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FCC TEST REPORT

FCC 47 CFR Part 27

MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

Industry Canada RSS-130, Issue 1

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

Industry Canada RSS-139, Issue 3

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

Report Reference No. ..... :	G0M-1601-5302-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 IC OATS Filing assigned code: 3470A
Applicant's name ..... :	lesswire GmbH
Address ..... :	Rudower Chaussee 30 12489 Berlin GERMANY
Test specification:	
Standard..... :	47 CFR Part 27 RSS-130, Issue 1 : 2013-10, RSS-139, Issue 3 : 2015-07 RSS-Gen, Issue 4, 2014-11, ANSI/TIA-603-D-2010 KDB 971168
Equipment under test (EUT):	
Product description	WLAN-LTE-Router
Model No.	CCU5
Additional Model(s)	None
Brand Name(s)	None
Hardware version	C/BWIA3
Firmware / Software version	1.0.119
	FCC-ID: 2AHHACCU5 IC: N/A
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 ..... : 2016-01-06

Date (s) of performance of tests ..... : 2016-02-12 - 2016-02-26

Compiled by ..... : Christian Weber

Tested by (+ signature) ..... : Burkhard Pudell B. Pudell
(Responsible for Test)

Approved by (+ signature) ..... : Christian Weber C. Weber
(Head of Lab)

Date of issue ..... : 2016-03-24

Total number of pages ..... : 77

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.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

Additional comments:

Test case selection is based on full modular approval of licensed transmitter module used by the EUT. The EUT uses a 2G/3G/4G module with full modular approval according to FCC and IC rules. For details about the radio module see EUT description in section 1.

Version History

Version	Issue Date	Remarks	Revised by
01	2016-03-10	Initial Release	
02	2016-03-24	Hard- and Software Version corrected	C. Weber

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1 Equipment (Test item) Description

Description	WLAN-LTE-Router		
Model	CCU5		
Additional Model(s)	None		
Brand Name(s)	None		
Serial number	None		
Hardware version	C/BWIA3		
Software / Firmware version	1.0.119		
FCC-ID	2AHHACCU5		
IC	N/A		
Equipment type	End product		
Equipment classification	Mobile Device (Human Body distance > 20 cm)		
Radio type	Transceiver		
Radio technology	W-CDMA / LTE		
Operating frequency range	LTE 13 : TX = 777 - 787 MHz, RX = 746 - 756 MHz FDD IV : TX = 1710 - 1755 MHz, RX = 2110 - 2155 MHz LTE 4 : TX = 1710 - 1755 MHz, RX = 2110 - 2155 MHz		
Assigned frequency band	FCC: 776 - 787 MHz ISED: 777 - 787MHz FCC/ISED: 1710 - 1755 MHz		
Main test frequencies LTE FDD 13	F_{LOW}	CH : 23205 UL: 779.5 MHz	CH : 5205 DL: 748.5 MHz
	F_{MID}	CH : 23230 UL: 782.0 MHz	CH : 5230 DL: 751.0 MHz
	F_{HIGH}	CH : 23255 UL: 784.5 MHz	CH : 5255 DL: 753.5 MHz
Main test frequencies LTE FDD 4	F_{LOW}	CH : 19957 UL: 1710.0 MHz	CH : 1950 DL: 2110.0 MHz
	F_{MID}	CH : 20175 UL: 1732.5 MHz	CH : 2175 DL: 2132.5 MHz
	F_{HIGH}	CH : 20393 UL: 1754.3 MHz	CH : 2393 DL: 2154.3 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
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, 2x RX		

Radio module	Type	GSM/3G module
	Model	ME909Tu-565
	Manufacturer	Huawei
	HW Version	P/N:55010129
	SW Version	00.02.08_US
	FCC-ID	QISME909TU-565
	IC	N/A
Antenna 1	Type	external dedicated
	Model	AN00899758
	Manufacturer	Techship
	Gain	2.14 dBi
Antenna 2	Type	external dedicated
	Model	AN00899758
	Manufacturer	Techship
	Gain	2.14 dBi
Manufacturer	lesswire GmbH Rudower Chaussee 30 12489 Berlin 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

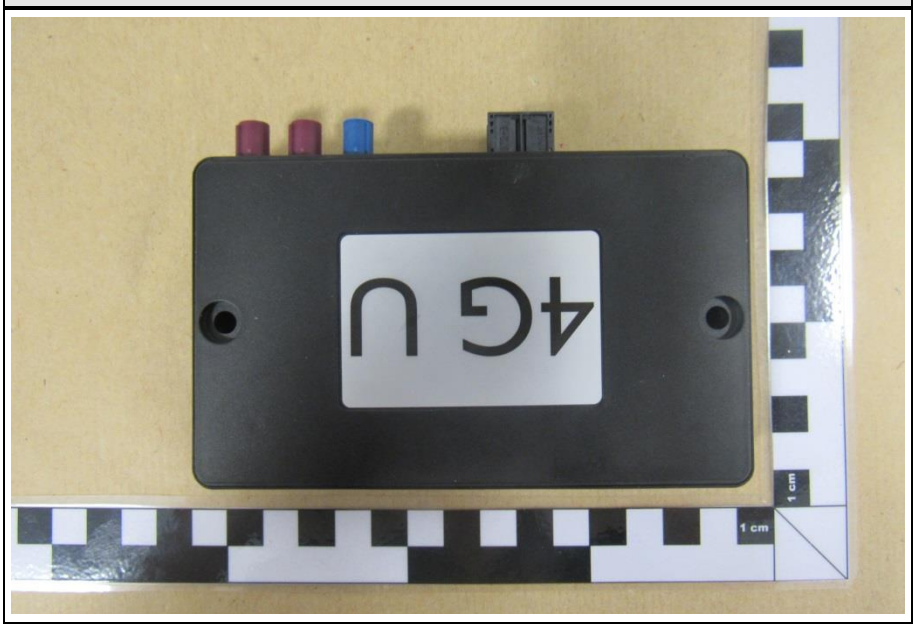
1.1 Photos – Equipment External

EUT FRONT

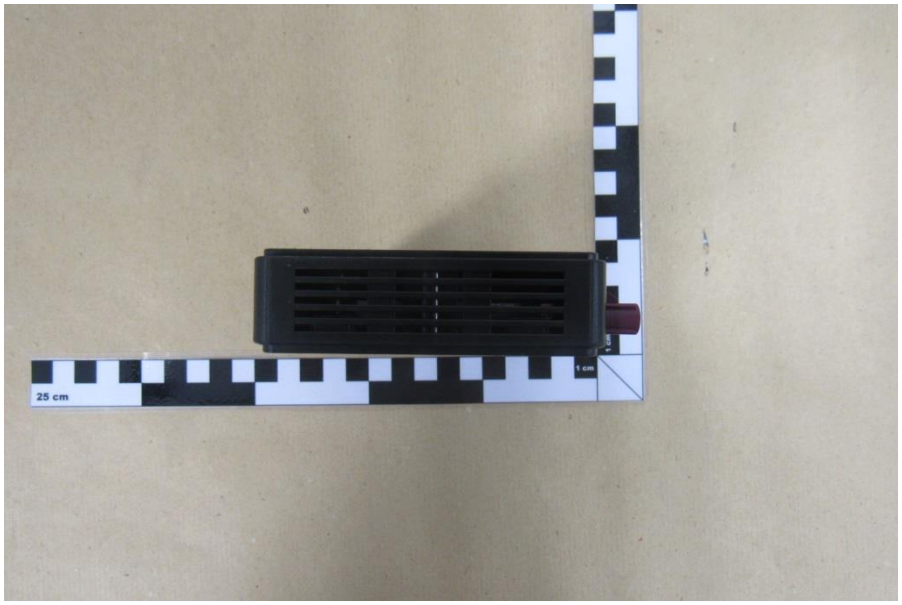
EUT BACK

EUT TOP

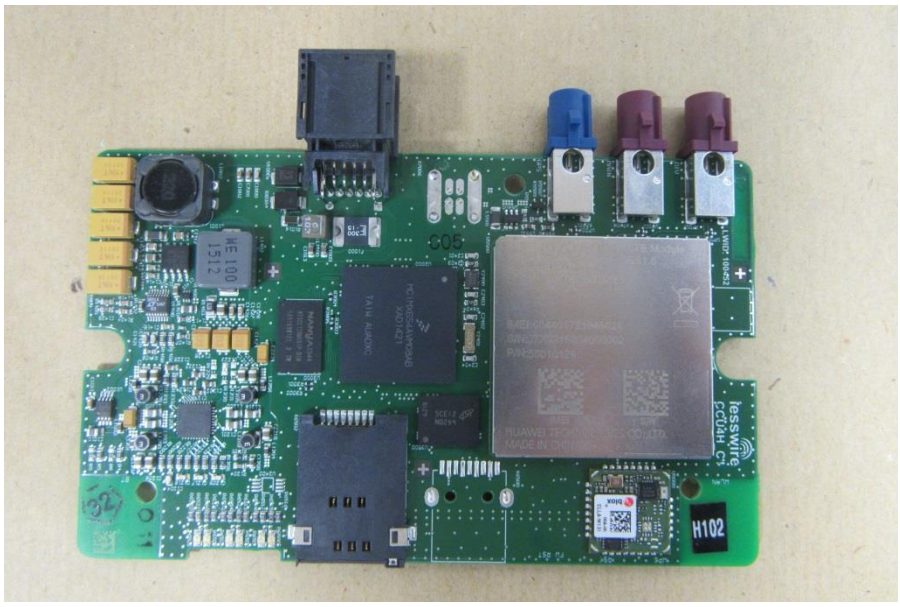
EUT BOTTOM

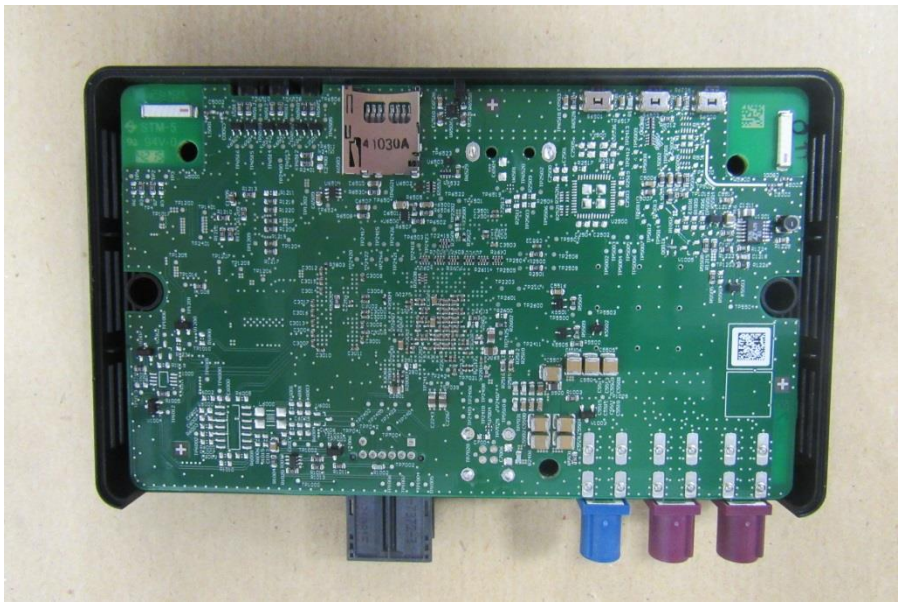


EUT LEFT

EUT RIGHT


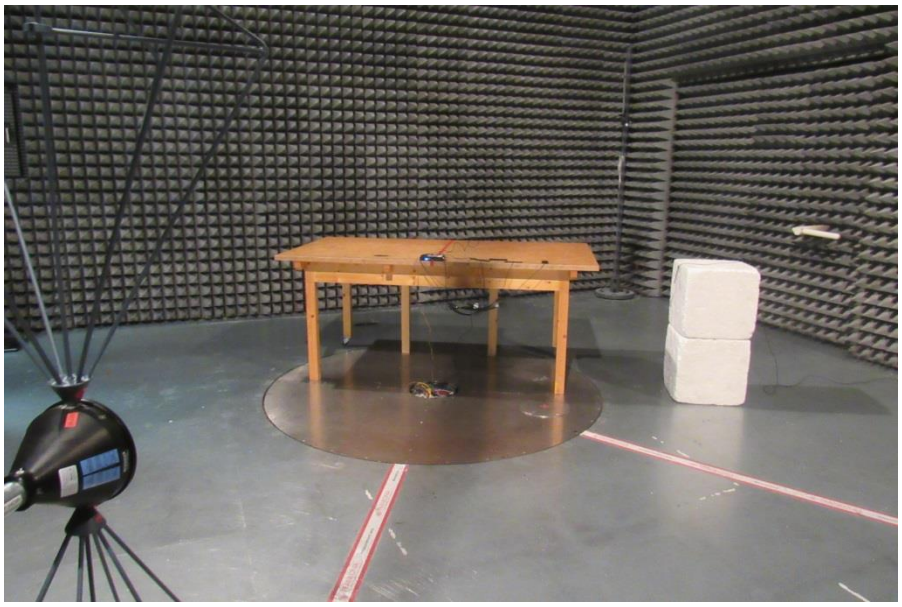
1.2 Photos – Equipment internal

EUT PCB FRONT


EUT PCB BACK


EUT 2-3G MODULE FRONT

1.3 Photos – Test setup

TESTSETUP


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	
WCDMA IV	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 4 QPSK	General conditions:	EUT powered by battery. External GSM and external GPS antenna connected. Active call to communication tester.
	Radio conditions:	Mode = transmit Modulation = QSPK Bandwidth = 20MHz RB allocation = RB : 100% Power level = Maximum
LTE 4 QAM	General conditions:	EUT powered by battery. External GSM and external GPS antenna connected. Active call to communication tester.
	Radio conditions:	Mode = transmit Modulation = 16-QAM Bandwidth = 20MHz RB allocation = RB : 100% Power level = Maximum
LTE 13 QPSK	General conditions:	EUT powered by battery. External GSM and GPS antenna connected. Active call to communication tester.
	Radio conditions:	Mode = transmit Modulation = QSPK Bandwidth = 10MHz RB allocation = RB : 100% Power level = Maximum
LTE 13 QAM	General conditions:	EUT powered by battery. External GSM and GPS antenna connected. Active call to communication tester.
	Radio conditions:	Mode = transmit Modulation = 16-QAM Bandwidth = 10MHz RB allocation = RB : 100% Power level = Maximum

WCDMA - RX	General conditions:	EUT powered by battery. External GSM and external GPS antenna connected.
	Radio conditions:	Mode = receive Connection = Sign. RAB Cell FACH
LTE 4 - RX	General conditions:	EUT powered by battery. External GSM and external GPS antenna connected.
	Radio conditions:	Mode = receive Connection = RMC Modulation = QPSK BW10 RB allocation = 0 up / 0 down
LTE 13 - RX	General conditions:	EUT powered by battery. External GSM and external GPS antenna connected.
	Radio conditions:	Mode = receive Connection = RMC Modulation = QPSK BW20 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	2014.1.15

Occupied Bandwidth					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Spectrum Analyzer	R&S	FSP 30	EF00312	2015-02	2016-02

Radiated power					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Fully-anechoic chamber	Frankonia	AC 3	EF00199	--	--
Spectrum Analyzer	R&S	FSIQ 26	EF00242	2015-04	2016-04
Biconical Antenna	R&S	HK 116	EF00012	2013-02	2016-02
LPD Antenna	R&S	HL 223	EF00187	2014-03	2017-03
LPD Antenna	R&S	HL 025	EF00327	2015-10	2018-10

Radiated spurious emissions					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
Semi-anechoic chamber	Frankonia	AC 1	EF00062	--	--
Spectrum Analyzer	R&S	FSEK 30	EF00168	2016-01	2017-01
Biconical Antenna	R&S	HK 116	EF00012	2013-02	2016-02
LPD Antenna	R&S	HL 223	EF00212	2013-02	2016-02
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, IC RSS-130, IC 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		Informational only
FCC § 2.1055 FCC § 27.54 IC RSS-130 4.3 IC RSS-139 6.4	Frequency stability	FCC § 27.54 IC RSS-130 4.3 IC RSS-139 6.4	N/R	
FCC § 27.50 (b)(10)	Effective radiated power	ANSI/TIA-603-D KDB 971168	PASS	
FCC § 27.50 (d)(4) IC RSS-130 4.4 IC RSS-139 6.5	Equivalent isotropic radiated power	ANSI/TIA-603-D KDB 971168	PASS	
FCC § 27.50 (d)(5) IC RSS-130 4.4 IC RSS-139 6.5	Peak to average ratio	KDB 971168	N/R	
FCC § 27.53(c) FCC § 27.53(h) IC RSS-130 4.6 IC RSS-139 6.6	Band-edge compliance	KDB 971168	N/R	
FCC § 27.53(c) FCC § 27.53(h) IC RSS-130 4.6 IC RSS-139 6.6	Conducted out-of-band emissions	KDB 971168	N/R	
FCC § 27.53(c) FCC § 27.53(h) IC RSS-130 4.6 IC RSS-139 6.6	Radiated out-of-band emissions	ANSI/TIA-603-D KDB 971168	PASS	
RSS-130 3.1 RSS-139 3.1 IC RSS-Gen 7.1	Receiver radiated spurious emissions	IC RSS-Gen 7.1	PASS	
Remarks:				

3 Test Conditions and Results

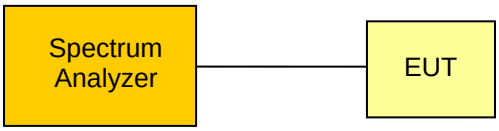
3.1 Test Conditions and Results – Occupied Bandwidth

Occupied Bandwidth acc. to FCC 2.1046, IC RSS-130, IC RSS-139	
Test according to measurement reference	Reference Method
	KDB 971168 / RSS-Gen 6.6
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 – WCDMA IV

Channel	Frequency [MHz]	Mode	Occupied Bandwidth [MHz]
F_{LOW}	1712.4	HSPA	4.168
F_{MID}	1732.6	HSPA	4.168
F_{HIGH}	1752.4	HSPA	4.168

Test results – LTE 13 QPSK

Channel	Frequency [MHz]	Mode	Occupied Bandwidth [MHz]
F_{LOW}	779,5	QPSK 5	4.709
F_{MID}	782,0	QPSK 5	4.629
F_{HIGH}	784,5	QPSK 5	4.609
F_{MID}	782,0	QPSK 10	9.058

Comments:

Test results – LTE 13 - QAM			
Channel	Frequency [MHz]	Mode	Occupied Bandwidth [MHz]
F_{LOW}	779,5	16-QAM 5	4.769
F_{MID}	782,0	16-QAM 5	4.649
F_{HIGH}	784,5	16-QAM 5	4.629
F_{MID}	782,0	16-QAM 10	9.058
Test results – LTE 4 - QPSK			
Channel	Frequency [MHz]	Mode	Occupied Bandwidth [MHz]
F_{LOW}	1710,7	QPSK 1.4	1.106
F_{MID}	1732,5	QPSK 1.4	1.114
F_{HIGH}	1754,3	QPSK 1.4	1.114
F_{LOW}	1711,5	QPSK 3	2.765
F_{MID}	1732,5	QPSK 3	2.895
F_{HIGH}	1753,5	QPSK 3	2.765
F_{LOW}	1712,5	QPSK 5	4.529
F_{MID}	1732,5	QPSK 5	4.809
F_{HIGH}	1752,5	QPSK 5	4.529
F_{LOW}	1715.0	QPSK 10	8.978
F_{MID}	1732,5	QPSK 10	9.018
F_{HIGH}	1750,0	QPSK 10	9.018
F_{LOW}	1717.5	QPSK 15	13.507
F_{MID}	1732,5	QPSK 15	13.707
F_{HIGH}	1747,5	QPSK 15	13.987
F_{LOW}	1720,0	QPSK 20	17.976
F_{MID}	1732,5	QPSK 20	17.855
F_{HIGH}	1745,0	QPSK 20	18.096
Comments:			

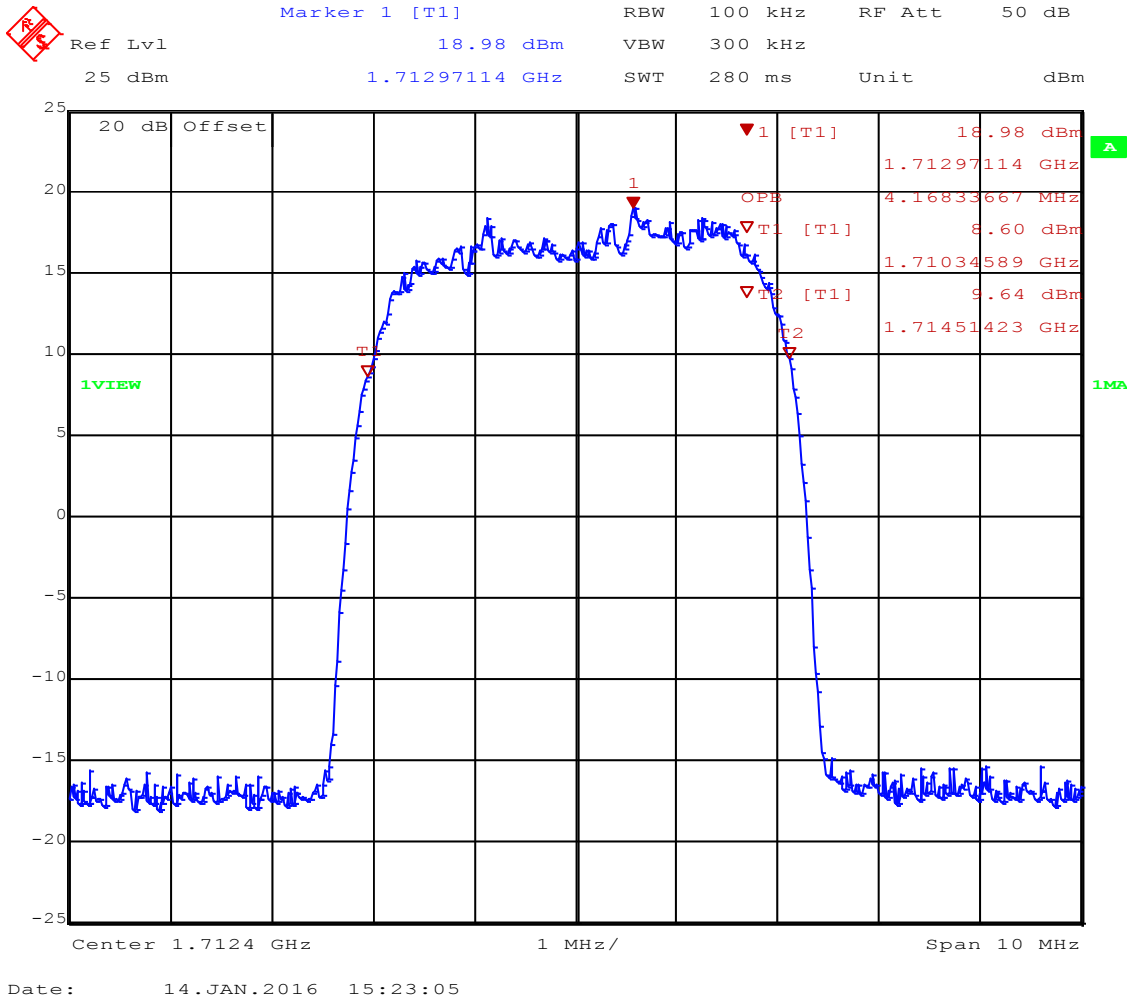
Test results – LTE 4 - QAM			
Channel	Frequency [MHz]	Mode	Occupied Bandwidth [MHz]
F_{LOW}	1710,7	16-QAM 1.4	1.114
F_{MID}	1732,5	16-QAM 1.4	1.114
F_{HIGH}	1754,3	16-QAM 1.4	1.106
F_{LOW}	1711,5	16-QAM 3	2.785
F_{MID}	1732,5	16-QAM 3	2.805
F_{HIGH}	1753,5	16-QAM 3	2.785
F_{LOW}	1712,5	16-QAM 5	4.529
F_{MID}	1732,5	16-QAM 5	4.549
F_{HIGH}	1752,5	16-QAM 5	4.549
F_{LOW}	1715.0	16-QAM 10	9.058
F_{MID}	1732,5	16-QAM 10	9.098
F_{HIGH}	1750,0	16-QAM 10	9.058
F_{LOW}	1717.5	16-QAM 15	13.467
F_{MID}	1732,5	16-QAM 15	13.426
F_{HIGH}	1747,5	16-QAM 15	13.587
F_{LOW}	1720,0	16-QAM 20	17.916
F_{MID}	1732,5	16-QAM 20	17.916
F_{HIGH}	1745,0	16-QAM 20	18.096
Comments:			

Occupied Bandwidth – FDD IV F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	UMTS FDD IV / CH: 1312 / HSUPA-HSDPA
Test Date:	2016-01-14
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.168 MHz

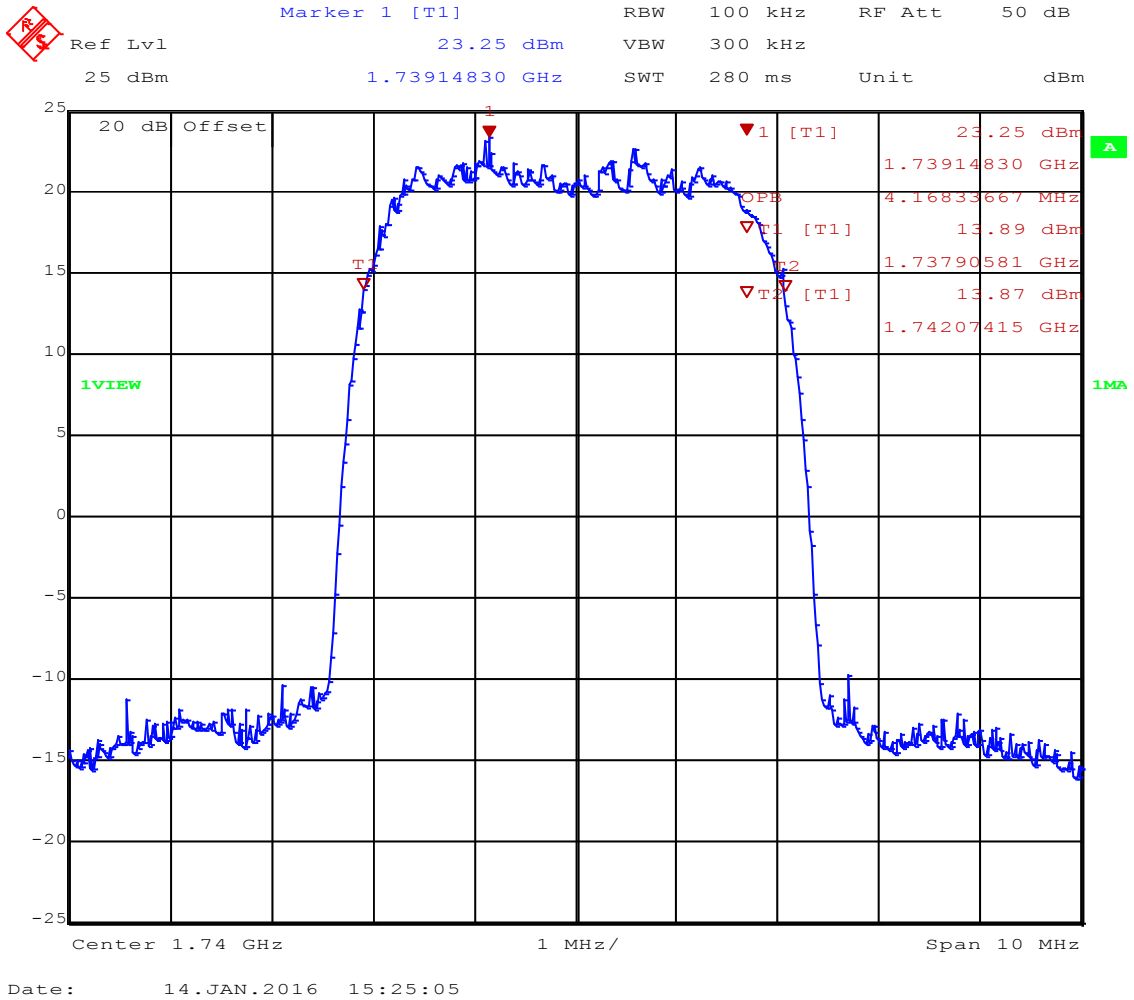


Occupied Bandwidth – FDD IV F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	UMTS FDD IV / CH: 1413 / HSUPA-HSDPA
Test Date:	2016-01-14
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.168 MHz

