

FCC Part 22/24 Compliance Test Report

Test Report no.:	FCC22&24_RM-588_23.doc	Date of Report:	13-Jan-2010
Number of pages:	20	Customer's Contact person:	Jyrki Juvani
Testing laboratory:	TCC Nokia Beijing Laboratory Beijing Economic and Technological Development Area No.5 Donghuan Zhonglu Beijing PRC China 100176 Tel. +86 10 8711 8888 Fax. +86 10 8711 4550	Customer:	Nokia Corporation P.O. Box 50 Elektroniikkatie 10 FIN-90571 OULU, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 (0) 7180 47222
FCC listing no.:	975940		
IC recognition no.:	661AH-1		
Tested devices/ accessories:	Phone RM-588 / Battery BL-5J / AC-charger AC-8E / Headset HS-125 / Dummy battery SF-141T		
FCC ID:	LJPRM-588X	IC:	661E-RM588
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Parts 22 and 24, TIA-603-C-2004 and IC standards RSS-GEN (Issue 2, June 2007), RSS-132 (Issue 2, September 2005) and RSS-133 (Issue 5, February 2009). 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 Specialist, EMC

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

Date of receipt	10-Jul-2009
Testing completed	22-Jul-2009
The customer's contact person	Jyrki Juvani
Test Plan referred to	T:\Projects\RM-588\TestPlan_RS\RS_Test_plan_RM-588.xls
Notes	-
Document name	FCC22&24_RM-588_23.doc

1.1. EUT and Accessory Information

The EUT is a 6-band (GSM850/900/1800/1900 and WCDMA Band I/VIII) 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-588	004401106532365	0301	-	20.0.048	51348
Phone	RM-588	004401106532332	0301	-	20.0.048	51349
Battery	BL-5J	4620409176J20111121;0670573	-	-	-	51351
Battery	BL-5J	4620409176J20111120;0670573	-	-	-	51352
AC-charger	AC-8E	3997917527070304595;0675387	-	-	-	51353
AC-charger	AC-8E	3997917527070304596;0675387	-	-	-	51354
Headset	HS-125	06943238463I3104890	-	-	-	51355
Headset	HS-125	06943238463I3103526	-	-	-	51356
Dummy Battery	SF-141T					51367

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)	4.4	Conducted RF output power	NP
§22.913(a)	4.4	Radiated RF output power	NP
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§22.917(a)	4.5	Band edge compliance	PASSED
§22.917(a), §2.1051	4.5	Spurious emissions at antenna terminals	NP
§22.917(a), §2.1053	4.5	Spurious radiated emissions	PASSED
§2.1055(a)	4.3	Frequency stability, temperature variation	PASSED
§2.1055(d)	4.3	Frequency stability, voltage variation	PASSED

GSM 1900:

Section in CFR 47	Section in RSS-GEN or RSS-133	Name of the test	Result
§2.1046(a)	6.4	Conducted RF output power	NP
§24.232(b)	6.4	Radiated RF output power	NP
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§24.238(a)	6.5	Band edge compliance	PASSED
§24.238(a), §2.1051	6.5	Spurious emissions at antenna terminals	NP
§24.238(a), §2.1053	6.5	Spurious radiated emissions	PASSED
§2.1055(a)	6.3	Frequency stability, temperature variation	PASSED
§2.1055(d)	6.3	Frequency stability, voltage variation	PASSED

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 Beijing Laboratory.

