

FCC Part 22/24/27 Compliance Test Report

Test Report no.:	FCC_Cellular_RM-1062_03ant1	Date of Report:	16-Dec-2014
Number of pages:	40	Customer's Contact person:	Jari Rontu
Testing laboratory:	TCC Microsoft Salo Laboratory P.O.Box(86) Joensuunkatu 7E FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 71 80 44122	Customer:	Microsoft 16620 West Bernardo Drive San Diego, CA 92127 USA Tel. +1 858 831 5000 Fax. +1 858 385 1598
FCC listing no.:	533467		
IC recognition no.:	661V-1		
Tested devices/ accessories:	Phone RM-1062 / Dummy Battery SD-238R / Headset WH-108 / Battery BV-T4B / Ac-Charger AC-20E		
FCC ID:	PYARM-1062	IC:	-
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-133 (Issue 6, January 2013), RSS-132 (Issue 3, January 2013), RSS-199 (Issue 2, October 2014). 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:			

Sami Lehtonen, Specialist, EMC

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

Date of receipt	28-Oct-2014
Testing completed	14-Nov-2014
The customer's contact person	Jari Rontu
Test Plan referred to	T:\Projects\RM-1062\TestPlan\RS_Testplan_RM-1062.xlsm
Notes	-
Document name	T:\Projects\RM-1062\EMC\FCC_Cellular_RM-1062_03ant1.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-1062	004402740524446	3202		02148.00000.14431.29000	18684
Dummy Battery	SD-238R		v.1	-	-	18685
Headset	WH-108	4235VFA	-	-	-	18691
Phone	RM-1062	004402740524461	3202	-	02148.00000.14431.29000	18732
Battery	BV-T4B	4181574345C10103838;0670764	V1.0	-	-	18733
Headset	WH-108	4235VFA	-	-	-	18698
Ac-Charger	AC-20E	409049415667071145560675628	CE	-	-	18697

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	NP
§24.232(b)	6.4	Radiated RF output power	NP
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	NP
§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

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	NP
§22.913(a)	4.4	Radiated RF output power	NP
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	NP
§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

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	NP
§22.913(a)	4.4	Radiated RF output power	NP
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	NP
§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

LTE7:

Section in CFR 47	Section in RSS-GEN or RSS-199	Name of the test	Result
§2.1046(a)	4.4	Conducted RF output power	NP
§27.50(h)(2)	4.4	Radiated RF output power	NP
N/A	N/A	Peak to average power ratio	NP
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§27.53(l)	4.5(b)	Band edge compliance	PASSED
§2.1051	4.5(b)	Spurious emissions at antenna terminals	NP
§27.53(l), §2.1053	4.5(b)	Spurious radiated emissions	PASSED
§27.54	4.3	Frequency stability, temperature variation	PASSED
§27.54	4.3	Frequency stability, voltage variation	PASSED

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 Microsoft Laboratory.

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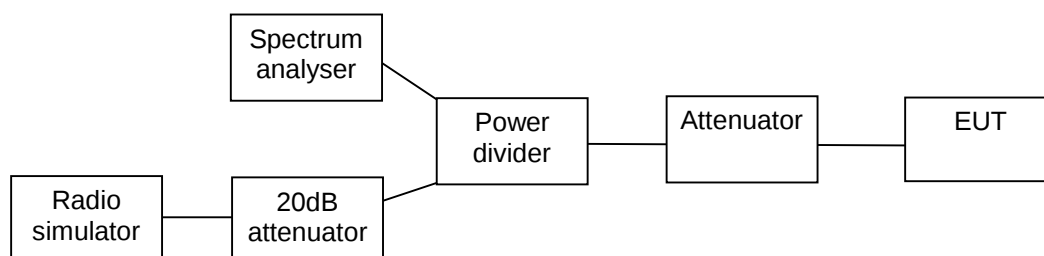
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2. Peak to average power ratio (FCC N/A, RSS-133 6.4, RSS-132 5.4)

EUT with DUT number	RM-1062, DUT 18684
Accessories with DUT numbers	SD-238R, DUT 18685 ; WH-108, DUT 18691
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	Measured from antenna 1.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 41 / 100.7
Date of measurements	29-Oct-2014
Measured by	Jari Keto

2.1. Test Setup



2.2. Test method and limit

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

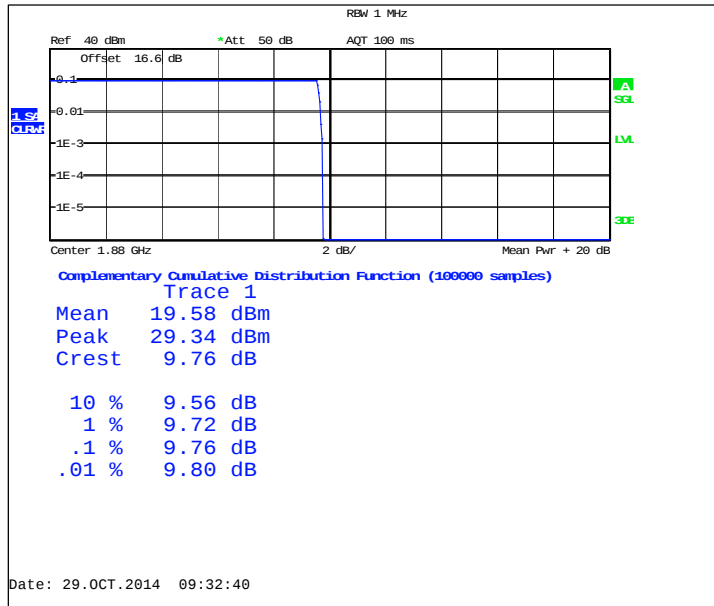
Limits for Peak to average power ratio measurements

Peak to average power ratio [dB]
≤ 13

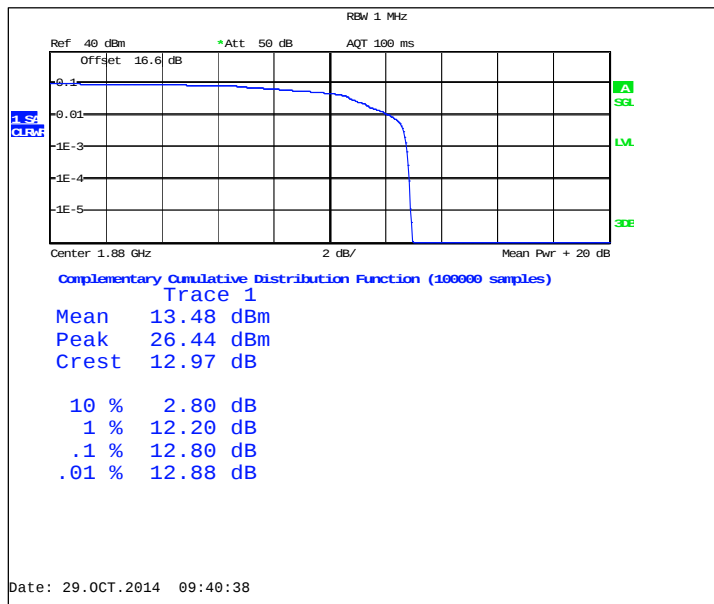
2.3. GSM 1900 Test results

Operation mode (TX on)	Channel / f _c [MHz]	Peak to average power ratio [dB]	Result
GSM	661 / 1880.0	9.76	PASSED
EGPRS	661 / 1880.0	12.97	PASSED

GSM



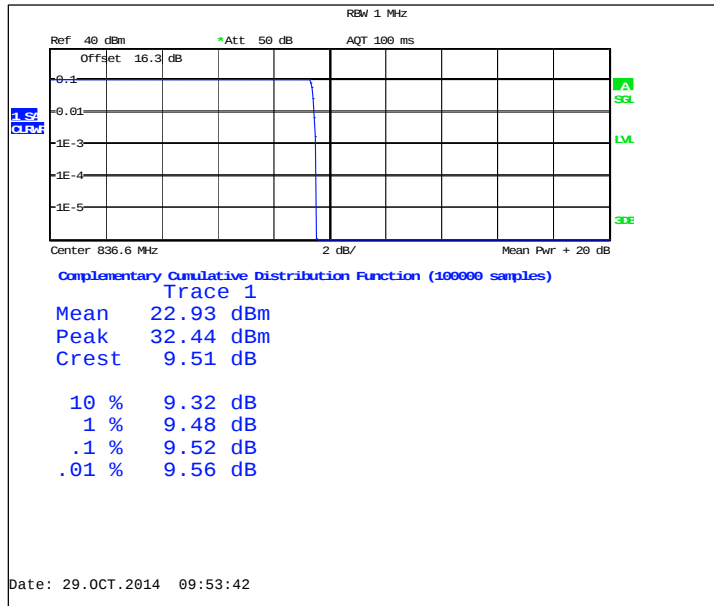
EGPRS



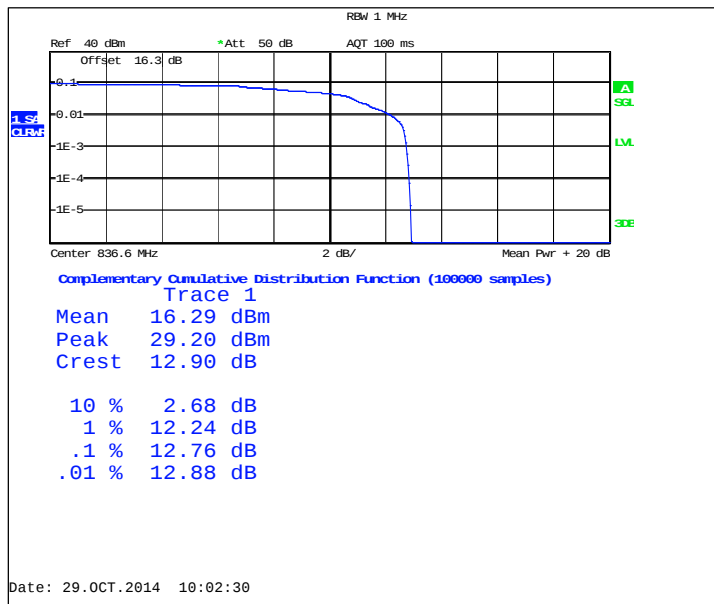
2.4. GSM 850 Test results

Operation mode (TX on)	Channel / f _c [MHz]	Peak to average power ratio [dB]	Result
GSM	190 / 836.6	9.51	PASSED
EGPRS	190 / 836.6	12.90	PASSED

GSM



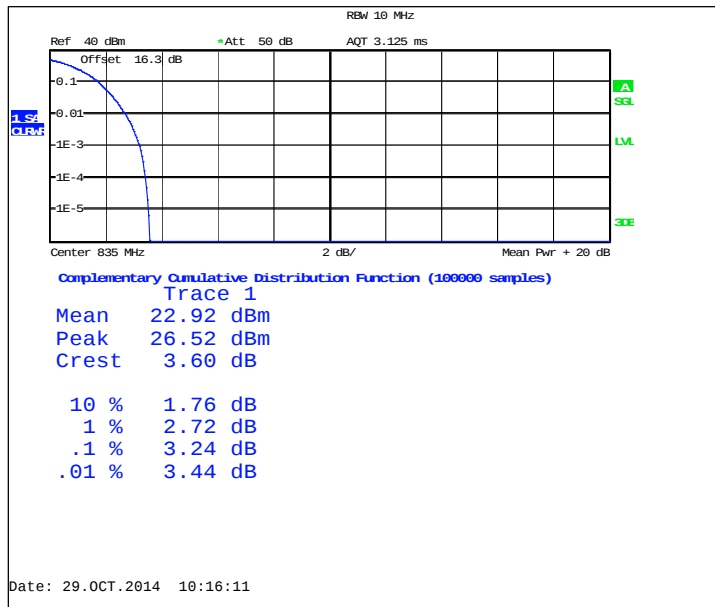
EGPRS



2.5. WCDMA5 Test results

Operation mode (TX on)	Channel / f _c [MHz]	Peak to average power ratio [dB]	Result
FDD	4175 / 835.0	3.60	PASSED

