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FCC TEST REPORT

FCC 47 CFR Part 27

MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

ISED RSS-130, Issue 1

Mobile Broadband Services (MBS) Equipment Operating in the Frequency Bands 698-756 MHz and 777-787 MHz

ISED RSS-139, Issue 3

Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1780 MHz and 2110-2180 MHz

Report Reference No. ..... :	G0M-1607-5773-TFC227UL-V02
Testing Laboratory ..... :	Eurofins Product Service GmbH
Address ..... :	Storkower Str. 38c 15526 Reichenwalde Germany
Accreditation ..... :	A2LA Accredited Testing Laboratory, Certificate No.: 1983.01 DAkkS - Registration number : D-PL-12092-01-02 ISED OATS Filing assigned code: 3470A
Applicant's name ..... :	FALCOM GmbH
Address ..... :	Gewerbering 6 98704 Langewiesen GERMANY
Test specification:	
Standard..... :	FCC Part 27 RSS-130, Issue 1 : 2013-10, RSS-139, Issue 3 : 2015-07 RSS-Gen, Issue 4, 2014-11
Test scope…….. ..... :	partial Radio compliance test
Equipment under test (EUT):	
Product description	UMTS/GSM/GPS/LTE-Device
Model No.	FOX3-4G-NA
Additional Model(s)	None
Brand Name(s)	None
Hardware version	P281_Rev03c
Firmware / Software version	3.0.4
	FCC-ID: QIXFOX3-4G-NA IC: 5383A-FOX34GNA
Test result	**Passed**

Possible test case verdicts:

- neither assessed nor tested ..... : N/N
- required by standard but not appl. to test object ..... : N/A
- required by standard but not tested ..... : N/T
- not required by standard for the test object ..... : N/R
- test object does meet the requirement ..... : P (Pass)
- test object does not meet the requirement ..... : F (Fail)

Testing:

Test Lab Temperature ..... :	20 – 23 °C	
Test Lab Humidity ..... :	32 – 38 %	
Date of receipt of test item ..... :	2016-10-05	
Date (s) of performance of tests ..... :	2016-12-13 - 2017-01-10	
Compiled by ..... :	Burkhard Pudell	
Tested by (+ signature) ..... : (Responsible for Test)	Burkhard Pudell	B. Pudell .....
Approved by (+ signature) ..... : (Deputy Head of Lab)	Toralf Jahn	T. J .....
Date of issue ..... :	2017-01-23	
Total number of pages ..... :	52	

General remarks:

The test results presented in this report relate only to the object tested.

The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.

Additional comments:

Test case selection is based on full modular approval of licensed transmitter module used by the EUT. The EUT uses a 3G/4G module with full modular approval according to FCC and ISED rules. For details about the radio module see EUT description in section 1.

Version History

Version	Issue Date	Remarks	Revised by
01	2017-01-19	Initial Release	
02	2017-01-23	Additional comments and test scope added	T. Jahn

REPORT INDEX

1 Equipment (Test item) Description

Description	UMTS/GSM/GPS/LTE-Device		
Model	FOX3-4G-NA		
Additional Model(s)	None		
Brand Name(s)	None		
Serial number	None		
Hardware version	P281_Rev03c		
Software / Firmware version	3.0.4		
PMN	TRACKING UNIT		
HVIN	FOX3-4G-NA		
FVIN	None		
HMN	None		
FCC-ID	QIXFOX3-4G-NA		
IC	5383A-FOX34GNA		
Equipment type	End product		
Equipment classification	Mobile Device (Human Body distance > 20 cm)		
Radio type	Transceiver		
Radio technology	W-CDMA / LTE		
Operating frequency range	FDD IV : TX = 1710 - 1755 MHz, RX = 2110 - 2155 MHz LTE 4 : TX = 1710 - 1755 MHz, RX = 2110 - 2155 MHz LTE 17 : TX = 704 - 716 MHz, RX = 734 - 746 MHz		
Assigned frequency band	FCC: 698 - 716 MHz & 728 - 746 MHz ISED: 698 - 756 MHz & 777 - 787 MHz FCC / ISED: 1710 - 1780 MHz & 2110 - 2180 MHz		
Main test frequencies UMTS FDD IV	F_{LOW}	CH : 1312 UL: 1712.4 MHz	CH : 1537 DL: 2112.4 MHz
	F_{MID}	CH : 1413 UL: 1732.6 MHz	CH : 1638 DL: 2132.6 MHz
	F_{HIGH}	CH : 1513 UL: 1752.6 MHz	CH : 1738 DL: 2152.6 MHz
Main test frequencies LTE FDD 4	F_{LOW}	CH : 20000 UL: 1715.0 MHz	CH : 2000 DL: 2115.0 MHz
	F_{MID}	CH : 20175 UL: 1732.5 MHz	CH : 2175 DL: 2132.5 MHz
	F_{HIGH}	CH : 20350 UL: 1750.0 MHz	CH : 2350 DL: 2150.0 MHz
Main test frequencies LTE FDD 17	F_{LOW}	CH : 23780 UL: 709.0 MHz	CH : 5780 DL: 739.0 MHz
	F_{MID}	CH : 23790 UL: 710.0 MHz	CH : 5790 DL: 740.0 MHz
	F_{HIGH}	CH : 23800 UL: 711.0 MHz	CH : 5800 DL: 741.0 MHz
Supported transmission modes	Circuit switched, Packet switched		
Modulations	HSDPA : QPSK, 16-QAM; HSUPA : BPSK LTE : QPSK, 16-QAM, 64-QAM		
Number of antennas	1x TX, 1x RX + 1x GPS		

Radio module	Type	3G/4G module
	Model	TOBY-L200
	Manufacturer	UBlox
	HW Version	192CA0
	SW Version	15.90
	FCC-ID	XPYTOBYL200
	IC	8595A-TOBYL200
Antenna	Type	external dedicated
	Model	FAL-ANT14 MA220
	Manufacturer	Taoglas
	Gain	2 dBi (manufacturer declaration)
Manufacturer	FALCOM GmbH Gewerbering 6 98704 Langewiesen GERMANY	
Power supply	V_{NOM}	12 or 24 VDC (Car Battery only)
	V_{MIN}	N/A
	V_{MIN}	N/A
AC/DC-Adaptor	Model	N/A
	Vendor	N/A
	Input	N/A
	Output	N/A

1.1 Photos – Equipment External

EUT TOP

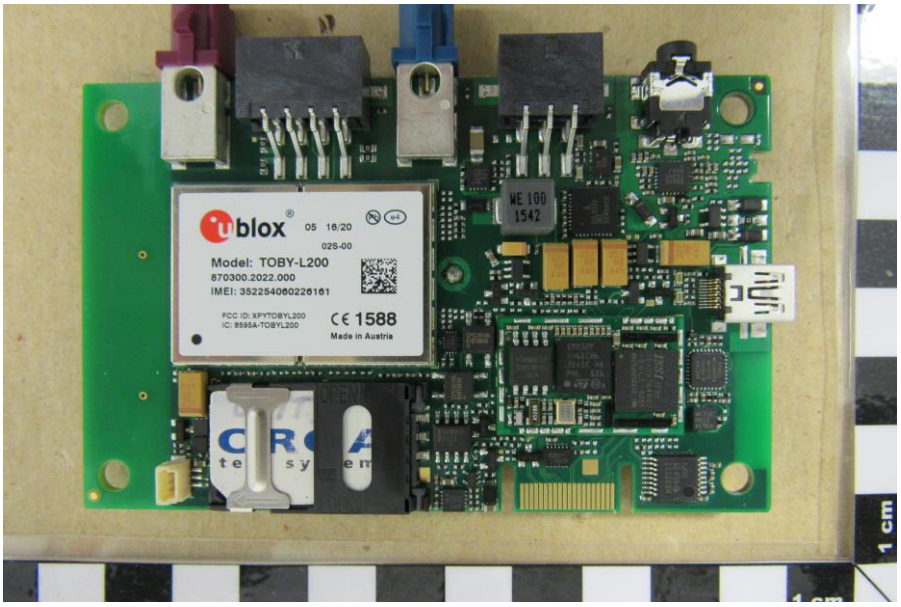

EUT BACK

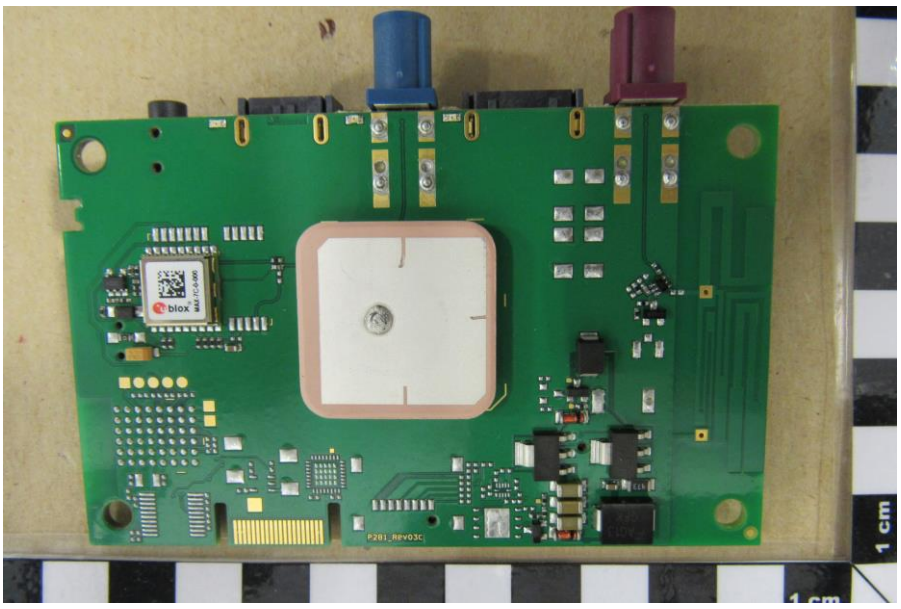

EUT INTERFACE


MULTI-BAND / GPS ANTENNA

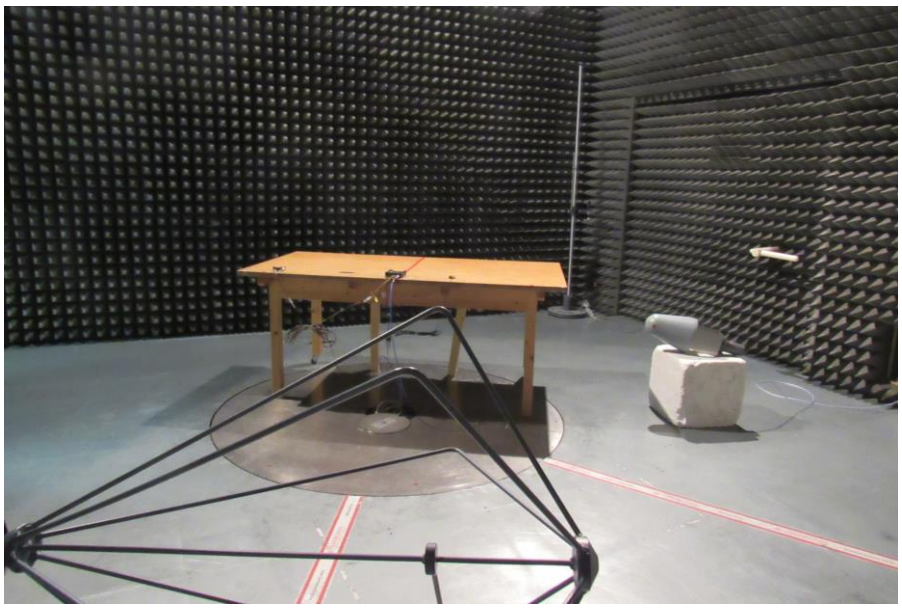

POWER CABLE


1.2 Photos – Equipment internal

EUT PCB FRONT


EUT PCB BACK


1.3 Photos – Test setup

TEST SETUP


1.4 Supporting Equipment Used During Testing

Product Type*	Device	Manufacturer	Model No.	Comments
SIM	Network	R&S	CMW500	UMTS / LTE -Tester

***Note:** Use the following abbreviations:

AE : Auxiliary/Associated Equipment, or

SIM : Simulator (Not Subjected to Test)

CABL : Connecting cables

1.5 Test Modes

Mode #	Description		
W-CDMA - CS	General conditions:	EUT powered by battery. External GSM and GPS antenna connected. Active call to communication tester.	
	Radio conditions:	Mode = transmit Connection = Circuit Switched Modulation = QPSK Configuration = RMC 12.2kbps Power level = Maximum	
W-CDMA - PS	General conditions:	EUT powered by battery. External GSM and external GPS antenna connected. Active call to communication tester.	
	Radio conditions:	Mode = transmit Connection = Packet Switched Modulation = QPSK Configuration = RMC 12.2kbps + HSPA Power level = Maximum	
LTE FDD 4	General conditions:	EUT powered by battery. External GSM and GPS antenna connected. Active call to communication tester.	
	Radio conditions:	LTE-1L	QSPK / 10MHz / RB : 1 @ low end
		LTE-1H	QSPK / 10MHz / RB : 1 @ high end
		LTE-HALF	QSPK / 10MHz / RB : 50% @ center
		LTE-FULL	QSPK / 10MHz / RB : 100%
LTE FDD 17	General conditions:	EUT powered by battery. External GSM and GPS antenna connected. Active call to communication tester.	
	Radio conditions:	LTE-1L	QSPK / 10MHz / RB : 1 @ low end
		LTE-1H	QSPK / 10MHz / RB : 1 @ high end
		LTE-HALF	QSPK / 10MHz / RB : 50% @ center
		LTE-FULL	QSPK / 10MHz / RB : 100%
W-CDMA - RX	General conditions:	EUT powered by battery. Internal GSM and external GPS antenna connected.	
	Radio conditions:	Mode = receive Connection = Sign. RAB Cell FACH	
LTE FDD - RX	General conditions:	EUT powered by battery. Internal GSM and external GPS antenna connected.	
	Radio conditions:	Mode = receive Connection = RMC Modulation = QPSK BW10 RB allocation = 0 up / 0 down	

1.6 Test Equipment Used During Testing

Measurement Software			
Description	Manufacturer	Name	Version
EMC Test Software	Dare Instruments	Radimation	2015.2.4

Occupied Bandwidth					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSIQ 26	EF00242	2016-04	2017-04

Radiated power					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Fully-anechoic chamber	Frankonia	AC 3	EF00199	functional test	functional test
Spectrum Analyzer	R&S	FSIQ 26	EF00242	2016-04	2017-04
LPD Antenna	R&S	HL 223	EF00187	2016-05	2019-05
Horn Antenna	R&S	BBHA 9120D	EF01153	2016-07	2017-07

Radiated spurious emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Semi-anechoic chamber	Frankonia	AC 1	EF00062	2016-01	2019-01
Spectrum Analyzer	R&S	FSEK 30	EF00168	2016-12	2017-12
Biconical Antenna	R&S	HK 116	EF00012	2016-05	2019-05
LPD Antenna	R&S	HL 223	EF00212	2016-04	2019-04
LPD Antenna	R&S	HL 025	EF00327	2015-10	2018-10

1.7 Sample emission level calculation

The following is a description of terms and a sample calculation, as appears in the radiated emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

Reading:

This is the reading obtained on the spectrum analyzer in dBµV. Any external preamplifiers used are taken into account through internal analyzer settings.

A.F.:

This is the antenna factor for the receiving antenna. It is a conversion factor, which converts electric fields strengths to voltages, which can be measured directly on the spectrum analyzer. It is treated as a loss in dB. Cable losses have been included with the A.F. to simplify the calculations. The antenna factor is used in calculations as follows:

Reading on Analyzer (dBµV) + A.F. (dB) = Net field strength (dBµV/m)

Net:

This is the net field strength measurement (as shown above).

