FCC Part 22/24 Compliance Test Report

Test Report no.:	Cph_FCC_0533_07.doc	**Date of Report:**	17-08-2005
Number of pages:	16	**Customer's Contact person:**	Ole Sørensen

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FCC listing no.:	99059
IC recognition no.:	4820 and 4820-1

Tested devices/ accessories:	**Phone; RM-111, AC-Charger; AC-1C, Headset; HS-35**

FCC ID:	QTKRM-111	**IC:**	661AD-RM111

Supplement reports:	

Testing has been carried out in accordance with:	**CFR 47, FCC rules Parts 22 and 24, TIA-603-B-2002 and IC standards RSS-132 and RSS-133. Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".**

Documentation:	The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory. The documentation of the testing performed on the tested devices is archived for 15 years at TCC Nokia.

Test Results:	**The EUT complies with the requirements in respect of all parameters subject to the test.** The test results relate only to devices specified in this document.

Date and signature for the contents:	

Allan Franch Henriksen, Engineer

FCC Part 22/24 Compliance Test Report / Template Version 2.0

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1. Summary for FCC Part 22/24 Compliance Test Report

Date of receipt	22_07-2005
Testing completed	17-08-2005
The customer's contact person	Ole Sørensen
Test Plan referred to	T:\Projects\RM-111\EMC\Test Plans\EMC_Testplan_for_RM-111.xls
Notes	None
Document name	T:\Projects\RM-111\EMC\Results\FCC\Cph_FCC_0533_07.doc

1.1. EUT and Accessory Information

The EUT is a triple band (GSM 900, 1800, 1900) mobile phone with GPRS, EGPRS and Bluetooth. The EUT is tested with maximum rated TX power, modulated with pseudo random bit sequence (PRBS9).

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-111	004400/66/166283/1	0350	-	03.55	28976
Headset	HS-35	-	-	-	-	28982
AC-Charger	AC-1C	0675353 394349L214410000031A	2.4	2.0	-	28981
Phone	RM-111	004400/66/167765/6	0305	-	03.53	235601
Headset	HS-35	-	-	-	-	28576
AC-Charger	AC-1C	394349L503410629837A	-	-	-	28574
Phone	RM-111	004400/66/167779/7	0305	-	03.53	28573

1.2. Summary of Test Results

GSM 1900:

Section in CFR 47	Section in RSS-133	Name of the test	Result
§2.1046(a)	6.2	Conducted RF output power	NP
§24.232(b)	6.2	Radiated RF output power	Passed
§2.1049(h)	5.6	99 % occupied bandwidth	Passed
§24.238(a)	6.3	Band edge compliance	Passed
§24.238(a), §2.1051	6.3	Spurious emissions at antenna terminals	NP
§24.238(a), §2.1053	6.3	Spurious radiated emissions	Passed
§2.1055(a)	7	Frequency stability, temperature variation	Passed
§2.1055(d)	7	Frequency stability, voltage variation	NP

PASSED   The EUT complies with the essential requirements in the standard.
FAILED   The EUT does not comply with the essential requirements in the standard.
NP   The test was not performed by the TCC Nokia Copenhagen Laboratory.

CONTENTS

2. Radiated RF output power
(FCC §22.913(a), §24.232(b), RSS-132 6.4, RSS-133 6.2)

EUT with DUT number	RM-111 Dut#28976
Accessories with DUT numbers	HS-35 Dut#28982, AC-1C Dut#28981
Operation Voltage [V] / [Hz]	230V
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 50 1004
Date of measurements	04-08-2005
Measured by	Christian Andersen

