FCC Part 22/24 Compliance Test Report

Test Report no.:	FCC_Cellular_RM-1077_16.docx	**Date of Report:**	28-Jan-2015
Number of pages:	35	**Customer's Contact person:**	Juha Paukku
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 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-1077 / Dummy Battery SD-131 / Battery BV-5TC / Charger AC-20E / Headset WH-108**		
FCC ID:	PYARM-1077	**IC:**	-
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-133 (Issue 6, January 2013), RSS-132 (Issue 3, January 2013). 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 2015.01.28 15:41:02 +02'00'	

Hannu Soderholm, Specialist, EMC

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

Date of receipt	03-Dec-2014
Testing completed	
The customer's contact person	Juha Paukku
Test Plan referred to	T:\Projects\RM-1077\TestPlan\RS_testplan_RM-1077.xlsm
Notes	-
Document name	T:\Projects\RM-1077\EMC\FCC_Cellular_RM-1077_16.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-1077	004402740214303	1520	-	02149.00000.14441.39000	43247
Dummy Battery	SD-131	-	V.1	-	-	43233
AC charger	AC-20E	486867341135112686 5;0675628	-	-	-	43140
Headset	WH-108	-	4.0	4.0	-	42927
Battery	BV-5TC	-	LG HW3.0	-		43239
Phone	RM-1077	004402740216126	1520		02149.00000.14441.39000	43243
Battery	BV-T5C	-	LG HW3.0			43244
AC charger	AC-20E	409049415667071180 1;0675628	-	-	-	43229
Headset	WH-108	4235VFA	-	-	-	43230

1.2. Summary of Test Results

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
N/A	6.4	Peak to average power ratio	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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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
N/A	5.4	Peak to average power ratio	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

WCDMA2:

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
N/A	6.4	Peak to average power ratio	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	-

WCDMA5:

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
N/A	5.4	Peak to average power ratio	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	-

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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CONTENTS

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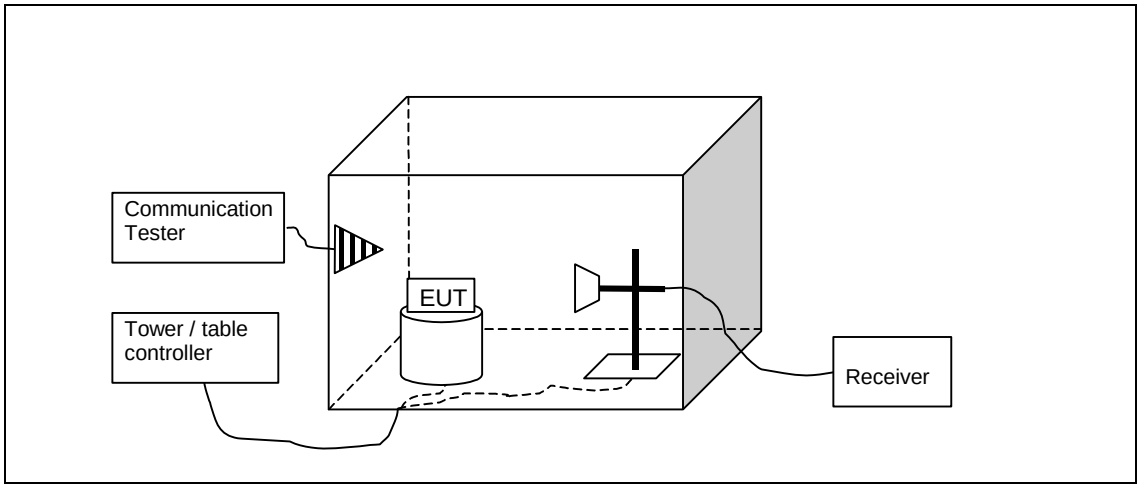
2. Radiated RF output power
(FCC §22.913(a), §24.232(b), RSS-132 4.4, RSS-133 6.4)

EUT with DUT number	RM-1077, DUT 43243
Accessories with DUT numbers	BV-T5C, DUT 43244 ; AC-20E, DUT 43229 ; WH-108, DUT 43230
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	21 / 42 / 99.2
Date of measurements	12-Dec-2014
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:

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

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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2.3. GSM 850 test results

RMS detector

Channel / f_C [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
128 / 824.2	29.28	0.847	-3	32.28	HORIZONTAL	PASSED
190 / 836.6	30.38	1.091	-1.25	31.63	HORIZONTAL	PASSED
251 / 848.8	29.48	0.888	-1.33	30.81	VERTICAL	PASSED

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

RMS detector

Channel / f_C [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
128 / 824.2	26.2	0.417	-6.13	32.33	VERTICAL	PASSED
190 / 836.6	26.84	0.483	-4.79	31.63	VERTICAL	PASSED
251 / 848.8	28.75	0.75	-2.06	30.81	VERTICAL	PASSED

2.5. GSM 1900 test results

RMS detector

Channel / f_C [MHz]	EIRP [dBm]	EIRP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
512 / 1850.2	32.9	1.948	-9.87	42.77	HORIZONTAL	PASSED
661 / 1880	32.26	1.681	-10.5	42.76	HORIZONTAL	PASSED
810 / 1909.8	32.6	1.819	-10.31	42.91	HORIZONTAL	PASSED

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

RMS detector

Channel / f_C [MHz]	EIRP [dBm]	EIRP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
512 / 1850.2	28.4	0.692	-14.37	42.77	HORIZONTAL	PASSED
661 / 1880	28.05	0.639	-14.71	42.76	HORIZONTAL	PASSED
810 / 1909.8	28.44	0.699	-14.47	42.91	HORIZONTAL	PASSED

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2.7. WCDMA2 test results

RMS detector

Channel / f_C [MHz]	EIRP [dBm]	EIRP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
9262 / 1852.4	25.26	0.336	-17.53	42.79	HORIZONTAL	PASSED
9400 / 1880	24.96	0.314	-17.8	42.76	HORIZONTAL	PASSED
9538 / 1907.6	25.92	0.391	-16.93	42.85	HORIZONTAL	PASSED

2.8. WCDMA5 test results

RMS detector

Channel / f_C [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
4132 / 826.4	20.93	0.124	-11.55	32.48	VERTICAL	PASSED
4175 / 835	20.91	0.123	-11.02	31.93	VERTICAL	PASSED
4233 / 846.6	20.12	0.103	-10.67	30.79	VERTICAL	PASSED

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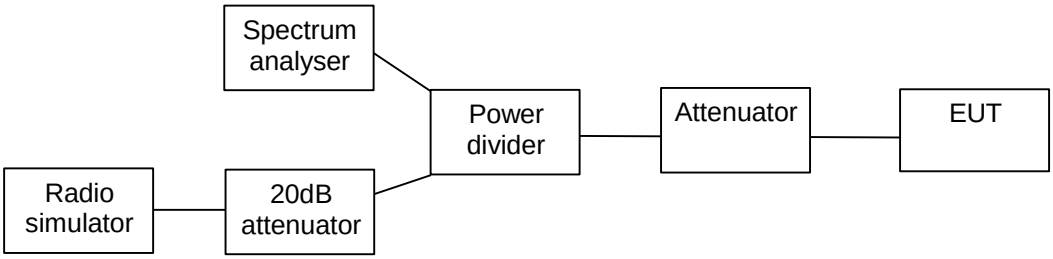
3. Peak to average power ratio
(FCC N/A, RSS-133 6.4, RSS-132 5.4)

EUT with DUT number	RM-1077, DUT 43247
Accessories with DUT numbers	DUT 43233 ; AC-20E, DUT ; WH-108, DUT
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	25 / 41 / 99.8
Date of measurements	16-Dec-2014
Measured by	Hannu Söderholm

