



REPORT No.: SZ21080277W05

TEST REPORT

APPLICANT : Reliance Communications LLC

PRODUCT NAME : Orbic 4G Module

MODEL NAME : RC101ML

BRAND NAME : Orbic

FCC ID : 2ABGH-RC101ML

STANDARD(S) : 47 CFR Part 27, Subpart M

RECEIPT DATE : 2021-10-24

TEST DATE : 2021-10-25 to 2021-11-11

ISSUE DATE : 2021-12-30

Edited by: Li Hanbin
Li Hanbin (Rapporteur)

Approved by: Shen Junsheng
Shen Junsheng (Supervisor)

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DIRECTORY

1. Technical Information	4
1.1. Applicant and Manufacturer Information	4
1.2. Equipment Under Test (EUT) Description	4
1.3. Maximum ERP/EIRP and Emission Designator	5
1.4. Test Standards and Results	7
1.5. Environmental Conditions	9
2. 47 CFR Part 2 and 27M Requirements	10
2.1. Transmitter Conducted Output Power And ERP/EIPR	10
2.2. Occupied Bandwidth	14
2.3. Conducted Spurious Emissions	54
2.4. Band Edge	103
2.5. Radiated Spurious Emissions	122
Annex A Test Uncertainty	149
Annex B Testing Laboratory Information	150



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Change History		
Version	Date	Reason for change
1.0	2021-12-30	First edition



1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Reliance Communications LLC
Applicant Address:	91 Colin Drive, Unit 1, HOLBROOK, New York 11741, United States
Manufacturer:	Unimaxcomm
Manufacturer Address:	35F,HBC HuiLong Center Building-II Minzhi Street,Longhua, Shenzhen, P.R. China 518110

1.2. Equipment Under Test (EUT) Description

Product Name:	Orbic 4G Module	
Hardware Version:	QMO2_V1.0_0611	
Software Version:	ORB101ML_v1.0.0.9_VZ	
IMEI:	352328320000143	
Modulation Type:	QPSK, 16QAM, 64QAM	
Operation Band:	Uplink: CA_7C; CA_41C	
Frequency Range:	LTE Band 7	Tx: 2500 MHz – 2570 MHz
		Rx: 2620 MHz – 2690 MHz
	LTE Band 41	Tx: 2496 MHz – 2690 MHz
		Rx: 2496 MHz – 2690 MHz
Channel Bandwidth:	LTE Band 7	5MHz, 10MHz, 15MHz, 20MHz
	LTE Band 41	5MHz, 10MHz, 15MHz, 20MHz
Antenna Type:	PIFA Antenna	
Antenna Gain:	LTE Band 7	2.70 dBi
	LTE Band 41	2.70 dBi

Note 1: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.



1.3. Maximum ERP/EIRP and Emission Designator

Channel bandwidth	Maximum ERP/EIRP (W)			
LTE CA_7C	QPSK	16QAM	64QAM	256QAM
20+20	0.187	/	/	/
LTE CA_41C	QPSK	16QAM	64QAM	256QAM
20+20	0.201	/	/	/



Channel bandwidth	Emission Designator (99%OBW)		
LTE CA_7C	QPSK	16QAM	64QAM
10+20	27M7G7D	27M7W7D	27M8D7W
15+10	23M1G7D	23M1W7D	23M1D7W
15+15	28M3G7D	28M3W7D	28M3D7W
15+20	32M6G7D	32M6W7D	32M6D7W
20+10	27M7G7D	27M7W7D	27M7D7W
20+15	32M6G7D	32M6W7D	32M6D7W
20+20	37M6G7D	37M5W7D	37M5D7W
LTE CA_41C	QPSK	16QAM	64QAM
5+20	23M9G7D	22M8W7D	22M8D7W
10+15	23M0G7D	23M0W7D	23M0D7W
10+20	27M7G7D	27M8W7D	27M8D7W
15+10	23M1G7D	23M1W7D	23M1D7W
15+15	28M2G7D	28M4W7D	28M2D7W
15+20	32M7G7D	32M6W7D	32M6D7W
20+5	22M8G7D	22M8W7D	22M8D7W
20+10	27M7G7D	27M7W7D	27M8D7W
20+15	32M5G7D	32M5W7D	32M6D7W
20+20	37M5G7D	37M4W7D	37M5D7W



1.4. Test Standards and Results

The objective of the report is to perform testing according to Part 2 and Part 27 for the EUT FCC ID Certification:

No	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 27	Miscellaneous Wireless Communications Services



Test detailed items/section required by FCC rules and results are as below:

Section	Description	Test Date	Test Engineer	Result	Method Determination /Remark
2.1046, 27.50(h)(2),	Transmitter Conducted Output Power and ERP/EIRP	Oct 25 to Oct 26, 2021	Li Hanbin	PASS	No deviation
2.1049	Occupied Bandwidth	Oct 26 to Oct 27, 2021	Li Hanbin	PASS	No deviation
2.1055,	Frequency Stability	Oct 25 to Oct 26, 2021	Li Hanbin	PASS	No deviation
2.1051, 27.53(m)(4),	Conducted Spurious Emissions	Oct 27 to Oct 28, 2021	Li Hanbin	PASS	No deviation
2.1051, 27.53(m)(4),	Band Edge	Oct 27 to Oct 28, 2021	Li Hanbin	PASS	No deviation
2.1051, 27.53(m)(4),	Radiated Spurious Emissions	Nov 8 to Nov 11, 2021	Yin Xiaogang	PASS	No deviation
Note 1: The tests were performed according to the method of measurements prescribed in KDB971168 D01 v03 and ANSI/TIA-603-E-2016.					
Note 2: The path loss during the RF test is calibrated to correct the results by the offset setting in the test equipments. The ref offset 8dB contains two parts that cable loss 5dB and Attenuator 3dB.					



1.5. Environmental Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 - 60
Atmospheric Pressure (kPa):	86 - 106



2. 47 CFR Part 2 and 27M Requirements

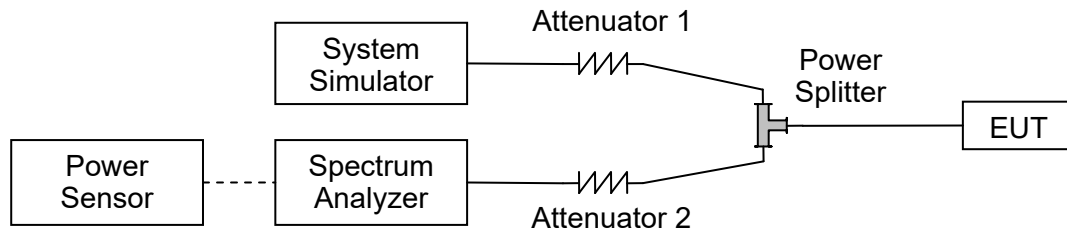
2.1. Transmitter Conducted Output Power And ERP/EIPR

2.1.1. Requirement

According to FCC section 2.1046(a) for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

According to FCC section 27.50 (h)(2) for LTE Band 7/41, Mobile and other user stations. Mobile stations are limited to 2 watts E.I.R.P. All user stations are limited to 2 watts transmitter output power.

2.1.1. Test Description



The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power. A call is established between the EUT and the SS.

2.1.2. Test procedure

KDB 971168 D01v03 Section 5.2 and ANSI/TIA-603-E-2016.

$EIRP \text{ (dBm)} = \text{Conducted Output Power (dBm)} + \text{Antenna Gain (dBi)}$

$ERP \text{ (dBm)} = EIPR \text{ (dBm)} - 2.15$



2.1.3. Result

Conducted Output Power

LTE CA_7C								
Combination:20MHz+20MHz(100RB+100RB)								
PCC Channel (3GPP)	SCC Channel	Modulation	PCC		SCC		Total RB Size	Measured Power(dBm)
			RB Size	RB Offset	RB Size	RB Offset		
20850	21048	QPSK	1	0	100	0	1	20.01
21001	21199	QPSK	1	0	100	0	1	19.92
21152	21350	QPSK	1	0	100	0	1	19.82

LTE CA_41C								
Combination:20MHz+20MHz(100RB+100RB)								
PCC Channel (3GPP)	SCC Channel	Modulation	PCC		SCC		Total RB Size	Measured Power(dBm)
			RB Size	RB Offset	RB Size	RB Offset		
39750	39948	QPSK	1	0	100	0	1	20.34
40521	40719	QPSK	1	0	100	0	1	19.78
41292	41490	QPSK	1	0	100	0	1	19.02

**Effective Radiated Power and Effective Isotropic Radiated Power**

LTE CA_7C									
Combination:20MHz+20MHz(100RB+100RB)									
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Measured Power(dBm)	Measured EIRP(W)
			RB Size	RB Offset	RB Size	RB Offset			
20850	21048	QPSK	1	0	100	0	1	22.71	0.187
21001	21199	QPSK	1	0	100	0	1	22.62	0.183
21152	21350	QPSK	1	0	100	0	1	22.52	0.179

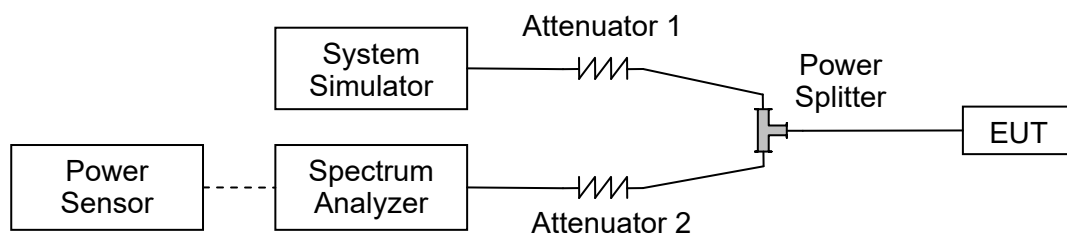
LTE CA_41C									
Combination:20MHz+20MHz(100RB+100RB)									
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Measured Power(dBm)	Measured EIRP(W)
			RB Size	RB Offset	RB Size	RB Offset			
39750	39948	QPSK	1	0	100	0	1	23.04	0.201
40521	40719	QPSK	1	0	100	0	1	22.48	0.177
41292	41490	QPSK	1	0	100	0	1	21.72	0.149

2.2. Occupied Bandwidth

2.2.1. Requirement

According to FCC section 2.1049, the occupied bandwidth 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. Occupied bandwidth is also known as the 99% emission bandwidth.

2.2.2. Test Description



The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power. A call is established between the EUT and the SS.

2.2.3. Test procedure

KDB 971168 D01v03 Section 4.1 and ANSI/TIA-603-E-2016.

