





RF TEST REPORT

Applicant ZTE Corporation

FCC ID SRQ-A103ZT

Product 5G Digital Mobile Phone

Model A103ZT

Report No. R2108A0736-R2V1

Issue Date October 25, 2021

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in FCC CFR47 Part 2 (2020)/ FCC CFR47 Part 27C (2020). The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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Approved by: Kai Xu

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Version	Revision description	Issue Date
Rev.0	Initial issue of report.	September 27, 2021
Rev.1	Update data in Page 41~42.	October 25, 2021

Note: This revised report (Report No. R2108A0736-R2V1) supersedes and replaces the previously issued report (Report No. R2108A0736-R2). Please discard or destroy the previously issued report and dispose of it accordingly.





Number	Test Case	Clause in FCC rules	Verdict	
1	RF Power Output and Effective Isotropic	2.1046	PASS	
'	Radiated Power	27.50(h)(2)	PASS	
2	Occupied Bandwidth	2.1049	PASS	
3	Band Edge Compliance	27.53(m)	PASS	
4	Peak-to-Average Power Ratio	27.50(d)/KDB971168 D01(5.7)	PASS	
5	Frequency Stability	2.1055 / 27.54	PASS	
6	Spurious Emissions at Antonna Terminals	2.1051	DACC	
6	Spurious Emissions at Antenna Terminals	27.53(m)	PASS	
7	Radiates Spurious Emission	2.1053	PASS	
,	Radiates Spurious Effission	27.53(m)	FASS	

Date of Testing: August 17, 2021 ~ September 10, 2021 and October 25, 2021

Date of Sample Received: August 16, 2021

Note: PASS: The EUT complies with the essential requirements in the standard.

FAIL: The EUT does not comply with the essential requirements in the standard.

All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.



1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology** (shanghai) co., Ltd. The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2. Test facility

FCC (Designation number: CN1179, Test Firm Registration Number: 446626)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform measurements.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform measurement.

1.3 Testing Location

Company: TA Technology (Shanghai) Co., Ltd.

Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China

City: Shanghai

Post code: 201201

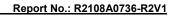
Country: P. R. China

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2 General Description of Equipment under Test

2.1 Applicant and Manufacturer Information

Applicant	ZTE Corporation				
Applicant address	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan				
Applicant address	District, Shenzhen, Guangdong, 518057, P.R.China				
Manufacturer	ZTE Corporation				
Manufacturar address	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan				
Manufacturer address	District, Shenzhen, Guangdong, 518057, P.R.China				

2.2 General information

	EUT Description	า				
Model	A103ZT					
IMEI	IMEI 1: 863601050011015					
IIVIEI	IMEI 2: 86360105001	5412				
Hardware Version	zm3A					
Software Version	A103ZT a.1.0					
Power Supply	Battery / AC adapter					
Antenna Type	Internal Antenna					
Antenna Gain	WCDMA Band IV:	-1.4 dBi				
Antenna Gam	LTE Band 41:	-1.46 dBi				
Test Mode(s)	WCDMA Band IV; LTE	E Band 41				
Test Modulation	(WCDMA) BPSK, QPS	SK,16QAM;				
rest Modulation	(LTE)QPSK, 16QAM,	64QAM;				
HSDPA UE Category	7					
HSUPA UE Category	12					
LTE Category	5					
Maximum E.I.R.P.	WCDMA Band IV:	21.78 dBm				
WIAXIII C.I.T.I .	LTE Band 41:	21.95 dBm				
Rated Power Supply Voltage	3.85V					
Operating Voltage	Minimum: 3.5V Maximum: 4.38V					
Operating Temperature	Lowest: -10°C Hig	hest: +55°C				
Extreme Temperature	Lowest: -30°C Hig	hest: +50°C				
	Mode	Tx (MHz)	Rx (MHz)			
Operating Frequency Range(s)	WCDMA Band IV	1710 ~ 1755	2110 ~ 2155			
	LTE Band 41	2496 ~ 2690	2496 ~ 2690			
	EUT Accessory					
Battery	Manufacturer: NingDe Amperex Technology Ltd.					
Dattery	Model: Li3939T44P8h896443					
Type-C to 3.5 mm Headphone	Manufacturer: JUWEI ELECTRONICS CO., LTD					
Jack	Model: JWUB1430-Z0	1				



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USB to type C Manufacturer: kingpower-tech Model: USBAF-TC20-B-15-HF

Note: 1. The EUT is sent from the applicant to TA and the information of the EUT is declared by

the applicant.



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3 Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standards:

FCC CFR47 Part 27C (2020)

ANSI C63.26 (2015)

Reference standard:

FCC CFR47 Part 2 (2020)

KDB 971168 D01 Power Meas License Digital Systems v03r01



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4 Test Configuration

There is more than one SIM card slot, each one should be applied throughout the compliance test respectively, and however, only the worst case (SIM 1) will be recorded in this report

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes. EUT stand-up position (Z axis), lie-down position (X, Y axis). Receiver antenna polarization (horizontal and vertical), the worst emission was found in position (Z axis, horizontal polarization) and the worst case was recorded.

All mode and data rates and positions and RB size and modulations were investigated.

Subsequently, only the worst case emissions are reported.

The following testing in WCDMA/LTE is set based on the maximum RF Output Power.

The following testing in different Bandwidth is set to detailin the following table:

Test modes are chosen to be reported as the worst case configuration below:

Test items	Modes/Modulation
rest items	WCDMA Band IV
	RMC
RF Power Output and Effective Isotropic Radiated Power	HSDPA/HSUPA
	HSPA+
Occupied Bandwidth	RMC
Band Edge Compliance	RMC
Peak-to-Average Power Ratio	RMC
Frequency Stability	RMC
Spurious Emissions at Antenna Terminals	RMC
Radiates Spurious Emission	RMC



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Test modes are chosen to be reported as the worst case configuration below for LTE Band 41:

Test items		Bandwidth (MHz)			Modulation		RB			Test Channel		
rest items	5	10	15	20	QPSK	16QAM/ 64QAM	1	50%	100%	L	M	Н
RF Power Output and Effective Isotropic Radiated Power	0	0	,	0	0	0	0	0	0	0	0	0
Occupied Bandwidth	0	0	-	0	0	0	-	-	0	0	0	0
Band Edge Compliance	0	0	-	0	0	0	0	-	0	0	1	0
Peak-to-Average Power Ratio	0	0	-	0	0	0	-	-	0	0	0	0
Frequency Stability	0	0	-	0	0	0	0	-	-	-	0	1
Spurious Emissions at Antenna Terminals	0	0	-	0	0	-	0	-	-	0	0	0
Radiates Spurious Emission	0	-	-	0	0	-	0	-	-	-	0	-
Note	The mark "O" means that this configuration is chosen for testing. The mark "-" means that this configuration is not testing.											



5 Test Case Results

5.1 RF Power Output and Effective Isotropic Radiated Power

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

During the process of the testing, The EUT was connected to the Base Station Simulator with a known loss. The EUT is controlled by the Base Station Simulator test set to ensure max power transmission with proper modulation.

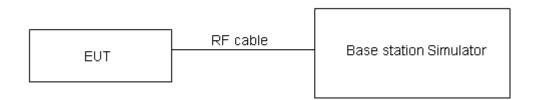
ERP can then be calculated as follows:

EIRP (dBm) = Output Power (dBm) - Losses (dB) + Antenna Gain (dBi)

where:dBd refers to gain relative to an ideal dipole.

EIRP (dBm) = ERP (dBm) + 2.15 (dB.)

Test Setup



Limits

No specific RF power output requirements in part 2.1046.