2.1. Test setup
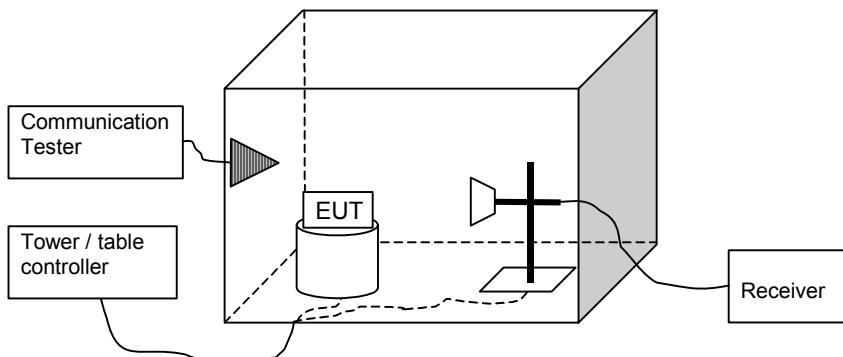
2.2. Test method and limit

The measurement is made according to TIA-603-B-2002 as follows:

The measurement is performed in the Anechoic Chamber with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system. The turntable is rotated 360 degrees and this is repeated for both horizontal and vertical receive antenna polarizations.

The EUT is placed on a nonconductive plate at 170 cm height.

The substitution method is used. Substitution values at each frequencies are measured beforehand and saved to the test software.

The substitution corrections are obtained as described below:

$$A_{SUBST} = P_{SUBST\_TX} - P_{SUBST\_RX} - L_{SUBST\_CABLES} + G_{SUBST\_TX\_ANT}$$

Where A_{SUBST} is the final substitution correction including receive antenna gain. P_{SUBST_TX} is signal generator level, P_{SUBST_RX} is receiver level, L_{SUBST_CABLES} is cable losses including both TX and RX cables and $G_{SUBST\_TX\_ANT}$ is substitution antenna gain.

The measurement results are obtained as described below:

$$P\ [dBm] = P_{MEAS} + A_{TOT}$$

Where P_{MEAS} is receiver reading in dBm and A_{TOT} is total correction factor including cable loss and substitution correction ($A_{TOT} = L_{CABLES} + A_{SUBST}$).

Limits for radiated RF output power measurements

Frequency range [MHz]	Limit [W]	Limit [dBm]
824 - 849	7	38.5
1850 - 1910	2	33

2.3. GSM 1900 Test results

GSM mode

Channel	EIRP [dBm]	EIRP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
512	30.20	1.047	-16.50	46.70	VERTICAL	Passed
661	31.10	1.288	-15.30	46.40	VERTICAL	Passed
810	30.70	1.175	-15.70	46.40	VERTICAL	Passed

GPRS mode, 1 TX Slot

Channel	EIRP [dBm]	EIRP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
512	30.20	1.047	-16.50	46.70	VERTICAL	Passed
661	30.40	1.096	-16.00	46.40	VERTICAL	Passed
810	30.40	1.096	-16.00	46.40	VERTICAL	Passed

EGPRS mode, 1 TX Slot

Channel	EIRP [dBm]	EIRP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
512	30.10	1.023	-16.60	46.70	VERTICAL	Passed
661	29.90	0.977	-16.50	46.40	VERTICAL	Passed
810	29.30	0.851	-17.10	46.40	VERTICAL	Passed

3. 99 % occupied bandwidth
(FCC §2.1049(h), RSS-132 4.2, RSS-133 5.6)

EUT with DUT number	RM-111 dut 28573
Accessories with DUT numbers	RH-35 dut 28576; AC-1E dut 28574
Operation Voltage [V] / [Hz]	220 / 50
Result	Done
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21.7 / 52 1002.4
Date of measurements	Aug. 11. 2005
Measured by	Jan Engelbrechtsen

3.1. Test setup
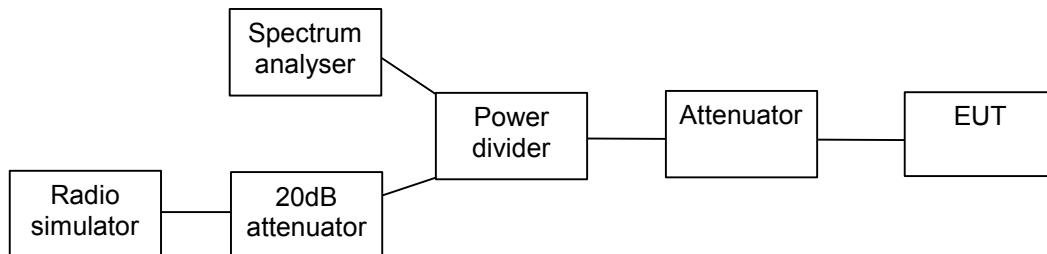
## 3.2. Test method and limit

The measurement is made according to FCC rules part 22 and 24 and IC standards RSS-132 and RSS-133.

