FCC Part 22/24/27 Compliance Test Report

Test Report no.:	FCC_Cellular_RM-1065_ant1_01	**Date of Report:**	10-Feb-2015
Number of pages:	127	**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 P.O.Box(86) Joensuunkatu 7E FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 71 80 44122
FCC listing no.: **IC recognition no.:**	533467 661V-1		
Tested devices/ accessories:	**Phone RM-1065 / Battery BV-T4B / Dummy Battery SD-238R / AC-Charger AC-20E / Headset WH-108**		
FCC ID:	PYAAAA	**IC:**	661X-AAA
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 4, November 2014), RSS-133 (Issue 6, January 2013), RSS-139 (Issue 2, February 2009), RSS-132 (Issue 3, January 2013), RSS-199 (Issue 2, October 2014), 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:	Digitally signed by Lehtonen Sami.K DN: o=Nokia, ou=People, 0.9.2342.19200300.100.1.1=10019393, cn=Lehtonen Sami.K Date: 2015.02.10 16:11:16 +02'00'		

Sami Lehtonen, Engineer, EMC

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

Date of receipt	07-Jan-2015
Testing completed	18-Jan-2015
The customer's contact person	Jari Rontu
Test Plan referred to	T:\Projects\RM-1065\TestPlan\RS_testplan_RM-1065.xlsm
Notes	Measured from Antenna 1.
Document name	T:\Projects\RM-1065\EMC\FCC_Cellular_RM-1065_ant1_01.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-1065	004402741070746;004402741070753	5201	-	02154.00000.14501.24000	18983
Battery	BV-T4B	4181574345C101045590670764	-	-	-	18709
Ac-Charger	AC-20E	4090494156670711455ö0675628	-	-	-	18697
Headset	WH-108	4235VFA	-	-	-	18698
Phone	RM-1065	004402741070845	5201	-	02154.00000.14501.24000	19004
Dummy Battery	SD-238R	-	v.1	-	-	19008
Headset	WH-108	4235VFA	-	-	-	18691

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	PASSED
N/A	6.4	Peak to average power ratio	PASSED
§2.1049(h)	6.6	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

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	NP
§24.232(b)	6.4	Radiated RF output power	PASSED
N/A	6.4	Peak to average power ratio	PASSED
§2.1049(h)	6.6	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

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WCDMA4:

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	NP
§27.50(d)(2)	6.4	Radiated RF output power	PASSED
N/A	6.4	Peak to average power ratio	PASSED
§2.1049(h)	6.6	99 % occupied bandwidth	PASSED
§27.53(g)	6.5	Band edge compliance	PASSED
§27.53(g), §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

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	PASSED
N/A	5.4	Peak to average power ratio	PASSED
§2.1049(h)	6.6	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

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	PASSED
N/A	5.4	Peak to average power ratio	PASSED
§2.1049(h)	6.6	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

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	NP
§24.232(b)	6.4	Radiated RF output power	PASSED
N/A	6.4	Peak to average power ratio	PASSED
§2.1049(h)	6.6	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

LTE4:

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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	NP
§27.50(d)(4)	6.4	Radiated RF output power	PASSED
N/A	6.4	Peak to average power ratio	PASSED
§2.1049(h)	6.6	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	NP
§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

LTE5:

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	PASSED
N/A	5.4	Peak to average power ratio	PASSED
§2.1049(h)	6.6	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

LTE12:

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	NP
§27.50(c)10	4.4	Radiated RF output power	PASSED
N/A	N/A	Peak to average power ratio	PASSED
§2.1049(h)	6.6	99 % occupied bandwidth	PASSED
§27.53(f)	4.6	Band edge compliance	PASSED
§27.53(f)	4.6	Spurious emissions at antenna terminals	NP
§27.53(f)	4.6	Spurious radiated emissions	PASSED
§27.54	4.3	Frequency stability, temperature variation	PASSED
§27.54	4.3	Frequency stability, voltage variation	PASSED

LTE17:

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	NP
§27.50(c)(10)	4.4	Radiated RF output power	PASSED
N/A	N/A	Peak to average power ratio	PASSED
§2.1049(h)	6.6	99 % occupied bandwidth	PASSED
§27.53(g)	4.6	Band edge compliance	PASSED
§27.53(g), §2.1051	4.6	Spurious emissions at antenna terminals	NP
§27.53(g), §2.1051	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

LTE28:

Section in CFR 47	Section in RSS-GEN	Name of the test	Result

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	or RSS-130		
§2.1046(a)	4.4	Conducted RF output power	NP
§27.50(c)10	4.4	Radiated RF output power	PASSED
N/A	4.4	Peak to average power ratio	PASSED
§2.1049(h)	6.6	99 % occupied bandwidth	PASSED
§27.53(g)	4.6	Band edge compliance	PASSED
§27.53(g)	4.6	Spurious emissions at antenna terminals	NP
§27.53(g)	4.6	Spurious radiated emissions	PASSED
§27.54	4.3	Frequency stability, temperature variation	PASSED
§27.54	4.3	Frequency stability, voltage variation	PASSED

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

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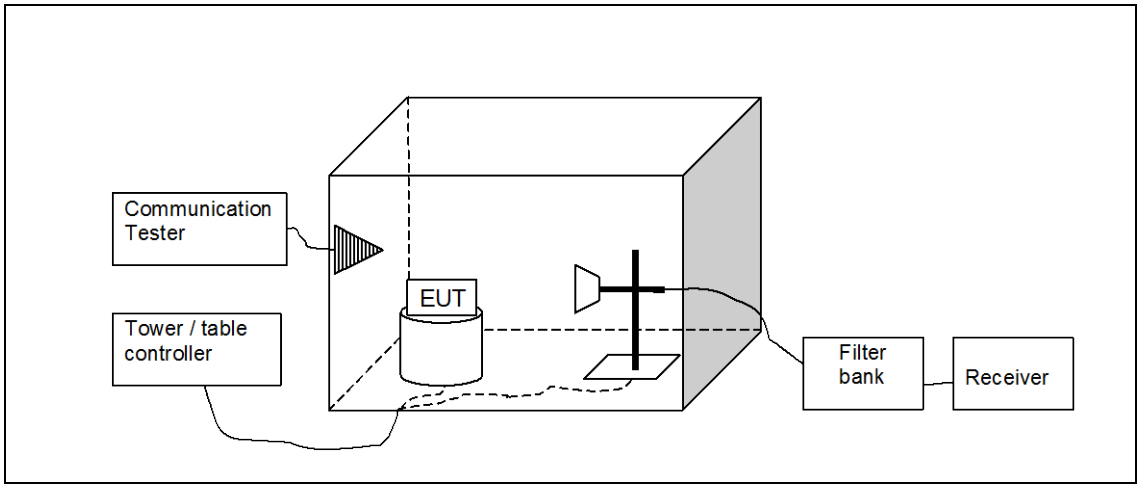
2. Spurious radiated emissions

(FCC §24.238(a), §27.53(g), §2.1051, §27.53(f), §27.53(l), §2.1053, §27.53(h), §2.1053, §24.238(a), §2.1053, §22.917(a), §2.1053, §2.1053, RSS-133 6.5, RSS-139 6.5, RSS-132 4.5, RSS-199 4.5(b), RSS-130 4.6)

EUT with DUT number	RM-1065, DUT 18983
Accessories with DUT numbers	BV-T4B, DUT 18709 ; AC-20E, DUT 18697 ; WH-108, DUT 18698
Operation Voltage [V] / [Hz]	115/60
Results	PASSED
Remarks	Measured from antenna 1.
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	21 / 40 / 99.3
Date of measurements	12-Jan-2015 - 18-Jan-2015
Measured by	Sami Lehtonen / Ville Mannermaa

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.

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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 1900	30 - 19100	-13
WCDMA2	30 - 19100	-13
WCDMA4	30 - 17500	-13
WCDMA5	30 - 8500	-13
GSM 850	30 - 8500	-13
LTE2	30 - 19100	-13
LTE4	30 - 17500	-13
LTE5	30 - 8500	-13
LTE7	30 - 25700	-13
LTE12	30 - 7200	-13
LTE17	30 - 7200	-13 (RBW = 100 kHz, ERP)
LTE28	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)

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2.3. 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	-42.72	0.05346	-48.22	5.5	HORIZONTAL	PASSED
1673.186	-42.39	0.05768	-47.89	5.5	HORIZONTAL	PASSED
1673.226	-49.05	0.01245	-55.65	6.6	VERTICAL	PASSED
2509.539	-35.91	0.25645	-47.51	11.6	VERTICAL	PASSED
2509.699	-35.9	0.25704	-47.5	11.6	VERTICAL	PASSED
3332.906	-60.32	0.00093	-63.62	3.3	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
1673.18	-42.5	0.05623	-48	5.5	HORIZONTAL	PASSED
2509.98	-46.17	0.02415	-57.77	11.6	VERTICAL	PASSED

2.5. 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
9305.13	-43.52	0.04446	-65.62	22.1	HORIZONTAL	PASSED
9572.465	-44.36	0.03664	-66.16	21.8	VERTICAL	PASSED
9785.731	-42.82	0.05224	-65.42	22.6	HORIZONTAL	PASSED
9840.481	-42.63	0.05458	-65.23	22.6	HORIZONTAL	PASSED
9957.438	-43.35	0.04624	-65.55	22.2	HORIZONTAL	PASSED
9960.401	-43.04	0.04966	-65.24	22.2	HORIZONTAL	PASSED

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2.6. 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
3753.487	-56.51	0.00223	-63.01	6.5	VERTICAL	PASSED
5637.174	-51.67	0.00681	-61.97	10.3	VERTICAL	PASSED

2.7. 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
3761.543	-51.92	0.00643	-58.22	6.3	VERTICAL	PASSED
5647.555	-50.94	0.00805	-61.24	10.3	HORIZONTAL	PASSED
7519.299	-45.88	0.02582	-62.28	16.4	HORIZONTAL	PASSED
9389.639	-44.11	0.03882	-65.31	21.2	VERTICAL	PASSED
9405.671	-44.17	0.03828	-65.17	21	HORIZONTAL	PASSED
9445.792	-43.91	0.04064	-65.31	21.4	HORIZONTAL	PASSED
9656.172	-44.06	0.03926	-65.66	21.6	VERTICAL	PASSED
9856.854	-43.05	0.04955	-65.55	22.5	HORIZONTAL	PASSED
9933.848	-42.93	0.05093	-65.23	22.3	HORIZONTAL	PASSED
9957.695	-43.15	0.04842	-65.05	21.9	VERTICAL	PASSED
11280.261	-40.95	0.08035	-64.25	23.3	HORIZONTAL	PASSED
13157.575	-51.67	0.00681	-68.37	16.7	HORIZONTAL	PASSED
15048.798	-50.14	0.00968	-71.24	21.1	VERTICAL	PASSED
16929.88	-49.97	0.01007	-72.97	23	VERTICAL	PASSED

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2.8. WCDMA4 test results

Channel 1412 / 1732.4 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
3463.698	-57.09	0.00195	-62.89	5.8	HORIZONTAL	PASSED
5200.907	-49.54	0.01112	-59.74	10.2	HORIZONTAL	PASSED
6926.935	-47.93	0.01611	-60.83	12.9	HORIZONTAL	PASSED
8249.118	-46.96	0.02014	-64.86	17.9	VERTICAL	PASSED
8657.611	-45.35	0.02917	-64.55	19.2	HORIZONTAL	PASSED
9310.2	-42.81	0.05236	-65.01	22.2	HORIZONTAL	PASSED
9624.429	-43.79	0.04178	-65.59	21.8	VERTICAL	PASSED
9685.391	-43.94	0.04036	-65.64	21.7	HORIZONTAL	PASSED
9905.15	-43.34	0.04634	-65.44	22.1	VERTICAL	PASSED
9956.573	-42.77	0.05284	-64.67	21.9	VERTICAL	PASSED
10394.019	-42.8	0.05248	-65.4	22.6	HORIZONTAL	PASSED
12123.453	-40.7	0.08511	-63	22.3	VERTICAL	PASSED
13864.03	-51.88	0.00649	-69.88	18	VERTICAL	PASSED
15588.454	-48.78	0.01324	-72.08	23.3	VERTICAL	PASSED
17333.319	-48.6	0.0138	-72.3	23.7	VERTICAL	PASSED

2.9. 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
854.107	-46.08	0.02466	-80.68	34.6	HORIZONTAL	PASSED
854.193	-46.33	0.02328	-80.83	34.5	VERTICAL	PASSED
879.289	-41.76	0.06668	-78.06	36.3	VERTICAL	PASSED
992.187	-41.39	0.07261	-80.59	39.2	VERTICAL	PASSED
996.032	-40.31	0.09311	-79.71	39.4	VERTICAL	PASSED
998.533	-40.93	0.08072	-80.23	39.3	VERTICAL	PASSED
1668.497	-51.69	0.00678	-57.29	5.6	HORIZONTAL	PASSED
2505.06	-52.68	0.0054	-64.18	11.5	VERTICAL	PASSED
3347.876	-59.51	0.00112	-62.81	3.3	HORIZONTAL	PASSED
4169.649	-58.46	0.00143	-63.96	5.5	HORIZONTAL	PASSED
5000.762	-55.06	0.00312	-63.36	8.3	HORIZONTAL	PASSED
5838.126	-52.89	0.00514	-61.19	8.3	VERTICAL	PASSED
6687.435	-49.43	0.0114	-60.03	10.6	VERTICAL	PASSED
7510.651	-49.59	0.01099	-63.69	14.1	HORIZONTAL	PASSED
8340.2	-49.44	0.01138	-65.04	15.6	HORIZONTAL	PASSED

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2.10. LTE2 test results

Channel 18900 / 1880.0 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
1860.927	-62.89	0.00051	-71.89	9	HORIZONTAL	PASSED
1861.029	-62.88	0.00052	-71.98	9.1	HORIZONTAL	PASSED
1899.357	-56.12	0.00244	-65.52	9.4	HORIZONTAL	PASSED
1899.464	-59.16	0.00121	-68.56	9.4	HORIZONTAL	PASSED
1911.202	-64.17	0.00038	-73.67	9.5	HORIZONTAL	PASSED
1959.734	-43.6	0.04365	-53.6	10	HORIZONTAL	PASSED
3760.421	-58.21	0.00151	-64.71	6.5	HORIZONTAL	PASSED
5640.461	-60.4	0.00091	-70.5	10.1	HORIZONTAL	PASSED
7520.621	-52.7	0.00537	-69.1	16.4	HORIZONTAL	PASSED

Channel 18900 / 1880.0 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
1959.103	-43.36	0.04613	-53.36	10	HORIZONTAL	PASSED
3760.421	-58.79	0.00132	-65.29	6.5	HORIZONTAL	PASSED
5640.581	-60.62	0.00087	-70.72	10.1	HORIZONTAL	PASSED
7520.621	-53.27	0.00471	-69.67	16.4	HORIZONTAL	PASSED

2.11. LTE4 test results

Channel 20175 / 1732.5 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
3465.261	-66.97	0.0002	-72.77	5.8	HORIZONTAL	PASSED
5198.121	-53.85	0.00412	-63.95	10.1	HORIZONTAL	PASSED
6930.862	-56.74	0.00212	-69.54	12.8	HORIZONTAL	PASSED
8664.404	-56.86	0.00206	-76.16	19.3	HORIZONTAL	PASSED
10396.824	-53.47	0.0045	-76.17	22.7	HORIZONTAL	PASSED

Channel 20175 / 1732.5 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
3465.261	-66.97	0.0002	-72.77	5.8	HORIZONTAL	PASSED
5198.041	-52.61	0.00548	-62.71	10.1	HORIZONTAL	PASSED
6930.822	-56.94	0.00202	-69.74	12.8	HORIZONTAL	PASSED
8663.602	-56.47	0.00225	-75.67	19.2	HORIZONTAL	PASSED
10397.184	-53.46	0.00451	-76.16	22.7	HORIZONTAL	PASSED

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2.12. LTE5 test results

Channel 20525 / 836.5 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
850.944	-58.49	0.00142	-92.99	34.5	HORIZONTAL	PASSED
881.477	-52.73	0.00533	-88.63	35.9	HORIZONTAL	PASSED
999.973	-51.78	0.00664	-90.48	38.7	HORIZONTAL	PASSED
1673.261	-59.35	0.00116	-64.85	5.5	HORIZONTAL	PASSED
2510.041	-65.06	0.00031	-76.96	11.9	HORIZONTAL	PASSED
3346.782	-74.67	3E-05	-77.97	3.3	HORIZONTAL	PASSED

Channel 20525 / 836.5 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
851.846	-55.97	0.00253	-90.57	34.6	HORIZONTAL	PASSED
882.088	-52.62	0.00547	-88.62	36	HORIZONTAL	PASSED
999.126	-52.03	0.00627	-90.53	38.5	HORIZONTAL	PASSED
1673.461	-60.05	0.00099	-65.55	5.5	HORIZONTAL	PASSED
2510.001	-65.05	0.00031	-76.95	11.9	HORIZONTAL	PASSED
3346.581	-76.35	2E-05	-79.65	3.3	HORIZONTAL	PASSED

2.13. LTE12 test results

Channel 23095 / 707.5 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
1420.391	-64.18	0.00038	-69.08	4.9	HORIZONTAL	PASSED
2130.616	-70.96	8E-05	-80.26	9.3	VERTICAL	PASSED
2825.09	-68.19	0.00015	-82.59	14.4	HORIZONTAL	PASSED

Channel 23095 / 707.5 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
1420.511	-66.74	0.00021	-71.64	4.9	HORIZONTAL	PASSED
2130.416	-70.24	9E-05	-80.24	10	HORIZONTAL	PASSED
2831.303	-67.97	0.00016	-82.57	14.6	VERTICAL	PASSED

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2.14. LTE17 test results

Channel 23790 / 710 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
1420.381	-64	0.0004	-68.9	4.9	HORIZONTAL	PASSED
2130.421	-70.24	9E-05	-80.24	10	HORIZONTAL	PASSED
2848.717	-67.29	0.00019	-82.59	15.3	VERTICAL	PASSED

Channel 23790 / 710 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
1420.301	-64.56	0.00035	-69.46	4.9	HORIZONTAL	PASSED
2130.461	-69	0.00013	-79	10	HORIZONTAL	PASSED
2846.032	-67.49	0.00018	-82.59	15.1	VERTICAL	PASSED

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2.15. LTE28 test results

Channel 27435 / 725.5 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
640	-59.18	0.00121	-92.98	33.8	HORIZONTAL	PASSED
769.88	-71.34	7E-05	-107.04	35.7	VERTICAL	PASSED
769.992	-71.33	7E-05	-107.03	35.7	VERTICAL	PASSED
800.028	-70.94	8E-05	-107.04	36.1	HORIZONTAL	PASSED
1451.381	-60.35	0.00092	-65.35	5	VERTICAL	PASSED
1600.02	-67.6	0.00017	-73.9	6.3	HORIZONTAL	PASSED
2186.139	-71.66	7E-05	-80.96	9.3	VERTICAL	PASSED
2912	-68.2	0.00015	-83.5	15.3	HORIZONTAL	PASSED

Channel 27435 / 725.5 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
636.874	-60.55	0.00088	-93.05	32.5	VERTICAL	PASSED
770	-71.33	7E-05	-107.03	35.7	VERTICAL	PASSED
770.008	-71.33	7E-05	-107.03	35.7	VERTICAL	PASSED
800.016	-70.94	8E-05	-107.04	36.1	HORIZONTAL	PASSED
1451.461	-66.83	0.00021	-72.23	5.4	HORIZONTAL	PASSED
1600.02	-67.92	0.00016	-74.22	6.3	HORIZONTAL	PASSED
2175.638	-72.71	5E-05	-81.71	9	HORIZONTAL	PASSED
2912	-68.2	0.00015	-83.5	15.3	HORIZONTAL	PASSED

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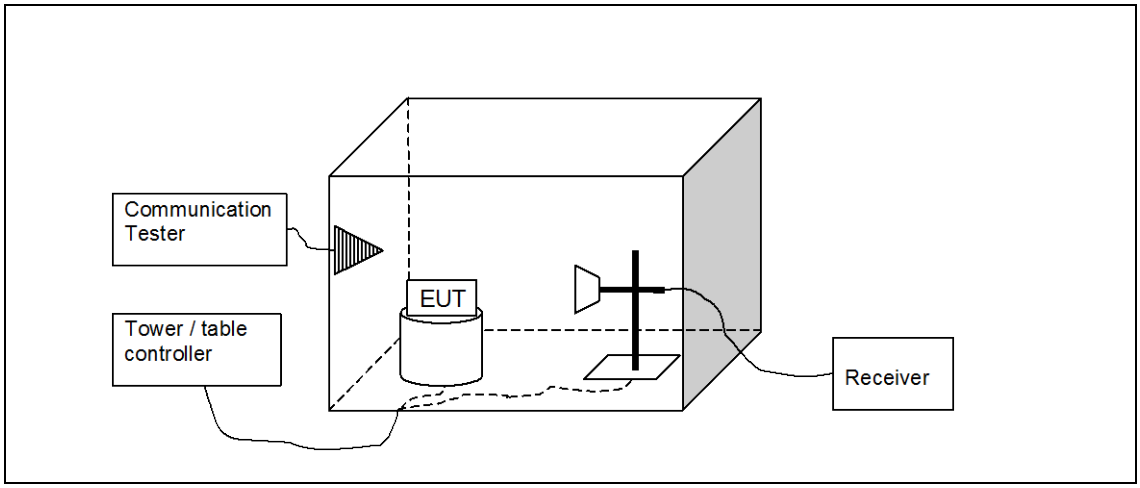
3. Radiated RF output power

(FCC §22.913(a), §27.50(c)(10), §27.50(c)10, §27.50(d)(4), §27.50(d)(2), §24.232(b), RSS-132 4.4, RSS-133 6.4, RSS-139 6.4, RSS-130 4.4)

EUT with DUT number	RM-1065, DUT 18983
Accessories with DUT numbers	BV-T4B, DUT 18709
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	Measured from antenna 1.
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	21 / 40 / 99.3
Date of measurements	18-Jan-2015
Measured by	Sami Lehtonen / Ville Mannermaa

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:

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

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
1710 - 1755	1 EiRP	30

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699 - 712	2 ERP	33
704 - 716	3 ERP	34.8
703 - 748	3 ERP	34.8

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3.3. 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	30.06	1.014	-6.09	36.15	VERTICAL	PASSED
190 / 836.6	29.58	0.907	-5.42	35	VERTICAL	PASSED
251 / 848.8	28.4	0.692	-5.99	34.39	HORIZONTAL	PASSED

3.4. 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	27.58	0.572	-8.57	36.15	VERTICAL	PASSED
190 / 836.6	25.92	0.39	-9.08	35	VERTICAL	PASSED
251 / 848.8	24.7	0.295	-9.69	34.39	HORIZONTAL	PASSED

3.5. 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	26.34	0.43	-18.66	45	HORIZONTAL	PASSED
661 / 1880	26.33	0.429	-18.85	45.18	HORIZONTAL	PASSED
810 / 1909.8	24.13	0.259	-21.15	45.28	HORIZONTAL	PASSED

3.6. 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	26.58	0.455	-18.42	45	HORIZONTAL	PASSED
661 / 1880	26.84	0.483	-18.34	45.18	HORIZONTAL	PASSED
810 / 1909.8	25.2	0.331	-20.08	45.28	HORIZONTAL	PASSED

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3.7. WCDMA2 test results

RMS detector

Channel / f_C [MHz]	EIRP [dBm]	EIRP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
9262 / 1852.4	21.38	0.137	-23.58	44.96	HORIZONTAL	PASSED
9400 / 1880	20.91	0.123	-24.27	45.18	HORIZONTAL	PASSED
9538 / 1907.6	20.91	0.123	-24.4	45.31	HORIZONTAL	PASSED

3.8. WCDMA4 test results

RMS detector

Channel / f_C [MHz]	EIRP [dBm]	EIRP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
1312 / 1712.4	22.47	0.177	-21.79	44.26	HORIZONTAL	PASSED
1412 / 1732.4	21.42	0.139	-22.87	44.29	HORIZONTAL	PASSED
1513 / 1752.6	22.67	0.185	-22.02	44.69	HORIZONTAL	PASSED

3.9. WCDMA5 test results

RMS detector

Channel / f_C [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
4132 / 826.4	19.63	0.092	-16.44	36.07	VERTICAL	PASSED
4175 / 835	18.42	0.07	-16.74	35.16	HORIZONTAL	PASSED
4233 / 846.6	18.24	0.067	-16.34	34.58	HORIZONTAL	PASSED

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3.10. LTE2 test results

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

Channel / f_C [MHz]	EIRP [dBm]	EIRP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
26065 / 1852.5	22.45	0.176	-22.51	44.96	HORIZONTAL	PASSED
18900 / 1880	22.69	0.186	-22.49	45.18	HORIZONTAL	PASSED
19175 / 1907.5	22.37	0.173	-22.94	45.31	HORIZONTAL	PASSED

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

Channel / f_C [MHz]	EIRP [dBm]	EIRP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
26065 / 1852.5	22.1	0.162	-22.86	44.96	HORIZONTAL	PASSED
18900 / 1880	22.24	0.167	-22.94	45.18	HORIZONTAL	PASSED
19175 / 1907.5	21.7	0.148	-23.61	45.31	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]	A_{TOT} [dB]	Polarisation	Results
19975 / 1712.5	24.05	0.254	-20.21	44.26	HORIZONTAL	PASSED
20175 / 1732.5	23.17	0.207	-21.12	44.29	HORIZONTAL	PASSED
20375 / 1752.5	23.63	0.23	-21.05	44.68	HORIZONTAL	PASSED

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

Channel / f_C [MHz]	EIRP [dBm]	EIRP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
19975 / 1712.5	24.16	0.261	-20.1	44.26	HORIZONTAL	PASSED
20175 / 1732.5	23.14	0.206	-21.15	44.29	HORIZONTAL	PASSED
20375 / 1752.5	23.73	0.236	-20.95	44.68	HORIZONTAL	PASSED

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3.12. LTE5 test results

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

Channel / f_C [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
20425 / 826.5	20.98	0.125	-15.08	36.06	VERTICAL	PASSED
20525 / 836.5	20.26	0.106	-14.97	35.23	HORIZONTAL	PASSED
20625 / 846.5	19.91	0.098	-14.67	34.58	HORIZONTAL	PASSED

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

Channel / f_C [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
20425 / 826.5	21.21	0.132	-14.85	36.06	VERTICAL	PASSED
20525 / 836.5	20.29	0.107	-14.94	35.23	HORIZONTAL	PASSED
20625 / 846.5	19.84	0.096	-14.74	34.58	HORIZONTAL	PASSED

3.13. LTE12 test results

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

Channel / f_C [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
23035 / 701.5	20.29	0.107	-13.56	33.85	VERTICAL	PASSED
23095 / 707.5	20.67	0.117	-13.74	34.41	VERTICAL	PASSED
23155 / 713.5	21.01	0.126	-13.84	34.85	VERTICAL	PASSED

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

Channel / f_C [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
23035 / 701.5	20.18	0.104	-13.67	33.85	VERTICAL	PASSED
23095 / 707.5	20.77	0.12	-13.64	34.41	VERTICAL	PASSED
23155 / 713.5	21.19	0.132	-13.66	34.85	VERTICAL	PASSED

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3.14. LTE17 test results

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

Channel / f_C [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
23755 / 706.5	20.61	0.115	-13.72	34.33	VERTICAL	PASSED
23790 / 710	20.82	0.121	-13.85	34.67	VERTICAL	PASSED
23825 / 713.5	20.76	0.119	-14.09	34.85	VERTICAL	PASSED

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

Channel / f_C [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
23755 / 706.5	20.68	0.117	-13.65	34.33	VERTICAL	PASSED
23790 / 710	20.81	0.12	-13.86	34.67	VERTICAL	PASSED
23825 / 713.5	20.95	0.124	-13.9	34.85	VERTICAL	PASSED

3.15. LTE28 test results

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

Channel / f_C [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
27235 / 705.5	20.23	0.105	-14.03	34.26	VERTICAL	PASSED
27435 / 725.5	20.06	0.101	-13.81	33.87	VERTICAL	PASSED
27635 / 745.5	17.25	0.053	-16	33.25	HORIZONTAL	PASSED

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

Channel / f_C [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
27235 / 705.5	20.32	0.108	-13.94	34.26	VERTICAL	PASSED
27435 / 725.5	20.22	0.105	-13.65	33.87	VERTICAL	PASSED
27635 / 745.5	17.32	0.054	-15.93	33.25	HORIZONTAL	PASSED

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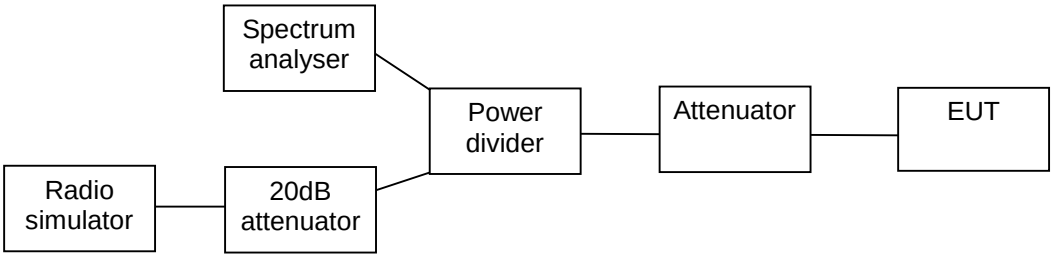
4. Peak to average power ratio

(FCC N/A, RSS-139 6.4, RSS-133 6.4, RSS-132 5.4, RSS-130 4.4, RSS-130 N/A)

EUT with DUT number	RM-1065, DUT 19004
Accessories with DUT numbers	SD-238R, DUT 19008 ; WH-108, DUT 18691
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	Measured from antenna 1.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 40 / 102.6
Date of measurements	15-Jan-2015
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 Peak to average power ratio measurements

Peak to average power ratio [dB]
≤ 13

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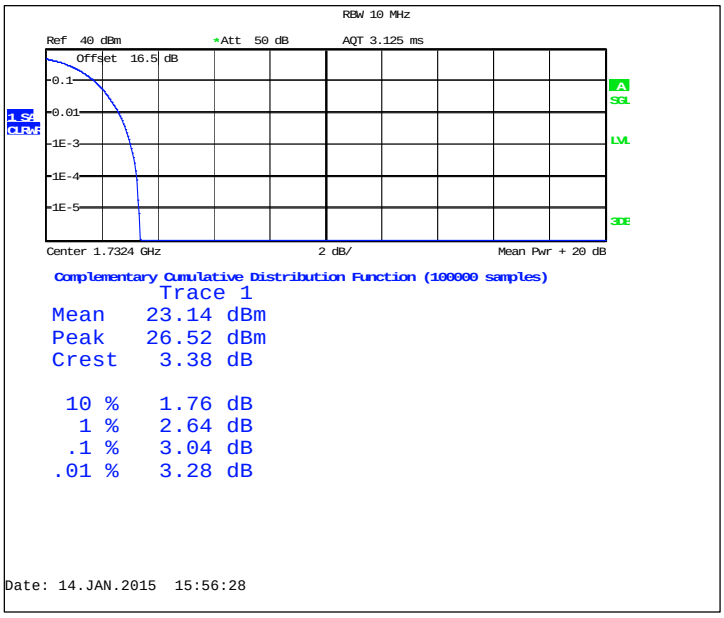
4.3. WCDMA4 Test results

Operation mode (TX on)	Channel / f_C [MHz]	Peak to average power ratio [dB]	Result
FDD	1412 / 1732.4	3.38	PASSED

FDD



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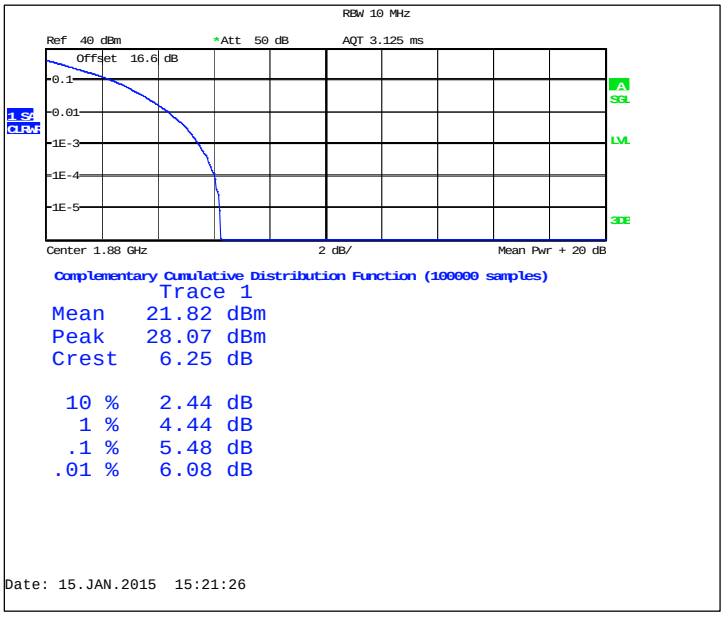
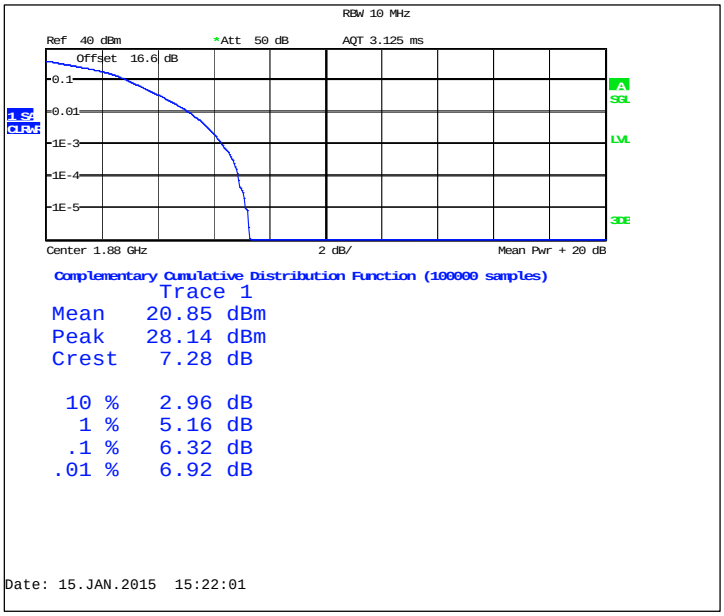
4.4. LTE2 Test results

Operation mode (TX on)	Channel / f_C [MHz]	Peak to average power ratio [dB]	Result
FDD, CBW 5MHz, QPSK, 25 RB	18900 / 1880.0	6.25	PASSED
FDD, CBW 5MHz, 16QAM, 25 RB	18900 / 1880.0	7.28	PASSED

FDD, CBW 5MHz, QPSK, 25 RB



FDD, CBW 5MHz, 16QAM, 25 RB



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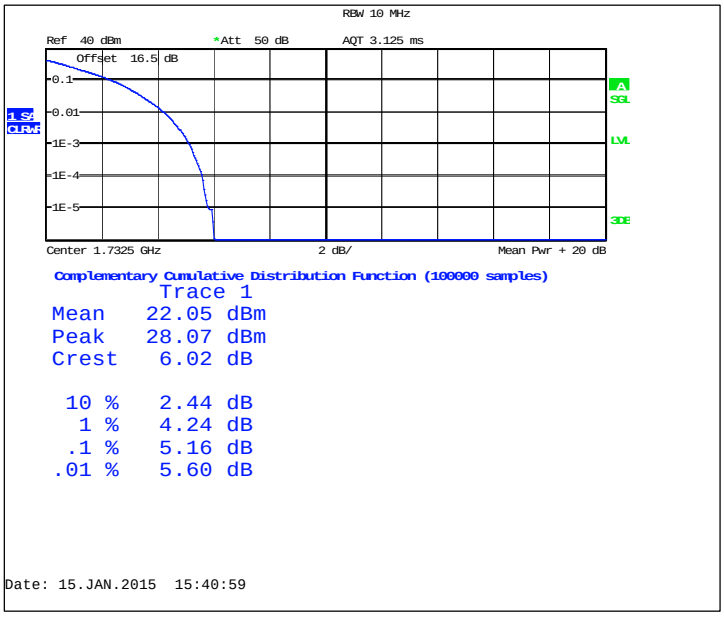
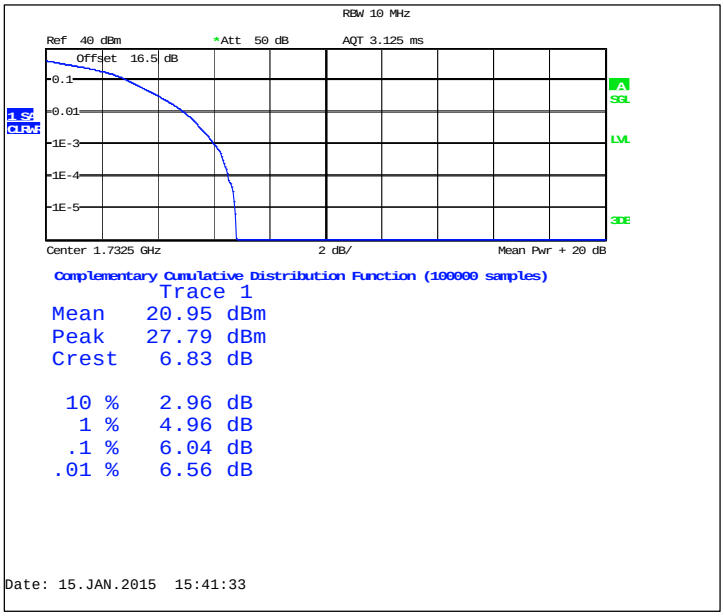
4.5. LTE4 Test results

Operation mode (TX on)	Channel / f_C [MHz]	Peak to average power ratio [dB]	Result
FDD, CBW 5MHz, QPSK, 25 RB	20175 / 1732.5	6.02	PASSED
FDD, CBW 5MHz, 16QAM, 25 RB	20175 / 1732.5	6.83	PASSED

