

FCC Part 22/24 Compliance Test Report

Test Report no.:	FCC22&24_RM-1039_05	Date of Report:	09-Sep-2014
Number of pages:	81	Customer's Contact person:	Helen Hu
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FCC listing no.:	94436		
IC recognition no.:	661AK-1		
Tested devices/ accessories:	Phone RM-1039 / Battery BV-T5A / AC Charger AC-20E / Headset WH-208 / Dummy Battery		
FCC ID:	QTLRM-1039	IC:	
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Parts 22/24, TIA-603-C-2004 and IC standards, RSS-GEN (Issue 3, December 2010), RSS-130 (Issue 1, October 2013), RSS-132 (Issue 2, September 2005), RSS-133 (Issue 5, February 2009). Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".		
Documentation:	The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory. The documentation of the testing performed on the tested devices is archived for 15 years at TCC Microsoft.		
Test Results:	The EUT complies with the requirements in respect of all parameters subject to the test. The test results relate only to devices specified in this document		
Date and signature for the contents:			

Jari Jantunen, System Manager, EMC

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

Date of receipt	25-Jul-2014
Testing completed	08-Aug-2014
The customer's contact person	Helen Hu
Test Plan referred to	T:\Projects\RM-1039\TestPlan\RS_Testplan_RM-1039.xlsm
Notes	-
Document name	T:\Projects\RM-1039\EMC\FCC22&24_RM-1039_05.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-1039	0044024794722049	0241	-	02032.00000.14271.24000	43204
Phone	RM-1039	004402479477972	0241	-	02032.00000.14271.24000	43203
Battery	BV-T5A	417534224c10101093;0670738	Proto_V5	-	-	43205
Charger	AC-20E	4868674086311108110;0675628	CE	-	-	43207
Headset	WH-208	2302571	CE	-	-	43208

1.2. Summary of Test Results

GSM 850:

Section in CFR 47	Section in RSS-GEN or RSS-132	Name of the test	Result
§2.1046(a), 22.913(a)	4.4	Conducted RF output power	NP
§22.913(a)	4.4	Radiated RF output power	PASSED
§2.1049(h)	4.6.1	99 % occupied bandwidth	NP
§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	NP
§2.1055(d)	4.3	Frequency stability, voltage variation	NP

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
§2.1049(h)	4.6.1	99 % occupied bandwidth	NP
§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	NP
§2.1055(d)	6.3	Frequency stability, voltage variation	NP

WCDMA 1900:

Section in CFR 47	Section in RSS-GEN or RSS-133	Name of the test	Result
§2.1046(a)	6.4	Conducted RF output power	NP
§24.232(b)	6.4	Radiated RF output power	PASSED
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§24.238(a)	6.5	Band edge compliance	PASSED
§24.238(a), §2.1051	6.5	Spurious emissions at antenna terminals	NP
§24.238(a), §2.1053	6.5	Spurious radiated emissions	PASSED
§2.1055(a)	6.3	Frequency stability, temperature variation	NP
§2.1055(d)	6.3	Frequency stability, voltage variation	NP

WCDMA 1700:

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
§2.1049(h)	4.6.1	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

WCDMA 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
§2.1049(h)	4.6.1	99 % occupied bandwidth	NP
§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	NP
§2.1055(d)	4.3	Frequency stability, voltage variation	NP

LTE700 Lower (Band 17):

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	NP
§2.1049(h)	4.6.1	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

LTE1900 (Band 2):

Section in CFR 47	Section in RSS-GEN or RSS-133	Name of the test	Result
§2.1046(a)	6.4	Conducted RF output power	NP
§24.232(b)	6.4	Radiated RF output power	NP
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§24.238(a)	6.5	Band edge compliance	PASSED
§24.238(a), §2.1051	6.5	Spurious emissions at antenna terminals	NP
§24.238(a), §2.1053	6.5	Spurious radiated emissions	PASSED
§2.1055(a)	6.3	Frequency stability, temperature variation	NP
§2.1055(d)	6.3	Frequency stability, voltage variation	NP

LTE1700 (Band 4):

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	NP
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§27.53(h)	6.5	Band edge compliance	PASSED
§27.53(h), §2.1051	6.5	Spurious emissions at antenna terminals	NP
§27.53(h), §2.1053	6.5	Spurious radiated emissions	PASSED
§2.1055(a)	6.3	Frequency stability, temperature variation	NP
§2.1055(d)	6.3	Frequency stability, voltage variation	NP

LTE850 (Band 5):

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

LTE7:

Section in CFR 47	Section in RSS-GEN or RSS-199	Name of the test	Result
§2.1046(a)	4.4	Conducted RF output power	NP
§27.50(h)(2)	4.4	Radiated RF output power	NP
§2.1049(h)	4.2	99 % occupied bandwidth	NP
§27.53(l)	4.5(b)	Band edge compliance	NP
§27.53(h), §2.1051	4.5(b)	Spurious emissions at antenna terminals	NP
§27.53(l), §2.1053	4.5(b)	Spurious radiated emissions	PASSED
§27.54	4.3	Frequency stability, temperature variation	NP
§27.54	4.3"	Frequency stability, voltage variation	NP

PASSED
FAILED
NP

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

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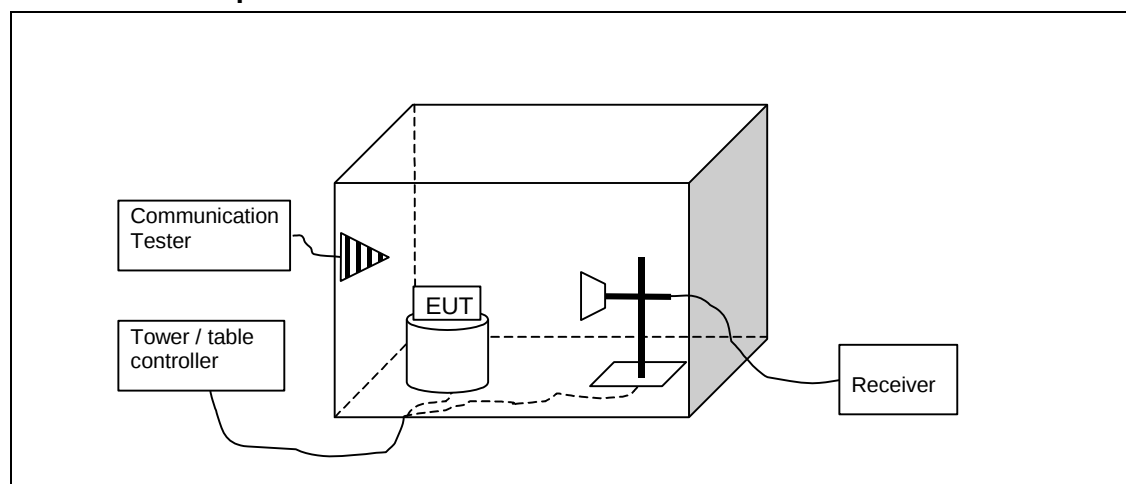
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2. Radiated RF output power

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

EUT with DUT number	RM-1039, DUT 43203
Accessories with DUT numbers	BV-T5A, DUT 43205
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	Ant1=swap antenna 1, Ant2= swap antenna 2
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	19 / 54 / 100.1
Date of measurements	30-Jul-2014
Measured by	Jan-Erik Lilja

2.1.1 Test setup



2.2. Test method and limit

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

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

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

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

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

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]
704 - 716	3 ERP	34.8
824 - 849	7 ERP	38.5
1710 - 1755	1 EIRP	30
1850 - 1910	2 EIRP	33

2.3. GSM 850 test results

RMS detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	P _{SUBST TX} [dBm]	P _{SUBST RX} [dBm]	G _{SUBST TX} ANT [dBd]	L _{SUBST CABLE} [dB]	Polarisation	Result
128 / 824.2	30.61	1.151	-1.2	10	-28.7	-3.49	3.4	HORIZONTAL	PASSED
190 / 836.6	29.88	0.973	-1.5	10	-28.51	-3.73	3.4	HORIZONTAL	PASSED
251 / 848.8	28.71	0.743	-1.77	10	-28.2	-4.32	3.4	HORIZONTAL	PASSED

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

RMS detector

Channel / f _c [MHz]	ERP [dBm]	ERP [W]	P _{MEAS} [dBm]	P _{SUBST TX} [dBm]	P _{SUBST RX} [dBm]	G _{SUBST TX} ANT [dBd]	L _{SUBST CABLE} [dB]	Polarisation	Result
128 / 824.2	25.34	0.342	-6.47	10	-28.7	-3.49	3.4	HORIZONTAL	PASSED
190 / 836.6	24.49	0.281	-6.89	10	-28.51	-3.73	3.4	HORIZONTAL	PASSED
251 / 848.8	22.86	0.193	-7.62	10	-28.2	-4.32	3.4	HORIZONTAL	PASSED

2.5. GSM 1900 test results

RMS detector

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	P _{SUBST TX} [dBm]	P _{SUBST RX} [dBm]	G _{SUBST TX} ANT [dBi]	L _{SUBST CABLE} [dB]	Polarisation	Result
512 / 1850.2	32.89	1.945	-9.74	10	-27.45	10.18	5	HORIZONTAL	PASSED
661 / 1880	32.56	1.803	-9.86	10	-27.33	10.19	5.1	HORIZONTAL	PASSED
810 / 1909.8	32.95	1.972	-9.55	10	-27.41	10.19	5.1	HORIZONTAL	PASSED

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

RMS detector

Channel / f _c [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	P _{SUBST TX} [dBm]	P _{SUBST RX} [dBm]	G _{SUBST TX} ANT [dBi]	L _{SUBST CABLE} [dB]	Polarisation	Result
512 / 1850.2	28.99	0.793	-13.64	10	-27.45	10.18	5	HORIZONTAL	PASSED
661 / 1880	29.13	0.818	-13.29	10	-27.33	10.19	5.1	HORIZONTAL	PASSED
810 / 1909.8	29.76	0.946	-12.74	10	-27.41	10.19	5.1	HORIZONTAL	PASSED

2.7. WCDMA 1900 test results, ant1

RMS detector

Channel / f _C [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	P _{SUBST TX} [dBm]	P _{SUBST RX} [dBm]	G _{SUBST TX} ANT [dBi]	L _{SUBST} CABLE [dB]	Polarisation	Result
9262 / 1852.4	25.55	0.359	-17.08	10	-27.45	10.18	5	HORIZONTAL	PASSED
9400 / 1880	24.9	0.309	-17.52	10	-27.33	10.19	5.1	HORIZONTAL	PASSED
9538 / 1907.6	24.93	0.311	-17.57	10	-27.41	10.19	5.1	HORIZONTAL	PASSED

2.8. WCDMA 1900 test results, ant2

RMS detector

Channel / f _C [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	P _{SUBST TX} [dBm]	P _{SUBST RX} [dBm]	G _{SUBST TX} ANT [dBi]	L _{SUBST} CABLE [dB]	Polarisation	Result
9262 / 1852.4	18.37	0.069	-24.26	10	-27.45	10.18	5	HORIZONTAL	PASSED
9400 / 1880	18.04	0.064	-24.38	10	-27.33	10.19	5.1	HORIZONTAL	PASSED
9538 / 1907.6	19.53	0.090	-22.97	10	-27.41	10.19	5.1	HORIZONTAL	PASSED

2.9. WCDMA 1700 test results, ant1

RMS detector

Channel / f _C [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	P _{SUBST TX} [dBm]	P _{SUBST RX} [dBm]	G _{SUBST TX} ANT [dBi]	L _{SUBST} CABLE [dB]	Polarisation	Result
1392 / 1712.4	26.26	0.423	-15.34	10	-26.41	9.99	4.8	HORIZONTAL	PASSED
1412 / 1732.4	25.22	0.333	-16.38	10	-26.46	10.04	4.9	HORIZONTAL	PASSED
1432 / 1752.6	25.36	0.344	-16.38	10	-26.6	10.04	4.9	HORIZONTAL	PASSED

2.10. WCDMA 1700 test results, ant2

RMS Detector

Channel / f _C [MHz]	EIRP [dBm]	EIRP [W]	P _{MEAS} [dBm]	P _{SUBST TX} [dBm]	P _{SUBST RX} [dBm]	G _{SUBST TX} ANT [dBi]	L _{SUBST} CABLE [dB]	Polarisation	Result
1392 / 1712.4	19.57	0.091	-22.03	10	-26.41	9.99	4.8	HORIZONTAL	PASSED
1412 / 1732.4	18.08	0.064	-23.52	10	-26.46	10.04	4.9	HORIZONTAL	PASSED
1432 / 1752.6	17.83	0.061	-23.91	10	-26.6	10.04	4.9	HORIZONTAL	PASSED

2.11. WCDMA 850 test results, ant1

RMS detector

Channel / f_c [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	$P_{SUBST\ TX}$ [dBm]	$P_{SUBST\ RX}$ [dBm]	$G_{SUBST\ TX\ ANT}$ [dBd]	$L_{SUBST\ CABLE}$ [dB]	Polarisation	Result
4132 / 826.4	15.97	0.040	-15.84	10	-28.7	-3.49	3.4	HORIZONTAL	PASSED
4183 / 836.6	15.63	0.037	-15.75	10	-28.51	-3.73	3.4	HORIZONTAL	PASSED
4233 / 846.6	14.07	0.026	-16.41	10	-28.2	-4.32	3.4	HORIZONTAL	PASSED

2.12. WCDMA 850 test results, ant2

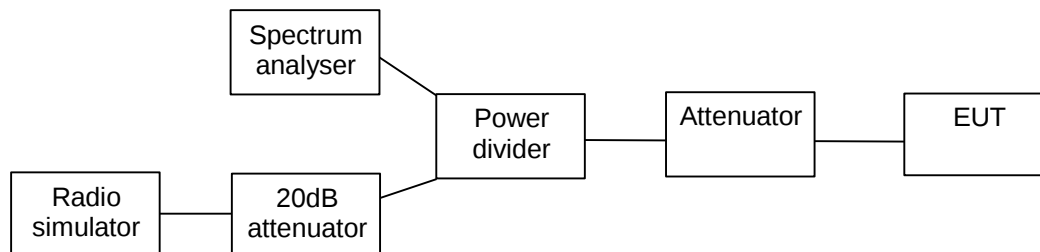
RMS detector

Channel / f_c [MHz]	ERP [dBm]	ERP [W]	P_{MEAS} [dBm]	$P_{SUBST\ TX}$ [dBm]	$P_{SUBST\ RX}$ [dBm]	$G_{SUBST\ TX\ ANT}$ [dBd]	$L_{SUBST\ CABLE}$ [dB]	Polarisation	Result
4132 / 826.4	20.89	0.123	-10.92	10	-28.7	-3.49	3.4	HORIZONTAL	PASSED
4183 / 836.6	20.13	0.103	-11.25	10	-28.51	-3.73	3.4	HORIZONTAL	PASSED
4233 / 846.6	19.35	0.086	-11.13	10	-28.2	-4.32	3.4	HORIZONTAL	PASSED

3. 99 % occupied bandwidth (FCC §2.1049(h), RSS-133 4.6.1, RSS-139 4.6.1, RSS-132 4.6.1, RSS-130 4.6.1)

EUT with DUT number	RM-1039, DUT 43204
Accessories with DUT numbers	BV-T5A, DUT 43205 ; AC-20E, DUT 43207 ; WH-208, DUT 43208
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 49 / 100
Date of measurements	30-Jul-2014
Measured by	Hannu Söderholm

3.1. Test Setup



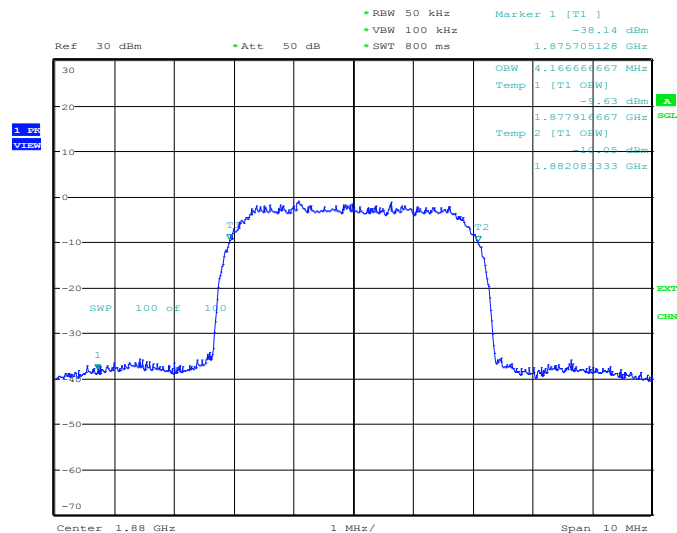
3.2. Test method and limit

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

3.3. WCDMA 1900 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD	4166.7

FDD, Channel 9400 / 1880.0 MHz

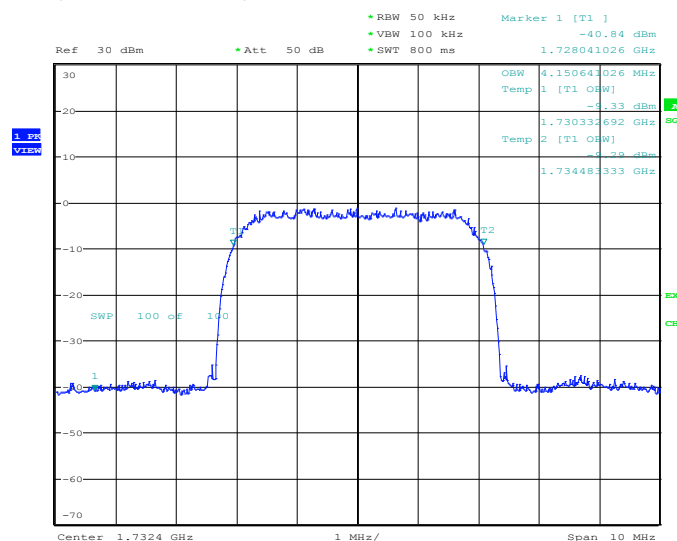


Date: 4.AUG.2014 12:16:34

3.4. WCDMA 1700 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD	4166.7

FDD, Channel 1412 / 1732.4 MHz

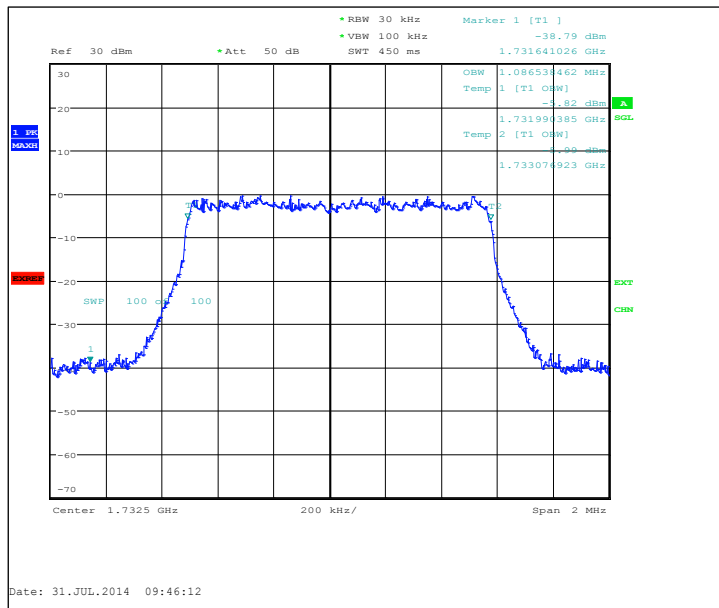


Date: 4.AUG.2014 12:06:59

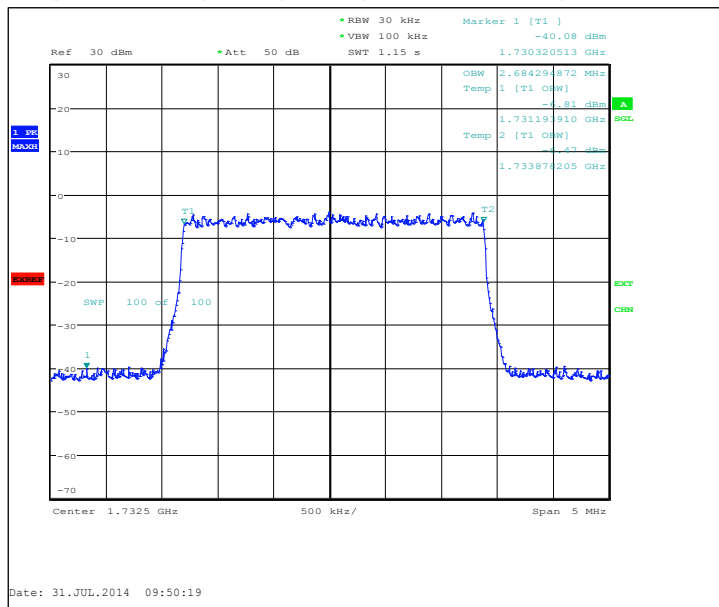
3.5. LTE1700 (Band 4) Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 1.4MHz, QPSK, 6 RB	1086.5
FDD, CBW 3MHz, QPSK, 15 RB	2684.3
FDD, CBW 5MHz, QPSK, 25 RB	4476
FDD, CBW 10MHz, QPSK, 50 RB	8966.4
FDD, CBW 15MHz, QPSK, 75 RB	13461.5
FDD, CBW 20MHz, QPSK, 100 RB	17868.5
FDD, CBW 1.4MHz, 16QAM, 6 RB	1092.9
FDD, CBW 3MHz, 16QAM, 15 RB	2684.3
FDD, CBW 5MHz, 16QAM, 25 RB	4476
FDD, CBW 10MHz, 16QAM, 50 RB	8918.2
FDD, CBW 15MHz, 16QAM, 75 RB	13429.4
FDD, CBW 20MHz, 16QAM, 100 RB	17868.5

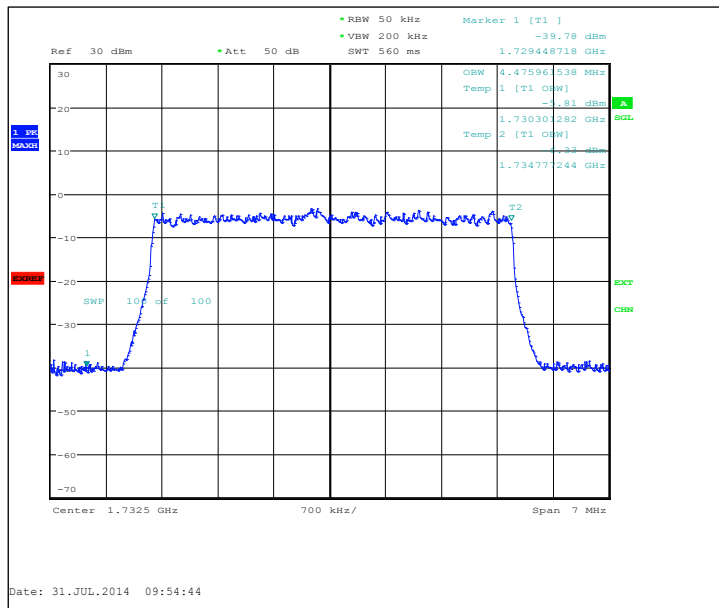
FDD, CBW 1.4MHz, QPSK, 6 RB, Channel 20175 / 1732.5 MHz, Antenna 1



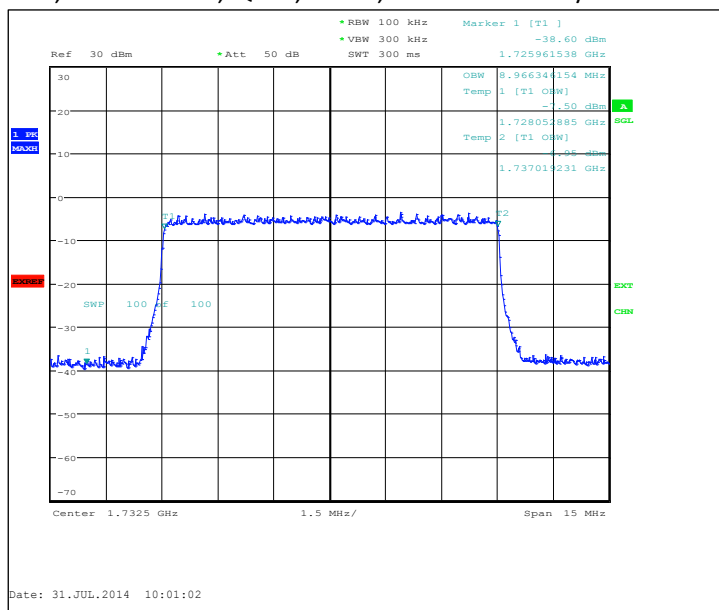
FDD, CBW 3MHz, QPSK, 15 RB, Channel 20175 / 1732.5 MHz, Antenna 1



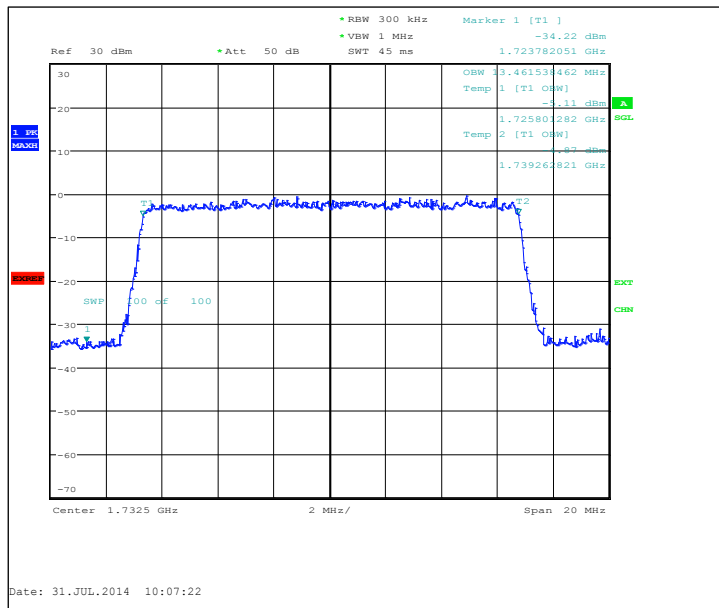
FDD, CBW 5MHz, QPSK, 25 RB, Channel 20175 / 1732.5 MHz, Antenna 1