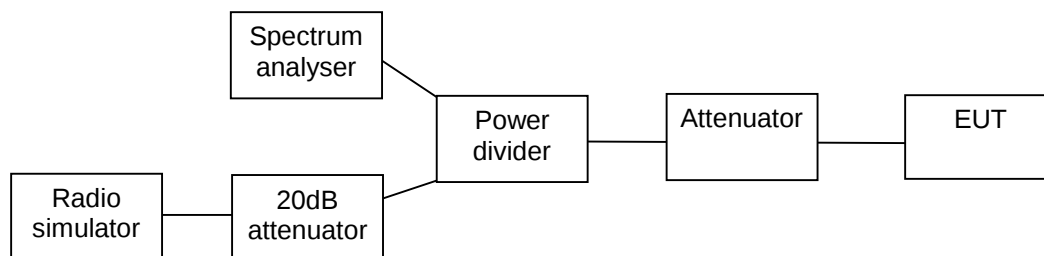
FDD



3. 99 % occupied bandwidth (FCC §2.1049(h), RSS-133 4.6.1, RSS-132 4.6.1, RSS-199 4.6.1)

EUT with DUT number	RM-1062, DUT 18684
Accessories with DUT numbers	SD-238R, DUT 18685 ; WH-108, DUT 18691
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	Measured from antenna 1.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 41 / 100.7
Date of measurements	29-Oct-2014
Measured by	Jari Keto

3.1. Test Setup



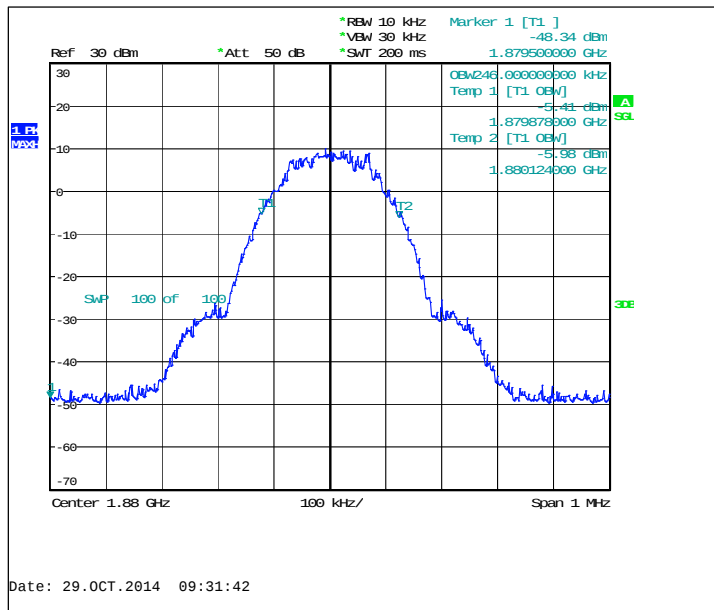
3.2. Test method and limit

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

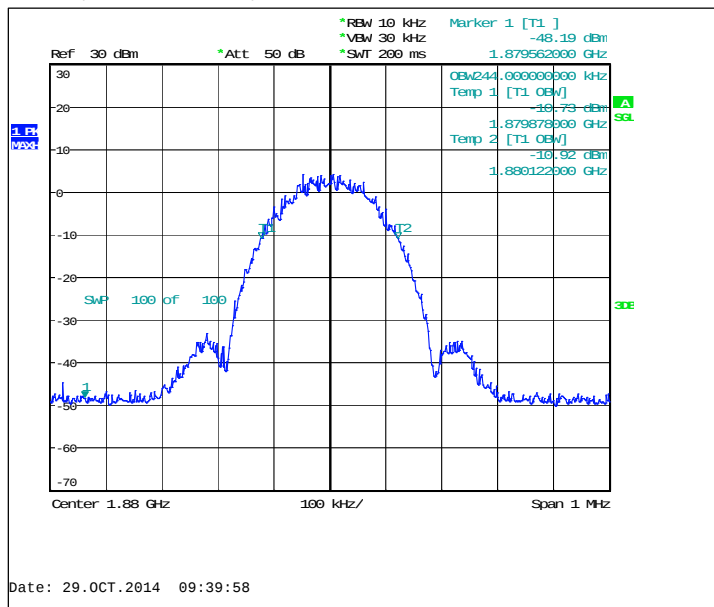
3.3. GSM 1900 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
GSM	246
EGPRS	244
GPRS	244

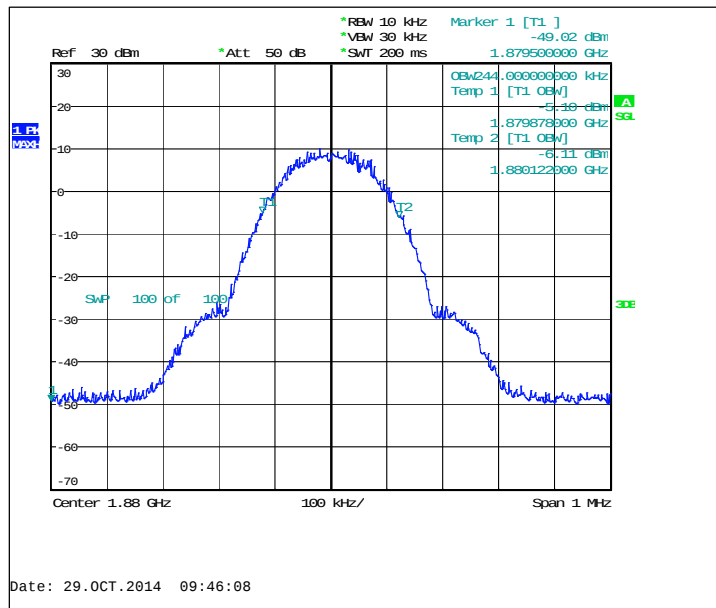
GSM, Channel 661 / 1880.0 MHz



EGPRS, Channel 661 / 1880.0 MHz



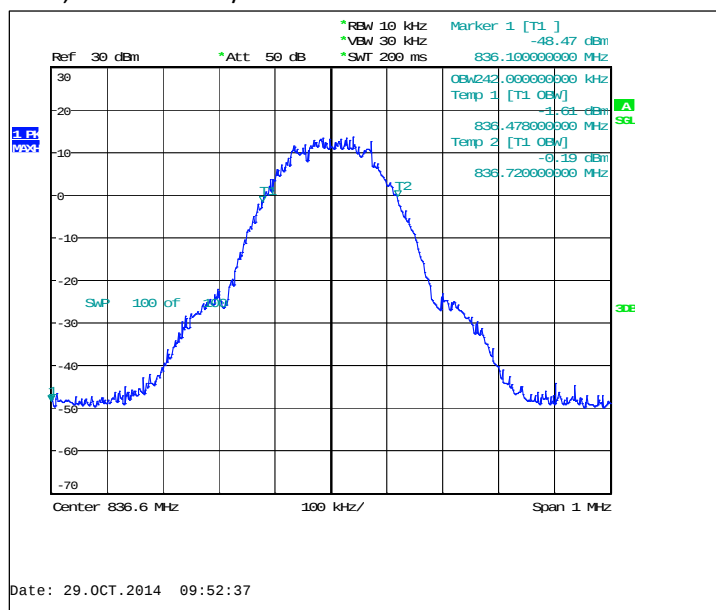
GPRS, Channel 661 / 1880.0 MHz



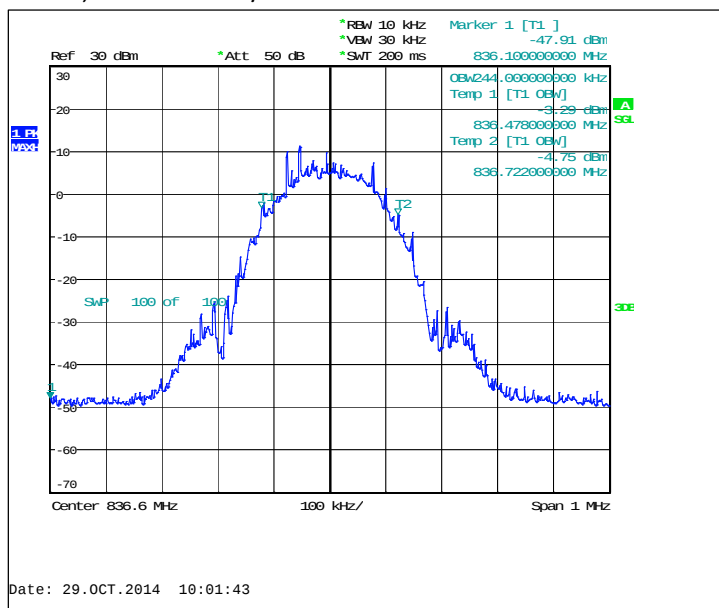
3.4. GSM 850 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
GSM	242
EGPRS	244
GPRS	244

