

TEST REPORT

No.: 2-20755853f/08

According to: FCC Regulations
Part 15.107 & 15.109

for

Toshiba Information Systems (UK) Ltd.

GSM/(E)GPRS/FDD Mobile Phone TM5-J01
+
AC/DC Adapter/ USB cable

Laboratory Accreditation and Listings			
 Deutscher Akkreditierungs Rat DAT-P176/94-02	 FEDERAL COMMUNICATIONS COMMISSION 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			
CETECOM GmbH Laboratory Radio Communications & Electromagnetic Compatibility Im Teelbruch 116 • 45219 Essen • Germany Registered in Essen, Germany, Reg. No.: HRB Essen 8984 Tel.: + 49 (0) 20 54 / 95 19-954 • Fax: + 49 (0) 20 54 / 95 19-964 E-mail: info@cetecom.de • Internet: www.cetecom.com			

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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.

According customers declaration, the mobile phones TM5-J01 (FCC ID SP2-TM5-J01) and TM5-E01 (FCC ID SP2-TM5-E01) are identical, except the radio unit of TM5-J01 which contains an additional FDD Band 6 transmitter. The similarities are valid for all other parts of the mobile phone, especially the unintentional transmitter part. Please see details on the detailed circuit and block diagrams.

Following tests have been performed to show compliance with applicable FCC Part 2 and Part 15 rules of the FCC CFR 47 (2008-10-01) and Industry Canada RSS-Gen, Issue 2 regulations.

1.1. TESTS OVERVIEW FCC Part 15&RSS

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 class B limits §15.207 Limits IC: Table 2, Chapter 7.2.2	1	1+2+3 +4+7	Passed
RECEIVER Radiated emissions	Cabinet + Interconnecting cables (radiated)	§15.109 §15.33 §15.35	RSS-132, Issue 2: 4.6 RSS-Gen, Issue 2: 6(a) RSS 133, Issue 3: 6.7(a)	FCC 15.109 Limits IC-Limits: Table 1, Chapter 6	1+2	1+3+5+6 +7	Passed

Remark: --



 Dipl.-Ing. W. Richter
 Responsible for testing laboratory


 GmbH
 Im Teelbruch 116
 45219 Essen
 Tel.: + 49 (0) 20 54 7 95 19 - 0
 Fax: + 49 (0) 20 54 7 95 19 - 997



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

2. Administrative Data

2.1. Identification of the testing laboratory

Company name:	CETECOM GmbH
Address:	Im Teelbruch 116 45219 Essen - Kettwig Germany
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.:	20755853
Responsible for test report and project leader:	Dipl.-Ing. C. Lorenz
Receipt of EUT:	2008-12-15
Date(s) of test:	2008-01-05 – 2009-02-05
Date of report:	2009-02-19

Version of template:	08.08

2.4. Applicant's details

Applicant's name:	Toshiba Information Systems (UK) Ltd.
Address:	Mobile Communication Divisions Delta House, The Crescent Southwood Business Park Farnborough, Hampshire, GU14 0NL, UK
Contact person:	Mr. Adrian Coyle

2.5. Manufacturer's details

Manufacturer's name:	Toshiba Corporation
Address:	1-1, Asahigaoka 3-chome, Hino-shi Tokyo, 191-8555 Japan

3. Equipment under test (EUT)

3.1. Additional declaration and description of main EUT

Main function	GSM/(E)GPRS/FDD Mobile with GPS Receiver		
Type	TM5-J01		
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	☒ Integrated ☐ External, no RF- connector ☐ External, separate RF-connector		
Antenna Gain	--		
MAX PEAK Output Power: GSM 850 Radiated	27.5 dBm		
E-GPRS 850	26.2 dBm		
GSM 1900	26.5 dBm		
E-GPRS 1900	27.9 dBm		
MAX PEAK Output Power: GSM 850 Conducted	32.0 dBm		
E-GPRS 850	30.2 dBm		
GSM 1900	29.4 dBm		
E-GPRS 1900	29.7 dBm		
FCC-ID	SP2-TM5-J01		
IC	--		
Installed option	GPS Receiver		
	FDD Band 1&6		
	Mini-USB connector		
Special EMI components	--		
Power supply	Regular power supply: 3.9 V nominal from Li-Io battery, which can be charged by wide voltage range AC/DC-Adapter (100V-240V)		
EUT sample type	☐ Production	☒ Pre-Production	☐ 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	TS-USB004	#1	PROTOTYPE I	--

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/FDD Mobile Phone	TM5-J01	359238020000371	CS3-1	Ver. 5001.0000.22
EUT B	AC/DC Adapter	TS-AC001-EU	#1	Prototype I	--
EUT C	USB-cable	TS-USB004	#1	Prototype I	--
EUT D	Battery	TSBTG01	--	--	--

