

MEASUREMENT REPORT

FCC PART 2 & 22 & 24 & 27

FCC ID: XMR2021AG521RNA

Application: Quectel Wireless Solutions Company Limited

Application Type: Certification

Product: LTE Module

Model No.: AG521R-NA

Brand Name: Quectel

FCC Rule Part(s): Part 2, 22 (H), 24 (E), 27

Test Procedure(s): ANSI C63.26: 2015

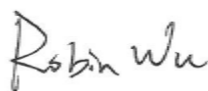
Test Date: January 28 ~ February 19, 2021

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
2101RSU050-U2	Rev. 01	Initial Report	02-20-2021	Valid

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1. GENERAL INFORMATION

1.1. Applicant

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

1.2. Manufacturer

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

1.3. Testing Facility

☒	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: R-20025, G-20034, C-20020, T-20020
☐	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
☐	Test Site - MRT Taiwan Laboratory
	Laboratory Location (Taiwan) No. 38, Fuxing 2 nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)
	Laboratory Accreditations
	TAF: L3261-190725 FCC: 291082, TW3261 ISED: TW3261

2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name:	LTE Module
Model No.:	AG521R-NA
Brand Name:	Quectel
Operating Temperature:	-35 ~ 75 °C
Power Type:	3.3 ~ 4.3Vdc, typical 3.8Vdc
UMTS Specification	
Single Band:	Band 2, 4, 5
Modulation:	Uplink up to 16QAM, Downlink up to 64QAM
E-UTRA Specification	
Single Band:	Band 2, 4, 5, 7, 12, 13, 14, 25, 26, 66, 71
Intra-Band:	CA_4C, CA_5B, CA_7C, CA_66C, CA_66B
Modulation:	UL & DL up to 64QAM

2.2. Product Specification Subjective to this Report

Uplink Frequency Range:	Band 2: 1850 ~ 1910 MHz; Band 4: 1710 ~ 1755 MHz Band 5: 824 ~ 849 MHz; Band 7: 2500 ~ 2570 MHz Band 12: 699 ~ 716 MHz; Band 13: 777 ~ 787 MHz Band 25: 1850 ~ 1915 MHz; Band 26: 824 ~ 849 MHz Band 66: 1710 ~ 1780 MHz; Band 71: 663 ~ 698 MHz
Downlink Frequency Range:	Band 2: 1930 ~ 1990 MHz; Band 4: 2110 ~ 2155 MHz Band 5: 869 ~ 894 MHz; Band 7: 2620 ~ 2690 MHz Band 12: 729 ~ 746 MHz; Band 13: 746 ~ 756 MHz Band 25: 1930 ~ 1995 MHz; Band 26: 869 ~ 894 MHz Band 66: 2110 ~ 2200 MHz; Band 71: 617 ~ 652 MHz

Note 1: For other features of this EUT, test report will be issued separately.

Note 2: The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Note 3: LTE band 26 transmit frequency for part 90 rule is 814 ~ 824MHz and part 22 rule is 824 ~ 849MHz. ERP over 15MHz bandwidth complies the ERP limit line of part 22 rule, therefore ERP of the partial frequency spectrum which falls within part 22 also complies.

2.3. Description of Available Antennas

Technology	Frequency Range (MHz)	Antenna Type	Max Peak Gain (dBi)
LTE Band 2	1850 ~ 1910	Dipole	0.25
LTE Band 4	1710 ~ 1755		1.47
LTE Band 5	824 ~ 849		2.68
LTE Band 7	2500 ~ 2570		0.55
LTE Band 12	699 ~ 716		-0.20
LTE Band 13	777 ~ 787		1.54
LTE Band 14	788 ~ 798		2.42
LTE Band 25	1850 ~ 1915		0.25
LTE Band 26	814 ~ 849		2.68
LTE Band 66	1710 ~ 1780		1.47
LTE Band 71	663 ~ 698		1.22

Note: All antenna information (Antenna type and Peak Gain) is provided by the manufacturer.

2.4. 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, Part 22, Part 24, Part 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

2.5. Device Capabilities

This device contains the following capabilities:

Working on LTE Band 2, 4, 5, 7, 12, 13, 14, 25, 26, 66, 71; Intra-band CA_4C, CA_5B, CA_7C, CA_66C, CA_66B LTE Module.

LTE Band 26 (824 ~ 849 MHz) overlaps the entire frequency range of LTE Band 5 (824 ~ 849 MHz). Therefore, test data provided in this report covers Band 5 as well as Band 26.

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 25 (1850 ~ 1915 MHz) overlaps the entire frequency range of LTE Band 2 (1850 ~ 1910 MHz). Therefore, test data provided in this report covers Band 2 as well as Band 25.

2.6. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

2.7. Maximum Power, Frequency Tolerance, and Emission Designator

LTE Band 2/25		QPSK			16QAM		
BW (MHz)	Feq. (MHz)	Designator	Tolerance (ppm)	Max Power (W)	Designator	Tolerance (ppm)	Max Power (W)
1.4	1850.7 ~ 1914.3	1M09G7D	-	0.1932	1M08W7D	-	0.1622
3	1851.5 ~ 1913.5	2M69G7D	-	0.1963	2M68W7D	-	0.1622
5	1852.5 ~ 1912.5	4M48G7D	-	0.1954	4M46W7D	-	0.1694
10	1855.0 ~ 1910.0	8M96G7D	-	0.1950	8M95W7D	-	0.1626
15	1857.5 ~ 1907.5	13M4G7D	-	0.2014	13M4W7D	-	0.1849
20	1860.0 ~ 1905.0	17M9G7D	0.0046	0.2023	17M9W7D	-	0.1866
LTE Band 2/25		64QAM					
BW (MHz)	Feq. (MHz)	Designator	Tolerance (ppm)	Max Power (W)			
1.4	1850.7 ~ 1914.3	1M08W7D	-	0.1346			
3	1851.5 ~ 1913.5	2M68W7D	-	0.1334			
5	1852.5 ~ 1912.5	4M47W7D	-	0.1327			
10	1855.0 ~ 1910.0	8M96W7D	-	0.1271			
15	1857.5 ~ 1907.5	13M4W7D	-	0.1422			
20	1860.0 ~ 1905.0	17M9W7D	-	0.1387			
LTE Band 4/66		QPSK			16QAM		
BW (MHz)	Feq. (MHz)	Designator	Tolerance (ppm)	Max Power (W)	Designator	Tolerance (ppm)	Max Power (W)
1.4	1710.7 ~ 1779.3	1M08G7D	-	0.1807	1M08W7D	-	0.1528
3	1711.5 ~ 1778.5	2M68G7D	-	0.1841	2M68W7D	-	0.1552
5	1712.5 ~ 1777.5	4M47G7D	-	0.1832	4M46W7D	-	0.1521
10	1715.0 ~ 1775.0	8M95G7D	-	0.1811	8M94W7D	-	0.1538
15	1717.5 ~ 1772.5	13M4G7D	-	0.1862	13M4W7D	-	0.1614
20	1720.0 ~ 1770.0	17M9G7D	-0.0052	0.1871	17M9W7D	-	0.1622
LTE Band 4/66		64QAM					
BW (MHz)	Feq. (MHz)	Designator	Tolerance (ppm)	Max Power (W)			
1.4	1710.7 ~ 1779.3	1M08W7D	-	0.1194			
3	1711.5 ~ 1778.5	2M68W7D	-	0.1208			
5	1712.5 ~ 1777.5	4M46W7D	-	0.1242			
10	1715.0 ~ 1775.0	8M96W7D	-	0.1205			
15	1717.5 ~ 1772.5	13M4W7D	-	0.1245			
20	1720.0 ~ 1770.0	17M9W7D	-	0.1306			

LTE Band 5/26		QPSK			16QAM		
BW (MHz)	Feq. (MHz)	Designator	Tolerance (ppm)	Max Power (W)	Designator	Tolerance (ppm)	Max Power (W)
1.4	824.7 ~ 848.3	1M08G7D	-	0.1954	1M08W7D	-	0.1652
3	825.5 ~ 847.5	2M69G7D	-	0.1977	2M68W7D	-	0.1766
5	826.5 ~ 846.5	4M47G7D	-	0.1972	4M47W7D	-	0.1726
10	829.0 ~ 844.0	8M96G7D	-0.0071	0.2004	8M94W7D	-	0.1750
LTE Band 5/26		64QAM					
BW (MHz)	Feq. (MHz)	Designator	Tolerance (ppm)	Max Power (W)			
1.4	824.7 ~ 848.3	1M08W7D	-	0.1355			
3	825.5 ~ 847.5	2M69W7D	-	0.1318			
5	826.5 ~ 846.5	4M47W7D	-	0.1346			
10	829.0 ~ 844.0	8M93W7D	-	0.1321			
LTE Band 26		QPSK			16QAM		
BW (MHz)	Feq. (MHz)	Designator	Tolerance (ppm)	Max Power (W)	Designator	Tolerance (ppm)	Max Power (W)
15	831.5 ~ 841.5	13M4G7D	-0.0071	0.2061	13M4W7D	-	0.1910
	821.5	13M4G7D	-	0.2223	13M4W7D	-	0.2061
LTE Band 26		64QAM					
BW (MHz)	Feq. (MHz)	Designator	Tolerance (ppm)	Max Power (W)			
15	831.5 ~ 841.5	13M4W7D	-	0.1416			
	821.5	13M4W7D	-	0.1352			
LTE Band 7		QPSK			16QAM		
BW (MHz)	Feq. (MHz)	Designator	Tolerance (ppm)	Max Power (W)	Designator	Tolerance (ppm)	Max Power (W)
5	2502.5 ~ 2567.5	4M47G7D	-	0.1901	4M47W7D	-	0.1637
10	2505.0 ~ 2565.0	8M95G7D	-	0.1884	8M95W7D	-	0.1690
15	2507.5 ~ 2562.5	13M4G7D	-	0.1919	13M4W7D	-	0.1742
20	2510.0 ~ 2560.0	17M9G7D	0.0093	0.1923	17M9W7D	-	0.1774
LTE Band 7		64QAM					
BW (MHz)	Feq. (MHz)	Designator	Tolerance (ppm)	Max Power (W)			
5	2502.5 ~ 2567.5	4M46W7D	-	0.1285			
10	2505.0 ~ 2565.0	8M94W7D	-	0.1245			
15	2507.5 ~ 2562.5	13M4W7D	-	0.1334			
20	2510.0 ~ 2560.0	17M9W7D	-	0.1327			

