

FCC Part 22/24 Compliance Test Report

Test Report no.:	Salo_FCC_0648_04.doc	Date of Report:	12.12.2006
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FCC listing no.:	533467		
IC recognition no.:	5385		
Tested devices/ accessories:	GSM Module RD-2		
FCC ID:	LJPRD-2	IC:	661E-RD2
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:			

Sami Lehtonen, System Manager

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

Date of receipt	13.11.2006
Testing completed	08.12.2006
The customer's contact person	Sonja Perälä
Test Plan referred to	T:\Projects\RD-2\TestPlan_RS\RS_Test_plan_for_RD-2.xls
Notes	-
Document name	T:\Projects\RD-2\EMC\Results\FCC\Salo_FCC_0648_04.doc

1.1. EUT and Accessory Information

The EUT is a 6-band (GSM850/900/1800/1900 and WCDMA Band II(1900)/V(850)) mobile phone with GPRS and EGPRS. The EUT is tested with maximum rated TX power, modulated with pseudo random bit sequence (PRBS9).

Product	Type	SN	HW	MV	SW	DUT
GSM Module	RD-2	004400/98/176984/5	1103	-	-	11642

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	PASSED
§22.913(a)	4.6, 4.4	Radiated RF output power	NP
§2.1049(h)	4.4.1	99 % occupied bandwidth	PASSED
§22.917(a)	4.7, 4.5	Band edge compliance	NP
§22.917(a), §2.1051	4.7, 4.5	Spurious emissions at antenna terminals	PASSED
§22.917(a), §2.1053	4.7, 4.5	Spurious radiated emissions	NP
§2.1055(a)	4.5, 4.3	Frequency stability, temperature variation	PASSED
§2.1055(d)	4.5, 4.3	Frequency stability, voltage variation	PASSED

GSM 1900:

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

WCDMA 850 (Band V):

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	PASSED
§22.913(a)	4.6, 4.4	Radiated RF output power	NP
§2.1049(h)	4.4.1	99 % occupied bandwidth	PASSED

§22.917(a)	4.7, 4.5	Band edge compliance	NP
§22.917(a), §2.1051	4.7, 4.5	Spurious emissions at antenna terminals	PASSED
§22.917(a), §2.1053	4.7, 4.5	Spurious radiated emissions	NP
§2.1055(a)	4.5, 4.3	Frequency stability, temperature variation	NP
§2.1055(d)	4.5, 4.3	Frequency stability, voltage variation	NP

WCDMA 1900 (Band II):

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

PASSED

FAILED

NP

The EUT complies with the essential requirements in the standard.

The EUT does not comply with the essential requirements in the standard.

The test was not performed by the TCC Nokia Salo Laboratory.

CONTENTS

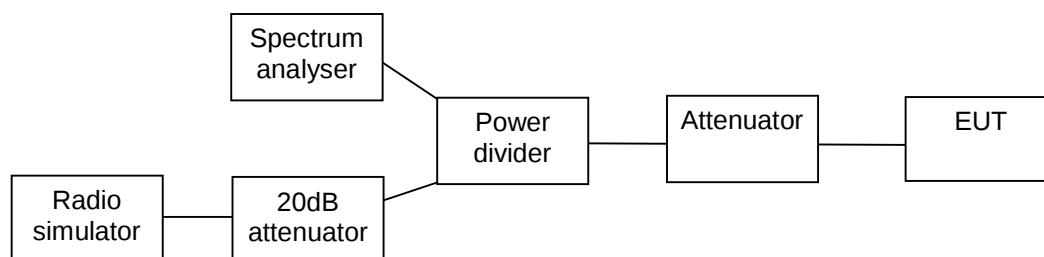
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2. Conducted RF output power (FCC §2.1046(a), 22.913(a), RSS-GEN 4.6, RSS-132 4.4, RSS-133 6.2)

EUT with DUT number	RD-2, DUT 11642
Accessories with DUT numbers	-
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 41 /101
Date of measurements	27.11.2006
Measured by	Anni Manninen

2.1. Test setup



2.2. Test method and limit

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

Limits for conducted RF output power measurements

Frequency range [MHz]	Limit [W]	Limit [dBm]
824 - 849	7	38.5
1710 - 1755	2	33
1850 - 1910	2	33