Rule Part 27.50(h) (2) specifies that "Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power."

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U=0.4 dB for RF power output, k = 2, U=0.4 dB for RF power output, k=0.4 dB for



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Test Results

		Maximum	Output Po	wer (dBm)	EIRP (dBm)			
		Channel	Channel	Channel	Channel	Channel	Channel	
WCDMA	Band IV	1312	1413	1513	1312	1413	1513	
		1712.4	1732.6	1752.6	1712.4	1732.6	1752.6	
		(MHz)	(MHz)	(MHz)	(MHz)	(MHz)	(MHz)	
RN	/IC	23.17	23.18	23.14	21.77	21.78	21.74	
	Sub - Test 1	22.61	22.78	22.76	21.21	21.38	21.36	
HSDPA	Sub - Test 2	22.65	22.78	22.62	21.25	21.38	21.22	
порга	Sub - Test 3	22.07	22.34	22.18	20.67	20.94	20.78	
	Sub - Test 4	22.33	22.26	22.10	20.93	20.86	20.70	
	Sub - Test 1	22.75	22.60	22.56	21.35	21.20	21.16	
	Sub - Test 2	21.55	21.60	21.50	20.15	20.20	20.10	
HSUPA	Sub - Test 3	21.77	21.68	21.56	20.37	20.28	20.16	
	Sub - Test 4	20.83	20.74	20.72	19.43	19.34	19.32	
	Sub - Test 5	22.63	22.82	22.74	21.23	21.42	21.34	
HSPA+	16QAM	22.23	22.38	22.42	20.83	20.98	21.02	



	LTE Band		Maximum Output Power(dBm) EIRP (dBm)								
		RB	RB		Channel/Frequency(MHz)						
BW	Modulation	size	offset	39675/	40620/	41565/	39675/	40620/	41565/		
				2498.5	2593	2687.5	2498.5	2593	2687.5		
		1	0	23.17	22.89	23.16	21.71	21.43	21.70		
		1	13	23.36	23.08	23.29	21.90	21.62	21.83		
		1	24	23.41	23.06	23.12	21.95	21.60	21.66		
	QPSK	12	0	22.30	21.98	22.34	20.84	20.52	20.88		
		12	6	22.41	22.14	22.30	20.95	20.68	20.84		
		12	13	22.56	22.20	22.18	21.10	20.74	20.72		
		25	0	22.42	22.13	22.25	20.96	20.67	20.79		
		1	0	22.16	21.80	21.85	20.70	20.34	20.39		
		1	13	22.15	22.09	22.13	20.69	20.63	20.67		
		1	24	22.07	22.02	22.08	20.61	20.56	20.62		
5MHz	16QAM	12	0	21.19	21.13	21.20	19.73	19.67	19.74		
		12	6	21.33	21.27	21.33	19.87	19.81	19.87		
		12	13	21.23	21.18	21.22	19.77	19.72	19.76		
		25	0	21.31	21.26	21.29	19.85	19.80	19.83		
		1	0	21.22	21.30	21.36	19.76	19.84	19.90		
		1	13	21.42	21.60	21.52	19.96	20.14	20.06		
	64QAM	1	24	21.42	21.62	21.36	19.96	20.16	19.90		
		12	0	20.55	20.68	20.69	19.09	19.22	19.23		
		12	6	20.53	20.67	20.69	19.07	19.21	19.23		
		12	13	20.87	20.85	20.65	19.41	19.39	19.19		
		25	0	20.61	20.80	20.73	19.15	19.34	19.27		
		RB	RB	Channel/Frequency(MHz)							
BW	Modulation	size	offset	39700/ 2501	40620/ 2593	41540/ 2685	39700/ 2501	40620/ 2593	41540/ 2685		
		1	0	23.16	22.87	23.14	21.70	21.41	21.68		
		1	25	23.34	23.05	23.26	21.88	21.59	21.80		
		1	49	23.38	23.02	23.08	21.92	21.56	21.62		
40041-	QPSK	25	0	22.28	21.95	22.31	20.82	20.49	20.85		
10MHz		25	13	22.38	22.10	22.26	20.92	20.64	20.80		
		25	25	22.53	22.16	22.14	21.07	20.70	20.68		
		50	0	22.40	22.08	22.20	20.94	20.62	20.74		
	16QAM	1	0	22.11	21.78	21.83	20.65	20.32	20.37		

A RF TO	_								
RF Te	est Report	4	0.5	00.40	00.07	00.44		0.: R2108A07	
		1	25	22.13	22.07	22.11	20.67	20.61	20.65
		1	49	22.04	21.99	22.05	20.58	20.53	20.59
		25	0	21.16	21.10	21.17	19.70	19.64	19.71
		25	13	21.30	21.23	21.29	19.84	19.77	19.83
		25	25	21.21	21.15	21.19	19.75	19.69	19.73
		50	0	21.28	21.22	21.25	19.82	19.76	19.79
		1	0	21.21	21.28	21.32	19.75	19.82	19.86
		1	25	21.40	21.57	21.51	19.94	20.11	20.05
		1	49	21.39	21.58	21.31	19.93	20.12	19.85
	64QAM	25	0	20.53	20.65	20.65	19.07	19.19	19.19
		25	13	20.50	20.63	20.64	19.04	19.17	19.18
		25	25	20.84	20.81	20.62	19.38	19.35	19.16
		50	0	20.59	20.75	20.69	19.13	19.29	19.23
		DD	DD		Ch	annel/Free	quency(MI	Hz)	
BW	Modulation	RB size	RB offset	39750/	40620/	41490/	39750/	40620/	41490/
		SIZC	Oliset	2506	2593	2680	2506	2593	2680
		1	0	23.13	22.84	23.11	21.67	21.38	21.65
		1	50	23.33	23.03	23.24	21.87	21.57	21.78
		1	99	23.36	22.99	23.05	21.90	21.53	21.59
	QPSK	50	0	22.25	21.91	22.27	20.79	20.45	20.81
		50	25	22.36	22.07	22.23	20.90	20.61	20.77
		50	50	22.50	22.12	22.10	21.04	20.66	20.64
		100	0	22.37	22.04	22.16	20.91	20.58	20.70
		1	0	21.80	21.73	21.78	20.34	20.27	20.32
		1	50	22.09	22.03	22.07	20.63	20.57	20.61
		1	99	22.02	21.97	22.03	20.56	20.51	20.57
20MHz	16QAM	50	0	21.13	21.07	21.14	19.67	19.61	19.68
		50	25	21.27	21.20	21.26	19.81	19.74	19.80
		50	50	21.18	21.11	21.15	19.72	19.65	19.69
		100	0	21.26	21.19	21.22	19.80	19.73	19.76
		1	0	21.18	21.25	21.28	19.72	19.79	19.82
		1	50	21.39	21.55	21.47	19.93	20.09	20.01
		1	99	21.37	21.55	21.30	19.91	20.09	19.84
	64QAM	50	0	20.50	20.61	20.60	19.04	19.15	19.14
		50	25	20.48	20.60	20.60	19.02	19.14	19.14

50

100

50

0

20.57

20.64

19.35

19.10

20.77

20.71

19.11

19.18

19.31

19.25

20.81

20.56



5.2 Occupied Bandwidth

Ambient condition

Temperature Relative humidity		Pressure	
23°C ~25°C	45%~50%	101.5kPa	

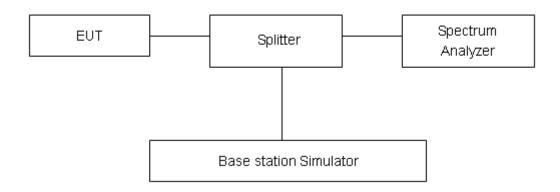
Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The occupied bandwidth is measured using spectrum analyzer.