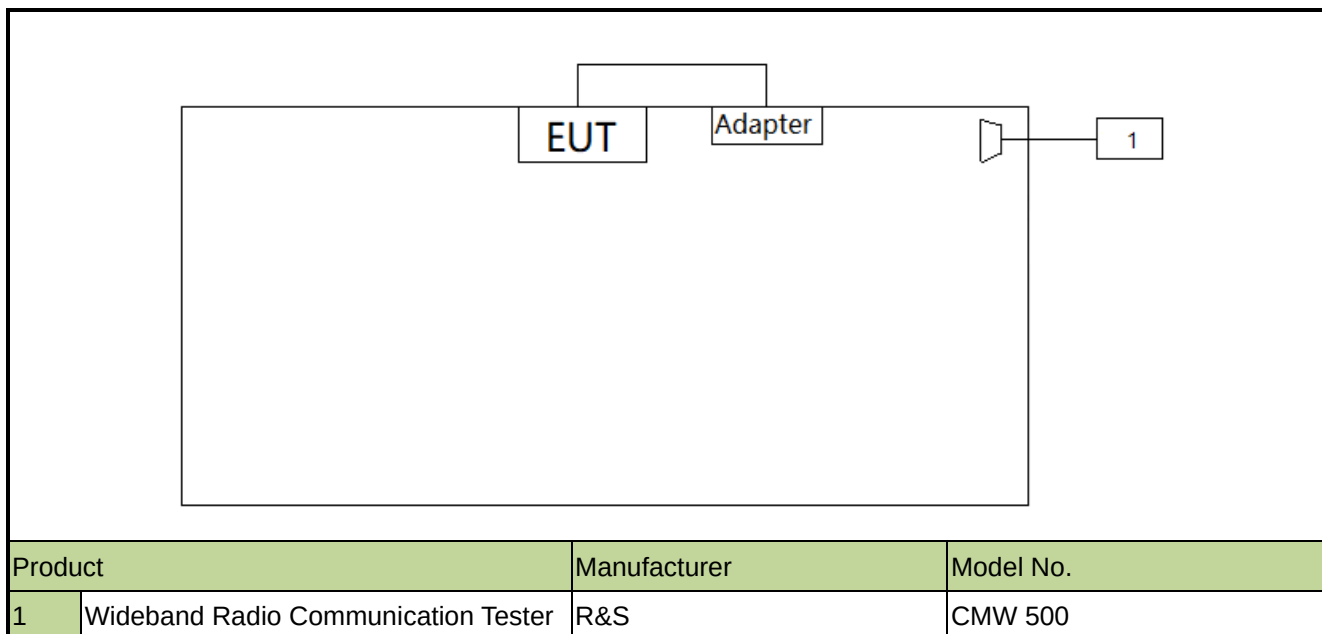
LTE Band 12		QPSK			16QAM		
BW (MHz)	Feq. (MHz)	Designator	Tolerance (ppm)	Max Power (W)	Designator	Tolerance (ppm)	Max Power (W)
1.4	699.7 ~ 715.3	1M08G7D	-	0.1923	1M08W7D	-	0.1581
3	700.5 ~ 714.5	2M68G7D	-	0.1866	2M68W7D	-	0.1683
5	701.5 ~ 713.5	4M48G7D	-	0.1892	4M46W7D	-	0.1600
10	704.0 ~ 711.0	8M93G7D	0.0084	0.1923	8M95W7D	-	0.1726
LTE Band 12		64QAM					
BW (MHz)	Feq. (MHz)	Designator	Tolerance (ppm)	Max Power (W)			
1.4	699.7 ~ 715.3	1M08W7D	-	0.1321			
3	700.5 ~ 714.5	2M69W7D	-	0.1250			
5	701.5 ~ 713.5	4M47W7D	-	0.1250			
10	704.0 ~ 711.0	8M94W7D	-	0.1285			
LTE Band 13		QPSK			16QAM		
BW (MHz)	Feq. (MHz)	Designator	Tolerance (ppm)	Max Power (W)	Designator	Tolerance (ppm)	Max Power (W)
5	779.5 ~ 784.5	4M47G7D	-	0.1897	4M47W7D	-	0.1589
10	782.0	8M93G7D	-0.0086	0.1849	8M95W7D	-	0.1702
LTE Band 13		64QAM					
BW (MHz)	Feq. (MHz)	Designator	Tolerance (ppm)	Max Power (W)			
5	779.5 ~ 784.5	4M47W7D	-	0.1291			
10	782.0	8M96W7D	-	0.1268			
LTE Band 71		QPSK			16QAM		
BW (MHz)	Feq. (MHz)	Designator	Tolerance (ppm)	Max Power (W)	Designator	Tolerance (ppm)	Max Power (W)
5	665.0 ~ 695.5	4M47G7D	-	0.1531	4M47W7D	-	0.1315
10	668.0 ~ 693.0	8M98G7D	-	0.1556	8M97W7D	-	0.1393
15	670.5 ~ 690.5	13M4G7D	-	0.1585	13M4W7D	-	0.1455
20	673.0 ~ 688.0	17M9G7D	-0.0027	0.1581	17M9W7D	-	0.1462
LTE Band 71		64QAM					
BW (MHz)	Feq. (MHz)	Designator	Tolerance (ppm)	Max Power (W)			
5	665.0 ~ 695.5	4M47W7D	-	0.1021			
10	668.0 ~ 693.0	8M94W7D	-	0.1028			
15	670.5 ~ 690.5	13M4W7D	-	0.1094			
20	673.0 ~ 688.0	17M9W7D	-	0.1062			

LTE Band 5B	QPSK			16QAM		
BW (MHz)	Designator	Tolerance (ppm)	Max Power(W)	Designator	Tolerance (ppm)	Max Power (W)
5 + 10MHz	13M8G7D	-	0.2443	13M8W7D	-	0.2051
10 + 5MHz	13M8G7D	-	0.2438	13M8W7D	-	0.2046
10 + 10MHz	18M7G7D	-	0.2455	18M7W7D	-	0.1910
LTE Band 5B	64QAM					
BW (MHz)	Designator	Tolerance (ppm)	Max Power (W)			
5 + 10MHz	13M7W7D	-	0.1429			
10 + 5MHz	13M8W7D	-	0.1380			
10 + 10MHz	18M8W7D	-	0.1306			
LTE Band 7C	QPSK			16QAM		
BW (MHz)	Designator	Tolerance (ppm)	Max Power(W)	Designator	Tolerance (ppm)	Max Power (W)
10 + 20MHz	27M6G7D	-	0.2624	27M5W7D	-	0.2323
15 + 10MHz	23M0G7D	-	0.2673	23M0W7D	-	0.2296
15 + 15MHz	28M2G7D	-	0.2642	28M2W7D	-	0.2999
15 + 20MHz	32M6G7D	-	0.2624	32M4W7D	-	0.2223
20 + 10MHz	27M6G7D	-	0.2649	27M6W7D	-	0.2280
20 + 15MHz	32M5G7D	-	0.2723	32M5W7D	-	0.2275
20 + 20MHz	37M4G7D	-	0.2673	37M4W7D		0.2307
LTE Band 7C	64QAM					
BW (MHz)	Designator	Tolerance (ppm)	Max Power (W)			
10 + 20MHz	27M6W7D	-	0.1462			
15 + 10MHz	23M1W7D	-	0.1469			
15 + 15MHz	28M1W7D	-	0.1435			
15 + 20MHz	32M4W7D	-	0.1422			
20 + 10MHz	27M6W7D	-	0.1393			
20 + 15MHz	32M5W7D	-	0.1535			
20 + 20MHz	37M4W7D	-	0.1517			

LTE Band 4/66C	QPSK			16QAM		
BW (MHz)	Designator	Tolerance (ppm)	BW (MHz)	Designator	Tolerance (ppm)	BW (MHz)
5 + 20MHz	22M7G7D	-	0.2547	22M7W7D	-	0.2004
10 + 15MHz	23M0G7D	-	0.2559	23M0W7D	-	0.2051
10 + 20MHz	27M6G7D	-	0.2518	27M6W7D	-	0.2009
15 + 10MHz	23M1G7D	-	0.2472	23M0W7D	-	0.2070
15 + 15MHz	28M3G7D	-	0.2523	28M2W7D	-	0.2198
15 + 20MHz	32M5G7D	-	0.2466	32M5W7D	-	0.2075
20 + 5MHz	22M9G7D	-	0.2483	22M8W7D	-	0.2133
20 + 10MHz	27M6G7D	-	0.2553	27M7W7D	-	0.2032
20 + 15MHz	32M4G7D	-	0.2559	32M5W7D	-	0.1972
20 + 20MHz	37M5G7D	-	0.2529	37M4W7D	-	0.2163
LTE Band 4/66C	64QAM					
BW (MHz)	Designator	Tolerance (ppm)	Max Power (W)			
5 + 20MHz	22M7W7D	-	0.1413			
10 + 15MHz	23M0W7D	-	0.1340			
10 + 20MHz	27M6W7D	-	0.1349			
15 + 10MHz	23M1W7D	-	0.1445			
15 + 15MHz	28M2W7D	-	0.1432			
15 + 20MHz	32M5W7D	-	0.1406			
20 + 5MHz	22M8W7D	-	0.1340			
20 + 10MHz	27M6W7D	-	0.1479			
20 + 15MHz	32M6W7D	-	0.1466			
20 + 20MHz	37M5W7D	-	0.1377			

LTE Band 66B	QPSK			16QAM		
BW (MHz)	Designator	Tolerance (ppm)	BW (MHz)	Designator	Tolerance (ppm)	BW (MHz)
5+5 MHz	9M24G7D	-	0.2254	9M22W7D	-	0.1786
5+10 MHz	13M8G7D	-	0.2344	13M8W7D	-	0.1845
10+5 MHz	13M8G7D	-	0.2275	13M8W7D	-	0.1854
5+15 MHz	18M1G7D	-	0.2333	18M2W7D	-	0.2018
15+5 MHz	18M1G7D	-	0.1977	18M2W7D	-	0.1718
10+10 MHz	18M7G7D	-	0.2312	18M7W7D	-	0.1871
LTE Band 66B	64QAM					
BW (MHz)	Designator	Tolerance (ppm)	Max Power (W)			
5+5 MHz	9M25W7D	-	0.1262			
5+10 MHz	13M8W7D	-	0.1309			
10+5 MHz	13M8W7D	-	0.1268			
5+15 MHz	18M2W7D	-	0.1294			
15+5 MHz	18M2W7D	-	0.1245			
10+10 MHz	18M7W7D	-	0.1233			

2.8. Configuration of Tested System



2.9. Test Environment Condition

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

3. TEST EQUIPMENT CALIBRATION DATE

Radiated Emission (WZ- AC1)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2021/08/01
Wideband Radio Communication Tester	R&S	CMW 500	MRTSUE06243	1 year	2021/11/07
PXA Signal Analyzer	Keysight	9030B	MRTSUE06395	1 year	2021/09/03
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2021/11/10
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2021/03/31
Broad Band Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2021/10/13
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06597	1 year	2021/02/23
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2021/11/15
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2021/06/11
Thermohygrometer	Testo	608-H1	MRTSUE06403	1 year	2021/08/08
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2021/04/30

