

FCC Part 22/24/27 Compliance Test Report

Test Report no.:	FCC22&24&27_RM-749_21.docx	Date of Report:	12-Apr-2011
Number of pages:	18	Customer's Contact person:	Lenaghan Alison
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FCC listing no.:	99059		
IC recognition no.:	661AL-1		
Tested devices/ accessories:	Phone RM-749 / Battery BL-5K		
FCC ID:	QFXRM-749	IC:	661Z-RM749
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Parts 22/24/27 , TIA-603-C-2004 and IC standards, RSS-GEN (Issue 3, December 2010), RSS-132 (Issue 2, September 2005), RSS-133 (Issue 5, February 2009), RSS-139 (Issue 2, 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 22/24/27 Compliance Test Report

Date of receipt	23-Mar-2011
Testing completed	12-Apr-2011
The customer's contact person	Lenaghan Alison
Test Plan referred to	T:\Projects\RM-749\TestPlan\RS_testplan_RM-749.xls
Notes	-
Document name	T:\Projects\RM-749\EMC\FCC22&24&27_RM-749_21.docx

1.1. EUT and Accessory Information

The EUT is a 9-band (GSM850/900/1800/1900) and WCDMA Band (I/II(1900)/IV(1700)/V(850)/VIII/) mobile phone with GPRS, EGPRS, HSDPA, HSUPA and WLAN and Bluetooth and FM transmitter. 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-749	004402/13/500070/5	2000	-	021-005	23747
Battery	BL-5K	4181570035A10100192;0670580	-	-	-	23738

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

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)	4.4	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 1900 (Band II):

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 1700 (Band IV):

Section in CFR 47	Section in RSS-GEN or RSS-139	Name of the test	Result
§2.1046(a)	6.4	Conducted RF output power	NP
§27.50(d)(2)	6.4	Radiated RF output power	PASSED
§2.1049(h)	4.6.1	99 % occupied bandwidth	NP
§27.53(g)	6.5	Band edge compliance	PASSED
§27.53(g), §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.

CONTENTS

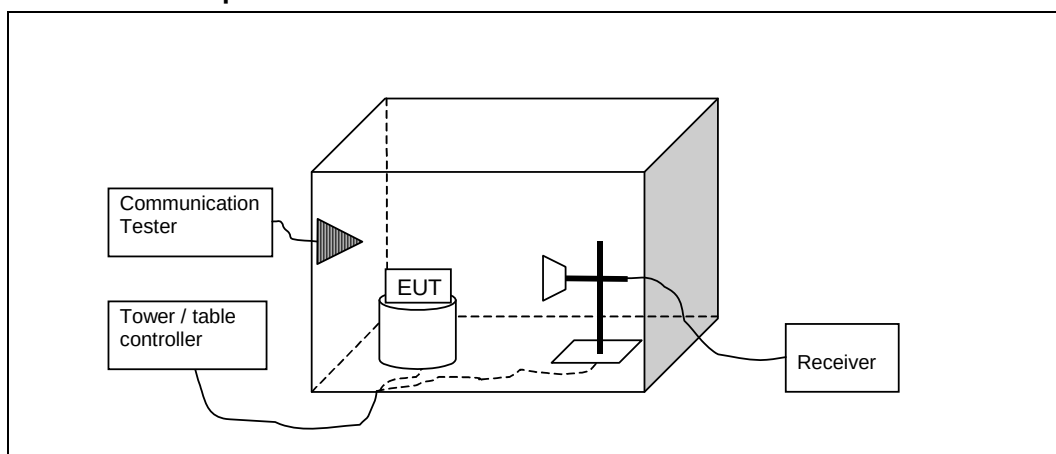
1. Summary for FCC Part 22/24/27 Compliance Test Report.....	2
1.1. EUT and Accessory Information	2
1.2. Summary of Test Results	2
2. Radiated RF output power	
(FCC §22.913(a), §24.232(b), §27.50(d)(2), RSS-132 4.4, RSS-133 6.4, RSS-139 6.4) ...	5
2.2. Test method and limit	5
2.3. GSM850 TX Test results	7
2.4. GSM1900 TX Test results	7
2.5. WCDMA 1900 (Band II) TX Test results	7
2.6. WCDMA 1700 (Band IV) TX Test results	8
2.7. WCDMA 850 (Band V) TX Test results	8
3. Band edge compliance	
(FCC §22.917(a), §24.238(a), §27.53(g), RSS-132 4.5, RSS-133 6.5, RSS-139 6.5)	9
3.2. Test method and limit	9
3.3. GSM850 Test results	10
3.4. GSM1900 Test results	12
3.5. WCDMA 1900 (Band II) Test results	14
3.6. WCDMA 1700 (Band IV) Test results	15
3.7. WCDMA 850 (Band V) Test results	16
4. Test Equipment	17
4.1. Conducted measurements	17
4.2. Radiated measurements	17

2. Radiated RF output power

(FCC §22.913(a), §24.232(b), §27.50(d)(2), RSS-132 4.4, RSS-133 6.4, RSS-139 6.4)

EUT with DUT number	RM-749, DUT 23747
Accessories with DUT numbers	BL-5K, DUT 23738
Operation Voltage [V] / [Hz]	-
Results	PASSED
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 42
Date of measurements	07-Apr-2011
Measured by	Ruben Hansen

2.1.1 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.

