



# **TEST REPORT**

## Applicant: Shanghai Rising Digital Co.,Ltd.

Address: No 318 , Chuanda Road , Pudong New District, Shanghai China

FCC ID: 2AJON-SECD7I0B03H

Product Name: Sany Encourage Integrated Display

Model Number: SECD-7I0B-03(H)

Standard(s): 47 CFR Part 2 47 CFR Part 22, Subpart H 47 CFR Part 27 ANSI C63.26-2015 KDB 971168 D01 Power Meas License Digital Systems v03r01

The above equipment has been tested and found compliance with the requirement of the relative standards by China Certification ICT Co., Ltd (Dongguan)

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## **Test Facility**

The Test site used by China Certification ICT Co., Ltd (Dongguan) to collect test data is located on the No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 442868, the FCC Designation No. : CN1314.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0123.

#### Declarations

China Certification ICT Co., Ltd (Dongguan) is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol " $\blacktriangle$ ". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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## **1. GENERAL INFORMATION**

## **1.1 Product Description for Equipment under Test (EUT)**

EUT Name:	Sany Encourage Integrated Display			
EUT Model:	SECD-7I0B-03(H)			
Operation modes:	WCDMA( R99 (Data), HSDPA, HSUPA) FDD-LTE,TDD-LTE			
Operation Bands and modes:	WCDMA: Band 5 LTE: Band 5/41			
Modulation Type:	BPSK, QPSK, 16QAM			
Rated Input Voltage:	DC 12~24V			
Serial Number:	CR21110071-RF-S1			
EUT Received Date:	2021.11.12			
EUT Received Status:	Good			

## **Accessory Information:**

Accessory Description Manufacturer		Model	Parameters
Power Cable	Unknown	Unknown	Un-shield, 2 m

## **1.2 Description of Test Configuration**

#### **1.2.1 EUT Operation Condition:**

EUT Operation Mode:	The system was configured for testing in each operation mode.
<b>Equipment Modifications:</b>	No
<b>EUT Exercise Software:</b>	No

#### WCDMA-Release 99

The following tests were conducted according to the test requirements outlines in section 5.2 of the 3GPP TS34.121-1 specification. The EUT has a nominal maximum output power of 24dBm (+1.7/-3.7).

	Loopback Mode	Test Mode 1		
WCDMA	Rel99 RMC	12.2kbps RMC		
WCDMA General Settings	Power Control Algorithm	Algorithm2		
	βc / βd	8/15		

## WCDMA HSDPA

The following tests were conducted according to the test requirements outlines in section 5.2 of the 3GPP TS34.121-1 specification.

	Mode	HSDPA	HSDPA	HSDPA	HSDPA		
	Subset	1	2	3	4		
	Loopback Mo e			Test Mode 1			
	Rel99 RMC			12.2kbps RM	С		
	HSDPA FRC			H-Set1			
WCDM	Power Control Algorithm			Algorithm2			
WCDMA General	βc	2/15	12/15	15/15	15/15		
Settings	βd	1 /15	15/15	8/15	4/15		
Settings	βd (SF)	64					
	βc/ βd	2/15	12/15	15/8	15/4		
	βhs	4/15	24/15	30/15	30/15		
	MPR(dB)	0	0	0.5	0.5		
	DACK	8					
	DNAK			8			
HSDPA	DCQI			8			
Spe ific	Ack-Nack repetition			3			
Settings	factor			5			
Settings	CQI Feedback			4ms			
	CQI Repetition Factor		2				
	Ahs=βhs/ βc			30/15			

#### WCDMA HSUPA

The following tests were conducted according to the test requirements outlines in section 5.2 of the 3GPP TS34.121-1 specification.

	Mode	HSUPA	HSUPA	HSUPA	HSUPA	HSUPA				
	Subset	1	2		4	5				
	Loopback Mode			Test Mode 1						
	Rel99 RMC		1	12.2kbps RMC	2					
	HSDPA FRC	H-Set1								
	HSUPA Test	HSUPA Loopback								
	Power Control	Algorithm2								
WCDMA	Algorithm		-	•						
General	βc	11/15	6/15	15/15	2/15	15/15				
Settings	βd	15/15	15/15	9/15	15/15	0				
	βec	209/225	12/15	30 15	2/15	5/15				
	βc/ βd	11/15	6/15	15/9	2/15	-				
	βhs	22/15	12/15	30/15	4/15	5/15				
	CM(dB)	1.0	3.0	2.0	3.0	1.0				
	MPR(dB)	0	2	1	2	0				
	DACK 8									
	DNAK	8								
HCDDA	DCQI	8								
HSDPA	Ack-Nack repetition	3								
Specific Settings	factor									
Settings	CQI Feedback	4ms								
	CQI Repetition Factor	2								
	Ahs=βhs/ βc			30/15						
	DE-DPCCH	6	8	8	5	7				
	DHARQ	0	0	0	0	0				
	AG Index	20	12	15	17	21				
	ETFCI	75	67	92	71	81				
	Associated Max UL	242.1	174.0	492.9	205.9	208.0				
	Data Rate k ps	242.1	174.9	482.8	205.8	308.9				
HSUPA Specific Settings	Reference E_FCls	E-TFCI E-TF E-TFC E-TF E-TFC E-TFC	EI PO 4 CI 67 I PO 18 CI 71 I PO23 CI 75 I PO26	E-TFCI 11 E-TFCI PO4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E E-TFCI PO 4 E-TFCI PO 18 E-TFCI PO 18 E-TFCI 71 E-TFCI PO23 E-TFCI 75 E-TFCI 75 E-TFCI PO26 E-TFCI 81 E-TFCI PO 27					

#### China Certification ICT Co., Ltd (Dongguan)

#### HSPA+

The following tests were conducted according to the test requirements in Table C.11.1.4 of 3GPP TS 34.121-1

Sub- test	β <sub>c</sub> (Note3)	βd	β <sub>нs</sub> (Note1)	$\beta_{ec}$	β <sub>ed</sub> (2xSF2) (Note 4)	β <sub>ed</sub> (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β <sub>ed</sub> 1: 30/15 β <sub>ed</sub> 2: 30/15	β <sub>ed</sub> 3: 24/15 β <sub>ed</sub> 4: 24/15	3.5	2.5	14	105	105
real control period period control con											

#### **DC-HSDPA**

The following tests were conducted according to the test requirements in Table C.8.1.12 of 3GPP TS 34.121-1

	Parameter	Unit	Value				
Nominal /	Avg. Inf. Bit Rate	kbps	60				
Inter-TTI	Distance	TTľs	1				
Number of	of HARQ Processes	Proces	6				
		ses	0				
Informatio	on Bit Payload ( $N_{INF}$ )	Bits	120				
Number (	Code Blocks	Blocks	1				
Binary Ch	nannel Bits Per TTI	Bits	960				
Total Ava	ilable SML's in UE	SML's	19200				
Number of	of SML's per HARQ Proc.	SML's	3200				
Coding R	ate		0.15				
Number of	of Physical Channel Codes	Codes	1				
Modulatio			QPSK				
Note 1:	The RMC is intended to be used for	or DC-HSD	PA				
	mode and both cells shall transmit	with identi	cal				
	parameters as listed in the table.						
Note 2:	Note 2: Maximum number of transmission is limited to 1, i.e.,						
	retransmission is not allowed. The		cy and				
	constellation version 0 shall be use	ed.					

#### Table C.8.1.12: Fixed Reference Channel H-Set 12

#### LTE (FDD):

The following tests were conducted according to the test requirements in 3GPP TS36.101

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP T\$36.101.

Table 6.0.2.4. Maximum	Dever	Deduction		for Dever	Class 2
Table 6.2.3-1: Maximum	Power	Reduction	(MPH)	tor Power	Class 3

Modulation	Cha	Channel bandwidth / Transmission bandwidth (RB)								
	1.4 MHz	1								
QPSK	> 5	>4	>8	> 12	> 16	> 18	≤ 1			
16 QAM	≤ 5	≤4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1			
16 QAM	> 5	>4	>8	> 12	> 16	> 18	≤ 2			

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS\_01".

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N <sub>RB</sub> )	A-MPR (dB)	
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA	
			3	>5	≤ 1	
			5	>6	≤1	
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36	10	>6	≤ 1	
			15	>8	≤ 1	
			20	>10	≤ 1	
NS_04	66222	41	5	>6	s 1	
110_04	0.0.2.2.2	-1	10, 15, 20	See Table 6.2.4-4		
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1	
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a	
NS 07	6.6.2.2.3	13	10	Table 6.2.4-2	Table 6.2.4-2	
N3_07	6.6.3.3.2	13		14010 0.2.4-2	10010 6.2.4-2	
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3	
NS_09	6.6.3.3.4	21	10, 15	> 40	<u>≤1</u>	
	0.0.0.0.1			> 55	≤2	
NS_10	00004	20	15,20	Table 6.2.4-3	Table 6.2.4-3	
NS_11	6.6.2.2.1	23'	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5	
NS_32			-			
Note 1: A	pplies to the lower	block of Band 23, i.e	a carrier place	d in the 2000-201	10 MHz region.	

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

## LTE(TDD):

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS).

	N	lormal cyclic prefix in de	Extended cyclic prefix in downlink				
Special subframe	DwPTS	UpF		DwPTS			
configuration		Normal cyclic prefix	Extended cyclic		Normal cyclic	Extended cyclic	
		in uplink	prefix in uplink		prefix in uplink	prefix in uplink	
0	$6592 \cdot T_s$			$7680 \cdot T_s$			
1	$19760 \cdot T_s$			$20480 \cdot T_s$	$2192 \cdot T_{e}$	2560 · T	
2	$21952 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$23040 \cdot T_s$	21/2 18	2000 13	
3	$24144 \cdot T_{s}$			$25600 \cdot T_s$			
4	$26336 \cdot T_s$			$7680 \cdot T_{\rm s}$			
5	$6592 \cdot T_s$			$20480 \cdot T_s$	$4384 \cdot T_{e}$	5120 · T	
6	$19760 \cdot T_s$			$23040 \cdot T_s$	4364 · 1 <sub>8</sub>	5120 · I <sub>s</sub>	
7	$21952 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$12800 \cdot T_s$			
8	$24144 \cdot T_s$			-	-	-	
9	$13168 \cdot T_{s}$			-	-	-	

#### Table 4.2-2: Uplink-downlink configurations.

Uplink-downlink	Downlink-to-										
configuration	Uplink Switch- point periodicity	0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	υ
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	υ	U	D

#### Calculated Duty Cycle

Uplink-	Downlink-to-		Subframe Number					Calculated				
Downlink Configuration	Uplink Switch- point Periodicity	0	1	2	3	4	5	6	7	8	9	Duty Cycle (%)
0	5 ms	D	S	U	U	U	D	S	U	U	U	63.33
1	5 ms	D	S	U	U	D	D	S	U	υ	D	43.33
2	5 ms	D	S	U	D	D	D	S	U	D	D	23.33
3	10 ms	D	S	U	U	U	D	D	D	D	D	31.67
4	10 ms	D	S	U	U	D	D	D	D	D	D	21.67
5	10 ms	D	S	U	D	D	D	D	D	D	D	11.67
6	5 ms	D	S	U	U	U	D	S	U	U	D	53.33

Calculated Duty Cycle = Extended cyclic prefix in uplink x (T<sub>s</sub>) x # of S + # of U

Example for Calculated Duty Cycle for Uplink-Downlink Configuration 0: Calculated Duty Cycle = 5120 x [1/(15000 x 2048)] x 2 + 6 ms = 63.33%

Calculated Duty Cycle = 5120 x [1/(15000 x 2048)] x 2 + 6 ms = 63.33% where  $T_s = 1/(15000 x 2048)$  seconds

