36 M	-	31.03.2011
057	relay-switch-unit (EMS system)	RSU	494440/002		-	1a	30.04.2009
058	capacitive clamp (Burst)	IP 4	99		-	4	
059	ferrite tube	FGZ 40 X 15 E	4225		36 M	-	31.03.2010
060	power amplifier (DC-2kHz)	PAS 5000	B6363		-	3	
061	ferrite tube	FGZ 40 X 15 E	4250		36 M	-	31.03.2010
063	log.-per. antenna (Subst 1)	3146	860941/007		36/12 M	-	31.10.2010
065	attenuator, (6 dB) 50 Ohm, 250W	AT 50-6-250	521057		12 M	1b	30.04.2009
066	notch filter (WCDMA; FDD1)	WRCT 1900/2200-5/40-	5		12 M	-	31.03.2009
067	coupling decoupling-network	CDN801-M2/M3	272		12 M	-	31.03.2009
068	coupling decoupling-network	CDN 801-M5	95226		12 M	-	31.03.2009
069	EM - clamp	EM101	9535159		36 M	-	31.03.3009
070	ferrite tube	FTC101	4199		24/12 M	-	31.03.2010
071	biconical antenna (Subst 1)	HUF-Z2	863.029/010		36/12 M	-	31.10.2010
072	coupling decoupling-network	CDN801-M2/M3	276		12 M	-	31.03.2009
083	AC - power supply, 0-10 A	EAC/MT 27010	910502096		pre-m	2	
084	AC - power supply, 0-5 A	ELABO-8-34214	-		pre-m	2	
085	AC - power supply, 0-10 A	R250	-		pre-m	2	
086	DC - power supply, 0 -10 A	LNG 50-10	-		pre-m	2	
087	DC - power supply, 0 -5 A	EA-3013 S	-		pre-m	2	
090	Helmholtz coil: 2x10 coils in series	-	-		pre-m	4	
091	USB-LWL-Converter	OLS-1	007/2006		-	4	
094	artificial head (No.1)	4905	1566990		pre-m	2	
098	Wireless Protocol Tester	PTW70Wlan	100093		15 M	-	31.03.2010
099	passive voltage probe	ESH2-Z3	299.7810.52		12 M	-	31.03.2009
100	passive voltage probe	Probe TK 9416	without		12 M	-	31.03.2009
110	USB-LWL-Converter	OLS-1	-		-	4	
119	RT harmonics analyser/dig. flickermeter	B10	G60547		36 M	-	31.03.2010
120	spectrum analyzer	FSEM 30	845538/011		12 M	-	31.03.2010
121	notch filter GSM 1900	WRCB 1879.5/1880.5EE	15		12 M	-	31.03.2009
122	notch filter GSM 1800	WRCB 1747/1748	12		12 M	-	31.03.2009
123	biconical antenna (Subst 2)	HUF-Z2.	860941/007		36/12 M	-	31.03.2010
131	RF-Current Probe	F-52	19		12 M	-	31.03.2009
132	log.-per. antenna (Subst 2)	HUF-Z3	860862/014		36/12 M	-	31.03.2010
133	horn antenna 18 GHz (Meas 1)	3115	9012-3629		36/12 M	-	31.03.2010
134	horn antenna 18 GHz (Subst 2)	3115	9005-3414		12 M	-	31.03.2009
136	adjustable dipole antenna (Dipole 1)	3121C-DB4	9105-0697		12 M	-	31.03.2009
140	signal generator	SMHU	831314/006		24/12 M	-	31.03.2010
142	attenuator (6 dB) 2 W, 8 GHz	DGL N	-		12 M	1b	30.04.2009
248	attenuator	SMA 6dB 2W	-		pre-m	2	
249	attenuator	SMA 10dB 10W	-		pre-m	2	
252	attenuator	N 6dB 12W	-		pre-m	2	
254	high pass GSM1800/1900/DECT	5HC 2600/12750-1.5KK	23042		12 M	-	31.03.2009
256	attenuator	SMA 3dB 2W	-		pre-m	2	
257	hybrid	4031C	04491		pre-m	2	
260	hybrid coupler	4032C	11342		pre-m	2	
261	thermal power sensor	NRV-Z55	825083/0008		24/12 M	-	31.03.2010
262	power meter	NRV-S	825770/0010		24/12 M	-	31.03.2010
263	signal generator	SMP 04	826190/0007		36/12 M	-	31.03.2010