The measurement results are obtained as described below:

$$P [dBm] = P_{SUBST\ TX} + P_{MEAS} - P_{SUBST\ RX} - L_{SUBST\ CABLES} + G_{SUBST\ TX\ ANT}$$

Where $P_{SUBST\ TX}$ is signal generator level. P_{MEAS} is measured power level from the EUT. $P_{SUBST\ RX}$ is measured power level in substitute measurement. $L_{SUBST\ CABLE}$ is the loss of the cable between the signal generator and the substitution antenna and $G_{SUBST\ TX\ ANT}$ is substitution antenna gain.

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]	P _{SUBST TX} [dBm]	P _{SUBST RX} [dBm]	G _{SUBST TX ANT} [dBd]	L _{SUBST CABLE} [dB]	Polarisation	Result
128 / 824.2	31.19	1.315	-3.01	-20	-59.7	-3.04	2.46	HORIZONTAL	PASSED
190 / 836.6	31.69	1.476	-1.56	-20	-58.7	-3.01	2.44	HORIZONTAL	PASSED
251 / 848.8	31.74	1.493	-0.96	-20	-58.6	-3.47	2.43	HORIZONTAL	PASSED

EGPRS mode, 1 TX Slot

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	P _{SUBST TX} [dBm]	P _{SUBST RX} [dBm]	G _{SUBST TX ANT} [dBd]	L _{SUBST CABLE} [dB]	Polarisation	Result
128 / 824.2	28.94	0.783	-5.26	-20	-59.7	-3.04	2.46	HORIZONTAL	PASSED
190 / 836.6	28.68	0.738	-4.57	-20	-58.7	-3.01	2.44	HORIZONTAL	PASSED
251 / 848.8	27.70	0.589	-5	-20	-58.6	-3.47	2.43	HORIZONTAL	PASSED

2.4. GSM1900 TX Test results

GSM mode

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	P _{SUBST TX} [dBm]	P _{SUBST RX} [dBm]	G _{SUBST TX ANT} [dBi]	L _{SUBST CABLE} [dB]	Polarisation	Result
512 / 1850.2	29.75	0.94406	-14.57	-20	-58	10.08	3.76	HORIZONTAL	PASSED
661 / 1880	29.40	0.87096	-14.79	-20	-58	10.00	3.81	HORIZONTAL	PASSED
810 / 1909.8	29.08	0.80910	-15.23	-20	-58	10.08	3.77	HORIZONTAL	PASSED

EGPRS mode, 1 TX Slot

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	P _{SUBST TX} [dBm]	P _{SUBST RX} [dBm]	G _{SUBST TX ANT} [dBi]	L _{SUBST CABLE} [dB]	Polarisation	Result
512 / 1850.2	28.31	0.67764	-16.01	-20	-58	10.08	3.76	HORIZONTAL	PASSED
661 / 1880	28.13	0.65013	-16.06	-20	-58	10.00	3.81	HORIZONTAL	PASSED
810 / 1909.8	27.31	0.53827	-17	-20	-58	10.08	3.77	HORIZONTAL	PASSED

2.5. WCDMA 1900 (Band II) TX Test results

RMS Detector

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	P _{SUBST TX} [dBm]	P _{SUBST RX} [dBm]	G _{SUBST TX ANT} [dBi]	L _{SUBST CABLE} [dB]	Polarisation	Result
9262 / 1852.4	22.22	0.16672	-22.1	-20	-58	10.08	3.76	HORIZONTAL	PASSED
9400 / 1880	22.02	0.15922	-22.17	-20	-58	10.00	3.81	HORIZONTAL	PASSED
9538 / 1907.6	21.63	0.14555	-22.68	-20	-58	10.08	3.77	HORIZONTAL	PASSED

2.6. WCDMA 1700 (Band IV) TX Test results

RMS Detector

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	P _{SUBST TX} [dBm]	P _{SUBST RX} [dBm]	G _{SUBST TX ANT} [dBi]	L _{SUBST CABLE} [dB]	Polarisation	Result
1392 / 1712.4	23.33	0.21528	-19.6	-20	-56.6	9.87	3.54	HORIZONTAL	PASSED
1420 / 1740	23.35	0.21627	-19.97	-20	-57	9.84	3.52	HORIZONTAL	PASSED
1432 / 1752.6	22.62	0.18281	-20.91	-20	-57.15	9.88	3.5	HORIZONTAL	PASSED

