

FCC Part 22/24/27 Compliance Test Report

Test Report no.:	FCC22&24&27_RM-824_07.docx	Date of Report:	04-Sep-2012
Number of pages:	44	Customer's Contact person:	Tia Melava
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FCC listing no.:	94436		
IC recognition no.:	661AK-1		
Tested devices/ accessories:	Phone RM-824 / Battery BP-5T / Charger AC-50E / Data Cable CA-190CD / Headset WH-208		
FCC ID:	PYARM-824	IC:	661V-RM824
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:			

Hannu Soderholm, Senior Engineer, EMC

1. Summary for FCC Part 22/24/27 Compliance Test Report

Date of receipt	24-Aug-2012
Testing completed	29-Jul-2012
The customer's contact person	Tia Melava
Test Plan referred to	T:\Projects\RM-824\TestPlan\RS_testplan_RM-824.xlsm
Notes	-
Document name	T:\Projects\RM-824\EMC\FCC22&24&27_RM-824_07.docx

1.1. EUT and Accessory Information

The EUT is a mobile phone with following features:
GSM/WCDMA/WLAN/Bluetooth
The EUT is tested with maximum rated TX power.

Devices under tests

Product	Type	SN	HW	MV	SW	DUT
Battery	BP-5T	3932132224140100128;0670665	-	-	-	42845
Phone	RM-824	004402139761575	2210	-	1225.0001.8422.9704.68	42841
Phone	RM-824	004402139761492	2210	-	1225.0001.8422.9704.1043	42847
Battery	BP-5T	3932132224140100129;0670665	-	-	-	42844
Charger	AC-50E	4090492023260400312;0675619	0.5	0.4	-	42776
Data Cable	CA-190CD	-	-	-	-	42778
Headset	WH-208					42831
Phone	RM-824	004402139761583	S2.21	-	1123.0005.8325.9680.151	42848
Battery	BP-5T	3932132224140100119;0670665	PWB Ver.1.0 Sony	-	-	42851
Phone	RM-824	004402139761153	2210	-	1230.0015.8441.9735.241	42877
Phone	RM-824	004402139761716	2210	-	1230.0015.8441.9735.241	42891
Phone	RM-824	004402139761567	2210	-	1230.0015.8441.9735.241	42892
Battery	BP-5T	3932132224140100127;0670665	PWB Ver.1.0 Sony	-	-	42846

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	-
§22.913(a)	4.4	Radiated RF output power	-
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§22.917(a)	4.5	Band edge compliance	-
§22.917(a), §2.1051	4.5	Spurious emissions at antenna terminals	-
§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

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

LTE 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	-
§22.913(a)	4.4	Radiated RF output power	PASSED
§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	-
§22.917(a), §2.1053	4.5	Spurious radiated emissions	PASSED
§2.1055(a)	4.3	Frequency stability, temperature variation	-
§2.1055(d)	4.3	Frequency stability, voltage variation	-

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	-
§24.232(b)	6.4	Radiated RF output power	-
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§24.238(a)	6.5	Band edge compliance	-
§24.238(a), §2.1051	6.5	Spurious emissions at antenna terminals	-
§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

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	-
§24.232(b)	6.4	Radiated RF output power	-
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§24.238(a)	6.5	Band edge compliance	-
§24.238(a), §2.1051	6.5	Spurious emissions at antenna terminals	-
§24.238(a), §2.1053	6.5	Spurious radiated emissions	PASSED
§2.1055(a)	6.3	Frequency stability, temperature variation	-
§2.1055(d)	6.3	Frequency stability, voltage variation	-

WCDMA 1700 (Band IV):

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	-
§24.232(b)	6.4	Radiated RF output power	PASSED
§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	-
§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

LTE 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	-
§24.232(b)	6.4	Radiated RF output power	PASSED
§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	-
§24.238(a), §2.1053	6.5	Spurious radiated emissions	PASSED
§2.1055(a)	6.3	Frequency stability, temperature variation	-
§2.1055(d)	6.3	Frequency stability, voltage variation	-

LTE1700 (Band 4):

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	-
§27.50(d)(4)	6.4	Radiated RF output power	-
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§27.53(h)	6.5	Band edge compliance	-
§27.53(h), §2.1051	6.5	Spurious emissions at antenna terminals	-
§27.53(h), §2.1053	6.5	Spurious radiated emissions	PASSED
§2.1055(a)	6.3	Frequency stability, temperature variation	-
§2.1055(d)	6.3	Frequency stability, voltage variation	-
N/A	N/A	Peak to average power ratio	-

LTE700 Lower (Band 17):

Section in CFR 47	Section in RSS-GEN or RSS-133	Name of the test	Result
§2.1046 (a)	N/A	Conducted RF output power	-
§27.50(c)(10)	N/A	Radiated RF output power	-
§2.1049(h)	N/A	99 % occupied bandwidth	PASSED
§27.53(g)	N/A	Band edge compliance	-
§27.53(g), §2.1051	N/A	Spurious emissions at antenna terminals	-
§27.53(g), §2.1051	N/A	Spurious radiated emissions	PASSED
§2.1055(a)	N/A	Frequency stability, temperature variation	PASSED
§2.1055(d)	N/A	Frequency stability, voltage variation	PASSED
N/A	N/A	Peak to average power ratio	-

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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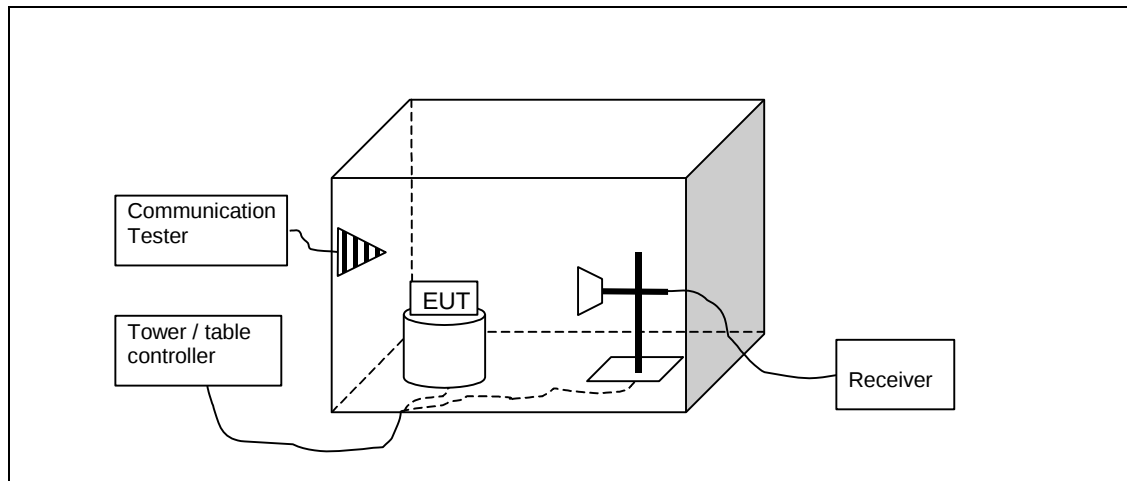
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2. Radiated RF output power

(FCC §22.913(a), §24.232(b), §27.50(d)(2), §27.53(h), §27.53(g), RSS-132 4.4, RSS-133 6.4)

EUT with DUT number	RM-824, DUT 42877
Accessories with DUT numbers	BP-5T, DUT 42846
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 52 / 100.1
Date of measurements	29-Aug-2012
Measured by	Timo Raiskio

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:

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

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

Limits for radiated RF output power measurements

Frequency range [MHz]	Limit [W]	Limit [dBm]
704 - 716	3 ERP	34.8
824 - 849	7 ERP	38.5
1710 - 1755	1 EIRP	30
1850 - 1910	2 EIRP	33

1.1 WCDMA 1700 (Band IV) TX Test results

Peak 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	24.71	0.296	-18.3	10	-27.99	9.82	4.8	HORIZONTAL	PASSED
1420 / 1740	25.59	0.362	-17.39	10	-27.88	10	4.9	VERTICAL	PASSED
1432 / 1752.6	25.52	0.356	-17.59	10	-28.01	10	4.9	VERTICAL	PASSED

RMS Detector

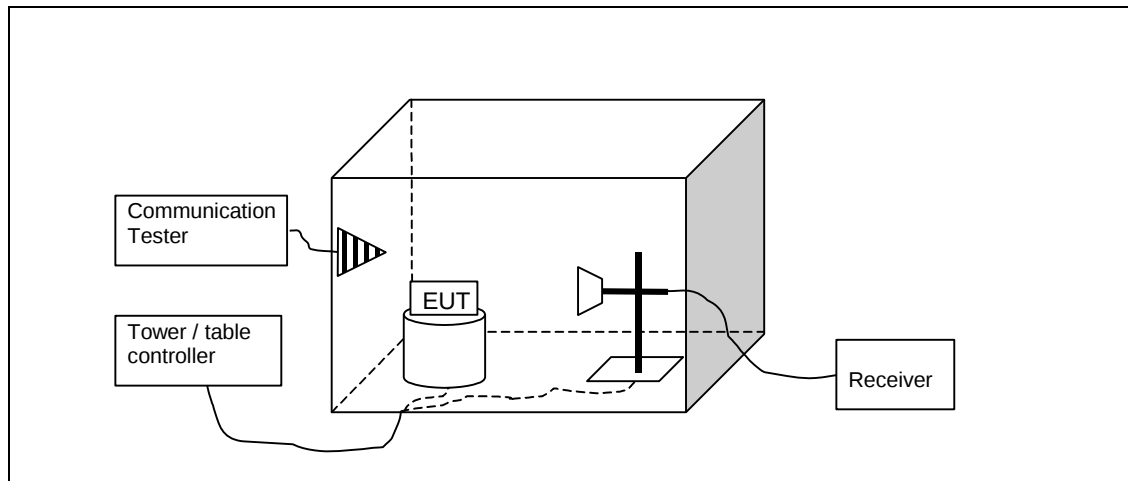
Channel / f _C [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	P _{SUBST TX} [dBm]	P _{SUBST RX} [dBm]	G _{SUBST TX} ANT [dBi]	L _{SUBST} CABLE [dB]	Polarisation	Result
1392 / 1712.4	20.95	0.124	-21.89	10	-27.82	9.82	4.8	HORIZONTAL	PASSED
1420 / 1740	21.5	0.141	-21.48	10	-27.88	10	4.9	HORIZONTAL	PASSED
1432 / 1752.6	21.55	0.143	-21.56	10	-28.01	10	4.9	HORIZONTAL	PASSED

