FCC Part 22/24 Compliance Test Report

Test Report no.:	FCC22&24_RM-1018_03.docx	**Date of Report:**	04-Jun-2014
Number of pages:	27	**Customer's Contact person:**	Tero Huhtala
Testing laboratory:	TCC Microsoft Tampere Laboratory P.O.Box 403 Visiokatu 3 FIN-33101 TAMPERE, FINLAND Tel. +358 71 800 8000 Fax. +358 71 804 6880	**Customer:**	Microsoft Tampere P.O.Box 403 Visiokatu 4 FIN-33720 TAMPERE, FINLAND Tel. +358 (0) 7180 46800 Fax. +358 (0) 7180 46880
FCC listing no.: **IC recognition no.:**	94436 661AK-1		
Tested devices/ accessories:	**Phone RM-1018 / Battery BL-5J / AC Charger AC-18E / Headset WH-108 / Dummy Battery SD-130**		
FCC ID:	PDNRM-1018	**IC:**	661R-RM1018
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 3, December 2010), 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 Microsoft.		
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 Söderholm 2014.06.04 15:44:37 +03'00'		

Hannu Söderholm, Specialist, EMC

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

Date of receipt	12-May-2014
Testing completed	28-May-2014
The customer's contact person	Tero Huhtala
Test Plan referred to	T:\Projects\RM-1018\TestPlan\RS_testplan_RM-1018.xlsm
Notes	-
Document name	T:\Projects\RM-1018\EMC\FCC22&24_RM-1018_03.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
Phone	RM-1018	004402478273679	1500	-	01068.00004.14182.20000	43170
Phone	RM-1018	004402478273562	1500	-	01068.00004.14182.04000	43175
Battery	BL-5J	4175354134B12507230;0670573	-	-	-	43173
AC Charger	AC-18E	4090493442750400944;0675695	-	-	-	43172
Headset	WH-108	2376171	-	-	-	43142
Dummy battery	SD-130	06.05.2014/03618	V.1	-	-	43176

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	-
§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	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	-
§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

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WCDMA 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	-
§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	-

WCDMA 850:

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	-

PASSED The EUT complies with the essential requirements in the standard.
FAILED The EUT does not comply with the essential requirements in the standard.
NP The test was not performed by the TCC Microsoft Laboratory.

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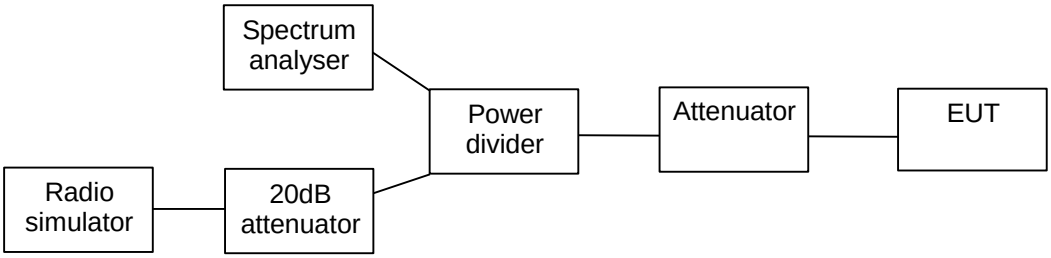
2. 99 % occupied bandwidth

(FCC §2.1049(h), RSS-133 4.6.1, RSS-132 4.6.1)

EUT with DUT number	RM-1018, DUT43175
Accessories with DUT numbers	SD-130, DUT43176
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	21-24 / 40-48 / 99.4-100.8
Date of measurements	14..23 -May-2014
Measured by	Timo Raiskio

2.1. Test Setup



2.2. Test method and limit

The measurement is made according to applicable FCC rule parts and IC standards.

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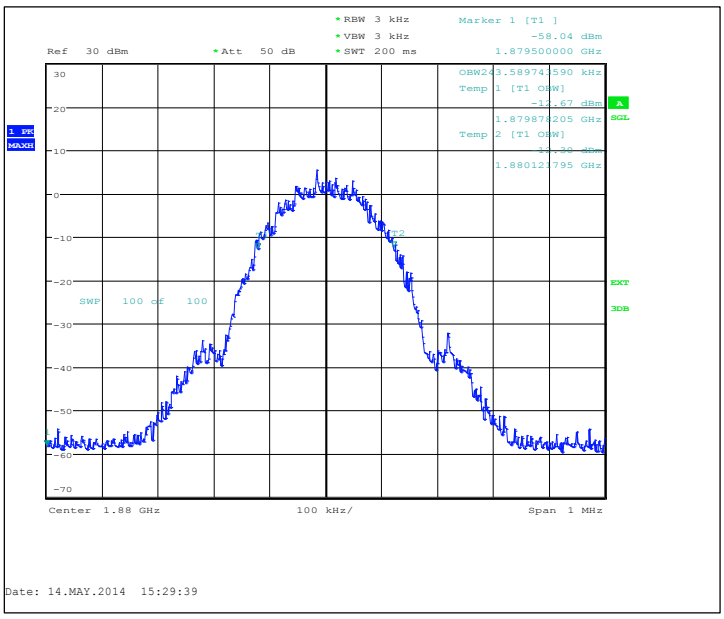
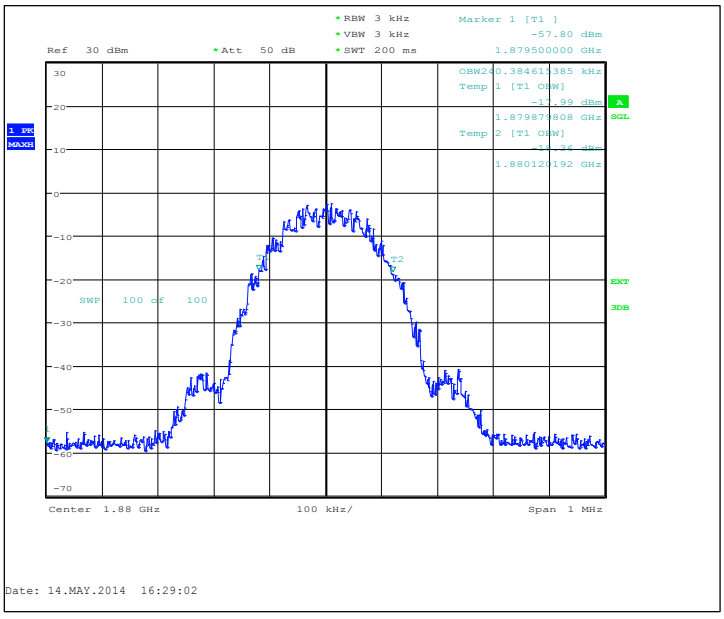
2.3. GSM 1900 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
GSM	243.6
EGPRS	240.4