2.3. GSM 850 Test results

GPRS mode, 2 TX Slots

Channel / f_c [MHz]	P [dBm]	P [W]	Result
128 / 824.2	31.40	1.380	PASSED
190 / 836.6	31.30	1.349	PASSED
251 / 848.8	31.30	1.349	PASSED

GPRS mode, 1 TX Slot1

Channel / f_c [MHz]	P [dBm]	P [W]	Result
128 / 824.2	31.70	1.479	PASSED
190 / 836.6	31.60	1.445	PASSED
251 / 848.8	32.40	1.738	PASSED

EGPRS mode, 2 TX Slot

Channel / f_c [MHz]	P [dBm]	P [W]	Result
128 / 824.2	29.10	0.813	PASSED
190 / 836.6	29.00	0.794	PASSED
251 / 848.8	29.00	0.794	PASSED

EGPRS mode, 1 TX Slot

Channel / f_c [MHz]	P [dBm]	P [W]	Result
128 / 824.2	28.80	0.759	PASSED
190 / 836.6	28.80	0.759	PASSED
251 / 848.8	30.10	1.023	PASSED

2.4. GSM 1900 Test results

GPRS mode, 2 TX Slots

Channel / f_c [MHz]	P [dBm]	P [W]	Result
512 / 1850.2	29.20	0.832	PASSED
661 / 1880.0	30.10	1.023	PASSED
810 / 1909.8	29.30	0.794	PASSED

GPRS mode, 1 TX Slot

Channel / f_c [MHz]	P [dBm]	P [W]	Result
512 / 1850.2	29.50	0.891	PASSED
661 / 1880.0	30.30	1.072	PASSED
810 / 1909.8	29.60	0.912	PASSED

EGPRS mode, 2 TX Slot

Channel / f_c [MHz]	P [dBm]	P [W]	Result
512 / 1850.2	27.10	0.513	PASSED
661 / 1880.0	27.10	0.513	PASSED
810 / 1909.8	27.40	0.550	PASSED

EGPRS mode, 1 TX Slot

Channel / f_c [MHz]	P [dBm]	P [W]	Result
512 / 1850.2	27.10	0.513	PASSED
661 / 1880.0	26.90	0.490	PASSED
810 / 1909.8	27.20	0.525	PASSED

2.5. WCDMA 850 Test results

Channel / f_c [MHz]	P [dBm]	P [W]	Result
4132 / 826.4	25.00	0.316	PASSED
4175 / 835.0	24.80	0.302	PASSED
4233 / 846.6	24.60	0.288	PASSED

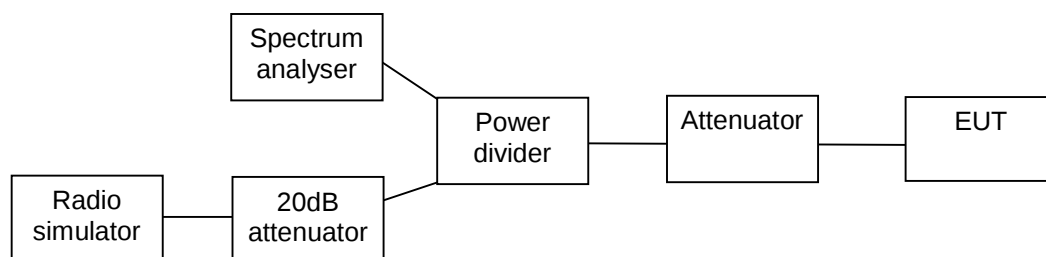
2.6. WCDMA 1900 Test results

Channel / f_c [MHz]	P [dBm]	P [W]	Result
9262 / 1852.4	24.50	0.282	PASSED
9400 / 1880.0	24.40	0.275	PASSED
9538 / 1907.6	24.20	0.263	PASSED

3. 99 % occupied bandwidth (FCC §2.1049(h), RSS-GEN 4.4.1, RSS-133 5.6)

EUT with DUT number	RD-2, DUT 11642
Accessories with DUT numbers	-
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 40 /101
Date of measurements	08.12.2006
Measured by	Anni Manninen

