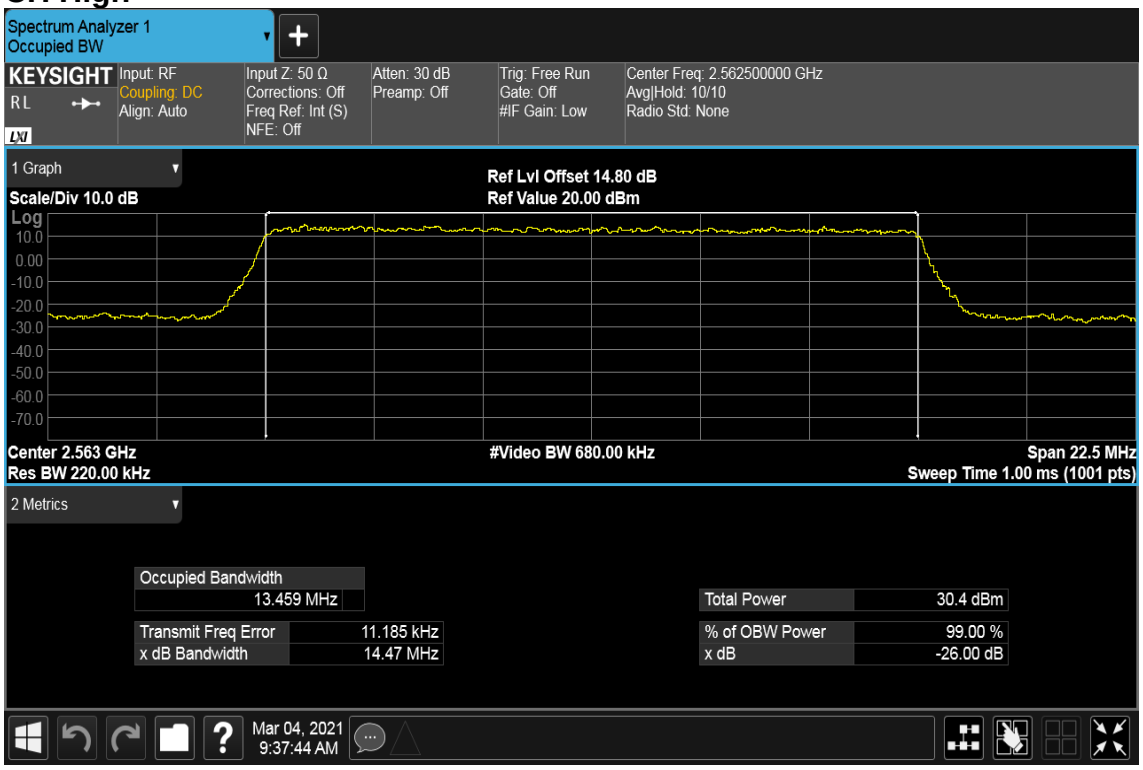
CH High



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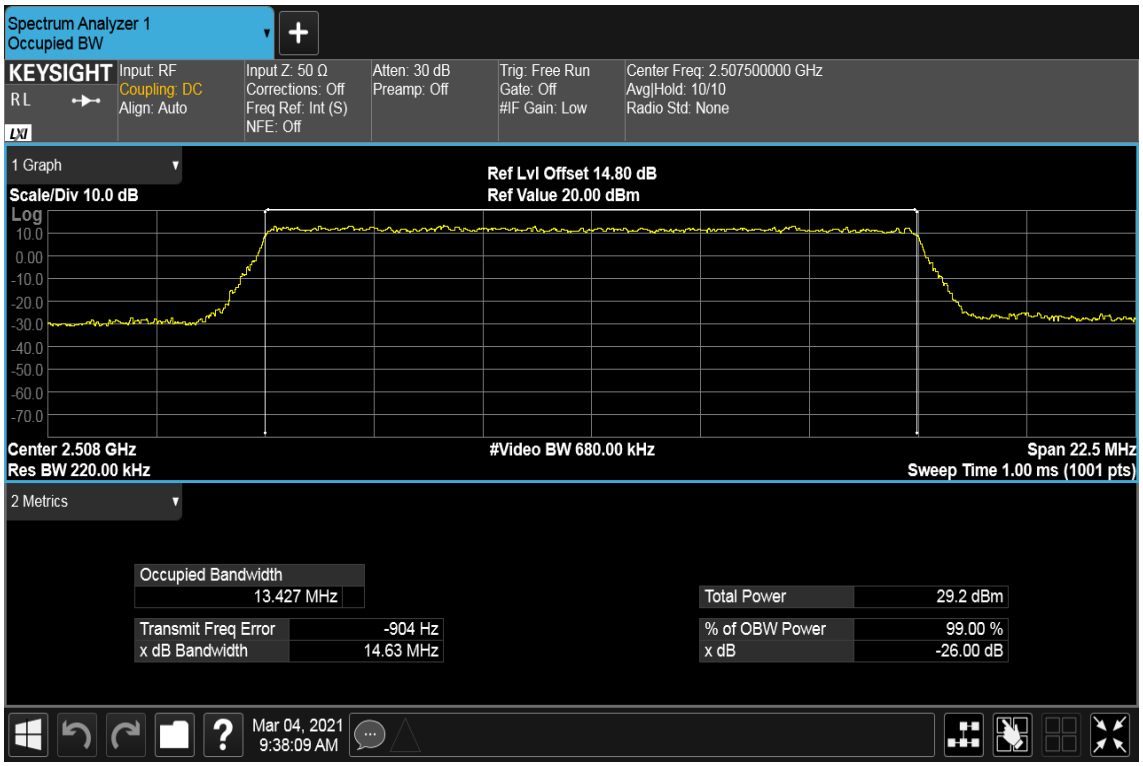
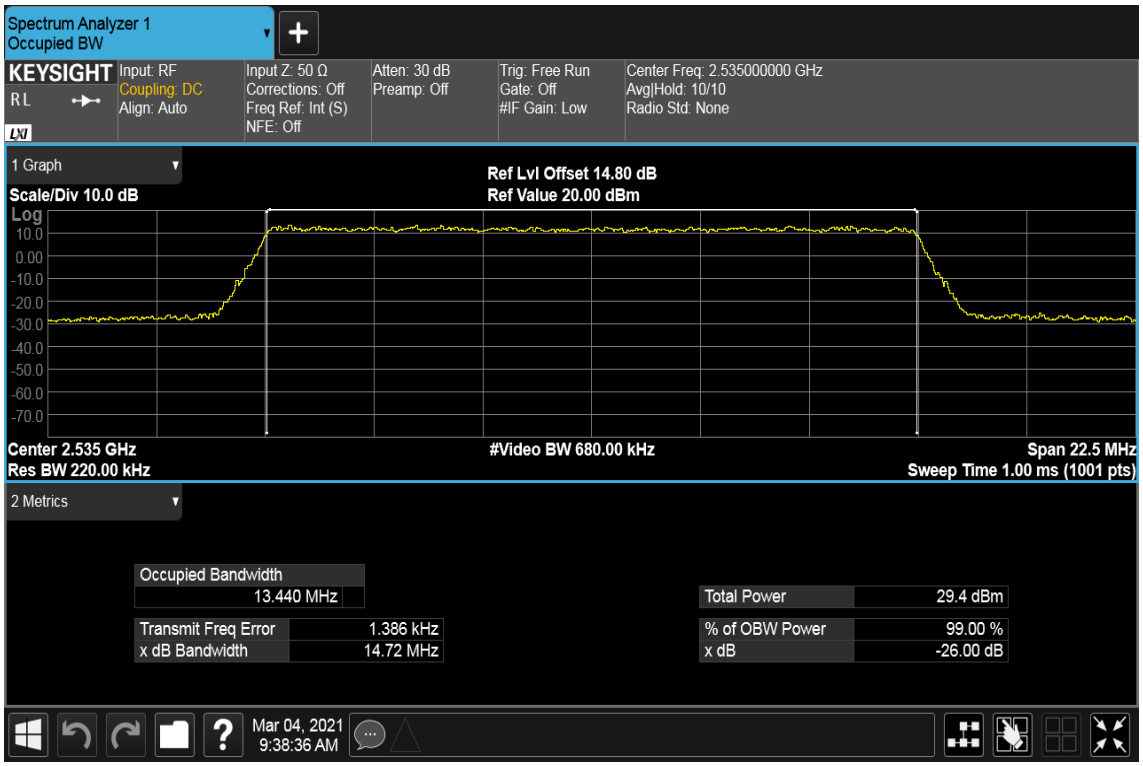
CHANNEL BANDWIDTH: 15MHz / 16QAM / RB =75, RB Offset = 0

CH Low



CH Mid



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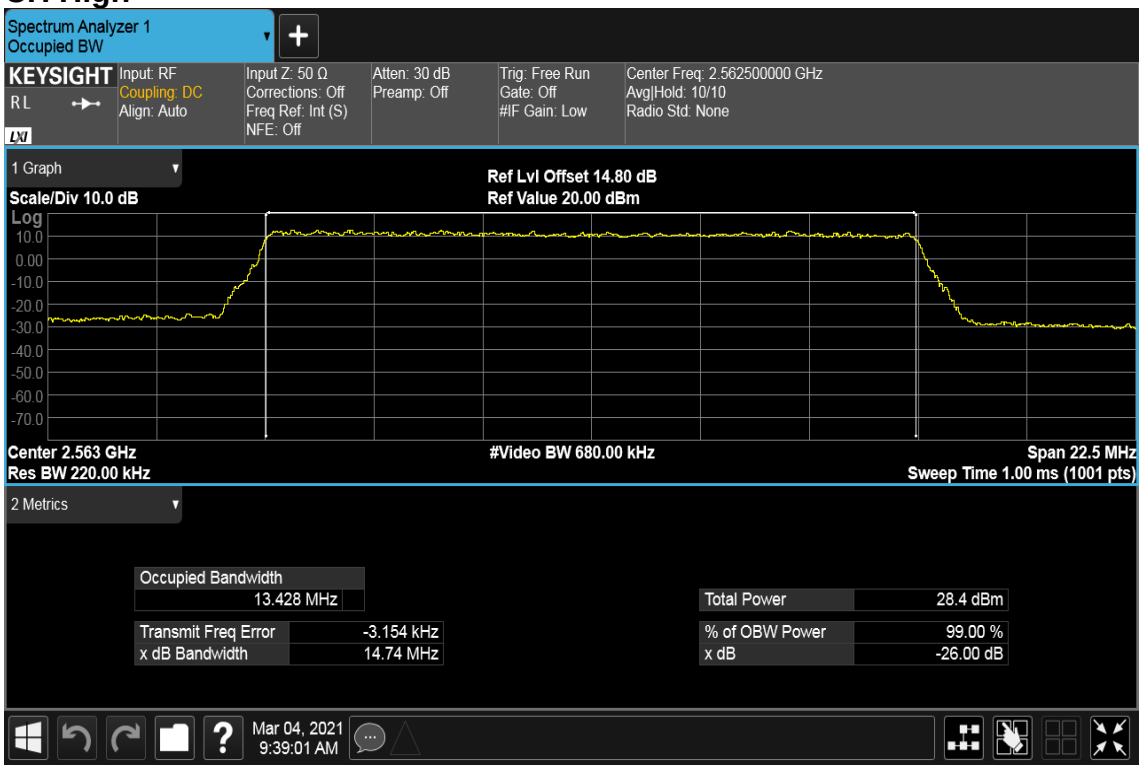
CH High



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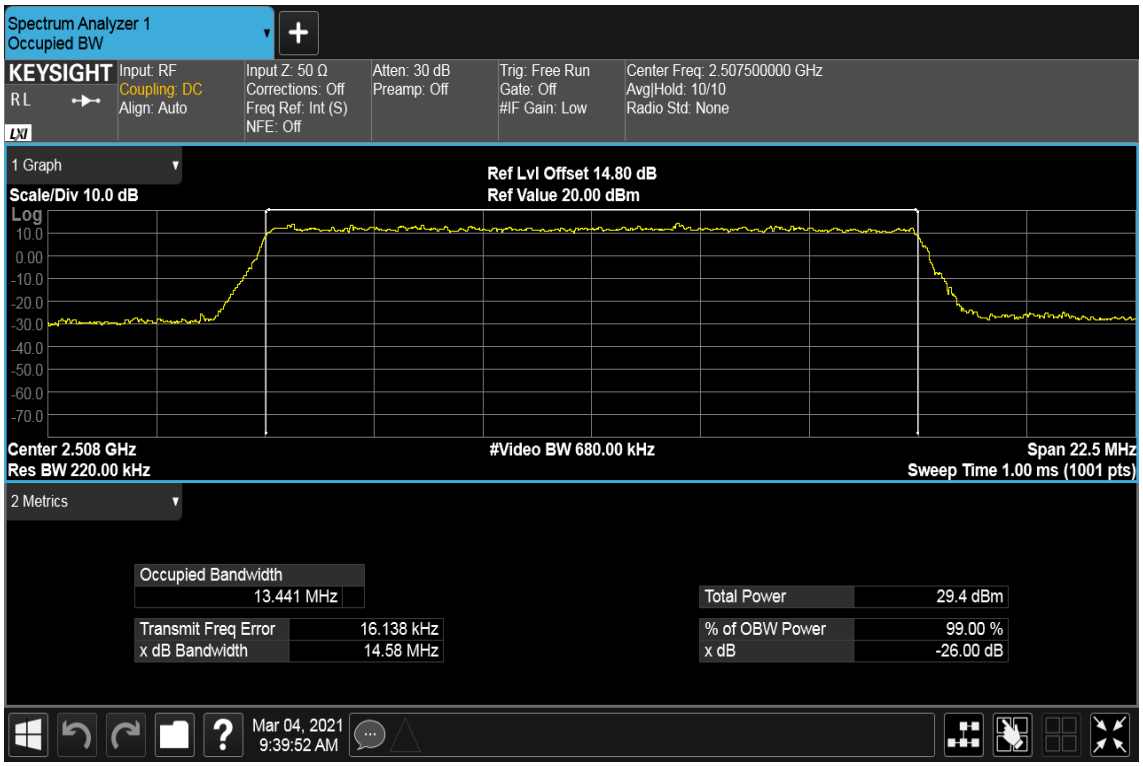
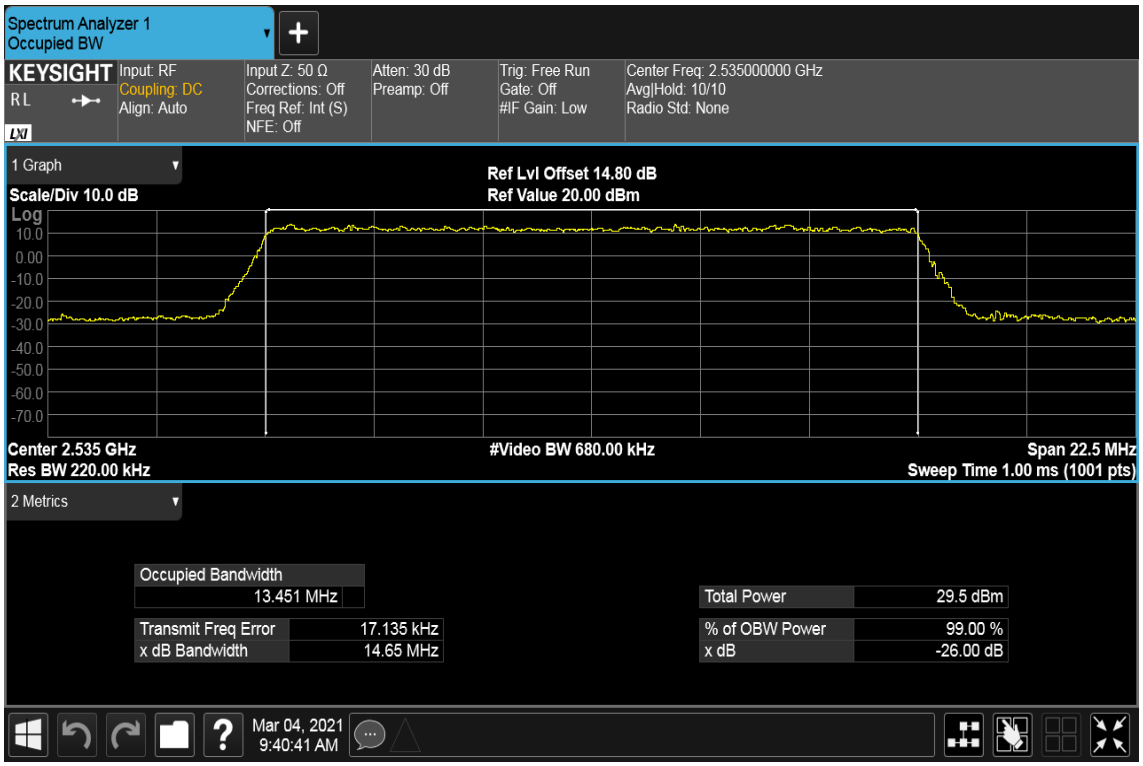
CHANNEL BANDWIDTH: 15MHz / 64QAM / RB =75, RB Offset = 0

CH Low



CH Mid



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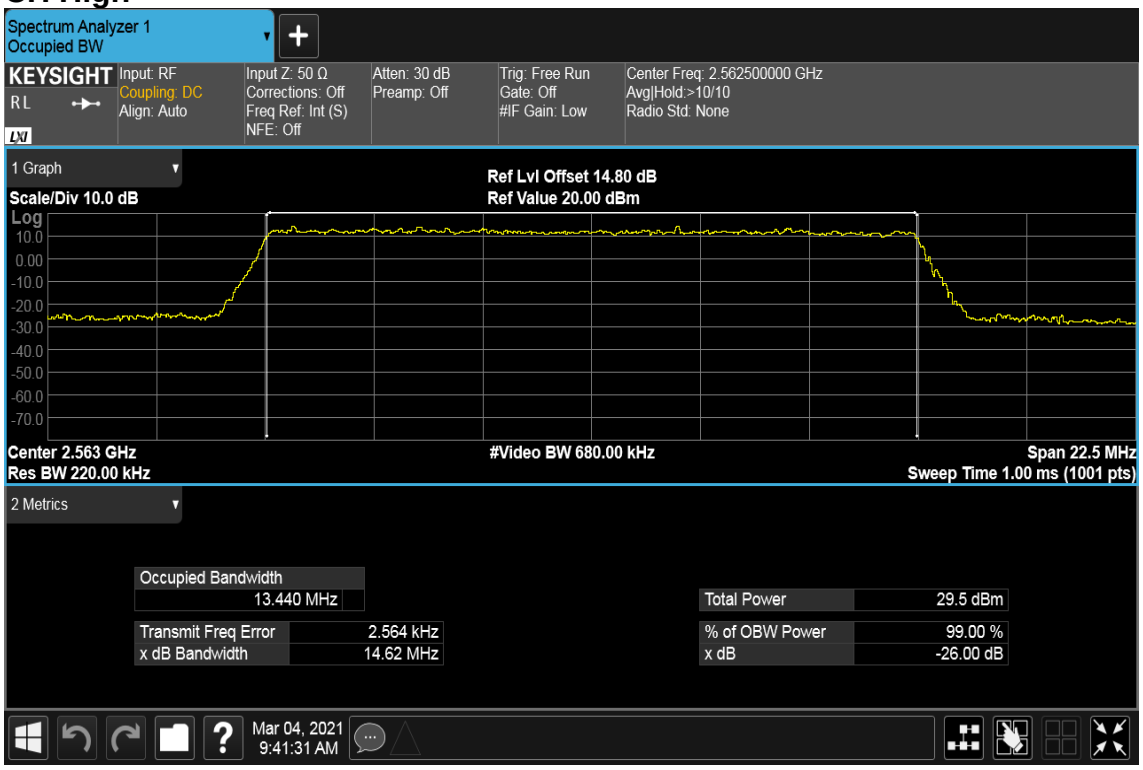
CH High



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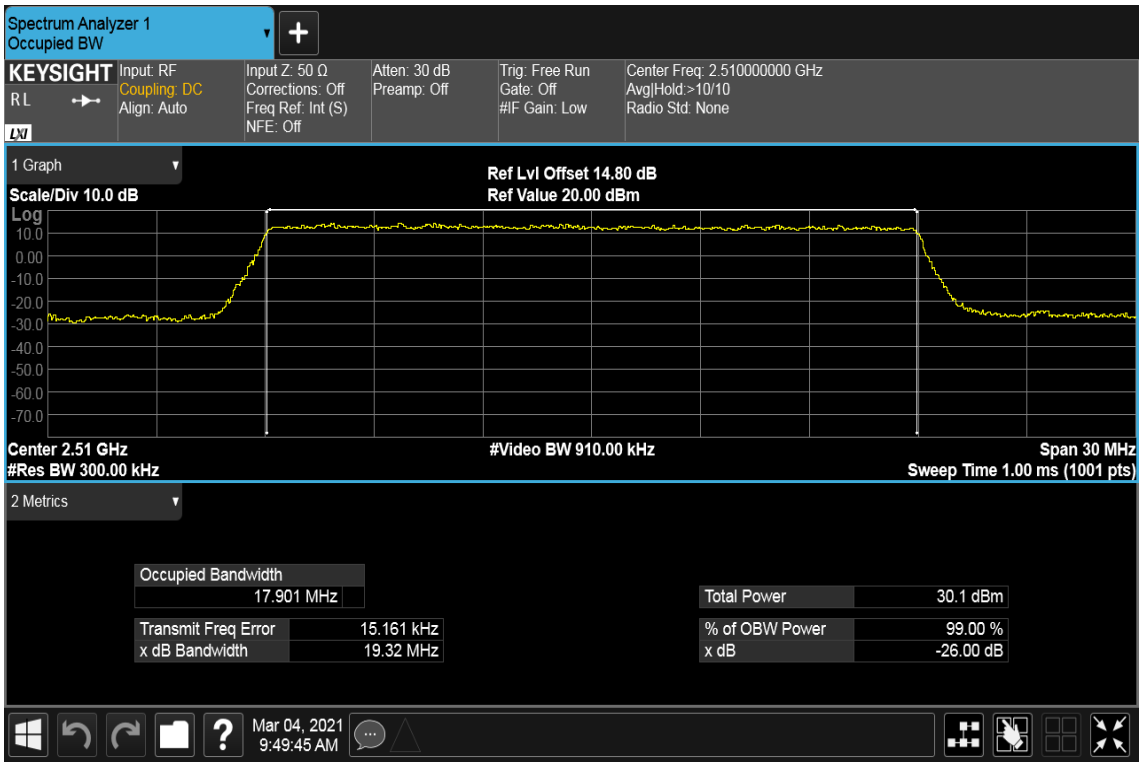
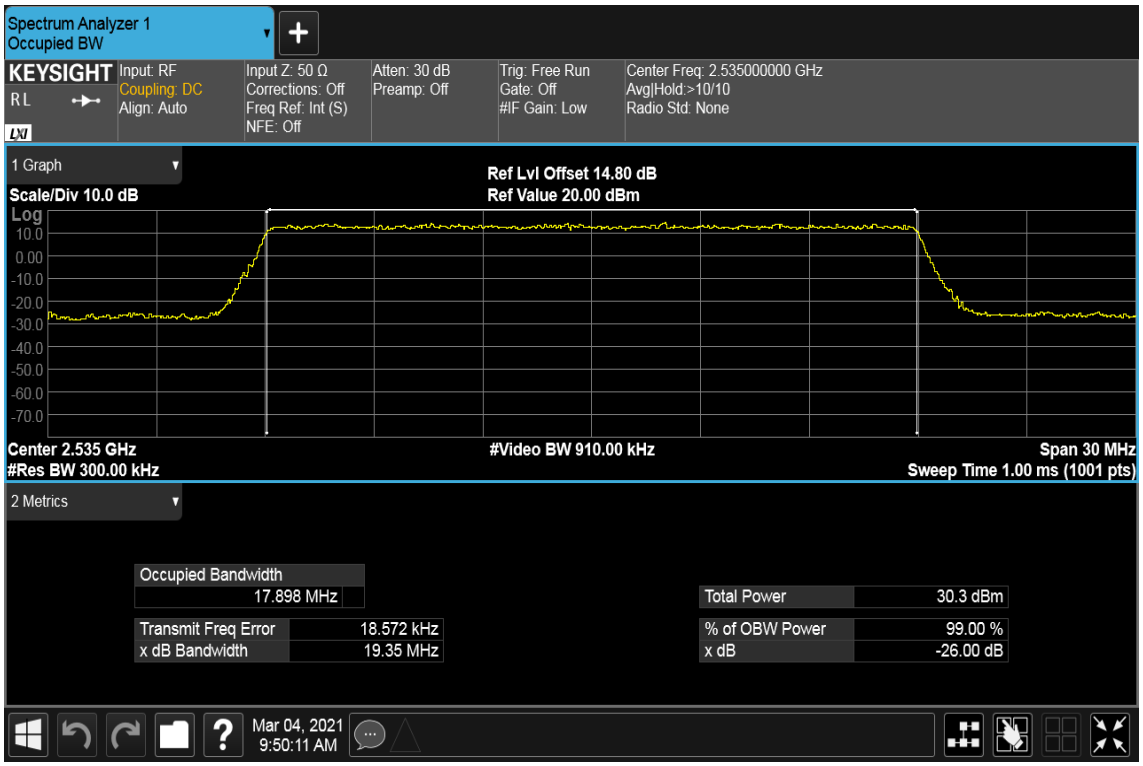
CHANNEL BANDWIDTH: 20MHz / QPSK / RB =100, RB Offset = 0

CH Low



CH Mid



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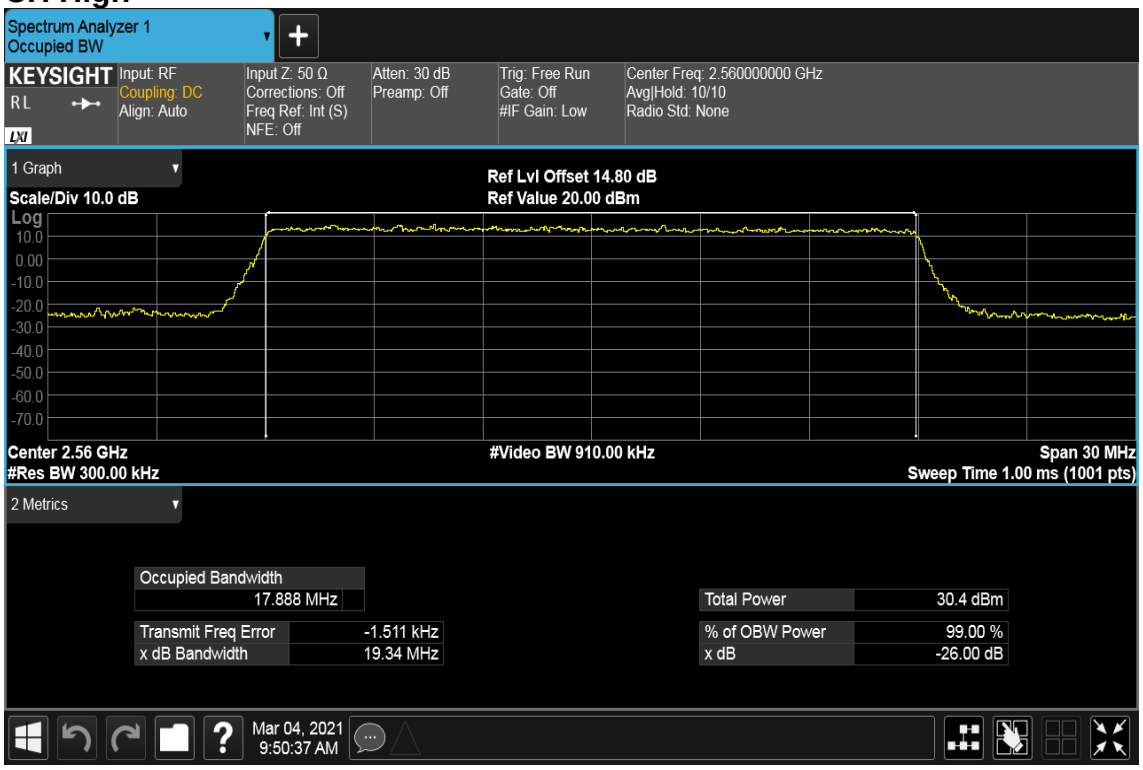
CH High