3. Radiated RF output power

(FCC §22.913(a), §24.232(b), §27.50(d)(2), §27.53(h), §27.53(g), RSS-132 4.4, RSS-133 6.4)

EUT with DUT number	RM-824, DUT 42892
Accessories with DUT numbers	BP-5T , DUT 42846
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 51 / 98.9
Date of measurements	03-Sep-2012
Measured by	Timo Raiskio

3.1.1 Test setup



3.2. 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:

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

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

Limits for radiated RF output power measurements

Frequency range [MHz]	Limit [W]	Limit [dBm]
704 - 716	3 ERP	34.8
824 - 849	7 ERP	38.5
1710 - 1755	1 EIRP	30
1850 - 1910	2 EIRP	33

3.3. LTE 1900 (Band II) test results

FDD, CBW 5MHz, QPSK, 1RB, Peak 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
18607 / 1850.7	28.93	0.782	-15.66	10	-29.46	10.13	5	VERTICAL	PASSED
18900 / 1880	28.37	0.687	-16.05	10	-29.24	10.28	5.1	VERTICAL	PASSED
19193 / 1909.3	26.94	0.494	-17.35	10	-29.25	10.14	5.1	VERTICAL	PASSED

FDD, CBW 5MHz, QPSK, 1RB, RMS detector

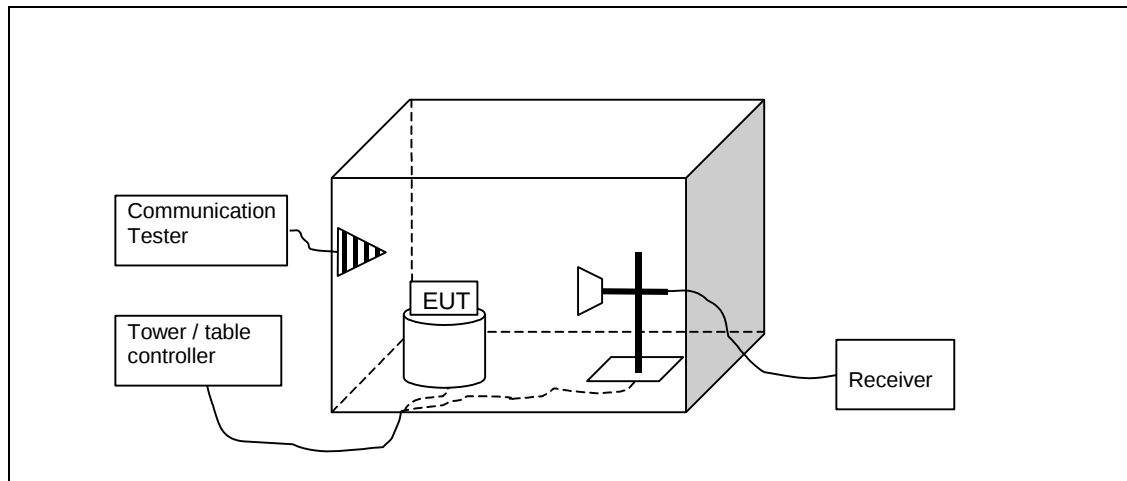
Channel / f_c [MHz]	EIRP [dBm]	EIRP [W]	P_{MEAS} [dBm]	$P_{SUBST\ TX}$ [dBm]	$P_{SUBST\ RX}$ [dBm]	$G_{SUBST\ TX\ ANT}$ [dBi]	$L_{SUBST\ CABLE}$ [dB]	Polarisation	Result
18607 / 1850.7	25.16	0.328	-19.43	10	-29.46	10.13	5	VERTICAL	PASSED
18900 / 1880	24.09	0.256	-20.33	10	-29.24	10.28	5.1	VERTICAL	PASSED
19193 / 1909.3	23.65	0.232	-20.64	10	-29.25	10.14	5.1	VERTICAL	PASSED

4. Radiated RF output power

(FCC §22.913(a), §24.232(b), §27.50(d)(2), §27.53(h), §27.53(g), RSS-132 4.4, RSS-133 6.4)

EUT with DUT number	RM-824, DUT 42891
Accessories with DUT numbers	BP-5T , DUT 42846
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 51 / 98.9
Date of measurements	03-Sep-2012
Measured by	Timo Raiskio

4.1.1 Test setup



4.2. 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.

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The substitution method is used. The measurement results are obtained as described below:

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

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

Limits for radiated RF output power measurements

Frequency range [MHz]	Limit [W]	Limit [dBm]
704 - 716	3 ERP	34.8
824 - 849	7 ERP	38.5
1710 - 1755	1 EIRP	30
1850 - 1910	2 EIRP	33

4.3. LTE 850 (Band V) test results

FDD, CBW 5MHz, QPSK, 1RB, Peak 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
20525 / 836.5	21.7	0.148	-10.8	10	-29.32	-3.42	3.4	VERTICAL	PASSED
20407 / 824.7	20.65	0.116	-11.48	10	-29.3	-3.77	3.4	VERTICAL	PASSED
20643 / 848.3	19.44	0.088	-12.92	10	-29.25	-3.49	3.4	VERTICAL	PASSED

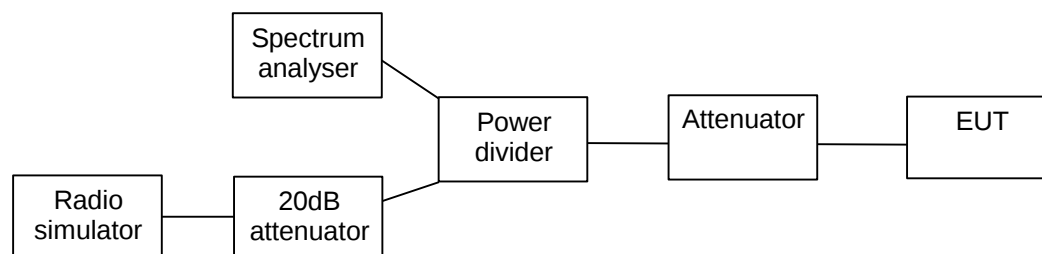
FDD, CBW 5MHz, QPSK, 1RB, RMS detector

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
20525 / 836.5	17.89	0.062	-14.61	10	-29.32	-3.42	3.4	VERTICAL	PASSED
20407 / 824.7	16.47	0.044	-15.66	10	-29.3	-3.77	3.4	VERTICAL	PASSED
20643 / 848.3	16.76	0.047	-15.6	10	-29.25	-3.49	3.4	VERTICAL	PASSED

5. 99% occupied bandwidth (FCC §2.1049(h), RSS-GEN 4.6.1)

EUT with DUT number	RM-824, DUT 42841, DUT42883
Accessories with DUT numbers	BP-5T, DUT 42845
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 50 / 99.6
Date of measurements	04-Jul-2012 and 29-Aug-2012
Measured by	Hannu Söderholm

5.1. Test Setup



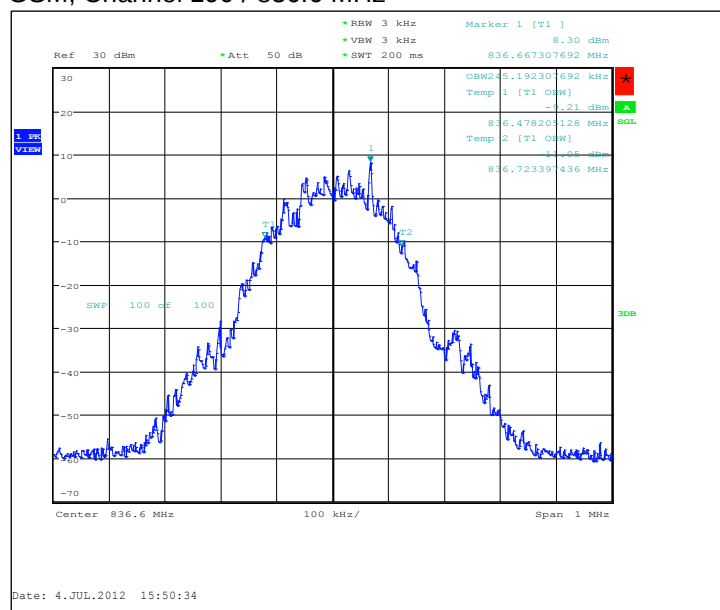
5.2. Test method and limit

The measurement is made according to FCC rules parts 22, 24, 27 and IC standard RSS-GEN.

