FCC Part 22/24/27 Compliance Test Report

Test Report no.:	FCC22&24&27_RM-983_01.docx	**Date of Report:**	31-Jul-2014
Number of pages:	73	**Customer's Contact person:**	Victoria Abadilla
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 16620 West Bernardo Drive San Diego, CA 92127 USA Tel. +1 858 831 5000 Fax. +1 858 385 1598
FCC listing no.: **IC recognition no.:**	533467 661V-1		
Tested devices/ accessories:	**Phone RM-983 / Dummy Battery SD-224R / Battery BV-L4A / Headset WH-208 / AC-Charger AC-60 / USB-Cable CA-190CD**		
FCC ID:	QMNRM-983	**IC:**	-
Supplement reports:	-		
Testing has been carried out in accordance with:	**CFR 47, FCC rules Parts 22/24/27, TIA-603-C-2004 and IC standards, RSS-GEN (Issue 3, December 2010), RSS-130 (Issue 1, October 2013), RSS-132 (Issue 2, September 2005), RSS-133 (Issue 5, February 2009). Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method and limit".**		
Documentation:	The test report must always be reproduced in full; reproduction of an excerpt only is subject to written approval of the testing laboratory. The documentation of the testing performed on the tested devices is archived for 15 years at TCC Microsoft.		
Test Results:	**The EUT complies with the requirements in respect of all parameters subject to the test.** The test results relate only to devices specified in this document		
Date and signature for the contents:			

Sami Lehtonen, Specialist, EMC

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

Date of receipt	26-Jun-2014
Testing completed	21-Jul-2014
The customer's contact person	Victoria Abadilla
Test Plan referred to	T:\Projects\RM-983\TestPlan\RS_TestPlan_RM-983.xlsm
Notes	-
Document name	Y:\Projects\RM-983\EMC\FCC22&24&27_RM-983_01.docx

1.1. EUT and Accessory Information

The EUT is a mobile phone with following features:
GSM/WCDMA/WLAN/Bluetooth
The EUT is tested with maximum rated TX power.

Devices under tests

Product	Type	SN	HW	MV	SW	DUT
Phone	RM-983	354250060000216ö059V766	0200	-	02028.00000.14224.06004	18434
Dummy Battery	SD-224R	-	V.1	-	-	18437
Headset	WH-208	-	-	-	-	18431
Phone	RM-983	354250060000224ö059V766	0200	-	02028.00000.14224.06004	18569
Battery	BV-L4A	4181574243S1140002 6ö0670727	v3	-	-	18427
Headset	WH-208	3342R31	-	-	-	18428
AC-Charger	AC-60E	4090493261610304125ö0675677	-	-	-	18217
USB-Cable	CA-190CD	07304562136C28	-	-	-	18219

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
§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
§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

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WCDMA 1900:

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

WCDMA 850:

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

LTE1900 (Band 2):

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

LTE1700 (Band 4):

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

LTE850 (Band 5):

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

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§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

LTE 2500 (Band 7):

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

LTE700 Lower (Band 17):

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

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

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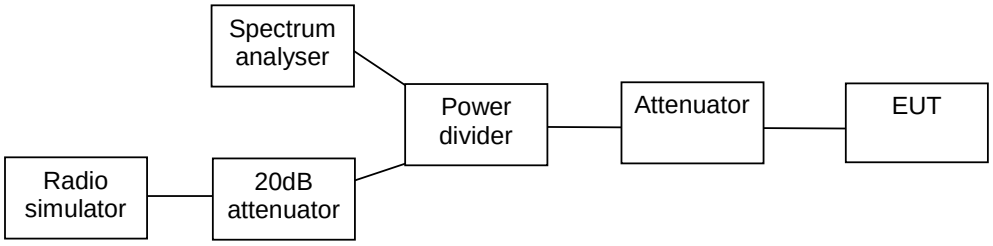
2. 99 % occupied bandwidth

(FCC §2.1049(h), RSS-133 4.6.1, RSS-132 4.6.1, RSS-139 4.6.1, RSS-199 4.2, RSS-130 4.6.1)

EUT with DUT number	RM-983, DUT 18434
Accessories with DUT numbers	SD-224R, DUT 18437 ; WH-208, DUT 18431
Operation Voltage [V] / [Hz]	
Results	
Remarks	
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	
Date of measurements	26-Jun-2014
Measured by	Tomi Lipponen

2.1. Test Setup



2.2. Test method and limit

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

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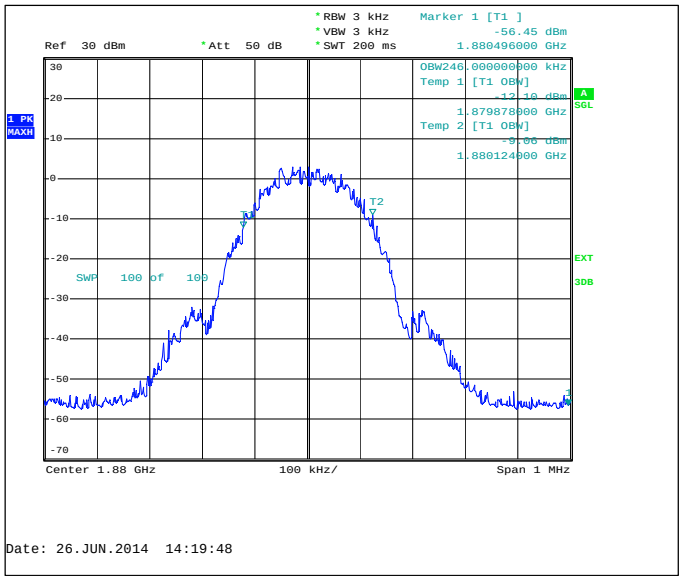
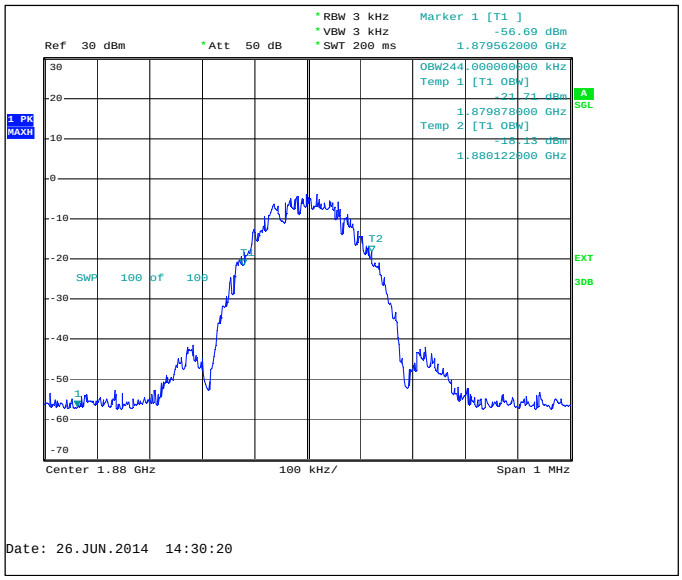
2.3. GSM 1900 Test results

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

GSM, Channel 661 / 1880.0 MHz



EGPRS, Channel 661 / 1880.0 MHz



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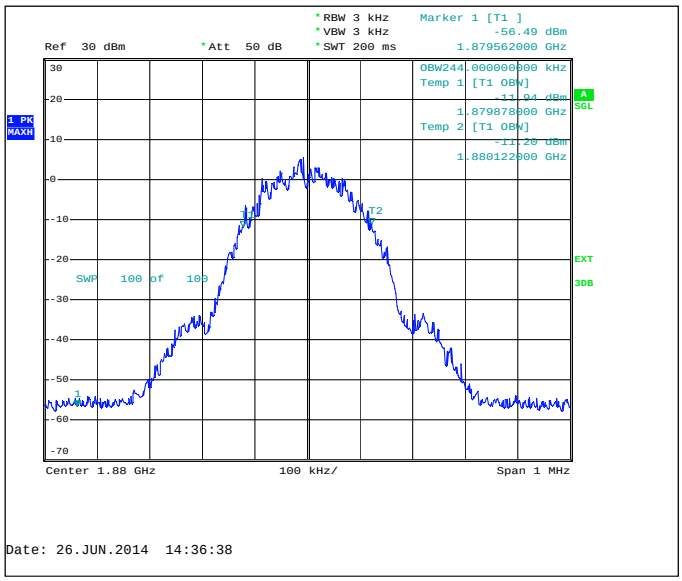
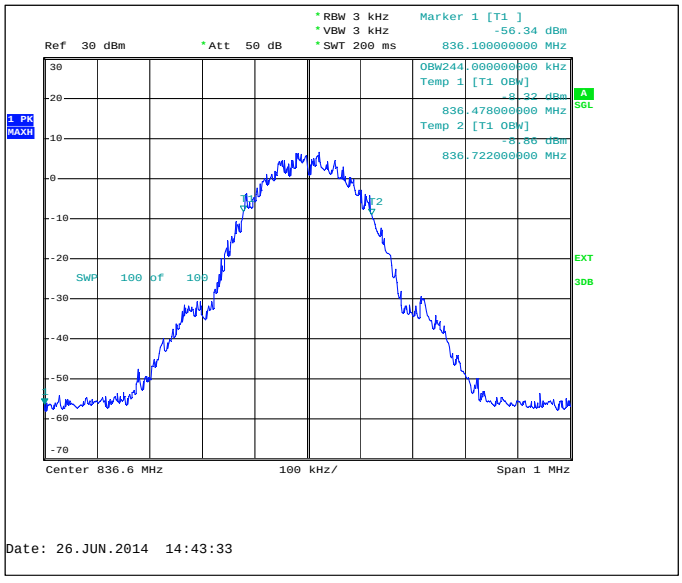
GPRS, Channel 661 / 1880.0 MHz



2.4. GSM 850 Test results

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

GSM, Channel 190 / 836.6 MHz



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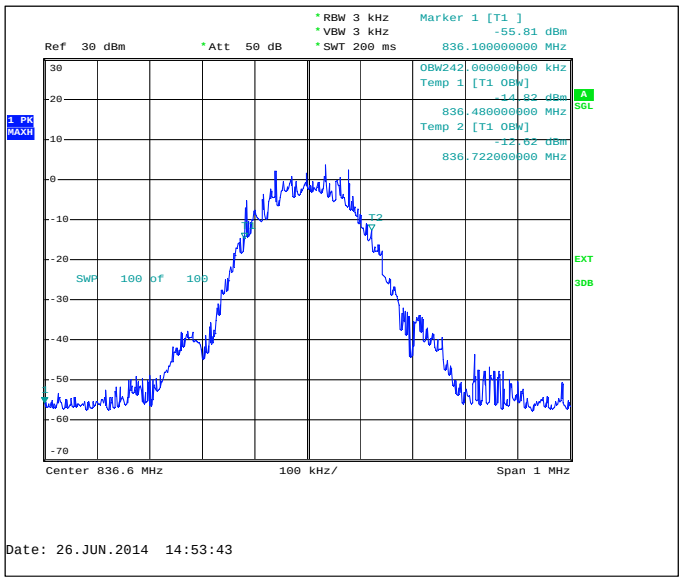
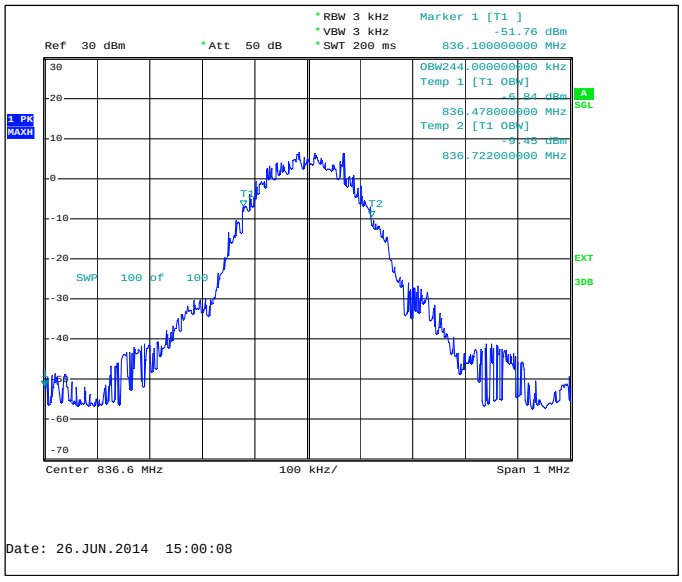
EGPRS, Channel 190 / 836.6 MHz



GPRS, Channel 190 / 836.6 MHz



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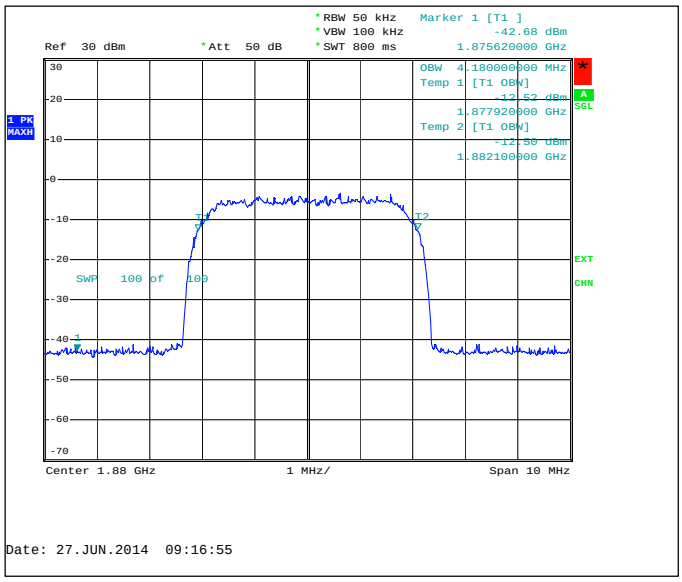
2.5. WCDMA 1900 Test results

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

FDD, Channel 9400 / 1880.0 MHz



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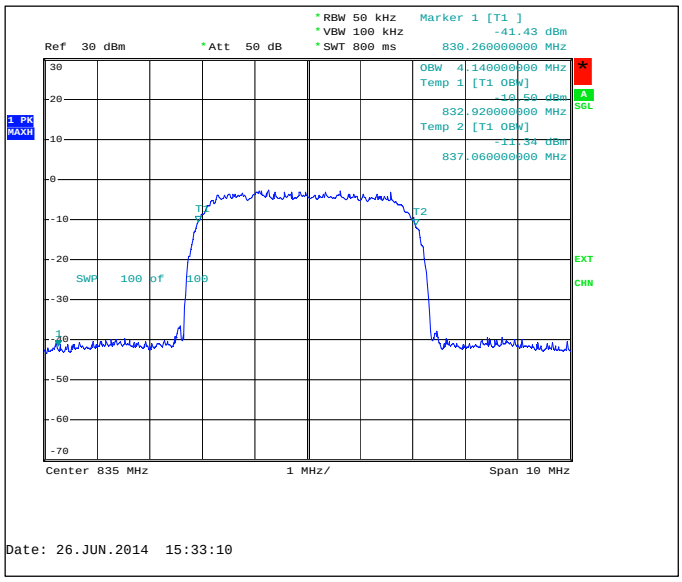
2.6. WCDMA 850 Test results

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

FDD, Channel 4175 / 835.0 MHz



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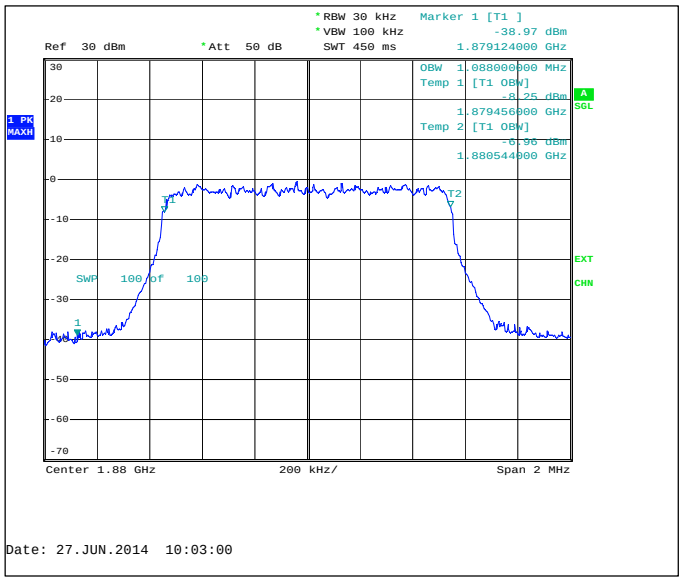
2.7. LTE1900 (Band 2) Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 1.4MHz, QPSK, 6 RB	1088
FDD, CBW 3MHz, QPSK, 15 RB	2690
FDD, CBW 5MHz, QPSK, 25 RB	4480
FDD, CBW 10MHz, QPSK, 50 RB	8970
FDD, CBW 15MHz, QPSK, 75 RB	13440
FDD, CBW 20MHz, QPSK, 100 RB	17850
FDD, CBW 1.4MHz, 16QAM, 6 RB	1092
FDD, CBW 3MHz, 16QAM, 15 RB	2690
FDD, CBW 5MHz, 16QAM, 25 RB	4480
FDD, CBW 10MHz, 16QAM, 50 RB	8910
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



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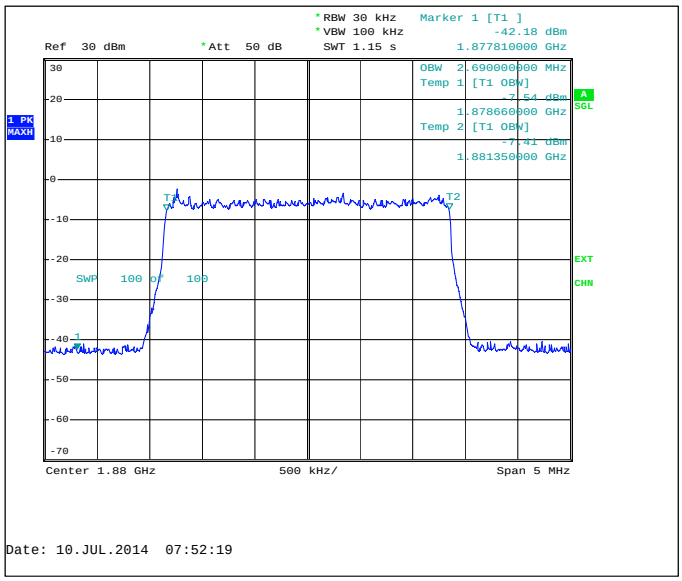
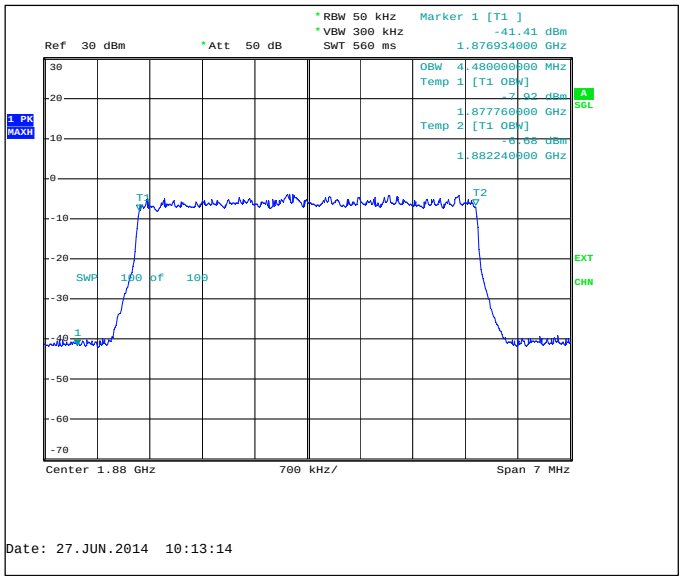
FDD, CBW 3MHz, QPSK, 15 RB, Channel 18900 / 1880.0 MHz



