

FCC Part 22/24/27 Compliance Test Report

Test Report no.:	FCC_Cellular_RM-1041_02.docx	Date of Report:	16-Oct-2014
Number of pages:	60	Customer's Contact person:	Helen Hu
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FCC listing no.:	533467		
IC recognition no.:	661V-1		
Tested devices/ accessories:	Phone RM-1041 / Battery BV-T5A / WLC Cover CC-3086 / AC-Charger AC-20E / Headset WH-108 / Dummy Battery SD-233R /		
FCC ID:	QTLRM-1041	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-132 (Issue 2, September 2005), RSS-133 (Issue 5, February 2009), RSS-139 (Issue 2, February 2009), RSS-130 (Issue 1, October 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:			

Jari Keto, Specialist, EMC

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

Date of receipt	26-Sep-2014
Testing completed	16-Oct-2014
The customer's contact person	Helen Hu
Test Plan referred to	T:\Projects\RM-1041\TestPlan\RS_testplan_RM-1041.xlsm
Notes	-
Document name	T:\Projects\RM-1041\EMC\FCC_Cellular_RM-1041_02.docx

1.1. EUT and Accessory Information

The EUT is a mobile phone with following features:

GSM/CDMA/WCDMA/WLAN/Bluetooth

The EUT is tested with maximum rated TX power.

Devices under tests

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-1041	353067060029511	0364	-	02042.00000.14372.27013	18673
Battery	BV-T5A	4175354295C1080102600670740	-	-	-	18674
WLC Cover	CC-3086	-	-	-	-	18675
AC-Charger	AC-20E	486867246144050013200675628	-	-	-	18676
Headset	WH-108	2265171	-	-	-	18677
Phone	RM-1041	353067060017250	0364	-	02042.00000.14372.27013	18639
Dummy Battery	SD-233R	-	-	-	-	18640
Headset	WH-108	2265171	-	-	-	18641

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	
§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	

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	
§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	

CDMA 800:

Section in CFR 47	Section in RSS-GEN or RSS-132	Name of the test	Result
§2.1046(a), 22.913(a)	4.4	Conducted RF output power	
§22.913(a)	4.4	Radiated RF output power	PASSED
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§22.917(a)	4.5	Band edge compliance	PASSED
§22.917(a), §2.1051	4.5	Spurious emissions at antenna terminals	
§22.917(a), §2.1053	4.5	Spurious radiated emissions	PASSED
§2.1055(a)	4.3	Frequency stability, temperature variation	
§2.1055(d)	4.3	Frequency stability, voltage variation	

CDMA 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	

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
§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
§2.1049(h)	4.6.1	99 % occupied bandwidth	
§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	

LTE2:

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	

LTE4:

Section in CFR 47	Section in RSS-GEN or RSS-139	Name of the test	Result
§2.1046(a)	6.4	Conducted RF output power	
§27.50(d)(4)	6.4	Radiated RF output power	PASSED
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§27.53(h)	6.5	Band edge compliance	PASSED
§27.53(h), §2.1051	6.5	Spurious emissions at antenna terminals	
§27.53(h), §2.1053	6.5	Spurious radiated emissions	PASSED
§2.1055(a)	6.3	Frequency stability, temperature variation	PASSED
§2.1055(d)	6.3	Frequency stability, voltage variation	PASSED

LTE13:

Section in CFR 47	Section in RSS-GEN or RSS-130	Name of the test	Result
§2.1046(a)	4.4	Conducted RF output power	
§27.50(b)(10)	4.4	Radiated RF output power	PASSED
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§27.53(c)(2)(4)	4.6	Band edge compliance	PASSED
§27.53(c)(2)(4),(f), §2.1051	4.6	Spurious emissions at antenna terminals	
§27.53(c)(2)(4),(f), §2.1053	4.6	Spurious radiated emissions	PASSED
§2.1055(a)	4.3 (a)	Frequency stability, temperature variation	PASSED
§2.1055(d)	4.3 (a)	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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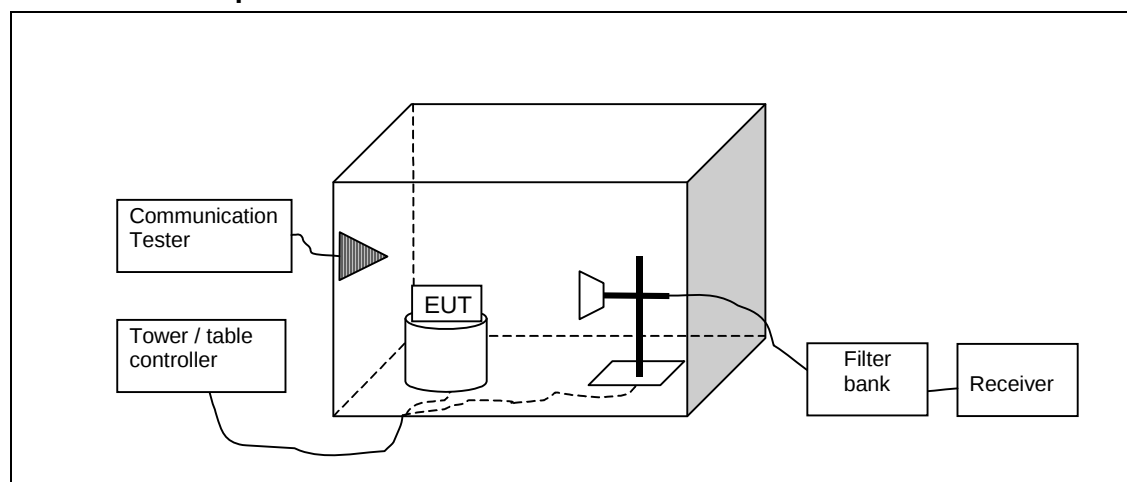
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2. Spurious radiated emissions

(FCC §22.917(a), §27.53(c)(2)(4),(f), §2.1053, §27.53(h), §2.1053, §22.917(a), §2.1053, §24.238(a), §2.1053, §2.1053, RSS-132 4.5, RSS-133 6.5, RSS-139 6.5, RSS-130 4.6)

EUT with DUT number	RM-1041, DUT 18673
Accessories with DUT numbers	BV-T5A, DUT 18674 ; CC-3086, DUT 18675 ; AC-20E, DUT 18676 ; WH-108, DUT 18677
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	17 / 45 / 101.4
Date of measurements	04-Oct-2014
Measured by	Sami Lehtonen / Kalle Hannila

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 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:

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

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

Limits for spurious radiated emissions measurements

Operation band	Frequency range [MHz]	Limit [dBm]
GSM 850	30 - 8500	-13
GSM 1900	30 - 19100	-13
WCDMA4	30 - 17500	-13
CDMA 800	30 - 8500	-13
LTE2	30 - 19100	-13
LTE4	30 - 17500	-13
LTE13	30 – 8000 763-775 and 793-805 1559 – 1610 1559 – 1610	-13 (RBW = 100 kHz, ERP) -35 (RBW = 6.25 kHz, ERP) -40 (RBW = 1 MHz) -50 (RBW = 700 Hz)

2.3. 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
3764.429	-57.16	0.00192	-63.46	6.3	VERTICAL	PASSED
5639.9	-51.5	0.00708	-61.9	10.4	VERTICAL	PASSED

2.4. 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
1673.1	-51.19	0.0076	-56.69	5.5	HORIZONTAL	PASSED
2510.822	-52.35	0.00582	-63.95	11.6	VERTICAL	PASSED

2.5. GSM 850 test results

Channel 190 / 836.6 MHz

Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1641.723	-57.84	0.00164	-63.74	5.9	HORIZONTAL	PASSED
1678.838	-56.67	0.00215	-63.27	6.6	VERTICAL	PASSED
1711.663	-56.29	0.00235	-62.69	6.4	HORIZONTAL	PASSED
2505.251	-52.29	0.0059	-63.79	11.5	VERTICAL	PASSED
2560.561	-52.1	0.00617	-64.5	12.4	HORIZONTAL	PASSED
3295.511	-59.08	0.00124	-62.58	3.5	HORIZONTAL	PASSED

2.6. GSM 1900 test results

Channel 661 / 1880.0 MHz

Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
9103.046	-44.92	0.03221	-65.32	20.4	HORIZONTAL	PASSED
9590.942	-44.25	0.03758	-66.15	21.9	VERTICAL	PASSED
9668.417	-43.56	0.04406	-65.46	21.9	VERTICAL	PASSED
9802.405	-43.09	0.04909	-65.79	22.7	HORIZONTAL	PASSED
9855.271	-44.1	0.0389	-66.6	22.5	HORIZONTAL	PASSED
9933.667	-43.21	0.04775	-65.01	21.8	VERTICAL	PASSED

2.7. CDMA 800 test results

Channel 384 / 836.52 MHz

Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
817.913	-38.45	0.14289	-74.35	35.9	VERTICAL	PASSED
821.734	-45.23	0.02999	-80.83	35.6	HORIZONTAL	PASSED
822.453	-42.59	0.05508	-78.69	36.1	VERTICAL	PASSED
822.847	-39.79	0.10495	-75.89	36.1	VERTICAL	PASSED
823.664	-43.73	0.04236	-79.83	36.1	VERTICAL	PASSED
1670.415	-56.51	0.00223	-62.91	6.4	VERTICAL	PASSED
2499.86	-51.84	0.00655	-63.34	11.5	VERTICAL	PASSED
2501.324	-52.19	0.00604	-63.59	11.4	VERTICAL	PASSED
3345.98	-52.87	0.00516	-56.17	3.3	VERTICAL	PASSED

2.8. LTE2 test results

Channel 18900 / 1880.0 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1842.38	-63.59	0.00044	-72.99	9.4	HORIZONTAL	PASSED
1892.992	-60.12	0.00097	-69.92	9.8	HORIZONTAL	PASSED
1894.018	-60.45	0.0009	-70.15	9.7	HORIZONTAL	PASSED
1902.149	-61.3	0.00074	-70.7	9.4	HORIZONTAL	PASSED
1902.956	-61.51	0.00071	-71.01	9.5	HORIZONTAL	PASSED
1914.985	-63.1	0.00049	-72.5	9.4	HORIZONTAL	PASSED
3760.421	-54.12	0.00387	-60.62	6.5	HORIZONTAL	PASSED
5648.958	-61.87	0.00065	-72.17	10.3	HORIZONTAL	PASSED
7520.862	-55.77	0.00265	-72.17	16.4	HORIZONTAL	PASSED

Channel 18900 / 1880.0 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
3760.421	-54.84	0.00328	-61.34	6.5	HORIZONTAL	PASSED
5644.709	-62.24	0.0006	-72.44	10.2	HORIZONTAL	PASSED
7520.661	-55.51	0.00281	-71.91	16.4	HORIZONTAL	PASSED

2.9. LTE4 test results

Channel 20175 / 1732.5 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
3465.341	-60.54	0.00088	-66.34	5.8	HORIZONTAL	PASSED
5198.161	-60.73	0.00085	-71.23	10.5	VERTICAL	PASSED
6930.862	-56.36	0.00231	-69.16	12.8	HORIZONTAL	PASSED
8663.522	-56.47	0.00225	-75.67	19.2	HORIZONTAL	PASSED
10385	-53.4	0.00457	-76.1	22.7	VERTICAL	PASSED

Channel 20175 / 1732.5 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
3465.341	-60.95	0.0008	-66.75	5.8	HORIZONTAL	PASSED
5198.121	-61.21	0.00076	-71.71	10.5	VERTICAL	PASSED
6930.741	-56.75	0.00211	-69.55	12.8	HORIZONTAL	PASSED
8669.614	-56.8	0.00209	-76.1	19.3	HORIZONTAL	PASSED
10385.04	-53.82	0.00415	-76.52	22.7	VERTICAL	PASSED

2.10. LTE13 test results

Channel 23230 / 782 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
752.705	-49.45	0.01135	-83.45	34	VERTICAL	PASSED
769.5	-71.36	7E-05	-106.96	35.6	VERTICAL	PASSED
800.048	-72.48	6E-05	-106.98	34.5	VERTICAL	PASSED
1564.341	-65.46	0.00028	-71.16	5.7	HORIZONTAL	PASSED
1600.02	-67.6	0.00017	-73.9	6.3	HORIZONTAL	PASSED
2346.14	-71.53	7E-05	-82.53	11	HORIZONTAL	PASSED
3128.621	-76.19	2E-05	-80.29	4.1	HORIZONTAL	PASSED
7971.323	-67.26	0.00019	-82.56	15.3	HORIZONTAL	PASSED

Channel 23230 / 782 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
752.625	-49.46	0.01132	-83.46	34	VERTICAL	PASSED
769.5	-71.36	7E-05	-106.96	35.6	VERTICAL	PASSED
800.001	-72.49	6E-05	-106.99	34.5	VERTICAL	PASSED
1564.501	-65.94	0.00025	-71.64	5.7	HORIZONTAL	PASSED
1600.02	-67.6	0.00017	-73.9	6.3	HORIZONTAL	PASSED
2346.301	-71.53	7E-05	-82.53	11	HORIZONTAL	PASSED
3128.661	-75.55	3E-05	-79.65	4.1	HORIZONTAL	PASSED
7975.01	-66.85	0.00021	-82.55	15.7	VERTICAL	PASSED

2.11. CDMA 1900 test results

Channel 600 / 1880 MHz

Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1910.121	-52.54	0.00557	-62.44	9.9	VERTICAL	PASSED
1910.29	-43.23	0.04753	-52.73	9.5	HORIZONTAL	PASSED
3759.98	-48.27	0.01489	-54.77	6.5	HORIZONTAL	PASSED
5649.639	-50.05	0.00989	-60.65	10.6	VERTICAL	PASSED
9366.874	-43.69	0.04276	-65.29	21.6	VERTICAL	PASSED
9558.737	-43.6	0.04365	-65.2	21.6	HORIZONTAL	PASSED
9878.136	-43.54	0.04426	-65.34	21.8	HORIZONTAL	PASSED
9909.198	-42.51	0.0561	-64.71	22.2	HORIZONTAL	PASSED

2.12. WCDMA2 test results

Channel 9400 / 1880.0 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
3761.423	-49.12	0.01225	-55.62	6.5	HORIZONTAL	PASSED
5635.371	-51.08	0.0078	-61.38	10.3	VERTICAL	PASSED
7525.391	-47.74	0.01683	-64.24	16.5	HORIZONTAL	PASSED
9395.611	-44.51	0.0354	-65.51	21	HORIZONTAL	PASSED
9469.76	-43.82	0.0415	-65.42	21.6	HORIZONTAL	PASSED
9560.06	-43.36	0.04613	-64.96	21.6	HORIZONTAL	PASSED
9788.397	-43.14	0.04853	-65.44	22.3	VERTICAL	PASSED
9859.659	-43.29	0.04688	-65.69	22.4	HORIZONTAL	PASSED
9943.667	-41.56	0.06982	-63.76	22.2	HORIZONTAL	PASSED
9955.21	-42.19	0.06039	-64.39	22.2	HORIZONTAL	PASSED
11272.004	-41.37	0.07295	-64.87	23.5	HORIZONTAL	PASSED
13167.114	-51.71	0.00675	-68.41	16.7	VERTICAL	PASSED
15035.01	-51.03	0.00789	-71.73	20.7	HORIZONTAL	PASSED

16928.798	-49.4	0.01148	-72.3	22.9	VERTICAL	PASSED
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2.13. WCDMA5 test results

Channel 4175 / 835.0 MHz

FDD mode, Peak detector

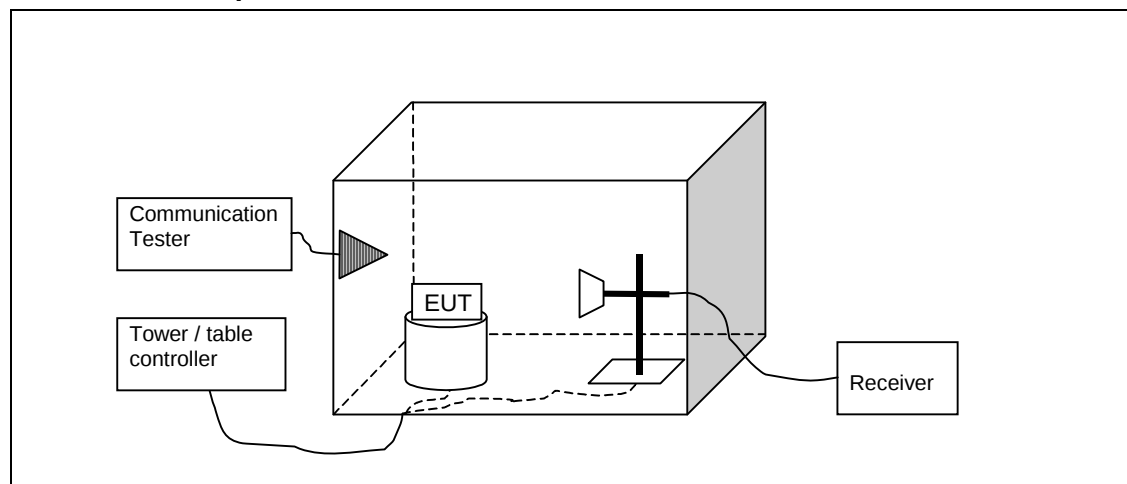
Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
821.338	-44.41	0.03622	-80.51	36.1	VERTICAL	PASSED
821.638	-44.33	0.0369	-80.43	36.1	VERTICAL	PASSED
848.462	-44.37	0.03656	-78.77	34.4	HORIZONTAL	PASSED
850.041	-45.42	0.02871	-79.92	34.5	HORIZONTAL	PASSED
993.069	-40.44	0.09036	-79.74	39.3	VERTICAL	PASSED
999.851	-40.41	0.09099	-79.71	39.3	VERTICAL	PASSED
1679.559	-56.96	0.00201	-63.56	6.6	VERTICAL	PASSED
2507.265	-50.56	0.00879	-62.46	11.9	HORIZONTAL	PASSED
3335.13	-52.6	0.0055	-55.9	3.3	HORIZONTAL	PASSED
4177.465	-58.41	0.00144	-63.81	5.4	HORIZONTAL	PASSED
5018.717	-54.24	0.00377	-62.74	8.5	VERTICAL	PASSED
5837.164	-53.63	0.00434	-61.93	8.3	HORIZONTAL	PASSED
6680.782	-49.55	0.01109	-59.95	10.4	VERTICAL	PASSED
7513.176	-50.15	0.00966	-63.95	13.8	VERTICAL	PASSED
8342.926	-49.22	0.01197	-64.82	15.6	HORIZONTAL	PASSED

3. Radiated RF output power

(FCC §22.913(a), §27.50(b)(10), §27.50(d)(4), §24.232(b), RSS-132 4.4, RSS-133 6.4, RSS-139 6.4, RSS-130 4.4)

EUT with DUT number	RM-1041, DUT 18673
Accessories with DUT numbers	BV-T5A, DUT 18674
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	17 / 45 / 101.4
Date of measurements	05-Oct-2014 – 13-Oct-2014
Measured by	Sami Lehtonen / Kalle Hannila

3.1.1 Test setup



3.2. Test method and limit

The measurement is made according to TIA-603-C-2004 as follows:

The measurement is performed in the Anechoic Chamber with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system. The turntable is rotated 360 degrees and this is repeated for both horizontal and vertical receive antenna polarizations.

