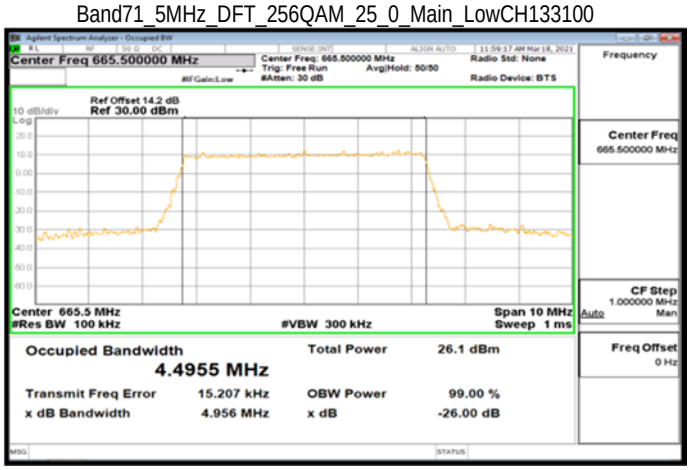
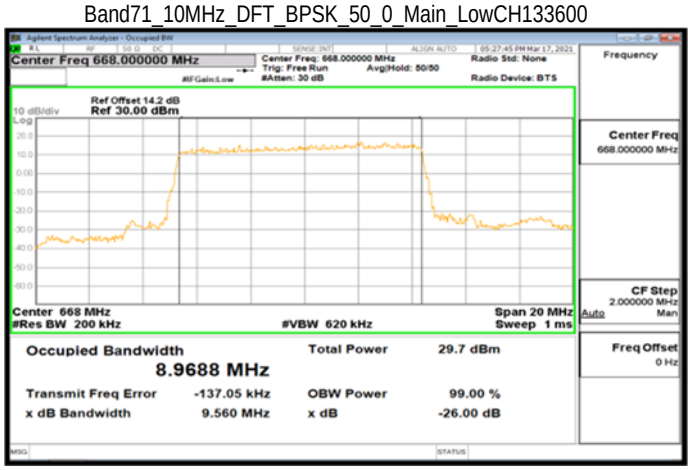
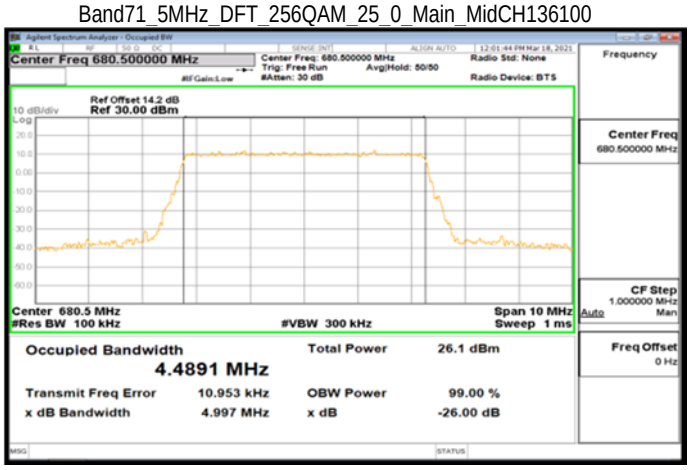
Band71_5MHz_DFT_256QAM_25_0_Main_LowCH133100



Band71_10MHz_DFT_BPSK_50_0_Main_LowCH133600



Band71_5MHz_DFT_256QAM_25_0_Main_MidCH136100



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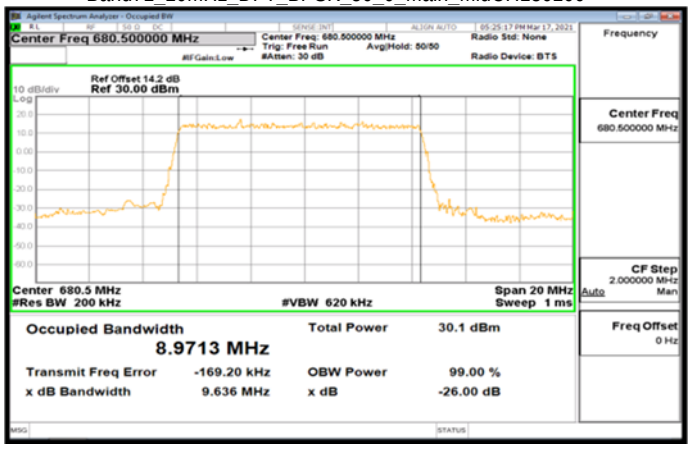

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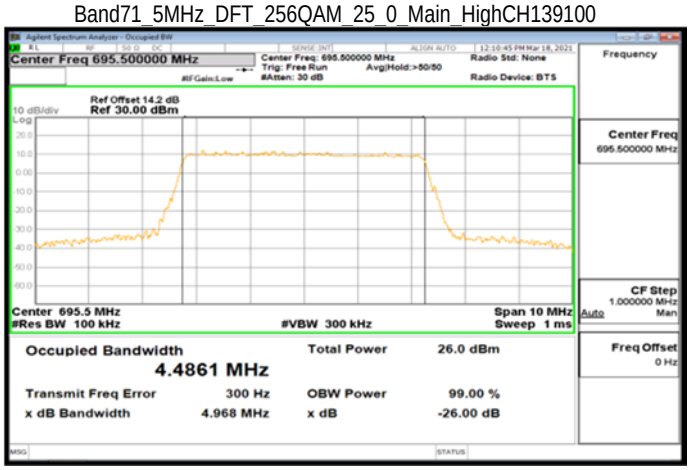

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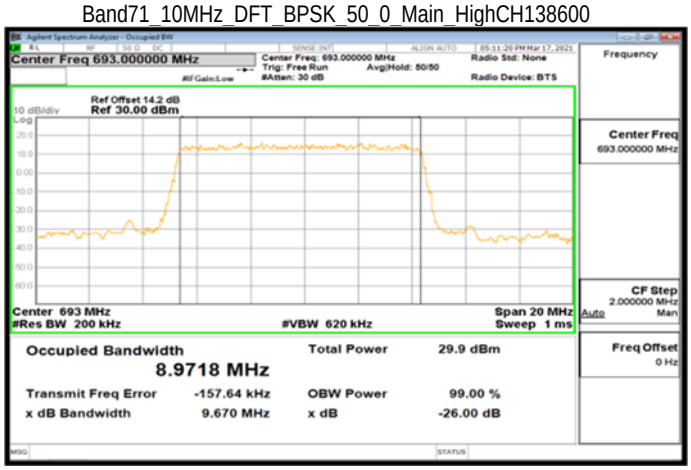

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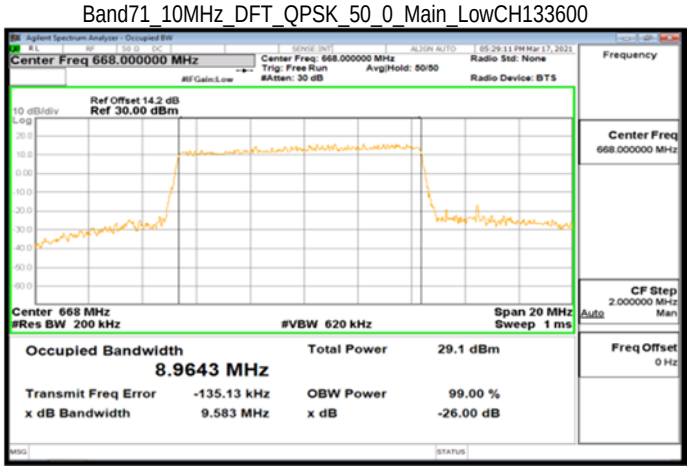

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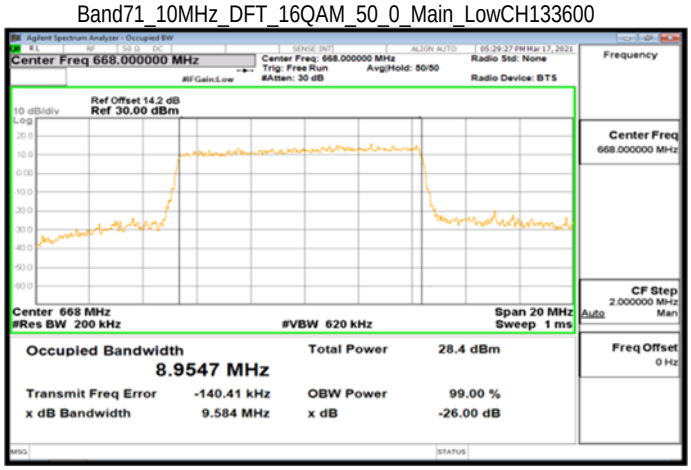

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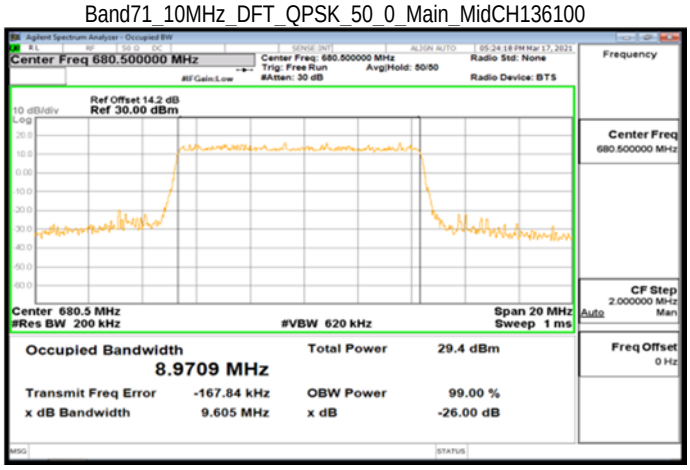

