

FCC Part 22/24/27 Compliance Test Report

Test Report no.:	FCC_Cellular_RM-1063_01_Ant1	Date of Report:	13-Jan-2015
Number of pages:	77	Customer's Contact person:	Jari Rontu
Testing laboratory:	TCC Microsoft Salo Laboratory P.O.Box(86) Joensuunkatu 7E FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 71 80 44122	Customer:	Microsoft P.O.Box(86) Joensuunkatu 7E FIN-24101 SALO, FINLAND Tel. +358 (0) 7180 08000 Fax. +358 71 80 44122
FCC listing no.:	533467		
IC recognition no.:	661V-1		
Tested devices/ accessories:	Phone RM-1063 / Dummy Battery SD-238R / Headset WH-108 / Battery BV-T4V / Ac-Charger AC-20E		
FCC ID:	PYARM-1063	IC:	-
Supplement reports:	-		
Testing has been carried out in accordance with:	CFR 47, FCC rules Parts 22/24/27, TIA-603-C-2004 and IC standards, RSS-GEN (Issue 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). Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".		
Documentation:	The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory. The documentation of the testing performed on the tested devices is archived for 15 years at TCC Microsoft.		
Test Results:	The EUT complies with the requirements in respect of all parameters subject to the test. The test results relate only to devices specified in this document		
Date and signature for the contents:			

Sami Lehtonen, Specialist, EMC

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

Date of receipt	28-Oct-2014
Testing completed	30-Dec-2014
The customer's contact person	Jari Rontu
Test Plan referred to	T:\Projects\RM-1063\TestPlan\RS_testplan_RM-1063.xlsm
Notes	-
Document name	T:\Projects\RM-1063\EMC\FCC_Cellular_RM-1063_01_Ant1.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-1063	356493060016703	6204	-	02154.00000.14501.24000	18940
Dummy Battery	SD-238R	-	0.1	-	-	18942
Headset	WH-108	2265171	-	-	-	18677
Phone	RM-1063	356493060017073	6204	-	02154.00000.14501.24000	18955
Battery	BV-T4V	4181574345C1010324280670764	CCE	-	-	18707
Ac-Charger	AC-20E	409049415667071145580675628	-	-	-	18697
Headset	WH-108	4235VF	-	-	-	18698
Phone	RM-1063	356493060016794	6204	-	02154.00000.14501.24000	18941
Dummy Battery	sd-238r	-	0.1	-	-	18943

1.2. Summary of Test Results

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)	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

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

LTE5:

Section in CFR 47	Section in RSS-GEN or RSS-132	Name of the test	Result
§2.1046(a), 22.913(a)	4.4	Conducted RF output power	NP
§22.913(a)	4.4	Radiated RF output power	NP
N/A	5.4	Peak to average power ratio	PASSED
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§22.917(a)	4.5	Band edge compliance	PASSED
§22.917(a), §2.1051	4.5	Spurious emissions at antenna terminals	NP
§22.917(a), §2.1053	4.5	Spurious radiated emissions	PASSED
§2.1055(a)	4.3	Frequency stability, temperature variation	NP
§2.1055(d)	4.3	Frequency stability, voltage variation	NP

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	NP
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§27.53(f)	4.6	Band edge compliance	PASSED
§27.53(f)	4.6	Spurious emissions at antenna terminals	NP
§27.53(f)	4.6	Spurious radiated emissions	PASSED
§27.54	4.3	Frequency stability, temperature variation	PASSED
§27.54	4.3	Frequency stability, voltage variation	PASSED

LTE17:

Section in CFR 47	Section in RSS-GEN or RSS-130	Name of the test	Result
§2.1046(a)	4.4	Conducted RF output power	NP
§27.50(c)(10)	4.4	Radiated RF output power	NP
N/A	N/A	Peak to average power ratio	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	NP
§2.1055(d)	4.3 (a)	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	NP
N/A	6.4	Peak to average power ratio	PASSED
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§24.238(a)	6.5	Band edge compliance	PASSED
§24.238(a), §2.1051	6.5	Spurious emissions at antenna terminals	NP
§24.238(a), §2.1053	6.5	Spurious radiated emissions	PASSED
§2.1055(a)	6.3	Frequency stability, temperature variation	PASSED
§2.1055(d)	6.3	Frequency stability, voltage variation	PASSED

GSM 850:

Section in CFR 47	Section in RSS-GEN or RSS-132	Name of the test	Result
§2.1046(a), 22.913(a)	4.4	Conducted RF output power	NP
§22.913(a)	4.4	Radiated RF output power	NP
N/A	5.4	Peak to average power ratio	PASSED
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§22.917(a)	4.5	Band edge compliance	PASSED
§22.917(a), §2.1051	4.5	Spurious emissions at antenna terminals	NP
§22.917(a), §2.1053	4.5	Spurious radiated emissions	PASSED
§2.1055(a)	4.3	Frequency stability, temperature variation	PASSED
§2.1055(d)	4.3	Frequency stability, voltage variation	PASSED

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)	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

WCDMA5:

Section in CFR 47	Section in RSS-GEN or RSS-132	Name of the test	Result
§2.1046(a), 22.913(a)	4.4	Conducted RF output power	NP
§22.913(a)	4.4	Radiated RF output power	NP
N/A	5.4	Peak to average power ratio	PASSED
§2.1049(h)	4.6.1	99 % occupied bandwidth	PASSED
§22.917(a)	4.5	Band edge compliance	PASSED
§22.917(a), §2.1051	4.5	Spurious emissions at antenna terminals	NP
§22.917(a), §2.1053	4.5	Spurious radiated emissions	PASSED
§2.1055(a)	4.3	Frequency stability, temperature variation	NP
§2.1055(d)	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.

CONTENTS

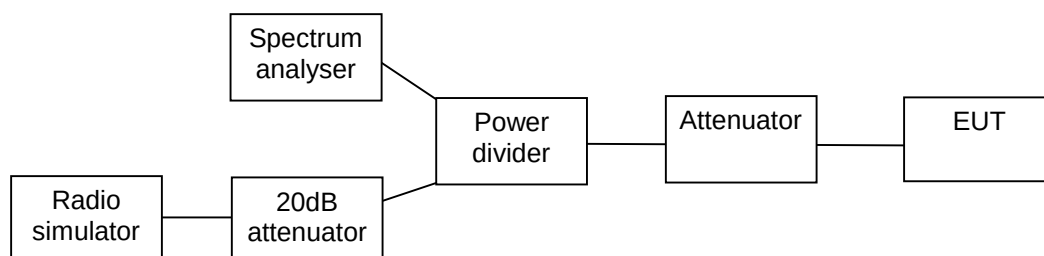
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2. Peak to average power ratio (FCC N/A, RSS-133 6.4, RSS-139 6.4, RSS-132 5.4)

EUT with DUT number	RM-1063, DUT 18940
Accessories with DUT numbers	SD-238R, DUT 18942 ; WH-108, DUT 18677
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	Measured from antenna 1.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 38 / 99.9
Date of measurements	15-Dec-2014
Measured by	Jari Keto

2.1. Test Setup



2.2. Test method and limit

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

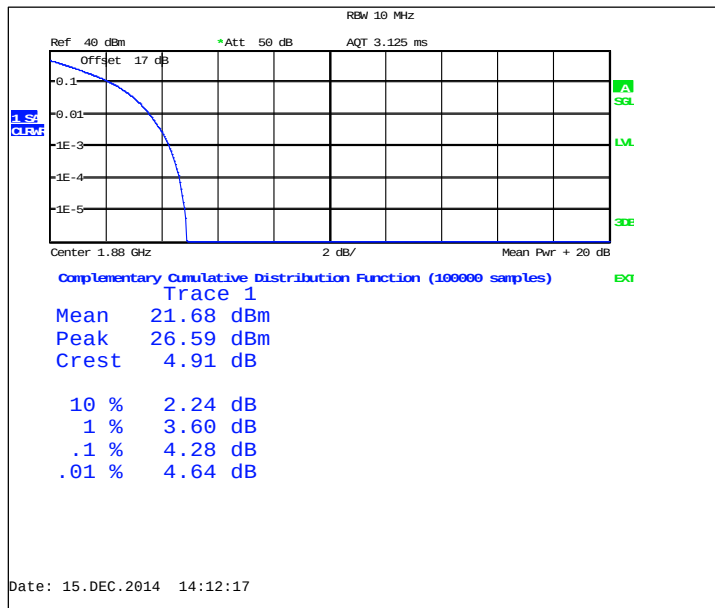
Limits for Peak to average power ratio measurements

Peak to average power ratio [dB]
≤ 13

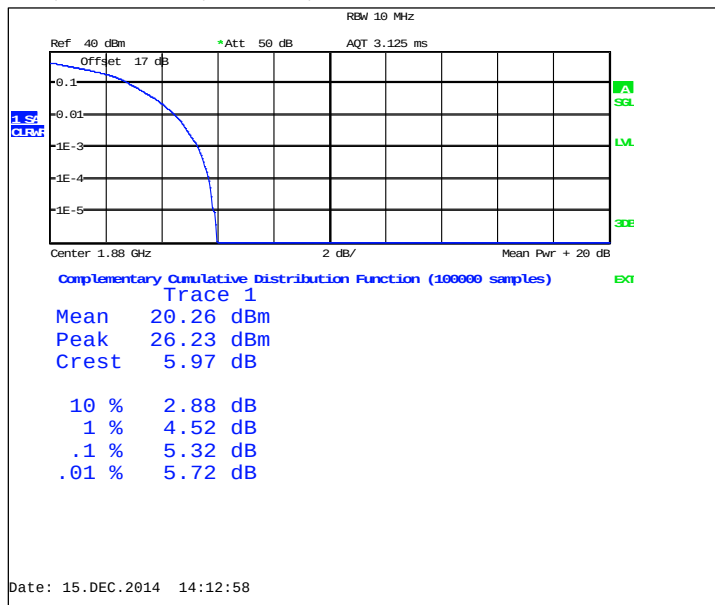
2.3. LTE2 Test results

Operation mode (TX on)	Channel / f _c [MHz]	Peak to average power ratio [dB]	Result
FDD, CBW 5MHz, QPSK, 25 RB	18900 / 1880.0	4.91	PASSED
FDD, CBW 5MHz, 16QAM, 25 RB	18900 / 1880.0	5.97	PASSED

FDD, CBW 5MHz, QPSK, 25 RB



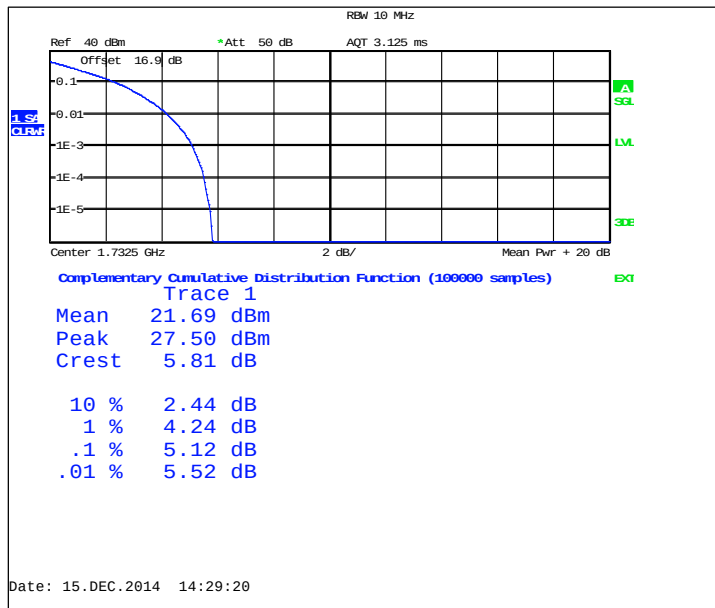
FDD, CBW 5MHz, 16QAM, 25 RB



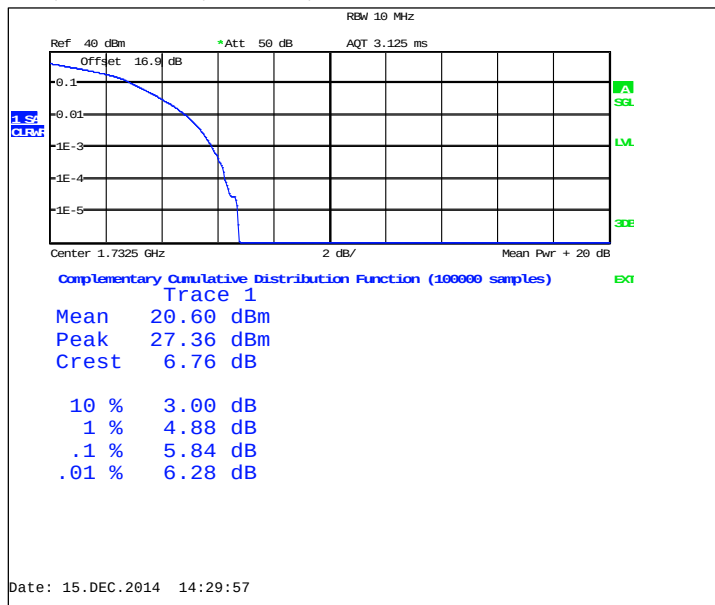
2.4. LTE4 Test results

Operation mode (TX on)	Channel / f_c [MHz]	Peak to average power ratio [dB]	Result
FDD, CBW 5MHz, QPSK, 25 RB	20175 / 1732.5	5.81	PASSED
FDD, CBW 5MHz, 16QAM, 25 RB	20175 / 1732.5	6.76	PASSED

FDD, CBW 5MHz, QPSK, 25 RB



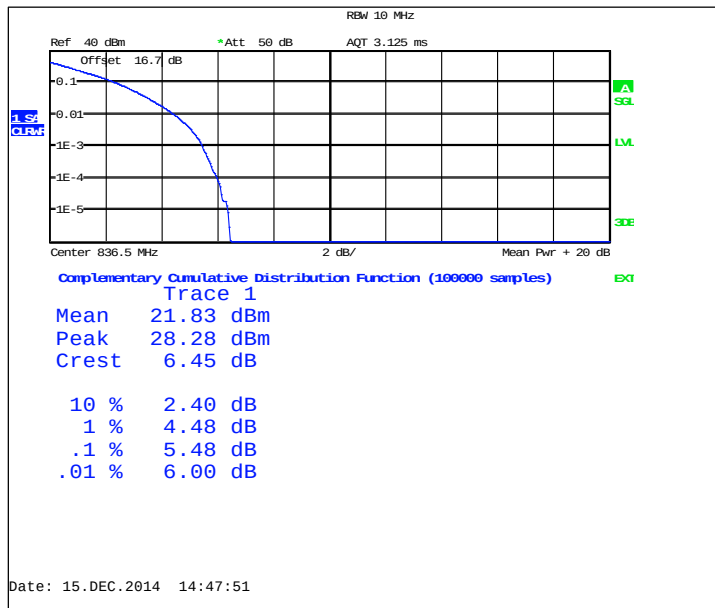
FDD, CBW 5MHz, 16QAM, 25 RB



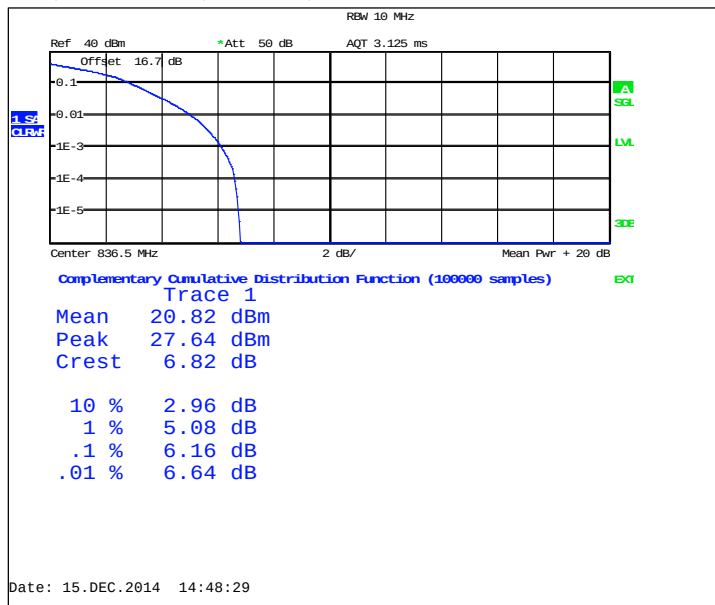
2.5. LTE5 Test results

Operation mode (TX on)	Channel / f _c [MHz]	Peak to average power ratio [dB]	Result
FDD, CBW 5MHz, QPSK, 25 RB	20525 / 836.5	6.45	PASSED
FDD, CBW 5MHz, 16QAM, 25 RB	20525 / 836.5	6.82	PASSED

FDD, CBW 5MHz, QPSK, 25 RB



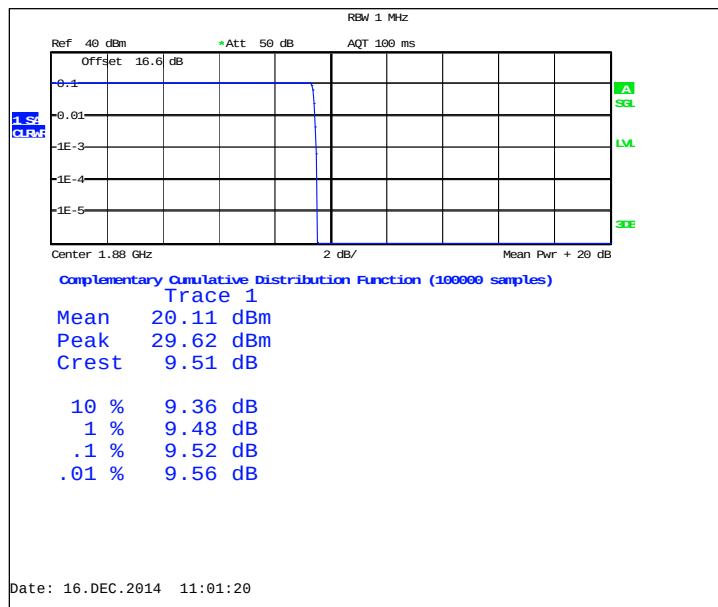
FDD, CBW 5MHz, 16QAM, 25 RB



2.6. GSM 1900 Test results

Operation mode (TX on)	Channel / f _c [MHz]	Peak to average power ratio [dB]	Result
GSM	661 / 1880.0	9.51	PASSED

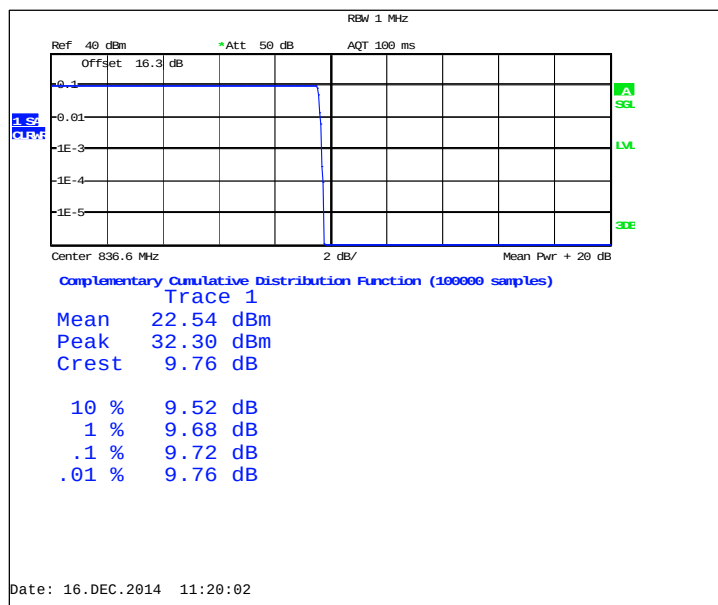
GSM



2.7. GSM 850 Test results

Operation mode (TX on)	Channel / f _c [MHz]	Peak to average power ratio [dB]	Result
GSM	190 / 836.6	9.76	PASSED

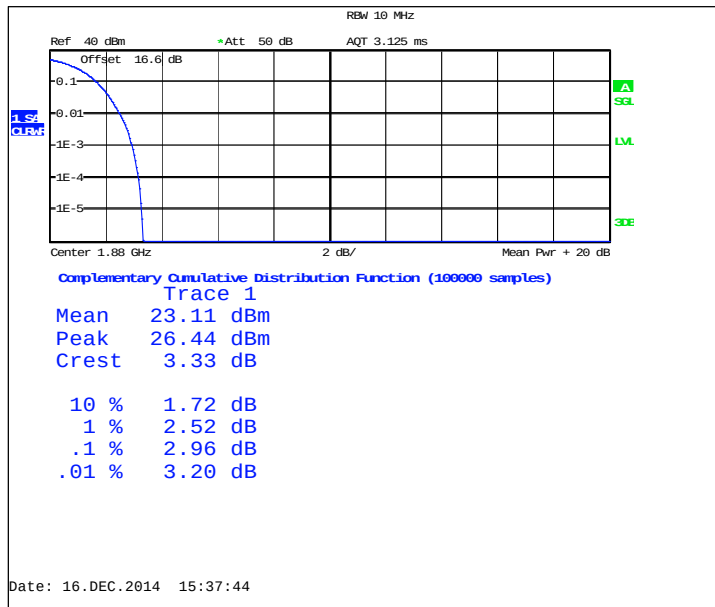
GSM



2.8. WCDMA2 Test results

Operation mode (TX on)	Channel / f _c [MHz]	Peak to average power ratio [dB]	Result
FDD	9400 / 1880.0	3.33	PASSED

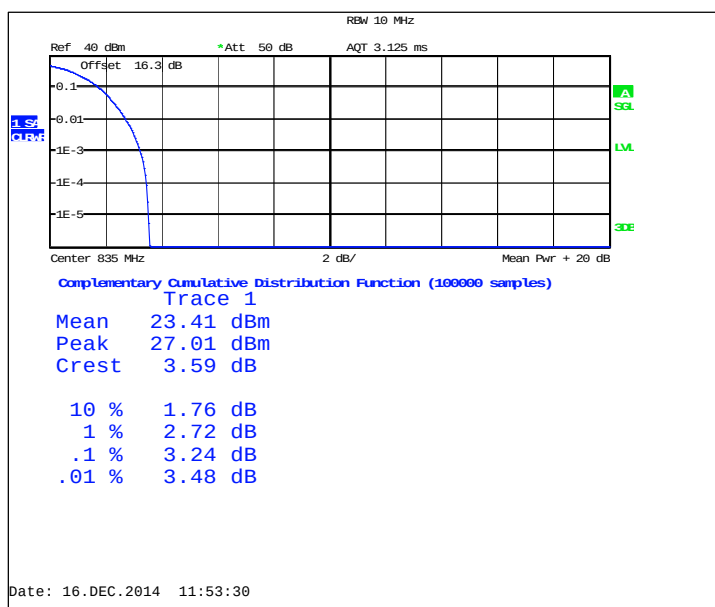
FDD



2.9. WCDMA5 Test results

Operation mode (TX on)	Channel / f _c [MHz]	Peak to average power ratio [dB]	Result
FDD	4175 / 835.0	3.59	PASSED