3.1. Test setup



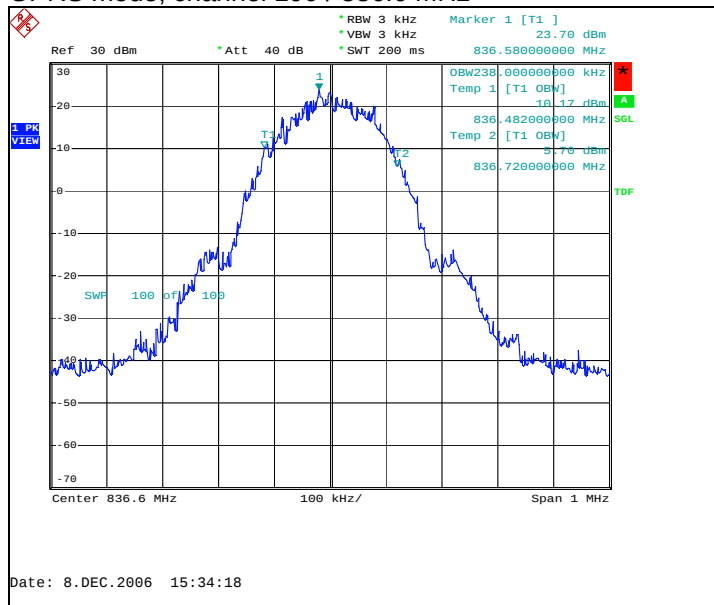
3.2. Test method and limit

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

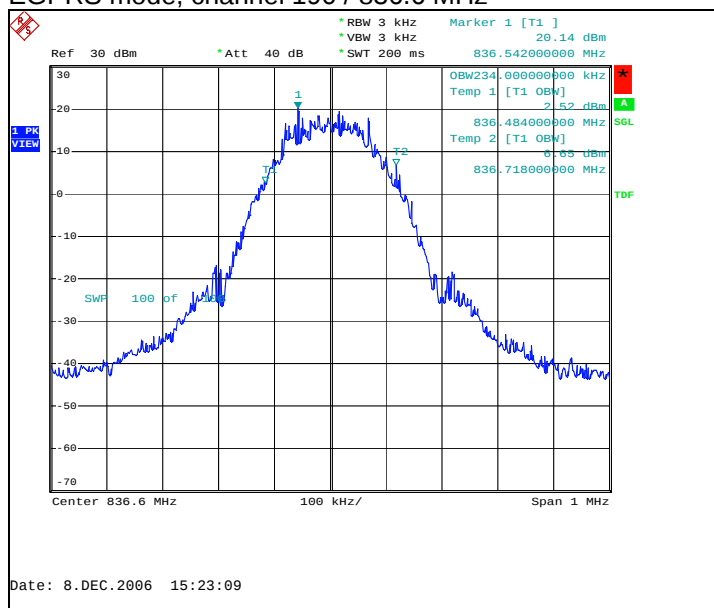
3.3. GSM 850 Test results

Operation mode (TX on)	99% occupied bandwidth [kHz]
GPRS	234.00
EGPRS	238.00

GPRS mode, channel 190 / 836.6 MHz



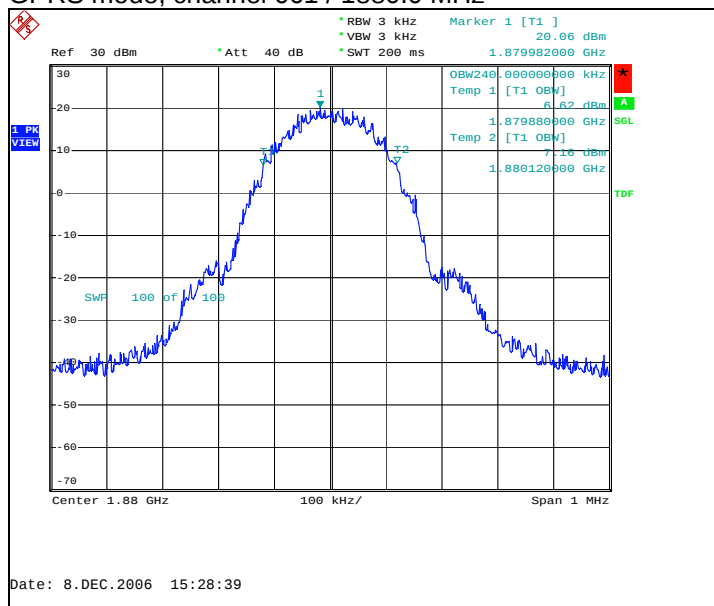
EGPRS mode, channel 190 / 836.6 MHz



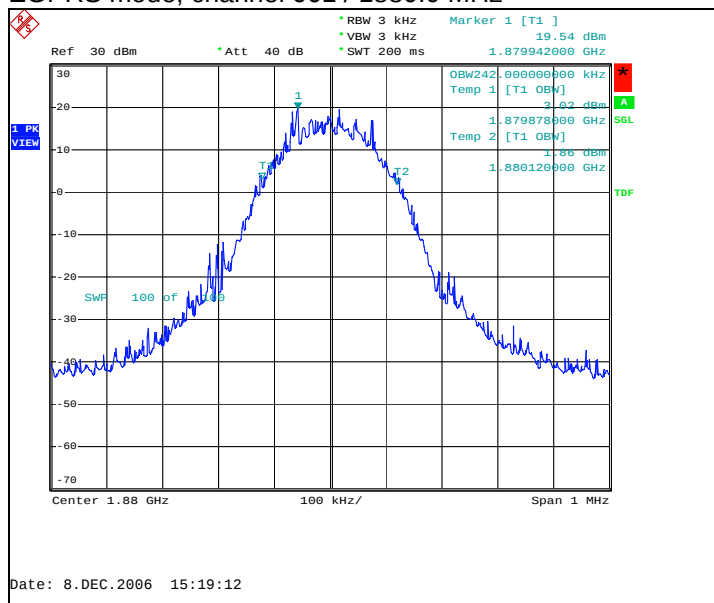
3.4. GSM 1900 Test results

Operation mode (TX on)	99% occupied bandwidth [kHz]
GPRS	240.00
EGPRS	242.00

GPRS mode, channel 661 / 1880.0 MHz



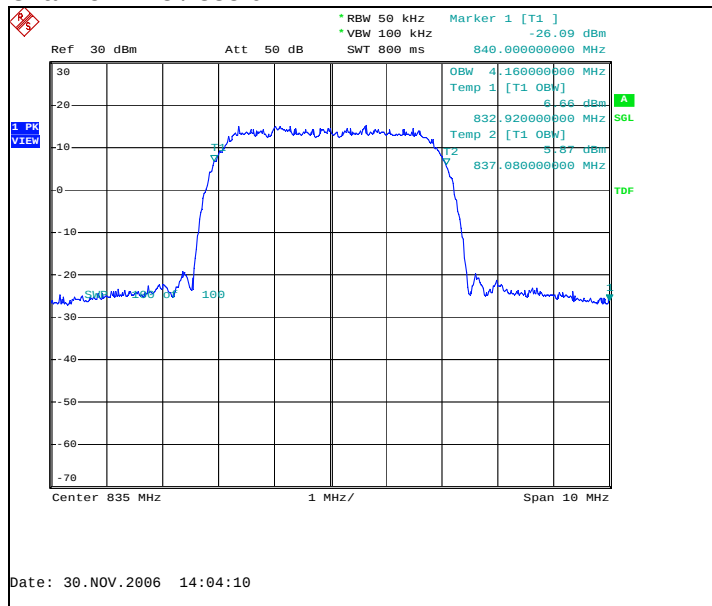
EGPRS mode, channel 661 / 1880.0 MHz



3.5. WCDMA 850 Test results

Operation mode (TX on)	99% occupied bandwidth [kHz]
FDD	4160.00

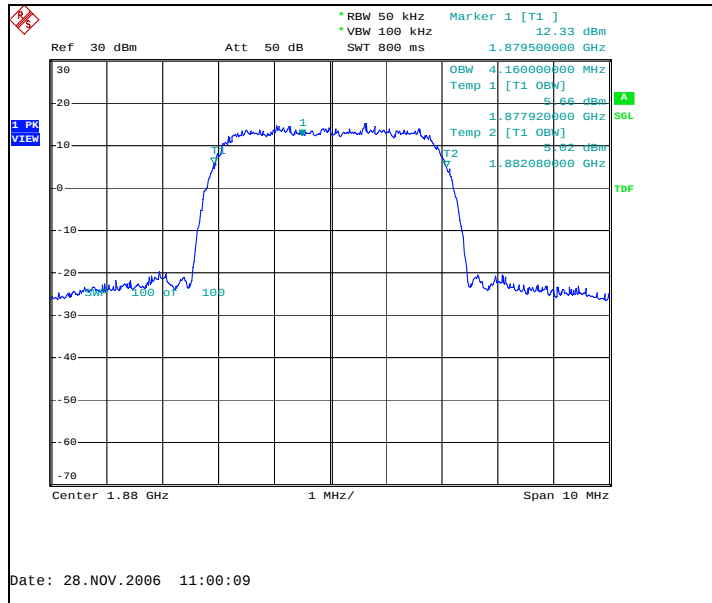
Channel 4175 / 835.0 MHz



3.6. WCDMA 1900 Test results