3.1. Test Setup



3.2. Test method and limit

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

Limits for Peak to average power ratio measurements

Peak to average power ratio [dB]
≤ 13

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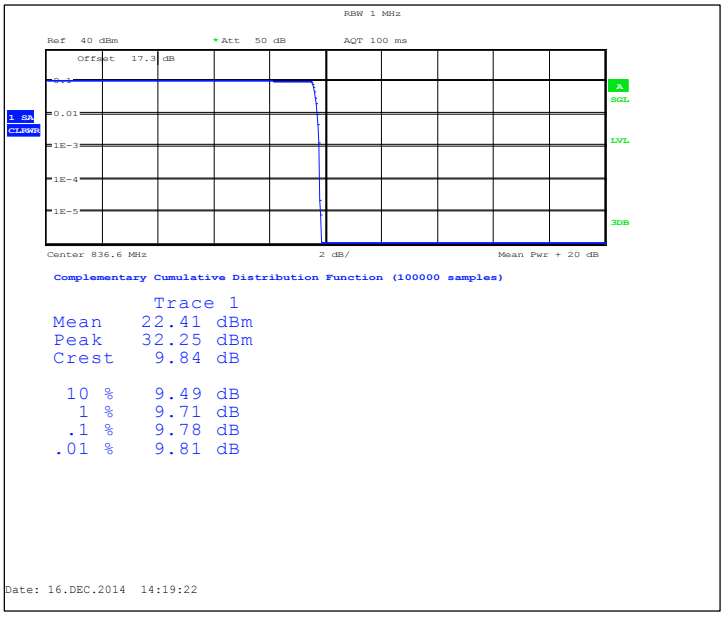
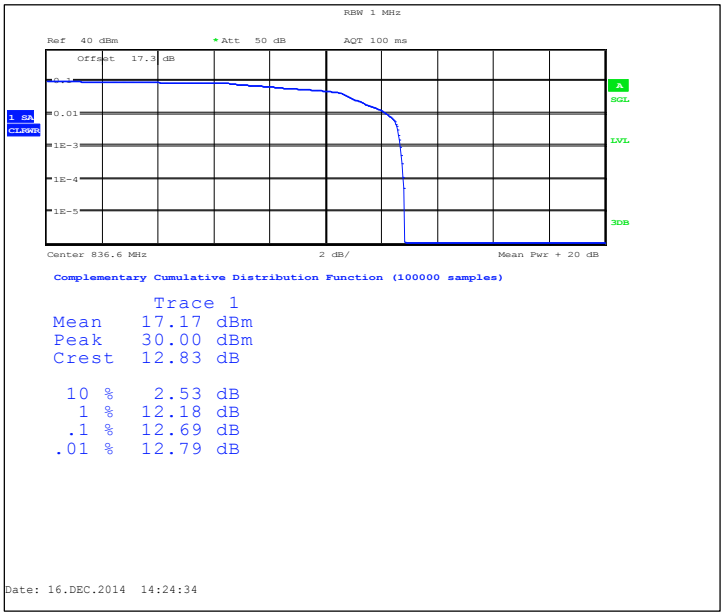
3.3. GSM 850 Test results

Operation mode (TX on)	Channel / f_C [MHz]	Peak to average power ratio [dB]	Result
GSM	190 / 836.6	9.84	PASSED
EGPRS	190 / 836.6	12.83	PASSED

GSM



EGPRS



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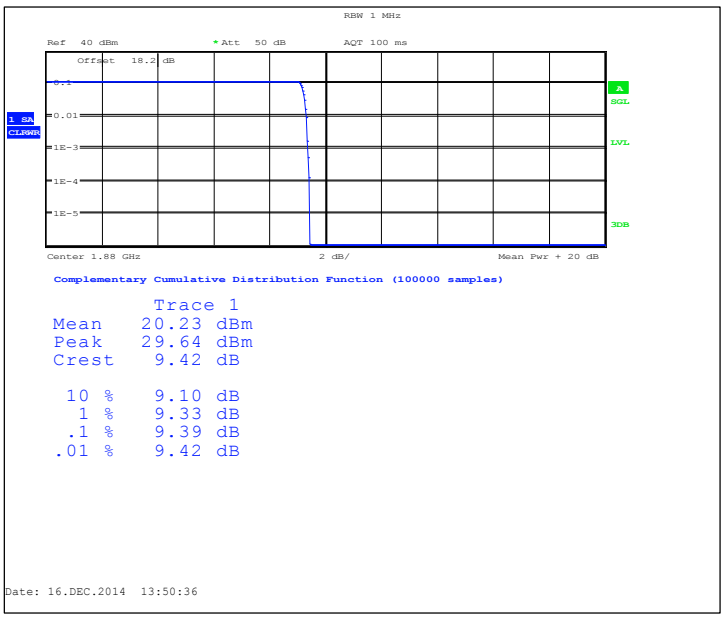
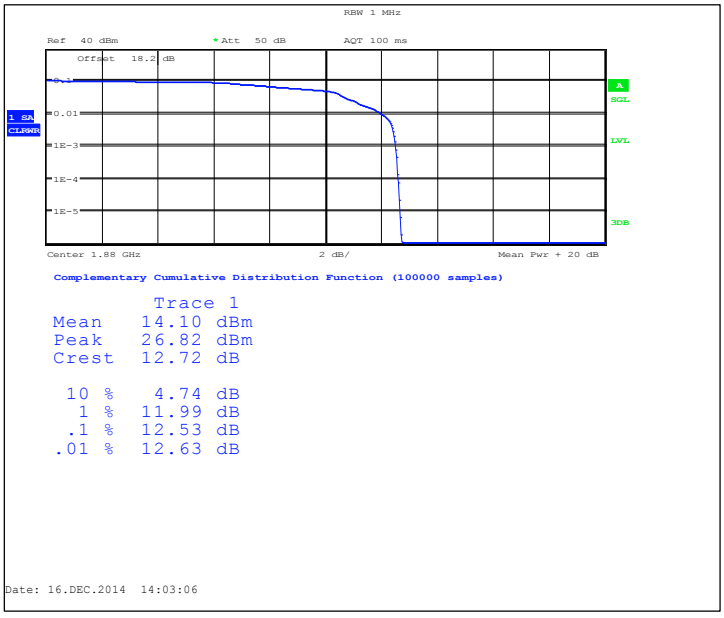
3.4. GSM 1900 Test results

Operation mode (TX on)	Channel / f_C [MHz]	Peak to average power ratio [dB]	Result
GSM	661 / 1880.0	9.42	PASSED
EGPRS	661 / 1880.0	12.72	PASSED

GSM



EGPRS



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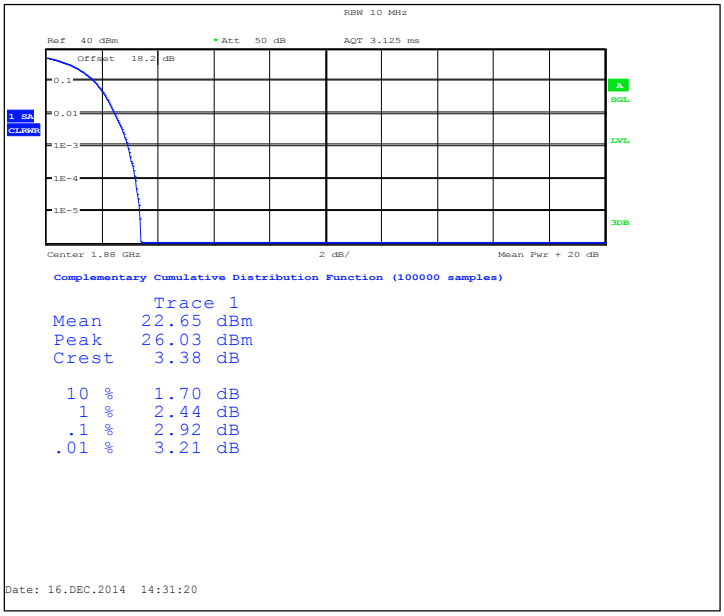
3.5. WCDMA2 Test results

Operation mode (TX on)	Channel / f_C [MHz]	Peak to average power ratio [dB]	Result
FDD	9400 / 1880.0	3.38	PASSED