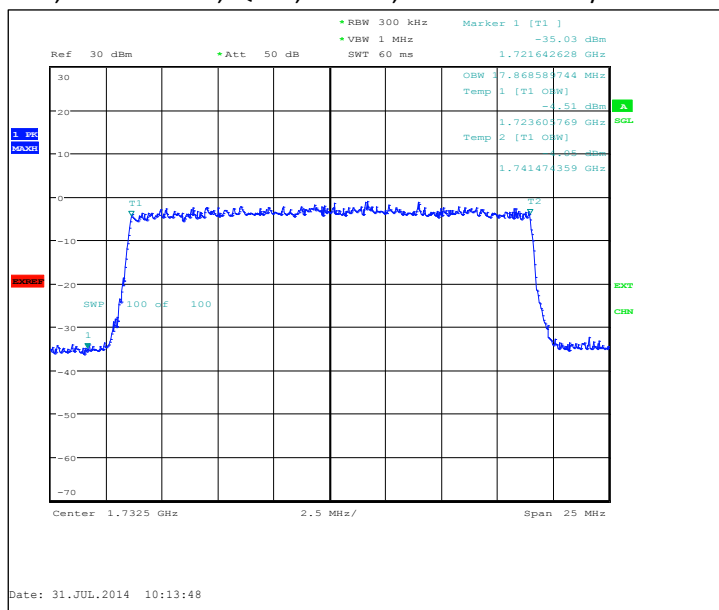
FDD, CBW 10MHz, QPSK, 50 RB, Channel 20175 / 1732.5 MHz, Antenna 1



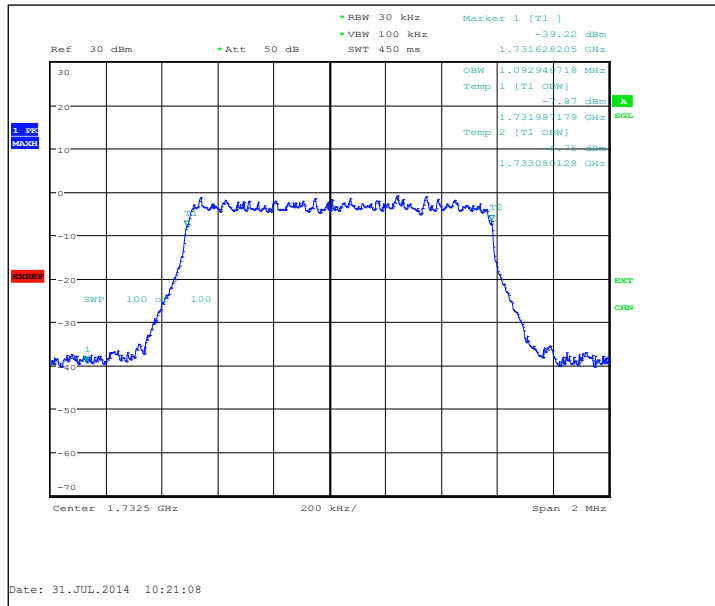
FDD, CBW 15MHz, QPSK, 75 RB, Channel 20175 / 1732.5 MHz, Antenna 1



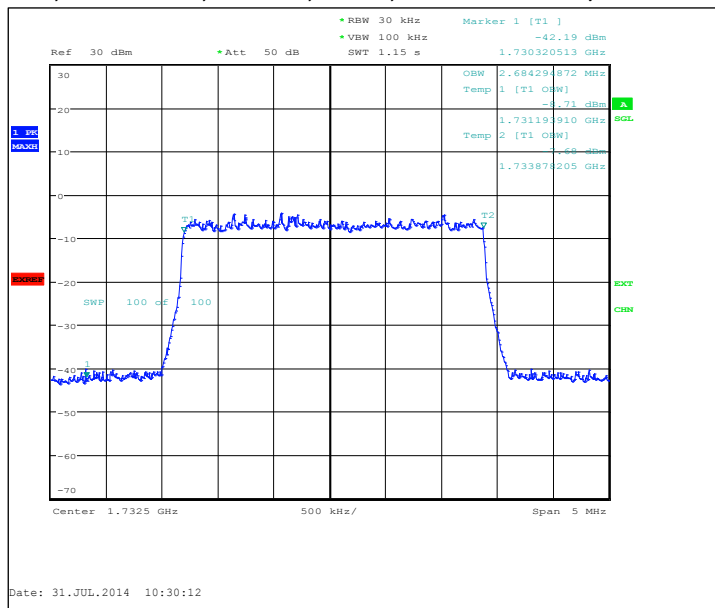
FDD, CBW 20MHz, QPSK, 100 RB, Channel 20175 / 1732.5 MHz, Antenna 1



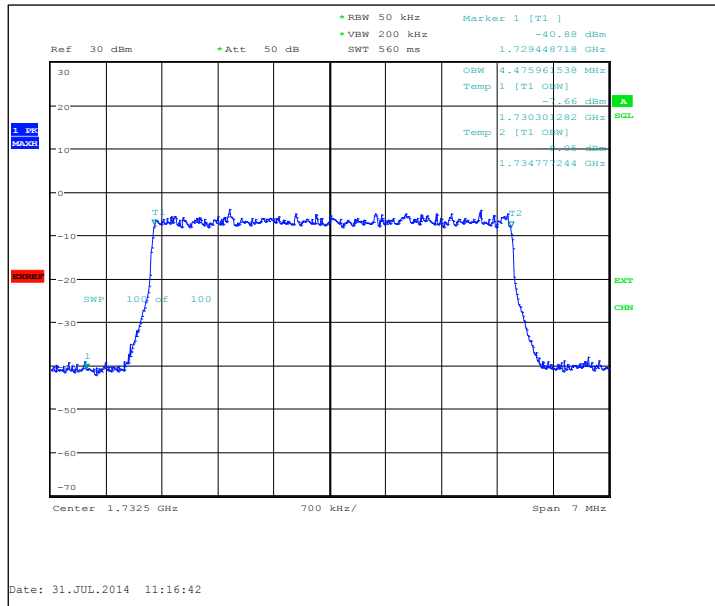
FDD, CBW 1.4MHz, 16QAM, 6 RB, Channel 20175 / 1732.5 MHz, Antenna 1



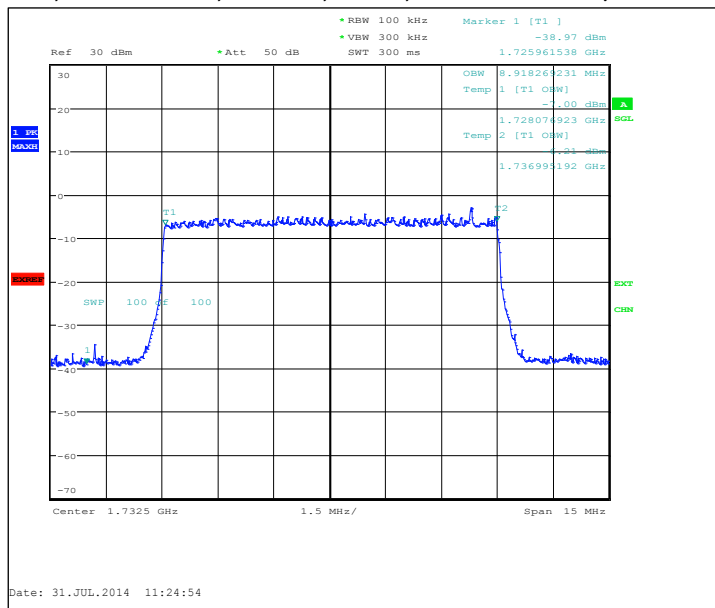
FDD, CBW 3MHz, 16QAM, 15 RB, Channel 20175 / 1732.5 MHz, Antenna 1



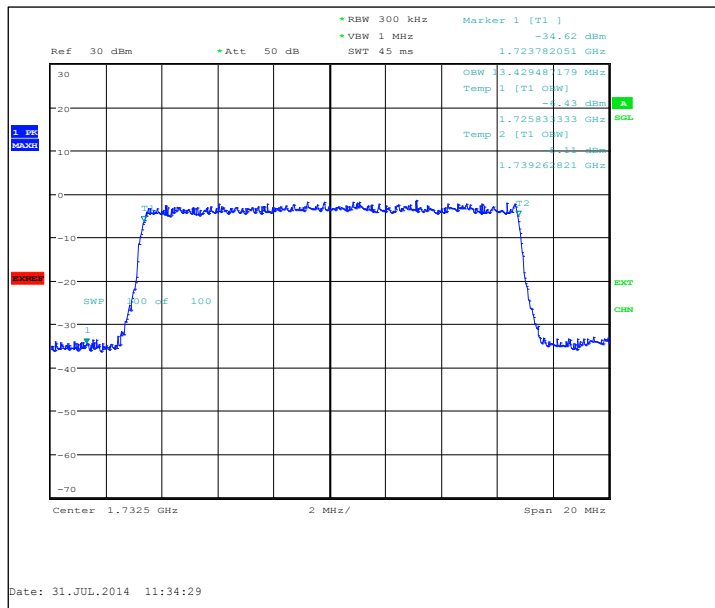
FDD, CBW 5MHz, 16QAM, 25 RB, Channel 20175 / 1732.5 MHz, Antenna 1



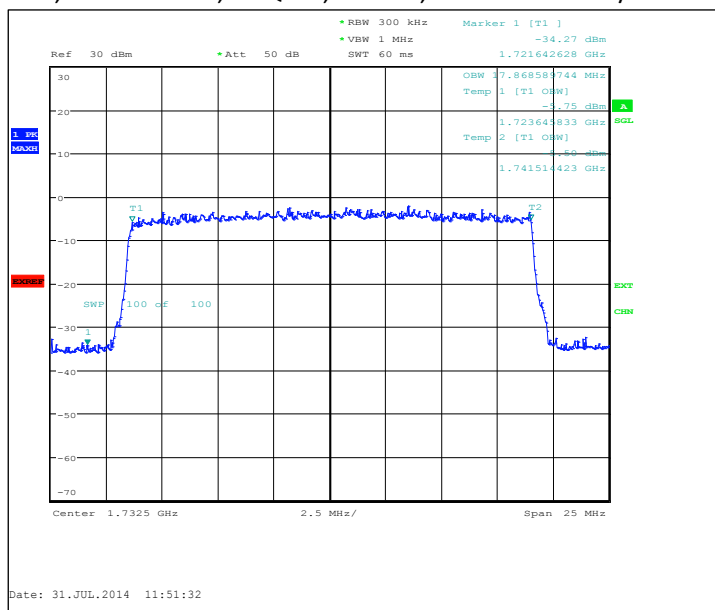
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 20175 / 1732.5 MHz, Antenna 1



FDD, CBW 15MHz, 16QAM, 75 RB, Channel 20175 / 1732.5 MHz, Antenna 1



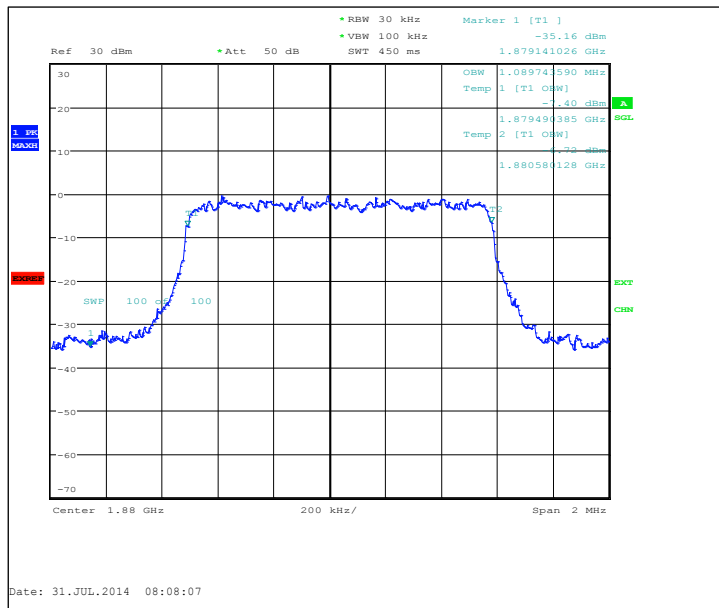
FDD, CBW 20MHz, 16QAM, 100 RB, Channel 20175 / 1732.5 MHz, Antenna 1



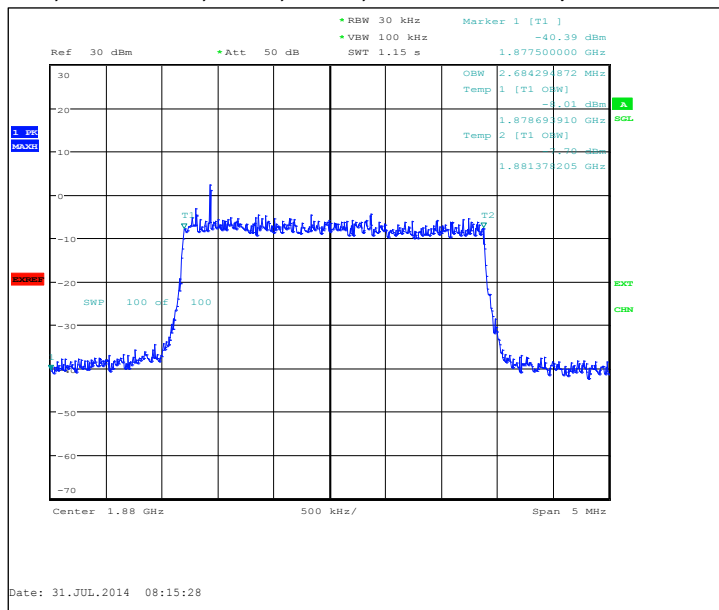
3.6. LTE1900 (Band 2) Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 1.4MHz, QPSK, 6 RB	1089.7
FDD, CBW 3MHz, QPSK, 15 RB	2684.3
FDD, CBW 5MHz, QPSK, 25 RB	4476
FDD, CBW 10MHz, QPSK, 50 RB	8966.3
FDD, CBW 15MHz, QPSK, 75 RB	13461.5
FDD, CBW 20MHz, QPSK, 100 RB	17908.7
FDD, CBW 1.4MHz, 16QAM, 6 RB	1089.7
FDD, CBW 3MHz, 16QAM, 15 RB	2684.3
FDD, CBW 5MHz, 16QAM, 25 RB	4476
FDD, CBW 10MHz, 16QAM, 50 RB	8942.3
FDD, CBW 15MHz, 16QAM, 75 RB	13461.5
FDD, CBW 20MHz, 16QAM, 100 RB	17894.7

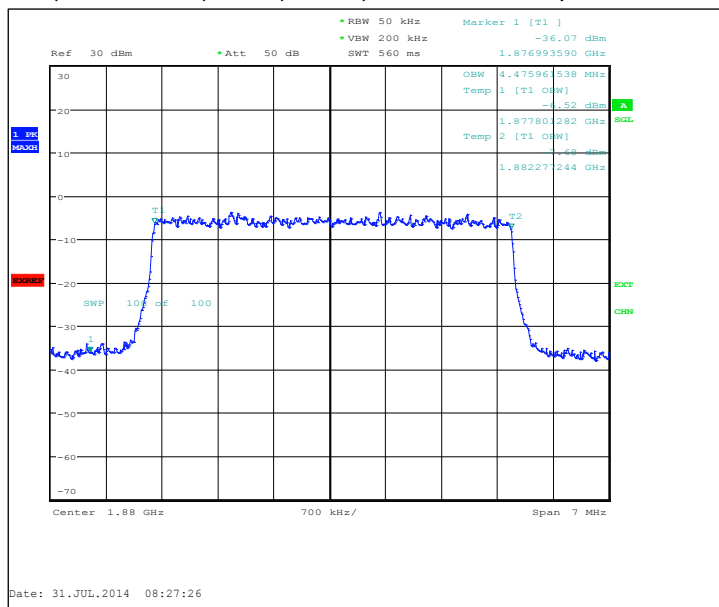
FDD, CBW 1.4MHz, QPSK, 6 RB, Channel 18900 / 1880.0 MHz, Antenna 1



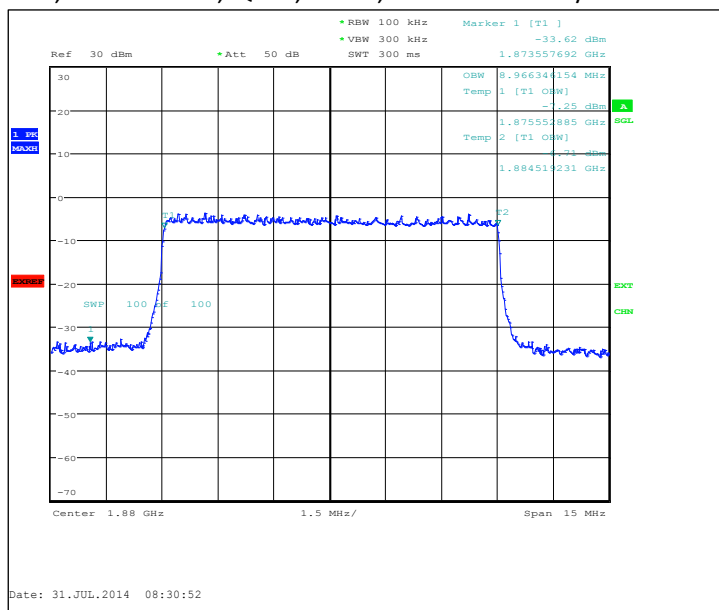
FDD, CBW 3MHz, QPSK, 15 RB, Channel 18900 / 1880.0 MHz, Antenna 1



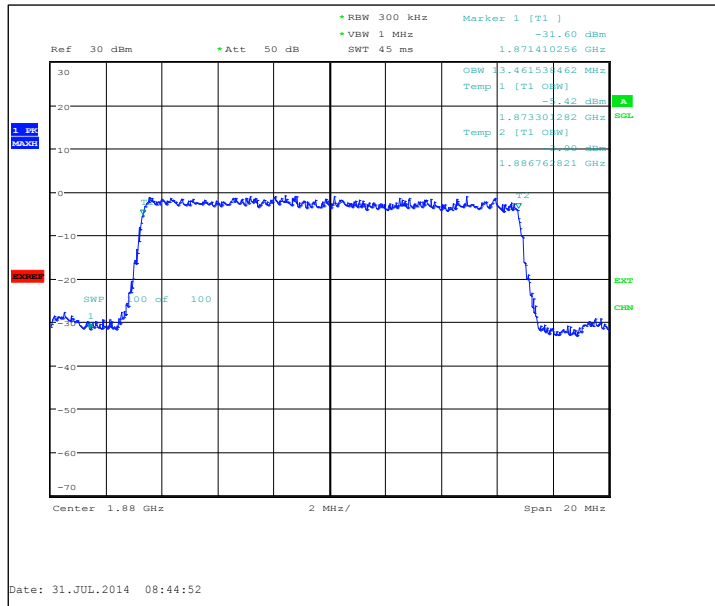
FDD, CBW 5MHz, QPSK, 25 RB, Channel 18900 / 1880.0 MHz, Antenna 1



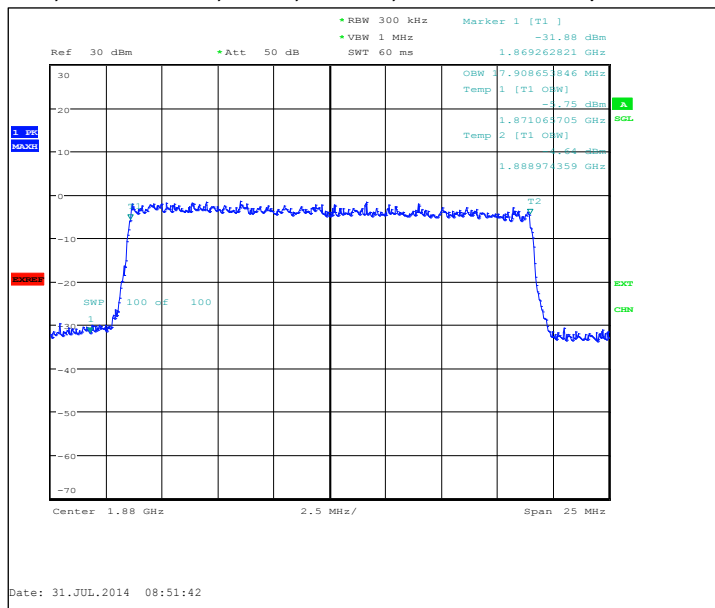
FDD, CBW 10MHz, QPSK, 50 RB, Channel 18900 / 1880.0 MHz, Antenna 1



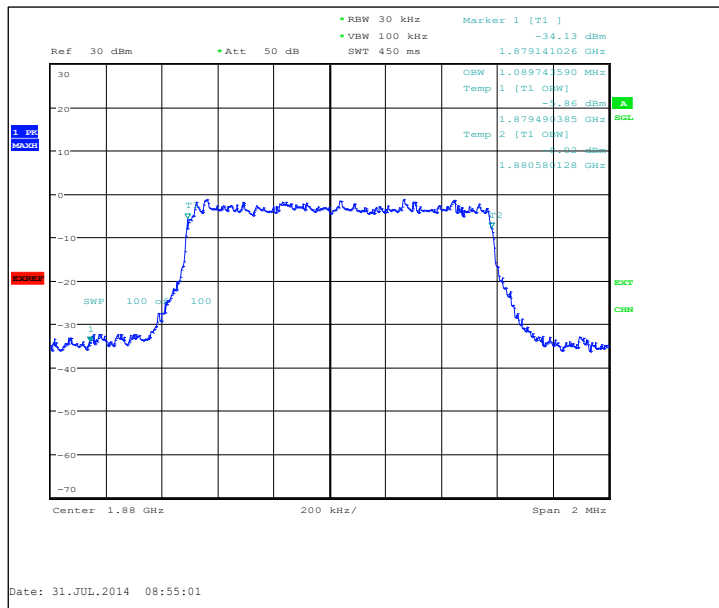
FDD, CBW 15MHz, QPSK, 75 RB, Channel 18900 / 1880.0 MHz, Antenna 1



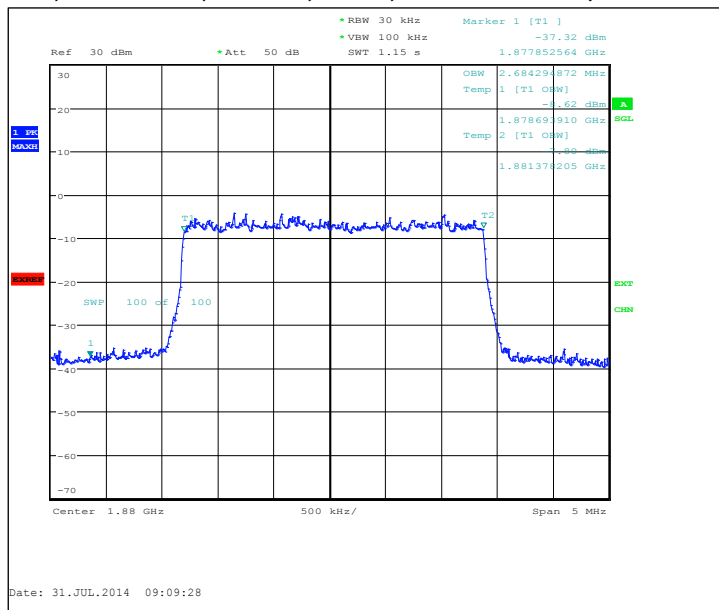
FDD, CBW 20MHz, QPSK, 100 RB, Channel 18900 / 1880.0 MHz, Antenna 1



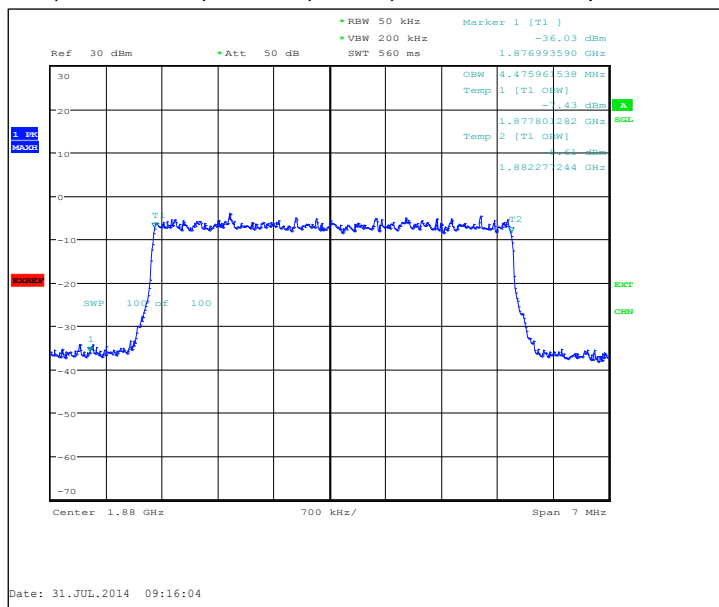
FDD, CBW 1.4MHz, 16QAM, 6 RB, Channel 18900 / 1880.0 MHz, Antenna 1



