

FCC Part 22/24 Compliance Test Report

Test Report no.:	FCC22&24_RM-640_12.docx	Date of Report:	9-July-2010
Number of pages:	16	Customer's Contact person:	Vivian Kill-Tollnek
Testing laboratory:	TCC Nokia Copenhagen Laboratory Frederikskaj 1790 COPENHAGEN V DENMARK Tel. +45 33 292929 Fax. +45 33 292934	Customer:	Nokia Corporation Lise Meitner Strasse 10 89081 ULM GERMANY Tel. +49 731 1754 0 Fax. +49 731 1754 6800
FCC listing no.:	99059		
IC recognition no.:	661AL-1		
Tested devices/ accessories:	Phone RM-640 / Battery BL-5CT		
FCC ID:	PPIRM-640	IC:	661U-RM640
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Parts 22/24 , TIA-603-C-2004 and IC standards, RSS-GEN (Issue 2, June 2007), RSS-132 (Issue 2, September 2005), 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:			

Ruben Hansen, System Manager, EMC

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

Date of receipt	03-Jun-2010
Testing completed	6-July-2010
The customer's contact person	Vivian Kill-Tollnek
Test Plan referred to	T:\Projects\RM-640\TestPlan\RS_testplan_RM-640.xls
Notes	-
Document name	T:\Projects\RM-640\EMC\FCC22&24_RM-640_12.docx

1.1. EUT and Accessory Information

The EUT is a 8-band (GSM850/900/1800/1900) and WCDMA Band (I/II(1900)/V(850)/VIII) mobile phone with GPRS, EGPRS, HSDPA, HSUPA and WLAN 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-640	004402/13/036904/8	0210	-	re 5.04	24264
Battery	BL-5CT	3820669492155080998;0670555	-	-	-	24267

1.2. Summary of Test Results

GSM850:

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	Passed
§2.1049(h)	4.6.1	99 % occupied bandwidth	NP
§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	NP
§2.1055(a)	4.3	Frequency stability, temperature variation	NP
§2.1055(d)	4.3	Frequency stability, voltage variation	NP

GSM1900:

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	Passed
§2.1049(h)	4.6.1	99 % occupied bandwidth	NP
§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	NP
§2.1055(a)	6.3	Frequency stability, temperature variation	NP
§2.1055(d)	6.3	Frequency stability, voltage variation	NP

WCDMA 2:

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	Passed
§2.1049(h)	4.6.1	99 % occupied bandwidth	NP
§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	NP
§2.1055(a)	6.3	Frequency stability, temperature variation	NP
§2.1055(d)	6.3	Frequency stability, voltage variation	NP

WCDMA 5:

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	Passed
§2.1049(h)	4.6.1	99 % occupied bandwidth	NP
§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	NP
§2.1055(a)	6.3	Frequency stability, temperature variation	NP
§2.1055(d)	6.3	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 Laboratory.

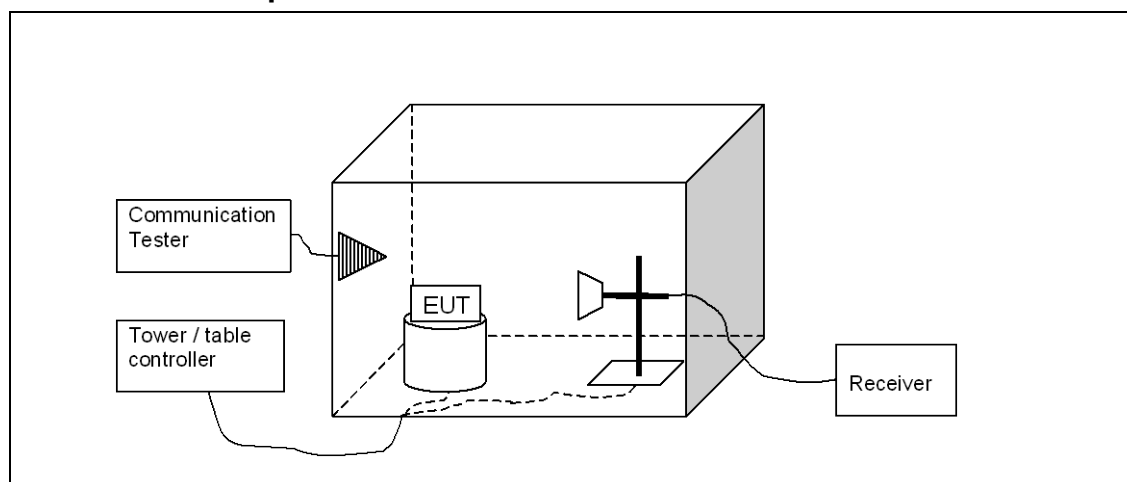
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2. Radiated RF output power (FCC §22.913(a), §24.232(b), RSS-132 4.4, RSS-133 6.4)

