

16.3 Results LTE band 12

The EUT was set to transmit the maximum power.

16.3.1 RF output power

Description:

This paragraph contains average power, peak output power and EIRP measurements for the mobile station. In all cases, the peak output power is within the required mask (this mask is specified in the JTC standards, TIA PN3389 Vol. 1 Chap 7, and is no FCC requirement).

Measurement:

The mobile was set up for the maximum output power with pseudo random data modulation.

To determine the Peak-To-Average Power Ratio (PAPR) the measurement was performed with the Power Complementary Cumulative Distribution Function (CCDF).

Measurement parameters		
Detector: Sample		
AQT: See plot		
Resolution bandwidth: 1 MHz		
Used equipment: See chapter 7.2 setup A		
Measurement uncertainty: See chapter 9		
Measurement procedure FCC: § 2.1046 ISED: RSS-Gen, 6.12		



Limits:

FCC	ISED		
47 CFR 27.50(c)(9)	RSS-130, 4.6.1 & 4.6.3		
Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.	 4.6.1: The transmitter output power shall be measured in terms of average power. In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission. 4.6.3: The e.r.p. shall not exceed 30 watts for mobile equipment and outdoor fixed subscriber equipment. The e.r.p. shall not exceed 3 watts for portable equipment and indoor fixed subscriber equipment. 		
Power: 34.7	77 dBm ERP		
PAPR: 13 dB (ISED only)			



Results:

Sub-Carrier Modulation		Number	Average Output Power [dBm] Channel No / Frequency [MHz]		Peak to Average Ratio [dB] Channel No / Frequency [MHz]			
Spacing [kHz]		of Tones	23011 / 699.1	23095 / 707.5	23179 / 715.9	23011 / 699.1	23095 / 707.5	23179 / 715.9
	BPSK	1T0	19.69	19.93	20.26	1.86	1.83	1.83
2.75		1T47	19.63	19.87	20.18	1.86	1.86	1.86
3.75	QPSK	1T0	19.72	19.89	20.33	1.68	1.68	1.71
		1T47	19.62	19.99	20.21	0.93	1.71	0.90
	BPSK	1T0	19.54	19.91	20.04	1.59	1.62	1.59
		1T11	19.62	19.86	20.20	1.65	1.65	1.65
15		1T0	19.72	19.86	20.42	1.59	1.57	1.54
	QPSK 1T	1T11	19.49	19.95	20.19	0.46	1.57	0.46
		12T0	17.82	18.01	18.35	5.74	5.80	5.45

The radiated output power is measured in the mode with the highest conducted output power.

Output Power (ERP)				
Sub-Carrier Spacing [kHz]	Frequency (MHz)	Average Output Power (dBm) BPSK	Average Output Power (dBm) QPSK	
	699.1	12.79	12.82	
3.75	707.5	12.73	12.79	
	715.9	12.86	12.93	
	699.1	12.72	12.82	
15	707.5	12.71	12.75	
	715.9	12.80	13.02	



Description:

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the mobile station in a "call mode". This is accomplished with the use of a R&S CMW500 DIGITAL RADIOCOMMUNICATION TESTER.

CTC I advanced

1. Measure the carrier frequency at room temperature.

2. Subject the mobile station to overnight soak at -30 C.

3. With the mobile station, powered with V_{nom} , connected to the CMW500 and in a simulated call on channel 1412 (centre channel), measure the carrier frequency. These measurements should be made within two minutes of powering up the mobile station, to prevent significant self warming.

4. Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.

5. Remeasure carrier frequency at room temperature with Vnom. Vary supply voltage from Vmin to Vmax, in 0.1 Volt steps remeasuring carrier frequency at each voltage. Pause at V_{nom} for 1.5 hours unpowered, to allow any self heating to stabilize, before continuing.

6. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

This measurement was performed with the highest channel bandwidth supported from the EUT on the middle channel

<u>Measurement:</u>	
Μ	easurement parameters
Detector:	
Sweep time:	
Video bandwidth:	Measured with CMW500
Resolution bandwidth:	Measured with CMW500
Span:	
Trace-Mode:	
Used equipment:	See chapter 7.4 setup A
Measurement uncertainty:	See chapter 9
Measurement procedure	FCC: § 2.1055
	ISED: RSS-Gen, 6.11

Me



<u>Limits:</u>

FCC	ISED
§ 27.54	RSS-130, 4.5
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.	The frequency stability shall be sufficient to ensure that the occupied bandwidth remains within each frequency block range when tested at the temperature and supply voltage variations specified in RSS-Gen.

Results:

FREQ ERROR versus VOLTAGE

Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)
3.2	-16	-0.0226
3.6	-16	-0.0226
4.0	-16	-0.0226

FREQ ERROR versus TEMPERATURE

Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)
-30	17	0.0240
-20	18	0.0254
-10	20	0.0283
± 0	-16	-0.0226
10	-11	-0.0155
20	-16	-0.0226
30	-15	-0.0212
40	-37	-0.0523
50	-24	-0.0339

Additional measurements for RSS-130 (4.3 b)

f _L = MHz	f _H = MHz
f_L – (max freq. error) = MHz	f _H + (max freq. error) = MHz



16.3.3 Spurious emissions radiated

Description:

The following steps outline the procedure used to measure the radiated emissions from the mobile station. The site is constructed in accordance with ANSI C63.4:2014 requirements and is recognized by the FCC to be in compliance for a 3 and a 10 meter site. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 711 MHz. Measured up to 8 GHz. The resolution bandwidth is set as outlined in Part 27.53. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the LTE band 12.

Measurement:

Measurement parameters			
Detector: Peak			
Sweep time:	2 sec.		
Resolution bandwidth:	1 MHz		
Video bandwidth:	3 MHz		
Span:	100 MHz Steps		
Trace mode:	Max Hold		
Used equipment:	See chapter 7.2 setup A		
Measurement uncertainty:	See chapter 9		
Measurement procedure	FCC: § 2.1053 ISED: RSS-Gen, 6.13		

<u>Limits:</u>

FCC	ISED		
§ 27.53(g)	RSS-130, 4.7.1		
For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.	The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 log10 p (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.		
-13 dBm			



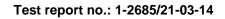
Results:

<u>BPSK</u>

SPURIOUS EMISSION LEVEL					
LOWEST CHANNEL MIDDLE CHANNEL			HANNEL	HIGHEST (CHANNEL
Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]
-/-	-	All detected emissions are more than 20 dB below the limit.		-/-	-
-/-	-/-	-/-	-/-	-/-	-/-
-/-	-/-	-/-	-/-	-/-	-/-

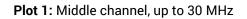
<u>QPSK</u>

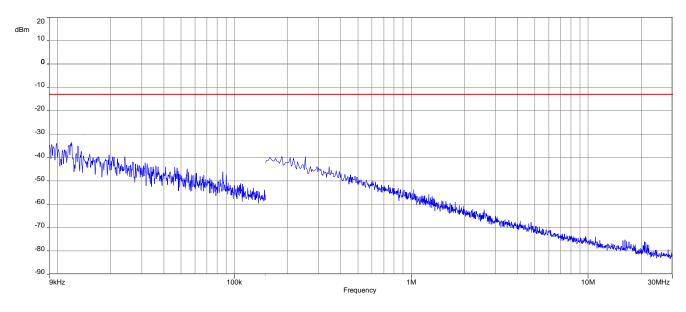
		SPURIOUS EM	ISSION LEVEL		
LOWEST C	CHANNEL MIDDLE CHANNEL H		MIDDLE CHANNEL H		HANNEL
Spurious emissions	Level [dBm]	Spurious emissions Level [dBm] Spurious emiss		Spurious emissions	Level [dBm]
-/·	-	All detected emissions are more than 20 dB below the limit.		-/-	
-/-	-/-	-/-	-/-	-//-	
-/-	-/-	-/-	-/-	-/-	-/-



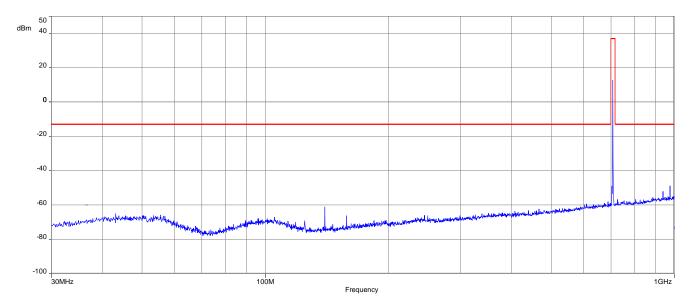


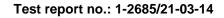
<u>BPSK</u>





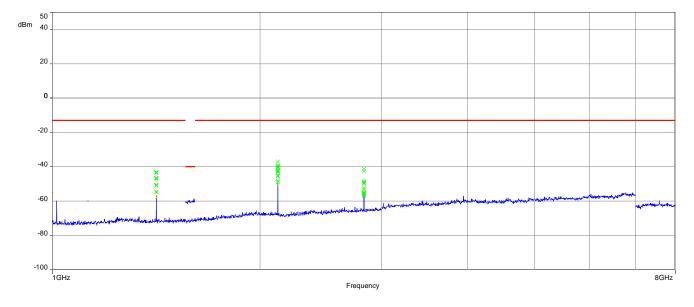
Plot 2: Middle channel, 30 MHz to 1 GHz

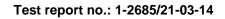






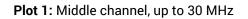
Plot 3: Middle channel, 1 GHz to 8 GHz

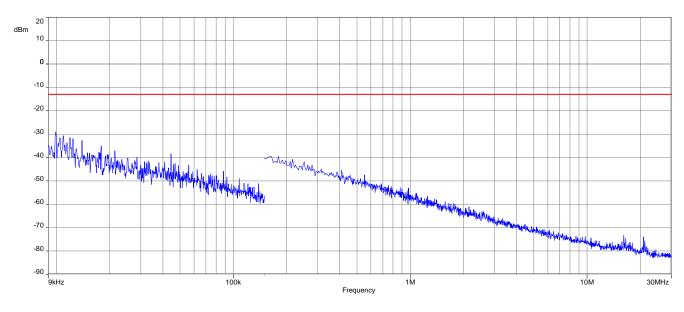




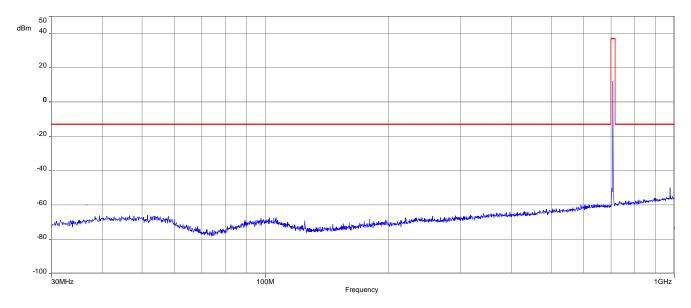


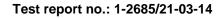
<u>QPSK</u>





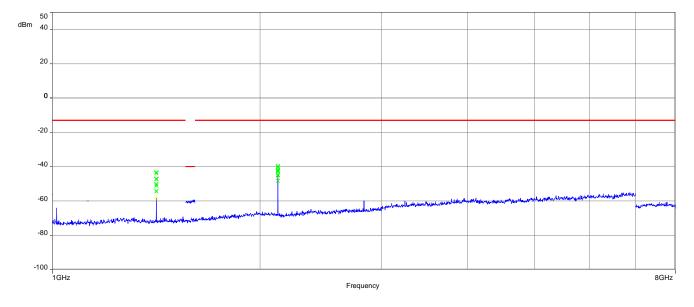
Plot 2: Middle channel, 30 MHz to 1 GHz







Plot 3: Middle channel, 1 GHz to 8 GHz





16.3.4 Spurious emissions conducted

Description:

The following steps outline the procedure used to measure the conducted emissions from the mobile station. 1. Determine frequency range for measurements: From § 2.1057 & RSS-Gen, 6.13.2 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency.

2. Determine mobile station transmits frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

Measurement:

Measurement parameters	
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	300 kHz
Resolution bandwidth:	100 kHz
Span:	10 MHz – 7.5 GHz
Trace-Mode:	Max Hold
Used equipment:	See chapter 7.4 setup A
Measurement uncertainty:	See chapter 9
Measurement procedure	FCC: § 2.1051 ISED: RSS-Gen, 6.13

Limits:

FCC	ISED
§ 27.53(g)	RSS-130, 4.7.1
For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.	The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 log10 p (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.
-13	dBm



Results:

<u>BPSK</u>

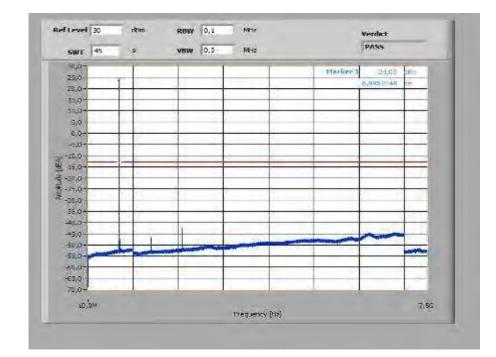
SPURIOUS EMISSION LEVEL					
LOWEST C	LOWEST CHANNEL		MIDDLE CHANNEL HIGHEST CHANNEL		CHANNEL
Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]
1398.2	-/-	1415.0	-/-	1431.8	-/-
2097.3	-/-	2122.5	-/-	2147.7	-/-
2796.4	-/-	2830.0	-/-	2863.6	-/-
3495.5	-/-	3537.5	-/-	3579.5	-/-
4194.6	-/-	4245.0	-/-	4295.4	-/-
4893.7	-/-	4952.5	-/-	5011.3	-/-
5592.8	-/-	5660.0	-/-	5727.2	-/-
6291.9	-/-	6367.5	-/-	6443.1	-/-
6991.0	-/-	7075.0	-/-	7159.0	-/-

<u>QPSK</u>

SPURIOUS EMISSION LEVEL					
LOWEST C	HANNEL	MIDDLE CHANNEL HIGHEST CHANNEL			HANNEL
Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]
1398.2	-/-	1415.0	-/-	1431.8	-/-
2097.3	-/-	2122.5	-/-	2147.7	-/-
2796.4	-/-	2830.0	-/-	2863.6	-/-
3495.5	-/-	3537.5	-/-	3579.5	-/-
4194.6	-/-	4245.0	-/-	4295.4	-/-
4893.7	-/-	4952.5	-/-	5011.3	-/-
5592.8	-/-	5660.0	-/-	5727.2	-/-
6291.9	-/-	6367.5	-/-	6443.1	-/-
6991.0	-/-	7075.0	-/-	7159.0	-/-

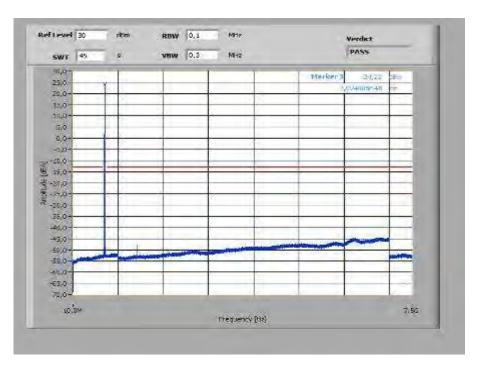


Plots: BPSK

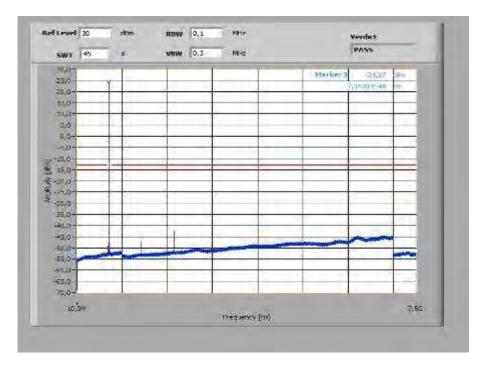


Plot 1: Lowest Channel (10 MHz - 7.5 GHz), spacing 3.75 kHz, 1@0 tones

Plot 2: Middle Channel (10 MHz - 7.5 GHz), spacing 3.75 kHz, 1@0 tones

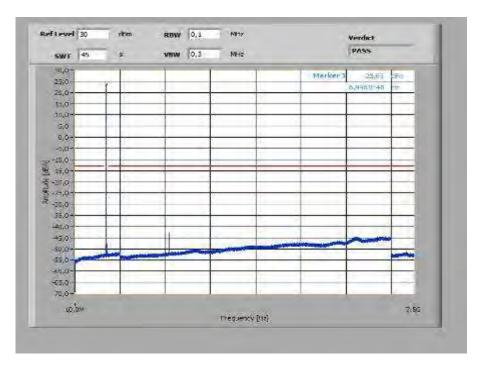




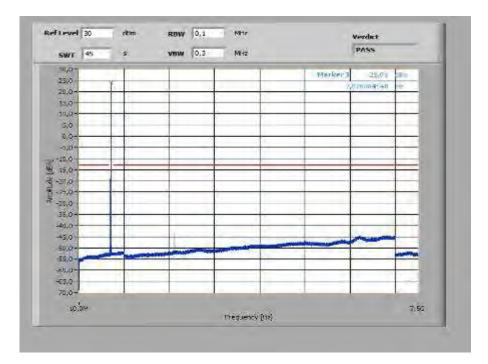


Plot 3: Highest Channel (10 MHz - 7.5 GHz), spacing 3.75 kHz, 1@0 tones

Plot 4: Lowest Channel (10 MHz - 7.5 GHz), spacing 3.75 kHz, 1@47 tones

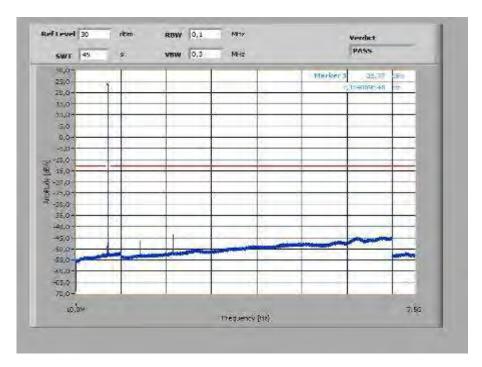




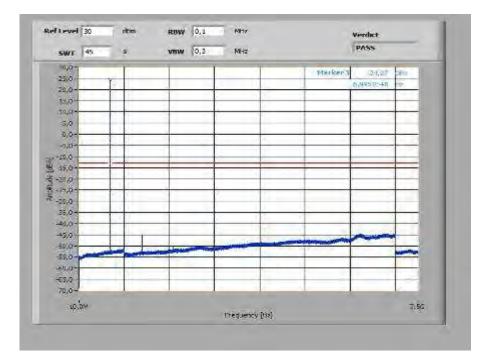


Plot 5: Middle Channel (10 MHz - 7.5 GHz), spacing 3.75 kHz, 1@47 tones

Plot 6: Highest Channel (10 MHz - 7.5 GHz), spacing 3.75 kHz, 1@47 tones

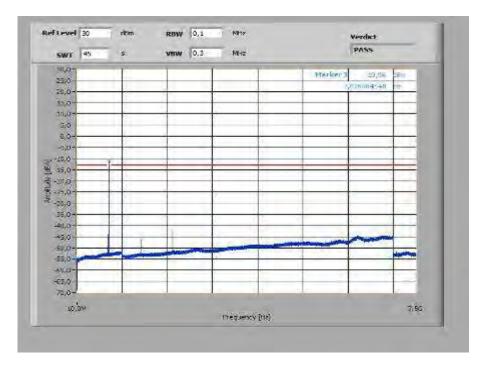




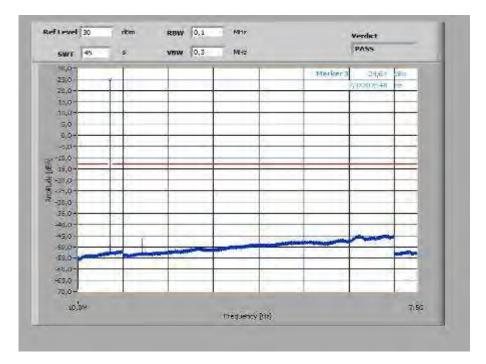


Plot 7: Lowest Channel (10 MHz - 7.5 GHz), spacing 15 kHz, 1@0 tones

Plot 8: Middle Channel (10 MHz - 7.5 GHz), spacing 15 kHz, 1@0 tones

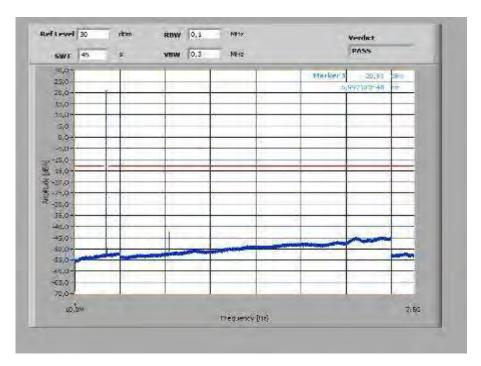




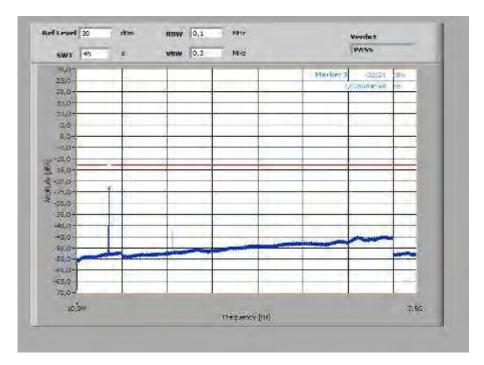


Plot 9: Highest Channel (10 MHz - 7.5 GHz), spacing 15 kHz, 1@0 tones

Plot 10: Lowest Channel (10 MHz - 7.5 GHz), spacing 15 kHz, 1@11 tones

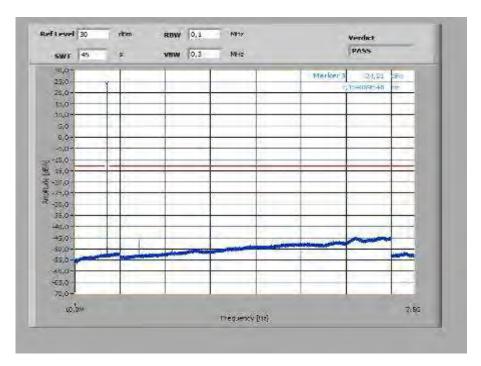






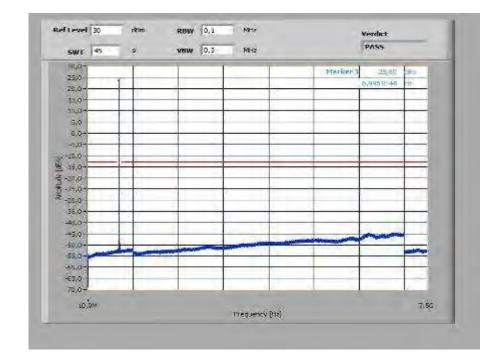
Plot 11: Middle Channel (10 MHz - 7.5 GHz), spacing 15 kHz, 1@11 tones