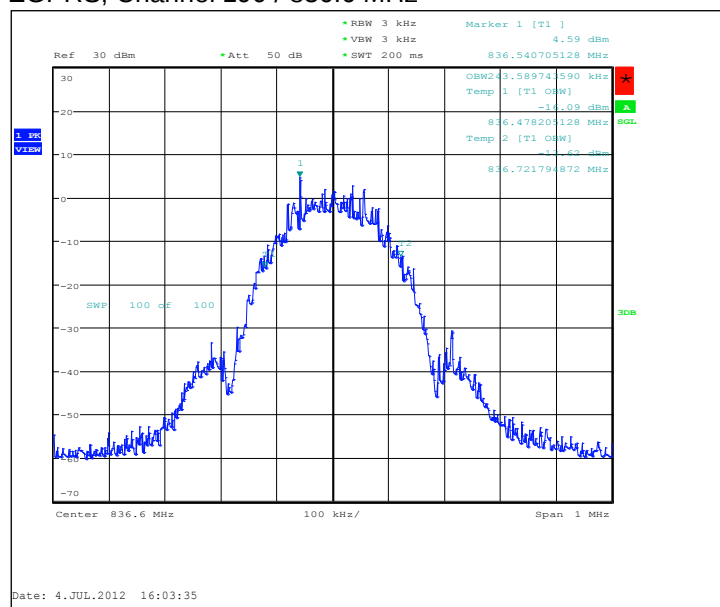
5.3. GSM 850 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
GSM	245.2
EGPRS	243.6

GSM, Channel 190 / 836.6 MHz



EGPRS, Channel 190 / 836.6 MHz



Operation mode (TX on)	99% Occupied bandwidth [kHz]
GSM	243.6
EGPRS	243.6

• RBW 3 kHz
• VBW 3 kHz
• SWT 200 ms
Marker 1 [T1]
4.55 dBm

Ref 30 dBm Att 50 dB 1.880068910 GHz

OBW243.589743590 kHz
Temp 1 [T1 OBW] -12.72 dBm
1.879876205 GHz
Temp 2 [T1 OBW] -12.93 dBm
1.88012795 GHz

SWP 100 dB 100

Center 1.88 GHz 100 kHz/ Span 1 MHz

1.995 V+20V

A BGL 3DB

Date: 4.JUL.2012 16:12:09

Ref 30 dBm Att 50 dB

• RBW 3 kHz
• VBW 3 kHz
• SWT 200 ms

Marker 1 [T1]
1.879860769 GHz

OBW243.589743590 kHz
Temp 1 [T1 OBW]
-15.84 dBm
1.879874603 GHz
Temp 2 [T2 OBW]
-17.13 dBm
1.880120192 GHz

SWR 100 dF 100

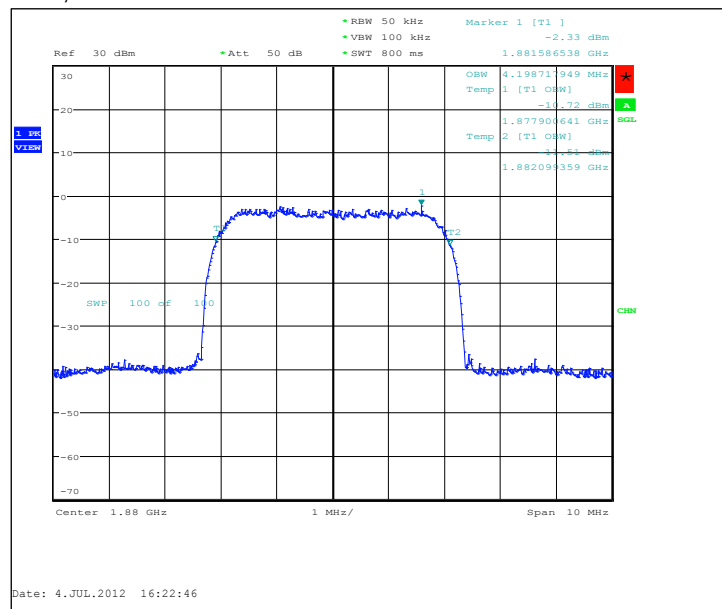
Center 1.88 GHz 100 kHz/ Span 1 MHz

Date: 4.JUL.2012 16:09:13

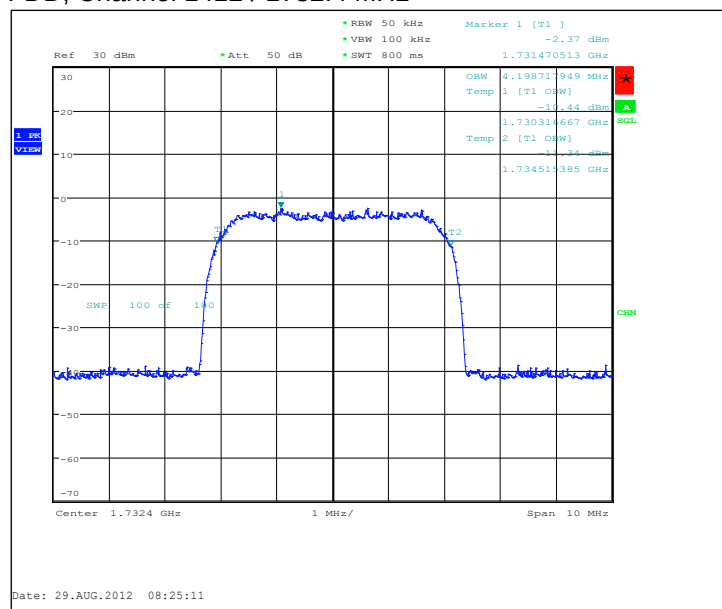
5.5. WCDMA 1900 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD	4198.7

FDD, Channel 9400 / 1880.0 MHz



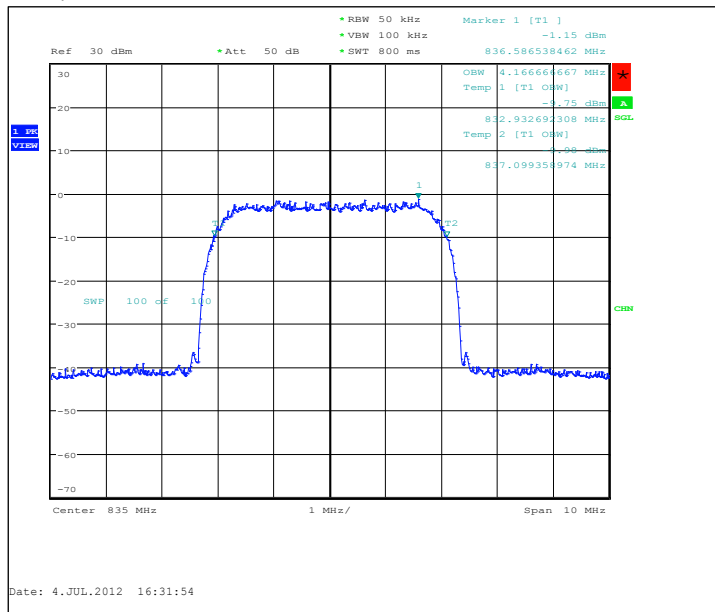
FDD, Channel 1412 / 1732.4 MHz



5.6. WCDMA 850 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD	4166.7

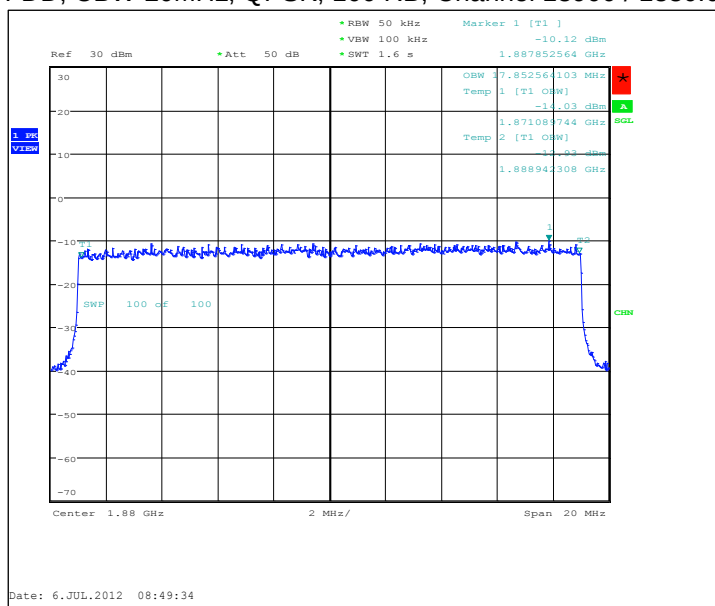
FDD, Channel 4175 / 835.0 MHz



5.7. LTE1900 (Band 2) Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 20MHz, QPSK, 100 RB	17852.6

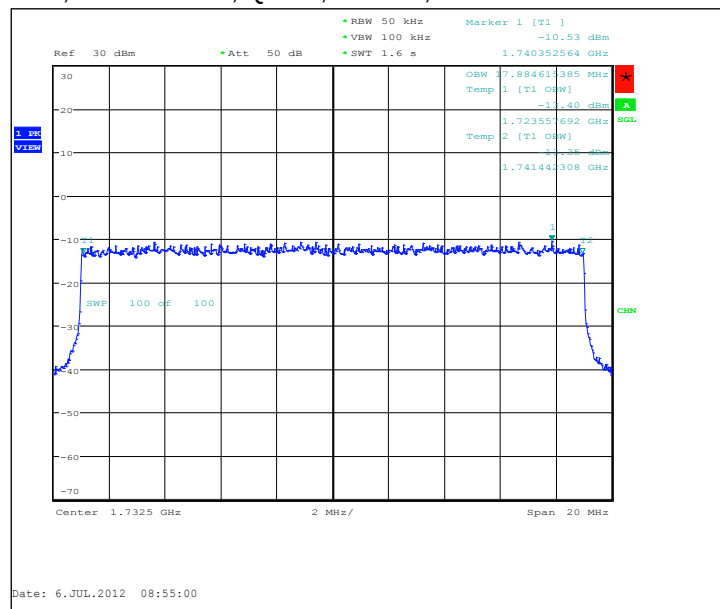
FDD, CBW 20MHz, QPSK, 100 RB, Channel 18900 / 1880.0 MHz



