



FG132-CN-00

RF Test Report

V1.1

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Change History

V1.1(2025-03-06)	The chapter 5.6 add the SRS specifications
V1.0 (2024-10-17)	Initial version

1 Test Version Description

Table 1. Test version description

Product name	FG132-CN-00
Hardware version	V1.3
Software version	19003.1000.20.02.01.09

2 Test Device

Table 2. Test device list

No.	Device Name	Manufacturer	Model
1	Programmable constant temperature and humidity test chamber	XI'AN HUANKE TEST Equipment Co., Ltd.	GDJS-100C
2	Wideband radio communication tester	R&S	CMW500
3	Wideband radio communication tester	Anritsu	MT8821C
4	Wideband radio communication tester	R&S	CMX500
5	Wideband radio communication tester	Keysight	E7515R
6	DC power Analyzer	KEYSIGHT	N6705C
7	DC power supply	Agilent	66309D/66319D
8	Vector Signal Generator	R&S	SMBV100B

3 Test Summary

Table 3. Summary of test items

No.	Test Item	Test Result	Remarks (Failed Item)
1	LTE FDD	PASS	--
2	LTE TDD	PASS	--
3	LTE HPUE	PASS	--
4	5G RedCap FDD	PASS	--
5	5G RedCap TDD	PASS	--
6	5G RedCap SRS	PASS	--
7	GNSS	PASS	--
8	Max throughput	PASS	--
9	Working Current	PASS	--

4 Test Standards and Conditions

4.1 Test Standards

Table 4. Supported systems and followed standards

No.	Communication System	Reference Standard/Specification
1	LTE	3GPP TS 36.521-1
2	5G RedCap	3GPP TS 38.521-1
3	GNSS	Product Specifications

4.2 Test Environment

Table 5. Test environment

No.	Test Environment	Test Temperature	Power Supply Voltage
1	Normal/NC	Normal temperature/room temperature: +25°C	Normal voltage: +3.8V
2	TL/VL	Low operating temperature: -35°C	Low voltage: +3.3V
3	TL/VH	Low operating temperature: -35°C	High voltage: +4.3V
4	TH/VL	High operating temperature: +75°C	Low voltage: +3.3V
5	TH/VH	High operating temperature: +75°C	High voltage: +4.3V

5 Test Items

5.1 LTE FDD Specifications

Description:

The maximum TX power of LTE FDD is measured by 10M QPSK 1RB. The RB position in low and medium channels is low, and the RB position in high channel is high.

Table 6. LTE-FDD maximum TX power & RX sensitivity (main+diversity) (Bandwidth=10M)

Band	Channel	Maximum TX Power (dBm)			RX Sensitivity (Main+Diversity) (dBm)		
		3GPP Requirement	Test Value		3GPP Requirement	Test Value	
			1975#	4698#		1975#	4698#
B1	L	23.0±2.7	22.7	22.6	-96.3	-102.3	-102.7
	M	23.0±2.7	22.6	22.6		-102.5	-102.9
	H	23.0±2.7	22.6	22.5		-102.1	-102.3
B3	L	23.0+2.7/-4.2	22.6	22.7	-93.3	-102.5	-102.3
	M	23.0±2.7	22.6	22.5		-102.5	-102.5
	H	23.0+2.7/-4.2	22.5	22.4		-102.5	-102.5
B5	L	23.0±2.7	23.0	23.0	-94.3	-103.3	-103.5
	M	23.0±2.7	23.0	23.0		-103.3	-103.3
	H	23.0±2.7	22.9	22.9		-102.9	-103.1
B8	L	23.0+2.7/-4.2	23.1	23.0	-93.3	-102.9	-103.1
	M	23.0±2.7	23.1	23.1		-103.3	-103.3
	H	23.0+2.7/-4.2	22.9	22.9		-102.9	-103.1

Table 7. LTE-FDD maximum TX power & RX sensitivity (main&diversity) (Bandwidth=10M)

		Maximum TX Power (dBm)			RX Sensitivity (dBm)				
Band	Channel	3GPP Requirement	Test Value		3GPP Requirement	Test Value (Main)		Test Value (Diversity)	
			1975#	4698#		1975#	4698#	1975#	4698#
B1	L	23.0±2.7	22.7	22.6	-96.3	-98.7	-98.9	-100.1	-100.5
	M	23.0±2.7	22.6	22.6		-98.9	-99.1	-100.3	-100.7
	H	23.0±2.7	22.6	22.5		-98.7	-98.9	-99.9	-99.9
	L	23.0+2.7/-4.2	22.6	22.7	-93.3	-99.1	-98.5	-99.5	-100.1