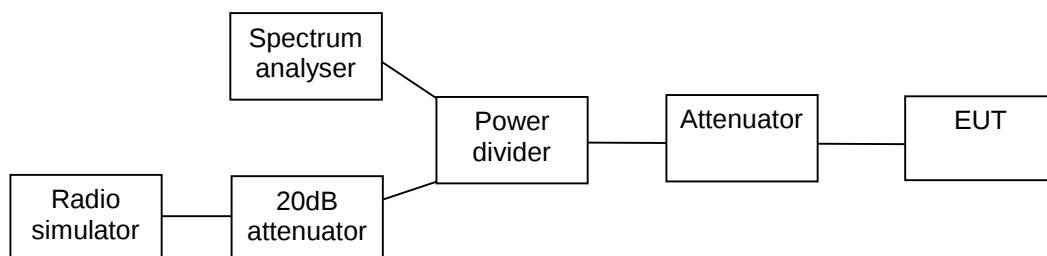
CONTENTS

1. Summary for FCC Part 22/24 Compliance Test Report	2
1.1. EUT and Accessory Information	2
1.2. Summary of Test Results	2
2. 99 % occupied bandwidth (FCC §2.1049(h), RSS-GEN 4.6.1)	5
2.1. Test setup	5
2.2. Test method and limit	5
2.3. GSM 850 Test results	6
2.4. GSM 1900 Test results	7
3. Band edge compliance (FCC §22.917(a), 24.238(a), RSS-132 4.5, RSS-133 6.5).....	8
3.1. Test setup	8
3.2. Test method and limit	8
3.3. GSM 850 Test results	9
3.4. GSM 1900 Test results	11
4. Spurious radiated emissions (FCC §22.917(a), §24.238(a), §2.1053, RSS-132 4.5, RSS-133 6.5).....	13
4.1. Test setup	13
4.2. Test method and limit	13
4.3. GSM 850 Test results	14
4.4. GSM 1900 Test results	14
5. Frequency stability, temperature variation (FCC §2.1055(a), RSS-132 4.3, RSS-133 6.3).....	16
5.1. Test setup	16
5.2. Test method and limit	16
5.3. GSM 850 Test results	17
5.4. GSM 1900 Test results	17
6. Frequency stability, voltage variation (FCC §2.1055(d), RSS-132 4.3, RSS-133 6.3).....	18
6.1. Test setup	18
6.2. Test method and limit	18
6.3. GSM 850 Test results	19
6.4. GSM 1900 Test results	19
7. Test Equipment.....	20
7.1. Conducted measurements	20
7.2. Radiated measurements	20

2. 99 % occupied bandwidth (FCC §2.1049(h), RSS-GEN 4.6.1)

EUT with DUT number	RM-588, DUT51349
Accessories with DUT numbers	BL-5J, DUT51351; AC-8E, DUT51354; HS-125, DUT51356
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 68 / 99.9
Date of measurements	13-Jul-2009
Measured by	Jia Dongsheng

2.1. Test setup



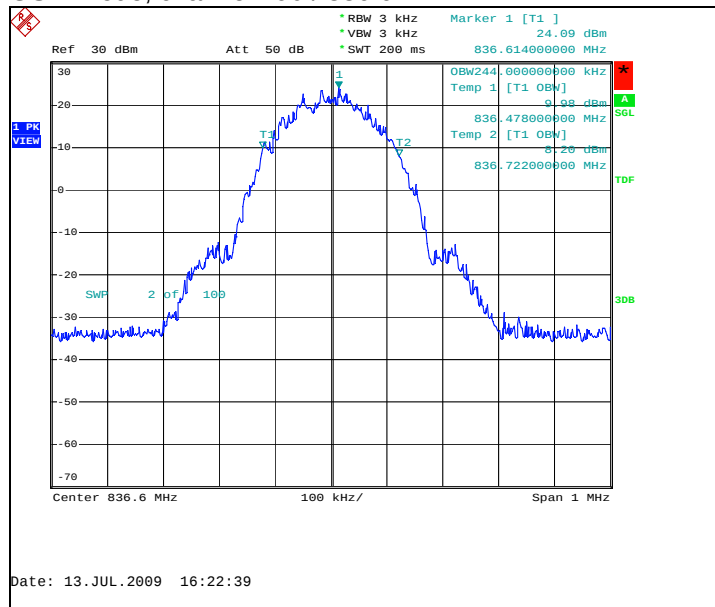
2.2. Test method and limit

The measurement is made according to FCC rules parts 22 and 24 and IC standard RSS-GEN.

