

RF MEASUREMENT REPORT

FCC ID: XMR202205EC200UUAU
Applicant: Quectel Wireless Solutions Co., Ltd
Product: LTE Module
Model No.: EC200U-AU
Brand Name: Quectel
FCC Classification: PCS Licensed Transmitter (PCB)
FCC Rule Part(s): Part 2, 22 (H), 24 (E), 27
Test Date: March 16 ~ 31, 2022

Reviewed By:

Sunny Sun

Approved By:

Robin Wu



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.26-2015. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2203RSU034-U2	Rev. 01	Initial Report	04-13-2022	Valid

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1. General Information

1.1. Applicant

Quectel Wireless Solutions Co., Ltd

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233

1.2. Manufacturer

Quectel Wireless Solutions Co., Ltd

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai, China 200233

1.3. Testing Facility

<input checked="" type="checkbox"/>	Test Site - MRT Suzhou Laboratory				
	Laboratory Location (Suzhou - Wuzhong)				
	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China				
	Laboratory Location (Suzhou - SIP)				
	4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China				
Laboratory Accreditations					
A2LA: 3628.01		CNAS: L10551			
FCC: CN1166		ISED: CN0001			
VCCI:	<input type="checkbox"/> R-20025	<input type="checkbox"/> G-20034	<input type="checkbox"/> C-20020	<input type="checkbox"/> T-20020	
	<input type="checkbox"/> R-20141	<input type="checkbox"/> G-20134	<input type="checkbox"/> C-20103	<input type="checkbox"/> T-20104	
<input type="checkbox"/>	Test Site - MRT Shenzhen Laboratory				
	Laboratory Location (Shenzhen)				
	1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China				
	Laboratory Accreditations				
	A2LA: 3628.02		CNAS: L10551		
FCC: CN1284		ISED: CN0105			
<input type="checkbox"/>	Test Site - MRT Taiwan Laboratory				
	Laboratory Location (Taiwan)				
	No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)				
	Laboratory Accreditations				
	TAF: L3261-190725				
FCC: 291082, TW3261		ISED: TW3261			

1.4. Product Information

Product Name	LTE Module
Model No.	EC200U-AU
IMEI	Conducted Measurement: 867869060001682 Radiated Measurement: 867869060001626
Wi-Fi Specification	802.11b Rx Scan
Bluetooth Specification	V4.2 BR/EDR
GSM Specification	GSM 850/1900
LTE Specification	LTE Band 2/4/5/7/38/41/66
Working Voltage	3.3 ~ 4.3Vdc, 3.8Vdc Typ.
Remark: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

1.5. Radio Specification

FDD T _x Frequency Range:	Band 2: 1850 ~ 1910 MHz; Band 4: 1710 ~ 1755 MHz Band 5: 824 ~ 849 MHz; Band 7: 2500 ~ 2570 MHz Band 66: 1710 ~ 1780 MHz
FDD R _x Frequency Range:	Band 2: 1930 ~ 1990 MHz; Band 4: 2110 ~ 2155 MHz Band 5: 869 ~ 894 MHz; Band 7: 2620 ~ 2690 MHz Band 66: 2110 ~ 2180 MHz
TDD T _x & R _x Frequency Range:	Band 38: 2570 ~ 2620 MHz; Band 41: 2496 ~ 2690 MHz
Modulation	Uplink: 16QAM; Downlink: 64QAM
Antenna Information	Dipole Antenna; Band 2: 1.59dBi; Band 4: 2.00dBi; Band 5: 2.53dBi; Band 7: 3.00dBi Band 38: 2.30dBi; Band 41: 3.00dBi; Band 66: 2.00dBi
Remark: 1. For other features of this EUT, test report will be issued separately; 2. 1.4MHz, 3MHz and 5MHz of LTE Band support 100% RB configuration for 16QAM; 10MHz、15MHz and 20MHz of LTE Band maximum support 27 RB configuration for 16QAM.	

1.6. Device Capabilities

This device contains the following capabilities:

Working on LTE Band 2, 4, 5, 7, 38, 41. 66.

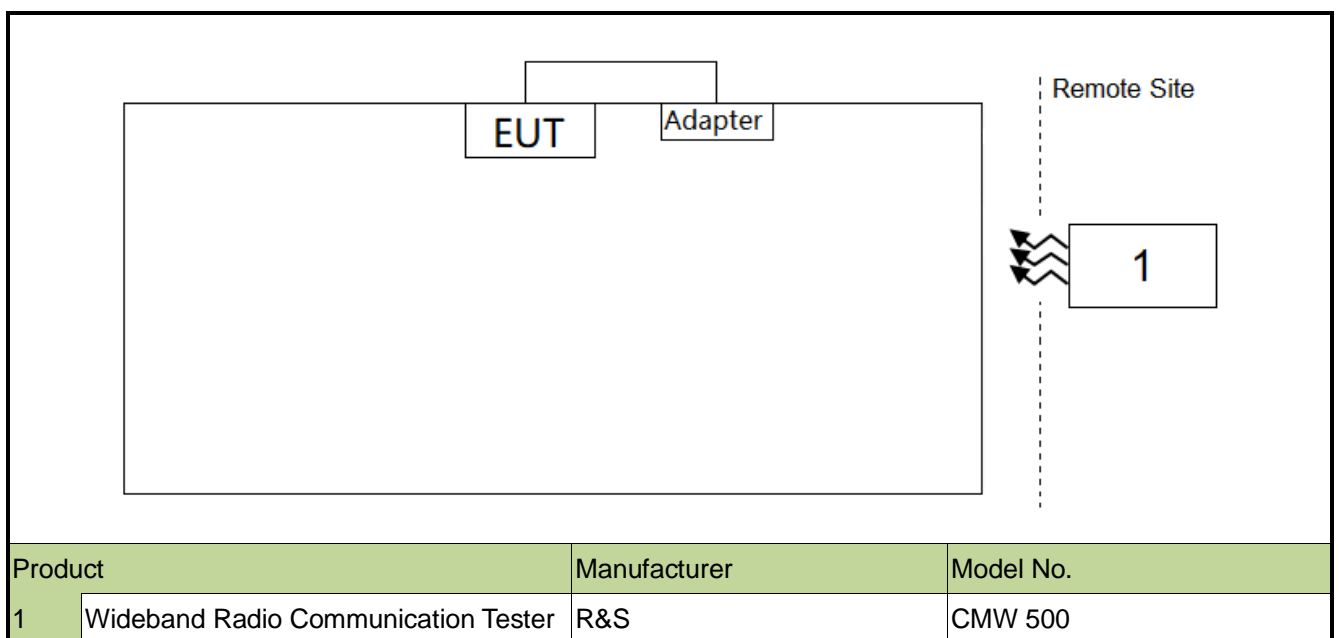
LTE Band 66 (1710 ~ 1780 MHz) overlaps the entire frequency range of LTE Band 4 (1710 ~ 1755 MHz).

Therefore, test data provided in this report covers Band 4 as well as Band 66.

LTE Band 41 (2496 ~ 2690 MHz) overlaps the entire frequency range of LTE Band 38 (2570 ~ 2620 MHz).

Therefore, test data provided in this report covers Band 38 as well as Band 41.

1.7. Configuration of Tested System



1.8. Test Methodology

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

- ANSI C63.26:2015
- FCC CFR 47 Part 2, 22, 24, 27
- FCC KDB 971168 D01 v03r01: Power Meas License Digital Systems
- FCC KDB 971168 D02 v02r01: Misc Rev Approv License Devices
- FCC KDB 412172 D01 v01r01: Determining ERP and EIRP

1.9. Test Environment Condition

Ambient Temperature	15 ~ 35°C
Relative Humidity	20 ~ 75%RH

2. Test Equipment Calibration Date

Instrument Name	Manufacturer	Model No.	Asset No.	Cali. Interval	Cal. Due Date	Test Site
Communication Tester	R&S	CMU 200	MRTSUE06009	1 year	2022/9/7	SIP-SR1
Communication Tester	R&S	CMW500	MRTSUE06243	1 year	2022/10/10	SIP-SR1
Signal Generator	Keysight	E8257D	MRTSUE06453	1 year	2022/6/24	SIP-SR1
Thermohygrometer	testo	622	MRTSUE06629	1 year	2022/11/2	SIP-SR1
Signal Generator	Keysight	E8257D	MRTSUE06904	1 year	2022/11/23	SIP-SR1
DC POWER MODULE	Keysight	N6743B	MRTSUE06905	/	/	SIP-SR1
DC POWER MODULE	Keysight	N6743B	MRTSUE06906	/	/	SIP-SR1
Low-Profile Modular Power System Mainframe	Keysight	N6700C	MRTSUE06907	/	/	SIP-SR1
Signal Analyzer	Keysight	N9021B	MRTSUE06915	1 year	2022/12/19	SIP-SR1
Temperature Chamber	BAOYT	BYG-80CL	MRTSUE06932	1 year	2023/3/16	SIP-SR1
Shielding Room	MIX-BEP	SIP-SR1	MRTSUE06948	/	/	SIP-SR1
TRILOG Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2022/5/24	WZ-AC2
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2022/10/28	WZ-AC2
EMI Test Receiver	Agilent	N9038A	MRTSUE06125	1 year	2022/6/24	WZ-AC2
Thermohygrometer	Mingle	ETH529	MRTSUE06170	1 year	2022/12/1	WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2022/10/21	WZ-AC2
Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2022/11/12	WZ-AC2
Anechoic Chamber	RIKEN	WZ-AC2	MRTSUE06213	1 year	2022/4/29	WZ-AC2
Horn Antenna	ETS	3117	MRTSUE06257	1 year	2022/9/25	WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06597	1 year	2022/12/1	WZ-AC2
Preamplifier	EMCI	EMC184045SE	MRTSUE06640	1 year	2023/1/13	WZ-AC2
Preamplifier	EMCI	EMC051845SE	MRTSUE06987	1 year	2022/9/9	WZ-AC2
Thermohygrometer	testo	Testo 608-H1	MRTSUE11038	1 year	2022/11/11	WZ-AC2

Software	Version	Function
EMI Software	V3	EMI Test Software

3. Measurement Uncertainty

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

Radiated Spurious Emissions
Measurement Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): Horizontal: 9kHz ~ 300MHz: 5.04dB 300MHz ~ 1GHz: 4.95dB 1GHz ~ 40GHz: 6.40dB Vertical: 9kHz ~ 300MHz: 5.24dB 300MHz ~ 1GHz: 6.03dB 1GHz ~ 40GHz: 6.40dB
Conducted Spurious Emissions
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 0.78dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 1.13dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 0.28%
Frequency Stability
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 76.2Hz

4. Test Result

4.1. Summary

FCC Section(s)	Test Description	Test Condition	Verdict
2.1049	Occupied Bandwidth	Conducted	Pass
2.1055, 22.355, 24.235, 27.54	Frequency Stability		Pass
22.913(a)(5)	Equivalent Radiated Power (Band 5)		Pass
24.232(c), 27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 2, 7, 38/41)		Pass
27.50(d)(4), 27.50(j)(3)	Equivalent Isotropic Radiated Power (Band 4/66)		Pass
2.1051, 22.917(a) 24.238(a), 27.53(h), (m)	Band Edge		Pass
24.232(d), 27.50(d)(5)	Peak to Average Ratio		Pass
2.1051, 22.917(a) 24.238(a), 27.53(h), (m)	Spurious Emission		Pass
2.1051, 22.917(a) 24.238(a), 27.53(h), (m)	Spurious Emission	Radiated	Pass

Notes:

- 1) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 2) All modes of operation and data rates were investigated. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst-case emissions.
- 3) All supported modulation types were evaluated. The worst-case emission of modulation was selected. Therefore, the Frequency Stability, Channel Band Edge, Conducted Spurious Emission, Radiated Spurious Emission were presented the worst-case in the test report.

4.2. Occupied Bandwidth Measurement

4.2.1. Test Limit

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured.

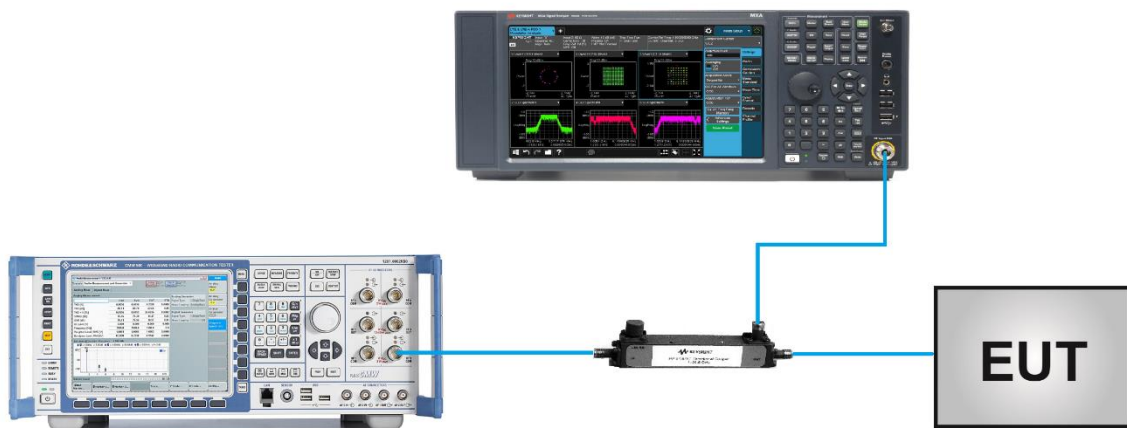
4.2.2. Test Procedure

ANSI C63.26-2015 - Section 5.4

4.2.3. Test Setting

1. Set center frequency to the nominal EUT channel center frequency
2. RBW = The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW
3. VBW $\geq 3 \times$ RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. Allow the trace to stabilize
8. Use the 99% power bandwidth function of the instrument and report the measured bandwidth.

4.2.4. Test Setup



4.2.5. Test Result

Refer to Appendix A.1.