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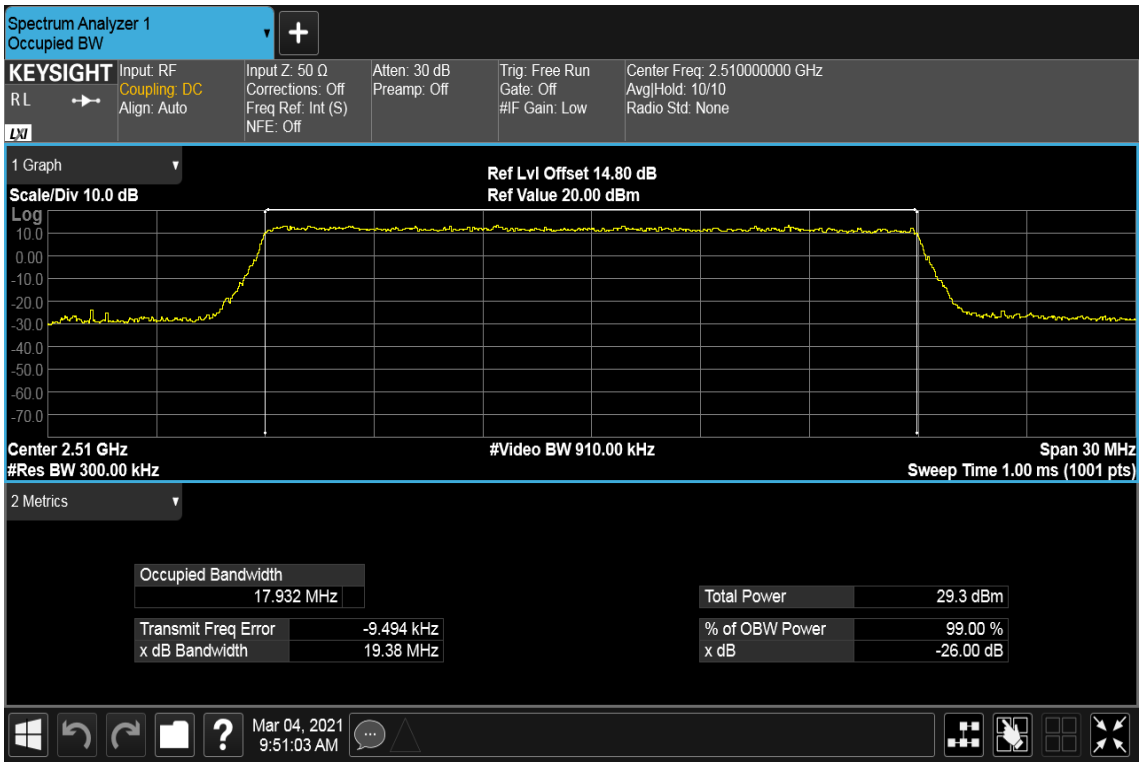
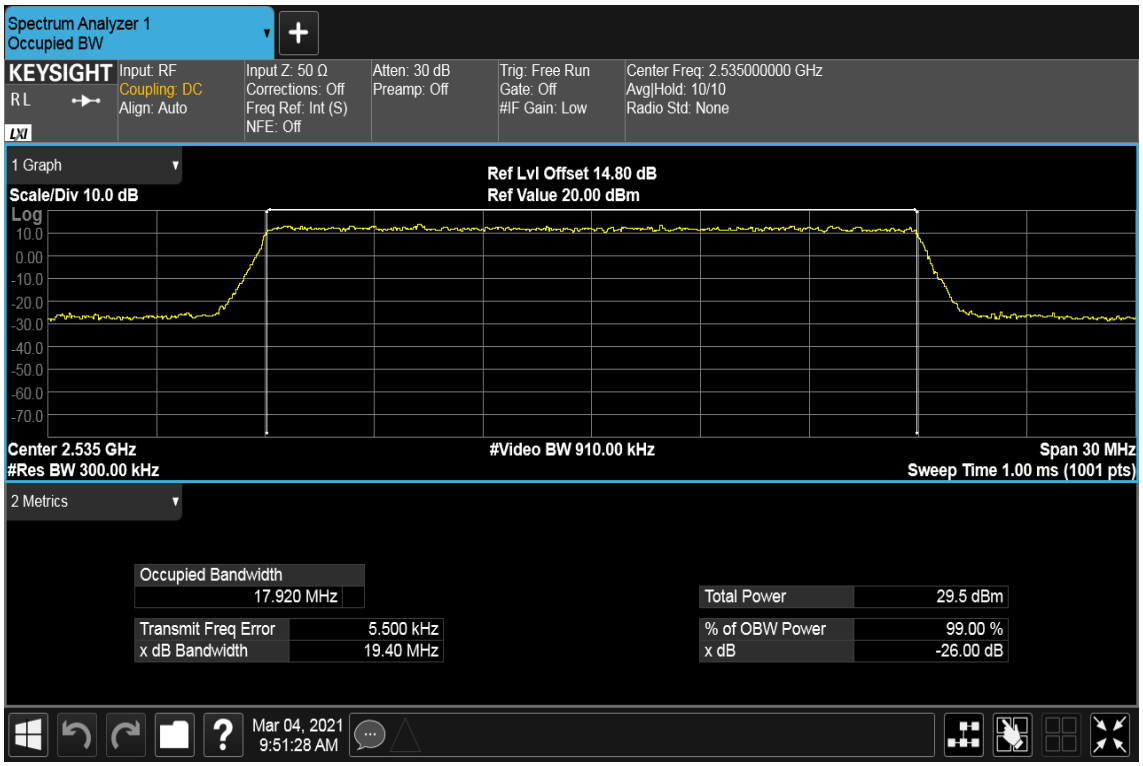
CHANNEL BANDWIDTH: 20MHz / 16QAM / RB =100, RB Offset = 0

CH Low



CH Mid



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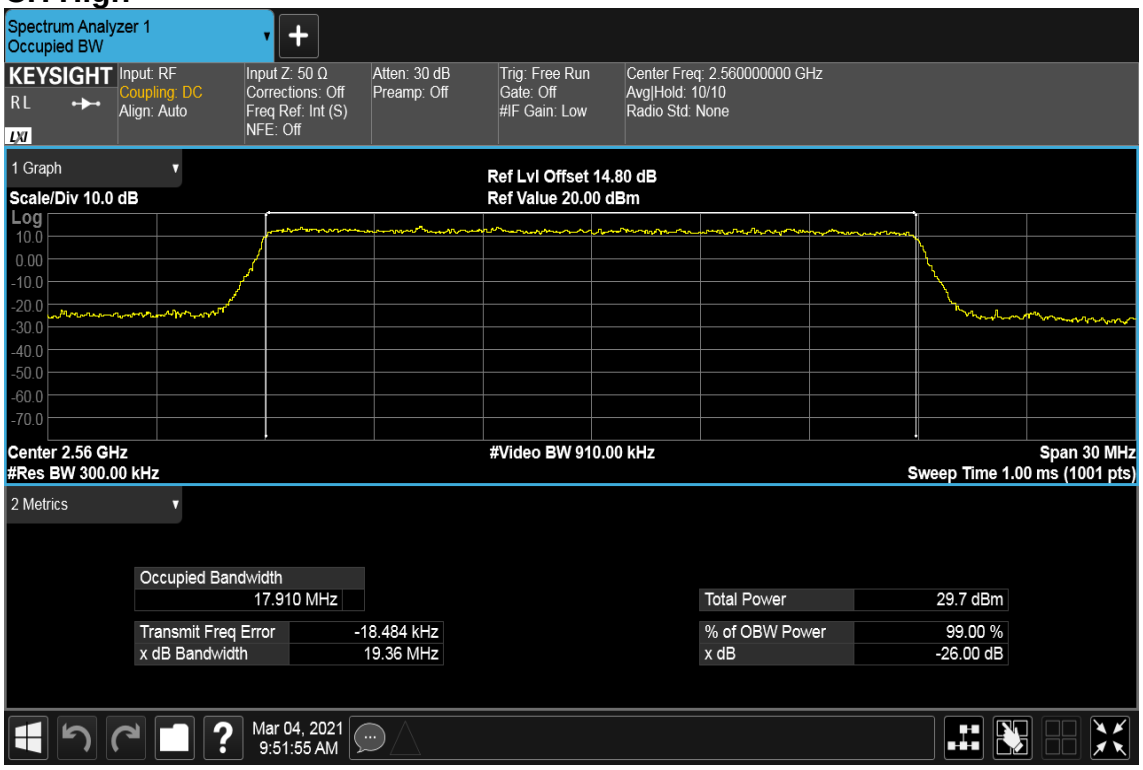
CH High



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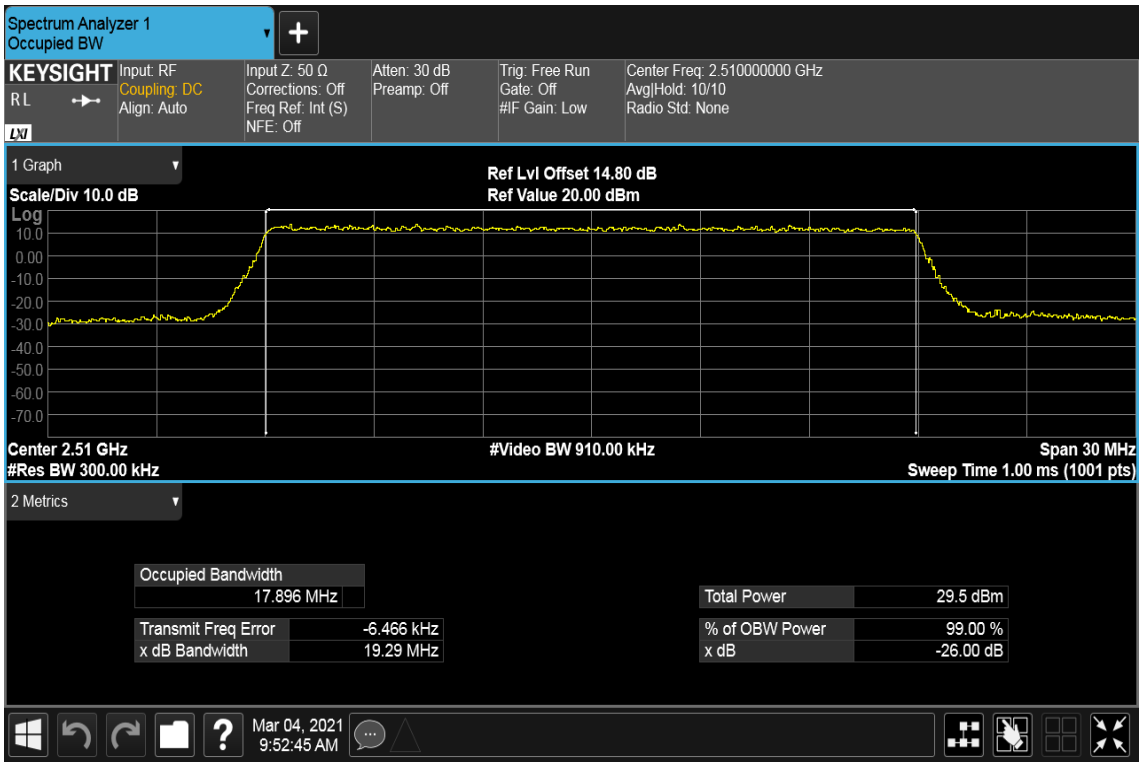
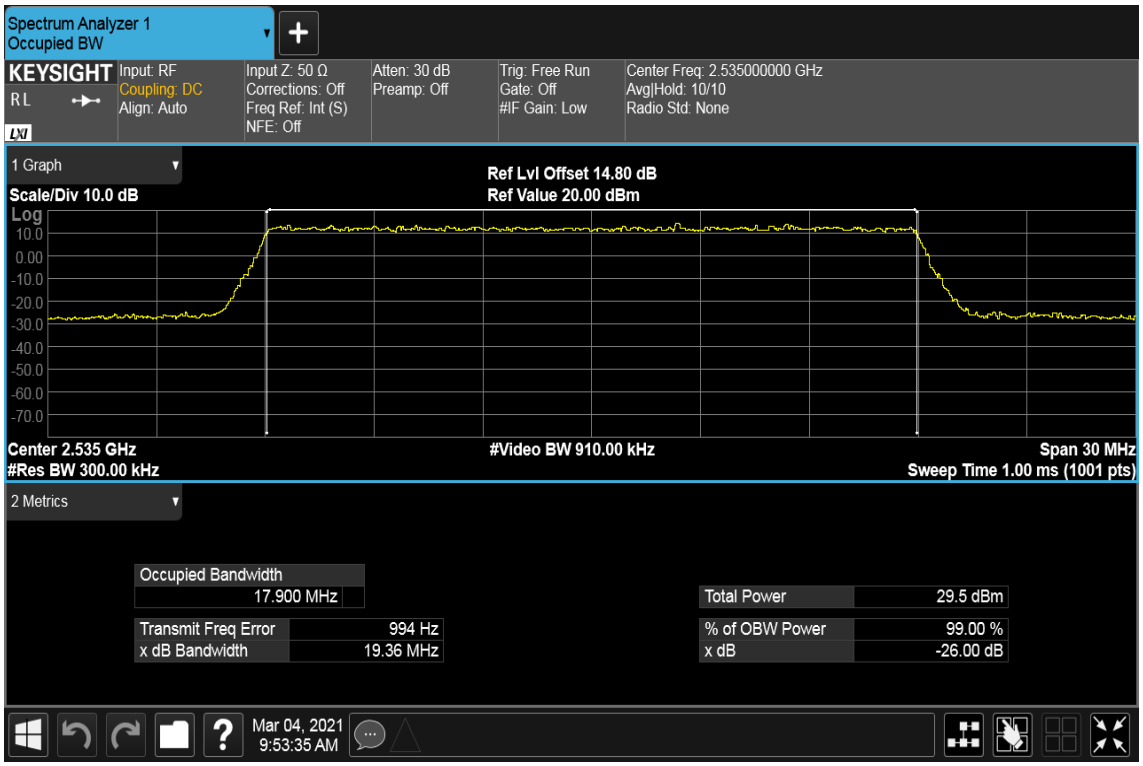
CHANNEL BANDWIDTH: 20MHz / 64QAM / RB =100, RB Offset = 0

CH Low



CH Mid



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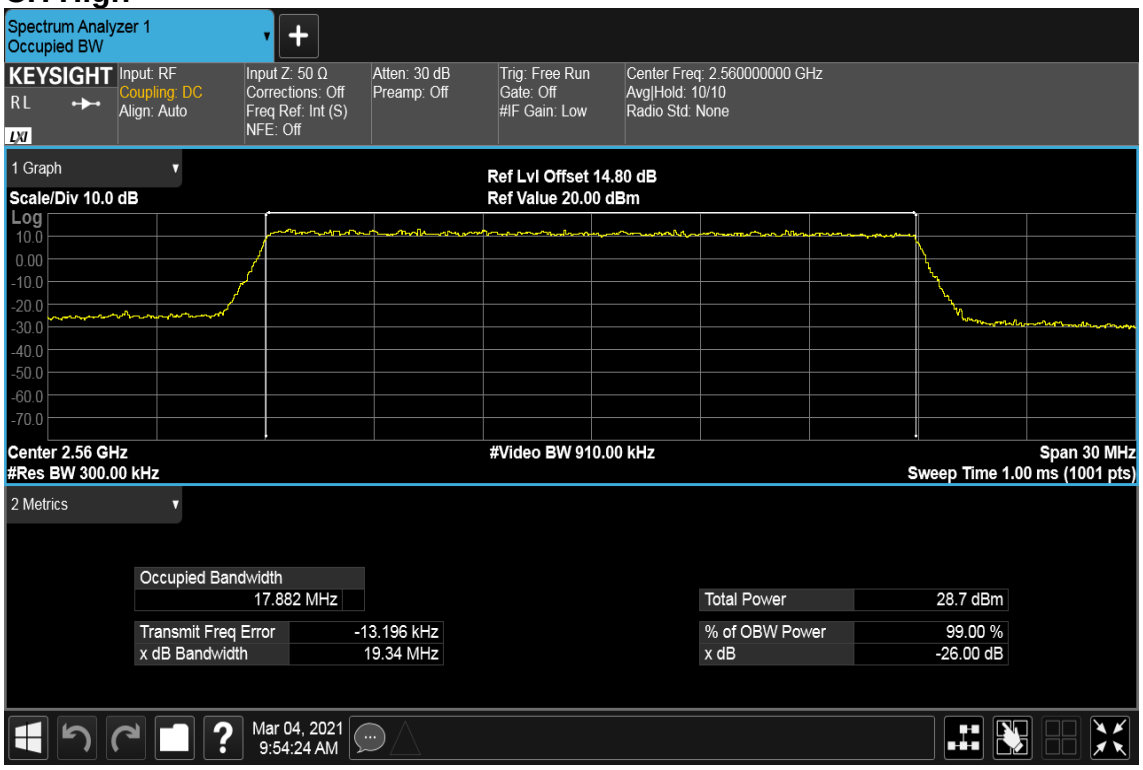
CH High



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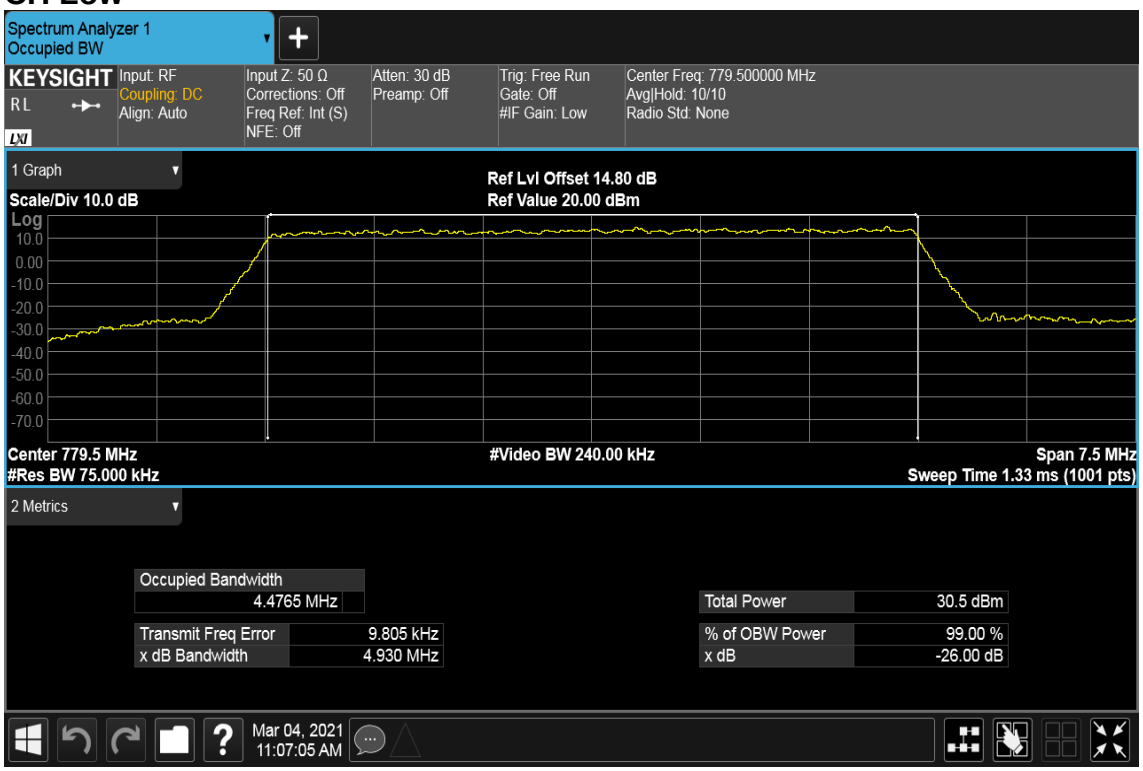
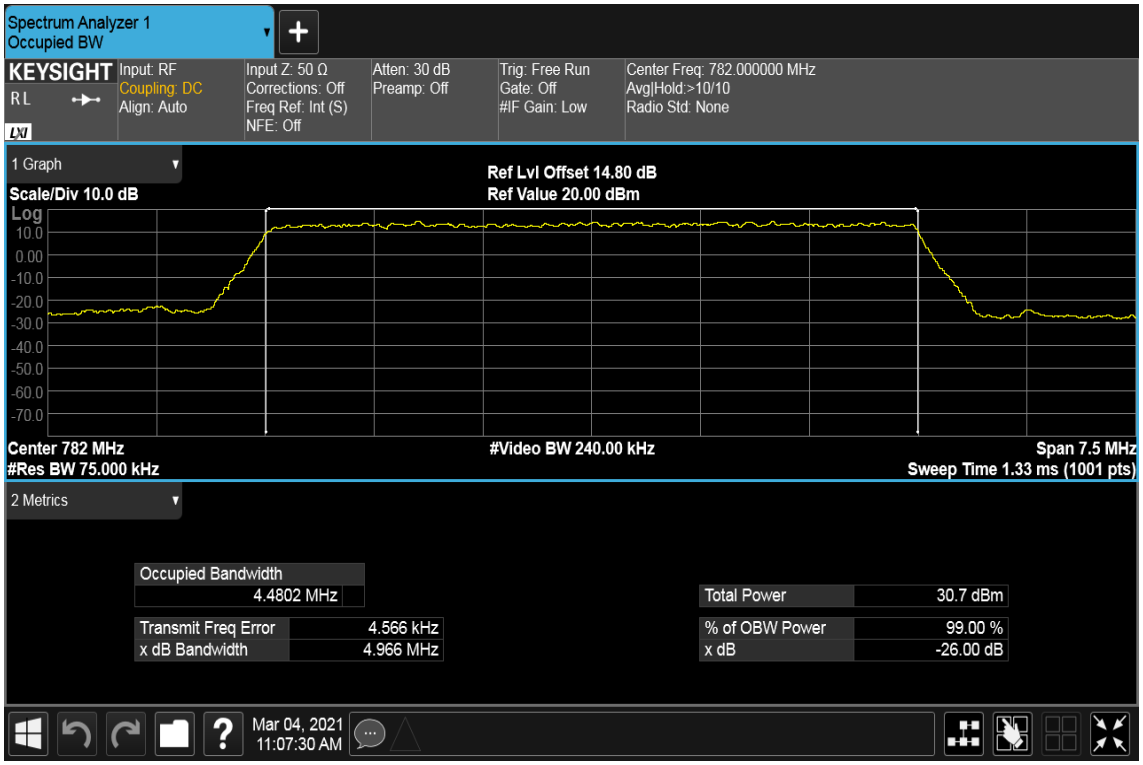
LTE Band 13

CHANNEL BANDWIDTH: 5MHz / QPSK / RB =25, RB Offset = 0

CH Low



CH Mid



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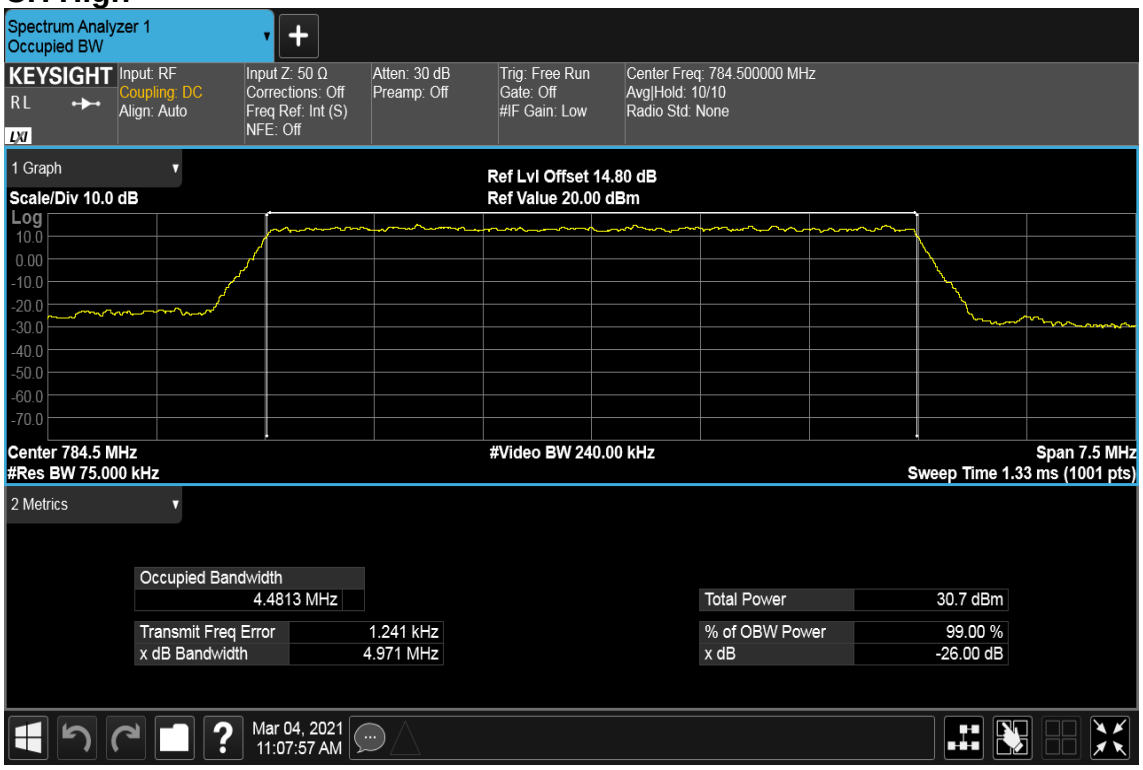
CH High