GSM, Channel 661 / 1880.0 MHz



EGPRS, Channel 661 / 1880.0 MHz



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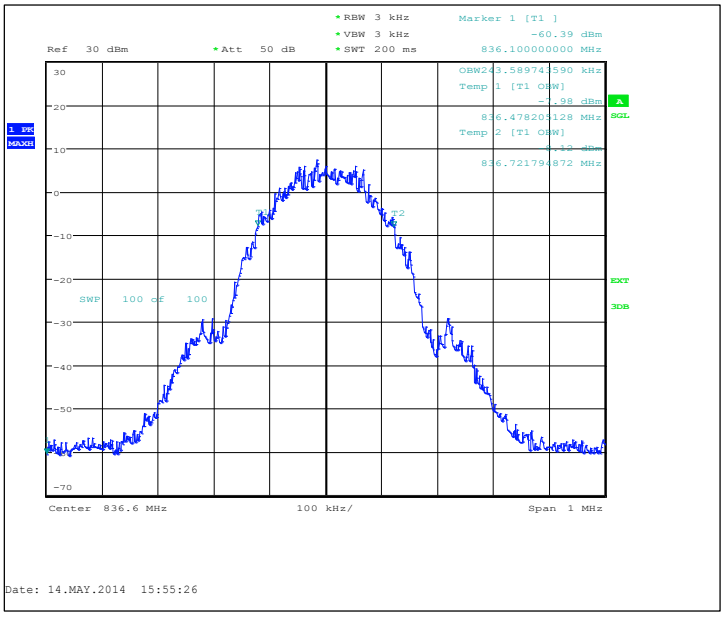
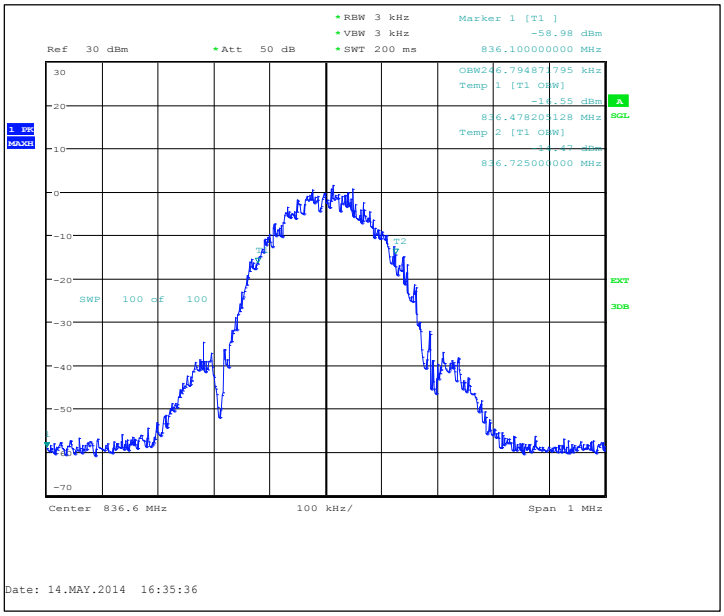
2.4. GSM 850 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
GSM	243.6
EGPRS	246.8

GSM, Channel 190 / 836.6 MHz



EGPRS, Channel 190 / 836.6 MHz



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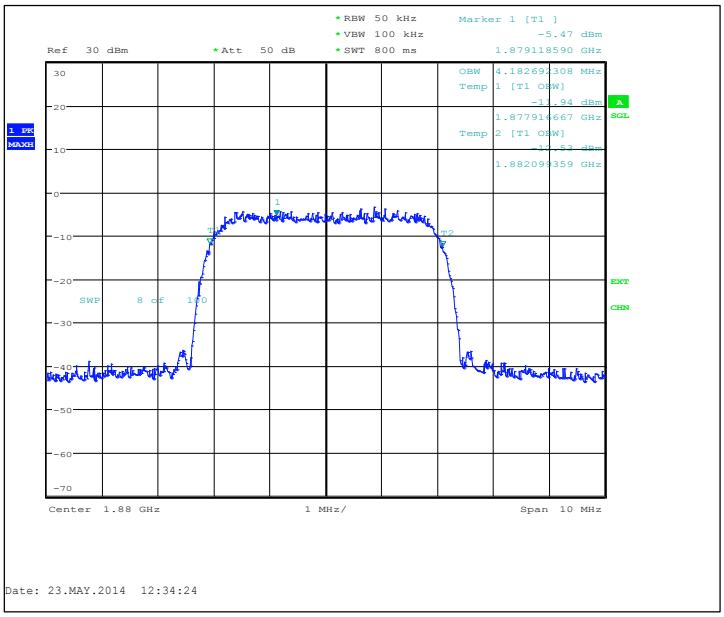
2.5. WCDMA 1900 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD	4182.7

FDD, Channel 9400 / 1880.0 MHz



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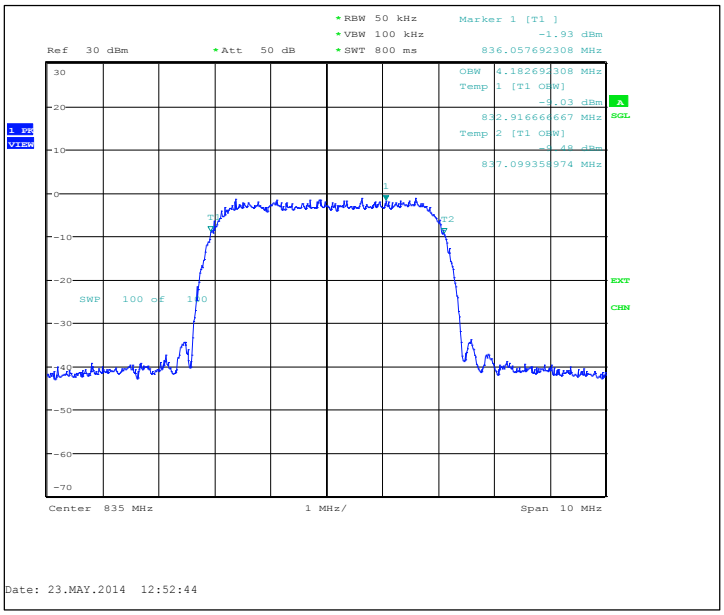
2.6. WCDMA 850 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD	4182.7