Limit:

This is the FCC Class B radiated emission limit (in units of dBµV/m). The FCC limits are given in units of µV/m. The following formula is used to convert the units of µV/m to dBµV/m:

Limit (dBµV/m) = 20*log (µV/m)

Margin:

This is the margin of compliance below the FCC limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Example only:

Reading	+	AF	=	Net Reading	:	Net reading - FCC limit = Margin
21.5 dBµV	+	26 dB	=	47.5 dBµV/m	:	47.5 dBµV/m - 57.0 dBµV/m = -9.5 dB

2 Result Summary

FCC 47 CFR Part 27, ISED RSS-130, ISED RSS-139				
Product Specific Standard Section	**Requirement – Test**	**Reference Method**	**Result**	**Remarks**
FCC § 2.1049 RSS-130 3.1 RSS-139 3.1 RSS-Gen 6.6	Occupied Bandwidth	RSS-Gen 6.6 KDB 971168 ANSI C63.26-2015 5.4		Informational only
FCC § 2.1055 FCC § 27.54 ISED RSS-130 4.3 ISED RSS-139 6.4	Frequency stability	FCC § 27.54 ISED RSS-130 4.3 ISED RSS-139 6.4 KDB 971168 ANSI C63.26-2015 5.6	N/T	
FCC § 27.50 (c)(10)	Effective radiated power	ANSI/TIA-603-D KDB 971168	PASS	
FCC § 27.50 (d)(4) ISED RSS-130 4.4 ISED RSS-139 6.5	Equivalent isotropic radiated power	ANSI/TIA-603-D KDB 971168 ANSI C63.26-2015 5.2	PASS	
FCC § 27.50 (d)(5) ISED RSS-130 4.4 ISED RSS-139 6.5	Peak to average ratio	KDB 971168	N/T	
FCC § 27.53(g) FCC § 27.53(h) ISED RSS-130 4.6 ISED RSS-139 6.6	Band-edge compliance	KDB 971168	N/T	
FCC § 27.53(g) FCC § 27.53(h) ISED RSS-130 4.6 ISED RSS-139 6.6	Conducted out-of-band emissions	KDB 971168	N/T	
FCC § 27.53(g) FCC § 27.53(h) ISED RSS-130 4.6 ISED RSS-139 6.6	Radiated out-of-band emissions	ANSI/TIA-603-D KDB 971168 ANSI C63.26-2015 5.5	PASS	
RSS-130 3.1 RSS-139 3.1 ISED RSS-Gen 7.1	Receiver radiated spurious emissions	ISED RSS-Gen 7.1 ANSI C63.4	PASS	
Remarks:				

3 Test Conditions and Results

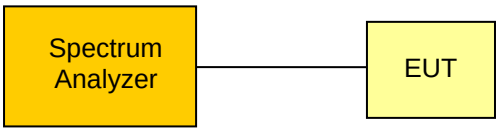
3.1 Test Conditions and Results – Occupied Bandwidth

Occupied Bandwidth acc. to FCC 2.1046, ISED RSS-130, ISED RSS-139	
Test according to measurement reference	Reference Method
	KDB 971168 / RSS-Gen 6.6 / ANSI C63.26-2015 5.4
Test frequency range	Tested frequencies
	F_{LOW} / F_{MID} / F_{HIGH}

Limits

None (Informational only)

Test setup



Test procedure

1. EUT set to test mode (Communication tester is used if needed)
2. Span set to at least twice the emission spectrum
3. Resolution bandwidth set to 1 % of span
4. Occupied Bandwidth (99 %) measurement with spectrum analyzer built in measurement function

Test results – W-CDMA IV

Channel	Frequency [MHz]	Mode	Occupied Bandwidth [MHz]
F_{LOW}	1712.4	FDD - CS	4125
F_{MID}	1732.6	FDD - CS	4125
F_{HIGH}	1752.4	FDD - CS	4135

Comments:

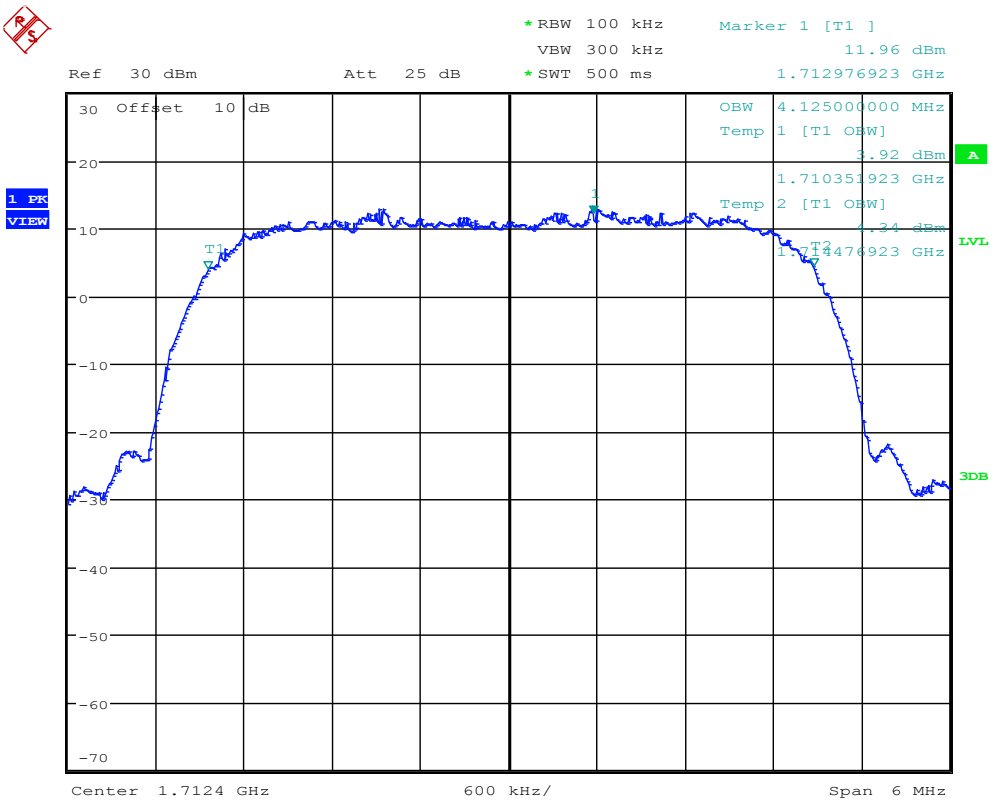
Test results – LTE FDD 4			
Channel	Frequency [MHz]	Mode	Occupied Bandwidth [MHz]
F_{LOW}	1710,7	QPSK BW1.4	1124
F_{MID}	1732,5	QPSK BW1.4	1124
F_{HIGH}	1754,3	QPSK BW1.4	1130
F_{LOW}	1711,5	QPSK BW 3	2705
F_{MID}	1732,5	QPSK BW 3	2705
F_{HIGH}	1753,5	QPSK BW 3	2705
F_{LOW}	1712,5	QPSK BW 5	4549
F_{MID}	1732,5	QPSK BW 5	4549
F_{HIGH}	1752,5	QPSK BW 5	4569
F_{LOW}	1715.0	QPSK BW 10	9138
F_{MID}	1732,5	QPSK BW 10	9138
F_{HIGH}	1750,0	QPSK BW 10	9178
F_{LOW}	1717.5	QPSK BW 15	13527
F_{MID}	1732,5	QPSK BW 15	13547
F_{HIGH}	1747,5	QPSK BW 15	13647
F_{LOW}	1720,0	QPSK BW 20	17876
F_{MID}	1732,5	QPSK BW 20	17956
F_{HIGH}	1745,0	QPSK BW 20	18116
Test results – LTE FDD 17			
Channel	Frequency [MHz]	Mode	Occupied Bandwidth [kHz]
F_{LOW}	706.5	QPSK BW 5	4549
F_{MID}	710.0	QPSK BW 5	4549
F_{HIGH}	713.5	QPSK BW 5	4569
F_{LOW}	709.0	QPSK BW 10	9098
F_{MID}	710.0	QPSK BW 10	9138
F_{HIGH}	711.0	QPSK BW 10	9138
Comments:			

Occupied Bandwidth – W-CDMA IV F_{Low}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	UMTS FDD IV / CH: 1312 / RMC
Test Date:	2017-01-09
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.125 MHz

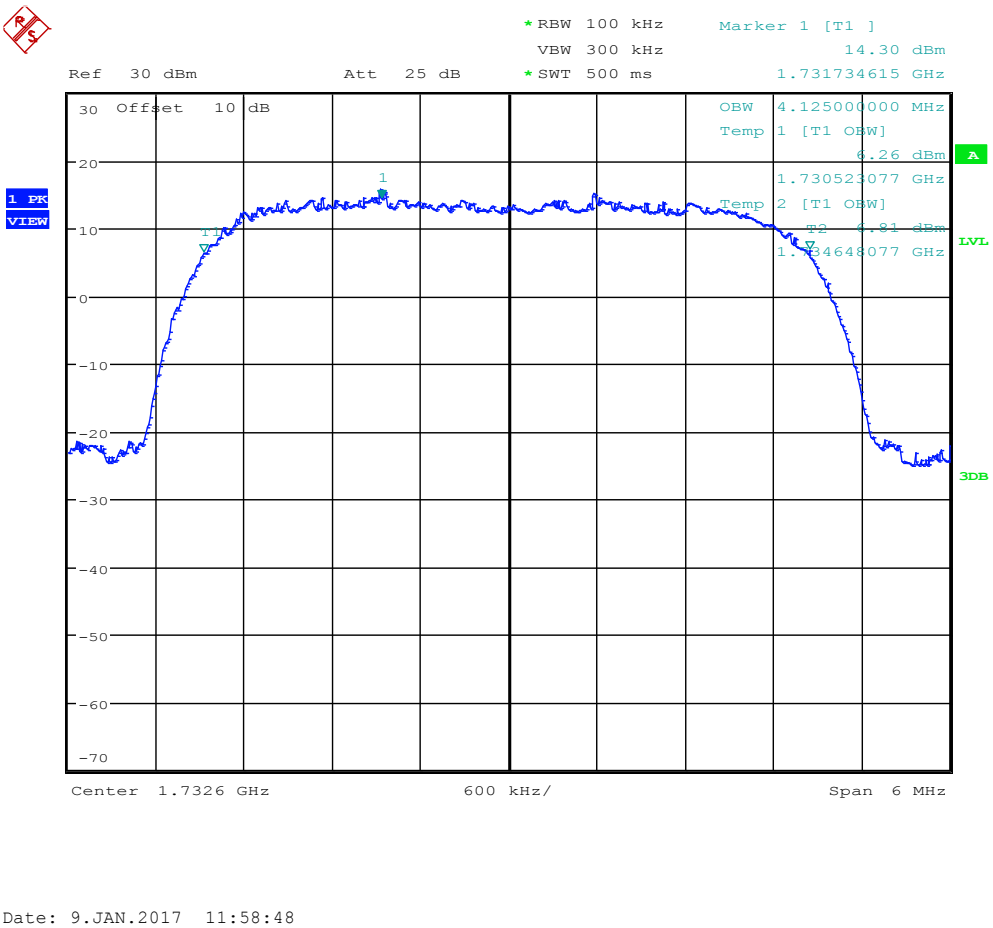


Occupied Bandwidth – W-CDMA IV F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	UMTS FDD IV / CH: 1413 / RMC
Test Date:	2017-01-09
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.125 MHz

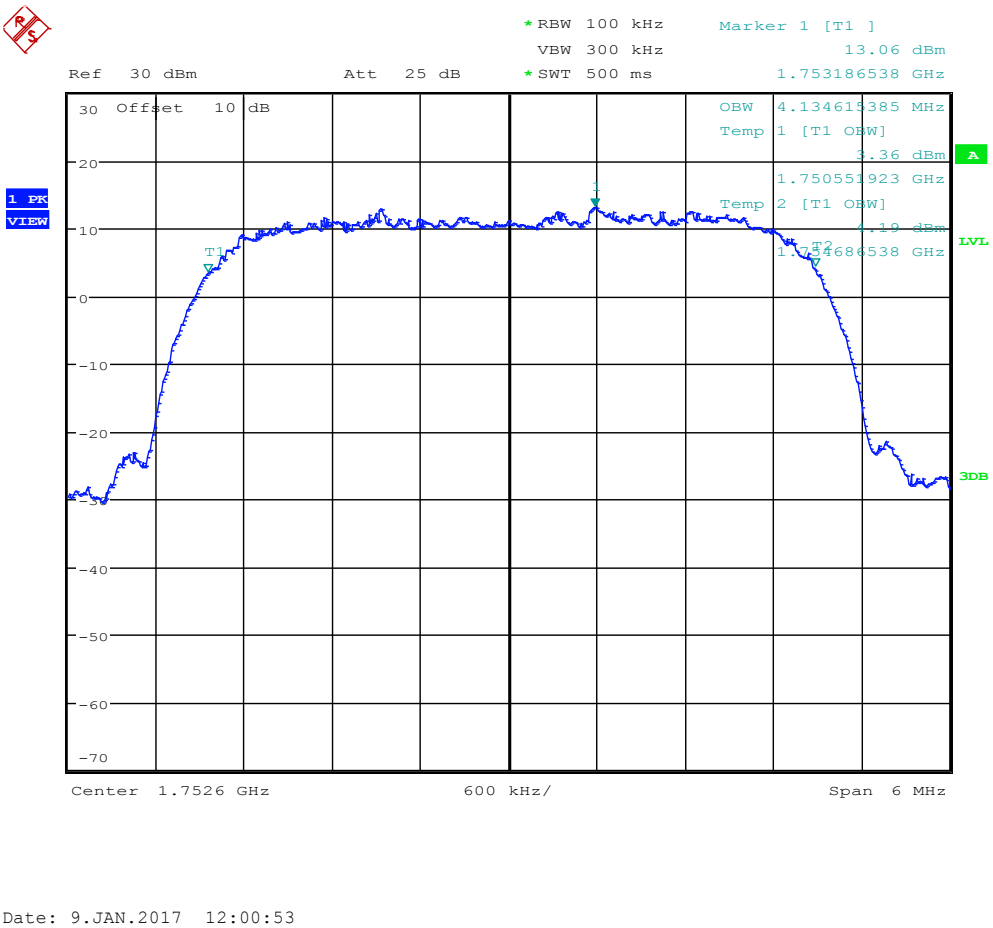


Occupied Bandwidth – W-CDMA IV F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	UMTS FDD IV / CH: 1513 / RMC
Test Date:	2017-01-09
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.135 MHz

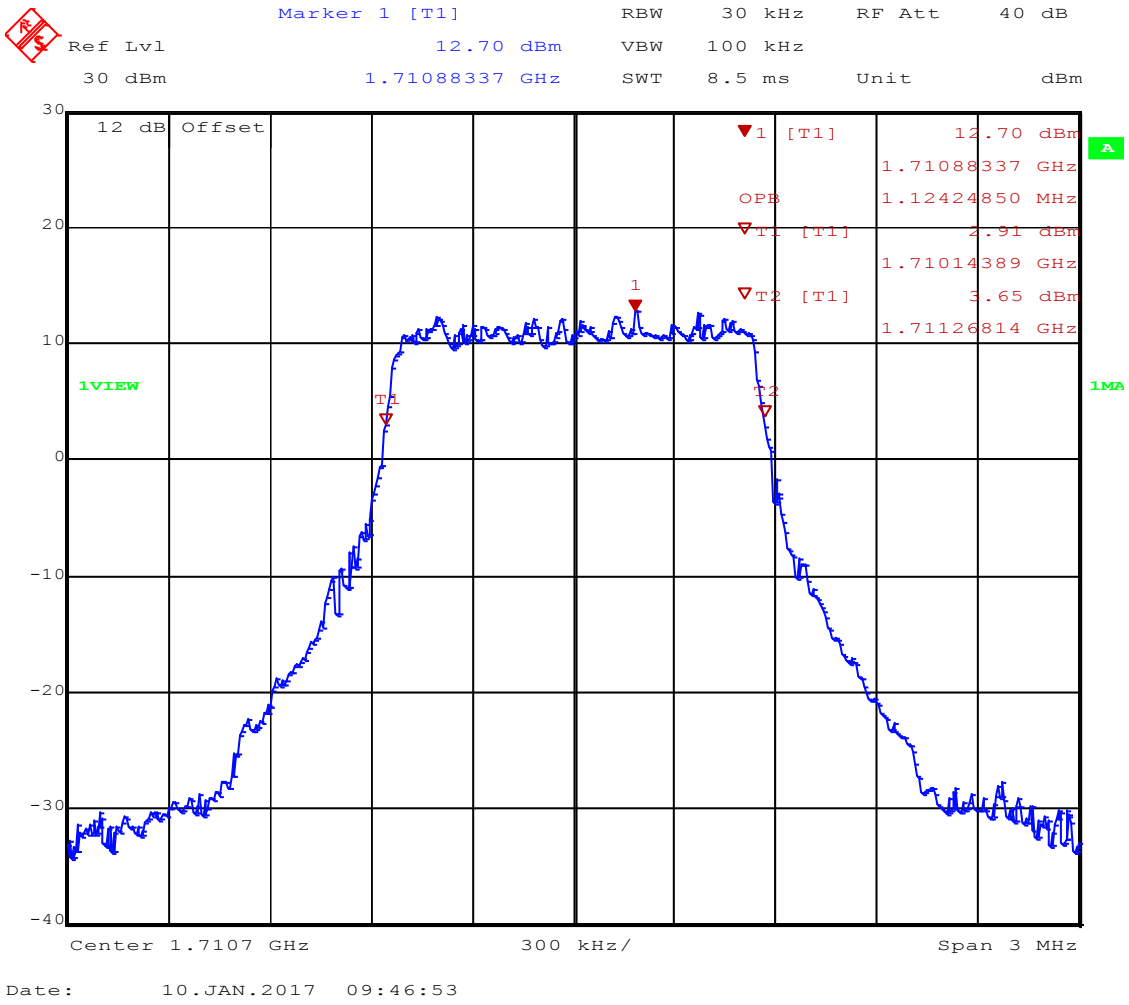


Occupied Bandwidth – LTE 4_QPSK-BW1.4 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 19193 / BW: 1.4MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 1.124 MHz