The EUT is placed on a nonconductive plate at 170 cm height.

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

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

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

Limits for radiated RF output power measurements

Frequency range [MHz]	Limit [W]	Limit [dBm]
824 - 849	7 ERP	38.5
1850 - 1910	2 EIRP	33
777 - 787	3 ERP	34.8

3.3. GSM 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
128 / 824.2	31.3	1.349	-3.79	-10	-51.49	-2.7	3.7	VERTICAL	PASSED
190 / 836.6	30.88	1.225	-3.3	-10	-50.68	-2.8	3.7	VERTICAL	PASSED
251 / 848.8	30.02	1.005	-3.21	-10	-50.33	-3.4	3.7	HORIZONTAL	PASSED

3.4. GSM 850 E-GPRS (MSC9) 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
128 / 824.2	27.91	0.618	-7.18	-10	-51.49	-2.7	3.7	VERTICAL	PASSED
190 / 836.6	27.62	0.578	-6.56	-10	-50.68	-2.8	3.7	VERTICAL	PASSED
251 / 848.8	27.9	0.617	-5.33	-10	-50.33	-3.4	3.7	VERTICAL	PASSED

3.5. GSM 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
512 / 1850.2	29.26	0.843	-13.59	-10	-50.35	8.1	5.6	VERTICAL	PASSED
661 / 1880	28.62	0.728	-14.12	-10	-50.34	8	5.6	VERTICAL	PASSED
810 / 1909.8	29.51	0.893	-13.77	-10	-50.98	8	5.7	VERTICAL	PASSED

3.6. GSM 1900 E-GPRS (MSC9) 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
512 / 1850.2	24.75	0.299	-18.1	-10	-50.35	8.1	5.6	VERTICAL	PASSED
661 / 1880	24.48	0.281	-18.26	-10	-50.34	8	5.6	VERTICAL	PASSED
810 / 1909.8	25.73	0.374	-17.55	-10	-50.98	8	5.7	VERTICAL	PASSED

3.7. CDMA 800 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
1013 / 824.7	22.2	0.166	-12.67	-10	-51.27	-2.7	3.7	HORIZONTAL	PASSED
384 / 836.52	21	0.126	-13.18	-10	-50.68	-2.8	3.7	HORIZONTAL	PASSED
777 / 848.31	21.43	0.139	-12.72	-10	-51.25	-3.4	3.7	HORIZONTAL	PASSED

3.8. WCDMA2 test results

RMS detector

Channel / f_c [MHz]	EIRP [dBm]	EIRP [W]	P_{MEAS} [dBm]	$P_{SUBST\ TX}$ [dBm]	$P_{SUBST\ RX}$ [dBm]	$G_{SUBST\ TX\ ANT}$ [dBi]	$L_{SUBST\ CABLE}$ [dB]	Polarisation	Result
9262 / 1852.4	22.32	0.171	-19.93	-10	-49.75	8.1	5.6	HORIZONTAL	PASSED
9400 / 1880	22.02	0.159	-20.32	-10	-49.94	8	5.6	HORIZONTAL	PASSED
9538 / 1907.6	21.15	0.130	-21.5	-10	-50.35	8	5.7	HORIZONTAL	PASSED

3.9. WCDMA5 test results

RMS detector

Channel / f_c [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	$P_{SUBST\ TX}$ [dBm]	$P_{SUBST\ RX}$ [dBm]	$G_{SUBST\ TX\ ANT}$ [dBd]	$L_{SUBST\ CABLE}$ [dB]	Polarisation	Result
4132 / 826.4	22.28	0.169	-12.8	-10	-51.48	-2.7	3.7	VERTICAL	PASSED
4183 / 836.6	21.88	0.154	-12.43	-10	-50.81	-2.8	3.7	VERTICAL	PASSED
4233 / 846.6	20.81	0.121	-12.29	-10	-50.2	-3.3	3.8	VERTICAL	PASSED

3.10. LTE2 test results

FDD, CBW 5MHz, QPSK, 1RB mid, 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
18625 / 1852.5	25	0.316228	-19.45	-10	-49.83	10.22	5.6	HORIZONTAL	PASSED

18900 / 1880	24.17	0.261216	-20.41	-10	-50	10.18	5.6	HORIZONTAL	PASSED
19175 / 1907.5	23.08	0.203236	-21.7	-10	-50.3	10.18	5.7	HORIZONTAL	PASSED

FDD, CBW 5MHz, 16QAM, 1RB mid, 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
18625 / 1852.5	25.05	0.31989	-19.4	-10	-49.83	10.22	5.6	HORIZONTAL	PASSED
18900 / 1880	24.15	0.260016	-20.43	-10	-50	10.18	5.6	HORIZONTAL	PASSED
19175 / 1907.5	23.15	0.206538	-21.63	-10	-50.3	10.18	5.7	HORIZONTAL	PASSED

3.11. LTE4 test results

FDD, CBW 5MHz, QPSK, 1RB mid, 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
19975 / 1712.5	25.38	0.345144	-18.52	-10	-49.25	9.95	5.3	HORIZONTAL	PASSED
20175 / 1732.5	25.58	0.36141	-18.17	-10	-49.2	9.95	5.4	HORIZONTAL	PASSED
20375 / 1752.5	25.08	0.322107	-18.97	-10	-49.5	9.95	5.4	HORIZONTAL	PASSED

FDD, CBW 5MHz, 16QAM, 1RB mid, 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
19975 / 1712.5	25.48	0.353183	-18.42	-10	-49.25	9.95	5.3	HORIZONTAL	PASSED
20175 / 1732.5	25.57	0.360579	-18.18	-10	-49.2	9.95	5.4	HORIZONTAL	PASSED
20375 / 1752.5	25.18	0.32961	-18.87	-10	-49.5	9.95	5.4	HORIZONTAL	PASSED

3.12. LTE13 test results

FDD, CBW 5MHz, QPSK, 1RB mid, 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
23205 / 779.5	19.99	0.09977	-15.06	-10	-50.85	-2.2	3.6	VERTICAL	PASSED
23230 / 782	20.35	0.108393	-14.62	-10	-50.77	-2.2	3.6	VERTICAL	PASSED
23255 / 784.5	20.3	0.107152	-14.8	-10	-51	-2.3	3.6	HORIZONTAL	PASSED

FDD, CBW 5MHz, 16QAM, 1RB mid, 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
23205 / 779.5	20.33	0.107895	-14.72	-10	-50.85	-2.2	3.6	VERTICAL	PASSED
23230 / 782	20.46	0.111173	-14.51	-10	-50.77	-2.2	3.6	VERTICAL	PASSED
23255 / 784.5	21.01	0.126183	-14.09	-10	-51	-2.3	3.6	VERTICAL	PASSED

3.13. CDMA 1900 test results

RMS detector

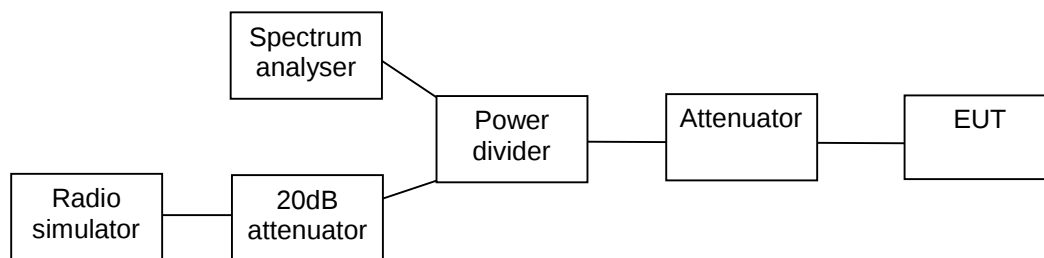
Channel / f_c [MHz]	EIRP [dBm]	EIRP [W]	P_{MEAS} [dBm]	$P_{SUBST\ TX}$ [dBm]	$P_{SUBST\ RX}$ [dBm]	$G_{SUBST\ TX\ ANT}$ [dBi]	$L_{SUBST\ CABLE}$ [dB]	Polarisation	Result
25 / 1851.25	22.6	0.182	-19.71	-10	-49.81	8.1	5.6	HORIZONTAL	PASSED
600 / 1880	20.92	0.124	-20.93	-10	-49.45	8	5.6	HORIZONTAL	PASSED
1175 / 1908.75	20.76	0.119	-21.89	-10	-50.35	8	5.7	HORIZONTAL	PASSED

4. 99 % occupied bandwidth

(FCC §2.1049(h), RSS-132 4.6.1, RSS-133 4.6.1, RSS-130 4.6.1, RSS-139 4.6.1)

EUT with DUT number	RM-1041, DUT 18639
Accessories with DUT numbers	SD-233R, DUT 18640 ; WH-108, DUT 18641
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 45 / 103.4
Date of measurements	01-Oct-2014
Measured by	Jari Keto

4.1. Test Setup



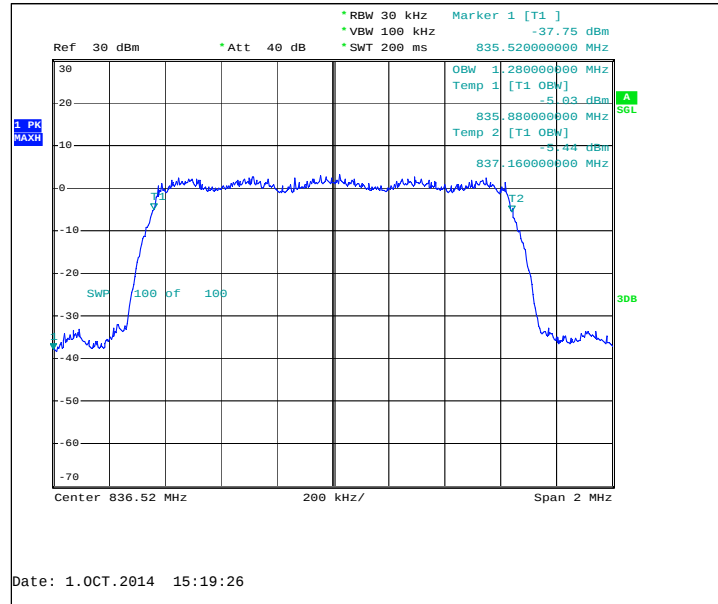
4.2. Test method and limit

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

4.3. CDMA 800 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
CDMA	1280

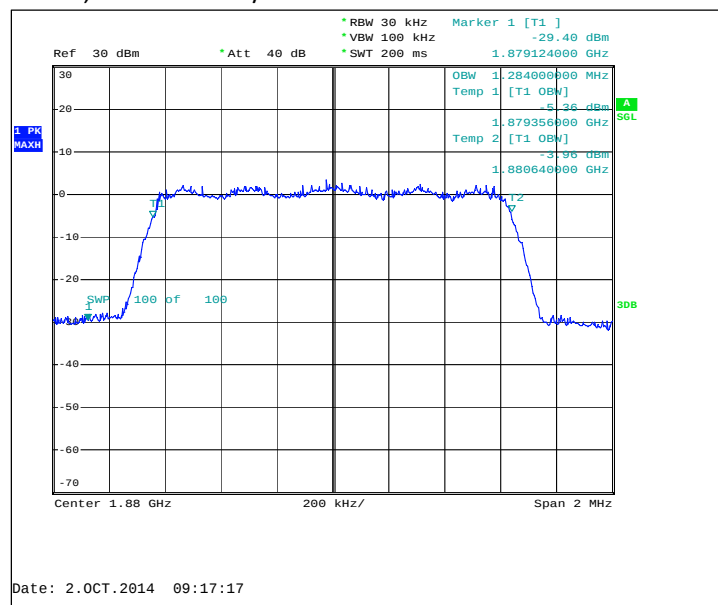
CDMA, Channel 384 / 836.52 MHz



4.4. CDMA 1900 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
CDMA	1284

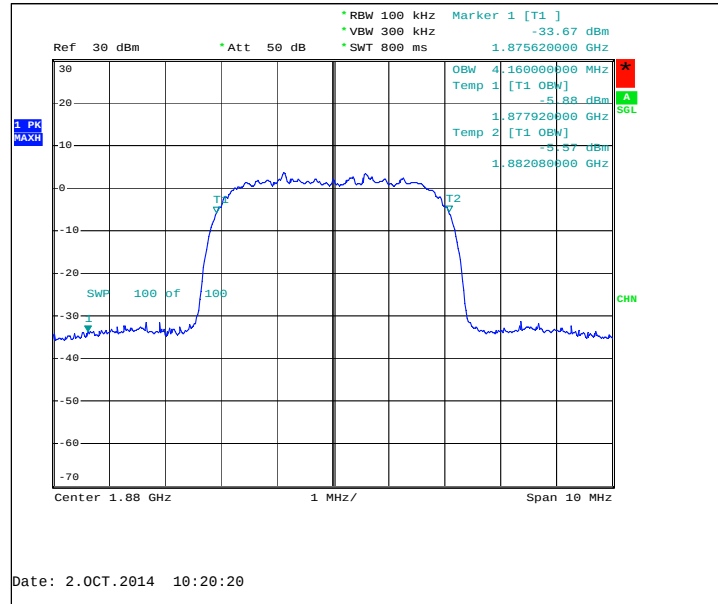
CDMA, Channel 600 / 1880.0 MHz



4.5. WCDMA2 Test results

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

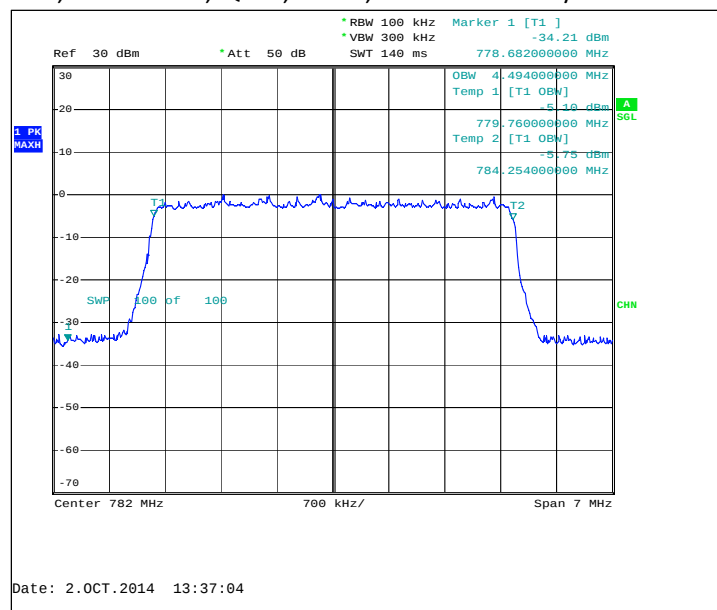
FDD, Channel 9400 / 1880.0 MHz



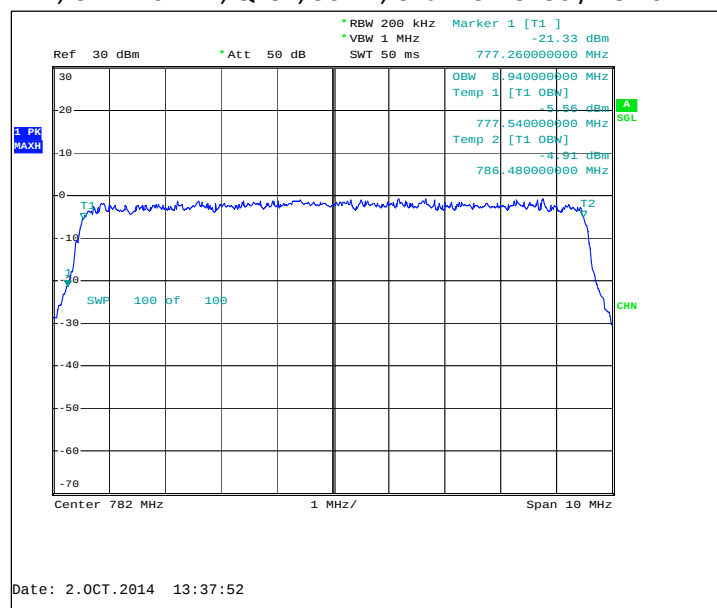
4.6. LTE13 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 5MHz, QPSK, 25 RB	4494
FDD, CBW 10MHz, QPSK, 50 RB	8940
FDD, CBW 5MHz, 16QAM, 25 RB	4494
FDD, CBW 10MHz, 16QAM, 50 RB	8940