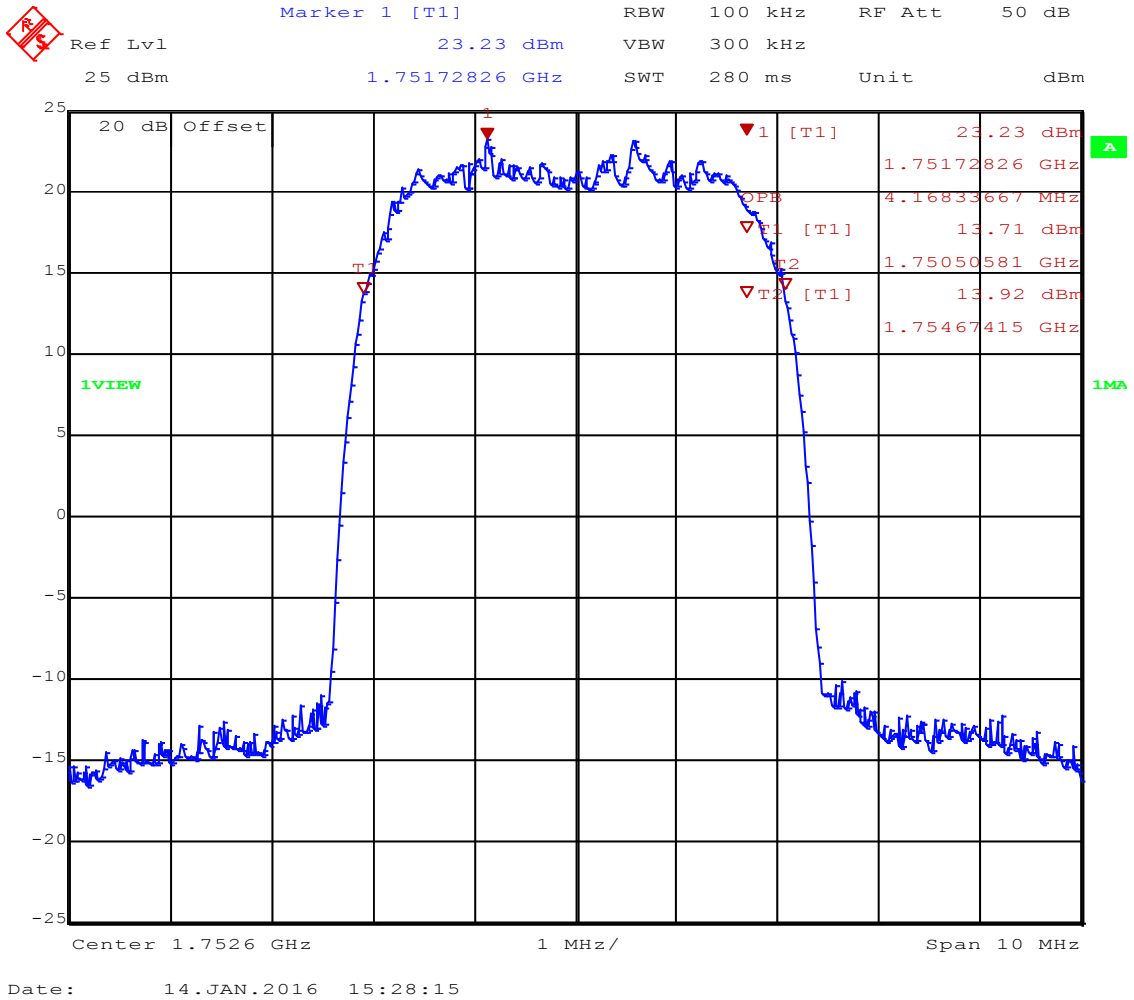


Occupied Bandwidth – FDD IV F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	UMTS FDD IV / CH: 1513 / HSUPA-HSDPA
Test Date:	2016-01-14
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.168 MHz

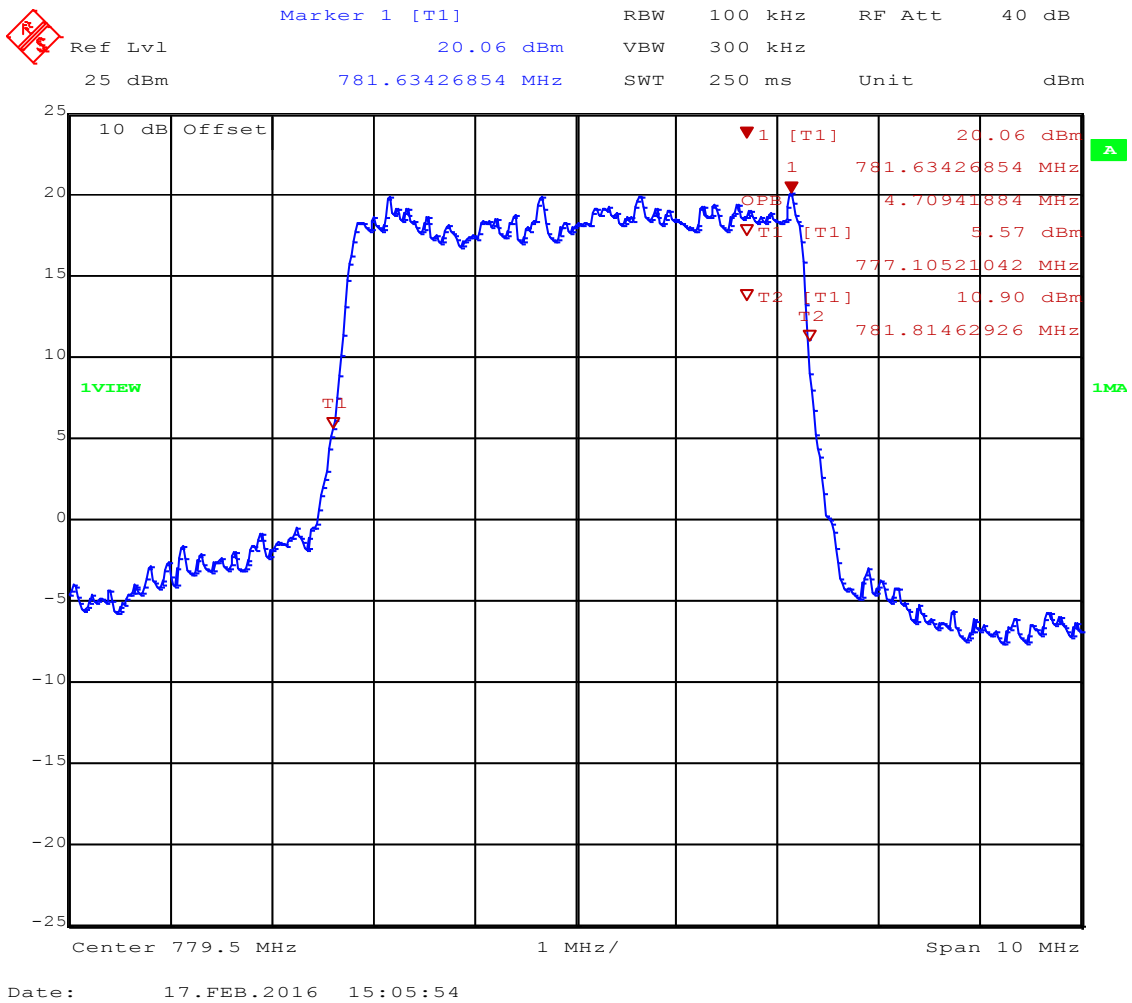


Occupied Bandwidth – LTE 13 QPSK-5 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 13 / CH: 23205 / BW: 5MHz; QPSK
Test Date:	2016-02-17
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.709 MHz

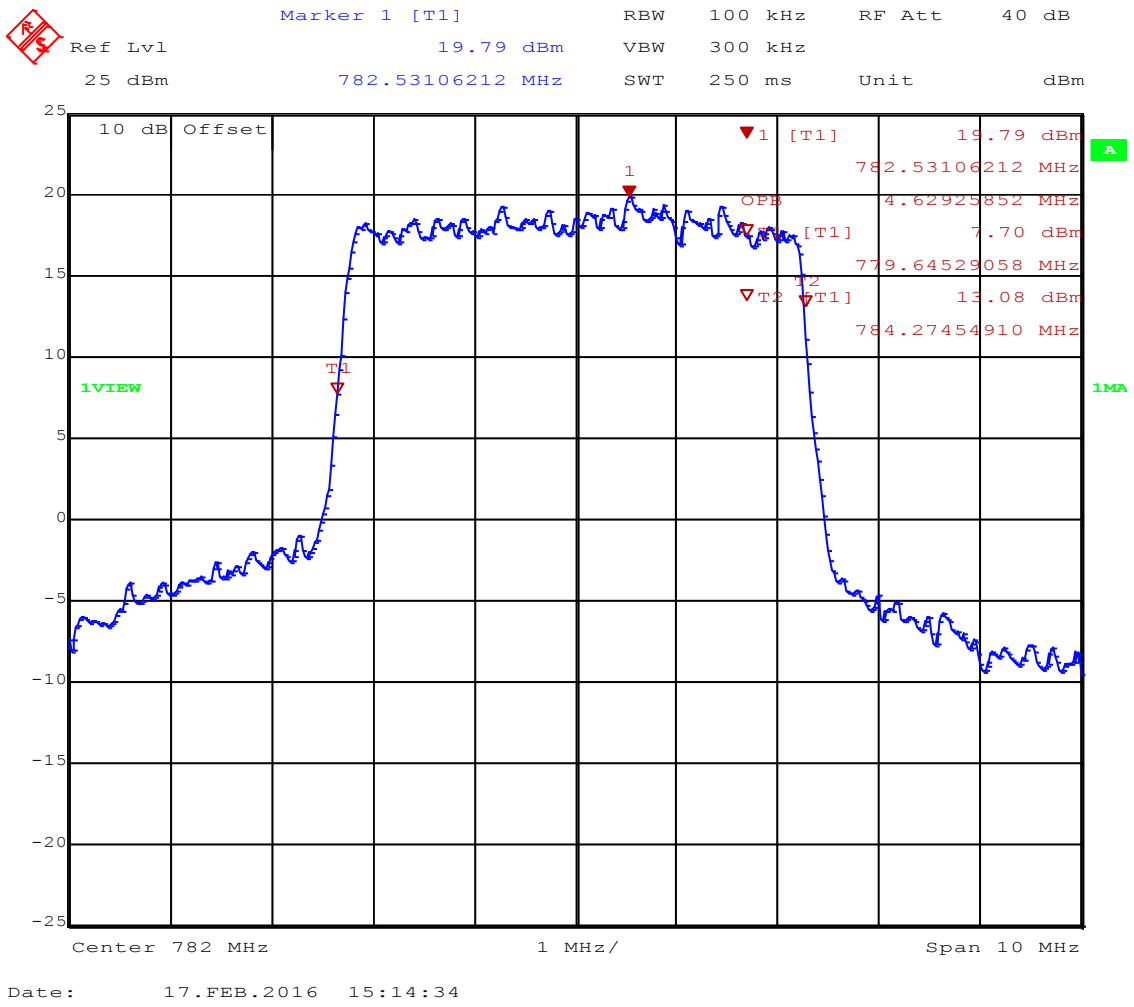


Occupied Bandwidth – LTE 13 QPSK-5 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 13 / CH: 23230 / BW: 5MHz; QPSK
Test Date:	2016-02-17
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.629 MHz

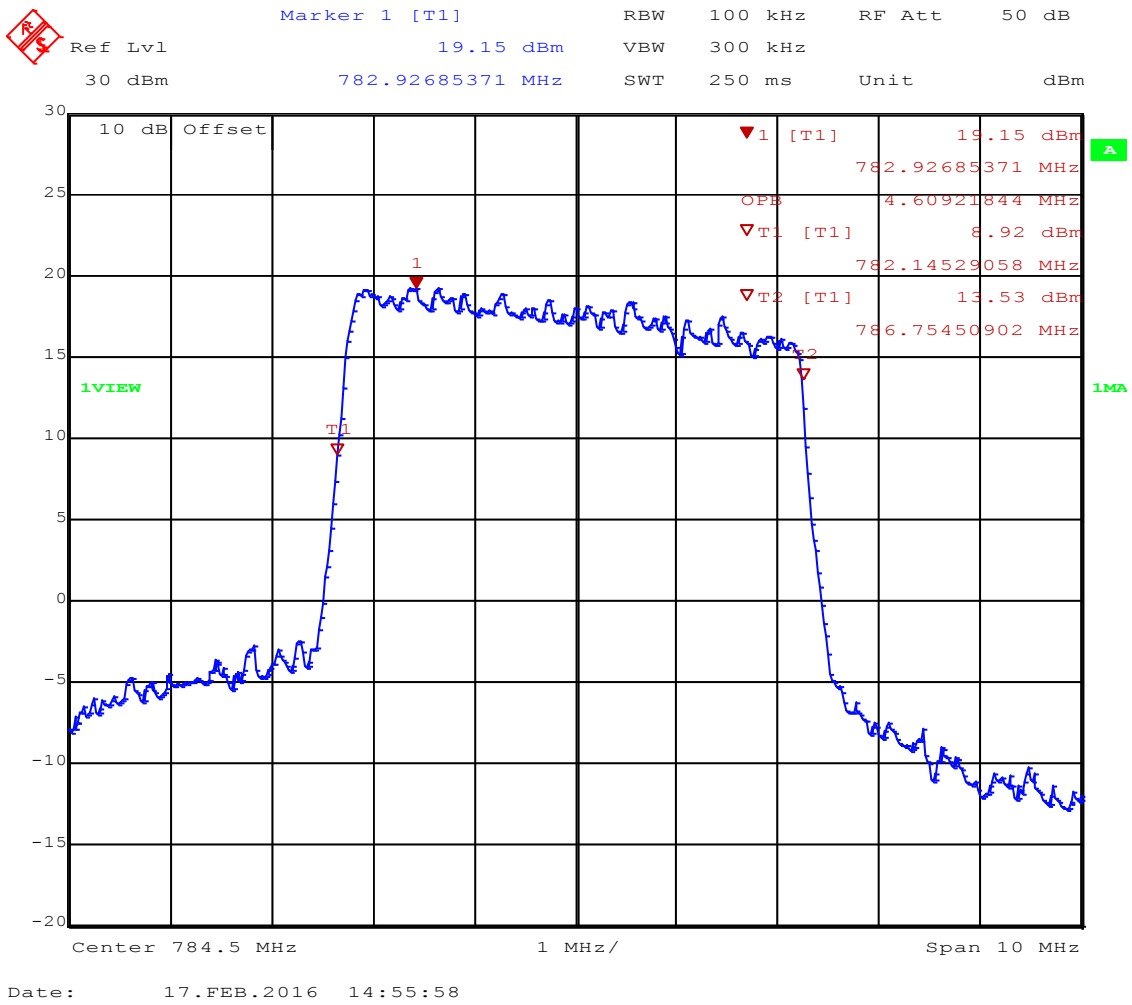


Occupied Bandwidth – LTE 13 QPSK-5 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 13 / CH: 23255 / BW: 5MHz; QPSK
Test Date:	2016-02-17
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.609 MHz

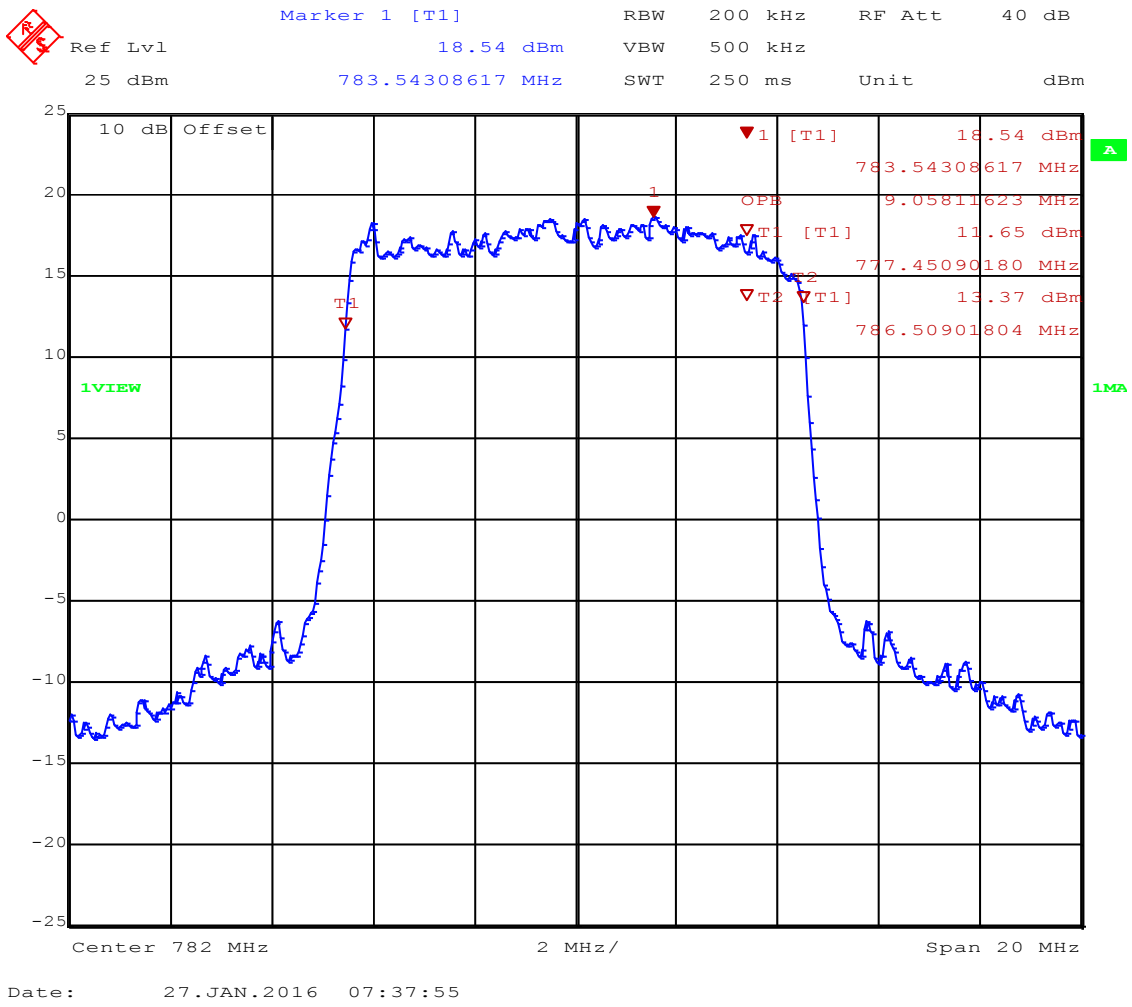


Occupied Bandwidth – LTE 13 QPSK-10 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 13 / CH: 23230 / BW: 10MHz; QPSK
Test Date:	2016-01-27
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 9.058 MHz

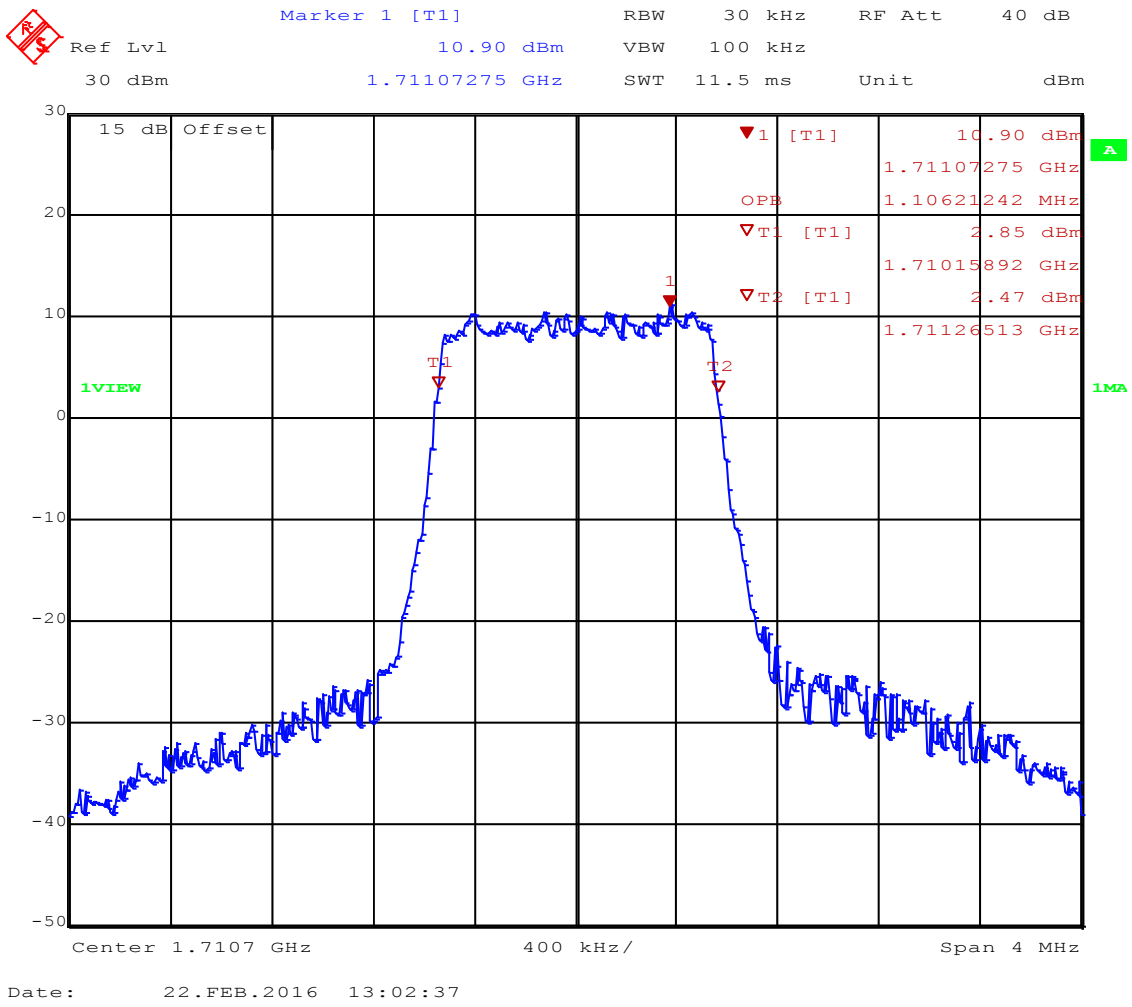


Occupied Bandwidth – LTE 4 QPSK-1.4 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 19957 / BW: 1.4MHz; QPSK
Test Date:	2016-02-22
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 1.114 MHz

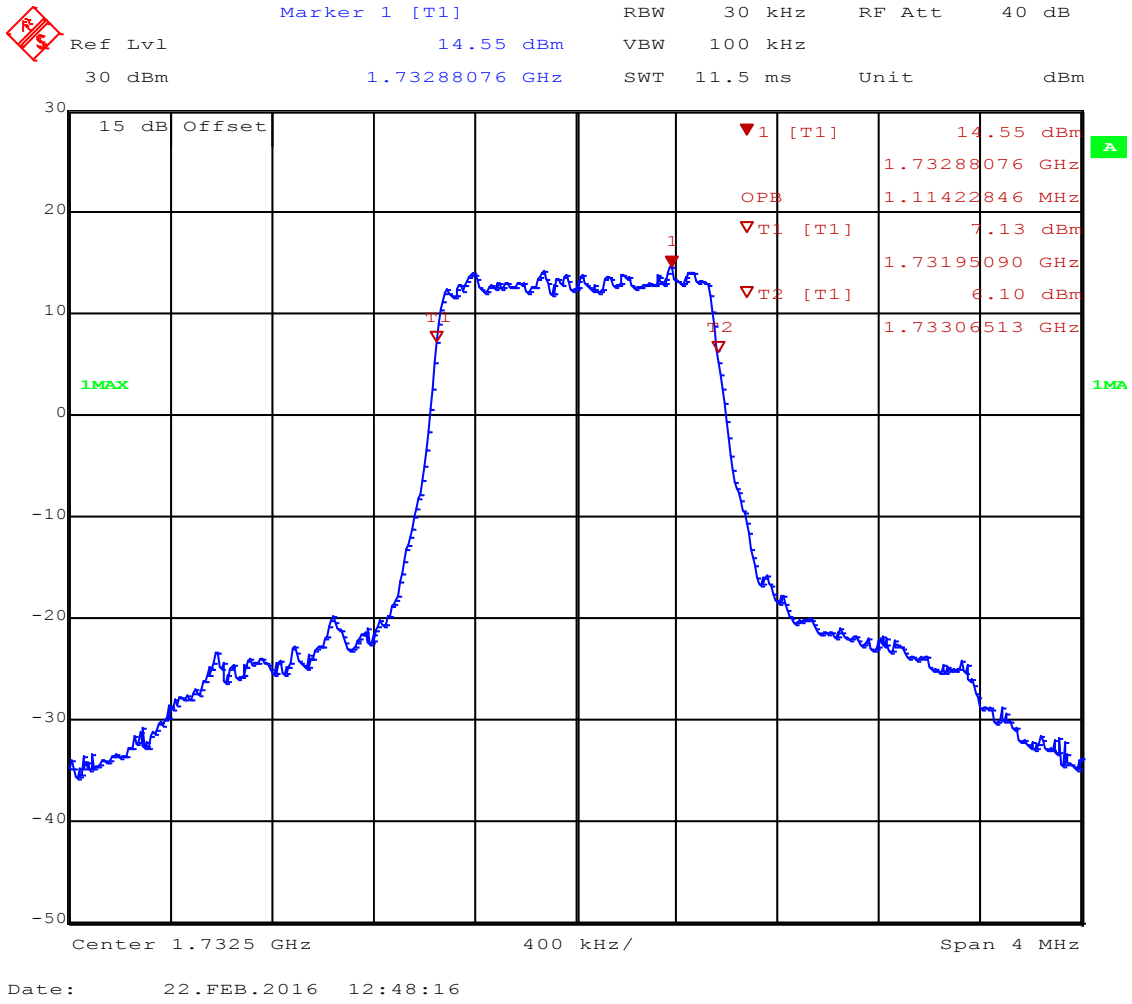


Occupied Bandwidth – LTE 4 QPSK-1.4 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
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:	2016-02-22
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 1.114 MHz