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



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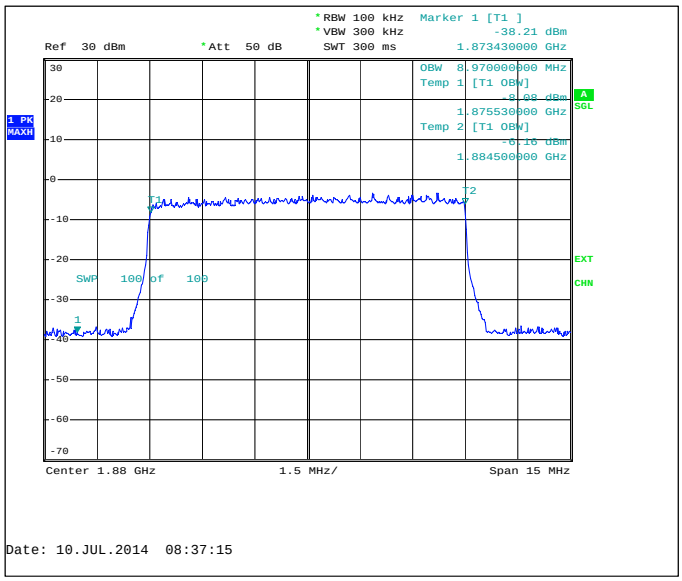
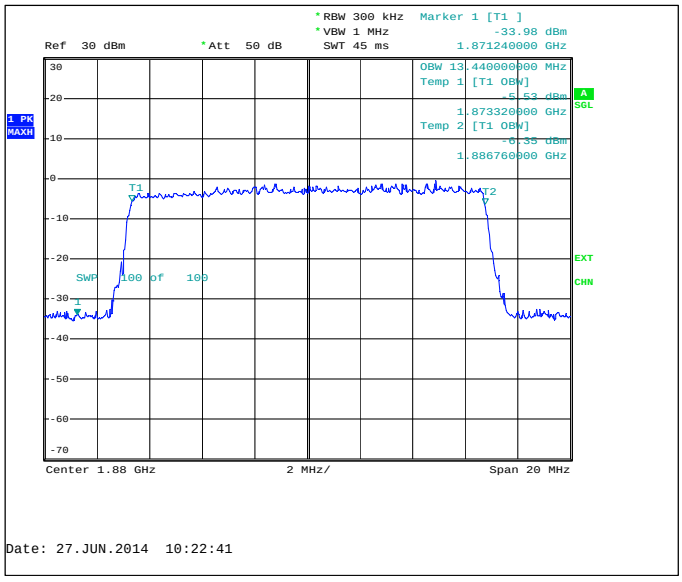
FDD, CBW 10MHz, QPSK, 50 RB, Channel 18900 / 1880.0 MHz



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



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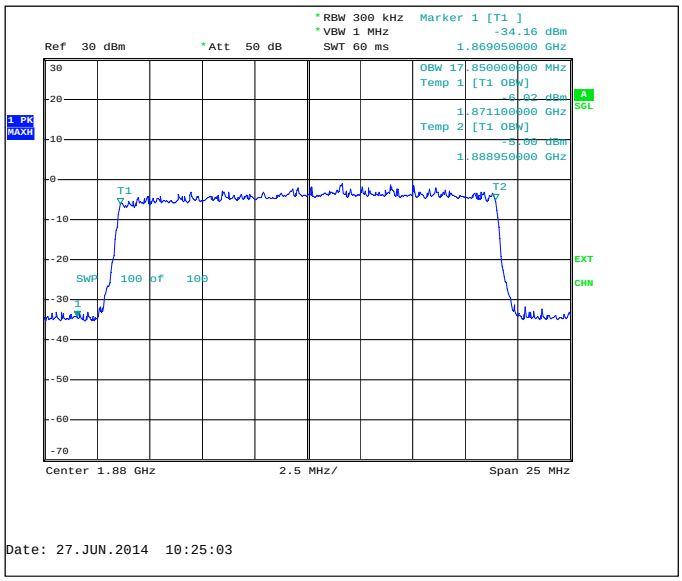
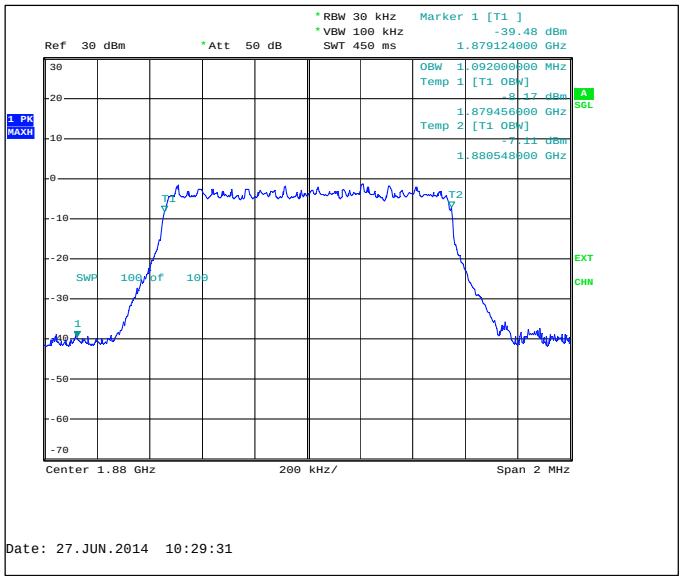
FDD, CBW 20MHz, QPSK, 100 RB, Channel 18900 / 1880.0 MHz



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



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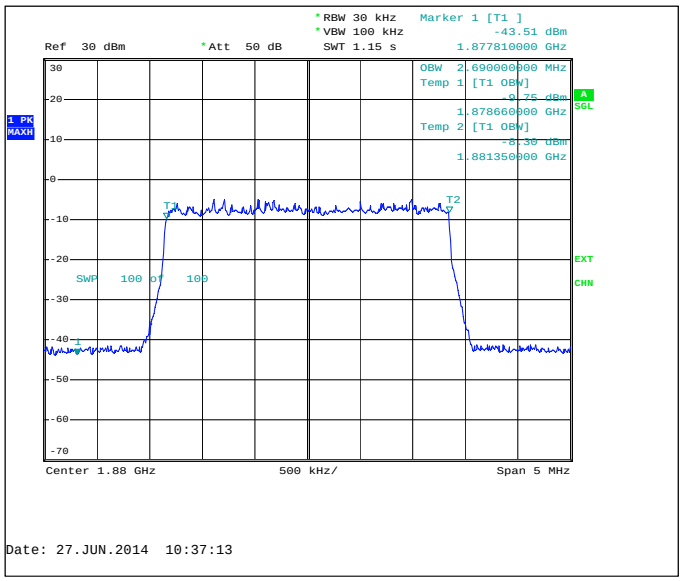
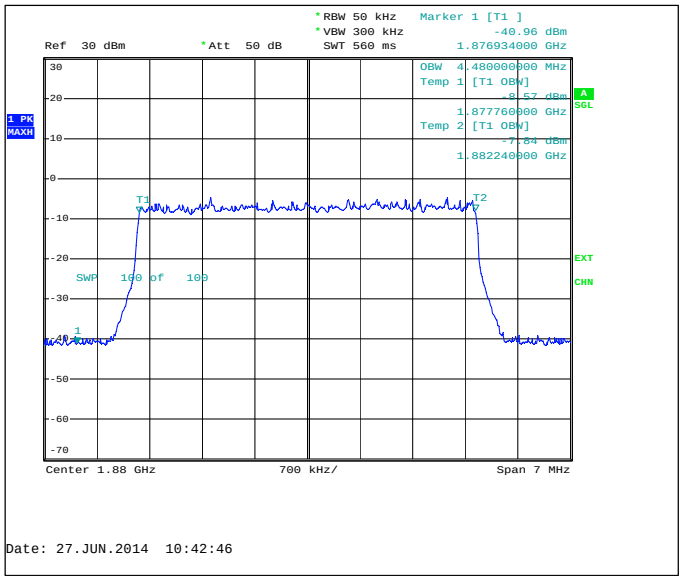
FDD, CBW 3MHz, 16QAM, 15 RB, Channel 18900 / 1880.0 MHz



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



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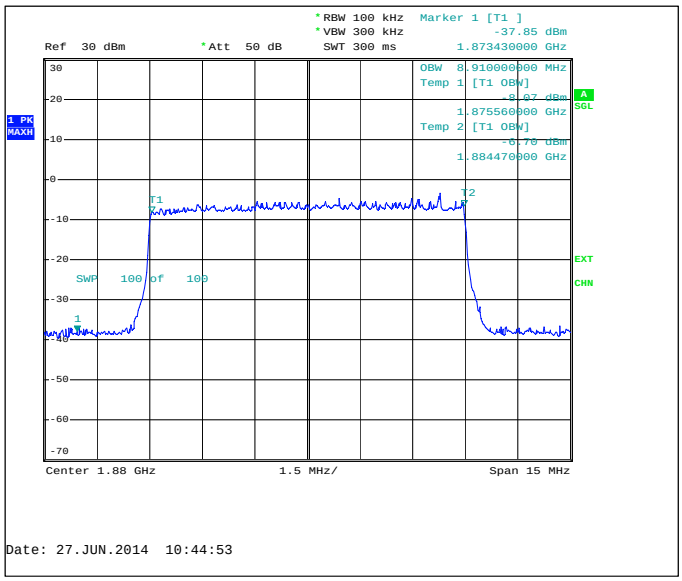
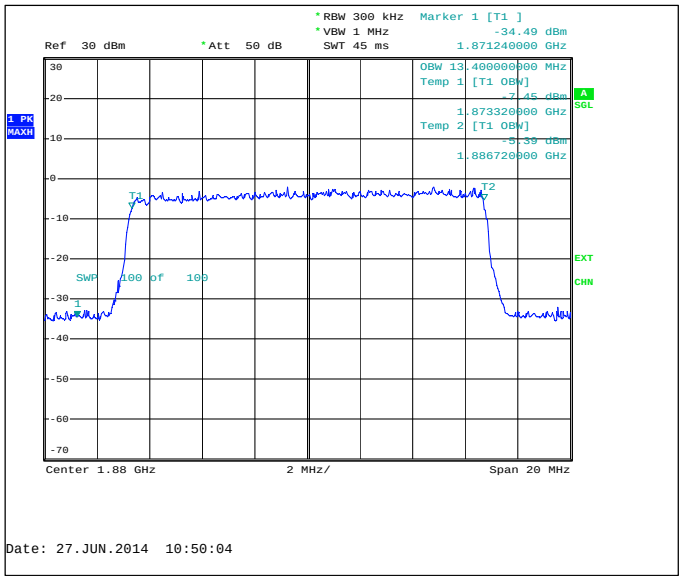
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 18900 / 1880.0 MHz



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



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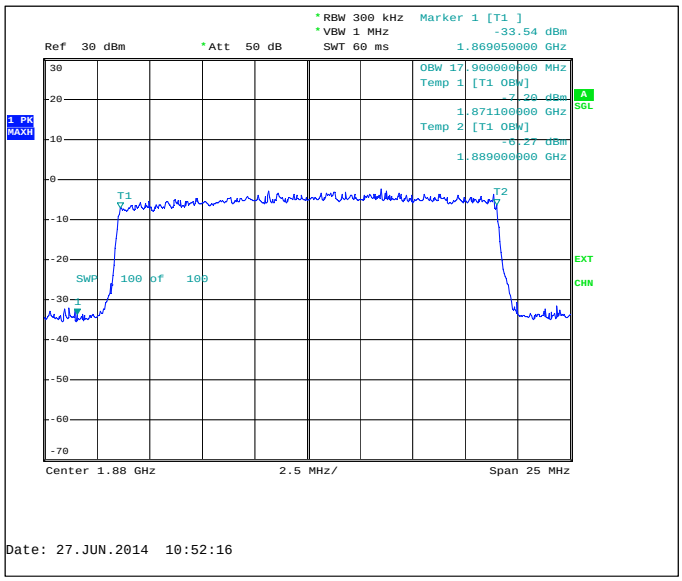
FDD, CBW 20MHz, 16QAM, 100 RB, Channel 18900 / 1880.0 MHz



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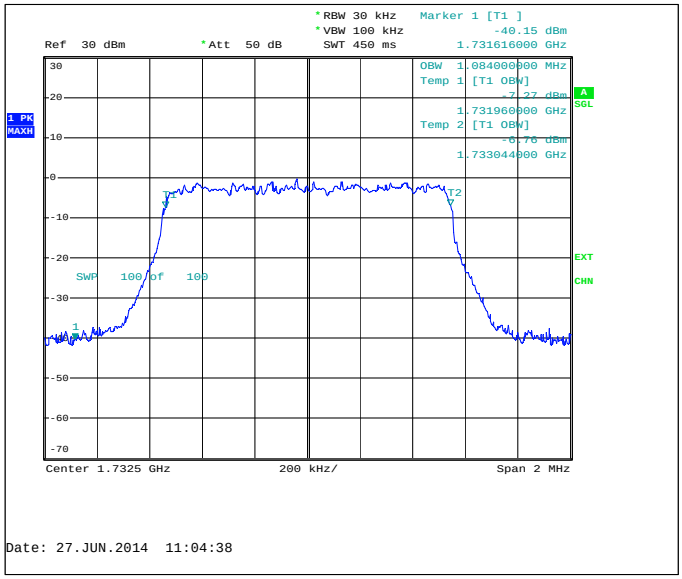
2.8. LTE1700 (Band 4) Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 1.4MHz, QPSK, 6 RB	1084
FDD, CBW 3MHz, QPSK, 15 RB	2690
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	17850
FDD, CBW 1.4MHz, 16QAM, 6 RB	1092
FDD, CBW 3MHz, 16QAM, 15 RB	2690
FDD, CBW 5MHz, 16QAM, 25 RB	4480
FDD, CBW 10MHz, 16QAM, 50 RB	8940
FDD, CBW 15MHz, 16QAM, 75 RB	13440
FDD, CBW 20MHz, 16QAM, 100 RB	17900

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



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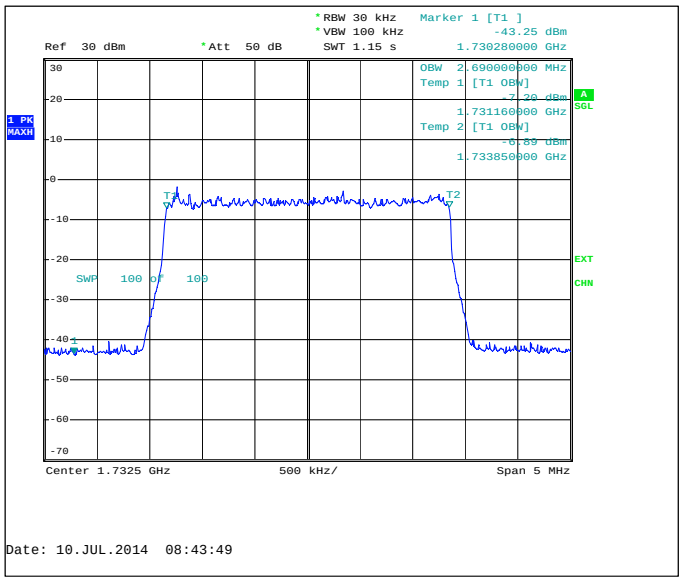
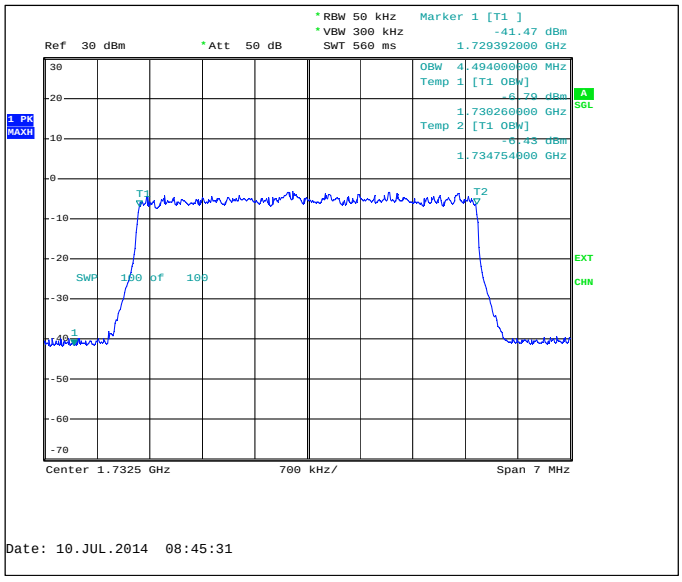
FDD, CBW 3MHz, QPSK, 15 RB, Channel 20175 / 1732.5 MHz



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



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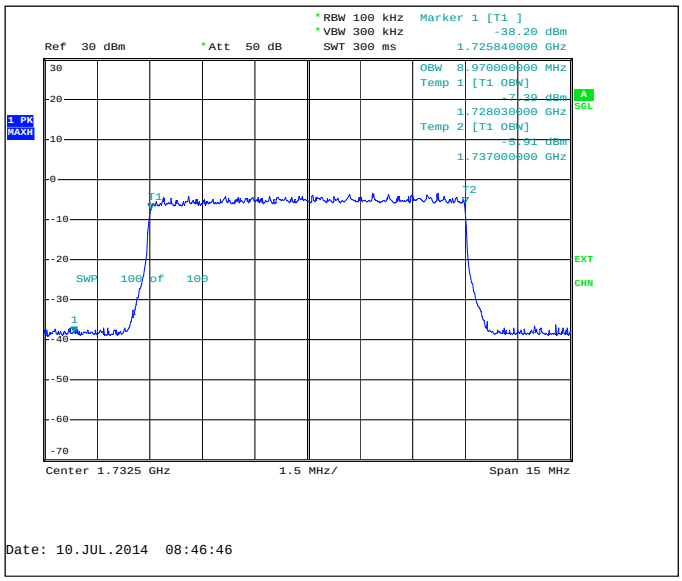
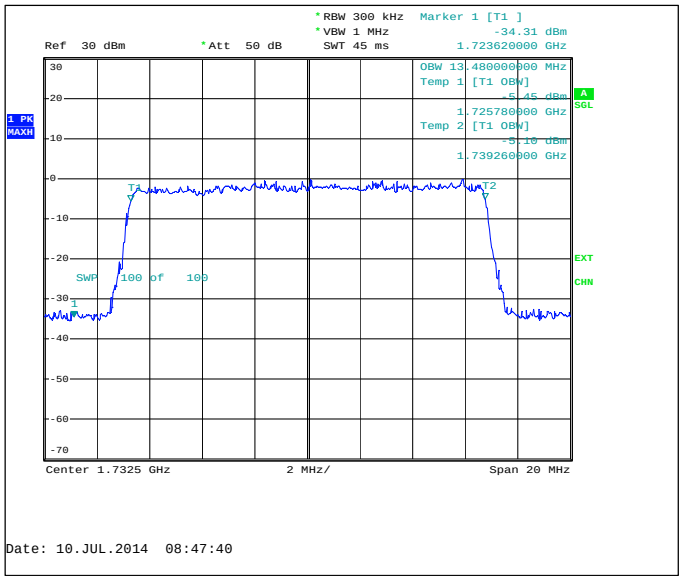
FDD, CBW 10MHz, QPSK, 50 RB, Channel 20175 / 1732.5 MHz



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



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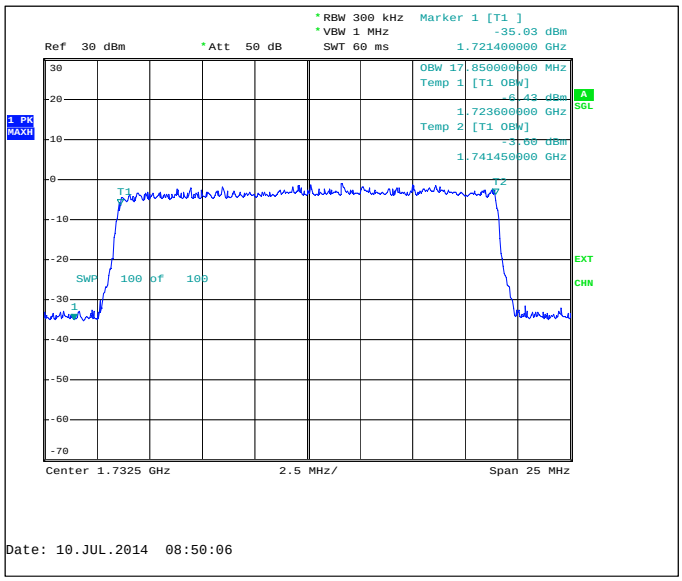
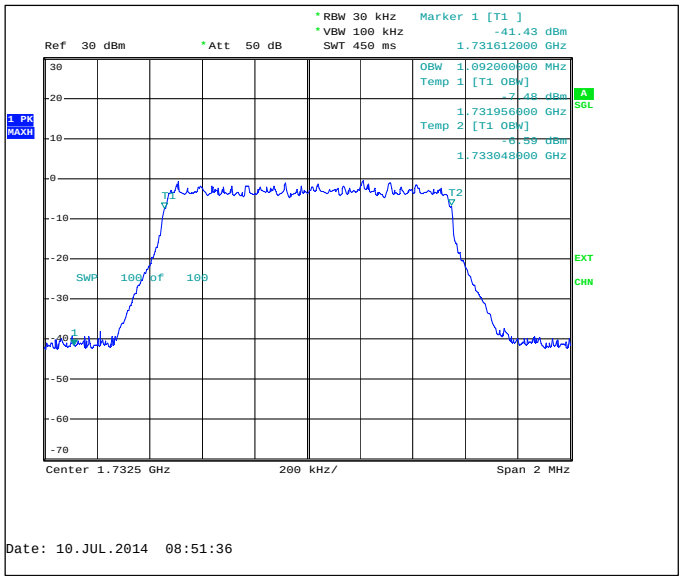
FDD, CBW 20MHz, QPSK, 100 RB, Channel 20175 / 1732.5 MHz