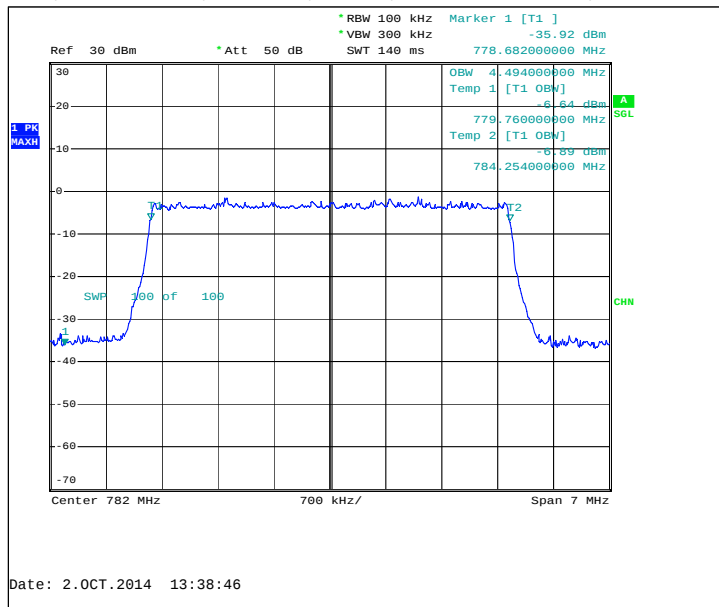
FDD, CBW 5MHz, QPSK, 25 RB, Channel 23230 / 782.0 MHz



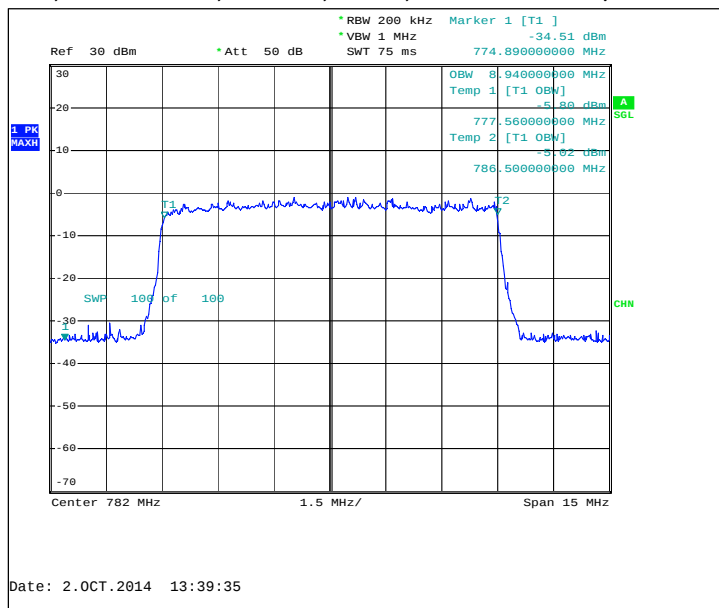
FDD, CBW 10MHz, QPSK, 50 RB, Channel 23230 / 782.0 MHz



FDD, CBW 5MHz, 16QAM, 25 RB, Channel 23230 / 782.0 MHz



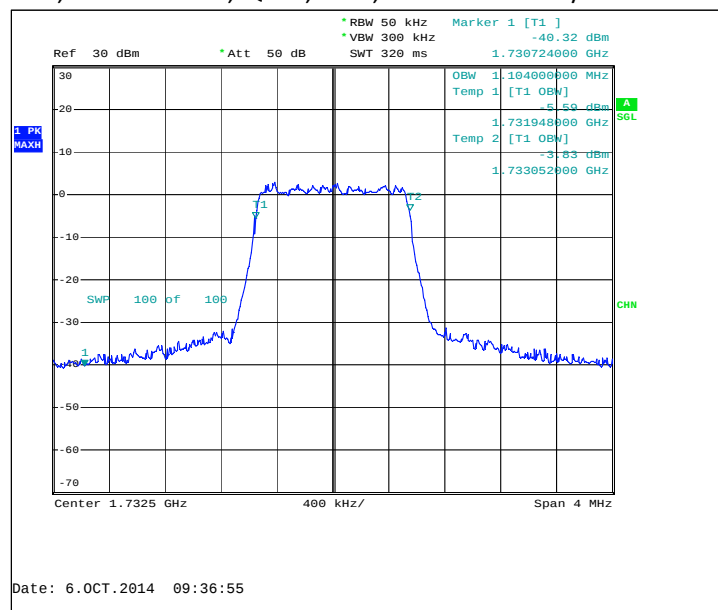
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 23230 / 782.0 MHz



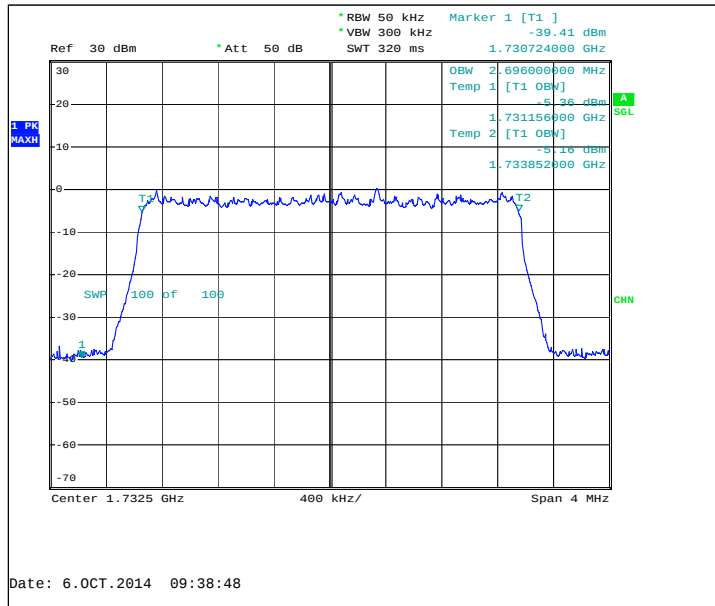
4.7. LTE4 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 1.4MHz, QPSK, 6 RB	1104
FDD, CBW 3MHz, QPSK, 15 RB	2696
FDD, CBW 5MHz, QPSK, 25 RB	4508
FDD, CBW 10MHz, QPSK, 50 RB	8970
FDD, CBW 15MHz, QPSK, 75 RB	13400
FDD, CBW 20MHz, QPSK, 100 RB	17850
FDD, CBW 1.4MHz, 16QAM, 6 RB	1104
FDD, CBW 3MHz, 16QAM, 15 RB	2688
FDD, CBW 5MHz, 16QAM, 25 RB	4480
FDD, CBW 10MHz, 16QAM, 50 RB	8970
FDD, CBW 15MHz, 16QAM, 75 RB	13400
FDD, CBW 20MHz, 16QAM, 100 RB	17900

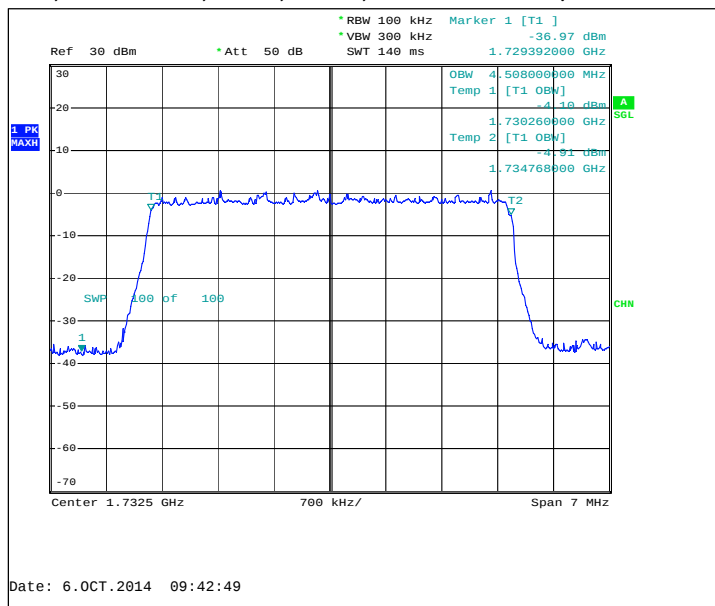
FDD, CBW 1.4MHz, QPSK, 6 RB, Channel 20175 / 1732.5 MHz



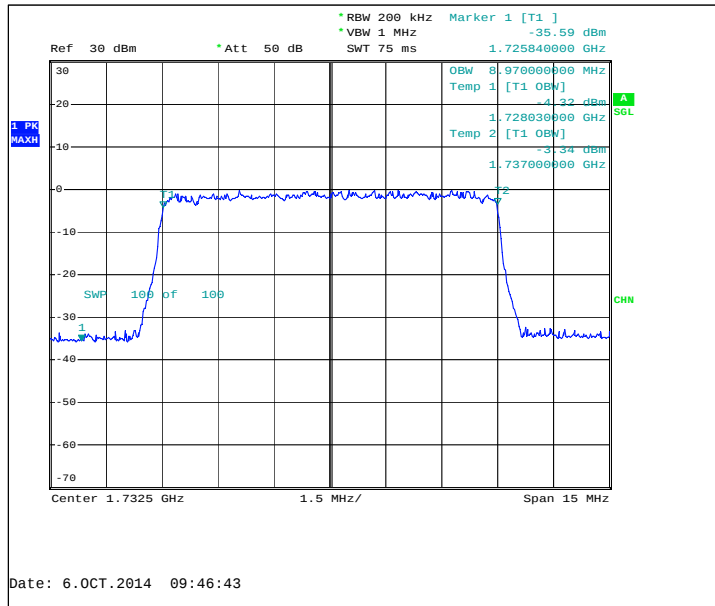
FDD, CBW 3MHz, QPSK, 15 RB, Channel 20175 / 1732.5 MHz



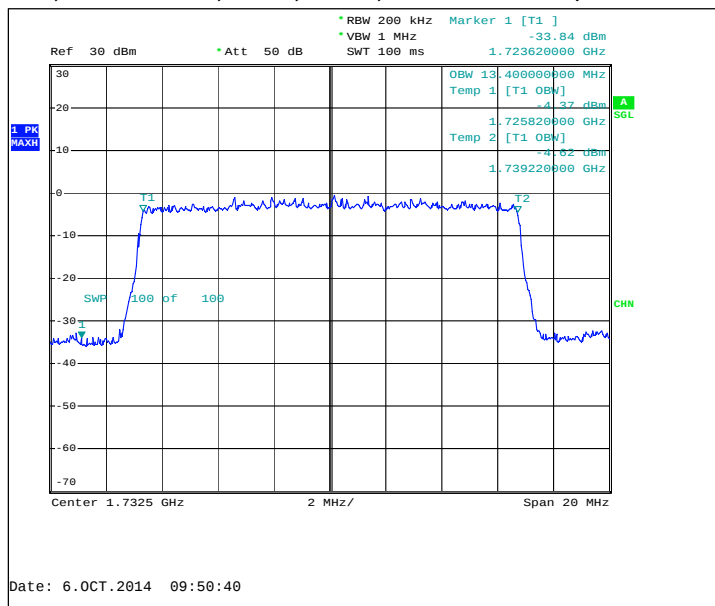
FDD, CBW 5MHz, QPSK, 25 RB, Channel 20175 / 1732.5 MHz



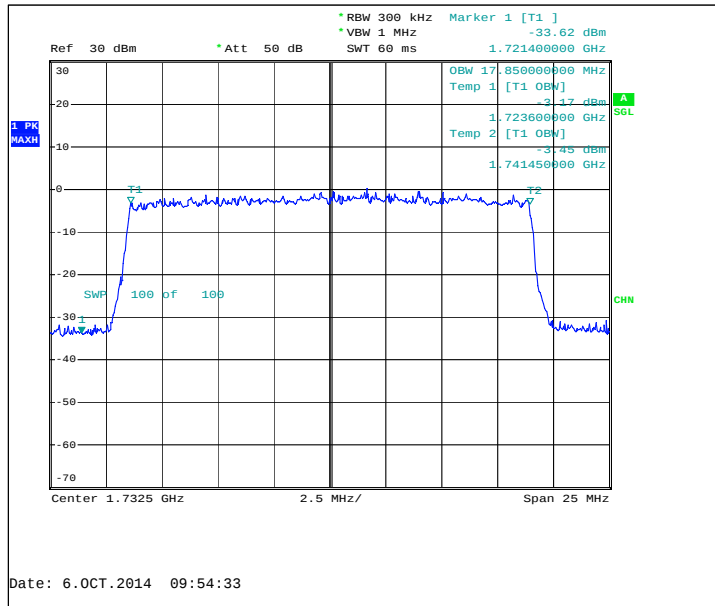
FDD, CBW 10MHz, QPSK, 50 RB, Channel 20175 / 1732.5 MHz



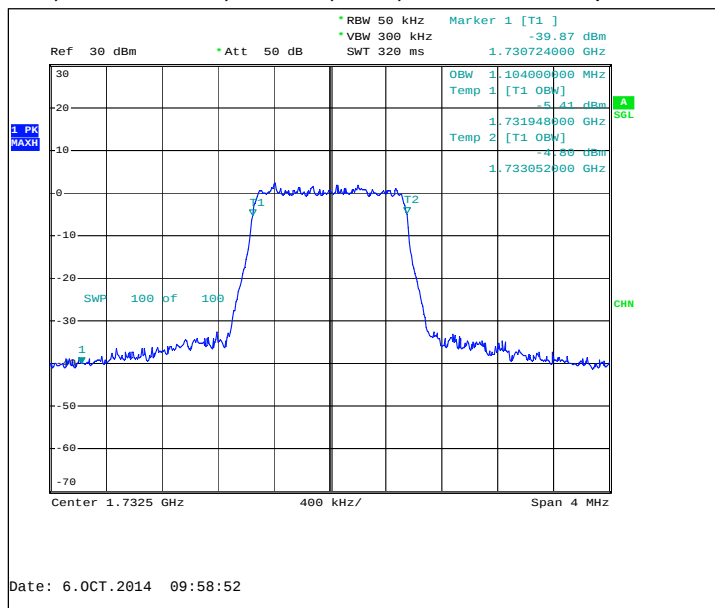
FDD, CBW 15MHz, QPSK, 75 RB, Channel 20175 / 1732.5 MHz



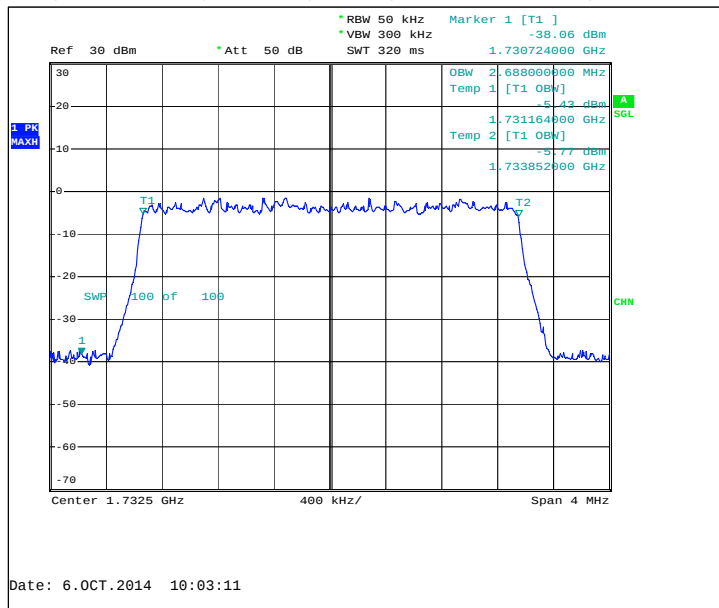
FDD, CBW 20MHz, QPSK, 100 RB, Channel 20175 / 1732.5 MHz



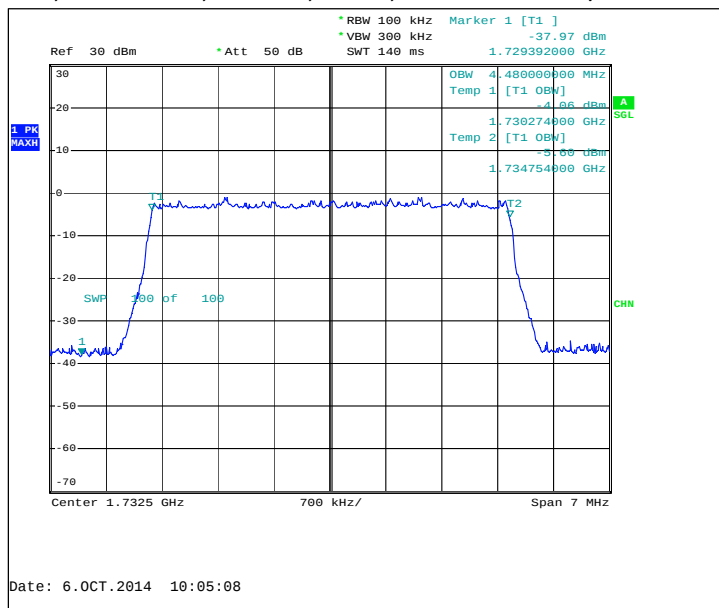
FDD, CBW 1.4MHz, 16QAM, 6 RB, Channel 20175 / 1732.5 MHz



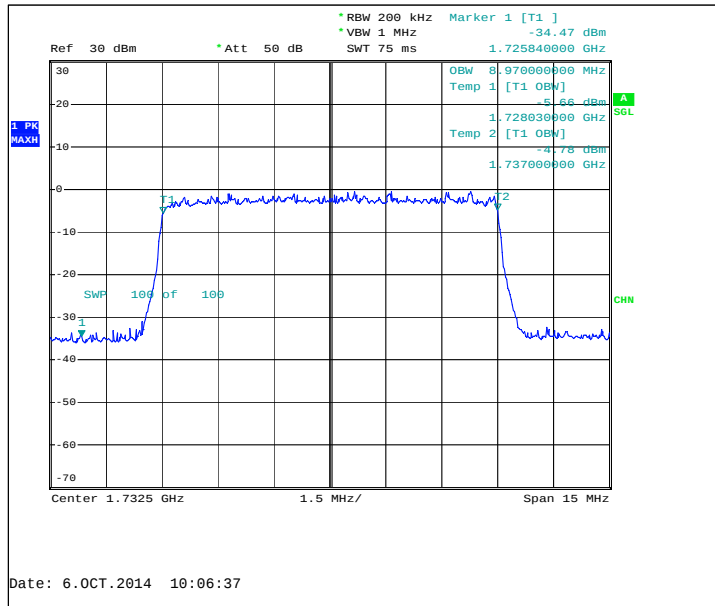
FDD, CBW 3MHz, 16QAM, 15 RB, Channel 20175 / 1732.5 MHz



