

**5G NR NSA LTE B2 + n66, 5MHz+5MHz, QPSK + DFT PI/2 BPSK, Channel 384500(NR)**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3425.01	-62.03	5.38	8.02	-59.39	-13.00	46.39	H
5141.01	-62.51	6.87	10.10	-59.28	-13.00	46.28	V
6856.01	-57.06	7.82	11.43	-53.45	-13.00	40.45	H
8571.01	-64.02	8.54	13.01	-59.55	-13.00	46.55	V
10284.01	-61.75	9.59	13.01	-58.33	-13.00	45.33	V
11993.00	-60.02	10.08	13.00	-57.10	-13.00	44.10	V

**5G NR NSA LTE B2 + n66, 5MHz+5MHz, QPSK + DFT PI/2 BPSK, Channel 393000(NR)**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3488.01	-65.70	5.50	8.17	-63.03	-13.00	50.03	H
5243.01	-65.57	7.00	10.24	-62.33	-13.00	49.33	H
6995.01	-62.31	8.26	11.59	-58.98	-13.00	45.98	H
8741.01	-64.57	8.48	13.05	-60.00	-13.00	47.00	V
10488.01	-61.80	9.67	13.10	-58.37	-13.00	45.37	V
12211.00	-59.77	10.05	13.08	-56.74	-13.00	43.74	V

**5G NR NSA LTE B2 + n66, 5MHz+5MHz, QPSK + DFT PI/2 BPSK, Channel 401500(NR)**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3555.01	-64.57	5.87	8.28	-62.16	-13.00	49.16	H
5337.01	-63.36	6.96	10.37	-59.95	-13.00	46.95	H
7123.01	-58.98	8.16	11.75	-55.39	-13.00	42.39	H
8899.01	-63.69	8.84	13.08	-59.45	-13.00	46.45	H
10683.00	-61.37	9.30	13.14	-57.53	-13.00	44.53	V
12460.00	-59.40	10.28	13.18	-56.50	-13.00	43.50	V

**5G NR NSA LTE B12 + n66, 5MHz+5MHz, QPSK + DFT PI/2 BPSK, Channel 384500(NR)**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3425.01	-60.06	5.38	8.02	-57.42	-13.00	44.42	H
5138.01	-62.12	6.86	10.09	-58.89	-13.00	45.89	H
6857.01	-56.11	7.81	11.43	-52.49	-13.00	39.49	H
8554.01	-64.54	8.58	13.01	-60.11	-13.00	47.11	V
10261.01	-62.03	9.51	13.00	-58.54	-13.00	45.54	V
12006.00	-60.22	10.07	13.00	-57.29	-13.00	44.29	V

**5G NR NSA LTE B12 + n66, 5MHz+5MHz, QPSK + DFT PI/2 BPSK, Channel 393000(NR)**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3490.01	-63.44	5.50	8.18	-60.76	-13.00	47.76	H
5241.01	-62.10	7.00	10.24	-58.86	-13.00	45.86	H
6992.01	-56.58	8.24	11.59	-53.23	-13.00	40.23	H
8743.01	-63.39	8.49	13.05	-58.83	-13.00	45.83	H
10489.01	-61.66	9.67	13.10	-58.23	-13.00	45.23	V
12204.00	-59.36	10.06	13.08	-56.34	-13.00	43.34	V

**5G NR NSA LTE B12 + n66, 5MHz+5MHz, QPSK + DFT PI/2 BPSK, Channel 401500(NR)**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
3555.01	-64.35	5.87	8.28	-61.94	-13.00	48.94	H
5338.01	-60.27	6.96	10.37	-56.86	-13.00	43.86	H
7125.01	-59.23	8.17	11.75	-55.65	-13.00	42.65	H
8905.01	-64.10	8.86	13.08	-59.88	-13.00	46.88	V
10678.00	-61.66	9.30	13.14	-57.82	-13.00	44.82	V
12456.00	-59.73	10.29	13.18	-56.84	-13.00	43.84	V

**5G NR NSA LTE B2 + n71, 5MHz+5MHz, QPSK + DFT PI/2 BPSK, Channel 133100(NR)**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1327.51	-53.42	3.15	4.60	2.15	-54.12	-13.00	41.12
1996.51	-53.68	4.04	4.61	2.15	-55.26	-13.00	42.26
2669.00	-52.97	4.76	6.40	2.15	-53.48	-13.00	40.48
3335.02	-54.61	5.30	7.80	2.15	-54.26	-13.00	41.26
3994.02	-55.11	6.07	8.89	2.15	-54.44	-13.00	41.44
4658.52	-53.47	6.47	9.56	2.15	-52.53	-13.00	39.53

**5G NR NSA LTE B2 + n71, 5MHz+5MHz, QPSK + DFT PI/2 BPSK, Channel 136100(NR)**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1352.01	-59.26	3.18	4.73	2.15	-59.86	-13.00	46.86
2041.50	-56.10	4.14	4.72	2.15	-57.67	-13.00	44.67
2731.00	-52.21	4.82	6.52	2.15	-52.66	-13.00	39.66
3415.02	-54.97	5.38	8.00	2.15	-54.50	-13.00	41.50
4083.52	-54.45	6.04	8.98	2.15	-53.66	-13.00	40.66
4775.01	-53.86	6.62	9.68	2.15	-52.95	-13.00	39.95

**5G NR NSA LTE B2 + n71, 5MHz+5MHz, QPSK + DFT PI/2 BPSK, Channel 139100(NR)**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1393.51	-52.24	3.23	4.95	2.15	-52.67	-13.00	39.67
2086.50	-48.52	4.18	4.86	2.15	-49.99	-13.00	36.99
2786.00	-52.46	4.89	6.61	2.15	-52.89	-13.00	39.89
3470.52	-54.78	5.47	8.13	2.15	-54.27	-13.00	41.27
4181.02	-53.63	6.16	9.08	2.15	-52.86	-13.00	39.86
4876.51	-54.36	6.72	9.78	2.15	-53.45	-13.00	40.45

**5G NR NSA LTE B66 + n71, 5MHz+5MHz, QPSK + DFT PI/2 BPSK, Channel 133100(NR)**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1345.51	-48.88	3.17	4.70	2.15	-49.50	-13.00	36.50
1996.51	-55.88	4.04	4.61	2.15	-57.46	-13.00	44.46
2668.50	-52.51	4.76	6.40	2.15	-53.02	-13.00	40.02
3330.02	-54.43	5.30	7.79	2.15	-54.09	-13.00	41.09
4007.02	-54.45	6.06	8.91	2.15	-53.75	-13.00	40.75
4648.02	-53.35	6.46	9.55	2.15	-52.41	-13.00	39.41

**5G NR NSA LTE B66 + n71, 5MHz+5MHz, QPSK + DFT PI/2 BPSK, Channel 136100(NR)**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1346.01	-55.01	3.17	4.70	2.15	-55.63	-13.00	42.63
2041.50	-54.42	4.14	4.72	2.15	-55.99	-13.00	42.99
2720.50	-51.86	4.80	6.50	2.15	-52.31	-13.00	39.31
3409.52	-54.69	5.37	7.98	2.15	-54.23	-13.00	41.23
4079.02	-54.36	6.04	8.98	2.15	-53.57	-13.00	40.57
4767.51	-53.40	6.60	9.67	2.15	-52.48	-13.00	39.48

**5G NR NSA LTE B66 + n71, 5MHz+5MHz, QPSK + DFT PI/2 BPSK, Channel 139100(NR)**

Frequency (MHz)	P <sub>Mea</sub> (dBm)	Path Loss(dB)	Antenna Gain(dBi)	Peak EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarization
1379.51	-50.32	3.21	4.87	2.15	-50.81	-13.00	37.81
2086.50	-51.80	4.18	4.86	2.15	-53.27	-13.00	40.27
2785.50	-52.72	4.89	6.61	2.15	-53.15	-13.00	40.15
3464.02	-54.75	5.45	8.11	2.15	-54.24	-13.00	41.24
4173.52	-53.93	6.15	9.07	2.15	-53.16	-13.00	40.16
4875.51	-54.20	6.72	9.78	2.15	-53.29	-13.00	40.29

## **A.3 Frequency Stability**

### **A.3.1 Method of Measurement**

Frequency stability is a measure of the frequency drift due to temperature and supply voltage variations, with reference to the frequency measured at +20 °C and rated supply voltage. Two reference points are established at the applicable unwanted emissions limit using a RBW equal to the RBW required by the unwanted emissions specification of the applicable regulatory standard. These reference points measured using the lowest and highest channel of operation shall be identified as  $F_L$  and  $F_H$  respectively.

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a “call mode”. This is accomplished with the use of UXM.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30°C.
3. With the EUT, powered via nominal voltage, connected to the UXM, and in a simulated call on middle channel for each NR band, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50°C.
7. With the EUT, powered via nominal voltage, connected to the UXM and in a simulated call on the center channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 °C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of the lower, higher and nominal voltage. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress.

### A.3.2 Measurement results

n25

#### Frequency Error vs Voltage

Temperature(°C)	Voltage(V)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.80	1850.280	1913.640		
50				1.90	0.0010
40				2.00	0.0011
30				-4.70	0.0025
10				-1.50	0.0008
0				-1.70	0.0009
-10				0.00	0.0000
-20				0.80	0.0004
-30				5.40	0.0029

#### Frequency Error vs Voltage

Voltage(V)	Temperature(°C)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
3.65	20	1850.280	1913.640	2.80	0.0015
4.20				-0.60	0.0003

n41

#### Frequency Error vs Voltage

Temperature(°C)	Voltage(V)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.80	2496.680	2688.160		
50				-9.50	0.0037
40				-7.70	0.0030
30				-26.70	0.0103
10				-8.10	0.0031
0				-1.90	0.0007
-10				0.50	0.0002
-20				-11.20	0.0043
-30				-9.60	0.0037

#### Frequency Error vs Voltage

Voltage(V)	Temperature(°C)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
3.65	20	2496.680	2688.160	-12.60	0.0049
4.20				-13.40	0.0052

**n66**
**Frequency Error vs Voltage**

Temperature(°C)	Voltage(V)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.80	1710.080	1779.880		
50				-5.70	0.0033
40				-6.70	0.0038
30				2.40	0.0014
10				-1.60	0.0009
0				-5.80	0.0033
-10				-1.30	0.0007
-20				-4.40	0.0025
-30				-3.90	0.0022

**Frequency Error vs Voltage**

Voltage(V)	Temperature(°C)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
3.65	20	1710.080	1779.880	-7.20	0.0041
4.20				-5.50	0.0032

**n71**
**Frequency Error vs Voltage**

Temperature(°C)	Voltage(V)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
20	3.80	663.280	696.640		
50				-3.90	0.0057
40				-2.50	0.0037
30				-2.50	0.0037
10				2.30	0.0034
0				-0.60	0.0009
-10				-0.70	0.0010
-20				-3.30	0.0048
-30				-2.70	0.0040

**Frequency Error vs Voltage**

Voltage(V)	Temperature(°C)	FL(MHz)	FH(MHz)	Offset(Hz)	Frequency error(ppm)
3.65	20	663.280	696.640	-0.70	0.0010
4.20				-1.70	0.0025

#### **A.4 Occupied Bandwidth**

Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the mid frequencies frequency. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

The measurement method is from ANSI C63.26:

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts.
- b) The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set  $\geq 3 \times$  RBW.
- c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation.
- d) Set the detection mode to peak, and the trace mode to max-hold.



n25

n25,5MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
1882.5	4.507	4.524

n25,5MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)



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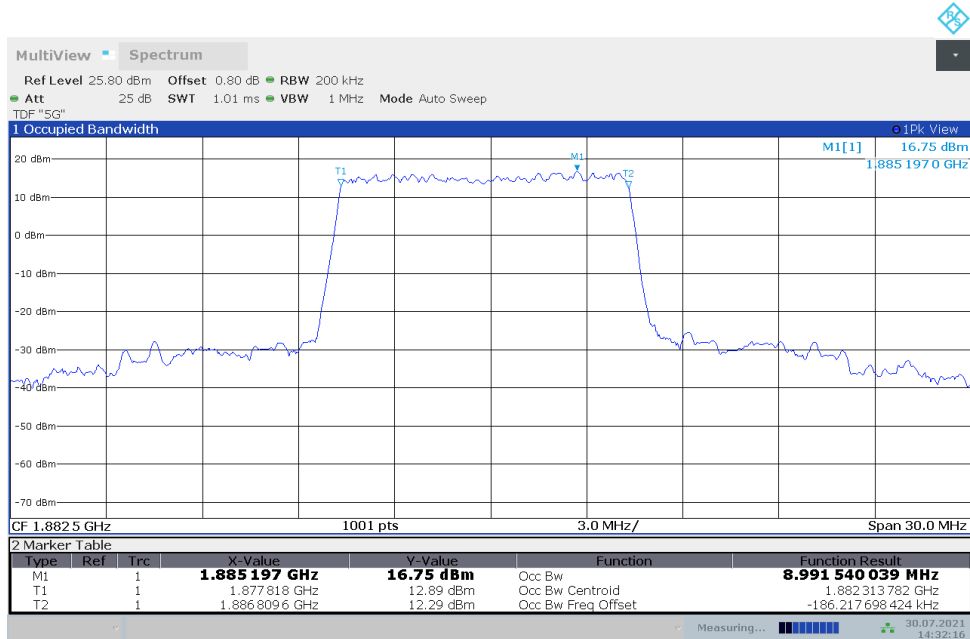
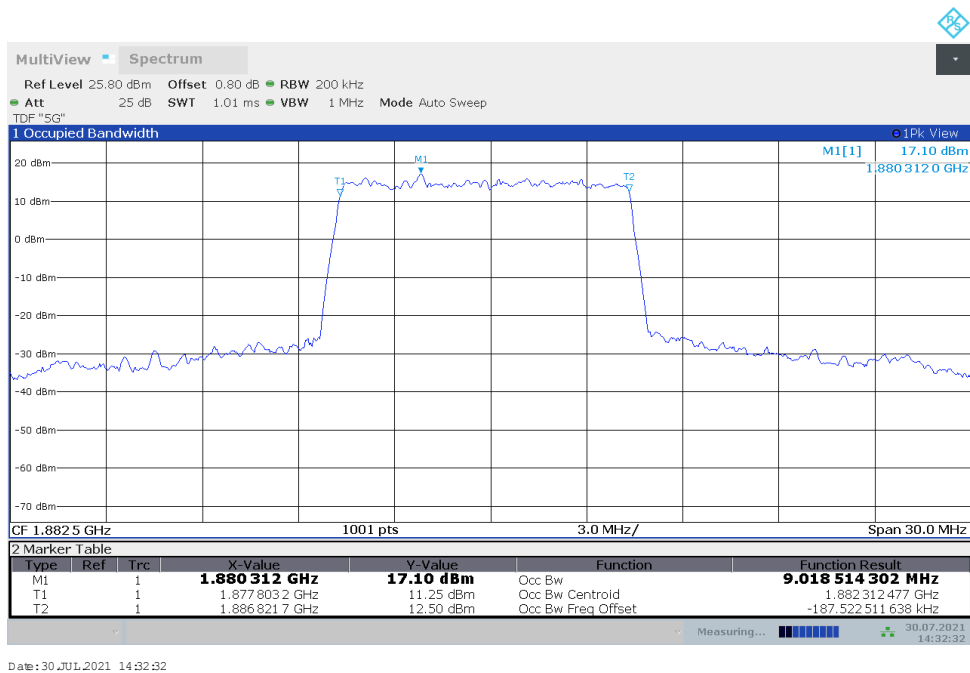
n25,5MHz Bandwidth,DFT-s-QPSK (99% BW)



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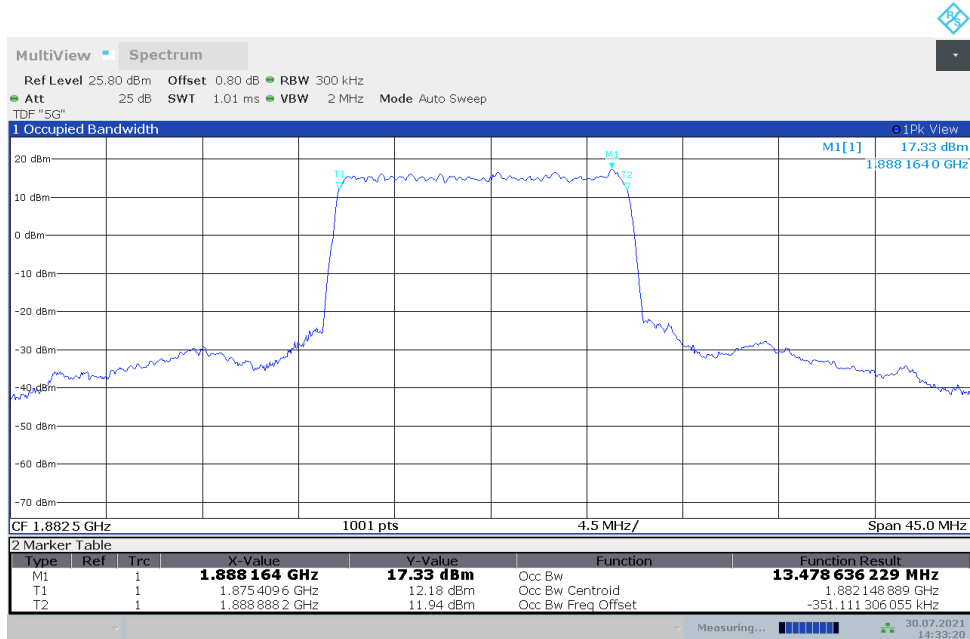
**n25,10MHz(99%)**

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
1882.5	8.992	9.019

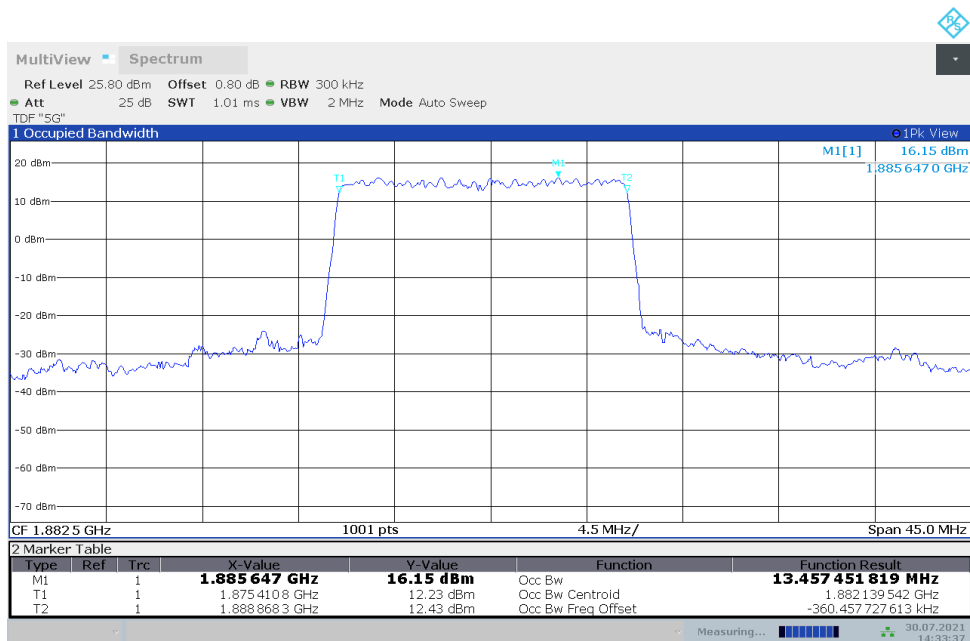
**n25,10MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)**

**n25,10MHz Bandwidth,DFT-s-QPSK (99% BW)**


**n25,15MHz(99%)**

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
1882.5	13.479	13.457

**n25,15MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)**


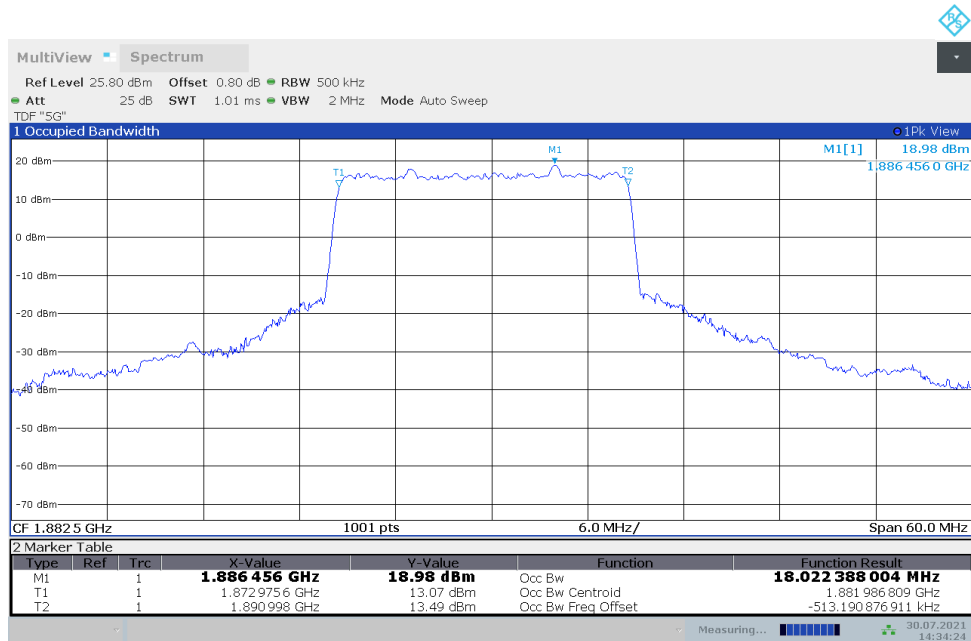
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**n25,15MHz Bandwidth,DFT-s-QPSK (99% BW)**


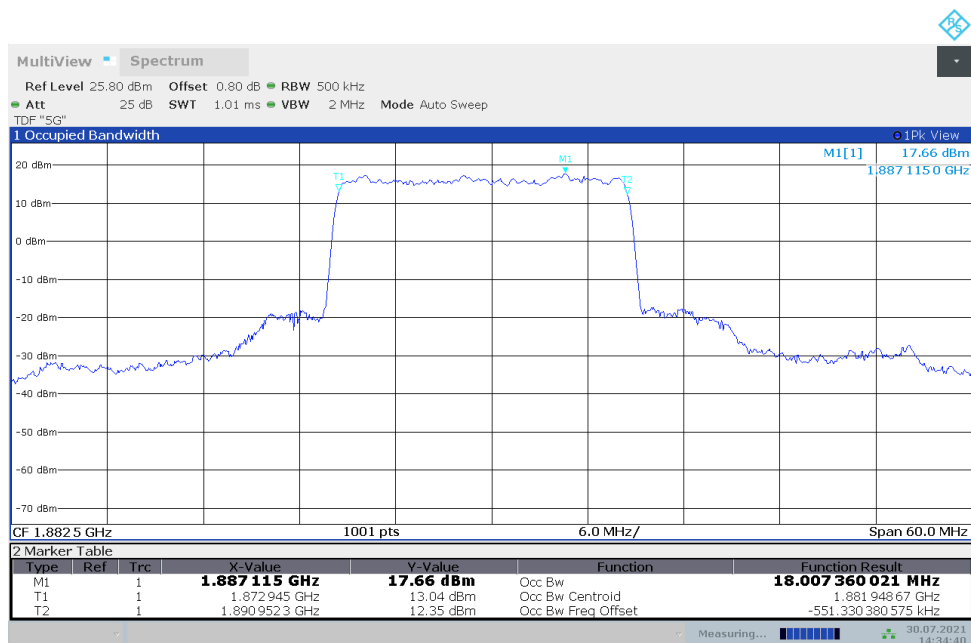
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**n25,20MHz(99%)**