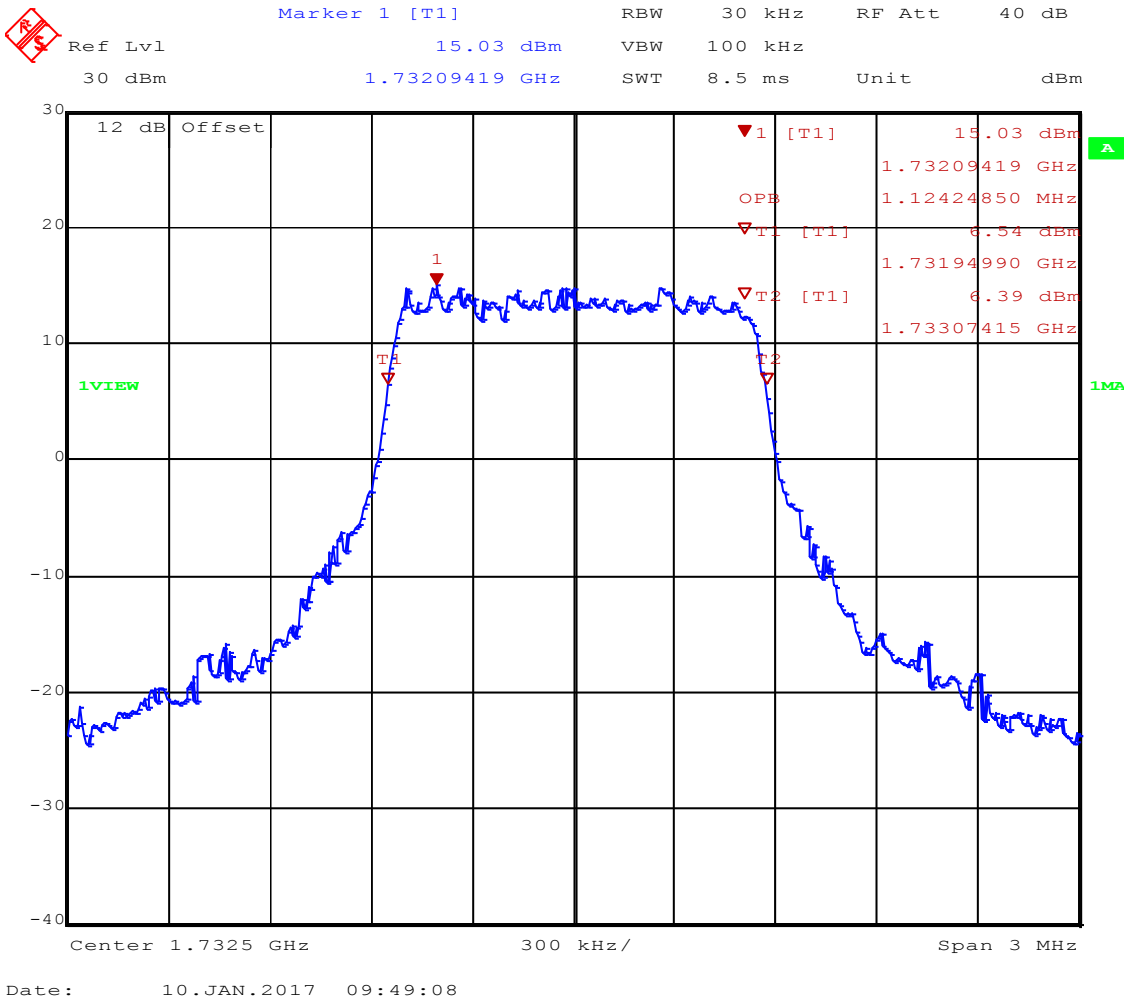


Occupied Bandwidth – LTE 4_QPSK-BW1.4 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20175 / BW: 1.4MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 1.124 MHz

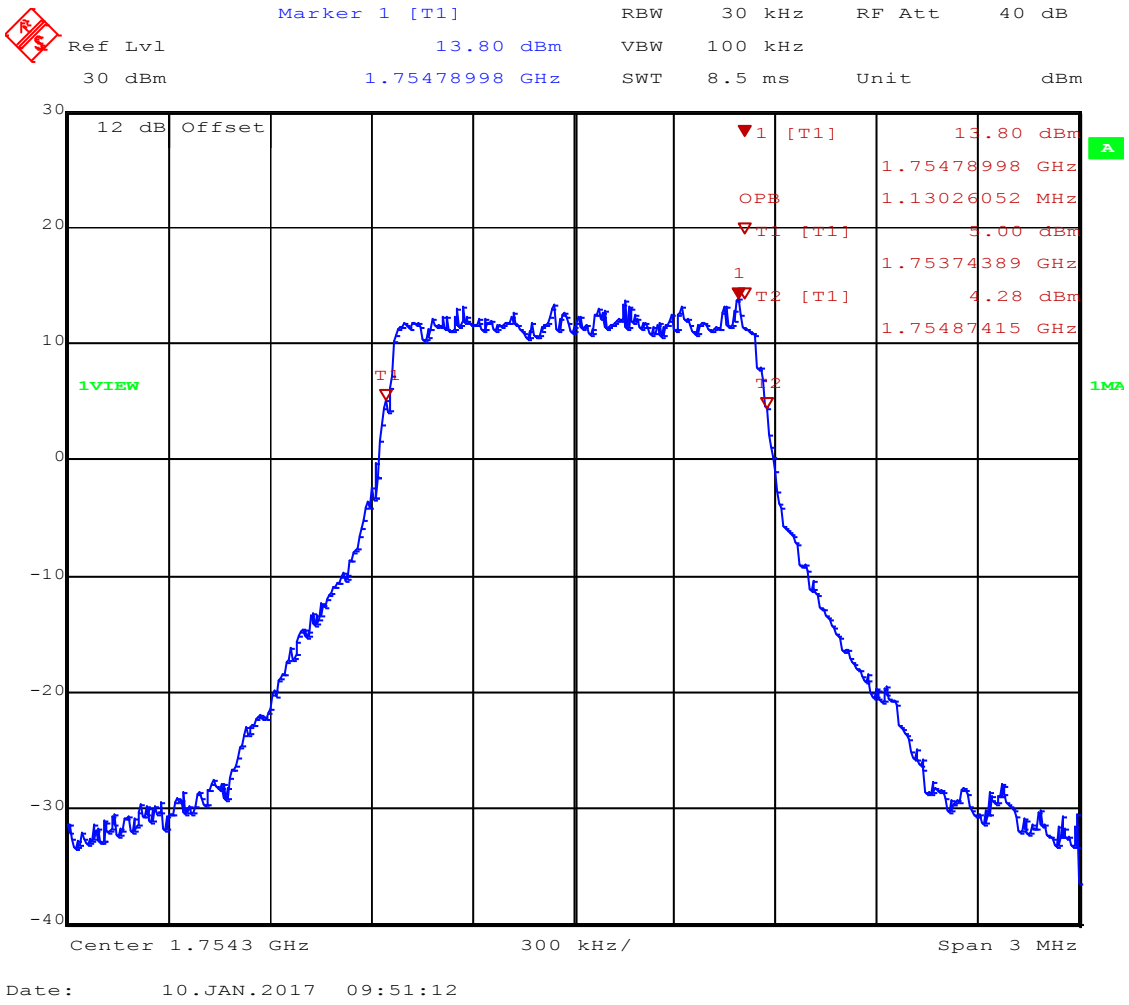


Occupied Bandwidth – LTE 4_QPSK-BW1.4 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20393 / BW: 1.4MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 1.130 MHz

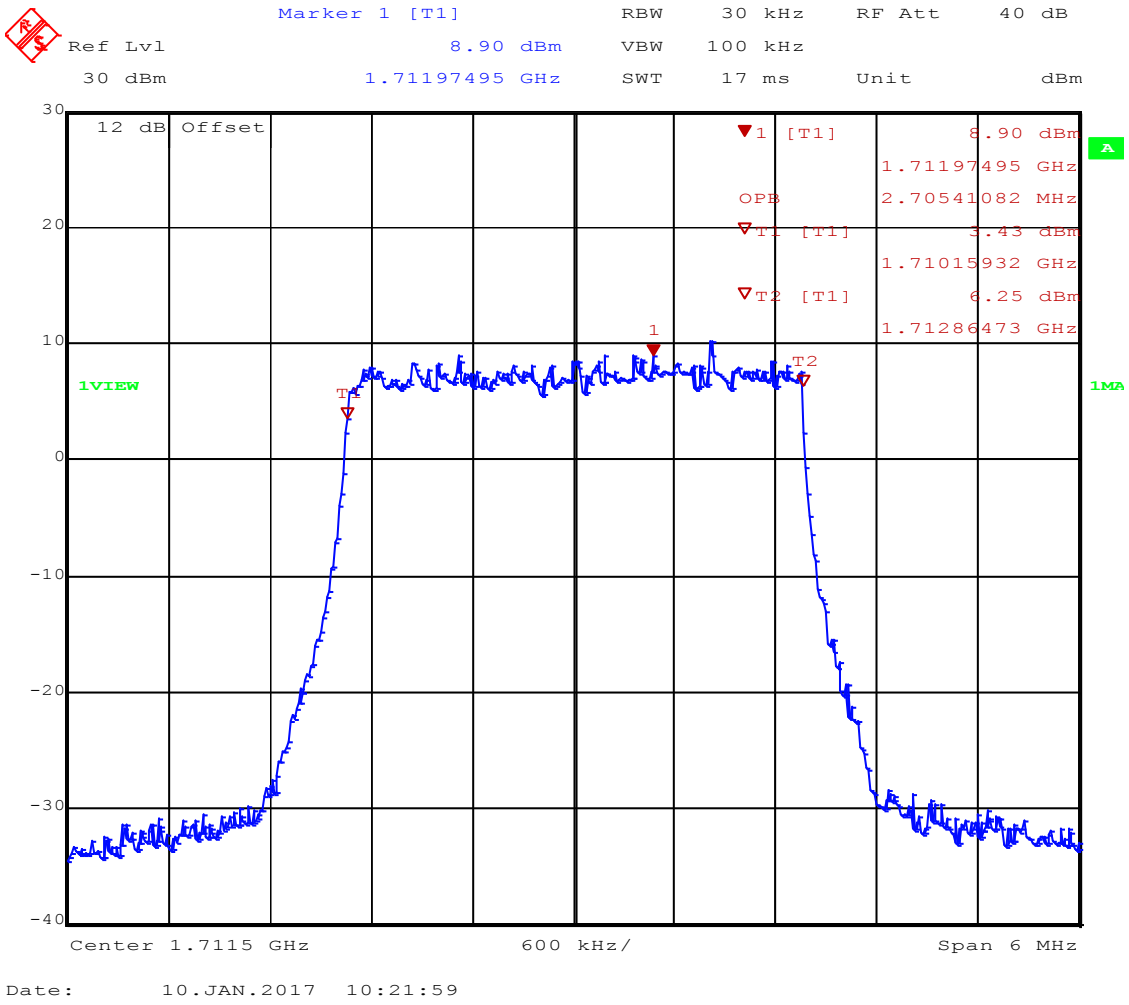


Occupied Bandwidth – LTE 4_QPSK-BW3 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 19965 / BW: 3MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 2.705 MHz

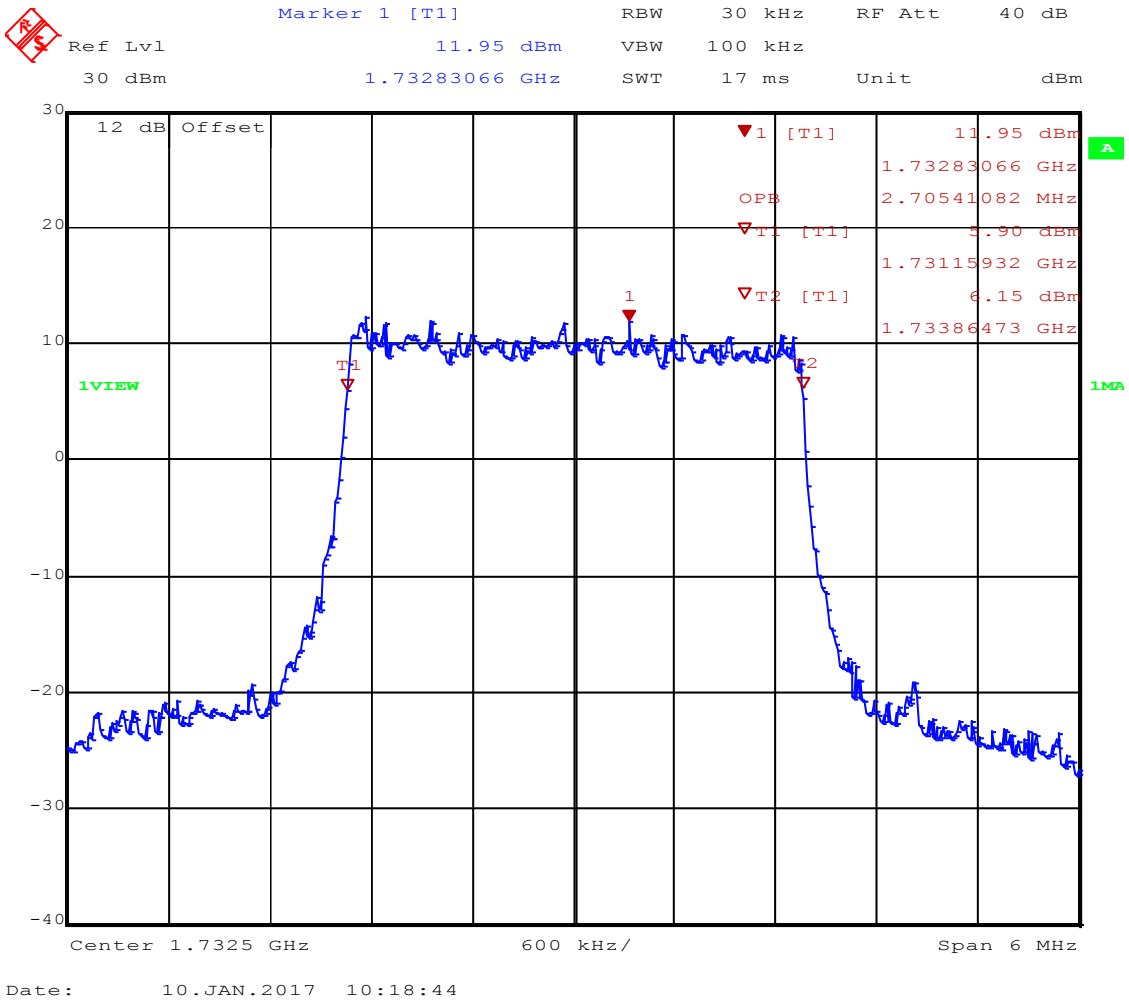


Occupied Bandwidth – LTE 4_QPSK-BW3 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20175 / BW: 3MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 2.705 MHz