4.3. Frequency Stability Measurement

4.3.1. Test Limit

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within $\pm 0.00025\%$ ($\pm 2.5\text{ppm}$) of the center frequency.

4.3.2. Test Procedure

ANSI C63.26-2015 - Section 5.6

4.3.3. Test Setting

Frequency Stability Under Temperature Variations:

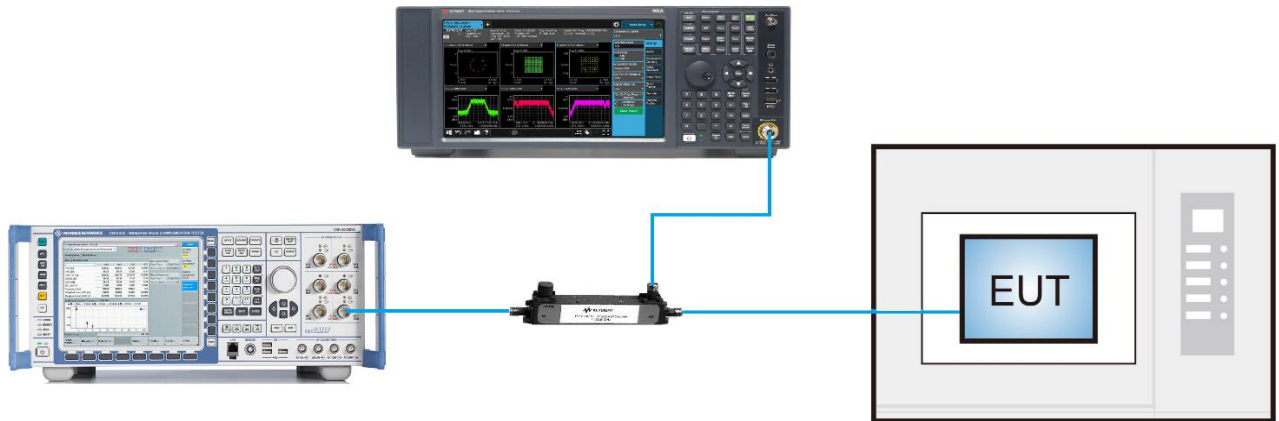
The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to highest. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C decreased per stage until the lowest temperature reached.

Frequency Stability Under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation ($\pm 15\%$) and endpoint, record the maximum frequency change.

4.3.4. Test Setup



4.3.5. Test Result

Refer to Appendix A.2.

4.4. Equivalent Isotropically Radiated Power Measurement

4.4.1. Test Limit

Band 5:

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

Band 2, 7, 38/41:

Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

Band 4/66:

Fixed, mobile stations operating in the 1710-1755 MHz band and mobile in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP.

4.4.2. Test Procedure

ANSI C63.26-2015 - Section 5.2

4.4.3. Test Setting

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.

The relevant equation for determining the maximum ERP or EIRP from the measured RF output power is given in Equation (1) as follows:

$$\text{ERP or EIRP} = P_{\text{Meas}} + G_{\text{T}}$$

where

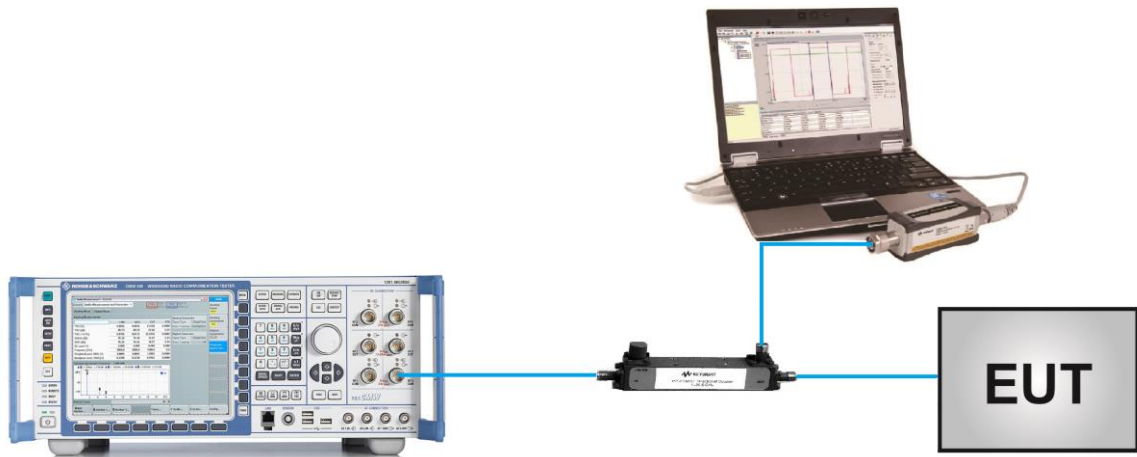
ERP or EIRP effective radiated power or equivalent isotropically radiated power, respectively (expressed in the same units as P_{Meas} , e.g., dBm or dBW)

P_{Meas} measured transmitter output power or PSD, in dBm or dBW

G_{T} gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP)

$$\text{ERP} = \text{EIRP} - 2.15$$

4.4.4. Test Setup



4.4.5. Test Result

Refer to Appendix A.3.

4.5. Band Edge Measurement

4.5.1. Test Limit

22.917(a), 24.238 (a), 27.53 (g) (h)

For operations in the 824 ~ 849 MHz, 1850 ~ 1910 MHz, 1930 ~ 1990 MHz, 600MHz & 698 ~ 746 MHz and 1710 ~ 1755 MHz, the FCC limit is $43 + 10\log_{10}(P_{\text{[Watts]}})$ dB below the transmitter power P(Watts) in a 1 MHz bandwidth. However, in the 1MHz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

27.53(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 than $43 + 10 \log (P)$ 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.

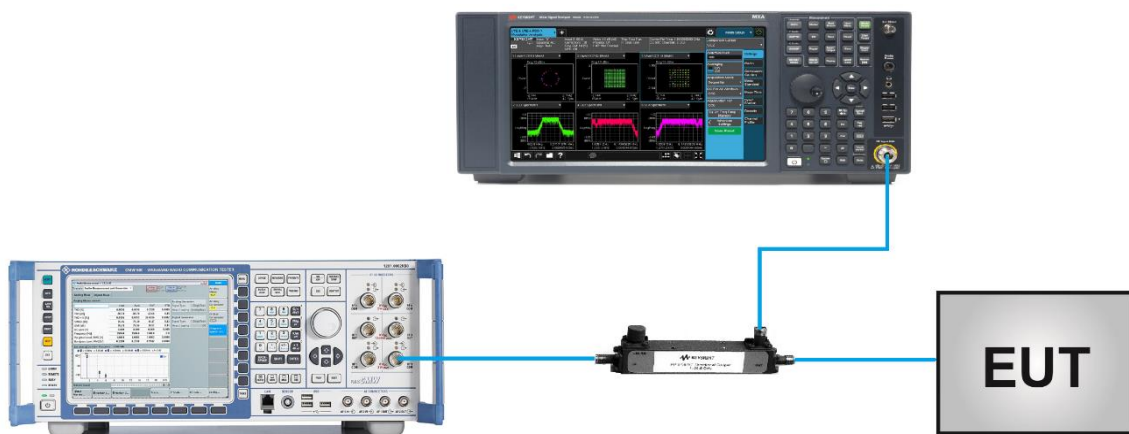
4.5.2. Test Procedure

ANSI C63.26-2015 - Section 5.7

4.5.3. Test Setting

1. Set the analyzer frequency to low or high channel
2. $RBW \geq$ The nominal RBW shall be in the range of 1% of the anticipated OBW (in the 1MHz band immediately outside and adjacent to the band edge). For improvement of the accuracy in the measurement of the average power of a noise-like emission, a RBW narrower than the specified reference bandwidth can be used (generally limited to no less than 1% of the OBW), provided that a subsequent integration is performed over the full required measurement bandwidth. This integration should be performed using the spectrum analyzer's band power functions.
3. $VBW \geq 3 \cdot RBW$
4. Sweep time = auto
5. Detector = power averaging (rms)
6. Set sweep trigger to "free run."
7. User gate triggered such that the analyzer only sweeps when the device is transmitting at full power
8. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over the on and off time of the transmitter, it can be necessary to increase the number of traces to be averaged above 100, or if using a manually configured sweep time, increase the sweep time.

4.5.4. Test Setup



4.5.5. Test Result

Refer to Appendix A.4.

4.6. Peak to Average Ratio Measurement

4.6.1. Test Limit

A peak to average ratio measurement is performed at the conducted port of the EUT. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) measurement profile is used to determine the largest deviation between the average and the peak power of the EUT in a given bandwidth. The CCDF curve shows how much time the peak waveform spends at or above a given average power level. The percent of time the signal spends at or above the level defines the probability for that particular power level.

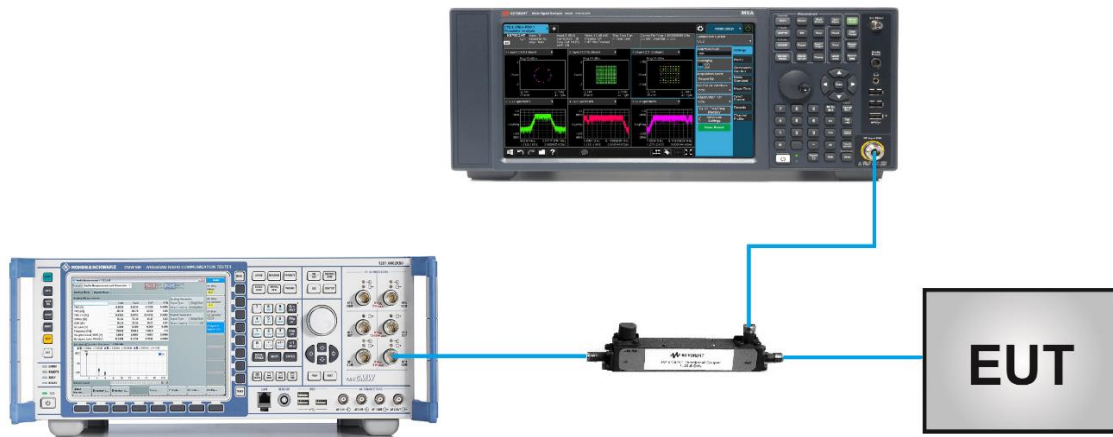
4.6.2. Test Procedure

ANSI C63.26-2015 - Section 5.2.3.4 (CCDF).

4.6.3. Test Setting

1. Set the resolution / measurement bandwidth \geq signal's occupied bandwidth
2. Set the number of counts to a value that stabilizes the measured CCDF curve
3. Record the maximum PARR level associated with a probability of 0.1%

4.6.4. Test Setup



4.6.5. Test Result

Refer to Appendix A.5.

4.7. Conducted Spurious Emission Measurement

4.7.1. Test Limit

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst-case configuration. All modes of operation were investigated and the worst-case configuration results are reported in this section.

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.

For Band 7, 38/41 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 $55 + 10 \log(P)$ dB.

4.7.2. Test Procedure

ANSI C63.26-2015 - Section 5.7

4.7.3. Test Setting

1. Set the analyzer frequency to low, mid, high channel.
2. RBW = 1MHz
3. VBW $\geq 3 \cdot$ RBW
4. Sweep time = auto
5. Detector = power averaging (rms)
6. Set sweep trigger to "free run."
7. User gate triggered such that the analyzer only sweeps when the device is transmitting at full power.
8. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. To accurately determine the average power over the on and off time of the transmitter, it can be necessary to increase the number of traces to be averaged above 100, or if using a manually configured sweep time, increase the sweep time.

4.7.4. Test Setup



4.7.5. Test Result

Refer to Appendix A.6.

4.8. Radiated Spurious Emission Measurement

4.8.1. Test Limit

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. The emission limit equal to -13dBm.

For Band 7, 38/41, 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 $55 + 10 \log(P)$ dB. The emission limit equal to -25dBm.

For LTE Band 13, 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 (-40dBm/MHz) equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW (-50dBm) EIRP for discrete emissions of less than 700 Hz bandwidth.

E (dB μ V/m) = EIRP (dBm) - 20 log D + 104.8; where D is the measurement distance in meters. The emission limit equal to 82.3dB μ V/m or 70.3dB μ V/m.