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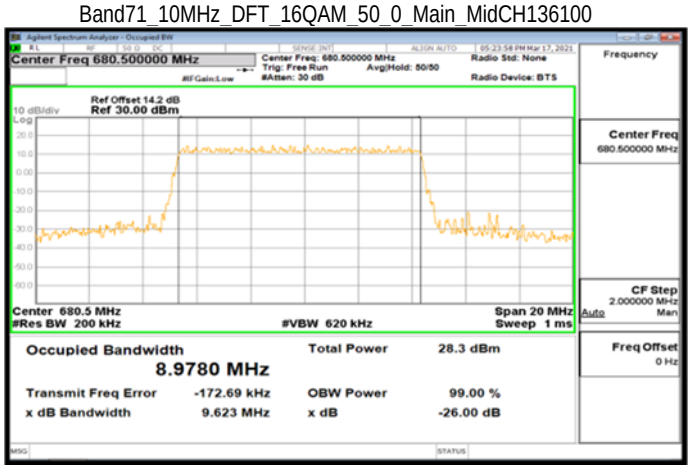

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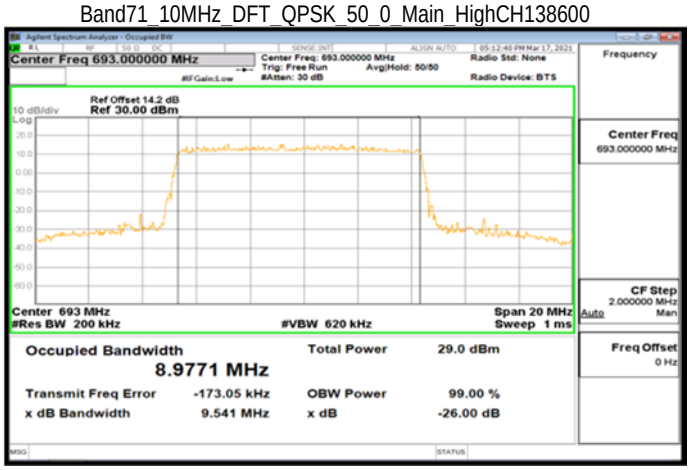

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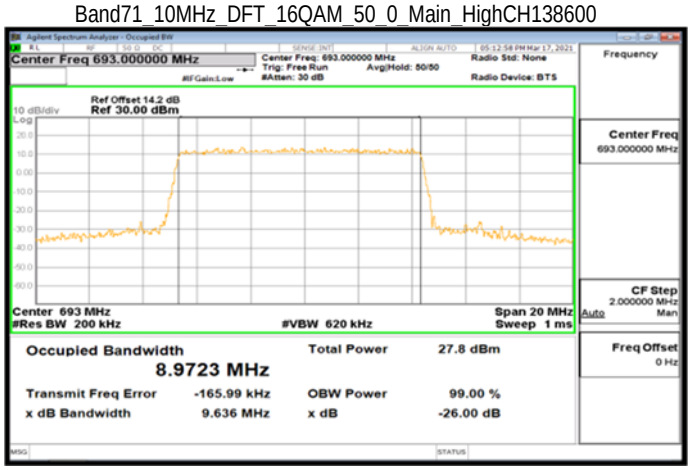

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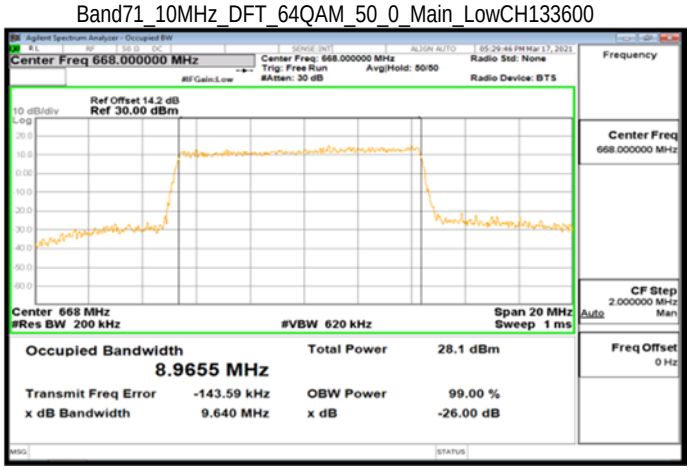

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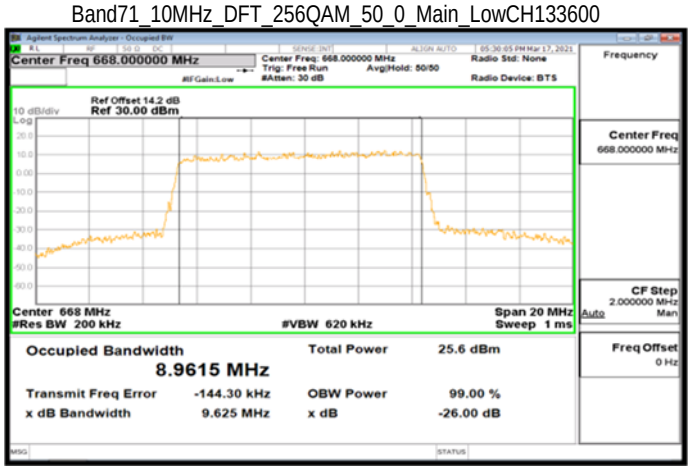
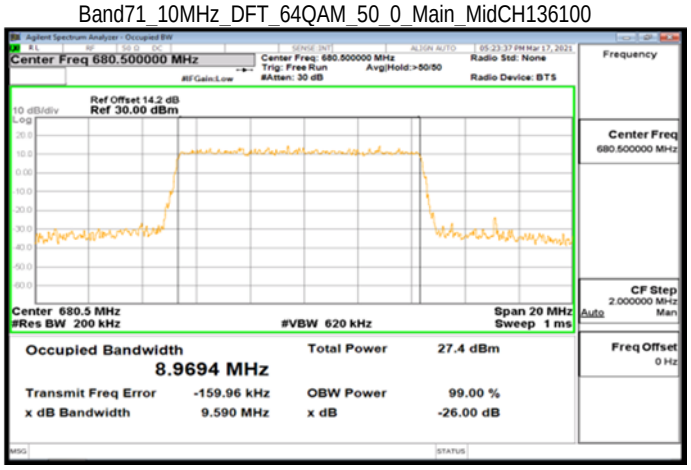
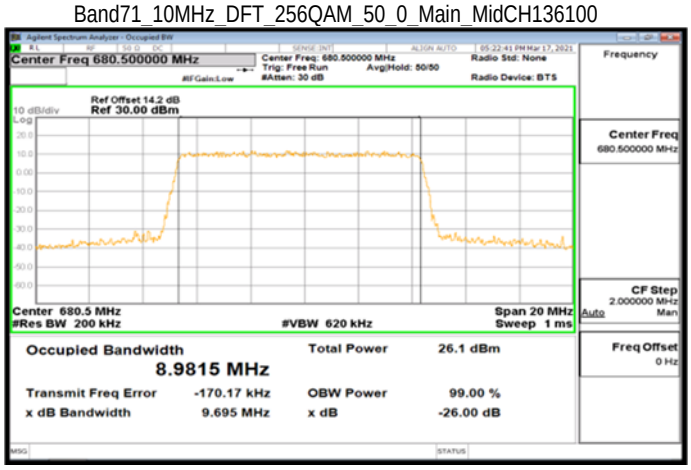


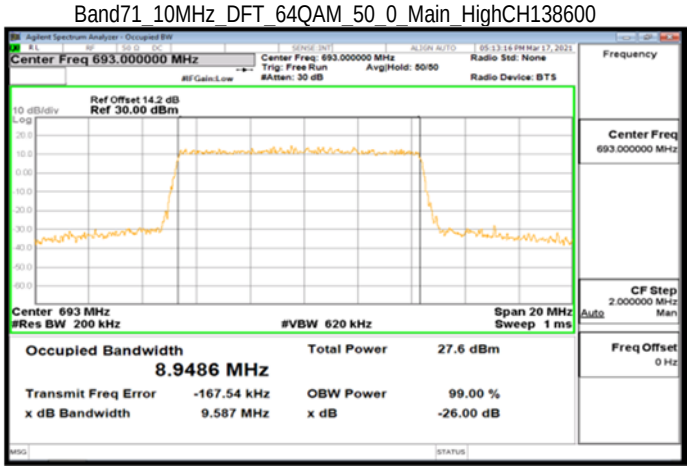
Band71_10MHz_DFT_64QAM_50_0_Main_MidCH136100



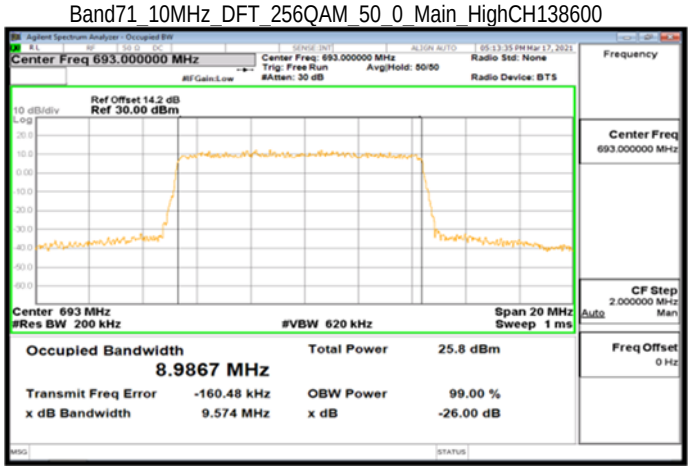
Band71_10MHz_DFT_256QAM_50_0_Main_MidCH136100