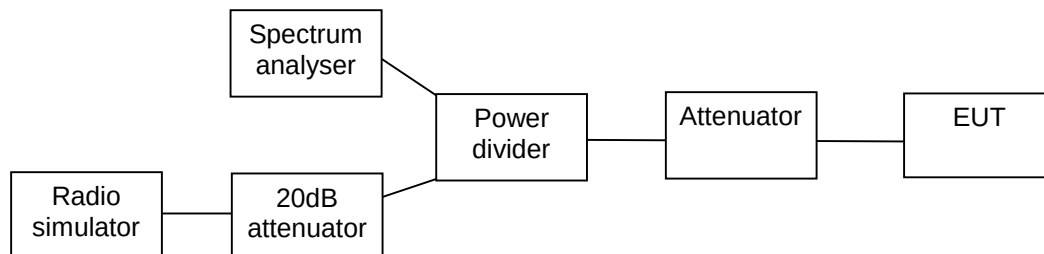
FDD



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-1063, DUT 18940, DUT 18941
Accessories with DUT numbers	SD-238R, DUT 18942, DUT 18943 ; WH-108, DUT 18677
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	Measured from antenna 1.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 38 / 99.9
Date of measurements	15-Dec-2014
Measured by	Jari Keto

3.1. Test Setup



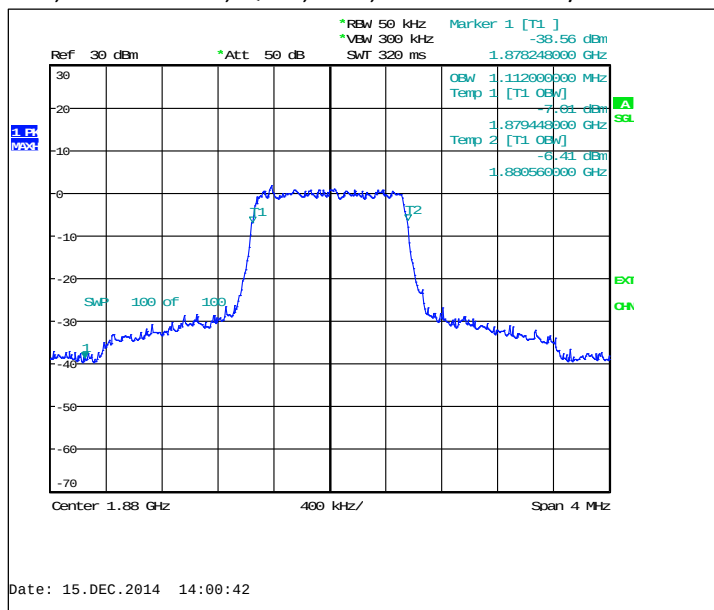
3.2. Test method and limit

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

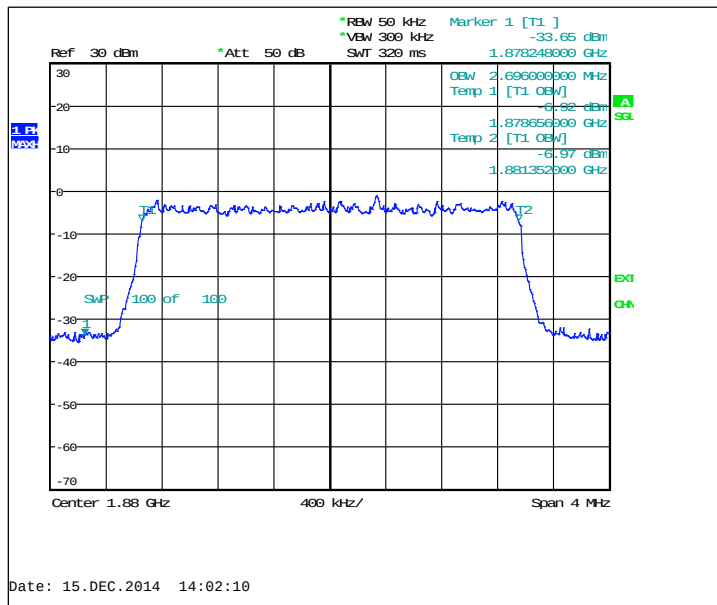
3.3. LTE2 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 1.4MHz, QPSK, 6 RB	1112
FDD, CBW 3MHz, QPSK, 15 RB	2696
FDD, CBW 5MHz, QPSK, 25 RB	4494
FDD, CBW 10MHz, QPSK, 50 RB	8970
FDD, CBW 15MHz, QPSK, 75 RB	13480
FDD, CBW 20MHz, QPSK, 100 RB	17900
FDD, CBW 1.4MHz, 16QAM, 6 RB	1120
FDD, CBW 3MHz, 16QAM, 15 RB	2688
FDD, CBW 5MHz, 16QAM, 25 RB	4494
FDD, CBW 10MHz, 16QAM, 50 RB	8970
FDD, CBW 15MHz, 16QAM, 75 RB	13400
FDD, CBW 20MHz, 16QAM, 100 RB	17900

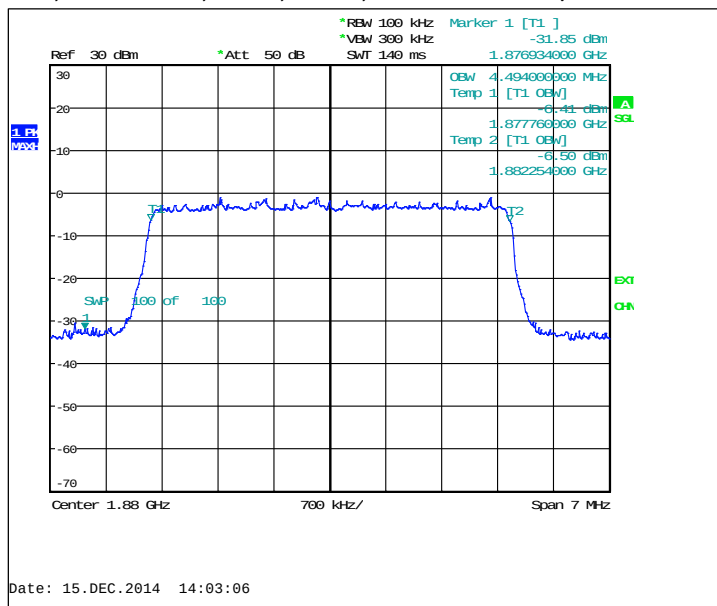
FDD, CBW 1.4MHz, QPSK, 6 RB, Channel 18900 / 1880.0 MHz



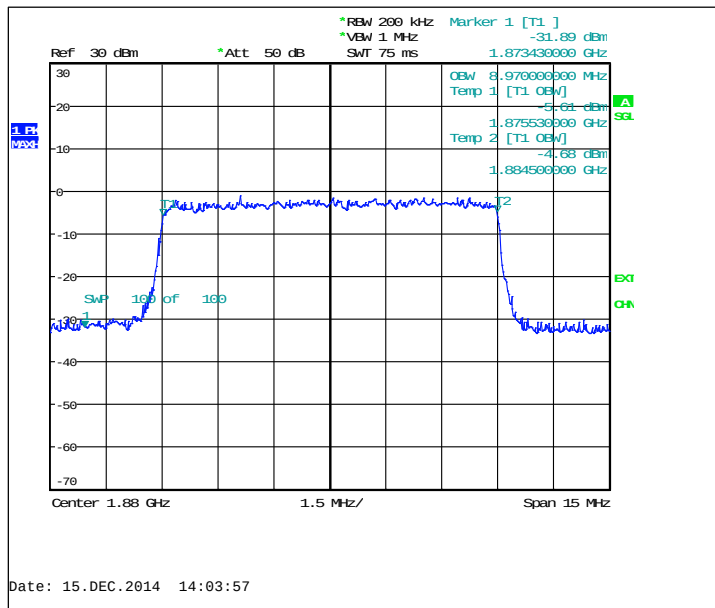
FDD, CBW 3MHz, QPSK, 15 RB, Channel 18900 / 1880.0 MHz



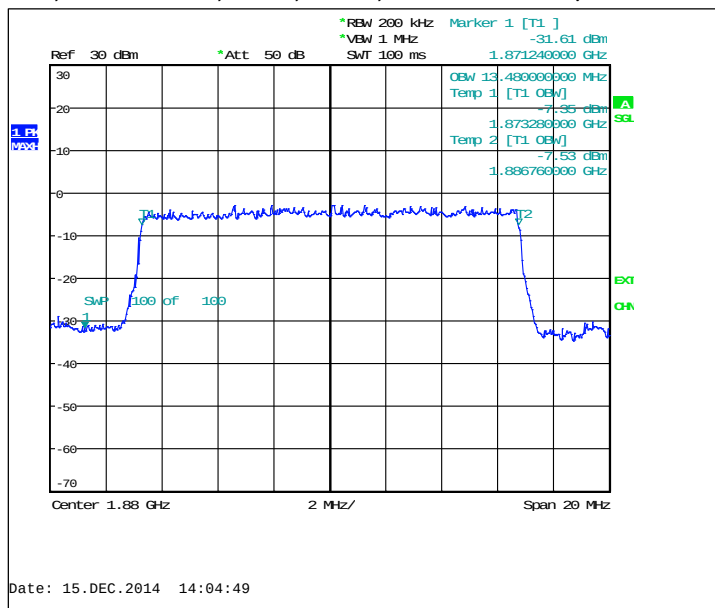
FDD, CBW 5MHz, QPSK, 25 RB, Channel 18900 / 1880.0 MHz



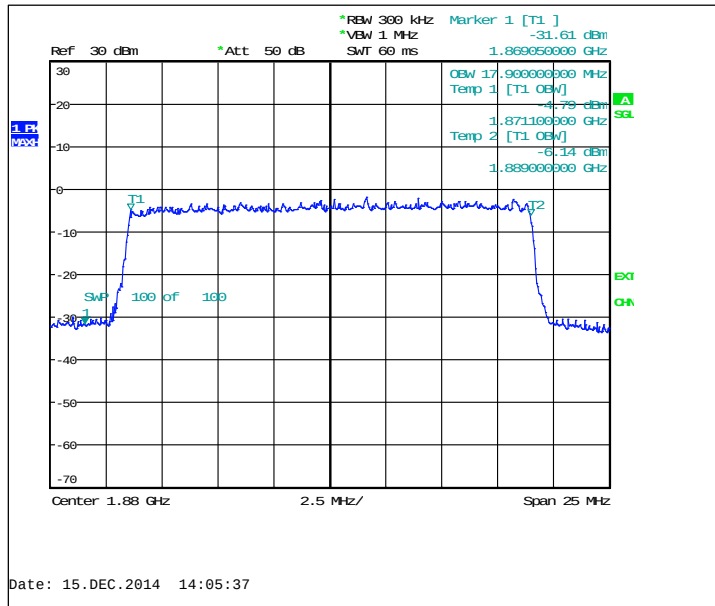
FDD, CBW 10MHz, QPSK, 50 RB, Channel 18900 / 1880.0 MHz



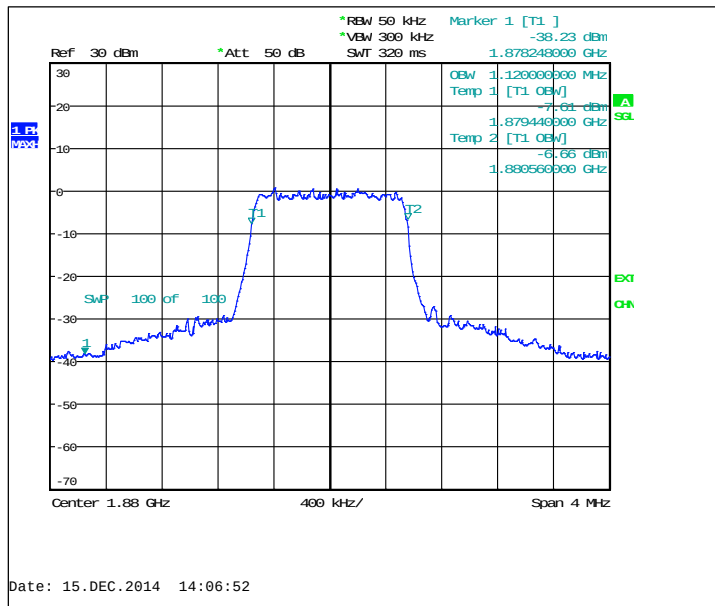
FDD, CBW 15MHz, QPSK, 75 RB, Channel 18900 / 1880.0 MHz



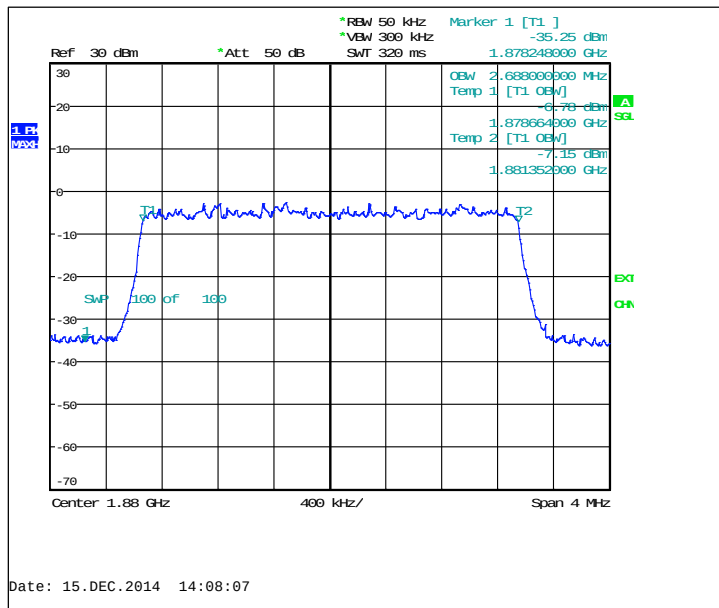
FDD, CBW 20MHz, QPSK, 100 RB, Channel 18900 / 1880.0 MHz



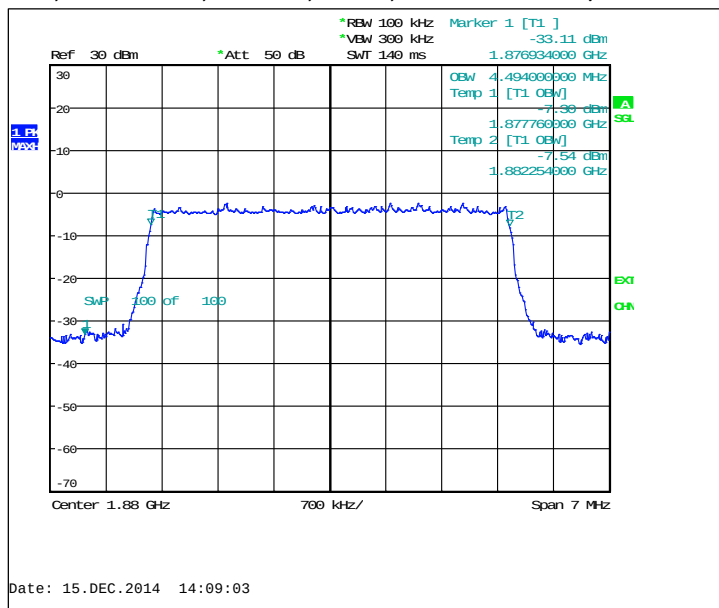
FDD, CBW 1.4MHz, 16QAM, 6 RB, Channel 18900 / 1880.0 MHz



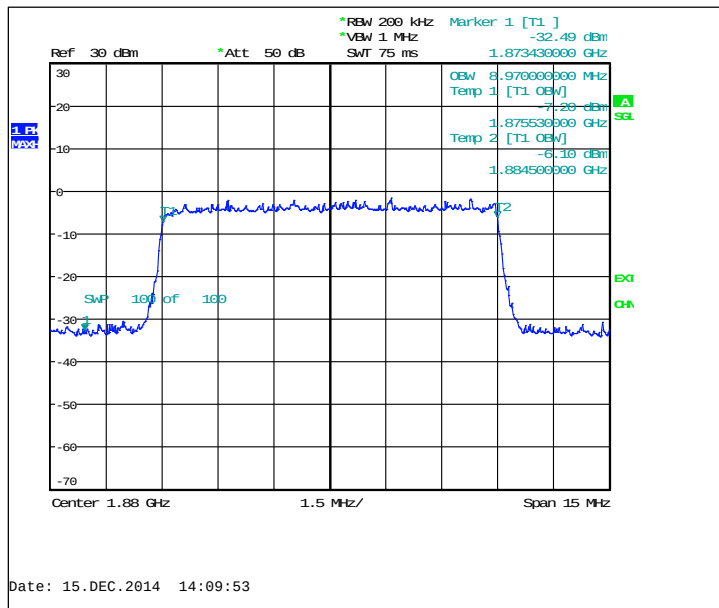
FDD, CBW 3MHz, 16QAM, 15 RB, Channel 18900 / 1880.0 MHz



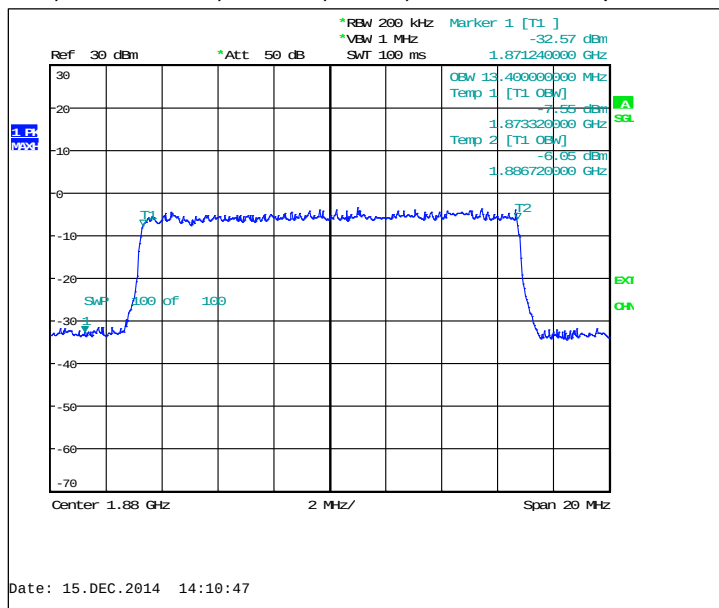
FDD, CBW 5MHz, 16QAM, 25 RB, Channel 18900 / 1880.0 MHz



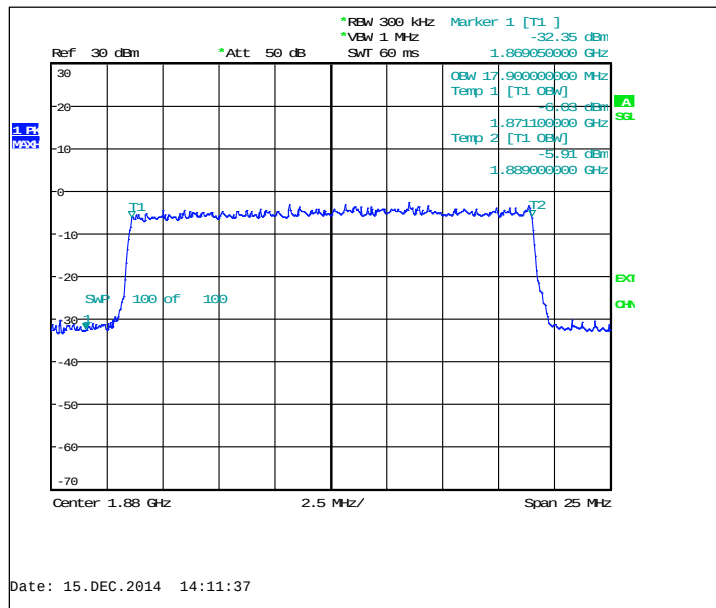
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 18900 / 1880.0 MHz



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



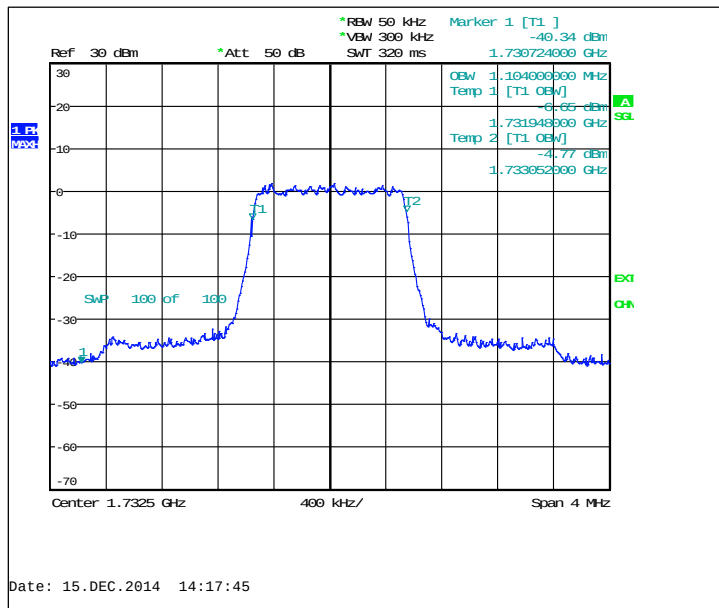
FDD, CBW 20MHz, 16QAM, 100 RB, Channel 18900 / 1880.0 MHz



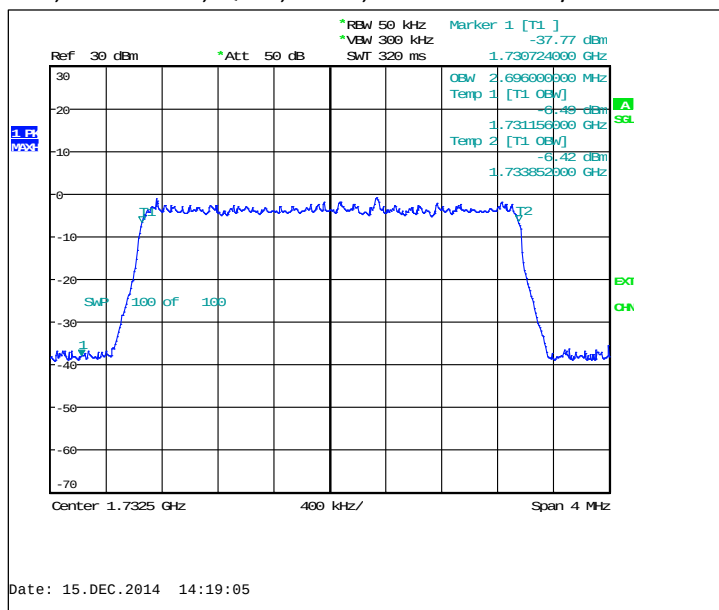
3.4. LTE4 Test results

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

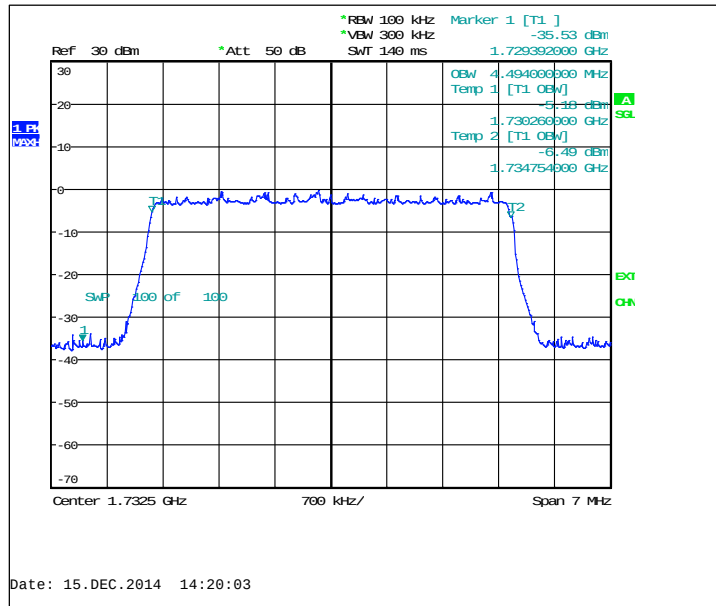
FDD, CBW 1.4MHz, QPSK, 6 RB, Channel 20175 / 1732.5 MHz



