

FCC Part 22/24/27 Compliance Test Report

Test Report no.:	FCC_Cellular_RM-1104_02_MAIN	Date of Report:	30-Oct-2015
Number of pages:	103	Customer's Contact person:	Jari Rontu
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FCC listing no.:	533467		
IC recognition no.:	661V-1		
Tested devices/ accessories:	Phone RM-1104 / Dummy Battery SD-244R		
FCC ID:	PYASTT	IC:	661X-STT
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-130 (Issue 1, October 2013), RSS-199 (Issue 2, October 2014). Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".		
Documentation:	The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory. The documentation of the testing performed on the tested devices is archived for 15 years at TCC Microsoft.		
Test Results:	The EUT complies with the requirements in respect of all parameters subject to the test. The test results relate only to devices specified in this document		
Date and signature for the contents:			

Timo Raiskio, System Manager, EMC

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

Date of receipt	15-Jun-2015
Testing completed	10-Sep-2015
The customer's contact person	Tia Melava
Test Plan referred to	T:\Projects\RM-1104\TestPlan\RS_TestPlan_RM-1104_EMC_FCC.xlsm
Notes	-
Document name	T:\Projects\RM-1104\EMC\FCC_Cellular_RM-1104_02_MAIN.docx

1.1. EUT and Accessory Information

The EUT is a mobile phone with following features:

GSM/WCDMA/WLAN

The EUT is tested with maximum rated TX power.

Devices under tests

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-1104	004402742178340;059X034	2012	-	01063.00001.15244.09000	100019
Dummy Battery	SD-244R	-	V.1	-	-	100022

1.2. Summary of Test Results

GSM 1900:

Section in CFR 47	Section in RSS-GEN or RSS-133	Name of the test	Result
§2.1046(a)	6.4	Conducted RF output power	NP
§24.232(b)	6.4	Radiated RF output power	NP
N/A	6.4	Peak to average power ratio	PASSED
§2.1049(h)	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	NP
§2.1055(a)	6.3	Frequency stability, temperature variation	PASSED
§2.1055(d)	6.3	Frequency stability, voltage variation	PASSED

GSM 850:

Section in CFR 47	Section in RSS-GEN or RSS-132	Name of the test	Result
§2.1046(a), 22.913(a)	4.4	Conducted RF output power	NP
§22.913(a)	4.4	Radiated RF output power	NP
N/A	5.4	Peak to average power ratio	PASSED
§2.1049(h)	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	NP
§2.1055(a)	4.3	Frequency stability, temperature variation	PASSED
§2.1055(d)	4.3	Frequency stability, voltage variation	PASSED

WCDMA2:

Section in CFR 47	Section in RSS-GEN or RSS-133	Name of the test	Result
§2.1046(a)	6.4	Conducted RF output power	NP
§24.232(b)	6.4	Radiated RF output power	NP
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	NP
§2.1055(a)	6.3	Frequency stability, temperature variation	PASSED
§2.1055(d)	6.3	Frequency stability, voltage variation	PASSED

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	NP
N/A	6.4	Peak to average power ratio	NP
§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	NP
§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	NP
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	NP
§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	NP
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	NP
§2.1055(a)	6.3	Frequency stability, temperature variation	PASSED
§2.1055(d)	6.3	Frequency stability, voltage variation	PASSED

LTE4:

Section in CFR 47	Section in RSS-GEN or RSS-139	Name of the test	Result
§2.1046(a)	6.4	Conducted RF output power	NP
§27.50(d)(4)	6.4	Radiated RF output power	NP
N/A	6.4	Peak to average power ratio	NP
§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	NP
§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	NP
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	NP
§2.1055(a)	4.3	Frequency stability, temperature variation	PASSED
§2.1055(d)	4.3	Frequency stability, voltage variation	PASSED

LTE7:

Section in CFR 47	Section in RSS-GEN or RSS-199	Name of the test	Result
§2.1046(a)	4.4	Conducted RF output power	NP
§27.50(h)(2)	4.4	Radiated RF output power	NP
N/A	N/A	Peak to average power ratio	NP
§2.1049(h)	6.6	99 % occupied bandwidth	PASSED
§27.53(l)	4.5(b)	Band edge compliance	PASSED
§2.1051	4.5(b)	Spurious emissions at antenna terminals	NP
§27.53(l), §2.1053	4.5(b)	Spurious radiated emissions	NP
§27.54	4.3	Frequency stability, temperature variation	PASSED
§27.54	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	NP
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	NP
§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	NP
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	NP
§2.1055(a)	4.3 (a)	Frequency stability, temperature variation	PASSED
§2.1055(d)	4.3 (a)	Frequency stability, voltage variation	PASSED

PASSED

FAILED

NP

The EUT complies with the essential requirements in the standard.

The EUT does not comply with the essential requirements in the standard.

The test was not performed by the TCC Microsoft Laboratory.

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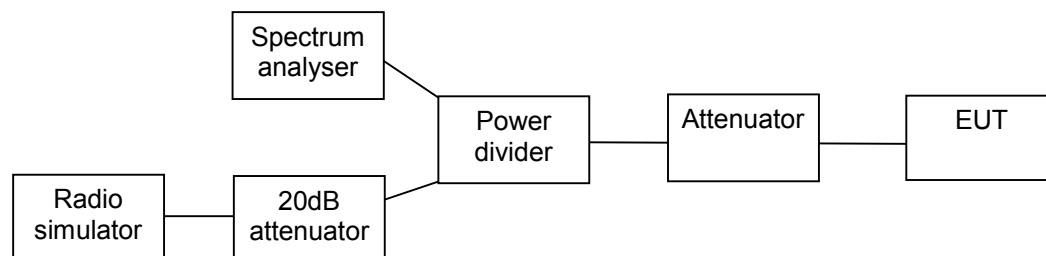
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2. Peak to average power ratio

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

EUT with DUT number	RM-1104, DUT 100019
Accessories with DUT numbers	SD-244R, DUT 100022
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20-25 / 40-50 / 98.0-102.0
Date of measurements	16-Jun-2015
Measured by	Kalle Hannila

2.1. Test Setup



2.2. Test method and limit

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

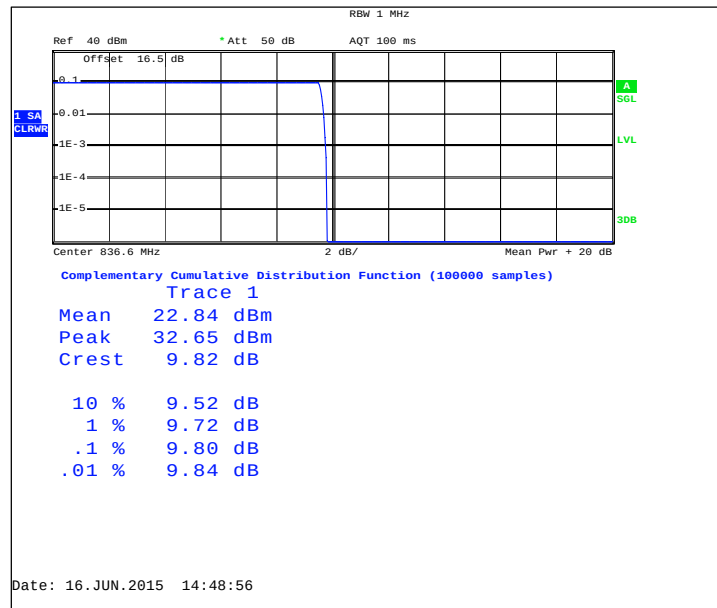
Limits for Peak to average power ratio measurements

Peak to average power ratio [dB]
≤ 13

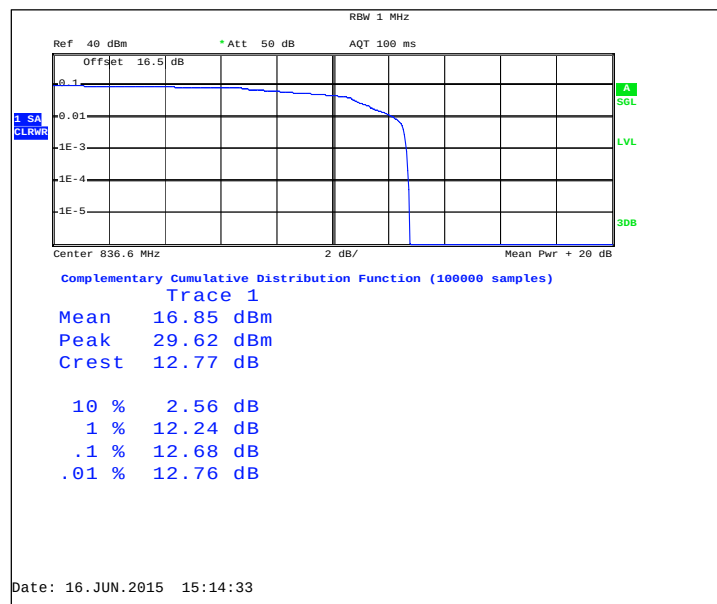
2.3. GSM 850 Test results

Operation mode (TX on)	Channel / f _c [MHz]	Peak to average power ratio [dB]	Result
GSM	190 / 836.6	9.82	PASSED
EGPRS	190 / 836.6	12.77	PASSED

GSM



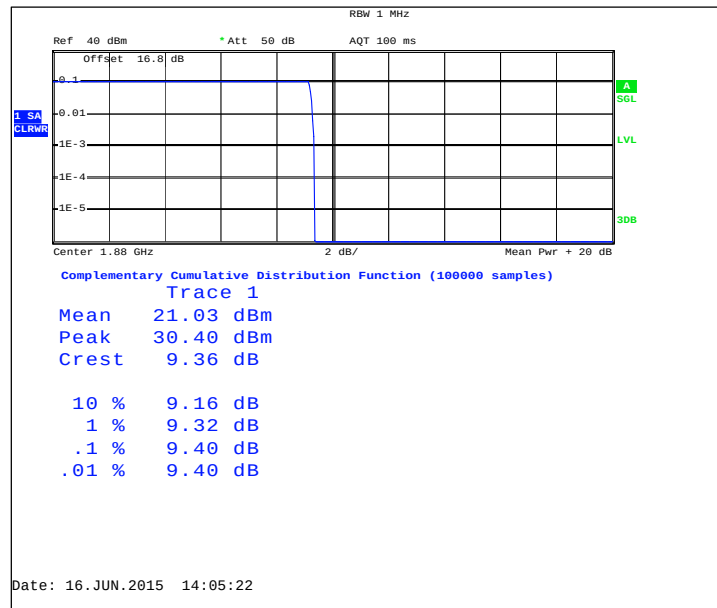
EGPRS



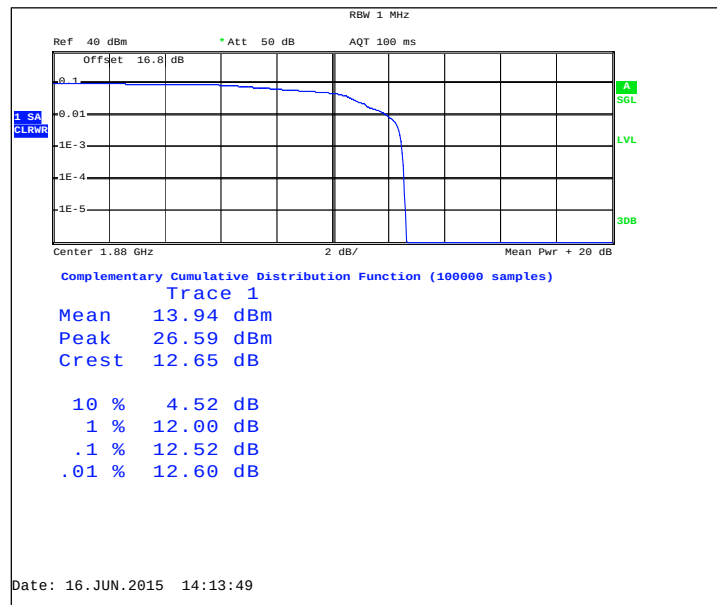
2.4. GSM 1900 Test results

Operation mode (TX on)	Channel / f _c [MHz]	Peak to average power ratio [dB]	Result
GSM	661 / 1880.0	9.36	PASSED
EGPRS	661 / 1880.0	12.65	PASSED

GSM



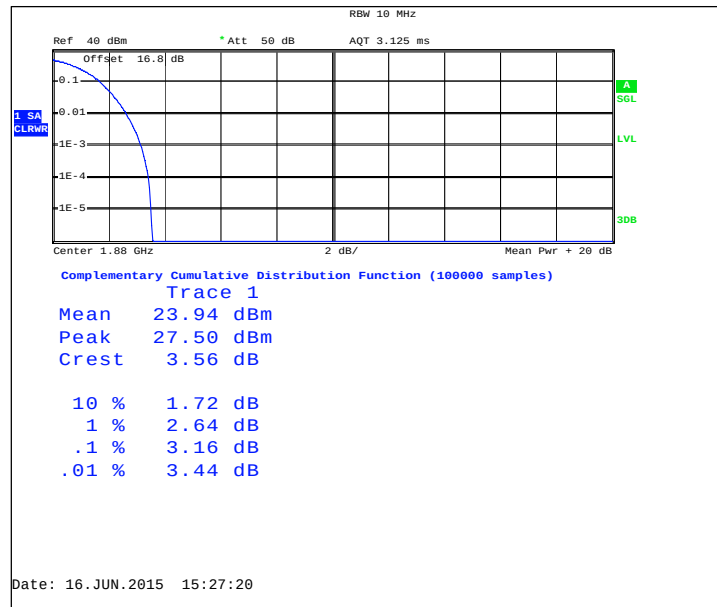
EGPRS



2.5. WCDMA2 Test results

Operation mode (TX on)	Channel / f _c [MHz]	Peak to average power ratio [dB]	Result
FDD	9400 / 1880.0	3.56	PASSED

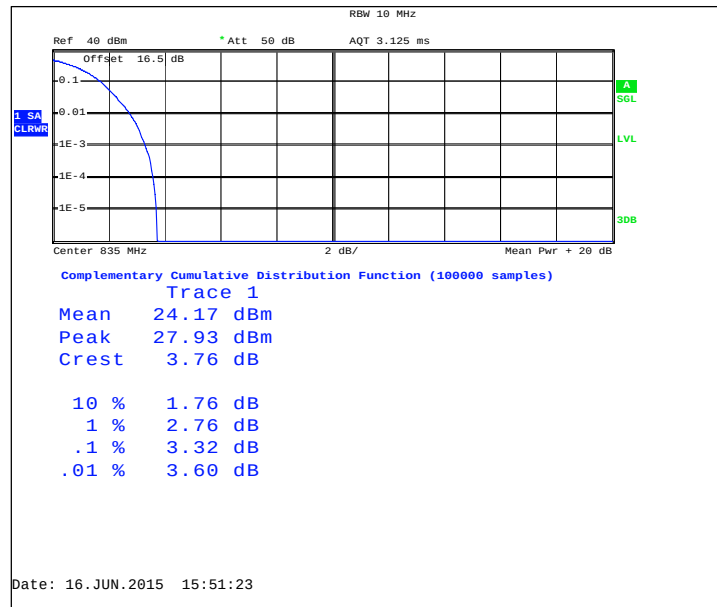
FDD



2.6. WCDMA5 Test results

Operation mode (TX on)	Channel / fc [MHz]	Peak to average power ratio [dB]	Result
FDD	4175 / 835.0	3.76	PASSED

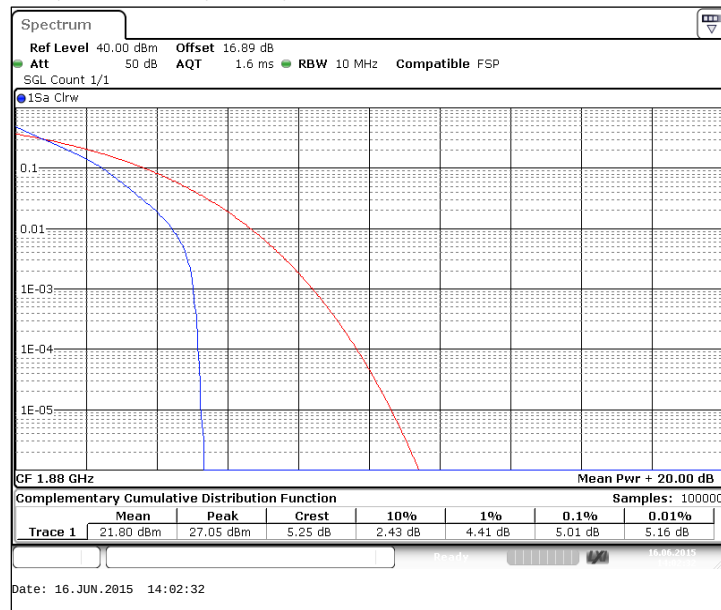
FDD



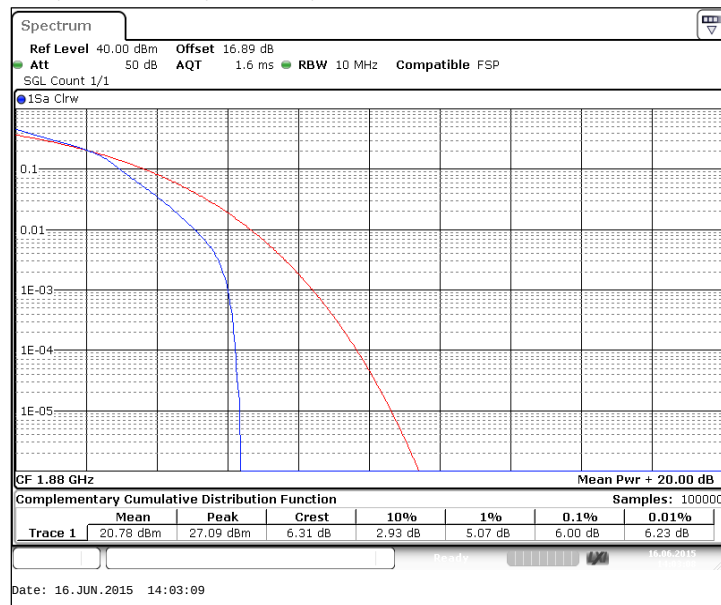
2.7. LTE2 Test results

Operation mode (TX on)	Channel / f _c [MHz]	Peak to average power ratio [dB]	Result
FDD, CBW 5MHz, QPSK, 25 RB	18900 / 1880.0	5.25	PASSED
FDD, CBW 5MHz, 16QAM, 25 RB	18900 / 1880.0	6.31	PASSED

FDD, CBW 5MHz, QPSK, 25 RB



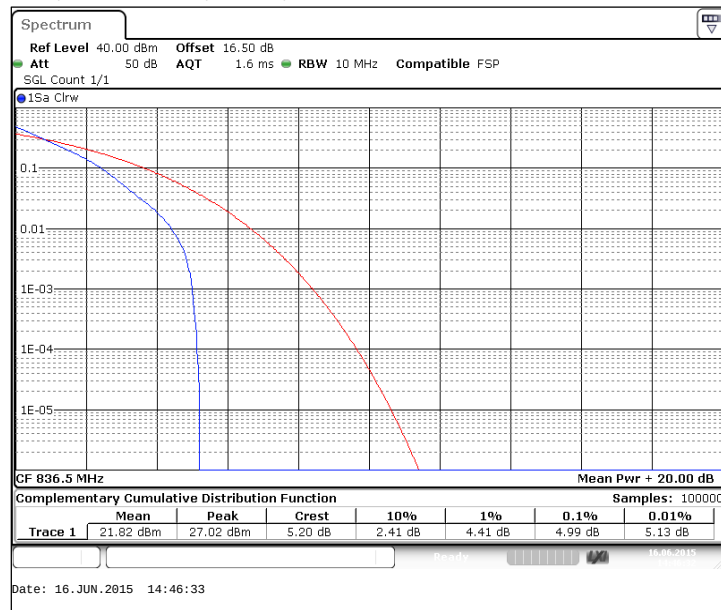
FDD, CBW 5MHz, 16QAM, 25 RB



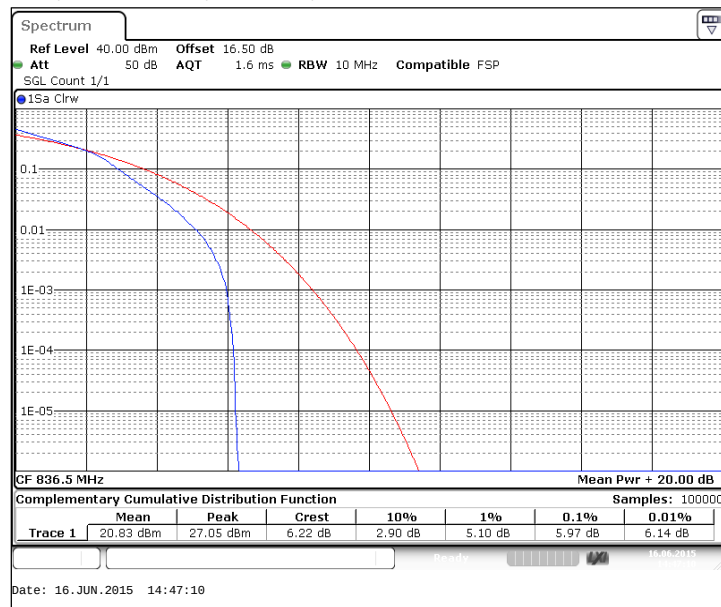
2.8. LTE5 Test results

Operation mode (TX on)	Channel / f _c [MHz]	Peak to average power ratio [dB]	Result
FDD, CBW 5MHz, QPSK, 25 RB	20525 / 836.5	5.20	PASSED
FDD, CBW 5MHz, 16QAM, 25 RB	20525 / 836.5	6.22	PASSED

FDD, CBW 5MHz, QPSK, 25 RB



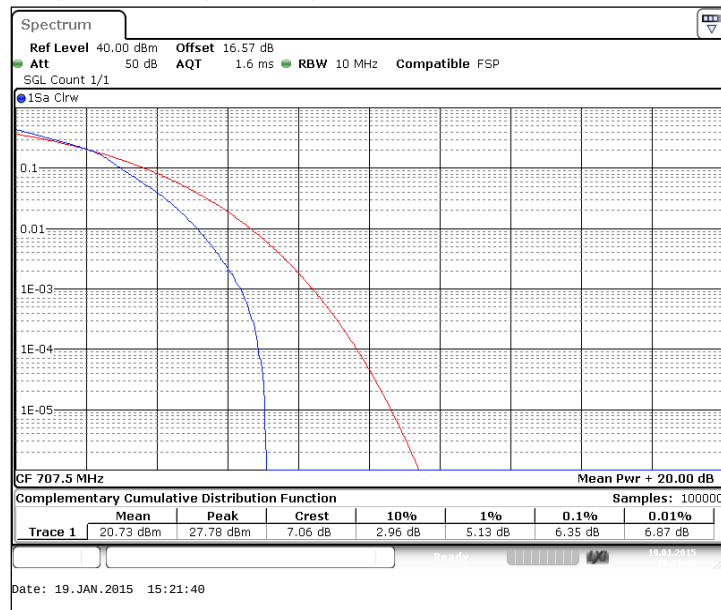
FDD, CBW 5MHz, 16QAM, 25 RB



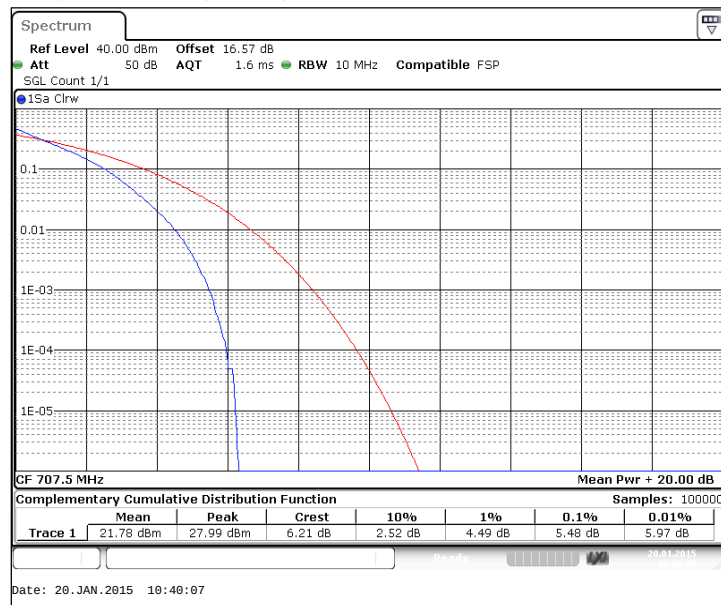
2.9. LTE12 Test results

Operation mode (TX on)	Channel / f _c [MHz]	Peak to average power ratio [dB]	Result
FDD, CBW 5MHz, 16QAM, 25 RB	23095 / 707.5	6.34	PASSED
FDD, CBW 5MHz, QPSK, 25 RB	23095 / 707.5	5.29	PASSED

FDD, CBW 5MHz, 16QAM, 25 RB



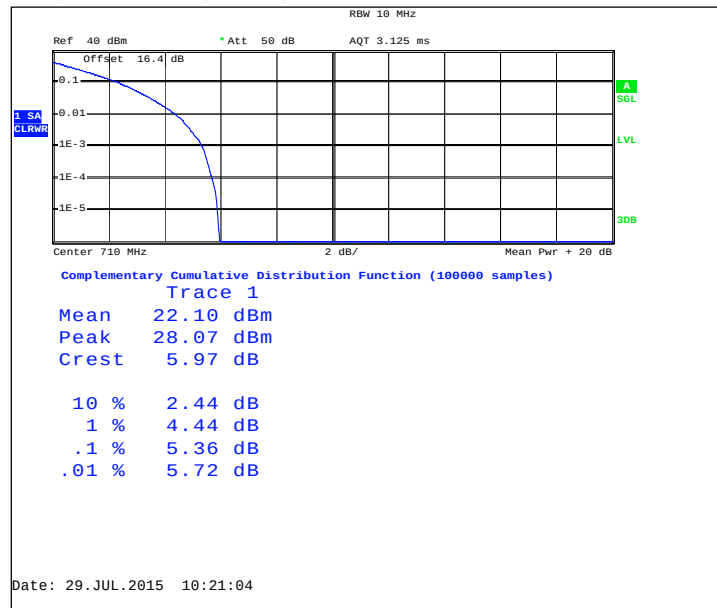
FDD, CBW 5MHz, QPSK, 25 RB



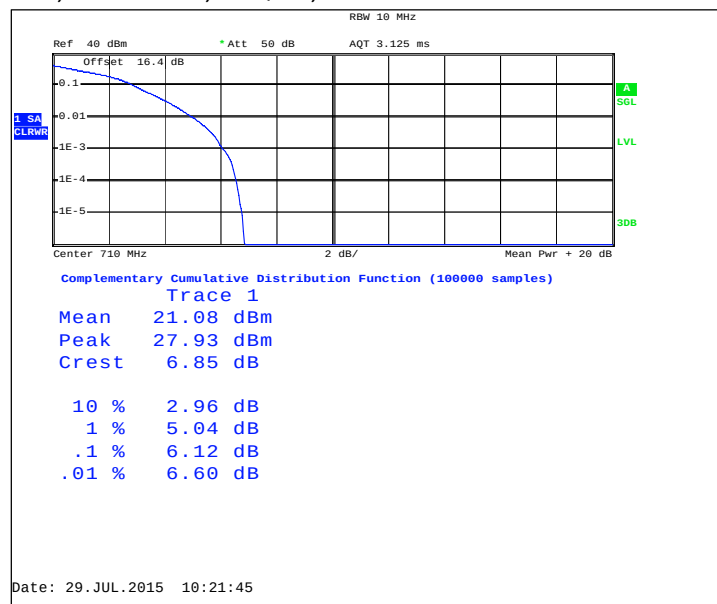
2.10. LTE17 Test results

Operation mode (TX on)	Channel / f _c [MHz]	Peak to average power ratio [dB]	Result
FDD, CBW 5MHz, QPSK, 25 RB	23790 / 710.0	5.97	PASSED
FDD, CBW 5MHz, 16QAM, 25 RB	23790 / 710.0	6.85	PASSED

FDD, CBW 5MHz, QPSK, 25 RB



FDD, CBW 5MHz, 16QAM, 25 RB

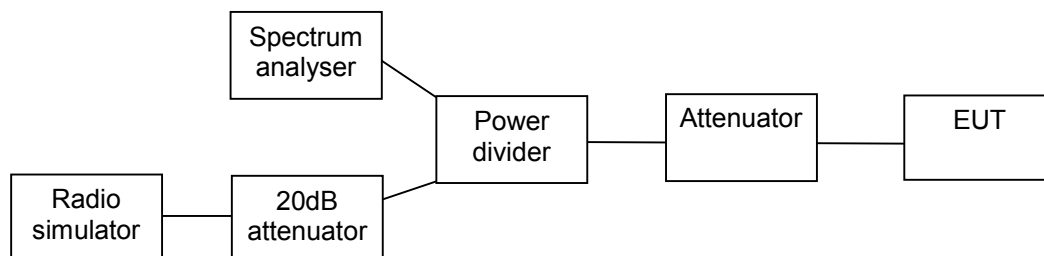


3. 99 % occupied bandwidth

(FCC §2.1049(h), RSS-133 6.6, RSS-139 6.6, RSS-132 6.6, RSS-130 6.6, RSS-199 6.6)

EUT with DUT number	RM-1104, DUT 100019
Accessories with DUT numbers	SD-244R, DUT 100022
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20-25 / 40-50 / 98.0-102.0
Date of measurements	16-Jun-2015
Measured by	Kalle Hannila

3.1. Test Setup



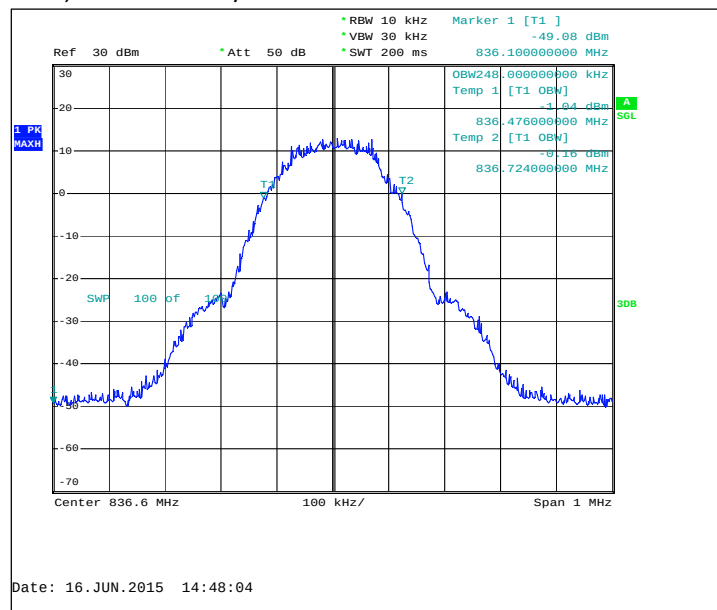
3.2. Test method and limit

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

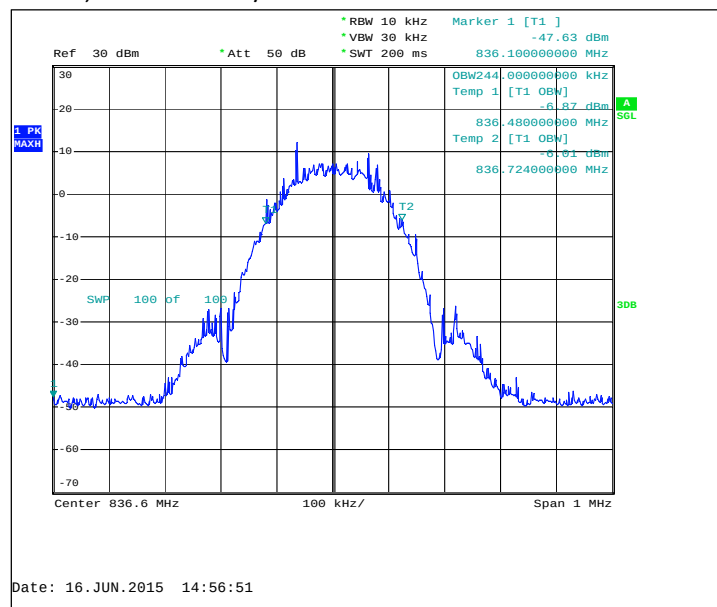
3.3. GSM 850 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
GSM	248
EGPRS	244

