PERFECT WIRELESS EXPERIENCE

FG132-EAU-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 (2024-11-07)	Initial version

1 Test Version Description

Table 1. Test version description

Product name	FG132-EAU-00
Hardware version	V1.3
Software version	19003.1000.60.02.01.06

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℃	Normal voltage: +3.8V
2	TL/VL	Low operating temperature: -35℃	Low voltage: +3.3V
3	TL/VH	Low operating temperature: -35℃	High voltage: +4.3V
4	TH/VL	High operating temperature: +75℃	Low voltage: +3.3V
5	TH/VH	High operating temperature: +75℃	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	
			0587#	0652#		0587#	0652#
B1	L	23.0±2.7	22.6	23.0	-96.3	-102.1	-102.3
	M	23.0±2.7	22.7	23.1		-102.3	-102.5
	H	23.0±2.7	22.7	23.0		-101.9	-101.9
B3	L	23.0+2.7/-4.2	22.7	23.2	-93.3	-101.7	-101.9
	M	23.0±2.7	22.7	23.1		-101.7	-102.1
	H	23.0+2.7/-4.2	22.8	23.1		-102.1	-101.9
B5	L	23.0±2.7	22.7	23.2	-94.3	-102.9	-103.1
	M	23.0±2.7	22.7	23.1		-102.8	-102.9
	H	23.0±2.7	22.7	23.0		-102.5	-102.7
B7	L	23.0+2.7/-4.2	22.4	22.7	-94.3	-101.9	-101.7
	M	23.0±2.7	22.3	22.7		-101.5	-101.9
	H	23.0+2.7/-4.2	22.3	22.7		-101.5	-101.5
B8	L	23.0+2.7/-4.2	22.6	23.1	-93.3	-102.5	-102.7
	M	23.0±2.7	22.7	23.2		-102.9	-102.9
	H	23.0+2.7/-4.2	22.8	23.0		-102.5	-102.5
B20	L	23.0+2.7/-4.2	22.6	23.1	-93.3	-102.7	-102.5
	M	23.0±2.7	22.6	23.1		-102.5	-102.7
	H	23.0+2.7/-4.2	22.7	23.1		-102.7	-102.7
B28	L	23.0+2.7/-3.2	22.5	23.1	-94.8	-102.6	-102.6
	M	23.0+2.7/-3.2	22.8	23.2		-103.0	-103.0
	H	23.0+2.7/-3.2	22.7	23.1		-102.6	-102.4

Table 7. LTE-FDD 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)	
			0587#	0652#		0587#	0652#	0587#	0652#
B1	L	23.0±2.7	22.6	23.0	-96.3	-98.5	-98.5	-99.7	-99.7
	M	23.0±2.7	22.7	23.1		-98.7	-98.7	-99.7	-99.9
	H	23.0±2.7	22.7	23.0		-98.3	-98.3	-99.3	-99.3
B3	L	23.0+2.7/-4.2	22.7	23.2	-93.3	-98.8	-98.9	-98.7	-98.9
	M	23.0±2.7	22.7	23.1		-99.1	-98.9	-98.7	-99.1
	H	23.0+2.7/-4.2	22.8	23.1		-99.1	-99.1	-98.9	-98.9
B5	L	23.0±2.7	22.7	23.2	-94.3	-99.7	-99.7	-100.5	-100.5
	M	23.0±2.7	22.7	23.1		-99.7	-99.7	-100.1	-100.1
	H	23.0±2.7	22.7	23.0		-99.3	-99.3	-99.9	-99.9
B7	L	23.0+2.7/-4.2	22.4	22.7	-94.3	-98.1	-98.1	-99.1	-99.3
	M	23.0±2.7	22.3	22.7		-98.3	-98.1	-99.1	-99.3
	H	23.0+2.7/-4.2	22.3	22.7		-98.3	-98.3	-98.9	-98.9
B8	L	23.0+2.7/-4.2	22.6	23.1	-93.3	-99.1	-98.9	-99.9	-99.9
	M	23.0±2.7	22.7	23.2		-99.3	-99.1	-100.1	-100.3
	H	23.0+2.7/-4.2	22.8	23.0		-99.3	-99.1	-99.9	-100.1
B20	L	23.0+2.7/-4.2	22.6	23.1	-93.3	-98.9	-99.1	-99.9	-99.9
	M	23.0±2.7	22.6	23.1		-99.3	-99.1	-99.5	-99.5
	H	23.0+2.7/-4.2	22.7	23.1		-99.3	-99.3	-99.7	-99.7
B28	L	23.0+2.7/-3.2	22.5	23.1	-94.8	-99.8	-99.8	-99.6	-99.8
	M	23.0+2.7/-3.2	22.8	23.2		-100.2	-100.2	-99.8	-99.6
	H	23.0+2.7/-3.2	22.7	23.1		-100.0	-99.8	-99.0	-99.4