2.2.4. Test Result



LTE CA_7C				
BW(MHz)	Channel Level	Modulation	99% BW(MHz)	26dB BW(MHz)
10M+20MHz	Low	QPSK	27.71	28.83
	Low	16QAM	27.67	28.74
	Low	64QAM	27.75	28.80
	Mid	QPSK	27.72	28.90
	Mid	16QAM	27.70	28.88
	Mid	64QAM	27.73	28.90
	High	QPSK	27.71	28.83
	High	16QAM	27.70	28.82
	High	64QAM	27.73	28.86
15M+10MHz	Low	QPSK	23.09	24.31
	Low	16QAM	23.08	24.21
	Low	64QAM	23.09	24.35
	Mid	QPSK	23.09	24.19
	Mid	16QAM	23.10	24.33
	Mid	64QAM	23.06	24.23
	High	QPSK	23.05	24.33
	High	16QAM	23.08	24.33
	High	64QAM	23.04	24.23
15M+15MHz	Low	QPSK	28.25	29.57
	Low	16QAM	28.28	29.59
	Low	64QAM	28.26	29.59
	Mid	QPSK	28.25	29.55
	Mid	16QAM	28.26	29.61
	Mid	64QAM	28.26	29.54
	High	QPSK	28.25	29.55
	High	16QAM	28.25	29.57
	High	64QAM	28.26	29.60
15M+20MHz	Low	QPSK	32.59	34.08
	Low	16QAM	32.60	34.06
	Low	64QAM	32.61	33.99
	Mid	QPSK	32.58	34.06
	Mid	16QAM	32.61	34.07
	Mid	64QAM	32.59	34.11
	High	QPSK	32.58	34.06
	High	16QAM	32.59	34.05
	High	64QAM	32.48	34.02



20M+10MHz	Low	QPSK	27.70	29.15
	Low	16QAM	27.68	29.17
	Low	64QAM	27.69	29.12
	Mid	QPSK	27.68	29.11
	Mid	16QAM	27.71	29.13
	Mid	64QAM	27.69	29.10
	High	QPSK	27.70	29.11
	High	16QAM	27.67	29.08
	High	64QAM	27.70	29.17
20M+15MHz	Low	QPSK	32.57	34.18
	Low	16QAM	32.58	34.24
	Low	64QAM	32.57	34.20
	Mid	QPSK	32.56	34.22
	Mid	16QAM	32.56	34.24
	Mid	64QAM	32.56	34.14
	High	QPSK	32.56	34.12
	High	16QAM	32.54	34.22
	High	64QAM	32.59	34.13
20M+20MHz	Low	QPSK	37.45	39.21
	Low	16QAM	37.52	39.33
	Low	64QAM	37.51	39.17
	Mid	QPSK	37.53	39.29
	Mid	16QAM	37.54	39.34
	Mid	64QAM	37.53	39.33
	High	QPSK	37.56	39.15
	High	16QAM	37.50	39.29
	High	64QAM	37.52	39.03



LTE CA_41C				
BW(MHz)	Channel Level	Modulation	99% BW(MHz)	26dB BW(MHz)
5M+20MHz	Low	QPSK	22.85	23.55
	Low	16QAM	22.82	23.75
	Low	64QAM	22.81	23.59
	Mid	QPSK	22.76	23.58
	Mid	16QAM	22.76	23.68
	Mid	64QAM	22.77	23.57
	High	QPSK	22.79	23.64
	High	16QAM	22.82	23.72
	High	64QAM	22.78	23.57
10M+15MHz	Low	QPSK	23.00	24.03
	Low	16QAM	23.03	24.13
	Low	64QAM	23.06	24.02
	Mid	QPSK	22.98	24.04
	Mid	16QAM	22.97	24.22
	Mid	64QAM	23.02	24.07
	High	QPSK	23.02	23.97
	High	16QAM	23.01	24.23
	High	64QAM	23.04	24.11
10M+20MHz	Low	QPSK	27.67	28.79
	Low	16QAM	27.76	28.78
	Low	64QAM	27.77	28.84
	Mid	QPSK	27.66	28.71
	Mid	16QAM	27.56	28.84
	Mid	64QAM	27.68	28.75
	High	QPSK	27.67	28.81
	High	16QAM	27.68	28.82
	High	64QAM	27.73	28.76
15M+10MHz	Low	QPSK	23.09	24.25
	Low	16QAM	23.02	24.21
	Low	64QAM	23.02	24.12
	Mid	QPSK	23.02	24.16
	Mid	16QAM	23.10	24.24
	Mid	64QAM	23.05	24.06
	High	QPSK	22.97	24.06
	High	16QAM	23.05	24.26
	High	64QAM	23.06	24.21



15M+15MHz	Low	QPSK	28.23	29.16
	Low	16QAM	28.35	29.13
	Low	64QAM	28.15	29.18
	Mid	QPSK	28.15	29.54
	Mid	16QAM	28.20	29.59
	Mid	64QAM	28.22	29.36
	High	QPSK	28.22	29.50
	High	16QAM	28.21	29.60
	High	64QAM	28.17	29.56
15M+20MHz	Low	QPSK	32.47	33.66
	Low	16QAM	32.42	33.86
	Low	64QAM	32.13	33.58
	Mid	QPSK	32.45	33.87
	Mid	16QAM	32.51	33.93
	Mid	64QAM	32.50	34.00
	High	QPSK	32.65	33.81
	High	16QAM	32.56	34.04
	High	64QAM	32.59	33.93
20M+5MHz	Low	QPSK	22.78	23.71
	Low	16QAM	22.78	23.73
	Low	64QAM	22.79	23.71
	Mid	QPSK	22.81	23.81
	Mid	16QAM	22.84	23.89
	Mid	64QAM	23.74	22.88
	High	QPSK	22.81	23.68
	High	16QAM	22.83	23.82
	High	64QAM	22.80	23.79
20M+10MHz	Low	QPSK	27.71	28.54
	Low	16QAM	27.55	28.61
	Low	64QAM	27.80	28.52
	Mid	QPSK	27.64	28.92
	Mid	16QAM	27.67	29.05
	Mid	64QAM	27.69	28.96
	High	QPSK	27.65	28.80
	High	16QAM	27.64	28.93
	High	64QAM	27.63	28.86
	Low	QPSK	32.49	34.01
	Low	16QAM	32.50	34.13

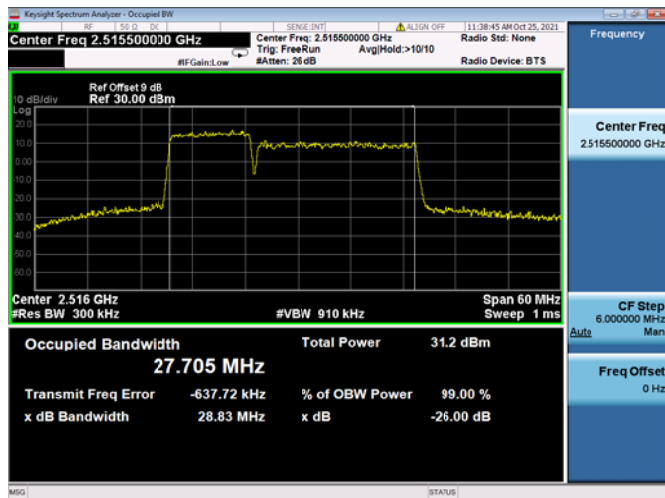


20M+15MHz	Low	64QAM	32.48	34.05
	Mid	QPSK	32.52	34.05
	Mid	16QAM	32.48	34.14
	Mid	64QAM	32.55	34.13
	High	QPSK	32.53	33.97
	High	16QAM	32.52	34.13
	High	64QAM	32.52	34.08
20M+20MHz	Low	QPSK	37.44	38.62
	Low	16QAM	37.35	38.74
	Low	64QAM	37.45	38.73
	Mid	QPSK	37.37	39.10
	Mid	16QAM	37.41	39.13
	Mid	64QAM	37.40	38.86
	High	QPSK	37.47	39.01
	High	16QAM	37.44	39.21
	High	64QAM	37.44	39.14

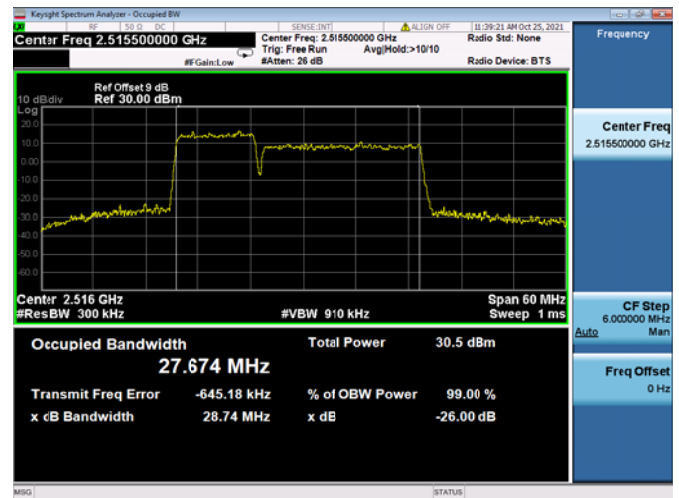


LTE CA_7C

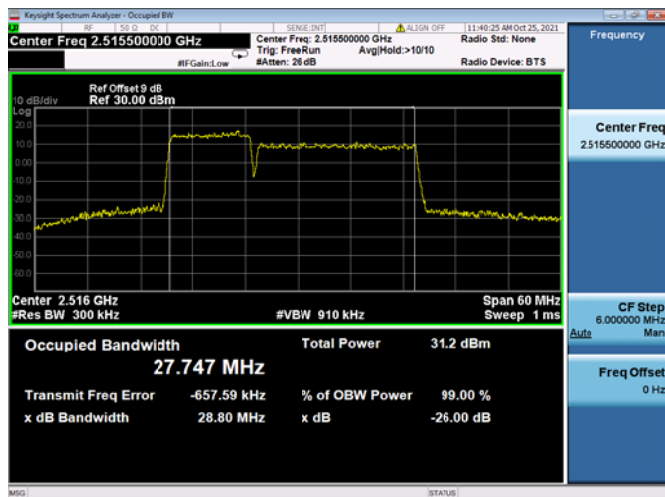
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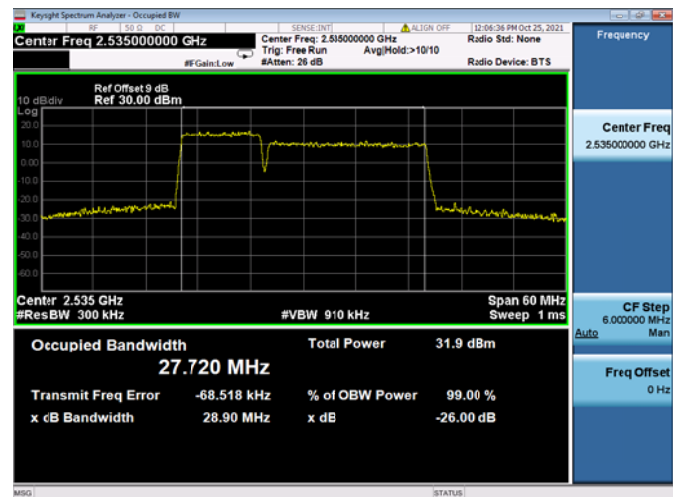
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10MHz+20MHz / 64QAM/ LCH

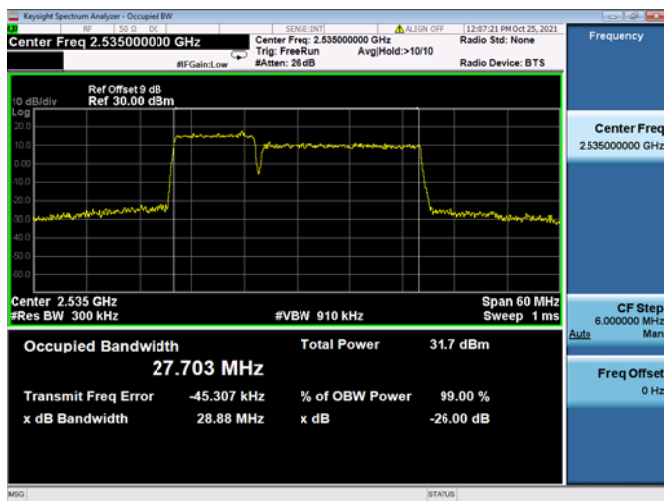


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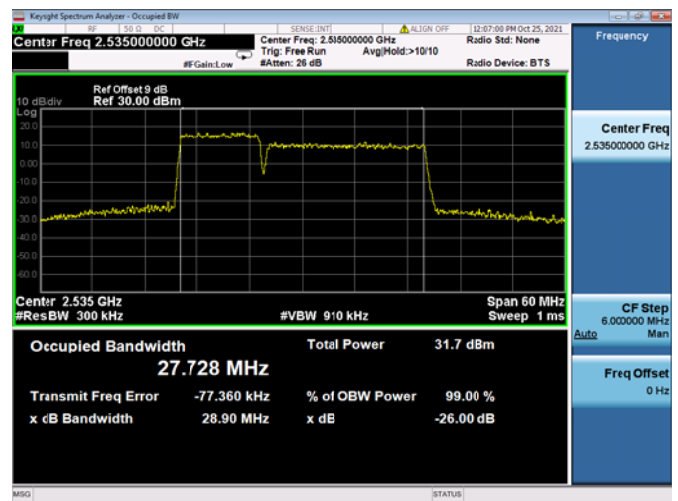