FDD



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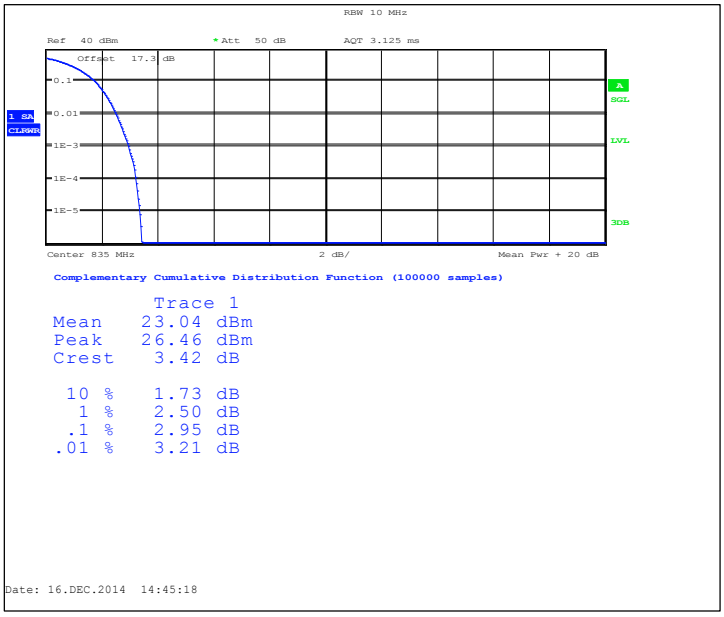
3.6. WCDMA5 Test results

Operation mode (TX on)	Channel / f_C [MHz]	Peak to average power ratio [dB]	Result
FDD	4175 / 835.0	3.42	PASSED

FDD



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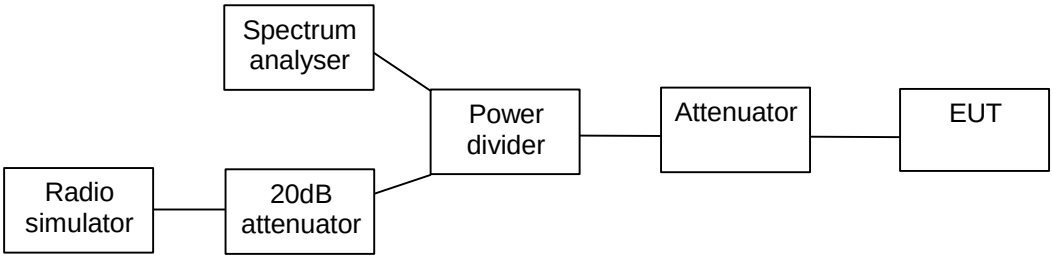
4. 99 % occupied bandwidth

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

EUT with DUT number	RM-1077, DUT 43247
Accessories with DUT numbers	DUT 43233 ; AC-20E, DUT ; WH-108, DUT
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	25 / 41 / 99.8
Date of measurements	16-Dec-2014
Measured by	Hannu Söderholm

4.1. Test Setup



4.2. Test method and limit

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

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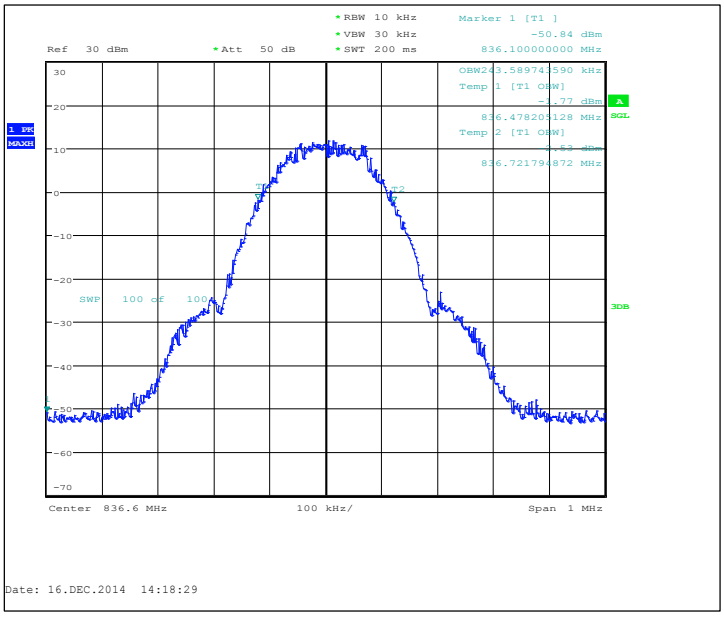
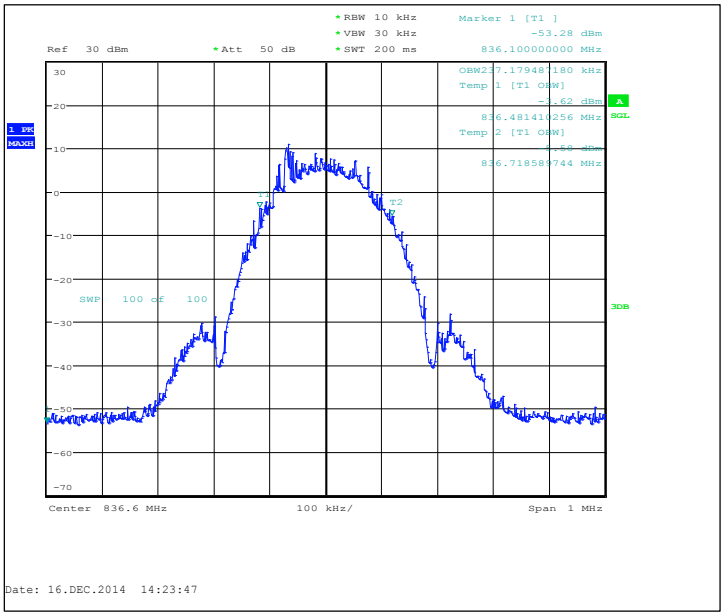
4.3. GSM 850 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
GSM	243.6
EGPRS	237.2

GSM, Channel 190 / 836.6 MHz



EGPRS, Channel 190 / 836.6 MHz



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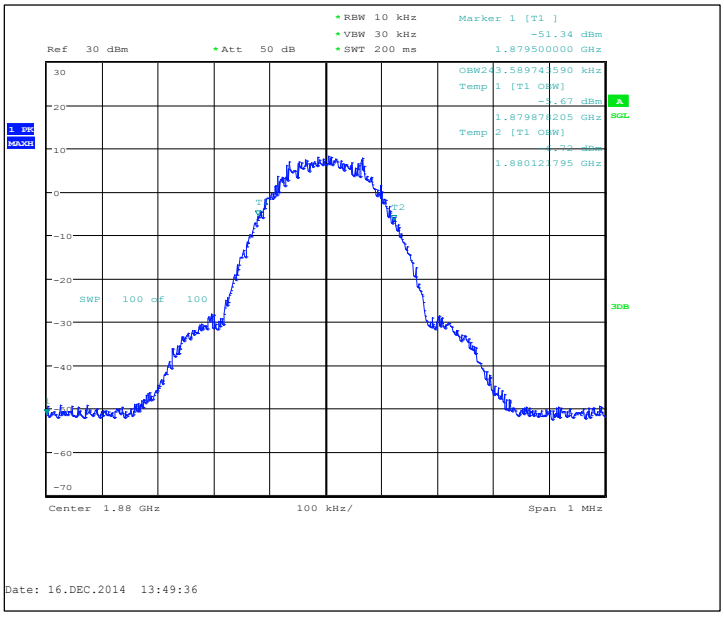
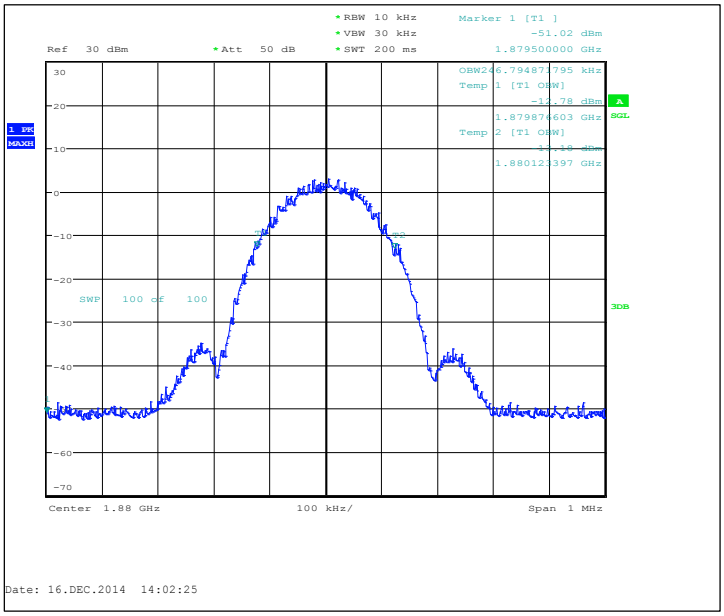
4.4. GSM 1900 Test results