264	spectrum analyzer	FSEK 30	826939/005		12 M	-	31.03.2010
265	peak power sensor	NRV-Z33, Model 04	840414/009		24/12 M	-	31.03.2010
266	peak power sensor	NRV-Z31, Model 04	843383/016		24/12 M	-	31.03.2010
267	notch filter GSM 850	WRCA 800/960-6EEK	9		12 M	-	31.03.2009
268	AC/DC power supply	EA 3050-A	9823636		pre-m	2	
270	termination	1418 N	BB6935		pre-m	2	
271	termination	1418 N	BE6384		pre-m	2	
272	attenuator (20 dB) 50 W	Model 47	BF6239		pre-m	2	
273	attenuator, (10 dB) 100 W	Model 48	BF9229		pre-m	2	

Ref.-No.	Equipment	Type	Serial-No.	Manufacturer	Interval of calibration	Remark	Cal due
274	attenuator (10 dB) 50 W	Model 47 (10 dB) 50 W	BG0321		pre-m	2	
275	DC-Block	Model 7003 (N)	C5129		pre-m	2	
276	DC-Block	Model 7006 (SMA)	C7061		pre-m	2	
277	Vector-Networkanalyzer	ZVC	831363/0005		12 M	-	31.03.2010
279	power divider	1515 (SMA)	LH855		pre-m	2	
284	coupling decoupling network	CDN 801-M1	1661		12 M	-	31.03.2009
285	coupling decoupling network	CDN 801-S1	1642		12 M	-	31.03.2009
287	pre-amplifier 25MHz - 4GHz	AMF-2D-100M4G-35-10P	379418		12 M	-	31.03.2009
289	bicon. - log. antenna (OATS)	CBL 6141	4107		36/12 M	-	31.10.2010
290	notch filter GSM 900	WRCA 901.9/903.1SS	3RR		12 M	-	31.03.2009
291	high pass filter GSM 850/900	WHJ 2200-4EE	14		12 M	-	31.03.2009
295	Racal Digital Radio Test Set	6103	1572		24 M	3	30.11.2010
298	Radio Communication Tester	CMU 200	832221/091		12 M	-	31.03.2010
299	audio microphone	134	-		pre-m	2	
300	AC LISN (50 Ohm/50µH, 1-phase)	ESH3-Z5	892 239/020		12 M	-	31.03.2009
301	attenuator (20 dB) 50W, 18GHz	47-20-33	AW0272		pre-m	2	
302	horn antenna 40 GHz (Meas 1)	BBHA9170	155		24/12 M	-	31.03.2010
303	horn antenna 40 GHz (Subst 1)	BBHA9170	156		24/12 M	-	31.03.2010
304	fix dipole antenna 1,6 GHz	EMCO 3125-307	9907-1001		24/12 M	-	31.03.2009
305	fix dipole antenna 1.8-2,0 GHz	EMCO 3125-306	9907-1001		24/12 M	-	31.03.2009
306	fix dipole antenna 2,45 GHz	EMCO 3125-308	9907-1001		24/12 M	-	31.03.2009
307	fix dipole antenna 3 GHz	EMCO 3125-309	9907-1001		24/12 M	-	31.03.2009
312	Switch unit	TS-RSP	1000147		12 M	1f	31.03.2009
317	1000 Hz calibrator 94 dB SPL	4230 94dB	1542286		12 M	-	31.03.2010
323	Communication Tester	CMD 55	825878/034		12 M	-	31.03.2009
331	climatic test chamber -40/+80 Grad	HC 4055	43146		24 M	-	31.10.2010
335	System-CTC-EMS-Conducted	System EMS Conducted	-		12 M	5	30.04.2009
340	Communication Tester	CMD 55	849709/037		12 M	-	31.03.2010
341	digital multimeter	Fluke 112	81650455		24 M	-	31.03.2010
342	digital multimeter	Volterra M-4660A	IB 255466		12 M	-	31.03.2009
344	adaptor 150/50 Ohm	150/50	-		12 M	-	31.03.2009
345	adaptor 150/50 Ohm	150/50	-		12 M	-	31.03.2009
347	laboratory site	radio lab.	-		-	3	
348	laboratory site	EMI conducted	-		-	3	
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		24 M	-	31.03.2010
355	power meter	URV 5	891310/027		12 M	-	31.03.2009