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
1882.5	18.022	18.007

**n25,20MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)**


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**n25,20MHz Bandwidth,DFT-s-QPSK (99% BW)**


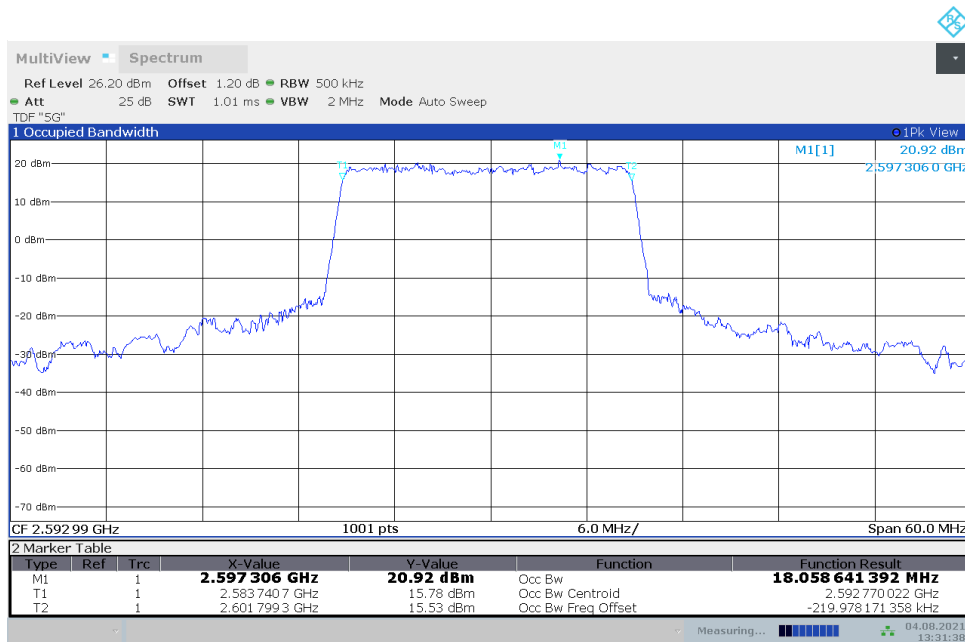
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n41

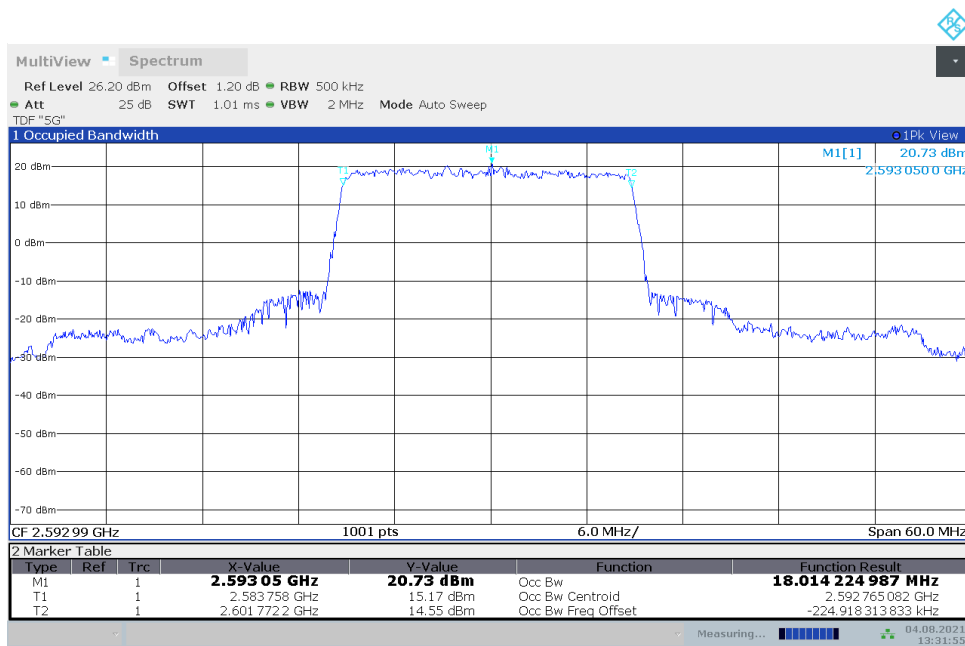
n41,20MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
2592.99	18.059	18.014

n41,20MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

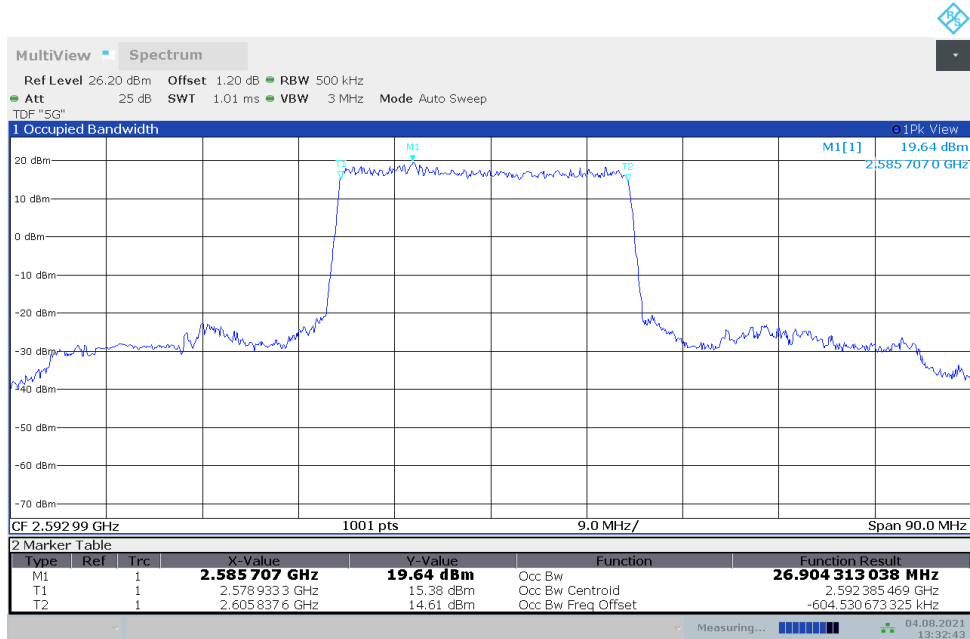


n41,20MHz Bandwidth,DFT-s-QPSK (99% BW)

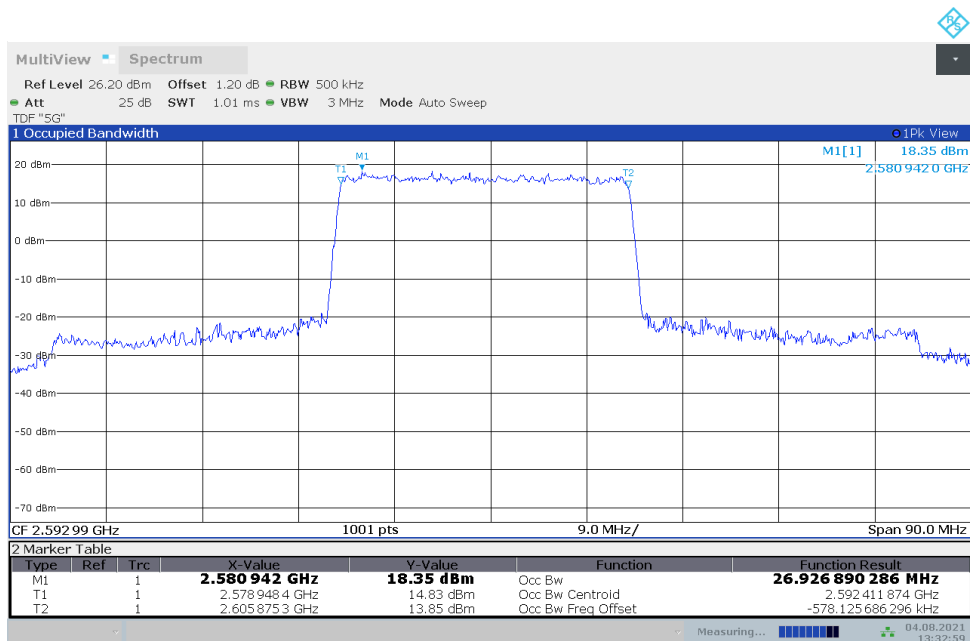


**n41,30MHz(99%)**

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
2592.99	26.904	26.927

**n41,30MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)**


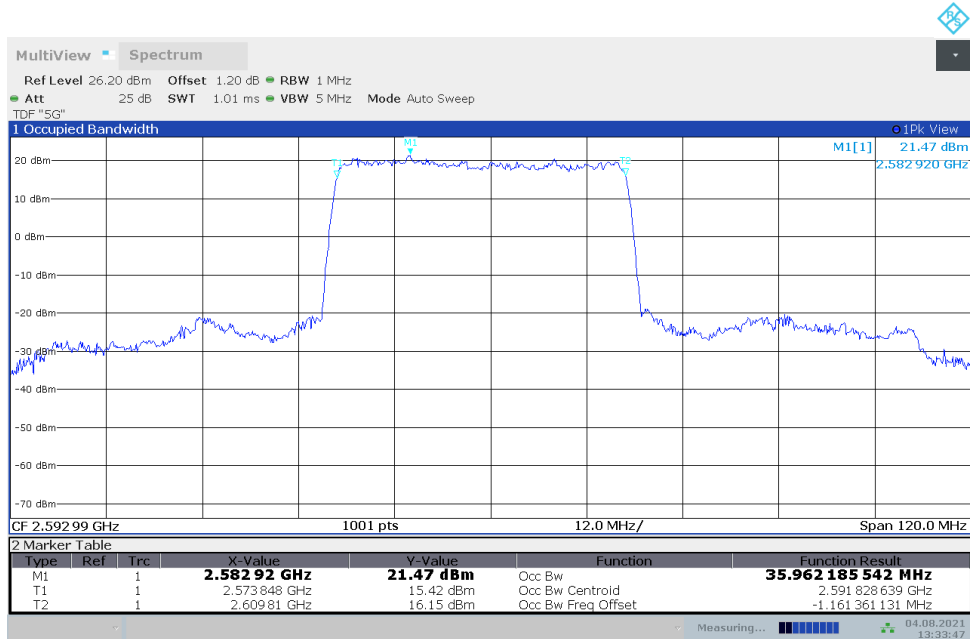
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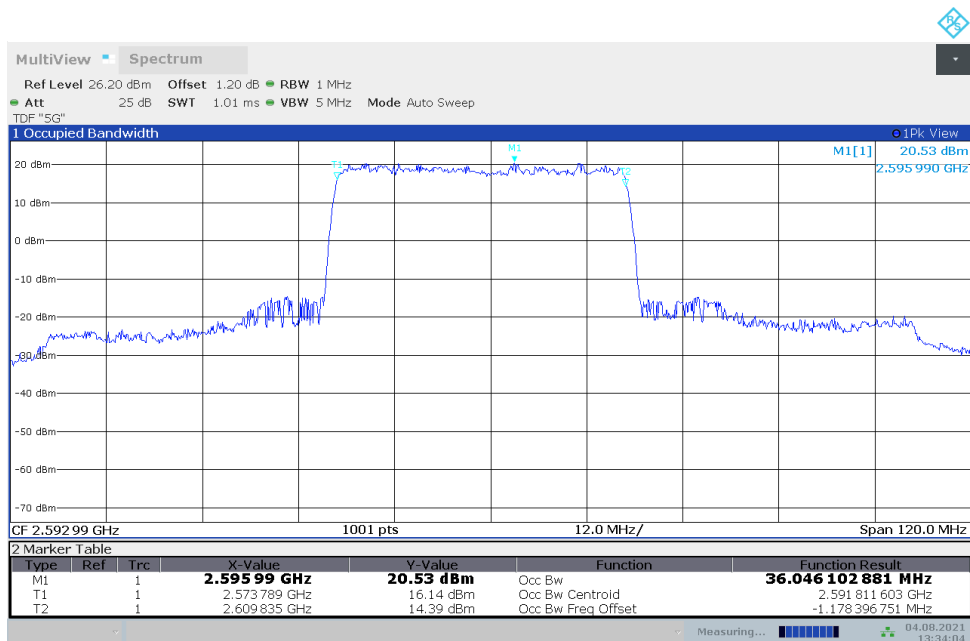
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**n41,40MHz(99%)**

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
2592.99	35.962	36.046

**n41,40MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)**


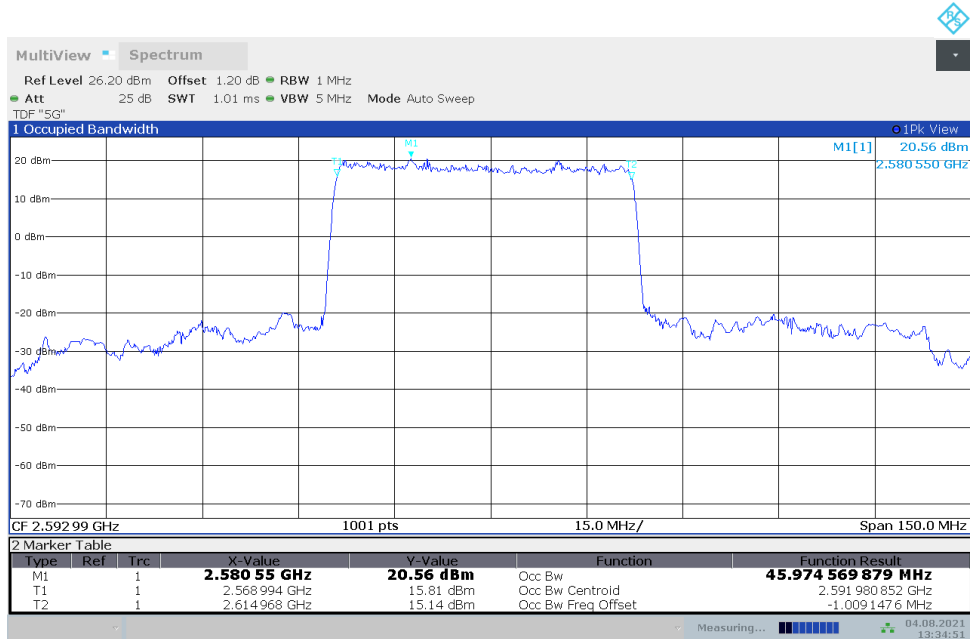
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**n41,40MHz Bandwidth,DFT-s-QPSK (99% BW)**


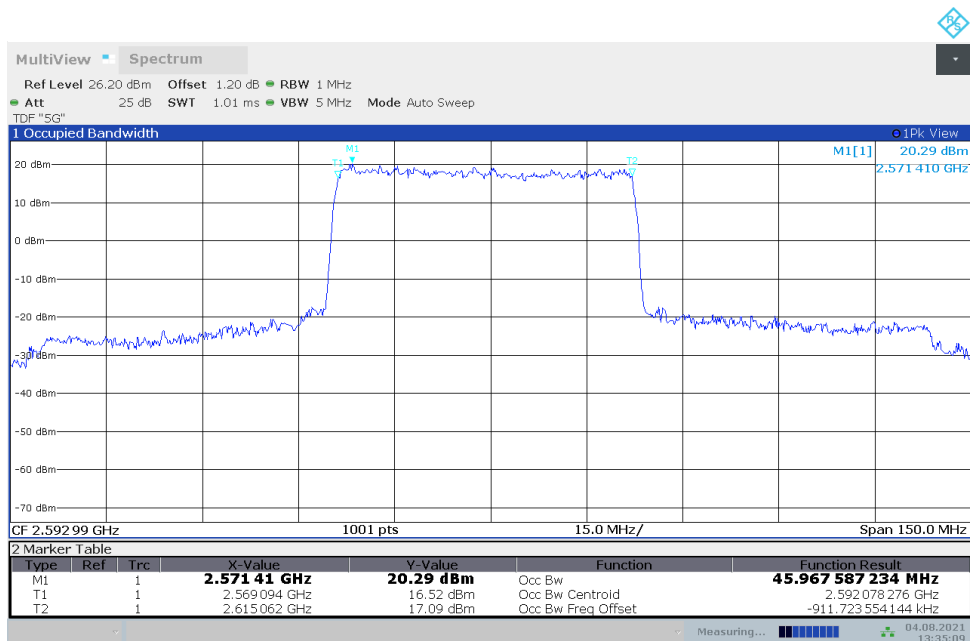
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**n41,50MHz(99%)**

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
2592.99	45.975	45.968

**n41,50MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)**


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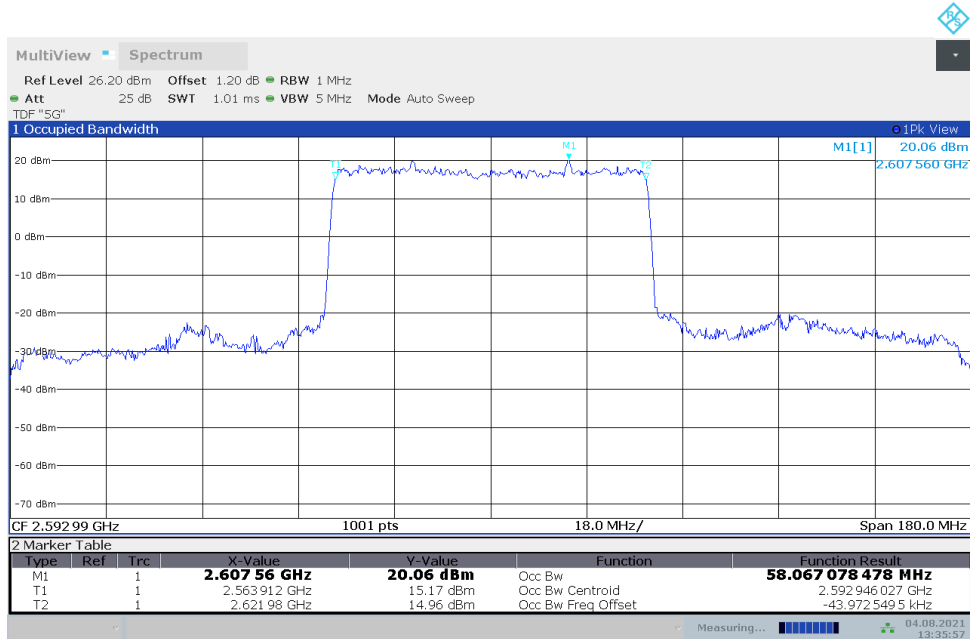
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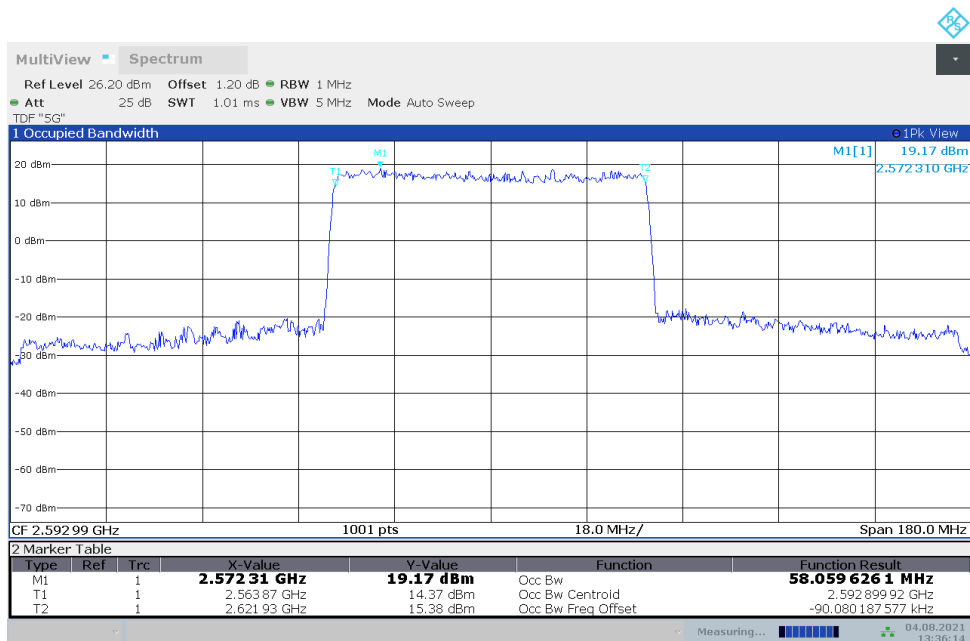