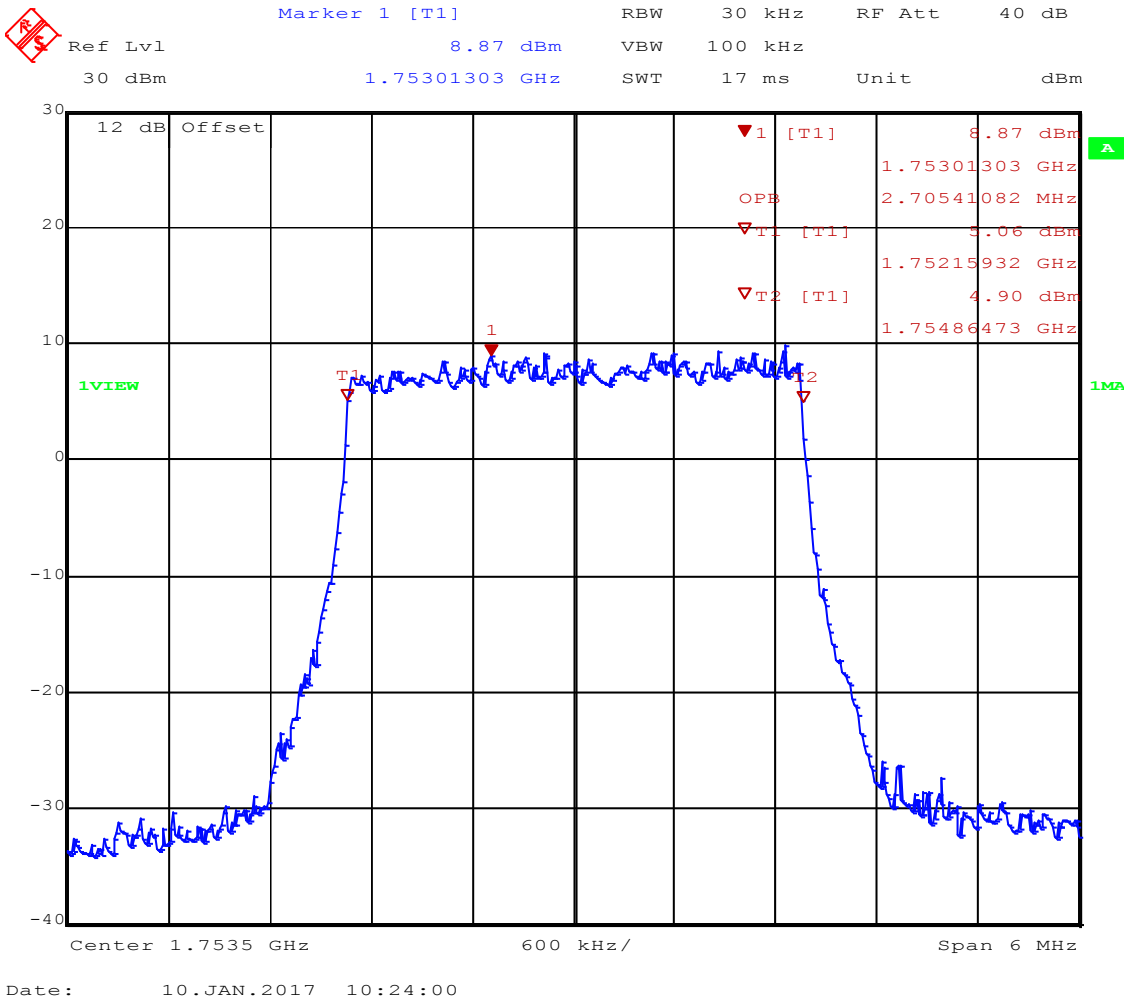


Occupied Bandwidth – LTE 4_QPSK-BW3 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20385 / BW: 3MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 2.705 MHz

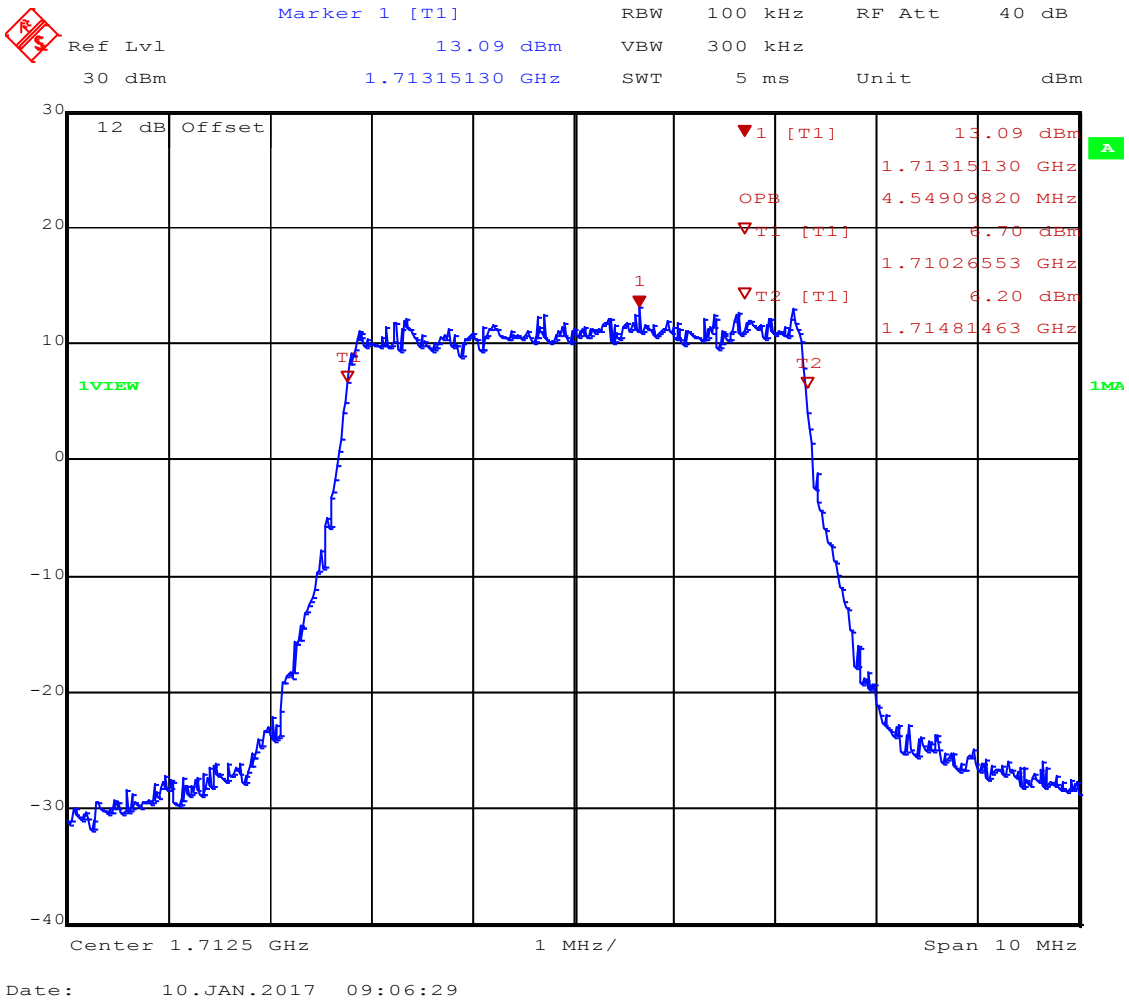


Occupied Bandwidth – LTE 4_QPSK-BW5 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 19975 / BW: 5MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.549 MHz

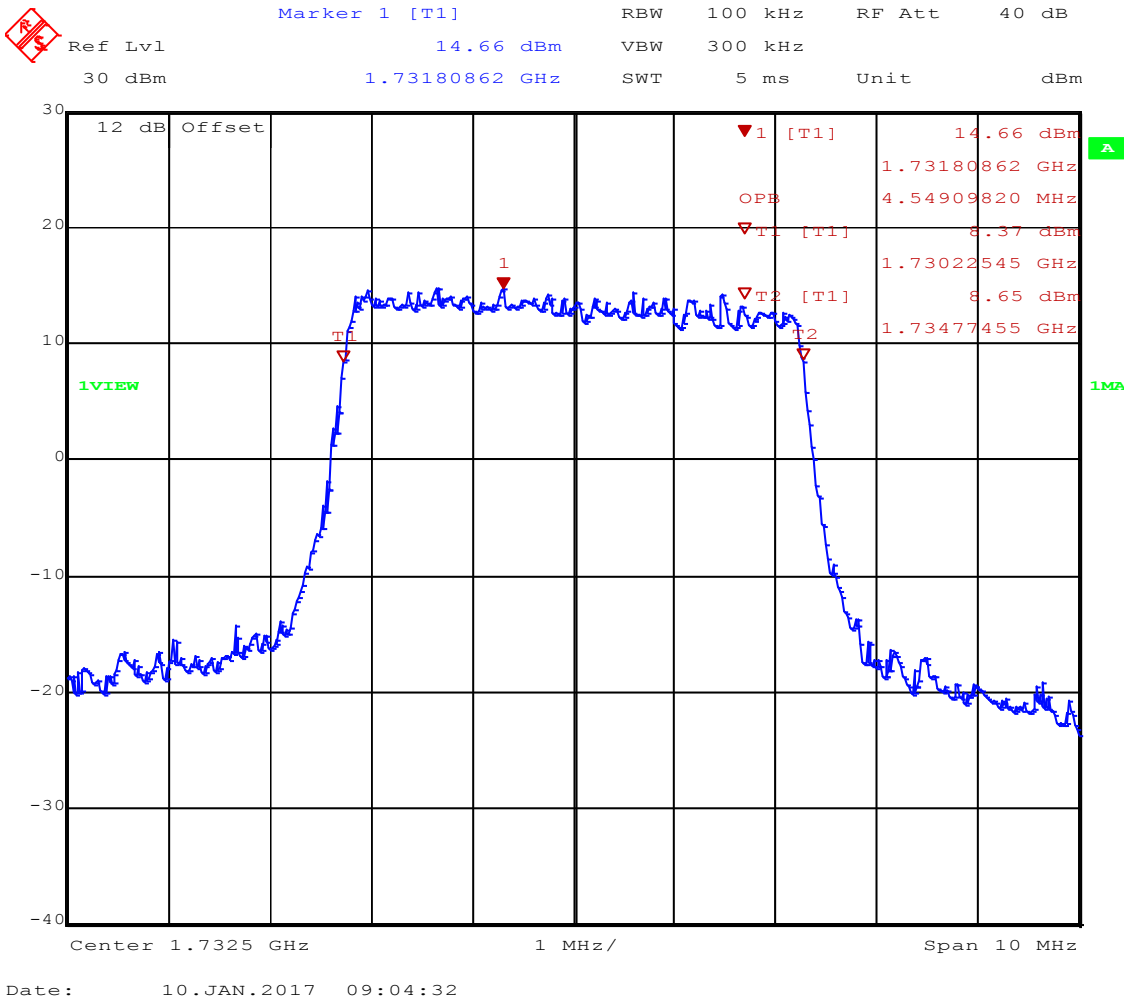


Occupied Bandwidth – LTE 4_QPSK-BW5 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20175 / BW: 5MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.549 MHz

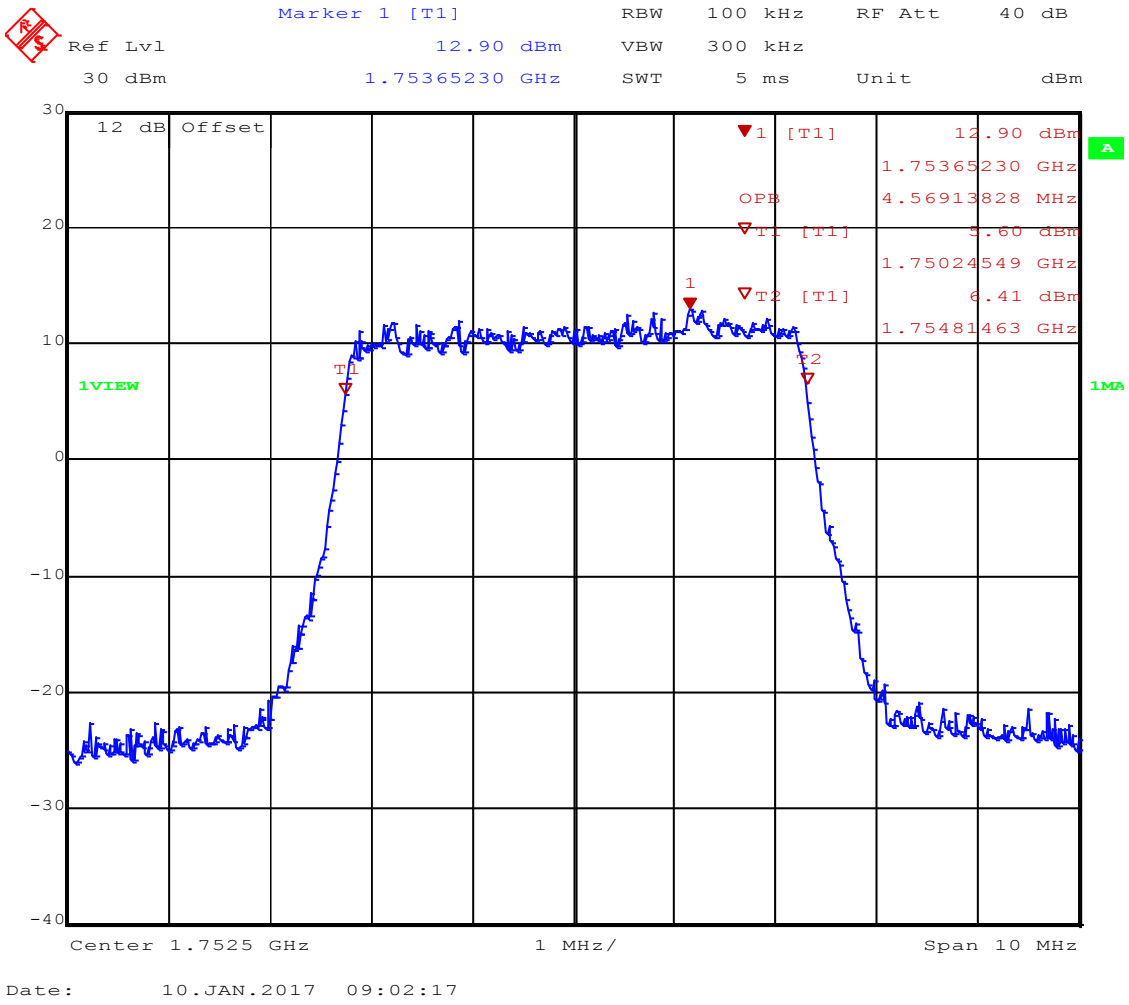


Occupied Bandwidth – LTE 4_QPSK-BW5 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20375 / BW: 5MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.569 MHz

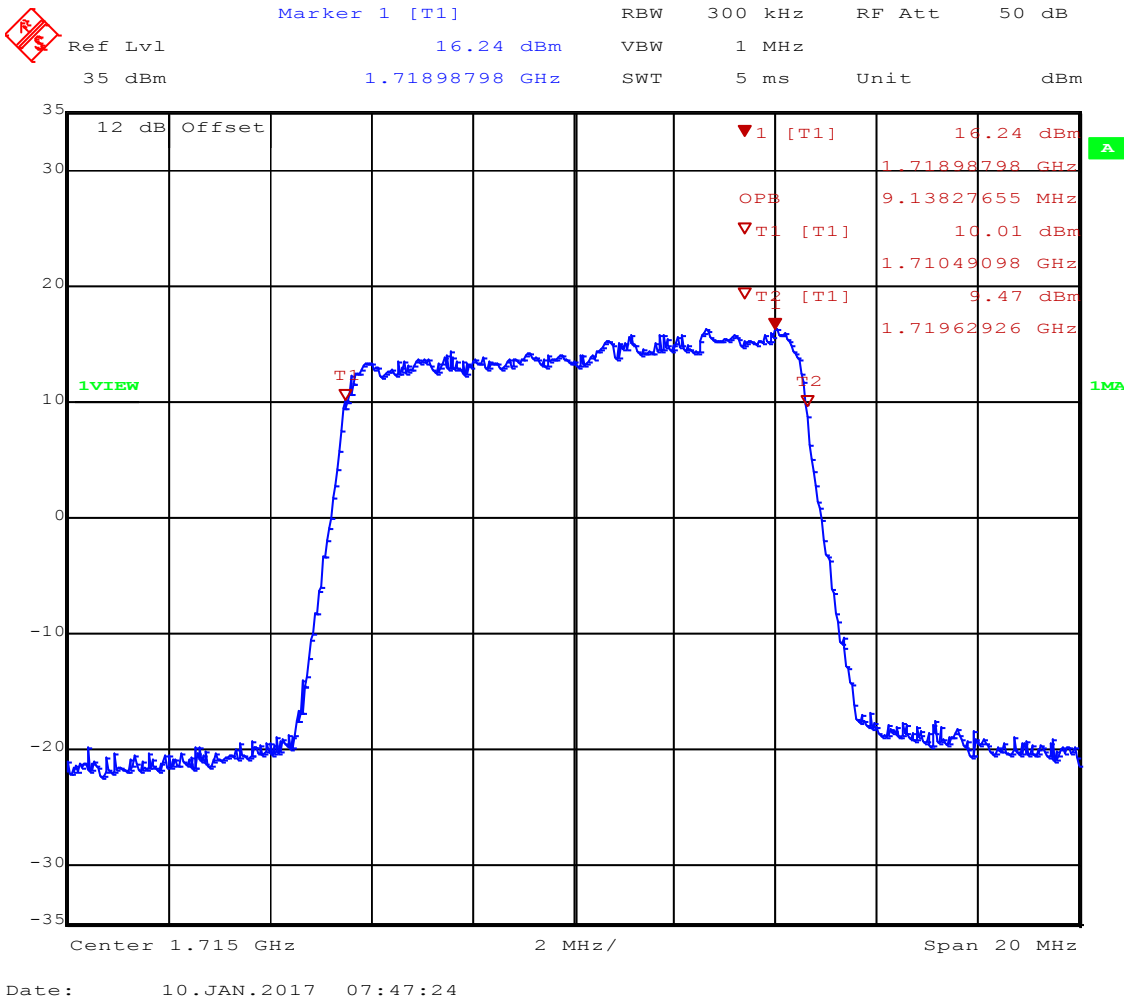


Occupied Bandwidth – LTE 4_QPSK-BW10 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20000 / BW: 10MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 9.138 MHz