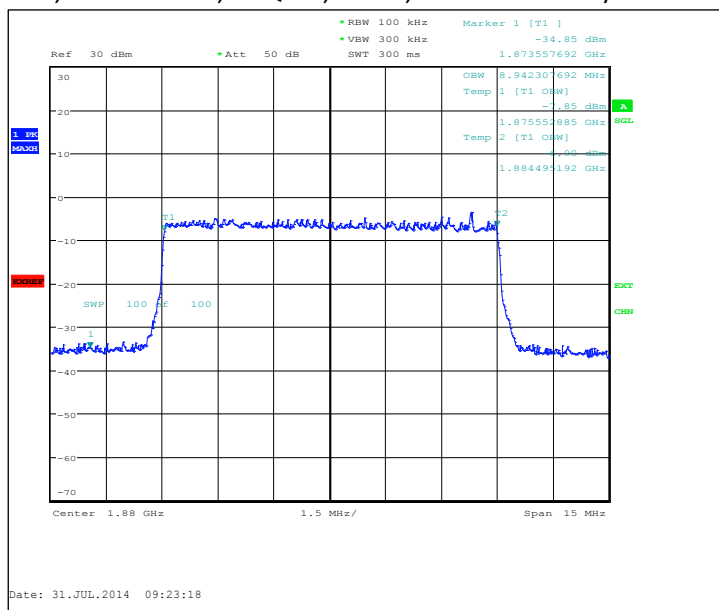
FDD, CBW 3MHz, 16QAM, 15 RB, Channel 18900 / 1880.0 MHz, Antenna 1



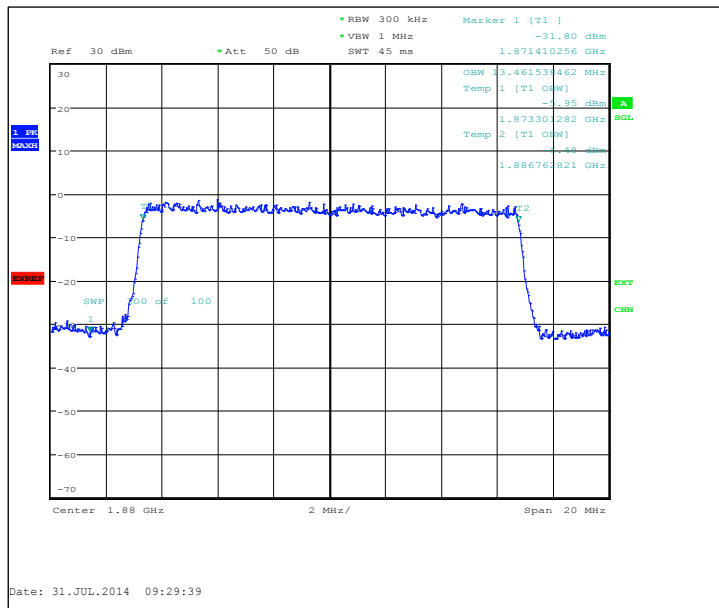
FDD, CBW 5MHz, 16QAM, 25 RB, Channel 18900 / 1880.0 MHz, Antenna 1



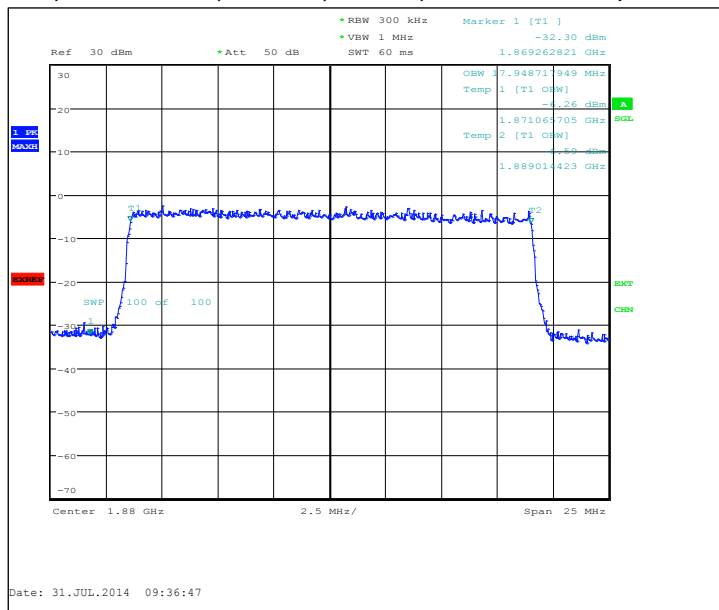
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 18900 / 1880.0 MHz, Antenna 1



FDD, CBW 15MHz, 16QAM, 75 RB, Channel 18900 / 1880.0 MHz, Antenna 1



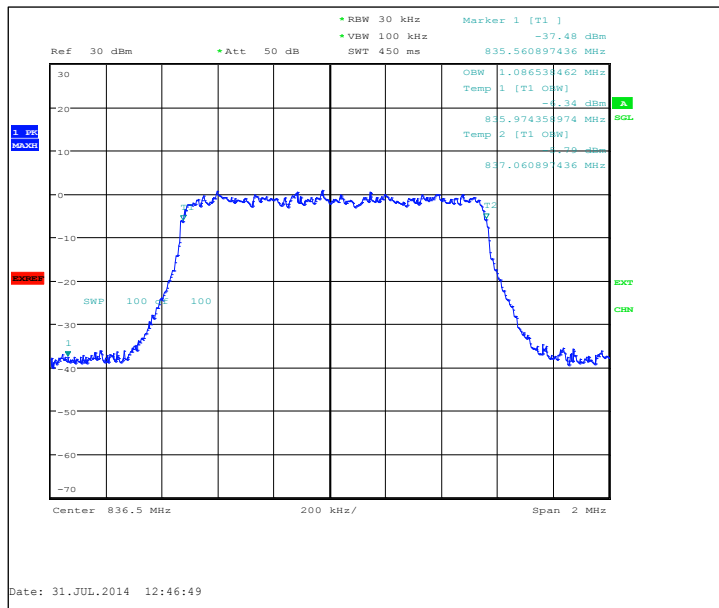
FDD, CBW 20MHz, 16QAM, 100 RB, Channel 18900 / 1880.0 MHz, Antenna 1



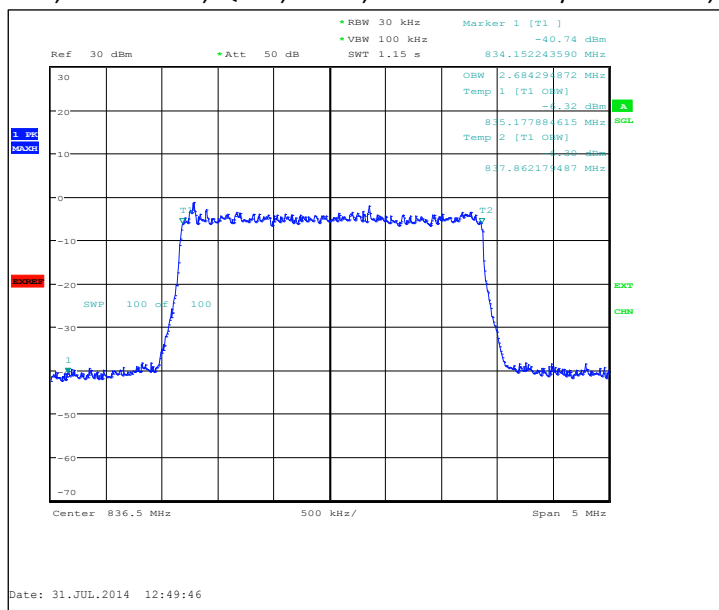
3.7. LTE850 (Band 5) Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 1.4MHz, QPSK, 6 RB	1086.5
FDD, CBW 3MHz, QPSK, 15 RB	2684.3
FDD, CBW 5MHz, QPSK, 25 RB	4476
FDD, CBW 10MHz, QPSK, 50 RB	8942.3
FDD, CBW 1.4MHz, 16QAM, 6 RB	1089.7
FDD, CBW 3MHz, 16QAM, 15 RB	2684.3
FDD, CBW 5MHz, 16QAM, 25 RB	4476
FDD, CBW 10MHz, 16QAM, 50 RB	8942.3

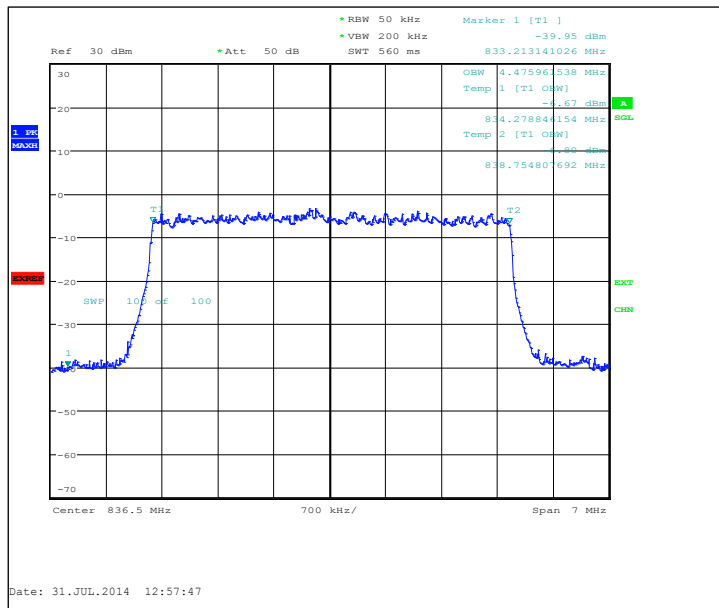
FDD, CBW 1.4MHz, QPSK, 6 RB, Channel 20525 / 836.5 MHz, Antenna 1



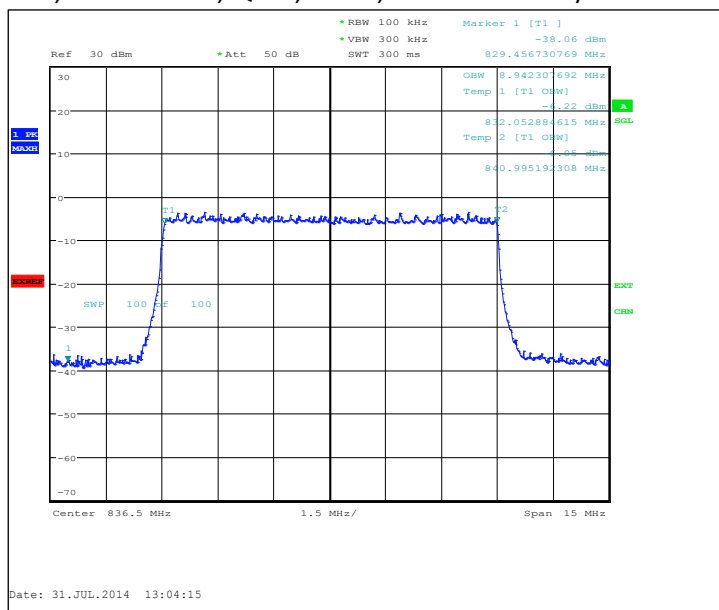
FDD, CBW 3MHz, QPSK, 15 RB, Channel 20525 / 836.5 MHz, Antenna 1



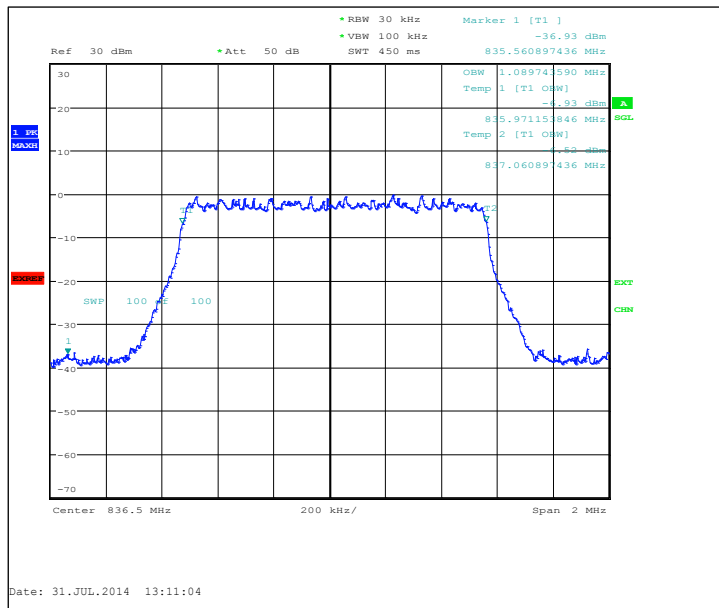
FDD, CBW 5MHz, QPSK, 25 RB, Channel 20525 / 836.5 MHz, Antenna 1



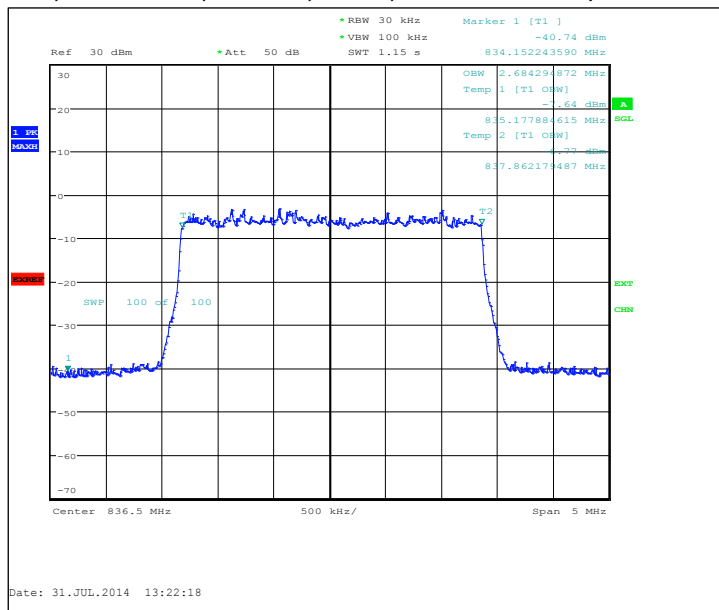
FDD, CBW 10MHz, QPSK, 50 RB, Channel 20525 / 836.5 MHz, Antenna 1



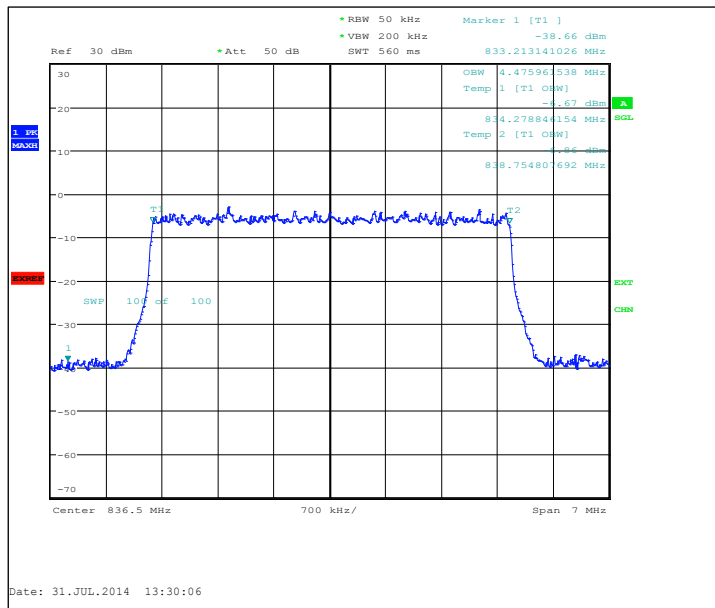
FDD, CBW 1.4MHz, 16QAM, 6 RB, Channel 20525 / 836.5 MHz, Antenna 1



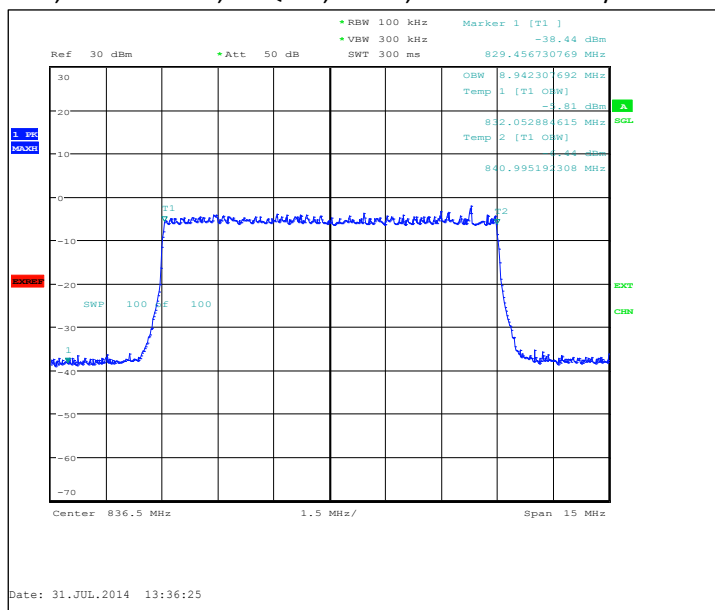
FDD, CBW 3MHz, 16QAM, 15 RB, Channel 20525 / 836.5 MHz, Antenna 1



FDD, CBW 5MHz, 16QAM, 25 RB, Channel 20525 / 836.5 MHz, Antenna 1



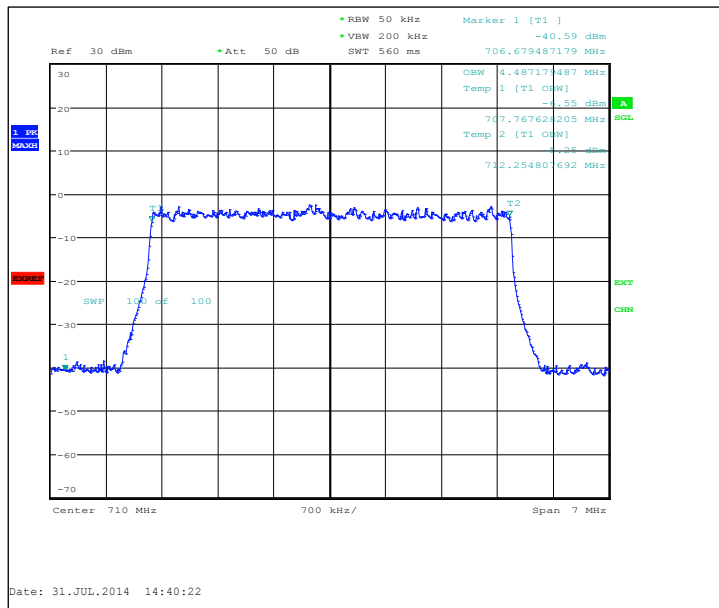
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 20525 / 836.5 MHz, Antenna 1



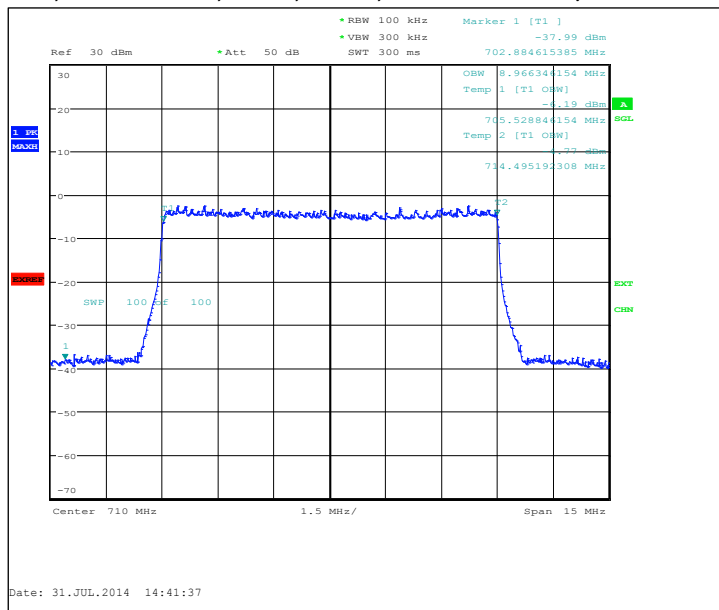
3.8. LTE700 Lower (Band 17) Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 5MHz, QPSK, 25 RB	4487.2
FDD, CBW 10MHz, QPSK, 50 RB	8966.3
FDD, CBW 5MHz, 16QAM, 25 RB	4476
FDD, CBW 10MHz, 16QAM, 50 RB	8942.3

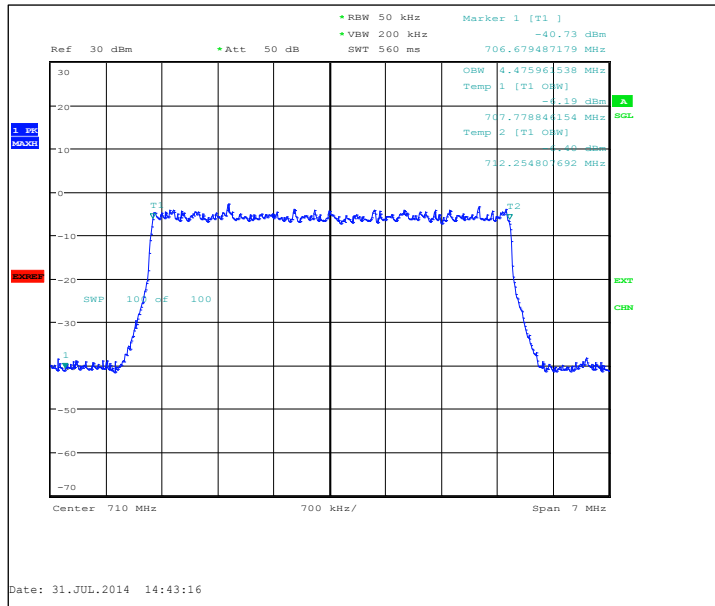
FDD, CBW 5MHz, QPSK, 25 RB, Channel 23790 / 710.0 MHz, Antenna 1



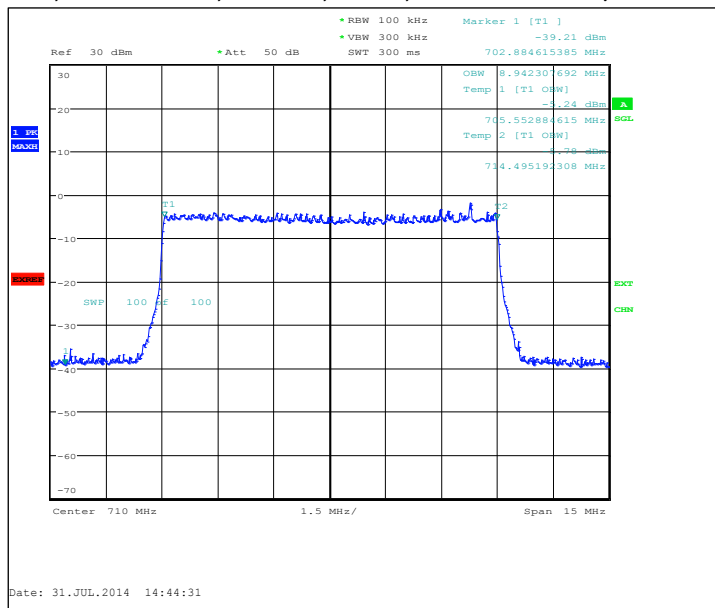
FDD, CBW 10MHz, QPSK, 50 RB, Channel 23790 / 710.0 MHz, Antenna 1



FDD, CBW 5MHz, 16QAM, 25 RB, Channel 23790 / 710.0 MHz, Antenna 1



FDD, CBW 10MHz, 16QAM, 50 RB, Channel 23790 / 710.0 MHz, Antenna 1

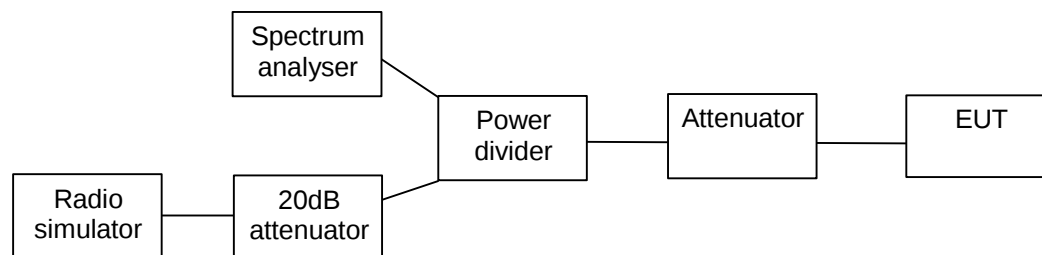


4. Band edge compliance

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

EUT with DUT number	RM-1039, DUT 43204
Accessories with DUT numbers	BV-T5A, DUT 43205 ; AC-20E, DUT 43207 ; WH-208, DUT 43208
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 49 / 100
Date of measurements	30-Jul-2014
Measured by	Hannu Söderholm

4.1. Test Setup



4.2. Test method and limit

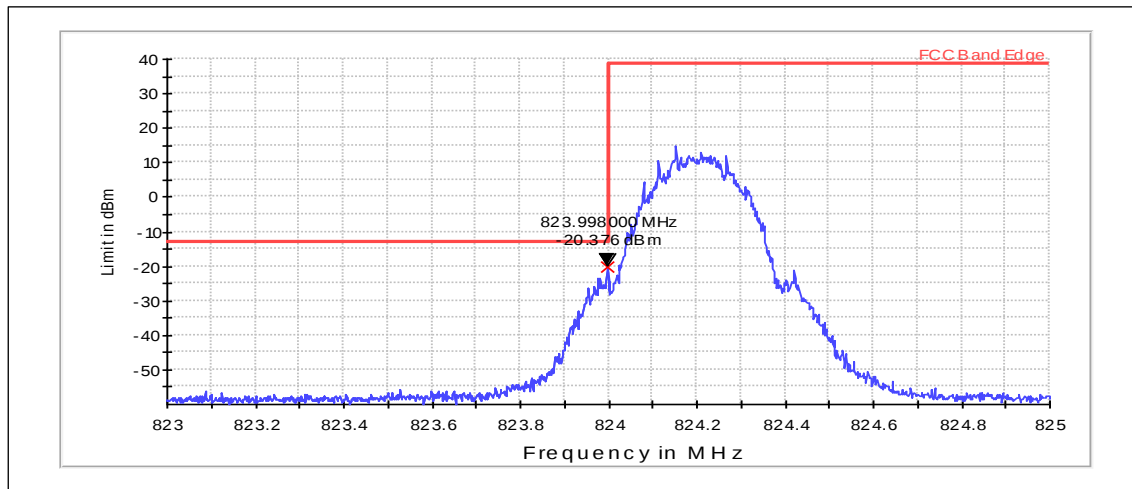
The measurement is made according to applicable FCC rule parts and IC standards.