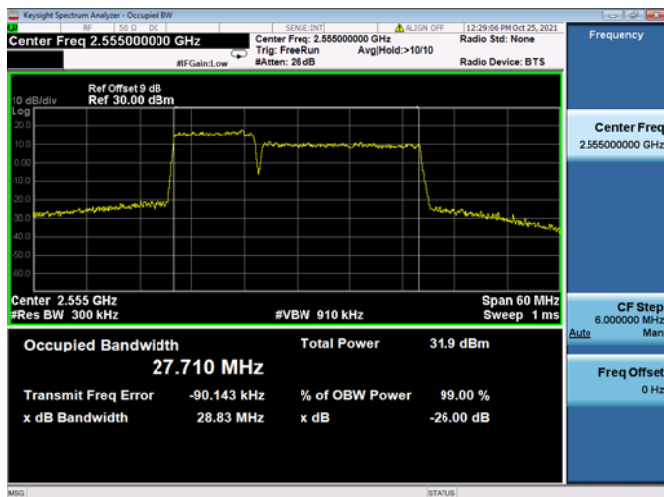
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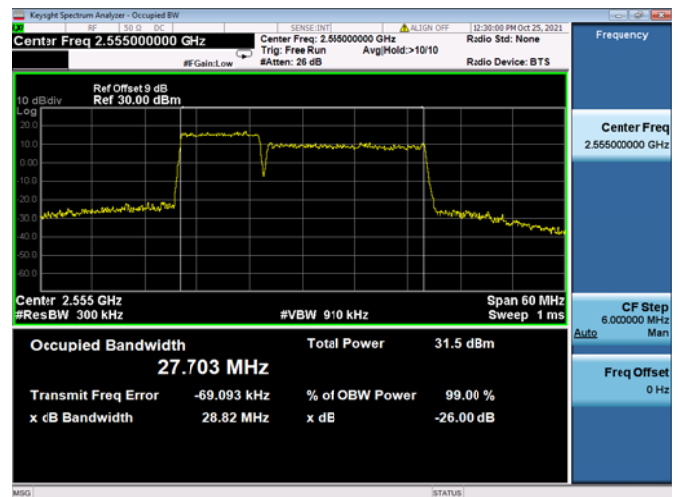
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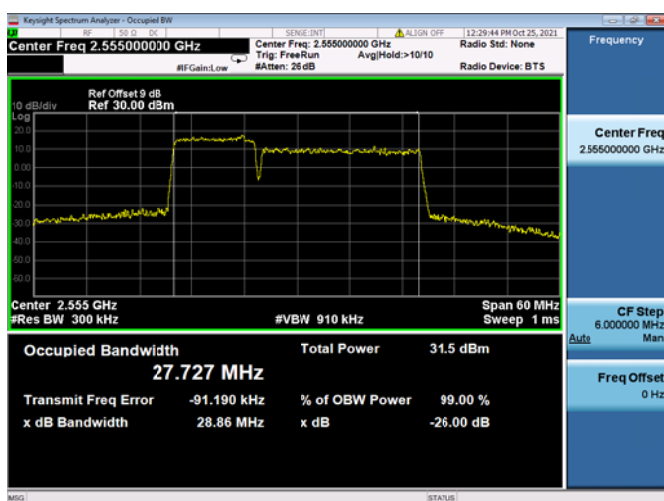
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10MHz+20MHz / 16QAM / HCH



10MHz+20MHz / 64QAM / HCH

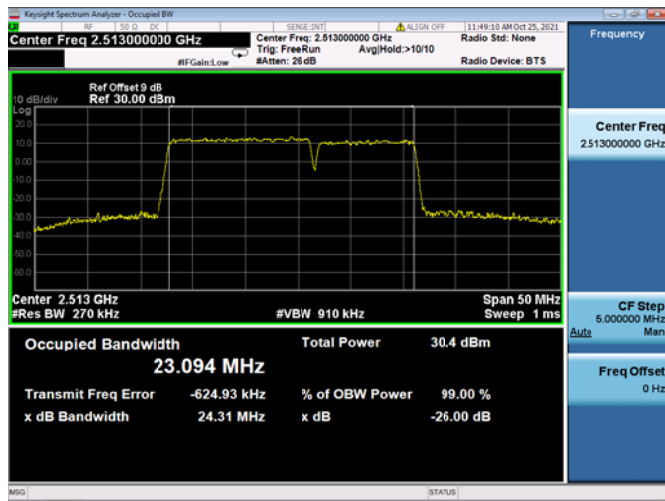


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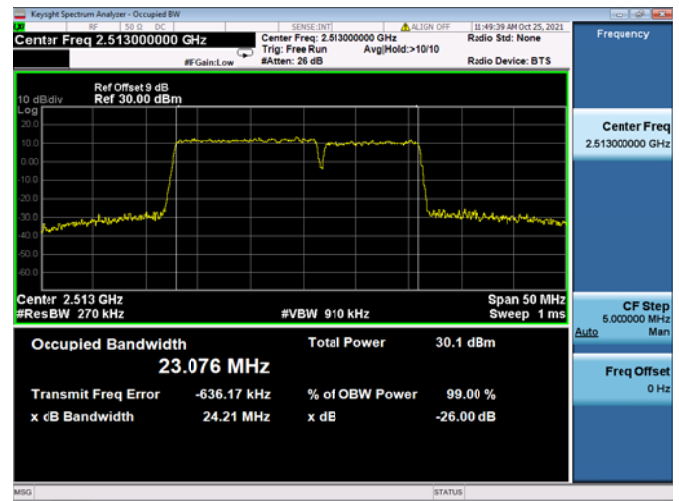


LTE CA_7C

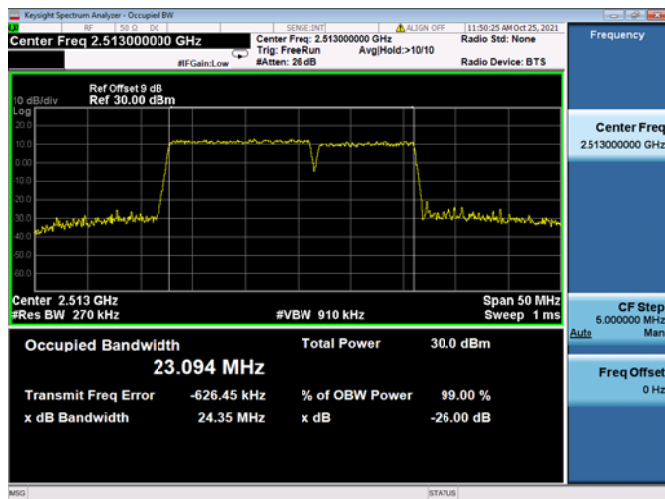
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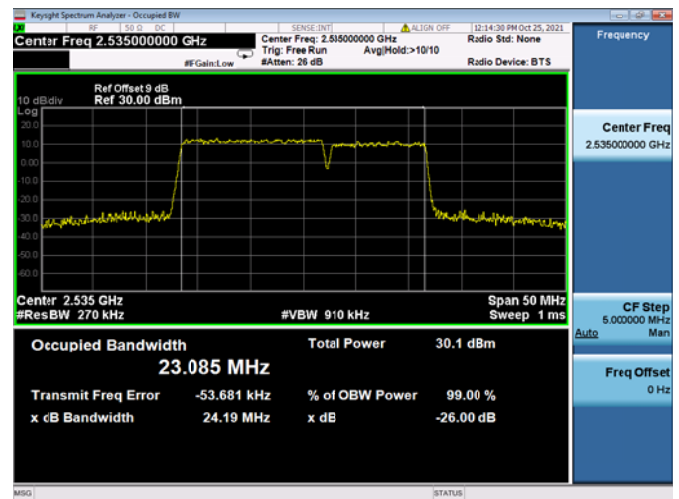
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15MHz+10MHz / 64QAM / LCH

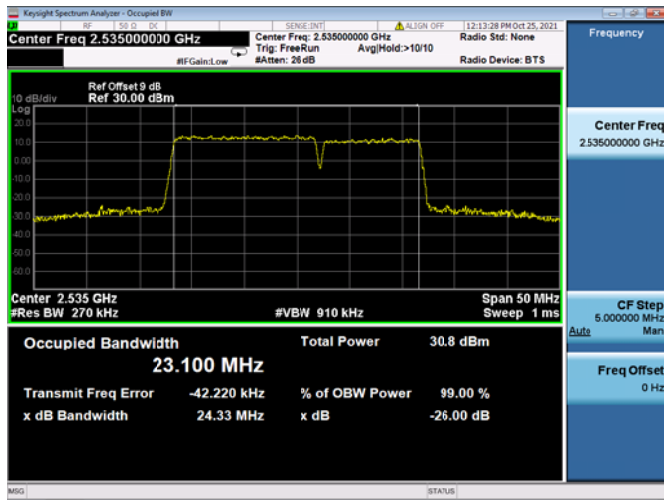


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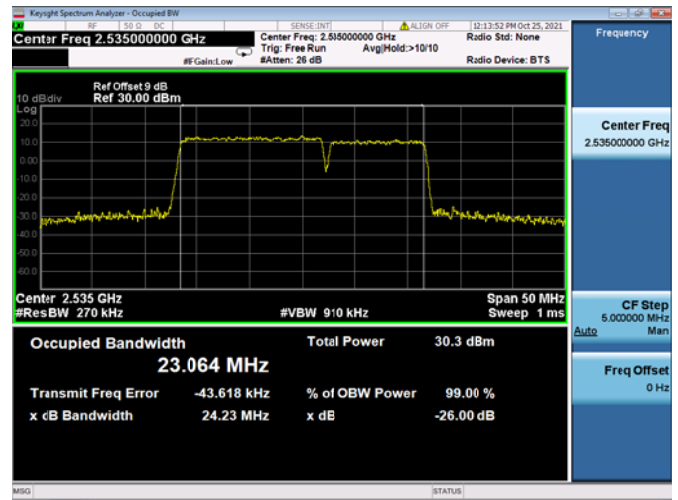