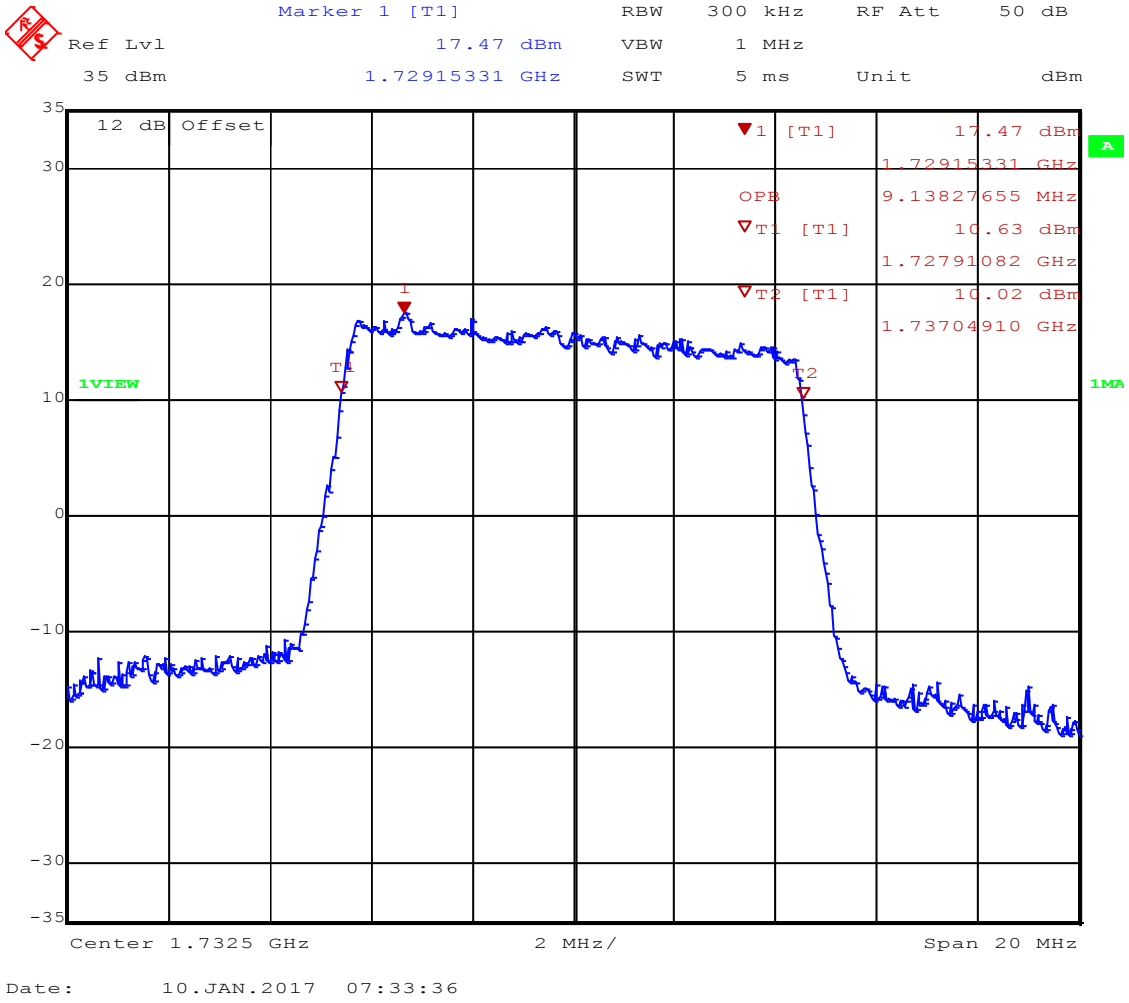


Occupied Bandwidth – LTE 4_QPSK-BW10 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20175 / BW: 10MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 9.138 MHz

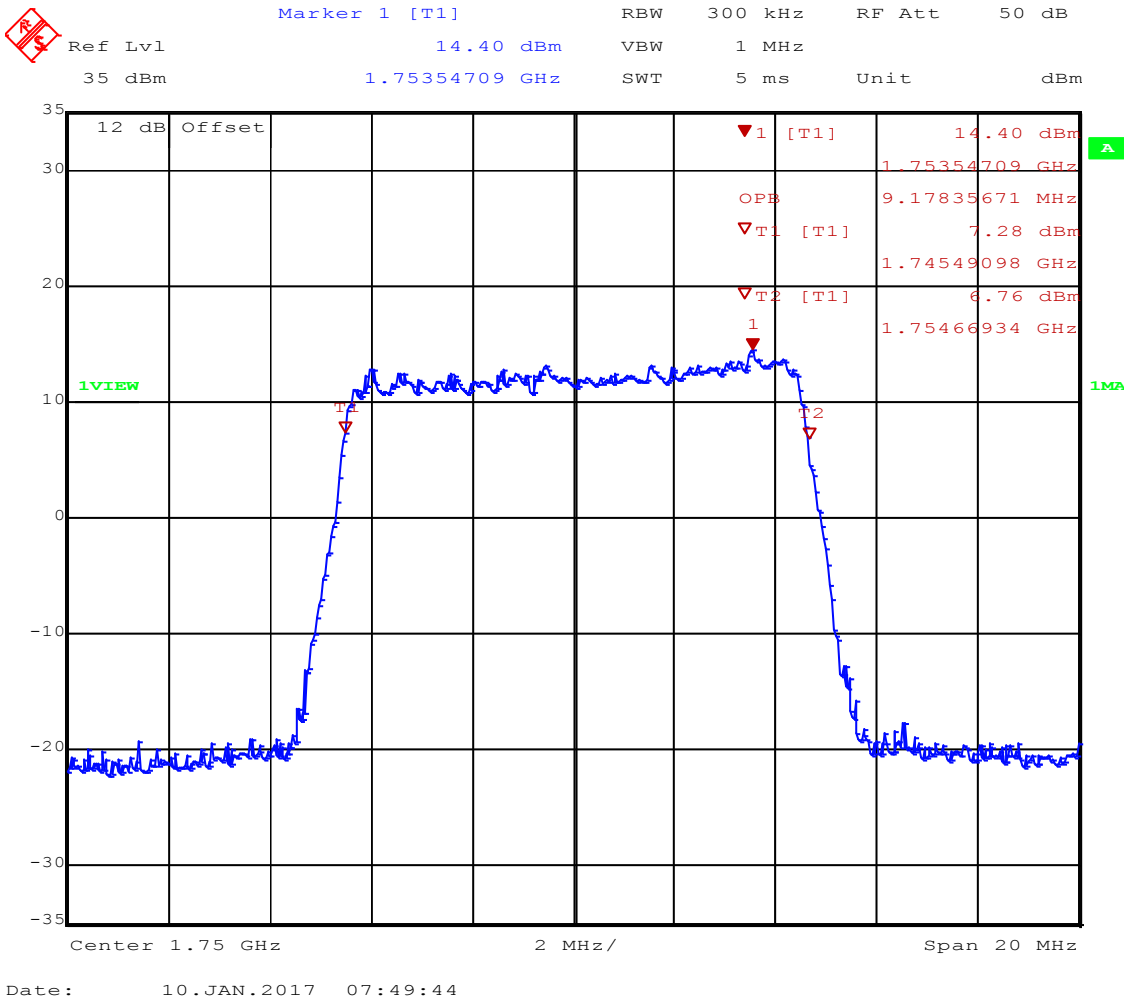


Occupied Bandwidth – LTE 4_QPSK-BW10 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20350 / BW: 10MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 9.178 MHz

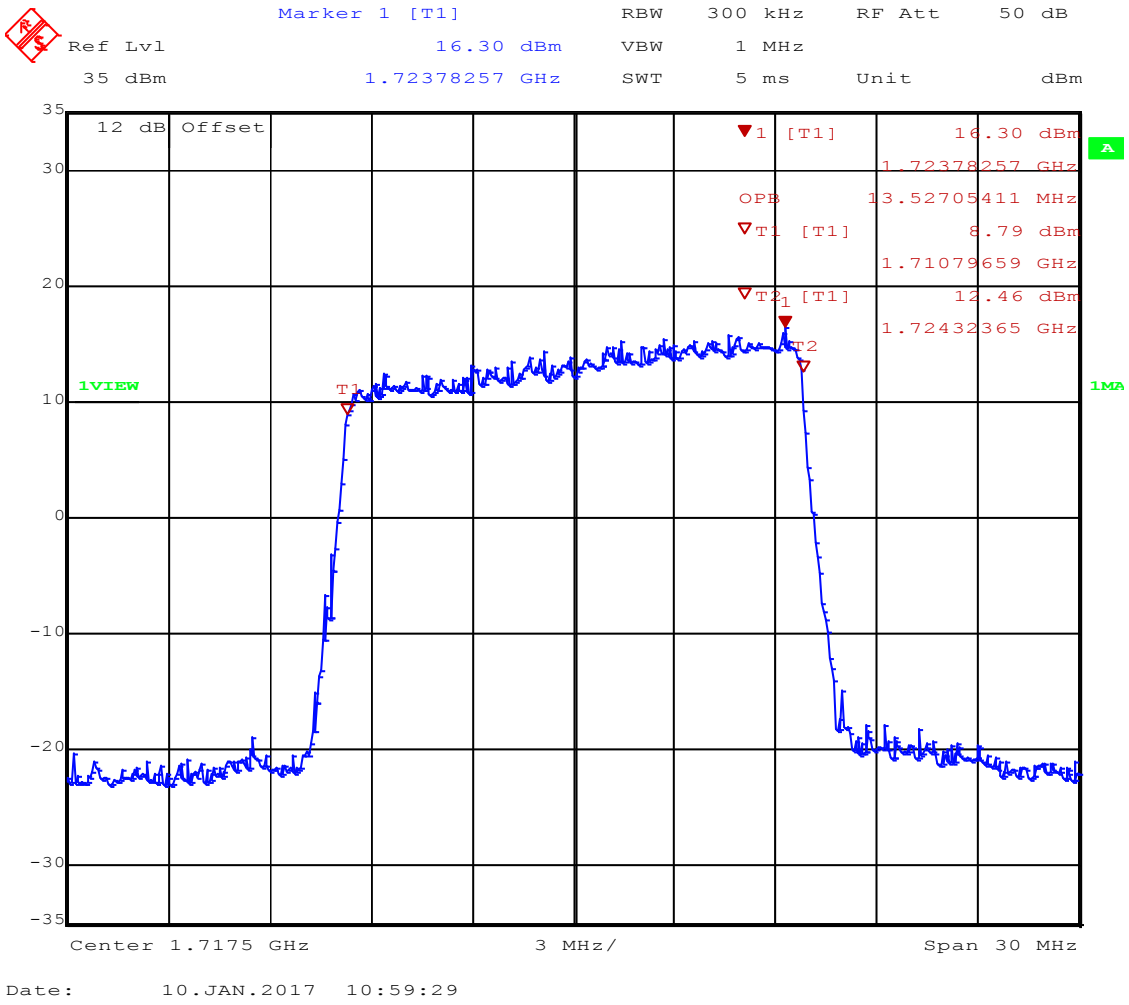


Occupied Bandwidth – LTE 4_QPSK-BW15 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20025 / BW: 15MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 13.527 MHz

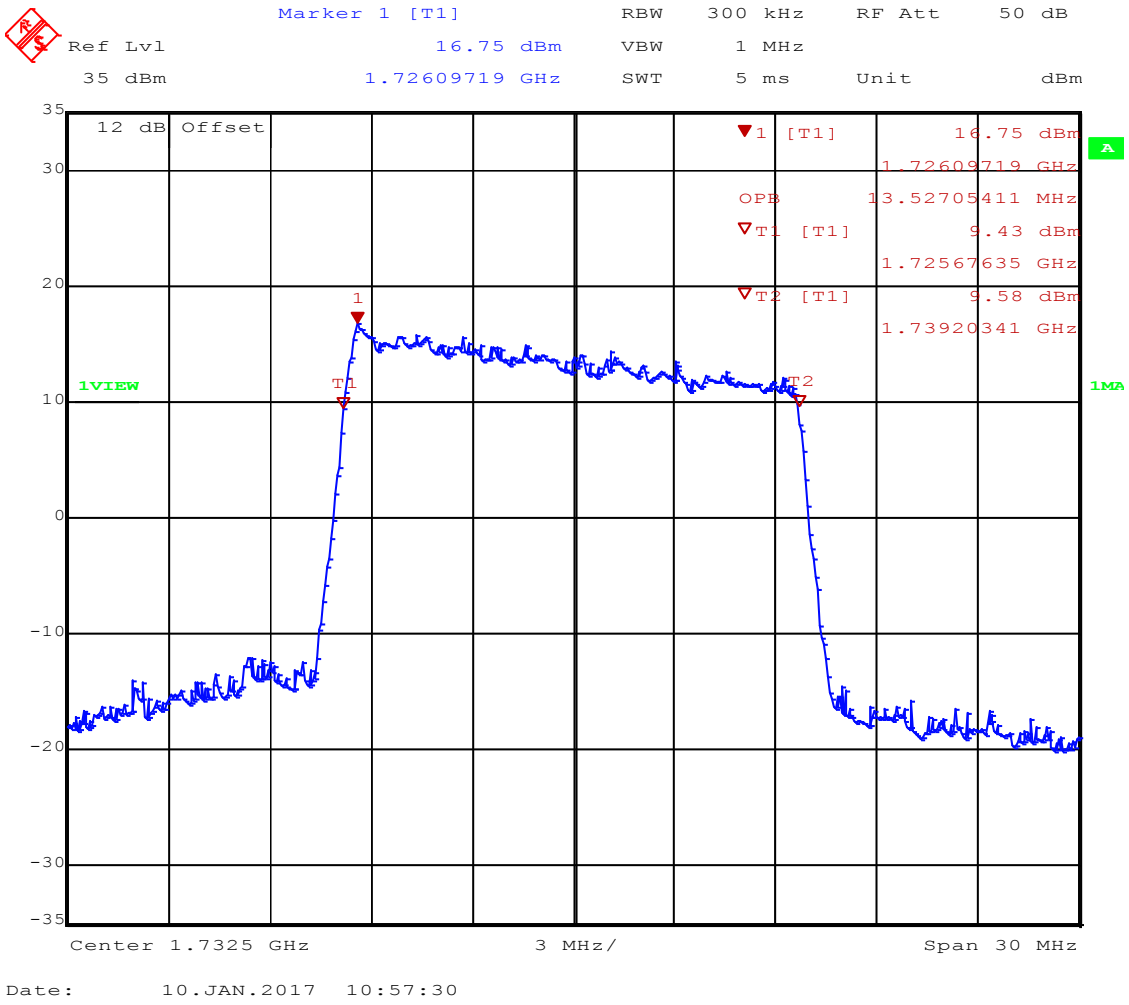


Occupied Bandwidth – LTE 4_QPSK-BW15 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20175 / BW: 15MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 13.527 MHz

