# 15 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.

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TC identifier	Description	verdict	date	Remark
RF-Testing	FCC: CFR Part 2 & Part 27 ISED: RSS-Gen, Issue 5	See table!	2022-04-14	-/-
5	RSS-130, Issue 2 (LTE Bands 12, 13) RSS-139, Issue 3 (LTE Band 4)			

# 15.1 Part 27/RSS-139: LTE band 4

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:

# 15.2 Part 27/RSS-130: LTE band 12

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:

С	Compliant	NC	Not compliant	NA	Not applicable	NP	Not performed

# 15.3 Part 27/RSS-130: LTE band 13

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:

C Compliant NC Not compliant NA Not applicable NP Not pe	formed
--	--------



### **16 RF measurements**

### **16.1 Description of test setup**

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

### 16.2 Results LTE band 4

The EUT was set to transmit the maximum power.

### 16.2.1 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 7.4 setup A				
Measurement uncertainty:	See chapter 9				
Maasurament procedure	FCC: § 2.1046				
	ISED: RSS-Gen, 6.12				



# <u>Limits:</u>

FCC	ISED
§ 27.50(d)(4) & (5)	RSS-139, 6.5
(4) Fixed, mobile, and portable (hand-held) stations	The equivalent isotropically radiated power (e.i.r.p.)
operating in the 1710-1755 MHz band and mobile	for mobile and portable transmitters shall not
and portable stations operating in the 1695-1710	exceed one watt.
MHz and 1755-1780 MHz bands are limited to 1 watt	In addition, the peak to average power ratio (PAPR)
EIRP.	of the equipment shall not exceed 13 dB for more
(5) In measuring transmissions in this band using an	than 0.1% of the time, using a signal that
average power technique, the peak-to-average ratio	corresponds 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

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### 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	19951 / 1710.1	20175 / 1732.5	20399 / 1754.9	19951 / 1710.1	20175 / 1732.5	20399 / 1754.9
	BPSK	1T0	19.37	19.43	19.14	2.03	2.00	2.06
		1T47	19.34	19.31	19.10	1.97	2.00	2.00
3.75	QPSK	1T0	19.41	19.36	19.20	0.29	0.26	0.32
		1T47	19.43	19.39	19.09	1.65	1.68	1.68
	BPSK	1T0	19.37	19.29	19.08	1.74	1.71	1.71
15		1T11	19.08	19.10	18.88	1.62	1.77	1.77
		1T0	19.35	19.48	19.06	1.68	1.62	1.71
	QPSK	1T11	19.21	19.33	18.96	0.46	1.74	1.62
		12T0	17.53	17.53	17.35	6.00	6.06	6.15

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					
	1710.1	21.77	21.83					
3.75	1732.5	23.23	23.19					
	1754.9	22.04	22.10					
	1710.1	21.77	21.75					
15	1732.5	23.09	23.38					
	1754.9	21.98	21.96					



### **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.

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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<sub>nom</sub>, connected to the CMW500 and in a simulated call on channel 1412 (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:	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		
Maagurament propedure	FCC: § 2.1055		
	ISED: RSS-Gen, 6.11		

#### Measurement:

### <u>Limits:</u>

FCC	ISED
§ 27.54	RSS-139, 6.4
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 stays within the operating frequency block when tested to 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	-31	-0.0179
3.6	-31	-0.0179
4.0	-31	-0.0179

### FREQ ERROR versus TEMPERATURE

Temperature (°C)	Frequency Error (Hz)	Frequency Error (ppm)
-30	36	0.0208
-20	24	0.0139
-10	16	0.0092
± 0	-30	-0.0173
10	-18	-0.0104
20	-31	-0.0179
30	-62	-0.0358
40	-24	-0.0139
50	-56	-0.0232



### **16.2.3 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, which is the transmitted carrier that can be as high as 1750 MHz. Measurement made up to 18 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 4.

#### 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(h)(1) & (3)	RSS-139, 6.6
<ul> <li>(1) Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.</li> <li>(3) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.</li> </ul>	<ul> <li>i. In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 (P) (watts) dB.</li> <li>ii. After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 (P) (watts) dB.</li> </ul>
-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]	
-/-	-	All detected emissions are more than 20 dB below the limit.		-/-		
-/-	-/-	-/-	-/-	-/-	-/-	
-/-	-/-	-/-	-/-	-/-	-/-	

### <u>QPSK</u>

Spurious Emission Level						
Lowest channel Middle channel			Highest o	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>BPSK</u>





Plot 2: Middle channel, 30 MHz to 1GHz







Plot 3: Middle channel, 1 GHz to 18GHz







### <u>QPSK</u>





Plot 2: Middle channel, 30 MHz to 1 GHz







Plot 3: Middle channel, 1 GHz to 18 GHz





### 16.2.4 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.

For the measurement the lowest, middle and highest channel bandwidth was used. If spurious were found the other bandwidths were measured, too.

#### Measurement:

Measurement parameters			
Detector:	Peak		
Sweep time:	Auto		
Video bandwidth:	300 kHz		
Resolution bandwidth:	100 kHz		
Span:	10 MHz – 18 GHz		
Trace-Mode:	Max Hold		
Used equipment:	See chapter 7.4 setup A		
Measurement uncertainty:	See chapter 9		
Maaauramant procedure	FCC: § 2.1051		
	ISED: RSS-Gen, 6.13		



<u>Limits:</u>

FCC	ISED			
§ 27.53(h)(1) & (3)	RSS-139, 6.6			
<ul> <li>(1) Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.</li> <li>(3) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.</li> </ul>	<ul> <li>i. In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 (P) (watts) dB.</li> <li>ii. After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 (P) (watts) dB.</li> </ul>			
-13 dBm				



### Results:

# <u>BPSK</u>

Spurious Emission Level						
Lowest channel		Middle c	Middle channel		Highest channel	
Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]	
3420.2	-/-	3465.0	-/-	3509.8	-/-	
5130.3	-/-	5197.5	-/-	5264.7	-/-	
6840.4	-/-	6930.0	-/-	7019.6	-/-	
8550.5	-/-	8662.5	-/-	8774.5	-/-	
10260.6	-/-	10395.0	-/-	10529.4	-/-	
11970.7	-/-	12127.5	-/-	12284.3	-/-	
13680.8	-/-	13860.0	-/-	14039.2	-/-	
15390.9	-/-	15592.5	-/-	15794.1	-/-	
17101.0	-/-	17325.0	-/-	17549.0	-/-	