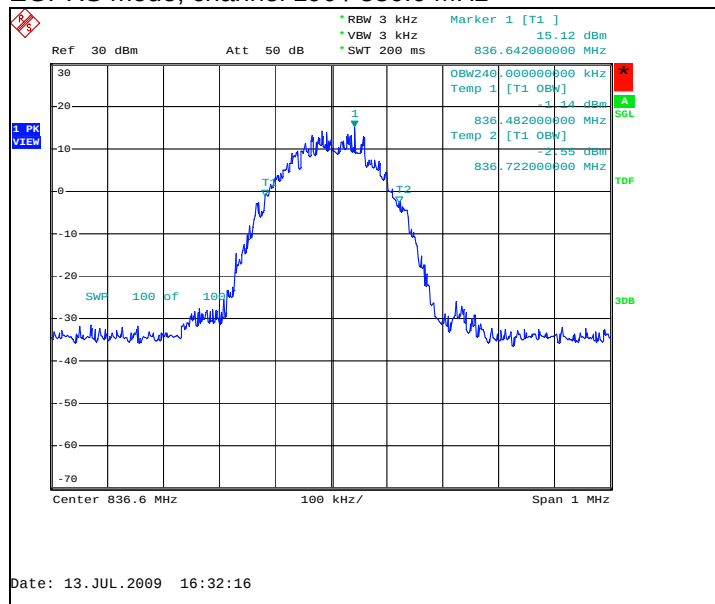
2.3. GSM 850 Test results

Operation mode (TX on)	99% occupied bandwidth [kHz]
GSM	244
EGPRS	240

GSM mode, channel 190 / 836.6 MHz



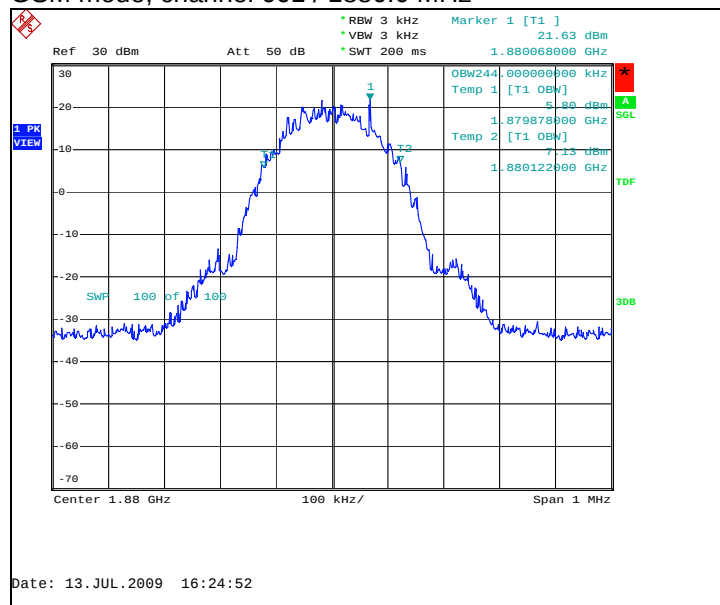
EGPRS mode, channel 190 / 836.6 MHz



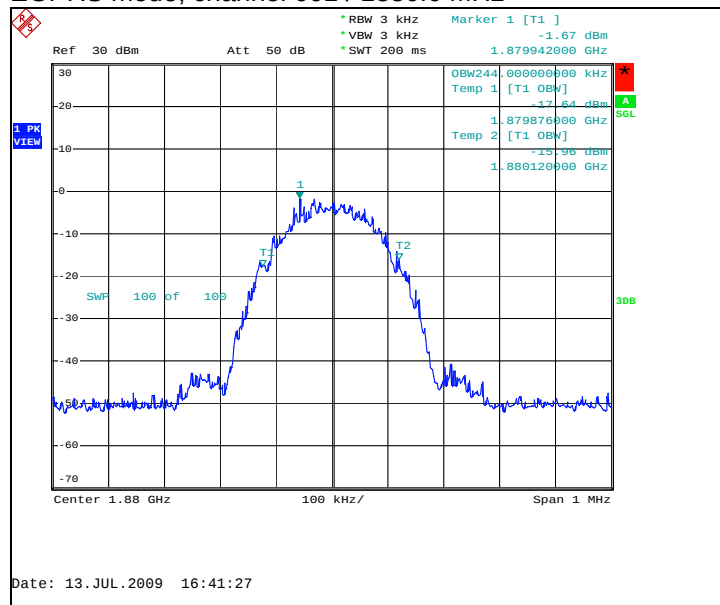
2.4. GSM 1900 Test results

Operation mode (TX on)	99% occupied bandwidth [kHz]
GSM	244
EGPRS	244

GSM mode, channel 661 / 1880.0 MHz



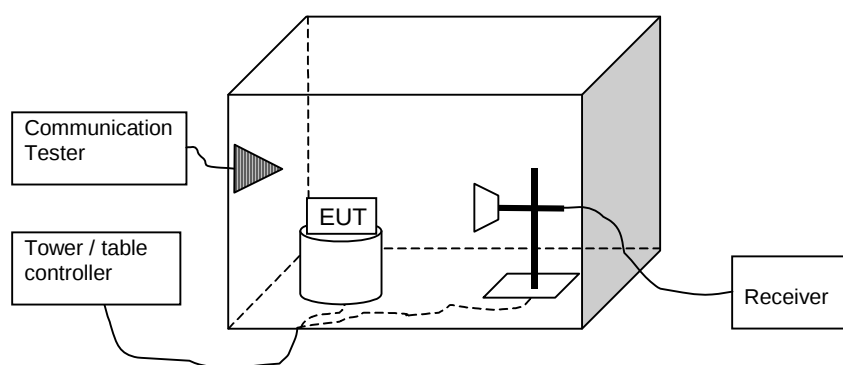
EGPRS mode, channel 661 / 1880.0 MHz



3. Band edge compliance (FCC §22.917(a), 24.238(a), RSS-132 4.5, RSS-133 6.5)

EUT with DUT number	RM-588, DUT51348
Accessories with DUT numbers	BL-5J, DUT51352; AC-8E, DUT51353; HS-125, DUT51355
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 64 / 99.5
Date of measurements	20-Jul-2009
Measured by	Zou Ming