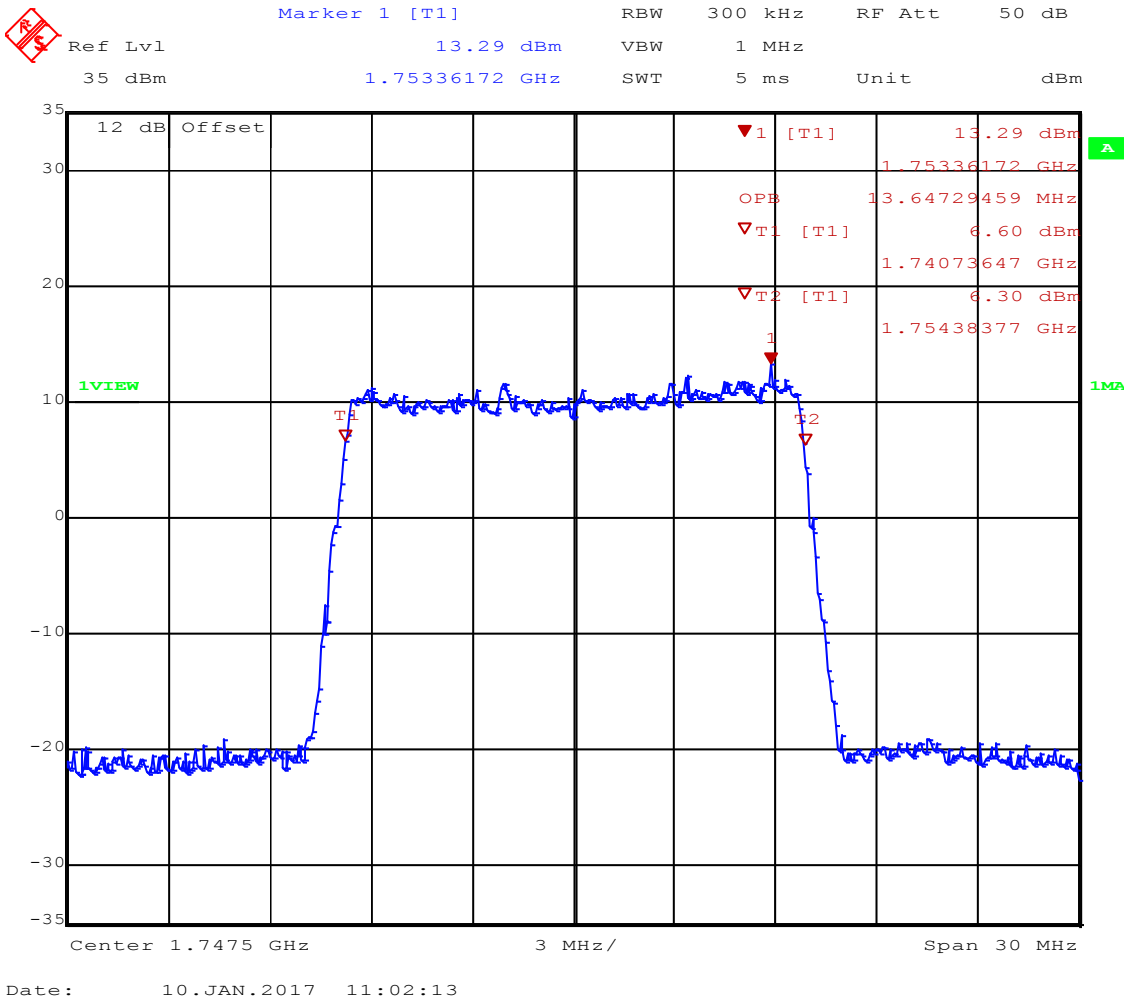


Occupied Bandwidth – LTE 4_QPSK-BW15 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20325 / BW: 15MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 13.647 MHz

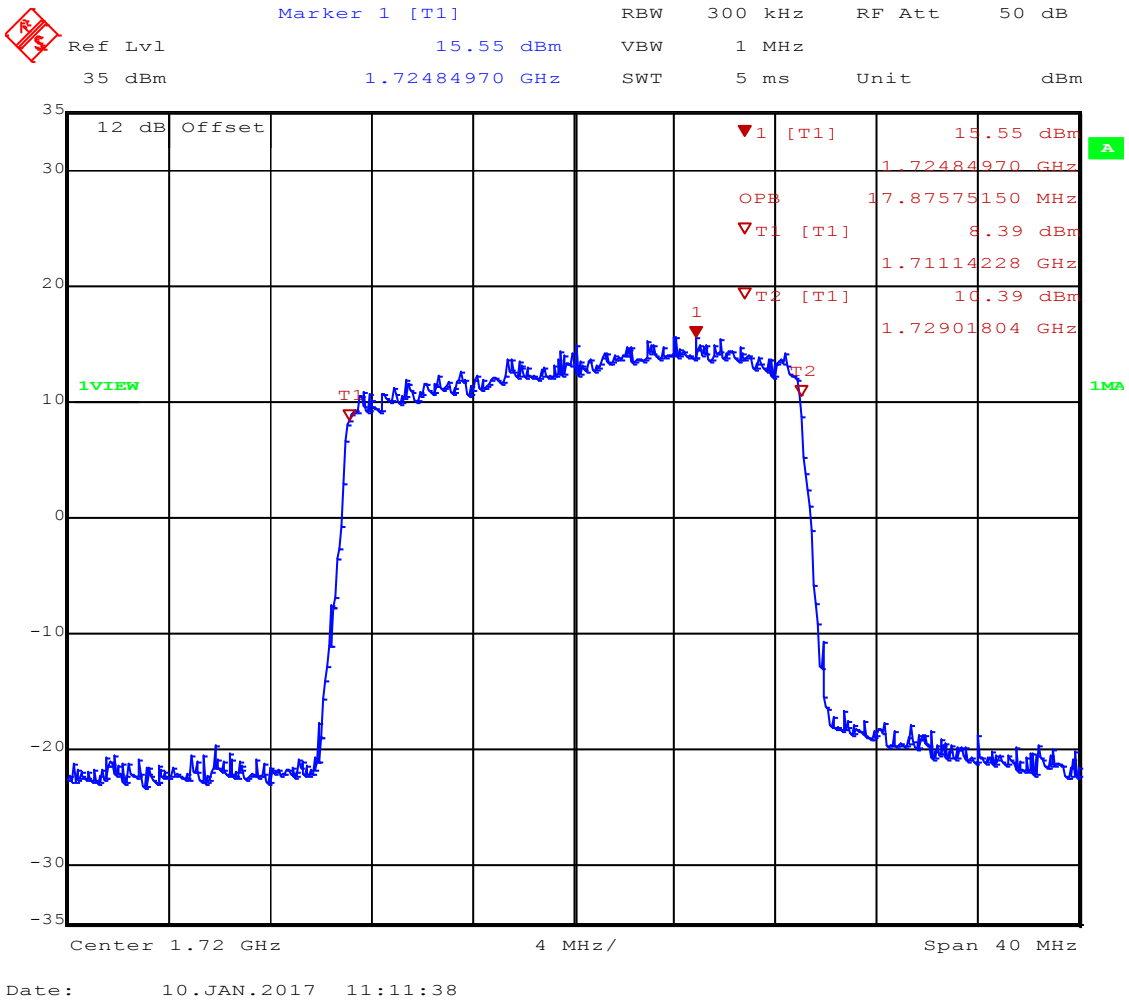


Occupied Bandwidth – LTE 4_QPSK-BW20 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20050 / BW: 20MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 17.876 MHz

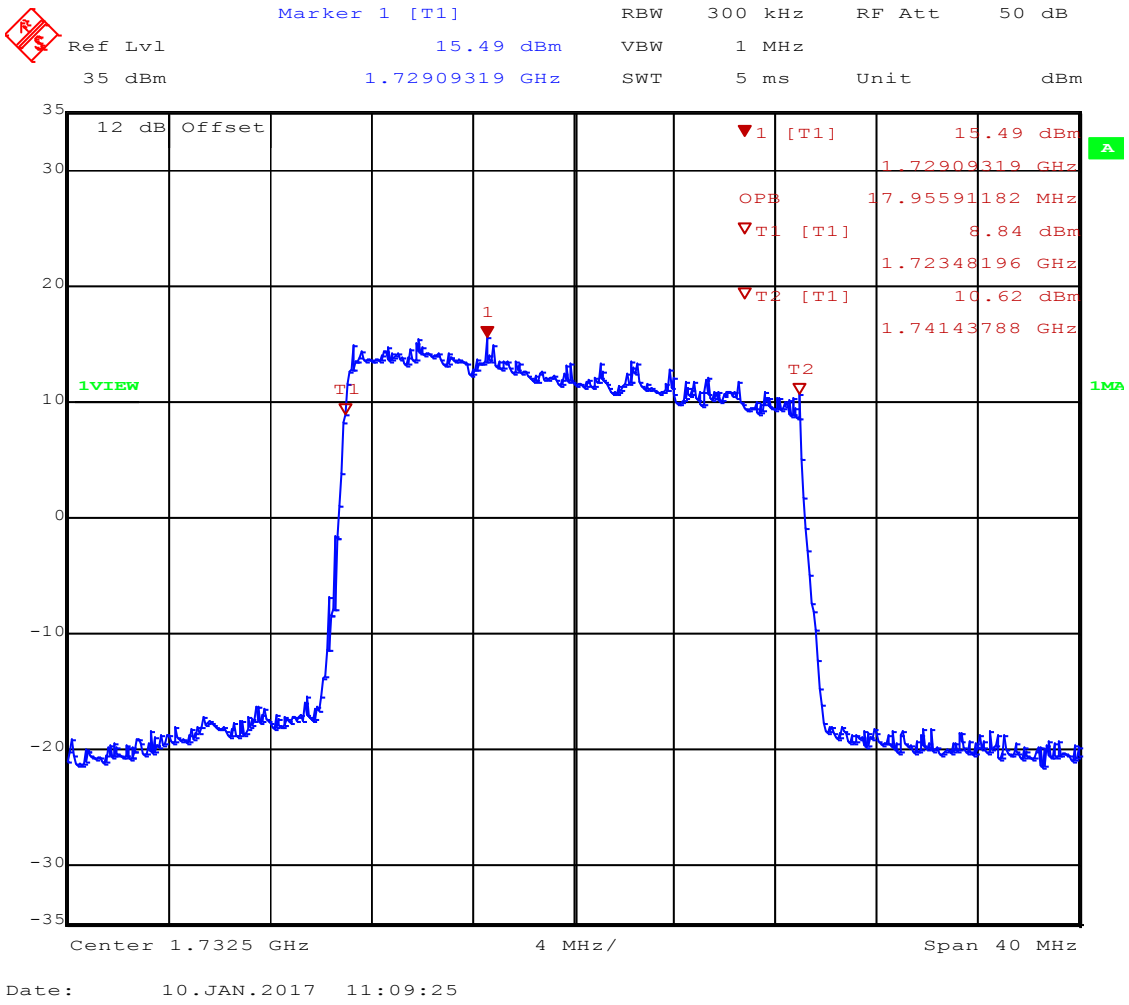


Occupied Bandwidth – LTE 4_QPSK-BW20 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20175 / BW: 20MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 17.956 MHz

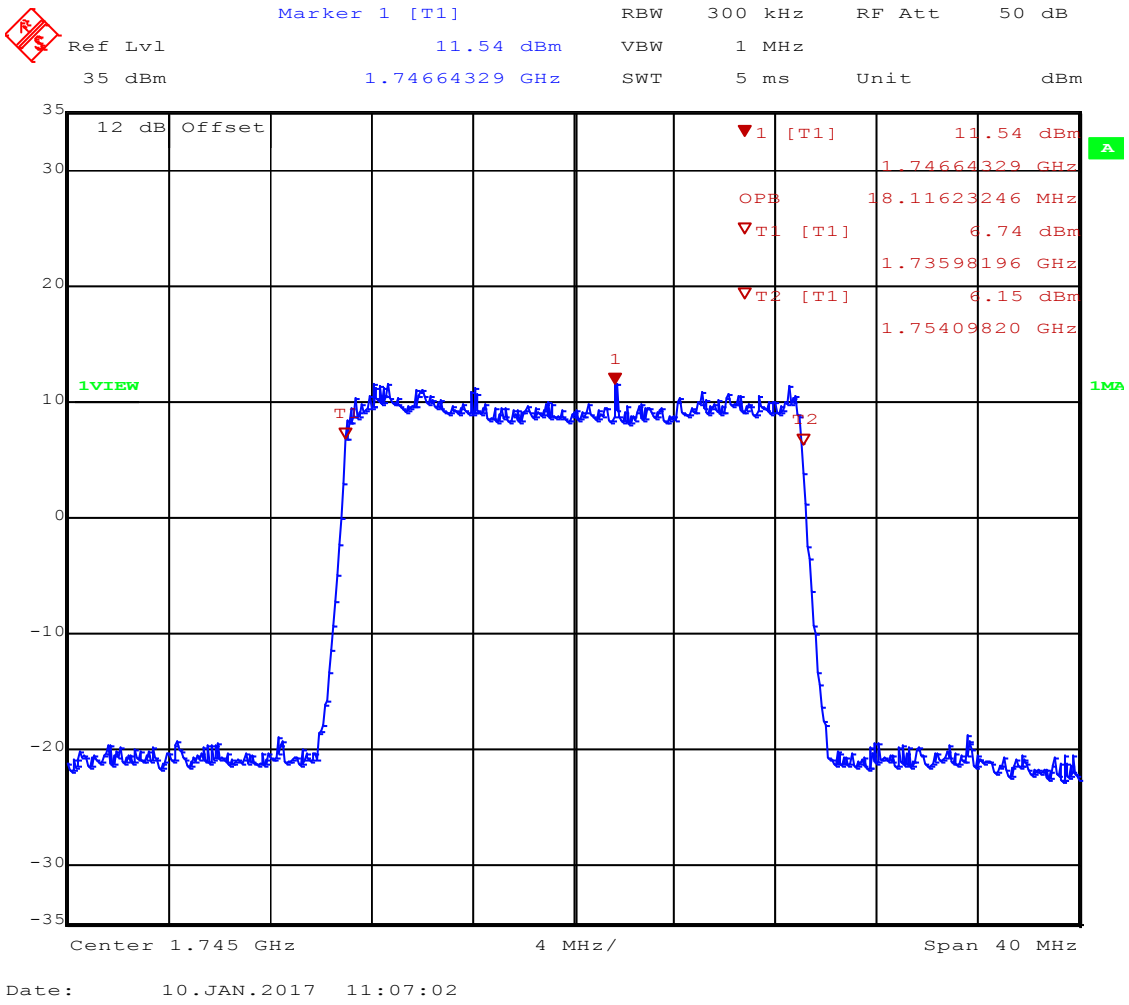


Occupied Bandwidth – LTE 4_QPSK-BW20 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20300 / BW: 20MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 18.116 MHz

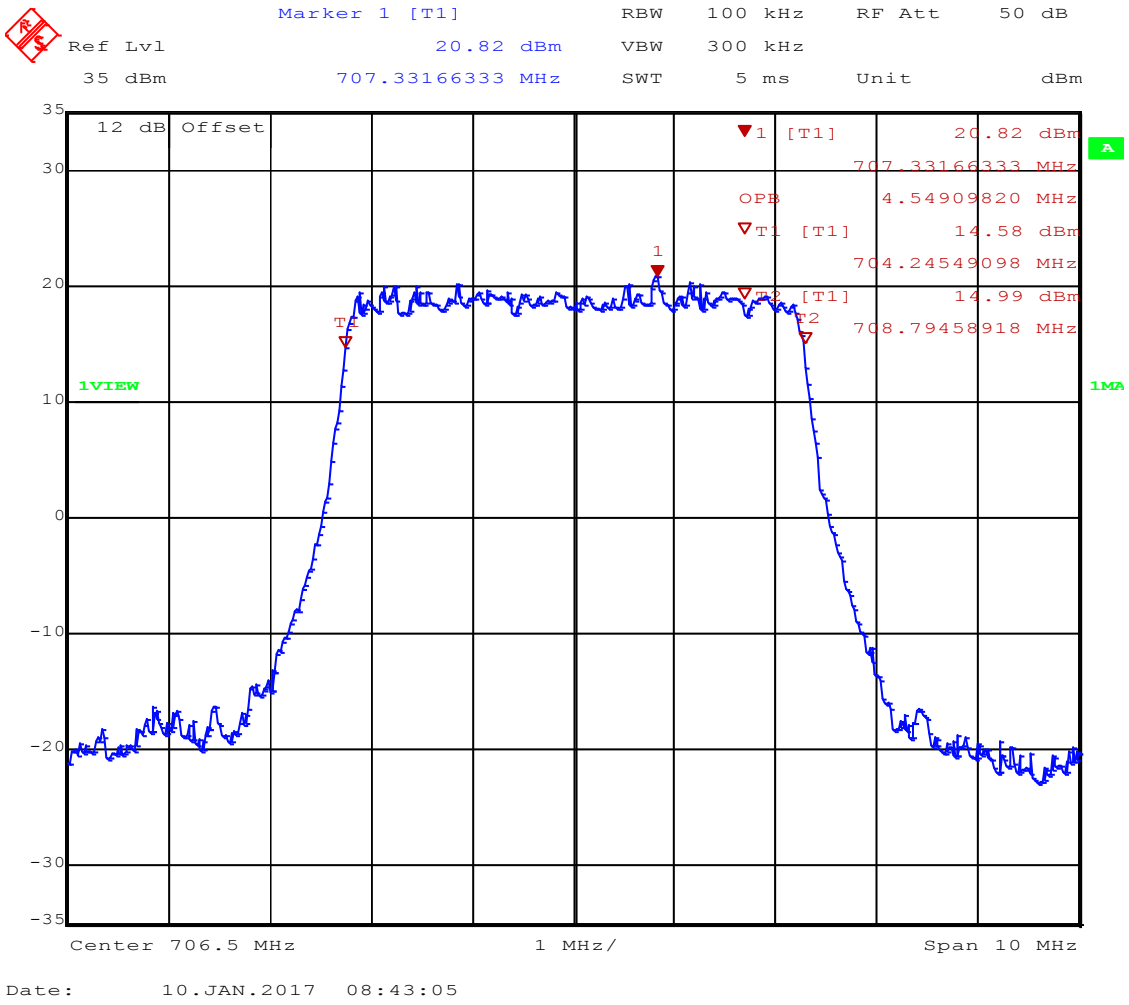


Occupied Bandwidth – LTE 17_QPSK-BW5 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 17 / CH: 23755 / BW: 5MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.549 MHz