4.8.2. Test Procedure

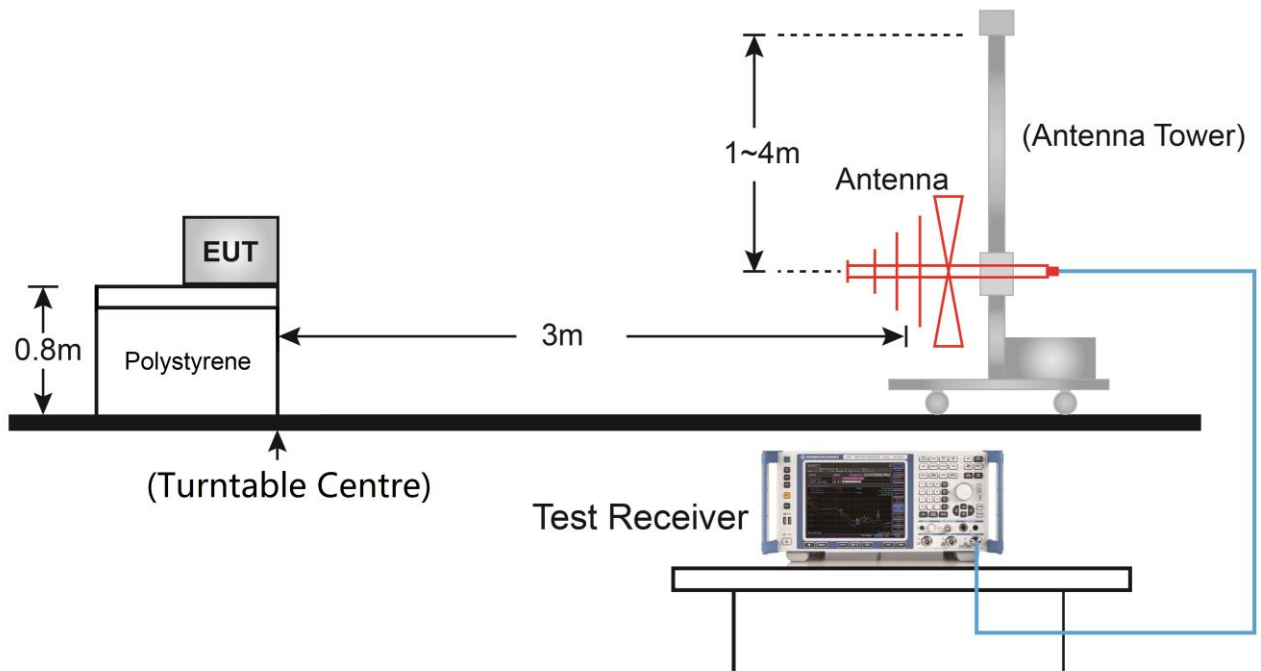
ANSI C63.26-2015 - Section 5.2.7 & 5.5

4.8.3. Test Setting

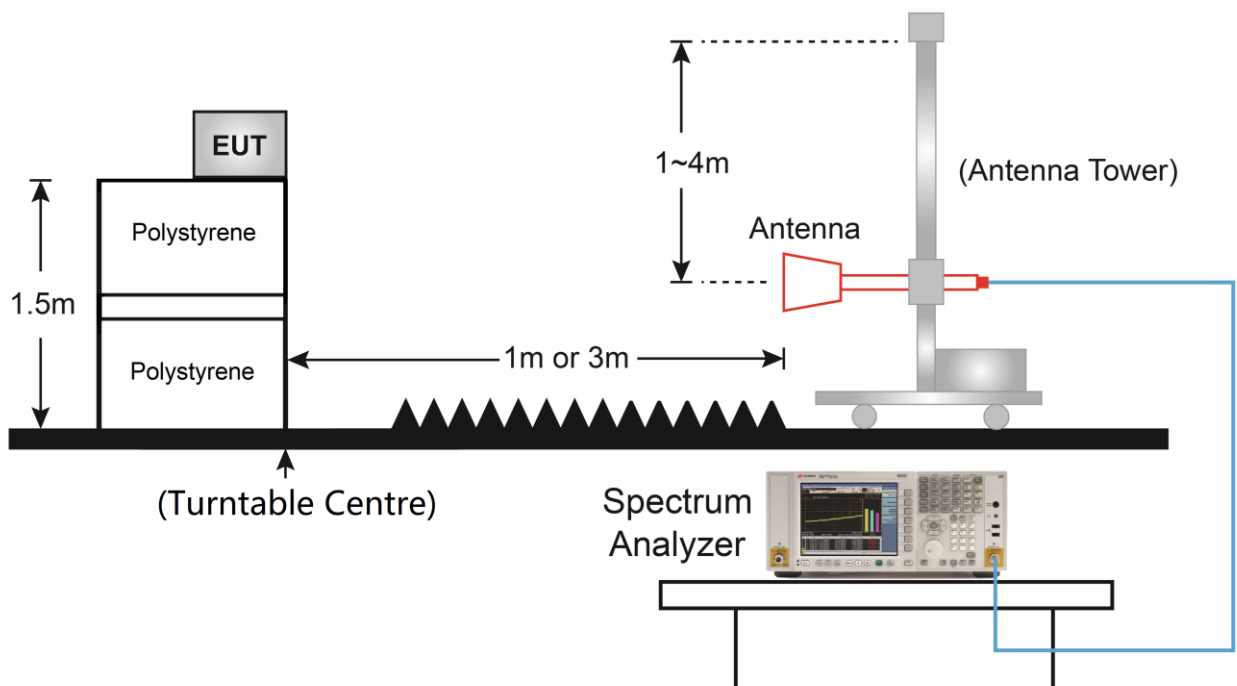
1. RBW = 1MHz
2. VBW \geq 3*RBW
3. Sweep time \geq 10 \times (number of points in sweep) \times (transmission symbol period)
4. Detector = Peak
5. Trace mode = max hold
6. The trace was allowed to stabilize

4.8.4. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



4.8.5. Test Result

Refer to Appendix A.7.

Appendix A - Test Result

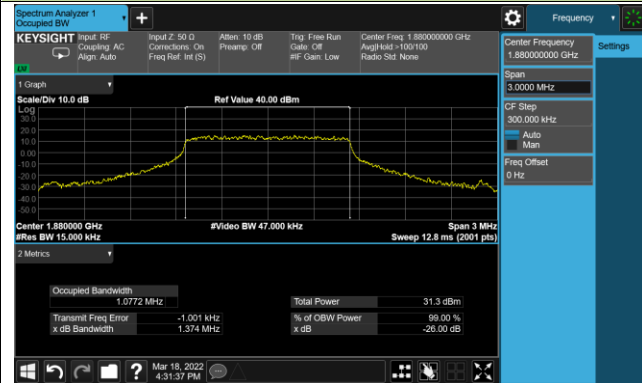
A.1 Occupied Bandwidth Test Result

Test Site	SIP-SR1	Test Engineer	Candy Luo
Test Band	Band 2	Test Date	2022/03/18

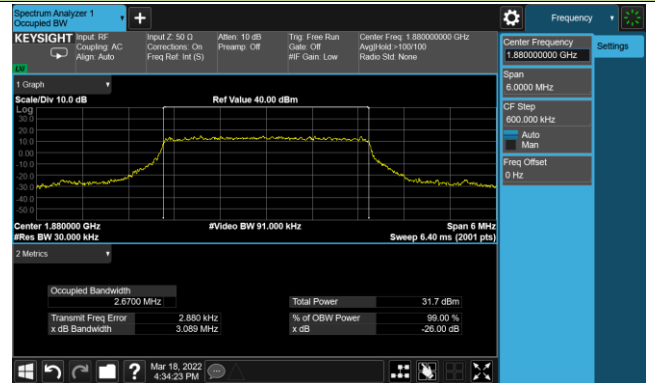
Channel	Frequency (MHz)	Bandwidth (MHz)	99% Bandwidth (MHz)
QPSK			
18900	1880.0	1.4	1.08
		3	2.67
		5	4.46
		10	8.91
		15	13.41
		20	17.89
16QAM			
18900	1880.0	1.4	1.08
		3	2.68
		5	4.44
		10(27 RB)	4.94
		15(27 RB)	4.99
		20(27 RB)	5.78

99% Bandwidth - QPSK

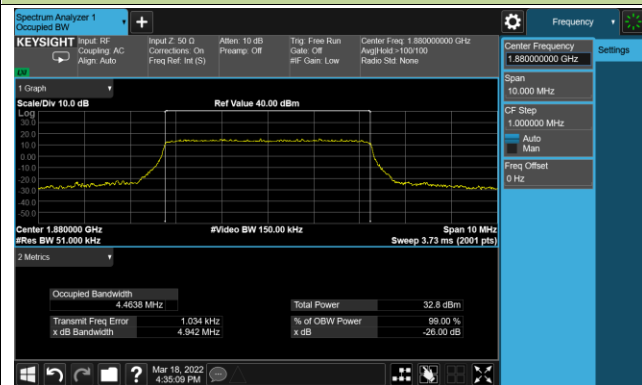
1.4MHz Channel Bandwidth



3MHz Channel Bandwidth



5MHz Channel Bandwidth



10MHz Channel Bandwidth



15MHz Channel Bandwidth

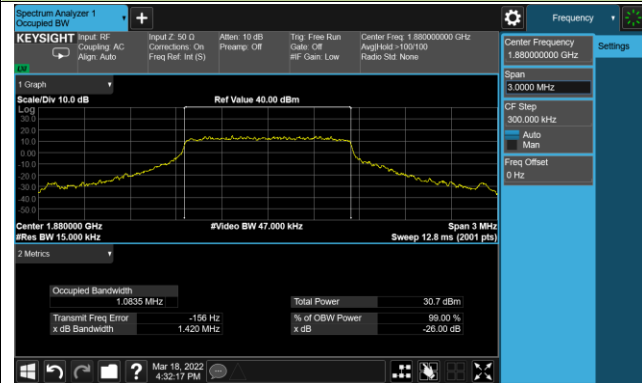


20MHz Channel Bandwidth

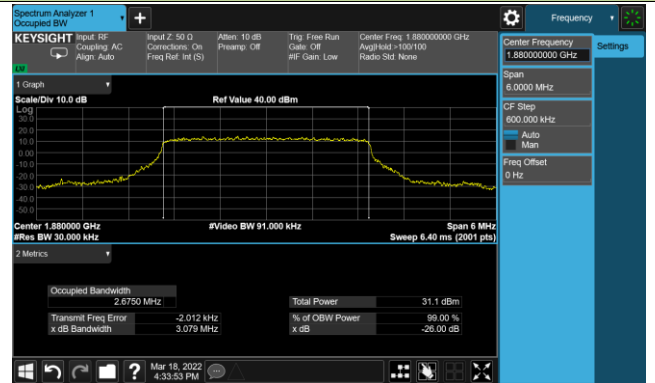


99% Bandwidth - 16QAM

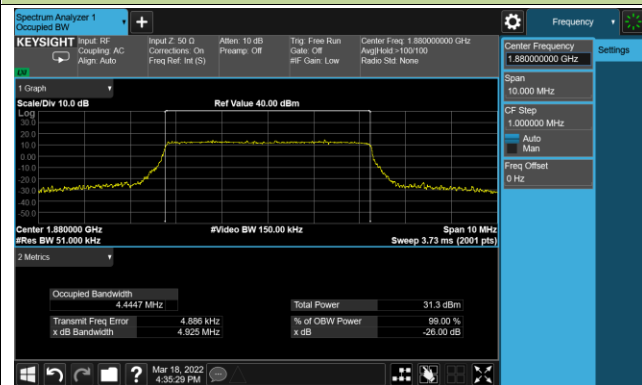
1.4MHz Channel Bandwidth



3MHz Channel Bandwidth



5MHz Channel Bandwidth



10MHz Channel Bandwidth



15MHz Channel Bandwidth



20MHz Channel Bandwidth

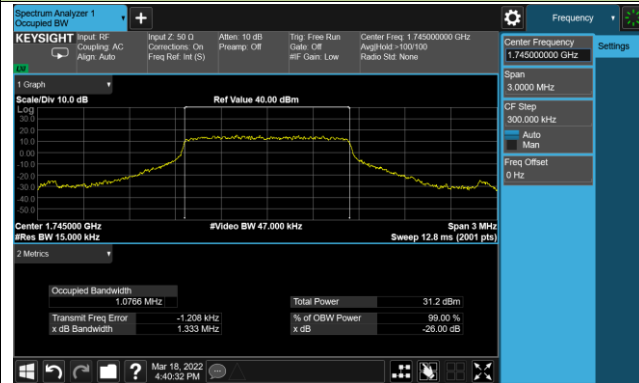


Test Site	SIP-SR1	Test Engineer	Candy Luo
Test Band	Band 4/66	Test Date	2022/03/18

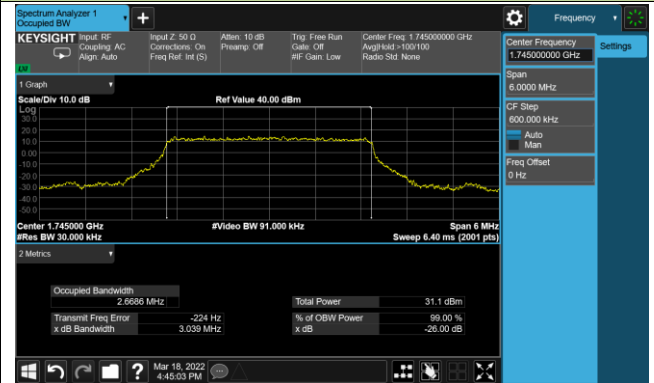
Channel	Frequency (MHz)	Bandwidth (MHz)	99% Bandwidth (MHz)
QPSK			
132322	1745.0	1.4	1.08
		3	2.67
		5	4.45
		10	8.90
		15	13.41
		20	17.86
16QAM			
132322	1745.0	1.4	1.08
		3	2.67
		5	4.45
		10(27 RB)	4.93
		15(27 RB)	4.86
		20(27 RB)	5.47