Radiated Emission (WZ-AC2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Keysight	N9038A	MRTSUE06125	1 year	2021/08/01
Wideband Radio Communication Tester	R&S	CMW 500	MRTSUE06243	1 year	2021/11/07
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2021/11/10
Bilog Period Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2021/10/13
Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06171	1 year	2021/10/27
Broad Band Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06597	1 year	2021/02/23
Broad Band Coaxial Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2021/11/15
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2021/06/11
Temperature/Humidity Meter	Minggao	ETH529	MRTSUE06170	1 year	2021/12/14
Anechoic Chamber	RIKEN	Chamber-AC2	MRTSUE06213	1 year	2021/04/30

Conducted Test Equipment (WZ-SR6, WZ-TR3)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EXA Signal Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2021/04/15
EXA Signal Analyzer	Keysight	N9010B	MRTSUE06452	1 year	2021/07/11
Signal Analyzer	R&S	FSV40	MRTSUE06218	1 year	2021/04/15
Wideband Radio Communication Tester	R&S	CMW 500	MRTSUE06243	1 year	2021/11/07
Power Meter	Agilent	U2021XA	MRTSUE06030	1 year	2021/11/17
DC Power Supply	GWINSTEK	DPS-3303C	MRTSUE06064	N/A	N/A
True RMS Clamp Meter	Fluke	319	MRTSUE06080	1 year	2021/05/06
Directional Coupler	Agilent	87301D	MRTSUE06082	1 year	2021/03/25
Dual Directional Coupler	Agilent	7778D	MRTSUE06083	1 year	2021/03/25
Attenuator	MVE	6dB	MRTSUE06534	1 year	2021/12/11
Attenuator	MVE	10dB	MRTSUE06543	1 year	2021/12/11
Temperature & Humidity Chamber	BAOYT	BYH-150CL	MRTSUE06051	1 year	2021/11/07
Thermohygrometer	testo	608-H1	MRTSUE06401	1 year	2021/08/08

Software	Version	Function
EMI Software	V3	EMI Test Software

4. 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% ($U=2U_c(y)$): 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% ($U=2U_c(y)$): 0.78dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 1.13dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 0.28%
Frequency Stability
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 76.2Hz

5. TEST RESULT

5.1. Summary

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1049	Occupied Bandwidth	N/A	Conducted	Pass	Section 5.2
2.1055, 22.355 24.235, 27.54	Frequency Stability	< 2.5 ppm		Pass	Section 5.3
22.913(a)(5)	Equivalent Radiated Power (Band 5/26)	< 7 Watts Max ERP		Pass	Section 5.4
27.50(b)(9) 27.50(c)(9)	Equivalent Radiated Power (Band 12, 13)	< 30 Watts Max ERP			
27.50(c)(10)	Equivalent Radiated Power (Band 71)	< 3 Watts Max ERP			
24.232(c) 27.50(h)(2)	Equivalent Isotropic Radiated Power (Band 2/25, 7)	< 2 Watts Max EIRP			
27.50(d)(4)	Equivalent Isotropic Radiated Power (Band 4/66)	< 1 Watts Max EIRP			
24.232(d), 27.50(d)(5)	Peak to Average Ratio	< 13dB		Pass	Section 5.6
2.1051, 22.917(a) 24.238(a), 27.53(c), 27.53(g), 27.53(h)	Band Edge (Band 2/25, 4/66, 5/26, 12, 13, 71)	< 43 + 10log ₁₀ (P _[Watts])		Pass	Section 5.5, 5.7
27.53(m)	Band Edge (Band 7)	27.53(m)(4)			
2.1051, 22.917(a) 24.238(a), 27.53(c), 27.53(g), 27.53(h)	Spurious Emission (Band 2/25, 4/66, 5/26, 12, 13, 71)	< 43 + 10log ₁₀ (P _[Watts])			
2.1051, 27.53(m)	Spurious Emission (Band 7)	< 55 + 10log ₁₀ (P _[Watts])			
2.1053, 22.917(a) 24.238(a), 27.53(c) (f) (g) (h)	Spurious Emissions (Band 2/25, 4/66, 5/26, 12, 13, 71)	< 43 + 10log ₁₀ (P _[Watts])	Radiated	Pass	Section 5.8
27.53(m)	Spurious Emissions (Band 7)	27.53(m)(4)			

Notes:

- 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.
- 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 (include the Intr-Band CA Mode) were presented the worst-case in the test report.

5.2. Occupied Bandwidth

5.2.1. 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.

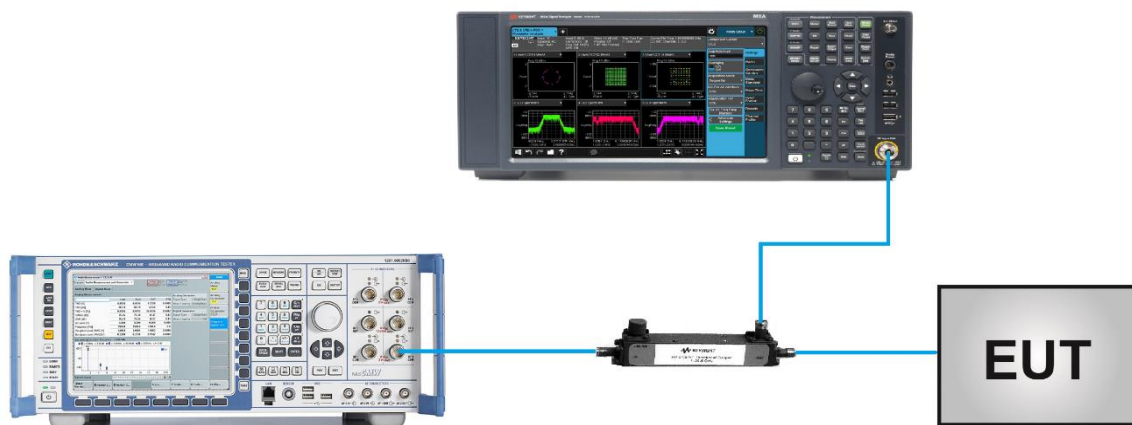
5.2.2. Test Procedure

ANSI C63.26-2015 - Section 5.4

5.2.3. 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.

5.2.4. Test Setup



5.2.5.Test Result

Product	LTE Module	Test Site	WZ-SR6
Test Engineer	Cloud Guo	Test Date	2021/02/01
Test Band	Band 2/25		

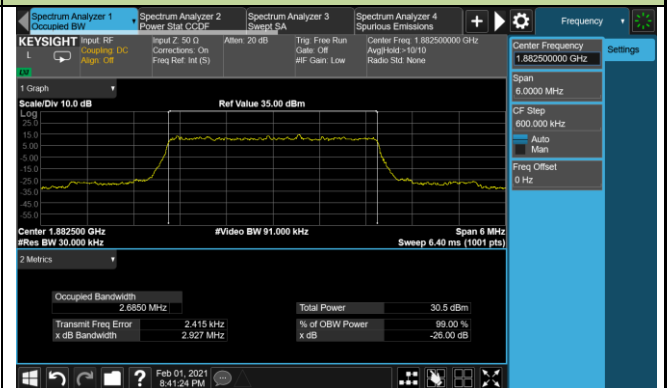
Channel	Frequency (MHz)	Bandwidth (MHz)	99% Bandwidth (MHz)
QPSK			
26365	1882.5	1.4	1.09
		3	2.69
		5	4.48
		10	8.96
		15	13.44
		20	17.85
16QAM			
26365	1882.5	1.4	1.08
		3	2.68
		5	4.46
		10	8.95
		15	13.41
		20	17.88
64QAM			
26365	1882.5	1.4	1.08
		3	2.68
		5	4.47
		10	8.96
		15	13.41
		20	17.87