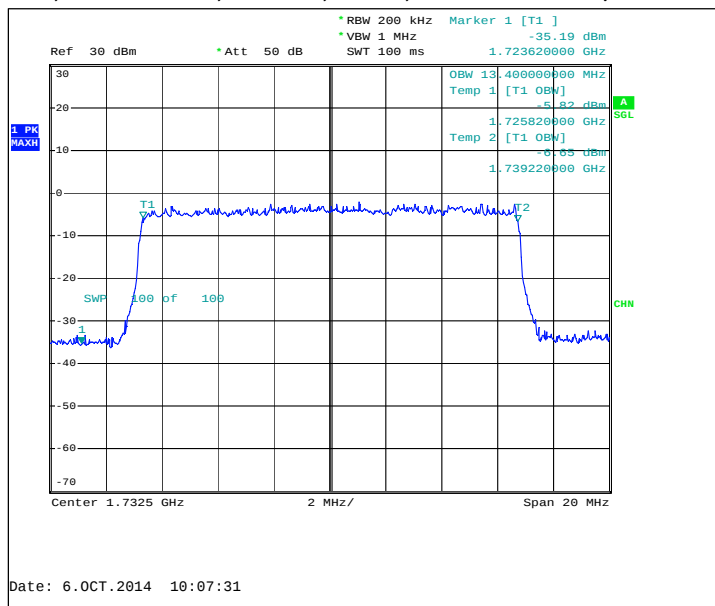
FDD, CBW 5MHz, 16QAM, 25 RB, Channel 20175 / 1732.5 MHz



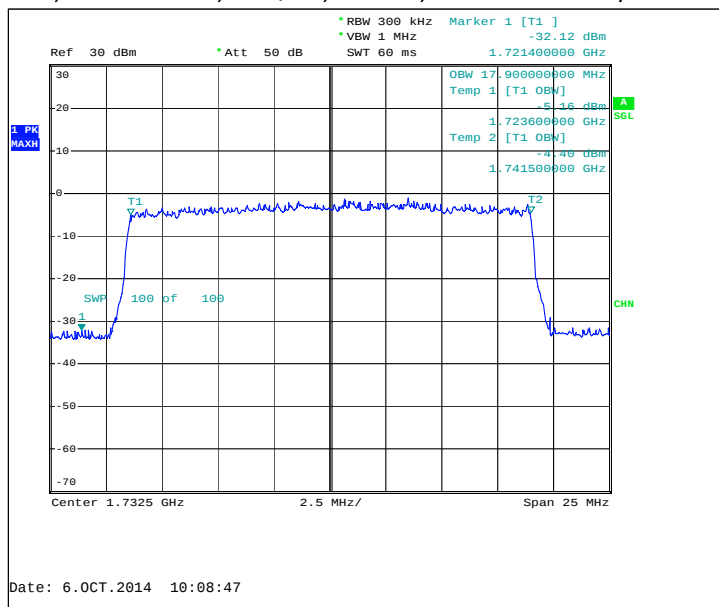
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 20175 / 1732.5 MHz



FDD, CBW 15MHz, 16QAM, 75 RB, Channel 20175 / 1732.5 MHz



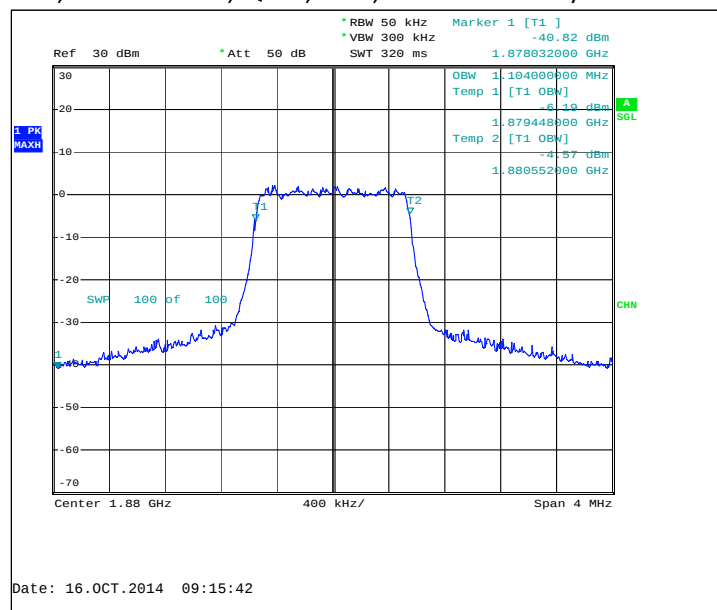
FDD, CBW 20MHz, 16QAM, 100 RB, Channel 20175 / 1732.5 MHz



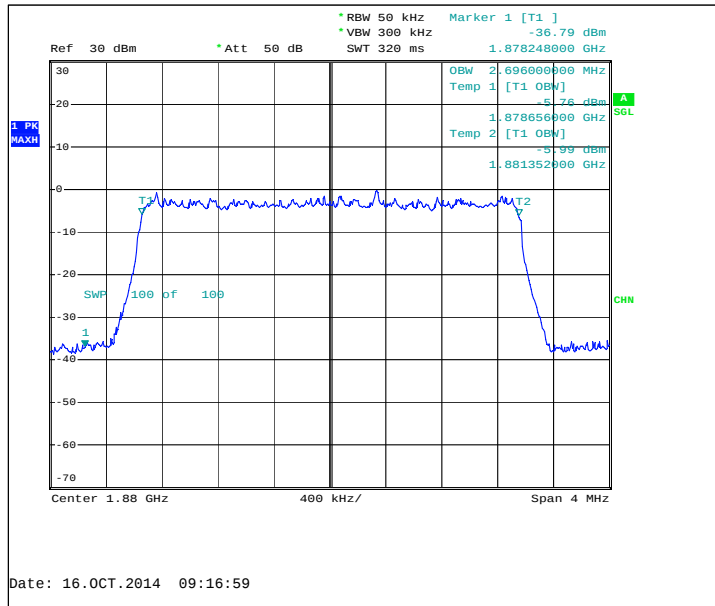
4.8. LTE2 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 1.4MHz, QPSK, 6 RB	1104
FDD, CBW 3MHz, QPSK, 15 RB	2696
FDD, CBW 5MHz, QPSK, 25 RB	4494
FDD, CBW 10MHz, QPSK, 50 RB	8970
FDD, CBW 15MHz, QPSK, 75 RB	13440
FDD, CBW 20MHz, QPSK, 100 RB	17900
FDD, CBW 1.4MHz, 16QAM, 6 RB	1112
FDD, CBW 3MHz, 16QAM, 15 RB	2688
FDD, CBW 5MHz, 16QAM, 25 RB	4480
FDD, CBW 10MHz, 16QAM, 50 RB	8970
FDD, CBW 15MHz, 16QAM, 75 RB	13400
FDD, CBW 20MHz, 16QAM, 100 RB	17900

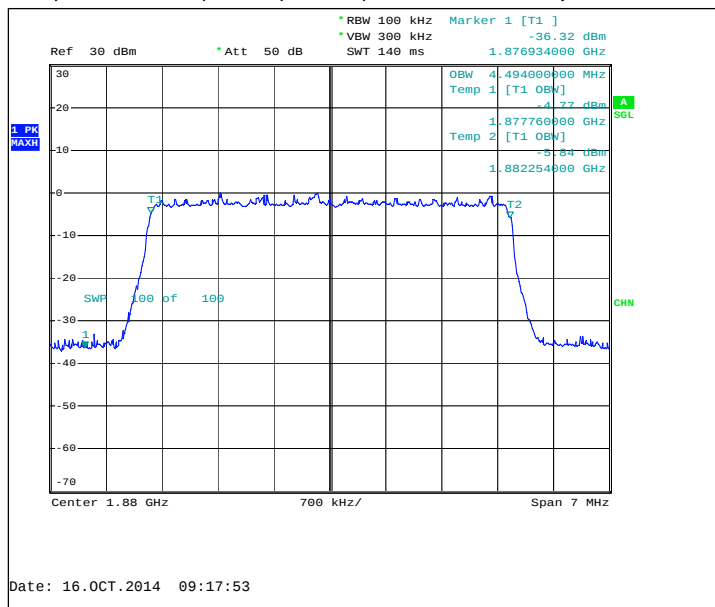
FDD, CBW 1.4MHz, QPSK, 6 RB, Channel 18900 / 1880.0 MHz



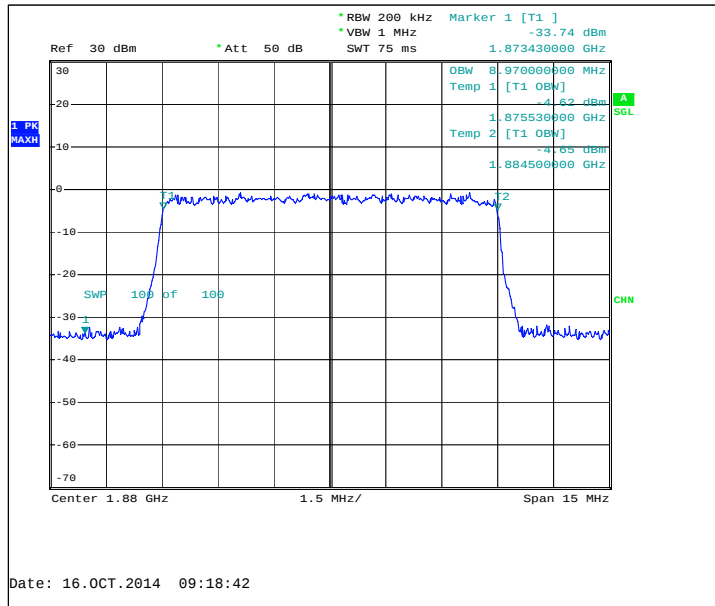
FDD, CBW 3MHz, QPSK, 15 RB, Channel 18900 / 1880.0 MHz



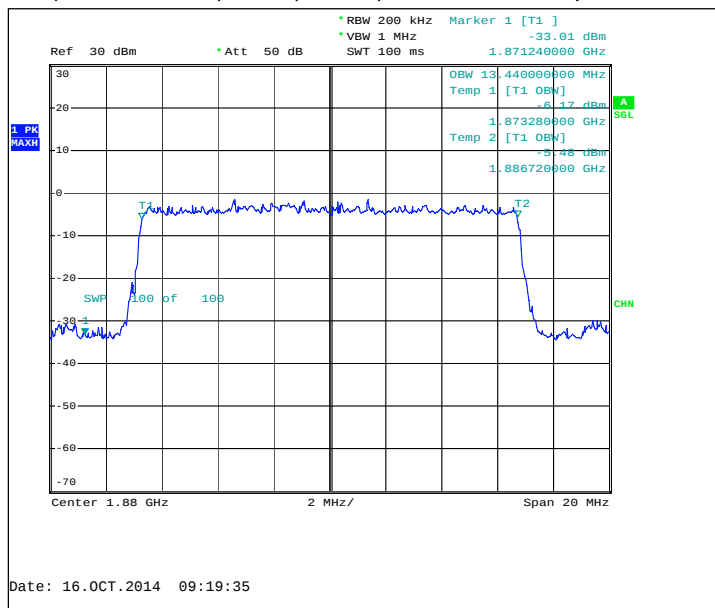
FDD, CBW 5MHz, QPSK, 25 RB, Channel 18900 / 1880.0 MHz



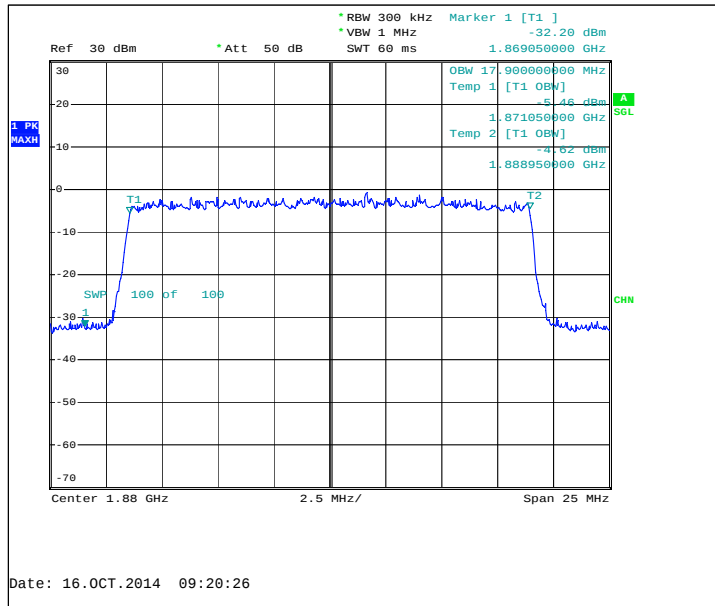
FDD, CBW 10MHz, QPSK, 50 RB, Channel 18900 / 1880.0 MHz



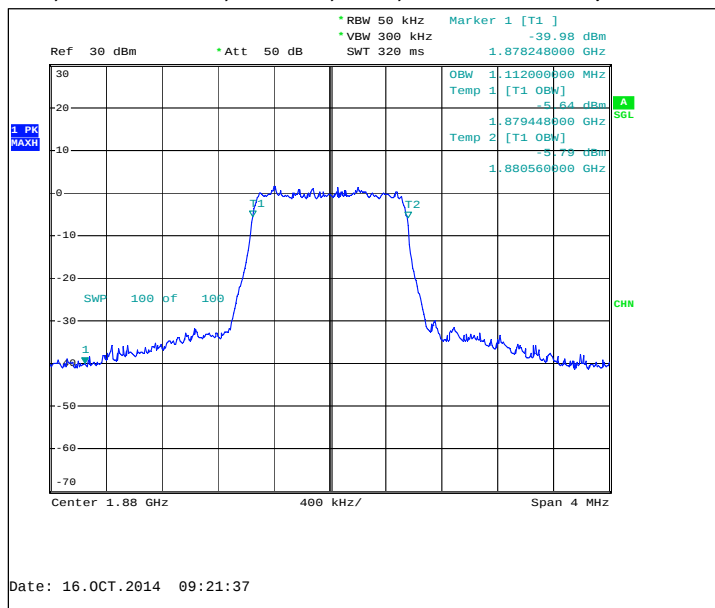
FDD, CBW 15MHz, QPSK, 75 RB, Channel 18900 / 1880.0 MHz



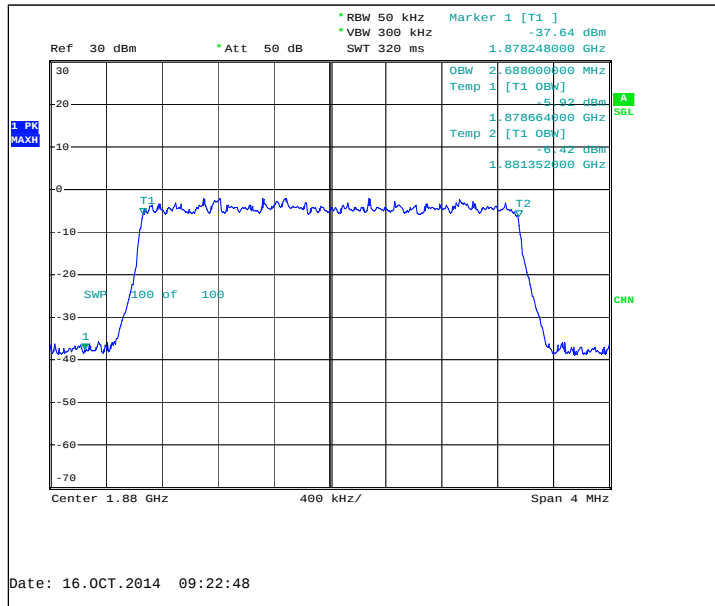
FDD, CBW 20MHz, QPSK, 100 RB, Channel 18900 / 1880.0 MHz



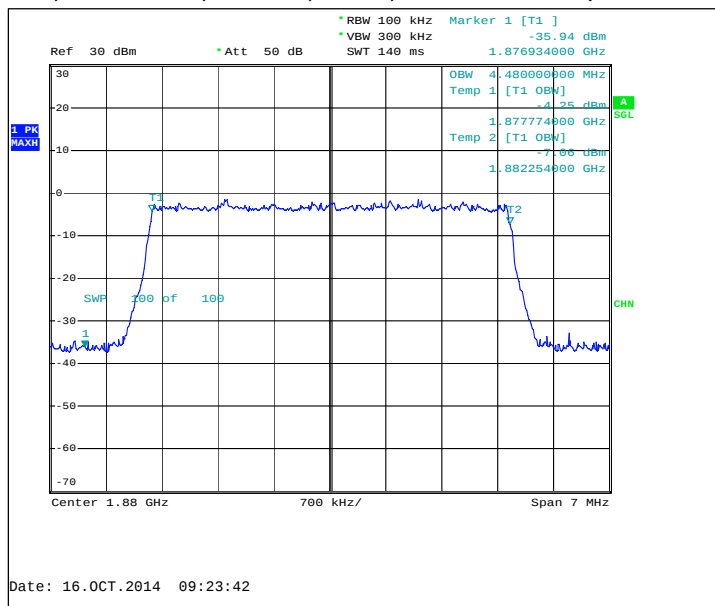
FDD, CBW 1.4MHz, 16QAM, 6 RB, Channel 18900 / 1880.0 MHz