5.8. LTE1700 (Band 4) Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 20MHz, QPSK, 100 RB	17884.6

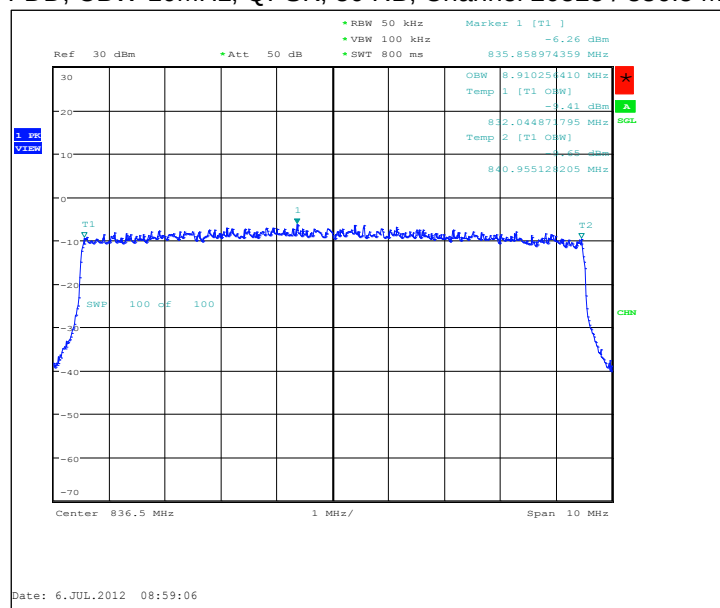
FDD, CBW 20MHz, QPSK, 100 RB, Channel 20175 / 1732.5 MHz



5.9. LTE850 (Band 5) Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 10MHz, QPSK, 50 RB	8910.3

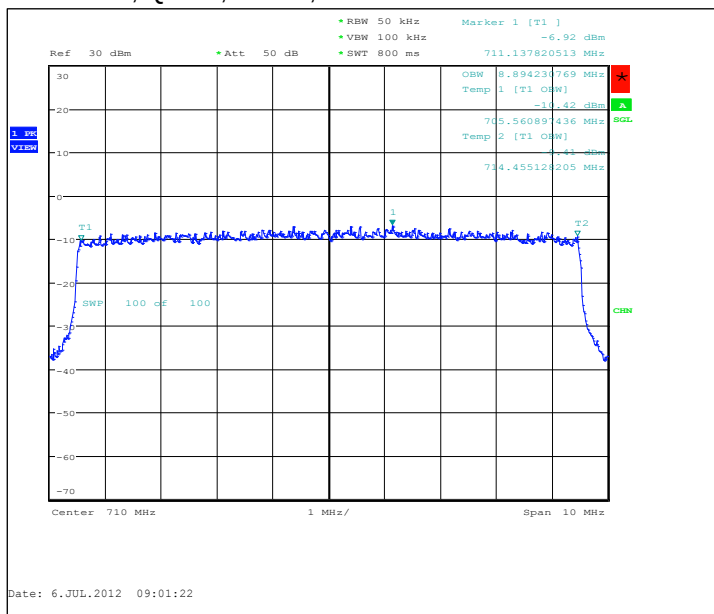
FDD, CBW 10MHz, QPSK, 50 RB, Channel 20525 / 836.5 MHz



5.10. LTE700 Lower (Band 17) Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 10MHz, QPSK, 50 RB	8894.2

FDD, CBW 10MHz, QPSK, 50 RB, Channel 23790 / 710.0 MHz

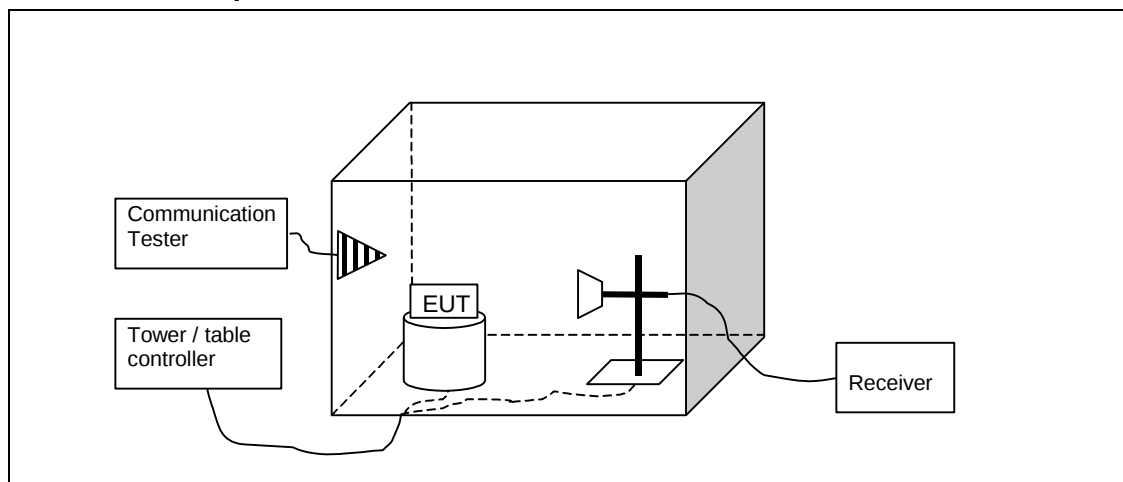


6. Band edge compliance

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

EUT with DUT number	RM-824, DUT 42877
Accessories with DUT numbers	BP-5T , DUT 42846
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	24 / 52 / 100.1
Date of measurements	29-Aug-2012
Measured by	Timo Raiskio

6.1.1 Test setup



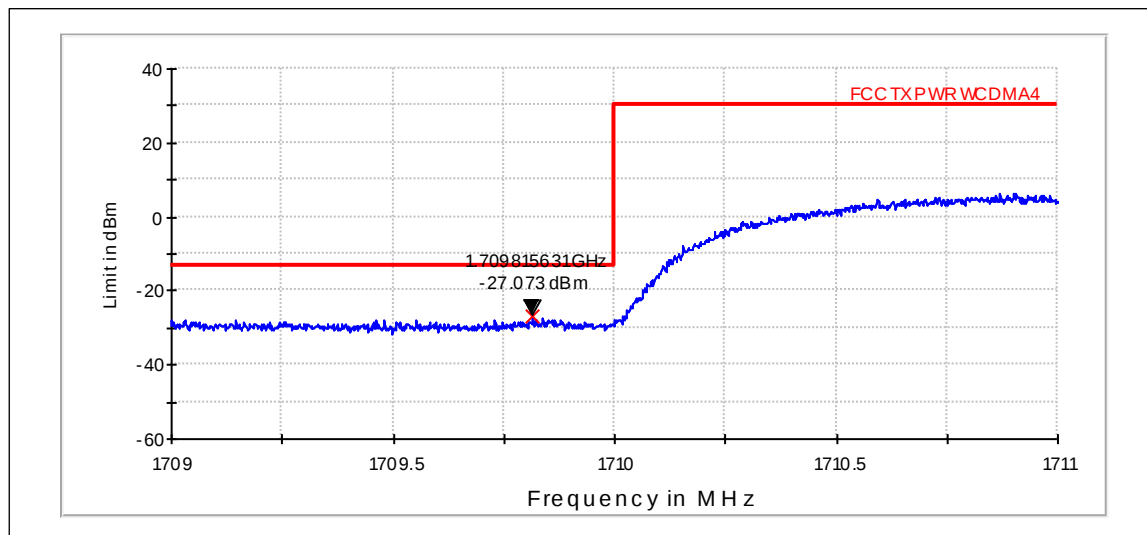
6.2. Test method and limit

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

Limits for band edge compliance measurements

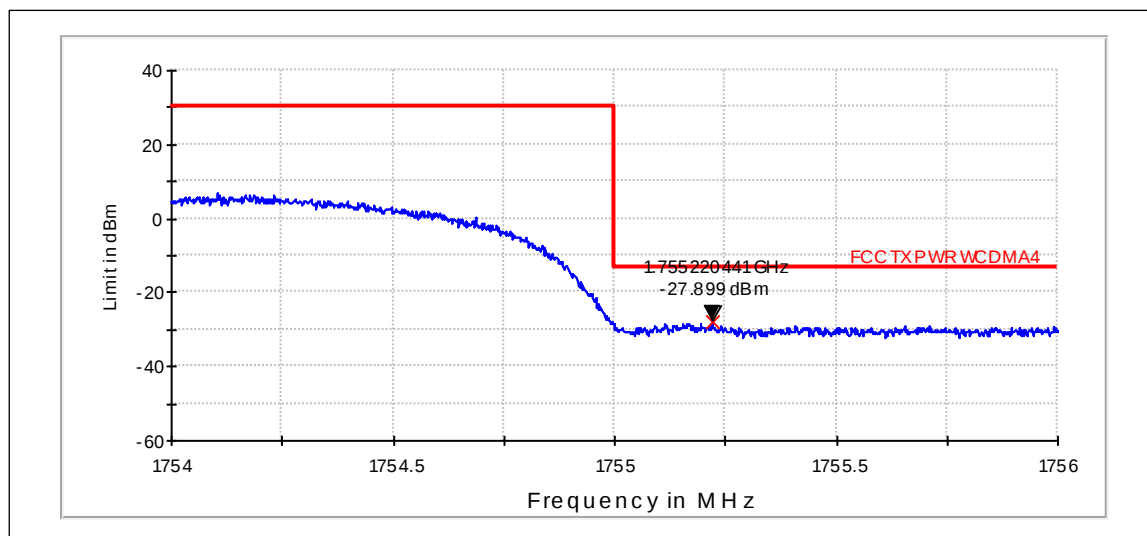
Operation band	Frequency range [MHz]	Limit [dBm]
LTE 700 Lower	703.9 – 704 and 716 – 716.1 Below 703.9 and above 716.1	-13 (RBW = 30 kHz, ERP) -13 (RBW = 30 kHz, ERP)
GSM850 / WCDMA850 / LTE850	Below 824 and above 849	-13
WCDMA1700 / LTE1700	Below 1710 and above 1755	-13
GSM1900 / LTE1900 / WCDMA1900	Below 1850 and above 1910	-13

6.3. WCDMA 1700 (Band IV) test results



RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

Operation mode (TX on)	Channel fc [MHz]	Level [dBm]	Results
FDD	1312 / 1712.4	-27.07	PASSED



RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

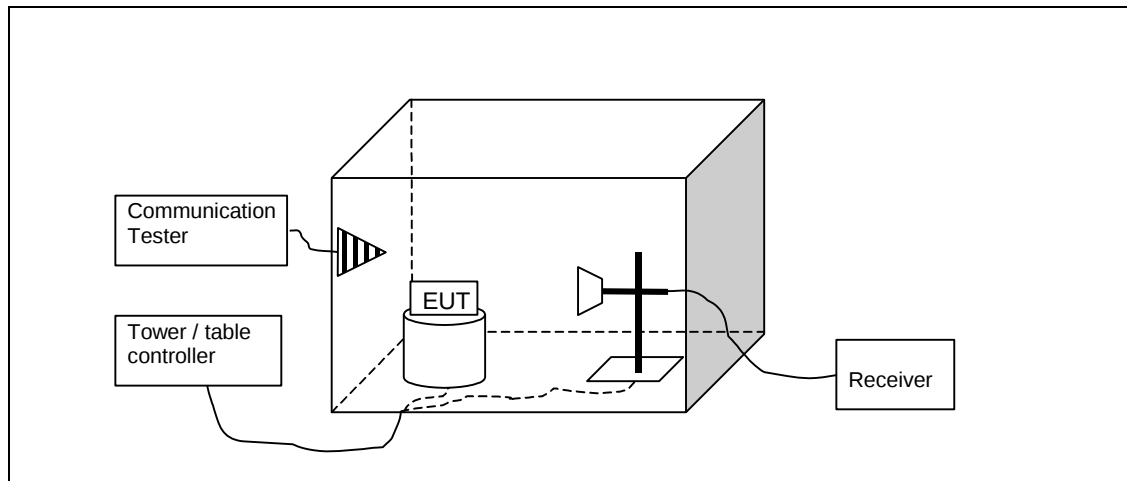
Operation mode (TX on)	Channel fc [MHz]	Level [dBm]	Results
FDD	1513 / 1752.6	-27.9	PASSED

7. Band edge compliance

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

EUT with DUT number	RM-824, DUT 42892
Accessories with DUT numbers	BP-5T , DUT 42846
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 51 / 98.9
Date of measurements	03-Sep-2012
Measured by	Timo Raiskio

7.1.1 Test setup



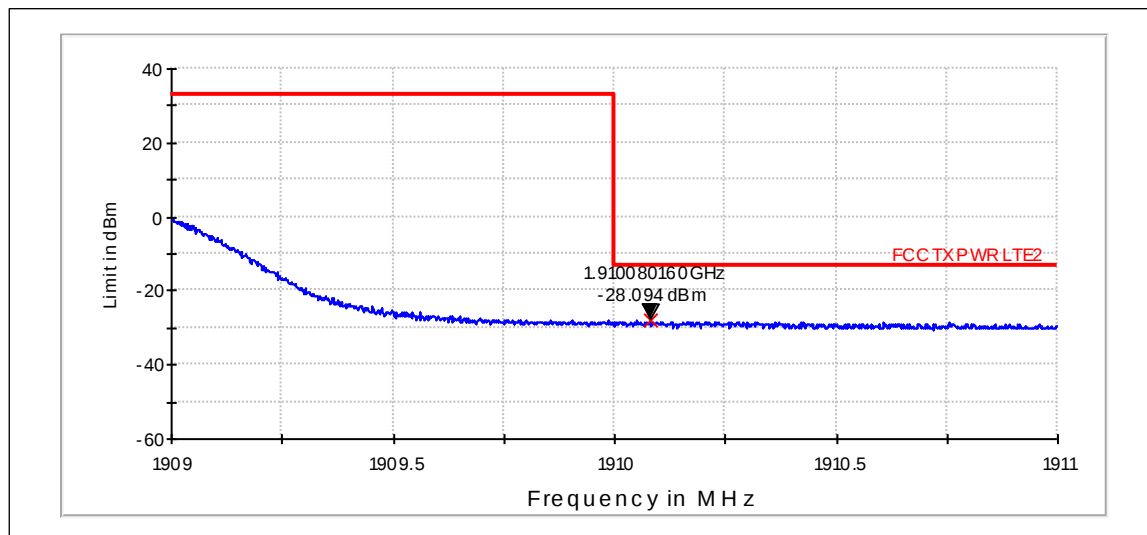
7.2. Test method and limit

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

Limits for band edge compliance measurements

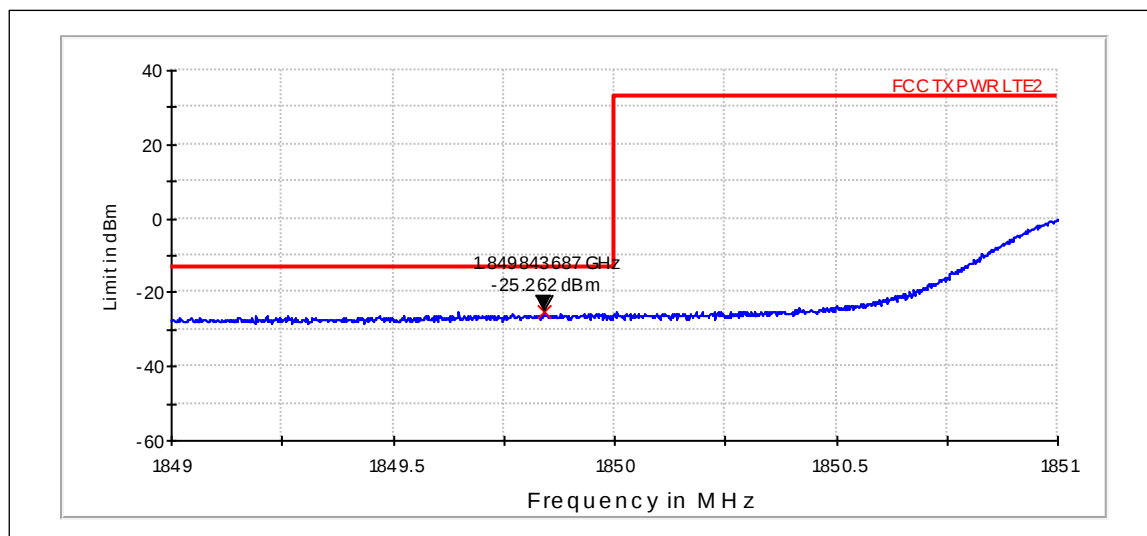
Operation band	Frequency range [MHz]	Limit [dBm]
LTE 700 Lower	703.9 – 704 and 716 – 716.1 Below 703.9 and above 716.1	-13 (RBW = 30 kHz, ERP) -13 (RBW = 30 kHz, ERP)
GSM850 / WCDMA850 / LTE850	Below 824 and above 849	-13
WCDMA1700 / LTE1700	Below 1710 and above 1755	-13
GSM1900 / LTE1900 / WCDMA1900	Below 1850 and above 1910	-13

7.3. LTE 1900 (Band II) test results



RMS (RBW: 200 kHz, VBW: 200 kHz, Max hold)

Operation mode (TX on)	Channel fc [MHz]	Level [dBm]	Results
FDD, CBW 20MHz, QPSK, 100 RB	19100 / 1900	-28.09	PASSED



RMS (RBW: 200 kHz, VBW: 200 kHz, Max hold)

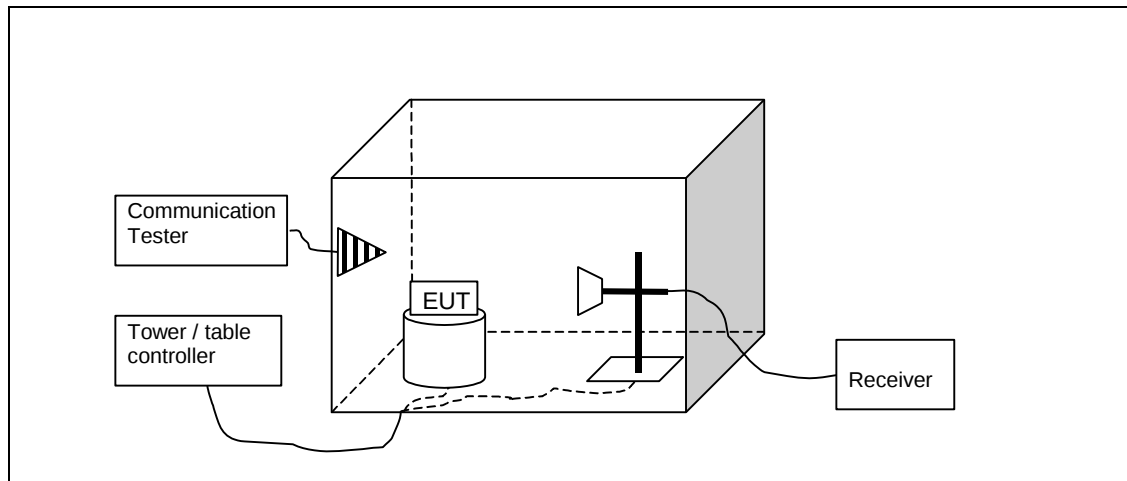
Operation mode (TX on)	Channel fc [MHz]	Level [dBm]	Results
FDD, CBW 20MHz, QPSK, 100 RB	18700 / 1860	-25.26	PASSED

8. Band edge compliance

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

EUT with DUT number	RM-824, DUT 42892
Accessories with DUT numbers	BP-5T , DUT 42846
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	23 / 51 / 98.9
Date of measurements	03-Sep-2012
Measured by	Timo Raiskio