*) 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	USB Converter	OLS-1	CTC#1	--	-
AE 2	GPS repeater	AS-47	CTC#1	--	--
AE 3	Notebook	DELL D610	CTC4	--	Windows XP + ActiveSynch Software

*) 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 + EUT B + EUT D (+ AE2)	For GPS mode also AE2 used
Set. 2	EUT A + EUT C + EUT D + AE 1 (+ AE3)	AE 3 situated outside 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 50	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 850 TCH mode TCH=192	A communication link is established between the mobile station and the test simulator. The transmitter is operated at its maximum rated output power: 33 dBm (power class 4; power control level 5). The input signal to the receiver is modulated with normal test modulation. The wanted RF input signal level to the receiver of the mobile station is set to a level to provide a stable communication link.
op. 3	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).
op. 4	GSM 1900 TCH mode TCH=661	A communication link is established between the mobile station and the test simulator. The transmitter is operated at its maximum rated output power: 30 dBm (power class 1; power control level 0). The input signal to the receiver is modulated with normal test modulation. The wanted RF input signal level to the receiver of the mobile station is set to a level to provide a stable communication link.
op. 5	GPS receive mode	The EUT is put in continuous GPS receive mode, the test sample is showing the received satellite positions with a corresponding installed software. This Op. Mode was set independent from other modes like GSM.
op. 6	Active Synch	With special software ActiveSynch installed on one notebook, data from the notebook could be transferred to the main EUT and vice-versa.
op. 7	Charging battery	Charging standard battery. This operating mode is combined with other op. modes.

*) 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: 180 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_BLKES_RES	Not applicable	0
Paging reorganisation		Off (0)
Signalling channel		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. Measurements

4.1. Conducted emissions on AC-Power lines

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

test location	☒ CETECOM Essen (Chapter 2.2.1)		☐ Please see Chapter 2.2.2		☐ Please see Chapter 2.2.3	
test site	☐ 333 EMI field	☒ 348 EMI cond.	☐ 334 EMS-field	☐ 335 EMS cond	☐ 347 Radio.lab.	☐ 337 OATS
receiver	☐ 001 ESS	☒ 377 ESCS 30	☐	☐	☐	☐
LISN	☒ 005 ESH2-Z5	☐ 007 ESH3-Z6	☐ 300 ESH3-Z5 & 50Ω used for AE		☐ no LISN for AE	
signaling	☐ 017 CMD 65	☐ 323 CMD 55	☐ 340 CMD 55			
signaling	☐ 298 CMU	☒ 460 CMU	☐ 295 RACAL		☐ 392 MT8820A	

STANDARDS AND LIMITS: PART 15, SUBPART B, §15.107 CLASS B, §15.207, KANADA: RSS-GEN:7.2.2, ANSI C63.4

Frequency [MHz]	Conducted limit [dBμV] Class B	
	QUASI-Peak	AVERAGE
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

Remark: * decreases with the logarithm of the frequency

TEST CONDITION AND MEASUREMENT PROCEDURES TEST SET-UP

link to test system (if used):	☒ air link	☐ cable connection	☐
EUT-grounding	☒ none	☐ with power supply	☐ additional connection
Equipment set up	☒ table top (40 cm distance to reference ground plane (wall))	☐ floor standing EUT stands isolated on reference ground plane (floor)	
Climatic conditions	Temperature: (24°C)	Rel. humidity: (23)%	Air pressure: (999)hPa
EMI-Receiver (Analyzer) Settings	Span/Range: 150 kHz to 30 MHz RBW: 9 kHz Detector/Mode: Max PEAK-hold, repetitive scan for preliminary testing Quasi-Peak Detector and Average-Detector for final measurement according ANSI 63.4, CISPR 16		

Devices which can be connected to the public AC-power network, should be tested against the radio frequency voltage conducted back into the AC-power line in the frequency range 150kHz to 30 MHz. 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 50Ω/50μH line impedance stabilization network (LISN) is used therefore. The EUT power input leads are connected through the LISN to the AC-power source. The LISN enclosure is electrically connected to the GND-plane. The measuring instrument is connected to the coaxial output of the LISN.

Tabletop devices were set-up on a 80 cm height over reference ground plane, floor standing equipment 10 cm raised above ground plane.

Measurements have been performed on each phase line and neutral line of the devices AC-power lines. The EUT was power supplied with 110 V/60Hz.

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.

Preliminary testing as a first step, determines the worst-case phase line (neutral or phase) as well as the most critical amplitude by changing the operating mode. A complete frequency-sweep is performed with PK-Detector.

Final testing for power phases and critical frequencies (Margin to AV- or QP limit lower than 3dB) as a second step includes measurements either on discrete frequency components with receivers detector set to Quasi-Peak and Average per frequency component or a complete sweep with corresponding detector.

