13 Summary of measurement results

\boxtimes	No deviations from the technical specifications were ascertained
	There were deviations from the technical specifications ascertained
	This test report is only a partial test report. The content and verdict of the performed test cases are listed below.

CTC I advanced

TC identifier	Description	verdict	date	Remark
RF-Testing	FCC: CFR Part 2 & Part 24 ISED: RSS-Gen, Issue 5	See table!	2022-04-14	-/-
	RSS 133, Issue 6 & SRSP-510, Issue 5			

13.1 Part 24/RSS-133: LTE band 2

Test Case	temperature conditions	power source voltages	С	NC	NA	NP	Remark
RF Output Power	Nominal	Nominal	\boxtimes				-/-
Frequency Stability	Extreme	Extreme	\boxtimes				-/-
Spurious Emissions Radiated	Nominal	Nominal	\boxtimes				-/-
Spurious Emissions Conducted	Nominal	Nominal	\boxtimes				-/-
Block Edge Compliance	Nominal	Nominal	\boxtimes				-/-
Occupied Bandwidth	Nominal	Nominal	\boxtimes				-/-

Notes:



14 RF measurements

14.1 Description of test setup

For the spurious measurements we use the substitution method according TIA/EIA 603.

14.2 Results LTE band 2

The EUT was set to transmit the maximum power.

14.2.1 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 C & 7.4 setup A		
Measurement uncertainty:	See chapter 9		
Measurement procedure:	FCC: § 2.1046 ISED: RSS-Gen, 6.12		



<u>Limits:</u>

FCC	ISED			
\$ 24.232(c)	RSS-133, 6.4 (referring to: SRSP-510, Issue 5)			
(c) Mobile and portable stations are limited to 2	SRSP-510, 5.1: Mobile stations and hand-held			
watts EIRP and the equipment must employ a	portables are limited to 2 watts maximum e.i.r.p.			
means for limiting power to the minimum necessary	RSS-133, 6.4: In addition, the transmitter's peak-to-			
for successful communications.	average power ratio (PAPR) shall not exceed 13 dB			
(d) In measuring transmissions in this band using an	for more than 0.1% of the time using a signal			
average power technique, the peak-to-average ratio	corresponding to the highest PAPR during periods of			
(PAR) of the transmission may not exceed 13 dB.	continuous transmission.			
Power: 33 dBm EIRP				
PAPR: 13 dB				



Results:

Sub-Carrier	Modulation	Number	Average Output Power [dBm] Channel No / Frequency [MHz]		Peak to Average Ratio [dB] Channel No / Frequency [MHz]			
[kHz]		Tones	18601 / 1850.1	18900 / 1880.0	19199 / 1909.9	18601 / 1850.1	18900 / 1880.0	19199 <i>/</i> 1909.9
3.75 -	DDOI/	1T0	19.82	19.75	19.77	1.97	2.00	1.94
	BPSK	1T47	19.79	19.60	19.74	1.94	0.32	8.20
	QPSK	1T0	19.85	19.69	19.83	1.68	0.32	0.29
		1T47	19.79	19.68	19.73	0.32	1.62	1.59
15	BPSK	1T0	19.81	19.72	19.60	1.71	1.65	1.62
		1T11	19.49	19.71	19.90	1.59	1.68	1.65
	QPSK	1T0	19.79	19.91	19.91	1.59	1.59	1.57
		1T11	19.72	19.60	19.76	0.52	0.46	0.49
		12T0	18.05	17.86	17.93	5.71	5.91	5.77

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

Output Power (EIRP)						
Sub-Carrier Spacing [kHz]	Frequency (MHz)	Average Output Power (dBm) BPSK	Average Output Power (dBm) QPSK			
	1850.1	20.32	20.35			
3.75	1880.0	20.95	20.89			
	1909.9	22.77	22.83			
	1851.1	20.31	20.29			
15	1880.0	20.92	21.11			
	1909.9	22.90	22.91			



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 9400 (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.

Measurement:

Measurement parameters			
Detector:			
Sweep time:			
Video bandwidth:	Macourad with CMW/E00		
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		

<u>Limits:</u>

FCC	ISED		
§ 24.235	RSS-133, 6.3		
The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.	The carrier frequency shall not depart from the reference frequency, in excess of ±2.5 ppm for mobile stations and ±1.0 ppm for base stations.		
± 2.5 ppm (ISED only)			



<u>Results:</u>

AFC FREQ ERROR versus VOLTAGE

Voltage (V)	Frequency Error (Hz)	Frequency Error (ppm)
3.2	-27	-0.0144
3.6	-27	-0.0144
4.0	-27	-0.0144

AFC FREQ ERROR versus TEMPERATURE

Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)
-30	25	0.0133
-20	30	0.0160
-10	33	0.0176
± 0	26	0.0138
10	-62	-0.0330
20	-27	-0.0144
30	-44	-0.0234
40	-57	-0.0303
50	-66	-0.0351



14.2.3 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. The resolution bandwidth is set as outlined in Part 24.238. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the LTE band II.

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 7.1 setup A & 7.2 setup B					
Measurement uncertainty:	See chapter 9					
Measurement procedure	FCC: § 2.1053 ISED: RSS-Gen, 6.13					

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



<u>Limits:</u>

FCC	ISED
§ 24.238 (a) & (b)	RSS-133, 6.5
 (a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. (b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. 	In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log(P) (watts). After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log(P) (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.
-13	dBm



Results:

BPSK:

SPURIOUS EMISSION LEVEL								
LOWEST C	HANNEL	MIDDLE C	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 EMISSION LEVEL								
LOWEST C	HANNEL	MIDDLE C	HANNEL	HIGHEST CHANNEL				
Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]			
-/-		All detected emis than 20 dB be	ssions are more low the limit.	-/-				
-/-	-/-	-/-	-/-	-/-	-/-			
-/-	-/-	-/-	-/-	-/-	-/-			



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<u>BPSK</u>





Plot 2: Mid channel (30 MHz – 1 GHz)





CTC I advanced

Plot 3: Mid channel (1 GHz – 18 GHz)



Carrier notched with 1.9 GHz rejection filter





Date: 24.00H.2022 07:05:52





<u>QPSK</u>





Plot 2: Mid channel (30 MHz – 1 GHz)





CTC I advanced

Plot 3: Mid channel (1 GHz – 18 GHz)