Plot 12: Highest Channel (10 MHz - 7.5 GHz), spacing 15 kHz, 1@11 tones



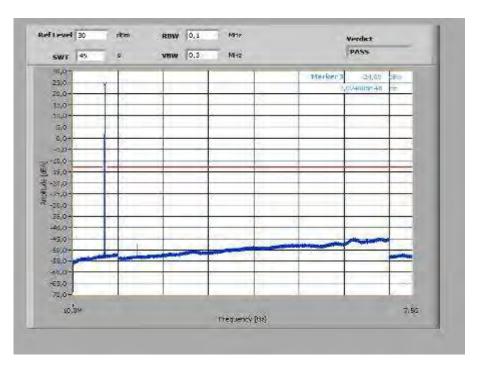


Plots: QPSK

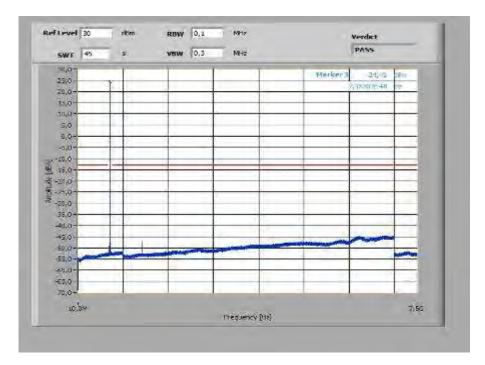


Plot 1: Lowest Channel (10 MHz - 7.5 GHz), spacing 3.75 kHz, 1@0 tones

Plot 2: Middle Channel (10 MHz - 7.5 GHz), spacing 3.75 kHz, 1@0 tones

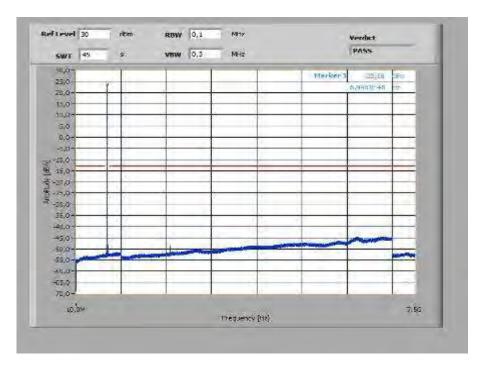




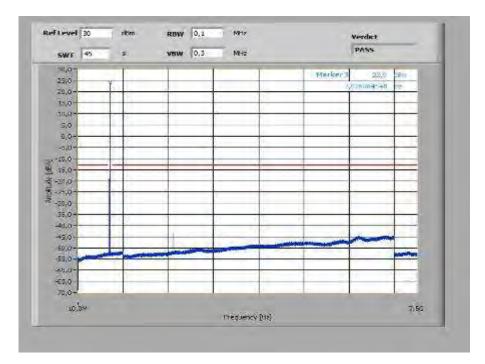


Plot 3: Highest Channel (10 MHz - 7.5 GHz), spacing 3.75 kHz, 1@0 tones

Plot 4: Lowest Channel (10 MHz - 7.5 GHz), spacing 3.75 kHz, 1@47 tones

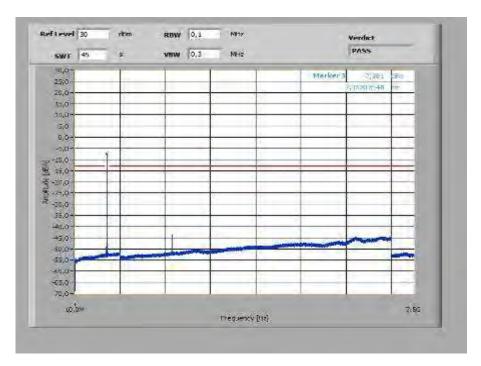




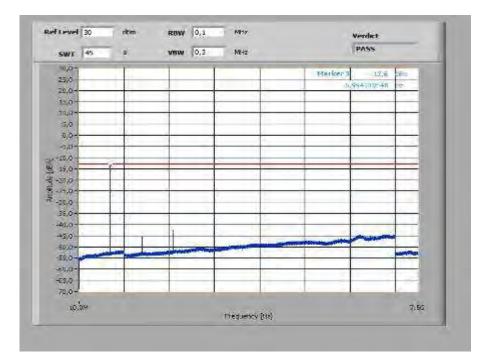


Plot 5: Middle Channel (10 MHz - 7.5 GHz), spacing 3.75 kHz, 1@47 tones

Plot 6: Highest Channel (10 MHz - 7.5 GHz), spacing 3.75 kHz, 1@47 tones

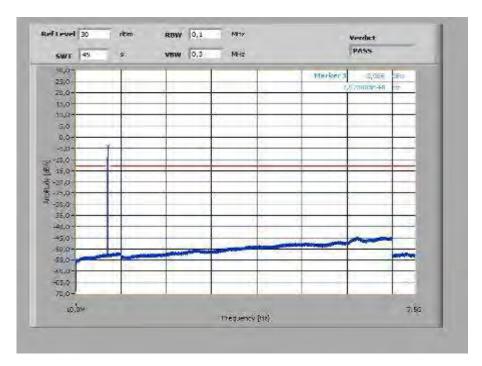




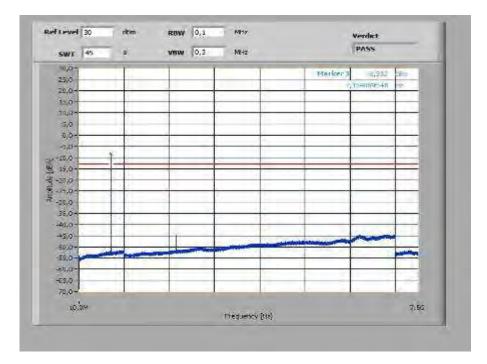


Plot 7: Lowest Channel (10 MHz - 7.5 GHz), spacing 15 kHz, 1@0 tones

Plot 8: Middle Channel (10 MHz -7.5 GHz), spacing 15 kHz, 1@0 tones

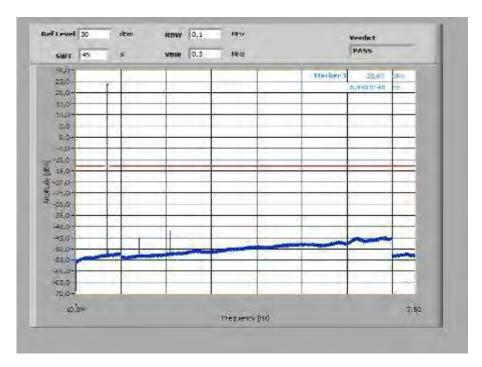




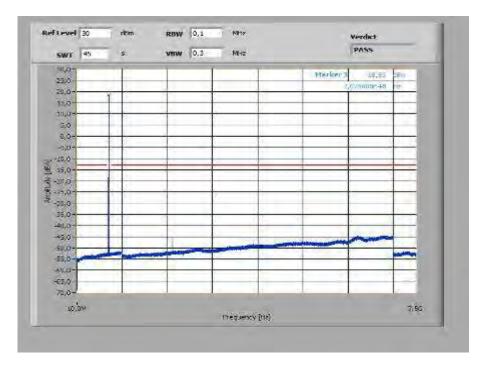


Plot 9: Highest Channel (10 MHz - 7.5 GHz), spacing 15 kHz, 1@0 tones

Plot 10: Lowest Channel (10 MHz - 7.5 GHz), spacing 15 kHz, 1@11 tones

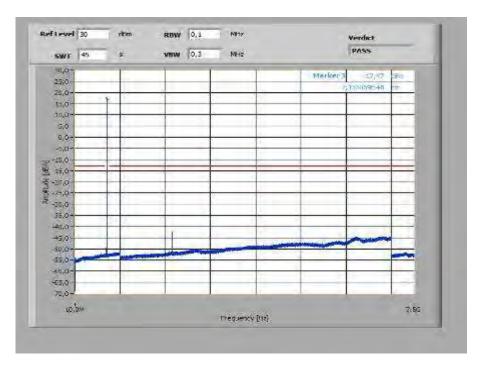




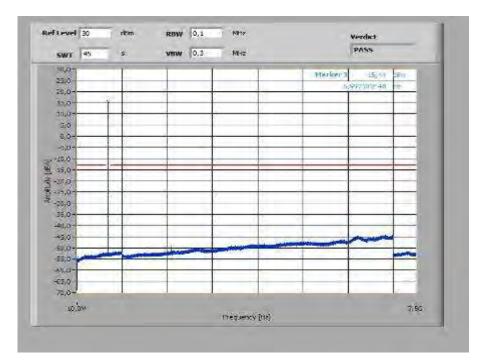


Plot 11: Middle Channel (10 MHz - 7.5 GHz), spacing 15 kHz, 1@11 tones

Plot 12: Highest Channel (10 MHz - 7.5 GHz), spacing 15 kHz, 1@11 tones

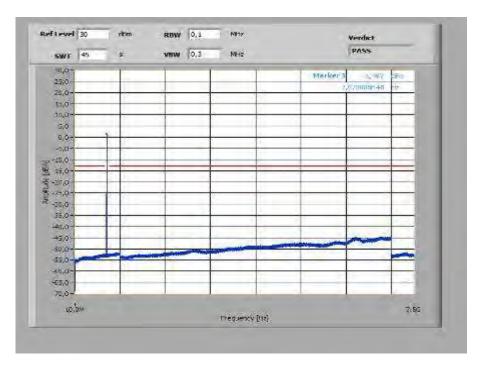




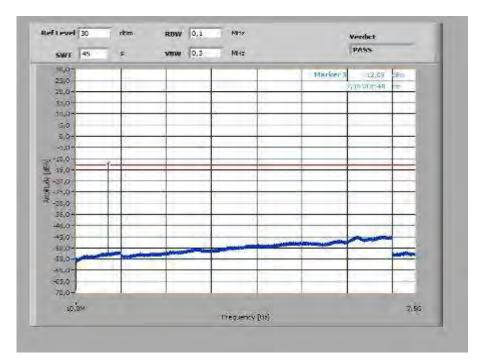


Plot 13: Lowest Channel (10 MHz - 7.5 GHz), spacing 15 kHz, 12@0 tones

Plot 14: Middle Channel (10 MHz - 7.5 GHz), spacing 15 kHz, 12@0 tones







Plot 15: Highest Channel (10 MHz - 7.5 GHz), spacing 15 kHz, 12@0 tones



16.3.5 Block edge compliance

Description:

The spectrum at the band edges must comply with the spurious emissions limits.

Measurement:

Measurement parameters	
Detector:	RMS
Sweep time:	180s
Video bandwidth:	300 kHz
Resolution bandwidth:	100 kHz
Span:	1 MHz
Trace-Mode:	Max Hold
Used equipment:	See chapter 7.4 setup A
Measurement uncertainty:	See chapter 9
Measurement procedure	FCC: § 2.1051 ISED: RSS-Gen, 6.13

<u>Limits:</u>

FCC	ISED
§ 27.53(g)	RSS-130, 4.7.1
For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.	The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 log10 p (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.
-13	dBm
Correction factor according to KDB 890810 if RBW < 1 % emission bandwidth: ⊠N/A here □10 log (RBW1/RBW2) = X dB; whereas: RBW1 = Y, RBW2 = Z	



Results: BPSK

Plot 1: Lowest channel, spacing 3.75 kHz, 1@0 tones

Ref Level 10.00 dBm	RBW 100 kHz T 180 5 • VBW 300 kHz		
SGL Count 1/1 TC	¥	A COLORADOR AND	
Controlled by CTC advanced LT Limit Grock	E Tester, Test Case Verdic	t: PASS @IRm Max MI[1]	-20.36 dBm
Linur Oprod Edge	PAR	wilth	808.099250 484
0.dam		1 1	
50 d8m			
20 0010			
20 d0m			
30 dBm			
40 dBm			the self y
			or one tailed at the state of the state of the
The state of the second second	colored and the first of the state	THE PROPERTY OF THE PROPERTY OF	
e0 d8m			the determinant and
CO UBIN			
70 dilum			
eo dem-			
Stort 694-0 MHz		101 pts	Stop 699.0 MHz

Date: 1.APR.2022 16:38:38

Plot 2: Highest channel, spacing 3.75 kHz, 1@0 tones

-Spectrum Ref Level 10.00 dBm RBW 100 kHz 30 d0 = SWT 180 z = VBW 300 kHz TDF Att Mode Auto Sweep SGL Count 1/1 ontrolled by CTC advanced LTE Tester, Test Case Verdict: PASS @IRm Max Linsit Bruck Linur Banul Edge -26,99 dBn F16.001750 484 M1[1] PALS D dBm -10 dBmand Edge -20 d8m-10.4 in indi I MIGHT milit. 50 d -60 d8 70 dbn BD dBr Start 716.0 MHz 10001 pts Stop 721.0 MHz

Date: 1.APR.2022 19:52:37

Test report no.: 1-2685/21-03-14

Plot 3: Lowest channel, spacing 3.75 kHz, 1@47 tones

Plot 4: Highest channel, spacing 3.75 kHz, 1@47 tones

Spectrum Ref Level 10.00 dBm

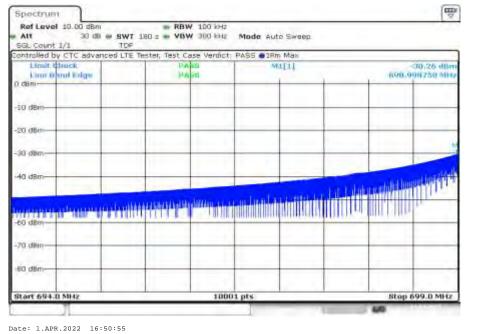
Controlled by CTC advanced LT		A MARKET AND A MARK THE AND A MARKET AND A MARK	
Limit Grack Linur Brand Edge	PAS	wi[1]	-26,98 JBm F16.000250 304z
D dBm	Papa		111.111/2.12 101/2
-10 dBm			
Band Edge			
+20 d8m			
diap			
All Materia	and the second se		
ad dealer thing the balance of	and an		
	dilligiolete de ateans anno		
-50 dBm			think has a smatter that the Asso
1111	CONTRACT DESIGN AND		THE PERMIT
-60 d8m			
-70 dbm			
-70 dbm			

10001 pts

* RBW 100 kHz

Date: 1.APR.2022 20:04:51

Lart 716.0 MHz



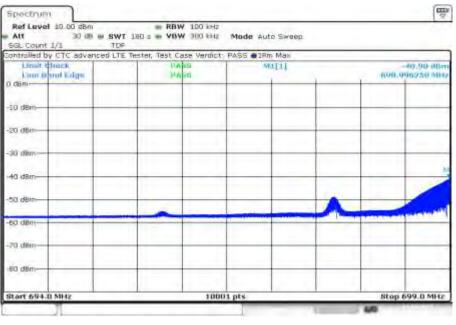


-

Stop 721.0 MHz

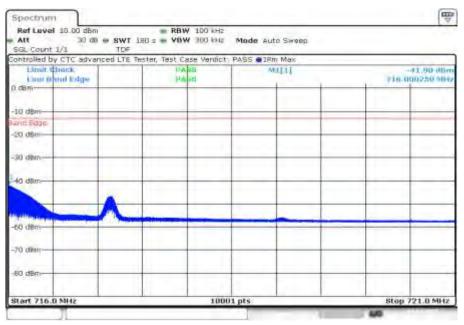


Plot 5: Lowest channel, spacing 15 kHz, 1@0 tones



Date: 1.APR.2022 17:28:12

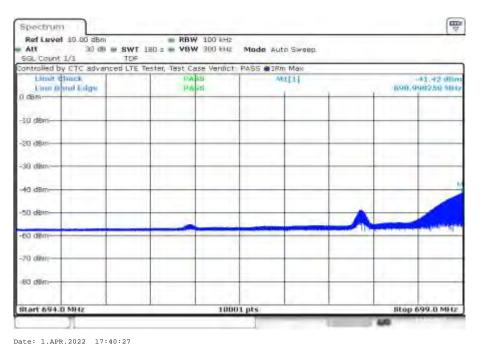
Plot 6: Highest channel, spacing 15 kHz, 1@0 tones



Date: 1.APR.2022 20:41:59



Plot 7: Lowest channel, spacing 15 kHz, 1@11 tones



Plot 8: Highest channel, spacing 15 kHz, 1@11 tones



Date: 1.APR.2022 20:54:12



Results: QPSK

Plot 1: Lowest channel, spacing 3.75 kHz, 1@0 tones

SGL Count 1/1 TDF		Mode Auto Sweep	
Controlled by CTC advanced LTE Limit Churck Limit Ohmit Kilge D dam	Tester, Test Case Verdict	PASS BIRM Max	-20,46 dBn non.ong/50 MH
50 d8m	_		
20 dBm			
-30 dbm			
40 dam			
and the second sec			
	u and and the des		
60 dBm	AT AT A AND AND AND AND AND AND AND AND AND A	en mån sen til vil det til det	
1999-1999 - San Traing an		en nån sen til Andri (1910) i ti	

Date: 1.APR.2022 17:03:11

Plot 2: Highest channel, spacing 3.75 kHz, 1@0 tones

		2		
	T 180	Mode Auto Sweep		
SGL Count 1/1 TDP ontrolled by CTC advanced LTP		t: PASS TRm Max		-
Limit thuck	PABS	MI[1]	1	-20,96 dBr
Linur Ohnd Edge	PARS		736	007250 МН
, applied to the second s				
10 dBm				-
and Edge				
20 dBm-				-
ed dum				
Bittering				_
	itili haran a sa s			-
S0 dBm	Contract of the later of the second	in the first of the second second		
50 dame			A Charles and the state of the	IN I
50 dBm			Network Contractor	
			Weihneltfäller antioxist	
			Weinner Weiter Alberte of	uuuuna
70 dBm			Weinnel Witten Alberte of	uwaana
50 dBm 60 dBm 70 dBm			Weinnel Hilfer Alberte de	

Date: 1.APR.2022 20:17:06

Test report no.: 1-2685/21-03-14

Plot 3: Lowest channel, spacing 3.75 kHz, 1@47 tones

Plot 4: Highest channel, spacing 3.75 kHz, 1@47 tones

Date: 1.APR.2022 20:29:20

Att 30 m = SW	* RBW 100 kHz	Mode Auto Sweep	
SGL Count 1/1 TD	E Contraction of the second	and the second second	
Controlled by CTC advanced LTI	E Tester, Test Case Verdict:	PASS @IRm Max	-27.01 00
Linu filmul Edge	PASS	wilth	710.007750 80
D dBm			
and a second sec			
10 dBm			
land Edge			
-20 dBm-			
and the second se			
Hilling			
Partie and a second			
	Contraction of the second		
-SO dam	A CONTRACTOR OF TAXABLE PROPERTY.		
		NAMES AND A DESCRIPTION OF	nininitati na manakana kara kara
			ninindud at par deve at the second
-eo dam			nindnákol megan kisko kistor a kora
-60 d8m			nindnákol a par detverte erek ker
-50 dem-		NAME AND ADDRESS OF	ninded of all and the second second second
-50 dBm		William (Color Color Col	
-60 dBm	1000	MANANYA NG RUMANYA	Stop 721.0 MH

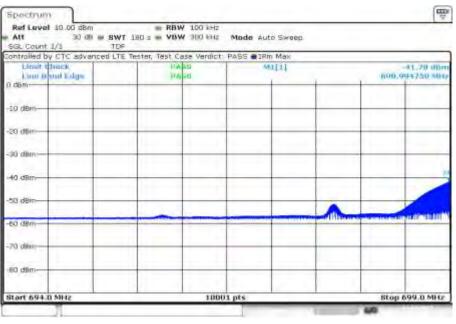
Date: 1.APR.2022 17:15:27

Ref Level 10.00 dBm	RBW 100 kHz	Mode Auto Sweep	
SGL Count 1/1 TDF ontrolled by CTC advanced LTE			
Limit Chuck	PASS	wrItt	-30.23 dBr non.999250 MH
i dami-			
so dem			
20 dBm			
million (in the second se			
40 dam-			and the second second
		and the second second	A DESCRIPTION OF THE PARTY OF T
indextangenetical ipenetical		T TO A REAL POINT OF THE REAL POINT OF THE P	
vo d8m			
no dilari			
70 dilm			



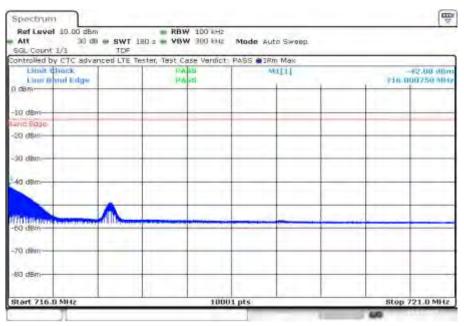


Plot 5: Lowest channel, spacing 15 kHz, 1@0 tones



Date: 1.APR.2022 17:52:42

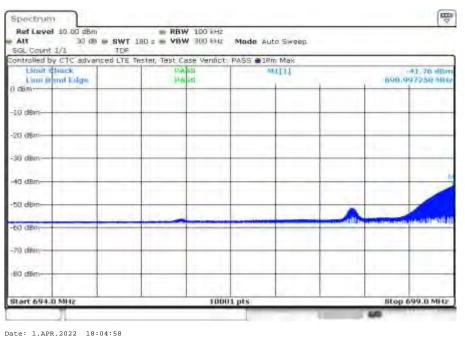
Plot 6: Highest channel, spacing 15 kHz, 1@0 tones



Date: 1.APR.2022 21:06:26

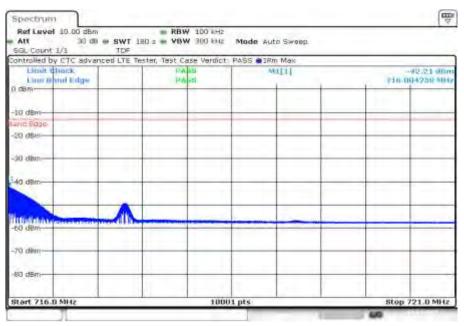


Plot 7: Lowest channel, spacing 15 kHz, 1@11 tones



Date: 1.APR.2022 10:04:58

Plot 8: Highest channel, spacing 15 kHz, 1@11 tones



Date: 1.APR.2022 21:18:40

1 00 dBm RBW 100 kHz 30 db = SWT 180 z = V6W 300 kHz Ref Level 10.00 dBm Att Mode Auto Sweep SGL Count 1/1 TOP ontrolled by CTC advanced LTE Tester, Tast Case Verdict: PASS @IRm Max Lindt Chuck Linu David Edge MILTI -41.43 dBn 808.994750 MH PALS D dam -10 dBm -20 dBr -30 dbr 40 dBr -50 dB -60 dBm 70 dam ED dBm-Stop 699.0 MHz Start 694.0 MHz 10001 pts Date: 1.APR.2022 18:17:13

Plot 10: Highest channel, spacing 15 kHz, 12@0 tones

-Spectrum Ref Level 10.00 dBm RBW 100 kHz 30 db = SWT 180 s = Y6W 300 642 TOF Att Mode Auto Sweep SGL Count 1/1 controlled by CTC advanced LTE Tester, Tast Case Verdict: PASS @IRm Max Linut Chuck Linut Datail Edge -91,92 00m 910.001750 404 MIT11 PAS D dBm -10 dBmand Edge -20 dBm-30 diam 40 dBm -60 dBm 70 dim EO dBr Start 716.0 MHz Stop 721.0 MHz 10001 pts

Date: 1.APR.2022 21:30:54



Plot 9: Lowest channel, spacing 15 kHz, 12@0 tones



16.3.6 Occupied bandwidth

Description:

Measurement of the occupied bandwidth of the transmitted signal.