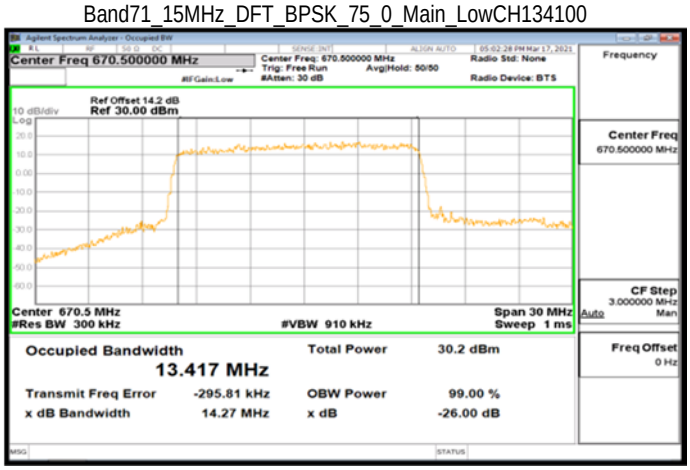
Band71_10MHz_DFT_64QAM_50_0_Main_HighCH138600



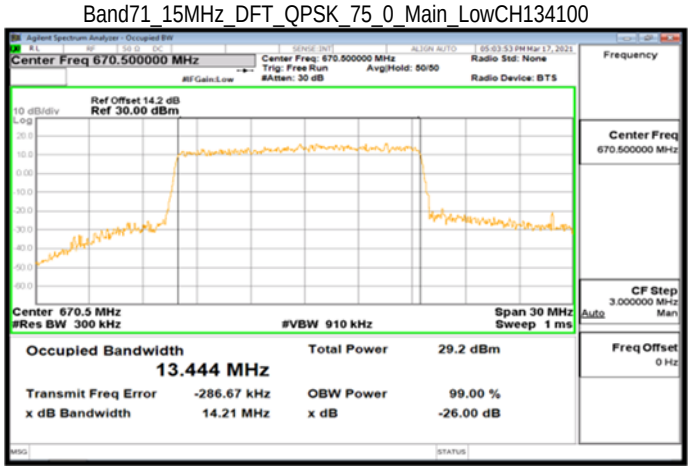
Band71_10MHz_DFT_256QAM_50_0_Main_HighCH138600



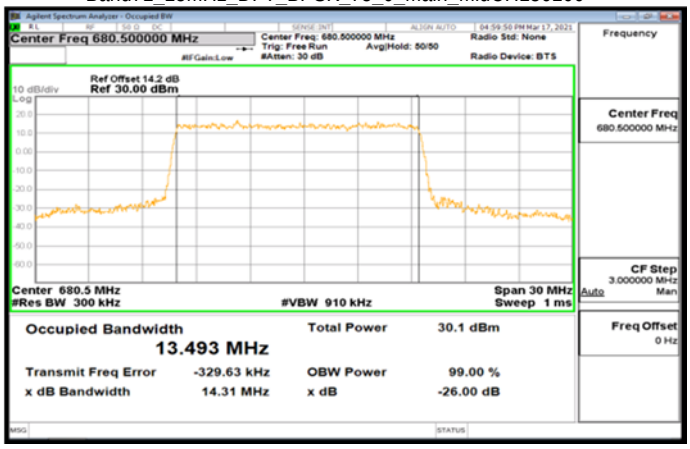
Band71_15MHz_DFT_BPSK_75_0_Main_LowCH134100



Band71_15MHz_DFT_QPSK_75_0_Main_LowCH134100



Band71_15MHz_DFT_BPSK_75_0_Main_MidCH136100



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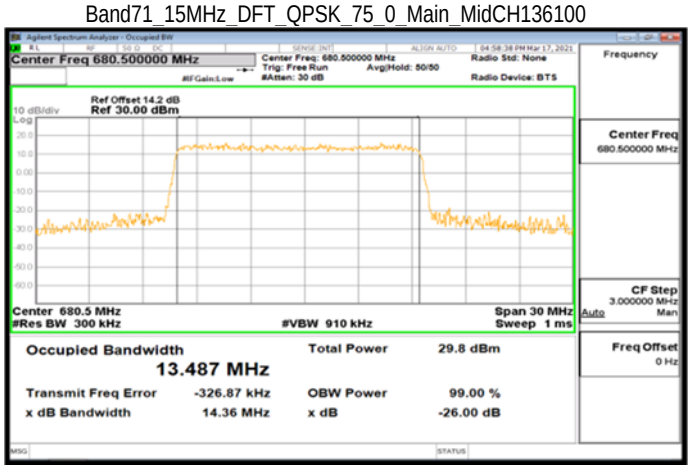
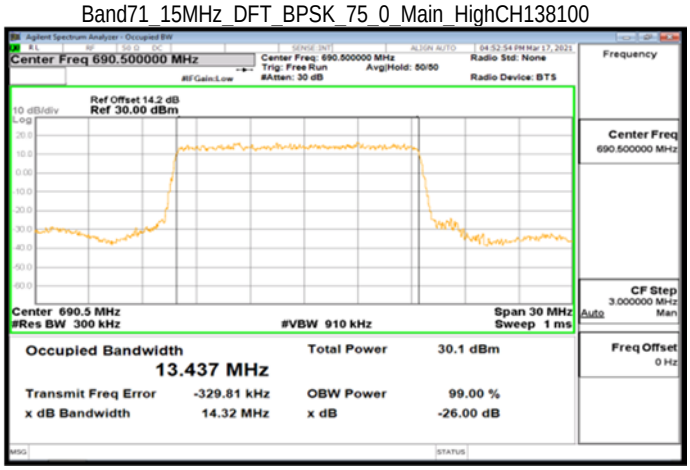


Band71_15MHz_DFT_BPSK_75_0_Main_HighCH138100



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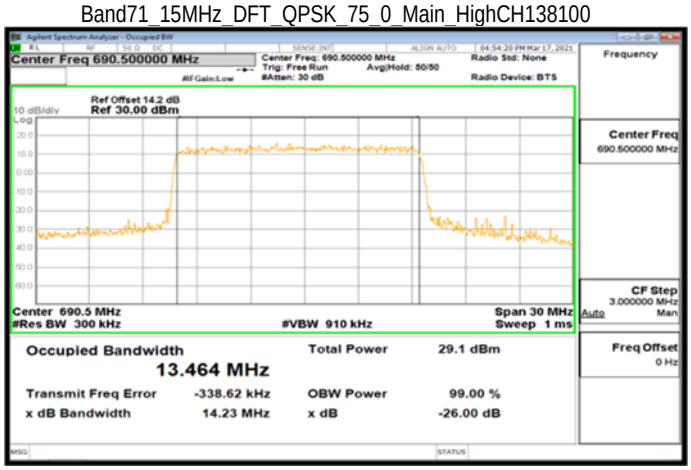
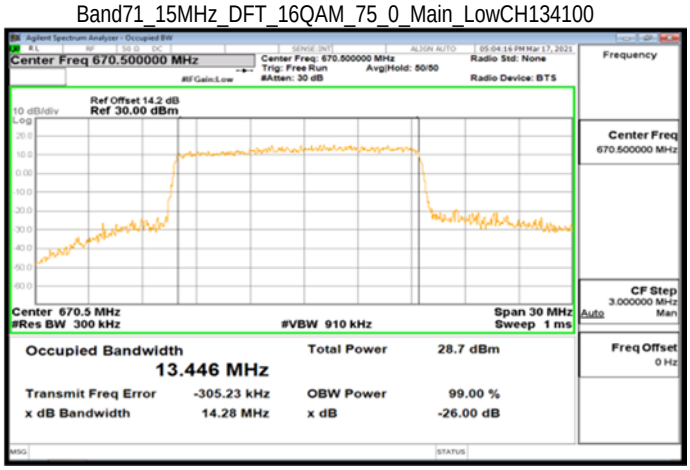
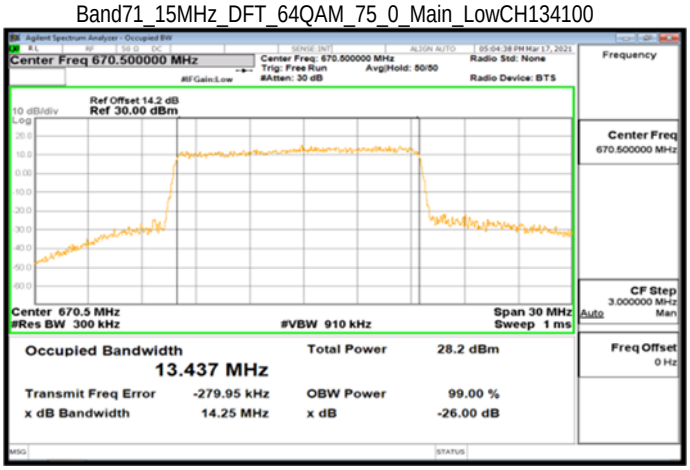