Limits for band edge compliance measurements

Operation band	Frequency range [MHz]	Limit [dBm]
GSM 850	Below 824 and above 849	-13
GSM 1900	Below 1850 and above 1910	-13
WCDMA 1900	Below 1850 and above 1910	-13
WCDMA 1700	Below 1710 and above 1755	-13
WCDMA 850	Below 824 and above 849	-13
LTE1900 (Band 2)	Below 1850 and above 1910	-13
LTE1700 (Band 4)	Below 1710 and above 1755	-13
LTE850 (Band 5)	Below 824 and above 849	-13
LTE7	Below 2494.5 2494.5 - 2499 2499 - 2500 2570 - 2571 2571 - 2575.5 Above 2575.5	-25 (RBW = 1 MHz, EIRP) -13 (RBW = 1 MHz, EIRP) -13 (RBW = 200 kHz, EIRP) -13 (RBW = 200 kHz, EIRP) -13 (RBW = 1 MHz, EIRP) -25 (RBW = 1 MHz, EIRP)
LTE700 Lower (Band 17)	703.9 - 704 and 716 - 716.1 Below 703.9 and above 716.1	-13 (RBW = 30 kHz, ERP) -13 (RBW = 30 kHz, ERP)

4.3. GSM 850 Test results

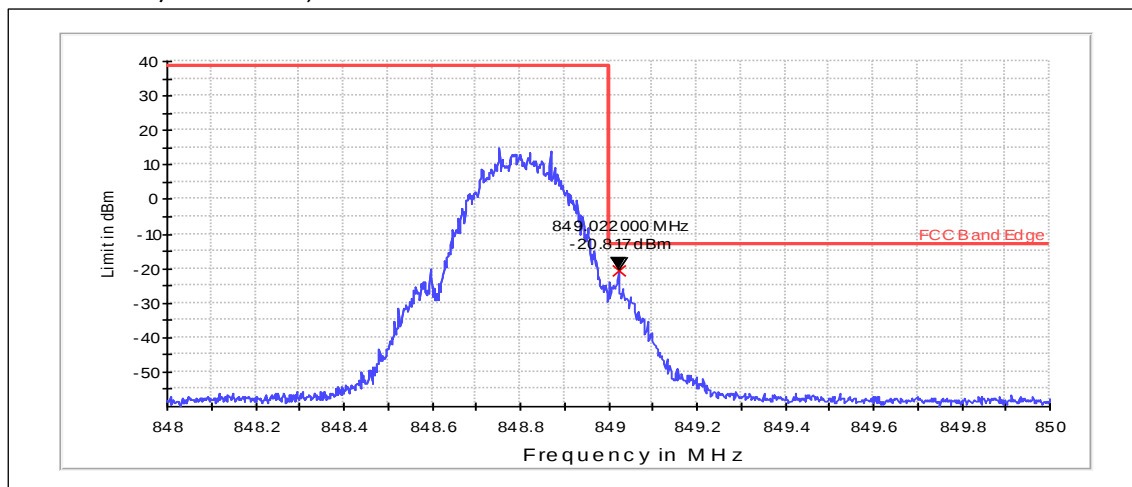
Channel 128 / 824.2 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	823.998	-20.38	PASSED

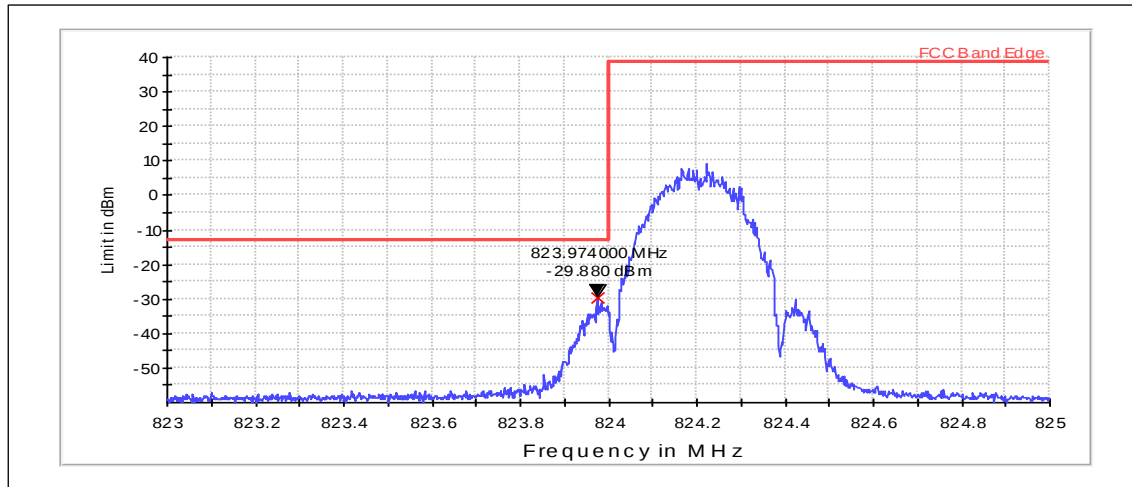
Channel 251 / 848.8 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	849.022	-20.82	PASSED

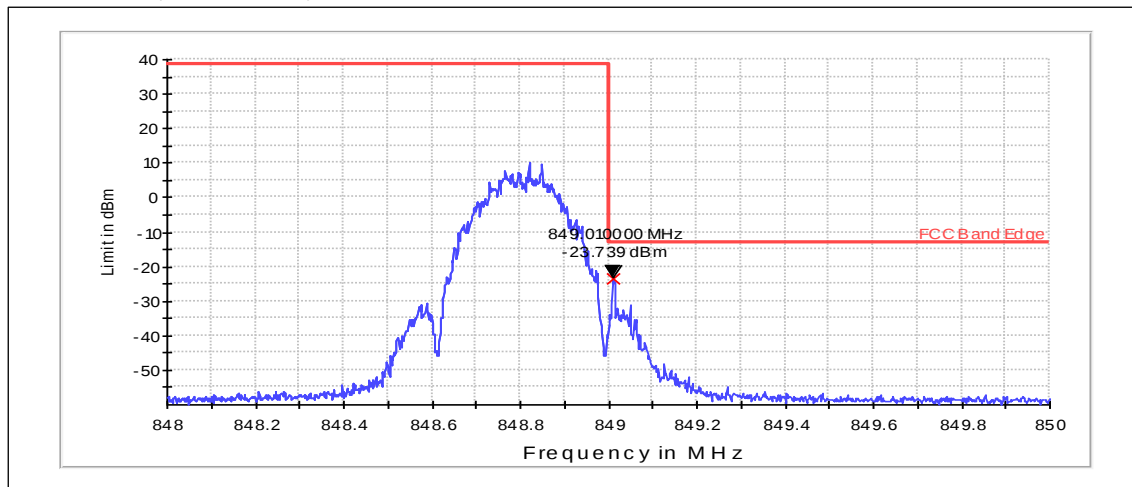
Channel 128 / 824.2 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	823.974	-29.88	PASSED

Channel 251 / 848.8 MHz, Antenna 1

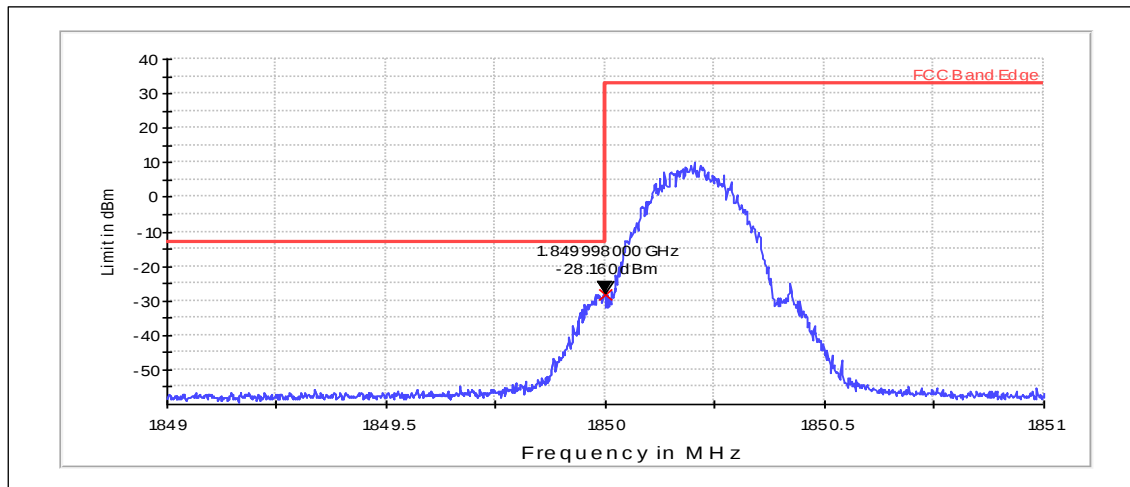


RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	849.010	-23.74	PASSED

4.4. GSM 1900 Test results

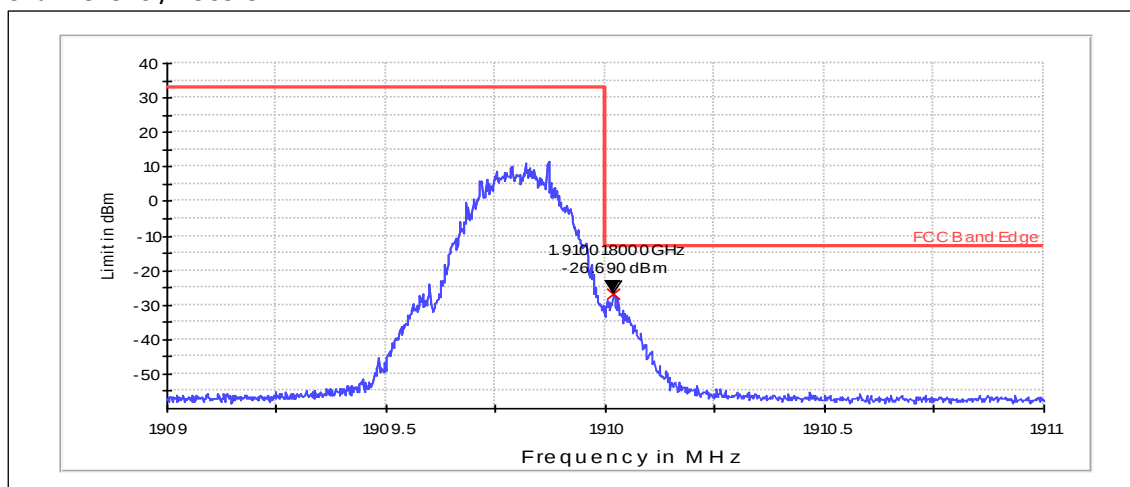
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	1849.998	-28.16	PASSED

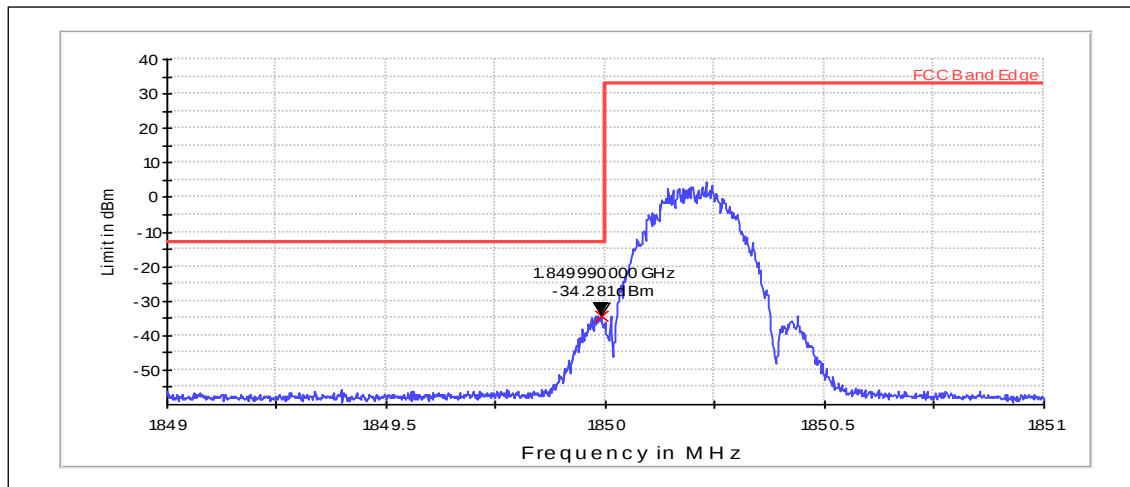
Channel 810 / 1909.8 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	1910.018	-26.69	PASSED

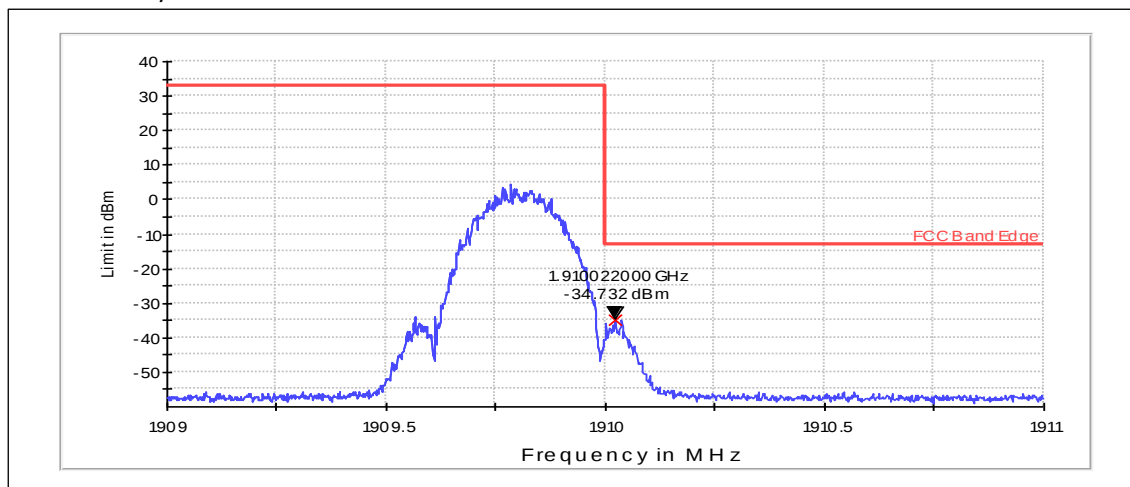
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	1849.990	-34.28	PASSED

Channel 810 / 1909.8 MHz

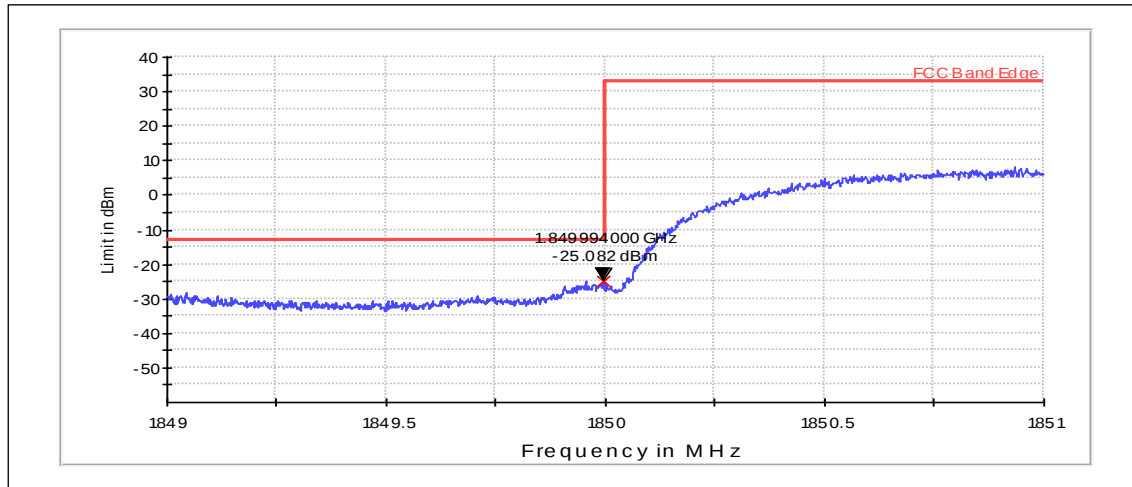


RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	1910.022	-34.73	PASSED

4.5. WCDMA 1900 Test results

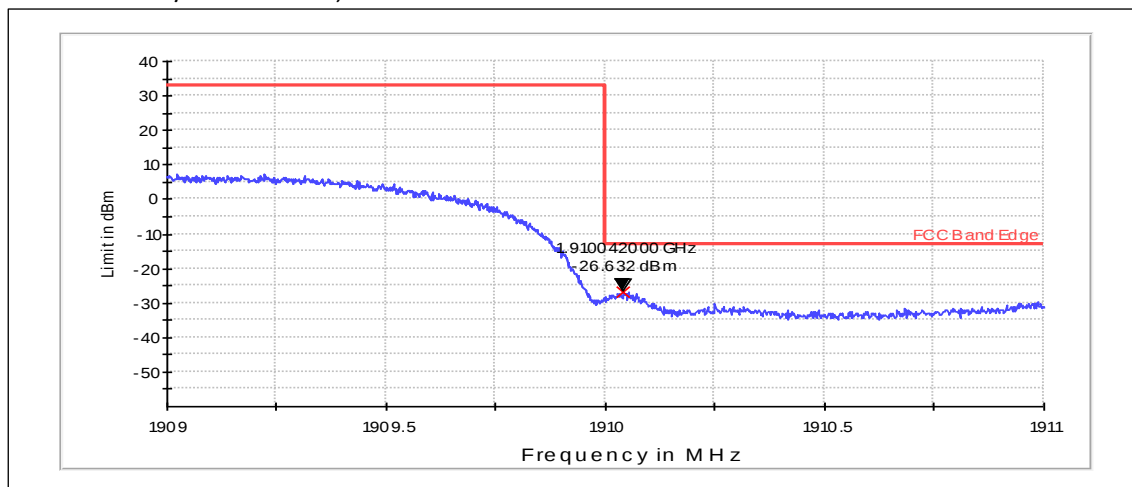
Channel 9262 / 1852.4 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1849.994	-25.08	PASSED

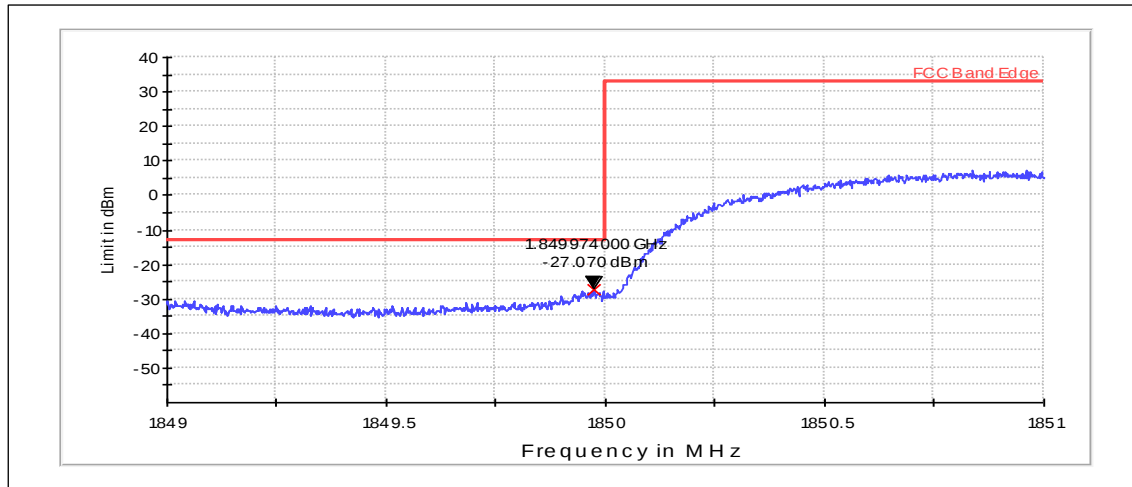
Channel 9538 / 1907.6 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1910.042	-26.63	PASSED

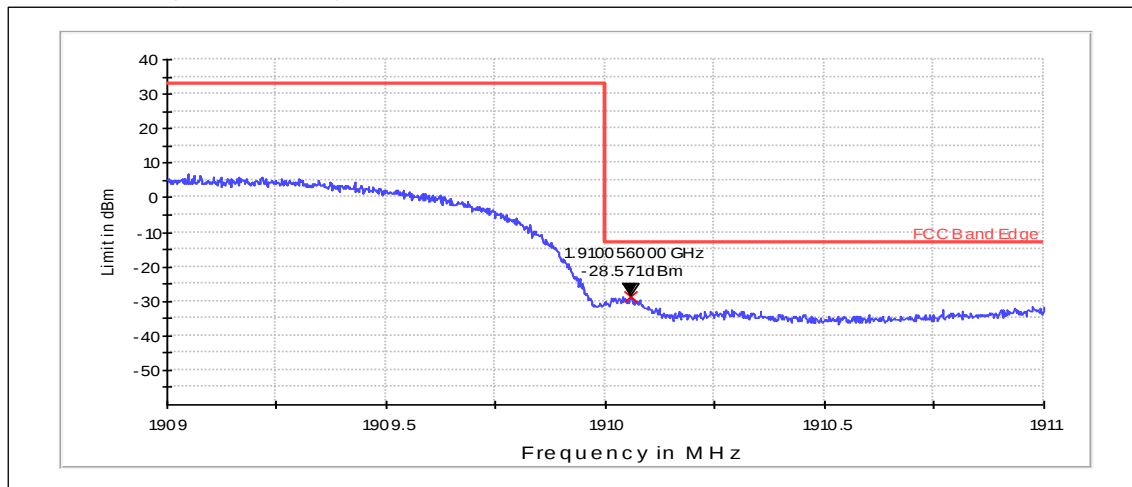
Channel 9262 / 1852.4 MHz, Antenna 2



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1849.974	-27.07	PASSED

Channel 9538 / 1907.6 MHz, Antenna 2

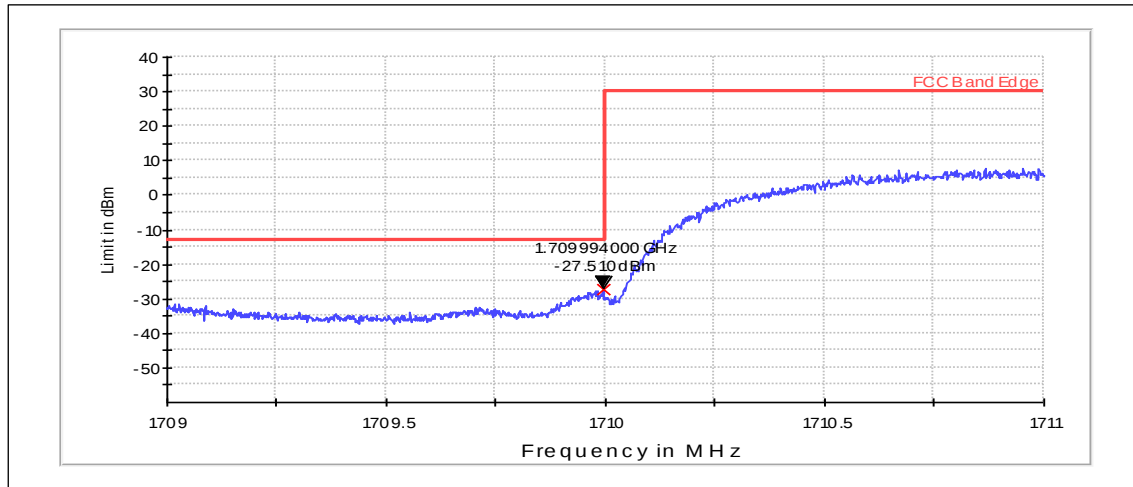


RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1910.056	-28.57	PASSED

4.6. WCDMA 1700 Test results

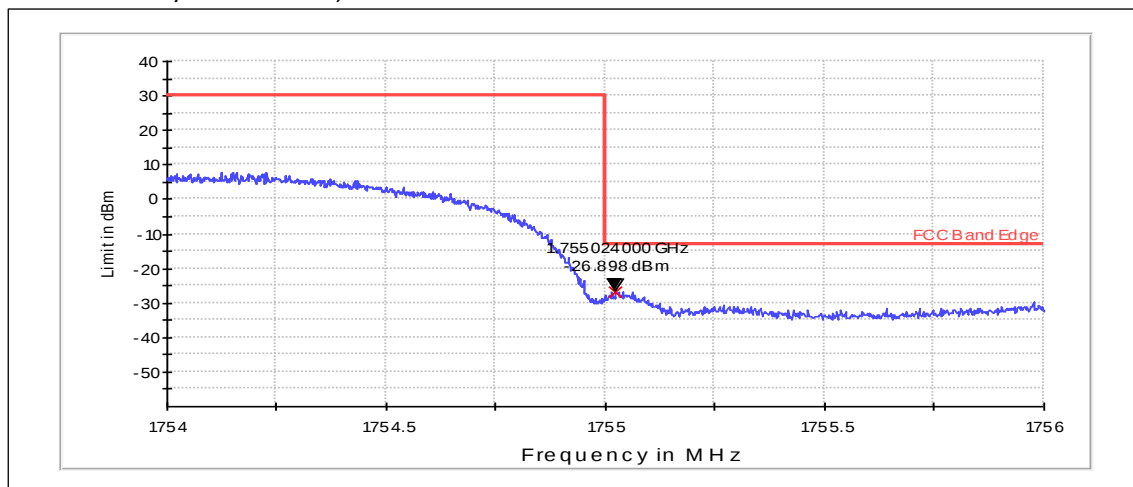
Channel 1312 / 1712.4 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1709.994	-27.51	PASSED