8.1.1 Test setup



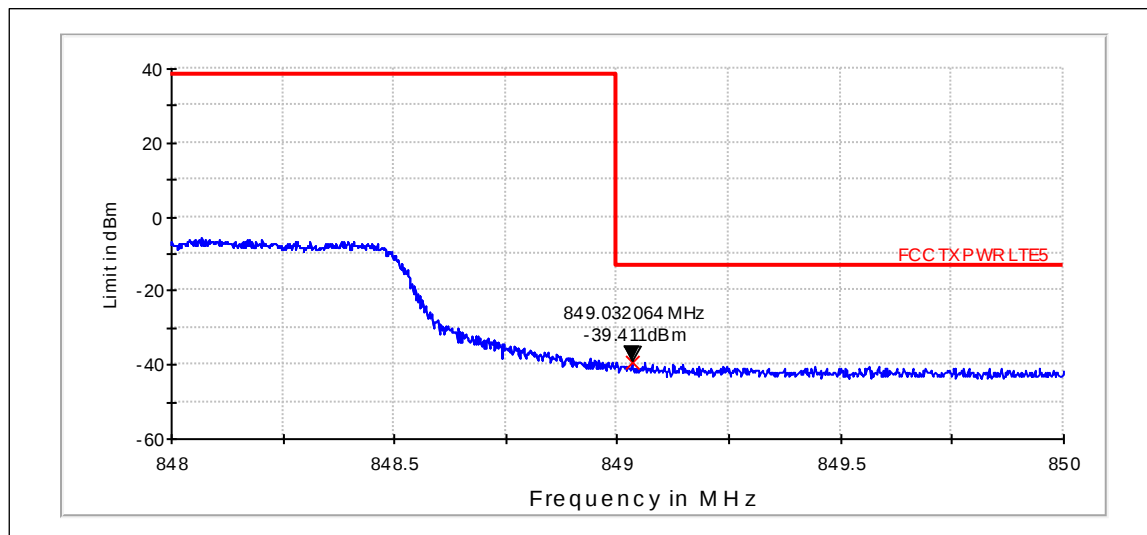
8.2. Test method and limit

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

Limits for band edge compliance measurements

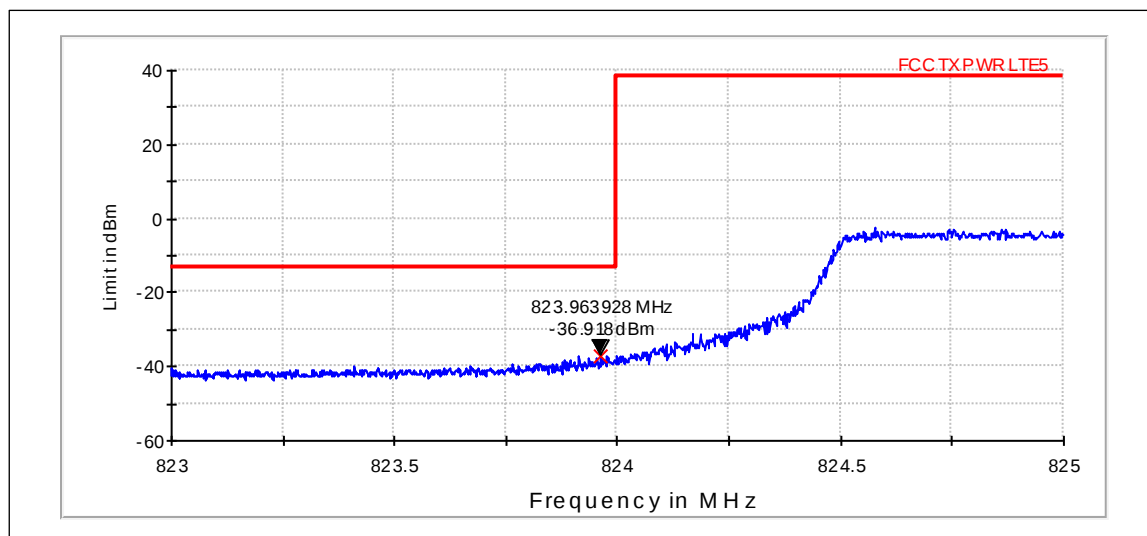
Operation band	Frequency range [MHz]	Limit [dBm]
LTE 700 Lower	703.9 – 704 and 716 – 716.1 Below 703.9 and above 716.1	-13 (RBW = 30 kHz, ERP) -13 (RBW = 30 kHz, ERP)
GSM850 / WCDMA850 / LTE850	Below 824 and above 849	-13
WCDMA1700 / LTE1700	Below 1710 and above 1755	-13
GSM1900 / LTE1900 / WCDMA1900	Below 1850 and above 1910	-13

8.3. LTE 850 (Band V) test results



RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

Operation mode (TX on)	Channel fc [MHz]	Level [dBm]	Results
FDD, CBW 10MHz, QPSK, 50 RB	20600 / 844	-39.41	PASSED



RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

Operation mode (TX on)	Channel fc [MHz]	Level [dBm]	Results
FDD, CBW 10MHz, QPSK, 50 RB	20450 / 829	-36.92	PASSED

EUT with DUT number	RM-824,DUT42883
Accessories with DUT numbers	BP-5T, DUT 42845
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 50 / 100
Date of measurements	29-Aug-2012
Measured by	Hannu Söderholm

```
graph LR; RS[Radio simulator] --> A20[20dB attenuator]; A20 --> PD[Power divider]; SA[Spectrum analyser] --> PD; PD --> ATT[Attenuator]; ATT --> EUT[EUT]
```

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD	4198.7

* RBW 50 kHz
 * VBW 100 kHz
 * SWT 800 ms

Marker 1 [T1]
 -2.37 dBm
 1.731470513 GHz

Ref 30 dBm
 * Att 50 dB

1.7324 GHz
 100 dB
 1.73451385 GHz

Center 1.7324 GHz
 1 MHz/
 Span 10 MHz

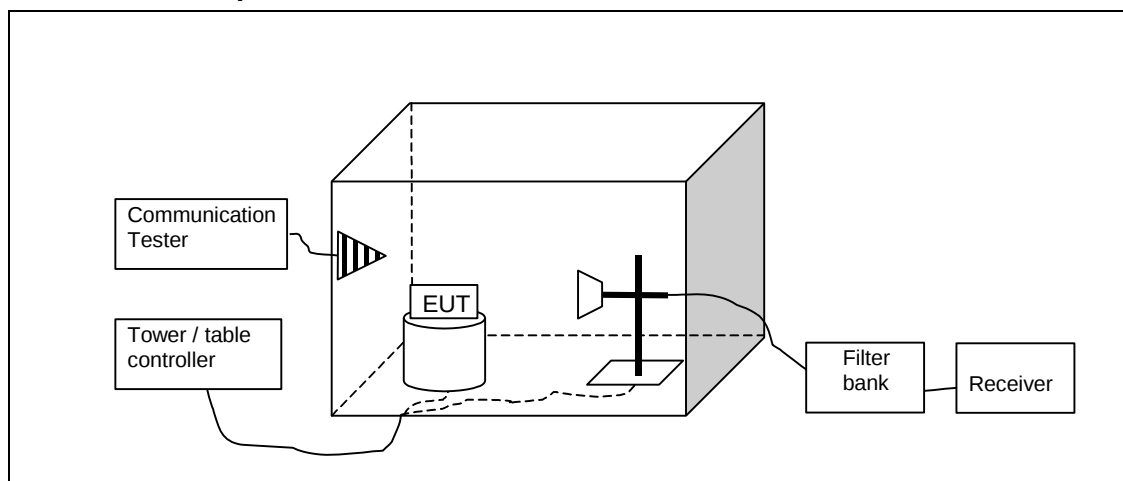
Date: 29.AUG.2012 08:25:11

10. Spurious radiated emissions

(FCC §22.917(a), §2.1053, §24.238(a), §2.1053, §27.53(g), §2.1053, §27.53(h), §27.53(g), RSS-132 4.5, RSS-133 6.5)

EUT with DUT number	RM-824, DUT 42847
Accessories with DUT numbers	BP-5T, DUT 42844 ; AC-50E, DUT 42776 ; CA-190CD, DUT 42778 ; WH-208, DUT 42831
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 52 / 100.5
Date of measurements	11-Jul-2012 and 28-Aug-2012
Measured by	Timo Raiskio

10.1.1 Test Setup



10.2. 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.

The measurement results are obtained as described below:

$$P \text{ [dBm]} = P_{\text{SUBST TX}} + G_{\text{SUBST TX ANT}} - L_{\text{SUBST CABLE}}$$

Where $P_{\text{SUBST TX}}$ is signal generator level, which produces the same receiver reading P_{MEAS} in dBm as EUT. $G_{\text{SUBST TX ANT}}$ is substitution antenna gain and $L_{\text{SUBST CABLE}}$ is the loss of the cable between the signal generator and the substitution antenna.

Limits for spurious radiated emissions measurements

Operation band	Frequency range [MHz]	Limit [dBm]
LTE 700 Lower	30 - 7200	-13 (RBW = 100 kHz, ERP)
GSM 850 / WCDMA 850	30 - 8500	-13
GSM 1900 / WCDMA 1900 WCDMA 1700 / LTE 1700	30 - 18000	-13

10.3. GSM850 TX Test results

Substitution method could not be utilized as no emissions above noise floor were found during measurements.

GSM mode, Channel 190 / 836.6 MHz

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarization	Results
1673.129	-55.69	0.0027	-50.75	-4.94	V	PASSED
1720.899	-57.68	0.00171	-52.55	-5.13	V	PASSED
2482.305	-54.28	0.00373	-55.5	1.22	V	PASSED
2544.629	-54.1	0.00389	-55.78	1.68	V	PASSED
3360.24	-59.05	0.00124	-62.44	3.39	V	PASSED

10.4. GSM850-E1 TX Test results

Substitution method could not be utilized as no emissions above noise floor were found during measurements.

EGPRS mode, Channel 190 / 836.6 MHz

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarization	Results
1661.623	-56.87	0.00206	-52	-4.87	V	PASSED
1667.836	-57.33	0.00185	-52.27	-5.06	V	PASSED
2496.072	-55.01	0.00316	-56.5	1.49	V	PASSED
2521.283	-54.15	0.00384	-55.75	1.6	V	PASSED
3339.218	-58.3	0.00148	-61.57	3.27	V	PASSED

10.5. GSM1900 TX Test results

Substitution method could not be utilized as no emissions above noise floor were found during measurements.