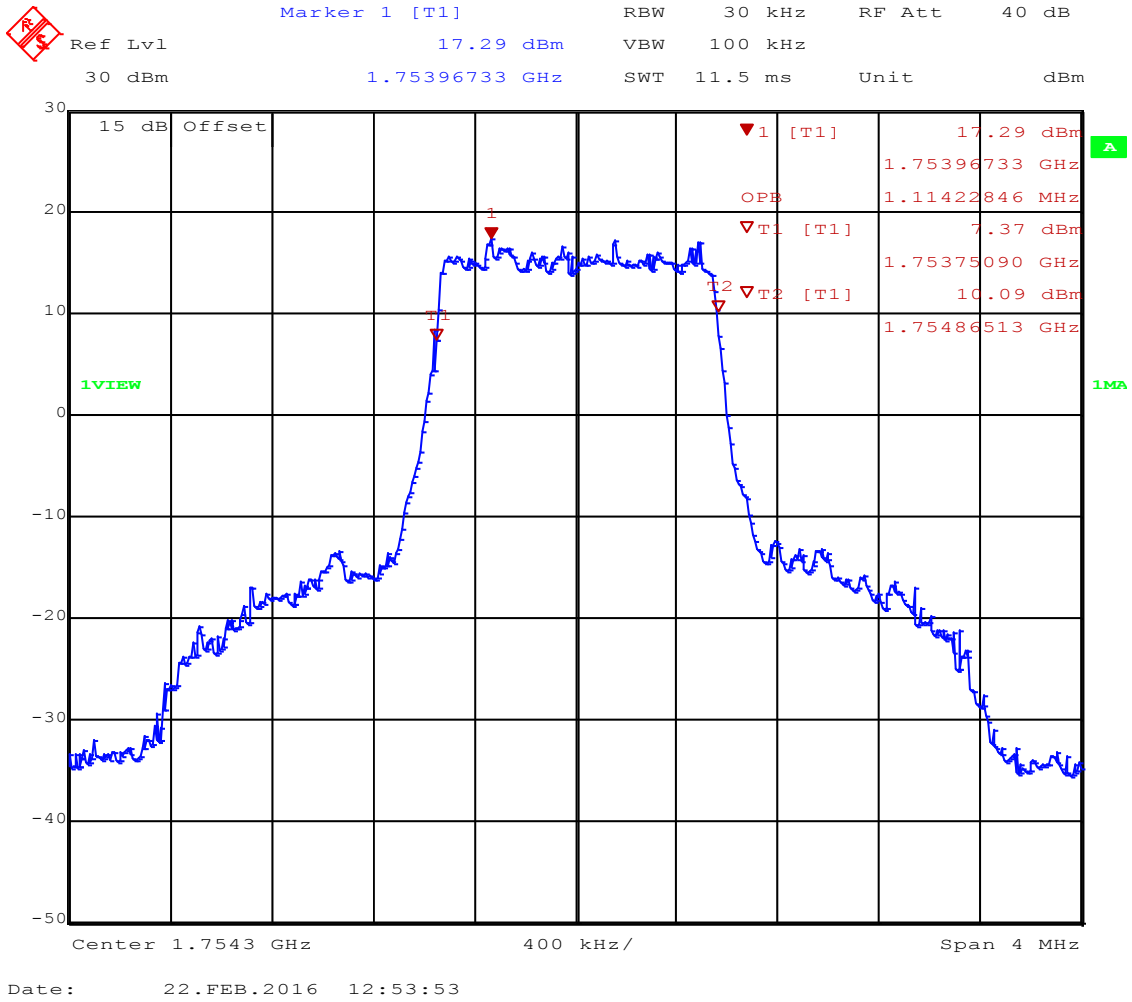


Occupied Bandwidth – LTE 4 QPSK-1.4 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
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:	2016-02-22
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 1.114 MHz

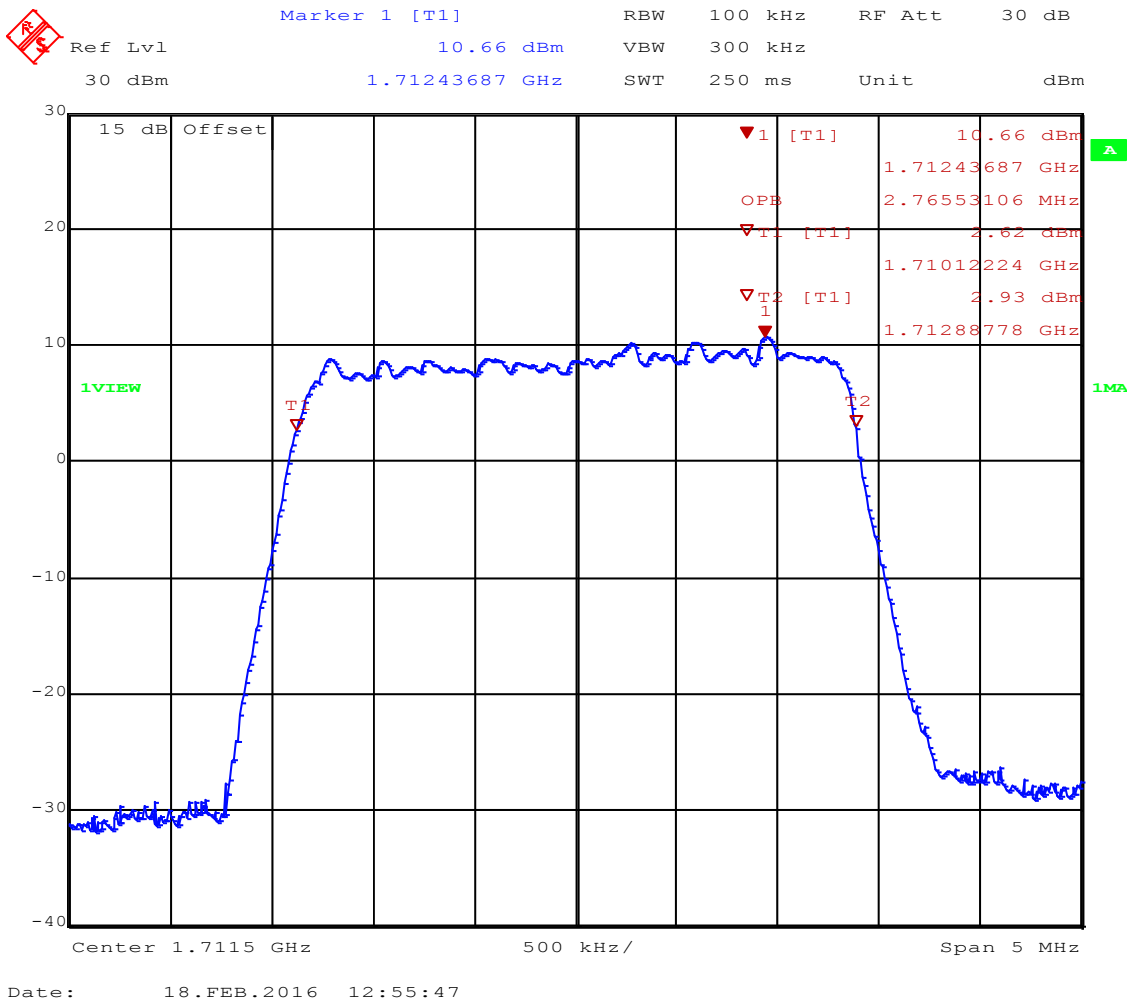


Occupied Bandwidth – LTE 4 QPSK-3 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 19965 / BW: 3MHz; QPSK
Test Date:	2016-02-18
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 2.765 MHz

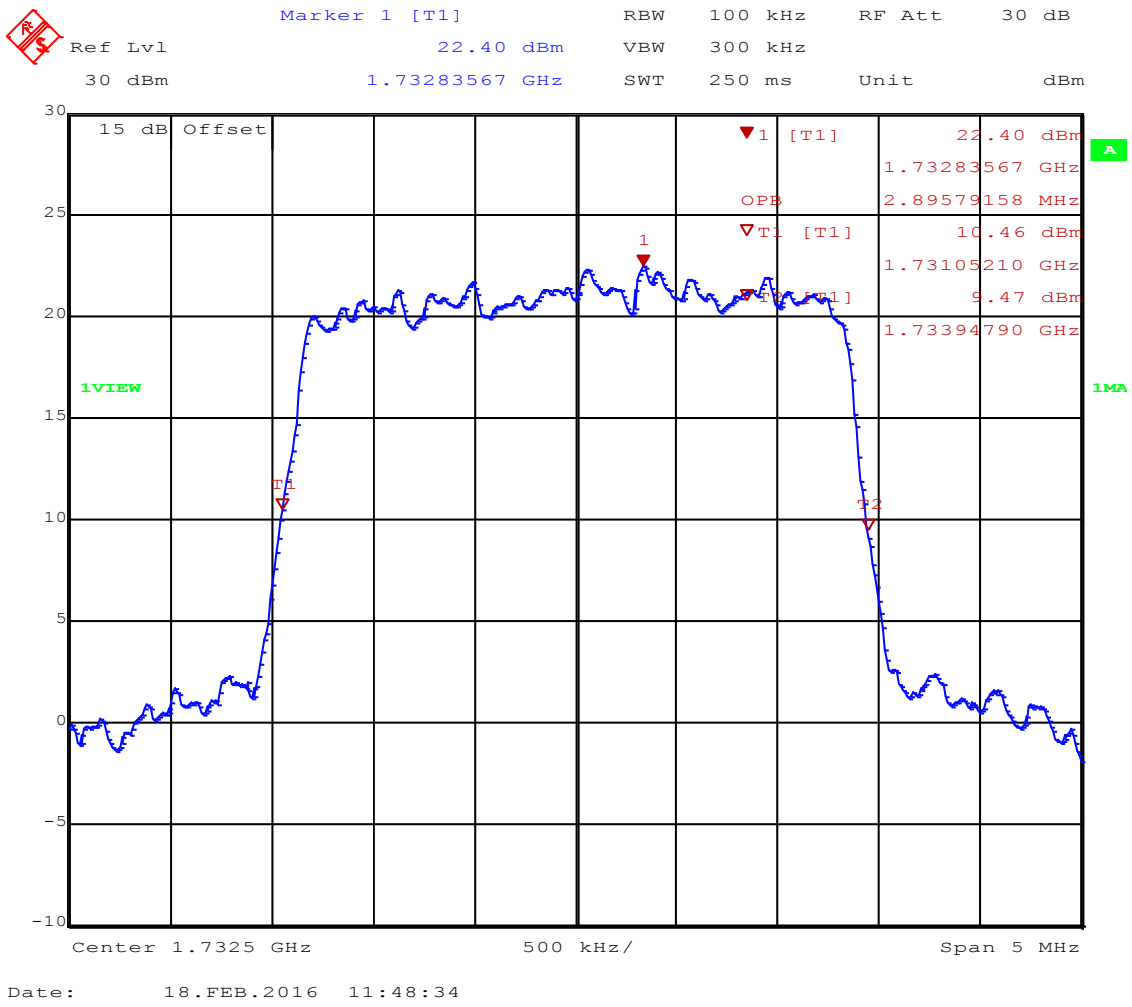


Occupied Bandwidth – LTE 4 QPSK-3 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20175 / BW: 3MHz; QPSK
Test Date:	2016-02-18
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 2.895 MHz

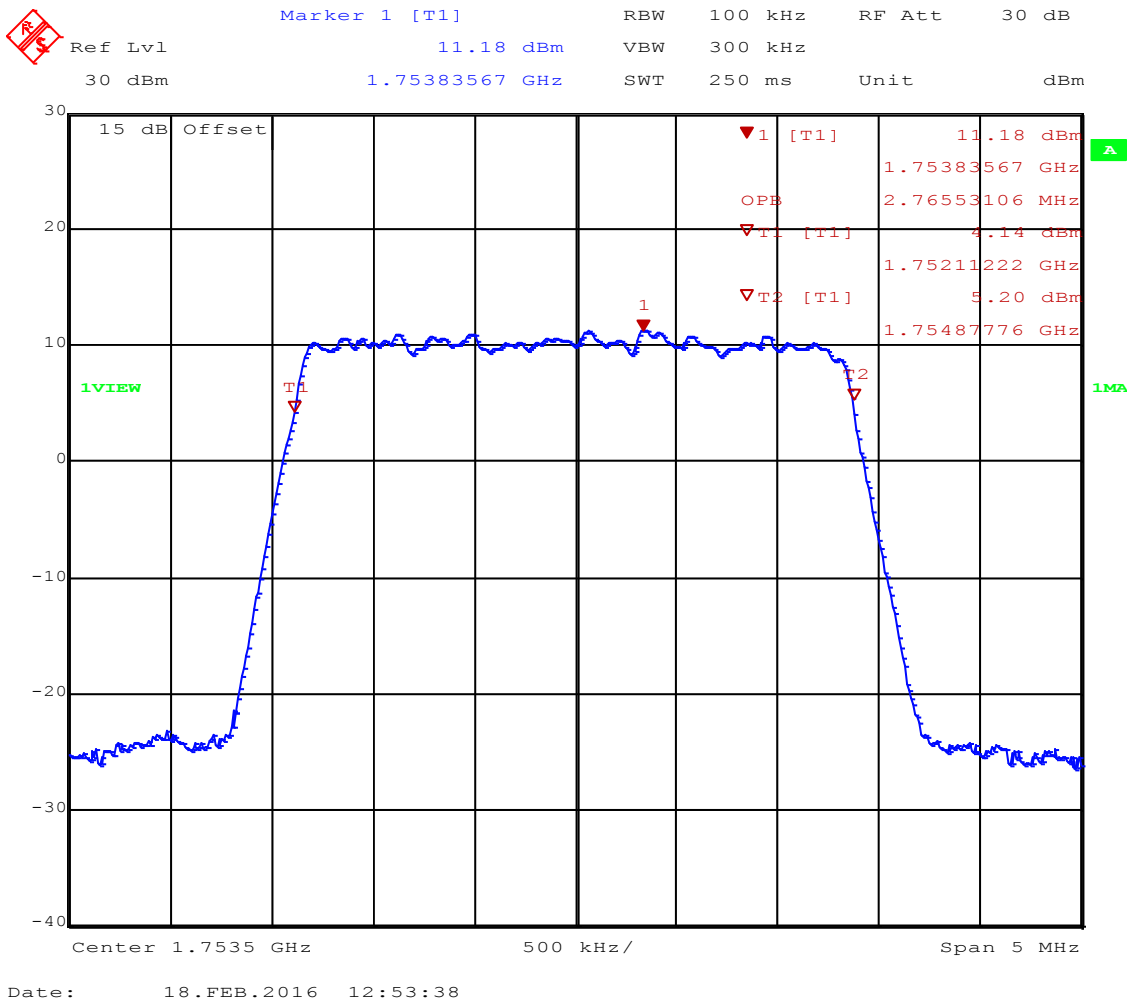


Occupied Bandwidth – LTE 4 QPSK-3 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20385 / BW: 3MHz; QPSK
Test Date:	2016-02-18
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 2.765 MHz

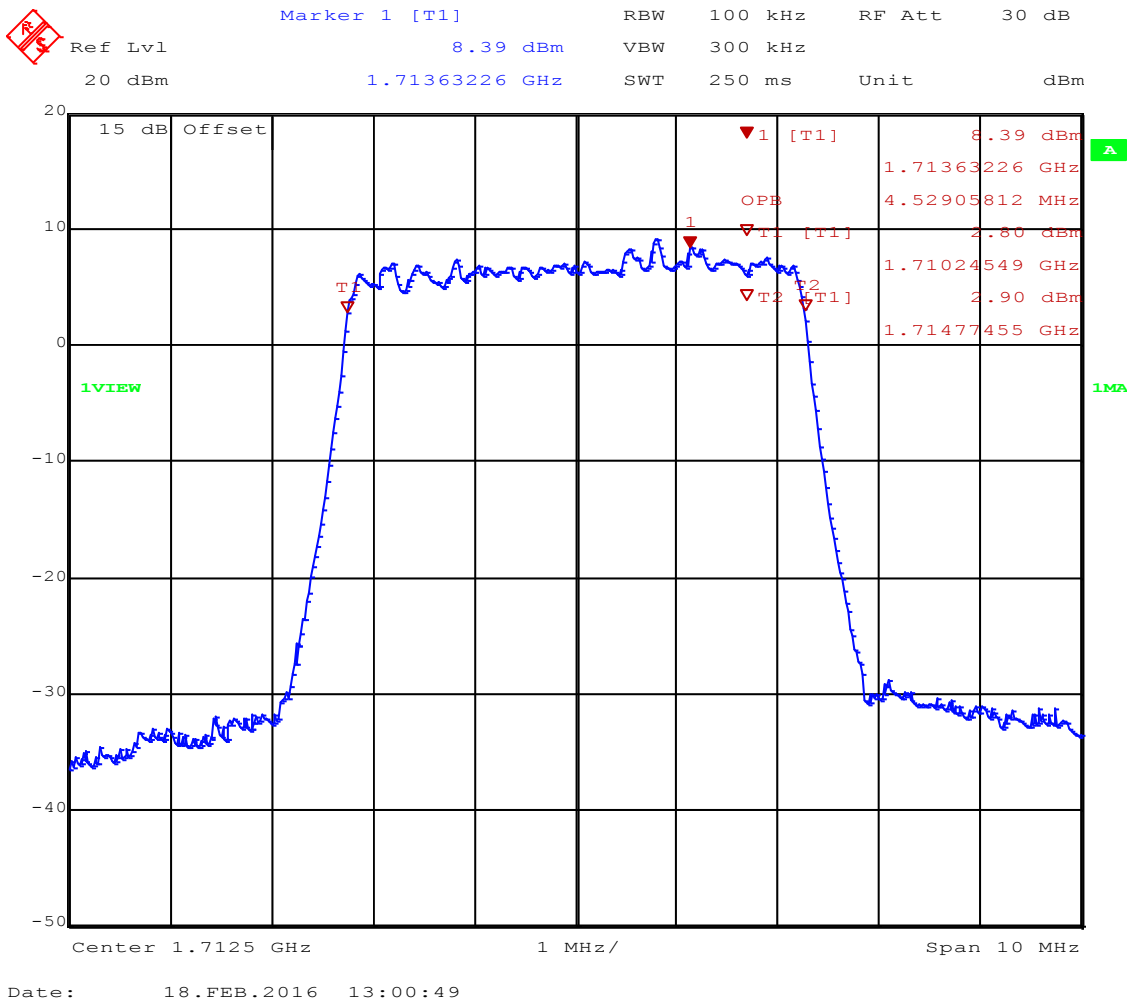


Occupied Bandwidth – LTE 4 QPSK-5 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 19975 / BW: 5MHz; QPSK
Test Date:	2016-02-18
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.529 MHz

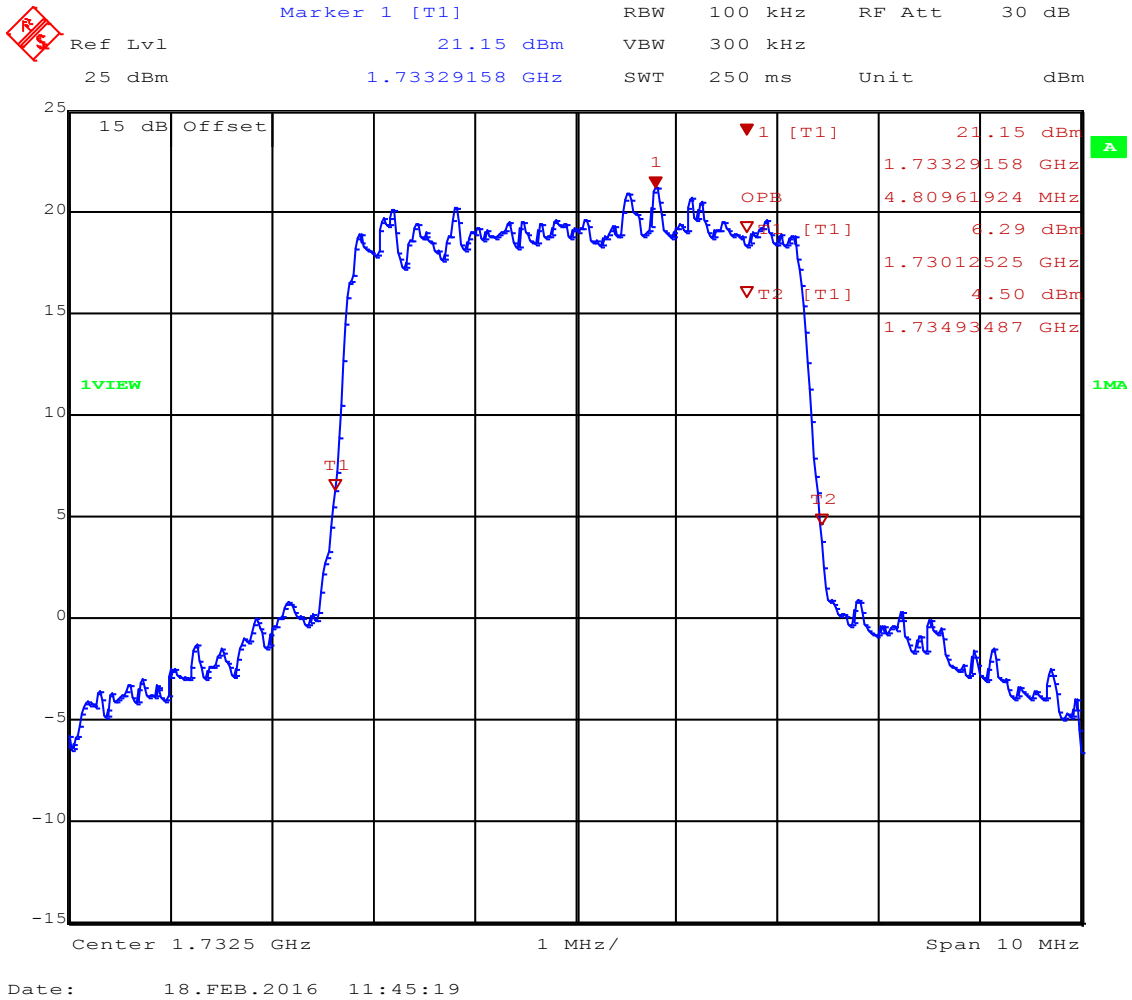


Occupied Bandwidth – LTE 4 QPSK-5 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20175 / BW: 5MHz; QPSK
Test Date:	2016-02-18
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.809 MHz

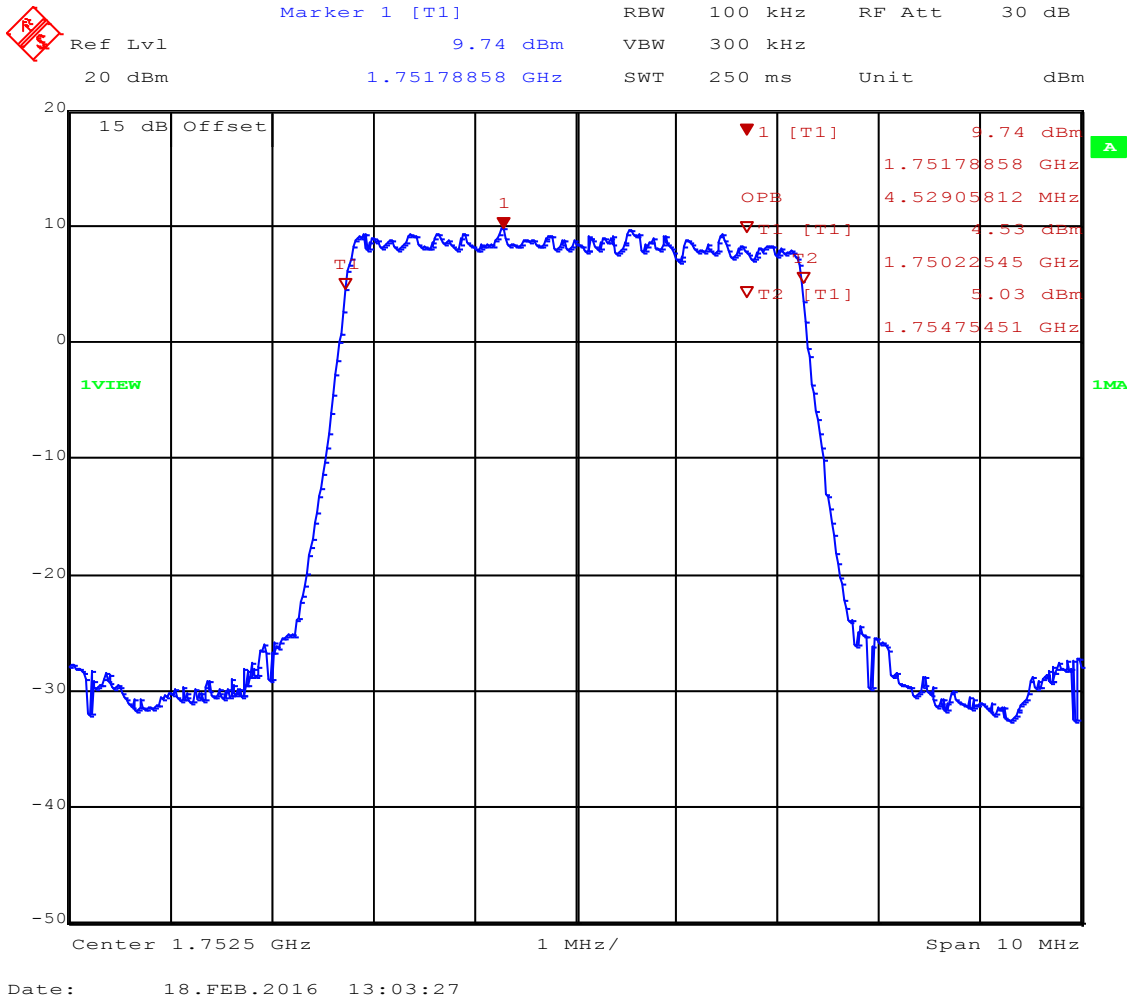


Occupied Bandwidth – LTE 4 QPSK-5 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20375 / BW: 5MHz; QPSK
Test Date:	2016-02-18
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.529 MHz