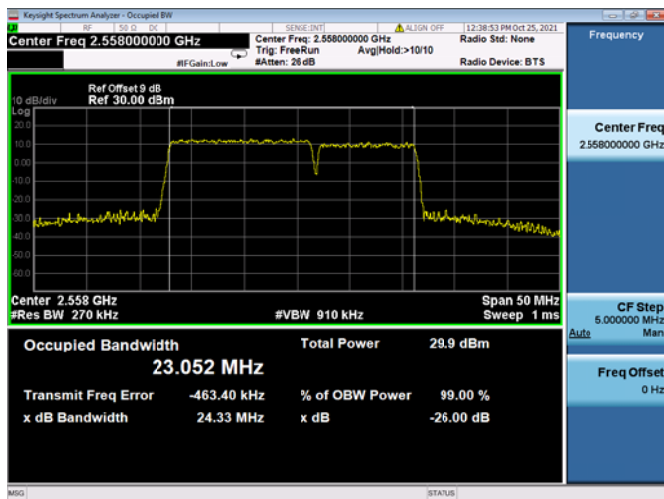
15MHz+10MHz/ 16QAM / MCH



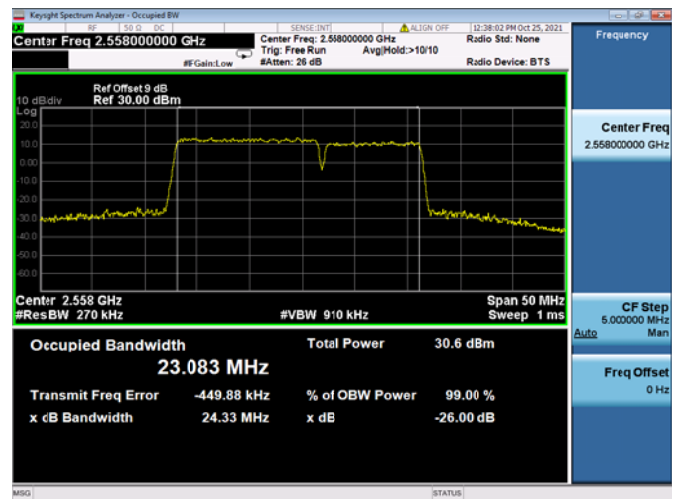
15MHz+10MHz / 64QAM / MCH



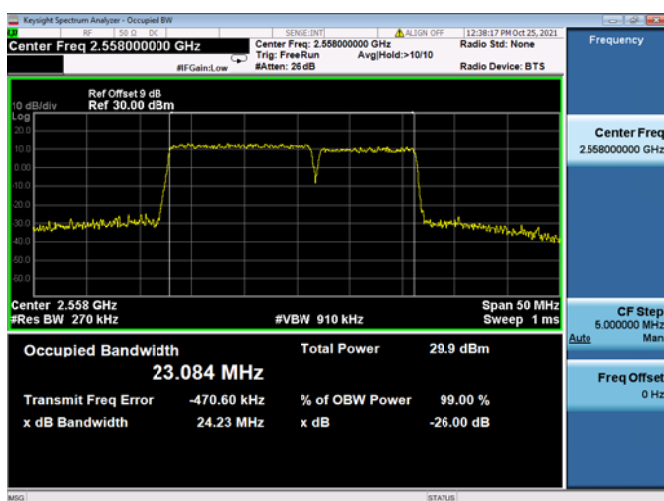
15MHz+10MHz / QPSK / HCH



15MHz+10MHz / 16QAM / HCH



15MHz+10MHz / 64QAM / HCH

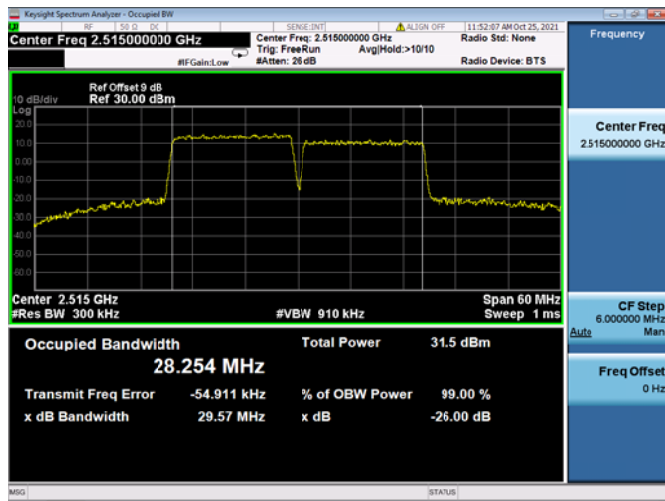


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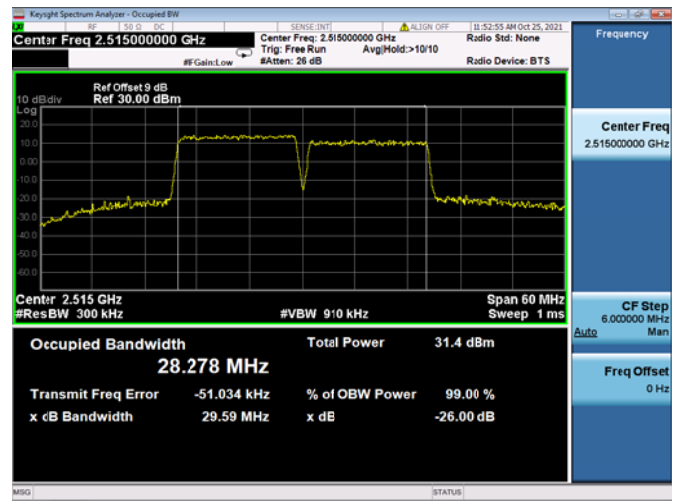


LTE CA_7C

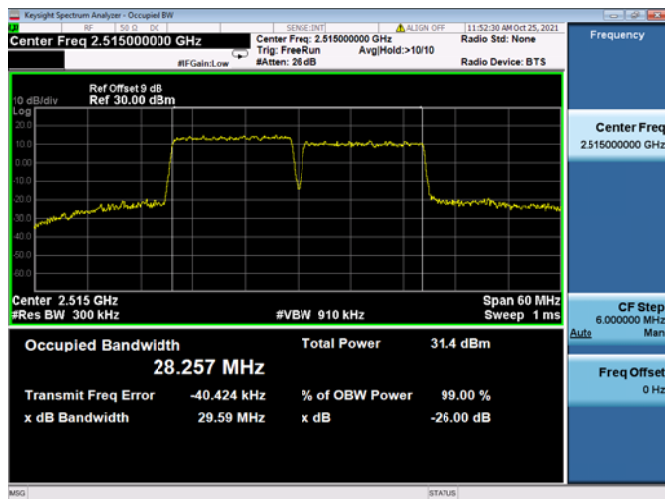
15MHz+15MHz /QPSK / LCH



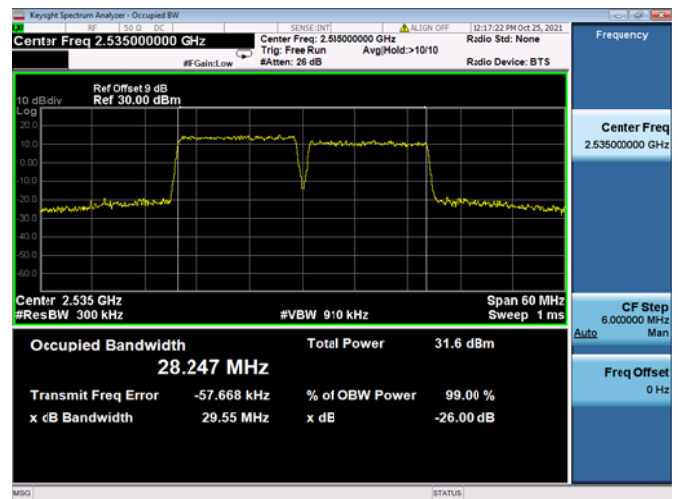
15MHz+15MHz / 16QAM / LCH



15MHz+15MHz / 64QAM/ LCH

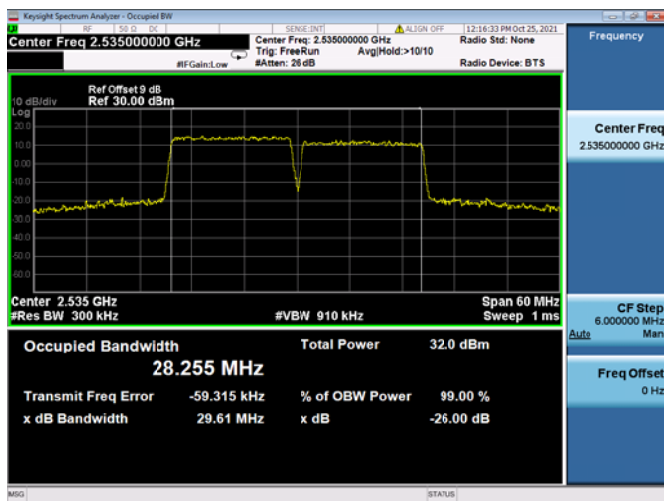


15MHz+15MHz / QPSK / MCH

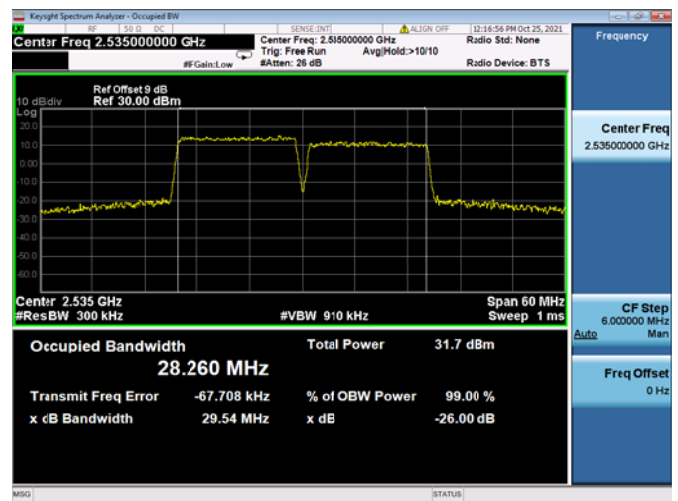




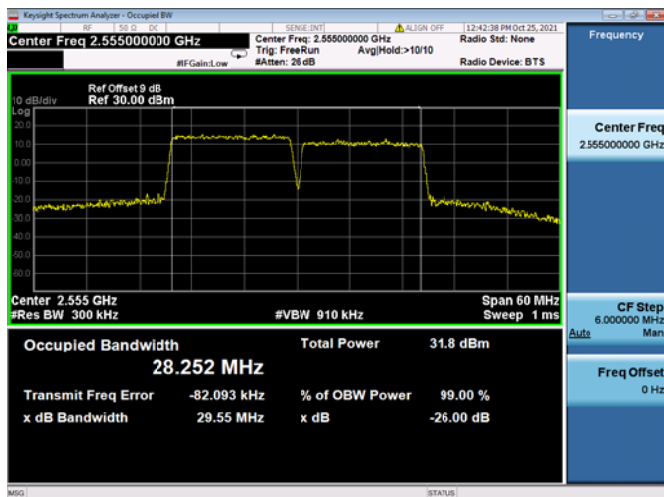
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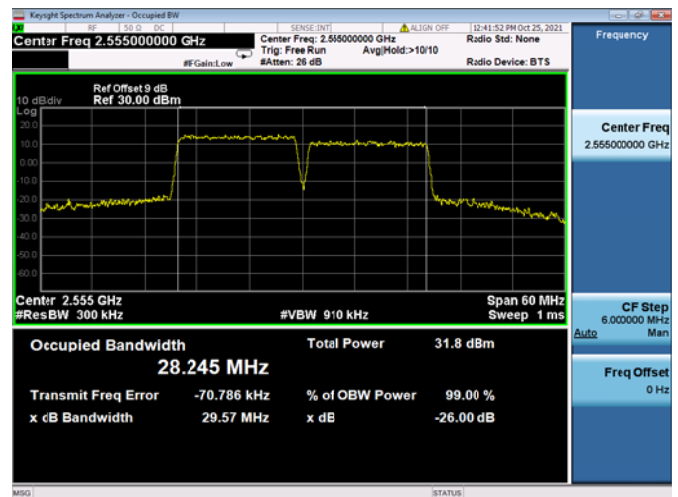
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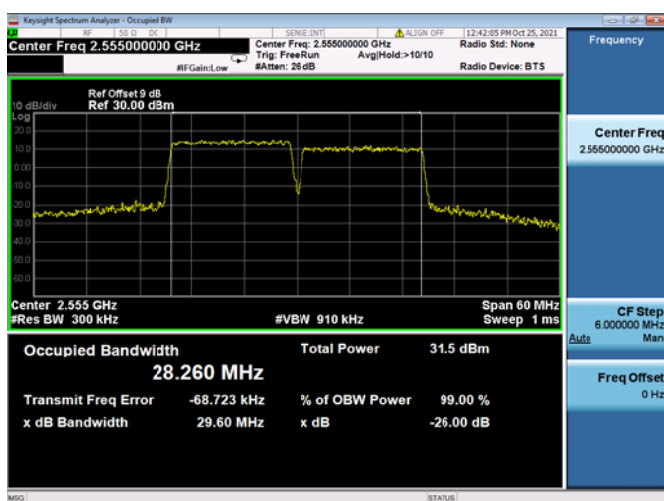
15MHz+15MHz / QPSK / HCH



