FCC Part 22/24 Compliance Test Report

Test Report no.:	Cph_FCC_0551_03.doc	**Date of Report:**	20.12.2005
Number of pages:	13	**Customer's Contact person:**	Harri Vähämiko
Testing laboratory:	TCC Nokia Copenhagen Laboratory Frederikskaj 1790 COPENHAGEN V DENMARK Tel. +45 33 292929 Fax. +45 33 292934	**Client:**	Nokia Corporation P.O. Box 86 Joensuunkatu 7 FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 44277
FCC listing no.: **IC recognition no.:**	99059 4820 and 4820-1		
Tested devices/ accessories:	**Phone RM-89, Battery BP-5L, Headset HS-5, AC_Charger AC-4E**		
FCC ID:	PYARM-89	**IC:**	661V-RM89
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-GEN, 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:	Digitally signed by Jufo Tuohino DN: cn=Jufo Tuohino, c=FI, ou=TCC Date: 2005.12.21 13:11:03 +01'00'		

Juho Tuohino, System Manager

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

Date of receipt	20.12.2005
Testing completed	20.12.2005
The customer's contact person	Harri Vähämiko
Test Plan referred to	\\SATCC01NMP\tcc_salo\Projects\RM-89\TestPlan_RS\RM_89_TestPlan_RS.xls
Notes	-
Document name	T:\Projects\RM-89\EMC\Results\FCC\Cph_FCC_0551_03.doc

1.1. EUT and Accessory Information

The EUT is a quadri band (GSM850/900/1800/1900) mobile phone with GPRS, EGPRS, Bluetooth and WLAN. 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-89	004400/61/171443/5	5010	-	05w42.1	28472
Battery	BP-5L	0670390393213M053110263096	-	-	-	28470
Headset	HS-5	-	1.0	1.2	-	28285
AC-Charger	AC-4E	409049539596010013O;0675384	3.22	-	-	28287

1.2. Summary of Test Results

GSM 850:

Section in CFR 47	Section in *RSS-GEN* or RSS-132	Name of the test	Result
§2.1046(a), 22.913(a)	*4.6*, 4.4	Conducted RF output power	-
§22.913(a)	*4.6*, 4.4	Radiated RF output power	Passed
§2.1049(h)	*4.4.1*	99 % occupied bandwidth	-
§22.917(a)	*4.7*, 4.5	Band edge compliance	Passed
§22.917(a), §2.1051	*4.7*, 4.5	Spurious emissions at antenna terminals	-
§22.917(a), §2.1053	*4.7*, 4.5	Spurious radiated emissions	-
§2.1055(a)	*4.5*, 4.3	Frequency stability, temperature variation	-
§2.1055(d)	*4.5*, 4.3	Frequency stability, voltage variation	-

GSM 1900:

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

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.

TCC Nokia Copenhagen Laboratory
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

CONTENTS

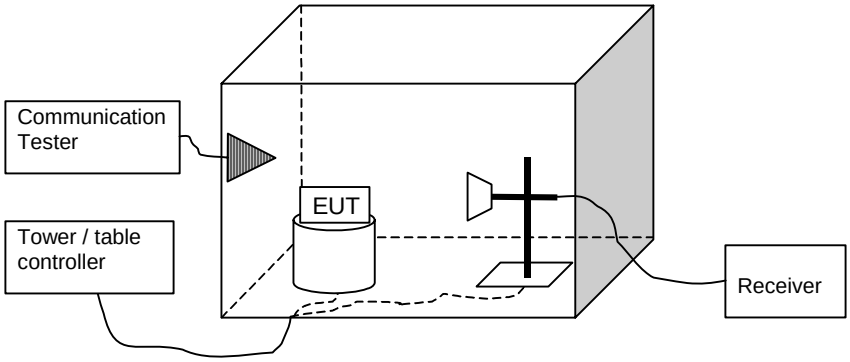
TCC Nokia Copenhagen Laboratory
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

2. Radiated RF output power

(FCC §22.913(a), §24.232(b), RSS-GEN 4.6, RSS-132 4.4, RSS-133 6.2)

EUT with DUT number	RM-89 #28472
Accessories with DUT numbers	BP-5L #28470, HS-5 #28285, AC-4E #28287
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21.3 / 43.5 / 988
Date of measurements	20.12.2005
Measured by	Juho Tuohino

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.