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

GSM, Channel 661 / 1880.0 MHz



EGPRS, Channel 661 / 1880.0 MHz



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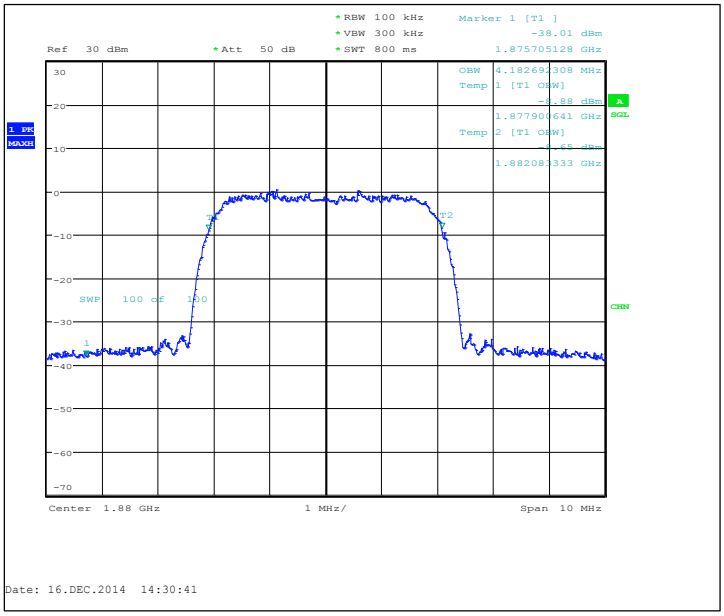
4.5. WCDMA2 Test results

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

FDD, Channel 9400 / 1880.0 MHz



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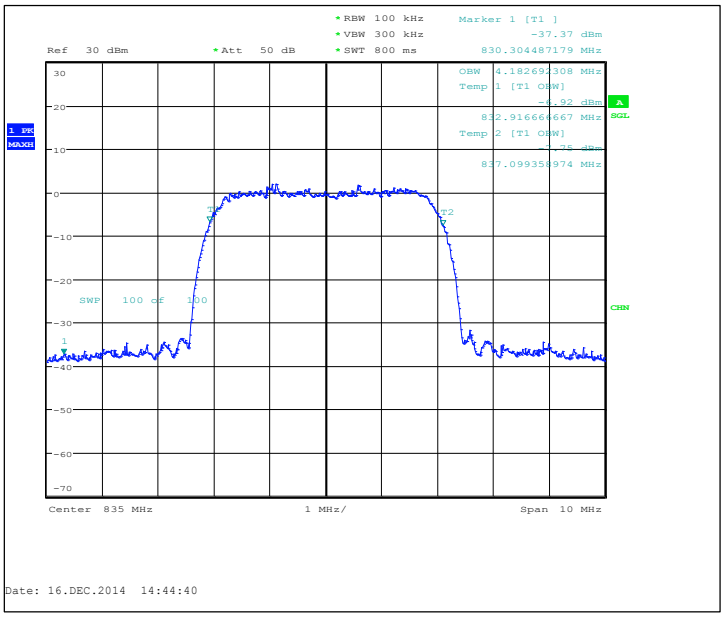
4.6. WCDMA5 Test results

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

FDD, Channel 4175 / 835.0 MHz



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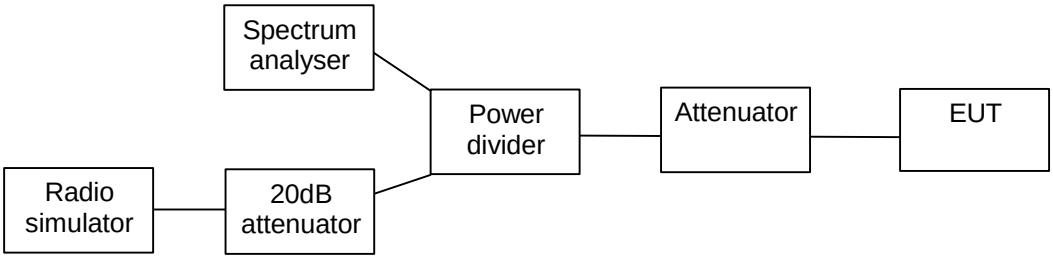
5. Band edge compliance

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

EUT with DUT number	RM-1077, DUT 43247
Accessories with DUT numbers	DUT 43233 ; AC-20E, DUT ; WH-108, DUT
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	25 / 41 / 99.8
Date of measurements	16-Dec-2014
Measured by	Hannu Söderholm

5.1. Test Setup



5.2. 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
WCDMA2	Below 1850 and above 1910	-13
WCDMA5	Below 824 and above 849	-13

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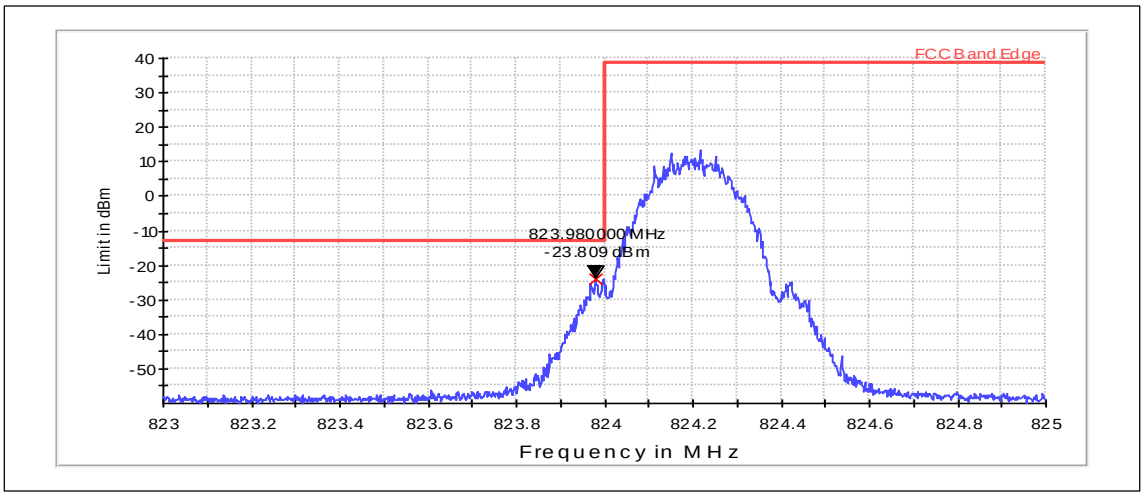
5.3. GSM 850 Test results