2.7. WCDMA 850 (Band V) TX Test results

RMS Detector

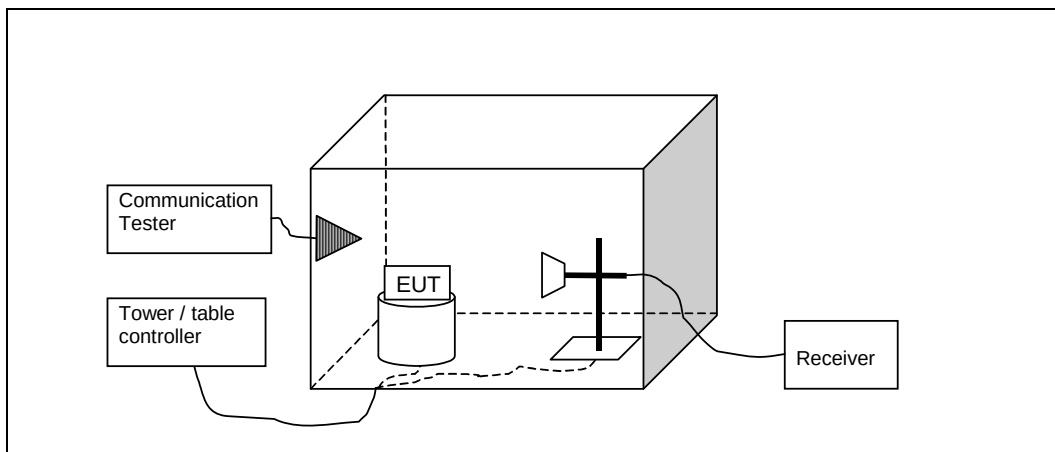
Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	P _{SUBST TX} [dBm]	P _{SUBST RX} [dBm]	G _{SUBST TX ANT} [dBd]	L _{SUBST CABLE} [dB]	Polarisation	Result
4132 / 826.4	22.12	0.163	-12.05	-20	-59.6	-2.98	2.45	HORIZONTAL	PASSED
4183 / 836.6	22.44	0.175	-10.81	-20	-58.7	-3.01	2.44	HORIZONTAL	PASSED
4233 / 846.6	23.03	0.201	-9.61	-20	-58.4	-3.33	2.43	HORIZONTAL	PASSED

3. Band edge compliance

(FCC §22.917(a), §24.238(a), §27.53(g), RSS-132 4.5, RSS-133 6.5, RSS-139 6.5)

EUT with DUT number	RM-749, DUT 23747
Accessories with DUT numbers	BL-5K, DUT 23738
Operation Voltage [V] / [Hz]	-
Results	PASSED
Remarks	None
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 42 / 1016
Date of measurements	07-Apr-2011
Measured by	Ruben Hansen

3.1.1 Test Setup



3.2. Test method and limit

The measurement is made according to FCC rules parts 22, 24, 27 and IC standards , RSS-132, RSS-133, RSS-139.

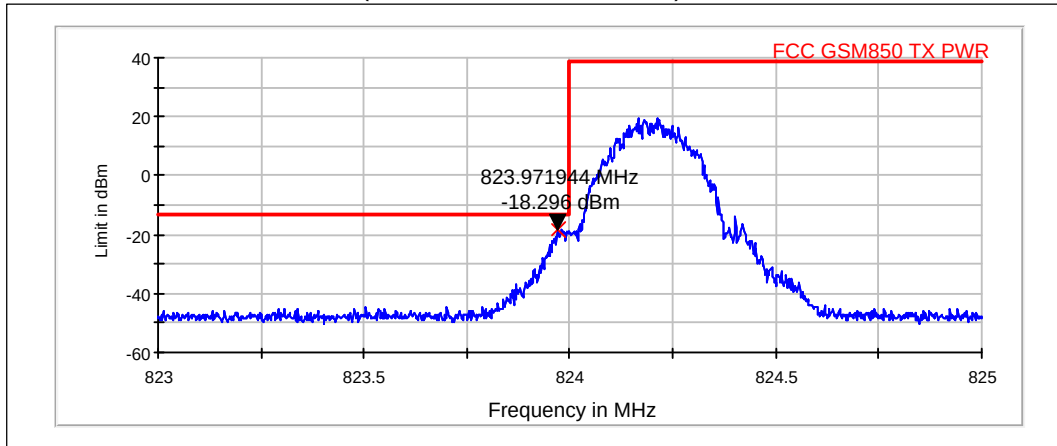
Limits for band edge compliance measurements