GSM, Channel 190 / 836.6 MHz



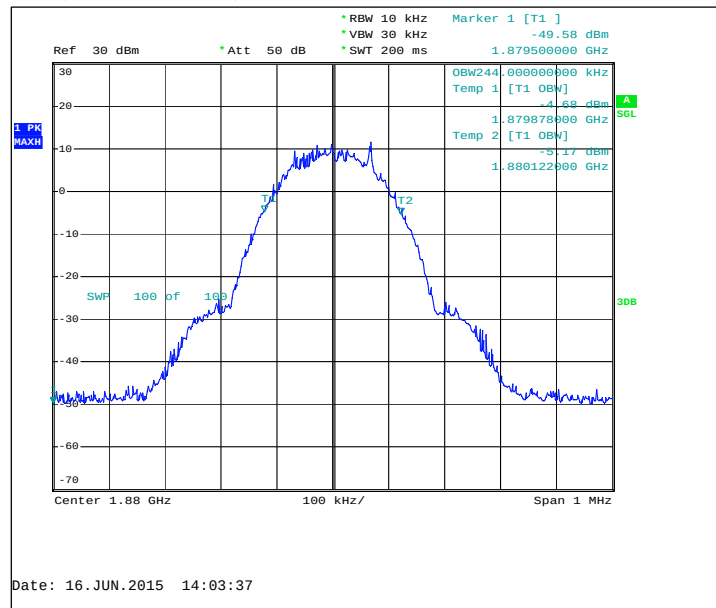
EGPRS, Channel 190 / 836.6 MHz



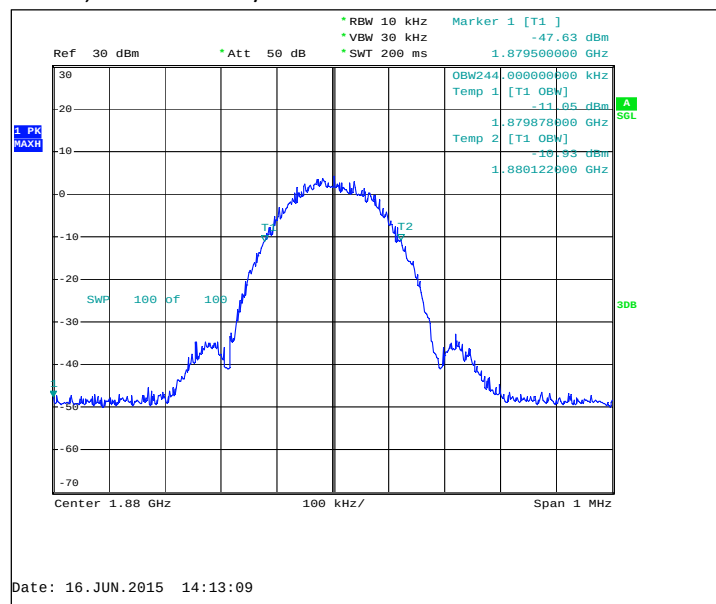
3.4. GSM 1900 Test results

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

GSM, Channel 661 / 1880.0 MHz



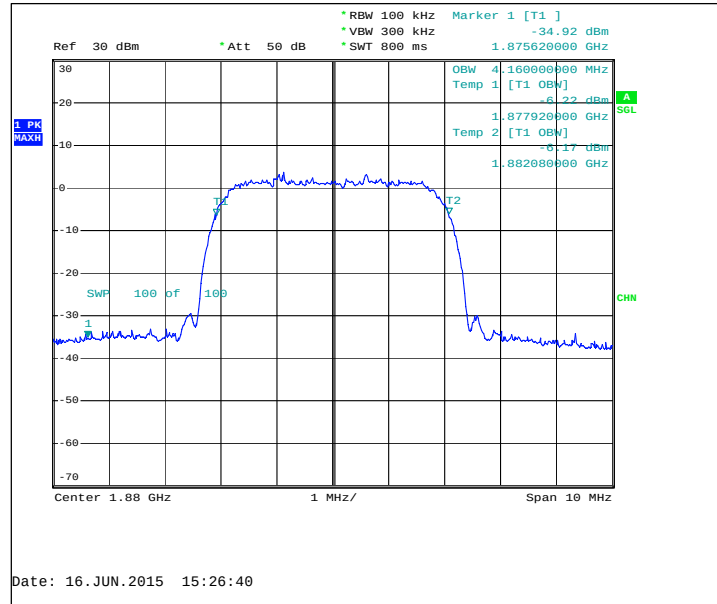
EGPRS, Channel 661 / 1880.0 MHz



3.5. WCDMA2 Test results

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

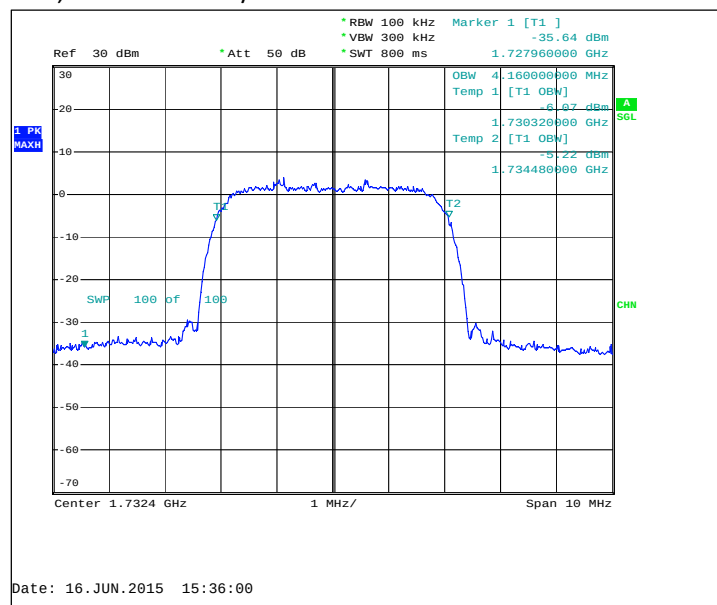
FDD, Channel 9400 / 1880.0 MHz



3.6. WCDMA4 Test results

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

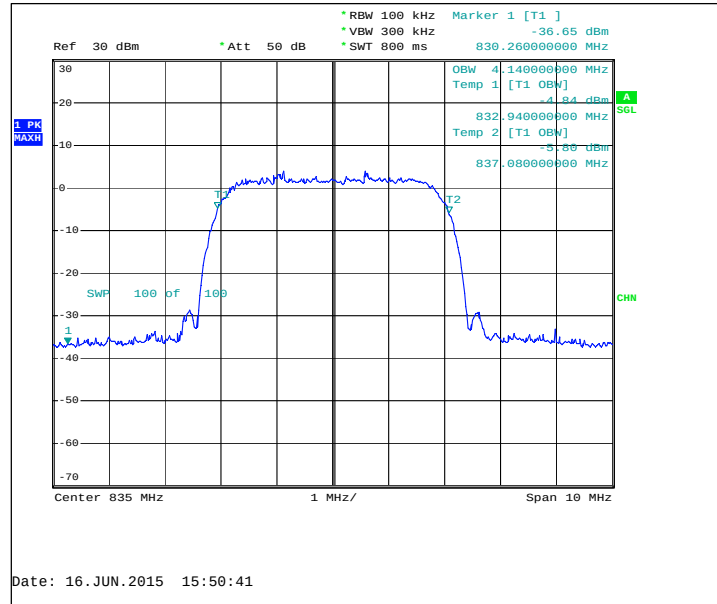
FDD, Channel 1412 / 1732.4 MHz



3.7. WCDMA5 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD	4140

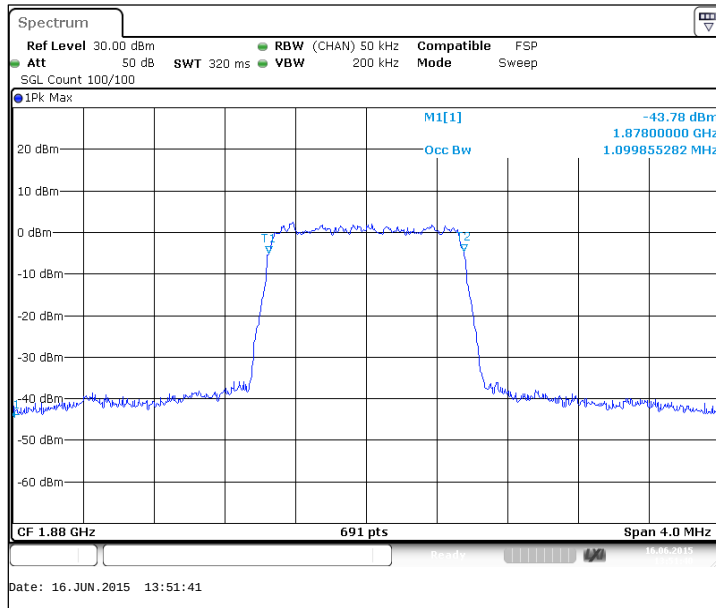
FDD, Channel 4175 / 835.0 MHz



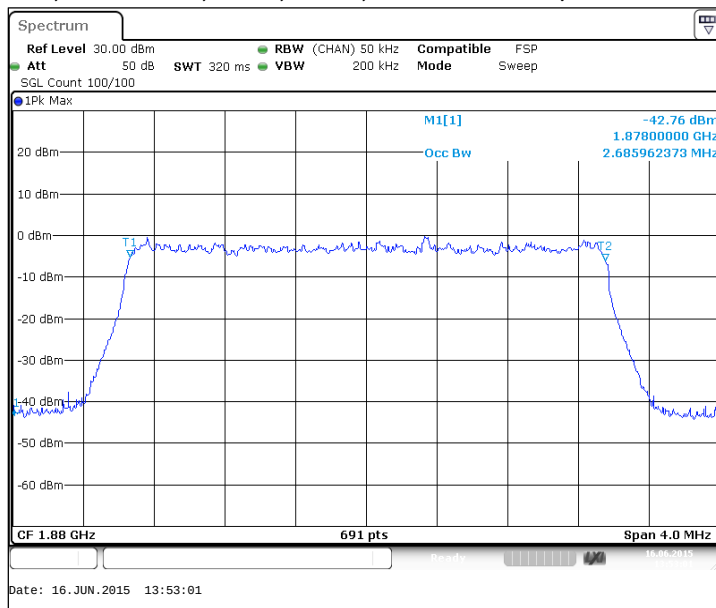
3.8. LTE2 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 1.4MHz, QPSK, 6 RB	1099.9
FDD, CBW 3MHz, QPSK, 15 RB	2686
FDD, CBW 5MHz, QPSK, 25 RB	4487.7
FDD, CBW 10MHz, QPSK, 50 RB	8943.6
FDD, CBW 15MHz, QPSK, 75 RB	13429.8
FDD, CBW 20MHz, QPSK, 100 RB	17872.6
FDD, CBW 1.4MHz, 16QAM, 6 RB	1099.9
FDD, CBW 3MHz, 16QAM, 15 RB	2680.2
FDD, CBW 5MHz, 16QAM, 25 RB	4477.6
FDD, CBW 10MHz, 16QAM, 50 RB	8943.6
FDD, CBW 15MHz, 16QAM, 75 RB	13371.9
FDD, CBW 20MHz, 16QAM, 100 RB	17872.6

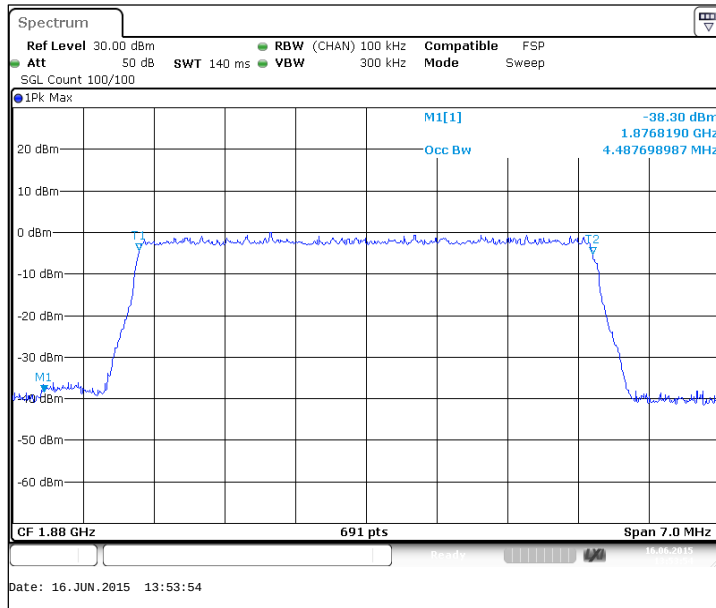
FDD, CBW 1.4MHz, QPSK, 6 RB, Channel 18900 / 1880.0 MHz



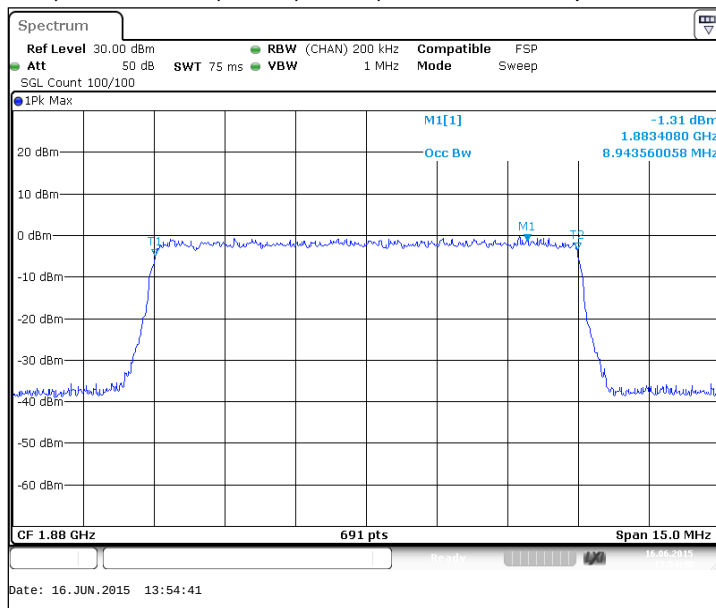
FDD, CBW 3MHz, QPSK, 15 RB, Channel 18900 / 1880.0 MHz



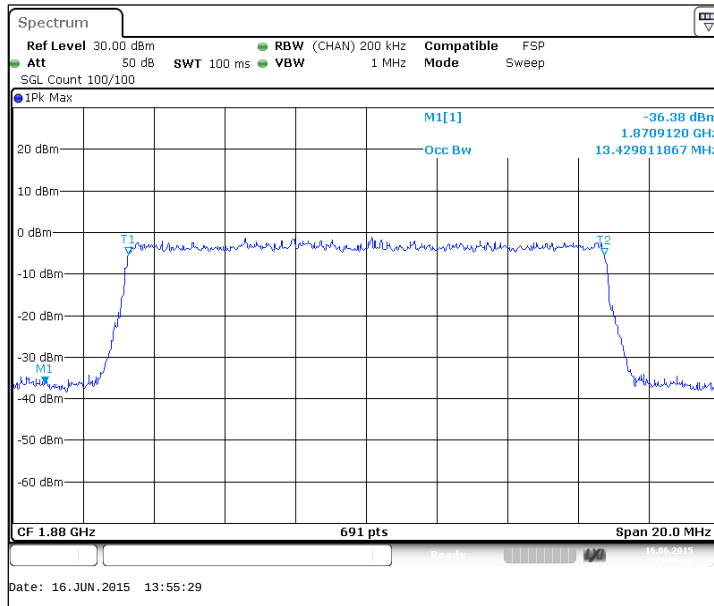
FDD, CBW 5MHz, QPSK, 25 RB, Channel 18900 / 1880.0 MHz



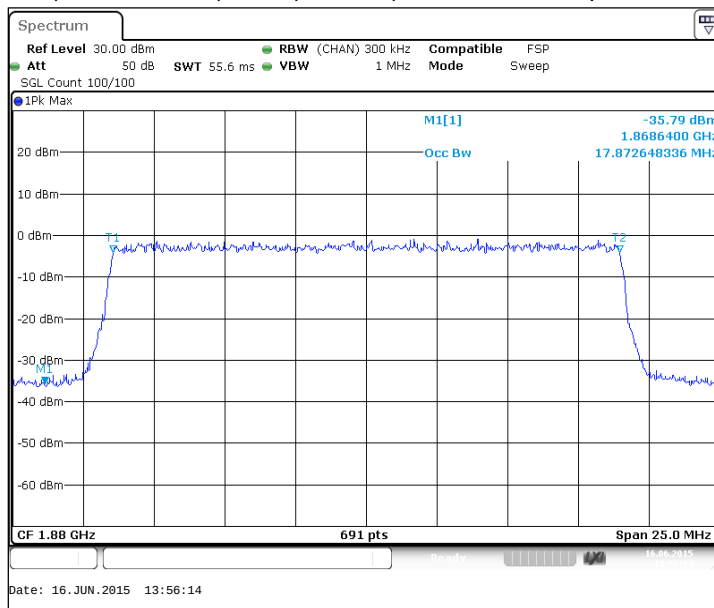
FDD, CBW 10MHz, QPSK, 50 RB, Channel 18900 / 1880.0 MHz



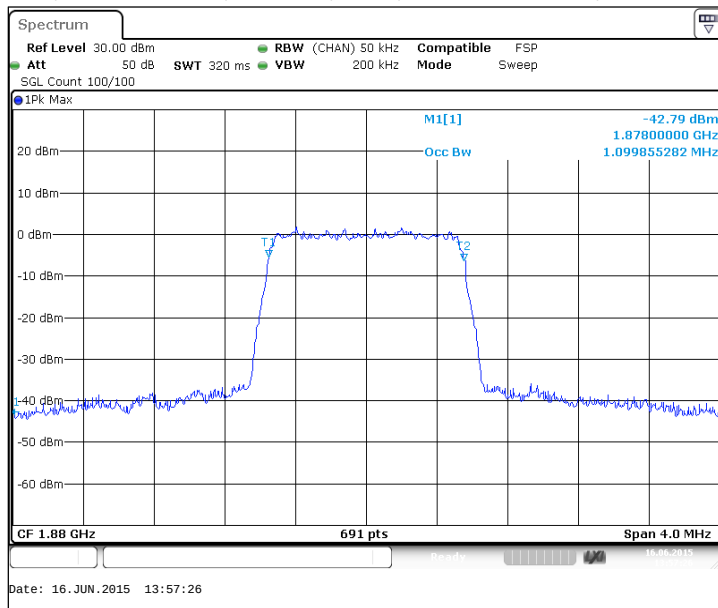
FDD, CBW 15MHz, QPSK, 75 RB, Channel 18900 / 1880.0 MHz



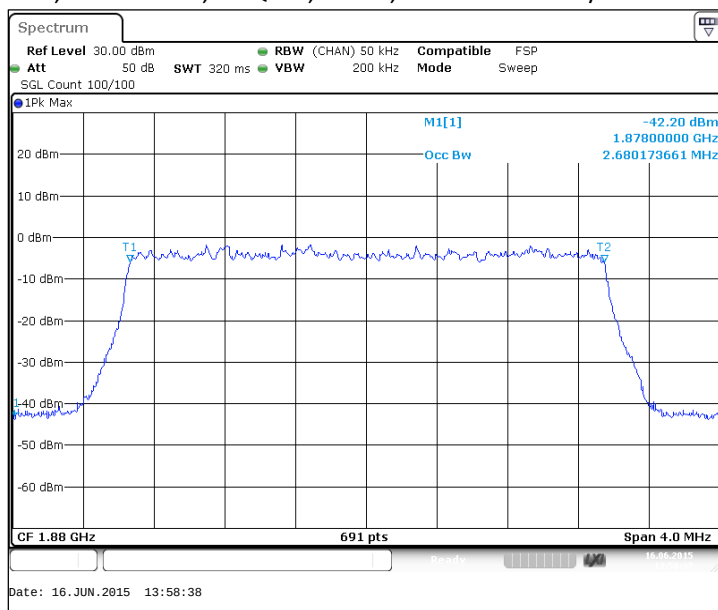
FDD, CBW 20MHz, QPSK, 100 RB, Channel 18900 / 1880.0 MHz



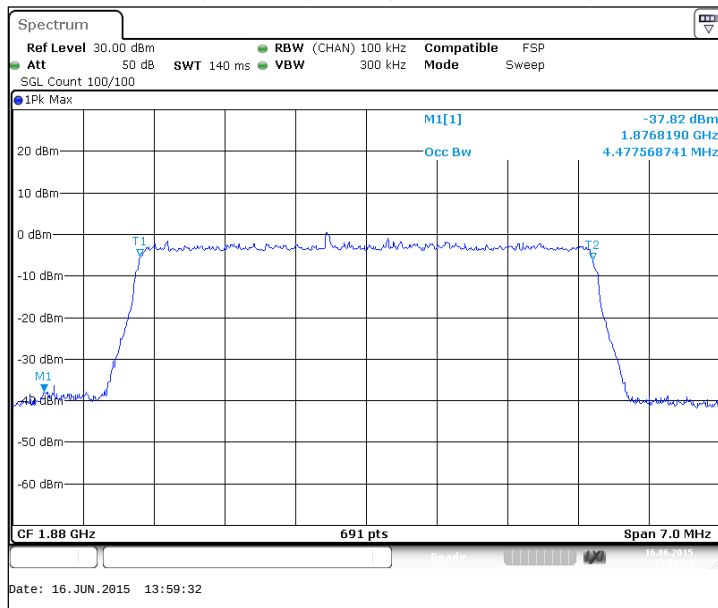
FDD, CBW 1.4MHz, 16QAM, 6 RB, Channel 18900 / 1880.0 MHz



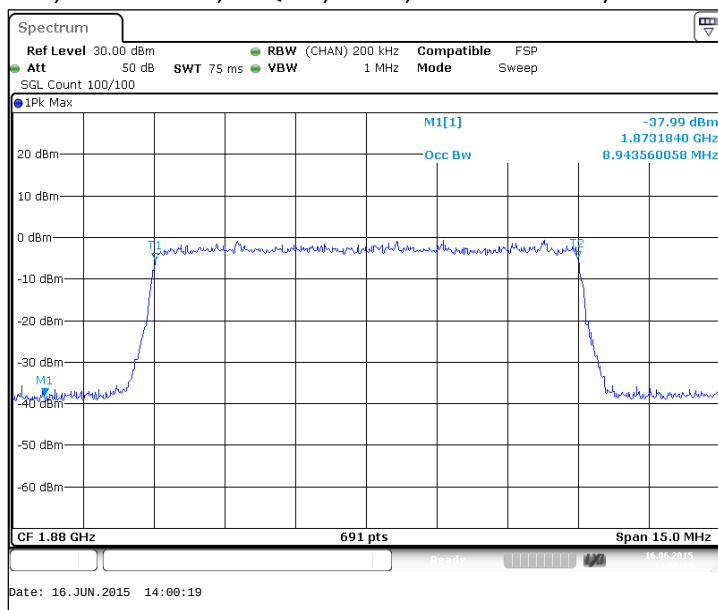
FDD, CBW 3MHz, 16QAM, 15 RB, Channel 18900 / 1880.0 MHz



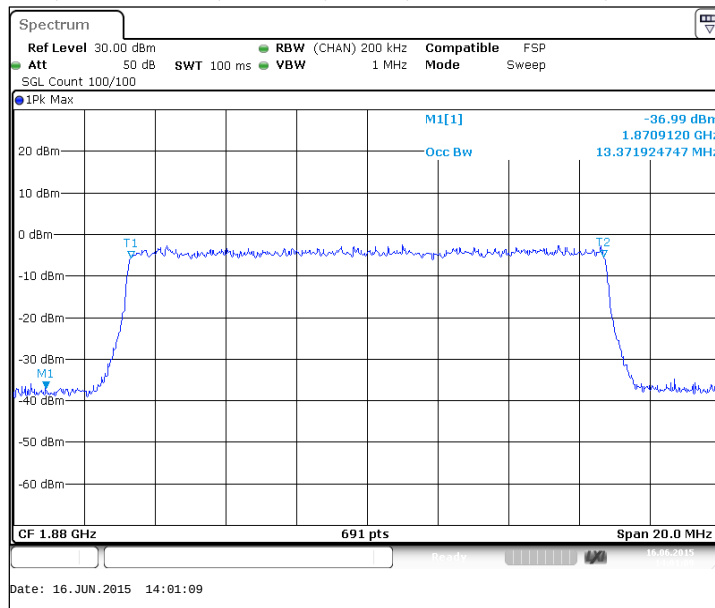
FDD, CBW 5MHz, 16QAM, 25 RB, Channel 18900 / 1880.0 MHz



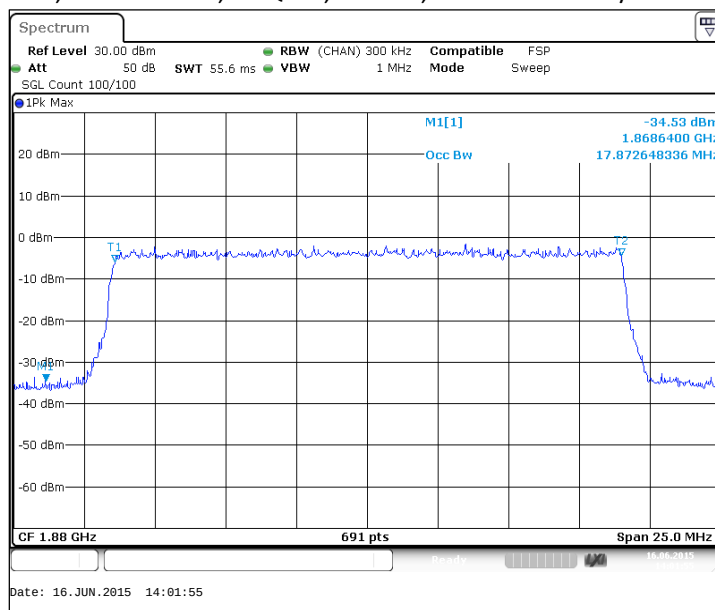
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 18900 / 1880.0 MHz



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



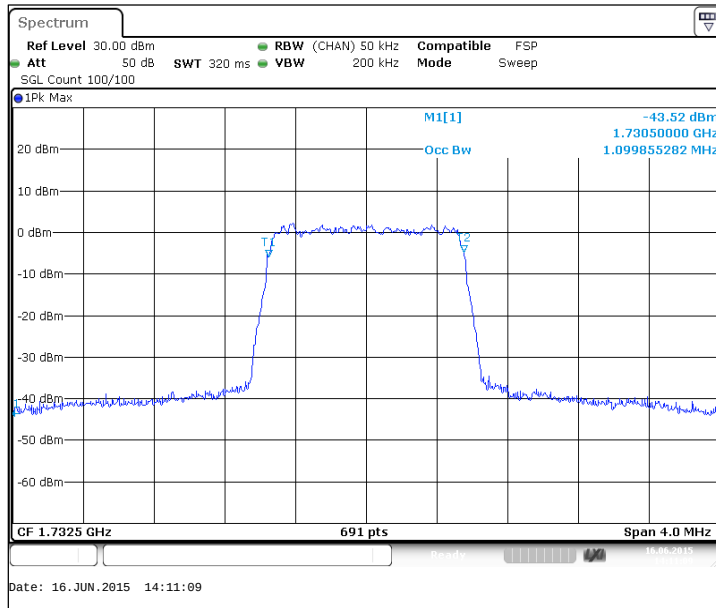
FDD, CBW 20MHz, 16QAM, 100 RB, Channel 18900 / 1880.0 MHz



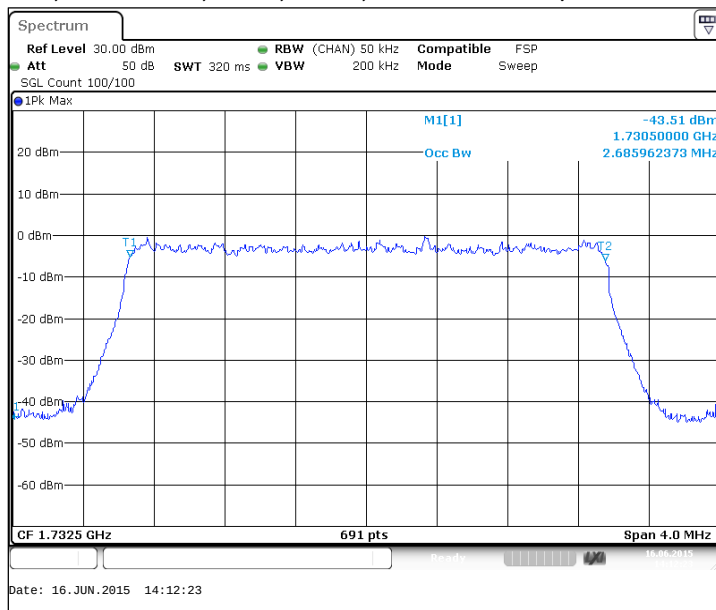
3.9. LTE4 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 1.4MHz, QPSK, 6 RB	1099.9
FDD, CBW 3MHz, QPSK, 15 RB	2686
FDD, CBW 5MHz, QPSK, 25 RB	4487.7
FDD, CBW 10MHz, QPSK, 50 RB	8943.6
FDD, CBW 15MHz, QPSK, 75 RB	13429.8
FDD, CBW 20MHz, QPSK, 100 RB	17872.6
FDD, CBW 1.4MHz, 16QAM, 6 RB	1099.9
FDD, CBW 3MHz, 16QAM, 15 RB	2680.2
FDD, CBW 5MHz, 16QAM, 25 RB	4477.6
FDD, CBW 10MHz, 16QAM, 50 RB	8943.6
FDD, CBW 15MHz, 16QAM, 75 RB	13371.9
FDD, CBW 20MHz, 16QAM, 100 RB	17872.6

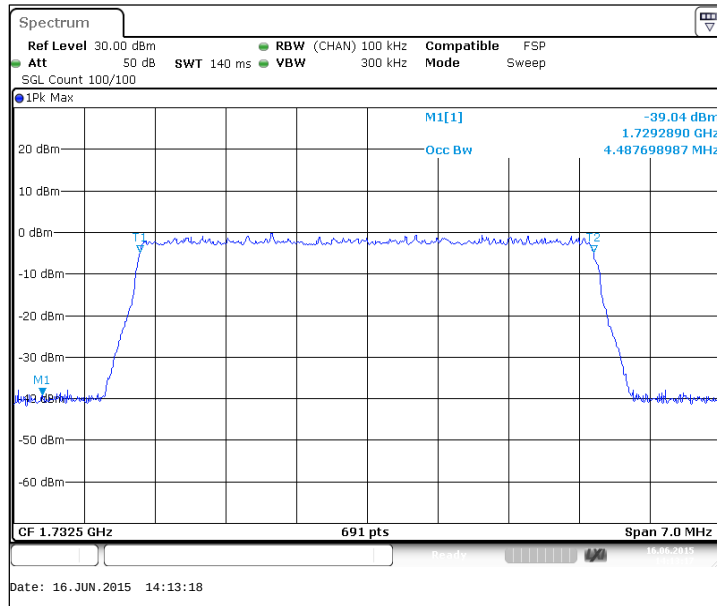
FDD, CBW 1.4MHz, QPSK, 6 RB, Channel 20175 / 1732.5 MHz



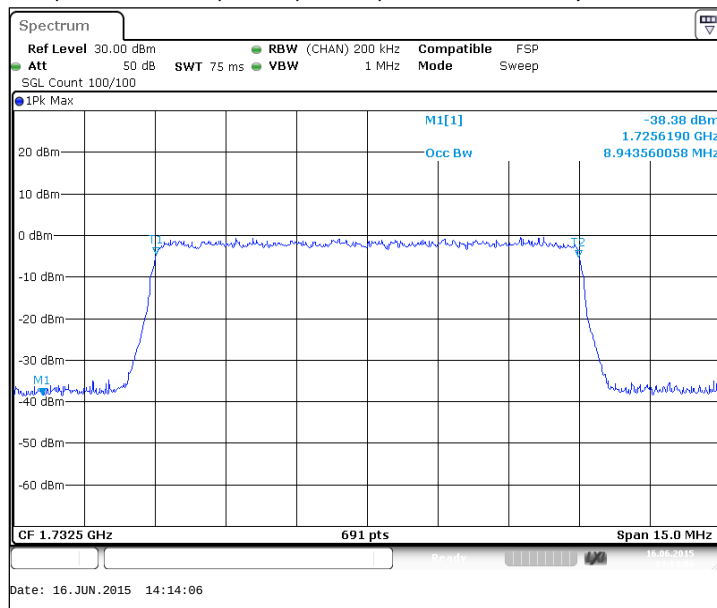
FDD, CBW 3MHz, QPSK, 15 RB, Channel 20175 / 1732.5 MHz