Carrier notched with 1.9 GHz rejection filter





Date: 24.MAH.2022 07:55:23



14.2.4 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:	30 MHz – 19.5 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				

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



<u>Limits:</u>

FCC	IC
§ 24.238 (a) & (b)	RSS-133, 6.5
 (a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. (b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. 	In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log(P) (watts). After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log(P) (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.
-13 (dBm



Results:

BPSK:

SPURIOUS EMISSION LEVEL								
Harmonic	Lowest channel Freq. (MHz)	Level [dBm]	Harmonic	Middle channel Freq. (MHz)	Level [dBm]	Harmonic	Highest channel Freq. (MHz)	Level [dBm]
2	3700.2	-/-	2	3760.0	-/-	2	3819.8	-/-
3	5550.3	-/-	3	5640.0	-/-	3	5729.7	-/-
4	7400.4	-/-	4	7520.0	-/-	4	7639.6	-/-
5	9250.5	-/-	5	9400.0	-/-	5	9549.5	-/-
6	11100.6	-/-	6	11280.0	-/-	6	11459.4	-/-
7	12950.7	-/-	7	13160.0	-/-	7	13369.3	-/-
8	14800.8	-/-	8	15040.0	-/-	8	15279.2	-/-
9	16650.9	-/-	9	16920.0	-/-	9	17189.1	-/-
10	18501.0	-/-	10	18800.0	-/-	10	19099.0	-/-

<u>QPSK:</u>

SPURIOUS EMISSION LEVEL								
Harmonic	Lowest channel Freq. (MHz)	Level [dBm]	Harmonic	Middle channel Freq. (MHz)	Level [dBm]	Harmonic	Highest channel Freq. (MHz)	Level [dBm]
2	3700.2	-/-	2	3760.0	-/-	2	3819.8	-/-
3	5550.3	-/-	3	5640.0	-/-	3	5729.7	-/-
4	7400.4	-/-	4	7520.0	-/-	4	7639.6	-/-
5	9250.5	-/-	5	9400.0	-/-	5	9549.5	-/-
6	11100.6	-/-	6	11280.0	-/-	6	11459.4	-/-
7	12950.7	-/-	7	13160.0	-/-	7	13369.3	-/-
8	14800.8	-/-	8	15040.0	-/-	8	15279.2	-/-
9	16650.9	-/-	9	16920.0	-/-	9	17189.1	-/-
10	18501.0	-/-	10	18800.0	-/-	10	19099.0	-/-



Plots: BPSK

Plot 1: Lowest Channel (10 MHz - 19.5 GHz), spacing 3.75 kHz, 1@0 tones



Plot 2: Middle Channel (10 MHz - 19.5 GHz), spacing 3.75 kHz, 1@0 tones







Plot 3: Highest Channel (10 MHz - 19.5 GHz), spacing 3.75 kHz, 1@0 tones

Plot 4: Lowest Channel (10 MHz - 19.5 GHz), spacing 3.75 kHz, 1@47 tones







Plot 5: Middle Channel (10 MHz - 19.5 GHz), spacing 3.75 kHz, 1@47 tones

Plot 6: Highest Channel (10 MHz - 19.5 GHz), spacing 3.75 kHz, 1@47 tones







Plot 7: Lowest Channel (10 MHz - 19.5 GHz), spacing 15 kHz, 1@0 tones

Plot 8: Middle Channel (10 MHz - 19.5 GHz), spacing 15 kHz, 1@0 tones







Plot 9: Highest Channel (10 MHz - 19.5 GHz), spacing 15 kHz, 1@0 tones

Plot 10: Lowest Channel (10 MHz - 19.5 GHz), spacing 15 kHz, 1@11 tones







Plot 11: Middle Channel (10 MHz - 19.5 GHz), spacing 15 kHz, 1@11 tones

Plot 12: Highest Channel (10 MHz - 19.5 GHz), spacing 15 kHz, 1@11 tones





Plots: QPSK

Plot 1: Lowest Channel (10 MHz - 19.5 GHz), spacing 3.75 kHz, 1@0 tones



Plot 2: Middle Channel (10 MHz - 19.5 GHz), spacing 3.75 kHz, 1@0 tones







Plot 3: Highest Channel (10 MHz - 19.5 GHz), spacing 3.75 kHz, 1@0 tones

Plot 4: Lowest Channel (10 MHz - 19.5 GHz), spacing 3.75 kHz, 1@47 tones







Plot 5: Middle Channel (10 MHz - 19.5 GHz), spacing 3.75 kHz, 1@47 tones

Plot 6: Highest Channel (10 MHz - 19.5 GHz), spacing 3.75 kHz, 1@47 tones







Plot 7: Lowest Channel (10 MHz - 19.5 GHz), spacing 15 kHz, 1@0 tones

Plot 8: Middle Channel (10 MHz - 19.5 GHz), spacing 15 kHz, 1@0 tones







Plot 9: Highest Channel (10 MHz - 19.5 GHz), spacing 15 kHz, 1@0 tones

Plot 10: Lowest Channel (10 MHz - 19.5 GHz), spacing 15 kHz, 1@11 tones







Plot 11: Middle Channel (10 MHz - 19.5 GHz), spacing 15 kHz, 1@11 tones

Plot 12: Highest Channel (10 MHz - 19.5 GHz), spacing 15 kHz, 1@11 tones







Plot 13: Lowest Channel (10 MHz - 19.5 GHz), spacing 15 kHz, 12@0 tones

Plot 14: Middle Channel (10 MHz - 19.5 GHz), spacing 15 kHz, 12@0 tones







Plot 15: Highest Channel (10 MHz - 19.5 GHz), spacing 15 kHz, 12@0 tones



14.2.5 Block edge compliance

Description:

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

Measurement:

Measurement parameters					
Detector:	RMS				
Sweep time:	180 sec.				
Video bandwidth:	100 kHz				
Resolution bandwidth:	20 kHz				
Span:	1 MHz steps				
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				

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



<u>Limits:</u>

FCC	ISED				
§ 24.238 (a) & (b)	RSS-133, 6.5				
 (a) The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. (b) Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. 	In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log(P) (watts). After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log(P) (watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.				
-13	dBm				
Correction factor according to KDB 890810 if RBW < 1 % emission bandwidth: N/A here					