## **1.2.2 Support Equipment List and Details**

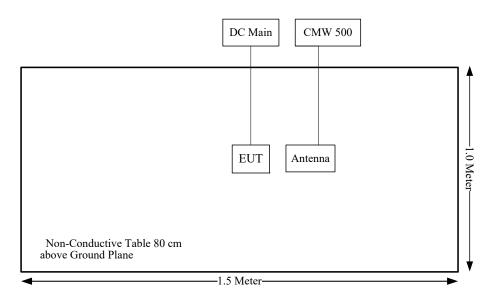
Manufacturer	Description	Model	Serial Number
R&S	Wideband Radio Communication Tester	CMW500	149218
Unknown	Antenna	Unknown	ANT01

#### **1.2.3 Support Cable List and Details**

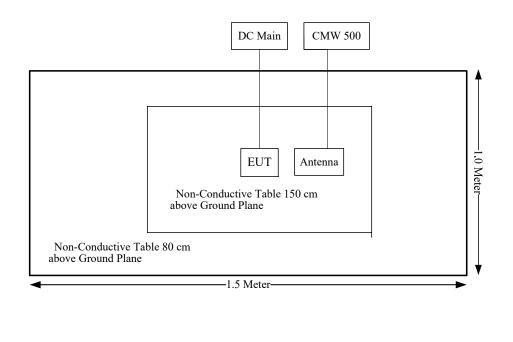
Cable Descrip	otion	Shielding Type	Ferrite Core	Length (m)	From Port	То
/		/	/	/	/	/

## 1.2.4 Block Diagram of Test Setup

Radiated Emmission Below 1GHz:



Radiated Emmission Above1GHz:



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## **1.3 Measurement Uncertainty**

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Parameter	Measurement Uncertainty				
Occupied Channel Bandwidth	±5 %				
RF output power, conducted	±0.61dB				
Power Spectral Density, conducted	±0.61 dB				
Unwanted Emissions, radiated	30M~200MHz: 4.15 dB,200M~1GHz: 5.61 dB,1G~6GHz: 5.14 dB, 6G~18GHz: 5.93 dB,18G~26.5G:5.47 dB,26.5G~40G:5.63 dB				
Unwanted Emissions, conducted	±1.26 dB				
Temperature	$\pm 1$ °C				
Humidity	$\pm 5\%$				
DC and low frequency voltages	$\pm 0.4\%$				
Duty Cycle	1%				

## 2. SUMMARY OF TEST RESULTS

Rules	Description of Test	Result
FCC§2.1046; § 22.913 (a); §27.50	RF Output Power	Compliance
FCC§ 2.1047	Modulation Characteristics	Not Applicable
FCC§ 2.1049; § 22.905 § 22.917; §27.53	Occupied Bandwidth	Compliance
FCC§ 2.1051, § 22.917 (a); §27.53;	Spurious Emissions at Antenna Terminal	Compliance
FCC§ 22.917 (a); §27.53 ;	Out of band emission, Band Edge	Compliance
FCC§ 2.1055 § 22.355; §27.54	Frequency stability vs. temperature Frequency stability vs. voltage	Compliance
FCC§ 2.1053 § 22.917 (a); §27.53	Field Strength of Spurious Radiation	Compliance
FCC §1.1310 & §2.1091	Maximum Permissible Exposure (MPE)	Compliance

## **3. REQUIREMENTS AND TEST PROCEDURES**

#### 3.1 Applicable Standard For Part 22 Subpart H:

#### 3.1.1 RF Output Power

FCC §22.913(a)

(5) The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7watts.

#### **3.1.2 Spurious Emissions**

FCC §22.917

(a) Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P) dB$ .

(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a reference bandwidth as follows:

(1) In the spectrum below 1 GHz, instrumentation should employ a reference bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy, provided that the measured power is integrated over the full required reference bandwidth (i.e., 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. (2) In the spectrum above 1 GHz, instrumentation should employ a reference bandwidth of 1 MHz

#### **3.1.3 Frequency stability**

FCC §22.355

Except as otherwise provided in this part, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table C-1 of this section.

Frequency range (MHz)	Base, fixed (ppm)	Mobile >3 watts (ppm)	Mobile ≤3 watts (ppm)
25 to 50	20	20	50
50 to 450	5	5	50
450 to 512	2.5	5	5
821 to 896	1.5	2.5	2.5
928 to 929	5	n/a	n/a
929 to 960	1.5	n/a	n/a
2110 to 2220	10	n/a	n/a

Table C-1 - Frequency Tolerance for Transmitters in the Public Mobile Services

#### **3.2 Applicable Standard For Part 27:**

#### 3.2.1 RF Output Power

#### FCC §27.50

#### (a)(3) Mobile and portable stations.

(i) For mobile and portable stations transmitting in the 2305-2315 MHz band or the 2350-2360 MHz band, the average EIRP must not exceed 50 milliwatts within any 1 megahertz of authorized bandwidth, *except that* for mobile and portable stations compliant with 3GPP LTE standards or another advanced mobile broadband protocol that avoids concentrating energy at the edge of the operating band the average EIRP must not exceed 250 milliwatts within any 5 megahertz of authorized bandwidth but may exceed 50 milliwatts within any 1 megahertz of authorized bandwidth but may exceed 50 milliwatts within any 1 megahertz of authorized bandwidth. For mobile and portable stations using time division duplexing (TDD) technology, the duty cycle must not exceed 38 percent in the 2305-2315 MHz and 2350-2360 MHz bands. Mobile and portable stations using FDD technology are restricted to transmitting in the 2305-2315 MHz band. Power averaging shall not include intervals in which the transmitter is off.

(ii) Mobile and portable stations are not permitted to transmit in the 2315-2320 MHz and 2345-2350 MHz bands.

(iii) *Automatic transmit power control*. Mobile and portable stations transmitting in the 2305-2315 MHz band or in the 2350-2360 MHz band must employ automatic transmit power control when operating so the stations operate with the minimum power necessary for successful communications.

(iv) *Prohibition on external vehicle-mounted antennas*. The use of external vehicle-mounted antennas for mobile and portable stations transmitting in the 2305-2315 MHz band or the 2350-2360 MHz band is prohibited.

(b)(10) Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

(c)(10) Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

(d)(4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

(h) The following power limits shall apply in the BRS and EBS:

(2)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.

#### **3.2.2 Spurious Emissions**

#### FCC §27.53

(a) For operations in the 2305-2320 MHz band and the 2345-2360 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power P (with averaging performed only during periods of transmission) within the licensed band(s) of operation, in watts, by the following amounts:

(4)For mobile and portable stations operating in the 2305-2315 MHz and 2350-2360 MHz bands:

(i) By a factor of not less than:  $43 + 10 \log (P) dB$  on all frequencies between 2305 and 2320 MHz and on all frequencies between 2345 and 2360 MHz that are outside the licensed band(s) of operation, not less than 55 + 10 log (P) dB on all frequencies between 2320 and 2324 MHz and on all frequencies between 2341 and 2345 MHz, not less than 61 + 10 log (P) dB on all frequencies between 2324 and 2328 MHz and on all frequencies between 2337 and 2341 MHz, and not less than 67 + 10 log (P) dB on all frequencies between 2328 and 2337 MHz;

(ii) By a factor of not less than 43 + 10 log (P) dB on all frequencies between 2300 and 2305 MHz, 55 + 10 log (P) dB on all frequencies between 2296 and 2300 MHz, 61 + 10 log (P) dB on all frequencies between 2292 and 2296 MHz, 67 + 10 log (P) dB on all frequencies between 2288 and 2292 MHz, and 70 + 10 log (P) dB below 2288 MHz;

(iii) By a factor of not less than  $43 + 10 \log (P) dB$  on all frequencies between 2360 and 2365 MHz, and not less than  $70 + 10 \log (P) dB$  above 2365 MHz.

(c)For operations in the 746-758 MHz band and the 776-788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On any frequency outside the 746-758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log (P) dB$ ;

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least  $43 + 10 \log (P) dB$ ;

(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $76 + 10 \log (P)$  dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than  $65 + 10 \log (P)$  dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

(f) For operations in the 746-758 MHz, 775-788 MHz, and 805-806 MHz bands, emissions in the band 1559-1610 MHz shall be limited to – 70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and – 80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation.

(g) For operations in the 600 MHz band and the 698-746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log (P) dB$ . Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

#### (h) AWS emission limits

(1) *General protection levels.* Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log<sub>10</sub> (P) dB.

(m)(4) 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)(6) 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.

#### 3.2.3 Frequency stability

#### FCC §27.54

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

## 3.3 Test Method:

#### 3.3.1 RF Output Power

According to CFR Part 2.1046, ANSI C63.26-2015 Section 5.2.5.5 and KDB 971168 D01 Power Meas License Digital Systems v03r01:

The relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

ERP or EIRP =  $P_{Meas} + G_T - L_C$ 

where:

ERP or EIRP = effective radiated power or equivalent isotropically radiated power, respectively
(expressed in the same units as P <sub>Meas</sub> , typically dBW or dBm);

PMeas	= measured transmitter output power or PSD, in dBm or dBW;
GT	= gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);
L <sub>C</sub>	= signal attenuation in the connecting cable between the transmitter and antenna, in dB.

#### 3.5.2 Occupied Bandwidth

According to CFR Part 2.1049, ANSI C63.26-2015 Section 5.4.4

The OBW is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

The following procedure shall be used for measuring (99%) power bandwidth:

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (typically a span of  $1.5 \times OBW$  is sufficient).

b) The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set  $\ge$  3 × RBW.

c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation. See guidance provided in 4.2.3. NOTE—Step a), step b), and step c) may require iteration to adjust within the specified tolerances.

d) Set the detection mode to peak, and the trace mode to max-hold.

e) If the instrument does not have a 99% OBW function, recover the trace data points and sum directly in linear power terms. Place the recovered amplitude data points, beginning at the lowest frequency, in a running sum until 0.5% of the total is reached. Record that frequency as the lower OBW frequency. Repeat the process until 99.5% of the total is reached and record that frequency as the upper OBW frequency. The 99% power OBW can be determined by computing the difference these two frequencies.

f) The OBW shall be reported and plot(s) of the measuring instrument display shall be provided with the test report. The frequency and amplitude axis and scale shall be clearly labeled. Tabular data can be reported in addition to the plot(s).

#### 3.3.3 Spurious emissions at antenna terminals

According to CFR Part 2.1051, 22.917(a), 27.53, ANSI C63.26-2015 Section 5.7.4, KDB 971168 D01 Power Meas License Digital Systems v03r01:

the applicable rule part specifies the reference bandwidth for measuring unwanted emission levels (typically, 100 kHz if the authorized frequency band/block is at or below 1 GHz and 1 MHz if the authorized frequency band/block is above 1 GHz),8 effectively depicting the unwanted emission limit in terms of a power spectral density. In those cases where no reference bandwidth is explicitly specified, the values in the preceding sentence should be used.

#### 3.3.4 Out of band emission

According to CFR Part 2.1051, 22.917(a), 27.53, ANSI C63.26-2015 Section 5.7.3, KDB 971168 D01 Power Meas License Digital Systems v03r01:

Typically, a measurement (resolution) bandwidth smaller than the reference bandwidth is allowed for measurements within a specified frequency range at the edge of the authorized frequency block/band (e.g., within the first Y MHz outside of the authorized frequency band/block, where the value of Y is specified in the relevant rule part). Some FCC out-of-band emission rules permit the use of a narrower RBW (typically limited to a minimum RBW of 1 % of the OBW) for measuring the out-of-band emissions without a requirement to integrate the result over the full reference bandwidth. Beyond the specified frequency range in which this relaxation of the uniform reference bandwidth is permitted, it typically is also acceptable to use a narrower RBW (again limited to a minimum of 1 % of OBW) to increase accuracy, but the measurement result must subsequently be integrated over the full reference bandwidth.