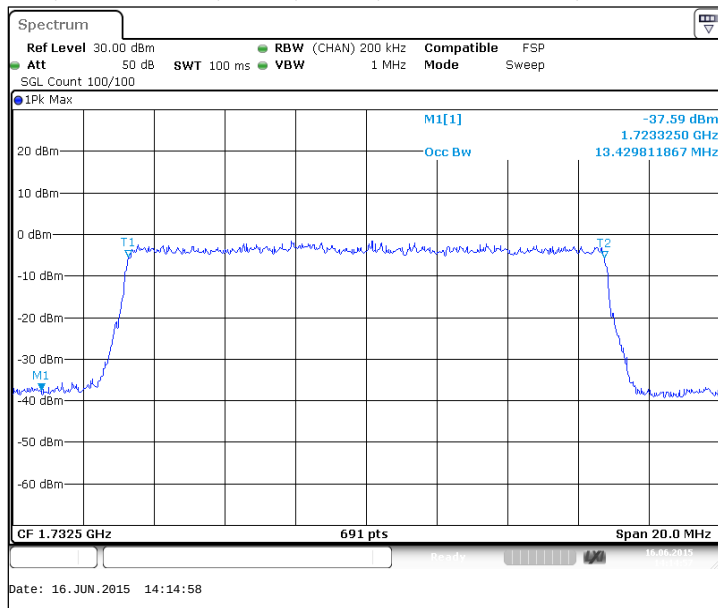
FDD, CBW 5MHz, QPSK, 25 RB, Channel 20175 / 1732.5 MHz



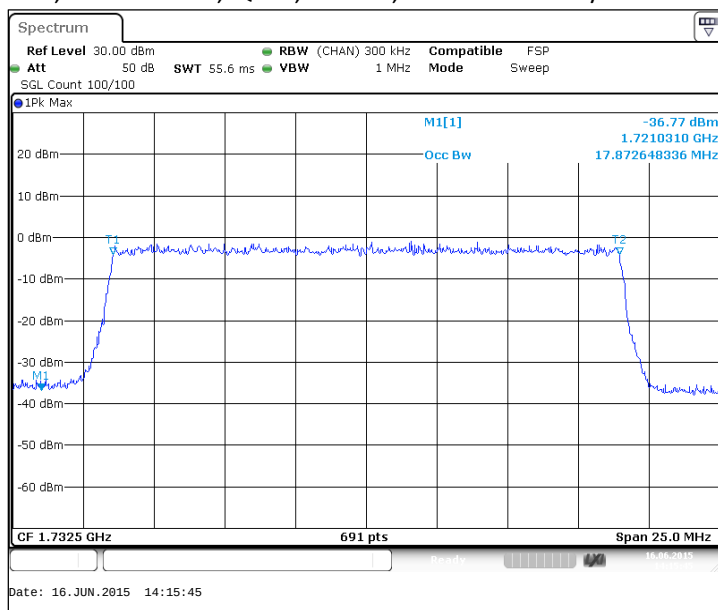
FDD, CBW 10MHz, QPSK, 50 RB, Channel 20175 / 1732.5 MHz



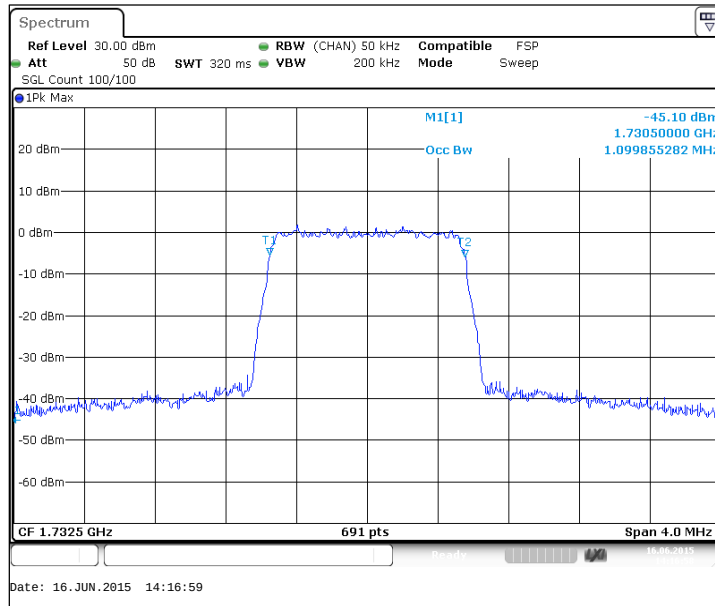
FDD, CBW 15MHz, QPSK, 75 RB, Channel 20175 / 1732.5 MHz



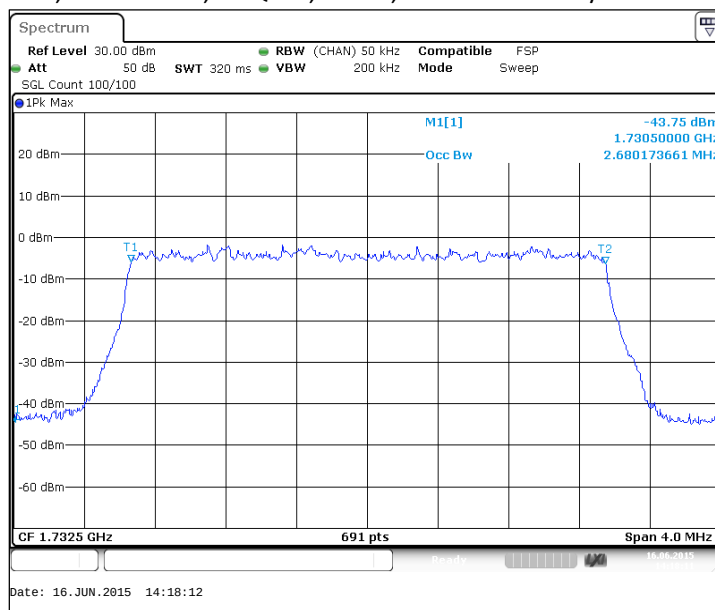
FDD, CBW 20MHz, QPSK, 100 RB, Channel 20175 / 1732.5 MHz



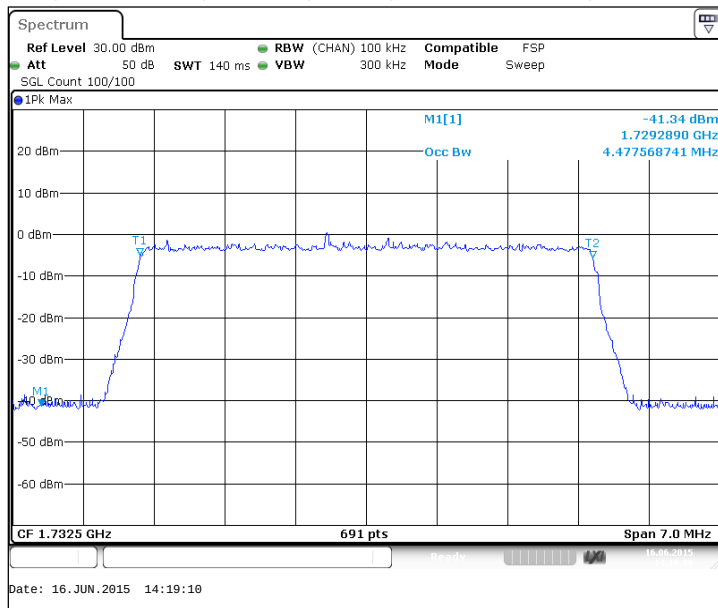
FDD, CBW 1.4MHz, 16QAM, 6 RB, Channel 20175 / 1732.5 MHz



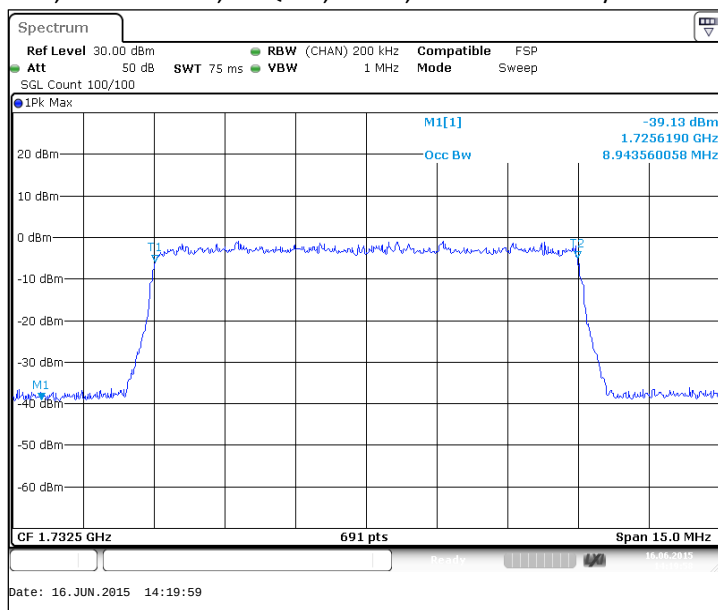
FDD, CBW 3MHz, 16QAM, 15 RB, Channel 20175 / 1732.5 MHz



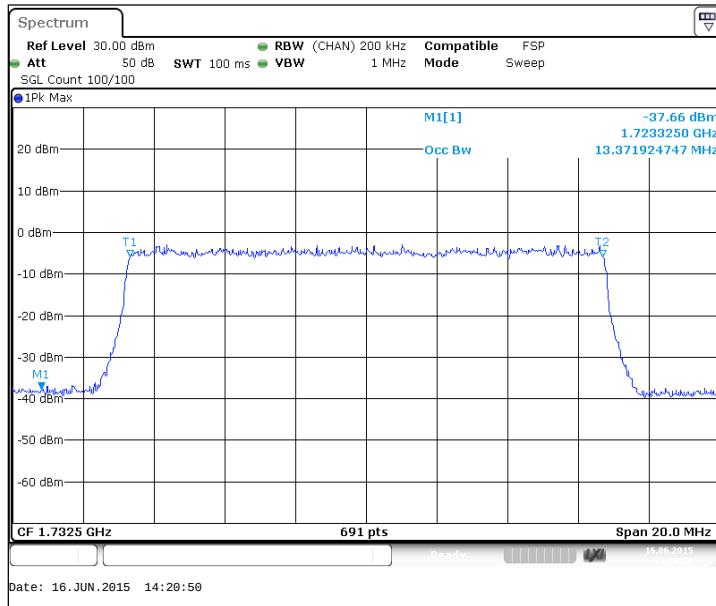
FDD, CBW 5MHz, 16QAM, 25 RB, Channel 20175 / 1732.5 MHz



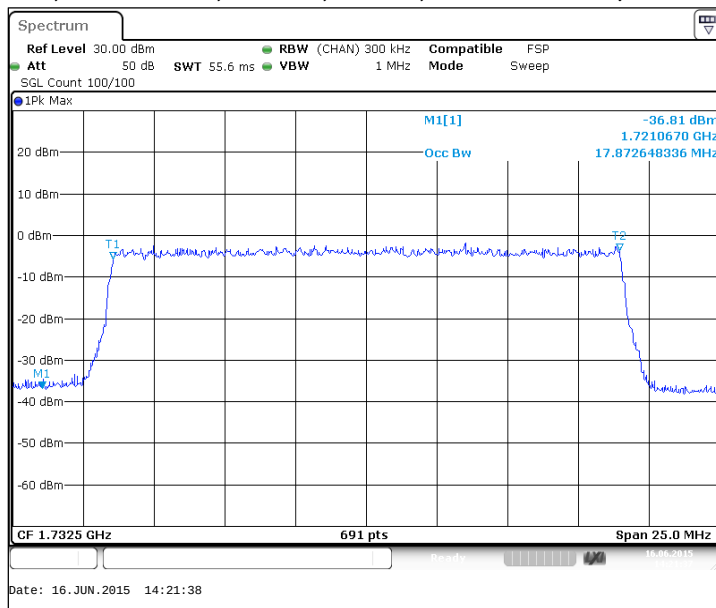
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 20175 / 1732.5 MHz



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



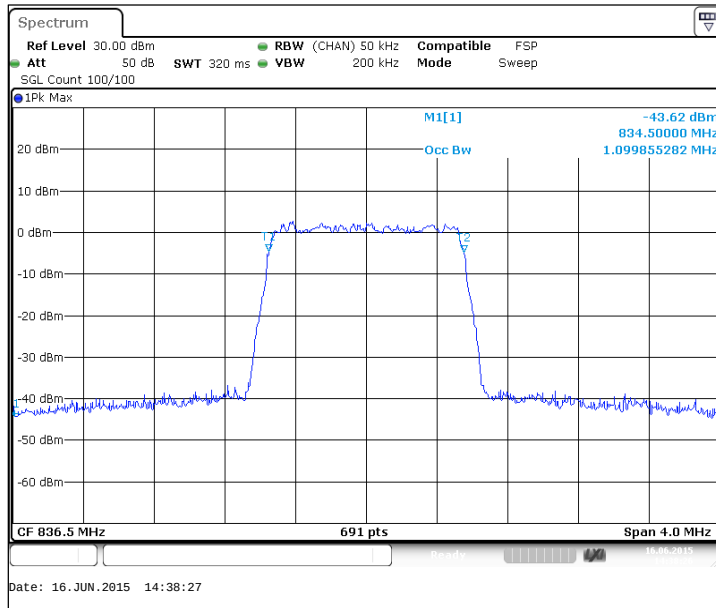
FDD, CBW 20MHz, 16QAM, 100 RB, Channel 20175 / 1732.5 MHz



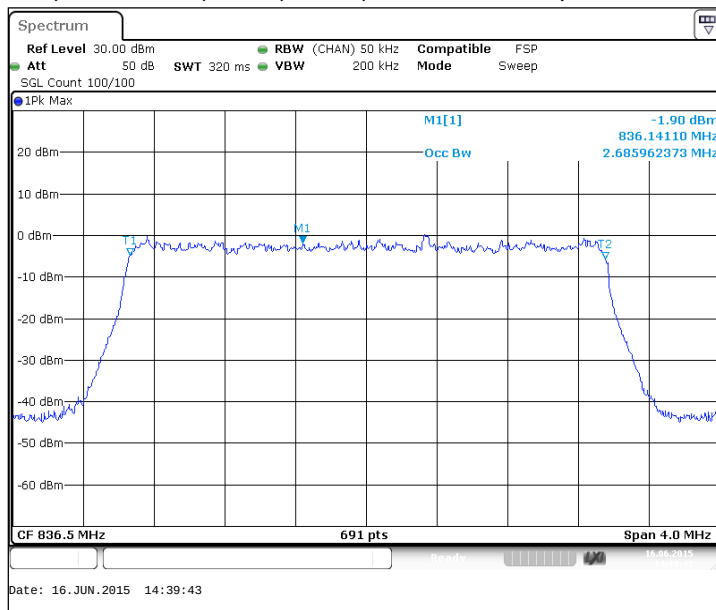
3.10. LTE5 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 1.4MHz, QPSK, 6 RB	1099.9
FDD, CBW 3MHz, QPSK, 15 RB	2686
FDD, CBW 5MHz, QPSK, 25 RB	4487.7
FDD, CBW 10MHz, QPSK, 50 RB	8943.6
FDD, CBW 1.4MHz, 16QAM, 6 RB	1099.9
FDD, CBW 3MHz, 16QAM, 15 RB	2680.2
FDD, CBW 5MHz, 16QAM, 25 RB	4477.6
FDD, CBW 10MHz, 16QAM, 50 RB	8943.6

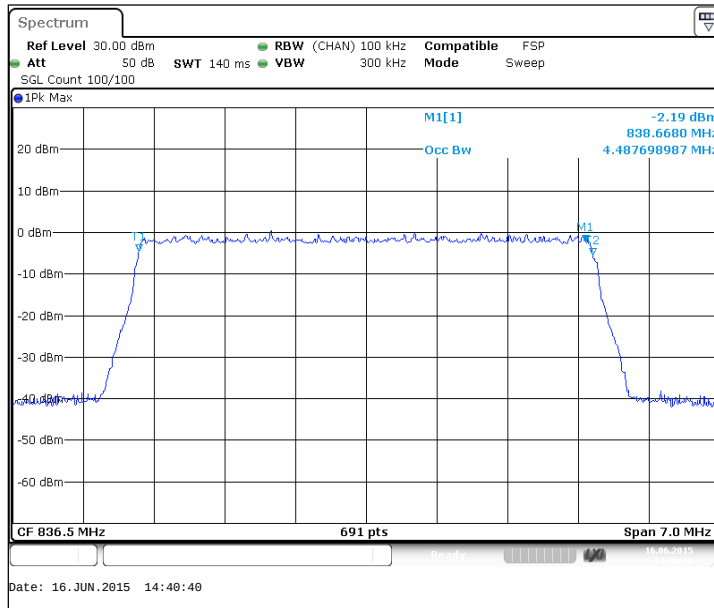
FDD, CBW 1.4MHz, QPSK, 6 RB, Channel 20525 / 836.5 MHz



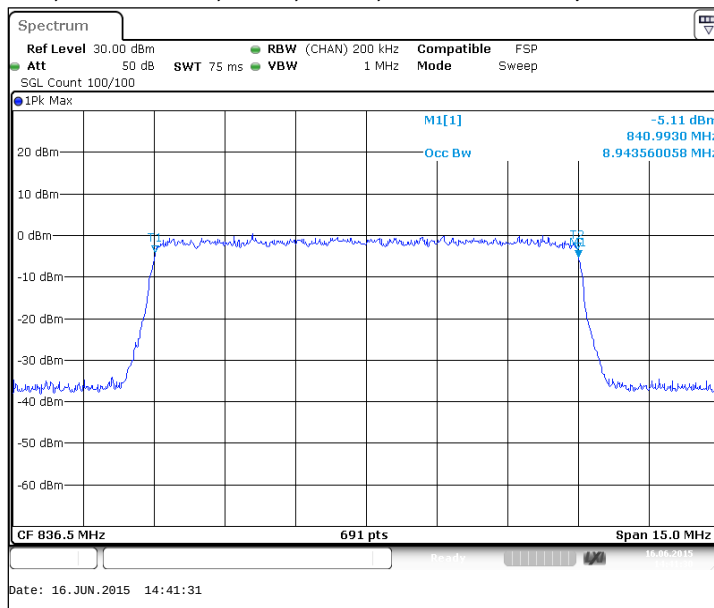
FDD, CBW 3MHz, QPSK, 15 RB, Channel 20525 / 836.5 MHz



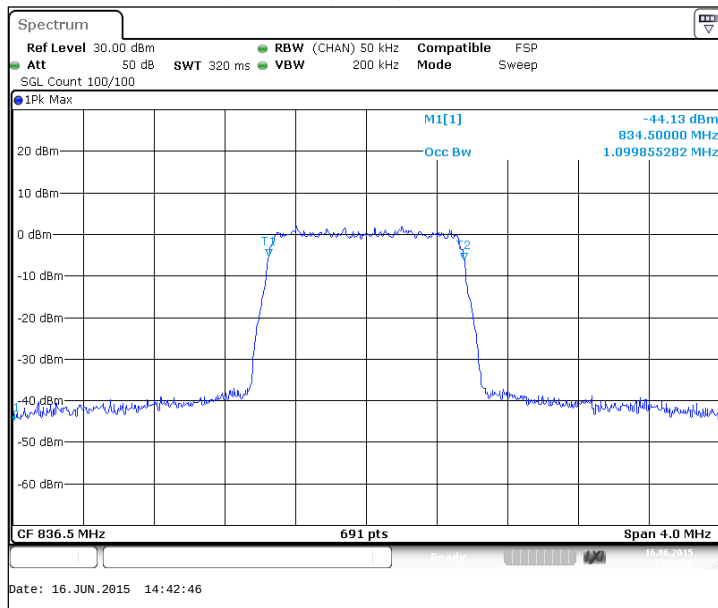
FDD, CBW 5MHz, QPSK, 25 RB, Channel 20525 / 836.5 MHz



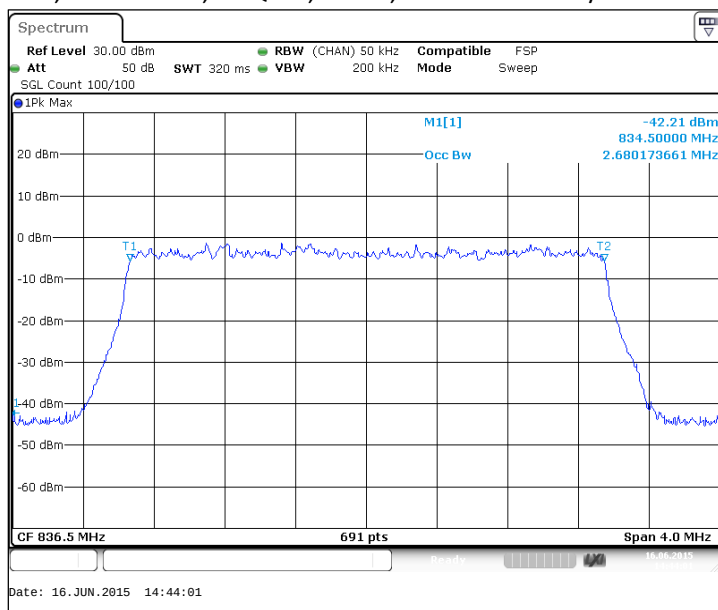
FDD, CBW 10MHz, QPSK, 50 RB, Channel 20525 / 836.5 MHz



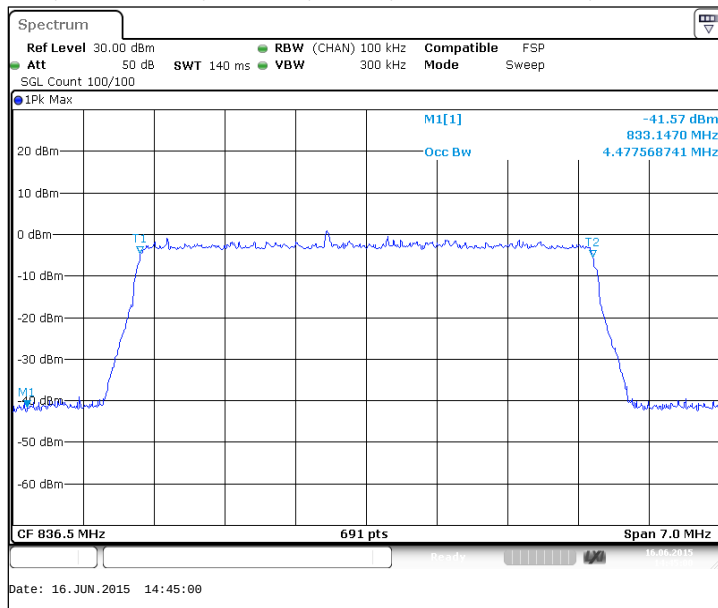
FDD, CBW 1.4MHz, 16QAM, 6 RB, Channel 20525 / 836.5 MHz



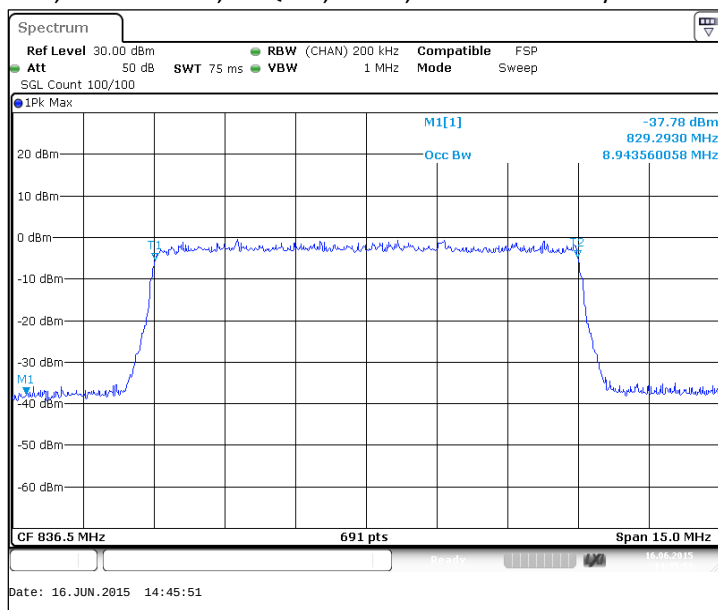
FDD, CBW 3MHz, 16QAM, 15 RB, Channel 20525 / 836.5 MHz



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



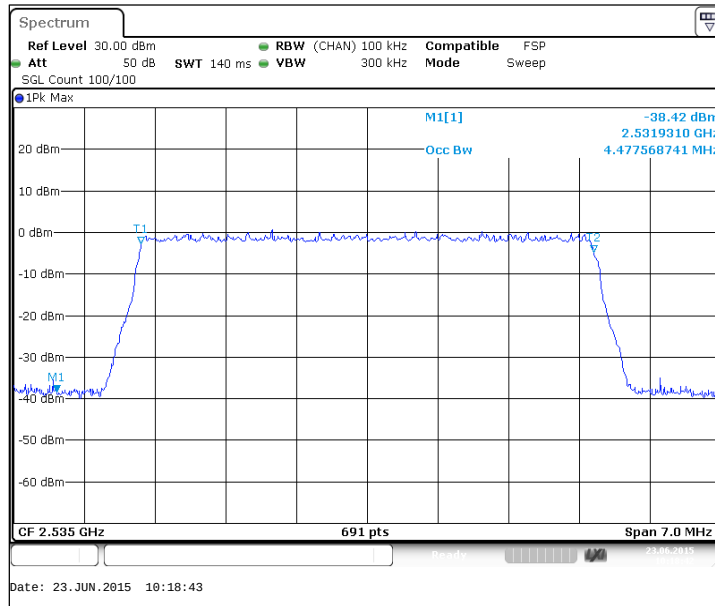
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 20525 / 836.5 MHz



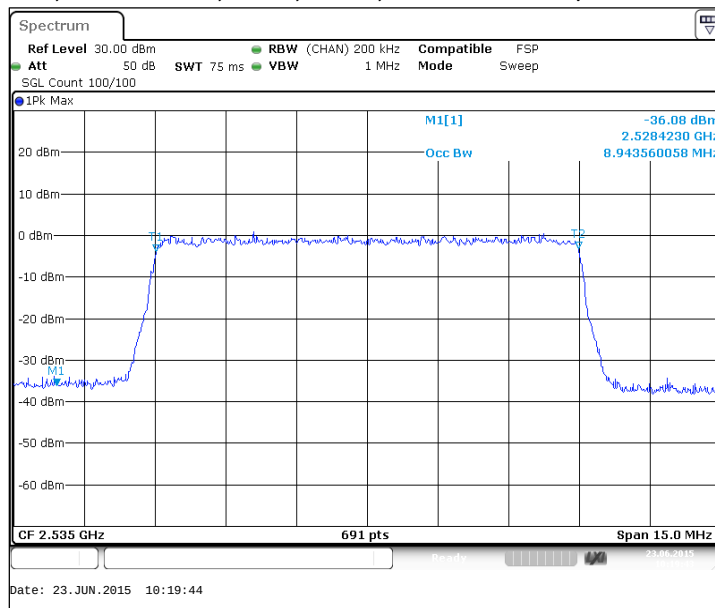
3.11. LTE7 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 5MHz, QPSK, 25 RB	4477.6
FDD, CBW 10MHz, QPSK, 50 RB	8943.6
FDD, CBW 15MHz, QPSK, 75 RB	13429.8
FDD, CBW 20MHz, QPSK, 100 RB	17872.6
FDD, CBW 5MHz, 16QAM, 25 RB	4477.6
FDD, CBW 10MHz, 16QAM, 50 RB	8943.6
FDD, CBW 15MHz, 16QAM, 75 RB	13400.9
FDD, CBW 20MHz, 16QAM, 100 RB	17908.8

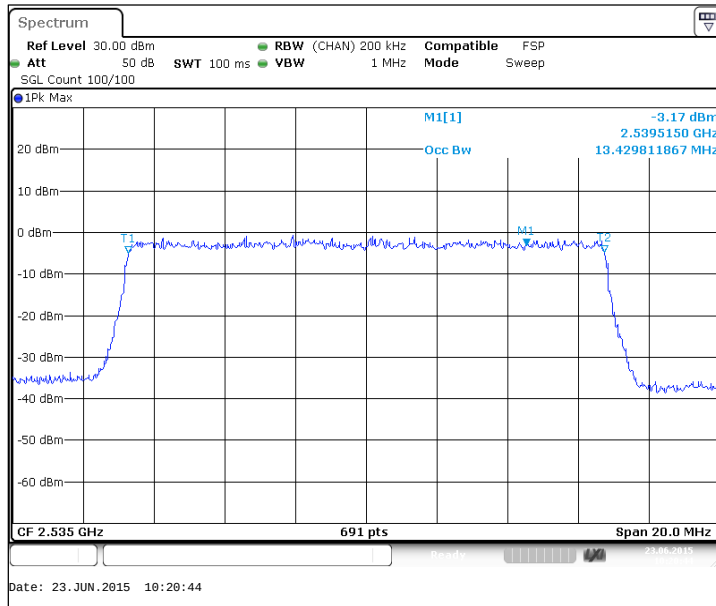
FDD, CBW 5MHz, QPSK, 25 RB, Channel 21100 / 2535.0 MHz



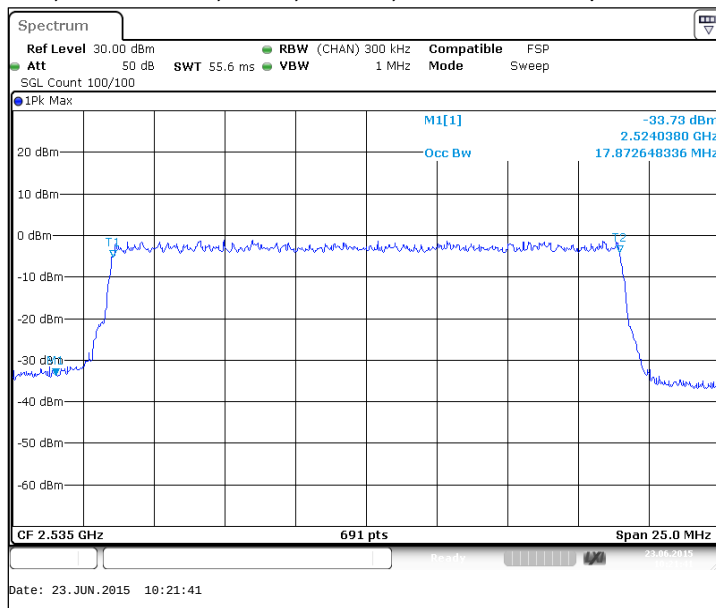
FDD, CBW 10MHz, QPSK, 50 RB, Channel 21100 / 2535.0 MHz



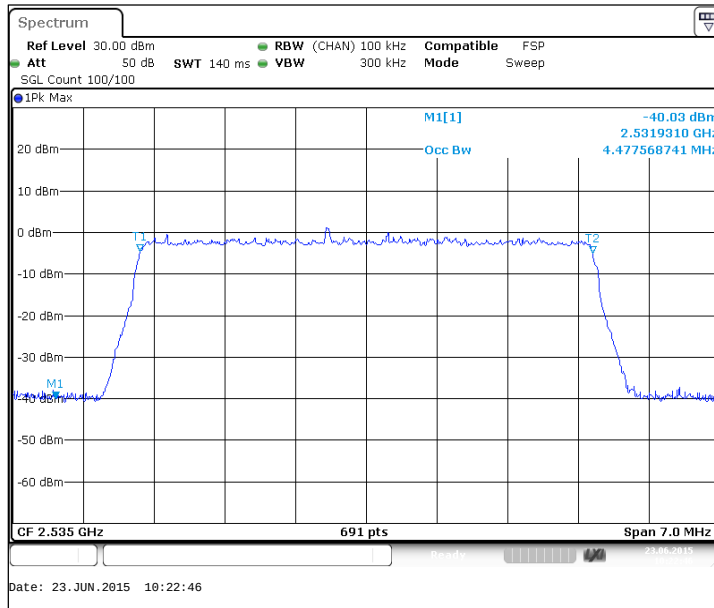
FDD, CBW 15MHz, QPSK, 75 RB, Channel 21100 / 2535.0 MHz



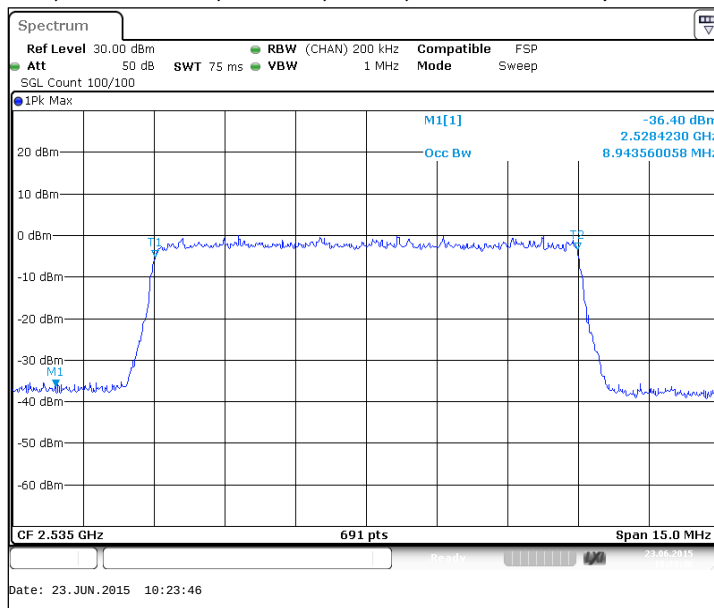
FDD, CBW 20MHz, QPSK, 100 RB, Channel 21100 / 2535.0 MHz