Results: BPSK

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

Spect	rum	L	****			0	
Ref Li Att SGL Co	evel ount 1	10.00 d8 30 (/1	IM ● R IB ● SWT 180 s ● V TDF	BW 20 kHz BW 100 kHz MM	ade Auto Sweep		
Controlle	ad by	CTC adv	anced LTE Tester, Test	Case Verdict: PAS	SS 🔮 1Rm Max		
0.d6m-	-				M1[1]	-35,15 dB 1,849998208 69 -41,63 dB	
-10 dBn	1			-		1.849500000 GH	
ob dBe						11.20 TAB 2340 TAB	
-zo una							
-30 dBr	n			-			
-40 dBc	_					Ma	
10 921				M4		M3	
-50 dBrt	100			Concession of the local division of the loca		and an	
and the second	A COLOR	Libraria	and the second	and house and the	boatter training and		
70 480	an an	man	In the second second second second	111111111111111111111111111111111111111	turnarth annual		
-70 080	1						
-BO dBr	0						
1.02.000	1						
Start 1	.845	GHz		10001 pt	s	Stop 1.85 GH	
larker							
Type	Ref	Trc	X-value	Y-value	Function	Function Result	
M1	0.1001	1	1.849998208 GHz	~35.15 dBm			
M2	_	1	1.8495 GHz	~41.63 dBm	8and Power	-24.57 dBm	
MS		1	1.8405 GH2	-51.55 dBm	Band Power	-31,91 d8n	
. M4		1	1.0475 GHZ	-51.79 dism	Band Power	-35.91 den	
MC			1.0403 /0415	-p+,+5 upm	STATIC POWER	-30.43 UDI	
MS M6		1	1.8455 GHz	~56.07 dBm	Band Dower	-40.25 dBn	

Date: 1.APR.2022 08:48:30

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



Date: 1.APR.2022 13:16:36

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

Spectrum

. RBW Ref Level 10.00 dan 20 kHz 30 dB ... SWT 180 c ... VBW 100 kHz Mode Auto Sweep Att Count 1/1 TDF SGL • 1Pm Max Controlled by CTC advanced LTE Tester. Test Case Verdict: Dass. M1[1] 35.45 dBr 1.910007296 GH 0.dBm M2[1] 46,58 dBr -10 dBm 1.910500000 GH -20 dBm 30 dBm -day day Contraction of -80 dBm-Stop 1.915 GHz Start 1.91 GHz 10001 pts Marker Type | Ref | Trc x-value Y-value Function **Function Result** 1.910007296 GHz 1.9105 GHz 1.9115 GHz -Value -35.45 dBm -46.58 dBm -54.11 dBm -56.07 dBm -54.78 dBm M1 M2 M3 -24.75 dBm -31.92 dBm -35.74 dBm -36.23 dBm Band Power Band Power Band Power Band Power 9125 GHz 9135 GHz M4 MS Band Power 1.9145 GHz -55.99 dBm M6 -40.08 d8m 6.00

Date: 1.APR.2022 13:33:02

Spectrum Ref Level 10.00 dam . RBW 20 kHz Att 30 dB 👄 SWT 180 s 👄 VBW 100 kHz Mode Auto Sweep SGL Count 1/1 TDE Controlled by CTC advanced LTE Tester, Test Case Verdict: PASS @1Pm Max M1[1] -02.27 dBr 1.849998720 GH 0.dBm M2[1] -42,40 dBr 10 dBm 1.849500000 GH -20 dBm 30 dBm-40 dBm-50 dBm-Intriduction of the local data in the -70 d8m--80 dBm Start 1.845 GHz 10001 pts Stop 1.85 GHz Marker
 Type
 Ref
 Trc

 M1
 1

 M2
 1
 X-value 84999872 GHz 1.8495 GHz Y-value -37.27 dBm -42.40 dBm Function **Function Result** Band Power -26.05 dBm 1.8405 GHz 1.8475 GHz 1.8465 GHz -49.86 dBm -51.65 dBm -54.68 dBm Band Power Band Power -32.54 d8m -36.28 d8m MS M4 Band Power Band Power -38.66 dBm MS M6 8455 GHz -56.24 dBm 40.42 dBm 440

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

Date: 1.APR.2022 09:04:53

CTC | advanced

CEER ▽



Spectrum						inter ↓
Ref Level Att SGL Count 1	10.00 d8 30 d	m ● Rf dB ● SWT 180 c ● VI TDF	3W 20 kHz BW 100 kHz Mk	ade Auto Sweep		ί.
Controlled by	CTC adv	anced LTE Tester, Test	Case Verdict: PAS	SS 🔵 1 Rm Max		
0.dBm				M1[1] M2[1]	W.	-48.77 dBn 1.849991808 GH -61.24 dBn 1.849500000 GH
-20 dBm						
-40 dBm			104		-	In the second second
-70 dBm						
Start 1.845	GHz		10001 pt	s		Stop 1.85 GHz
Marker		100000000000000000000000000000000000000			5-57457	
Type Ref M1	Trc 1	X-value 1.849991808 GHz	+48.77 dBm	Function	Fun	ction Result
M2 M3	1	1.8495 GHz 1.8465 GHz	-61.24 dBm -65.03 dBm	Band Power Band Power	-40.16 dBm -45.10 dBm	
MS M6	1 1	1.8465 GHz 1.8465 GHz 1.8455 GHz	-63.97 dBm -65.12 dBm	Band Power Band Power Band Power		-47.56 dBm -48.03 dBm
	1				VIII III	640

Date: 1.APR.2022 09:54:14

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





CTC I advanced

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

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

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

Spectrum
Ref Level 10.00 dBm PBW 20 kHz
Att 30 dB SWT 100 s VBW 100 kHz Mode Auto Sweep
SGL Count 1/1 TDF
Controlled hu CTC advacced LTE Textor, Text Care Martint, DASS 100 MBy

Controlled by CTC advanced LTE Tester, Test Case Verdict: PASS @1Pm Max M1[1] 48,73 dBr 1.910000256 GH 0.dBm M2[1] -60.51 dBr 10 dBm 1.910500000 GH -20 dBm 30 dBm-40 dBmd dBm--70 dBm--80 dBm Start 1.91 GHz 10001 pts Stop 1.915 GHz Marker X-value 910000256 GHz 1.9105 GHz 1.9115 GHz 1.9125 GHz 1.9135 GHz
 Type
 Ref
 Trc