TCC Nokia Copenhagen Laboratory
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

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 850 Test results

GSM mode

Channel	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
128	28.10	0.646	-7.50	35.60	VERTICAL	Passed
190	27.30	0.537	-7.10	34.40	VERTICAL	Passed
251	28.70	0.741	-5.90	34.60	HORIZONTAL	Passed

GPRS mode, 2 TX Slots

Channel	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
128	27.50	0.562	-8.10	35.60	VERTICAL	Passed
190	26.70	0.468	-7.70	34.40	VERTICAL	Passed
251	28.20	0.661	-6.40	34.60	HORIZONTAL	Passed

GPRS mode, 3 TX Slot

Channel	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
128	25.00	0.316	-10.60	35.60	VERTICAL	Passed
190	24.80	0.302	-9.60	34.40	VERTICAL	Passed
251	25.40	0.347	-9.20	34.60	HORIZONTAL	Passed

EGPRS mode, 1 TX Slot

Channel	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
128	24.40	0.275	-11.20	35.60	VERTICAL	Passed
190	24.40	0.275	-10.00	34.40	VERTICAL	Passed
251	25.10	0.324	-9.50	34.60	HORIZONTAL	Passed

TCC Nokia Copenhagen Laboratory
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

2.4. GSM 1900 Test results

GSM mode

Channel	EIRP [dBm]	EIRP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
512	31.30	1.349	-15.40	46.70	VERTICAL	Passed
661	31.30	1.349	-14.60	45.90	HORIZONTAL	Passed
810	31.70	1.479	-14.90	46.60	HORIZONTAL	Passed

GPRS mode, 2 TX Slots

Channel	EIRP [dBm]	EIRP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
512	30.60	1.148	-16.10	46.70	VERTICAL	Passed
661	30.40	1.096	-15.50	45.90	HORIZONTAL	Passed
810	31.10	1.288	-15.50	46.60	HORIZONTAL	Passed

GPRS mode, 3 TX Slot

Channel	EIRP [dBm]	EIRP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
512	27.70	0.589	-19.00	46.70	VERTICAL	Passed
661	28.00	0.631	-17.90	45.90	HORIZONTAL	Passed
810	28.10	0.646	-18.50	46.60	HORIZONTAL	Passed

EGPRS mode, 1 TX Slot

Channel	EIRP [dBm]	EIRP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Result
512	28.30	0.676	-18.40	46.70	VERTICAL	Passed
661	28.70	0.741	-17.20	45.90	HORIZONTAL	Passed
810	28.70	0.741	-17.90	46.60	HORIZONTAL	Passed

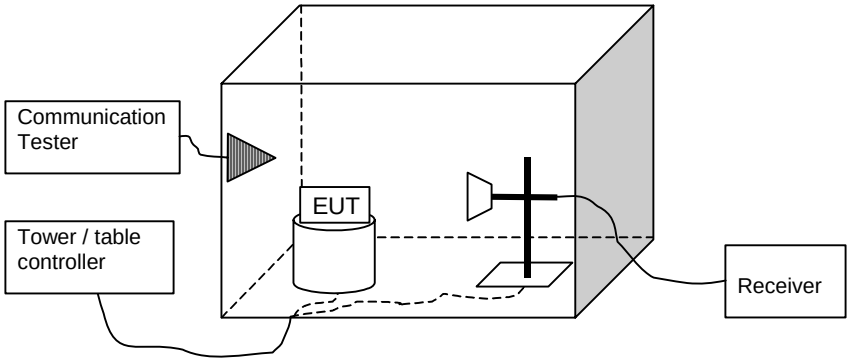
TCC Nokia Copenhagen Laboratory
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

3. Band edge compliance

(FCC §22.917(a), 24.238(a), RSS-GEN 4.7, RSS-132 4.5, RSS-133 6.3)

EUT with DUT number	RM-89 #28472
Accessories with DUT numbers	BP-5L #28470, HS-5 #28285, AC-4E #28287
Operation Voltage [V] / [Hz]	230 / 50
Result	Passed
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21.3 / 43.5 / 988
Date of measurements	20.12.2005
Measured by	Juho Tuohino

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-GEN, RSS-132 and RSS-133.