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

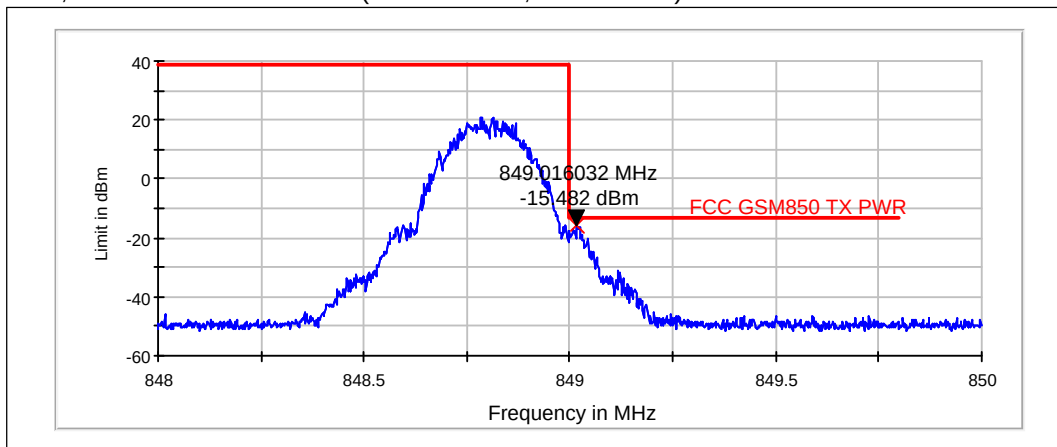
3.3. GSM850 Test results

Operation mode (TX on)	Channel / f_c [MHz]	Level [dBm]	Result
GSM	128 / 824.2	-18.3	PASSED
GSM	251 / 848.8	-15.48	PASSED
EGPRS	128 / 824.2	-15.01	PASSED
EGPRS	251 / 848.8	-29.97	PASSED

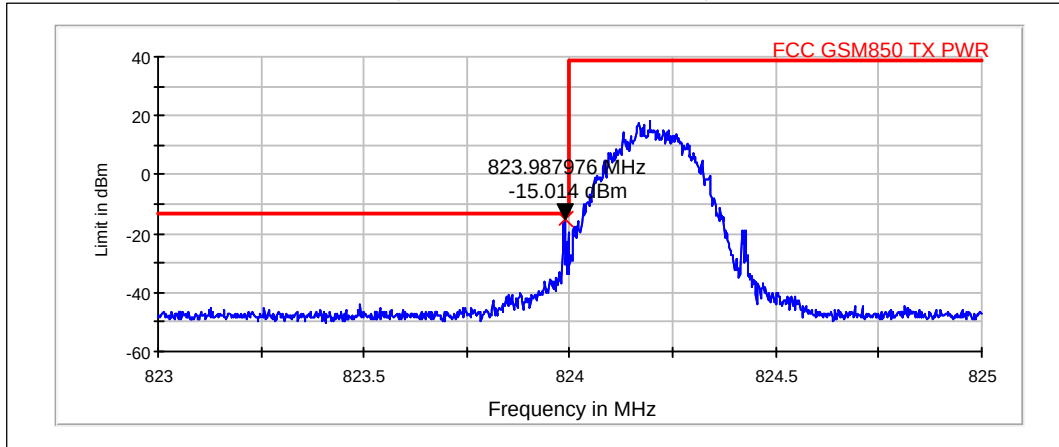
GSM, channel 128 / 824.2 MHz (Peak detector, RBW: 3 kHz)



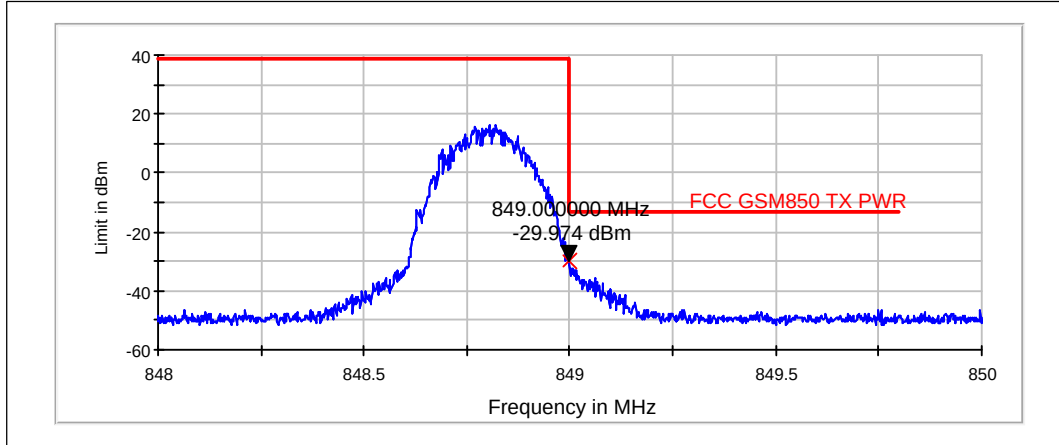
GSM, channel 251 / 848.8 MHz (Peak detector, RBW: 3 kHz)



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



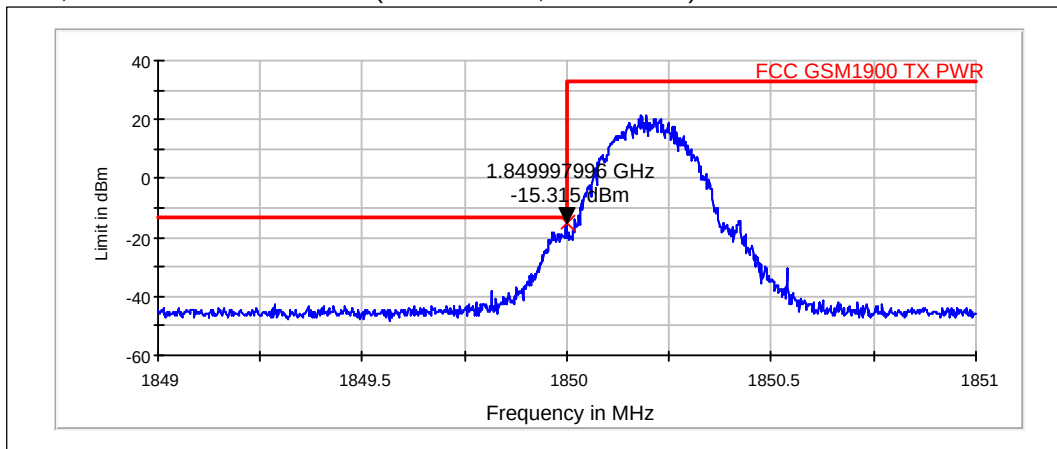
EGPRS, channel 251 / 848.8 MHz (Peak detector, RBW: 3 kHz)