 M1
 1

 M2
 1
 Y-value -48.73 dBm -60.51 dBm Function **Function Result** -40.14 dBm -45.43 dBm -47.15 dBm -47.72 dBm Band Power 63.36 dBm 63.93 dBm Band Power Band Power M3 M4 Band Power Band Power 64.60 dBm MS M6 .9145 GHz 64.53 dBm -48.03 d8m 440

Date: 1.APR.2022 14:39:07







<u>Results:</u> QPSK

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

Spectrum						1000
Ref Level Att SGL Count 1	10.00 de 30	am Pa dB = SWT 180 s = VI TDF	BW 20 kHz BW 100 kHz Mk	ade Auto Sweep	2	
ontrolled by	CTC adv	anced LTE Tester, Test	Case Verdict: PAS	SS 🔵 1 Rm Max		
0.dBm				M1[1] M2[1]	Ŧ	-05.40 dBn 1.849973248 GH -46.80 dBn 1.849500000 GH
-20 dBm						,
-40 dBm			- M4		1	
-70 dlim	edmat a	an an an a bha an ta an	in the second second	ther test test to the test of test	ain ibéte	
80 dBm						
Start 1.845	GHz		10001 pt	5		Stop 1.85 GHz
larker Type Ref	Trc	X-value	Y-value	Function	Fu	nction Result
M1 M2	1	1.849973248 GHz 1.8495 GHz	~35.40 dBm ~46.80 dBm	Band Power	-25,46	
M3 M4	1	1.8485 GHz 1.8475 GHz	-47.96 dBm -51.48 dBm	Band Power Band Power		-32.61 d8m -36.76 d8m
M5 M6	1	1.8455 GHz	-58.75 dBm -59.98 dBm	Band Power		-40.98 dBm
	1				- UIIIII	640

Date: 1.APR.2022 09:21:16

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

	and the second					
Ref Level	10.00 d	âm 👄 Rê	W 20 kHz	100000000000000000000000000000000000000		
SCL Count 1	4	dB SWI 180 S VI	SW 100 KHZ MK	ode Auto Sweep		
Controlled by	CTC ad	vanced LTE Tester, Test	Case Verdict: PAS	SS @ 18m Max		
Í				M1[1]		-37,44 dBm
0.dBm-				(1997)		1.910006272 GH
				ME2[1]		-49.32 dBn
-10 d8m			-			1.910500000 GH
-20 dBm						
×						
130 dBm			-		-	
AD ME	-					
dia	-	A second second	7.44			
APRIL PROPERTY		and the second se	10.00			
	The second second		the second se		MD .	
-60 dBm		Bill fillt fillt torre ter eine			210	- P
-60 dBm						rege Tribpeendatie worden verweer verwee
-60 dBm		HAULUNTERIN				
-60 dBm	IIIIT	H ÚTOLOŬ TROF	and the second second	nation and a data	no Nimar	
-60 dBm -70 dBm -80 dBm	IIIIT		THE COLOUR DESIGN	neder over och och o	MUCH MANAN	
-00 dBm -70 dBm -80 dBm Start 1.91 G	Hz		10001 pt		nds Intil Hilf Andra T	Stop 1.915 GHz
-60 dBm -70 dBm -80 dBm Start 1.91 G Marker	Hz	TE TE TORINGE DE LE TE	10001 pt	nin omn		Stop 1.915 GHz
-60 dBm -70 dBm -80 dBm Start 1.91 G Marker Type Ref	Hz	X-value	10001 pt	s		Stop 1.915 GHz
-60 dBm -70 dBm -80 dB	Hz Trc	X-volue 1.910006272 GHz	10001 pt Y-value -37.44 dBm	s	F	Stop 1.913 GHz
-00 dBm -70 dBm -80 dBm Stort 1.91 G Marker Type Ref M1 M2	Hz	X-value 1.91006222 GHz 1.9185 GHz	10001 pt -27.44 dBm -43.32 dBm	Is Function Band Power	F)	Stop 1.915 GHz unction Result -26.96 dBm
-60 dBm -70 dBm -80 dBm -80 dBm Marker Type Ref M1 M2 M3	Hz 1 1	X-value 1.910006272 GHz 1.9105 GHz 1.9115 GHz	10001 pt -17.44 dBm -43.32 dBm -57.25 dBm	S Function Band Power Band Power	FIS	Stop 1.915 GHz unction Result -26.96 dBm -33.33 dBm
-00 dBm -70 dBm -80 dBm -80 dBm Stort 1.91 G Marker Type Ref M1 M2 M3 M4	Hz 1 1 1	X-value 1.910006272 GHz 1.9105 GHz 1.9115 GHz 1.9125 GHz	10001 pt -37.44 dBm -43.32 dBm -57.25 dBm -52.35 dBm	Es Function Band Power Band Power Band Power	F	Stop 1.915 GHz unction Result -26.96 dBm -33.33 dBm -36.89 dBm
-60 dBm -70 dBm -80 dBm -80 dBm Stort 1.91 G Marker Type Ref M1 M2 M3 M4 M5 M6	Hz 1 1 1 1	X-value 1.91006272 GHz 1.9105 GHz 1.9115 GHz 1.9125 GHz 1.9125 GHz 1.9135 GHz 1.9135 GHz	10001 pt -37.44 dBm -43.32 dBm -57.25 dBm -52.35 dBm -56.59 dBm -56.59 dBm	Function Band Power Ba	FT	Stop 1.915 GHz unction Result -26.96 dBm -36.89 dBm -99.24 dBm -99.24 dBm -90.24 dBm

Date: 1.APR.2022 13:49:28

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

Ref Level 10.00 dan

Spectrum

30 dB 👄 SWT 180 s 👄 VBW 100 kHz Mode Auto Sweep Att Count 1/1 TDF SGL • 1Pm Max Controlled by CTC advanced LTE Tester. Test Case Verdict: Dass. M1[1] 37,40 dB 1.849991808 GH 0.dBm M2[1] 42.09 dBr -10 dBm 1.849500000 GH -20 dBm 30 dBm 40 dBm 50 dBm--70 d8m--BO dBm Stop 1.85 GHz Start 1.845 GHz 10001 pts Marker Type | Ref | Trc X-value Y-value Function **Function Result** X-Value 1.849991808 GHz 1.8495 GHz 1.8465 GHz 1.8475 GHz 1.8465 GHz M1 M2 M3 -37.40 dBm -42.99 dBm -53.24 dBm -27.03 dBm -33.57 dBm -37.29 dBm -39.62 dBm Band Power Band Power Band Power Band Power 56.60 dBm 54.47 dBm M4 MS 1.8455 GHz Band Power M6 -56.10 dBm -41.32 dBm 640