Band	Channel	Maximum TX Power (dBm)			RX Sensitivity (dBm)				
		3GPP Requirement	Test Value		3GPP Requirement	Test Value (Main)		Test Value (Diversity)	
			1975#	4698#		1975#	4698#	1975#	4698#
B3	M	23.0±2.7	22.6	22.5		-99.3	-99.1	-99.7	-99.9
	H	23.0+2.7/-4.2	22.5	22.4		-99.3	-98.9	-99.9	-99.9
B5	L	23.0±2.7	23.0	23.0		-99.7	-99.7	-100.9	-101.3
	M	23.0±2.7	23.0	23.0	-94.3	-99.7	-99.9	-100.5	-100.9
	H	23.0±2.7	22.9	22.9		-99.5	-99.5	-100.3	-100.7
B8	L	23.0+2.7/-4.2	23.1	23.0		-99.3	-99.3	-100.3	-100.7
	M	23.0±2.7	23.1	23.1	-93.3	-99.5	-99.5	-100.7	-100.9
	H	23.0+2.7/-4.2	22.9	22.9		-99.3	-99.3	-100.3	-100.7

Table 8. Other specifications of LTE-FDD

Band	Test Environment	Protocol Section	Test Case	Result
B1/B3/B5/B8	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.2.2	UE Maximum Output Power	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.2.3	Maximum Power Reduction (MPR)	PASS
	NC	6.2.4	Additional Maximum Power Reduction (A-MPR)	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.2.5	Configured UE transmitted Output Power	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.2	Minimum Output Power	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.3	Transmit OFF power	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.4.1	General ON/OFF time mask	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.4.2.1	PRACH time mask	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.4.2.2	SRS time mask	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.5.1	Power Control Absolute power tolerance	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.5.2	Power Control Relative power tolerance	PASS

Band	Test Environment	Protocol Section	Test Case	Result
	TH/VL, TH/VH			
	Normal	6.3.5.3	Aggregate power control tolerance	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.5.1	Frequency Error	PASS
	NC	6.5.2.1	Error Vector Magnitude (EVM) for PUSCH	PASS
	NC	6.5.2.1	Error Vector Magnitude (EVM) for PUCCH	PASS
	NC	6.5.2.1	Error Vector Magnitude (EVM) for PRACH	PASS
	Normal	6.5.2.1A	PUSCH-EVM with exclusion period	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.5.2.2	Carrier leakage	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.5.2.3	In-band emissions for non-allocated RB	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.5.2.4	EVM equalizer spectrum flatness	PASS
	Normal	6.6.1	Occupied bandwidth	PASS
	NC	6.6.2.1	Spectrum Emission Mask	PASS
	NC	6.6.2.2	Additional Spectrum Emission Mask	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.6.2.3	Adjacent Channel Leakage Power Ratio	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	7.3	Reference sensitivity level	PASS
	NC	7.4	Maximum input level	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.2.3_3	Maximum Power Reduction (MPR) for UL 64QAM	PASS
	NC	6.2.4_2	Additional Maximum Power Reduction (A-MPR) for UL 64QAM	PASS
	NC	6.5.2.1_1	Error Vector Magnitude (EVM) for UL 64QAM	PASS
	NC	6.6.2.2_1	Additional Spectrum Emission Mask for UL 64QAM	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.6.2.3_4	Adjacent Channel Leakage Power Ratio for Multi-Cluster PUSCH with UL 64QAM	PASS

Band	Test Environment	Protocol Section	Test Case	Result
	NC	7.4_H	Maximum input level for 256QAM in DL	PASS

5.2 LTE TDD Specifications

Description:

The maximum TX power of LTE TDD is measured by 10M QPSK 1RB. The RB position in low and medium channels is low, and the RB position in high channel is high.

Table 9. LTE-TDD maximum TX power & RX sensitivity (main+diversity) (Bandwidth=10M)

Band	Channel	Maximum TX Power (dBm)			RX Sensitivity (Main+Diversity) (dBm)		
		3GPP Requirement	Test Value		3GPP Requirement	Test Value	
			1975#	4698#		1975#	4698#
B34	L	23.0±2.7	22.5	22.5		-101.9	-102.1
	M	23.0±2.7	22.4	22.5	-96.3	-102.1	-102.1
	H	23.0±2.7	22.5	22.4		-102.1	-102.1
B38	L	23.0±2.7	22.2	22.2		-102.1	-102.3
	M	23.0±2.7	22.1	22.0	-96.3	-101.9	-102.5
	H	23.0±2.7	22.1	22.2		-101.7	-102.1
B39	L	23.0±2.7	22.6	22.5		-102.3	-102.1
	M	23.0±2.7	22.6	22.5	-96.3	-102.5	-102.3
	H	23.0±2.7	22.7	22.6		-102.5	-102.1
B40	L	23.0±2.7	22.6	22.5		-101.7	-101.5
	M	23.0±2.7	22.5	22.6	-96.3	-101.7	-101.5
	H	23.0±2.7	22.6	22.8		-100.7	-100.5
B41	L	23.0+2.7/-4.2	21.9	22.1		-101.5	-101.3
	M	23.0±2.7	22.0	22.1	-94.3	-102.1	-102.3
	H	23.0+2.7/-4.2	22.2	22.4		-101.7	-101.9