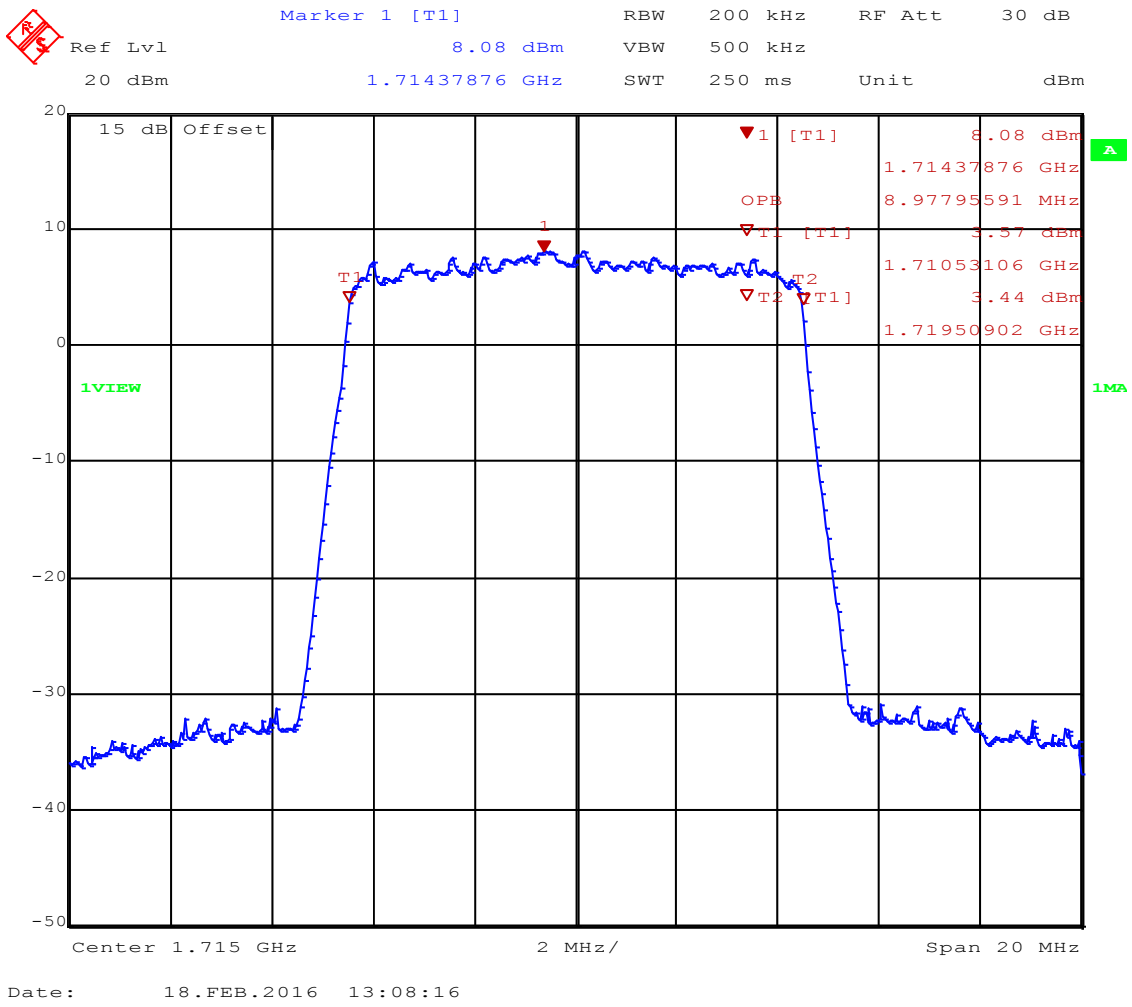


Occupied Bandwidth – LTE 4 QPSK-10 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20000 / BW: 10MHz; QPSK
Test Date:	2016-02-18
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 8.978 MHz

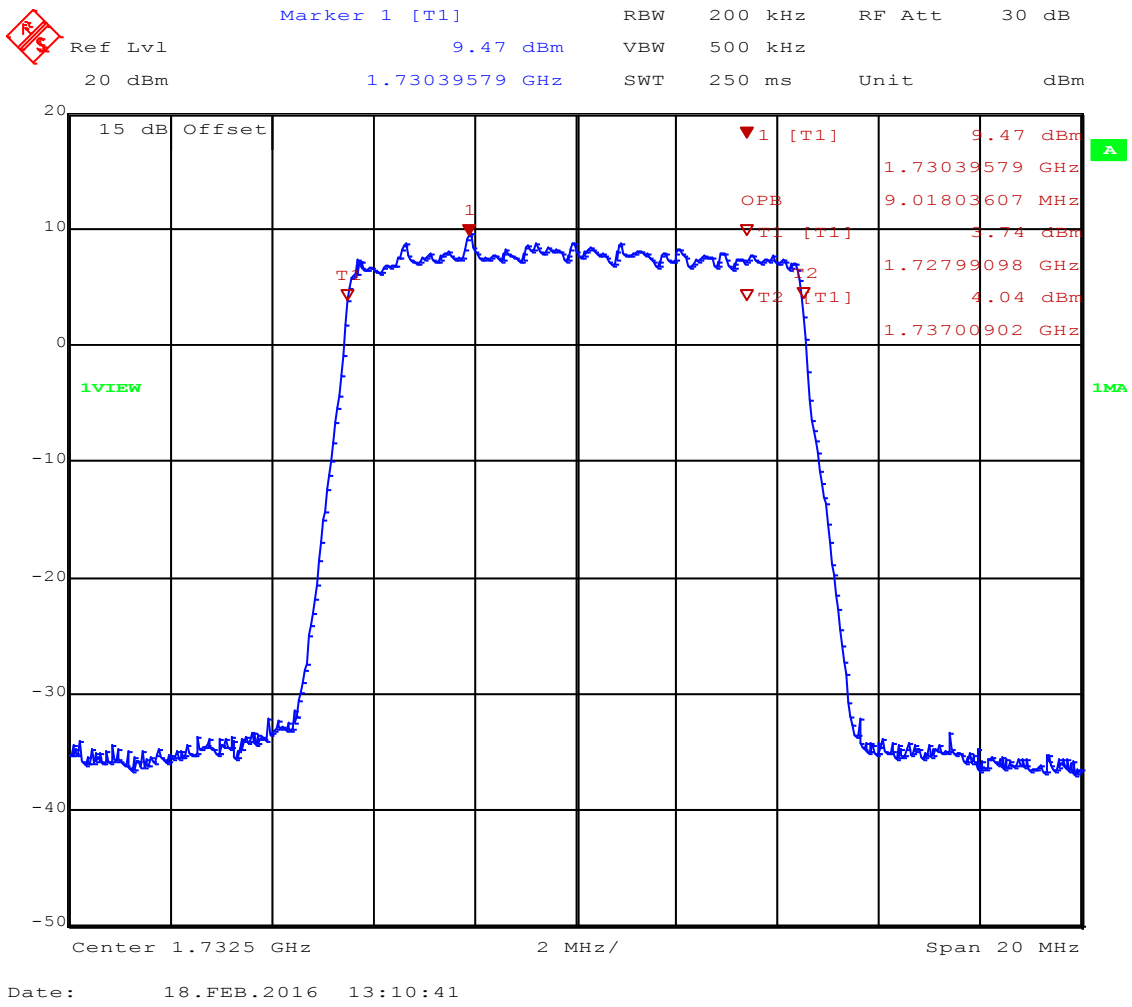


Occupied Bandwidth – LTE 4 QPSK-10 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20175 / BW: 10MHz; QPSK
Test Date:	2016-02-18
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 9.018 MHz

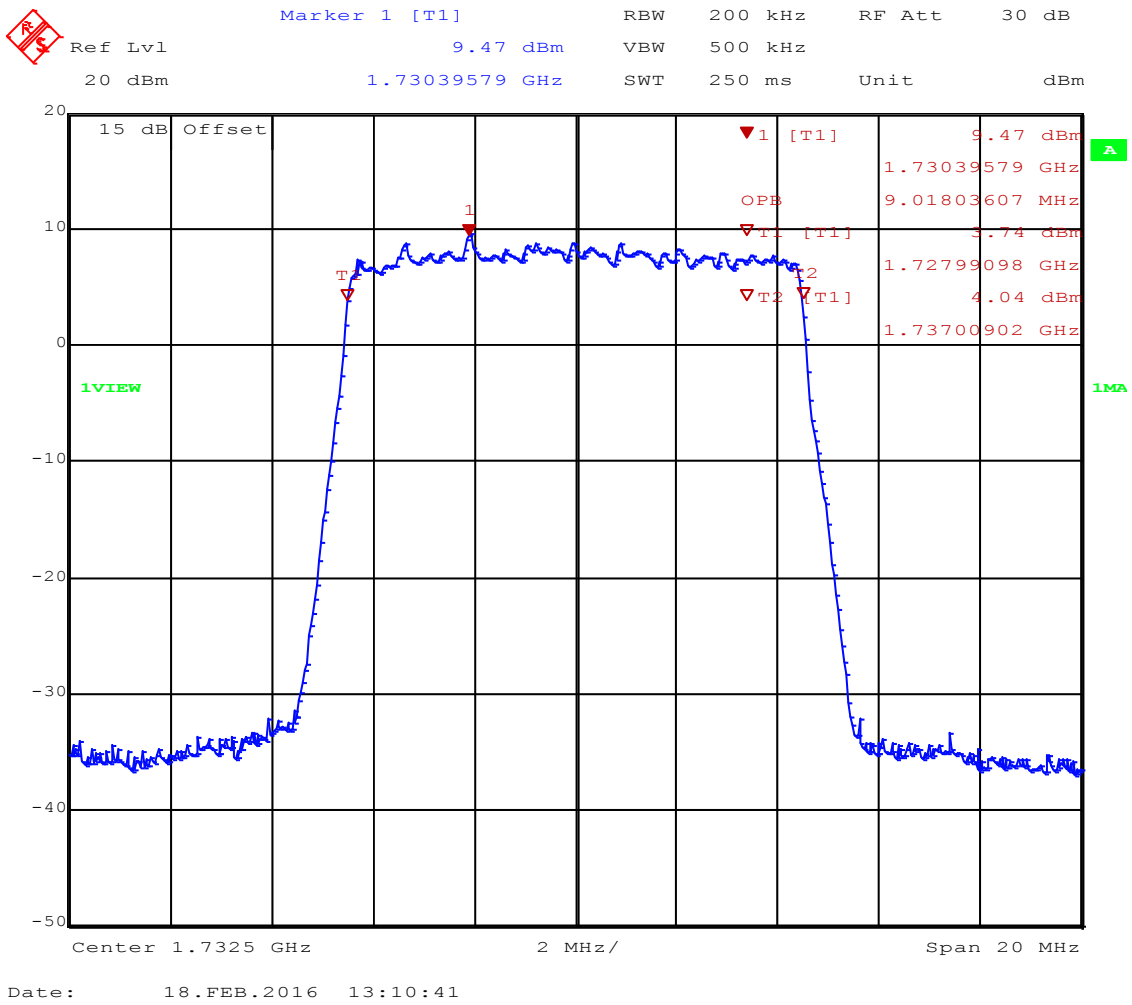


Occupied Bandwidth – LTE 4 QPSK-10 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20175 / BW: 10MHz; QPSK
Test Date:	2016-02-18
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 9.018 MHz

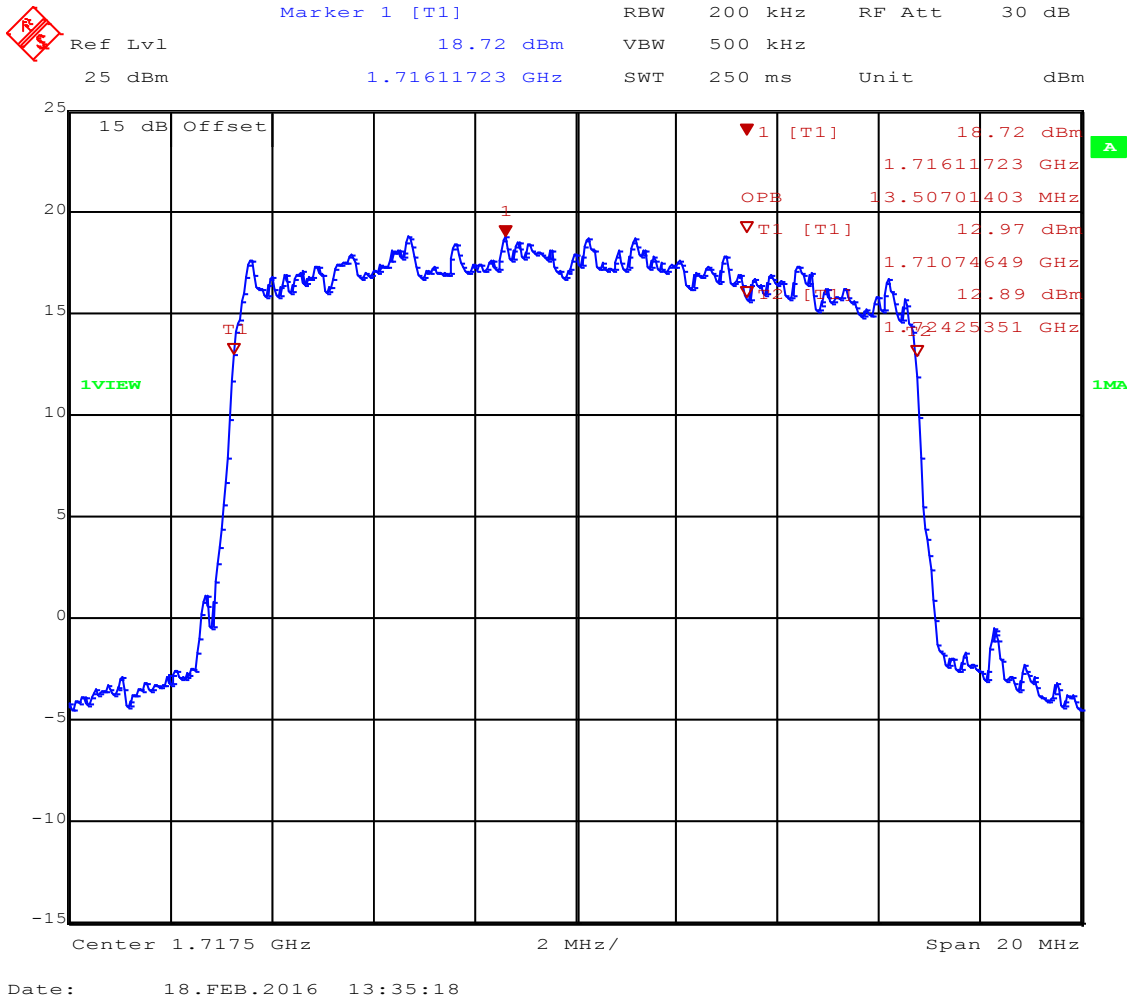


Occupied Bandwidth – LTE 4 QPSK-15 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20025 / BW: 15MHz; QPSK
Test Date:	2016-02-18
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 13.507 MHz

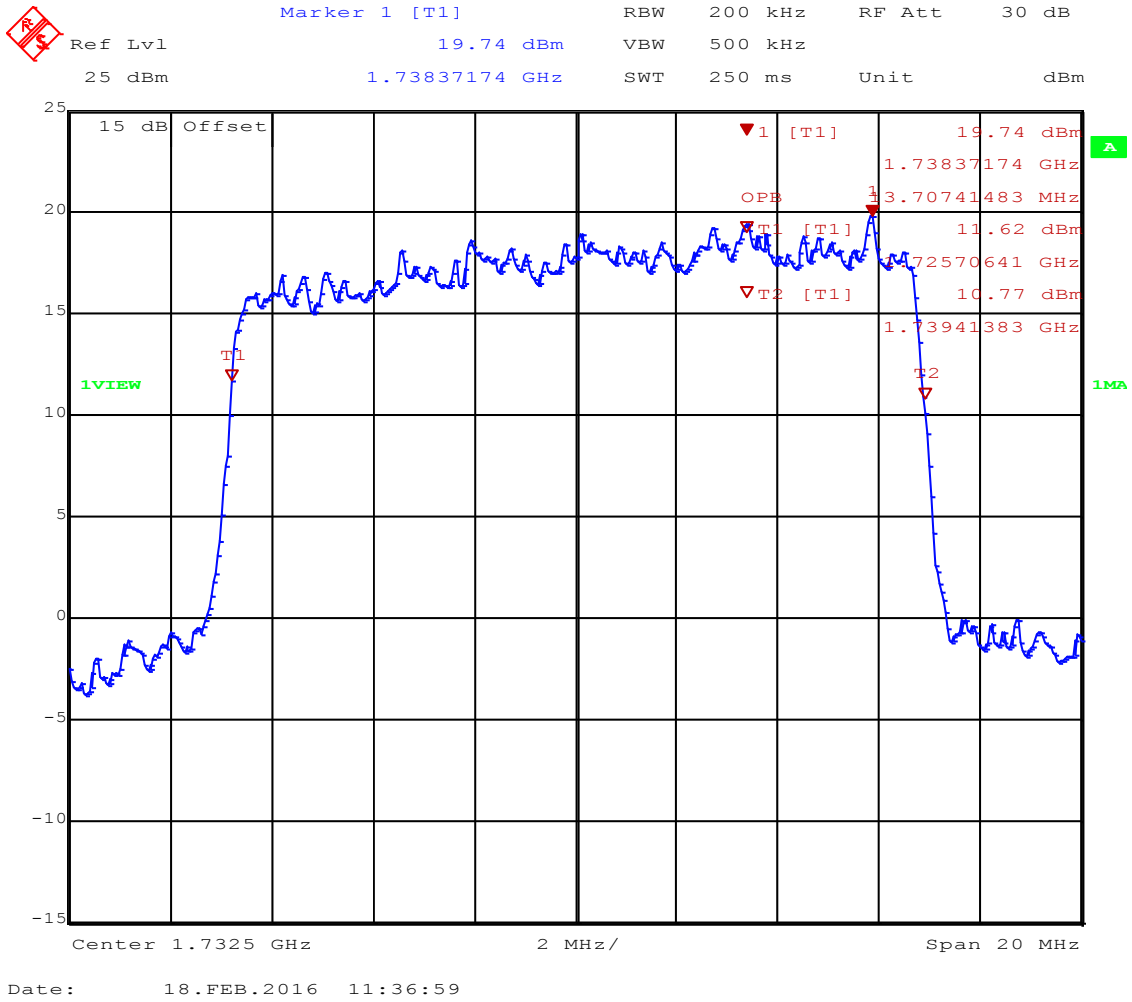


Occupied Bandwidth – LTE 4 QPSK-15 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20175 / BW: 15MHz; QPSK
Test Date:	2016-02-18
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 13.707 MHz

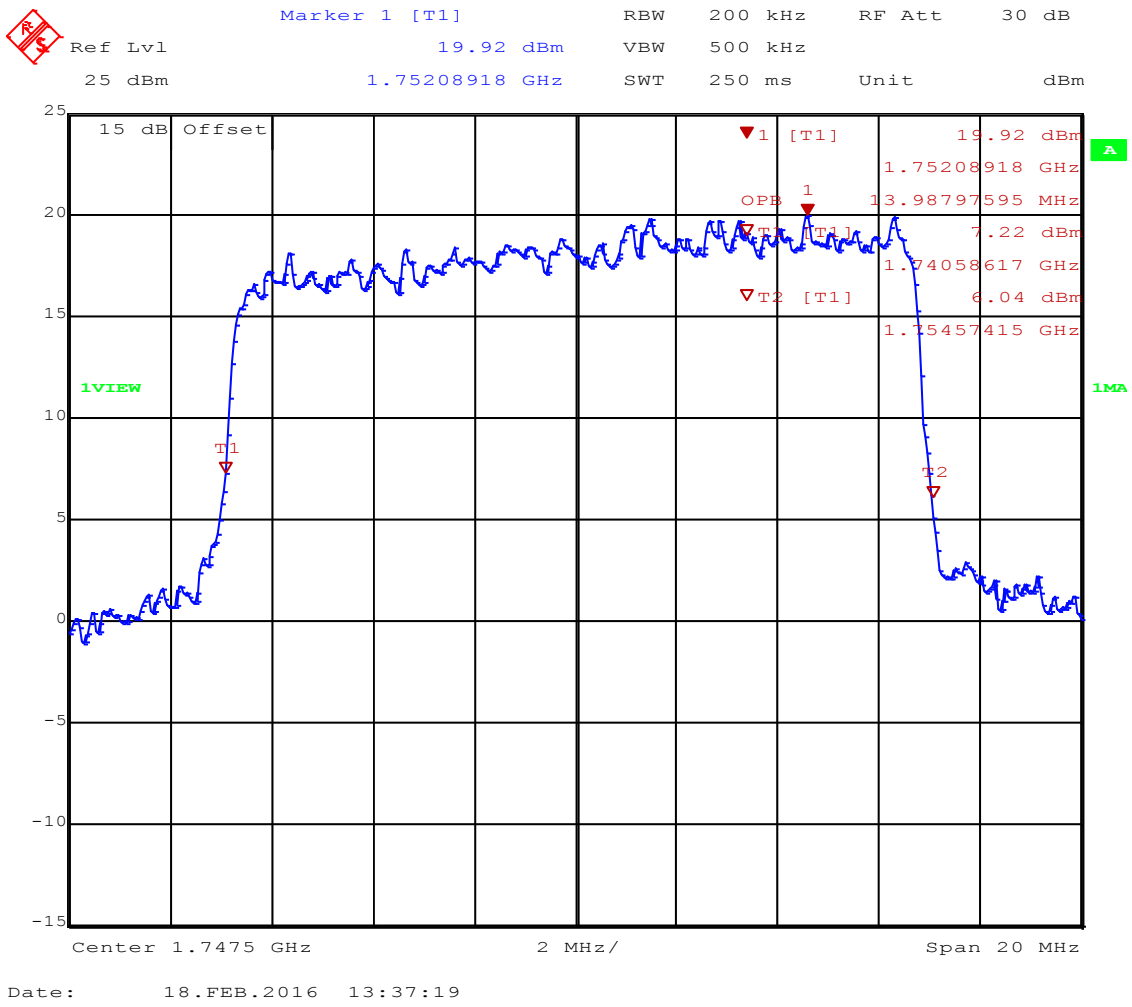


Occupied Bandwidth – LTE 4 QPSK-15 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20325 / BW: 15MHz; QPSK
Test Date:	2016-02-18
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 13.987 MHz

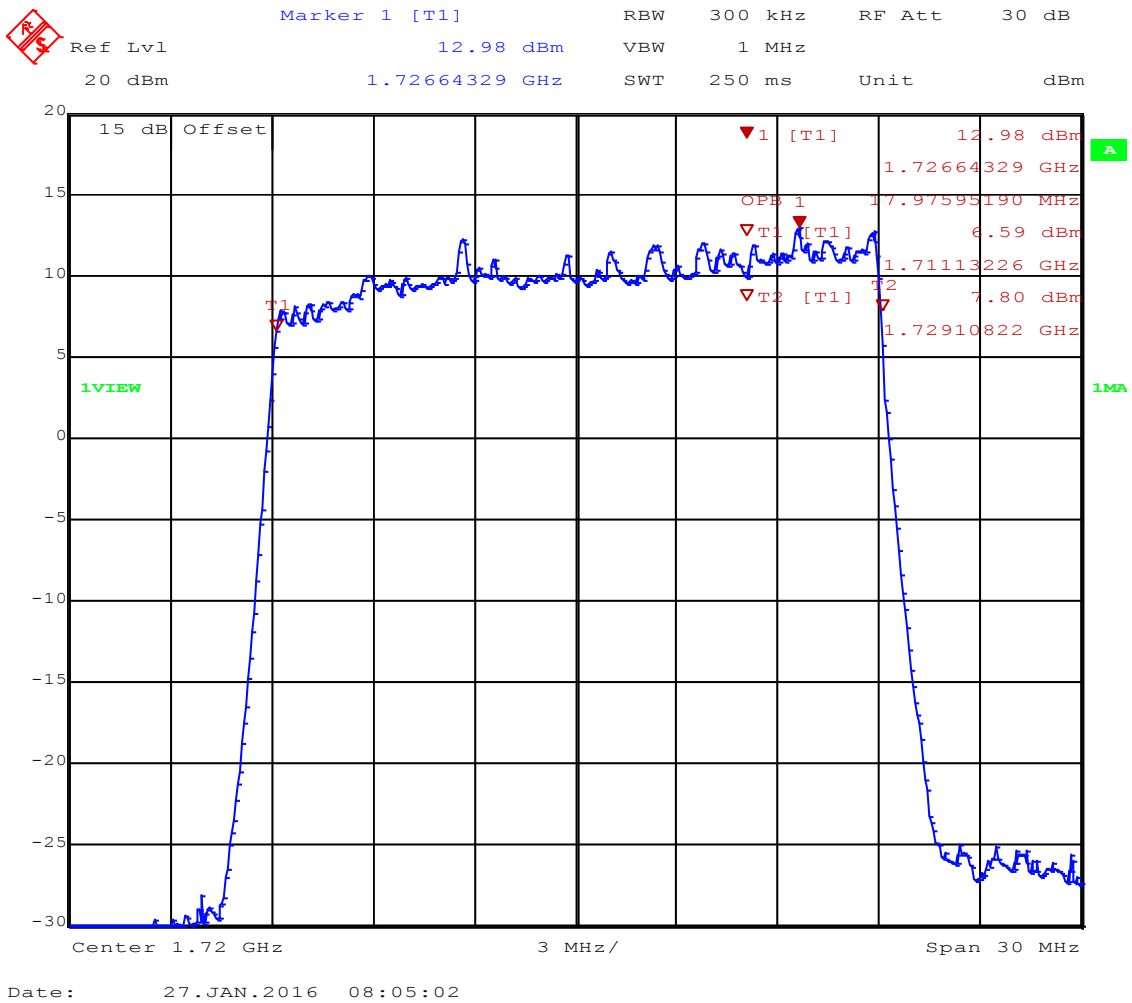


Occupied Bandwidth – LTE 4 QPSK-20 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20050 / BW: 20MHz; QPSK
Test Date:	2016-01-27
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 17.976 MHz