EUT with DUT number	RM-640, DUT 24264
Accessories with DUT numbers	BL-5CT, DUT 24267
Operation Voltage [V] / [Hz]	-
Results	PASSED
Remarks	None
Temp [°C] / Humidity [%RH] /	22 / 46
Date of measurements	06-Jul-2010
Measured by	Ruben Hansen

2.1. Test Setup



2.2. Test method and limit

The measurement is made according to TIA-603-C-2004 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
1710 - 1755	1	30
1850 - 1910	2	33

2.3. GSM850 TX Test results

GSM mode

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Result
128 / 824.2	29.88	0.973	-3.59	33.47	HORIZONTAL	PASSED
190 / 836.6	28.27	0.671	-5.04	33.31	VERTICAL	PASSED
251 / 848.8	26.9	0.49	-6.07	32.97	HORIZONTAL	PASSED

EGPRS mode, 1 TX Slot

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Result
128 / 824.2	25.8	0.38	-7.67	33.47	HORIZONTAL	PASSED
190 / 836.6	25.64	0.366	-7.67	33.31	VERTICAL	PASSED
251 / 848.8	23.27	0.212	-9.7	32.97	HORIZONTAL	PASSED

2.4. GSM1900 TX Test results

GSM mode

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Result
512 / 1850.2	26.2	0.417	-18.76	44.96	HORIZONTAL	PASSED
661 / 1880	26.63	0.46	-18.81	45.44	VERTICAL	PASSED
810 / 1909.8	27.38	0.547	-18.13	45.51	VERTICAL	PASSED

EGPRS mode, 1 TX Slot

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Result
512 / 1850.2	23.84	0.242	-21.12	44.96	HORIZONTAL	PASSED
661 / 1880	23.79	0.239	-21.65	45.44	VERTICAL	PASSED
810 / 1909.8	24.51	0.282	-21	45.51	VERTICAL	PASSED

2.5. WCDMA2 TX Test results

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Result
9262 / 1852.4	19.82	0.096	-25.25	45.07	HORIZONTAL	PASSED
9400 / 1880	20.54	0.113	-24.9	45.44	VERTICAL	PASSED
9538 / 1907.6	21	0.126	-24.64	45.64	VERTICAL	PASSED

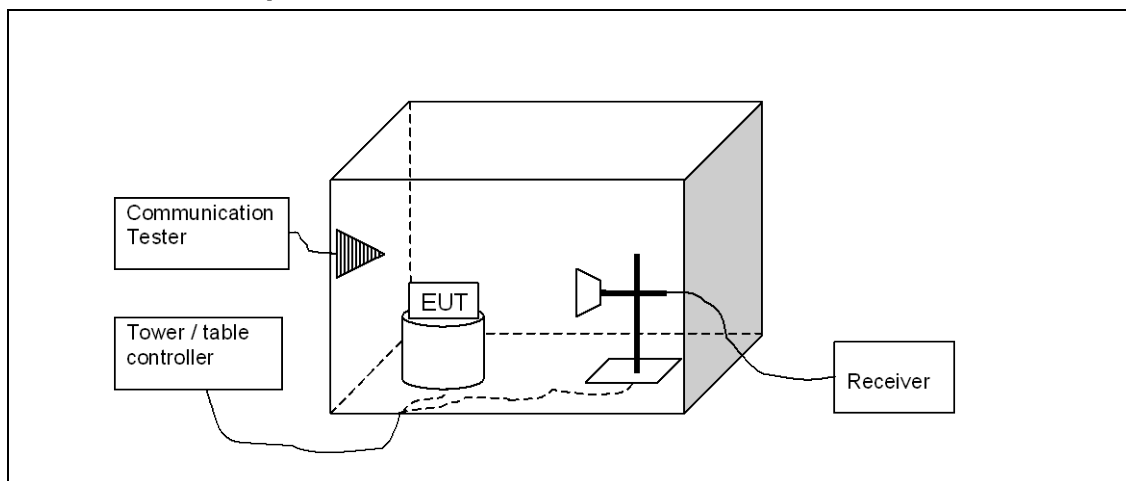
2.6. WCDMA5 TX Test results

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Result
4132 / 826.4	23.44	0.221	-10.14	33.58	HORIZONTAL	PASSED
4183 / 836.6	23.77	0.238	-9.54	33.31	HORIZONTAL	PASSED
4233 / 846.6	21.62	0.145	-11.43	33.05	HORIZONTAL	PASSED

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

EUT with DUT number	RM-640, DUT 24264
Accessories with DUT numbers	BL-5CT, DUT 24267
Operation Voltage [V] / [Hz]	-
Results	PASSED
Remarks	None
Temp [°C] / Humidity [%RH] /	22 / 46
Date of measurements	06-Jul-2010
Measured by	Ruben Hansen