### <u>QPSK</u>

Spurious Emission Level					
Lowest channel		Middle channel		Highest channel	
Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]	Spurious emissions	Level [dBm]
3420.2	-/-	3465.0	-/-	3509.8	-/-
5130.3	-/-	5197.5	-/-	5264.7	-/-
6840.4	-/-	6930.0	-/-	7019.6	-/-
8550.5	-/-	8662.5	-/-	8774.5	-/-
10260.6	-/-	10395.0	-/-	10529.4	-/-
11970.7	-/-	12127.5	-/-	12284.3	-/-
13680.8	-/-	13860.0	-/-	14039.2	-/-
15390.9	-/-	15592.5	-/-	15794.1	-/-
17101.0	-/-	17325.0	-/-	17549.0	-/-



### Plots: BPSK



Plot 1: Lowest Channel (10 MHz - 18 GHz), spacing 3.75 kHz, 1@0 tones

Plot 2: Middle Channel (10 MHz - 18 GHz), spacing 3.75 kHz, 1@0 tones







Plot 3: Highest Channel (10 MHz - 18 GHz), spacing 3.75 kHz, 1@0 tones

Plot 4: Lowest Channel (10 MHz - 18 GHz), spacing 3.75 kHz, 1@47 tones







Plot 5: Middle Channel (10 MHz - 18 GHz), spacing 3.75 kHz, 1@47 tones

Plot 6: Highest Channel (10 MHz - 18 GHz), spacing 3.75 kHz, 1@47 tones







Plot 7: Lowest Channel (10 MHz - 18 GHz), spacing 15 kHz, 1@0 tones

Plot 8: Middle Channel (10 MHz - 18 GHz), spacing 15 kHz, 1@0 tones







Plot 9: Highest Channel (10 MHz - 18 GHz), spacing 15 kHz, 1@0 tones

Plot 10: Lowest Channel (10 MHz - 18 GHz), spacing 15 kHz, 1@11 tones







Plot 11: Middle Channel (10 MHz - 18 GHz), spacing 15 kHz, 1@11 tones

Plot 12: Highest Channel (10 MHz - 18 GHz), spacing 15 kHz, 1@11 tones





### Plots: QPSK



Plot 1: Lowest Channel (10 MHz - 18 GHz), spacing 3.75 kHz, 1@0 tones

Plot 2: Middle Channel (10 MHz - 18 GHz), spacing 3.75 kHz, 1@0 tones







Plot 3: Highest Channel (10 MHz - 18 GHz), spacing 3.75 kHz, 1@0 tones

Plot 4: Lowest Channel (10 MHz - 18 GHz), spacing 3.75 kHz, 1@47 tones







Plot 5: Middle Channel (10 MHz - 18 GHz), spacing 3.75 kHz, 1@47 tones

Plot 6: Highest Channel (10 MHz - 18 GHz), spacing 3.75 kHz, 1@47 tones







Plot 7: Lowest Channel (10 MHz - 18 GHz), spacing 15 kHz, 1@0 tones

Plot 8: Middle Channel (10 MHz - 185 GHz), spacing 15 kHz, 1@0 tones







Plot 9: Highest Channel (10 MHz - 18 GHz), spacing 15 kHz, 1@0 tones

Plot 10: Lowest Channel (10 MHz - 18 GHz), spacing 15 kHz, 1@11 tones







Plot 11: Middle Channel (10 MHz - 18 GHz), spacing 15 kHz, 1@11 tones

Plot 12: Highest Channel (10 MHz - 18 GHz), spacing 15 kHz, 1@11 tones







Plot 13: Lowest Channel (10 MHz - 18 GHz), spacing 15 kHz, 12@0 tones

Plot 14: Middle Channel (10 MHz - 18 GHz), spacing 15 kHz, 12@0 tones







Plot 15: Highest Channel (10 MHz - 18 GHz), spacing 15 kHz, 12@0 tones



# 16.2.5 Block edge compliance

### **Description:**

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

For the measurement the lowest, middle and highest channel bandwidth was used. If spurious were found the other bandwidths were measured, too.

### Measurement:

Measurement parameters						
Detector:	RMS					
Sweep time:	180s					
Video bandwidth:	100 kHz					
Resolution bandwidth:	20 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(h)(1) & (3)	RSS-139, 6.6
<ul> <li>(1) Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.</li> <li>(3) Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.</li> </ul>	<ul> <li>i. In the first 1.0 MHz bands immediately outside and adjacent to the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 (P) (watts) dB.</li> <li>ii. After the first 1.0 MHz outside the equipment's smallest operating frequency block, which can contain the equipment's occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 (P) (watts) dB.</li> </ul>
-13	dBm
Correction factor according to KDB 890	0810 if RBW < 1 % emission bandwidth: A here

 $\Box$ 10 log (RBW1/RBW2) = X dB; whereas: RBW1 = Y, RBW2 = Z

### <u>Results:</u> BPSK

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

Att	M Ven	00.00 UB	8 • SWT 30 s • V8	W 100 kHz Mo	de Auto Sweep		
Solution	ed by	CTC adv	anced LTE Tester, Test	Case Verdict: PAS	SS 😑 1Rm Max		
0 dBm- -10 dBr	n				M1[1] M2[1]	-34.82 dBn 1.709996288 GH -40.95 dBn 1.709500000 GH	
-20 dBr	n		-	-			
-30 dBr	n					340	
-40 dbr	n			-			
-50 d8r	n	101112	145	104	of the local division in which the		
1	int 4		NAME OF TAXABLE				
-70 dBr	n					and a second state of the second s	
-BO dBr	n						
Start 1	.705	GHz		10001 pt	5	Stop 1.71 GHz	
larker							
Туре	Ref	Trc	X-value	Y-value	Function	Function Result	
M1		1	1.709996288 GHz	-34.82 dBm	and the second s		
M2		1	1.7095 GHz	-40.95 dBm	Band Power	-25.16 dBm	
M3	-	1	1.7085 GHz	-66.04 dBm	Band Power	-32.54 dB	
M4		1	1.7075 GHz	-53.94 dBm	Band Power	-36.41 d8m	
		1	1.7005 GH2	-54 02 dBm	sand Power	-38.81 d8m	