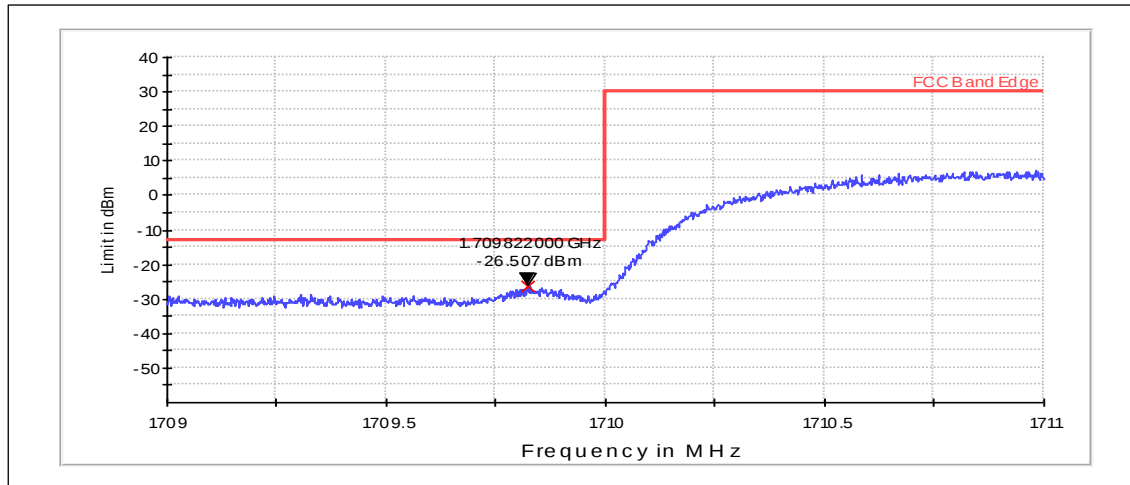
Channel 1513 / 1752.6 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1755.024	-26.90	PASSED

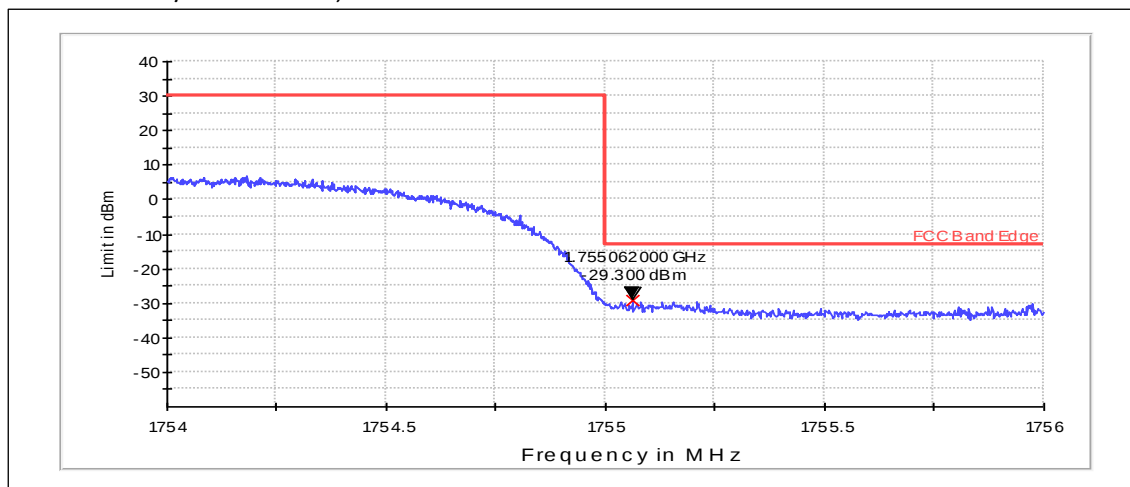
Channel 1312 / 1712.4 MHz, Antenna 2



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1709.822	-26.51	PASSED

Channel 1513 / 1752.6 MHz, Antenna 2

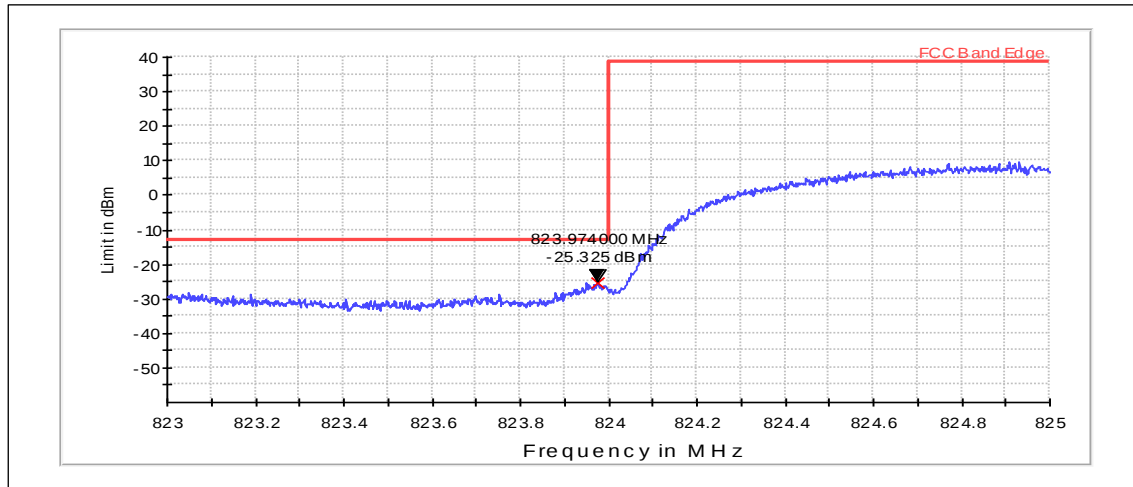


RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1755.062	-29.30	PASSED

4.7. WCDMA 850 Test results

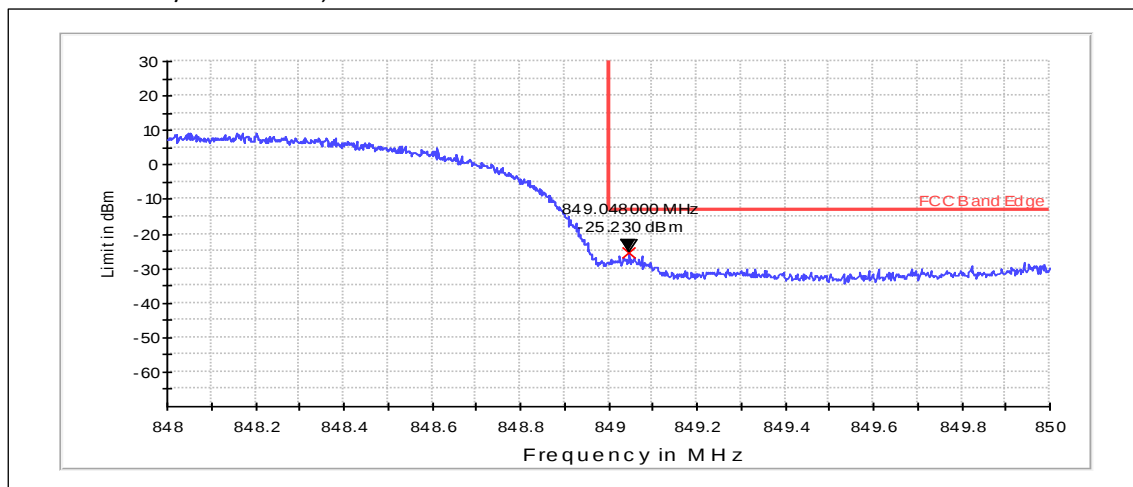
Channel 4132 / 826.4 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	823.974	-25.33	PASSED

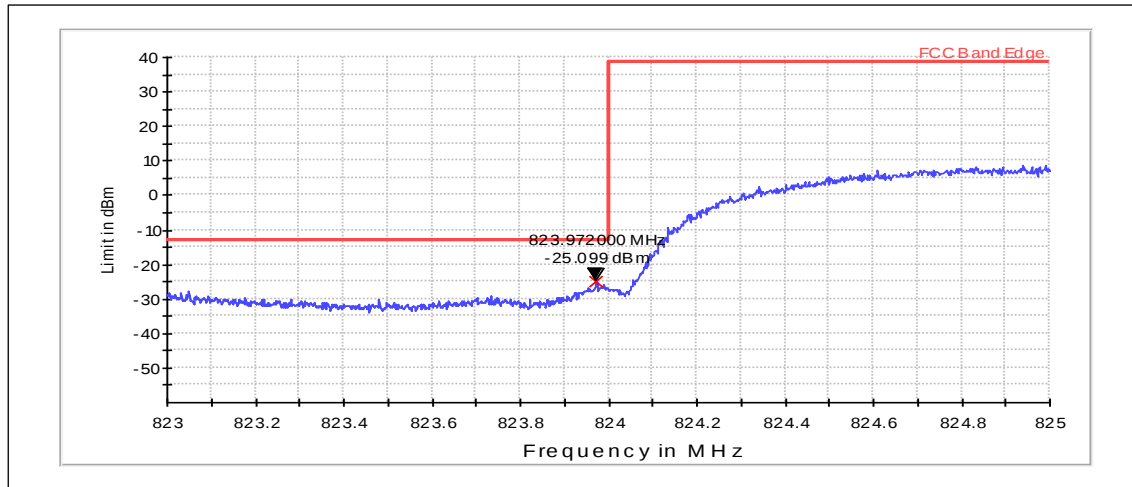
Channel 4233 / 846.6 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	849.048	-25.23	PASSED

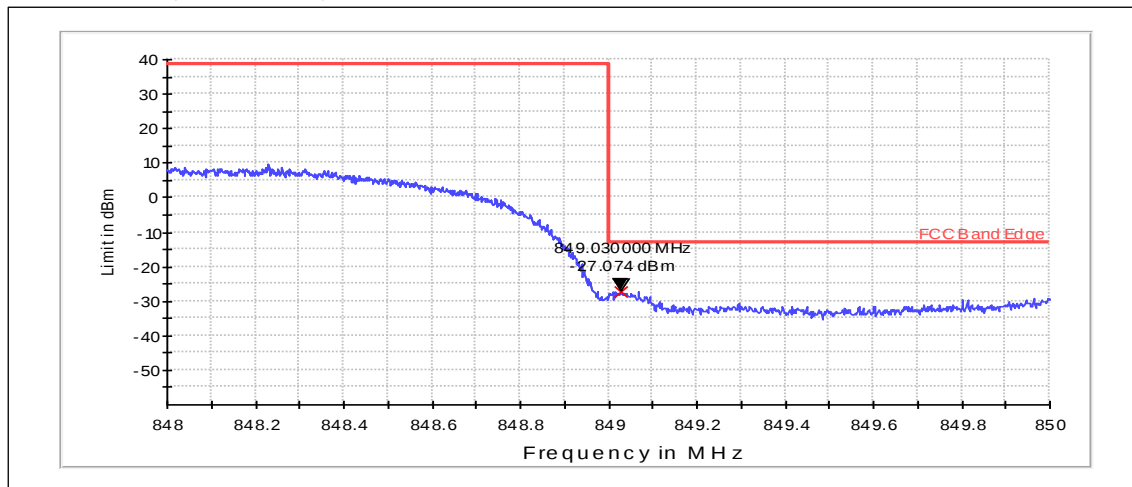
Channel 4132 / 826.4 MHz, Antenna 2



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	823.972	-25.10	PASSED

Channel 4233 / 846.6 MHz, Antenna 2

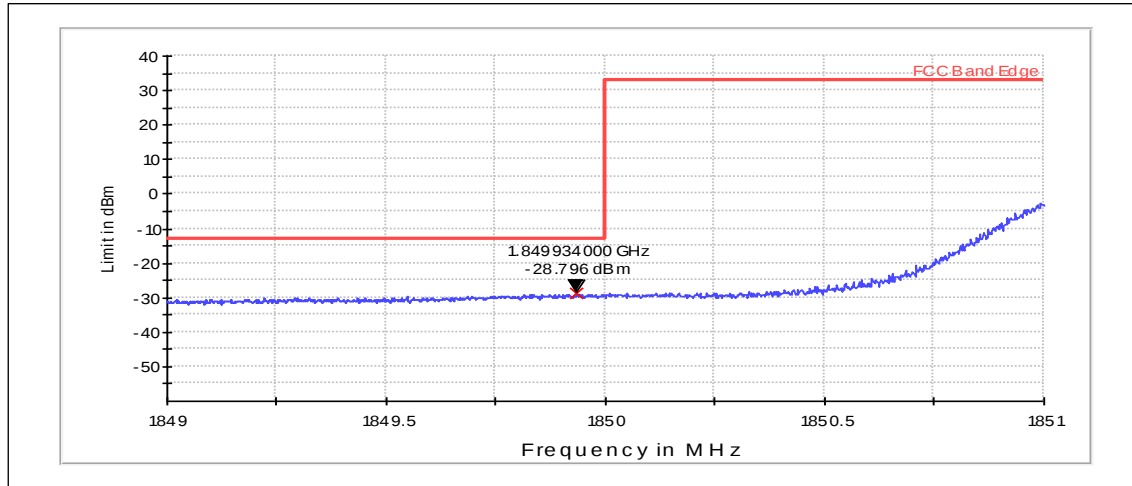


RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	849.030	-27.07	PASSED

4.8. LTE1900 (Band 2) Test results

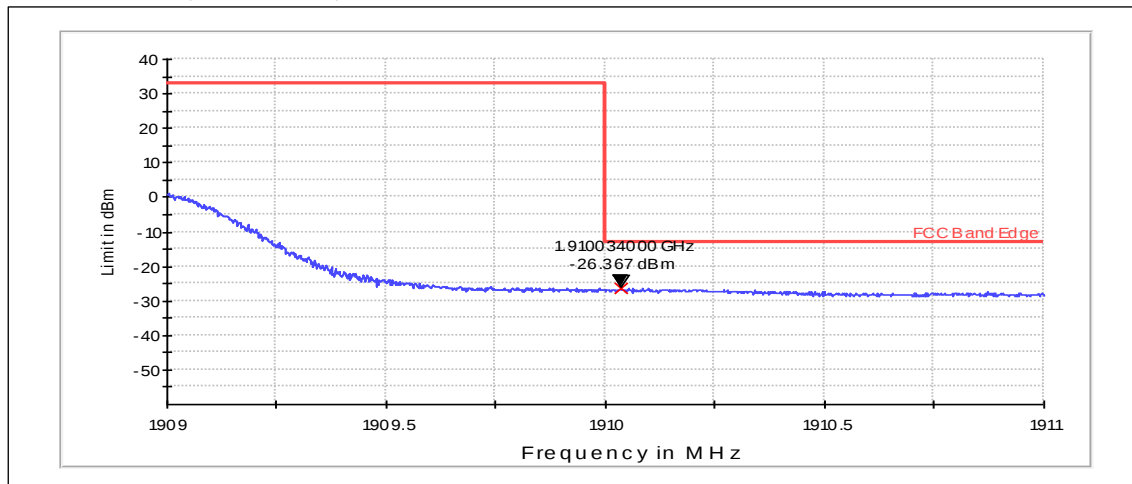
Channel 18700 / 1860 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1849.934	-28.80	PASSED

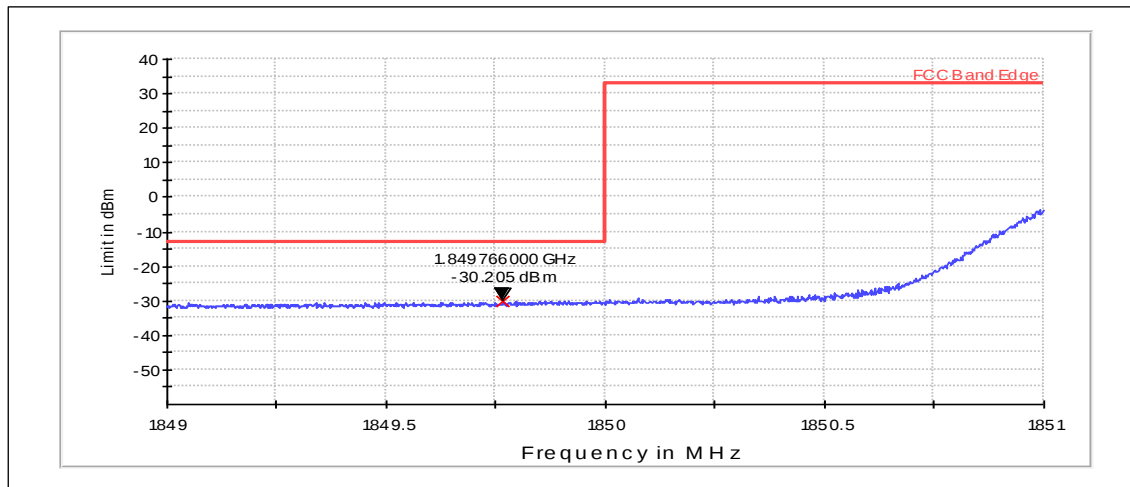
Channel 19100 / 1900 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1910.034	-26.37	PASSED

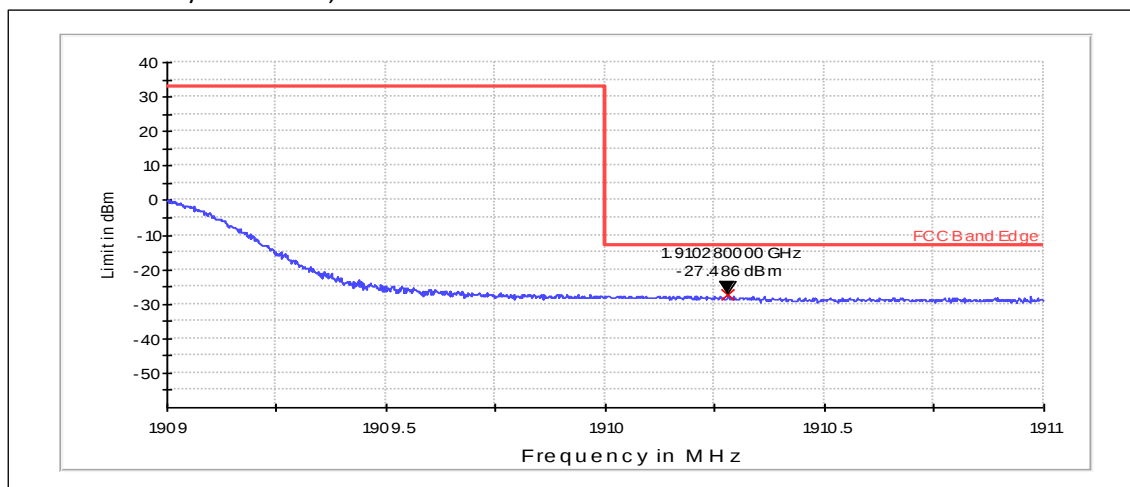
Channel 18700 / 1860 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1849.766	-30.21	PASSED

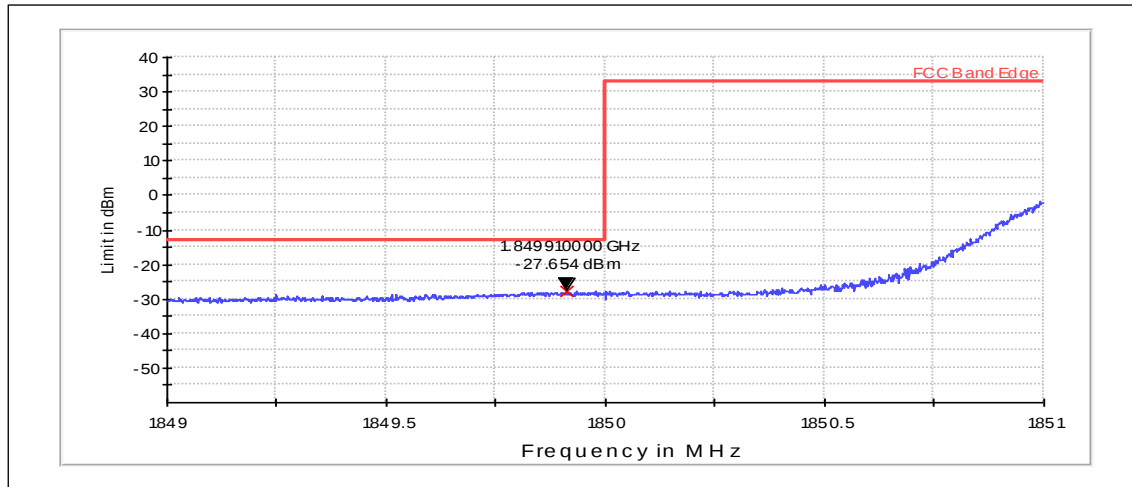
Channel 19100 / 1900 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1910.280	-27.49	PASSED

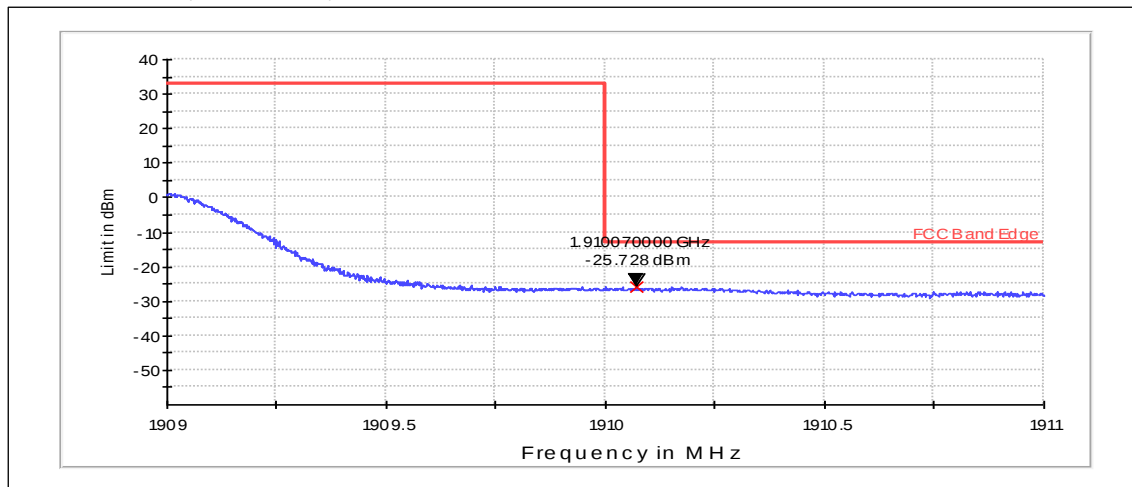
Channel 18700 / 1860 MHz, Antenna 2



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1849.910	-27.65	PASSED

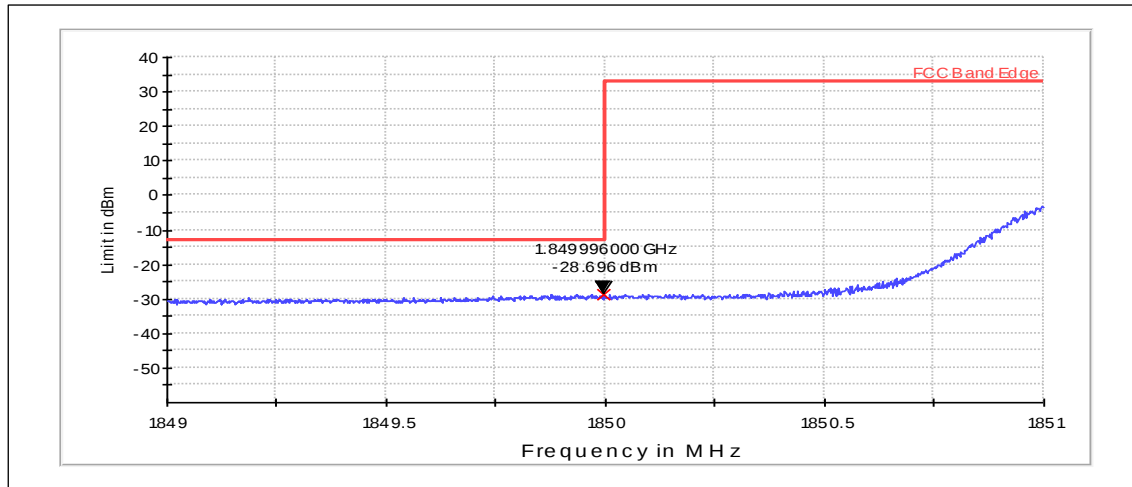
Channel 19100 / 1900 MHz, Antenna 2



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1910.070	-25.73	PASSED

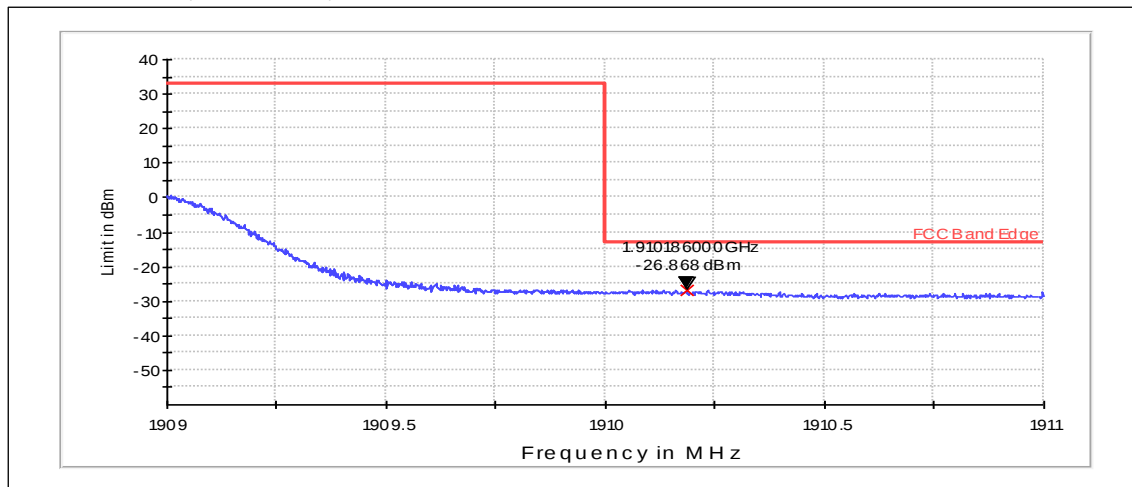
Channel 18700 / 1860 MHz, Antenna 2



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1849.996	-28.70	PASSED

Channel 19100 / 1900 MHz, Antenna 2

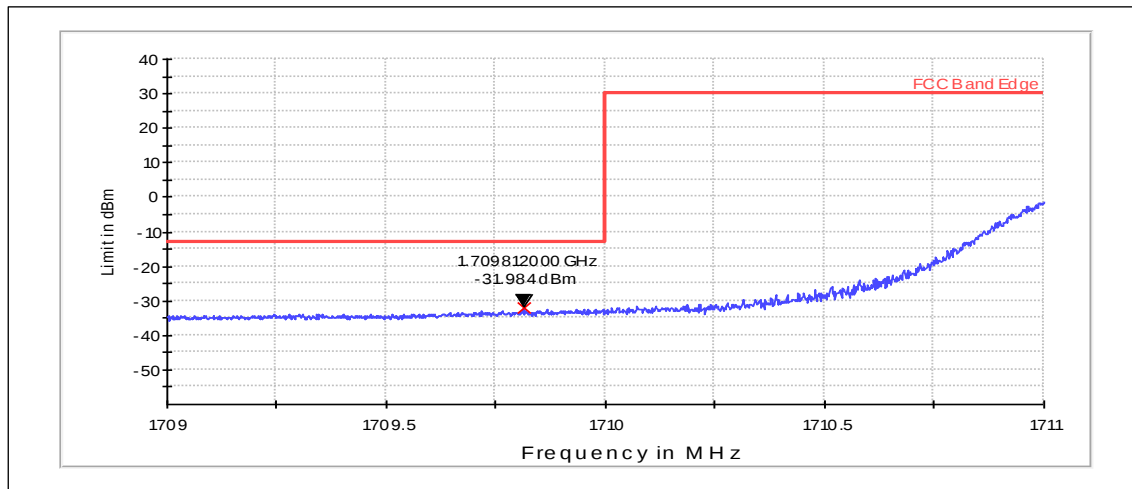


RMS (RBW: 200 kHz, VBW: 200 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1910.186	-26.87	PASSED