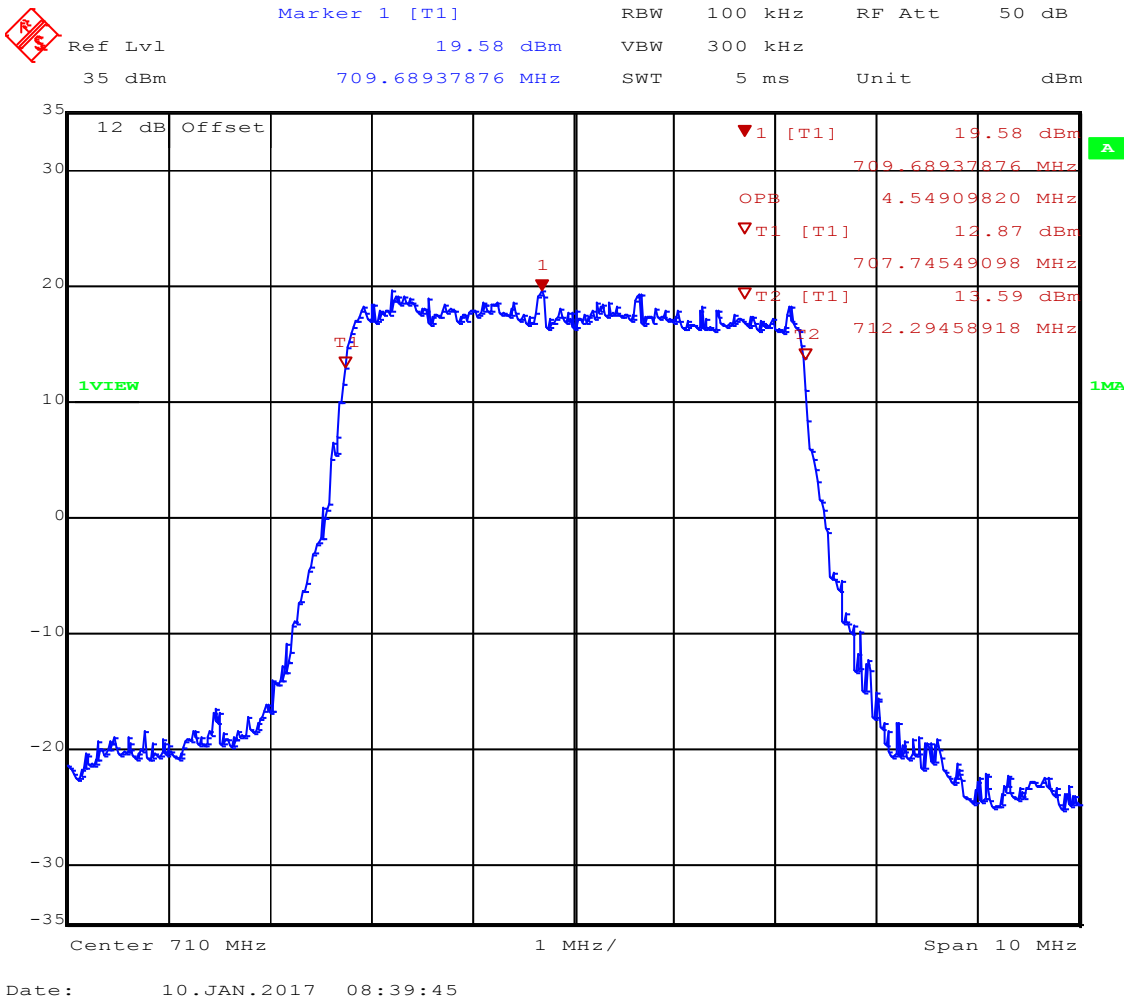


Occupied Bandwidth – LTE 17_QPSK-BW5 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 17 / CH: 23790 / BW: 5MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.549 MHz

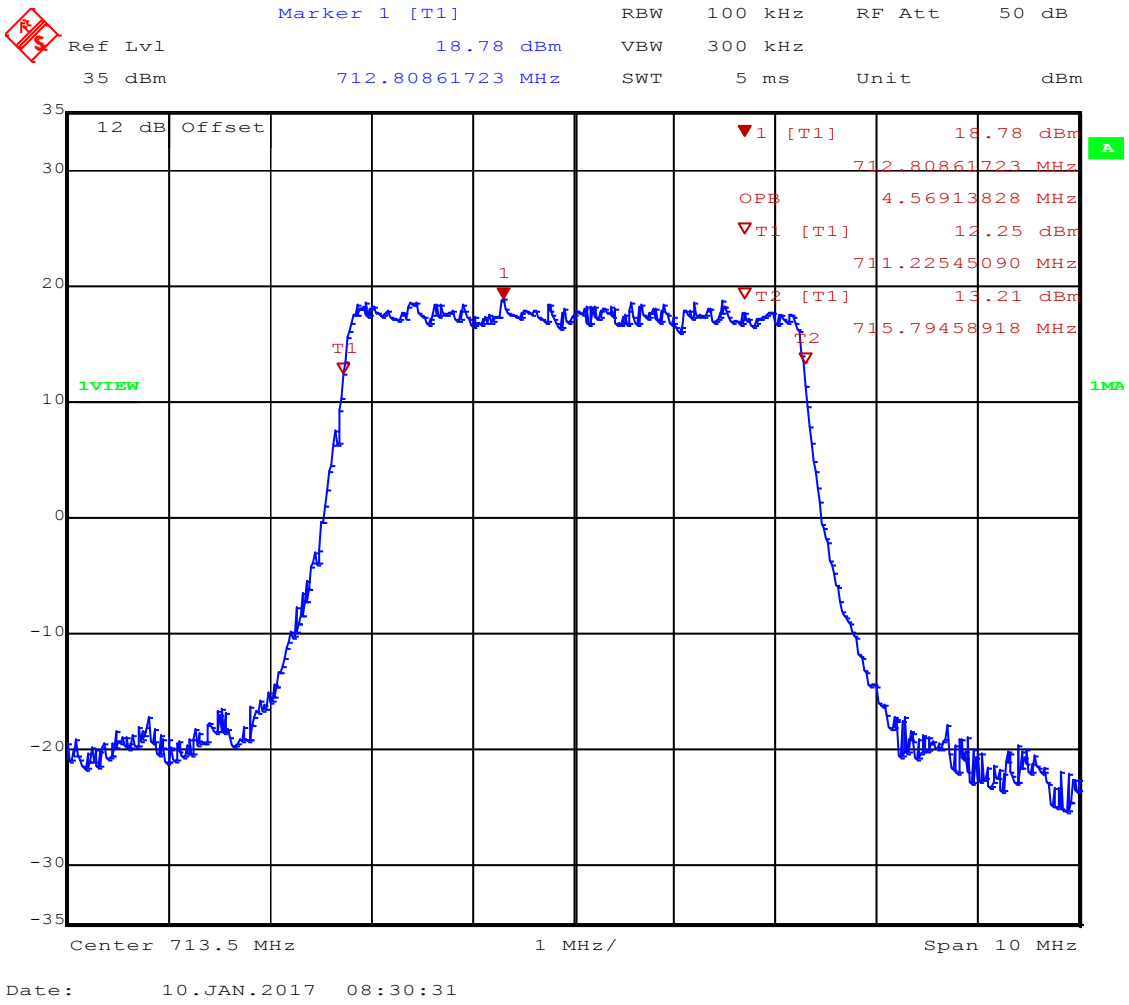


Occupied Bandwidth – LTE 17_QPSK-BW5 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 17 / CH: 23825 / BW: 5MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.569 MHz

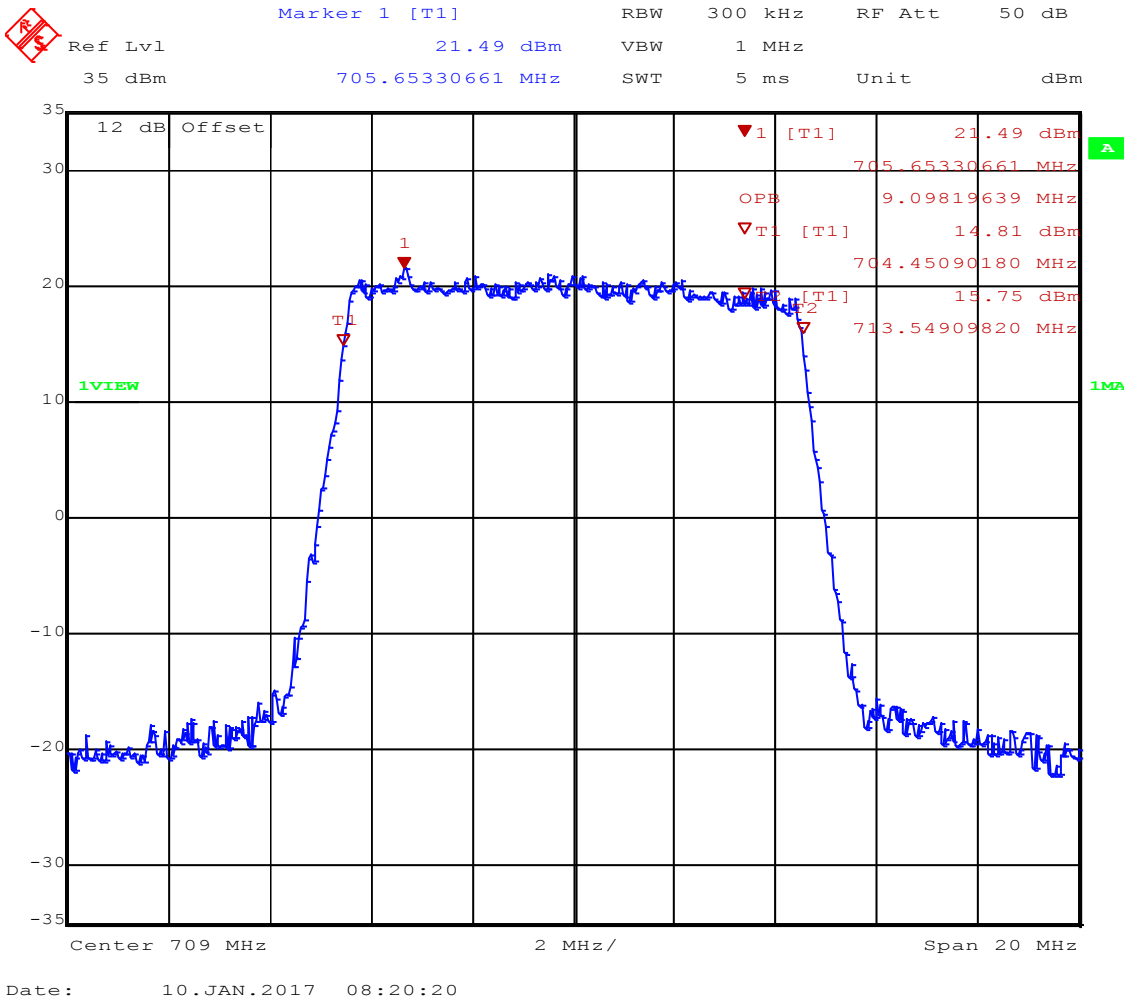


Occupied Bandwidth – LTE 17_QPSK-BW10 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 17 / CH: 23780 / BW: 10MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 9.098 MHz

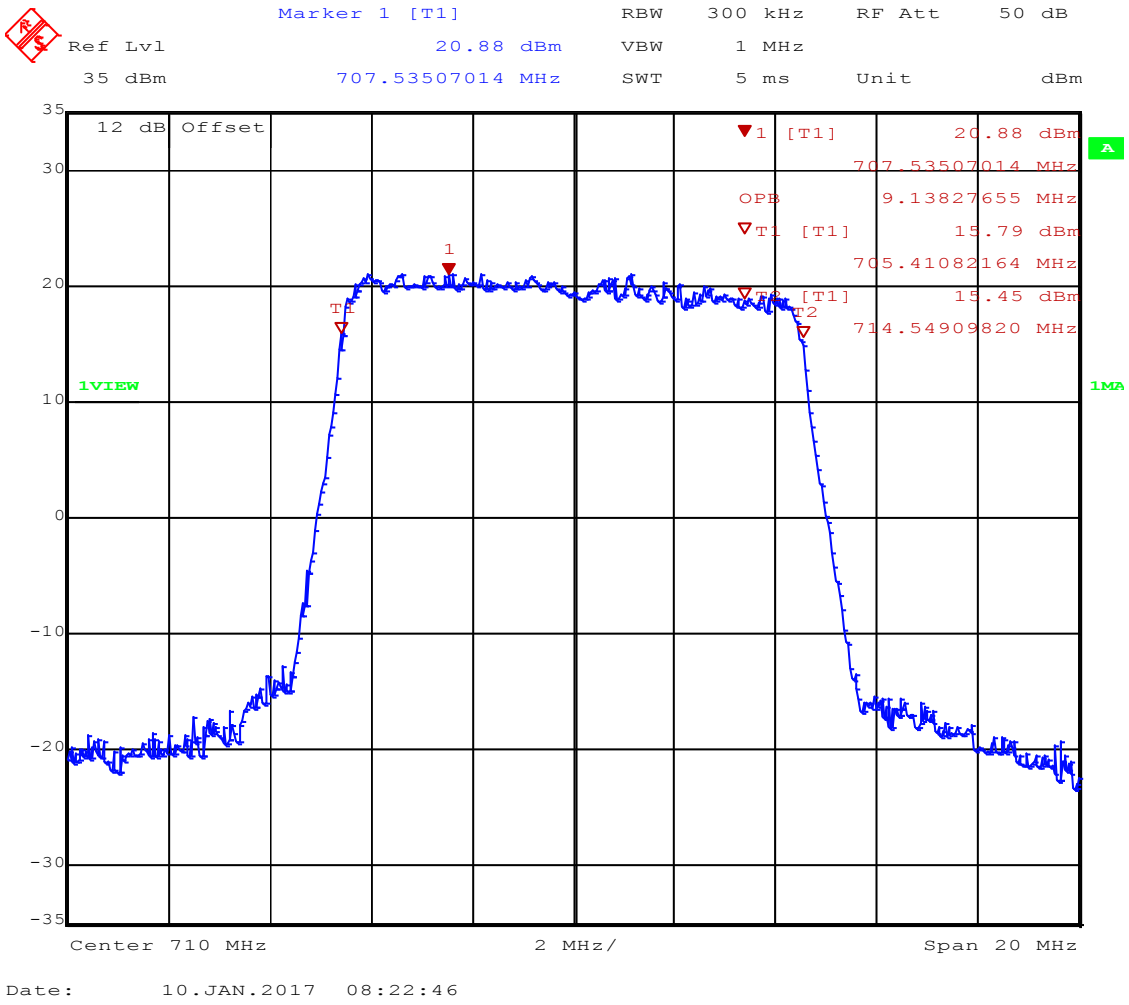


Occupied Bandwidth – LTE 17_QPSK-BW10 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 17 / CH: 23790 / BW: 10MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 9.138 MHz