MEASUREMENT RESULTS

Set-up no.		1					
Operating Mode		4					
Frequency [MHz]	Power lead	Readings on SA. (R _R) [dBμV]	Used Detector			Margin to Limit (M) [dB]	Verdict
			PK	QP	AV		
0.15-30 MHz	N/L1	see diagram 01.01	X	X	X	>3dB to AV/QP-limit	Passed
Remarks: For more information please see diagrams enclosed in the annex 2-20755853f/08-A1, chapter 1.1, positive margin means passed result							

Set-up no.		1					
Operating Mode		2					
Frequency [MHz]	Power lead	Readings on SA. (R _R) [dBμV]	Used Detector			Margin to Limit (M) [dB]	Verdict
			PK	QP	AV		
0.15-30 MHz	N/L1	see diagram 01.02	X	X	X	>3dB to AV/QP-limit	Passed
Remarks: For more information please see diagrams enclosed in the annex 2-20755853f/08-A1, chapter 1.1, positive margin means passed result							

Set-up no.		1					
Operating Mode		1					
Frequency [MHz]	Power lead	Readings on SA. (R _R) [dBμV]	Used Detector			Margin to Limit (M) [dB]	Verdict
			PK	QP	AV		
0.15-30 MHz	N/L1	see diagram 01.03	X	X	X	>3dB to AV/QP-limit	Passed
Remarks: For more information please see diagrams enclosed in the annex 2-20755853f/08-A1, chapter 1.1, positive margin means passed result							

Set-up no.		1					
Operating Mode		3					
Frequency [MHz]	Power lead	Readings on SA. (R _R) [dBμV]	Used Detector			Margin to Limit (M) [dB]	Verdict
			PK	QP	AV		
0.15-30 MHz	N/L1	see diagram 01.04	X	--	X	>3dB to AV/QP-limit	Passed
Remarks: For more information please see diagrams enclosed in the annex 2-20755853f/08-A1, chapter 1.1, positive margin means passed result							

Margin to Limit for verdict: $M = L_T - R_R + C_{Loss}$

Abbreviations used:

- R_R : Receiver readings in dBμV
- C_{Loss} : cable loss
- L_T : Limit in dBμV

VERDICT

Summary of measurement results for conducted emissions on AC-Power lines: Passed

4.2. Radiated emissions, 30 MHz - 1 GHz, §15.109, RSS210, RSS132, RSS133, RSS-gen

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

test location	☒ CETECOM Essen (Chapter. 2.2.1)	☐ Please see Chapter. 2.2.2	☐ Please see Chapter. 2.2.3
test site	☒ 441 EMI SAR	☐ 487 SAR NSA	☐ 337 OATS
receiver	☐ 377 ESCS30	☒ 001 ESS	☐ 347 Radio.lab.
spectr. analys.	☐ 381 380 FSBS	☐ 120 FSEM	☐ 264 FSEK
antenna	☒ 048 EMCO3143	☐ 133 EMCO3115	☐ 302 BBHA9170
signaling	☐ 298 CMU	☒ 460 CMU	☒ 392 MT8820A
power supply	☐ 456 EA 3013A	☐ 457 EA 3013A	☐ 459 EA 2032-50
otherwise	☐ 400 FTC40x15E	☐ 401 FTC40x15E	☒ 482 Filter Matrix

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
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):	☒ air link	☐ cable connection	☒ The EUT was power supplied with 110 V/60Hz.
EUT-grounding	☒ none	☐ with power supply	☐ additional connection
Equipment set up	☒ table top 0.8m height	☐ floor standing	
Climatic conditions	Temperature: (23°C)	Rel. humidity: (33)%	Air pressure: (893)hPa
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

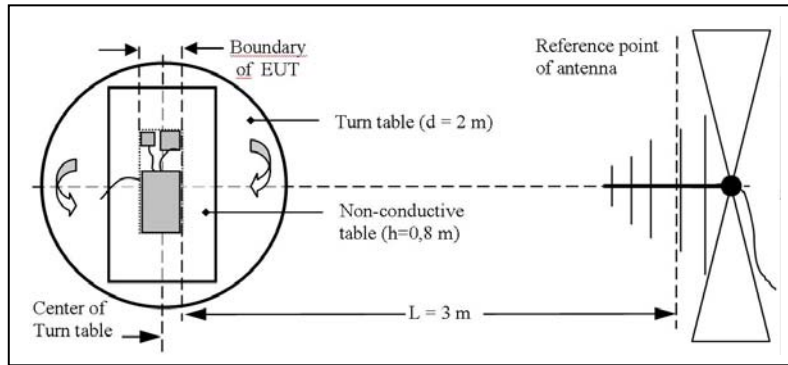
GENERAL MEASUREMENT PROCEDURES:

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 < F < 1 GHz):

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

Set-up No.		1								
Operating Mode		3+7								
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	30.410	31.8	1000.0	120.00	100.0	V	32.0	14.9	8.2	40.0
	63.810	22.3	1000.0	120.00	171.0	V	9.0	6.9	17.7	40.0
	123.020	15.6	1000.0	120.00	121.0	V	245.0	8.3	27.9	43.5
	898.68	31.2	1000.0	120.00	323.0	H	96.0	27.4	14.8	46.0