. RBW

20 kHz

Date: 1.APR.2022 09:37:39

Spectrum Ref Level 10.00 dam . RBW 20 kHz Att 30 dB 👄 SWT 180 s 👄 VBW 100 kHz Mode Auto Sweep SGL Count 1/1 TDE Controlled by CTC advanced LTE Tester, Test Case Verdict: PASS @1Pm Max M1[1] 35,51 dBr 1.910005248 GH 0.dBm M2[1] -41.26 dBr 10 dBm 1.910500000 GH -20 dBm 30 dBmat los -60 dBm - Minister -70 dBm -BO dBm-Start 1.91 GHz 10001 pts Stop 1.915 GHz Marker Y-value -35.51 dBm -41.26 dBm -52.70 dBm -51.66 dBm -53.80 dBm -53.80 dBm X-value 910005248 GHz 1.9105 GHz 1.9115 GHz 1.9125 GHz 1.9135 GHz
 Type
 Ref
 Trc

 M1
 1

 M2
 1
 Function **Function Result** -25.62 dBm -32.79 dBm -36.57 dBm -39.03 dBm Band Power Band Power Band Power MS M4 Band Power Band Power MS M6 .9145 GHz 58.97 dBm 40.82 dBm 440

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

Date: 1.APR.2022 14:05:54



CEER ▽

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

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

Spectrum Ref Level 10.00 dam

SGL Count 1/1

Att

Date: 1.APR.2022 10:26:59

0.dBm- -10 dBm -20 dBm -30 dBm					ME	2[1]		1.910006272 GH2 -60,86 dBm 1.910500000 GH3
-70 dBm -70 dBm -80 dBm	ME	-			L engrisses	A		N.
Start 1	91 G	Hz		10001 p	ts			Stop 1.915 GHz
Marker		a construction of the	100000000000000000000000000000000000000	2000-000-00	- 45699	ause ari	1000	
Type	Ref	Trc	X-value	Y-value	Fund	tion	Fun	ction Result
M1		1	1.910006272 GHz	~49.76 dBm				
M2		1	1.9105 GHz	~60.86 dBm	8-and 4	Power		-40.63 dBm
MS		1	1.9115 GHz	~63.52 dBm	Band i	Power		-46.24 dBm
M4		1	1.9125 GHz	~64.53 dBm	8 and 9	Power		-47.57 d8m
MS		1	1.9135 GHz	-64.91 dBm	Band 8	Power		-47.99 dBm
M6		1	1.9145 GHz	~65.21 dBm	Band I	Power		-48.22 dBm
		1			-			4.80

. RBW

30 dB 🖷 SWT 180 s 🖷 VBW 100 kHz

Controlled by CTC advanced LTE Tester, Test Case Verdict: PASS @1Rm Max

TDF

20 kHz

Mode Auto Sweep

M1[1]



member of RWTÜV group

CEES ▽

-49.76 dBr 1.910006272 GH

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

Spectrum

Start 1.845 GHz Marker Type | Ref | Trc |

M1 M2 M3

M4 MS M6

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

Date: 1.APR.2022 10:43:22

Spect	eum.	11							
Ref Li Att SGL Co	evel iunt 1	10.00 da 30 d	m PR B SWT 180 S V TDF	BW 20 kHz BW 100 kHz M	tode Aut	o Sweep			
Controlle	ad by	CTC adv	anced LTE Tester, Test	Case Verdict: PA	SS @1Pm	Ман			
0 dBm-	,				M	1(1) 7(1)	Ψ.	-49,50 1.910010752 -60.00 1.910500000	dBr dBr dBr dBr
-20 dBn -30 dBn -40 dBn									
ng dan	MR		Ля	14a		- 1	-		
-70 ditri -80 ditri	+								
Start 1	.91 G	Hz		10001 p	ets.			Stop 1.915	GHz
Marker			2002/2011/11 02		a	1005-0-	2010		
Type	Ref	Trc	X-value	Y-value	Fund	tion	E	unction Result	
M1		1	1.910010752 GHz	~49.50 dBm	10000	10.0			
M2		1	1.9105 GHz	~60.00 dBm	8and 4	Power	-40.2		dêm
M3		1	1.9115 GHz	-62.94 dBm	Band	POWEr	-46.0		dBm
M4		1	1.9125 GHz	~64.22 dBm	Band	Power	-47.1		47.52 d8m
MS		1	1.9135 GHz	-65.02 dBm	Band i	Power		-47.96	dBm
M6	-	1	1.9145 GH2	+64.90 dBm	Band	POWER		-48.21 (dBm
		1					- COLUMN	6,40	

X-value

X-Value 1.849993728 GHz 1.8495 GHz 1.8465 GHz 1.8465 GHz 1.8455 GHz

10001 pts

-49,44 dBm -61,37 dBm -64,25 dBm -65,23 dBm -64,38 dBm

-65.43 dBm

Function

Band Power Band Power Band Power Band Power Band Power

Y-value



49,44 dBr

and the first of the

Stop 1.85 GHz

-40.42 dBm -46.02 dBm -47.62 dBm -47.93 dBm -48.25 dBm

M

Function Result

640

Plot 7: Lowest channel, spacing 15 kHz, 12@0 tones

Plot 8: Highest channel, spacing 15 kHz, 12@0 tones

Ref Level 10.00 dam

Spectrum

Att SGL Count 1/1

0.dBm

-10 dBm -20 dBm-30 dBm-40 dBm 50 dBm--obta -70 d8m--BD dBm-Start 1.91 GHz 10001 pts Marker X-value 1.910011776 GHz 1.9105 GHz 1.9115 GHz 1.9125 GHz 1.9135 GHz 1.0145 GHz Y-value -49.65 dBm -64.51 dBm -64.72 dBm -65.27 dBm -65.20 dBm -65.40 dBm Type | Ref | Trc Function Result Function M) M2 M3 M4 Band Power Band Power Band Power Band Power Band Power