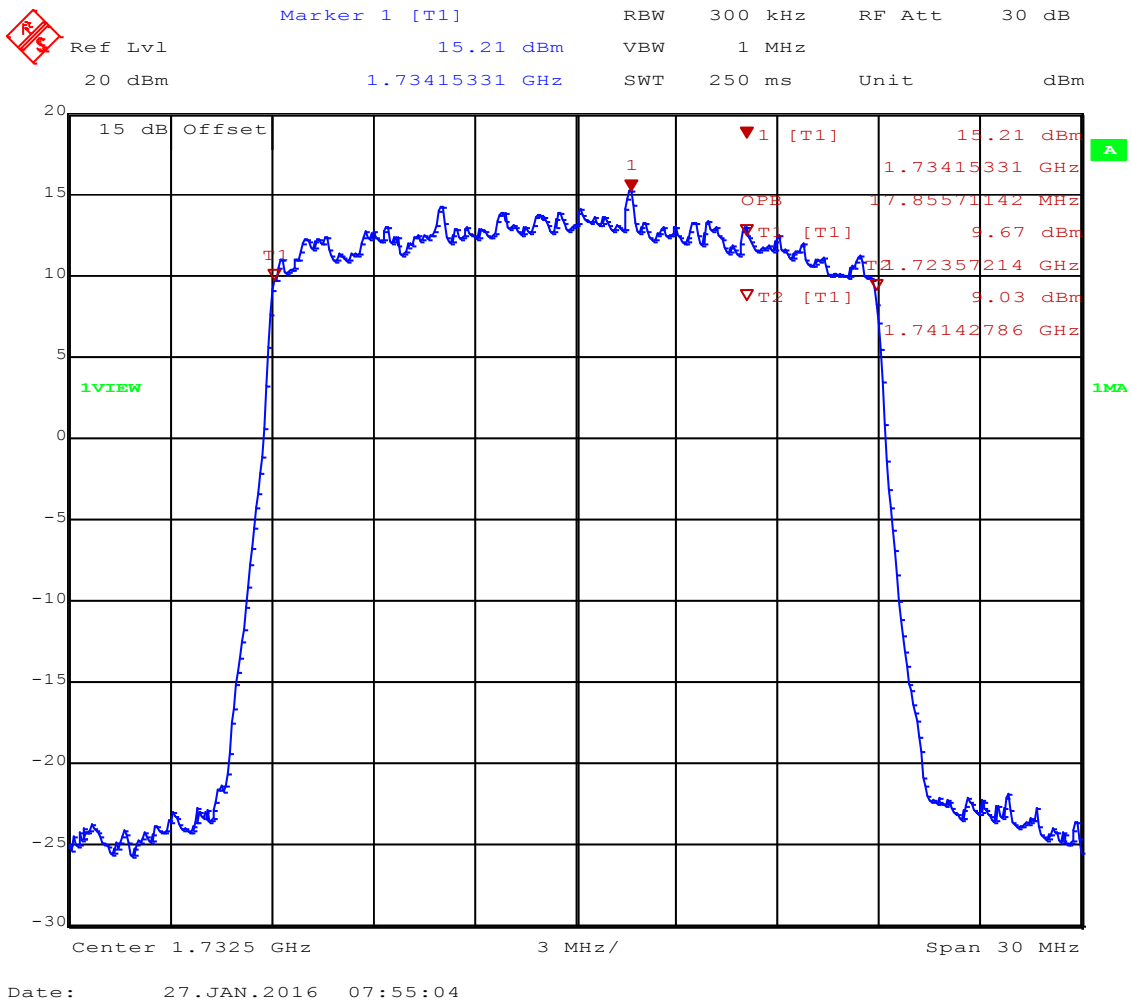


Occupied Bandwidth – LTE 4 QPSK-20 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20175 / BW: 20MHz; QPSK
Test Date:	2016-01-27
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 17.855 MHz

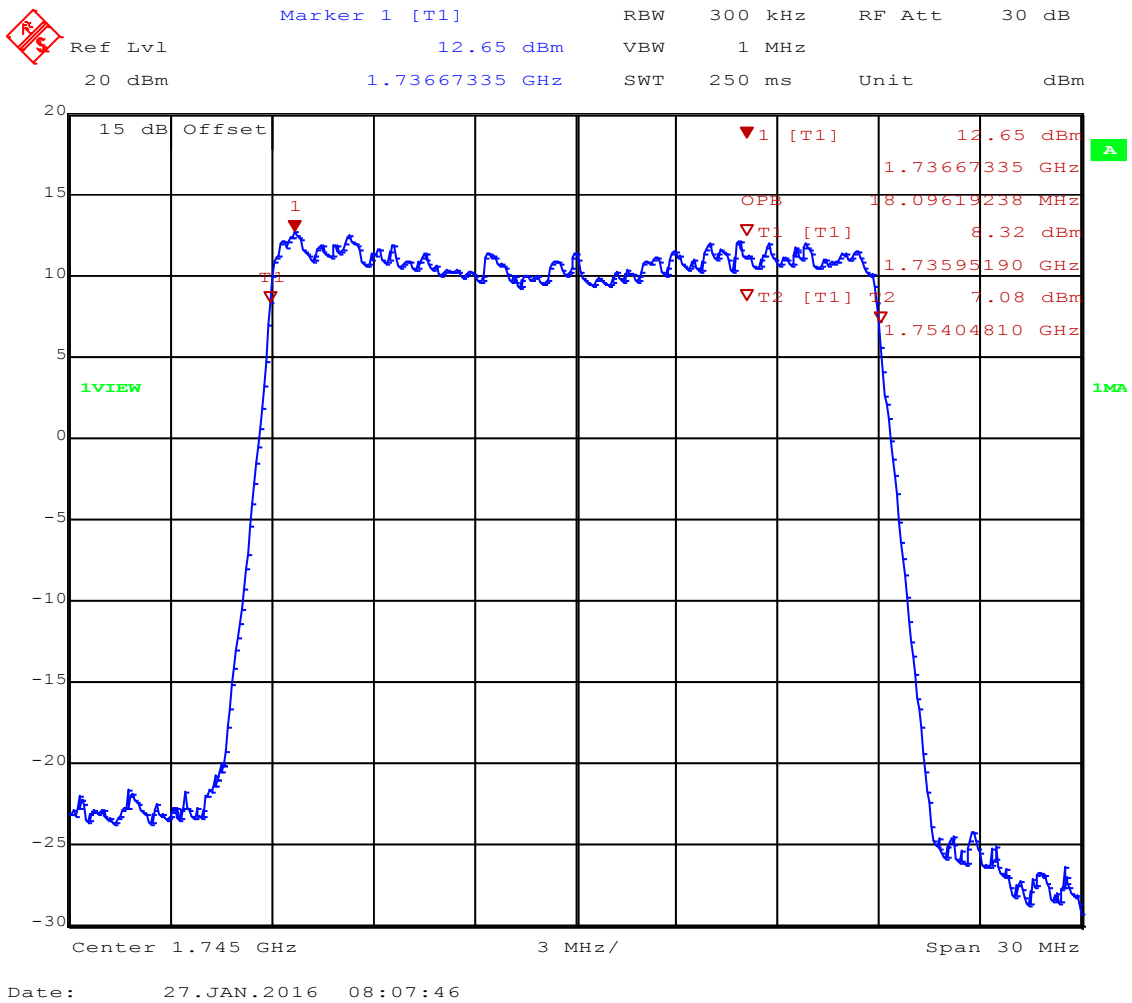


Occupied Bandwidth – LTE 4 QPSK-20 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20300 / BW: 20MHz; QPSK
Test Date:	2016-01-27
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 18.096 MHz

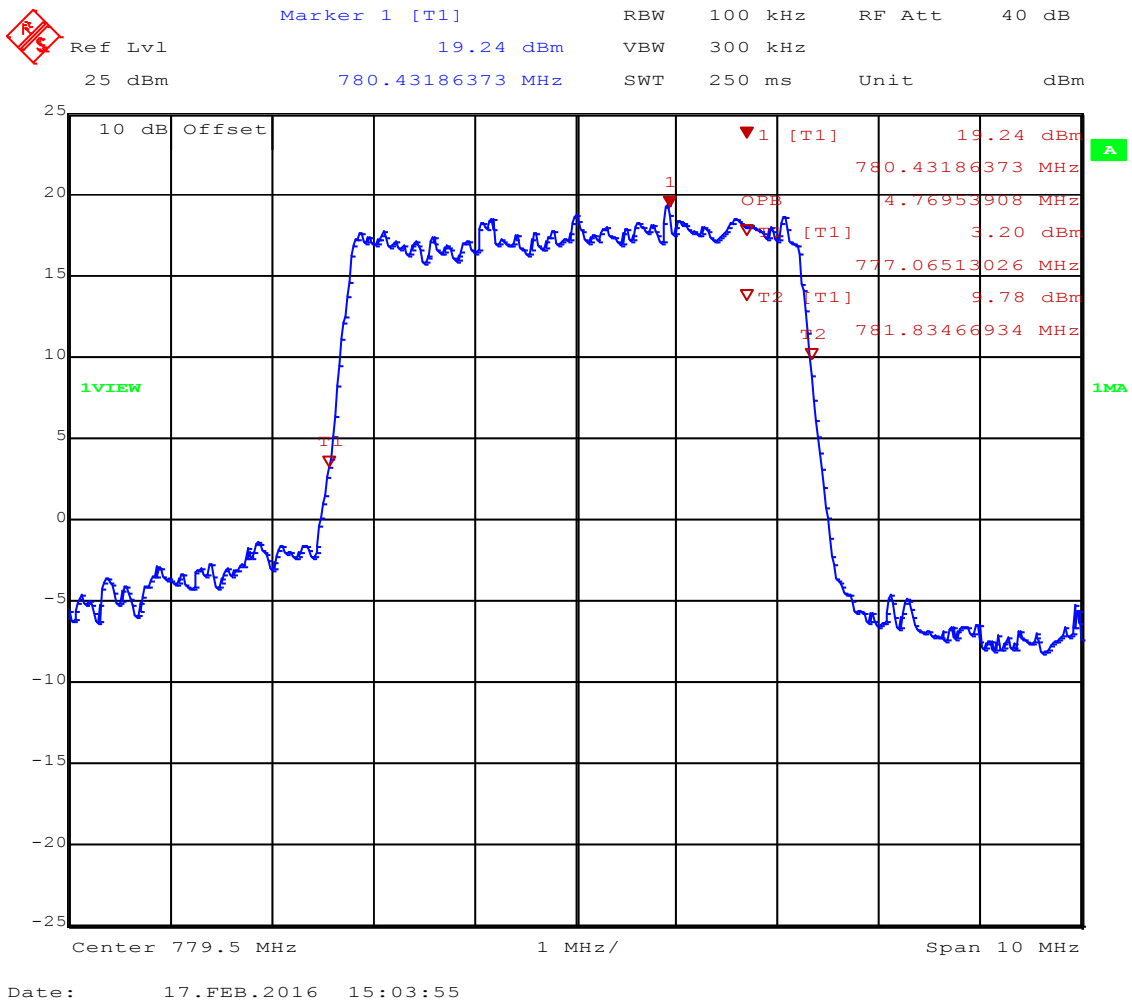


Occupied Bandwidth – LTE 13 16-QAM-5 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 13 / CH: 23205 / BW: 5MHz; 16-QAM
Test Date:	2016-02-17
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.769 MHz

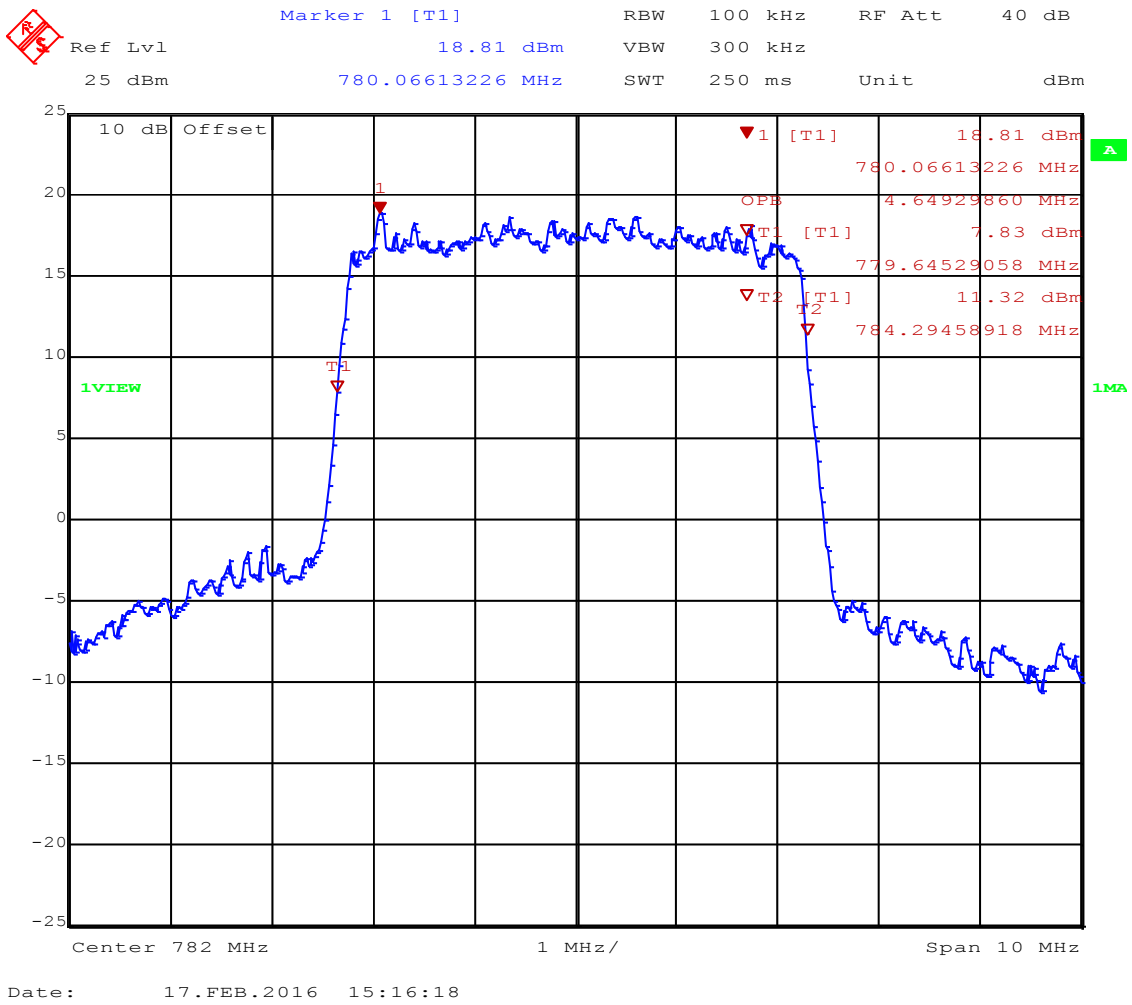


Occupied Bandwidth – LTE 13 16-QAM-5 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 13 / CH: 23230 / BW: 5MHz; 16-QAM
Test Date:	2016-02-17
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.649 MHz

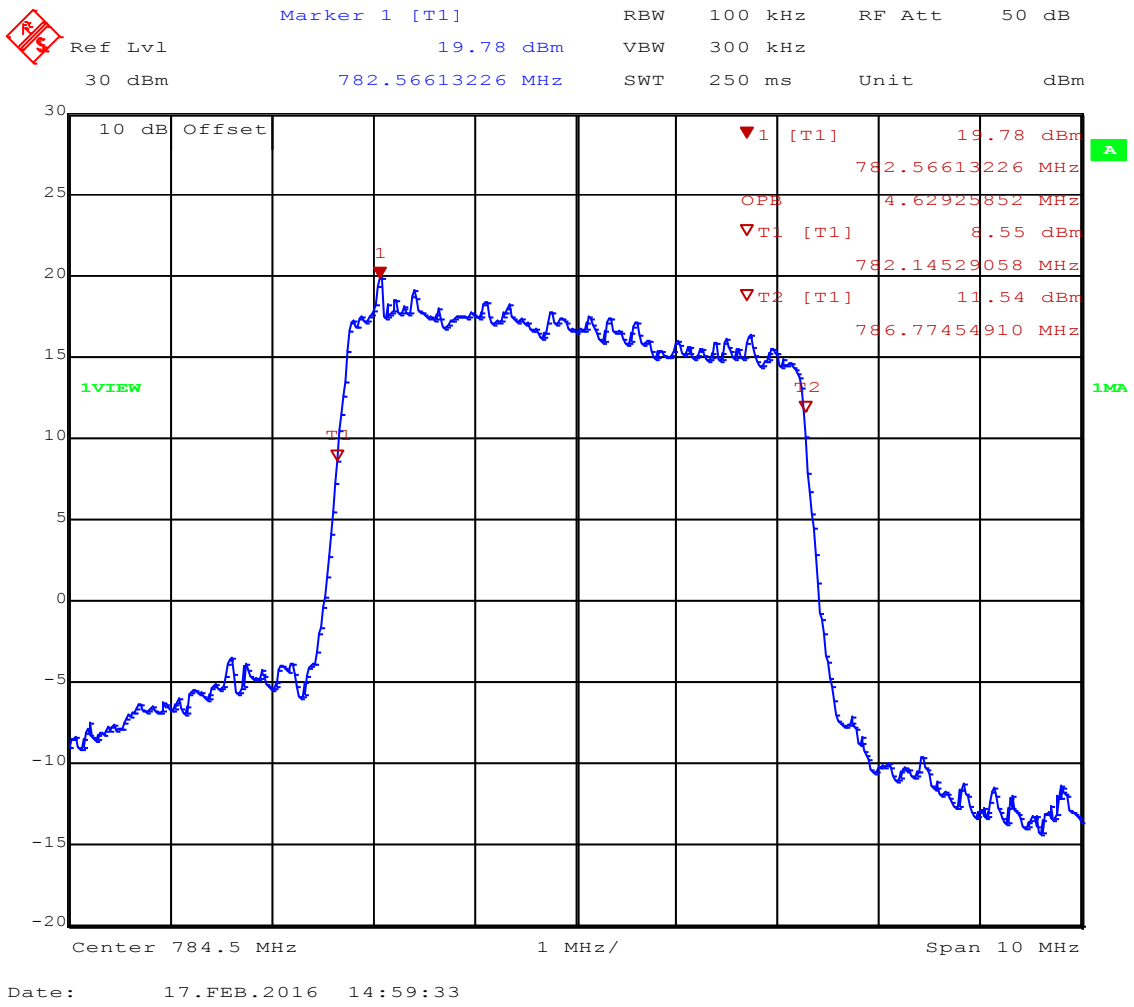


Occupied Bandwidth – LTE 13 16-QAM-5 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 13 / CH: 23255 / BW: 5MHz; 16-QAM
Test Date:	2016-02-17
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.629 MHz

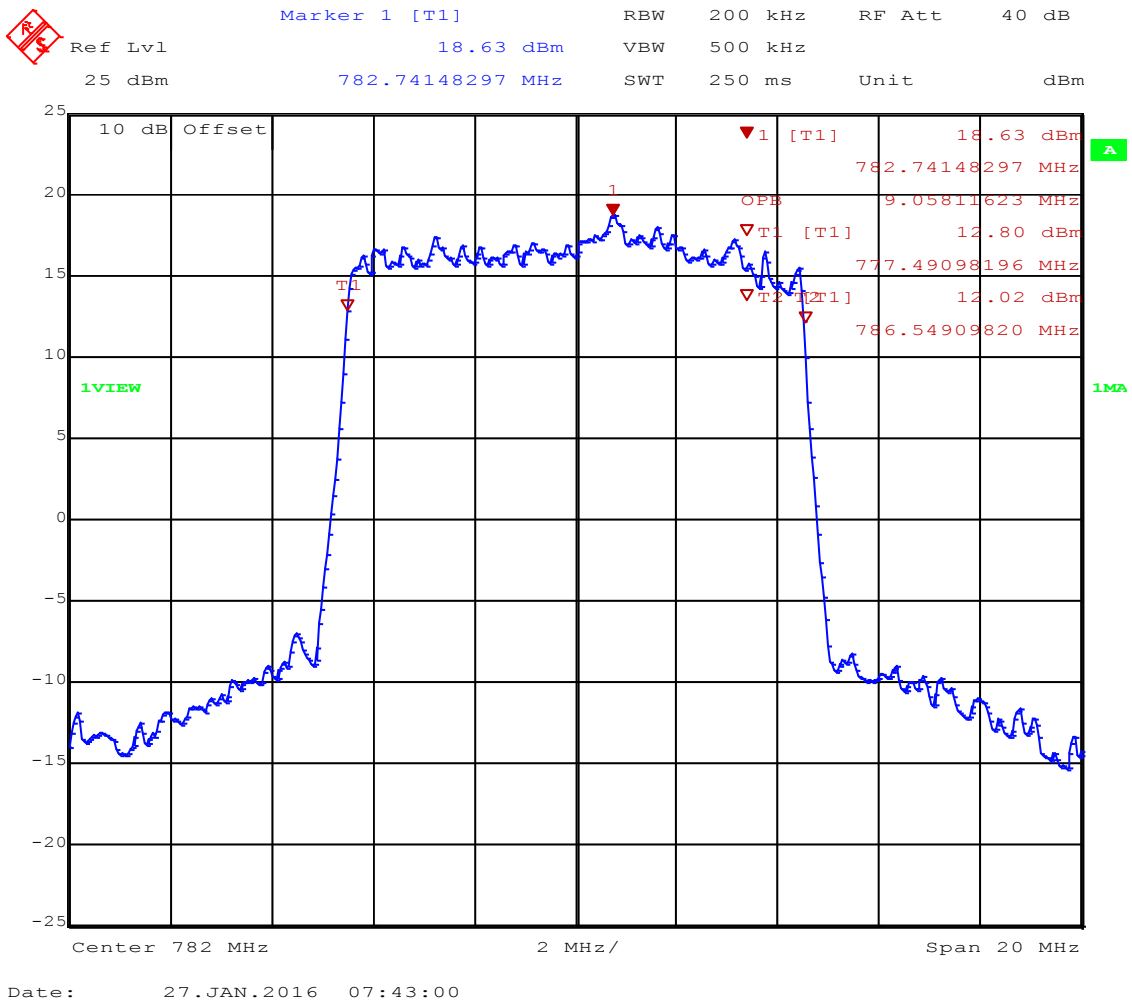


Occupied Bandwidth – LTE 13 16-QAM-10 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 13 / CH: 23230 / BW: 10MHz; 16-QAM
Test Date:	2016-01-27
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 9.058 MHz

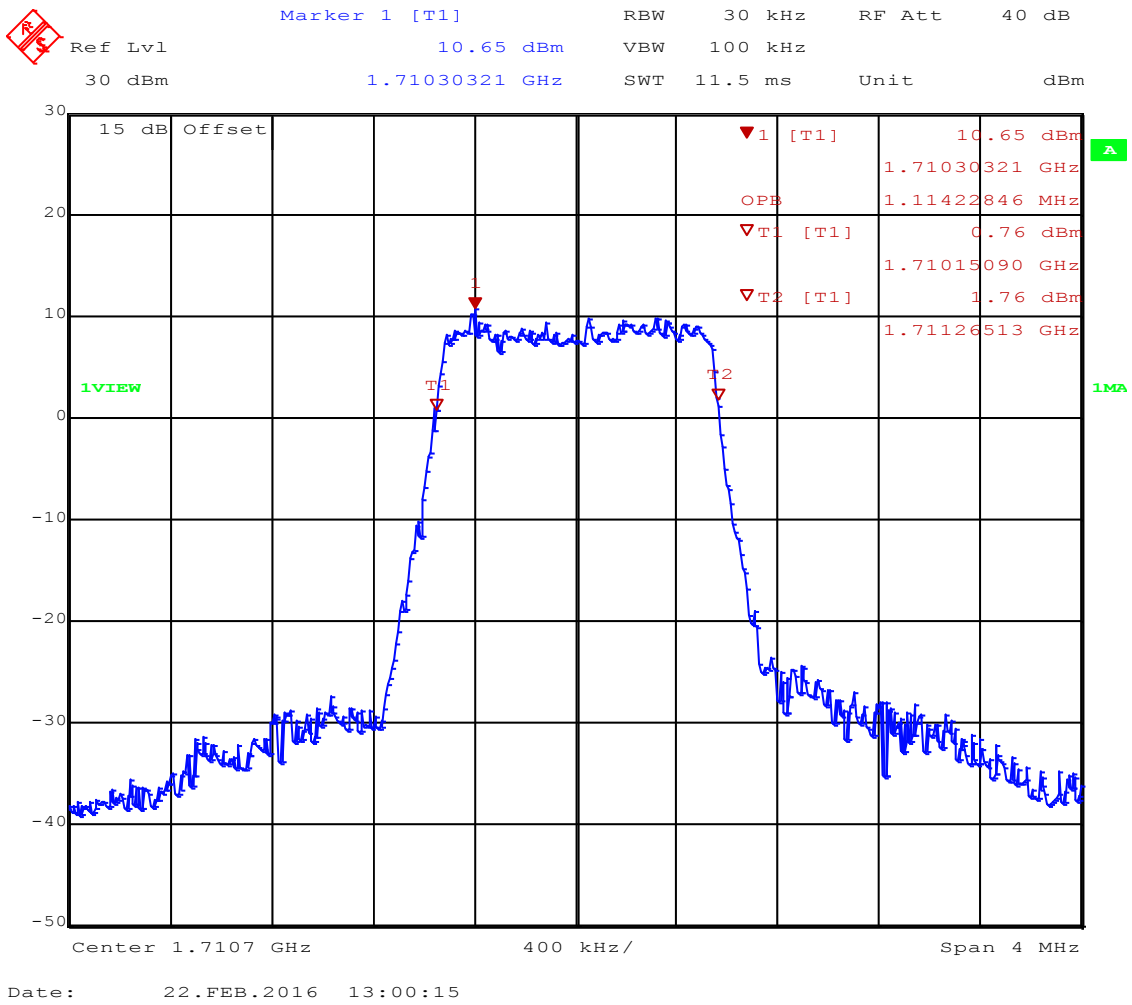


Occupied Bandwidth – LTE 4 16-QAM-1.4 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 19957 / BW: 1.4MHz; 16-QAM
Test Date:	2016-02-22
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 1.114 MHz