99% Bandwidth - QPSK

1.4MHz Channel Bandwidth



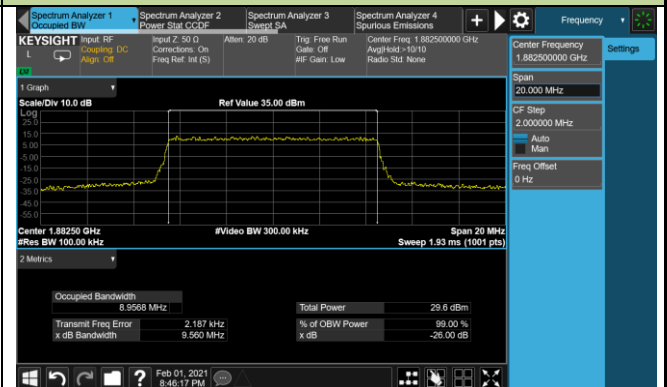
3MHz Channel Bandwidth



5MHz Channel Bandwidth



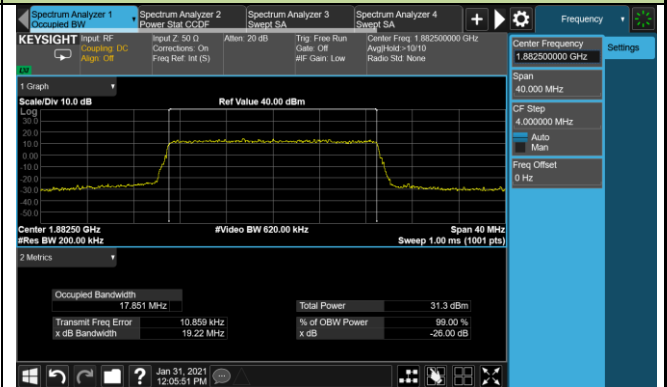
10MHz Channel Bandwidth



15MHz Channel Bandwidth



20MHz Channel Bandwidth

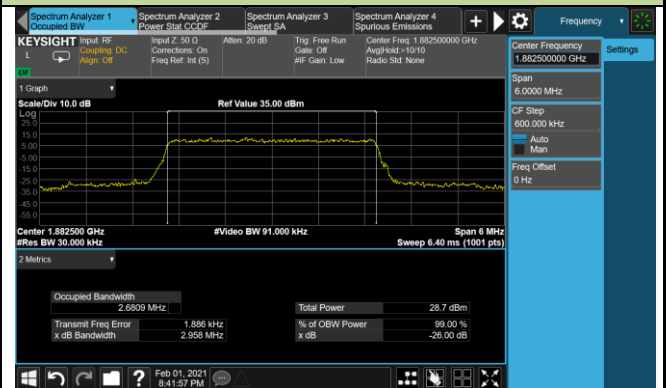


99% Bandwidth - 16QAM

1.4MHz Channel Bandwidth



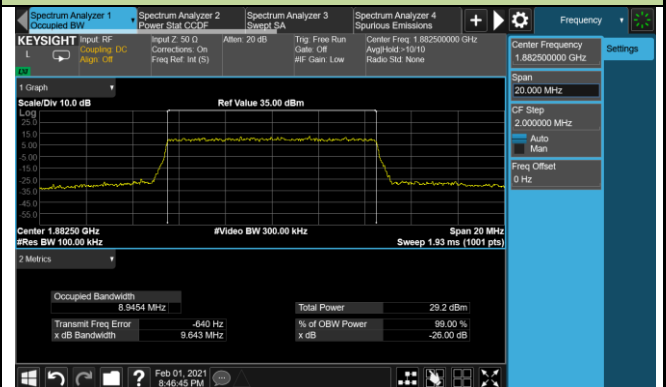
3MHz Channel Bandwidth



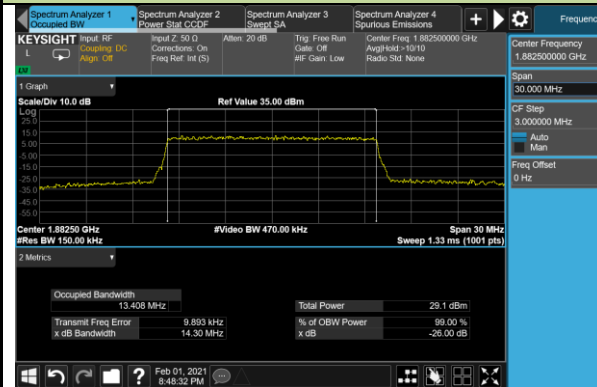
5MHz Channel Bandwidth



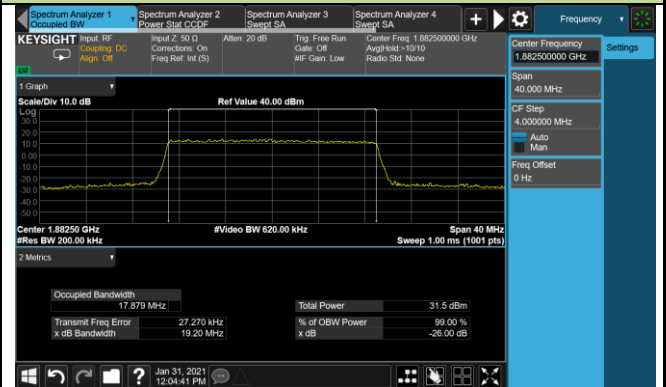
10MHz Channel Bandwidth



15MHz Channel Bandwidth



20MHz Channel Bandwidth

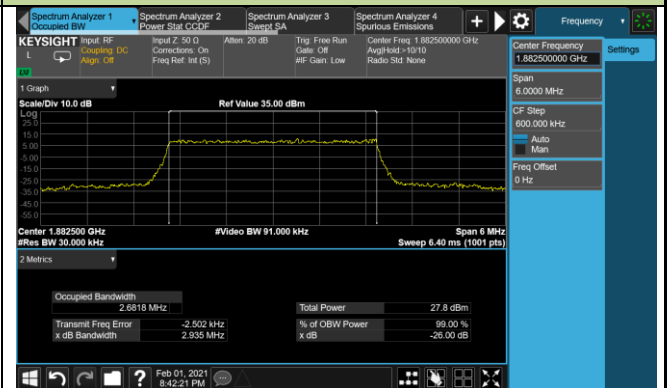


99% Bandwidth - 64QAM

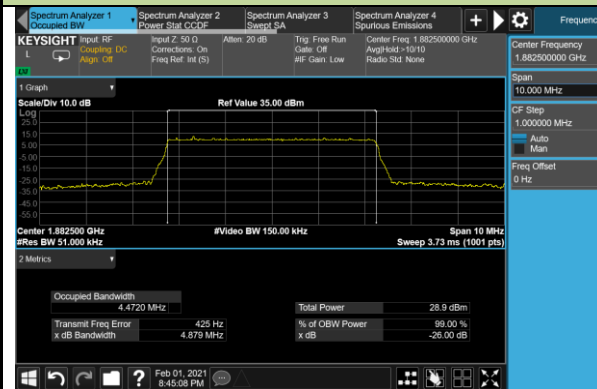
1.4MHz Channel Bandwidth



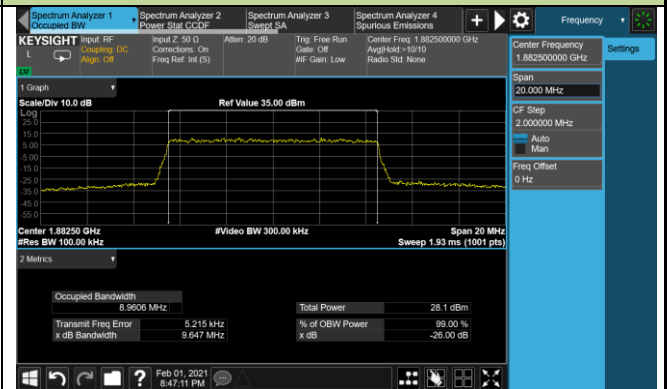
3MHz Channel Bandwidth



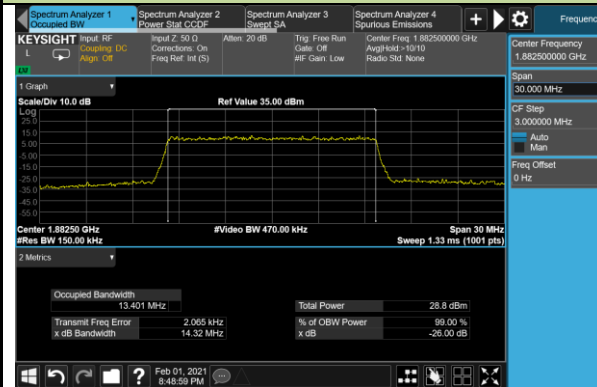
5MHz Channel Bandwidth



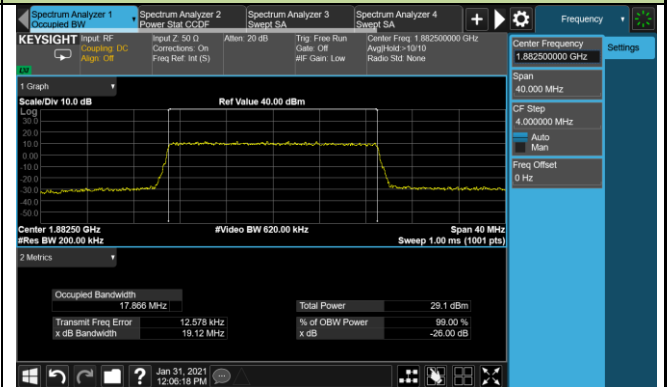
10MHz Channel Bandwidth



15MHz Channel Bandwidth



20MHz Channel Bandwidth

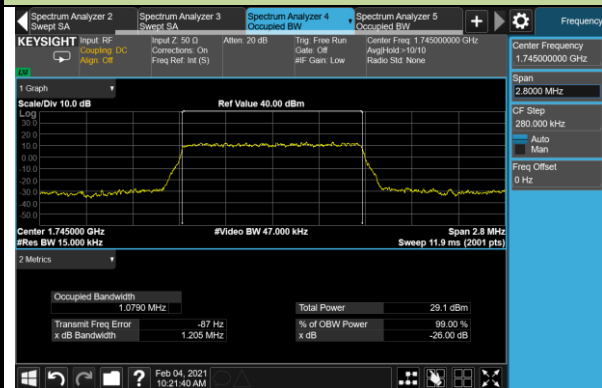


Product	LTE Module	Test Site	WZ-SR6
Test Engineer	Cloud Guo	Test Date	2021/02/04
Test Band	Band 4/66		

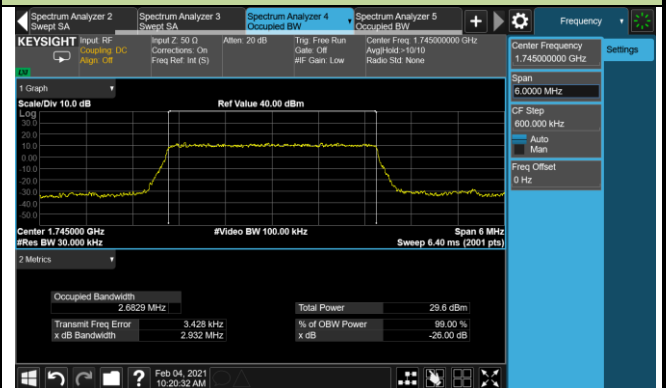
Channel	Frequency (MHz)	Bandwidth (MHz)	99% Bandwidth (MHz)
QPSK			
20300	1745.0	1.4	1.08
		3	2.68
		5	4.47
		10	8.95
		15	13.40
		20	17.89
16QAM			
20300	1745.0	1.4	1.08
		3	2.68
		5	4.46
		10	8.94
		15	13.41
		20	17.90
64QAM			
20300	1745.0	1.4	1.08
		3	2.68
		5	4.46
		10	8.96
		15	13.40
		20	17.86