**n41,60MHz(99%)**

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
2592.99	58.067	58.060

**n41,60MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)**


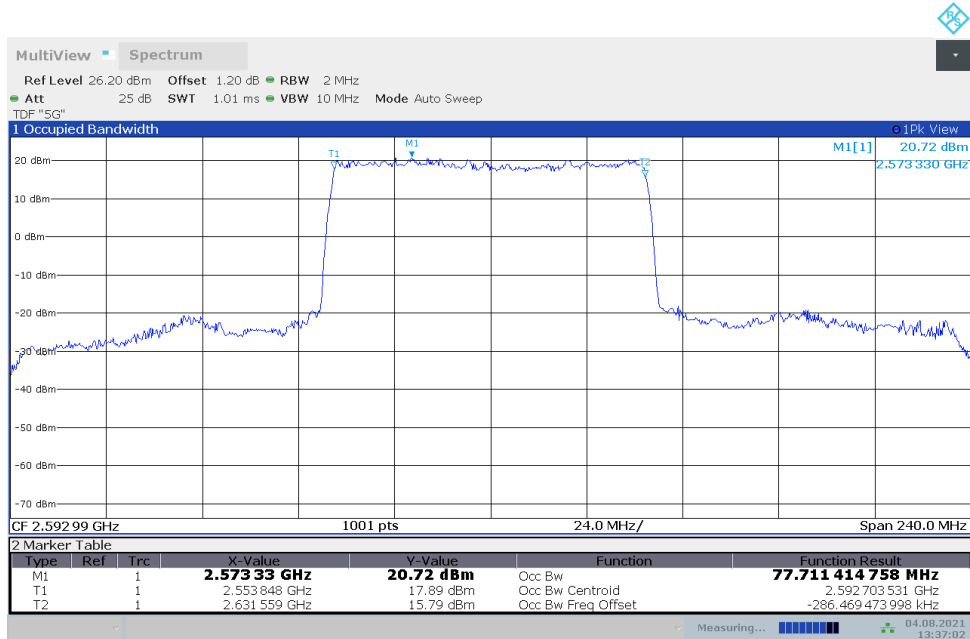
Date: 4 AUG. 2021 13:35:57

**n41,60MHz Bandwidth,DFT-s-QPSK (99% BW)**


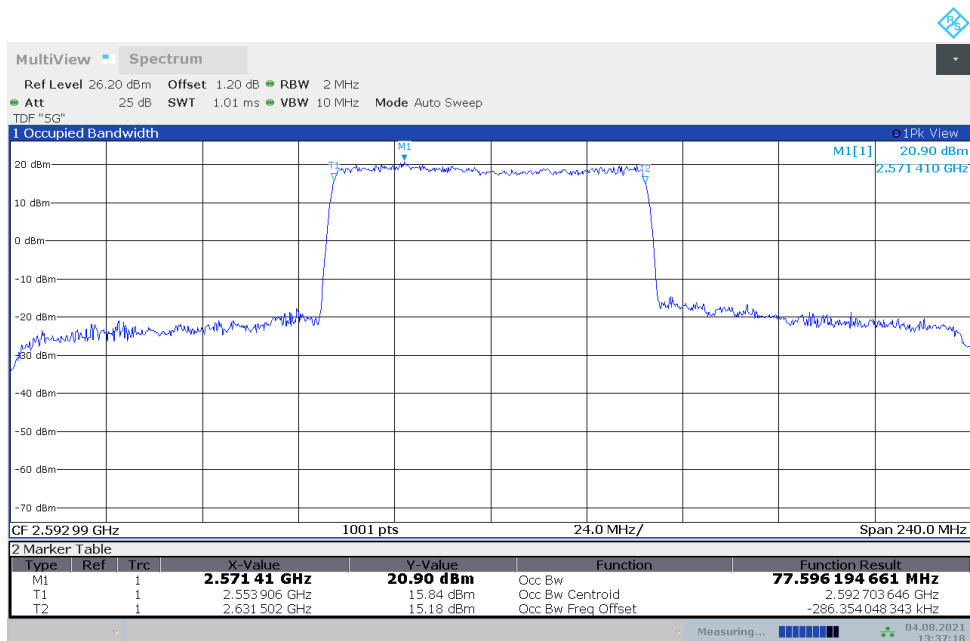
Date: 4 AUG. 2021 13:36:14

**n41,80MHz(99%)**

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
2592.99	77.711	77.596

**n41,80MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)**


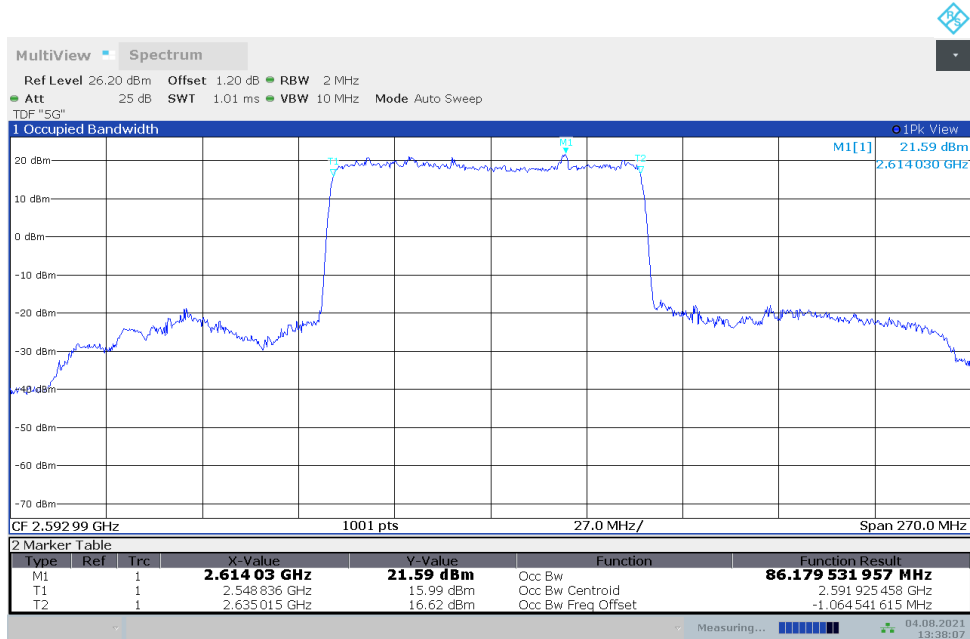
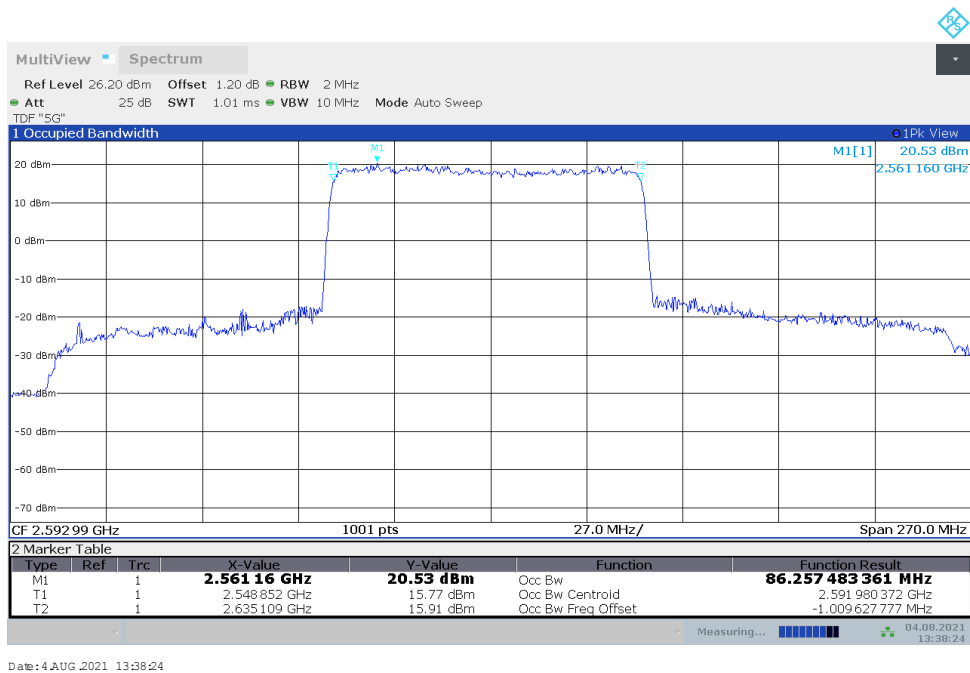
Date: 4 AUG. 2021 13:37:02

**n41,80MHz Bandwidth,DFT-s-QPSK (99% BW)**


Date: 4 AUG. 2021 13:37:19

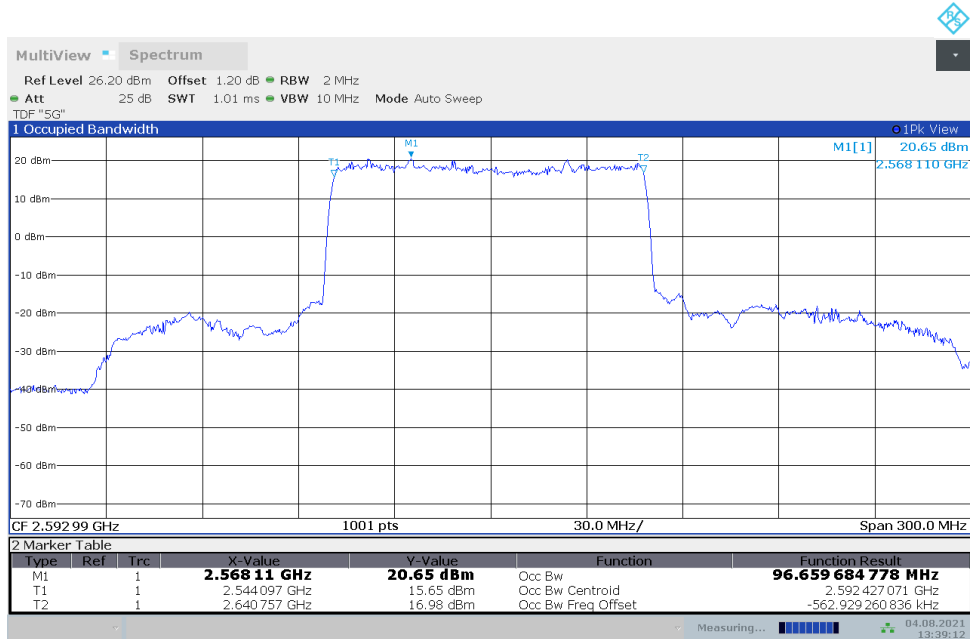
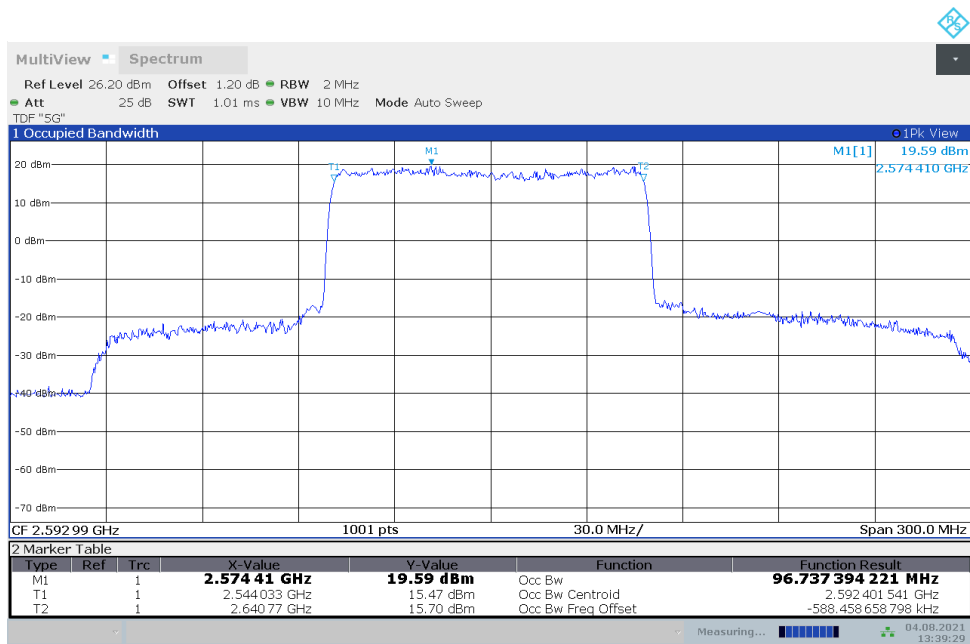
**n41,90MHz(99%)**

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
2592.99	86.180	86.257

**n41,90MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)**

**n41,90MHz Bandwidth,DFT-s-QPSK (99% BW)**


**n41,100MHz(99%)**

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
2592.99	96.660	96.737

**n41,100MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)**

**n41,100MHz Bandwidth,DFT-s-QPSK (99% BW)**


n66

n66,5MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
1745	4.502	4.520

n66,5MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)



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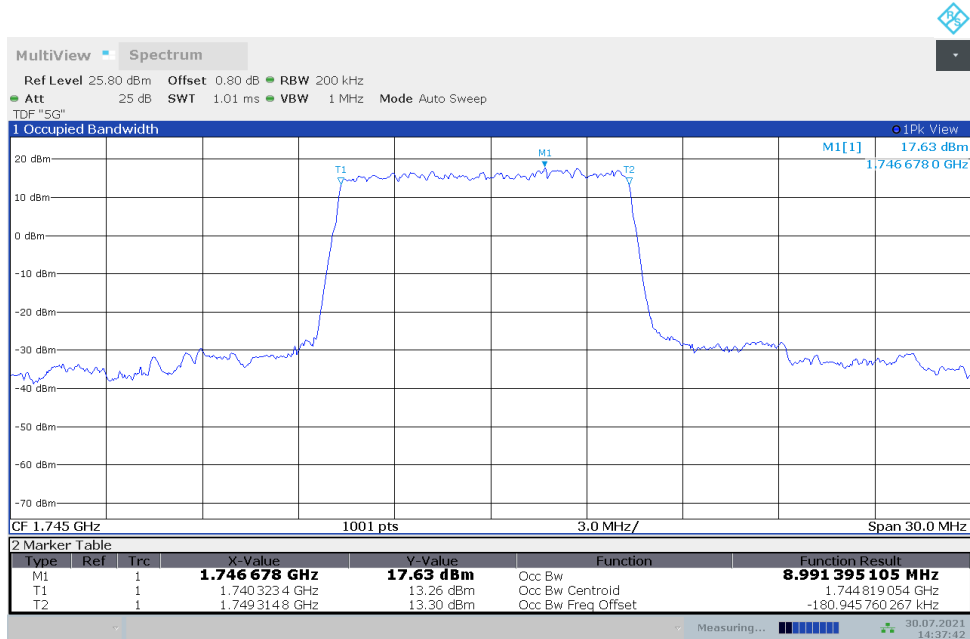
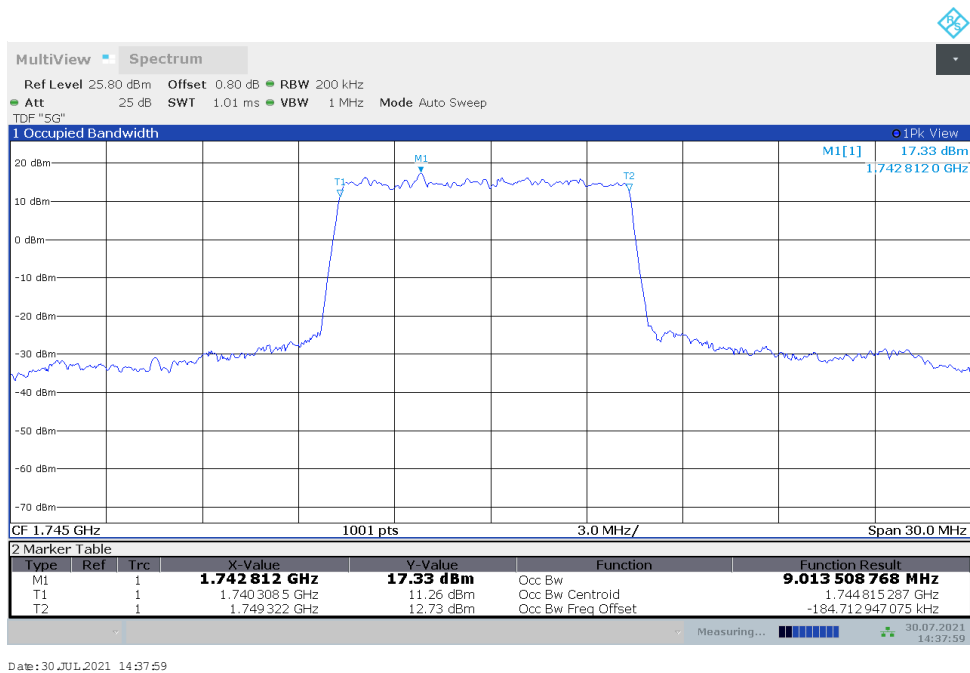
n66,5MHz Bandwidth,DFT-s-QPSK (99% BW)



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**n66,10MHz(99%)**

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
1745	8.991	9.014

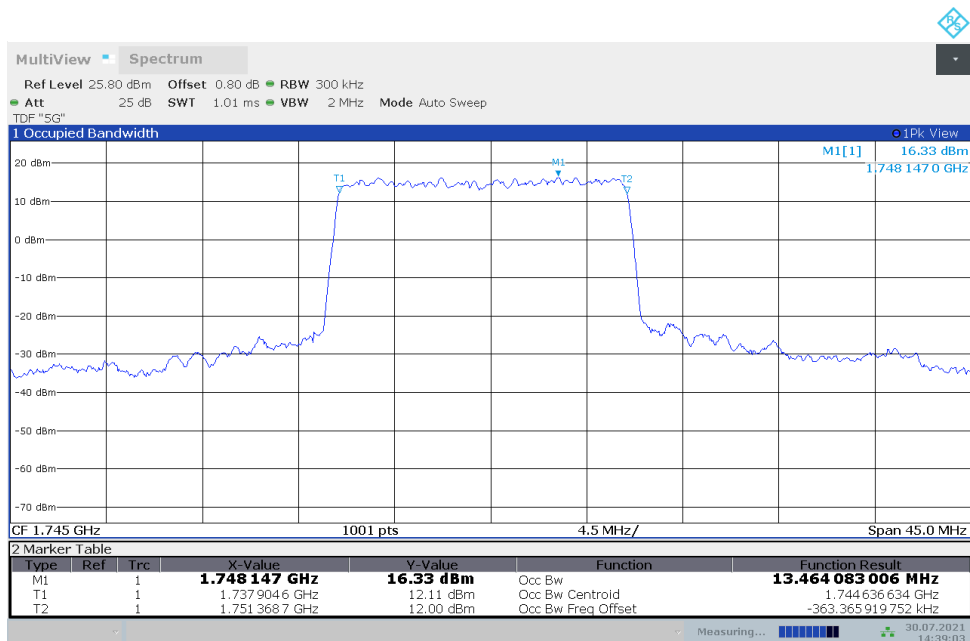
**n66,10MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)**

**n66,10MHz Bandwidth,DFT-s-QPSK (99% BW)**


**n66,15MHz(99%)**

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
1745	13.462	13.464

**n66,15MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)**


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**n66,15MHz Bandwidth,DFT-s-QPSK (99% BW)**


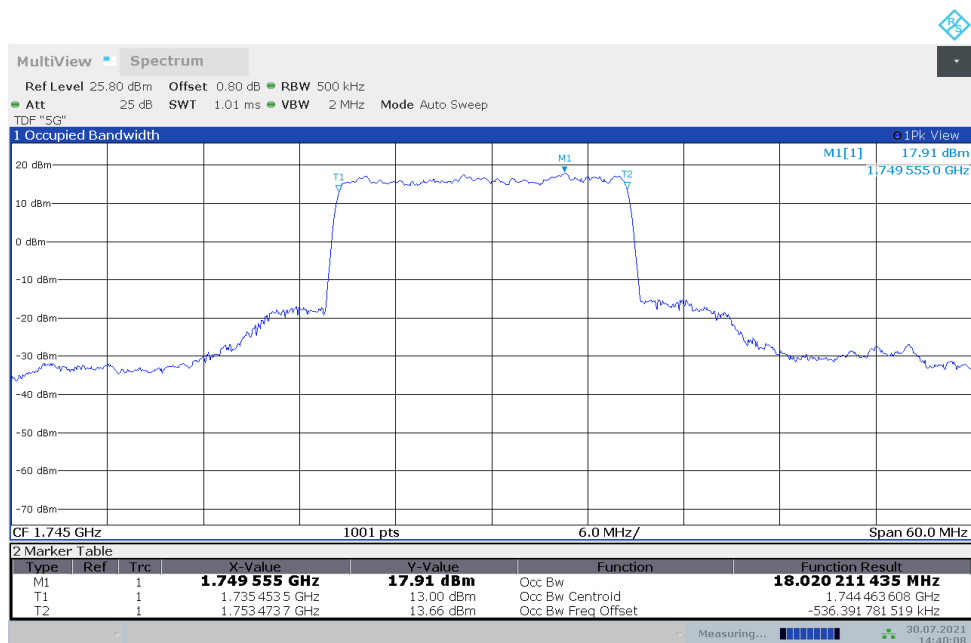
Date: 30 JUL 2021 14:39:04

**n66,20MHz(99%)**

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
1745	18.026	18.020

**n66,20MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)**


Date:30 JUL 2021 14:39:52

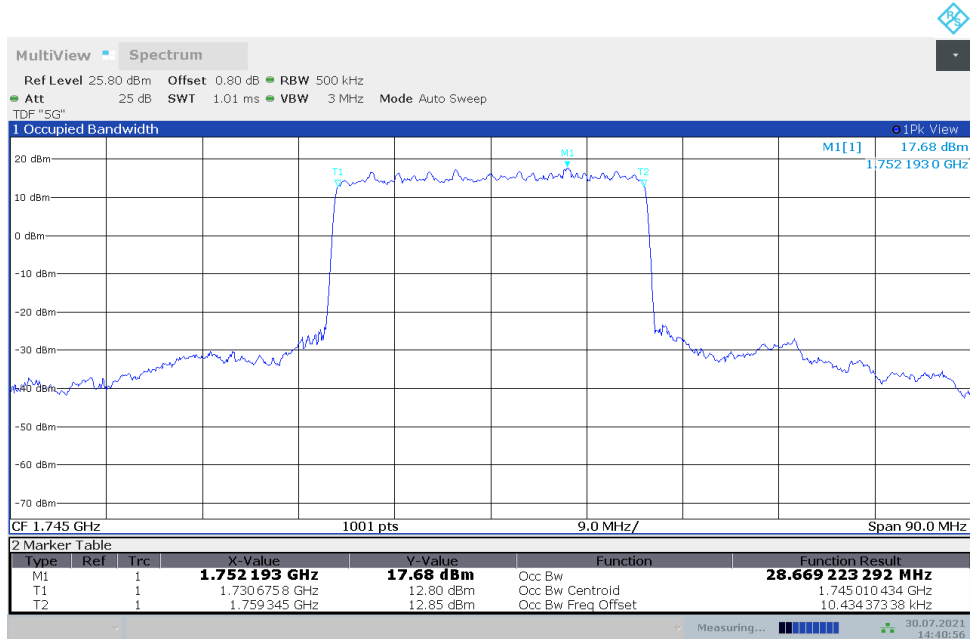
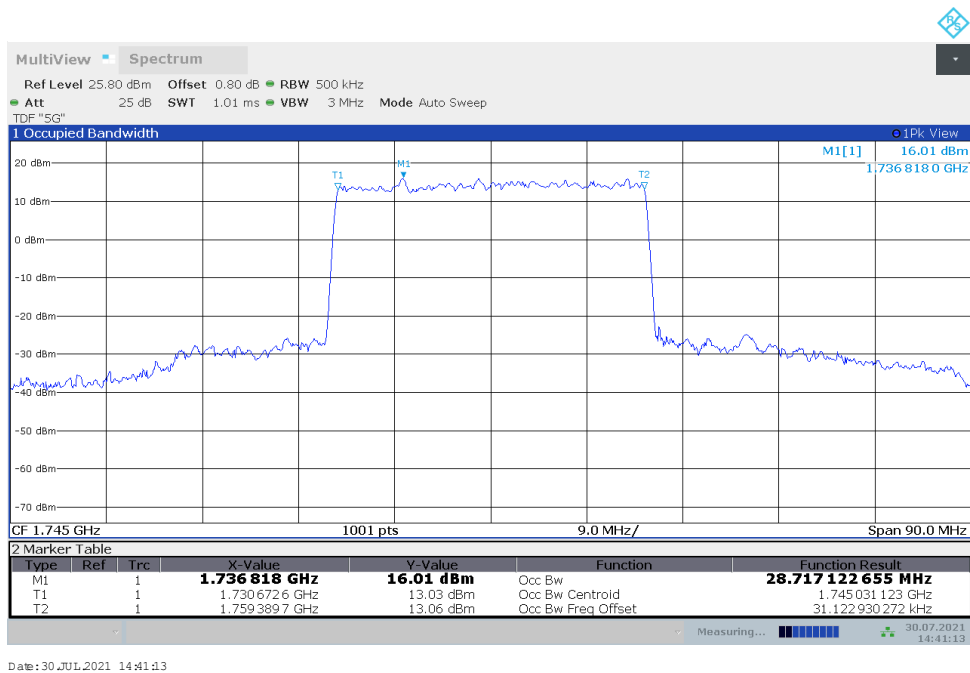
**n66,20MHz Bandwidth,DFT-s-QPSK (99% BW)**