Operation mode (TX on)	99% occupied bandwidth [kHz]
FDD	4160.00

Channel 9400 / 1880.0 MHz

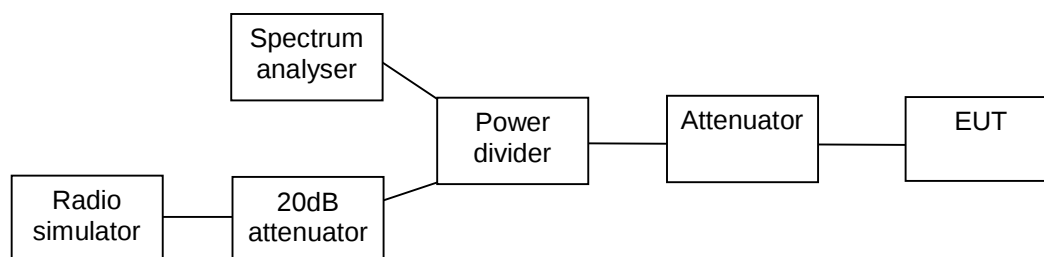


4. Spurious emissions at antenna terminals

(FCC §22.917(a), §24.238(a), §2.1051, RSS-GEN 4.7, RSS-132 4.5, RSS-133 6.3)

EUT with DUT number	RD-2, DUT 11642
Accessories with DUT numbers	-
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 40 /101
Date of measurements	07.12.2006
Measured by	Anni Manninen

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-GEN, RSS-132 and RSS-133.

Limits for spurious emissions at antenna terminals measurements

Operation band	Frequency range [MHz]	Limit [dBm]
GSM 850 / WCDMA 850	30 - 8500	-13
GSM 1900 / WCDMA 1700 / WCDMA 1900	30 - 18000	-13

4.3. GSM 850 Test results

GPRS mode, channel 190 / 836.6 MHz

Frequency / [MHz]	P [dBm]	Result
1673.300000	-26.40	PASSED
2509.650000	-30.50	PASSED