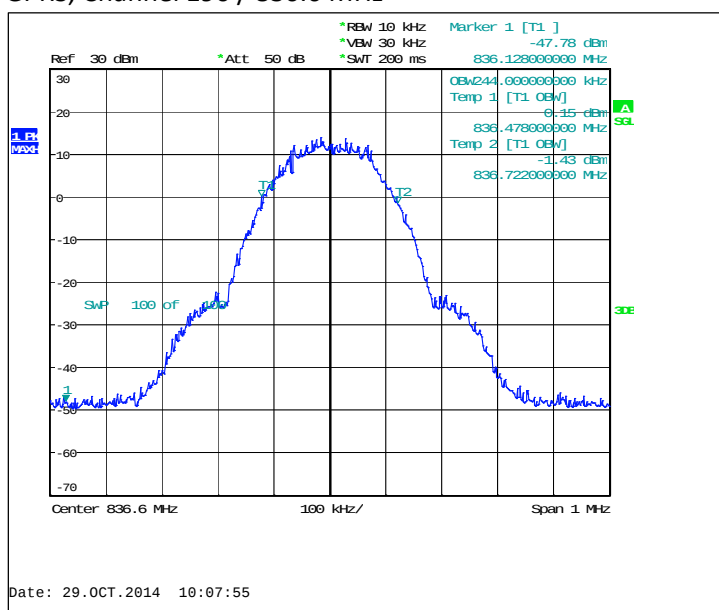
GSM, Channel 190 / 836.6 MHz



EGPRS, Channel 190 / 836.6 MHz



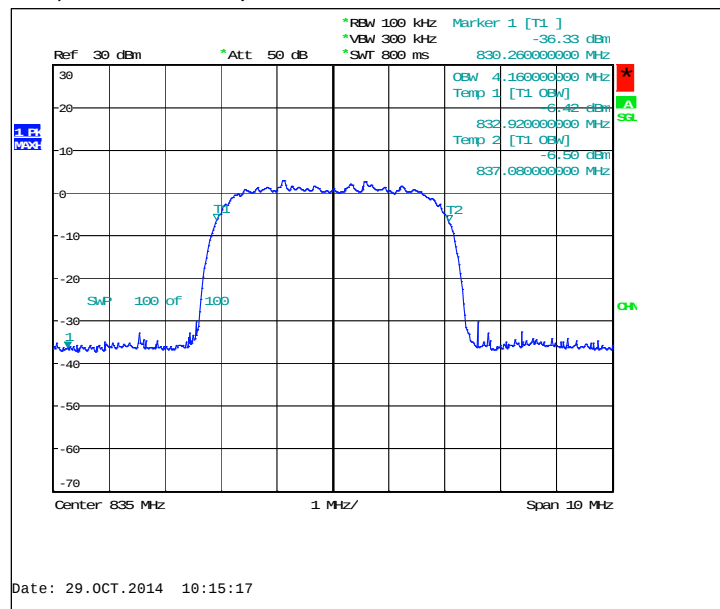
GPRS, Channel 190 / 836.6 MHz



3.5. WCDMA5 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD	4160

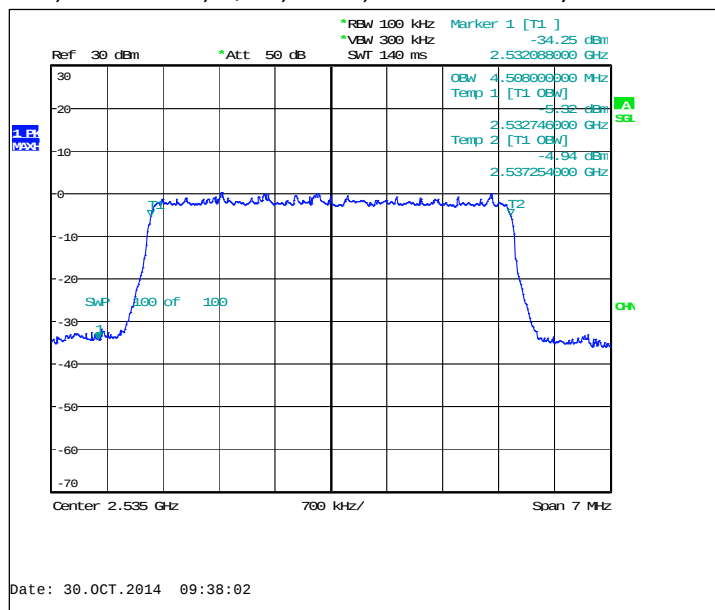
FDD, Channel 4175 / 835.0 MHz



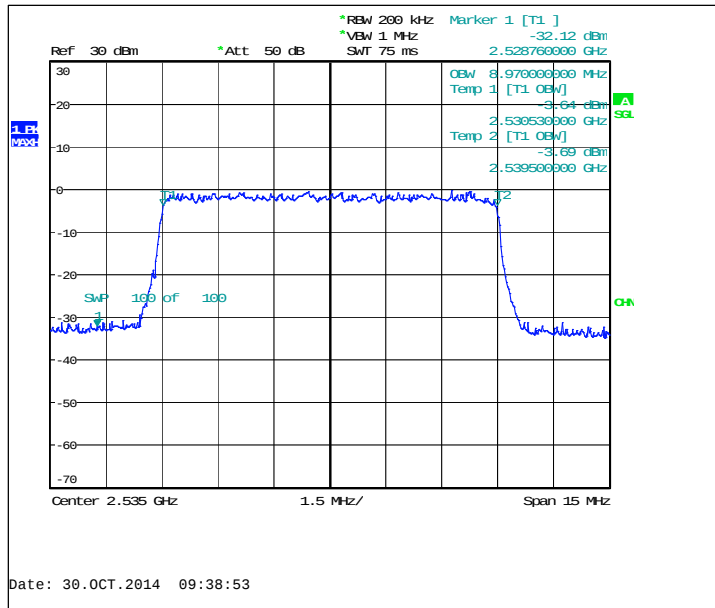
3.6. LTE7 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 5MHz, QPSK, 25 RB	4508
FDD, CBW 10MHz, QPSK, 50 RB	8970
FDD, CBW 15MHz, QPSK, 75 RB	13440
FDD, CBW 20MHz, QPSK, 100 RB	17900
FDD, CBW 5MHz, 16QAM, 25 RB	4494
FDD, CBW 10MHz, 16QAM, 50 RB	8970
FDD, CBW 15MHz, 16QAM, 75 RB	13400
FDD, CBW 20MHz, 16QAM, 100 RB	17850

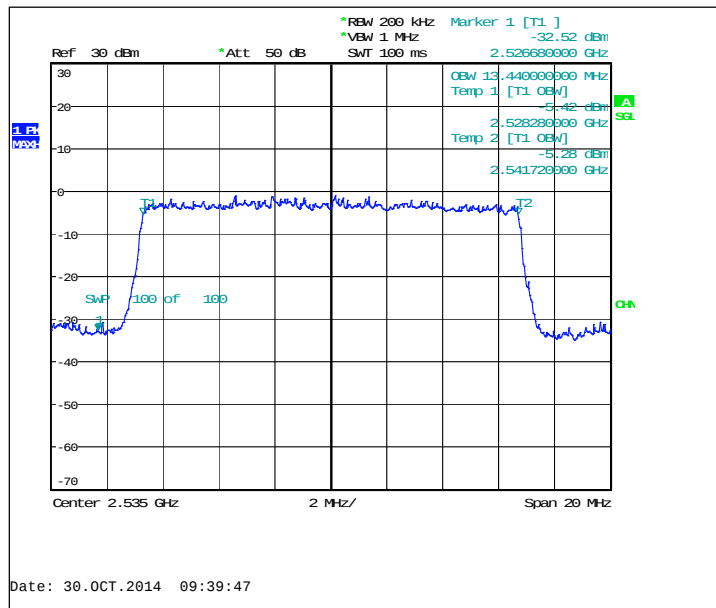
FDD, CBW 5MHz, QPSK, 25 RB, Channel 21100 / 2535.0 MHz



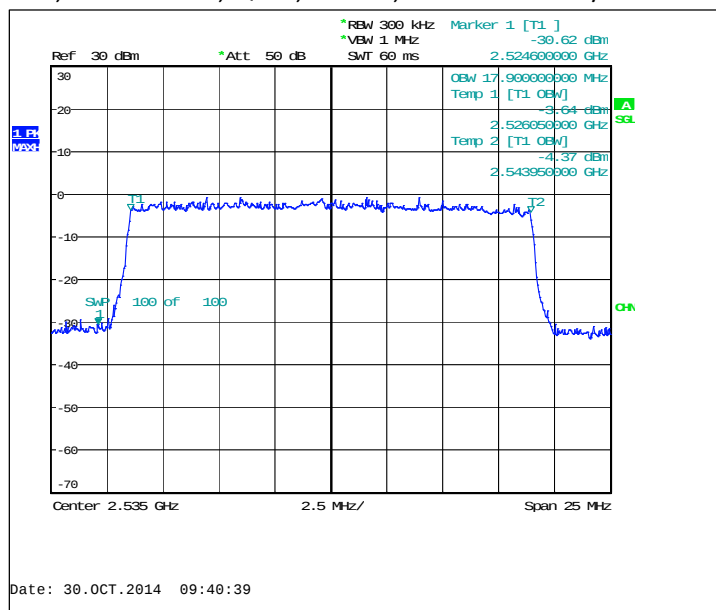
FDD, CBW 10MHz, QPSK, 50 RB, Channel 21100 / 2535.0 MHz



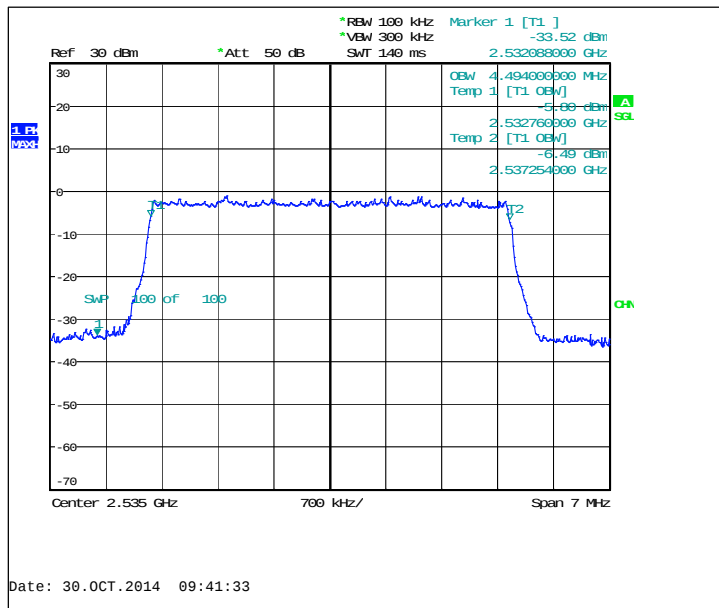
FDD, CBW 15MHz, QPSK, 75 RB, Channel 21100 / 2535.0 MHz



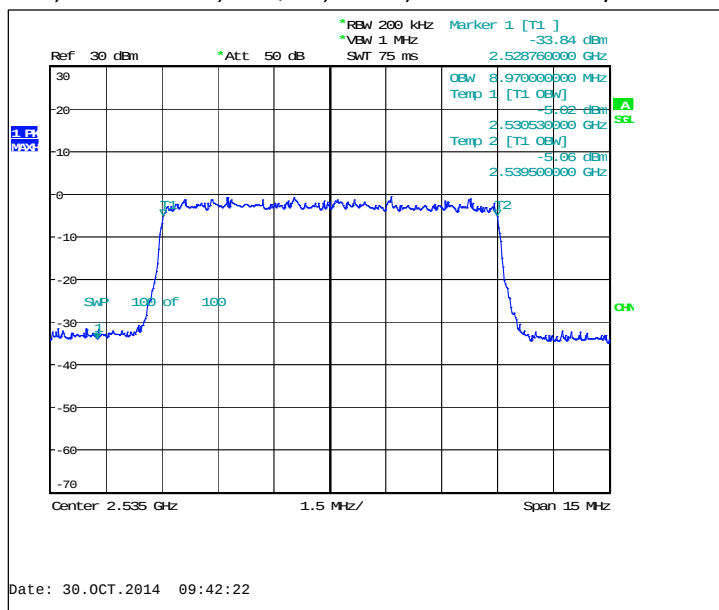
FDD, CBW 20MHz, QPSK, 100 RB, Channel 21100 / 2535.0 MHz