#### **3.3.5 Frequency stability**

According to CFR Part 2.1055, ANSI C63.26-2015 Section 5.6, KDB 971168 D01 Power Meas License Digital Systems v03r01:

Frequency stability is a measure of the frequency drift due to temperature and supply voltage variations, with reference to the frequency measured at +20 °C and rated supply voltage.

The operating carrier frequency shall be set up in accordance with the manufacturer's published operation and instruction manual prior to the commencement of these tests. No adjustment of any frequency determining circuit element shall be made subsequent to this initial set-up. Frequency stability is tested:

a) At 10 °C intervals of temperatures between -30 °C and +50 °C at the manufacturer's rated supply voltage, and

b) At +20 °C temperature and  $\pm 15\%$  supply voltage variations. If a product is specified to operate over a range of input voltage then the -15% variation is applied to the lowermost voltage and the +15% is applied to the uppermost voltage.

During the test all necessary settings, adjustments and control of the EUT have to be performed without disturbing the test environment, i.e., without opening the environmental chamber. The frequency stabilities can be maintained to a lesser temperature range provided that the transmitter is automatically inhibited from operating outside the lesser temperature range. For handheld equipment that is only capable of operating from internal batteries and the supply voltage cannot be varied, the frequency stability tests shall be performed at the nominal battery voltage and the battery end point voltage specified by the manufacturer. An external supply voltage can be used and set at the internal battery nominal voltage, and again at the battery operating end point voltage which shall be specified by the equipment manufacturer.

If an unmodulated carrier is not available, the mean frequency of a modulated carrier can be obtained by using a frequency counter with gating time set to an appropriately large multiple of bit periods (gating time depending on the required accuracy). Full details on the choice of values shall be included in the test report.

#### 3.3.6 Field strength of spurious radiation

According to CFR Part 2.1053, 22.917(a), 27.53, ANSI C63.26-2015 Section 5.5.3:

#### Test setup:

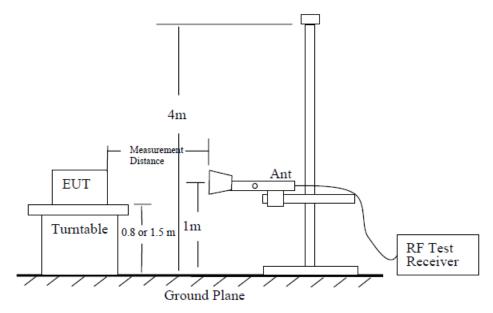
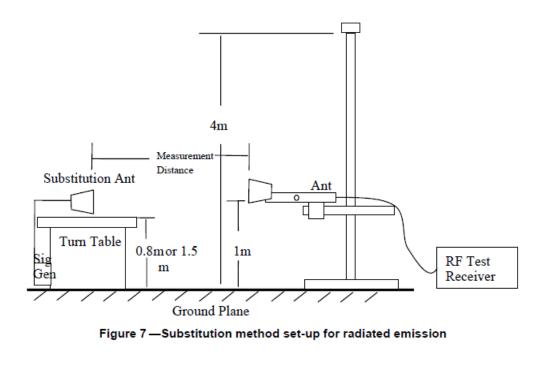


Figure 6—Test site-up for radiated ERP and/or EIRP measurements



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#### **Test Procedure:**

- a) Place the EUT in the center of the turntable. The EUT shall be configured to transmit into the standard non-radiating load (for measuring radiated spurious emissions), connected with cables of minimal length unless specified otherwise. If the EUT uses an adjustable antenna, the antenna shall be positioned to the length that produces the worst case emission at the fundamental operating frequency.
- b) Each emission under consideration shall be evaluated:
  - Raise and lower the measurement antenna in accordance 5.5.2, as necessary to enable detection of the maximum emission amplitude relative to measurement antenna height.
  - Rotate the EUT through 360° to determine the maximum emission level relative to the axial position.
  - 3) Return the turntable to the azimuth where the highest emission amplitude level was observed.
  - 4) Vary the measurement antenna height again through 1 m to 4 m again to find the height associated with the maximum emission amplitude.
  - 5) Record the measured emission amplitude level and frequency using the appropriate RBW.
- c) Repeat step b) for each emission frequency with the measurement antenna oriented in both the horizontal and vertical polarizations to determine the orientation that gives the maximum emissions amplitude.
- d) Set-up the substitution measurement with the reference point of the substitution antenna located as near as possible to where the center of the EUT radiating element was located during the initial EUT measurement.
- e) Maintain the previous measurement instrument settings and test set-up, with the exception that the EUT is removed and replaced by the substitution antenna.
- f) Connect a signal generator to the substitution antenna; locate the signal generator so as to minimize any potential influences on the measurement results. Set the signal generator to the frequency where emissions are detected, and set an output power level such that the radiated signal can be detected by the measurement instrument, with sufficient dynamic range relative to the noise floor.
- g) For each emission that was detected and measured in the initial test [i.e., in step b) and step c)]:
  - 1) Vary the measurement antenna height between 1 m to 4 m to maximize the received (measured) signal amplitude.
  - Adjust the signal generator output power level until the amplitude detected by the measurement instrument equals the amplitude level of the emission previously measured directly in step b) and step c).
  - Record the output power level of the signal generator when equivalence is achieved in step 2).
- Repeat step e) through step g) with the measurement antenna oriented in the opposite polarization.
- Calculate the emission power in dBm referenced to a half-wave dipole using the following equation:

Pe = Ps(dBm) - cable loss (dB) + antenna gain (dBd)

where

- Pe = equivalent emission power in dBm
- Ps = source (signal generator) power in dBm

NOTE-dBd refers to the measured antenna gain in decibels relative to a half-wave dipole.

- j) Correct the antenna gain of the substitution antenna if necessary to reference the emission power to a half-wave dipole. When using measurement antennas with the gain specified in dBi, the equivalent dipole-referenced gain can be determined from: gain (dBd) = gain (dBi) - 2.15 dB. If necessary, the antenna gain can be calculated from calibrated antenna factor information
- k) Provide the complete measurement results as a part of the test report.

## 4. Test DATA AND RESULTS

## 4.1 Antenna Port Test Data and Results for WCDMA Band 5:

Serial Number:	CR21110071-RF-S1	Test Date:	2021/12/25
Test Site:	RF	Test Mode:	Transmitting
Tester:	LE Qiao	Test Result:	Pass

Environmental Conditions:								
Temperature: (°C)	21.6	Relative Humidity: (%)	64	ATM Pressure: (kPa)	101.3			

Test Equipment List and Details:							
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date		
R&S	Spectrum Analyzer	FSV40	101474	2021/7/22	2022/7/21		
zhuoxiang	Coaxial Cable	SMA-178	211002	Each time	N/A		
Mini-Circuits	DC Block	BLK-18-S+	1554404	Each time	N/A		
YINSAIGE	Coaxial Cable	SS402	SJ0100002	Each time	N/A		
R&S	Wideband Radio Communication Tester	CMW500	149218	2021/7/22	2022/7/21		
BACL	TEMP&HUMI Test Chamber	BTH-150	30026	2021/7/22	2022/7/21		
UNI-T	Multimeter	UT39A+	C210582554	2021/9/30	2022/9/29		
E-Microwave	Two-way Spliter	ODP-1-6	OE0120176	Each Time	N/A		

\* Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

EUT Information@ WCDMA Band VA:						
Antenna Gain (dBi):	3.06	Antenna Gain (dBd):	0.91	Cable Loss (dB):	0.3	
Operation Volta	Operation Voltage(V <sub>DC</sub> ):					
Lowest:	9	Normal:	24	Highest:	36	

Test Frequency For Each Mode:							
Operation Modes	Lowest Frequency (MHz)	Middle Frequency (MHz)	Highest Frequency (MHz)				
WCDMA	826.4	836.6	846.6				

FCC§2.1046;§ 22.913 (a) RF Output Power:						
	Conducted A	verage Output	Power(dBm)	Maximum	ERP Limit	
Test Mode	Lowest Channel	Middle Channel	Highest Channel	ERP (dBm)	(dBm)	
WCDMA R99 Subtest 1	22.14	21.86	22.27	22.88	38.45	
HSDPA Subtest 1	22.31	22.48	22.45	23.09	38.45	
HSDPA Subtest 2	21.92	22.24	22.42	23.03	38.45	
HSDPA Subtest 3	22.37	22.25	22.67	23.28	38.45	
HSDPA Subtest 4	22.75	22.92	22.84	23.53	38.45	
HSUPA Subtest 1	22.58	22.63	22.51	23.24	38.45	
HSUPA Subtest 2	22.87	22.75	21.84	23.48	38.45	
HSUPA Subtest 3	22.69	21.98	22.79	23.4	38.45	
HSUPA Subtest 4	22.42	22.71	21.88	23.32	38.45	
HSUPA Subtest 5	22.83	21.93	22.07	23.44	38.45	
Note: ERP=Con	ducted Power(dI	Bm) - Cable loss(	dB) + Antenna (	Gain(dBd)		
				Result:	Pass	

## Test Data:

Peak-to-average Ratio(PAR)						
		Peak	-to-average Ratio	o(dB)	Limit (dB)	
	Test Mode	Lowest Channel	Middle Channel	Highest Channel		
	WCDMA R99	3.19	3.22	3.33	13	
	HSDPA	3.77	3.62	3.86	13	
	HSUPA	2.84	3.33	3.42	13	
				Result:	Pass	

FCC §2.1049, §22.917, §22.905:Occupied Bandwidth							
Operation	99% Occupied Bandwidth (MHz)			26 dB Occupied Bandwidth (MHz)			
Mode	Low Channel	Middle channel	High Channel	Low Channel	Middle Channel	High Channel	
WCDMA R99	4.139	4.153	4.139	4.703	4.703	4.689	
HSDPA	4.139	4.153	4.124	4.718	4.747	4.732	
HSUPA	4.124	4.153	4.124	4.703	4.732	4.703	
Note: The test p	lots please refer t	to the Plots of Oc	cupied Bandwid	th			

#### FCC §2.1051, §22.917(a):Spurious Emissions at Antenna Terminal

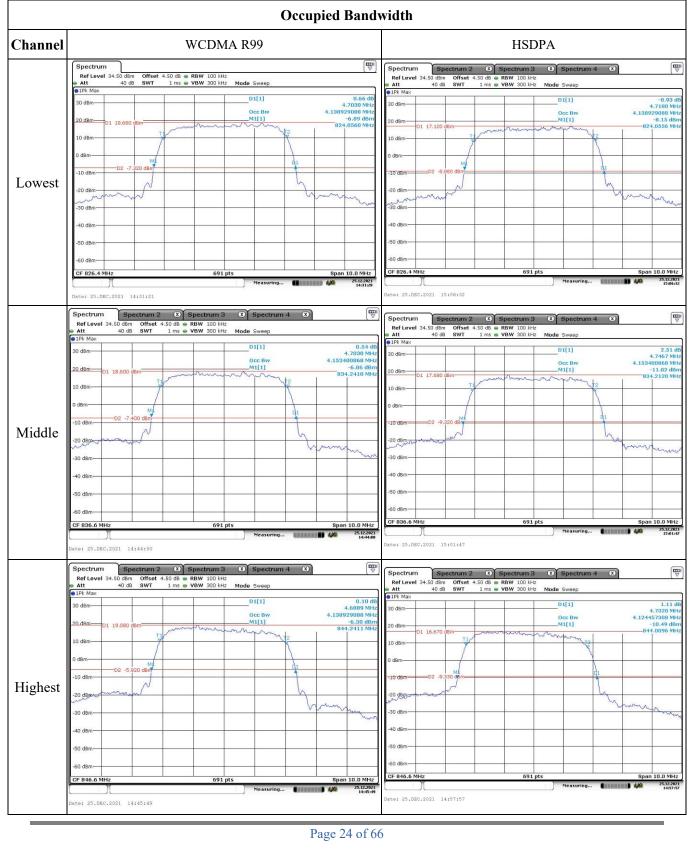
Result: Pass, Please refer to the test plots of Spurious Emissions at Antenna Terminal.