Limits for band edge compliance measurements

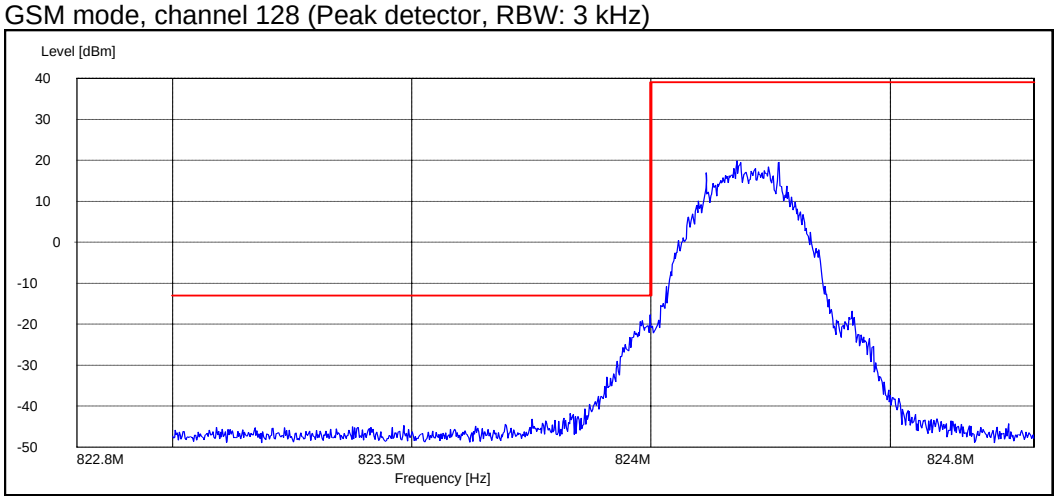
Operation band	Frequency range [MHz]	Limit [dBm]
GSM 850 / WCDMA 850	Below 824 and above 849	-13
GSM 1900 / WCDMA 1900	Below 1850 and above 1910	-13

TCC Nokia Copenhagen Laboratory
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

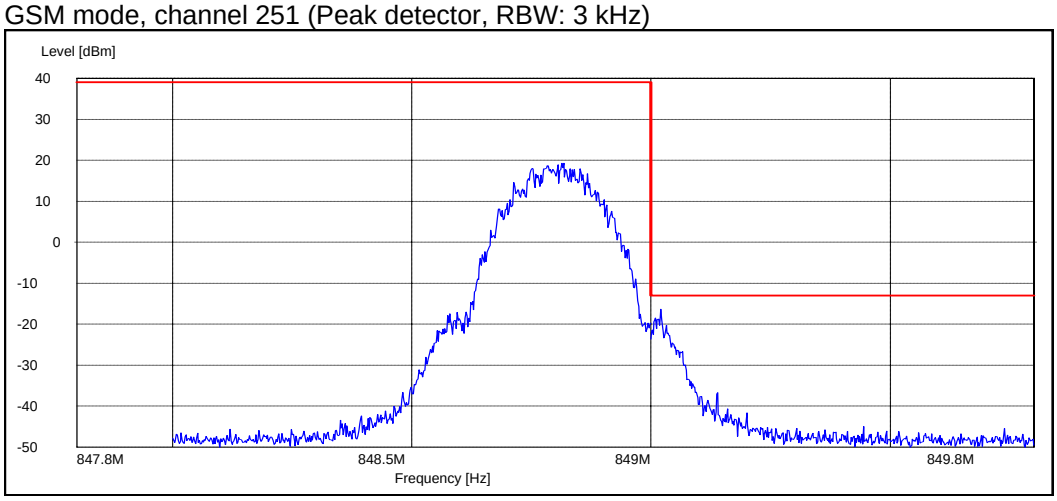
3.3. GSM 850 Test results

Operation mode (TX on)	Channel	Level [dBm]
GSM	128	-17.70
GSM	251	-16.33
EGPRS	128	-26.90
EGPRS	251	-25.16