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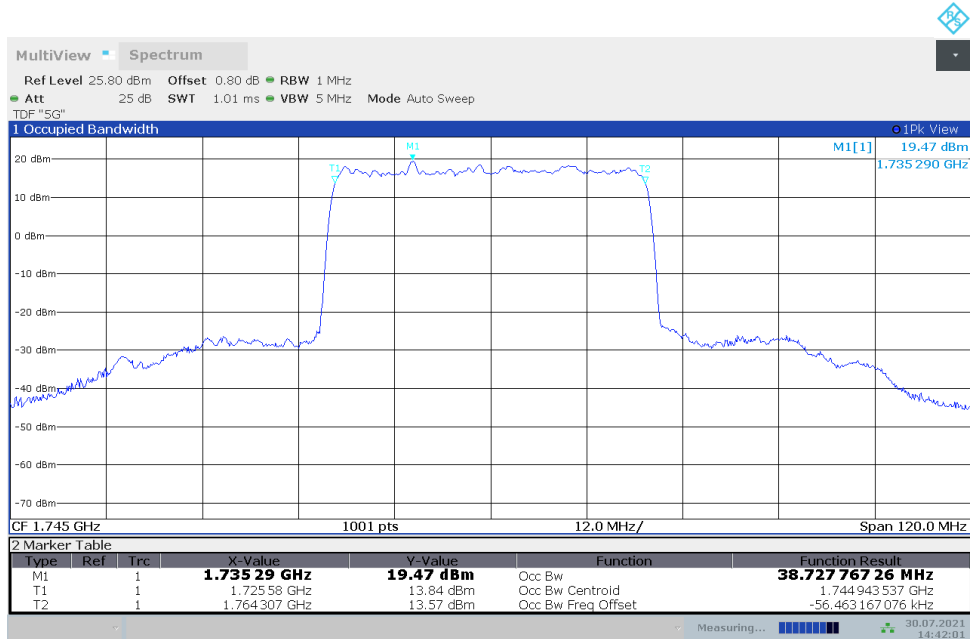
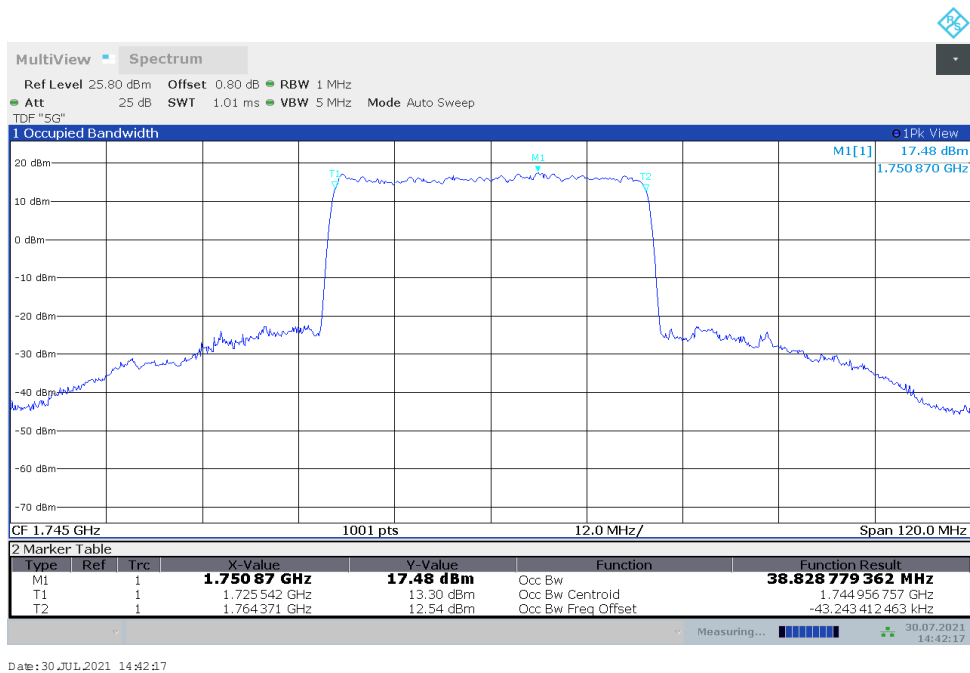
**n66,30MHz(99%)**

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
1745	28.669	28.717

**n66,30MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)**

**n66,30MHz Bandwidth,DFT-s-QPSK (99% BW)**


**n66,40MHz(99%)**

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
1745	38.728	38.829

**n66,40MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)**

**n66,40MHz Bandwidth,DFT-s-QPSK (99% BW)**


n71

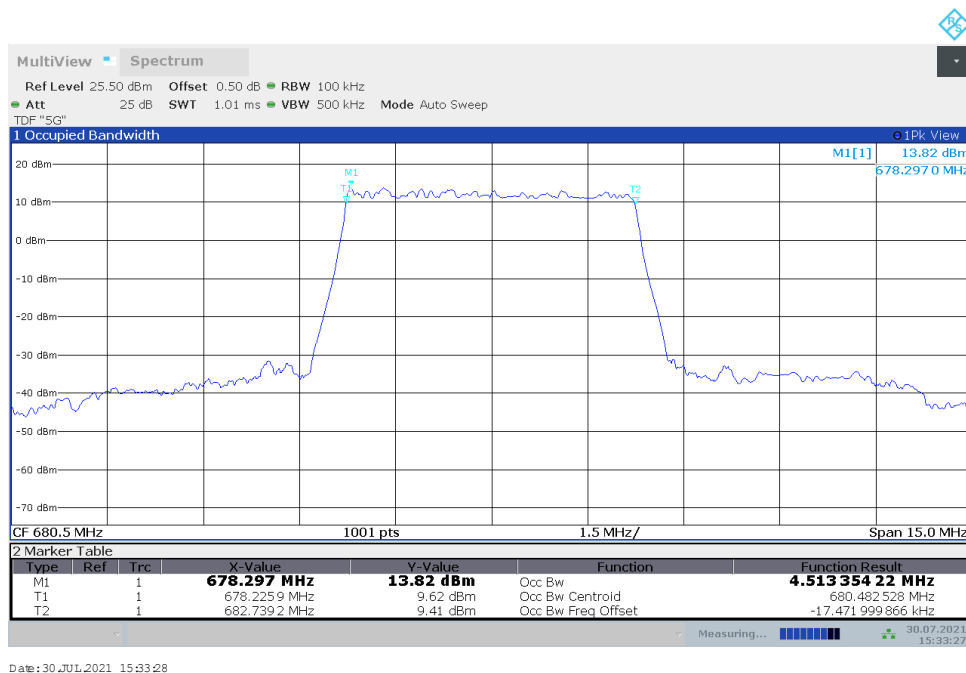
n71,5MHz(99%)

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
680.5	4.496	4.513

n71,5MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)

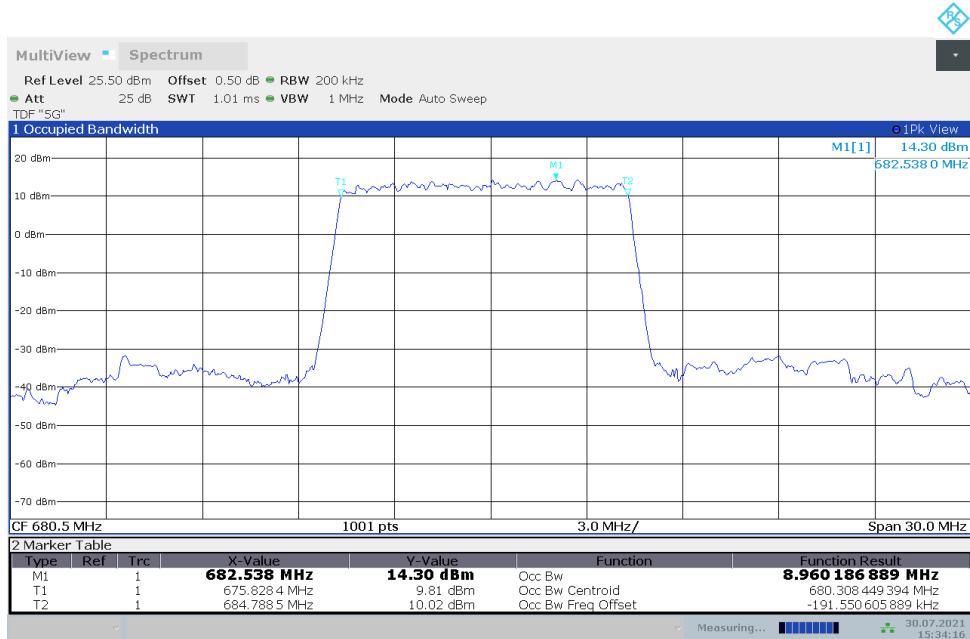
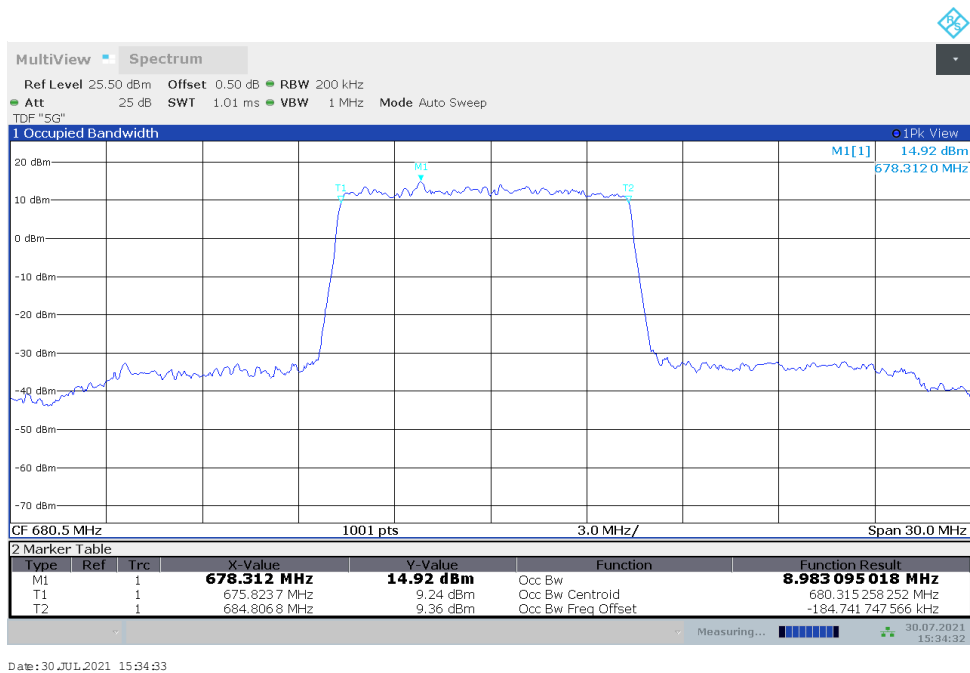


n71,5MHz Bandwidth,DFT-s-QPSK (99% BW)



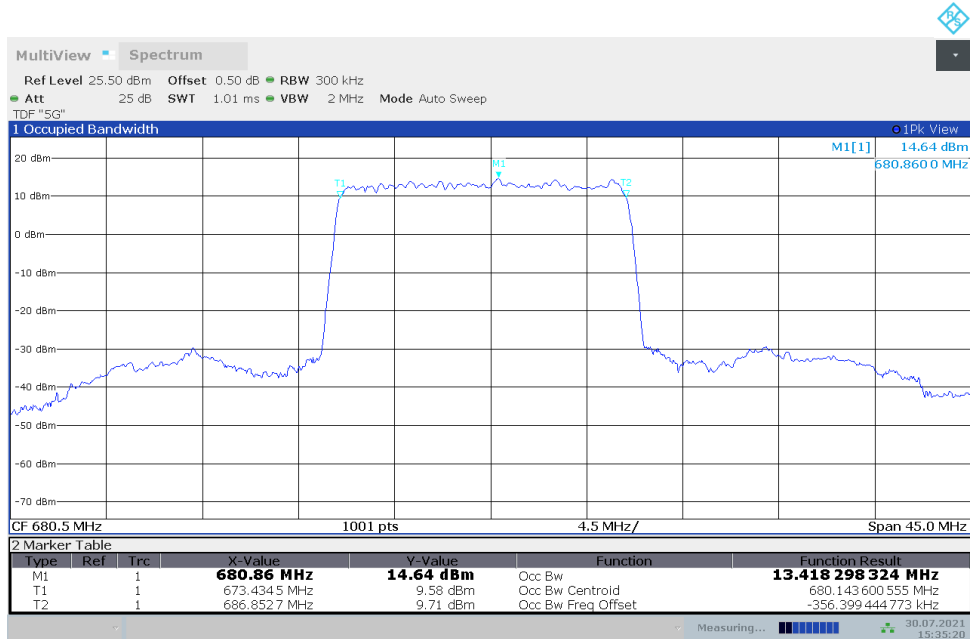
**n71,10MHz(99%)**

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
680.5	8.960	8.983

**n71,10MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)**

**n71,10MHz Bandwidth,DFT-s-QPSK (99% BW)**


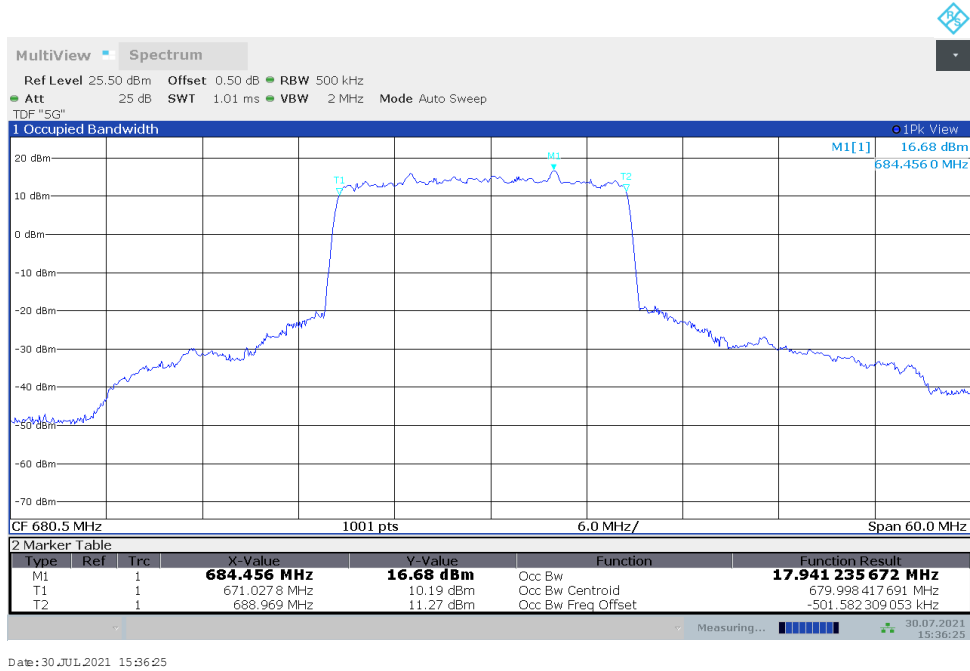
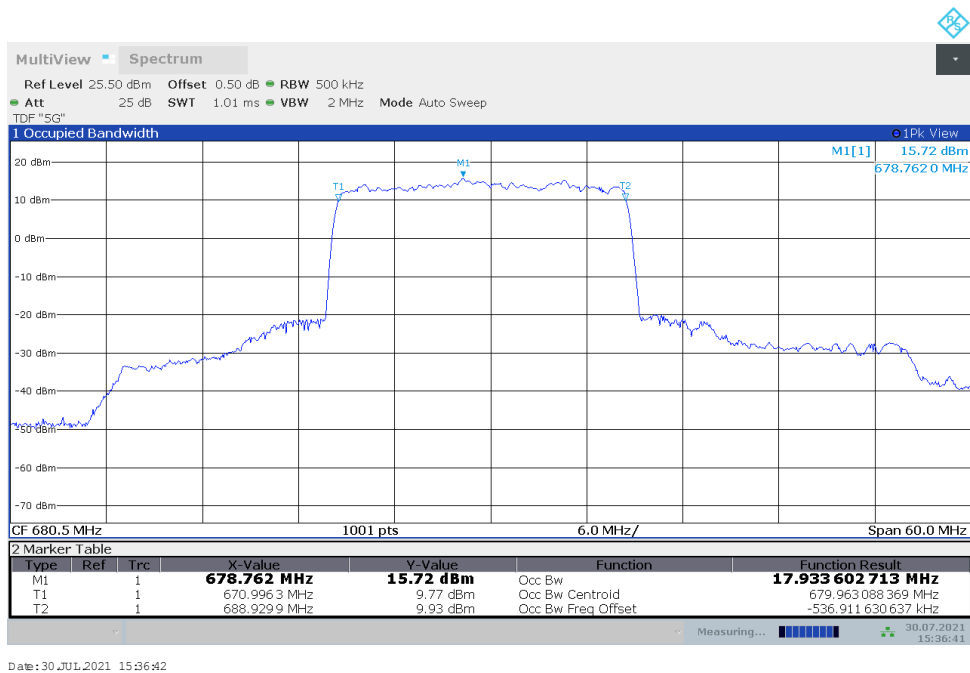
**n71,15MHz(99%)**

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
680.5	13.418	13.430

**n71,15MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)**

**n71,15MHz Bandwidth,DFT-s-QPSK (99% BW)**


**n71,20MHz(99%)**

Frequency (MHz)	Occupied Bandwidth (99%) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
680.5	17.941	17.934

**n71,20MHz Bandwidth,DFT-s-pi/2 BPSK (99% BW)**

**n71,20MHz Bandwidth,DFT-s-QPSK (99% BW)**


## **A.5 Emission Bandwidth**

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. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

The measurement method is from ANSI C63.26:

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
- b) The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set  $\geq 3 \times$  RBW.
- c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation.
- d) The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target “-X dB” requirement, i.e., if the requirement calls for measuring the -26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
- e) Set spectrum analyzer detection mode to peak, and the trace mode to max hold.

n25

n25,5MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
1882.5	5.035	4.990

n25,5MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



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n25,5MHz Bandwidth,DFT-s-QPSK (-26dBc BW)



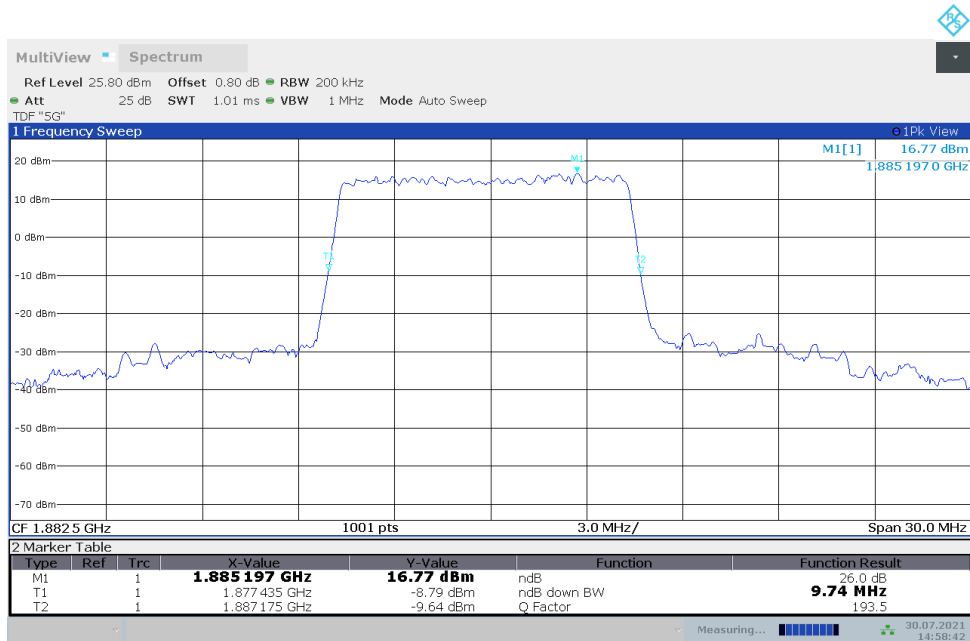
Date: 30 JUL 2021 14:57:55



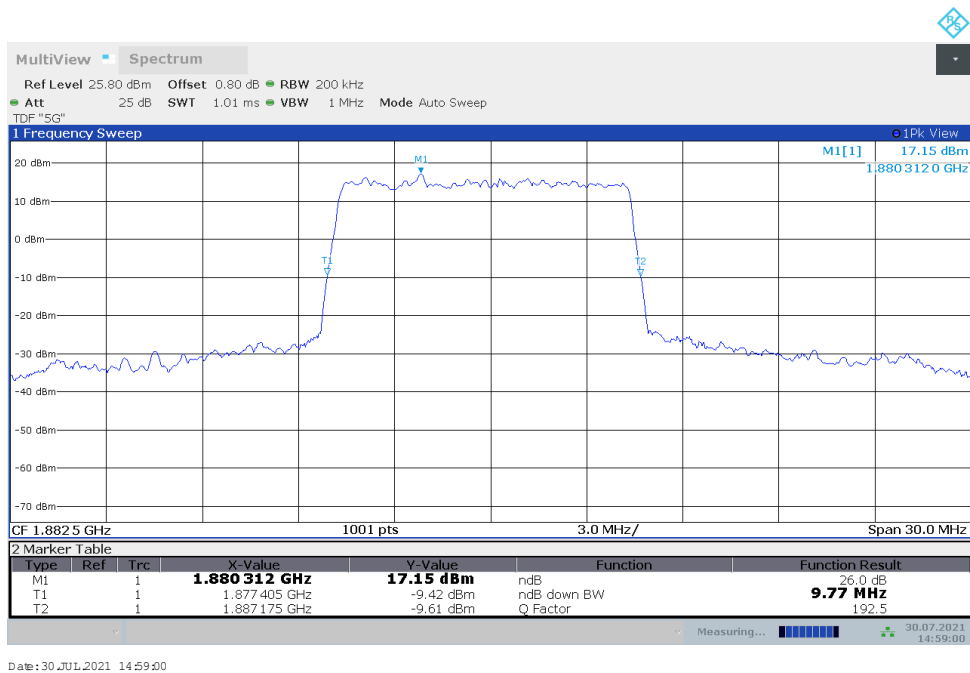
### n25,10MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
1882.5	9.740	9.770

### n25,10MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)

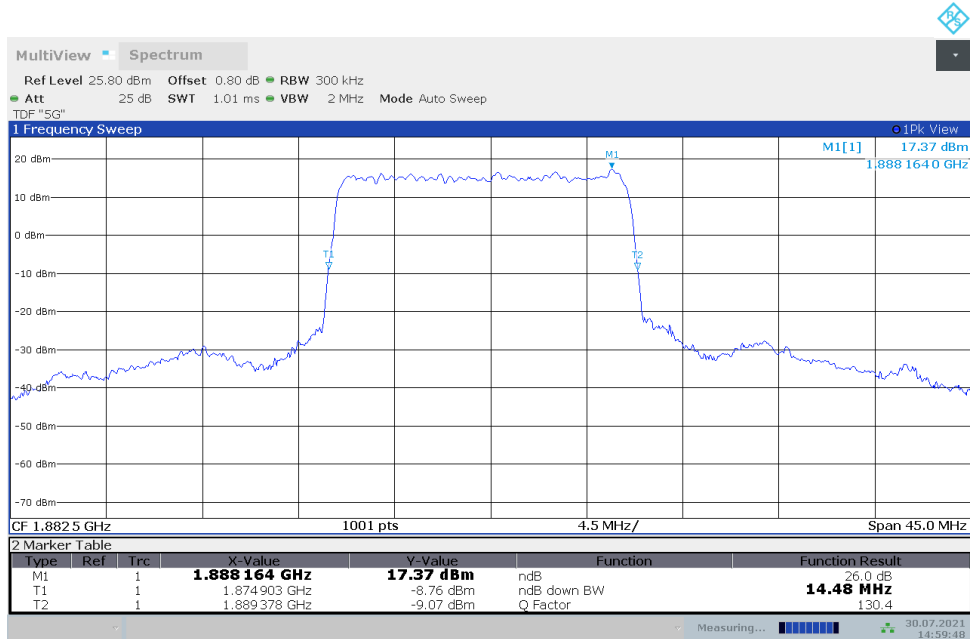
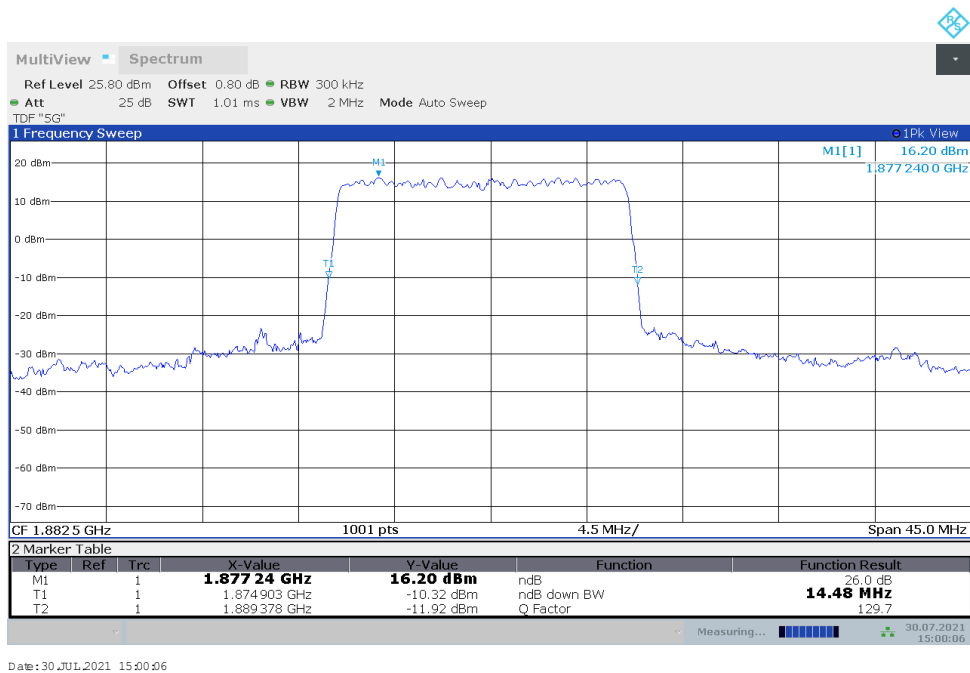