3.1. Test setup



3.2. Test method and limit

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

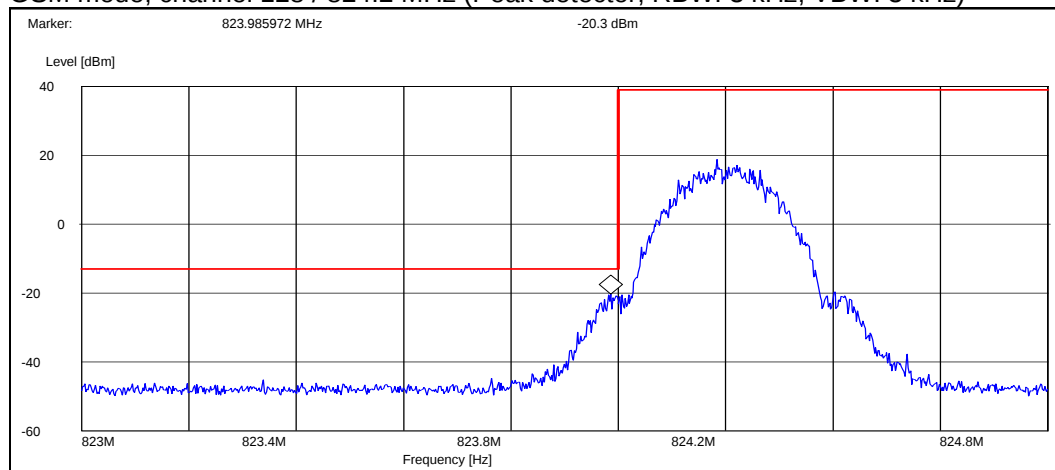
Limits for band edge compliance measurements

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

3.3. GSM 850 Test results

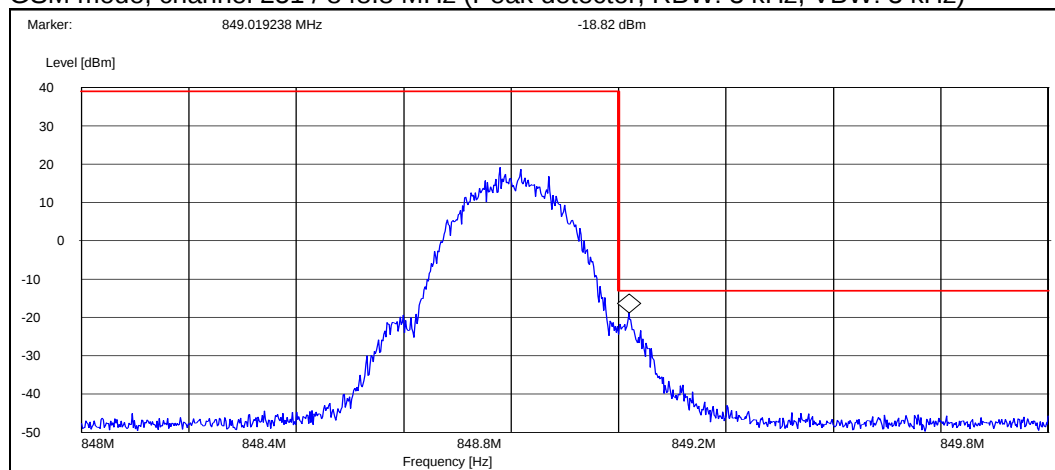
Operation mode (TX on)	Channel / f_c [MHz]	Level [dBm]
GSM	128 / 824.2	-20.30
GSM	251 / 848.8	-18.80
EGPRS	128 / 824.2	-34.20
EGPRS	251 / 848.8	-33.40

GSM mode, channel 128 / 824.2 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)



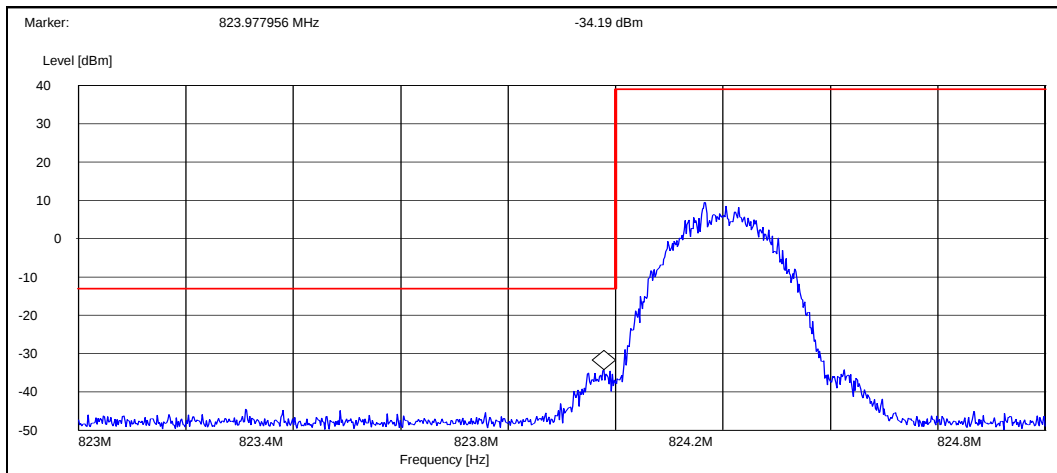
Operation mode (TX on)	Channel / f_c [MHz]	P [dBm]
GSM	128 / 824.2	-20.30

GSM mode, channel 251 / 848.8 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)