15MHz+15MHz / 16QAM / HCH



15MHz+15MHz / 64QAM / HCH



N/A



LTE CA_7C

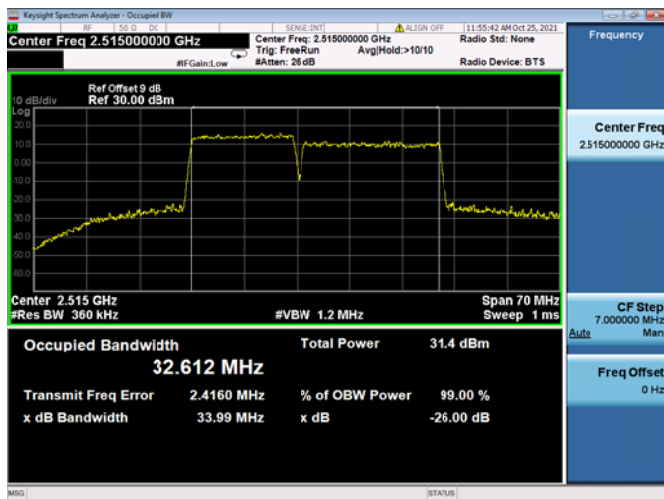
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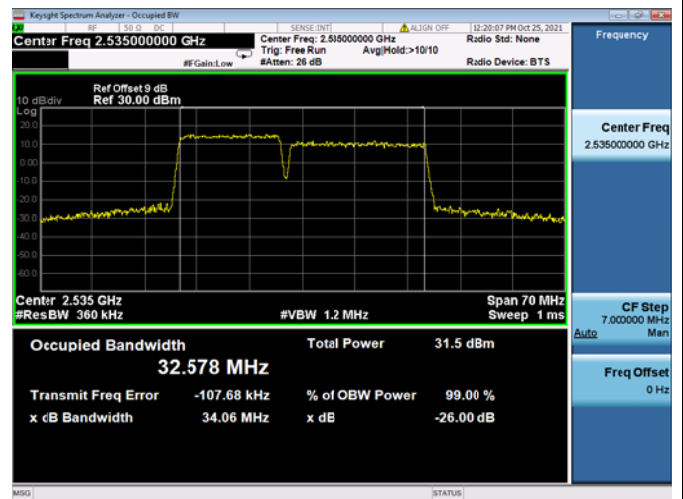
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15MHz+20MHz /64QAM / LCH

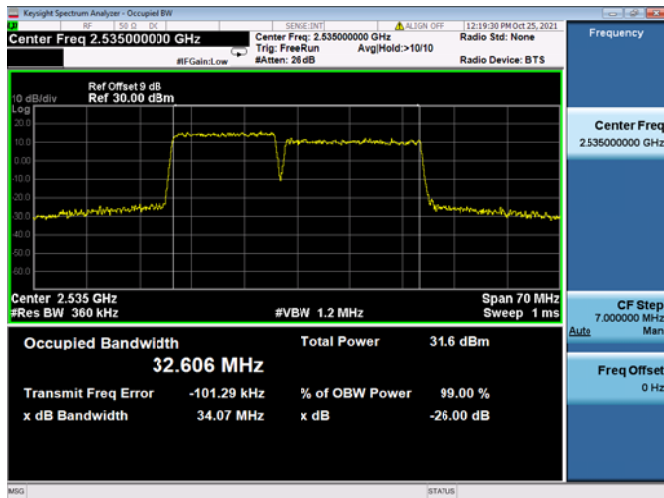


15MHz+20MHz / QPSK / MCH

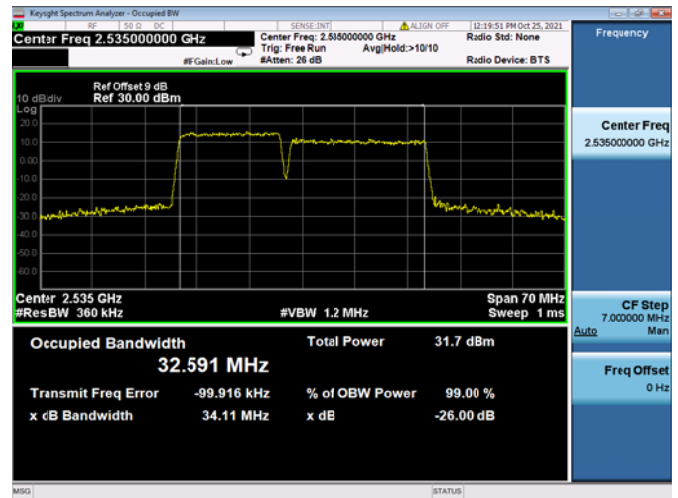




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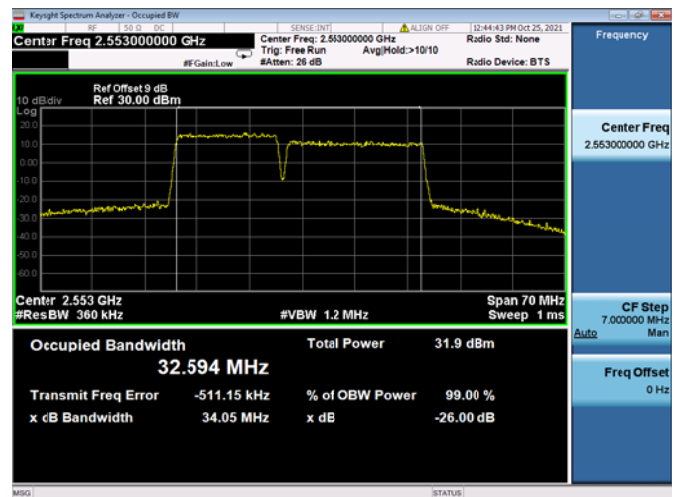
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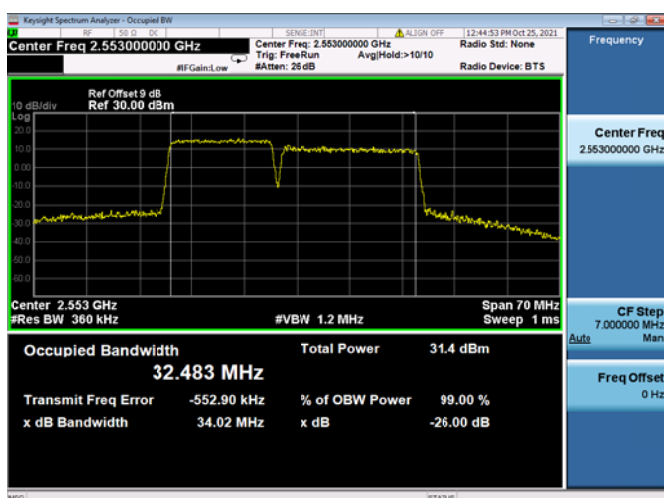
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15MHz+20MHz / 16QAM / HCH



15MHz+20MHz / 64QAM / HCH

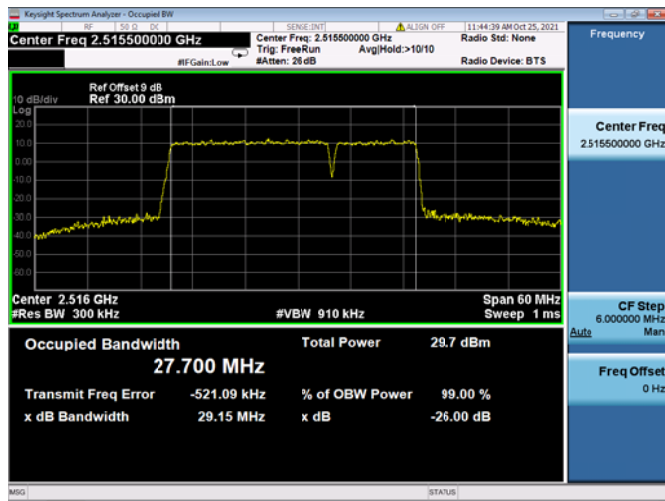


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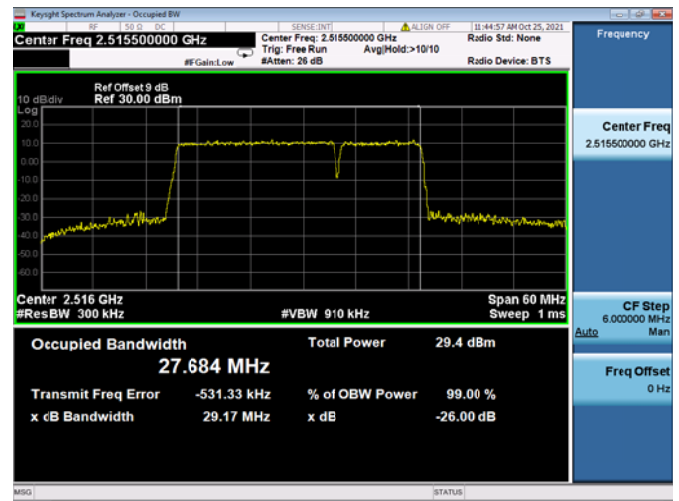


LTE CA_7C

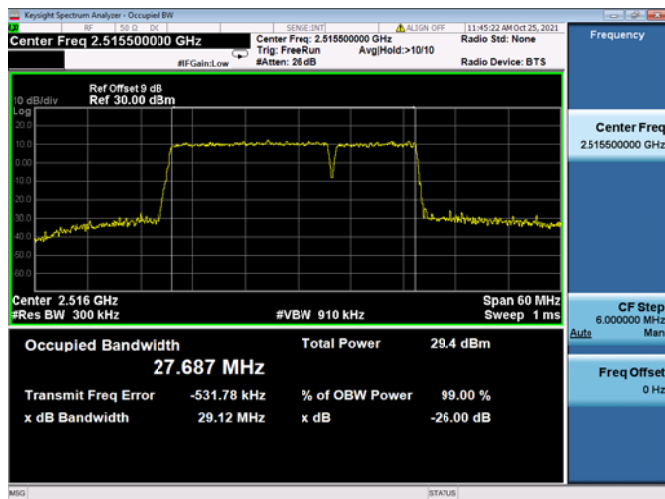
20MHz+10MHz /QPSK / LCH



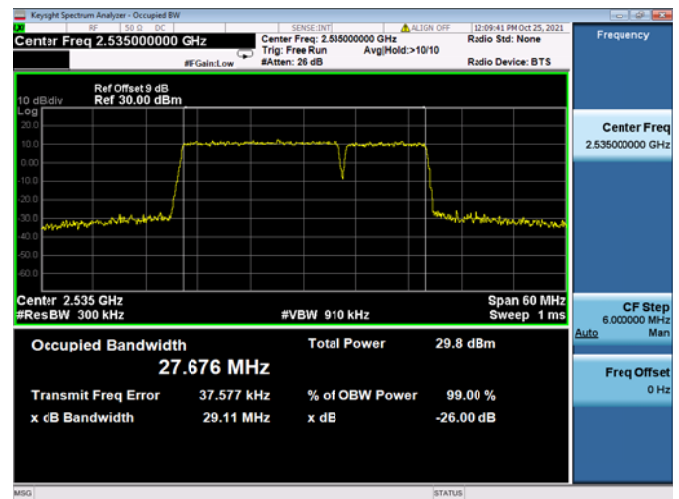
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20MHz+10MHz / 64QAM / LCH