4.9. LTE1700 (Band 4) Test results

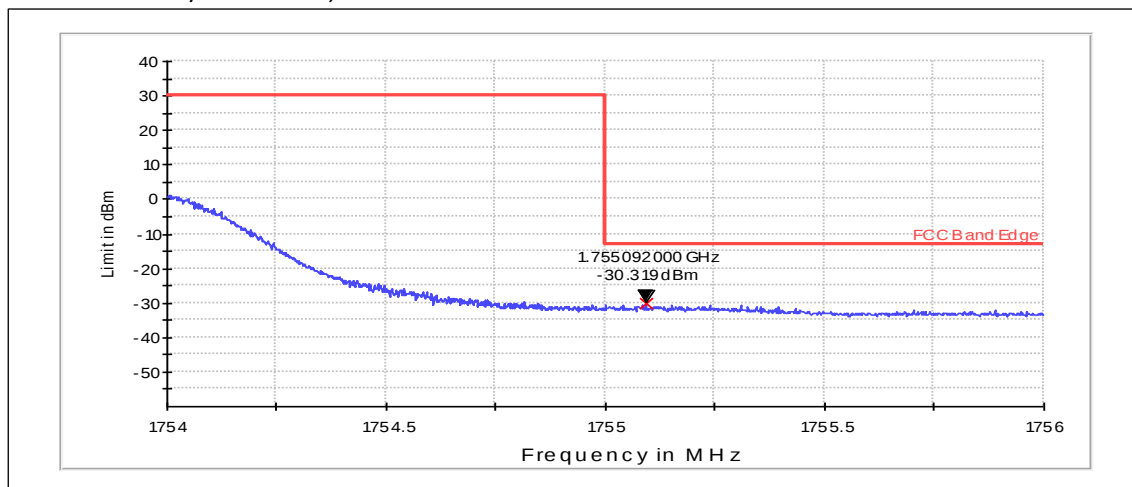
Channel 20050 / 1720 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1709.812	-31.98	PASSED

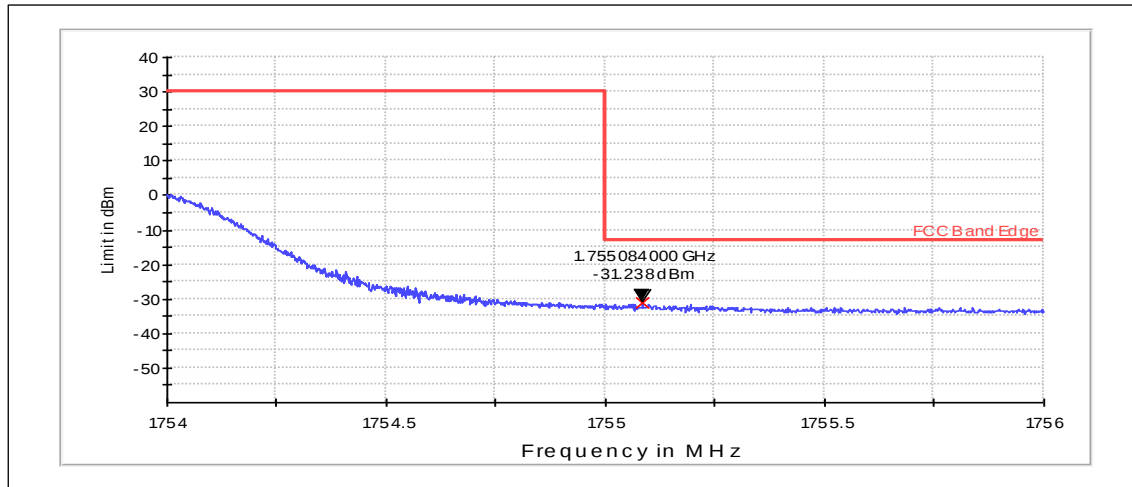
Channel 20300 / 1745 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1755.092	-30.32	PASSED

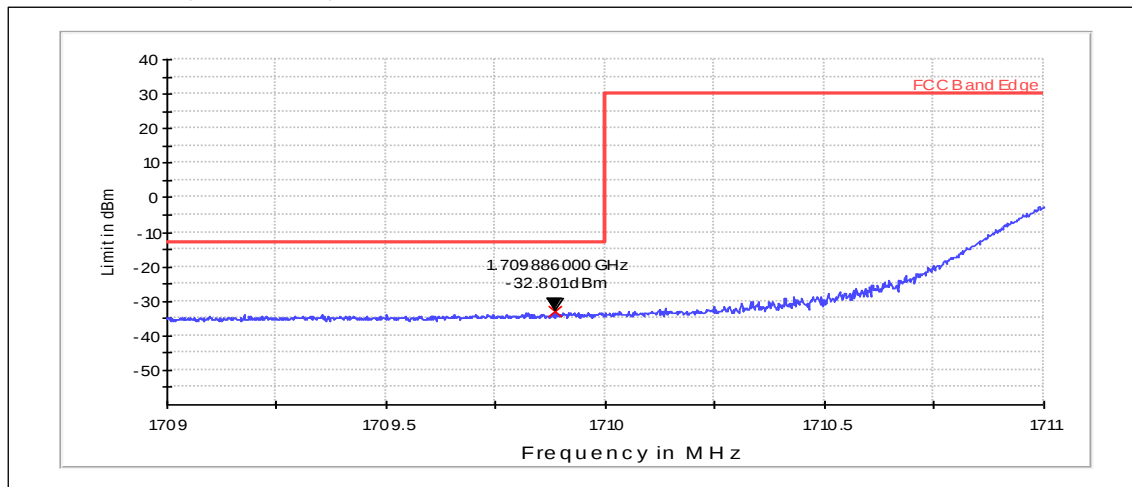
Channel 20300 / 1745 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1755.084	-31.24	PASSED

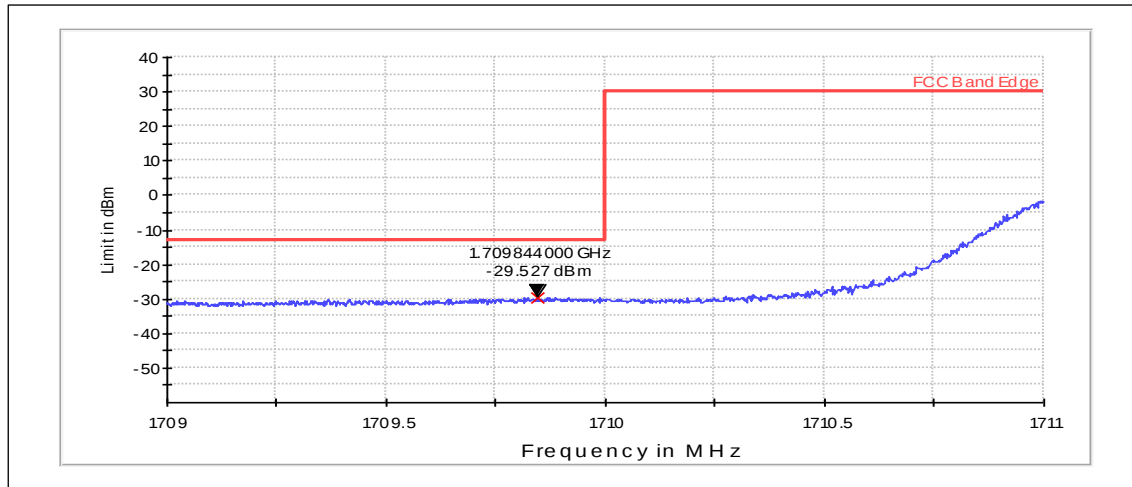
Channel 20050 / 1720 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1709.886	-32.80	PASSED

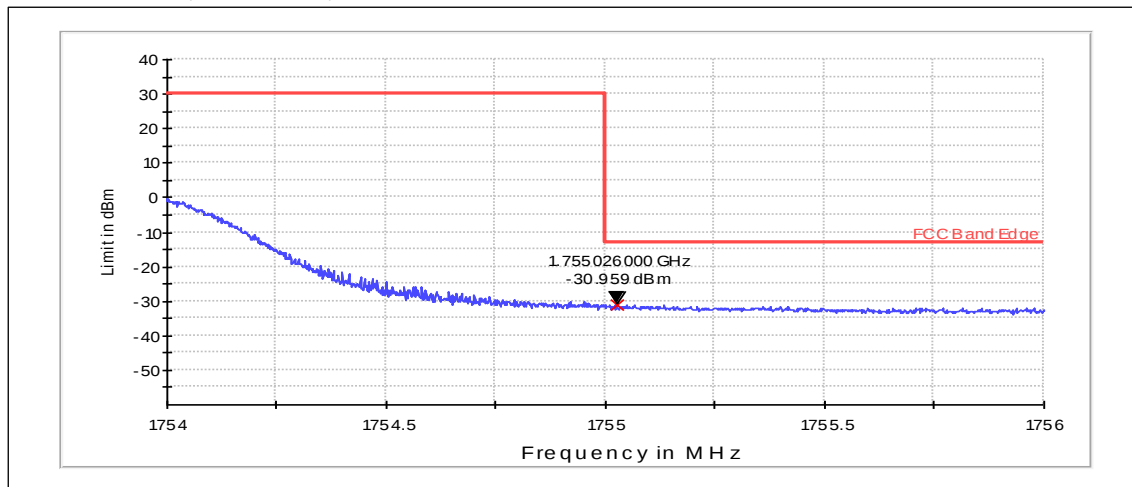
Channel 20050 / 1720 MHz, Antenna 2



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1709.844	-29.53	PASSED

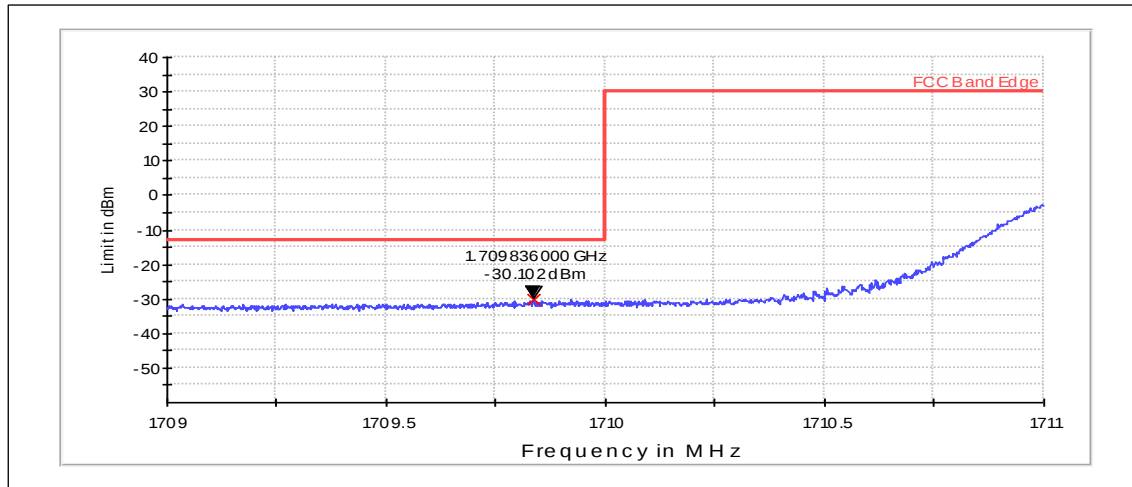
Channel 20300 / 1745 MHz, Antenna 2



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1755.026	-30.96	PASSED

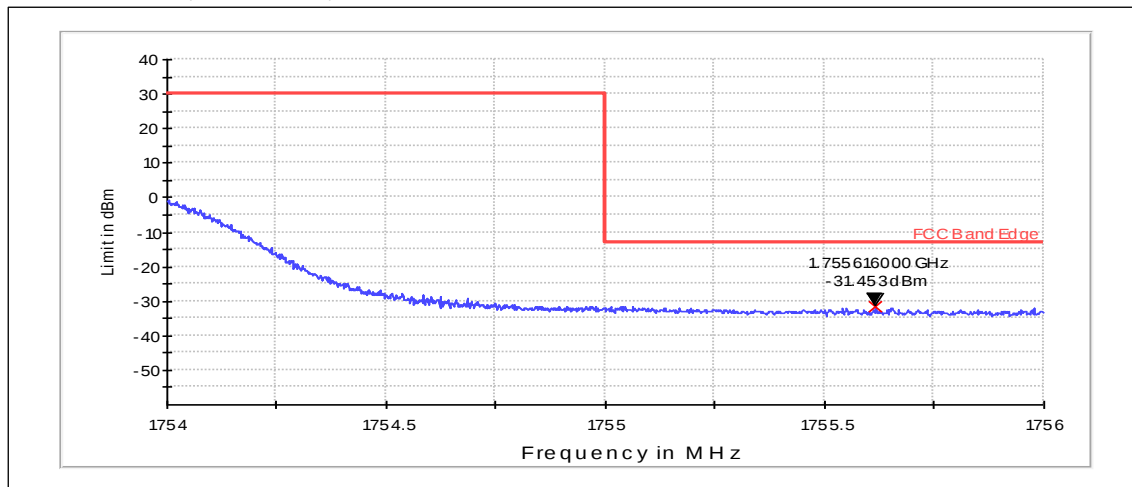
Channel 20050 / 1720 MHz, Antenna 2



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1709.836	-30.10	PASSED

Channel 20300 / 1745 MHz, Antenna 2

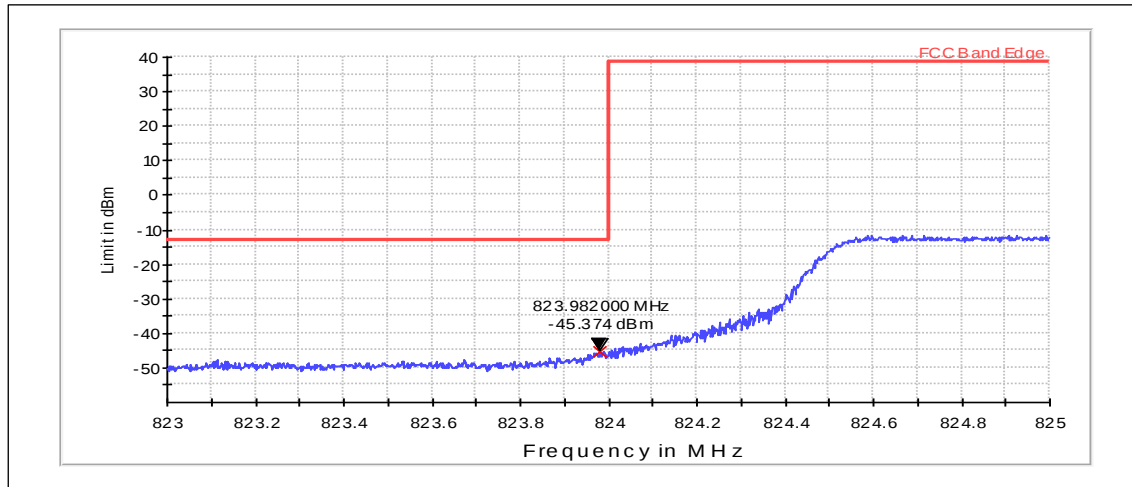


RMS (RBW: 200 kHz, VBW: 200 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1755.616	-31.45	PASSED

4.10. LTE850 (Band 5) Test results

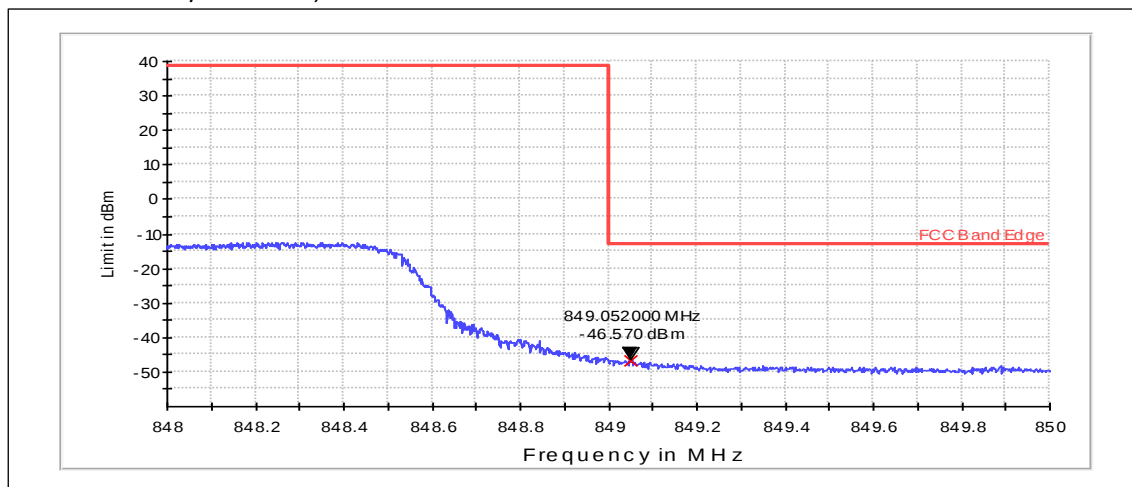
Channel 20450 / 829 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	823.982	-45.37	PASSED

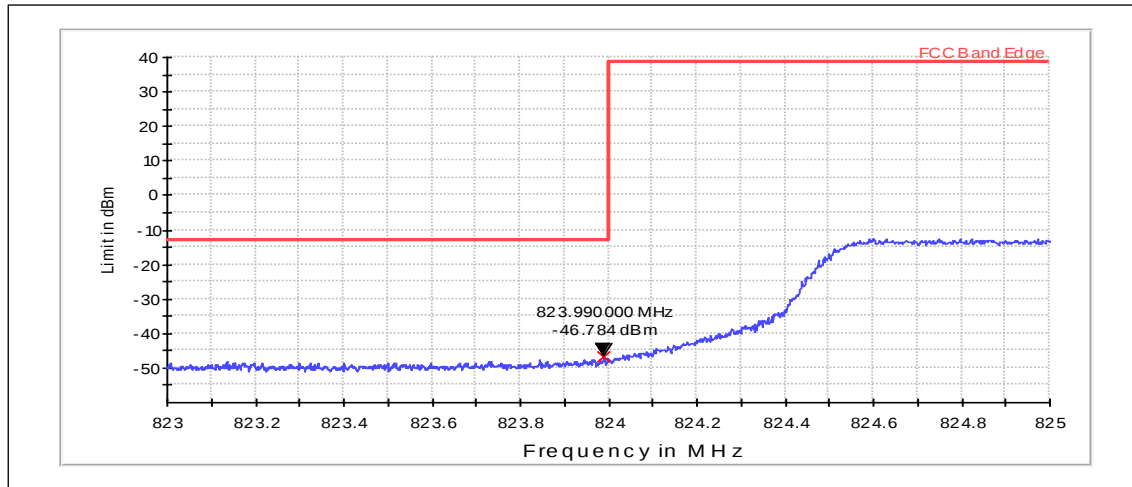
Channel 20600 / 844 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	849.052	-46.57	PASSED

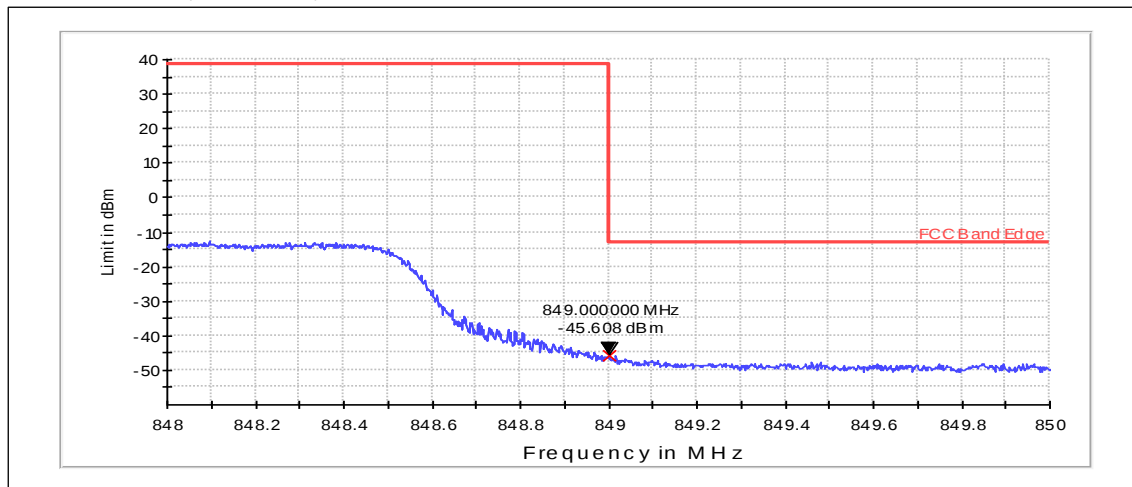
Channel 20450 / 829 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	823.990	-46.78	PASSED