3.3.   GSM 1900 Test results

Operation mode (TX on)	99% occupied bandwidth [kHz]
GSM	249
EGPRS	247.5

GSM mode, channel 661
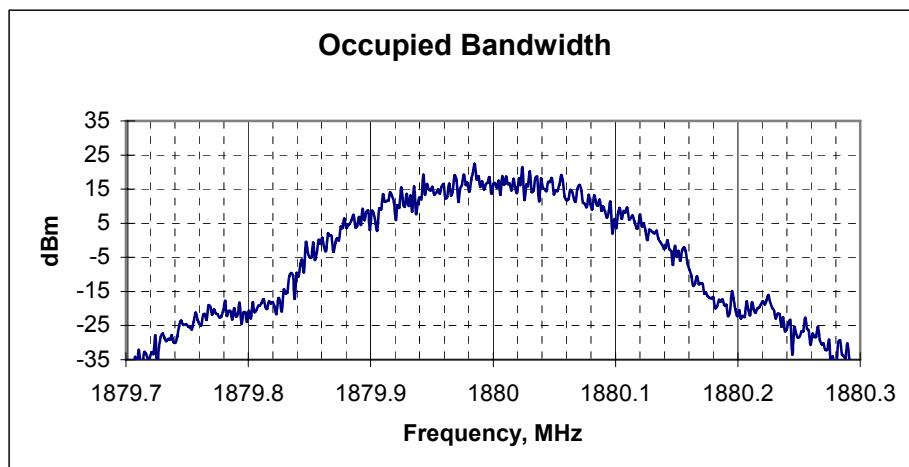
EGPRS mode, channel 661
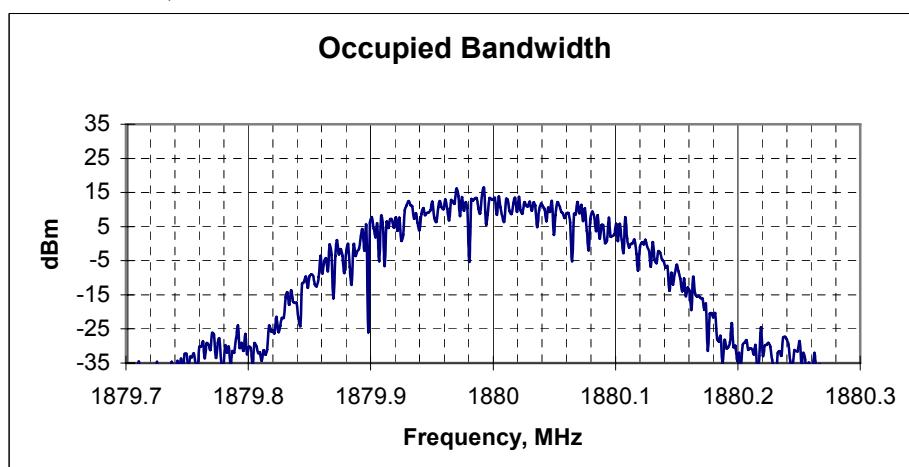
4. Band edge compliance
(FCC §22.917(a), 24.238(a), RSS-132 4.5, RSS-133 6.3)

EUT with DUT number	RM-111 Dut#28976
Accessories with DUT numbers	HS-35 Dut#28982, AC-1C Dut#28981
Operation Voltage [V] / [Hz]	230V
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 50 1004
Date of measurements	04-08-2005
Measured by	Christian Andersen