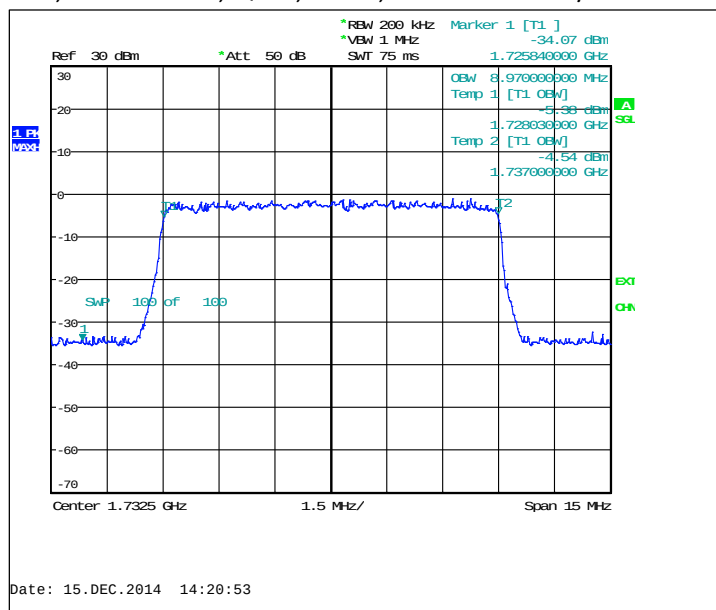
FDD, CBW 3MHz, QPSK, 15 RB, Channel 20175 / 1732.5 MHz



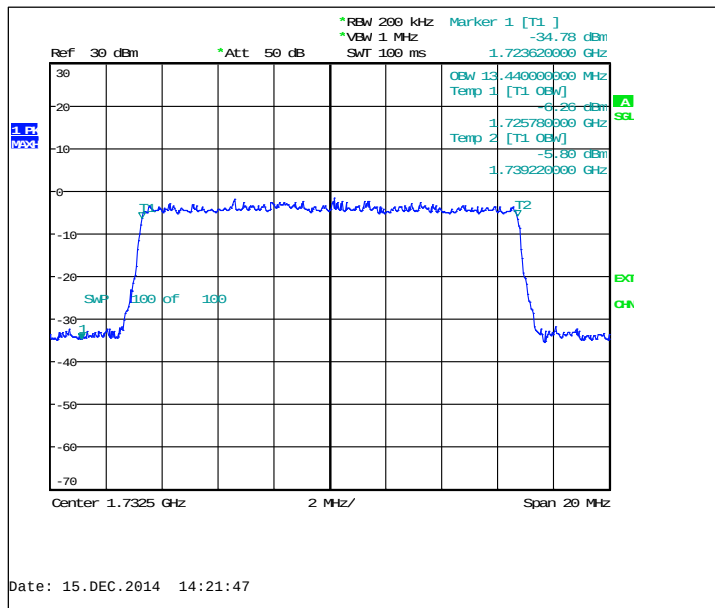
FDD, CBW 5MHz, QPSK, 25 RB, Channel 20175 / 1732.5 MHz



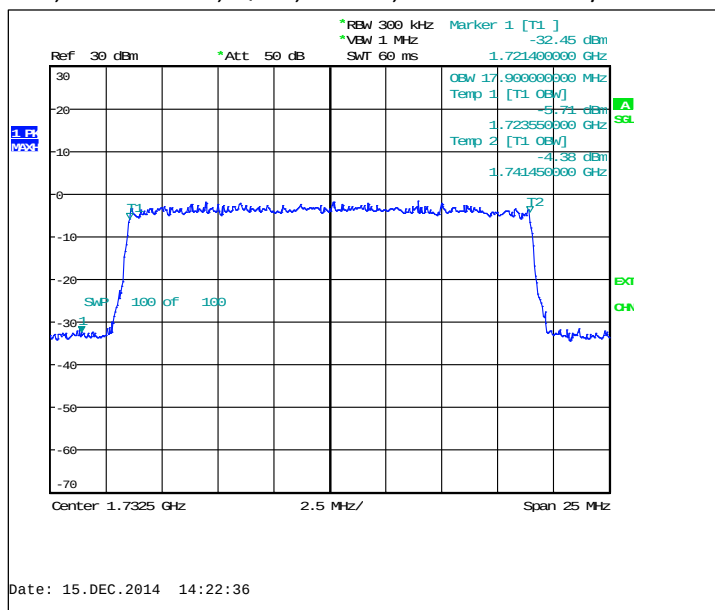
FDD, CBW 10MHz, QPSK, 50 RB, Channel 20175 / 1732.5 MHz



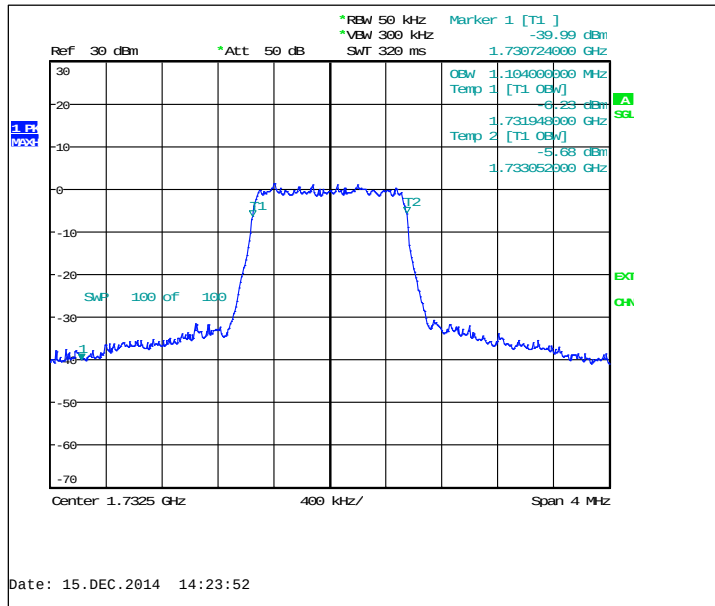
FDD, CBW 15MHz, QPSK, 75 RB, Channel 20175 / 1732.5 MHz



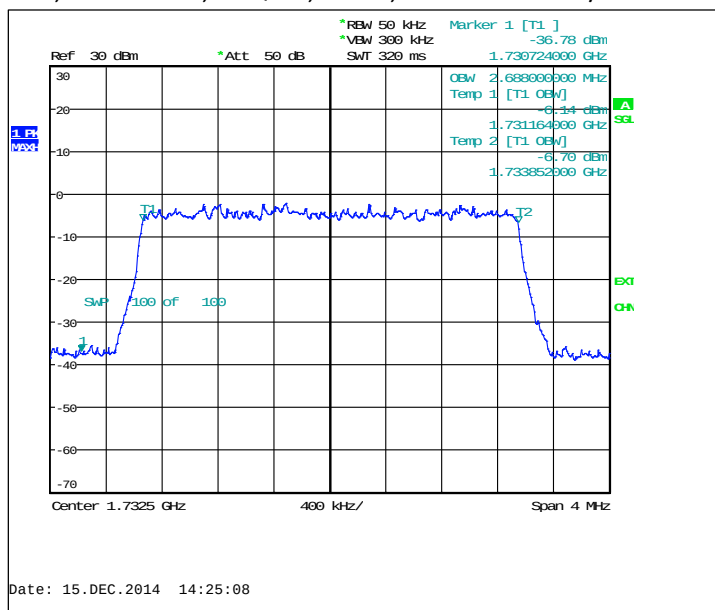
FDD, CBW 20MHz, QPSK, 100 RB, Channel 20175 / 1732.5 MHz



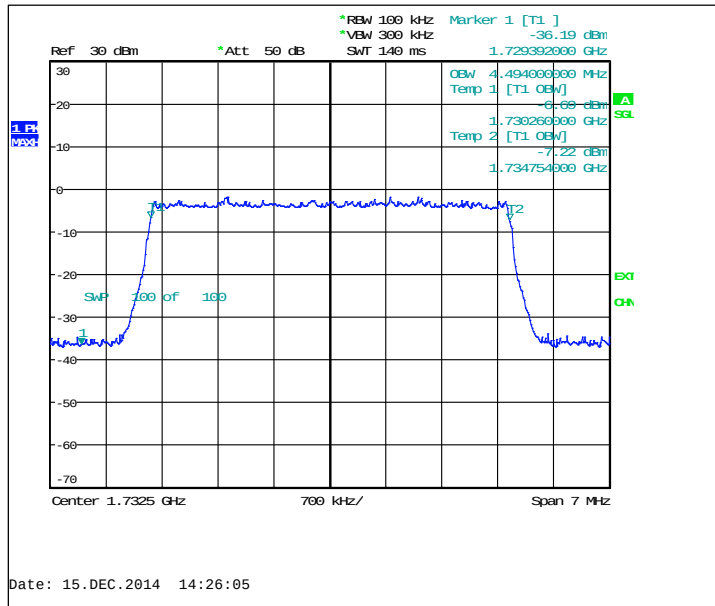
FDD, CBW 1.4MHz, 16QAM, 6 RB, Channel 20175 / 1732.5 MHz



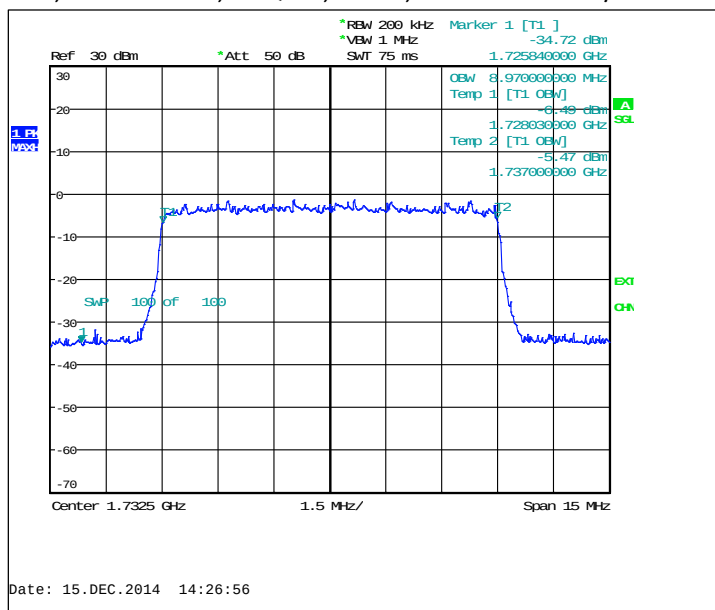
FDD, CBW 3MHz, 16QAM, 15 RB, Channel 20175 / 1732.5 MHz



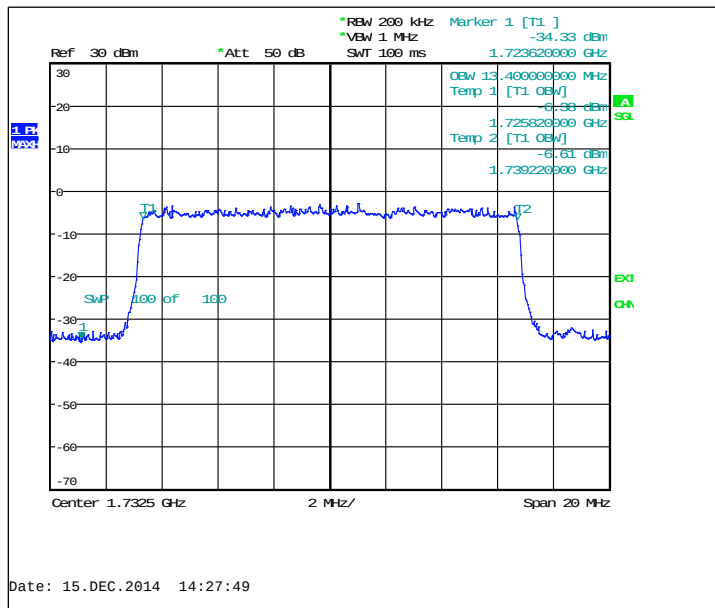
FDD, CBW 5MHz, 16QAM, 25 RB, Channel 20175 / 1732.5 MHz



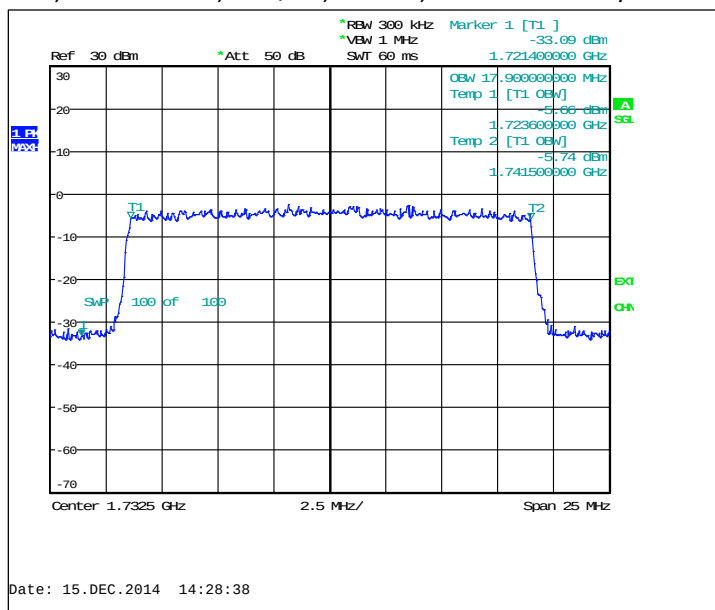
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 20175 / 1732.5 MHz



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



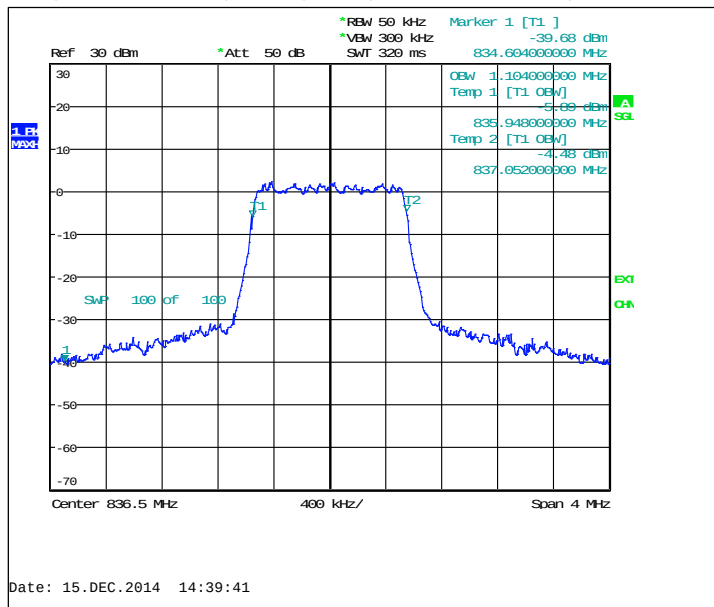
FDD, CBW 20MHz, 16QAM, 100 RB, Channel 20175 / 1732.5 MHz



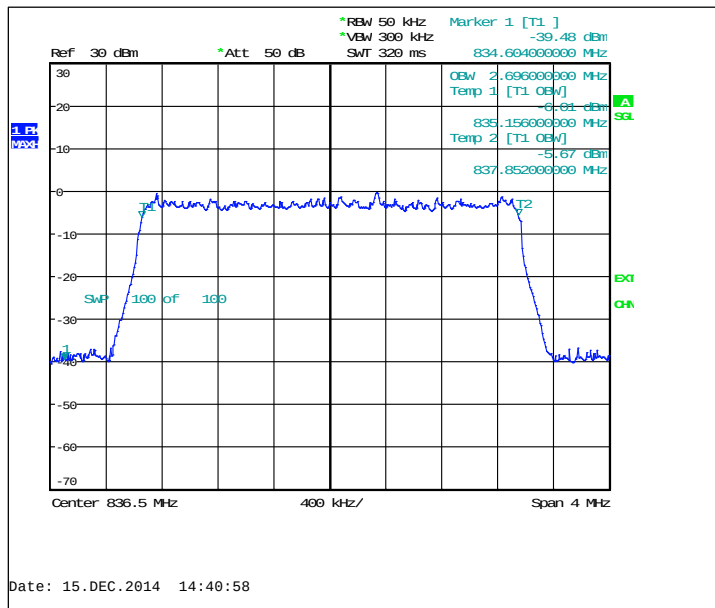
3.5. LTE5 Test results

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

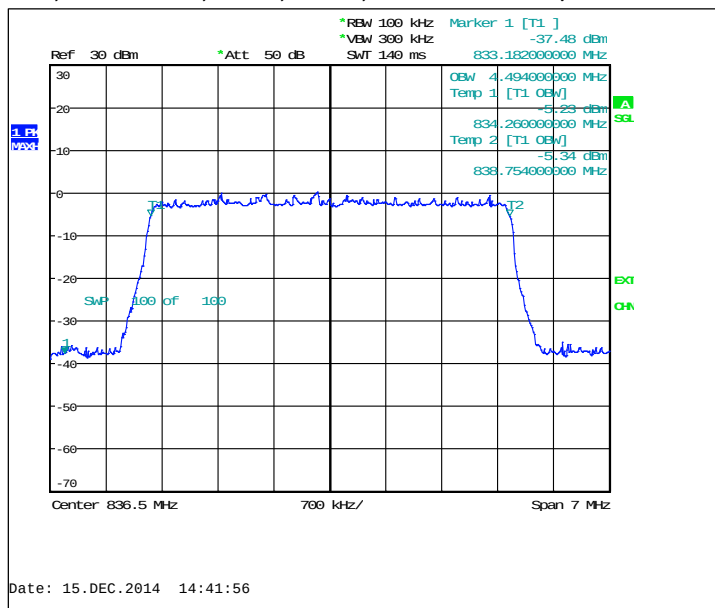
FDD, CBW 1.4MHz, QPSK, 6 RB, Channel 20525 / 836.5 MHz



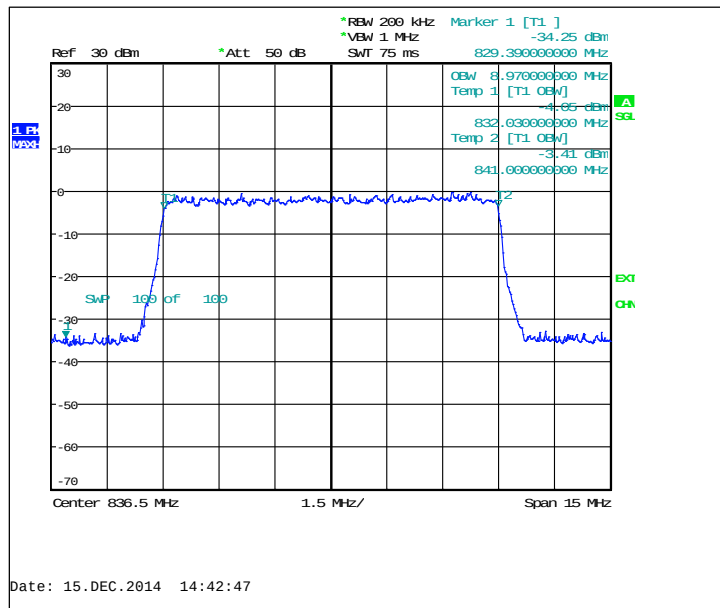
FDD, CBW 3MHz, QPSK, 15 RB, Channel 20525 / 836.5 MHz



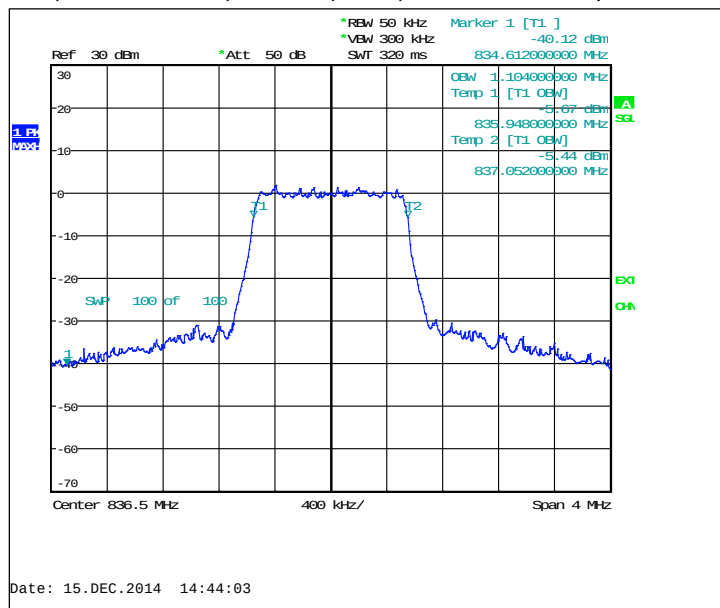
FDD, CBW 5MHz, QPSK, 25 RB, Channel 20525 / 836.5 MHz



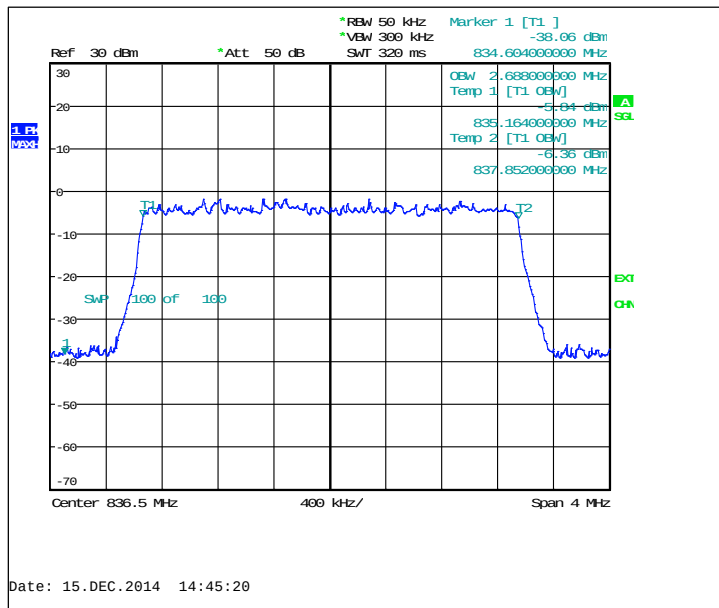
FDD, CBW 10MHz, QPSK, 50 RB, Channel 20525 / 836.5 MHz



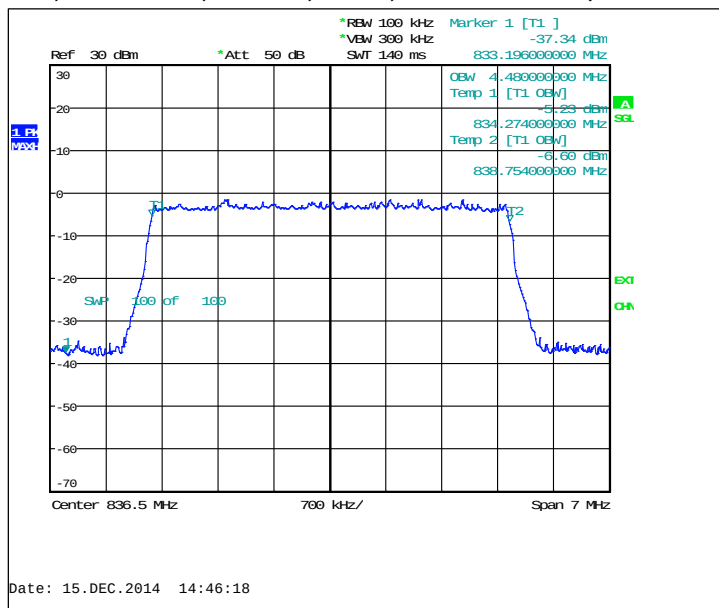
FDD, CBW 1.4MHz, 16QAM, 6 RB, Channel 20525 / 836.5 MHz