99% Bandwidth - QPSK

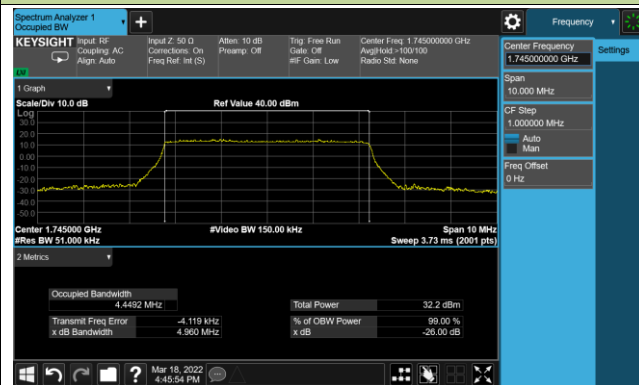
1.4MHz Channel Bandwidth



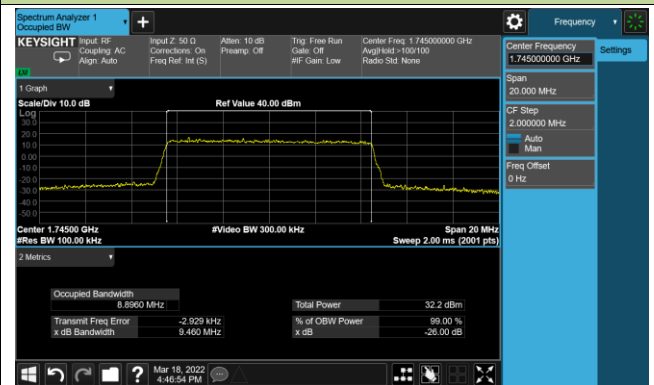
3MHz Channel Bandwidth



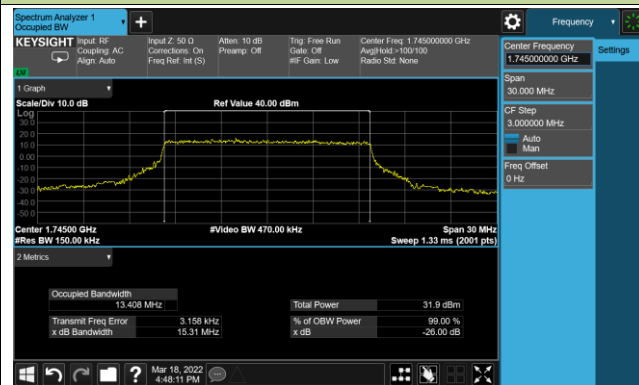
5MHz Channel Bandwidth



10MHz Channel Bandwidth



15MHz Channel Bandwidth



20MHz Channel Bandwidth

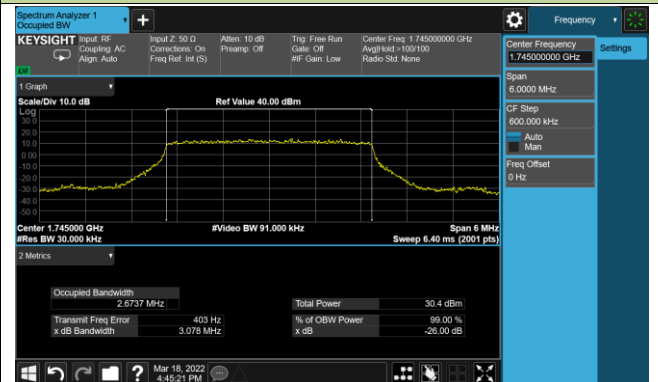


99% Bandwidth - 16QAM

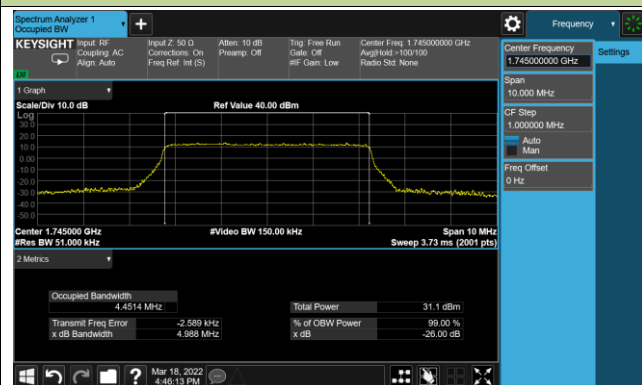
1.4MHz Channel Bandwidth



3MHz Channel Bandwidth



5MHz Channel Bandwidth



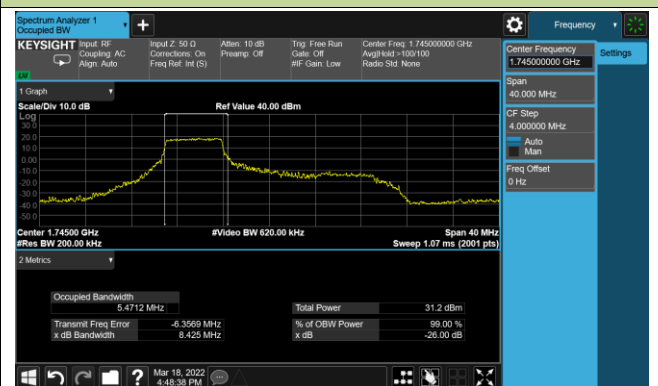
10MHz Channel Bandwidth



15MHz Channel Bandwidth



20MHz Channel Bandwidth

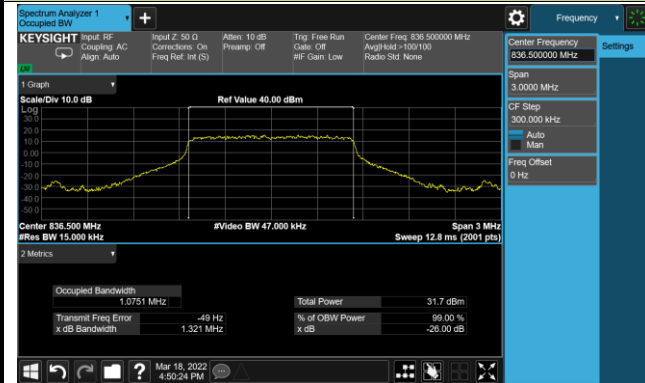


Test Site	SIP-SR1	Test Engineer	Candy Luo
Test Band	LTE Band 5	Test Date	2022/03/18

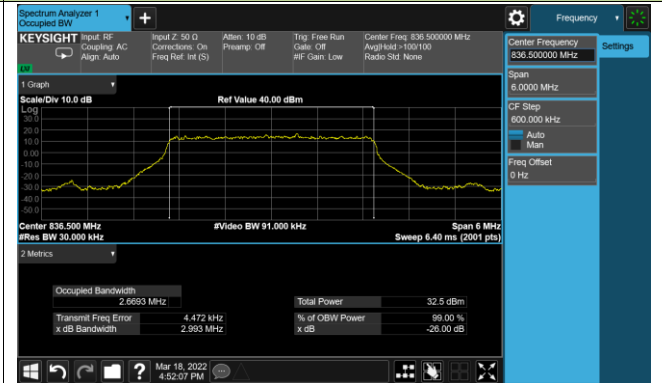
Channel	Frequency (MHz)	Bandwidth (MHz)	99% Bandwidth (MHz)
QPSK			
20525	836.5	1.4	1.08
		3	2.67
		5	4.46
		10	8.90
16QAM			
20525	836.5	1.4	1.08
		3	2.68
		5	4.46
		10(27 RB)	4.94

99% Bandwidth - QPSK

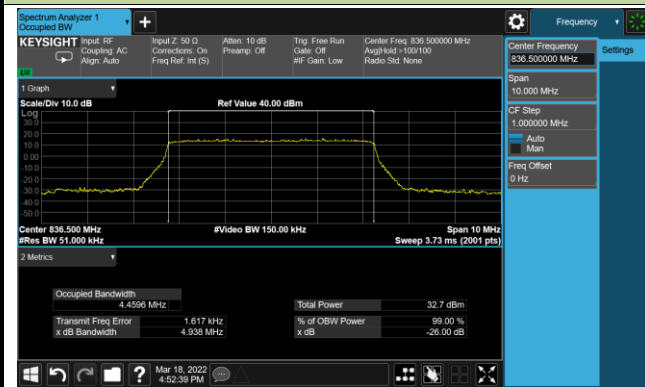
1.4MHz Channel Bandwidth



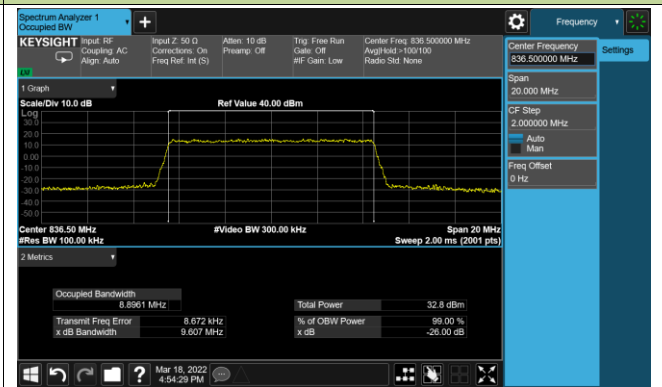
3MHz Channel Bandwidth



5MHz Channel Bandwidth

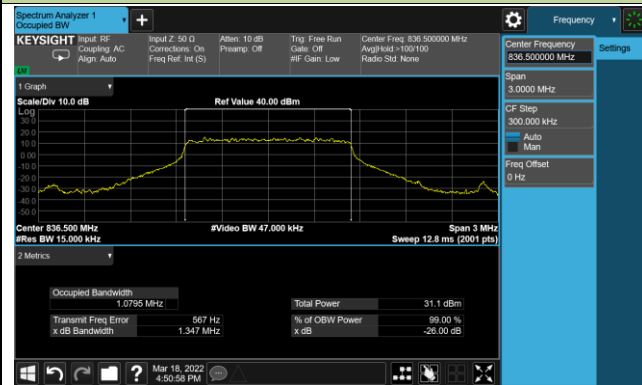


10MHz Channel Bandwidth

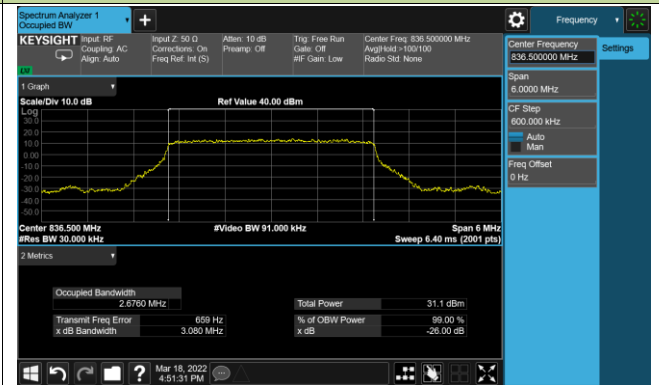


99% Bandwidth -16QAM

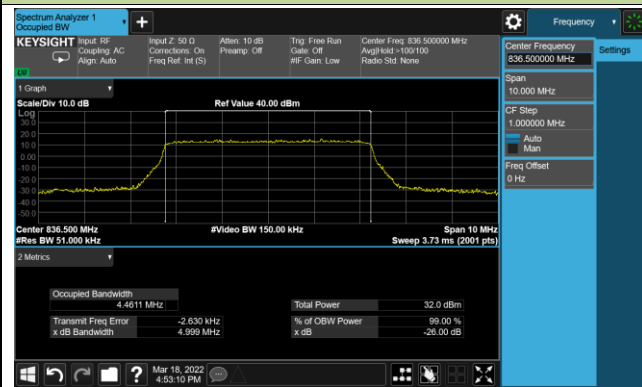
1.4MHz Channel Bandwidth



3MHz Channel Bandwidth



5MHz Channel Bandwidth



10MHz Channel Bandwidth

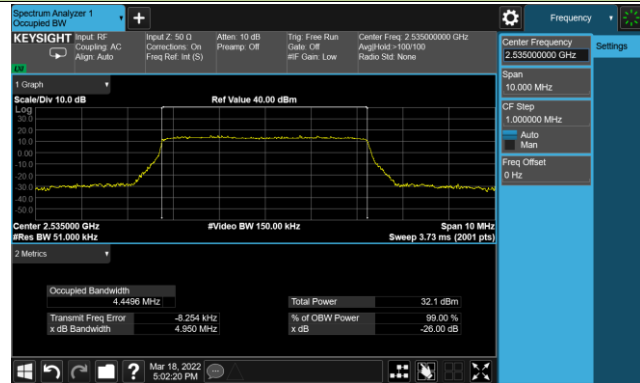


Test Site	SIP-SR1	Test Engineer	Candy Luo
Test Band	LTE Band 7	Test Date	2022/03/18

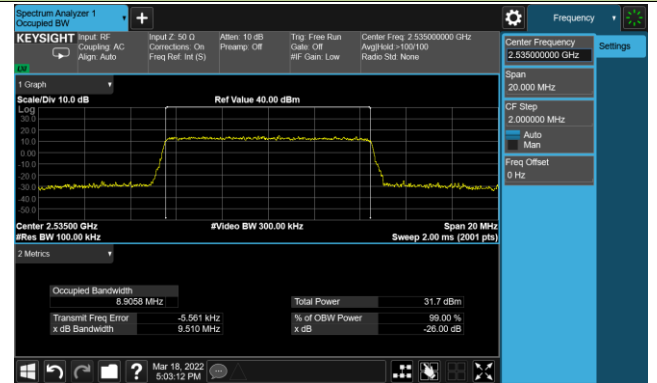
Channel	Frequency (MHz)	Bandwidth (MHz)	99% Bandwidth (MHz)
QPSK			
21100	2535.0	5	4.45
		10	8.91
		15	13.44
		20	17.88
16QAM			
21100	2535.0	5	4.44
		10 (27 RB)	4.92
		15 (27 RB)	5.06
		20 (27 RB)	5.48

99% Bandwidth - QPSK

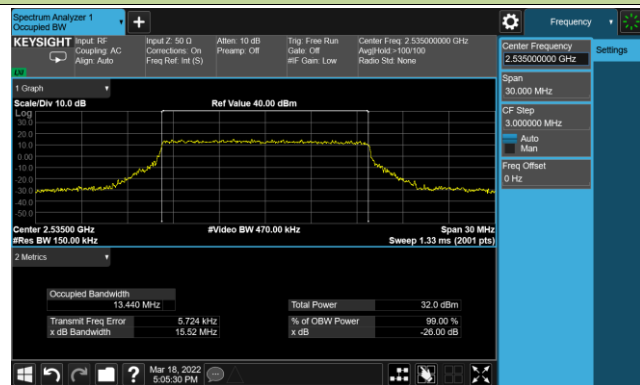
5MHz Channel Bandwidth



10MHz Channel Bandwidth



15MHz Channel Bandwidth

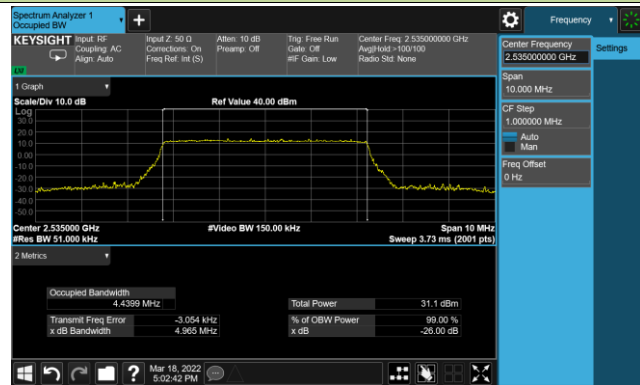


20MHz Channel Bandwidth



99% Bandwidth - 16QAM

5MHz Channel Bandwidth



10MHz Channel Bandwidth



15MHz Channel Bandwidth



20MHz Channel Bandwidth

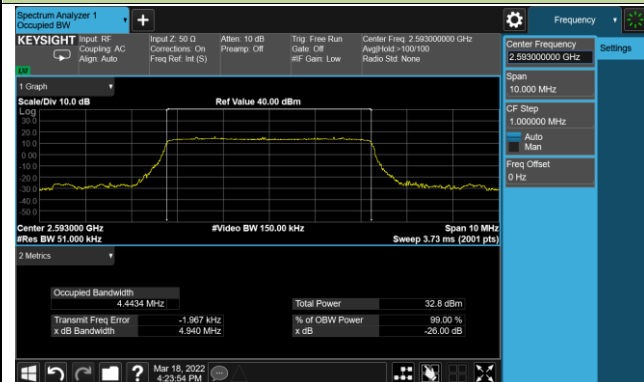


Test Site	SIP-SR1	Test Engineer	Candy Luo
Test Band	LTE Band 38/41	Test Date	2022/03/18