GSM mode, channel 128 (Peak detector, RBW: 3 kHz)

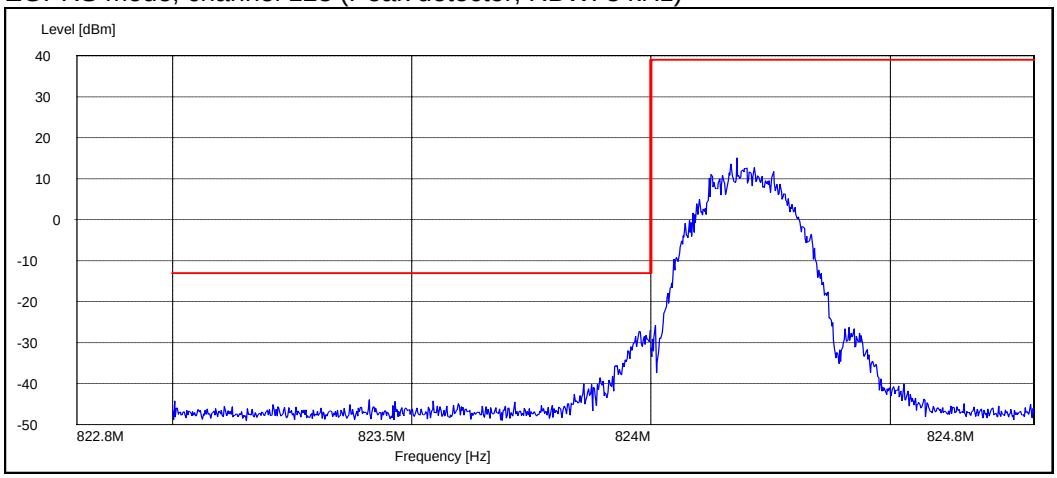


GSM mode, channel 251 (Peak detector, RBW: 3 kHz)

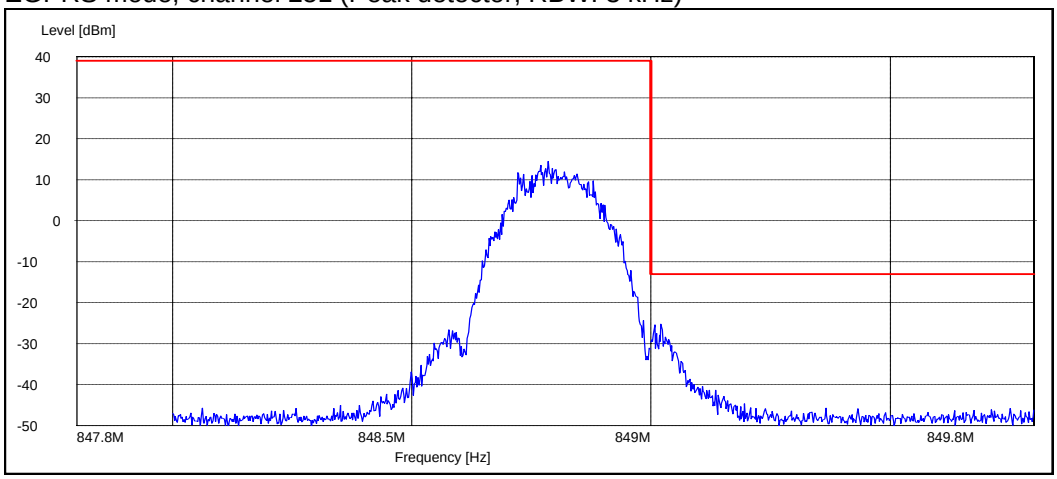


TCC Nokia Copenhagen Laboratory
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