Table 8. Other specifications of LTE-FDD

Band	Test Environment	Protocol Section	Test Case	Result
B1/ B3/ B5/B7/ B8/B20/	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

Band	Test Environment	Protocol Section	Test Case	Result
B28	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
	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

Band	Test Environment	Protocol Section	Test Case	Result
	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
	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	
			0587#	0652#		0587#	0652#
B38	L	23.0±2.7	22.5	22.8	-96.3	-101.9	-101.9
	M	23.0±2.7	22.3	22.6		-101.7	-101.7
	H	23.0±2.7	22.4	22.5		-101.5	-101.5
B40	L	23.0±2.7	22.7	22.9	-96.3	-101.3	-101.1
	M	23.0±2.7	22.8	22.9		-101.3	-101.3
	H	23.0±2.7	23.1	23.3		-100.9	-100.9

Band	Channel	Maximum TX Power (dBm)			RX Sensitivity (Main+Diversity) (dBm)		
		3GPP Requirement	Test Value		3GPP Requirement	Test Value	
			0587#	0652#		0587#	0652#
B41	L	23.0+2.7/-4.2	22.8	22.8	-94.3	-101.4	-101.3
	M	23.0±2.7	22.4	22.7		-101.9	-101.9
	H	23.0+2.7/-4.2	22.8	22.8		-101.3	-101.5
B42	L	23.0+3.0/-4.0	22.6	22.7	-95.0	-102.0	-102.0
	M	23.0+3.0/-4.0	22.6	22.8		-101.8	-102.0
	H	23.0+3.0/-4.0	22.6	23.0		-102.0	-102.2
B43	L	23.0+3.0/-4.0	22.7	23.2	-95.0	-102.0	-102.2
	M	23.0+3.0/-4.0	22.9	23.0		-102.2	-102.4
	H	23.0+3.0/-4.0	22.7	22.8		-102.4	-102.6

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)	
			0587#	0652#		0587#	0652#	0587#	0652#
B38	L	23.0±2.7	22.5	22.8	-96.3	-99.5	-99.3	-97.9	-97.5
	M	23.0±2.7	22.3	22.6		-98.9	-99.1	-98.3	-98.1
	H	23.0±2.7	22.4	22.5		-98.9	-98.7	-97.9	-97.5
B40	L	23.0±2.7	22.7	22.9	-96.3	-97.1	-96.9	-99.1	-99.2
	M	23.0±2.7	22.8	22.9		-97.3	-97.3	-98.9	-98.9
	H	23.0±2.7	23.1	23.3		-96.9	-96.9	-97.7	-98.1
B41	L	23.0+2.7/-4.2	22.8	22.8	-94.3	-98.9	-98.9	-97.1	-97.1
	M	23.0±2.7	22.4	22.7		-99.1	-99.1	-98.5	-98.5
	H	23.0+2.7/-4.2	22.8	22.8		-98.9	-98.7	-98.3	-98.1
B42	L	23.0+3.0/-4.0	22.6	22.7	-95.0	-99.0	-98.8	-98.8	-98.8
	M	23.0+3.0/-4.0	22.6	22.8		-99.0	-98.8	-98.8	-99.0
	H	23.0+3.0/-4.0	22.6	23.0		-99.4	-99.2	-99.2	-99.2
B43	L	23.0+3.0/-4.0	22.7	23.2	-95.0	-99.4	-99.4	-99.2	-99.2
	M	23.0+3.0/-4.0	22.9	23.0		-99.6	-99.2	-99.2	-99.4
	H	23.0+3.0/-4.0	22.7	22.8		-99.6	-99.6	-99.2	-99.2

Table 11. Other specifications of LTE-TDD

Band	Test Environment	Protocol Section	Test Case	Result
B38/B40/B41/B42/B43	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
	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

Band	Test Environment	Protocol Section	Test Case	Result
	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
	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	
			0587#	0363#
B38	L	26.0±2.7	25.7	25.7
	M	26.0±2.7	25.8	25.8
	H	26.0±2.7	25.7	25.6
B40	L	26.0±2.7	26.1	25.9
	M	26.0±2.7	26.1	25.9