0 dâm • RBW 20 kHz 30 dB • SWT 180 s • VBW 100 kHz

Controlled by CTC advanced LTE Tester, Test Case Verdict: PASS 👳 1Pm Max

TDF

Date: 1.APR.2022 15:28:24

MS M6

Att SGL Count 1	30 d	18	BW 100 kHz Mc	ide Auto Sweep		
Controlled by	CTC adv	anced LTE Tester, Test	Case Verdict: PAS	SS 🔵 1 Pm Max		
0.dBm				M1[1]	-49,48 dB 1,849982720 di -63,63 dB	
-10 d8m		-	-		1.849500000 G	
-20 dBm-						
-30 dBm						
-40 dBm						
man data						
50 dBm						
-60 dBm	in the second	the second second			M2 M2	
-70 dBm						
-80 dBm		· · · · · · · · · · · · · · · · · · ·				
Start 1.845	GHz		10001 pt	5	Stop 1.85 GH	
Marker	37-341-141	22307/22022 02	35760 PM 201	202402301000 mil	5-1745-0244-1110-0440-1-4	
Type Ref	Trc	X-value	Y-value	Function	Function Result	
MI	1	1.84998272 GHz	⇒49,48 dBm			
M2	1	1.8495 GH2	+63.63 dBm	Band Power	-41.88 dB	
M3	1	1.0405 GH2	-65.50 dBm	Band Dower	-48.10 dBr	
MS	1	1.8465 GHz	-65.65 dBm	Band Power	-48.58 dBn	
M6	1	1.8455 GHz	~65.55 dBm	Band Power	-48.66 dBr	
MB	1	1.8455.GH2	-65.55 dBm	Band Power	-48.66 dBn	

Mode Auto Sweep

M1[1]

M2[1]

49,65 dBr 1.910011776 GHz -64.51 dBm 1.910500000 GHz

Stop 1.915 GHz

-42.49 dBm -48.12 dBm -48.45 dBm -48.55 dBm -48.63 dBm

6,00





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 extreme and mid frequencies of the LTE band II frequency band. The table below lists the measured 99% power and -26dBc occupied bandwidths. Spectrum analyzer plots are included on the following pages.

Measureme	ent 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
Reporti	ing only

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<u>Results:</u>

Occupied Bandwidth – BPSKMode99% OBW (kHz)-26 dBc BW (kHz)Low channel / spacing 3.75 kHz; 1@0 tones6240Mid channel / spacing 3.75 kHz; 1@0 tones5440High channel / spacing 3.75 kHz; 1@0 tones6538Low channel / spacing 3.75 kHz; 1@47 tones6438Mid channel / spacing 3.75 kHz; 1@47 tones6538High channel / spacing 3.75 kHz; 1@47 tones6338Low channel / spacing 3.75 kHz; 1@47 tones117118					
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	54	40			
High channel / spacing 3.75 kHz; 1@0 tones	65	38			
Low channel / spacing 3.75 kHz; 1@47 tones	64	38			
Mid channel / spacing 3.75 kHz; 1@47 tones	65	38			
High channel / spacing 3.75 kHz; 1@47 tones	63	38			
Low channel / spacing 15 kHz; 1@0 tones	117	118			
Mid channel / spacing 15 kHz; 1@0 tones	119	103			
High channel / spacing 15 kHz; 1@0 tones	120	102			
Low channel / spacing 15 kHz; 1@11 tones	127	113			
Mid channel / spacing 15 kHz; 1@11 tones	127	103			
High channel / spacing 15 kHz; 1@11 tones	120	115			

Occupied Ba	ndwidth – QPSK	
Mode	99% OBW (kHz)	-26 dBc BW (kHz)
Low channel / spacing 3.75 kHz; 1@0 tones	68	39
Mid channel / spacing 3.75 kHz; 1@0 tones	68	41
High channel / spacing 3.75 kHz; 1@0 tones	69	42
Low channel / spacing 3.75 kHz; 1@47 tones	68	39
Mid channel / spacing 3.75 kHz; 1@47 tones	67	39
High channel / spacing 3.75 kHz; 1@47 tones	69	39
Low channel / spacing 15 kHz; 1@0 tones	118	113
Mid channel / spacing 15 kHz; 1@0 tones	119	115
High channel / spacing 15 kHz; 1@0 tones	119	130
Low channel / spacing 15 kHz; 1@11 tones	119	118
Mid channel / spacing 15 kHz; 1@11 tones	122	130
High channel / spacing 15 kHz; 1@11 tones	123	117
Low channel / spacing 15 kHz; 12@0 tones	191	239
Mid channel / spacing 15 kHz; 12@0 tones	186	256
High channel / spacing 15 kHz; 12@0 tones	184	248



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 15:22:32

Raf Level 30.8 din + RMV 114c 40.00 = SMT 201 oc # RMV 114c Mode Add Second nt CTC Tenter #170 Pr 74 MA # LONGLED in. anal growing many many many many many many thripton! -" The stand stand of the property of the stand of the sta CP 1.00 GH

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

40 d8 • SWT 250 ms • V8W 5 kHz 100 TDF Att Mode Auto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . 1Pk Max M1[1] 2.08 dBr T MB 1.0798927360 GHz 23.99 dBm 20 dBr M3[1] 1.8799112100 GH 10 dB D dBr -10 dB -20 dBn and the second se Mile wanter 40 dBr -50 dBm -60 dBm-CF 1.88 GHz 10001 pts Span 1.0 MHz Marker X-value 1.879692736 GHz 40.192 kHz 1.87991121 GHz Y-value -2.08 dBm 0.06 dB 23.99 dBm Type | Ref | Trc Т Function **Function Result** M1 D2 M3 M1

Date: 13.APR.2022 15:33:49



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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

Date: 13.APR.2022 15:45:05

Spectrum

Ref Level 30.00 dBr BBW 2 kHz 40 d8 • SWT 250 ms • V8W 5 kHz 100 TDF Att Mode Auto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . 1Pk Max M1[1] 1.71 dB T MB 1.9091936000 GHz 24.46 dBm 20 dBr M3[1] 1,0002114100 GH 10 dB D dB -10 dB -20 dBr MIN/M New Manual Contractor No. of Concession, Name 40 dBr -50 dBm -60 dBm CF 1.9093 GHz 10001 pts Span 1.0 MHz Marker X-value 1.9091936 GHz 37.76 kHz 1.90921141 GHz Y-value -1.71 dBm 0.11 dB 24.46 dBm Type | Ref | Trc Т Function **Function Result** M1 D2 M3 M1