Channel	Frequency (MHz)	Bandwidth (MHz)	99% Bandwidth (MHz)
QPSK			
37980	2593.0	5	4.44
		10	8.89
		15	13.42
		20	17.87
16QAM			
37980	2593.0	5	4.45
		10 (27 RB)	4.91
		15 (27 RB)	5.08
		20 (27 RB)	5.25

99% Bandwidth - QPSK

5MHz Channel Bandwidth



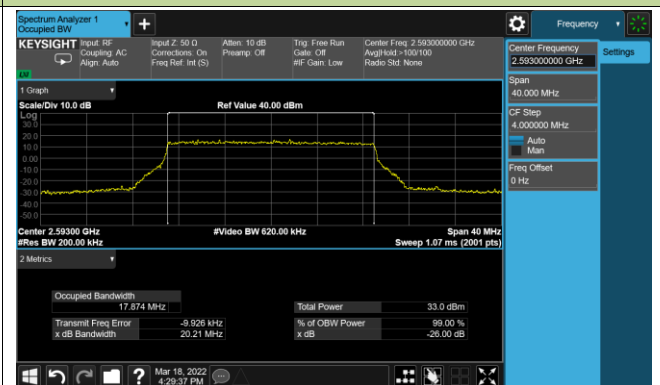
10MHz Channel Bandwidth



15MHz Channel Bandwidth

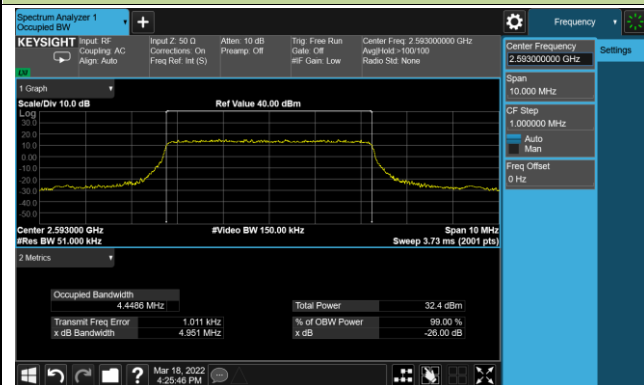


20MHz Channel Bandwidth



99% Bandwidth - 16QAM

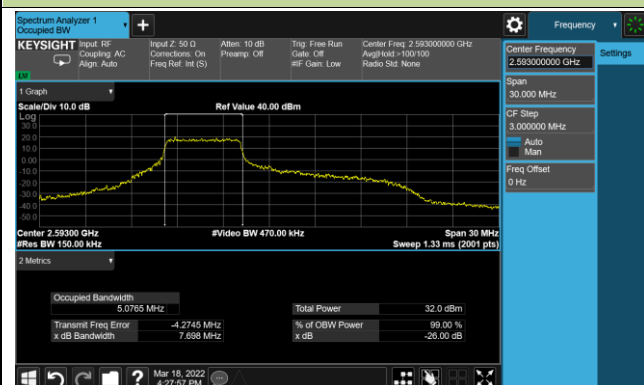
5MHz Channel Bandwidth



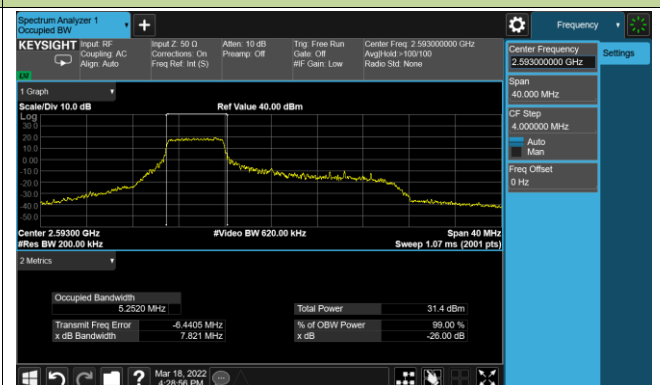
10MHz Channel Bandwidth



15MHz Channel Bandwidth



20MHz Channel Bandwidth



A.2 Frequency Stability Test Result

Test Site	SIP-SR1	Test Engineer	Candy Luo
Test Band	LTE Band 2	Test Date	2022/03/24

Power (Vdc)	Temp (°C)	Frequency Tolerance (ppm)
3.80	- 30	0.0068
	- 20	0.0058
	- 10	0.0064
	0	-0.0065
	+ 10	-0.0089
	+ 20	-0.0088
	+ 30	-0.0057
	+ 40	-0.0081
4.30	+ 20	-0.0065
3.40	+ 20	0.0060

Test Site	SIP-SR1	Test Engineer	Candy Luo
Test Band	LTE Band 4/66	Test Date	2022/03/24

Power (Vdc)	Temp (°C)	Frequency Tolerance (ppm)
3.80	- 30	0.0071
	- 20	0.0084
	- 10	0.0069
	0	-0.0063
	+ 10	-0.0064
	+ 20	-0.0072
	+ 30	-0.0064
	+ 40	-0.0068
4.30	+ 20	-0.0054
3.40	+ 20	0.0058

Test Site	SIP-SR1	Test Engineer	Candy Luo
Test Band	LTE Band 5	Test Date	2022/03/24

Power (Vdc)	Temp (°C)	Frequency Tolerance (ppm)
3.80	- 30	-0.0081
	- 20	-0.0114
	- 10	-0.0075
	0	-0.0114
	+ 10	-0.0114
	+ 20	-0.0127
	+ 30	-0.0126
	+ 40	-0.0139
4.30	+ 50	-0.0135
3.40	+ 20	-0.0117
	+ 20	-0.0085

Test Site	SIP-SR1	Test Engineer	Candy Luo
Test Band	LTE Band 7	Test Date	2022/03/24

Power (Vdc)	Temp (°C)	Frequency Tolerance (ppm)
3.80	- 30	0.0054
	- 20	0.0059
	- 10	0.0053
	0	-0.0058
	+ 10	-0.0070
	+ 20	-0.0080
	+ 30	-0.0061
	+ 40	-0.0068
4.30	+ 50	-0.0067
3.40	+ 20	-0.0031
	+ 20	-0.0066

Test Site	SIP-SR1	Test Engineer	Candy Luo
Test Band	LTE Band 38/41	Test Date	2022/03/24

Power (Vdc)	Temp (°C)	Frequency Tolerance (ppm)
3.80	- 30	-0.0072
	- 20	-0.0072
	- 10	0.0058
	0	-0.0065
	+ 10	-0.0063
	+ 20	-0.0049
	+ 30	-0.0065
	+ 40	-0.0092
4.30	+ 20	-0.0073
3.40	+ 20	-0.0073

A.3 Equivalent Isotropically Radiated Power Test Result

Test Site	SIP-SR1	Test Engineer	Candy Luo
Test Band	LTE Band 2	Test Date	2022/03/18

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
QPSK							
18607	1850.70	1.4	1	0	22.99	24.58	< 33.01
18900	1880.00				23.17	24.76	< 33.01
19193	1909.30				22.90	24.49	< 33.01
18607	1850.70	1.4	1	2	23.35	24.94	< 33.01
18900	1880.00				23.40	24.99	< 33.01
19193	1909.30				23.01	24.60	< 33.01
18607	1850.70	1.4	1	6	22.66	24.25	< 33.01
18900	1880.00				22.68	24.27	< 33.01
19193	1909.30				22.30	23.89	< 33.01
18607	1850.70	1.4	6	0	22.22	23.81	< 33.01
18900	1880.00				22.31	23.90	< 33.01
19193	1909.30				21.93	23.52	< 33.01
18615	1851.50	3	1	0	23.24	24.83	< 33.01
18900	1880.00				23.17	24.76	< 33.01
19185	1908.50				23.06	24.65	< 33.01
18615	1851.50	3	1	7	23.67	25.26	< 33.01
18900	1880.00				23.71	25.30	< 33.01
19185	1908.50				23.30	24.89	< 33.01
18615	1851.50	3	1	14	22.26	23.85	< 33.01
18900	1880.00				22.25	23.84	< 33.01
19185	1908.50				21.75	23.34	< 33.01
18615	1851.50	3	15	0	22.45	24.04	< 33.01
18900	1880.00				22.44	24.03	< 33.01
19185	1908.50				22.10	23.69	< 33.01

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
QPSK							
18625	1852.50	5	1	0	23.18	24.77	< 33.01
18900	1880.00				23.32	24.91	< 33.01
19175	1907.50				23.28	24.87	< 33.01
18625	1852.50	5	1	12	23.12	24.71	< 33.01
18900	1880.00				23.17	24.76	< 33.01
19175	1907.50				22.98	24.57	< 33.01
18625	1852.50	5	1	24	23.25	24.84	< 33.01
18900	1880.00				23.32	24.91	< 33.01
19175	1907.50				23.08	24.67	< 33.01
18625	1852.50	5	25	0	22.44	24.03	< 33.01
18900	1880.00				22.38	23.97	< 33.01
19175	1907.50				22.18	23.77	< 33.01
18650	1855.00	10	1	0	23.25	24.84	< 33.01
18900	1880.00				23.26	24.85	< 33.01
19150	1905.00				23.40	24.99	< 33.01
18650	1855.00	10	1	24	23.45	25.04	< 33.01
18900	1880.00				23.34	24.93	< 33.01
19150	1905.00				23.16	24.75	< 33.01
18650	1855.00	10	1	49	23.56	25.15	< 33.01
18900	1880.00				23.35	24.94	< 33.01
19150	1905.00				23.06	24.65	< 33.01
18650	1855.00	10	50	0	22.54	24.13	< 33.01
18900	1880.00				22.54	24.13	< 33.01
19150	1905.00				22.27	23.86	< 33.01

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
QPSK							
18675	1857.50	15	1	0	23.04	24.63	< 33.01
18900	1880.00				23.41	25.00	< 33.01
19125	1902.50				23.29	24.88	< 33.01
18675	1857.50	15	1	37	23.27	24.86	< 33.01
18900	1880.00				23.47	25.06	< 33.01
19125	1902.50				23.10	24.69	< 33.01
18675	1857.50	15	1	74	23.27	24.86	< 33.01
18900	1880.00				23.60	25.19	< 33.01
19125	1902.50				23.14	24.73	< 33.01
18675	1857.50	15	75	0	22.42	24.01	< 33.01
18900	1880.00				22.47	24.06	< 33.01
19125	1902.50				22.25	23.84	< 33.01
18700	1860.00	20	1	0	22.89	24.48	< 33.01
18900	1880.00				23.30	24.89	< 33.01
19100	1900.00				23.31	24.90	< 33.01
18700	1860.00	20	1	49	23.41	25.00	< 33.01
18900	1880.00				23.59	25.18	< 33.01
19100	1900.00				23.39	24.98	< 33.01
18700	1860.00	20	1	99	23.16	24.75	< 33.01
18900	1880.00				23.56	25.15	< 33.01
19100	1900.00				23.09	24.68	< 33.01
18700	1860.00	20	100	0	22.22	23.81	< 33.01
18900	1880.00				22.49	24.08	< 33.01
19100	1900.00				22.16	23.75	< 33.01

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
16QAM							
18607	1850.70	1.4	1	0	21.98	23.57	< 33.01
18900	1880.00				21.90	23.49	< 33.01
19193	1909.30				21.68	23.27	< 33.01
18607	1850.70	1.4	1	2	22.33	23.92	< 33.01
18900	1880.00				22.13	23.72	< 33.01
19193	1909.30				21.94	23.53	< 33.01
18607	1850.70	1.4	1	6	21.36	22.95	< 33.01
18900	1880.00				21.68	23.27	< 33.01
19193	1909.30				21.23	22.82	< 33.01
18607	1850.70	1.4	6	0	21.13	22.72	< 33.01
18900	1880.00				21.10	22.69	< 33.01
19193	1909.30				20.91	22.50	< 33.01
18615	1851.50	3	1	0	22.12	23.71	< 33.01
18900	1880.00				22.91	24.50	< 33.01
19185	1908.50				21.95	23.54	< 33.01
18615	1851.50	3	1	7	22.59	24.18	< 33.01
18900	1880.00				22.70	24.29	< 33.01
19185	1908.50				22.90	24.49	< 33.01
18615	1851.50	3	1	14	21.23	22.82	< 33.01
18900	1880.00				21.13	22.72	< 33.01
19185	1908.50				21.26	22.85	< 33.01
18615	1851.50	3	15	0	21.22	22.81	< 33.01
18900	1880.00				21.48	23.07	< 33.01
19185	1908.50				21.18	22.77	< 33.01