Band	Channel	Maximum TX Power (dBm)		
		3GPP Requirement	Test Value	
			0587#	0363#
	H	26.0±2.7	26.4	26.2
B41	L	26.0+2.7/-4.2	25.9	25.8
	M	26.0±2.7	25.8	25.7
	H	26.0+2.7/-4.2	26.0	25.9
B42	L	26.0+3/-4	25.5	25.5
	M	26.0+3/-4	25.8	25.8
	H	26.0+3/-4	25.9	25.9
B43	L	26.0+3/-4	26.0	26.0
	M	26.0+3/-4	25.9	25.9
	H	26.0+3/-4	25.8	25.8

Table 13. Other specifications of LTE HPUE

Band	Test Environment	Protocol Section	Test Case	Result
B38/B40/ B41/B42/ B43	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
	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 Table7.3.2.4.1-3.
- 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 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 ≤ 3.0GHz	3.0GHz < f ≤ 6.0 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	
				0652#	0363#		0652#	0363#
n1	20	L	23±2±TT	22.7	22.8	-93.8+TT	-99.5	-99.5
		M	23±2±TT	22.7	22.7		-99.7	-99.5
		H	23±2±TT	22.7	22.7		-99.1	-99.3
n3	20	L	23+2/-3.5±T	22.8	23.0	-90.8+TT	-99.3	-99.3
		M	23±2±TT	22.7	22.9		-99.3	-99.3
		H	23+2/-3.5±TT	22.8	23.1		-99.3	-99.3
n5	20	L	23±2±TT	23.2	23.3	-86.8+TT	-99.9	-99.9
		M	23±2±TT	23.0	23.3		-99.7	-99.7
		H	23±2±TT	23.0	23.3		-99.7	-99.7
n7	20	L	23+2/-3.5±TT	23.2	23.0	-91.8+TT	-99.3	-99.1
		M	23±2±TT	23.2	23.0		-99.3	-99.1
		H	23+2/-3.5±TT	23.0	23.0		-99.1	-98.9

Band	BW (MHz)	Channel	Maximum TX Power (dBm)			RX Sensitivity (Main+Diversity) (dBm)		
			3GPP Requirement	Test Value		3GPP requirement	Test Value	
				0652#	0363#		0652#	0363#
n8	20	L	23+2/-3.5±TT	22.9	23.2	-85.8+TT	-99.7	-99.5
		M	23±2±TT	22.9	23.0		-99.7	-99.5
		H	23+2/-3.5±TT	22.7	23.0		-99.5	-99.5
n20	20	L	23+2/-3.5±TT	22.8	23.1	-89.8+TT	-99.1	-99.1
		M	23±2±TT	22.9	23.1		-99.3	-99.3
		H	23+2/-3.5±TT	22.9	23.1		-99.3	-99.1
n28	20	L	23+2+TT/-2.5-TT	23.1	23.1	-90.8+TT	-99.9	-99.7
		M	23+2+TT/-2.5-TT	23.2	23.3		-99.9	-99.9
		H	23+2+TT/-2.5-TT	23.0	23.2		-99.7	-99.7

Table 15. 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)	
				0652#	0363#		0652#	0363#	0652#	0363#
n1	20M	L	23±2±TT	22.7	22.8	-93.8+3+TT	-95.7	-95.5	-97.1	-96.7
		M	23±2±TT	22.7	22.7		-95.9	-95.7	-97.1	-96.9
		H	23±2±TT	22.7	22.7		-95.7	-95.5	-96.7	-96.5
n3	20M	L	23+2/-3.5±T	22.8	23.0	-90.8+3+TT	-95.9	-95.7	-96.5	-95.9
		M	23±2±TT	22.7	22.9		-96.3	-96.1	-96.5	-96.3
		H	23+2/-3.5±TT	22.8	23.1		-96.3	-96.1	-96.7	-96.3
n5	20M	L	23±2±TT	23.2	23.3	-86.8+3+TT	-96.3	-96.1	-97.3	-96.7
		M	23±2±TT	23.0	23.3		-96.1	-96.1	-97.3	-97.3
		H	23±2±TT	23.0	23.3		-96.1	-96.1	-97.1	-96.9
n7	20M	L	23+2/-3.5±TT	23.2	23.0	-91.8+3+TT	-95.5	-95.3	-96.7	-96.7
		M	23±2±TT	23.2	23.0		-95.5	-95.5	-96.5	-96.5
		H	23+2/-3.5±TT	23.0	23.0		-95.7	-95.5	-96.3	-96.1
n8	20M	L	23+2/-3.5±TT	22.9	23.2	-85.8+3+TT	-95.7	-95.9	-97.1	-97.1
		M	23±2±TT	22.9	23.0		-95.7	-95.5	-96.9	-97.1