4.1. Test setup
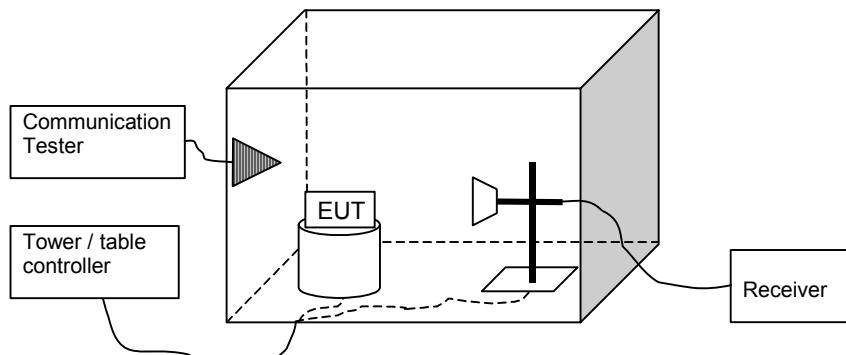
4.2. Test method and limit

The measurement is made according to FCC rules part 22 and 24 and IC standards RSS-132 and RSS-133.

Limits for band edge compliance measurements

Operation band	Frequency range [MHz]	Limit [dBm]
GSM 850	Below 824 and above 849	-13
GSM 1900	Below 1850 and above 1910	-13

4.3. GSM 1900 Test results

Operation mode (TX on)	Channel	Level [dBm]
GSM	512	-15.47
GSM	810	-15.17
EGPRS	512	-21.70
EGPRS	810	-23.13

GSM mode, channel 512 (Peak detector, RBW: 3 kHz)
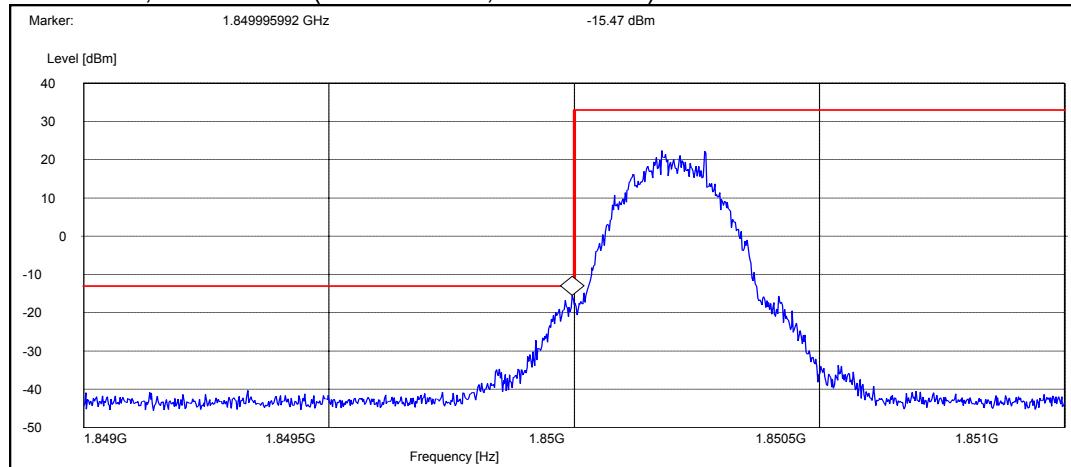
GSM mode, channel 810 (Peak detector, RBW: 3 kHz)
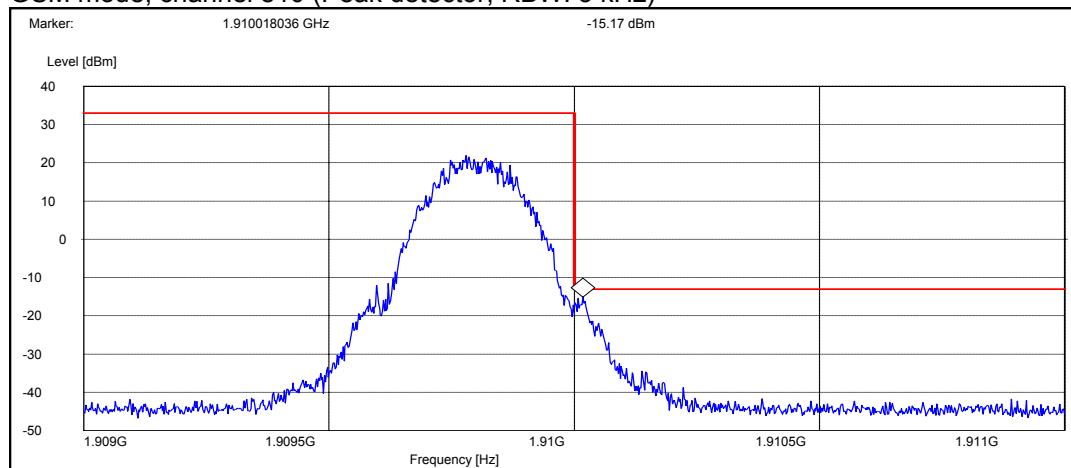
EGPRS mode, channel 512 (Peak detector, RBW: 3 kHz)