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



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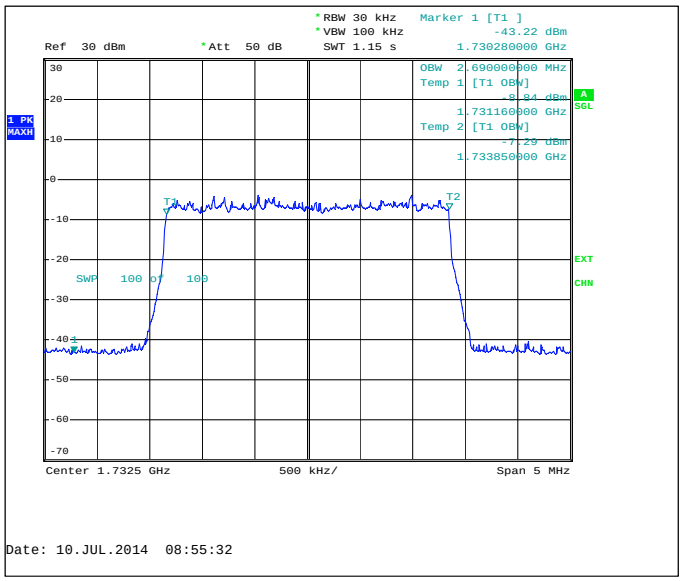
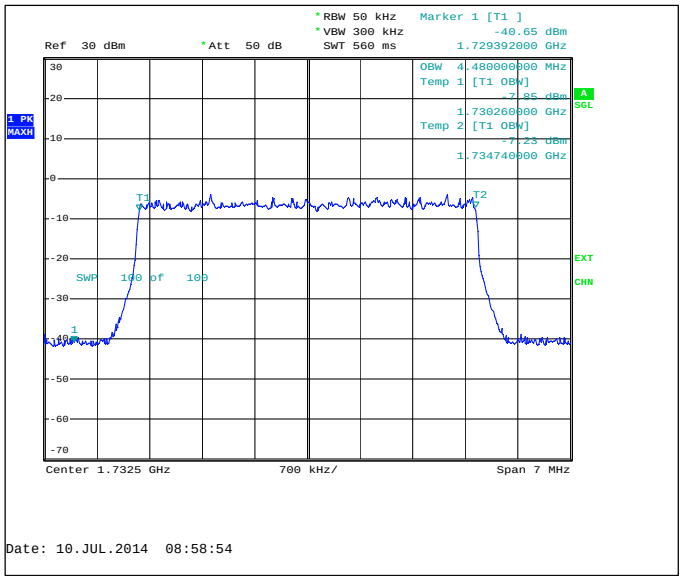
FDD, CBW 3MHz, 16QAM, 15 RB, Channel 20175 / 1732.5 MHz



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



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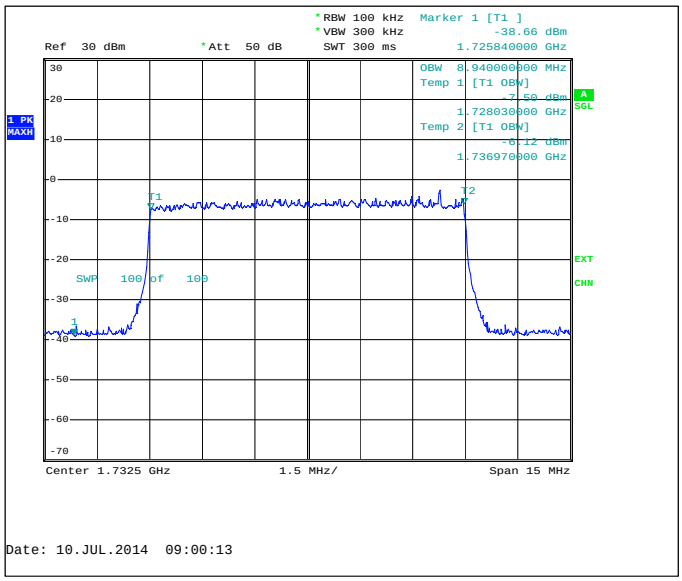
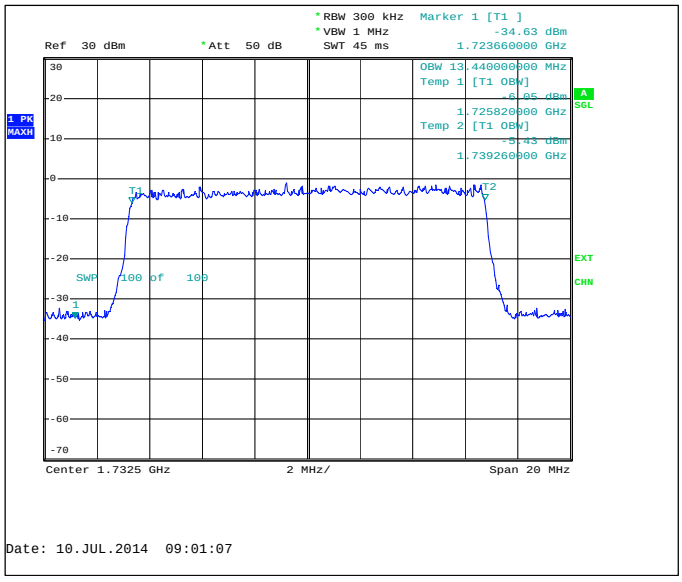
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 20175 / 1732.5 MHz



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



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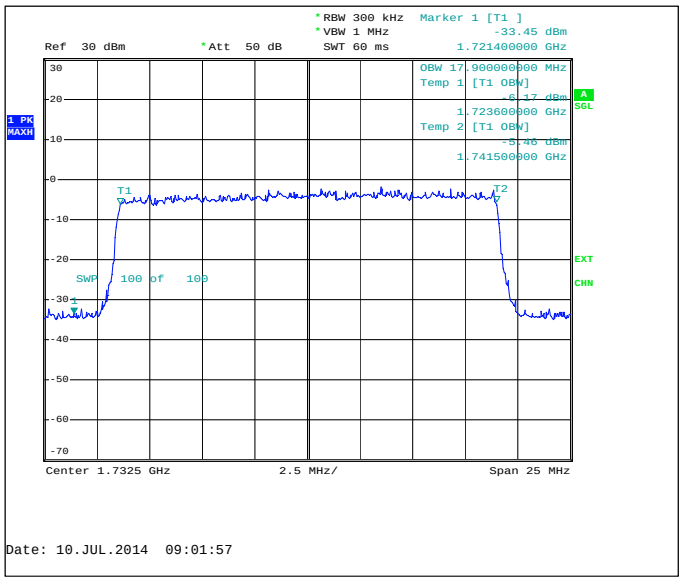
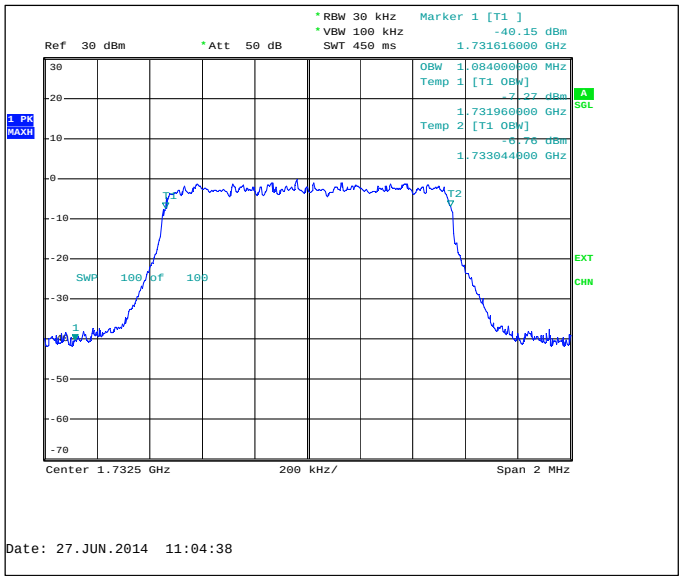
FDD, CBW 20MHz, 16QAM, 100 RB, Channel 20175 / 1732.5 MHz



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



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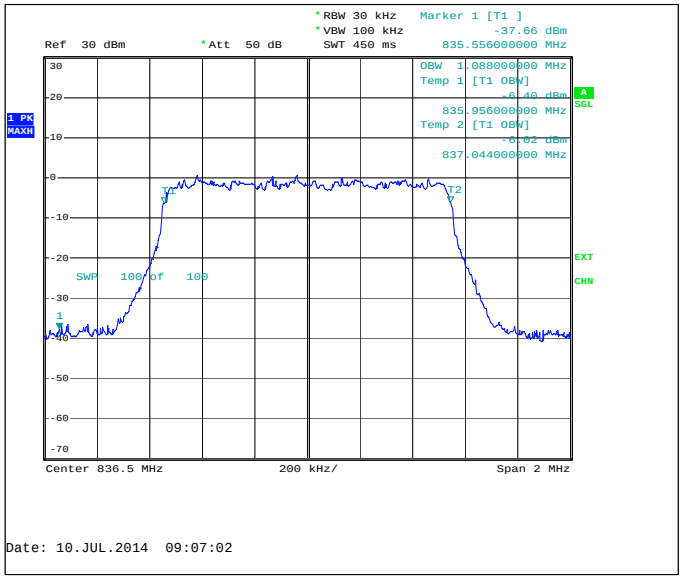
2.9. LTE850 (Band 5) Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 1.4MHz, QPSK, 6 RB	1088
FDD, CBW 3MHz, QPSK, 15 RB	2690
FDD, CBW 5MHz, QPSK, 25 RB	4480
FDD, CBW 10MHz, QPSK, 50 RB	8970
FDD, CBW 1.4MHz, 16QAM, 6 RB	1092
FDD, CBW 3MHz, 16QAM, 15 RB	2680
FDD, CBW 5MHz, 16QAM, 25 RB	4480
FDD, CBW 10MHz, 16QAM, 50 RB	8940

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



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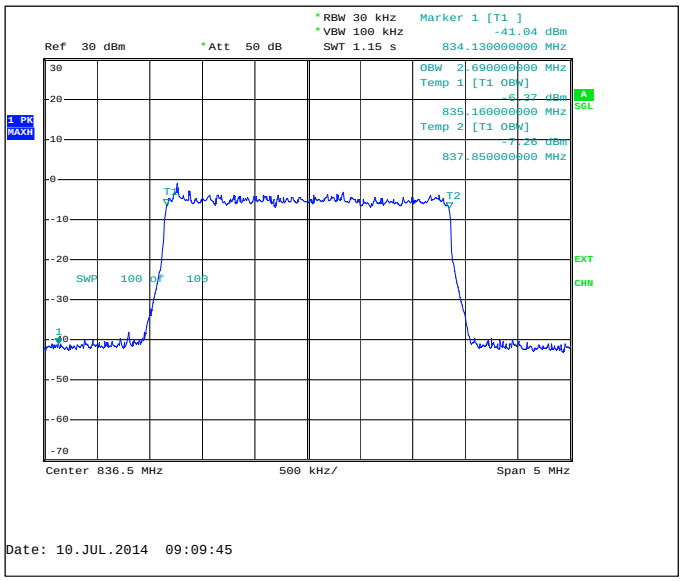
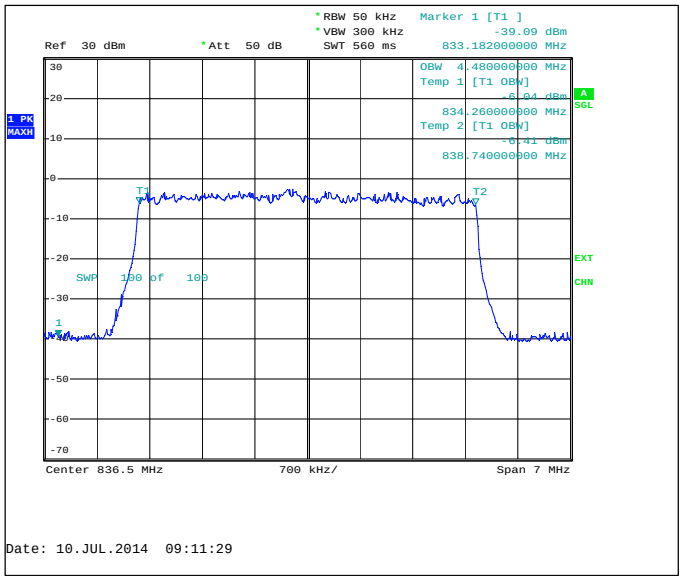
FDD, CBW 3MHz, QPSK, 15 RB, Channel 20525 / 836.5 MHz



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



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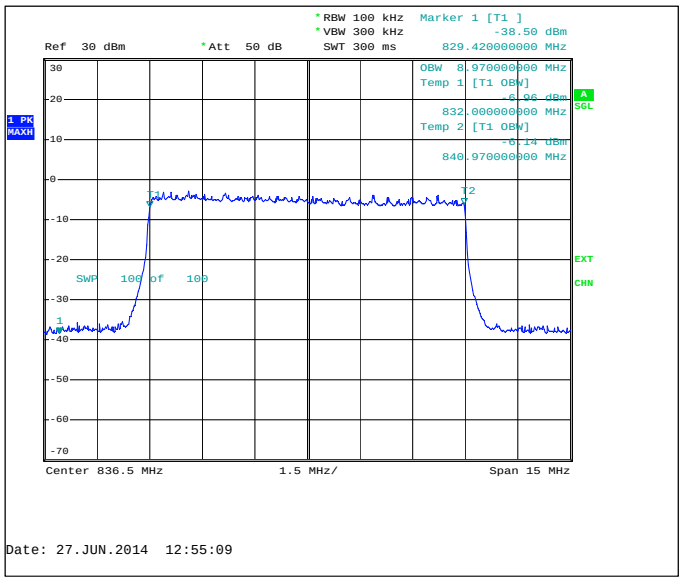
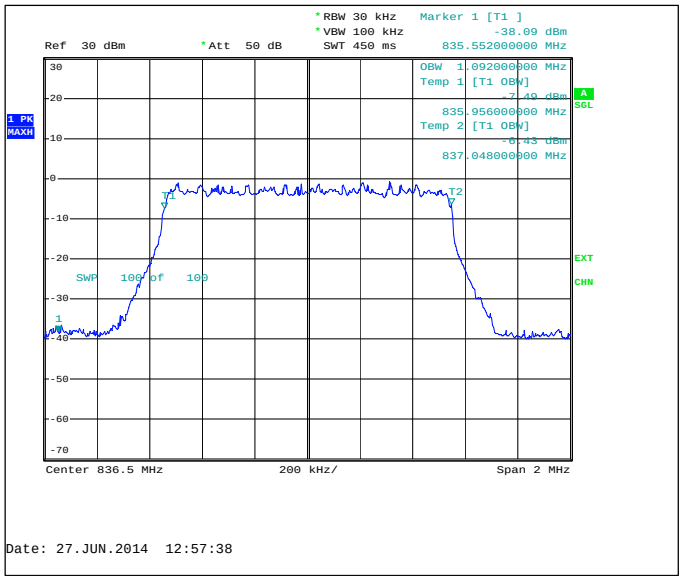
FDD, CBW 10MHz, QPSK, 50 RB, Channel 20525 / 836.5 MHz



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



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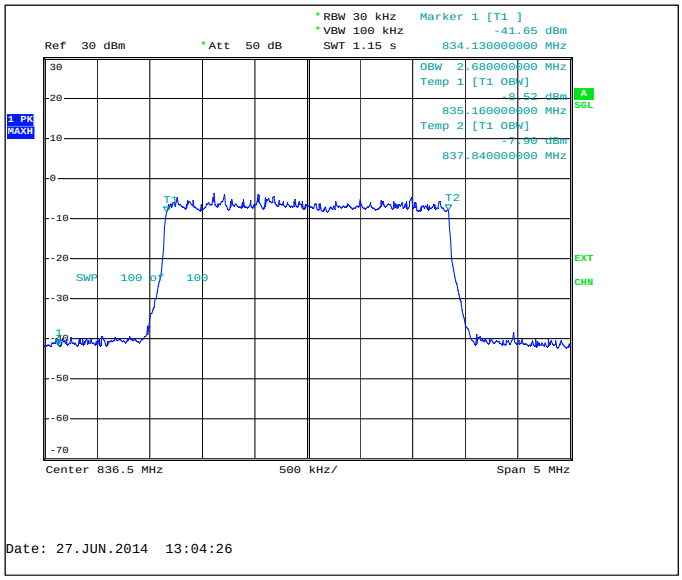
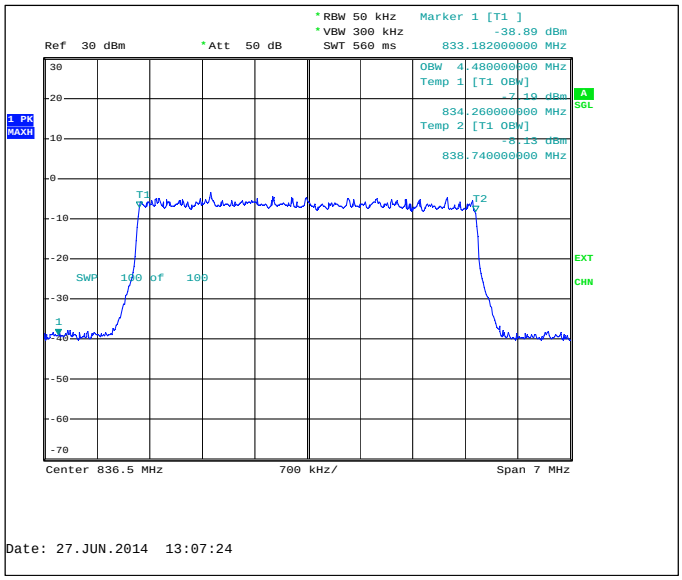
FDD, CBW 3MHz, 16QAM, 15 RB, Channel 20525 / 836.5 MHz



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



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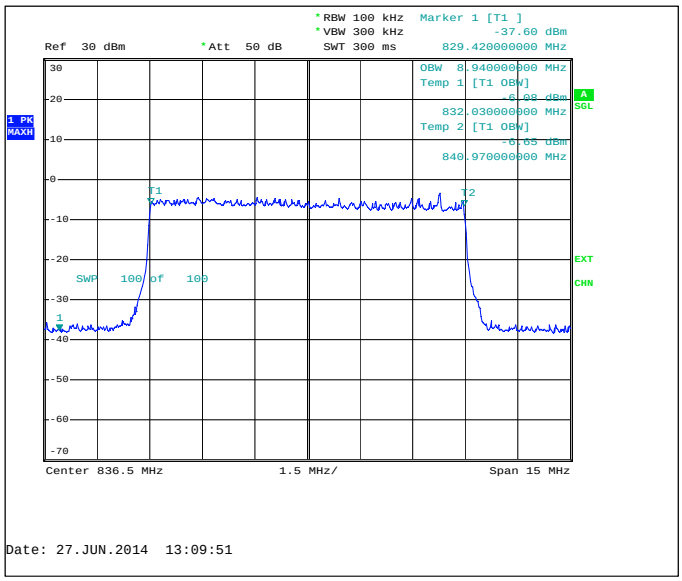
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 20525 / 836.5 MHz