Remark: *.) For more information please see diagrams enclosed in the annex 2-20755853f/08-A1, chapter 1.2, positive margin means passed result

Set-up No.		1								
Operating Mode		1+7								
Diagram no.	Frequency (MHz)	MaxPeak (dB μ V/m)	Meas. Time (ms)	Band-width (kHz)	Antenna height (cm)	Polar-ity	Turntable position (deg)	Corr. (dB) (C _F)	Margin (dB) (M)	Limit (dB μ V/m) (L _T)
2.04	30.15	31.1	1000.0	120.0	100.0	V	118.0	15.0	8.9	40.0
	62.84	22.2	1000.0	120.0	162.0	V	355.0	6.8	17.8	40.0
	118.76	21.6	1000.0	120.0	183.0	H	144.0	7.9	21.9	43.5
	943.47	37.7	1000.0	120.0	248.0	H	53.0	27.0	8.3	46.0

Remark: *) For more information please see diagrams enclosed in the annex 2-20755853f/08-A1, chapter 1.2, positive margin means passed result

Set-up No.		2								
Operating Mode		3+6+7								
Diagram no.	Frequency (MHz)	MaxPeak (dB μ V/m)	Meas. Time (ms)	Band-width (kHz)	Antenna height (cm)	Polar-ity	Turntable position (deg)	Corr. (dB) (C _F)	Margin (dB) (M)	Limit (dB μ V/m) (L _T)
2.07	54.01	7.0	1000.0	120.000	100.0	V	29.0	7.2	33.0	40.0
	65.98	9.1	1000.0	120.000	204.0	V	148.0	7.0	30.9	40.0
	66.17	12.0	1000.0	120.000	181.0	V	320.0	7.0	28.0	40.0
	78.12	10.5	1000.0	120.000	287.0	V	146.0	7.8	29.5	40.0
	83.98	33.2	1000.0	120.000	368.0	H	0.0	8.8	6.8	40.0
	89.96	31.2	1000.0	120.000	368.0	H	24.0	8.5	12.3	43.5
	209.97	29.2	1000.0	120.000	157.0	H	319.0	12.2	14.3	43.5
	918.93	30.3	1000.0	120.000	170.0	V	318.0	26.5	15.7	46.0

Remark: *) For more information please see diagrams enclosed in the annex 2-20755853f/08-A1, chapter 1.2, positive margin means passed result

Set-up No.		1								
Operating Mode		3+5+7								
Diagram no.	Frequency (MHz)	MaxPeak (dBμV/m)	Meas. Time (ms)	Band-width (kHz)	Antenna height (cm)	Polar-ity	Turntable position (deg)	Corr. (dB) (C _F)	Margin (dB) (M)	Limit (dBμV/m) (L _T)
2.12	30.20	35.58	20.00	120.0	1..4.00m	H/V	0..360°	--	4.42	40.0 (QP)
	136.48	28.76	20.00	120.0	1..4.00m	H/V	0..360°	--	14.74	43.5 (QP)
	895.88	42.60	20.00	120.0	1..4.00m	H/V	0..360°	--	3.4	46.0 (QP)

Remark: *) For more information please see diagrams enclosed in the annex 2-20755853f/08-A1, chapter 1.2, positive margin means passed result

Margin to Limit:

$$M = L_T - R_R + C_F + D_F$$

$$= L_T - R_R + (AF_{ANTENNA} + Cable_{LOSS}) + D_F$$

Remark: positive margin means passed result

Abbreviations used:

- R_R : Receiver readings in dBμV/m
- CF: Transducer in dB = AF (antenna factor) + CL (cable loss)
- D_F : distance correction factor (if different measurement distance used than specified in the standard)

VERDICT

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

MEASUREMENT RESULTS:

Set-up No.		1								
Operating Mode		3+7								
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	2018.5	40.29	10.0	1000.0	1.55	H/V	0..360°	--	33.71	74.0 (PK)
2.02	14223.3	60.71	10.0	1000.0	1.55	H/V	0..360°	--	13.23	74.0 (PK)
	17694.6	64.65	10.0	1000.0	1.55	H/V	0..360°	--	9.35	74.0 (PK)

Remarks:

For more information please see diagrams enclosed in the annex 2-20755853f/08-A1, chapter 1.3, positive margin means passed result

1.) diagrams shows PK/AV detector measurements

Set-up No.		1								
Operating Mode		1+7								
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	1382.2	37.32	10.0	1000.0	1.55	H/V	0..360°	--	36.68	74.0 (PK)
2.06	14318.7	59.0	100.0	1000.0	155.0	H	207.0	18.6	15.0	74.0 (PK)
	17715.1	63.0	100.0	1000.0	155.0	V	-26.0	22.0	11.0	74.0 (PK)