Table 10. LTE-TDD maximum TX power & RX sensitivity (main&diversity) (Bandwidth=10M)

Band	Channel	Maximum TX Power (dBm)		RX Sensitivity (dBm)					
		3GPP Requirement	Test Value		3GPP Requirement	Test Value (main)		Test Value (diversity)	
			1975#	4698#		1975#	4698#	1975#	4698#
B34	L	23.0±2.7	22.5	22.5	-96.3	-98.7	-98.7	-99.5	-99.7
	M	23.0±2.7	22.4	22.5		-98.5	-98.7	-99.7	-99.7
	H	23.0±2.7	22.5	22.4		-98.7	-98.5	-99.5	-99.9
B38	L	23.0±2.7	22.2	22.2	-96.3	-99.7	-100.1	-98.3	-98.5
	M	23.0±2.7	22.1	22.0		-99.5	-99.9	-98.5	-98.9
	H	23.0±2.7	22.1	22.2		-99.5	-99.5	-98.1	-98.5
B39	L	23.0±2.7	22.6	22.5	-96.3	-99.1	-98.9	-99.9	-99.9
	M	23.0±2.7	22.6	22.5		-98.9	-98.9	-99.9	-99.9
	H	23.0±2.7	22.7	22.6		-98.9	-98.7	-99.9	-99.9
B40	L	23.0±2.7	22.6	22.5	-96.3	-97.1	-97.5	-99.7	-99.1
	M	23.0±2.7	22.5	22.6		-97.9	-97.9	-99.3	-98.9
	H	23.0±2.7	22.6	22.8		-96.9	-96.9	-98.5	-98.1
B41	L	23.0+2.7/-4.2	21.9	22.1	-94.3	-99.1	-99.5	-98.1	-97.8
	M	23.0±2.7	22.0	22.1		-99.5	-99.5	-98.5	-98.9
	H	23.0+2.7/-4.2	22.2	22.4		-99.1	-99.7	-98.7	-98.3

Table 11. Other specifications of LTE-TDD

Band	Test Environment	Protocol Section	Test Case	Result
B34/B38/ B39/B40/ B41	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.2.2	UE Maximum Output Power	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.2.3	Maximum Power Reduction (MPR)	PASS
	NC	6.2.4	Additional Maximum Power Reduction (A-MPR)	PASS
B41	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.2.5	Configured UE transmitted Output Power	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.2	Minimum Output Power	PASS
	Normal, TL/VL, TL/VH,	6.3.3	Transmit OFF power	PASS

Band	Test Environment	Protocol Section	Test Case	Result
	TH/VL, TH/VH			
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.4.1	General ON/OFF time mask	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.4.2.1	PRACH time mask	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.4.2.2	SRS time mask	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.5.1	Power Control Absolute power tolerance	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.5.2	Power Control Relative power tolerance	PASS
	Normal	6.3.5.3	Aggregate power control tolerance	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.5.1	Frequency Error	PASS
	NC	6.5.2.1	Error Vector Magnitude (EVM) for PUSCH	PASS
	NC	6.5.2.1	Error Vector Magnitude (EVM) for PUCCH	PASS
	NC	6.5.2.1	Error Vector Magnitude (EVM) for PRACH	PASS
	Normal	6.5.2.1A	PUSCH-EVM with exclusion period	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.5.2.2	Carrier leakage	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.5.2.3	In-band emissions for non-allocated RB	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.5.2.4	EVM equalizer spectrum flatness	PASS
	Normal	6.6.1	Occupied bandwidth	PASS
	NC	6.6.2.1	Spectrum Emission Mask	PASS
	NC	6.6.2.2	Additional Spectrum Emission Mask	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.6.2.3	Adjacent Channel Leakage Power Ratio	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	7.3	Reference sensitivity level	PASS
	NC	7.4	Maximum input level	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.2.3_3	Maximum Power Reduction (MPR) for UL 64QAM	PASS
	NC	6.2.4_2	Additional Maximum Power Reduction (A-	PASS

Band	Test Environment	Protocol Section	Test Case	Result
			MPR) for UL 64QAM	
	NC	6.5.2.1_1	Error Vector Magnitude (EVM) for UL 64QAM	PASS
	NC	6.6.2.2_1	Additional Spectrum Emission Mask for UL 64QAM	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.6.2.3_4	Adjacent Channel Leakage Power Ratio for Multi-Cluster PUSCH with UL 64QAM	PASS
	NC	7.4_H	Maximum input level for 256QAM in DL	PASS

5.3 LTE HPUE Specifications

Description:

The maximum TX power is measured by 10MHz QPSK 1RB. The RB position in low and medium channels is low, and the RB position in high channel is high.