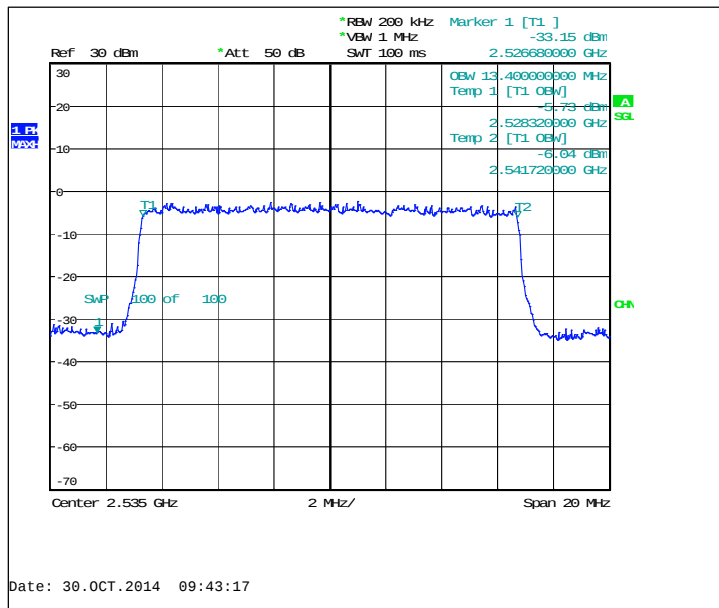
FDD, CBW 5MHz, 16QAM, 25 RB, Channel 21100 / 2535.0 MHz



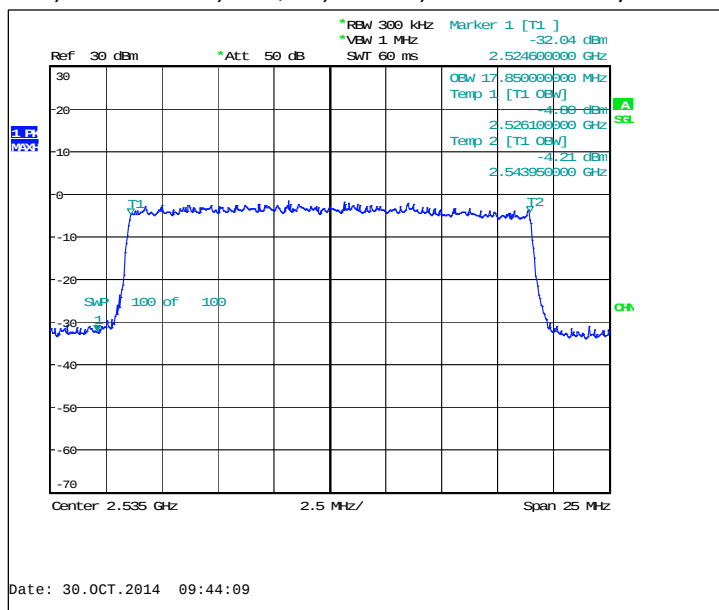
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 21100 / 2535.0 MHz



FDD, CBW 15MHz, 16QAM, 75 RB, Channel 21100 / 2535.0 MHz



FDD, CBW 20MHz, 16QAM, 100 RB, Channel 21100 / 2535.0 MHz

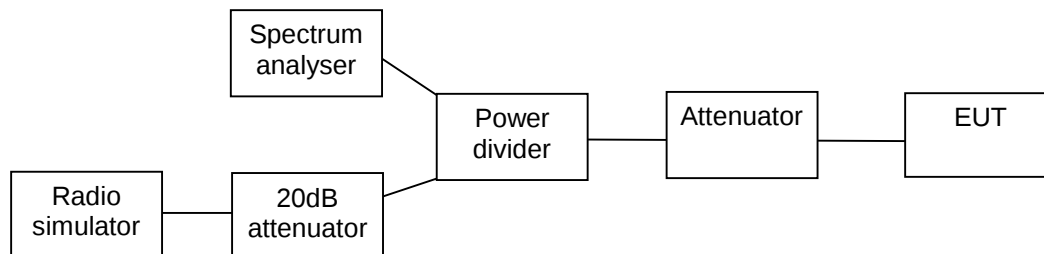


4. Band edge compliance

(FCC §24.238(a), §27.53(l), §22.917(a), RSS-133 6.5, RSS-132 4.5, RSS-199 4.5(b))

EUT with DUT number	RM-1062, DUT 18684
Accessories with DUT numbers	SD-238R, DUT 18685 ; WH-108, DUT 18691
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	Measured from antenna 1.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 41 / 100.7
Date of measurements	29-Oct-2014
Measured by	Jari Keto

4.1. Test Setup



4.2. Test method and limit

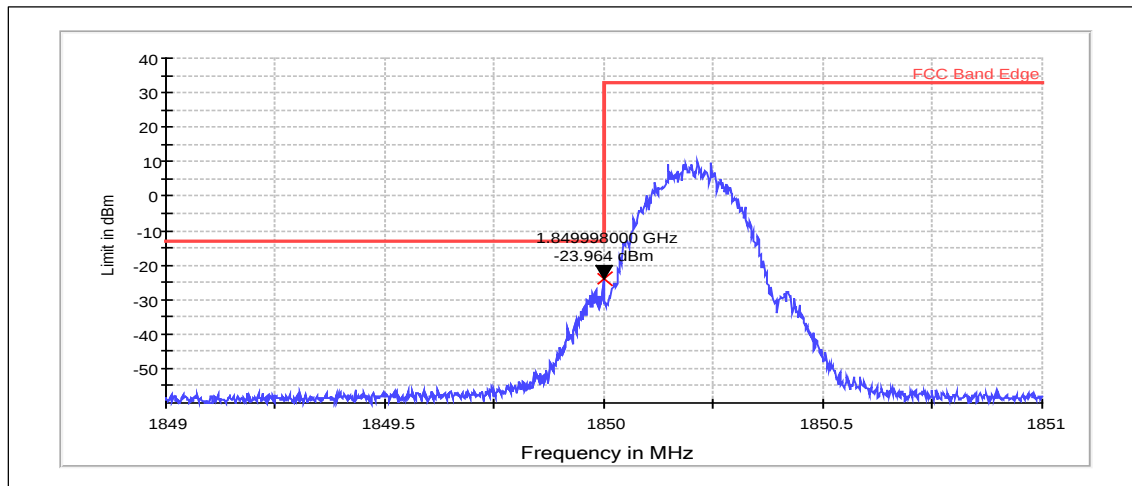
The measurement is made according to applicable FCC rule parts and IC standards.

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
WCDMA5	Below 824 and above 849	-13
LTE7	Below 2494.5	-25 (RBW = 1 MHz, VBW = 3 MHz)
	2494.5 - 2499	-13 (RBW = 1 MHz, VBW = 3 MHz)
	2499 – 2500	-13 (RBW = 200 kHz, VBW = 1 MHz)
	2570 – 2571	-13 (RBW = 200 kHz, VBW = 1 MHz)
	2571 – 2575.5	-13 (RBW = 1 MHz, VBW = 3 MHz)
	Above 2575.5	-25 (RBW = 1 MHz, VBW = 3 MHz)

4.3. GSM 1900 Test results

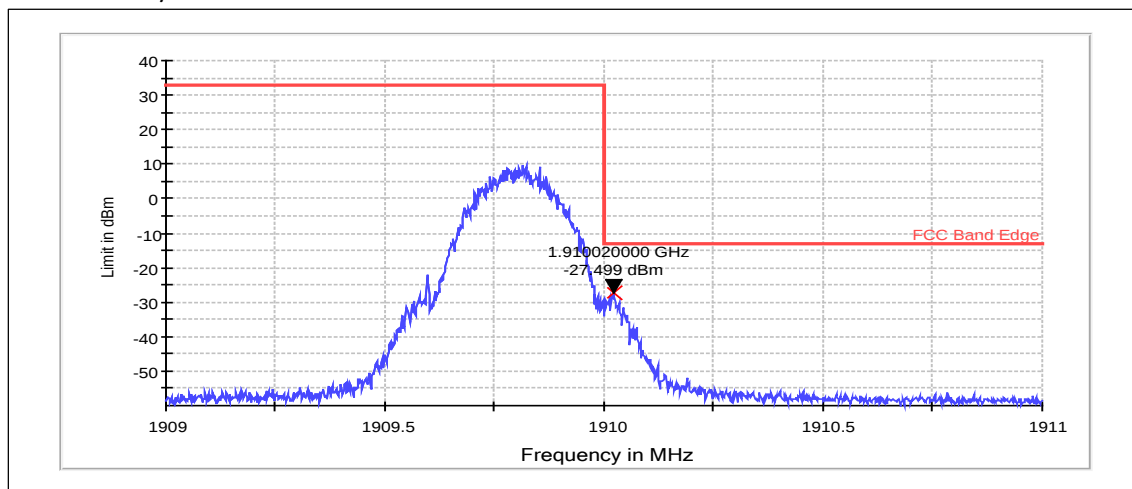
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	1849.998	-23.96	PASSED

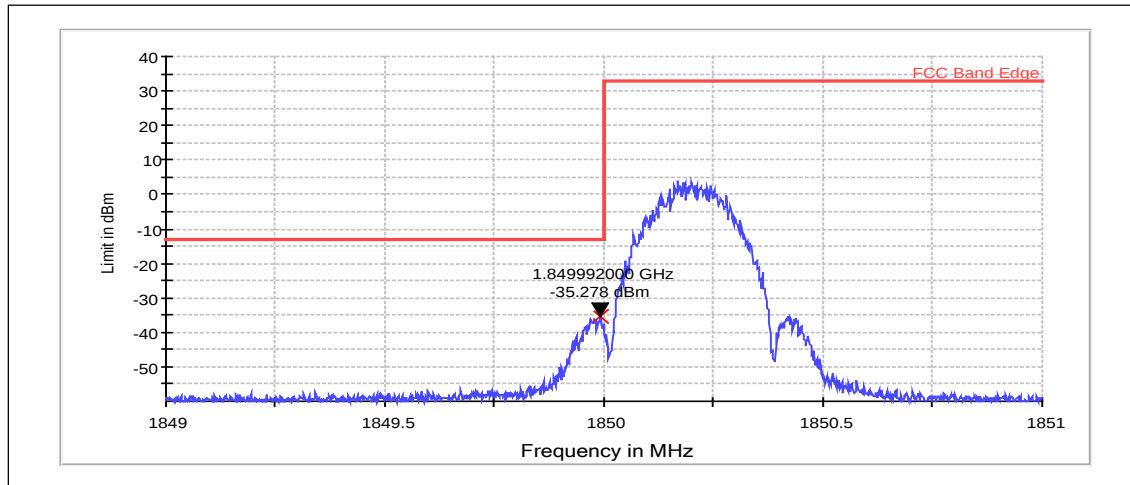
Channel 810 / 1909.8 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	1910.020	-27.50	PASSED

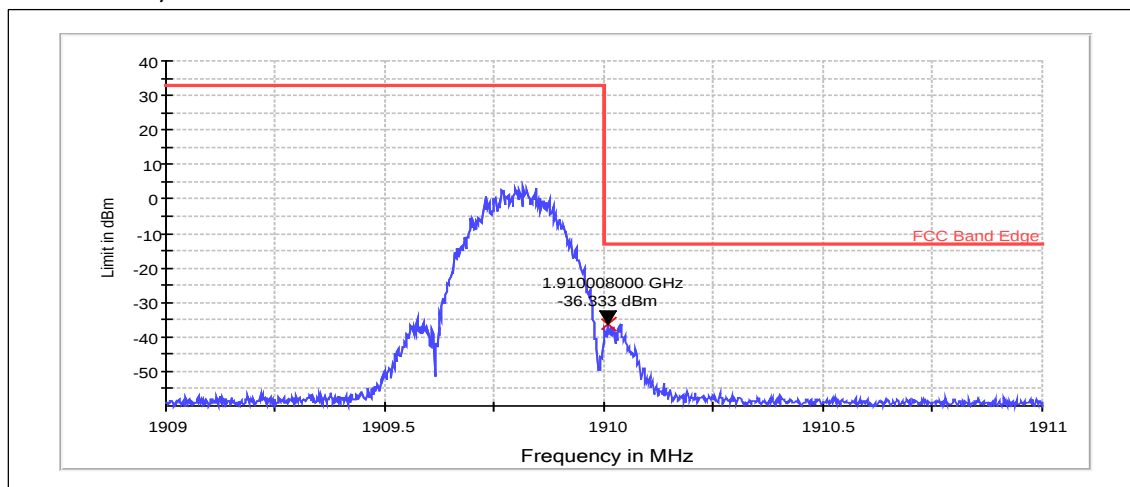
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	1849.992	-35.28	PASSED