FDD, CBW 5MHz, QPSK, 25 RB



FDD, CBW 5MHz, 16QAM, 25 RB



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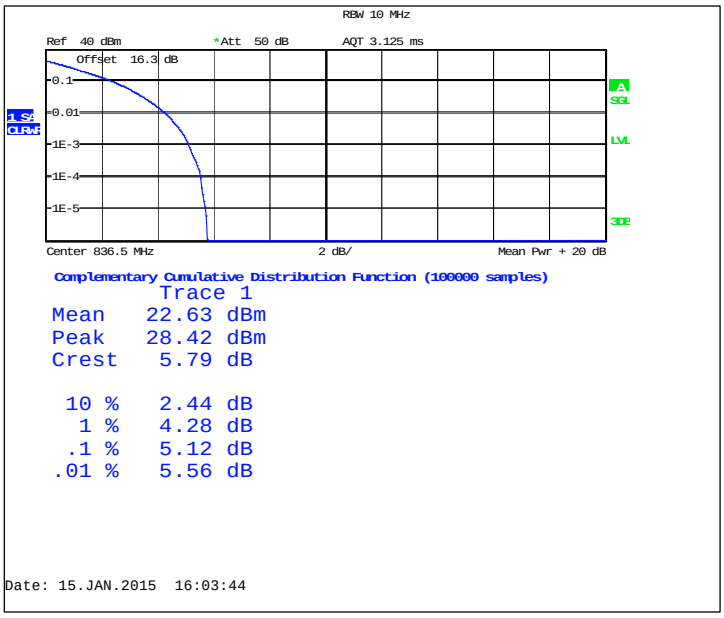
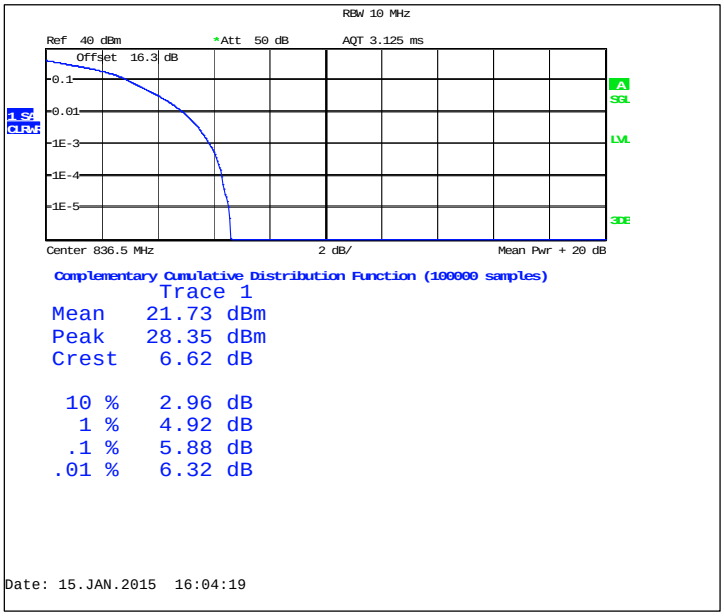
4.6. LTE5 Test results

Operation mode (TX on)	Channel / f_C [MHz]	Peak to average power ratio [dB]	Result
FDD, CBW 5MHz, QPSK, 25 RB	20525 / 836.5	5.79	PASSED
FDD, CBW 5MHz, 16QAM, 25 RB	20525 / 836.5	6.62	PASSED

FDD, CBW 5MHz, QPSK, 25 RB



FDD, CBW 5MHz, 16QAM, 25 RB



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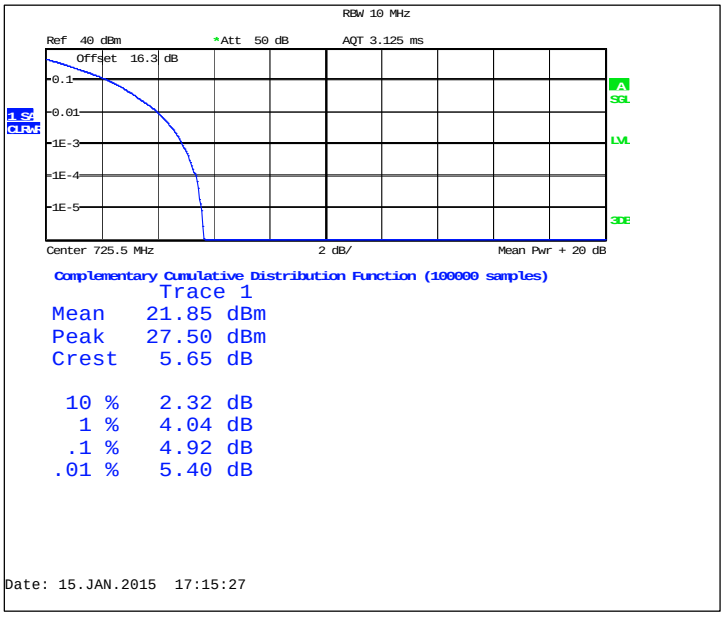
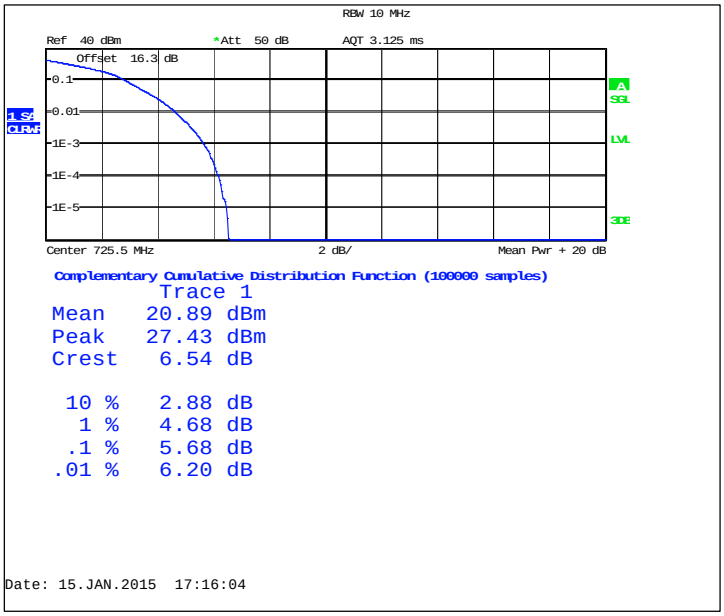
4.7. LTE28 Test results

Operation mode (TX on)	Channel / f_C [MHz]	Peak to average power ratio [dB]	Result
FDD, CBW 5MHz, QPSK, 25 RB	27435 / 725.5	5.65	PASSED
FDD, CBW 5MHz, 16QAM, 25 RB	27435 / 725.5	6.54	PASSED

FDD, CBW 5MHz, QPSK, 25 RB



FDD, CBW 5MHz, 16QAM, 25 RB



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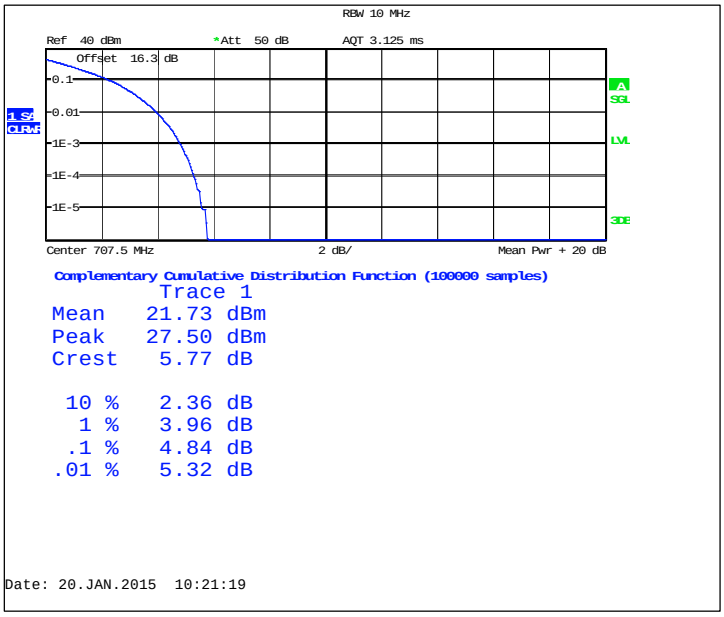
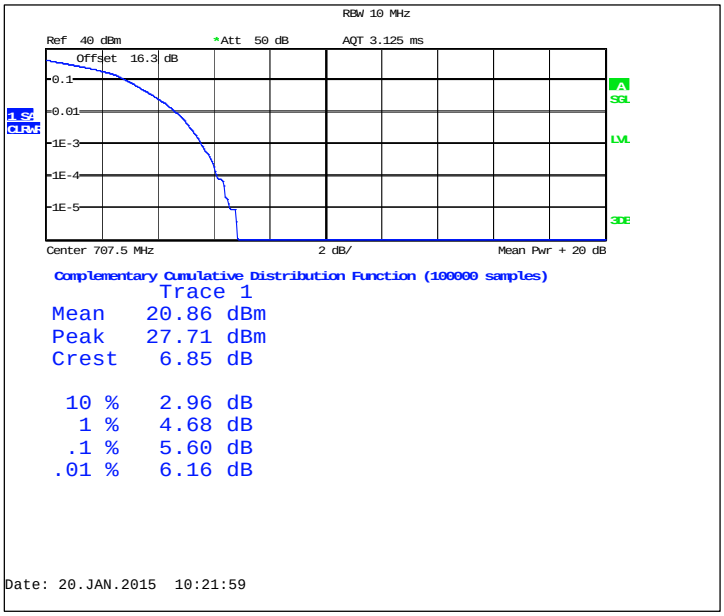
4.8. LTE12 Test results

Operation mode (TX on)	Channel / f_C [MHz]	Peak to average power ratio [dB]	Result
FDD, CBW 5MHz, QPSK, 25 RB	23095 / 707.5	5.77	PASSED
FDD, CBW 5MHz, 16QAM, 25 RB	23095 / 707.5	6.85	PASSED

FDD, CBW 5MHz, QPSK, 25 RB



FDD, CBW 5MHz, 16QAM, 25 RB



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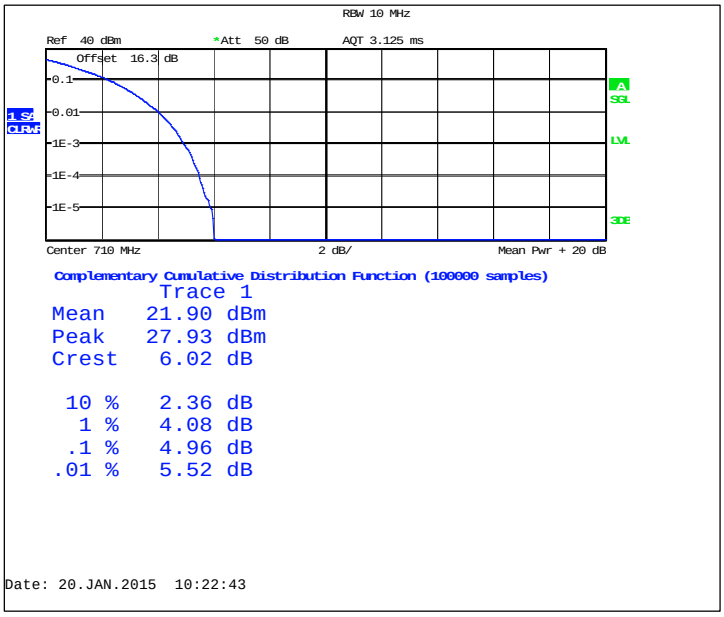
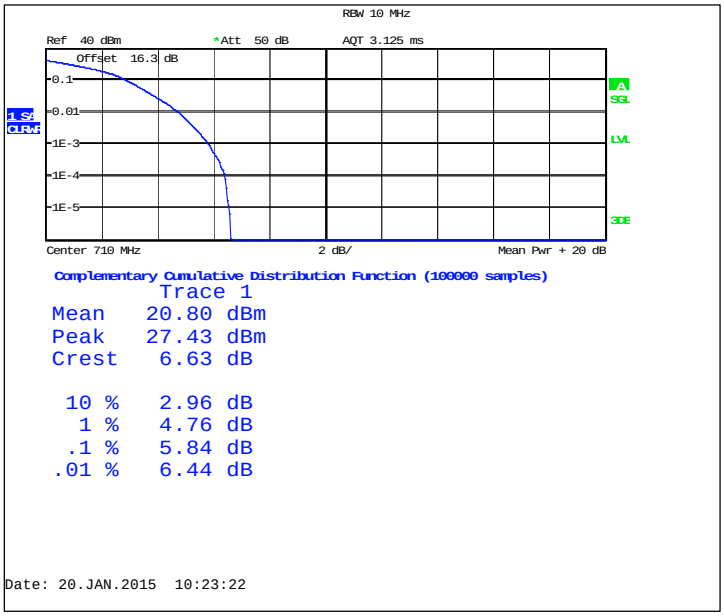
4.9. LTE17 Test results

Operation mode (TX on)	Channel / f_C [MHz]	Peak to average power ratio [dB]	Result
FDD, CBW 5MHz, QPSK, 25 RB	23790 / 710.0	6.02	PASSED
FDD, CBW 5MHz, 16QAM, 25 RB	23790 / 710.0	6.63	PASSED

FDD, CBW 5MHz, QPSK, 25 RB



FDD, CBW 5MHz, 16QAM, 25 RB



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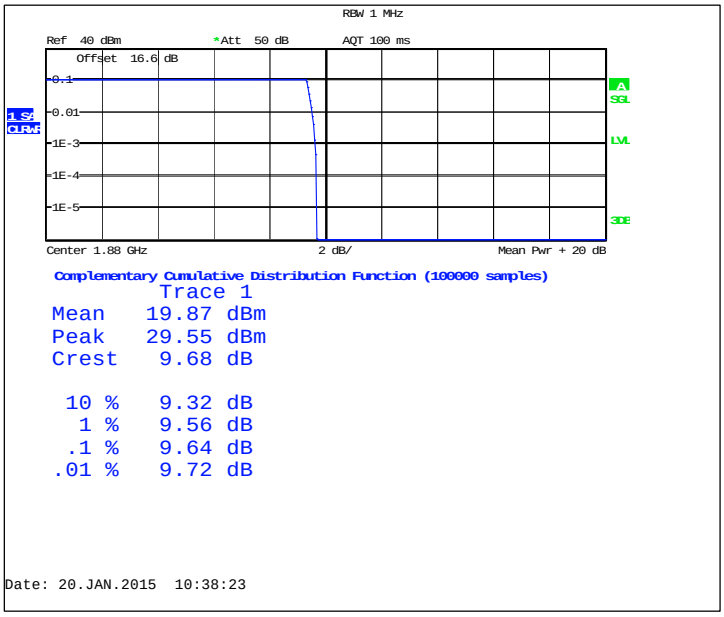
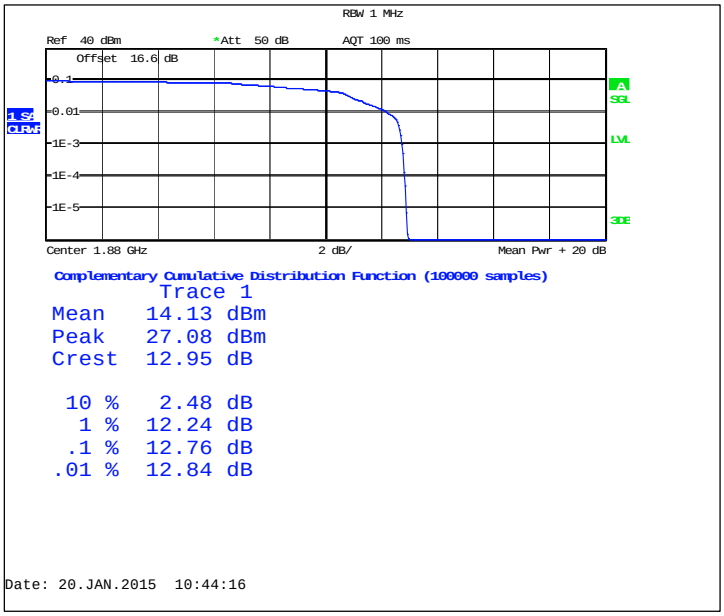
4.10. GSM 1900 Test results

Operation mode (TX on)	Channel / f_C [MHz]	Peak to average power ratio [dB]	Result
GSM	661 / 1880.0	9.68	PASSED
EGPRS	661 / 1880.0	12.95	PASSED

GSM



EGPRS



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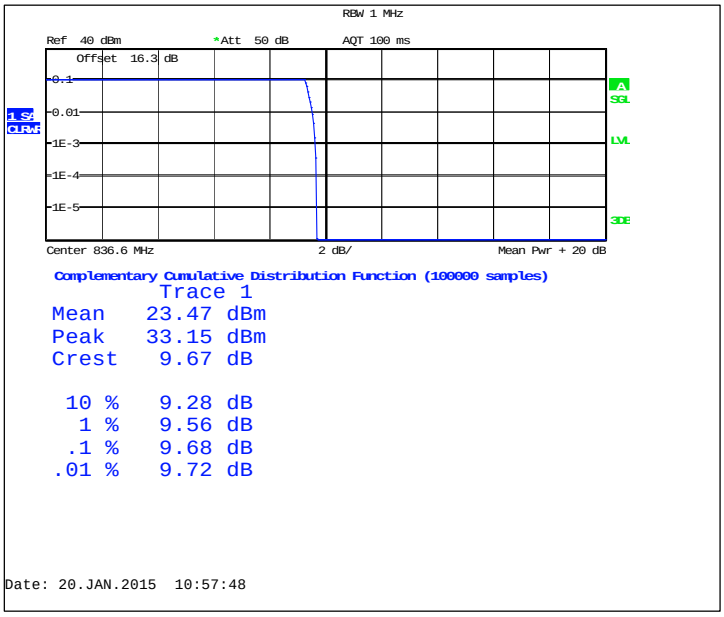
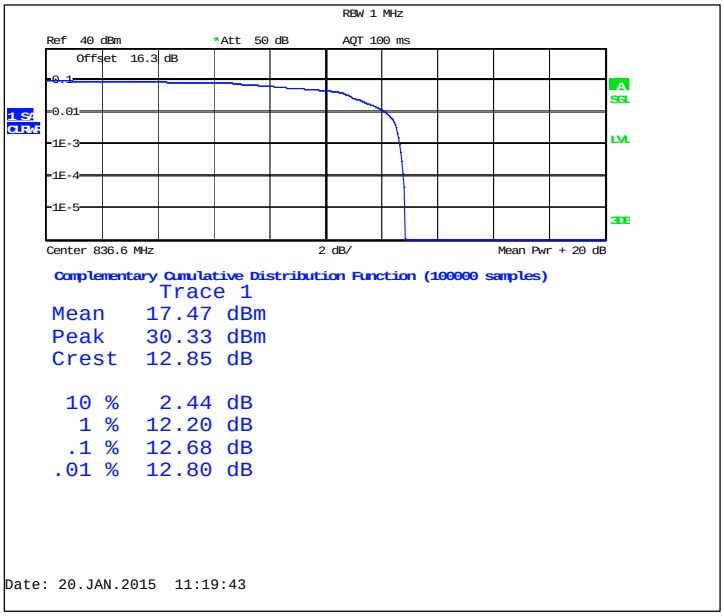
4.11. GSM 850 Test results

Operation mode (TX on)	Channel / f_C [MHz]	Peak to average power ratio [dB]	Result
GSM	190 / 836.6	9.67	PASSED
EGPRS	190 / 836.6	12.85	PASSED

GSM



EGPRS



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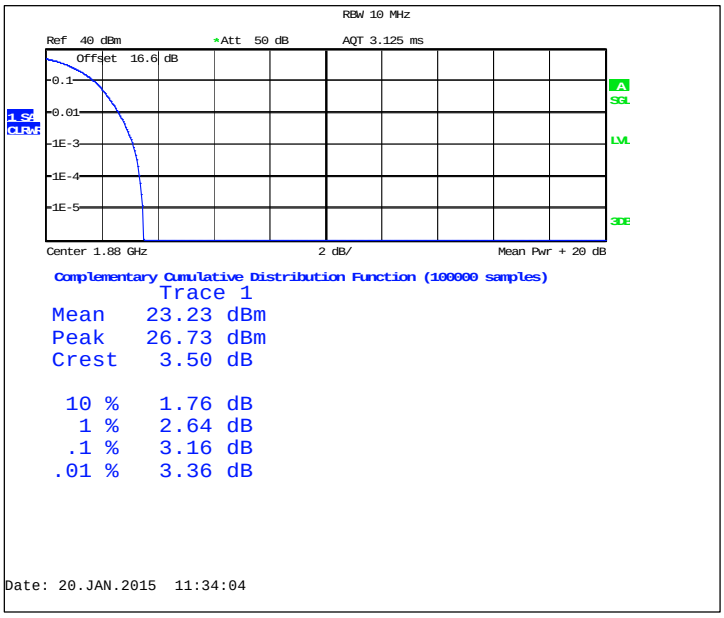
4.12. WCDMA2 Test results

Operation mode (TX on)	Channel / f_C [MHz]	Peak to average power ratio [dB]	Result
FDD	9400 / 1880.0	3.50	PASSED

FDD



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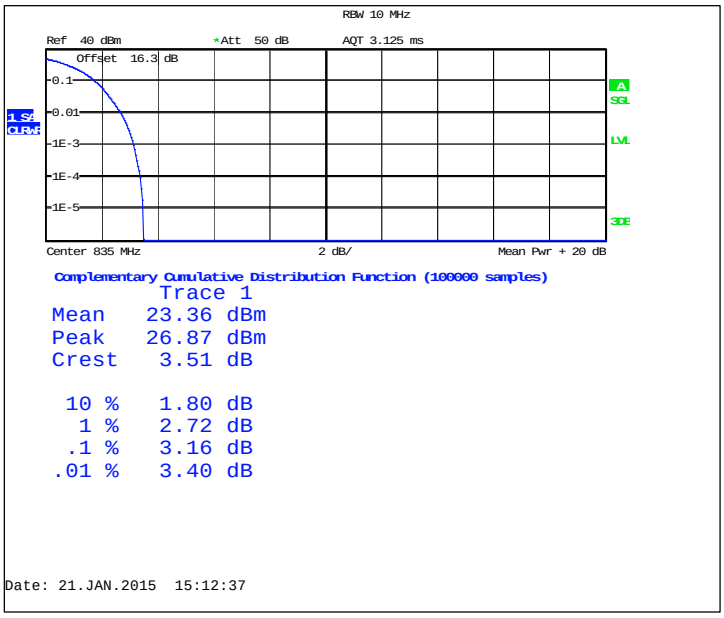
4.13. WCDMA5 Test results

Operation mode (TX on)	Channel / f_C [MHz]	Peak to average power ratio [dB]	Result
FDD	4175 / 835.0	3.51	PASSED

FDD



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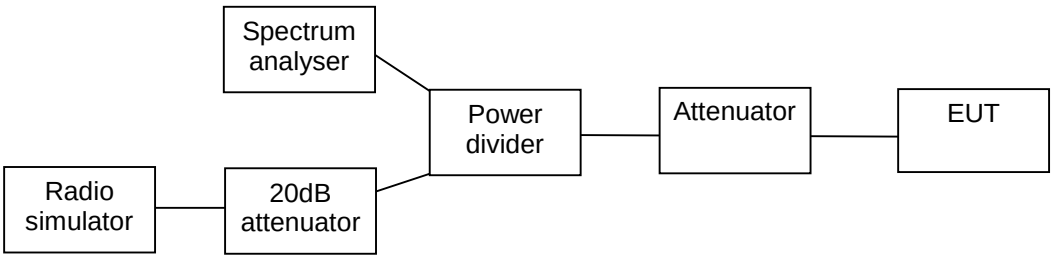
5. 99 % occupied bandwidth

(FCC §2.1049(h), RSS-132 4.6.1, RSS-139 4.6.1, RSS-133 4.6.1, RSS-199 4.6.1, RSS-130 4.6.1)

EUT with DUT number	RM-1065, DUT 19004
Accessories with DUT numbers	SD-238R, DUT 19008 ; WH-108, DUT 18691
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	Measured from antenna 1
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	22 / 40 / 102.6
Date of measurements	15-Jan-2015
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.

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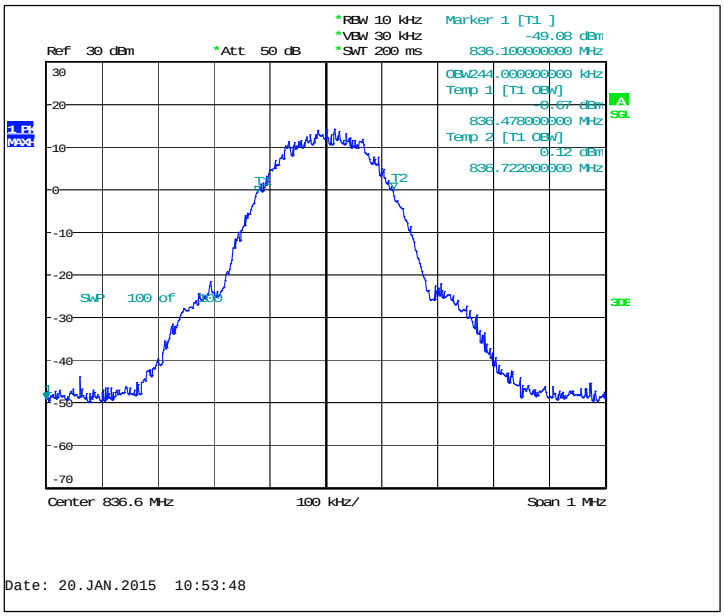
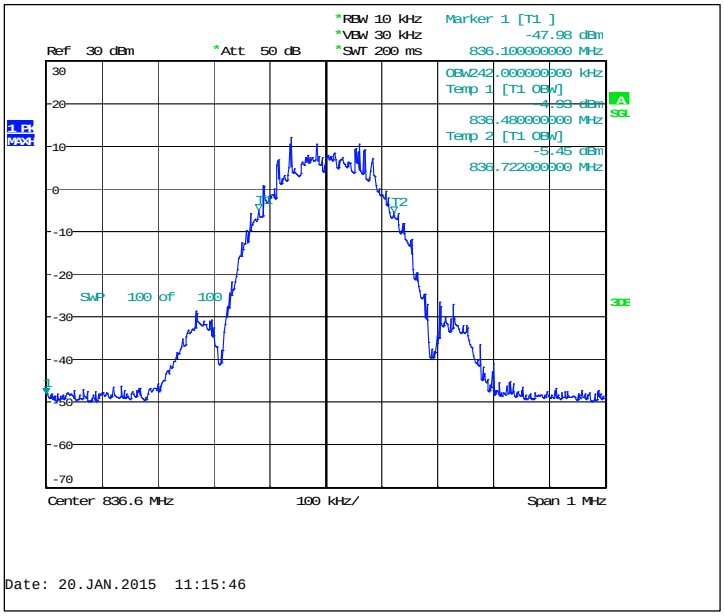
5.3. GSM 850 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
GSM	244
EGPRS	242
GPRS	246

GSM, Channel 190 / 836.6 MHz



EGPRS, Channel 190 / 836.6 MHz



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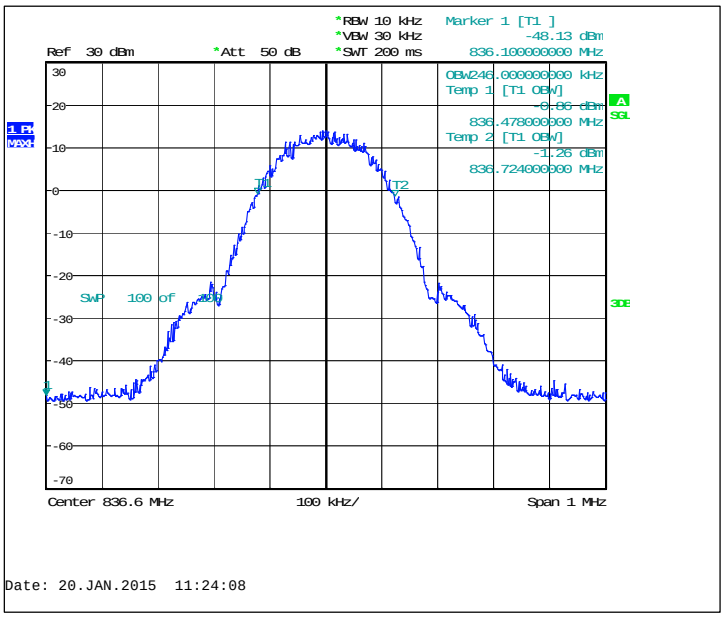
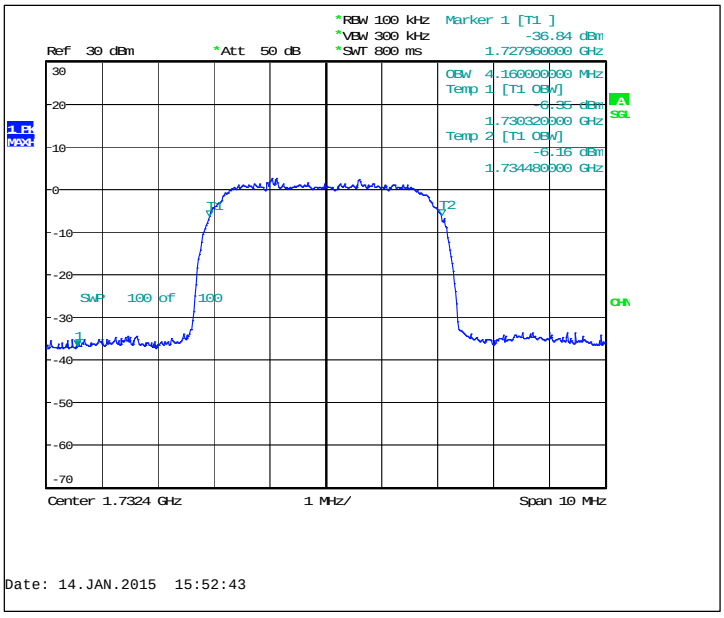
GPRS, Channel 190 / 836.6 MHz



5.4. WCDMA4 Test results

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

FDD, Channel 1412 / 1732.4 MHz



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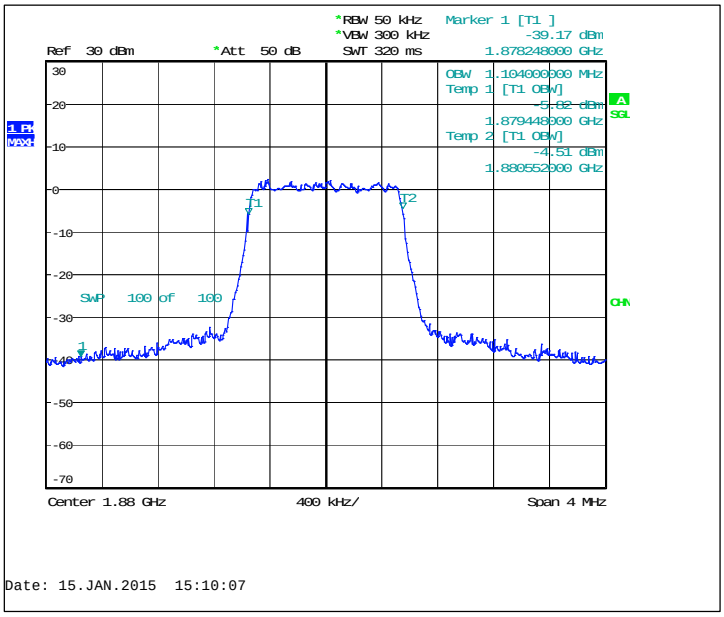
5.5. LTE2 Test results

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	1104
FDD, CBW 3MHz, 16QAM, 15 RB	2680
FDD, CBW 5MHz, 16QAM, 25 RB	4494
FDD, CBW 10MHz, 16QAM, 50 RB	8970
FDD, CBW 15MHz, 16QAM, 75 RB	13440
FDD, CBW 20MHz, 16QAM, 100 RB	17950

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



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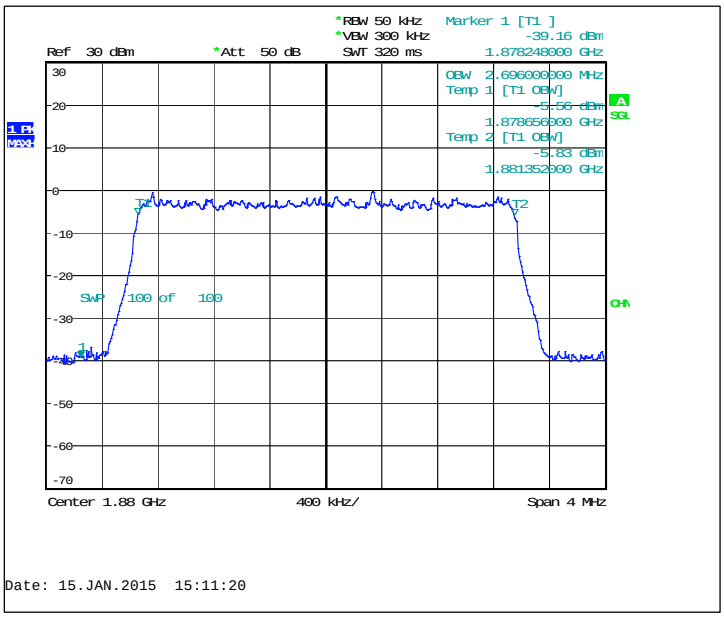
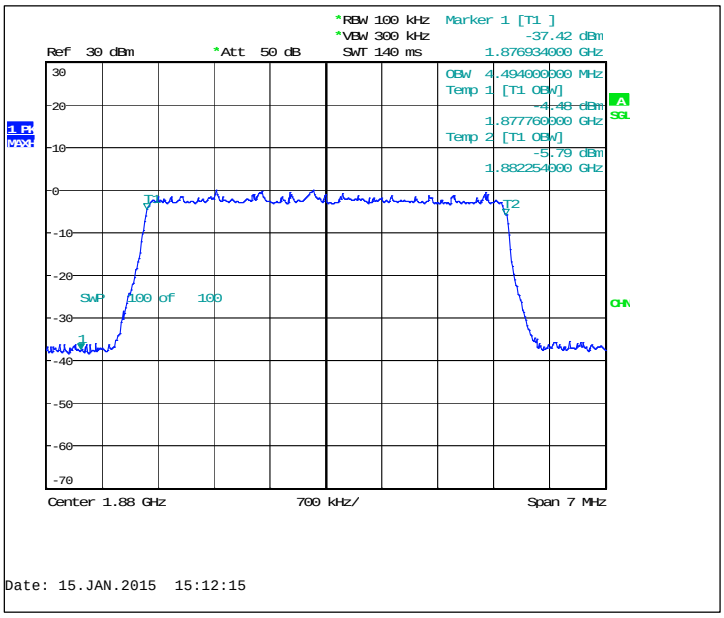
FDD, CBW 3MHz, QPSK, 15 RB, Channel 18900 / 1880.0 MHz



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



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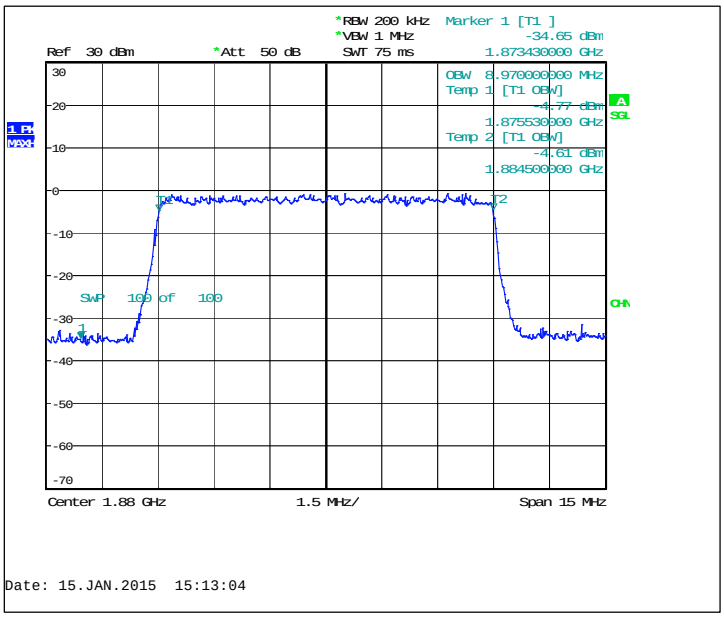
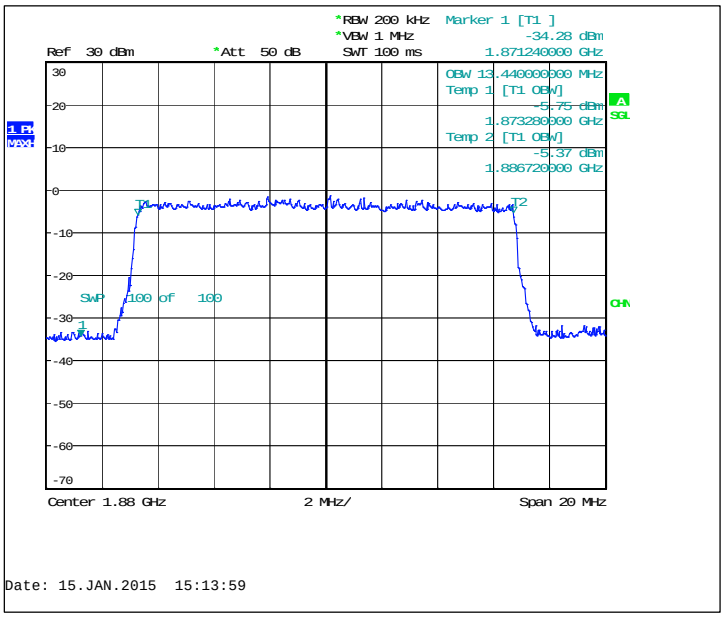
FDD, CBW 10MHz, QPSK, 50 RB, Channel 18900 / 1880.0 MHz



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



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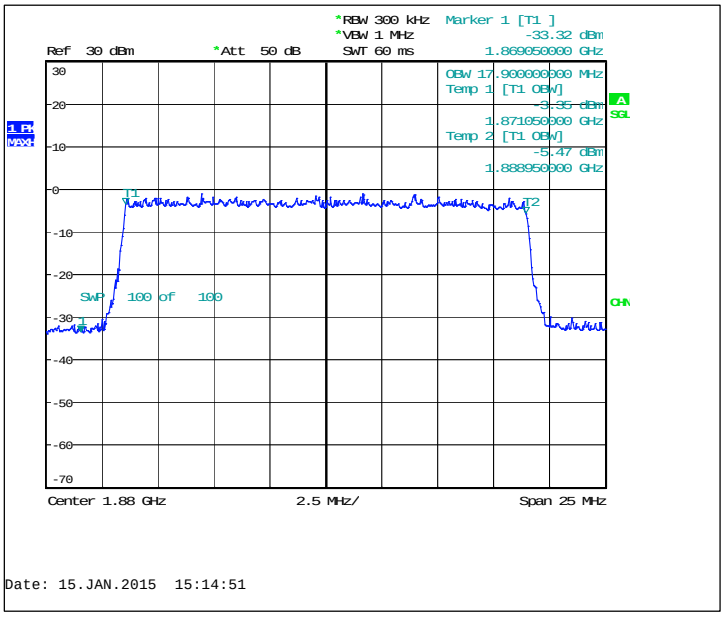
FDD, CBW 20MHz, QPSK, 100 RB, Channel 18900 / 1880.0 MHz