RBW is set to ≥1%EBW, VBW is set to 3x RBW.

99% power and -26dBc occupied bandwidths are recorded. Spectrum analyzer plots are included on the following pages.

Test Setup



Limits

No specific occupied bandwidth requirements in part 2.1049.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U = 624Hz.



Test Result

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	_	

Mode	Mode Channel		99% Power Bandwidth (MHz)	-26dBc Bandwidth(MHz)	
WCDMA Band IV (RMC)	1312	1712.4	4.1424	4.685	
	1413	1732.6	4.1365	4.676	
(KIVIC)	1513	1752.6	4.1395	4.647	

			LTE	Band 41		
RB	Modulation	Bandwidth	Channel	Frequency	99% Power	-26dBc
KB	Wiodulation	(MHz)	Chamilei	(MHz)	Bandwidth(MHz)	Bandwidth(MHz)
		5	39675	2498.5	4.529	5.028
			40620	2593	4.484	4.926
			41565	2687.5	4.506	4.806
			39700	2501	9.038	9.820
	QPSK	10	40620	2593	9.022	10.032
			41540	2685	8.988	10.252
			39750	2506	17.966	19.366
		20	40620	2593	17.914	19.900
			41490	2680	17.933	19.952
	16QAM		39675	2498.5	4.514	4.952
		5	40620	2593	4.513	4.923
			41565	2687.5	4.508	4.882
		10	39700	2501	8.992	9.637
100%			40620	2593	9.006	9.703
			41540	2685	8.982	9.568
		20	39750	2506	17.907	19.316
			40620	2593	17.928	19.468
			41490	2680	17.966	19.402
			39675	2498.5	4.512	4.918
		5	40620	2593	4.486	4.885
			41565	2687.5	4.515	4.840
			39700	2501	8.987	9.608
	64QAM	10	40620	2593	8.984	9.583
			41540	2685	8.979	9.475
			39750	2506	17.928	20.541
		20	40620	2593	17.904	19.311
			41490	2680	17.945	19.341

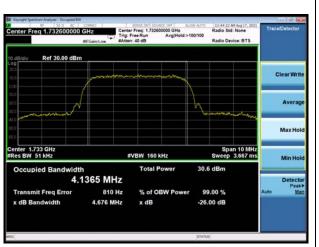


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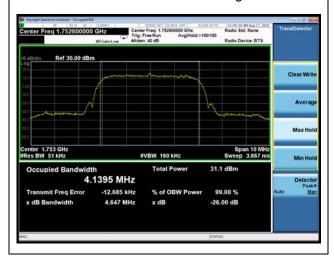
WCDMA Band IV CH-Low



WCDMA Band IV CH Middle



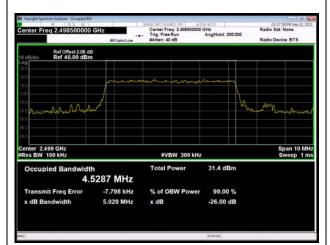
WCDMA Band IV CH High



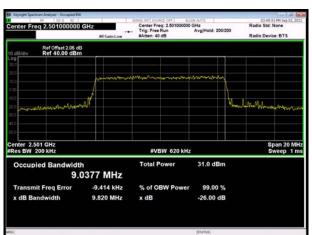


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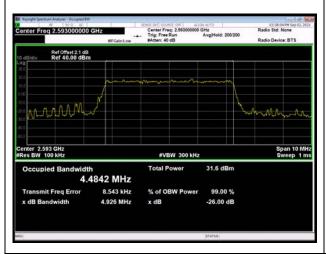
LTE Band 41 QPSK 5MHz CH-Low



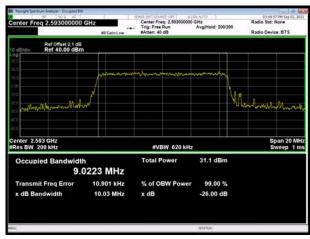
LTE Band 41 QPSK 10MHz CH-Low



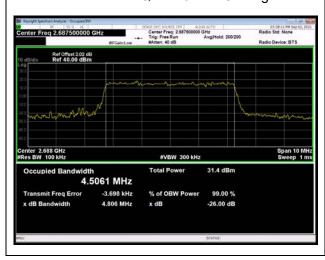
LTE Band 41 QPSK 5MHz CH-Middle



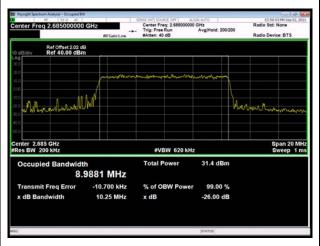
LTE Band 41 QPSK 10MHz CH-Middle



LTE Band 41 QPSK 5MHz CH-High



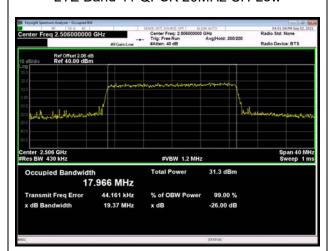
LTE Band 41 QPSK 10MHz CH-High



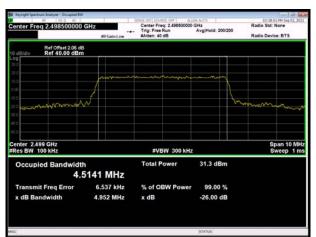




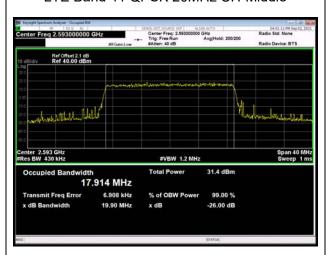




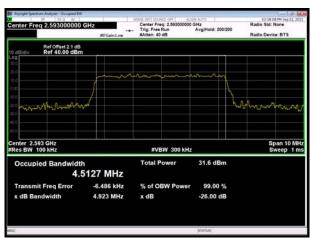
LTE Band 41 16QAM 5MHz CH-Low



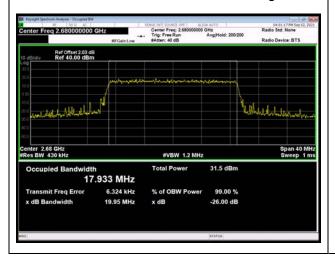
LTE Band 41 QPSK 20MHz CH-Middle



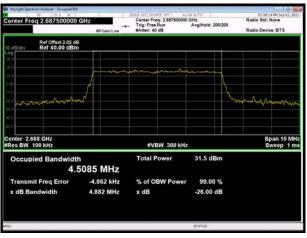
LTE Band 41 16QAM 5MHz CH-Middle



LTE Band 41 QPSK 20MHz CH-High



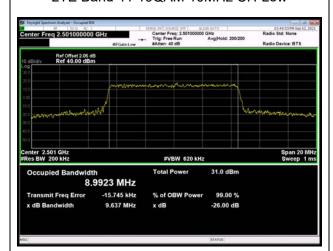
LTE Band 41 16QAM 5MHz CH-High



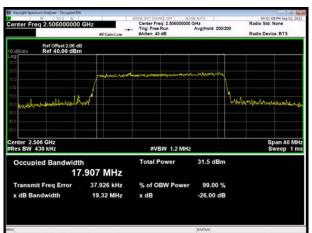


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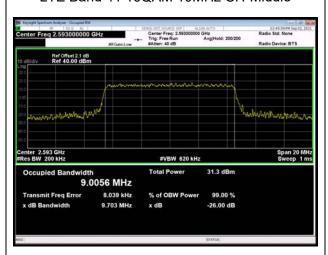
LTE Band 41 16QAM 10MHz CH-Low