Remarks:

For more information please see diagrams enclosed in the annex 2-20755853f/08-A1, chapter 1.3, positive margin means passed result

1.) diagrams shows PK/AV detector measurements

Set-up No.		2								
Operating Mode		3+6+7								
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)
2.08	1947.8 ^{2.)}	48.22	100.0	1000.0	155.0	V/H	0..360°	--	11.0	74.0 (PK)
	1947.8 ^{2.)}	46.00	100.0	1000.0	155.0	V/H	0..360°	--	8.0	54.0 (AV)
2.09	3598.7	28.84	100.0	1000.0	155.0	V/H	0..360°	--	25.16	54.0 (AV)

Remarks: For more information please see diagrams enclosed in the annex 2-20755853f/08-A1, chapter 1.3, positive margin means passed result

1.) diagrams shows PK/AV detector measurements

2.) signal from Base station (CH600), not from EUT

Set-up No.		1								
Operating Mode		3+5+7								
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)
2.10	1573.3 ^{2.)}	50.72	100.0	1000.0	155.0	V/H	0..360°	--	23.28	74.0 (PK)
	1575.4 ^{2.)}	35.50	100.0	1000.0	155.0	V/H	0..360°	--	18.5	54.0 (AV)
	1958.3	42.96	100.0	1000.0	155.0	V/H	0..360°	--	31.04	74.0 (PK)
2.11	Noise Level	--	100.0	1000.0	155.0	V/H	0..360°	--	> 20 dB	74 (PK) 54 (AV)

Remarks: for more information please see diagrams enclosed in the annex 2-20755853f/08-A1, chapter 1.3, positive margin means passed result

1.) diagrams shows PK/AV detector measurements

2.) Signal from GPS Repeater, not from EUT

3.) signal from Base station (CH651), not from EUT

Margin to Limit:

$$M = L_T - R_R + C_F + D_F$$

$$= L_T - R_R + (AF_{ANTENNA} + Cable_{LOSS}) + D_F$$

Remark: positive margin means passed result

Abbreviations used:

- 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

VERDICT

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

4.4. Measurement uncertainties

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

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

Following table shows expectable uncertainties for each measurement type performed.

Measurement	Frequency range	Calculated uncertainty based on a confidence level of 95%	Remarks:
RF-Power Output conducted	9 kHz .. 20 GHz	1.0 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	5.0 dB	Magnetic field
	30 MHz .. 1 GHz	4.02 dB	E-Field
	1 GHz .. 18 GHz	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	4.0 dB	--
	150 kHz .. 30 MHz	3.6 dB	

Table : measurement uncertainties, valid for conducted/radiated measurements

5. Instruments and Ancillary

5.1. Used equipment “CTC”

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

5.1.1. 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=4.53, Mess-Software=4.52
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=4.52/Messsoftware=4.51
489	emi test receiver	ESU40	1000-30	Firmware=3.93, 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