Table 12. LTE HPUE maximum TX power

Band	Channel	Maximum TX Power (dBm)		
		3GPP Requirement	Test Value	
			1975#	4698#
B38	L	26.0±2.7	25.5	25.5
	M	26.0±2.7	25.2	25.4
	H	26.0±2.7	25.2	25.3
B41	L	26.0+2.7/-4.2	25.2	25.3
	M	26.0±2.7	25.3	25.3
	H	26.0+2.7/-4.2	25.4	25.6

Table 13. Other specifications of LTE HPUE

Band	Test Environment	Protocol Section	Test Case	Result
B38/B41	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.2.2_1	UE Maximum Output Power for HPUE	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.2.3_1	Maximum Power Reduction (MPR) for HPUE	PASS
	NC	6.2.4_1	Additional Maximum Power Reduction (A-MPR) for HPUE	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.2.5_1	Configured UE transmitted Output Power for HPUE	PASS

Band	Test Environment	Protocol Section	Test Case	Result
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.5_1.1	Power Control Absolute power tolerance for HPUE	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.5_1.2	Power Control Relative power tolerance for HPUE	PASS
	Normal	6.3.5_1.3	Aggregate power control tolerance for HPUE	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.6.2.3_1	Adjacent Channel Leakage Power Ratio for HPUE	PASS

5.4 5G RedCap FDD Specifications

Description:

- The maximum TX power of 5G RedCap is measured in FDD SCS=15KHz, TDD SCS=30KHz, UL DFT-s-OFDM QPSK Inner Full RB.
- The RX sensitivity of 5G RedCap is measured in FDD SCS=15KHz, TDD SCS=30KHz, the UL RB configure refer to 3GPP protocol 38.521-1 Table 7.3.2.4.1-3.
- TT is the test tolerance, and the tolerance value of TX power is referred to 3GPP protocol 38.521-1 Table 6.2I.1.5-2, as shown in the following figure.

Table 6.2I.1.5-2: Test Tolerance (UE maximum output power)

	$f \leq 3.0\text{GHz}$	$3.0\text{GHz} < f \leq 4.2\text{GHz}$	$4.2\text{GHz} < f \leq 6.0\text{GHz}$
BW $\leq 40\text{MHz}$	0.7 dB	1.0 dB	1.0 dB

Figure 1. RedCap maximum TX power tolerance

Refer to 3GPP protocol 38.521-1 Table 7.3I.2.5-7 for tolerances of RX sensitivity, as shown in the following figure.

Table 7.3I.2.5-7: Test Tolerance (TT) for RX sensitivity level for RedCap UE

$f \leq 3.0\text{GHz}$	$3.0\text{GHz} < f \leq 6.0\text{GHz}$
0.7 dB	1.0 dB

Figure 2. RedCap Tolerances of RX sensitivity

Table 14. RedCap maximum TX power & RX sensitivity (main+diversity)

Band	BW (MHz)	Channel	Maximum TX Power (dBm)			RX Sensitivity (Main+Diversity) (dBm)		
			3GPP Requirement	Test Value		3GPP requirement	Test Value	
				1975#	1892#		1975#	1892#
n1	20	L	23±2±TT	22.8	23.0	-93.8+TT	-99.5	-99.9
		M	23±2±TT	22.9	22.9		-99.7	-99.9
		H	23±2±TT	22.8	22.8		-99.3	-99.5
n3	20	L	23+2/-3.5±T	22.7	22.9	-90.8+TT	-99.5	-99.9
		M	23±2±TT	22.9	22.8		-99.5	-99.9
		H	23+2/-3.5±TT	23.0	22.9		-99.5	-99.9
n5	20	L	23±2±TT	23.2	23.1	-86.8+TT	-99.9	-100.1
		M	23±2±TT	23.2	23.3		-99.7	-100.1
		H	23±2±TT	23.1	23.2		-99.7	-100.1
n8	20	L	23+2/-3.5±TT	23.3	22.7	-85.8+TT	-99.7	-99.9
		M	23±2±TT	23.3	22.6		-99.7	-99.9
		H	23+2/-3.5±TT	23.1	22.6		-99.7	-99.9
n28	20	L	23+2+TT/-2.5-TT	23.2	23.1	-90.8+TT	-99.9	-100.1
		M	23+2+TT/-2.5-TT	23.0	23.0		-100.1	-100.1
		H	23+2+TT/-2.5-TT	22.8	22.8		-99.9	-99.9

Table 15. RedCap maximum TX power & RX sensitivity (main&diversity)