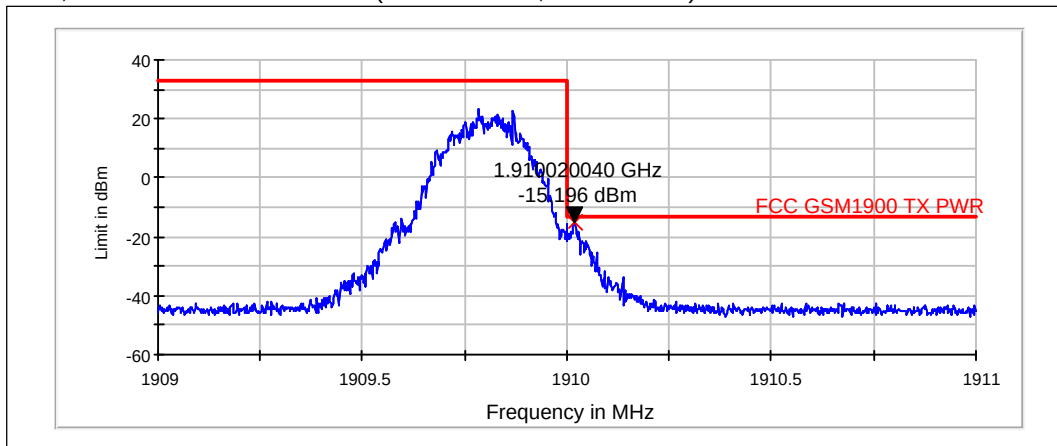
3.4. GSM1900 Test results

Operation mode (TX on)	Channel / f_c [MHz]	Level [dBm]	Result
GSM	512 / 1850.2	-15.31	PASSED
GSM	810 / 1909.8	-15.2	PASSED
EGPRS	512 / 1850.2	-27.85	PASSED
EGPRS	810 / 1909.8	-28.61	PASSED

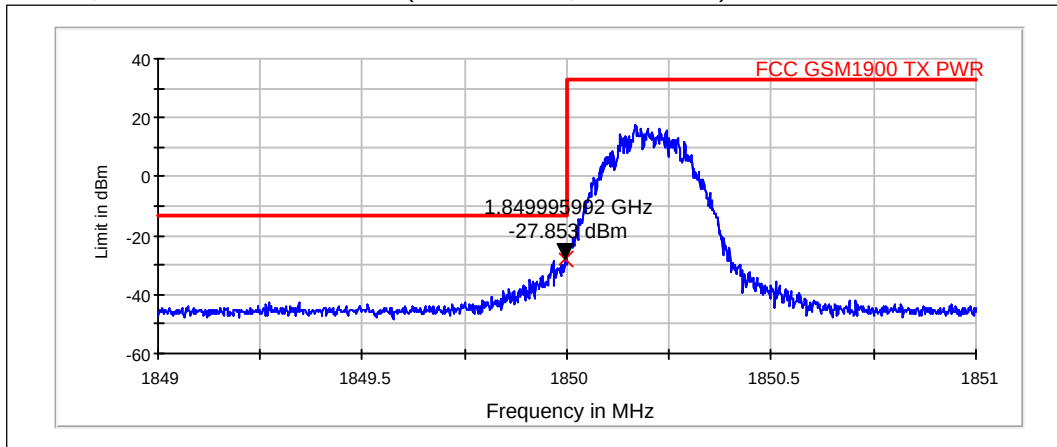
GSM, channel 512 / 1850.2 MHz (Peak detector, RBW: 3 kHz)



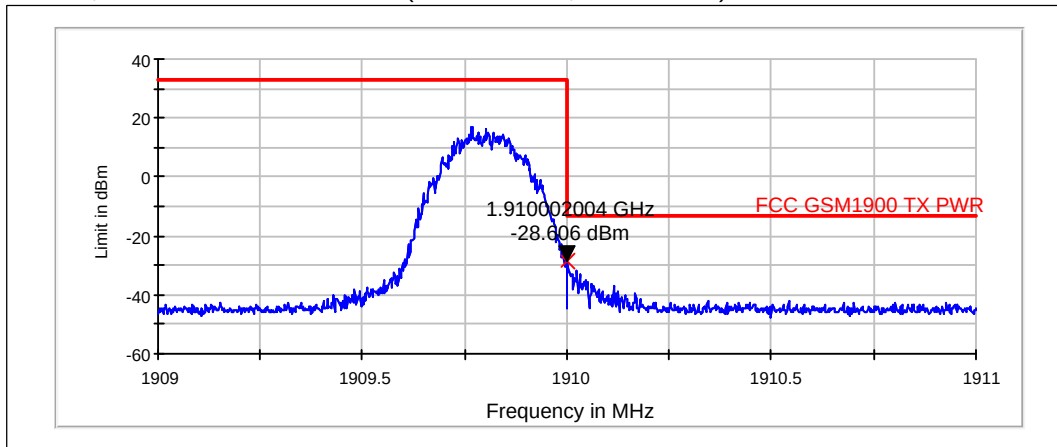
GSM, channel 810 / 1909.8 MHz (Peak detector, RBW: 3 kHz)