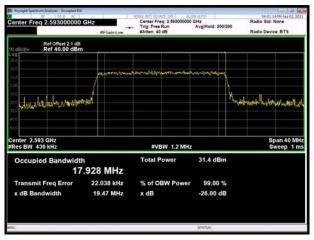
LTE Band 41 16QAM 20MHz CH-Low



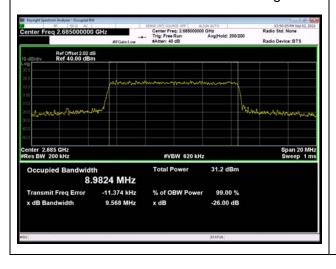
LTE Band 41 16QAM 10MHz CH-Middle



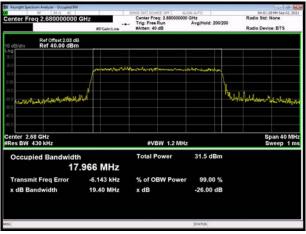
LTE Band 41 16QAM 20MHz CH-Middle



LTE Band 41 16QAM 10MHz CH-High



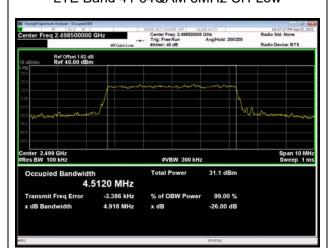
LTE Band 41 16QAM 20MHz CH-High



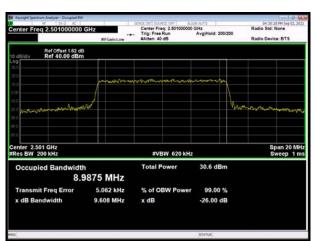


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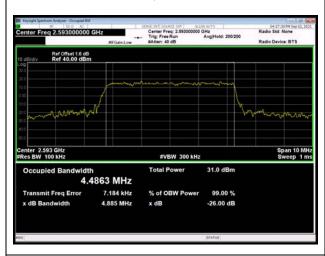
LTE Band 41 64QAM 5MHz CH-Low



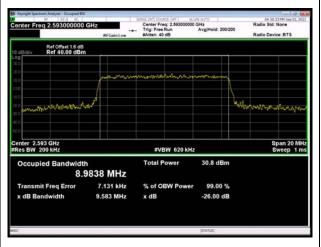
LTE Band 41 64QAM 10MHz CH-Low



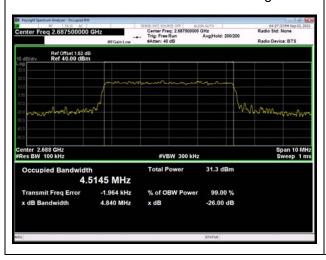
LTE Band 41 64QAM 5MHz CH-Middle



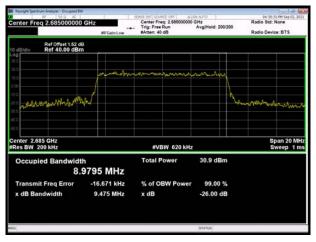
LTE Band 41 64QAM 10MHz CH-Middle



LTE Band 41 64QAM 5MHz CH-High



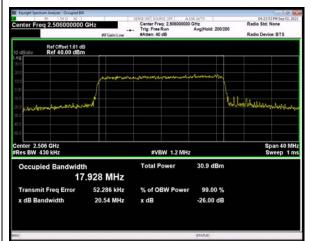
LTE Band 41 64QAM 10MHz CH-High



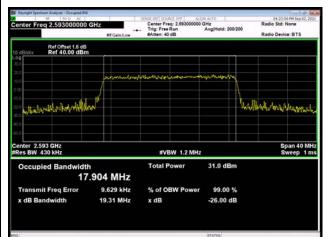


F Test Report No.: R2108A0736-R2V1

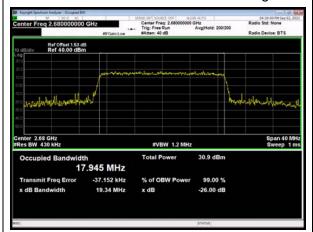
LTE Band 41 64QAM 20MHz CH-Low



LTE Band 41 64QAM 20MHz CH-Middle



LTE Band 41 64QAM 20MHz CH-High





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5.3 Band Edge Compliance

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The band edge of the lowest and highest channels were measured.

The testing follows KDB 971168 D01 v03r01 Section 6.0

The EUT was connected to spectrum analyzer and system simulator via a power divider.

The band edges of low and high channels for the highest RF powers were measured.

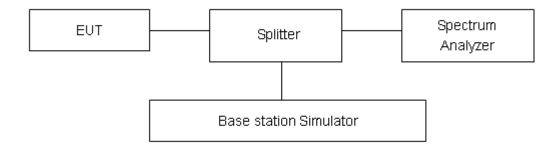
For LTE Band 41 low channel set RBW >= 2% EBW in the 1MHz band immediately outside and adjacent to the band edge. Beyond the 1 MHz band from the band edge, RBW=1MHz was used on spectrum analyzer.

Set spectrum analyzer with RMS detector.

The RF fundamental frequency should be excluded against the limit line in the operating frequency band

Checked that all the results comply with the emission limit line.

Test Setup



Limits

Rule Part 27.53(m) (4) specifies that "for BRS and EBS stations. For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(4) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Example:



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The limit line is derived from 43 + 10log (P) dB below the transmitter power P(Watts)

- = P(W)- [43 + 10log(P)] (dB)
- = [30 + 10log(P)](dBm) [43 + 10log(P)](dB) = -13dBm.

Measurement Uncertainty

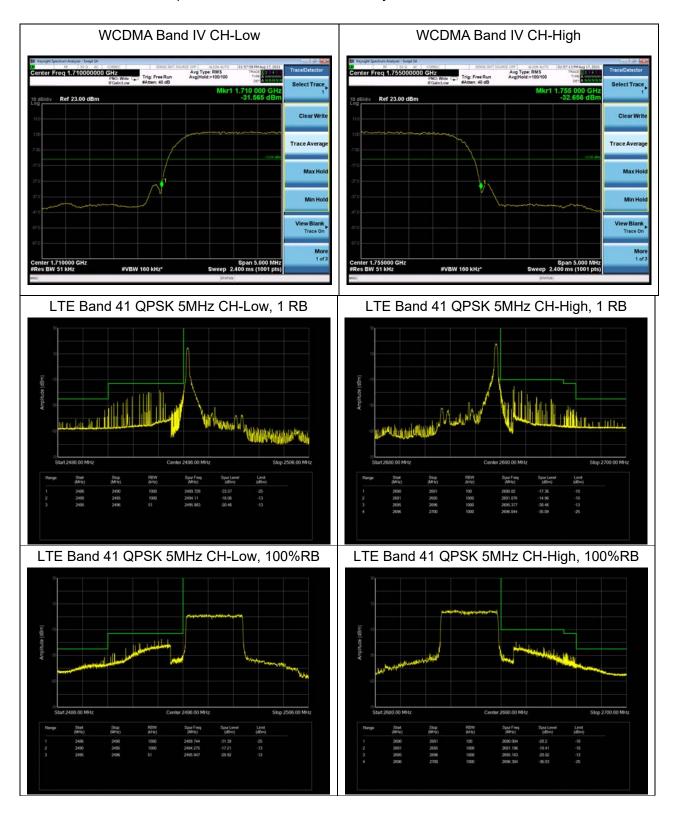
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 1.96, U=0.684dB.