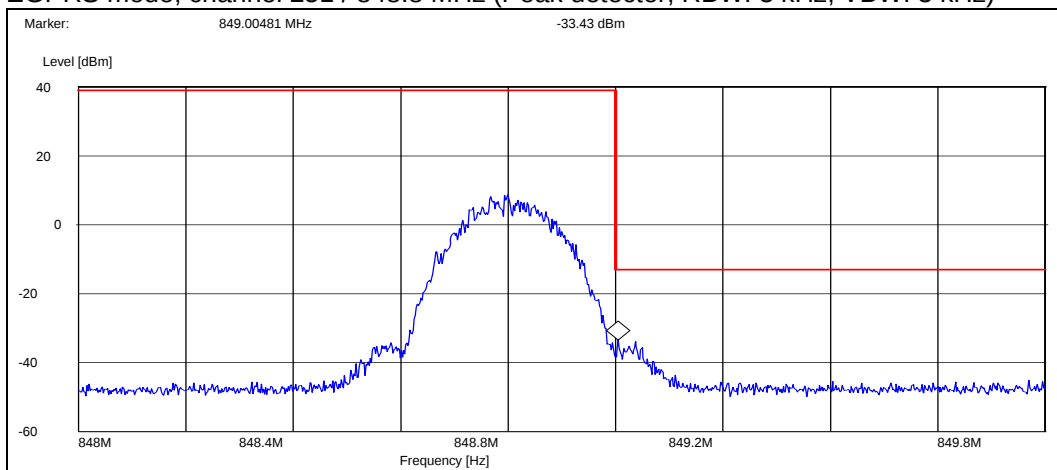
Operation mode (TX on)	Channel / f_c [MHz]	P [dBm]
GSM	251 / 848.8	-18.80

EGPRS mode, channel 128 / 824.2 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)



Operation mode (TX on)	Channel / f_c [MHz]	P [dBm]
EGPRS	128 / 824.2	-34.20

EGPRS mode, channel 251 / 848.8 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)

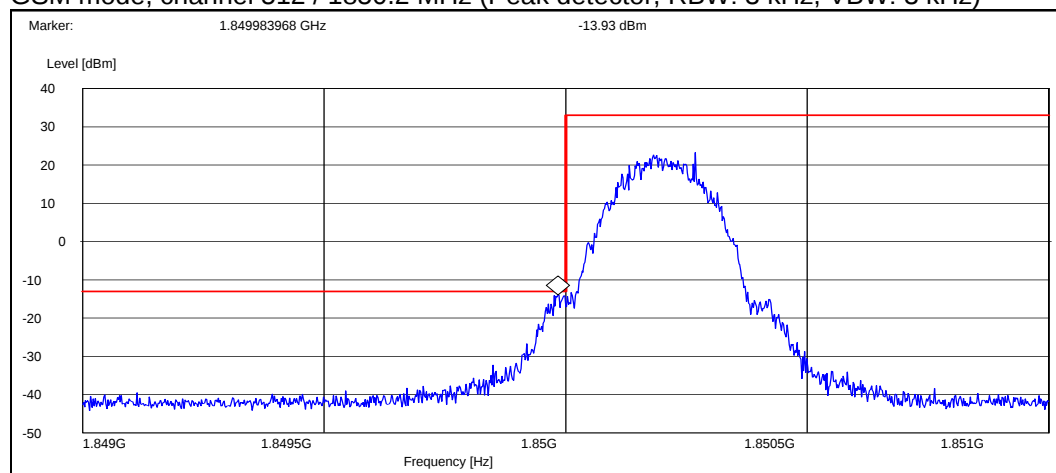


Operation mode (TX on)	Channel / f_c [MHz]	P [dBm]
EGPRS	251 / 848.8	-33.40

3.4. GSM 1900 Test results

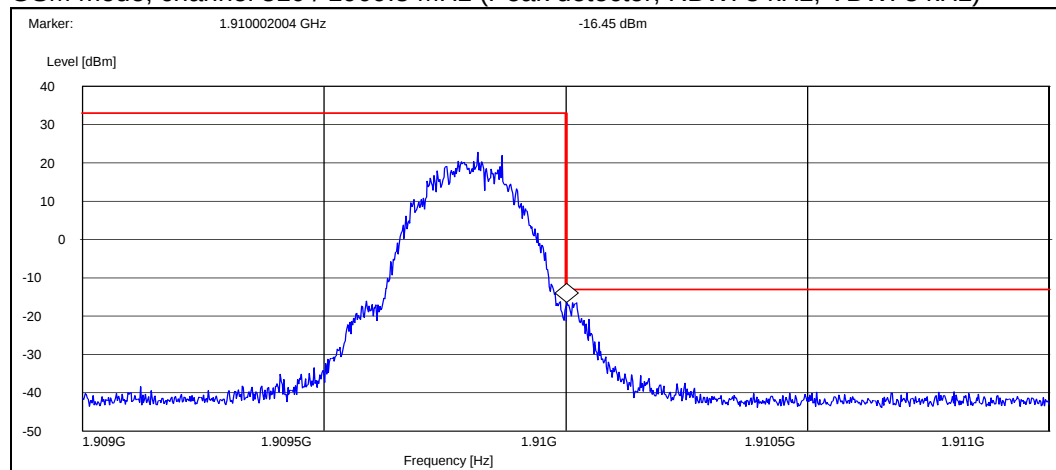
Operation mode (TX on)	Channel / f_c [MHz]	Level [dBm]
GSM	512 / 1850.2	-13.90
GSM	810 / 1909.8	-16.40
EGPRS	512 / 1850.2	-19.80
EGPRS	810 / 1909.8	-24.30