## FCC §2.1051, §22.917(a):Out of band emission, Band Edge

Result: Pass, Please refer to the test plots of Out of band emission, Band Edge.

FCC §2.1055, §22.355: Frequency Stability							
Test Modulation:	WCDMA R99		Test Channel:	836.6	MHz		
Test Item	Temperature	Voltage	Frequen	cy Error	Limit		
Test Item	(°C)	(VDC)	(Hz)	(ppm)	(ppm)		
	-30	24	22	0.026	2.5		
	-20	24	20	0.024	2.5		
	-10	24	-16	-0.019	2.5		
Frequency	0	24	18	0.022	2.5		
Stability vs.	10	24	24	0.029	2.5		
Temperature	20	24	26	0.031	2.5		
	30	24	22	0.026	2.5		
	40	24	-18	-0.022	2.5		
	50	24	21	0.025	2.5		
Frequency	20	9	24	0.029	2.5		
Stability vs. Voltage	20	36	23	0.027	2.5		
				Result:	Pass		

#### **Test Plots:**

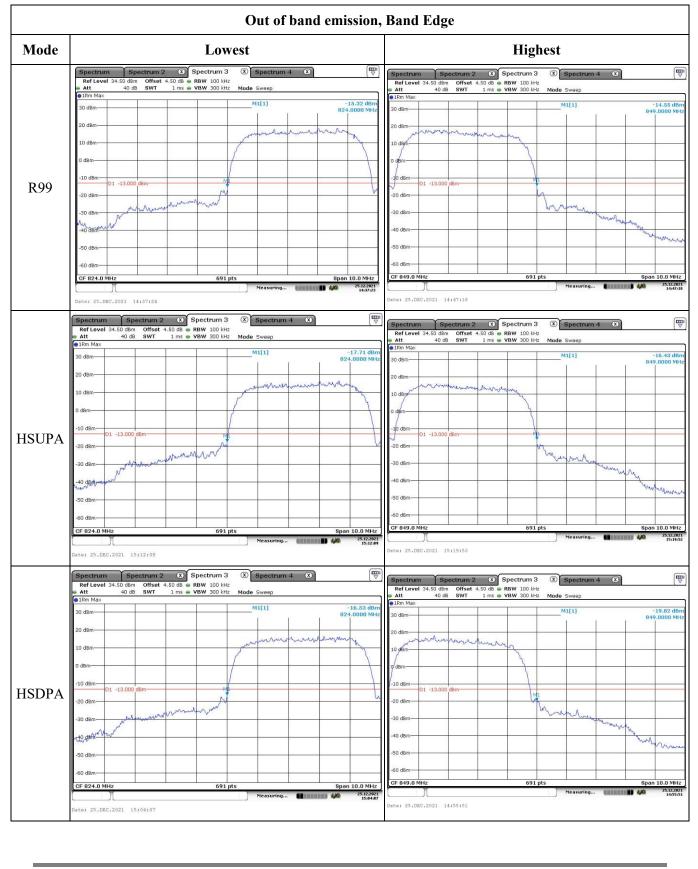


Report No.: CR21110071-00

Channel	HSUPA
	Spectrum         Spectrum 2         Image: Spectrum 3         Spectrum 4         Image: Spectrum
	D1[1]     1.63 dB
	30 dBm 4.7030 MHz 0 Cc Bw 4.12457300 MHz 20 dBm M11] -0.39 dBm
	01 16.680 dBm B24.0560 MHz
	0 dBm
	-10 dem 02 -9,320 dem
owest	
	-20 dem
	-40 dBm-
	-50 d8m
	-60 d£m
	CF 826.4 MHz 691 pts Span 10.0 MHz CF 826.4 MHz 691 pts Measuring
	Date: 25.DBC.2021 15:11:10
	Spectrum         Spectrum 2         Spectrum 3         Spectrum 4         Im           Ref Level 34.50 dbm         Offset 4.50 db         RBW 100 Hz         Im         Im         Im
	Att 40 dB SWT 1 ms WBW 300 kHz Mode Sweep 1Pk Max
	30 dBm D1[1] 0.47 dB 4.7323 MHz Occ Bw 4.133400866 MHz
	20 dBm
	10 dBm
Middle	-10 dBm D2 -9.000 dBm
Wilddie	20 dam when the second
	-30 dBm
	-40 dBm
	-50 dBm
	CF 836.6 MHz 691 pts Span 10.0 MHz Measuring Katering Kateri
	Date: 25.DBC.2021 15:16:38
	Spectrum         Spectrum 2         Spectrum 3         Spectrum 4         C         Image: Comparison of the spectrum 3         Comparison of the spectrum 4         C         Image: Comparison of the spectrum 4
	D1[1]     1.44 dB
	4.7033 MHz Occ Bw 4.124457308 MHz
	01 17.110 dBm
	10 dBm
	M
Highest	
-	20 dBm wand
	-30 dBm
	-40 dBm
	-50 dBm
	-60 dBm G91 pts Span 10.0 MHz
	Measuring 15:18:07
	Date: 25.DEC.2021 15:18:37

	Spurious Emissions at An	tenna Terminal
Channel	WCDM	IA R99
Lowest	Spectrum         Spectrum 2         Spectrum 3         Spectrum 4         C         C           Ref Level 34.50 dBm         Offset 4.50 dB         RBW 100 kHz         Made         Sweep         Sectrum 4         C	Spectrum         Spectrum 2         ③         Spectrum 3         ③         Spectrum 4         ④         Important           Ref Level 34.50 dBm         Offset 4.50 dB         RBW 1.0Hz         Made Sweep         Important         Important </th
	-30 dBm -40 dBm -40 dBm -50	-30 dBm
Middle	Spectrum         Spectrum 2         Spectrum 3         Spectrum 4         Image: Control of Spectrum	Spectrum         Spectrum 2         Spectrum 3         Spectrum 4         Image: Spectrum 4
Highest	Spectrum         Spectrum 2         Spectrum 3         Spectrum 4         Image: Control of the state	Spectrum         Spectrum 2         Spectrum 3         Spectrum 4         C           Ref level 34.50 dbm         Offset 4.50 db         RBW 1 MHz         C

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Serial Number:	CR21110071-RF-S1	Test Date:	2021/12/24
Test Site:	RF	Test Mode:	Transmitting
Tester:	LE Qiao	Test Result:	Pass

## 4.2 Antenna Port Test Data and Results for LTE Band 5:

Environmental Conditions:					
Temperature: (℃)	25.9	Relative Humidity: (%)	60	ATM Pressure: (kPa)	101.2

Test Equipment List and Details:							
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date		
R&S	Spectrum Analyzer	Spectrum Analyzer	101474	2021/7/22	2022/7/21		
zhuoxiang	Coaxial Cable	SMA-178	211002	Each time	N/A		
Mini-Circuits	DC Block	BLK-18-S+	1554404	Each time	N/A		
YINSAIGE	Coaxial Cable	SS402	SJ0100002	Each time	N/A		
R&S	R&S Wideband Radio Communication Tester		149218	2021/7/22	2022/7/21		
BACL	TEMP&HUMI Test Chamber	BTH-150	30026	2021/7/22	2022/7/21		
UNI-T	Multimeter	UT39A+	C210582554	2021/9/30	2022/9/29		
E-Microwave	Two-way Spliter	ODP-1-6	OE0120176	Each Time	N/A		
	* *						

\* Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

EUT Information@ LTE Band 5▲:					
Antenna Gain (dBi):	3.06	Antenna Gain (dBd):	0.91	Cable Loss (dB):	0.3
Operation Voltage(V <sub>DC</sub> ):					
Lowest:	9	Normal:	24	Highest:	36

Test Frequency For Each Mode:						
Operation Bandwidth	Lowest Frequency (MHz)	Middle Frequency (MHz)	Highest Frequency (MHz)			
1.4MHz	824.7	836.5	848.3			
3MHz	825.5	836.5	847.5			
5MHz	826.5	836.5	846.5			
10MHz	829	836.5	844			

## Test Data:

FCC§2.1046;	§ 22.913 (a)					
<b>RF Output Po</b>	ower:					
Test	Resource	Conducted A	verage Output	Power(dBm)	Maximum	
Bandwidth & Modulation	Block & RB offset	Lowest Channel	Middle Channel	Highest Channel	ERP (dBm)	ERP Limit (dBm)
	RB1#0	23.69	23.36	23.30		
	RB1#3	23.52	23.40	23.34		
	RB1#5	23.50	23.32	23.34	24.3	29.45
1.4MHz QPSK	RB3#0	23.52	23.69	23.46	24.3	38.45
	RB3#3	23.64	23.60	23.32		
	RB6#0	22.55	22.42	22.51		
	RB1#0	22.66	22.86	22.42		
	RB1#3	22.76	22.80	22.43		
1.4MHz 16QAM	RB1#5	23.00	23.01	22.40	23.62	38.45
1.4MHZ TOQAM	RB3#0	22.60	22.33	22.68	23.62	58.45
	RB3#3	22.44	22.36	22.58		
	RB6#0	21.67	21.30	21.35		
	RB1#0	23.37	23.44	23.10	- 24.25	38.45
	RB1#8	23.53	23.54	23.35		
3MHz QPSK	RB1#14	23.64	23.48	23.33		
SMHZ QPSK	RB6#0	22.50	22.41	22.22		
	RB6#9	22.52	22.45	22.36		
	RB15#0	22.52	22.46	22.35		
	RB1#0	22.85	22.91	22.30		38.45
	RB1#8	22.69	22.66	22.31		
3MHz 16QAM	RB1#14	22.76	22.74	21.93	23.52	
SIMITZ TOQAM	RB6#0	21.51	21.39	21.31	23.32	
	RB6#9	21.52	21.45	21.54		
	RB15#0	21.60	21.39	21.32		
	RB1#0	23.35	23.21	23.12		
	RB1#13	23.63	23.32	23.25		
5MHz QPSK	RB1#24	23.46	23.43	23.15	24.24	38.45
JMIIZ QI SK	RB15#0	22.50	22.49	22.26	24.24	50.45
	RB15#10	22.52	22.49	22.31		
	RB25#0	22.54	22.41	22.29		
	RB1#0	22.10	22.56	22.47		
	RB1#13	22.22	22.79	22.52		
5MHz 16QAM	RB1#24	21.87	22.66	22.07	23.4	38.45
contra to grant	RB15#0	21.50	21.43	21.27	<i>23</i> .т	50.75
	RB15#10	21.39	21.34	21.34		
	RB25#0	21.55	21.28	21.26		

## China Certification ICT Co., Ltd (Dongguan)

Report No.: CR21110071-00

					Result:	Pass	
Note: ERP=Conducted Power(dBm) - Cable loss(dB) + Antenna Gain(dBd)							
	RB50#0	21.58	21.49	21.22			
	RB25#25	21.51	21.52	21.11			
TOWITZ TOQAM	RB25#0	21.58	21.46	21.55	23.51	50.45	
10MHz 16QAM	RB1#49	22.45	22.66	21.89	23.51	38.45	
	RB1#25	22.84	22.69	22.31			
	RB1#0	22.73	22.90	22.35			
	RB50#0	22.56	22.44	22.40	24.25		
	RB25#25	22.55	22.45	22.26			
IOWITZ QF SK	RB25#0	22.54	22.40	22.37		56.45	
10MHz QPSK	RB1#49	23.33	23.30	23.42		38.45	
	RB1#25	23.64	23.60	23.54			
	RB1#0	23.29	23.50	23.30			

Peak-to-average Ratio(PAR)						
Test	Resource	Peak-	Peak-to-average Ratio(dB)			
Bandwidth & Modulation	Block & RB offset	Lowest Channel	Middle Channel	Highest Channel	Limit (dB)	
10MHz QPSK	RB1#0	4.26	4.41	4.41	13	
TOWINZ QPSK	RB50#0	4.64	4.96	4.55	13	
10MHz	RB1#0	5.30	5.36	5.36	13	
16QAM	RB50#0	5.74	5.88	5.71	13	
				Result:	Pass	

FCC §2.1049, §22.905:Occupied Bandwidth							
Operation	99% Occupied Bandwidth (MHz)			26 dB Occupied Bandwidth (MHz)			
Mode	Low Channel	Middle channel	High Channel	Low Channel	Middle Channel	High Channel	
1.4MHz QPSK	1.096	1.108	1.102	1.320	1.320	1.296	
1.4MHz 16QAM	1.108	1.096	1.102	1.320	1.296	1.308	
3MHz QPSK	2.695	2.695	2.695	2.952	2.940	2.964	
3MHz 16QAM	2.695	2.683	2.695	2.964	2.964	2.952	
5MHz QPSK	4.531	4.511	4.511	5.060	5.020	5.000	
5MHz 16QAM	4.511	4.531	4.531	5.020	5.040	5.040	
10MHz QPSK	8.942	8.942	8.901	9.840	9.640	9.680	
10MHz 16QAM	8.942 8.942 8.901			9.720	9.760	9.680	
Note: The test pl	ots please refer t	o the Plots of O	ccupied Bandwid	lth			

FCC §2.1051, §22.917(a):Spurious Emissions at Antenna Terminal			
<b>Result:</b>	Pass, Please refer to the test plots of Spurious Emissions at Antenna Terminal.		