EGPRS mode, channel 128 (Peak detector, RBW: 3 kHz)



EGPRS mode, channel 251 (Peak detector, RBW: 3 kHz)

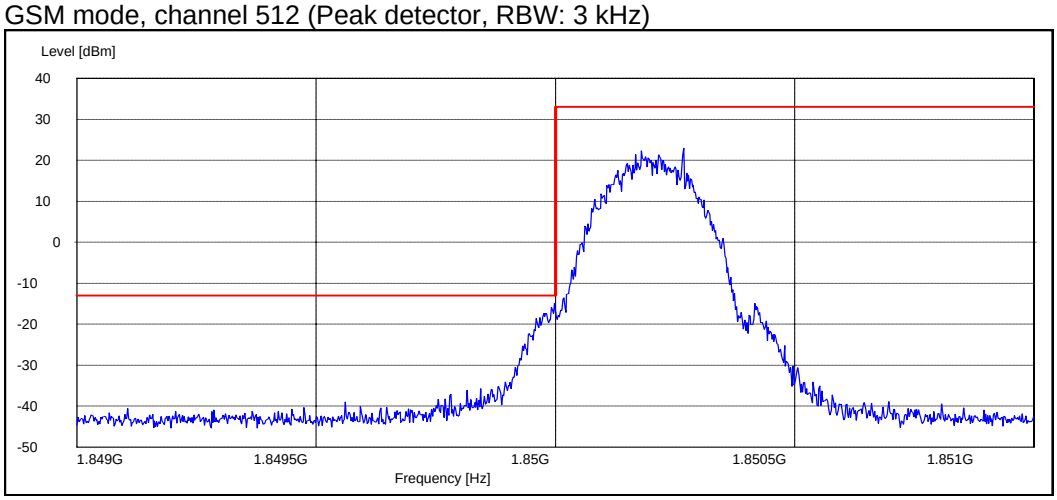


TCC Nokia Copenhagen Laboratory
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

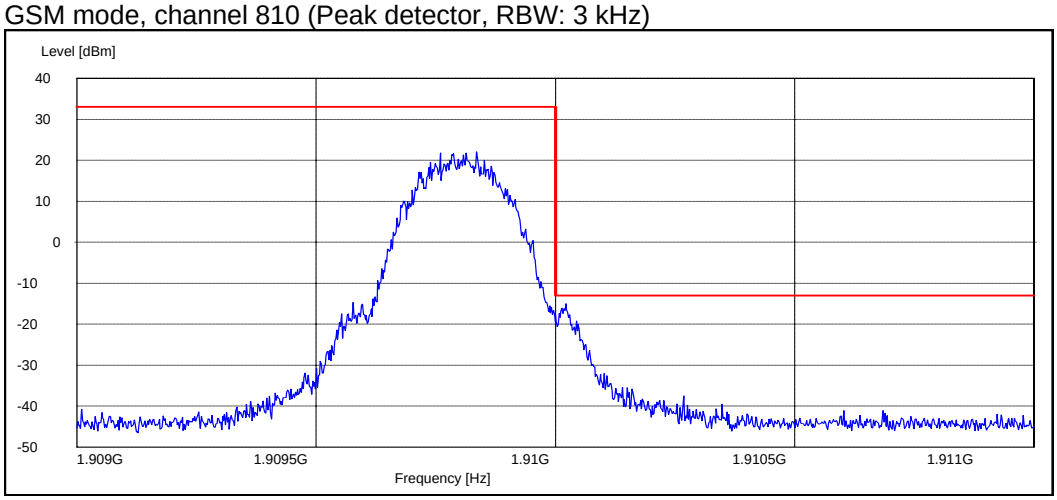
3.4. GSM 1900 Test results

Operation mode (TX on)	Channel	Level [dBm]
GSM	512	-14.96
GSM	810	-14.99
EGPRS	512	-19.85
EGPRS	810	-22.77