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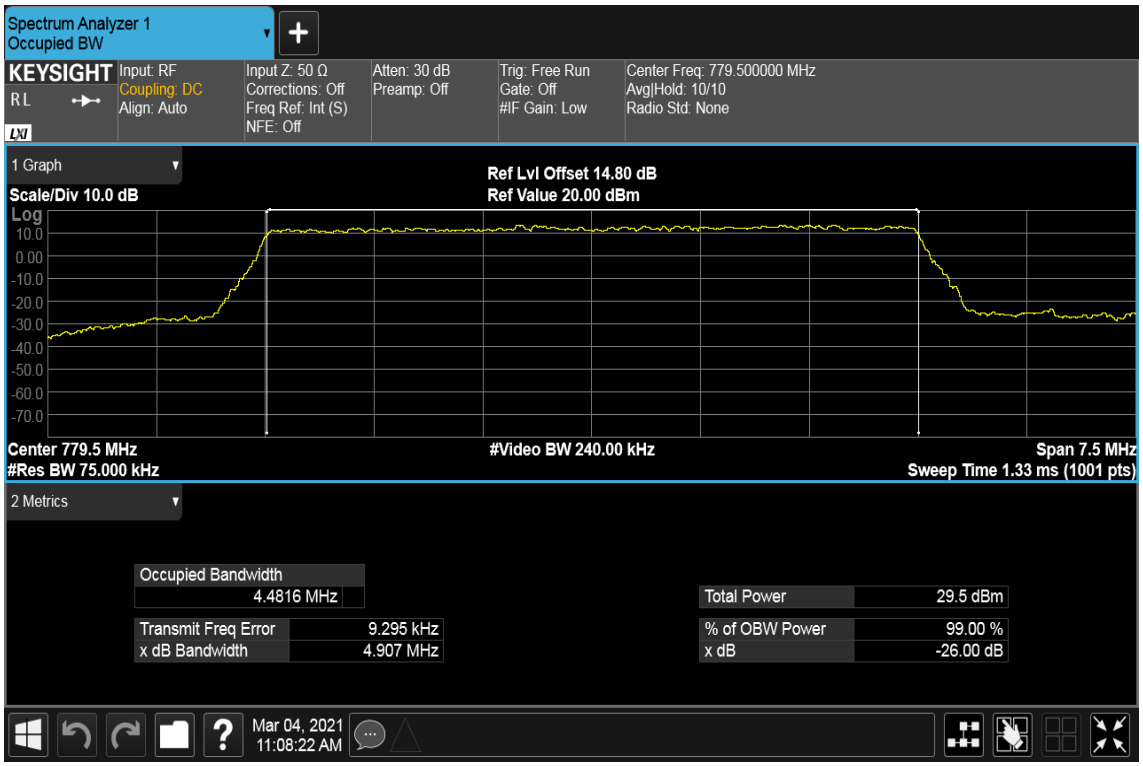
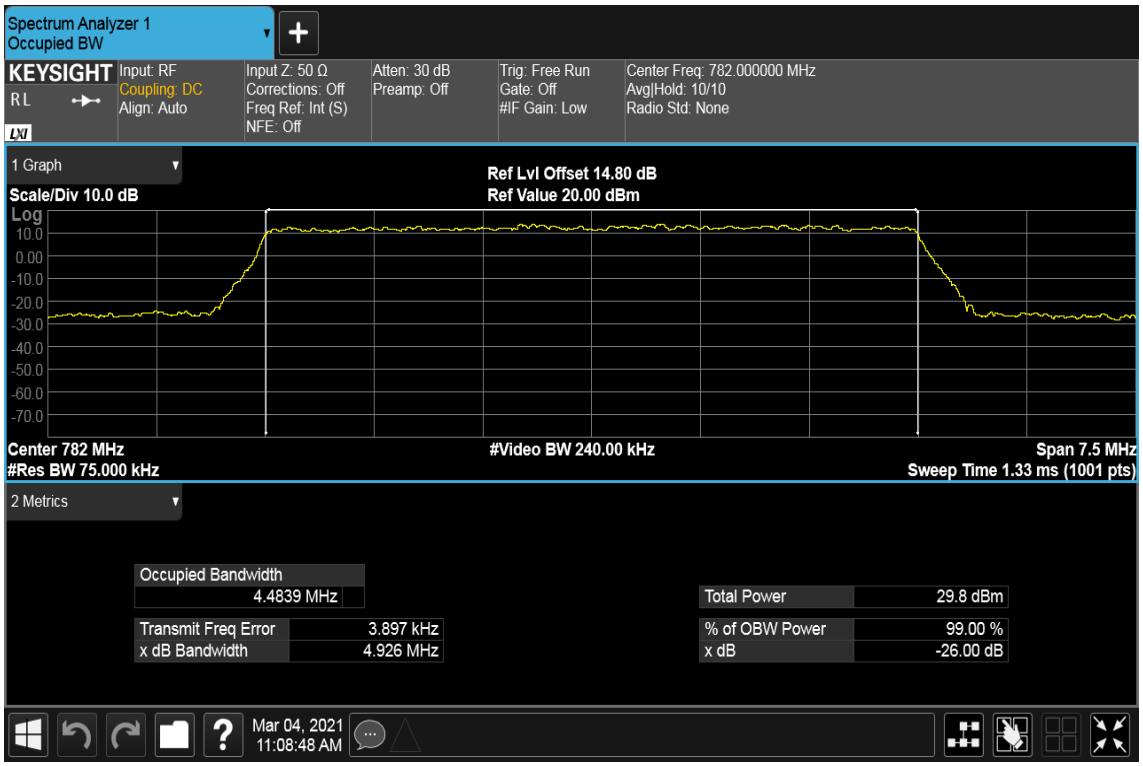
CHANNEL BANDWIDTH: 5MHz / 16QAM / RB =25, RB Offset = 0

CH Low



CH Mid



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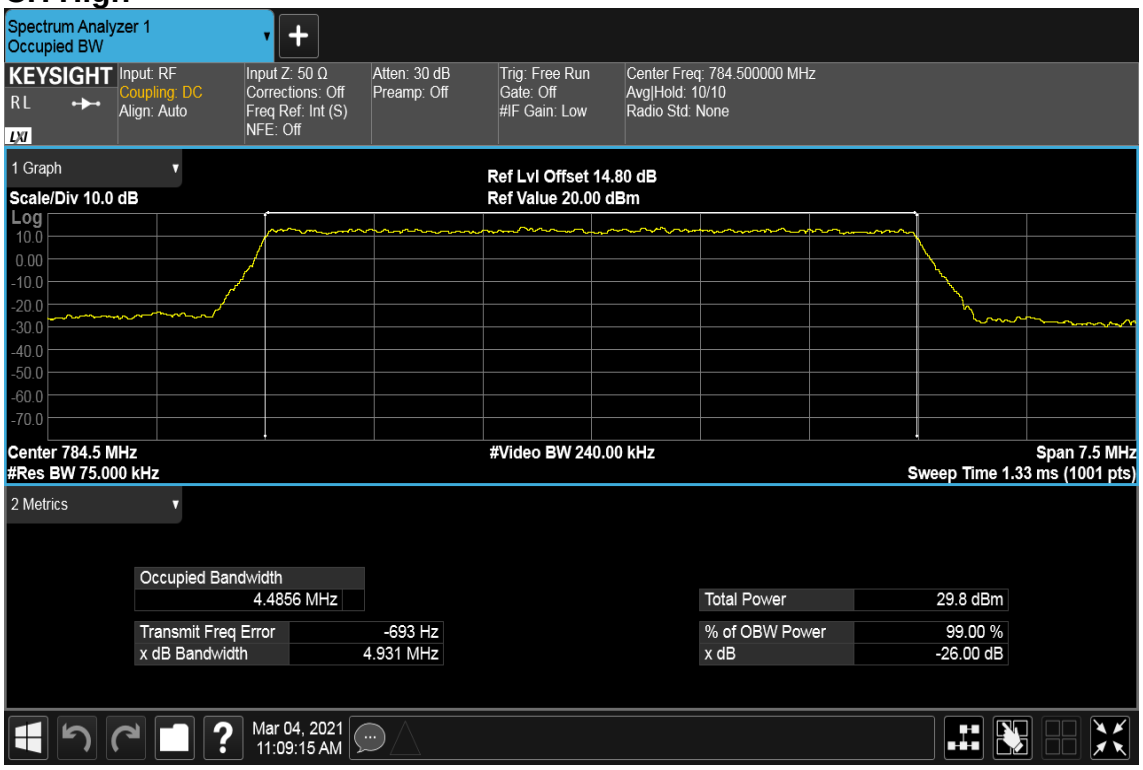
CH High



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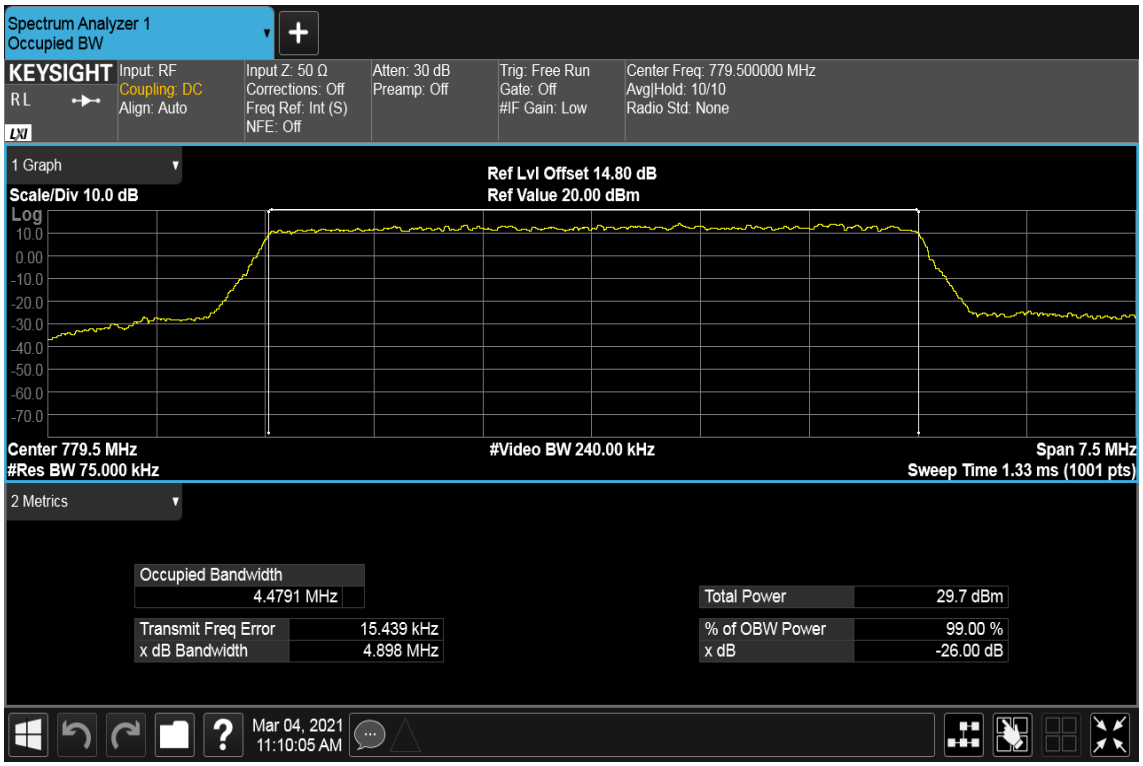
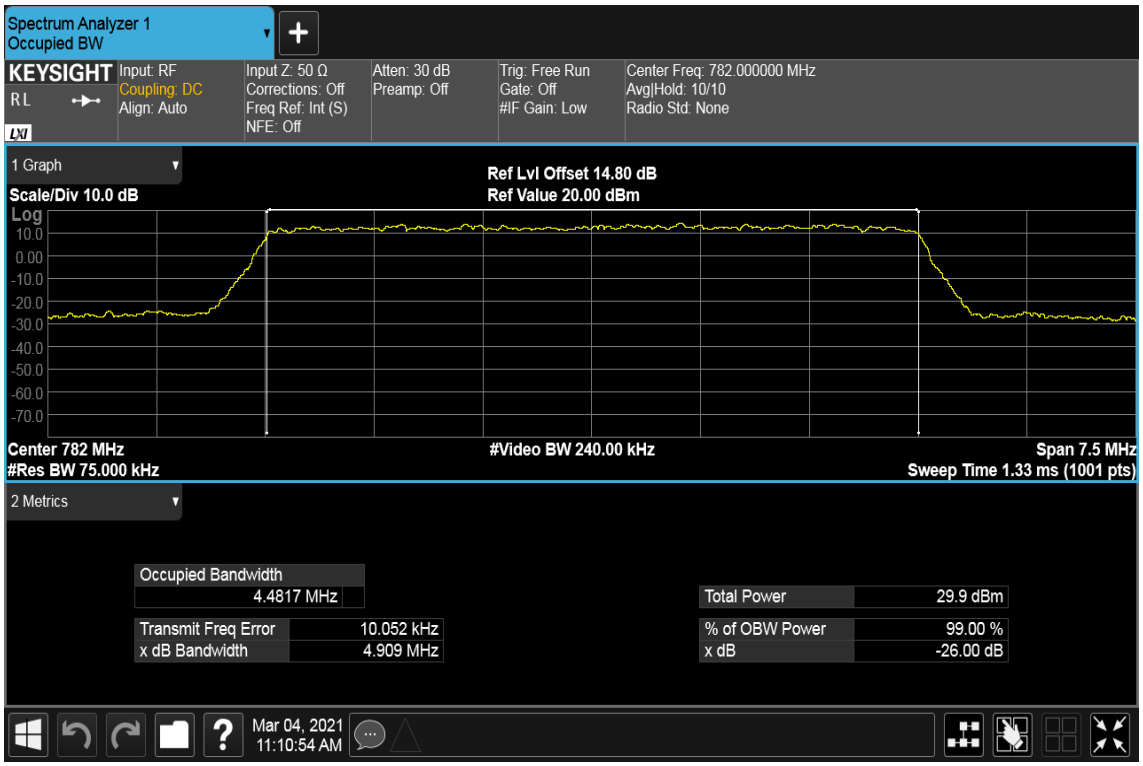
CHANNEL BANDWIDTH: 5MHz / 64QAM / RB =25, RB Offset = 0

CH Low



CH Mid



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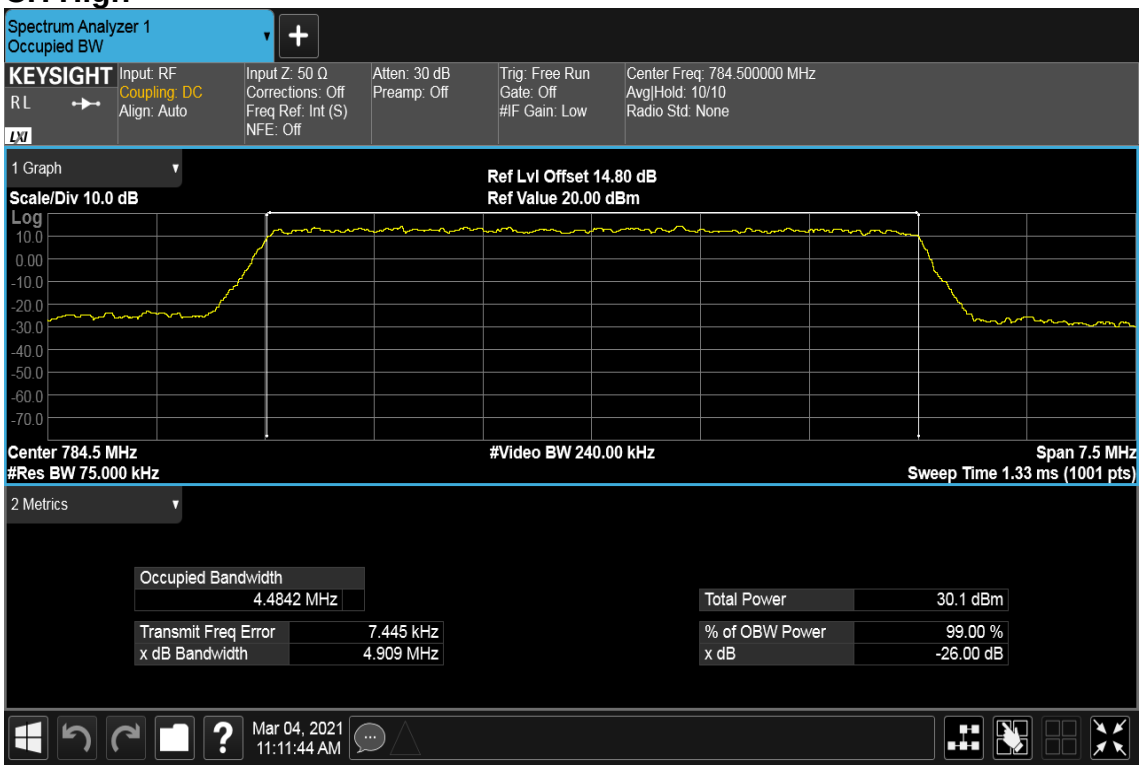
CH High



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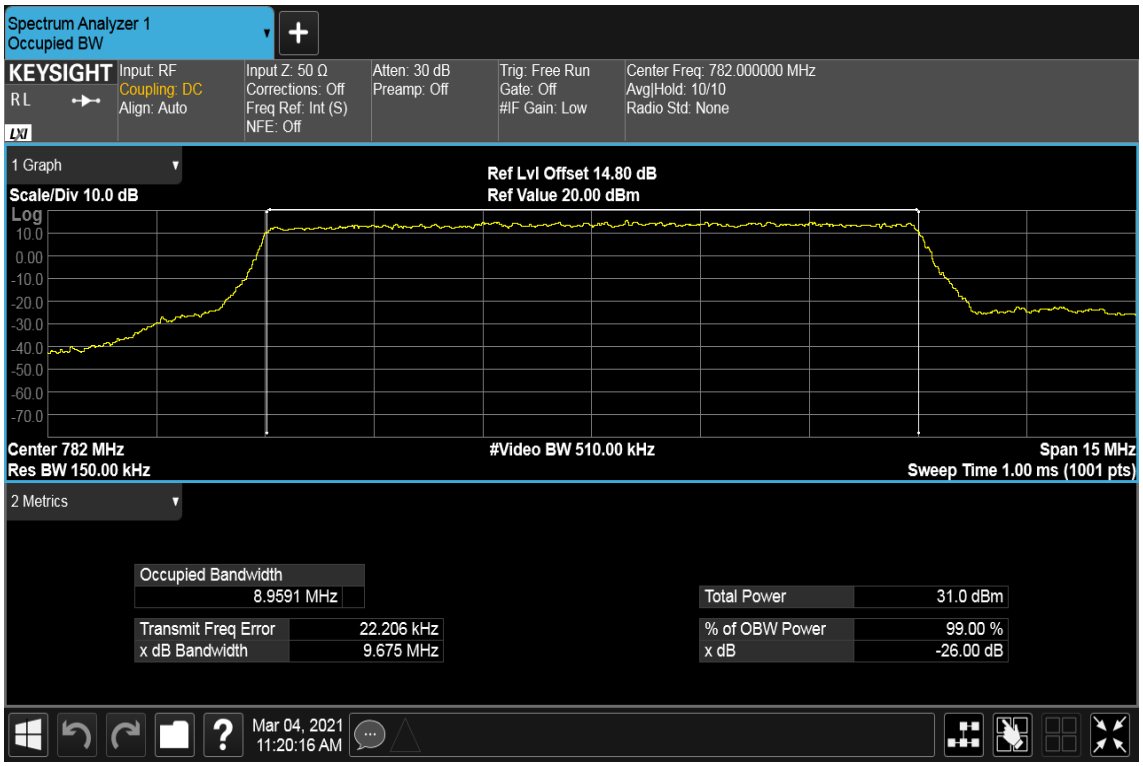
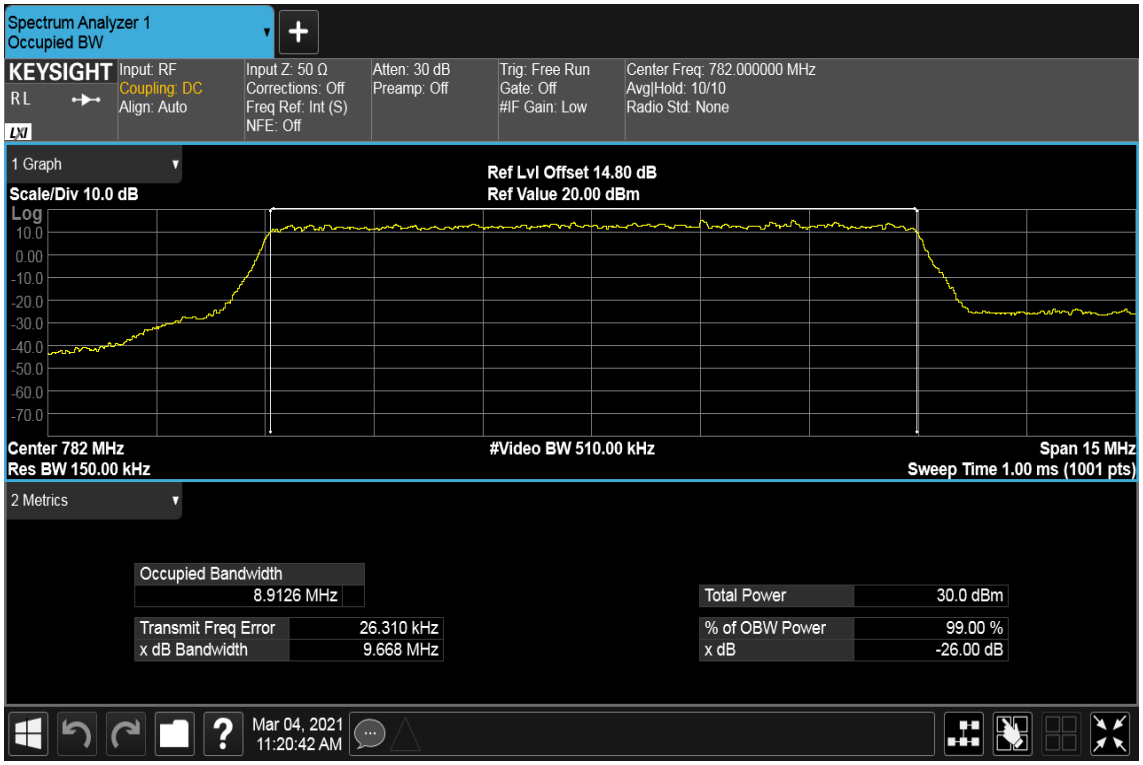
CHANNEL BANDWIDTH: 10MHz / QPSK / RB =50, RB Offset = 0
CH Mid



CHANNEL BANDWIDTH: 10MHz / 16QAM / RB =50, RB Offset = 0
CH Mid



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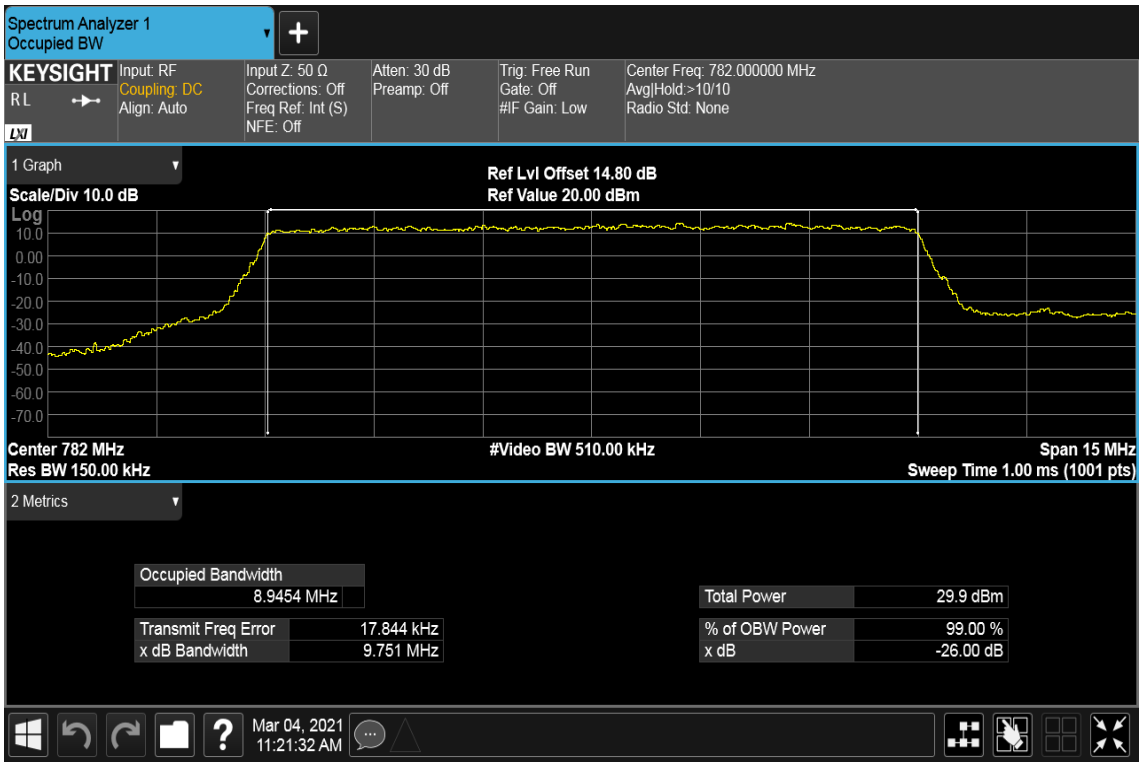
CHANNEL BANDWIDTH: 10MHz / 64QAM / RB =50, RB Offset = 0
CH Mid



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8.4 PEAK TO AVERAGE POWER RATIO

LIMIT

In measuring transmissions in this band using an average power technique, peak-to-average power ratio (PAPR) of the transmission may not exceed 13 dB.

TEST PROCEDURES

1. According to KDB 971168D01.
2. The EUT was connect to spectrum analyzer and call box.
3. Set the CCDF function in spectrum analyzer.
4. The highest RF output power were measured and recorded the maximum PAPR level associated with a probability of 0.1%.
5. Record the Peak to Average Power Ratio.

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TEST RESULTS

Temperature:	23.2 ~ 24.1℃	**Humidity:**	56.9 ~ 58.3% RH
Tested by:	Jerry Chang	**Test Date:**	March 3 ~ 4, 2021
Temperature:	24.3 ~ 25.8℃	**Humidity:**	57.4 ~ 58.9% RH
Tested by:	Jerry Chang	**Test Date:**	August 26 ~ 27, 2021

LTE Band 4

LTE BAND 4							
Channel bandwidth: 1.4MHz				Channel bandwidth: 3MHz			
Freq. (MHz)	CH	PAPR (dB)		Freq. (MHz)	CH	PAPR (dB)	
		64QAM	Limit			64QAM	Limit
1710.7	19957	5.59	13	1711.5	19965	5.63	13
1732.5	20175	5.20	13	1732.5	20175	5.33	13
1754.3	20393	5.97	13	1753.5	20385	5.76	13

LTE BAND 4							
Channel bandwidth: 5MHz				Channel bandwidth: 10MHz			
Freq. (MHz)	CH	PAPR (dB)		Freq. (MHz)	CH	PAPR (dB)	
		64QAM	Limit			64QAM	Limit
1712.5	19957	5.76	13	1715.0	20000	5.86	13
1732.5	20175	5.25	13	1732.5	20175	5.59	13
1752.5	20375	5.95	13	1750.0	20350	5.70	13

LTE BAND 4							
Channel bandwidth: 15MHz				Channel bandwidth: 20MHz			
Freq. (MHz)	CH	PAPR (dB)		Freq. (MHz)	CH	PAPR (dB)	
		64QAM	Limit			64QAM	Limit
1717.5	20025	5.53	13	1720.0	20050	5.63	13
1732.5	20175	5.52	13	1732.5	20175	5.68	13
1747.5	20325	5.74	13	1745.0	20300	5.72	13

Note: We selected worst case to performed test in middle channel, the results can be meet other channel.