## FCC §2.1051, §22.917(a):Out of band emission, Band Edge

Result: Pass, Please refer to the test plots of Out of band emission, Band Edge.

FCC §2.1055, §22.355: Frequency Stability						
Test Mode:	10 MHz QPSK		Test Channel:	836.5	MHz	
T and Italia	Temperature	Voltage	Frequen	cy Error	Limit	
Test Item	(°C)	(VDC)	(Hz)	(ppm)	(ppm)	
	-30	24	-0.70	-0.001	2.5	
	-20	24	6.61	0.008	2.5	
	-10	24	7.18	0.009	2.5	
Frequency	0	24	-7.03	-0.008	2.5	
Stability vs.	10	24	6.83	0.008	2.5	
Temperature	20	24	-6.07	-0.007	2.5	
	30	24	-7.55	-0.009	2.5	
	40	24	-8.09	-0.010	2.5	
	50	24	-9.59	-0.011	2.5	
Frequency Stability vs. Voltage	20	9	-8.60	-0.010	2.5	
	20	36	-5.56	-0.007	2.5	
				Result:	Pass	

Test Mode:	10 MHz 16QAM		Test Channel:	836.5	MHz
Test Item	Temperature	Voltage	Frequen	cy Error	Limit
Test Item	(°C)	(V <sub>DC</sub> )	(Hz)	(ppm)	(ppm)
	-30	24	-0.87	-0.001	2.5
	-20	24	9.72	0.012	2.5
	-10	24	6.40	0.008	2.5
Frequency	0	24	9.30	0.011	2.5
Stability vs.	10	24	-5.78	-0.007	2.5
Temperature	20	24	-7.92	-0.009	2.5
	30	24	6.72	0.008	2.5
	40	24	-7.31	-0.009	2.5
	50	24	9.09	0.011	2.5
Frequency	20	9	8.55	0.010	2.5
Stability vs. Voltage	20	36	9.39	0.011	2.5
			•	Result:	Pass

## **Test Plots:**

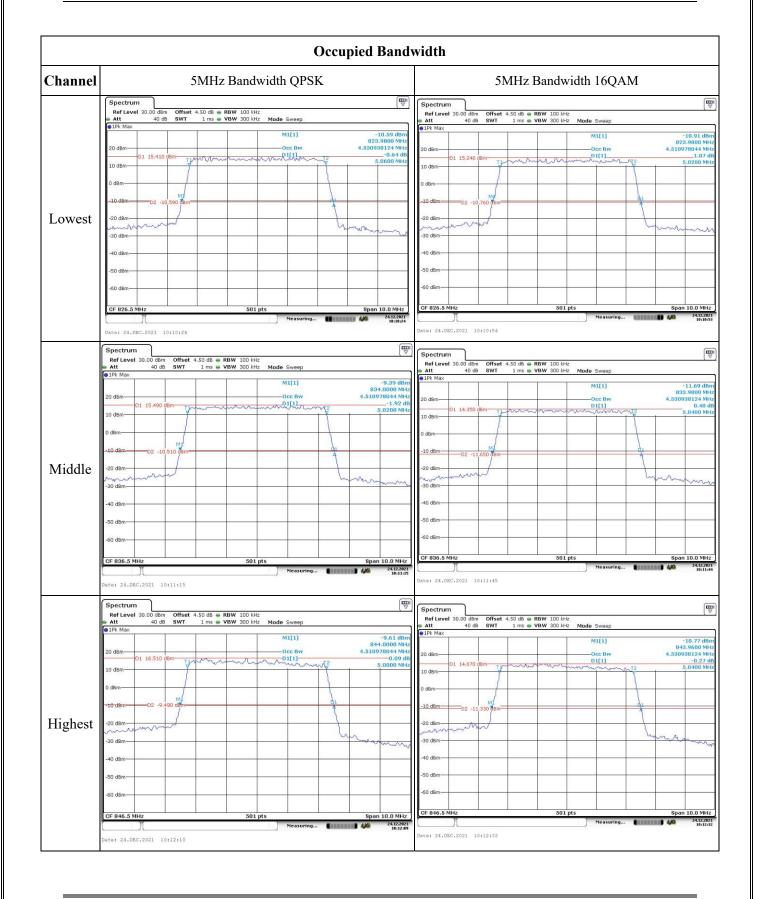
	Occupied Bandy	width
Channel	1.4MHz Bandwidth QPSK	1.4MHz Bandwidth 16QAM
Lowest	Spectrum         (T)           Ref Level 30.00 dim         Offset 4.50 dill e RBW 30 kHz         Mode Sweep           Att         40 dill SWT         1.1 ms         VBW 100 kHz         Mode Sweep           Image: Spectrum         Image: Spectrum         Image: Spectrum         1.1 ms         -10.035 dBm           20 dBm         Image: Spectrum         Image: Spectrum         Image: Spectrum         1.1 ms         -10.035 dBm           20 dBm         Image: Spectrum         Image: Spectrum         Image: Spectrum         Image: Spectrum         1.2 0.035 dBm           10 dBm         Image: Spectrum         Image: Spectrum         Image: Spectrum         1.2 0.000 MHz           10 dBm         Image: Spectrum         Image: Spectrum         Image: Spectrum         Image: Spectrum           20 dBm         Image: Spectrum         Image: Spectrum         Image: Spectrum         Image: Spectrum           -10 dBm         Image: Spectrum         Image: Spectrum         Image: Spectrum         Image: Spectrum           -20 dBm         Image: Spectrum         Image: Spectrum         Image: Spectrum         Image: Spectrum           -30 dBm         Image: Spectrum         Image: Spectrum         Image: Spectrum         Image: Spectrum           -50 dBm         Image: Spectrum	Spectrum         Image: Spectrum           Ref Level 30.00 dBm         Offset 4.50 dB @ RBW 30 H4z           Mit         40 dB           SWT         1.1 ms @ VBW 100 H4z           Mit[1]         -10.19 dBm           20 dBm         01 15.660 dBm           0 dBm         01 15.660 dBm           0 dBm         01 15.660 dBm           0 dBm         02 -10.320 dBm           -20 dBm         02 -10.320 dBm           -30 dBm         02 -10.320 dBm           -50 dBm         04 dBm           -50 dBm         04 dBm           -50 dBm         051 pts           Spon 3.0 MHz         24.0802.2021 10106:14
Middle	Spectrum         The second secon	Spectrum         TW           ext         40 d8         SWT         1.1 ms         e NBW         30 kHz           e Att         40 d8         SWT         1.1 ms         e VBW 100 kHz         Mode         Sweep           e IPk Max         01 11         -10.43 gAm         01 11         -10.43 gAm           20 dBm         01 15.400 dBm         10 gS 0000303 MHz         0111         -10.95 gAm           10 dBm         01 15.400 dBm         10 gS 0000303 MHz         0111         -10.95 gAm           0 dBm         01 15.400 dBm         10 gS 0000303 MHz         0111         -10.95 gAm           0 dBm         0 gS 0.500 dBm         1.29600 MHz         0111         -10.95 gAm           -20 dBm         -20.600 dBm         -10.950 dBm         -10.95 gAm         -10.95 gAm           -20 dBm         -20.600 dBm         -10.950 dBm         -10.950 dBm         -10.950 dBm           -60 dBm         -50 dBm         -50 dBm         -50 dBm         -50 dBm         -21.050 dBm           -60 dBm         -50 dBm         -50 dBm         -50 dBm         -50 dBm         -50 dBm           -60 dBm         -50 dBm         -50 dBm         -50 dBm         -50 dBm         -50 dBm           -50 dBm
Highest	Ref Art.Bol.2011         Colorad           Ref Lovel 30.00 dbm         Offset 4.50 db = RBW         30 kHz           Att         40 db         SWT         1.1 ms = VBW 100 kHz         Mode Sweep           Image: Strate in the stra	Att         40 d8         SWT         1.1 ms         VBW         100 kHz           IPk Max         000000000000000000000000000000000000

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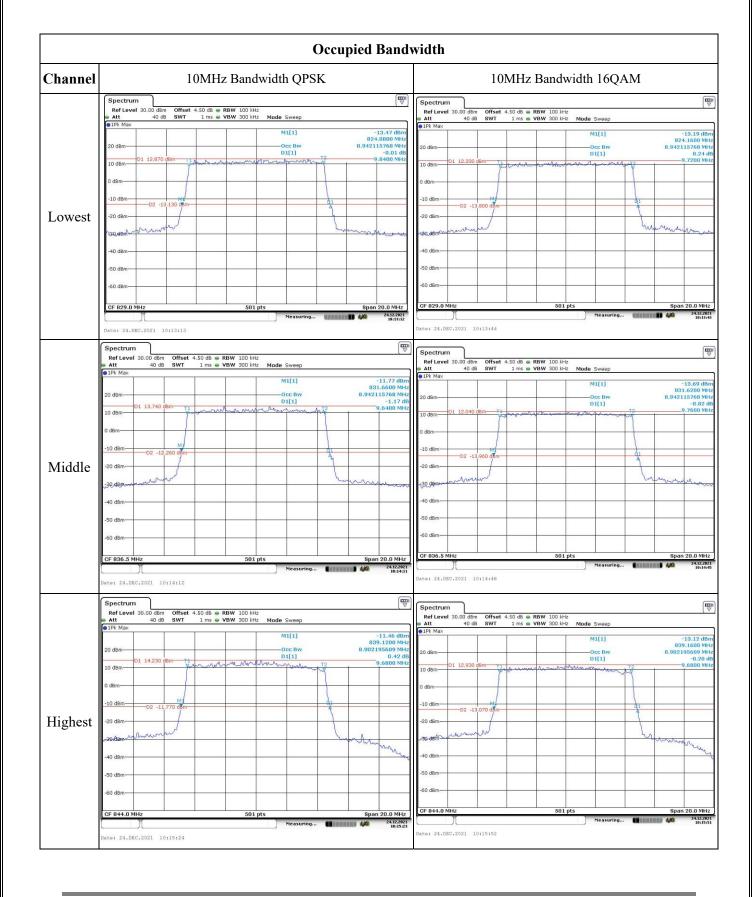
## China Certification ICT Co., Ltd (Dongguan)