356	power sensor	NRV-Z1	882322/014		24/12 M	-	31.03.2009
357	power sensor	NRV-Z1	861761/002		24/12 M	-	31.03.2009
358	Power Amplifier 10 kHz-220MHz	AR75A220M1	15860		12 M	1b	30.04.2009
362	TOSM Calibration Kit 50 Ohm	ZV-Z21/ZV-Z11	without		12 M	-	31.03.2010
365	10V Insertion Unit 50 Ohm	URV5-Z2	100880		24/12 M	-	31.03.2010
366	Ultra Compact Simulator	UCS 500 M4	V0531100594		12 M	-	31.03.2009
367	audio measurement amplifier	2636	316832/001		12 M	-	31.03.2009
369	insertion unit (SAR-EMS, Ch. A)	URV5-Z2	100301		24 M	-	31.03.2010
370	insertion unit (SAR-EMS, Ch. B)	URV5-Z2	100302		24 M	-	31.03.2009
371	Bluetooth Tester	CBT32	100153		12 M	-	31.03.2009
373	V-Network 5µH/50 Ohm	ESH3-Z6	100535		other	-	31.03.2010
374	power amplifier 0,8-3 GHz	60S1G3	306528		-	1a	30.04.2009
375	directional coupler	DC7144M1	306498		-	1a	30.04.2009
376	horn antenna 6 GHz	BBHA9120 E	BBHA 9120 E 179		12 M	-	31.03.2009
377	emi test receiver	ESCS 30	100160		12 M	-	11.11.2009
378	broadband RF field monitor	RadiSense III	03D00013SNO-08		12 M	-	31.03.2009
383	signal generator	SME 03	842 828 /034		36/12 M	-	31.03.2010
386	coupling decoupling network	CDN USB/p	19397		12 M	-	31.03.2009
387	coupling decoupling network	CDN L-801 M2	2051		12 M	-	31.03.2009
388	coupling decoupling network	CDN L-801 T2	1929		12 M	-	31.03.2009
389	digital multimeter	Keithley 2000	0583926		24 M	-	31.03.2011
390	Industry Acoustic System	MO 2000 Set	2127100123		-	4	
392	Radio Communication Tester	MT8820A	6K00000788		12 M	-	31.03.2010
394	power amplifier 80-1000 MHz	BLWA 0810-250/200	045610		-	1a	30.04.2009
399	Sound Calibrator	Sound Calibrator 4231	2665101		15	-	31.03.2010
400	ferrite tube (>15 dB, EN 55022)	FTC 40 X 15 E	5559		12 M	-	31.03.2009
401	ferrite tube (>15 dB, EN 55022)	FTC 40 X 15 E	5560		12 M	-	31.03.2009
411	Test Cable Kit N 50 Ohm (male)	ZV-Z11	100200		pre-m	2	
413	Quad-Ridge Horn Antenna	3164-04	00090667		12 M	1f	31.03.2009
414	Circularly polarized com. Antenna	3102	00033734		-	3	
415	Antenna Position Controller	2090	00035634		-	4	
416	MAPS Positioner (light duty)	2010	-		-	4	
420	System CTC CTIA-OTA	System CTC CTIA-OTA	-		12 M	5	31.03.2009
429	MAPS-Positionier (medium duty)	2015	-		-	4	
430	Thermo-Hygrometer	H270	54476		24 M	-	30.11.2010
431	Model 7405	Near-Field Probe Set	9305-2457		-	4	
432	pre-amplifier 100MHz-26GHz	JS4-00102600-38-5P	1030896		12 M	-	31.03.2009
436	Radio Communication Tester	CMU 200	103083		12 M	-	31.03.2010
439	UltraLog-Antenna	HL 562	100248		12 M	-	31.03.2009
440	CDN for Databable	CDN-UTP	CDN-UTP 029		24 M	-	31.03.2010
441	System CTC-SAR-EMI	System EMI field (SAR)	-		12 M	5	30.06.2009
442	System CTC-SAR-EMS	System EMS field (SAR)	-		12 M	5	30.04.2009
443	System CTC-FAR-EMI-Spuri	System CTC-FAR-EMI-	-		12 M	5	30.03.2009
444	System CTC FAR-EMS	System EMS-Field (FAR)	-		12 M	5	30.04.2009
448	notch filter WCDMA FDD II	WRCT 1850.0/2170.0-	5		12 M	1c	31.03.2009