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



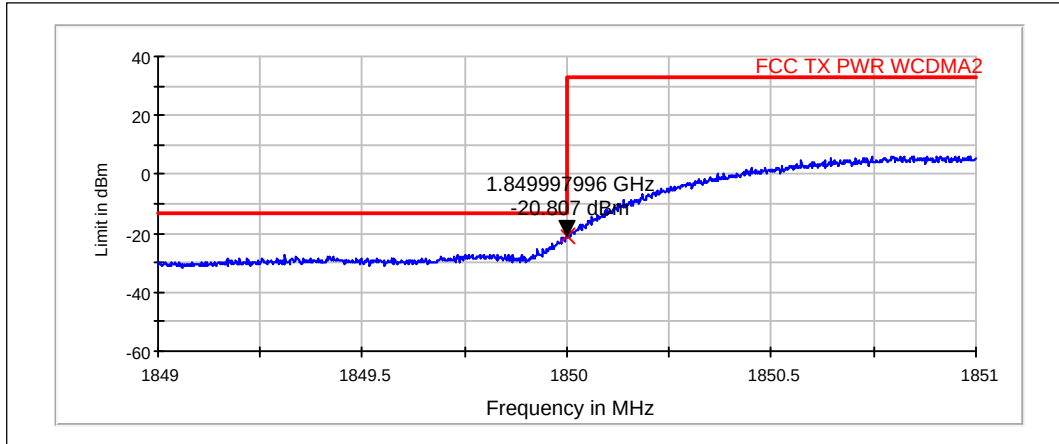
EGPRS, channel 810 / 1909.8 MHz (Peak detector, RBW: 3 kHz)



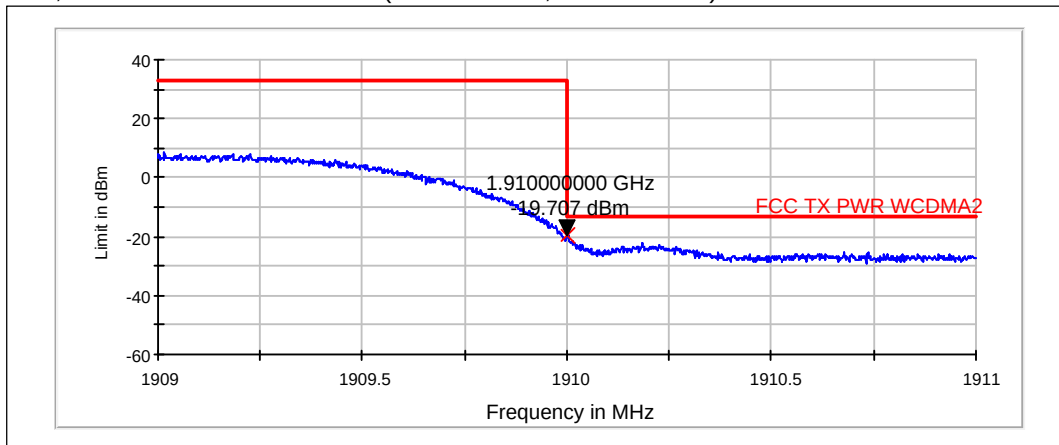
3.5. WCDMA 1900 (Band II) Test results

Operation mode (TX on)	Channel / f_c [MHz]	Level [dBm]	Result
FDD	9262 / 1852.4	-20.81	PASSED
FDD	9538 / 1907.6	-19.71	PASSED

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



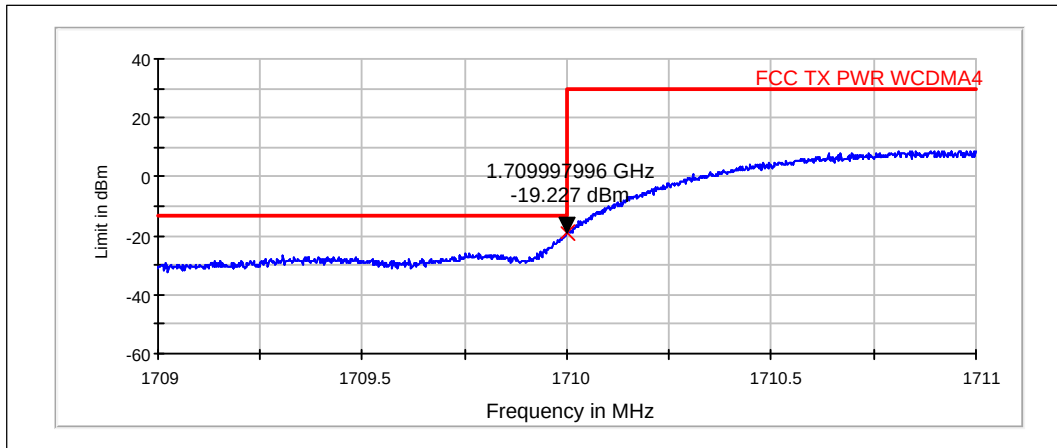
FDD, channel 9538 / 1907.6 MHz (RMS detector, RBW: 50 kHz)