GSM mode, channel 512 / 1850.2 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)



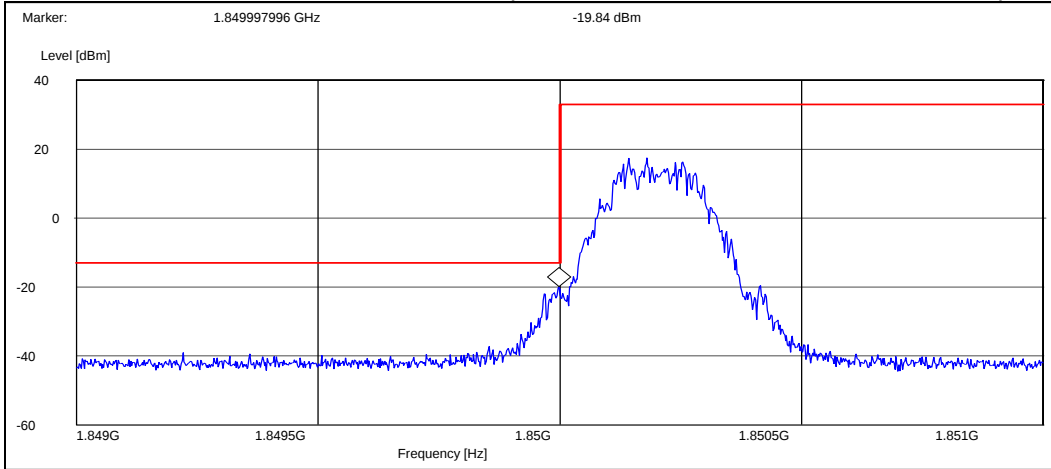
Operation mode (TX on)	Channel / f_c [MHz]	P [dBm]
GSM	512 / 1850.2	-13.90

GSM mode, channel 810 / 1909.8 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)



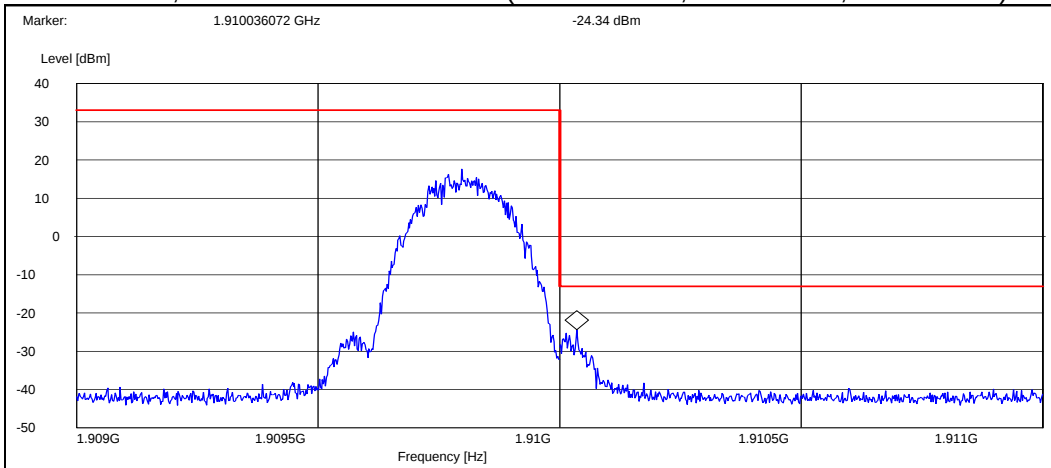
Operation mode (TX on)	Channel / f_c [MHz]	P [dBm]
GSM	810 / 1909.8	-16.40

EGPRS mode, channel 512 / 1850.2 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)



Operation mode (TX on)	Channel / f_c [MHz]	P [dBm]
EGPRS	512 / 1850.2	-19.80

EGPRS mode, channel 810 / 1909.8 MHz (Peak detector, RBW: 3 kHz, VBW: 3 kHz)