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

Spectrum	SI	Hectrom 2 (8)				
Ref Level Att SGL Count 1,	10.00 dB 30 d /1	m BRB' B SWT 30 s SWT TDF	W 20 kHz W 100 kHz Mor	de Auto Sweep		
Controlled by	CTC adv	anced LTE Tester, Test	Case Verdict: PAS	ss e1Rm Max		
D dBm				M1[1]		-37.61 dBm 1.755002248 GHz
-10 dBm						1.755500000 GHz
-20 d8m		1			-	Current of the second
-30 dBm-					_	
thin ME	_				-	
I ROWING IN	-	MI				
C.C.C.		I IIII BRANN I	The second second	The second s	ME	The second second second
cBm-			at a stand or 2		and three brand	
-70 dBm-		and the second sec				and being the standard strength of the
-80 dBm					_	
Start 1.755	GHz		10001 at	5	-	Stop 1.76 GHz
Marker						South and a service
Type   Ref	Trol	X-value	Y-value	Function	Fun	ction Result
M1	1	1.75500224 GHz	-37.61 dBm	Contraction and the		
M2	1	1.7555 GHz	-42.63 dBm	Band Power		-27.19 dBm
M3	1	1.7565 GHz	-50.63 dBm	Band Power		-33.61 dBm
M4	1	1.7575 GHz	-64.21 dBm	Band Power		-37.15 dBm
MS	1	1.7585 GH2	-56.82 dBm	Band Power		-39,46 dBm
Mb	1	1.7595 GH2	~65.08 dBm	Band Power		-41.18 dBm
5 T C	1				022222222	6,00

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

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

Spectrum

Spectrum Ref Level 10.00 dBm RBW 20 kHz 44 Att Mode Auto Sweep SGL Count 1/1 Controlled by CTC advanced LTE Tester, Test Case Verdict: PASS @IRm Max -35.36 dBr M1[1] 1.755001216 GHz -65.75 dBm M2[1] D dBm 1.755500000 GH -10 d8m--20 dBm-30 dB et i -70 dBm -BO dBm-Start 1.755 GHz 10001 pts Stop 1.76 GHz Marker X-value 1.75501216 GHz 1.7555 GHz 1.7555 GHz 1.7575 GHz 1.7585 GHz 1.7595 GHz Y-value -35.36 dBm -65.75 dBm -47.80 dBm -54.45 dBm -56.67 dBm -56.04 dBm 
 Type
 Ref
 Trc

 M1
 1

 M2
 1

 M3
 1

 M4
 1
 Function Function Result Band Power -25.66 dBm Band Power Band Power Band Power Band Power -32.96 dBm -36.72 dBm -39.20 dBm -40.97 dBm MS Me 6,003

X

Date: 4.APR.2022 18:39:33

introlled by I	and and the second second	Fige:				
and an and a grade of a	CTC adv	anced LTE Tester, Test	Case Verdict: PAS	is einm Max		
16505				wilil		-36.92 dBi
dBm-				842531		-46 \$3 dB
t0 d8m						1.709500000 G
					1	March 19 March 19 Con
20 dBm					-	
an date						
SO GOIN						
40 d8m					100	N 2 million
to due			101		THE COLOR	
SO dam mb		105	Statement of the Allen	THE REAL PROPERTY OF		
State of the		A Acceleration Statistics				
	Sec. 1	10.00 m 10.00 m 10.00 m	A REPORT OF A	on the second	Contraction of the last	Marca Marca Astronom
/0.dBm-						
BO dBm		-			-	
	20.00					ALCON DISTRIBUTION
tart 1.705 (	SHz		10001 pt	5	- 10	Stop 1.71 GH
arker						
Type Ref	Trc	X-value	Y-value	Function	Func	tion Result
M1	1	1.709993728 GHz	-36.92 dBm	and the second s		
M2	1	1.7095 GHz	-46.53 dBm	Band Power		-26,58 dBn
M3	1	1.7085 GHz	-48.69 dBm	Band Power		-33.10 dBn
M4	1	1.7075 GHz	-53.94 dBm	Band Power		-36.72 dBn
1010-		1.7005 GH2	-50.25 dBm	Band Power		-39.00 den



**B** 

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

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

Spectrum 2 (8)

Spectrum

Date: 4.APR.2022 16:45:32

Controlk	ed by	CTC adv	anced LTE Teste	r, Test	Case Verdict:	PASS 018	Im Max		
0 dBm-	-						M1[1] M2[1]		-43.77 dBn 1.755010688 GH -60.11 dBn 1.755500000 CH
-20 d8n -30 d8n									
40 dbn	-	_						_	
	W.S.			billinde	Market Market	-		- heg	
-70 dBn -80 dBn	1								
Start 1	755	GHz	- 11 - Lin		10001	l pts		121	Stop 1.76 GHz
Marker									
Туре	Ref	Trc	X-value		Y-value	Fun	ction	0 1	unction Result
M1		1	1.755010688	GHz	-43,77 dB	m	and and		
M2		1	1.7555	GHz	-60.11 dB	m Band	1 Power		-41.59 dBm
M3		1	1.7565	GHz	-65.03 dB	m Band	i Power		-46.46 dBm
M4	-	1	1.7575	GH2	-63.60 dB	m Band	I Power		-47.52 dBm
		2.1	1.7585	GH2	-64.33 dB/	m Band	5 Power		-47.96 dBm
MS.			3-11 Grand	241.14			and the second se		