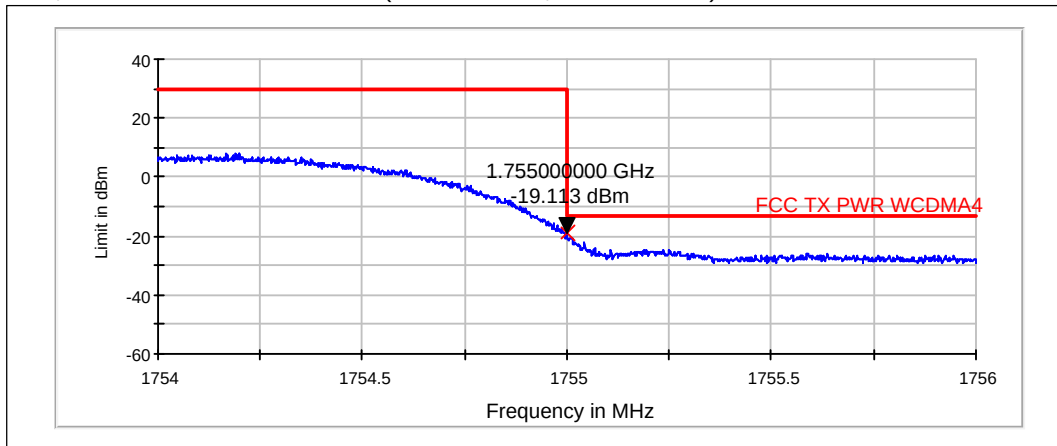
3.6. WCDMA 1700 (Band IV) Test results

Operation mode (TX on)	Channel / f_c [MHz]	Level [dBm]	Result
FDD	1312 / 1712.4	-19.23	PASSED
FDD	1513 / 1752.6	-19.11	PASSED

FDD, channel 1312 / 1712.4 MHz (RMS detector, RBW: 50 kHz)



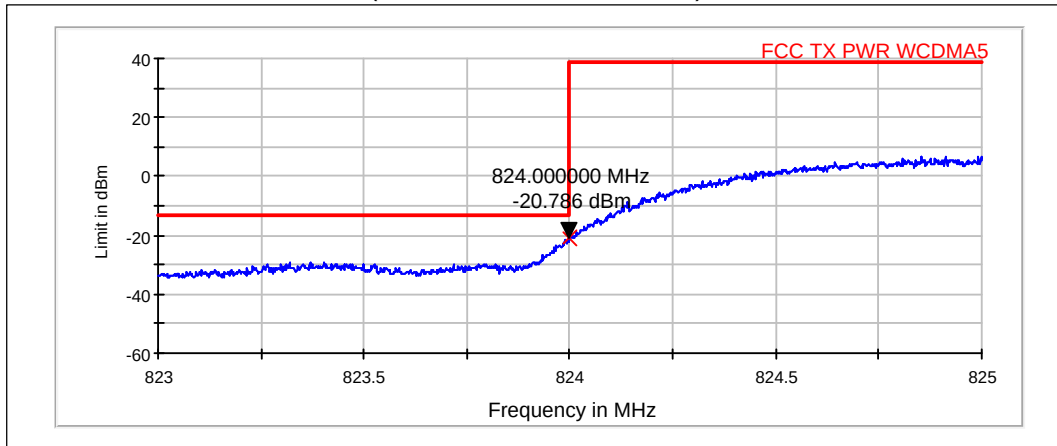
FDD, channel 1513 / 1752.6 MHz (RMS detector, RBW: 50 kHz)