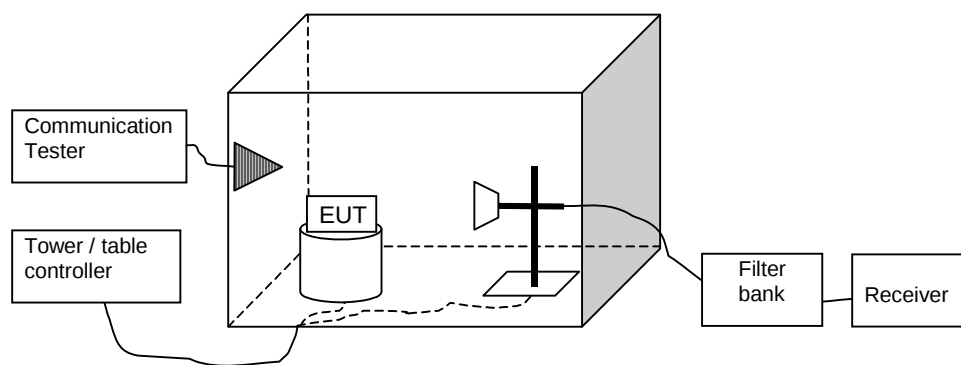


Operation mode (TX on)	Channel / f_c [MHz]	P [dBm]
EGPRS	810 / 1909.8	-24.30

4. Spurious radiated emissions (FCC §22.917(a), §24.238(a), §2.1053, RSS-132 4.5, RSS-133 6.5)

EUT with DUT number	RM-588, DUT51348
Accessories with DUT numbers	BL-5J, DUT51352; AC-8E, DUT51353; HS-125, DUT51355
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 64 / 100.2
Date of measurements	15-Jul-2009
Measured by	Zou Ming

4.1. Test setup



4.2. Test method and limit

The measurement is made according to TIA-603-C-2004 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.

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]
WCDMA 850	30 - 8500	-13
GSM 1900	30 - 18000	-13

4.3. GSM 850 Test results

GSM mode, channel 190 / 836.6 MHz

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Result
1673.143287	-38.90	0.12882	-44.30	5.40	HORIZONTAL	PASSED
2509.820641	-43.00	0.05012	-55.10	12.10	VERTICAL	PASSED
3346.689379	-47.60	0.01738	-56.50	8.90	VERTICAL	PASSED

EGPRS mode, channel 190 / 836.6 MHz

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Result
1673.143287	-43.20	0.04786	-48.60	5.40	HORIZONTAL	PASSED
2510.320641	-50.80	0.00832	-62.90	12.10	VERTICAL	PASSED
3346.189379	-53.80	0.00417	-62.70	8.90	VERTICAL	PASSED

4.4. GSM 1900 Test results

GSM mode, channel 661 / 1880.0 MHz

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Result
3760.023046	-39.40	0.11482	-49.10	9.70	VERTICAL	PASSED
5640.282565	-41.10	0.07762	-53.80	12.70	VERTICAL	PASSED
7520.042084	-39.10	0.12303	-55.00	15.90	HORIZONTAL	PASSED

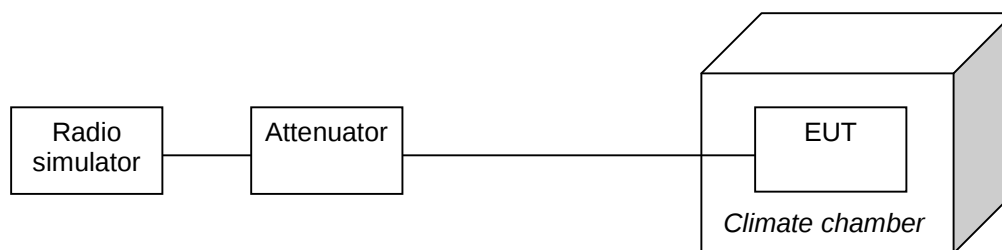
EGPRS mode, channel 661 / 1880.0 MHz

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Result
3760.023046	-39.30	0.11749	-49.00	9.70	VERTICAL	PASSED
5639.782565	-48.40	0.01445	-61.10	12.70	VERTICAL	PASSED
7520.042084	-45.00	0.03162	-60.90	15.90	HORIZONTAL	PASSED

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

EUT with DUT number	RM-588, DUT51349
Accessories with DUT numbers	BL-5J, DUT51351; AC-8E, DUT51354; HS-125, DUT51356
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 68 / 99.9
Date of measurements	13-Jul-2009
Measured by	Jia Dongsheng

5.1. Test setup



5.2. Test method and limit

The measurement is made according to FCC rules parts 22 and 24 and IC standards 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	-16	-0.0191
40	-15	-0.0179
30	-22	-0.0263
20	-13	-0.0155
10	-19	-0.0227
0	-16	-0.0191
-10	-13	-0.0155
-20	-23	-0.0275
-30	-19	-0.0227

5.4. GSM 1900 Test results

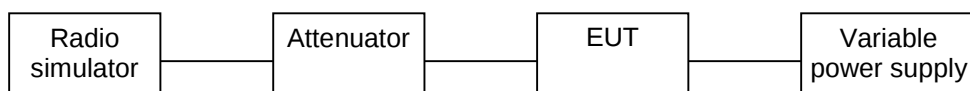
GSM mode, channel 661 / 1880.0 MHz

Temperature [°C]	Deviation [Hz]	Deviation [ppm]
50	-62	-0.0330
40	-61	-0.0324
30	-61	-0.0324
20	-57	-0.0303
10	-51	-0.0271
0	-66	-0.0351
-10	-46	-0.0245
-20	-51	-0.0271
-30	-58	-0.0309