B



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

Date: 13.APR.2022 14:15:00

Spectrum Ref Level 30.00 dBr

Att

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

40 db ⊕ SWT 250 ms ⊕ VBW 5 kHz 100 TDF SGL Count 100/100 controlled by CTC advanced LTE Tester ●1Pk Max 21[1] 1.8507682560 GHz 23.95 dBm 20 dBr 111 1.8507891900 GH 10 dBr D dBn -10 dB -20 dBm and the second second second 30 dBm 40 dBm -50 dBm -60 dBm-CF 1.8507 GHz 10001 pts Marker X-value 1.850768256 GHz 38.016 kHz 1.85076819 GHz Type | Ref | Trc Y-value Function Function Result -2.02 dBm -0.07 dB 23.95 dBm M1 D2 M3 MI

BBW 2 kHz

Mode Auto Sweep

Date: 13.APR.2022 15:23:41





2.02 dB

Date: 13.APR.2022 15:34:58





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 BBW 2 kHz 40 d8 @ SWT 250 ms @ V8W 5 kHz 100 TDF Att Mode Auto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . 1Pk Max 1.91 dB Ma 1.8800682240 GHz 24.12 dBm 20 dBn 13[1] 1.8800876900 GH 10 dB D dBr -10 dBr Trintel -20 dBm-Spice Steeper THE OWNER WATCHING 30 dt 40 dBm -50 dBm -60 dBm-CF 1.88 GHz 10001 pts Span 1.0 MHz Marker X-value 1.880058224 GHz 38.016 kHz 1.68008769 GHz Y-value -1.91 dBm -0.44 dB 24.12 dBm Type | Ref | Trc | Т Function **Function Result** M1 D2 M3 M1 6,00



B



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

Ref Level 30.00 dBm BBW 2 kHz 40 d8 • SWT 250 ms • V8W 5 kHz 100 TDF Att Mode Auto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . 1Pk Max 1.81 dBr Ma 1.9093687040 GHz 24.34 dBm 20 dBn 1112 1.0003876900 GH 10 dB D dBr -10 dBr YWWWWW Warnieland (The State of State -20 dBm 30 dB 40 dBm -50 dBm -60 dBm-CF 1.9093 GHz 10001 pts Span 1.0 MHz Marker X-value 1.909368704 GHz 37.632 kHz 1.90938769 GHz Y-value -1.81 dBm -0.06 dB 24.34 dBm Type | Ref | Trc Т Function **Function Result** M1 D2 M3 M1

Date: 13.APR.2022 15:46:14



B



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



Date: 13.APR.2022 15:27:36



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 15:38:53





Date: 13.APR.2022 15:50:09





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



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 RBW 2 kHz 40 d8
 SWT 250 ms
 VBW 5 kHz Att Mode Auto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . @1Pk Max 2.76 dB 431111 1.8507083528 GH 23.08 dBn 20 dB 11161 8507859900 GH 10 de D.dB -10 di 11 20 d CINING WANT àù 60 di CF 1.8507 GHz 10001 pts Span 1.0 MHz Marker X-value 1.850708352 GHz 113.28 kHz 1.85078599 GHz Type | Ref | Trc Y-value Function Function Result -2.76 dBm -0.14 dB 23.00 dBm D2 M1

Date: 13.APR.2022 15:28:45

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

ę Par La Sin a NW life A D a SWT 221 or a NW LIFE Mode Address 12 Tester . . UP 1.00002 New Constant Date: 13.APR.2022 15:10:0

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

B Spectrum Ref Level 30.00 dB RBW 2 kHz . 40 d8 • SWT 250 ms • V8W 5 kHz 100 TDF Att Mode Auto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . @1Pk Max 1M1[1] 2.81 dB 1.6800156160 GHz 23.21 dBm 20 dB 13[1] 8800786900 GH 10 dB D dBr MAAA -10 dB -20 dB ANN THE T 30 -60 dBr CF 1.88 GHz 10001 pts Span 1.0 MHz Marker X-value 1.880015515 GHz 103.424 kHz 1.88007869 GHz Y-value -2.81 dBm -0.03 dB 23.21 dBm Type | Ref | Trc Function Function Result M1 D2 M3 M1

Date: 13.APR.2022 15:40:02



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



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







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 15:24:50

Plot 4: mid char

Date: 13.APR.2022 15:36:07

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el (-26	6 dB	c BW), spacin	g 3.7	5 kHz, 1@	0 tone	S			
Spectr Ref Le Att	um vel 3	20.00 dB/ 40 d	m 6 e SWT 2	50 ms 🖷	RBW 2 kHz VBW 5 kHz	Mode Aut	o Sweep			
SGL Con	d by 0	10/100	TDF	ster el	Pk Max					_
20 dBm					T MD		41[1]		1.879	-1.0
10 dBm-					A		43[1]		1.879	24.0
D dBm-					Ne		-	_		
-10 dBm	_				1 300			_		-
-20 dBm	-		-	and the			-			+
	1111	COTION OF	Contrainer and					THE PARTY OF	Walter and	-
-40 dBm							_	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	the Martine Ann	
-50 dBm	-			-			-	-		+
-60 dBm	-						+			+
CF 1.88	GHz				1000	1 pts	-		S	an 1.
Marker	not 1	Text	ar contes	<u></u>	M. contrast	1 6.00	alas I	-	and from Planes	
M1	Ref	1	1.87989	44 GHz	-1.30 di	kro - un	Lation		menon Kesi	
D2	ML	1	1.879911	95 KH2 91 GH2	0.08 24.80 df	des .	-			

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



10 di 08 GH 30 đBn DO GH

-

0 MHz

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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

B Spectrum Ref Level 30.00 dBr BBW 2 kHz 40 d8 • SWT 250 ms • V8W 5 kHz 100 TDF Att Mode Auto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . 1Pk Max M1[1] 0.91 dBr T Ma 1.9091942400 GHz 25.14 dBm 20 dBr M3[1] 1,0002110100 GH 10 dB D dBr -10 dB Price and -20 dBn TYNY! JAN BANK 40 dBr -50 dBm -60 dBm CF 1.9093 GHz 10001 pts Span 1.0 MHz Marker X-value 1,90919424 GHz 41,728 kHz 1,90921191 GHz Y-value -0.91 dBm -0.07 dB 25.14 dBm Type | Ref | Trc Т Function **Function Result** M1 D2 M3 M1

