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## GSM 1900 Test Report for RH-37

**Test Report no.:** DTX11175-EN  
**Number of pages:** 12

**Date of Report:** June 11, 2004  
**Customer's  
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IC File # 4820-1, February 2004

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**Tested devices/  
accessories:** **Phone: RH-37 and Battery: BL- 5B**

**Supplement reports:**

**Testing has been  
carried out in  
accordance with:** The tests listed in this report have been done to demonstrate compliance with the applicable requirements in FCC rules Part 24 and IC standard RSS-133.

**Documentation:** The documentation of the testing performed on the tested devices is archived for 15 years at TCC Copenhagen.

**Test Results:** The tested device complies with the requirements in respect of all parameters subject to the test. The test results and statements relate only to the items tested. The test report shall not be reproduced except in full, without written approval of the laboratory.

**Date and signatures  
for the contents:**

6/11/2004



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**Ruben Hansen  
EMC Team Leader**

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## 1. Summary of test results

Section in CFR 47	Section in RSS-133		Result
§2.1046 (a)	6.2	Conducted RF output	NA
§24.232 (b)	6.2	Radiated RF output	NA
§2.1049 (h)	5.6	99% occupied bandwidth	PASS
§24.238 (a)	6.3	Bandedge compliance	NA
§24.238 (a), §2.1051	6.3	Spurious emissions at antenna terminals	NA
§24.238 (a), §2.1053	6.3	Spurious radiated emission	PASS
§24.235, §2.1055 (a)(1)(b)	7	Frequency stability, temperature variation	NA
§24.235, §2.1055 (d)(1)(2)	7	Frequency stability, voltage variation	NA

PASS Pass

FAIL Fail

X Measured, but there is no applicable performance criteria

NA Not Applicable

## 2. EUT Information

Product	Type	SN	HW	MV	SW	DUT
Phone	RH-37	004400/40/178904/3	4258		A3.01.1-417060	233907
Battery	BL-5B	0670455363807 L103C20101777				233912
Active back cover	CC-140D	178	1EZ-06		2.20 EMC	233908

### 2.1. EUT description

The EUT is a triple band ( 900MHz/1800MHz/1900MHz) E-GPRS (EDGE) GSM mobile phone.

The EUT was not modified during the tests.

## 3. EUT Test Setup

For each test the EUT was exercised to find the worst case of operation modes and device configuration.

The test setup photograph are in Appendix A

#### 4. Applicable Standards

The tests were performed in guidance of CFR 47, part 24 and part 2, ANSI/TIA/EIA-603-A and RSS-133. Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method" for each test case.

#### 5. 99% occupied bandwidth

EUT	233859		
Accessories	233862		
Temp, Humidity, Air Pressure	22.7 °C	37.5 RH%	1018 mbar
Date of measurement	6/1/2004		
FCC rule part	§2.1049 (h)		
RSS-133 section	5.66.3		
Measured by	Jesper Nielsen		
Result	<b>PASSED</b>		

##### 5.1. Test setup

The BS simulator was used to set the TX channel and power level and modulate the TX signal with different bit patterns.

##### 5.2. EUT operation mode

EUT operation mode	TX on, 1 time slot transmission, PRBS 2E9-1 audio modulation, GMSK modulation
EUT channel	512, 810
EUT TX power level	0 (+30dBm)

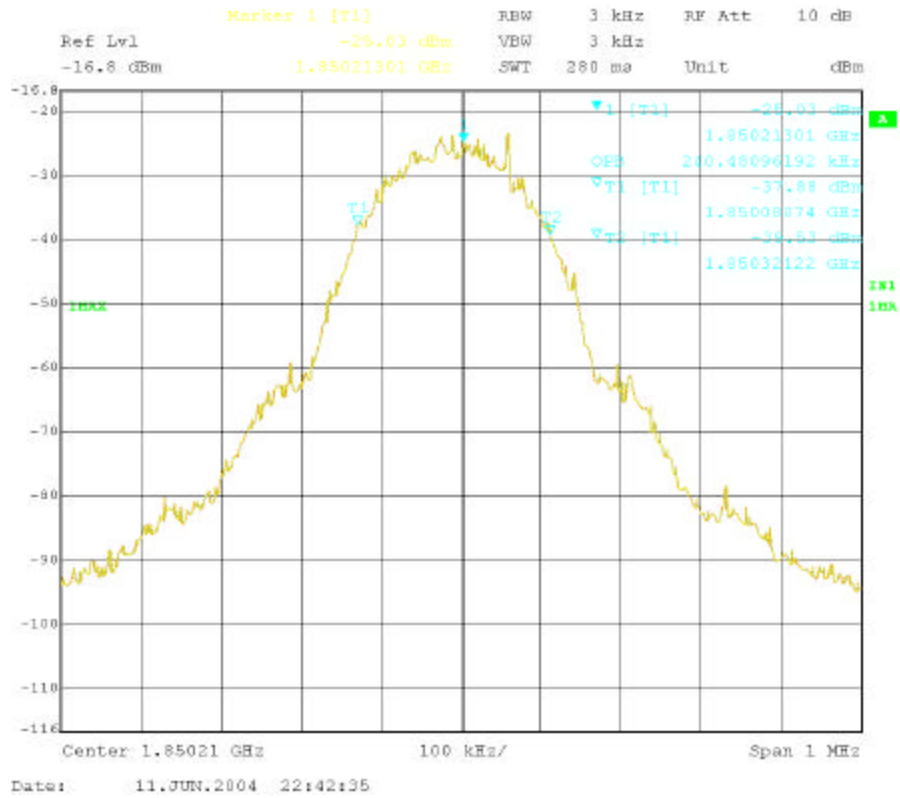
##### 5.3. Results

The 99% occupied bandwidth was measured using the in-built function of the spectrum analyzer.