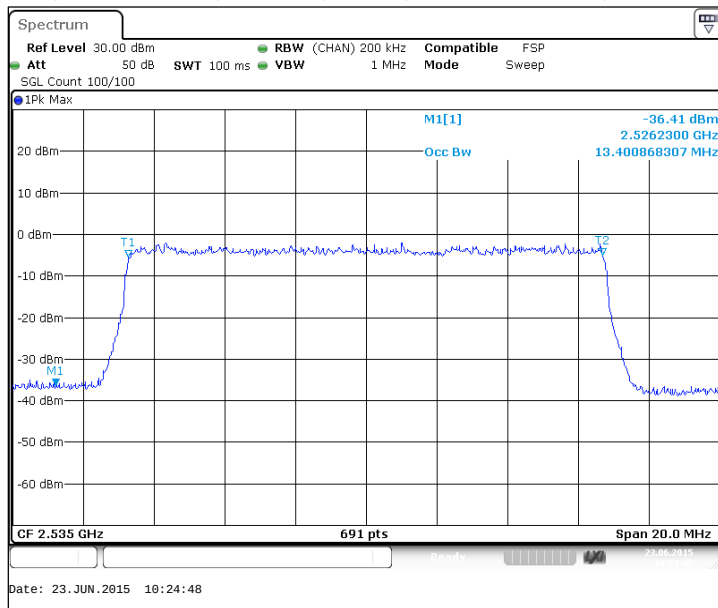
FDD, CBW 5MHz, 16QAM, 25 RB, Channel 21100 / 2535.0 MHz



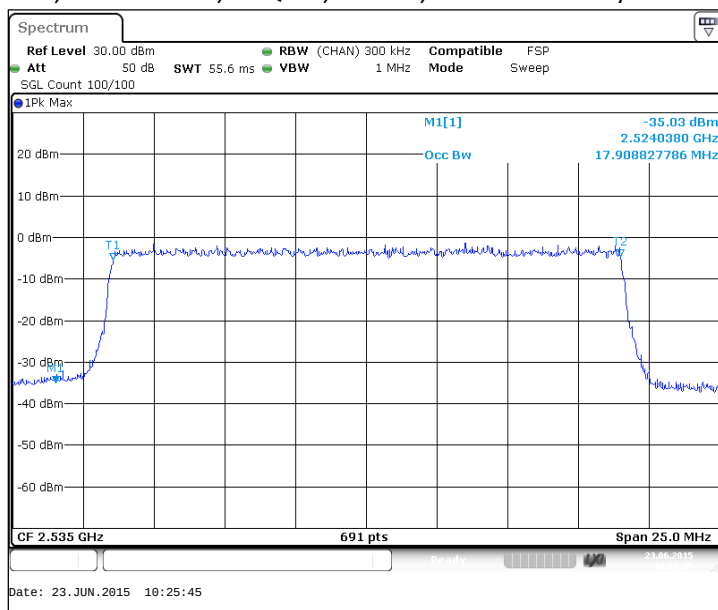
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 21100 / 2535.0 MHz



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



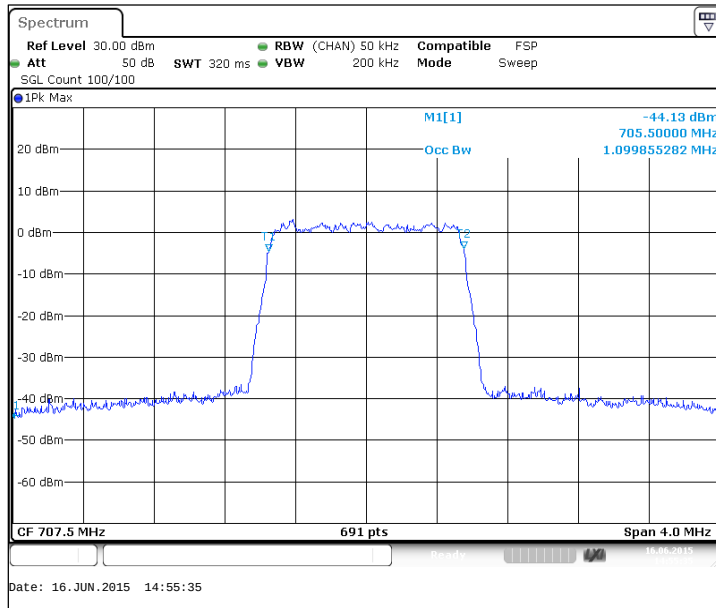
FDD, CBW 20MHz, 16QAM, 100 RB, Channel 21100 / 2535.0 MHz



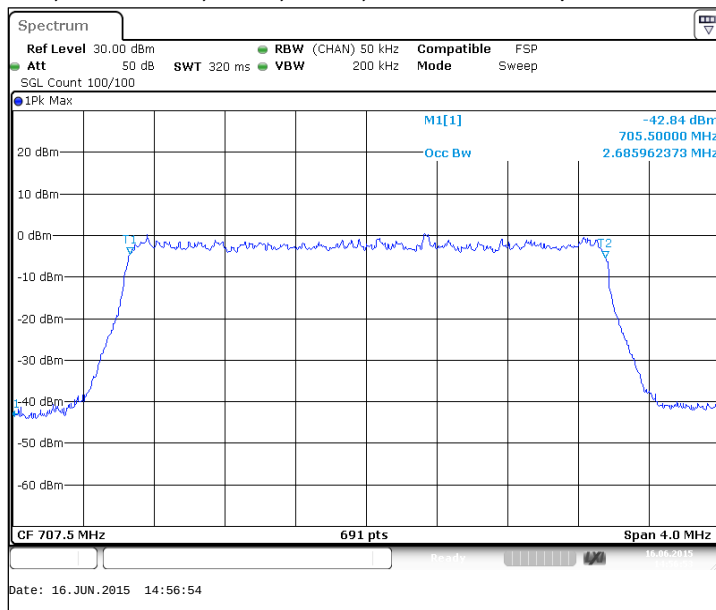
3.12. LTE12 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 1.4MHz, QPSK, 6 RB	1099.9
FDD, CBW 3MHz, QPSK, 15 RB	2686
FDD, CBW 5MHz, QPSK, 25 RB	4487.7
FDD, CBW 10MHz, QPSK, 50 RB	8943.6
FDD, CBW 1.4MHz, 16QAM, 6 RB	1099.9
FDD, CBW 3MHz, 16QAM, 15 RB	2680.2
FDD, CBW 5MHz, 16QAM, 25 RB	4477.6
FDD, CBW 10MHz, 16QAM, 50 RB	8943.6

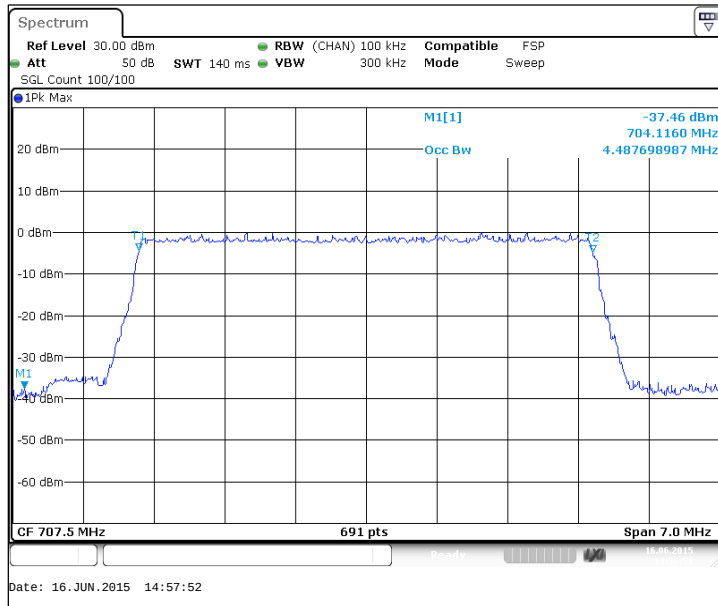
FDD, CBW 1.4MHz, QPSK, 6 RB, Channel 23095 / 707.5 MHz



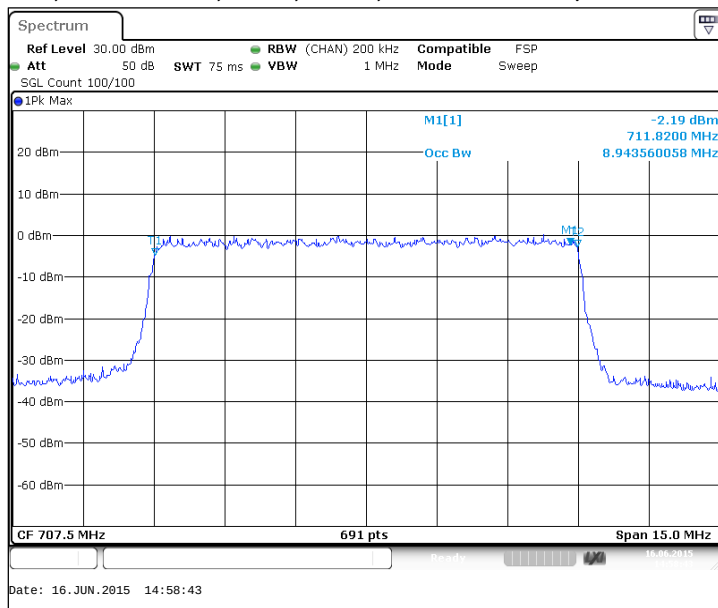
FDD, CBW 3MHz, QPSK, 15 RB, Channel 23095 / 707.5 MHz



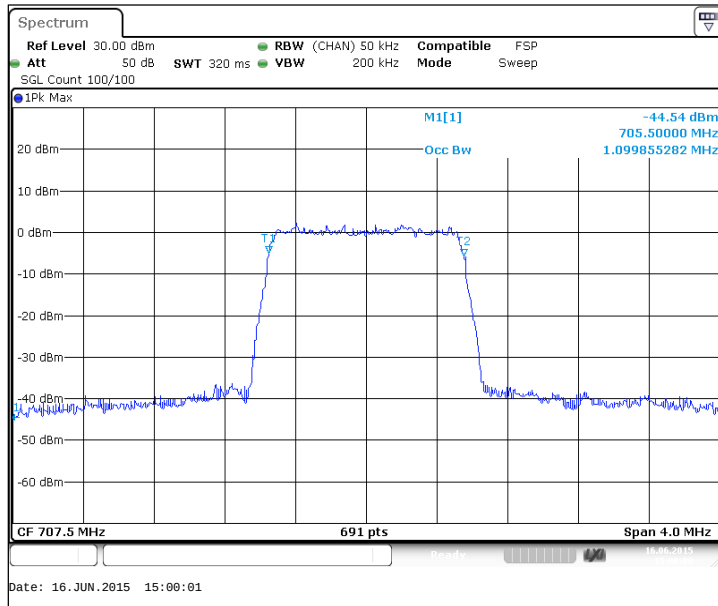
FDD, CBW 5MHz, QPSK, 25 RB, Channel 23095 / 707.5 MHz



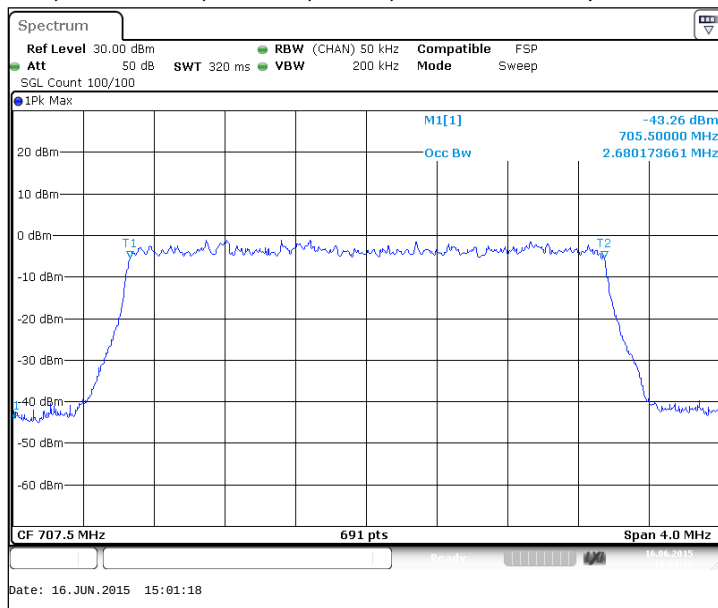
FDD, CBW 10MHz, QPSK, 50 RB, Channel 23095 / 707.5 MHz



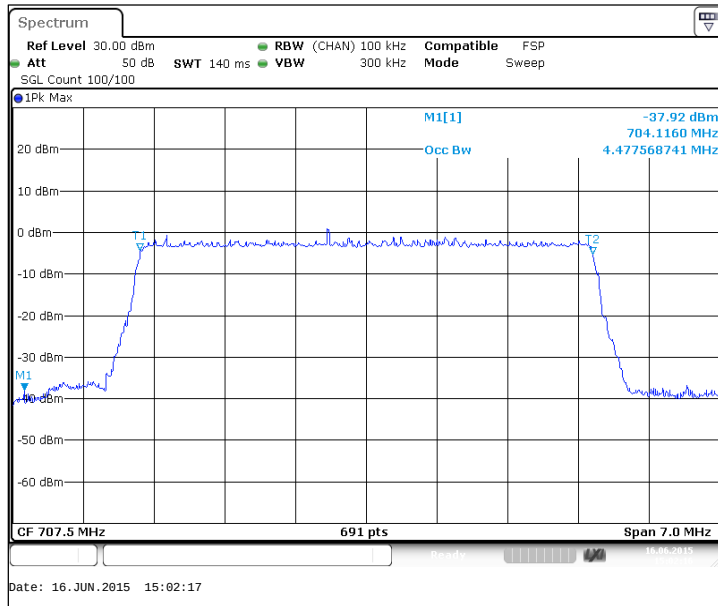
FDD, CBW 1.4MHz, 16QAM, 6 RB, Channel 23095 / 707.5 MHz



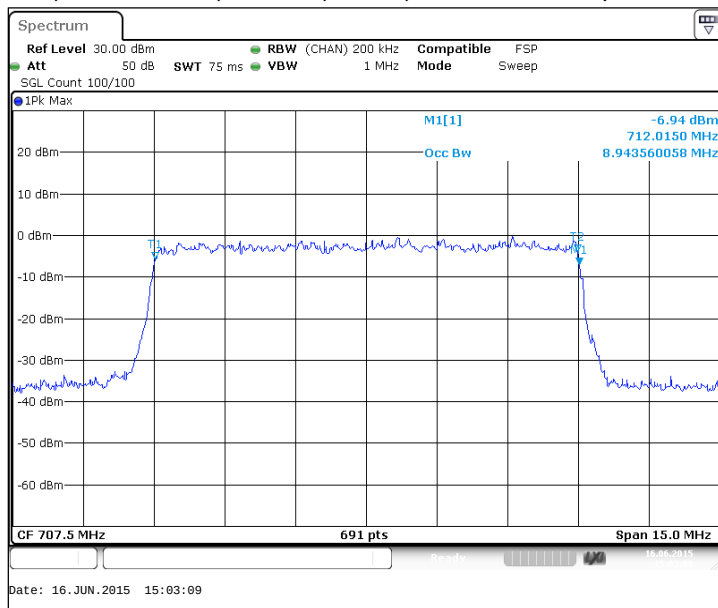
FDD, CBW 3MHz, 16QAM, 15 RB, Channel 23095 / 707.5 MHz



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



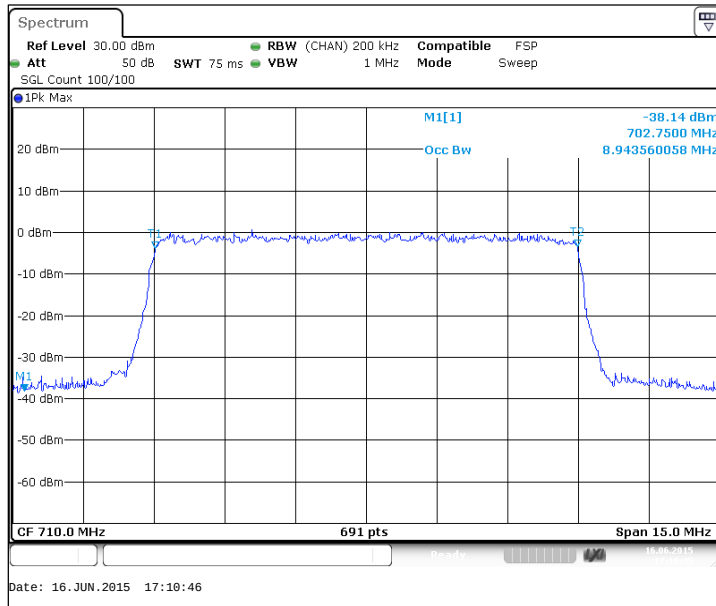
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 23095 / 707.5 MHz



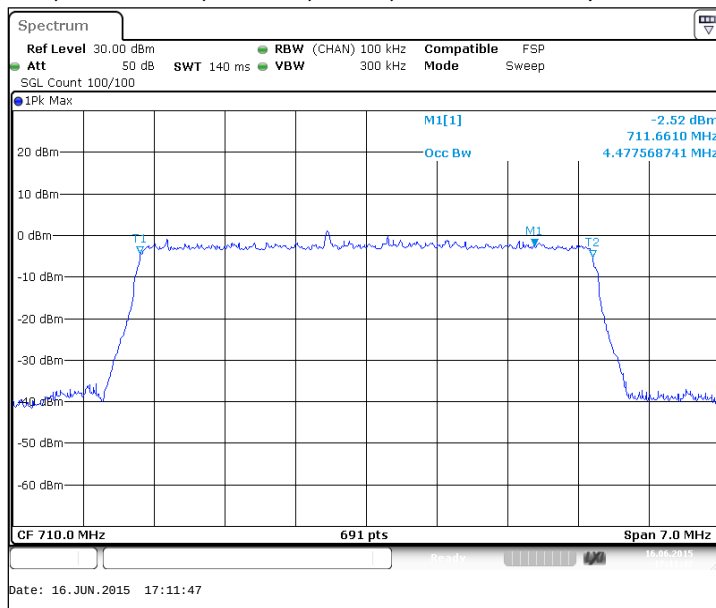
3.13. LTE17 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 10MHz, QPSK, 50 RB	8943.6
FDD, CBW 5MHz, 16QAM, 25 RB	4477.6
FDD, CBW 10MHz, 16QAM, 50 RB	8943.6
FDD, CBW 5MHz, QPSK, 25 RB	4487.7

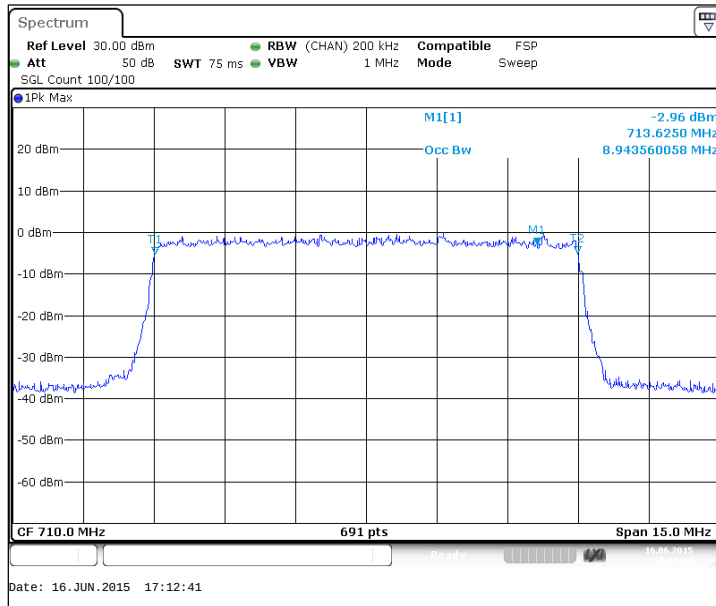
FDD, CBW 10MHz, QPSK, 50 RB, Channel 23790 / 710.0 MHz



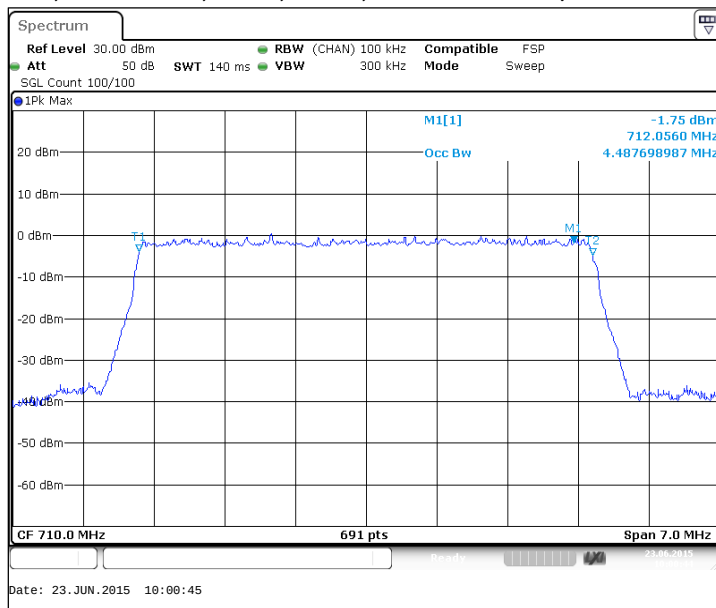
FDD, CBW 5MHz, 16QAM, 25 RB, Channel 23790 / 710.0 MHz



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



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

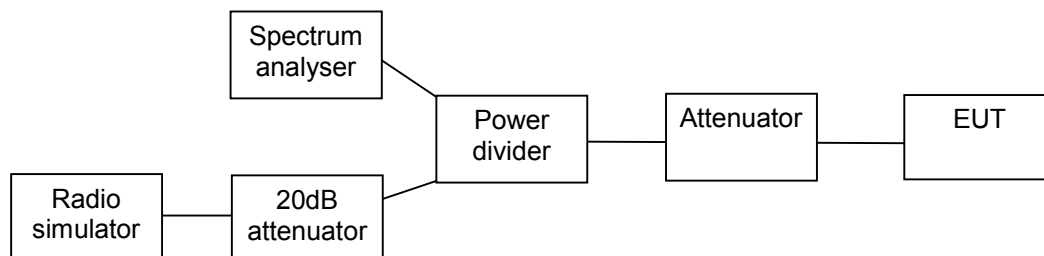


4. Band edge compliance

(FCC §24.238(a), §27.53(l), §27.53(g), §27.53(c)(2)(4), §27.53(f), §22.917(a), §27.53(h), RSS-133 6.5, RSS-139 6.5, RSS-132 4.5, RSS-130 4.6, RSS-199 4.5(b))

EUT with DUT number	RM-1104, DUT 100019
Accessories with DUT numbers	SD-244R, DUT 100022
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20-25 / 40-50 / 98.0-102.0
Date of measurements	16-Jun-2015
Measured by	Kalle Hannila

4.1. Test Setup



4.2. Test method and limit

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

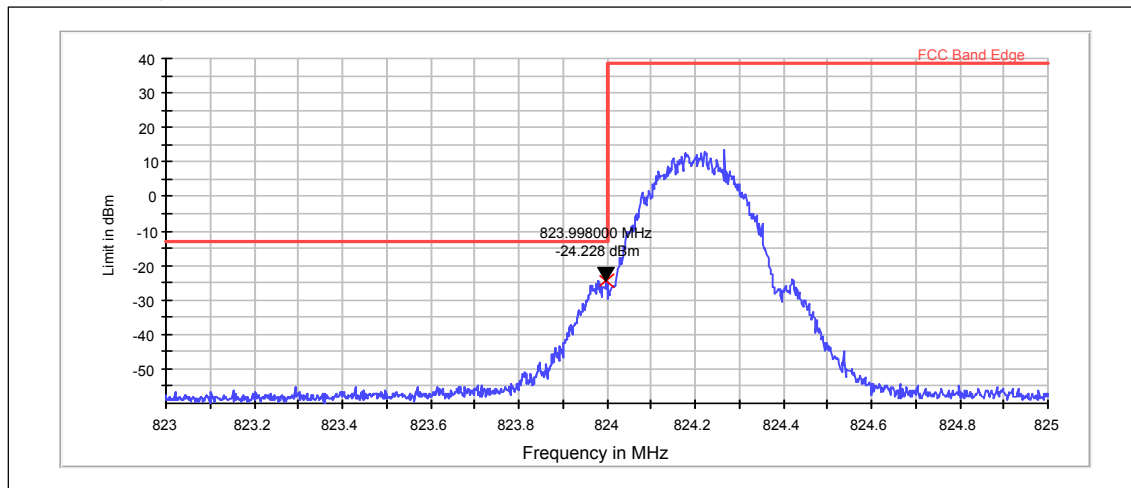
Previous evaluations have shown, that the currently selected CBW/RB configurations represent the worst case for this test. The evaluations are repeated every now and then to ensure, that the selections remain valid.

Limits for band edge compliance measurements

Operation band	Frequency range [MHz]	Limit [dBm]
LTE2	Below 1850 and above 1910	-13
LTE4	Below 1710 and above 1755	-13
LTE5	Below 824 and above 849	-13
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)
LTE13	776.9 -777 and 787 - 787.1 Below 776.9 and above 787.1 763-775 and 793-805	-13 (RBW = 30 kHz, VBW = 100 kHz) -13 (RBW = 100 kHz, VBW = 300 kHz) -35 (RBW = 10 kHz, VBW = 30 kHz)
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)
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)

4.3. GSM 850 Test results

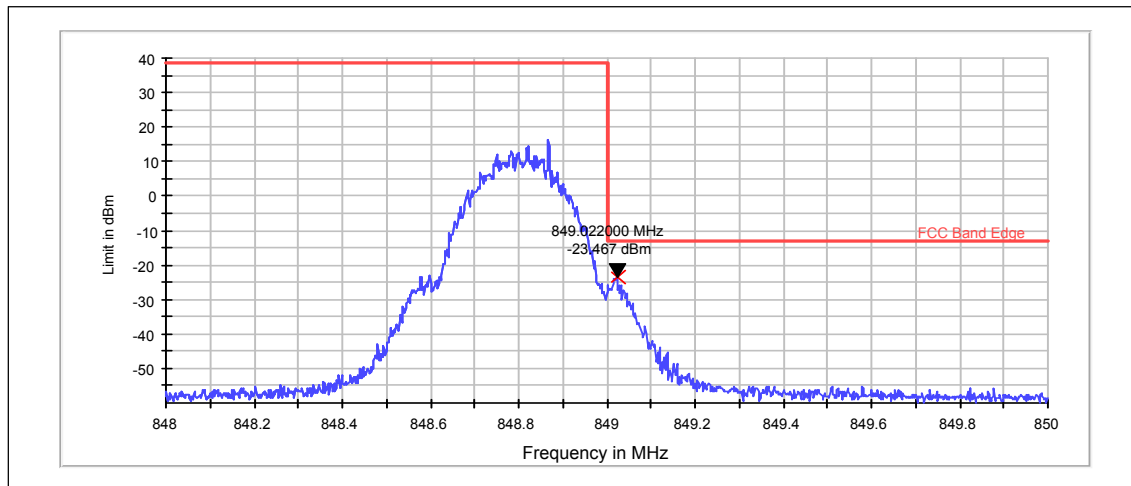
Channel 128 / 824.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	823.998	-24.23	PASSED

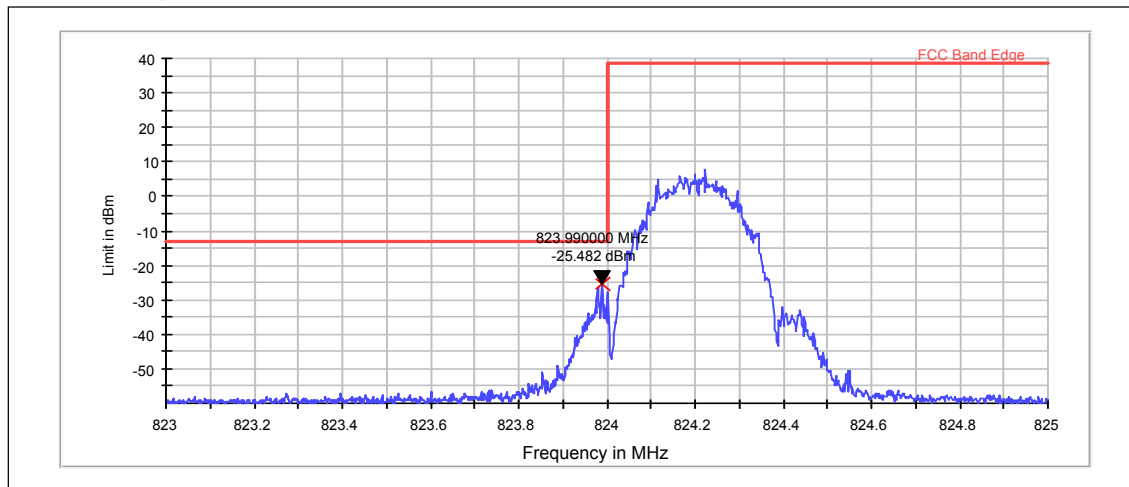
Channel 251 / 848.8 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	849.022	-23.47	PASSED

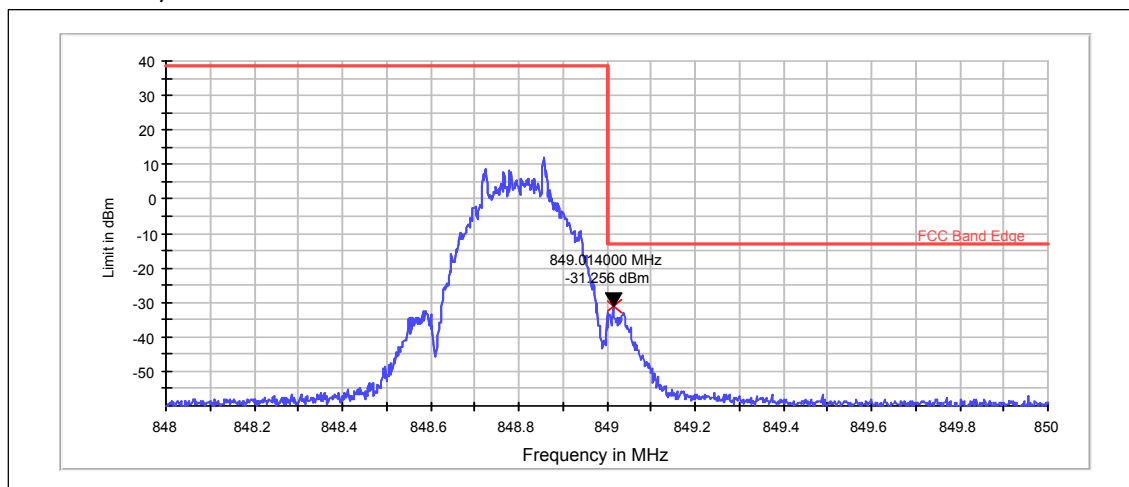
Channel 128 / 824.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	823.990	-25.48	PASSED