### n25,10MHz Bandwidth,DFT-s-QPSK (-26dBc BW)



**n25,15MHz(-26dBc)**

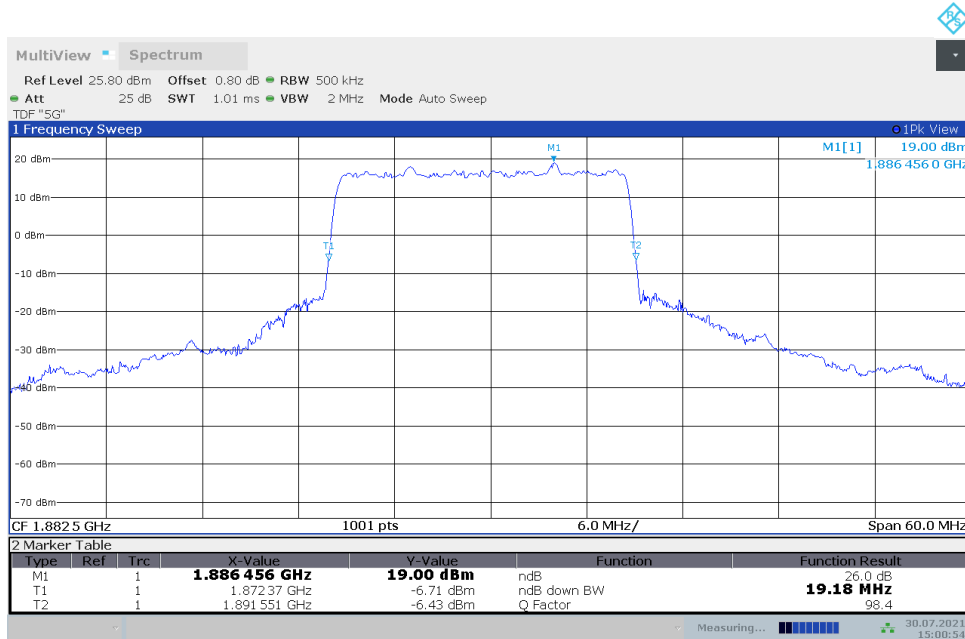
Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
1882.5	14.476	14.476

**n25,15MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)**

**n25,15MHz Bandwidth,DFT-s-QPSK (-26dBc BW)**


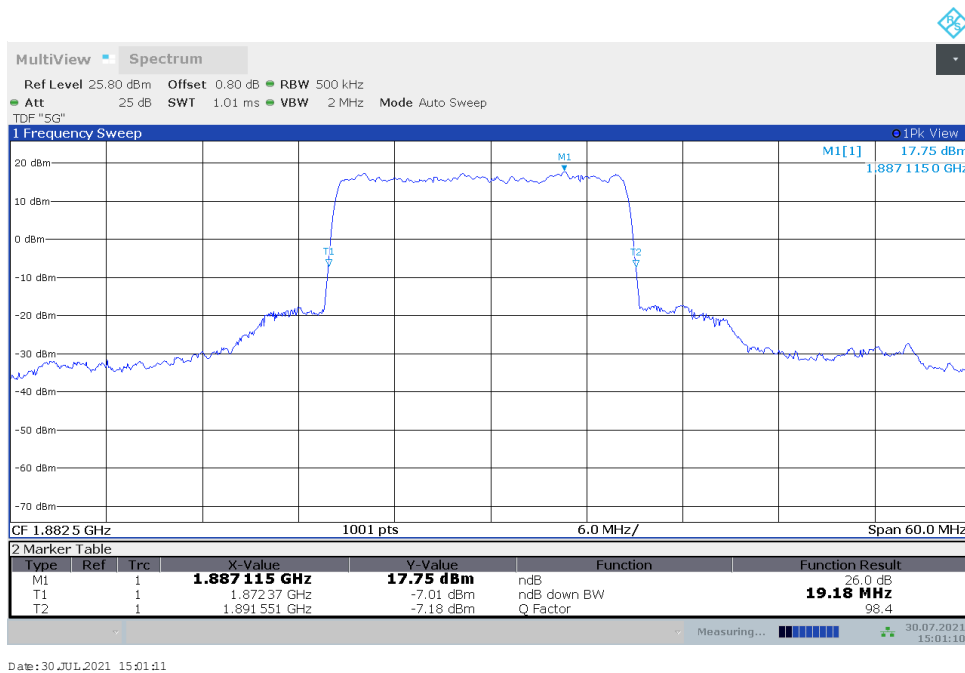
### n25,20MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
1882.5	19.181	19.181

### n25,20MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



### n25,20MHz Bandwidth,DFT-s-QPSK (-26dBc BW)

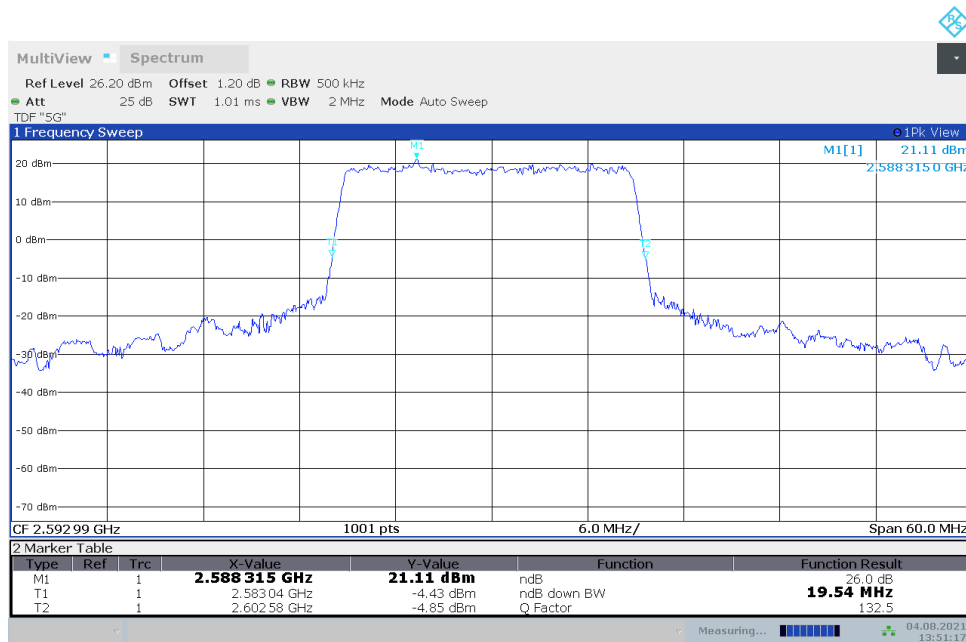


n41

n41,20MHz(-26dBc)

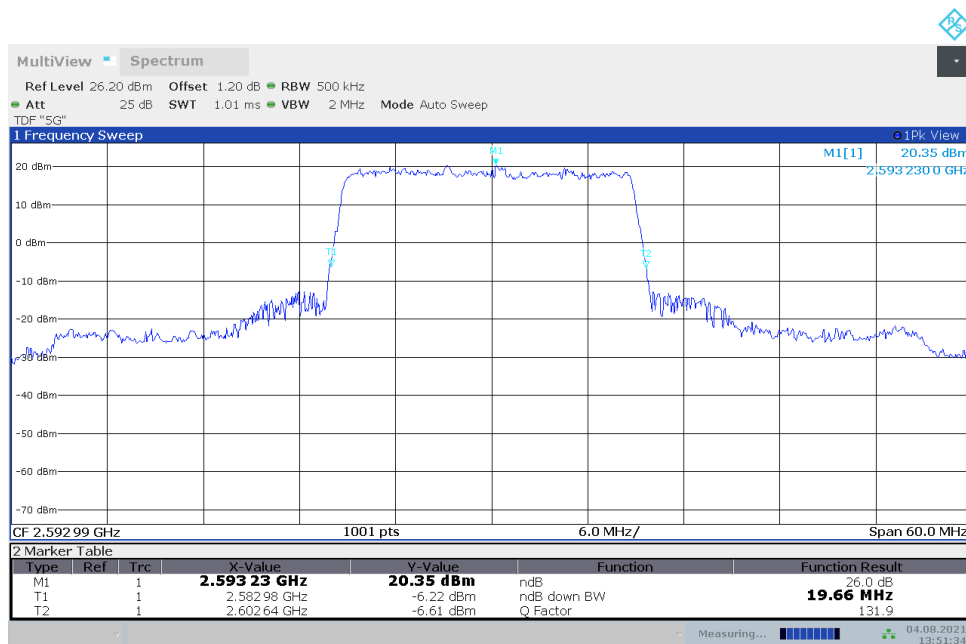
Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
2592.99	19.540	19.660

n41,20MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



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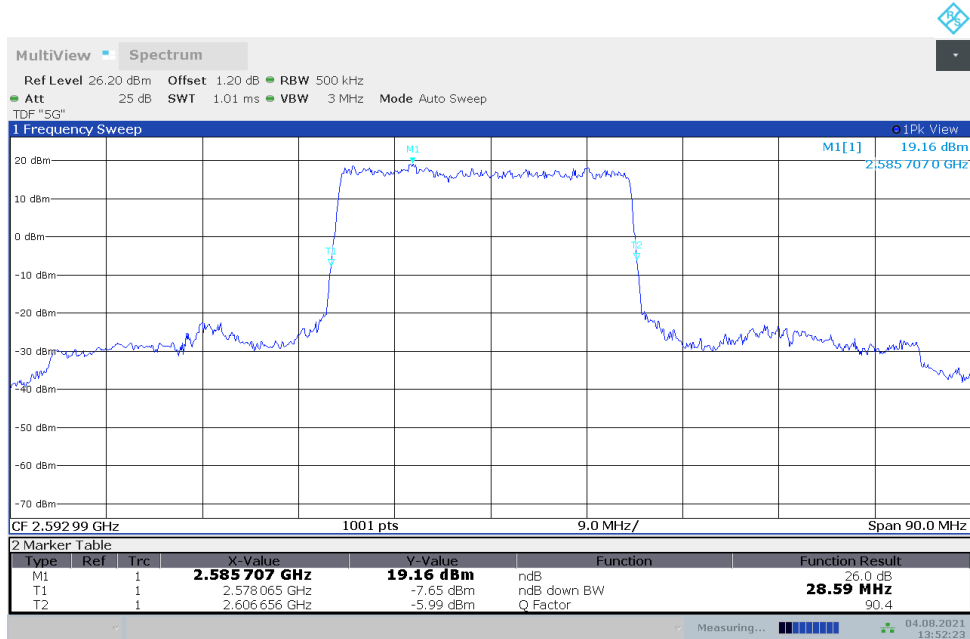
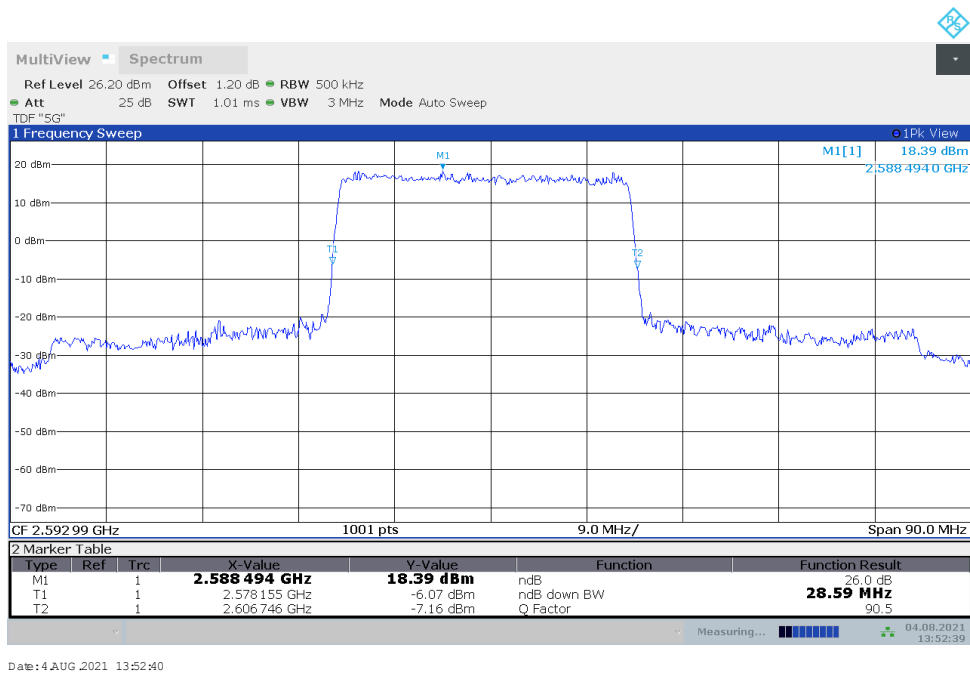
n41,20MHz Bandwidth,DFT-s-QPSK (-26dBc BW)



Date: 4 AUG 2021 13:51:34

**n41,30MHz(-26dBc)**

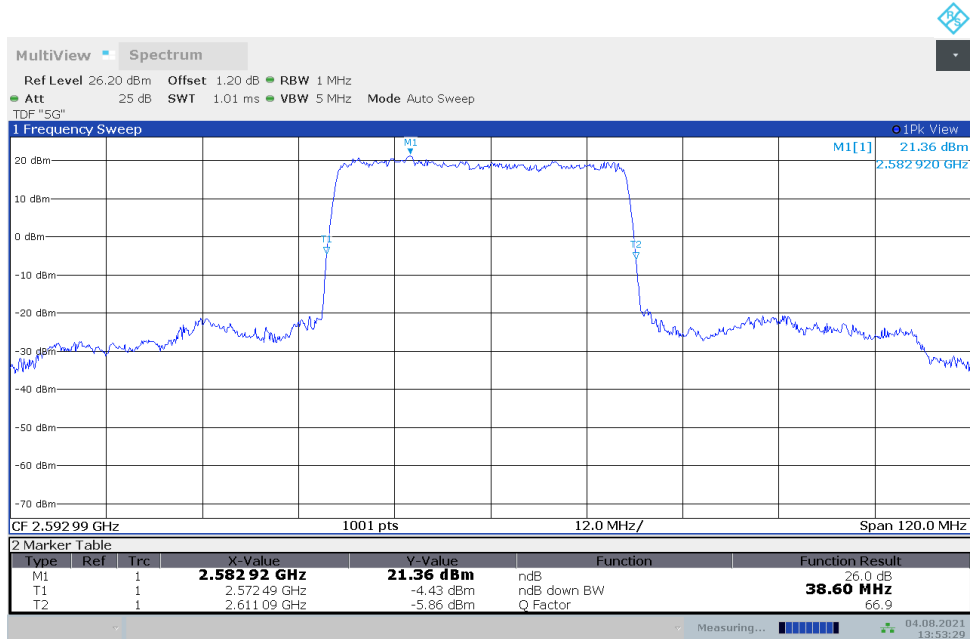
Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
2592.99	28.591	28.591

**n41,30MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)**

**n41,30MHz Bandwidth,DFT-s-QPSK (-26dBc BW)**


### n41,40MHz(-26dBc)

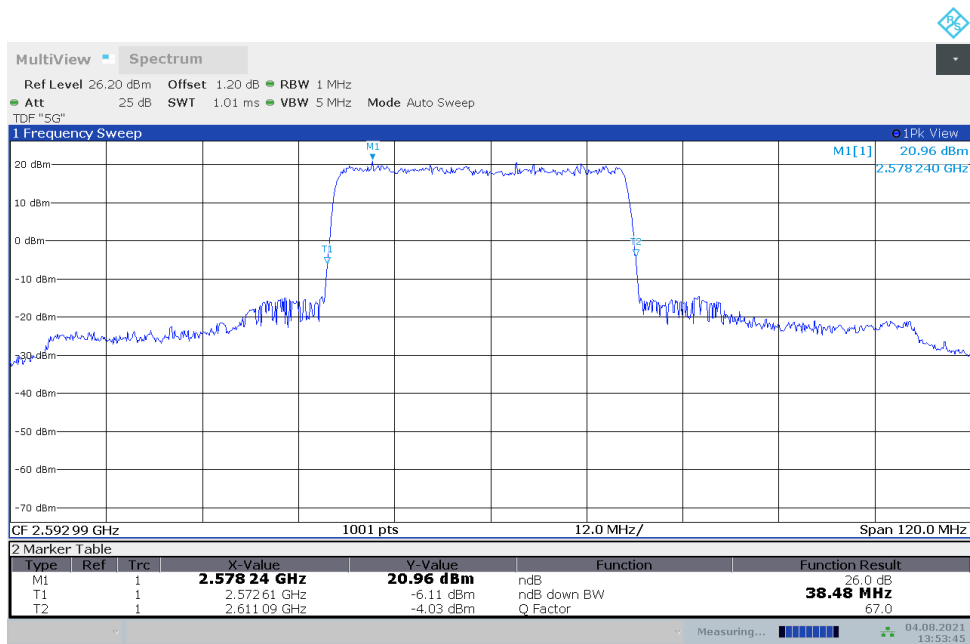
Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
2592.99	38.600	38.480

### n41,40MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



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### n41,40MHz Bandwidth,DFT-s-QPSK (-26dBc BW)

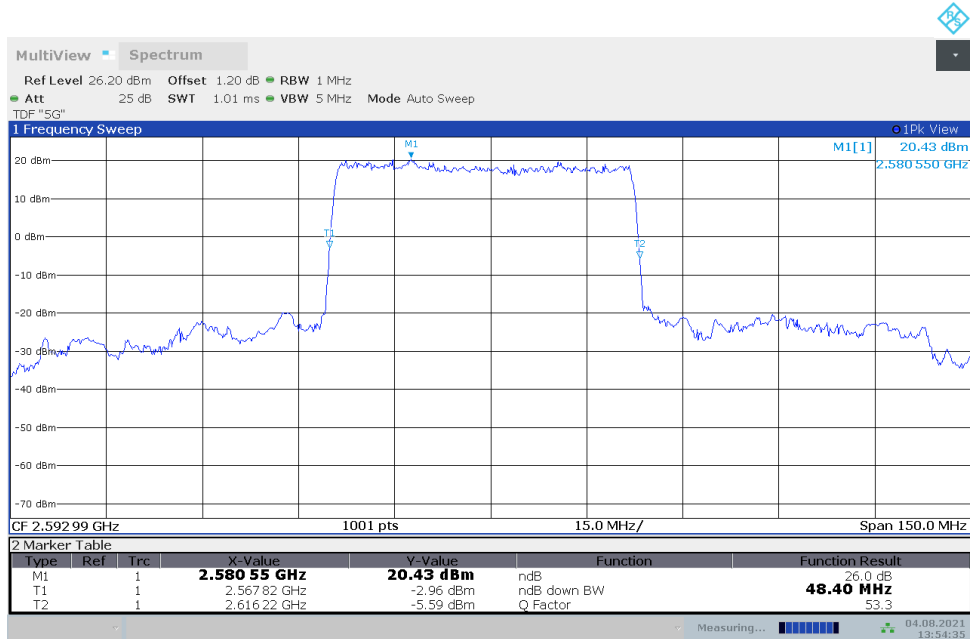


Date: 4 AUG. 2021 13:53:46

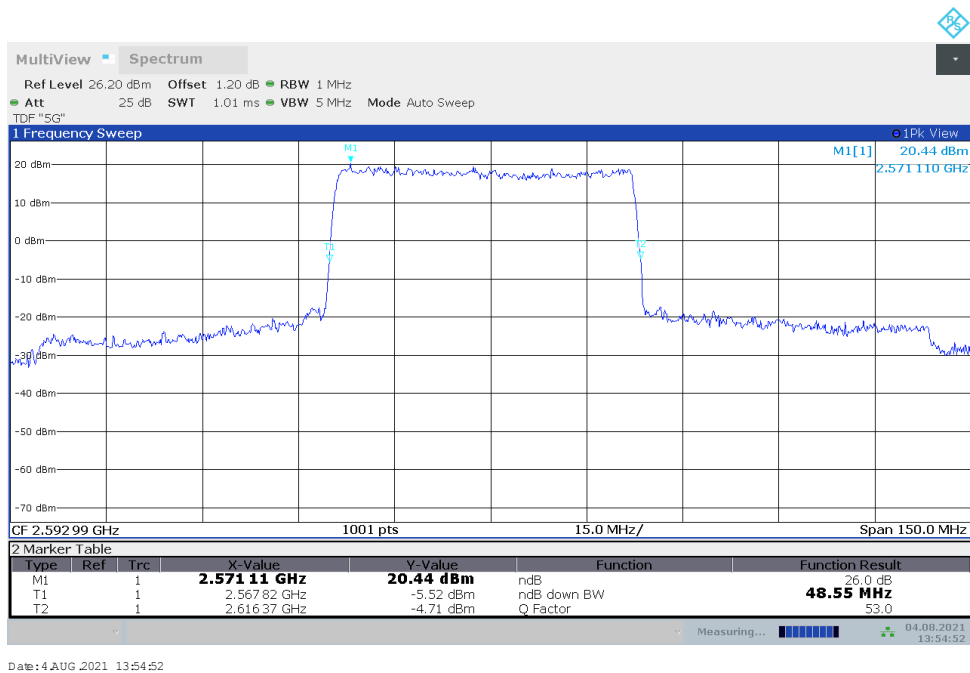
### n41,50MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
2592.99	48.400	48.550