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LTE Band 7

LTE BAND 7							
Channel bandwidth: 5MHz				Channel bandwidth: 10MHz			
Freq. (MHz)	CH	PAPR (dB)		Freq. (MHz)	CH	PAPR (dB)	
		64QAM	Limit			64QAM	Limit
2502.5	20775	5.56	13	2505.0	20800	5.82	13
2535.0	21100	5.79	13	2535.0	21100	5.90	13
2567.5	21375	5.60	13	2565.0	21350	5.78	13

LTE BAND 7							
Channel bandwidth: 15MHz				Channel bandwidth: 20MHz			
Freq. (MHz)	CH	PAPR (dB)		Freq. (MHz)	CH	PAPR (dB)	
		64QAM	Limit			64QAM	Limit
2507.5	20825	5.60	13	2510	20850	5.59	13
2535.0	21100	5.97	13	2535	21100	5.95	13
2562.5	21375	5.88	13	2560	21350	5.94	13

LTE Band 13

LTE BAND 13							
Channel bandwidth: 5MHz				Channel bandwidth: 10MHz			
Freq. (MHz)	CH	PAPR (dB)		Freq. (MHz)	CH	PAPR (dB)	
		64QAM	Limit			64QAM	Limit
779.5	23205	5.92	13	782.0	23230	5.47	13
782.0	23230	5.76	13				
784.5	23255	5.90	13				

Note: We selected worst case to performed test in middle channel, the results can be meet other channel.

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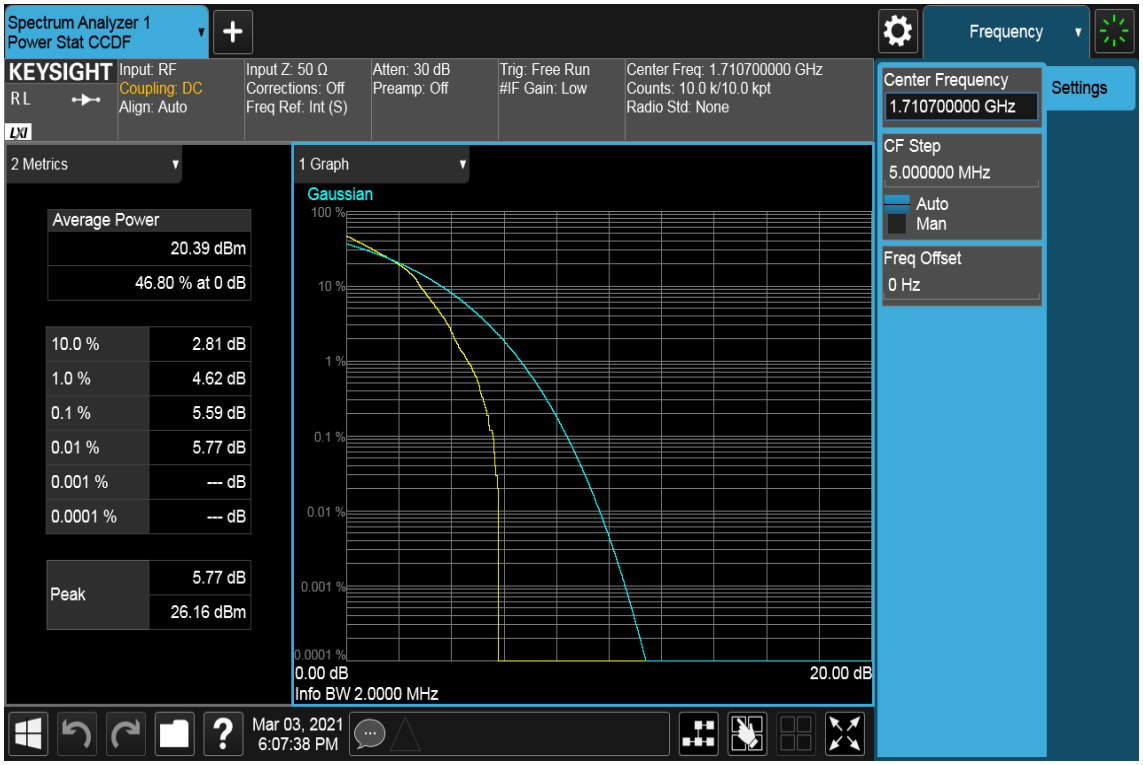
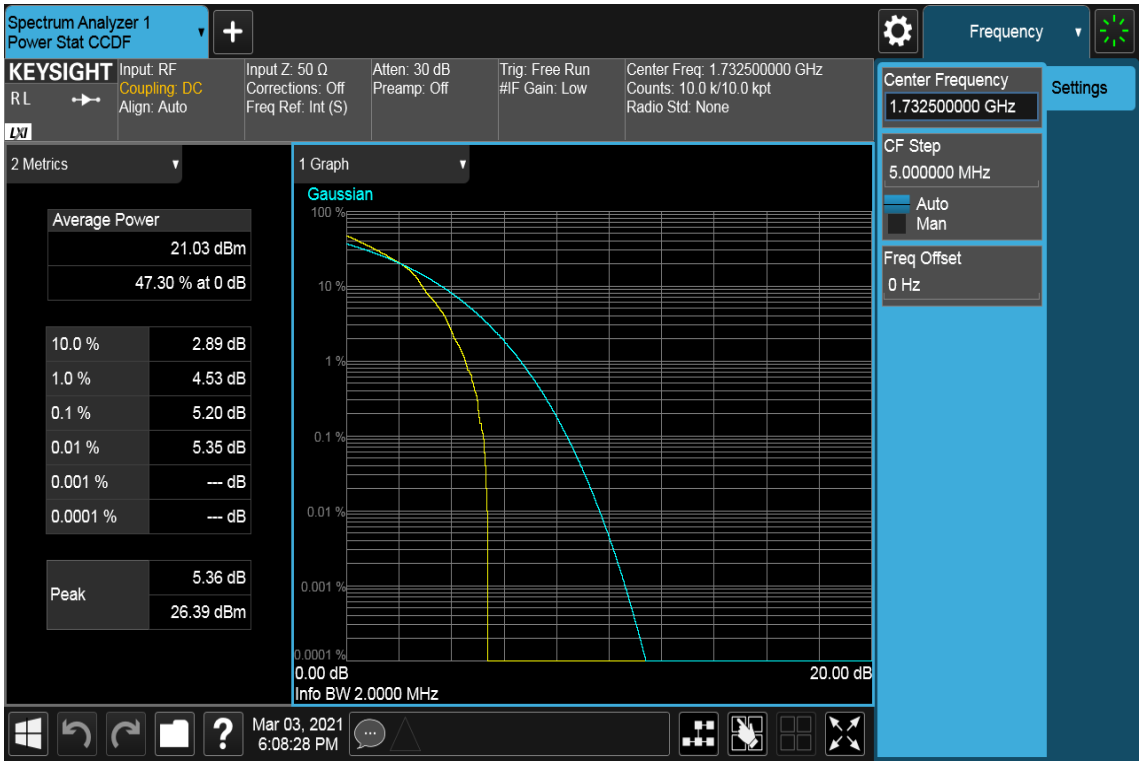
LTE Band 4

CHANNEL BANDWIDTH: 1.4MHz / 64QAM / RB =6, RB Offset = 0

CH Low



CH Mid



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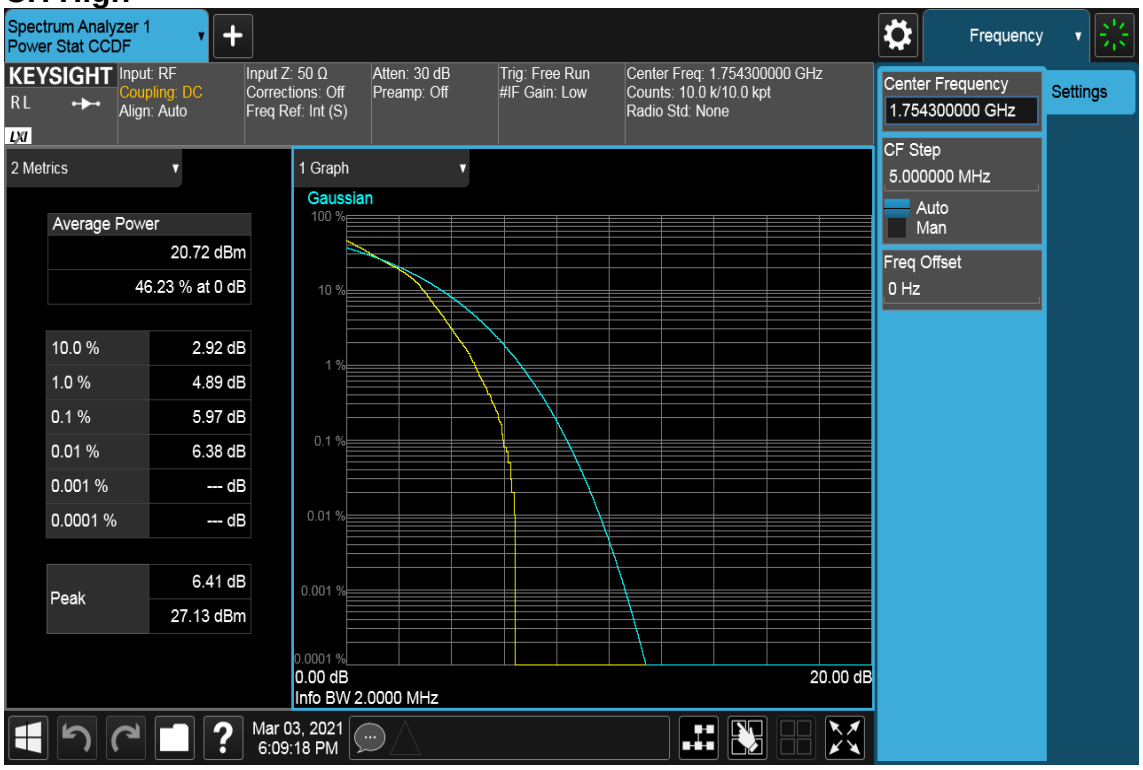
CH High



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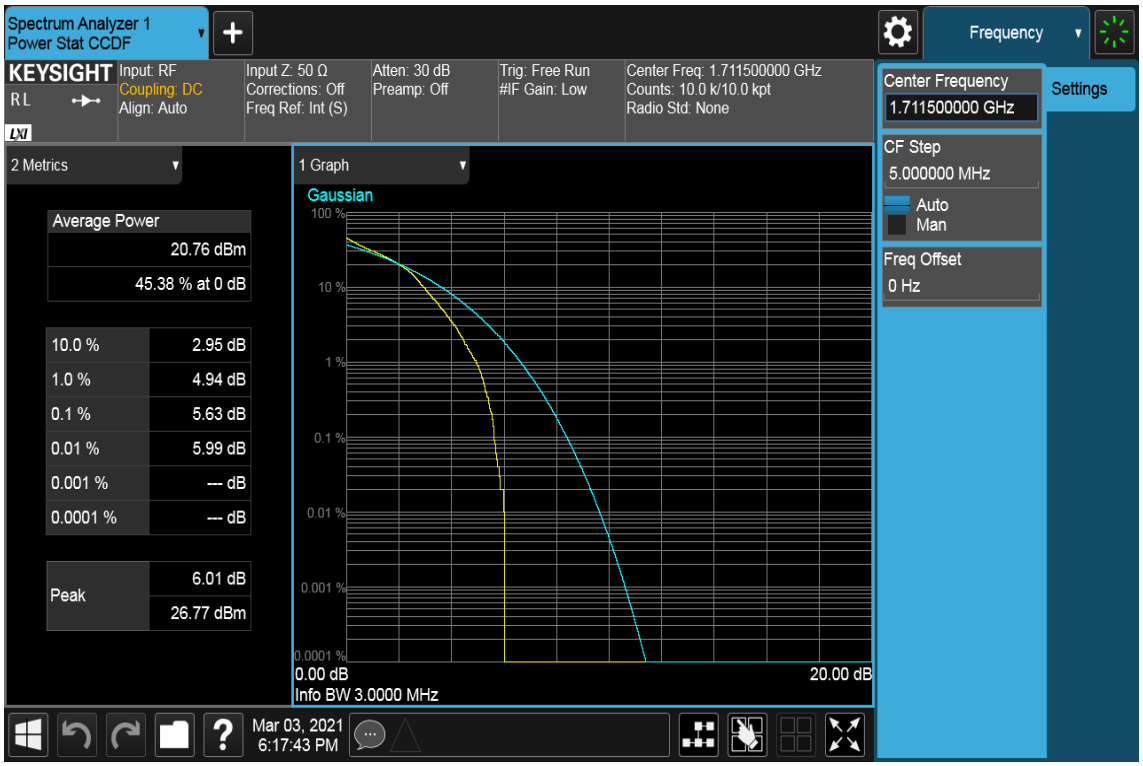
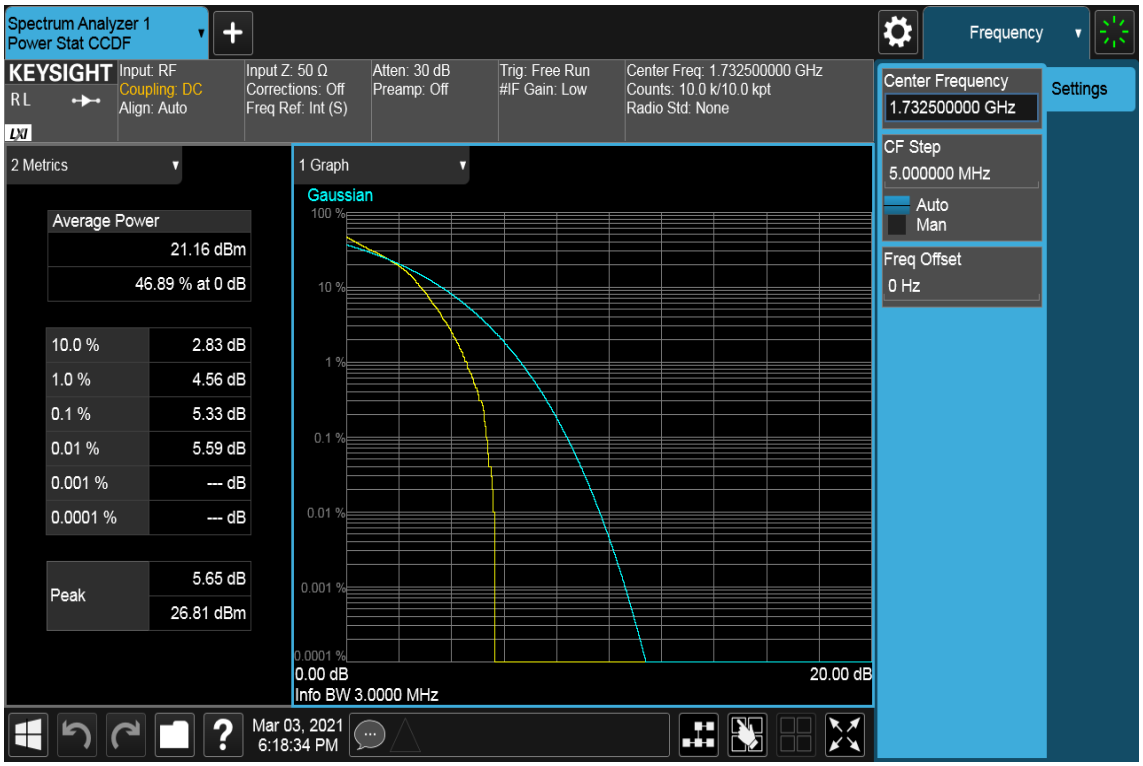
CHANNEL BANDWIDTH: 3MHz / 64QAM / RB =15, RB Offset = 0

CH Low



CH Mid



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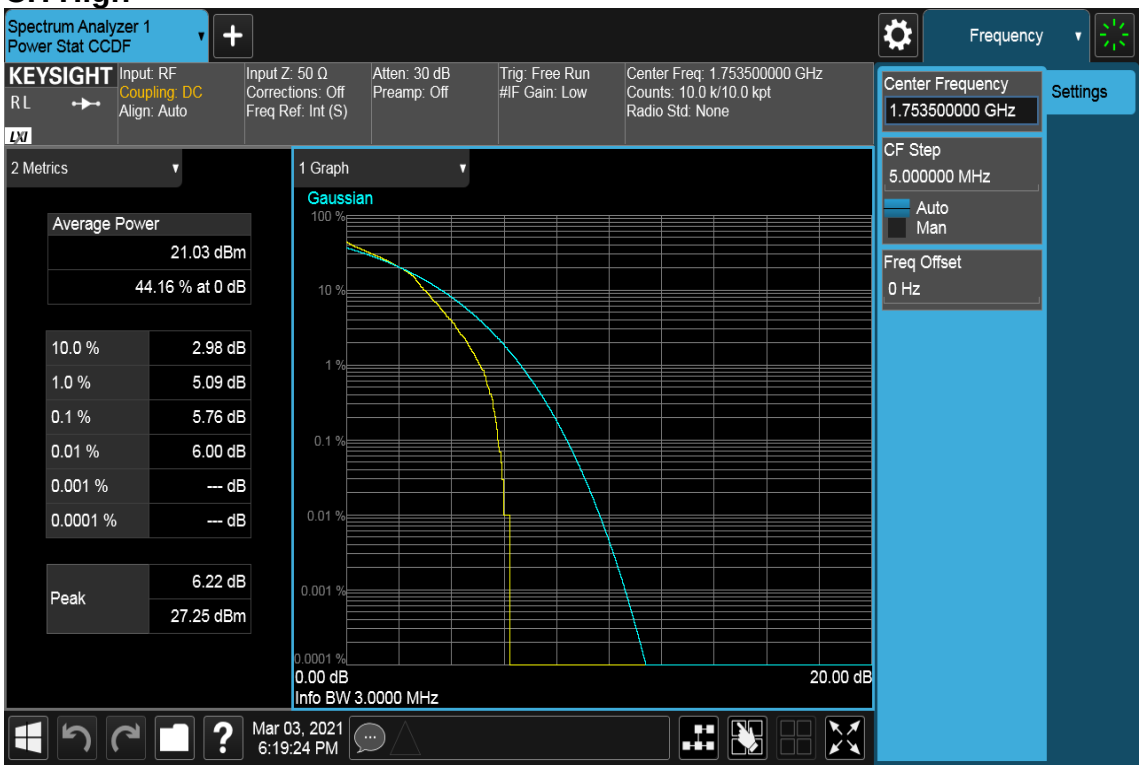
CH High



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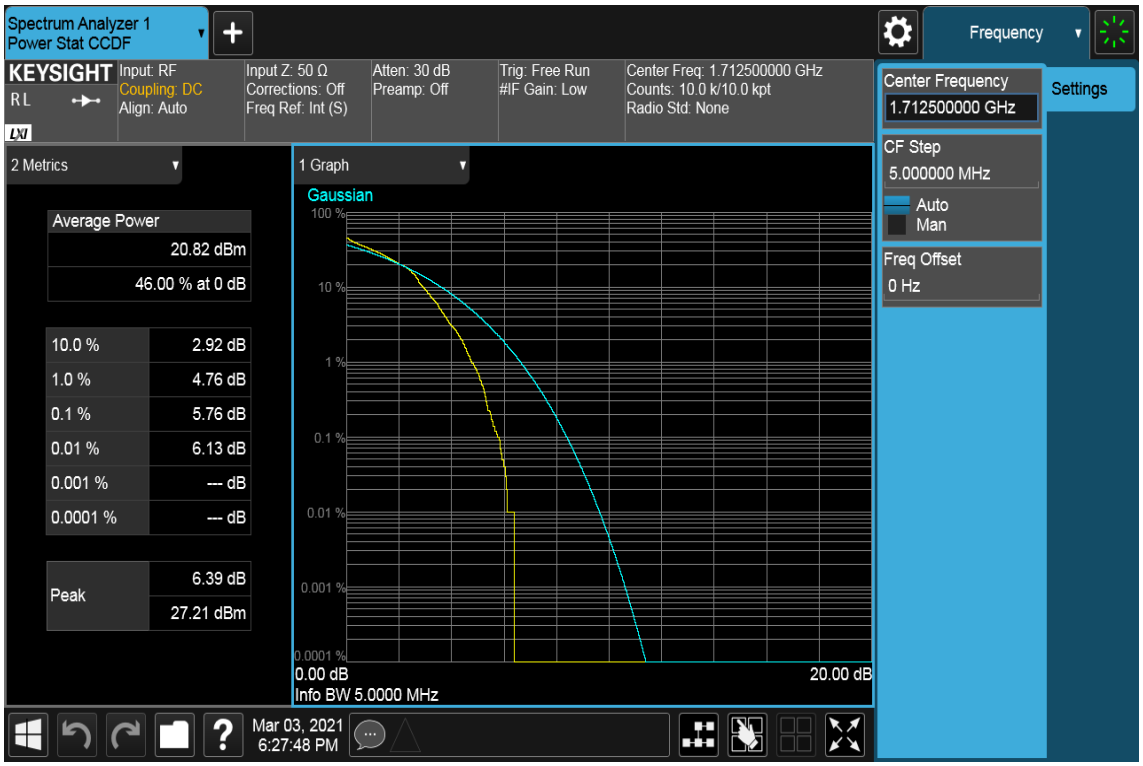
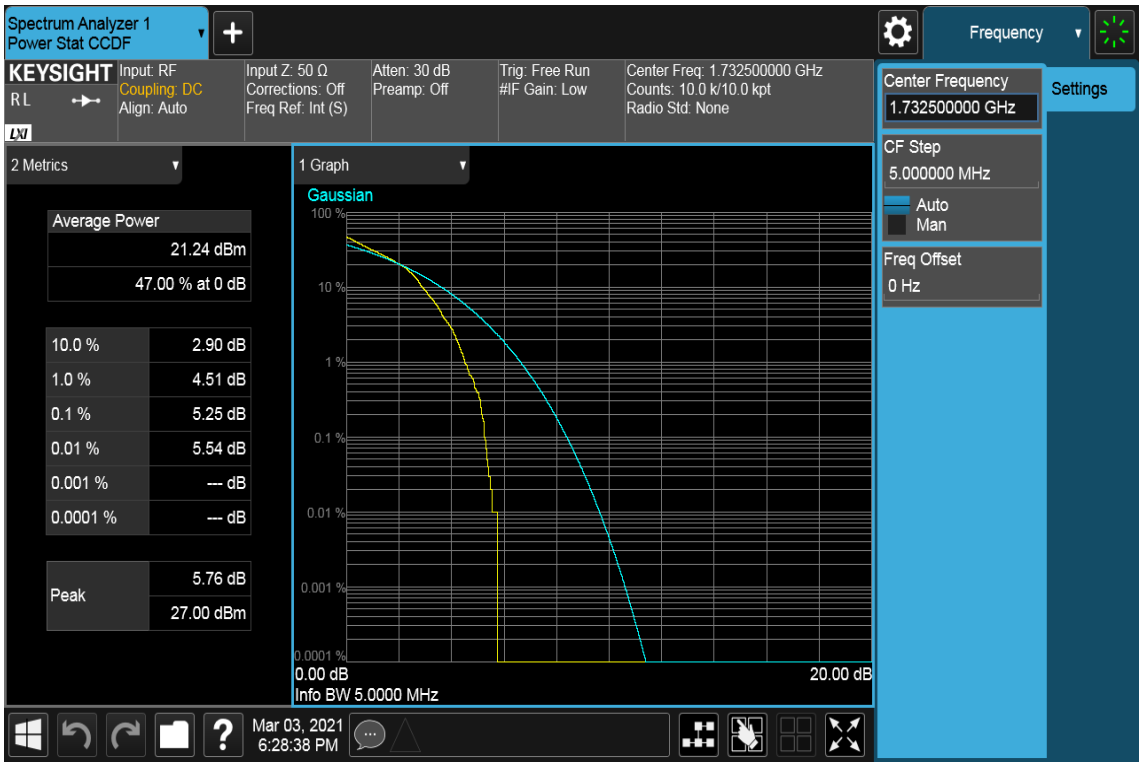
CHANNEL BANDWIDTH: 5MHz / 64QAM / RB =25, RB Offset = 0

CH Low



CH Mid



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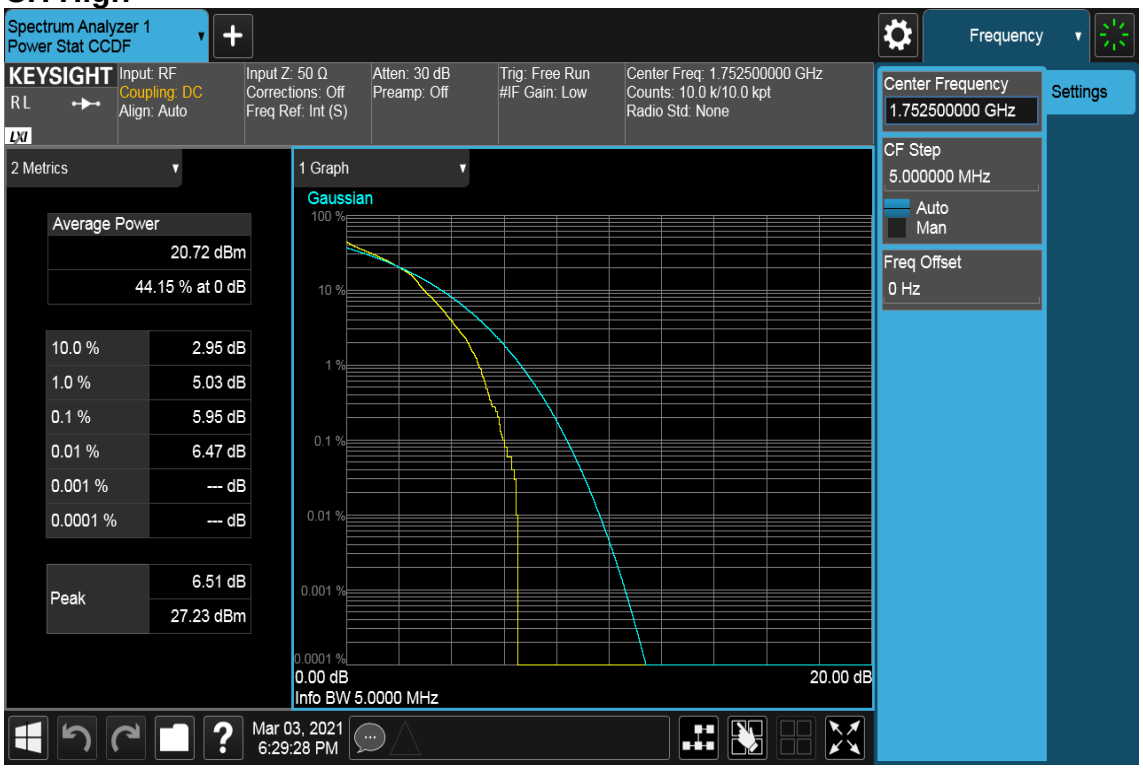
CH High