Band	BW	Channel	Maximum TX Power (dBm)			RX Sensitivity (dBm)				
			3GPP Requirement	Test Value		3GPP Requirement	Test Value (main)		Test Value (diversity)	
				0652#	0363#		0652#	0363#	0652#	0363#
n20	20M	H	23+2/-3.5±TT	22.7	23.0	-89.8+3+TT	-95.7	-95.7	-97.1	-97.1
		L	23+2/-3.5±TT	22.8	23.1		-95.7	-95.5	-96.7	-96.7
		M	23±2±TT	22.9	23.1		-95.7	-95.7	-96.7	-96.7
		H	23+2/-3.5±TT	22.9	23.1		-95.9	-95.9	-96.5	-96.7
n28	20M	L	23+2+TT/-2.5-TT	23.1	23.1	-90.8+3+TT	-97.1	-97.1	-96.5	-96.5
		M	23+2+TT/-2.5-TT	23.2	23.3		-97.1	-97.1	-96.7	-96.7
		H	23+2+TT/-2.5-TT	23.0	23.2		-96.9	-96.9	-96.5	-96.5

Table 16. Other specifications of RedCap

Band	Test Environment	Protocol Section	Test Case	Result
n1/ n3/ n5/n7/n8/ n20/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,	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 Table7.3.2.4.1-3.
- 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	
				0652#	0363#		0652#	0363#
n38	20	L	23±2±TT	22.6	22.9	-93.8+TT	-99.3	-99.7
		M	23±2±TT	22.5	22.8		-99.3	-99.7
		H	23±2±TT	22.3	22.8		-99.3	-99.5
n40	20	L	23±2±TT	22.7	23.0	-93.8+TT	-98.7	-98.9
		M	23±2±TT	22.8	23.1		-98.7	-98.9
		H	23±2±TT	23.0	23.3		-98.9	-98.9
n41	20	L	23+2/-3.5±TT	22.7	23.1	-91.8+TT	-99.7	-99.5
		M	23±2±TT	22.5	22.7		-99.9	-99.9
		H	23+2/-3.5±TT	22.6	22.7		-99.7	-99.5
n77	20	L	23+2+TT/-3-TT	22.6	23.0	-92.8+TT	-99.6	-99.6
		M	23+2+TT/-3-TT	22.9	23.0		-100.6	-100.6
		H	23+2+TT/-3-TT	23.1	23.5		-100.8	-100.6
n78	20	L	23+2+TT/-3-TT	22.6	22.8	-92.8+TT	-99.5	-99.5
		M	23+2+TT/-3-TT	22.3	22.7		-100.1	-100.3
		H	23+2+TT/-3-TT	23.8	23.8		-100.7	-100.5

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)	
				0652#	0363#		0652#	0363#	0652#	0363#
n38	20M	L	23±2±TT	22.6	22.9	-93.8+2.5+TT	-97.3	-97.5	-95.9	-95.7
		M	23±2±TT	22.5	22.8		-97.1	-97.5	-96.5	-96.1
		H	23±2±TT	22.3	22.8		-96.9	-97.0	-96.3	-95.9
n40	20M	L	23±2±TT	22.7	23.0	-93.8+2.5+TT	-95.1	-95.1	-96.7	-96.5
		M	23±2±TT	22.8	23.1		-95.7	-95.7	-96.5	-96.3
		H	23±2±TT	23.0	23.3		-95.5	-95.5	-96.3	-95.3
n41	20M	L	23+2/-3.5±TT	22.7	23.1	-91.8+2.5+TT	-97.5	-97.0	-96.0	-96.2
		M	23±2±TT	22.5	22.7		-97.1	-97.5	-96.5	-96.1
		H	23+2/-3.5±TT	22.6	22.7		-97.3	-97.0	-95.9	-95.9
n77	20M	L	23+2+TT/-3-TT	22.6	23.0	-92.8+2.5+TT	-97.0	-97.5	-96.4	-95.8
		M	23+2+TT/-3-TT	22.9	23.0		-98.0	-98.5	-97.2	-96.8
		H	23+2+TT/-3-TT	23.1	23.5		-97.8	-98.5	-96.8	-97.2
n78	20M	L	23+2+TT/-3-TT	22.6	22.8	-92.8+2.5+TT	-97.1	-97.5	-96.3	-95.9
		M	23+2+TT/-3-TT	22.3	22.7		-97.7	-98.5	-97.1	-96.9
		H	23+2+TT/-3-TT	23.8	23.8		-97.9	-98.5	-97.1	-97.1