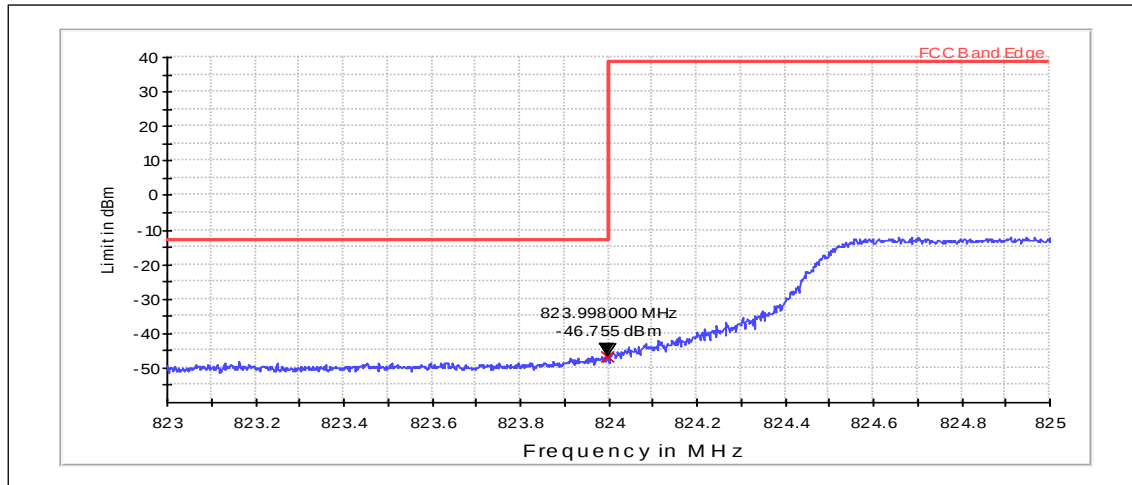
Channel 20600 / 844 MHz, Antenna 1



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	849.000	-45.61	PASSED

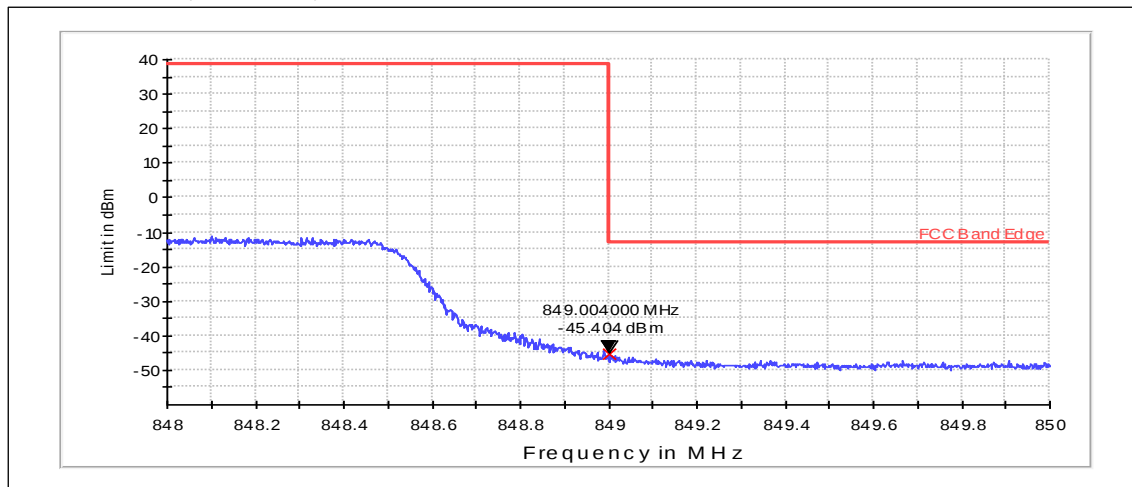
Channel 20450 / 829 MHz, Antenna 2



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	823.998	-46.76	PASSED

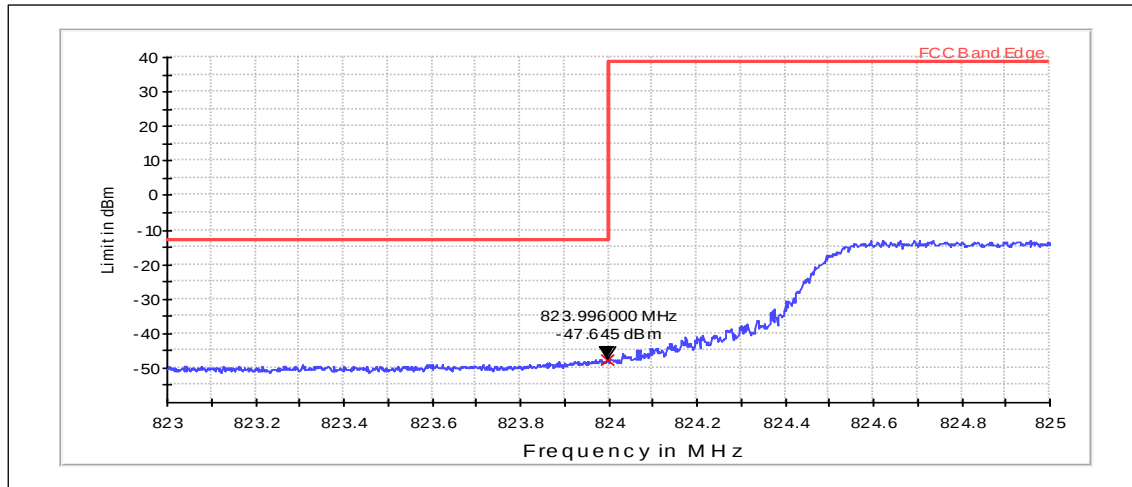
Channel 20600 / 844 MHz, Antenna 2



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	849.004	-45.40	PASSED

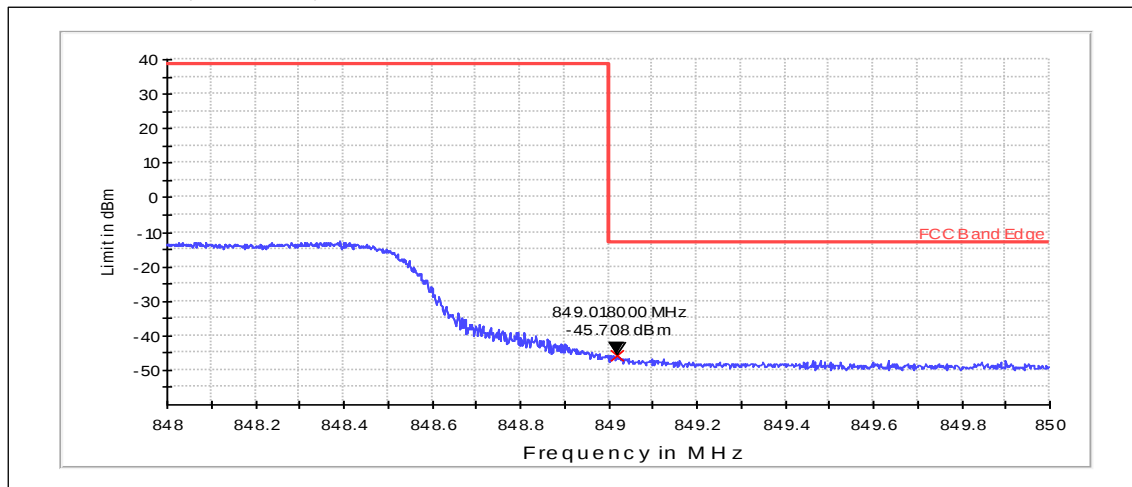
Channel 20450 / 829 MHz, Antenna 2



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	823.996	-47.64	PASSED

Channel 20600 / 844 MHz, Antenna 2

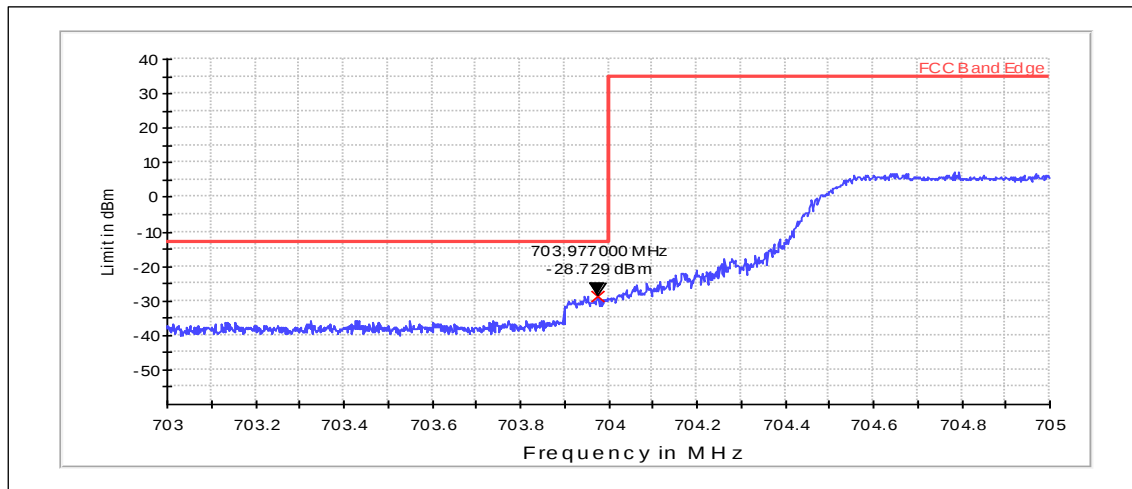


RMS (RBW: 100 kHz, VBW: 100 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	849.018	-45.71	PASSED

4.11. LTE700 Lower (Band 17) Test results

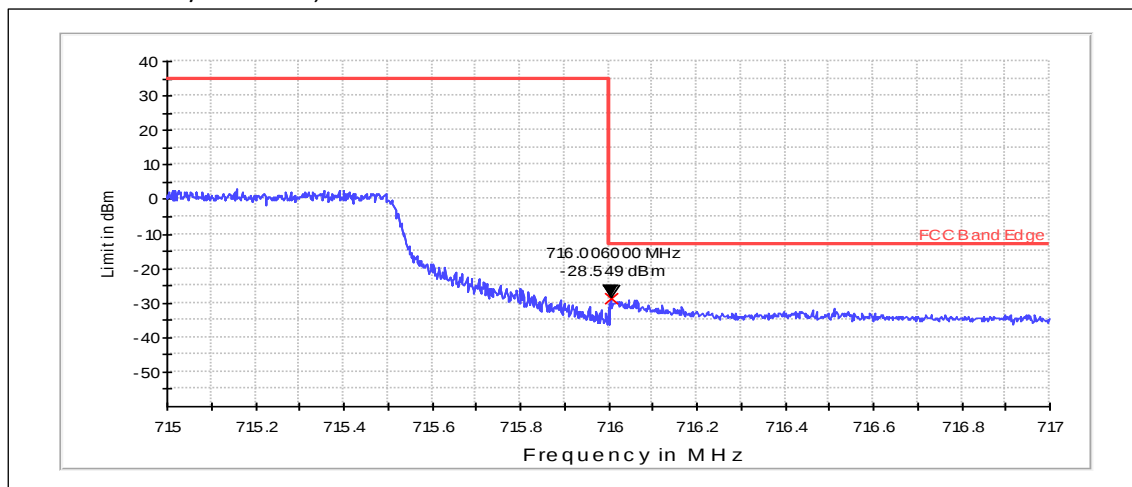
Channel 23780 / 709 MHz, Antenna 1



RMS (RBW: 30 kHz, VBW: 30 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	703.977	-28.73	PASSED

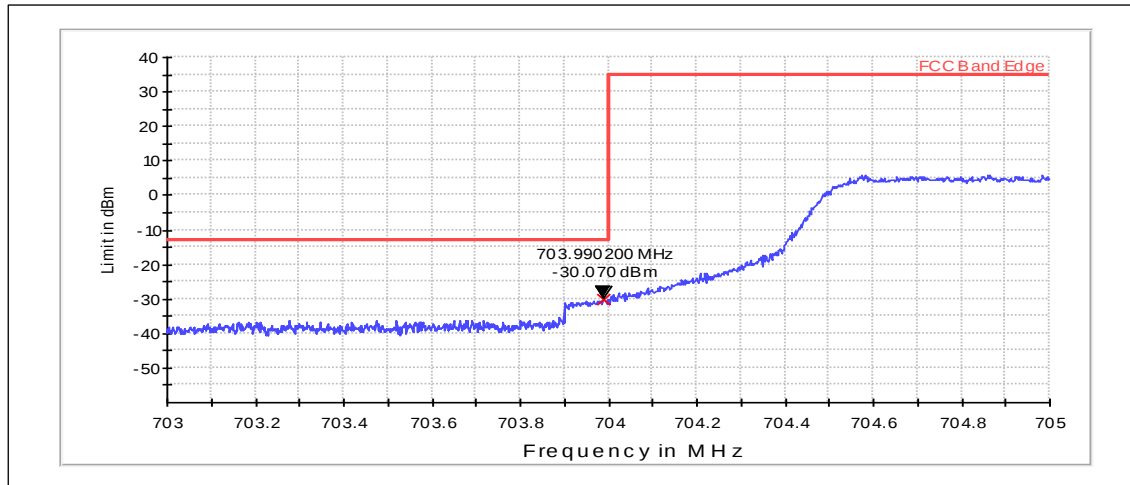
Channel 23800 / 711 MHz, Antenna 1



RMS (RBW: 30 kHz, VBW: 30 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	716.006	-28.55	PASSED

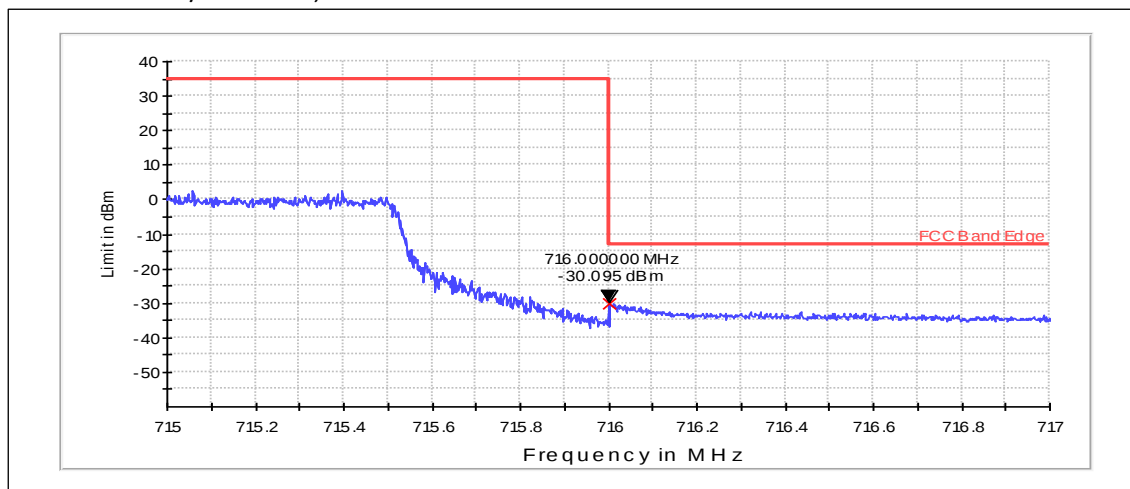
Channel 23780 / 709 MHz, Antenna 1



RMS (RBW: 30 kHz, VBW: 30 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	703.990	-30.07	PASSED

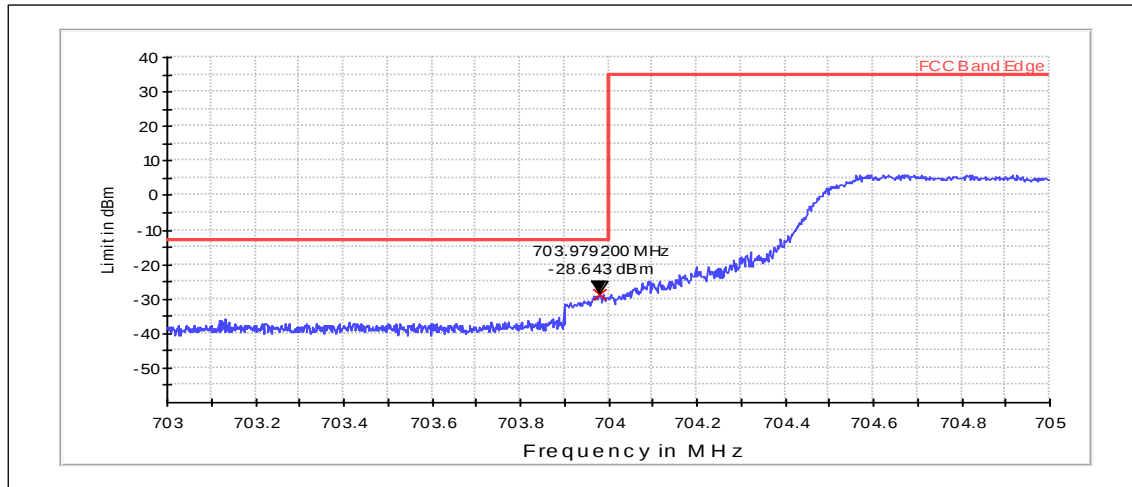
Channel 23800 / 711 MHz, Antenna 1



RMS (RBW: 30 kHz, VBW: 30 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	716.000	-30.09	PASSED

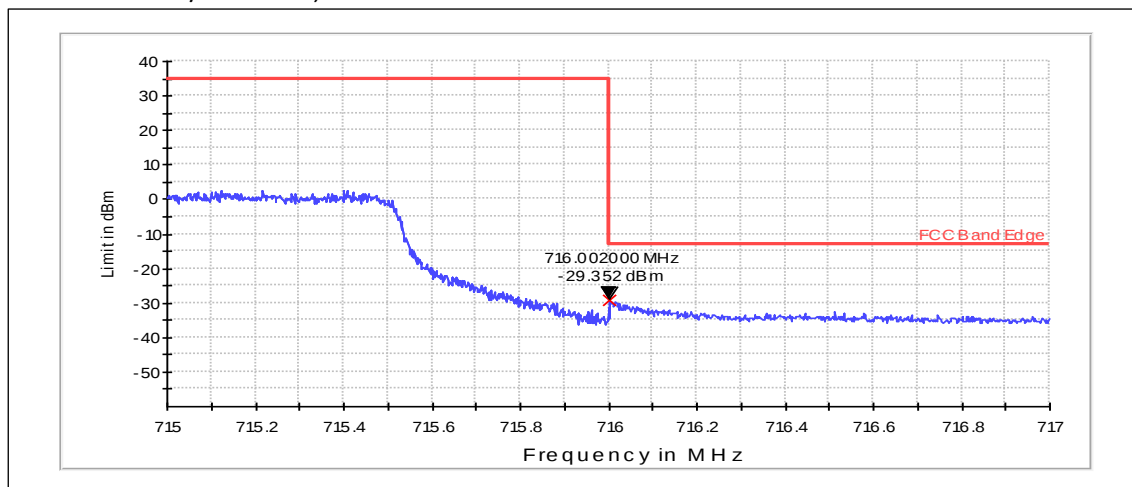
Channel 23780 / 709 MHz, Antenna 2



RMS (RBW: 30 kHz, VBW: 30 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	703.979	-28.64	PASSED

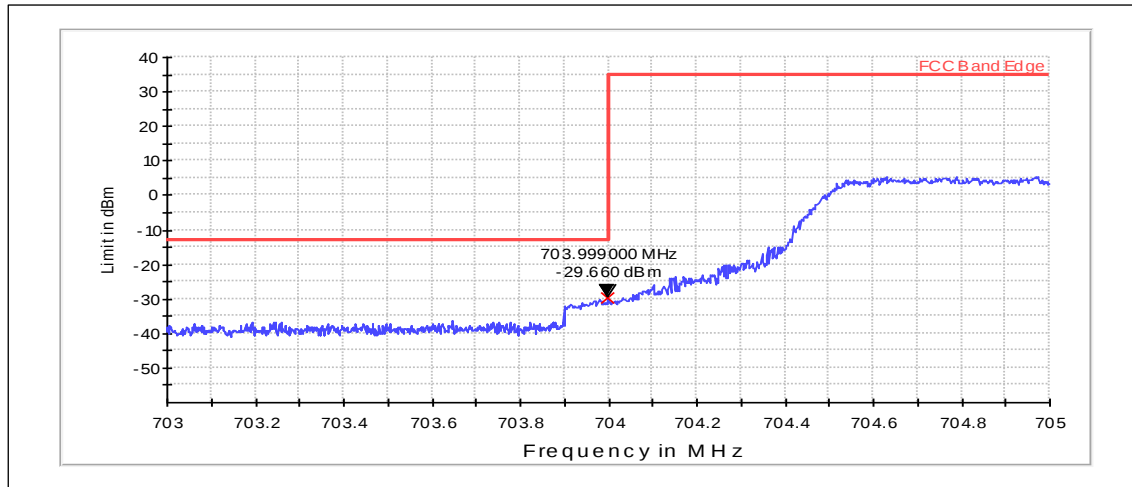
Channel 23800 / 711 MHz, Antenna 2



RMS (RBW: 30 kHz, VBW: 30 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	716.002	-29.35	PASSED

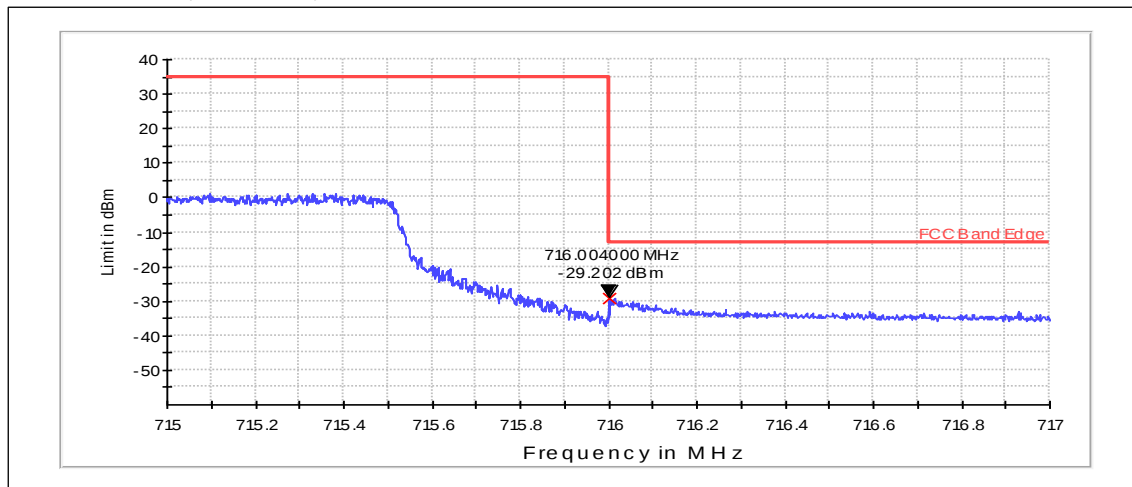
Channel 23780 / 709 MHz, Antenna 2



RMS (RBW: 30 kHz, VBW: 30 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	703.999	-29.66	PASSED

Channel 23800 / 711 MHz, Antenna



RMS (RBW: 30 kHz, VBW: 30 kHz, Max hold)

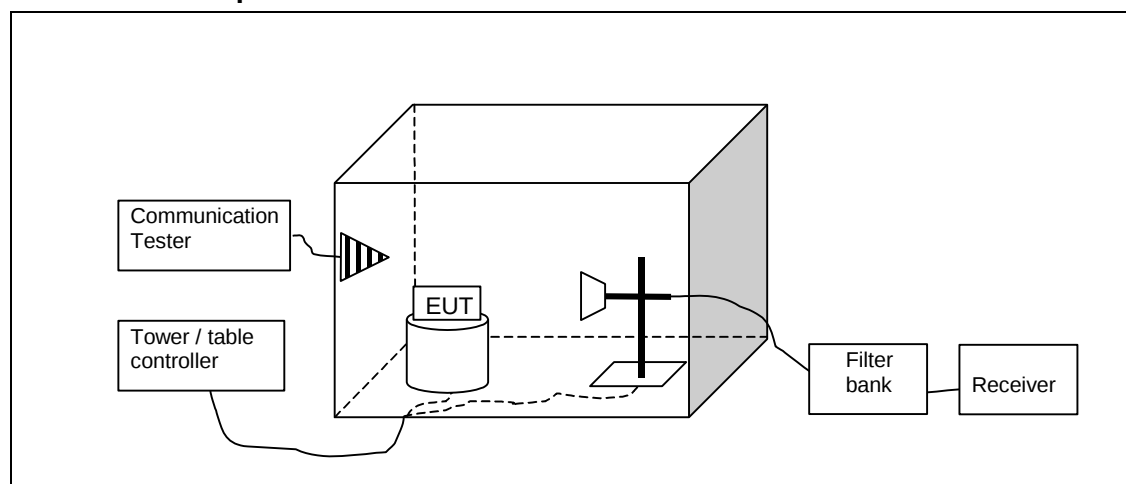
Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	716.004	-29.20	PASSED

5. Spurious radiated emissions

(FCC §24.238(a), §27.53(g), §2.1051, §27.53(l), §2.1053, §27.53(h), §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-1039, DUT 43203
Accessories with DUT numbers	BV-T5A, DUT 43205 ; AC-20E, DUT 43207 ; WH-208, DUT 43208
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	Ant1=swap antenna 1, Ant2= swap antenna 2
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	18-19 / 54-55 / 99.2-100.3
Date of measurements	28-Jul.. 08-Aug-2014
Measured by	Jan-Erik Lilja

5.1.1 Test setup



5.2. Test method and limit

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

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with absorbers on the floor and measuring antenna at fixed height using 2-axis EUT position system.

The Final Measurement is performed in the Semi-Anechoic Chamber with conducting metal floor, if the Preliminary Measurement results are closer than 20 dB to the permissible value.

The EUT is placed at nonconductive plate at the turntable center.

For each suspected frequency, the turntable is rotated 360 degrees and antenna is scanned from 1 to 4 m. This is repeated for both horizontal and vertical receive antenna polarizations.

The emissions less than 20 dB below the permissible value are reported.

The substitution method is used.