5.1.2. Single instruments and test systems

Ref.-No.	Equipment	Type	Serial-No.	Manufacturer	Interval of calibration	Remark	Cal due
001	emi test receiver	ESS	825132/017	Rohde & Schwarz	12 M	-	31.03.2009
005	AC - LISN (50 Ohm/50µH, test site 1)	ESH2-Z5	861741/005	Rohde & Schwarz	12 M	-	31.03.2009
007	DC - LISN (50 Ohm/5µH)	ESH3-Z6	892563/002	Rohde & Schwarz	12 M	-	31.03.2009
009	power meter (EMS-radiated)	NRV	863056/017	Rohde & Schwarz	12 M	-	31.03.2009
012	signal generator (EMS-cond.)	SMY 01	839069/027	Rohde & Schwarz	36/12 M	-	31.03.2011
013	power meter (EMS cond.)	NRVD	839111/003	Rohde & Schwarz	12 M	-	31.03.2009
014	insertion unit (EMS cond.)	URV5-Z2	838519/029	Rohde & Schwarz	12 M	-	31.03.2009
015	insertion unit (EMS cond.)	URV5-Z4	838570/024	Rohde & Schwarz	12 M	-	31.03.2009
016	line impedance simulating network	Op. 24-D	B6366	Spitzenberger+Spies	36 M	-	31.10.2010
017	Communication Tester	CMD 60 M	844365/014	Rohde & Schwarz	12 M	-	31.03.2009
020	horn antenna 18 GHz (Subst 1)	3115	9107-3699	EMCO	36/12 M	-	31.03.2010
021	loop antenna (H-Field)	6502	9206-2770	EMCO	36 M	-	31.03.2010
022	audio measurement amplifier	2636C	1537643	Brüel & Kjaer	12 M	-	31.03.2009
030	loop antenna (H-field)	HFH-Z2	879604/026	Rohde & Schwarz	36 M	-	31.03.2009
031	absorbing clamp	MDS-21	863325/015	Rohde & Schwarz	24/12 M	-	31.03.2009
033	RF-current probe (100kHz-30MHz)	ESH2-Z1	879581/18	Rohde & Schwarz	12 M	-	31.03.2009
048	bicon. - log. antenna (SAR)	3143	1108	EMCO	36/12 M	-	30.04.2011
049	current clamp (injection)	F-120-2	48	FCC	12 M	-	31.03.2009
050	3-ph coupling-decoupling-netw. (Burst)	CDN 300	176	Schaffner	12 M	-	31.03.2009
051	VHF-current probe 20-300 MHz	ESV-Z1	872421	Rohde & Schwarz	12 M	-	31.03.2009
052	notch filter DECT	WRCB 1887,82/1889,55SS	12	Wainwright Industries	12 M	-	31.03.2009
053	audio analyzer	UPA3	860612/022	Rohde & Schwarz	36 M	-	31.03.2011
057	relay-switch-unit (EMS system)	RSU	494440/002	Rohde & Schwarz	-	1a	30.04.2009
058	capacitive clamp (Burst)	IP 4	99	Hafely	-	4	
059	ferrite tube	FGZ 40 X 15 E	4225	Lüthi	36 M	-	31.03.2010
060	power amplifier (DC-2kHz)	PAS 5000	B6363	Spitzenberger+Spies	-	3	
061	ferrite tube	FGZ 40 X 15 E	4250	Lüthi	36 M	-	31.03.2010
063	log.-per. antenna (Subst 1)	3146	860941/007	EMCO	36/12 M	-	31.10.2010
065	attenuator, (6 dB) 50 Ohm, 250W	AT 50-6-250	521057	BNOS Electronics	12 M	1b	30.04.2009
066	notch filter (WCDMA; FDD1)	WRCT 1900/2200-5/40-	5	Wainwright GmbH	12 M	-	31.03.2009
067	coupling decoupling-network	CDN801-M2/M3	272	Lüthi	12 M	-	31.03.2009
068	coupling decoupling-network	CDN 801-M5	95226	Lüthi	12 M	-	31.03.2009
069	EM - clamp	EM101	9535159	Lüthi	36 M	-	31.03.2009
070	ferrite tube	FTC101	4199	Lüthi	24/12 M	-	31.03.2010
071	biconical antenna (Subst 1)	HUF-Z2	863.029/010	Rohde & Schwarz	36/12 M	-	31.10.2010
072	coupling decoupling-network	CDN801-M2/M3	276	Lüthi	12 M	-	31.03.2009
079	4 wire T-network	EZ-10	862 939 / 011	Rohde & Schwarz	24/12 M	-	31.03.2009
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	
090	Helmholtz coil: 2x10 coils in series	-	-	RWTÜV	pre-m	4	
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	12 M	-	31.03.2009
100	passive voltage probe	Probe TK 9416	without	Schwarzbeck	12 M	-	31.03.2009
110	USB-LWL-Converter	OLS-1	-	Extrem USB	-	4	
119	RT harmonics analyser/dig. flickermeter	B10	G60547	BOCONSULT	36 M	-	31.03.2010
120	spectrum analyzer	FSEM 30	845538/011	Rohde & Schwarz	12 M	-	31.03.2009
121	notch filter GSM 1900	WRCB 1879,5/1880,5EE	15	Wainwright GmbH	12 M	-	31.03.2009
122	notch filter GSM 1800	WRCB 1747/1748	12	Wainwright GmbH	12 M	-	31.03.2009
123	biconical antenna (Subst 2)	HUF-Z2,	860941/007	Rohde & Schwarz	36/12 M	-	31.03.2010
131	RF-Current Probe	F-52	19	FCC	12 M	-	31.03.2009
132	log.-per. antenna (Subst 2)	HUF-Z3	860862/014	Rohde & Schwarz	36/12 M	-	31.03.2010
133	horn antenna 18 GHz (Meas 1)	3115	9012-3629	EMCO	36/12 M	-	31.03.2010
134	horn antenna 18 GHz (Subst 2)	3115	9005-3414	EMCO	12 M	-	31.03.2009
136	adjustable dipole antenna (Dipole 1)	3121C-DB4	9105-0697	EMCO	12 M	-	31.03.2009
137	1000 Hz calibrator 94 dB SPL	4230 94 dB	1 594 698	Brüel & Kjaer	12 M	-	31.03.2009
140	signal generator	SMHU	831314/006	Rohde & Schwarz	24/12 M	-	31.03.2010
142	attenuator (6 dB) 2 W, 8 GHz	DGL N	-	Radiall	12 M	1b	30.04.2009
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	
254	high pass GSM1800/1900/DECT	5HC 2600/12750-1.5KK	23042	Trilithic	12 M	-	31.03.2009
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	24/12 M	-	31.03.2010
262	power meter	NRV-S	825770/0010	Rohde & Schwarz	24/12 M	-	31.03.2010
263	signal generator	SMP 04	826190/0007	Rohde & Schwarz	36/12 M	-	31.03.2010
264	spectrum analyzer	FSEK 30	826939/005	Rohde & Schwarz	12 M	-	31.03.2009
265	peak power sensor	NRV-Z33, Model 04	840414/009	Rohde & Schwarz	24/12 M	-	31.03.2010
266	peak power sensor	NRV-Z31, Model 04	843383/016	Rohde & Schwarz	24/12 M	-	31.03.2010
267	notch filter GSM 850	WRCA 800/960-6EEK	9	Wainwright GmbH	12 M	-	31.03.2009
268	AC/DC power supply	EA 3050-A	9823636	-	pre-m	2	
270	termination	1418 N	BB6935	Weinschel	pre-m	2	
271	termination	1418 N	BE6384	Weinschel	pre-m	2	
272	attenuator (20 dB) 50 W	Model 47	BF6239	Weinschel	pre-m	2	