FDD, Channel 4175 / 835.0 MHz



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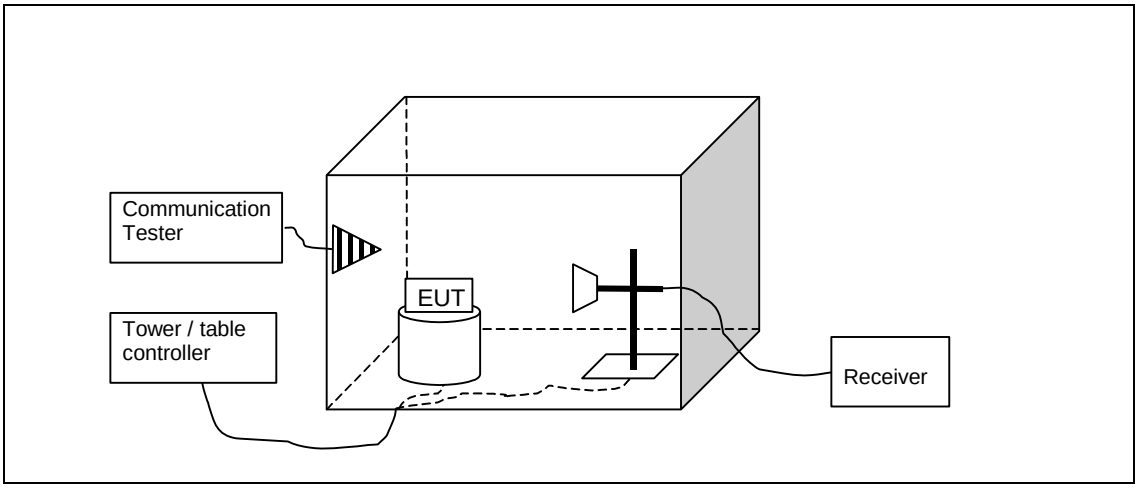
3. Radiated RF output power
(FCC §22.913(a), §24.232(b), RSS-132 4.4, RSS-133 6.4)

EUT with DUT number	RM-1018, DUT 43170
Accessories with DUT numbers	BL-5J, DUT 43173
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 48 / 100-103
Date of measurements	26.. 27-May-2014
Measured by	Jari Jantunen

3.1.1 Test setup



1.1 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 ERP	38.5
1850 - 1910	2 EIRP	33

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3.2. GSM 850 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	29.55	0.902	-3.51	10	-29.95	-3.49	3.4	VERTICAL	PASSED
190 / 836.6	30.29	1.069	-2.41	10	-29.83	-3.73	3.4	VERTICAL	PASSED
251 / 848.8	29.67	0.927	-2.66	10	-30.05	-4.32	3.4	VERTICAL	PASSED

3.3. GSM 850 E-GPRS (MSC9) test results

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	28.33	0.681	-4.73	10	-29.95	-3.49	3.4	HORIZONTAL	PASSED
190 / 836.6	26.17	0.414	-6.53	10	-29.83	-3.73	3.4	VERTICAL	PASSED
251 / 848.8	27.32	0.540	-4.32	10	-29.36	-4.32	3.4	HORIZONTAL	PASSED

3.4. GSM 1900 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	32.1	1.622	-11.75	10	-28.67	10.18	5	HORIZONTAL	PASSED
661 / 1880	28.3	0.676	-15.47	10	-28.68	10.19	5.1	VERTICAL	PASSED
810 / 1909.8	32.76	1.888	-10.66	10	-28.33	10.19	5.1	VERTICAL	PASSED

3.5. GSM 1900 E-GPRS (MSC9) test results

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	27.71	0.590	-16.14	10	-28.67	10.18	5	HORIZONTAL	PASSED
661 / 1880	28.28	0.673	-15.47	10	-28.66	10.19	5.1	HORIZONTAL	PASSED
810 / 1909.8	28.55	0.716	-14.87	10	-28.33	10.19	5.1	VERTICAL	PASSED

3.6. WCDMA 1900 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	23.21	0.209	-20.64	10	-28.67	10.18	5	HORIZONTAL	PASSED
9400 / 1880	23.83	0.242	-19.94	10	-28.68	10.19	5.1	HORIZONTAL	PASSED
9538 / 1907.6	23.69	0.234	-19.73	10	-28.33	10.19	5.1	HORIZONTAL	PASSED

3.7. WCDMA 850 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	20.19	0.104	-12.87	10	-29.95	-3.49	3.4	VERTICAL	PASSED
4183 / 836.6	19.9	0.098	-12.8	10	-29.83	-3.73	3.4	VERTICAL	PASSED
4233 / 846.6	20.52	0.113	-11.81	10	-30.05	-4.32	3.4	VERTICAL	PASSED

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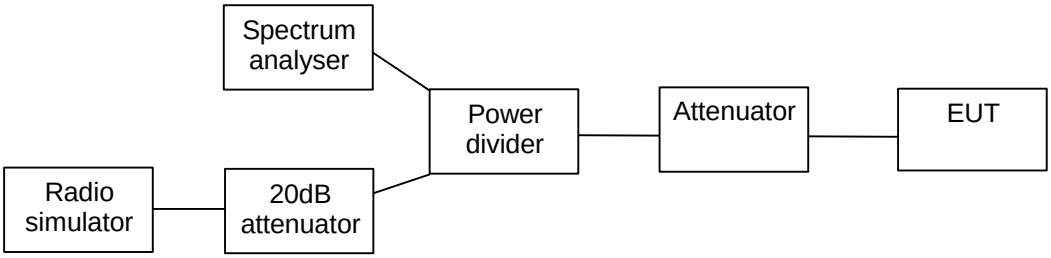
4. Band edge compliance

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

EUT with DUT number	RM-1018, DUT43175
Accessories with DUT numbers	SD-130, DUT43176
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	23 / 44 / 100.5
Date of measurements	14-May-2014
Measured by	Timo Raiskio

4.1. Test Setup



4.2. Test method and limit

The measurement is made according to applicable FCC rule parts and IC standards.

Limits for band edge compliance measurements

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

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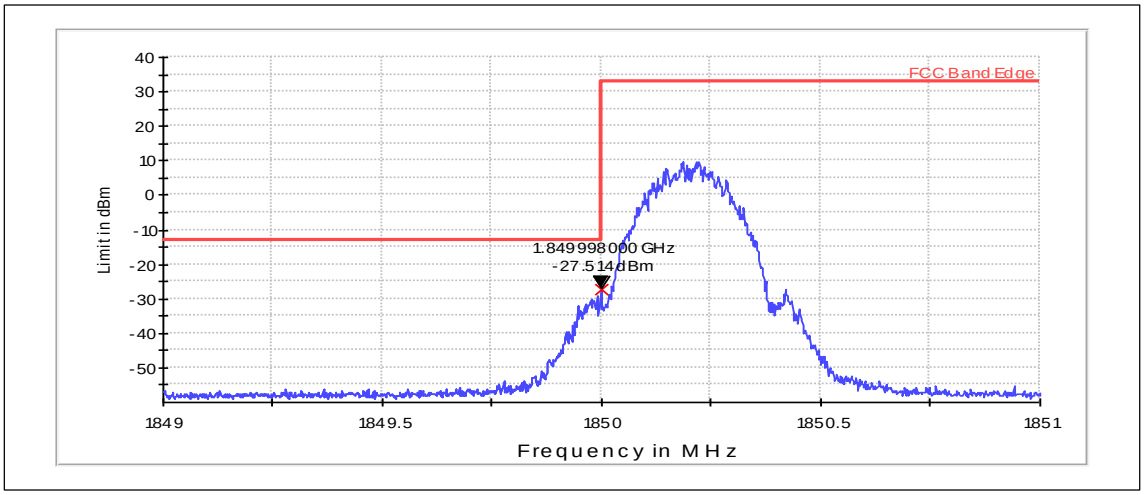
4.3. GSM 1900 Test results