3.1. Test Setup



3.2. Test method and limit

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

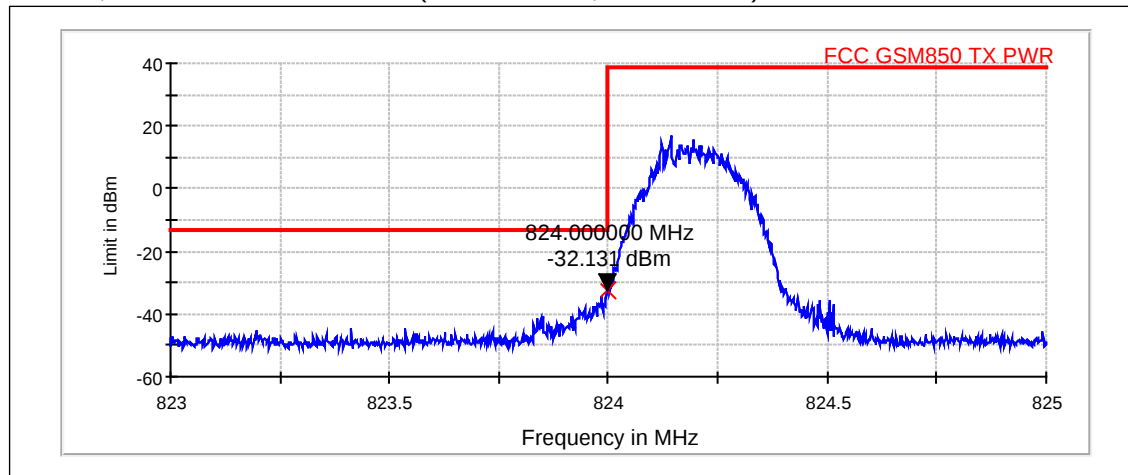
Limits for band edge compliance measurements

Operation band	Frequency range [MHz]	Limit [dBm]
GSM850 / WCDMA 850	Below 824 and above 849	-13
WCDMA 1700	Below 1710 and above 1755	-13
GSM 1900 / WCDMA 1900	Below 1850 and above 1910	-13

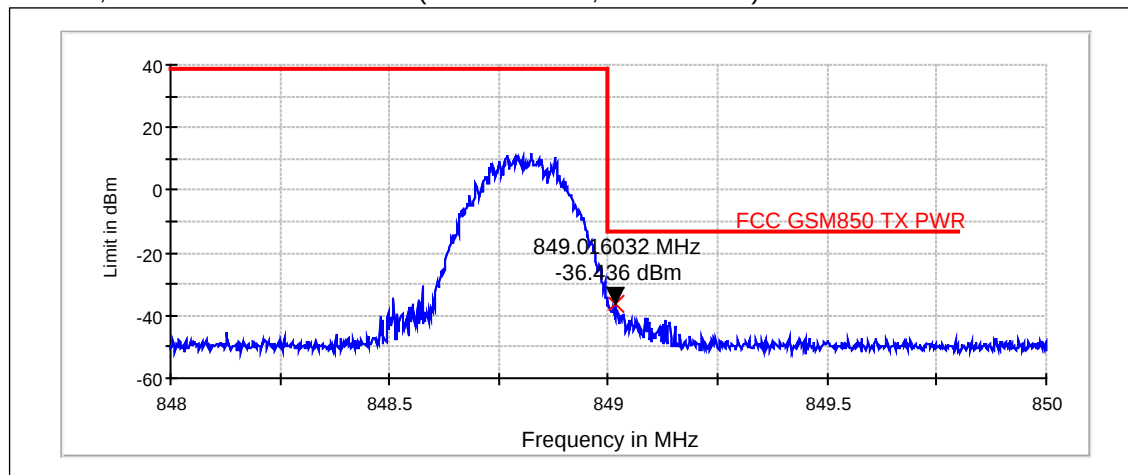
3.3. GSM850 Test results

Operation mode (TX on)	Channel / f _c [MHz]	Level [dBm]
GSM	128 / 824.2	-17.18
EGPRS	128 / 824.2	-32.13
EGPRS	251 / 848.8	-47.04
GSM	251 / 848.8	-18.24