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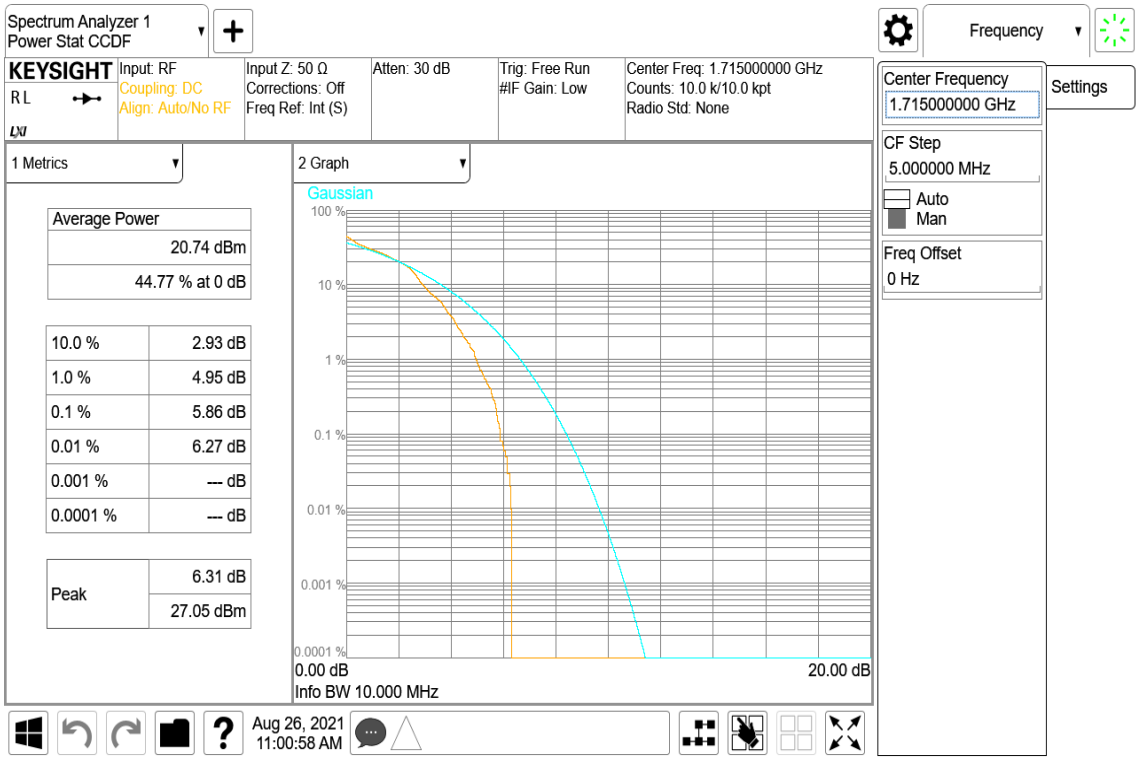
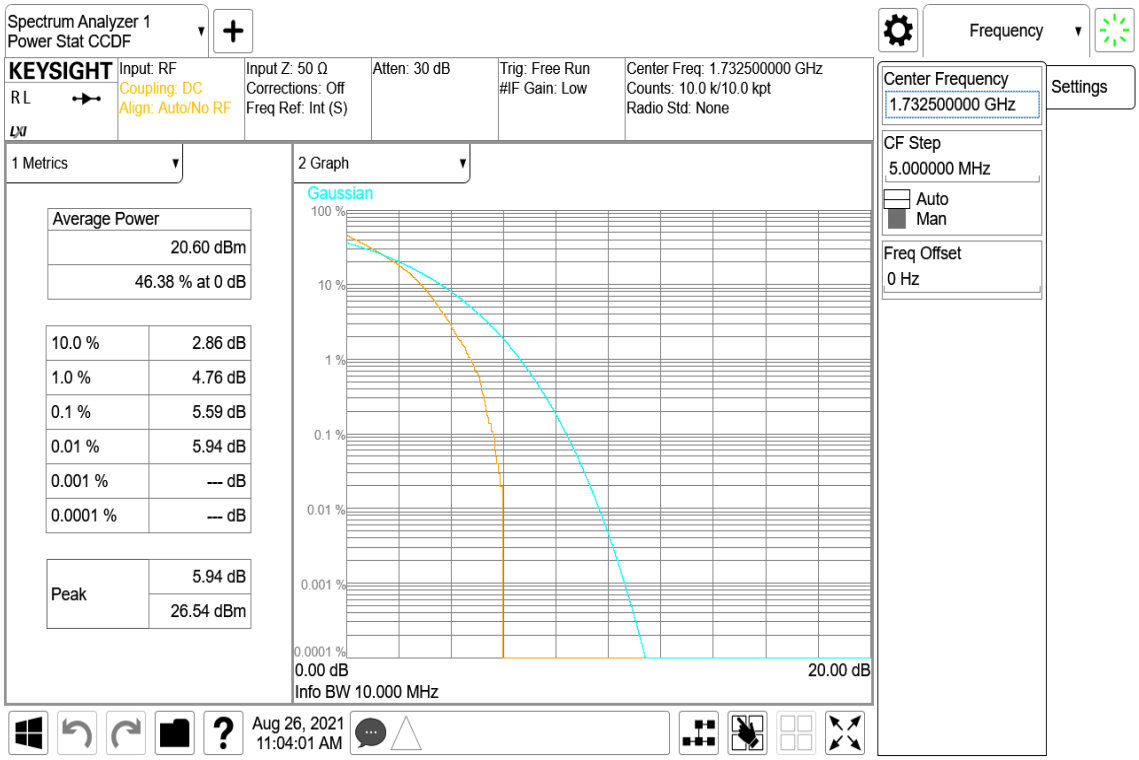
CHANNEL BANDWIDTH: 10MHz / 64QAM / RB =50, RB Offset = 0

CH Low



CH Mid



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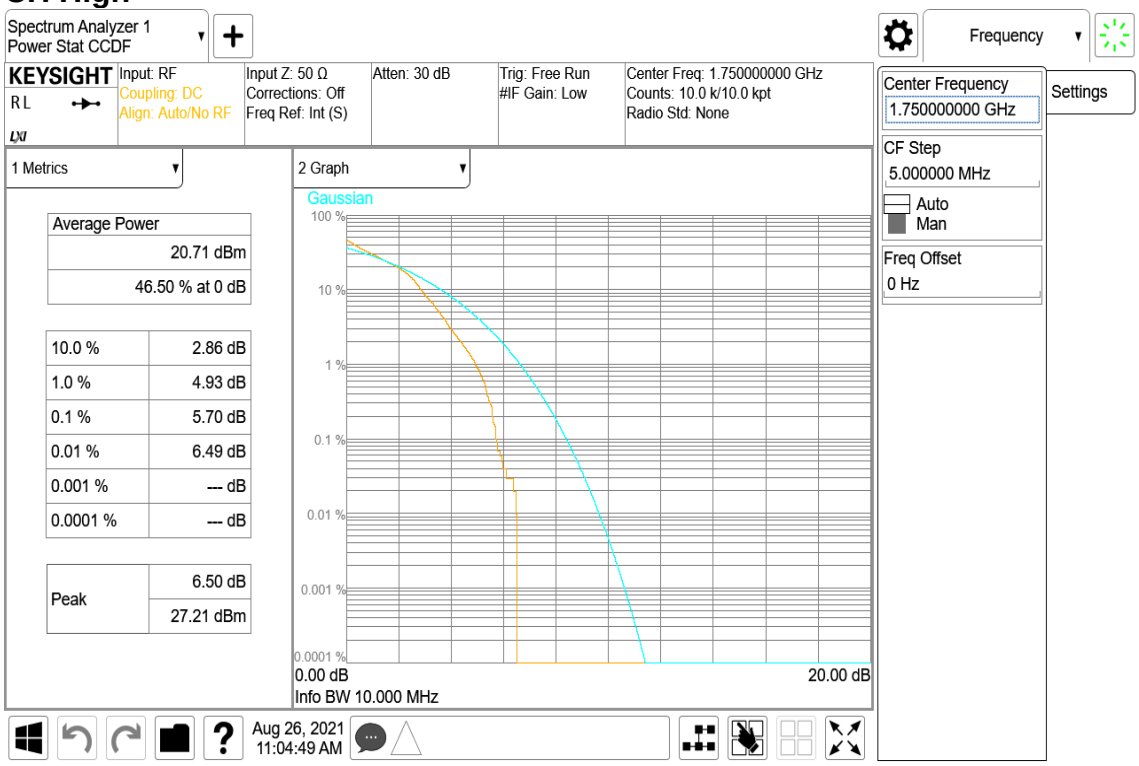
CH High



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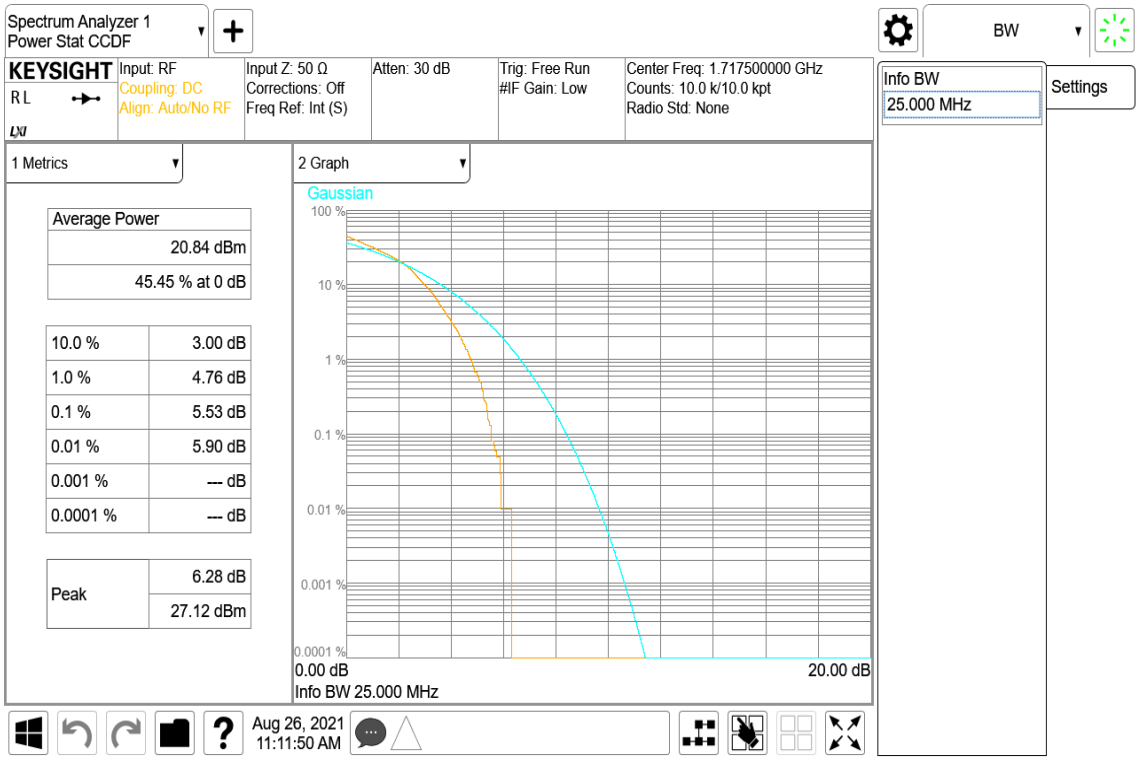
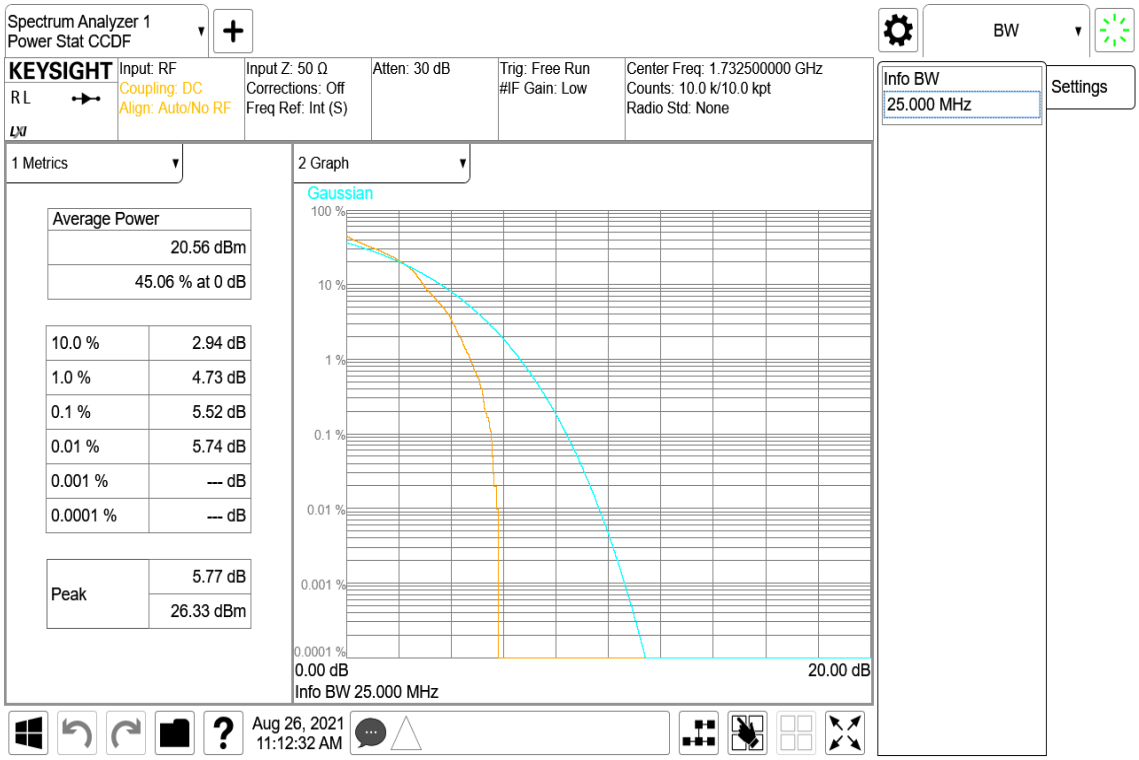
CHANNEL BANDWIDTH: 15MHz / 64QAM / RB =75, RB Offset = 0

CH Low



CH Mid



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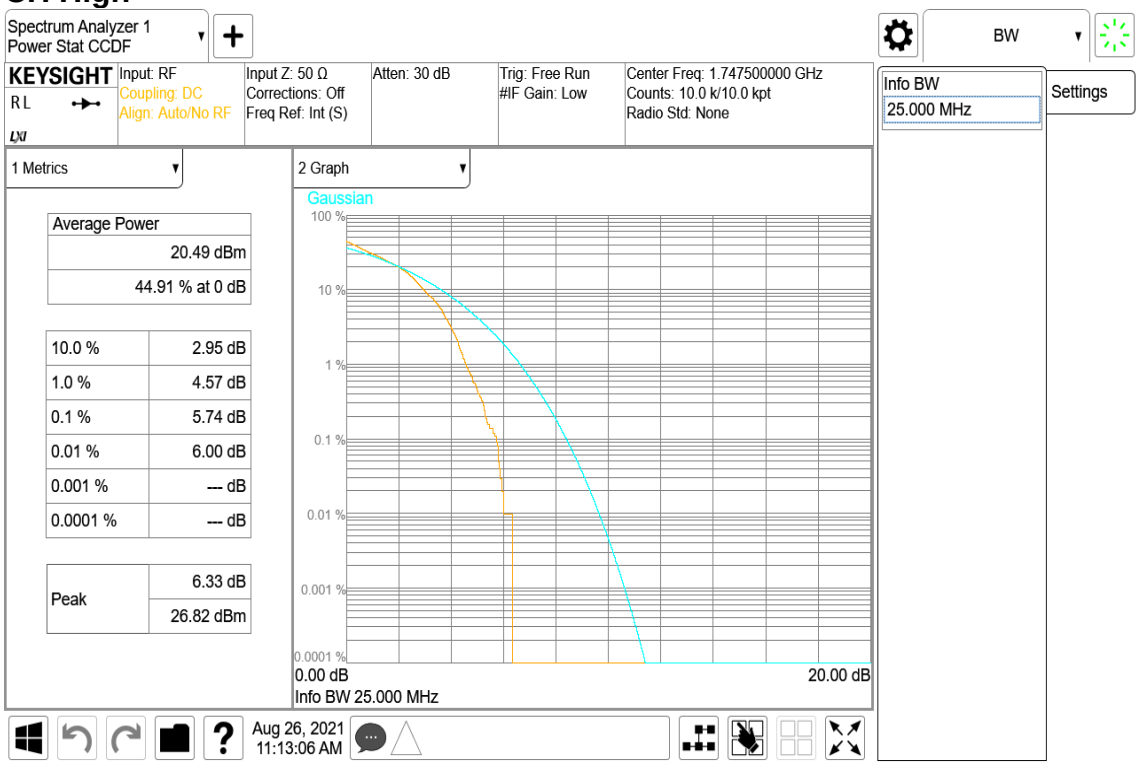
CH High



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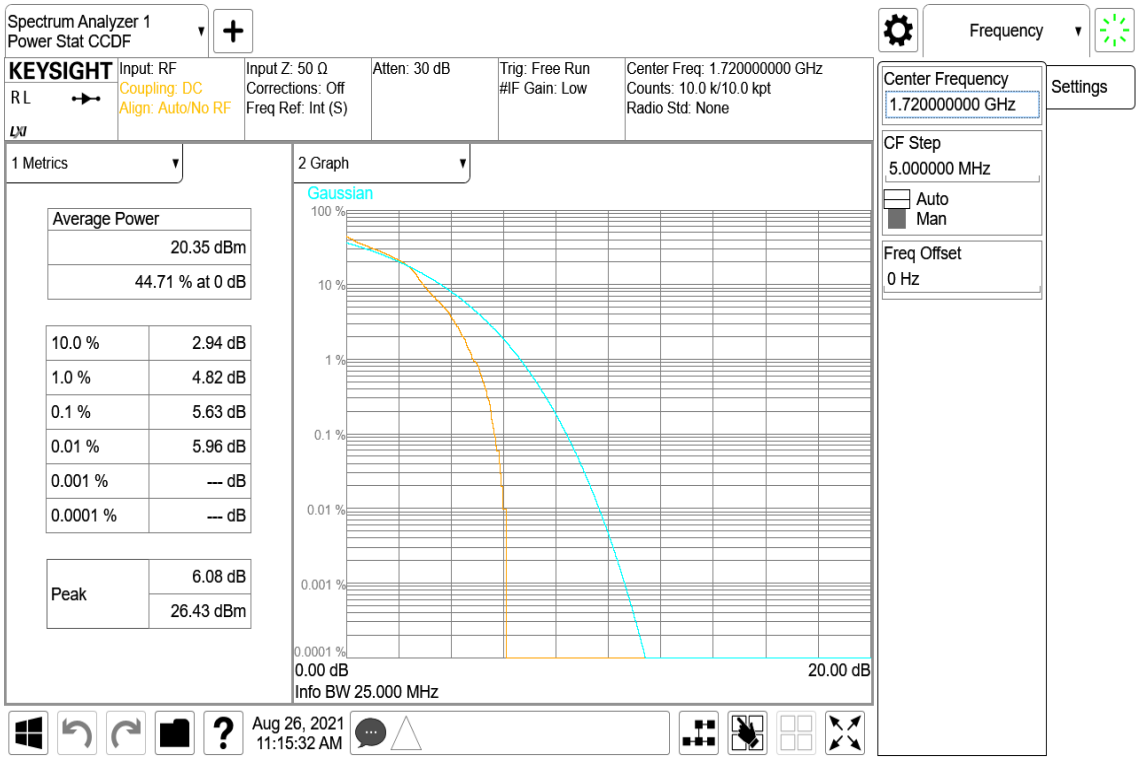
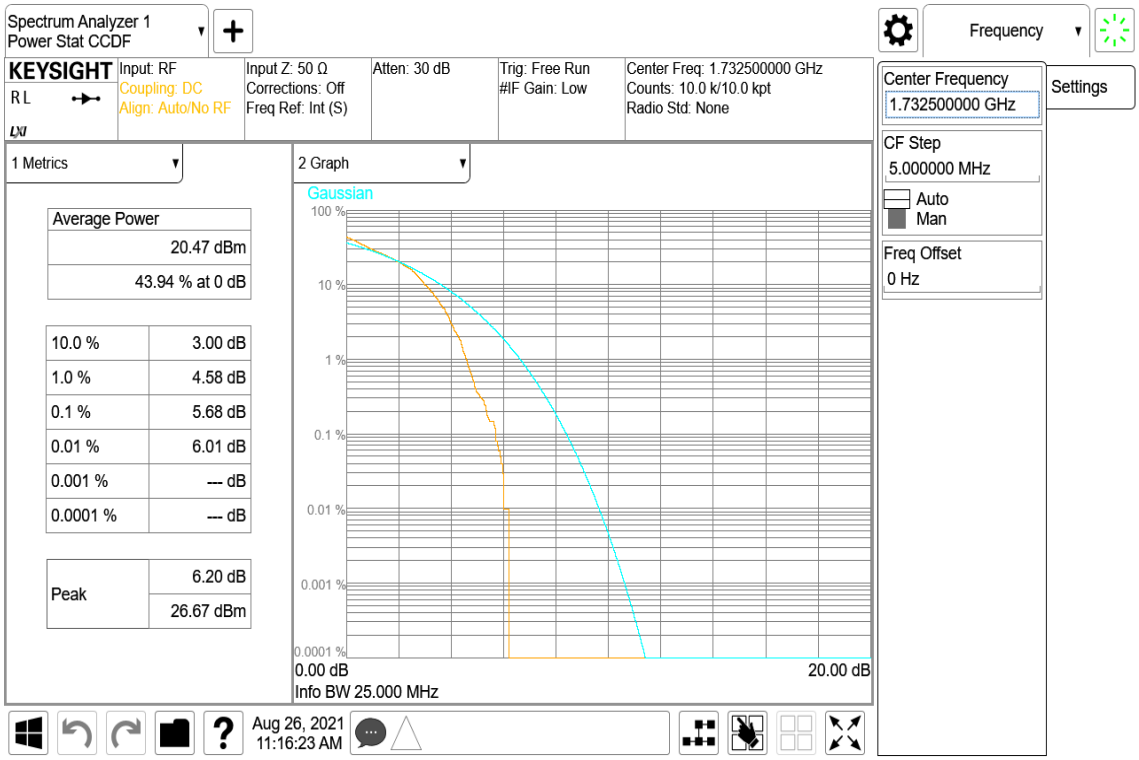
CHANNEL BANDWIDTH: 20MHz / 64QAM / RB =100, RB Offset = 0

CH Low



CH Mid



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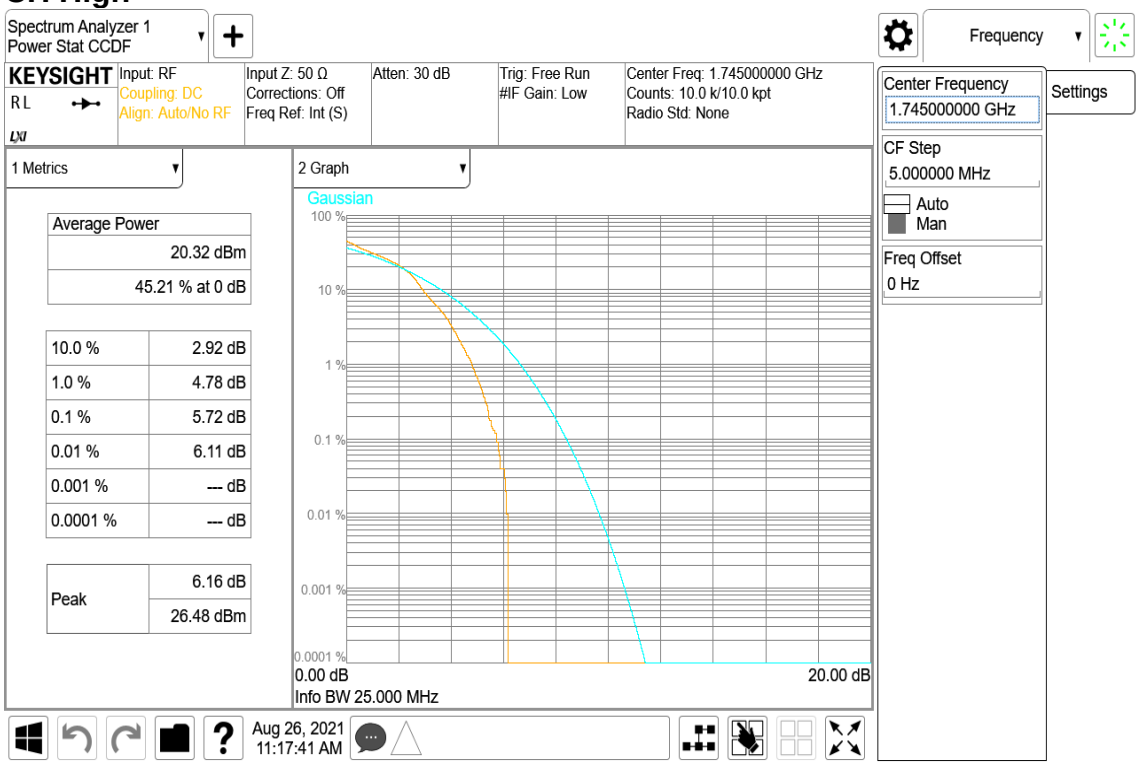
CH High



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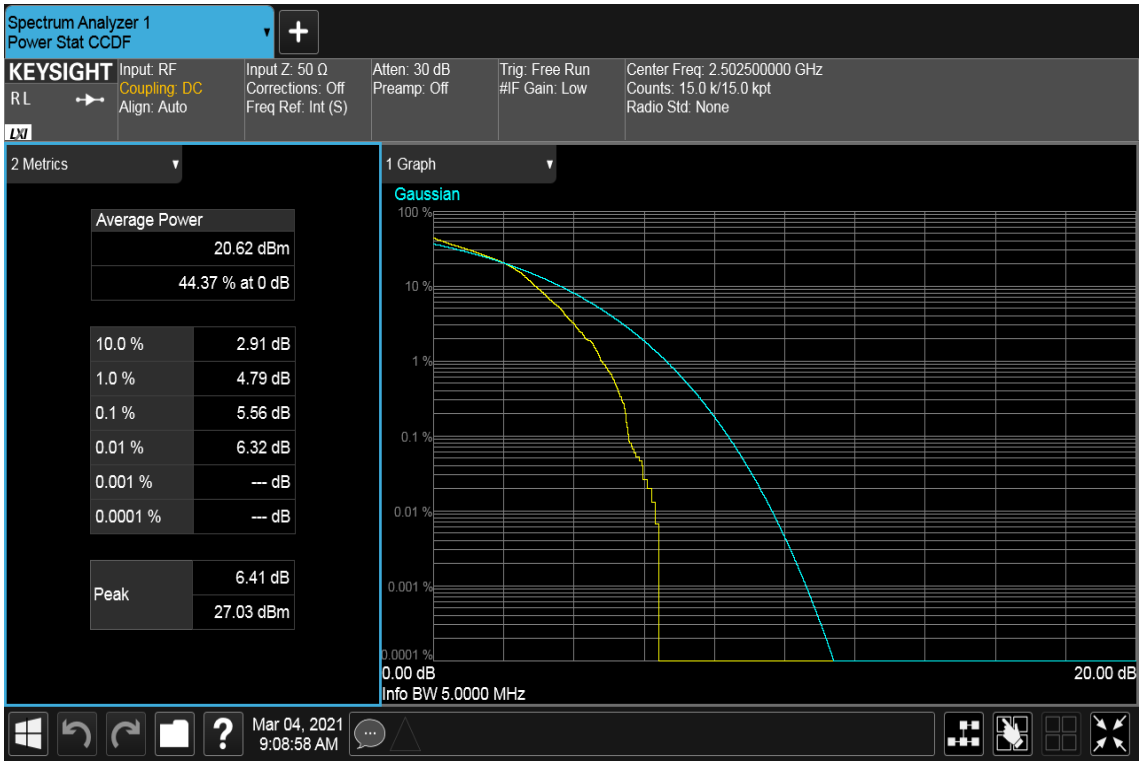
LTE Band 7