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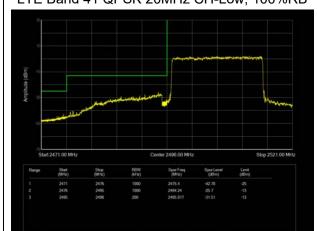
Test Result

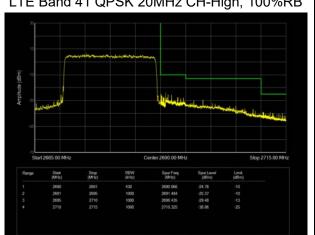
All the test traces in the plots shows the test results clearly.



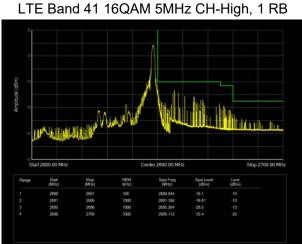
RF Test Report Report No.: R2108A0736-R2V1 LTE Band 41 QPSK 10MHz CH-High, 1 RB LTE Band 41 QPSK 10MHz CH-Low, 1 RB LTE Band 41 QPSK 10MHz CH-Low, 100%RB LTE Band 41 QPSK 10MHz CH-High, 100%RB LTE Band 41 QPSK 20MHz CH-Low, 1 RB LTE Band 41 QPSK 20MHz CH-High, 1 RB

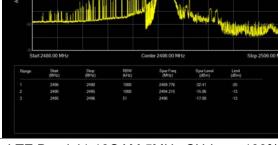
RF Test Report Report No.: R2108A0736-R2V1 LTE Band 41 QPSK 20MHz CH-Low, 100%RB LTE Band 41 QPSK 20MHz CH-High, 100%RB



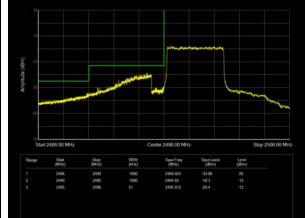


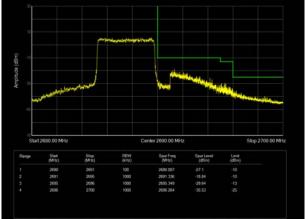
LTE Band 41 16QAM 5MHz CH-Low, 1 RB

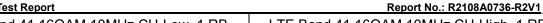


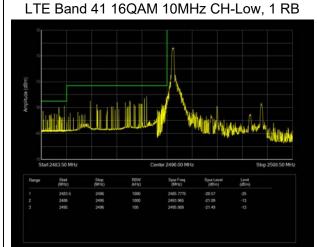


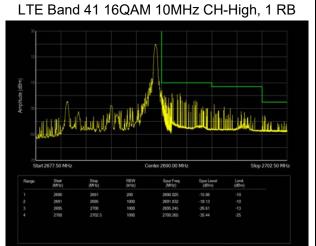




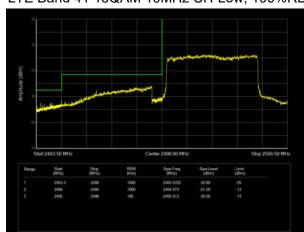


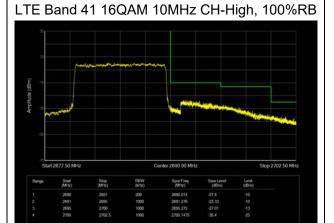




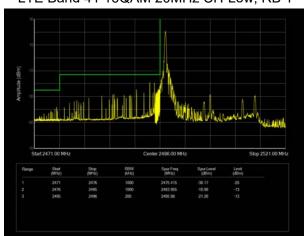


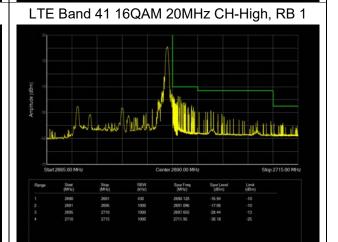
LTE Band 41 16QAM 10MHz CH-Low, 100%RB



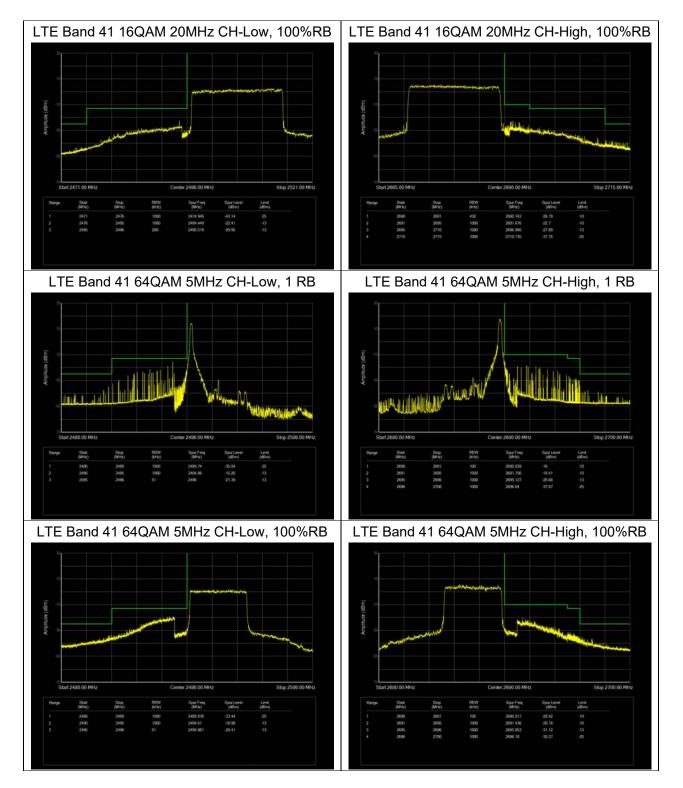


LTE Band 41 16QAM 20MHz CH-Low, RB 1

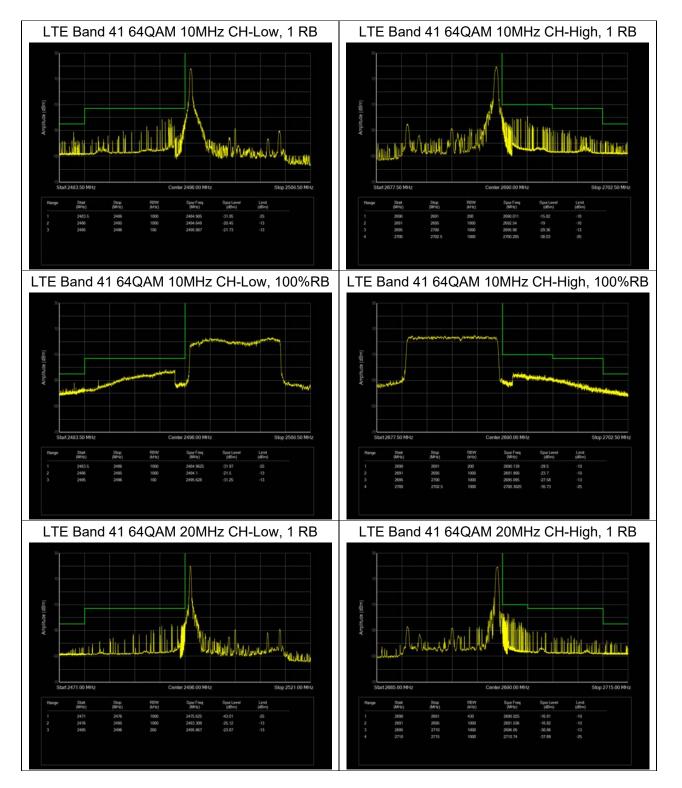






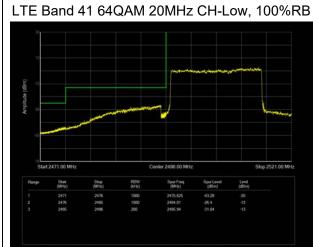


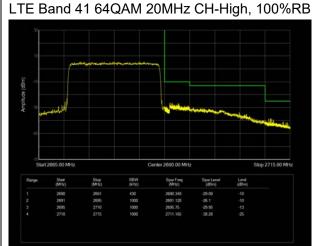






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5.4 Peak-to-Average Power Ratio (PAPR)