Table 19. Other specifications of RedCap

Band	Test Environment	Protocol Section	Test Case	Result
n38/n40/n41 n77/n78	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

Band	Test Environment	Protocol Section	Test Case	Result
	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
	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)
n38	M	20.8	19.6
n40	M	21.1	19.9
n41	M	21.0	19.9
n77	M	21.2	21.1
n78	M	21.1	21.1

5.7 GNSS Specifications

Table 21. GNSS specifications

Mode	Test Case	Unit	Test Value	
			0041#	1213#
GNSS	Tracking sensitivity	dBm	-157.5	-157.0
	Cold start (RX power@-130dBm)	s	31.5	31.4
	Warm start (RX power@-130dBm)	s	29.5	29.4
	Hot start (RX power@-130dBm)	s	1.4	1.3
	Acquisition Sensitivity at different power level (cold start)	dBm	-146.5	-146.0
	Position Accuracy (cold start@-130dBm, CEP 50%)	m	1.4	1.0
	C/N0 (RX power@-130dBm)	dB/Hz	38.8	38.8
	Current consumption fixing (Cold start - average current until TTFF with 20SVs @-130dBm)	mA	44.0	43.9
	Current consumption tracking (Weak signal,20SVs @-146dBm, no power saving, fix rate=1sec)	mA	44.9	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	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
	B7	20M	CH20850	194.973	194.973	75.376	75.376
			CH21100	194.973	194.973	75.376	75.376
			CH21350	194.973	194.973	75.376	75.376
	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
	B20	20M	CH24250	194.973	194.973	75.376	75.376
			CH24300	194.973	194.973	75.376	75.376
			CH24350	194.973	194.973	75.376	75.376
	B28	20M	CH27310	194.973	194.973	75.376	75.376
			CH27460	194.973	194.973	75.376	75.376
			CH27560	194.973	194.973	75.376	75.376
LTE-TDD RMS	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
			CH38750	170.89	170.89	45.226	45.226

System	Band	BW	Channel	DL Theoretical Value (Mbps)	DL Test Value (Mbps)	UL Theoretical Value (Mbps)	UL Test Value (Mbps)
RedCap FDD RMS	B40	20M	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
	B42	20M	CH41690	170.89	170.89	45.226	45.226
			CH42590	170.89	170.89	45.226	45.226
			CH43490	170.89	170.89	45.226	45.226
	B43	20M	CH43690	170.89	170.89	45.226	45.226
			CH44590	170.89	170.89	45.226	45.226
			CH45490	170.89	170.89	45.226	45.226
	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
	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
	n7	20M	CH526000	230.74	230.74	122.98	122.98
			CH531000	231.36	231.36	122.98	122.98
			CH536000	231.15	231.15	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
	n20	20M	CH160200	231.36	231.36	122.98	122.98
			CH161200	230.74	230.74	122.98	122.98
			CH162200	230.74	230.74	122.98	122.98

System	Band	BW	Channel	DL Theoretical Value (Mbps)	DL Test Value (Mbps)	UL Theoretical Value (Mbps)	UL Test Value (Mbps)
RedCap TDD RMS	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
	n38	20M	CH516000	193.31	193.31	78.08	78.08
			CH519000	193.31	193.31	78.08	78.08
			CH522000	193.31	193.31	78.08	78.08
	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
	n77	20M	CH620668	193.31	193.31	78.08	78.08
			CH650000	193.56	193.56	78.08	78.08
			CH679332	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

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	0363#		0652#	
			Test value (mA)	Power (dBm)	Test value (mA)	Power (dBm)
LTE-FDD RMS	B1	CH18050	640	22.6	654	23.0
		CH18300	563	22.7	577	23.1