Report No.: CR21110071-00

		Occupied Band	wiutii	
Channel	3MHz B	andwidth QPSK	3MHz Ba	ndwidth 16QAM
	Spectrum		Spectrum	
	Ref Level         30.00 dBm         Offset         4.50 dB         RBW           Att         40 dB         SWT         1.1 ms         VBW           1Pk Max         40 dB         SWT         1.1 ms         VBW	30 kHz 100 kHz Mode Sweep	Ref Level 30.00 dBm         Offset 4.50 dB (a)         RBW           Att         40 dB         SWT         1.1 ms (a)         VBW	
	LEK MAA	M1[1] -12.30 dBm 824.0240 MHz	e 1Pk Max	M1[1] -14.33 di 824.0240 M
	20 dBm-01 14,250 dBm-714	Occ Bw 2.694610778 MHz D1[1] -0.24 dB	20 dBm-	Occ Bw 2.694610778 M D1[1] 1.67
	10 dBm	2.9520 MHz	10 dBm 01 12.420 dBm 11	Alman 2.9640 M
	D dBm		0 dBm	
	-10 dBmD2 -11.750 dBm		-10 d8m	
Lowest	-20 dBm	1	-20 dBm	
	130'dBm	Manna Manna	use and how when he was	manna
	-40 dBm		-40 dBm-	
	-50 dBm		-50 dBm-	
	-60 dBm		-60 dBm	
	-00 uBm			
	CF 825.5 MHz	501 pts Span 6.0 MHz Measuring 24122021 19:07:54	CF 825.5 MHz	501 pts Span 6.0 M Measuring 24.12. 19:0
	Date: 24.DEC.2021 10:07:55	10:07:54	Date: 24.DEC.2021 10:08:22	
	Spectrum			
	Ref Level 30.00 dBm Offset 4.50 dB  RBW Att 40 dB SWT 1.1 ms  VBW	30 kHz	Ref Level 30.00 dBm Offset 4.50 dB @ RBW	30 kHz
	1Pk Max	M1[1] -12.51 dBm	Att 40 dB SWT 1.1 ms      VBW     IPk Max	/ 100 kHz Mode Sweep M1[1] -14.58 d
	20 dBm	835.0240 MHz Occ Bw 2.694610778 MHz	20 dBm	M1[1] -14.58 d 835.0120 M Occ Bw 2.682634731 M
	10 dBm 01 13.410 dBm T1m	D1[1] 0.28 dB		D1[1] 0.81
	0 dBm-		0 dBm	
N C' 1 11	-10 dBm	di di	-10 dBm	4
Middle	-20 dBm		-20 dBm	h
	waa definition of the second		ABD-dBM-5-2	man
	-40 dBm		-40 dBm-	
	-50 d8m		-50 dBm	
	-60 dBm		-60 dBm	
	CF 836.5 MHz	501 pts Span 6.0 MHz	CF 836.5 MHz	501 pts Span 6.0 M
		Measuring 24.12.2021 10:08:42		Measuring 🚺 10100 🚧 24.12.2 19:04
	Date: 24.DEC.2021 10:08:43		Date: 24.DEC.2021 10:09:06	
	Spectrum		Spectrum	(
	Ref Level 30.00 dBm         Offset 4.50 dB         RBW           Att         40 dB         SWT         1.1 ms         VBW           IPk Max         10 dB         SWT         1.1 ms         VBW		Ref Level 30.00 dBm         Offset 4.50 dB ● RBW           ● Att         40 dB         SWT         1.1 ms ● VBW	30 kHz
	JPK MdA	M1[1] -14.31 dBm 846.0000 MHz	IPk Max	M1[1] -12.66 d
	20 dBm	Occ Bw 2.694610778 MHz D1[1] 1.54 dB		846.0120 Occ Bw 2.694610778 D1[1] -0.51
	10 dBm D1 12.520 dBm THUMM	- 2.9640 MHz	10 dBm 01 12.850 dBm TM 0000 Arm	serve we what we want the serve we want the serve was a server the server the server the server server the server se
	0 dBm		0 dBm	
	-10 dBm	dı	-10 d8m	A1
Highest	-20 dBm-		-20 dBm	1
8	-30 dBm	- Anton a	-30 dBm-	Lammar and the second
	-40 dBm-	man man	-40.dBm	
	-50 dBm-		-50.dBm	
			-60 dBm-	
	-60 dBm			
	CF 847.5 MHz	501 pts Span 6.0 MHz Measuring 44122021	CF 847.5 MHz	501 pts Span 6.0 M Measuring 44.12.3 10:00
		Measuring 10:09:27		10101



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	Spurious Emissions at An	itenna Terminal
Channel	1.4MHz Band	lwidth QPSK
	Spectrum         Image: Construction of the state	Spectrum         mm         mm           Ref Level 10.00 d8m         Offset 4.50 d8 ■ RBW 1 MHz         W           Att         30 d8         SWT         36 ms ■ VBW 3 MHz
	PIPk Max     M1[1]41.08 dBm     B44.10 MHz     20 dBm	
	10 dBm	-10 dBm 01 -13,000 dBm
Lowest	-10 dBm	-30 dbm
	-30 dBm- -40 dBm- - 45 dBm- 	-50 dbm
	-60 dBm	-30 dBm
	Neasuring         Maintain	Measuring  Measuring  Measuring
	Spectrum         Image: Constraint of the second seco	Spectrum Ref Level 10.00 dBm Offset 4.50 dB ● RBW 1 MHz ▲ Att 30 dB SWT 36 ms ● VBW 3 MHz Mode Sweep ● IPK Max
	20 d8m	0 dbm
	0 dBm	-20 dbm
Middle	-20 dBm	HI +D dan 
	40 dem 	460 dBm-
	-60 d8m Start 30.0 MHz 501 pts Stop 1.0 GHz Measuring Measuring	Start 1.0 GHz Stop 10.0 GHz Stop 10.0 GHz
	Date: 24.DEC.2021 11:15:12	Date: 24.080.2021 11:15:37 Spectrum Ref Level 10.00 dBm Offset 4.50 dB
	Att 40 dB SWT 9.7 ms VBW 300 kHz Mode Sweep     PPk Max     M1[1] -41.64 dBm     828.70 MHz	Att 30 d8 SWT 36 ms      VBW 3 MHz Mode Sweep     PIPk Max     N1[1] -38.63 dBm
	20 dem	0 dBm
	0 dBm	-10 dBm 01 -13,000 dBm
4	-10 dBm-01 -13.000 dBm-	-30 dBm
Highest	-20 dbm	40 cm
	-40 dem M1	-60 dim
	10 Bm	-70 dBm
	Start 30.0 MHz 501 pts Stop 1.0 GHz	Start 1.0 GHz S01 pts Stop 10.0 GHz Start 1.0 GHz Neasuring
	Date: 24.DBC.2021 11:16:12	Date: 24.DEC.2021 11:16:37

	Spurious Emissions at An	tenna Terminal					
Channel	el 3MHz Bandwidth QPSK						
	Spectrum         [776]           Ref Level 30.00 dBm         Offset 4.50 dB ● RBW 100 kHz           ▲ Att         40 dB           SWT         9.7 ms ● VBW 300 kHz           Mode         Sweep	Ref Level         10.00 dBm         Offset         4.50 dB         ● RBW         1 MHz           ■ Att         30 dB         SWT         36 ms         ● VBW         3 MHz         Mode         Sweep					
	20 dBm B46.10 MHz						
	10 dBm	-10 dBm 01 -13.000 dBm					
Lowest	-10 dBm 01 -13.000 dBm	-30 dBm -40 dBm -40 dBm 					
	40 dem-	-60 d8m					
	-60 dBm	-80 d8m					
	Measuring         24122221 111716           Date: 24.0502.2021         11:17:16	Measuring         Measuring<					
	Spectrum         TTD           Ref Level 30.00 dBm         Offset 4.50 dB	Ref Level 10.00 dBm         Offset 4.50 dB         RBW         1MHz         [V]           Att         30 dB         SWT         36 ms         VBW 3 MHz         Node Sweep           #IFK Max					
	20 dam 565.30 MHz	M1[1] -39.29 dBm 6.3440 GHz -10 dBm-					
	0 dBm	01 -13.000 dBm					
Middle	-20 dBm	-50 dBm					
	-40 dBm-	-50 d8m					
	-60 d8m	-80 d8m- Start 1.0 GHz 501 pts Stop 10.0 GHz Start 1.0 GHz 2412/875 Neosuring					
	Date: 24.DEC.2021 11:18:10           Spectrum	Date: 24.050.2021 11:18:35					
	Ref Level 30.00 dBm         Offset 4.50 dB         RBW 100 kHz           Att         40 dB         SWT         9.7 ms         VBW 300 kHz           M1R Max         Max         M1[1]         -42.95 dBm	Ref Level 10.00 dBm         Offset 4.50 dB         RBW 1 MHz         Image: Comparison of the state of the stat					
	20 dBm	0 dBm -10 dBm 01 -13.000 dBm					
	0 dBm 01 -13.000 dBm 01 -13.000 dBm	-20 dBm					
Highest	-20 dBm	-50 BBm					
	40 dem	-60 dBm					
	-60 dBm	-8U 08m Start 1.0 GHz 501 pts Stop 10.0 GHz Neasuring 1000 2000 2000 2000 2000 2000 2000 2					
	Date: 24.DEC.2021 11:19:05	Date: 24.DEC.2021 11:19:33					

	Spurious Emissions at An	tenna Terminal							
Channel	5MHz Bandwidth QPSK								
	Spectrum         (™)           Ref Lavel 30.00 dBm         Offset 4.50 dB ● RBW 100 kHz           ▲ Att         40 dB         SWT         9.7 ms ● VBW 300 kHz           ▲ DPL Max         ●         Node         Sweep	Spectrum         mm           Ref Level         10.00 dBm         Offset         4.50 dB @ RBW         1 MHz           Att         30 dB         SWT         36 ms @ VBW         3 MHz         Mode         Sweep           @ JPK Max							
Lowest	20 dBm	0 dBm 01 -13.000 dBm 01 -13.000 dBm							
	0 d8m	-20 dBm							
	-30 dBm -40 dBm - ungresselletermenten son sonther and the son	-50 dBm							
	Start 30.0 MHz         Stop 1.0 GHz           Start 30.0 MHz         S01 pts         Stop 1.0 GHz           Neasuring         Measuring         2412287           Date: 24.0E0.2021 11:20:20         11:20:20	Start 1.0 GHz         Stop 10.0 GHz           Start 1.0 GHz         Stop 10.0 GHz           Date: 24.080.2021 11:20:42         Measuring							
	Spectrum         Image: Constraint of the sector of t	Spectrum         mm           Ref Level 10.00 dBm         Offset 4.50 dB ● RBW 1 MH:           ● Att         30 dB SWT           36 ms ● VBW 3 MH:							
	20 dBm 10 dBm10 dBm10	0 dBm -10 dBm 01 -13.000 dBm							
NC 111.	0 dBm 10 dBm 11 -13.000 dBm 12 -10 dBm12 -10 dBm	-20 dBm							
Middle	-20 dBm	40 dBm							
	-50 dBm	-70 dBm							
	Start 30.0 MHz         Stop 1.0 GHz           Start 30.0 MHz         501 pts         Stop 1.0 GHz           Measuring         Measuring         Weasuring         Weasuring           Date: 24.DEC.2021         11:21:14         Stop 1.0 GHz         Stop 1.0 GHz	Date: 24.DEC.2021 11:21:42							
	Spectrum         Image: Constraint of the second seco	Spectrum         Ref Level         Offset         4.50 dB         RBW 1 MHz           Att         30 dB         SWT         36 ms         VBW 3 MHz         Mode         Sweep           # JPK Max							
	20 dem 10 dem1	0 d8m							
	0 dBm	-20 d8m							
Highest	-20 dBm	40 dBm MI www.horewalk							
	-50 dem	-70 dBm							
	Start 30.0 MHz         Stop 1.0 GHz           Start 30.0 MHz         Stop 1.0 GHz           Date: 24.DEC.2021 lis22:18         Measuring	Start 1.0 GHz         S01 pts         Stop 10.0 GHz           Date: 24.080.2021 11:22:37         Measuring         Ministration of the stop 10.0 GHz							