CHANNEL BANDWIDTH: 5MHz / 64QAM / RB =25, RB Offset = 0

CH Low



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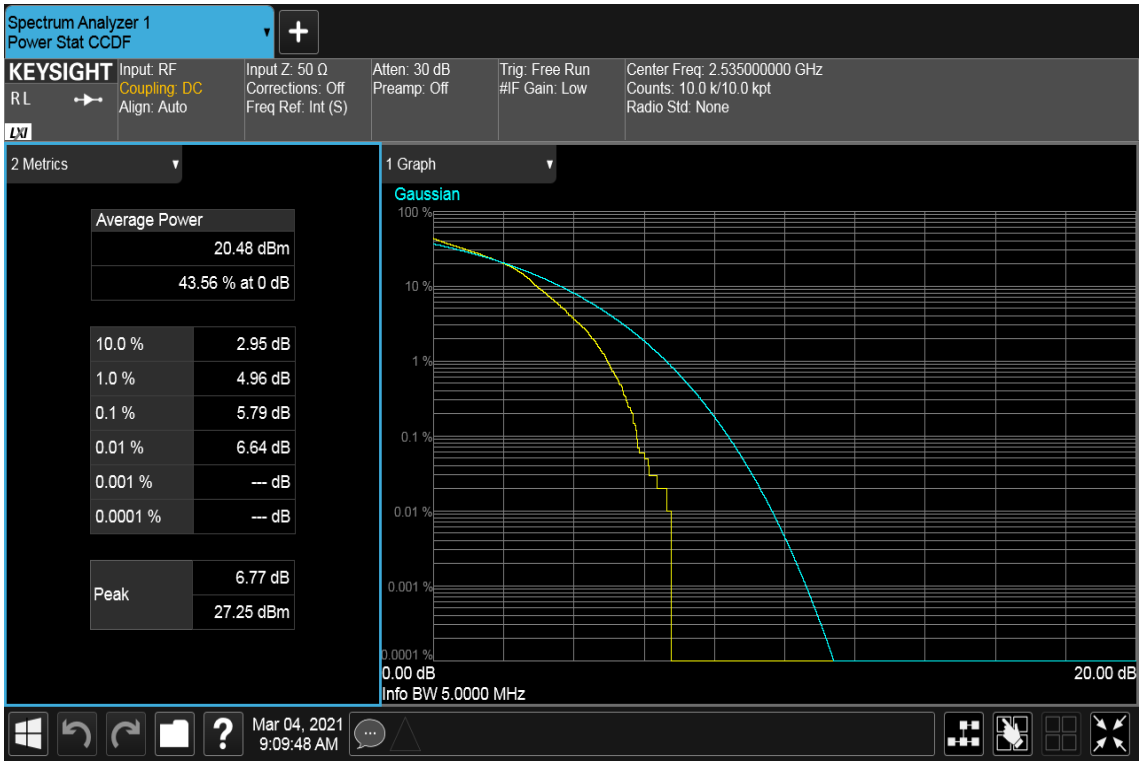

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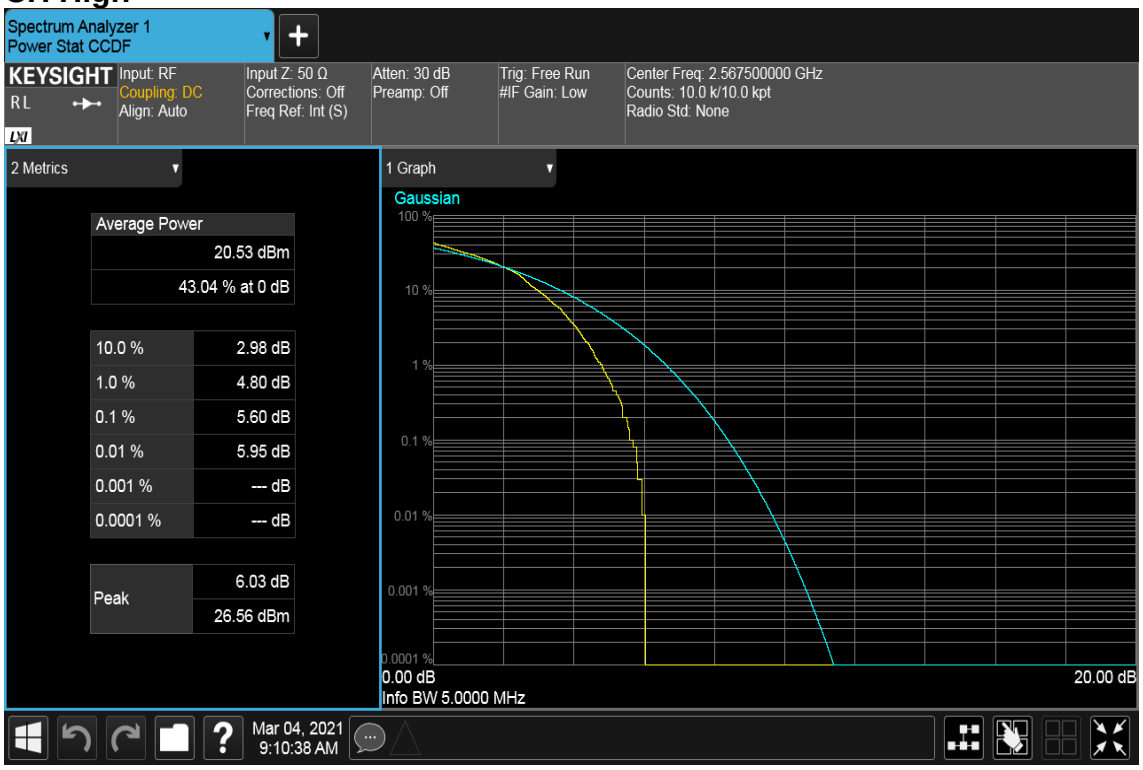
CH High



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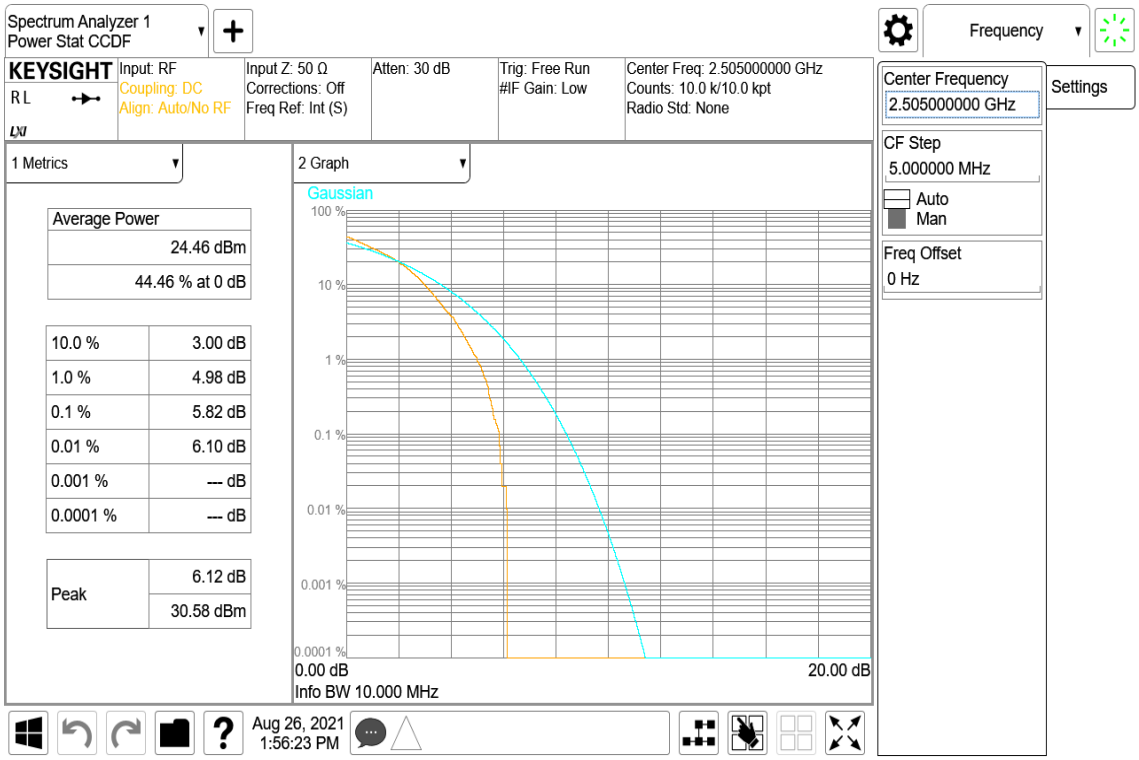
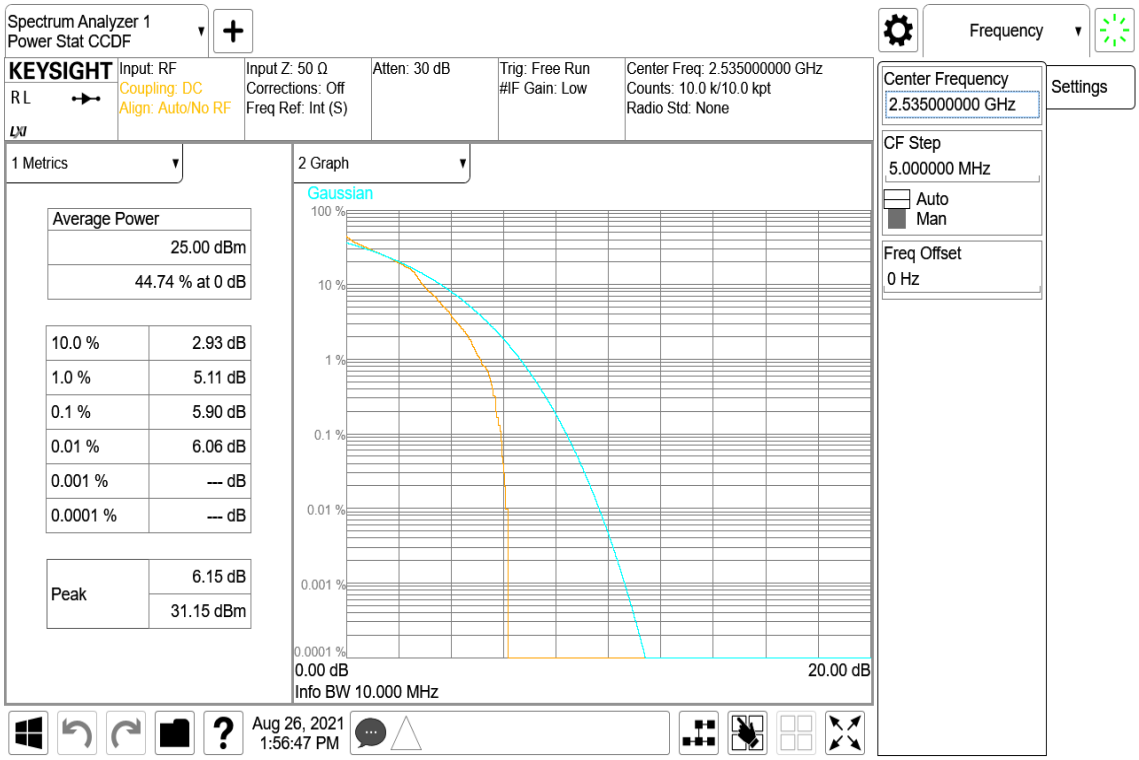
CHANNEL BANDWIDTH: 10MHz / 64QAM / RB =50, RB Offset = 0

CH Low



CH Mid



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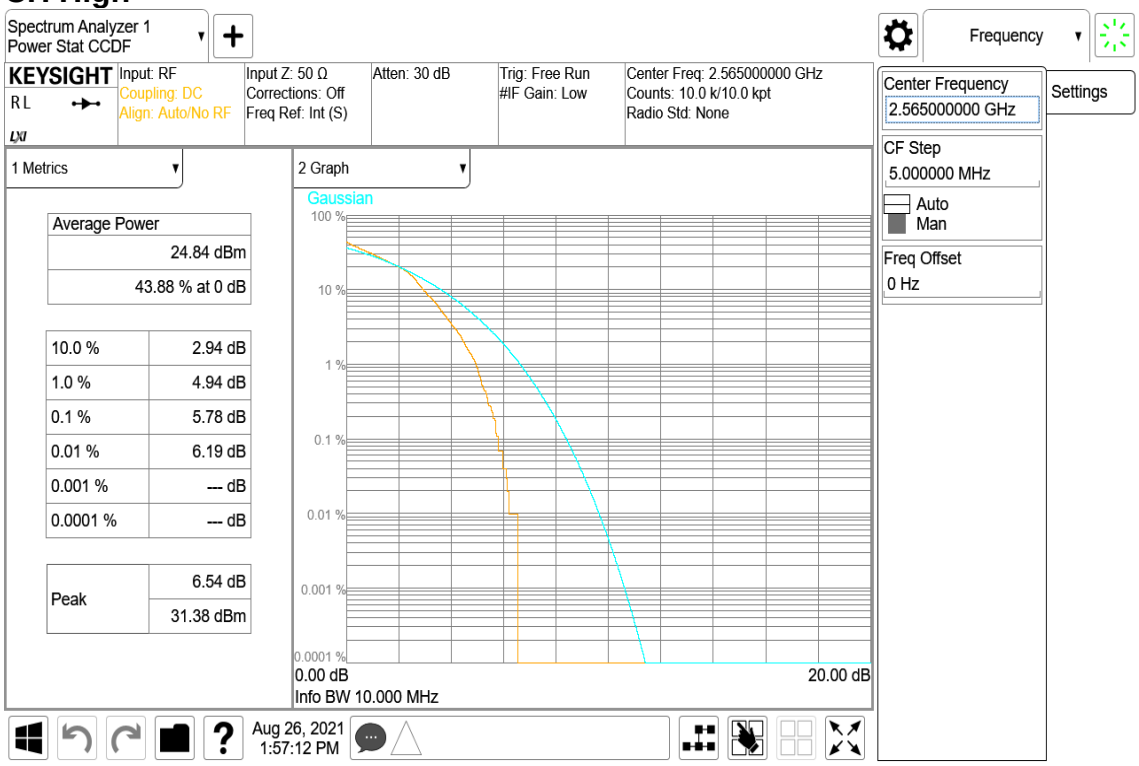
CH High



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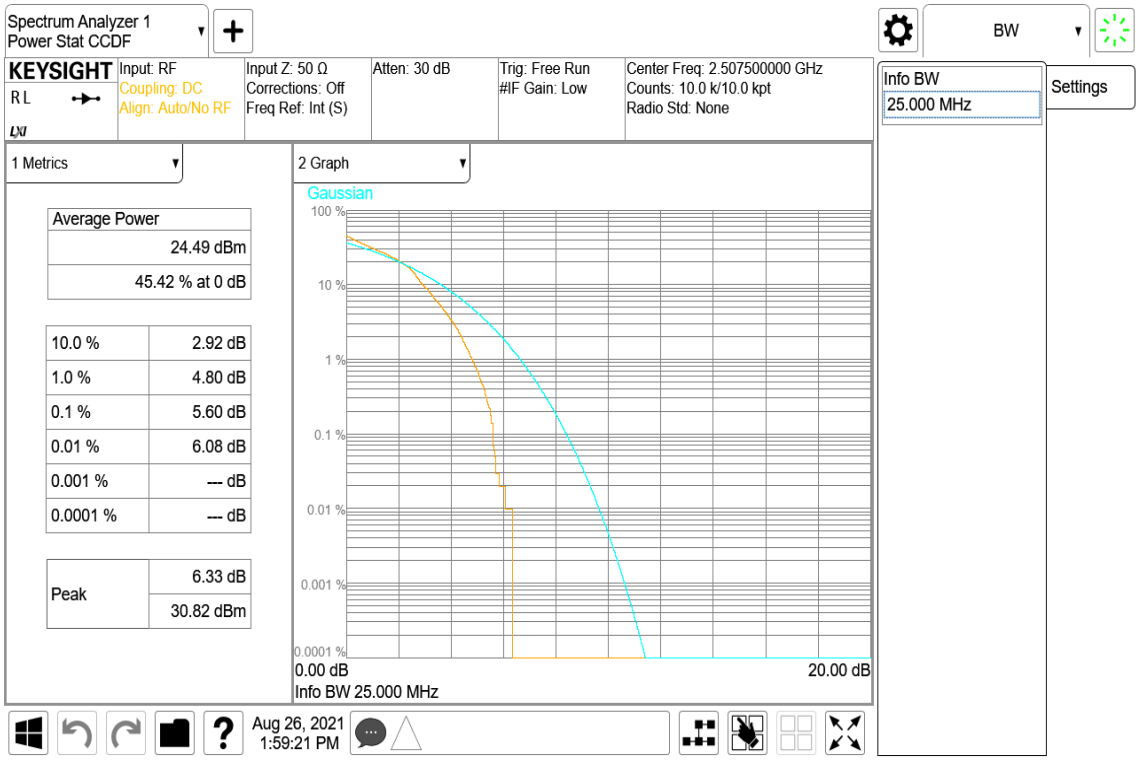
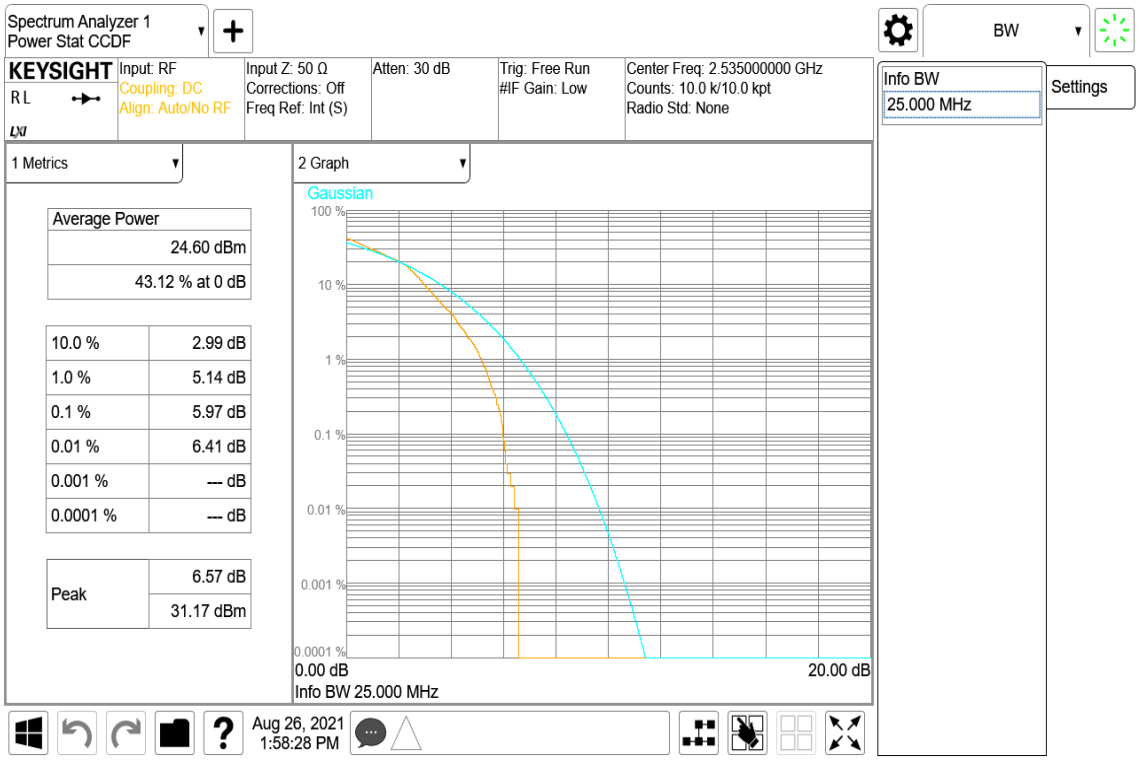
CHANNEL BANDWIDTH: 15MHz / 64QAM / RB =75, RB Offset = 0

CH Low



CH Mid



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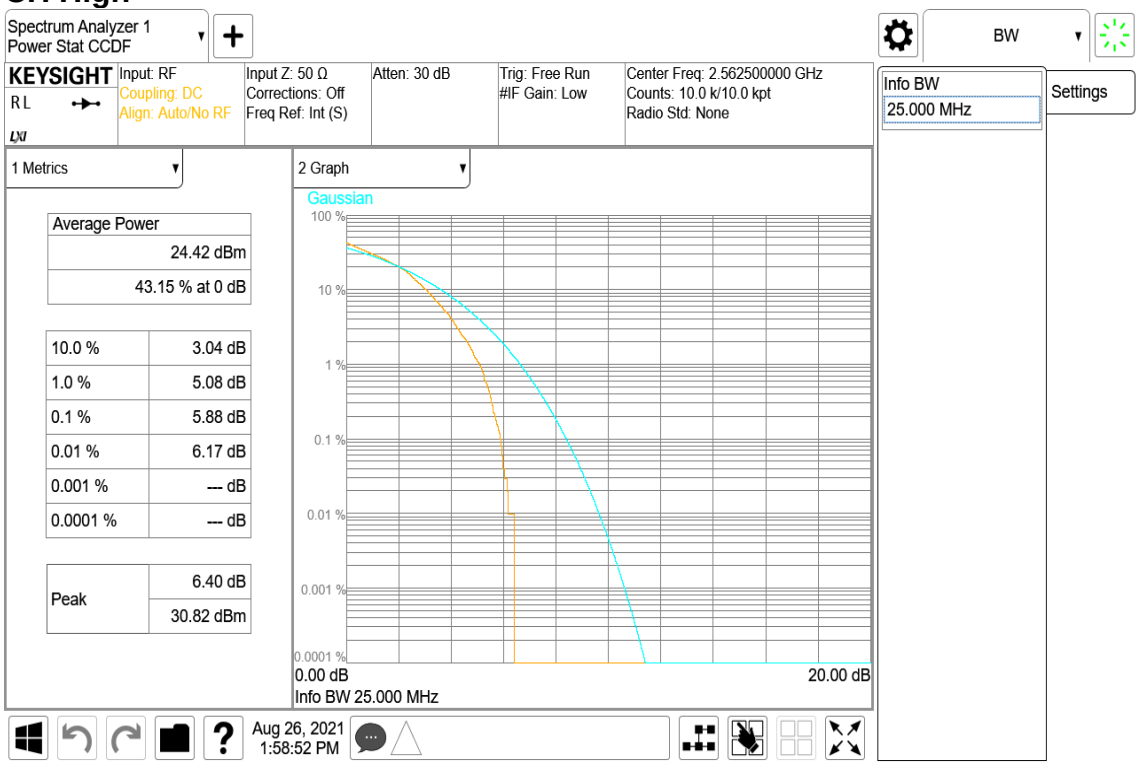
CH High



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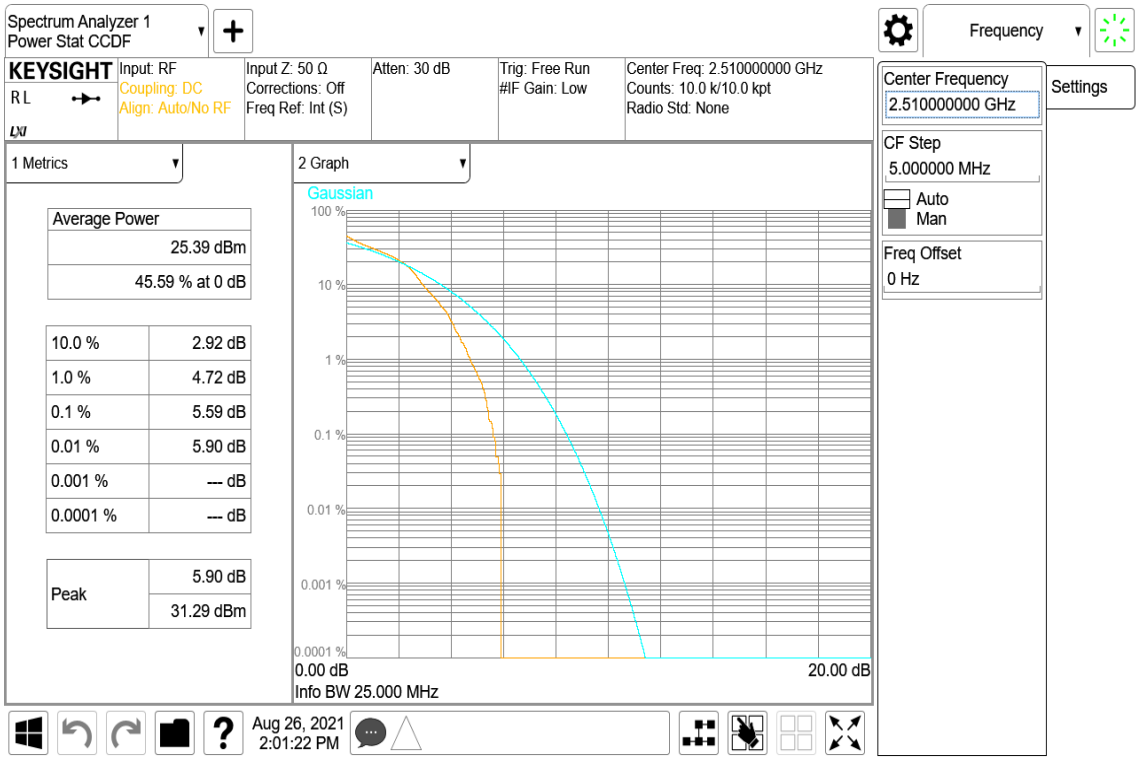
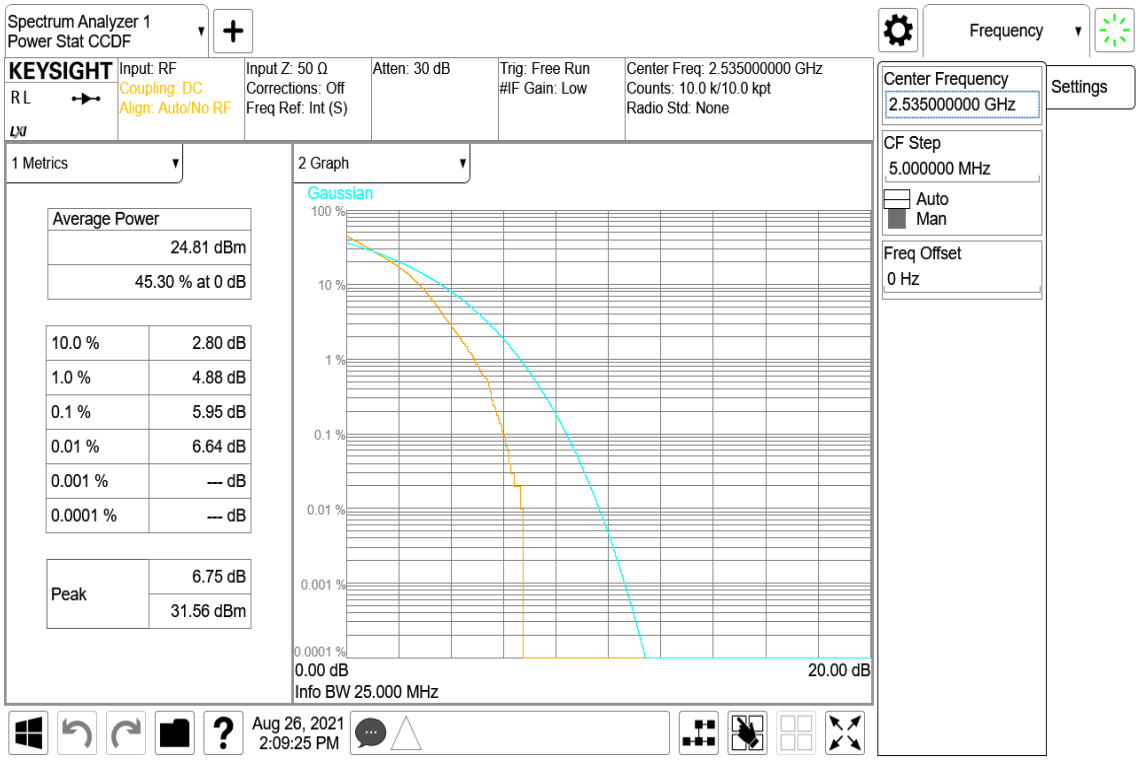
CHANNEL BANDWIDTH: 20MHz / 64QAM / RB =100, RB Offset = 0