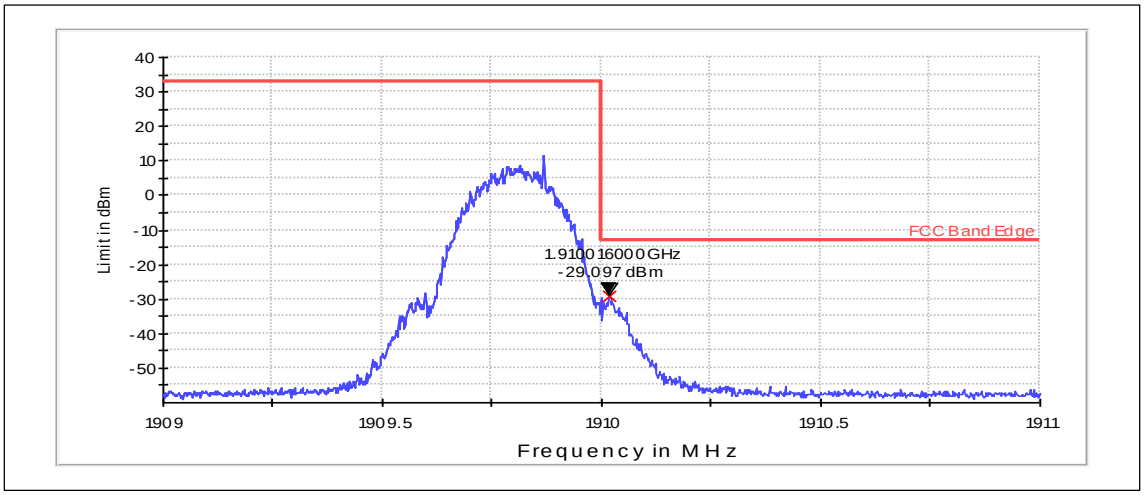
Channel 512 / 1850.2 MHz



RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	1849.998	-27.51	PASSED

Channel 810 / 1909.8 MHz



RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	1910.016	-29.10	PASSED

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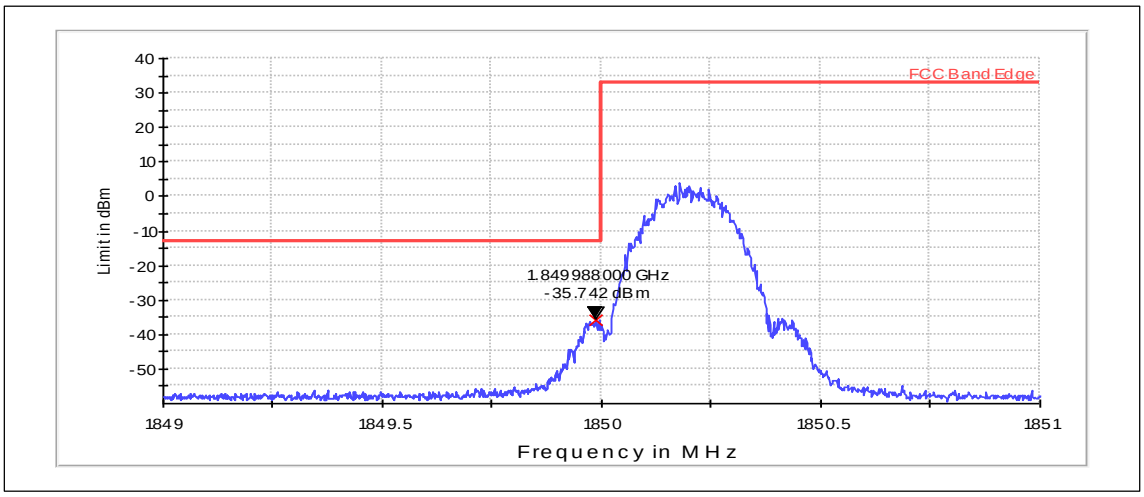
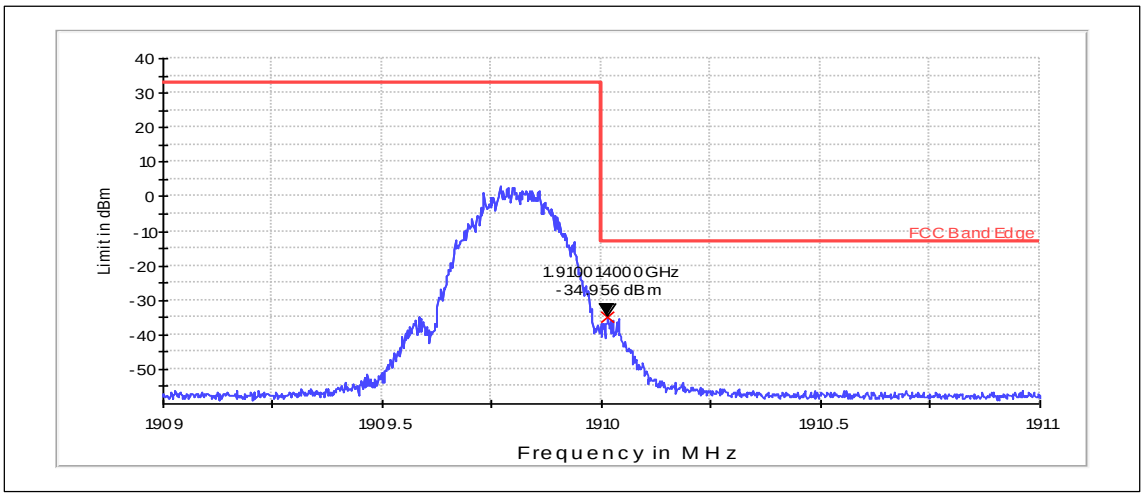
Channel 512 / 1850.2 MHz



RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	1849.988	-35.74	PASSED

Channel 810 / 1909.8 MHz



RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	1910.014	-34.96	PASSED

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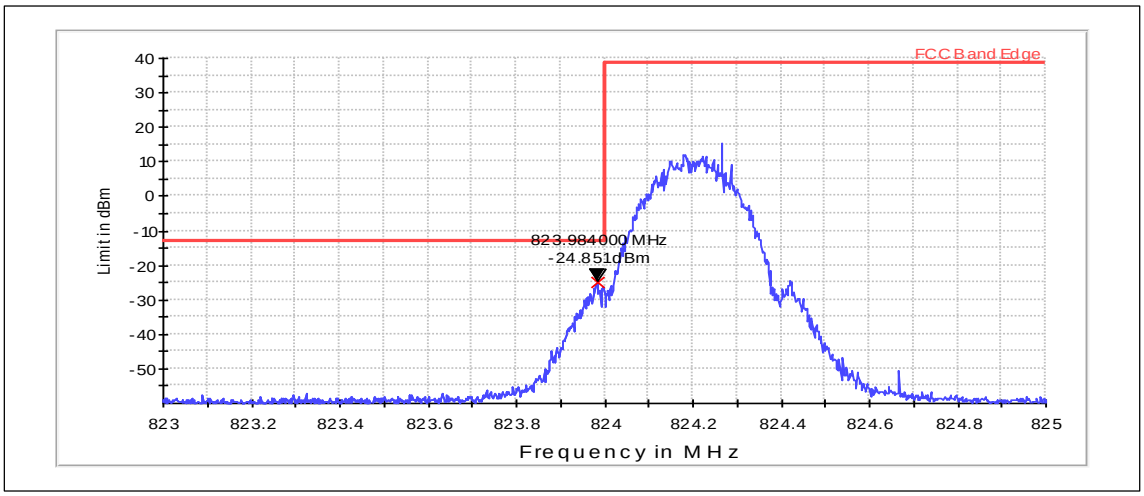
4.4. GSM 850 Test results

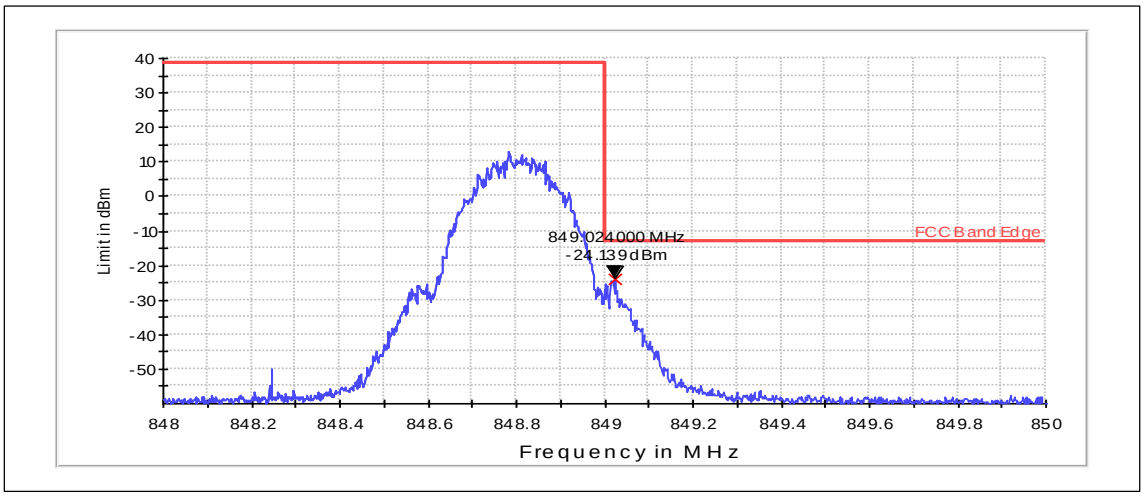
Channel 128 / 824.2 MHz



RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	823.984	-24.85	PASSED

Channel 251 / 848.8 MHz



RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	849.024	-24.14	PASSED

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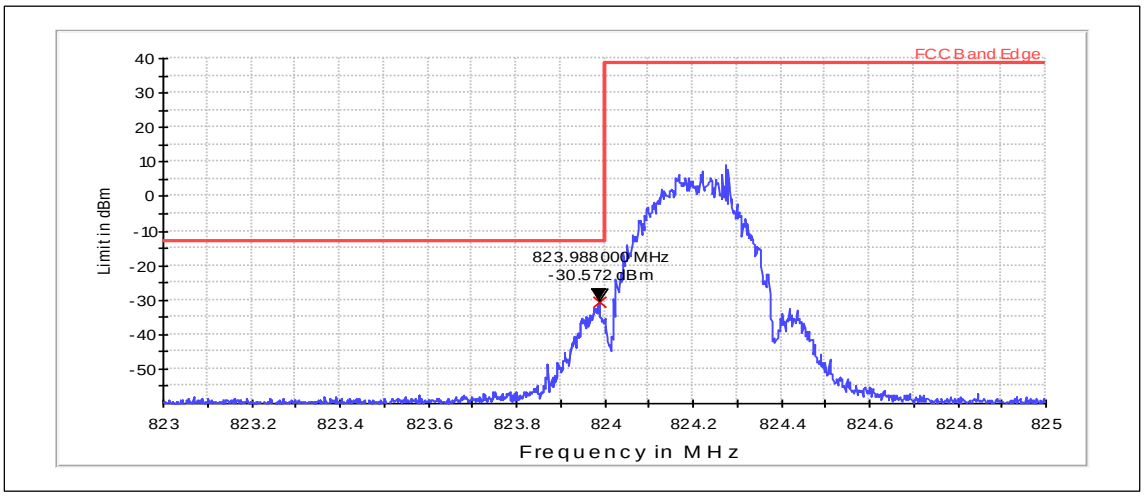
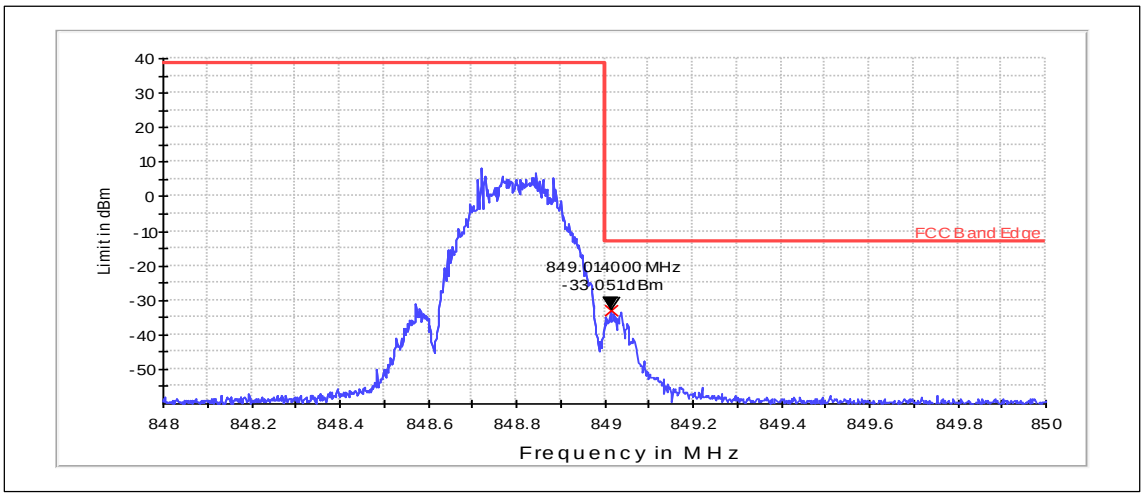
Channel 128 / 824.2 MHz



RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	823.988	-30.57	PASSED

Channel 251 / 848.8 MHz



RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	849.014	-33.05	PASSED

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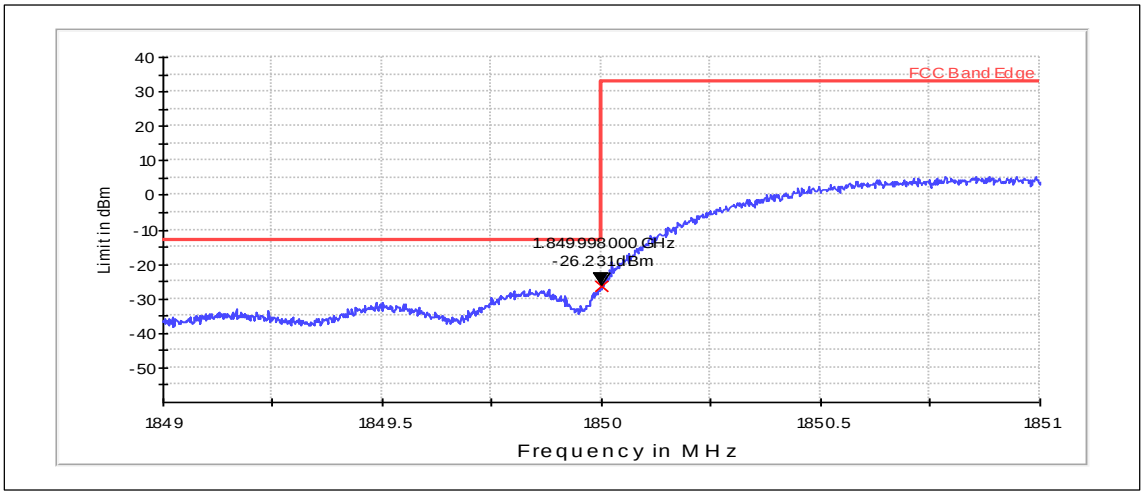
4.5. WCDMA 1900 Test results

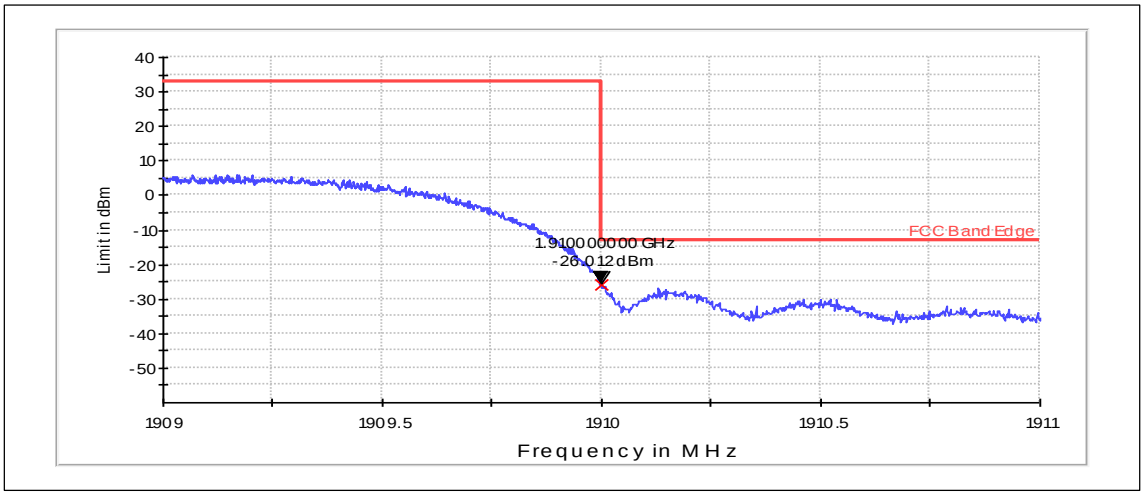
Channel 9262 / 1852.4 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1849.998	-26.23	PASSED

Channel 9538 / 1907.6 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1910.000	-26.01	PASSED

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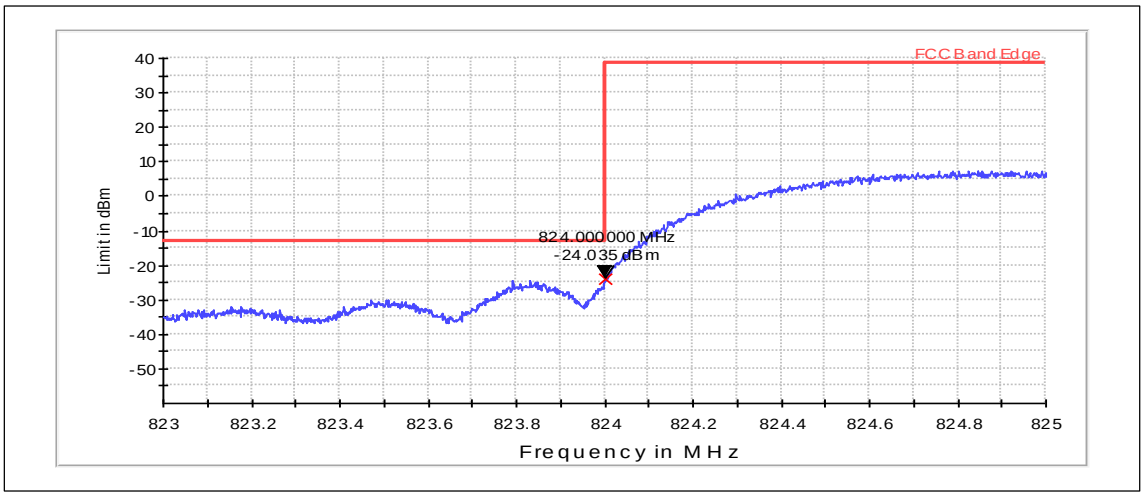
4.6. WCDMA 850 Test results