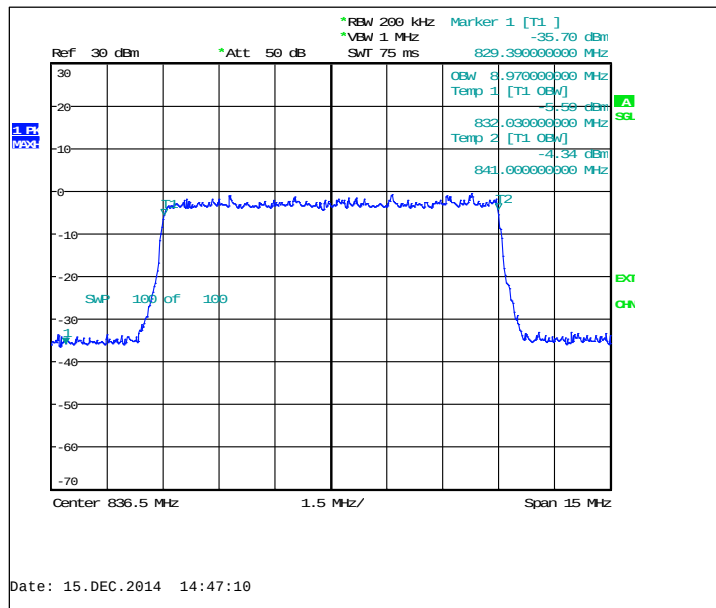
FDD, CBW 3MHz, 16QAM, 15 RB, Channel 20525 / 836.5 MHz



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



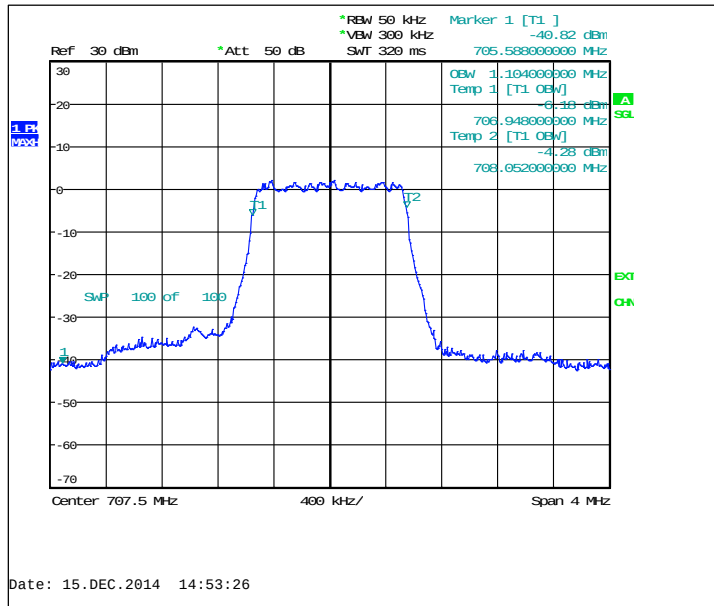
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 20525 / 836.5 MHz



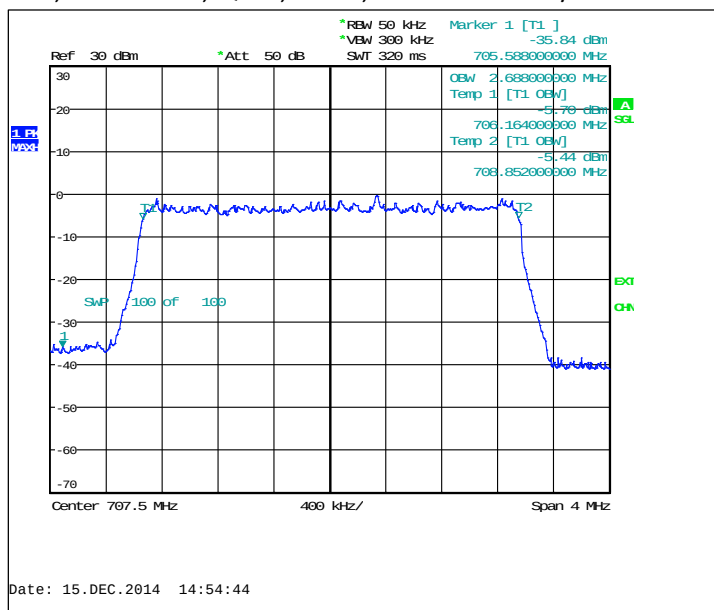
3.6. LTE12 Test results

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

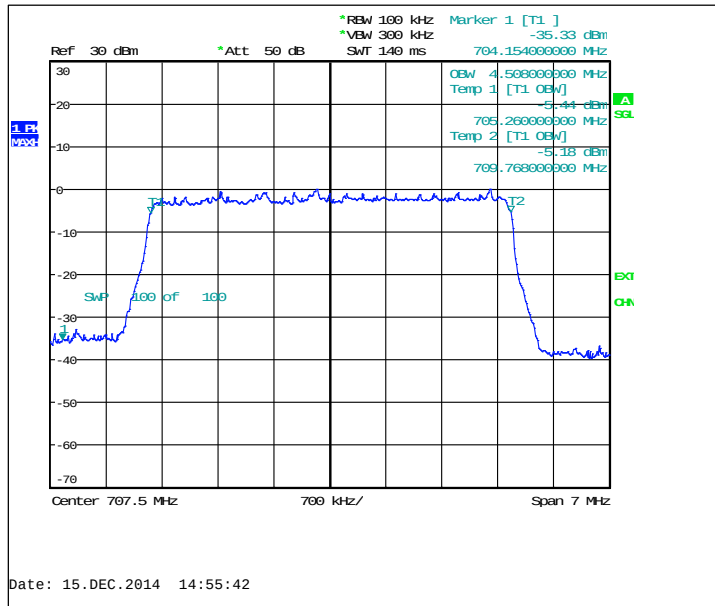
FDD, CBW 1.4MHz, QPSK, 6 RB, Channel 23095 / 707.5 MHz



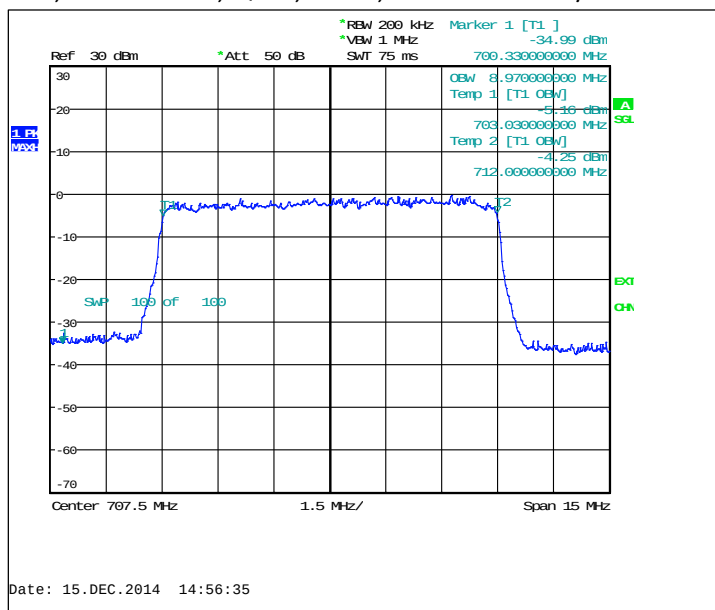
FDD, CBW 3MHz, QPSK, 15 RB, Channel 23095 / 707.5 MHz



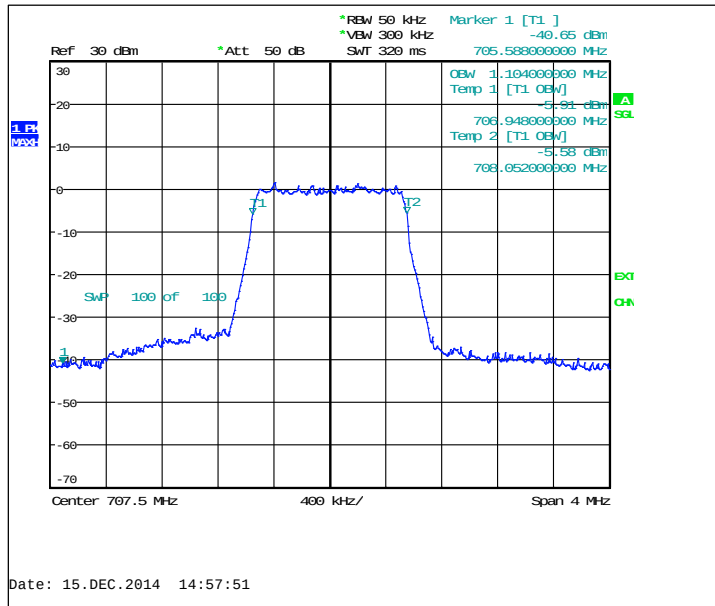
FDD, CBW 5MHz, QPSK, 25 RB, Channel 23095 / 707.5 MHz



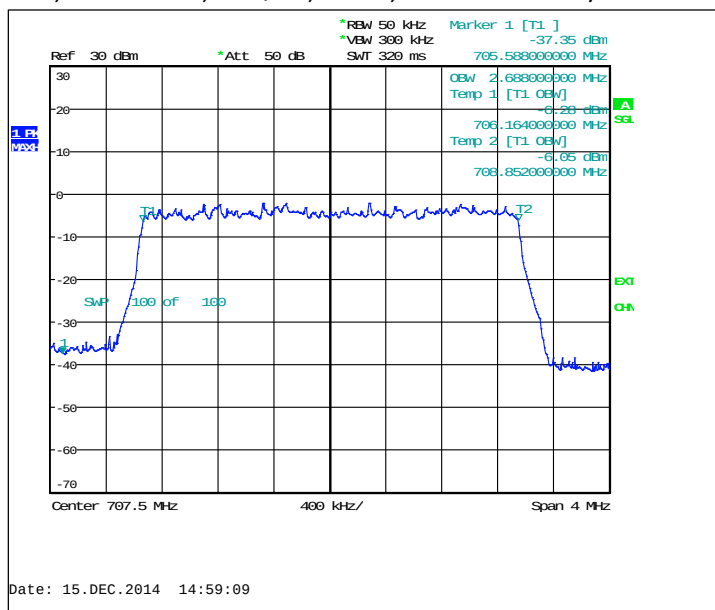
FDD, CBW 10MHz, QPSK, 50 RB, Channel 23095 / 707.5 MHz



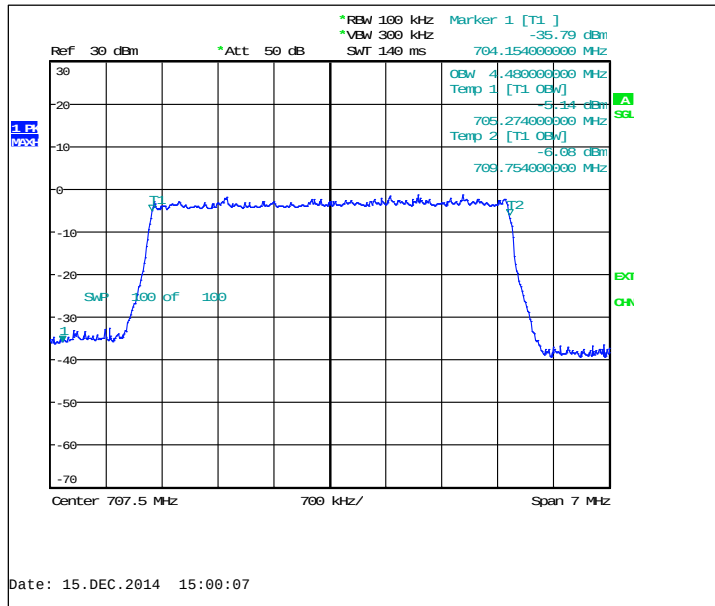
FDD, CBW 1.4MHz, 16QAM, 6 RB, Channel 23095 / 707.5 MHz



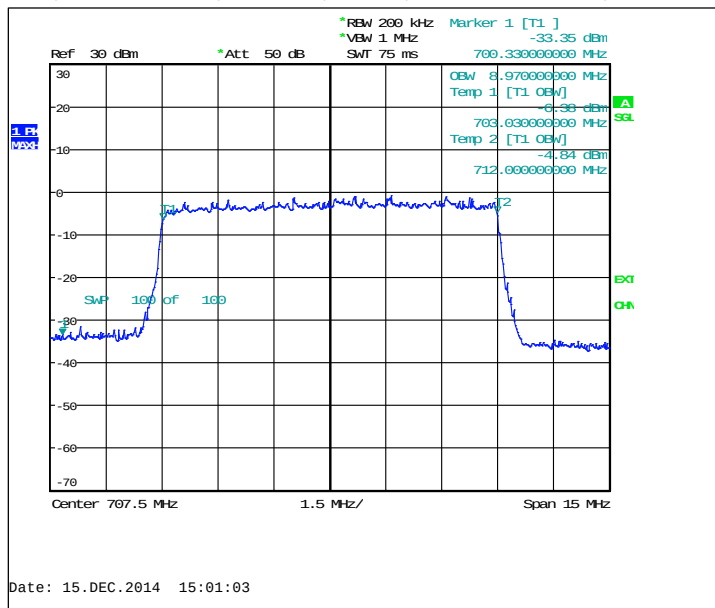
FDD, CBW 3MHz, 16QAM, 15 RB, Channel 23095 / 707.5 MHz



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



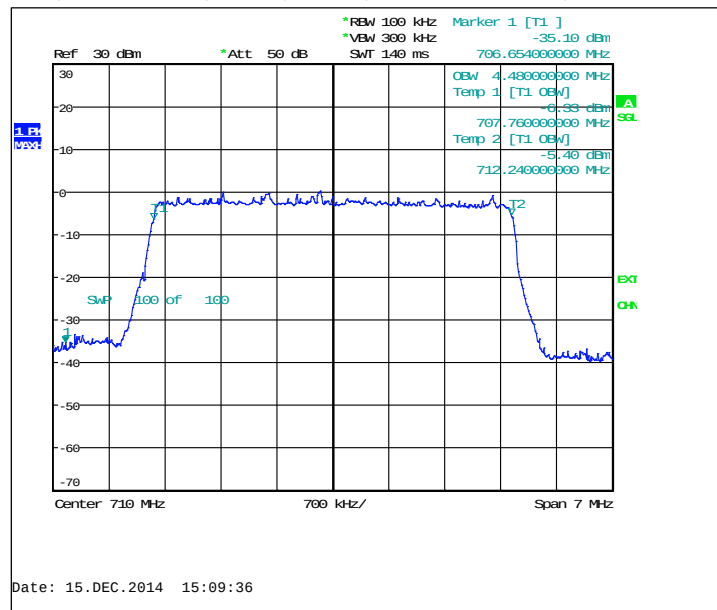
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 23095 / 707.5 MHz



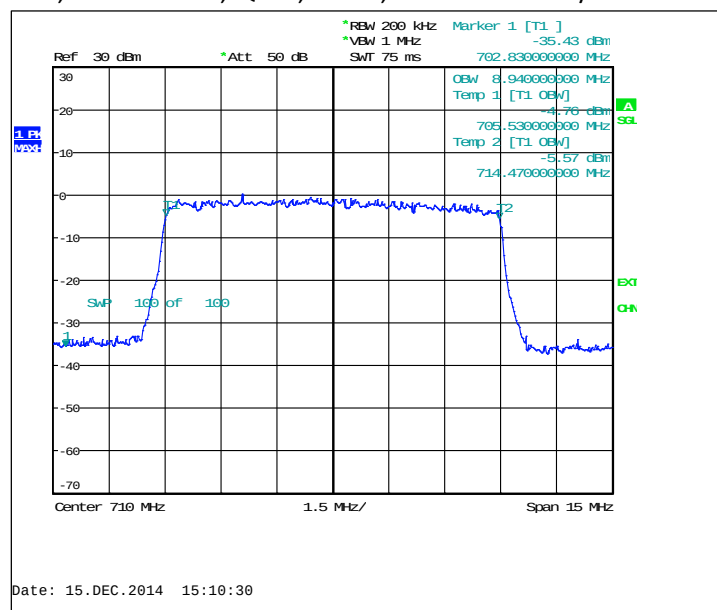
3.7. LTE17 Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 5MHz, QPSK, 25 RB	4480
FDD, CBW 10MHz, QPSK, 50 RB	8940
FDD, CBW 5MHz, 16QAM, 25 RB	4480
FDD, CBW 10MHz, 16QAM, 50 RB	8970

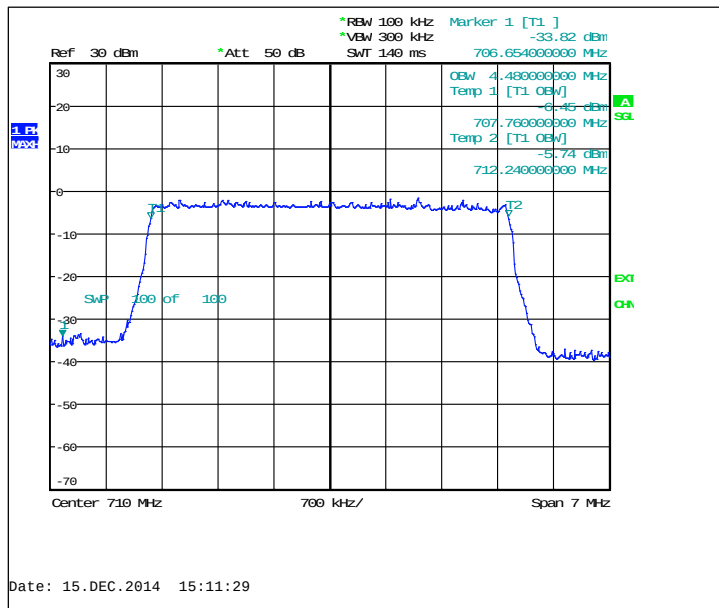
FDD, CBW 5MHz, QPSK, 25 RB, Channel 23790 / 710.0 MHz



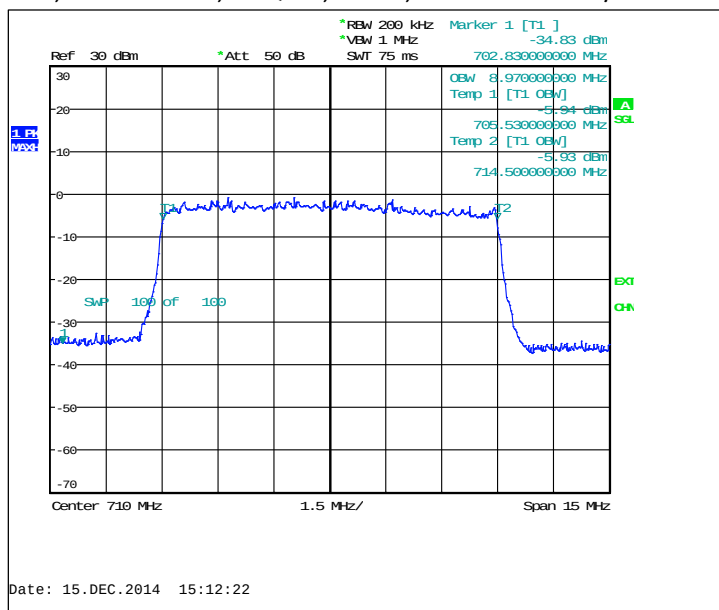
FDD, CBW 10MHz, QPSK, 50 RB, Channel 23790 / 710.0 MHz



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



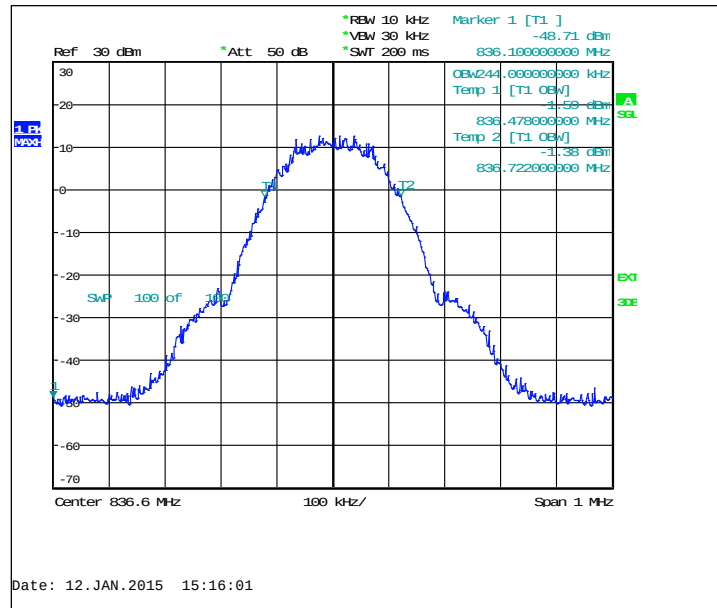
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 23790 / 710.0 MHz