CH Low



CH Mid



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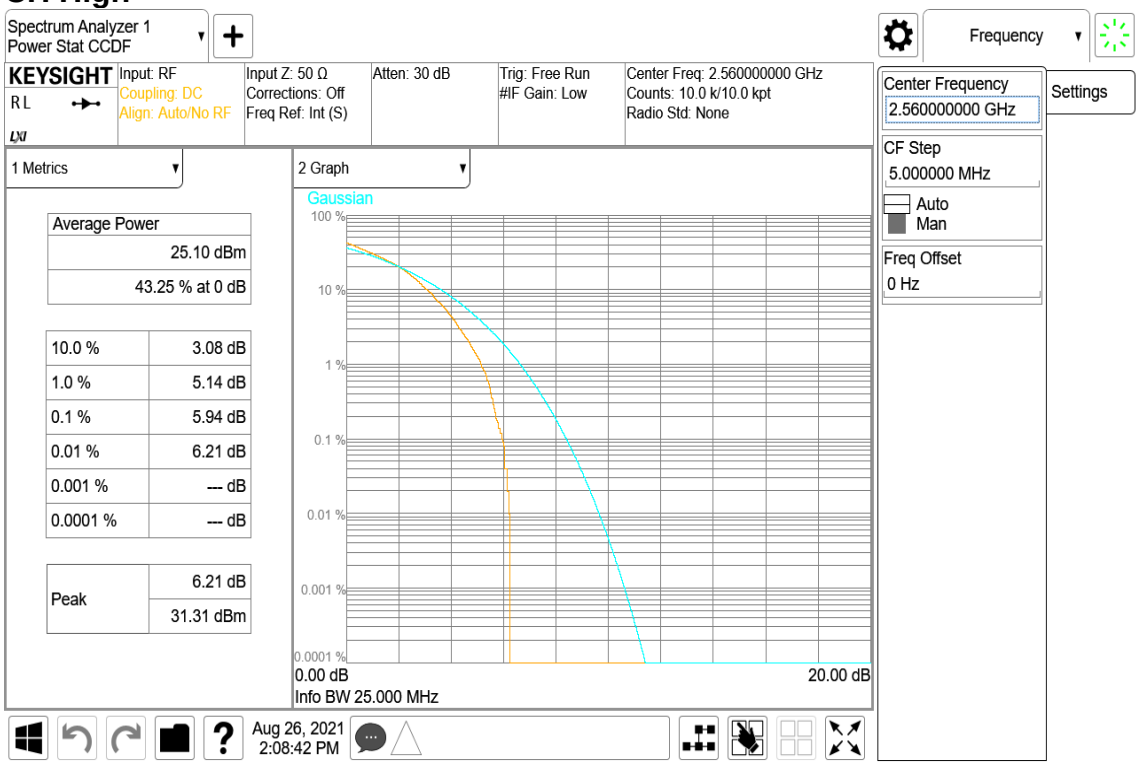
CH High



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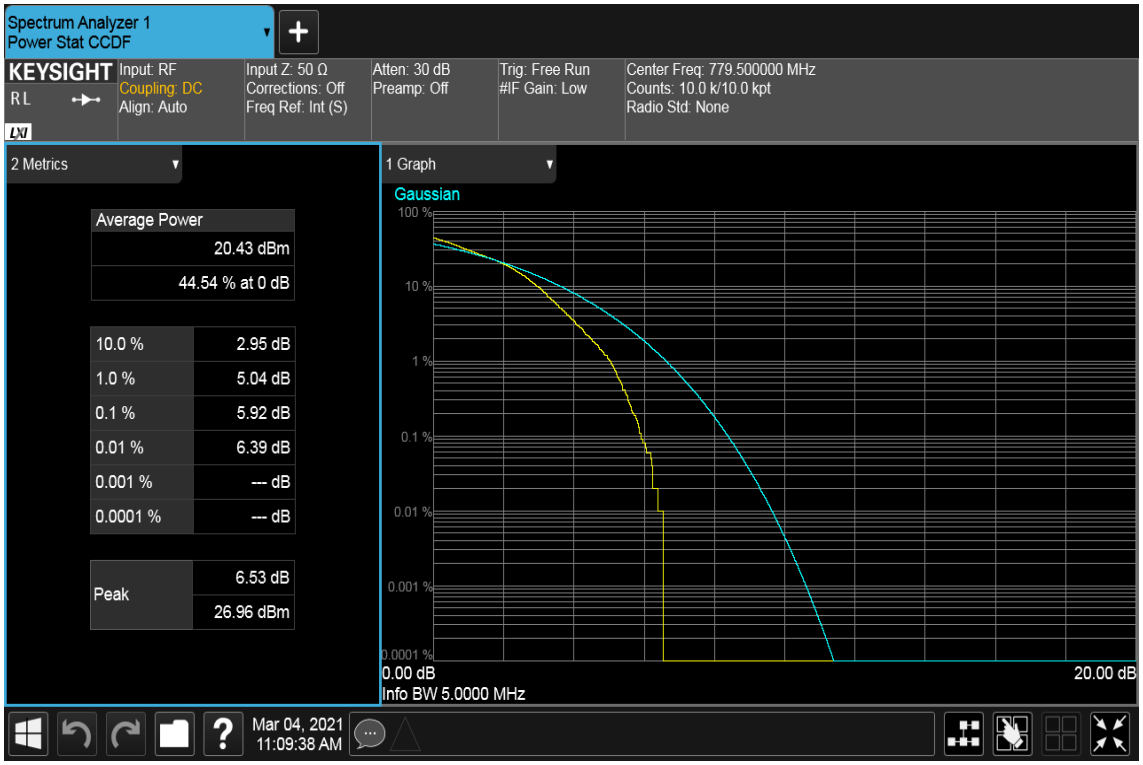
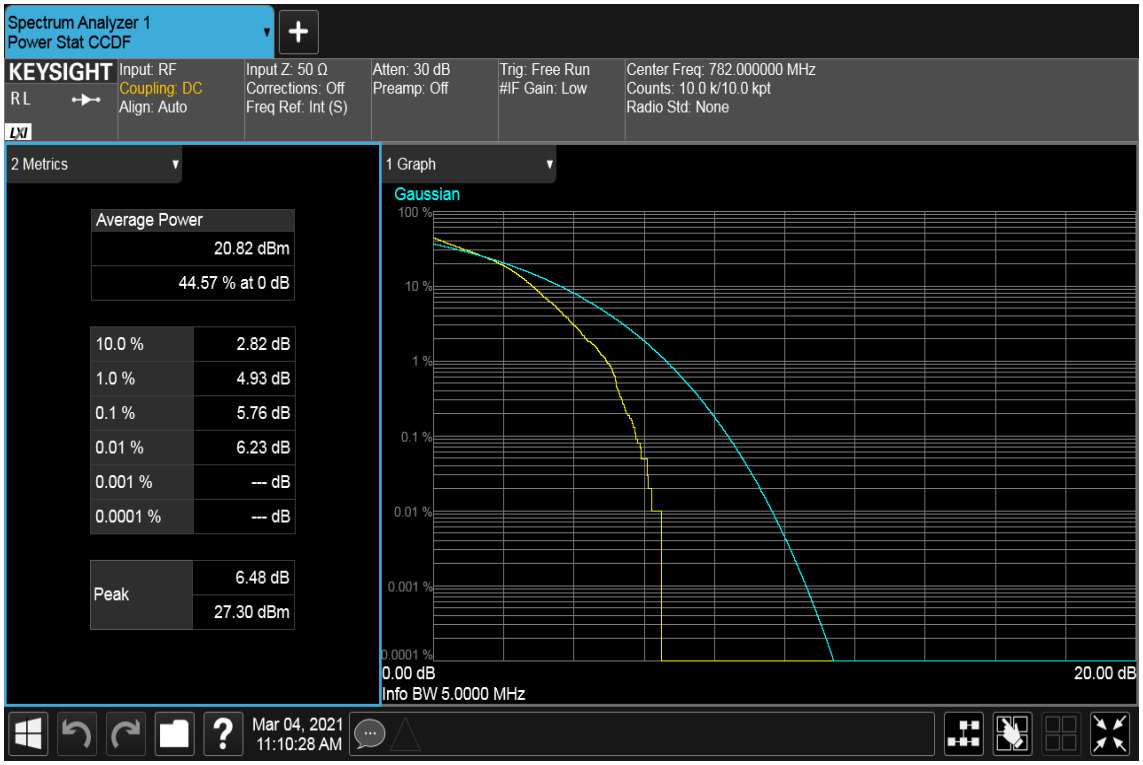
LTE Band 13

CHANNEL BANDWIDTH: 5MHz / 64QAM / RB =25, RB Offset = 0

CH Low



CH Mid



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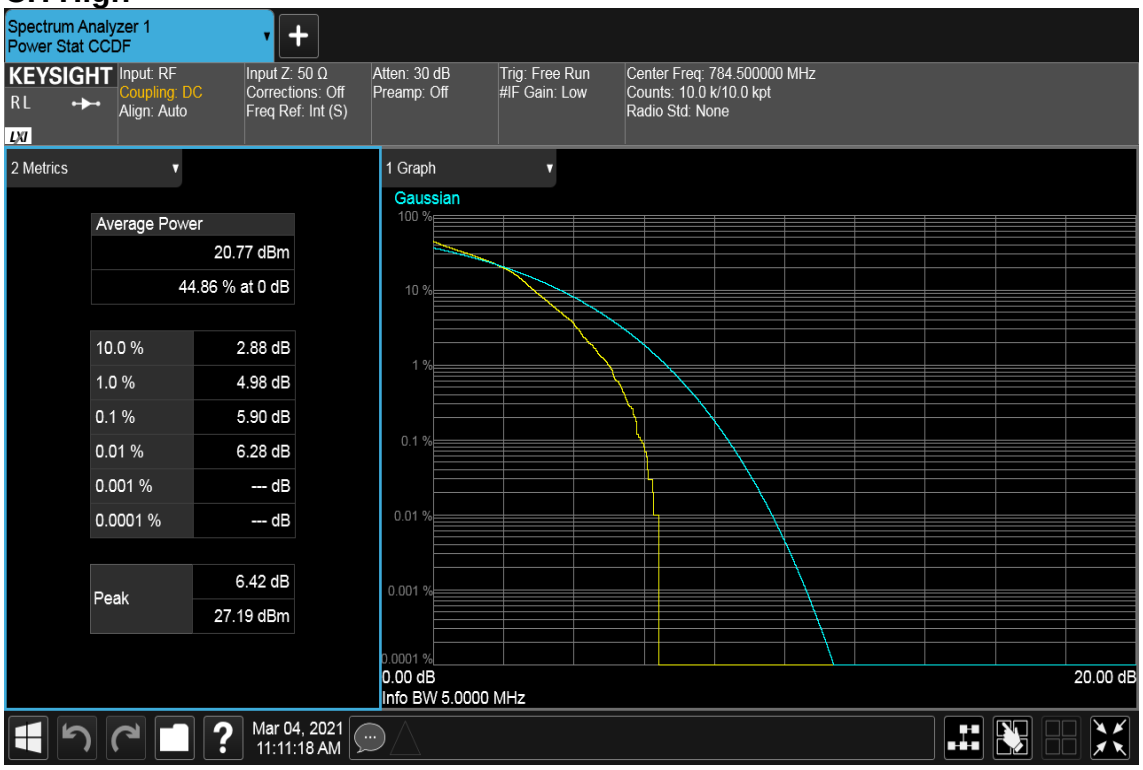
CH High



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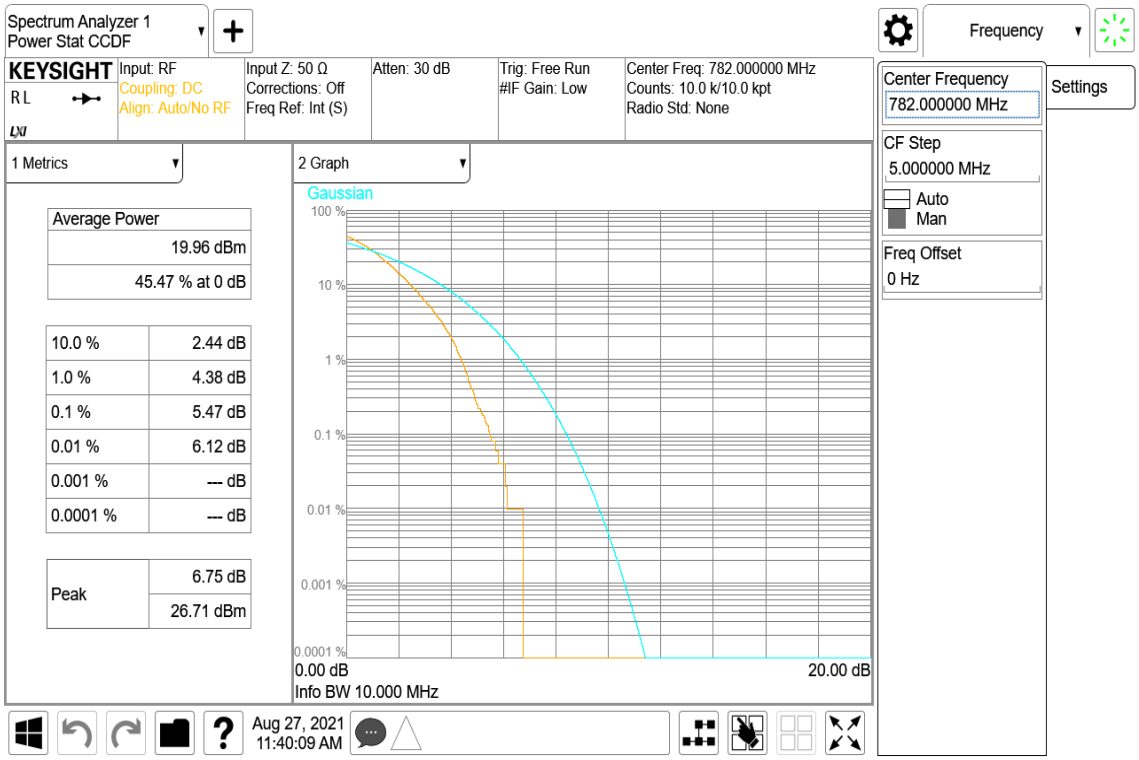
CHANNEL BANDWIDTH: 10MHz / 64QAM / RB =50, RB Offset = 0
CH Mid



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8.5 OUT OF BAND EMISSION AT ANTENNA TERMINALS

LIMIT

FCC §27.53(c) for LTE B13

For operations in the 746–758 MHz band and the 776–788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:(2) On any frequency outside the 776– 788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB (-13dBm)(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

FCC §27.53(m) (4) (6) for LTE B7

For mobile digital stations, the attenuation factor shall be not less than 40 + 10 log (P) dB on all frequencies between the channel edge and 5 megahertz from the channel edge, 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz and 55 + 10 log (P) dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.Measurement procedure. Compliance with these rules is based on the use of measurement nstrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed; for mobile digital stations, in the 1 megahertz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least two percent may be employed, except when the 1 megahertz band is 2495-2496 MHz, in which case a resolution bandwidth of at least one percent may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 megahertz or 1 percent of emission bandwidth, as specified; or 1 megahertz or 2 percent for mobile digital stations, except in the band 2495-2496 MHz). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. With respect to television operations, measurements must be made of the separate visual and aural operating powers at sufficiently frequent intervals to ensure compliance with the rules.

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FCC §27.53(h)(1) for LTE B4(h)

AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least 43 + 10 log10 (P) dB.

ISED RSS-130 §4.7.1, 4.7.2 for LTE B13

Compliance for operations in the 617-652 MHz, 663-698 MHz, 698-756 MHz and the 777-787 MHz band, the unwanted emissions in any 100 kHz bandwidth on any frequency outside the low frequency edge and the high frequency edge of each frequency block range(s), shall be attenuated below the transmitter power, P (dBW), by at least 43 + 10 log10 p (watts), dB. However, in the 100 kHz band immediately outside of the equipment's frequency block range, a resolution bandwidth of 30 kHz may be employed.

In addition to the limit outlined in section 4.7.1 above, equipment operating in the frequency bands 746-756 MHz and 777-787 MHz shall also comply with the following restrictions:the power of any unwanted emissions in any 6.25 kHz bandwidth for all frequencies between 763-775 MHz and 793-806 MHz shall be attenuated below the transmitter power, P (dBW), by at least:76 + 10 log10 p (watts), dB, for base and fixed equipment and65 + 10 log10 p (watts), dB, for mobile and portable equipmentthe e.i.r.p. in the band 1559-1610 MHz shall not exceed −70 dBW/MHz for wideband signal and −80 dBW for discrete emission with bandwidth less than 700 Hz.

RSS-139 §6.6 for LTE B4,

In the first 1.0 MHz bands immediately outside and adjacent to the equipment’s smallest operating frequency block,Footnote 2 which can contain the equipment’s occupied bandwidth, the emission power per any 1% of the emission bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.After the first 1.0 MHz outside the equipment’s smallest operating frequency block, which can contain the equipment’s occupied bandwidth, the emission power in any 1 MHz bandwidth shall be attenuated below the transmitter output power P (in dBW) by at least 43 + 10 log10 p (watts) dB.

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RSS-199 §4.5 for LTE B7

In the 1 MHz band immediately outside and adjacent to the channel edge, the unwanted emission power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth for base station and fixed subscriber equipment, and 2% for mobile subscriber equipment. Beyond the 1 MHz band, a resolution bandwidth of 1 MHz shall be used. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz, or 1% or 2% of the occupied bandwidth, as applicable.Equipment shall comply with the following unwanted emission limits:for base station and fixed subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least 43 + 10 log10 p for mobile subscriber equipment, the power of any unwanted emissions measured as above shall be attenuated (in dB) below the transmitter power, P (dBW), by at least:
40 + 10 log10 p from the channel edges to 5 MHz away
43 + 10 log10 p between 5 MHz and X MHz from the channel edges, and
55 + 10 log10 p at X MHz and beyond from the channel edges
In addition, the attenuation shall not be less than 43 + 10 log10 p on all frequencies between 2490.5 MHz and 2496 MHz, and 55 + 10 log10 p at or below 2490.5 MHz.In (a) and (b), p is the transmitter power measured in watts and X is 6 MHz or the equipment occupied bandwidth, whichever is greater.
p is the transmitter power measured in watts and **X** is 6 MHz or the equipment occupied bandwidth, whichever is greater.

TEST PROCEDURES

KDB 971168 D01 Power Meas License Digital Systems – Section 6.0
1. RBW ≥ 1% of the emission bandwidth
2. VBW ≥ 3 x RBW
3. Span was set large enough so as to capture all out of emissions near the band edge.

TEST RESULTS:

Temperature:	23.2 ~ 24.1℃	**Humidity:**	56.9 ~ 58.3% RH
Tested by:	Jerry Chang	**Test Date:**	March 3 ~ 4, 2021
Temperature:	22.4℃	**Humidity:**	53.8% RH
Tested by:	Jerry Chang	**Test Date:**	June 24, 2021
Temperature:	25.2℃	**Humidity:**	55.4% RH
Tested by:	Jerry Chang	**Test Date:**	June 25, 2021
Temperature:	25.8℃	**Humidity:**	57.4% RH
Tested by:	Jerry Chang	**Test Date:**	August 26, 2021

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Band Edge
LTE Band 4
CHANNEL BANDWIDTH: 1.4MHz / QPSK / RB =6, RB Offset = 0
LOWER BAND EDGE

HIGHER BAND EDGE

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CHANNEL BANDWIDTH: 1.4MHz / QPSK / RB =1, RB Offset = 0
LOWER BAND EDGE

CHANNEL BANDWIDTH: 1.4MHz / QPSK / RB =1, RB Offset = 5
HIGHER BAND EDGE

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CHANNEL BANDWIDTH: 3MHz / QPSK / RB =15, RB Offset = 0

LOWER BAND EDGE

HIGHER BAND EDGE

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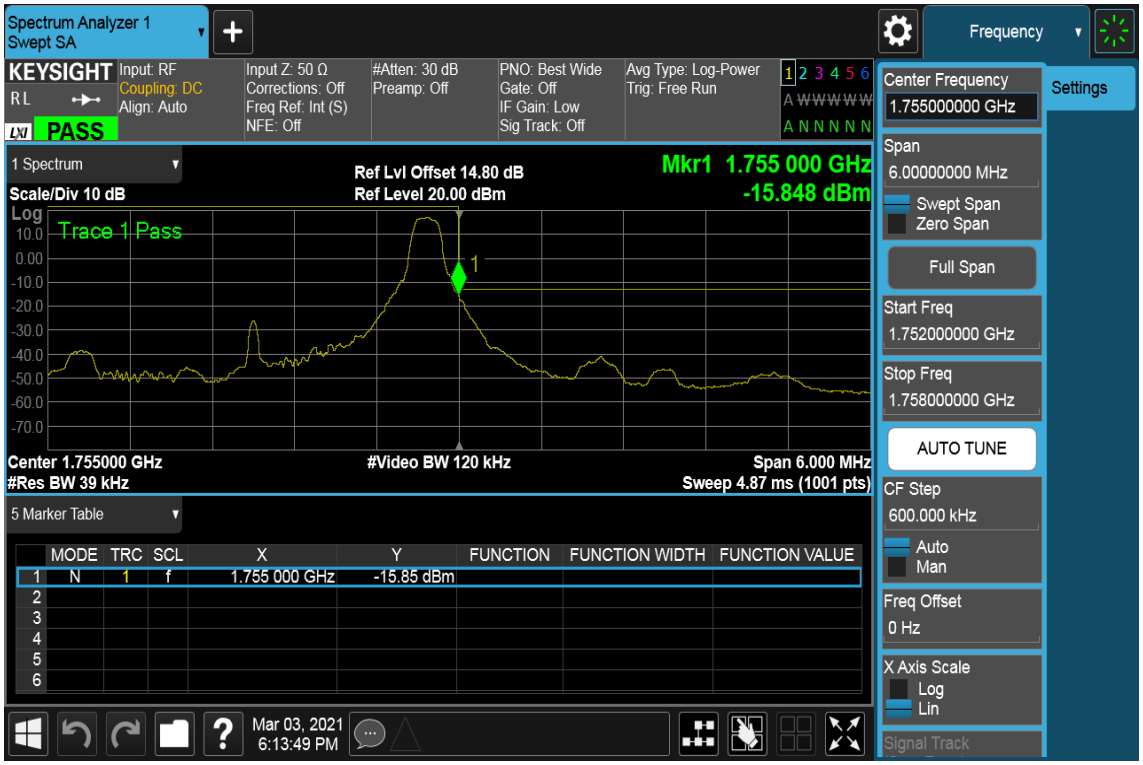
CHANNEL BANDWIDTH: 3MHz / QPSK / RB =1, RB Offset = 0
LOWER BAND EDGE

CHANNEL BANDWIDTH: 3MHz / QPSK / RB =1, RB Offset = 14
HIGHER BAND EDGE



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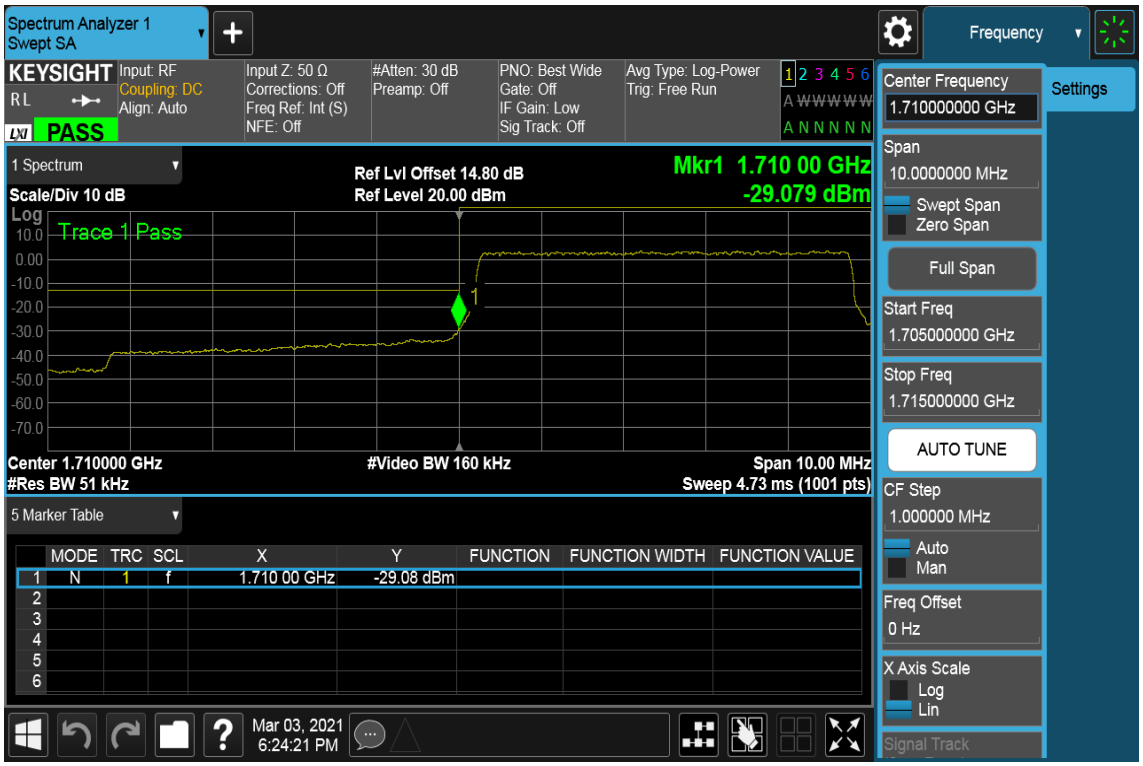
CHANNEL BANDWIDTH: 5MHz / QPSK / RB =25, RB Offset = 0