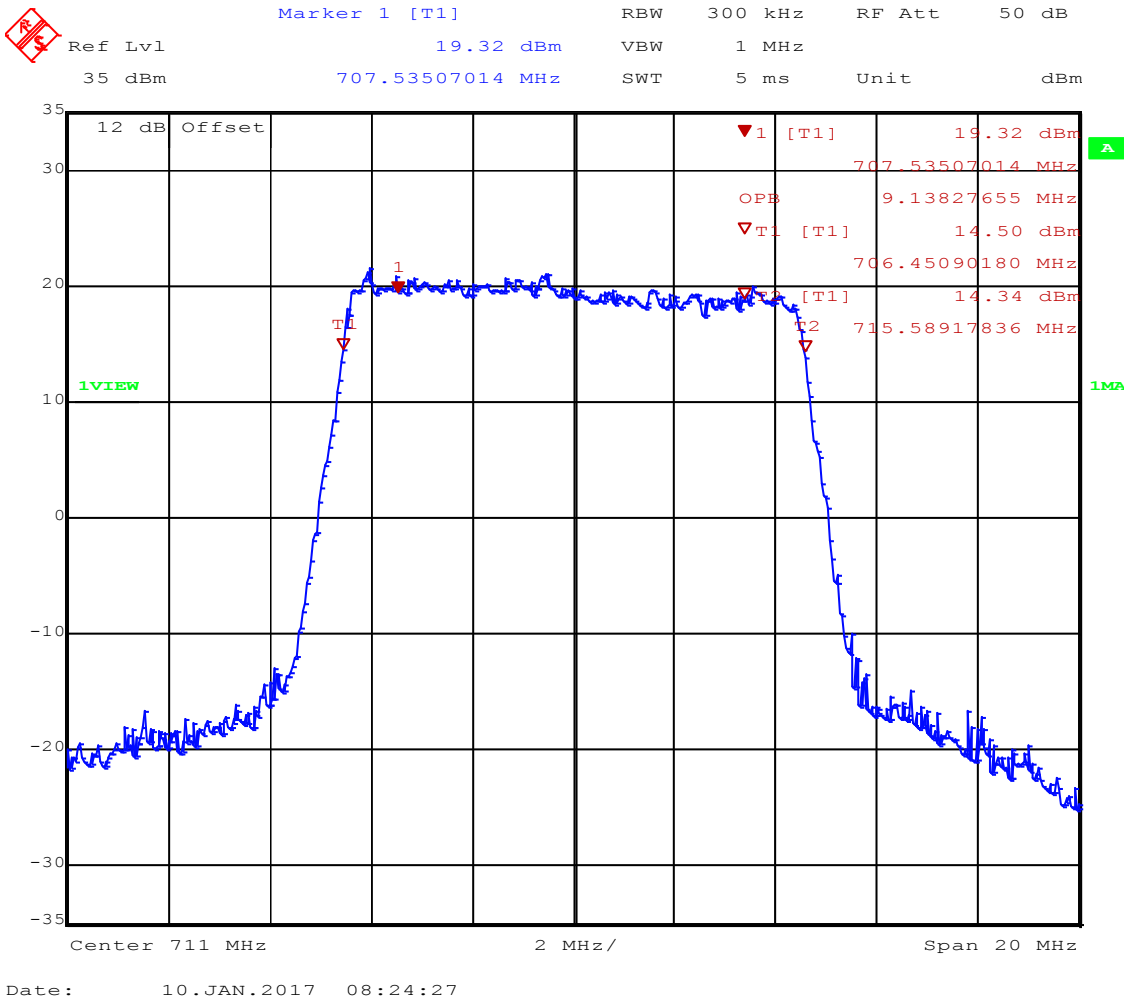


Occupied Bandwidth – LTE 17_QPSK-BW10 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1607-5773

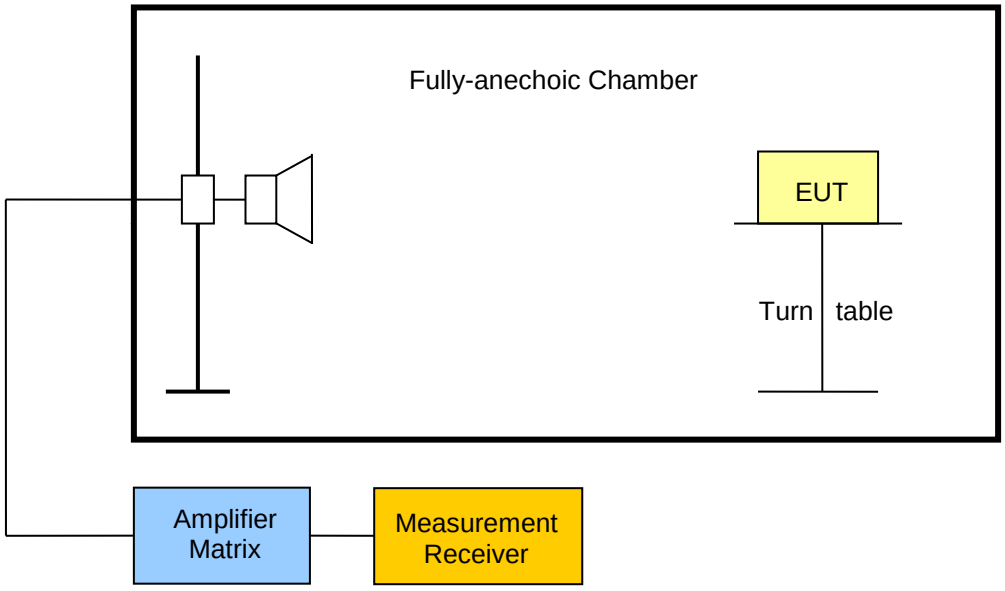
Applicant:	FALCOM GmbH
EUT Name:	UMTS/GSM/GPS/LTE-Device
Model:	FOX3-4G-NA
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 17 / CH: 23800 / BW: 10MHz; QPSK
Test Date:	2017-01-10
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 9.138 MHz



3.2 Test Conditions and Results – Effective radiated power / Equivalent isotropic radiated power

Radiated power acc. to FCC 27 / ISED RSS-130 / ISED RSS-139		**Verdict: PASS**
EUT requirement rule parts and clause	Reference	
	FCC § 27.50(c)(10) / FCC § 27.50(d)(4) ISED RSS-130 4.4 / ISED RSS-139 6.5	
Test according to measurement reference	Reference Method	
	ANSI/TIA-603-D, KDB 971168, ANSI C63.26-2015 5.2	
Test frequency range	Tested frequencies	
	F_{LOW} / F_{MID} / F_{HIGH}	
Limits		
Carrier Frequency range	Equipment type	Power limit
698-746 MHz	Mobile transmitter	FCC : 3 Watts (34.77 dBm) e.r.p. IC : 5 Watts (36.99 dBm) e.i.r.p.
1710-1755 MHz	Mobile transmitter	FCC : 1 Watts (30 dBm) e.i.r.p. IC : 1 Watts (30 dBm) e.i.r.p.

Test setup



Test procedure

1. EUT set to test mode
2. The radiated power is measured with a measurement antenna in ver + hor polarization
3. To obtain maximum level the EUT is rotated
4. The EUT is replaced with a half-wave dipole and the power to the dipole is adjusted to obtain same radiated power measurement value

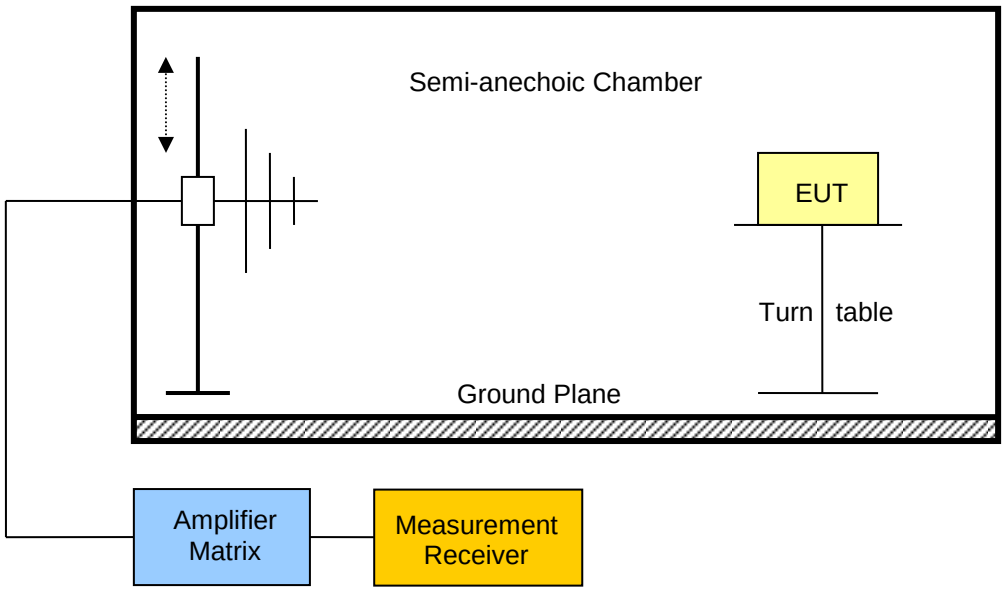
Test results – W-CDMA IV / LTE 4 E.I.R.P.							
Channel	Frequency [MHz]	Mode	Pol.	Power [dBm e.i.r.p]	Limit [dBm e.i.r.p]	Margin [dB]	Result
F_{LOW}	1712.4	FDD - CS	Hor	14.4	30	-15.6	PASS
F_{MID}	1732.6	FDD - CS	Hor	18.2	30	-11.8	PASS
F_{HIGH}	1752.6	FDD - CS	Hor	16.3	30	-13.7	PASS
F_{LOW}	1715.0	QPSK BW 10	Hor	14.7	30	-15.3	PASS
F_{MID}	1732,5	QPSK BW 10	Hor	17.9	30	-12.1	PASS
F_{HIGH}	1750,0	QPSK BW 10	Hor	16.8	30	-13.2	PASS
Comments:							

Test results – LTE 17 E.R.P.							
Channel	Frequency [MHz]	Mode	Pol.	Power [dBm e.r.p]	Limit [dBm e.r.p]	Margin [dB]	Result
F_{LOW}	709,0	QPSK BW 10	Hor	14.4	34.77	-20.37	PASS
F_{MID}	710,0	QPSK BW 10	Hor	18.2	34.77	-16.57	PASS
F_{HIGH}	711,0	QPSK BW 10	Hor	16.3	34.77	-18.47	PASS
Test results – LTE 17 E.I.R.P.							
Channel	Frequency [MHz]	Mode	Pol.	Power [dBm e.i.r.p]	Limit [dBm e.i.r.p]	Margin [dB]	Result
F_{LOW}	709,0	QPSK BW 10	Hor	16.55	36.99	-20.44	PASS
F_{MID}	710,0	QPSK BW 10	Hor	20.35	36.99	-16.64	PASS
F_{HIGH}	711,0	QPSK BW 10	Hor	18.45	36.99	-18.54	PASS
Comments:							

3.3 Test Conditions and Results – Transmitter radiated emissions

Transmitter radiated power acc. to FCC 27 / ISED RSS-130 / ISED RSS-139					**Verdict: PASS**
Test according referenced standards	Reference Method				
	FCC § 27.53(g), FCC § 27.53(h) ISED RSS-130 4.6, ISED RSS-139 6.6				
Test according to measurement reference	Reference Method				
	ANSI/TIA-603-D, KDB 971168, ANSI C63.26-2015 5.5				
Test frequency range	Tested frequencies				
	30 MHz – 10th Harmonic				
Limits					
Region	Operating Frequency range [MHz]	Type	Frequency Range [MHz]	Bandwidth [kHz]	Limit [dBm]
FCC	698-746	Mobile	10 – 703.9	100	43 + 10 · log$_{10}$(P) [dB] = -13
			703.9 – 704	30	43 + 10 · log$_{10}$(P) [dB] = -13
			716 – 716.1	30	43 + 10 · log$_{10}$(P) [dB] = -13
			716.1 – 10th harmonic	100	43 + 10 · log$_{10}$(P) [dB] = -13
ISED	698-756	Mobile	10 – 703.9	100	43 + 10 · log$_{10}$(P) [dB] = -13
			703.9 – 704	30	43 + 10 · log$_{10}$(P) [dB] = -13
			716 – 716.1	30	43 + 10 · log$_{10}$(P) [dB] = -13
			716.1 – 10th harmonic	100	43 + 10 · log$_{10}$(P) [dB] = -13
FCC ISED	1710-1755	Mobile	10 – 1709	1000	43 + 10 · log$_{10}$(P) [dB] = -13
			1709 – 1710	1 % of EBW	43 + 10 · log$_{10}$(P) [dB] = -13
			1755 – 1756	1 % of EBW	43 + 10 · log$_{10}$(P) [dB] = -13
			1756 - 10th harmonic	1000	43 + 10 · log$_{10}$(P) [dB] = -13

Test setup



Test procedure

1. EUT set to test mode
2. Maximum emission level is measured by rotating the EUT and adjusting the antenna height for vertical polarization
3. The EUT is replaced by a substitution antenna and generator
4. The power level is set to obtain the same power reading
5. Measurement is repeated for horizontal polarization

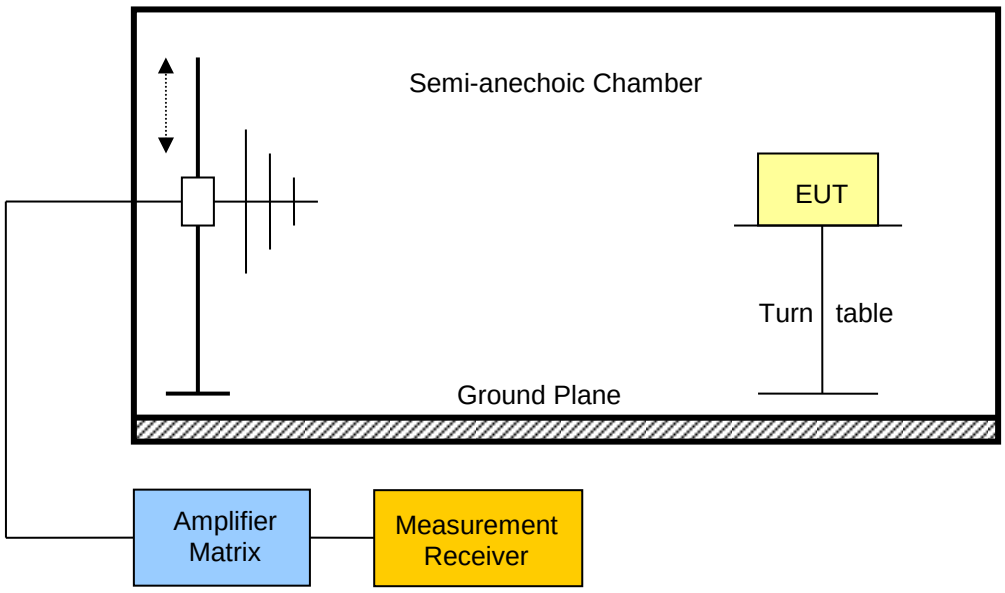
Test results – FDD IV							
Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dbm]	Pol.	Limit [dBm]	Margin [dB]
F_{HIGH}	1752.6	HSPA	1756	-26.8	ver	-13.00	-13.8
F_{HIGH}	1752.6	HSPA	1756	-26.1	hor	-13.00	-13.1
Comments:							

Test results – LTE 4							
Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dbm]	Pol.	Limit [dBm]	Margin [dB]
F_{HIGH}	1750.0	QPSK BW 10	1756	-26.7	ver	-13.00	-13.7
F_{HIGH}	1750.0	QPSK BW 10	1756	-25.5	hor	-13.00	-12.5
Comments:							

Test results – LTE 17							
Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dbm]	Pol.	Limit [dBm]	Margin [dB]
F_{MID}	710,0	QPSK BW 10	875	-25.0	hor	-13.00	-12.0
F_{HIGH}	711,0	QPSK BW 10	895	-26.0	ver	-13.00	-13.0
Comments:							

3.4 Test Conditions and Results – Receiver radiated emissions

Receiver radiated emissions acc. to ISED RSS-130 / ISED RSS-139				**Verdict: PASS**
Test according referenced standards	Reference Method			
	ISED RSS-Gen 7.1			
Test according to measurement reference	Reference Method			
	ANSI C63.4			
Test frequency range	Tested frequencies			
	30 MHz – 5th Harmonic			
EUT test mode	Receive			
Limits				
Frequency range [MHz]	Detector	Limit [µV/m]	Limit [dBµV/m]	Limit Distance [m]
30 – 88	Quasi-Peak	100	40	3
88 – 216	Quasi-Peak	150	43.5	3
216 – 960	Quasi-Peak	200	46	3
960 – 1000	Quasi-Peak	500	54	3
> 1000	Average	500	54	3
Test setup				



Test procedure
1. EUT set to receive mode (Communication tester is used if needed) 2. Span it set according to measurement range 3. Resolution bandwidth below 1GHz is set according to CISPR 16 with peak/quasi-peak detector and RBW of 1MHz with peak/average detector is used above 1GHz 4. Markers are set to peak emission levels

Test results

Channel	Frequency [MHz]	Emission [MHz]	Emission Level [dbµV/m]	Emission Level [µV/m]	Det.	Limit [µV/m]	Margin [µV/m]
F_{MID} FDD IV	2132,6	1960	45.27	183.4	ver	500	-316.6
F_{MID} LTE 4	2132,5	1960	45.27	183.4	ver	500	-316.6
F_{MID} LTE 17	740.0	1426	42.79	137.9	ver	500	-362.1

Comments:
* Physical distance between EUT and measurement antenna.
** Emission level corresponds to ambient noise floor