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
16QAM							
18625	1852.50	5	1	0	22.30	23.89	< 33.01
18900	1880.00				22.68		< 33.01
19175	1907.50				22.33		< 33.01
18625	1852.50	5	1	12	22.27	23.86	< 33.01
18900	1880.00				22.59		< 33.01
19175	1907.50				22.07		< 33.01
18625	1852.50	5	1	24	22.68	24.27	< 33.01
18900	1880.00				22.41		< 33.01
19175	1907.50				22.21		< 33.01
18625	1852.50	5	25	0	21.43	23.02	< 33.01
18900	1880.00				21.39		< 33.01
19175	1907.50				21.22		< 33.01
18650	1855.00	10	1	0	22.17	23.76	< 33.01
18900	1880.00				23.05		< 33.01
19150	1905.00				22.23		< 33.01
18650	1855.00	10	1	24	22.43	24.02	< 33.01
18900	1880.00				22.96		< 33.01
19150	1905.00				22.05		< 33.01
18650	1855.00	10	1	49	22.56	24.15	< 33.01
18900	1880.00				22.87		< 33.01
19150	1905.00				22.13		< 33.01
18650	1855.00	10	27	0	21.41	23.00	< 33.01
18900	1880.00				21.32		< 33.01
19150	1905.00				21.00		< 33.01

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
16QAM							
18675	1857.50	15	1	0	22.63	24.22	< 33.01
18900	1880.00				22.30	23.89	< 33.01
19125	1902.50				22.53	24.12	< 33.01
18675	1857.50	15	1	37	22.58	24.17	< 33.01
18900	1880.00				22.34	23.93	< 33.01
19125	1902.50				22.27	23.86	< 33.01
18675	1857.50	15	1	74	22.89	24.48	< 33.01
18900	1880.00				22.51	24.10	< 33.01
19125	1902.50				22.34	23.93	< 33.01
18675	1857.50	15	27	0	21.04	22.63	< 33.01
18900	1880.00				21.25	22.84	< 33.01
19125	1902.50				20.79	22.38	< 33.01
18700	1860.00	20	1	0	22.30	23.89	< 33.01
18900	1880.00				22.69	24.28	< 33.01
19100	1900.00				22.42	24.01	< 33.01
18700	1860.00	20	1	49	22.81	24.40	< 33.01
18900	1880.00				22.99	24.58	< 33.01
19100	1900.00				22.51	24.10	< 33.01
18700	1860.00	20	1	99	22.28	23.87	< 33.01
18900	1880.00				22.95	24.54	< 33.01
19100	1900.00				22.27	23.86	< 33.01
18700	1860.00	20	27	0	20.52	22.11	< 33.01
18900	1880.00				20.75	22.34	< 33.01
19100	1900.00				20.26	21.85	< 33.01

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

Test Site	SIP-SR1	Test Engineer	Candy Luo
Test Band	LTE Band 4/66	Test Date	2022/03/18

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
QPSK							
131979	1710.70	1.4	1	0	23.07	25.07	< 30.00
132322	1745.00				22.33	24.33	< 30.00
132665	1779.30				21.66	23.66	< 30.00
131979	1710.70	1.4	1	2	23.00	25.00	< 30.00
132322	1745.00				22.92	24.92	< 30.00
132665	1779.30				22.32	24.32	< 30.00
131979	1710.70	1.4	1	6	22.22	24.22	< 30.00
132322	1745.00				22.88	24.88	< 30.00
132665	1779.30				22.64	24.64	< 30.00
131979	1710.70	1.4	6	0	21.62	23.62	< 30.00
132322	1745.00				21.59	23.59	< 30.00
132665	1779.30				21.14	23.14	< 30.00
131987	1711.50	3	1	0	23.06	25.06	< 30.00
132322	1745.00				23.14	25.14	< 30.00
132657	1778.50				21.30	23.30	< 30.00
131987	1711.50	3	1	7	23.17	25.17	< 30.00
132322	1745.00				23.22	25.22	< 30.00
132657	1778.50				22.57	24.57	< 30.00
131987	1711.50	3	1	14	21.76	23.76	< 30.00
132322	1745.00				22.89	24.89	< 30.00
132657	1778.50				22.37	24.37	< 30.00
131987	1711.50	3	15	0	21.32	23.32	< 30.00
132322	1745.00				21.82	23.82	< 30.00
132657	1778.50				21.36	23.36	< 30.00

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
QPSK							
131997	1712.50	5	1	0	22.99	24.99	< 30.00
132322	1745.00				23.32	25.32	< 30.00
132647	1777.50				21.89	23.89	< 30.00
131997	1712.50	5	1	12	22.73	24.73	< 30.00
132322	1745.00				22.70	24.70	< 30.00
132647	1777.50				22.36	24.36	< 30.00
131997	1712.50	5	1	24	21.81	23.81	< 30.00
132322	1745.00				21.71	23.71	< 30.00
132647	1777.50				22.63	24.63	< 30.00
131997	1712.50	5	25	0	21.79	23.79	< 30.00
132322	1745.00				21.81	23.81	< 30.00
132647	1777.50				21.48	23.48	< 30.00
132022	1715.00	10	1	0	23.79	25.79	< 30.00
132322	1745.00				23.21	25.21	< 30.00
132622	1775.00				22.35	24.35	< 30.00
132022	1715.00	10	1	24	22.97	24.97	< 30.00
132322	1745.00				22.91	24.91	< 30.00
132622	1775.00				22.43	24.43	< 30.00
132022	1715.00	10	1	49	21.79	23.79	< 30.00
132322	1745.00				21.49	23.49	< 30.00
132622	1775.00				22.58	24.58	< 30.00
132022	1715.00	10	27	0	22.03	24.03	< 30.00
132322	1745.00				21.92	23.92	< 30.00
132622	1775.00				21.54	23.54	< 30.00

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
QPSK							
132047	1717.50	15	1	0	23.68	25.68	< 30.00
132322	1745.00				23.61		< 30.00
132597	1772.50				23.04		< 30.00
132047	1717.50	15	1	37	23.06	25.06	< 30.00
132322	1745.00				22.84		< 30.00
132597	1772.50				22.42		< 30.00
132047	1717.50	15	1	74	22.61	24.61	< 30.00
132322	1745.00				21.81		< 30.00
132597	1772.50				22.28		< 30.00
132047	1717.50	15	75	0	22.19	24.19	< 30.00
132322	1745.00				21.88		< 30.00
132597	1772.50				21.59		< 30.00
132072	1720.00	20	1	0	23.79	25.79	< 30.00
132322	1745.00				23.50		< 30.00
132572	1770.00				23.01		< 30.00
132072	1720.00	20	1	49	23.40	25.40	< 30.00
132322	1745.00				23.04		< 30.00
132572	1770.00				22.78		< 30.00
132072	1720.00	20	1	99	22.77	24.77	< 30.00
132322	1745.00				21.35		< 30.00
132572	1770.00				22.63		< 30.00
132072	1720.00	20	100	0	22.16	24.16	< 30.00
132322	1745.00				21.80		< 30.00
132572	1770.00				21.51		< 30.00

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
16QAM							
131979	1710.70	1.4	1	0	21.78	23.78	< 30.00
132322	1745.00				20.98	22.98	< 30.00
132665	1779.30				20.52	22.52	< 30.00
131979	1710.70	1.4	1	2	21.83	23.83	< 30.00
132322	1745.00				21.37	23.37	< 30.00
132665	1779.30				21.22	23.22	< 30.00
131979	1710.70	1.4	1	6	21.08	23.08	< 30.00
132322	1745.00				21.72	23.72	< 30.00
132665	1779.30				21.35	23.35	< 30.00
131979	1710.70	1.4	6	0	20.39	22.39	< 30.00
132322	1745.00				20.51	22.51	< 30.00
132665	1779.30				20.13	22.13	< 30.00
131987	1711.50	3	1	0	21.86	23.86	< 30.00
132322	1745.00				22.02	24.02	< 30.00
132657	1778.50				21.06	23.06	< 30.00
131987	1711.50	3	1	7	22.03	24.03	< 30.00
132322	1745.00				21.99	23.99	< 30.00
132657	1778.50				22.22	24.22	< 30.00
131987	1711.50	3	1	14	21.27	23.27	< 30.00
132322	1745.00				21.76	23.76	< 30.00
132657	1778.50				21.42	23.42	< 30.00
131987	1711.50	3	15	0	20.41	22.41	< 30.00
132322	1745.00				20.87	22.87	< 30.00
132657	1778.50				20.14	22.14	< 30.00

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
16QAM							
131997	1712.50	5	1	0	22.02	24.02	< 30.00
132322	1745.00				22.49	24.49	< 30.00
132647	1777.50				21.18	23.18	< 30.00
131997	1712.50	5	1	12	21.83	23.83	< 30.00
132322	1745.00				21.48	23.48	< 30.00
132647	1777.50				21.78	23.78	< 30.00
131997	1712.50	5	1	24	20.83	22.83	< 30.00
132322	1745.00				20.92	22.92	< 30.00
132647	1777.50				21.67	23.67	< 30.00
131997	1712.50	5	25	0	20.65	22.65	< 30.00
132322	1745.00				20.84	22.84	< 30.00
132647	1777.50				20.43	22.43	< 30.00
132022	1715.00	10	1	0	22.58	24.58	< 30.00
132322	1745.00				22.96	24.96	< 30.00
132622	1775.00				21.24	23.24	< 30.00
132022	1715.00	10	1	24	22.61	24.61	< 30.00
132322	1745.00				21.69	23.69	< 30.00
132622	1775.00				21.31	23.31	< 30.00
132022	1715.00	10	1	49	21.23	23.23	< 30.00
132322	1745.00				20.11	22.11	< 30.00
132622	1775.00				21.61	23.61	< 30.00
132022	1715.00	10	27	0	20.81	22.81	< 30.00
132322	1745.00				21.11	23.11	< 30.00
132622	1775.00				20.02	22.02	< 30.00
Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)							

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
16QAM							
132047	1717.50	15	1	0	22.82	24.82	< 30.00
132322	1745.00				22.28	24.28	< 30.00
132597	1772.50				22.69	24.69	< 30.00
132047	1717.50	15	1	37	22.18	24.18	< 30.00
132322	1745.00				22.26	24.26	< 30.00
132597	1772.50				21.31	23.31	< 30.00
132047	1717.50	15	1	74	21.76	23.76	< 30.00
132322	1745.00				20.39	22.39	< 30.00
132597	1772.50				21.96	23.96	< 30.00
132047	1717.50	15	27	0	21.01	23.01	< 30.00
132322	1745.00				21.29	23.29	< 30.00
132597	1772.50				21.15	23.15	< 30.00
132072	1720.00	20	1	0	23.20	25.20	< 30.00
132322	1745.00				22.42	24.42	< 30.00
132572	1770.00				22.51	24.51	< 30.00
132072	1720.00	20	1	49	22.43	24.43	< 30.00
132322	1745.00				22.19	24.19	< 30.00
132572	1770.00				22.05	24.05	< 30.00
132072	1720.00	20	1	99	22.10	24.10	< 30.00
132322	1745.00				20.23	22.23	< 30.00
132572	1770.00				22.04	24.04	< 30.00
132072	1720.00	20	27	0	20.73	22.73	< 30.00
132322	1745.00				21.21	23.21	< 30.00
132572	1770.00				21.31	23.31	< 30.00

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

Test Site	SIP-SR1	Test Engineer	Candy Luo
Test Band	LTE Band 5	Test Date	2022/03/18

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	ERP (dBm)	Limit (dBm)
QPSK							
20407	824.70	1.4	1	0	23.52	23.90	< 38.45
20525	836.50				23.07	23.45	< 38.45
20643	848.30				21.63	22.01	< 38.45
20407	824.70	1.4	1	2	22.67	23.05	< 38.45
20525	836.50				23.07	23.45	< 38.45
20643	848.30				22.06	22.44	< 38.45
20407	824.70	1.4	1	6	22.12	22.50	< 38.45
20525	836.50				22.45	22.83	< 38.45
20643	848.30				22.67	23.05	< 38.45
20407	824.70	1.4	6	0	21.34	21.72	< 38.45
20525	836.50				21.94	22.32	< 38.45
20643	848.30				20.89	21.27	< 38.45
20415	825.50	3	1	0	23.24	23.62	< 38.45
20525	836.50				22.83	23.21	< 38.45
20635	847.50				21.84	22.22	< 38.45
20415	825.50	3	1	7	23.29	23.67	< 38.45
20525	836.50				23.34	23.72	< 38.45
20635	847.50				22.63	23.01	< 38.45
20415	825.50	3	1	14	21.89	22.27	< 38.45
20525	836.50				22.08	22.46	< 38.45
20635	847.50				22.66	23.04	< 38.45
20415	825.50	3	15	0	21.79	22.17	< 38.45
20525	836.50				22.06	22.44	< 38.45
20635	847.50				21.42	21.80	< 38.45

Note: The ERP (dBm) = Output Power (dBm) + Antenna Gain (dBi) - 2.15

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	ERP (dBm)	Limit (dBm)
QPSK							
20425	826.50	5	1	0	23.46	23.84	< 38.45
20525	836.50				23.13	23.51	< 38.45
20625	846.50				22.55	22.93	< 38.45
20425	826.50	5	1	12	21.97	22.35	< 38.45
20525	836.50				22.91	23.29	< 38.45
20625	846.50				22.55	22.93	< 38.45
20425	826.50	5	1	24	21.71	22.09	< 38.45
20525	836.50				22.20	22.58	< 38.45
20625	846.50				22.71	23.09	< 38.45
20425	826.50	5	25	0	21.87	22.25	< 38.45
20525	836.50				22.09	22.47	< 38.45
20625	846.50				21.84	22.22	< 38.45
20450	829.00	10	1	0	23.82	24.20	< 38.45
20525	836.50				23.52	23.90	< 38.45
20600	844.00				22.47	22.85	< 38.45
20450	829.00	10	1	24	23.32	23.70	< 38.45
20525	836.50				23.03	23.41	< 38.45
20600	844.00				23.05	23.43	< 38.45
20450	829.00	10	1	49	21.36	21.74	< 38.45
20525	836.50				22.49	22.87	< 38.45
20600	844.00				22.76	23.14	< 38.45
20450	829.00	10	50	0	22.34	22.72	< 38.45
20525	836.50				22.31	22.69	< 38.45
20600	844.00				22.06	22.44	< 38.45