LOWER BAND EDGE



HIGHER BAND EDGE

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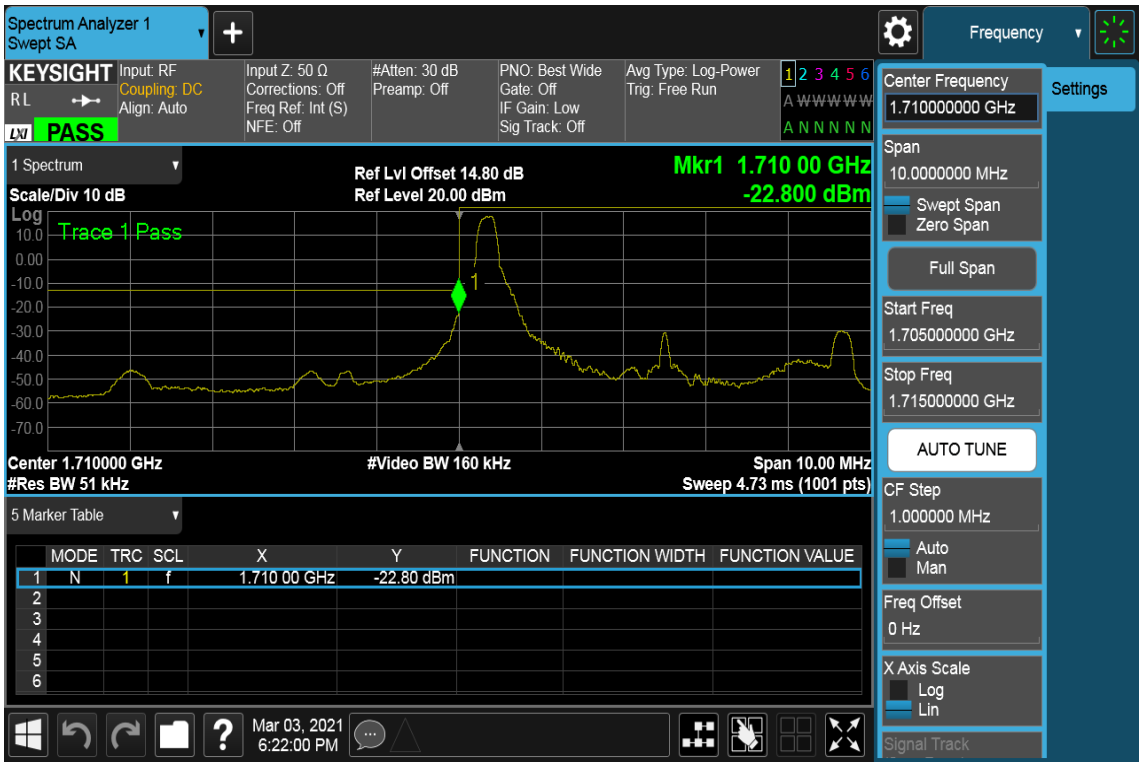
CHANNEL BANDWIDTH: 5MHz / QPSK / RB =1, RB Offset = 0
LOWER BAND EDGE



CHANNEL BANDWIDTH: 5MHz / QPSK / RB =1, RB Offset = 24
HIGHER BAND EDGE

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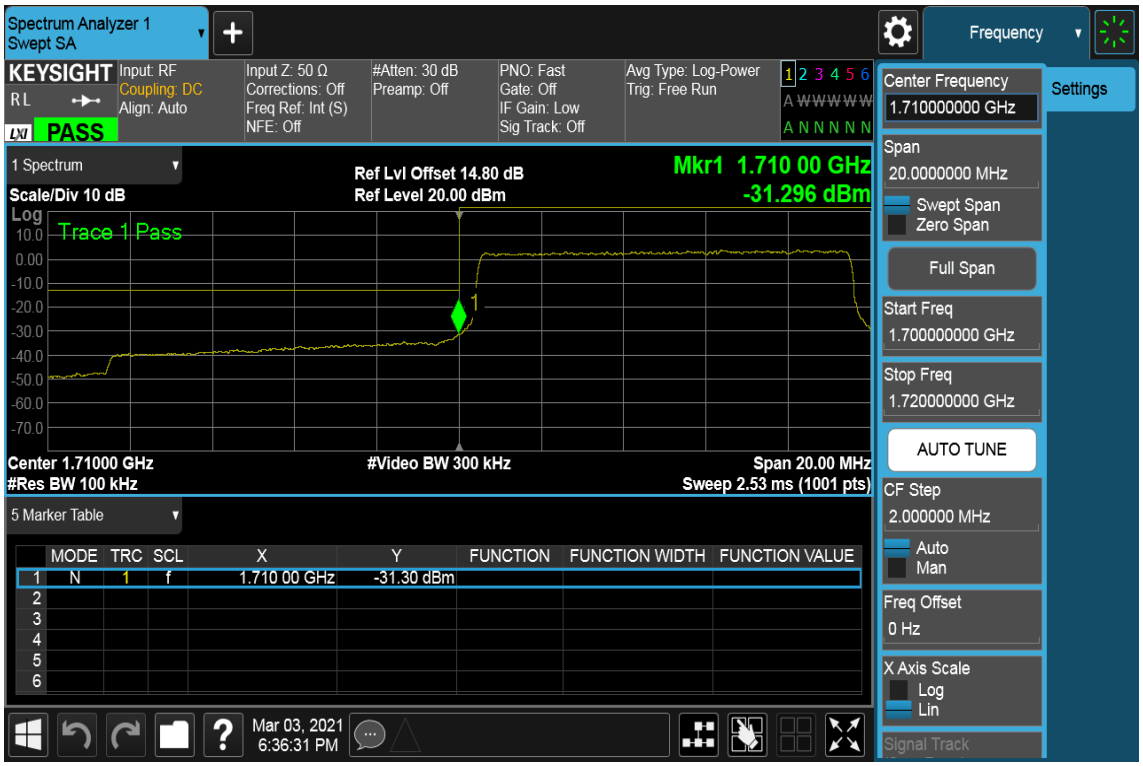
CHANNEL BANDWIDTH: 10MHz / QPSK / RB =50, RB Offset = 0

LOWER BAND EDGE



HIGHER BAND EDGE

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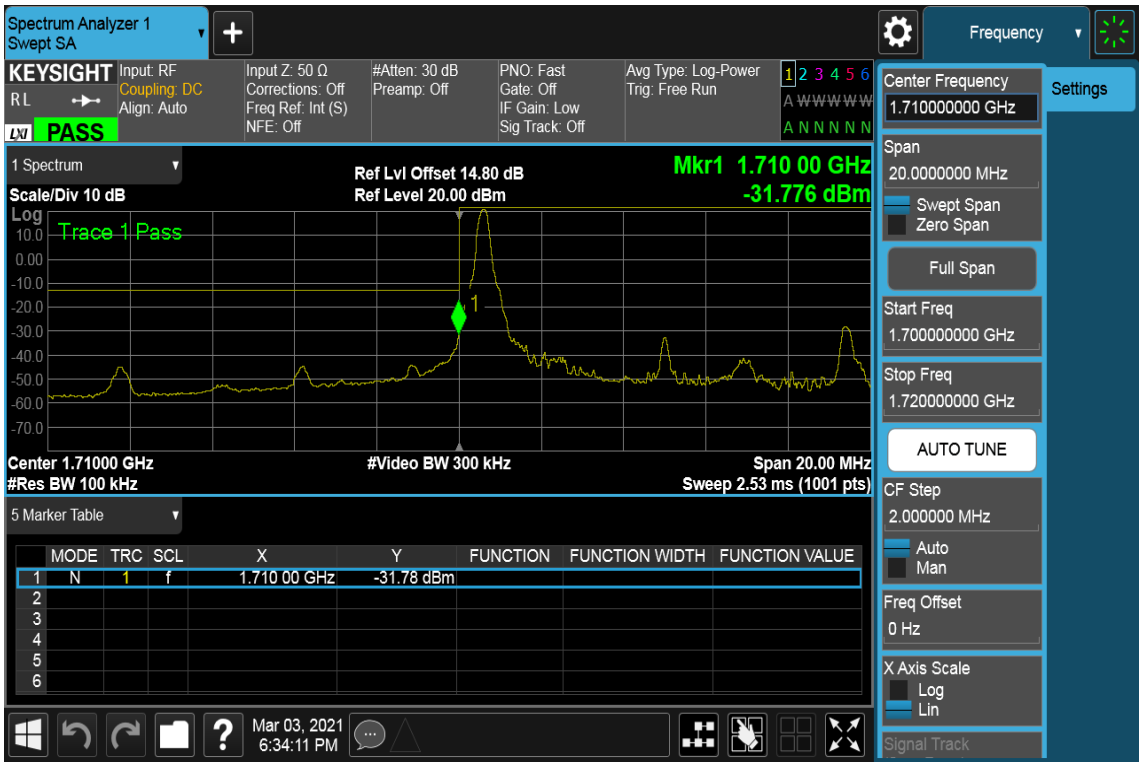
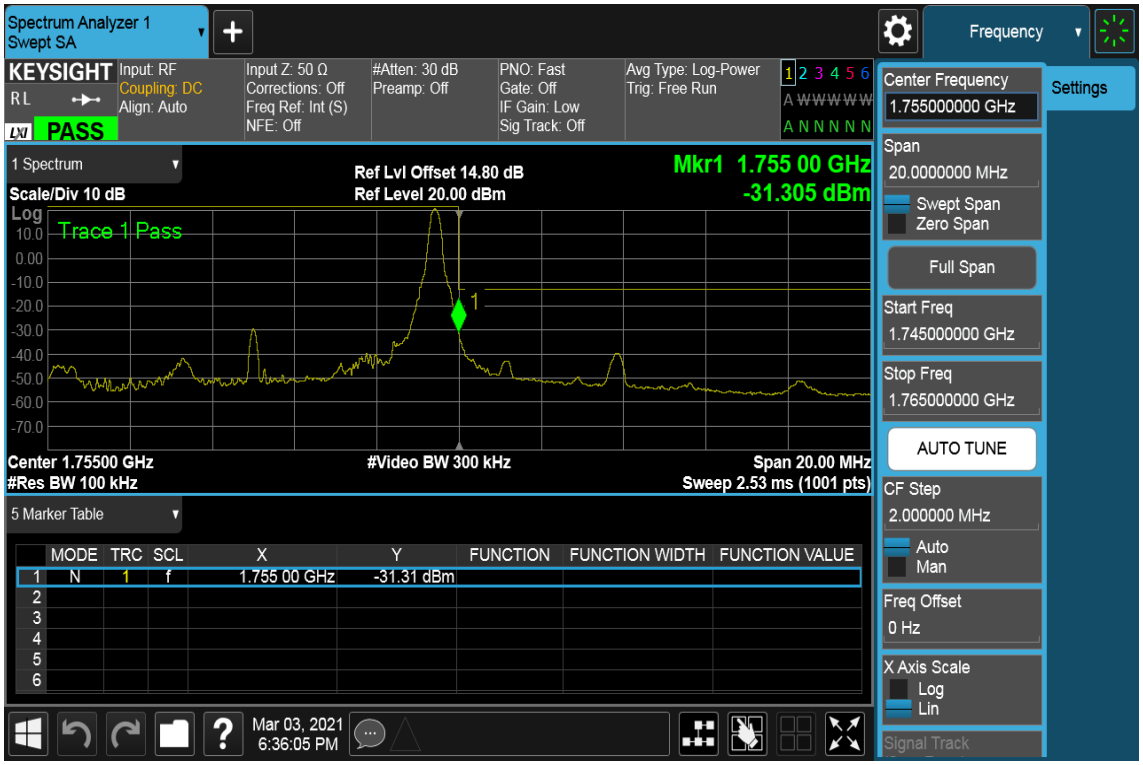
CHANNEL BANDWIDTH: 10MHz / QPSK / RB =1, RB Offset = 0
LOWER BAND EDGE



CHANNEL BANDWIDTH: 10MHz / QPSK / RB =1, RB Offset = 49
HIGHER BAND EDGE



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CHANNEL BANDWIDTH: 15MHz / QPSK / RB =75, RB Offset = 0

LOWER BAND EDGE

HIGHER BAND EDGE

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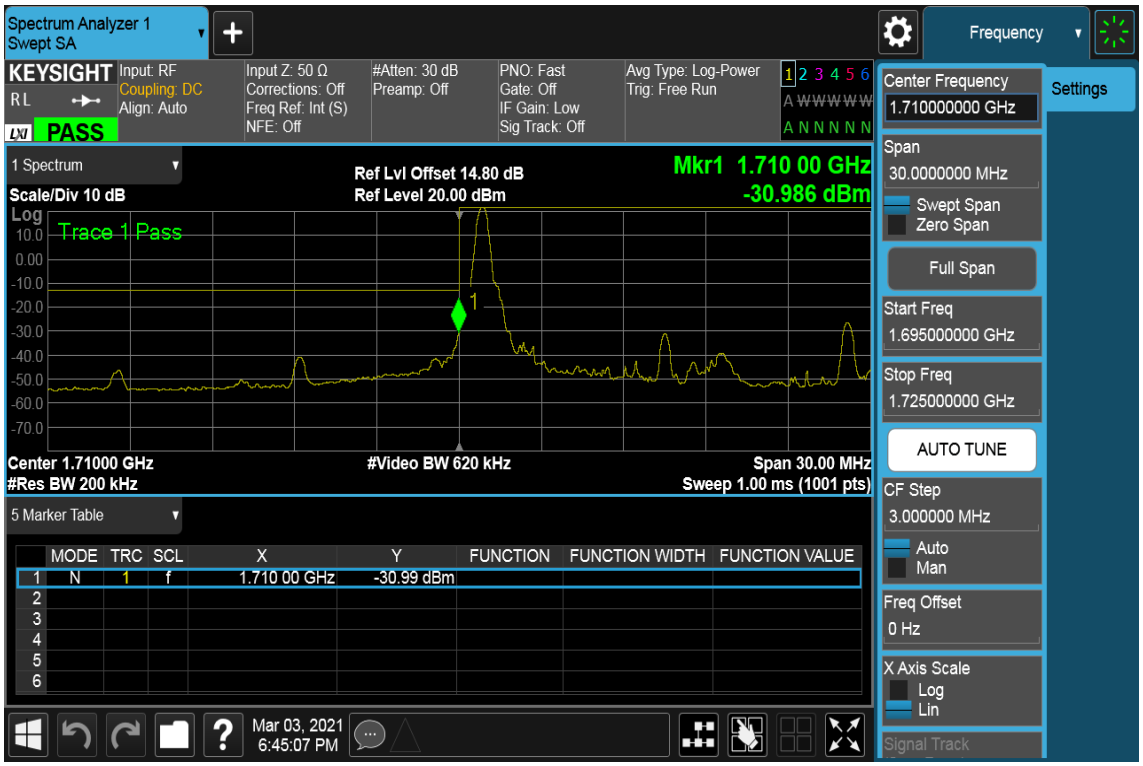
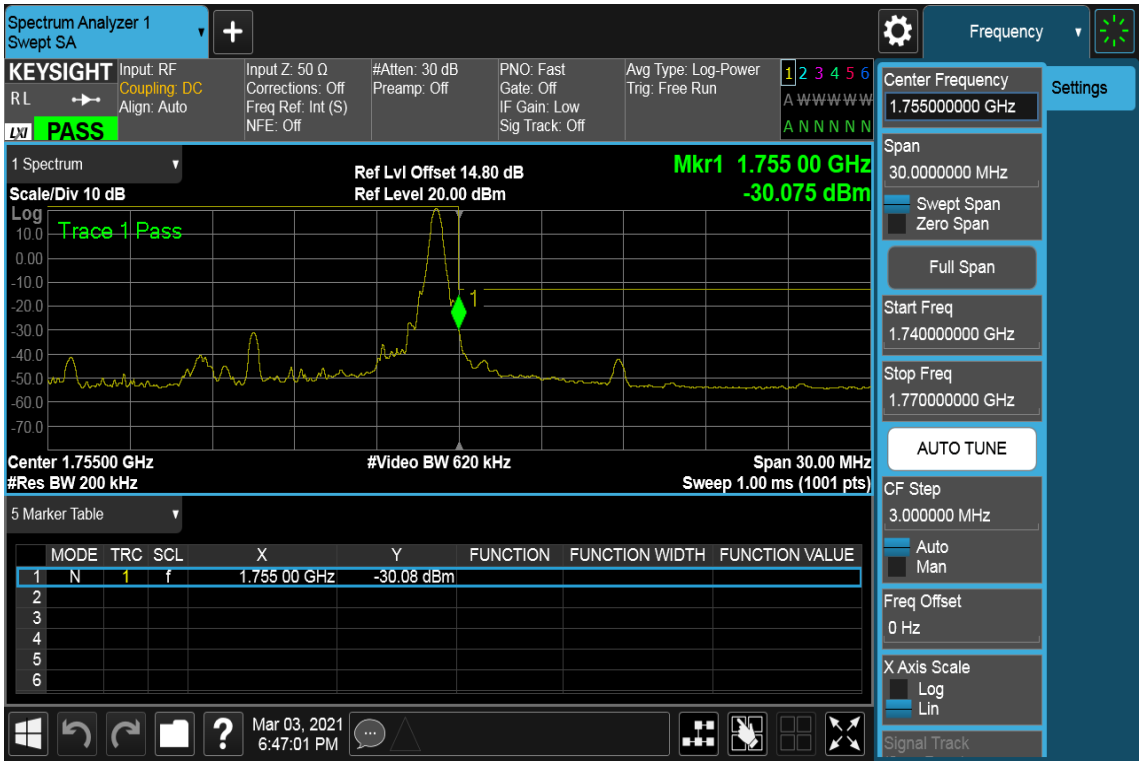
CHANNEL BANDWIDTH: 15MHz / QPSK / RB =1, RB Offset = 0
LOWER BAND EDGE



CHANNEL BANDWIDTH: 15MHz / QPSK / RB =1, RB Offset = 74
HIGHER BAND EDGE



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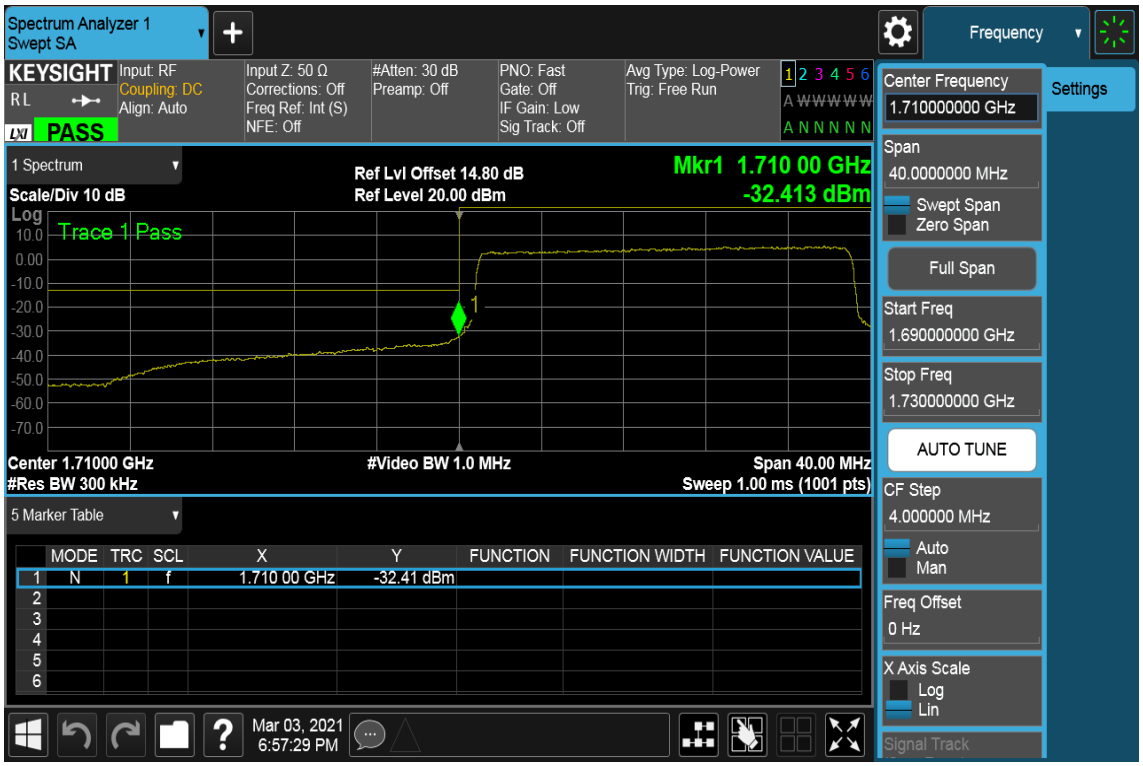
CHANNEL BANDWIDTH: 20MHz / QPSK / RB =100, RB Offset = 0

LOWER BAND EDGE



HIGHER BAND EDGE

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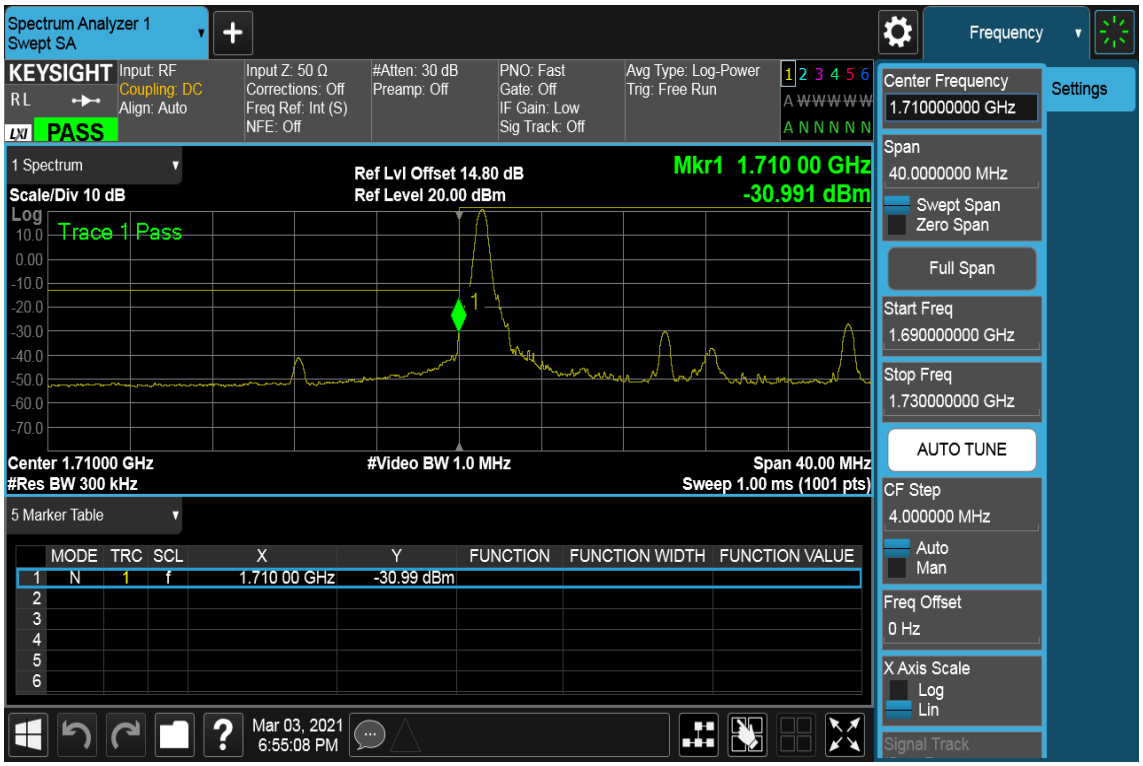
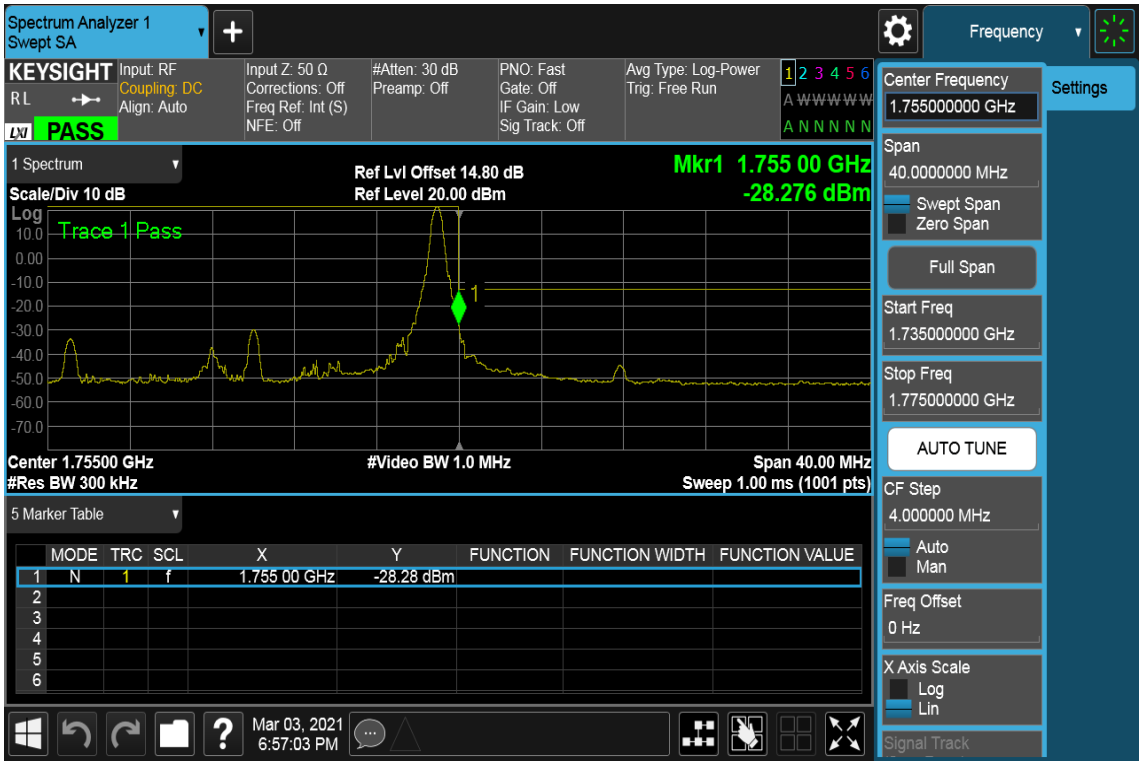
CHANNEL BANDWIDTH: 20MHz / QPSK / RB =1, RB Offset = 0
LOWER BAND EDGE



CHANNEL BANDWIDTH: 20MHz / QPSK / RB =1, RB Offset = 99
HIGHER BAND EDGE



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