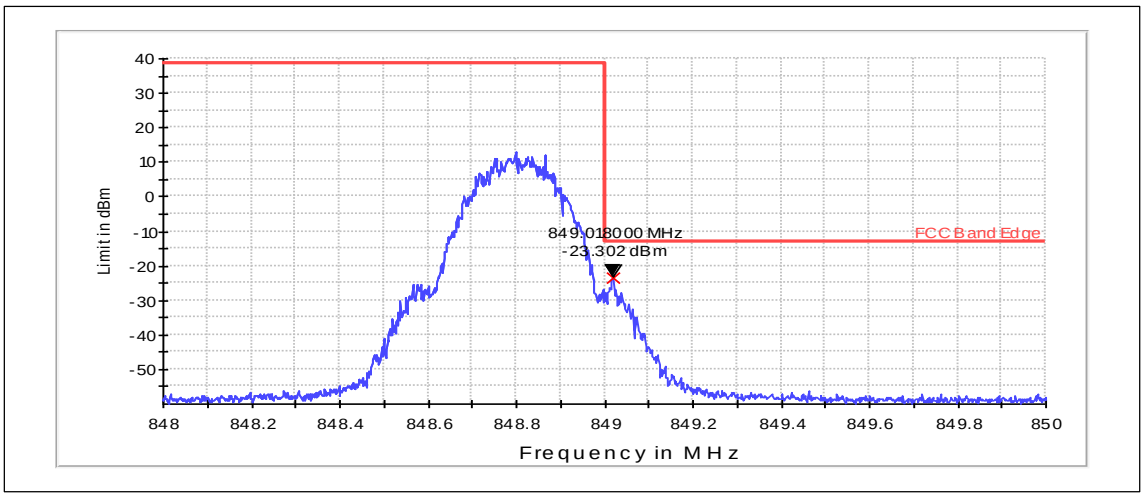
Channel 128 / 824.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	823.980	-23.81	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	849.018	-23.30	PASSED

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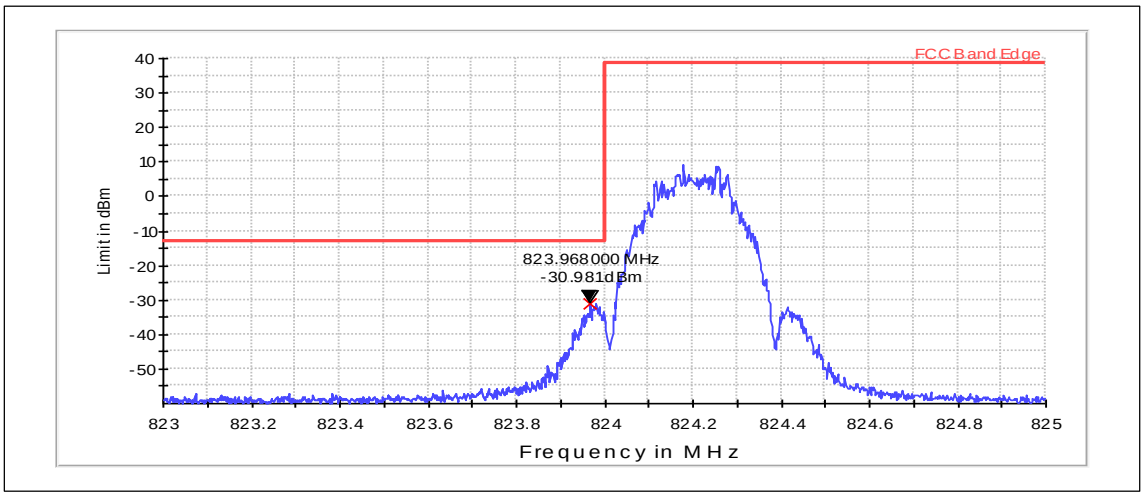
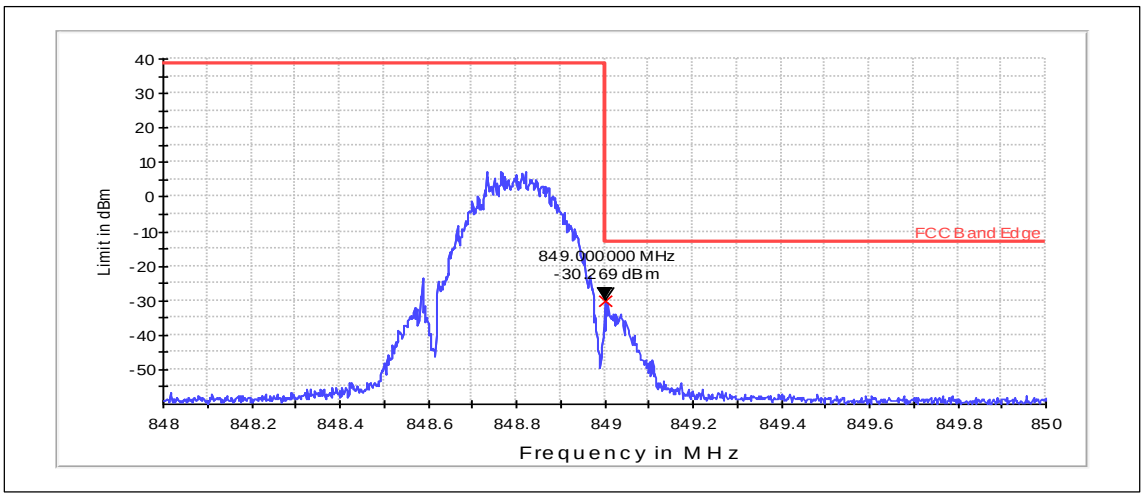
Channel 128 / 824.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	823.968	-30.98	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	849.000	-30.27	PASSED

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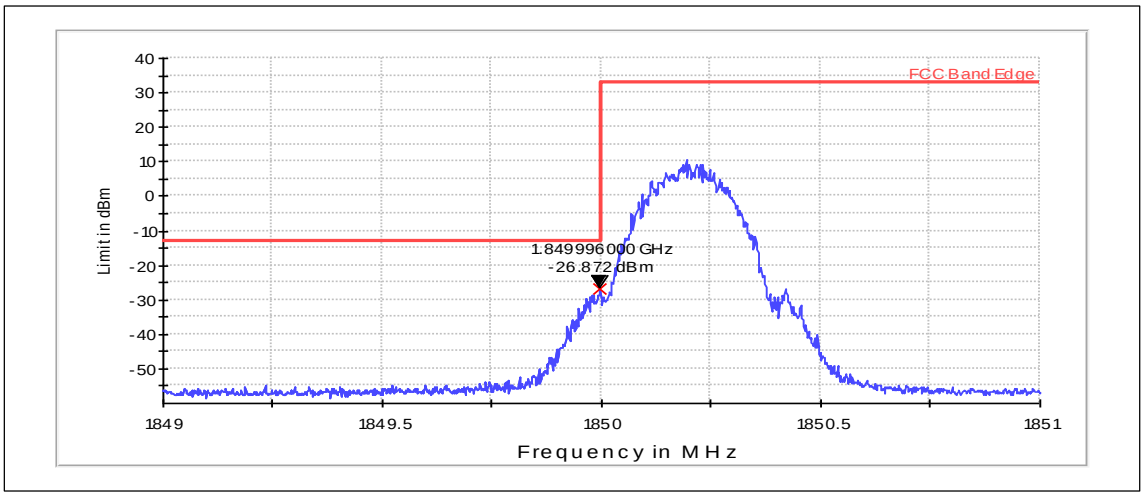
5.4. GSM 1900 Test results