Marker:	1.849981964 GHz		-21.7 dBm

EGPRS mode, channel 810 (Peak detector, RBW: 3 kHz)

Marker:	1.910004008 GHz		-23.13 dBm
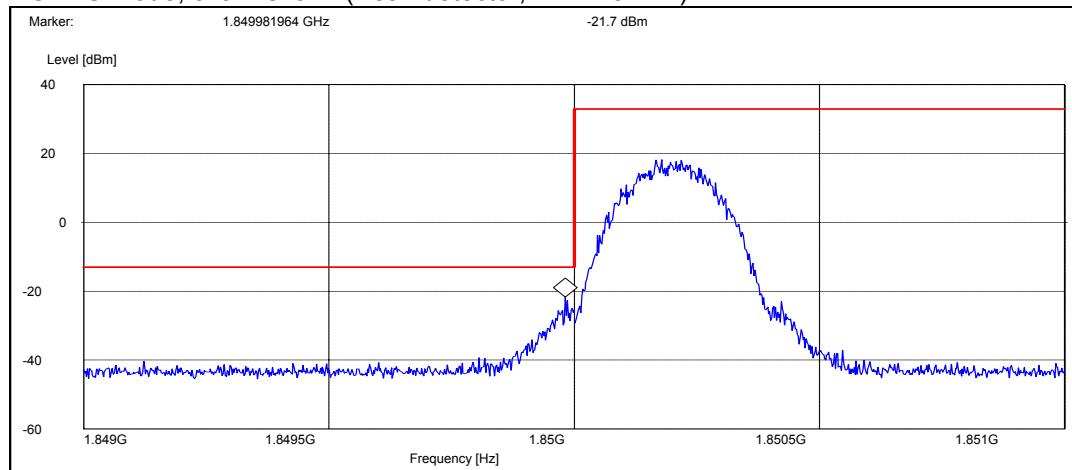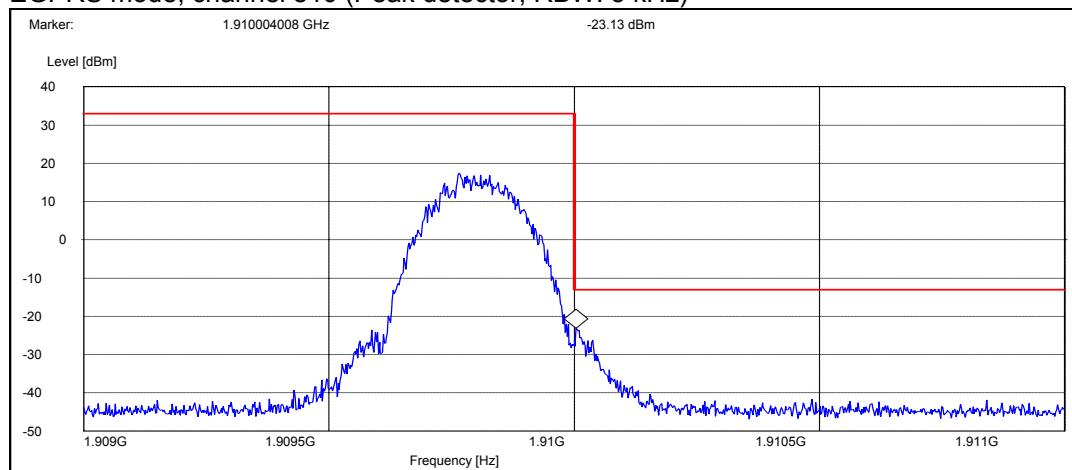
5. Spurious radiated emissions
(FCC §22.917(a), §24.238(a), §2.1053, RSS-132 4.5, RSS-133 6.3)