			Maximum TX Power (dBm)			RX Sensitivity (dBm)				
Band	BW	Channel	3GPP Requirement	Test Value		3GPP Requirement	Test Value (main)		Test Value (diversity)	
				1975#	1892#		1975#	1892#	1975#	1892#
n1	20M	L	23±2±TT	22.8	23.0	-93.8+3+TT	-95.7	-95.5	-97.1	-97.1
		M	23±2±TT	22.9	22.9		-95.9	-95.7	-97.1	-97.1
		H	23±2±TT	22.8	22.8		-95.7	-95.5	-96.7	-96.7
n3	20M	L	23+2/-3.5±T	22.7	22.9	-90.8+3+TT	-96.3	-95.9	-96.9	-96.9
		M	23±2±TT	22.9	22.8		-96.0	-96.1	-96.7	-96.9
		H	23+2/-3.5±TT	23.0	22.9		-96.5	-96.3	-96.9	-96.9
n5	20M	L	23±2±TT	23.2	23.1	-86.8+3+TT	-96.3	-96.3	-97.5	-97.5
		M	23±2±TT	23.2	23.3		-96.3	-96.1	-97.5	-97.5

			Maximum TX Power (dBm)		RX Sensitivity (dBm)					
Band	BW	Channel	3GPP Requirement	Test Value		3GPP Requirement	Test Value (main)		Test Value (diversity)	
				1975#	1892#		1975#	1892#	1975#	1892#
n8	20M	H	23±2±TT	23.1	23.2		-96.1	-96.1	-97.3	-97.3
		L	23+2/-3.5±TT	23.3	22.7		-96.1	-96.1	-97.3	-97.3
		M	23±2±TT	23.3	22.6	-85.8+3+TT	-96.1	-96.1	-97.3	-97.3
		H	23+2/-3.5±TT	23.1	22.6		-95.9	-95.9	-97.3	-97.3
n28	20M	L	23+2+TT/-2.5-TT	23.2	23.1		-97.1	-97.1	-96.7	-96.5
		M	23+2+TT/-2.5-TT	23.0	23.0	-90.8+3+TT	-97.3	-97.3	-96.9	-96.9
		H	23+2+TT/-2.5-TT	22.8	22.8		-97.1	-97.1	-96.7	-96.7

Table 16. Other specifications of RedCap

Band	Test Environment	Protocol Section	Test Case	Result
n1/n3/n5/n8/n28	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.2I.1	UE maximum output power for RedCap	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.2.2	Maximum Power Reduction (MPR)	PASS
	Normal	6.2.3	UE additional maximum output power reduction	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.2.4	Configured transmitted power	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.1	Minimum output power	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.2	Transmit OFF power	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.3	Transmit ON/OFF time mask	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.3.4	PRACH time mask	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.3.6	SRS time mask	PASS
	Normal	6.3.4.2	Absolute power tolerance	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.4.3	Power Control Relative power tolerance	PASS

Band	Test Environment	Protocol Section	Test Case	Result
	TH/VL, TH/VH			
	Normal	6.3.4.4	Aggregate power tolerance (PUCCH/PUSCH)	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.4.1	Frequency error	PASS
	Normal	6.4.2.1	Error Vector Magnitude (PUCCH/PUSCH/PRACH)	PASS
	Normal	6.4.2.2	Carrier leakage	PASS
	Normal	6.4.2.3	In-band emissions (PUCCH/PUSCH)	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.4.2.4	EVM equalizer spectrum flatness	PASS
	Normal	6.4.2.5	EVM equalizer spectrum flatness for Pi/2 BPSK	PASS
	Normal	6.5.1	Occupied bandwidth	PASS
	Normal	6.5.2.2	Spectrum Emission Mask	PASS
	Normal	6.5.2.3	Additional spectrum emission mask	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.5.2.4	Adjacent channel leakage ratio	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	7.3I.2	Reference sensitivity power level for RedCap	PASS
	Normal	7.4	Maximum input level	PASS

5.5 5G RedCap TDD Specifications

Description:

- The maximum TX power of 5G RedCap is measured in FDD SCS=15KHz, TDD SCS=30KHz, UL DFT-s-OFDM QPSK Inner Full RB.
- The RX sensitivity of 5G RedCap is measured in FDD SCS=15KHz, TDD SCS=30KHz, the UL RB configure refer to 3GPP protocol 38.521-1 Table 7.3.2.4.1-3.
- TT is the test tolerance, and the tolerance value of TX power is referred to 3GPP protocol 38.521-1 Table 6.2I.1.5-2, as shown in the following figure.

Table 6.2I.1.5-2: Test Tolerance (UE maximum output power)

	f ≤ 3.0GHz	3.0GHz < f ≤ 4.2GHz	4.2GHz < f ≤ 6.0GHz
BW ≤ 40MHz	0.7 dB	1.0 dB	1.0 dB

Figure 3. RedCap maximum TX power tolerance

Refer to 3GPP protocol 38.521-1 Table 7.3I.2.5-7 for tolerances of RX sensitivity, as shown in the following figure.