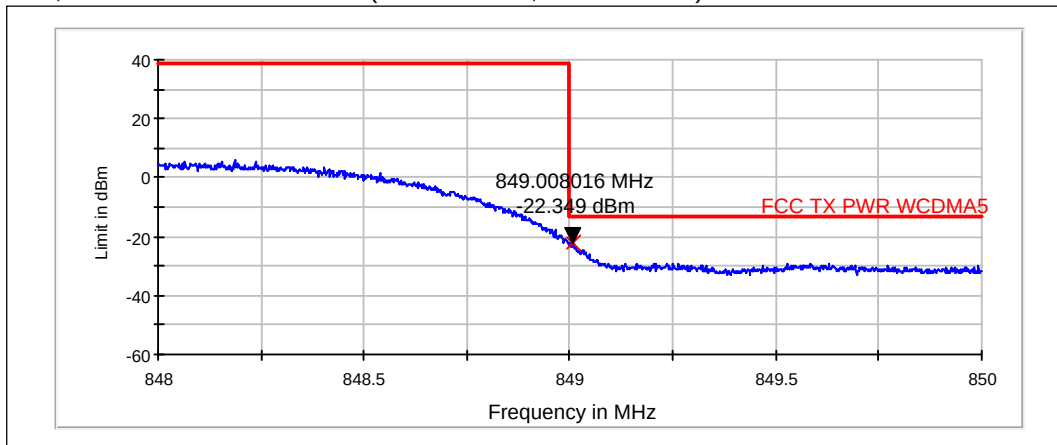
3.7. WCDMA 850 (Band V) Test results

Operation mode (TX on)	Channel / f_c [MHz]	Level [dBm]	Result
FDD	4132 / 826.4	-20.79	PASSED
FDD	4233 / 846.6	-22.35	PASSED

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



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



4. Test Equipment

4.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
13037	Power Supply 0-15V 10A	EA3012	LP Instruments	15C, 15B
13357	Signal Generator	SMP02	Rohde&Schwarz	22/24/27, 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
20682	LISN	ESH3-Z5	Rohde&Schwarz	15C, 15B
16601	Communication Tester	CMU200	Rohde&Schwarz	22/24/27, 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
18772	Shielded Chamber	RFD-100	ETS-Lindgren	15C, 15B
19116	Power splitter	-	various	22/24/27, 15C, 15B
19171	Communication Tester	CMU200	Rohde&Schwarz	15C, 15B
19625	Climatic Chamber	VT4002EMC	Vötsch	22/24/27, 15C, 15B
19678	Spectrum Analyzer	FSP	Rohde&Schwarz	22/24/27, 15C, 15B
20168	Bluetooth Tester	CBT	Rohde&Schwarz	22/24/27, 15C, 15B
20543	UPS. 700V/A 490W	PW 9120 700i	Powerware	22/24/27, 15C, 15B
20544	Transformer. 230/115V	-	Nokia	22/24/27, 15C, 15B

4.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
13077	Power Supply	EA-3016	-	22/24/27, 15C, 15B
13799	Signal Generator	SMP02	Rohde&Schwarz	22/24/27, 15C, 15B
13936	Band reject filter	WRCD1747.5-0.2/40-10SS	Wainwright Instruments	22/24/27, 15C, 15B
13937	Band reject filter	WRCA902.4-0.2/40-6SS	Wainwright Instruments	22/24/27, 15C, 15B
14021	Relay Dual 6 Chnl μ Wave Mux	10-785-522	-	22/24/27, 15C, 15B
14114	Highpass Filter	WHK1000-12SS	Wainwright Instruments	22/24/27, 15C, 15B
14187	Band reject filter	WRCD1747.5-0.2/40-10SS	Wainwright	22/24/27, 15C, 15B
14188	Band reject filter	WRCA902.4-0.2/40-6SS	Wainwright	22/24/27, 15C, 15B
14900	Antenna Controller	HD100	HD GmbH	22/24/27, 15C, 15B
15191	Turntable Controller Unit	G-800SDX	YAESU	22/24/27, 15C, 15B
15742	Programmable Relay Switching System	-----	Pickering	22/24/27, 15C, 15B
16633	Band reject filter	WRCD1880.0-0.2/40-10SS	Wainwright	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
17644	Dual 6 Channel MUX Microwave Relay SMA 50 Ohm	10-785-522	Pickering	22/24/27, 15C, 15B
18416	Communication Tester	CMU200	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
18792	Mast/turntable controller	2090	ETS-EMCO	22/24/27, 15C, 15B

Eq. No	Equipment	Type	Manufacturer	Used in
18860	Antenna	HL562	Rohde&Schwarz	22/24/27, 15C, 15B
19151	High Pass Filter	WHJS3000-10SS	Wainwright	22/24/27, 15C, 15B
19587	Band reject filter	WRCG2400/2483-2390/2493-35/10SS	Wainwright	22/24/27, 15C, 15B
19966	Antenna	HFH2-Z2	Rohde&Schwarz	15C, 15B
20078	Relay 2x6 Chnl μ Wave Mux	10-785B-522	Pickering	22/24/27, 15C, 15B
20114	Band reject filter	WRCG1737/1743-1733/1747-40/6SS	Wainwright	22/24/27, 15C, 15B
20115	Band reject filter	-	Wainwright	22/24/27, 15C, 15B
20116	Band reject filter	WRCG832/83/-825/845-40/5SS	Wainwright	22/24/27, 15C, 15B
20168	Bluetooth Tester	CBT	Rohde&Schwarz	22/24/27, 15C, 15B
20543	UPS. 700V/A 490W	PW 9120 700i	Powerware	22/24/27, 15C, 15B
20544	Transformer. 230/115V	-	Nokia	22/24/27, 15C, 15B
20698	Antenna	BBHA 9120 D	SCHWARZBECK	22/24/27, 15C, 15B
-	Relay Dual 6 Chnl μ Wave Mux	10-785-522	-	22/24/27, 15C, 15B