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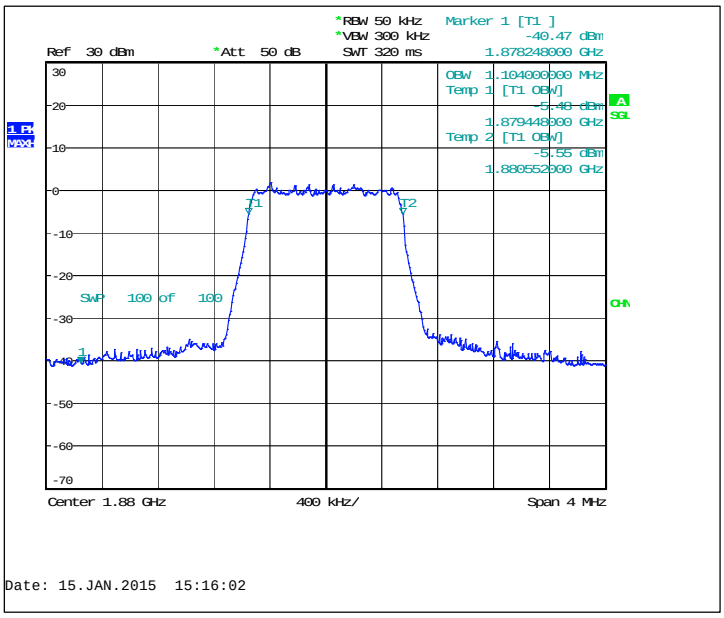
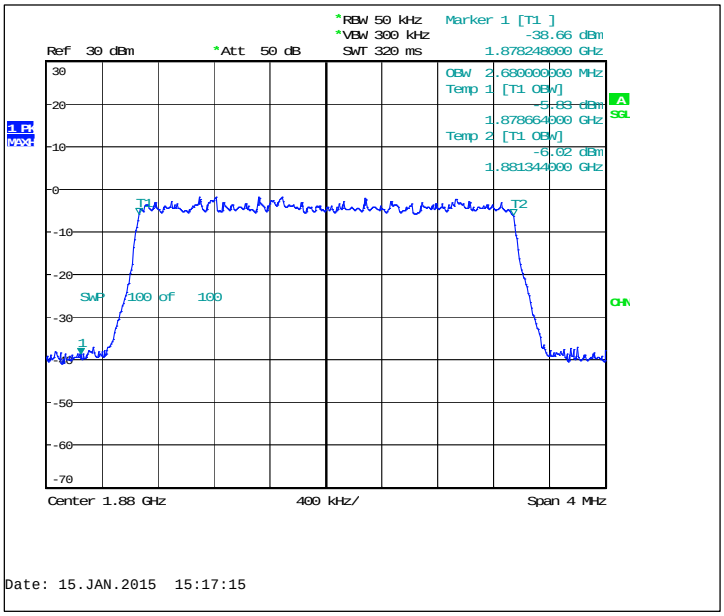
FDD, CBW 1.4MHz, 16QAM, 6 RB, Channel 18900 / 1880.0 MHz



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



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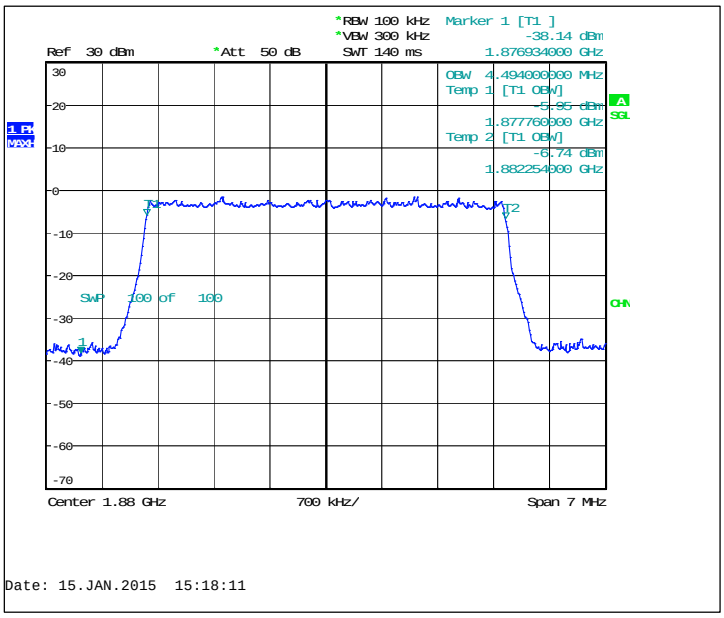
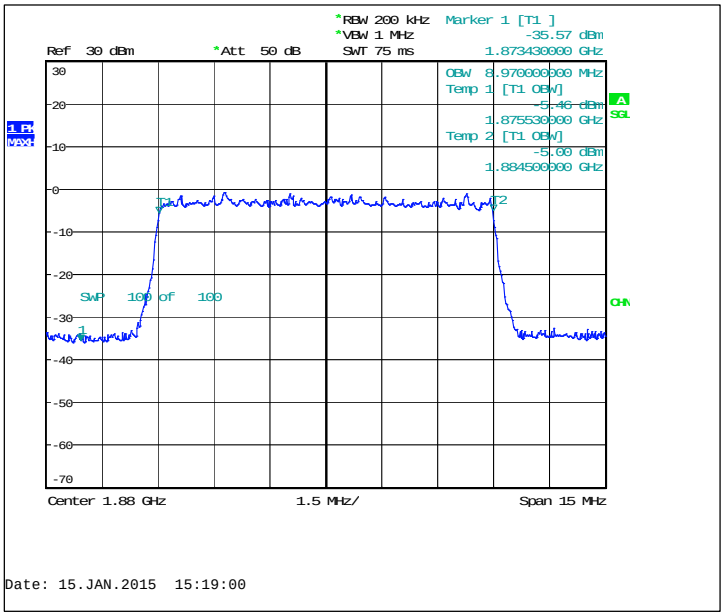
FDD, CBW 5MHz, 16QAM, 25 RB, Channel 18900 / 1880.0 MHz



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



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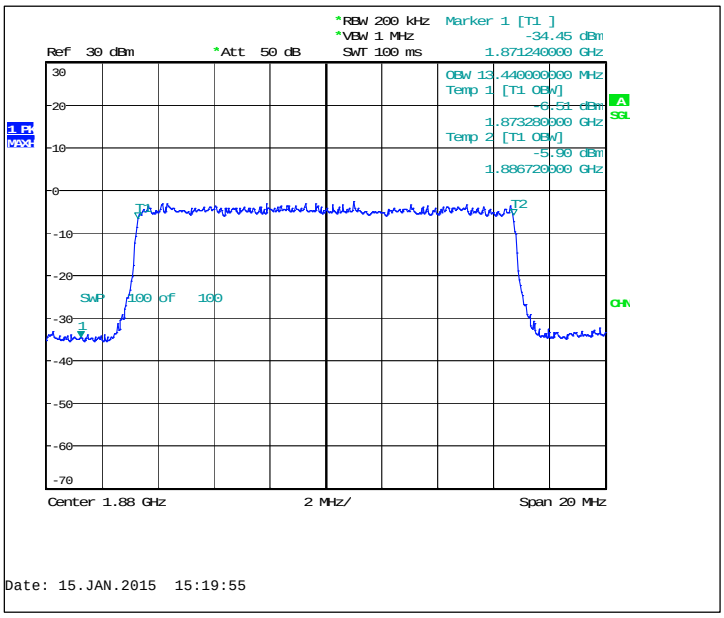
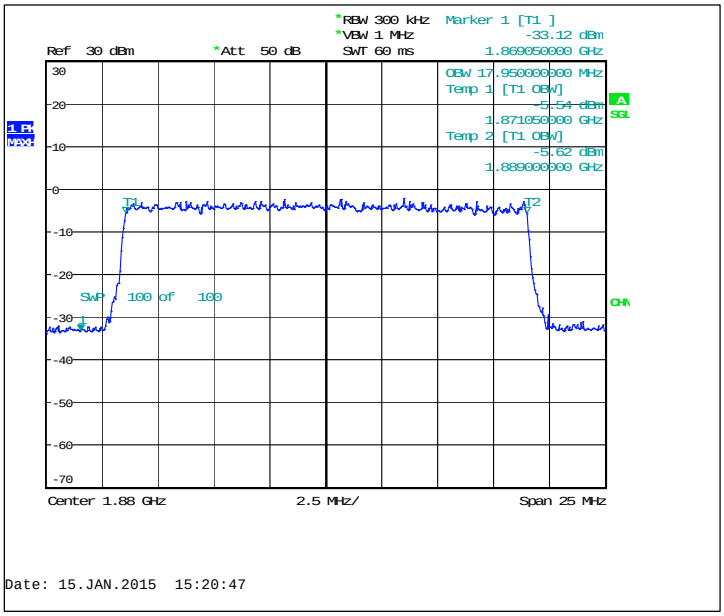
FDD, CBW 15MHz, 16QAM, 75 RB, Channel 18900 / 1880.0 MHz



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



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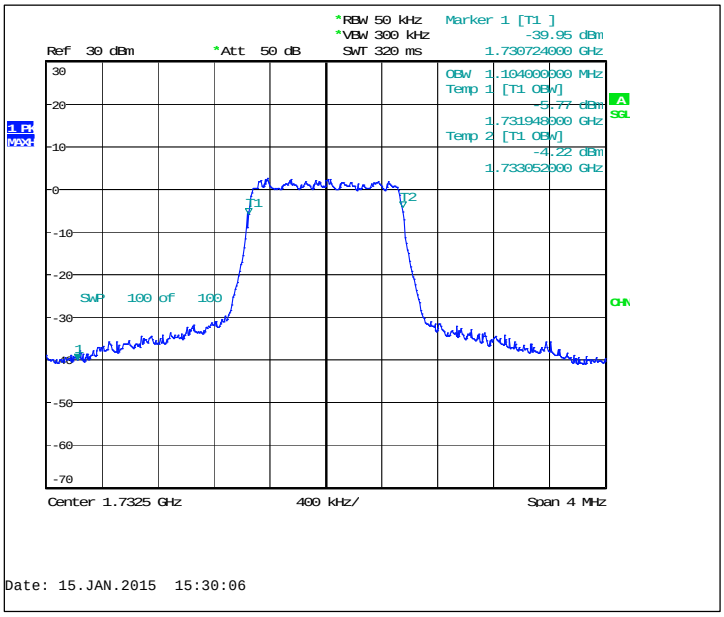
5.6. LTE4 Test results

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	4494
FDD, CBW 10MHz, QPSK, 50 RB	9000
FDD, CBW 15MHz, QPSK, 75 RB	13440
FDD, CBW 20MHz, QPSK, 100 RB	17850
FDD, CBW 1.4MHz, 16QAM, 6 RB	1104
FDD, CBW 3MHz, 16QAM, 15 RB	2680
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	17900

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



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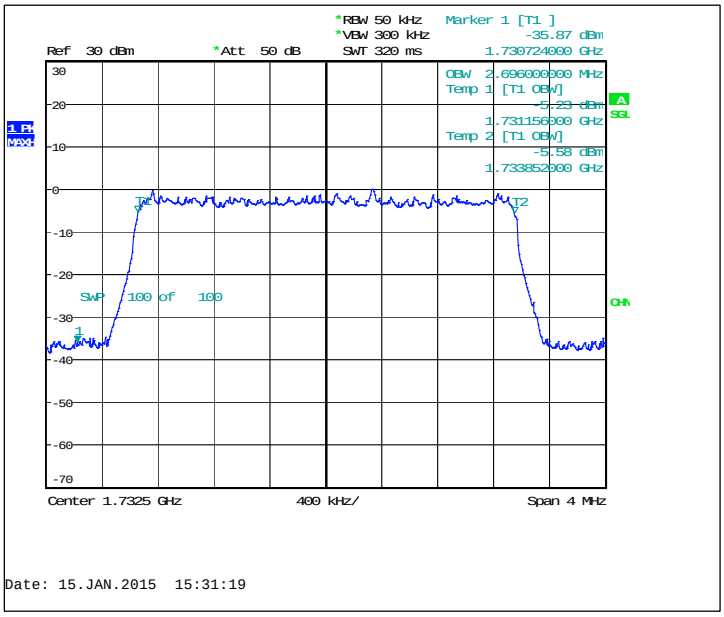
FDD, CBW 3MHz, QPSK, 15 RB, Channel 20175 / 1732.5 MHz



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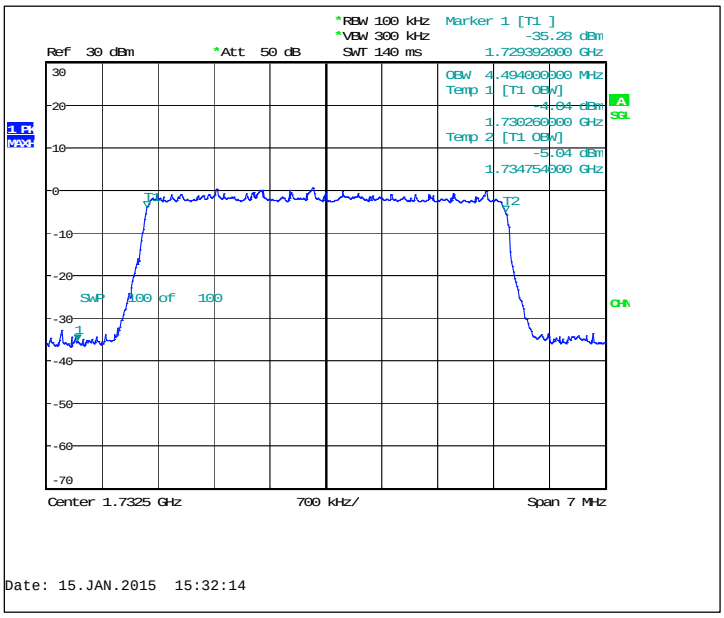
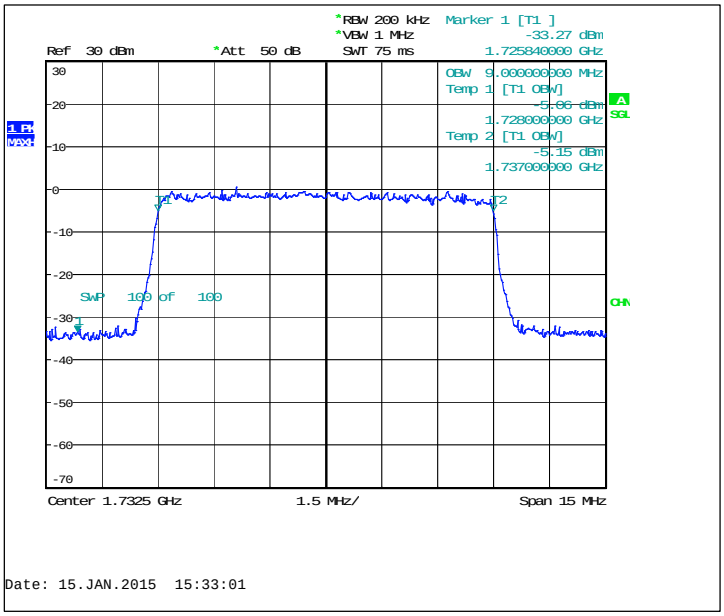
FDD, CBW 5MHz, QPSK, 25 RB, Channel 20175 / 1732.5 MHz



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



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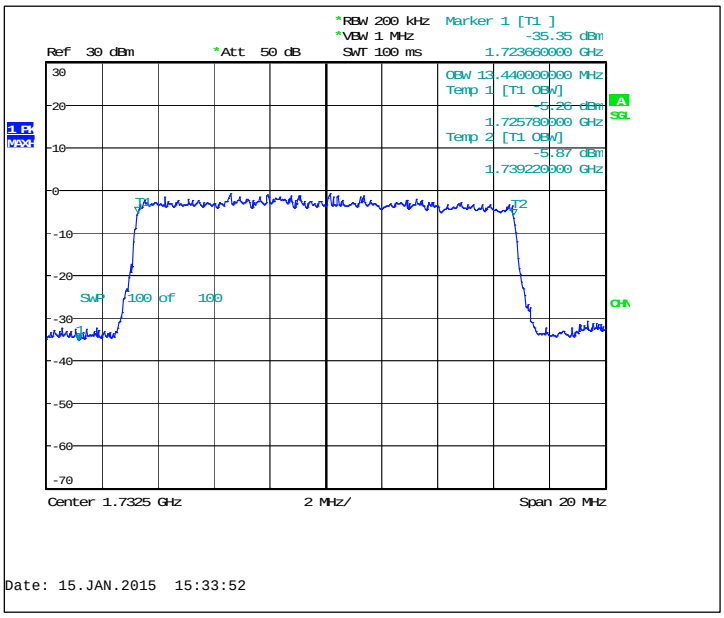
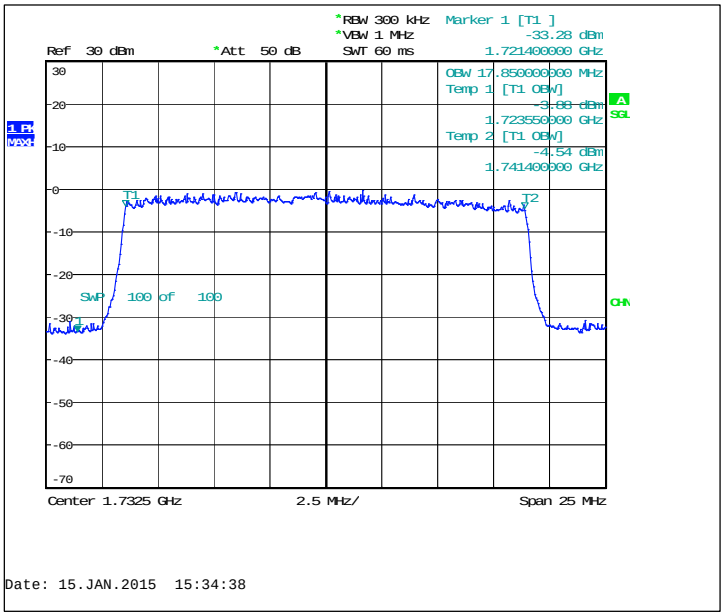
FDD, CBW 15MHz, QPSK, 75 RB, Channel 20175 / 1732.5 MHz



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



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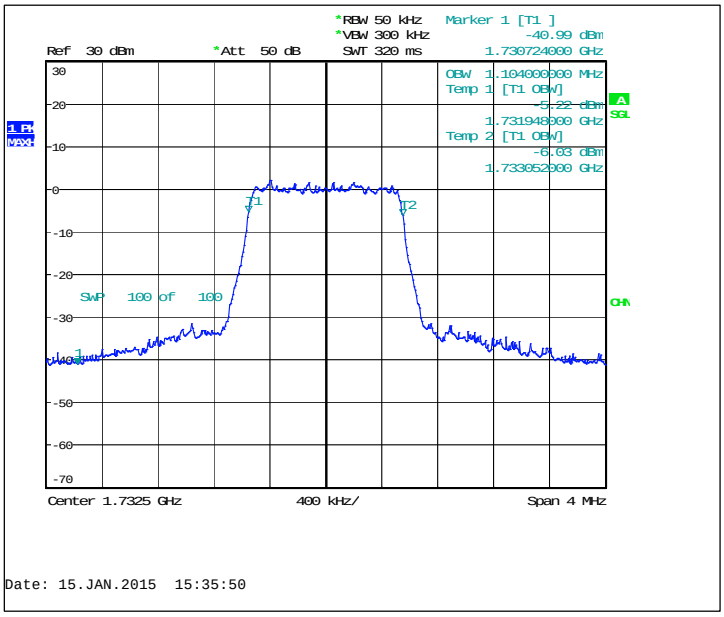
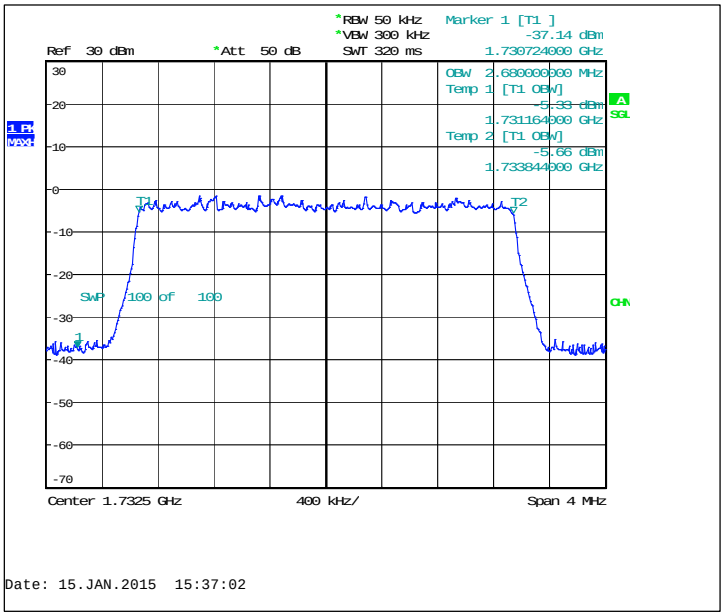
FDD, CBW 1.4MHz, 16QAM, 6 RB, Channel 20175 / 1732.5 MHz



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



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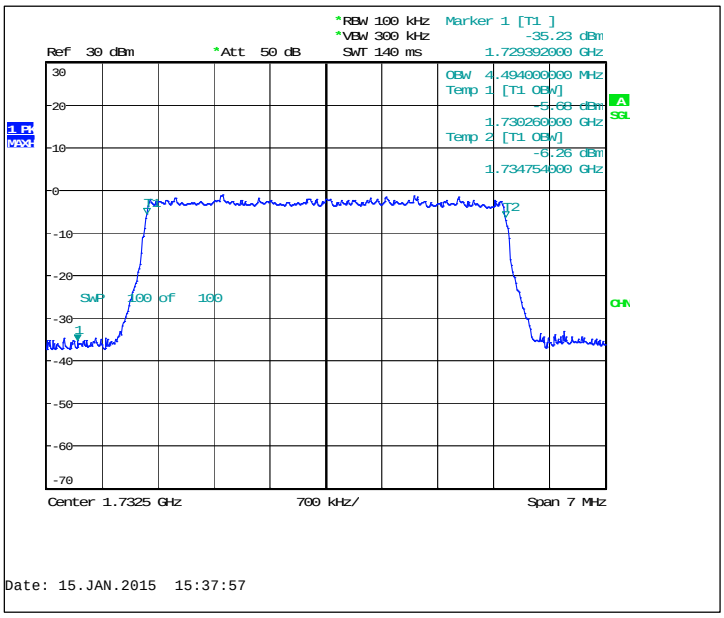
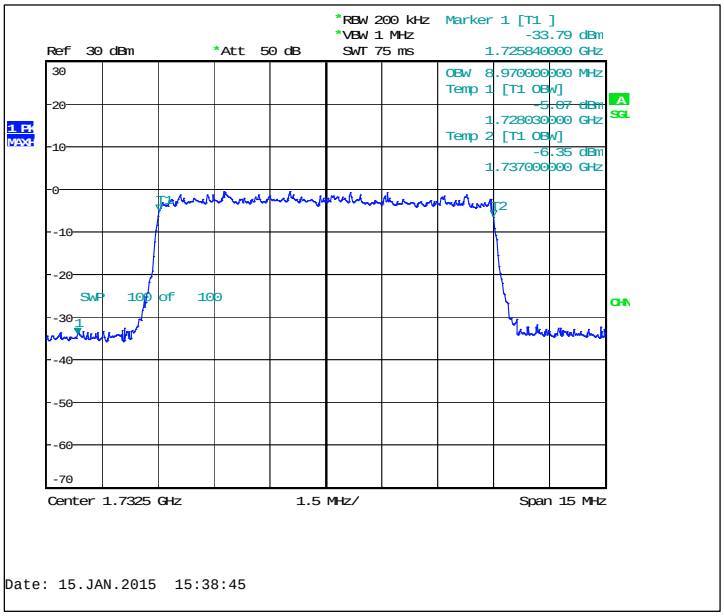
FDD, CBW 5MHz, 16QAM, 25 RB, Channel 20175 / 1732.5 MHz



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



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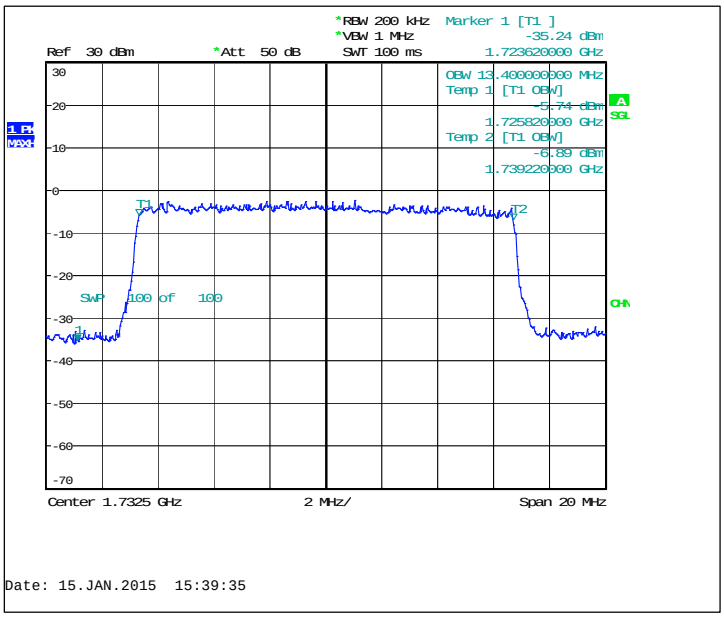
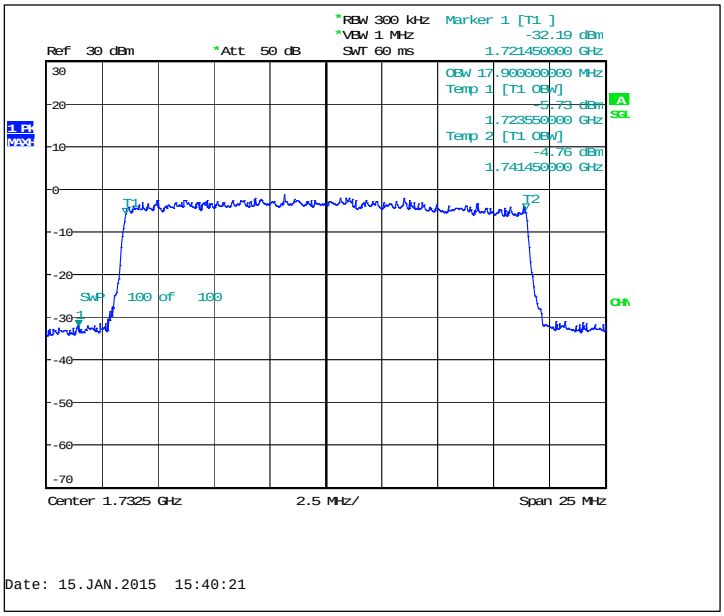
FDD, CBW 15MHz, 16QAM, 75 RB, Channel 20175 / 1732.5 MHz



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



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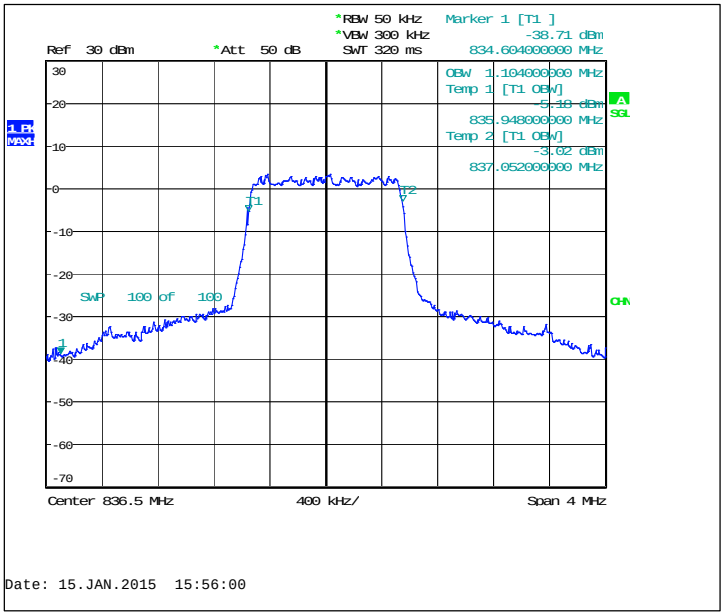
5.7. LTE5 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 1.4MHz, QPSK, 6 RB	1104
FDD, CBW 3MHz, QPSK, 15 RB	2688
FDD, CBW 5MHz, QPSK, 25 RB	4508
FDD, CBW 10MHz, QPSK, 50 RB	9000
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	9000

FDD, CBW 1.4MHz, QPSK, 6 RB, Channel 20525 / 836.5 MHz



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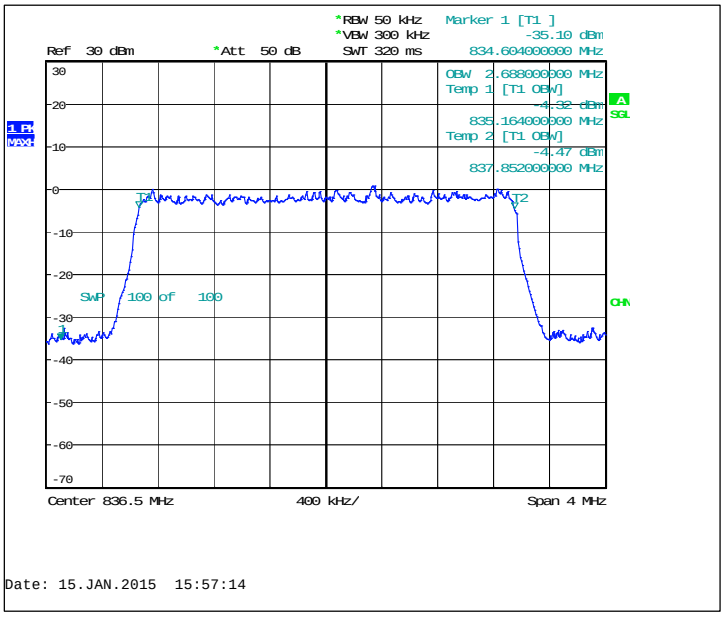
FDD, CBW 3MHz, QPSK, 15 RB, Channel 20525 / 836.5 MHz



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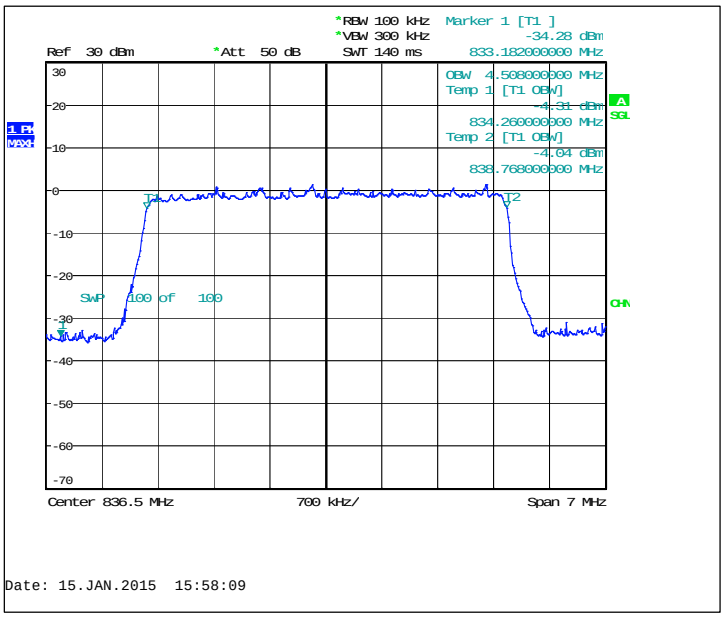
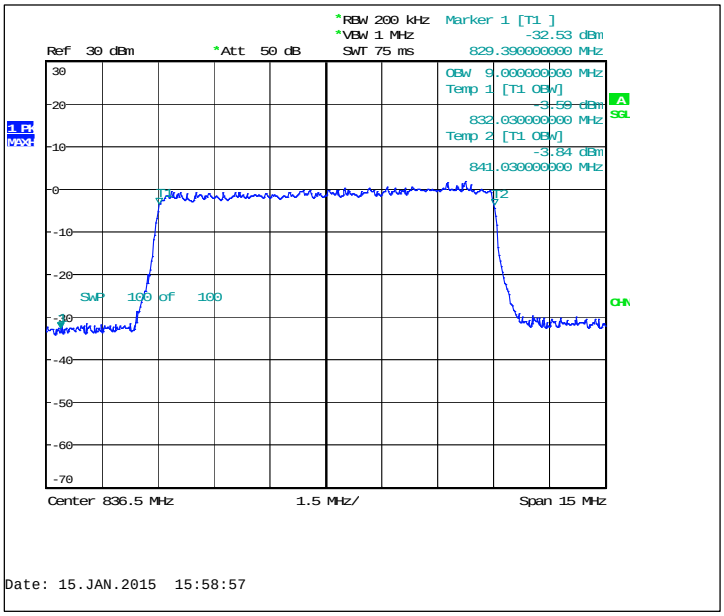
FDD, CBW 5MHz, QPSK, 25 RB, Channel 20525 / 836.5 MHz



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



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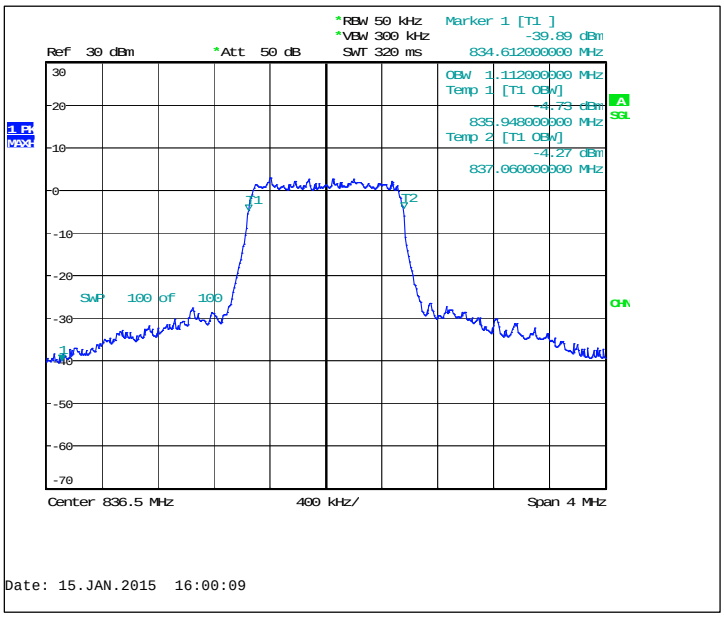
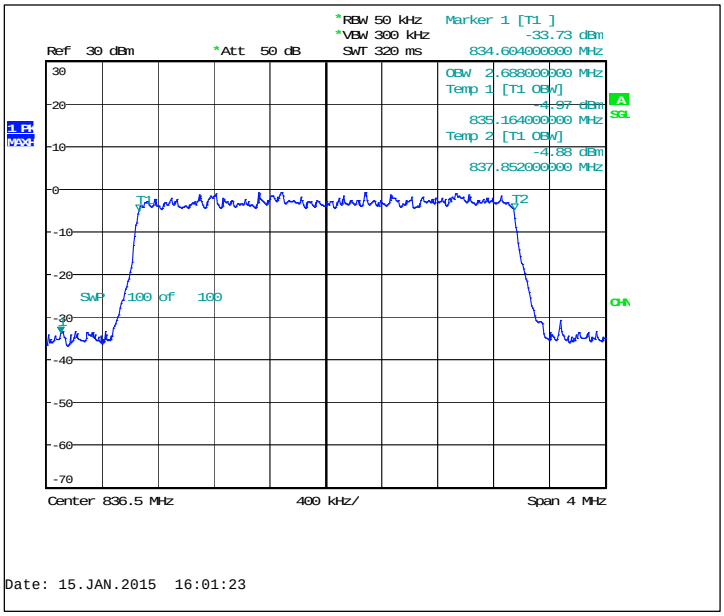
FDD, CBW 1.4MHz, 16QAM, 6 RB, Channel 20525 / 836.5 MHz



FDD, CBW 3MHz, 16QAM, 15 RB, Channel 20525 / 836.5 MHz



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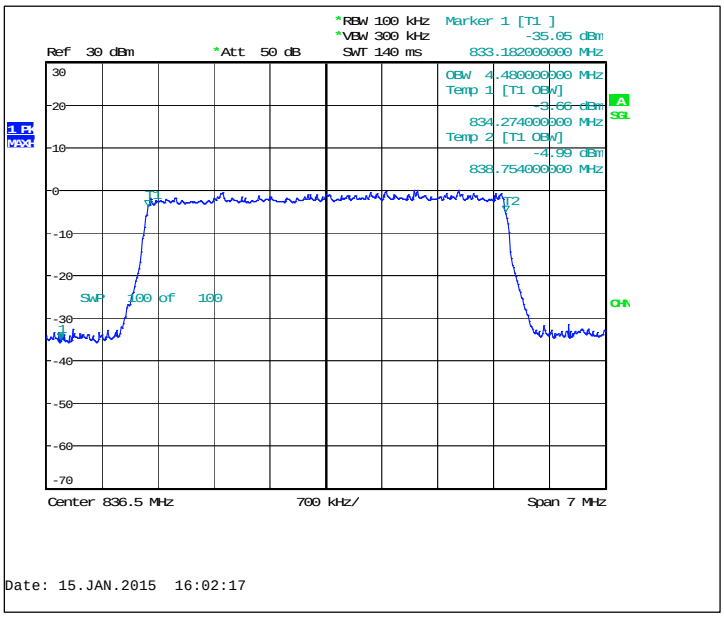
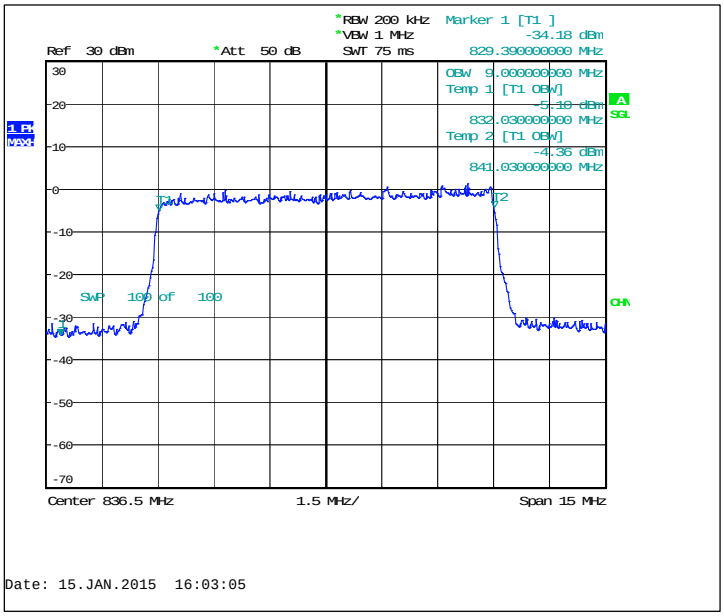
FDD, CBW 5MHz, 16QAM, 25 RB, Channel 20525 / 836.5 MHz