Ref.-No.	Equipment	Type	Serial-No.	Manufacturer	Interval of calibration	Remark	Cal due
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	Vector-Networkanalyzer	ZVC	831363/0005	Rohde & Schwarz	12 M	-	31.03.2009
279	power divider	1515 (SMA)	LH855	Weinschel	pre-m	2	
284	coupling decoupling network	CDN 801-M1	1661	Lüthi	12 M	-	31.03.2009
285	coupling decoupling network	CDN 801-S1	1642	Lüthi	12 M	-	31.03.2009
287	pre-amplifier 25MHz - 4GHz	AMF-2D-100M4G-35-10P	379418	Miteq	12 M	-	31.03.2009
289	bicon. - log. antenna (OATS)	CBL 6141	4107	Schaffner Chase	36/12 M	-	31.10.2010
290	notch filter GSM 900	WRCA 901,9/903,1SS	3RR	Wainwright GmbH	12 M	-	31.03.2009
291	high pass filter GSM 850/900	WHJ 2200-4EE	14	Wainwright GmbH	12 M	-	31.03.2009
295	Racal Digital Radio Test Set	6103	1572	Racal	24 M	3	30.11.2010
298	Radio Communication Tester	CMU 200	832221/091	Rohde & Schwarz	12 M	-	31.03.2009
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	-	31.03.2009
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	24/12 M	-	31.03.2010
303	horn antenna 40 GHz (Subst 1)	BBHA9170	156	Schwarzbeck	24/12 M	-	31.03.2010
304	fix dipole antenna 1,6 GHz	EMCO 3125-307	9907-1001	ETS	24/12 M	-	31.03.2009
305	fix dipole antenna 1,8-2,0 GHz	EMCO 3125-306	9907-1001	ETS	24/12 M	-	31.03.2009
306	fix dipole antenna 2,45 GHz	EMCO 3125-308	9907-1001	ETS	24/12 M	-	31.03.2009
307	fix dipole antenna 3 GHz	EMCO 3125-309	9907-1001	ETS	24/12 M	-	31.03.2009
312	Switch unit	TS-RSP	1000147	R&S	12 M	1f	31.03.2009
317	1000 Hz calibrator 94 dB SPL	4230 94dB	1542286	Brüel & Kjaer	12 M	-	31.03.2009
323	Communication Tester	CMD 55	825878/034	Rohde & Schwarz	12 M	-	31.03.2009
331	climatic test chamber -40/+80 Grad	HC 4055	43146	Heraeus Vötsch	24 M	-	31.10.2010
335	System-CTC-EMS-Conducted	System EMS Conducted	-	Rohde & Schwarz	12 M	5	30.04.2009
340	Communication Tester	CMD 55	849709/037	Rohde & Schwarz	12 M	-	31.03.2009
341	digital multimeter	Fluke 112	81650455	Fluke	24 M	-	31.03.2010
342	digital multimeter	Voltcraft M-4660A	1B 255466	Voltcraft	12 M	-	31.03.2009
344	adaptor 150/50 Ohm	150/50	-	Krohne	12 M	-	31.03.2009
345	adaptor 150/50 Ohm	150/50	-	Krohne	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	Rohde & Schwarz	24 M	-	31.03.2010
355	power meter	URV 5	891310/027	Rohde & Schwarz	12 M	-	31.03.2009
356	power sensor	NRV-Z1	882322/014	Rohde & Schwarz	24/12 M	-	31.03.2009
357	power sensor	NRV-Z1	861761/002	Rohde & Schwarz	24/12 M	-	31.03.2009
358	Power Amplifier 10 kHz-220MHz	AR75A220M1	15860	Amplifier Research	12 M	1b	30.04.2009
362	TOSM Calibration Kit 50 Ohm	ZV-Z21/ZV-Z11	without	Rohde&Schwarz	12 M	-	31.03.2009
365	10V Insertion Unit 50 Ohm	URV5-Z2	100880	Rohde & Schwarz	24/12 M	-	31.03.2010
366	Ultra Compact Simulator	UCS 500 M4	V0531100594	EM-Test	12 M	-	31.03.2009
367	audio measurement amplifier	2636	316832/001	Brüel & Kjaer	12 M	-	31.03.2009
369	insertion unit (SAR-EMS, Ch. A)	URV5-Z2	100301	Rohde & Schwarz	24/12 M	-	31.03.2010