Channel 251 / 848.8 MHz

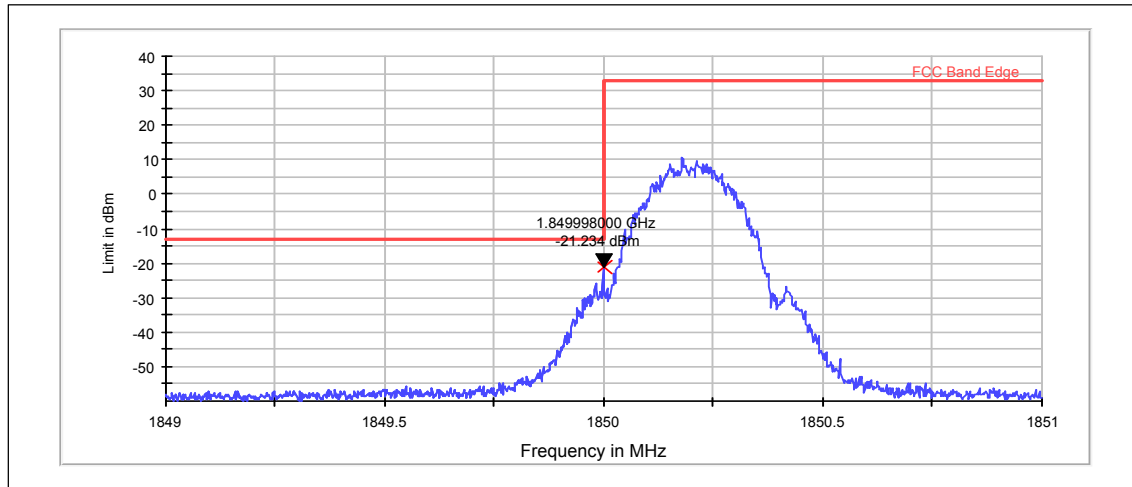


RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	849.014	-31.26	PASSED

4.4. GSM 1900 Test results

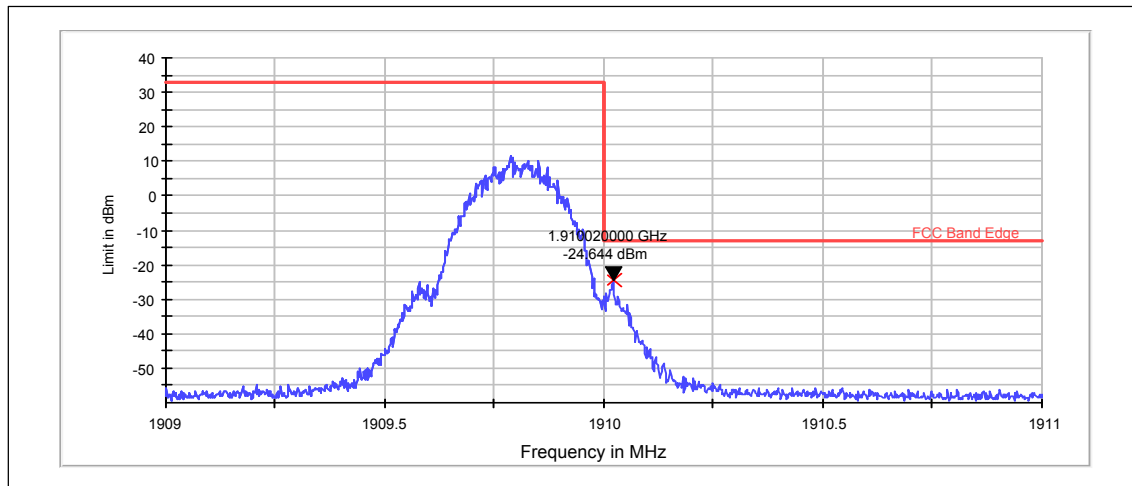
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	1849.998	-21.23	PASSED

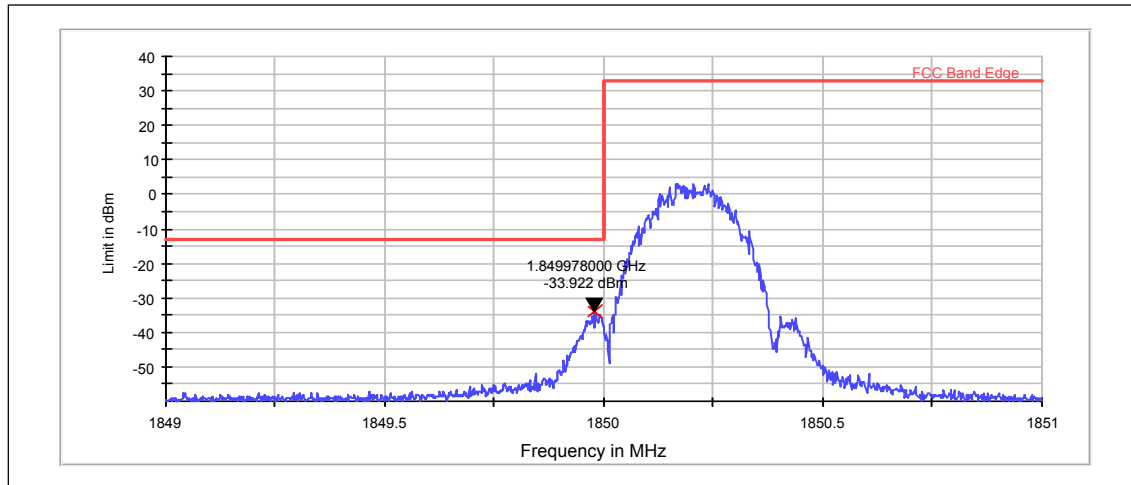
Channel 810 / 1909.8 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	1910.020	-24.64	PASSED

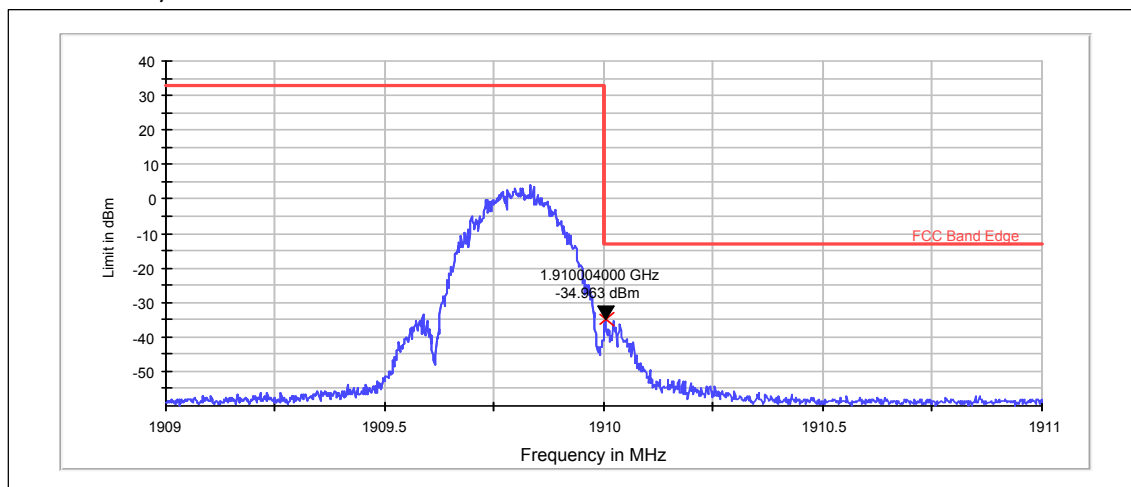
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	1849.978	-33.92	PASSED

Channel 810 / 1909.8 MHz

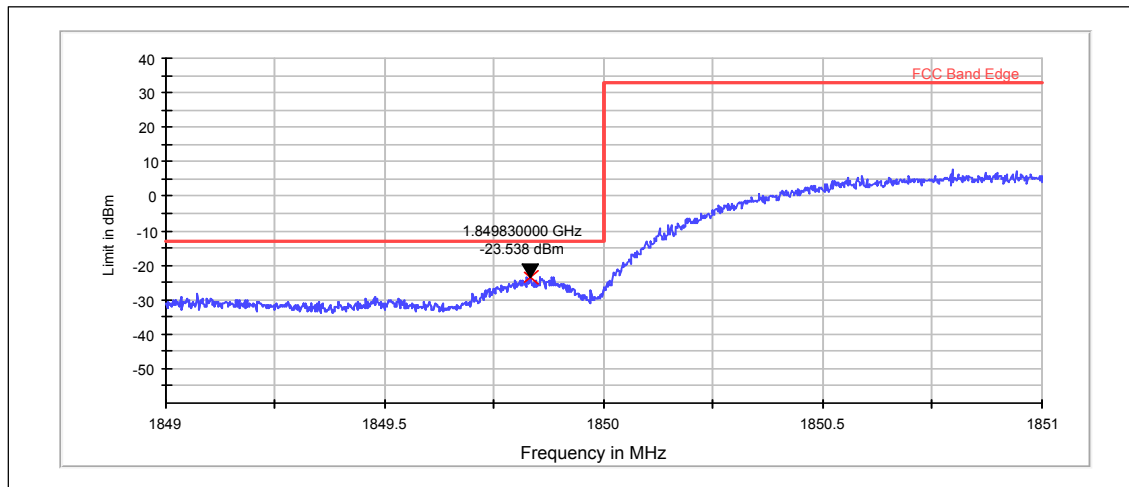


RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	1910.004	-34.96	PASSED

4.5. WCDMA2 Test results

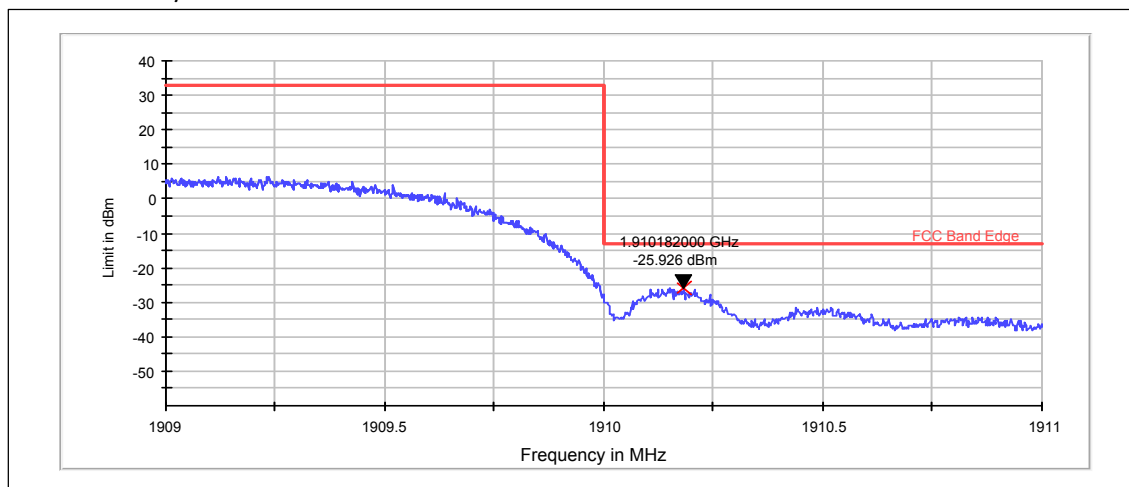
Channel 9262 / 1852.4 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1849.830	-23.54	PASSED

Channel 9538 / 1907.6 MHz

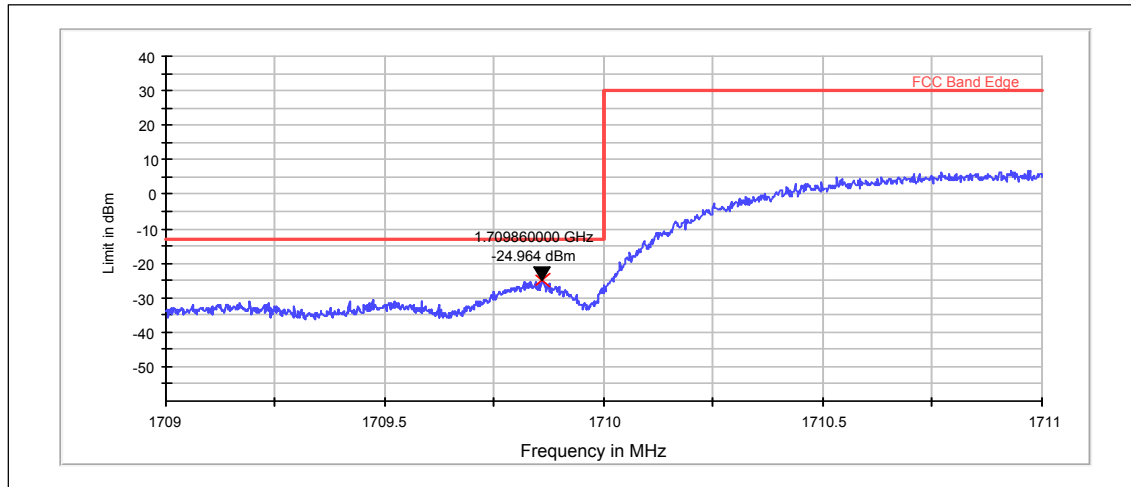


RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1910.182	-25.93	PASSED

4.6. WCDMA4 Test results

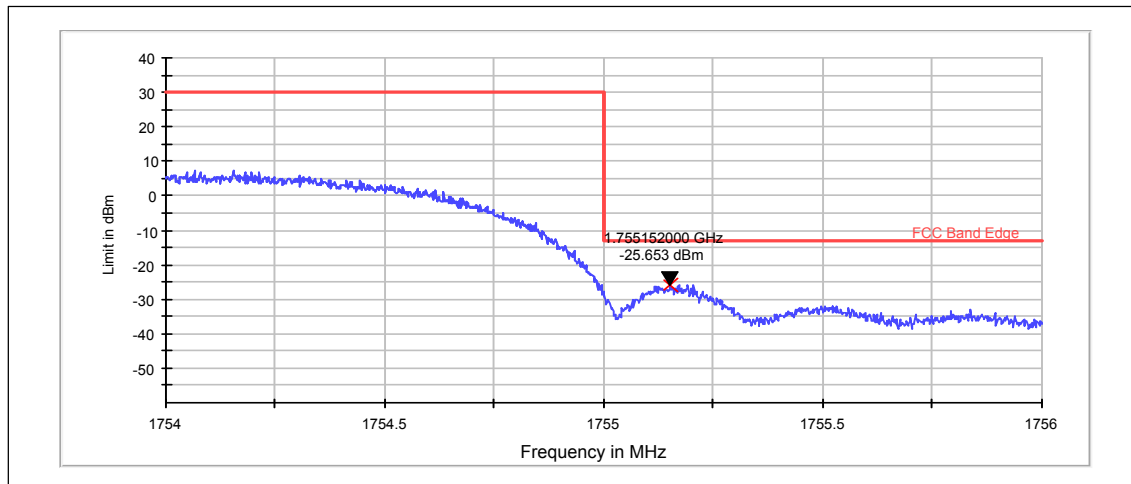
Channel 1312 / 1712.4 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1709.860	-24.96	PASSED

Channel 1513 / 1752.6 MHz

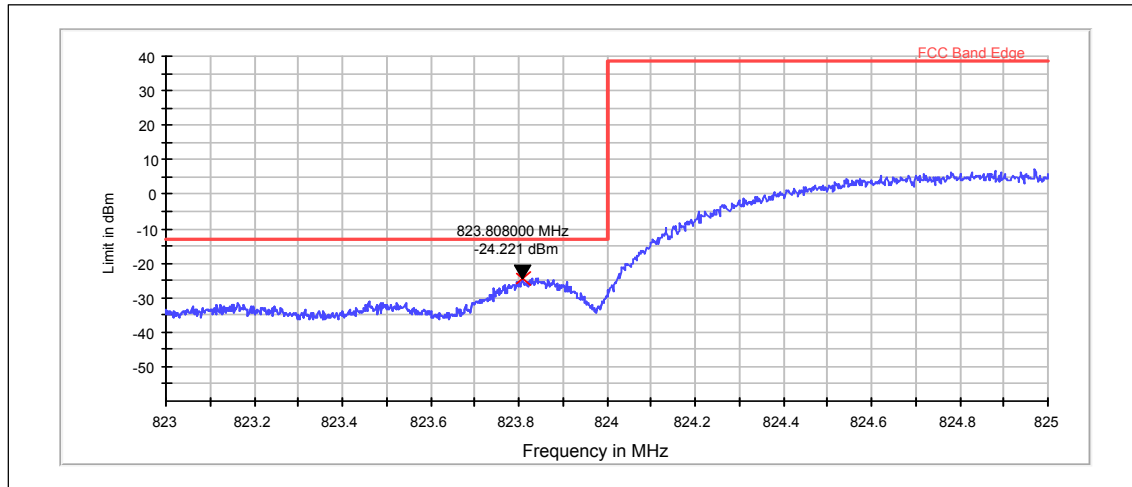


RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1755.152	-25.65	PASSED

4.7. WCDMA5 Test results

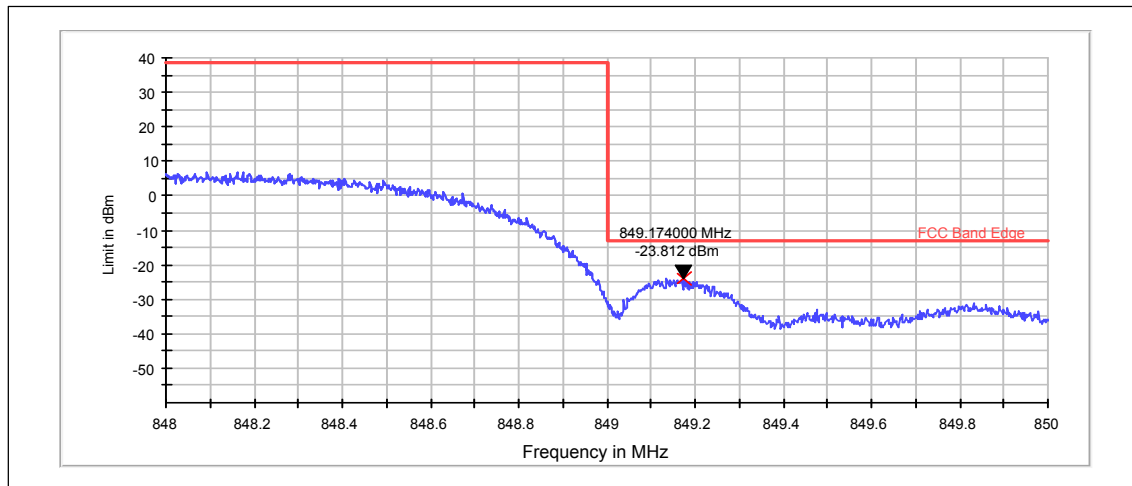
Channel 4132 / 826.4 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	823.808	-24.22	PASSED

Channel 4233 / 846.6 MHz

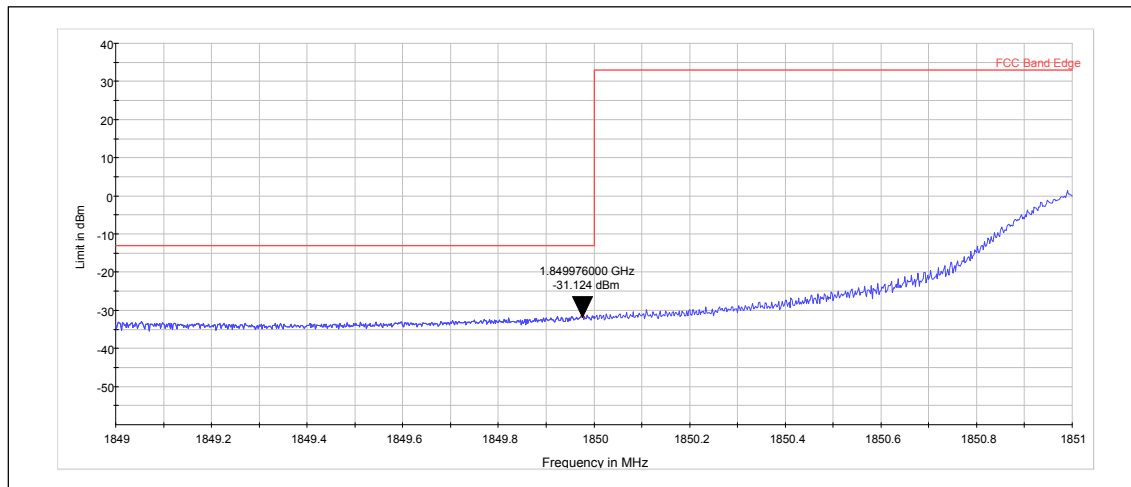


RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	849.174	-23.81	PASSED

4.8. LTE2 Test results

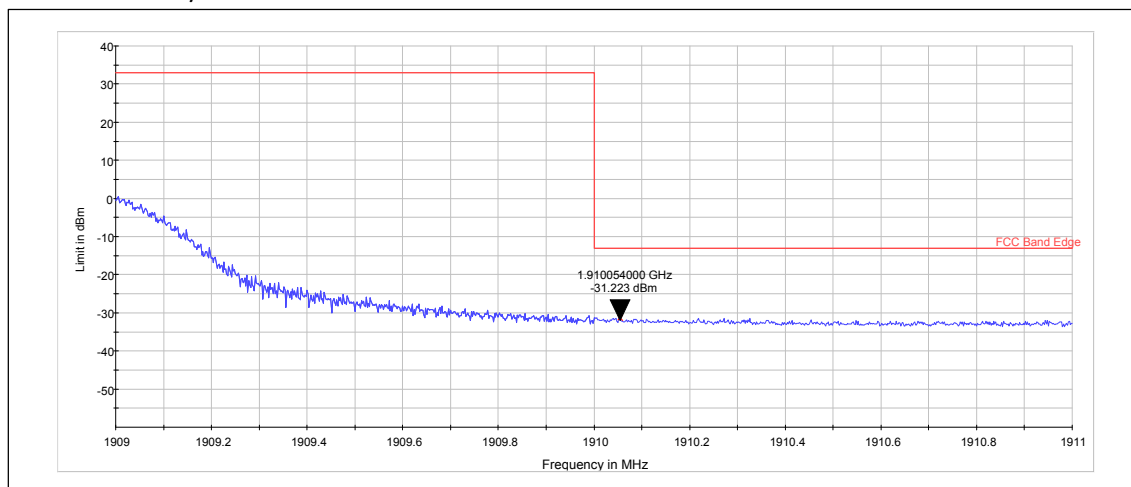
Channel 18700 / 1860 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1849.976	-31.12	PASSED

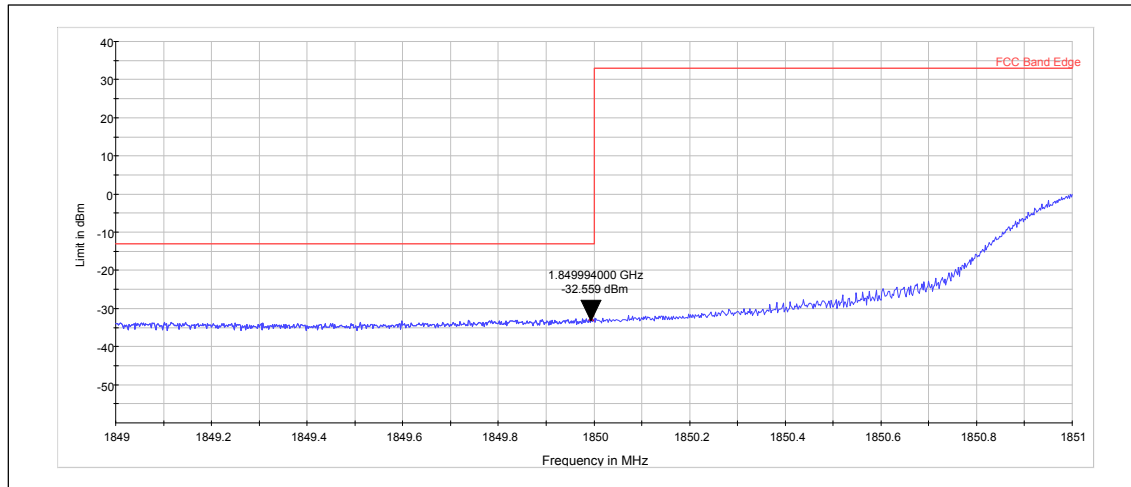
Channel 19100 / 1900 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1910.054	-31.22	PASSED

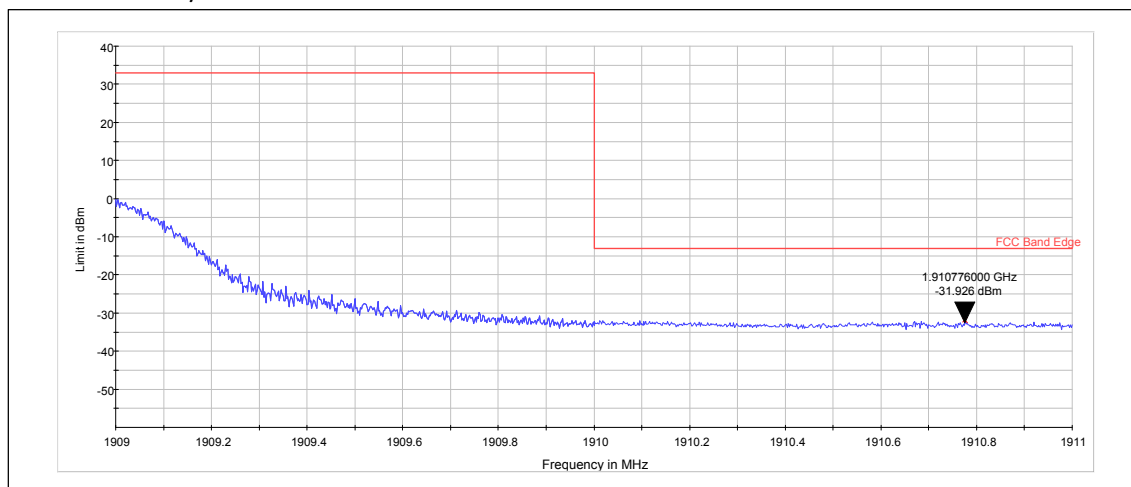
Channel 18700 / 1860 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1849.994	-32.56	PASSED

Channel 19100 / 1900 MHz

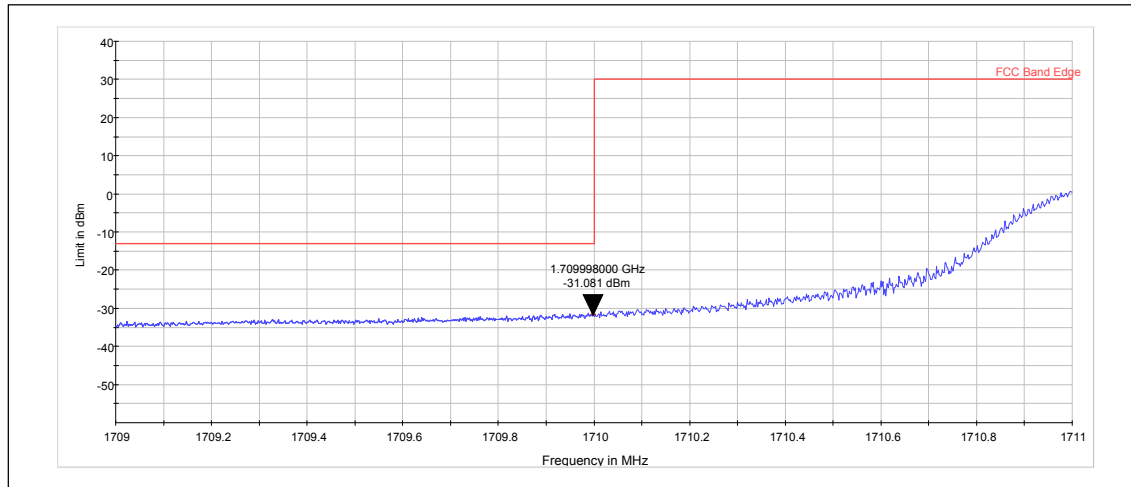


RMS (RBW: 200 kHz, VBW: 1 MHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1910.776	-31.93	PASSED

4.9. LTE4 Test results

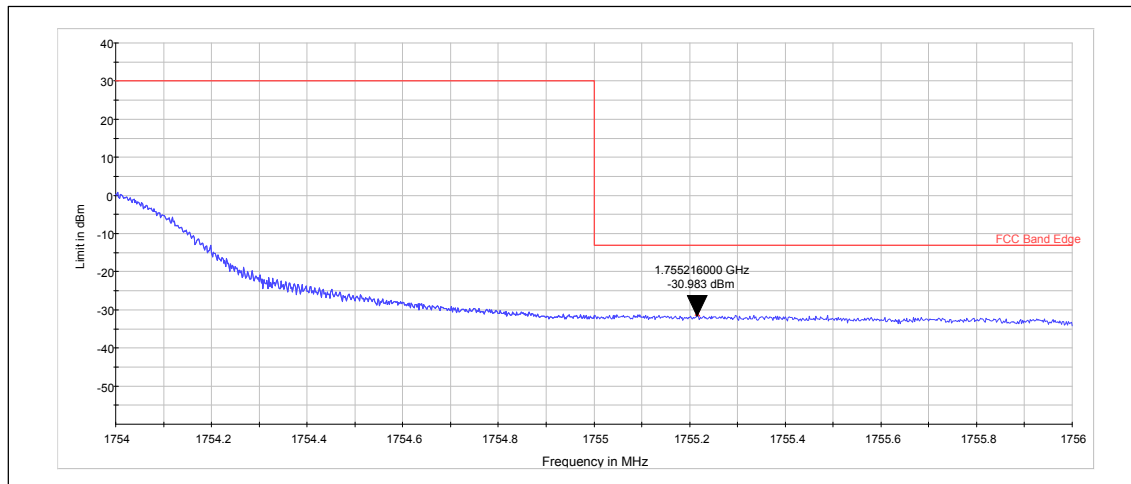
Channel 20050 / 1720 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1709.998	-31.08	PASSED

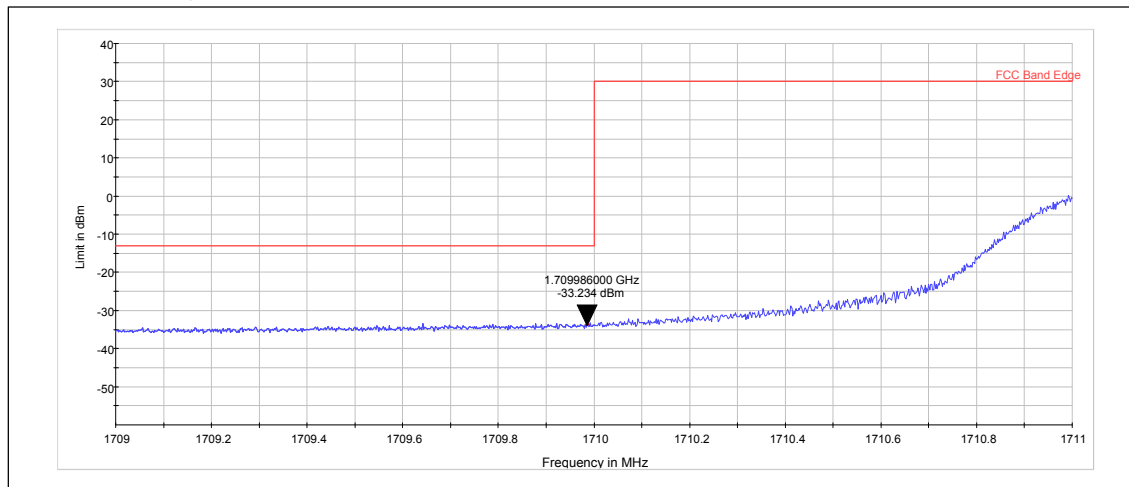
Channel 20300 / 1745 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1755.216	-30.98	PASSED

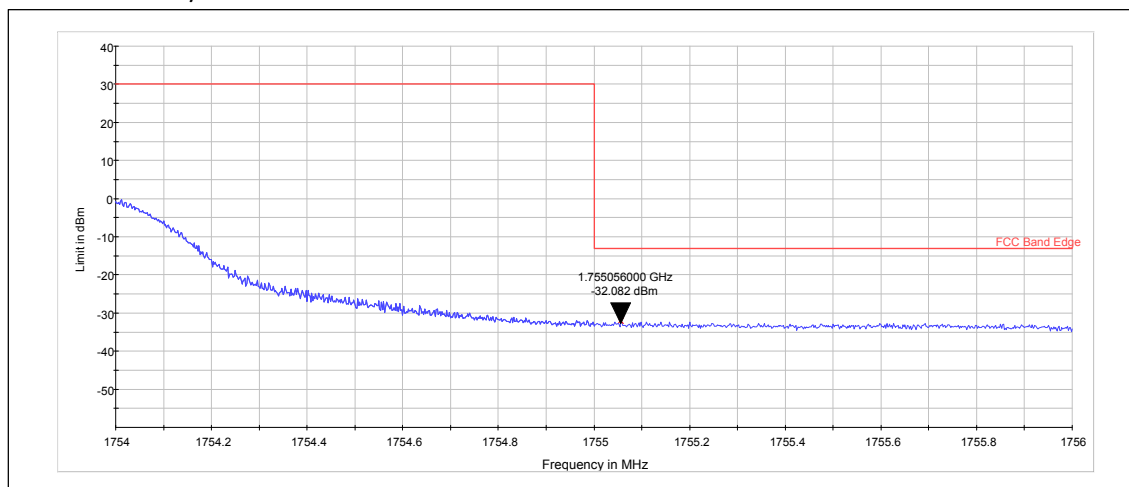
Channel 20050 / 1720 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1709.986	-33.23	PASSED