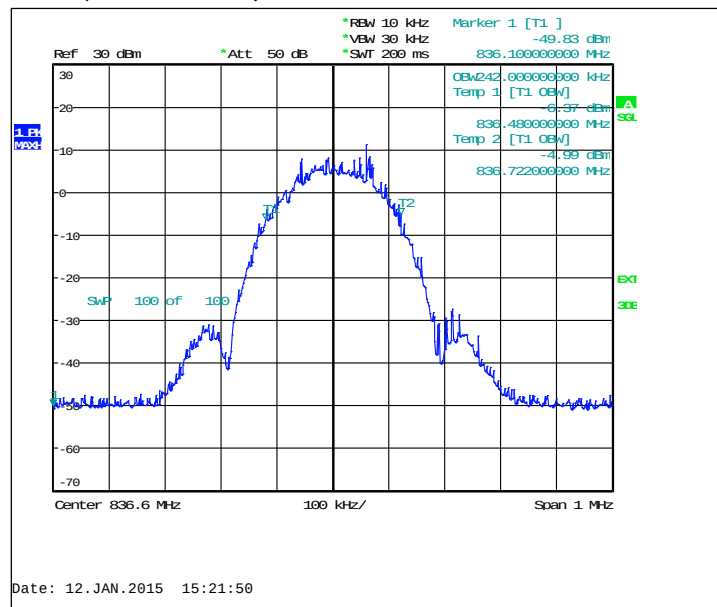
3.8. GSM 850 Test results

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

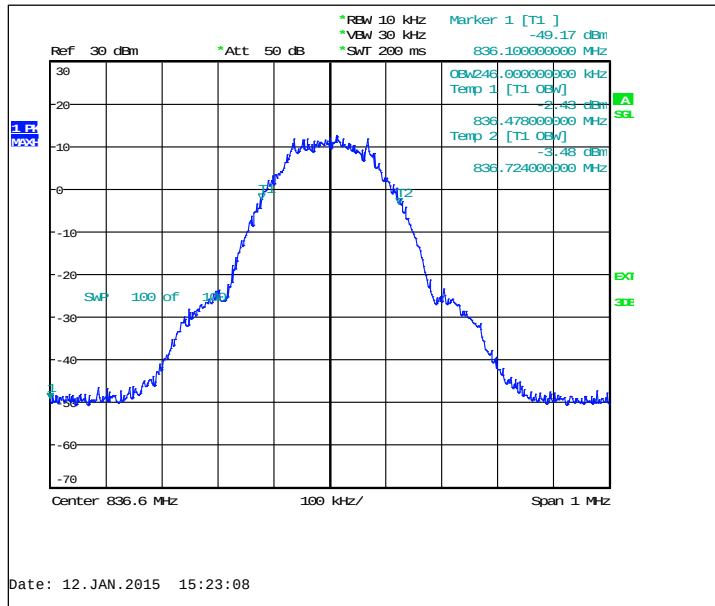
GSM, Channel 190 / 836.6 MHz



EGPRS, Channel 190 / 836.6 MHz



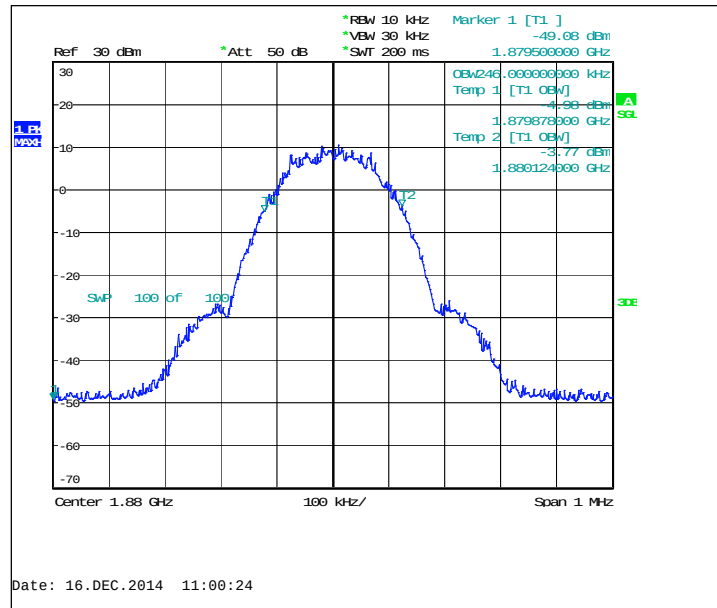
GPRS, Channel 190 / 836.6 MHz



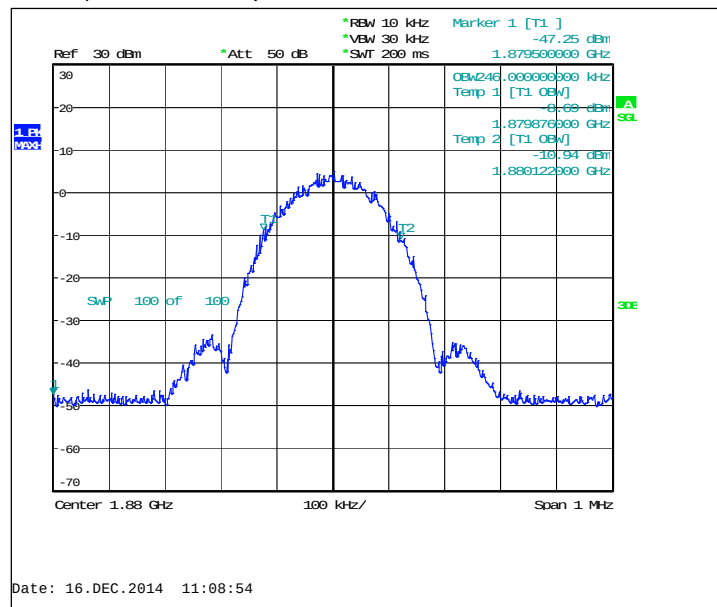
3.9. GSM 1900 Test results

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

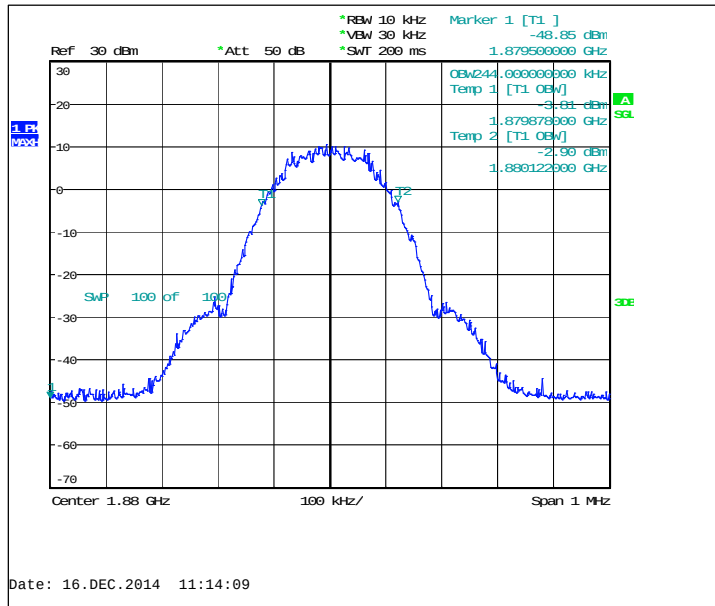
GSM, Channel 661 / 1880.0 MHz



EGPRS, Channel 661 / 1880.0 MHz



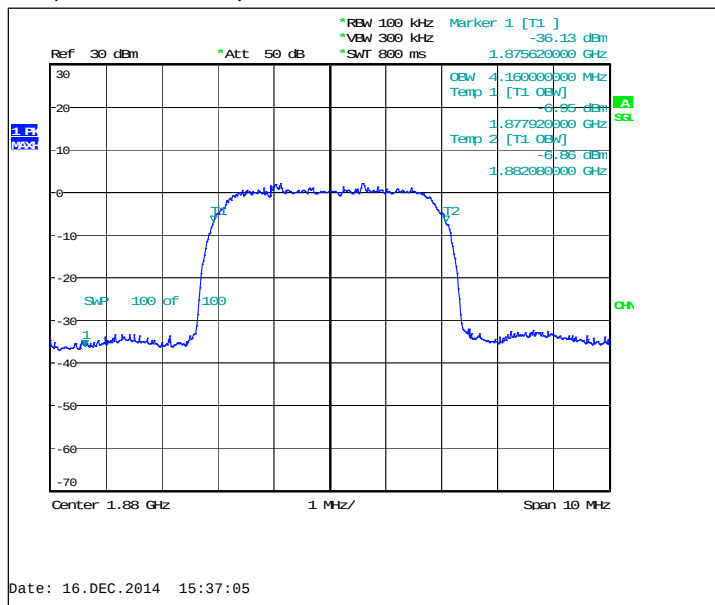
GPRS, Channel 661 / 1880.0 MHz



3.10. WCDMA2 Test results

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

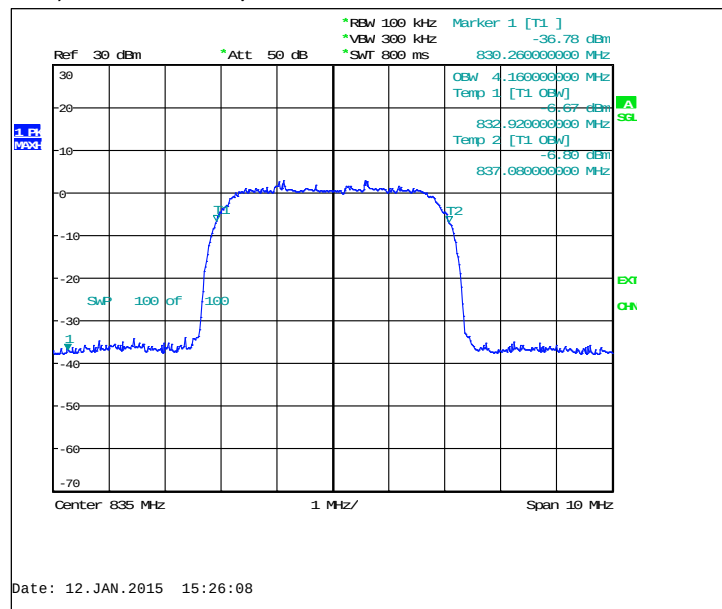
FDD, Channel 9400 / 1880.0 MHz



3.11. WCDMA5 Test results

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

FDD, Channel 4175 / 835.0 MHz

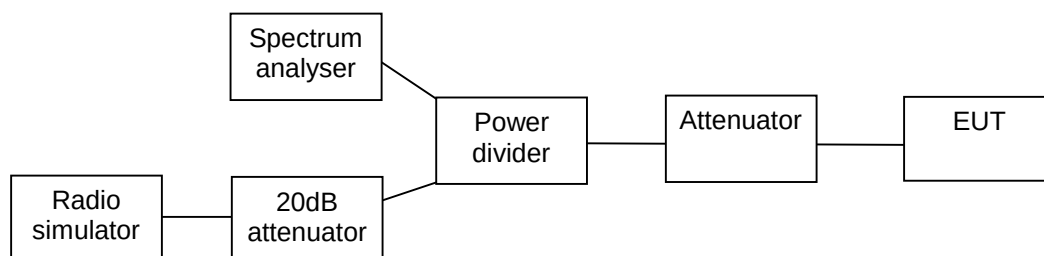


4. Band edge compliance

(FCC §24.238(a), §27.53(g), §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)

EUT with DUT number	RM-1063, DUT 18940
Accessories with DUT numbers	SD-238R, DUT 18942 ; WH-108, DUT 18677
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	Measured from antenna 1.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 38 / 99.9
Date of measurements	15-Dec-2014
Measured by	Jari Keto

4.1. Test Setup



4.2. Test method and limit

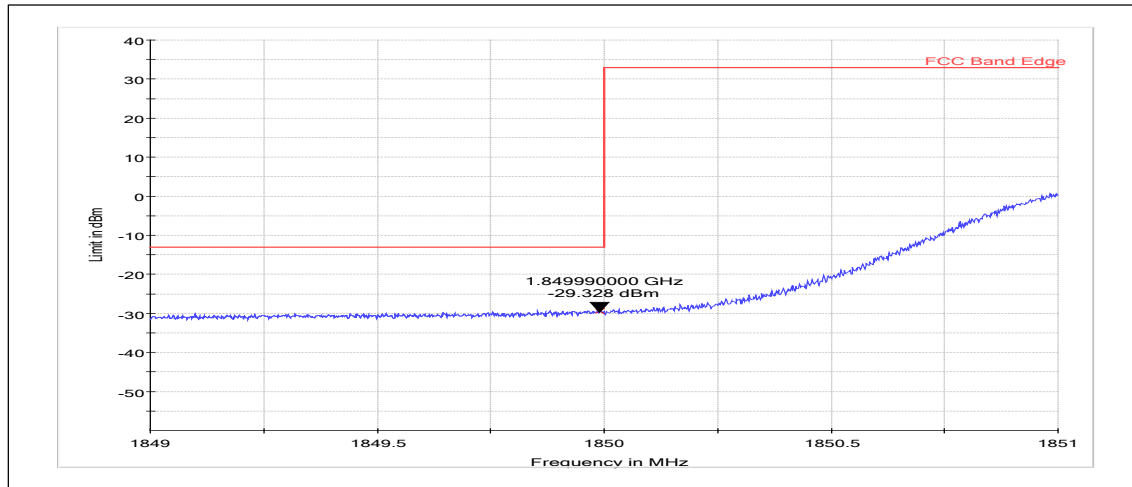
The measurement is made according to applicable FCC rule parts and IC standards.

Limits for band edge compliance measurements

Operation band	Frequency range [MHz]	Limit [dBm]
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)
LTE17	703.9 – 704 and 716 – 716.1 Below 703.9 and above 716.1	-13 (RBW = 30 kHz, VBW = 100 kHz) -13 (RBW = 30 kHz, VBW = 100 kHz)
GSM 1900	Below 1850 and above 1910	-13
GSM 850	Below 824 and above 849	-13
WCDMA2	Below 1850 and above 1910	-13
WCDMA5	Below 824 and above 849	-13

4.3. LTE2 Test results

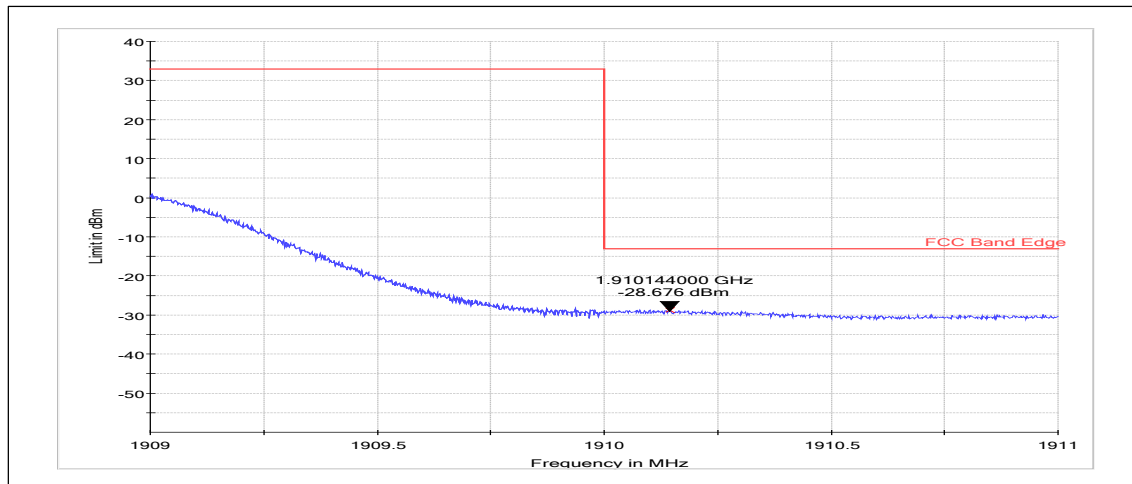
Channel 18700 / 1860 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1849.990	-29.33	PASSED

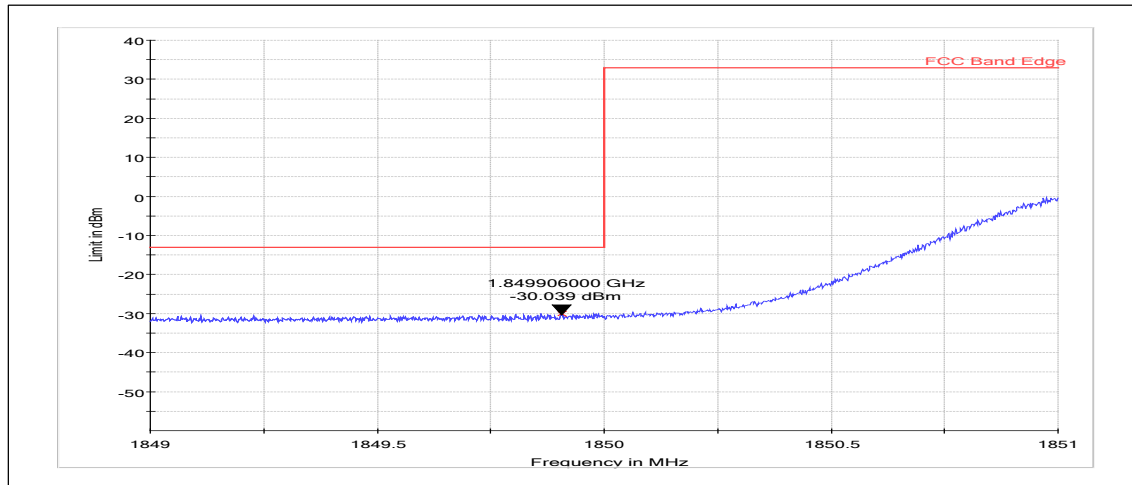
Channel 19100 / 1900 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1910.144	-28.68	PASSED

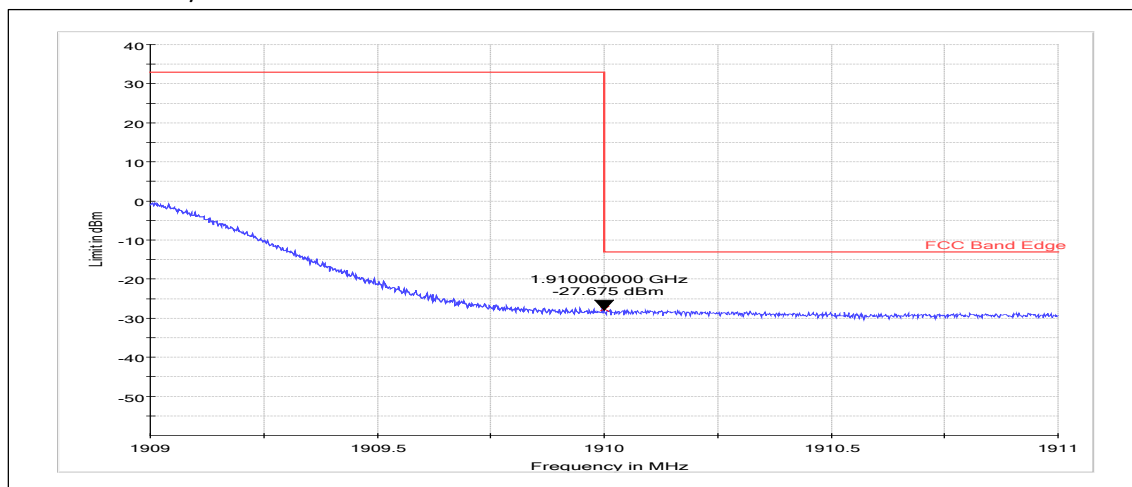
Channel 18700 / 1860 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1849.906	-30.04	PASSED

Channel 19100 / 1900 MHz

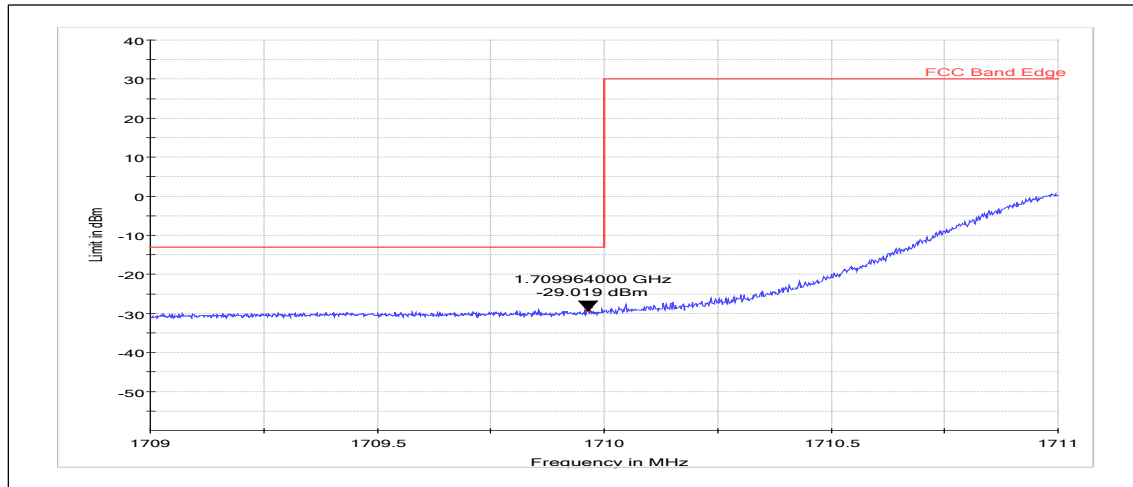


RMS (RBW: 200 kHz, VBW: 1 MHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1910.000	-27.67	PASSED

4.4. LTE4 Test results

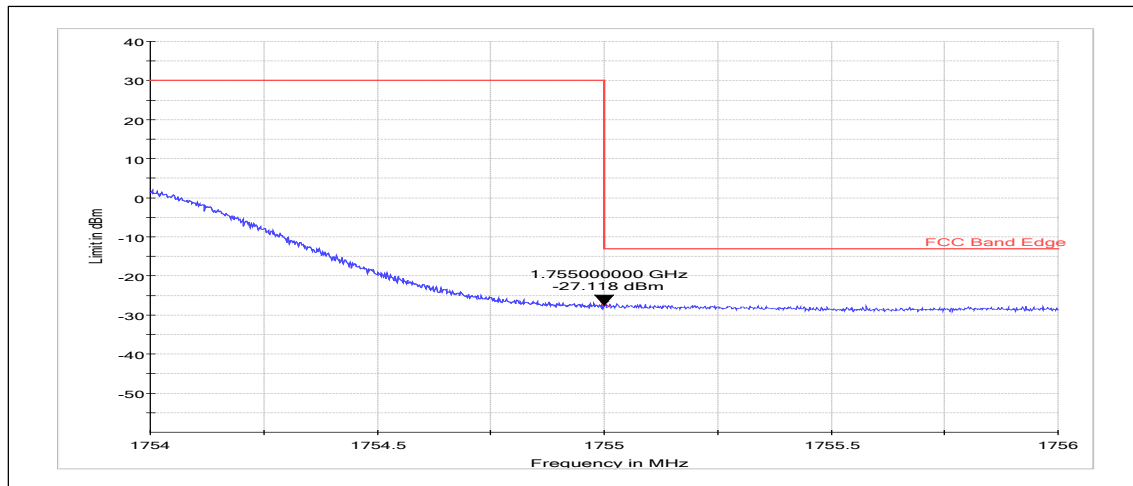
Channel 20050 / 1720 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1709.964	-29.02	PASSED

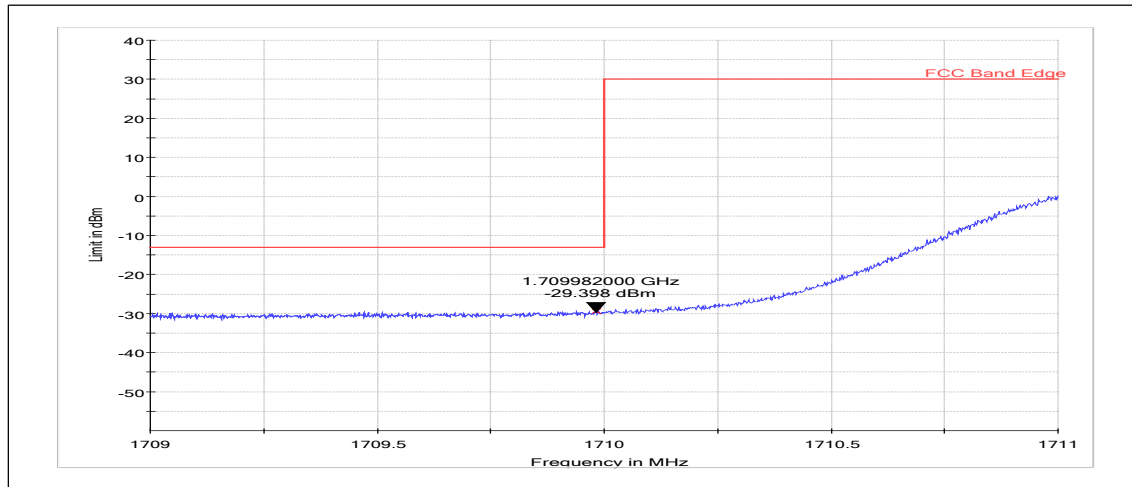
Channel 20300 / 1745 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1755.000	-27.12	PASSED

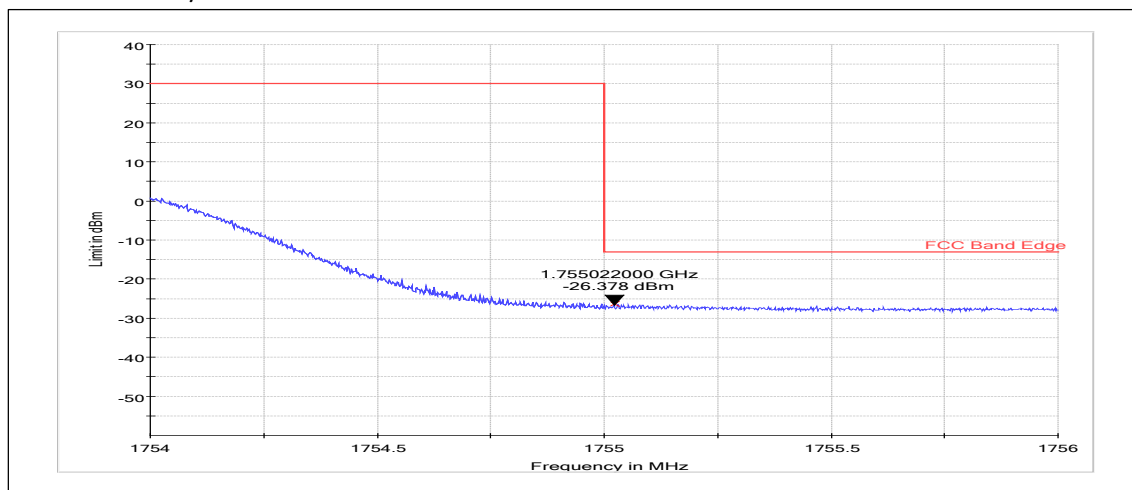
Channel 20050 / 1720 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1709.982	-29.40	PASSED