### n41,50MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)

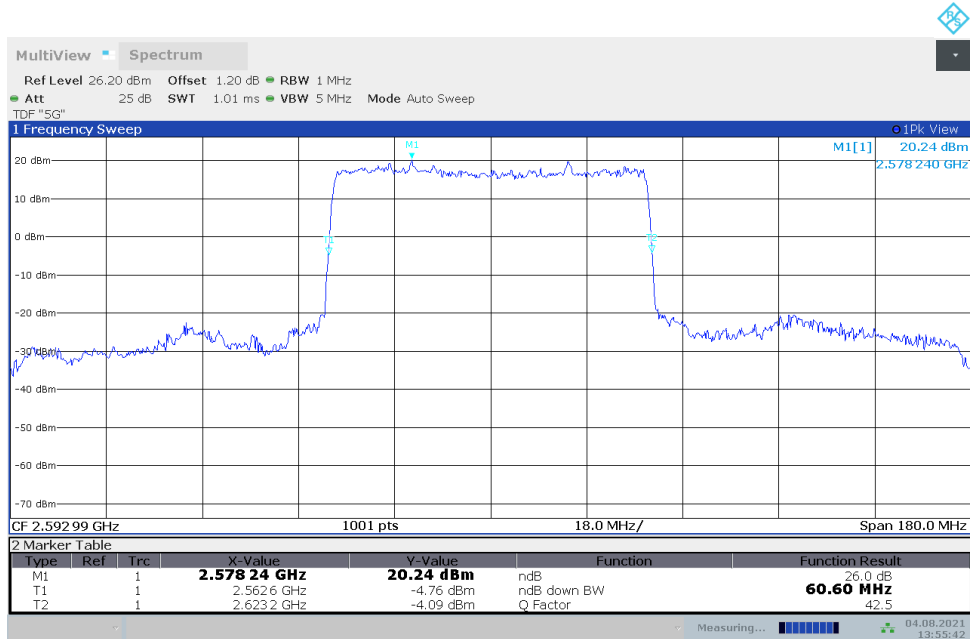
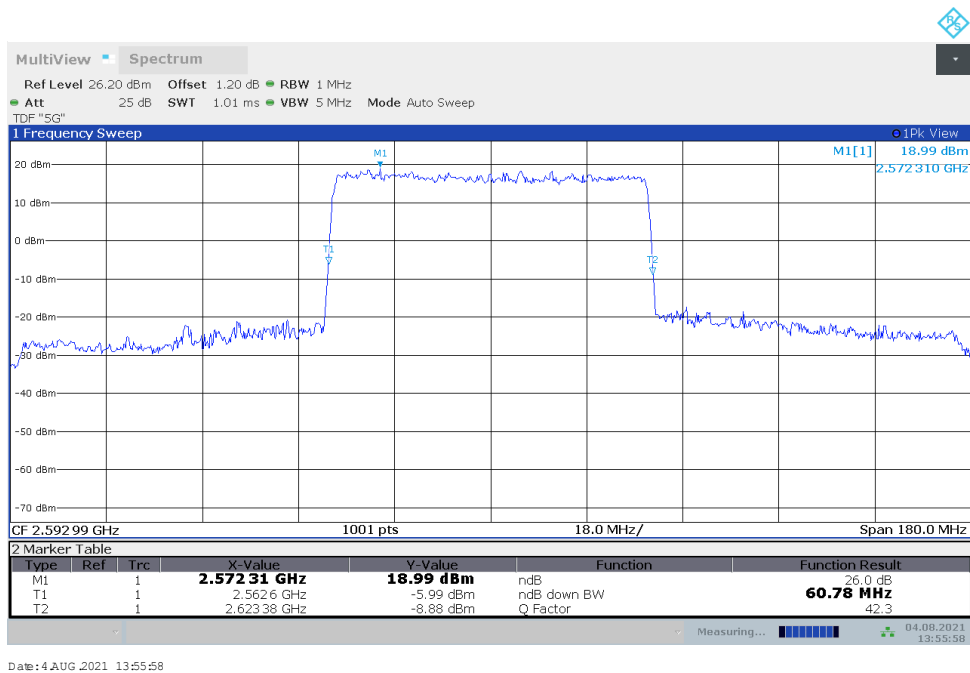


### n41,50MHz Bandwidth,DFT-s-QPSK (-26dBc BW)



**n41,60MHz(-26dBc)**

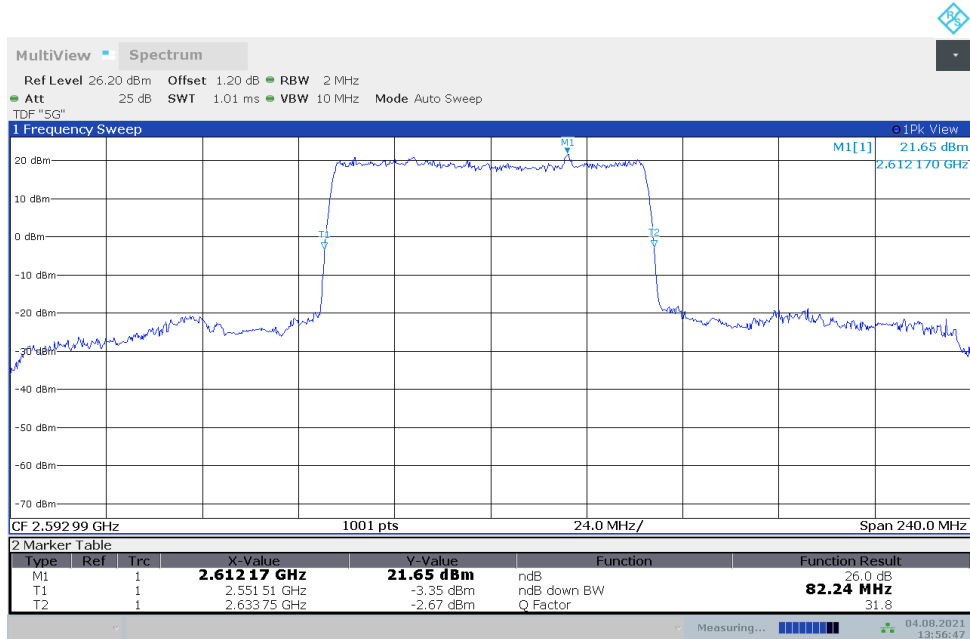
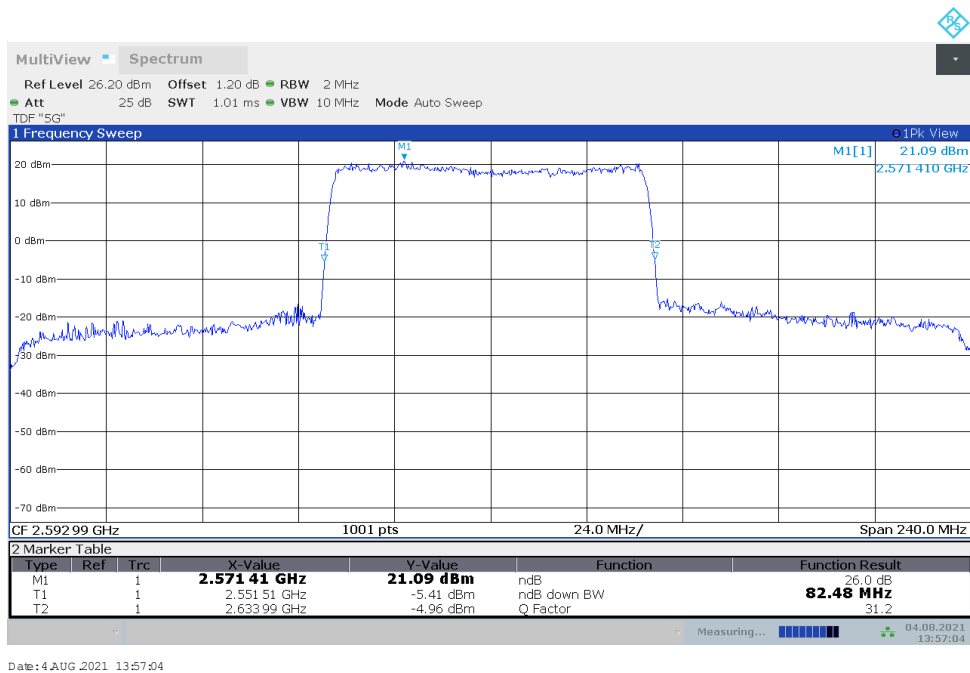
Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
2592.99	60.600	60.780

**n41,60MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)**

**n41,60MHz Bandwidth,DFT-s-QPSK (-26dBc BW)**




**n41,80MHz(-26dBc)**

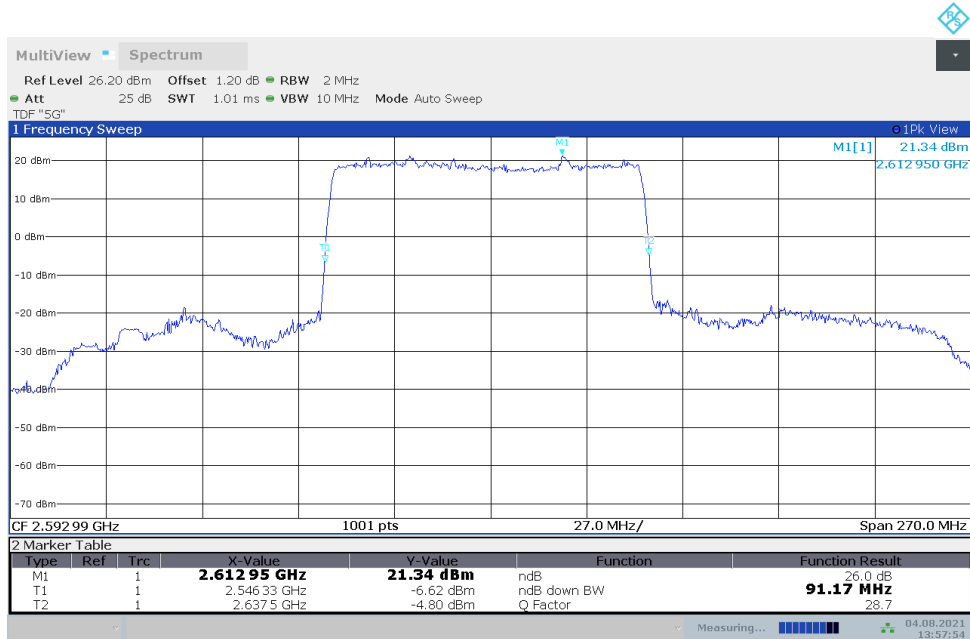
Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
2592.99	82.240	82.480

**n41,80MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)**

**n41,80MHz Bandwidth,DFT-s-QPSK (-26dBc BW)**


### n41,90MHz(-26dBc)

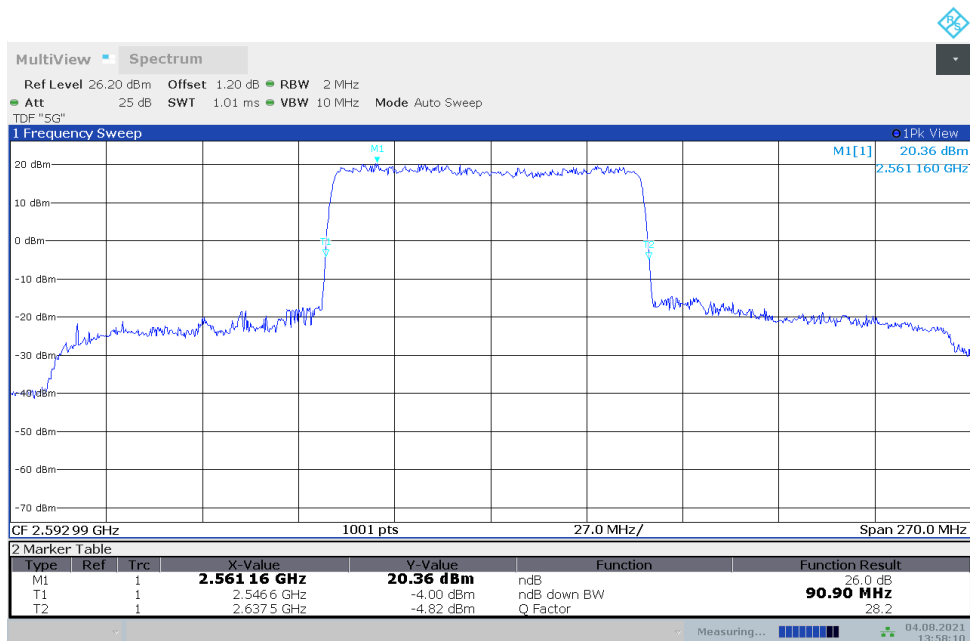
Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
2592.99	91.170	90.900

### n41,90MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



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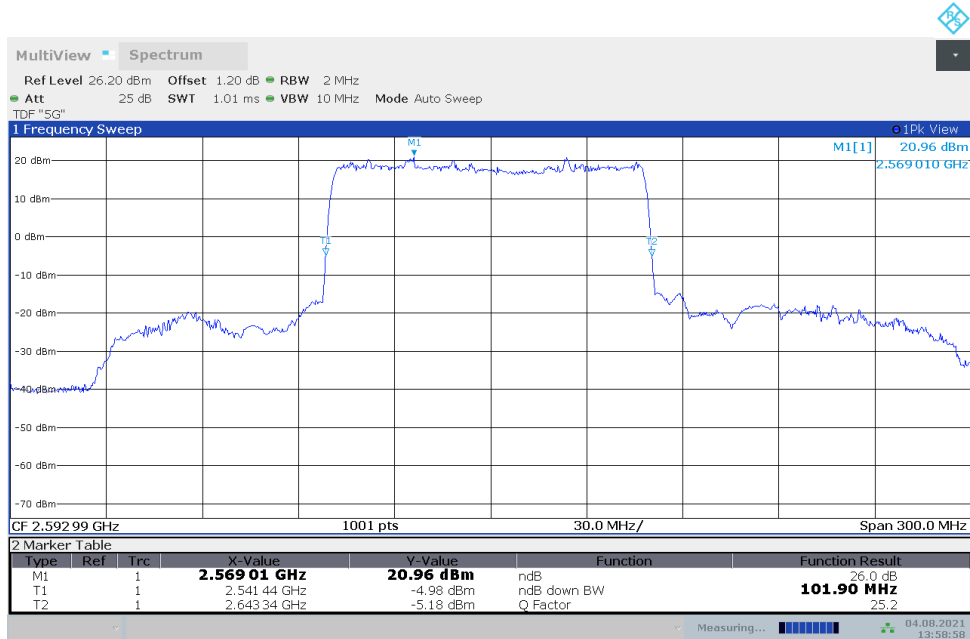
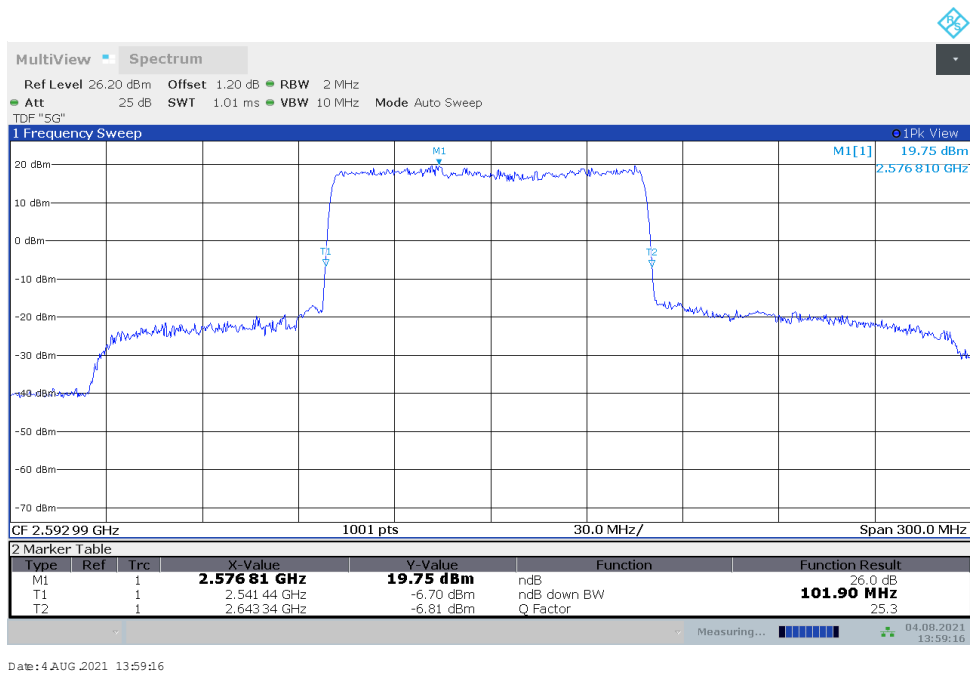
### n41,90MHz Bandwidth,DFT-s-QPSK (-26dBc BW)



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**n41,100MHz(-26dBc)**

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
2592.99	101.900	101.900

**n41,100MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)**

**n41,100MHz Bandwidth,DFT-s-QPSK (-26dBc BW)**


n66

n66,5MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
1745	5.005	5.035

n66,5MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



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n66,5MHz Bandwidth,DFT-s-QPSK (-26dBc BW)

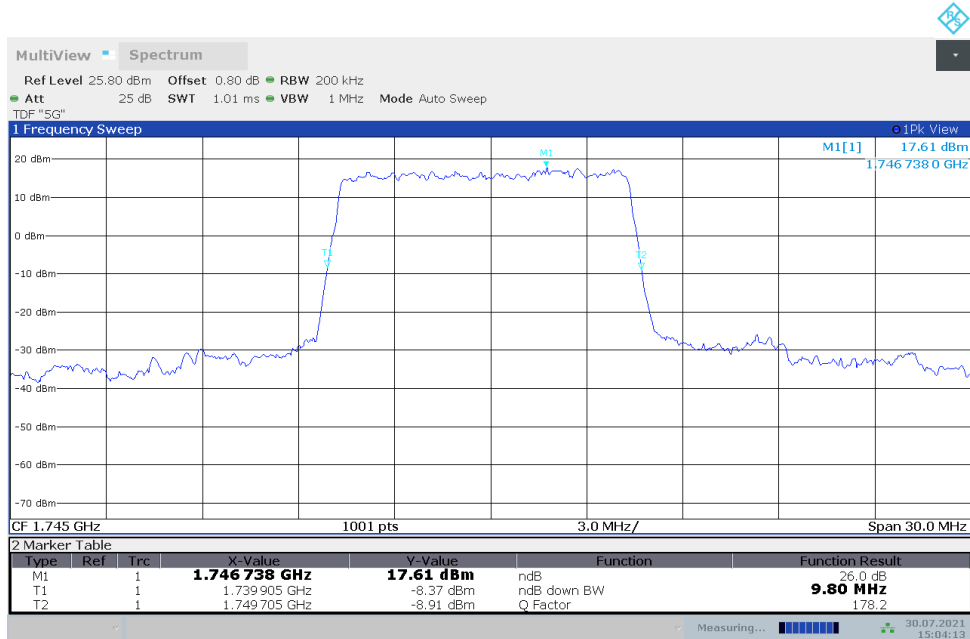


Date: 30 JUL 2021 15:03:25

### n66,10MHz(-26dBc)

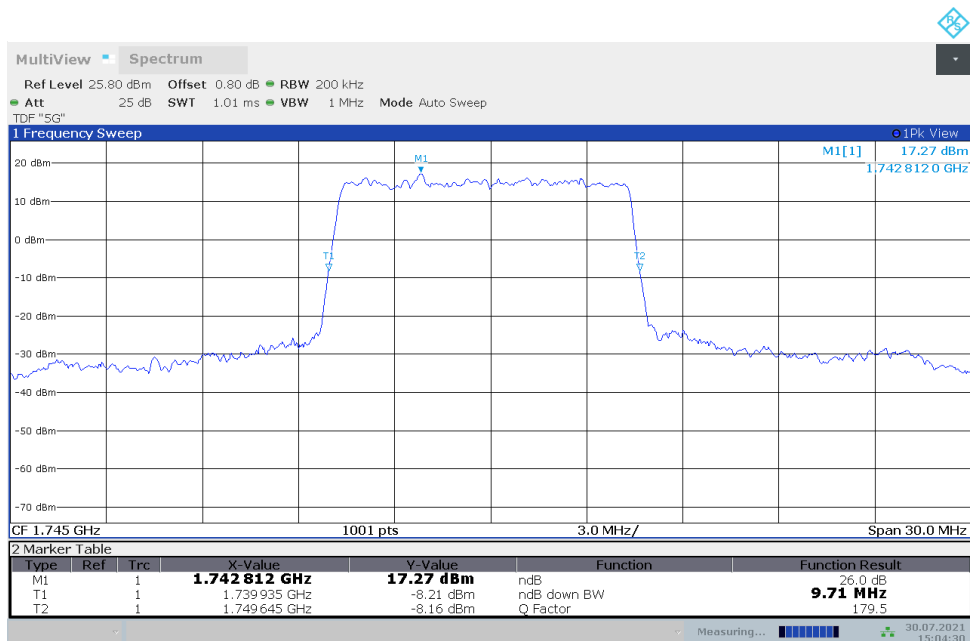
Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
1745	9.800	9.710

### n66,10MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



Date: 30 JUL 2021 15:04:14

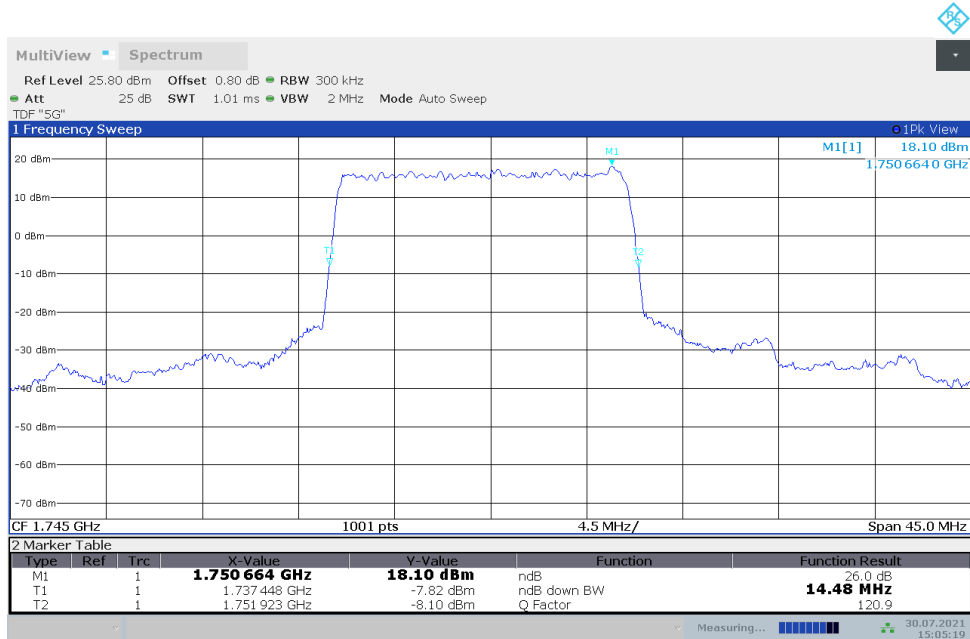
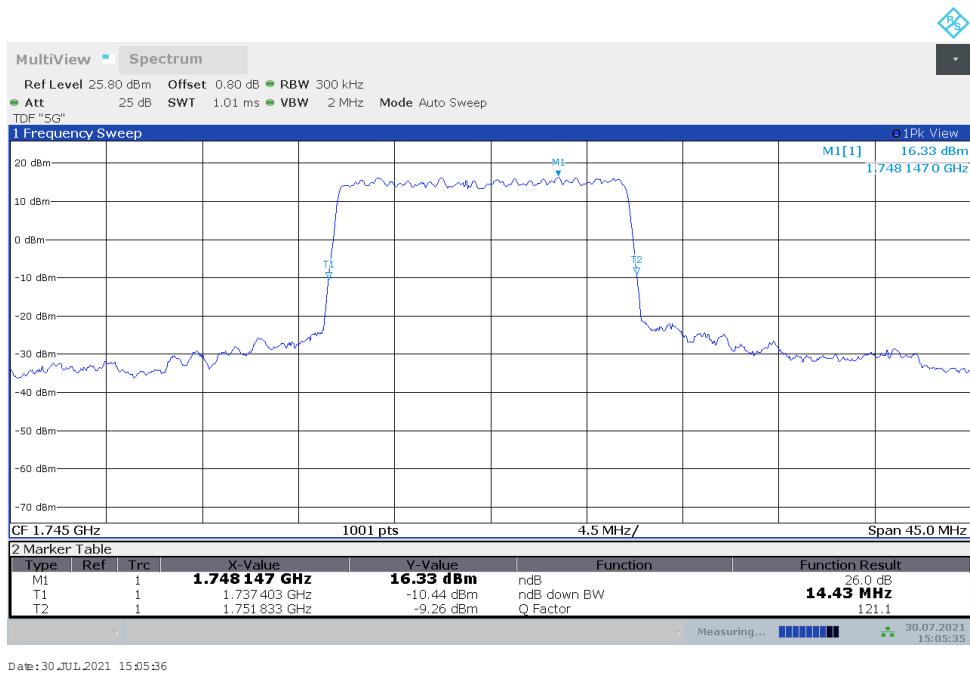
### n66,10MHz Bandwidth,DFT-s-QPSK (-26dBc BW)