Measurement:

Similar to conducted emissions, occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the mid frequencies of the LTE band 12 frequency band. The table below lists the measured 99% power and -26dBc occupied bandwidths. Spectrum analyzer plots are included on the following pages.

Part 27.53 requires a measurement bandwidth of at least 1% of the occupied bandwidth.

Measurement parameters					
Detector:	Peak				
Sweep time:	180s				
Video bandwidth:	100 kHz				
Resolution bandwidth:	30 kHz				
Span:	2 x nominal bandwidth				
Trace-Mode:	Max Hold				
Used equipment:	See chapter 7.4 setup A				
Measurement uncertainty:	See chapter 9				
Measurement procedure	FCC: § 2.1049				
	ISED: RSS-Gen, 6.7				

Limits:

FCC	ISED					
§ 2.1049	RSS-Gen, 6.7					
Reporting only						

<u>Results:</u>

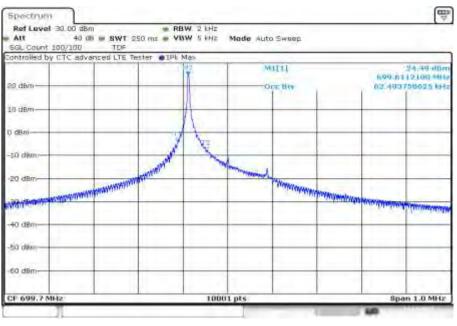
Occupied Ba	ndwidth – BPSK	
Mode	99% OBW (kHz)	-26 dBc BW (kHz)
Low channel / spacing 3.75 kHz; 1@0 tones	62	40
Mid channel / spacing 3.75 kHz; 1@0 tones	62	39
High channel / spacing 3.75 kHz; 1@0 tones	62	39
Low channel / spacing 3.75 kHz; 1@47 tones	63	38
Mid channel / spacing 3.75 kHz; 1@47 tones	62	38
High channel / spacing 3.75 kHz; 1@47 tones	63	38
Low channel / spacing 15 kHz; 1@0 tones	121	99
Mid channel / spacing 15 kHz; 1@0 tones	121	104
High channel / spacing 15 kHz; 1@0 tones	124	117
Low channel / spacing 15 kHz; 1@11 tones	125	104
Mid channel / spacing 15 kHz; 1@11 tones	118	98
High channel / spacing 15 kHz; 1@11 tones	119	118

Occupied Bandwidth – QPSK								
Mode	99% OBW (kHz)	-26 dBc BW (kHz)						
Low channel / spacing 3.75 kHz; 1@0 tones	71	39						
Mid channel / spacing 3.75 kHz; 1@0 tones	70	38						
High channel / spacing 3.75 kHz; 1@0 tones	70	38						
Low channel / spacing 3.75 kHz; 1@47 tones	72	39						
Mid channel / spacing 3.75 kHz; 1@47 tones	69	39						
High channel / spacing 3.75 kHz; 1@47 tones	72	38						
Low channel / spacing 15 kHz; 1@0 tones	125	115						
Mid channel / spacing 15 kHz; 1@0 tones	119	117						
High channel / spacing 15 kHz; 1@0 tones	128	117						
Low channel / spacing 15 kHz; 1@11 tones	121	115						
Mid channel / spacing 15 kHz; 1@11 tones	128	130						
High channel / spacing 15 kHz; 1@11 tones	131	130						
Low channel / spacing 15 kHz; 12@0 tones	183	246						
Mid channel / spacing 15 kHz; 12@0 tones	186	251						
High channel / spacing 15 kHz; 12@0 tones	187	252						



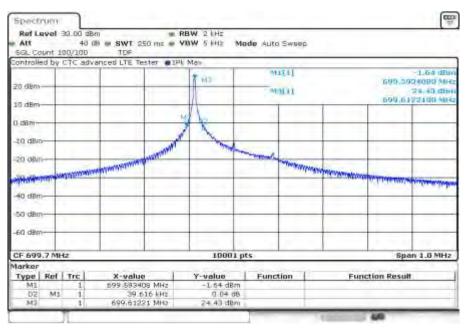
Plots: BPSK

Plot 1: low channel (99% - OBW), spacing 3.75 kHz, 1@0 tones

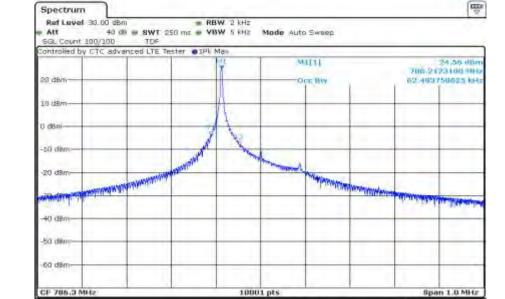


Date: 13.APR.2022 10:28:13

Plot 2: low channel (-26 dBc BW), spacing 3.75 kHz, 1@0 tones



Date: 13.APR.2022 10:28:41



Plot 3: mid channel (99% - OBW), spacing 3.75 kHz, 1@0 tones

Plot 4: mid channel (-26 dBc BW), spacing 3.75 kHz, 1@0 tones

Date: 13.APR.2022 16:12:59

Spectrum Ref Level 30.00 dBm

Att

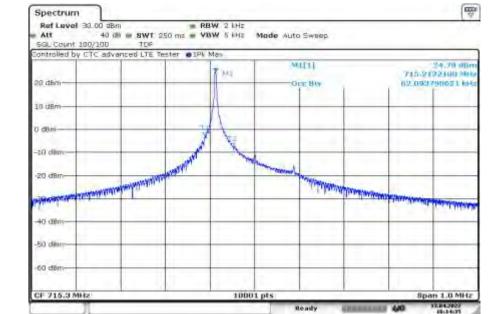
40 db = 8WT 250 ms = VBW 5 HHz 100 TDF Mode ALito Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . IPk Max MITTI 1.85 dB 7 MI 707,3907280 MHz 24,59 dbm 20 der MILLE 707.1124100 408 10 dB O CER 40 dB 20 dBm MININA 1000 40 dBr 50 dBm -60 dBm CF 707.5 MHz 10001 pts Span 1.0 MHz larker Y-value -1.95 dBm 0.36 dB 24.59 dBm X-value 707.393728 MHz 39.36 kHz 707.41241 MHz Type | Ref | Trc Function Function Result M3 M1

RBW 2 HHz

Date: 13.APR.2022 10:38:59

CTC I advanced

10.04.2022

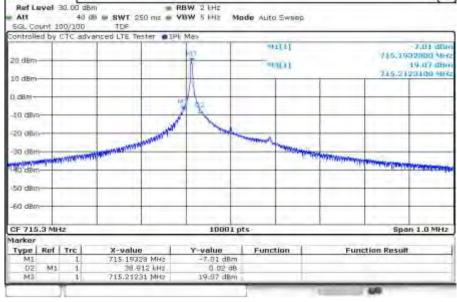


Plot 5: high channel (99% - OBW), spacing 3.75 kHz, 1@0 tones

Spectrum

Date: 13.APR.2022 16:14:35

Plot 6: high channel (-26 dBc BW), spacing 3.75 kHz, 1@0 tones



Date: 13.APR.2022 10:49:24



Spectrum Ref Level 30.00 dam Att Mode Auto Sweep SGL Count 100/100 TOP 411 11 24,46 dBr 699.7075900 MH 20 dBm NV.790720529 htt Bw 10 dBm 0 der 10 dBm Neie IN SI -20 dilm THE REPORT OF THE PARTY OF THE West of the second s 30 dan ALC: N 40 dBm 50 dem -60 dimi Span 1.0 MHz 10001 pts CE 600.7 MHz

Plot 7: low channel (99% - OBW), spacing 3.75 kHz, 1@47 tones

Plot 8: low channel (-26 dBc BW), spacing 3.75 kHz, 1@47 tones

Spectrum Ref Level 30.00 dan

SGL Count 100/100

Att

Controlled by CTC advanced LTE Tester . 1Pk Max 112 APP 7605120 THE 20. dBm 1111 24,59 JBn 7875900 MH 10 dBm D dism -10 dim Maren . at dem ALC MARKED BALL MARKED BALL 30 dBm 40 d8m 50 dBm -60 dBm-CF 699.7 MHz 10001 pts Span 1.0 MHz farker X-Value 699.768512 MHz 37.76 kHz Y-value Function -1.48 dBm -0.13 d8 Function Result Type Ref Trc Mi D2 699.78759 MHz 24.53 dBm MB

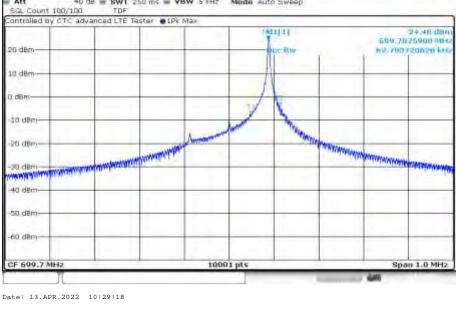
BRBW 2 HH

Mode Auto Sweep

40 dB = SWT 250 ms = VBW 5 Hz

TDF

Date: 13.APR.2022 10:29:47





d of the second

u ≣ i Spectrum 0 dBm · RBW 2 kHz 40 db · SWT 250 ms · VBW 5 kHz Ref Level 30.00 dBm Att Mode Auto Sweep SGL Count 100/100 TOP ontrolled by CTC advanced LTE Tester . IPk Max ALLETT 24,53 087 20 dBm 01.993800070 kH ETT HAVE 10 dBm U dBr -aŭ div Treven -20 dBr A REAL PROPERTY OF THE PARTY OF T South and the second 30 de ALC: NOTE: T 40 dBm -50 dilun 60 dBm Span 1.0 MHz CF 707.5 MHz 10001 pts

Plot 9: mid channel (99% - OBW), spacing 3.75 kHz, 1@47 tones

Date: 13.APR.2022 10:39:37

Spectrum Ref Level 30.00 dBm

Att

Plot 10: mid channel (-26 dBc BW), spacing 3.75 kHz, 1@47 tones

40 db = 8WT 250 ms = VBW 5 HHz 200 TDF SGL Count 100/100 controlled by CTC advanced LTE Tester . IPk Max 1.10 (8) 관련된 707,5681930 MHz 24.51 dbm 20 den 11111 707 5875900 MIK 10 dB D CER 10 dBr and the second 20 dBm A CONTRACTOR OF THE OWNER Minimum (M 30 di HO dBm 50 dBm -60 dBm-CF 707.5 MHz 10001 pts Span 1.0 MHz Marker Type Ref Trc X-value 707.566192 MHz 38.016 kHz 707.58759 MHz Y-value Function Function Result Ŧ -1.49 dBm -0.02 dB 24.51 dBm M1 02 M3 M1

RBW 2 HHz

Mode Auto Sweep

Date: 13.APR.2022 10:40:05



-Spectrum 0 dBm · RBW 2 kHz 40 db · SWT 250 ms · VBW 5 kHz Ref Level 30.00 dBm Att Mode Auto Sweep SGL Count 100/100 TOP ontrolled by CTC advanced LTE Tester . IPk Max MIETI 10.99 db 715-0075900 404 62 593740076 kH 20 dBm TT BAY 10 dBr U dBi -aŭ de 20 ds PANI 30 di TP MA -54 dillin 60 dBm Span 1.0 MHz CF 715.3 MHz 10001 pts

Plot 11: high channel (99% - OBW), spacing 3.75 kHz, 1@47 tones

Date: 13.APR.2022 10:50:01

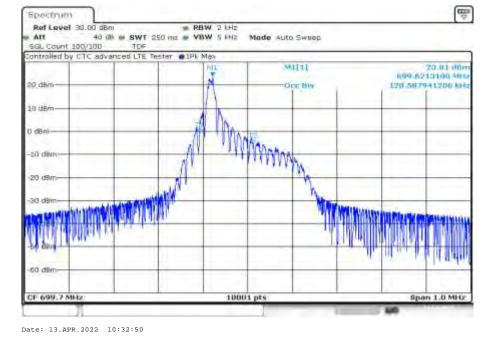
Spectrum

Plot 12: high channel (-26 dBc BW), spacing 3.75 kHz, 1@47 tones

Ref Level 30.00 dBm RBW 2 HHz 40 db # 8WT 250 ms # VBW 5 HHz 100 TDF Att Mode ALIto Sweep SGL Count 100/100 controlled by CTC advanced LTE Tester . IPk Max 7,00 dBi MITTI /15.3683200 MHz 19.04 080 20 den Tent 1 715.3801000 MH 10 dB D CER 40 dB 20 dila Tyenky Witten 30 dB Total and the NY MANAGER STATE OF 50 dBm -60 dBm CF 715.3 MHz 10001 pts Span 1.0 MHz larker X-value 715.36832 MHz 37.888 kHz 715.38939 MHz Type | Ref | Trc Y-value Function Function Result -7.03 dBm 0.03 dB 19:04 dBm 02 M3 M1

Date: 13.APR.2022 10:50:30





Plot 13: low channel (99% - OBW), spacing 15 kHz, 1@0 tones

Plot 14: low channel (-26 dBc BW), spacing 15 kHz, 1@0 tones

Spectrum

Ref Level 30.00 dB RBW 2 HHz 40 db # 8WT 250 ms # VBW 5 HHz 100 TOF Att Mode Auto Sweep 100/100 SGL Count ontrolled by CTC advanced LTE Tester . IPk Max MITTI 1.90 dB 5 5809,5809920 MHz 24,39 dbn 20 dê MELT 690,6208100 403 10 di 0.08 Anong -10 d 20 1 60 dBr CF 699.7 MHz 10001 pts Span 1.0 MHz Markei Y-value -1.90 dBm 0.24 dB 24.39 dBm X-value 599 580992 MHz 99 828 VH5 699.62081 MHz Type | Ref | Trc Function Function Result M3

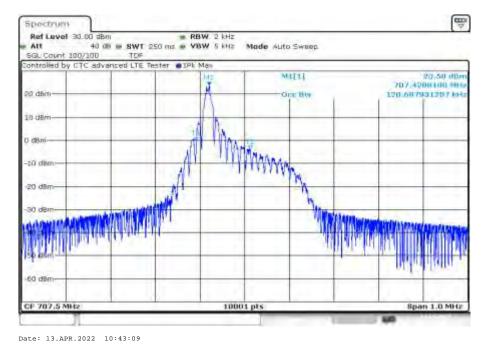
Date: 13.APR.2022 10:33:18

CTC | advanced

-

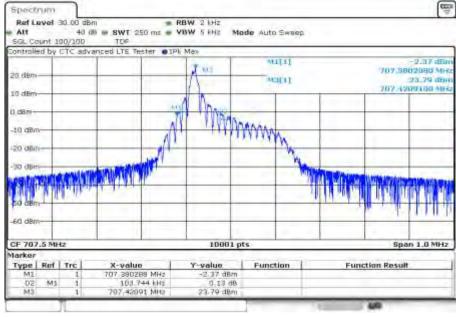
member of RWTÜV group





Plot 15: mid channel (99% - OBW), spacing 15 kHz, 1@0 tones

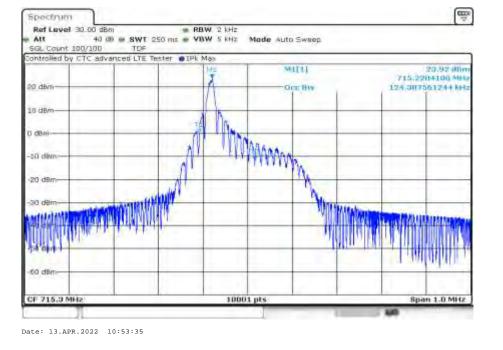
Plot 16: mid channel (-26 dBc BW), spacing 15 kHz, 1@0 tones



Date: 13.APR.2022 10:43:37

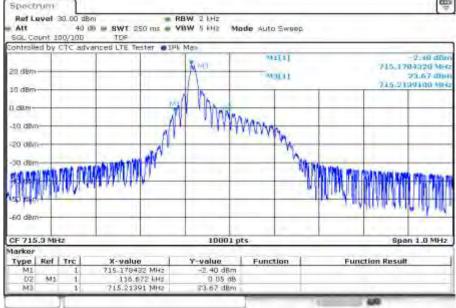
CTC I advanced

Test report no.	: 1-2685/21-03-14
-----------------	-------------------



Plot 17: high channel (99% - OBW), spacing 15 kHz, 1@0 tones

Plot 18: high channel (-26 dBc BW), spacing 15 kHz, 1@0 tones



CTC I advanced

8

Test report no.: 1-2685/21-03-14

-Spectrum 0 dBm • RBW 2 kHz 40 00 • 8WT 250 ms • VBW 5 kHz Ref Level 30.00 dBm Att Mode Auto Sweep SGL Count 100/100 TOP ontrolled by CTC advanced LTE Tester . IPk Max MIETT 23.83 d 600.7656 (14) 140 20 dBm а. 120 B87511249 kH CE BW 10 dBr U dB -20 di 20 d 10 60 dB n 1.0 MHz CF 699.7 MHz 10001 pts Spit Date: 13.APR.2022 10:33:56

Plot 19: low channel (99% - OBW), spacing 15 kHz, 1@11 tones

Plot 20: low channel (-26 dBc BW), spacing 15 kHz, 1@11 tones

ontrolled by CTC advanced LTE Tester . IPk Max

Spectrum Ref Level 30.00 dB

SGL Count 100/100

Att

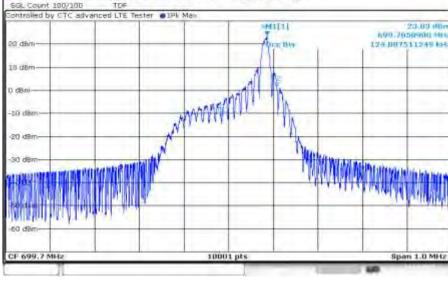
695,7132000 MH 23,66 dbi 20 dB 0[1] 690,7857000 MH 10 dB O CES -10 dB 20 di 30 **MANANA** 60 dBm CF 699.7 MHz 10001 pts Marke Y-value -2 59 dBm 0.21 dB 23.66 dBm X-value 699 7152 MHz 104.32 kHz 699.78579 MHz Type Ref Tro Function Function Result M3

RBW 2 HHz

Mode Auto Sweep

40 db # 8WT 250 ms # VBW 5 HHz 100 TOF

Date: 13.APR.2022 10:34:24





-

2.59 dB

Span 1.0 MHz

-Spectrum 0 dBm · RBW 2 kHz 40 db · SWT 250 ms · VBW 5 kHz Ref Level 30.00 dBm Att Mode Auto Sweep SGL Count 100/100 TOP ied by CTC advanced LTE Tester @ IPk Max IMALE 11 24,20 0 707.5709940 30 M 20 dBm 117.788221178 kH IT 1949 10 dBr U dB -20 di 20 d MANA 60 dB n 1.0 MHz CE 707.5 MHz 10001 pts Sp-

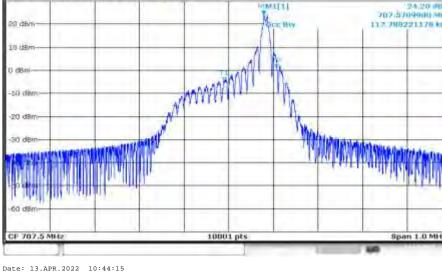
Plot 21: mid channel (99% - OBW), spacing 15 kHz, 1@11 tones

Plot 22: mid channel (-26 dBc BW), spacing 15 kHz, 1@11 tones

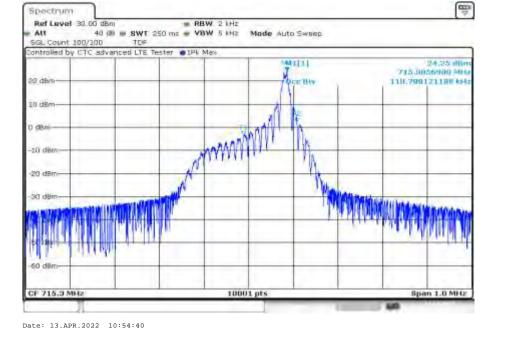
Spectrum

Ref Level 30.00 dB RBW 2 HHz 40 db # 8WT 250 ms # VBW 5 HHz 100 TOF Att Mode Auto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . IPk Max 1.53 dB 생활되 707,5207040 MHz 24.61 @bit 20 dB 1111-0 707.5789000 MH 10 d8 0.08 -10 d 20.0 100 CF 707.5 MHz 10001 pts Span 1.0 MHz Marker X-value 707.520704 MHz 90.176 kHz 707.57899 MHz Type | Ref | Tro Y-value Function Function Result -1.53 dBm -0.03 dB 24.51 dBm M3

Date: 13.APR.2022 10:44:43



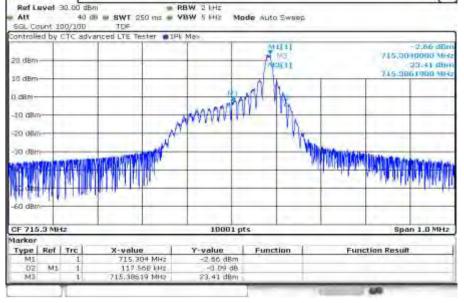
CTC | advanced member of RWTÜV group



Plot 23: high channel (99% - OBW), spacing 15 kHz, 1@11 tones

Plot 24: high channel (-26 dBc BW), spacing 15 kHz, 1@11 tones

Spectrum



Date: 13.APR.2022 10:55:08

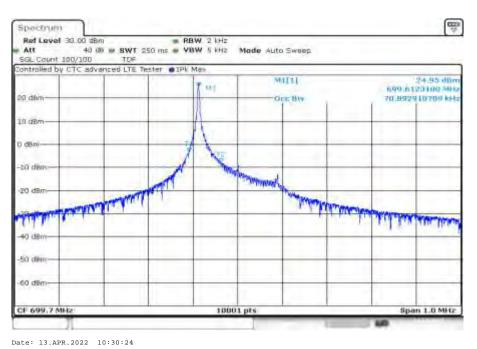


E.