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

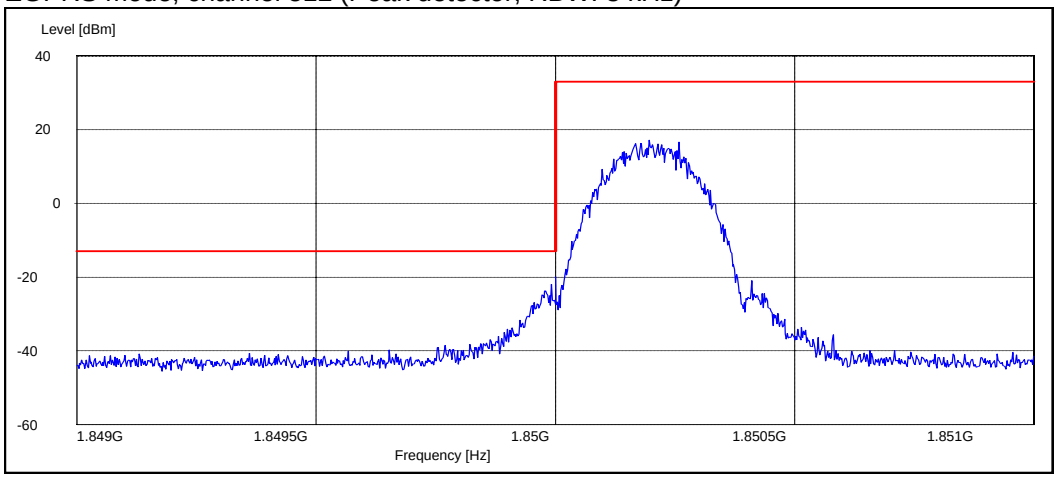


GSM mode, channel 810 (Peak detector, RBW: 3 kHz)

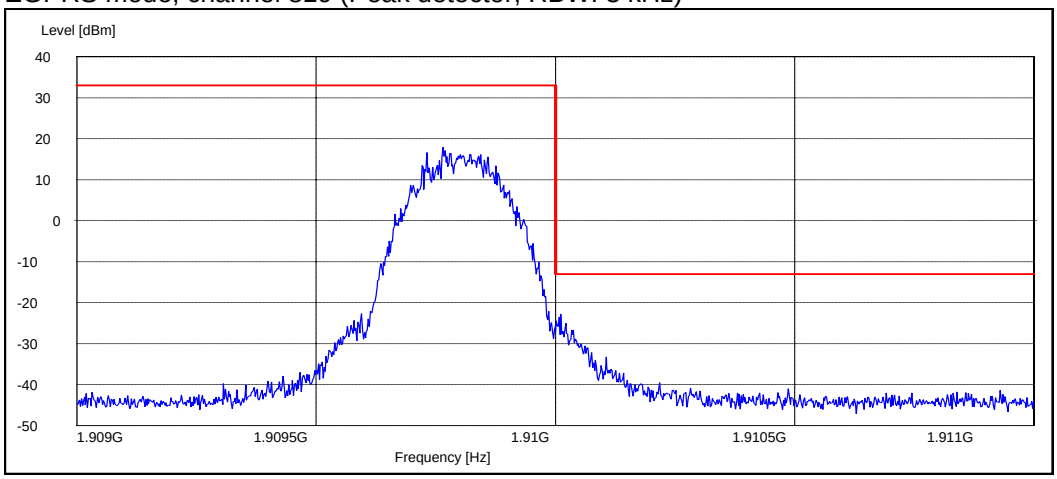


TCC Nokia Copenhagen Laboratory
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

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



EGPRS mode, channel 819 (Peak detector, RBW: 3 kHz)



TCC Nokia Copenhagen Laboratory
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

4. Test Equipment

4.1. 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

4.2. 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

TCC Nokia Copenhagen Laboratory
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934

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

TCC Nokia Copenhagen Laboratory
Frederikskaj
1790 COPENHAGEN V
DENMARK
Tel. +45 33 292929
Fax. +45 33 292934