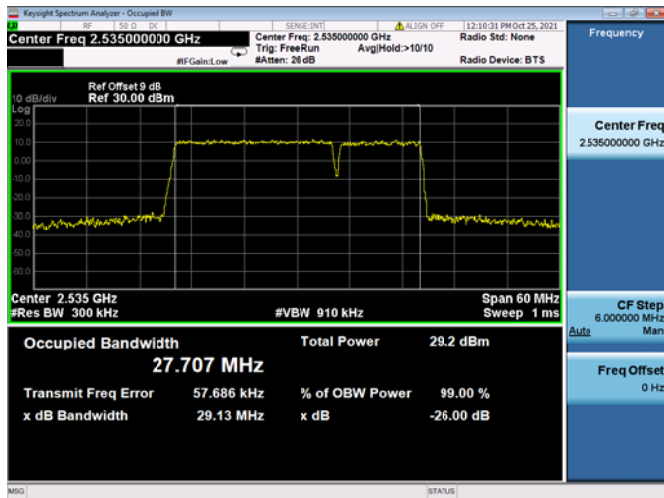


20MHz+10MHz / QPSK / MCH

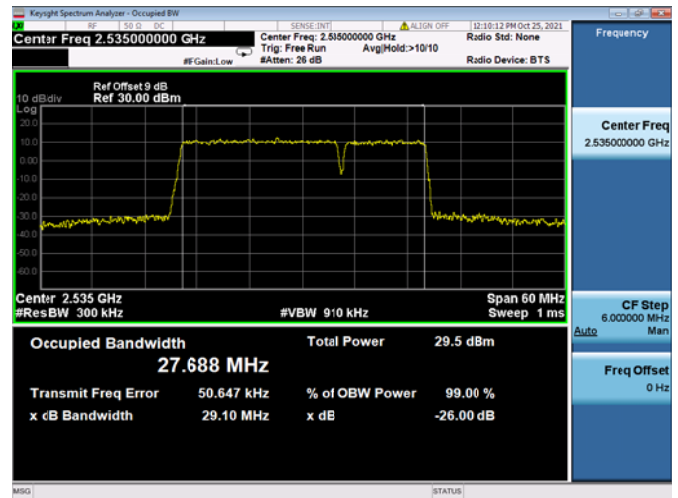




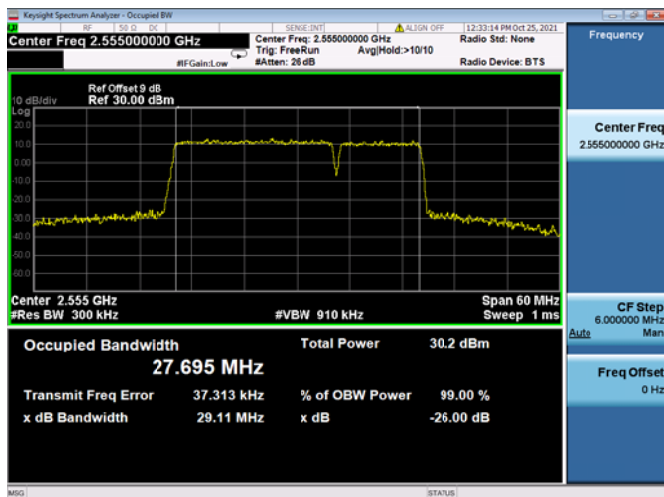
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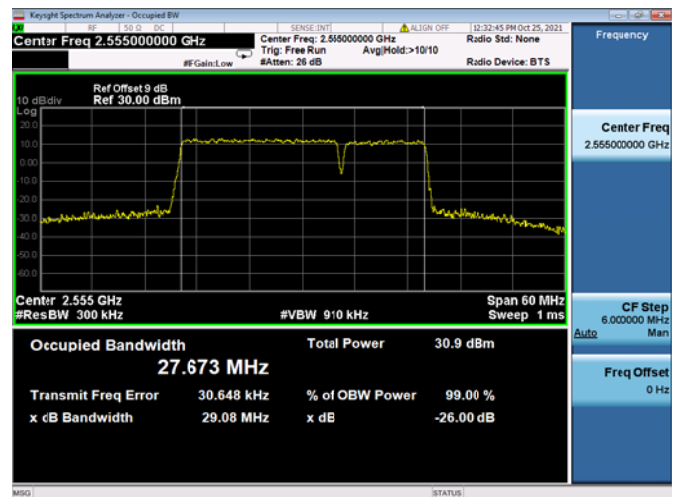
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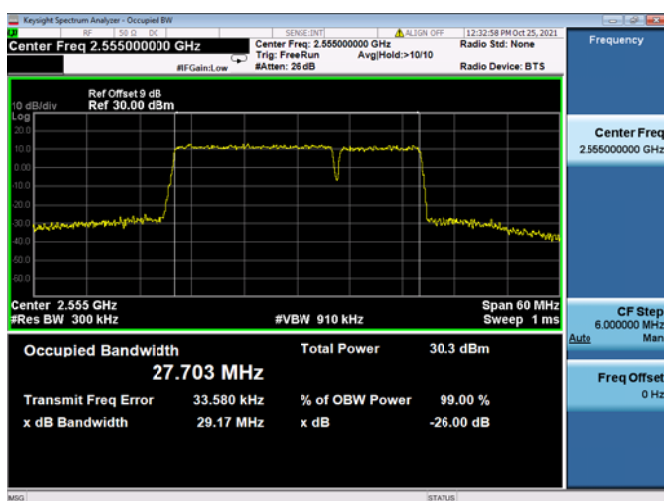
20MHz+10MHz / QPSK / HCH



20MHz+10MHz / 16QAM / HCH



20MHz+10MHz / 64QAM / HCH



N/A

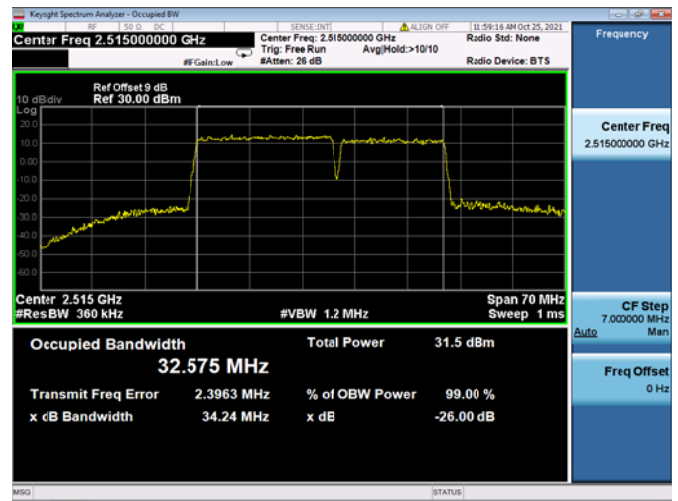


LTE CA_7C

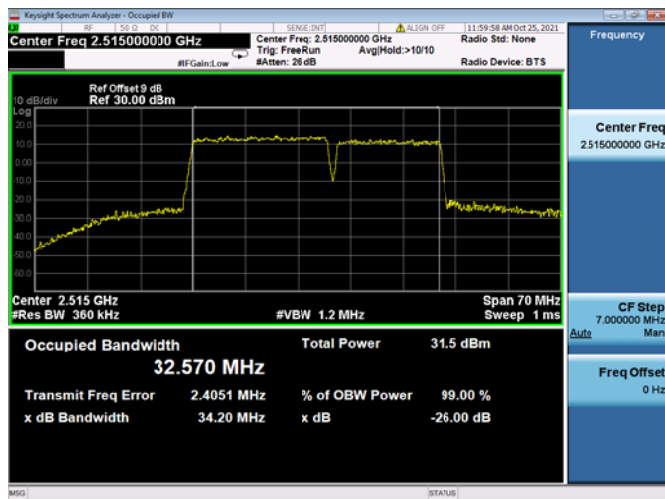
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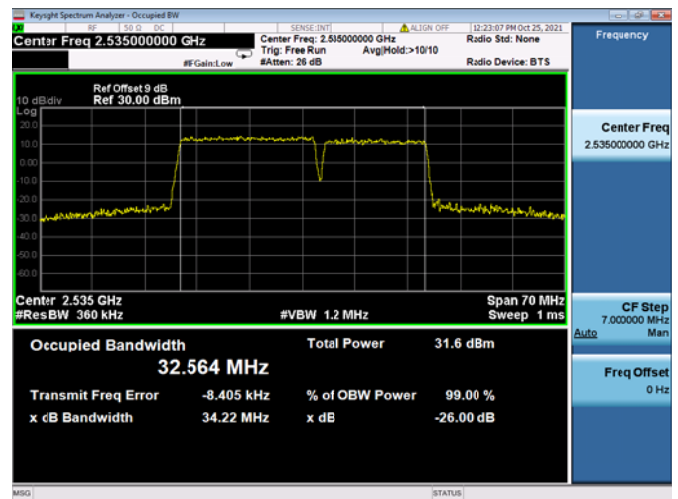
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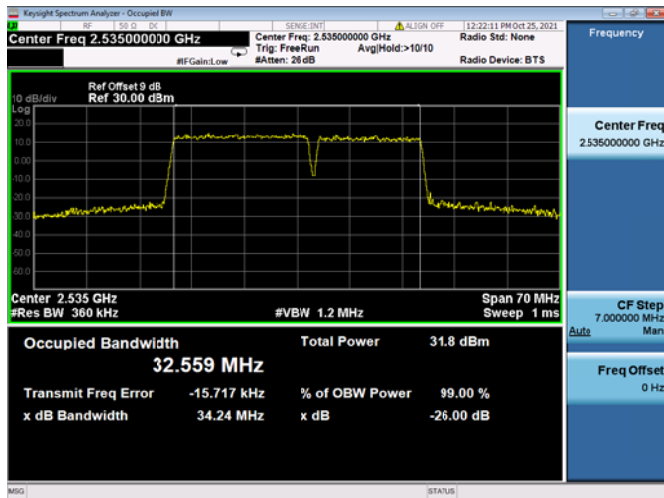


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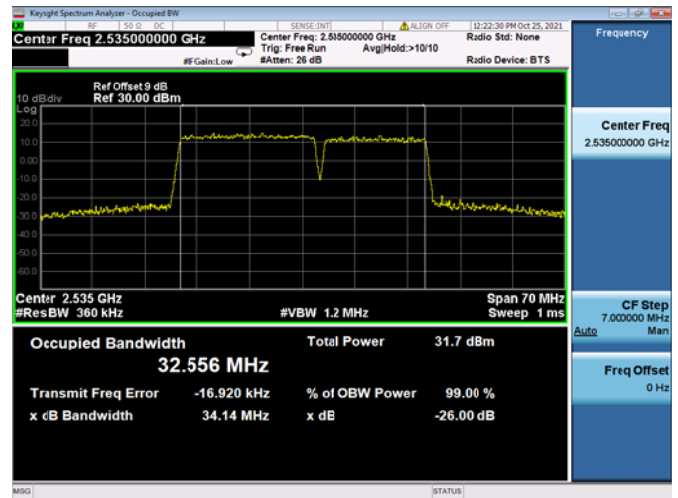