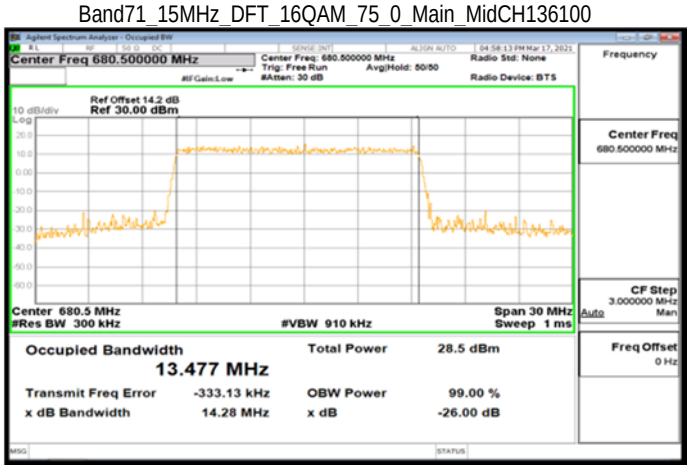
Band71_15MHz_DFT_16QAM_75_0_Main_LowCH134100



Band71_15MHz_DFT_64QAM_75_0_Main_LowCH134100



Band71_15MHz_DFT_16QAM_75_0_Main_MidCH136100



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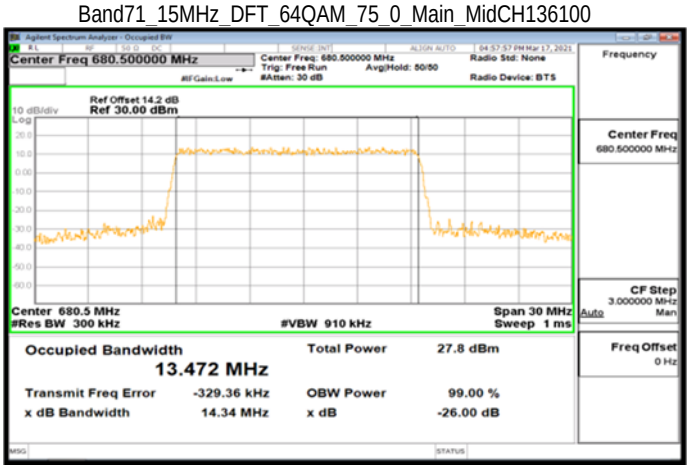

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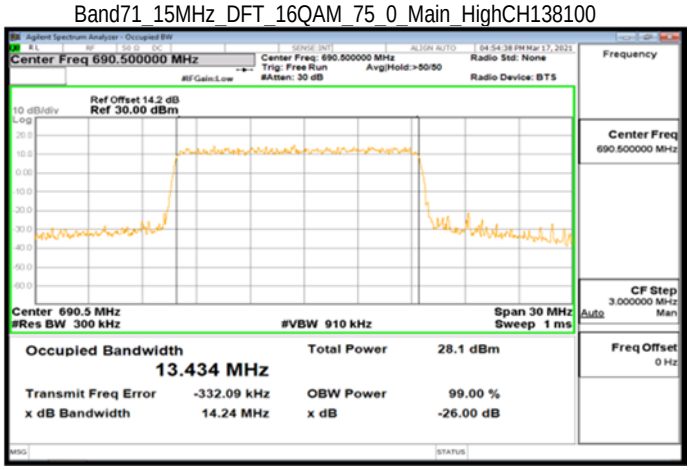

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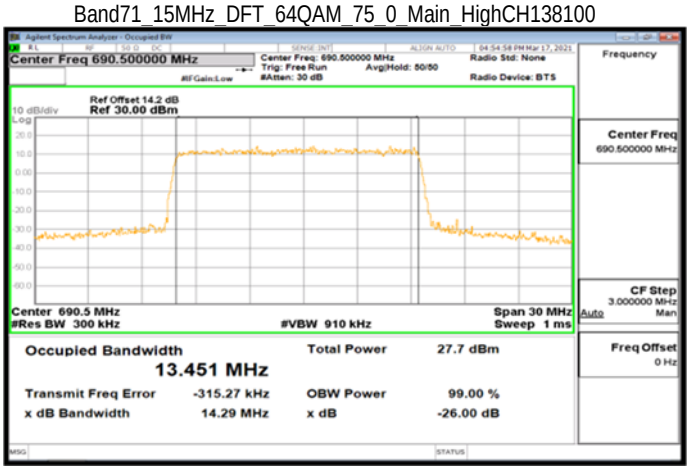
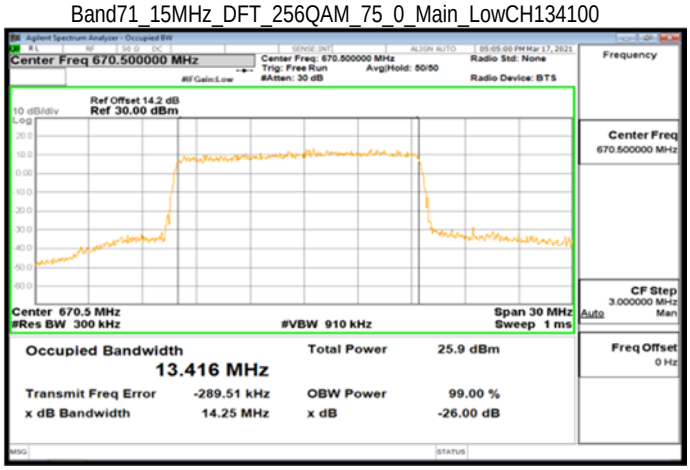
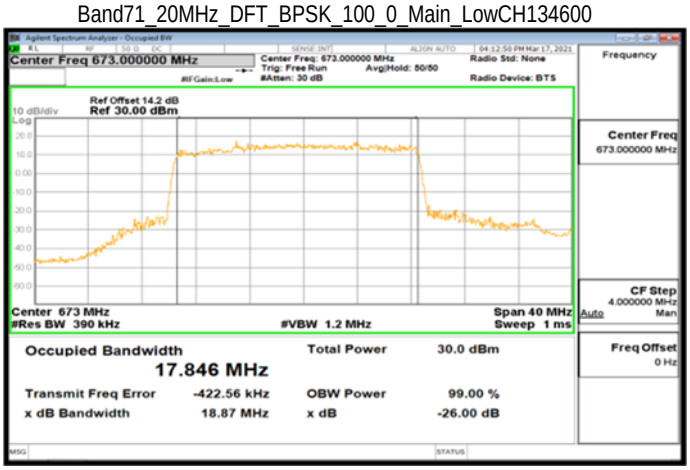


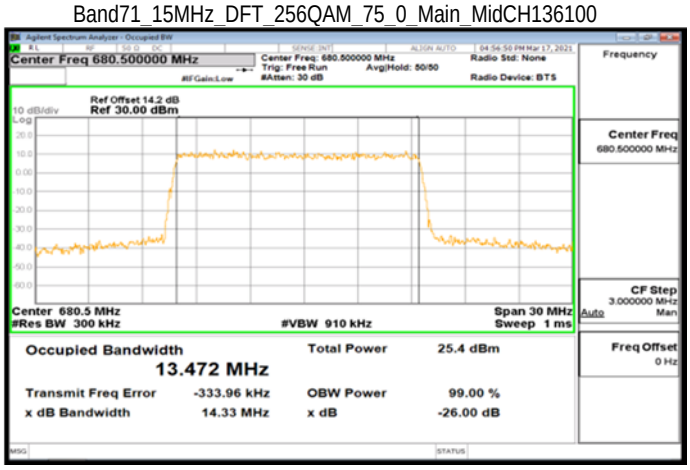
Band71_15MHz_DFT_256QAM_75_0_Main_LowCH134100



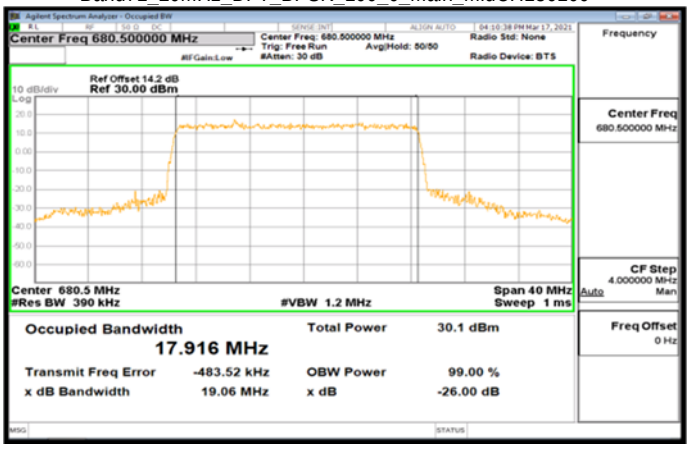
Band71_20MHz_DFT_BPSK_100_0_Main_LowCH134600



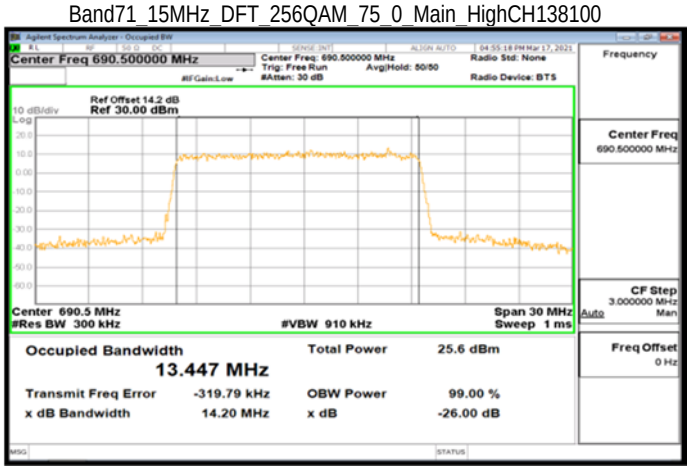
Band71_15MHz_DFT_256QAM_75_0_Main_MidCH136100