FDD, CBW 10MHz, 16QAM, 50 RB, Channel 20525 / 836.5 MHz



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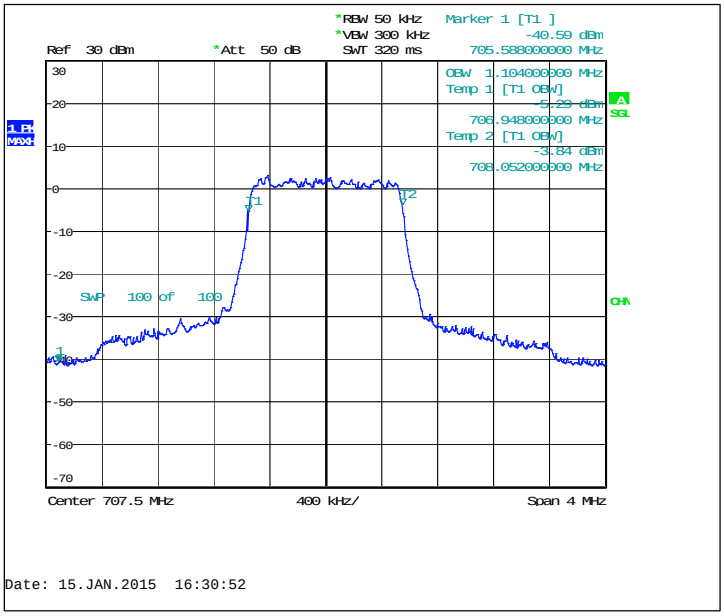
5.8. LTE12 Test results

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 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 1.4MHz, QPSK, 6 RB, Channel 23095 / 707.5 MHz



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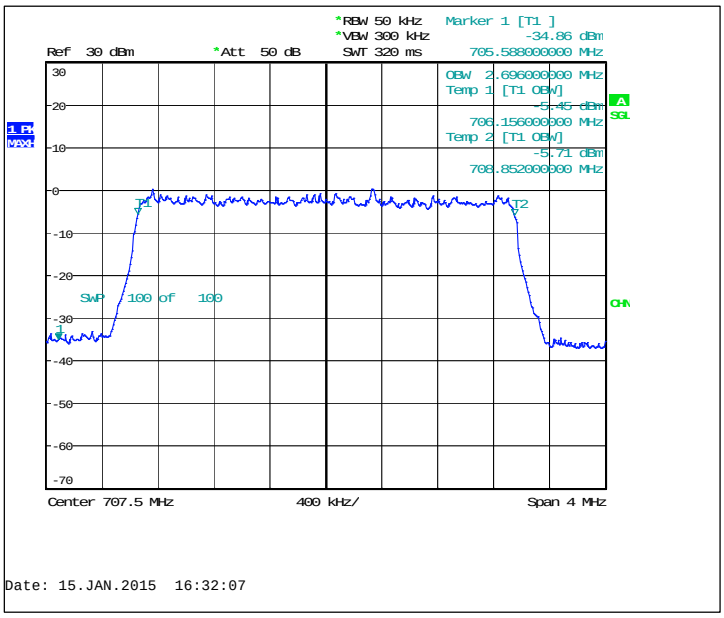
FDD, CBW 3MHz, QPSK, 15 RB, Channel 23095 / 707.5 MHz



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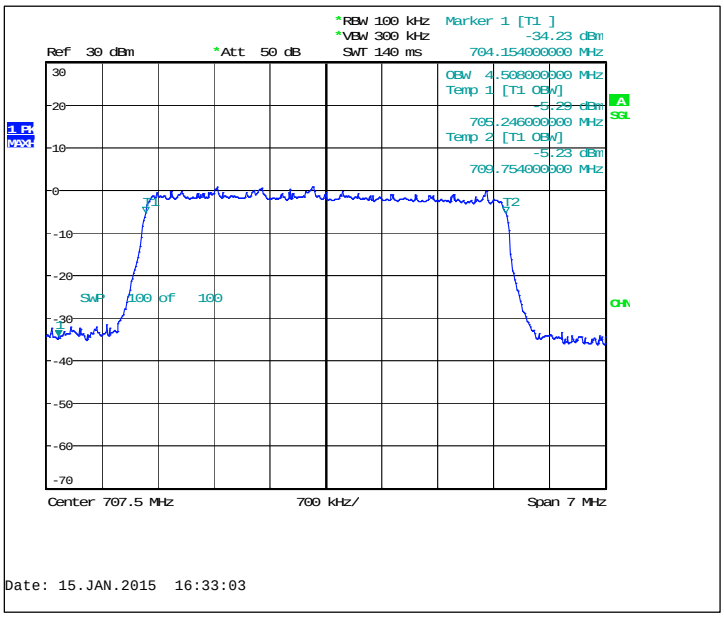
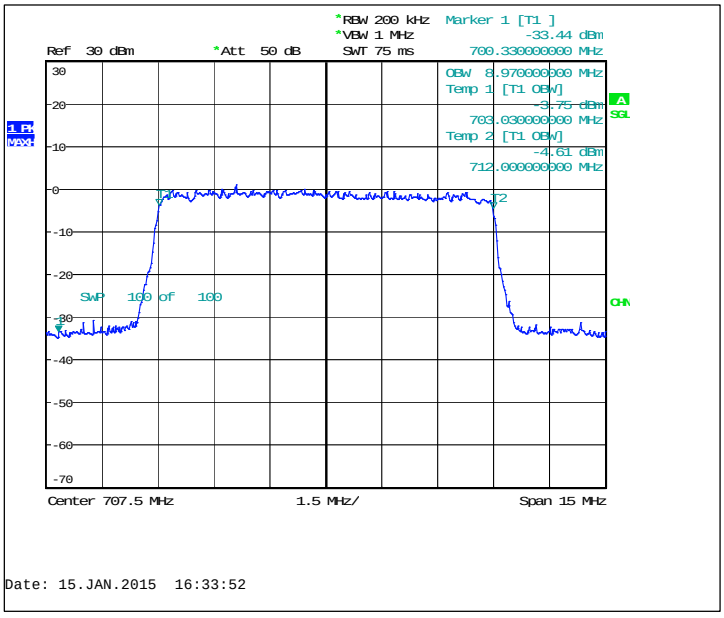
FDD, CBW 5MHz, QPSK, 25 RB, Channel 23095 / 707.5 MHz



FDD, CBW 10MHz, QPSK, 50 RB, Channel 23095 / 707.5 MHz



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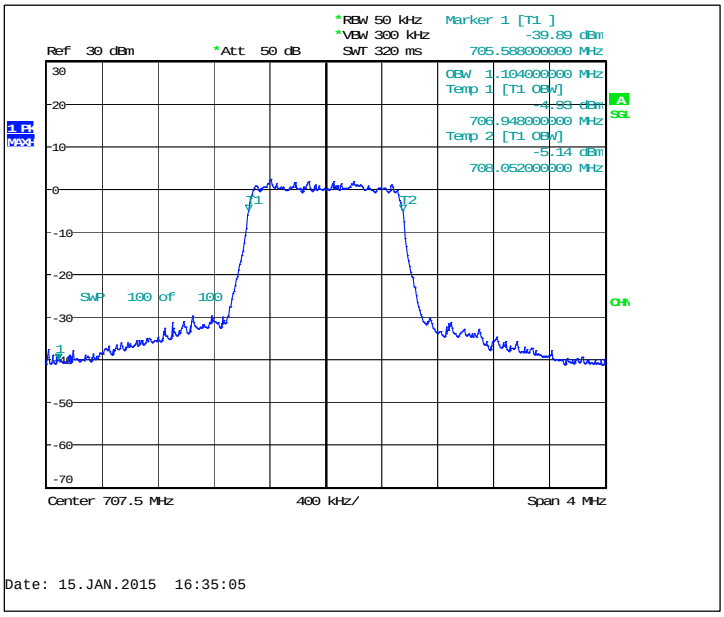
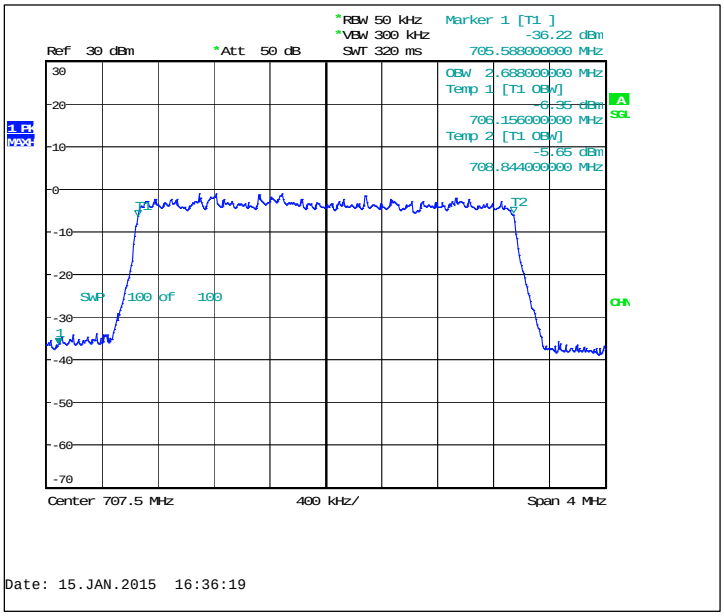
FDD, CBW 1.4MHz, 16QAM, 6 RB, Channel 23095 / 707.5 MHz



FDD, CBW 3MHz, 16QAM, 15 RB, Channel 23095 / 707.5 MHz



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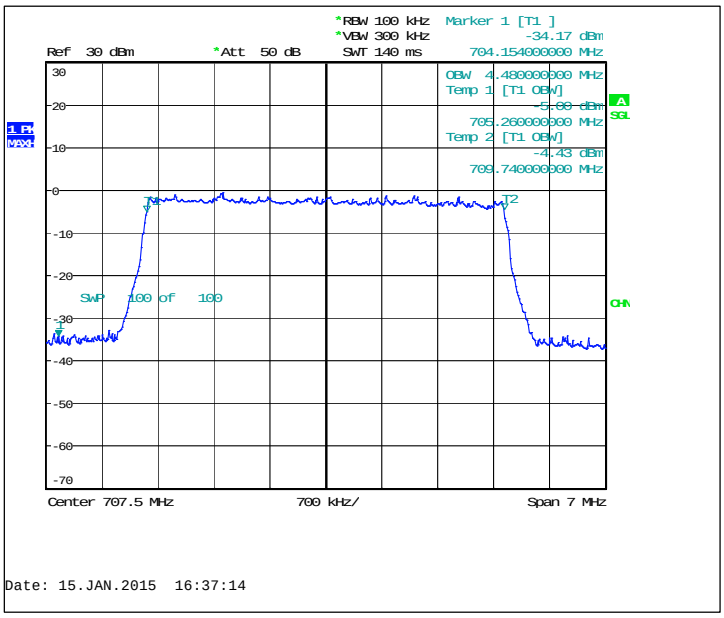
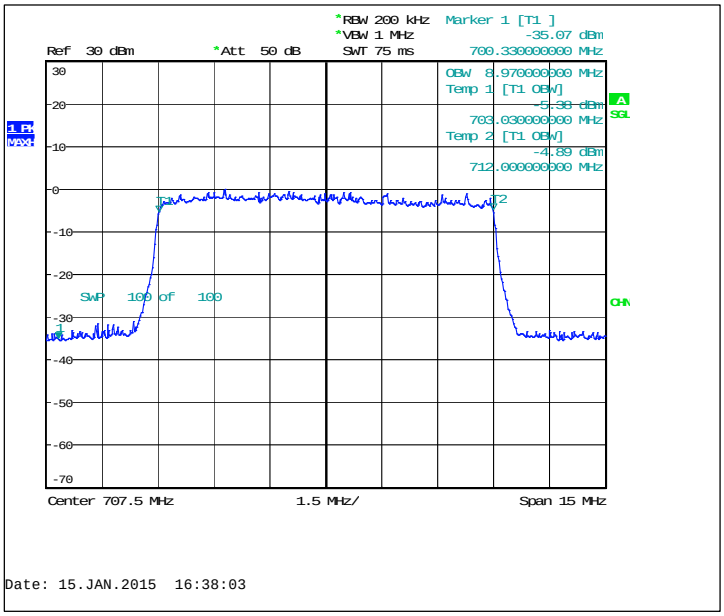
FDD, CBW 5MHz, 16QAM, 25 RB, Channel 23095 / 707.5 MHz



FDD, CBW 10MHz, 16QAM, 50 RB, Channel 23095 / 707.5 MHz



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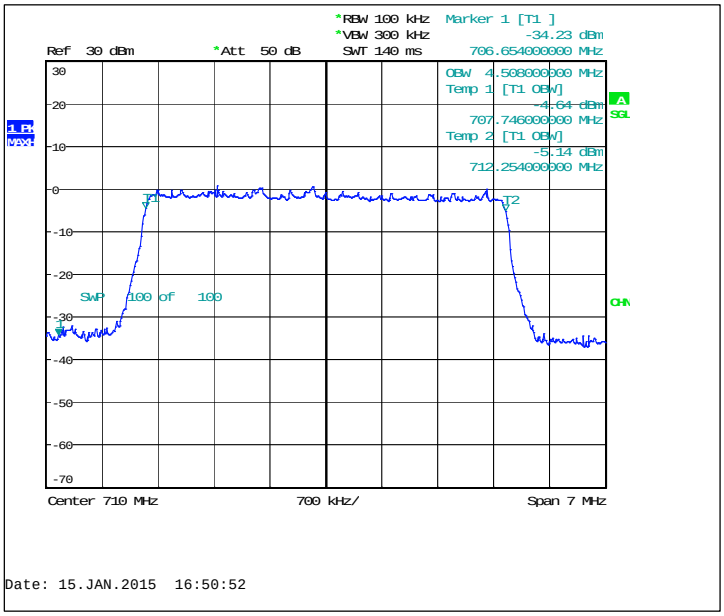
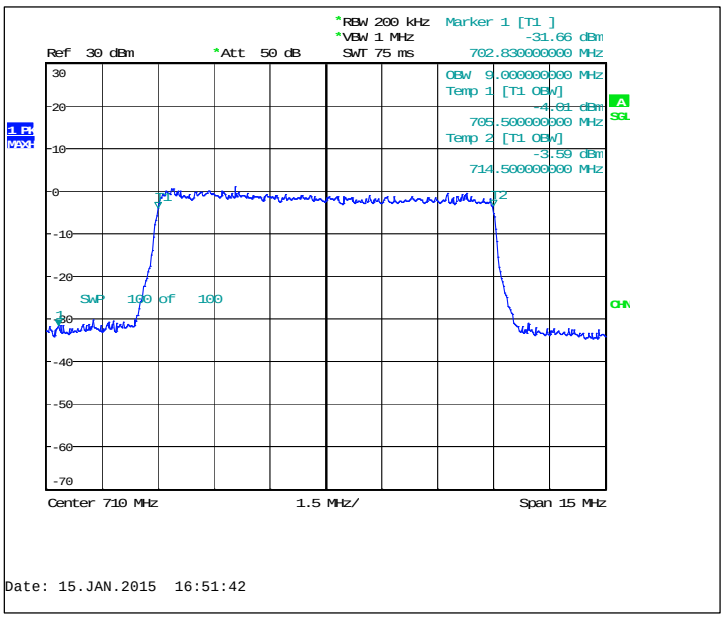
5.9. LTE17 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 5MHz, QPSK, 25 RB	4508
FDD, CBW 10MHz, QPSK, 50 RB	9000
FDD, CBW 5MHz, 16QAM, 25 RB	4480
FDD, CBW 10MHz, 16QAM, 50 RB	9000

FDD, CBW 5MHz, QPSK, 25 RB, Channel 23790 / 710.0 MHz



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



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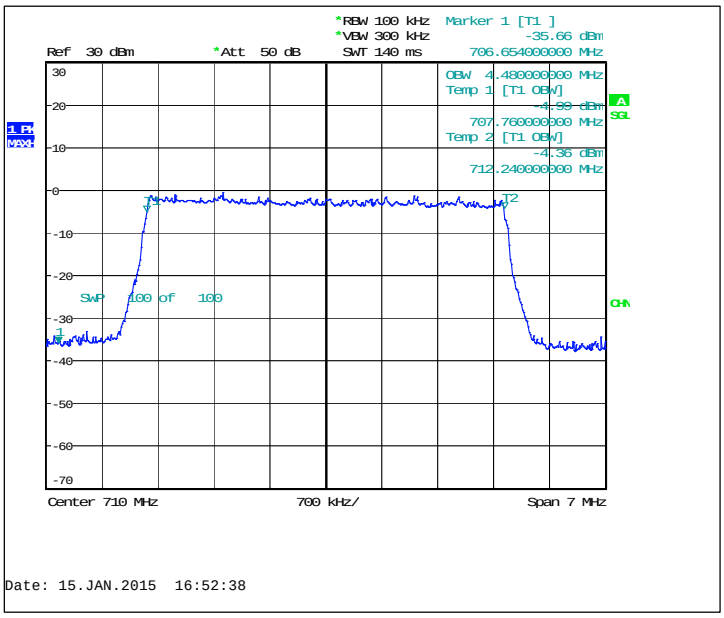
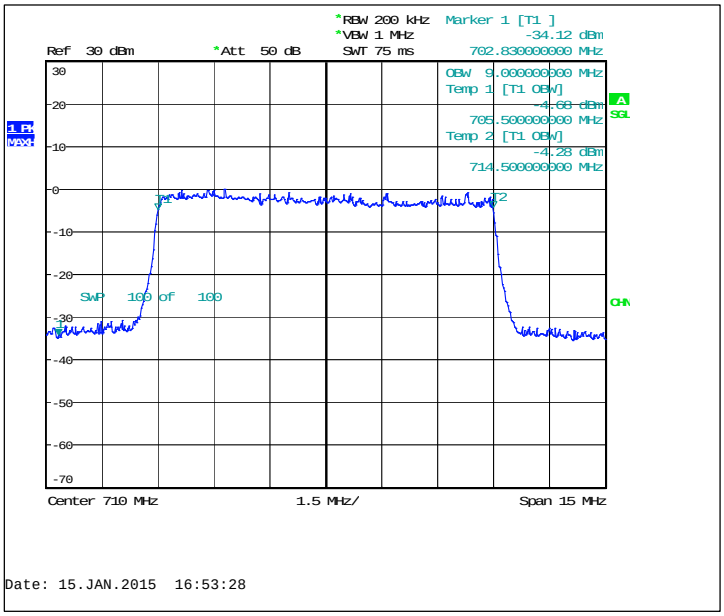
FDD, CBW 5MHz, 16QAM, 25 RB, Channel 23790 / 710.0 MHz



FDD, CBW 10MHz, 16QAM, 50 RB, Channel 23790 / 710.0 MHz



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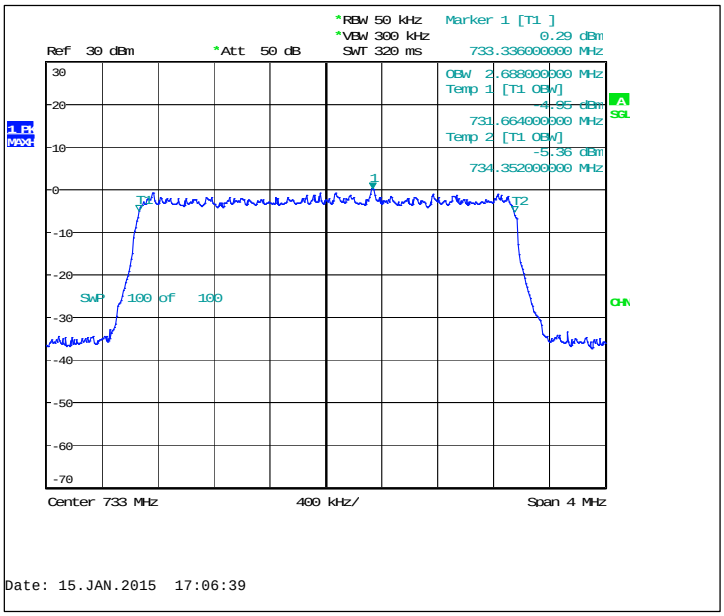
5.10. LTE28 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 3MHz, QPSK, 15 RB	2688
FDD, CBW 5MHz, QPSK, 25 RB	4494
FDD, CBW 10MHz, QPSK, 50 RB	8970
FDD, CBW 15MHz, QPSK, 75 RB	13400
FDD, CBW 20MHz, QPSK, 100 RB	17900
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	17850

FDD, CBW 3MHz, QPSK, 15 RB, Channel 27435 / 725.5 MHz



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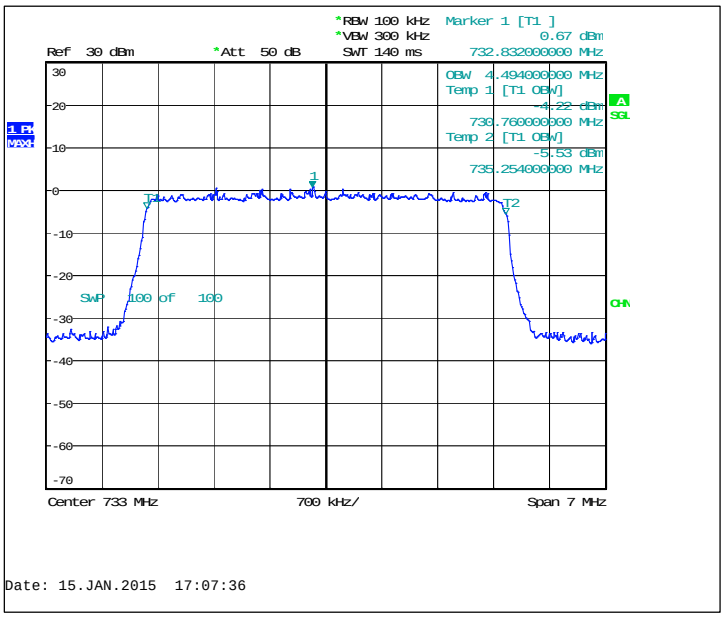
FDD, CBW 5MHz, QPSK, 25 RB, Channel 27435 / 725.5 MHz



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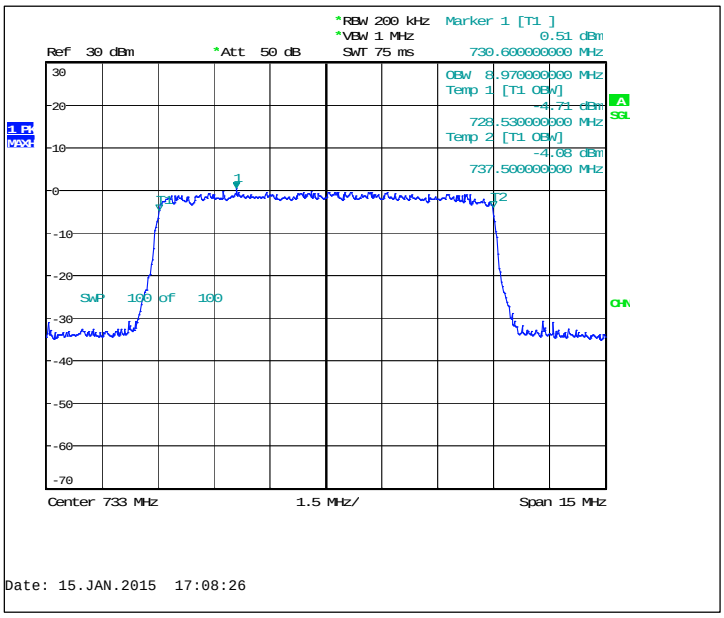
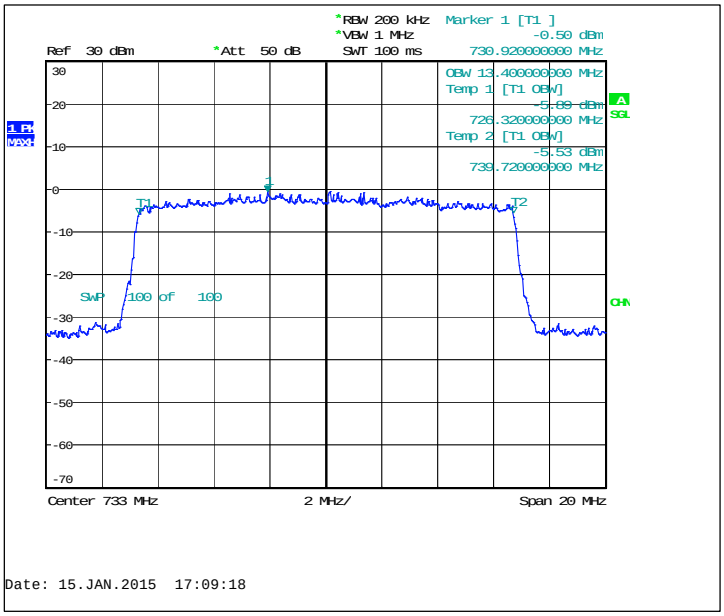
FDD, CBW 10MHz, QPSK, 50 RB, Channel 27435 / 725.5 MHz



FDD, CBW 15MHz, QPSK, 75 RB, Channel 27435 / 725.5 MHz



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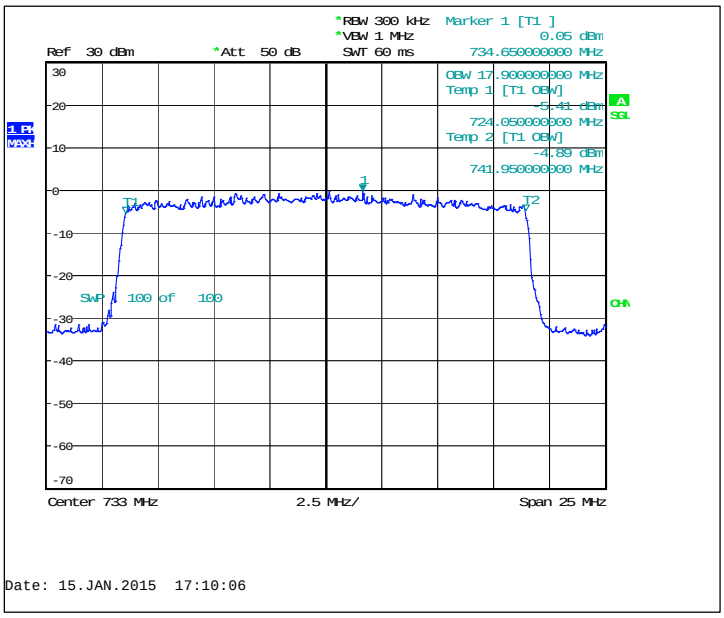
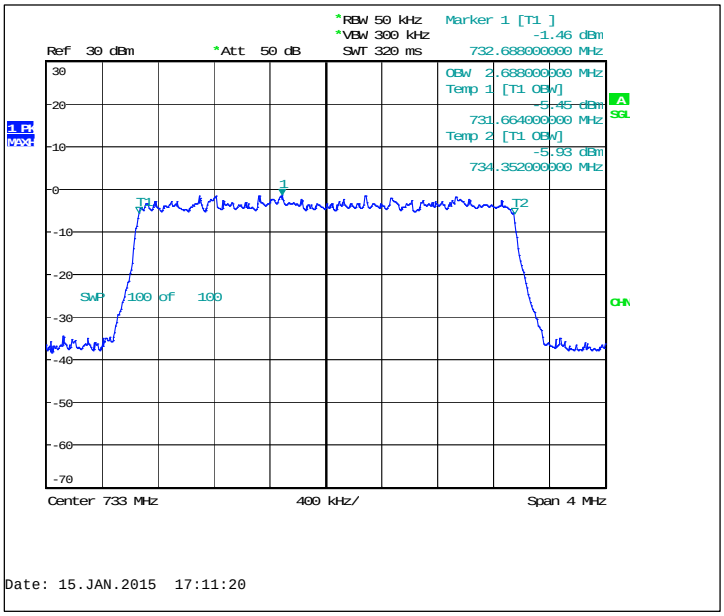
FDD, CBW 20MHz, QPSK, 100 RB, Channel 27435 / 725.5 MHz



FDD, CBW 3MHz, 16QAM, 15 RB, Channel 27435 / 725.5 MHz



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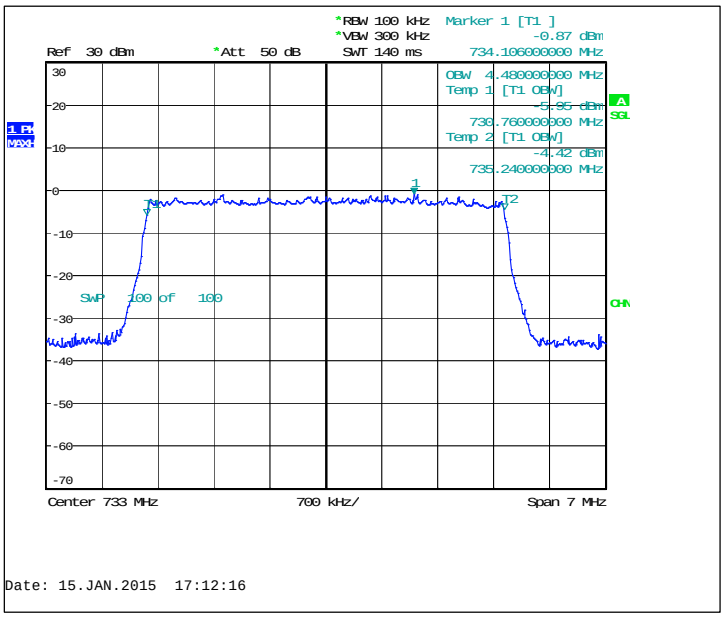
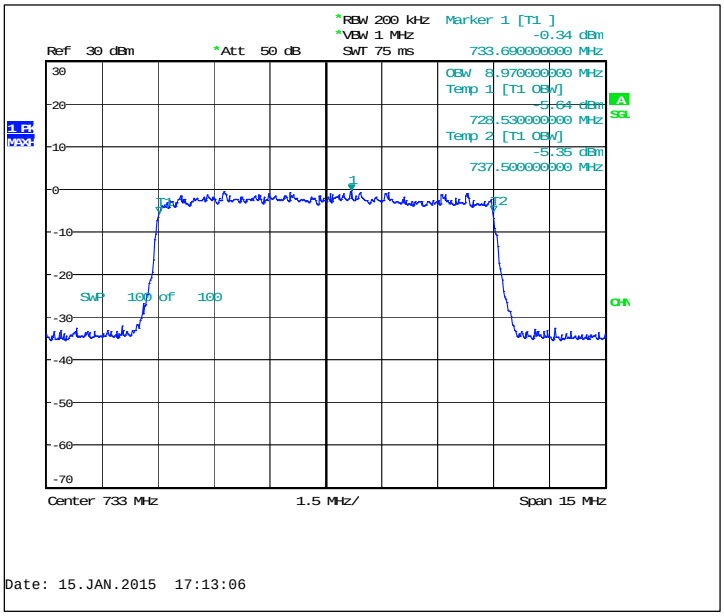
FDD, CBW 5MHz, 16QAM, 25 RB, Channel 27435 / 725.5 MHz



FDD, CBW 10MHz, 16QAM, 50 RB, Channel 27435 / 725.5 MHz



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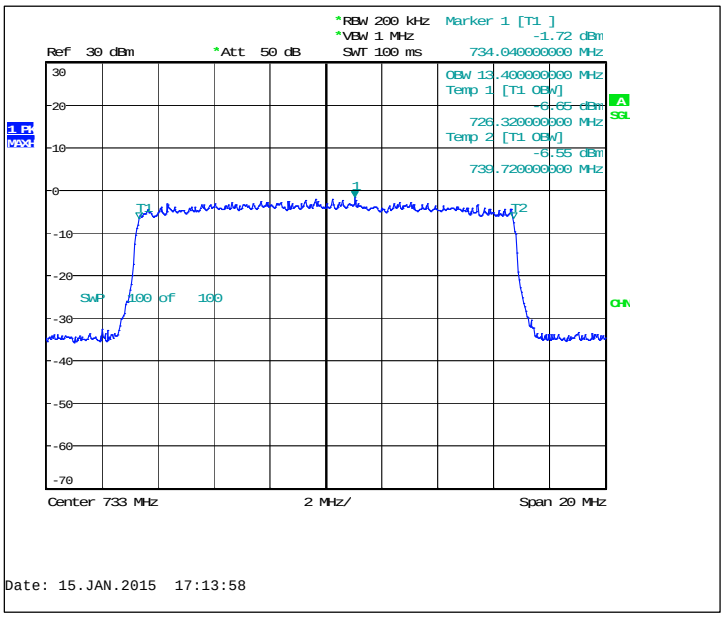
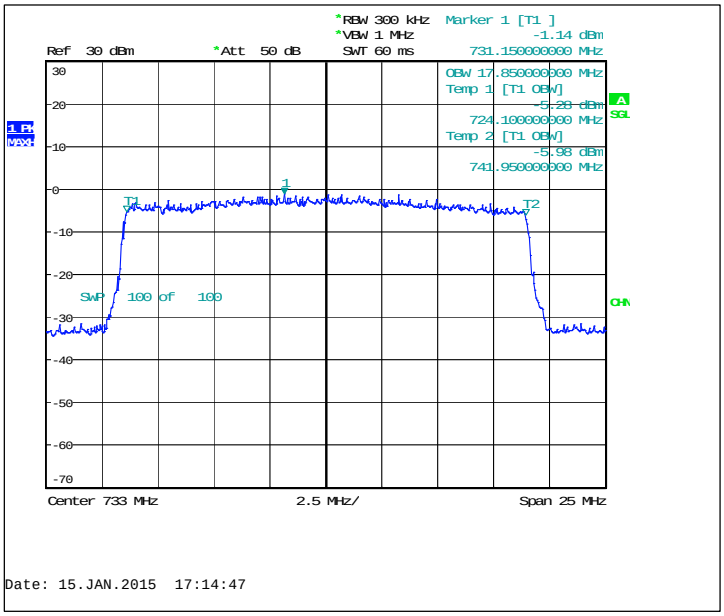
FDD, CBW 15MHz, 16QAM, 75 RB, Channel 27435 / 725.5 MHz



FDD, CBW 20MHz, 16QAM, 100 RB, Channel 27435 / 725.5 MHz



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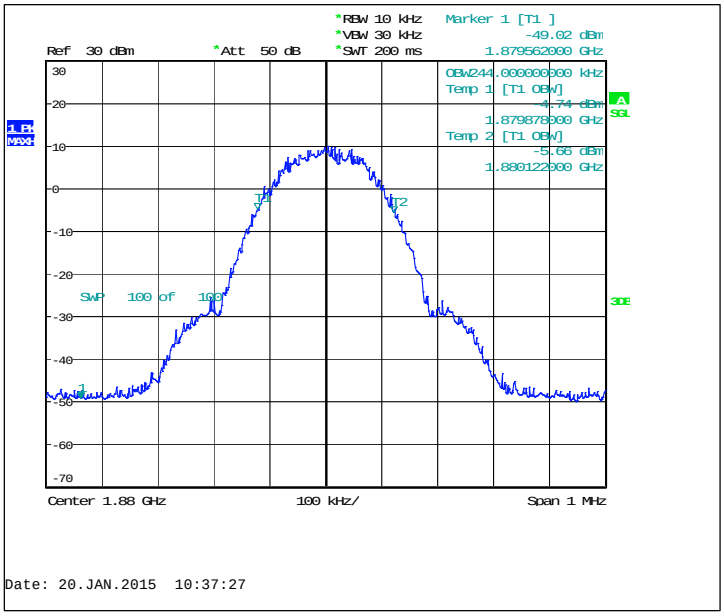
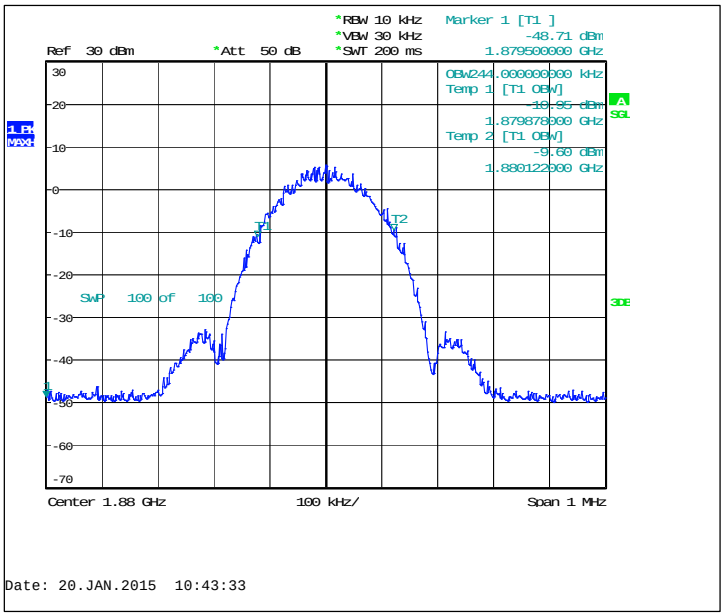
5.11. GSM 1900 Test results