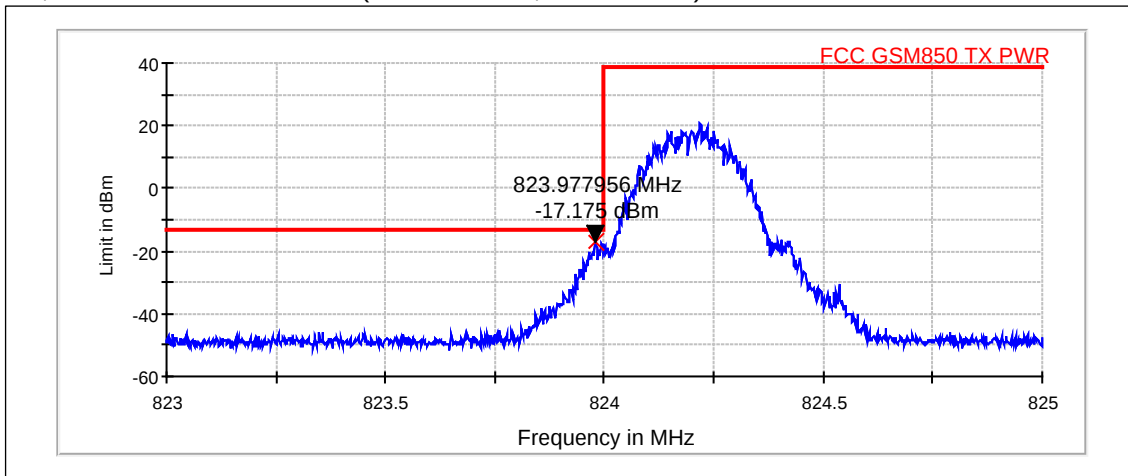
EGPRS, channel 128 / 824.2 MHz (Peak detector, RBW: 3 kHz)



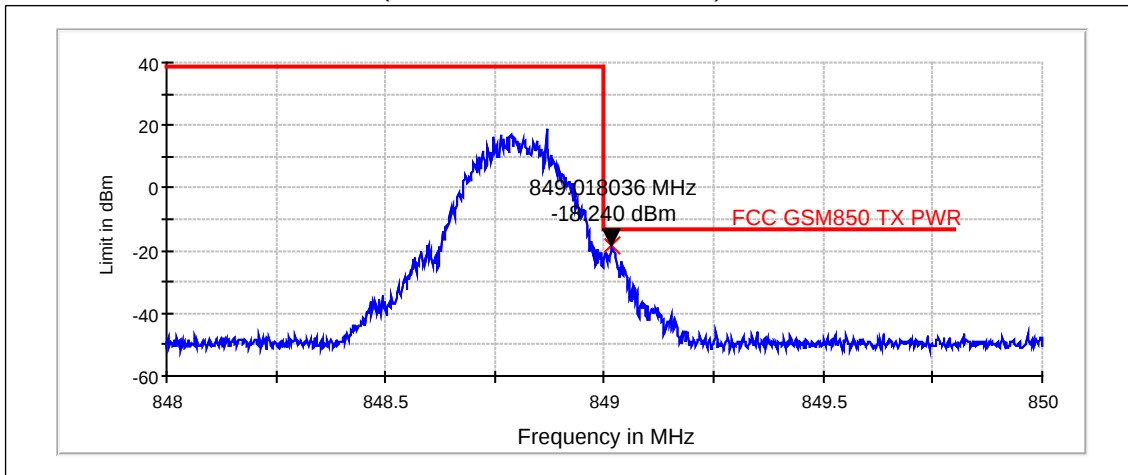
EGPRS, channel 251 / 848.8 MHz (Peak detector, RBW: 3 kHz)



SM, channel 128 / 824.2 MHz (Peak detector, RBW: 3 kHz)



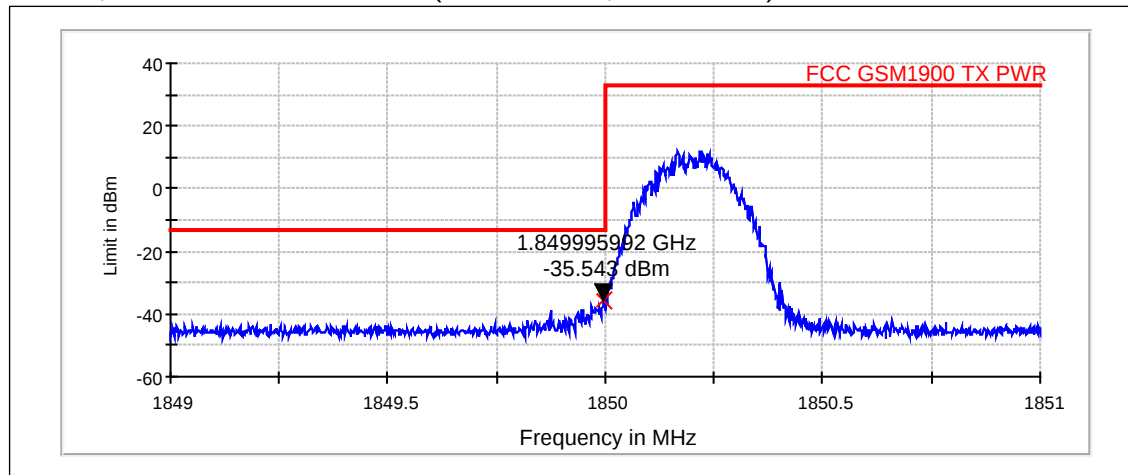
GSM, channel 251 / 848.8 MHz (Peak detector, RBW: 3 kHz)