3384.600000	-31.00	PASSED

EGPRS mode, channel 190 / 836.6 MHz

Frequency / [MHz]	P [dBm]	Result
3390.000000	-31.60	PASSED
5564.452000	-31.20	PASSED
6319.420000	-31.50	PASSED

4.4. GSM 1900 Test results

GPRS mode, channel 661 / 1880.0 MHz

Frequency / [MHz]	P [dBm]	Result
3796.240000	-31.90	PASSED
5634.960000	-30.80	PASSED
7469.600000	-30.80	PASSED

EGPRS mode, channel 661 / 1880.0 MHz

Frequency / [MHz]	P [dBm]	Result
3722.560000	-31.70	PASSED
5632.080000	-31.10	PASSED
7599.200000	-30.20	PASSED

4.5. WCDMA 850 Test results

Channel 4175 / 835.0 MHz

Frequency / [MHz]	P [dBm]	Result
1691.000000	-37.60	PASSED
2534.250000	-37.30	PASSED
3385.200000	-31.50	PASSED

4.6. WCDMA 1900 Test results

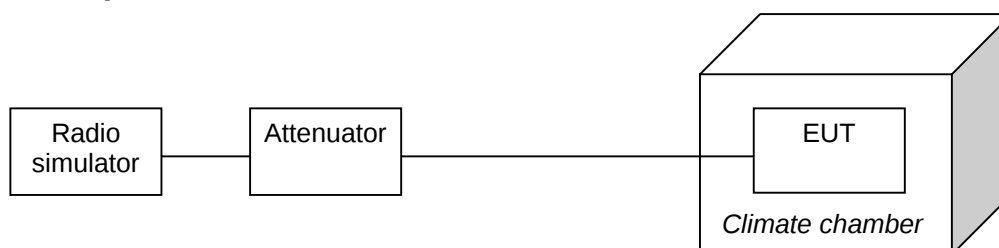
Channel 9400 / 1880.0 MHz

Frequency / [MHz]	P [dBm]	Result
3751.360000	-31.40	PASSED
5605.800000	-30.70	PASSED
7518.560000	-29.90	PASSED