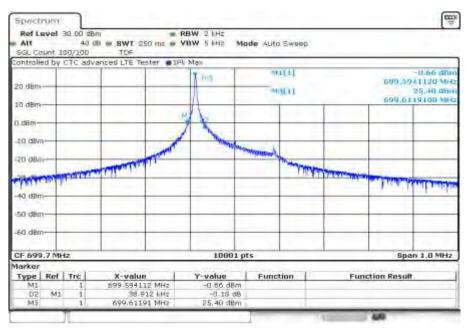


Plots: QPSK

Plot 1: low channel (99% - OBW), spacing 3.75 kHz, 1@0 tones



Plot 2: low channel (-26 dBc BW), spacing 3.75 kHz, 1@0 tones



Date: 13.APR.2022 10:30:52

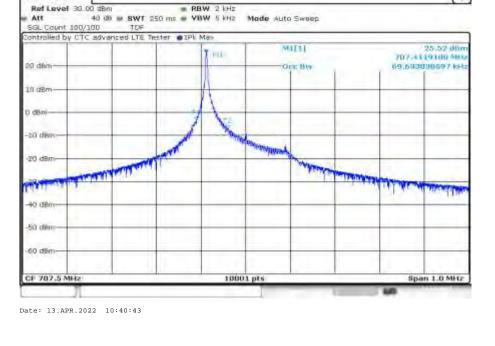
Plot 3: mid channel (99% - OBW), spacing 3.75 kHz, 1@0 tones

Plot 4: mid channel (-26 dBc BW), spacing 3.75 kHz, 1@0 tones

Spectrum

Ref Level 30.00 dBm RBW 2 HHz 40 db = 8WT 250 ms = VBW 5 HHz 100 TDF Att Mode ALito Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . IPk Max MITTI 0.63 dB 7 707,39 (6880 MHz 25,50 dbir 20 der MULT 707.1117100 MR 10 dB O CES 40 dB 20 dila (The may 40 dBr 50 dBm -60 dBm CF 707.5 MHz 10001 pts Span 1.0 MHz Marker Y-value -0.53 dBm -0.02 dB 25.38 dBm X-value 707.394689 MH2 37.596 kH2 707,41171 MH2 Type | Ref | Trc Function Function Result 1 M1 M1

Date: 13.APR.2022 10:41:11



-

Plot 6: high channel (-26 dBc BW), spacing 3.75 kHz, 1@0 tones

controlled by CTC advanced LTE Tester . IPk Max

Spectrum Ref Level 30.00 dBm

SGL Count 100/100

Att

20 der

D DET 10 df 20 df/ -30 dB

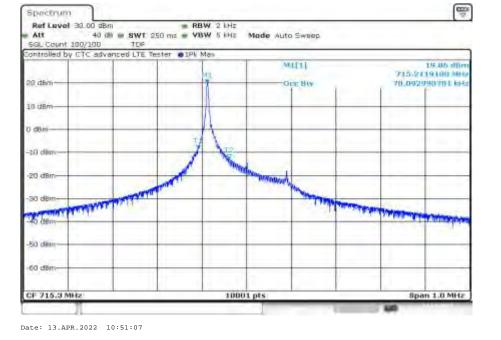
dem/ 50 dBr -60 dBm CF 715.3 MHz

larker

Type | Ref | Trc

M1

Test report no.: 1-2685/21-03-14



RBW 2 HHz

10001 pts

Y-value -6.14 dBm 0.00 dB 19.94 dBm

Mode Auto Sweep

MITTI

MILLE

Function

TIME

40 db = 8WT 250 ms = VBW 5 HHz 100 TDF

Plot 5: high channel (99% - OBW), spacing 3.75 kHz, 1@0 tones

X-value 715.194624 MHz 38.272 kHz 715.21181 MHz Date: 13.APR.2022 10:51:35



-

6.14 dB /15,1046240 MHz 19,94 (BH

715.2118100 404

Span 1.0 MHz

Function Result

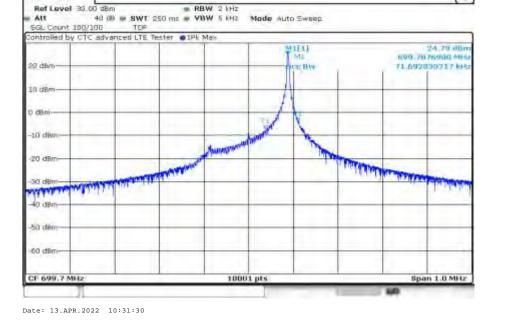
Plot 7: low channel (99% - OBW), spacing 3.75 kHz, 1@47 tones

Spectrum

Plot 8: low channel (-26 dBc BW), spacing 3.75 kHz, 1@47 tones

			TDF anced LTE Tes	ter antik	Man		-			-	
20 d8m	-			101			and and				-0.95 db) 00+040 Mb- 95,25 db) 890000 MB
D dBm-							A				
-20 dBr					(bearing and	and the second	7	The year		-	
- 30 d8m	_	-	TTOTA	C. Martinetter	_		_		معطان موردو	THE PARTY OF	TTTT
40 dBr		and cu		-		-	-				1
50 dBm	-	_	-			-	-	_		-	-
-60 dBm	-							-			
CF 699	7 ME	42			1000	1 pts				Sp	an 1.0 MHz
Marker	1	and a									
Type	Ref	Trc	X-value 599 76646	a 141 m	Y-value -0.95 dB		Function	-	Fun	ction Resul	11
02	M1		38.91		0.95 08			-			
M3	143	1	699.7000		25.23 dB			-			

Date: 13.APR.2022 10:31:59



Spectrum Ref Level 30.00 dBm 0 dBm # RBW 2 kHz 40 db # SWT 250 ms # VBW 5 kHz Att Mode Auto Sweep SGL Count 100/100 TOP ontrolled by CTC advanced LTE Tester . IPk Max ARIA 25.41 (0) 707.0000900 484 20 dBm 68,59914068n kH er Hiv 10 dBr U dBr -aŭ di 20 da MINE MARINE MARINE SAME ΞŪ. Males And 40 dBr -50 dim 60 dBm Span 1.0 MHz CF 707.5 MHz 10001 pts

Plot 9: mid channel (99% - OBW), spacing 3.75 kHz, 1@47 tones

SGL Count 100/100

Plot 10: mid channel (-26 dBc BW), spacing 3.75 kHz, 1@47 tones

controlled by CTC advanced LTE Tester . IPk Max

111 707,0009040 MHz 25,39 mHz 20 den 1130 707.5890000 444 10 dB D CER 10 dB 20 dBm -O dBm 30 di 50 dBm -60 dBm-CF 707.5 MHz Span 1.0 MHz 10001 pts Marker Type Ref Trc X-value 707 565464 MHz Y-value Function Function Result 4 -0.79 dBm 0.10 dB 25.39 dBm M1 38.912 LHz 202.56909 MHz 02 M3 M1

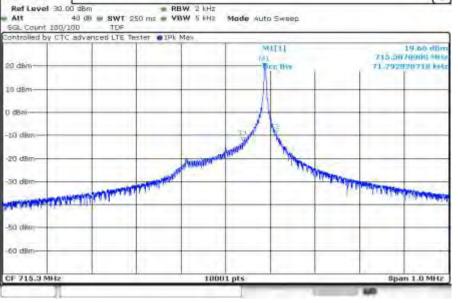
Date: 13.APR.2022 10:42:17







0.79 dB



Plot 11: high channel (99% - OBW), spacing 3.75 kHz, 1@47 tones

Spectrum

Date: 13.APR.2022 10:52:13

Plot 12: high channel (-26 dBc BW), spacing 3.75 kHz, 1@47 tones

B Spectrum Ref Level 30.00 dBm RBW 2 HHz 40 db # 8WT 250 ms # VBW 5 HHz 100 TDF Att Mode Auto Sweep SGL Count 100/100 controlled by CTC advanced LTE Tester . IPk Max MITTI G. 14 dD 715,9667200 MHz 19,84 (BH) 20 den lan1 715.06 OQUICI MILL 10 dB D CER 40 dB 20 dla WEITER 30 dt Construction of the second No. of Concession, Name and the second second 50 dBr -60 dBm CF 715.3 MHz 10001 pts Span 1.0 MHz larker X-value 715.36672 MHz 38.144 kHz 715.38809 MHz Type | Ref | Trc Y-value Function Function Result 1 -6.44 dBm 0.17 dB 19.84 dBm 02 M1 M1

Date: 13.APR.2022 10:52:41



0 dBm · RBW 2 kHz 40 db · SWT 250 ms · VBW 5 kHz Ref Level 30.00 dBm Att Mode Auto Sweep SGL Count 100/100 TDF d by CTC advanced LTE Tester @IPk Max MIETI 23,93,00 199.6190100 MH 129.287471251 kH 20 dBr Oct Biv 10 dBn U dB an di 20 60 di n 1.0 MHz CE 699.7 MHz 10001 pts 8p Date: 13.APR.2022 10:35:02

Plot 13: low channel (99% - OBW), spacing 15 kHz, 1@0 tones

Spectrum

Plot 14: low channel (-26 dBc BW), spacing 15 kHz, 1@0 tones

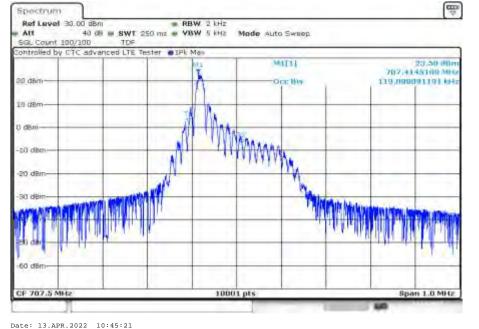
-Spectrum Ref Level 30.00 dB RBW 2 HHz 40 db # 8WT 250 ms # VBW 5 HHz 100 TOF Att Mode Auto Sweep 100/100 SGL Count ontrolled by CTC advanced LTE Tester . IPk Max MITTI 1.87 dB 600.0708400 MHC 20 dê MALIT 26.22 (19) 690,6170100 403 10 d8 0.08 MAMM -10 di 20 di 30 0 ALIK AL 60 dBn CF 699.7 MHz 10001 pts Span 1.0 MHz Markei X-value 699.57984 MHz 115.392 kHz 699.61761 MHz Type | Ref | Tro Y-value Function Function Result -1.97 dBm -0.22 dB 24.22 dBm M3

Date: 13.APR.2022 10:35:30



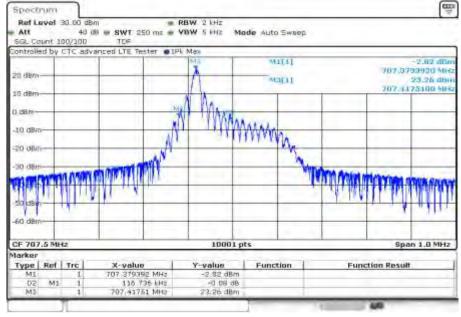
unit (

Test report no.: 1-2685/21-03-14



Plot 15: mid channel (99% - OBW), spacing 15 kHz, 1@0 tones

Plot 16: mid channel (-26 dBc BW), spacing 15 kHz, 1@0 tones



Date: 13.APR.2022 10:45:49



Plot 18: high chai

Date: 13.APR.2022 10:55:46

Ref Level		# SWT 25		BW 2 kHz	Mode Auto	- Current			
SGL Count 1			0.1112	and a side	PROPERTY.	2 Deland			
Controlled by	CTC advar	teed LTE Tes	ter øIPk	Man					
					14	1151			-2.06 dB
20 dBm	_			A ME				716.17	92000 M
				1	M	3[1]		216.23	24.17 m
10 dBm				1 h		1	1	143.41	un rin al
			=0	1 10.					
G LERI			N	1 YAAA	A				
-10 dBm			1	1111	MARARA				
Sie della	1.0		N		1111111	NA.			
20 dBm			11.	-		N'N		-	-
		and the second	and a star			1	-		
30 dBm	and the second second	DOMESTIC:	1				a sinter of		
distant in the second			1				1.1.1.1.1.1.1.1.1	A CONTRACTOR	THE PLAN
2101111	10-1-1	1 1 11					diam'r.		
50 dBm	-						1		100
and and the									
60 dBm							-		
				-		-			1
CF 715.3 M	42	_	_	1000	1 pts	_		Spa	an 1.0 MH
larker	1221-	12.00		- Contractor	1				
Type Ref M1	THE	X-value 715.179	n MUS	Y-value -2.08 dB	Fund	tion	FL	inction Result	
D2 M3	1	116 50		0.18 8					
M3	1	715.2188		24.13 dB					

Made Auto Sweep

AMAMAM

10001 pts

MIETI

Occ Biv

Plot 17: high channel (99% - OBW), spacing 15 kHz, 1@0 tones

 Ref Level 30.00 dBm
 # RBW 2 kHz

 Att
 40 db # SWT 250 ms # VBW 5 kHz

TDF ed by CTC advanced LTE Tester @IPk Max

Spectrum

20 dBm

10 dBm U dB

-20 dl 20 d

60 d8

CE 715.3 MHz

SGL Count 100/100



E →

23,99 dBn 715.9173100 404 127,887211279 kH

n 1.0 MHz

Spit



Test report no.: 1-2685/21-03-14

umi ₽ Spectrum 0 dBm = RBW 2 kHz 40 00 = 8WT 250 ms = V8W 5 kHz Ref Level 30.00 dBm Att Mode Auto Sweep SGL Count 100/100 TOP ied by CTC advanced LTE Tester @ IPk Max ITT INCOME 20,33.01 699.7014900 M 121 287871219 kH 20 dBm TT HAV 10 dBr U dB -20 di 20 60 CE 699.7 MHz 10001 pts n 1.0 MH 8p Date: 13.APR.2022 10:36:07

Plot 19: low channel (99% - OBW), spacing 15 kHz, 1@11 tones

Plot 20: low channel (-26 dBc BW), spacing 15 kHz, 1@11 tones

Spectrum Ref Level 30.00 dB

Att

40 db # 8WT 250 ms # VBW 5 HHz 100 TOF SGL Count 100/100 ontrolled by CTC advanced LTE Tester . IPk Max 2.26 df 695,7606800 MHz 23,77 dBH 20 dB 1174 000 403 10 d8 O CB WAA -10 d 20.0 30 -60 dBr CF 699.7 MHz 10001 pts Span 1.0 MHz Marke X-Value 699.70368 MHz 115 2 LHz 699.70369 MHz Type | Ref | Tro Y-value Function Function Result -2.26 dBm -0.30 dB 23.77 dBm M3

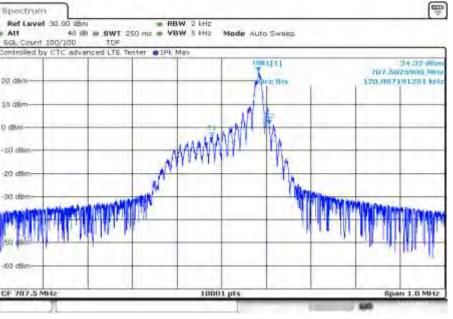
RBW 2 HHz

Mode Auto Sweep

Date: 13.APR.2022 10:36:36



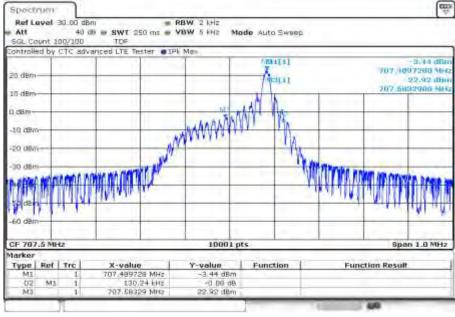
8



Plot 21: mid channel (99% - OBW), spacing 15 kHz, 1@11 tones

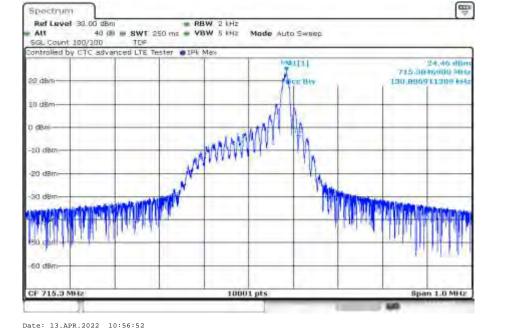
Date: 13.APR.2022 10:46:27

Plot 22: mid channel (-26 dBc BW), spacing 15 kHz, 1@11 tones



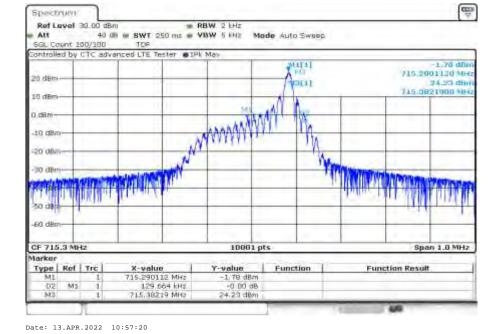
Date: 13.APR.2022 10:46:55





Plot 23: high channel (99% - OBW), spacing 15 kHz, 1@11 tones

Plot 24: high channel (-26 dBc BW), spacing 15 kHz, 1@11 tones



Page 290 of 362



unit (Spectrum 0 dBm • RBW 2 kHz 40 db • 8WT 250 ms • VBW 5 kHz Ref Level 30.00 dBm Att Mode Auto Sweep SGL Count 100/100 TOP ontrolled by CTC advanced LTE Tester @ IPk Max MIETI 12.10 0 190.6160100 000 190.08160100 100 20 dBm OCT BW 10 dBr U dB -20 di 20 (Invit 60 dB n 1.0 MHz CE 699.7 MHz 10001 pts Sp-Date: 13.APR.2022 10:37:13

Plot 25: low channel (99% - OBW), spacing 15 kHz, 12@0 tones

Plot 26: low channel (-26 dBc BW), spacing 15 kHz, 12@0 tones

Spectrum Ref Level 30.00 dB

Att

40 db # 8WT 250 ms # VBW 5 HHz 100 TOF SGL Count 100/100 ontrolled by CTC advanced LTE Tester . IPk Max MITTI 14.02 dB 699,5830400 MHz 12.67 dBH 20 dB MALLE 690,6179100 MPR 10 dB WWWWWWWWW O CER 10 df 20 dil 30 d Winter Windstreet Inter **MV** Alarshi 50 dBrs -60 dBm CF 699.7 MHz 10001 pts Span 1.0 MHz Marker X-Value 699 58304 MHz 246 336 kHz 699.61791 MHz Type | Ref | Trc Y-value Function Function Result -14.02 dBm 0.67 dB 12.67 dBm M3

Mode Auto Sweep

RBW 2 HHz

Date: 13.APR.2022 10:37:42

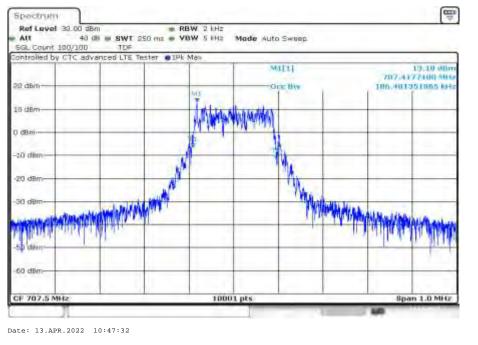


Plot 27: mid channel (99% - OBW), spacing 15 kHz, 12@0 tones

Plot 28: mid channel (-26 dBc BW), spacing 15 kHz, 12@0 tones

SGL Count :	100/100				dealer and				
controlled by	CTC adva	inced LTE Te	ster ø IPk	Maa					
		1				TITI			14.81 dB
20 d8m	-	-		in i		1430			11.60 (1)
Same -									63100 48
10 dBm		-		ALLA COM	AND A LAND				1
0.0871				VAIAA all	All work of the				
LI LISTI									
20. dBm	_		- way	¥		41			
30.000			31			114			
20 dBm			is T	-		100	-		
		1.0.0	Contract of the			1.10			
-30 dBm		SILAN ANA	141			19	the Assessed on the		
at the set of the	Alternation of	A CONTRACTOR					The second second	MARMALINA	ALL ALLAND
	a show	1 1					1	Statistics.	TRUCK MALE
50 dBm									
and a		1		1 1					
-60 dBm-	-		-			-	-		-
					1.1		-	1.1.1.1.1	1.00
CF 707.5 M	Hz			1000	1 pts	-		Spa	in 1.0 MH
larker									
Type Ref	Tre	X-value	1	Y-value	Fund	tion	Fu	iction Resul	t.
M1	1	707-37939		-14.81 dB					
-02 M3	4	260.6	BE KHE	0 27 t 11.50 de					

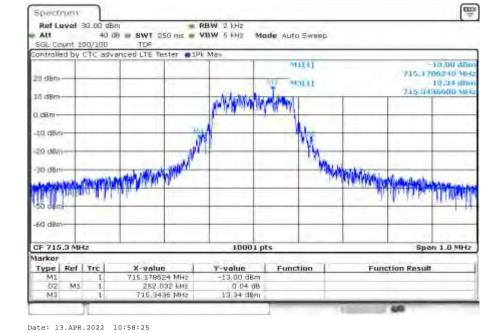
Date: 13.APR.2022 10:48:00

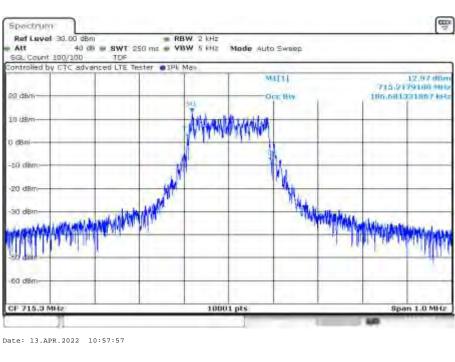




Plot 29: high channel (99% - OBW), spacing 15 kHz, 12@0 tones

Plot 30: high channel (-26 dBc BW), spacing 15 kHz, 12@0 tones









16.4 Results LTE band 13

The EUT was set to transmit the maximum power.

16.4.1 RF output power

Description:

This paragraph contains average power, peak output power and EIRP measurements for the mobile station. In all cases, the peak output power is within the required mask (this mask is specified in the JTC standards, TIA PN3389 Vol. 1 Chap 7, and is no FCC requirement).

Measurement:

The mobile was set up for the maximum output power with pseudo random data modulation.

To determine the Peak-To-Average Power Ratio (PAPR) the measurement was performed with the Power Complementary Cumulative Distribution Function (CCDF).