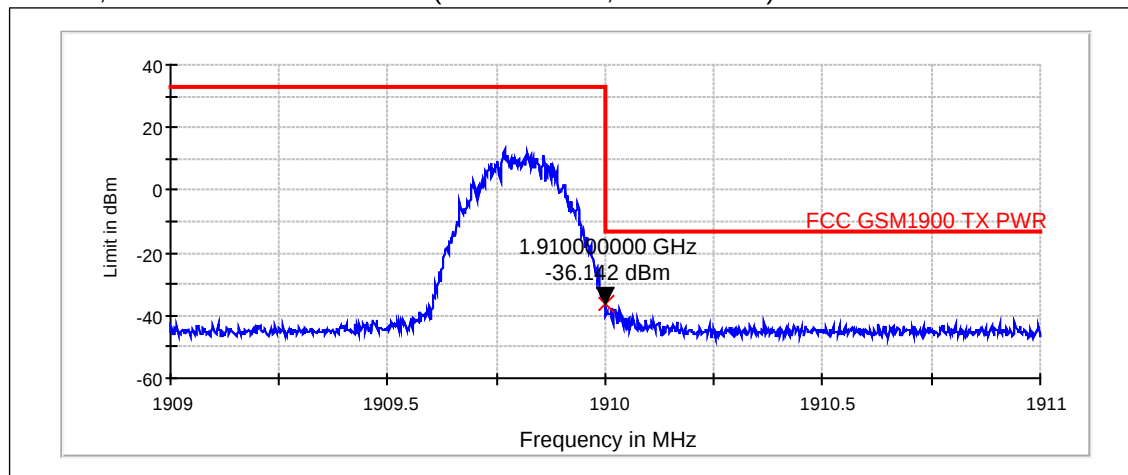
3.4. GSM1900 Test results

Operation mode (TX on)	Channel / f_c [MHz]	Level [dBm]
GSM	512 / 1850.2	-20.04
EGPRS	512 / 1850.2	-35.54
EGPRS	810 / 1909.8	-36.14
GSM	810 / 1909.8	-17.43

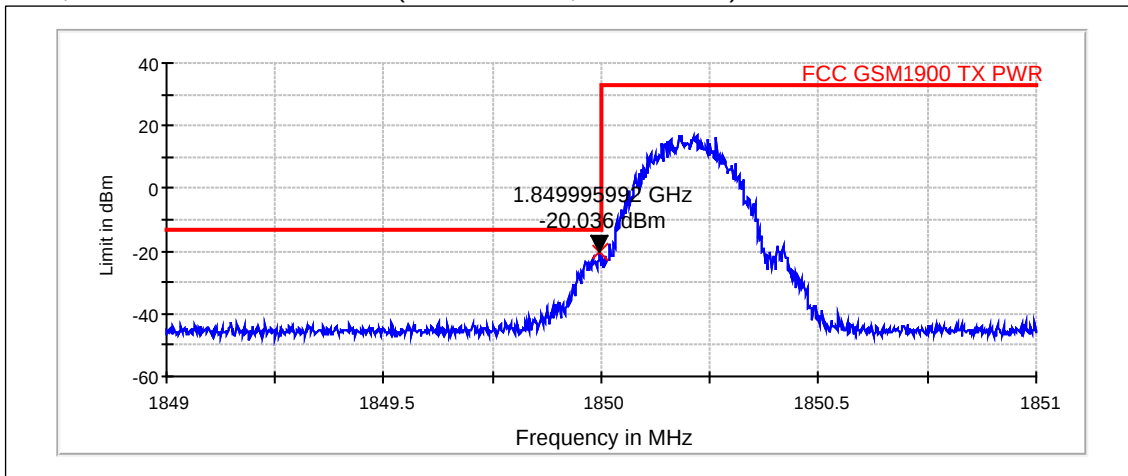
EGPRS, channel 512 / 1850.2 MHz (Peak detector, RBW: 3 kHz)