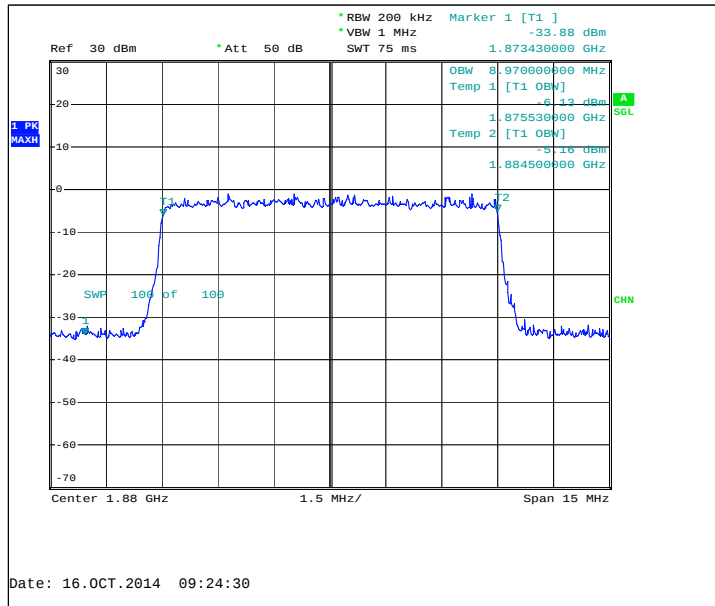
FDD, CBW 3MHz, 16QAM, 15 RB, Channel 18900 / 1880.0 MHz



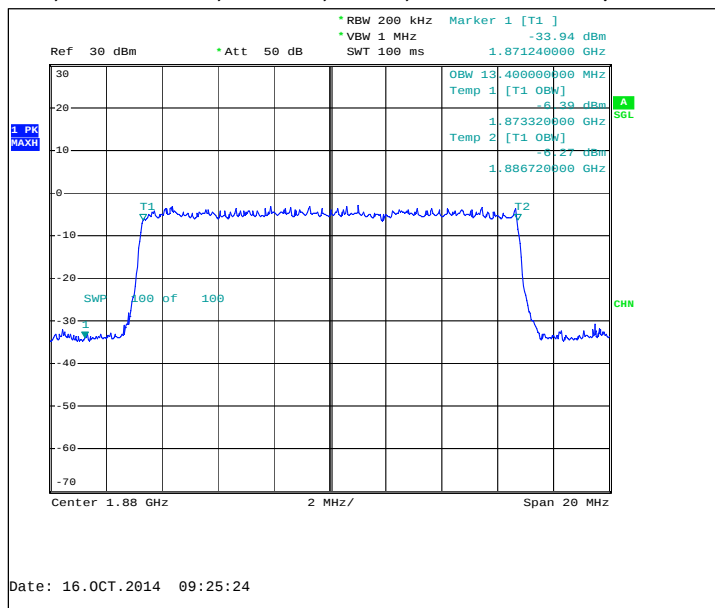
FDD, CBW 5MHz, 16QAM, 25 RB, Channel 18900 / 1880.0 MHz



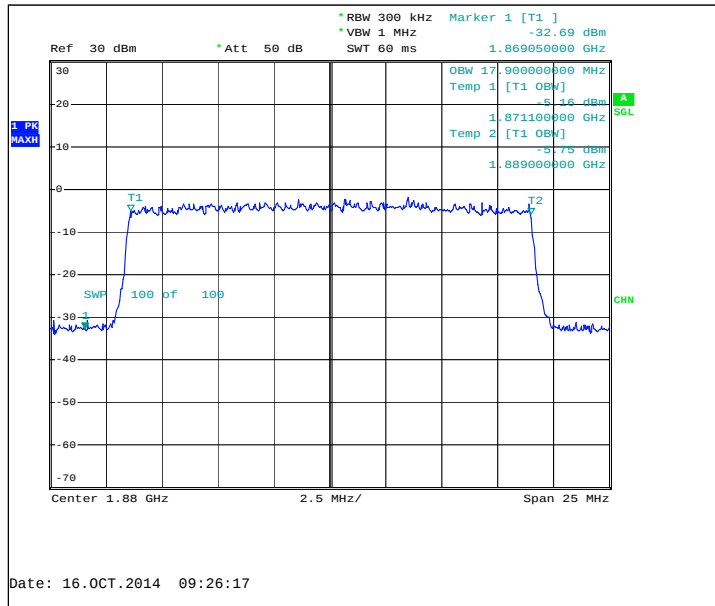
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 18900 / 1880.0 MHz



FDD, CBW 15MHz, 16QAM, 75 RB, Channel 18900 / 1880.0 MHz



FDD, CBW 20MHz, 16QAM, 100 RB, Channel 18900 / 1880.0 MHz

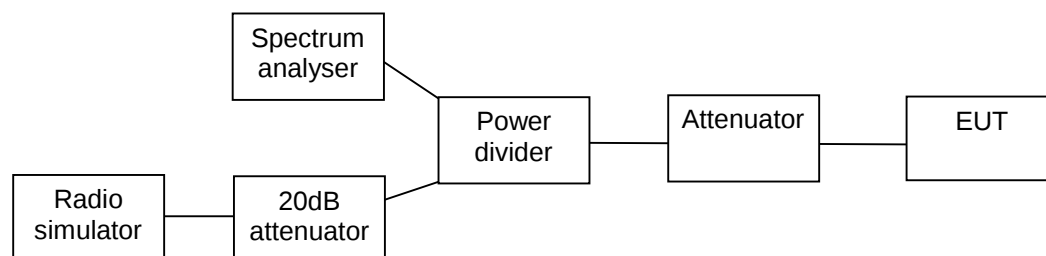


5. Band edge compliance

(FCC §22.917(a), §27.53(h), §27.53(c)(2)(4), §24.238(a), RSS-132 4.5, RSS-133 6.5, RSS-130 4.6, RSS-139 6.5)

EUT with DUT number	RM-1041, DUT 18639
Accessories with DUT numbers	SD-233R, DUT 18640 ; WH-108, DUT 18641
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 45 / 103.4
Date of measurements	01-Oct-2014
Measured by	Jari Keto

5.1. Test Setup



5.2. Test method and limit

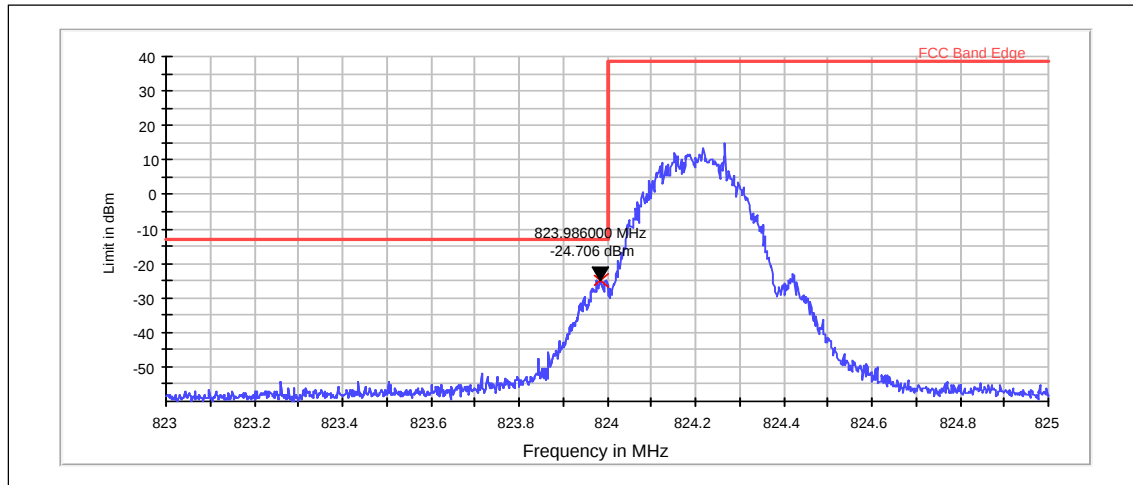
The measurement is made according to applicable FCC rule parts and IC standards.

Limits for band edge compliance measurements

Operation band	Frequency range [MHz]	Limit [dBm]
GSM 850	Below 824 and above 849	-13
WCDMA5	Below 824 and above 849	-13
CDMA 800	Below 824 and above 849	-13
CDMA 1900	Below 1850 and above 1910	-13
GSM 1900	Below 1850 and above 1910	-13
WCDMA2	Below 1850 and above 1910	-13
LTE13	776.9 - 777 and 787 - 787.1 Below 776.9 and above 787.1 763-775 and 793-805	-13 (RBW = 30 kHz, VBW = 100 kHz) -13 (RBW = 100 kHz, VBW = 300 kHz) -35 (RBW = 10 kHz, VBW = 30 kHz)
LTE2	Below 1850 and above 1910	-13
LTE4	Below 1710 and above 1755	-13

5.3. GSM 850 Test results

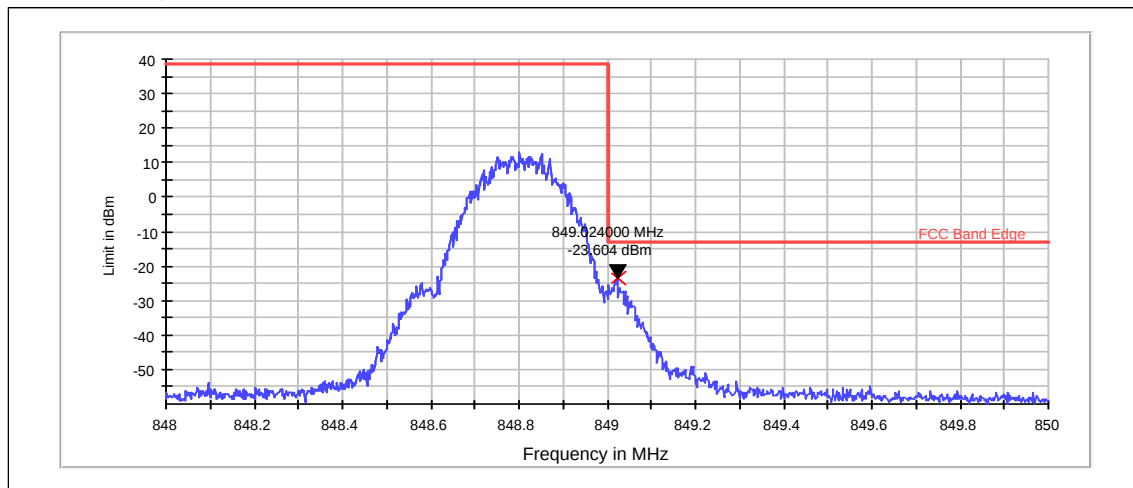
Channel 128 / 824.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	823.986	-24.71	PASSED

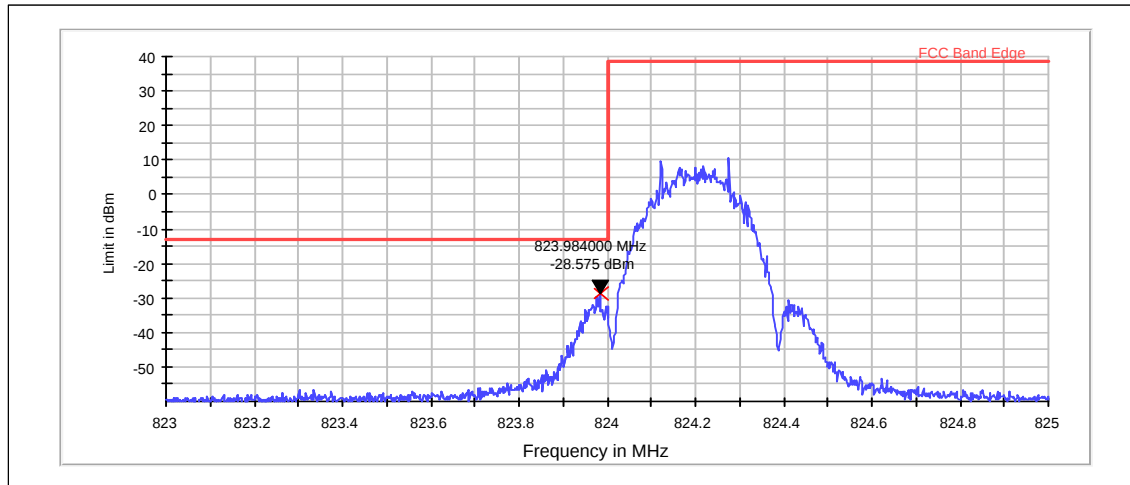
Channel 251 / 848.8 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	849.024	-23.60	PASSED

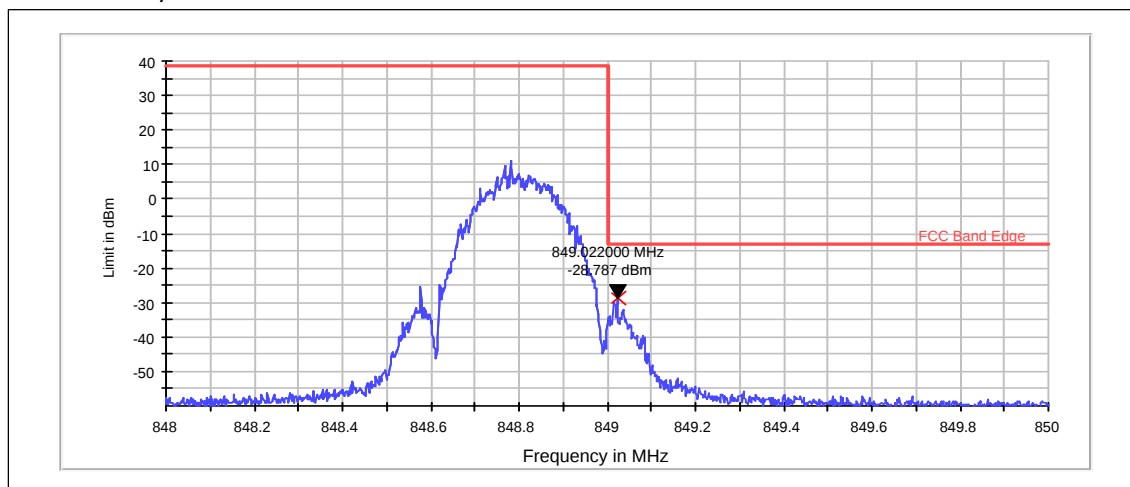
Channel 128 / 824.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	823.984	-28.57	PASSED

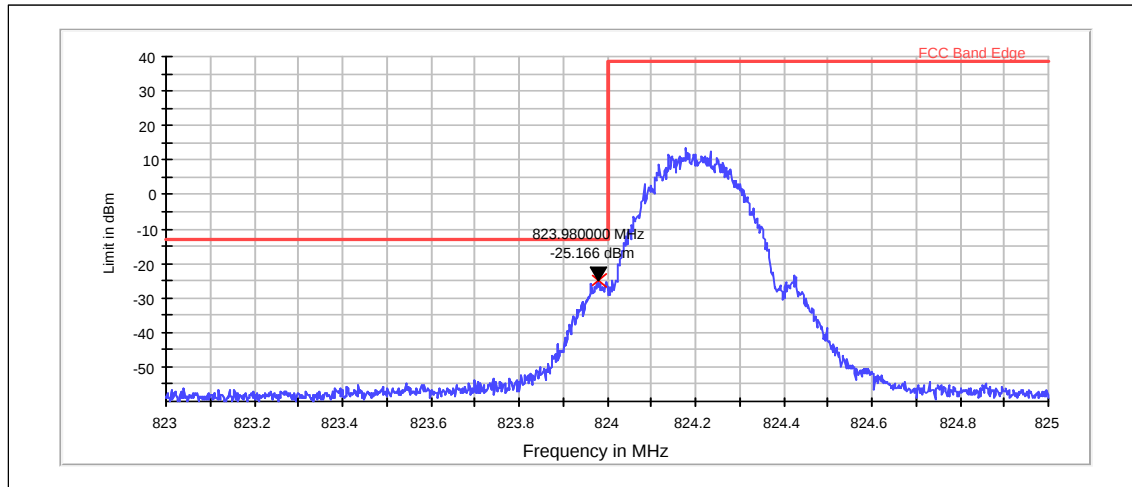
Channel 251 / 848.8 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	849.022	-28.79	PASSED

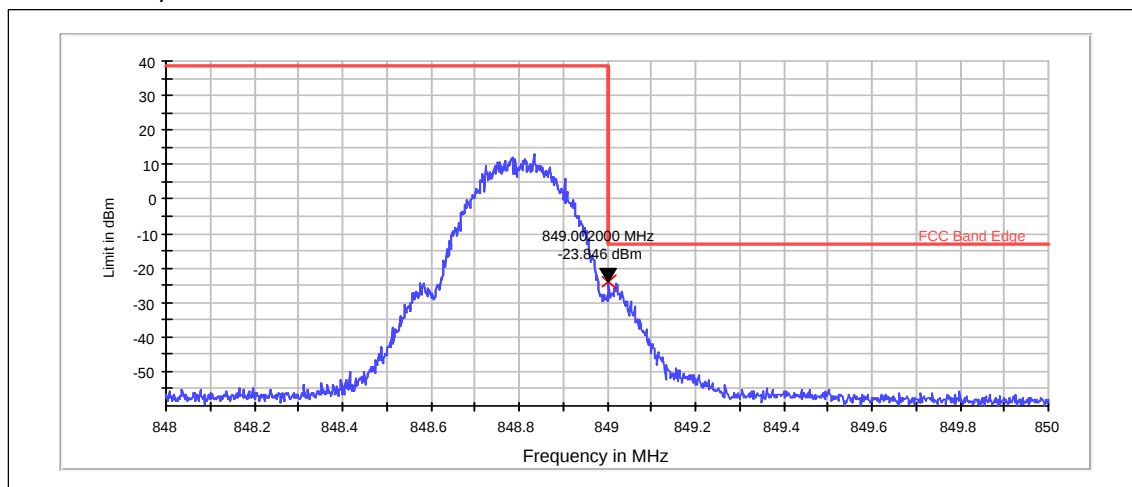
Channel 128 / 824.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GPRS	823.980	-25.17	PASSED