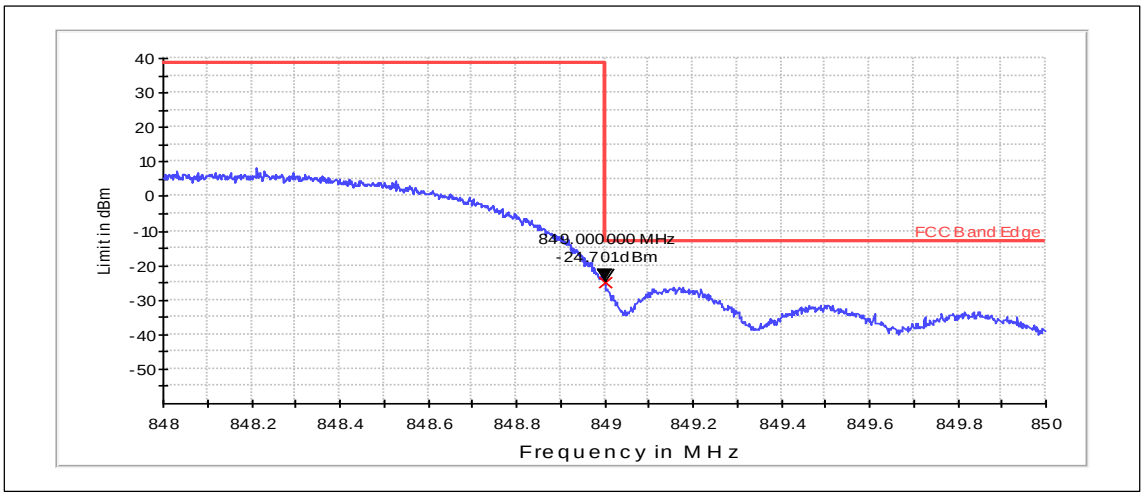
Channel 4132 / 826.4 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	824.000	-24.03	PASSED

Channel 4233 / 846.6 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	849.000	-24.70	PASSED

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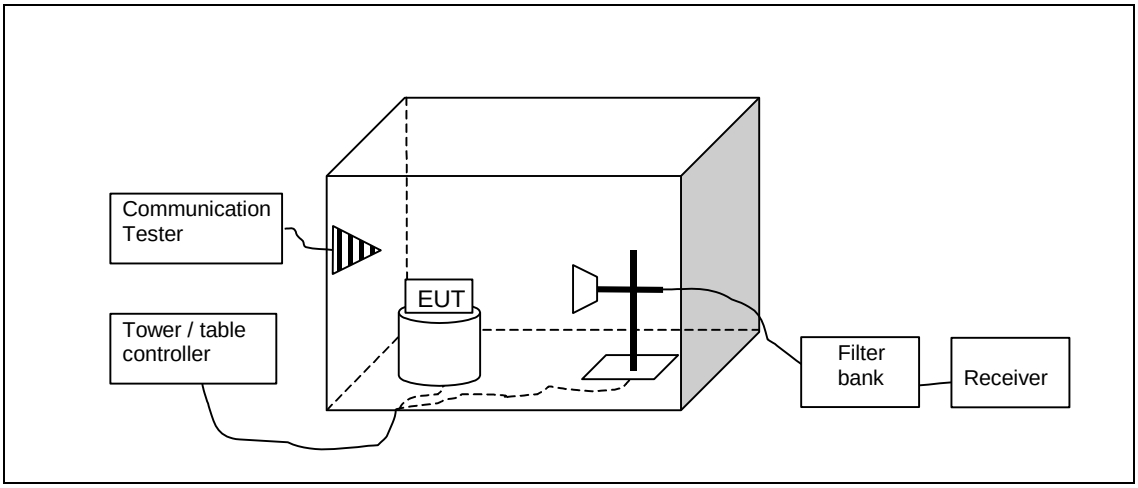
5. Spurious radiated emissions

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

EUT with DUT number	RM-1018, DUT 43170
Accessories with DUT numbers	BL-5J, DUT 43173 ; AC-18E, DUT 43172 ; WH-108, DUT 43142
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	21 / 48 / 100
Date of measurements	16-May-2014
Measured by	Jari Jantunen

5.1.1 Test setup



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5.2. 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]
GSM 850	30 - 8500	-13
GSM 1900	30 - 19100	-13
WCDMA 1900	30 - 19100	-13
WCDMA 850	30 - 8500	-13

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5.3. GSM 850 test results

Substitution method couldn't be utilized as no emissions above noise floor were found during measurements.

Peak detector

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
1673.026	-45.15	0.03055	-38.45	-6.7	HORIZONTAL	PASSED
2510.18	-54.51	0.00354	-55.01	0.5	VERTICAL	PASSED
3380.481	-59.31	0.00117	-59.71	0.4	VERTICAL	PASSED

5.4. GSM 850 E-GPRS (MSC9) test results

Substitution method couldn't be utilized as no emissions above noise floor were found during measurements.

Peak detector

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
1673.1	-60.09	0.00098	-53.29	-6.8	VERTICAL	PASSED
2509.66	-53.97	0.00401	-54.37	0.4	HORIZONTAL	PASSED

5.5. GSM 1900 test results

Substitution method couldn't be utilized as no emissions above noise floor were found during measurements.

Peak detector

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
3759.84	-48.95	0.01274	-53.05	4.1	VERTICAL	PASSED
5639.8	-50.09	0.00979	-57.79	7.7	VERTICAL	PASSED
9278.918	-45.38	0.02897	-63.88	18.5	VERTICAL	PASSED

5.6. GSM 1900 E-GPRS (MSC9) test results

Substitution method couldn't be utilized as no emissions above noise floor were found during measurements.

Peak detector

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
3760.1	-53.57	0.0044	-57.37	3.8	HORIZONTAL	PASSED
5639.82	-51.99	0.00632	-59.69	7.7	HORIZONTAL	PASSED

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5.7. WCDMA 1900 test results

Substitution method couldn't 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 [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
3761.703	-52.29	0.0059	-56.29	4	VERTICAL	PASSED
5630.281	-51.97	0.00635	-59.67	7.7	HORIZONTAL	PASSED
7525.952	-48.12	0.01542	-61.82	13.7	HORIZONTAL	PASSED
9323.186	-44.06	0.03926	-62.56	18.5	VERTICAL	PASSED
11277.655	-44.89	0.03243	-63.39	18.5	HORIZONTAL	PASSED
13163.186	-51.47	0.00713	-62.77	11.3	HORIZONTAL	PASSED
15049.92	-50.84	0.00824	-65.24	14.4	VERTICAL	PASSED
16923.908	-49.46	0.01132	-66.16	16.7	VERTICAL	PASSED

5.8. WCDMA 850 test results

Substitution method couldn't 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 [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
1668.216	-59	0.00126	-52.2	-6.8	HORIZONTAL	PASSED
2509.709	-54.85	0.00327	-55.35	0.5	VERTICAL	PASSED
3342.585	-59.88	0.00103	-60.08	0.2	VERTICAL	PASSED
4183.437	-57.32	0.00185	-60.52	3.2	HORIZONTAL	PASSED
5016.112	-55.27	0.00297	-60.57	5.3	HORIZONTAL	PASSED
5838.968	-54.45	0.00359	-59.95	5.5	VERTICAL	PASSED
6689.238	-50.98	0.00798	-58.58	7.6	HORIZONTAL	PASSED
7518.547	-50.74	0.00843	-62.14	11.4	HORIZONTAL	PASSED
8340.762	-49.86	0.01033	-62.86	13	VERTICAL	PASSED