449	notch filter WCDMA FDD V	WRCT 824.0/894.0-5/40-	1		12 M	1c	31.03.2009
454	Oscilloscope	HM 205-3	9210 P 29661		-	4	

Ref.-No.	Equipment	Type	Serial-No.	Manufacturer	Interval of calibration	Remark	Cal due
455	Oscilloscope	HP 54602B	US 350 336 45		-	4	
456	DC-Power supply 0-5A	EA 3013 S	207810		pre-m	2	
457	DC-Power supply, 0-5A	EA-3013 S	9624680		pre-m	2	
459	DC -power supply 0-5 A., 0-32 V	EA-PS 2032-50	910722		pre-m	2	
460	Radio Communication Tester	CMU 200	108901		12 M	-	31.03.2009
462	AF-Generator	MX-2020	-		-	4	
463	Universal source	HP3245A	2831A03472		-	4	
464	Thermo-Hygro-Monitor	WS-9400	without		24 M	-	30.11.2010
465	Thermo-Hygro-Monitor	WS-9400	without		24 M	-	30.11.2010
466	digital multimeter	Fluke 112	89210157		24 M	-	31.03.2010
467	digital multimeter	Fluke 112	89680306		24 M	-	31.03.2010
468	digital multimeter	Fluke 112	90090455		24 M	-	31.03.2010
470	Thermo-Hygro-Monitor	WS-9400	-		24 M	-	30.11.2010
476	Spectrum Analyzer	FSM	840500/004		24/12 M	-	31.03.2009
477	ReRadiating GPS-System	AS-47	-		-	3	
482	filtermatrix	FilterMatrix SAR 1	-		-	1d	
484	pre-amplifier 2,5 - 18 GHz	AMF-5D-02501800-25-	1244554		12 M	-	31.03.2009
487	NSA-Verification of CTC-SAR-EMI	Svstem EMI field (SAR)	-		12 M	-	31.10.2009
489	emi test receiver	ESU40	1000-30		12 M	-	31.03.2010
490	high pass 2,65 GHz>18GHz	6HC 2650/18000-3-KK	200709138		12 M	-	31.03.2009
491	ESD Simulator dito	ESD dito	dito307022		24 M	-	31.03.2011
494	power supply (GPIB)	Agilent 66332A	US 37474017		24/12 M	-	31.03.2011
498	Power Supply	NGPE 40/40	402		-	2	
500	industry Acoustic System	MO 2000 Set	100048		-	4	
502	band reject filter	WRCG 1709/1786-	SN 9		-	-	
503	band reject filter	WRCG 824/849-814/859-	SN 5		-	-	
517	relais swite matrix	HF Relais Box Keithley	SE 04		-	-	
522	electronical load	EL 9000	-		-	-	
523	Digitalmultimeter	L4411A	MY46000154		24 M	-	31.03.2009
524	Voltage Drop Simulator	VDS 200	0196-16		18 M	-	31.03.2009
525	Koppelnetzwerk	CNA 200	1196-01		18 M	-	31.03.2009
526	Burst Generator	EFT 200 A	0496-06		18 M	-	31.03.2009
527	Micro Pulse Generator	MPG 200 B	0496-05		18 M	-	31.03.2009
528	Load Dump Simulator	LD 200B	0496-06		18 M	-	31.03.2009
529	6 dB Broadband resistive power divider	Model 1515	LH 855		-	2	
530	10 dB Broadband resistive power divider	R 416110000	LOT 9828		2	-	
531	H-field system	Lackman System	without		-	2	
533	Impedance Stabilization Network	ISN T200A	25706		12 M	-	29.04.2009
534	Impedance Stabilization Network	ISN T400A	24881		12 M	-	29.04.2009
535	Impedance Stabilization Network	ISN T800	26321		12 M	-	28.04.2009
536	Impedance Stabilization Network	ISN ST08	25867		12 M	-	28.04.2009
541	Impedance Stabilization Network	ISN T8-Cat6	26373		12 M	-	
547	Universal Radiocommunikation Tester	CMU 200	835390/014		13 M	-	31.03.2009
548	Digital-Barometer	GBP 2300	ohne		36/12 M	-	31.03.2012