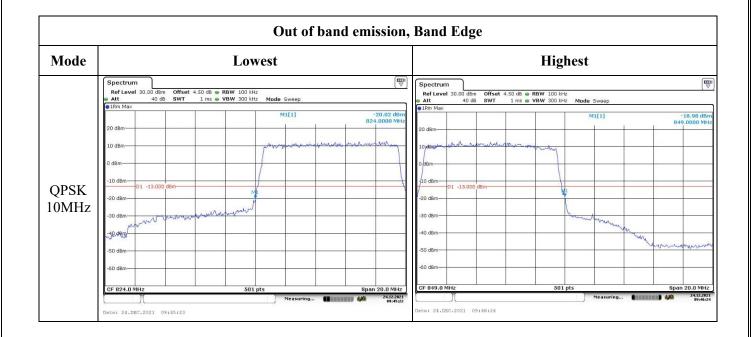
	Spurious Emissions at An	tenna Terminal							
Channel	10MHz Bandwidth QPSK								
	Spectrum         (□)           Ref Level 30.00 dBm         Offset 4.50 dB ● RBW 100 kHz           Att         40 dB           SWT         9.7 ms ● VBW 300 kHz	Spectrum         mm         mm           Ref Level 10.00 dBm         Offset 4.50 dB ⊕ RBW 1 MHz         ₩                ▲ Att             30 dB SWT             36 ms ● VBW 3 MHz          Mode Sweep							
	10 dBm	-10 dBm- -20 dBm-							
Lowest	-10 dBm-01 -13.000 dBm-01 -13.0000 dBm-01 -13.000 dBm-01 -13.0000 dBm-01 -13.0000 dBm-01 -13.0000 dBm-01 -13.0000 dBm-01 -13.0000 dBm-01 -13.0000 dBm-01 -13.00000 dBm-01 -13.000000000000000000000000000000000000	-30 dam-							
	-30 dBm- 40 dBm- 53 dBm-	-50 d8m							
	-50 dBm	-80 d8m							
	Stort 30.0 MHz         Stop 1.0 GHz	Start 1.0 GHz         S01 pts         Stop 10.0 GHz           Outon 1.0 GHz         Neosuring         Ministrator           Date: 24.080.2021         11:23:44							
	Spectrum         Image: Constraint of the second secon	Spectrum         Important           RefLevel 10.00 dBm         Offset 4.50 dB @ RBW 1 MHz           @ Att         30 dB         SWT         36 ms @ VBW 3 MHz           @ IPK Max         Important         Important         Important							
	20 d8m	0 dBm							
	0 dBm	-20 dBm							
Middle	01 -13.000 dBm-	40 Bm - MI Mundaulanan Manager Marine Company							
	-40 dBm	-60 d8m							
	-60 dBm	-80 dBm							
	Date: 24.DEC.2021 11:24:14	Date: 24.08C.2021 11:24:39							
	Spectrum         Image: Constraint of the system           Ref Level 30.00 dBm         Offset 4.50 dB         RBW 100 kHz           Att         40 dB         SWT         9.7 ms         VBW 300 kHz           M1Pk Max         M1[1]         -45.46 dBm	Ref Level 10:00 dBm         Offset 4.50 dB @ RBW 1 MHz         (V)           @ Att         30 dB         SWT         36 ms @ VBW 3 MHz         Mode Sweep           @ IPK Max         @							
	20 dBm 45.46 dBm 615.70 MHz	0 dBm							
	0 dBm	-20 dBm							
Highest	-20 dBm	40 dan werelin work were with the were and a start were and the second start were and the second start were second start							
	-40 dBm	-60 dBm							
	-60 d8m	-80 d8m							
	24.12.2021 Date: 24.DEC.2021 11:25:19	Date: 24.DBC.2021 11:25:41							

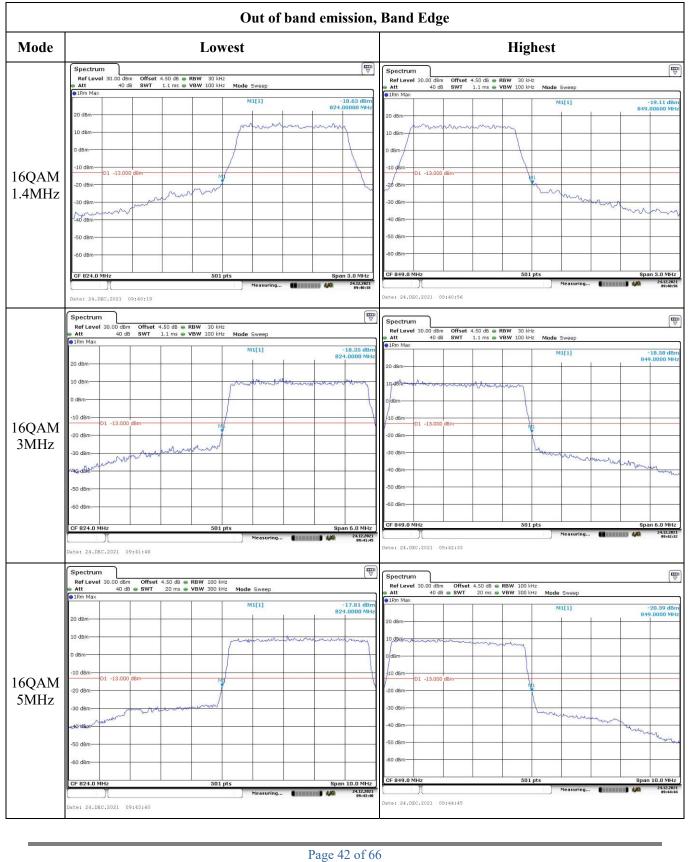
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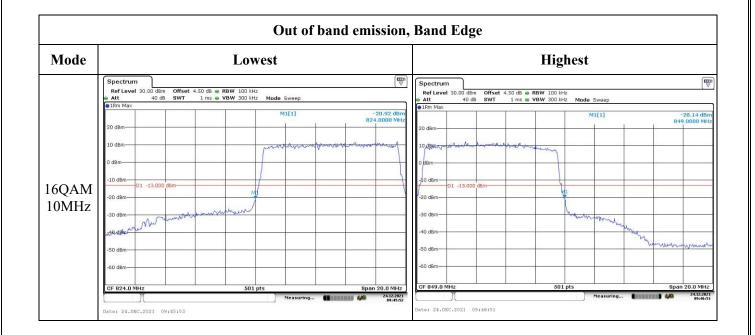
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	Out of band emission,	Band Edge			
Mode	Lowest	Highest			
	Spectrum         (™)           Ref Level 30.00 dBm         Offset 4.50 dB ● RBW 30 kHz         (♥)           Att         40 dB SWT         1.1 ms ● VBW 100 kHz         Mode Sweep           ● JAm Max         (♥)         (♥)         (♥)	Spectrum         mm           Ref Level 30.00 dBm         Offset 4.50 dB ∈ RBW         30 1Hz           ● Att         40 dB         SWT         1.1 ms ∈ VBW 100 1Hz           Mode         Sweep			
QPSK 1.4MHz	20 dBm     -15.97 dBm       20 dBm     924,00000 MHz       10 dBm     -10 dBm       0 dBm     -10 dBm       -10 dBm     -11,000 dBm       -20 dBm     -11,000 dBm       -30 dBm     -11,000 dBm       -30 dBm     -11,000 dBm       -20 dBm     -11,000 dBm       -20 dBm     -11,000 dBm       -30 dBm     -11,000 dBm       -30 dBm     -11,000 dBm       -20 dBm     -11,000	• IPM Max               • 16.61 dbm            20 dbm               • 16.61 dbm            10 dbm               • • • • • • • • • • • • •			
	Spectrum         Image: Constraint of the sector of th	Spectrum         Image: Constraint of the sector of t			
	20 dBm	20 dBm			
QPSK 3MHz	-10 dBm 01 -13.000 dBm 10	-20 dBm 01 -13.000 dBm 12 -20 dBm			
	-50 dBm -60 dBm -60 dBm CF 824.0 MHz 501 pts Span 6.0 MHz Span 6.0 MHz 2412281 Neasuring 440 2412281 Span 6.0 MHz 2412281	-50 d8m -60 d8m CF 849.0 NHz 501 pts Span 6.0 NHz Measuring 1222221 Measuring 1222221			
	Date: 24.DBC/2021 09:41:29  Spectrum RefLevel 30.00 dBm Offset 4.50 dB ● RBW 100 16/2	Date: 24.DE0.2021 09:42:10  Spectrum Ref Level 30.00 dBm Offset 4.50 dB  RBW 100 kHz			
	Att 40 dB WT 20 ms VBW 300 kHz Mode Sweep      Arm Max     M1[1] -10.14 dBm     824.0000 MHz	Att         40 dB         SWT         20 ms         VBW 200 kHz         Mode Sweep           #1Pm Max         -19.80 dBm         -19.80 dBm         -19.80 dBm         -19.80 dBm           20 dBm         -19.80 dBm         -19.80 dBm         -19.80 dBm         -19.80 dBm			
	10 dBm 0 dBm0 dBm 0 dBm 0 dBm0 dBm0 dBm 0 dBm0 dBm0 dBm _	10.d8m			
QPSK 5MHz	01 -13.000 dBm	01 -13.000 dBm			
	-50 dBm	-50 dBm			
	CF 824.0 MHz 501 pts Span 10.0 MHz CF 824.0 MHz 400 2412201 Neasuring	CF 849.0 MHz         S01 pts         Span 10.0 MHz           Dates: 24.080.2021         09:44:14         Measuring         24:080.2021         99:44:14			







no mitemia i ort rest Data and Results for DrD Dana m									
Serial Number:	CR21110071-RF-S1	Test Date:	2021/12/24~2022/01/06						
Test Site:	RF	Test Mode:	Transmitting						
Tester:	LE Qiao	Test Result:	Pass						

### 4.3 Antenna Port Test Data and Results for LTE Band 41:

Environmental Conditions:							
Т	ſemperature: (℃)	22.1~25.9	Relative Humidity: (%)	60~64	ATM Pressure: (kPa)	101.2~101.4	

Test Equipment List and Details:							
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date		
R&S	Spectrum Analyzer	Spectrum Analyzer	101474	2021/7/22	2022/7/21		
zhuoxiang	zhuoxiang Coaxial Cable		211001	Each time	N/A		
Mini-Circuits	DC Block	BLK-18-S+	1554403	Each time	N/A		
YINSAIGE	Coaxial Cable	SS402	SJ0100002	Each time	N/A		
R&S	Wideband Radio Communication Tester	CMW500	149218	2021/7/22	2022/7/21		
BACL	BACL TEMP&HUMI Test Chamber		30026	2021/7/22	2022/7/21		
UNI-T Multimeter		UT39A+	C210582554	2021/9/30	2022/9/29		
E-Microwave	Two-way Spliter	ODP-1-6	OE0120176	Each Time	N/A		
* Statement of T	raceability: China Certification 1	ICT Co Itd (Do	ngguan) attests t	hat all calibratio	ns have been		

\* Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

EUT Information@LTE Band 41 A:							
Antenna Gain (dBi):	3.06		Cable Loss (dB):	0.7			
Operation Volta	Operation Voltage(VDC):						
Lowest:	9	Normal:	24	Highest:	36		

Test Frequency For Each Mode:							
Operation Bandwidth	Lowest Frequency (MHz)	Middle Frequency (MHz)	Highest Frequency (MHz)				
5MHz	2557.5	2605	2652.5				
10MHz	2560	2605	2650				
15MHz	2562.5	2605	2647.5				
20MHz	2565	2605	2645				