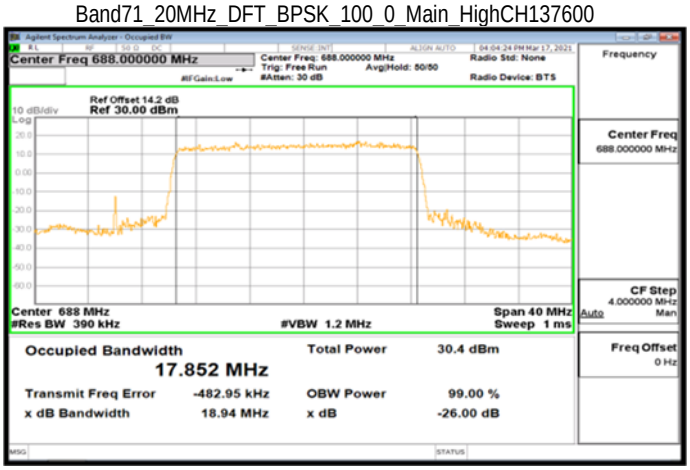
Band71_20MHz_DFT_BPSK_100_0_Main_MidCH136100



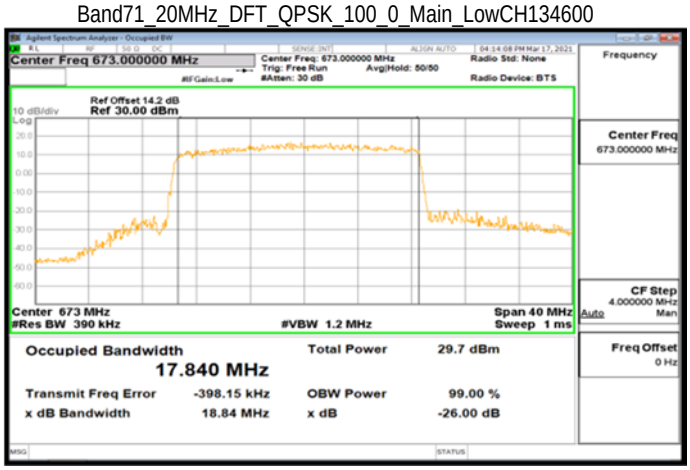
Band71_15MHz_DFT_256QAM_75_0_Main_HighCH138100



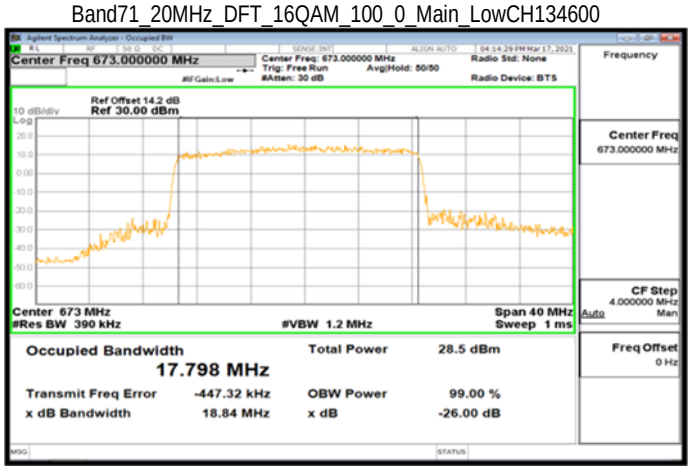
Band71_20MHz_DFT_BPSK_100_0_Main_HighCH137600



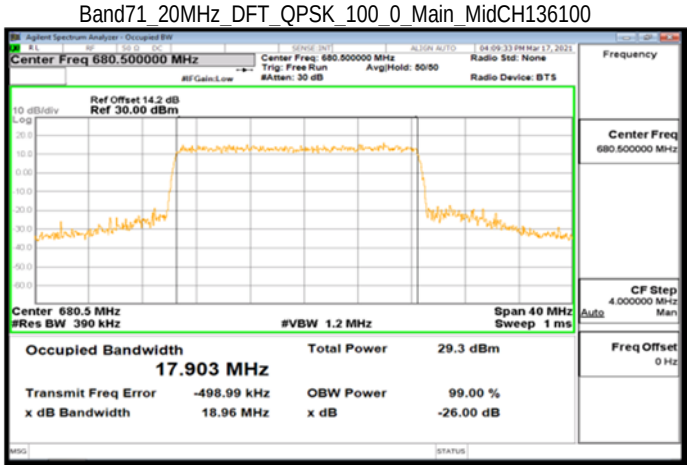
Band71_20MHz_DFT_QPSK_100_0_Main_LowCH134600



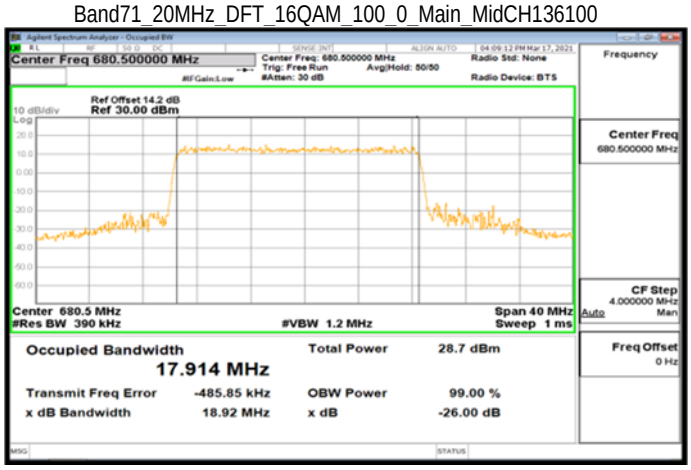
Band71_20MHz_DFT_16QAM_100_0_Main_LowCH134600



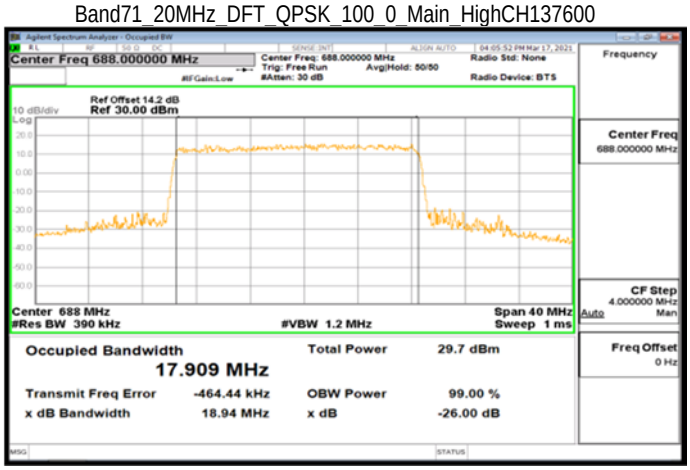
Band71_20MHz_DFT_QPSK_100_0_Main_MidCH136100



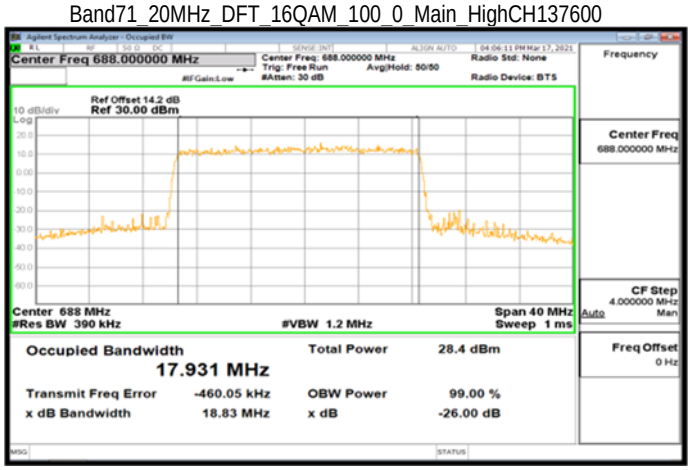
Band71_20MHz_DFT_16QAM_100_0_Main_MidCH136100