|	
EUT with DUT number	RM-111 Dut#28976
Accessories with DUT numbers	HS-35 Dut#28982, AC-1C Dut#28981
Operation Voltage [V] / [Hz]	230V
Result	Passed
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 50 1004
Date of measurements	04-08-2005
Measured by	Christian Andersen

5.1. Test setup
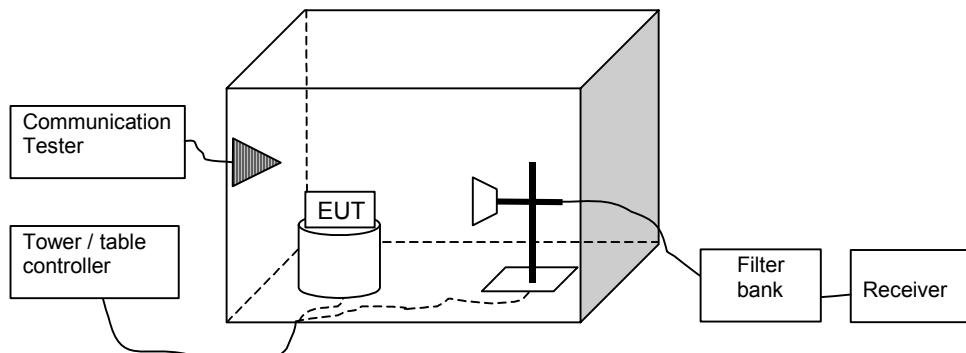
5.2. Test method and limit

The measurement is made according to TIA-603-B-2002 as follows:

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system.

The Final Measurement is performed in the Semi-Anechoic Chamber with conducting metal floor, if the Preliminary Measurement results are closer than 20 dB to the permissible value.

The EUT is placed at nonconductive plate at the turntable center.

For each suspected frequency, the turntable is rotated 360 degrees and antenna is scanned from 1 to 4 m. This is repeated for both horizontal and vertical receive antenna polarizations.

FCC Part 22/24 Compliance Test Report
/ Template Version 2.0

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The emissions less than 20 dB below the permissible value are reported.
The substitution method is used. Substitution values at each frequencies are measured beforehand and saved to the test software.

The substitution corrections are obtained as described below:

$$A_{SUBST} = P_{SUBST\_TX} - P_{SUBST\_RX} - L_{SUBST\_CABLES} + G_{SUBST\_TX\_ANT}$$

Where A_{SUBST} is the final substitution correction including receive antenna gain. P_{SUBST_TX} is signal generator level, P_{SUBST_RX} is receiver level, L_{SUBST_CABLES} is cable losses including both TX and RX cables and $G_{SUBST\_TX\_ANT}$ is substitution antenna gain.

The measurement results are obtained as described below:

$$P\ [dBm] = P_{MEAS} + A_{TOT}$$

Where P_{MEAS} is receiver reading in dBm and A_{TOT} is total correction factor including cable loss, preamplifier gain and substitution correction ($A_{TOT} = L_{CABLES} - G_{PREAMP} + A_{SUBST}$).