Channel 20300 / 1745 MHz

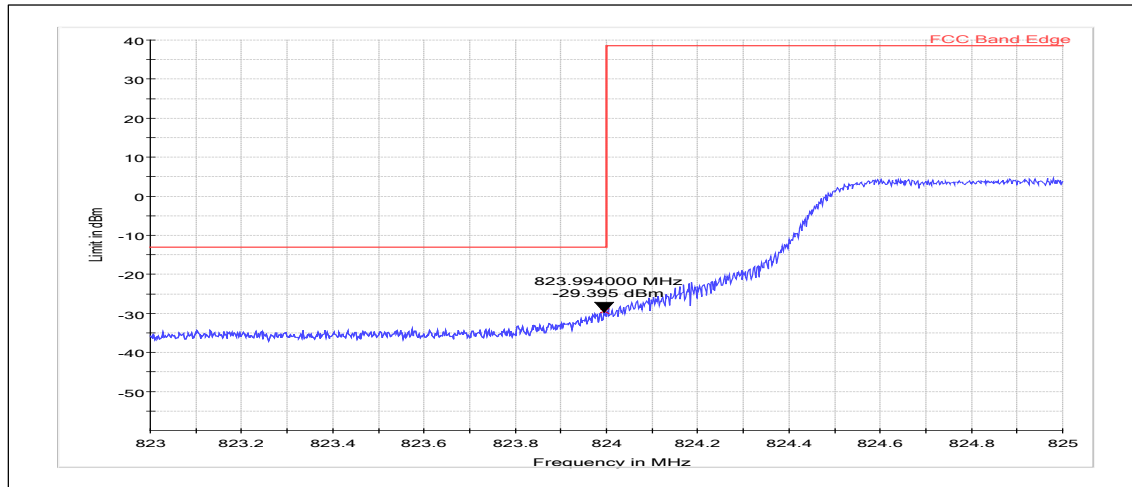


RMS (RBW: 200 kHz, VBW: 1 MHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1755.022	-26.38	PASSED

4.5. LTE5 Test results

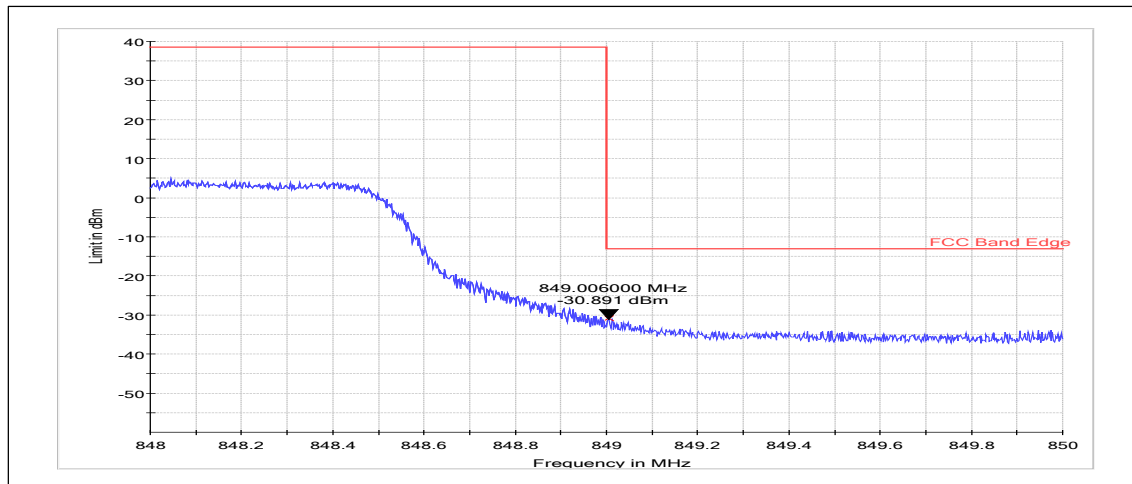
Channel 20450 / 829 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	823.994	-29.39	PASSED

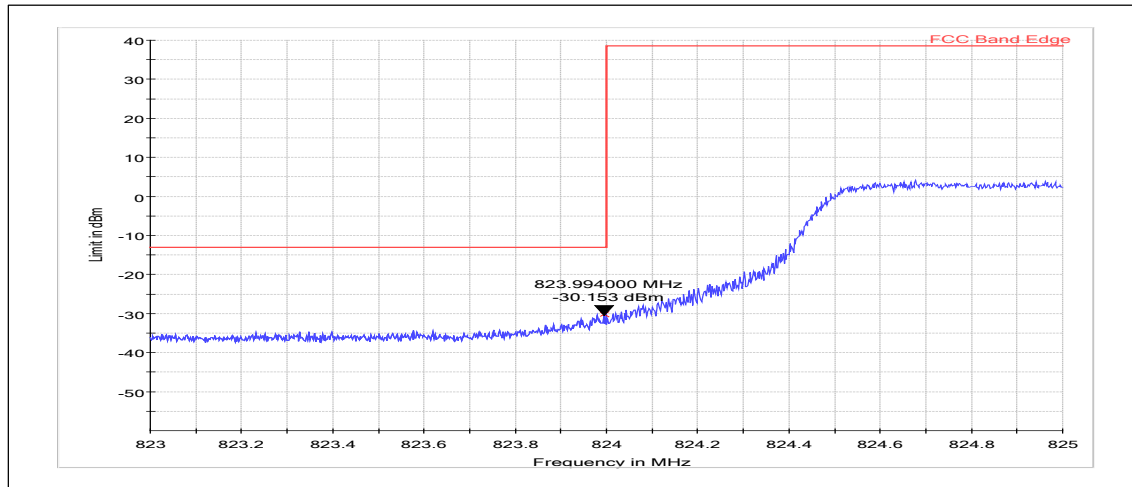
Channel 20600 / 844 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	849.006	-30.89	PASSED

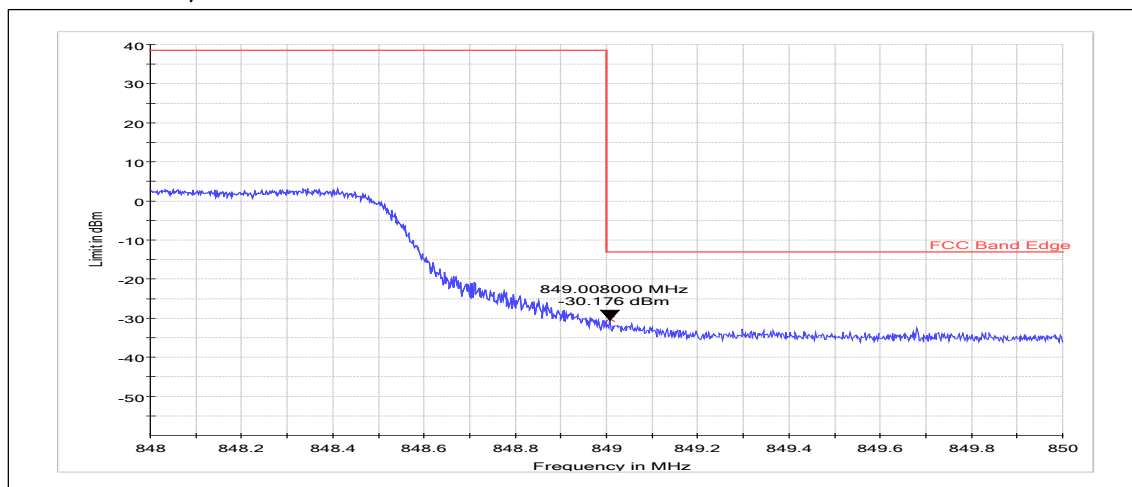
Channel 20450 / 829 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	823.994	-30.15	PASSED

Channel 20600 / 844 MHz

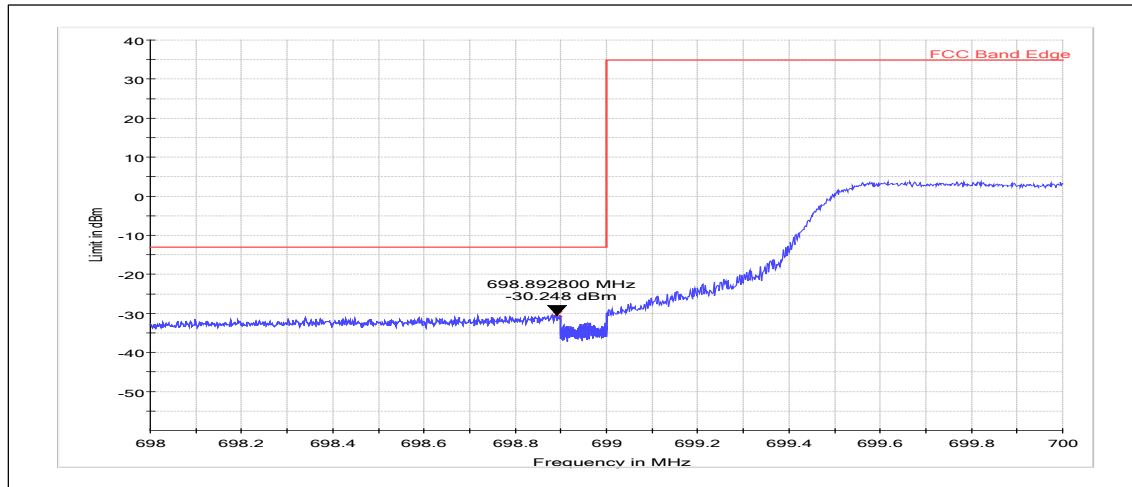


RMS (RBW: 100 kHz, VBW: 300 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	849.008	-30.18	PASSED

4.6. LTE12 Test results

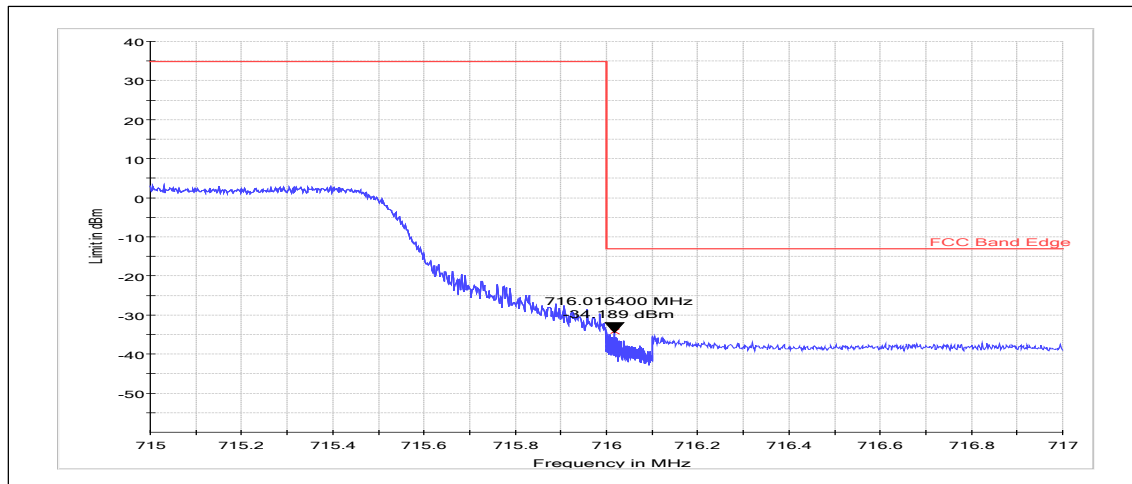
Channel 23060 / 704 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	698.893	-30.25	PASSED

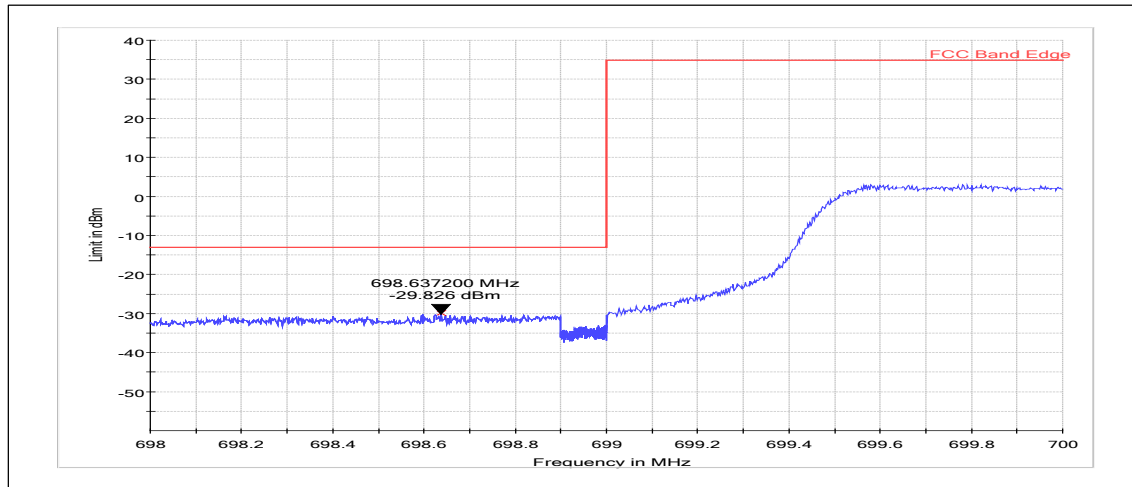
Channel 23130 / 711 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	716.016	-34.19	PASSED

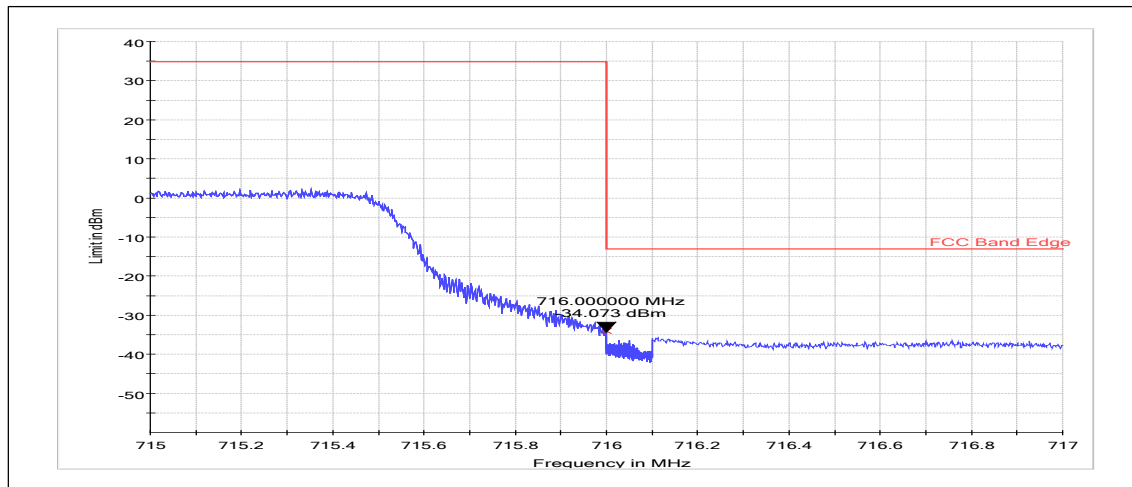
Channel 23060 / 704 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	698.637	-29.83	PASSED

Channel 23130 / 711 MHz

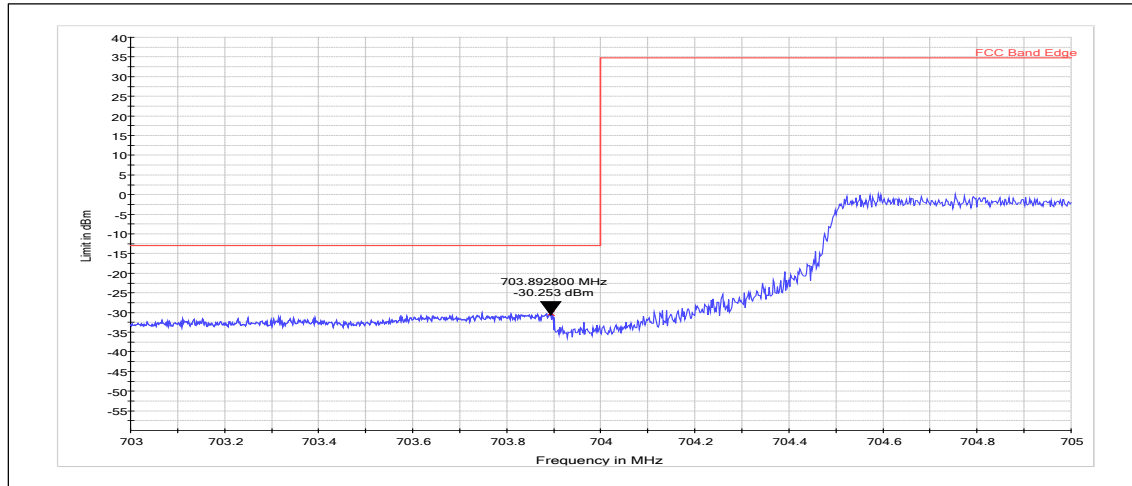


RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	716.000	-34.07	PASSED

4.7. LTE17 Test results

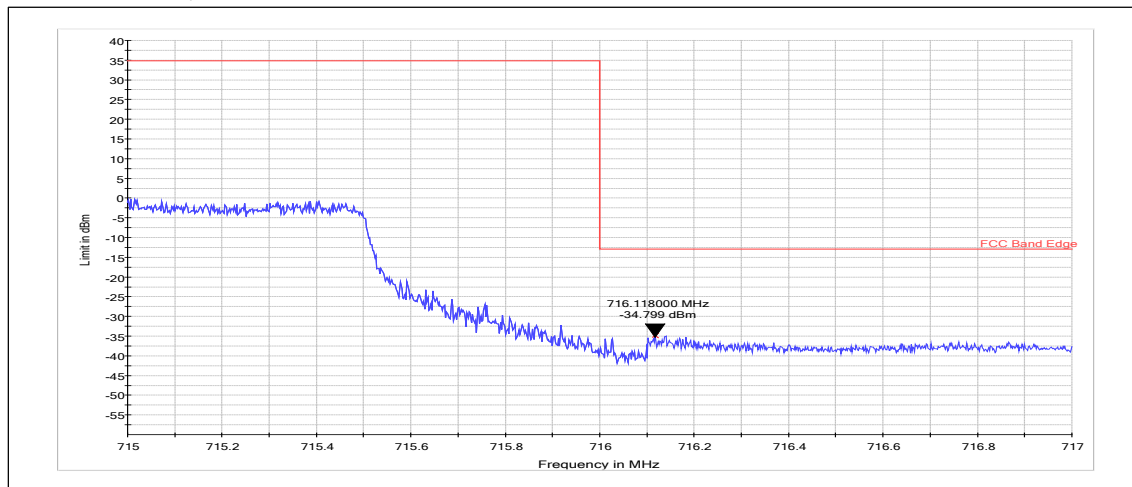
Channel 23780 / 709 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	703.893	-30.25	PASSED

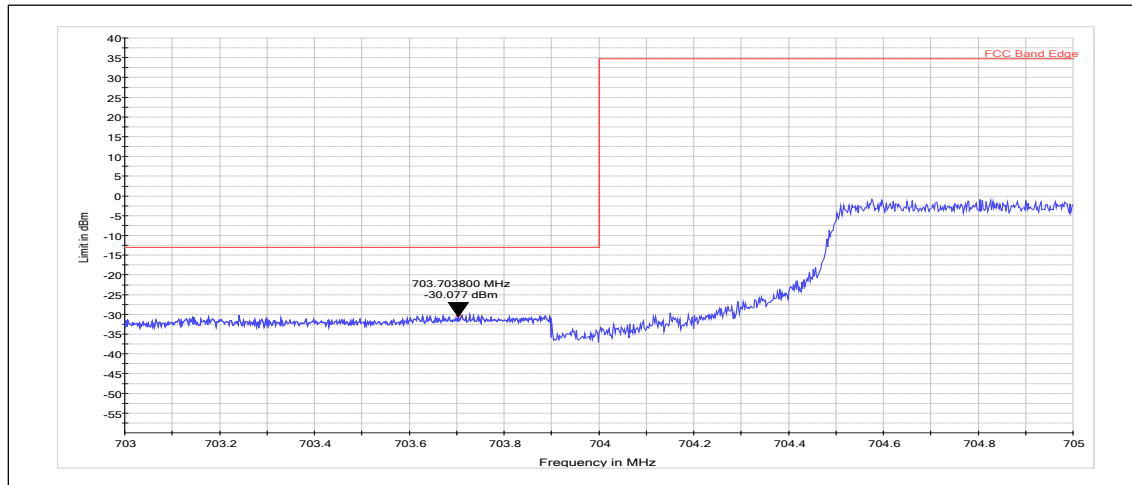
Channel 23800 / 711 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	716.118	-34.80	PASSED

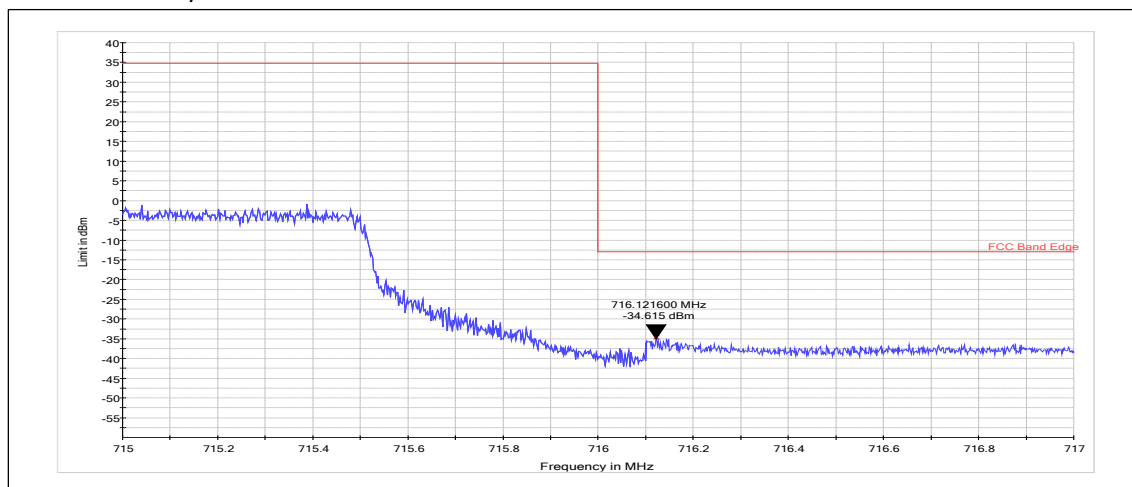
Channel 23780 / 709 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	703.704	-30.08	PASSED