Channel 20300 / 1745 MHz

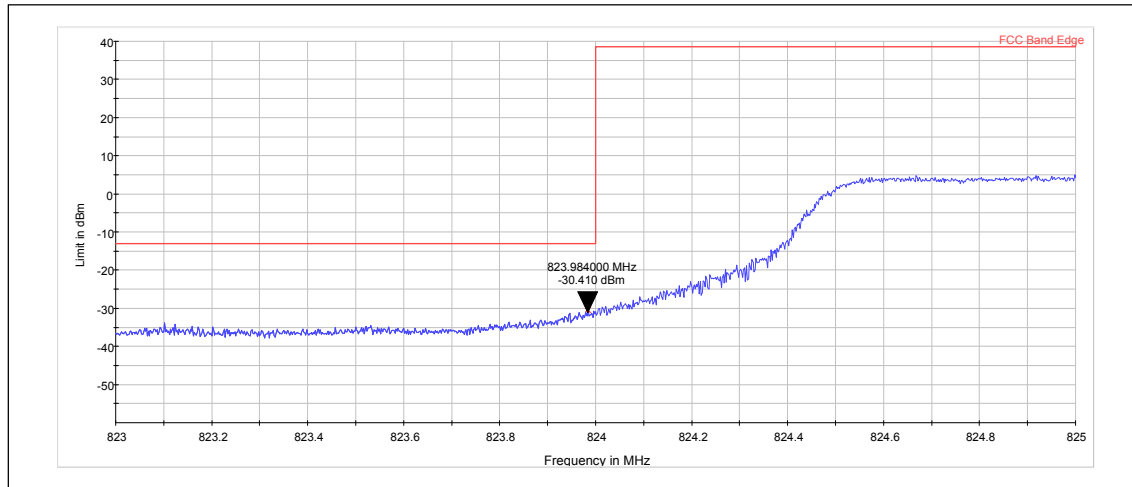


RMS (RBW: 200 kHz, VBW: 1 MHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1755.056	-32.08	PASSED

4.10. LTE5 Test results

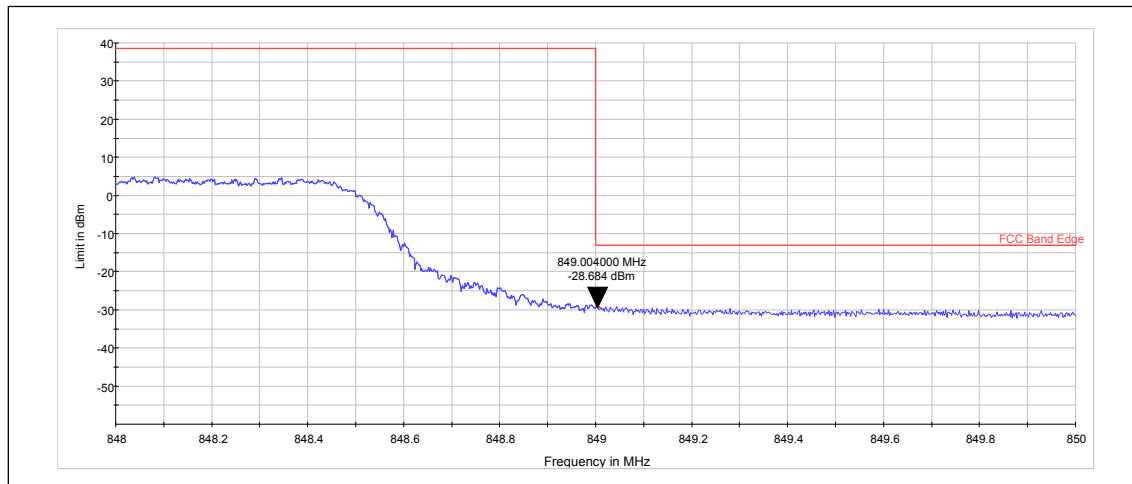
Channel 20450 / 829 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	823.984	-30.41	PASSED

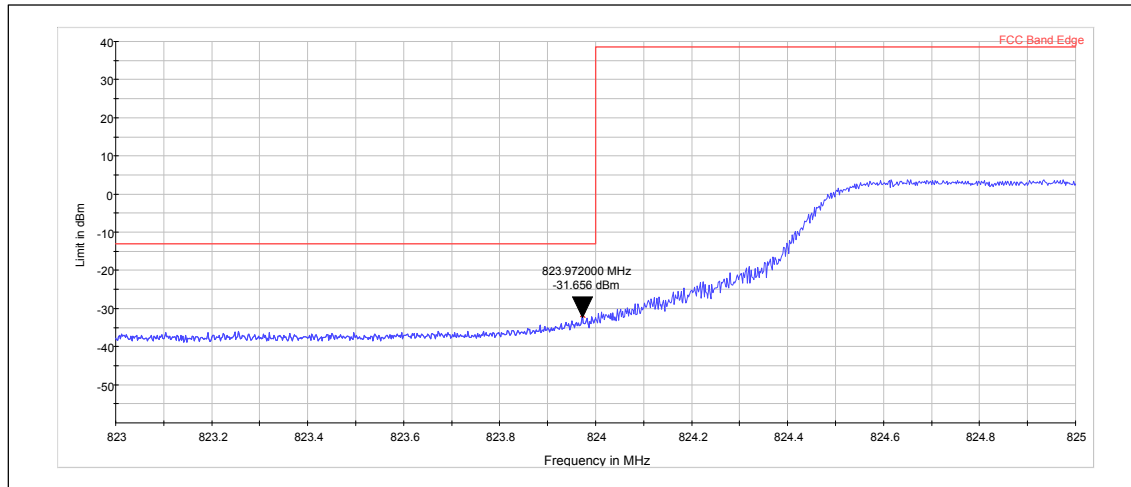
Channel 20600 / 844 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	849.004	-28.68	PASSED

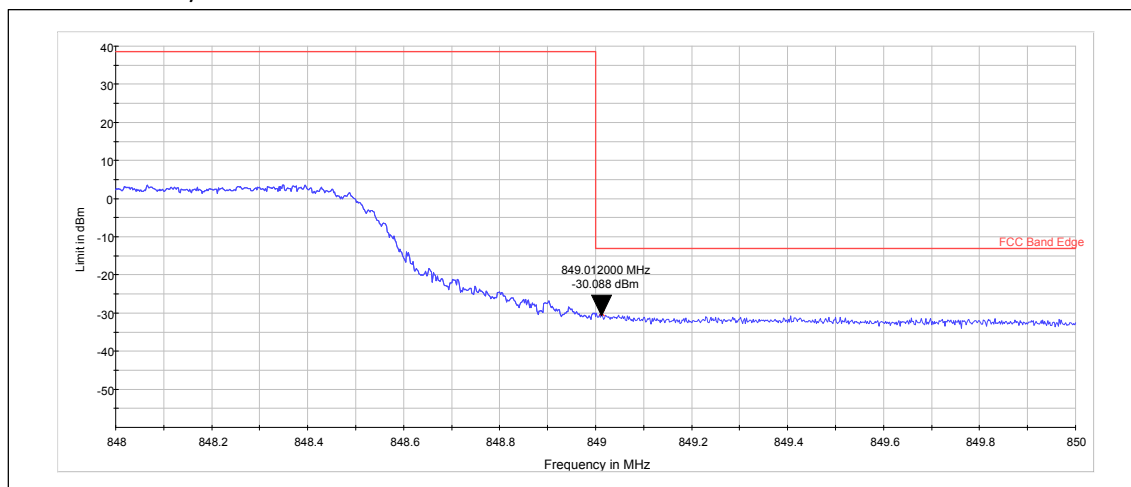
Channel 20450 / 829 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	823.972	-31.66	PASSED

Channel 20600 / 844 MHz

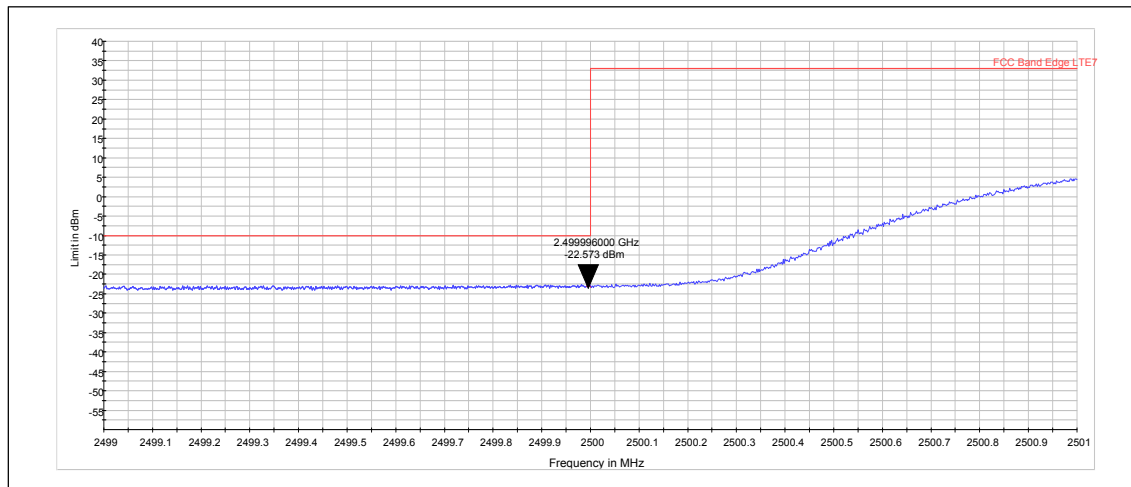


RMS (RBW: 100 kHz, VBW: 300 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	849.012	-30.09	PASSED

4.11. LTE7 Test results

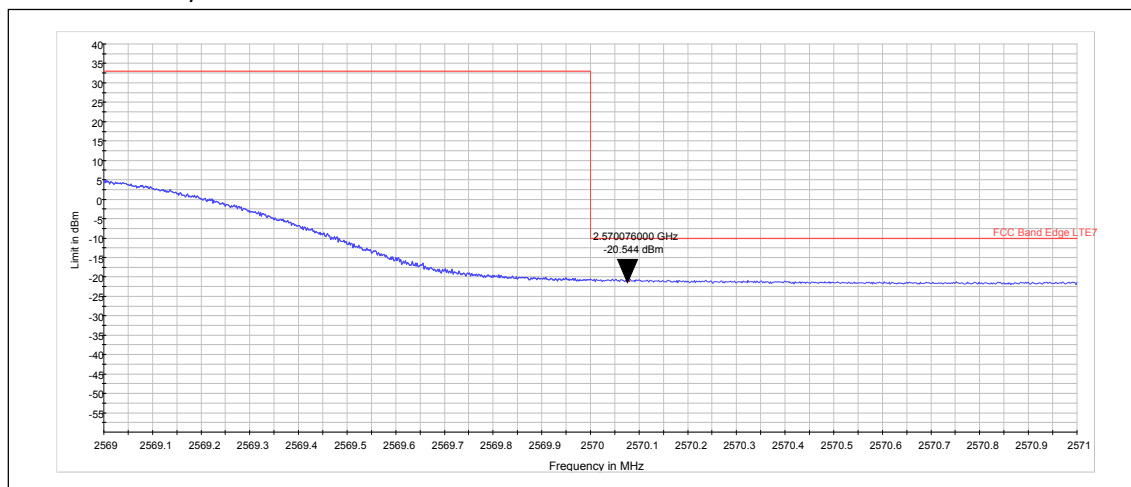
Channel 20850 / 2510 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	2499.996	-22.57	PASSED

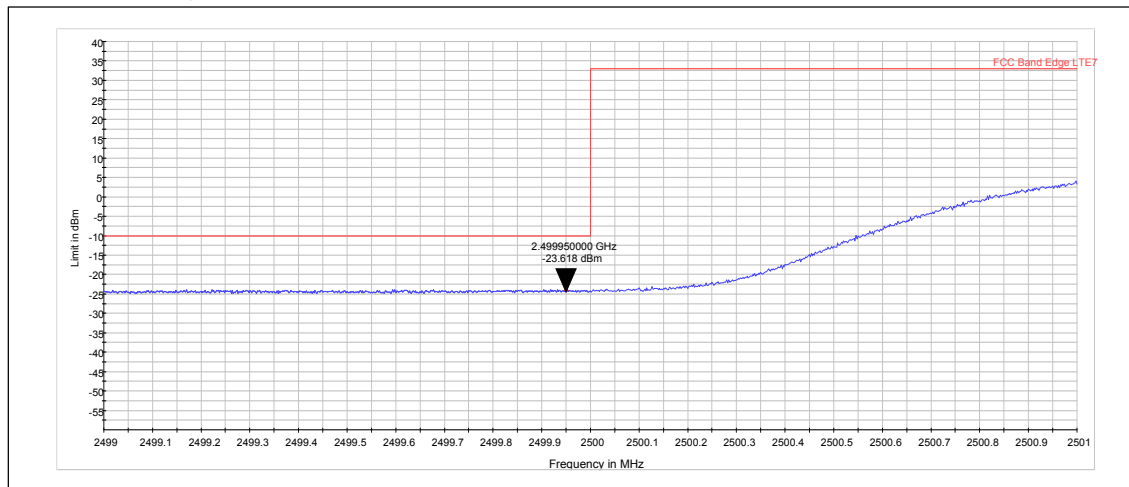
Channel 21350 / 2560 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	2570.076	-20.54	PASSED

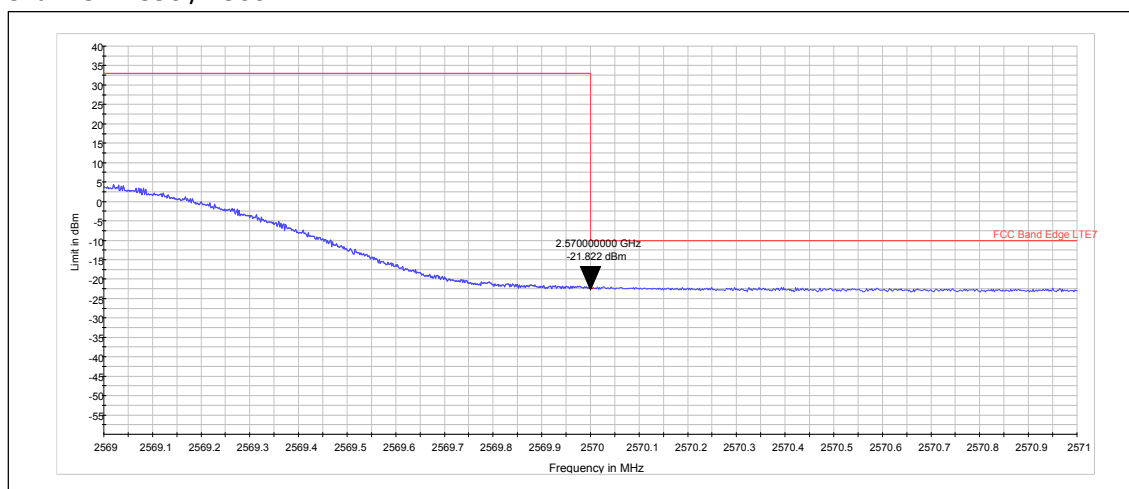
Channel 20850 / 2510 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	2499.950	-23.62	PASSED

Channel 21350 / 2560 MHz

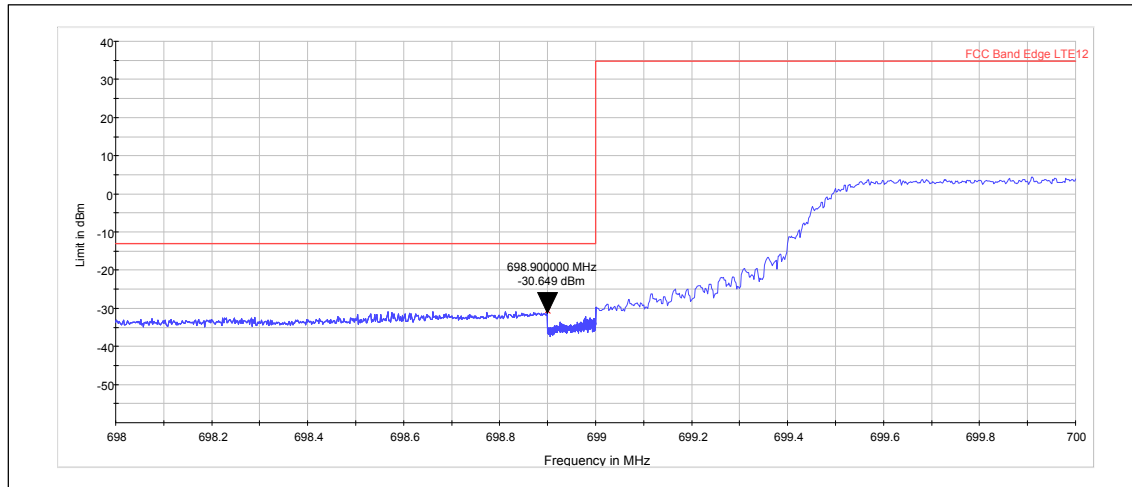


RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	2570.000	-21.82	PASSED

4.12. LTE12 Test results

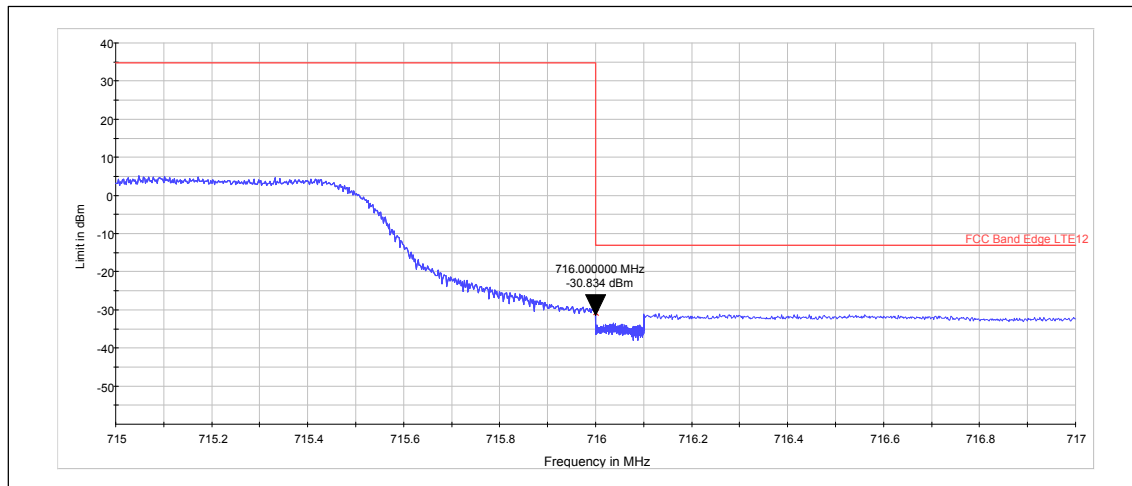
Channel 23060 / 704 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	698.900	-30.65	PASSED

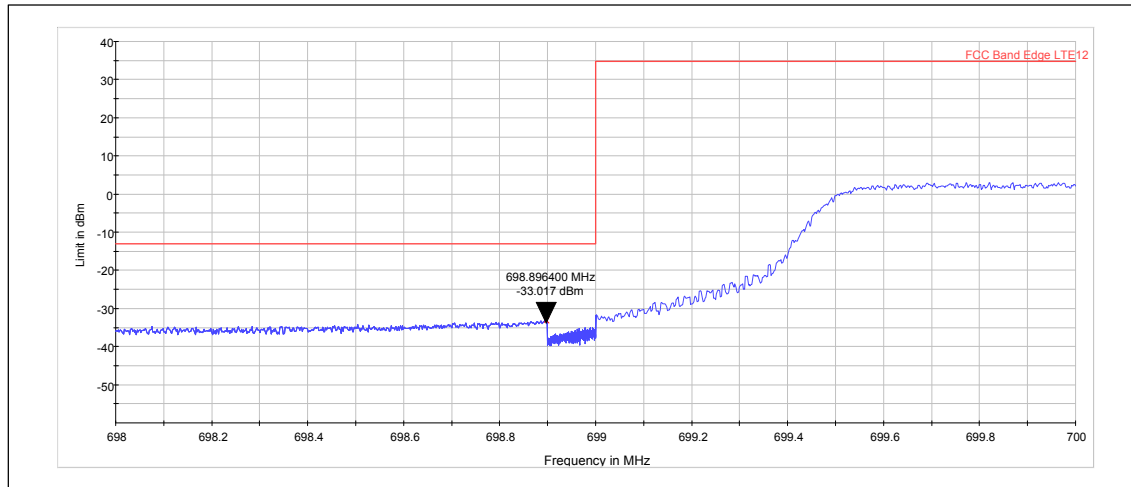
Channel 23130 / 711 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	716.000	-30.83	PASSED

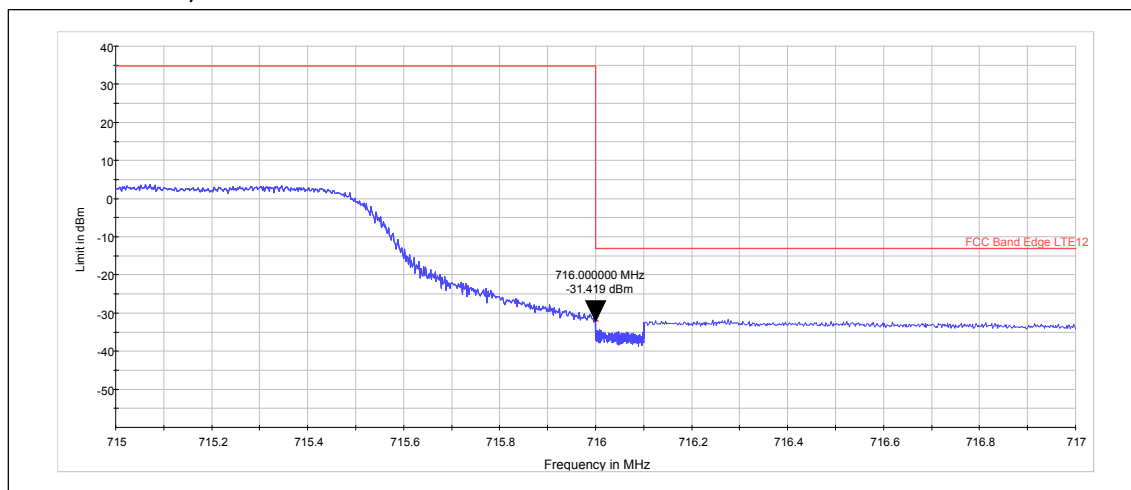
Channel 23060 / 704 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	698.896	-33.02	PASSED

Channel 23130 / 711 MHz

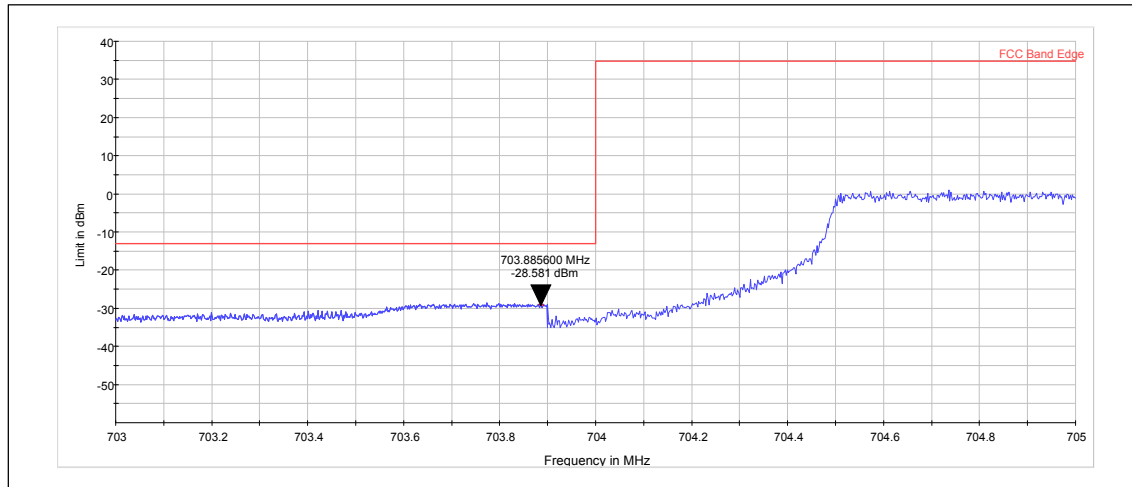


RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	716.000	-31.42	PASSED

4.13. LTE17 Test results

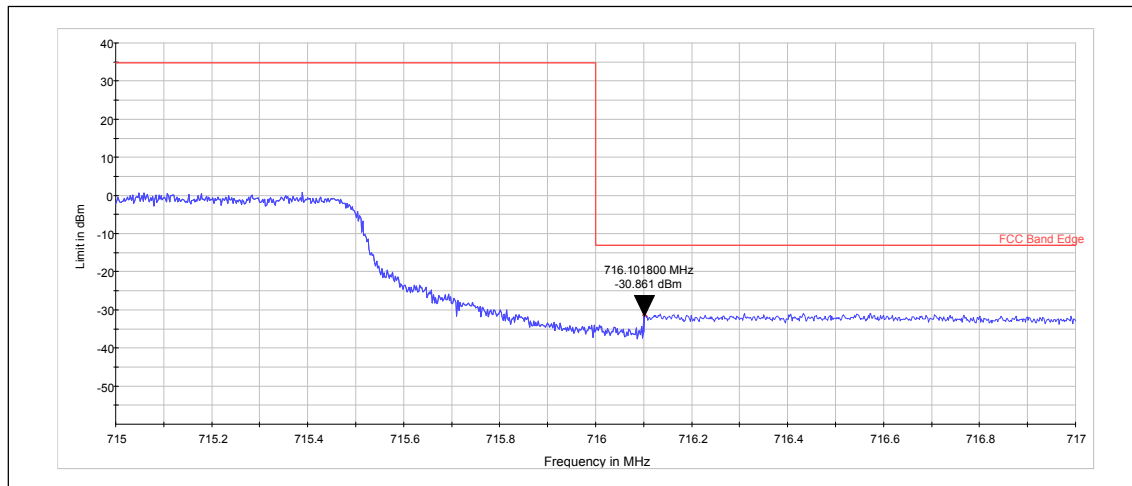
Channel 23780 / 709 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	703.886	-28.58	PASSED

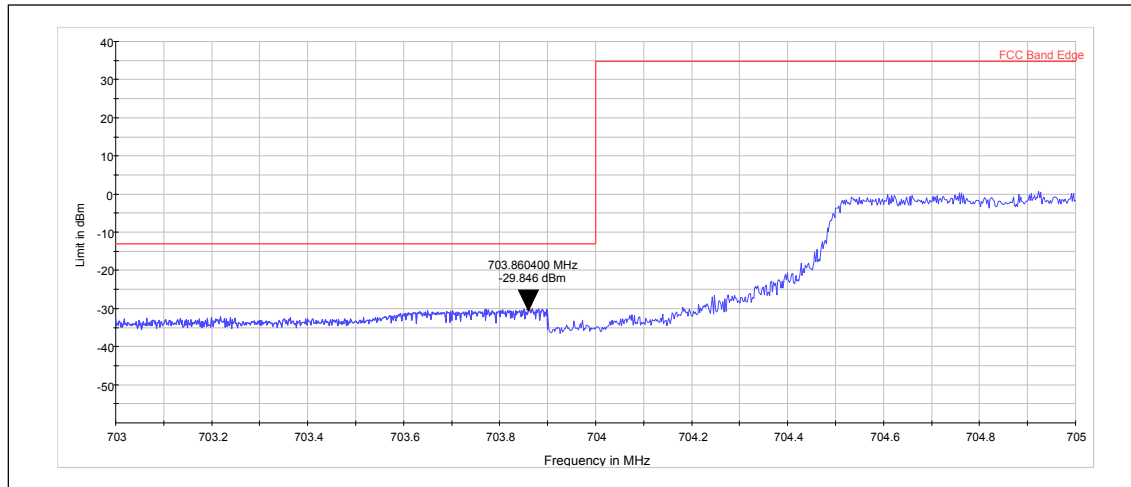
Channel 23800 / 711 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	716.102	-30.86	PASSED

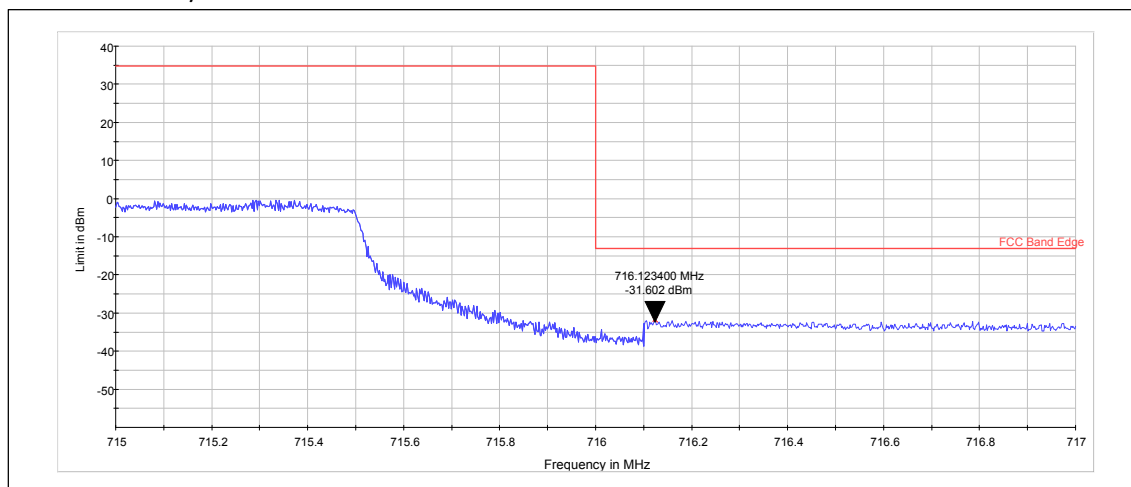
Channel 23780 / 709 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	703.860	-29.85	PASSED

Channel 23800 / 711 MHz



RMS detector, Max hold

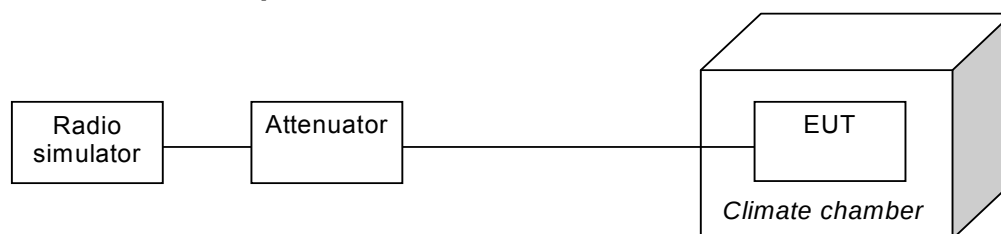
Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	716.123	-31.60	PASSED

5. Frequency stability, temperature variation

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

EUT with DUT number	RM-1104, DUT 100019
Accessories with DUT numbers	SD-244R, DUT 100022
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20-25 / 40-50 / 98.0-102.0
Date of measurements	16 and 17-Jun-2015
Measured by	Kalle Hannila

5.1. Test Setup



5.2. 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

5.3. GSM 850 Test results

GSM, Channel 190 / 836.6 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	836.60	-5.23000	-0.0063	PASSED
40	836.60	-8.39000	-0.01	PASSED
30	836.60	-8.01000	-0.0096	PASSED
20	836.60	-13.56000	-0.0162	PASSED
10	836.60	-5.62000	-0.0067	PASSED
0	836.60	-3.23000	-0.0039	PASSED
-10	836.60	-12.53000	-0.015	PASSED
-20	836.60	-8.98000	-0.0107	PASSED
-30	836.60	-11.24000	-0.0134	PASSED

5.4. GSM 1900 Test results

GSM, Channel 661 / 1880.0 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	1880.00	9.49000	0.005	PASSED
40	1880.00	11.88000	0.0063	PASSED
30	1880.00	19.69000	0.0105	PASSED
20	1880.00	-2.65000	-0.0014	PASSED
10	1880.00	9.56000	0.0051	PASSED
0	1880.00	10.53000	0.0056	PASSED
-10	1880.00	17.11000	0.0091	PASSED
-20	1880.00	5.29000	0.0028	PASSED
-30	1880.00	19.82000	0.0105	PASSED

5.5. WCDMA4 Test results

FDD, Channel 1412 / 1732.4 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	1732.40	-2.41089	-0.0014	PASSED
40	1732.40	-0.51880	-0.0003	PASSED
30	1732.40	0.12207	0.0001	PASSED
20	1732.40	-4.53186	-0.0026	PASSED
10	1732.40	-0.39673	-0.0002	PASSED
0	1732.40	-3.86047	-0.0022	PASSED
-10	1732.40	5.08118	0.0029	PASSED
-20	1732.40	2.59399	0.0015	PASSED
-30	1732.40	-1.58691	-0.0009	PASSED