System	Band	Channel	0363#		0652#	
			Test value (mA)	Power (dBm)	Test value (mA)	Power (dBm)
(10MHz 1RB)		CH18550	618	22.7	632	23.0
	B3	CH19250	602	22.7	621	23.2
		CH19575	645	22.7	665	23.1
		CH19900	707	22.8	726	23.1
	B5	CH20450	670	22.7	706	23.2
		CH20525	627	22.7	631	23.1
		CH20600	620	22.7	630	23.0
	B7	CH20800	739	22.4	771	22.7
		CH21100	653	22.3	673	22.7
		CH21400	750	22.3	763	22.7
	B8	CH21500	549	22.6	579	23.1
		CH21625	522	22.7	573	23.2
		CH21750	572	22.8	634	23.0
	B20	CH24200	589	22.6	618	23.1
		CH24300	530	22.6	552	23.1
		CH24400	557	22.7	596	23.1
	B28	CH27260	524	22.5	543	23.1
		CH27410	521	22.8	547	23.2
		CH27610	532	22.7	569	23.1
LTE-TDD RMS (10MHz 1RB)	B38	CH37800	450	22.5	478	22.8
		CH38000	385	22.3	463	22.6
		CH38200	366	22.4	389	22.5
	B40	CH38700	418	22.7	426	22.9
		CH39150	375	22.8	388	22.9
		CH39600	386	23.1	399	23.3
	B41	CH39700	410	22.8	405	22.8
		CH40620	389	22.4	462	22.7
		CH41540	415	22.8	450	22.8
		CH41640	353	22.6	385	22.7

System	Band	Channel	0363#		0652#	
			Test value (mA)	Power (dBm)	Test value (mA)	Power (dBm)
	B42	CH42590	351	22.6	378	22.8
		CH43540	331	22.6	361	23.0
	B43	CH43640	319	22.7	340	23.2
		CH44590	308	22.9	321	23.0
		CH45540	312	22.7	322	22.8
LTE-TDD HUPE RMS (10MHz 1RB)	B38	CH37800	605	25.7	628	25.7
		CH38000	590	25.8	623	25.8
		CH38200	550	25.7	566	25.6
	B40	CH38700	652	26.1	616	25.9
		CH39150	567	26.1	556	25.9
		CH39600	647	26.4	607	26.2
	B41	CH39700	607	25.9	591	25.8
		CH40620	588	25.8	623	25.7
		CH41540	592	26.0	598	25.9
	B42	CH41640	480	25.5	498	25.5
		CH42590	468	25.8	492	25.8
		CH43540	447	25.9	467	25.9
	B43	CH43640	428	26.0	448	26.0
		CH44590	405	25.9	416	25.9
		CH45540	418	25.8	419	25.8
RedCap FDD RMS (10MHz Inner_Ful)	n1	CH423000	582	22.7	557	22.8
		CH428000	538	22.7	520	22.7
		CH433000	595	22.7	563	22.7
	n3	CH362000	549	22.8	514	23.0
		CH368500	619	22.7	586	22.9
		CH375000	708	22.8	679	23.1
	n5	CH174800	622	23.2	579	23.3
		CH176300	500	23.0	491	23.3
		CH177800	557	23.0	547	23.3

System	Band	Channel	0363#		0652#	
			Test value (mA)	Power (dBm)	Test value (mA)	Power (dBm)
	n7	CH525000	750	23.2	679	23.0
		CH531000	698	23.2	640	23.0
		CH537000	767	23.0	712	23.0
	n8	CH186000	519	22.9	556	23.2
		CH188500	513	22.9	514	23.0
		CH191000	511	22.7	518	23.0
	n20	CH159200	562	22.8	548	23.1
		CH161200	546	22.9	533	23.1
		CH163200	588	22.9	570	23.1
	n28	CH152600	513	23.1	489	23.1
		CH156100	510	23.2	492	23.3
		CH159600	525	23.0	501	23.2
RedCap TDD RMS (20MHz Inner_Ful)	n38	CH516000	223	22.6	227	22.9
		CH519000	220	22.5	215	22.8
		CH522000	204	22.3	201	22.8
	n40	CH462000	232	22.7	216	23.0
		CH470000	213	22.8	201	23.1
		CH478000	189	23.0	183	23.3
	n41	CH501204	193	22.7	177	23.1
		CH518598	223	22.5	217	22.7
		CH535998	220	22.6	211	22.7
	n77	CH620668	220	22.6	194	23.0
		CH650000	189	22.9	179	23.0
		CH679332	268	23.1	264	23.5
	n78	CH620668	220	22.6	192	22.8
		CH636666	204	22.3	200	22.7
		CH652666	188	22.7	181	23.1