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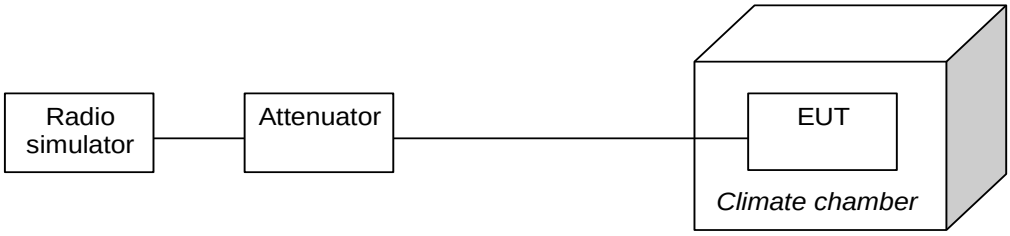
6. Frequency stability, temperature variation
(FCC §2.1055(a), RSS-133 6.3, RSS-132 4.3)

EUT with DUT number	RM-1018, DUT43175
Accessories with DUT numbers	SD-130, DUT43176
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	23 / 45 / 100.0
Date of measurements	15-May-2014
Measured by	Timo Raiskio

6.1. Test Setup



6.2. Test method and limit

The measurement is made according to applicable FCC rule parts and IC standards 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

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6.3. GSM 1900 Test results

GSM, Channel 661 / 1880.0 MHz

Temperature [ºC]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	1880.00	-7.62000	-0.0041	PASSED
40	1880.00	-7.43000	-0.004	PASSED
30	1880.00	-10.46000	-0.0056	PASSED
20	1880.00	-1.61000	-0.0009	PASSED
10	1880.00	-7.30000	-0.0039	PASSED
0	1880.00	-6.46000	-0.0034	PASSED
-10	1880.00	-10.78000	-0.0057	PASSED
-20	1880.00	-6.39000	-0.0034	PASSED
-30	1880.00	-16.14000	-0.0086	PASSED
-10	1880.00	-10.78000	-0.0057	PASSED

6.4. GSM 850 Test results

GSM, Channel 190 / 836.6 MHz

Temperature [ºC]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	836.60	-14.59000	-0.0174	PASSED
40	836.60	-9.43000	-0.0113	PASSED
30	836.60	-10.91000	-0.013	PASSED
20	836.60	-11.04000	-0.0132	PASSED
10	836.60	-9.56000	-0.0114	PASSED
0	836.60	-10.40000	-0.0124	PASSED
-10	836.60	-8.39000	-0.01	PASSED
-20	836.60	-10.65000	-0.0127	PASSED
-30	836.60	-9.23000	-0.011	PASSED

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

EUT with DUT number	RM-1018, DUT43175
Accessories with DUT numbers	SD-130, DUT43176
Operation Voltage [V] / [Hz]	3.5 / 3.7 / 4.2 VDC
Results	PASSED
Remarks	-
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	23 / 44 / 100.5
Date of measurements	14-May-2014
Measured by	Timo Raiskio

7.1. Test Setup

7.2. Test method and limit
The measurement is made according to applicable FCC rule parts and IC standards 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

7.3. GSM 1900 Test results
GSM

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	1880.00	-14.01000	-0.0075	PASSED
Battery cut-off point / 3.5	1880.00	-10.40000	-0.0055	PASSED
Nominal / 3.7	1880.00	-6.72000	-0.0036	PASSED

7.4. GSM 850 Test results
GSM

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	836.60	-11.36000	-0.0136	PASSED
Battery cut-off point / 3.5	836.60	-9.94000	-0.0119	PASSED
Nominal / 3.7	836.60	-8.33000	-0.01	PASSED

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8. Test Equipment

8.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM38112	Power supply	6632A	Agilent	22/24/27, 15C, 15E
TM38114	Power supply	6632A	Agilent	22/24/27, 15C, 15E
TM37773	Communication Tester	CMU200	R&S	22/24/27, 15B
TM30600	Impulse limiter	ESH3-Z2	R&S	15C, 15B
TM26490	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
TM26491	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
TM37610	Spectrum Analyzer	FSU26	R&S	22/24/27, 15C, 15E
TM23007	Oscilloscope	TDS684B	Tektronix	15E
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	22/24/27
2001	Bluetooth tester	CBT	R&S	15C, 15B
2009	LISN 50 µH	ENV216	R&S	15C, 15B
2010	LISN 50 µH	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
2021	Communication Tester	CMW500	R&S	22/24/27
2022	Communication Tester	CMU200	R&S	22/24/27
2023	Spectrum Analyzer	ESMI-RF	R&S	15B/15C
2024	Analyzer display unit	ESAI-D	R&S	15B/15C
2026	Signal Generator	SMF 100A	R&S	22/24/27, 15C, 15E, 15B

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8.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
-	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C
TM37678	Communication Tester	CMU200	R&S	22/24/27, 15B
TM38845	Receiver	ESIB 26	R&S	22/24/27, 15C, 15E, 15B
-	Antenna	HL562	R&S	22/24/27, 15C, 15E, 15B
-	Turntable	2188	EMCO	22/24/27, 15C, 15E, 15B
-	Turntable controller	2090	EMCO	22/24/27, 15C, 15E, 15B
-	RF system panel	OSP130	R&S	22/24/27, 15C, 15E, 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 µH	LISN-5-20-2	FCC	22/24/27, 15C, 15B
TM30644	LISN 50 µH	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
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 chamber	UNKNOWN	TDK	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	-	22/24/27, 15C, 15E, 15B
TM38066	High pass filter	WHKX3.0/18G-12SS	Wainwright	22/24/27, 15C, 15E, 15B
2028	High pass filter	WHKX 1.0/15G-12SS	Wainwright	22/24/27, 15C,15E, 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
TM23892	Controller	G-1000SDX	Yaesu	22/24/27, 15C, 15E
2001	Bluetooth tester	CBT	R&S	15C, 15B
6023	Antenna	VUBA 9117	Schwarzbeck	22/24/27
2021	Communication Tester	CMW500	R&S	22/24/27
2025	Antenna	HFH2-Z2	R&S	15C
2026	Signal Generator	SMF 100A	R&S	22/24/27, 15C, 15E, 15B
2052	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C, 15B, 15E
-	Antenna	QSH18S20	Q-Par	22/24/27, 15C, 15B, 15E
-	Antenna	QSH20S20	Q-Par	22/24/27, 15C, 15B, 15E
-	Antenna	QSH20S20	Q-Par	22/24/27, 15C, 15B, 15E

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