Date: 4.APR.2022 19:03:40

Spect	rum	18	pettram 2 🛛 🔊	05.00-				
Att SGL Co	ovel	10.00 dB 30 ( /1	m	W 100 kHz Mo	de Auto	Sweep	5	
Controlk	ed by	CTC adv	anced LTE Tester, Test	Case Verdict: PA	SS 🔵 1 Rm	Мак		
D d6m-	-	_			M	2[1]		-42.55 dBm 1.709999232 GHz -58.60 dBm
-10 dBr							15	1.709500000 GHz
-20 dBr	-		-	-			-	
-30 dBn				-			-	
-40 dim	1							
-80 dile	1.1						-	
-60 d8m	110		No. A				ME	NE
-70 dBr	-	September 100	alan na calair a calair					weight and
70 000								
-80.080	0							
Start 1	.705	GHz		10001 p	ts			Stop 1.71 GHz
Marker								
Түрө	Ref	Trc	X-value	Y-value	Funct	ion	Fun	ction Result
M1		1	1.709999232 GHz	-42.55 dBm	- www.co.	1		
M2		1	1.7095 GHz	-58.60 dBm	Band P	20war		-40,58 dBm
M3		1	1.7085 GHz	-61.29 dBm	Band F	0/w/81	-45.66 di	
M4		1	1.7075 GHz	-64-81 dBm	Band F	ower		-47.32 dBm
MS		1	1.7065 GHz	~65.44 dBm	Band F	ower		-47.71 dBm
M6		1	1.7055 GHz	~64.12 dBm	Band F	0wer		-48.10 dBm
Q	1.0	n				-	CONTRACTOR OF	6/6

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

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

Spectrum	8	pectrum 2 (8)				(CCC)
Ref Level Att SGL Count 1	10.00 dB 30 ( /1	m # RBV 15 # SWT 30 s # V07 TDF	W 20 kHz W 100 kHz Mo	de Auto Sweep		
Controlled by	CTC adv	anced LTE Tester, Test	Case Verdict: PAS	SS e1Rm Max		
D dBm				M1[1] M2[1]		-43.35 dBn 1.755007232 GH -65.31 dBn 1.755500000 GH
-20 dam					-	
-30 dBm						
140 dlim						
					_	
					-	No
-70 dBm				and the second		Constantial and a start and a second
-80 d8m						
Start 1.755	GHz		10001 pt	15		Stop 1.76 GHz
Marker						
Type Ref	Trc	X-value	Y-value	Function	Function Result	
M1	1	1.755007232 GHz	-43.35 dBm	200000000000000000000000000000000000000		
M2	1	1.7555 GHz	-65.31 dBm	Band Power		-40.81 dBm
E M	1	1.7565 GH2	-bo.14 dBm	Band Power		-46.1B dBm
ME	1	1.7575 GH2	-65 66 dBm	Band Power		-47.34 OBm
M6	1	1.7595 GH2	~63.87 dBm	Band Power		-48.15 dBm
0 T.C	N				CONTRACTOR OF	4/6

Date: 4.APR.2022 19:11:31

Ref Level	10.00 dB	m = RB 15 = SWT 30 s = V6	W 20 kHz W 100 kHz Mor	ie Auto Sweep	,	
SGL Count 1	1/1	TOF	020010/0020 0020		7.1	
ontrolled by	CTC adv	anced LTE Tester, Test	Case Verdict: PAS	SS e1Rm Max		
10000				MILII	1	-42,88 dBr
) dBm-				MOLAT		-50 45 dBr
til dam				matal		1.709500000 CH
					1	Value of a constant
20 dBm						
and date				1		
SO ODIN						
40 d8m-			-		-	-
80 dtim						
35 dan						NC.
60 dBm-1	i San manan		1	a data a data	and the second second	Contraction of the local division of the loc
70 diles				Concernant of the second		and the second
70 GBIII-						
-80 dBm						
	-					ALCON NUMBER OF
start 1.705	GHz		10001 pt	5		Stop 1.71 GHz
tarker						
Type Ref	Trc	X-value	Y-value	Function	Funct	ion Result
M1	1	1.709994752 GHz	-42.88 dBm	Service Stempts		10000000
M2	1	1.7095 GHz	-59.45 dBm	Band Power	-41.02 dB	
Ma	1	1.7085 GHz	-61,70 dBm	Band Power		-45.73 dBm
M4	1	1.7075 GHz	-63.86 dBm	Band Power		-47.28 d8m
Mb.	1	1.7065 GH2	-0+02 d8m	Band Power		-47,74 dBm
646	41.	\$17055 GH2	-04.34 Gibin	Baud hower		-40.15 08/



# <u>Results:</u> QPSK

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

Spectrum	8	pectrom 2 (8)				
Ref Level Att SGL Count 1	10.00 dB 30 ( /1	m BRB 5 SWT 30 5 S V0 TDF	W 20 kHz W 100 kHz Mo	de Auto Sweep		
controlled by	CTC adv	anced LTE Tester, Test	Case Verdict: PAS	55 🛛 1Rm Max		
D dBm				M1[1] M2[1]		-34.89 dBn 1.709996288 GH -57.53 dBn
-10 dBm						1.709500000 CH
-20 d8m			-		-	
-30 dBm		-		-	-	-
-40 d8m					100	
RO dlive				and the second second	-	
-So dem MG		and the second se	N COLUMN			
-70 dBm-						
-80 d8m					-	
Start 1.705	GHz		10001 pt	5		Stop 1.71 GHz
tarker						
Type   Ref	Trc	X-value	Y-value	Function	Fun	iction Result
Mi	1	1.709996288 GHz	-34.89 dBm	and the second second		
M2	1	1.7095 GHz	-57.53 dBm	Band Power	-26.12 dB	
Ma	1	1.7085 GHz	-47.65 dBm	Band Power	-33.53 dB	
014	4	1.7075 GH2	-00.09 dBm	Band Power		-37.32 dBm
M6	1	1.7055 GHz	-58.11 dBm	Band Power		-41.38 dBm
State 1		ALL HERE AFTER	and a stated	a strate to state the		14105 44111