99% Bandwidth - QPSK

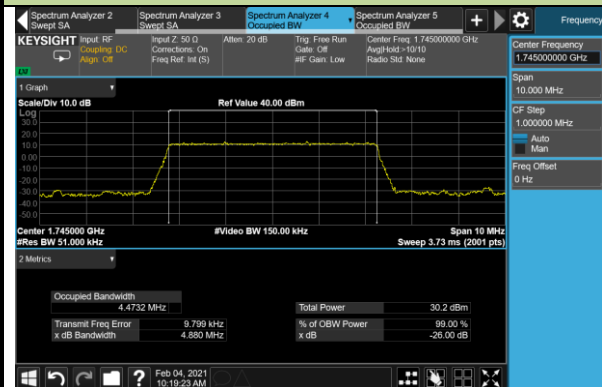
1.4MHz Channel Bandwidth



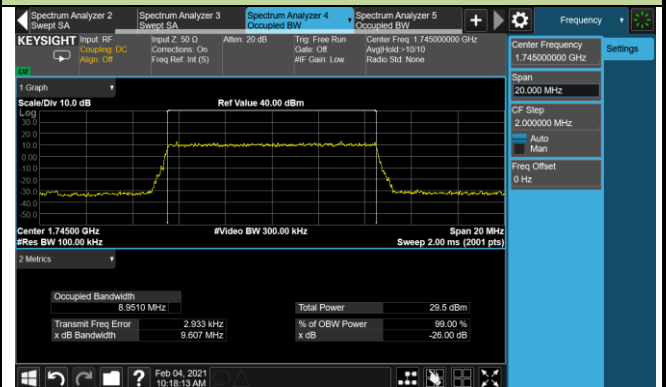
3MHz Channel Bandwidth



5MHz Channel Bandwidth



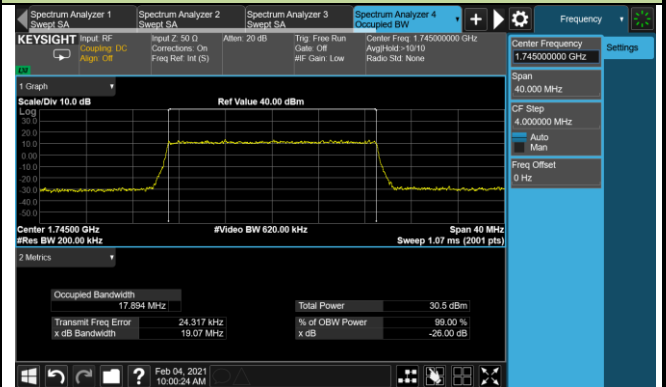
10MHz Channel Bandwidth



15MHz Channel Bandwidth

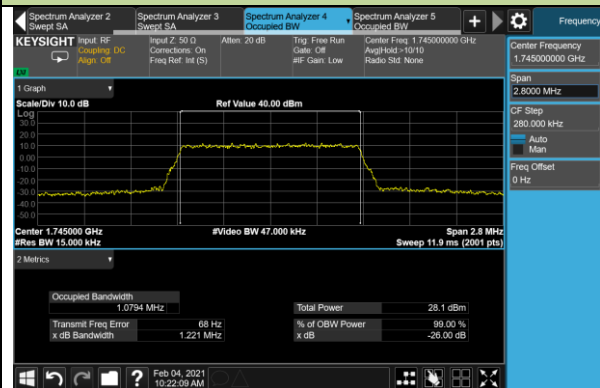


20MHz Channel Bandwidth

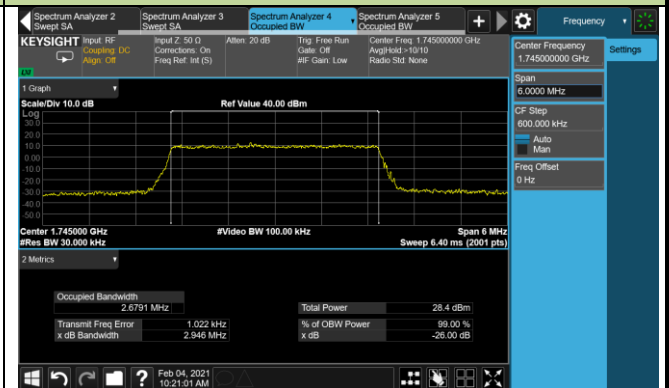


99% Bandwidth - 16QAM

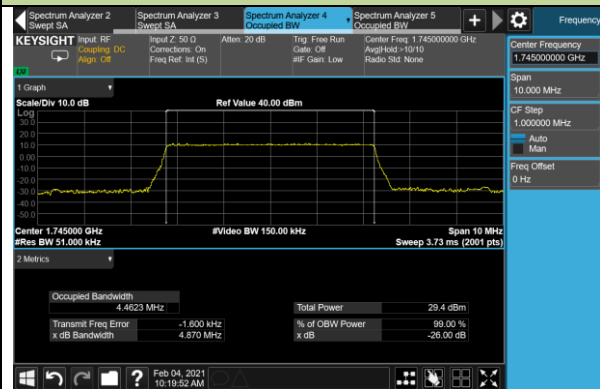
1.4MHz Channel Bandwidth



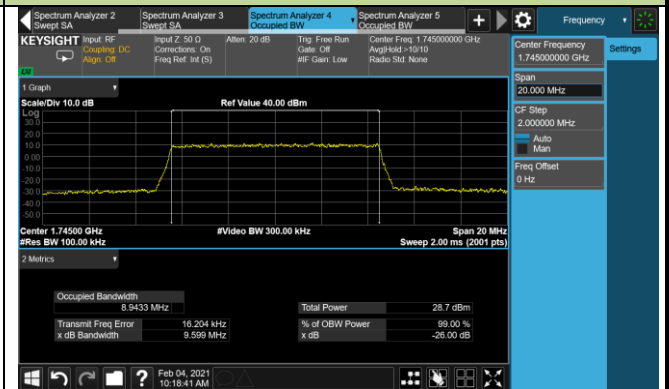
3MHz Channel Bandwidth



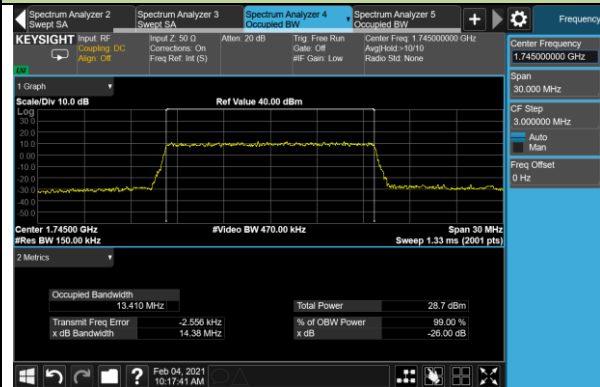
5MHz Channel Bandwidth



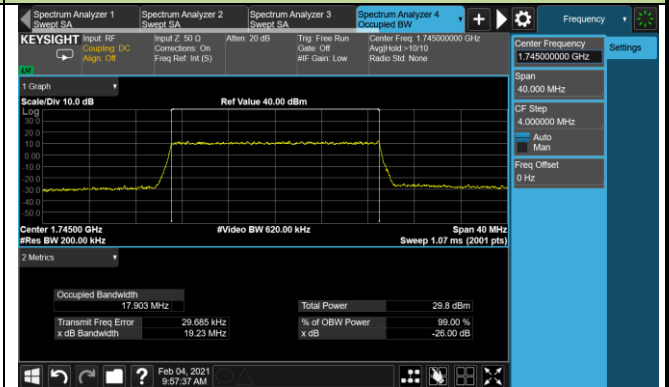
10MHz Channel Bandwidth



15MHz Channel Bandwidth



20MHz Channel Bandwidth

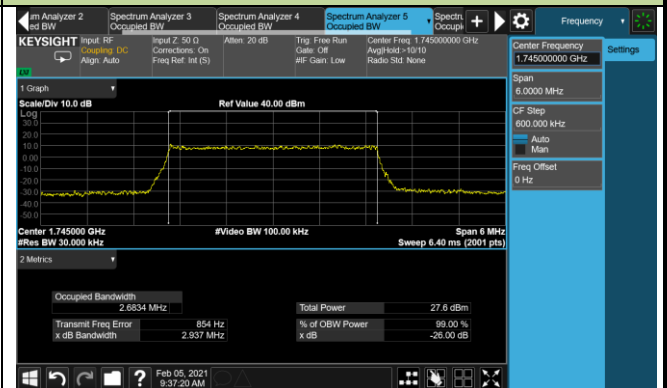


99% Bandwidth - 64QAM

1.4MHz Channel Bandwidth



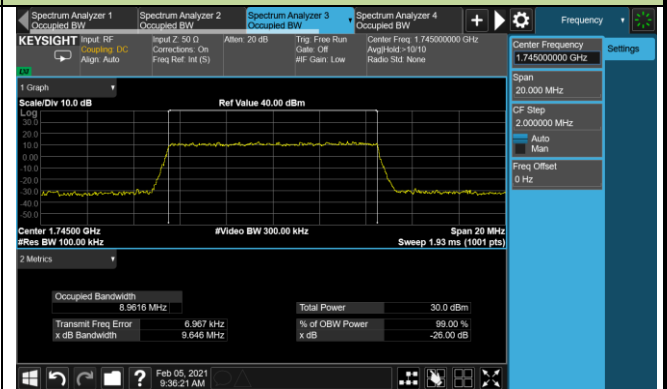
3MHz Channel Bandwidth



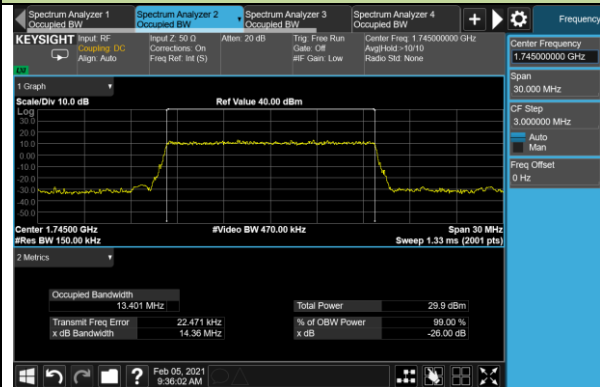
5MHz Channel Bandwidth



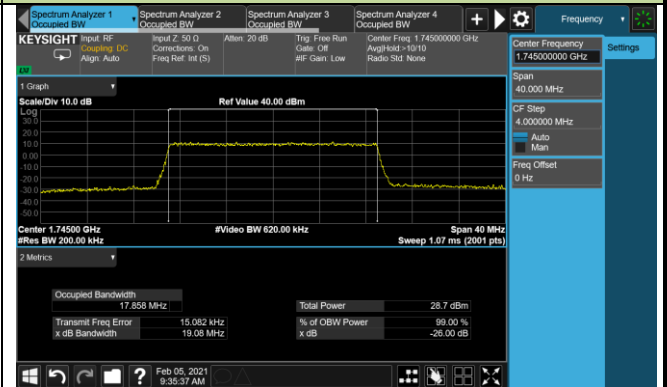
10MHz Channel Bandwidth



15MHz Channel Bandwidth



20MHz Channel Bandwidth

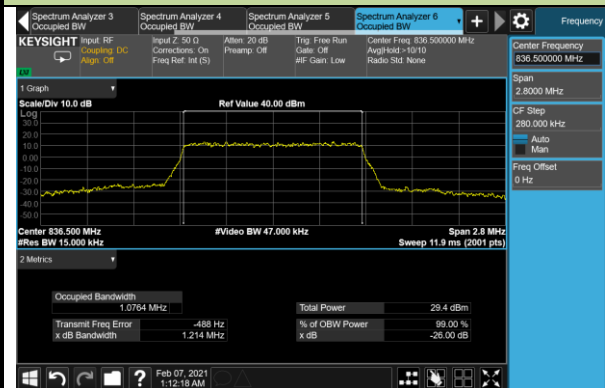


Product	LTE Module	Test Site	WZ-SR6
Test Engineer	Cloud Guo	Test Date	2021/02/07
Test Band	LTE Band 5/26		

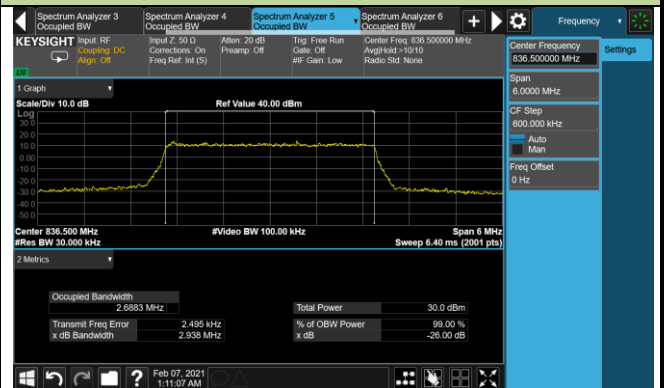
Channel	Frequency (MHz)	Bandwidth (MHz)	99% Bandwidth (MHz)
QPSK			
20525	836.5	1.4	1.08
		3	2.69
		5	4.47
		10	8.96
		15	13.38
27185	821.5	15	13.38
16QAM			
20525	836.5	1.4	1.08
		3	2.68
		5	4.47
		10	8.94
		15	13.38
27185	821.5	15	13.37
64QAM			
20525	836.5	1.4	1.08
		3	2.69
		5	4.47
		10	8.93
		15	13.40
27185	821.5	15	13.36