Band71_20MHz_DFT_QPSK_100_0_Main_HighCH137600



Band71_20MHz_DFT_16QAM_100_0_Main_HighCH137600



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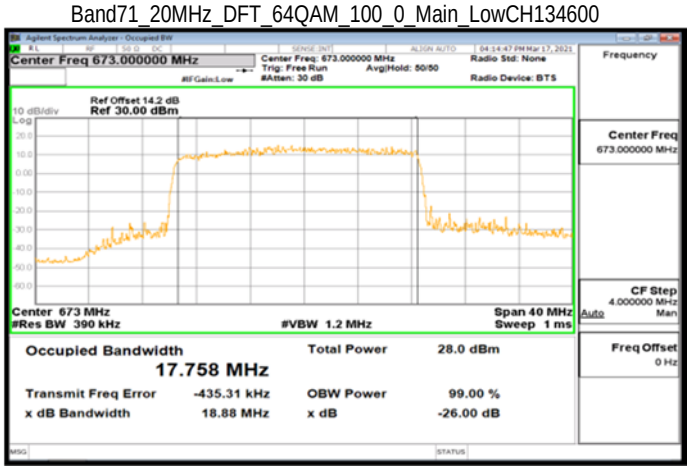
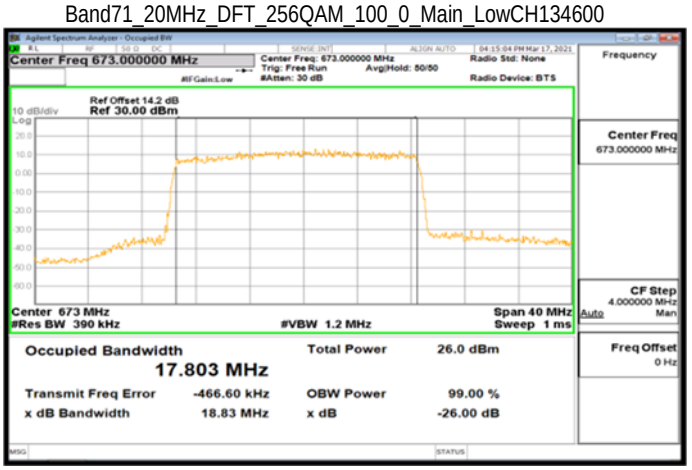
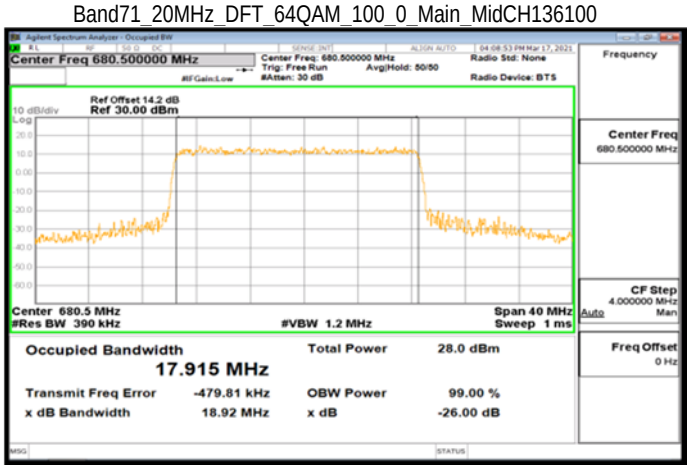


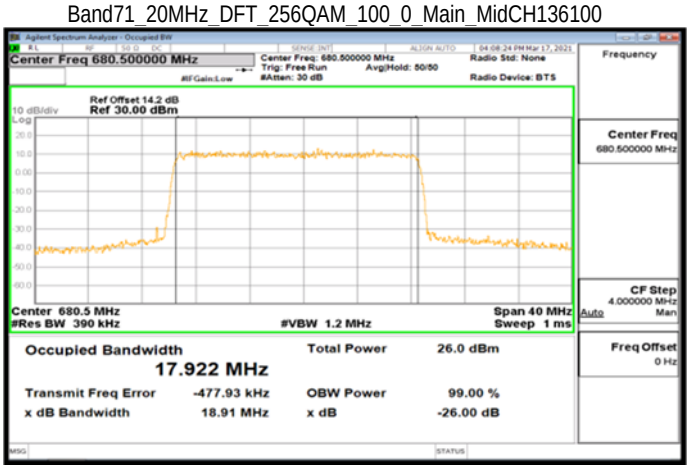
Band71_20MHz_DFT_256QAM_100_0_Main_LowCH134600



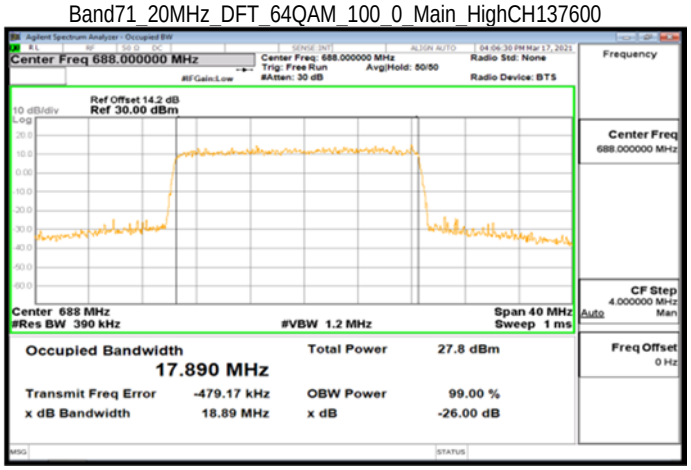
Band71_20MHz_DFT_64QAM_100_0_Main_MidCH136100



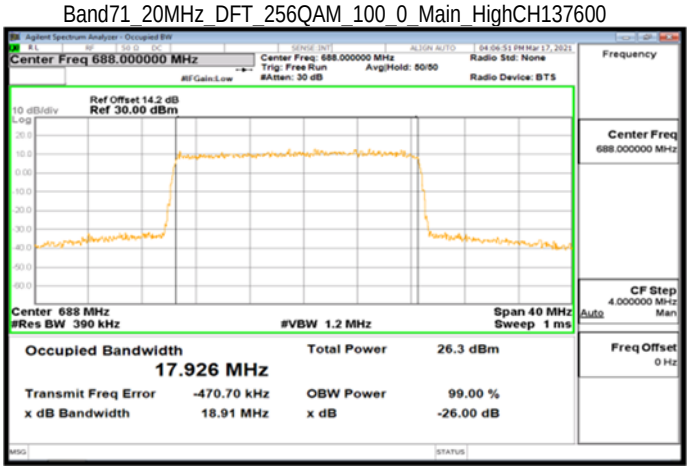
Band71_20MHz_DFT_256QAM_100_0_Main_MidCH136100



Band71_20MHz_DFT_64QAM_100_0_Main_HighCH137600



Band71_20MHz_DFT_256QAM_100_0_Main_HighCH137600



8 OUT OF BAND EMISSION AT ANTENNA TERMINALS

8.1 Standard Applicable

FCC §22.917(a)(b), §24.238(a), §27.53(g), §27.53(h), §27.53(m)
RSS-130 §4.7, RSS-132 §5.5, RSS-133 §6.5.1, RSS-139 §6.6, RSS-199 §4.5

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

FCC §27.53(g) 5G NR n12, n71

Compliance for operations in the 600 MHz, 698-746 MHz, 746-758 MHz and the 776-788 MHz band with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kilohertz or greater. However, in the 100 kilohertz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

(2) On any frequency outside the 776-788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least 43 + 10 log (P) dB;
(3) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 76 + 10 log (P) dB in a 6.25 kHz band segment, for base and fixed stations;
(4) On all frequencies between 763-775 MHz and 793-805 MHz, by a factor not less than 65 + 10 log (P) dB in a 6.25 kHz band segment, for mobile and portable stations;

ISED RSS-130 §4.7.1 for 5G NR n12, n71

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.

ISED RSS-133 §6.5.1 for 5G NR n2, n25

Equipment shall comply with the limits in (i) and (ii) below.

i. In the 1.0 MHz bands immediately outside and adjacent to the equipment's operating frequency block, the emission power per any 1% of the emission bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p(watts).

ii. After the first 1.0 MHz, the emission power in any 1 MHz bandwidth shall be attenuated (in dB) below the transmitter output power P (dBW) by at least 43 + 10 log10p(watts). If the measurement is performed using 1% of the emission bandwidth, power integration over 1.0 MHz is required.

FCC §27.53(h)(1) for 5G NR n66

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

RSS-139 §6.6 for5G NR n66

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.

FCC §27.53(m) (4) (6) for 5G NR n7, n38

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.

RSS-199 §4.5 for 5G NR n7, n38

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:

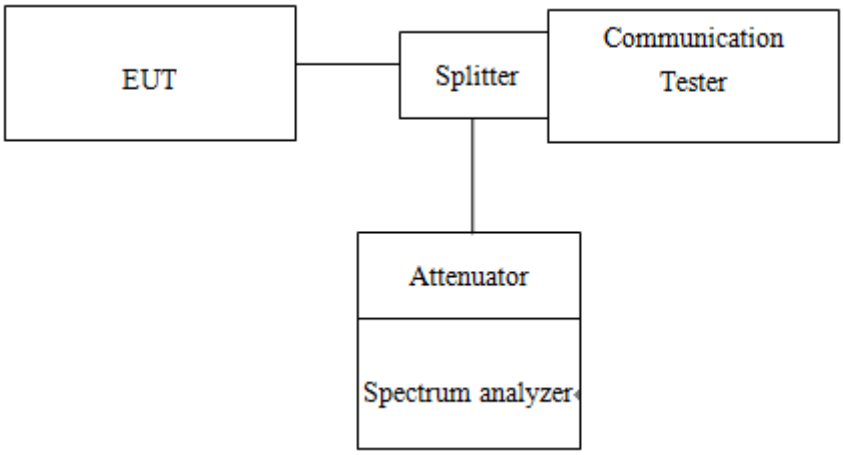
40 + 10 log10 p from the channel edges to 5 MHz away

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.

8.2 Test SET-UP



8.3 Measurement Procedure

8.3.1 Conducted Emission

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation The resolution bandwidth of the spectrum analyzer was set at 1MHz, sufficient scans were taken to show the out of band Emissions if any up to 10th harmonic.