Date: 4.APR.2022 16:28:59

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

Spect	rum	8	pectrum 2 (8)				
Ref L Att SGL Co	evel	10.00 dB 30 d	m BRB' 6 SWT 30 s SV6' TDF	W 20 kHz W 100 kHz Mor	de Auto Sweep	2	
Controll	ed by	CTC adv	anced LTE Tester, Test	Case Verdict: PAS	SS e1Rm Max		
0 dBm-	n				M1[1] M2[1]	~	-37.42 dBm 1.755008768 GHz -62.85 dBm 1.755500000 GHz
-20 dBr							
(30 dBr	n			-		_	
dbr							
			and the second s	-		MS	
						NAME AND STATE	
-70 dBr	n						
-80 dBr	n <del>' · · · ·</del>					-	
Start 1	.755	GHz		10001 pt	5		Stop 1.76 GHz
Marker					~~~		
Туре	Ref	Trc	X-value	Y-value	Function	C Fu	inction Result
M1		1	1.755008768 GHz	-37.42 dBm	and the second second	- D	
M2		1	1.7555 GHz	-62.85 dBm	Band Power		-27.94 dBm
M3		1	1.7565 GHz	-65.84 dBm	Band Power		-34,37 dBm
M4		1	1.7575 GHz	-64.92 dBm	Band Power		-37.87 dBm
MS		1	1.7585 GH2 1.7595 GH2	-50.76 dBm -58.56 dBm	Band Power Band Power		-40.15 dBm -41.78 dBm
0	1.1	1				CONTRACTOR OF CO	6/6

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

Spectrum 2 (2)

Spectrum

Date: 4.APR.2022 16:36:50

Controlled by	CTC adv	ranced LTE Tester,	Test Case Verdict: P/	ASS 🔵 1Rm Max			
0 dBm				M1[1] M2[1]		-35,47 dBm 1.755003776 GHz -44.32 dBm 1.755500000 GHz	
130 dBm		M3	MA			Mp	
-70 dBm	-						
-70 dBm	GHz		10001	at s		Stop 1.76 GHz	
-70 dBm -80 dBm Start 1,755 Marker	GHz		10001	pts		Stop 1.76 GHz	
-70 dBm -80 dBm Stort 1.755 Marker Type   Ref	GHz	X-value	10001	pts	Fu	Stop 1.76 GHz	
-70 dBm -80 dBm Start 1.755 Marker Type Ref M1	GHz	X-value 1.755003776 GH	10001 Y-value 12 -35, 47 dBm	pts Function	Fu	Stop 1.76 GHz	
-70 dBm -80 dBm Stort 1.755 Marker Type Ref M1 M2	GHz	X-value 1.755003776 GH 1.7555 GH	10001 ; Y-value 12 -35.47 dBm 12 -44.32 dBm	pts Function Band Power	Fu	Stop 1.76 GHz Inction Result -26.62 dBm	
-70 dBm -80 dBm Stort 1.755 Marker Type Ref M1 M2 M3	GHz Trc 1 1	X-value 1.755003776 GH 1.7555 GH 1.7555 GH	10001 ( Y-value 12 -35.47 dBm 12 -44.32 dBm 12 -47.51 dBm 12 -47.51 dBm	Punction Band Powar Band Powar	Fu	Stop 1.76 GHz Inction Result -26.62 dBm -33.85 dBm	
-70 dBm -80 dBm Stort 1.755 Marker Type Ref M1 M2 M3 M4	GHz 1 1 1 1	X-value 1.755003776 GH 1.7555 GH 1.7505 GH 1.7575 GH	10001 Y-value 12 -35,47 dBm 12 -44,32 dBm 12 -47,91 dBm 12 -47,91 dBm 12 -51.40 dBm	Pts Function Band Power Band Power Band Power	Fu	Stop 1.76 GHz inction Result -26.62 dBm -33.85 dBm -37.57 dBm	
-70 dBm -80 dBm Start 1.755 Marker Type Ref M1 M2 M3 M4 M5	GHz 1 1 1 1 1	X-value 1.755003776 GH 1.7555 GH 1.7555 GH 1.7575 GH 1.7575 GH	10001 ( Y-value 12 -35, 47 dBm 12 -44, 32 dBm 12 -44, 32 dBm 12 -51, 40 dBm 12 -54, 09 dBm 12 -54, 09 dBm	Punction Band Power Band Power Band Power Band Power	Fu	Stop 1.76 GHz motion Result -26.62 dBm -33.85 dBm -37.57 dBm -39.97 dBm	

Date: 4.APR.2022 18:55:15

Spect	rum	8	pectrum 2 (8)				i com
Ref L Att SGL Co	evel	10.00 dB 30 ( /1	5m - RB 05 - SWT 30 5 - V6 TDF	W 20 kHz W 100 kHz Mo	de Auto Sweep		
Controll	ed by	CTC adv	vanced LTE Tester, Test	Case Verdict: PAS	55 e1Rm Max		
D dBm- -10 dBn	n				M1[1] M2[1]		-37,10 dBm 1,709999232 GHz -65,37 dBm 1,709500000 GHz
-20 dBn -30 dBn	n					-	T
-40 dbn -50 dbn	n-140					M3	
		12.10103	and the second secon	a tecnina di tet	and a constant		a la company a de la casa de
-70 dBn -80 dBn	n						
Start 1	.705	GHz		10001 pt	5		Stop 1.71 GHz
Marker				and the second s			
Туре	Ref	Trc	X-value	Y-value	Function	Func	tion Result
M2		1	1.7095 GHz	-65.37 dBm	Band Power		-27.62 dBm
M3		1	1.7085 GHz	-51.30 dBm	Band Power		-34,14 dBm
M4		1	1.7075 GHz	-65.05 dBm	Band Power		-37.72 d8m
MS.		1	1.7065 GHz	~65.60 dBm	Band Power		-39.97 dBm
M6	-	1	1.7055 GH2	-55.46 dBm	Band Power		-41.62 dBm
Q	10	1				62111110	6/6