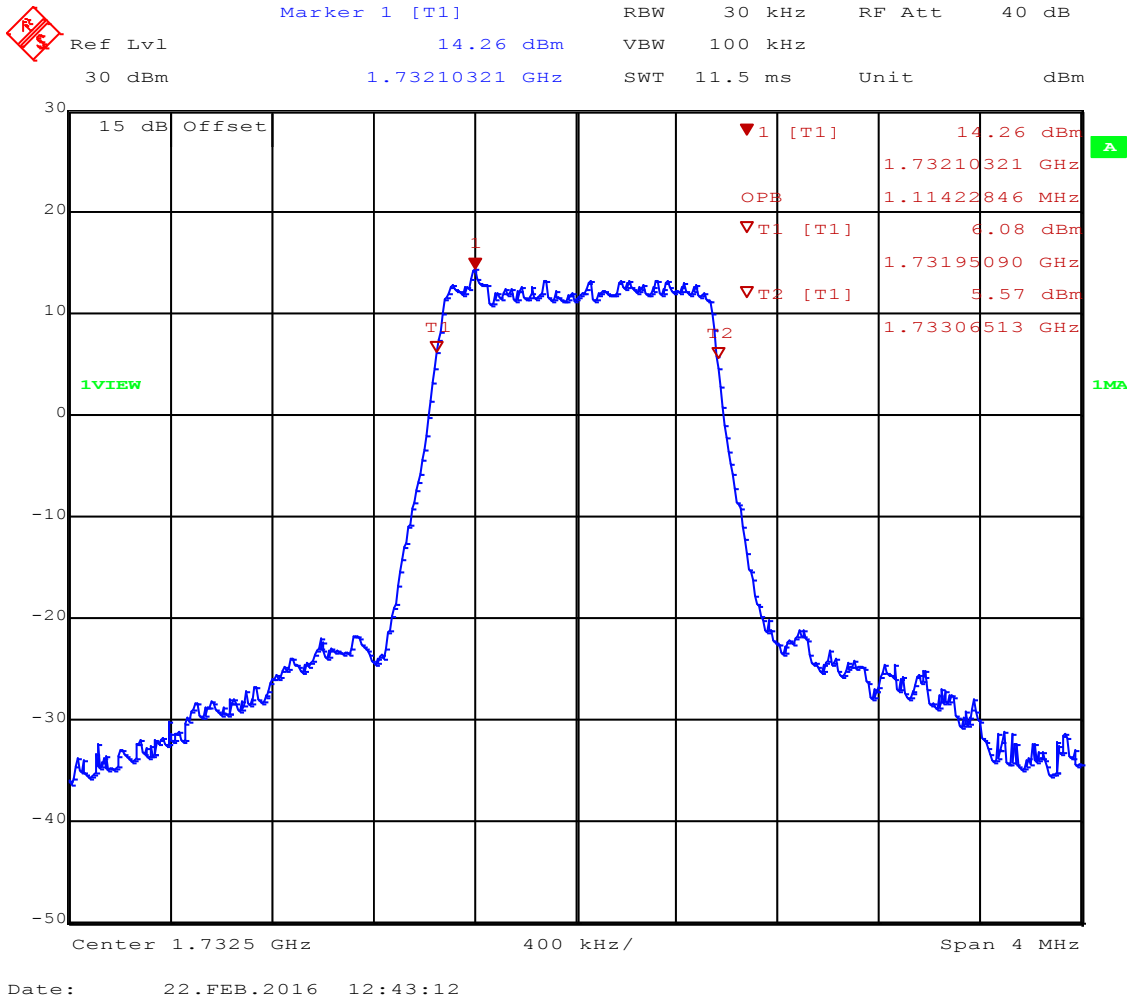


Occupied Bandwidth – LTE 4 16-QAM-1.4 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20175 / BW: 1.4MHz; 16-QAM
Test Date:	2016-02-22
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 1.114 MHz

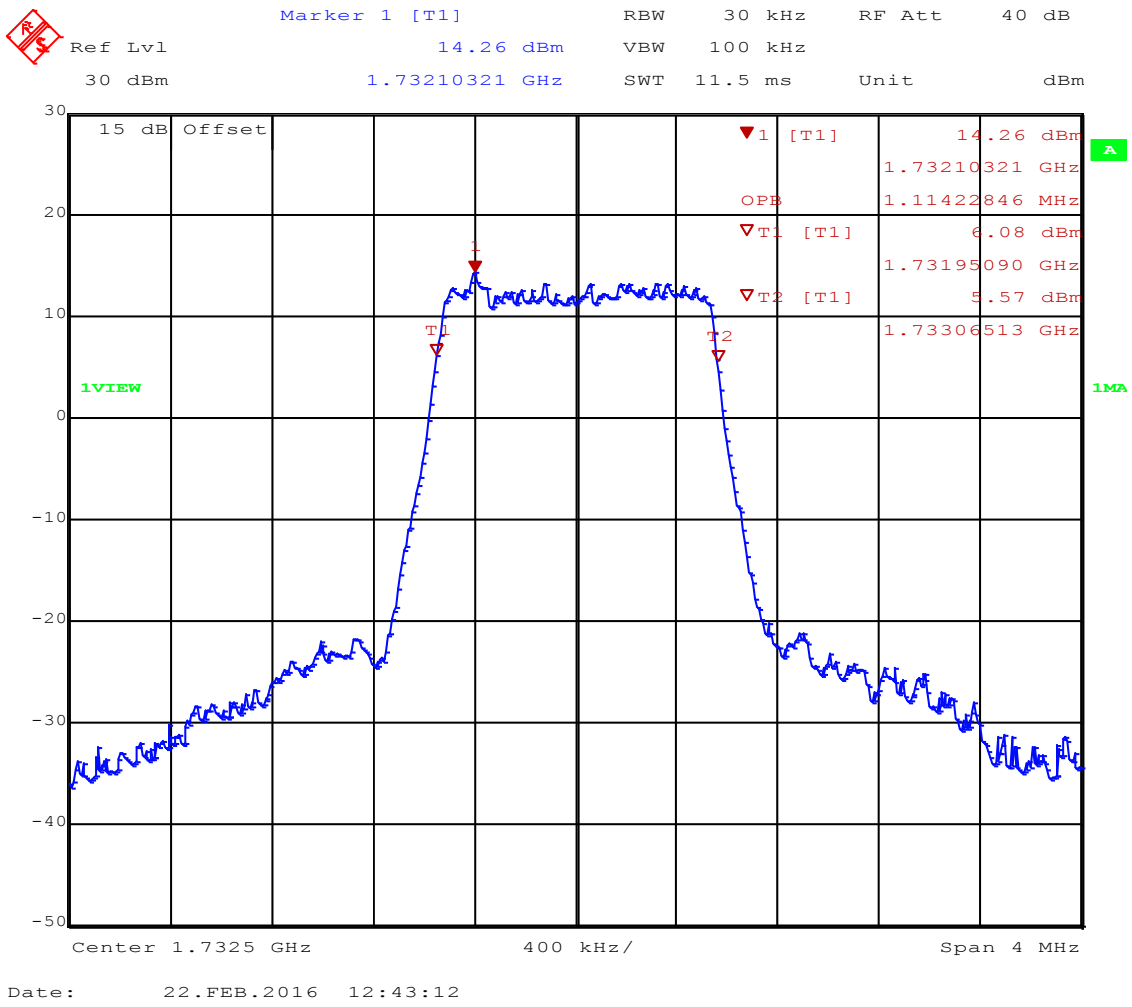


Occupied Bandwidth – LTE 4 16-QAM-1.4 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20175 / BW: 1.4MHz; 16-QAM
Test Date:	2016-02-22
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 1.114 MHz

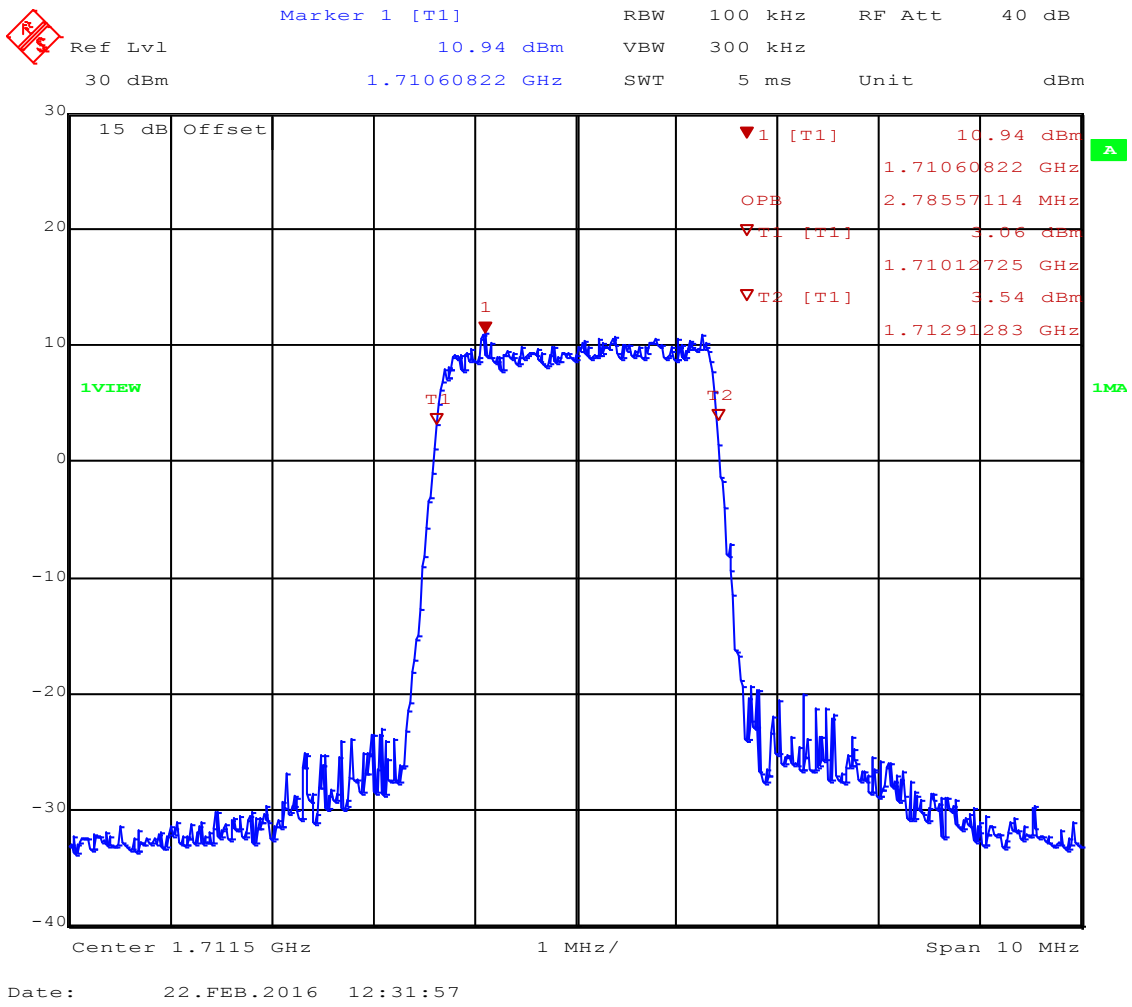


Occupied Bandwidth – LTE 4 16-QAM-3 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 19965 / BW: 3MHz; 16-QAM
Test Date:	2016-02-22
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 2.785 MHz

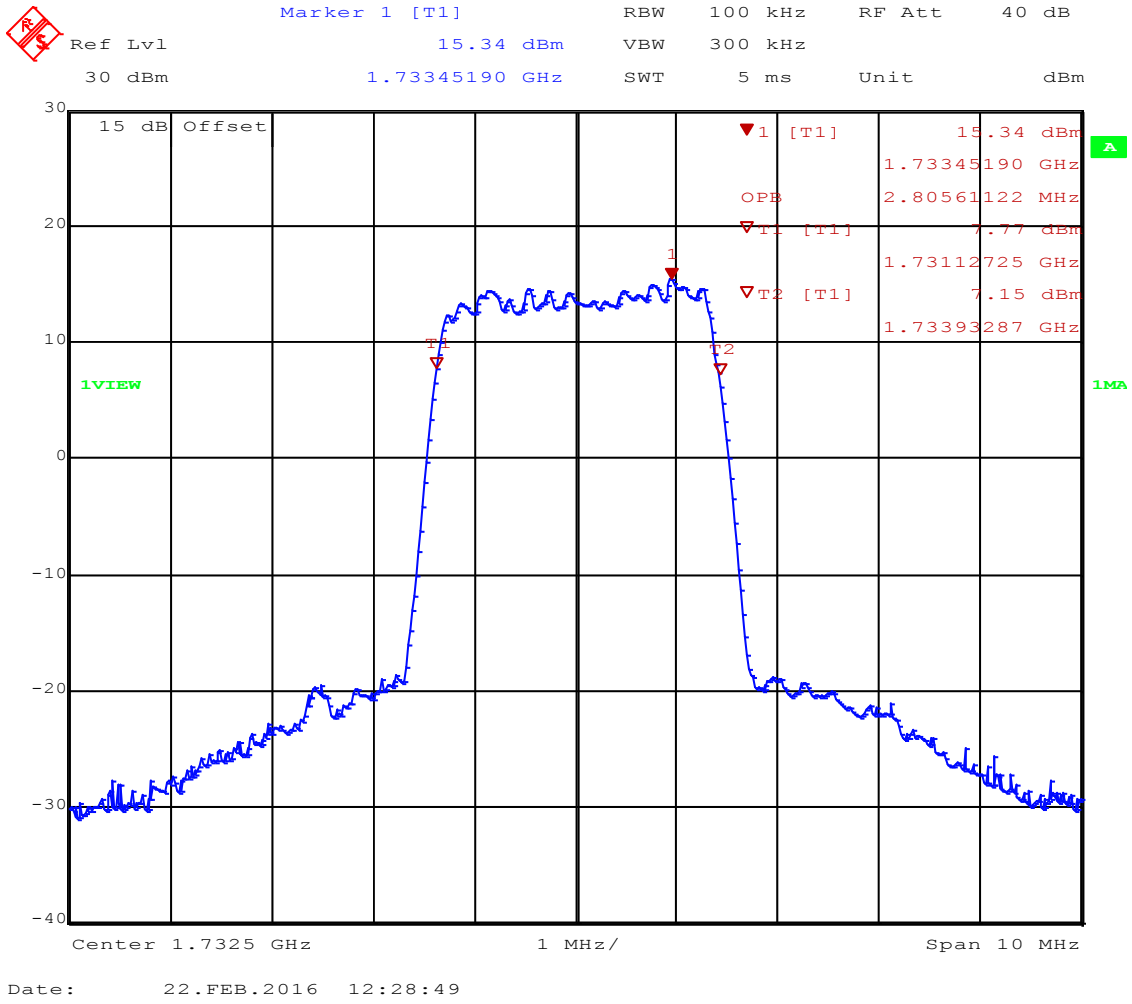


Occupied Bandwidth – LTE 4 16-QAM-3 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20175 / BW: 3MHz; 16-QAM
Test Date:	2016-02-22
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 2.805 MHz

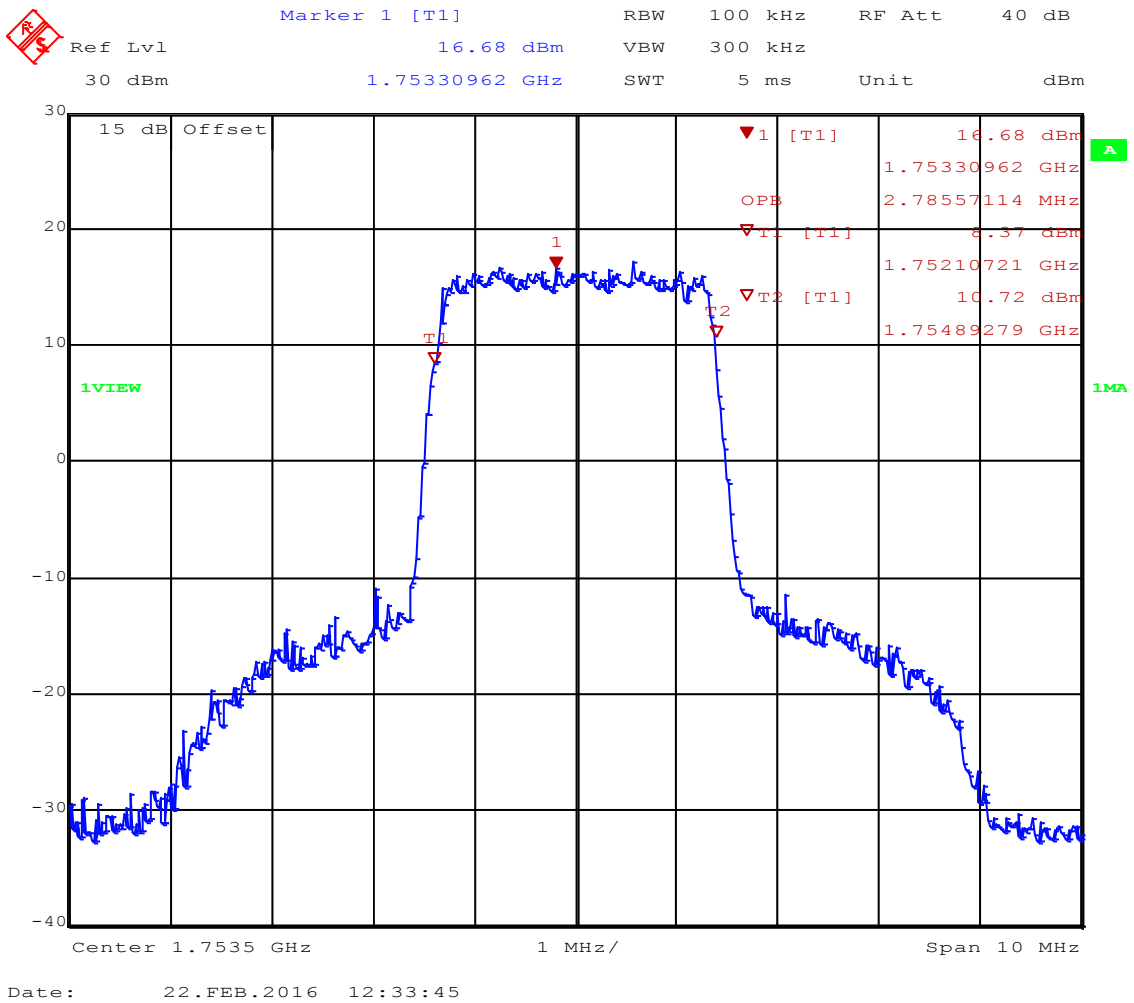


Occupied Bandwidth – LTE 4 16-QAM-3 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20385 / BW: 3MHz; 16-QAM
Test Date:	2016-02-22
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 2.785 MHz

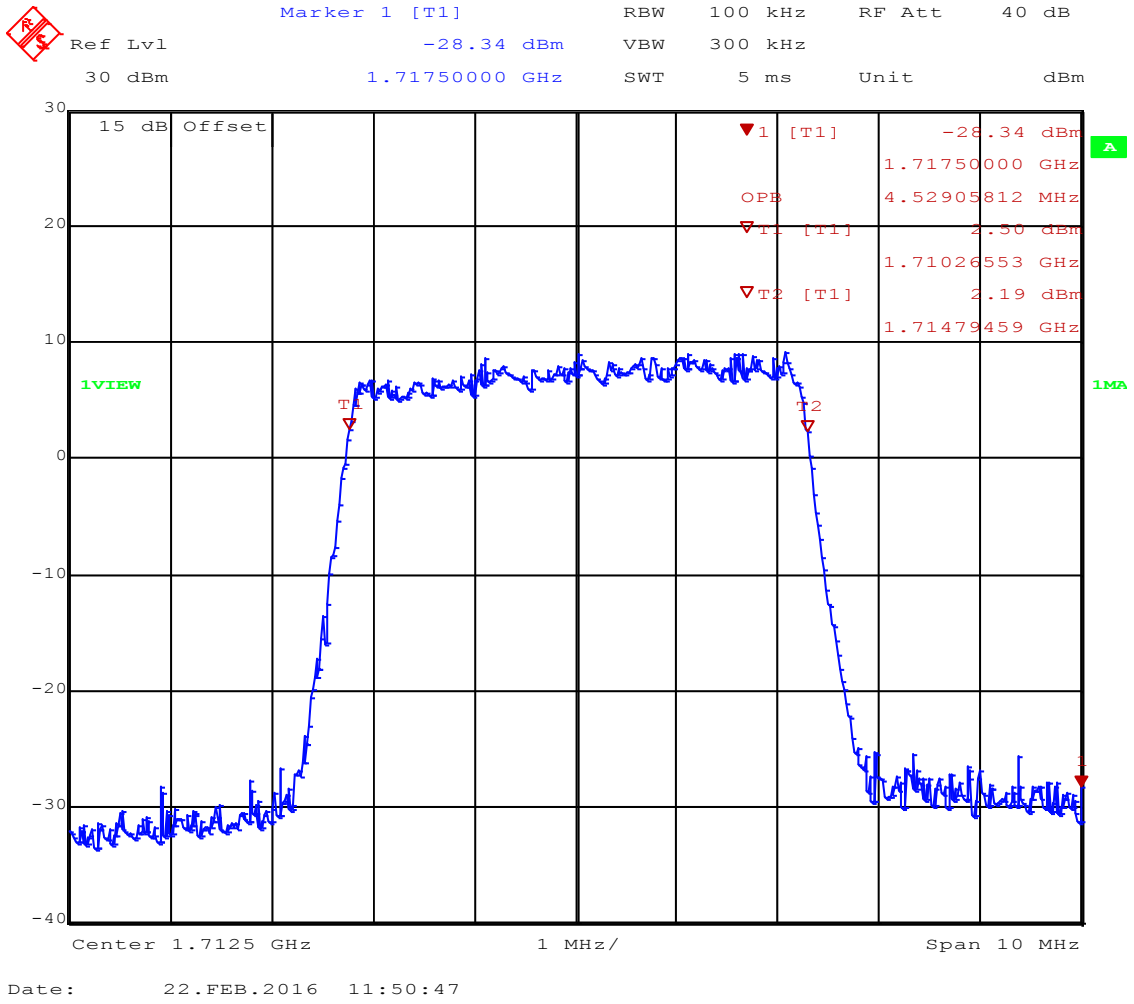


Occupied Bandwidth – LTE 4 16-QAM-5 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 19975 / BW: 5MHz; 16-QAM
Test Date:	2016-02-22
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.529 MHz

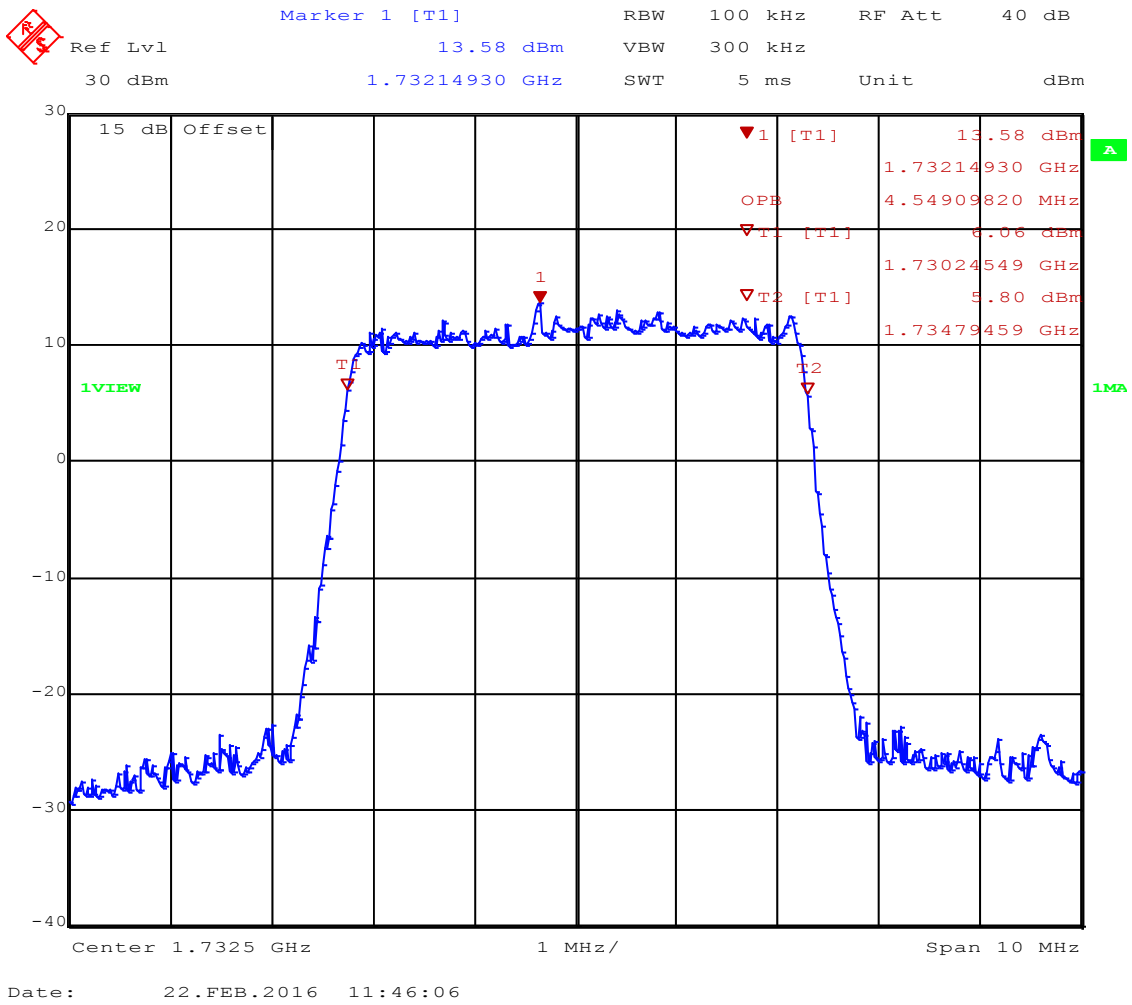


Occupied Bandwidth – LTE 4 16-QAM-5 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20175 / BW: 5MHz; 16-QAM
Test Date:	2016-02-22
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.549 MHz