Date: 30 JUL 2021 15:04:30

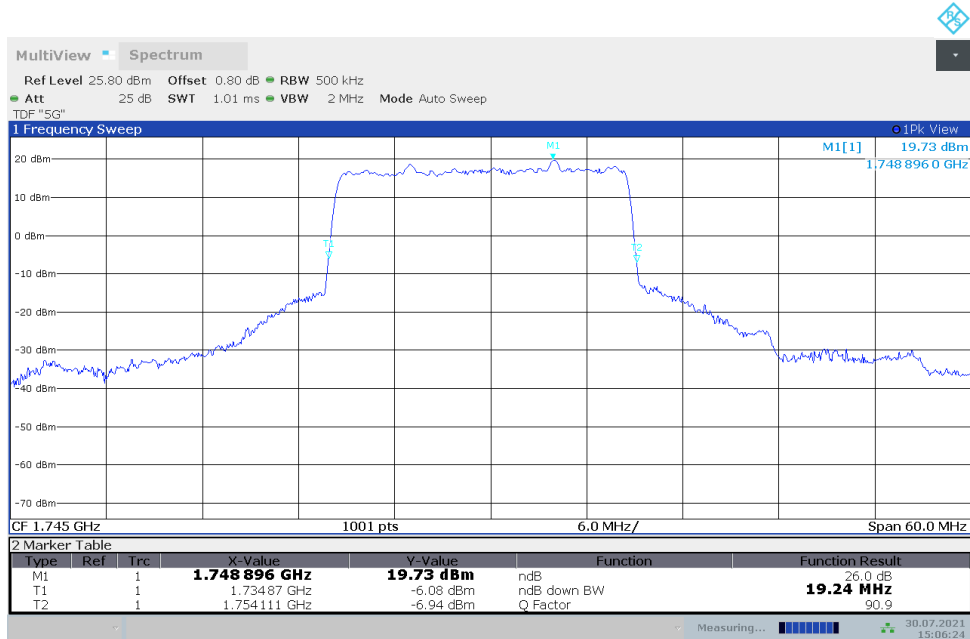
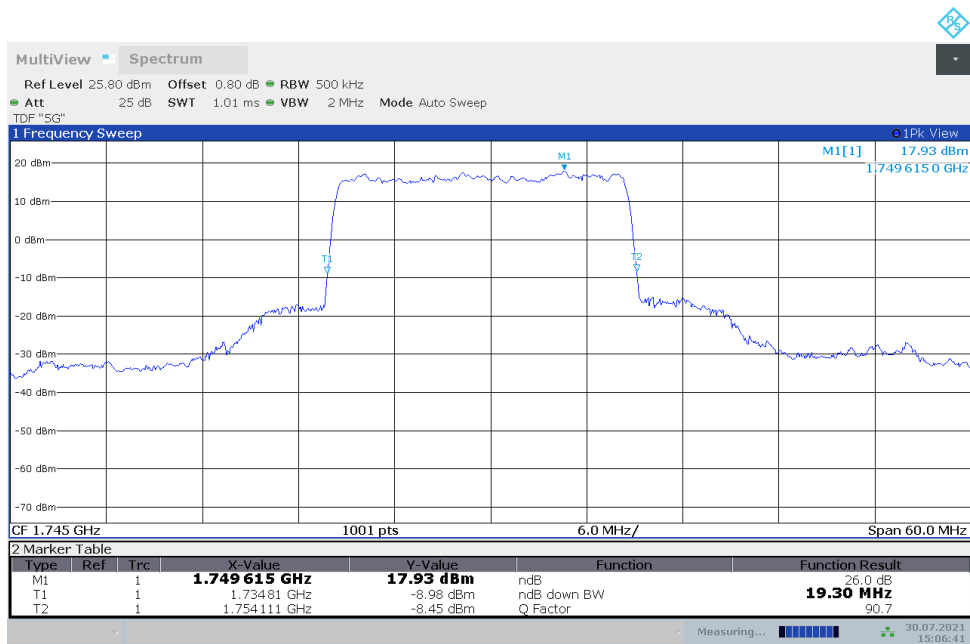
**n66,15MHz(-26dBc)**

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
1745	14.476	14.431

**n66,15MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)**

**n66,15MHz Bandwidth,DFT-s-QPSK (-26dBc BW)**


**n66,20MHz(-26dBc)**

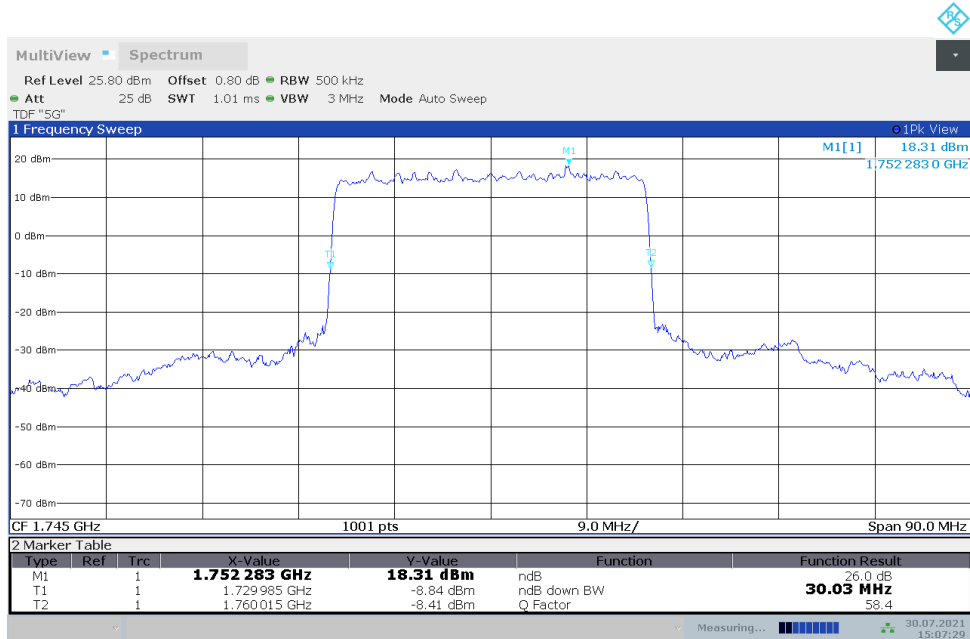
Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
1745	19.241	19.301

**n66,20MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)**

**n66,20MHz Bandwidth,DFT-s-QPSK (-26dBc BW)**


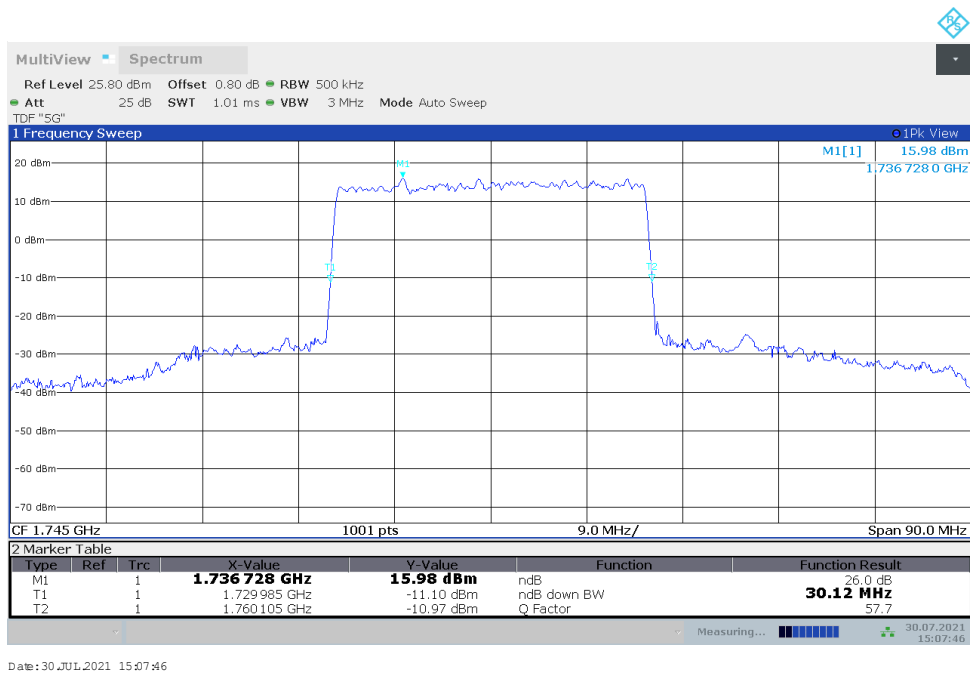
### n66,30MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
1745	30.030	30.120

### n66,30MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



### n66,30MHz Bandwidth,DFT-s-QPSK (-26dBc BW)

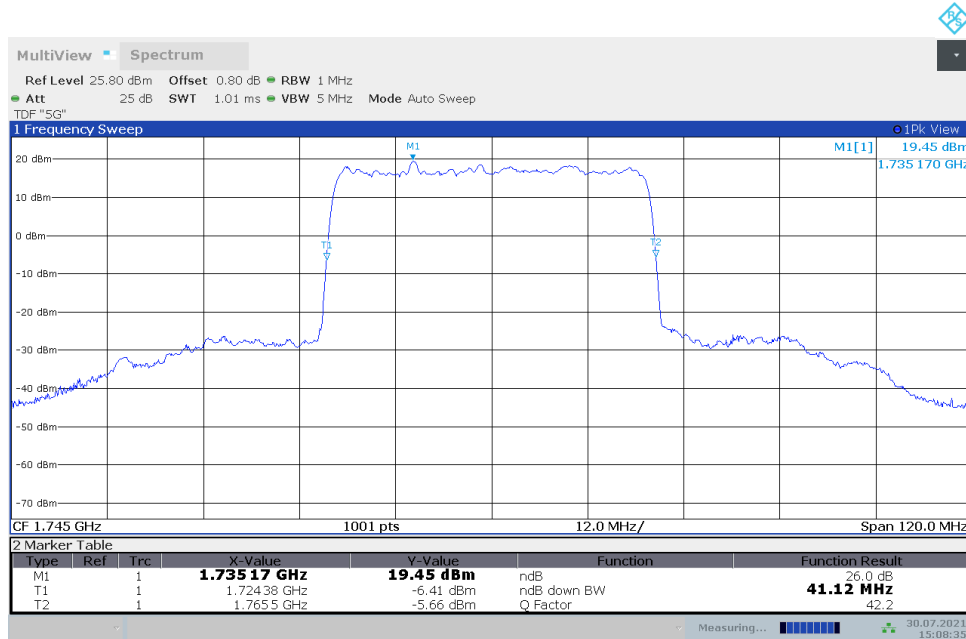




### n66,40MHz(-26dBc)

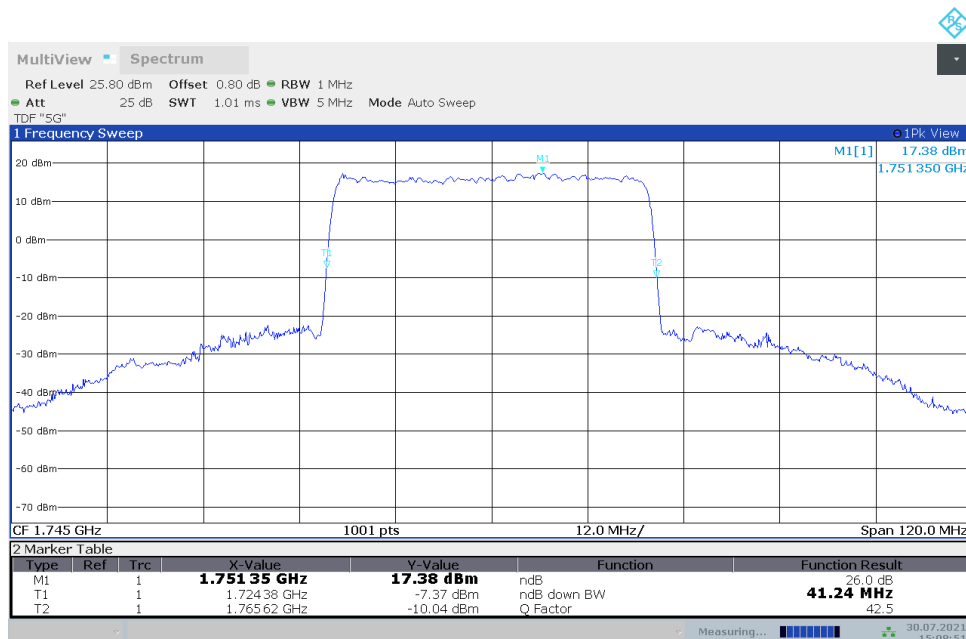
Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
1745	41.120	41.240

### n66,40MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



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### n66,40MHz Bandwidth,DFT-s-QPSK (-26dBc BW)



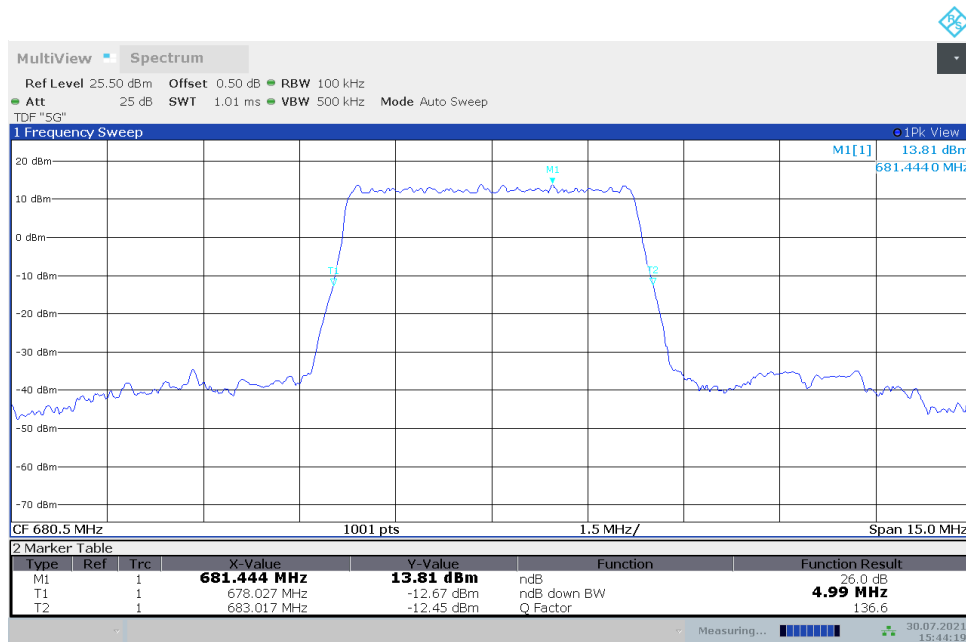
Date: 30 JUL 2021 15:08:51

n71

n71,5MHz(-26dBc)

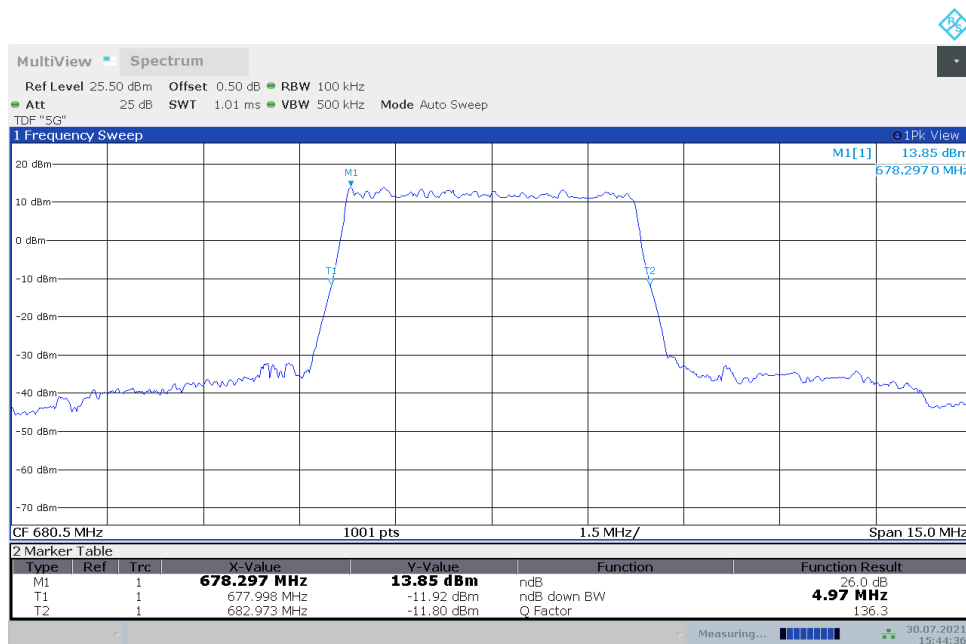
Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
680.5	4.990	4.975

n71,5MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



Date: 30 JUL 2021 15:44:20

n71,5MHz Bandwidth,DFT-s-QPSK (-26dBc BW)

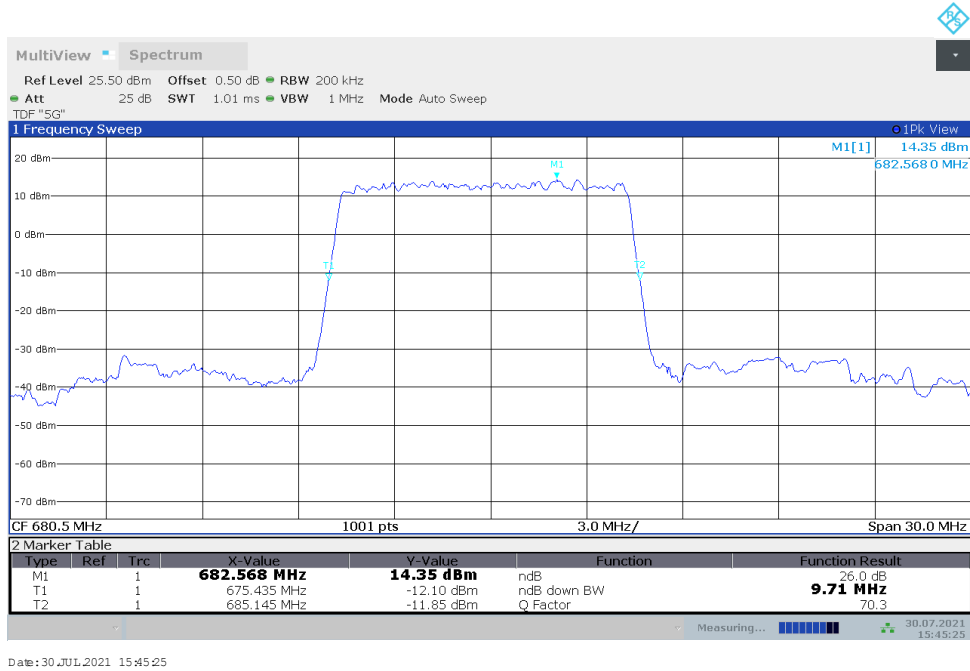


Date: 30 JUL 2021 15:44:37

### n71,10MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
680.5	9.710	9.650

### n71,10MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)

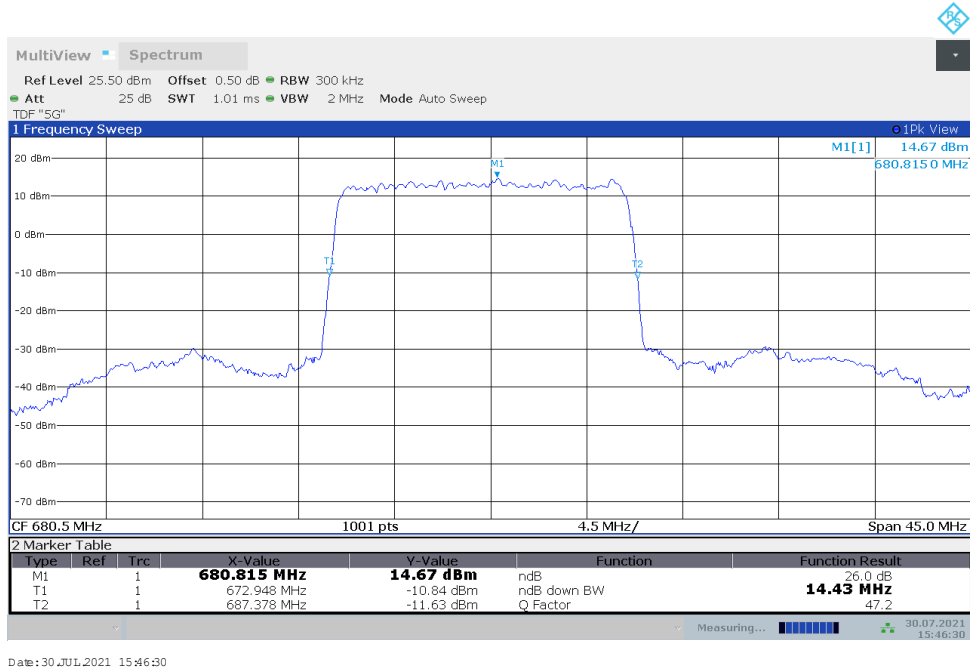
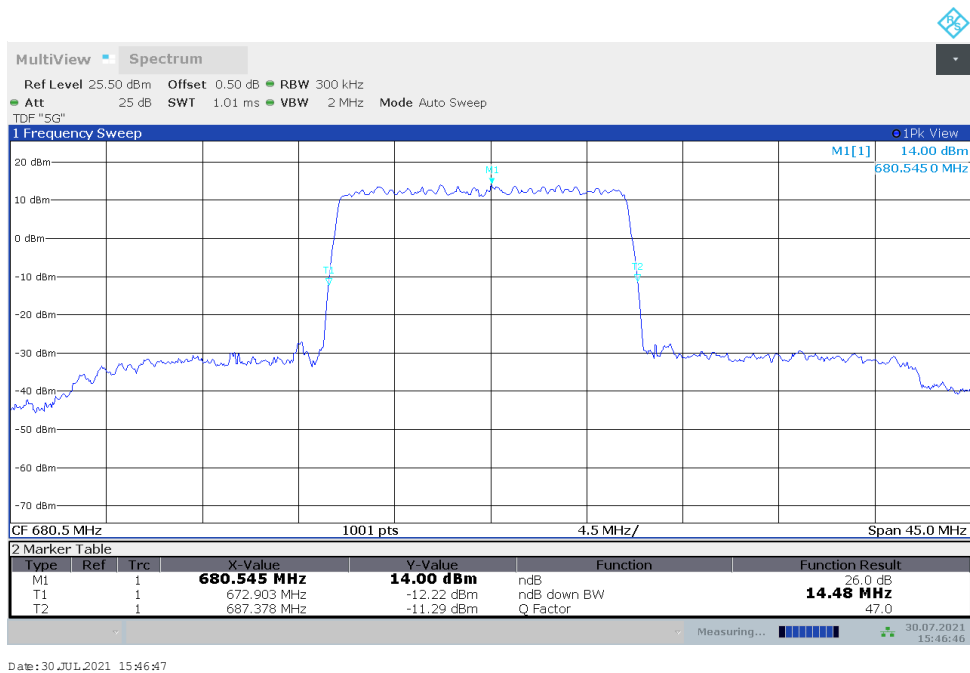