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

# MS 1 1.7055 GHz -53.26 dBm Ben M6 1 1.7055 GHz -53.94 dBm Ben Date: 4.APR.2022 17:01:14

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

Spectrum	8	pethan 2					
Ref Level Att SGL Count 1	10.00 dB 30 ( 1/1	m # RB 35 # SWT 30 s # V6 TDF	W 20 kHz W 100 kHz Mo	de Auto Sweep		1	
Controlled by	CTC adv	anced LTE Tester, Test	Case Verdict: PAS	SS @1Rm Max			
0 dBm				M1[1] M2[1]	-	-43.21 dBn 1.755002240 GH -65.86 dBn 1.755500000 GH	
-20 dBm							
40 dbm							
	Contraction of the local distance of the loc	EM	140	addition of the second	14 G	And Participation	
-70 d8m							
Start 1.755	GHz		10001 pt	pts Stop 1.76 GHz			
Marker							
Type Ref	Trc	X-value	Y-value	Function Func		ction Result	
M2	1	1.7555 GHz	-65.86 dBm	Band Priver	at 17 db.		
M3	1	1.7565 GHz	-61.91 dBm	Band Power		-46.98 dBm	
M4	1	1.7575 GHz	-63.87 dBm	Band Power		-47.78 d8m	
MS	1	1.7585 GHz	~65.08 dBm	Band Power		-48,15 dBm	
M6	1	1.7595 GHz	-64.35 dBm	Band Power		-48.34 dBm	
) TO	X				CONTRACTOR OF	446	

Date: 4.APR.2022 19:19:22





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

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

Spectrum

X

Spectrum

Controlled b	y CTC adv	vanced LTE Tester, Test	Case Verdict: PAS	55 🔵 1 Rm Max		
0 dBm				M1[1] M2[1]		-43.26 dBm 1.755001216 GHz -65.30 dBm 1.755500000 GHz
-20 dBm						
				an and a second second	145	alarahan ang ang ang ang ang ang ang ang ang a
-70 dBm						
Start 1.75	5 GHz		10001 pt	5		Stop 1.76 GHz
Marker Type   Pe	f   Tec	Youalue	Y-walue	Eurotion	Functi	ion Posult
Mi	1	1.755001216 GHz	-43.26 dBm	runction	rance	un result
M2	1	1.7555 GHz	-65.30 dBm	Band Power		-40.98 dBm
M3	1	1.7565 GHz	-85.04 dBm	Band Power		-46.87 dBm
M4	1	1.7575 GHz	-65.76 dBm	Band Power		-47.75 d8m
MS.	1	1.7585 GHz	~63.08 dBm	Band Power		-48,13 dBm
M6	1	1.7595 GHz	+65.75 dBm	Band Power		-48.33 dBm

Date: 4.APR.2022 19:27:13

SGL Co	unt 1	/1 CTC adv	TDF	Care Verdet: DA	C A10m May	p		
0 dBm-					M1[1] M2[1]		-42.52 dBr 1.709999232 GH -62.83 dBr 1.709500000 GH	
-20 d8m								
30 dBm	-							
40 d8m	-							
50 dille	1					100		
90 apr								
60 dBm	100	all states and	and the state of t	A succession of the	an abidit shares id	the distance of the		
70 dBm								
neb 08-	(in the second s		-					
Start 1	705	GHz		10001 p	ts Stop 1.71 GH			
larker								
Түрө	Ref	Trc	X-value	Y-value	Function	Func	tion Result	
M1		1	1.709999232 GHz	-42.52 dBm	David Davids		10 TO -00-	
M2	-	1	1.7095 GH2	-62.83 dBm	Band Power		-40,70 dBm	
M4		1	1.7075 GHz	-66.20 dBm	Band Power		-47.70 d8m	
MS.		1	1.7065 GHz	-65.62 dBm	Band Power		-48.03 dBm	
M6		1	1.7055 GH2	~66.19 dBm	Band Power		-48.31 dbm	



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

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

Date: 4.APR.2022 17:16:57

Spect	rum	8	pectrum 2	(2)							
Ref Lo Att SGL Co	evel junt 1	10.00 dB 30 d	m 16 👄 SWT 30 : TDF	= RB = V8	W 20 kHz W 100 kHz /	Mode Auto	Sweep	,			
Controlle	ed by	CTC adv	anced LTE Test	er, Test	Case Verdict:	PASS @1R	т Мак				
D dBm-	-					N	2[1]	Ţ.		-4 1.75500 -6 1.75550	5.39 dBn 2240 GH 5.59 dBn 0000 GH
-20 dan -30 dan											
- to dan			MO					MG		-	
-70 dBn -80 dBn											
Start 1	.755	GHz	- U		10001	pts		-	1.1	Stop	1.76 GHz
Marker					and the second second	-				a rise and a lo	
Type	Ref	Trc	X-value		Y-value	Fund	tion	1	Functi	an Result	
M1		1	1.75500224	GHz	-45.38 dBr	10					ane no a m <sup>2</sup>
M2		1	1.7555	GHz	-65.58 dB	m Band	Power			-4	2.93 dBm
M3		1	1.7565	GHz	-65.17 dB	m Band	Power				8.32 dBm
M4		1	1.7575	GHz	-65,42 dBr	m Band	Power			-4	8.51 d8m
MS.		1	1.7585	GH2	~65.16 dBr	m Band	Power			-4	0.60 dBm
M6		1	1.7595	GH2	~66.12 dBr	m Band	Power			+4	8.65 dBm
	_	17				-		_	_		

Date: 4.APR.2022 19:35:04



**B** 



### 16.2.6 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 4 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		

### <u>Limits:</u>

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	64	40				
Mid channel / spacing 3.75 kHz; 1@0 tones	63	40				
High channel / spacing 3.75 kHz; 1@0 tones	63	40				
Low channel / spacing 3.75 kHz; 1@47 tones	64	39				
Mid channel / spacing 3.75 kHz; 1@47 tones	65	37				
High channel / spacing 3.75 kHz; 1@47 tones	64	38				
Low channel / spacing 15 kHz; 1@0 tones	121	100				
Mid channel / spacing 15 kHz; 1@0 tones	131	103				
High channel / spacing 15 kHz; 1@0 tones	116	104				
Low channel / spacing 15 kHz; 1@11 tones	122	118				
Mid channel / spacing 15 kHz; 1@11 tones	126	116				
High channel / spacing 15 kHz; 1@11 tones	121	104				