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

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Spectrum

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

Ref Level 30.00 dBr BBW 2 kHz 40 05 • SWT 250 ms • VBW 5 kHz 100 TDF Att Mode Auto Sweep SGL Count 100/100 controlled by CTC advanced LTE Tester . 1Pk Max 1.21 dB ¥1[1] 1.8507668480 GHz 24.63 dBm 20 dBr 13[1] 1.8507891900 GH 10 dB D dBn -10 dB 11 20 dBm Aller Marine Marine 30 **MANA** HO dBan--50 dBr -60 dBm-CF 1.8507 GHz 10001 pts Span 1.0 MHz Marker X-value 1.850766848 GHz 38 528 kHz 1.85076819 GHz Type | Ref | Trc Y-value Function Function Result -1.21 dBm -0.19 dB 24.63 dBm M1 D2 MI

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

B Spectrum Ref Level 30.00 dBm BBW 2 kHz 40 d8 • SWT 250 ms • V8W 5 kHz 100 TDF Att Mode Auto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . 1Pk Max 1.15 dB 111 1.6800665600 GH 24.98 dBn 20 dBr 1111 0900 GH 1 8800 10 dB D dBr -10 dBr -20 dBm 30 dt 1111 440 40 dBr -50 dBm -60 dBm-CF 1.88 GHz 10001 pts Span 1.0 MHz Marker X-value 1.88006555 GHz 38.912 kHz 1.88008809 GHz Y-value -1.15 dBm 0.07 dB 24.98 dBm Type | Ref | Trc Т Function **Function Result** M1 D2 M3 .M1

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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

B Spectrum Ref Level 30.00 dBn BBW 2 kHz 40 d8 • SWT 250 ms • V8W 5 kHz 100 TDF Att Mode Auto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . 1Pk Max 0.97 dBr 111 1.9093667848 GHz 25.08 dBm 20 dBr 111 1.0005 10900 CH 10 dB D dBr -10 dBr NT CO -20 dBm Line have 30 dt 40 dBr -50 dBm -60 dBm-CF 1.9093 GHz 10001 pts Span 1.0 MHz Marker X-value 1.909366784 GHz 38.656 kHz 1.90938809 GHz Y-value -0.97 dBm -0.05 dB 25.06 dBm Type | Ref | Trc Function **Function Result** M1 D2 M3 M1

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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 d8
 SWT 250 ms
 VBW 5 kHz Att Mode Auto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . @ 1Pk Max M1[1] 3.37 dB 1.8505812480 GHz 23.45 dBm 20 dB M3[1] 1.8506167100 GH 10 ds D.dB -10 d 20.6 60 dBm CF 1.8507 GHz 10001 pts Span 1.0 MHz Marker X-value 1.850581248 GHz 113.408 kHz 1.85061671 GHz Type | Ref | Trc Y-value Function Function Result -3.37 dBm 0.73 dB 23.45 dBm D2 M1

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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

B Spectrum Ref Level 30.00 dB RBW 2 kHz ٠ 40 d8 • SWT 250 ms • V8W 5 kHz 100 TDF Att Mode Auto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . @ 1Pk Max M1[1] 2.38 dB 1.0798795520 GH 23.68 dBn 20 dB M3[1] 1.8799167100 GH 10 de D dB -10 df ٧V -20 di 30 60 dB CF 1.88 GHz 10001 pts Span 1.0 MHz Marker X-value 1.879879552 GHz 115.072 kHz 1.87991671 GHz Y-value -2.38 dBm -0.09 dB 23.68 dBm Type | Ref | Trc Function Function Result M1 D2 M

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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



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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 RBW 2 kHz 40 d8
 SWT 250 ms
 VBW 5 kHz Att Mode Auto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . @1Pk Max 3.40 dB MITIT 1.8507033600 GH 20 dB 13[1] 22.52 dBr 65900 GH 85020 10 dB D dB -10 df -20 dB Mary The State 30 d rs h 60 dBm CF 1.8507 GHz 10001 pts Span 1.0 MHz Marker X-value 1.85070336 GHz 117-504 kHz 1.85078659 GHz Type | Ref | Trc Y-value Function Function Result -3.40 dBm -0.15 dB 22.52 dBm M1 D2 M1

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member of RWTÜV group

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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

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B Spectrum Ref Level 30.00 dB RBW 2 kHz 40 dB • SWT 250 ms • VBW 5 kHz 100 TDF Att Mode Auto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . @1Pk Max 3.52 dB MM1T11 1.0799900168 GH 22.72 dBn 20 dB 3[1] 00778900 GH 10 de D dBr -10 df -20 di THE TIME 30.6 60 dB CF 1.88 GHz 10001 pts Span 1.0 MHz Marker X-value 1.879990016 GHz 130.432 kHz 1.88007789 GHz Y-value -3.52 dBm -0.71 dB 22.72 dBm Type | Ref | Trc Function Function Result M1 D2 M3





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



CTC I advanced

Emi ∀ Spectrum 0 dBm = RBW 2 kHz 40 dB = SWT 250 ms = VBW 5 kHz Ref Level 30.00 dBm Att Mode Auto Sweep unt 100/100 TOP SGL Co introlled by CTC advanced LTE Tester @1Pk Max M1[1] 11.70 dl 1.0506169100 GH 191.180881912 kH 20 dBn Occ Bw 10 dBri 0.68 -10 dl 20 MANAN WITH MARKE 60 d8 n 1.0 MHz CF 1.8507 GHz 10001 pts \$p Date: 13.APR.2022 13:34:40

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 d8
 SWT 250 ms
 VBW 5 kHz Mode Auto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . 1Pk Max M1[1] 14.16 df 1.8505806 U GH 20 d8 M3[1] 12.05 dB 8507107000 GH 10 de **BUIN!** D.dB -10 di 20 d MARCHINA alphi LAM A 60 dBn CF 1.8507 GHz 10001 pts Span 1.0 MHz Marker Y-value -14.16 dBm 0.35 dB 12.05 dBm X-value 1.850580609 GHz 236.72 kHz 1.8507107 GHz Type | Ref | Trc Function Function Result D2 M1

RBW 2 kHz

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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



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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

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