Limits for spurious radiated emissions measurements

Operation band	Frequency range [MHz]	Limit [dBm]
GSM 850	30 - 8500	-13
GSM 1900	30 - 18000	-13

5.3. GSM 1900 Test results

GSM mode, channel 661

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
3760.023046	-29.10	1.23027	-45.50	16.40	VERTICAL	Passed
5651.298597	-46.80	0.02089	-66.90	20.10	HORIZONTAL	Passed
7520.042084	-37.80	0.16596	-62.20	24.40	VERTICAL	Passed

EGPRS mode, channel 661

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
3760.023046	-39.10	0.12303	-55.50	16.40	VERTICAL	Passed
5652.298597	-46.20	0.02399	-66.30	20.10	HORIZONTAL	Passed
7519.042084	-45.60	0.02754	-70.00	24.40	VERTICAL	Passed

6. Frequency stability, temperature variation
(FCC §2.1055(a), §2.1055(a), RSS-132 4.3, 6.3, RSS-133 7)

EUT with DUT number	RM-111 dut 235601
Accessories with DUT numbers	Headset dut 28576, Charger dut 28574
Operation Voltage [V] / [Hz]	220 / 50
Result	Passed
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21.7 / 52 1002.4
Date of measurements	Aug. 12. 2005
Measured by	Jan Engelbrechtsen

6.1. Test setup
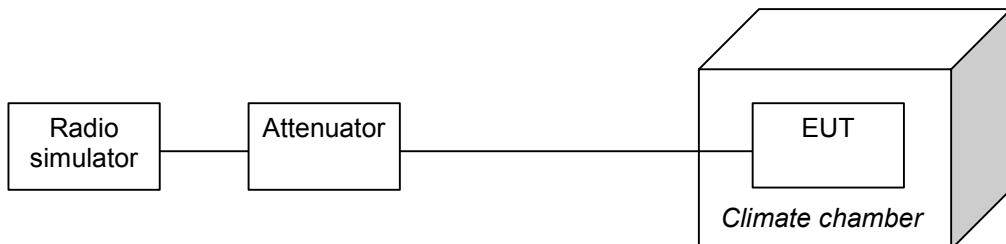
6.2. Test method and limit

The measurement is made according to FCC rules part 22 and 24 and IC standards RSS-132 and RSS-133 as follows:

a) The climate chamber temperature is set to the maximum value and the temperature is allowed to stabilize.
b) The EUT is placed in the chamber.
c) The EUT is set in idle mode for 45 minutes.
d) The EUT is set to transmit.
e) The transmit frequency error was measured immediately.
f) The steps c - e were repeated for each temperature.

Limits for frequency stability, temperature variation measurements

Frequency deviation [ppm]
± 2.5

6.3. GSM 1900 Test results

GSM mode, channel 661

Temperature [ºC]	Deviation [Hz]	Deviation [ppm]
50	-25.5	-0.0136
40	-24.7	-0.013
30	-33	-0.018
20	-26.7	-0.014
10	-24.8	-0.013
0	-32	-0.017
-10	-32.3	-0.017
-20	-36	-0.019
-30	-34.3	-0.018

7. Test Equipment

7.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
13037	Power Supply 0-15V 10A	EA3012	LP Instruments	15B,15C
13513	Pulse Limiter 9KHz-30MHz	ESH3Z2	Rohde&Schwarz	15B,15C
13666	EMI Test Reciever 9KHz-2,5GHz	ESPC	Rohde&Schwarz	15B,15C
13935	Two Lines Artificial Mains Network	ESH3-Z5	Rohde&Schwarz	15B,15C
16995	Directional Coupler 20dB 0,5-2,0 GHz SMA Conn.	1538RA-20	Weinschel	15B,15C
18772	Shielded Chamber	RFD-100	ETS-Lindgren	15B,15C
19171	Universal Radio Communication Tester	CMU200	Rohde&Schwarz	15B,15C
11386	System DC Power Supply	HP6632A	Hewlett Packard	22.24
11487	Network analyzer 300KHz-3,0GHz	HP8753A	Hewlett Packard	22.24
11584	Spectrum analyzer 50Hz-6,5GHz	HP8561B	Hewlett Packard	22.24
13134	Tracking generator	HP85645A	Hewlett Packard	22.24
13302	Spectrum Analyzer 9KHz-12.8GHz	HP8596E	Hewlett Packard	22.24
13371	Temperature Chamber	S-1,2C	Thermotron	22.24
13524	Digital Radiocomm. Tester	CMD55	Rohde&Schwarz	22.24
14807	S - Parameter Test Set 300KHz-6GHz	HP85047A	Hewlett Packard	22.24
15859	Digital Radio Communication Test Set	4201S	Wavetek	22.24
17277	Multimeter Digital 6 1/2 Digit	AT34401A	Agilent Technologies	22.24
17796	Radio Communication Test Set	4400M	Wavetek	22.24
19374	Resonant Dipole Antenna 850MHz SMA m Conn.	-	NMP Cph	22.24
19375	Resonant Dipole Antenna 1900MHz SMA m Conn.	-	NMP Cph	22.24
13037	Power Supply 0-15V 10A	EA3012	LP Instruments	15B,15C