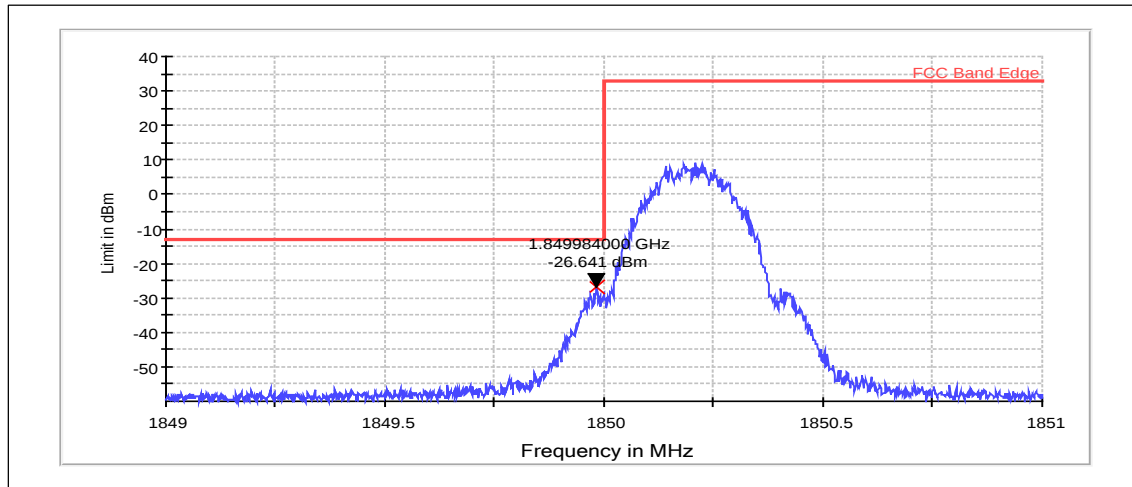
Channel 810 / 1909.8 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	1910.008	-36.33	PASSED

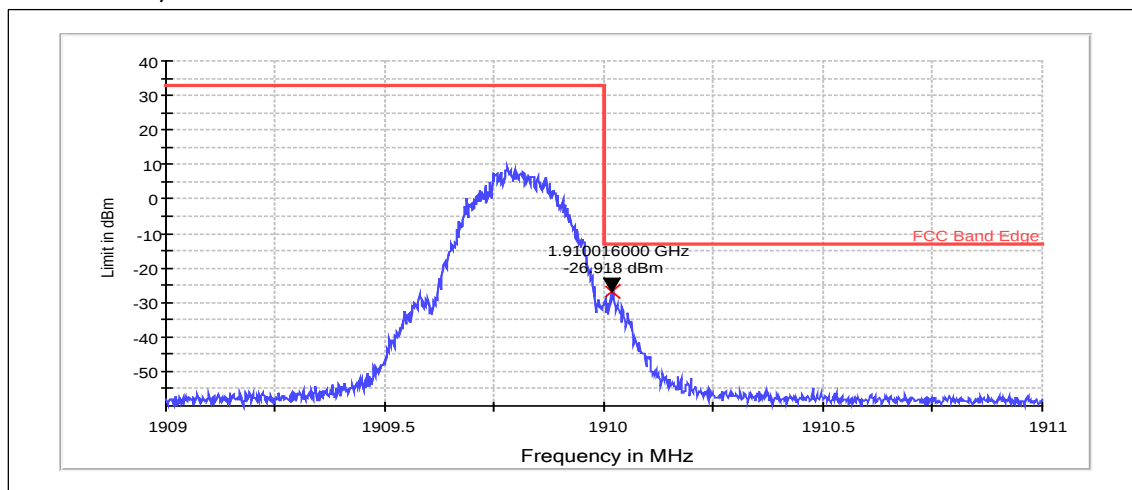
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GPRS	1849.984	-26.64	PASSED

Channel 810 / 1909.8 MHz

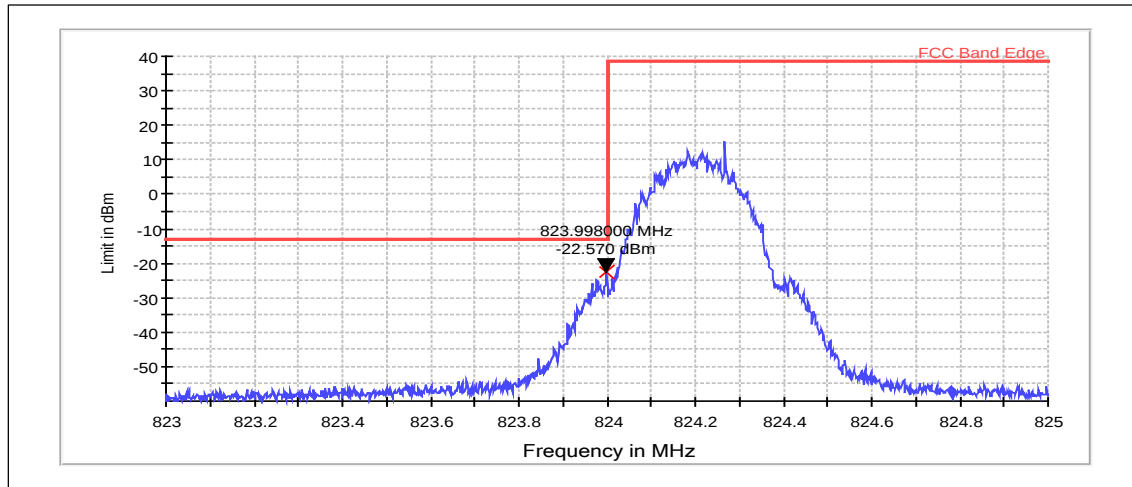


RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GPRS	1910.016	-26.92	PASSED

4.4. GSM 850 Test results

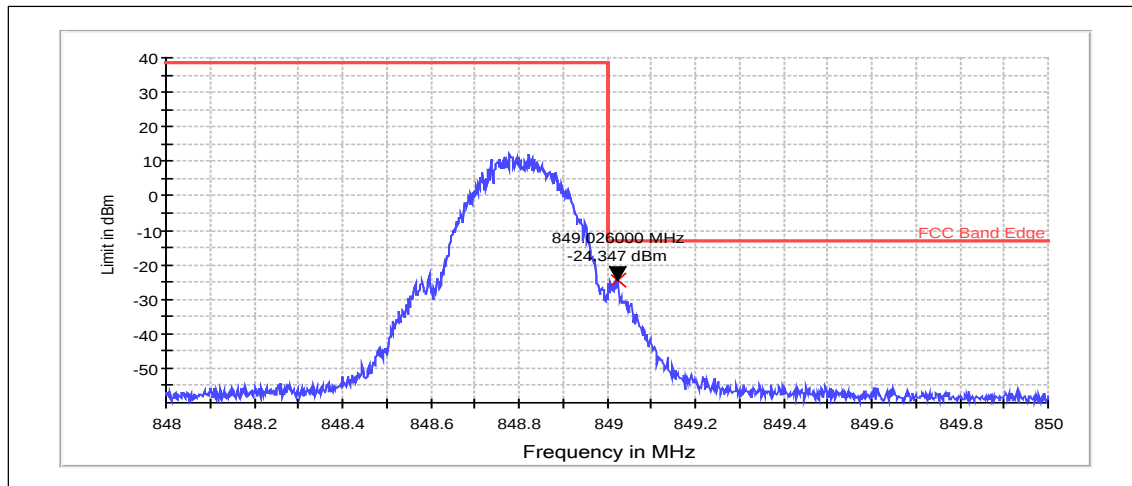
Channel 128 / 824.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	823.998	-22.57	PASSED

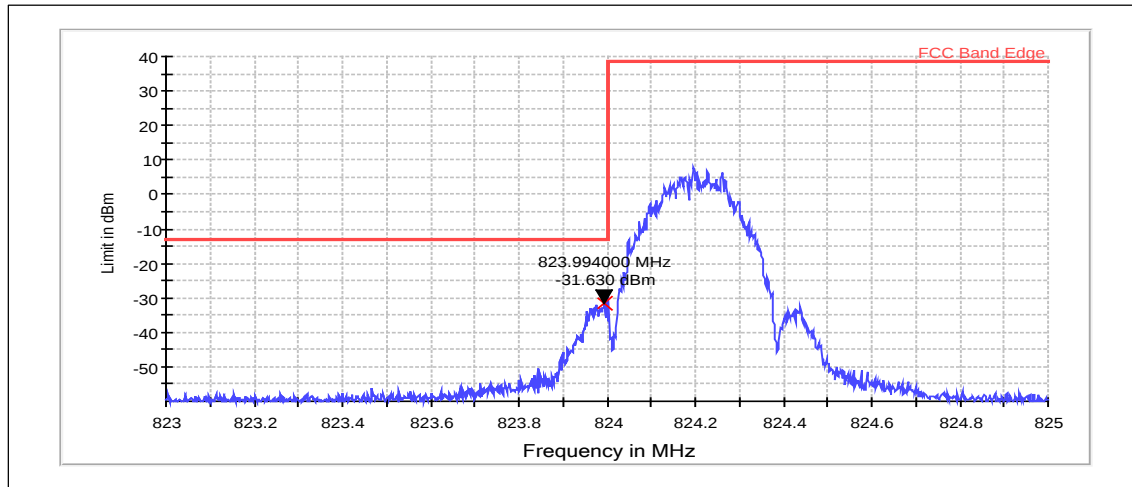
Channel 251 / 848.8 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	849.026	-24.35	PASSED

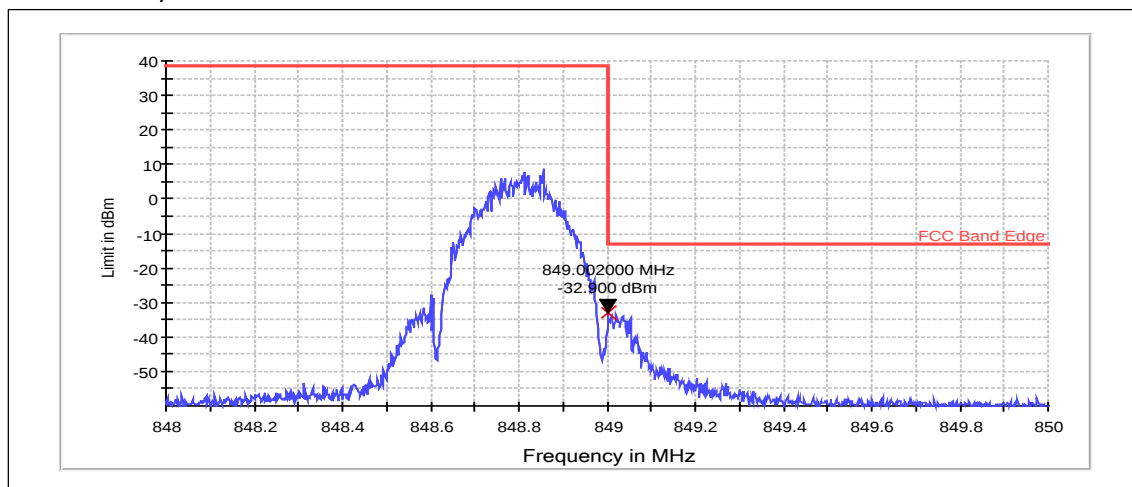
Channel 128 / 824.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	823.994	-31.63	PASSED