Channel 251 / 848.8 MHz

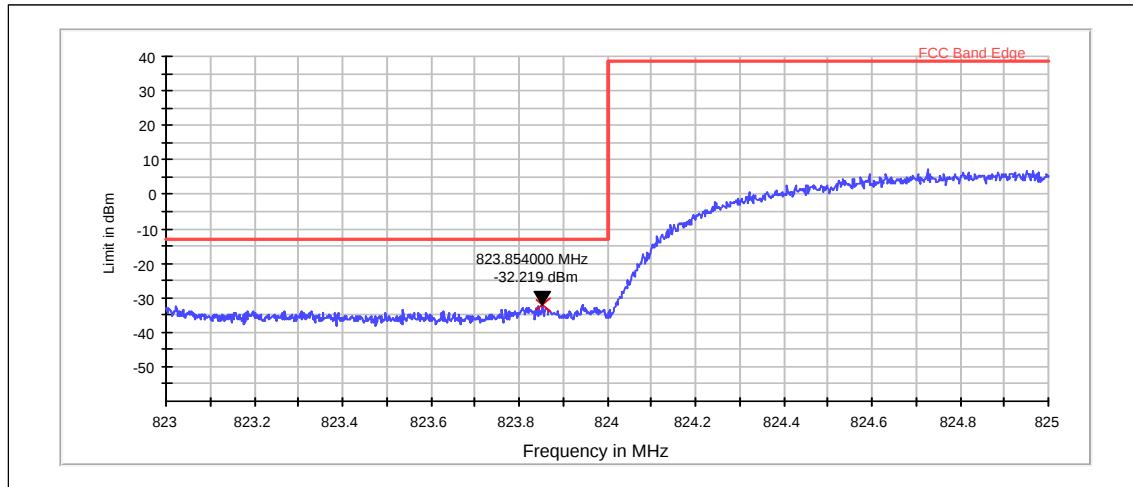


RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GPRS	849.002	-23.85	PASSED

5.4. WCDMA5 Test results

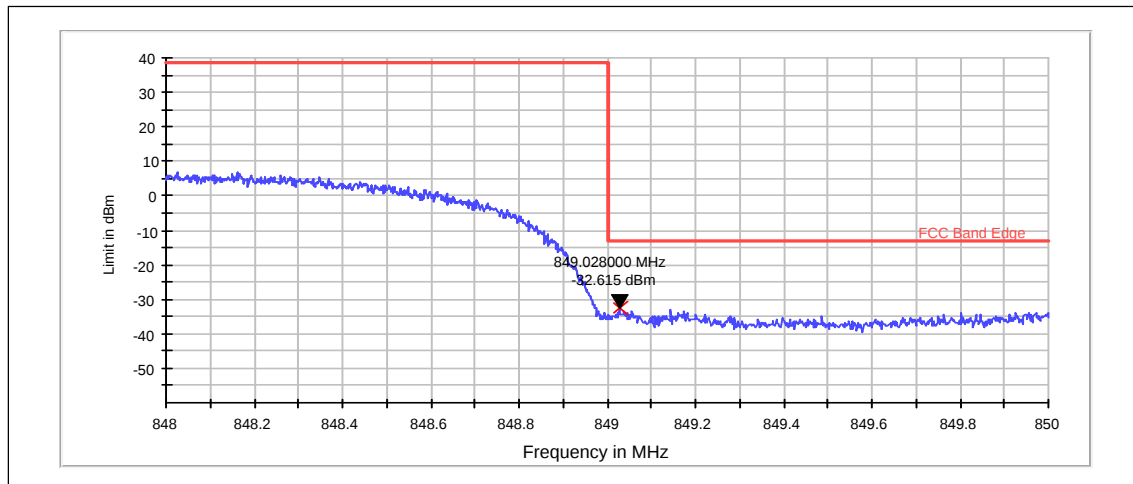
Channel 4132 / 826.4 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	823.854	-32.22	PASSED

Channel 4233 / 846.6 MHz

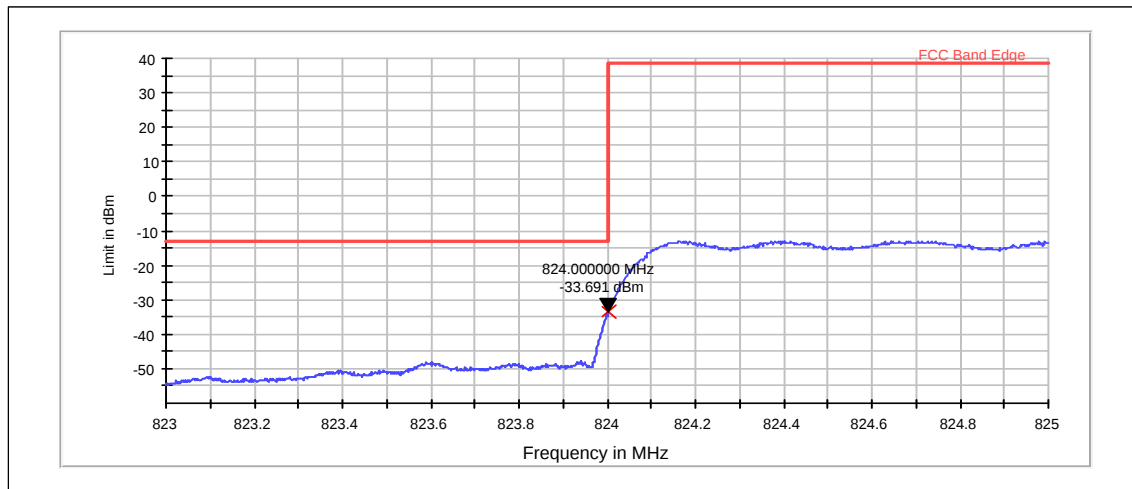


RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	849.028	-32.61	PASSED

5.5. CDMA 800 Test results

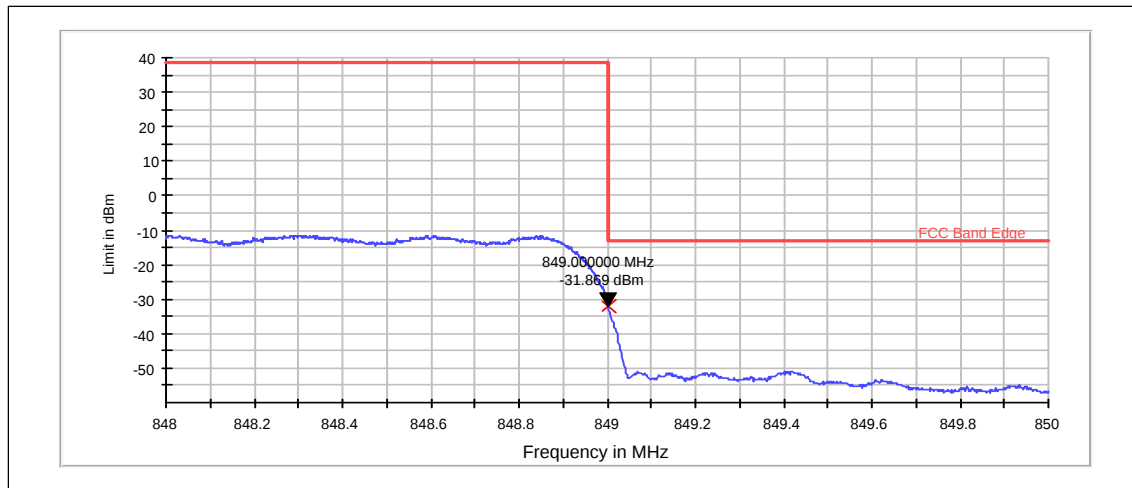
Channel 1013 / 824.7 MHz



RMS (RBW: 15 kHz, VBW: 30 kHz, video averaging)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
CDMA	824.000	-33.69	PASSED

Channel 777 / 848.31 MHz

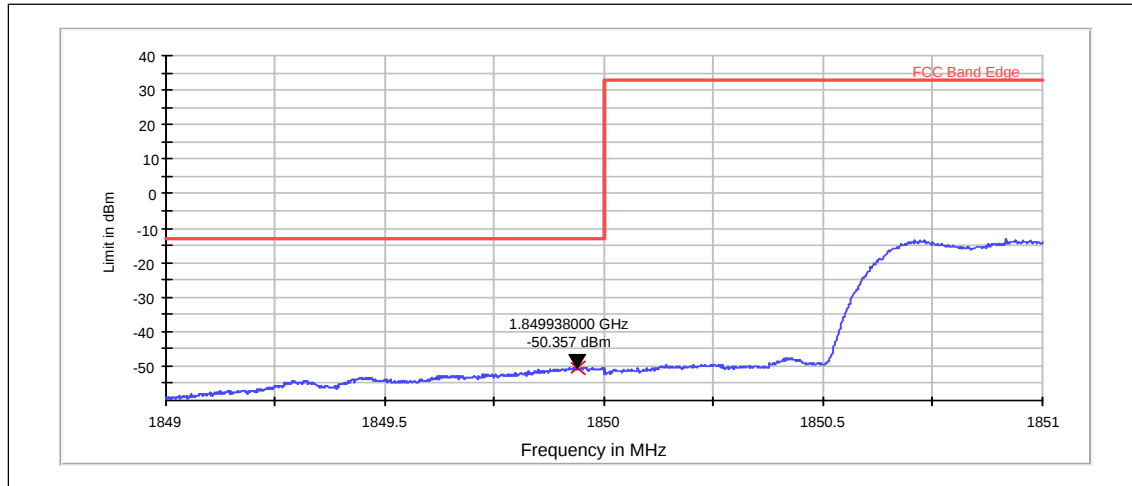


RMS (RBW: 15 kHz, VBW: 30 kHz, video averaging)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
CDMA	849.000	-31.87	PASSED

5.6. CDMA 1900 Test results

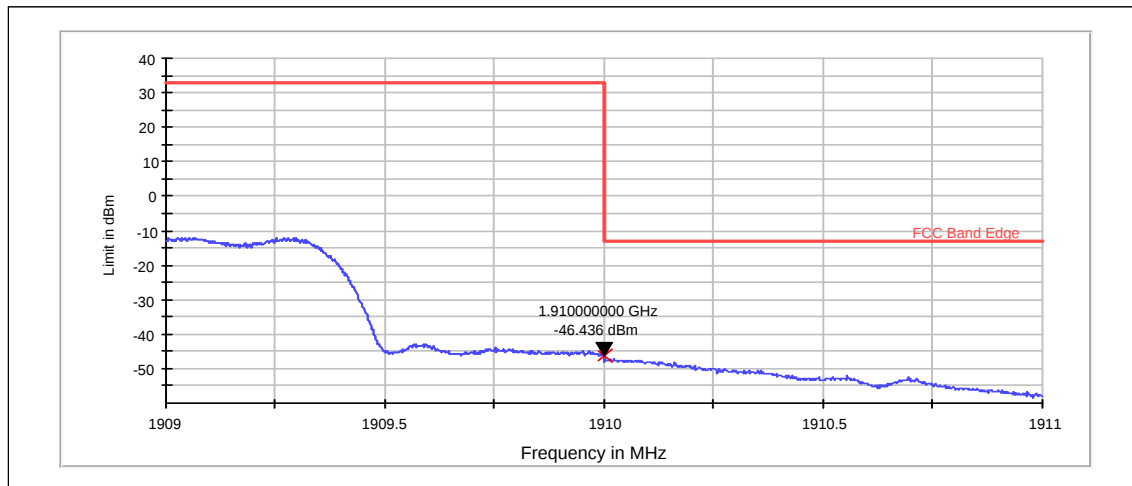
Channel 25 / 1851.25 MHz



RMS (RBW: 15 kHz, VBW: 30 kHz, video averaging)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
CDMA	1849.938	-50.36	PASSED

Channel 1175 / 1908.75 MHz

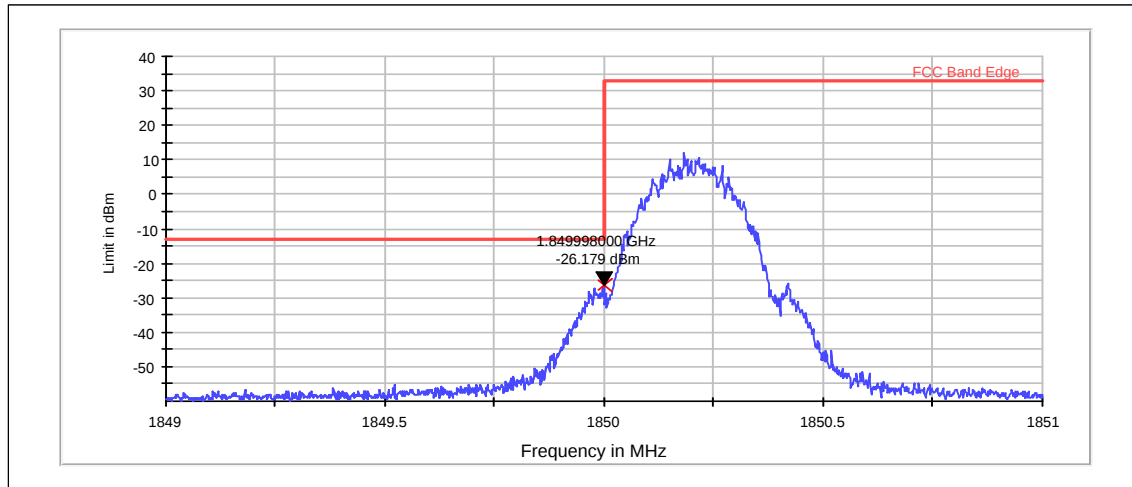


RMS (RBW: 15 kHz, VBW: 30 kHz, video averaging)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
CDMA	1910.000	-46.44	PASSED

5.7. GSM 1900 Test results

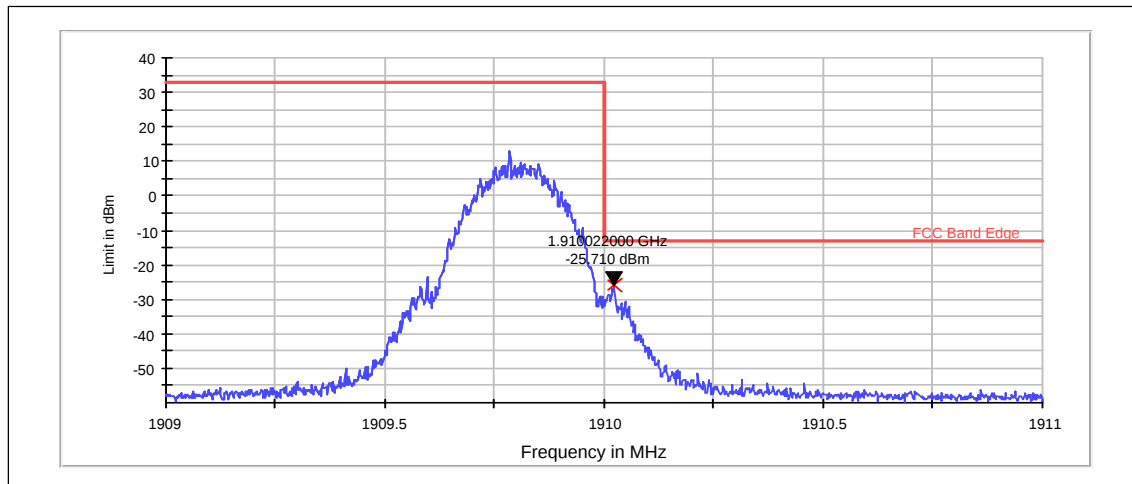
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	1849.998	-26.18	PASSED

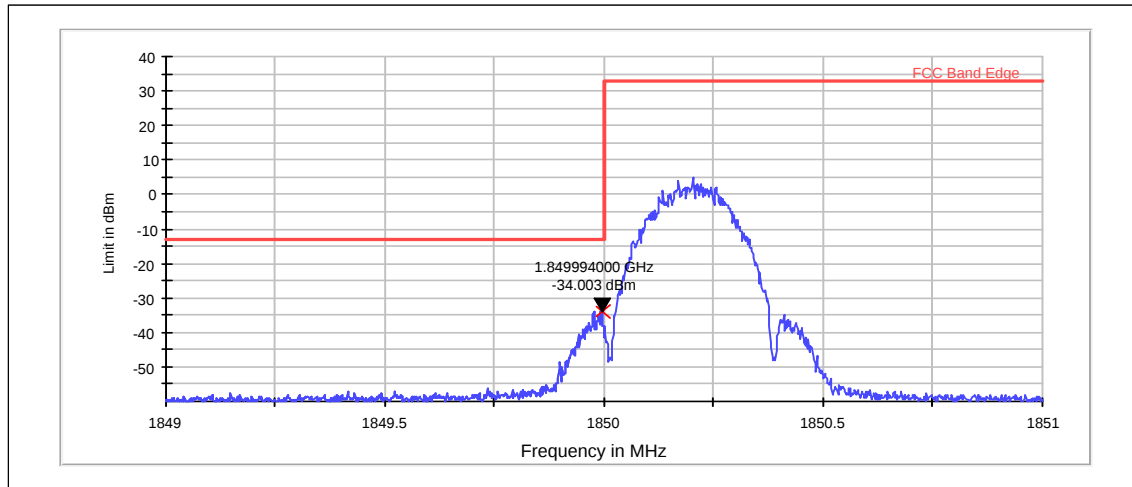
Channel 810 / 1909.8 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	1910.022	-25.71	PASSED