99% Bandwidth - QPSK

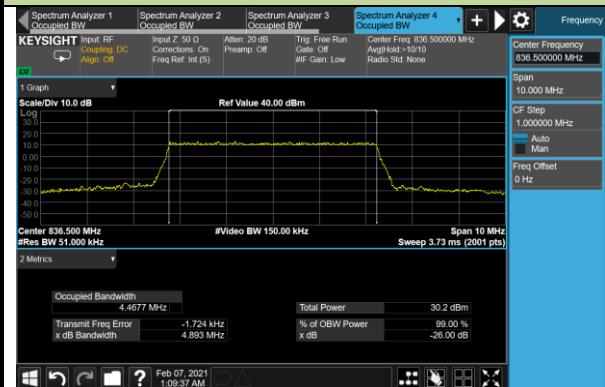
1.4MHz Channel Bandwidth



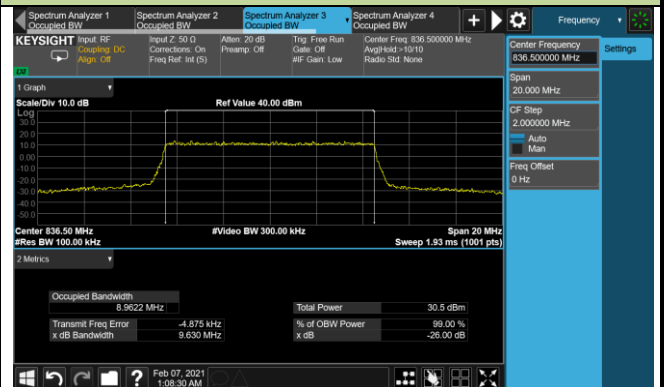
3MHz Channel Bandwidth



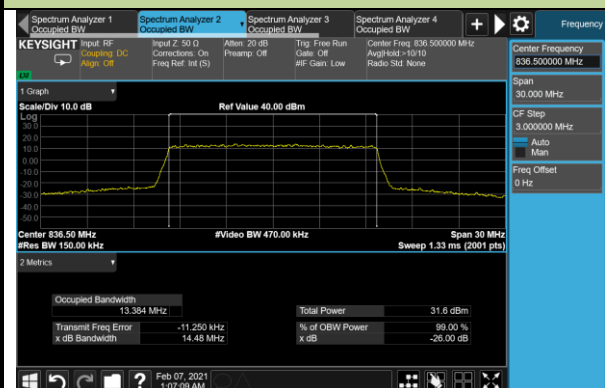
5MHz Channel Bandwidth



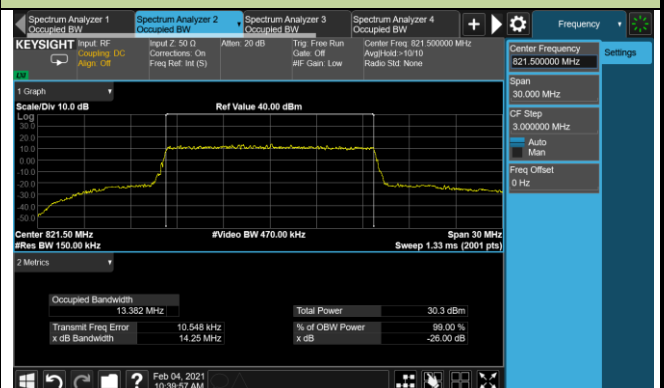
10MHz Channel Bandwidth



15MHz Channel Bandwidth



821.5MHz

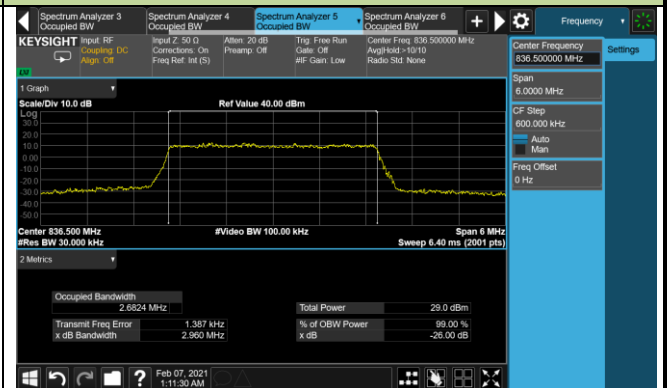


99% Bandwidth -16QAM

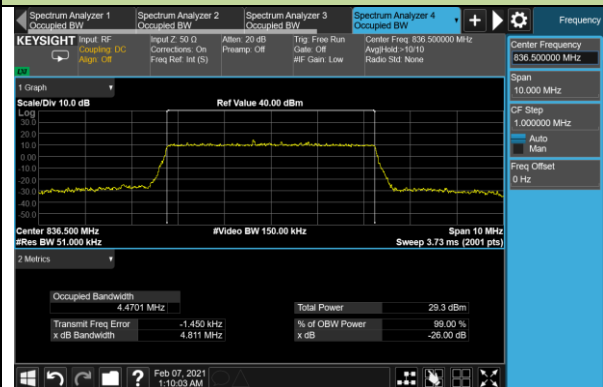
1.4MHz Channel Bandwidth



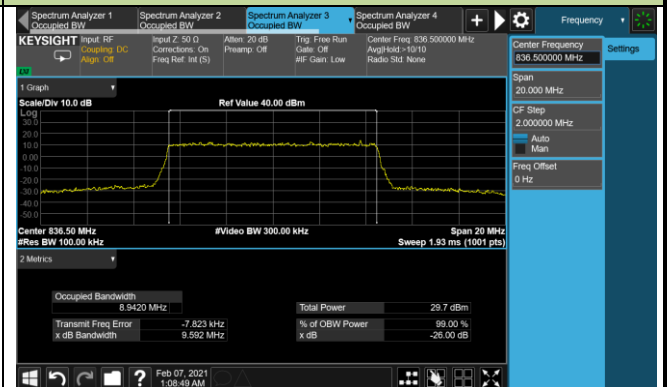
3MHz Channel Bandwidth



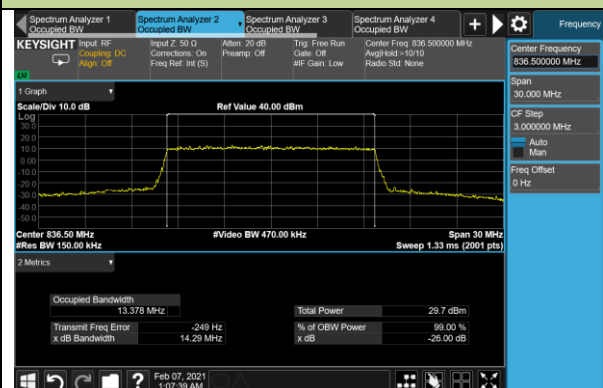
5MHz Channel Bandwidth



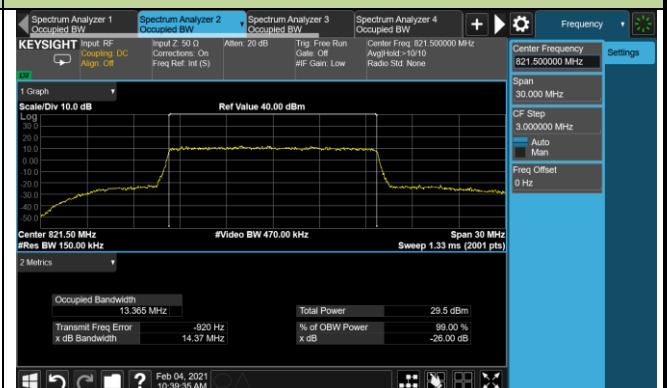
10MHz Channel Bandwidth



15MHz Channel Bandwidth



821.5MHz

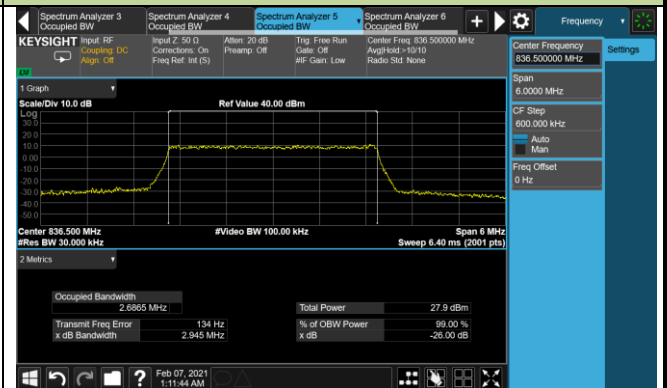


99% Bandwidth - 64QAM

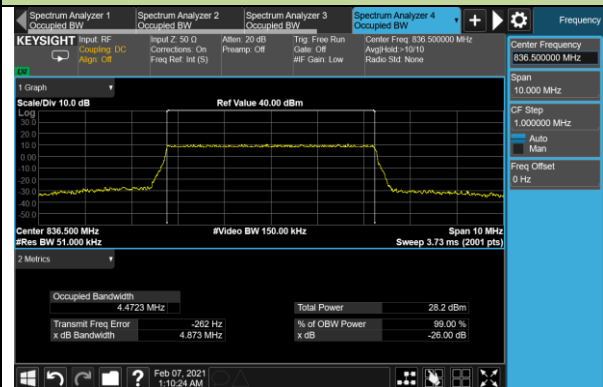
1.4MHz Channel Bandwidth



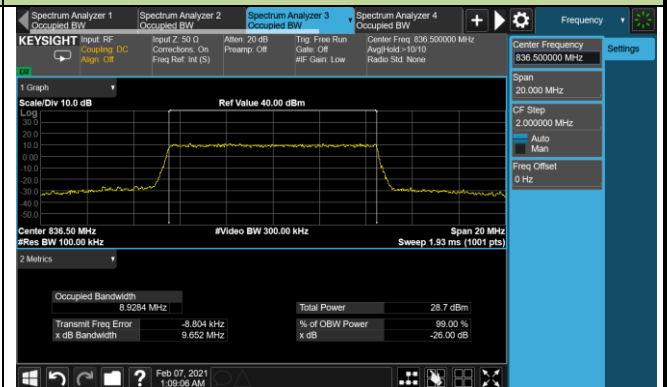
3MHz Channel Bandwidth



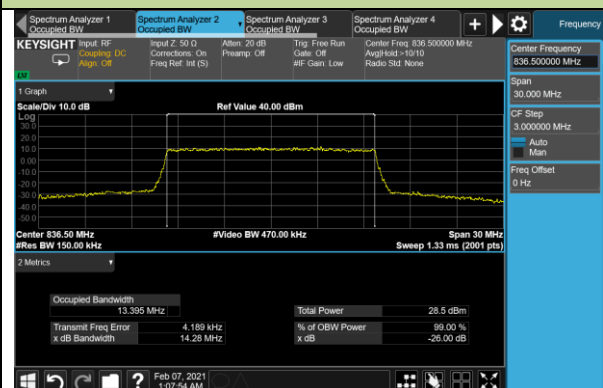
5MHz Channel Bandwidth



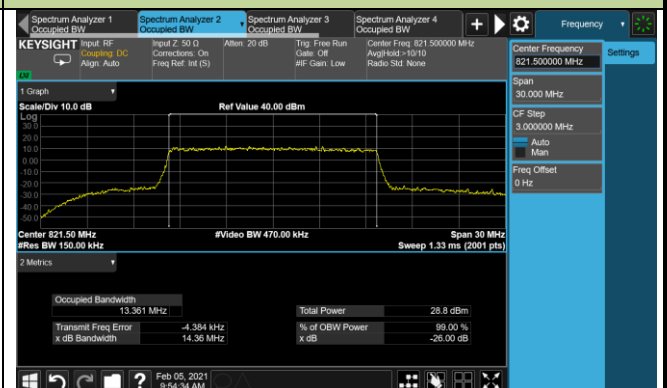
10MHz Channel Bandwidth



15MHz Channel Bandwidth



821.5MHz

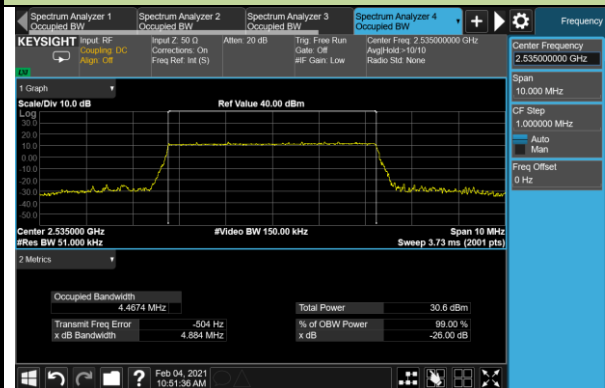


Product	LTE Module	Test Site	WZ-SR6
Test Engineer	Cloud Guo	Test Date	2021/02/04