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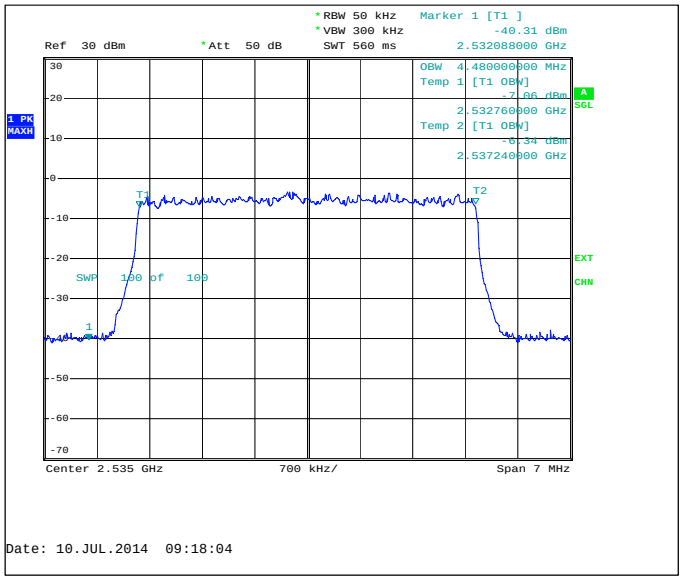
2.10. LTE 2500 (Band 7) Test results

Operation mode (TX on)	99% Occupied bandwidth [kHz]
FDD, CBW 5MHz, QPSK, 25 RB	4480
FDD, CBW 10MHz, QPSK, 50 RB	8940
FDD, CBW 15MHz, QPSK, 75 RB	13480
FDD, CBW 20MHz, QPSK, 100 RB	17850
FDD, CBW 5MHz, 16QAM, 25 RB	4466
FDD, CBW 10MHz, 16QAM, 50 RB	8910
FDD, CBW 15MHz, 16QAM, 75 RB	13400
FDD, CBW 20MHz, 16QAM, 100 RB	24800
FDD, CBW 20MHz, 16QAM, 100 RB	17850

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



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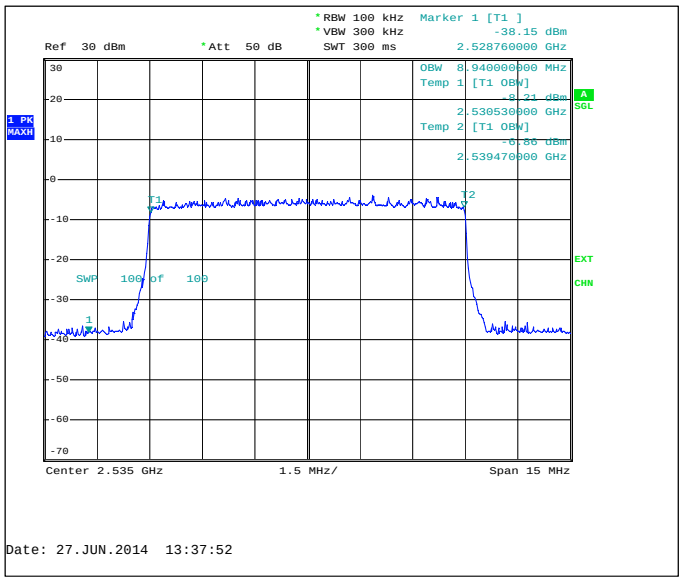
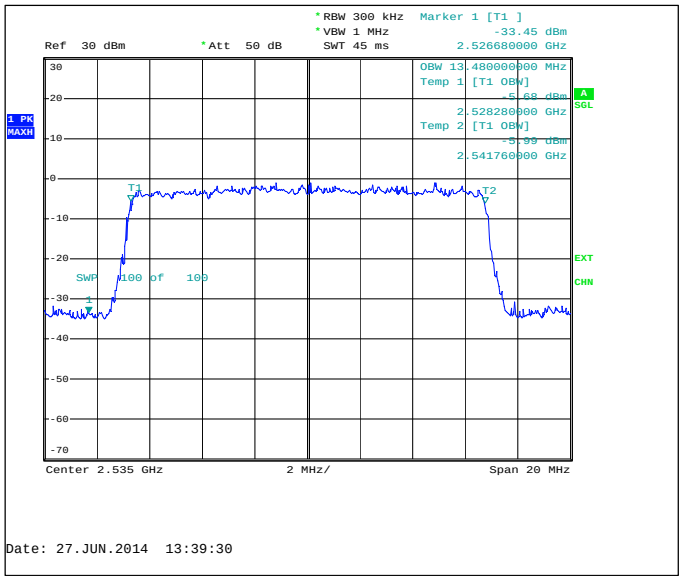
FDD, CBW 10MHz, QPSK, 50 RB, Channel 21100 / 2535.0 MHz



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



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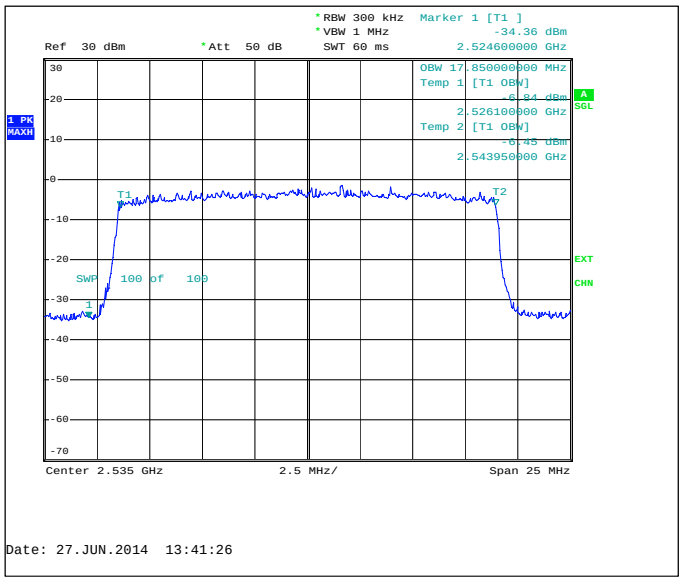
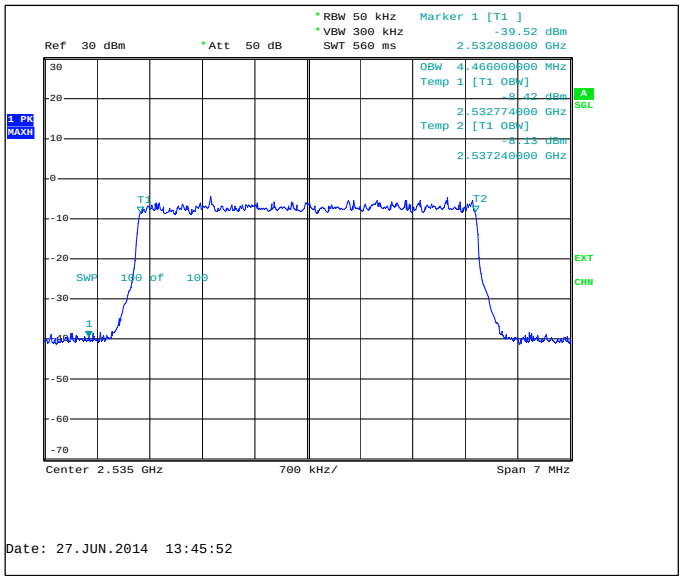
FDD, CBW 20MHz, QPSK, 100 RB, Channel 21100 / 2535.0 MHz



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



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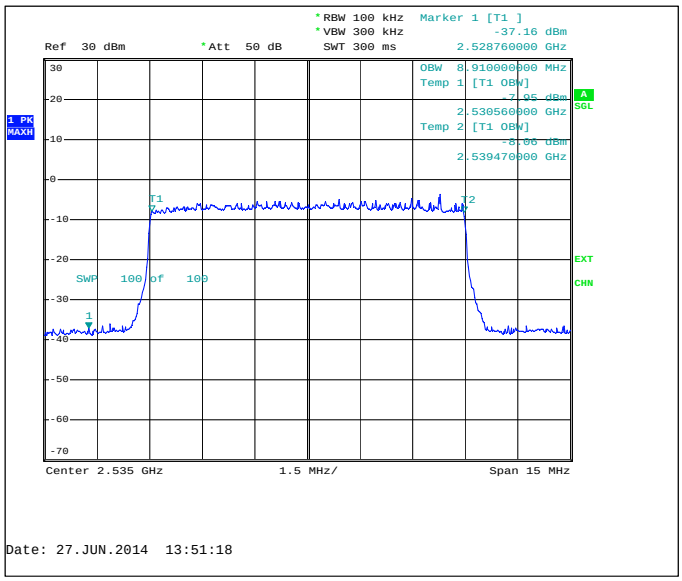
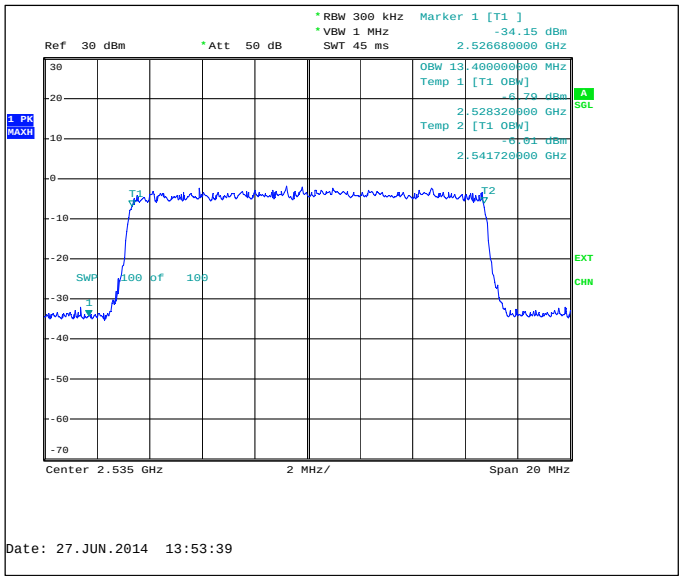
FDD, CBW 10MHz, 16QAM, 50 RB, Channel 21100 / 2535.0 MHz



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



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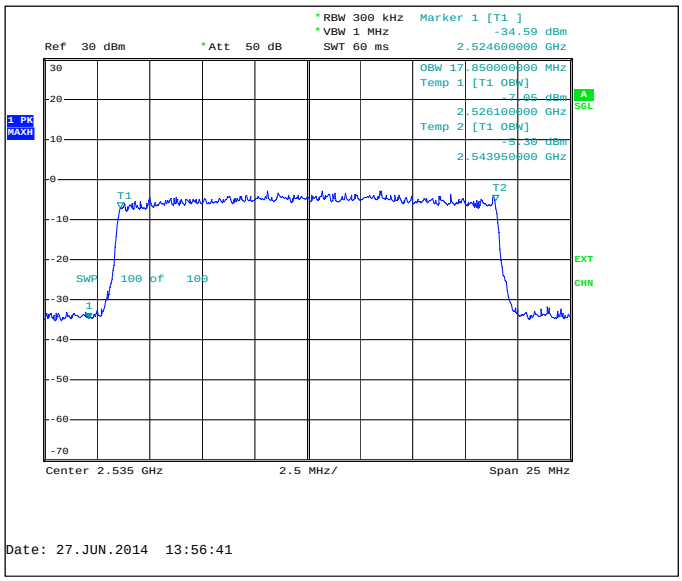
FDD, CBW 20MHz, 16QAM, 100 RB, Channel 21100 / 2535.0 MHz



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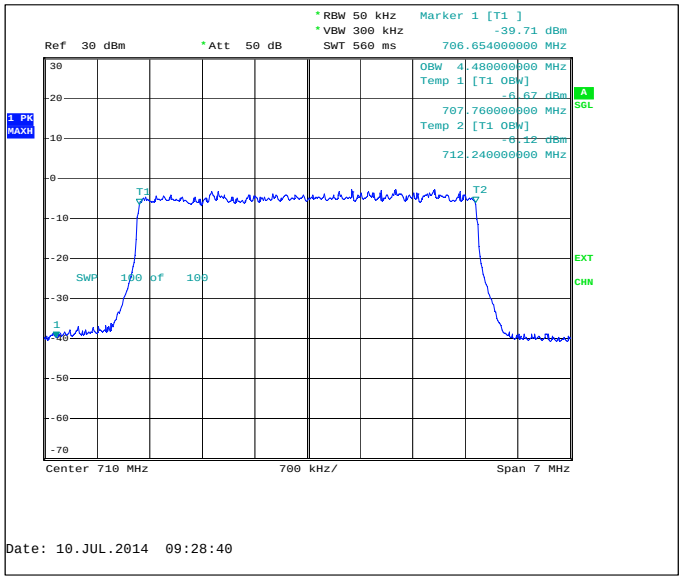
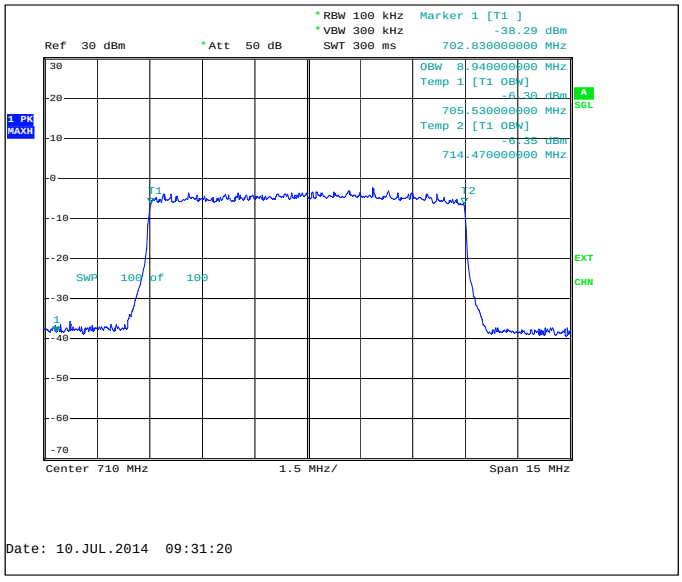
2.11. LTE700 Lower (Band 17) Test results

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	4466
FDD, CBW 10MHz, 16QAM, 50 RB	8940

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



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



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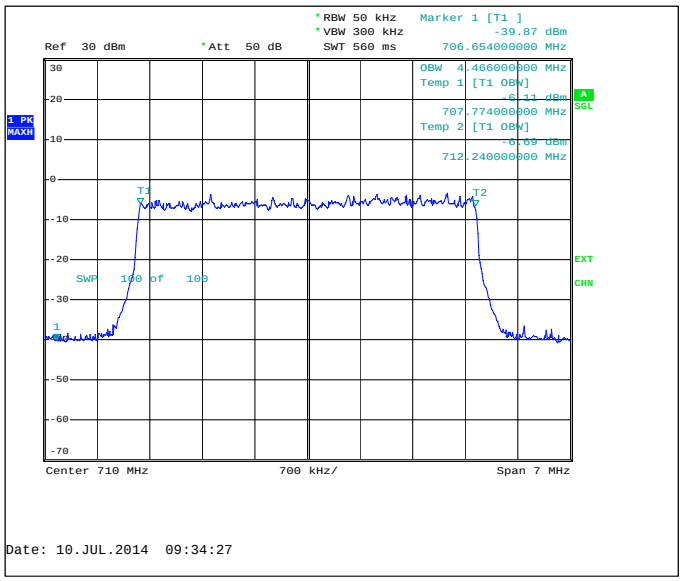
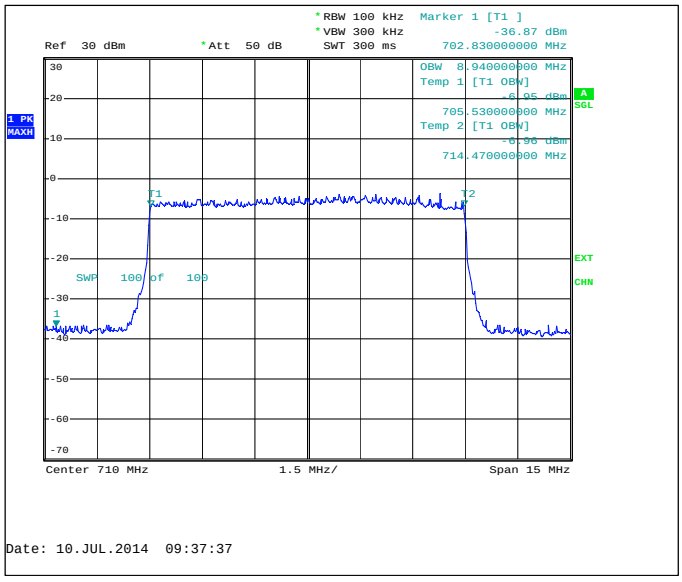
FDD, CBW 5MHz, 16QAM, 25 RB, Channel 23790 / 710.0 MHz



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



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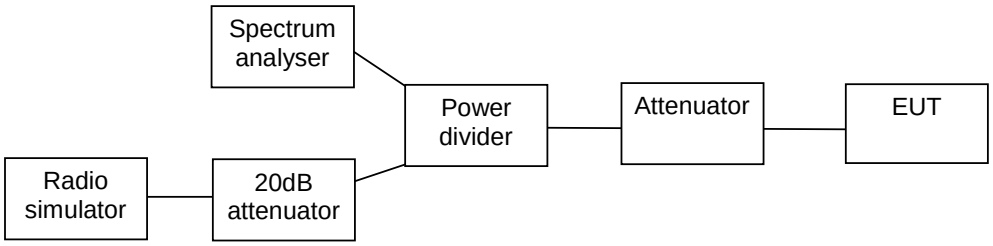
3. Band edge compliance

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

EUT with DUT number	RM-983, DUT 18434
Accessories with DUT numbers	SD-224R, DUT 18437 ; WH-208, DUT 18431
Operation Voltage [V] / [Hz]	
Results	
Remarks	
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	
Date of measurements	26-Jun-2014
Measured by	Tomi Lipponen

3.1. Test Setup



3.2. Test method and limit

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

Limits for band edge compliance measurements

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

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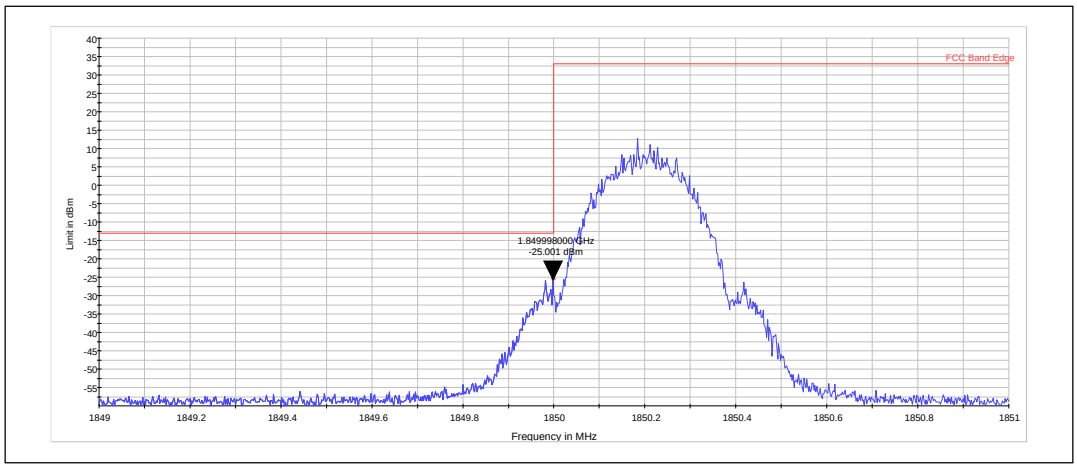
3.3. GSM 1900 Test results