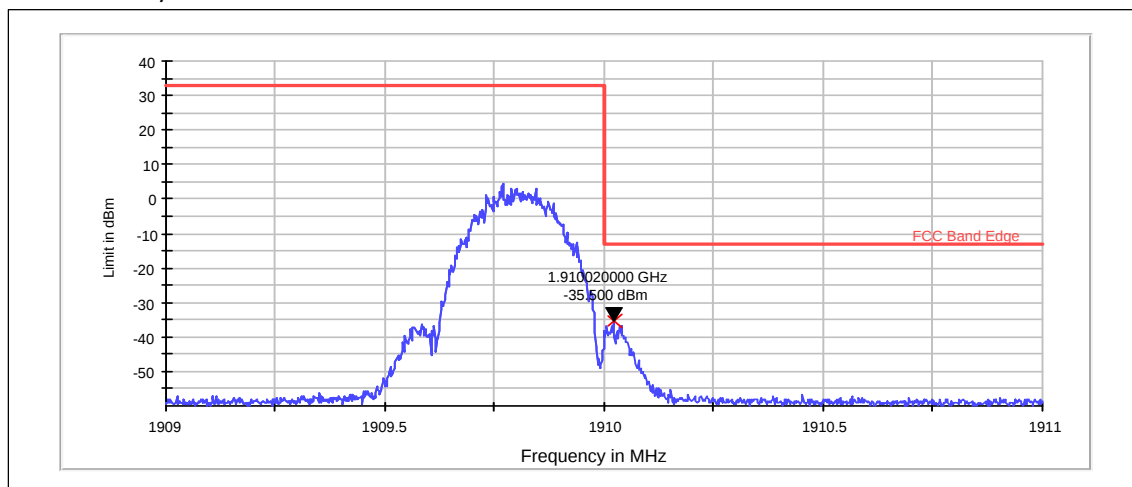
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	1849.994	-34.00	PASSED

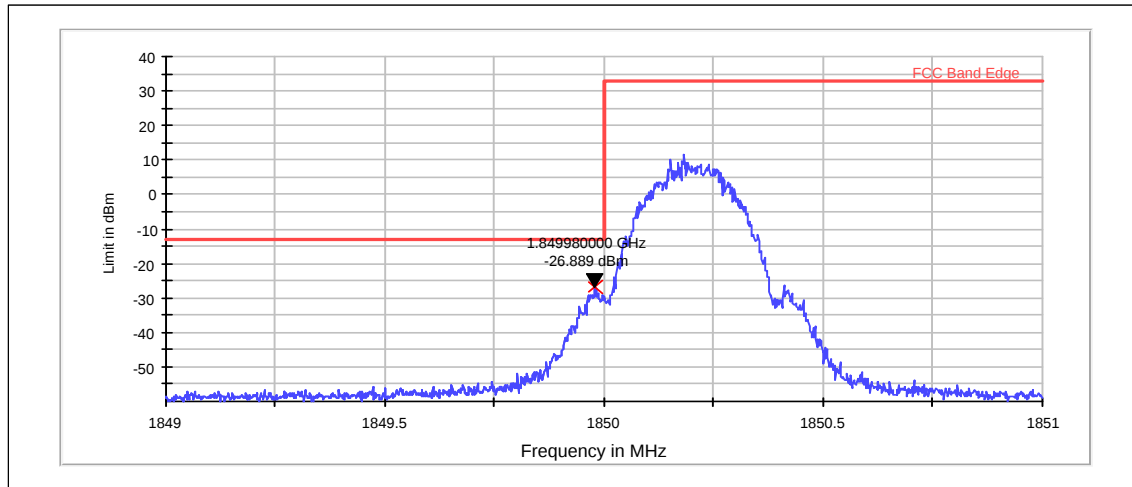
Channel 810 / 1909.8 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	1910.020	-35.50	PASSED

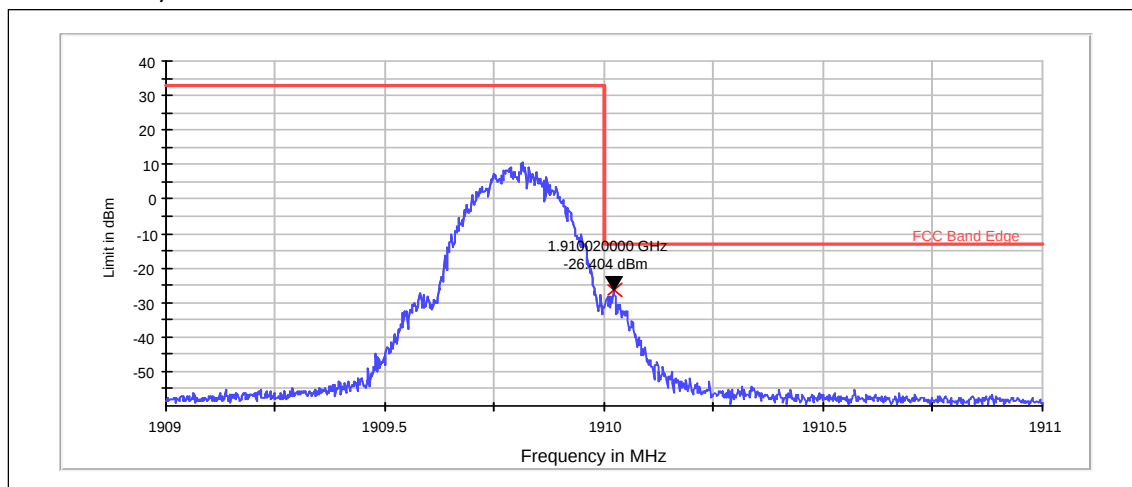
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GPRS	1849.980	-26.89	PASSED

Channel 810 / 1909.8 MHz

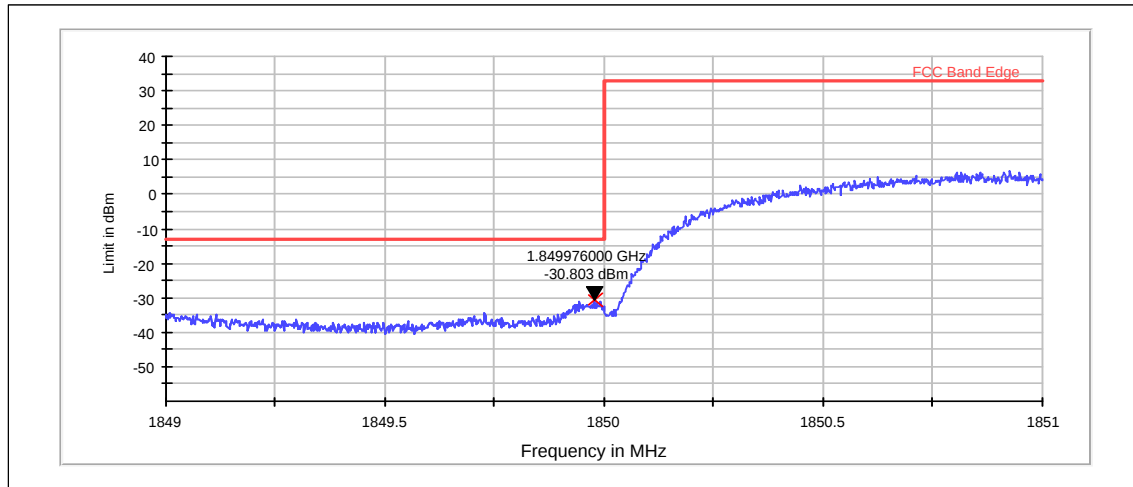


RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GPRS	1910.020	-26.40	PASSED

5.8. WCDMA2 Test results

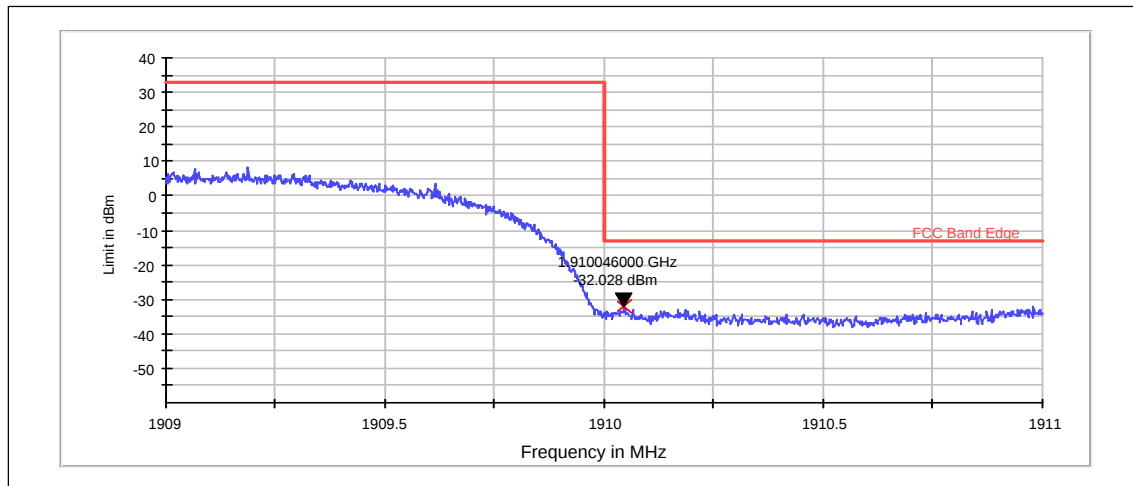
Channel 9262 / 1852.4 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1849.976	-30.80	PASSED

Channel 9538 / 1907.6 MHz

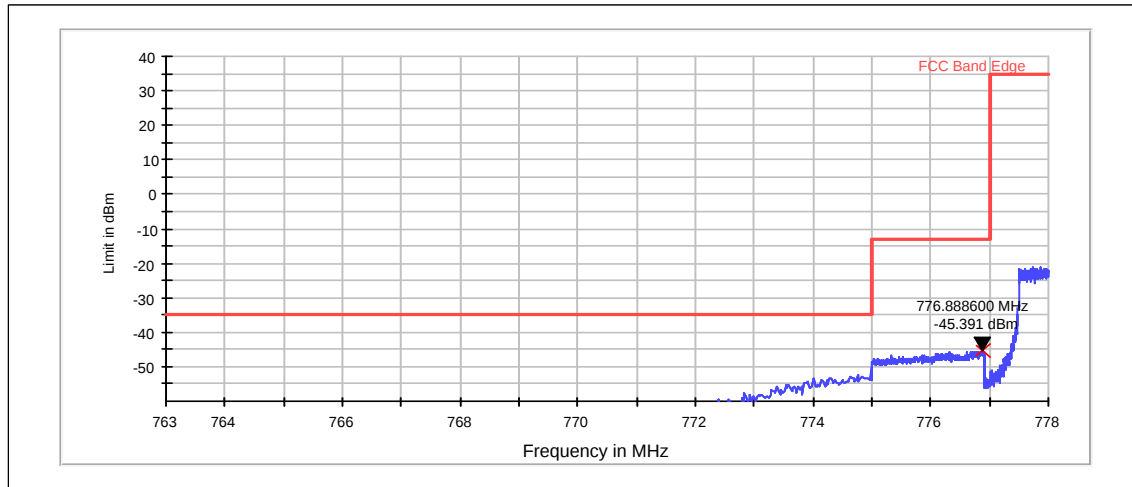


RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1910.046	-32.03	PASSED

5.9. LTE13 Test results

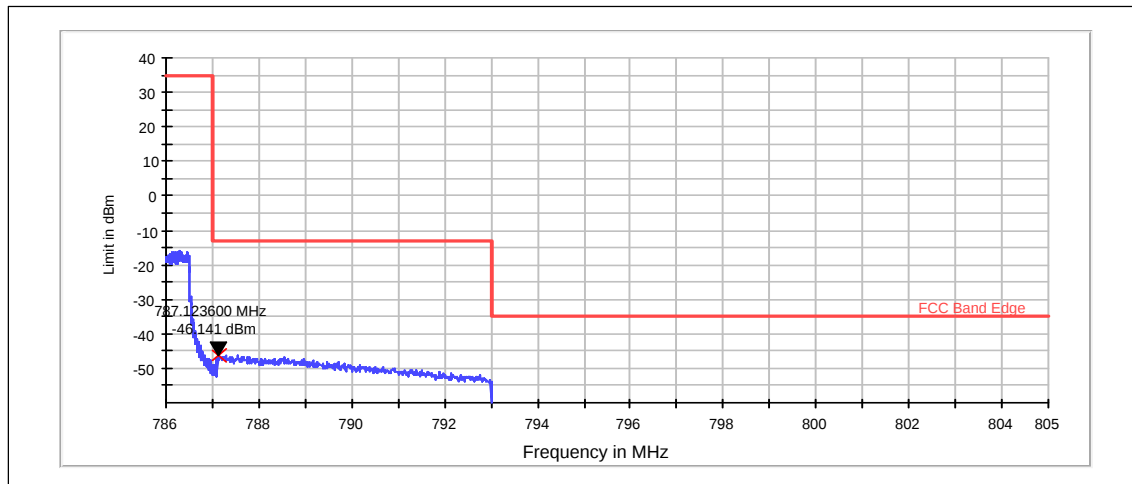
Channel 23230 / 782 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	776.889	-45.39	PASSED

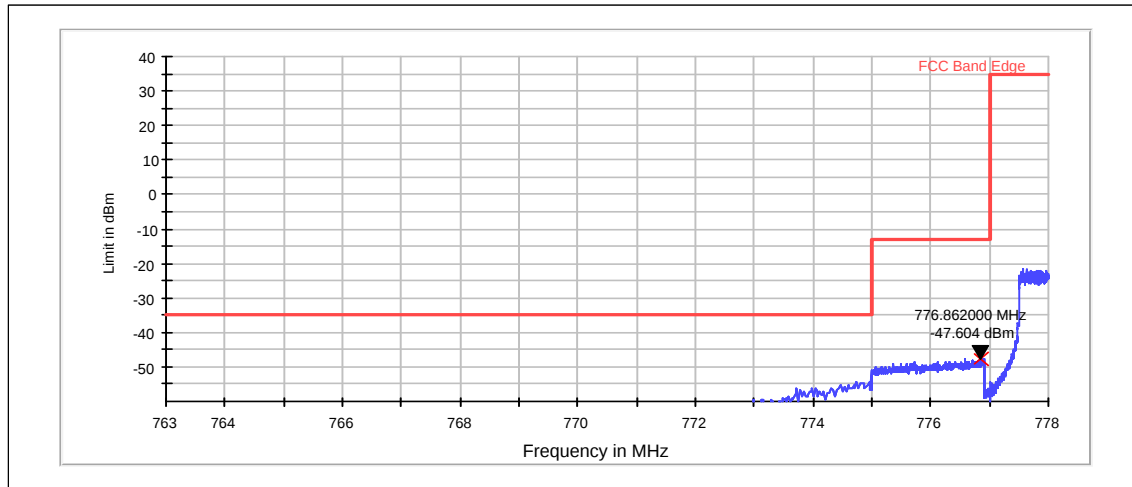
Channel 23230 / 782 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	787.124	-46.14	PASSED

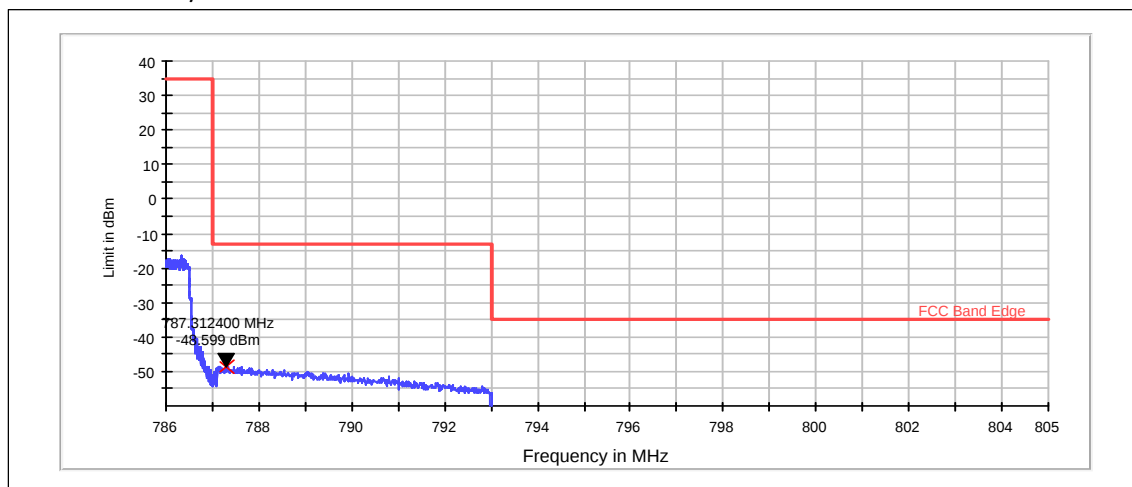
Channel 23230 / 782 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	776.862	-47.60	PASSED