GSM mode, Channel 661 / 1880.0 MHz

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarization	Results
3759.96	-47.38	0.01826	-54.87	7.49	H	PASSED
3823.327	-54.94	0.00321	-62.88	7.94	V	PASSED
5625.691	-51.37	0.00729	-61.27	9.9	H	PASSED
7546.012	-50.92	0.00809	-64.9	13.98	H	PASSED

10.6. GSM1900-E1 TX Test results

Substitution method could not be utilized as no emissions above noise floor were found during measurements.

EGPRS mode, Channel 661 / 1880.0 MHz

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarization	Results
3760.02	-53.43	0.00454	-60.92	7.49	H	PASSED
3766.553	-53.34	0.00464	-61.17	7.83	V	PASSED
5655.852	-51.74	0.00669	-61.43	9.69	H	PASSED
7506.112	-51.07	0.00781	-64.75	13.68	H	PASSED

10.7. WCDMA 850 (Band V) Test results

Substitution method could not be utilized as no emissions above noise floor were found during measurements.

Channel 4175 / 835.0 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarization	Results
1671.102	-55.73	0.00267	-50.56	-5.17	H	PASSED
1671.663	-56.06	0.00248	-50.93	-5.13	H	PASSED
2501.483	-42.47	0.05661	-43.98	1.51	H	PASSED
2501.884	-42.47	0.05666	-43.98	1.51	H	PASSED
3343.707	-46.7	0.02136	-49.67	2.97	H	PASSED
3344.749	-46.64	0.02167	-49.92	3.28	V	PASSED

10.8. WCDMA 1900 (Band II) Test results

Substitution method could not be utilized as no emissions above noise floor were found during measurements.

Channel 9400 / 1880.0 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarization	Results
3758.737	-49.68	0.01076	-57.57	7.89	V	PASSED
3761.463	-50.32	0.00928	-58.22	7.9	V	PASSED
7524.509	-49.24	0.01192	-63.22	13.98	H	PASSED

10.9. LTE 1700 (Band IV) Test results

Substitution method could not be utilized as no emissions above noise floor were found during measurements.

Channel 20175 / 1732.5 MHz

FDD, CBW 5MHz, QPSK, 1 RB, RMS detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarization	Results
3465.581	-64.59	0.00035	-70.1	5.51	H	PASSED
5207.5	-62.05	0.00062	-71.93	9.88	V	PASSED
6920.521	-58.32	0.00147	-70.75	12.43	H	PASSED
8663.442	-58.11	0.00154	-73.31	15.2	H	PASSED
10385.12	-58.51	0.00141	-75.33	16.82	H	PASSED

10.10. LTE700 Lower (Band 17) Test results

Substitution method could not be utilized as no emissions above noise floor were found during measurements.

Channel 23790 / 710 MHz

FDD, CBW 5MHz, QPSK, 1 RB, RMS detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarization	Results
1429.439	-47.82	0.01651	-87	39.18	V	PASSED
2140	-40.21	0.09532	-83.48	43.27	V	PASSED
2850	-37.39	0.18247	-85.67	48.28	V	PASSED

10.11. LTE 850 (Band V) Test results

Substitution method could not be utilized as no emissions above noise floor were found during measurements.

Channel 20525 / 836.5 MHz

FDD, CBW 5MHz, QPSK, 1 RB, RMS detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarization	Results
857.438	-59.62	0.00109	-93.03	33.41	V	PASSED
879.994	-40.09	0.0979	-74.61	34.52	V	PASSED
882.3	-40.26	0.09423	-74.61	34.35	V	PASSED
1673.341	-66.3	0.00023	-59.16	-7.14	V	PASSED
2506.594	-74.65	3E-05	-74.97	0.32	H	PASSED
3346.341	-77.02	2E-05	-80.28	3.26	V	PASSED

10.12. LTE 1900 (Band II) Test results

Substitution method could not be utilized as no emissions above noise floor were found during measurements.

Channel 18900 / 1880.0 MHz

FDD, CBW 5MHz, QPSK, 1 RB, RMS detector

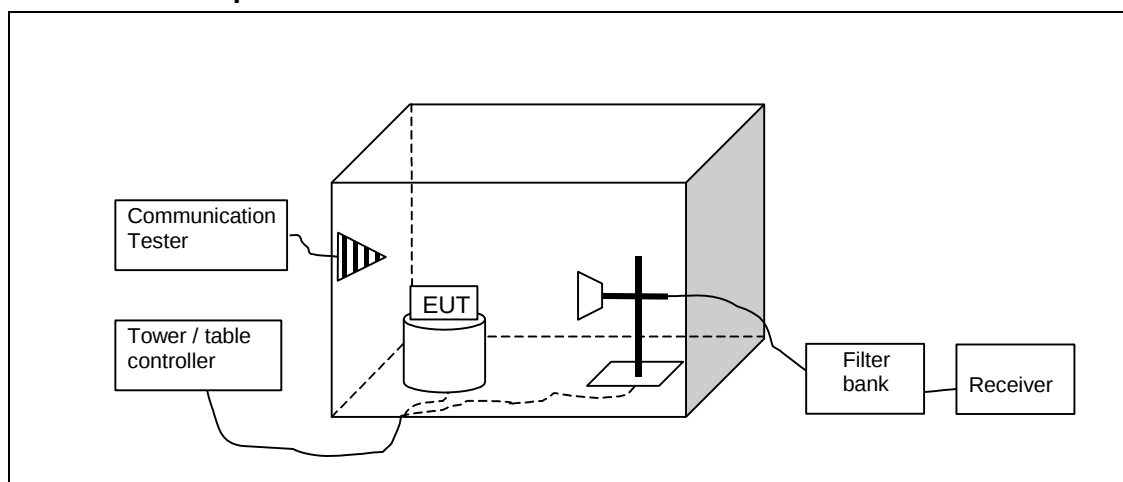
Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarization	Results
1958.831	-36.78	0.21009	-34.47	-2.31	H	PASSED
3760.501	-54.65	0.00343	-62.56	7.91	V	PASSED
5640.621	-58.68	0.00135	-68.58	9.9	V	PASSED
7525.07	-60.62	0.00087	-74.6	13.98	H	PASSED

11. Spurious radiated emissions

(FCC §22.917(a), §2.1053, §24.238(a), §2.1053, §27.53(g), §2.1053, §27.53(h), §27.53(g), RSS-132 4.5, RSS-133 6.5)

EUT with DUT number	RM-824, DUT 42877
Accessories with DUT numbers	BP-5T , DUT 42846 ; AC-50E, DUT 42776 ; CA-190CD, DUT 42778 ; WH-208, DUT 42831
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 48 / 100.0
Date of measurements	27-Aug-2012
Measured by	Timo Raiskio

11.1.1 Test setup



11.2. 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.

The measurement results are obtained as described below:

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

Where $P_{SUBST\ TX}$ is signal generator level, which produces the same receiver reading P_{MEAS} in dBm as EUT. $G_{SUBST\ TX\ ANT}$ is substitution antenna gain and $L_{SUBST\ CABLE}$ is the loss of the cable between the signal generator and the substitution antenna.

Limits for spurious radiated emissions measurements

Operation band	Frequency range [MHz]	Limit [dBm]
LTE 700 Lower	30 - 7200	-13 (RBW = 100 kHz, ERP)
GSM850 / WCDMA850 / LTE850	30 - 8500	-13
WCDMA1700 / LTE1700 / / GSM1900 / WCDMA1900 / LTE1900	30 - 18000	-13

11.3. WCDMA 1700 (Band IV) test results

Channel 1412 / 1732.4 MHz

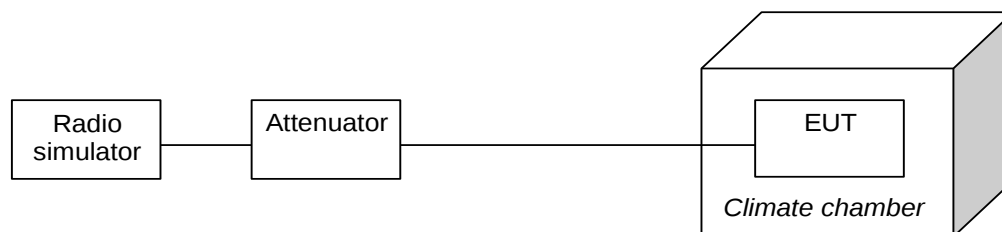
FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [μW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarization	Results
1714.9	-42.08	0.06197	-38.98	-3.1	VERTICAL	PASSED
3765.832	-54.86	0.00327	-62.7	7.84	VERTICAL	PASSED
5649.519	-51.78	0.00664	-61.39	9.61	HORIZONTAL	PASSED
7543.988	-49.28	0.0118	-63.22	13.94	HORIZONTAL	PASSED

12. Frequency stability, temperature variation (FCC §2.1055(a), RSS-132 4.3, RSS-133 6.3, RSS-139 6.3)

EUT with DUT number	RM-824, DUT 42841
Accessories with DUT numbers	BP-5T, DUT 42845
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 50 / 99.6
Date of measurements	04-Jul-2012
Measured by	Hannu Söderholm

12.1. Test Setup



12.2. Test method and limit

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

12.3. GSM 850 Test results

GSM, Channel 190 / 836.6 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	836.6	-22.92	-0.0274	PASSED
40	836.6	-11.24	-0.0134	PASSED
30	836.6	-22.54	-0.0269	PASSED
20	836.6	-16.59	-0.0198	PASSED
10	836.6	-0.13	-0.0002	PASSED
0	836.6	-4.39	-0.0052	PASSED
-10	836.6	11.75	0.014	PASSED
-20	836.6	9.36	0.0112	PASSED

12.4. GSM 1900 Test results

GSM, Channel 661 / 1880.0 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	1880	-9.23	-0.0049	PASSED
40	1880	-17.11	-0.0091	PASSED
30	1880	21.11	0.0112	PASSED
20	1880	2.97	0.0016	PASSED
10	1880	-17.82	-0.0095	PASSED
0	1880	34.87	0.0185	PASSED
-10	1880	47.01	0.025	PASSED
-20	1880	20.79	0.0111	PASSED