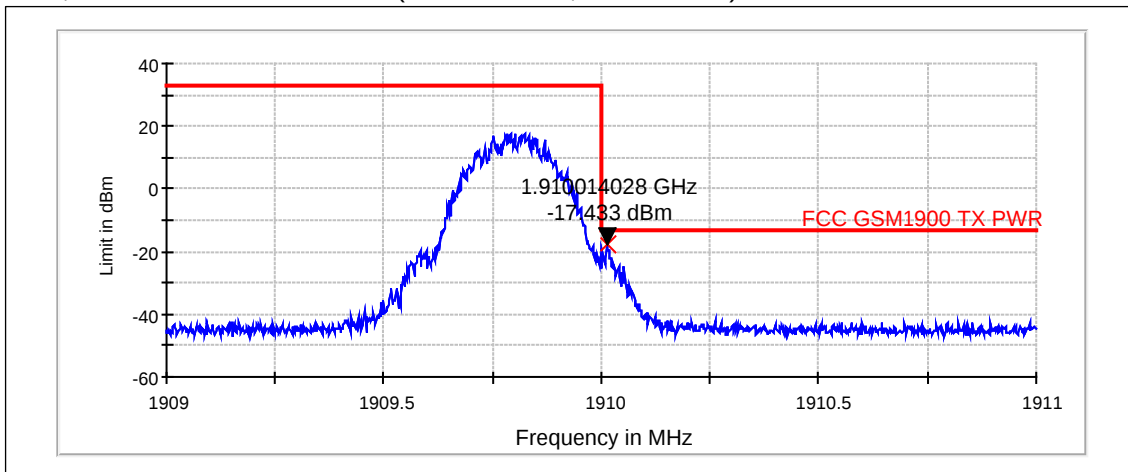
EGPRS, channel 810 / 1909.8 MHz (Peak detector, RBW: 3 kHz)



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



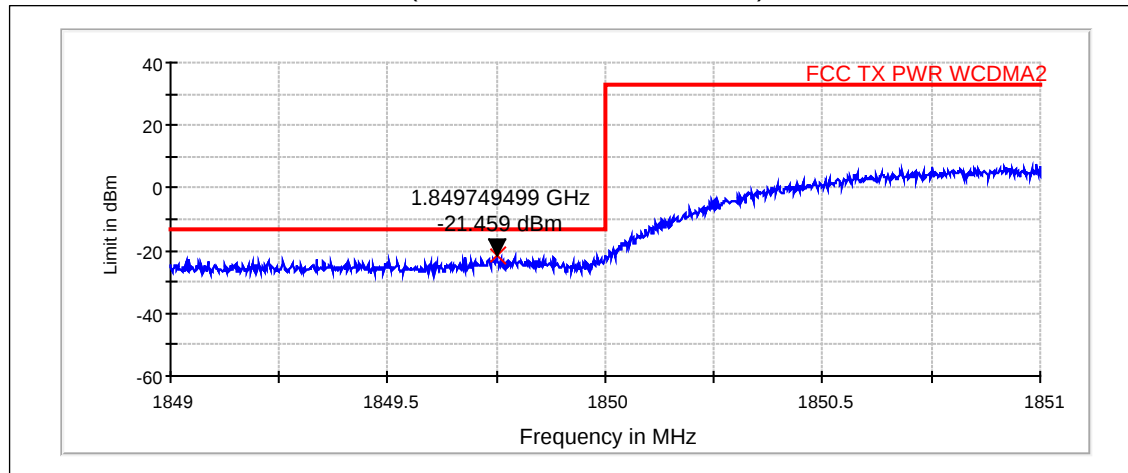
GSM, channel 810 / 1909.8 MHz (Peak detector, RBW: 3 kHz)



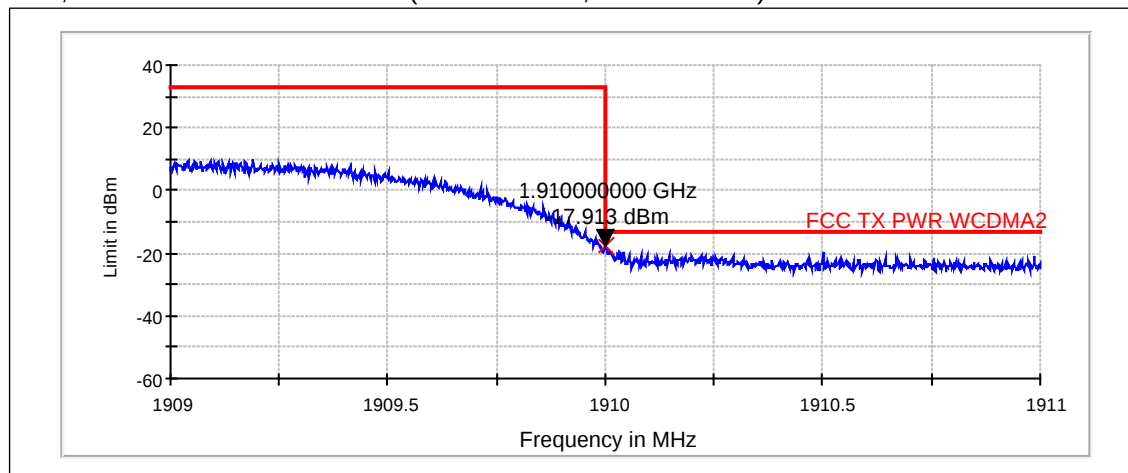
3.5. WCDMA2 Test results

Operation mode (TX on)	Channel / f_c [MHz]	Level [dBm]
FDD	9262 / 1852.4	-21.46
FDD	9538 / 1907.6	-17.91