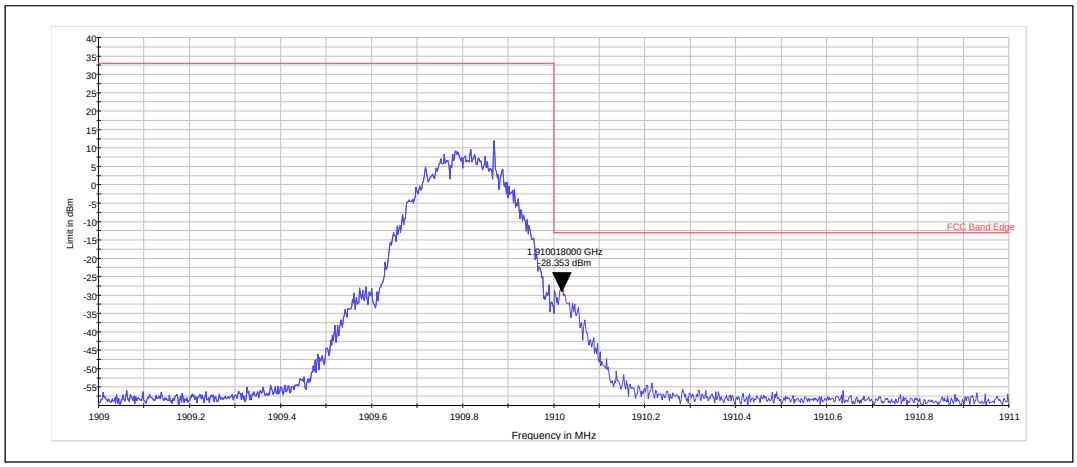
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	1849.998	-25.00	PASSED

Channel 810 / 1909.8 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	1910.018	-28.35	PASSED

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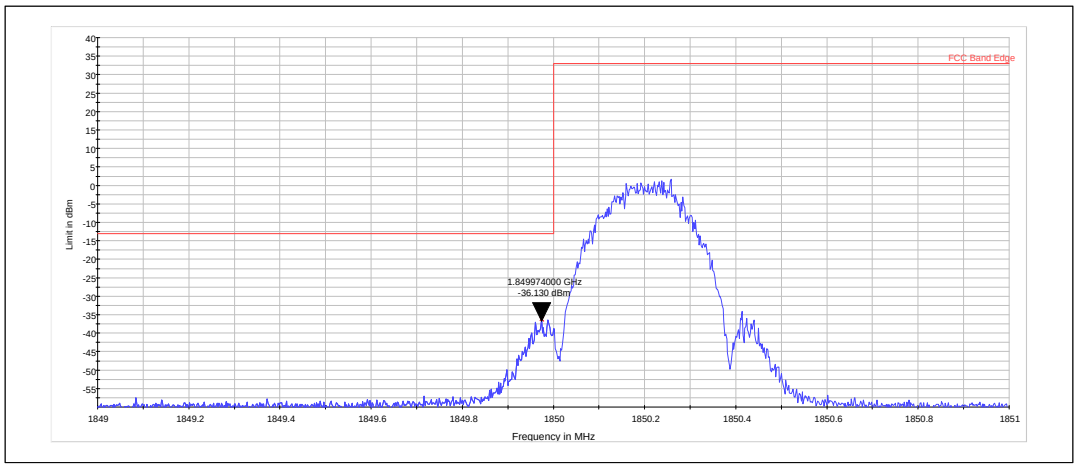
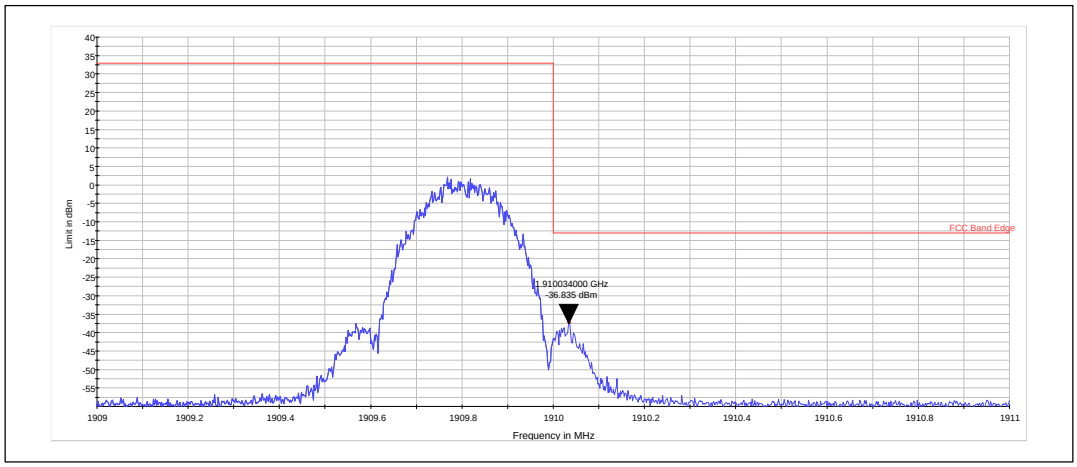
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	1849.974	-36.13	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	1910.034	-36.83	PASSED

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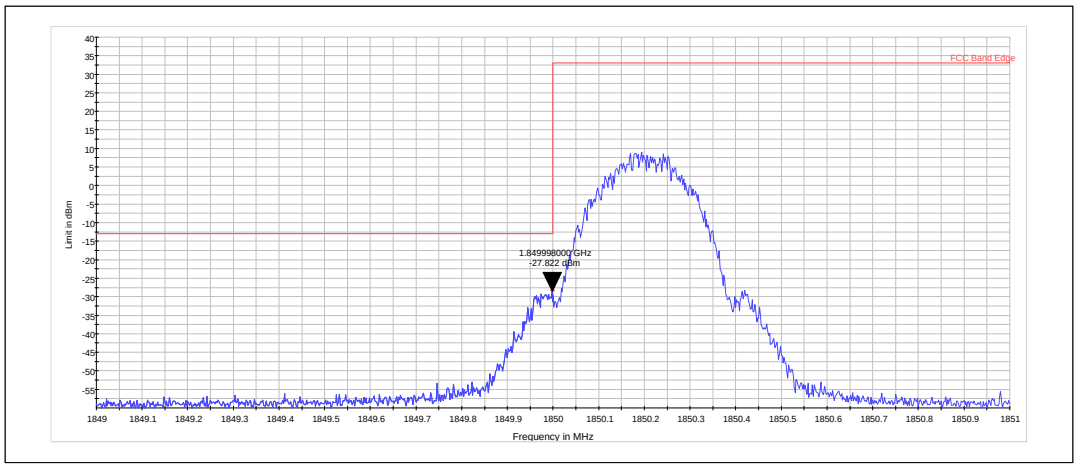
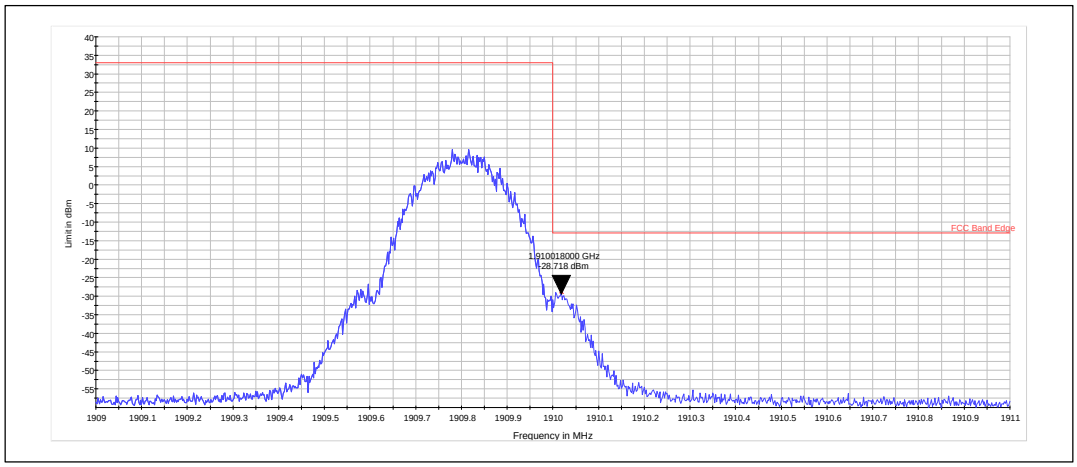
Channel 512 / 1850.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GPRS	1849.998	-27.82	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	-28.72	PASSED

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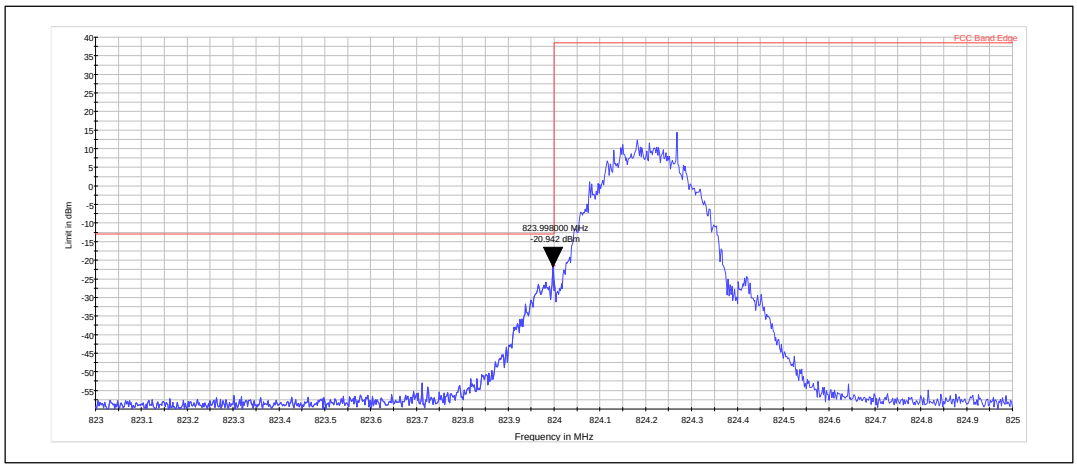
3.4. GSM 850 Test results

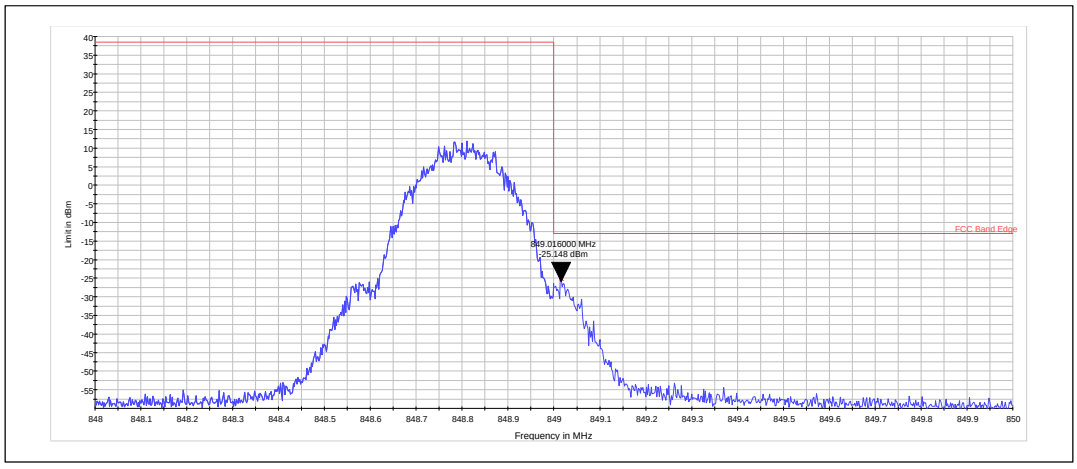
Channel 128 / 824.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GSM	823.998	-20.94	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	849.016	-25.15	PASSED

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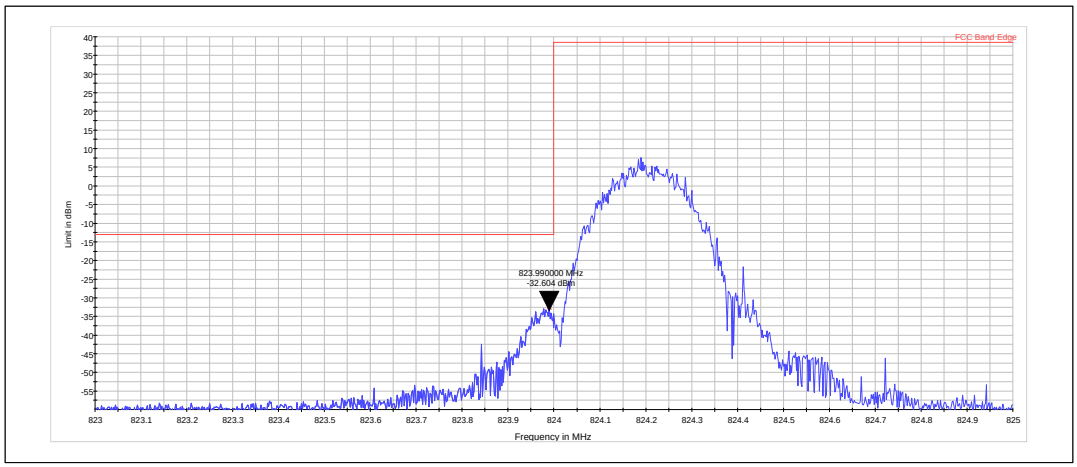
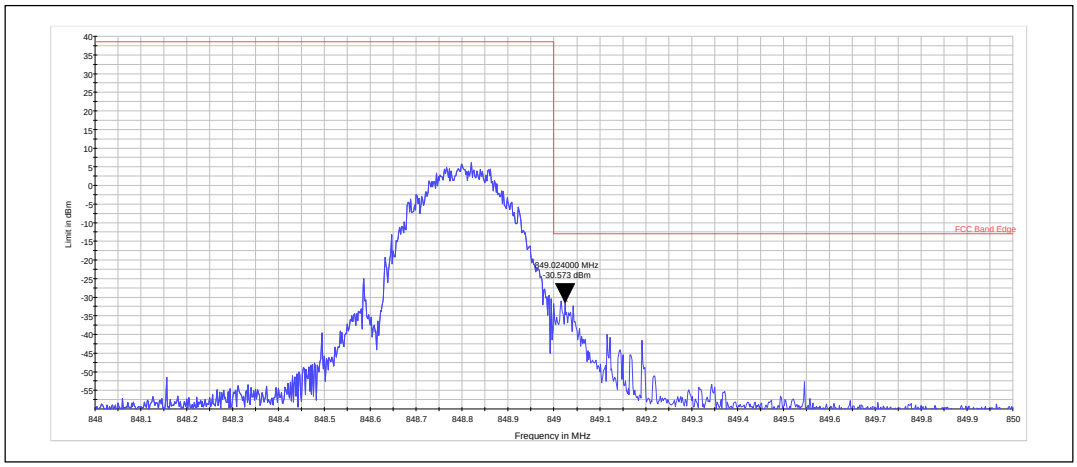
Channel 128 / 824.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
EGPRS	823.990	-32.60	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	849.024	-30.57	PASSED

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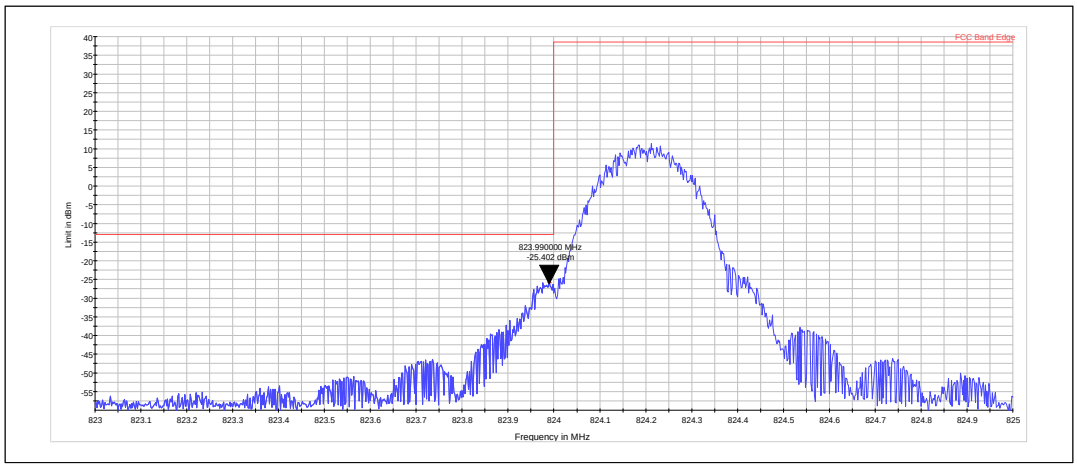
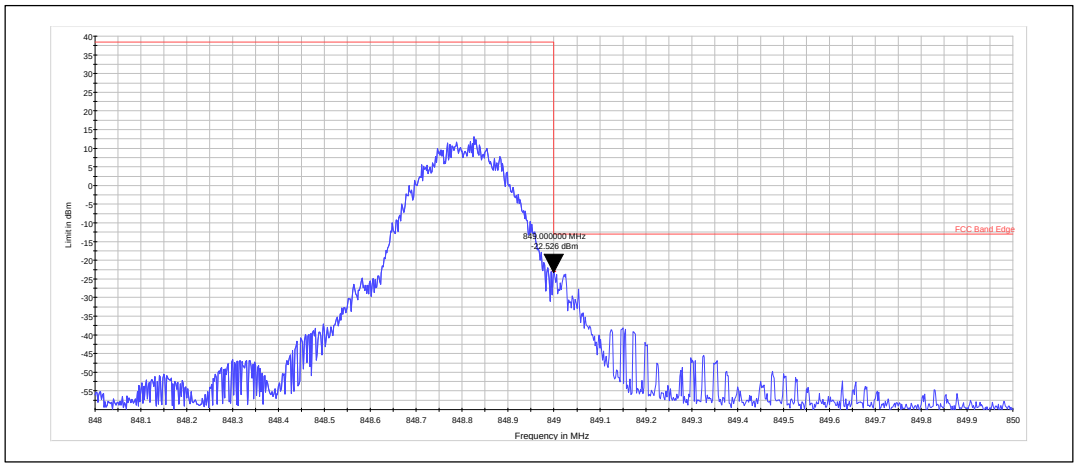
Channel 128 / 824.2 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
GPRS	823.990	-25.40	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	849.000	-22.53	PASSED

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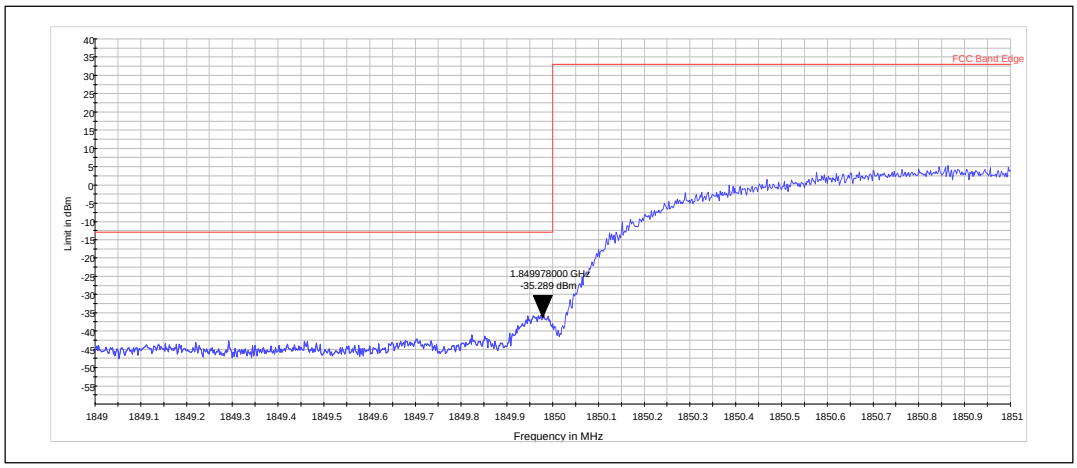
3.5. WCDMA 1900 Test results