12.5. LTE700 Lower (Band 17) Test results

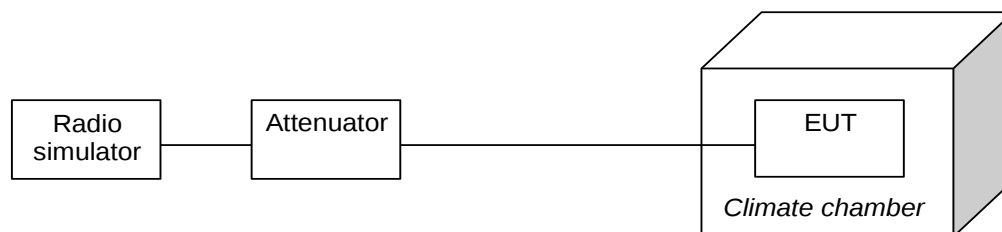
Channel 23790 / 710.0 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	710	0.40054	0.0006	PASSED
40	710	0.58651	0.0008	PASSED
30	710	0.32902	0.0005	PASSED
20	710	0.61512	0.0009	PASSED
10	710	0.38624	0.0005	PASSED
0	710	0.5722	0.0008	PASSED
-10	710	0.70095	0.001	PASSED
-20	710	0.50068	0.0007	PASSED

13. Frequency stability, temperature variation (FCC §2.1055(a), RSS-132 4.3, RSS-133 6.3, RSS-139 6.3)

EUT with DUT number	RM-824, DUT42883
Accessories with DUT numbers	BP-5T, DUT 42845
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 50 / 100
Date of measurements	28-Aug-2012
Measured by	Hannu Söderholm

13.1. Test Setup



13.2. Test method and limit

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

13.3. WCDMA 1700 Test results

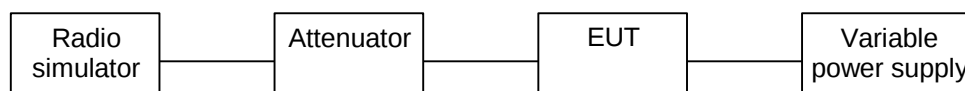
FDD, Channel 1412 / 1732.4 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	1732.4	-2.83814	-0.0016	PASSED
40	1732.4	-1.83106	-0.0011	PASSED
30	1732.4	-0.50354	-0.0003	PASSED
20	1732.4	0.7019	0.0004	PASSED
10	1732.4	-0.62561	-0.0004	PASSED
0	1732.4	-1.0376	-0.0006	PASSED
-10	1732.4	1.00708	0.0006	PASSED
-20	1732.4	1.40381	0.0008	PASSED

14. Frequency stability, voltage variation (FCC §2.1055(d), RSS-132 4.3, RSS-133 6.3, RSS-139 6.3)

EUT with DUT number	nhl-99, DUT 42841
Accessories with DUT numbers	BP-5T, DUT 42845
Operation Voltage [V] / [Hz]	3.5 / 3.7 / 4.1
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 51 / 98.6
Date of measurements	11-Jul-2012
Measured by	Hannu Söderholm

14.1. Test Setup



14.2. Test method and limit

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

14.3. GSM 1900 Test results

GSM, Channel 661 / 1880.0 MHz

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.1	1880	-6.65	-0.0035	PASSED
Nominal / 3.7	1880	-4	-0.0021	PASSED
Battery cut-off point / 3.5	1880	-3.49	-0.0019	PASSED

14.4. GSM 850 Test results

GSM, Channel 190 / 836.6 MHz

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.1	836.6	-2.32	-0.0028	PASSED
Nominal / 3.7	836.6	-2.2	-0.0026	PASSED
Battery cut-off point / 3.5	836.6	-20.92	-0.025	PASSED

14.5. LTE700 Lower (Band 17) Test results

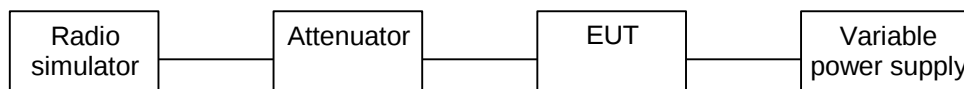
Channel 23790 / 710.0 MHz

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.1	710	0.41485	0.0006	PASSED
Nominal / 3.7	710	0.75817	0.0011	PASSED
Battery cut-off point / 3.5	710	0.68665	0.001	PASSED

15. Frequency stability, voltage variation (FCC §2.1055(d), RSS-132 4.3, RSS-133 6.3, RSS-139 6.3)

EUT with DUT number	RM-824, DUT42883
Accessories with DUT numbers	BP-5T, DUT 42845
Operation Voltage [V] / [Hz]	3.5 / 3.7 / 4.1
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 51 / 100
Date of measurements	29-Aug-2012
Measured by	Hannu Söderholm

15.1. Test Setup



15.2. Test method and limit

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

15.3. WCDMA 1700 Test results

FDD, Channel 1412 / 1732.4 MHz

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.1	1732.4	-1.54114	-0.0009	PASSED
Nominal / 3.7	1732.4	-4.53186	-0.0026	PASSED
Battery cut-off point / 3.5	1732.4	1.25122	0.0007	PASSED

16. Test Equipment

16.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM38112	Power supply	6632A	Agilent	22/24/27, 15C
TM38631	Signal Generator	83640L	Agilent	22/24/27, 15C, 15B
OM06312	Signal Generator	E4422B	Agilent	22/24
TM37678	Communication Tester	CMU200	R&S	15C, 15B
TM30600	Impulse limiter	ESH3-Z2	R&S	15C, 15B
TM26490	LISN 50 μ H	ESH3-Z5	R&S	15C, 15B
TM26491	LISN 50 μ H	ESH3-Z5	R&S	15C, 15B
TM37610	Spectrum Analyzer	FSU26	R&S	22/24/27, 15C
TM22806	Battery	BAT 20/E	Fiskars	15C, 15B
TM22805	UPS	PS 20/1.2	Fiskars	15C, 15B
-	Temperature and humidity logger	175-H2	Testo	15C, 15B
-	Temperature and humidity logger	175-H2	Testo	22/24/27, 15C
-	Air pressure and temperature logger	635-2	Testo	22/24/27, 15C, 15B
-	Air pressure sensor	0638-1835	Testo	22/24/27, 15C, 15B
-	Temperature test chamber	VT 4002	Vötsch	22/24
2058	Receiver	ESPC	R&S	15C, 15B
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B
2002	Communication Tester	CMU200	R&S	22/24/27, 15C
2009	LISN 50 μ H	ENV216	R&S	15C, 15B
2010	LISN 50 μ H	ENV216	R&S	15C, 15B
2012	Power splitter	11667B	Agilent	22/24/27, 15C
2013	Attenuator	8493C	Agilent	22/24/27, 15C
2014	Attenuator	8493C	Agilent	22/24/27, 15C
2019	Power splitter	ZN2PD-9G-S+	Mini-Circuits	15E
2020	Power splitter	ZN2PD-9G-S+	Mini-Circuits	15E
2023	Spectrum Analyzer	ESMI-RF	R&S	15B/15C
2024	Analyzer display unit	ESAI-D	R&S	15B/15C

16.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM38114	Power supply	6632A	Agilent	22/24/27, 15C, 15B
TM38631	Signal Generator	83640L	Agilent	22/24/27, 15C, 15B
TM38323	Preamplifier	PA-02 18-26 GHz	EMC Automation	22/24/27, 15C, 15B
-	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C
TM26497	Antenna	3115	Emco	22/24/27, 15C, 15B
TM37773	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
TM38845	Receiver	ESIB 26	R&S	22/24/27, 15C, 15B
-	Antenna	HL562	R&S	22/24/27, 15C, 15B
-	Turntable	2188	EMCO	22/24/27, 15C, 15B
-	Turntable controller	2090	EMCO	22/24/27, 15C, 15B
-	RF system panel	TS-RSP	R&S	22/24/27, 15C, 15B
-	RF system panel	TS-RSP	R&S	22/24/27, 15C, 15B
-	Mini mast	2075-2	ETS Lindgren	22/24/27, 15C, 15B
TM38843	Mini mast	2075	Emco	22/24/27, 15C, 15B
TM38842	Antenna mast controller	2090	Emco	22/24/27, 15C, 15B
TM30643	LISN 50 μ H	LISN-5-20-2	FCC	22/24/27, 15C, 15B
TM30644	LISN 50 μ H	LISN-5-20-2	FCC	22/24/27, 15C, 15B
-	Temperature and humidity logger	175-H2	Testo	22/24/27, 15C, 15B
-	Air pressure and temperature logger	635-2	Testo	22/24/27, 15C, 15B
-	Air pressure sensor	0638-1835	Testo	22/24/27, 15C, 15B
TM39180	Laser distance meter	Disto Pro	Leica	22/24/27, 15C, 15B
TM37523	Preamplifier	AMF-4D-10M-3G-25-20P	Miteq	22/24/27, 15C, 15B
TM37498	Preamplifier	AMF-5D-020180-26-10P	Miteq	22/24/27, 15C, 15B
TM30599	Semi anechoic chambre	UNKNOWN	TDK	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	-	22/24/27, 15C, 15B
TM38066	High pass filter	4HC3000/18000-3-KK	Trilithic	22/24/27, 15C, 15B
-	High pass filter	WHKX 1.6/15G-12SS	Wainwright	22/24/27, 15C, 15B
TM37545	Tunable notch filter	800.0/960.0-0.2/40-8SSK	Wainwright	22
TM26512	Tunable notch filter	WRCD1850/1910-0.2/40-10SSK	Wainwright	24
-	Band reject filter	WRCG1877/1883-1870/1890-40/6EE	Wainwright	24
-	Band reject filter	WRCG1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	27
-	Band reject filter	WRCG832/838-825/848-40/5SS	Wainwright	22
TM23892	Controller	G-1000SDX	Yaesu	22/24/27
2001	Bluetooth tester	CBT	R&S	22/24/27, 15C, 15B
6023	Antenna	VUBA 9117	Schwarzbeck	22/24/27, 15C