5.6. LTE7 Test results

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

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	2535.00	-3.00407	-0.0012	PASSED
40	2535.00	-3.91960	-0.0015	PASSED
30	2535.00	-3.96252	-0.0016	PASSED
20	2535.00	-1.84536	-0.0007	PASSED
10	2535.00	-1.87397	-0.0007	PASSED
0	2535.00	-0.92983	-0.0004	PASSED
-10	2535.00	-3.63350	-0.0014	PASSED
-20	2535.00	-2.94685	-0.0012	PASSED
-30	2535.00	-2.47479	-0.001	PASSED

5.7. LTE12 Test results

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

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	707.50	-0.68665	-0.001	PASSED
40	707.50	-0.91553	-0.0013	PASSED
30	707.50	-1.02997	-0.0015	PASSED
20	707.50	1.24455	0.0018	PASSED
10	707.50	0.77248	0.0011	PASSED
0	707.50	1.50204	0.0021	PASSED
-10	707.50	0.45776	0.0007	PASSED
-20	707.50	0.15736	0.0002	PASSED
-30	707.50	0.22888	0.0003	PASSED

5.8. LTE17 Test results

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

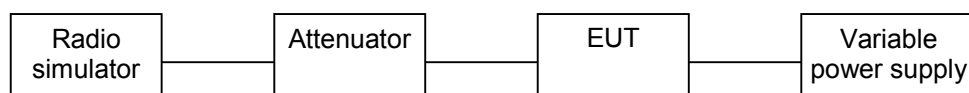
Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	710.00	-0.05722	-0.0001	PASSED
40	710.00	-0.70095	-0.001	PASSED
30	710.00	0.55790	0.0008	PASSED
20	710.00	0.24319	0.0003	PASSED
10	710.00	0.21458	0.0003	PASSED
0	710.00	1.17302	0.0016	PASSED
-10	710.00	1.11580	0.0016	PASSED
-20	710.00	0.98705	0.0014	PASSED
-30	710.00	0.94414	0.0013	PASSED

6. Frequency stability, voltage variation

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

EUT with DUT number	RM-1104, DUT 100019
Accessories with DUT numbers	SD-244R, DUT 100022
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20-25 / 40-50 / 98.0-102.0
Date of measurements	16-Jun-2015
Measured by	Kalle Hannila

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 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

6.3. GSM 850 Test results

GSM, Channel 190 / 836.6 MHz

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.4	836.60	-7.36000	-0.0088	PASSED
Battery cut-off point / 3.3	836.60	-9.04000	-0.0108	PASSED
Nominal / 3.9	836.60	-8.59000	-0.0103	PASSED

6.4. GSM 1900 Test results

GSM, Channel 661 / 1880.0 MHz

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.4	1880.00	5.29000	0.0028	PASSED
Battery cut-off point / 3.3	1880.00	18.08000	0.0096	PASSED
Nominal / 3.9	1880.00	12.59000	0.0067	PASSED

6.5. WCDMA4 Test results

FDD, Channel 1412 / 1732.4 MHz

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.4	1732.40	-1.00000	-0.0006	PASSED
Battery cut-off point / 3.3	1732.40	4.05884	0.0023	PASSED
Nominal / 3.9	1732.40	0.74768	0.0004	PASSED

6.6. LTE7 Test results

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

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.4	2535.00	-2.58923	-0.001	PASSED
Battery cut-off point / 3.3	2535.00	-3.14713	-0.0012	PASSED
Nominal / 3.9	2535.00	-1.84536	-0.0007	PASSED

6.7. 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 / 4.4	707.50	1.53065	0.0022	PASSED
Battery cut-off point / 3.3	707.50	-0.40054	-0.0006	PASSED
Nominal / 3.9	707.50	-0.92983	-0.0013	PASSED

6.8. LTE17 Test results

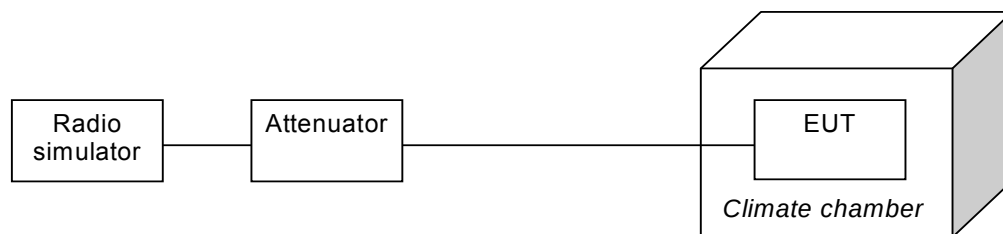
FDD, CBW 10MHz, QPSK, 50 RB, Channel 23790 / 710.0 MHz

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.4	710.00	1.63078	0.0023	PASSED
Battery cut-off point / 3.3	710.00	1.60217	0.0023	PASSED
Nominal / 3.9	710.00	1.08719	0.0015	PASSED

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

EUT with DUT number	RM-1104, DUT 100019
Accessories with DUT numbers	SD-244R, DUT 100022
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20-25 / 40-50 / 98.0-102.0
Date of measurements	16-Jun-2015
Measured by	Kalle Hannila

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.

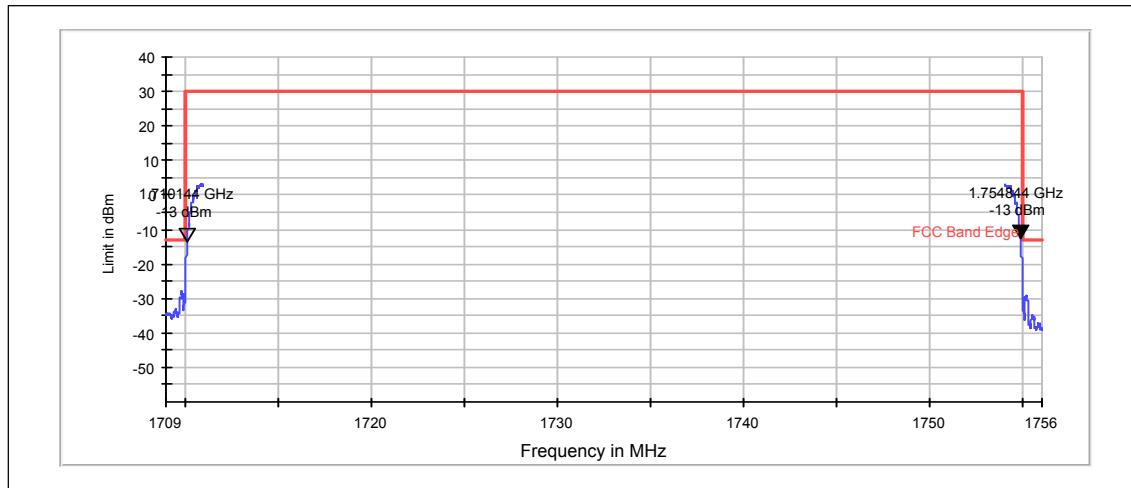
The results were then calculated as per section 4.3 of RSS-130.

Limits for frequency stability, temperature variation measurements

Limit
The results must be within the operating band.

7.3. WCDMA4 Test results

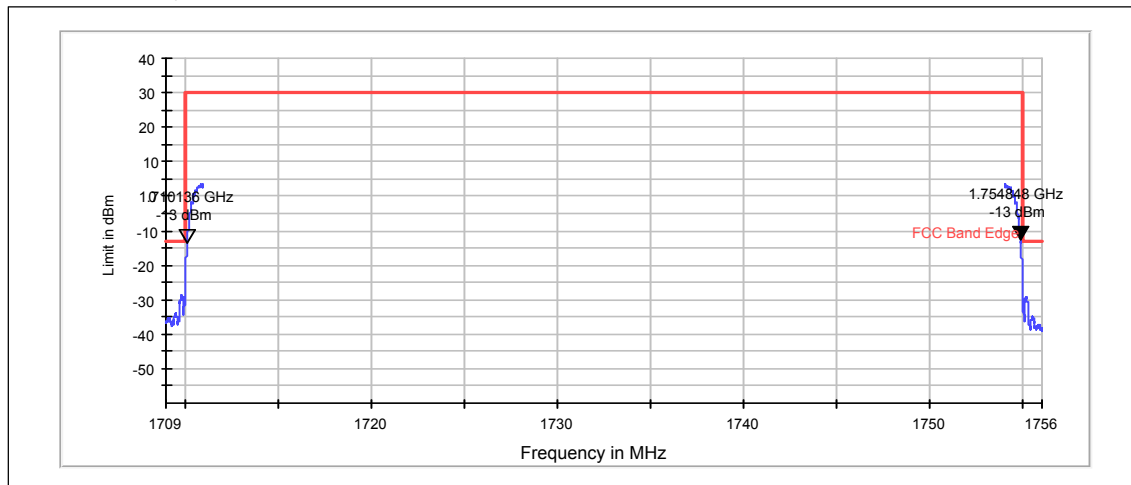
Channel 1412 / 1732.4 MHz



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
50	4.73023	1710.144000	1710.143995	1754.844000	1754.844004	PASSED

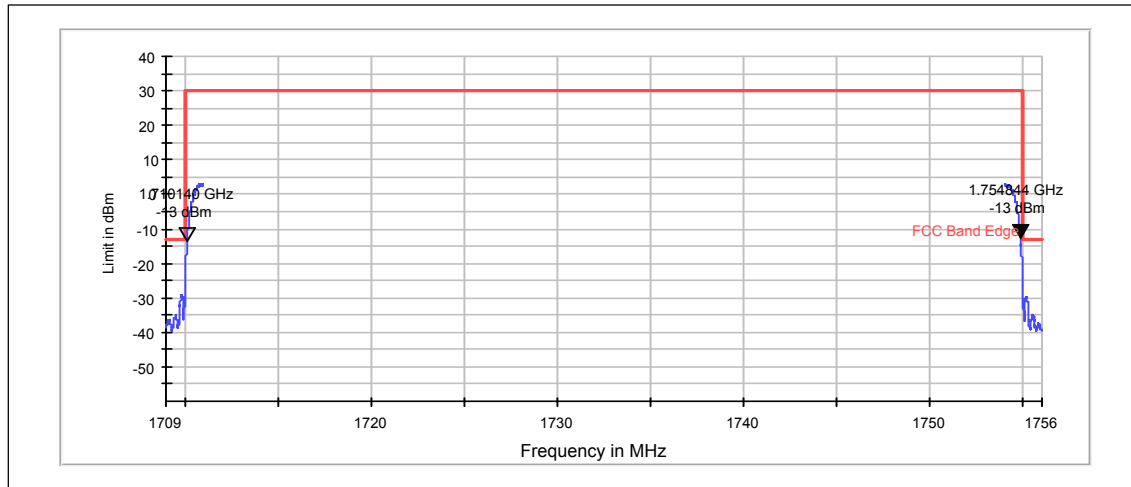
Channel 1412 / 1732.4 MHz



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
20	12.25281	1710.136000	1710.135987	1754.848000	1754.848012	PASSED

Channel 1412 / 1732.4 MHz

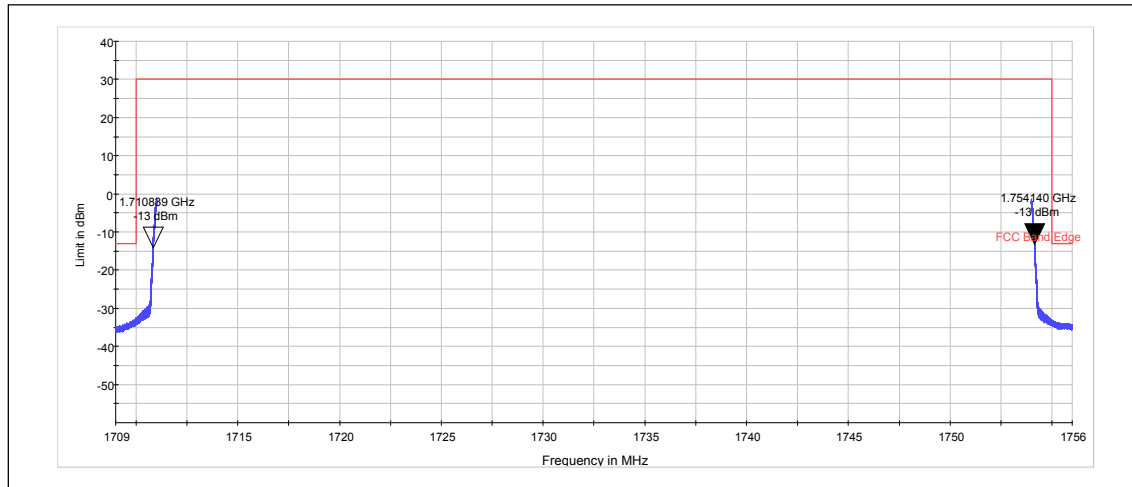


RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

Temperature [°C]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
-30	22.09473	1710.140000	1710.139977	1754.844000	1754.844022	PASSED

7.4. LTE4 Test results

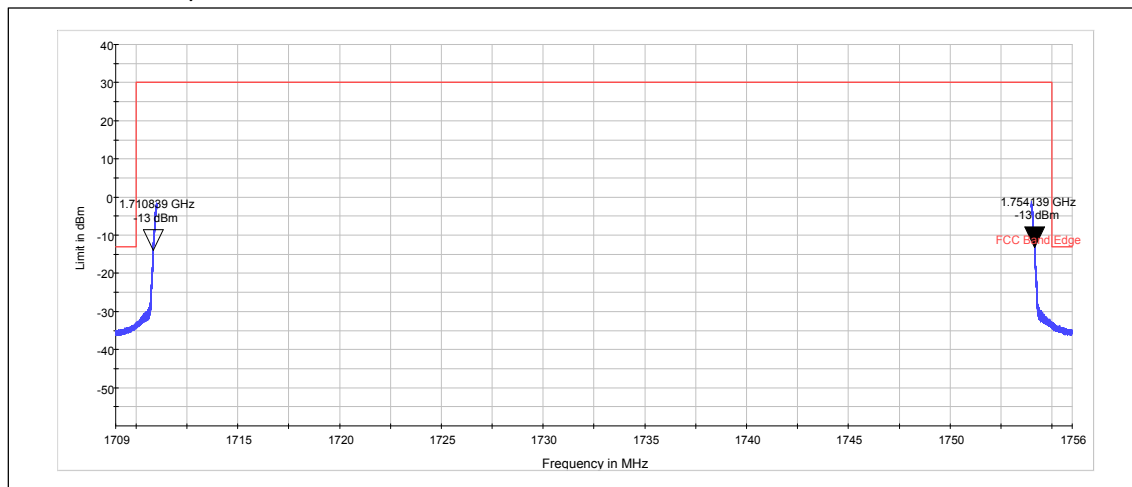
Channel 20175 / 1732.5 MHz



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

Temperature [°C]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
50	1.41621	1710.839200	1710.839198	1754.139600	1754.139601	PASSED

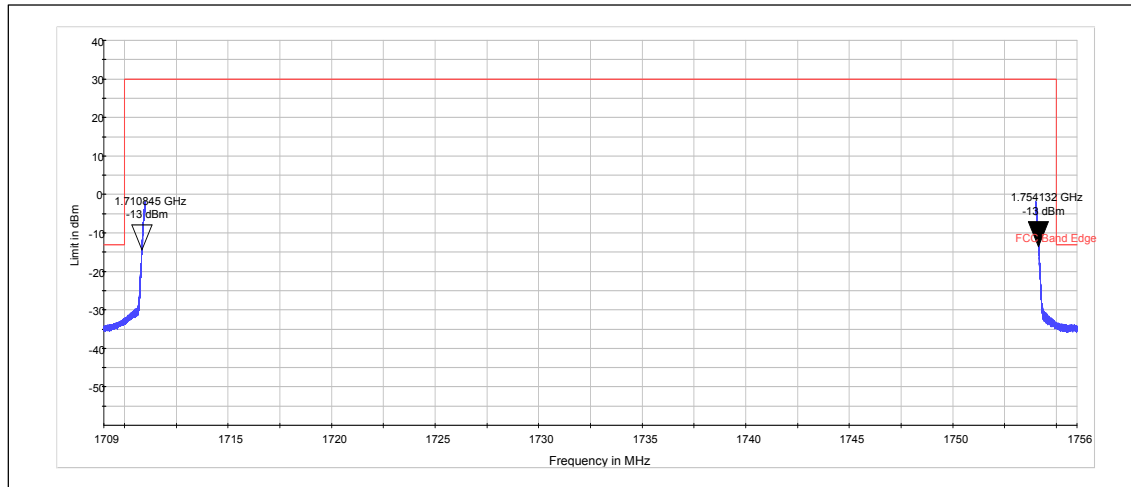
Channel 20175 / 1732.5 MHz



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	2.37465	1710.838600	1710.838597	1754.138600	1754.138602	PASSED

Channel 20175 / 1732.5 MHz

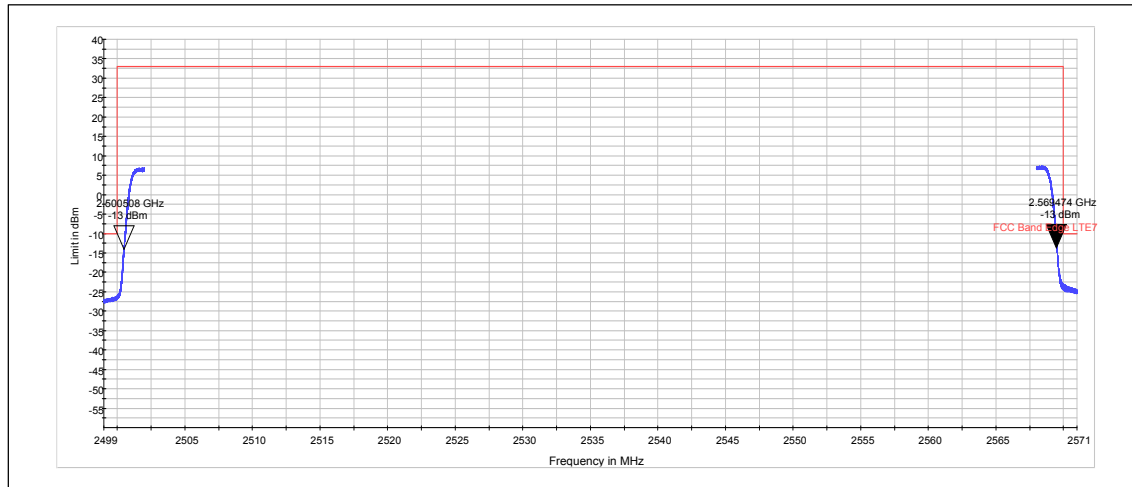


RMS (RBW: 500 kHz, VBW: 2 MHz)

Temperature [°C]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
-30	2.61784	1710.845000	1710.844997	1754.132400	1754.132402	PASSED

7.5. LTE7 Test results

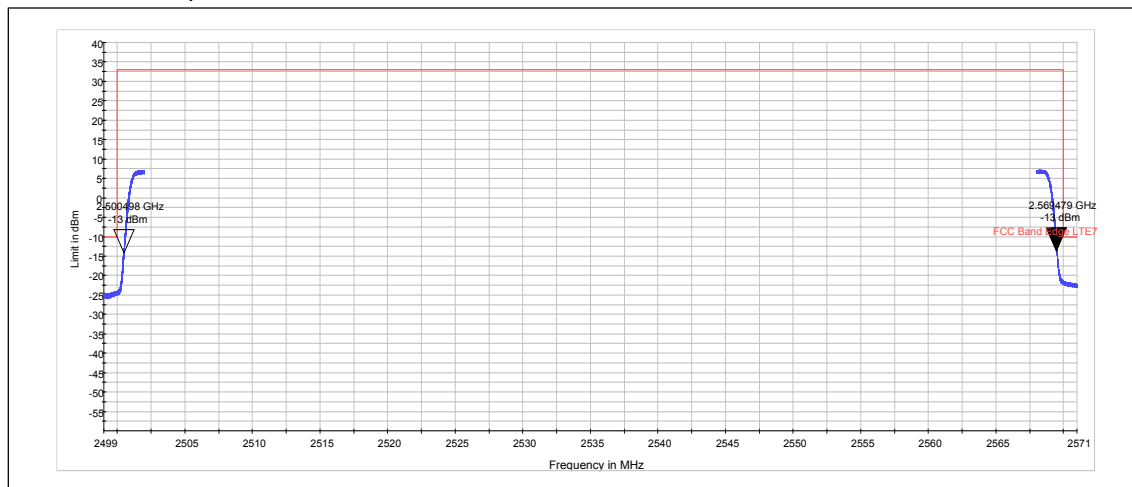
Channel 21100 / 2535.0 MHz



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

Temperature [°C]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
50	0.45776	2500.507500	2500.507499	2569.474200	2569.474200	PASSED

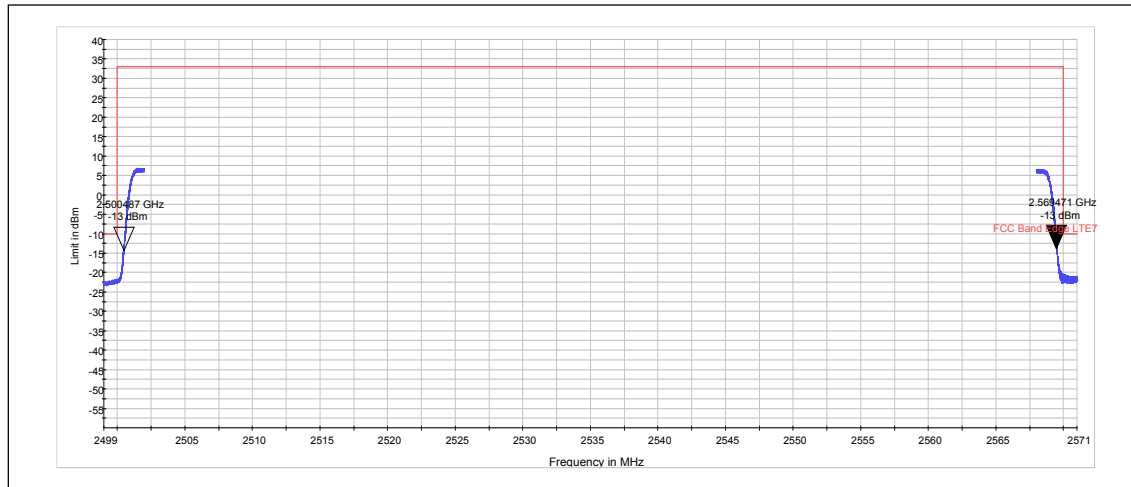
Channel 21100 / 2535.0 MHz



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

Temperature [°C]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
20	2.86102	2500.497900	2500.497897	2569.478700	2569.478702	PASSED

Channel 21100 / 2535.0 MHz

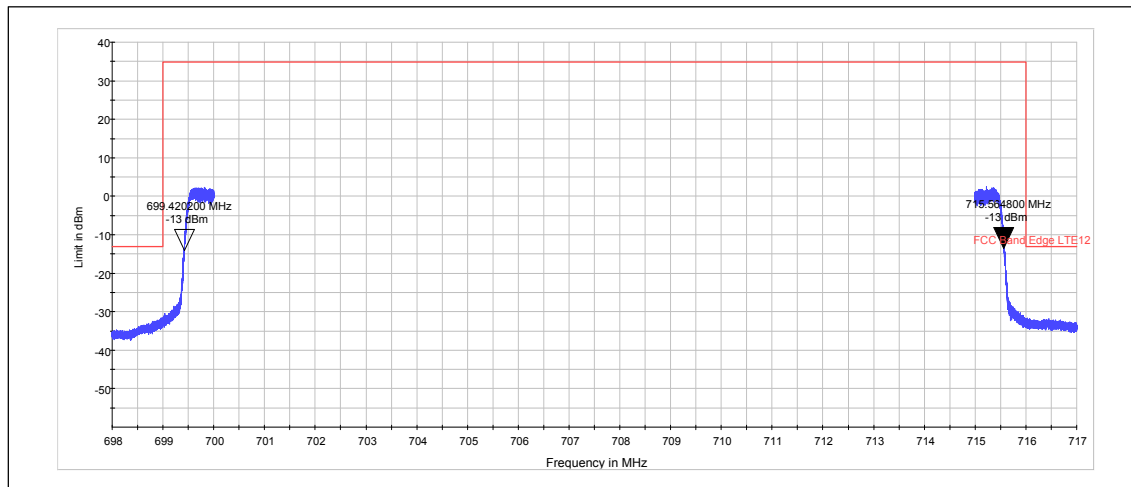


RMS (RBW: 500 kHz, VBW: 2 MHz)

Temperature [°C]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
-30	3.53336	2500.487400	2500.487396	2569.470900	2569.470903	PASSED

7.6. LTE12 Test results

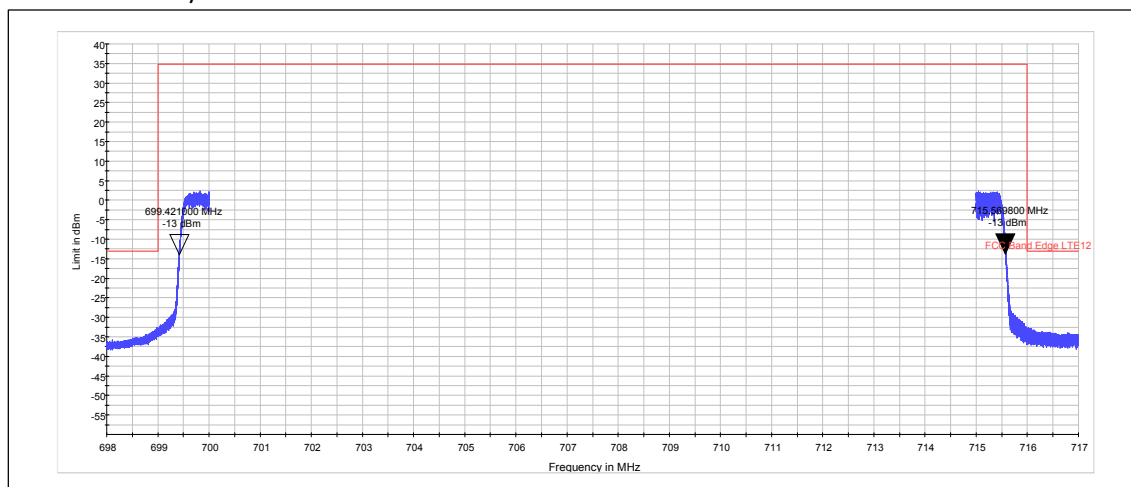
Channel 23095 / 707.5 MHz



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

Temperature [°C]	Deviation [Hz]	Low marker [MHz]	Marker - Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
50	0.52929	699.420200	699.420199	715.564800	715.564800	PASSED

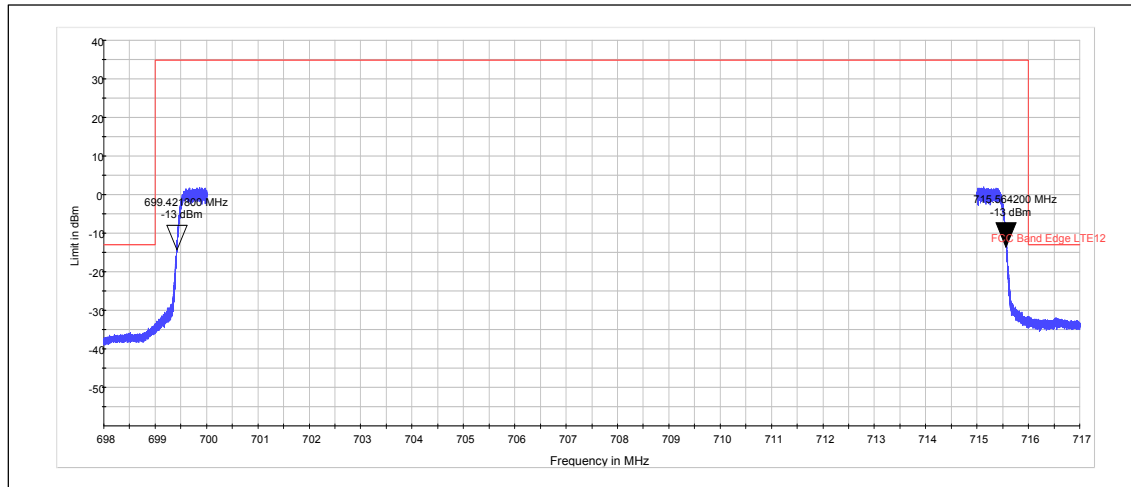
Channel 23095 / 707.5 MHz



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

Temperature [°C]	Deviation [Hz]	Low marker [MHz]	Marker - Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
20	2.36034	699.421000	699.420997	715.569800	715.569802	PASSED

Channel 23095 / 707.5 MHz

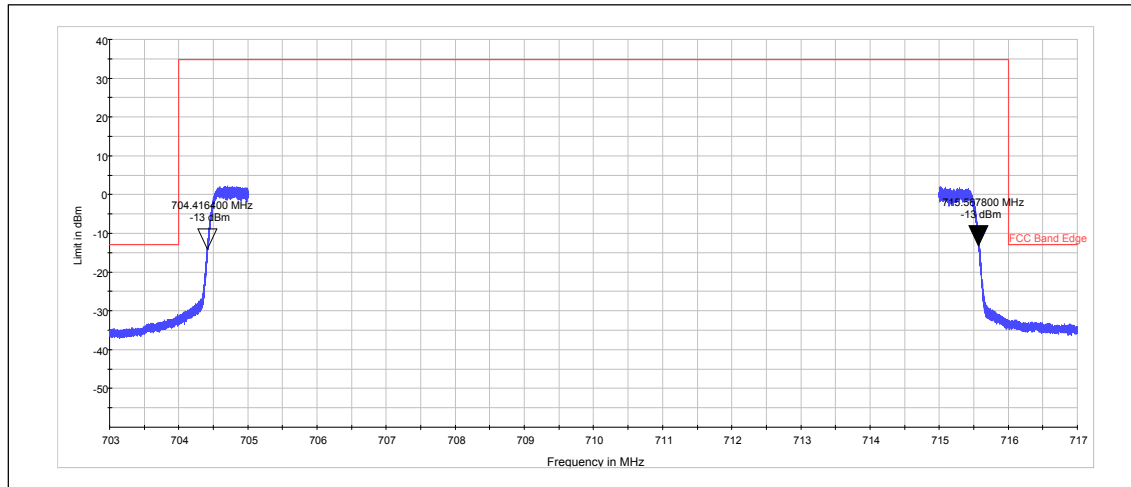


RMS (RBW: 100 kHz, VBW: 300 kHz)

Temperature [°C]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
-30	0.88692	699.421800	699.421799	715.564200	715.564200	PASSED

7.7. LTE17 Test results

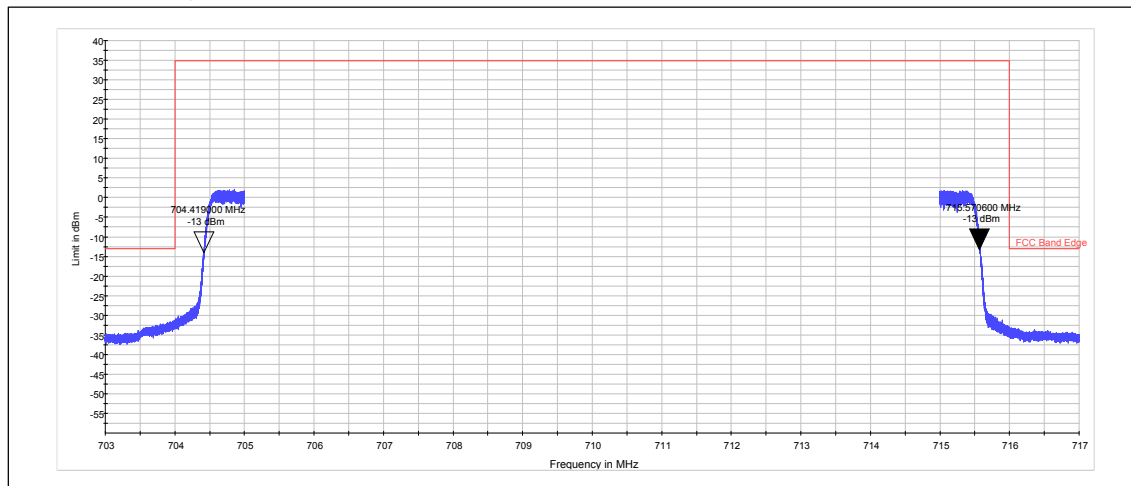
Channel 23790 / 710.0 MHz



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

Temperature [°C]	Deviation [Hz]	Low marker [MHz]	Marker - Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
50	-0.15736	704.416400	704.416399	715.567800	715.567800	PASSED

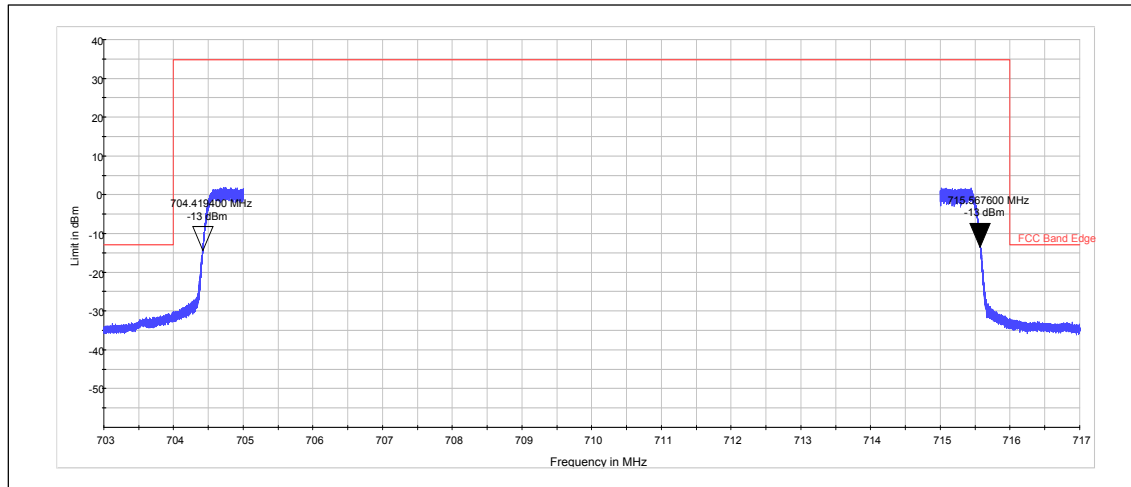
Channel 23790 / 710.0 MHz



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

Temperature [°C]	Deviation [Hz]	Low marker [MHz]	Marker - Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
20	0.54359	704.419000	704.418999	715.570600	715.570600	PASSED

Channel 23790 / 710.0 MHz



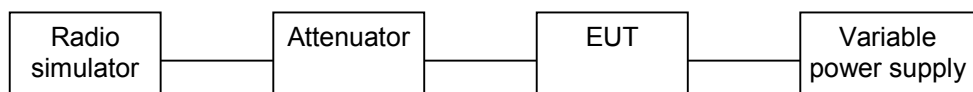
RMS (RBW: 100 kHz, VBW: 300 kHz)

Temperature [°C]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
-30	0.91553	704.419400	704.419399	715.567600	715.567600	PASSED

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

EUT with DUT number	RM-1104, DUT 100019
Accessories with DUT numbers	SD-244R, DUT 100022
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	20-25 / 40-50 / 98.0-102.0
Date of measurements	16-Jun-2015
Measured by	Kalle Hannila

8.1. Test Setup



8.2. Test method and limit

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

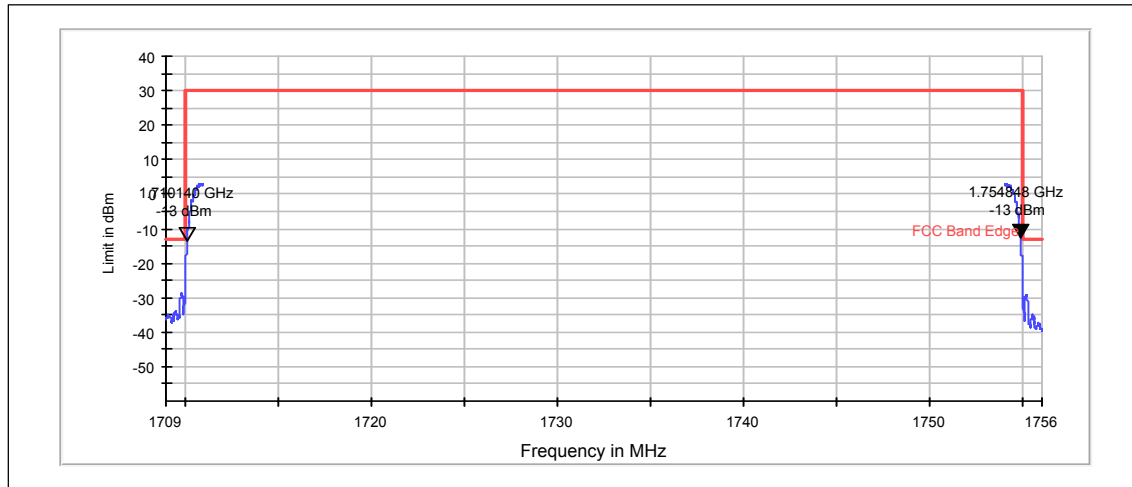
The EUT battery was replaced with an adjustable power supply. The frequency stability was measured at nominal voltage and at the battery cut-off point.