Test Band	LTE Band 7		

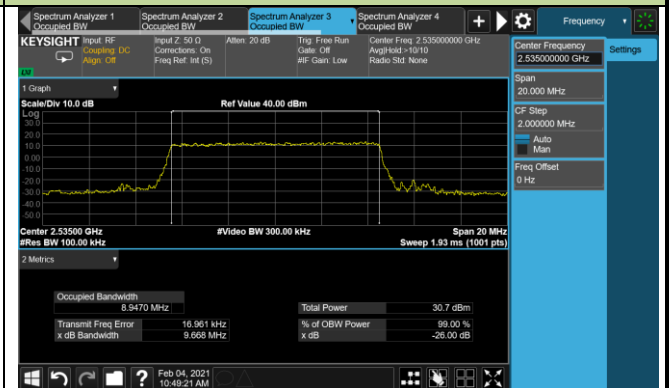
Channel	Frequency (MHz)	Bandwidth (MHz)	99% Bandwidth (MHz)
QPSK			
21100	2535.0	5	4.47
		10	8.95
		15	13.42
		20	17.89
16QAM			
21100	2535.0	5	4.47
		10	8.95
		15	13.39
		20	17.88
64QAM			
21100	2535.0	5	4.46
		10	8.94
		15	13.38
		20	17.85

99% Bandwidth - QPSK

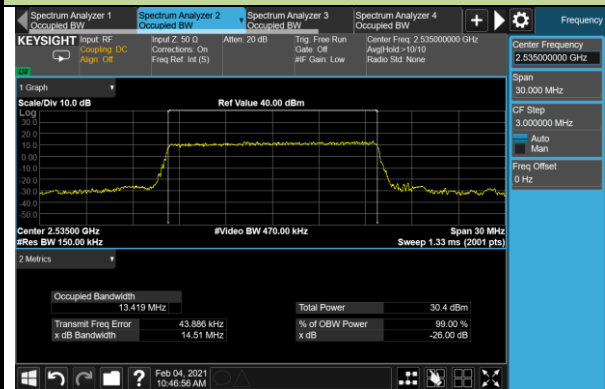
5MHz Channel Bandwidth



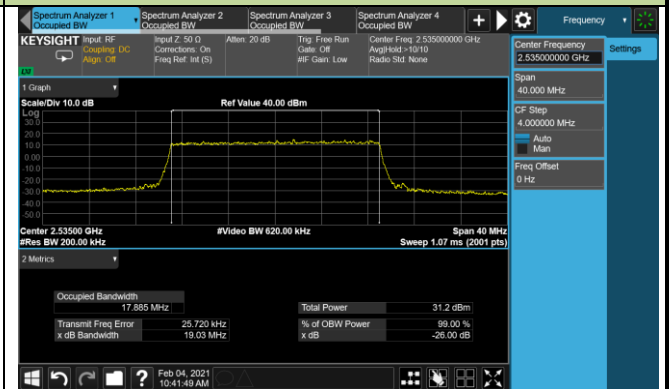
10MHz Channel Bandwidth



15MHz Channel Bandwidth

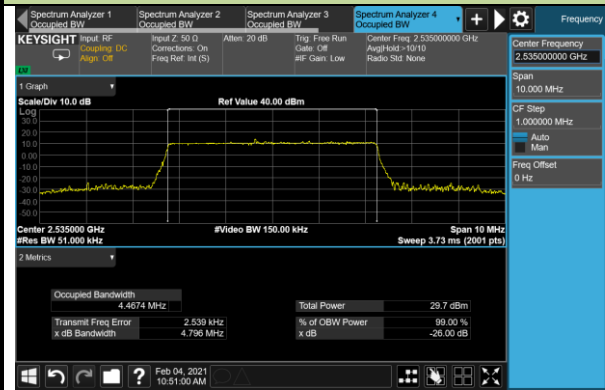


20MHz Channel Bandwidth

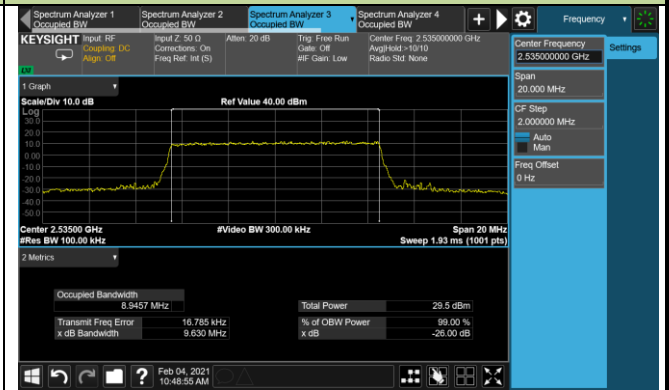


99% Bandwidth - 16QAM

5MHz Channel Bandwidth



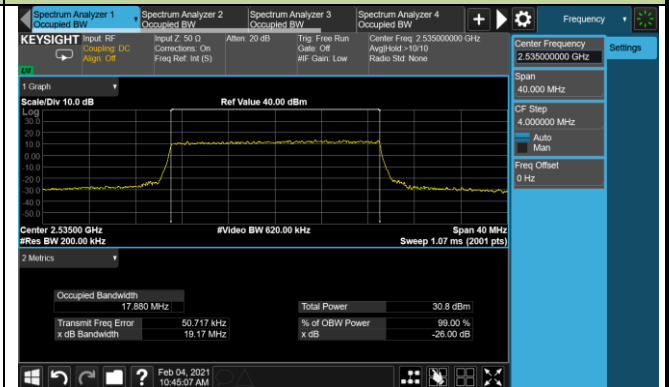
10MHz Channel Bandwidth



15MHz Channel Bandwidth

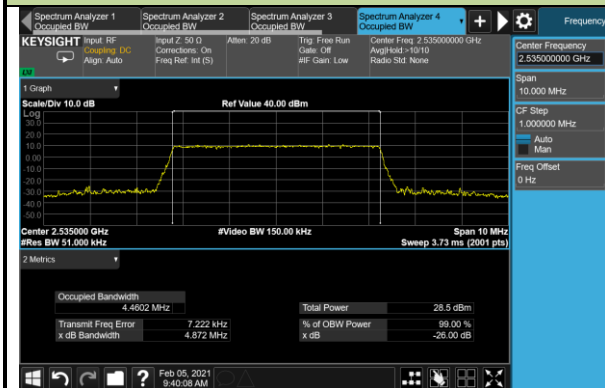


20MHz Channel Bandwidth

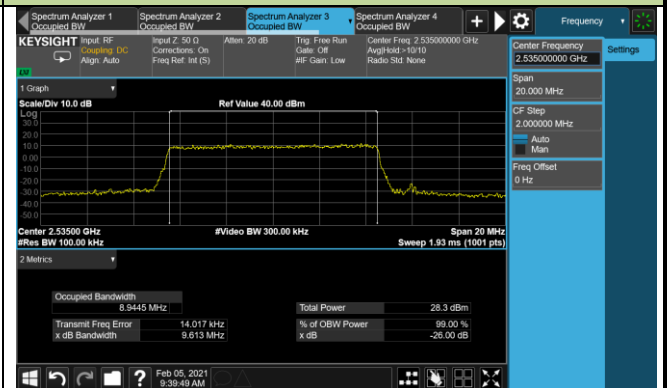


99% Bandwidth - 64QAM

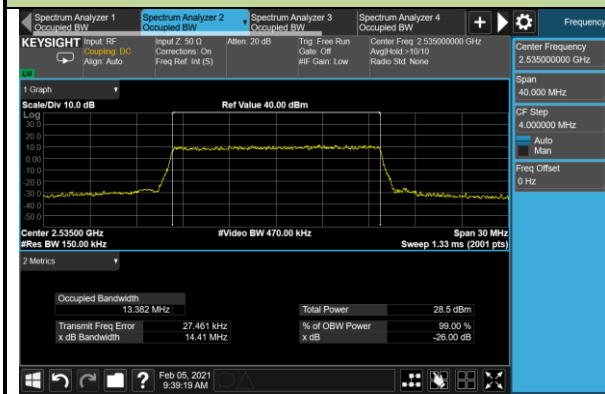
5MHz Channel Bandwidth



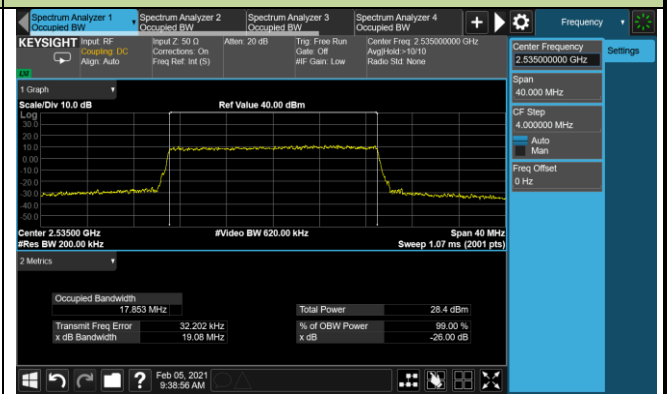
10MHz Channel Bandwidth



15MHz Channel Bandwidth



20MHz Channel Bandwidth

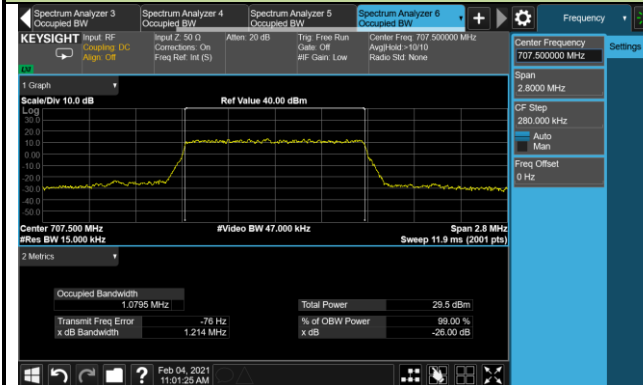


Product	LTE Module	Test Site	WZ-SR6
Test Engineer	Cloud Guo	Test Date	2021/02/04
Test Band	LTE Band 12		