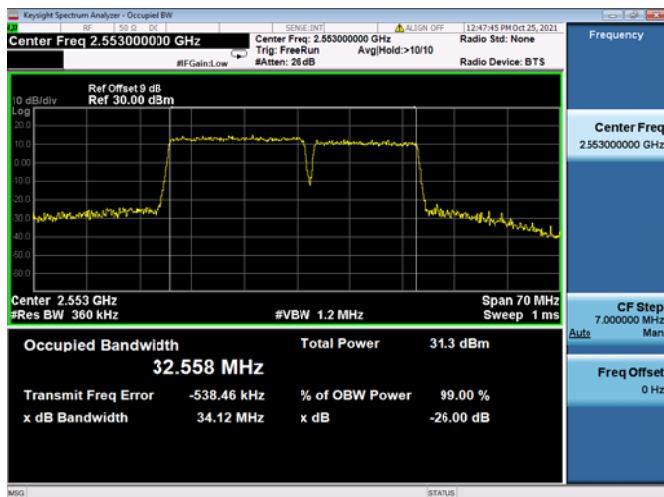
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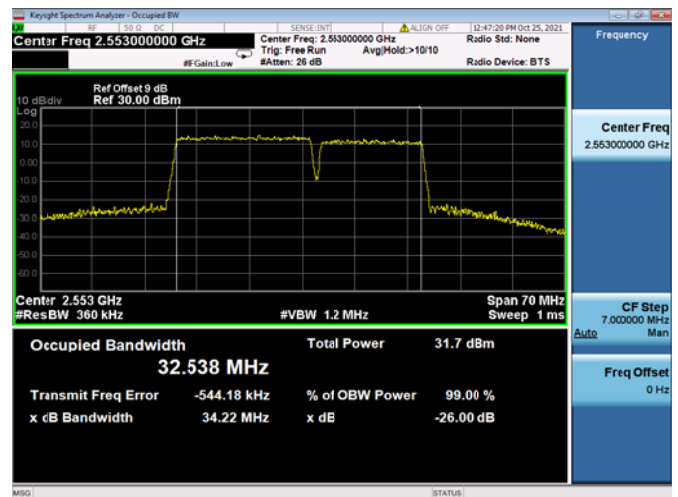
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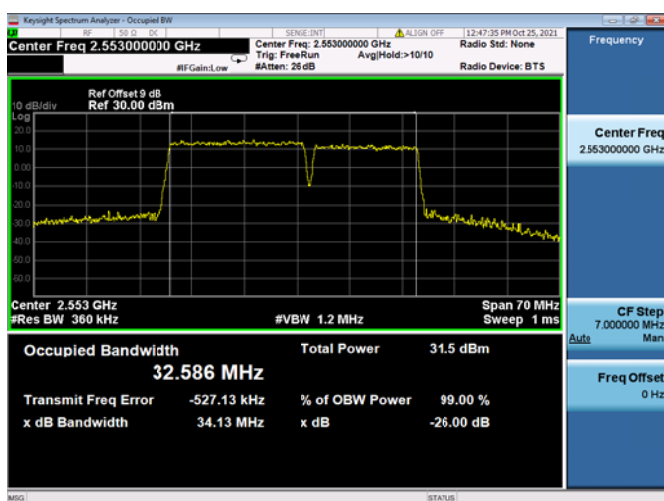
20MHz+15MHz / QPSK / HCH



20MHz+15MHz / 16QAM / HCH



20MHz+15MHz / 64QAM / HCH

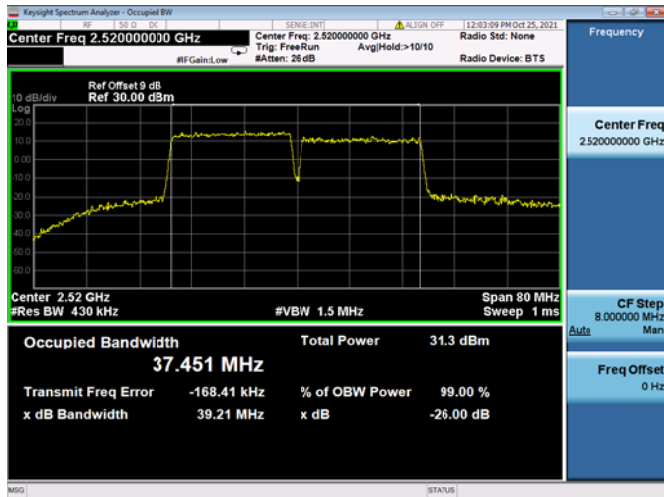


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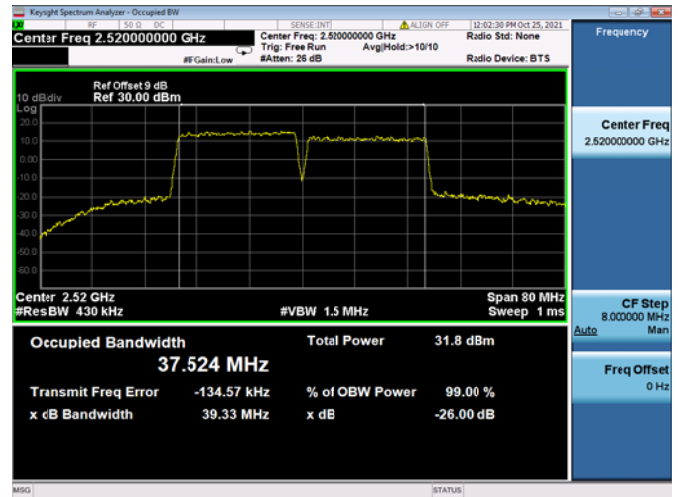


LTE CA_7C

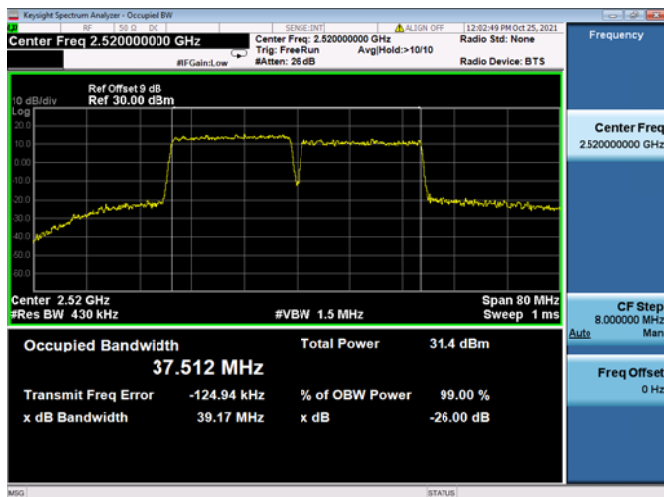
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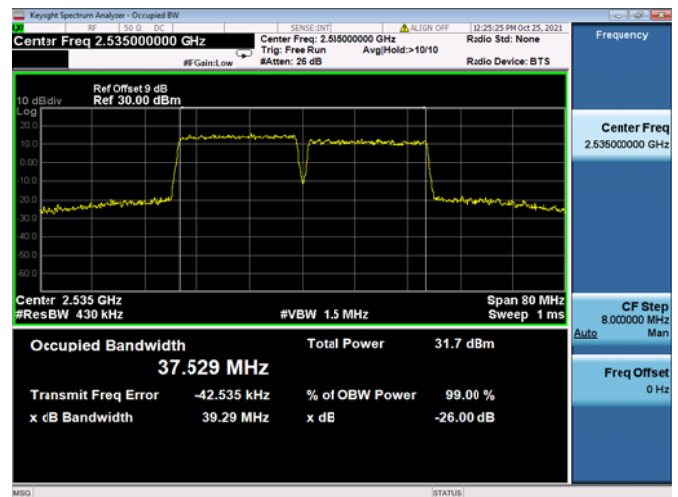
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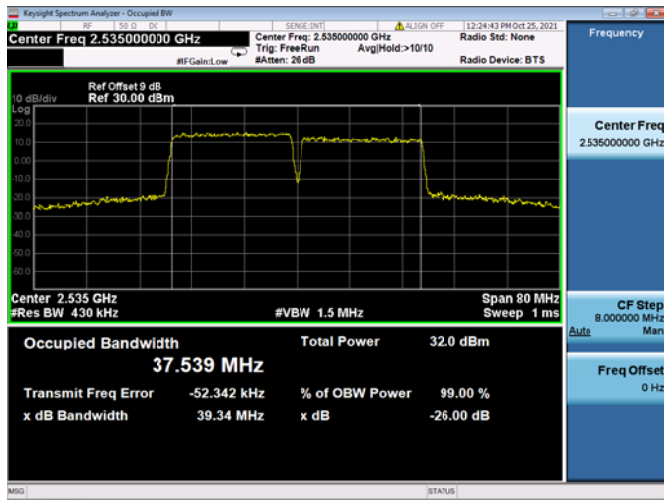


20MHz+20MHz / QPSK / MCH

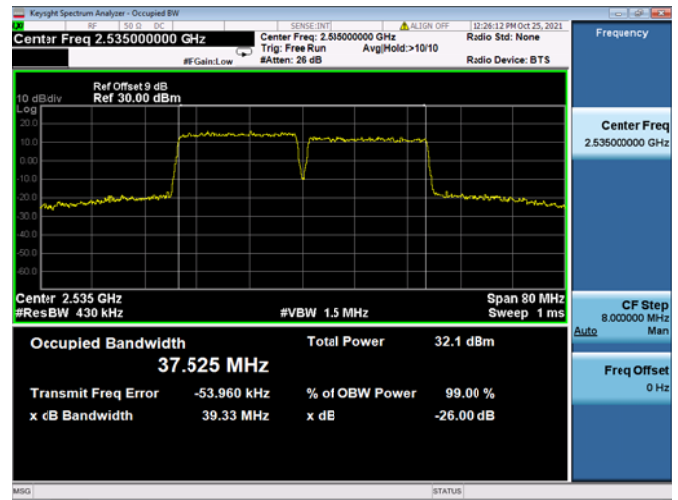




20MHz+20MHz / 16QAM / MCH



20MHz+20MHz / 64QAM / MCH



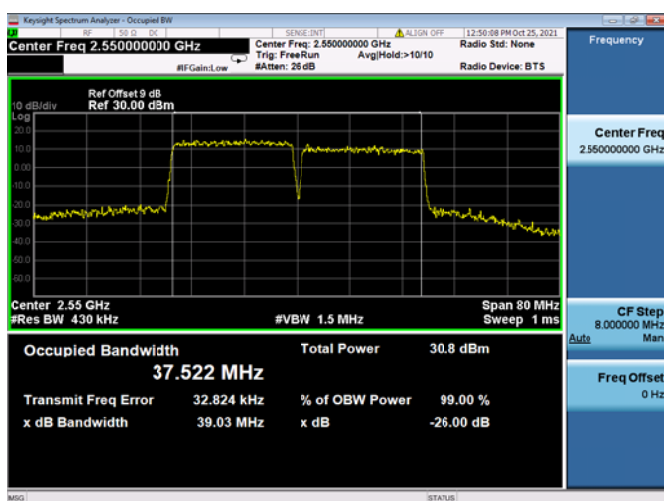
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20MHz+20MHz / 16QAM / HCH



20MHz+20MHz / 64QAM/ HCH

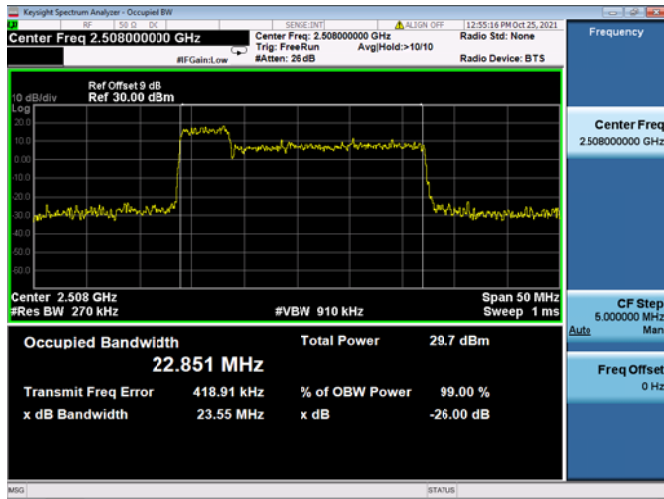


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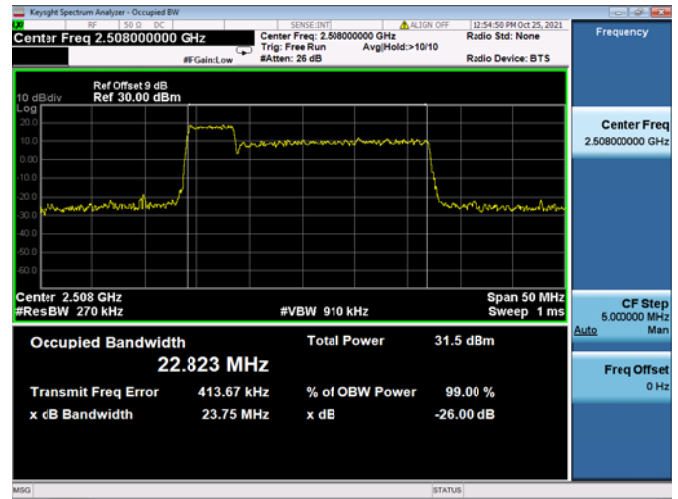