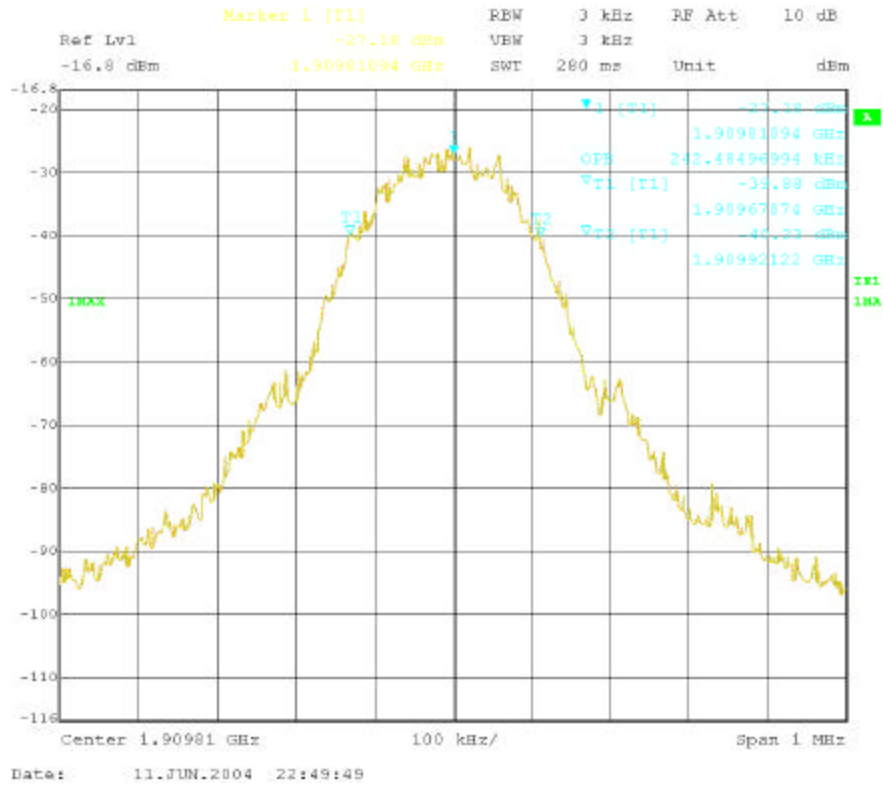
Table 1 99% Occupied bandwidth

EUT Channel	99% occupied bandwidth [kHz]
512	240.481
810	242.485

5.4. Screen shots



Channel 512



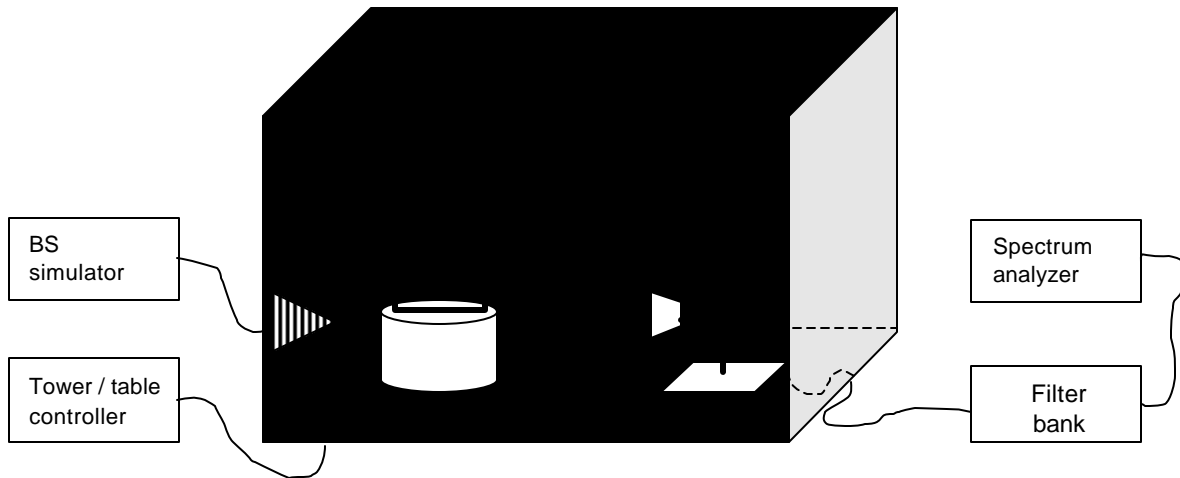
Channel 810

## 6. Spurious radiated emission

EUT	233859		
Accessories	233862		
Temp, Humidity, Air Pressure	22.7 °C	37.5 RH%	1018 mbar
Date of measurement	6/1/2004		
FCC rule part	§24.238 (a), §2.1053		
RSS-133 section	6.3		
Measured by	Jesper Nielsen		
Result	<b>PASSED</b>		

### 6.1. Test setup

A set of LP/HP/BS filters was used to prevent overloading the spectrum analyzer. The BS simulator was used to set the TX channel and power level and modulate the TX signal with different bit patterns. The test was done manually.