370	insertion unit (SAR-EMS, Ch. B)	URV5-Z2	100302	Rohde & Schwarz	24/12 M	-	31.03.2009
371	Bluetooth Tester	CBT32	100153	R&S	12 M	-	31.03.2009
373	V-Network 5µH/50 Ohm	ESH3-Z6	100535	Rohde & Schwarz	other	-	31.03.2010
374	power amplifier 0,8-3 GHz	60S1G3	306528	Amplifier Research	-	1a	30.04.2009
375	directional coupler	DC7144M1	306498	Amplifier Research	-	1a	30.04.2009
376	horn antenna 6 GHz	BBHA9120 E	BBHA 9120 E 179	Schwarzbeck	12 M	-	31.03.2009
377	emi test receiver	ESCS 30	100160	Rohde & Schwarz	12 M	-	11.11.2009
378	broadband RF field monitor	RadiSense III	03D00013SNO-08	DARE B.V.	12 M	-	31.03.2009
383	signal generator	SME 03	842 828 /034	Rohde & Schwarz	36/12 M	-	31.03.2010
386	coupling decoupling network	CDN USB/p	19397	Schaffner	12 M	-	31.03.2009
387	coupling decoupling network	CDN L-801 M2	2051	Lüthi	12 M	-	31.03.2009
388	coupling decoupling network	CDN L-801 T2	1929	Lüthi	12 M	-	31.03.2009
389	digital multimeter	Keithley 2000	0583926	Keithley	24/12 M	-	31.03.2009
390	Industrv Acoustic Svsstem	MO 2000 Set	2127100123	Sennheiser	-	4	
392	Radio Communication Tester	MT8820A	6K00000788	Anritsu	12 M	-	31.03.2009
394	power amplifier 80-1000 MHz	BLWA 0810-250/200	045610	Bonn-Elektronik	-	1a	30.04.2009
400	ferrite tube (>15 dB, EN 55022)	FTC 40 X 15 E	5559	Lüthi	12 M	-	31.03.2009
401	ferrite tube (>15 dB, EN 55022)	FTC 40 X 15 E	5560	Lüthi	12 M	-	31.03.2009
411	Test Cable Kit N 50 Ohm (male)	ZV-Z11	100200	R&S / Rosenberger	pre-m	2	
413	Quad-Ridge Horn Antenna	3164-04	00090667	ETS-Lindgren	12 M	1f	31.03.2009
414	Circularly polarized com. Antenna	3102	00033734	EMCO	-	3	
415	Antenna Position Controller	2090	00035634	ETS-Lindgren	-	4	
416	MAPS Positioner (light duty)	2010	-	ETS-Lindgren	-	4	
420	System CTC CTIA-OTA	System CTC CTIA-OTA	-	ETS-Lindgren/Cetecom	12 M	5	31.03.2009
429	MAPS-Positionier (medium duty)	2015	-	ETS-Lindgren	-	4	
430	Thermo-Hygrometer	H270	54476	Dostmann electronic	24 M	-	30.11.2010
431	Model 7405	Near-Field Probe Set	9305-2457	EMCO	-	4	
436	Radio Communication Tester	CMU 200	103083	Rohde & Schwarz	12 M	-	31.03.2009
439	UltraLog-Antenna	HL 562	100248	Rohde + Schwarz	12 M	-	31.03.2009
440	CDN for Datacable	CDN-UTP	CDN-UTP 029	EMC Partner AG,	24 M	-	31.03.2010
441	System CTC-SAR-EMI	System EMI field (SAR)	-	ETS	12 M	5	30.06.2009
442	System CTC-SAR-EMS	System EMS field (SAR)	-	ETS-Lindgren/Cetecom	12 M	5	30.04.2009
443	System CTC-FAR-EMI-Spuri	System CTC-FAR-EMI-	-	ETS-Lindgren/Cetecom	12 M	5	30.03.2009
444	System CTC FAR-EMS	System EMS-Field (FAR)	-	ETS Lindgren/Cetecom	12 M	5	30.04.2009
448	notch filter WCDMA FDD II	WRCT 1850.0/2170.0-	5	Wainwright Instruments	12 M	1c	31.03.2009
449	notch filter WCDMA FDD V	WRCT 824.0/894.0-5/40-	1	Wainwright Instruments	12 M	1c	31.03.2009
454	Oscilloscope	HM 205-3	9210 P 29661	Hameg	-	4	
455	Oscilloscope	HP 54602B	US 350 336 45	Hawlett Packard	-	4	

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