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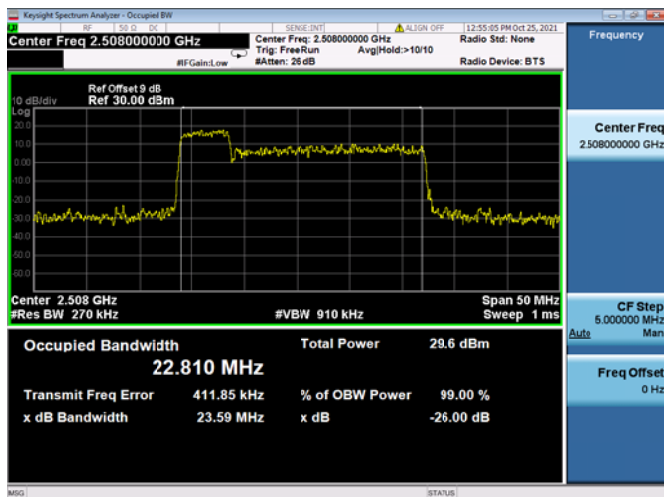
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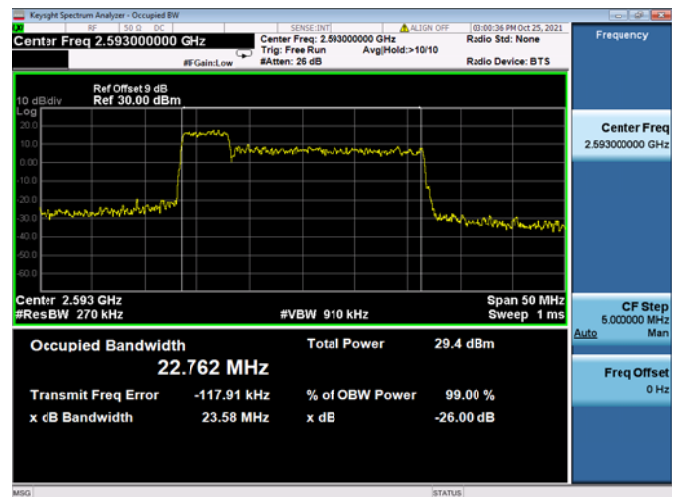
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5MHz+20MHz / 64QAM / LCH

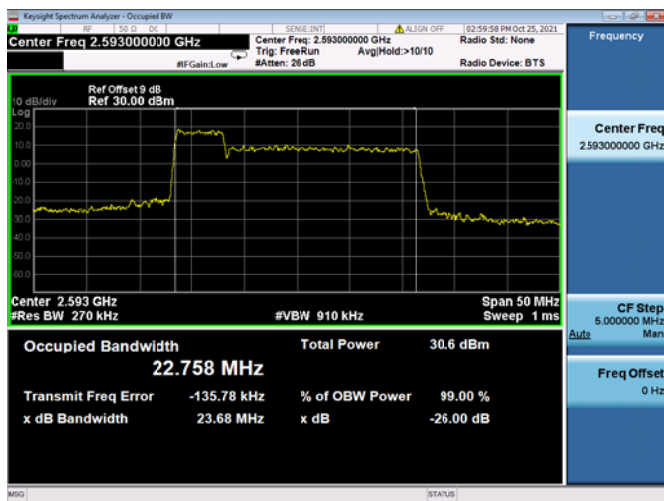


5MHz+20MHz / QPSK / MCH

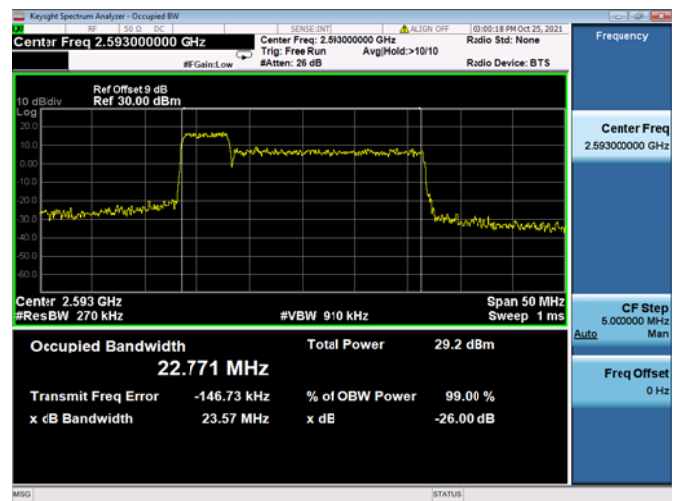




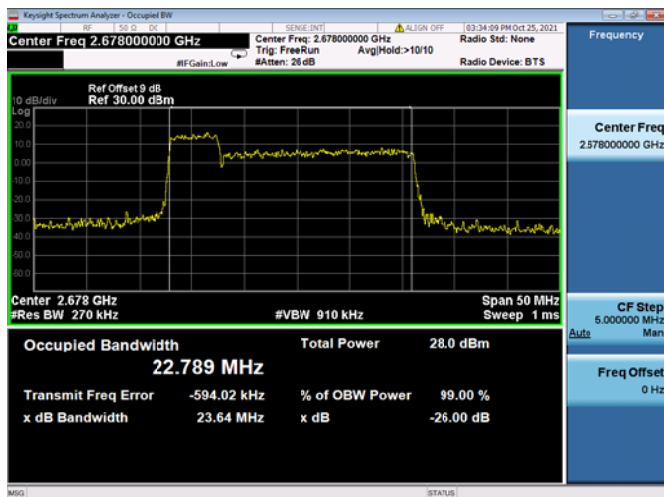
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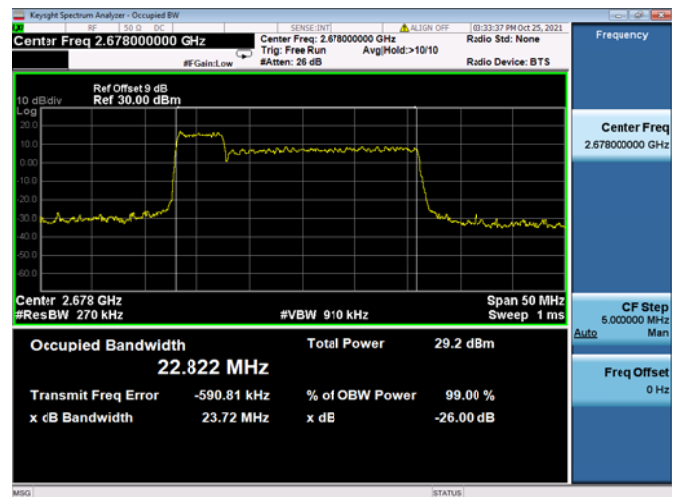
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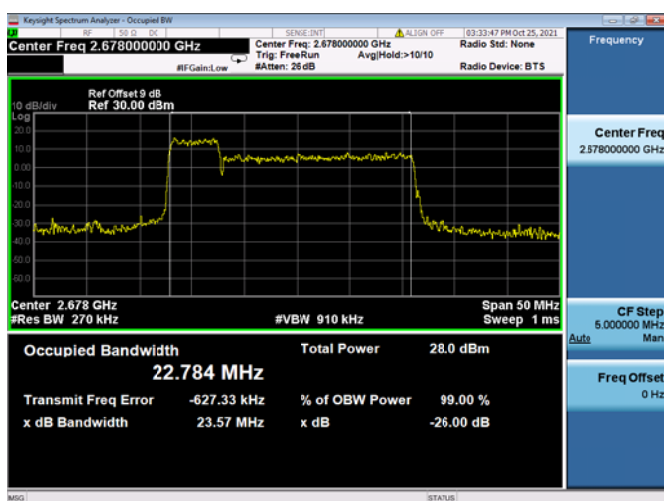
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5MHz+20MHz / 16QAM / HCH



5MHz+20MHz / 64QAM/ HCH

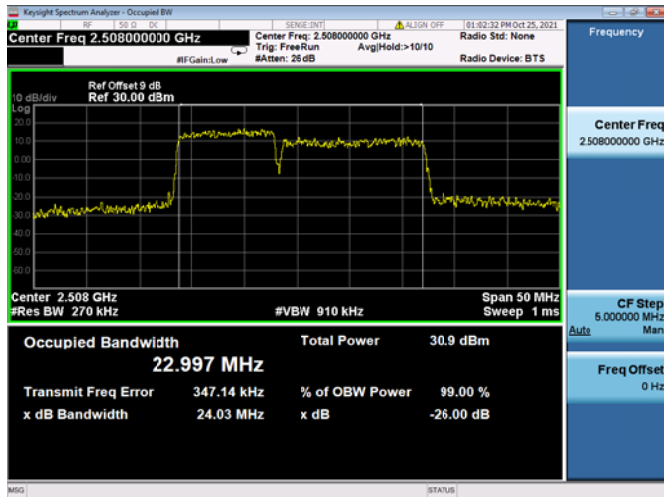


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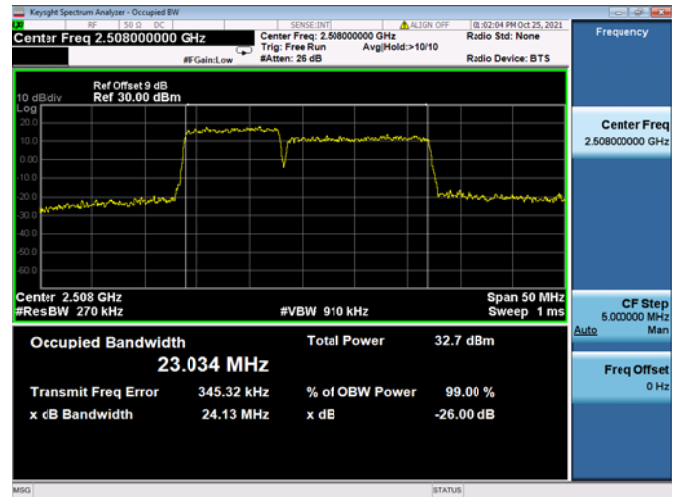


LTE CA_41C

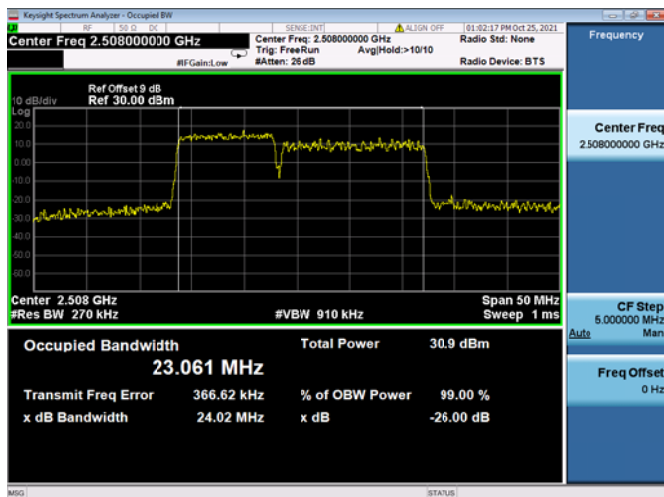
10MHz+15MHz / QPSK / LCH



10MHz+15MHz / 16QAM / LCH



10MHz+15MHz / 64QAM / LCH



10MHz+15MHz / QPSK / MCH