FDD, channel 9262 / 1852.4 MHz (Peak detector, RBW: 50 kHz)



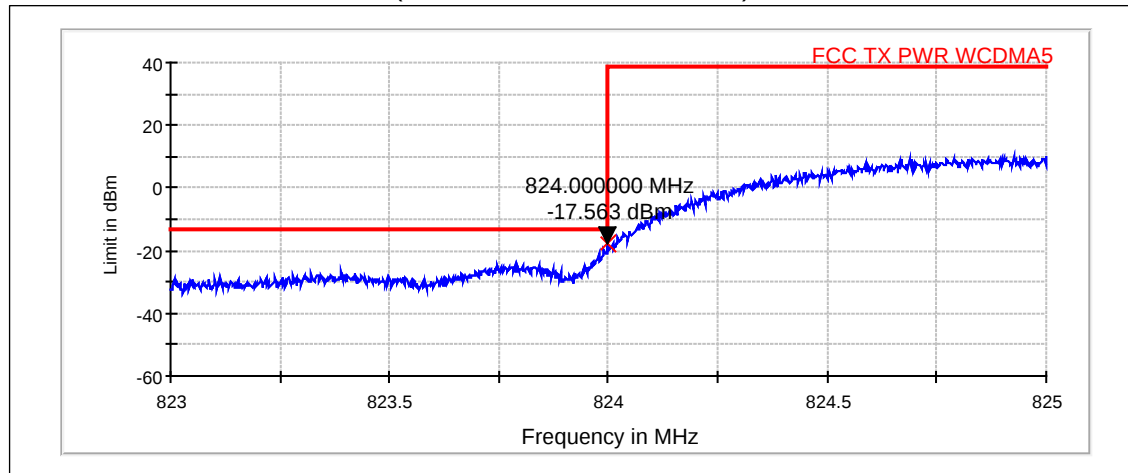
FDD, channel 9538 / 1907.6 MHz (Peak detector, RBW: 50 kHz)



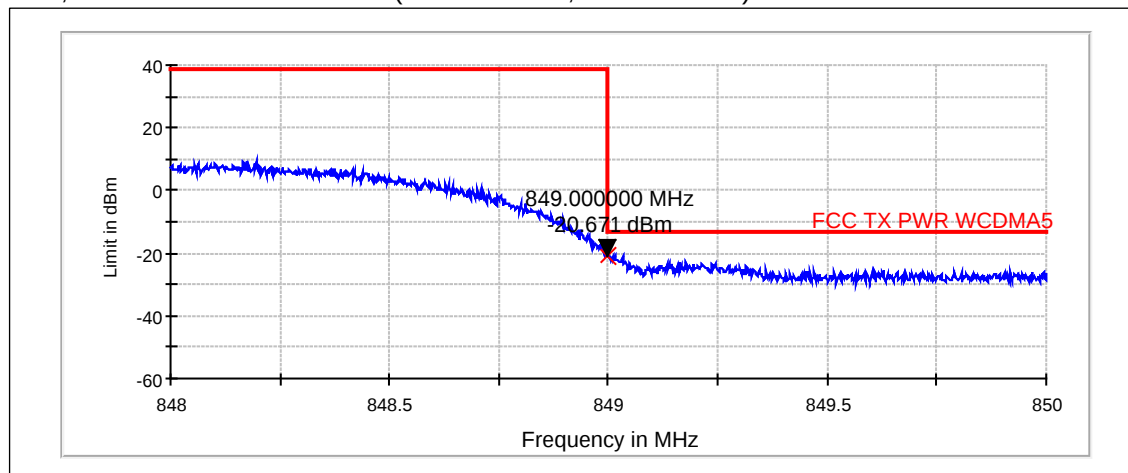
3.6. WCDMA5 Test results

Operation mode (TX on)	Channel / f_c [MHz]	Level [dBm]
FDD	4132 / 826.4	-17.56
FDD	4233 / 846.6	-20.67

FDD, channel 4132 / 826.4 MHz (Peak detector, RBW: 50 kHz)



FDD, channel 4233 / 846.6 MHz (Peak detector, RBW: 50 kHz)