Table 7.3I.2.5-7: Test Tolerance (TT) for RX sensitivity level for RedCap UE

f ≤ 3.0GHz	3.0GHz < f ≤ 6.0 GHz
0.7 dB	1.0 dB

Figure 4. RedCap Tolerances of RX sensitivity

Table 17. RedCap maximum TX power & RX sensitivity (main+diversity)

Band	BW (MHz)	Channel	Maximum TX Power (dBm)			RX Sensitivity (Main+Diversity) (dBm)		
			3GPP Requirement	Test Value		3GPP requirement	Test Value	
				1975#	1892#		1975#	1892#
n40	20	L	23±2±TT	22.9	23.0		-99.3	-99.7
		M	23±2±TT	22.9	23.1	-93.8+TT	-99.5	-99.7
		H	23±2±TT	22.8	23.0		-99.1	-99.1
n41	20	L	23+2/-3.5±TT	22.6	22.5		-99.3	-99.3
		M	23±2±TT	22.6	22.8	-91.8+TT	-99.9	-99.9
		H	23+2/-3.5±TT	22.8	22.9		-99.9	-99.8
n78	20	L	23+2+TT/-3-TT	23.8	23.7		-98.9	-99.0
		M	23+2+TT/-3-TT	23.6	23.7	-92.8+TT	-99.9	-99.5
		H	23+2+TT/-3-TT	24.0	24.0		-99.7	-99.5
n79	20	L	23+2+TT/-3-TT	22.9	22.9		-99.8	-99.5
		M	23+2+TT/-3-TT	23.8	23.7	-92.3+TT	-100.0	-99.5
		H	23+2+TT/-3-TT	23.9	23.6		-99.4	-99.0

Table 18. RedCap maximum TX power & RX sensitivity (main&diversity)

Band	BW	Channel	Maximum TX Power (dBm)		RX Sensitivity (dBm)					
			3GPP Requirement	Test Value		3GPP Requirement	Test Value (main)		Test Value (diversity)	
				1975#	1892#		1975#	1892#	1975#	1892#
n40	20M	L	23±2±TT	22.9	23.0		-95.3	-95.8	-97.1	-97.3
		M	23±2±TT	22.9	23.1	-93.8+2.5+TT	-95.9	-96.2	-96.9	-96.9
		H	23±2±TT	22.8	23.0		-95.5	-95.6	-96.9	-96.7
n41	20M	L	23+2/-3.5±TT	22.6	22.5		-97.4	-97.3	-96.6	-96.3
		M	23±2±TT	22.6	22.8	-91.8+2.5+TT	-97.3	-97.3	-96.8	-96.9
		H	23+2/-3.5±TT	22.8	22.9		-97.1	-97.3	-96.4	-96.5
n78	20M	L	23+2+TT/-3-TT	23.8	23.7		-96.7	-96.8	-95.5	-95.5
		M	23+2+TT/-3-TT	23.6	23.7	-92.8+2.5+TT	-97.5	-97.6	-96.5	-96.3
		H	23+2+TT/-3-TT	24.0	24.0		-97.1	-97.2	-96.3	-96.3
n79	20M	L	23+2+TT/-3-TT	22.9	22.9		-97.2	-97.2	-96.4	-96.6
		M	23+2+TT/-3-TT	23.8	23.7	-92.3+2.5+TT	-97.6	-97.6	-96.5	-96.5
		H	23+2+TT/-3-TT	23.9	23.6		-97.2	-97.2	-95.6	-95.6

Table 19. Other specifications of RedCap

Band	Test Environment	Protocol Section	Test Case	Result
n40/n41 n78/n79	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.2I.1	UE maximum output power for RedCap	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.2.2	Maximum Power Reduction (MPR)	PASS
	Normal	6.2.3	UE additional maximum output power reduction	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.2.4	Configured transmitted power	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.1	Minimum output power	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.2	Transmit OFF power	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.3	Transmit ON/OFF time mask	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.3.4	PRACH time mask	PASS

Band	Test Environment	Protocol Section	Test Case	Result
	TH/VL, TH/VH			
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.3.6	SRS time mask	PASS
	Normal	6.3.4.2	Absolute power tolerance	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.3.4.3	Power Control Relative power tolerance	PASS
	Normal	6.3.4.4	Aggregate power tolerance (PUCCH/PUSCH)	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.4.1	Frequency error	PASS
	Normal	6.4.2.1	Error Vector Magnitude (PUCCH/PUSCH/PRACH)	PASS
	Normal	6.4.2.2	Carrier leakage	PASS
	Normal	6.4.2.3	In-band emissions (PUCCH/PUSCH)	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.4.2.4	EVM equalizer spectrum flatness	PASS
	Normal	6.4.2.5	EVM equalizer spectrum flatness for Pi/2 BPSK	PASS
	Normal	6.5.1	Occupied bandwidth	PASS
	Normal	6.5.2.2	Spectrum Emission Mask	PASS
	Normal	6.5.2.3	Additional spectrum emission mask	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	6.5.2.4	Adjacent channel leakage ratio	PASS
	Normal, TL/VL, TL/VH, TH/VL, TH/VH	7.3I.2	Reference sensitivity power level for RedCap	PASS
	Normal	7.4	Maximum input level	PASS