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

GSM, Channel 661 / 1880.0 MHz



EGPRS, Channel 661 / 1880.0 MHz



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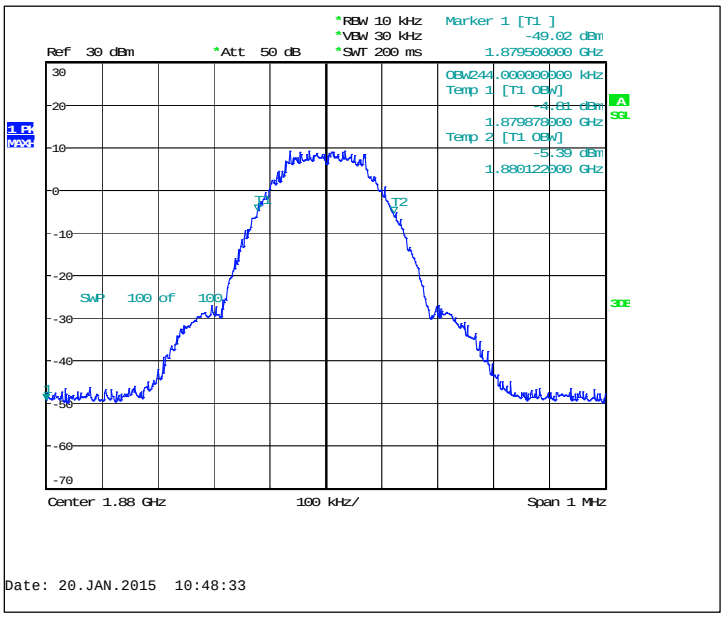
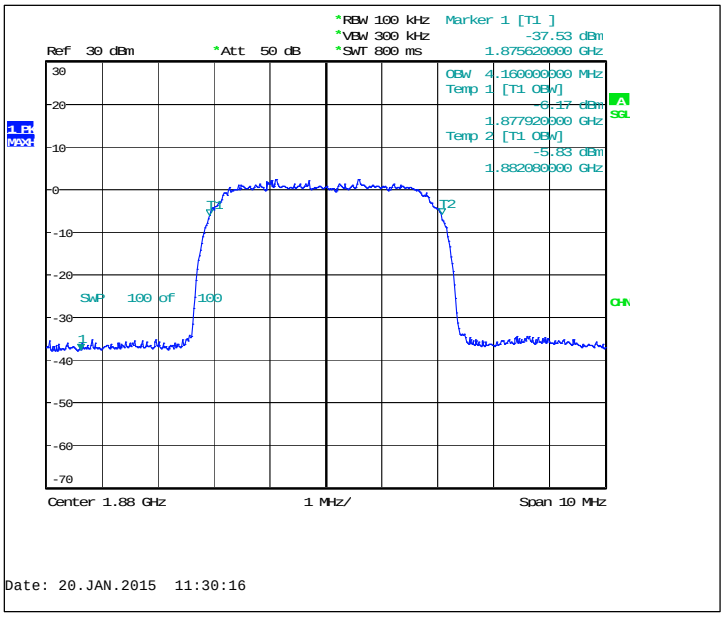
GPRS, Channel 661 / 1880.0 MHz



5.12. WCDMA2 Test results

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

FDD, Channel 9400 / 1880.0 MHz



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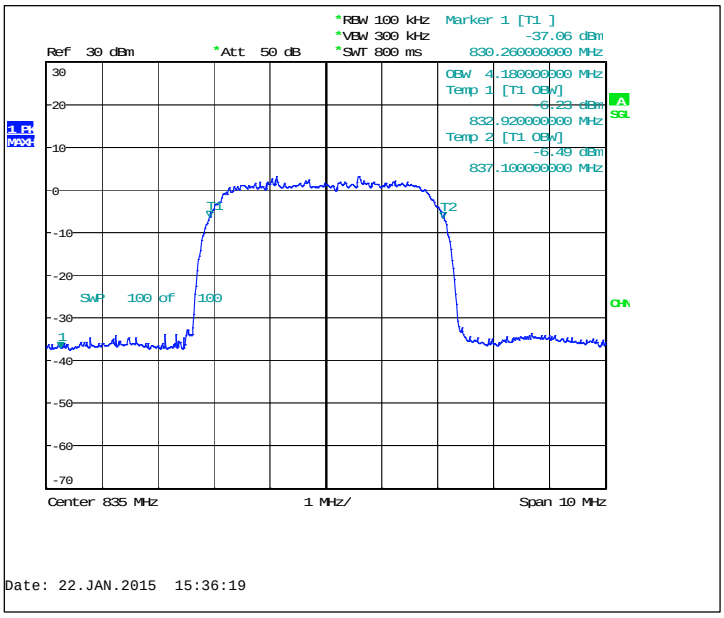
5.13. WCDMA5 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD	4180

FDD, Channel 4175 / 835.0 MHz



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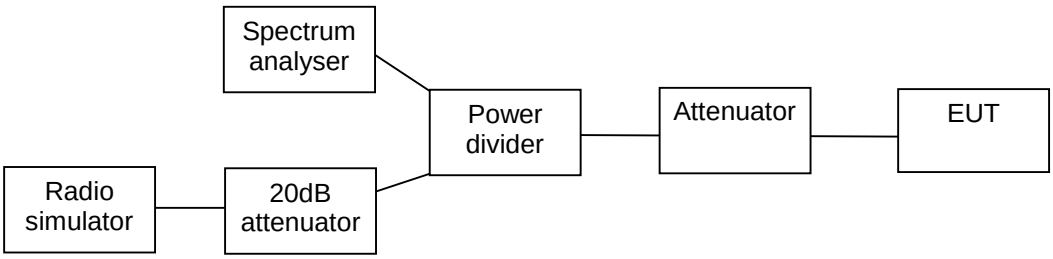
6. Band edge compliance

(FCC §24.238(a), §27.53(f), §27.53(l), §27.53(h), §27.53(g), §22.917(a), RSS-133 6.5, RSS-132 4.5, RSS-139 6.5, RSS-199 4.5(b), RSS-130 4.6)

EUT with DUT number	RM-1065, DUT 19004
Accessories with DUT numbers	SD-238R, DUT 19008 ; WH-108, DUT 18691
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	Measured from antenna 1
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	22 / 40 / 102.6
Date of measurements	15-Jan-2015
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.

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
WCDMA4	Below 1710 and above 1755	-13
WCDMA5	Below 824 and above 849	-13
LTE2	Below 1850 and above 1910	-13
LTE4	Below 1710 and above 1755	-13
LTE5	Below 824 and above 849	-13
LTE7	2496 - 2499 2499 – 2500 2570 – 2571 2571 – 2575	-10 (RBW = 1 MHz, VBW = 3 MHz) -10 (RBW = 500 kHz, VBW = 2 MHz) -10 (RBW = 500 kHz, VBW = 2 MHz) -10 (RBW = 1 MHz, VBW = 3 MHz)
LTE12	698.9 – 699.0 and 716.0 – 716.1 Below 698.9 and above 716.1	-13 (RBW = 30 kHz, VBW = 100 kHz) -13 (RBW = 100 kHz, VBW = 300 kHz)
LTE17	703.9 – 704 and 716 – 716.1 Below 703.9 and above 716.1	-13 (RBW = 30 kHz, VBW = 100 kHz) -13 (RBW = 100 kHz, VBW = 300 kHz)
LTE28	702.9 -703 and 748 - 748.1 Below 702.9 and above 748.1	-13 (RBW = 30 kHz, VBW = 100 kHz) -13 (RBW = 100 kHz, VBW = 300 kHz)

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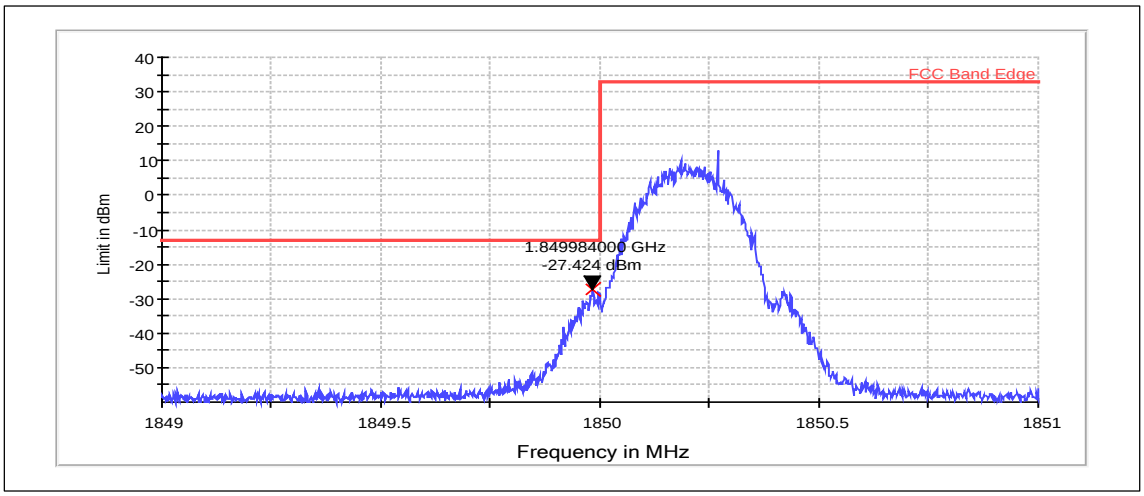
6.3. GSM 1900 Test results

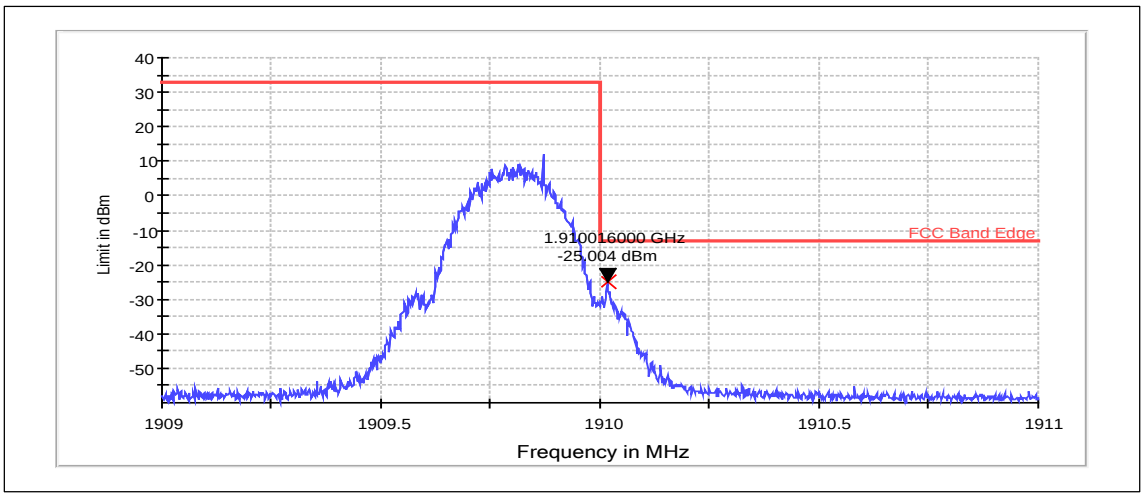
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	1849.984	-27.42	PASSED

Channel 810 / 1909.8 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	1910.016	-25.00	PASSED

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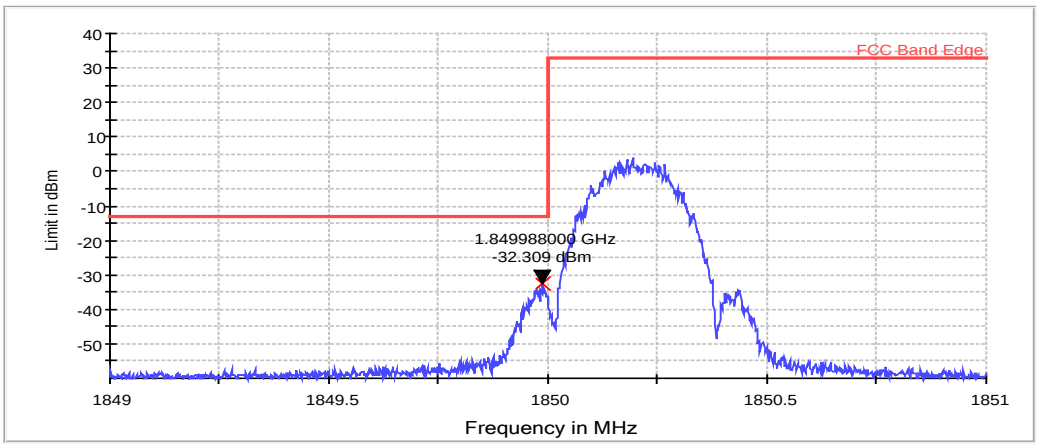
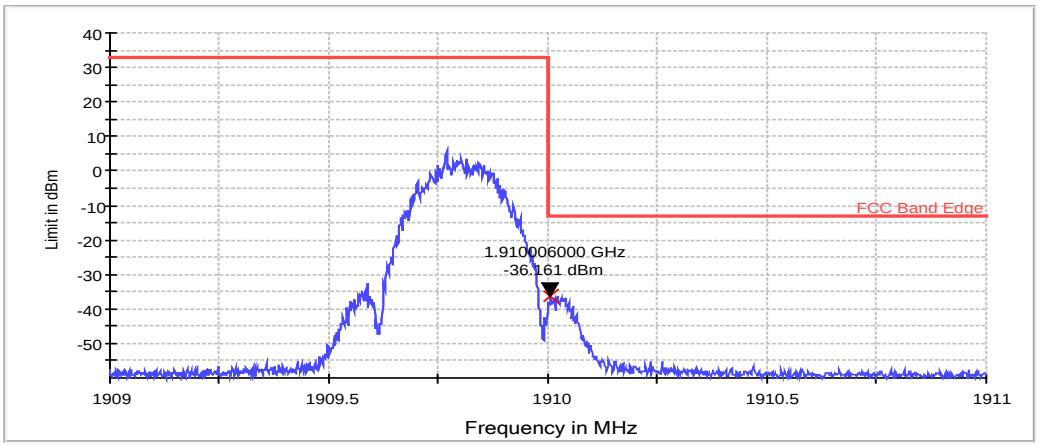
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	1849.988	-32.31	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	1910.006	-36.16	PASSED

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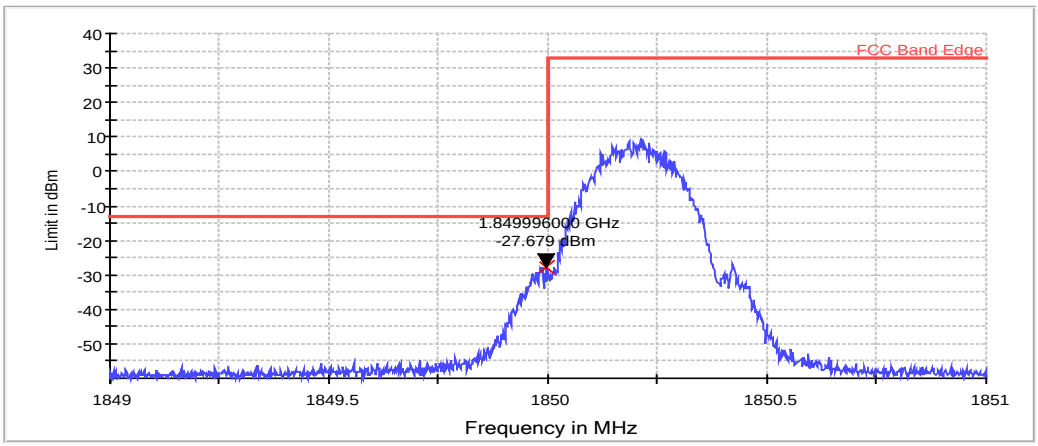
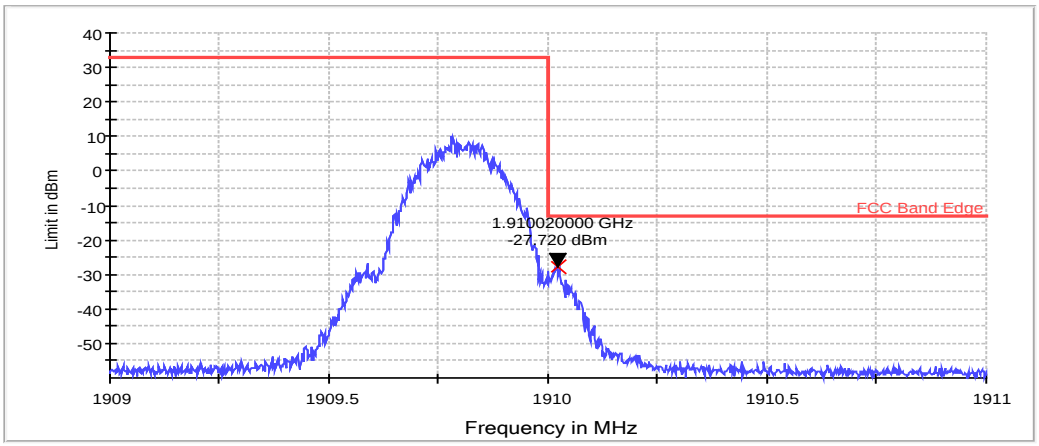
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GPRS	1849.996	-27.68	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	-27.72	PASSED

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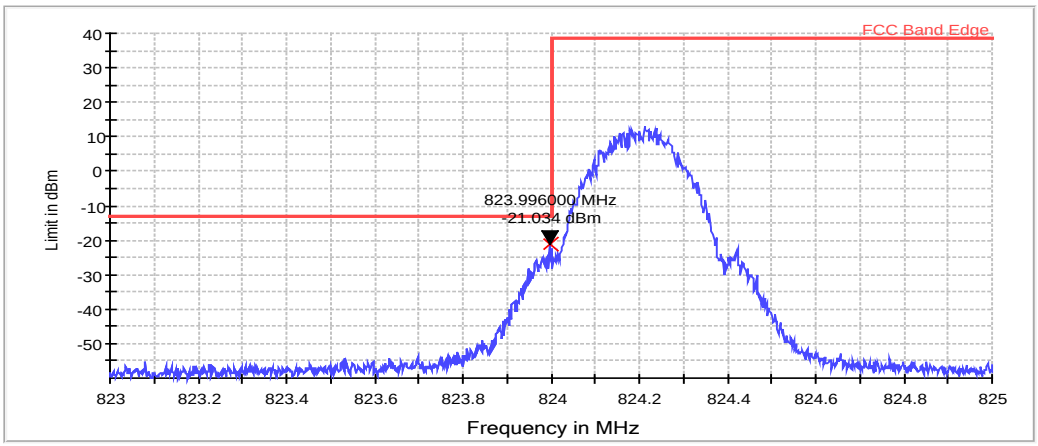
6.4. GSM 850 Test results

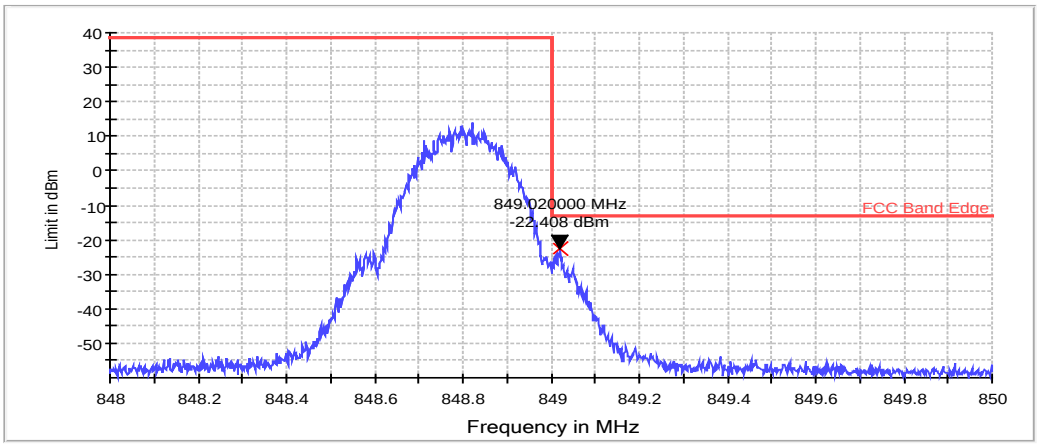
Channel 128 / 824.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	823.996	-21.03	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	849.020	-22.41	PASSED

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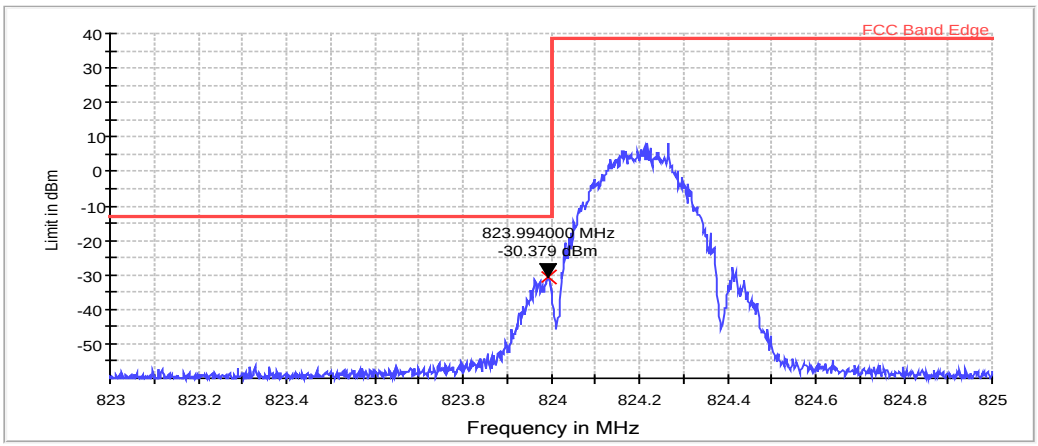
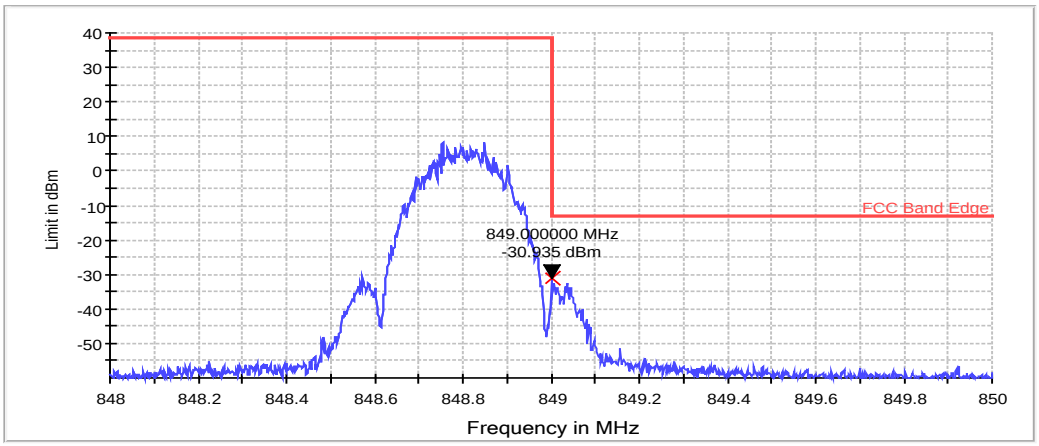
Channel 128 / 824.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	823.994	-30.38	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	-30.93	PASSED

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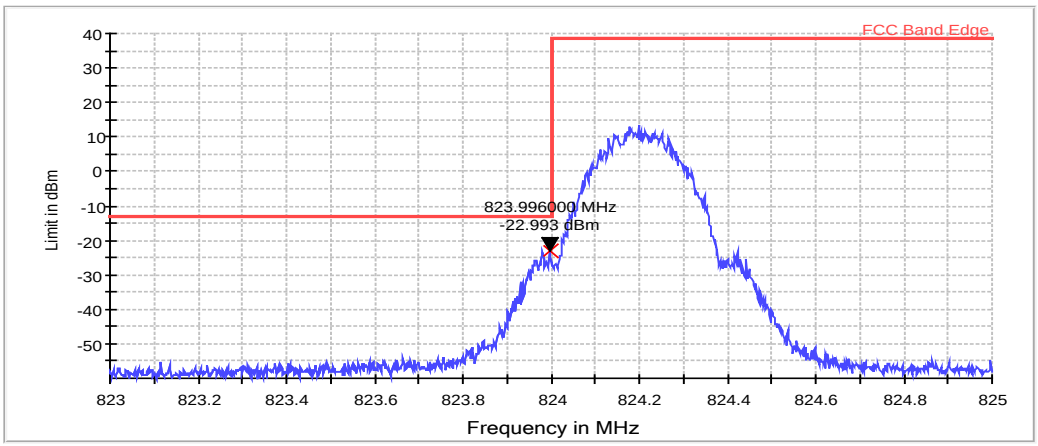
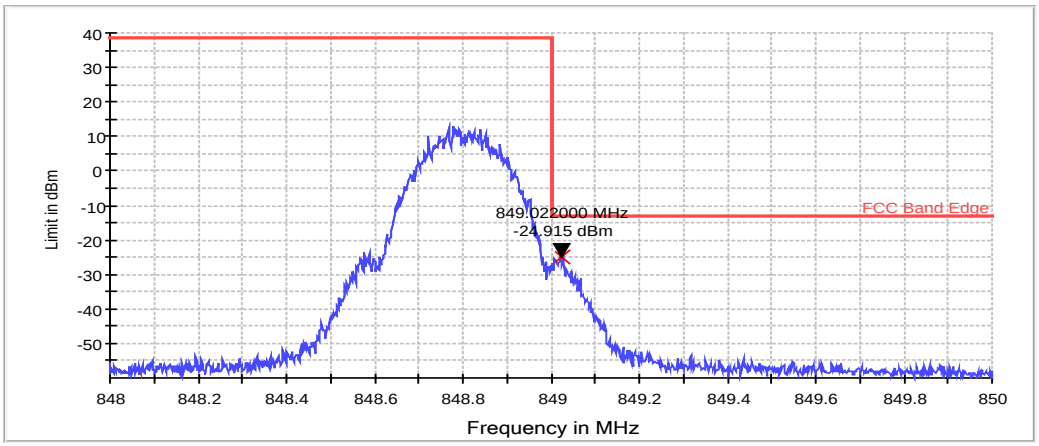
Channel 128 / 824.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GPRS	823.996	-22.99	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	849.022	-24.91	PASSED

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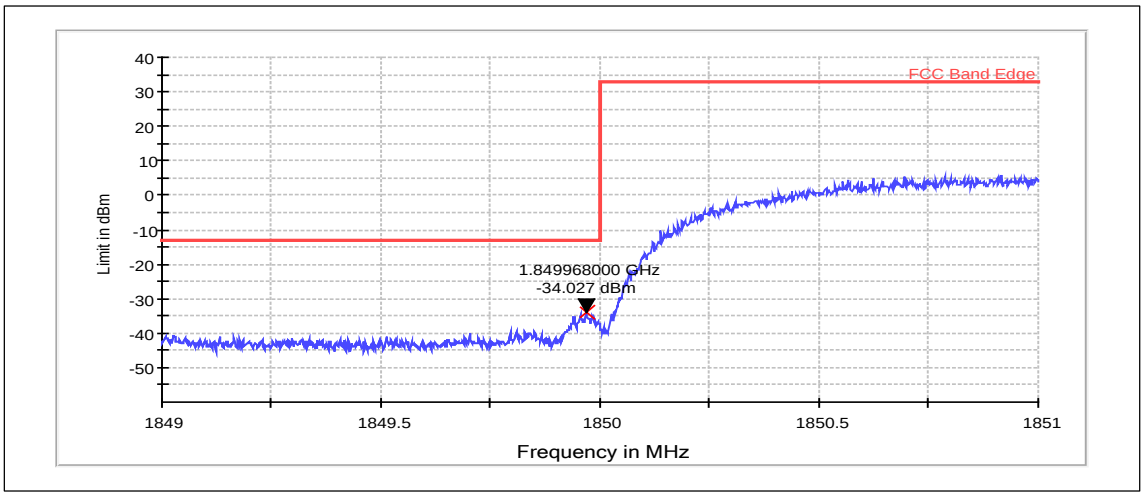
6.5. WCDMA2 Test results

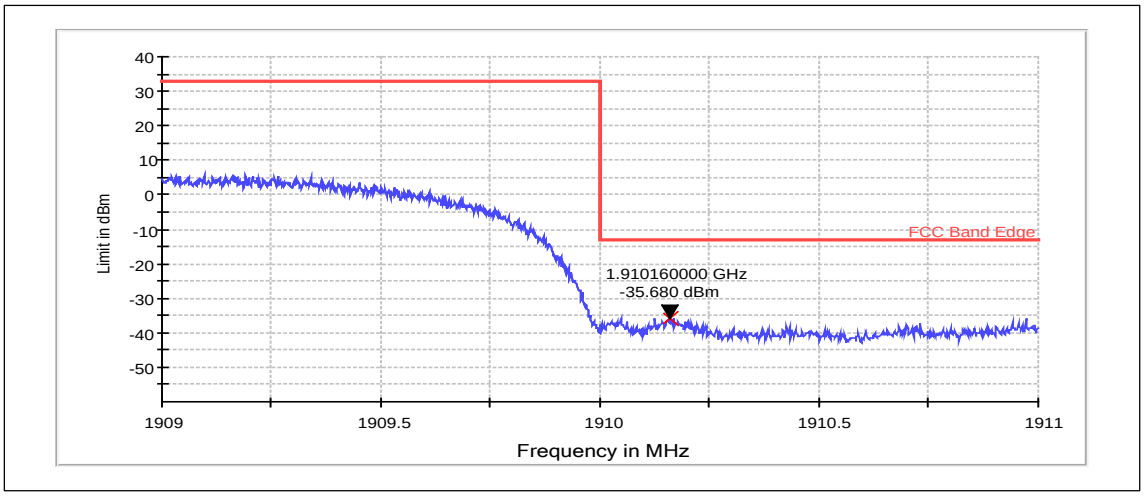
Channel 9262 / 1852.4 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1849.968	-34.03	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	1910.160	-35.68	PASSED

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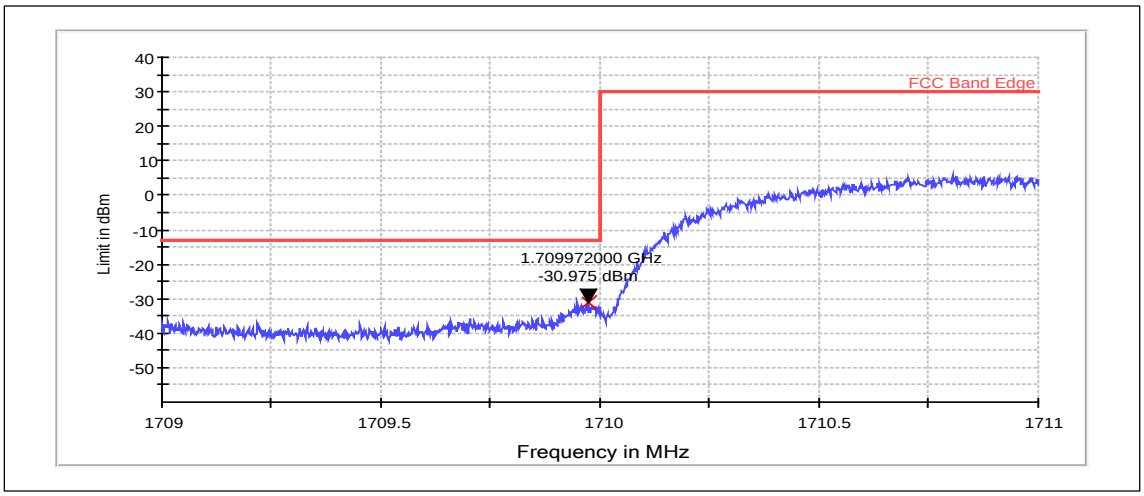
6.6. WCDMA4 Test results

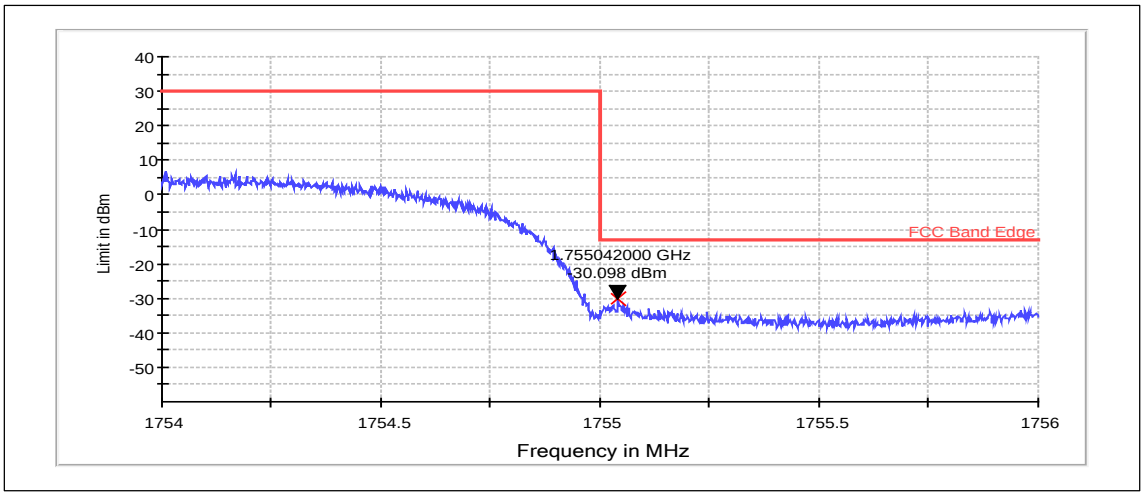
Channel 1312 / 1712.4 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1709.972	-30.98	PASSED

Channel 1513 / 1752.6 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1755.042	-30.10	PASSED

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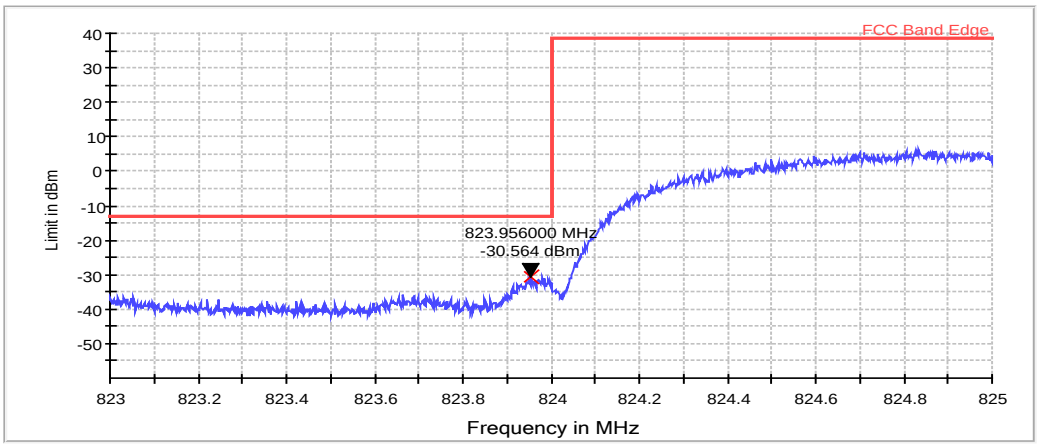
6.7. WCDMA5 Test results

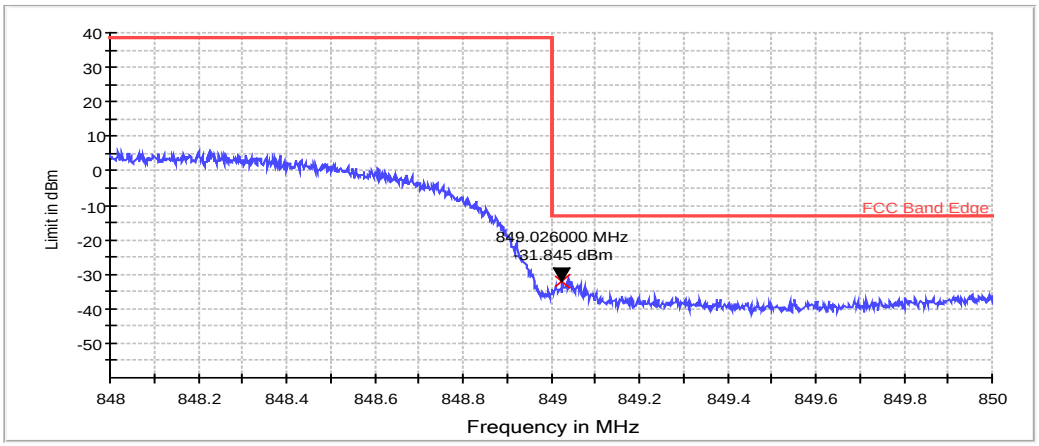
Channel 4132 / 826.4 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	823.956	-30.56	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	849.026	-31.85	PASSED

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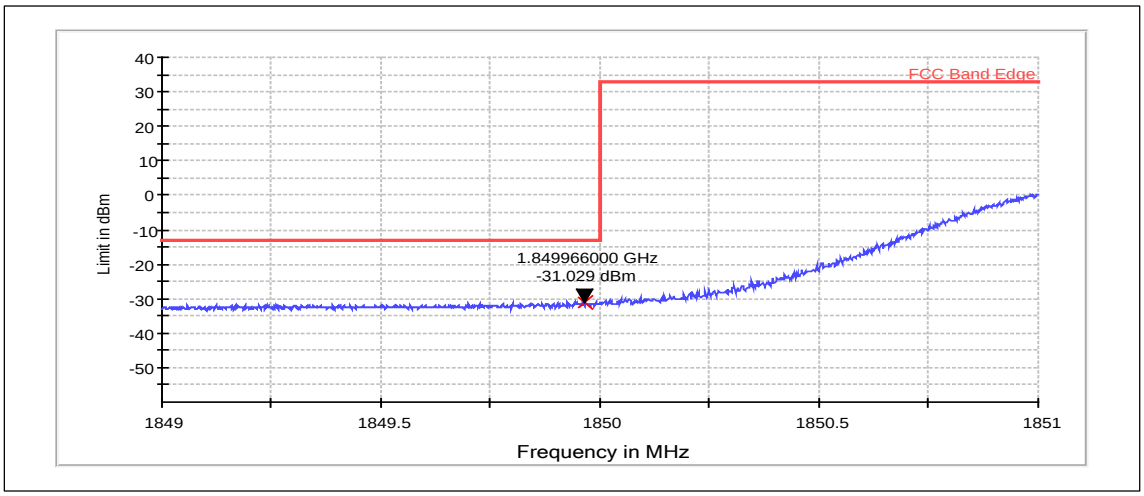
6.8. LTE2 Test results