The measurement results are obtained as described below:

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

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

Limits for spurious radiated emissions measurements

Operation band	Frequency range [MHz]	Limit [dBm]
GSM 850	30 - 8500	-13
GSM 1900	30 - 19100	-13
WCDMA 1900	30 - 19100	-13
WCDMA 1700	30 - 17500	-13
WCDMA 850	30 - 8500	-13
LTE1900 (Band 2)	30 - 19100	-13
LTE1700 (Band 4)	30 - 17500	-13
LTE850 (Band 5)	30 - 8500	-13
LTE7	30 - 25700	-13
LTE700 Lower (Band 17)	30 - 7200	-13 (RBW = 100 kHz, ERP)

5.3. GSM 850 test results

Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1288.337	-61.9	0.00065	-52.4	-9.5	HORIZONTAL	PASSED
1373.627	-62.57	0.00055	-53.17	-9.4	HORIZONTAL	PASSED
2541.082	-55.21	0.00301	-56.01	0.8	HORIZONTAL	PASSED

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

Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1673.18	-60.3	0.00093	-53.5	-6.8	VERTICAL	PASSED
2512.105	-54.89	0.00324	-55.39	0.5	VERTICAL	PASSED

5.5. GSM 1900 test results

Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
3262.525	-57.88	0.00163	-60.18	2.3	VERTICAL	PASSED
8843.166	-46	0.02512	-63.2	17.2	VERTICAL	PASSED
12100.481	-45.93	0.02553	-63.83	17.9	VERTICAL	PASSED

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

Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
3759.98	-55.29	0.00296	-59.09	3.8	HORIZONTAL	PASSED
5632.004	-51.97	0.00635	-59.77	7.8	VERTICAL	PASSED

5.7. WCDMA 1900 test results, Ant1

Channel 9400 / 1880.0 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
30.18	-69.11	0.00012	-54.91	-14.2	VERTICAL	PASSED
31.04	-67.15	0.00019	-52.35	-14.8	VERTICAL	PASSED
31.231	-67.49	0.00018	-52.59	-14.9	VERTICAL	PASSED
2975.006	-50.05	0.00989	-55.25	5.2	VERTICAL	PASSED
3758.016	-51.98	0.00634	-55.78	3.8	HORIZONTAL	PASSED
5631.162	-52.65	0.00543	-60.45	7.8	VERTICAL	PASSED
7520.06	-48.49	0.01416	-62.19	13.7	HORIZONTAL	PASSED
9398.697	-45.52	0.02805	-63.62	18.1	HORIZONTAL	PASSED
11274.208	-44.76	0.03342	-63.06	18.3	VERTICAL	PASSED
13156.974	-52.51	0.00561	-63.81	11.3	HORIZONTAL	PASSED
15049.158	-51.51	0.00706	-65.91	14.4	VERTICAL	PASSED
16912.565	-49.65	0.01084	-66.45	16.8	VERTICAL	PASSED

5.8. WCDMA 1900 test results, Ant2

Channel 9400 / 1880.0 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
3768.677	-56.45	0.00226	-60.45	4	VERTICAL	PASSED
5634.489	-52.32	0.00586	-60.02	7.7	VERTICAL	PASSED
5636.092	-51.5	0.00708	-59.2	7.7	HORIZONTAL	PASSED
7523.186	-49.3	0.01175	-63	13.7	HORIZONTAL	PASSED
9347.796	-44.6	0.03467	-62.6	18	VERTICAL	PASSED
9401.944	-44.4	0.03631	-62.5	18.1	HORIZONTAL	PASSED
11284.669	-44.77	0.03334	-63.37	18.6	HORIZONTAL	PASSED
13151.242	-52.85	0.00519	-64.05	11.2	HORIZONTAL	PASSED
15038.497	-51.91	0.00644	-65.91	14	HORIZONTAL	PASSED
16916.493	-50.19	0.00957	-67.09	16.9	VERTICAL	PASSED

5.9. WCDMA 1700 test results, Ant1

Channel 1412 / 1732.4 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
3462.455	-51.2	0.00759	-54.5	3.3	HORIZONTAL	PASSED
5198.463	-51.89	0.00647	-59.09	7.2	HORIZONTAL	PASSED
6929.54	-48.08	0.01556	-59.28	11.2	VERTICAL	PASSED
7539.94	-48.84	0.01306	-62.74	13.9	VERTICAL	PASSED
8665.186	-47.27	0.01875	-63.77	16.5	HORIZONTAL	PASSED
9440.862	-45.26	0.02979	-63.36	18.1	HORIZONTAL	PASSED
10389.851	-46.32	0.02333	-63.62	17.3	HORIZONTAL	PASSED
12128.063	-45.78	0.02642	-63.78	18	VERTICAL	PASSED
13864.11	-51.94	0.0064	-63.64	11.7	HORIZONTAL	PASSED
15586.329	-50.33	0.00927	-66.23	15.9	VERTICAL	PASSED
17315.483	-48.97	0.01268	-67.37	18.4	VERTICAL	PASSED

5.10. WCDMA 1700 test results, Ant2

Channel 1412 / 1732.4 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
2581.042	-52.21	0.00601	-55.31	3.1	HORIZONTAL	PASSED
2583.587	-52.05	0.00624	-55.15	3.1	VERTICAL	PASSED
3462.375	-53.16	0.00483	-56.46	3.3	HORIZONTAL	PASSED
4897.455	-53.52	0.00445	-60.82	7.3	HORIZONTAL	PASSED
5197.06	-52.94	0.00508	-60.24	7.3	HORIZONTAL	PASSED
6927.576	-48.08	0.01556	-59.18	11.1	VERTICAL	PASSED
8662.461	-46.79	0.02094	-63.29	16.5	HORIZONTAL	PASSED
9235.491	-45.13	0.03069	-63.33	18.2	VERTICAL	PASSED
9317.575	-44.69	0.03396	-63.09	18.4	HORIZONTAL	PASSED
9318.858	-45.03	0.03141	-63.33	18.3	HORIZONTAL	PASSED
10396.304	-45.59	0.02761	-62.79	17.2	HORIZONTAL	PASSED
12127.221	-45.85	0.026	-63.75	17.9	HORIZONTAL	PASSED
13853.168	-51.97	0.00635	-63.57	11.6	HORIZONTAL	PASSED
15600.237	-50.13	0.00971	-66.23	16.1	VERTICAL	PASSED
17331.756	-49.2	0.01202	-67.5	18.3	VERTICAL	PASSED

5.11. WCDMA 850 test results, Ant1

Channel 4175 / 835.0 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1000.301	-62.95	0.00051	-53.15	-9.8	VERTICAL	PASSED
1671.222	-56.24	0.00238	-49.54	-6.7	HORIZONTAL	PASSED
2502.224	-54.4	0.00363	-54.4	0	HORIZONTAL	PASSED
2508.587	-54.1	0.00389	-54.4	0.3	HORIZONTAL	PASSED
2511.202	-54.53	0.00352	-55.03	0.5	VERTICAL	PASSED
3335.331	-57.72	0.00169	-57.82	0.1	HORIZONTAL	PASSED
3340.301	-59.15	0.00122	-59.25	0.1	HORIZONTAL	PASSED
4177.986	-57.63	0.00173	-60.73	3.1	VERTICAL	PASSED
5006.493	-55.21	0.00301	-60.81	5.6	VERTICAL	PASSED
5852.435	-53.26	0.00472	-58.66	5.4	HORIZONTAL	PASSED
6686.834	-51.62	0.00689	-59.32	7.7	VERTICAL	PASSED
7509.329	-51.56	0.00698	-62.76	11.2	HORIZONTAL	PASSED
8358.397	-50.24	0.00946	-63.24	13	VERTICAL	PASSED

5.12. WCDMA 850 test results, ant2

Channel 4175 / 835.0 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
30.461	-51.06	0.00783	-82.86	31.8	HORIZONTAL	PASSED
30.769	-51.42	0.00721	-83.02	31.6	HORIZONTAL	PASSED
31.839	-52.8	0.00525	-83.9	31.1	HORIZONTAL	PASSED
39.419	-56.97	0.00201	-83.77	26.8	HORIZONTAL	PASSED
1676.112	-58.8	0.00132	-52.1	-6.7	HORIZONTAL	PASSED
2507.184	-53.98	0.004	-54.18	0.2	HORIZONTAL	PASSED
3342.786	-56.15	0.00243	-56.25	0.1	HORIZONTAL	PASSED
4183.277	-57.57	0.00175	-60.67	3.1	VERTICAL	PASSED
5002.365	-55.28	0.00296	-60.88	5.6	VERTICAL	PASSED
5844.699	-53.67	0.0043	-59.37	5.7	VERTICAL	PASSED
6674.409	-51.32	0.00738	-59.42	8.1	VERTICAL	PASSED
7517.024	-51.37	0.00729	-62.67	11.3	HORIZONTAL	PASSED
8346.854	-50.43	0.00906	-63.43	13	VERTICAL	PASSED

5.13. LTE1900 (Band 2) test results, ant1

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
2860.146	-60.83	0.00083	-65.83	5	HORIZONTAL	PASSED
2867.471	-60.89	0.00081	-65.69	4.8	HORIZONTAL	PASSED
3760.421	-51.2	0.00759	-55	3.8	HORIZONTAL	PASSED
5640.581	-58.58	0.00139	-66.28	7.7	HORIZONTAL	PASSED
7514.449	-60.34	0.00092	-73.64	13.3	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
3760.301	-51.27	0.00746	-55.07	3.8	HORIZONTAL	PASSED
5640.621	-58.58	0.00139	-66.28	7.7	HORIZONTAL	PASSED
7526.713	-59.93	0.00102	-73.63	13.7	HORIZONTAL	PASSED

5.14. LTE1900 (Band 2) test results, ant2

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
3760.381	-56.65	0.00216	-60.45	3.8	HORIZONTAL	PASSED
5640.661	-56.67	0.00215	-64.37	7.7	HORIZONTAL	PASSED
7525.271	-59.63	0.00109	-73.33	13.7	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
3760.421	-57.74	0.00168	-61.54	3.8	HORIZONTAL	PASSED
5640.541	-55.38	0.0029	-63.08	7.7	HORIZONTAL	PASSED
7520.541	-59.35	0.00116	-73.05	13.7	HORIZONTAL	PASSED

5.15. LTE1700 (Band 4) test results, ant1

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
3465.381	-57.21	0.0019	-60.61	3.4	HORIZONTAL	PASSED
5197.961	-59.21	0.0012	-66.41	7.2	VERTICAL	PASSED
6929.579	-58.5	0.00141	-69.7	11.2	HORIZONTAL	PASSED
8652.74	-57.45	0.0018	-73.95	16.5	VERTICAL	PASSED
10385	-56.84	0.00207	-74.24	17.4	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
3465.381	-57.36	0.00184	-60.76	3.4	HORIZONTAL	PASSED
5197.961	-59.35	0.00116	-66.55	7.2	VERTICAL	PASSED
6929.579	-58.31	0.00148	-69.51	11.2	HORIZONTAL	PASSED
8652.781	-57.45	0.0018	-73.95	16.5	VERTICAL	PASSED
10385	-56.84	0.00207	-74.24	17.4	HORIZONTAL	PASSED

5.16. LTE1700 (Band 4) test results, ant2

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
3465.341	-55.57	0.00277	-58.97	3.4	HORIZONTAL	PASSED
5198.041	-56.64	0.00217	-63.84	7.2	HORIZONTAL	PASSED
6929.579	-58.5	0.00141	-69.7	11.2	HORIZONTAL	PASSED
8653.382	-57.68	0.00171	-74.28	16.6	HORIZONTAL	PASSED
10385.962	-56.97	0.00201	-74.27	17.3	VERTICAL	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
3465.381	-56.29	0.00235	-59.69	3.4	HORIZONTAL	PASSED
5197.921	-57.16	0.00192	-64.36	7.2	HORIZONTAL	PASSED
6929.579	-58.5	0.00141	-69.7	11.2	HORIZONTAL	PASSED
8652.74	-57.45	0.0018	-73.95	16.5	VERTICAL	PASSED
10385.922	-56.97	0.00201	-74.27	17.3	VERTICAL	PASSED

5.17. LTE850 (Band 5) test results, ant1

Channel 20525 / 836.5 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
37.759	-68.81	0.00013	-96.51	27.7	HORIZONTAL	PASSED
1673.461	-67.04	0.0002	-60.34	-6.7	HORIZONTAL	PASSED
2510.161	-66.43	0.00023	-66.83	0.4	HORIZONTAL	PASSED
3353.475	-78.88	1E-05	-79.08	0.2	HORIZONTAL	PASSED

Channel 20525 / 836.5 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
30.093	-64.56	0.00035	-96.56	32	HORIZONTAL	PASSED
1673.301	-65.97	0.00025	-59.27	-6.7	HORIZONTAL	PASSED
2510.081	-66.58	0.00022	-66.98	0.4	HORIZONTAL	PASSED

5.18. LTE850 (Band 5) test results, ant2

Channel 20525 / 836.5 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
2510.201	-67.82	0.00017	-68.22	0.4	HORIZONTAL	PASSED
3346.541	-61.02	0.00079	-61.12	0.1	HORIZONTAL	PASSED

Channel 20525 / 836.5 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
30.04	-64.53	0.00035	-96.53	32	HORIZONTAL	PASSED
3346.862	-61.86	0.00065	-61.96	0.1	HORIZONTAL	PASSED

5.19. LTE7 test results, ant1

Channel 21100 / 2535.0 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
2569.591	-63.75	0.00042	-64.75	1	HORIZONTAL	PASSED
2570.815	-63.55	0.00044	-64.55	1	HORIZONTAL	PASSED
2572.955	-64.63	0.00034	-65.53	0.9	HORIZONTAL	PASSED
2585.399	-64.73	0.00034	-65.83	1.1	HORIZONTAL	PASSED
2611.387	-64.54	0.00035	-65.84	1.3	HORIZONTAL	PASSED
2789.014	-63.76	0.00042	-65.76	2	HORIZONTAL	PASSED
5070.381	-54.11	0.00388	-62.01	7.9	HORIZONTAL	PASSED
7605.661	-57.41	0.00182	-71.01	13.6	HORIZONTAL	PASSED
10135.531	-56.92	0.00203	-73.02	16.1	HORIZONTAL	PASSED
12665.441	-56.49	0.00224	-73.89	17.4	HORIZONTAL	PASSED

Channel 21100 / 2535.0 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
2565.264	-64.35	0.00037	-65.45	1.1	HORIZONTAL	PASSED
2573.272	-63.28	0.00047	-64.18	0.9	HORIZONTAL	PASSED
2573.583	-64.4	0.00036	-65.3	0.9	HORIZONTAL	PASSED
2574.712	-63.52	0.00044	-64.42	0.9	HORIZONTAL	PASSED
2760.052	-64.27	0.00037	-65.87	1.6	HORIZONTAL	PASSED
2771.146	-64.17	0.00038	-65.87	1.7	HORIZONTAL	PASSED
5070.301	-54.53	0.00352	-62.43	7.9	HORIZONTAL	PASSED
7605.621	-57.65	0.00172	-71.25	13.6	HORIZONTAL	PASSED
10141.062	-56.66	0.00216	-72.76	16.1	HORIZONTAL	PASSED
12667.164	-56.81	0.00208	-74.31	17.5	HORIZONTAL	PASSED

5.20. LTE7 test results, ant2

Channel 21100 / 2535.0 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
2573.904	-64.65	0.00034	-65.55	0.9	HORIZONTAL	PASSED
2656.108	-39.23	0.1194	-40.53	1.3	HORIZONTAL	PASSED
5070.261	-54.44	0.0036	-62.34	7.9	HORIZONTAL	PASSED
7598.206	-60.08	0.00098	-73.58	13.5	HORIZONTAL	PASSED
10146.874	-57.14	0.00193	-73.34	16.2	HORIZONTAL	PASSED
12668.727	-56.8	0.00209	-74.3	17.5	HORIZONTAL	PASSED

Channel 21100 / 2535.0 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
2565.93	-64.49	0.00036	-65.49	1	HORIZONTAL	PASSED
2569.183	-64.32	0.00037	-65.32	1	HORIZONTAL	PASSED
2579.034	-64.3	0.00037	-65.3	1	HORIZONTAL	PASSED
2582.511	-64.26	0.00037	-65.26	1	HORIZONTAL	PASSED
2655.523	-32.81	0.5236	-34.21	1.4	HORIZONTAL	PASSED
5070.261	-54.03	0.00395	-61.93	7.9	HORIZONTAL	PASSED
7605.381	-58.65	0.00136	-72.15	13.5	HORIZONTAL	PASSED
10132.485	-56.61	0.00218	-72.71	16.1	HORIZONTAL	PASSED
12667.285	-56.48	0.00225	-73.98	17.5	HORIZONTAL	PASSED

5.21. LTE700 Lower (Band 17) test results, ant1

Channel 23790 / 710 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1420.381	-66.32	0.00023	-57.72	-8.6	HORIZONTAL	PASSED

Channel 23790 / 710 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1420.381	-65.84	0.00026	-57.24	-8.6	HORIZONTAL	PASSED

5.22. LTE700 Lower (Band 17) test results, ant2

Channel 23790 / 710 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1420.381	-63.76	0.00042	-55.16	-8.6	HORIZONTAL	PASSED

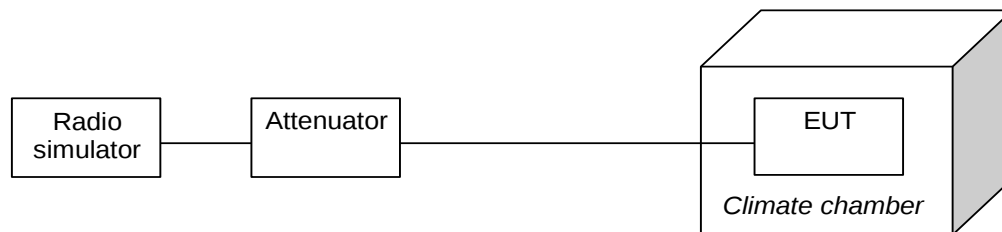
FDD, CBW 5MHz, 16QAM, 1 RB, RMS detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1420.341	-61.75	0.00067	-53.15	-8.6	HORIZONTAL	PASSED
2130.541	-69.56	0.00011	-66.36	-3.2	HORIZONTAL	PASSED
2840.701	-69.53	0.00011	-72.23	2.7	HORIZONTAL	PASSED

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

EUT with DUT number	RM-1039, DUT 43204
Accessories with DUT numbers	BV-T5A, DUT 43205 ; AC-20E, DUT 43207 ; WH-208, DUT 43208
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 49 / 100
Date of measurements	30-Jul-2014
Measured by	Hannu Söderholm

6.1. Test Setup



6.2. Test method and limit

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

The climate chamber temperature is set to the maximum value and the temperature is allowed to stabilize.

The EUT is placed in the chamber.

The EUT is set in idle mode for 15 minutes.

The EUT is set to transmit.

The transmit frequency error was measured immediately.

The steps c - e were repeated for each temperature. Limits for frequency stability, temperature variation measurements

Frequency deviation [ppm]
+/- 2.5

6.3. WCDMA 1700 Test results

FDD, Channel 1412 / 1732.4 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	1732.40	0.47302	0.0003	PASSED
40	1732.40	0.36621	0.0002	PASSED
30	1732.40	-0.09155	-0.0001	PASSED
20	1732.40	-0.47302	-0.0003	PASSED
10	1732.40	1.40381	0.0008	PASSED
0	1732.40	2.01416	0.0012	PASSED
-10	1732.40	-0.64087	-0.0004	PASSED
-20	1732.40	1.20544	0.0007	PASSED
-30	1732.40	5.05066	0.0029	PASSED

6.4. LTE700 Lower (Band 17) Test results

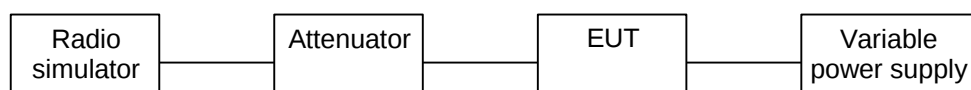
FDD, CBW 10MHz, QPSK, 50 RB, Channel 23790 / 710.0 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	710.00	-0.18597	-0.0003	PASSED
40	710.00	-1.20163	-0.0017	PASSED
30	710.00	-0.72956	-0.001	PASSED
20	710.00	0.94414	0.0013	PASSED
10	710.00	-0.38624	-0.0005	PASSED
0	710.00	0.52929	0.0007	PASSED
-10	710.00	0.72956	0.001	PASSED
-20	710.00	0.51498	0.0007	PASSED
-30	710.00	1.31607	0.0019	PASSED

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

EUT with DUT number	RM-1039, DUT 43204
Accessories with DUT numbers	Dummy battery
Operation Voltage [V] / [Hz]	3.6 / 3.7 / 4.2
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 49 / 100
Date of measurements	30-Jul-2014
Measured by	Hannu Söderholm

7.1. Test Setup



7.2. Test method and limit

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

The EUT battery was replaced with an adjustable power supply. The frequency stability was measured at nominal voltage and at the battery cut-off point.

Limits for frequency stability, voltage variation measurements

Frequency deviation [ppm]
+/- 2.5

7.3. WCDMA 1700 Test results

FDD,

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	1732.40	1.75476	0.001	PASSED
Battery cut-off point / 3.6	1732.40	-3.11279	-0.0018	PASSED
Nominal / 3.7	1732.40	-0.21362	-0.0001	PASSED

7.4. LTE700 Lower (Band 17) 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	-0.12875	-0.0002	PASSED
Battery cut-off point / 3.6	710.00	-0.48637	-0.0007	PASSED
Nominal / 3.7	710.00	0.12875	0.0002	PASSED

8. Test Equipment

8.1. Conducted measurements

Eq. No	Equipment	Type	Manufacturer	Used in
TM38112	Power supply	6632A	Agilent	22/24/27, 15C, 15E
TM38114	Power supply	6632A	Agilent	22/24/27, 15C, 15E
TM37773	Communication Tester	CMU200	R&S	22/24/27, 15B
TM30600	Impulse limiter	ESH3-Z2	R&S	15C, 15B
TM26490	LISN 50 μ H	ESH3-Z5	R&S	15C, 15B
TM26491	LISN 50 μ H	ESH3-Z5	R&S	15C, 15B
TM37610	Spectrum Analyzer	FSU26	R&S	22/24/27, 15C, 15E
TM23007	Oscilloscope	TDS684B	Tektronix	15E
TM22806	Battery	BAT 20/E	Fiskars	15C, 15B
TM22805	UPS	PS 20/1.2	Fiskars	15C, 15B
-	Temperature and humidity logger	175-H2	Testo	15C, 15B
-	Temperature and humidity logger	175-H2	Testo	22/24/27, 15C
-	Air pressure and temperature logger	635-2	Testo	22/24/27, 15C, 15B
-	Air pressure sensor	0638-1835	Testo	22/24/27, 15C, 15B
-	Temperature test chamber	VT 4002	Vötsch	22/24/27
2001	Bluetooth tester	CBT	R&S	15C, 15B
2009	LISN 50 μ H	ENV216	R&S	15C, 15B
2010	LISN 50 μ H	ENV216	R&S	15C, 15B
2012	Power splitter	11667B	Agilent	22/24/27, 15C
2013	Attenuator	8493C	Agilent	22/24/27, 15C
2014	Attenuator	8493C	Agilent	22/24/27, 15C
2019	Power splitter	ZN2PD-9G-S+	Mini-Circuits	15E
2020	Power splitter	ZN2PD-9G-S+	Mini-Circuits	15E
2021	Communication Tester	CMW500	R&S	22/24/27
2022	Communication Tester	CMU200	R&S	22/24/27
2023	Spectrum Analyzer	ESMI-RF	R&S	15B/15C
2024	Analyzer display unit	ESAI-D	R&S	15B/15C
2026	Signal Generator	SMF 100A	R&S	22/24/27, 15C, 15E, 15B
-	Bluetooth tester	CBT	R&S	15C, 15B

8.2. Radiated measurements

Eq. No	Equipment	Type	Manufacturer	Used in
-	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C
TM37678	Communication Tester	CMU200	R&S	22/24/27, 15B
TM38845	Receiver	ESIB 26	R&S	22/24/27, 15C, 15E, 15B
-	Antenna	HL562	R&S	22/24/27, 15C, 15E, 15B
-	Turntable	2188	EMCO	22/24/27, 15C, 15E, 15B
-	Turntable controller	2090	EMCO	22/24/27, 15C, 15E, 15B
-	RF system panel	OSP130	R&S	22/24/27, 15C, 15E, 15B
-	Mini mast	2075-2	ETS Lindgren	22/24/27, 15C, 15B
TM38843	Mini mast	2075	Emco	22/24/27, 15C, 15B
TM38842	Antenna mast controller	2090	Emco	22/24/27, 15C, 15B
TM30643	LISN 50 µH	LISN-5-20-2	FCC	22/24/27, 15C, 15B
TM30644	LISN 50 µH	LISN-5-20-2	FCC	22/24/27, 15C, 15B
-	Temperature and humidity logger	175-H2	Testo	22/24/27, 15C, 15B
-	Air pressure and temperature logger	635-2	Testo	22/24/27, 15C, 15B
-	Air pressure sensor	0638-1835	Testo	22/24/27, 15C, 15B
TM37523	Preamplifier	AMF-4D-10M-3G-25-20P	Miteq	22/24/27, 15C, 15B
TM37498	Preamplifier	AMF-5D-020180-26-10P	Miteq	22/24/27, 15C, 15B
TM30599	Semi anechoic chamber	UNKNOWN	TDK	22/24/27, 15C, 15B
TM22638	Power supply	OL63743-901	-	22/24/27, 15C, 15E, 15B
TM38066	High pass filter	WHKX3.0/18G-12SS	Wainwright	22/24/27, 15C, 15E, 15B
2028	High pass filter	WHKX 1.0/15G-12SS	Wainwright	22/24/27, 15C, 15E, 15B
TM37545	Tunable notch filter	800.0/960.0-0.2/40-8SSK	Wainwright	22
TM26512	Tunable notch filter	WRCD1850/1910-0.2/40-10SSK	Wainwright	24
-	Band reject filter	WRCG1877/1883-1870/1890-40/6EE	Wainwright	24
-	Band reject filter	WRCG1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	27
TM23892	Controller	G-1000SDX	Yaesu	22/24/27, 15C, 15E
2001	Bluetooth tester	CBT	R&S	15C, 15B
6023	Antenna	VUBA 9117	Schwarzbeck	22/24/27
2021	Communication Tester	CMW500	R&S	22/24/27
2025	Antenna	HFH2-Z2	R&S	15C
2026	Signal Generator	SMF 100A	R&S	22/24/27, 15C, 15E, 15B
2052	Antenna	BBHA 9120 D	Schwarzbeck	22/24/27, 15C, 15B, 15E
-	Antenna	QSH18S20	Q-Par	22/24/27, 15C, 15B, 15E
-	Antenna	QSH20S20	Q-Par	22/24/27, 15C, 15B, 15E
-	Antenna	QSH20S20	Q-Par	22/24/27, 15C, 15B, 15E
-	Bluetooth tester	CBT	R&S	15C, 15B