Measurement parameters					
Detector:	Sample				
AQT:	See plot				
Resolution bandwidth:	1 MHz				
Used equipment:	See chapter 7.4 setup A				
Measurement uncertainty:	See chapter 9				
Measurement procedure	FCC: § 2.1046 ISED: RSS-Gen, 6.12				

<u>Limits:</u>

FCC	ISED
§ 27.50(b)(10)	RSS-130, 4.6.1 & 4.6.3
Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.	 4.6.1: The transmitter output power shall be measured in terms of average power. In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission. 4.6.3: The e.r.p. shall not exceed 30 watts for mobile equipment and outdoor fixed subscriber equipment. The e.r.p. shall not exceed 3 watts for portable equipment and indoor fixed subscriber equipment.
Power: 34 7	77 dBm ERP
	B (ISED only)



<u>Results:</u>

Sub-Carrier	Modulation	Number	-	Average Output Power [dBm] Channel No / Frequency [MHz]			Peak to Average Ratio [dB] Channel No / Frequency [MHz]			
Spacing [kHz]		of Tones	23181 / 777.1	23230 / 782.0	23279 / 786.9	23181 / 777.1	23230 / 782.0	23279 / 786.9		
	BPSK	1T0	19.83	19.55	19.45	1.88	1.91	1.91		
		1T47	19.47	19.55	19.49	0.29	1.88	1.88		
3.75	QPSK	1T0	19.65	19.54	19.53	0.29	0.26	0.32		
		1T47	19.58	19.54	19.48	1.62	1.62	1.62		
	BPSK	1T0	19.57	19.80	19.78	1.65	1.57	1.57		
15		1T11	19.91	19.60	19.58	1.62	1.62	1.62		
		1T0	19.83	19.50	19.76	1.62	1.65	1.65		
	QPSK	1T11	19.60	19.53	19.70	0.49	0.46	1.59		
		12T0	17.73	17.84	17.72	5.68	5.88	5.97		

The radiated output power is measured in the mode with the highest conducted output power.

Output Power (ERP)							
Sub-Carrier Spacing [kHz]	Frequency (MHz)	Average Output Power (dBm) BPSK	Average Output Power (dBm) QPSK				
	777.1	14.63	14.45				
3.75	782.0	14.25	14.24				
	786.9	13.99	14.03				
	777.1	14.71	14.63				
15	782.0	14.50	14.23				
	786.9	14.28	14.26				



Description:

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the mobile station in a "call mode". This is accomplished with the use of a R&S CMW500 DIGITAL RADIOCOMMUNICATION TESTER.

CTC | advanced

1. Measure the carrier frequency at room temperature.

2. Subject the mobile station to overnight soak at -30 C.

3. With the mobile station, powered with V_{nom}, connected to the CMW500 and in a simulated call on channel 782 (center channel), measure the carrier frequency. These measurements should be made within two minutes of powering up the mobile station, to prevent significant self warming.

4. Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.

5. Re-measure carrier frequency at room temperature with V_{nom} . Vary supply voltage from V_{min} to V_{max} , in 0.1 Volt steps re-measuring carrier frequency at each voltage. Pause at V_{nom} for 1.5 hours unpowered, to allow any self heating to stabilize, before continuing.

6. At all temperature levels hold the temperature to +/-0.5°C during the measurement procedure.

This measurement was performed with the highest channel bandwidth supported from the EUT on the middle channel

Measurement parameters			
Detector:			
Sweep time:			
Video bandwidth:	Measured with CMW500		
Resolution bandwidth:	Measured with CMW500		
Span:			
Trace-Mode:			
Used equipment:	See chapter 7.4 setup A		
Measurement uncertainty:	See chapter 9		
Measurement procedure	FCC: § 2.1055		
	ISED: RSS-Gen, 6.11		

Measurement:

<u>Limits:</u>

FCC	ISED
§ 27.54	RSS-130, 4.5
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.	The frequency stability shall be sufficient to ensure that the occupied bandwidth remains within each frequency block range when tested at the temperature and supply voltage variations specified in RSS-Gen.



<u>Results:</u>

FREQ ERROR versus VOLTAGE

Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)
3.2	-60	-0.0767
3.6	-60	-0.0767
4.0	-60	-0.0767

FREQ ERROR versus TEMPERATURE

Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)
-30	32	0.0409
-20	31	0.0396
-10	27	0.0345
± 0	16	0.0205
10	19	0.0243
20	-60	-0.0767
30	-39	-0.0499
40	-30	-0.0384
50	-37	-0.0473

Additional measurements for RSS-130 (4.3 b)

f _L = MHz	f _H = MHz	
f_L – (max freq. error) = MHz	f _H + (max freq. error) = MHz	



16.4.3 Spurious emissions radiated

Description:

The following steps outline the procedure used to measure the radiated emissions from the mobile station. The site is constructed in accordance with ANSI C63.4:2014 requirements and is recognized by the FCC to be in compliance for a 3 and a 10 meter site. The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier that can be as high as 782 MHz. Measured up to 8 GHz. The resolution bandwidth is set as outlined in Part 27.53. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the LTE band 13.

Measurement:

Measurement parameters			
Detector:	Peak / RMS		
Sweep time:	2 sec.		
Resolution bandwidth:	1 MHz		
Video bandwidth:	3 MHz		
Span:	100 MHz Steps		
Trace mode:	Max Hold		
Used equipment:	See chapter 7.2 setup A		
Measurement uncertainty:	See chapter 9		
Measurement procedure	FCC: § 2.1053 ISED: RSS-Gen, 6.13		

<u>Limits:</u>

FCC	ISED			
\$ 27.53(c)	RSS-130, 4.7.1			
 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following: (c)(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB. 	The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 log10 p (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.			
-13 dPm				

-13 dBm



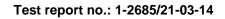
Results:

<u>BPSK</u>

SPURIOUS EMISSION LEVEL						
LOWEST CHANNEL		MIDDLE CHANNEL		HIGHEST CHANNEL		
Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]	
-/-	-/-	1564.0	-42.8	/	-/-	
	-/-		-45.4	-/-	-/-	
1	-/-	All other detected emissions are		1	-/-	
-/-	-/-	-/-	more than 20 dB below the limit.		-/-	-/-
-/-	-/-		-/-	-/-	-/-	
	-/-		-/-	-/-	-/-	

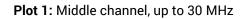
<u>QPSK</u>

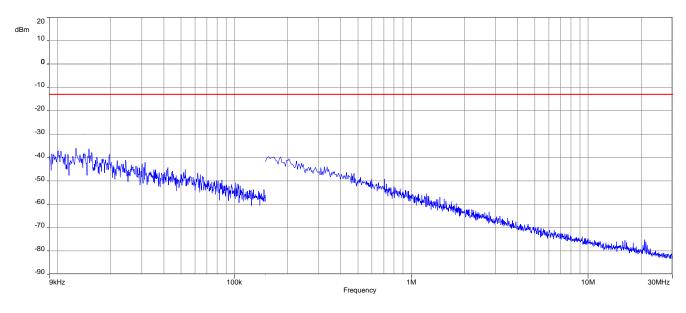
SPURIOUS EMISSION LEVEL					
LOWEST CHANNEL		MIDDLE CHANNEL		HIGHEST CHANNEL	
Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]
-/-	-/-	1564.0	-42.9	/	-/-
	-/-		-45.7	-/-	-/-
,	-/-	All other detected emissions are		1	-/-
-/-	-/- more than 20 dB below the limit.		-/-	-/-	
-/-	-/-	-/-	-/-	/	-/-
	-/-		-/-	-/-	-/-



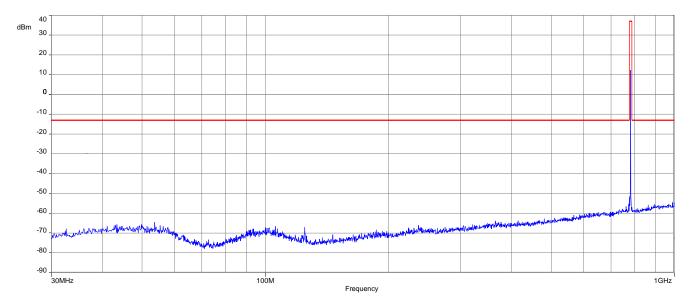


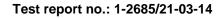
<u>BPSK</u>





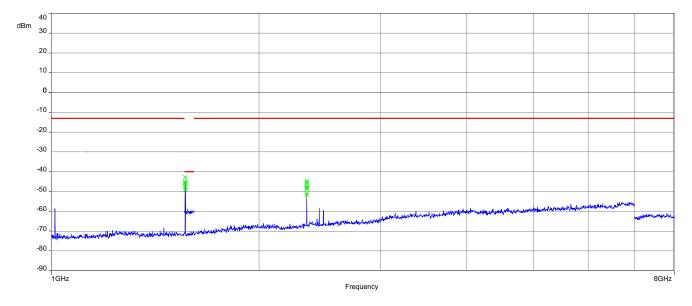
Plot 2: Middle channel, 30 MHz to 1 GHz

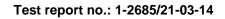






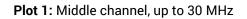
Plot 3: Middle channel, 1 MHz to 8 GHz

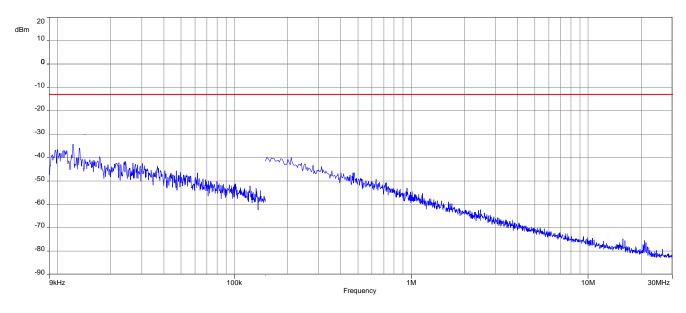




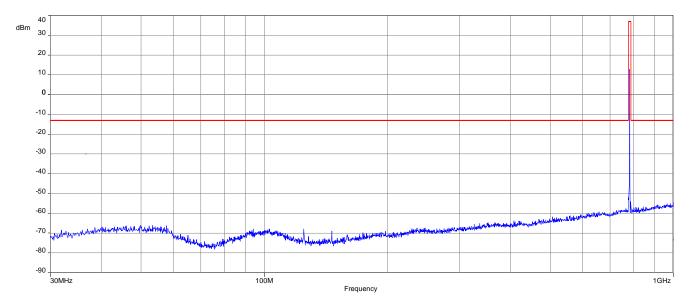


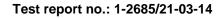
<u>QPSK</u>





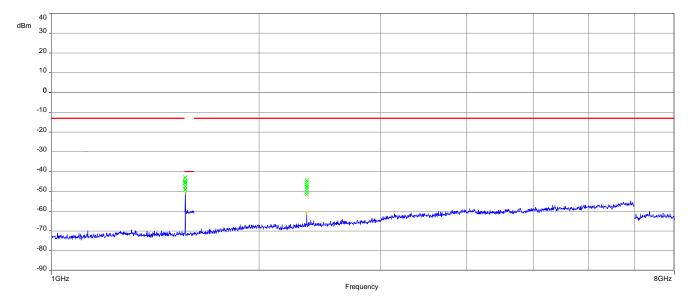
Plot 2: Middle channel, 30 MHz to 1 GHz







Plot 3: Middle channel, 1 MHz to 8 GHz





16.4.4 Spurious emissions conducted

Description:

The following steps outline the procedure used to measure the conducted emissions from the mobile station. 1. Determine frequency range for measurements: From § 2.1057 & RSS-Gen, 6.13.2 the spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency. For the mobile station equipment tested data taken from 10 MHz to 8 GHz. 2. Determine mobile station transmits frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.

Measurement:

Measuremer	nt parameters
Detector:	Peak
Sweep time:	Auto
Video bandwidth:	300 kHz
Resolution bandwidth:	100 kHz
Span:	10 MHz – 8 GHz
Trace-Mode:	Max Hold
Used equipment:	See chapter 7.4 setup A
Measurement uncertainty:	See chapter 9
Measurement procedure	FCC: § 2.1051 ISED: RSS-Gen, 6.13

Limits:

FCC	ISED
\$ 27.53(c)	RSS-130, 4.7.1
 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following: (c)(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB. 	The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 log10 p (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.
-12	dBm

-13 dBm



Results:

<u>BPSK</u>

		SPURIOUS EMI	SSION LEVEL		
LOWEST C	HANNEL	MIDDLE CHANNEL HIGHEST CHANI		HANNEL	
Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]
1554.2	-/-	1564.0	-/-	1573.8	-/-
2331.3	-/-	2346.0	-/-	2360.7	-/-
3108.4	-/-	3128.0	-/-	3147.6	-/-
3885.5	-/-	3910.0	-/-	3934.5	-/-
4662.6	-/-	4692.0	-/-	4721.4	-/-
5439.7	-/-	5474.0	-/-	5508.3	-/-
6216.8	-/-	6256.0	-/-	6295.2	-/-
6993.9	-/-	7038.0	-/-	7082.1	-/-
7771.0	-/-	7820.0	-/-	7869.0	-/-

<u>QPSK</u>

		SPURIOUS EM	SSION LEVEL		
LOWEST C	LOWEST CHANNEL		MIDDLE CHANNEL HIGHEST CHANNEI		HANNEL
Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]
1554.2	-/-	1564.0	-/-	1573.8	-/-
2331.3	-/-	2346.0	-/-	2360.7	-/-
3108.4	-/-	3128.0	-/-	3147.6	-/-
3885.5	-/-	3910.0	-/-	3934.5	-/-
4662.6	-/-	4692.0	-/-	4721.4	-/-
5439.7	-/-	5474.0	-/-	5508.3	-/-
6216.8	-/-	6256.0	-/-	6295.2	-/-
6993.9	-/-	7038.0	-/-	7082.1	-/-
7771.0	-/-	7820.0	-/-	7869.0	-/-

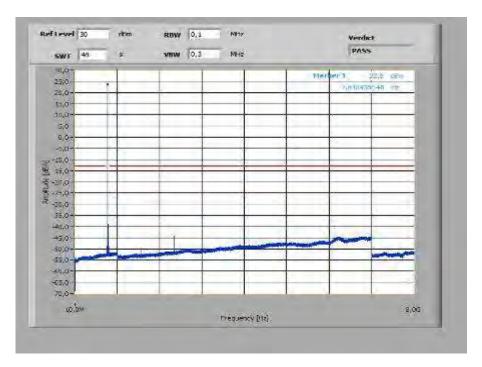


Plots: BPSK

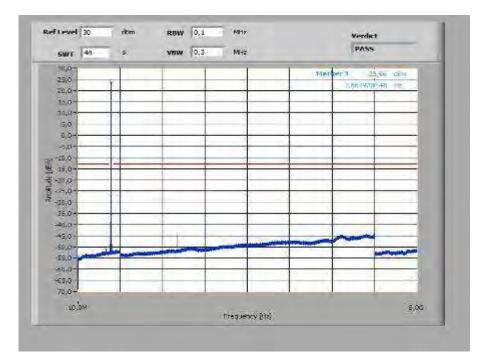
Reftenel 30 ritim. RBW 0.1 MHz Verdet PASS SWT 40 9 VRW 0,3 Merz -0,0-Placer 3 23,9 GET 25,0 2094048 20,0-13.0 an,q-5,0 0,0--0,0--10,0 -15,0 -31,0 -31,0 -30,0 35.0-+40,0--45,0 -59,07 55,0--04.01--65,Q 70,0-10.04 8,00 Trequency (Hz)

Plot 1: Lowest Channel (10 MHz - 8 GHz), spacing 3.75 kHz, 1@0 tones

Plot 2: Middle Channel (10 MHz - 8 GHz), spacing 3.75 kHz, 1@0 tones

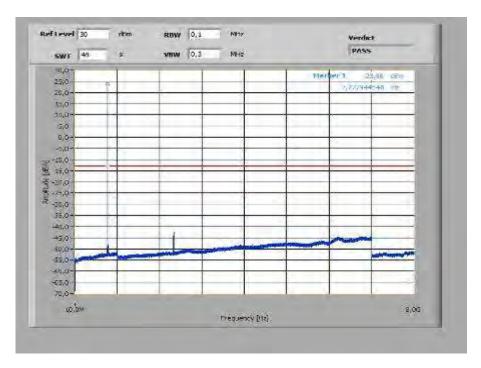




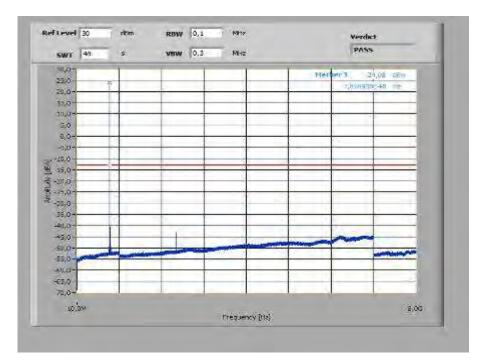


Plot 3: Highest Channel (10 MHz - 8 GHz), spacing 3.75 kHz, 1@0 tones

Plot 4: Lowest Channel (10 MHz - 8 GHz), spacing 3.75 kHz, 1@47 tones

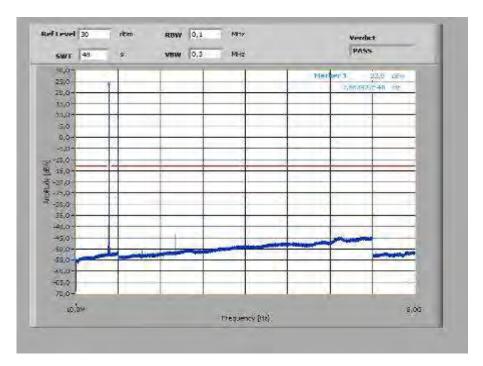




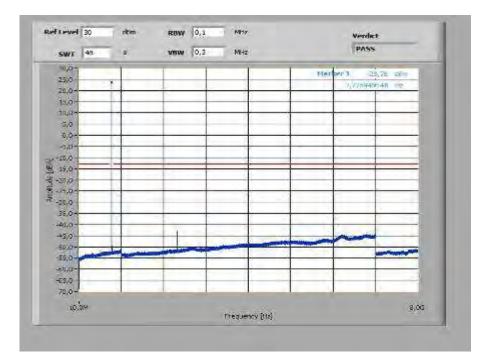


Plot 5: Middle Channel (10 MHz - 8 GHz), spacing 3.75 kHz, 1@47 tones

Plot 6: Highest Channel (10 MHz - 8 GHz), spacing 3.75 kHz, 1@47 tones

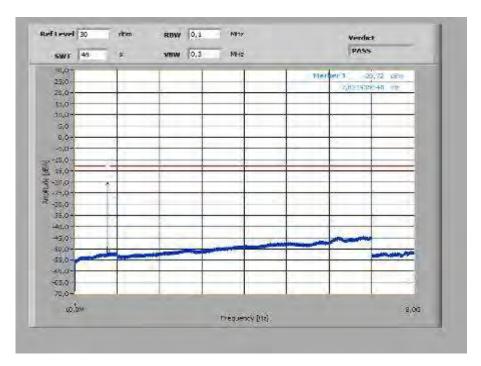




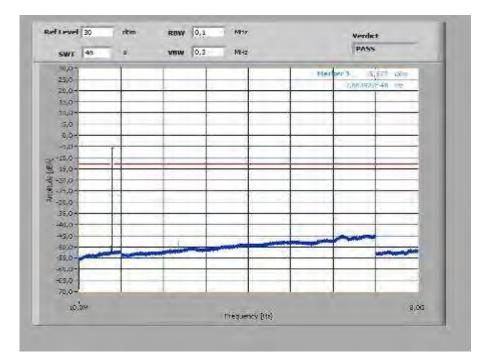


Plot 7: Lowest Channel (10 MHz - 8 GHz), spacing 15 kHz, 1@0 tones

Plot 8: Middle Channel (10 MHz - 8 GHz), spacing 15 kHz, 1@0 tones

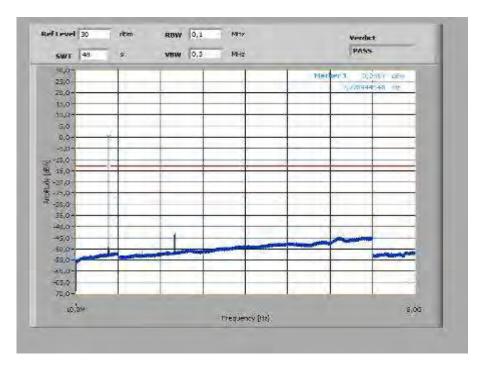




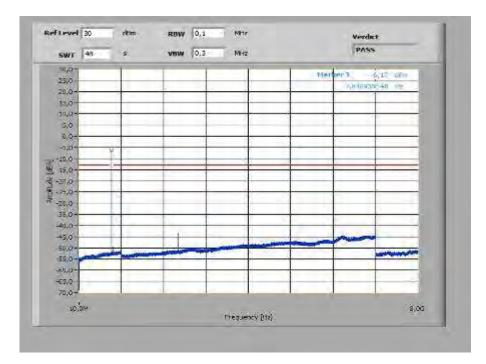


Plot 9: Highest Channel (10 MHz - 8 GHz), spacing 15 kHz, 1@0 tones

Plot 10: Lowest Channel (10 MHz - 8 GHz), spacing 15 kHz, 1@11 tones

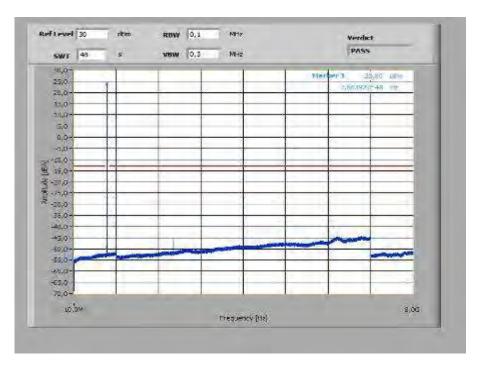






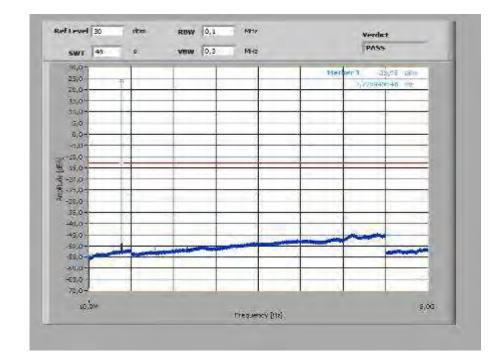
Plot 11: Middle Channel (10 MHz - 8 GHz), spacing 15 kHz, 1@11 tones