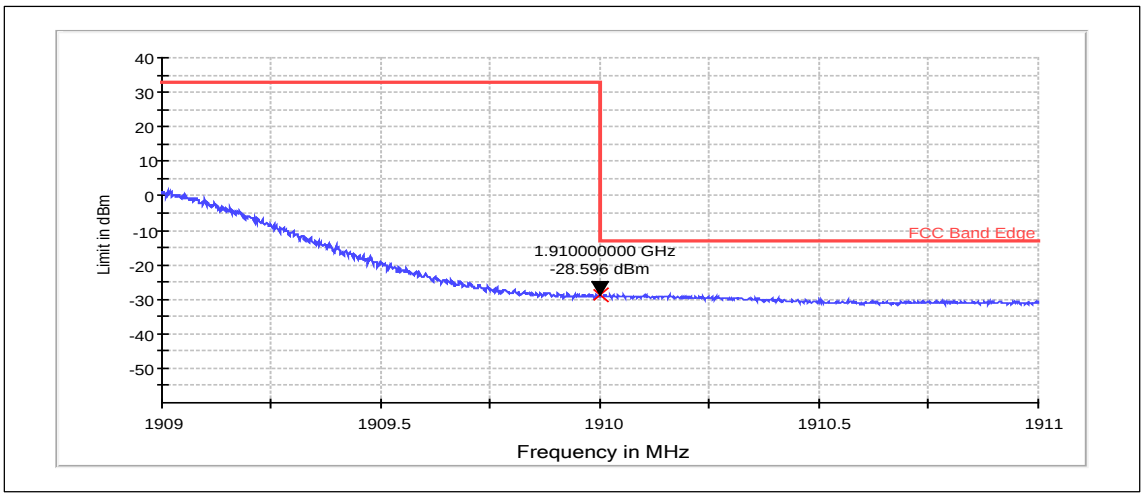
Channel 18700 / 1860 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1849.966	-31.03	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	-28.60	PASSED

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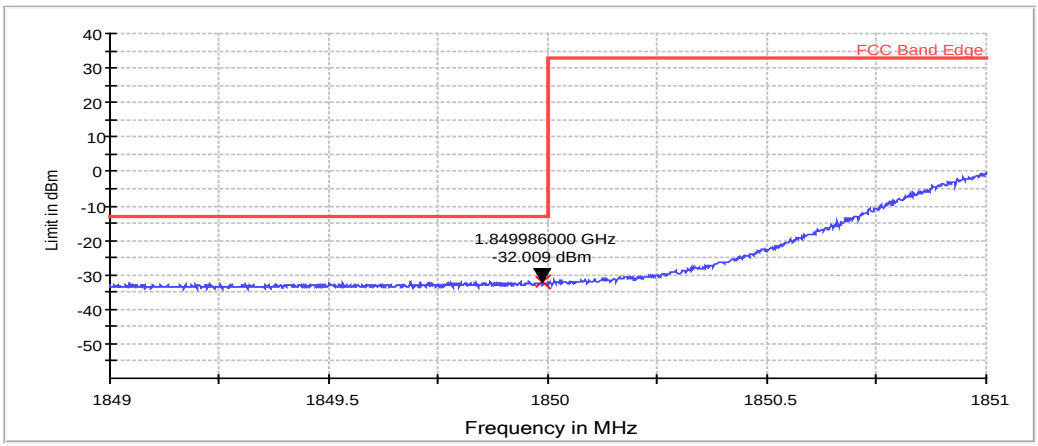
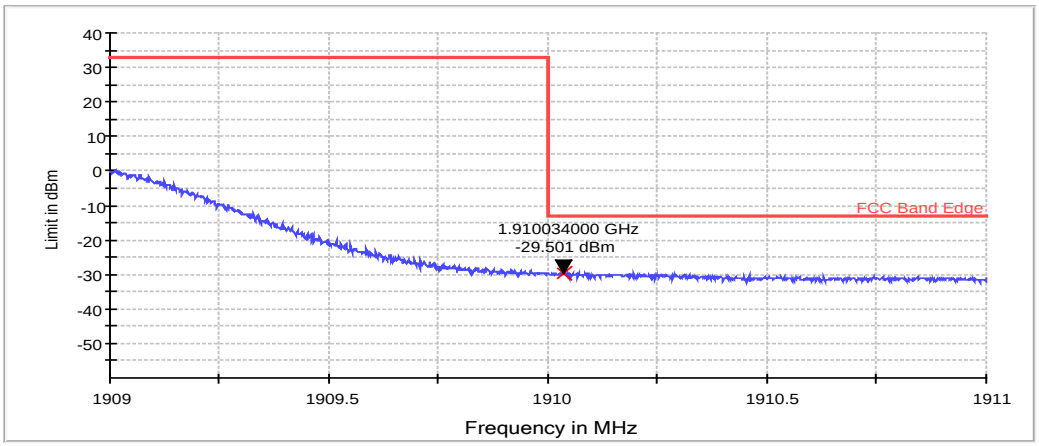
Channel 18700 / 1860 MHz



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	-32.01	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	1910.034	-29.50	PASSED

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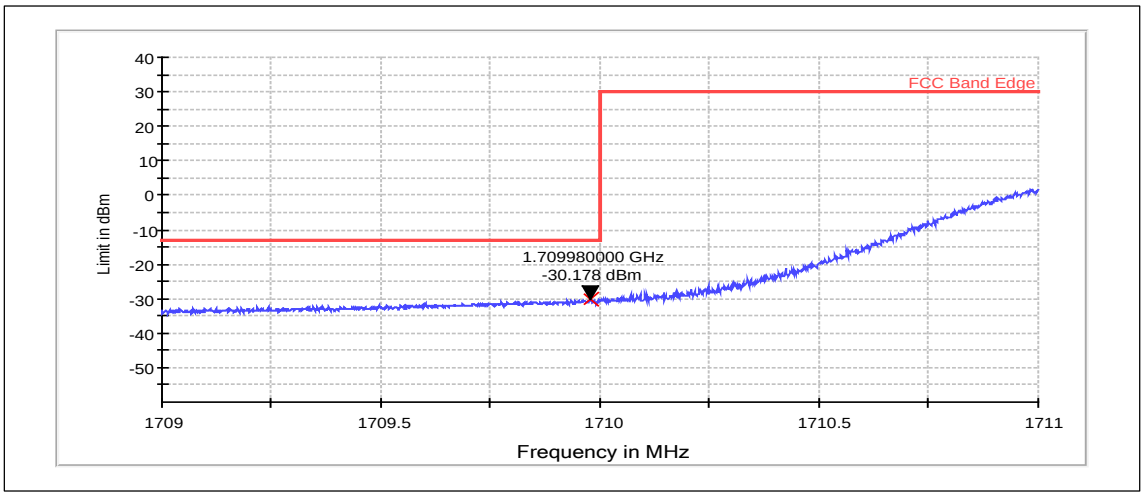
6.9. LTE4 Test results

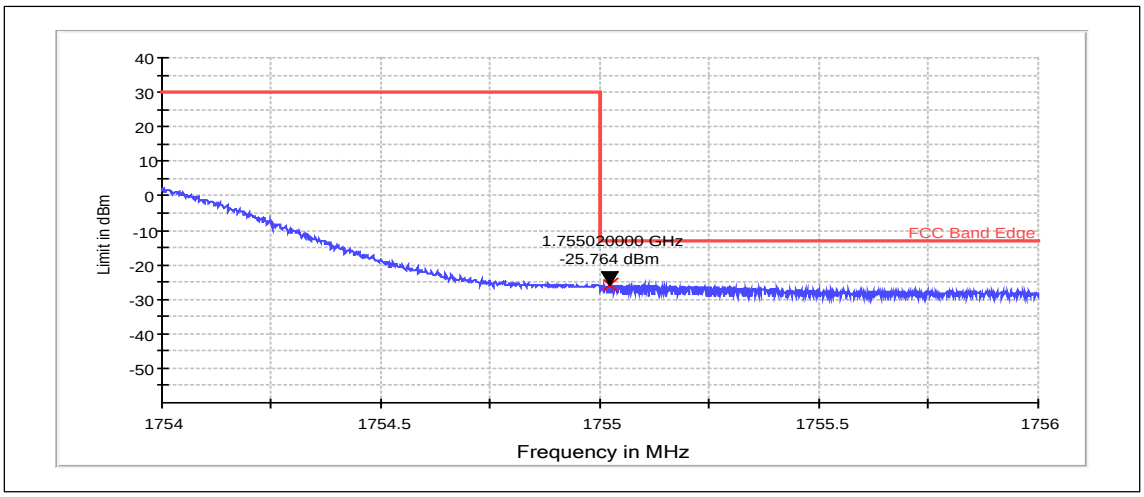
Channel 20050 / 1720 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1709.980	-30.18	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	1755.020	-25.76	PASSED

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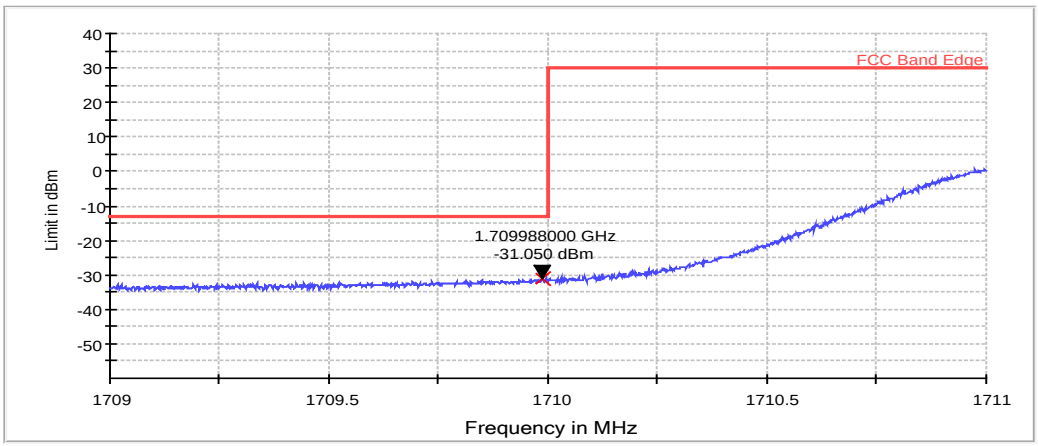
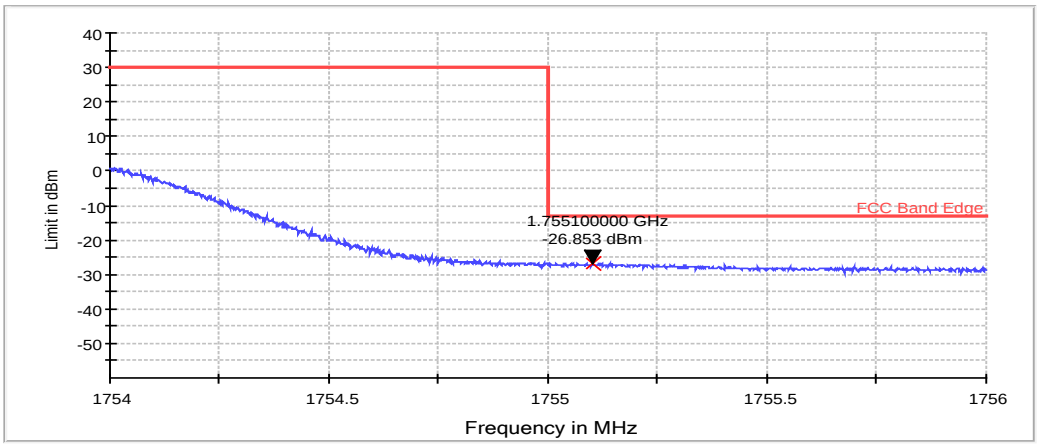
Channel 20050 / 1720 MHz



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	-31.05	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	1755.100	-26.85	PASSED

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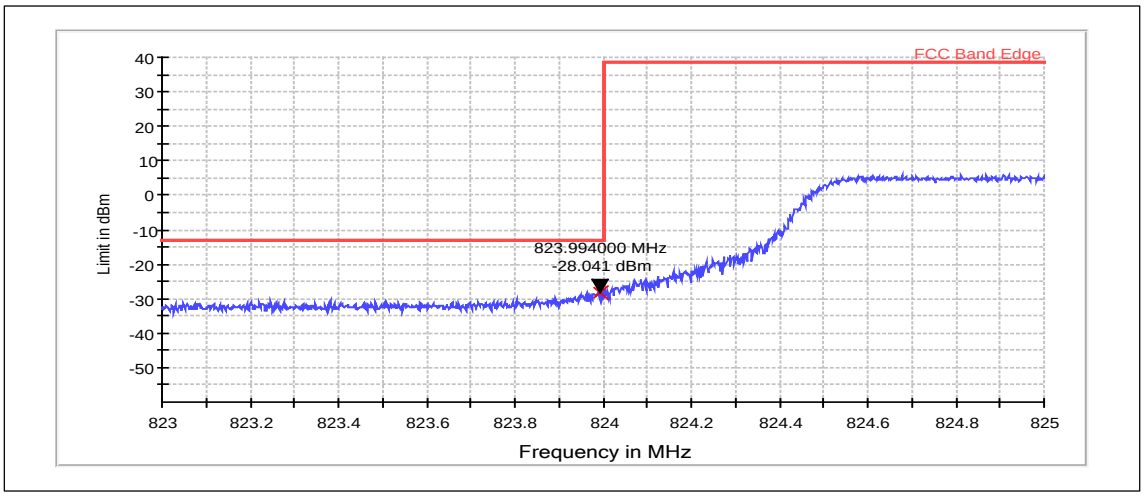
6.10. LTE5 Test results

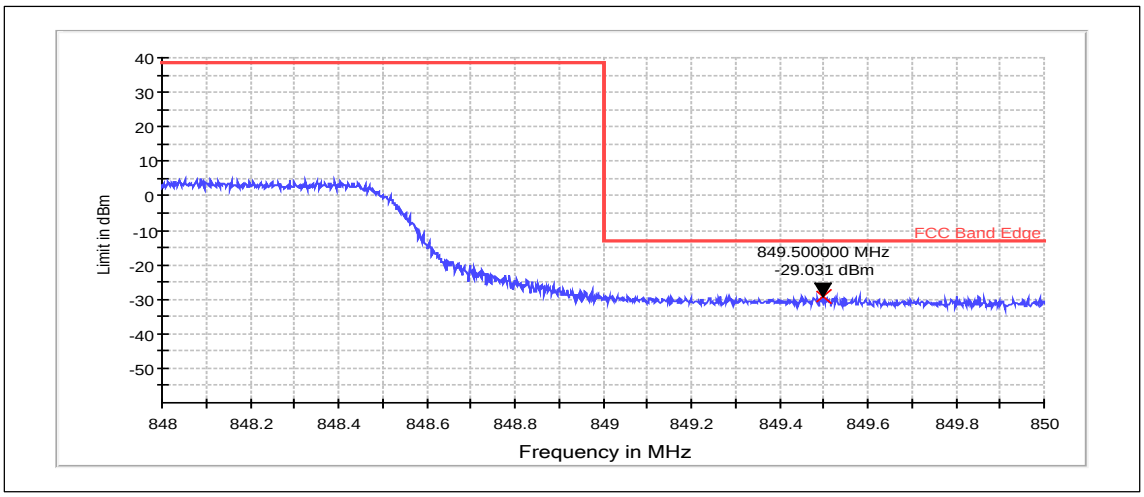
Channel 20450 / 829 MHz



RMS (RBW: 100 kHz, VBW: 300 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	823.994	-28.04	PASSED

Channel 20600 / 844 MHz



RMS (RBW: 100 kHz, VBW: 300 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	849.500	-29.03	PASSED

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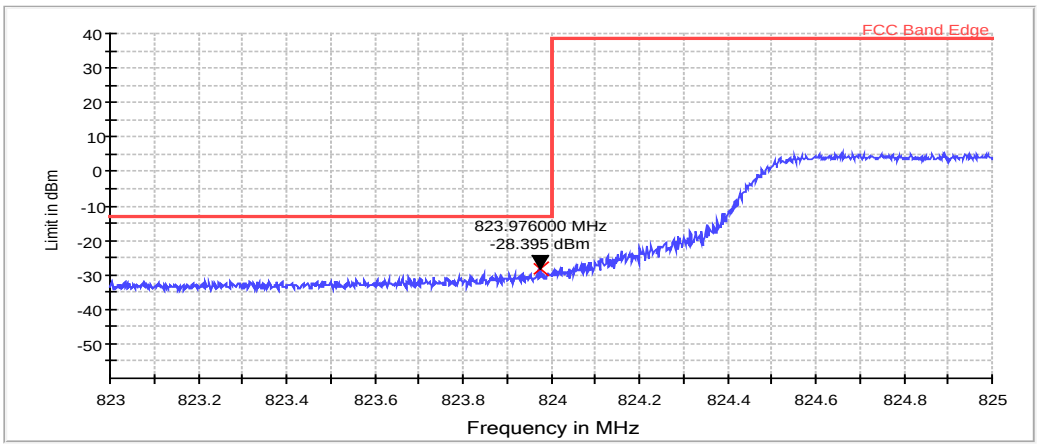
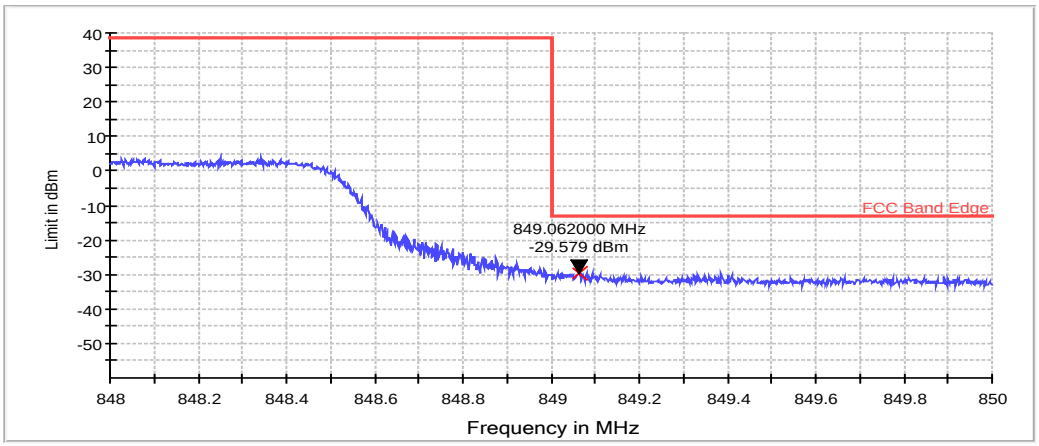
Channel 20450 / 829 MHz



RMS (RBW: 100 kHz, VBW: 300 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	823.976	-28.39	PASSED

Channel 20600 / 844 MHz



RMS (RBW: 100 kHz, VBW: 300 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	849.062	-29.58	PASSED

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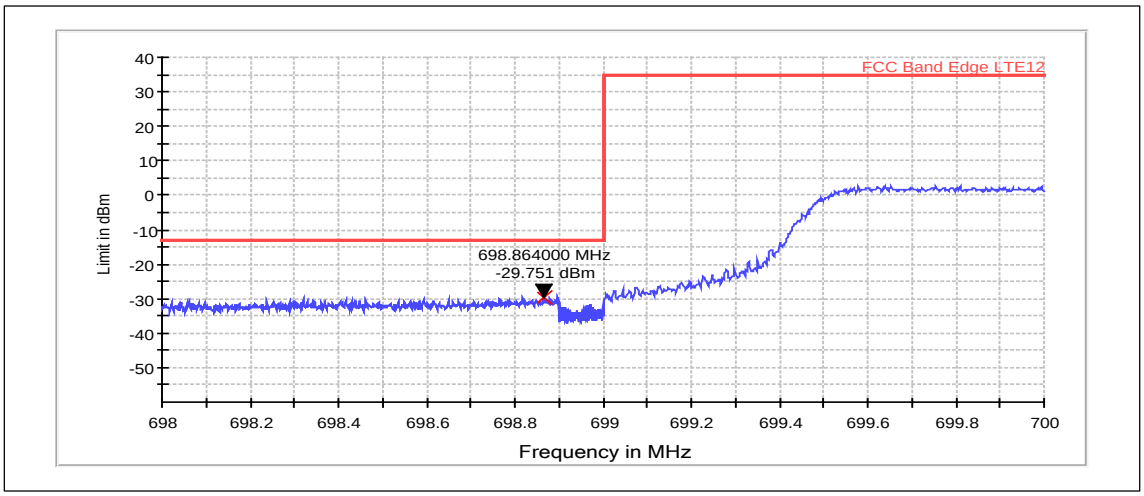
6.11. LTE12 Test results

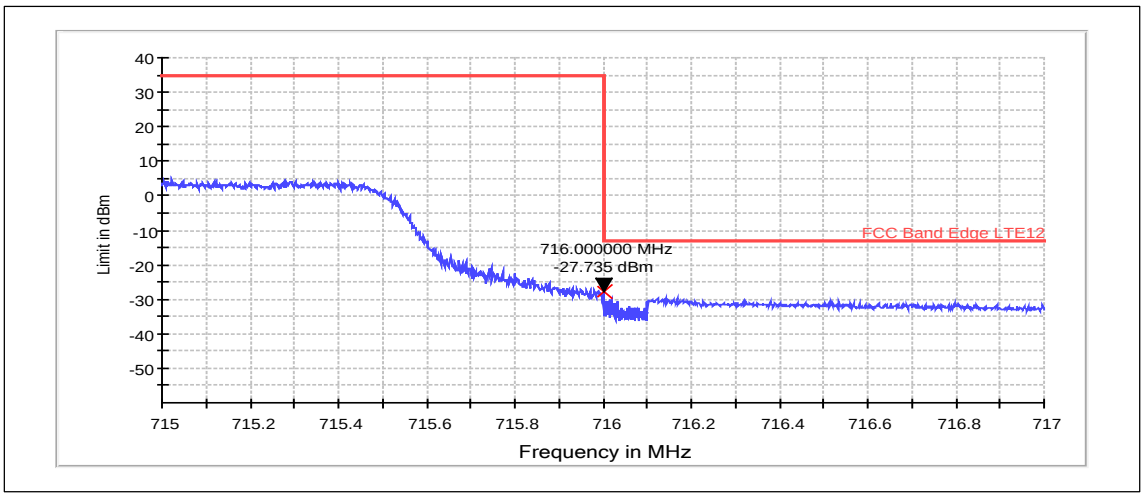
Channel 23060 / 704 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	698.864	-29.75	PASSED

Channel 23130 / 711 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	716.000	-27.73	PASSED

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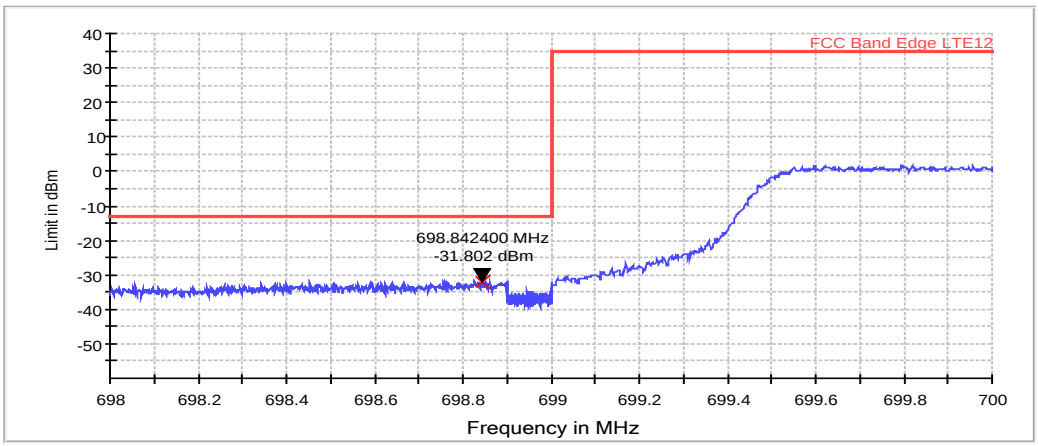
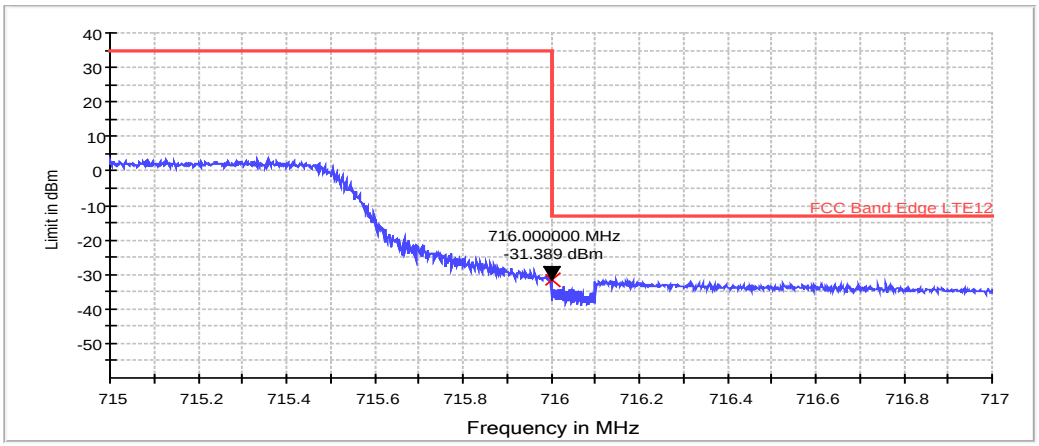
Channel 23060 / 704 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	698.842	-31.80	PASSED

Channel 23130 / 711 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	716.000	-31.39	PASSED

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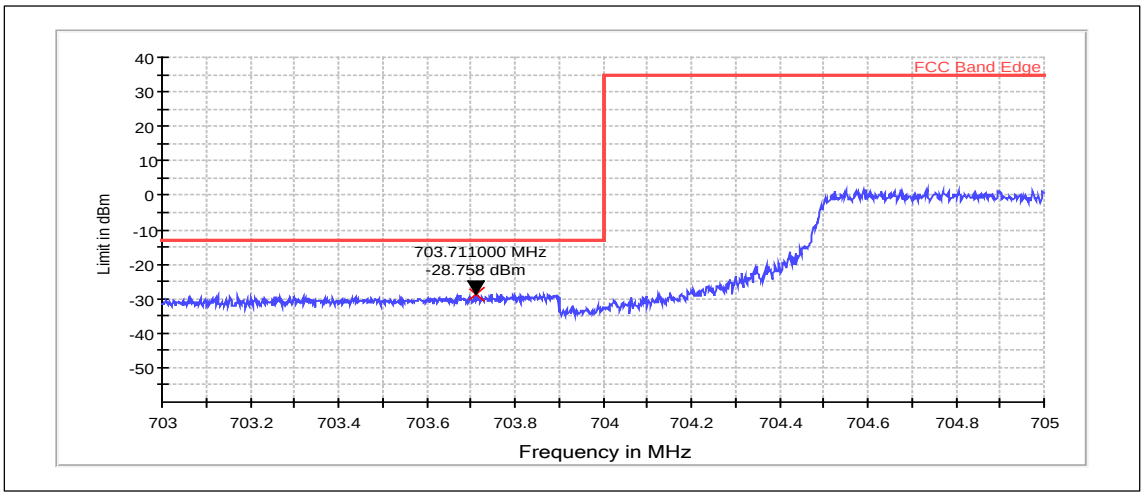
6.12. LTE17 Test results

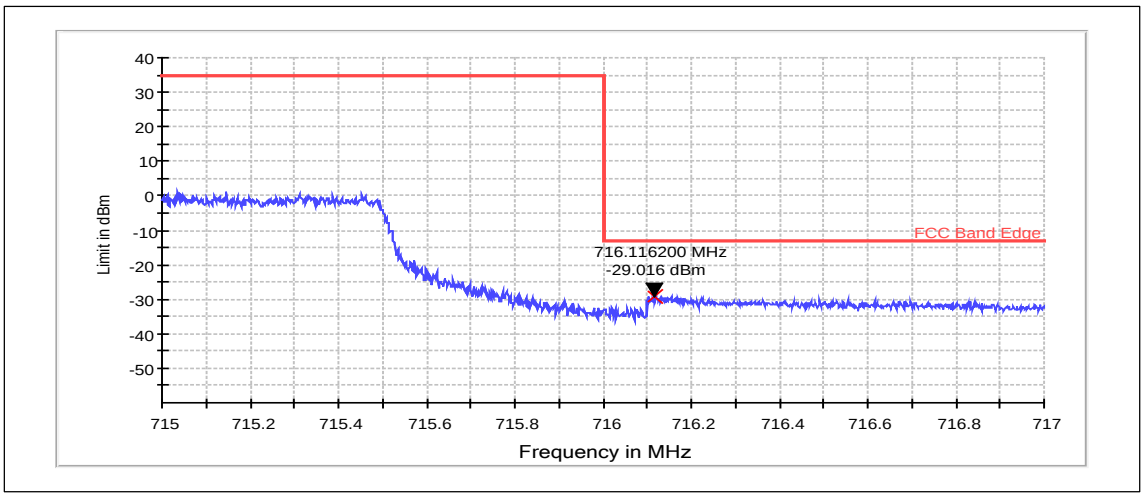
Channel 23780 / 709 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	703.711	-28.76	PASSED

Channel 23800 / 711 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	716.116	-29.02	PASSED

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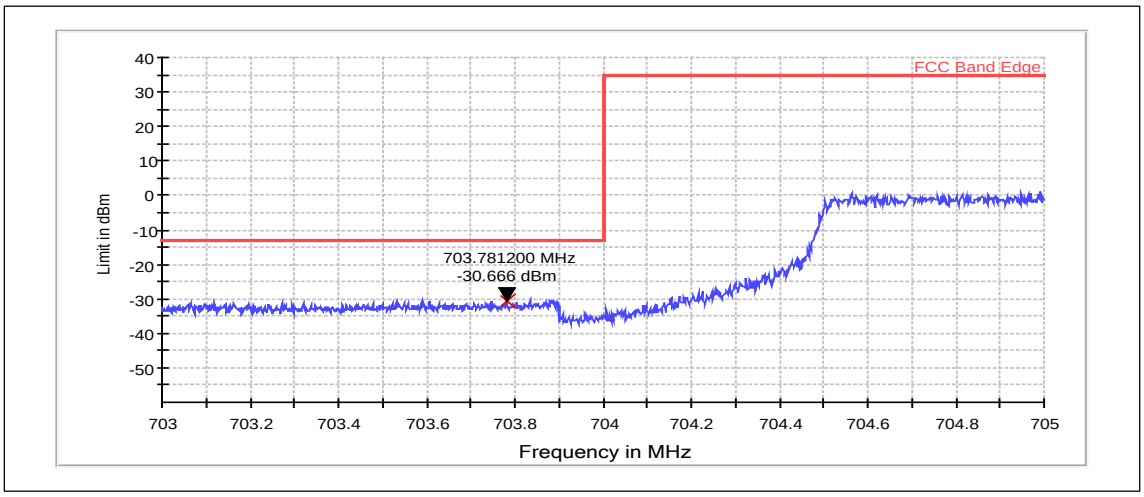
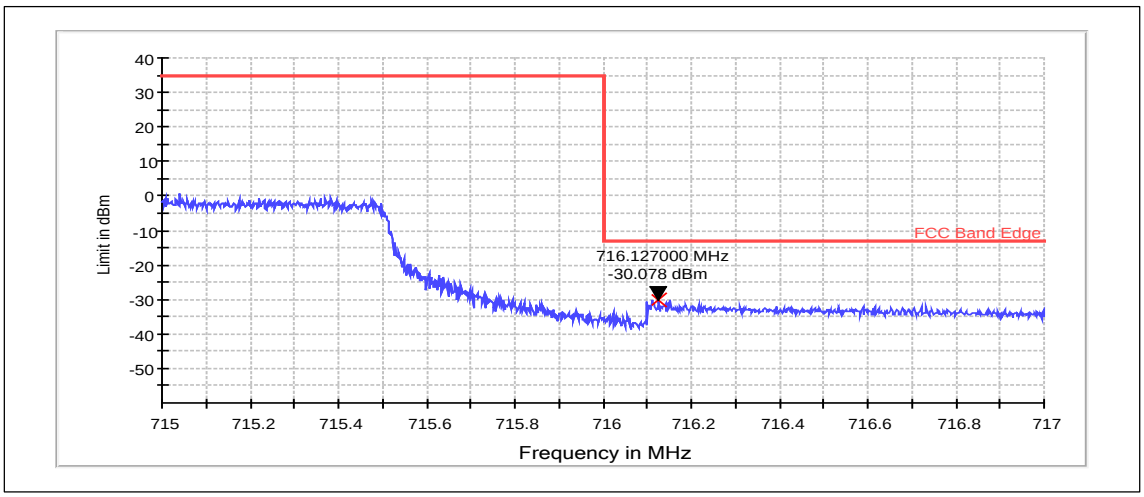
Channel 23780 / 709 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	703.781	-30.67	PASSED

Channel 23800 / 711 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	716.127	-30.08	PASSED

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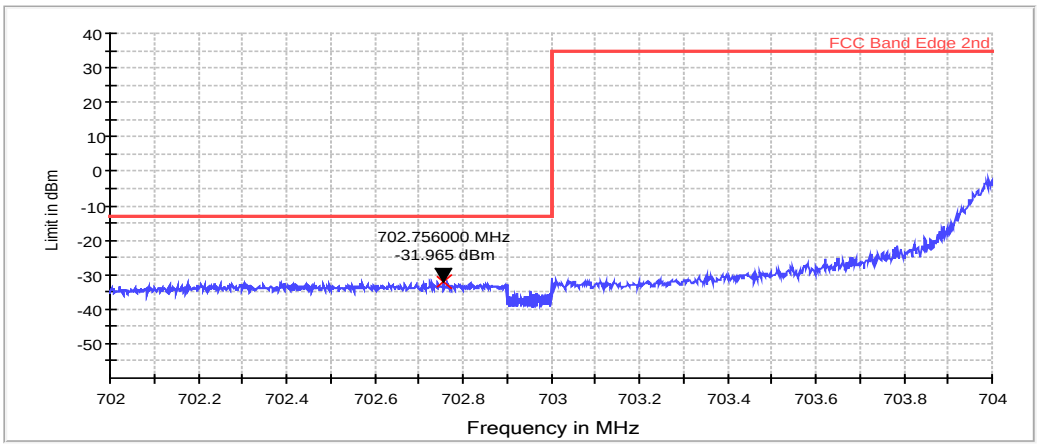
6.13. LTE28 Test results

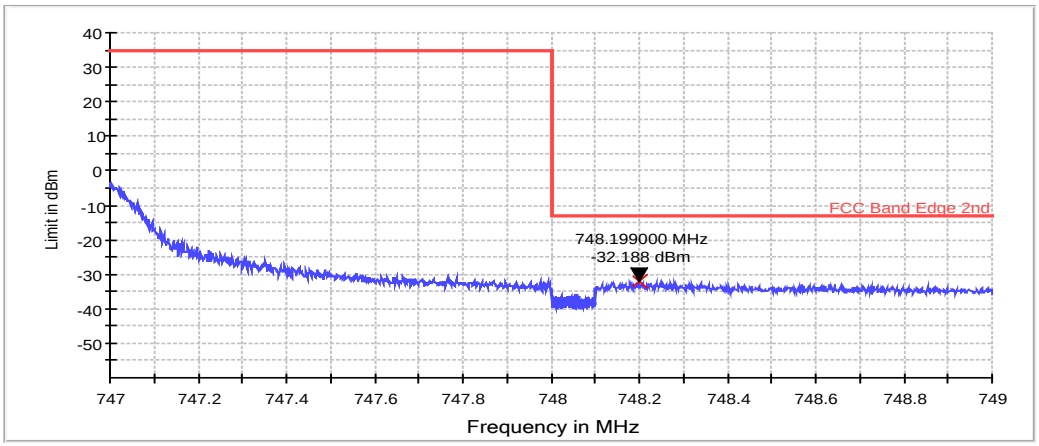
Channel 27310 / 713 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	702.756	-31.96	PASSED

Channel 27560 / 738 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	748.199	-32.19	PASSED

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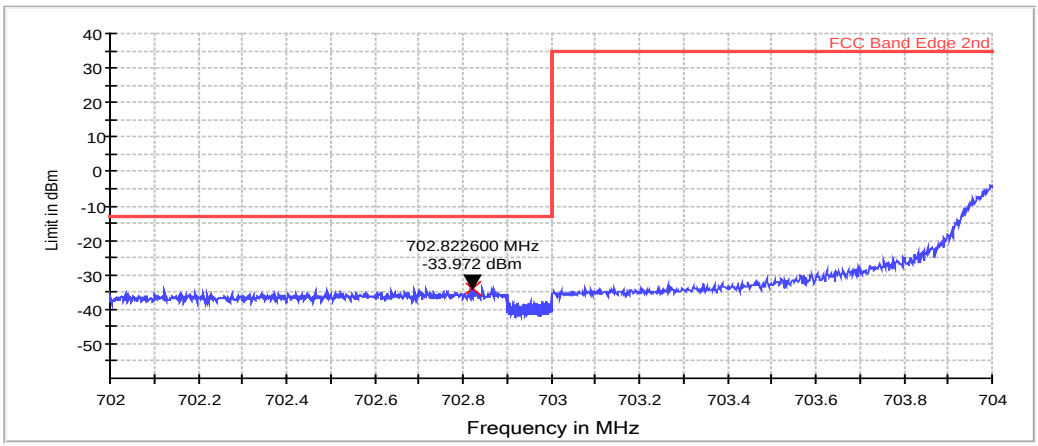
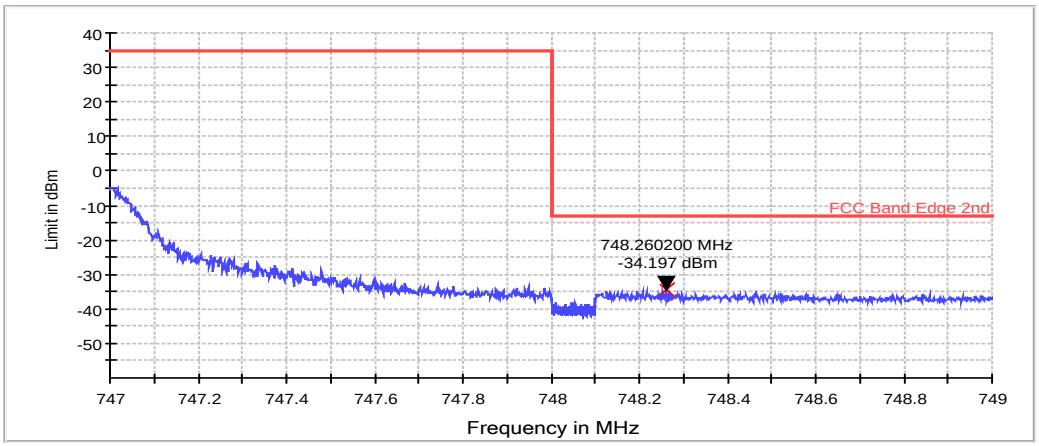
Channel 27310 / 713 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	702.823	-33.97	PASSED