7.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
14020	Programmable Relay Switching System	-	Pickering	15B,15C,22,24
18792	Multi Device Controller	2090	ETS-EMCO	15B,15C,22,24
13829	Turntable Controller	4630-100	Comtest	15B,15C,22,24
14963	RF Preamplifier 100MHz-4GHz (Metal Chassis)	AFS3-00100400	Miteq/NMP Cph	15B,15C,22,24
13668	BiLog Antenna 30-2000MHz	BiLog-CBL6112A	Chase	15B,15C,22,24
18861	EMI Test Receiver 20Hz-26,5GHz	ESI	Rohde&Schwarz	15B,15C,22,24
12679	Dual Log Periodic Antenna 1-18 GHz	HL025	Rohde&Schwarz	15B,15C,22,24
18860	Ultra Broadband Antenna	HL562	Rohde&Schwarz	15B,15C,22,24

Eq. No	Equipment	Type	Manufacturer	Used in
	Ultralog 30-3000MHz			
18773	Shielded Chamber	RFD-100	ETS-Lindgren	15B,15C,22,24
18774	Shielded Chamber	RFSD-F/A-100	ETS-Lindgren	15B,15C,22,24
18324	High Pass Filter 3GHz SMA f Conn	WHJS3000-10SS	Wainwright	15B,15C,22,24
14114	Highpass Filter 1000MHz-4500MHz	WHK1000-12SS	Wainwright	15B,15C,22,24
13918	Highpass Filter 2000-4000MHz 50OHM SMA Conn	WHKS2000-10SS	Wainwright Instruments	15B,15C,22,24
13937	Ultra Stable Notch Filter 902,4MHz	WRCA902.4-0.2/40-6SS	Wainwright Instruments	15B,15C,22,24
13936	Ultra Stable Notch Filter 1747,5MHz	WRCD1747.5-0.2/40-10SS	Wainwright Instruments	15B,15C,22,24
13917	Highpass Filter 1000-3000MHz 50OHM SMA Conn	WHKS1000-10SS	Wainwright Instruments	15B,15C,22,24
14188	Ultra Stable Notch Filter 902,4MHz	WRCA902.4-0.2/40-6SS	Wainwright	15B,15C,22,24
14187	Ultra Stable Notch Filter 1747,5MHz	WRCD1747.5-0.2/40-10SS	Wainwright	15B,15C,22,24
16633	Ultra Stable Notch Filter 1880,0MHz	WRCD1880.0-0.2/40-10SS	Wainwright	15B,15C,22,24
18323	Band reject filter 1947-1953MHz 40dB	WRCG1947/1953-1940/1960-40/6SS	Wainwright	15B,15C,22,24
15190	Infra Red Remote Control Unit	4630	Emco	22,24,15B,15C
14993	EMI Test Receiver 9KHz-2750MHz	ESCS30	Rohde&Schwarz	22,24,15B,15C
15191	Turntable Contoller Unit	G-800SDX	YAESU	22,24,15B,15C
14900	Antenna Controller	HD100	HD GmbH	22,24,15B,15C