Channel 23800 / 711 MHz

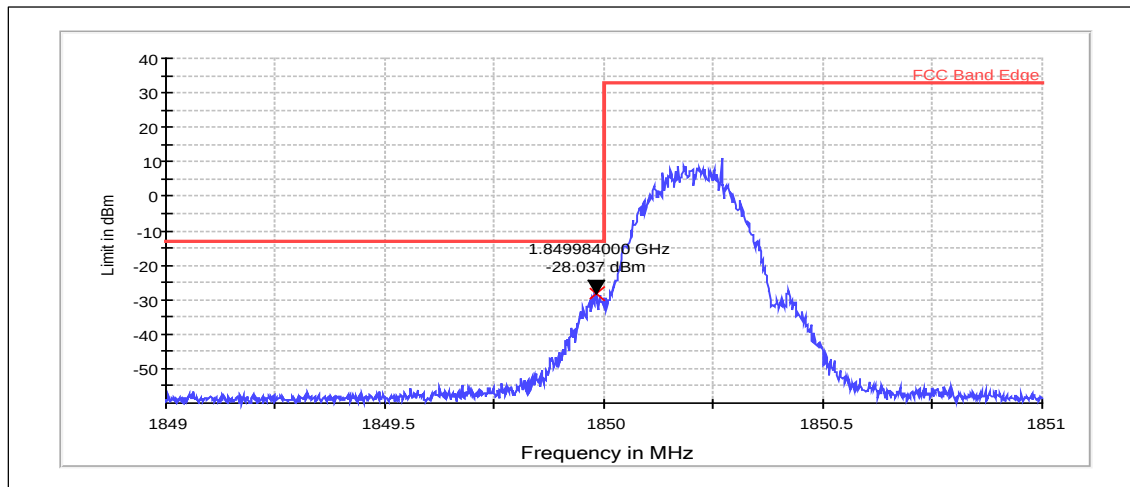


RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	716.122	-34.61	PASSED

4.8. GSM 1900 Test results

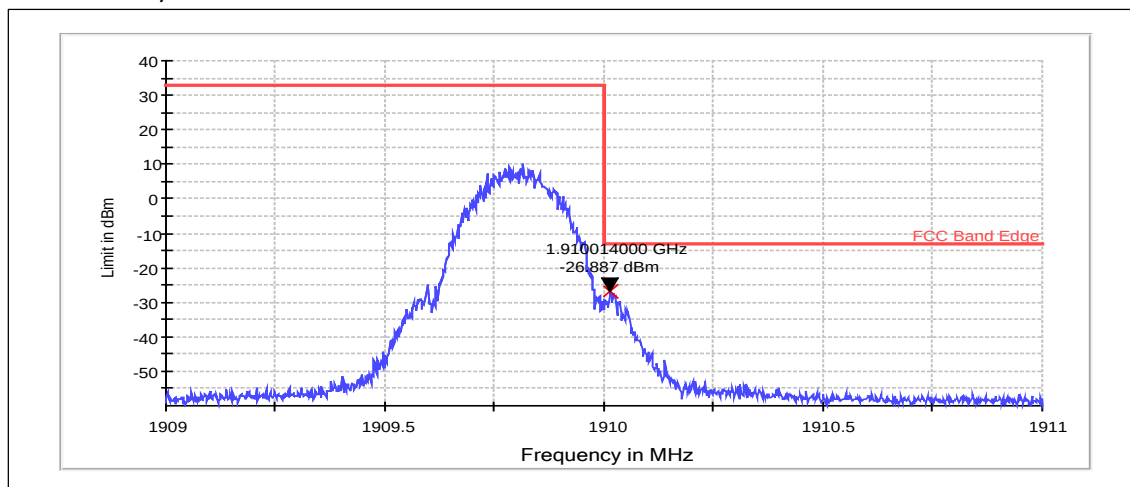
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	1849.984	-28.04	PASSED

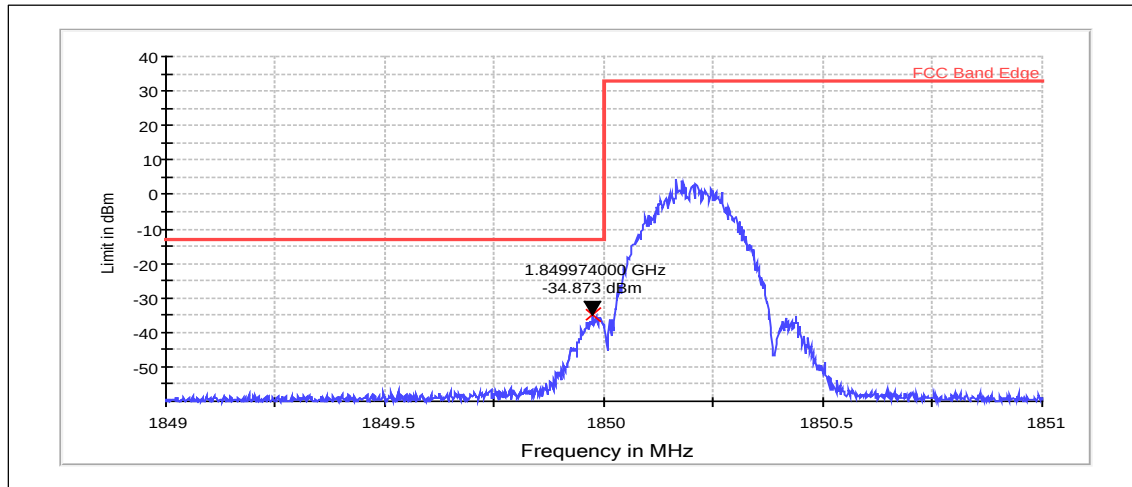
Channel 810 / 1909.8 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	1910.014	-26.89	PASSED

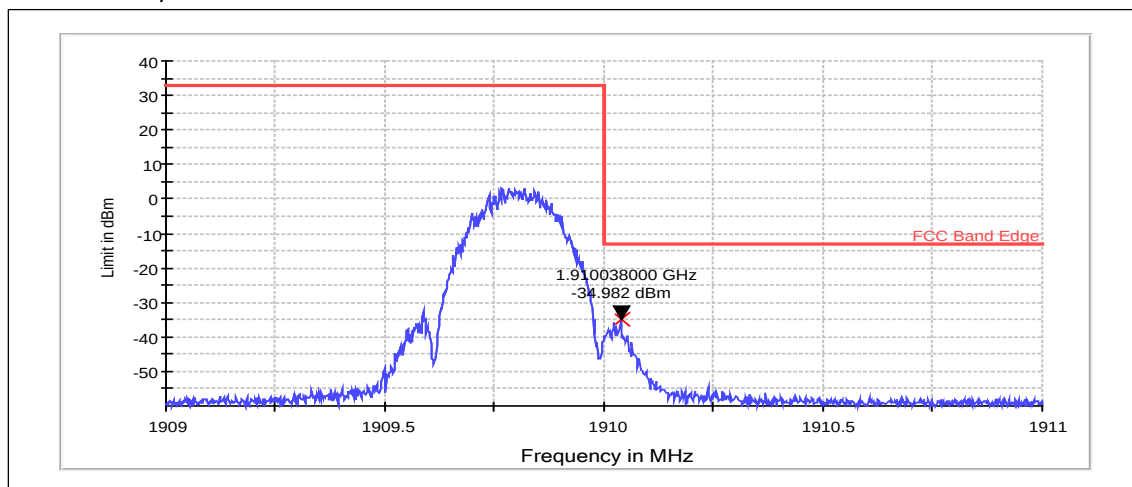
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	1849.974	-34.87	PASSED

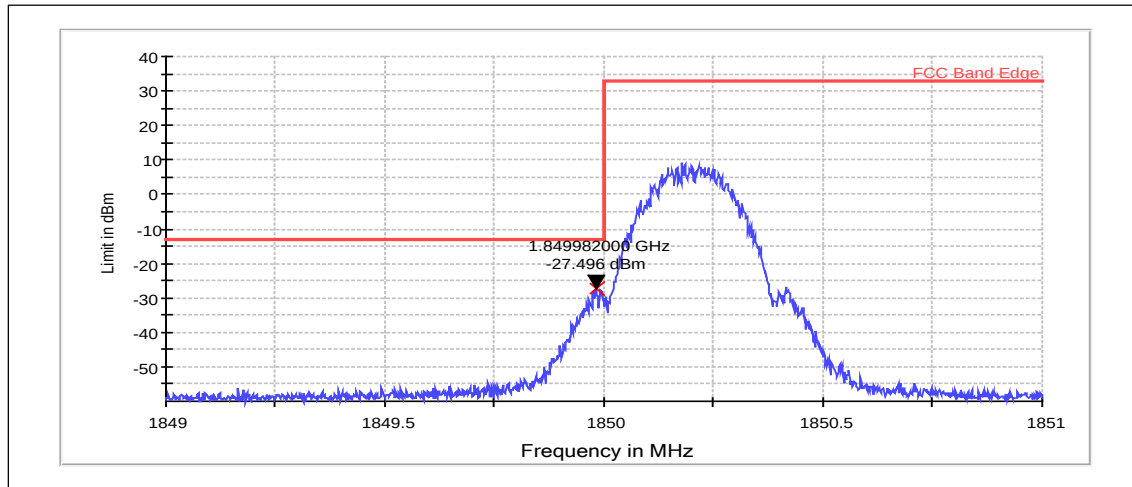
Channel 810 / 1909.8 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	1910.038	-34.98	PASSED

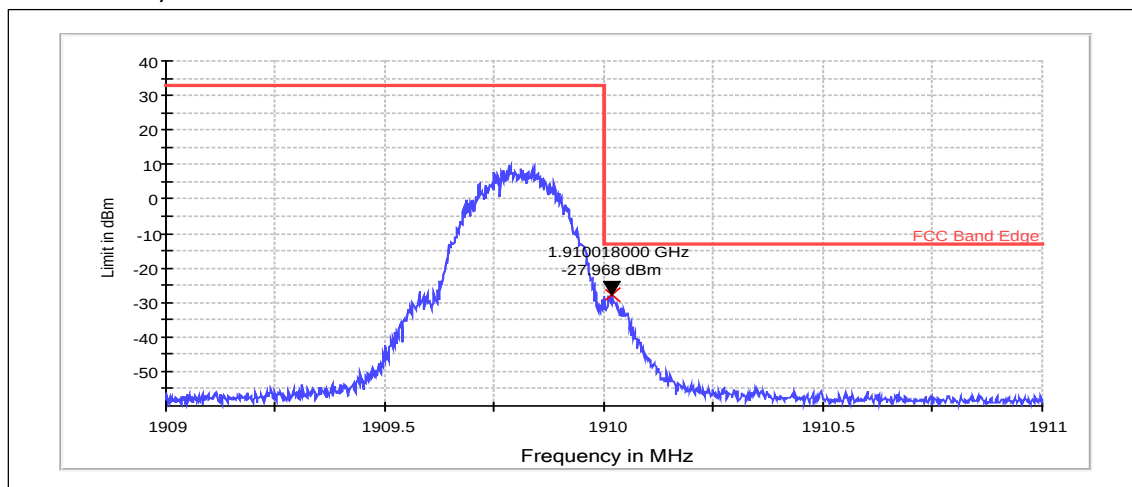
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GPRS	1849.982	-27.50	PASSED

Channel 810 / 1909.8 MHz

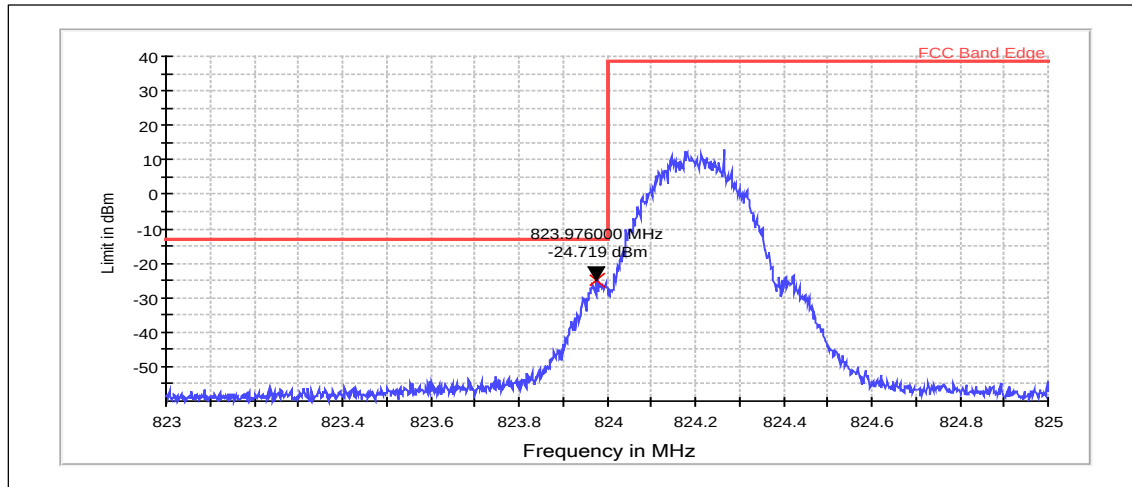


RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GPRS	1910.018	-27.97	PASSED

4.9. GSM 850 Test results

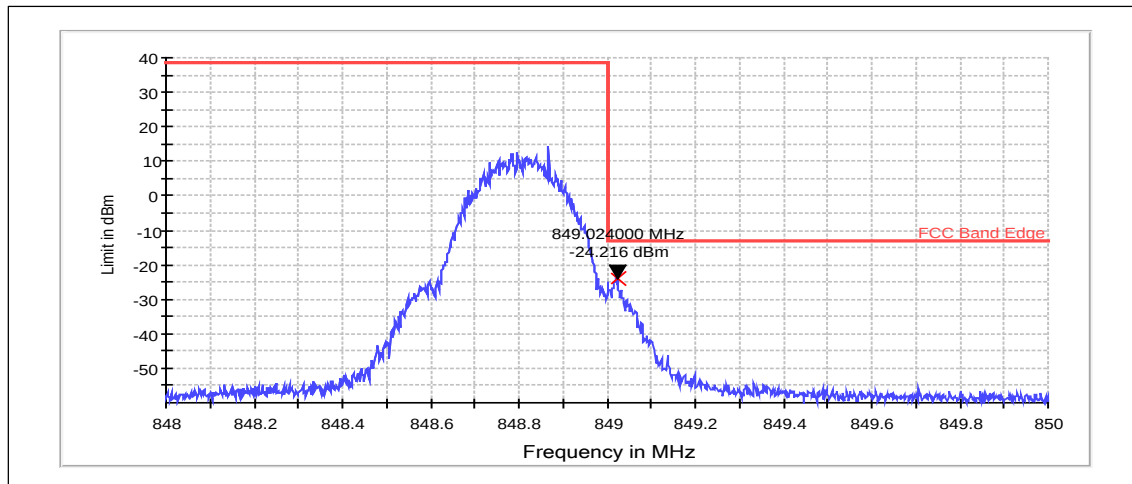
Channel 128 / 824.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	823.976	-24.72	PASSED

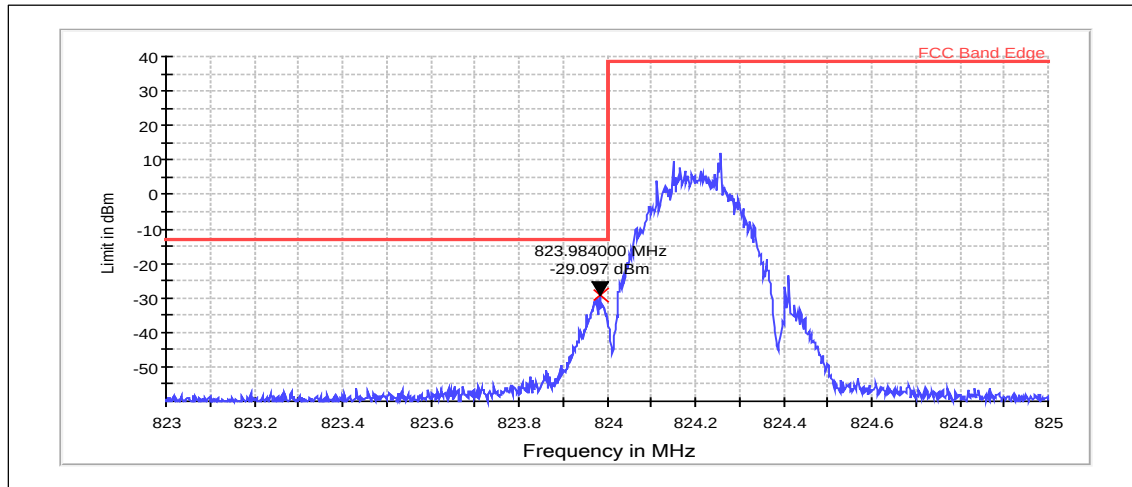
Channel 251 / 848.8 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	849.024	-24.22	PASSED

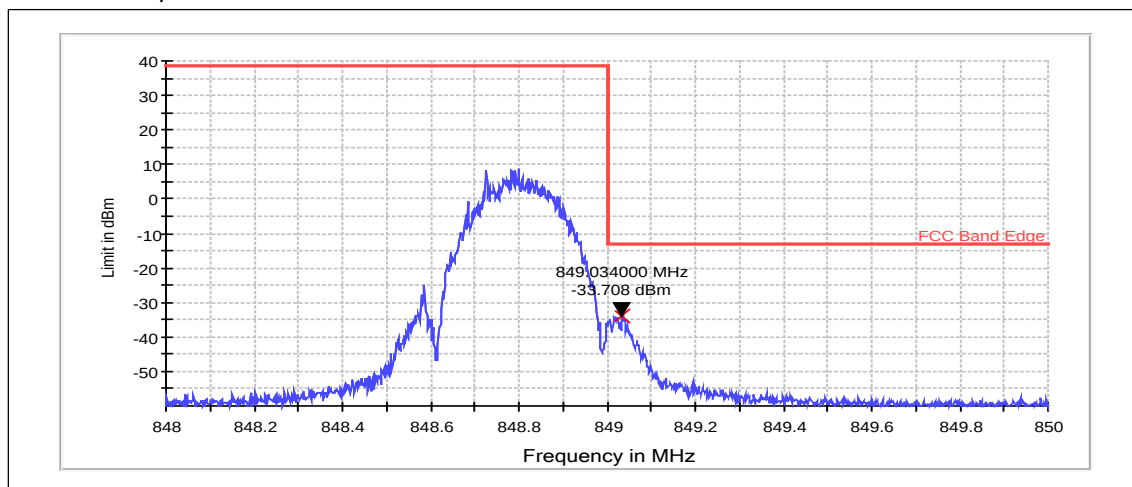
Channel 128 / 824.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	823.984	-29.10	PASSED

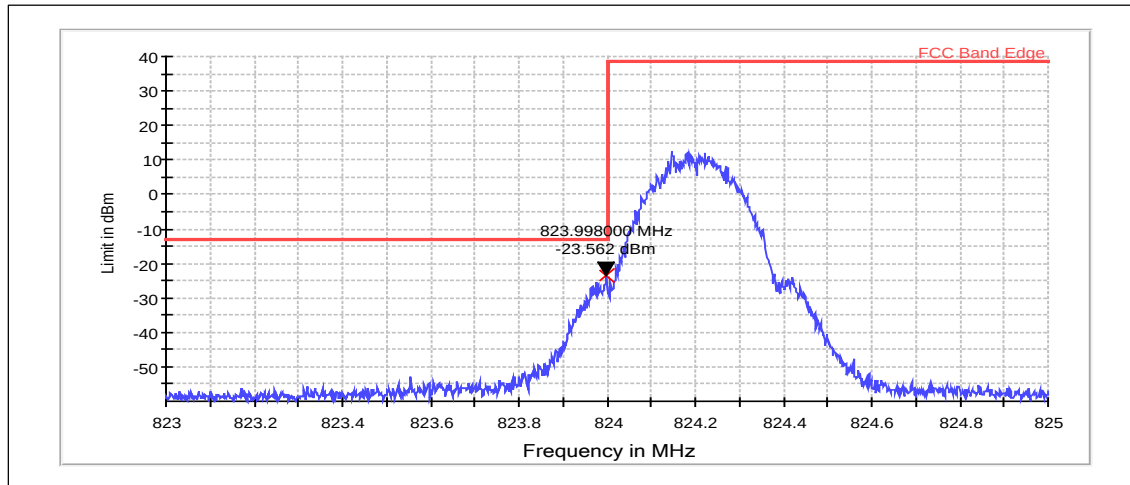
Channel 251 / 848.8 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	849.034	-33.71	PASSED

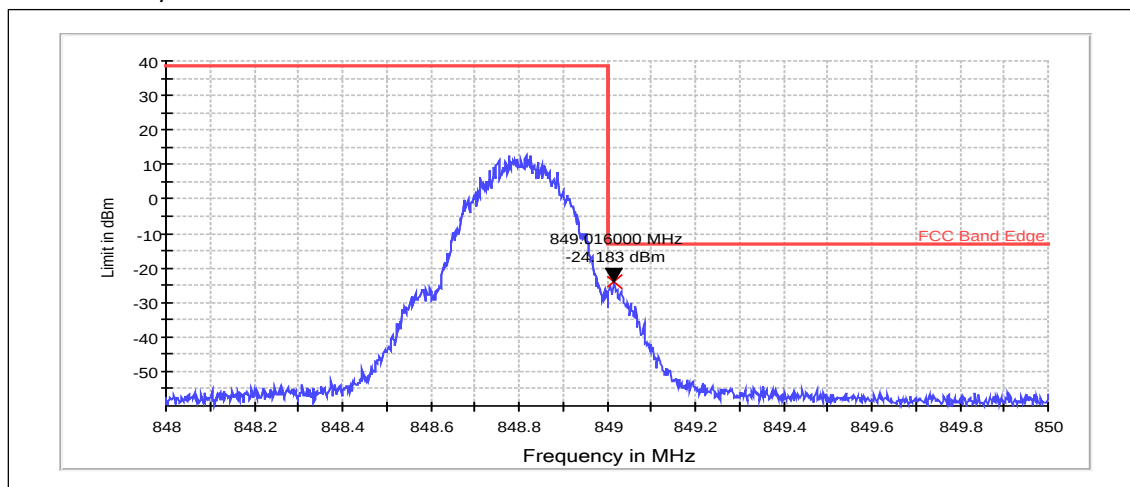
Channel 128 / 824.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GPRS	823.998	-23.56	PASSED

Channel 251 / 848.8 MHz

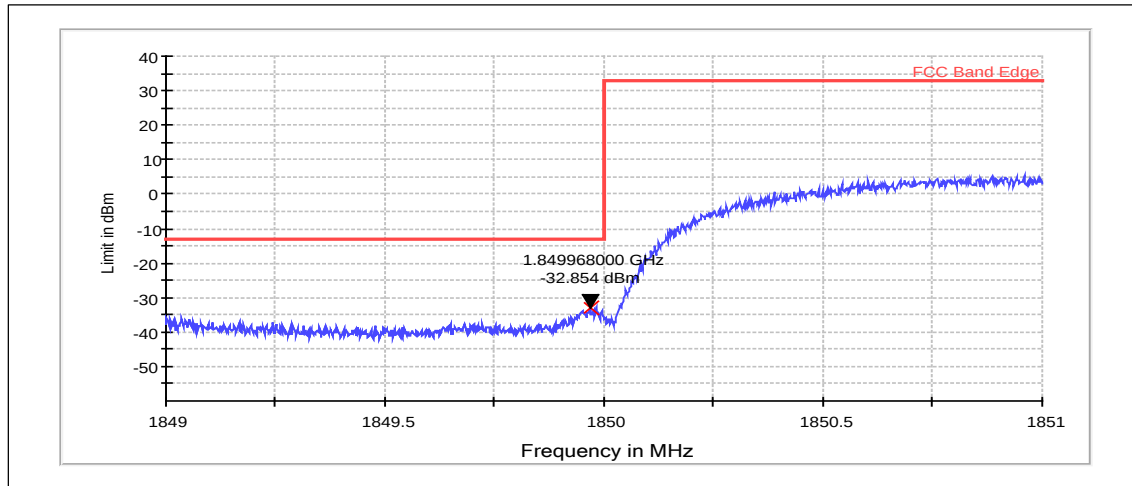


RMS (RBW: 3 kHz, VBW: 3 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GPRS	849.016	-24.18	PASSED