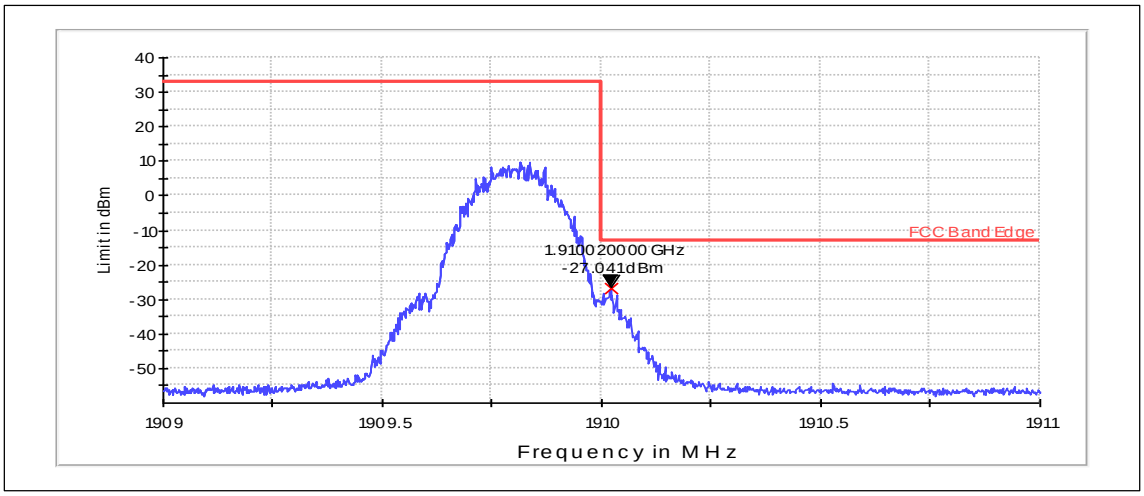
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	1849.996	-26.87	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	1910.020	-27.04	PASSED

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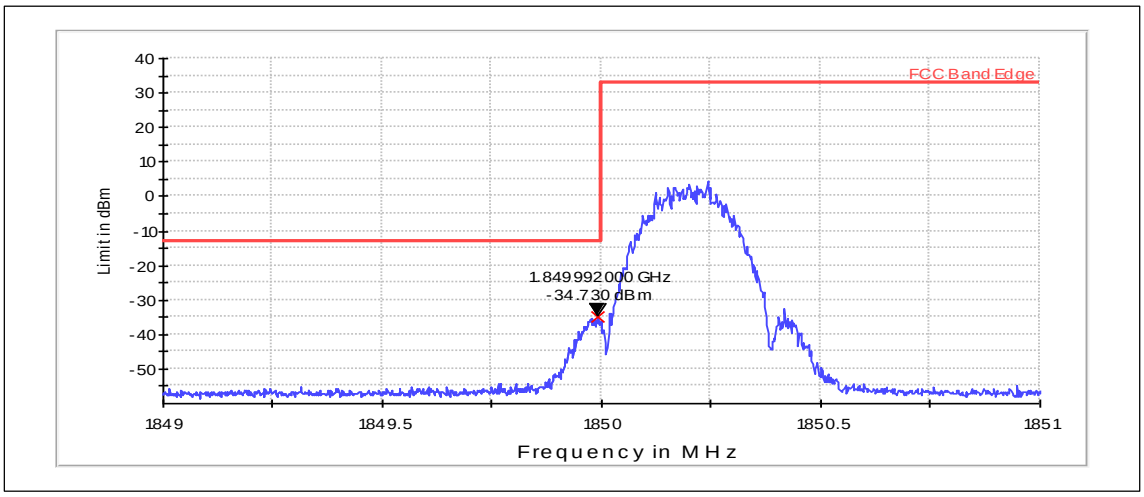
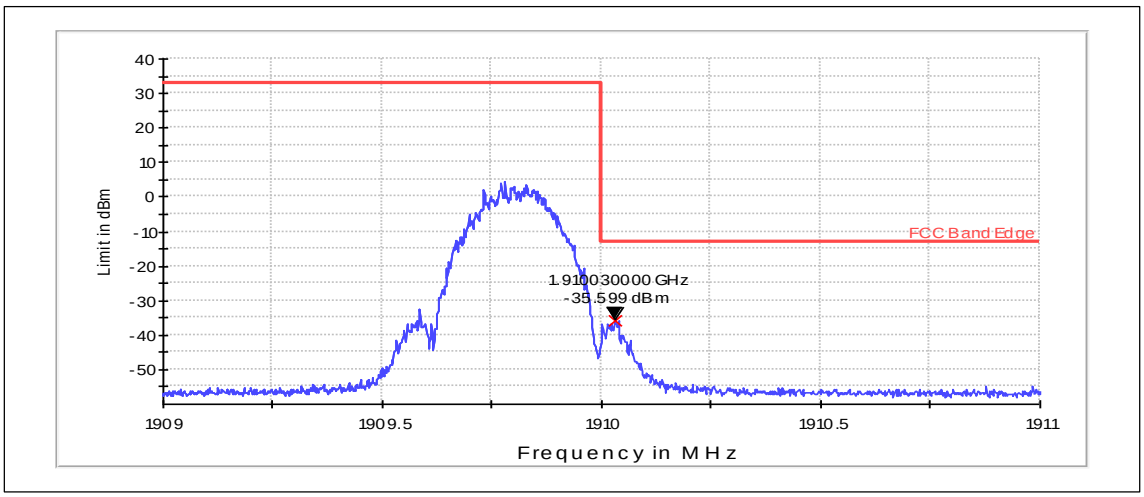
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	1849.992	-34.73	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	1910.030	-35.60	PASSED

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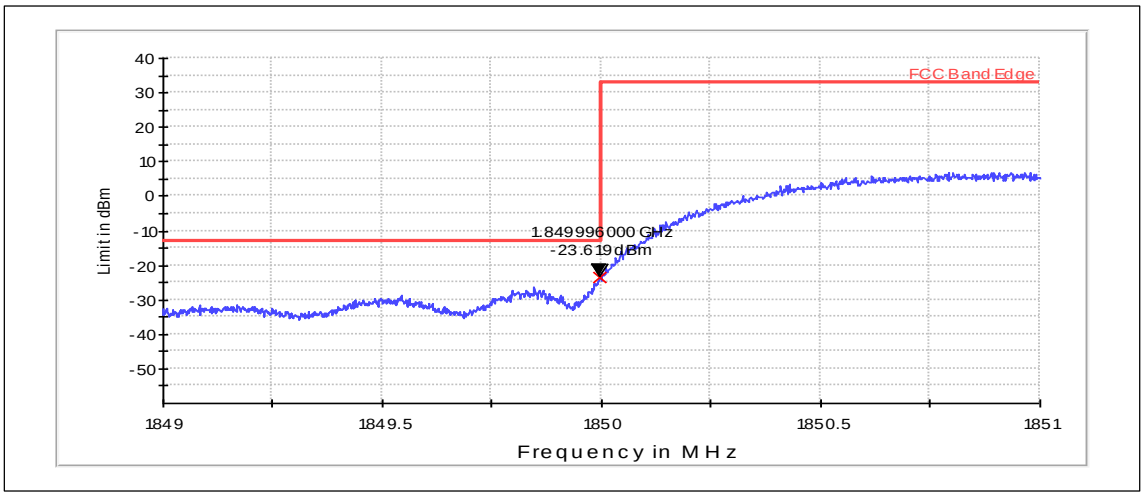
5.5. WCDMA2 Test results