6. Frequency stability, voltage variation (FCC §2.1055(d), RSS-132 4.3, RSS-133 6.3)

EUT with DUT number	RM-558, DUT51349
Accessories with DUT numbers	SF-141T, DUT51367
Operation Voltage [V] / [Hz]	Nominal
Result	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 68 / 99.9
Date of measurements	13-Jul-2009
Measured by	Jia Dongsheng

6.1. Test setup



6.2. Test method and limit

The measurement is made according to FCC rules parts 22 and 24 and IC standards 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]
Battery cut-off point / 3.50	-11	-0.0131
Nominal / 3.70	-16	-0.0191

6.4. GSM 1900 Test results

GSM mode, channel 661 / 1880.0 MHz

Voltage level [V]	Deviation [Hz]	Deviation [ppm]
Battery cut-off point / 3.50	-41	-0.0218
Nominal / 3.70	-49	-0.0261

7. Test Equipment

7.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
BJPCPT0073	SIGNAL GENERATOR	SMR 20	Rohde&Schwarz	22/24/27, 15C, 15B
BJPCTC0055	RADIO COMMUNICATION TESTER	CMU200	Rohde&Schwarz	22/24/27, 15C, 15B
BJPCPT0039	LISN	ESH3-Z5	Rohde&Schwarz	15C, 15B
BJPCPT0040	TEST RECEIVER	ESCS30	Rohde&Schwarz	15C, 15B
BJPCPT0069	LISN	ESH3-Z5	Rohde&Schwarz	15C, 15B
BJPCPT0079	LISN	ESH3-Z5	Rohde&Schwarz	15C, 15B
BJPCPT0191	PULSE LIMITER	ESH3-Z2	Rohde&Schwarz	15C, 15B
BJPCPT0131	RADIO COMMUNICATION TESTER	CMU200	ROHDE&SCHWARZ	15C, 15B
BJPCTC0089	Temperature Test chamber	VT4002	Vötsch Industrietechnik	22/24/27, 15C
BJPCTC0090	FSP spectrum analyzer	FSP30	R&S	22/24/27, 15C
BJPCTC0067	BLUETOOTH TESTER	CBT	R&S	22/24/27, 15C
BJPCHW0020	Dc Power supply	Hp6632B	HP	22/24/27, 15C
BJPCTC0094	GPB-RS232 convertor	GPB-RS232	National Instruments	22/24/27, 15C

7.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
BJPCPT0129	Relay Unit	TS-RSP	Rohde&Schwarz	22/24/27, 15C, 15B
BJPCPT0130	Relay Unit	TS-RSP	Rohde&Schwarz	22/24/27, 15C, 15B
BJPCPT0080	Device Controller	EMCO2090	ETS-EMCO	22/24/27, 15C, 15B
BJPCTC0048	RF Preamplifier 10MHz-3GHz (Metal chassis)	AFS4-00100300-10-10P-4	MITEQ	22/24/27, 15C, 15B
BJPCTC0007	Ultra Broadband Antenna 30MHz-3000MHz	HL562	Rohde&Schwarz	22/24/27, 15C, 15B
BJPCPT0162	Horn Antenna 1GHz-18GHz	HF906	Rohde&Schwarz	22/24/27, 15C, 15B
BJPCTC0029	Horn Antenna 1GHz-18GHz	HF906	Rohde&Schwarz	22/24/27, 15C, 15B
BJPCTC0049	RF preamplifier 3GHz-18GHz	BLMA-0118-1A-BT	Rohde&Schwarz	22/24/27, 15C, 15B
BJPCTC0072	3m anechoic chamber	-	ETS-Lindgren	22/24/27, 15C, 15B
BJPCTC0075	Turntable	Model 2088	ETS-EMCO	22/24/27, 15C, 15B
BJPCPT0072	EMI Test Receiver 20Hz-26.5GHz	ESIB26	Rohde&Schwarz	22/24/27, 15C, 15B
BJPCPT0150	High Pass filter	WHKS 1200-10SS	Wainwright instruments	22/24/27, 15C, 15B
BJPCTC0034	Notch Filter	WRCT800/880-0.2/40-5SSK	Wainwright instruments	22, 15B
BJPCPT0151	Notch Filter	WRCD1800/2000-0.2/40-5SSK	Wainwright instruments	24, 15B
BJPCTC0017	Radio Communication Tester	CMU200	Rohde&Schwarz	22/24/27, 15C, 15B
BJPCPT0154	Filter	WRCT2402/2480-2400/2483.5-30-20SS	Wainwright instruments	15C, 15B
BJPCTC0058	Bluetooth tester	CBT	Rohde&Schwarz	15C, 15B
BJPCTC0064	WCDMA II FILTER	WRCG1877/1883-1870/1890-40/6SS	Wainwright instruments	24, 15B
BJPCTC0065	WCDMA V FILTER	WRCG832/838-825/845-40/5SS	Wainwright instruments	22, 15B
BJPCTC0066	ANTENNA	SBA9113	SWARZBECK	22/24/27
BJPCTC0096	RF Preamplifier 100MHz-3GHz	AFS4-00100300-20-23P-6	MITEQ	22/24/27, 15C, 15B