### Test Data:

FCC§2.1046;	§ 27.50(h)(2)					
<b>RF Output P</b>	ower:					
Test	Resource	Conducted A	verage Output	Power(dBm)	Maximum	
Bandwidth & Modulation	Block & RB offset	Lowest Channel	Middle Channel	Highest Channel	EIRP (dBm)	EIRP Limit (dBm)
	RB1#0	21.55	21.37	21.22		
5MHz QPSK	RB1#13	21.57	21.41	21.37		
	RB1#24	21.49	21.31	21.17	22.02	22
	RB15#0	20.60	20.33	20.36	23.93	33
	RB15#10	20.53	20.47	20.34		
	RB25#0	20.59	20.37	20.24		
	RB1#0	20.17	20.40	20.40		
5MHz 16QAM	RB1#13	20.17	20.65	20.57		
	RB1#24	20.16	20.65	20.29	23.01	33
JMIIZ IOQAM	RB15#0	19.52	19.42	19.20	25.01	
	RB15#10	19.45	19.41	19.19		
	RB25#0	19.75	19.34	19.24		
	RB1#0	21.75	21.35	21.21	24.11	33
	RB1#25	21.69	21.71	21.22		
	RB1#49	21.53	21.42	21.01		
10MHz QPSK	RB25#0	20.77	20.27	20.26		
	RB25#25	20.60	20.49	20.30		
	RB50#0	20.70	20.31	20.12		
	RB1#0	20.80	20.23	20.41		
	RB1#25	20.93	21.25	20.73		
10MHz 16QAM	RB1#49	20.56	21.08	20.24	23.61	33
TOWITZ TOQAM	RB25#0	19.80	19.47	19.44	23.01	55
	RB25#25	19.58	19.59	19.44		
	RB50#0	19.73	19.53	19.24		
	RB1#0	21.64	21.27	21.20		
	RB1#38	21.73	21.54	21.18		
15MHz QPSK	RB1#74	21.48	21.33	20.96	24.09	33
15MHZ QF5K	RB36#0	20.70	20.18	20.14	24.09	33
	RB36#39	20.69	20.20	20.19		
	RB75#0	20.66	20.20	20.08		
	RB1#0	20.75	20.36	20.28		
	RB1#38	20.58	21.17	20.23		
15MHz 16QAM	RB1#74	20.52	21.14	20.07	23.53	33
1514112 TOQAM	RB36#0	19.74	19.34	19.31	20.00	
	RB36#39	19.58	19.47	19.40		
	RB75#0	19.81	19.20	19.26		

#### China Certification ICT Co., Ltd (Dongguan)

Report No.: CR21110071-00

					<b>Result:</b>	Pass	
Note: EIRP=Conducted Power(dBm) - Cable loss(dB) + Antenna Gain(dBi)							
	RB100#0	19.74	19.20	19.24			
	RB50#50	19.62	19.61	19.29			
2010112 TOQAM	RB50#0	19.77	19.41	19.42	23.69	33	
20MHz 16QAM	RB1#99	20.98	20.61	19.66			
	RB1#50	21.33	21.01	20.14			
	RB1#0	20.95	20.15	19.83			
	RB100#0	20.58	20.15	20.13	24.14	33	
	RB50#50	20.55	20.20	20.16			
20101112 QF SK	RB50#0	20.77	20.29	20.26			
20MHz QPSK	RB1#99	21.57	21.09	21.34		22	
	RB1#50	21.78	21.70	21.73		l	
	RB1#0	21.65	20.96	21.38			

Peak-to-average Ratio(PAR)							
Test	Resource	Peak-	Peak-to-average Ratio(dB)				
Bandwidth & Modulation	Block & RB offset	Lowest Channel	Middle Channel	Highest Channel	Limit (dB)		
20MHz QPSK	RB1#0	4.29	5.62	6.46	13		
20MHZ QPSK	RB100#0	4.26	6.61	5.22	13		
20MHz	RB1#0	6.87	7.10	5.07	13		
16QAM	RB100#0	6.70	7.62	5.19	13		
				<b>Result:</b>	Pass		

FCC §2.1049, §27.53:Occupied Bandwidth						
Operation Mode	99% Occupied Bandwidth (MHz)			26 dB Occupied Bandwidth (MHz)		
	Low Channel	Middle channel	High Channel	Low Channel	Middle Channel	High Channel
5MHz QPSK	4.491	4.491	4.511	5.240	5.000	5.020
5MHz 16QAM	4.511	4.511	4.511	5.240	4.980	5.000
10MHz QPSK	8.981	8.942	8.942	10.440	9.840	9.880
10MHz 16QAM	8.942	8.942	8.942	9.960	9.600	9.720
15MHz QPSK	13.593	13.533	13.473	20.040	15.060	16.800
15MHz 16QAM	13.593	13.533	13.533	24.360	15.840	15.480
20MHz QPSK	17.964	17.884	17.884	20.000	19.840	19.760
20MHz 16QAM	17.884	17.884	17.884	19.920	21.040	19.680
Note: The test plots please refer to the Plots of Occupied Bandwidth						

FCC §2.1051, § 27.53:Spurious Emissions at Antenna Terminal				
<b>Result:</b>	Pass, Please refer to the test plots of Spurious Emissions at Antenna Terminal.			

# FCC §2.1051, § 27.53:Out of band emission, Band Edge

Result: Pass, Please refer to the test plots of Out of band emission, Band Edge.

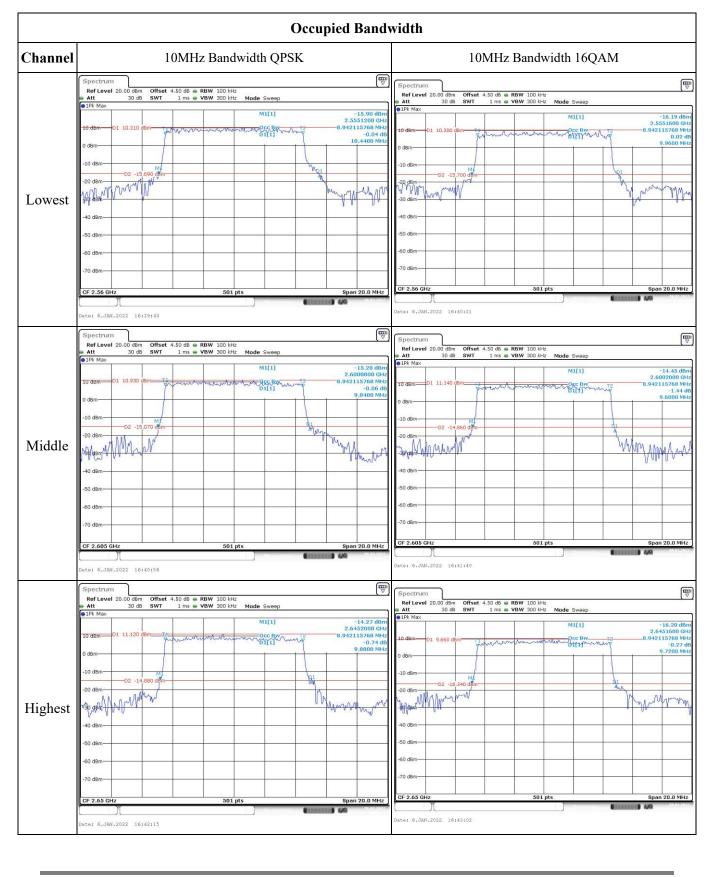
FCC §2.1055, §27.54: Frequency Stability						
Test Mode:	20M QPSK	Test Channel: Lowest for Lower Edge, Highest for Upper Edge			for Upper Edge	
Test Item	Temperature (°C)	Voltage (V <sub>DC</sub> )	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	24	2555.514	2555.00	2654.457	2655
	-20	24	2555.512	2555.00	2654.455	2655
	-10	24	2555.513	2555.00	2654.454	2655
	0	24	2555.514	2555.00	2654.457	2655
	10	24	2555.515	2555.00	2654.454	2655
	20	24	2555.514	2555.00	2654.457	2655
	30	24	2555.516	2555.00	2654.457	2655
	40	24	2555.511	2555.00	2654.451	2655
	50	24	2555.514	2555.00	2654.453	2655
Frequency Stability vs. Voltage	20	9	2555.517	2555.00	2654.457	2655
	20	36	2555.518	2555.00	2654.457	2655
					Result:	Pass

Test Mode:	20M 16QAM	Test Channel: Lowest for Lower Edge, Highest for Upper Edge				
Test Item	Temperature (°C)	Voltage (V <sub>DC</sub> )	Lower Edge (MHz)		Upper Edge (MHz)	
			Result	Limit	Result	Limit
Frequency Stability vs. Temperature	-30	24	2555.517	2555.00	2654.456	2655
	-20	24	2555.514	2555.00	2654.451	2655
	-10	24	2555.512	2555.00	2654.452	2655
	0	24	2555.514	2555.00	2654.457	2655
	10	24	2555.519	2555.00	2654.456	2655
	20	24	2555.514	2555.00	2654.457	2655
	30	24	2555.515	2555.00	2654.458	2655
	40	24	2555.516	2555.00	2654.457	2655
	50	24	2555.514	2555.00	2654.459	2655
Frequency Stability vs. Voltage	20	9	2555.518	2555.00	2654.457	2655
	20	36	2555.514	2555.00	2654.457	2655
	•	•		•	Result:	Pass

## **Test Plots:**

	Occupied Band	width			
Channel	5MHz Bandwidth QPSK	5MHz Bandwidth 16QAM			
Lowest	Spectrum         Image: Spectrum           Ref Level 20.00 dBm         Offset 4.50 dB e RBW 100 Hz           Att         30 dB SWT           11 ms         VBW 300 Hz           Mark         M1[1]           -12.70 dBm           10 dBm         -12.70 dBm           0 dBm         -12.70 dBm           -10 dBm         -12.70 dBm           -20 dBm         -10.00 Hz           -30 dBm         -10.00 Hz           -20 dBm         -10.00 Hz           -30 dBm         -10.00 Hz           -20 dBm         -10.00 Hz	Spectrum         Image: Spectrum           Ref Level 20.00 dbm         Offset 4.50 db @ RBW 100 kHz           • Att         30 db SWT           • IPk Max         M1[1]           • 1.51 99 dbm           • 10 dbm         01 11.040 dbm           • 0 dbm         0.11 0 dbm           • 0 dbm         0.13 0 db           • 0 dbm         0.13 0 db           • 0 dbm         0.2 -14.00 dbm           • 0 dbm         0.13 0 db           • 0 dbm         0.2 -14.00 dbm           • 0 dbm         0.13 dbm			
Middle	Spectrum         Image: Construction of the sector of	Spectrum         Image: Constraint of the second secon			
Highest	Spectrum         W           Ref Lovel 20.00 dBm         Offset 4.50 dB = RBW 100 kHz           Att         30 dB _ SWT           10 dBm         13.260 dBm           0 dBm         01 13.260 dBm           10 dBm         02 -12.740 dBm           -10 dBm         02 -12.740 dBm           -20 dBm         -10 dBm           -02 -12.740 dBm         -10 dBm           -20 dBm         -10 dBm           -10 dBm         -10 dBm           -10 dBm         -10 dBm           -10 dBm         -12.740 dBm           -20 dBm         -10 dBm           -10 dBm         -10 dBm           -10 dBm         -10 dBm           -10 dBm         -10 dBm           -10 dBm         -10 dBm           -20 dBm         -10 dBm           -10 dBm         -10 dBm	Spectrum         W           Ref Level 20.00 dbm         Offset 4.50 db @ PBW 100 H/2           • Att         30 db SWT           • Di 12.450 dbm         MI[1]           • 10 dbm         01 12.450 dbm           • 0 dbm         0111           • 0 dbm         01111 <tr< th=""></tr<>			

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