Occupied Bandwidth – QPSK						
Mode	99% OBW (kHz)	-26 dBc BW (kHz)				
Low channel / spacing 3.75 kHz; 1@0 tones	70	38				
Mid channel / spacing 3.75 kHz; 1@0 tones	69	39				
High channel / spacing 3.75 kHz; 1@0 tones	67	39				
Low channel / spacing 3.75 kHz; 1@47 tones	67	39				
Mid channel / spacing 3.75 kHz; 1@47 tones	69	39				
High channel / spacing 3.75 kHz; 1@47 tones	66	39				
Low channel / spacing 15 kHz; 1@0 tones	120	114				
Mid channel / spacing 15 kHz; 1@0 tones	118	116				
High channel / spacing 15 kHz; 1@0 tones	118	114				
Low channel / spacing 15 kHz; 1@11 tones	116	130				
Mid channel / spacing 15 kHz; 1@11 tones	129	113				
High channel / spacing 15 kHz; 1@11 tones	116	126				
Low channel / spacing 15 kHz; 12@0 tones	186	251				
Mid channel / spacing 15 kHz; 12@0 tones	191	250				
High channel / spacing 15 kHz; 12@0 tones	191	249				



### 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 09:38:41



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 09:48:46

Ref Level 30.00 dBr

40 d8 ⊕ SWT 250 ms ⊕ V8W 5 kHz 100 TDF Att Mode Auto Sweep SGL Count 100/100 controlled by CTC advanced LTE Tester . 1Pk Max M1[1] 2.55 dB T MB 1.7323938888 GHz 23.53 dBm 20 dBr M3[1] 1.7324123100 GH 10 dB D.dB -10 dB -20 dBm with the second s 100 40 dBm -50 dBr -60 dBm-CF 1.7325 GHz 10001 pts Span 1.0 MHz Marker Y-value -2.55 dBm 0.22 dB 23.53 dBm X-value 1.732393088 GHz 40.064 kHz 1.73241231 GHz Type | Ref | Trc Function Function Result M1 MI

BBW 2 kHz



**₩** 

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**₩** 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 . 1Pk Max MI[1] 23.50 dt 1.7542125100 GH 20 d8m 0634 kH Occ Bw 63,3936 10 dBri 0 :60 -10 db 20 d8 North W T-Inventor Pm 40 dB 50 dBm -60 dBm

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 Ref Level 30.00 dBr

SGL Count 100/100

Att

controlled by CTC advanced LTE Tester @1Pk Max M1[1] M9 1.7541926400 GHz 20 dB M3[1] 23.29 dB 1.7542114100 GH 10 dB D.dB -10 dB -20 dBm "Aliver white HIN'S T Auto United the 40 dBr -50 dBr -60 dBm-CF 1.7543 GHz 10001 pts Span 1.0 MHz Marker Y-value -2.80 dBm 0.01 dB 23.29 dBm X-value 1.75419264 GHz 40.448 kHz 1.75421141 GHz Type | Ref | Trc Function Function Result Μ1 MI

BBW 2 kHz

Mode Auto Sweep

40 d8 ⊕ SWT 250 ms ⊕ V8W 5 kHz 100 TDF

Date: 13.APR.2022 09:59:02





**₩** 

2.80 dB

mandan



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 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 2.65 dB 1.7107676160 GHz 23.39 dBm M3 [3[1] 20 dBr 1.7107886900 GH 10 dBr D dBn -10 dB -20 dBm "Interstation 30 dB 40 dBm -50 dBm -60 dBm-CF 1.7107 GHz 10001 pts Span 1.0 MHz Marker Y-value -2.65 dBm -0.26 dB 23.39 dBm X-value 1.710767616 GHz 38.784 kHz 1.71076869 GHz Type | Ref | Trc Function Function Result M1 D2 M3 MI

Date: 13.APR.2022 09:39:47



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 . @ 1Pk Max MI[1] 23.37 dB 20 dBm CC BW 10 dBri 0 c6r -10 db Any other -20 dB and the first of the second ANT WAL (WILLIAM) ag qalu 1 Million 40 dBm 50 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 dBr BBW 2 kHz 40 db ⊕ SWT 250 ms ⊕ VBW 5 kHz 100 TDF Att Mode Auto Sweep SGL Count 100/100 controlled by CTC advanced LTE Tester ●1Pk Max 2.41 dB 1.7325694728 GHz 23.63 dBm 20 dBr 11 1.7325876900 GH 10 dBr D dBn -10 dBr White -20 dBm and the second second -30 d8m-Contraction of the +O dBm -50 dBm -60 dBm-CF 1.7325 GHz 10001 pts Span 1.0 MHz Marker Y-value -2.41 dBm -0.02 dB 23.63 dBm X-value 1.732569472 GHz 36.864 kHz 1.73258769 GHz Type | Ref | Trc Function Function Result M1 D2 M3 MI

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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

Spectrum

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 591111 2.78 dB 1.7540682560 GHz 23.23 dBm 20 dBn 11[1] 93900 GH 1.7543 10 dBr D dBn -10 dBr TYNIN -20 dBm ana she was NUMBER -30 qBlu The second -+O dBm -50 dBm -60 dBm-CF 1.7543 GHz 10001 pts Span 1.0 MHz Marker X-value 1.754368256 GHz 38.016 kHz 1.75438839 GHz Type | Ref | Trc Y-value Function Function Result -2.78 dBm -0.07 dB 23.23 dBm M1 D2 M3 MI

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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



Date: 13.APR.2022 09:43:17



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Spectrum Ref Level 30.00 dBn Att Mode Auto Sweep unt 100/100 TDF SGL Co d by CTC advanced LTE Tester @1Pk Max MI[1] 20 dBr Occ Bw 10 dBri 0.68 Man -10 dl 20

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 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] 2.76 df T<sub>4</sub> 1.7923788880 GH 29.31 dB U GH 20 dB M3[1] 1.7324140100 GH 10 ds D.dB downw -10 d 20.6 60 dB CF 1.7325 GHz 10001 pts Span 1.0 MHz Marker X-value 1.73237888 GHz 102-528 kHz 1.73241401 GHz Type | Ref | Trc Y-value Function Function Result -2.76 dBm 0.00 dB 23.31 dBm D2 M1

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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



Date: 13.APR.2022 09:44:23



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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



Date: 13.APR.2022 09:54:28





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 09:40:54

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TOP ontrolled by CTC advanced LTE Tester . 1Pk Max