Note: The ERP (dBm) = Output Power (dBm) + Antenna Gain (dBi) - 2.15

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	ERP (dBm)	Limit (dBm)
16QAM							
20407	824.70	1.4	1	0	22.27	22.65	< 38.45
20525	836.50				21.81	22.19	< 38.45
20643	848.30				20.45	20.83	< 38.45
20407	824.70	1.4	1	2	21.52	21.90	< 38.45
20525	836.50				21.77	22.15	< 38.45
20643	848.30				21.04	21.42	< 38.45
20407	824.70	1.4	1	6	20.99	21.37	< 38.45
20525	836.50				21.47	21.85	< 38.45
20643	848.30				21.42	21.80	< 38.45
20407	824.70	1.4	6	0	20.34	20.72	< 38.45
20525	836.50				20.92	21.30	< 38.45
20643	848.30				19.91	20.29	< 38.45
20415	825.50	3	1	0	22.09	22.47	< 38.45
20525	836.50				22.61	22.99	< 38.45
20635	847.50				20.71	21.09	< 38.45
20415	825.50	3	1	7	22.21	22.59	< 38.45
20525	836.50				22.98	23.36	< 38.45
20635	847.50				21.65	22.03	< 38.45
20415	825.50	3	1	14	20.82	21.20	< 38.45
20525	836.50				21.07	21.45	< 38.45
20635	847.50				22.19	22.57	< 38.45
20415	825.50	3	15	0	20.83	21.21	< 38.45
20525	836.50				21.15	21.53	< 38.45
20635	847.50				20.57	20.95	< 38.45

Note: The ERP (dBm) = Output Power (dBm) + Antenna Gain (dBi) - 2.15

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	ERP (dBm)	Limit (dBm)
16QAM							
20425	826.50	5	1	0	22.78	23.16	< 38.45
20525	836.50				22.27	22.65	< 38.45
20625	846.50				21.71	22.09	< 38.45
20425	826.50	5	1	12	22.81	23.19	< 38.45
20525	836.50				22.32	22.70	< 38.45
20625	846.50				21.68	22.06	< 38.45
20425	826.50	5	1	24	20.81	21.19	< 38.45
20525	836.50				21.63	22.01	< 38.45
20625	846.50				21.83	22.21	< 38.45
20425	826.50	5	25	0	20.96	21.34	< 38.45
20525	836.50				21.14	21.52	< 38.45
20625	846.50				20.97	21.35	< 38.45
20450	829.00	10	1	0	22.66	23.04	< 38.45
20525	836.50				22.97	23.35	< 38.45
20600	844.00				21.33	21.71	< 38.45
20450	829.00	10	1	24	22.24	22.62	< 38.45
20525	836.50				22.69	23.07	< 38.45
20600	844.00				22.13	22.51	< 38.45
20450	829.00	10	1	49	20.31	20.69	< 38.45
20525	836.50				21.60	21.98	< 38.45
20600	844.00				22.23	22.61	< 38.45
20450	829.00	10	27	0	21.71	22.09	< 38.45
20525	836.50				21.29	21.67	< 38.45
20600	844.00				21.71	22.09	< 38.45

Note: The ERP (dBm) = Output Power (dBm) + Antenna Gain (dBi) - 2.15

Test Site	SIP-SR1	Test Engineer	Candy Luo
Test Band	LTE Band 7	Test Date	2022/03/18

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
QPSK							
20775	2502.50	5	1	0	23.02	26.02	< 33.01
21100	2535.00				22.98	25.98	< 33.01
21425	2567.50				22.76	25.76	< 33.01
20775	2502.50	5	1	12	22.99	25.99	< 33.01
21100	2535.00				22.93	25.93	< 33.01
21425	2567.50				22.82	25.82	< 33.01
20775	2502.50	5	1	24	23.06	26.06	< 33.01
21100	2535.00				23.09	26.09	< 33.01
21425	2567.50				22.93	25.93	< 33.01
20775	2502.50	5	25	0	23.07	26.07	< 33.01
21100	2535.00				23.09	26.09	< 33.01
21425	2567.50				23.01	26.01	< 33.01
20800	2505.00	10	1	0	23.01	26.01	< 33.01
21100	2535.00				22.96	25.96	< 33.01
21400	2565.00				22.34	25.34	< 33.01
20800	2505.00	10	1	24	23.42	26.42	< 33.01
21100	2535.00				23.27	26.27	< 33.01
21400	2565.00				22.85	25.85	< 33.01
20800	2505.00	10	1	49	23.24	26.24	< 33.01
21100	2535.00				23.19	26.19	< 33.01
21400	2565.00				23.09	26.09	< 33.01
20800	2505.00	10	50	0	22.27	25.27	< 33.01
21100	2535.00				22.18	25.18	< 33.01
21400	2565.00				22.02	25.02	< 33.01

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
QPSK							
20825	2507.50	15	1	0	22.31	25.31	< 33.01
21100	2535.00				22.01	25.01	< 33.01
21375	2562.50				21.89	24.89	< 33.01
20825	2507.50	15	1	37	22.08	25.08	< 33.01
21100	2535.00				22.34	25.34	< 33.01
21375	2562.50				21.91	24.91	< 33.01
20825	2507.50	15	1	74	22.15	25.15	< 33.01
21100	2535.00				22.13	25.13	< 33.01
21375	2562.50				22.46	25.46	< 33.01
20825	2507.50	15	75	0	22.16	25.16	< 33.01
21100	2535.00				22.21	25.21	< 33.01
21375	2562.50				22.52	25.52	< 33.01
20850	2510.00	20	1	0	21.85	24.85	< 33.01
21100	2535.00				21.76	24.76	< 33.01
21350	2560.00				22.11	25.11	< 33.01
20850	2510.00	20	1	49	22.29	25.29	< 33.01
21100	2535.00				22.19	25.19	< 33.01
21350	2560.00				22.49	25.49	< 33.01
20850	2510.00	20	1	99	22.16	25.16	< 33.01
21100	2535.00				22.25	25.25	< 33.01
21350	2560.00				22.59	25.59	< 33.01
20850	2510.00	20	100	0	21.25	24.25	< 33.01
21100	2535.00				21.41	24.41	< 33.01
21350	2560.00				21.03	24.03	< 33.01

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
16QAM							
20775	2502.50	5	1	0	22.79	25.79	< 33.01
21100	2535.00				22.82	25.82	< 33.01
21425	2567.50				22.61	25.61	< 33.01
20775	2502.50	5	1	12	23.21	26.21	< 33.01
21100	2535.00				23.14	26.14	< 33.01
21425	2567.50				22.81	25.81	< 33.01
20775	2502.50	5	1	24	23.10	26.10	< 33.01
21100	2535.00				23.11	26.11	< 33.01
21425	2567.50				23.33	26.33	< 33.01
20775	2502.50	5	25	0	22.15	25.15	< 33.01
21100	2535.00				22.29	25.29	< 33.01
21425	2567.50				22.02	25.02	< 33.01
20800	2505.00	10	1	0	22.94	25.94	< 33.01
21100	2535.00				23.16	26.16	< 33.01
21400	2565.00				22.88	25.88	< 33.01
20800	2505.00	10	1	24	23.42	26.42	< 33.01
21100	2535.00				23.37	26.37	< 33.01
21400	2565.00				22.98	25.98	< 33.01
20800	2505.00	10	1	49	22.98	25.98	< 33.01
21100	2535.00				23.17	26.17	< 33.01
21400	2565.00				23.60	26.60	< 33.01
20800	2505.00	10	27	0	22.11	25.11	< 33.01
21100	2535.00				22.06	25.06	< 33.01
21400	2565.00				21.83	24.83	< 33.01

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
16QAM							
20825	2507.50	15	1	0	21.77	24.77	< 33.01
21100	2535.00				22.17	25.17	< 33.01
21375	2562.50				22.35	25.35	< 33.01
20825	2507.50	15	1	37	22.07	25.07	< 33.01
21100	2535.00				22.27	25.27	< 33.01
21375	2562.50				22.42	25.42	< 33.01
20825	2507.50	15	1	74	21.97	24.97	< 33.01
21100	2535.00				22.44	25.44	< 33.01
21375	2562.50				22.94	25.94	< 33.01
20825	2507.50	15	27	0	21.17	24.17	< 33.01
21100	2535.00				21.59	24.59	< 33.01
21375	2562.50				21.15	24.15	< 33.01
20850	2510.00	20	1	0	22.32	25.32	< 33.01
21100	2535.00				22.37	25.37	< 33.01
21350	2560.00				22.19	25.19	< 33.01
20850	2510.00	20	1	49	22.80	25.80	< 33.01
21100	2535.00				22.54	25.54	< 33.01
21350	2560.00				22.44	25.44	< 33.01
20850	2510.00	20	1	99	22.46	25.46	< 33.01
21100	2535.00				22.12	25.12	< 33.01
21350	2560.00				22.90	25.90	< 33.01
20850	2510.00	20	27	0	20.98	23.98	< 33.01
21100	2535.00				21.36	24.36	< 33.01
21350	2560.00				21.05	24.05	< 33.01

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

Test Site	SIP-SR1	Test Engineer	Candy Luo
Test Band	LTE Band 38/41	Test Date	2022/03/18

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
QPSK							
39675	2498.50	5	1	0	23.61	26.61	< 33.01
40620	2593.00				22.98	25.98	< 33.01
40565	2687.50				23.14	26.14	< 33.01
39675	2498.50	5	1	12	23.61	26.61	< 33.01
40620	2593.00				23.46	26.46	< 33.01
40565	2687.50				23.49	26.49	< 33.01
39675	2498.50	5	1	24	23.24	26.24	< 33.01
40620	2593.00				23.02	26.02	< 33.01
40565	2687.50				23.04	26.04	< 33.01
39675	2498.50	5	25	0	22.71	25.71	< 33.01
40620	2593.00				22.62	25.62	< 33.01
40565	2687.50				22.69	25.69	< 33.01
39700	2501.00	10	1	0	23.67	26.67	< 33.01
40620	2593.00				23.15	26.15	< 33.01
41540	2685.00				23.39	26.39	< 33.01
39700	2501.00	10	1	24	23.79	26.79	< 33.01
40620	2593.00				23.75	26.75	< 33.01
41540	2685.00				23.79	26.79	< 33.01
39700	2501.00	10	1	49	23.51	26.51	< 33.01
40620	2593.00				23.52	26.52	< 33.01
41540	2685.00				23.33	26.33	< 33.01
39700	2501.00	10	50	0	22.80	25.80	< 33.01
40620	2593.00				22.74	25.74	< 33.01
41540	2685.00				22.84	25.84	< 33.01

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
QPSK							
39725	2503.50	15	1	0	23.82	26.82	< 33.01
40620	2593.00				23.03	26.03	< 33.01
41515	2682.50				23.14	26.14	< 33.01
39725	2503.50	15	1	37	23.64	26.64	< 33.01
40620	2593.00				23.56	26.56	< 33.01
41515	2682.50				23.61	26.61	< 33.01
39725	2503.50	15	1	74	23.07	26.07	< 33.01
40620	2593.00				22.97	25.97	< 33.01
41515	2682.50				23.20	26.20	< 33.01
39725	2503.50	15	75	0	22.77	25.77	< 33.01
40620	2593.00				22.69	25.69	< 33.01
41515	2682.50				22.71	25.71	< 33.01
39750	2506.00	20	1	0	23.68	26.68	< 33.01
40620	2593.00				22.98	25.98	< 33.01
41490	2680.00				22.57	25.57	< 33.01
39750	2506.00	20	1	49	23.84	26.84	< 33.01
40620	2593.00				23.79	26.79	< 33.01
41490	2680.00				23.79	26.79	< 33.01
39750	2506.00	20	1	99	23.35	26.35	< 33.01
40620	2593.00				23.13	26.13	< 33.01
41490	2680.00				22.87	25.87	< 33.01
39750	2506.00	20	100	0	22.57	25.57	< 33.01
40620	2593.00				22.52	25.52	< 33.01
41490	2680.00				22.61	25.61	< 33.01

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
16QAM							
39675	2498.50	5	1	0	22.82	25.82	< 33.01
40620	2593.00				22.31	25.31	< 33.01
40565	2687.50				22.32	25.32	< 33.01
39675	2498.50	5	1	12	22.80	25.80	< 33.01
40620	2593.00				22.83	25.83	< 33.01
40565	2687.50				22.72	25.72	< 33.01
39675	2498.50	5	1	24	22.38	25.38	< 33.01
40620	2593.00				22.24	25.24	< 33.01
40565	2687.50				22.21	25.21	< 33.01
39675	2498.50	5	25	0	21.76	24.76	< 33.01
40620	2593.00				21.69	24.69	< 33.01
40565	2687.50				21.71	24.71	< 33.01
39700	2501.00	10	1	0	22.71	25.71	< 33.01
40620	2593.00				21.99	24.99	< 33.01
41540	2685.00				22.72	25.72	< 33.01
39700	2501.00	10	1	24	22.94	25.94	< 33.01
40620	2593.00				22.63	25.63	< 33.01
41540	2685.00				23.06	26.06	< 33.01
39700	2501.00	10	1	49	22.73	25.73	< 33.01
40620	2593.00				22.75	25.75	< 33.01
41540	2685.00				22.16	25.16	< 33.01
39700	2501.00	10	27	0	21.93	24.93	< 33.01
40620	2593.00				21.83	24.83	< 33.01
41540	2685.00				21.93	24.93	< 33.01