5. Frequency stability, temperature variation (FCC §2.1055(a), §2.1055(a), RSS-GEN 4.5, RSS-132 4.3, RSS-133 7)

EUT with DUT number	RD-2, DUT 11642
Accessories with DUT numbers	-
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 40 /101
Date of measurements	27.11.2006
Measured by	Anni Manninen

5.1. Test setup



5.2. 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 as follows:

- The climate chamber temperature is set to the maximum value and the temperature is allowed to stabilize.
- The EUT is placed in the chamber.
- The EUT is set in idle mode for 15 minutes.
- The EUT is set to transmit.
- The transmit frequency error was measured immediately.
- The steps c - e were repeated for each temperature.

Limits for frequency stability, temperature variation measurements

Frequency deviation [ppm]
± 2.5

5.3. GSM 850 Test results

GSM mode, channel 190 / 836.6 MHz

Temperature [°C]	Deviation [Hz]	Deviation [ppm]
50	-10	-0.01
40	23	0.03
30	23	0.03
20	-17	-0.02
10	-13	-0.02
0	-12	-0.01
-10	-15	-0.02
-20	-14	-0.02
-30	24	0.03

5.4. GSM 1900 Test results

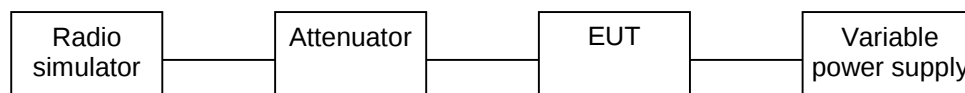
GSM mode, channel 661 / 1880.0 MHz

Temperature [°C]	Deviation [Hz]	Deviation [ppm]
50	-44	-0.02
40	-36	-0.02
30	-49	-0.03
20	-40	-0.02
10	-43	-0.02
0	-51	-0.03
-10	-43	-0.02
-20	-50	-0.03
-30	-36	-0.02

6. Frequency stability, voltage variation (FCC §2.1055(d), RSS-GEN 4.5, RSS-132 4.3, RSS-133 7)

EUT with DUT number	RD-2, DUT 11642
Accessories with DUT numbers	-
Operation Voltage [V] / [Hz]	115 / 60
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 40 / 101
Date of measurements	27.11.2006
Measured by	Anni Manninen

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-GEN, RSS-132 and RSS-133 as follows:

The EUT battery was replaced with an adjustable power supply. The frequency stability was measured at nominal voltage and at the battery cut-off point.

Limits for frequency stability, voltage variation measurements

Frequency deviation [ppm]
± 2.5

6.3. GSM 850 Test results

GSM mode, channel 190 / 836.6 MHz

Voltage level [V]	Deviation [Hz]	Deviation [ppm]
Nominal / 3.3	23	0.03
Battery cut-off point / 3.0	23	0.03

6.4. GSM 1900 Test results

GSM mode, channel 661 / 1880.0 MHz

Voltage level [V]	Deviation [Hz]	Deviation [ppm]
Nominal / 3.3	-32	-0.02
Battery cut-off point / 3.0	-50	-0.03

7. Test Equipment

7.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
1742	EMI Test Receiver	ESMI	R&S	15C, 15B
1759	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
1872	Thermo- Hygrograph	00.02520.150700	Lambrecht	15C, 15B
1916	Radio Communication tester	CMTA84	R&S	15C, 15B
2039	Power Supply	PL330QMD	THURLBY	15C, 15B
2060	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
2068	CDN-Antenna line	S1	NMP	15C, 15B
2097	Pulse Limiter	ESH3-Z2	R&S	15C, 15B
2111	Multimeter	TX3	Tektronix	15C, 15B
2156	Digital Radio Communication Tester	CMU200	R&S	15C, 15B
2206	Signal generator	SMX	R&S	15C, 15B
2335	GPIB Switch 2 to 1	-	National Instruments	15C, 15B
2347	Digital Radio Communication Tester	CMU200	R&S	22/24, 15C, 15B
2352	Spectrum Analyzer	FSP	R&S	22/24, 15C
2359	Temperature Test system	VT4002	Vötsch Industrietechnik	22/24
2360	Serial Bus Converter	Serial 488A	IO Tech	22/24
2362	Power Supply	NGPX 70/5	R&S	22/24
2388	Bluetooth Tester	CBT	R&S	15C, 15B
-	RF Emission Software	ES-K1 v.1.71	R&S	22/24, 15C, 15B