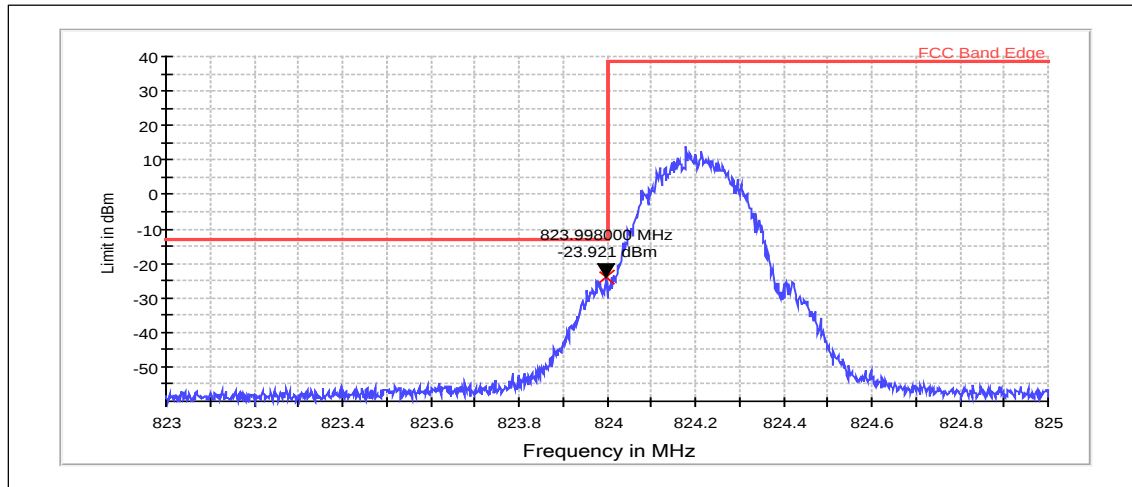
Channel 251 / 848.8 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	849.002	-32.90	PASSED

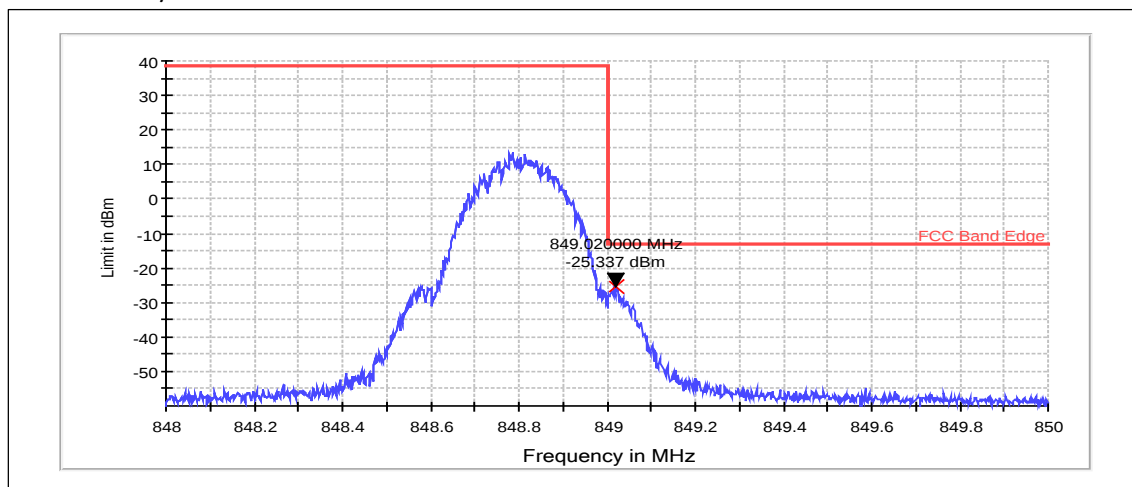
Channel 128 / 824.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GPRS	823.998	-23.92	PASSED

Channel 251 / 848.8 MHz

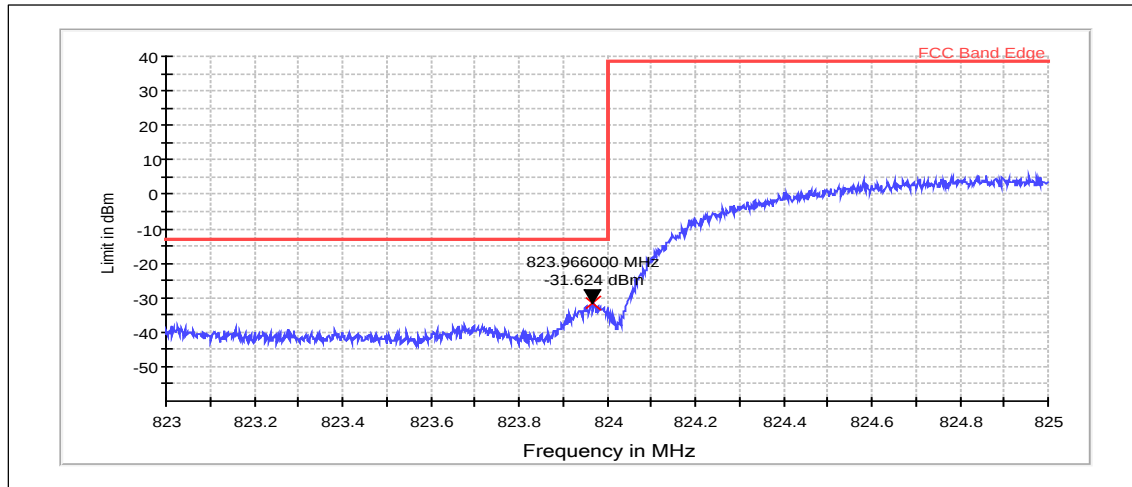


RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GPRS	849.020	-25.34	PASSED

4.5. WCDMA5 Test results

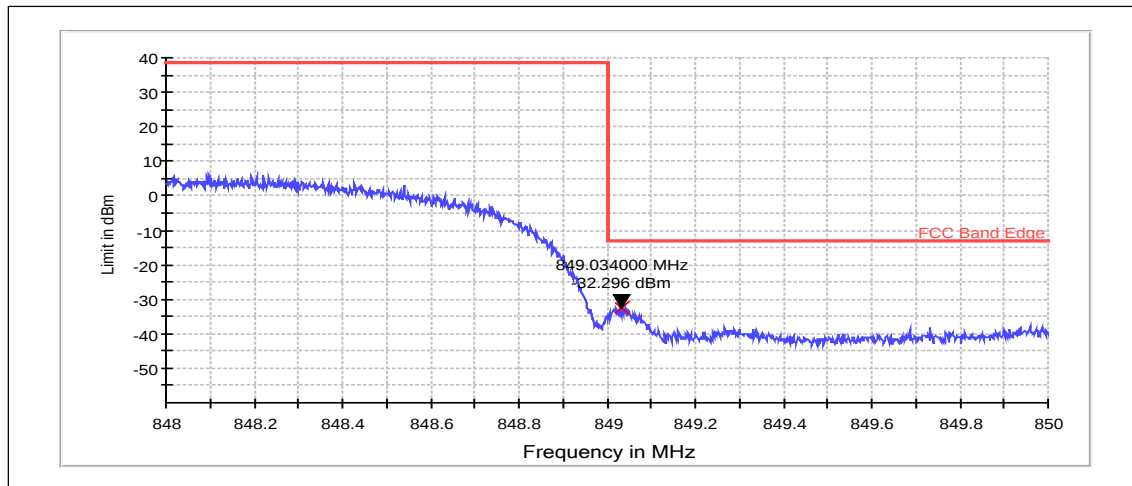
Channel 4132 / 826.4 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	823.966	-31.62	PASSED

Channel 4233 / 846.6 MHz

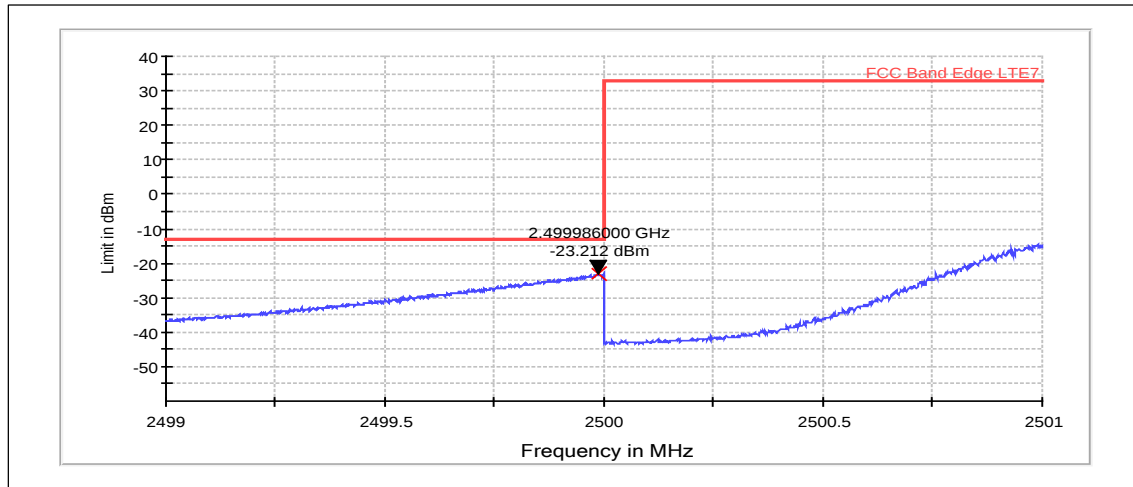


RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	849.034	-32.30	PASSED

4.6. LTE7 Test results

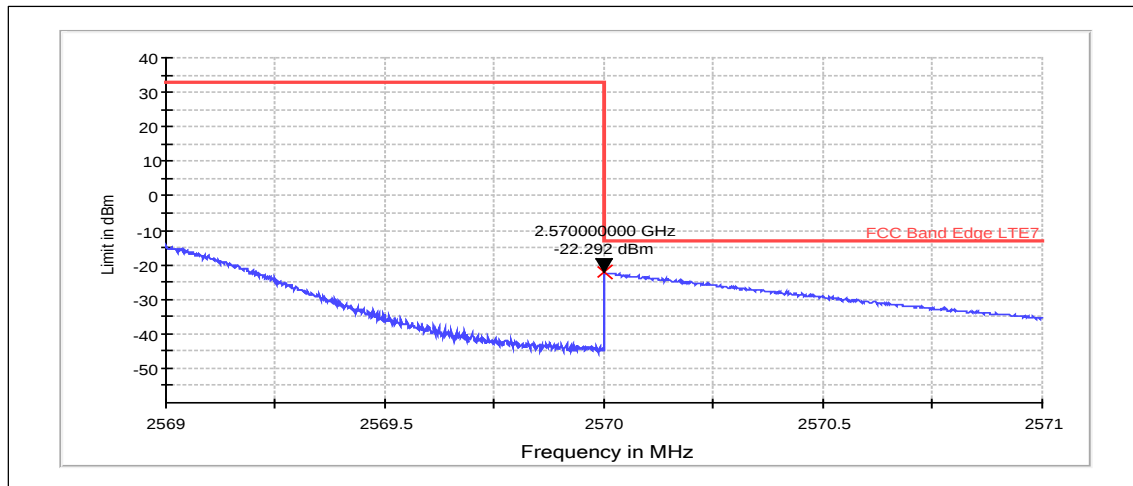
Channel 20850 / 2510 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	2499.986	-23.21	PASSED