Plot 12: Highest Channel (10 MHz - 8 GHz), spacing 15 kHz, 1@11 tones



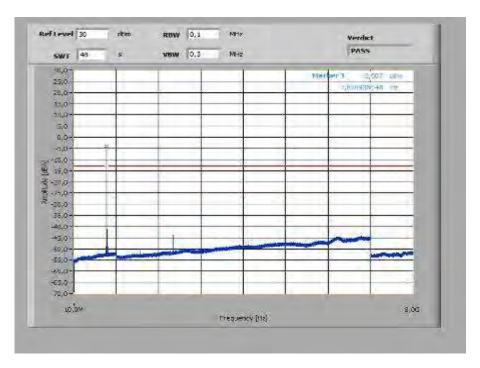


Plots: QPSK

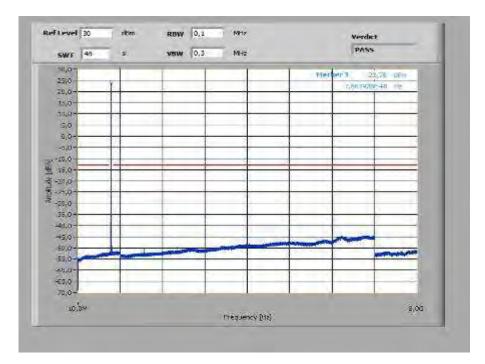


Plot 1: Lowest Channel (10 MHz - 8 GHz), spacing 3.75 kHz, 1@0 tones

Plot 2: Middle Channel (10 MHz - 8 GHz), spacing 3.75 kHz, 1@0 tones

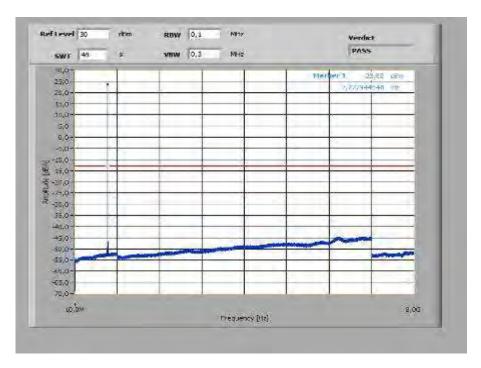




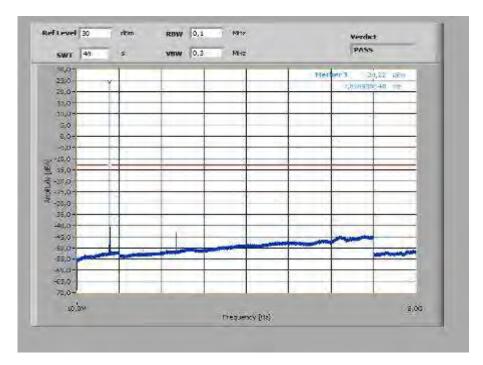


Plot 3: Highest Channel (10 MHz - 8 GHz), spacing 3.75 kHz, 1@0 tones

Plot 4: Lowest Channel (10 MHz - 8 GHz), spacing 3.75 kHz, 1@47 tones

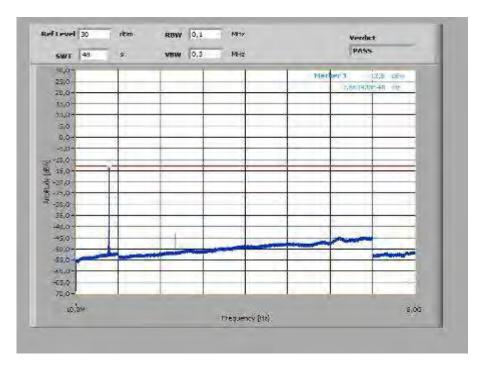




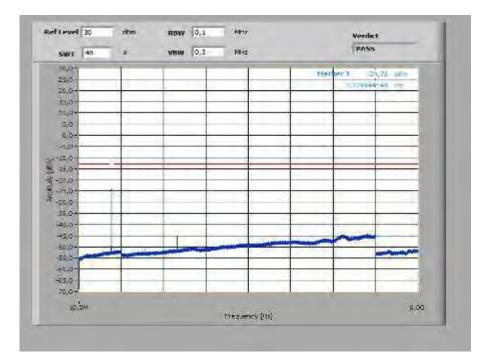


Plot 5: Middle Channel (10 MHz - 8 GHz), spacing 3.75 kHz, 1@47 tones

Plot 6: Highest Channel (10 MHz - 8 GHz), spacing 3.75 kHz, 1@47 tones

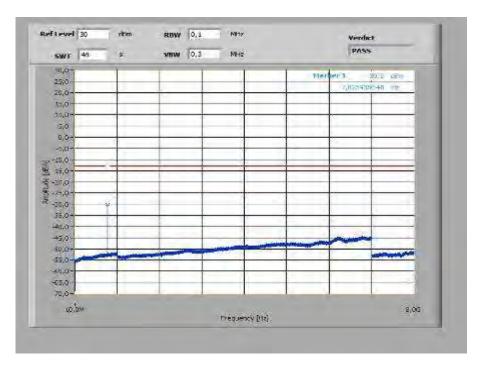




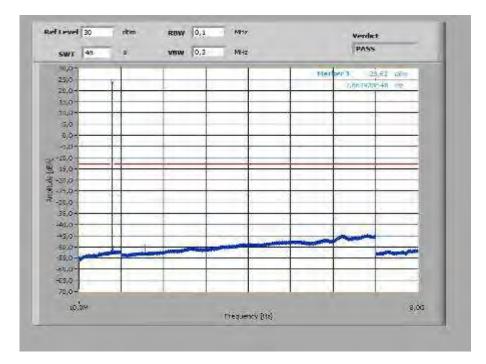


Plot 7: Lowest Channel (10 MHz - 8 GHz), spacing 15 kHz, 1@0 tones

Plot 8: Middle Channel (10 MHz - 8 GHz), spacing 15 kHz, 1@0 tones

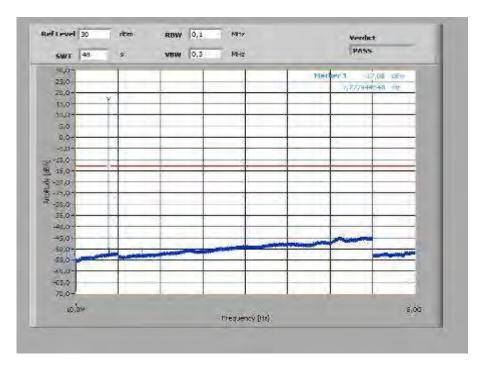




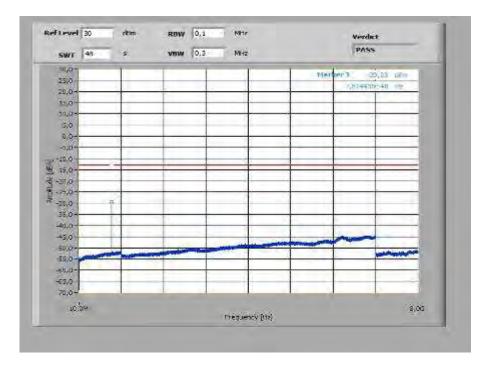


Plot 9: Highest Channel (10 MHz - 8 GHz), spacing 15 kHz, 1@0 tones

Plot 10: Lowest Channel (10 MHz - 8 GHz), spacing 15 kHz, 1@11 tones

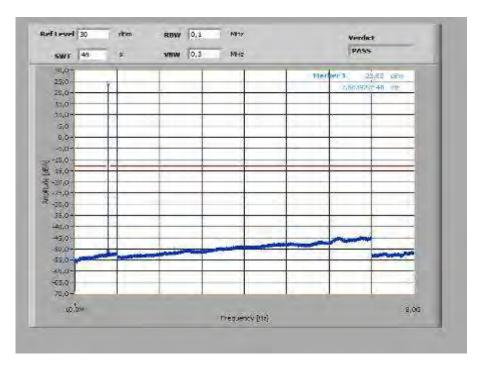




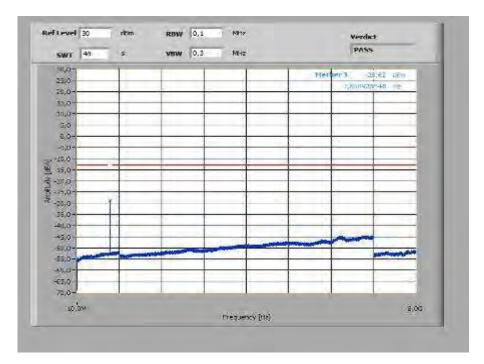


Plot 11: Middle Channel (10 MHz - 8 GHz), spacing 15 kHz, 1@11 tones

Plot 12: Highest Channel (10 MHz - 8 GHz), spacing 15 kHz, 1@11 tones

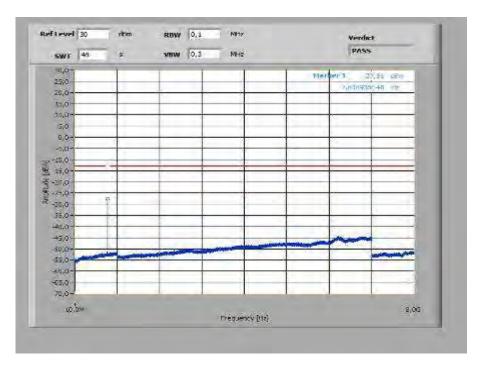




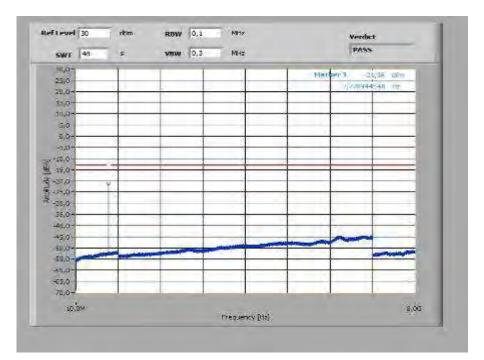


Plot 13: Lowest Channel (10 MHz - 8 GHz), spacing 15 kHz, 12@0 tones

Plot 14: Middle Channel (10 MHz - 8 GHz), spacing 15 kHz, 12@0 tones







Plot 15: Highest Channel (10 MHz - 8 GHz), spacing 15 kHz, 12@0 tones



16.4.5 Block edge compliance

Description:

The spectrum at the band edges must comply with the spurious emissions limits.

Measurement:

Measurement parameters	
Detector:	RMS
Sweep time:	180s
Video bandwidth:	300 kHz
Resolution bandwidth:	100 kHz
Span:	1 MHz
Trace-Mode:	Max Hold
Used equipment:	See chapter 7.2 setup A
Measurement uncertainty:	See chapter 9
Measurement procedure	FCC: § 2.1051 ISED: RSS-Gen, 6.13

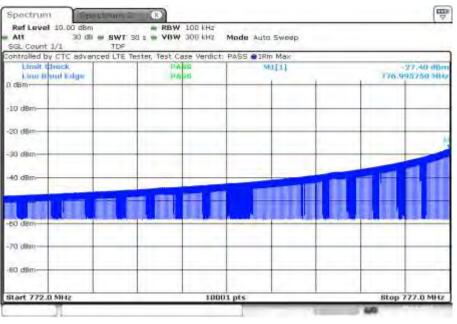
<u>Limits:</u>

FCC	ISED
\$ 27.53(c)	RSS-130, 4.7.1
 (c) For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following: (c)(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB. 	The unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 log10 p (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.
-13	dBm
⊠N/A	0810 if RBW < 1 % emission bandwidth: A here 5 whereas: RBW1 = Y, RBW2 = Z



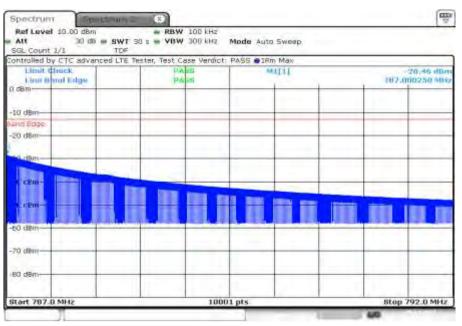
Results: BPSK

Plot 1: Lowest channel, spacing 3.75 kHz, 1@0 tones



Date: 5.APR.2022 07:50:05

Plot 2: Highest channel, spacing 3.75 kHz, 1@0 tones



Date: 5.APR.2022 09:27:07

Test report no.: 1-2685/21-03-14

Plot 3: Lowest channel, spacing 3.75 kHz, 1@47 tones

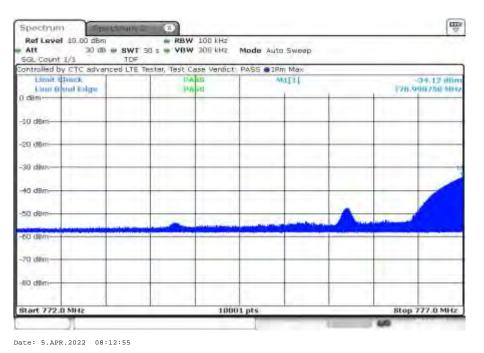
Plot 4: Highest channel, spacing 3.75 kHz, 1@47 tones

1 Spectrum Ref Level 10.00 dBm x RBW 100 KHz ** 30 db 🗰 8WT 38 s 🖷 VBW 300 kHz Att Mode Auto Sweep SGL Count 1/1 TDF Controlled by CTC advanced LTE Tester, Test Case Verdict: PASS @IRm Max Limit Churck PASS MILTI Limit Church Edge PAss -26,45 dbn 187.004250 804 D dBm -10 dBmand Edge -20 d8m--60 d 70 dilm BO dBr Stop 792.0 MHz Start 787.0 MHz 10001 pts

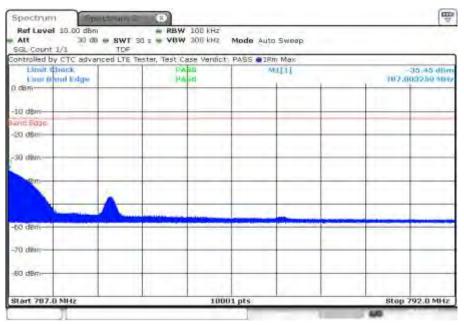




Plot 5: Lowest channel, spacing 15 kHz, 1@0 tones



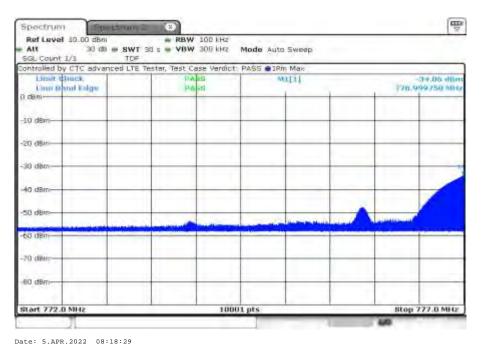
Plot 6: Highest channel, spacing 15 kHz, 1@0 tones



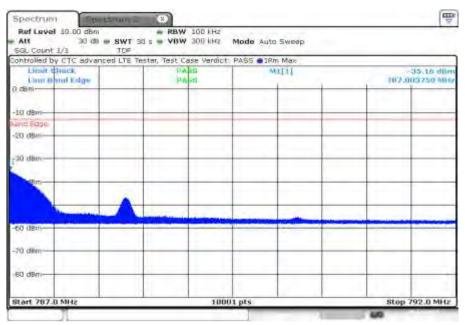
Date: 5.APR.2022 09:49:51



Plot 7: Lowest channel, spacing 15 kHz, 1@11 tones



Plot 8: Highest channel, spacing 15 kHz, 1@11 tones



Date: 5.APR.2022 09:55:25



<u>Results:</u> QPSK

Plot 1: Lowest channel, spacing 3.75 kHz, 1@0 tones

SGL Count 1/1 TD Controlled by CTC advanced LTI		DACC #10m May	
Limit Chuck Limit Chuck	PASS PASS	MT[1]	-27,42 00r 176,994750 MH
50 d8m			
20 dBin			
30 dilm			
40 dBm			
Q0 dBm			
60 d8m			

Date: 5.APR.2022 08:01:13

Plot 2: Highest channel, spacing 3.75 kHz, 1@0 tones

Ref Level 10.00 dBm	RBW 100 kHz		Ţ Ţ
Att 30 db = SWT SGL Count 1/1 TDF	38 s 🖷 VBW 305 kHz	Mode Auto Sweep	
ontrolled by CTC advanced LTE	Testar, Tast Case Verdict:	PASS # IRm Max	
Linsk Grack Lins Band Edge	PABS	MILII	-20,43 dBn 107,010750 MH
3 dBm			
10 dBm			
and Edge			
20 d8m			
a dbm			
60 dBm			the second second second being
and dates			
70 diun			
80 dBm			

Date: 5.APR.2022 09:38:16

© CTC advanced GmbH

Plot 3: Lowest channel, spacing 3.75 kHz, 1@47 tones

Spectrum

-10 dBm -20 (8) -30 db 40 da

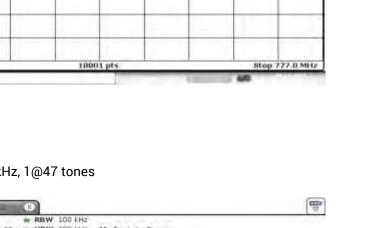
-60 dBm 70 dille -ED dBm-

Start 772.0 MHz

Date: 5.APR.2022 08:06:48

	-20,40 dbr 187,000250 SB4		E Tester, Test Case Verdict:	the state of the s	
-10 dBm -20 dBm -20 dBm		Limit Chuck Linu Ornal Edge	PAS	WILL	
and 90ge -20 d8m		0 dBm	-		
20 dBm					
20 dBm					
co dem					
50 dBm		20 dBm			
50 dBm					
		1110			
70 dBm		to dam			
70 dBm					
		70 dilum			
80 dBm		nD dBm			
		CO UDITI-			

Date: 5.APR.2022 09:43:50

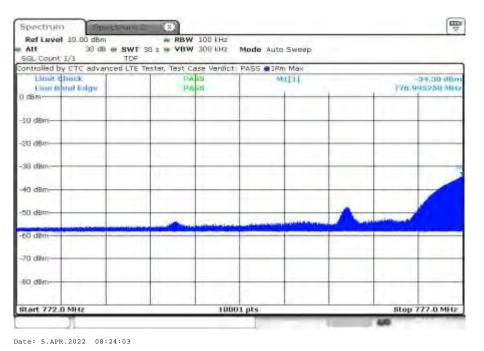




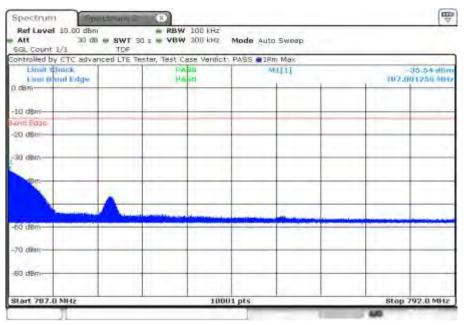




Plot 5: Lowest channel, spacing 15 kHz, 1@0 tones



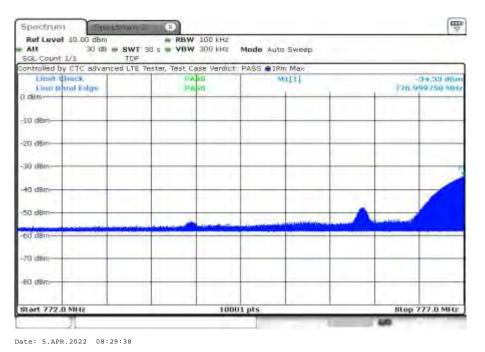
Plot 6: Highest channel, spacing 15 kHz, 1@0 tones



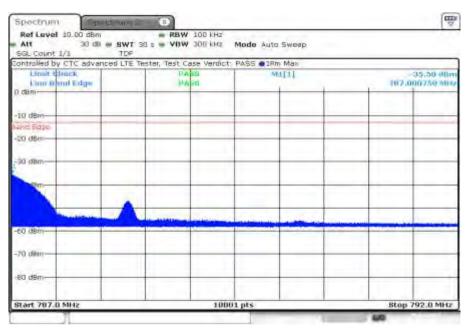
Date: 5.APR.2022 10:01:00



Plot 7: Lowest channel, spacing 15 kHz, 1@11 tones



Plot 8: Highest channel, spacing 15 kHz, 1@11 tones



Date: 5.APR.2022 10:06:34

© CTC advanced GmbH

Plot 9: Lowest channel, spacing 15 kHz, 12@0 tones

Limit thuck	E Tester, Test Case Verdic	MI[1]	 36,44 dl/m
Linux Obrod Edge	PAGE	and the second sec	 V6.987250 MH
0 d8m-			
10 dBm			 -
20 d8m			_
30 dilm-			
40 dBm			 -
50 dBm			
60 dBm			-
70 dilm			_

Date: 5.APR.2022 08:35:12

Plot 10: Highest channel, spacing 15 kHz, 12@0 tones

Date: 5.APR.2022 10:12:09

ontrolled by CTC advanced LTE	E Testar, Tast Case Verdict:	PASS IRm Max	
Linst thuck	DASS	MALE11	-37,70 00m
Chur O'mul Edge	PAHS		107.004750 804
10 d8m			
and Edge			
-20 dBm			
-30 dim-	-		
dBm-			
60 d8m			
70 dBm			





16.4.6 Occupied bandwidth

Description:

Measurement of the occupied bandwidth of the transmitted signal.

Measurement:

Similar to conducted emissions, occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the mid frequencies of the LTE band 13 frequency band. The table below lists the measured 99% power and -26dBc occupied bandwidths. Spectrum analyzer plots are included on the following pages.

Part 27.53 requires a measurement bandwidth of at least 1% of the occupied bandwidth.