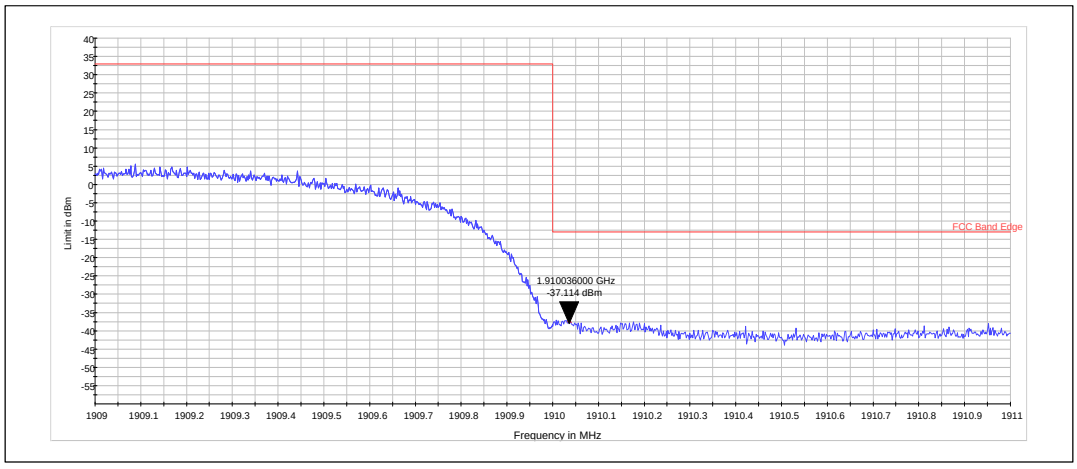
Channel 9262 / 1852.4 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	1849.978	-35.29	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	-37.11	PASSED

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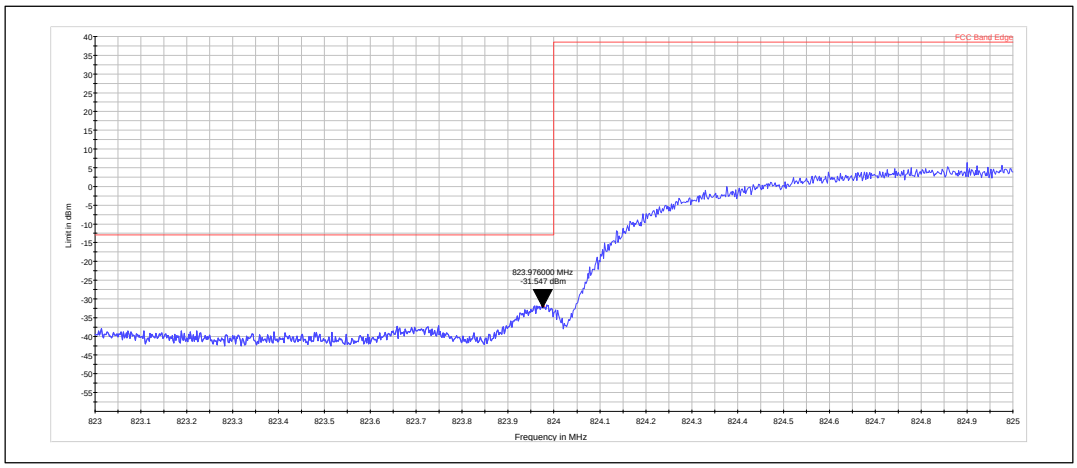
3.6. WCDMA 850 Test results

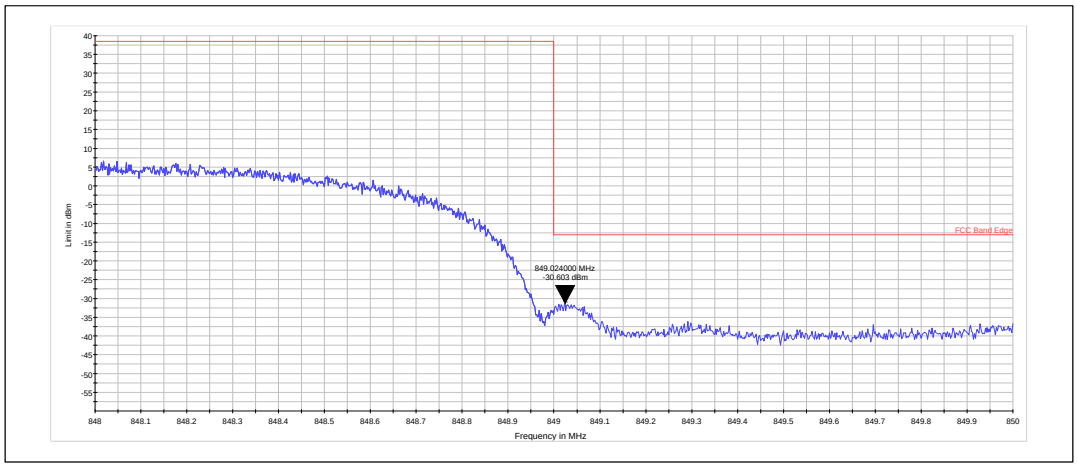
Channel 4132 / 826.4 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD	823.976	-31.55	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	849.024	-30.60	PASSED

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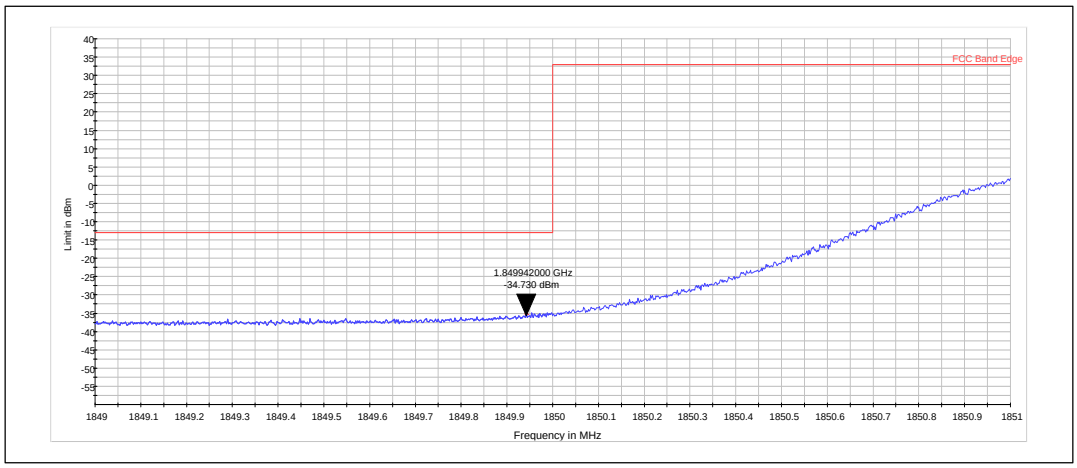
3.7. LTE1900 (Band 2) Test results

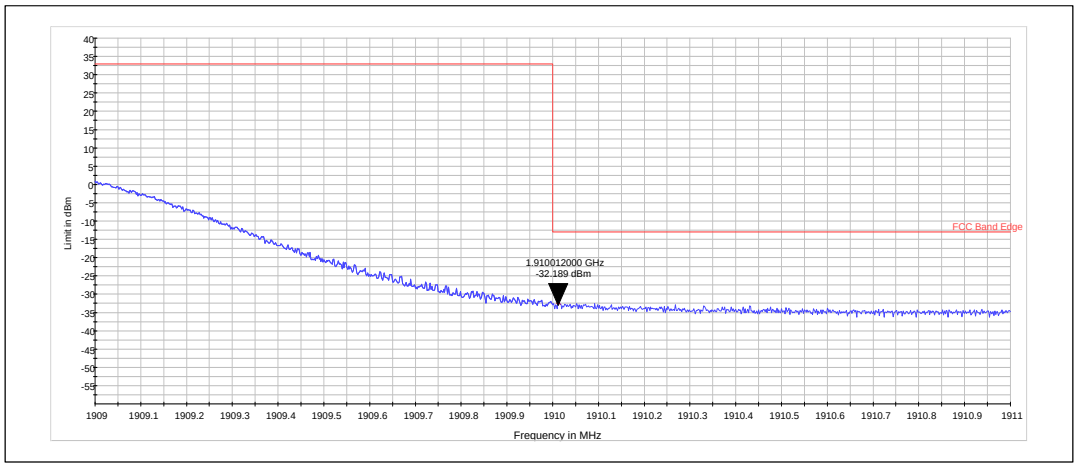
Channel 18700 / 1860 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1849.942	-34.73	PASSED

Channel 19100 / 1900 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1910.012	-32.19	PASSED

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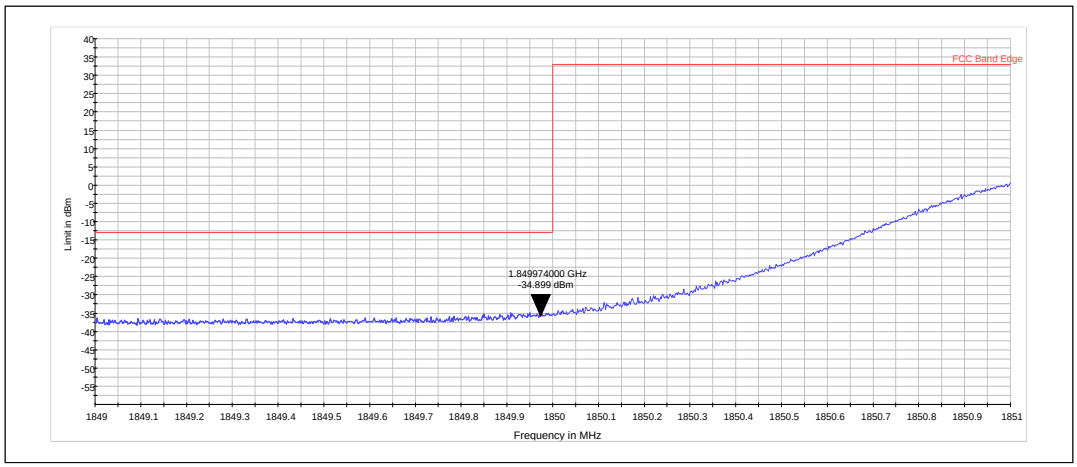
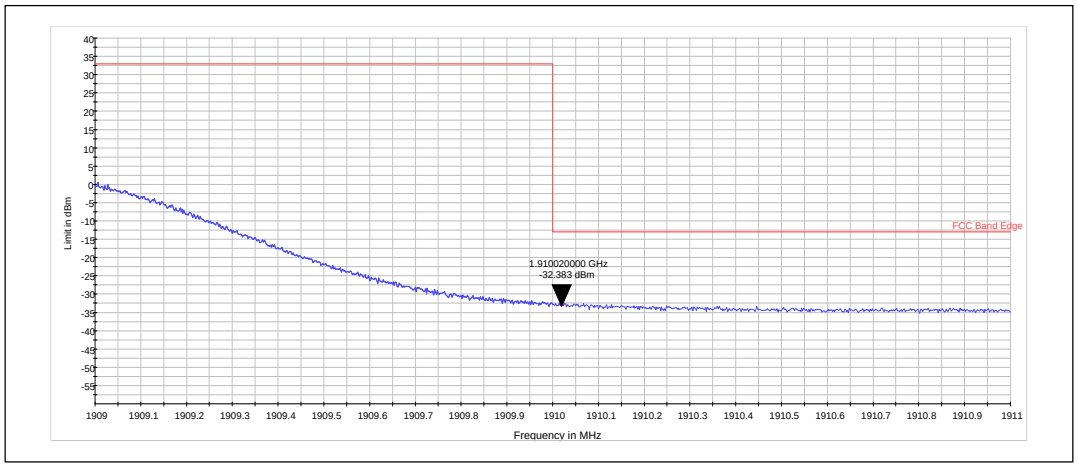
Channel 18700 / 1860 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1849.974	-34.90	PASSED

Channel 19100 / 1900 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1910.020	-32.38	PASSED

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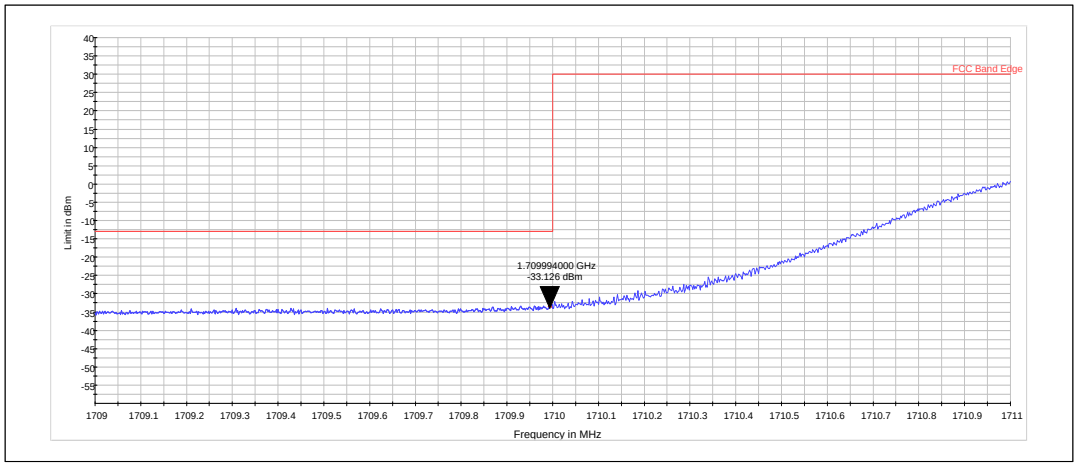
3.8. LTE1700 (Band 4) Test results

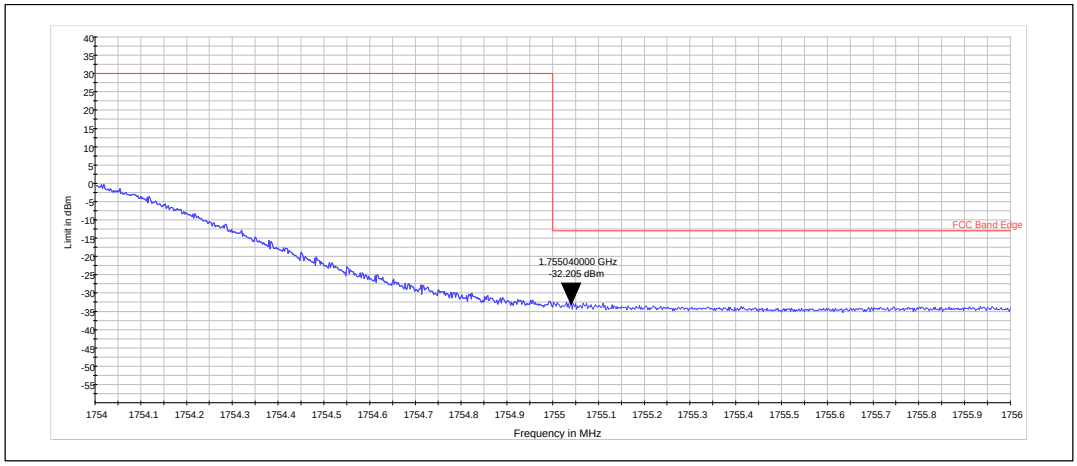
Channel 20050 / 1720 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1709.994	-33.13	PASSED

Channel 20300 / 1745 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	1755.040	-32.20	PASSED

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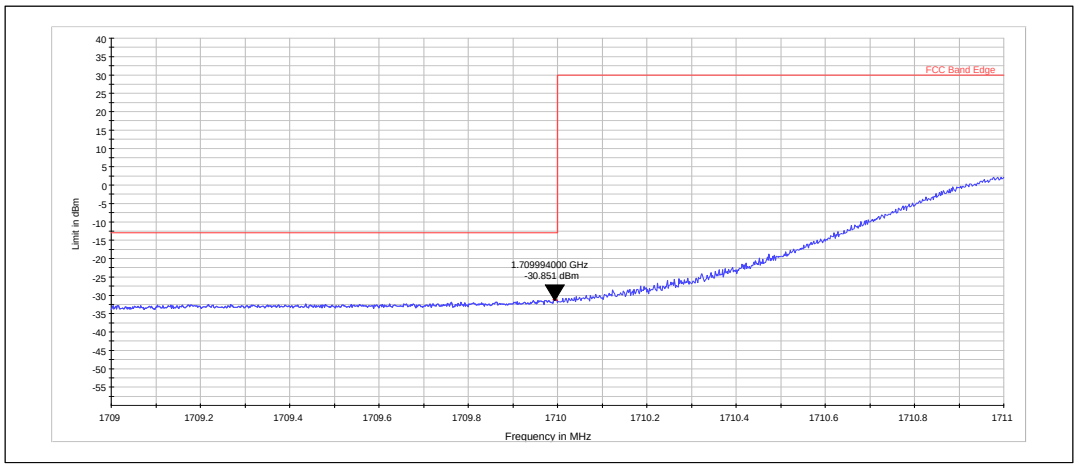
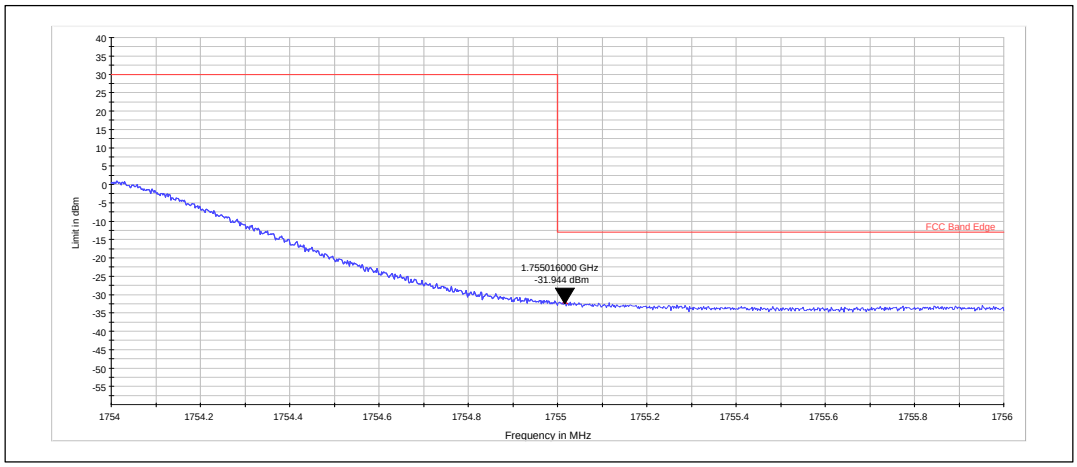
Channel 20050 / 1720 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1709.994	-30.85	PASSED

Channel 20300 / 1745 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	1755.016	-31.94	PASSED

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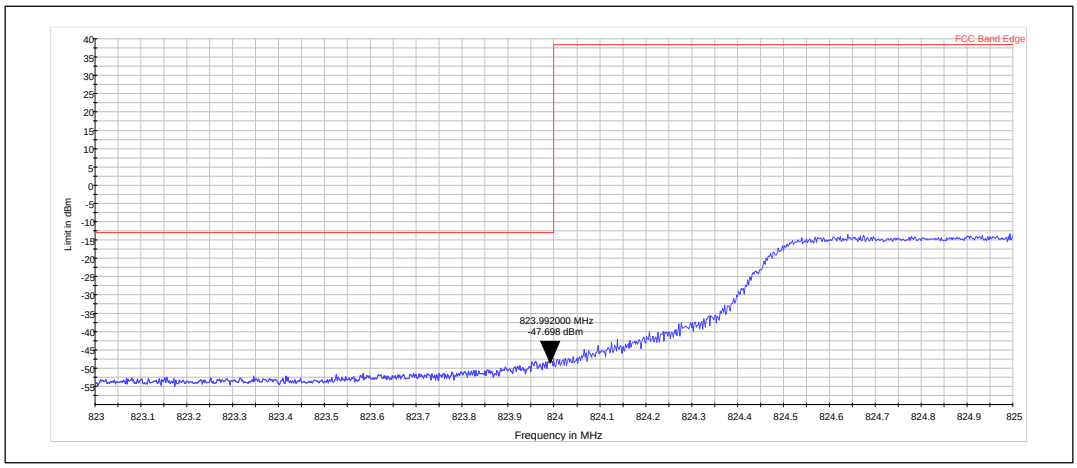
3.9. LTE850 (Band 5) Test results