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

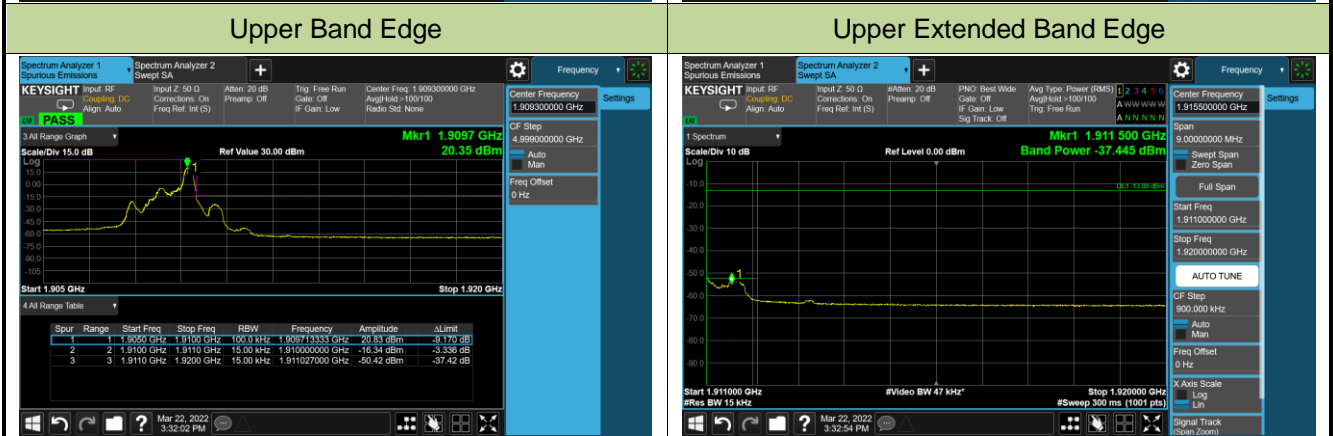
Channel No.	Frequency (MHz)	Channel Bandwidth (MHz)	RB Size	RB Offset	Output Power (dBm)	EIRP (dBm)	Limit (dBm)
16QAM							
39725	2503.50	15	1	0	23.07	26.07	< 33.01
40620	2593.00				22.25	25.25	< 33.01
41515	2682.50				22.39	25.39	< 33.01
39725	2503.50	15	1	37	22.91	25.91	< 33.01
40620	2593.00				22.74	25.74	< 33.01
41515	2682.50				22.87	25.87	< 33.01
39725	2503.50	15	1	74	22.31	25.31	< 33.01
40620	2593.00				22.14	25.14	< 33.01
41515	2682.50				22.44	25.44	< 33.01
39725	2503.50	15	27	0	21.99	24.99	< 33.01
40620	2593.00				21.85	24.85	< 33.01
41515	2682.50				21.42	24.42	< 33.01
39750	2506.00	20	1	0	22.82	25.82	< 33.01
40620	2593.00				22.21	25.21	< 33.01
41490	2680.00				21.24	24.24	< 33.01
39750	2506.00	20	1	49	23.01	26.01	< 33.01
40620	2593.00				22.57	25.57	< 33.01
41490	2680.00				23.07	26.07	< 33.01
39750	2506.00	20	1	99	22.51	25.51	< 33.01
40620	2593.00				22.33	25.33	< 33.01
41490	2680.00				21.61	24.61	< 33.01
39750	2506.00	20	27	0	21.76	24.76	< 33.01
40620	2593.00				21.68	24.68	< 33.01
41490	2680.00				21.80	24.80	< 33.01

Note: The EIRP (dBm) = Output Power (dBm) + Antenna Gain (dBi)

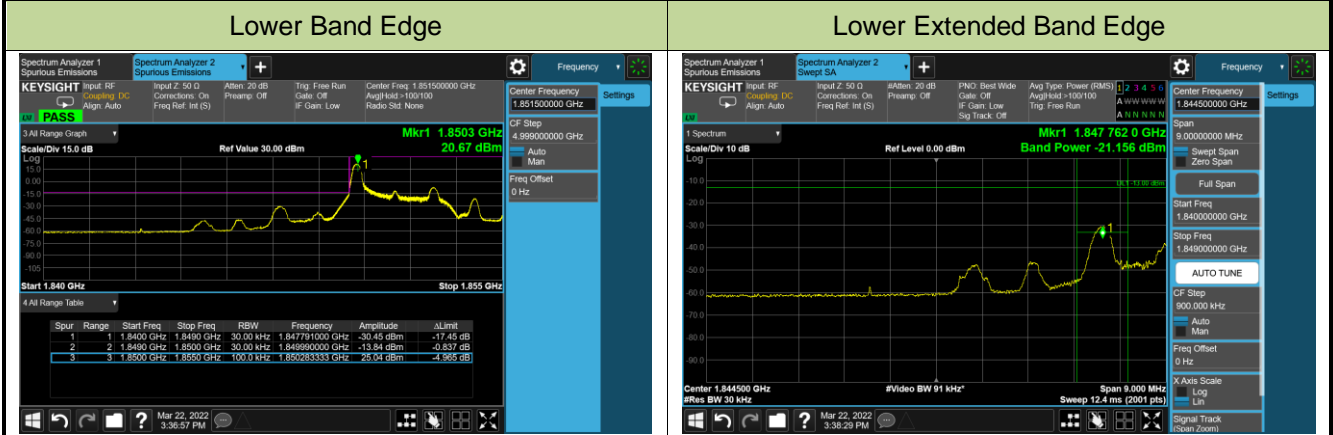
A.4 Band Edge Test Result

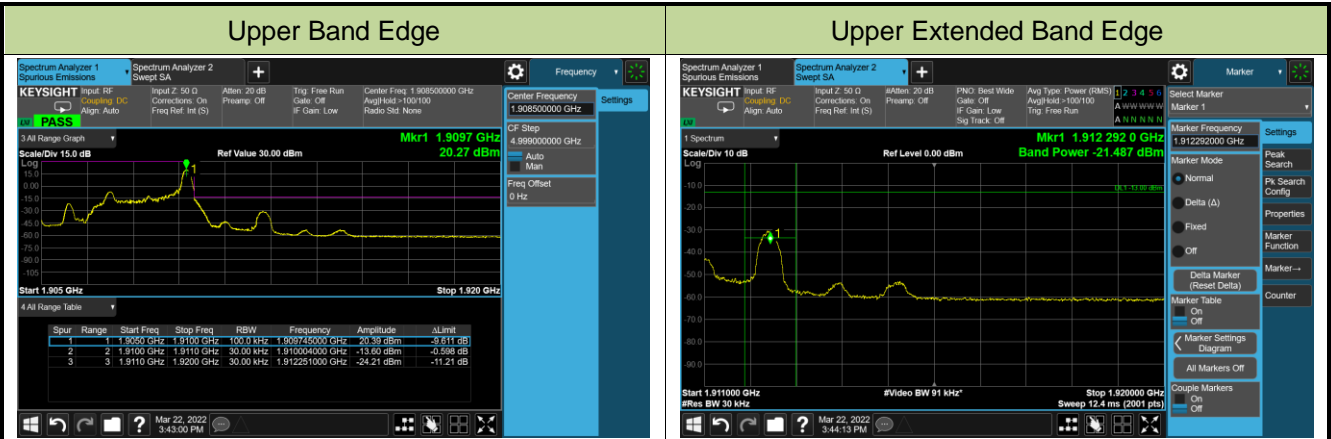
Test Site	SIP-SR1	Test Engineer	Candy Luo
Test Band	LTE Band 2	Test Date	2022/03/22

1.4MHz Channel Bandwidth - 1RB

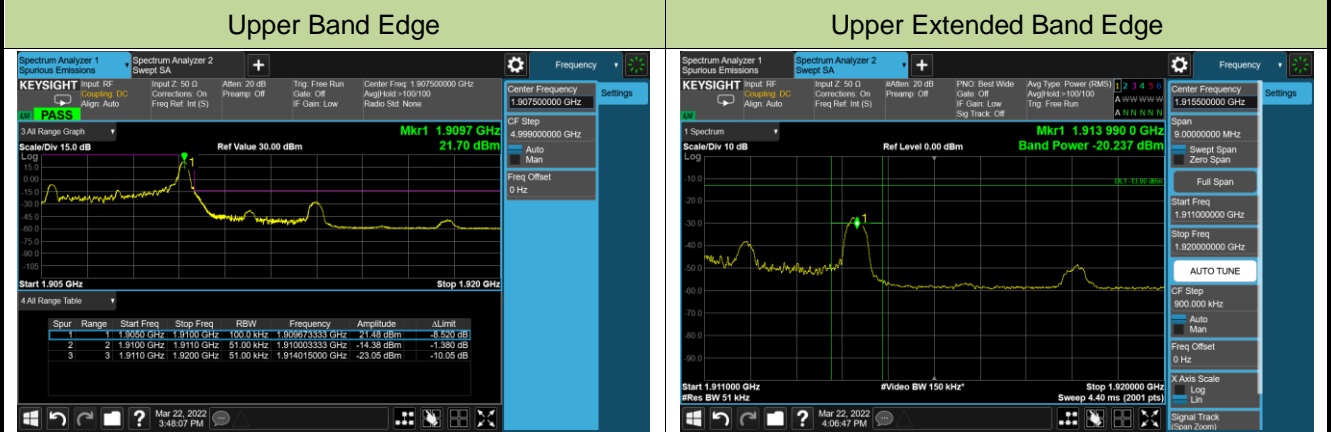


3MHz Channel Bandwidth - 1RB





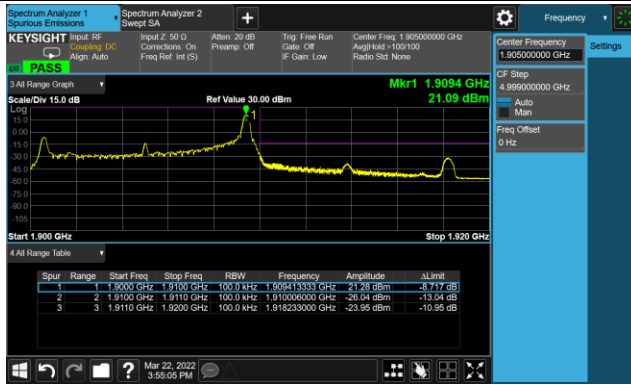
5MHz Channel Bandwidth - 1RB



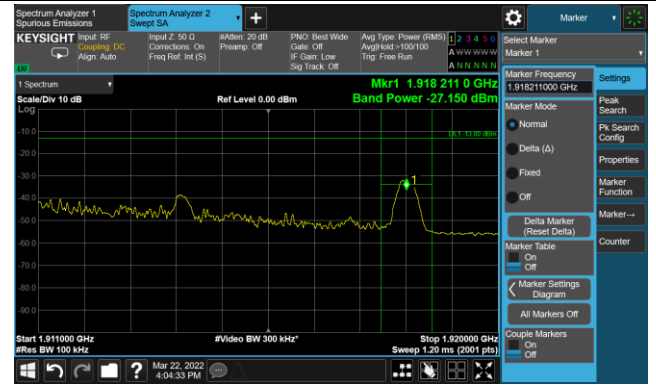
10MHz Channel Bandwidth - 1RB



Upper Band Edge

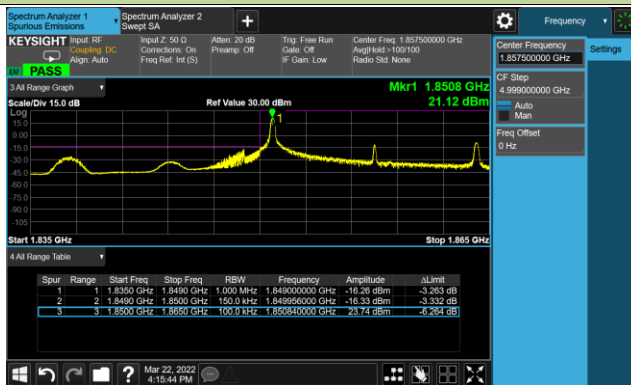


Upper Extended Band Edge

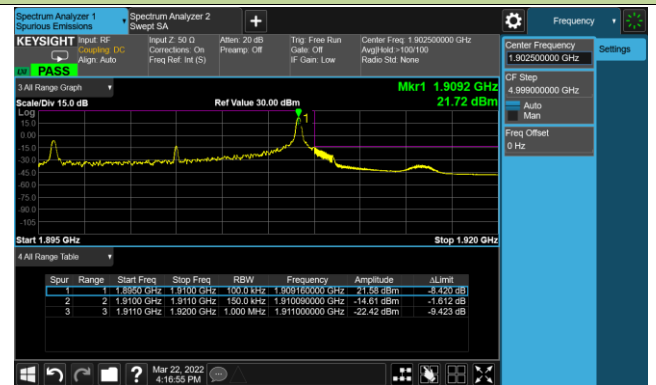


15MHz Channel Bandwidth - 1RB

Lower Band Edge

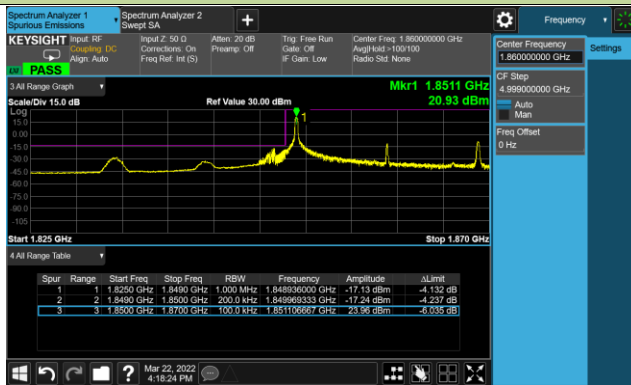


Upper Band Edge



20MHz Channel Bandwidth - 1RB

Lower Band Edge



Upper Band Edge