4.10. WCDMA2 Test results

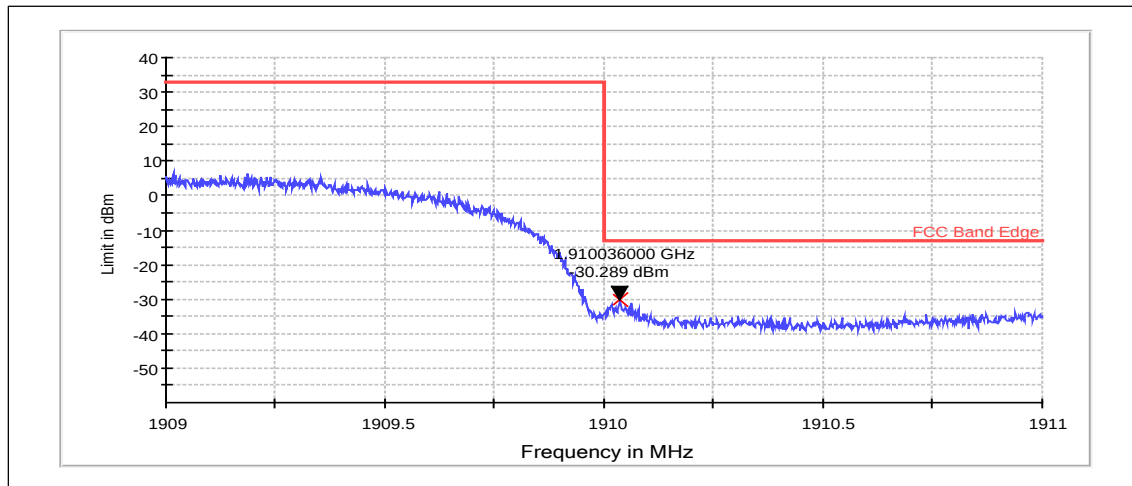
Channel 9262 / 1852.4 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1849.968	-32.85	PASSED

Channel 9538 / 1907.6 MHz

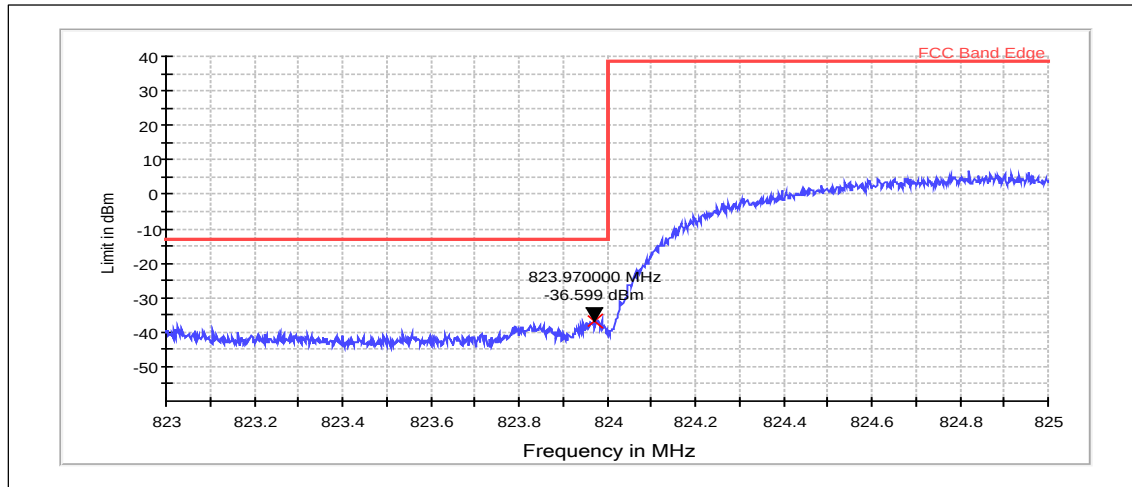


RMS (RBW: 50 kHz, VBW: 50 kHz, Max hold)

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1910.036	-30.29	PASSED

4.11. WCDMA5 Test results

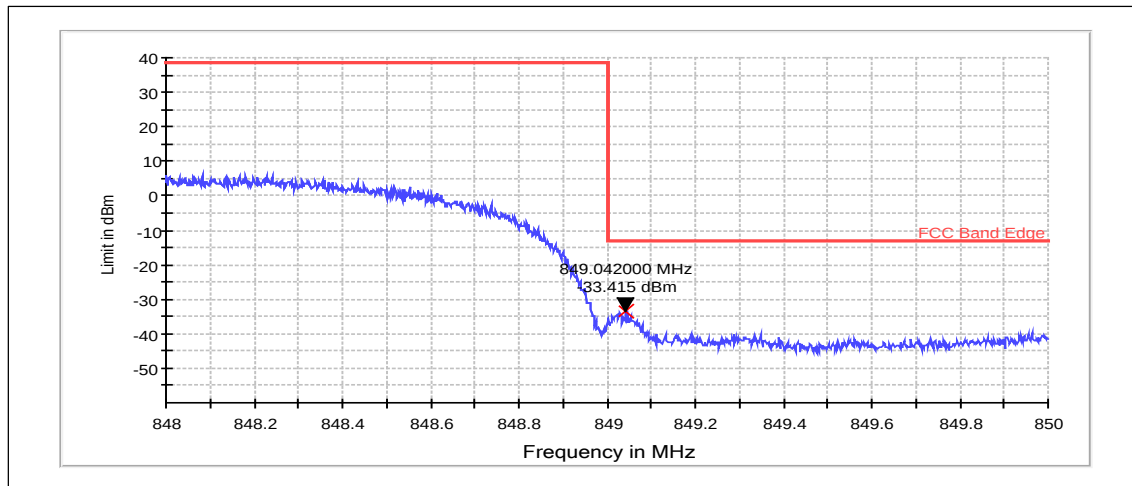
Channel 4132 / 826.4 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	823.970	-36.60	PASSED

Channel 4233 / 846.6 MHz



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

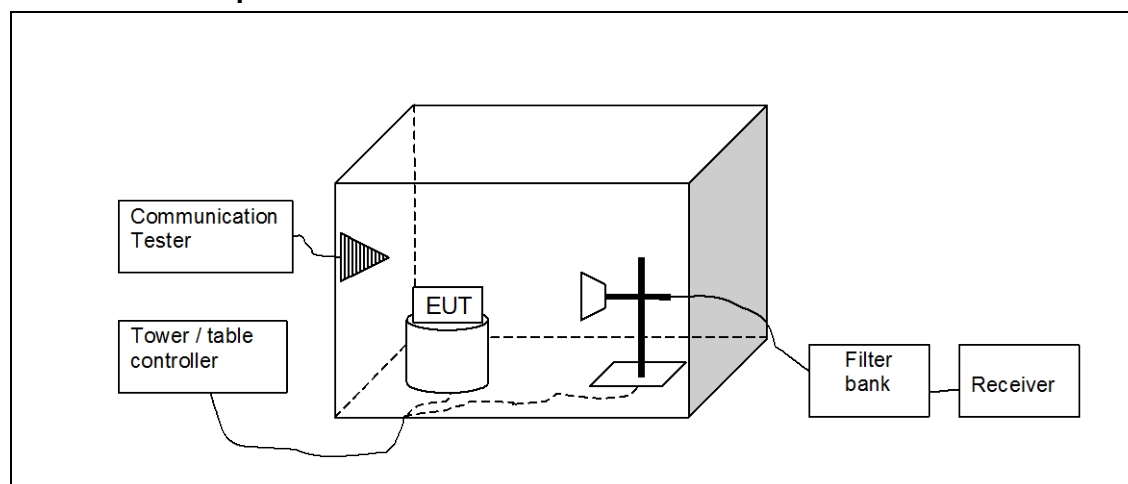
Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	849.042	-33.41	PASSED

5. Spurious radiated emissions

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

EUT with DUT number	RM-1063, DUT 18955
Accessories with DUT numbers	BV-T4V, DUT 18707 ; AC-20E, DUT 18697 ; WH-108, DUT 18698
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	Measured antenna 1
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 40 / 101.4
Date of measurements	30-Dec-2014
Measured by	Ville Mannermaa / Kalle Hannila

5.1.1 Test setup



5.2. Test method and limit

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

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

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

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

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

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

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

The measurement is made up to 10th harmonic of the EUT highest TX channel.

The substitution method is used.

The measurement results are obtained as described below:

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

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

5.3. LTE2 test results

Channel 18900 / 1880.0 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1848.317	-59.41	0.00115	-68.81	9.4	HORIZONTAL	PASSED
1866.266	-59.86	0.00103	-69.36	9.5	HORIZONTAL	PASSED
1892.62	-54.36	0.00366	-64.16	9.8	HORIZONTAL	PASSED
1892.992	-59.53	0.00111	-69.33	9.8	HORIZONTAL	PASSED
1897.781	-61.74	0.00067	-71.24	9.5	HORIZONTAL	PASSED
1905.802	-61.24	0.00075	-70.74	9.5	HORIZONTAL	PASSED
3756.493	-67.3	0.00019	-73.9	6.6	HORIZONTAL	PASSED
5640.621	-61.07	0.00078	-71.17	10.1	HORIZONTAL	PASSED
7516.293	-58.45	0.00143	-74.65	16.2	HORIZONTAL	PASSED

Channel 18900 / 1880.0 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1892.821	-59.7	0.00107	-69.5	9.8	HORIZONTAL	PASSED
3752.204	-67.14	0.00019	-73.94	6.8	HORIZONTAL	PASSED
5641.383	-62.05	0.00062	-72.15	10.1	HORIZONTAL	PASSED
7522.585	-58.15	0.00153	-74.65	16.5	HORIZONTAL	PASSED

5.4. LTE4 test results

Channel 20175 / 1732.5 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
3465.381	-58.21	0.00151	-64.01	5.8	HORIZONTAL	PASSED
5200.005	-62.5	0.00056	-73	10.5	VERTICAL	PASSED
6920	-58.23	0.0015	-71.73	13.5	VERTICAL	PASSED
8663.402	-55.72	0.00268	-74.92	19.2	HORIZONTAL	PASSED
10385.762	-53.4	0.00457	-76.1	22.7	VERTICAL	PASSED

Channel 20175 / 1732.5 MHz

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

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
3465.341	-58.63	0.00137	-64.43	5.8	HORIZONTAL	PASSED
5198.282	-61.46	0.00071	-71.96	10.5	VERTICAL	PASSED
6930.942	-58.44	0.00143	-71.24	12.8	HORIZONTAL	PASSED
8663.522	-56.08	0.00247	-75.28	19.2	HORIZONTAL	PASSED
10387.846	-53.82	0.00415	-76.52	22.7	VERTICAL	PASSED

5.5. LTE5 test results

Channel 20525 / 836.5 MHz

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

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
854.491	-58.41	0.00144	-93.01	34.6	HORIZONTAL	PASSED
880.102	-52.92	0.00511	-88.62	35.7	HORIZONTAL	PASSED
881.972	-52.64	0.00545	-88.54	35.9	HORIZONTAL	PASSED
1673.341	-63.28	0.00047	-68.78	5.5	HORIZONTAL	PASSED
2510.121	-60.01	0.001	-71.91	11.9	HORIZONTAL	PASSED
3352.553	-79.38	1E-05	-82.58	3.2	HORIZONTAL	PASSED

Channel 20525 / 836.5 MHz

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

Frequency [MHz]	P [dBm]	P [μW]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
821.987	-57.47	0.00179	-92.97	35.5	HORIZONTAL	PASSED
852.246	-58.46	0.00143	-93.06	34.6	HORIZONTAL	PASSED
864.245	-55.9	0.00257	-90.5	34.6	HORIZONTAL	PASSED
880.85	-52.84	0.0052	-88.64	35.8	HORIZONTAL	PASSED
999.836	-51.82	0.00658	-90.52	38.7	HORIZONTAL	PASSED
1673.381	-63.46	0.00045	-68.96	5.5	HORIZONTAL	PASSED
2509.881	-63.39	0.00046	-75.29	11.9	HORIZONTAL	PASSED
3347.703	-79.3	1E-05	-82.6	3.3	HORIZONTAL	PASSED

5.6. LTE12 test results

Channel 23095 / 707.5 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1420.431	-69.66	0.00011	-74.56	4.9	HORIZONTAL	PASSED
2130.496	-69.6	0.00011	-79.6	10	HORIZONTAL	PASSED
2830.1	-67.94	0.00016	-82.54	14.6	VERTICAL	PASSED

Channel 23095 / 707.5 MHz

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

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1420.511	-72.51	6E-05	-77.41	4.9	HORIZONTAL	PASSED
2130.416	-70.93	8E-05	-80.93	10	HORIZONTAL	PASSED
2829.94	-67.94	0.00016	-82.54	14.6	VERTICAL	PASSED

5.7. LTE17 test results

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
1420.461	-70.77	8E-05	-75.67	4.9	HORIZONTAL	PASSED
2130.501	-70.94	8E-05	-80.94	10	HORIZONTAL	PASSED
2849.599	-68.15	0.00015	-83.45	15.3	VERTICAL	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
1420.461	-70.77	8E-05	-75.67	4.9	HORIZONTAL	PASSED
2130.581	-70.94	8E-05	-80.94	10	HORIZONTAL	PASSED
2849.96	-67.2	0.00019	-82.6	15.4	VERTICAL	PASSED

5.8. GSM 850 test results

Channel 190 / 836.6 MHz

Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1673.106	-49.49	0.01125	-56.09	6.6	VERTICAL	PASSED
1683.848	-56.37	0.00231	-63.37	7	VERTICAL	PASSED
2519.76	-51.94	0.0064	-64.04	12.1	HORIZONTAL	PASSED
3302.445	-60.37	0.00092	-63.57	3.2	VERTICAL	PASSED

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

Channel 190 / 836.6 MHz

Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
1673.14	-48.96	0.01271	-54.46	5.5	HORIZONTAL	PASSED
2509.66	-44.27	0.03741	-55.87	11.6	VERTICAL	PASSED

5.10. GSM 1900 test results

Channel 661 / 1880.0 MHz

Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
9433.387	-45.05	0.03126	-66.45	21.4	HORIZONTAL	PASSED
9513.347	-42.48	0.05649	-64.08	21.6	HORIZONTAL	PASSED
9700.922	-44.36	0.03664	-65.46	21.1	HORIZONTAL	PASSED
9812.705	-43.93	0.04046	-66.53	22.6	HORIZONTAL	PASSED
9848.337	-43.49	0.04477	-65.89	22.4	VERTICAL	PASSED
9937.234	-43.66	0.04305	-65.96	22.3	HORIZONTAL	PASSED

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

Channel 661 / 1880.0 MHz

Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
3760.06	-52.99	0.00502	-59.49	6.5	HORIZONTAL	PASSED
5640.1	-51.16	0.00766	-61.56	10.4	VERTICAL	PASSED

5.12. WCDMA2 test results

Channel 9400 / 1880.0 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
3757.455	-57.92	0.00161	-64.22	6.3	VERTICAL	PASSED
5635.611	-51.87	0.0065	-62.17	10.3	VERTICAL	PASSED
7516.453	-48.08	0.01556	-63.98	15.9	VERTICAL	PASSED
9234.529	-43.64	0.04325	-65.14	21.5	HORIZONTAL	PASSED
9343.868	-42.92	0.05105	-64.92	22	HORIZONTAL	PASSED
9398.176	-44.13	0.03864	-65.03	20.9	VERTICAL	PASSED
9489.118	-43.67	0.04295	-65.47	21.8	HORIZONTAL	PASSED
9852.926	-43.32	0.04656	-65.92	22.6	HORIZONTAL	PASSED
9904.389	-43.02	0.04989	-65.22	22.2	HORIZONTAL	PASSED
9958.898	-42.59	0.05508	-64.79	22.2	HORIZONTAL	PASSED
11274.088	-41.66	0.06823	-64.86	23.2	VERTICAL	PASSED
13153.006	-51.38	0.00728	-68.18	16.8	HORIZONTAL	PASSED
15044.108	-49.87	0.0103	-70.87	21	VERTICAL	PASSED
16920.581	-50.11	0.00975	-72.91	22.8	VERTICAL	PASSED

5.13. WCDMA5 test results

Channel 4175 / 835.0 MHz

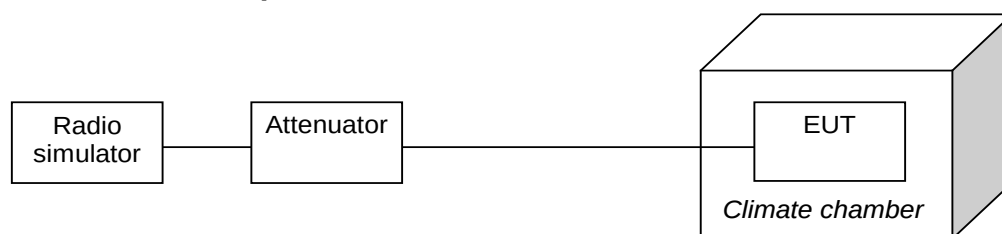
FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [μ W]	P _{MEAS} [dBm]	A _{TOT} [dB]	Polarisation	Results
821.398	-44.09	0.03899	-79.69	35.6	HORIZONTAL	PASSED
847.928	-45.28	0.02965	-79.38	34.1	VERTICAL	PASSED
847.961	-45.45	0.02851	-79.95	34.5	HORIZONTAL	PASSED
848.401	-45.13	0.03069	-79.53	34.4	HORIZONTAL	PASSED
988.156	-40.65	0.0861	-79.55	38.9	VERTICAL	PASSED
989.637	-39.67	0.10789	-78.77	39.1	VERTICAL	PASSED
1668.497	-53.07	0.00493	-59.37	6.3	VERTICAL	PASSED
2504.86	-52.26	0.00594	-63.76	11.5	VERTICAL	PASSED
3333.848	-60.3	0.00093	-63.6	3.3	HORIZONTAL	PASSED
4180.431	-58.56	0.00139	-63.96	5.4	HORIZONTAL	PASSED
5018.116	-54.39	0.00364	-62.89	8.5	VERTICAL	PASSED
5838.126	-53.78	0.00419	-62.08	8.3	VERTICAL	PASSED
6687.715	-50.29	0.00935	-60.69	10.4	HORIZONTAL	PASSED
7524.599	-48.98	0.01265	-63.28	14.3	HORIZONTAL	PASSED
8345.451	-49.66	0.01081	-65.16	15.5	VERTICAL	PASSED

6. Frequency stability, temperature variation (FCC §2.1055(a), §27.54, RSS-139 6.3, RSS-130 4.3, RSS-133 6.3)

EUT with DUT number	RM-1063, DUT 18940, DUT 18941
Accessories with DUT numbers	SD-238R, DUT 18942, DUT 18943 ; WH-108, DUT 18677
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	Measured from antenna 1.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 38 / 99.9
Date of measurements	15-Dec-2014
Measured by	Jari Keto

6.1. Test Setup



6.2. Test method and limit

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

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

The EUT is placed in the chamber.

The EUT is set in idle mode for 15 minutes.

The EUT is set to transmit.

The transmit frequency error was measured immediately.

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

Frequency deviation [ppm]
+/- 2.5

6.3. LTE4 Test results

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

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	1732.50	-1.65939	-0.001	PASSED
40	1732.50	-2.70367	-0.0016	PASSED
30	1732.50	-2.21729	-0.0013	PASSED
20	1732.50	-2.36034	-0.0014	PASSED
10	1732.50	0.72956	0.0004	PASSED
0	1732.50	-1.58787	-0.0009	PASSED
-10	1732.50	-1.83106	-0.0011	PASSED
-20	1732.50	-2.51770	-0.0015	PASSED
-30	1732.50	-0.28610	-0.0002	PASSED

6.4. 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	-1.43051	-0.002	PASSED
40	707.50	-1.68800	-0.0024	PASSED
30	707.50	-1.00136	-0.0014	PASSED
20	707.50	-1.94550	-0.0028	PASSED
10	707.50	-0.84400	-0.0012	PASSED
0	707.50	-1.27316	-0.0018	PASSED
-10	707.50	-1.04427	-0.0015	PASSED
-20	707.50	-0.72956	-0.001	PASSED
-30	707.50	-0.61512	-0.0009	PASSED

6.5. GSM 850 Test results

GSM, Channel 190 / 836.6 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	836.60	11.04000	0.0132	PASSED
40	836.60	10.72000	0.0128	PASSED
30	836.60	8.01000	0.0096	PASSED
20	836.60	5.94000	0.0071	PASSED
10	836.60	5.17000	0.0062	PASSED
0	836.60	5.94000	0.0071	PASSED
-10	836.60	10.14000	0.0121	PASSED
-20	836.60	6.39000	0.0076	PASSED
-30	836.60	15.24000	0.0182	PASSED

6.6. GSM 1900 Test results

GSM, Channel 661 / 1880.0 MHz

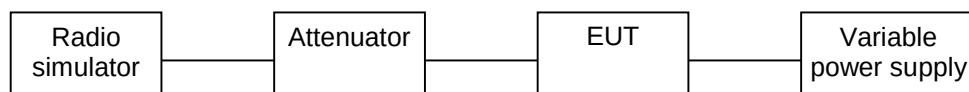
Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	1880.00	49.20000	0.0262	PASSED
40	1880.00	46.23000	0.0246	PASSED
30	1880.00	50.37000	0.0268	PASSED
20	1880.00	49.53000	0.0263	PASSED
10	1880.00	44.68000	0.0238	PASSED
0	1880.00	47.40000	0.0252	PASSED
-10	1880.00	43.52000	0.0231	PASSED
-20	1880.00	43.00000	0.0229	PASSED
-30	1880.00	52.88000	0.0281	PASSED

7. Frequency stability, voltage variation

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

EUT with DUT number	RM-1063, DUT 18940, DUT 18941
Accessories with DUT numbers	SD-238R, DUT 18942, DUT 18943 ; WH-108, DUT 18677
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	Measured from antenna 1.
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	22 / 38 / 99.9
Date of measurements	15-Dec-2014
Measured by	Jari Keto

7.1. Test Setup



7.2. Test method and limit

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

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

Limits for frequency stability, voltage variation measurements

Frequency deviation [ppm]
+/- 2.5

7.3. LTE4 Test results

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

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	1732.50	-4.32015	-0.0025	PASSED
Battery cut-off point / 3.6	1732.50	-2.67506	-0.0015	PASSED
Nominal / 3.8	1732.50	-2.03133	-0.0012	PASSED

7.4. LTE12 Test results

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

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	707.50	-2.43187	-0.0034	PASSED
Battery cut-off point / 3.6	707.50	-1.38760	-0.002	PASSED
Nominal / 3.8	707.50	-1.81675	-0.0026	PASSED

7.5. GSM 850 Test results

GSM,

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	836.60	-0.45000	-0.0005	PASSED
Battery cut-off point / 3.6	836.60	4.20000	0.005	PASSED
Nominal / 3.8	836.60	6.59000	0.0079	PASSED

7.6. GSM 1900 Test results

GSM,

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	1880.00	37.26000	0.0198	PASSED
Battery cut-off point / 3.6	1880.00	46.62000	0.0248	PASSED
Nominal / 3.8	1880.00	47.14000	0.0251	PASSED

8. Test Equipment

8.1. Conducted measurements

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

8.2. Radiated measurements

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

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