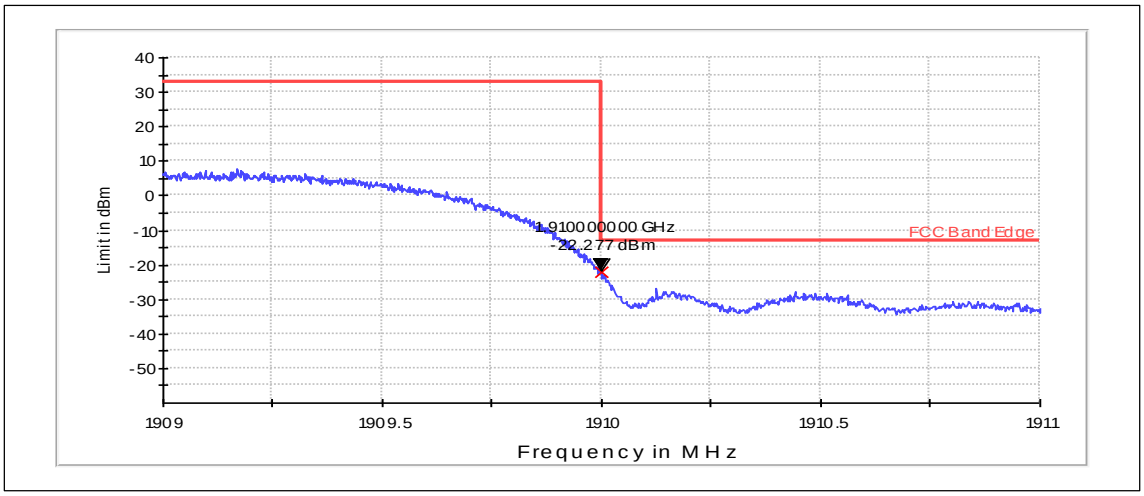
Channel 9262 / 1852.4 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1849.996	-23.62	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	-22.28	PASSED

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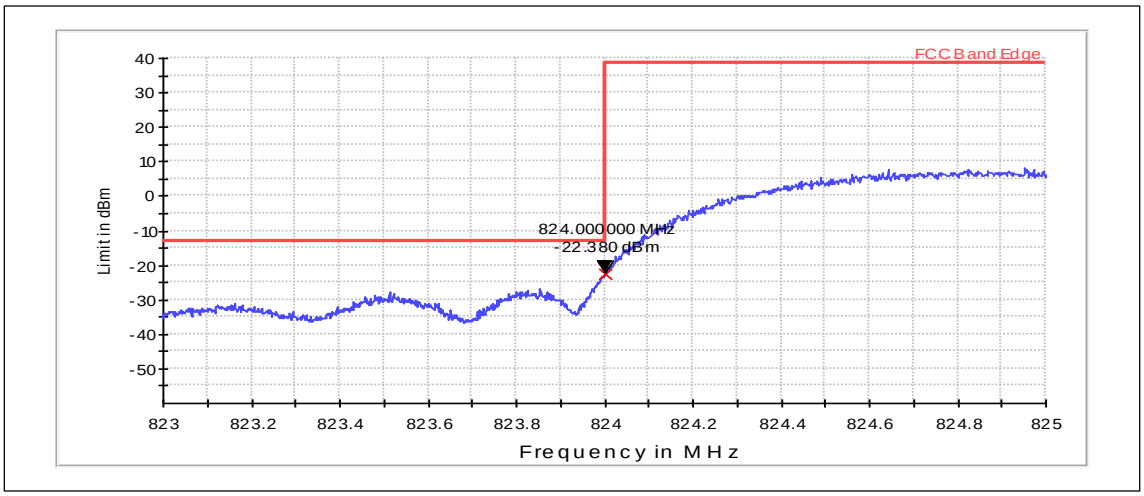
5.6. WCDMA5 Test results

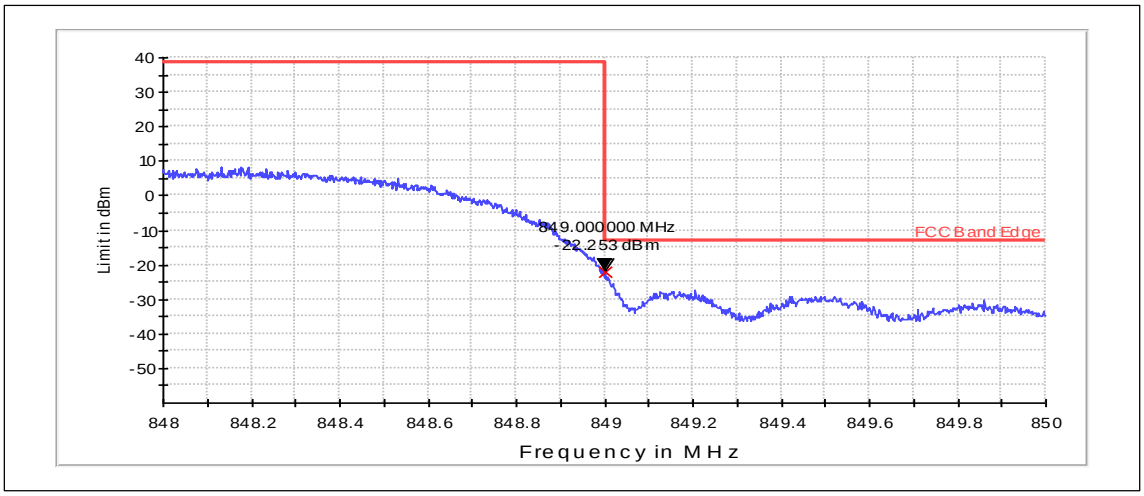
Channel 4132 / 826.4 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	824.000	-22.38	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	-22.25	PASSED

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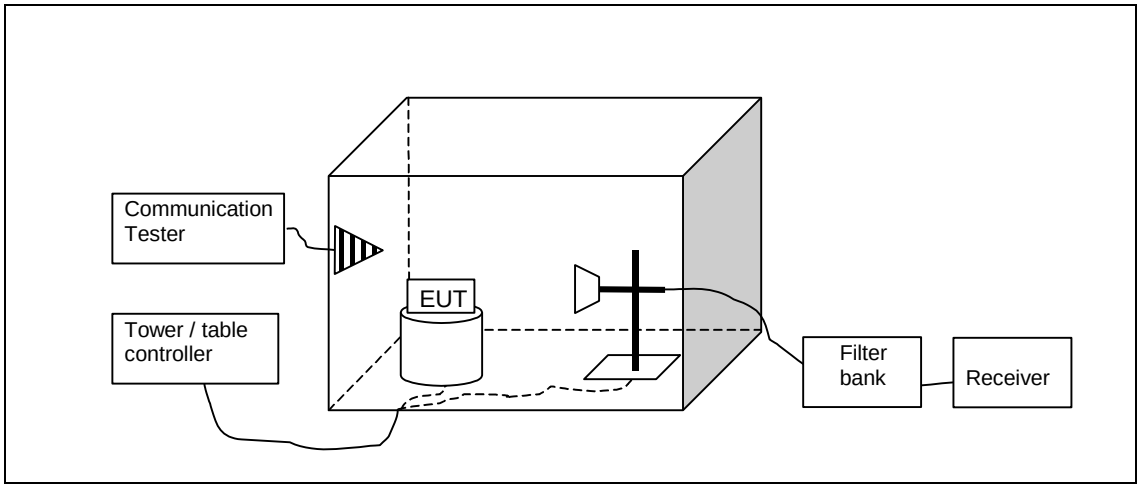
6. Spurious radiated emissions

(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-1077, DUT 43243
Accessories with DUT numbers	BV-T5C, DUT 43244 ; AC-20E, DUT 43229 ; WH-108, DUT 43230
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 42 / 99.2
Date of measurements	12-Dec-2014
Measured by	Timo Raiskio

6.1.1 Test setup



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6.2. 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 measurement is made up to 10th harmonic of the EUT highest TX channel.
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
WCDMA2	30 - 19100	-13
WCDMA5	30 - 8500	-13

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6.3. GSM 850 test results

Channel 190 / 836.6 MHz

Peak detector

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
1673.146	-41.29	0.0743	-34.59	-6.7	HORIZONTAL	PASSED
1673.146	-41.09	0.0778	-34.49	-6.6	VERTICAL	PASSED
1673.226	-40.88	0.08166	-34.28	-6.6	VERTICAL	PASSED
2509.9	-42.73	0.05333	-43.03	0.3	VERTICAL	PASSED
2510.02	-42.87	0.05164	-43.17	0.3	VERTICAL	PASSED
3346.453	-51.81	0.00659	-52.51	0.7	VERTICAL	PASSED

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

Channel 190 / 836.6 MHz

Peak detector

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
1673.22	-42.66	0.0542	-36.06	-6.6	VERTICAL	PASSED
2509.74	-48.62	0.01374	-48.92	0.3	VERTICAL	PASSED