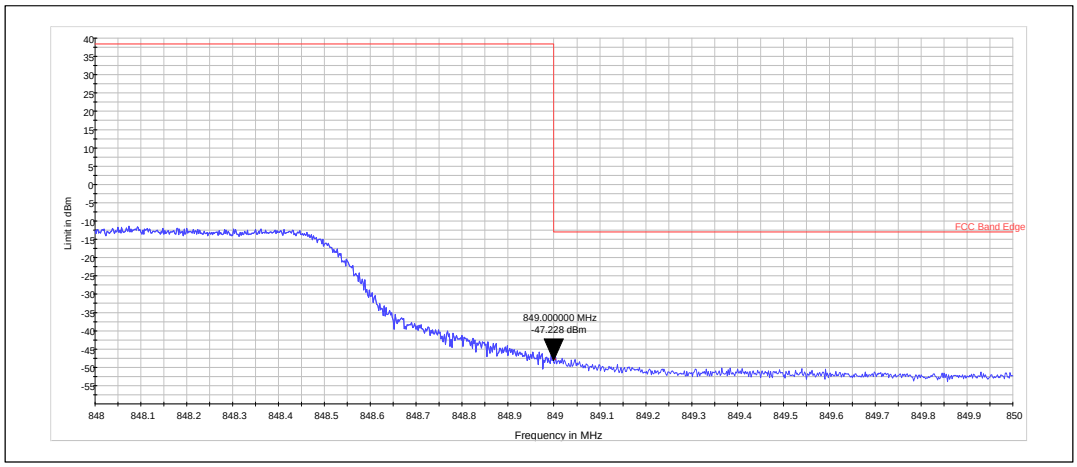
Channel 20450 / 829 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	823.992	-47.70	PASSED

Channel 20600 / 844 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	849.000	-47.23	PASSED

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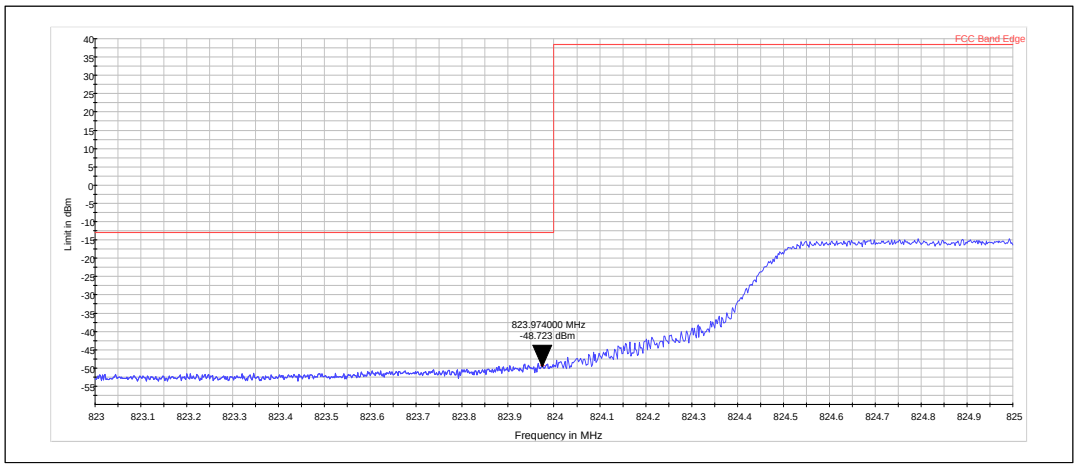
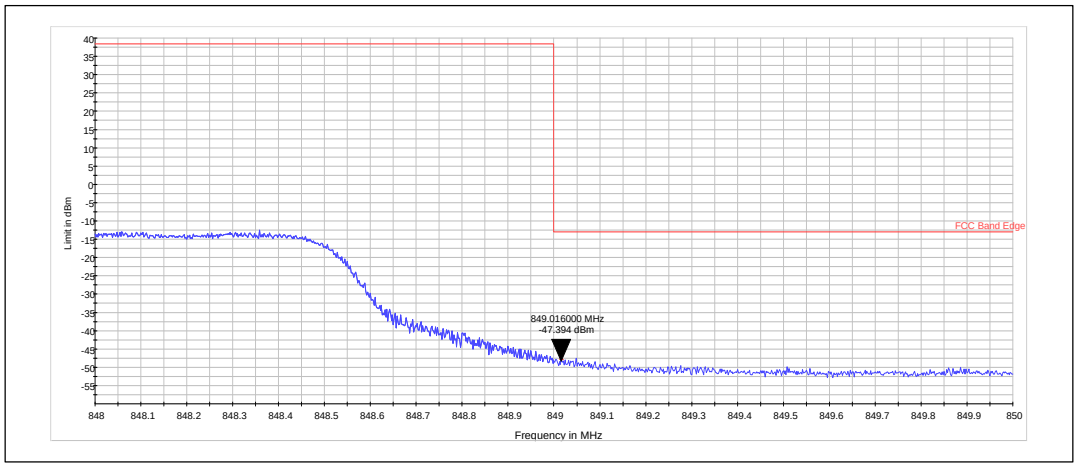
Channel 20450 / 829 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	823.974	-48.72	PASSED

Channel 20600 / 844 MHz



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

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	849.016	-47.39	PASSED

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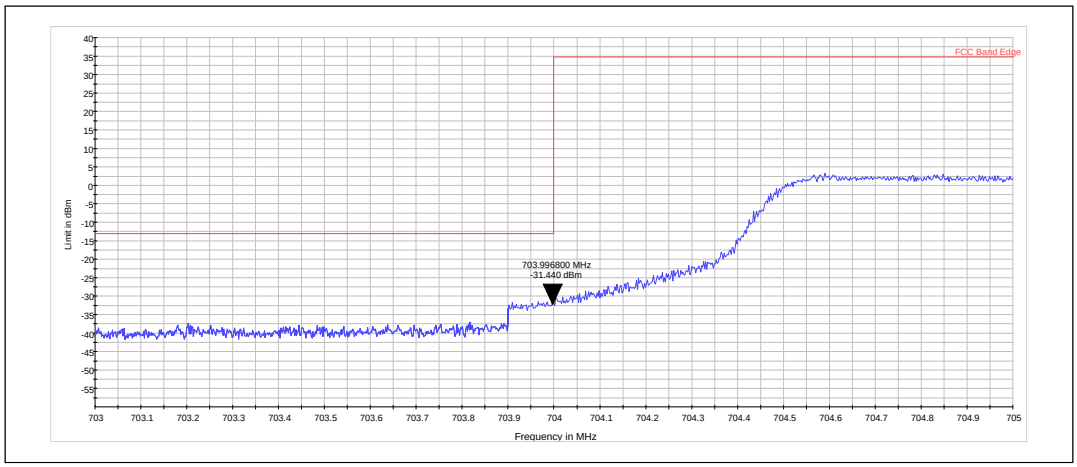
3.10. LTE700 Lower (Band 17) Test results

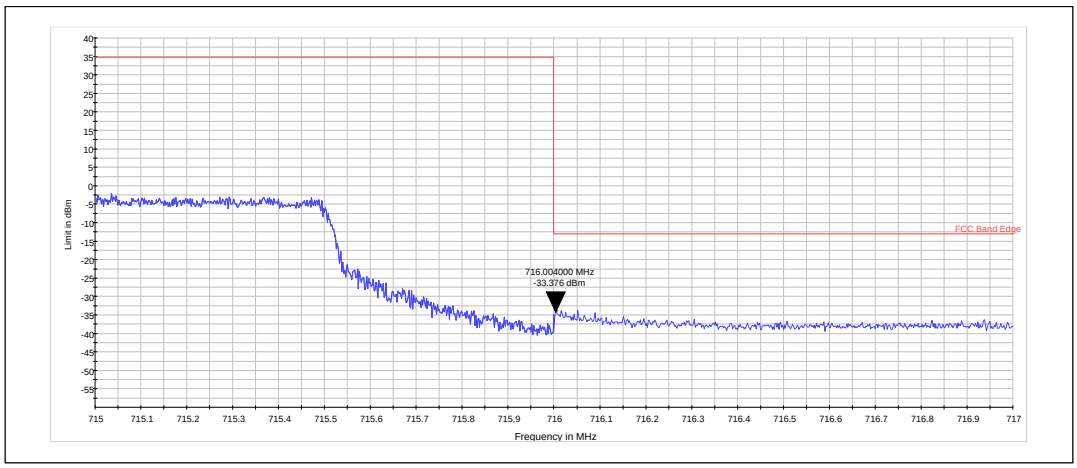
Channel 23780 / 709 MHz



RMS detector

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	703.997	-31.44	PASSED

Channel 23800 / 711 MHz



RMS detector

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, 16QAM, 50 RB	716.004	-33.38	PASSED

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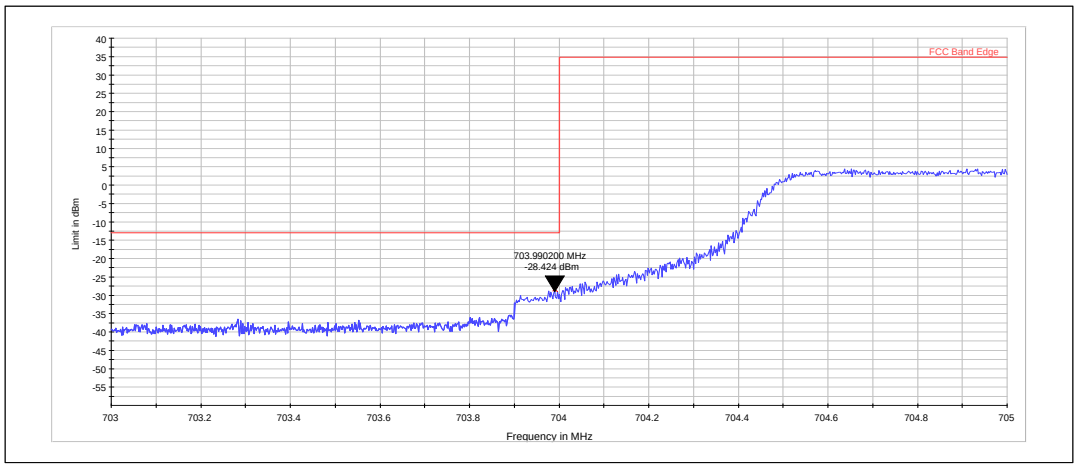
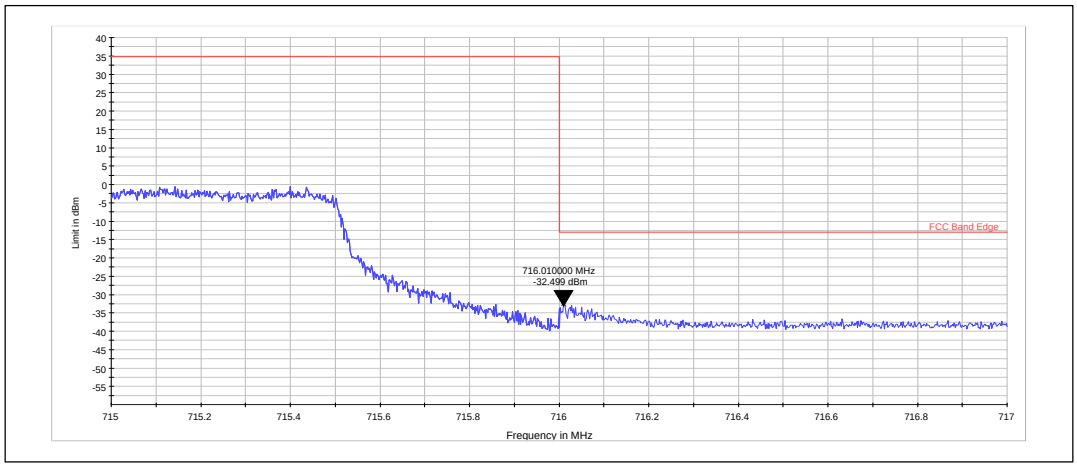
Channel 23780 / 709 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	703.990	-28.42	PASSED

Channel 23800 / 711 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 10MHz, QPSK, 50 RB	716.010	-32.50	PASSED

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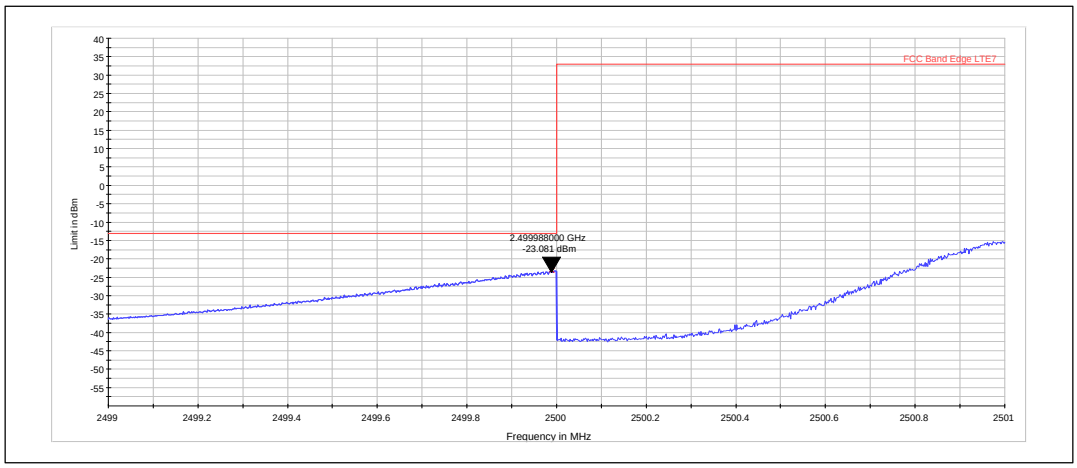
3.11. LTE 2500 (Band 7) Test results

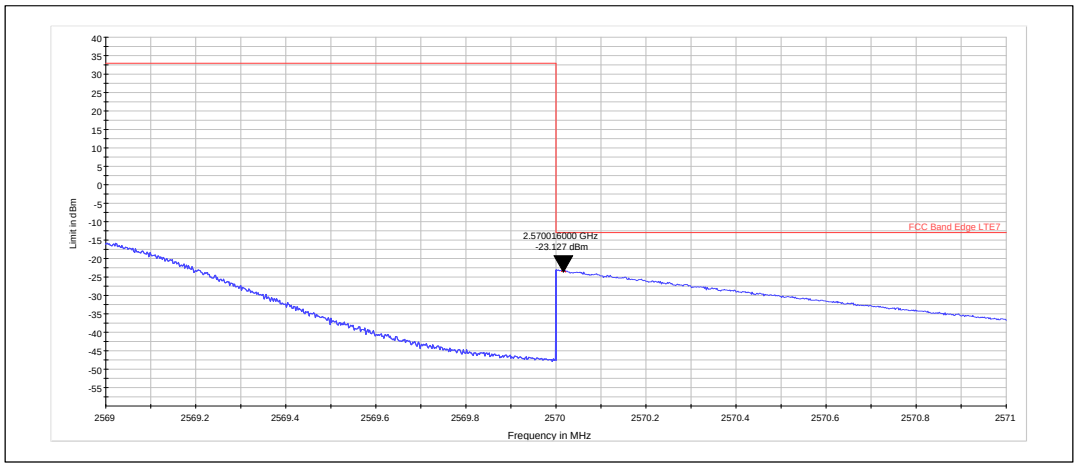
Channel 20850 / 2510 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	2499.988	-23.08	PASSED

Channel 21350 / 2560 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, QPSK, 100 RB	2570.016	-23.13	PASSED

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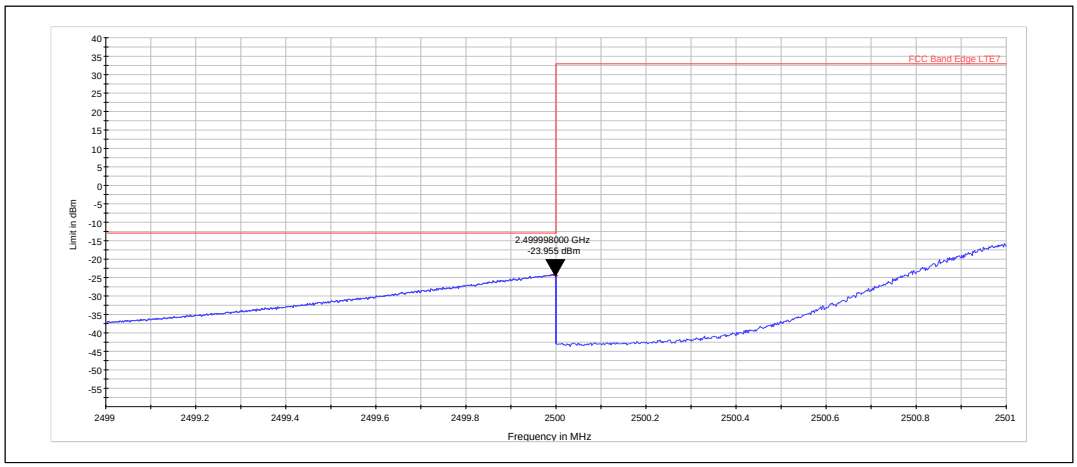
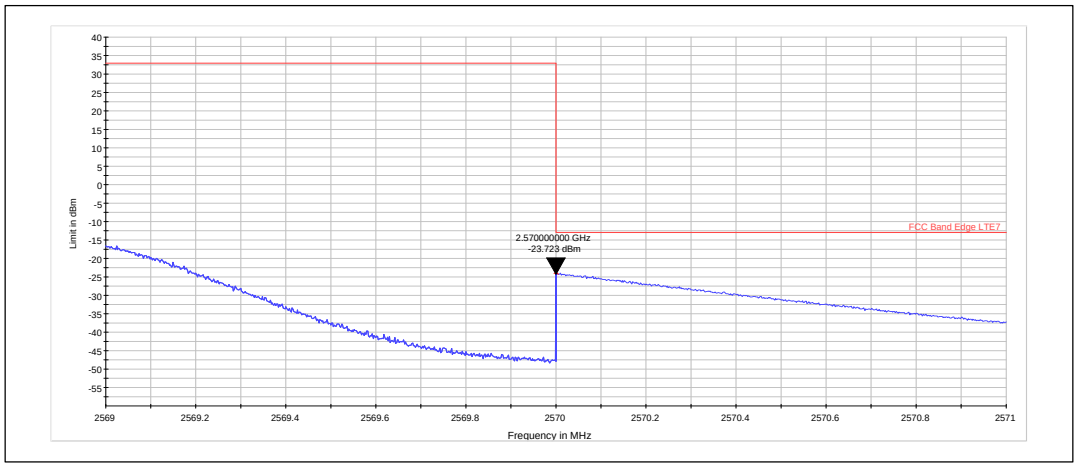
Channel 20850 / 2510 MHz



RMS detector, Max hold

Operation mode (TX on)	Frequency [MHz]	Level [dBm]	Result
FDD, CBW 20MHz, 16QAM, 100 RB	2499.998	-23.96	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	-23.72	PASSED

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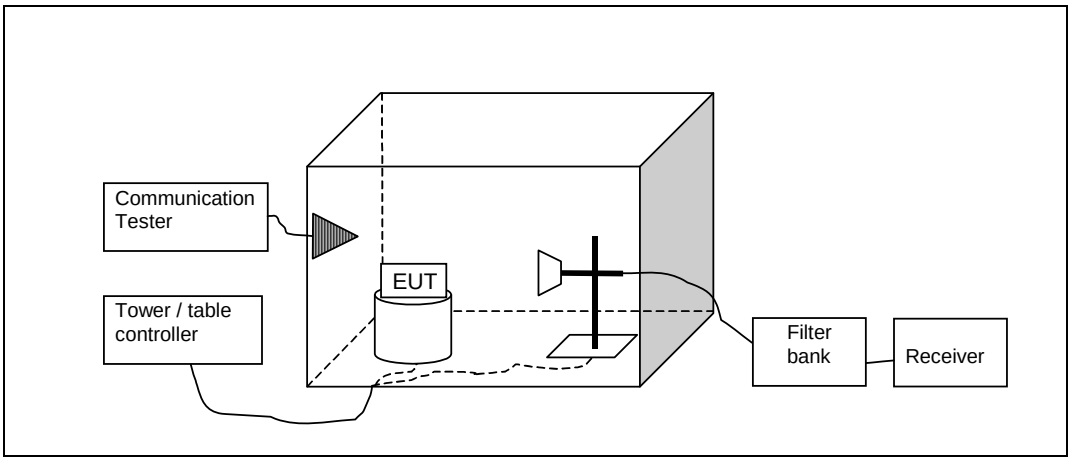
4. Spurious radiated emissions

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

EUT with DUT number	RM-983, DUT 18569
Accessories with DUT numbers	BV-L4A, DUT 18427 ; WH-208, DUT 18428 ; AC-60E, DUT 18217 ; CA-190CD, DUT 18219
Operation Voltage [V] / [Hz]	115 / 60
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 40 / 101.9
Date of measurements	21-Jul-2014
Measured by	Sami Lehtonen / Kari Salminen / Ville-Matti Mannermaa

4.1.1 Test setup



4.2. 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.