7.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
1748	Log. per. Antenna	HL025	R&S	22/24, 15C
1749	Log. per. Antenna	HL025	R&S	22/24, 15C
1875	Thermo- Hygrograph	00.02520.150700	Lambrecht	22/24, 15C, 15B
1917	Radio Communication tester	CMTA84	R&S	22/24, 15C, 15B
1933	Precision half-wave dipole antennas	HZ-13	R&S	22/24, 15C
1938	Precision half-wave dipole antennas	HZ-12	R&S	22/24, 15C
2006	Radiation Reference Source	VSQ	MEB	22/24, 15C, 15B
2009	Signal generator	SMP 22	R&S	22/24, 15C, 15B
2019	Multimeter	34401A	HP	22/24, 15C, 15B
2027	Coupling and Decoupling Network	M2 (modified) DC1	MEB	22/24, 15C, 15B
2028	Coupling and Decoupling Network	M3 (modified) DC2	MEB	22/24, 15C, 15B
2029	Power Supply	PL330	THURLBY	22/24, 15C, 15B
2043	Band Reject Filter	WRCA824/849-0,2-6SS	Wainwright	22/24, 15C, 15B
2047	Band Reject Filter	WRCC1800/2000-0,2-10SS	Wainwright	22/24, 15C, 15B
2051	High Pass Filter	4HC1700-1-KK	R&S	22/24, 15C
2057	Log. per. Antenna	HL025	R&S	22/24, 15C

Eq. No	Equipment	Type	Manufacturer	Used in
2109	Power Supply	PL330QMD	THURLBY	22/24, 15C, 15B
2110	Multimeter	34401A	HP	22/24, 15C, 15B
2112	Multimeter	TX3	Tektronix	22/24, 15C, 15B
2116	Controller	EMCO MODEL 2090	ETS	22/24, 15C, 15B
2133	Power Meter	NRVS	R&S	22/24, 15C
2134	Power Sensor	NRV-Z32	R&S	22/24, 15C
2135	Coupling and Decoupling Network	CDN 801-M3	LÜTHI	22/24, 15C, 15B
2138	Ultra Broadband Antenna	HL562	R&S	22/24, 15C, 15B
2140	Biconical Antenna	EMCO93110B	EMCO	22/24, 15C
2142	Log.-per.-dipol Antenna	3146	EMCO	22/24, 15C
2144	Attenuator	6803.17B	Huber-Suhner	22/24, 15C, 15B
2150	High Pass Filter	F-15041	RLC ELECTRONICS	22/24, 15C
2176	Coupling and Decoupling Network	CDN 801-M3	LÜTHI	22/24, 15C, 15B
2180	Digital Radio Communication Tester	CMU200	R&S	22/24, 15C, 15B
2188	Preamplifier	AFS4-00100300-20-23P-6	MITEQ	22/24, 15C, 15B
2330	EMI Test receiver	ESIB26	R&S	22/24, 15C, 15B
2334	GPIO Switch 2 to 1	-	National Instruments	22/24, 15C, 15B
2348	Yaesu controller	G-1000DXC	YAESU	22/24, 15C, 15B
2349	Computer controller (Yaesu)	GS-232B	YAESU	22/24, 15C, 15B
2350	Preamplifier	AMF-6D-020180-29-20P	MITEQ	22/24, 15C
2361	Anechoic chamber	3 meter semi/full anechoic chamber	Euroshield	22/24, 15C, 15B
2398	Horn antenna	HF906	R&S	22/24, 15C
2363	Band Reject Filter	WRCG 832/838-825/845/5SS	Wainwright	22/24
2364	Band Reject Filter	WRCG1877/1883 - 1870/1890-40/6SS	Wainwright	22/24
2365	Relay Switch Unit	TS-RSP	R&S	22/24, 15C, 15B
2366	Relay Switch Unit	TS-RSP	R&S	22/24, 15C, 15B
2384	Band Reject Filter	WRCG832/838-825/845-40/5SS	Wainwright	22/24
2388	Bluetooth Tester	CBT	R&S	15C, 15B
-	RF Emission Software	ES-K1 v.1.71	R&S	22/24, 15C, 15B