Channel 27560 / 738 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	748.260	-34.20	PASSED

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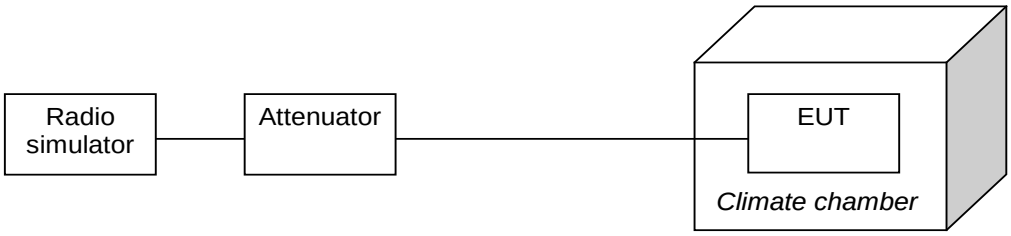
7. Frequency stability, temperature variation

(FCC §2.1055(a), §24.235, §27.54, RSS-139 6.3, RSS-133 6.3, RSS-132 4.3, RSS-199 4.3, RSS-130 4.3, RSS-130 4.3 (a))

EUT with DUT number	RM-1065, DUT 19004
Accessories with DUT numbers	SD-238R, DUT 19008 ; WH-108, DUT 18691
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	Measured from antenna 1
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	22 / 40 / 102.6
Date of measurements	14-Jan-2015
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 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. WCDMA4 Test results

FDD, Channel 1412 / 1732.4 MHz

Temperature [ºC]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
40	1732.40	2.70081	0.0016	PASSED
30	1732.40	-16.96777	-0.0098	PASSED
20	1732.40	2.89917	0.0017	PASSED
10	1732.40	0.73242	0.0004	PASSED
0	1732.40	-2.13623	-0.0012	PASSED
-10	1732.40	4.48608	0.0026	PASSED
-20	1732.40	3.52478	0.002	PASSED
-30	1732.40	8.14819	0.0047	PASSED
50	1732.40	0.41199	0.0002	PASSED

7.4. LTE2 Test results

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

Temperature [ºC]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	1880.00	1.38760	0.0007	PASSED
40	1880.00	-0.27180	-0.0001	PASSED
30	1880.00	2.10285	0.0011	PASSED
20	1880.00	0.47207	0.0003	PASSED
10	1880.00	2.68936	0.0014	PASSED
0	1880.00	1.34468	0.0007	PASSED
-10	1880.00	1.20163	0.0006	PASSED
-20	1880.00	2.08855	0.0011	PASSED
-30	1880.00	0.77248	0.0004	PASSED

7.5. LTE4 Test results

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

Temperature [ºC]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	1732.50	0.44346	0.0003	PASSED
40	1732.50	1.25885	0.0007	PASSED
30	1732.50	2.30312	0.0013	PASSED
20	1732.50	0.75817	0.0004	PASSED
10	1732.50	0.81539	0.0005	PASSED
0	1732.50	2.08855	0.0012	PASSED
-10	1732.50	1.40190	0.0008	PASSED
-20	1732.50	2.05994	0.0012	PASSED
-30	1732.50	1.84536	0.0011	PASSED

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7.6. LTE5 Test results

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

Temperature [ºC]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	836.50	-1.97411	-0.0024	PASSED
40	836.50	-1.13010	-0.0014	PASSED
30	836.50	-2.26021	-0.0027	PASSED
20	836.50	-1.27316	-0.0015	PASSED
10	836.50	-0.48637	-0.0006	PASSED
0	836.50	-0.61512	-0.0007	PASSED
-10	836.50	-0.84400	-0.001	PASSED
-20	836.50	-0.57220	-0.0007	PASSED
-30	836.50	0.34332	0.0004	PASSED

7.7. LTE12 Test results

FDD, CBW 10MHz, QPSK, 50 RB, Channel 23095 / 707.5 MHz

Temperature [ºC]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	707.50	-1.40190	-0.002	PASSED
40	707.50	-2.16007	-0.0031	PASSED
30	707.50	-1.73092	-0.0024	PASSED
20	707.50	-2.34604	-0.0033	PASSED
10	707.50	-1.05858	-0.0015	PASSED
0	707.50	-0.60081	-0.0008	PASSED
-10	707.50	-1.15871	-0.0016	PASSED
-20	707.50	-0.71526	-0.001	PASSED
-30	707.50	-0.62943	-0.0009	PASSED

7.8. LTE17 Test results

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

Temperature [ºC]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	710.00	-0.14305	-0.0002	PASSED
40	710.00	0.20027	0.0003	PASSED
30	710.00	-0.20027	-0.0003	PASSED
20	710.00	0.95844	0.0014	PASSED
10	710.00	1.77383	0.0025	PASSED
0	710.00	0.30041	0.0004	PASSED
-10	710.00	0.34332	0.0005	PASSED
-20	710.00	0.95844	0.0014	PASSED
-30	710.00	0.81539	0.0012	PASSED

7.9. LTE28 Test results

FDD, CBW 20MHz, QPSK, 100 RB, Channel 27435 / 725.5 MHz

Temperature [ºC]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
40	725.50	0.30041	0.0004	PASSED

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30	725.50	0.77248	0.0011	PASSED
20	725.50	-1.04427	-0.0014	PASSED
10	725.50	0.81539	0.0011	PASSED
0	725.50	-0.08583	-0.0001	PASSED
-10	725.50	0.62943	0.0009	PASSED
-20	725.50	0.18597	0.0003	PASSED
-30	725.50	0.92983	0.0013	PASSED
50	725.50	-0.62943	-0.0009	PASSED

7.10. GSM 1900 Test results

GSM, Channel 661 / 1880.0 MHz

Temperature [ºC]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	1880.00	45.39000	0.0241	PASSED
40	1880.00	43.07000	0.0229	PASSED
30	1880.00	45.85000	0.0244	PASSED
20	1880.00	37.97000	0.0202	PASSED
10	1880.00	38.42000	0.0204	PASSED
0	1880.00	44.04000	0.0234	PASSED
-10	1880.00	46.04000	0.0245	PASSED
-20	1880.00	43.52000	0.0231	PASSED
-30	1880.00	58.76000	0.0313	PASSED

7.11. GSM 850 Test results

GSM, Channel 190 / 836.6 MHz

Temperature [ºC]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	836.60	13.95000	0.0167	PASSED
40	836.60	9.23000	0.011	PASSED
30	836.60	3.75000	0.0045	PASSED
20	836.60	6.01000	0.0072	PASSED
10	836.60	5.88000	0.007	PASSED
0	836.60	8.72000	0.0104	PASSED
-10	836.60	4.00000	0.0048	PASSED
-20	836.60	17.56000	0.021	PASSED
-30	836.60	13.11000	0.0157	PASSED

7.12. WCDMA2 Test results

FDD, Channel 9400 / 1880.0 MHz

Temperature [ºC]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	1880.00	4.85230	0.0026	PASSED
40	1880.00	1.02234	0.0005	PASSED
30	1880.00	-0.25940	-0.0001	PASSED
20	1880.00	-0.76294	-0.0004	PASSED
10	1880.00	1.38855	0.0007	PASSED
0	1880.00	-4.54712	-0.0024	PASSED

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-10	1880.00	3.34168	0.0018	PASSED
-20	1880.00	8.48389	0.0045	PASSED
-30	1880.00	11.50513	0.0061	PASSED

7.13. WCDMA5 Test results

FDD, Channel 4175 / 835.0 MHz

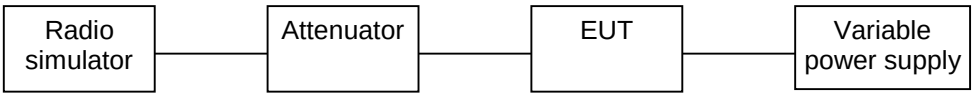
Temperature [ºC]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	835.00	-1.43433	-0.0017	PASSED
40	835.00	-1.48010	-0.0018	PASSED
30	835.00	-1.43433	-0.0017	PASSED
20	835.00	-7.75147	-0.0093	PASSED
10	835.00	3.12805	0.0037	PASSED
0	835.00	-0.88501	-0.0011	PASSED
-10	835.00	-7.09534	-0.0085	PASSED
-20	835.00	4.68445	0.0056	PASSED
-30	835.00	1.20544	0.0014	PASSED

8. Frequency stability, voltage variation

(FCC §2.1055(d), §27.54, RSS-139 6.3, RSS-133 6.3, RSS-132 4.3, RSS-199 4.3, RSS-130 4.3, RSS-130 4.3 (a))

EUT with DUT number	RM-1065, DUT 19004
Accessories with DUT numbers	SD-238R, DUT 19008 ; WH-108, DUT 18691
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	Measured from antenna 1
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	22 / 40 / 102.6
Date of measurements	15-Jan-2015
Measured by	Jari Keto

8.1. Test Setup



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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. WCDMA4 Test results

FDD,

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	1732.40	4.44031	0.0026	PASSED
Battery cut-off point / 3.6	1732.40	1.96838	0.0011	PASSED
Nominal / 3.8	1732.40	5.29480	0.0031	PASSED

8.4. LTE2 Test results

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

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	1880.00	1.11580	0.0006	PASSED
Battery cut-off point / 3.6	1880.00	0.85831	0.0005	PASSED
Nominal / 3.8	1880.00	0.22888	0.0001	PASSED

8.5. 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	1.74522	0.001	PASSED
Battery cut-off point / 3.6	1732.50	0.24319	0.0001	PASSED
Nominal / 3.8	1732.50	0.88692	0.0005	PASSED

8.6. LTE5 Test results

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

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	836.50	0.08583	0.0001	PASSED
Battery cut-off point / 3.6	836.50	-0.32902	-0.0004	PASSED
Nominal / 3.8	836.50	-2.03133	-0.0024	PASSED

8.7. LTE12 Test results

FDD, CBW 10MHz, QPSK, 50 RB, Channel 23095 / 707.5 MHz

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	707.50	-1.01566	-0.0014	PASSED
Battery cut-off point / 3.6	707.50	-0.72956	-0.001	PASSED
Nominal / 3.8	707.50	-0.58651	-0.0008	PASSED

8.8. LTE17 Test results

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

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	710.00	0.14305	0.0002	PASSED
Battery cut-off point / 3.6	710.00	0.47207	0.0007	PASSED
Nominal / 3.8	710.00	0.37193	0.0005	PASSED

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8.9. LTE28 Test results

FDD, CBW 20MHz, QPSK, 100 RB, Channel 27435 / 725.5 MHz

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	725.50	-0.55790	-0.0008	PASSED
Battery cut-off point / 3.6	725.50	-0.60081	-0.0008	PASSED
Nominal / 3.8	725.50	-1.14441	-0.0016	PASSED

8.10. GSM 1900 Test results

GSM,

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	1880.00	43.39000	0.0231	PASSED
Battery cut-off point / 3.6	1880.00	46.23000	0.0246	PASSED
Nominal / 3.8	1880.00	41.84000	0.0223	PASSED

8.11. GSM 850 Test results

GSM,

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	836.60	8.01000	0.0096	PASSED
Battery cut-off point / 3.6	836.60	9.56000	0.0114	PASSED
Nominal / 3.8	836.60	3.23000	0.0039	PASSED

8.12. WCDMA2 Test results

FDD,

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	1880.00	2.80762	0.0015	PASSED
Battery cut-off point / 3.6	1880.00	-4.48608	-0.0024	PASSED
Nominal / 3.8	1880.00	-3.29590	-0.0018	PASSED

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8.13. WCDMA5 Test results

FDD,

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Battery cut-off point / 3.6	835.00	2.21252	0.0026	PASSED
Nominal / 3.8	835.00	3.64685	0.0044	PASSED
Max / 4.2	835.00	-2.80762	-0.0034	PASSED

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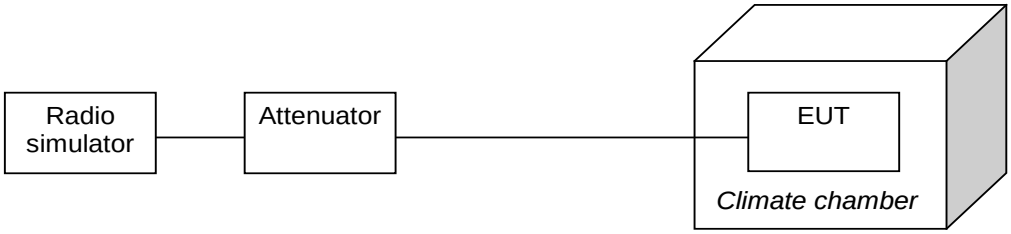
9. Frequency stability, temperature variation, (Band edge method)
(RSS-139 6.3, RSS-199 4.3, RSS-130 4.3, RSS-130 4.3 (a))

EUT with DUT number	RM-1065, DUT 19004
Accessories with DUT numbers	SD-238R, DUT 19008 ; WH-108, DUT 18691
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	Measured from antenna 1
Temp [ºC] / Humidity [%RH] / Air Pressure [kPa]	22 / 40 / 102.6
Date of measurements	15-Jan-2015
Measured by	Jari Keto

9.1. Test Setup



9.2. 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.
The results were then calculated as per section 4.3 of RSS-130.

Limits for frequency stability, temperature variation measurements

Limit
The results must be within the operating band.

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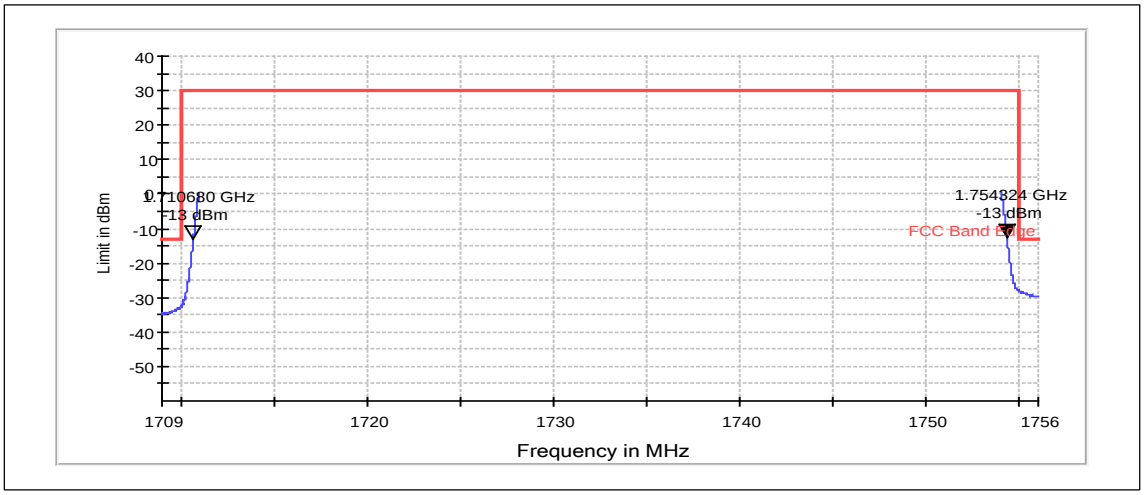
9.3. LTE4 Test results

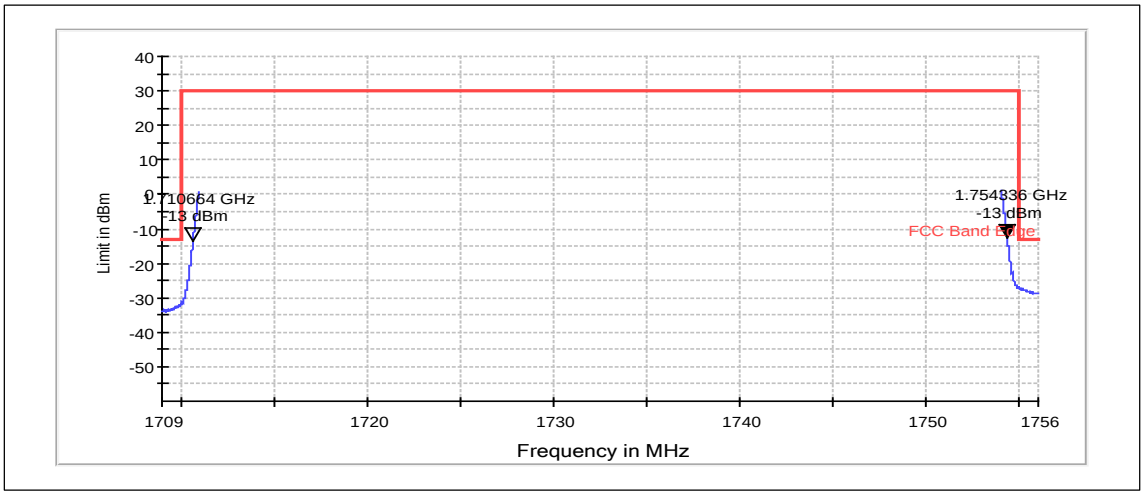
Channel 20175 / 1732.5 MHz



RMS (RBW: 500 kHz, VBW: 2 MHz)

Temperature [ºC]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
50	-0.95844	1710.680000	1710.679999	1754.324000	1754.324000	PASSED

Channel 20175 / 1732.5 MHz



RMS (RBW: 500 kHz, VBW: 2 MHz)

Temperature [ºC]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
20	-1.75953	1710.664000	1710.663998	1754.336000	1754.336001	PASSED

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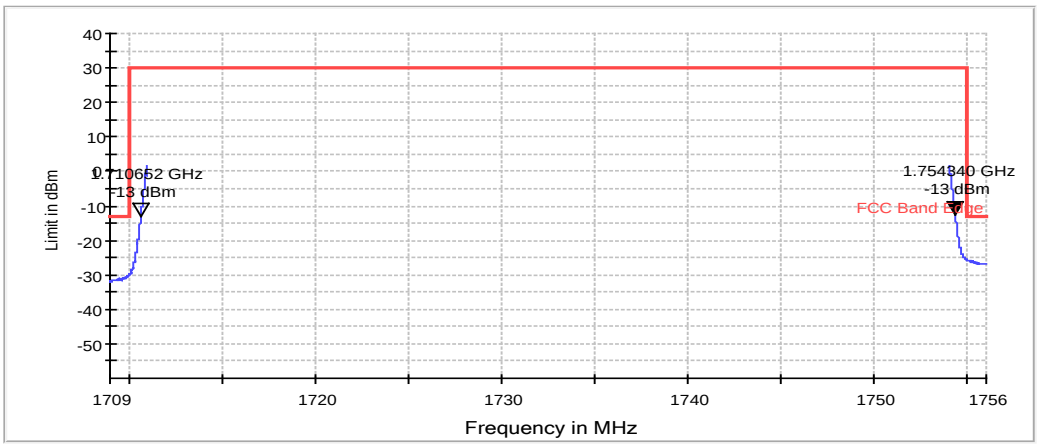
Channel 20175 / 1732.5 MHz



RMS (RBW: 500 kHz, VBW: 2 MHz)

Temperature [ºC]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
-30	1.27316	1710.652000	1710.651998	1754.340000	1754.340001	PASSED

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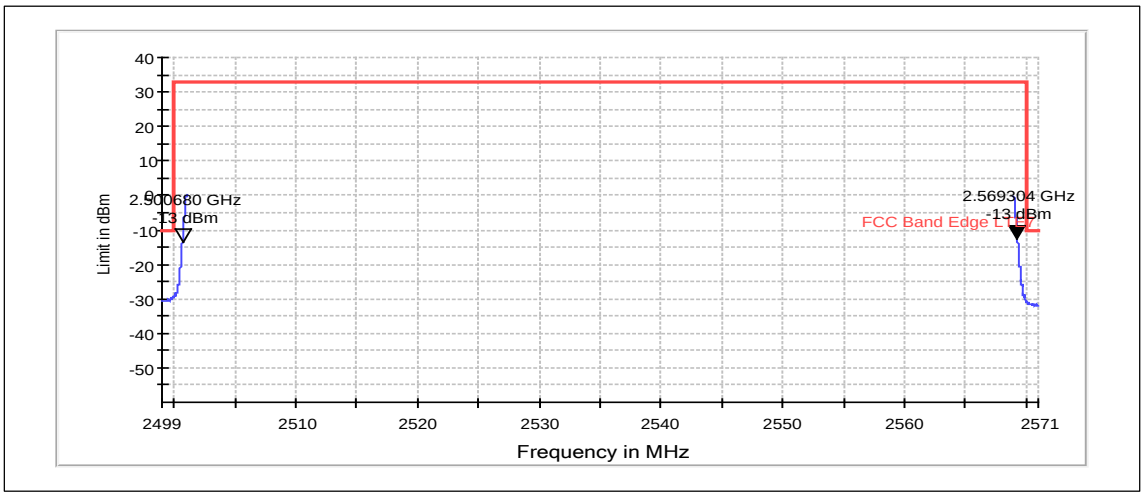
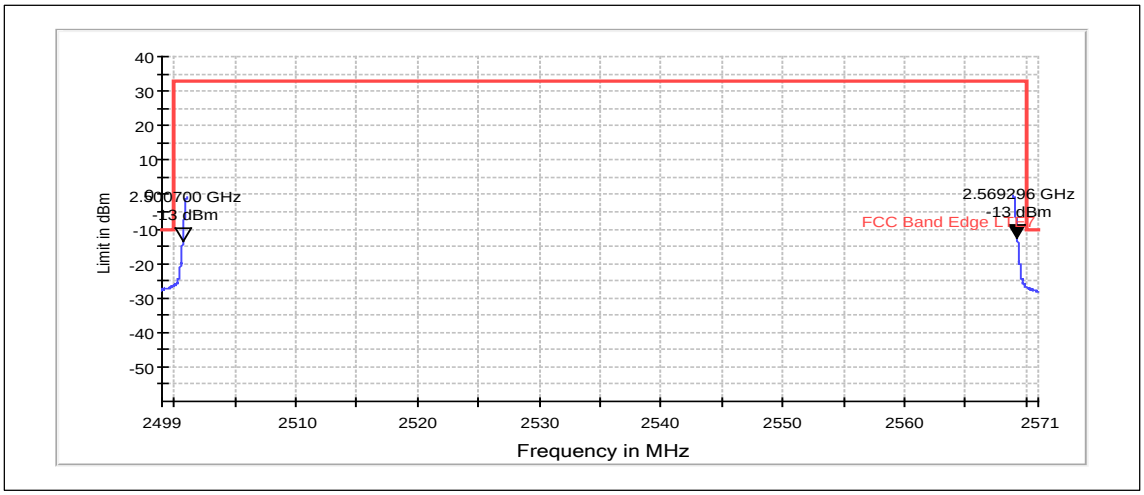
Channel 21100 / 2535.0 MHz



RMS (RBW: 500 kHz, VBW: 2 MHz)

Temperature [°C]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
20	-9.26971	2500.680000	2500.679990	2569.304000	2569.304009	PASSED

Channel 21100 / 2535.0 MHz



RMS (RBW: 500 kHz, VBW: 2 MHz)

Temperature [°C]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
-30	-2.61784	2500.700000	2500.699997	2569.296000	2569.296002	PASSED

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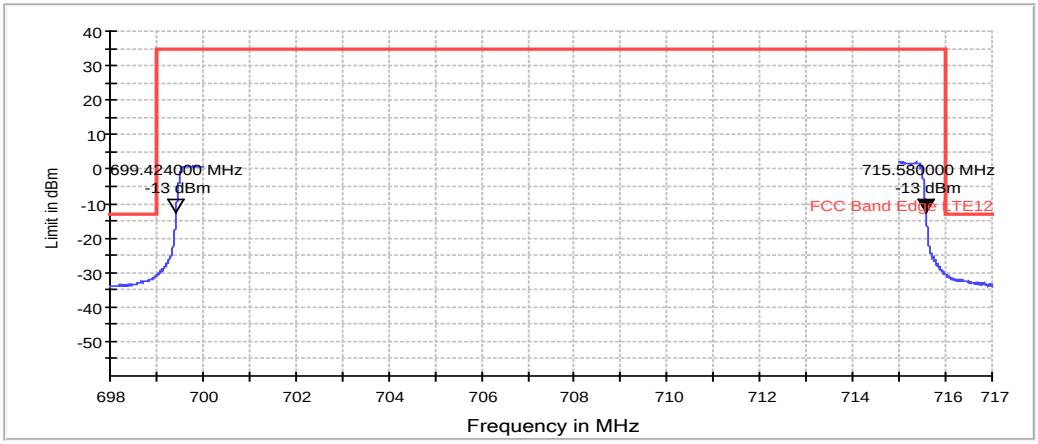
9.4. LTE12 Test results

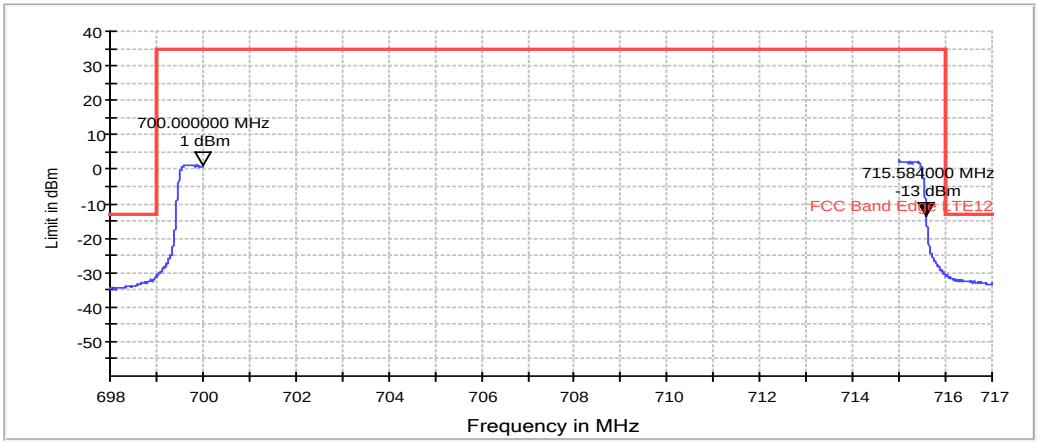
Channel 23095 / 707.5 MHz



RMS (RBW: 100 kHz, VBW: 300 kHz)

Temperature [ºC]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
50	0.65804	699.424000	699.423999	715.580000	715.580000	PASSED

Channel 23095 / 707.5 MHz



RMS (RBW: 100 kHz, VBW: 300 kHz)

Temperature [ºC]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
20	0.21458	700.000000	699.999999	715.584000	715.584000	PASSED

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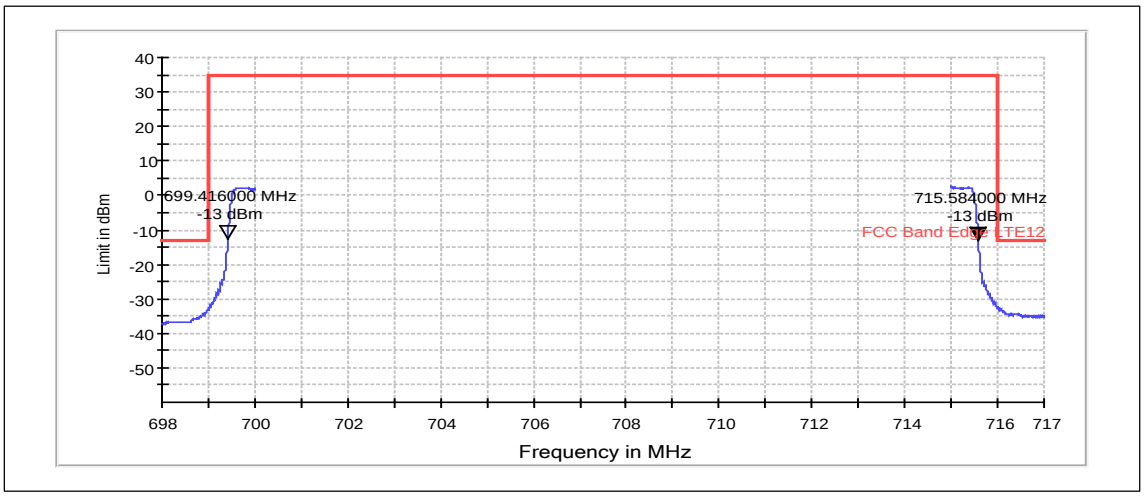
Channel 23095 / 707.5 MHz

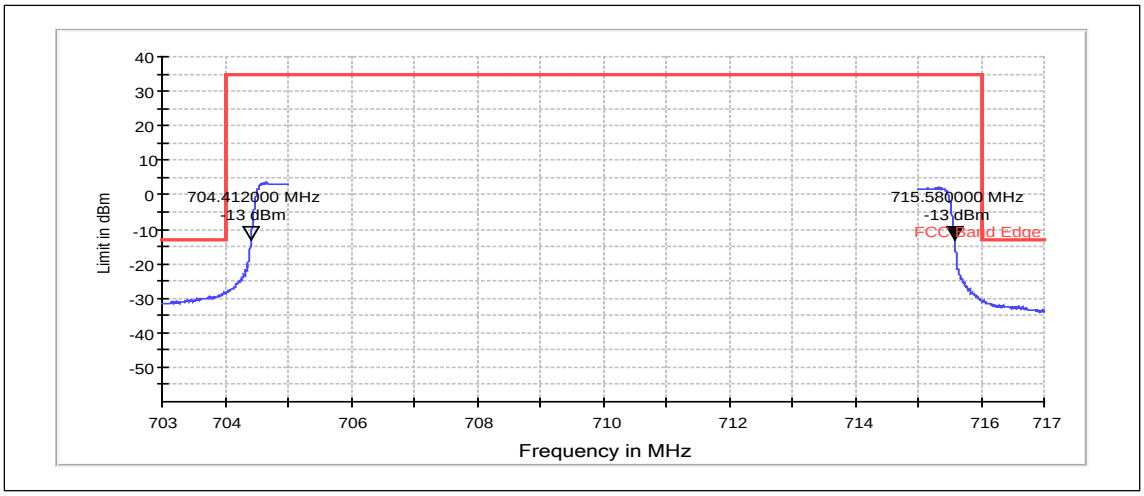


RMS (RBW: 100 kHz, VBW: 300 kHz)

Temperature [ºC]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
-30	1.11580	699.416000	699.415998	715.584000	715.584001	PASSED

9.5. LTE17 Test results

Channel 23790 / 710.0 MHz



RMS (RBW: 100 kHz, VBW: 300 kHz)

Temperature [ºC]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
50	-2.70367	704.412000	704.411997	715.580000	715.580002	PASSED

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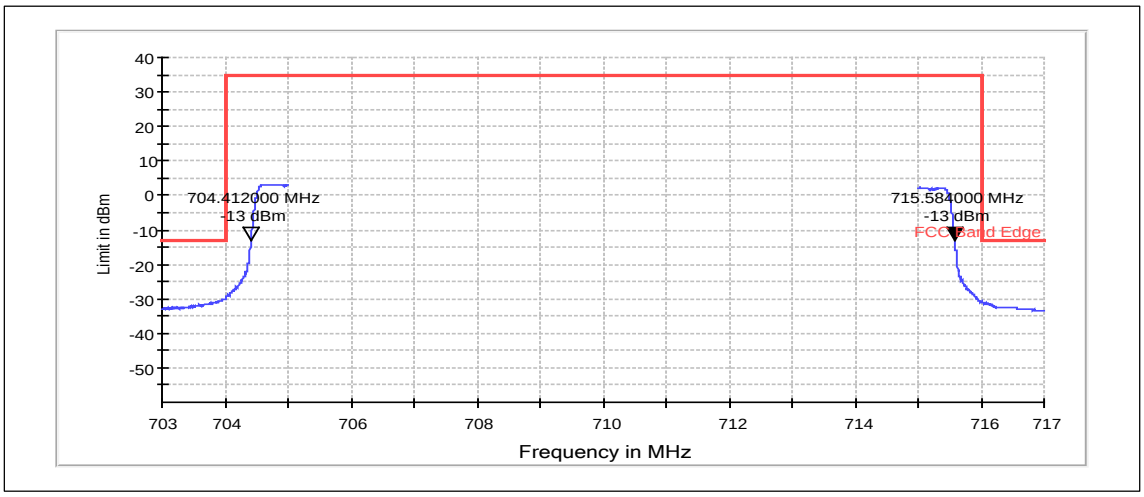
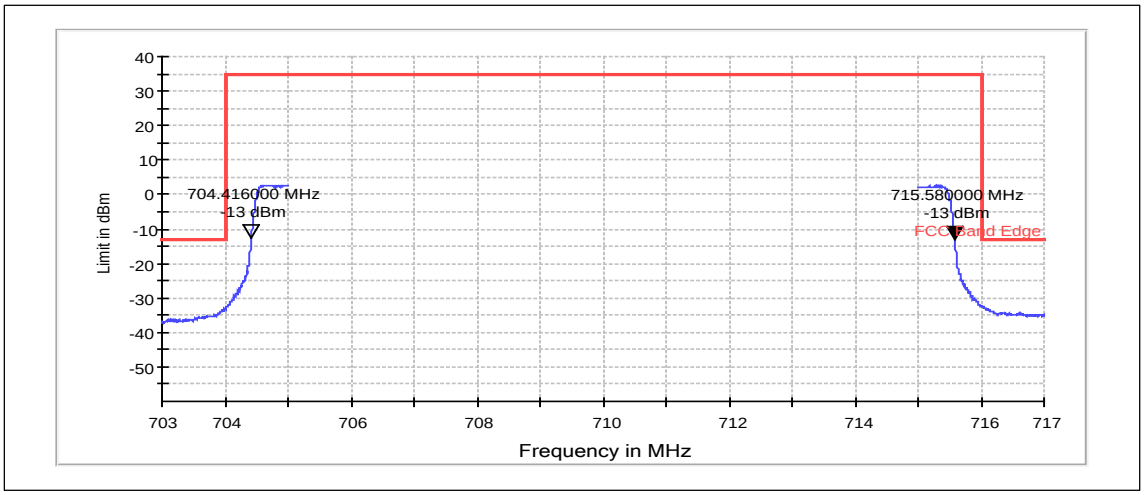
Channel 23790 / 710.0 MHz



RMS (RBW: 100 kHz, VBW: 300 kHz)

Temperature [ºC]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
20	-1.07288	704.412000	704.411998	715.584000	715.584001	PASSED

Channel 23790 / 710.0 MHz



RMS (RBW: 100 kHz, VBW: 300 kHz)

Temperature [ºC]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
-30	-0.30041	704.416000	704.415999	715.580000	715.580000	PASSED

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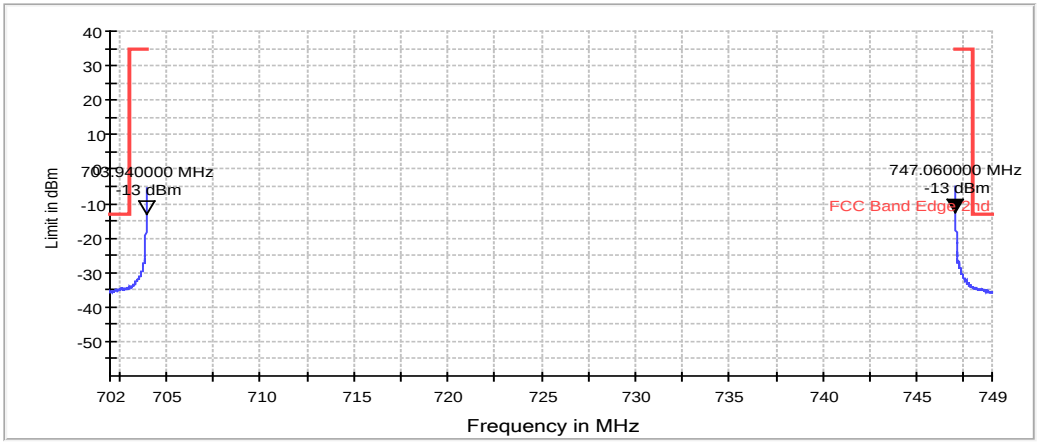
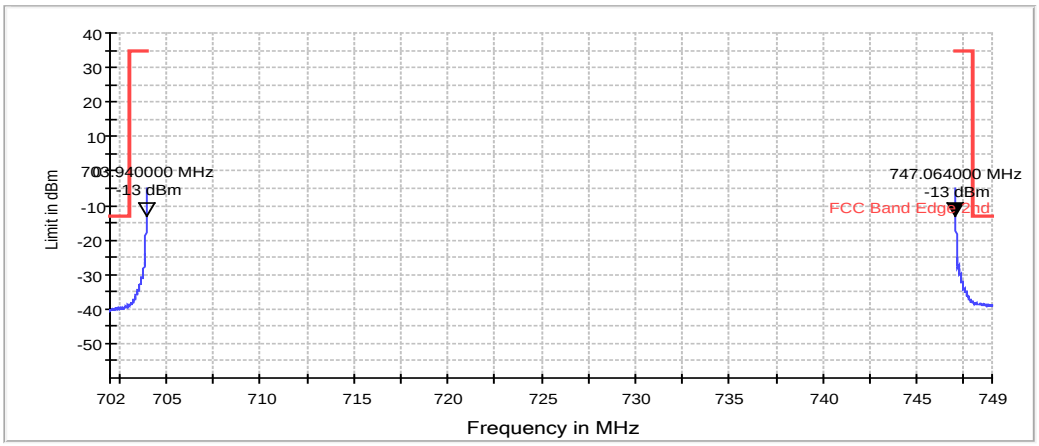
9.6. LTE28 Test results

Channel 27435 / 725.5 MHz



Temperature [ºC]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
20	-2.57492	703.940000	703.939997	747.060000	747.060002	PASSED