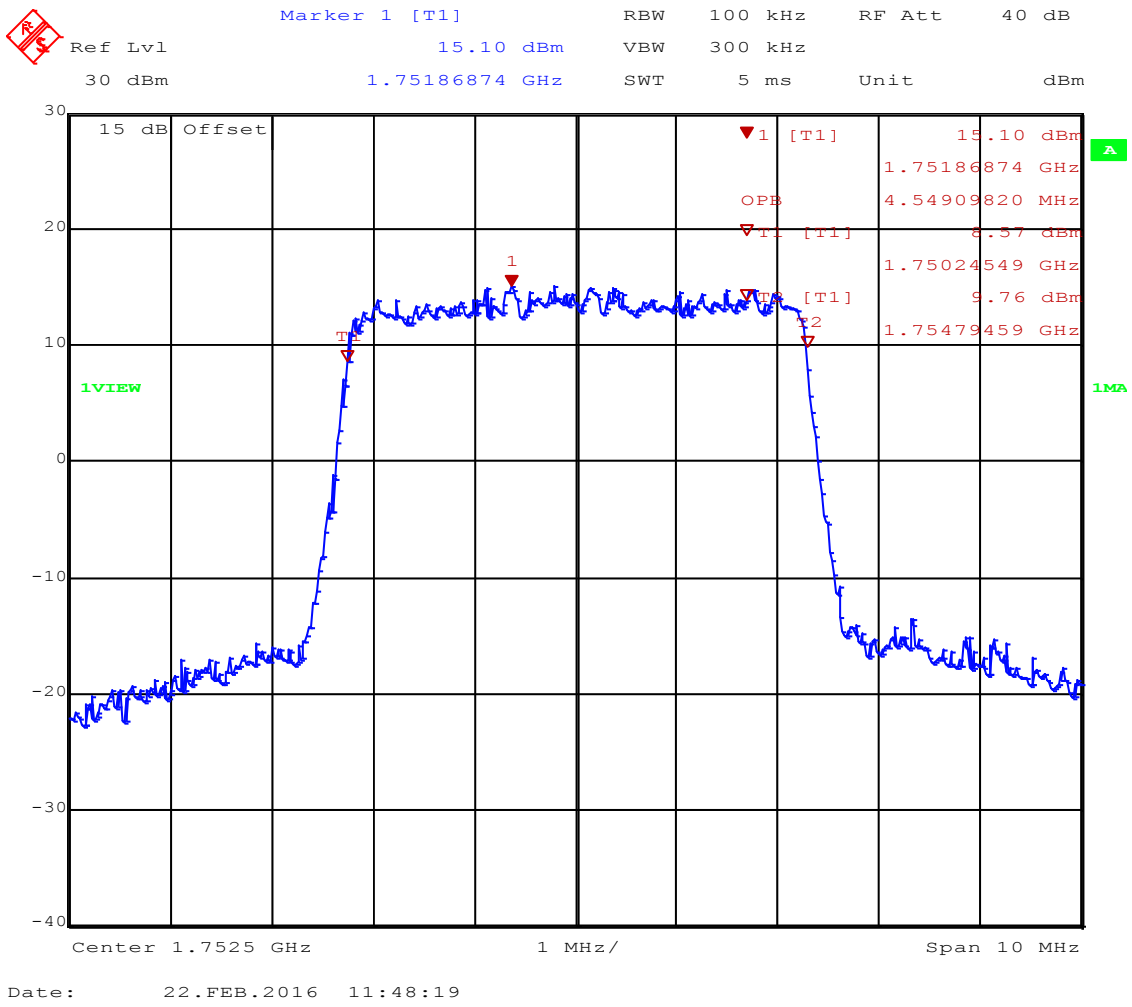


Occupied Bandwidth – LTE 4 16-QAM-5 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20375 / BW: 5MHz; 16-QAM
Test Date:	2016-02-22
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 4.549 MHz

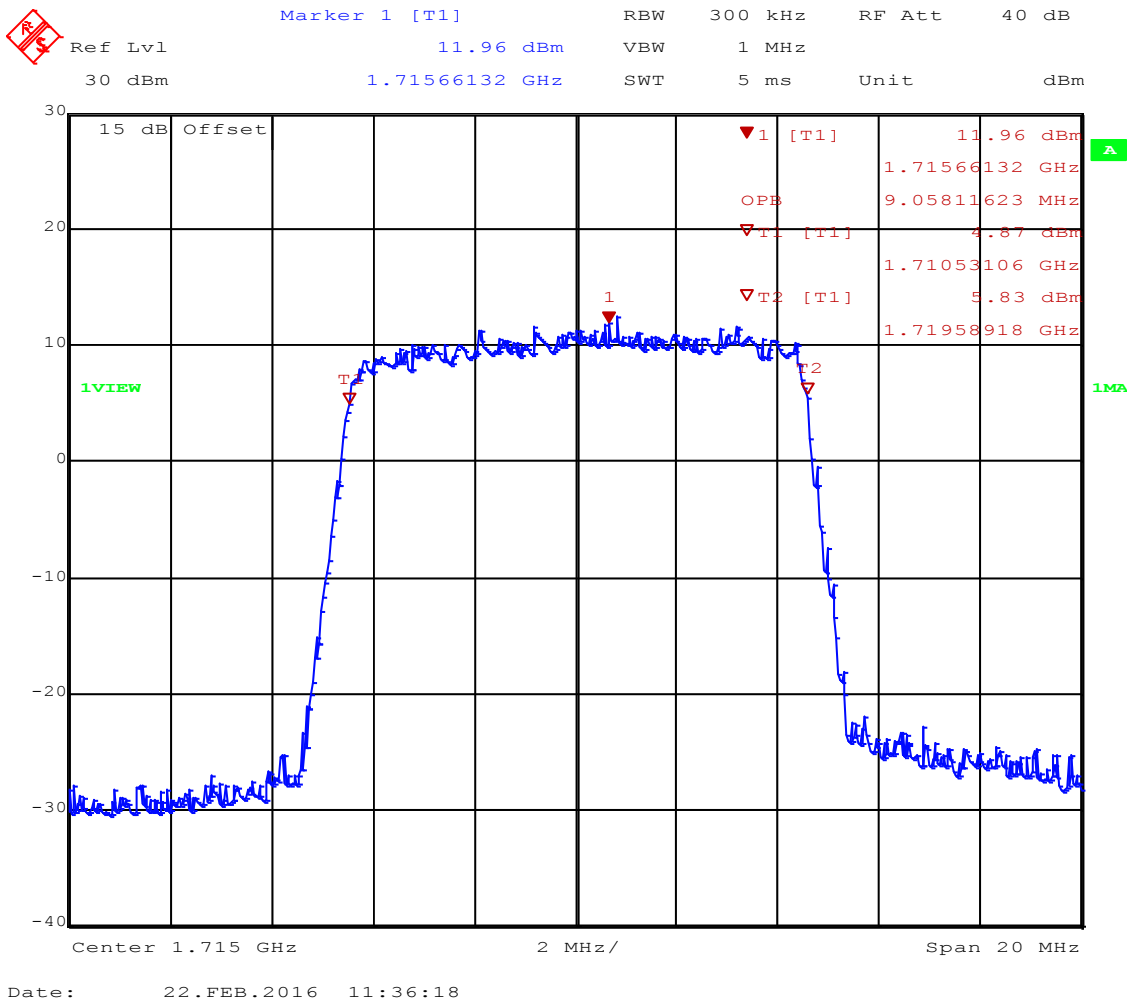


Occupied Bandwidth – LTE 4 16-QAM-10 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20000 / BW: 10MHz; 16-QAM
Test Date:	2016-02-22
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 9.058 MHz

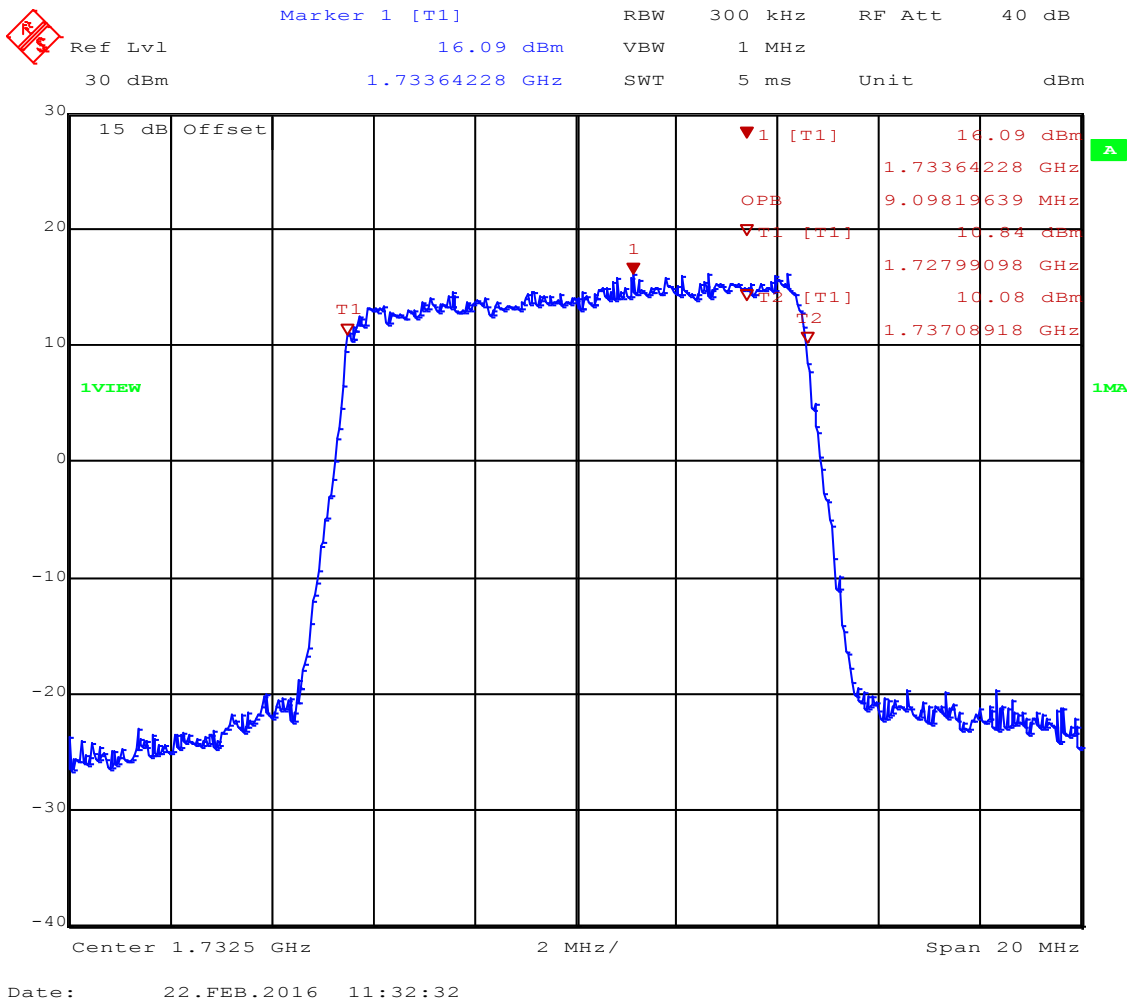


Occupied Bandwidth – LTE 4 16-QAM-10 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20175 / BW: 10MHz; 16-QAM
Test Date:	2016-02-22
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 9.098 MHz

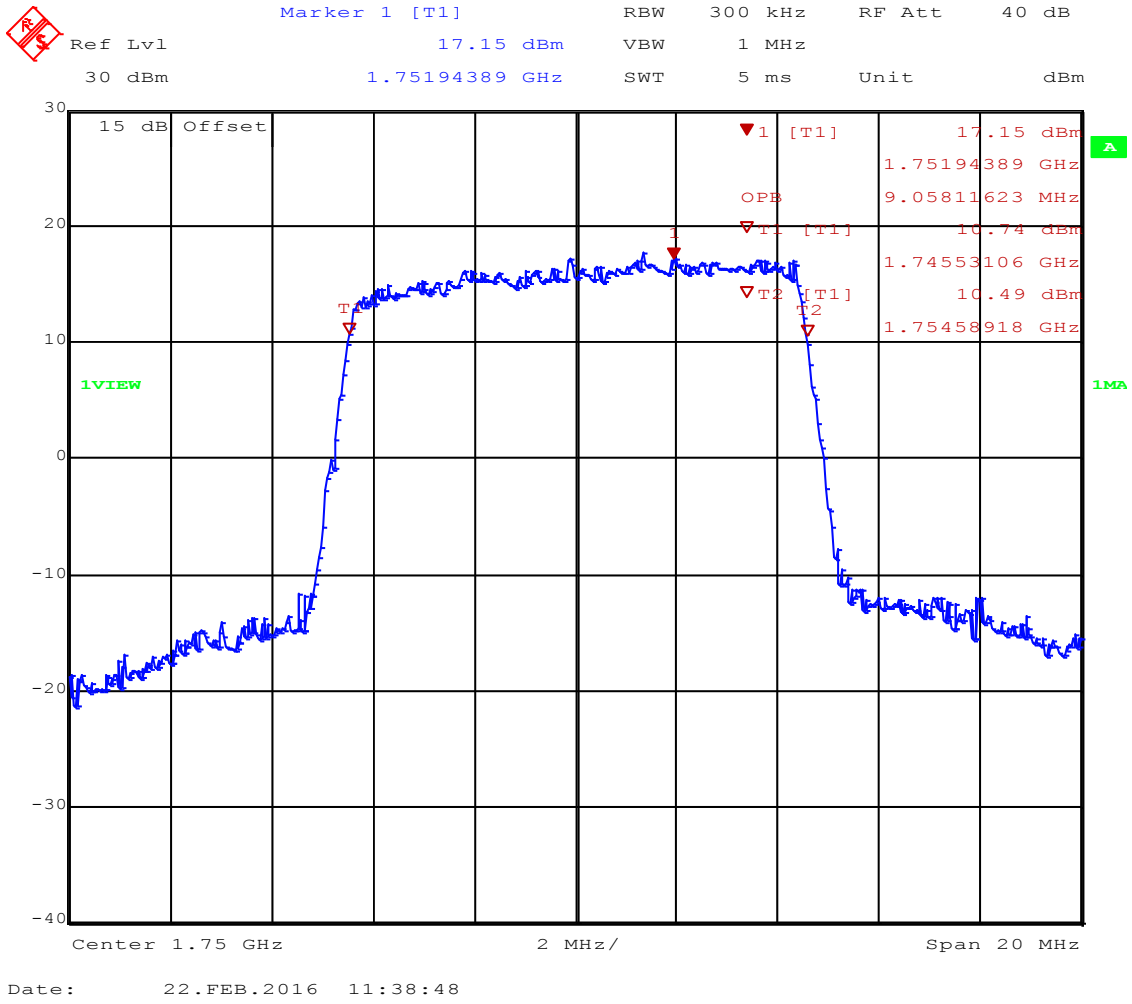


Occupied Bandwidth – LTE 4 16-QAM-10 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20350 / BW: 10MHz; 16-QAM
Test Date:	2016-02-22
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 9.058 MHz

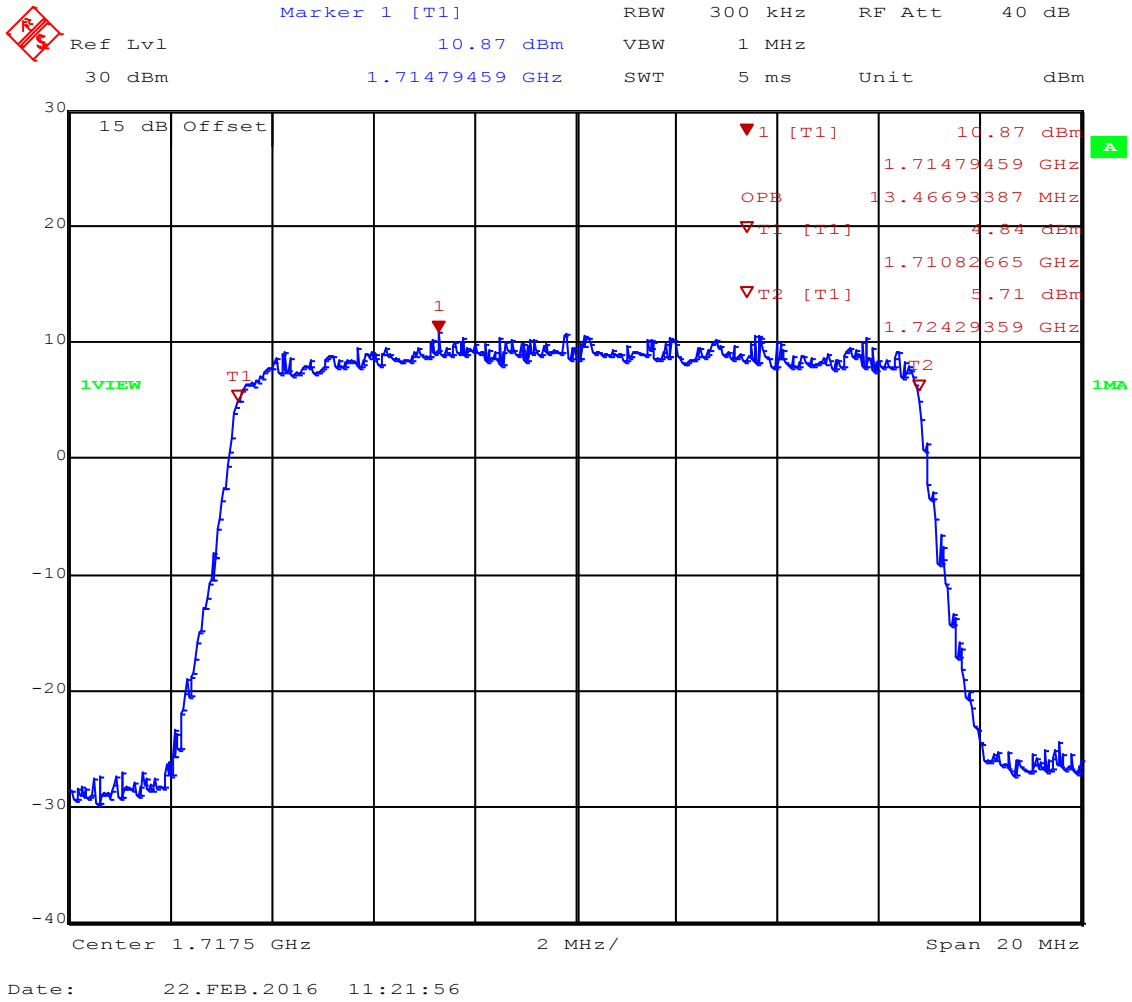


Occupied Bandwidth – LTE 4 16-QAM-15 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20025 / BW: 15MHz; 16-QAM
Test Date:	2016-02-22
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 13.467 MHz

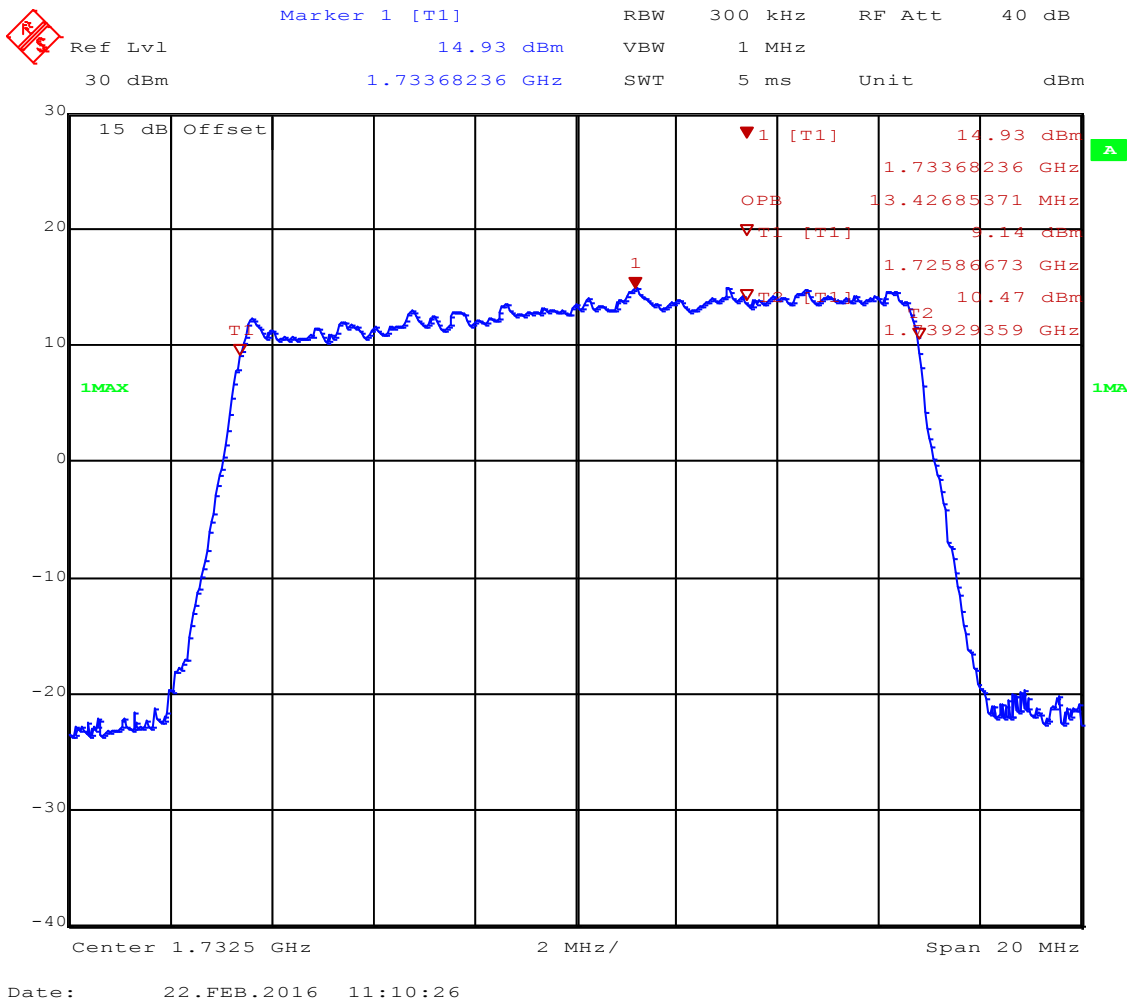


Occupied Bandwidth – LTE 4 16-QAM-15 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20175 / BW: 15MHz; 16-QAM
Test Date:	2016-02-22
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 13.426 MHz

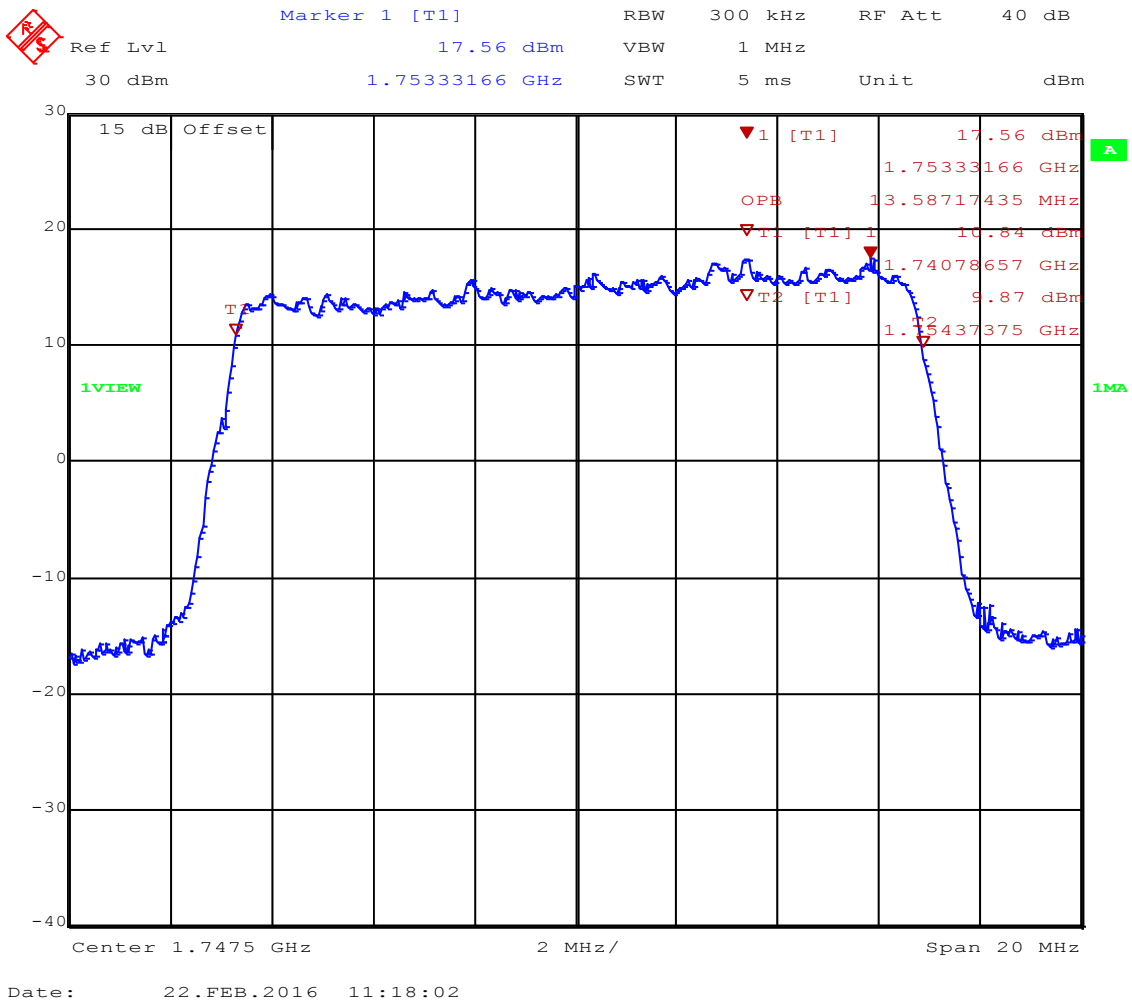


Occupied Bandwidth – LTE 4 16-QAM-15 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20325 / BW: 15MHz; 16-QAM
Test Date:	2016-02-22
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 13.587 MHz

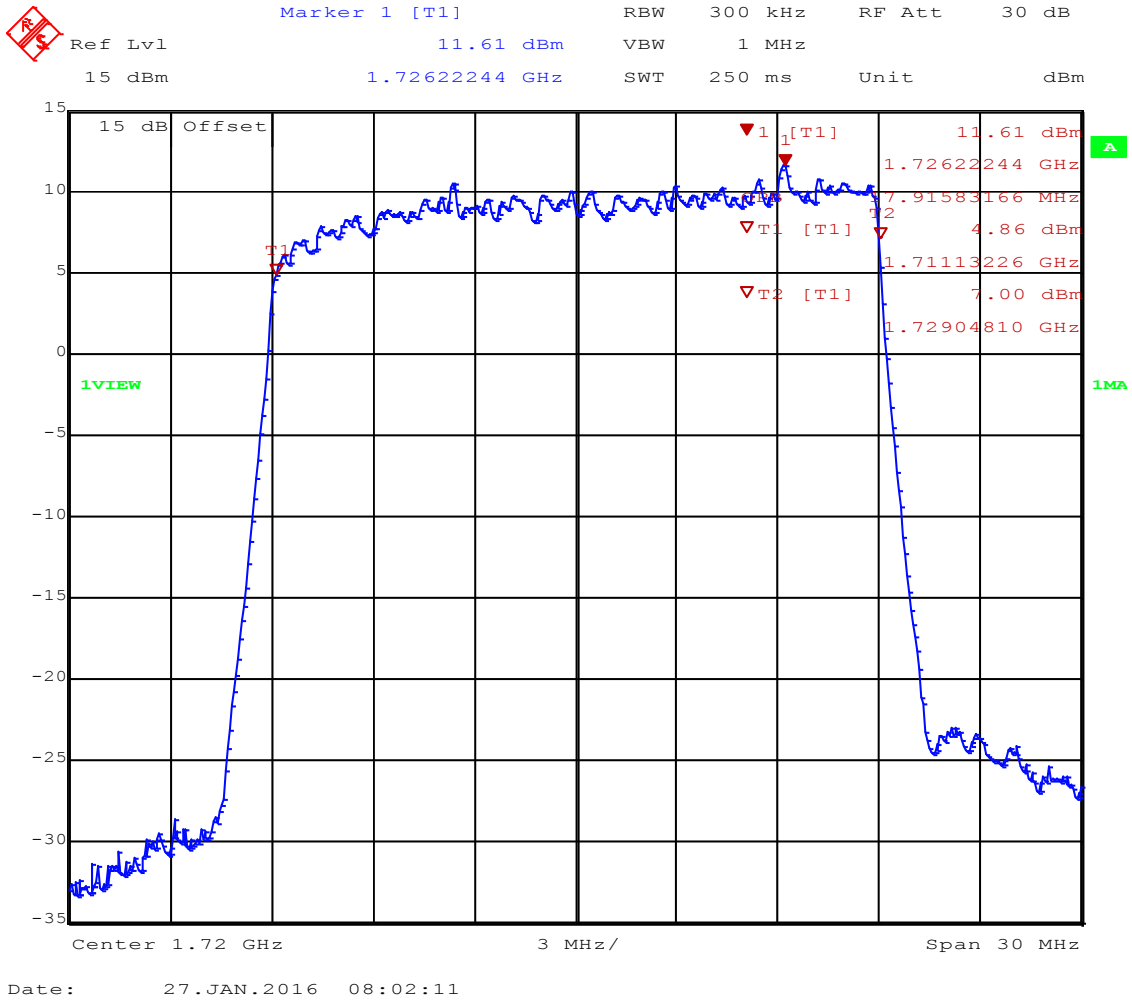


Occupied Bandwidth – LTE 4 16-QAM-20 F_{LOW}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20050 / BW: 20MHz; 16-QAM
Test Date:	2016-01-27
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 17.916 MHz