5.6 5G RedCap SRS Specifications

Table 20. SA 1T2R

Band	Channel	Maximum TX Power (dBm)	
		Test Value (TX0)	Test Value (TX0_SRS)
n40	M	21.3	20.0

Band	Channel	Maximum TX Power (dBm)	
		Test Value (TX0)	Test Value (TX0_SRS)
n41	M	20.6	19.6
n77	M	22.0	20.5
n78	M	20.7	19.0

5.7 GNSS Specifications

Table 21. GNSS specifications

Mode	Test Case	Unit	Test Value	
			0363#	8862#
GNSS	Tracking sensitivity	dBm	-157.5	-157.0
	Cold start (RX power@-130dBm)	s	30.4	30.5
	Warm start (RX power@-130dBm)	s	28.4	28.9
	Hot start (RX power@-130dBm)	s	1.1	1.1
	Acquisition Sensitivity at different power level (cold start)	dBm	-146.0	-146.5
	Position Accuracy (cold start@-130dBm, CEP 50%)	m	1.2	0.6
	C/N0 (RX power@-130dBm)	dB/Hz	38.8	38.7
	Current consumption fixing (Cold start - average current until TTFF with 20SVs @-130dBm)	mA	45.6	45.2
	Current consumption tracking (Weak signal, 20SVs @-146dBm, no power saving, fix rate=1sec)	mA	44.7	44.5

5.8 Max Throughput

Single Band Max throughput

Description:

- For LTE single band maximum physical layer throughput test, the BW is the maximum BW defined by the 3GPP protocol. The uplink-downlink configurations of the TDD band to be set 5 when DL max physical layer throughput test, and to be set 0 when UL max physical layer throughput test, and the special subframe is 4.
- For SA single band maximum physical layer throughput test, the BW is the maximum BW defined by the 3GPP protocol. The FDD SCS is 15kHz, TDD SCS is 30kHz, the uplink-downlink configurations of the TDD band to be set 5ms 8DS1U S(10:2:2) when DL max physical layer throughput test, and to be set 3DS6U S(10:2:2) when UL max physical layer throughput test.

Table 22. Single Band Max throughput

System	Band	BW(MHz)	Channel	DL Theoretical Value (Mbps)	DL Test Value (Mbps)	UL Theoretical Value (Mbps)	UL Test Value (Mbps)
LTE-FDD RMS	B1	20M	CH18100	194.973	194.973	75.376	75.376
			CH18300	194.973	194.973	75.376	75.376
			CH18500	194.973	194.973	75.376	75.376
	B3	20M	CH19300	194.973	194.973	75.376	75.376
			CH19575	194.973	194.973	75.376	75.376
			CH19850	194.973	194.973	75.376	75.376
	B5	10M	CH20450	97.462	97.462	36.696	36.696
			CH20525	97.462	97.462	36.696	36.696
			CH20600	97.462	97.462	36.696	36.696
	B8	10M	CH21500	97.462	97.462	36.696	36.696
			CH21625	97.462	97.462	36.696	36.696
			CH21750	97.462	97.462	36.696	36.696
LTE-TDD RMS	B34	15M	CH36275	130.76	130.76	33.034	33.034
	B38	20M	CH37850	170.89	170.89	45.226	45.226
			CH38000	170.89	170.89	45.226	45.226
			CH38150	170.89	170.89	45.226	45.226
	B39	20M	CH38350	170.89	170.89	45.226	45.226
			CH38450	170.89	170.89	45.226	45.226
			CH38550	170.89	170.89	45.226	45.226
	B40	20M	CH38750	170.89	170.89	45.226	45.226
			CH39150	170.89	170.89	45.226	45.226
			CH39550	170.89	170.89	45.226	45.226
	B41	20M	CH39750	170.89	170.89	45.226	45.226
			CH40620	170.89	170.89	45.226	45.226
			CH41490	170.89	170.89	45.226	45.226
RedCap FDD RMS	n1	20M	CH424000	230.74	230.74	122.98	122.98
			CH428000	231.15	231.15	122.98	122.98
			CH432000	230.95	230.95	122.98	122.98