Measurement parameters		
Detector:	Peak	
Sweep time:	180s	
Video bandwidth:	100 kHz	
Resolution bandwidth:	300 kHz	
Span:	2 x nominal bandwidth	
Trace-Mode:	Max Hold	
Used equipment:	See chapter 7.4 setup A	
Measurement uncertainty:	See chapter 9	
Measurement procedure	FCC: § 2.1049	
	ISED: RSS-Gen, 6.7	

Limits:

FCC	ISED	
§ 2.1049	RSS-Gen, 6.7	
Reporting only		



<u>Results:</u>

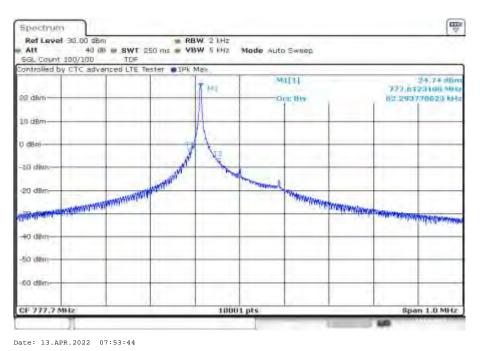
Occupied Bandwidth – BPSK				
Mode	99% OBW (kHz)	-26 dBc BW (kHz)		
Low channel / spacing 3.75 kHz; 1@0 tones	62	39		
Mid channel / spacing 3.75 kHz; 1@0 tones	63	40		
High channel / spacing 3.75 kHz; 1@0 tones	62	39		
Low channel / spacing 3.75 kHz; 1@47 tones	61	38		
Mid channel / spacing 3.75 kHz; 1@47 tones	62	38		
High channel / spacing 3.75 kHz; 1@47 tones	62	38		
Low channel / spacing 15 kHz; 1@0 tones	115	117		
Mid channel / spacing 15 kHz; 1@0 tones	120	103		
High channel / spacing 15 kHz; 1@0 tones	120	111		
Low channel / spacing 15 kHz; 1@11 tones	122	102		
Mid channel / spacing 15 kHz; 1@11 tones	125	120		
High channel / spacing 15 kHz; 1@11 tones	127	128		

Occupied Bandwidth – QPSK			
Mode	99% OBW (kHz)	-26 dBc BW (kHz)	
Low channel / spacing 3.75 kHz; 1@0 tones	67	39	
Mid channel / spacing 3.75 kHz; 1@0 tones	69	38	
High channel / spacing 3.75 kHz; 1@0 tones	72	42	
Low channel / spacing 3.75 kHz; 1@47 tones	68	39	
Mid channel / spacing 3.75 kHz; 1@47 tones	71	39	
High channel / spacing 3.75 kHz; 1@47 tones	69	38	
Low channel / spacing 15 kHz; 1@0 tones	117	114	
Mid channel / spacing 15 kHz; 1@0 tones	119	114	
High channel / spacing 15 kHz; 1@0 tones	122	116	
Low channel / spacing 15 kHz; 1@11 tones	117	115	
Mid channel / spacing 15 kHz; 1@11 tones	120	103	
High channel / spacing 15 kHz; 1@11 tones	117	116	
Low channel / spacing 15 kHz; 12@0 tones	186	249	
Mid channel / spacing 15 kHz; 12@0 tones	183	246	
High channel / spacing 15 kHz; 12@0 tones	186	246	

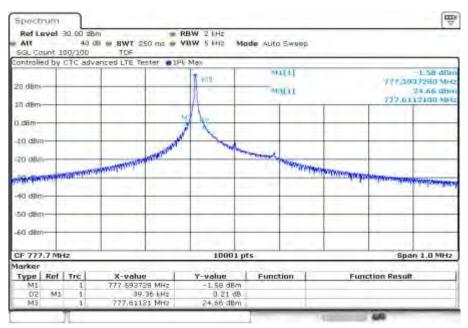


Plots: BPSK

Plot 1: low channel (99% - OBW), spacing 3.75 kHz, 1@0 tones

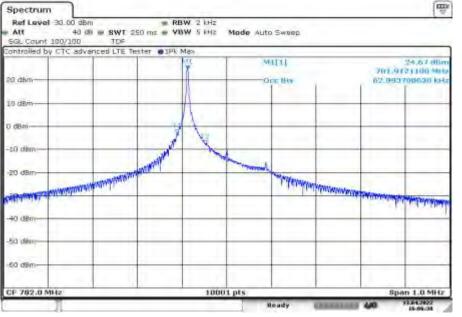


Plot 2: low channel (-26 dBc BW), spacing 3.75 kHz, 1@0 tones



Date: 13.APR.2022 07:54:13

© CTC advanced GmbH



Plot 3: mid channel (99% - OBW), spacing 3.75 kHz, 1@0 tones

Date: 13.APR.2022 16:06:38

Spectrum

Plot 4: mid channel (-26 dBc BW), spacing 3.75 kHz, 1@0 tones

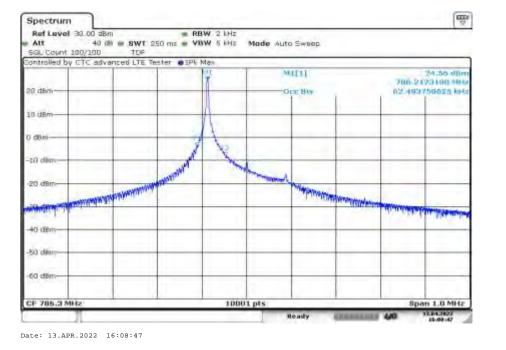
Ref Level 30.00 dBm RBW 2 HHz 40 db # 8WT 250 ms # VBW 5 #Hz 100 TDF Att Mode ALito Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . IPk Max MITTI 1.54 dft Ť 112 701,8906020 MHz 24,69 (89) 20 der MILLE 701.0112100 404 10 dB O CB 40 dB 20 dla - Partiene 40 dBr 50 dBm -60 dBm CF 782.0 MHz 10001 pts Span 1.0 MHz larker Y-value -1.54 dBm 0.09 dB 24.59 dBm X-value 781.893632 MHz 39.552 LHz 701.91121 MHz Type | Ref | Trc Function Function Result M1 M1

Date: 13.APR.2022 08:04:37



5

Test report no.: 1-2685/21-03-14



Plot 5: high channel (99% - OBW), spacing 3.75 kHz, 1@0 tones

Plot 6: high channel (-26 dBc BW), spacing 3.75 kHz, 1@0 tones

Spectrum



5

Ref Level 30.00 dBm RBW 2 HHz 40 db = 8WT 250 ms = VBW 5 HHz 100 TDF Att Mode ALito Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . IPk Max MITTI 1.56 dfb t MI 706.1928960 МНо 20 d8 MULT 24.62 dBi 706.2124100 404 10 dB O CB 40 dB 20 dila 0.001 Mar No. 40 dBr 50 dBm -60 dBm CF 786.3 MHz 10001 pts Span 1.0 MHz larker Y-value -1.56 dBm 0.11 dB 24.52 dBm X-value 785 192895 MHz 39 232 LHz 205 21241 MHz Type | Ref | Trc Function Function Result M1 M1

Date: 13.APR.2022 08:15:05

© CTC advanced GmbH

Plot 8: low channel (-26 dBc BW), spacing 3.75 kHz, 1@47 tones

Ref Level 30.00 dBm

SGL Count 100/100

Att

-60 dBm-

Markei

M1 02 M1

Type | Ref | Trc

			Milil
20 d8m		-	1111
10 d8m			A
0.0871		-	M/1-
-10 dBm			1
-20 dBm		Annon	
the state		Der.	
Ashering and a second second	Share and and a start of the st		
-++0 dBm-			

X-value 777 768192 MHz 37 888 kHz 777,76769 MHz

40 db @ 8WT 250 ms @ V8W 5 HHz 200 TDF

RBW 2 HHz

Mode Alito Sweep

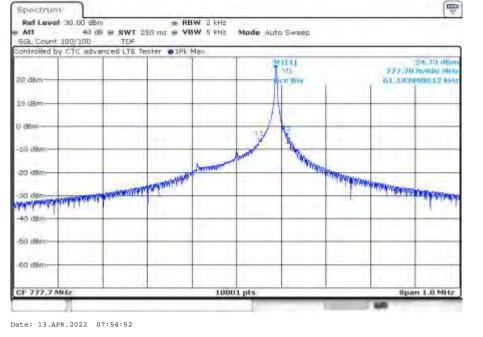
10001 pts

Function

Y-value -1.24 dBm -0.20 dB 24.79 dBm

Test report no.:	1-2685/21-03-14
------------------	-----------------

Plot 7: low channel (99% - OBW), spacing 3.75 kHz, 1@47 tones



5

-1.24 dBm 7 (7.7681920 MHz 24.79 dBm 737 /2876980 4943

Span 1.0 MHz

NAMES AND ADDRESS OF ADDRES

Function Result

Date: 13.APR.2022 07:55:21

Spectrum Ref Level 30.00 dBm 0 dBm # RBW 2 kHz 40 db # SWT 250 ms # VBW 5 kHz Att Mode Auto Sweep SGL Count 100/100 TOP ontrolled by CTC advanced LTE Tester . IPk Max MILLI 20 dBm ETT BAY 10 dBm U dBr -aŭ di New Wart 20 dBr A STATISTICS AND A STAT STOP IT ALL DAY 30 de ALC: NOT THE OWNER OF 40 dBm

Plot 9: mid channel (99% - OBW), spacing 3.75 kHz, 1@47 tones

Plot 10: mid channel (-26 dBc BW), spacing 3.75 kHz, 1@47 tones

Spectrum Ref Level 30.00 dBm

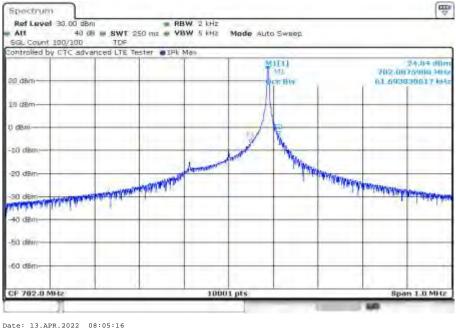
Att

40 db = 8WT 250 ms = VBW 5 HHz 200 TDF SGL Count 100/100 controlled by CTC advanced LTE Tester . IPk Max 1.21 dfb 11 I I 702.0682880 MHz 24.79 dbm 20 den EIGT I 70121.0076900 404 10 dB D CER -10 dB maryim 20 dila 114 HO dBm-50 dBr -60 dBm CF 782.0 MHz Span 1.0 MHz 10001 pts Marker Y-value -1.21 dBm -0.26 dB 24.79 dBm Type | Ref | Trc X-value 782.056288 MHz 36.06 kHz 762.06769 MHz Function Function Result M1 M1

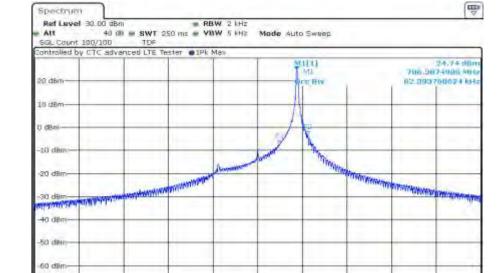
Mode ALIto Sweep

RBW 2 HHz

Date: 13.APR.2022 08:05:45







10001 pts

Plot 11: high channel (99% - OBW), spacing 3.75 kHz, 1@47 tones

Date: 13.APR.2022 08:15:43

CF 785.3 MHz

Spectrum

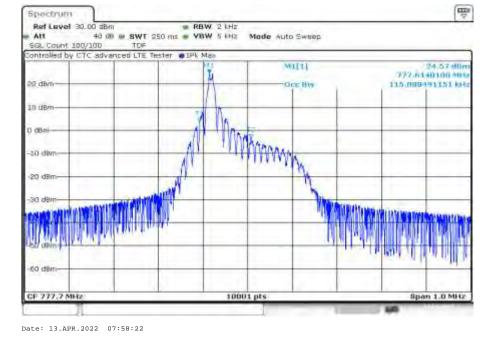
Plot 12: high channel (-26 dBc BW), spacing 3.75 kHz, 1@47 tones

Ref Level 30.00 dBm RBW 2 HHz 40 db = 8WT 250 ms = VBW 5 HHz 200 TDF Att Mode Auto Sweep SGL Count 100/100 controlled by CTC advanced LTE Tester . IPk Max 1.36 dfb 관련된 706,0689200 MHz 20 den 1111 24.64 (IB) 706.3876900 MR 10 dB D CER to dBr - constants 20 dilm North Court WHICH BEARING 30 đệ -40 dBm 50 dBm -60 dBm-CF 786.3 MHz 10001 pts Span 1.0 MHz larker X-value 786.36832 MH2 37.888 kH2 206.38769 MH2 Type | Ref | Trc Y-value Function Function Result 1 -1 36 dBm -0.13 dB 24.54 dBm M3 02 M3 M1

Date: 13.APR.2022 08:16:12



Span 1.0 MHz



Plot 13: low channel (99% - OBW), spacing 15 kHz, 1@0 tones

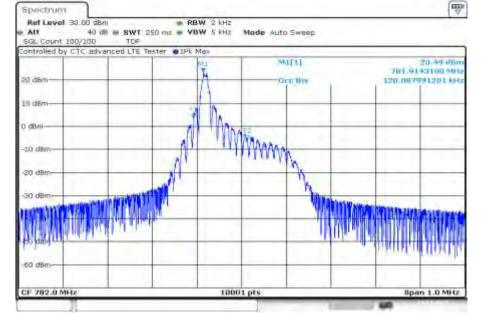
Plot 14: low channel (-26 dBc BW), spacing 15 kHz, 1@0 tones

Spectrum

Ref Level 30.00 dB RBW 2 kHz 40 db # 8WT 250 ms # VBW 5 kHz 100 TDF Att Mode Auto Sweep 100/100 SGL Count ontrolled by CTC advanced LTE Tester . IPk Max MITSI 2.56 dB 3 737,5790090 MHz 23,56 dBH 20 dê MACIN 777.6204100 MP 10 di n 0.08 -10 df 20 di 30 d 60 dBr CF 777.7 MHz 10001 pts Span 1.0 MHz Marke X-value 777,579008 MHz 116 572 HHz 777,52041 MHz Type | Ref | Tro Y-value Function Function Result -2 56 dBm 0 07 dB 23 56 dBm M3

Date: 13.APR.2022 07:58:51



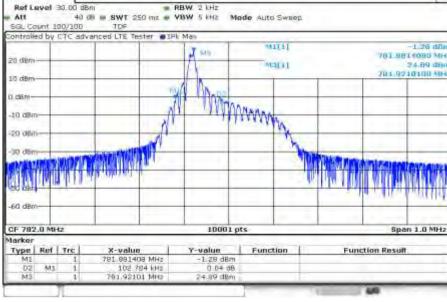


Plot 15: mid channel (99% - OBW), spacing 15 kHz, 1@0 tones

Date: 13.APR.2022 08:08:48

Spectrum

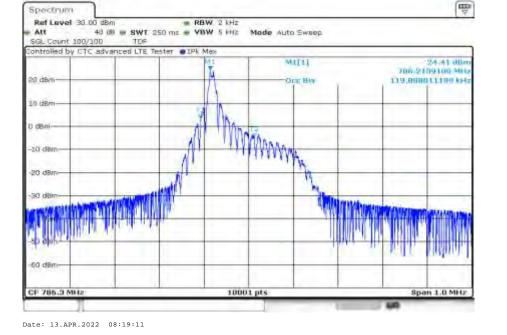
Plot 16: mid channel (-26 dBc BW), spacing 15 kHz, 1@0 tones



Date: 13.APR.2022 08:09:17



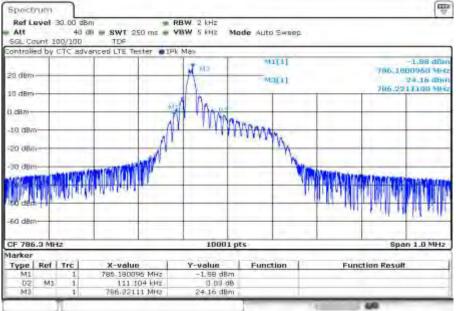
-



Plot 17: high channel (99% - OBW), spacing 15 kHz, 1@0 tones

Plot 18: high channel (-26 dBc BW), spacing 15 kHz, 1@0 tones

Date: 13.APR.2022 08:19:40





-Spectrum 0 dBm · RBW 2 kHz 40 db · SWT 250 ms · VBW 5 kHz Ref Level 30.00 dBm Att Mode Auto Sweep SGL Count 100/100 TOP ontrolled by CTC advanced LTE Tester @ IPk Max MMIETI 23.61 (0 777.770 1.41 20 dBm 121 887811219 64 TT HAVE 10 dBr U dB -an di 20 n 1.0 MHz 777.7 MHz 10001 pts Spit

Plot 19: low channel (99% - OBW), spacing 15 kHz, 1@11 tones

Plot 20: low channel (-26 dBc BW), spacing 15 kHz, 1@11 tones

Date: 13.APR.2022 07:59:30

Spectrum

Ref Level 30.00 dB RBW 2 HHz 40 db # 8WT 250 ms # VBW 5 HHz 100 TOF Att Mode Auto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester @IPk Max Is his 1.26 dfl 777.7168000 MHz 24.82 dbm 20 dB 1111 7789000 4144 10 d8 O CB ANA -10 di 20 di ŝ CF 777.7 MHz 10001 pts Span 1.0 MHz Marke Y-value -1.26 dBm -0.06 dB 24.82 dBm X-value 777 7168 MHz 102 4 kHz 777,77899 MHz Type | Ref | Tro Function Function Result M1

Date: 13.APR.2022 07:59:59



-Spectrum 0 dBm · RBW 2 kHz 40 db · SWT 250 ms · VBW 5 kHz Ref Level 30.00 dBm Att Mode Auto Sweep SGL Count 100/100 TOP ied by CTC advanced LTE Tester @ IPk Max MIE11 24,03 0 702.005 PERCENT. 124.887511249 kH 20 dBm T Bhy 10 dBr U dB -aŭ di 20 d 60 n 1.0 MHz CE 782.0 MHz 10001 pts Spit Date: 13.APR.2022 08:09:55

Plot 21: mid channel (99% - OBW), spacing 15 kHz, 1@11 tones

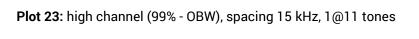
Plot 22: mid channel (-26 dBc BW), spacing 15 kHz, 1@11 tones

Spectrum

Ref Level 30.00 dB RBW 2 HHz 40 db # 8WT 250 ms # VBW 5 HHz 100 TDF Att Mode ALIto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . IPk Max 3.25 dB 33 IT 11 702.000896d MH 20 dB 11.11 22.85 dB 702.0852900 MH 10 d8 0.08 10 d η 20.0 30 d HALL. MEANERU AND MAY DO MAN 60 dBi CF 782.0 MHz 10001 pts Span 1.0 MHz Marker X-value 782.000895 MHz 119.68 kHz 782.08529 MHz Type | Ref | Trc Y-value Function Function Result -3.25 dBm -0.48 dB 22.05 dBm M1 M1

Date: 13.APR.2022 08:10:24





Spectrum

Ref Level 30.00 dBm

0 dBm · RBW 2 kHz 40 db · SWT 250 ms · VBW 5 kHz Att Mode Auto Sweep SGL Count 100/100 TOP ied by CTC advanced LTE Tester @IPk Max MIETI 23.90-0 700.0030900 501 126.987301270 kH 20 dBm on Hyp 10 dBr U dB -20 di 20 d 3Ó 60 dB n 1.0 MHz CE 785.3 MHz 10001 pts Sp-

Date: 13.APR.2022 08:20:18

Date: 13.APR.2022 08:20:47

Plot 24: high channel (-26 dBc BW), spacing 15 kHz, 1@11 tones



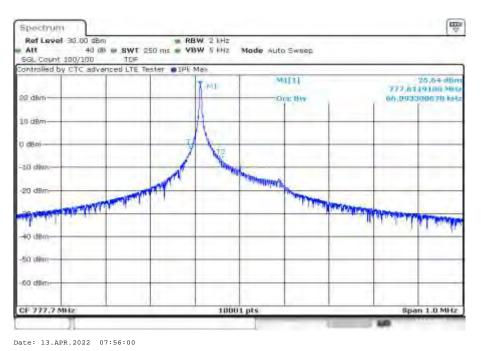
-

⁵ Spectrum Ref Level 30.00 dB RBW 2 HHz 40 db = 8WT 250 ms = VBW 5 HHz 100 TDF Att Mode ALIto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . IPk Max UMATEL 0.25 dB 706.2938240 MHz 22.79 dbn 20 dB 11.11 706.3790900 404 10 d8 O CB -10 d 20.0 WINNIN 60 dB CF 786.3 MHz 10001 pts Span 1.0 MHz Markei X-value 785.293824 MHz 127.872 kHz 786.37909 MHz Type | Ref | Tro Y-value Function Function Result -3.23 dBm -0.20 dB 22.79 dBm M3

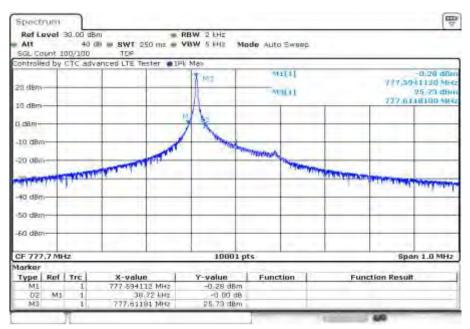


Plots: QPSK

Plot 1: low channel (99% - OBW), spacing 3.75 kHz, 1@0 tones



Plot 2: low channel (-26 dBc BW), spacing 3.75 kHz, 1@0 tones



Date: 13.APR.2022 07:56:29

-Spectrum Ref Level 30.00 dBm Att Mode Auto Sweep SGL Count 100/100 TOP ontrolled by CTC advanced LTE Tester . IPK Max MIETI 25.70 dBr 701.9119100 MH M1 20 dBm Oct: Biv 69.093000691 kH 10 dBr U dBi aŭ di Trading when the 20 da Lange Land Darwing (ann) 40 dBr -54 dille 60 dBm Span 1.0 MHz CF 782.0 MHz 10001 pts

Plot 3: mid channel (99% - OBW), spacing 3.75 kHz, 1@0 tones

Plot 4: mid channel (-26 dBc BW), spacing 3.75 kHz, 1@0 tones

Spectrum Ref Level 30.00 dBm

SGL Count 100/100

Att

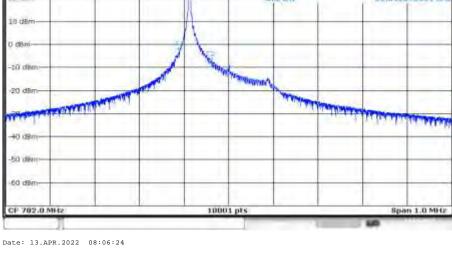
ontrolled by CTC advanced LTE Tester . IPk May MITTI C. te dB 701.8947200 MbHz 20 der MULT 25.55 dBi 701.0119100 404 10 dB O CER 40 dB 20 dila THE PARTY OF 1111 1111 40 dBr 50 dBm -60 dBm CF 782.0 MHz 10001 pts Span 1.0 MHz larker Y-value -0.46.dBm -0.26.dB 25.55.dBm X-value 781.89472 MHz 38.272 kHz 781.91191 MHz Type | Ref | Trc Function Function Result M1

Mode ALito Sweep

RBW 2 HHz

40 db = 8WT 250 ms = VBW 5 HHz 100 TDF

Date: 13.APR.2022 08:06:53





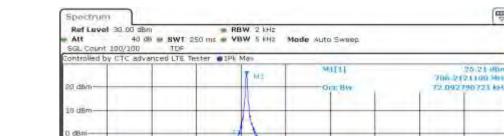
aŭ di 20 d

40 dB 50 dim 60 dBr

CE 785.3 MHz

Spectrum

Date: 13.APR.2022 08:16:50



Thursday

Plot 5: high channel (99% - OBW), spacing 3.75 kHz, 1@0 tones

Plot 6: high channel (-26 dBc BW), spacing 3.75 kHz, 1@0 tones

Ref Level 30.00 dBm RBW 2 HHz 40 db = 8WT 250 ms = VBW 5 HHz 100 TDF Att Mode ALito Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . IPk Max MITTI -0.77 dE τ MI 706,1939840 MHz 25,32 dbm 20 d8 MULT 706.2122100 404 10 dB O CB 40 dB 20 080 State Land and 111 1 +O dBr 50 dBm -60 dBm CF 786.3 MHz 10001 pts Span 1.0 MHz larker X-value 785 193984 MH2 41.5 KH2 206.21221 MH2 Y-value -0.77 dBm 0.08 dB 25.32 dBm Type | Ref | Trc Function Function Result 1 M1 M1