Channel 27435 / 725.5 MHz



Temperature [ºC]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
-30	-1.04427	703.940000	703.939998	747.064000	747.064001	PASSED

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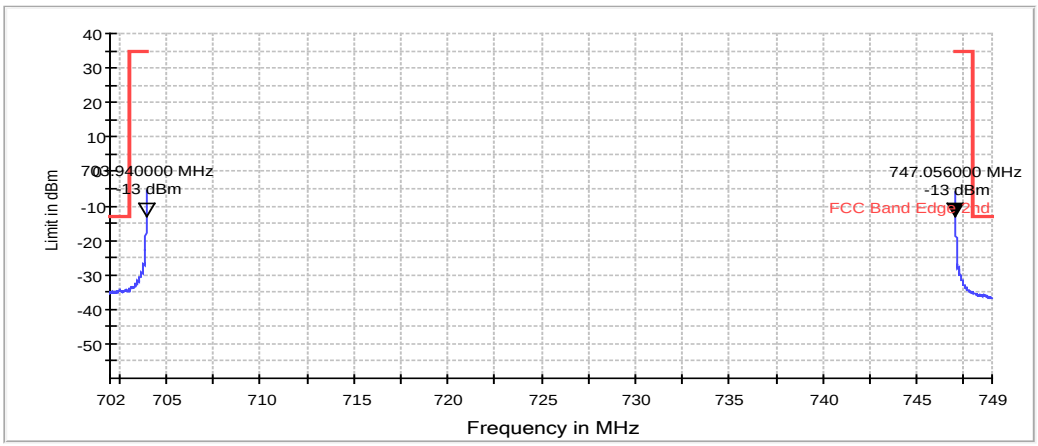
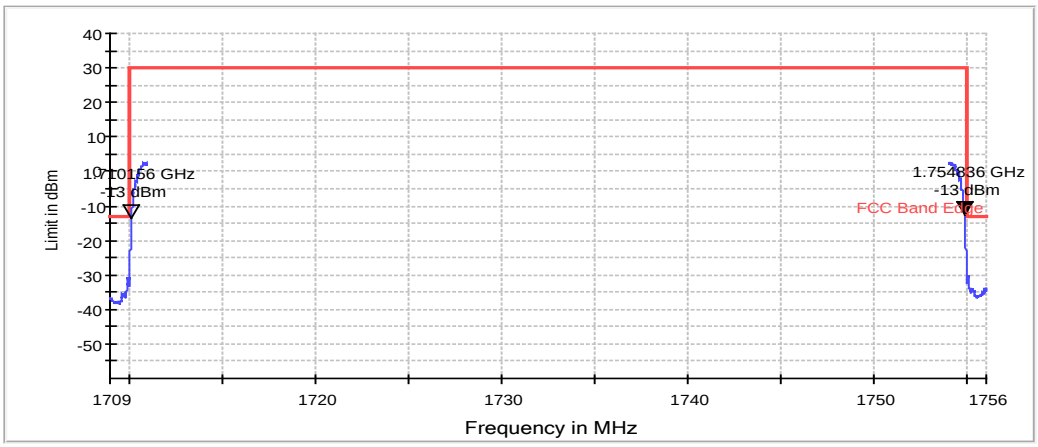
Channel 27435 / 725.5 MHz



Temperature [°C]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
50	-2.94685	703.940000	703.939997	747.056000	747.056002	PASSED

9.7. WCDMA4 Test results

Channel 1412 / 1732.4 MHz



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

Temperature [°C]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
-30	-18.31055	1710.156000	1710.155981	1754.836000	1754.836018	PASSED

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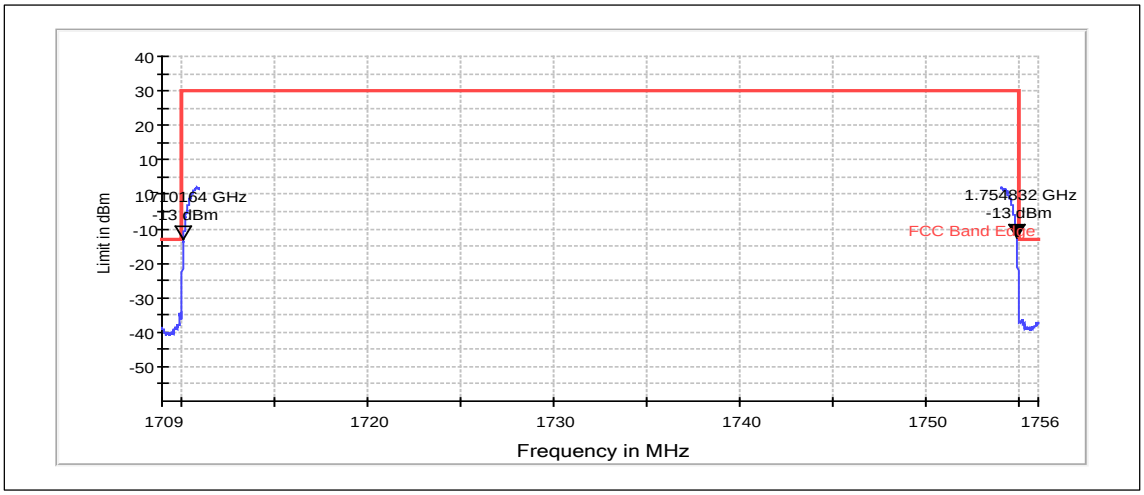
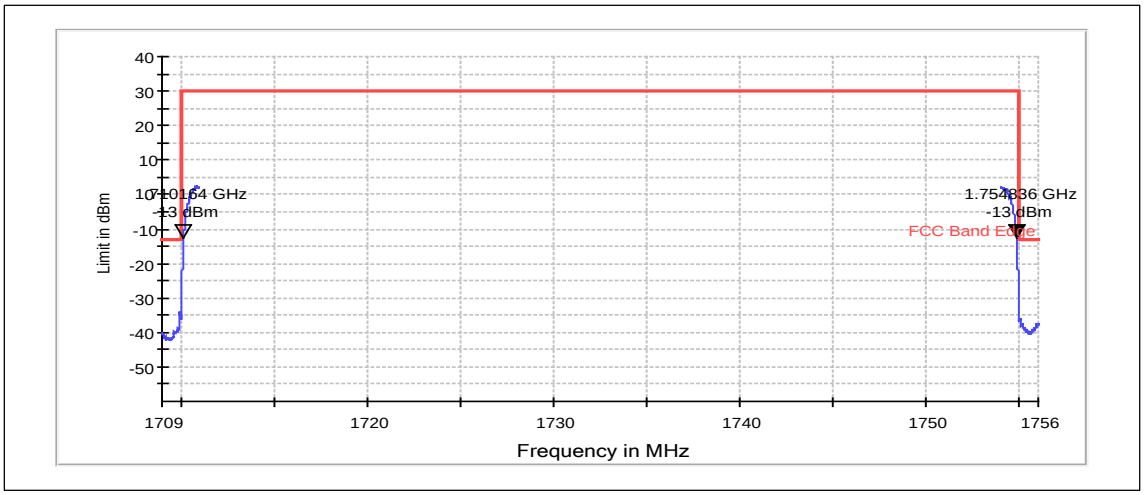
Channel 1412 / 1732.4 MHz



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

Temperature [ºC]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
50	18.93616	1710.164000	1710.163981	1754.832000	1754.832018	PASSED

Channel 1412 / 1732.4 MHz



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

Temperature [ºC]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
20	5.09644	1710.164000	1710.163994	1754.836000	1754.836005	PASSED

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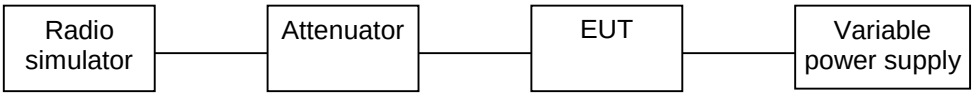
10. Frequency stability, voltage variation, (Band edge method)

§2.1055(d), §27.54,(RSS-139 6.3, RSS-199 4.3, RSS-130 4.3, RSS-130 4.3 (a))

EUT with DUT number	RM-1065, DUT 19004
Accessories with DUT numbers	SD-238R, DUT 19008 ; WH-108, DUT 18691
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	Measured from antenna 1
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 40 / 102.6
Date of measurements	15-Jan-2015
Measured by	Jari Keto

10.1. Test Setup



10.2. 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.
The results were then calculated as per section 4.3 of RSS-130.

Limits for frequency stability, voltage variation measurements

Limit
The results must be within the operating band.

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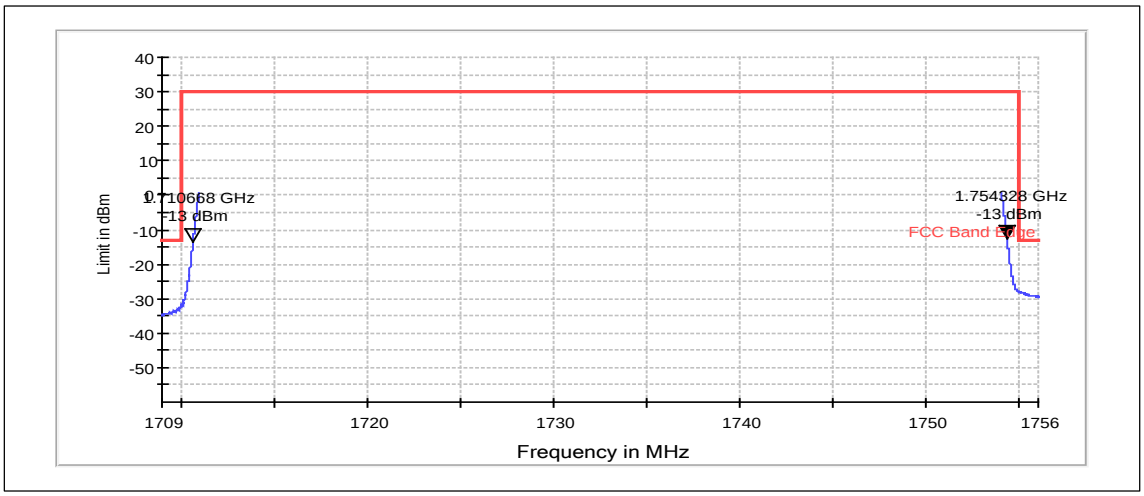
10.3. LTE4 Test results

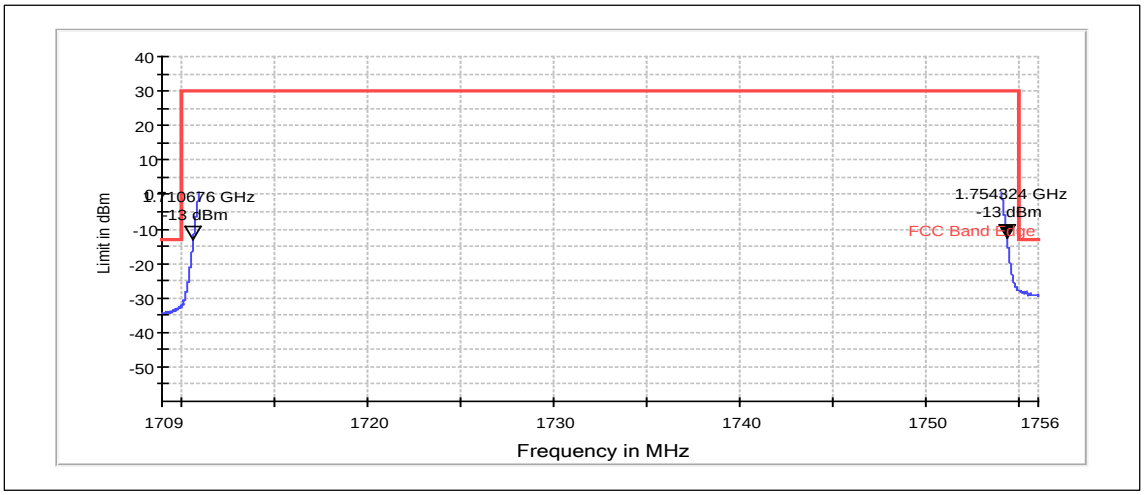
Channel 20175 / 1732.5 MHz



RMS (RBW: 500 kHz, VBW: 2 MHz)

Voltage level [V]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
Max / 4.2	0.55790	1710.668000	1710.667999	1754.328000	1754.328000	PASSED

Channel 20175 / 1732.5 MHz



RMS (RBW: 500 kHz, VBW: 2 MHz)

Voltage level [V]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
Battery cut-off point / 3.6	-2.93255	1710.676000	1710.675997	1754.324000	1754.324002	PASSED

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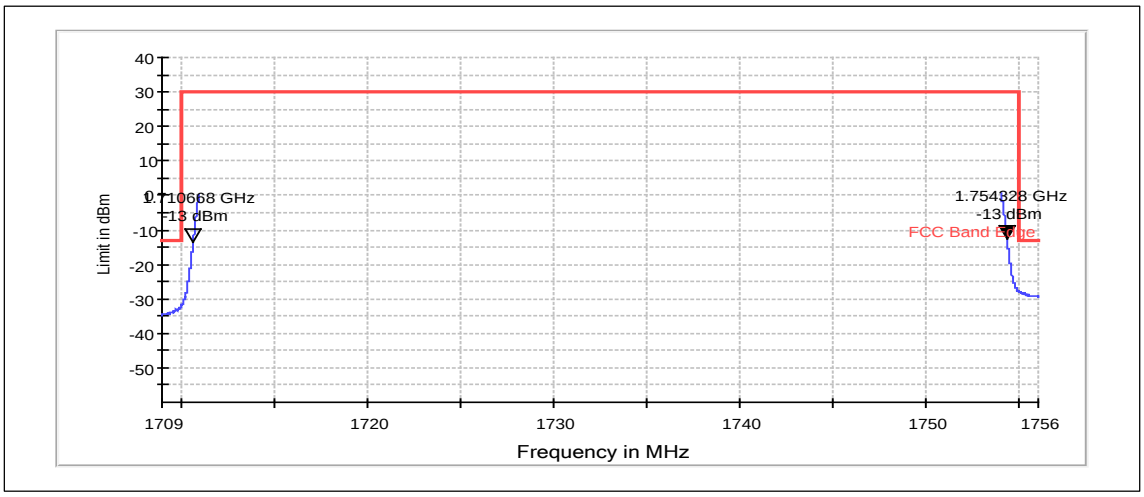
Channel 20175 / 1732.5 MHz

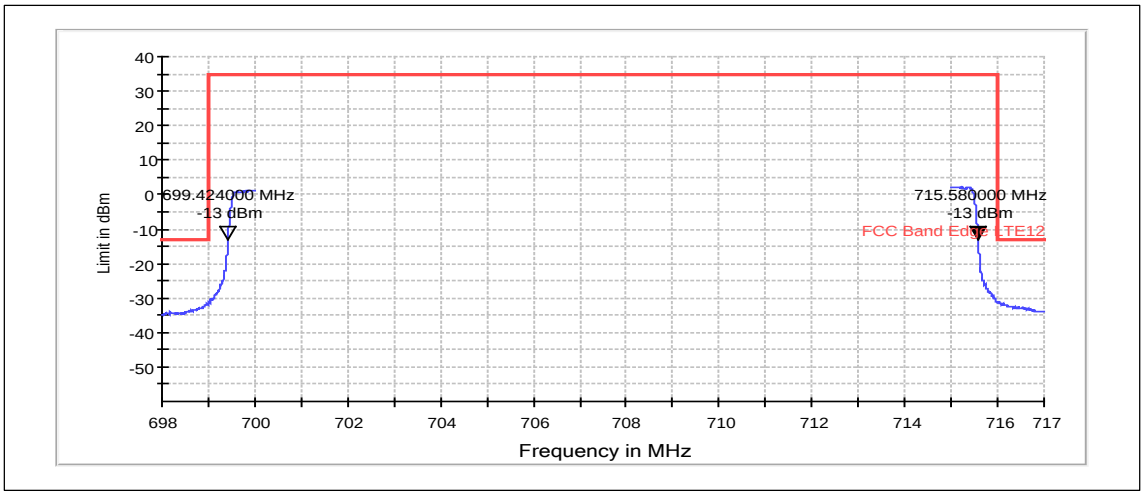


RMS (RBW: 500 kHz, VBW: 2 MHz)

Voltage level [V]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
Nominal / 3.8	-1.25885	1710.668000	1710.667998	1754.328000	1754.328001	PASSED

10.4. LTE12 Test results

Channel 23095 / 707.5 MHz



RMS (RBW: 100 kHz, VBW: 300 kHz)

Voltage level [V]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
Max / 4.2	-0.08583	699.424000	699.423999	715.580000	715.580000	PASSED

Channel 23095 / 707.5 MHz

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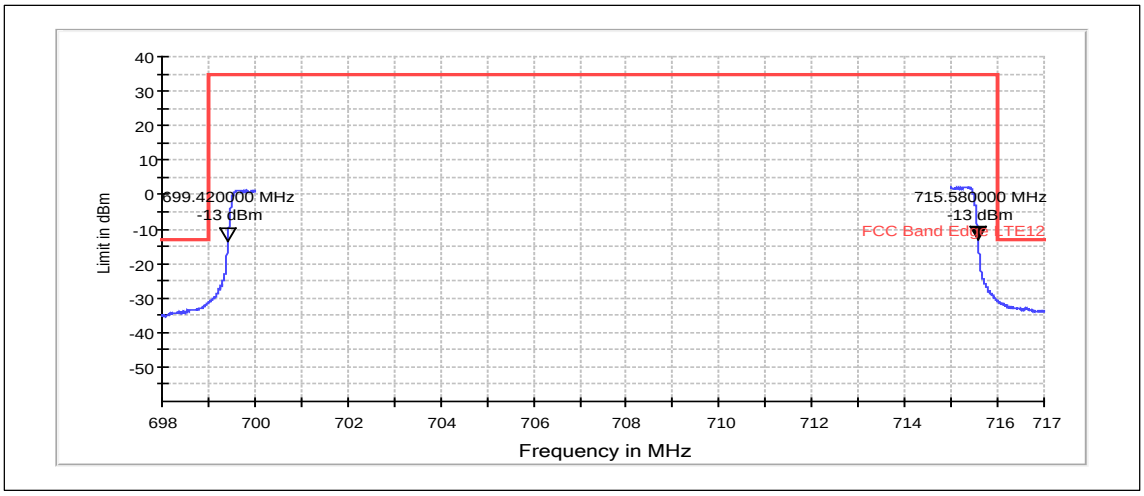

RMS (RBW: 100 kHz, VBW: 300 kHz)

Voltage level [V]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
Battery cut-off point / 3.6	0.30041	699.420000	699.419999	715.580000	715.580000	PASSED

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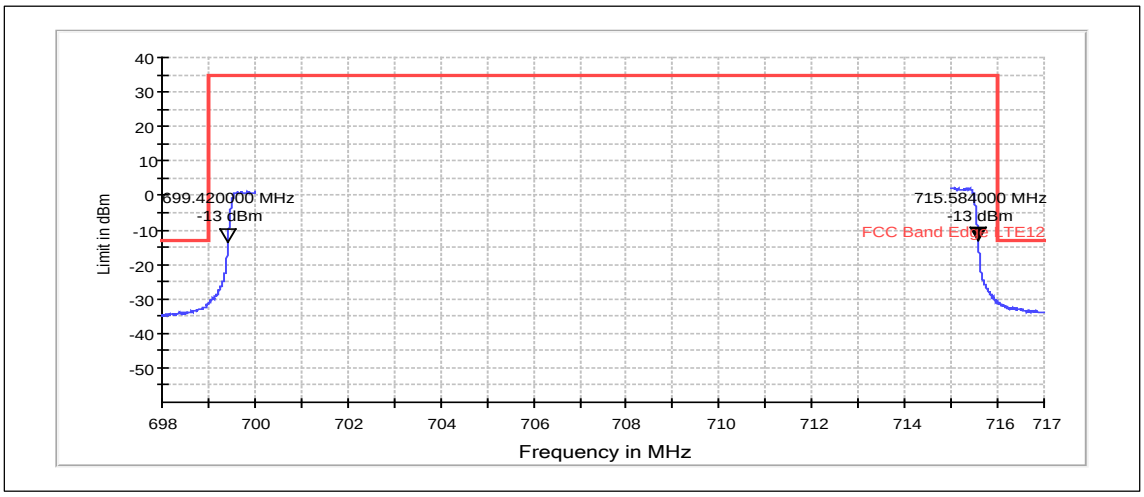
Channel 23095 / 707.5 MHz

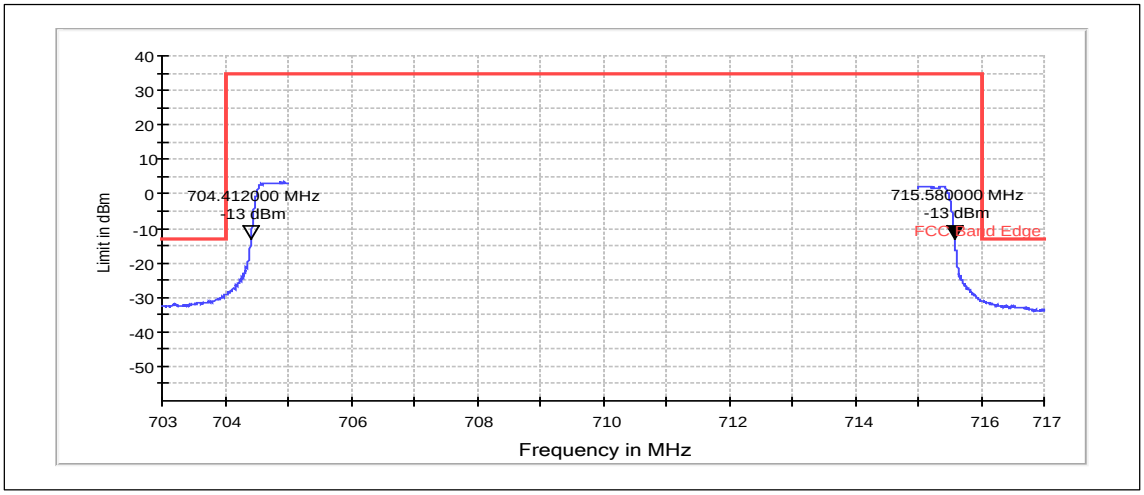


RMS (RBW: 100 kHz, VBW: 300 kHz)

Voltage level [V]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
Nominal / 3.8	-0.32902	699.420000	699.419999	715.584000	715.584000	PASSED

10.5. LTE17 Test results

Channel 23790 / 710.0 MHz



RMS (RBW: 100 kHz, VBW: 300 kHz)

Voltage level [V]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
Max / 4.2	-1.10149	704.412000	704.411998	715.580000	715.580001	PASSED

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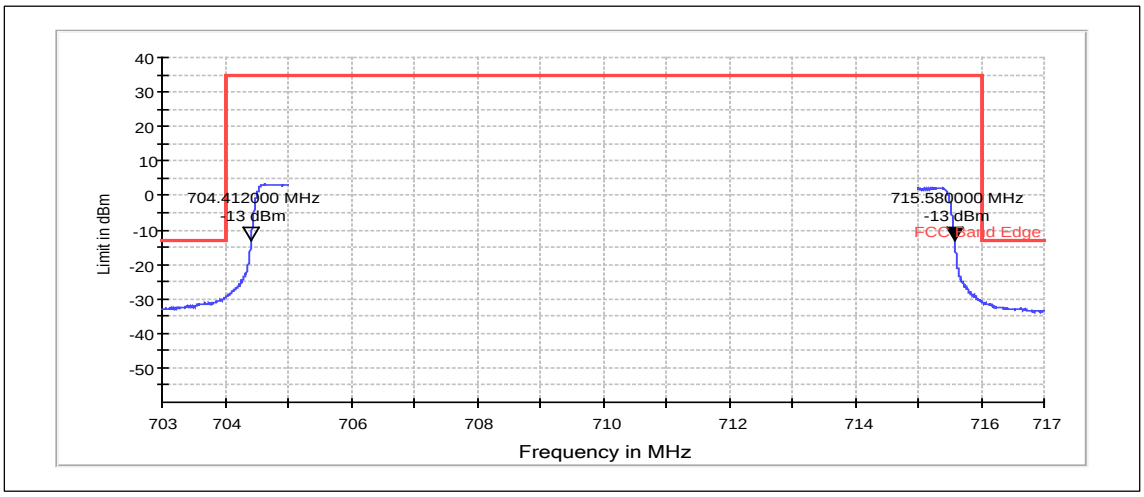
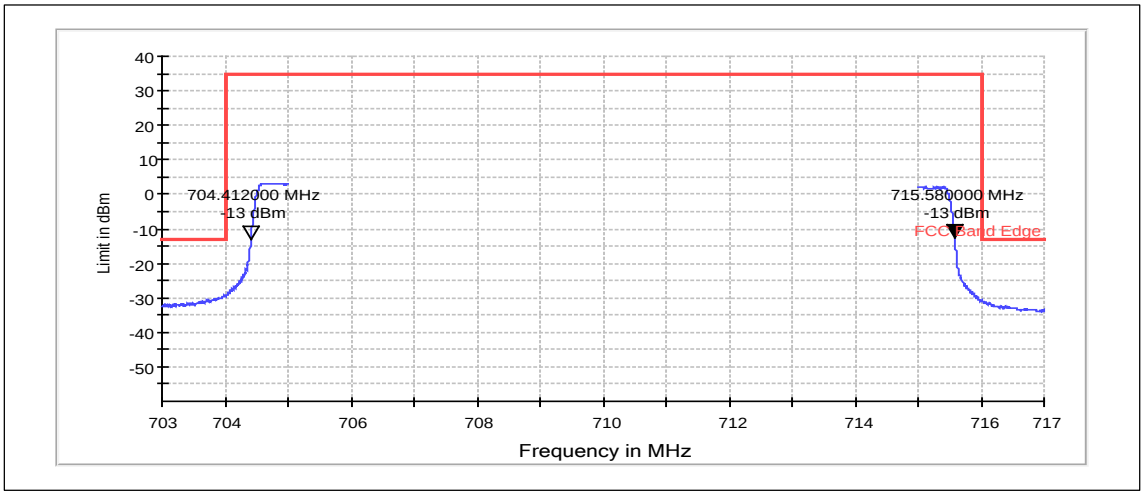
Channel 23790 / 710.0 MHz



RMS (RBW: 100 kHz, VBW: 300 kHz)

Voltage level [V]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
Battery cut-off point / 3.6	-2.58923	704.412000	704.411997	715.580000	715.580002	PASSED

Channel 23790 / 710.0 MHz



RMS (RBW: 100 kHz, VBW: 300 kHz)

Voltage level [V]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
Nominal / 3.8	-1.88828	704.412000	704.411998	715.580000	715.580001	PASSED

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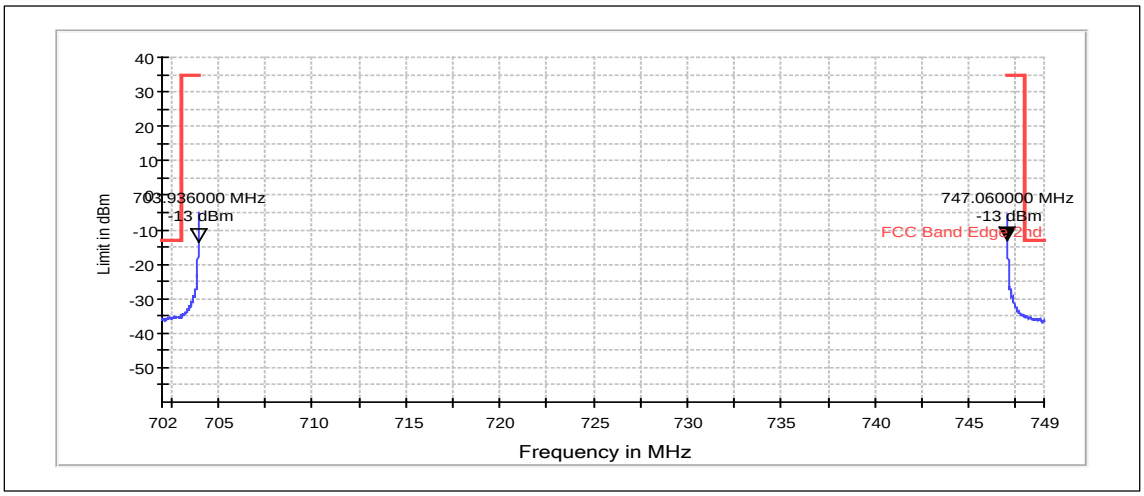
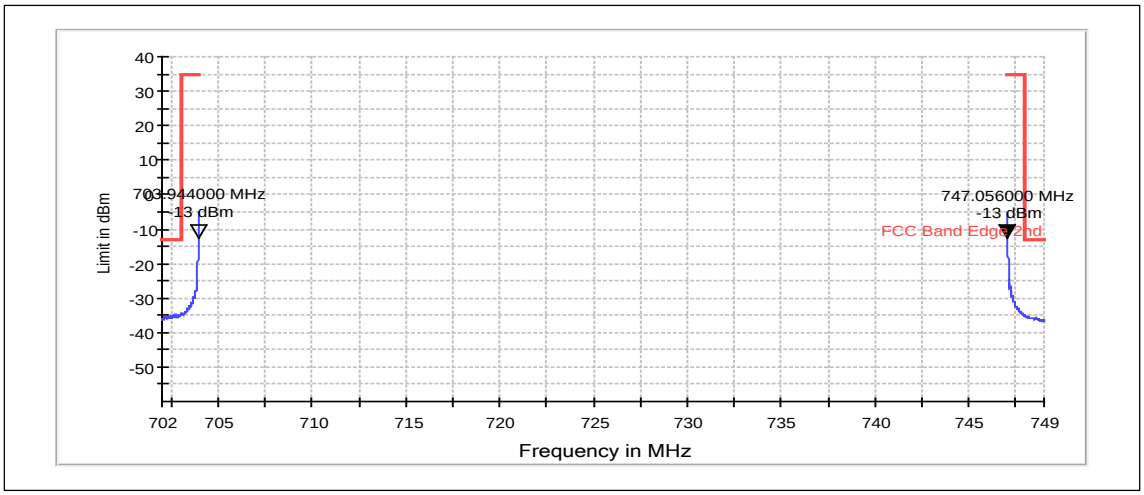
10.6. LTE28 Test results

Channel 27435 / 725.5 MHz



Voltage level [V]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
Max / 4.2	-2.53201	703.936000	703.935997	747.060000	747.060002	PASSED

Channel 27435 / 725.5 MHz



Voltage level [V]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
Battery cut-off point / 3.6	-2.51770	703.944000	703.943997	747.056000	747.056002	PASSED

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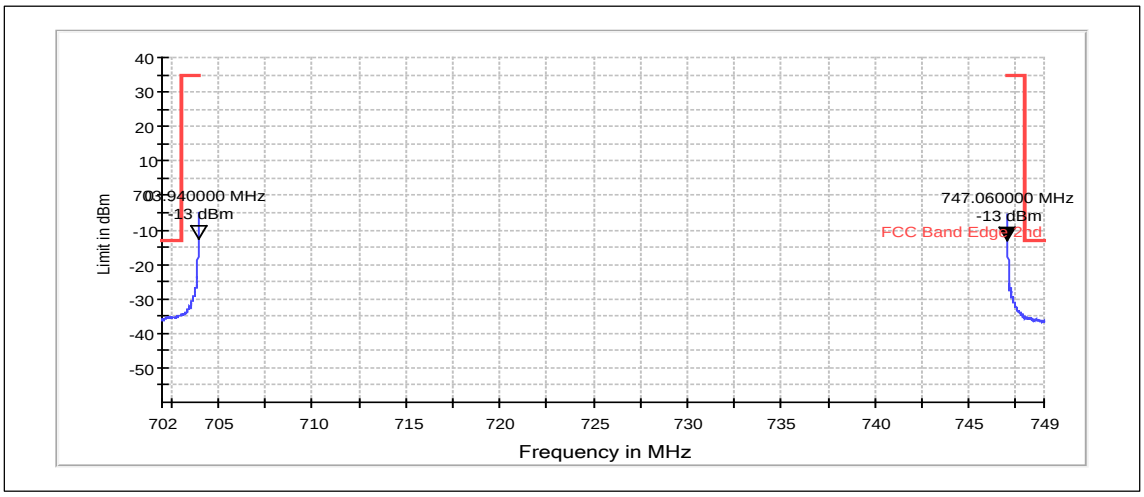
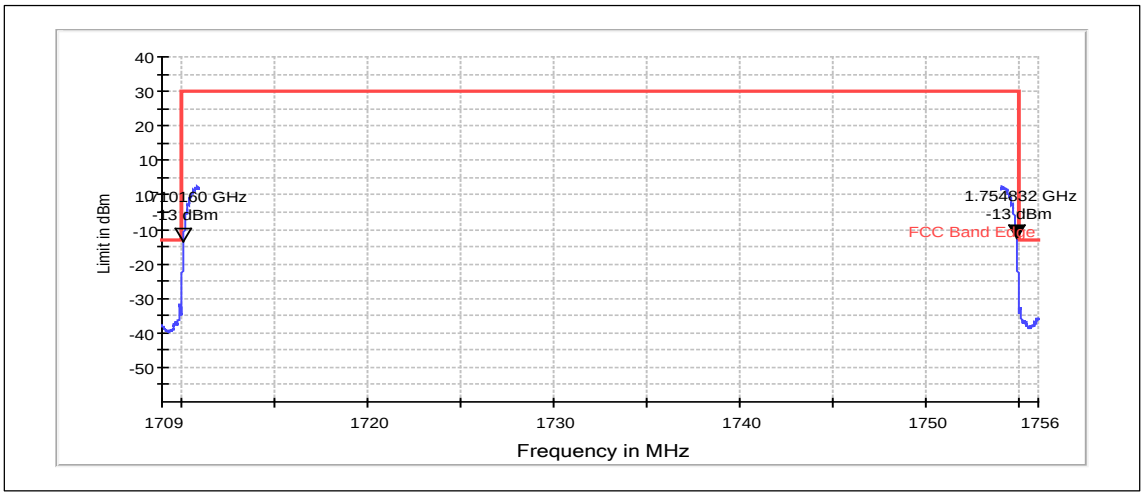
Channel 27435 / 725.5 MHz



Voltage level [V]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
Nominal / 3.8	-2.81811	703.940000	703.939997	747.060000	747.060002	PASSED

10.7. WCDMA4 Test results



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

Voltage level [V]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
Max / 4.2	-27.46582	1710.160000	1710.159972	1754.832000	1754.832027	PASSED

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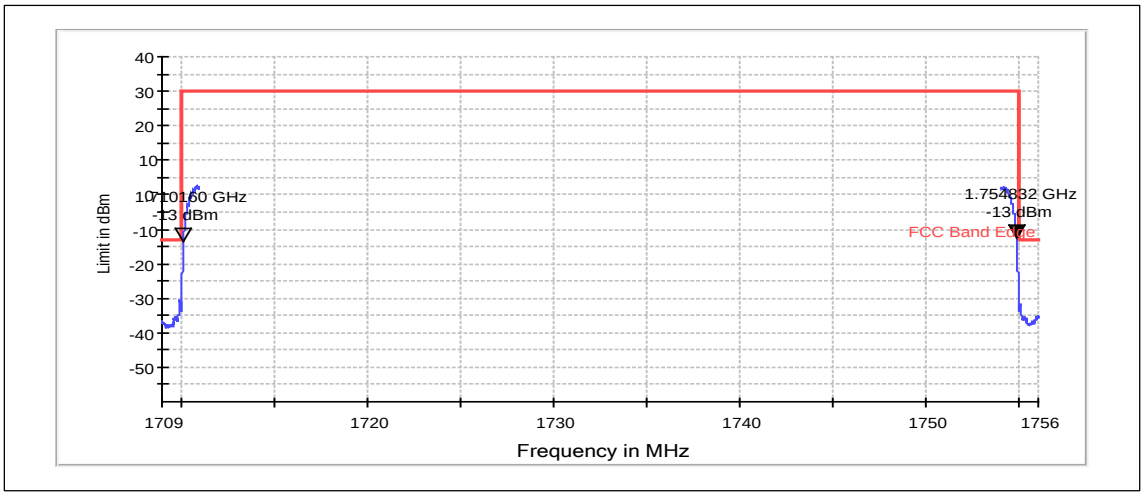
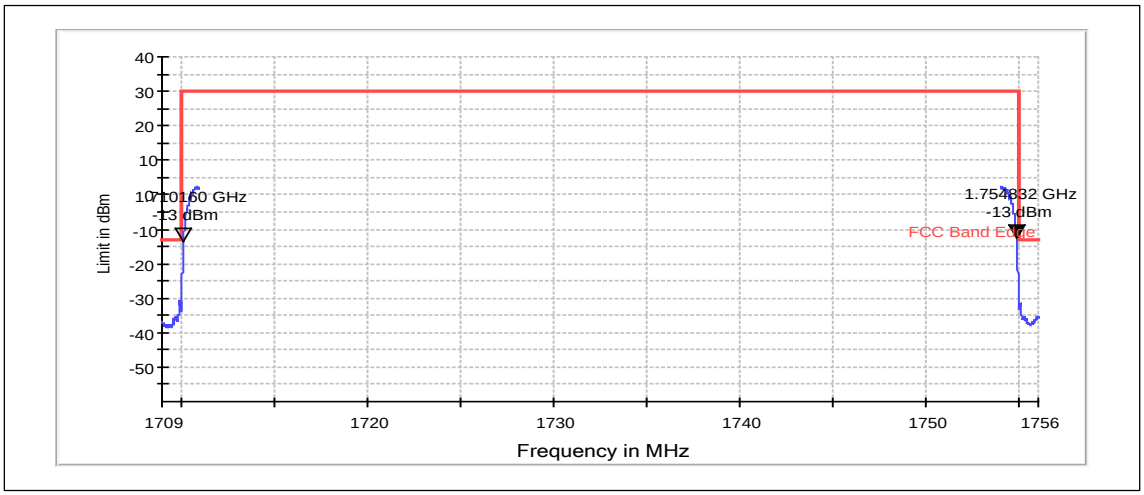
10.8. WCDMA4 Test results



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

Voltage level [V]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
Battery cut-off point / 3.6	-30.91431	1710.160000	1710.159969	1754.832000	1754.832030	PASSED



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

Voltage level [V]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
Nominal / 3.8	-21.66748	1710.160000	1710.159978	1754.832000	1754.832021	PASSED

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11. Test Equipment

11.1. 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

11.2. 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

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Eq. No	Equipment	Type	Manufacturer	Used in
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
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

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