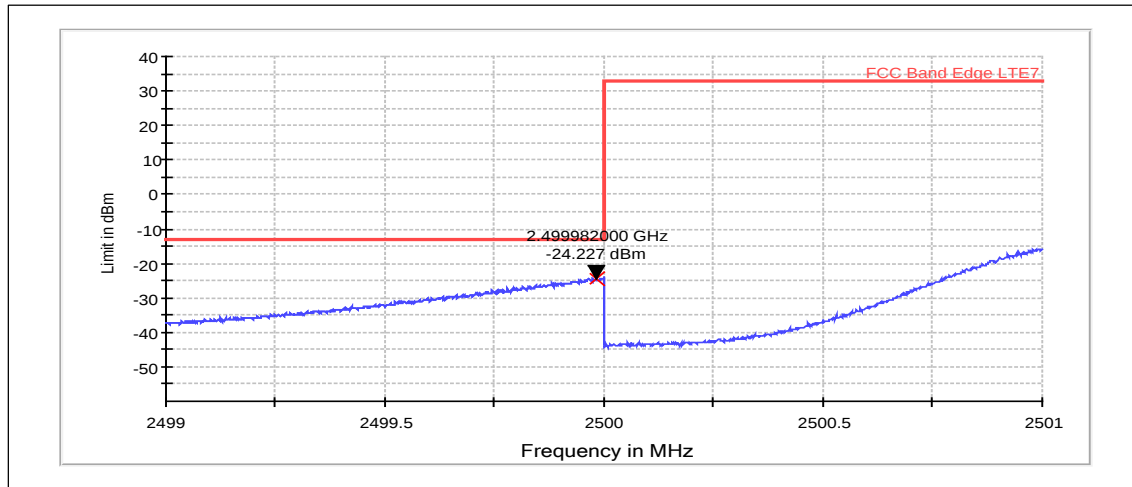
Channel 21350 / 2560 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	2570.000	-22.29	PASSED

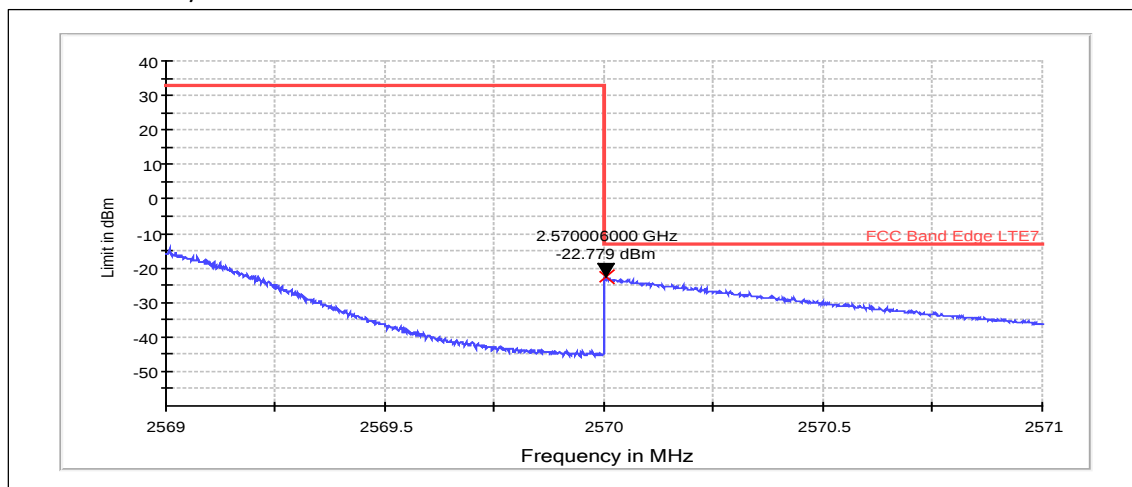
Channel 20850 / 2510 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	2499.982	-24.23	PASSED

Channel 21350 / 2560 MHz



RMS detector, Max hold

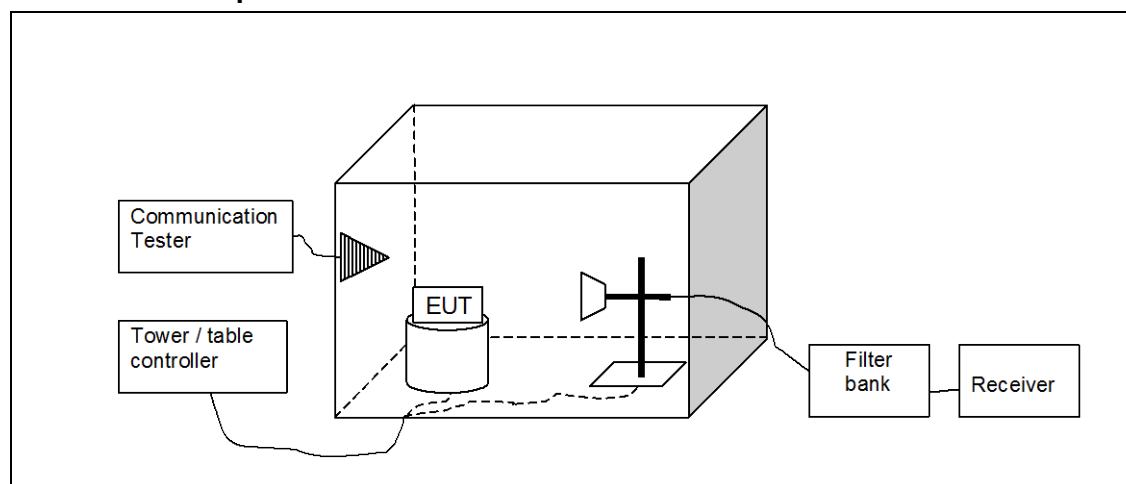
Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	2570.006	-22.78	PASSED

5. Spurious radiated emissions

(FCC §22.917(a), §27.53(l), §2.1053, §22.917(a), §2.1053, §24.238(a), §2.1053, §2.1053, RSS-132 4.5, RSS-133 6.5, RSS-199 4.5(b))

EUT with DUT number	RM-1062, DUT 18732
Accessories with DUT numbers	BV-T4B, DUT 18733 ; WH-108, DUT 18698 ; AC-20E, DUT 18697
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	Measured from antenna 1.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 42 / 103.2
Date of measurements	14-Nov-2014
Measured by	Sami Lehtonen

5.1.1 Test setup



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 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
WCDMA5	30 - 8500	-13
LTE7	30 - 25700	-13

5.3. 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
1673.186	-51.08	0.0078	-57.68	6.6	VERTICAL	PASSED
1673.267	-46.42	0.0228	-51.92	5.5	HORIZONTAL	PASSED
1711.503	-57.51	0.00177	-63.91	6.4	HORIZONTAL	PASSED
2510.02	-42.92	0.05105	-54.52	11.6	VERTICAL	PASSED
2510.06	-43.33	0.04645	-54.93	11.6	VERTICAL	PASSED
3396.954	-59.97	0.00101	-63.17	3.2	VERTICAL	PASSED

5.4. 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	-45.97	0.02529	-51.47	5.5	HORIZONTAL	PASSED
2509.9	-42.9	0.05129	-54.8	11.9	HORIZONTAL	PASSED

5.5. 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
9566.333	-44.22	0.03784	-66.02	21.8	VERTICAL	PASSED
9618.758	-44.11	0.03882	-65.91	21.8	HORIZONTAL	PASSED
9796.553	-43.36	0.04613	-66.06	22.7	HORIZONTAL	PASSED
9851.343	-43.34	0.04634	-66.04	22.7	HORIZONTAL	PASSED
9903.607	-42.94	0.05082	-65.14	22.2	HORIZONTAL	PASSED
11511.703	-41.75	0.06683	-65.75	24	HORIZONTAL	PASSED

5.6. 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
3759.94	-52.59	0.00551	-58.89	6.3	VERTICAL	PASSED
5643.627	-50.21	0.00953	-60.71	10.5	VERTICAL	PASSED

5.7. WCDMA5 test results

Channel 4175 / 835.0 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
851.358	-46.26	0.02366	-80.76	34.5	HORIZONTAL	PASSED
854.674	-46.01	0.02506	-80.61	34.6	HORIZONTAL	PASSED
985.686	-41.51	0.07063	-80.11	38.6	VERTICAL	PASSED
991.258	-39.59	0.1099	-78.79	39.2	VERTICAL	PASSED
996.423	-41.07	0.07816	-80.47	39.4	VERTICAL	PASSED
1001.303	-58.47	0.00142	-63.57	5.1	VERTICAL	PASSED
1667.575	-53	0.00501	-59.3	6.3	VERTICAL	PASSED
2496.242	-52.33	0.00585	-64.23	11.9	HORIZONTAL	PASSED
3335.892	-59.45	0.00114	-62.75	3.3	VERTICAL	PASSED
4175.18	-58.27	0.00149	-63.67	5.4	HORIZONTAL	PASSED
5008.136	-54	0.00398	-62.6	8.6	VERTICAL	PASSED
5837.044	-53.67	0.0043	-62.07	8.4	VERTICAL	PASSED
6677.335	-50.74	0.00843	-61.04	10.3	VERTICAL	PASSED
7507.846	-49.44	0.01138	-63.74	14.3	HORIZONTAL	PASSED
8344.93	-49.12	0.01225	-64.62	15.5	HORIZONTAL	PASSED

5.8. LTE7 test results

Channel 21100 / 2535.0 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
2509.334	-62.14	0.00061	-74.24	12.1	HORIZONTAL	PASSED
2552.29	-61.55	0.0007	-73.65	12.1	HORIZONTAL	PASSED
2559.143	-61.49	0.00071	-73.89	12.4	HORIZONTAL	PASSED
2569.058	-62.32	0.00059	-74.62	12.3	HORIZONTAL	PASSED
2576.032	-62.16	0.00061	-74.56	12.4	HORIZONTAL	PASSED
5070.421	-51.89	0.00647	-62.79	10.9	HORIZONTAL	PASSED
7605.341	-54.4	0.00363	-70.7	16.3	HORIZONTAL	PASSED
10140.661	-51.16	0.00766	-73.36	22.2	HORIZONTAL	PASSED