4. Test Equipment

4.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
20168	Bluetooth Tester	CBT	Rohde&Schwarz	22/24/27, 15C, 15B
18772	Shielded Chamber	RFD-100	ETS-Lindgren	15C, 15B
13037	Power Supply 0-15V 10A	EA3012	LP Instruments	15C, 15B
13513	Pulse Limiter	ESH3Z2	Rohde&Schwarz	15C, 15B
13666	Receiver	ESPC	Rohde&Schwarz	15C, 15B
13935	LISN	ESH3-Z5	Rohde&Schwarz	15C, 15B
16995	Directional Coupler 20dB 0,5-2,0 GHz SMA Conn.	1538RA-20	Weinschel	15C, 15B
18772	Shielded Chamber	RFD-100	ETS-Lindgren	15C, 15B
19171	Communication Tester	CMU200	Rohde&Schwarz	15C, 15B
11386	DC Power Supply	HP6632A	Hewlett Packard	22/24/27, 15C, 15B
19678	Spectrum Analyzer	FSP	Rohde&Schwarz	22/24/27, 15C, 15B
16601	Communication Tester	CMU200	Rohde&Schwarz	22/24/27, 15C, 15B
19625	Climatic Chamber	VT4002EMC	Vötsch	22/24/27, 15C, 15B
13357	Signal Generator	SMP02	Rohde&Schwarz	22/24/27, 15C, 15B
19116	Power splitter	-	various	22/24/27, 15C, 15B
20544	Transformer. 230/115V	-	Nokia	22/24/27, 15C, 15B
20543	UPS. 700V/A 490W	PW 9120 700i	Powerware	22/24/27, 15C, 15B

4.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
18792	Mast/turntable controller	2090	ETS-EMCO	22/24/27, 15C, 15B
18416	Communication Tester	CMU200	Rohde&Schwarz	22/24/27, 15C, 15B
20168	Bluetooth Tester	CBT	Rohde&Schwarz	22/24/27, 15C, 15B
13077	Power Supply	EA-3016	-	22/24/27, 15C, 15B
15742	Programmable Relay Switching System	-----	Pickering	22/24/27, 15C, 15B
20078	Relay 2x6 Chnl μ Wave Mux	10-785B-522	Pickering	22/24/27, 15C, 15B
14021	Relay Dual 6 Chnl μ Wave Mux	10-785-522	-	22/24/27, 15C, 15B
-	Relay Dual 6 Chnl μ Wave Mux	10-785-522	-	22/24/27, 15C, 15B
17644	Dual 6 Channel MUX Microwave Relay SMA 50 Ohm	10-785-522	Pickering	22/24/27, 15C, 15B
16948	Dual 6 Channel MUX Microwave Relay SMA 50 Ohm	10-785-522	Pickering	22/24/27, 15C, 15B
16949	Dual 6 Channel MUX Microwave Relay SMA 50 Ohm	10-785-522	Pickering	22/24/27, 15C, 15B
18861	Receiver	EMI Test Receiver 20Hz-26,5GHz ESI	Rohde&Schwarz	22/24/27, 15C, 15B
18860	Antenna	HL562	Rohde&Schwarz	22/24/27, 15C, 15B
18773	Anechoic chamber	RFD-100	ETS-Lindgren	22/24/27, 15C, 15B
18774	Anechoic chamber	RFSD-F/A-100	ETS-Lindgren	22/24/27, 15C, 15B

Eq. No	Equipment	Type	Manufacturer	Used in
19151	High Pass Filter	WHJS3000-10SS	Wainwright	22/24/27, 15C, 15B
13937	Band reject filter	WRCA902.4-0.2/40-6SS	Wainwright Instruments	22/24/27, 15C, 15B
13936	Band reject filter	WRCD1747.5-0.2/40-10SS	Wainwright Instruments	22/24/27, 15C, 15B
14114	Highpass Filter	WHK1000-12SS	Wainwright Instruments	22/24/27, 15C, 15B
14188	Band reject filter	WRCA902.4-0.2/40-6SS	Wainwright	22/24/27, 15C, 15B
14187	Band reject filter	WRCD1747.5-0.2/40-10SS	Wainwright	22/24/27, 15C, 15B
16633	Band reject filter	WRCD1880.0-0.2/40-10SS	Wainwright	22/24/27, 15C, 15B
19587	Band reject filter	WRCG2400/2483-2390/2493-35/10SS	Wainwright	22/24/27, 15C, 15B
20115	Band reject filter	-	Wainwright	22/24/27, 15C, 15B
20114	Band reject filter	WRCG1737/1743-1733/1747-40/6SS	Wainwright	22/24/27, 15C, 15B
20116	Band reject filter	WRCG832/83/-825/845-40/5SS	Wainwright	22/24/27, 15C, 15B
20698	Antenna	BBHA 9120 D	SCHWARZBECK	22/24/27, 15C, 15B
19966	Antenna	HFH2-Z2	Rohde&Schwarz	15C, 15B
13799	Signal Generator	SMP02	Rohde&Schwarz	22/24/27, 15C, 15B
15191	Turntable Controller Unit	G-800SDX	YAESU	22/24/27, 15C, 15B
14900	Antenna Controller	HD100	HD GmbH	22/24/27, 15C, 15B
20544	Transformer. 230/115V	-	Nokia	22/24/27, 15C, 15B
20543	UPS. 700V/A 490W	PW 9120 700i	Powerware	22/24/27, 15C, 15B