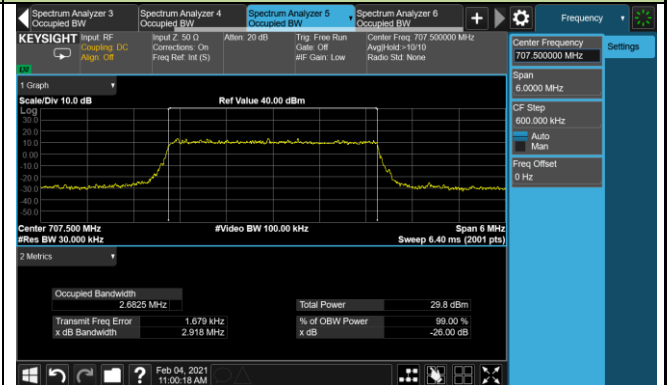
Channel	Frequency (MHz)	Bandwidth (MHz)	99% Bandwidth (MHz)
QPSK			
23095	707.5	1.4	1.08
		3	2.68
		5	4.48
		10	8.93
16QAM			
23095	707.5	1.4	1.08
		3	2.68
		5	4.46
		10	8.95
64QAM			
23095	707.5	1.4	1.08
		3	2.69
		5	4.47
		10	8.94

99% Bandwidth - QPSK

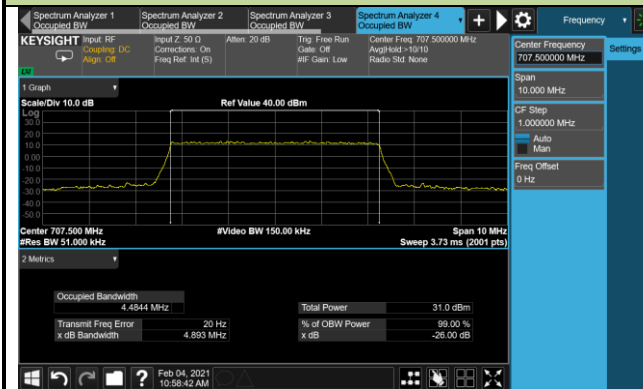
1.4MHz Channel Bandwidth



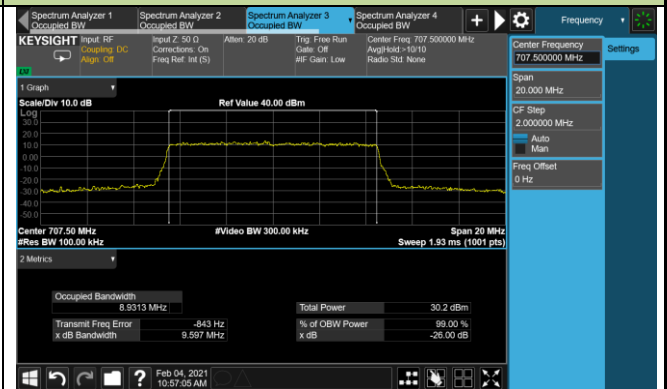
3MHz Channel Bandwidth



5MHz Channel Bandwidth

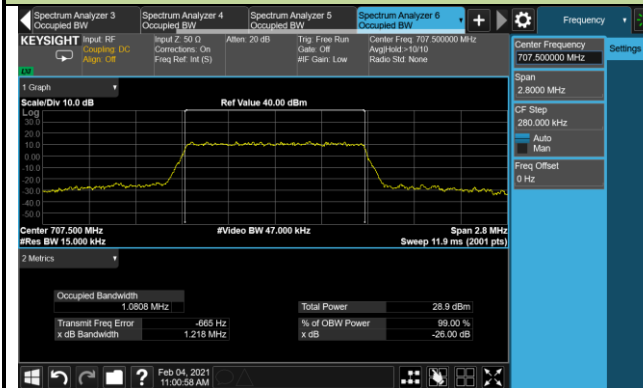


10MHz Channel Bandwidth

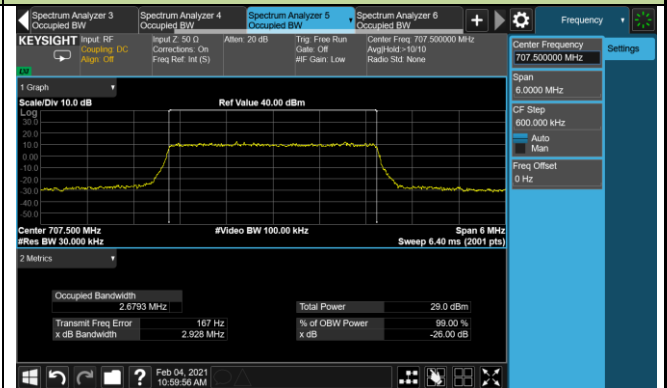


99% Bandwidth - 16QAM

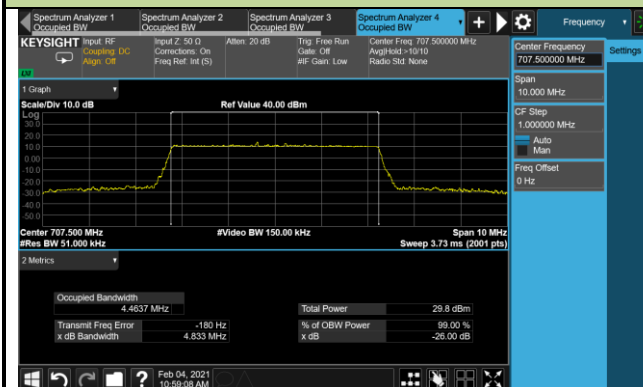
1.4MHz Channel Bandwidth



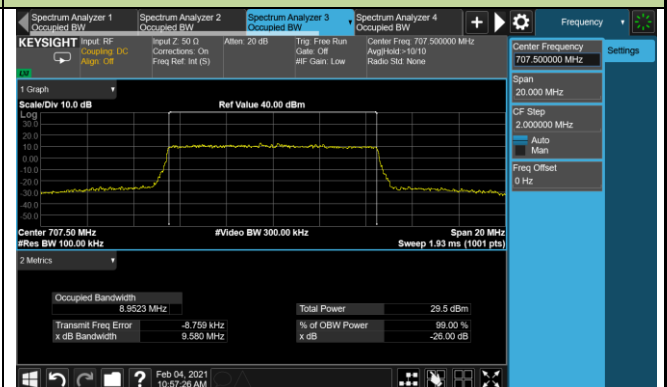
3MHz Channel Bandwidth



5MHz Channel Bandwidth



10MHz Channel Bandwidth

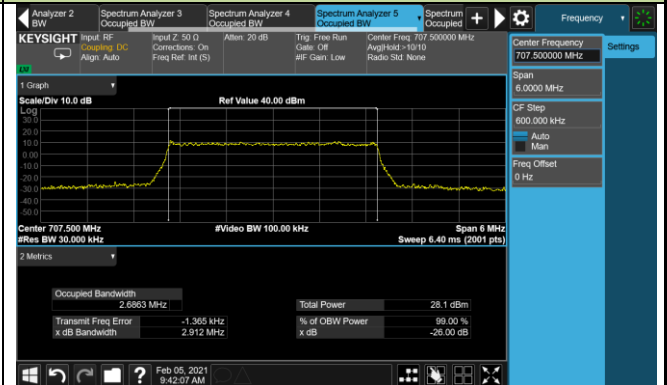


99% Bandwidth - 64QAM

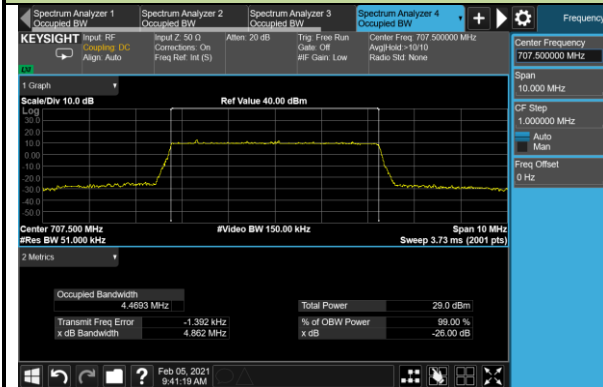
1.4MHz Channel Bandwidth



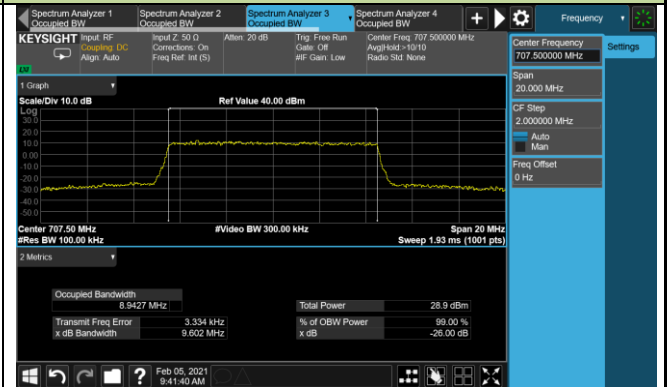
3MHz Channel Bandwidth



5MHz Channel Bandwidth



10MHz Channel Bandwidth



Product	LTE Module	Test Site	WZ-SR6
Test Engineer	Cloud Guo	Test Date	2021/02/04
Test Band	LTE Band 13		

Channel	Frequency (MHz)	Bandwidth (MHz)	99% Bandwidth (MHz)
QPSK			
23230	782.0	5	4.47
		10	8.93
16QAM			
23230	782.0	5	4.47
		10	8.95
64QAM			
23230	782.0	5	4.47
		10	8.96