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

Limits for frequency stability, voltage variation measurements

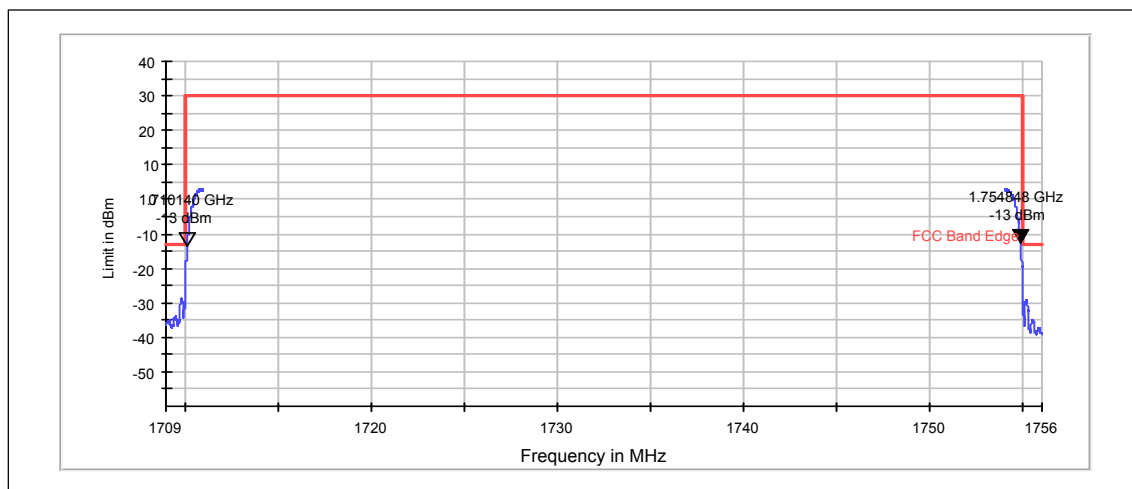
Limit
The results must be within the operating band.

8.3. WCDMA4 Test results



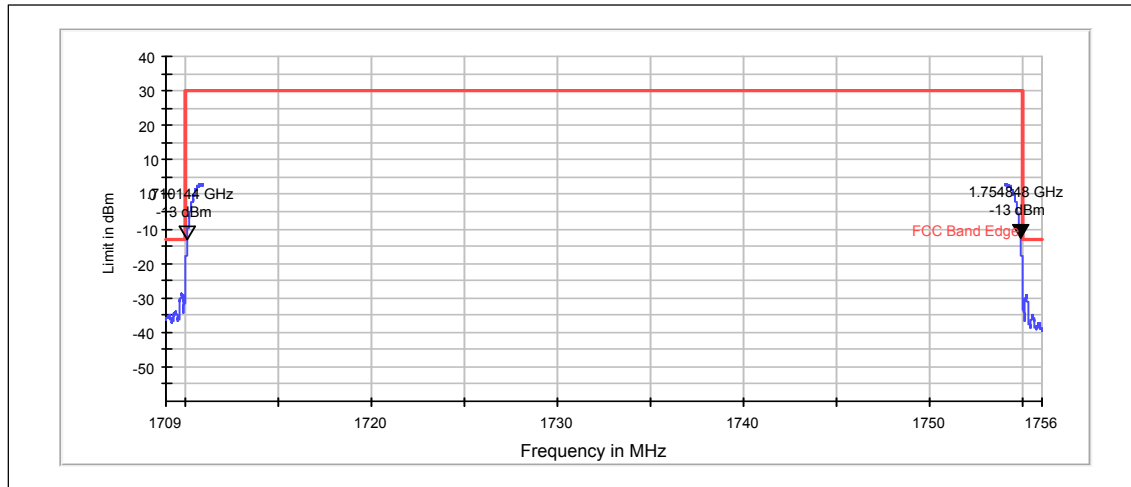
RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

Voltage level [V]	Deviation [Hz]	Low marker [MHz]	Marker - Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
Max / 4.4	-0.42725	1710.140000	1710.139999	1754.848000	1754.848000	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
Battery cut-off point / 3.3	-6.77490	1710.140000	1710.139993	1754.848000	1754.848006	PASSED

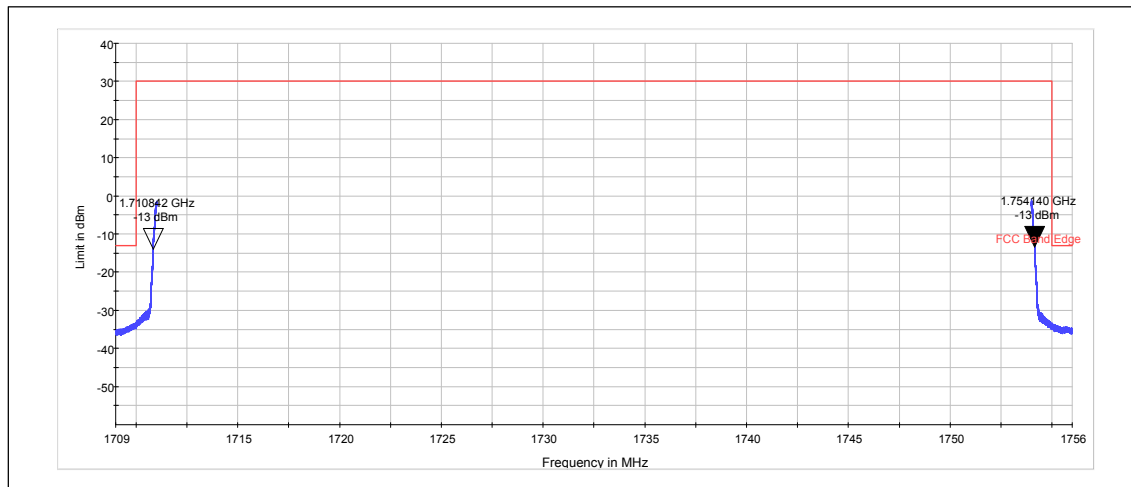


RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

Voltage level [V]	Deviation [Hz]	Low marker [MHz]	Marker - Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
Nominal / 3.9	-2.91443	1710.144000	1710.143997	1754.848000	1754.848002	PASSED

8.4. LTE4 Test results

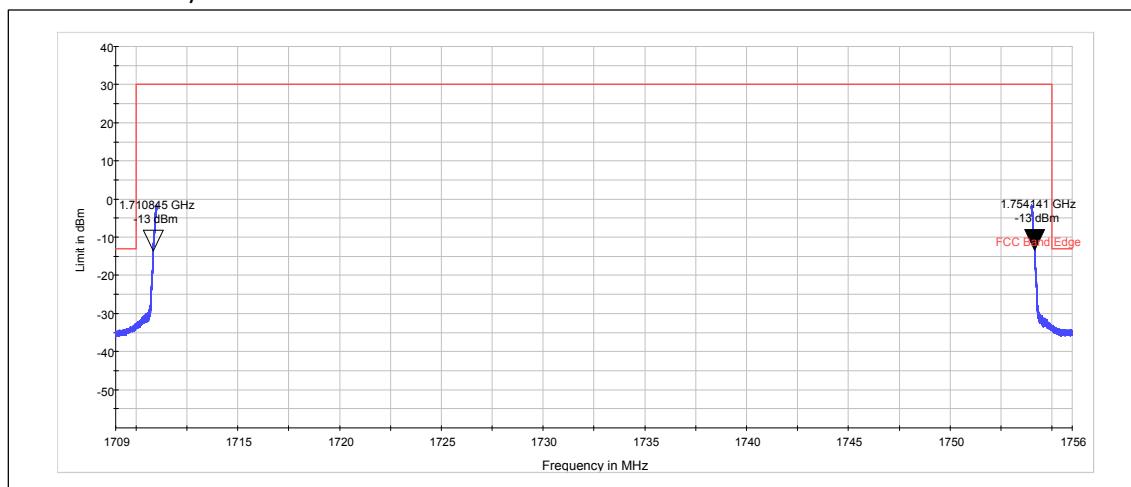
Channel 20175 / 1732.5 MHz



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 / 4.4	1.84536	1710.841600	1710.841598	1754.140200	1754.140201	PASSED

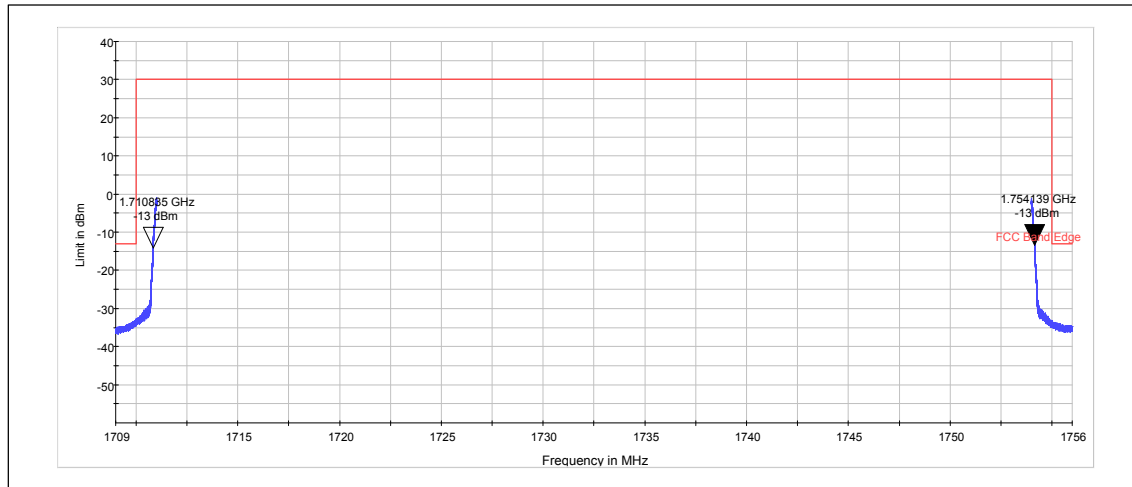
Channel 20175 / 1732.5 MHz



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 / 3.3	1.38760	1710.844800	1710.844798	1754.140600	1754.140601	PASSED

Channel 20175 / 1732.5 MHz

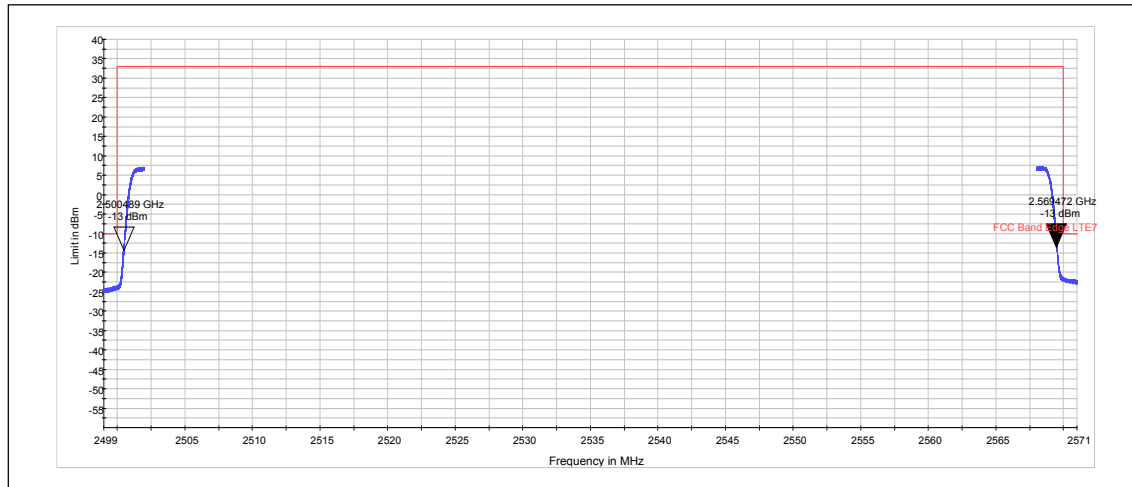


RMS (RBW: 500 kHz, VBW: 2 MHz)

Voltage level [V]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
Nominal / 3.9	1.70231	1710.834800	1710.834798	1754.138800	1754.138801	PASSED

8.5. LTE7 Test results

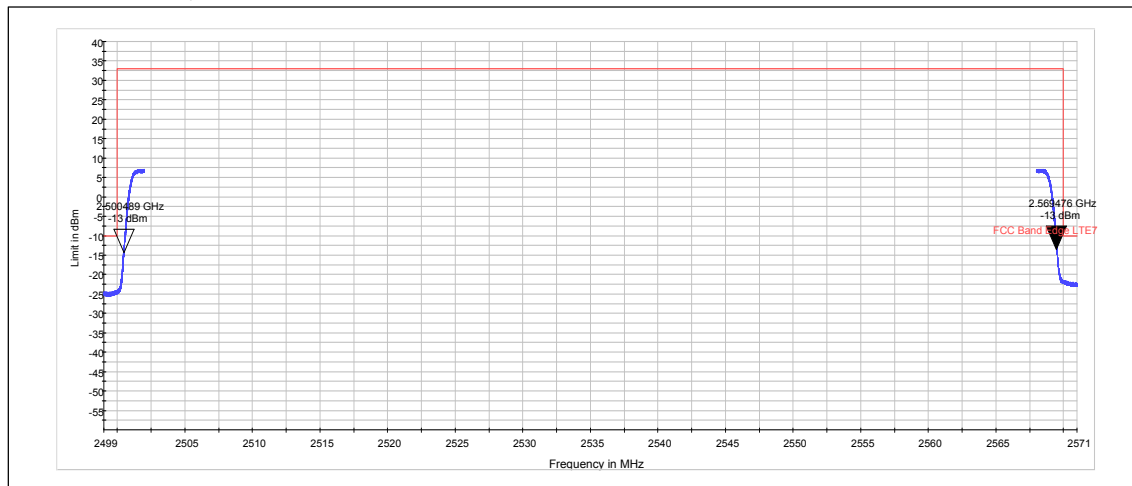
Channel 21100 / 2535.0 MHz



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 / 4.4	3.06130	2500.489200	2500.489196	2569.472400	2569.472403	PASSED

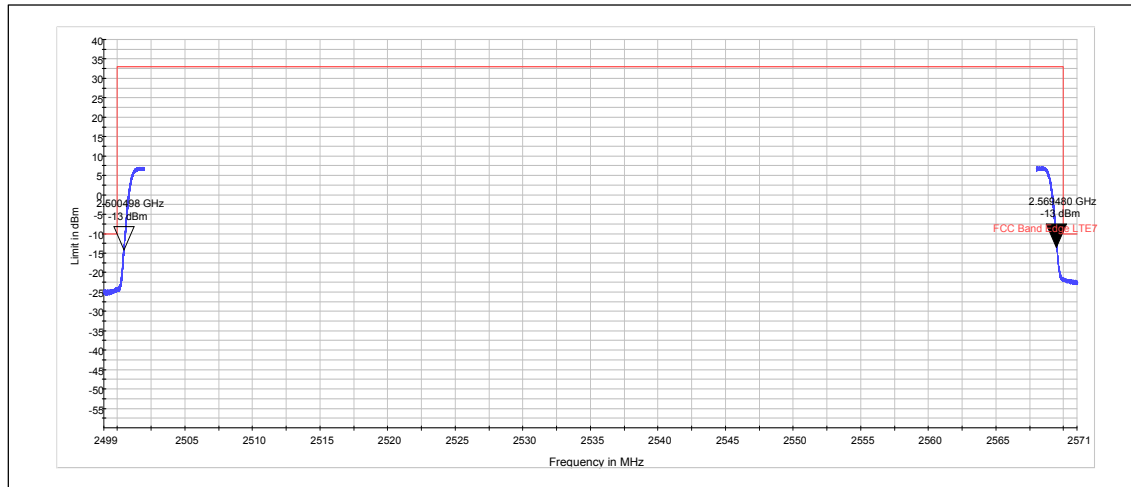
Channel 21100 / 2535.0 MHz



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 / 3.3	2.24590	2500.488900	2500.488897	2569.475700	2569.475702	PASSED

Channel 21100 / 2535.0 MHz

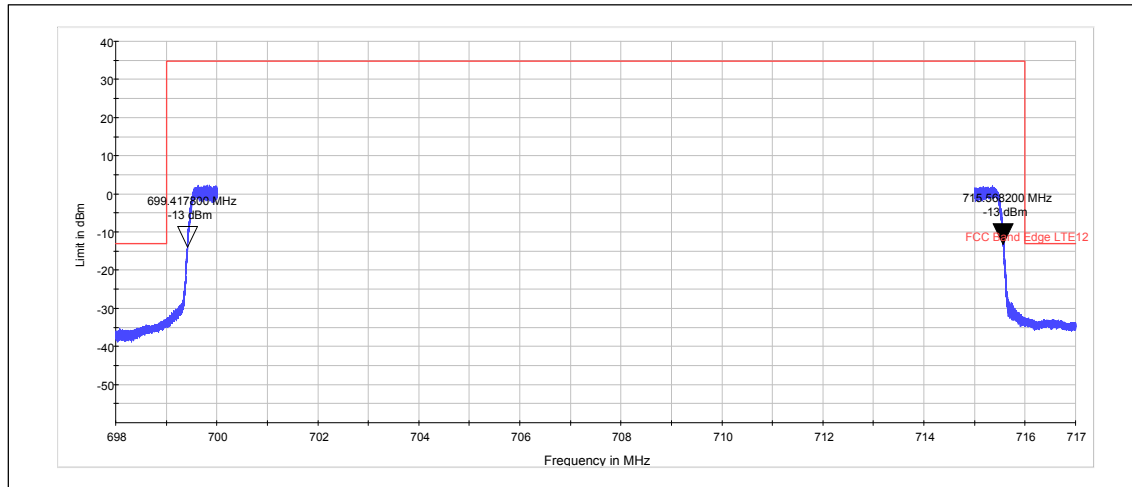


RMS (RBW: 500 kHz, VBW: 2 MHz)

Voltage level [V]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
Nominal / 3.9	3.54767	2500.497600	2500.497596	2569.480200	2569.480203	PASSED

8.6. LTE12 Test results

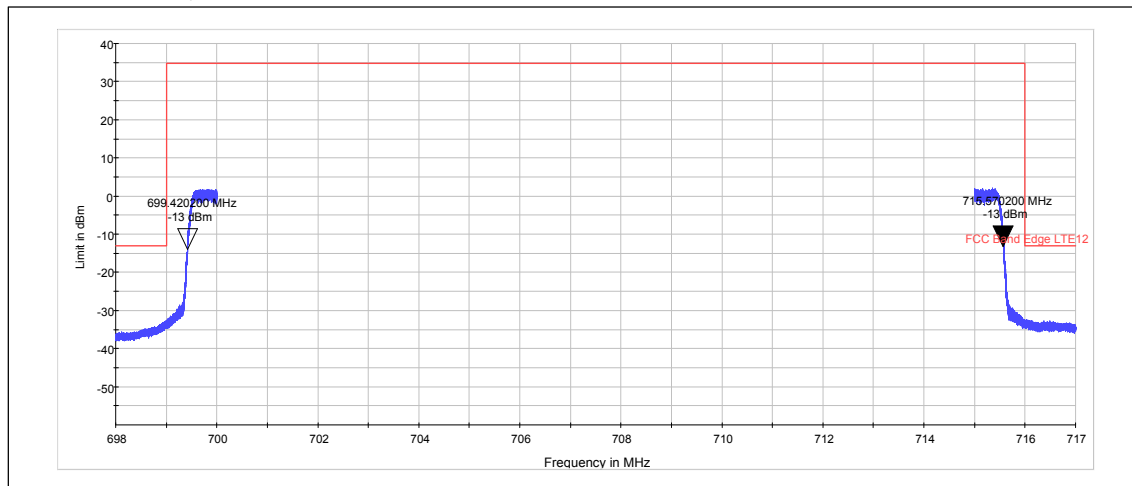
Channel 23095 / 707.5 MHz



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 / 4.4	0.84400	699.417800	699.417799	715.568200	715.568200	PASSED

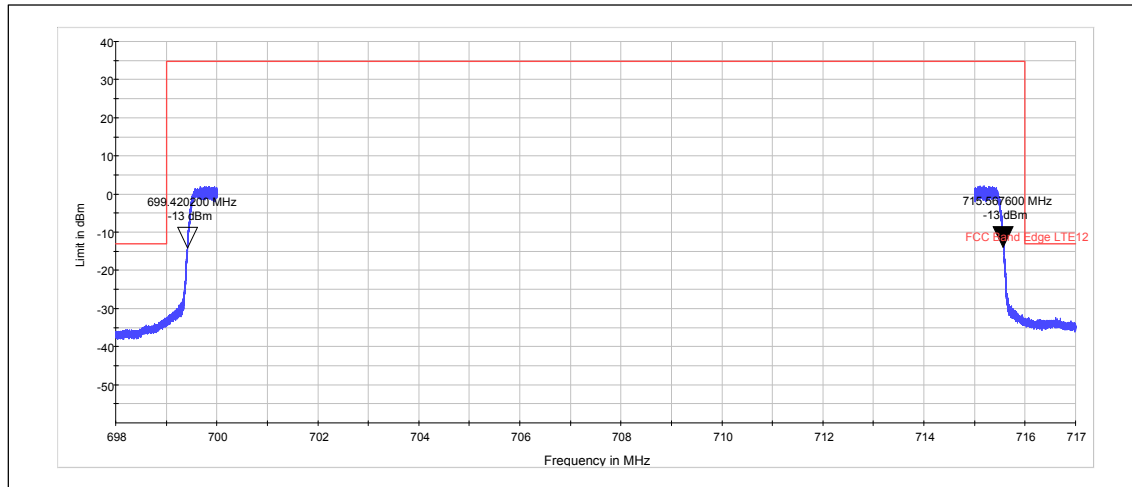
Channel 23095 / 707.5 MHz



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
Battery cut-off point / 3.3	0.74387	699.420200	699.420199	715.570200	715.570200	PASSED

Channel 23095 / 707.5 MHz

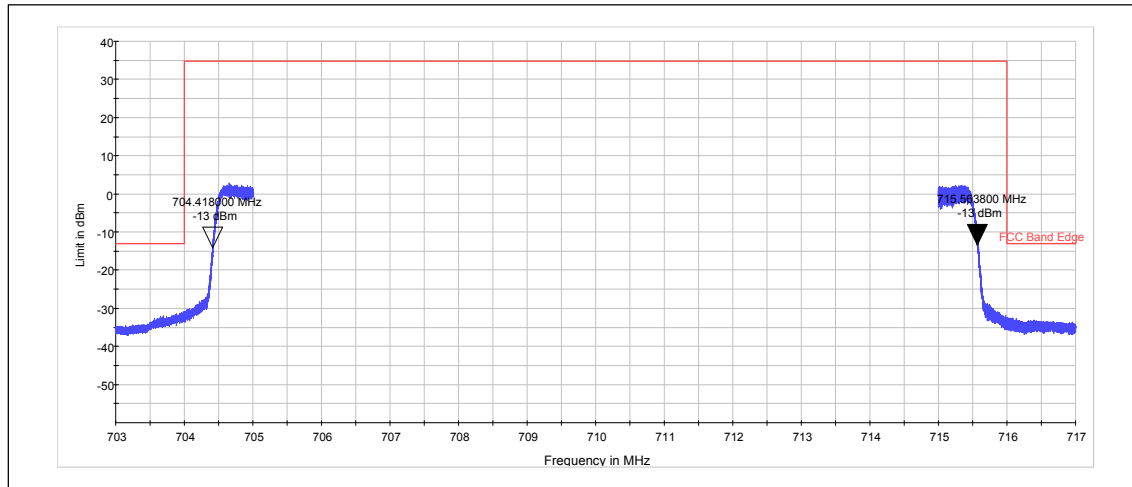


RMS (RBW: 100 kHz, VBW: 300 kHz)

Voltage level [V]	Deviation [Hz]	Low marker [MHz]	Marker – Dev [MHz]	High marker [MHz]	Marker + Dev [MHz]	Result
Nominal / 3.9	1.17302	699.420200	699.420198	715.567600	715.567601	PASSED

8.7. LTE17 Test results

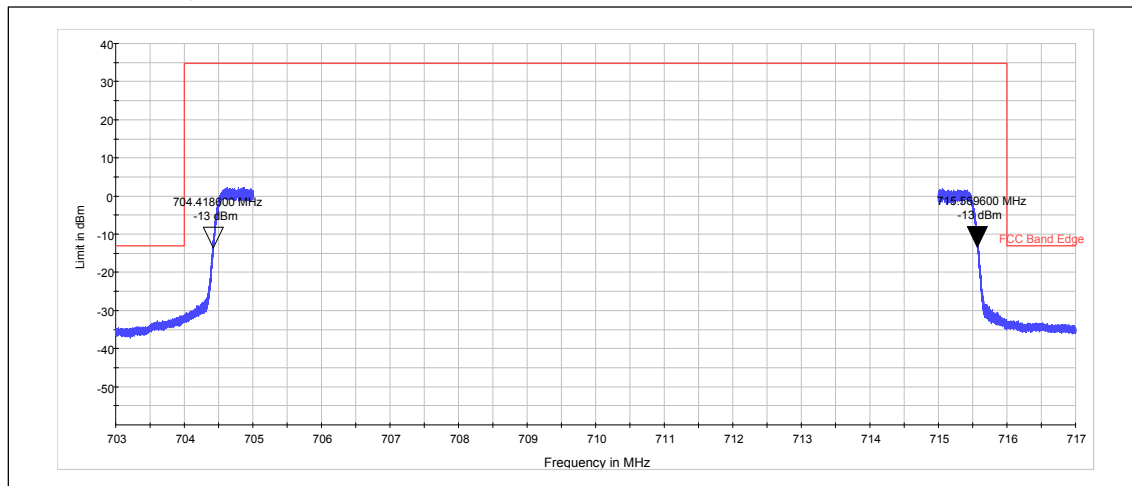
Channel 23790 / 710.0 MHz



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 / 4.4	-0.54359	704.418000	704.417999	715.563800	715.563800	PASSED

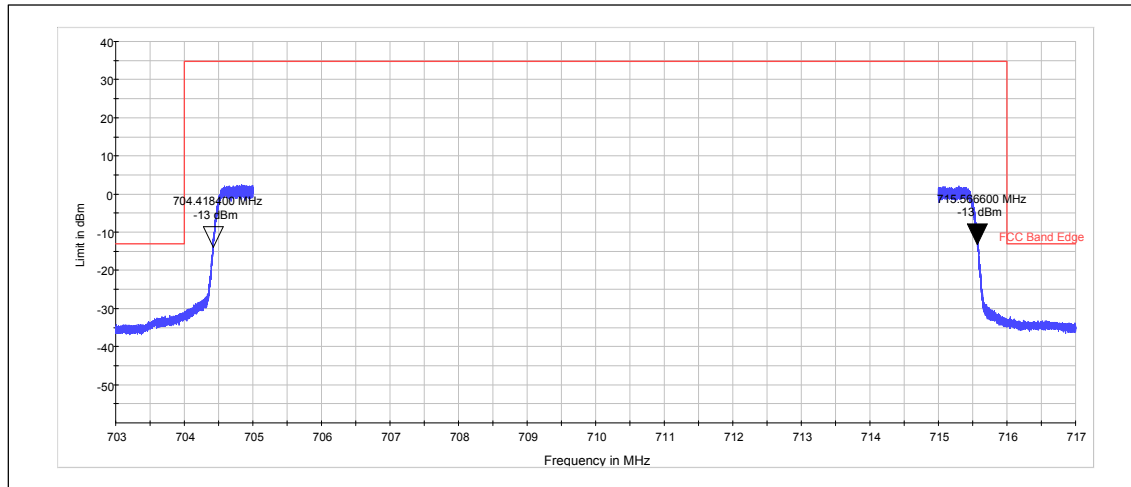
Channel 23790 / 710.0 MHz



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
Battery cut-off point / 3.3	1.25885	704.418600	704.418598	715.569600	715.569601	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 / 3.9	0.91553	704.418400	704.418399	715.566600	715.566600	PASSED

9. Test Equipment

9.1. Conducted measurements

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

9.2. Radiated measurements

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

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

END OF REPORT