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The substitution method is used.

The measurement results are obtained as described below:

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

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

Limits for spurious radiated emissions measurements

Operation band	Frequency range [MHz]	Limit [dBm]
GSM 850	30 - 8500	-13
GSM 1900	30 - 19100	-13
WCDMA 1900	30 - 19100	-13
LTE1900 (Band 2)	30 - 19100	-13
LTE1700 (Band 4)	30 - 17500	-13
LTE850 (Band 5)	30 - 8500	-13
LTE2500 (Band 7)	30 - 25700	-13
LTE700 Lower (Band 17)	30 - 7200	-13 (RBW = 100 kHz, ERP)

4.3. GSM 850 test results

Peak detector

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
1647.174	-56.89	0.00205	-62.79	5.9	HORIZONTAL	PASSED
1673.026	-50.06	0.00986	-56.46	6.4	VERTICAL	PASSED
1673.267	-44.46	0.03581	-49.86	5.4	HORIZONTAL	PASSED
2509.659	-45.1	0.0309	-57.1	12	HORIZONTAL	PASSED
2509.739	-45.06	0.03119	-57.06	12	HORIZONTAL	PASSED
3302.244	-59.34	0.00116	-62.94	3.6	HORIZONTAL	PASSED

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

Peak detector

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
1673.18	-50.91	0.00811	-56.31	5.4	HORIZONTAL	PASSED
2509.86	-51.3	0.00741	-63.3	12	HORIZONTAL	PASSED

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4.5. GSM 1900 test results

Peak detector

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
8869.299	-46.22	0.02388	-65.62	19.4	HORIZONTAL	PASSED
9462.926	-45.13	0.03069	-66.43	21.3	VERTICAL	PASSED
9533.627	-42.91	0.05117	-65.21	22.3	VERTICAL	PASSED
9726.493	-43.58	0.04385	-65.88	22.3	VERTICAL	PASSED
9899.038	-43.05	0.04955	-65.95	22.9	VERTICAL	PASSED
9941.813	-43.46	0.04508	-65.66	22.2	VERTICAL	PASSED

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

Peak detector

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
3760.06	-56	0.00251	-62.5	6.5	HORIZONTAL	PASSED
5636.934	-51.71	0.00675	-62.01	10.3	VERTICAL	PASSED

4.7. WCDMA 1900 test results

Channel 9400 / 1880.0 MHz

FDD mode, Peak detector

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
3761.263	-54.14	0.00385	-60.64	6.5	VERTICAL	PASSED
5635.05	-51.71	0.00675	-62.01	10.3	VERTICAL	PASSED
7511.563	-47.41	0.01816	-63.71	16.3	VERTICAL	PASSED
8920.301	-44.41	0.03622	-64.71	20.3	VERTICAL	PASSED
9355.731	-43.53	0.04436	-64.93	21.4	VERTICAL	PASSED
9395.371	-43.99	0.0399	-65.39	21.4	HORIZONTAL	PASSED
9550.762	-43.35	0.04624	-65.75	22.4	HORIZONTAL	PASSED
9757.295	-43.15	0.04842	-65.35	22.2	VERTICAL	PASSED
9841.663	-43.73	0.04236	-65.53	21.8	HORIZONTAL	PASSED
9918.818	-41.54	0.07015	-63.94	22.4	HORIZONTAL	PASSED
11280.541	-41.37	0.07295	-64.87	23.5	VERTICAL	PASSED
13154.609	-51.52	0.00705	-68.42	16.9	HORIZONTAL	PASSED
15043.387	-49.4	0.01148	-71.4	22	VERTICAL	PASSED
16917.295	-46.76	0.02109	-72.16	25.4	VERTICAL	PASSED

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4.8. LTE1900 (Band 2) test results

Channel 18900 / 1880.0 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
3760.421	-61.08	0.00078	-67.58	6.5	HORIZONTAL	PASSED
5649.319	-61.94	0.00064	-72.44	10.5	VERTICAL	PASSED
7511.643	-58.95	0.00127	-74.95	16	HORIZONTAL	PASSED

Channel 18900 / 1880.0 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
3760.18	-61.56	0.0007	-68.06	6.5	HORIZONTAL	PASSED
5630.762	-61.28	0.00074	-71.68	10.4	VERTICAL	PASSED
7527.595	-59.13	0.00122	-74.93	15.8	HORIZONTAL	PASSED

4.9. LTE1700 (Band 4) test results

Channel 20175 / 1732.5 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
3465.421	-61.47	0.00071	-67.17	5.7	VERTICAL	PASSED
5198.001	-58.23	0.0015	-68.43	10.2	HORIZONTAL	PASSED
6930.341	-58.1	0.00155	-71.9	13.8	HORIZONTAL	PASSED
8667.971	-57.11	0.00195	-76.11	19	HORIZONTAL	PASSED
10393.778	-53.77	0.0042	-76.07	22.3	VERTICAL	PASSED

Channel 20175 / 1732.5 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
3465.381	-61.92	0.00064	-67.62	5.7	VERTICAL	PASSED
5198.001	-57.57	0.00175	-67.77	10.2	HORIZONTAL	PASSED
6930.381	-58.1	0.00155	-71.9	13.8	HORIZONTAL	PASSED
8669.775	-57.06	0.00197	-76.16	19.1	HORIZONTAL	PASSED
10387.325	-53.71	0.00426	-76.11	22.4	VERTICAL	PASSED

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4.10. LTE850 (Band 5) 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
820.191	-56.52	0.00223	-93.02	36.5	HORIZONTAL	PASSED
849.502	-58.67	0.00136	-93.07	34.4	HORIZONTAL	PASSED
881.531	-52.95	0.00507	-88.55	35.6	HORIZONTAL	PASSED
956.331	-50.61	0.00869	-90.51	39.9	HORIZONTAL	PASSED
1673.381	-56.19	0.0024	-61.59	5.4	HORIZONTAL	PASSED
2510.121	-62.33	0.00058	-74.23	11.9	HORIZONTAL	PASSED
3346.862	-74.33	4E-05	-77.93	3.6	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
853.49	-58.78	0.00132	-92.98	34.2	HORIZONTAL	PASSED
880.822	-52.92	0.00511	-88.62	35.7	HORIZONTAL	PASSED
958.118	-50.42	0.00908	-90.52	40.1	HORIZONTAL	PASSED
1673.421	-57.35	0.00184	-62.75	5.4	HORIZONTAL	PASSED
2509.961	-62.32	0.00059	-74.22	11.9	HORIZONTAL	PASSED
3346.862	-73.83	4E-05	-77.43	3.6	HORIZONTAL	PASSED

4.11. LTE 2500 (Band 7) test results

Channel 21100 / 2535.0 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
5070.421	-60.57	0.00088	-70.77	10.2	HORIZONTAL	PASSED
7601.493	-58.42	0.00144	-74.32	15.9	HORIZONTAL	PASSED
10149.559	-53.92	0.00406	-76.12	22.2	VERTICAL	PASSED

Channel 21100 / 2535.0 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
5070.421	-59.52	0.00112	-69.72	10.2	HORIZONTAL	PASSED
7609.429	-58.97	0.00127	-74.57	15.6	VERTICAL	PASSED
10149.92	-53.93	0.00405	-76.13	22.2	VERTICAL	PASSED

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4.12. LTE700 Lower (Band 17) test results

Channel 23790 / 710 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
1420.341	-53.32	0.00466	-57.82	4.5	HORIZONTAL	PASSED
2130.541	-71.42	7E-05	-81.02	9.6	HORIZONTAL	PASSED
2844.87	-68.68	0.00014	-82.58	13.9	VERTICAL	PASSED

Channel 23790 / 710 MHz

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

Frequency [MHz]	P [dBm]	P [µW]	P_{MEAS} [dBm]	A_{TOT} [dB]	Polarisation	Results
1420.381	-53.27	0.00471	-57.77	4.5	HORIZONTAL	PASSED
2130.301	-72.17	6E-05	-81.77	9.6	HORIZONTAL	PASSED
2840.782	-67.02	0.0002	-81.02	14	HORIZONTAL	PASSED

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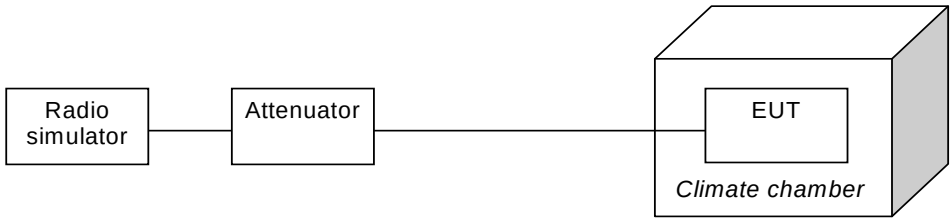
5. Frequency stability, temperature variation

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

EUT with DUT number	RM-983, DUT 18434
Accessories with DUT numbers	SD-224R, DUT 18437 ; WH-208, DUT 18431
Operation Voltage [V] / [Hz]	Nominal
Results	PASSED
Remarks	-
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	21 / 40 / 101.4
Date of measurements	26-Jun-2014
Measured by	Tomi Lipponen

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

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5.3. GSM 1900 Test results

GSM, Channel 661 / 1880.0 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	1880.00	47.14000	0.0251	PASSED
40	1880.00	50.56000	0.0269	PASSED
30	1880.00	50.30000	0.0268	PASSED
20	1880.00	46.30000	0.0246	PASSED
10	1880.00	48.69000	0.0259	PASSED
0	1880.00	45.33000	0.0241	PASSED
-10	1880.00	48.75000	0.0259	PASSED
-20	1880.00	41.46000	0.0221	PASSED
-30	1880.00	51.72000	0.0275	PASSED

5.4. GSM 850 Test results

GSM, Channel 190 / 836.6 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	836.60	8.72000	0.0104	PASSED
40	836.60	7.36000	0.0088	PASSED
30	836.60	7.17000	0.0086	PASSED
20	836.60	3.94000	0.0047	PASSED
10	836.60	1.87000	0.0022	PASSED
0	836.60	1.49000	0.0018	PASSED
-10	836.60	0.13000	0.0002	PASSED
-20	836.60	1.81000	0.0022	PASSED
-30	836.60	-1.16000	-0.0014	PASSED

5.5. WCDMA 1900 Test results

FDD, Channel 9400 / 1880.0 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	1880.00	7.61414	0.004	PASSED
40	1880.00	3.15857	0.0017	PASSED
30	1880.00	-1.20544	-0.0006	PASSED
20	1880.00	5.67627	0.003	PASSED
10	1880.00	2.80762	0.0015	PASSED
0	1880.00	1.80054	0.001	PASSED
-10	1880.00	3.69263	0.002	PASSED
-20	1880.00	10.57434	0.0056	PASSED
-31	1880.00	7.08008	0.0038	PASSED

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5.6. WCDMA 850 Test results

FDD, Channel 4175 / 835.0 MHz

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	835.00	1.48010	0.0018	PASSED
40	835.00	0.07629	0.0001	PASSED
30	835.00	2.80762	0.0034	PASSED
20	835.00	-5.17273	-0.0062	PASSED
10	835.00	-5.82886	-0.007	PASSED
0	835.00	0.07629	0.0001	PASSED
-10	835.00	-1.96838	-0.0024	PASSED
-20	835.00	-0.24414	-0.0003	PASSED
-30	835.00	6.04248	0.0072	PASSED

5.7. LTE1900 (Band 2) Test results

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

Temperature [°C]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	1880.00	-0.67234	-0.0004	PASSED
40	1880.00	-2.48909	-0.0013	PASSED
30	1880.00	-1.64509	-0.0009	PASSED
20	1880.00	-2.63214	-0.0014	PASSED
10	1880.00	-2.26021	-0.0012	PASSED
0	1880.00	0.18597	0.0001	PASSED
-10	1880.00	-2.37465	-0.0013	PASSED
-20	1880.00	-2.67506	-0.0014	PASSED
-30	1880.00	-3.41892	-0.0018	PASSED

5.8. LTE1700 (Band 4) 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	-0.82970	-0.0005	PASSED
40	1732.50	-2.41756	-0.0014	PASSED
30	1732.50	-2.31743	-0.0013	PASSED
20	1732.50	-0.42915	-0.0002	PASSED
10	1732.50	-0.61512	-0.0004	PASSED
0	1732.50	-1.24455	-0.0007	PASSED
-10	1732.50	-0.37193	-0.0002	PASSED
-20	1732.50	-1.18733	-0.0007	PASSED
-30	1732.50	-1.17302	-0.0007	PASSED

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5.9. LTE850 (Band 5) Test results

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

Temperature [ºC]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	836.50	-2.01702	-0.0024	PASSED
40	836.50	-1.71661	-0.0021	PASSED
30	836.50	-1.25885	-0.0015	PASSED
20	836.50	0.17166	0.0002	PASSED
10	836.50	-0.64373	-0.0008	PASSED
0	836.50	-1.04427	-0.0012	PASSED
-10	836.50	-0.52929	-0.0006	PASSED
-20	836.50	-0.05722	-0.0001	PASSED
-30	836.50	-0.65804	-0.0008	PASSED

5.10. LTE2500 (Band 7) Test results

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

Temperature [ºC]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	2535.00	1.88828	0.0007	PASSED
40	2535.00	4.50611	0.0018	PASSED
30	2535.00	0.14305	0.0001	PASSED
20	2535.00	2.74658	0.0011	PASSED
10	2535.00	1.77383	0.0007	PASSED
0	2535.00	3.87669	0.0015	PASSED
-10	2535.00	-1.35899	-0.0005	PASSED
-20	2535.00	0.74387	0.0003	PASSED
-30	2535.00	4.70638	0.0019	PASSED

5.11. LTE700 Lower (Band 17) Test results

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

Temperature [ºC]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
50	710.00	-0.01431	0	PASSED
40	710.00	0.37193	0.0005	PASSED
30	710.00	0.52929	0.0007	PASSED
20	710.00	1.54495	0.0022	PASSED
10	710.00	0.81539	0.0012	PASSED
0	710.00	0.32902	0.0005	PASSED
-10	710.00	0.35763	0.0005	PASSED
-20	710.00	0.75817	0.0011	PASSED
-30	710.00	1.75953	0.0025	PASSED

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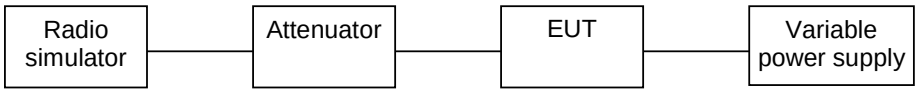
6. Frequency stability, voltage variation

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

EUT with DUT number	RM-983, DUT 18434
Accessories with DUT numbers	SD-224R, DUT 18437 ; WH-208, DUT 18431
Operation Voltage [V] / [Hz]	
Results	
Remarks	
Temp [°C] / Humidity [%RH] / Air Pressure [kPa]	
Date of measurements	26-Jun-2014
Measured by	Tomi Lipponen

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

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6.3. GSM 1900 Test results

GSM,

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	1880.00	45.01000	0.0239	PASSED
Battery cut-off point / 3.6	1880.00	52.24000	0.0278	PASSED
Nominal / 3.8	1880.00	46.30000	0.0246	PASSED

6.4. GSM 850 Test results

GSM,

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	836.60	-2.07000	-0.0025	PASSED
Battery cut-off point / 3.6	836.60	3.55000	0.0042	PASSED
Nominal / 3.8	836.60	0.39000	0.0005	PASSED

6.5. WCDMA 1900 Test results

FDD,

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	1880.00	-2.71606	-0.0014	PASSED
Battery cut-off point / 3.6	1880.00	4.85230	0.0026	PASSED
Nominal / 3.8	1880.00	2.67029	0.0014	PASSED

6.6. WCDMA 850 Test results

FDD,

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	835.00	1.19019	0.0014	PASSED
Battery cut-off point / 3.6	835.00	2.44141	0.0029	PASSED
Nominal / 3.8	835.00	-0.19836	-0.0002	PASSED

6.7. LTE1900 (Band 2) Test results

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

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	1880.00	-0.44346	-0.0002	PASSED
Battery cut-off point / 3.6	1880.00	-3.20435	-0.0017	PASSED
Nominal / 3.8	1880.00	-2.91824	-0.0016	PASSED

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6.8. LTE1700 (Band 4) Test results

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

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	1732.50	-1.93119	-0.0011	PASSED
Battery cut-off point / 3.6	1732.50	-3.86238	-0.0022	PASSED
Nominal / 3.8	1732.50	-2.03133	-0.0012	PASSED

6.9. LTE850 (Band 5) Test results

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

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	836.50	-1.43051	-0.0017	PASSED
Battery cut-off point / 3.6	836.50	-1.21594	-0.0015	PASSED
Nominal / 3.8	836.50	0.34332	0.0004	PASSED

6.10. LTE2500 (Band 7) Test results

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

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	2535.00	2.24590	0.0009	PASSED
Battery cut-off point / 3.6	2535.00	3.43323	0.0014	PASSED
Nominal / 3.8	2535.00	-6.10828	-0.0024	PASSED

6.11. LTE700 Lower (Band 17) Test results

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

Voltage level [V]	Frequency [MHz]	Deviation [Hz]	Deviation [ppm]	Result
Max / 4.2	710.00	-0.10014	-0.0001	PASSED
Battery cut-off point / 3.6	710.00	0.12875	0.0002	PASSED
Nominal / 3.8	710.00	-0.97275	-0.0014	PASSED

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7. Test Equipment

7.1. Conducted measurements

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

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7.2. 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
6117	Open switch and control unit	OSP 150	R&S	22/24/27, 15C 15B
6131	Notch Filter	WRCT902.4-0.4/40-8SS	Wainwright	22/24/27, 15C 15B
6130	Notch Filter	WRCD1880-1.1.25/50-10SS	Wainwright	22/24/27
6159	Band Reject Filter	WRCD1747.8-0.4/40-5SS	Wainwright	22/24/27,15C, 15B
6158	Band Reject Filter	WRCT836.6-0.4/40-8SS	Wainwright	22/24/27,15C, 15B
6197	Band Reject Filter	WRCJV2531/2539-2523/2547-60/12SS	Wainwright	22/24/27,15C, 15B
2231	Band Reject Filter	WRCG1947/1953-1940/1960-40/6SS	Wainwright	22/24/27,15C, 15B
2391	Band Reject Filter	WRCG1729.4/1735.4-1722.4/1742.4-40/6SS	Wainwright	27
2386	Band Reject Filter	WRCG1764.4/1770.4-1760.4/1774.4-40/6SS	Wainwright	22/24/27, 15C, 15B
2385	Band Reject Filter	WRCG1744.4/1750.4-1740.4/1754.4-40/6SS	Wainwright	22/24/27, 15C, 15B
2357	Band Reject Filter	WRCG2400/2483-2390/2493-35/10SS	Wainwright	15C
2188	Preamplifier	AFS4-00100300-20-23P-6	Miteq	22/24/27, 15C, 15B
6195	High Pass Filter	-	Wainwright	22/24/27, 15C, 15B
2364	Band Reject Filter	WRCG1877/1883 - 1870/1890-40/6SS	Wainwright	24
2361	Anechoic Chamber	3 m Semi / Full Anechoic Chamber	Euroshield	22/24/27, 15C, 15B
6212	Antenna Array system	-	TCC	22/24/27, 15C, 15B
-	RF immunity / Emission Software	EMC32	R&S	22/24/27, 15C, 15B
6089	Antenna	HFH2-Z2	R&S	15C, 15B
2027	CDN	M2 (modified) DC1	MEB	22/24/27, 15C, 15B
2028	CDN	M3 (modified) DC2	MEB	22/24/27, 15C, 15B
2176	CDN	CDN 801-M3	Lüthi	22/24/27, 15C, 15B
2135	CDN	CDN 801-M3	Lüthi	22/24/27, 15C, 15B
2029	Power Supply	PL330	Thurlby	22/24/27, 15C
6038	Data Logger	Testo 580	Testo	22/24/27, 15C, 15B
6037	Data Logger	175-H2	Testo	22/24/27, 15C, 15B
6039	USB Interface	5541765	Testo	22/24/27, 15C, 15B

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