10001 pts

Date: 13.APR.2022 08:17:19



-

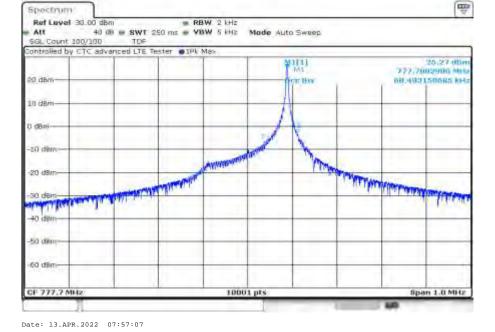
Span 1.0 MHz

Plot 7: low channel (99% - OBW), spacing 3.75 kHz, 1@47 tones

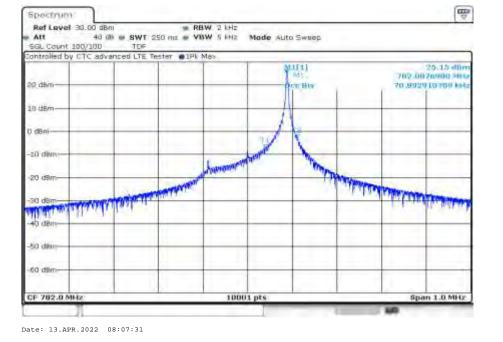
Plot 8: low channel (-26 dBc BW), spacing 3.75 kHz, 1@47 tones

Att	40	8m (8) = 8WT 250 ms = TDF		lade Auto Swar	ab.	
		vanced LTE Tester	IPK Men			
20 d8m-				Materi Materi		-0.89 dB 7.700+040 % 25.51 dB 7.7678900 %
0 06711				A		
-10 dBm			Nin diaman and a		And a state of the second second second	
40 dBm		All and a low of a low of the second s				S. C. S. C. S.
50 dBm-						
CF 777.7	MHZ		10001	pts		Span 1.0 MH
Marker Type R	et Tre	X-value	Y-value	Function	Euroction R	esult
M1	1 M1 1 1	777 765464 MHz 38 848 kHz 777,78789 MHz	-0,89 dBm 0.31 dB 25.51 dBm			

Date: 13.APR.2022 07:57:36







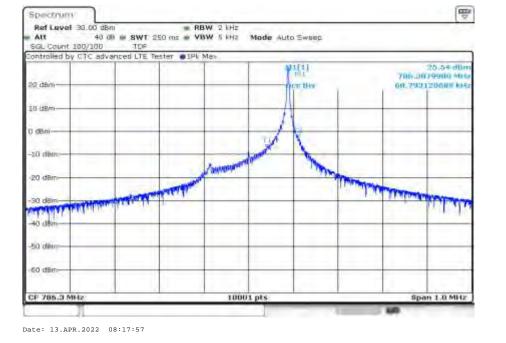
Plot 9: mid channel (99% - OBW), spacing 3.75 kHz, 1@47 tones

Plot 10: mid channel (-26 dBc BW), spacing 3.75 kHz, 1@47 tones

SGL Count 100/100 ontrolled by CTC adv	anced LTE Tester @IPk	Mare			
20 dBm			Anara a	702.00	-0,51 dBi 68000 Mi4 25,60 dBi 90000 Mi4
IO dBm			not le		
DBm-			18		
10 dBm		all			
20 dBm		Annanananan		The second s	
million and the ore	A CONTRACTOR OF A CONTRACTOR O		_	Calification in the second	(International)
AC dBm					
50 dBm				-	
60 dBm-			_	_	
EF 782.0 MHz		10001 ;	pts	Spa	n 1.0 MHz
arker					

Date: 13.APR.2022 08:08:00





Plot 11: high channel (99% - OBW), spacing 3.75 kHz, 1@47 tones

Plot 12: high channel (-26 dBc BW), spacing 3.75 kHz, 1@47 tones

Spectrum

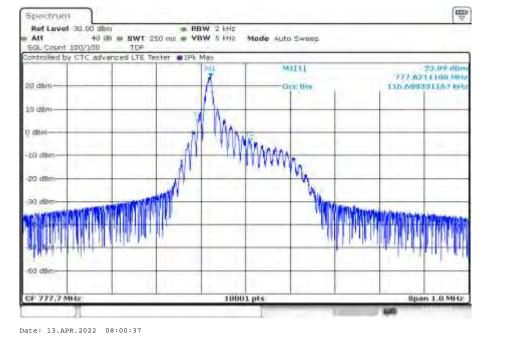
Controlled by CTC	advanced LTE	Tester #IP	Men					
20 d8m				_	MLAX .			-0.40 dBu 60120 Mor 25,59 dBu 70000 Au
10 dBm	_		1	1	1	1	748-24	Voin - Re
0.0871	-	-		1	1	-		
-\$0 dBm			-	No. of Concession, Name	h			-
-20 dBm	-		- mart	_	-	State Barrison		
-30 d8m	and the second	and the second			_	1	A DESCRIPTION OF THE OWNER	TT SHOWARD
And a		1						1.000
-40 dBm	-				-	-	-	-
50 dBm					-			
and and a								
-60 dBm-	_				+			
CF 786.3 MHz			10001	pts	-		Spa	50 1.0 MHz
larker								
Type Ref Tr			Y-value		ction	Fun	ction Result	t.
M1 02 M1		0912 MHz	-0.49 dBn					
02 M3 M3		8,272 kHz 8794 MHz	0.00 d8 25.59 d84					

Date: 13.APR.2022 08:18:26



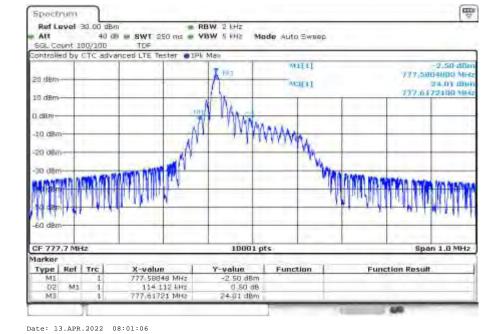
-

Test report no.: 1-2685/21-03-14

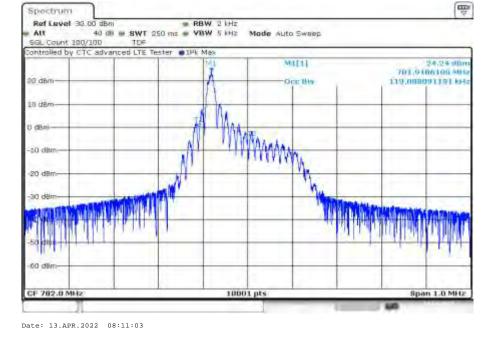


Plot 13: low channel (99% - OBW), spacing 15 kHz, 1@0 tones

Plot 14: low channel (-26 dBc BW), spacing 15 kHz, 1@0 tones







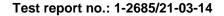
Plot 15: mid channel (99% - OBW), spacing 15 kHz, 1@0 tones

Plot 16: mid channel (-26 dBc BW), spacing 15 kHz, 1@0 tones



⁻Spectrum Ref Level 30.00 dB RBW 2 HHz 40 db # 8WT 250 ms # VBW 5 HHz 100 TOF Att Mode ALito Sweep 100/100 SGL Count ontrolled by CTC advanced LTE Tester . IPk Max MITTI 1.60 dB Ŵ13 781.8808960 MHC 20 dê Marit 24,46 (0) 781,0160100 403 10 di 0.08 1100 -10 d 20.6 60 dBr CF 782.0 MHz 10001 pts Span 1.0 MHz Markei X-value 781.880996 MHz 114 176 kHz 701.93561 MHz Type | Ref | Tro Y-value Function Function Result -1.50 dBm -0.19 dB 24.46 dBm M3

Date: 13.APR.2022 08:11:32



Spectrum Ref Level 30.00 dBm 0 dBm RBW 2 kHz 40 db = 8WT 250 ms • VBW 5 kHz Att Mode Auto Sweep SGL Count 100/100 TDF d by CTC advanced LTE Tester IPk Max MIETI 24.22 (II 706.2167100 404 122 187781222 kH 20 dBr OCT BIN 10 dBn U de -20 di 20 n 1.0 MHz CE 785.3 MHz 10001 pts Sp-Date: 13.APR.2022 08:21:25

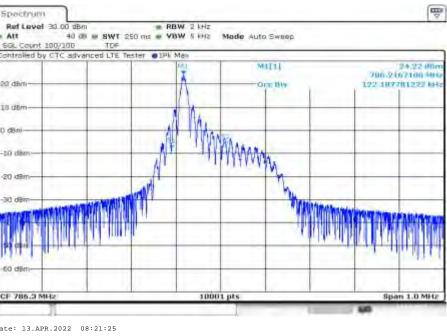
Plot 17: high channel (99% - OBW), spacing 15 kHz, 1@0 tones

Plot 18: high channel (-26 dBc BW), spacing 15 kHz, 1@0 tones

-Spectrum Ref Level 30.00 dB RBW 2 HHz 18. 40 db # 8WT 250 ms # VBW 5 HHz 100 TOF Att Mode Auto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . IPk Max MITSI 2,96 dfl 706.17958 IO MH 20 de MERT 23.32 dB 706.2107100 403 10 d8 O CB mmm -10 di 20 dil 30 d 11 50 -60 dBr CF 786.3 MHz 10001 pts Span 1.0 MHz larker X-value 785.179584 MHz 115.546 kHz 706.21071 MHz Type | Ref | Tro Y-value Function Function Result -2.98 dBm 0 22 dB 23 32 dBm M3

Date: 13.APR.2022 08:21:54





-Spectrum 0 dBm · RBW 2 kHz 40 db · SWT 250 ms · VBW 5 kHz Ref Level 30.00 dBm Att Mode Auto Sweep SGL Count 100/100 TOP introlled by CTC advanced LTE Tester . IPk Max MMILTI 277.770290KI MB 117,188201172 kH 20 dBm TE BAY 10 dBr U dB -aŭ di 20 d 60 dB n 1.0 MHz CE 777.7 MHz 10001 pts Sp-

Plot 19: low channel (99% - OBW), spacing 15 kHz, 1@11 tones

Plot 20: low channel (-26 dBc BW), spacing 15 kHz, 1@11 tones

Spectrum Ref Level 30.00 dB

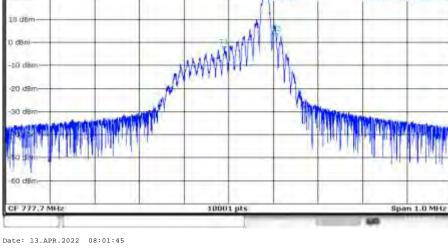
Att

40 db # 8WT 250 ms # VBW 5 HHz 100 TOF SGL Count 100/100 ontrolled by CTC advanced LTE Tester . IPk Max 2.11 dB MILLI 777,7656800 MH 24,04 (B) 20 dB 14.00 2843900 MH 10 d8 O CB 444 -10 df 20 di 30 d úl.ih de la db Ol 60 dBr CF 777.7 MHz 10001 pts Span 1.0 MHz Markei Y-value -2.11 dBm -0.00 dB 24.04 dBm X-value 777.70368 MH2 115.2 LH2 777.70139 MH2 Type | Ref | Tro Function Function Result M3

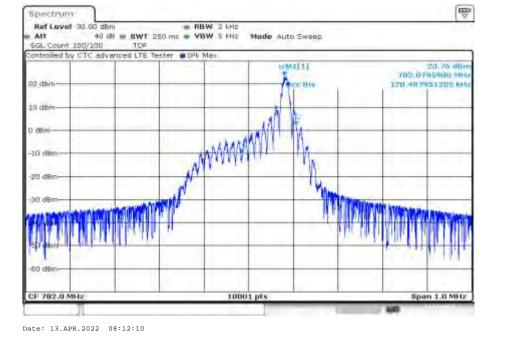
Mode Auto Sweep

RBW 2 HHz

Date: 13.APR.2022 08:02:14

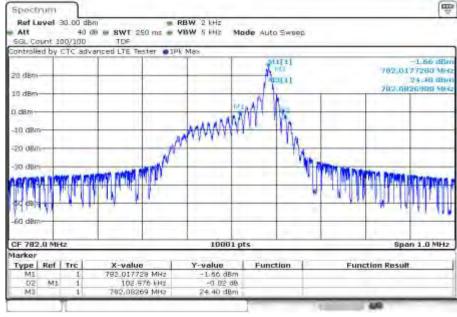






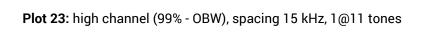
Plot 21: mid channel (99% - OBW), spacing 15 kHz, 1@11 tones

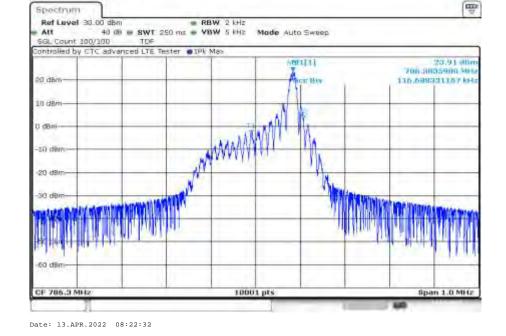
Plot 22: mid channel (-26 dBc BW), spacing 15 kHz, 1@11 tones



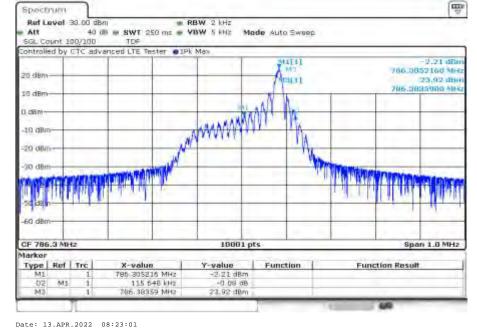
Date: 13.APR.2022 08:12:39







Plot 24: high channel (-26 dBc BW), spacing 15 kHz, 1@11 tones



© CTC advanced GmbH

CTC | advanced member of RWTÜV group

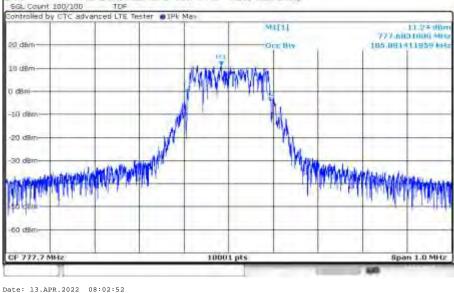
-Spectrum 0 dBm • RBW 2 kHz 40 00 • 8WT 250 ms • VBW 5 kHz Ref Level 30.00 dBm Att Mode Auto Sweep SGL Count 100/100 TOP ied by CTC advanced LTE Tester @IPk Max MIETI 11.24 # 20 dBm OCT BIN 10 dBri U dB -aŭ di 20 6

Plot 25: low channel (99% - OBW), spacing 15 kHz, 12@0 tones

Plot 26: low channel (-26 dBc BW), spacing 15 kHz, 12@0 tones

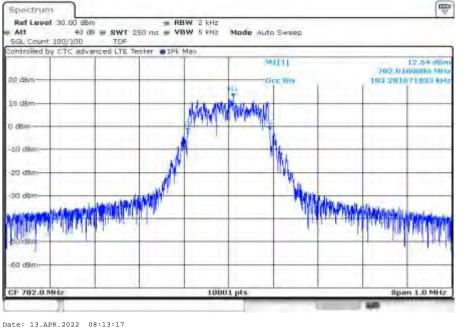
-Spectrum Ref Level 30.00 dB RBW 2 HHz 40 db # 8WT 250 ms # VBW 5 HHz 100 TOF Att Mode Auto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . IPk Max MITTI 14,03 dB 777,5802210 MHz 11,97 dbo 20 dB MELL 777.6101100 404 10 d8 O CB -10 df 20 08 30 d Ministration 7114 -60 dBm CF 777.7 MHz 10001 pts Span 1.0 MHz Marke Y-value -14.03 dBm -0.60 dB 11.97 dBm X-value 777 580224 MHz 249,28 kHz 777,61911 MHz Type | Ref | Trc Function Function Result M3

Date: 13.APR.2022 08:03:21

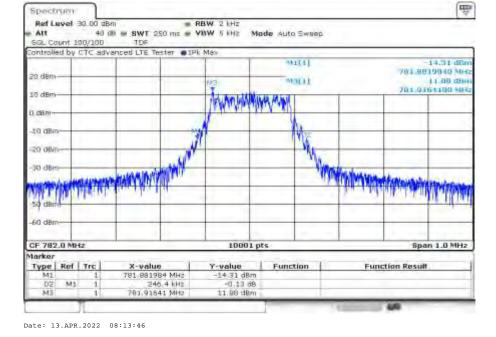




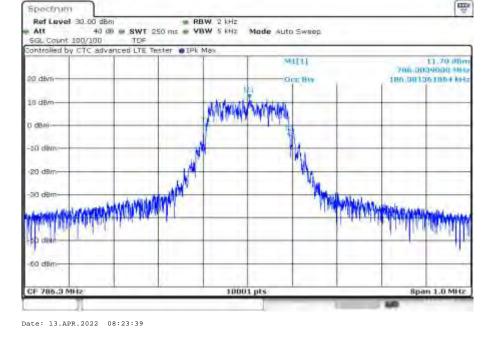
Plot 28: mid channel (-26 dBc BW), spacing 15 kHz, 12@0 tones



Plot 27: mid channel (99% - OBW), spacing 15 kHz, 12@0 tones







Plot 29: high channel (99% - OBW), spacing 15 kHz, 12@0 tones

Plot 30: high channel (-26 dBc BW), spacing 15 kHz, 12@0 tones

Spectrum



-

Ref Level 30.00 dB RBW 2 HHz 40 db # 8WT 250 ms # VBW 5 HHz 100 TDF Att Mode Auto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . IPk Max MITSI 14,96 dfl 766.183232d MHz 20 de MULT 11.47 (11) Nie and rood Me 10 d8 MW O CB -10 di 20.0 No MANAMA 60 di CF 786.3 MHz 10001 pts Span 1.0 MHz Markei X-value 785 183232 MHz 245,76 kHz 786,3031 MHz Type | Ref | Tro Y-value Function Function Result -14 96 dBm -0.61 dB 11.47 dBm M3

Date: 13.APR.2022 08:24:08



17 Observations

No observations except those reported with the single test cases have been made.



18 Glossary

EUT	Equipment under text			
EUT	Equipment under test Device under test			
DUT				
UUT	Unit under test			
GUE	GNSS User Equipment			
ETSI	European Telecommunications Standards Institute			
EN	European Standard			
FCC	Federal Communications Commission			
FCC ID	Company Identifier at FCC			
IC	Industry Canada Draduet marketing name			
PMN	Product marketing name			
HMN	Host marketing name			
HVIN	Hardware version identification number			
FVIN	Firmware version identification number			
EMC	Electromagnetic Compatibility			
HW	Hardware			
SW	Software			
Inv. No.	Inventory number			
S/N or SN	Serial number			
C	Compliant			
NC	Not compliant			
NA	Not applicable			
NP	Not performed			
PP	Positive peak			
QP	Quasi peak			
AVG	Average			
00	Operating channel			
OCW	Operating channel bandwidth			
OBW	Occupied bandwidth			
OOB	Out of band			
DFS	Dynamic frequency selection			
CAC	Channel availability check			
OP	Occupancy period			
NOP	Non occupancy period			
DC	Duty cycle			
PER	Packet error rate			
CW	Clean wave			
MC	Modulated carrier			
WLAN	Wireless local area network			
RLAN	Radio local area network			
DSSS	Dynamic sequence spread spectrum			
OFDM	Orthogonal frequency division multiplexing			
FHSS	Frequency hopping spread spectrum			
GNSS	Global Navigation Satellite System			
C/N ₀	Carrier to noise-density ratio, expressed in dB-Hz			
0,110				

19 Document history

Version	Applied changes	Date of release
-/-	Initial release	2022-04-14

20 Accreditation Certificate – D-PL-12076-01-04



Note: The current certificate annex is published on the websites (link see below).

https://www.dakks.de/files/data/as/pdf/D-PL-12076-01-04e.pdf

or

https://ctcadvanced.com/app/uploads/2020/06/D-PL-12076-01-04_Canada_TCEMC.pdf

21 Accreditation Certificate – D-PL-12076-01-05

first page	last page
Deutsche Akkreditierungsstelle GmbH	Deutsche Akkreditierungsstelle GmbH
Entrusted according to Section B subsection 1 Additional To convertion with Version L subsection 3 add/stelevelby Signature In the Middlalieral Agreements of DA, HAC and HE For Matual Recognition Accoreditation	Office-Bindly Office-State/State Man: Office-Franceshiering (performance ID Stream-State NT Stateshiering) (ball Theory 600 Therefore are Man State Stateshiering)
The Describe Advertises againste Großer arrests that the testing Walanatury CTC advances SimbH Unterfückbeinner Straßle 6-10, 661137 Sourbelicken Is cooperatoria valer the terms of DNI UN 60/015 37015 2018 to compare to favore in the belowing relator	
Talecommunication (FCC Requirements)	The publication of economic of the accordance partition in subject to be publication of economical by the publication of economics of the accordance partition is subject by a subject partition of experime disagnation of the control stress of the subject partition of the accordance to one profiles of economics of for improvement of a location them in the accordance to one partition between the scores of the improvement of the testing of the two accordance to one partition between the scores of the improvement of the testing of the testing of the accordance to one partition between the scores of the improvement of the testing of the testing of the accordance to one partition between the scores of the score
The accreditation tertificate shall only again in connection with the risting of accreditation of 03 DO-2020 with the accreditation number 0.5%, (2006) A comptonic the account dust, the reverse statis of the accerditation and the following review with miles (0.5% pages).	second backs preventions for black." The accelerations visate prevention of the second secon
Hagitterion number of the constructs B-R-12004-01 di	The op-Gackets party or reaction by take in exercised from the following velocities (A). We would be appreciate to the following of the second s
Via pretrame tangents with the prime influence in an accurate the reason of the same in state. This is preservation of the same in- state pretrame tank is the object of the influence of an endowed in the same prime influence distribution of the prime influence in the same in the same i	

Note: The current certificate annex is published on the websites (link see below).

https://www.dakks.de/files/data/as/pdf/D-PL-12076-01-05e.pdf

or

https://ctcadvanced.com/app/uploads/2020/06/D-PL-12076-01-05_TCB_USA.pdf