Ambient condition

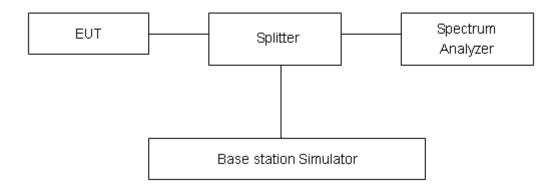
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

Measure the total peak power and record as PPk. And measure the total average power and record as PAvg. Both the peak and average power levels must be expressed in the same logarithmic units (*e.g.*, dBm). Determine the PAPR from:

PAPR (dB) = PPk (dBm) - PAvg (dBm).

Test Setup



Limits

Rule Part 27.50(d)(5) Equipment employed must be authorized in accordance with the provisions of 24.51. Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (d)(6) of this section. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

Measurement Uncertainty

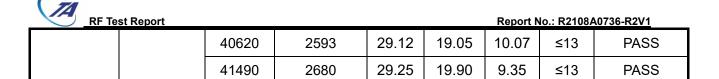
The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor k = 2, U = 0.4 dB.



Test Results

WCDMA Band IV	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion
RMC	1312	1712.4	24.52	21.70	2.82	≤13	PASS
	1413	1732.6	24.95	21.76	3.19	≤13	PASS
	1513	1752.6	24.91	21.74	3.17	≤13	PASS

LTE Band 41									
Modulation	Bandwidth (MHz)	Channel	Frequency (MHz)	Peak (dBm)	Avg (dBm)	PAPR (dB)	Limit (dB)	Conclusion	
		39675	2498.5	28.72	20.87	7.85	≤13	PASS	
	5	40620	2593	29.32	21.32	8.00	≤13	PASS	
		41565	2687.5	29.01	19.48	9.53	≤13	PASS	
		39700	2501	28.78	20.90	7.88	≤13	PASS	
QPSK	10	40620	2593	29.17	19.72	9.45	≤13	PASS	
		41540	2685	29.01	19.32	9.69	≤13	PASS	
		39750	2506	28.99	19.64	9.35	≤13	PASS	
	20	40620	2593	29.20	19.71	9.49	≤13	PASS	
		41490	2680	29.24	19.80	9.44	≤13	PASS	
	5	39675	2498.5	29.10	20.07	9.03	≤13	PASS	
		40620	2593	29.44	19.30	10.14	≤13	PASS	
		41565	2687.5	29.32	19.37	9.95	≤13	PASS	
	10	39700	2501	29.13	18.96	10.17	≤13	PASS	
16QAM		40620	2593	29.57	19.80	9.77	≤13	PASS	
		41540	2685	29.43	19.54	9.89	≤13	PASS	
	20	39750	2506	29.50	20.15	9.35	≤13	PASS	
		40620	2593	29.88	22.11	7.77	≤13	PASS	
		41490	2680	29.73	20.23	9.50	≤13	PASS	
		39675	2498.5	28.60	19.00	9.60	≤13	PASS	
	5	40620	2593	28.86	17.84	11.02	≤13	PASS	
		41565	2687.5	28.77	19.00	9.77	≤13	PASS	
64QAM	10	39700	2501	28.66	19.14	9.52	≤13	PASS	
		40620	2593	28.99	19.22	9.77	≤13	PASS	
		41540	2685	28.89	19.04	9.85	≤13	PASS	
	20	39750	2506	29.12	19.94	9.18	≤13	PASS	





5.5 Frequency Stability

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

Frequency Stability (Temperature Variation)

The temperature inside the climate chamber is varied from -30°C to +50°C in 10°C step size.

- (1)With all power removed, the temperature was decreased to -10°C and permitted to stabilize for three hours.
- (2)Measure the carrier frequency with the test equipment in a "call mode". These measurements should be made within 1 minute of powering up the mobile station, to prevent significant self warming.
- (3) Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

Frequency Stability (Voltage Variation)

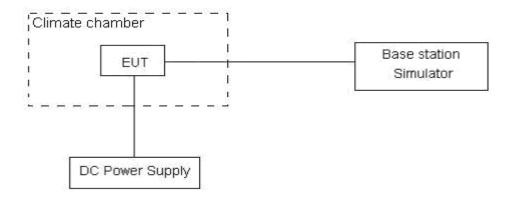
The frequency stability shall be measured with variation of primary supply voltage as follows:

Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried,

battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

This transceiver is specified to operate with an input voltage of between 3.5 V and 4.38 V, with a nominal voltage of 3.85V.

Test setup



Limits

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor k = 3, U = 0.01 ppm.



WCDMA Band IV									
Condition		Freq.Error (Hz)	Freq.Error (Hz)	Frequency Stability (ppm)	Frequency Stability (ppm)	Verdict			
Temperature	Voltage	QPSK	BPSK	QPSK	BPSK				
Normal (25℃)		15.99	2.38	0.00923	0.00137	PASS			
Extreme (50°C)		7.98	7.57	0.00461	0.00437	PASS			
Extreme (40°C)		12.72	2.15	0.00734	0.00124	PASS			
Extreme (30°C)		9.75	16.77	0.00563	0.00968	PASS			
Extreme (20℃)	Normal	6.96	1.36	0.00402	0.00078	PASS			
Extreme (10°C)	Nomai	3.85	9.21	0.00222	0.00532	PASS			
Extreme (0°C)		2.48	5.21	0.00143	0.00301	PASS			
Extreme (-10°C)		13.79	10.93	0.00796	0.00631	PASS			
Extreme (-20°C)		6.24	10.31	0.00360	0.00595	PASS			
Extreme (-30°C)		9.41	7.36	0.00543	0.00425	PASS			
25℃	LV	6.60	6.14	0.00381	0.00355	PASS			
250	HV	9.78	10.69	0.00564	0.00617	PASS			