### 6.2. Test method

- The emissions were searched and maximized by moving the turn table and measuring antenna and manipulating the EUT.
- All suspicious frequencies with emission levels were recorded.
- The EUT was replaced with a substituting antenna.
- For each frequency recorded, the substituting antenna was fed with the power (from signal generator) giving the same reading as in (b). These power levels were reported.

### 6.3. EUT operation mode

	GSM
EUT operation mode	TX on, 1 time slot transmission, GMSK modulation
EUT channel	512, 661, 810
EUT TX power level	0 (+30dBm)

### 6.4. Limit

Frequency [MHz]	Level [dBm]
30 – 19100	-13

### 6.5. Results

The formula below was used to calculate the EIRP of the spurious emissions. If there were no emissions closer than 20dB below the limit line, then the emission levels were documented only at the transmitter's mid-channel harmonics.

$$P_{Emission} [dBm] = P_{SubstTX} [dBm] - L_{Cable} [dB] + G_{Antenna} [dBi]$$

where the variables are as follows:

$P_{Measured}$ [dBm]	Measured emission level (from step b in 6.2)
$P_{Subst\_TX}$ [dBm]	Signal generator power (from step d in 6.2) fed to the substituting antenna
$L_{Cable}$ [dB]	Loss of the cable between antenna and signal generator (from step d in 6.2)
$G_{Antenna}$ [dBi]	Gain of the substitutive antenna over isotropic radiator



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Emission levels, EUT 233907, channel 661, GMSK

Frequency [MHz]	P <sub>Measured</sub> [dBm]	P <sub>Subst_TX</sub> [dBm]	L <sub>Cable</sub> [dB]	G <sub>Antenna</sub> [dBi]	P <sub>Emission</sub> [dBm]
3760,00	-66.52	-59.10	9.04	15.80	-52.34
5640,00	-66.07	-61.10	11.85	18.03	-54.92

## 7. Test equipment

Each test equipment is calibrated once a year, except antennas which are calibrated every second year.

### 7.1. Radiated measurements

Equipment #	Equipment	Type	Serial #	Manufacturer
	10 meter OATS			
14993	EMI Test Receiver 9KHz-2750MHz	ESCS30	847124/001	Rohde&Schwarz
15191	Turntable Contoller Unit	G-800SDX	ONO10000	YAESU
14900	Antenna Controller	HD100	100/552	HD GmbH
18792	Multi Device Controller	2090	1606	ETS-EMCO
13829	Turntable Controller	4630-100	100/510	Comtest
14963	RF Preamplifier 100MHz-4GH z (Metal Chassis)	AFS3-00100400	571131	Miteq/NMP Cph
13668	BiLog Antenna 30- 2000MHz	BiLog-CBL6112A	2259	Chase
18861	EMI Test Receiver 20Hz-26,5GHz	ESI	833362/004	Rohde&Schwarz
12679	Dual Log Periodic Antenna 1 -26.5 GHz	HL025	-----	Rohde&Schwarz
18860	Ultra Broadband Antenna Ultralog 30-3000MHz	HL562	100154	Rohde&Schwarz
18773	Shielded Chamber	RFD-100	2420	ETS-Lindgren
18774	Shielded Chamber	RFSD-F/A-100	2425	ETS-Lindgren
18324	High Pass Filter 3GHz SMA f Conn	WHJS3000-10SS	1	Wainwright
14114	Highpass Filter 1000MHz-4500MHz	WHK1000-12SS	1	Wainwright
13918	Highpass Filter 2000-4000MHz 50OHM SMA Conn	WHKS2000-10SS		Wainwright Instruments
13937	Ultra Stable Notch Filter 902,4MHz	WRCA902.4-0.2/40- 6SS		Wainwright Instruments
13936	Ultra Stable Notch Filter 1747,5MHz	WRCD1747.5 - 0.2/40-10SS		Wainwright Instruments
16633	Ultra Stable Notch Filter 1880,0MHz	WRCD1880.0 - 0.2/40-10SS		Wainwright Instruments

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## 8. Test setup photographs

### 8.1. Radiated RF output power

The Turntable

The Mast and the Shed

### 8.2. 99% occupied bandwidth/ Bandedge compliance

The setup

### **8.3. Spurious radiated emission**

The Anechoic Chamber

### **8.4. Frequency Stability, Temperature Variation**

The Temperature Chamber