1. To connect Antenna Port of EUT to Spectrum.
2. Set RBW = 1MHz & VBW = 1MHz on Spectrum.
3. Allow trace to fully stabilize

4. Repeat above procedures until all default test channel measured were complete.

8.4 Measurement Equipment Used

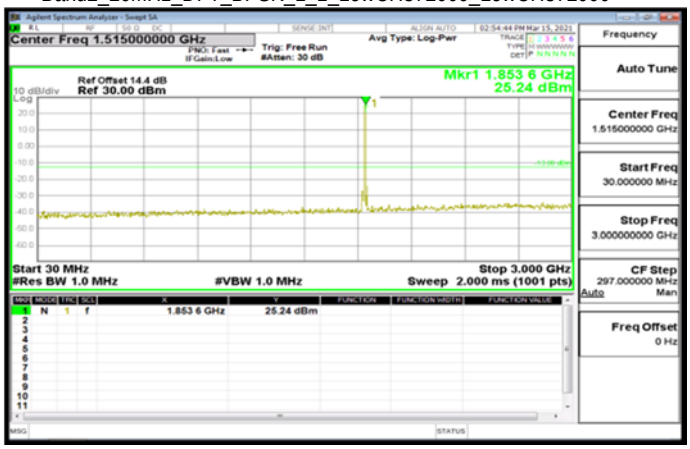
Conducted Emission Test Site: Conducted 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY53400256	11/19/2020	11/18/2021
UXM 5G	KEYSIGHT	E7515B	MY59321561	12/22/2020	12/21/2021
Temperature Chamber	TERCHY	MHG-120LF	911009	05/20/2020	05/19/2021
DC Power Supply	Agilent	E3640A	MY52410006	12/17/2020	12/16/2021
Attenuator	Mini-Circuit	BW-S10W2+	2	12/16/2020	12/15/2021
DC Block	Mini-Circuits	BLK-18-S+	1	12/16/2020	12/15/2021
Power Divider	RF-LAMBDA	RFLT2W1G18G	18112200202	12/16/2020	12/15/2021

8.5 Measurement Result:

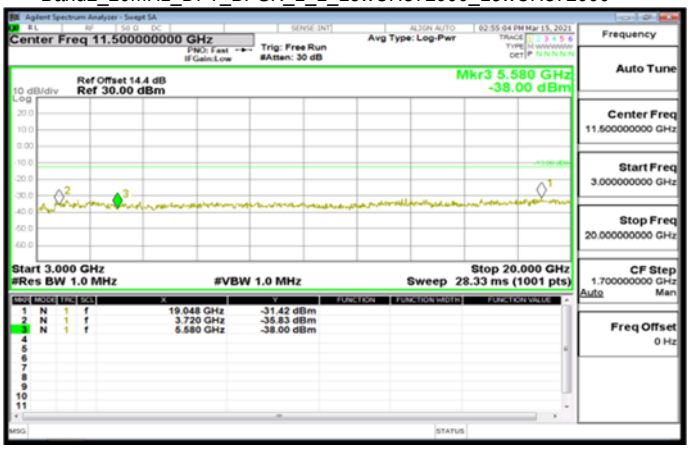
Refer to next pages.

Out of Band Emission

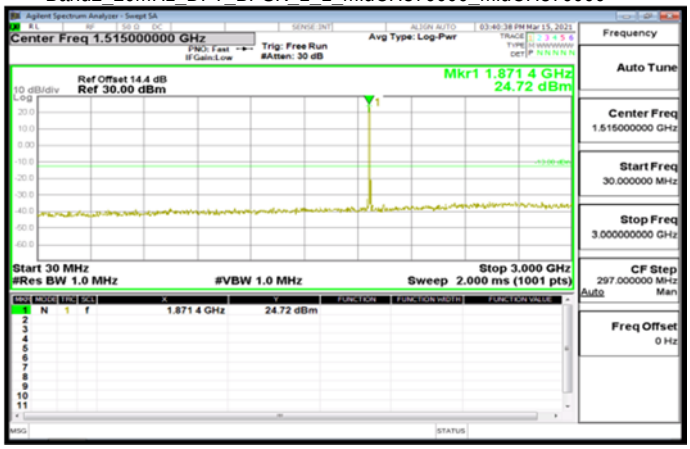
Band2_20MHz_DFT_BPSK_1_1_LowCH372000_LowCH372000



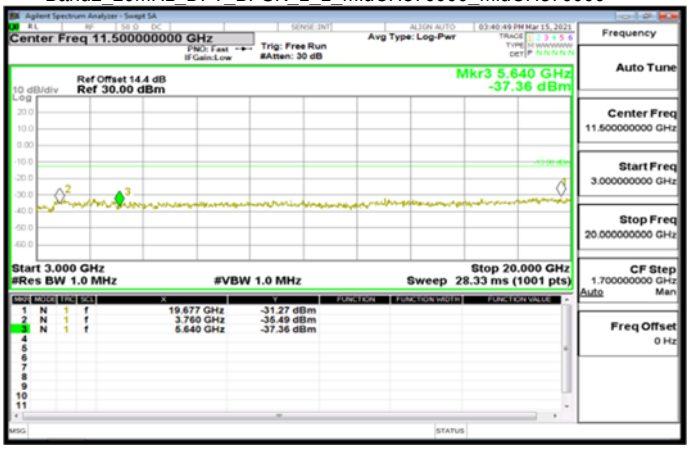
Band2_20MHz_DFT_BPSK_1_1_LowCH372000_LowCH372000



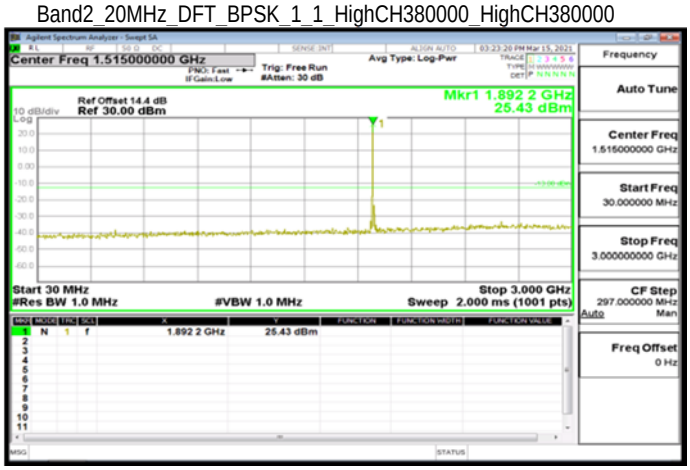
Band2_20MHz_DFT_BPSK_1_1_MidCH376000_MidCH376000



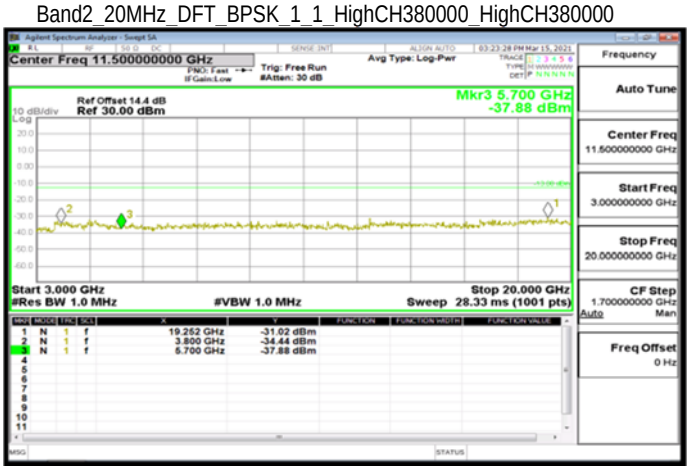
Band2_20MHz_DFT_BPSK_1_1_MidCH376000_MidCH376000



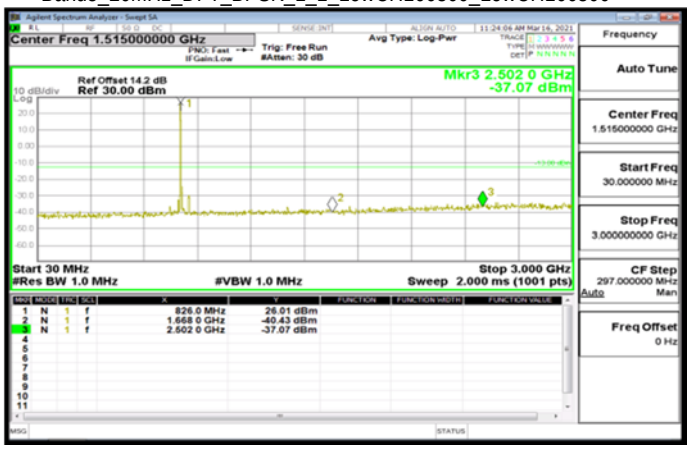
Band2_20MHz_DFT_BPSK_1_1_HighCH380000_HighCH380000



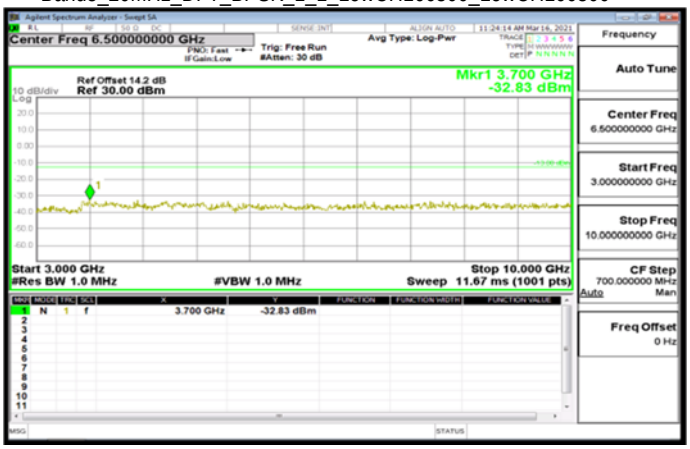
Band2_20MHz_DFT_BPSK_1_1_HighCH380000_HighCH380000