System	Band	BW(MHz)	Channel	DL Theoretical Value (Mbps)	DL Test Value (Mbps)	UL Theoretical Value (Mbps)	UL Test Value (Mbps)
RedCap TDD RMS	n3	20M	CH363000	231.36	231.36	122.98	122.98
			CH368500	231.36	231.36	122.98	122.98
			CH374000	231.15	231.15	122.98	122.98
	n5	20M	CH175800	231.36	231.36	122.98	122.98
			CH176300	231.36	231.36	122.98	122.98
			CH176800	230.74	230.74	122.98	122.98
	n8	20M	CH187000	231.15	231.15	122.98	122.98
			CH188500	231.36	231.36	122.98	122.98
			CH190000	230.74	230.74	122.98	122.98
	n28	20M	CH153600	230.95	230.95	122.98	122.98
			CH156600	231.36	231.36	122.98	122.98
			CH158600	230.74	230.74	122.98	122.98
	n40	20M	CH462000	193.31	193.31	78.08	78.08
			CH470000	193.21	193.21	78.08	78.08
			CH478000	193.56	193.56	78.08	78.08
	n41	20M	CH501204	193.31	193.31	78.08	78.08
			CH518598	193.21	193.21	78.08	78.08
			CH535998	193.41	193.41	78.08	78.08
	n78	20M	CH620668	193.31	193.31	78.08	78.08
			CH636666	193.21	193.21	78.08	78.08
			CH652666	193.41	193.41	78.08	78.08
	n79	20M	CH694000	193.31	193.31	78.08	78.08
			CH713334	193.41	193.41	78.08	78.08
			CH732666	193.21	193.21	78.08	78.08

5.9 Working Current

1. Test conditions: normal temperature of 25°C/3.8V
2. Test data:

Table 23. Single band working current

System	Band	Channel	1975#		1892#	
			Test value (mA)	Power (dBm)	Test value (mA)	Power (dBm)
LTE-FDD RMS (10MHz 1RB)	B1	CH18050	625	22.7	618	22.6
		CH18300	568	22.6	564	22.6
		CH18550	616	22.6	610	22.5
	B3	CH19250	597	22.6	587	22.7
		CH19575	624	22.6	609	22.5
		CH19900	701	22.5	676	22.4
	B5	CH20450	663	23.0	658	23.0
		CH20525	618	23.0	624	23.0
		CH20600	622	22.9	610	22.9
	B8	CH21500	556	23.1	552	23.0
		CH21625	549	23.1	541	23.1
		CH21750	591	22.9	579	22.9
LTE-TDD RMS (10MHz 1RB)	B34	CH36250	336	22.5	310	22.5
		CH36275	338	22.4	310	22.5
		CH36300	337	22.5	309	22.4
	B38	CH37800	429	22.2	411	22.2
		CH38000	435	22.1	419	22.0
		CH38200	408	22.1	399	22.2
	B39	CH38300	292	22.6	277	22.5
		CH38450	293	22.6	279	22.5
		CH38600	297	22.7	281	22.6
	B40	CH38700	383	22.6	381	22.5
		CH39150	380	22.5	383	22.6
		CH39600	392	22.6	391	22.8
	B41	CH39700	401	21.9	398	22.1
		CH40620	431	22.0	416	22.1
		CH41540	410	22.2	407	22.4
		CH37800	608	25.5	559	25.5

System			Band	Channel	1975#		1892#	
					Test value (mA)	Power (dBm)	Test value (mA)	Power (dBm)
LTE-TDD RMS (10MHz 1RB)	HUPE	B38	CH38000	597	25.2	569	25.4	
			CH38200	537	25.2	519	25.3	
	B41	CH39700	548	25.2	534	25.3		
		CH40620	599	25.3	569	25.3		
		CH41540	549	25.4	542	25.6		
RedCap RMS (10MHz Inner_Ful)	FDD	n1	CH423000	600	22.8	599	23.0	
			CH428000	571	22.9	564	22.9	
			CH433000	598	22.8	590	22.8	
		n3	CH362000	540	22.7	538	22.9	
			CH368500	580	22.9	570	22.8	
			CH375000	707	23.0	684	22.9	
		n5	CH174800	650	23.2	651	23.1	
			CH176300	562	23.2	564	23.3	
			CH177800	610	23.1	614	23.2	
		n8	CH186000	578	23.3	566	22.7	
			CH188500	540	23.3	533	22.6	
			CH191000	544	23.1	557	22.6	
		n28	CH152600	532	23.2	527	23.1	
			CH156100	517	23.0	518	23.0	
			CH159600	526	22.8	521	22.8	
RedCap RMS (20MHz Inner_Ful)	TDD	n40	CH462000	212	22.9	205	23.0	
			CH470000	212	22.9	209	23.1	
			CH478000	219	22.8	214	23.0	
		n41	CH501204	197	22.6	193	22.5	
			CH518598	237	22.6	239	22.8	
			CH535998	239	22.8	235	22.9	
		n78	CH620668	245	23.8	244	23.7	
			CH636666	248	23.6	248	23.7	
			CH652666	254	24.0	256	24.0	

System	Band	Channel	1975#		1892#	
			Test value (mA)	Power (dBm)	Test value (mA)	Power (dBm)
	n79	CH694000	270	22.9	269	22.9
		CH713334	290	23.8	289	23.7
		CH732666	302	23.9	290	23.6