Ref Level 30.00 dBm

SGL Count 100/100

Att



Mode Auto Sweep

MI[1]

Date: 13.APR.2022 09:50:31

Spectrum

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



Date: 13.APR.2022 09:50:59

ami ∀

**₩** 



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



**₩** 

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 controlled by CTC advanced LTE Tester @1Pk Max M1[1] 1.94 dB 1.7541940480 GHz 24.07 dBm MB 20 dB M3[1] 1.7542117100 GH 10 dB D.dB -10 dB STATISTICS. J -20 dBo A stalley 111111 THE REAL PROPERTY. THUNK 40 dBr -50 dBa -60 dBm-CF 1.7543 GHz 10001 pts Span 1.0 MHz Marker Y-value -1.94 dBm -0.06 dB 24.07 dBm X-value 1.754194048 GHz 30.912 kHz 1.75421171 GHz Type | Ref | Trc Function Function Result M1 MI

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

Spectrum



Date: 13.APR.2022 09:41:32

Spectrum Ref Level 30.00 dBr

SGL Count 100/100

Att

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

controlled by CTC advanced LTE Tester ●1Pk Max

1111 1.7107667200 GHz 24.24 dBm 20 dBr 13[1] 1.7107882900 GH 10 dB D dBn -10 dB Contractor -20 dBm Lawson Martin -30 dt -40 dBm--50 dBr -60 dBm-CF 1.7107 GHz 10001 pts Span 1.0 MHz Marker X-value 1.71076672 GHz 38.656 kHz 1.71076829 GHz Type | Ref | Trc Y-value Function Function Result -1.80 dBm -0.07 dB 24.24 dBm M1 D2 M3 MI

BBW 2 kHz

Mode Auto Sweep

40 db ⊕ SWT 250 ms ⊕ VBW 5 kHz 100 TDF

Date: 13.APR.2022 09:42:00



ami ∀

**₩** 

1.80 dB

11



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

Ref Level 30.00 dBr

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

40 db ⊕ SWT 250 ms ⊕ VBW 5 kHz 100 TDF Att Mode Auto Sweep SGL Count 100/100 controlled by CTC advanced LTE Tester ●1Pk Max 1.74 dB ¥1[1] 1.7325670400 GH 24.51 dBn 20 dBr 3[1] 1.7325879900 GH 10 dB D dBn -10 dB 01170 -20 dBm Life Aler 30 dt -40 dBm--50 dBr -60 dBm-CF 1.7325 GHz 10001 pts Span 1.0 MHz Marker Y-value -1.74 dBm 0.13 dB 24.51 dBm X-value 1.73256704 GHz 38.656 kHz 1.73258799 GHz Type | Ref | Trc Function Function Result M1 D2 M3 MI

BBW 2 kHz

Date: 13.APR.2022 09:52:06



E ⇒



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

Spectrum

Plot 12: high 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 2.23 dB 91[1] 1.7540668488 GHz 20 dBr 13[1] 24.05 dBr 1.7543891900 GH 10 dB D dBn -10 dB -20 dBm ALL MARKED -30 dt -40 dBm-100 -50 dBr -60 dBm-CF 1.7543 GHz 10001 pts Span 1.0 MHz Marker X-value 1.754366848 GHz 38 528 kHz 1.75438819 GHz Type | Ref | Trc Y-value Function Function Result -2.23 dBm 0.19 dB 24.05 dBm M1 D2 MI

Date: 13.APR.2022 10:02:20



E ⇒



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 ⊕ V8W 5 kHz 100 TDF Att Mode Auto Sweep SGL Count 100/100 ontrolled by CTC advanced LTE Tester . @ 1Pk Max M1[1] 3.21 dB 1.7105812480 GHz 23.36 dBm 20 dB M3[1] 1.7106175100 GH 10 de D.dB AAAAAA -10 di 20 d 30 60 dBr CF 1.7107 GHz 10001 pts Span 1.0 MHz larker Y-value -3.21 dBm 0.54 dB 23.36 dBm X-value 1.710581248 GHz 113.92 kHz 1.71061751 GHz Type | Ref | Trc Function Function Result D2 M1

Date: 13.APR.2022 09:45:29

CTC I advanced



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







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 10:05:50

member of RWTÜV group



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

E ⇒ 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 4.63 d M1[1] 1.7106892888 GH 21.49 dBn 20 dB 13[1] 7107803900 CH 10 de D.dB WWW -10 di 20 d 30 AMIN UN M NIN MIN 1 60 di CF 1.7107 GHz 10001 pts Span 1.0 MHz larker Y-value -4.63 dBm 0.34 dB 21.49 dBm Type | Ref | Trc Function Function Result X-value 1.71068928 GHz 130.048 kHz 1.71078039 GHz D2 M1

Date: 13.APR.2022 09:46:36



ami ∀ 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 @1Pk Max M11[1] 22.60 dl 20 d8m DC BW 10 dBri 0.68 -10 dl 20 6 

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

E ⇒ 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 3.00 dB CW1111 1.7325067520 GHz 22.80 dBm 20 dB 13[1] .7325821900 GH 10 dB D dB WAAAAA -10 df 20 d aù. WATER 60 dB CF 1.7325 GHz 10001 pts Span 1.0 MHz Marker X-value 1.732506752 GHz 113.024 kHz 1.73258219 GHz Type | Ref | Trc Y-value Function Function Result -3.00 dBm -0.72 dB 22.60 dBm M1 D2 M1

Date: 13.APR.2022 09:56:41







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







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



Date: 13.APR.2022 09:47:42





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







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

Date: 13.APR.2022 10:08:02

**₩** 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] 14,10 dB 1.7541811200 GH 11.95 dBn 20 dB M3[1] IOO GH 10 de D.dB -10 df 1 -20 di Wwwwwwwwww 30 d A RIVER dam A STATISTICS 60 dBm CF 1.7543 GHz 10001 pts Span 1.0 MHz Marker Y-value -14.10 dBm -0.09 dB 11.95 dBm X-value 1.75418112 GHz 249 344 kHz 1.7543436 GHz Type | Ref | Trc Function Function Result D2 M1