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			Danu 41					
Condition	Condition		Freq.Error	Freq.Error	Frequency	Frequency	Frequency	
DANDWIDTH		(Hz)	(Hz)	(Hz)	Stability	Stability	Stability	Verdict
BANDWIDTH	5MHz	040414	400 414	ODOK	(ppm)	(ppm)	(ppm)	
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	D400
Normal (25°C)	-	11.00	14.00	11.00	0.00424	0.00540	0.00424	PASS
Extreme (50°C)		15.00	3.00	10.00	0.00578	0.00116	0.00386	PASS
Extreme (40°C)		15.00	1.00	17.00	0.00578	0.00039	0.00656	PASS
Extreme (30°C)		3.00	3.00	7.00	0.00116	0.00116	0.00270	PASS
Extreme (20°C)	Normal	16.00	3.00	15.00	0.00617	0.00116	0.00578	PASS
Extreme (10°C)		9.00	9.00	10.00	0.00347	0.00347	0.00386	PASS
Extreme (0°C)		8.00	9.00	16.00	0.00309	0.00347	0.00617	PASS
Extreme (-10°C)		17.00	5.00	2.00	0.00656	0.00193	0.00077	PASS
Extreme (-20°C)		11.00	1.00	12.00	0.00424	0.00039	0.00463	PASS
Extreme (-30°C)		11.00	16.00	11.00	0.00424	0.00617	0.00424	PASS
25 ℃	LV	3.00	12.00	8.00	0.00116	0.00463	0.00309	PASS
250	HV	14.00	3.00	6.00	0.00540	0.00116	0.00231	PASS
Condition					Frequency	Frequency	Frequency	
Condition		Freq.Error	Freq.Error	Freq.Error	Stability	Stability	Stability	Verdict
BANDWIDTH	10MHz	(Hz)	(Hz)	(Hz)	(ppm)	(ppm)	(ppm)	
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal (25°C)		10.00	13.00	2.00	0.00386	0.00501	0.00077	PASS
Extreme (50°C)		7.00	1.00	12.00	0.00270	0.00039	0.00463	PASS
Extreme (40°C)		15.00	13.00	3.00	0.00578	0.00501	0.00116	PASS
Extreme (30°C)		1.00	4.00	17.00	0.00039	0.00154	0.00656	PASS
Extreme (20°C)	1	10.00	8.00	17.00	0.00386	0.00309	0.00656	PASS
Extreme (10°C)	Normal	13.00	8.00	6.00	0.00501	0.00309	0.00231	PASS
Extreme (0°C)		11.00	6.00	11.00	0.00424	0.00231	0.00424	PASS
Extreme (-10°C)		2.00	13.00	12.00	0.00077	0.00501	0.00463	PASS
Extreme (-20°C)		3.00	15.00	17.00	0.00116	0.00578	0.00656	PASS
Extreme (-30°C)		17.00	14.00	15.00	0.00656	0.00540	0.00578	PASS
	LV	5.00	5.00	1.00	0.00193	0.00193	0.00039	PASS
25 ℃	HV	2.00	17.00	15.00	0.00077	0.00656	0.00578	PASS
					Frequency	Frequency	Frequency	
Condition		Freq.Error	Freq.Error	Freq.Error	Stability	Stability	Stability	
BANDWIDTH	20MHz	(Hz)	(Hz)	(Hz)	(ppm)	(ppm)	(ppm)	Verdict
Temperature	Voltage	64QAM	16QAM	QPSK	64QAM	16QAM	QPSK	
Normal (25°C)	vollage	9.00	14.00	8.00	0.00347	0.00540	0.00309	PASS
Extreme (50°C)		13.00	11.00	6.00	0.00547	0.00340	0.00303	PASS
Extreme (40°C)		2.00	4.00	5.00	0.00077	0.00424	0.00231	PASS
Extreme (30°C)	Normal	11.00	13.00	1.00	0.00077	0.00134	0.00193	PASS
Extreme (20°C)		7.00	11.00	15.00	0.00424	0.00301	0.00578	PASS
Extreme (10°C)		14.00	1.00			0.00424	0.00378	PASS
Extreme (100)		14.00	1.00	1.00	0.00540	0.00039	0.00039	rass



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Extreme (0°C)		1.00	9.00	7.00	0.00039	0.00347	0.00270	PASS
Extreme (-10°C)		13.00	6.00	4.00	0.00501	0.00231	0.00154	PASS
Extreme (-20°C)		12.00	12.00	16.00	0.00463	0.00463	0.00617	PASS
Extreme (-30°C)		13.00	8.00	8.00	0.00501	0.00309	0.00309	PASS
25℃	LV	15.00	15.00	4.00	0.00578	0.00578	0.00154	PASS
	HV	6.00	16.00	3.00	0.00231	0.00617	0.00116	PASS



5.6 Spurious Emissions at Antenna Terminals

Ambient condition

Temperature	Relative humidity	Pressure			
23°C ~25°C	45%~50%	101.5kPa			

Method of Measurement

The EUT was connected to Spectrum Analyzer and Base Station Simulator via power Splitter. The measurement is carried out using a spectrum analyzer. The spectrum analyzer scans from 9kHz to the 10th harmonic of the carrier. The peak detector is used.

RBW is set to 100kHz, VBW is set to 300kHz for 30MHz~1GHz

RBW is set to 1MHz, VBW is set to 3MHz for above 1GHz, Sweep is set to ATUO.

RBW is set to 1 kHz (0.009MHz~ 0.15 MHz),

RBW is set to 10 kHz (0.15 MHz~ 30 MHz)

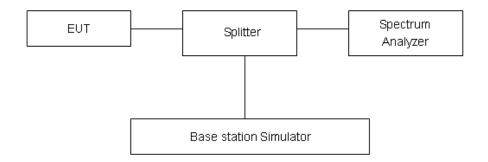
RBW is set to 100 kHz (30MHz~1000 MHz)

RBW is set to 1000 kHz (above 1000MHz)

Of those disturbances below (limit – 20 dB), the mark is not required for the EUT.

The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup



Limits

Rule Part 27.53(m) 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(4) of this section.

Part 27.53(m) Limit	-25 dBm
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor k = 1.96.

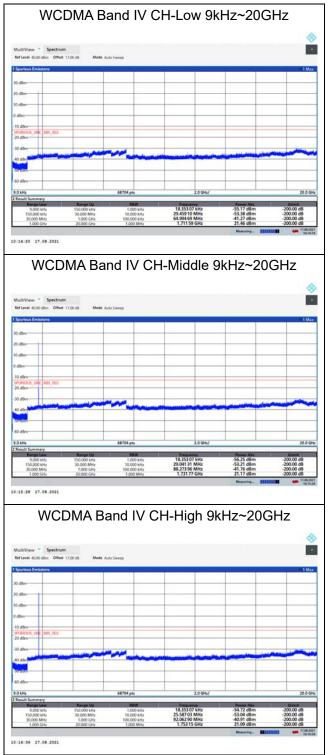
Frequency	Uncertainty			
9kHz-1GHz	0.684 dB			
1GHz-27GHz	1.407 dB			

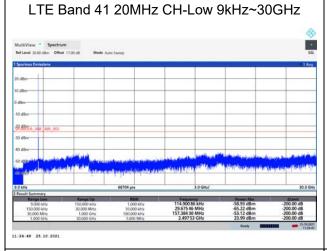


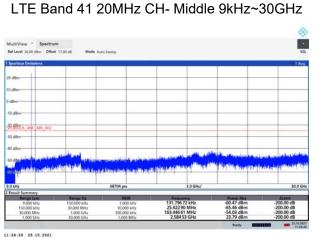
Test Result

Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions more than 20 dB below the limit are not reported.

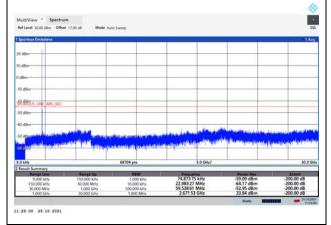
The signal beyond the limit is carrier.