Channel 21100 / 2535.0 MHz

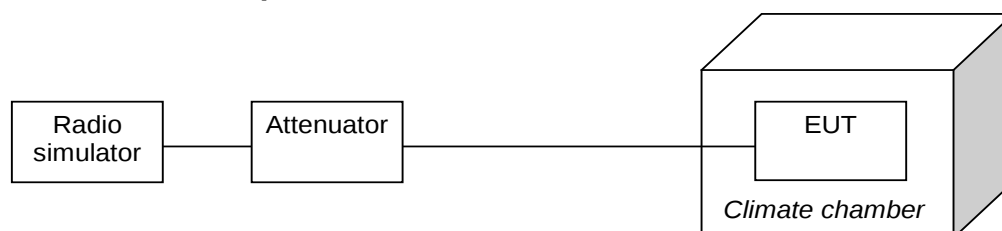
FDD, CBW 5MHz, 16QAM, 1 RB, RMS detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
2518.071	-60.91	0.00081	-73.01	12.1	HORIZONTAL	PASSED
2553.873	-61.79	0.00066	-73.89	12.1	HORIZONTAL	PASSED
5070.501	-52.25	0.00596	-63.15	10.9	HORIZONTAL	PASSED
7605.341	-54.4	0.00363	-70.7	16.3	HORIZONTAL	PASSED
10147.275	-53.81	0.00416	-76.11	22.3	HORIZONTAL	PASSED

6. Frequency stability, temperature variation (FCC §2.1055(a), §27.54, RSS-133 6.3, RSS-132 4.3, RSS-199 4.3)

EUT with DUT number	RM-1062, DUT 18684
Accessories with DUT numbers	SD-238R, DUT 18685 ; WH-108, DUT 18691
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	Measured from antenna 1.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 41 / 100.7
Date of measurements	29-Oct-2014
Measured by	Jari Keto

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

6.3. GSM 1900 Test results

GSM, Channel 661 / 1880.0 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	1880.00	44.75000	0.0238	PASSED
40	1880.00	45.33000	0.0241	PASSED
30	1880.00	42.75000	0.0227	PASSED
20	1880.00	43.33000	0.023	PASSED
10	1880.00	42.68000	0.0227	PASSED
0	1880.00	41.84000	0.0223	PASSED
-10	1880.00	45.91000	0.0244	PASSED
-20	1880.00	40.62000	0.0216	PASSED
-30	1880.00	45.07000	0.024	PASSED

6.4. GSM 850 Test results

GSM, Channel 190 / 836.6 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	836.60	4.07000	0.0049	PASSED
40	836.60	5.04000	0.006	PASSED
30	836.60	6.97000	0.0083	PASSED
20	836.60	6.97000	0.0083	PASSED
10	836.60	0.77000	0.0009	PASSED
0	836.60	1.61000	0.0019	PASSED
-10	836.60	1.87000	0.0022	PASSED
-20	836.60	1.81000	0.0022	PASSED
-30	836.60	-3.87000	-0.0046	PASSED

6.5. LTE7 Test results

FDD, CBW 20MHz, QPSK, 100 RB, Channel 21100 / 2535.0 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	2535.00	-8.85487	-0.0035	PASSED

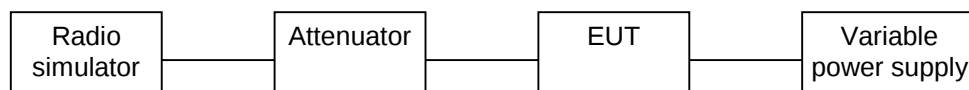
40	2535.00	6.35147	0.0025	PASSED
30	2535.00	1.91689	0.0008	PASSED
20	2535.00	3.89099	0.0015	PASSED
10	2535.00	1.61648	0.0006	PASSED
0	2535.00	-1.60217	-0.0006	PASSED
-10	2535.00	-3.31879	-0.0013	PASSED
-20	2535.00	-0.41485	-0.0002	PASSED
-30	2535.00	-3.01838	-0.0012	PASSED

7. Frequency stability, voltage variation

(FCC §2.1055(d), §27.54, RSS-133 6.3, RSS-132 4.3, RSS-199 4.3)

EUT with DUT number	RM-1062, DUT 18684
Accessories with DUT numbers	SD-238R, DUT 18685 ; WH-108, DUT 18691
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	Measured from antenna 1.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 41 / 100.7
Date of measurements	29-Oct-2014
Measured by	Jari Keto

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	37.26000	0.0198	PASSED
Battery cut-off point / 3.6	1880.00	46.43000	0.0247	PASSED
Nominal / 3.8	1880.00	47.27000	0.0251	PASSED

7.4. GSM 850 Test results

GSM,

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	836.60	4.52000	0.0054	PASSED
Battery cut-off point / 3.6	836.60	0.77000	0.0009	PASSED
Nominal / 3.8	836.60	6.84000	0.0082	PASSED

7.5. LTE7 Test results

FDD, CBW 20MHz, QPSK, 100 RB, Channel 21100 / 2535.0 MHz

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	2535.00	-0.55790	-0.0002	PASSED
Battery cut-off point / 3.6	2535.00	-0.08583	0	PASSED
Nominal / 3.8	2535.00	1.91689	0.0008	PASSED

8. Test Equipment

8.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
6039	USB Interface	5541765	Testo	22/24/27, 15C, 15B
6044	V-network	ESH3-Z6	R&S	-
2059	V-network	ESH3-Z6	R&S	-
1759	LISN 50 µH	ESH3-Z5	R&S	22/24/27, 15C, 15B
2097	Pulse Limiter	ESH3-Z2	R&S	22/24/27, 15C, 15B
1999	Receiver	ESIB26	R&S	22/24/27, 15C, 15B
2180	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2390	Directional Coupler	DC2600	AR	-
-	RF immunity / Emission Software	EMC32	R&S	22/24/27, 15C, 15B
2060	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
1759	LISN 50 µH	ESH3-Z5	R&S	15C, 15B
2039	Power Supply	PL330QMD	Thurlby	15C, 15B
6036	Data Logger	175-H2	Testo	22/24/27, 15C, 15B
2359	Temperature Test Chamber	VT4002	Vötsch	22/24/27
2352	Spectrum Analyzer	FSP-30	R&S	22/24/27, 15C
6109	Communication Tester	CMU200	R&S	22/24/27, 15C
6246	Power Supply	66332A	HP	22/24/27, 15C
1992	Signal Generator	83630B	Agilent	15C, 15B
6098	Signal Generator	8648C	Agilent	-
6046	Attenuator 10dB	8493C	Agilent	22/24/27, 15C
6047	Attenuator 20dB	8493C	Agilent	22/24/27, 15C
6045	Power splitter	11667B	Agilent	22/24/27, 15C
6247	Communication Tester	CBT	R&S	22/24/27, 15C 15B
6052	Communication Tester	CMU200	R&S	22/24/27, 15C 15B
6248	Power Supply	6632B	-	22/24/27, 15C 15B
6106	Spectrum Analyzer	FSP-30	R&S	22/24/27, 15C 15B
6113	Signal Generator	SMF100A	R&S	22/24/27, 15C 15B
6202	Temperature Test Chamber	VT4002	Vötsch	22/24/27, 15C 15B
6122	Power Splitter	11667B	Agilent	22/24/27, 15C 15B
6134	Attenuator 10dB	BW-S10-2W263+	Mini-Circuits	22/24/27, 15C
6136	Attenuator 20dB	BW-S20-2W263+	Mini-Circuits	22/24/27, 15C
6103	Bluetooth tester	CBT	R&S	22/24/27, 15C 15B
6250	Power Supply	6651A	Agilent	22/24/27, 15C 15B
6108	Communication Tester	CMU200	R&S	22/24/27, 15C 15B
6105	Spectrum Analyzer	FSV-30	R&S	22/24/27, 15C 15B
6251	Temperature Test Chamber	VT4002	Vötsch	22/24/27, 15C 15B
6243	Power Splitter	1167B	Agilent	22/24/27, 15C 15B
6245	Attenuator 10dB	BW-S10-2W263+	Mini-Circuits	22/24/27, 15C 15B
6244	Attenuator 20dB	BW-S20-2W263+	Mini-Circuits	22/24/27, 15C 15B

8.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
2388	Bluetooth Tester	CBT	R&S	15B
10479	Communication Tester	CMW500	R&S	22/24/27, 15C, 15B
2347	Communication Tester	CMU200	R&S	22/24/27, 15C, 15B
2009	Signal Generator	SMP 22	R&S	22/24/27, 15C, 15B
2348	Controller	G-1000DXC	Yaesu	22/24/27, 15C, 15B
2349	Computer Controller	g-1000DXC	Yaesu	22/24/27, 15C, 15B
2116	Controller	EMCO 2090	ETS	22/24/27, 15C, 15B
2109	Power Supply	PL330QMD	Thurlby	22/24/27, 15C, 15B
2353	Receiver	ESIB26	R&S	22/24/27, 15C, 15B
6115	Open switch and control unit	OSP 130	R&S	22/24/27, 15C 15B
6116	Open switch and control unit	OSP 150	R&S	22/24/27, 15C 15B

Eq. No	Equipment	Type	Manufacturer	Used in
6117	Open switch and control unit	OSP 150	R&S	22/24/27, 15C, 15B
6131	Notch Filter	WRCT902.4-0.4/40-8SS	Wainwright	22/24/27, 15C, 15B
6130	Notch Filter	WRCD1880-1.1.25/50-10SS	Wainwright	22/24/27
6159	Band Reject Filter	WRCD1747.8-0.4/40-5SS	Wainwright	22/24/27, 15C, 15B
6158	Band Reject Filter	WRCT836.6-0.4/40-8SS	Wainwright	22/24/27, 15C, 15B
6197	Band Reject Filter	WRCJV2531/2539-2523/2547-60/12SS	Wainwright	22/24/27, 15C, 15B
2231	Band Reject Filter	WRCG1947/1953-1940/1960-40/6SS	Wainwright	22/24/27, 15C, 15B
2391	Band Reject Filter	WRCG1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	27
2386	Band Reject Filter	WRCG1764.4/1770.4-1760.4/1774.4-40/6SS	Wainwright	22/24/27, 15C, 15B
2385	Band Reject Filter	WRCG1744.4/1750.4-1740.4/1754.4-40/6SS	Wainwright	22/24/27, 15C, 15B
2357	Band Reject Filter	WRCG2400/2483-2390/2493-35/10SS	Wainwright	15C
2188	Preamplifier	AFS4-00100300-20-23P-6	Miteq	22/24/27, 15C, 15B
6195	High Pass Filter	-	Wainwright	22/24/27, 15C, 15B
2364	Band Reject Filter	WRCG1877/1883 - 1870/1890-40/6SS	Wainwright	24
2361	Anechoic Chamber	3 m Semi / Full Anechoic Chamber	Euroshield	22/24/27, 15C, 15B
6212	Antenna Array system	-	TCC	22/24/27, 15C, 15B
-	RF immunity / Emission Software	EMC32	R&S	22/24/27, 15C, 15B
6089	Antenna	HFH2-Z2	R&S	15C, 15B
2027	CDN	M2 (modified) DC1	MEB	22/24/27, 15C, 15B
2028	CDN	M3 (modified) DC2	MEB	22/24/27, 15C, 15B
2176	CDN	CDN 801-M3	Lüthi	22/24/27, 15C, 15B
2135	CDN	CDN 801-M3	Lüthi	22/24/27, 15C, 15B
2029	Power Supply	PL330	Thurlby	22/24/27, 15C
6038	Data Logger	Testo 580	Testo	22/24/27, 15C, 15B
6037	Data Logger	175-H2	Testo	22/24/27, 15C, 15B
6039	USB Interface	5541765	Testo	22/24/27, 15C, 15B