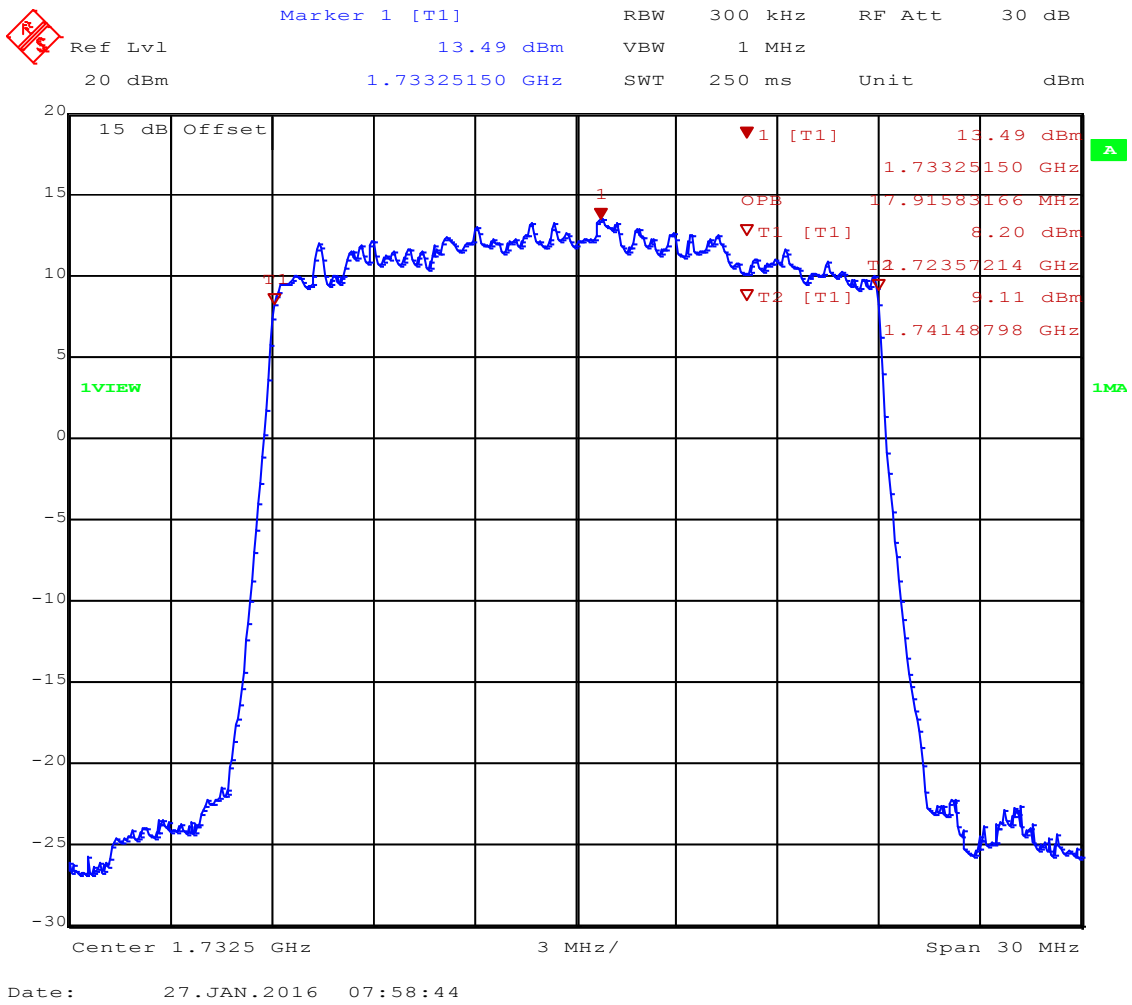


Occupied Bandwidth – LTE 4 16-QAM-20 F_{MID}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20175 / BW: 20MHz; 16-QAM
Test Date:	2016-01-27
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 17.916 MHz

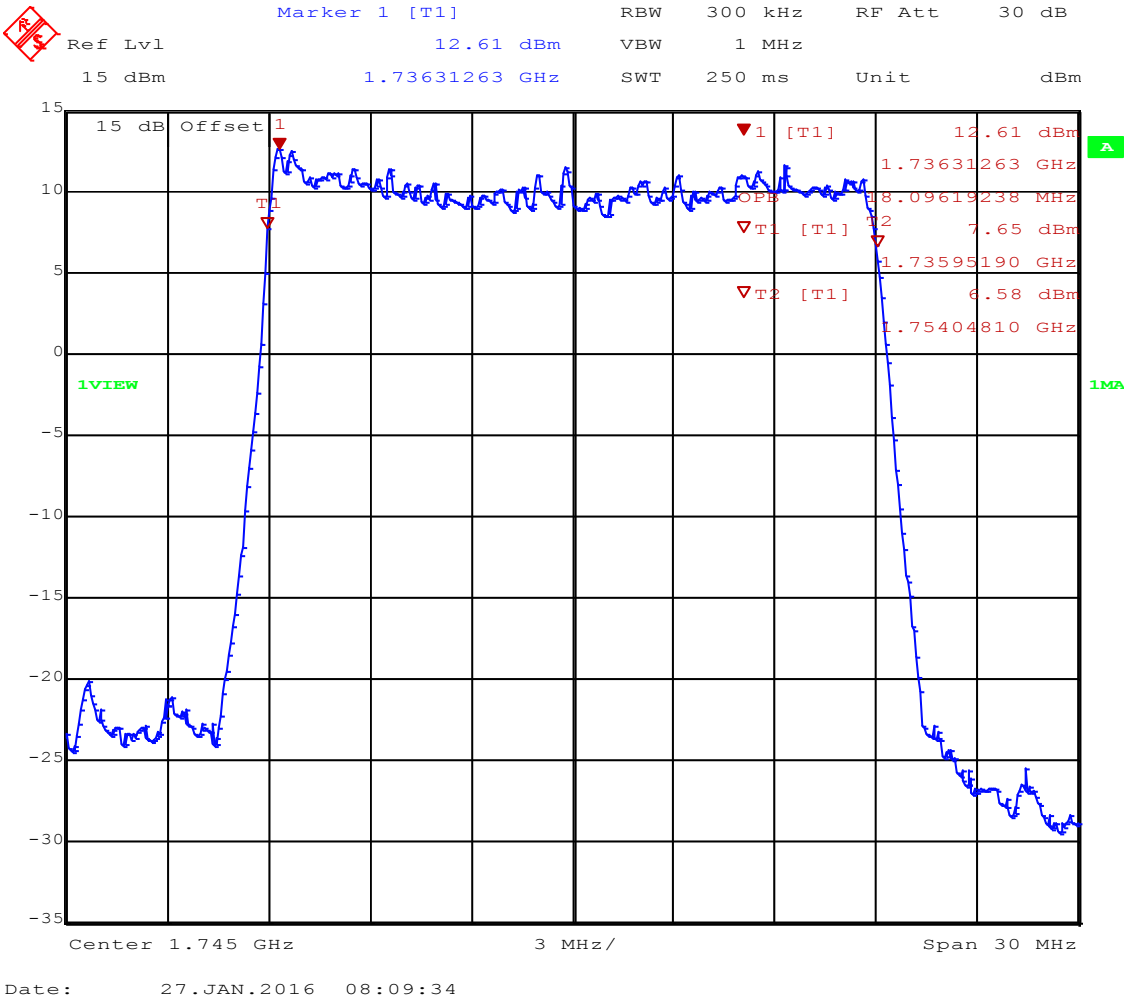


Occupied Bandwidth – LTE 4 16-QAM-20 F_{HIGH}

Occupied Bandwidth acc. to RSS-Gen

Project Number: G0M-1601-5302

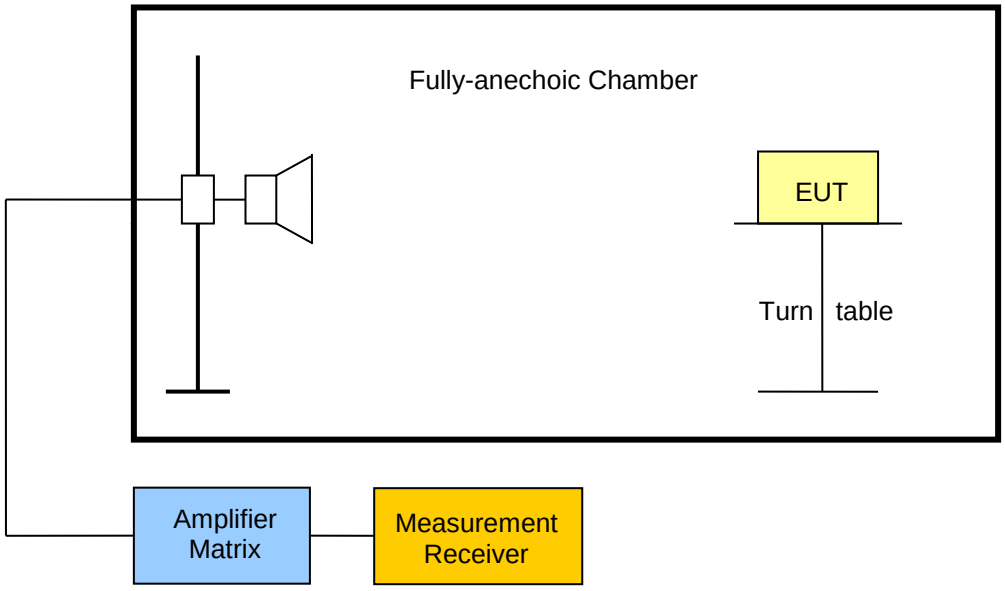
Applicant:	lesswire GmbH
EUT Name:	2G/3G/4G WLAN Hotspot
Model:	CCU5.3.1 (BWIA3)
Test Site:	Eurofins Product Service GmbH
Operator:	Burkhard Pudell
Test Conditions:	Tnom / Vnom
Mode:	LTE FDD 4 / CH: 20300 / BW: 20MHz; 16-QAM
Test Date:	2016-01-27
Verdict:	NONE (INFORMATION ONLY)
Note 1:	A spectrum analyzer with an integrated 99% power bandwidth function is used
Note 2:	OBW = 18.096 MHz



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

Radiated power acc. to FCC 27 / IC RSS-130 / IC RSS-139		Verdict: PASS
EUT requirement rule parts and clause	Reference	
	FCC § 27.50(b)(10) / FCC § 27.50(d)(4) IC RSS-130 4.4 / IC RSS-139 6.5	
Test according to measurement reference	Reference Method	
	ANSI/TIA-603-D, KDB 971168	
Test frequency range	Tested frequencies	
	F_{LOW} / F_{MID} / F_{HIGH}	
Limits		
Carrier Frequency range	Equipment type	Power limit
777-787 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 – WCDMA IV 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	HSPA	ver	15.5	30	-14.5	PASS
F_{MID}	1732.6	HSPA	ver	19.5	30	-10.5	PASS
F_{HIGH}	1752.4	HSPA	ver	18.3	30	-11.7	PASS
Test results – LTE 13 E.R.P.							
Channel	Frequency [MHz]	Mode	Pol.	Power [dBm e.r.p]	Limit [dBm e.r.p]	Margin [dB]	Result
F_{LOW}	779.5	QPSK 5	hor	22.6	34.77	-12.17	PASS
F_{MID}	782.0	QPSK 5	hor	21.6	34.77	-13.17	PASS
F_{HIGH}	784.5	QPSK 5	hor	20.8	34.77	-13.97	PASS
F_{MID}	782.0	QPSK 10	hor	20.6	34.77	-14.17	PASS
F_{LOW}	779.5	16-QAM 5	hor	20.8	34.77	-13.97	PASS
F_{MID}	782.0	16-QAM 5	hor	20.7	34.77	-13.87	PASS
F_{HIGH}	784.5	16-QAM 5	hor	19.8	34.77	-12.97	PASS
F_{MID}	782.0	16-QAM 10	hor	20.1	34.77	-22.25	PASS
Test results – LTE 13 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}	779.5	QPSK 5	hor	24.75	36.99	-12.24	PASS
F_{MID}	782.0	QPSK 5	hor	23.75	36.99	-13.24	PASS
F_{HIGH}	784.5	QPSK 5	hor	22.95	36.99	-14.04	PASS
F_{MID}	782.0	QPSK 10	hor	22.75	36.99	-14.24	PASS
F_{LOW}	779.5	16-QAM 5	hor	22.95	36.99	-14.04	PASS
F_{MID}	782.0	16-QAM 5	hor	22.85	36.99	-13.94	PASS
F_{HIGH}	784.5	16-QAM 5	hor	21.95	36.99	-15.04	PASS
F_{MID}	782.0	16-QAM 10	hor	22.25	36.99	-14.74	PASS
Comments:							

Test results – 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}	1710.7	QPSK 1.4	ver	22.1	30	-7.9	PASS
F_{MID}	1732.5	QPSK 1.4	ver	22.3	30	-7.7	PASS
F_{HIGH}	1754.3	QPSK 1.4	ver	23.7	30	-6.3	PASS
F_{LOW}	1711.5	QPSK 3	ver	23.4	30	-6.6	PASS
F_{MID}	1732.5	QPSK 3	ver	23.3	30	-6.7	PASS
F_{HIGH}	1753.5	QPSK 3	ver	24.3	30	-5.7	PASS
F_{LOW}	1712.5	QPSK 5	ver	24.2	30	-5.6	PASS
F_{MID}	1732.5	QPSK 5	ver	24.6	30	-5.4	PASS
F_{HIGH}	1752.5	QPSK 5	ver	26.9	30	-3.1	PASS
F_{LOW}	1715.0	QPSK 10	ver	22.8	30	-7.2	PASS
F_{MID}	1732.5	QPSK 10	ver	23.7	30	-6.3	PASS
F_{HIGH}	1750.0	QPSK 10	ver	23.8	30	-6.2	PASS
F_{LOW}	1717.5	QPSK 15	ver	23.5	30	-6.5	PASS
F_{MID}	1732.5	QPSK 15	ver	23.6	30	-6.4	PASS
F_{HIGH}	1747.5	QPSK 15	ver	25.7	30	-4.3	PASS
F_{LOW}	1720.0	QPSK 20	ver	26.6	30	-3.4	PASS
F_{MID}	1732.5	QPSK 20	ver	25.6	30	-4.4	PASS
F_{HIGH}	1745.0	QPSK 20	ver	27.4	30	-2.6	PASS
Comments:							

Test results – 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}	1710.7	16-QAM 1.4	ver	22.6	30	-7.4	PASS
F_{MID}	1732.5	16-QAM 1.4	ver	22.6	30	-7.4	PASS
F_{HIGH}	1754.3	16-QAM 1.4	ver	23.7	30	-6.3	PASS
F_{LOW}	1711.5	16-QAM 3	ver	23.5	30	-6.5	PASS
F_{MID}	1732.5	16-QAM 3	ver	22.6	30	-7.4	PASS
F_{HIGH}	1753.5	16-QAM 3	ver	24.0	30	-6.0	PASS
F_{LOW}	1712.5	16-QAM 5	ver	24.9	30	-5.1	PASS
F_{MID}	1732.5	16-QAM 5	ver	25.3	30	-4.7	PASS
F_{HIGH}	1752.5	16-QAM 5	ver	26.5	30	-3.5	PASS
F_{LOW}	1715.0	16-QAM 10	ver	23.8	30	-6.2	PASS
F_{MID}	1732.5	16-QAM 10	ver	25.4	30	-4.7	PASS
F_{HIGH}	1750.0	16-QAM 10	ver	25.6	30	-4.4	PASS
F_{LOW}	1717.5	16-QAM 15	ver	24.6	30	-5.4	PASS
F_{MID}	1732.5	16-QAM 15	ver	25.0	30	-5.0	PASS
F_{HIGH}	1747.5	16-QAM 15	ver	26.9	30	-3.1	PASS
F_{LOW}	1720.0	16-QAM 20	ver	26.9	30	-3.1	PASS
F_{MID}	1732.5	16-QAM 20	ver	25.7	30	-4.3	PASS
F_{HIGH}	1745.0	16-QAM 20	ver	27.5	30	-2.5	PASS
Comments:							

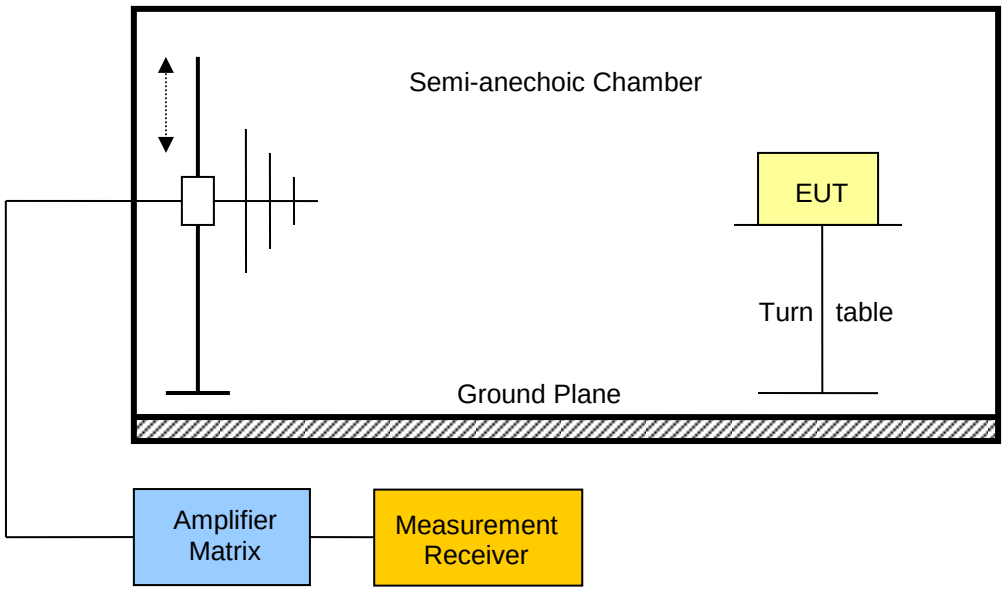
3.3 Test Conditions and Results – Transmitter radiated emissions

Transmitter radiated power acc. to FCC 27 / IC RSS-130 / IC RSS-139	Verdict: PASS
Test according referenced standards	Reference Method
	FCC § 27.53(c), FCC § 27.53(h) IC RSS-130 4.6, IC RSS-139 6.6
Test according to measurement reference	Reference Method
	ANSI/TIA-603-D, KDB 971168
Test frequency range	Tested frequencies
	30 MHz – 10th Harmonic

Limits

Region	Operating Frequency range [MHz]	Type	Frequency Range [MHz]	Bandwidth [kHz]	Limit [dBm]
FCC	776-788	Mobile	10 - 763	100	$43 + 10 \cdot \log_{10}(P)$ [dB] = -13
			763 - 775	6.25	$65 + 10 \cdot \log_{10}(P)$ [dB] = -35
			775 – 775.9	100	$43 + 10 \cdot \log_{10}(P)$ [dB] = -13
			775.9 – 776	30	$43 + 10 \cdot \log_{10}(P)$ [dB] = -13
			788 – 788.1	30	$43 + 10 \cdot \log_{10}(P)$ [dB] = -13
			788.1 – 793	100	$43 + 10 \cdot \log_{10}(P)$ [dB] = -13
			793 – 805	6.25	$65 + 10 \cdot \log_{10}(P)$ [dB] = -35
			805 – 10th harmonic	100	$43 + 10 \cdot \log_{10}(P)$ [dB] = -13
ISED	777-787	Mobile	10 - 763	100	$43 + 10 \cdot \log_{10}(P)$ [dB] = -13
			763 - 775	6.25	$65 + 10 \cdot \log_{10}(P)$ [dB] = -35
			775 – 776.9	100	$43 + 10 \cdot \log_{10}(P)$ [dB] = -13
			776.9 – 777	30	$43 + 10 \cdot \log_{10}(P)$ [dB] = -13
			787 – 787.1	30	$43 + 10 \cdot \log_{10}(P)$ [dB] = -13
			788.1 – 793	100	$43 + 10 \cdot \log_{10}(P)$ [dB] = -13
			793 – 806	6.25	$65 + 10 \cdot \log_{10}(P)$ [dB] = -35
			806 – 1559	100	$43 + 10 \cdot \log_{10}(P)$ [dB] = -13
			1559 – 1610	100	Wideband: -70 dBW/MHz Discrete, <700 Hz: -80 dBW
			1610 – 10th harmonic	100	$43 + 10 \cdot \log_{10}(P)$ [dB] = -13
FCC ISED	1710-1755	Mobile	10 – 1709	1000	$43 + 10 \cdot \log_{10}(P)$ [dB] = -13
			1709 – 1710	1 % of EBW	$43 + 10 \cdot \log_{10}(P)$ [dB] = -13
			1755 – 1756	1 % of EBW	$43 + 10 \cdot \log_{10}(P)$ [dB] = -13
			1756 - 10th harmonic	1000	$43 + 10 \cdot \log_{10}(P)$ [dB] = -13

Test setup



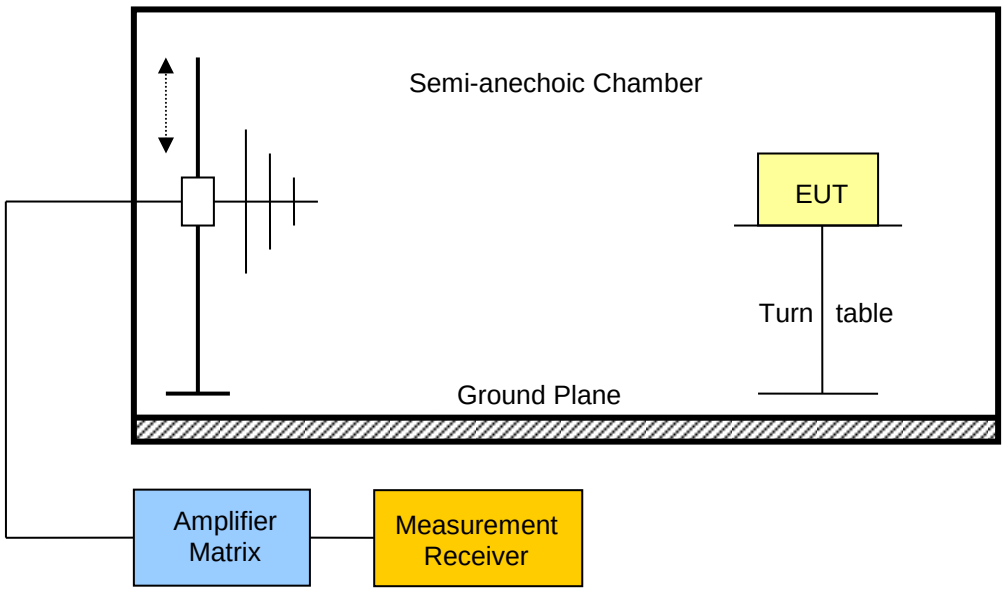
Test procedure

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 – WCDMA IV							
Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dbm]	Pol.	Limit [dBm]	Margin [dB]
F_{LOW}	1712.4	HSPA	No significant spurious emissions				
F_{MID}	1732.6	HSPA					
F_{HIGH}	1752.4	HSPA					
Test results – LTE 13							
Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dbm]	Pol.	Limit [dBm]	Margin [dB]
F_{LOW}	779.5	BW: 10MHz; #RB: 50-0	774.626	-44.2	ver	-35	-9.21
F_{LOW}	779.5	BW: 10MHz; #RB: 50-0	774.932	-48.1	hor	-35	-13.11
F_{MID}	782.0	BW: 10MHz; #RB: 50-0	774.422	-45.60	ver	-35	-10.59
F_{MID}	782.0	BW: 10MHz; #RB: 50-0	788.442	-40.50	ver	-35	-05.53
F_{MID}	782.0	BW: 10MHz; #RB: 50-0	775.000	-41.60	hor	-35	-06.64
F_{MID}	782.0	BW: 10MHz; #RB: 50-0	788.918	-43.90	hor	-35	-08.91
F_{HIGH}	784.5	BW: 10MHz; #RB: 50-0	788.068	-41.90	ver	-35	-06.85
F_{HIGH}	784.5	BW: 10MHz; #RB: 50-0	788.523	-45.70	hor	-35	-10.65
Test results – LTE 4							
Channel	Frequency [MHz]	Mode	Emission [MHz]	Level [dbm]	Pol.	Limit [dBm]	Margin [dB]
F_{LOW}	1720.0	BW: 20MHz; #RB:100	1710	-28.40	ver	-13.00	-15.36
F_{MID}	1732.5	No significant spurious emissions					
F_{HIGH}	1745.0	BW: 20MHz; #RB:100	1755	-24.60	ver	-13.00	-11.64
F_{HIGH}	1745.0	BW: 20MHz; #RB:100	1755	-25.30	hor	-13.00	-12.34
Comments:							

3.4 Test Conditions and Results – Receiver radiated emissions

Receiver radiated emissions acc. to IC RSS-130 / IC RSS-139				Verdict: PASS
Test according referenced standards	Reference Method			
	IC 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} WCDMA IV	2132.6	No significant spurious emissions					
F_{MID} LTE 4	2132.5	No significant spurious emissions					
F_{MID} LTE 13	751.0	No significant spurious emissions					

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