LTE Band 41 20MHz CH- High 9kHz~30GHz





5.7 Radiates Spurious Emission

Ambient condition

Temperature	Relative humidity	Pressure			
23°C ~25°C 45%~50%		101.5kPa			

Method of Measurement

- 1. The testing follows FCC KDB 971168 D01 v03r01 Section 5.8 and ANSI C63.26 (2015).
- 2. Below 1GHz: The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H). Above 1GHz: (Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.) The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).
- 3. A loop antenna, A log-periodic antenna or horn antenna shall be substituted in place of the EUT. The log-periodic antenna will be driven by a signal generator and the level will be adjusted till the same power value on the spectrum analyzer or receiver. The level of the spurious emissions can be calculated through the level of the signal generator, cable loss, the gain of the substitution antenna and the reading of the spectrum analyzer or receiver.
- 4. The EUT is then put into continuously transmitting mode at its maximum power level during the test. Set Test Receiver or Spectrum RBW=100kHz, VBW=300kHz for 30MHz to 1GHz and RBW=1MHz, VBW=3MHz for above 1GHz, and the maximum value of the receiver should be recorded as (Pr).
- 5. The EUT shall be replaced by a substitution antenna. In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power (PMea) is applied to the input of the substitution antenna, and adjust the level of the signal generator output until the value of the receiver reach the previously recorded (Pr). The power of signal source (PMea) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.
- 6. A amplifier should be connected to the Signal Source output port. And the cable should be connect between the Amplifier and the Substitution Antenna. The cable loss (PcI) ,the Substitution Antenna Gain (Ga) and the Amplifier Gain (PAg) should be recorded after test.
- 7. The measurement results are obtained as described below:

Power(EIRP)=PMea- PAg - Pcl + Ga

The measurement results are amend as described below:

Power(EIRP)=PMea- Pcl + Ga

8. This value is EIRP since the measurement is calibrated using an antenna of known gain (2.15 dBi) and known input power. ERP can be calculated from EIRP by subtracting the gain of the dipole, ERP = EIRP-2.15dBi.

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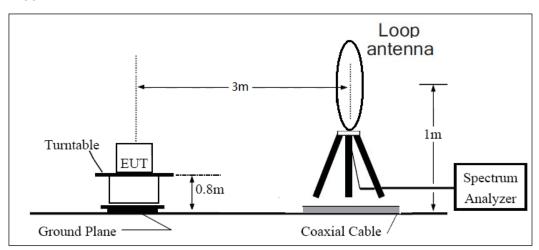


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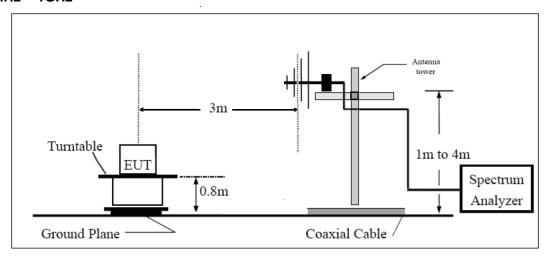
The modulation mode and RB allocation refer to section 5.1, using the maximum output power configuration.

Test setup

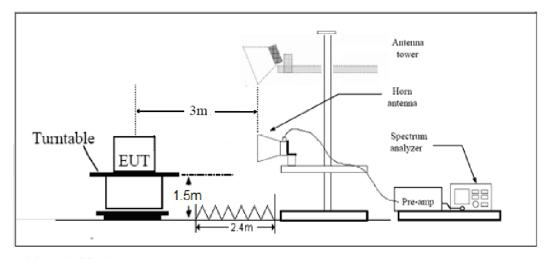
9KHz ~ 30MHz



30MHz ~ 1GHz



Above 1GHz



Note: Area side: 2.4mX3.6m



Limits

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Rule Part 27.53(m) $55 + 10 \log (P) dB$ on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(4) of this section.

Part 27.53(m) Limit	-25 dBm

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = \pm 1.96$, $U = \pm 3.55$ dB.

Test Result

Sweep the whole frequency band through the range from 9kHz to the 10th harmonic of the carrier, the emissions below the noise floor will not be recorded in the report.

WCDMA Band IV CH-Middle

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	3465.2	-65.80	2.70	12.70	Horizontal	-55.80	-13.00	42.80	90
3	5197.8	-57.44	3.20	12.50	Horizontal	-48.14	-13.00	35.14	0
4	6930.4	-61.48	4.20	11.80	Horizontal	-53.88	-13.00	40.88	45
5	8663.0	-52.02	4.40	12.50	Horizontal	-43.92	-13.00	30.92	270
6	10395.6	-48.50	4.70	11.30	Horizontal	-41.90	-13.00	28.90	45
7	12128.2	-44.12	5.20	13.80	Horizontal	-35.52	-13.00	22.52	315
8	13860.8	-48.74	5.70	11.30	Horizontal	-43.14	-13.00	30.14	90
9	15593.4	-51.68	6.10	16.80	Horizontal	-40.98	-13.00	27.98	0
10	17326.0	-48.83	6.10	14.20	Horizontal	-40.73	-13.00	27.73	90

Note: 1. The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.

LTE Band 41 QPSK 5MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	5181.50	-60.10	3.20	12.50	Horizontal	-50.80	-25.00	25.80	0
3	7772.40	-46.21	4.40	12.30	Horizontal	-38.31	-25.00	13.31	225
4	10363.40	-46.53	4.70	11.80	Horizontal	-39.43	-25.00	14.43	45
5	12960.80	-53.19	5.40	14.00	Horizontal	-44.59	-25.00	19.59	180
6	15554.80	-56.47	6.10	16.80	Horizontal	-45.77	-25.00	20.77	90
7	18151.00								
8	20744.00								
9	23337.00								
10	25930.00								

Note: 1. The other Spurious RF Radiated emissions level is no more than noise floor.

2. The worst emission was found in the antenna is Horizontal position.



LTE Band 41 QPSK 20MHz CH-Middle, RB 1

Harmonic	Frequency (MHz)	SG (dBm)	Cable Loss (dB)	Gain (dBi)	Antenna Polarization	EIRP Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (deg)
2	5168.30	-61.41	3.20	12.50	Horizontal	-52.11	-25.00	27.11	45
3	7752.00	-44.41	4.40	12.30	Horizontal	-36.51	-25.00	11.51	0
4	10336.00	-49.72	4.70	11.80	Horizontal	-42.62	-25.00	17.62	270
5	12923.60	-52.19	5.40	14.00	Horizontal	-43.59	-25.00	18.59	180
6	15522.10	-56.43	6.10	16.80	Horizontal	-45.73	-25.00	20.73	315
7	18151.00								
8	20744.00								
9	23337.00								
10	25930.00								

Note: 1. The other Spurious RF Radiated emissions level is no more than noise floor.

^{2.} The worst emission was found in the antenna is Horizontal position.



6 Main Test Instruments

Name	Manufacturer	Туре	Serial Number	Calibration Date	Expiration Date
Base Station Simulator	R&S	CMW500	113824	2021-05-15	2022-05-14
Power Splitter	Hua Xiang	SHX-GF2-2-13	10120101	1	/
Spectrum Analyzer	Key sight	N9010A	MY50210259	2021-05-15	2022-05-14
Signal Analyzer	R&S	FSV3030	101411	2020-12-13	2021-12-12
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2020-04-02	2023-04-01
TRILOG Broadband Antenna	SCHWARZBECK	VULB 9163	391	2019-12-16	2022-12-15
Horn Antenna	R&S	HF907	102723	2020-08-11	2023-08-10
Horn Antenna	ETS-Lindgren	3160-09	00102643	2018-06-20	2023-06-19
Horn Antenna	STEATITE	QSH-SL-26-40- K-15	16779	2019-12-24	2022-12-23
Signal generator	R&S	SMB 100A	102594	2021-05-15	2022-05-14
Climatic Chamber	ESPEC	SU-242	93000506	2020-12-13	2021-12-12
MOB COMMS DC SUPPLY	Keysight	66319D	MY43004105	2021-06-09	2021-12-08
RF Cable	Agilent	SMA 15cm	0001	2021-06-09	2021-12-08
Software	R&S	EMC32	9.26.0	1	/

******END OF REPORT ******



ANNEX A: The EUT Appearance

The EUT Appearance are submitted separately.



ANNEX B: Test Setup Photos

The Test Setup Photos are submitted separately.