Band5_20MHz_DFT_BPSK_1_1_LowCH166800_LowCH166800

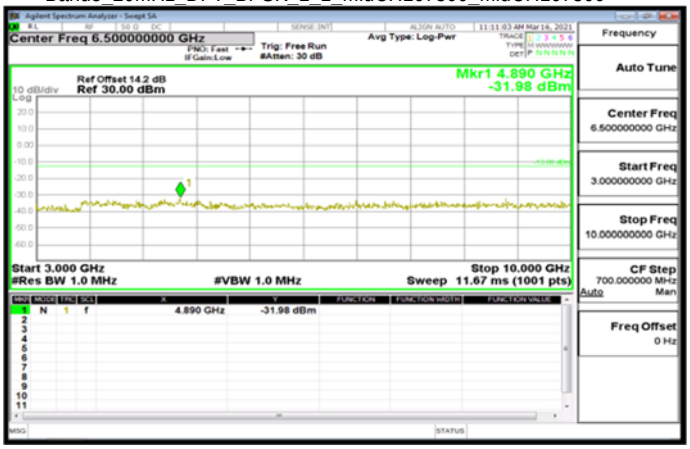


Band5_20MHz_DFT_BPSK_1_1_LowCH166800_LowCH166800

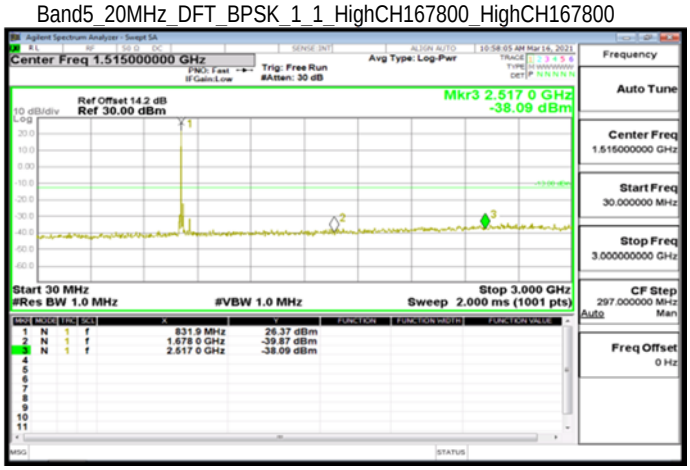


Band5_20MHz_DFT_BPSK_1_1_MidCH167300_MidCH167300

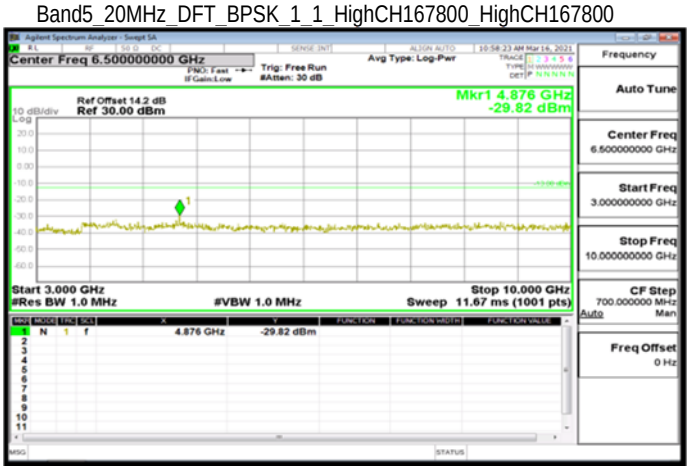
Band5_20MHz_DFT_BPSK_1_1_MidCH167300_MidCH167300



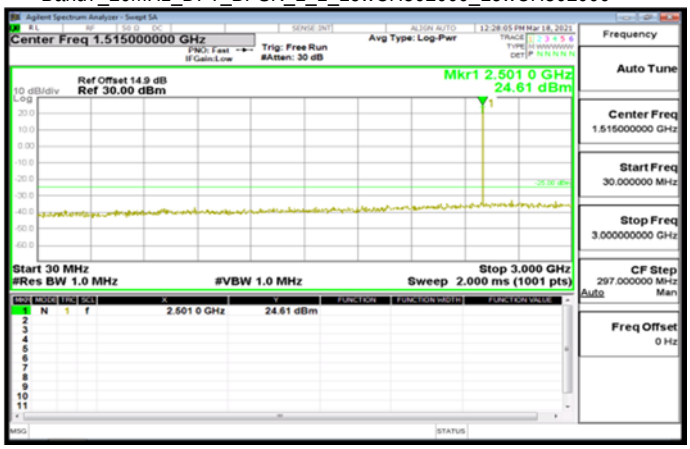
Band5_20MHz_DFT_BPSK_1_1_HighCH167800_HighCH167800



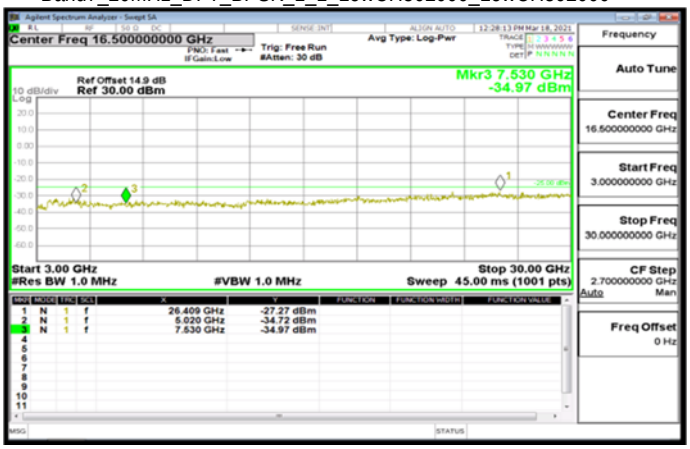
Band5_20MHz_DFT_BPSK_1_1_HighCH167800_HighCH167800



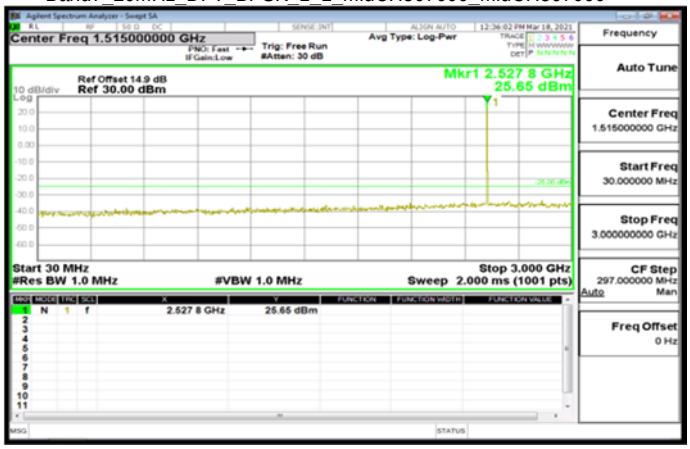
Band7_20MHz_DFT_BPSK_1_1_LowCH502000_LowCH502000



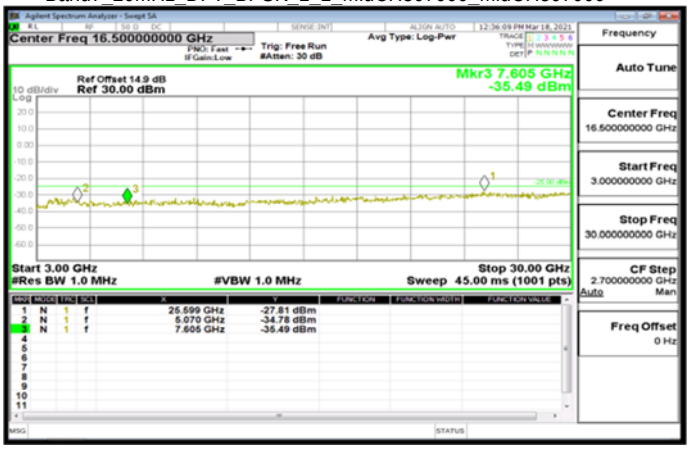
Band7_20MHz_DFT_BPSK_1_1_LowCH502000_LowCH502000



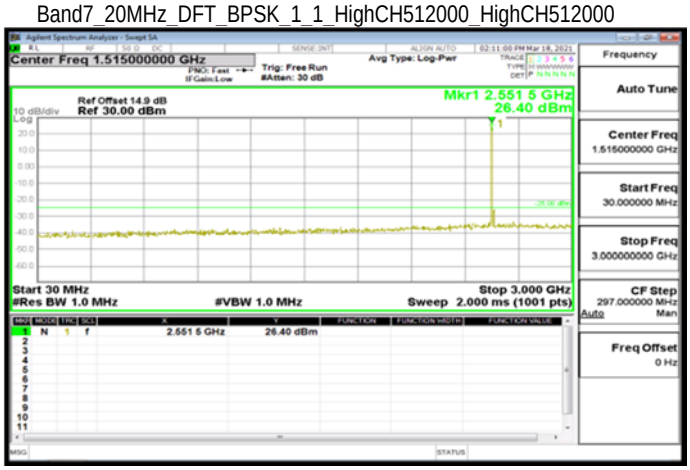
Band7_20MHz_DFT_BPSK_1_1_MidCH507000_MidCH507000



Band7_20MHz_DFT_BPSK_1_1_MidCH507000_MidCH507000



Band7_20MHz_DFT_BPSK_1_1_HighCH512000_HighCH512000



Band7_20MHz_DFT_BPSK_1_1_HighCH512000_HighCH512000