6.5. GSM 1900 test results

Channel 661 / 1880.0 MHz

Peak detector

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
5635.431	-52.19	0.00604	-60.39	8.2	HORIZONTAL	PASSED
7527.214	-48.7	0.01349	-63.1	14.4	VERTICAL	PASSED
9301.283	-45.27	0.02972	-64.17	18.9	HORIZONTAL	PASSED
9321.443	-44.64	0.03436	-63.74	19.1	VERTICAL	PASSED
9449.699	-44.5	0.03548	-62.1	17.6	HORIZONTAL	PASSED
10571.543	-44.31	0.03707	-62.81	18.5	VERTICAL	PASSED

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

Channel 661 / 1880.0 MHz

Peak detector

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
3760.14	-52.98	0.00504	-57.48	4.5	HORIZONTAL	PASSED
5640.902	-52.11	0.00615	-60.31	8.2	HORIZONTAL	PASSED

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6.7. WCDMA2 test results

Channel 9400 / 1880.0 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
3757.695	-42.67	0.05408	-47.17	4.5	VERTICAL	PASSED
3762.385	-41.31	0.07396	-45.81	4.5	HORIZONTAL	PASSED
3762.425	-41.25	0.07499	-45.75	4.5	HORIZONTAL	PASSED
5633.687	-51.41	0.00723	-59.61	8.2	HORIZONTAL	PASSED
7523.667	-48.02	0.01578	-62.22	14.2	VERTICAL	PASSED
7531.162	-48.61	0.01377	-63.11	14.5	VERTICAL	PASSED
9279.78	-43.97	0.04009	-63.57	19.6	VERTICAL	PASSED
9396.894	-44.59	0.03475	-63.09	18.5	VERTICAL	PASSED
9959.82	-45.68	0.02704	-63.58	17.9	HORIZONTAL	PASSED
11272.806	-44.1	0.0389	-62.9	18.8	HORIZONTAL	PASSED
13163.387	-52.09	0.00618	-63.69	11.6	VERTICAL	PASSED
15046.834	-50.7	0.00851	-65.1	14.4	VERTICAL	PASSED
16920.18	-50.28	0.00938	-66.78	16.5	VERTICAL	PASSED

6.8. WCDMA5 test results

Channel 4175 / 835.0 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
821.999	-46.9	0.02042	-79.2	32.3	VERTICAL	PASSED
848.302	-49.18	0.01208	-79.98	30.8	VERTICAL	PASSED
848.47	-47.82	0.01652	-78.22	30.4	HORIZONTAL	PASSED
1000.802	-62.68	0.00054	-52.48	-10.2	VERTICAL	PASSED
1665.17	-58.8	0.00132	-52	-6.8	VERTICAL	PASSED
2502.745	-54.73	0.00337	-54.63	-0.1	HORIZONTAL	PASSED
2506.593	-54.64	0.00344	-54.74	0.1	VERTICAL	PASSED
2514.399	-53.3	0.00468	-53.9	0.6	VERTICAL	PASSED
3347.675	-59.82	0.00104	-60.52	0.7	VERTICAL	PASSED
4176.824	-57.71	0.00169	-61.31	3.6	VERTICAL	PASSED
5011.503	-54.81	0.0033	-60.81	6	VERTICAL	PASSED
5841.934	-53.3	0.00468	-59.3	6	VERTICAL	PASSED
6672.685	-50.86	0.0082	-59.16	8.3	VERTICAL	PASSED
7514.86	-51.24	0.00752	-62.74	11.5	VERTICAL	PASSED
8347.615	-50.18	0.00959	-63.68	13.5	VERTICAL	PASSED

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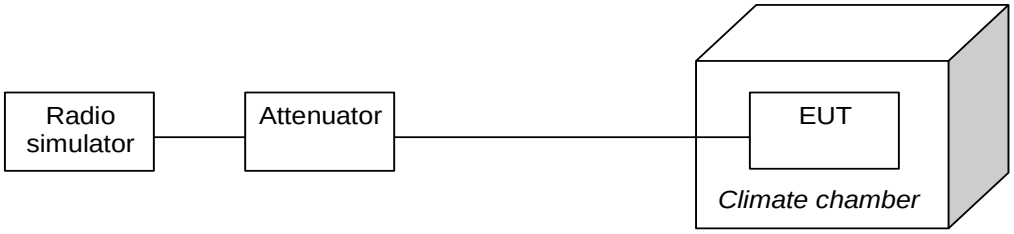
7. Frequency stability, temperature variation
(FCC §2.1055(a), RSS-133 6.3, RSS-132 4.3)

EUT with DUT number	RM-1077, DUT 43247
Accessories with DUT numbers	AC-20E, DUT 43140 ; WH-108, DUT 42927 ; BV-5TC, DUT 43239
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	-20 to 50
Date of measurements	16-Dec-2014
Measured by	Hannu Söderholm

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 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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7.3. GSM 1900 Test results

GSM, Channel 661 / 1880.0 MHz

Temperature [ºC]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	1880.00	-1.42000	-0.0008	PASSED
40	1880.00	-12.07000	-0.0064	PASSED
30	1880.00	-13.69000	-0.0073	PASSED
20	1880.00	-17.56000	-0.0093	PASSED
10	1880.00	-10.98000	-0.0058	PASSED
0	1880.00	-9.62000	-0.0051	PASSED
-10	1880.00	-8.20000	-0.0044	PASSED
-20	1880.00	-7.49000	-0.004	PASSED
-30	1880.00	-4.65000	-0.0025	PASSED

7.4. GSM 850 Test results

GSM, Channel 190 / 836.6 MHz

Temperature [ºC]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	836.60	-5.29000	-0.0063	PASSED
40	836.60	-7.36000	-0.0088	PASSED
30	836.60	-12.20000	-0.0146	PASSED
20	836.60	-15.95000	-0.0191	PASSED
10	836.60	-12.40000	-0.0148	PASSED
0	836.60	-15.05000	-0.018	PASSED
-10	836.60	-13.62000	-0.0163	PASSED
-20	836.60	-9.56000	-0.0114	PASSED
-30	836.60	-5.29000	-0.0063	PASSED

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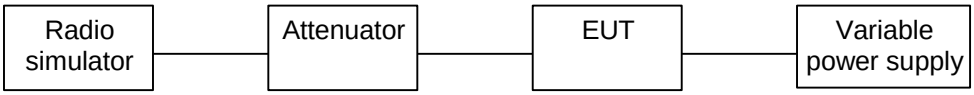
8. Frequency stability, voltage variation
(FCC §2.1055(d), RSS-133 6.3, RSS-132 4.3)

EUT with DUT number	RM-1077, DUT 43247
Accessories with DUT numbers	SD-131, DUT 43233 ; AC-20E, DUT 43140 ; WH-108, DUT 42927 ; BV-5TC, DUT 43239
Operation Voltage [V] / [Hz]	3.5 / 3.8 / 4.35
Results	PASSED
Remarks	-
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	25 / 41 / 99.2
Date of measurements	17-Dec-2014
Measured by	Hannu Söderholm

8.1. Test Setup



8.2. 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

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8.3. GSM 850 Test results

GSM,

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.3	836.60	-8.65000	-0.0103	PASSED
Battery cut-off point / 3.5	836.60	-8.07000	-0.0096	PASSED
Nominal / 3.8	836.60	-10.40000	-0.0124	PASSED

8.4. GSM 1900 Test results

GSM,

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.3	1880.00	-19.63000	-0.0104	PASSED
Battery cut-off point / 3.5	1880.00	-13.88000	-0.0074	PASSED
Nominal / 3.8	1880.00	-11.17000	-0.0059	PASSED

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9. Test Equipment

9.1. 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
-	Bluetooth tester	CBT	R&S	15C, 15B

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9.2. 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
-	Bluetooth tester	CBT	R&S	15C, 15B

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