Channel 23230 / 782 MHz

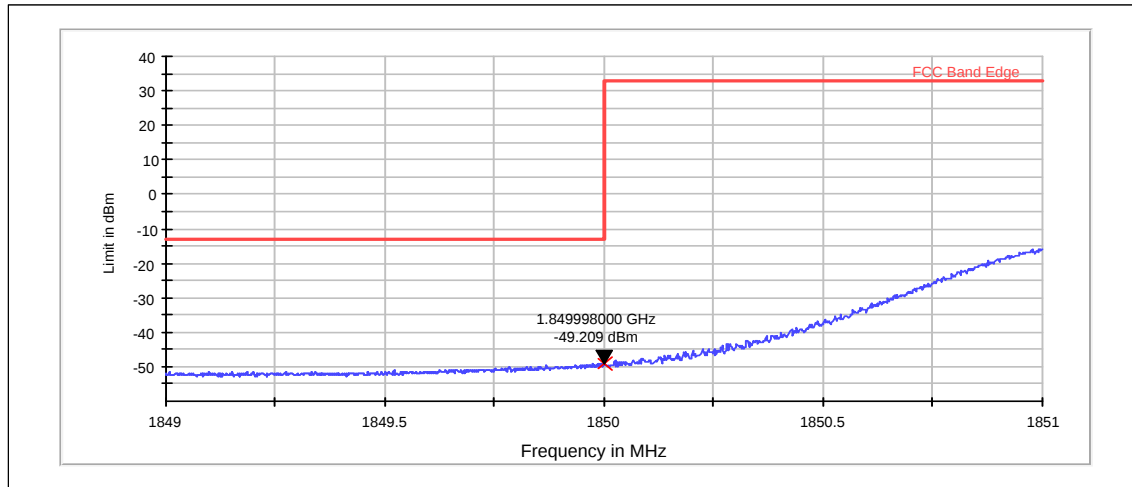


RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	787.312	-48.60	PASSED

5.10. LTE2 Test results

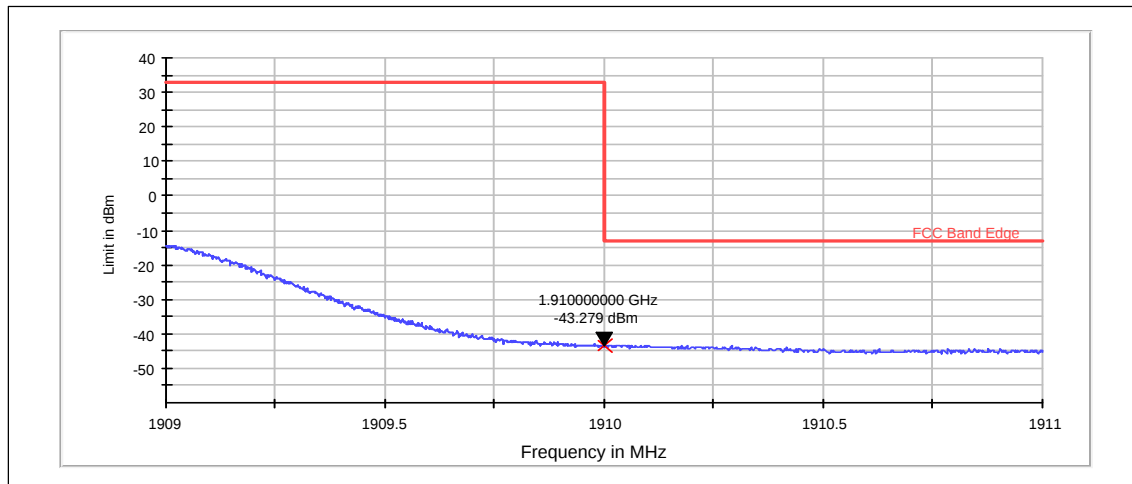
Channel 18700 / 1860 MHz



RMS (RBW: 200 kHz, VBW: 1 MHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1849.998	-49.21	PASSED

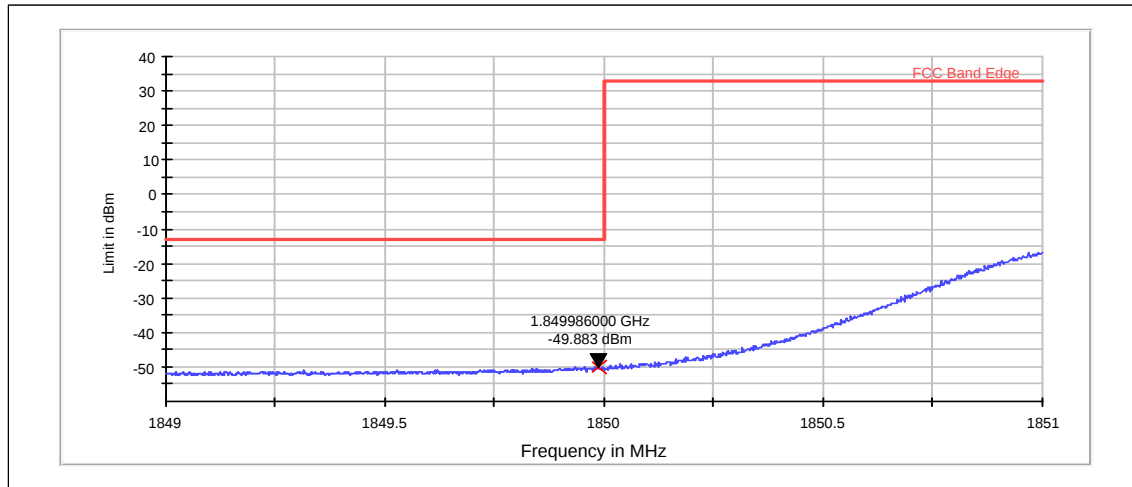
Channel 19100 / 1900 MHz



RMS (RBW: 200 kHz, VBW: 1 MHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1910.000	-43.28	PASSED

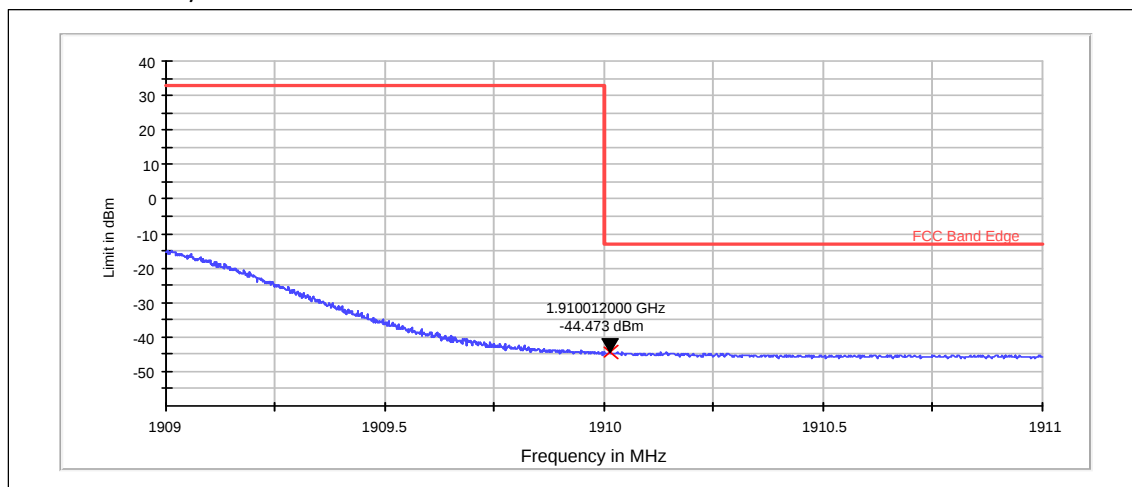
Channel 18700 / 1860 MHz



RMS (RBW: 200 kHz, VBW: 1 MHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1849.986	-49.88	PASSED

Channel 19100 / 1900 MHz

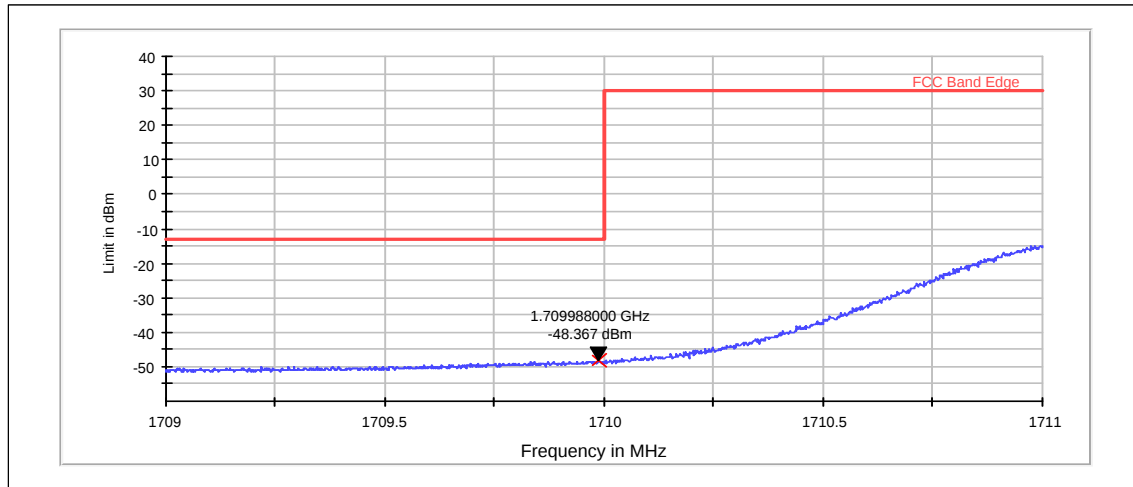


RMS (RBW: 200 kHz, VBW: 1 MHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1910.012	-44.47	PASSED

5.11. LTE4 Test results

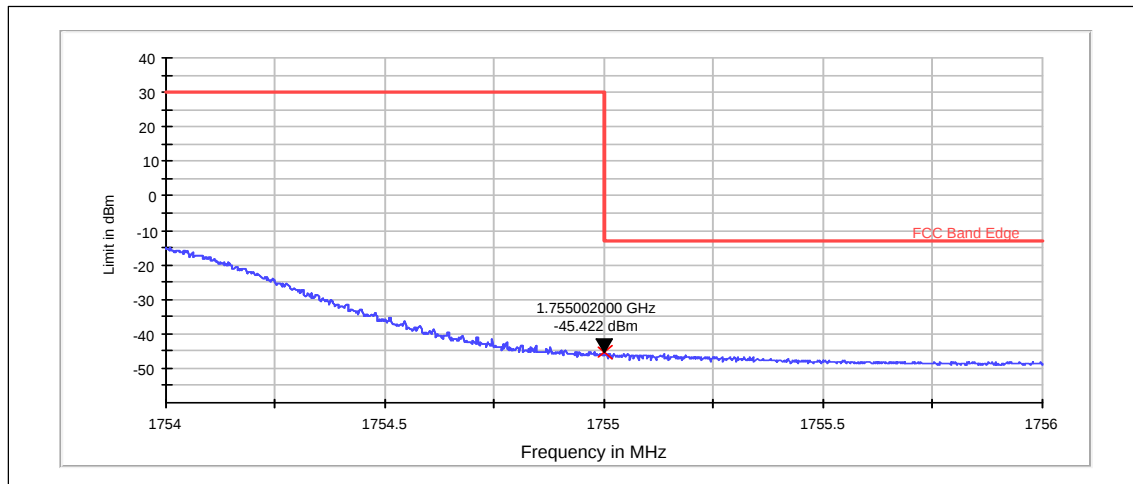
Channel 20050 / 1720 MHz



RMS (RBW: 200 kHz, VBW: 1 MHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1709.988	-48.37	PASSED

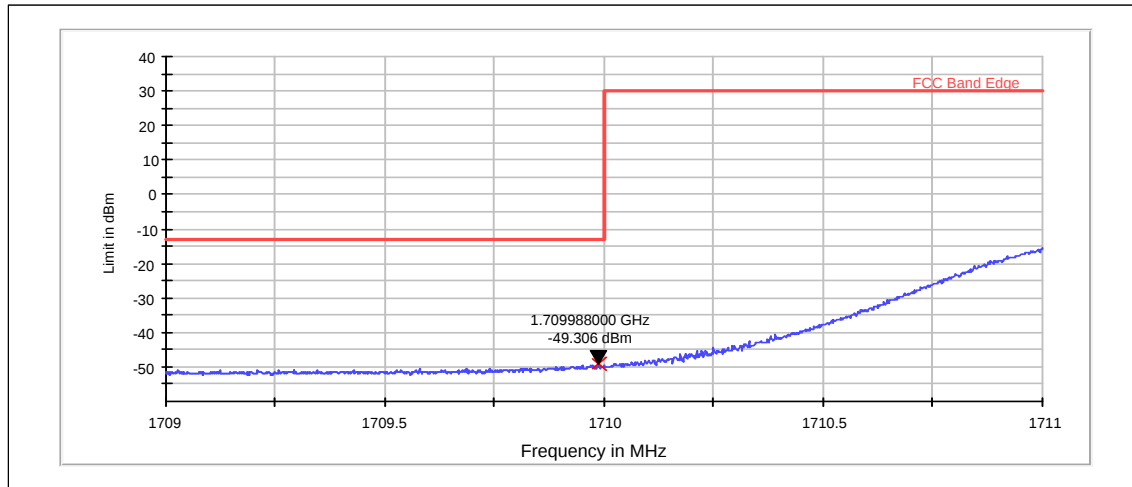
Channel 20300 / 1745 MHz



RMS (RBW: 200 kHz, VBW: 1 MHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1755.002	-45.42	PASSED

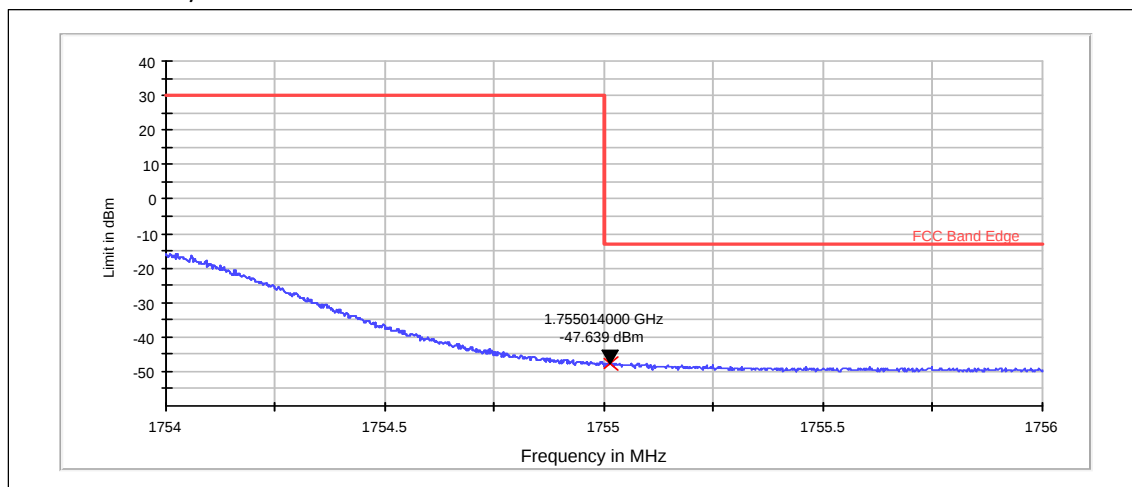
Channel 20050 / 1720 MHz



RMS (RBW: 200 kHz, VBW: 1 MHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1709.988	-49.31	PASSED

Channel 20300 / 1745 MHz



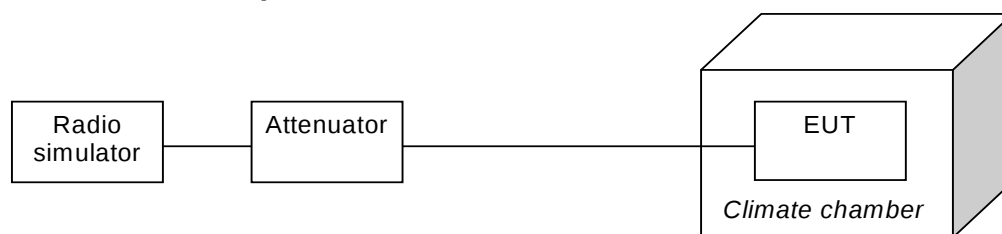
RMS (RBW: 200 kHz, VBW: 1 MHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1755.014	-47.64	PASSED

6. Frequency stability, temperature variation (FCC §2.1055(a), RSS-130 4.3 (a), RSS-139 6.3)

EUT with DUT number	RM-1041, DUT 18639
Accessories with DUT numbers	SD-233R, DUT 18640 ; WH-108, DUT 18641
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 45 / 103.4
Date of measurements	02-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. LTE13 Test results

FDD, CBW 10MHz, QPSK, 50 RB, Channel 23230 / 782.0 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	782.00	-2.04563	-0.0026	PASSED
40	782.00	-2.38895	-0.0031	PASSED
30	782.00	-1.91689	-0.0025	PASSED
20	782.00	-1.20163	-0.0015	PASSED
10	782.00	-1.70231	-0.0022	PASSED
0	782.00	-0.91553	-0.0012	PASSED
-10	782.00	-0.31471	-0.0004	PASSED
-20	782.00	-0.02861	0	PASSED
-30	782.00	-0.30041	-0.0004	PASSED

6.4. LTE4 Test results

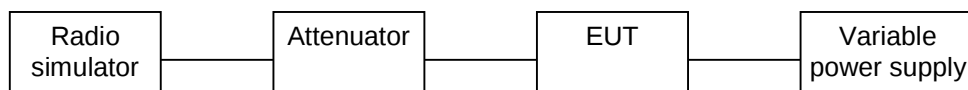
FDD, CBW 20MHz, QPSK, 100 RB, Channel 20175 / 1732.5 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	1732.50	-1.40190	-0.0008	PASSED
40	1732.50	-0.24319	-0.0001	PASSED
30	1732.50	-1.13010	-0.0007	PASSED
20	1732.50	0.55790	0.0003	PASSED
10	1732.50	0.92983	0.0005	PASSED
0	1732.50	1.54495	0.0009	PASSED
-10	1732.50	2.70367	0.0016	PASSED
-20	1732.50	3.96252	0.0023	PASSED
-30	1732.50	2.77519	0.0016	PASSED

7. Frequency stability, voltage variation (FCC §2.1055(d), RSS-130 4.3 (a), RSS-139 6.3)

EUT with DUT number	RM-1041, DUT 18639
Accessories with DUT numbers	SD-233R, DUT 18640 ; WH-108, DUT 18641
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 45 / 103.4
Date of measurements	02-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. LTE13 Test results

FDD, CBW 10MHz, QPSK, 50 RB, Channel 23230 / 782.0 MHz

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	782.00	-1.50204	-0.0019	PASSED
Battery cut-off point / 3.6	782.00	-3.41892	-0.0044	PASSED
Nominal / 4.0	782.00	-1.65939	-0.0021	PASSED

7.4. LTE4 Test results

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

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	1732.50	0.55790	0.0003	PASSED
Battery cut-off point / 3.6	1732.50	3.11852	0.0018	PASSED
Nominal / 4.0	1732.50	2.10285	0.0012	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 μ H	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 μ H	ESH3-Z5	R&S	15C, 15B
1759	LISN 50 μ H	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