### n71,10MHz Bandwidth,DFT-s-QPSK (-26dBc BW)



**n71,15MHz(-26dBc)**

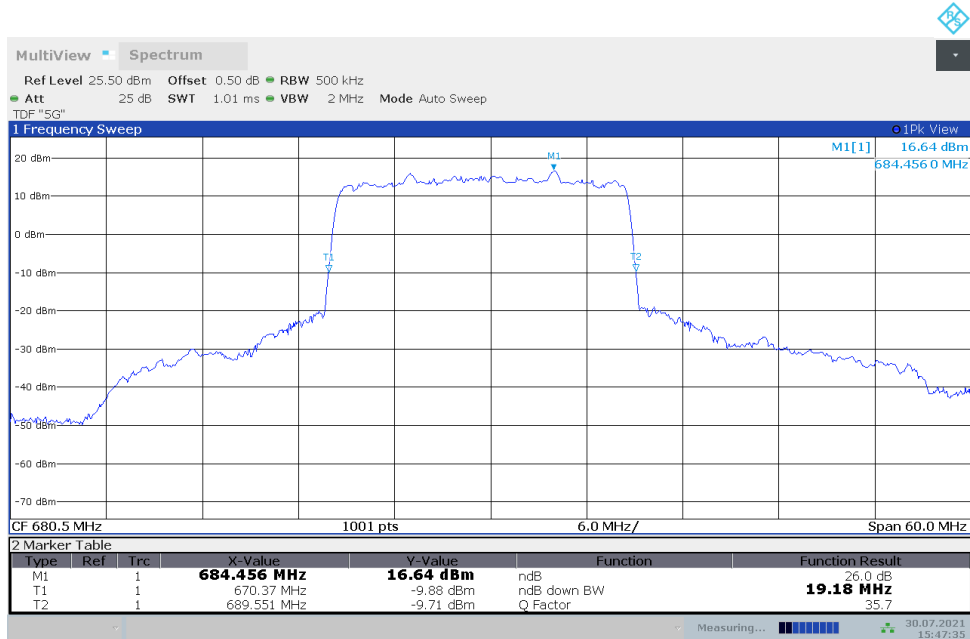
Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
680.5	14.431	14.476

**n71,15MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)**

**n71,15MHz Bandwidth,DFT-s-QPSK (-26dBc BW)**


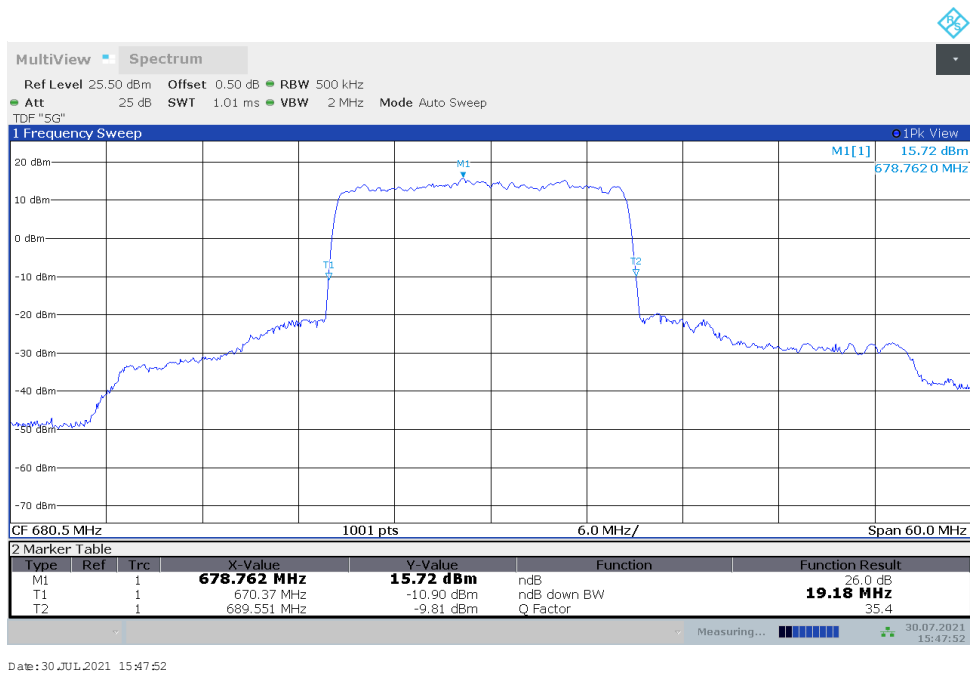
### n71,20MHz(-26dBc)

Frequency (MHz)	Emission Bandwidth (-26dBc) (MHz)	
	DFT-s-pi/2 BPSK	DFT-s-QPSK
680.5	19.181	19.181

### n71,20MHz Bandwidth,DFT-s-pi/2 BPSK (-26dBc BW)



### n71,20MHz Bandwidth,DFT-s-QPSK (-26dBc BW)



## **A.6 Band Edge Compliance**

### **A.6.1 Measurement limit**

Part 22.917, Part 24.238 and Part 27.53(h) specify that 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.

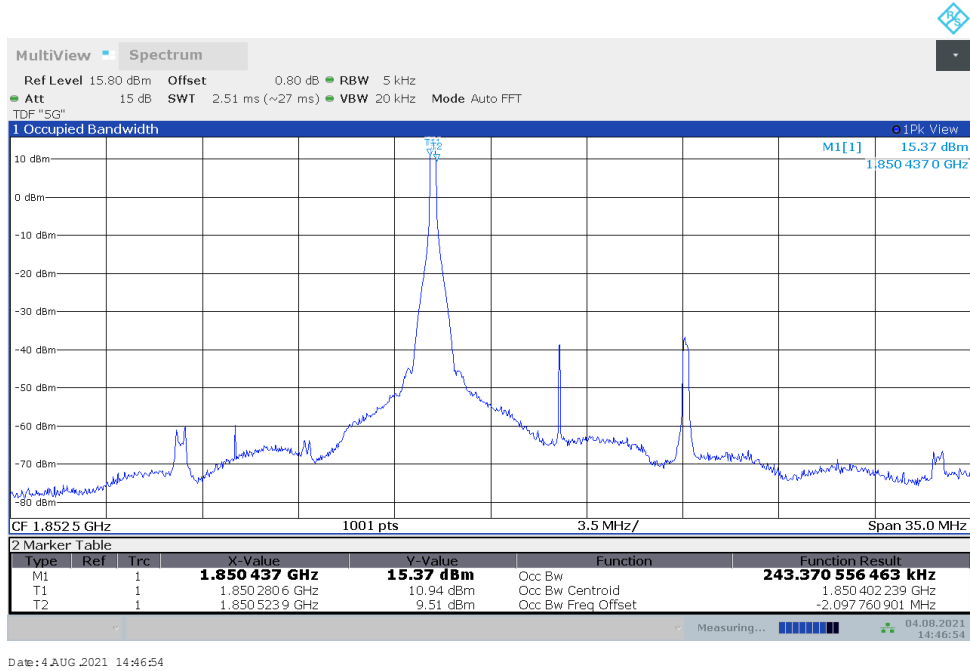
Part 27.53(m) specifies for mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log(P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log(P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log(P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log(P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log(P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Part 27.53(g) states for operations in the 600 MHz band and the 698–746 MHz band, the power of any emission outside a 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, by at least  $43 + 10 \log(P)$  dB. Compliance 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.

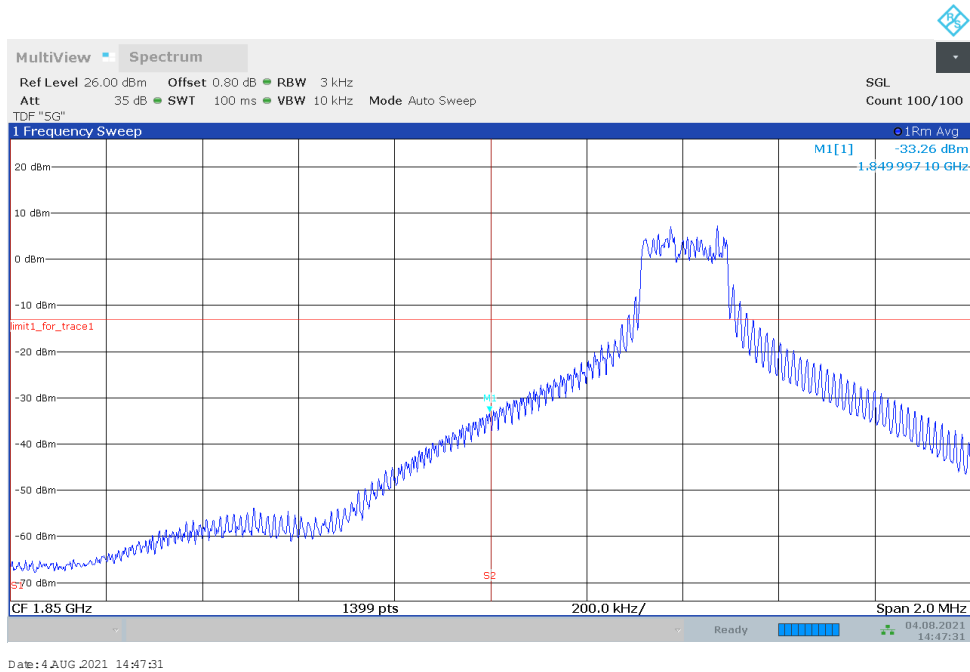
## A.6.2 Measurement result

### NR n25

### OBW: 1RB-LOW\_offset

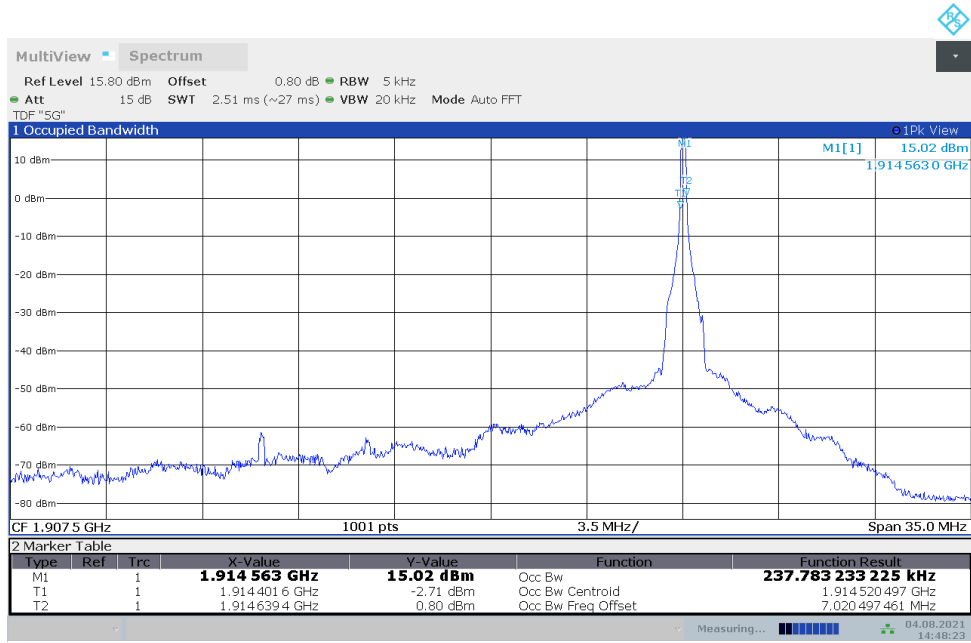


## LOW BAND EDGE BLOCK-1RB-LOW\_offset

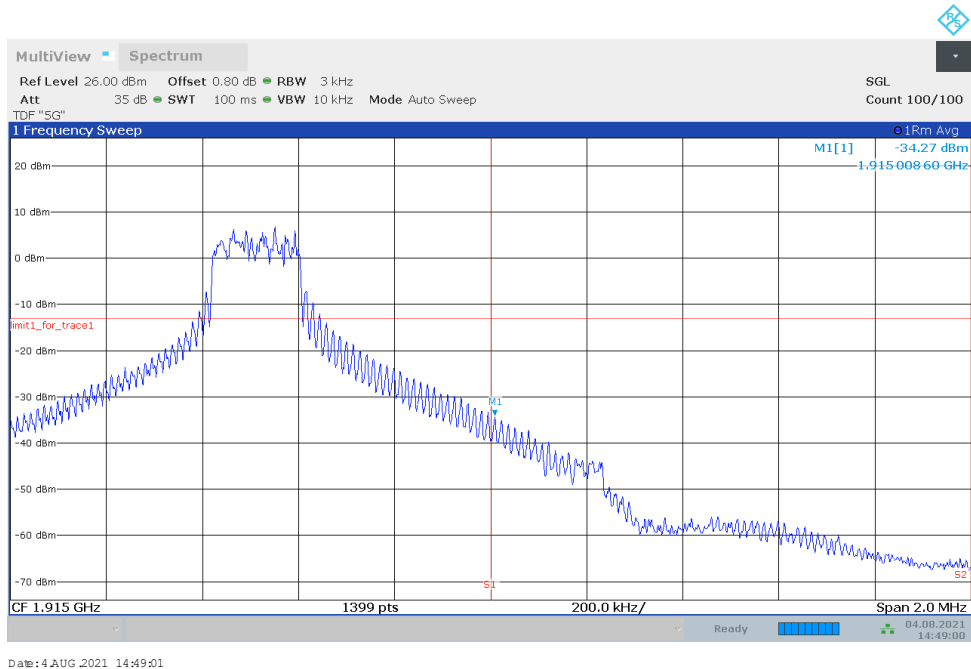


NR n25

OBW: 1RB-HIGH\_offset



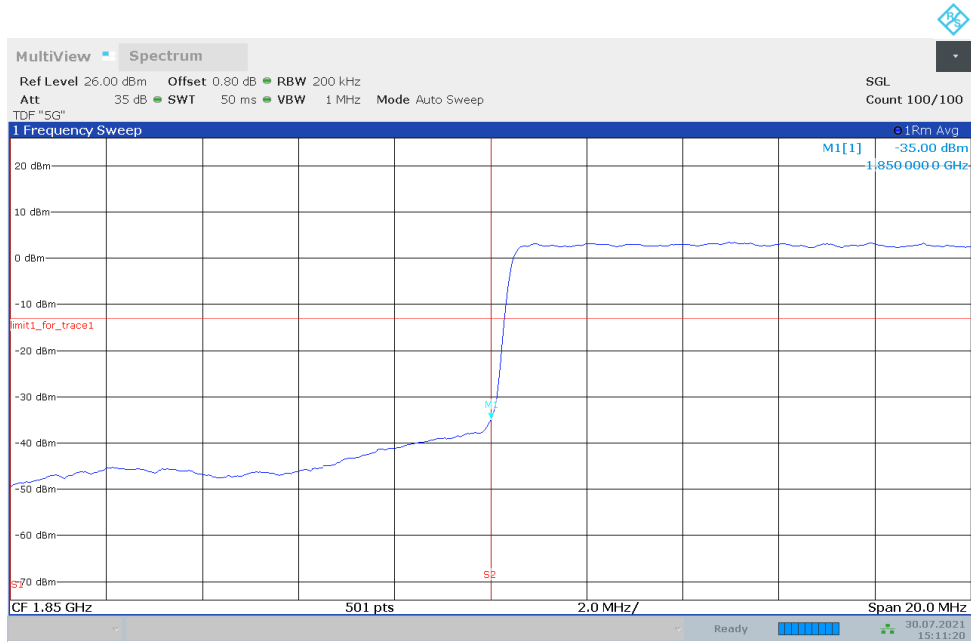
HIGH BAND EDGE BLOCK-1RB-HIGH\_offset





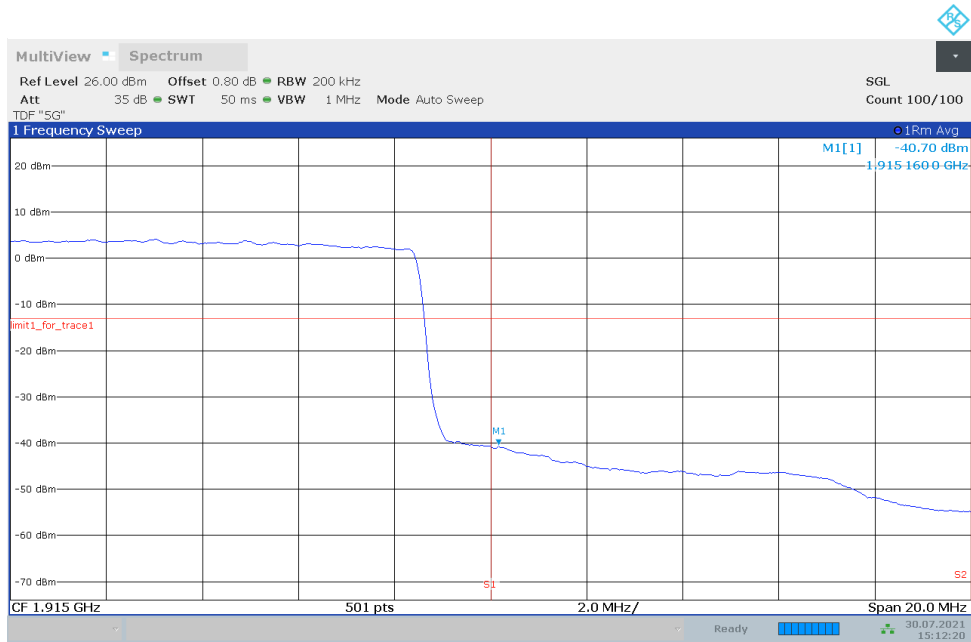
NR n25

LOW BAND EDGE BLOCK-20M-100%RB



Date: 30 JUL 2021 15:11:21

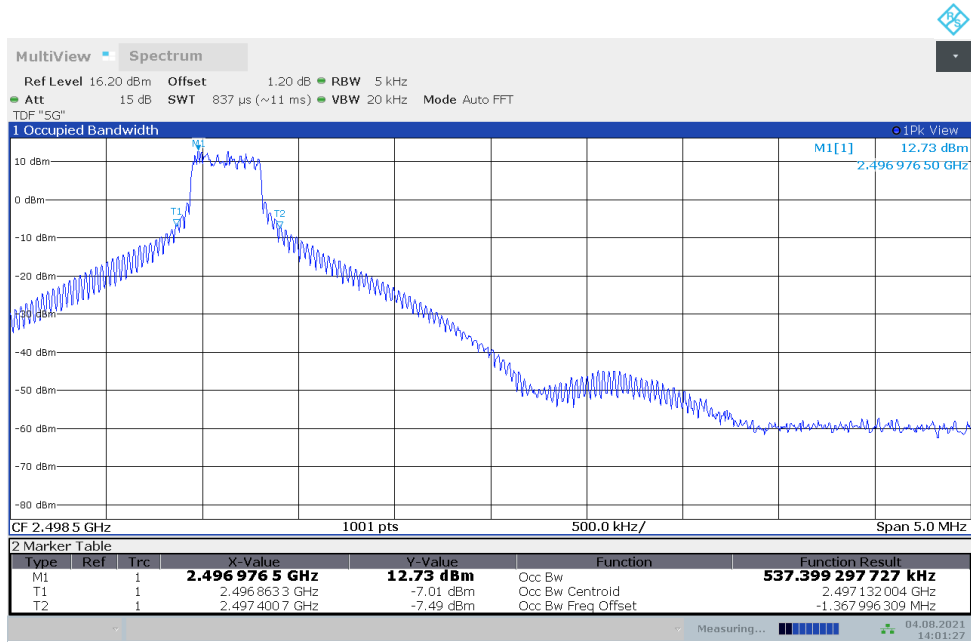
HIGH BAND EDGE BLOCK-20M-100%RB



Date: 30 JUL 2021 15:12:20

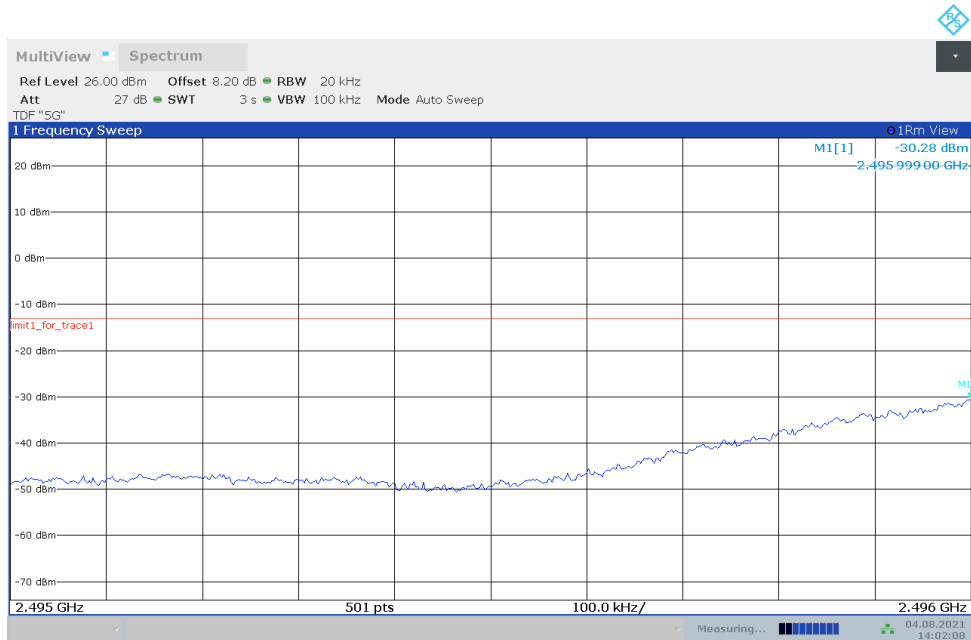
NR n41

OBW: 1RB-LOW\_offset



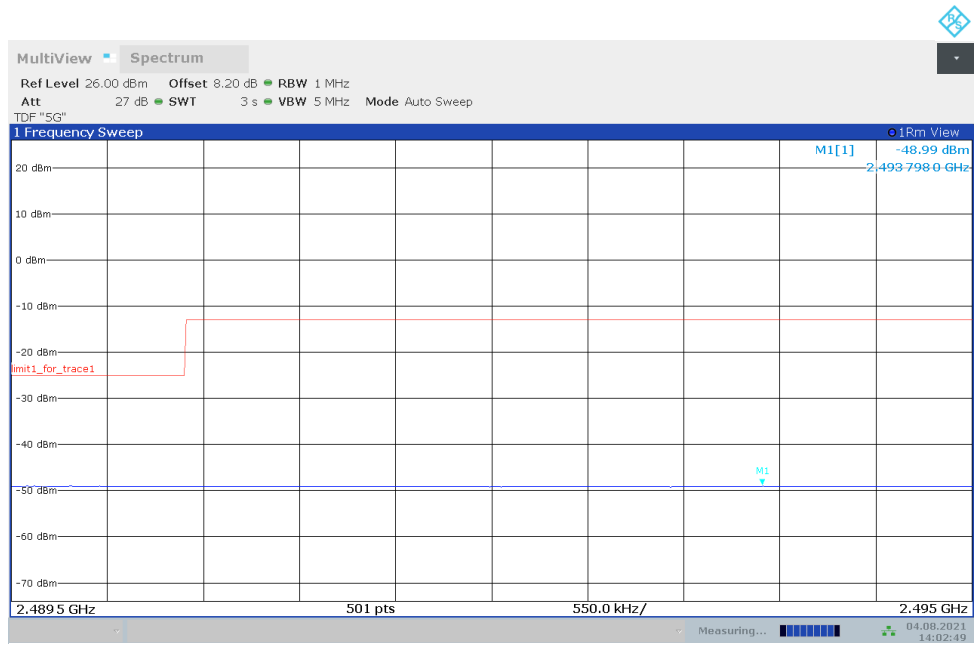
Date: 4 AUG. 2021 14:01:28

LOW BAND EDGE BLOCK-1RB-LOW\_offset



Date: 4 AUG. 2021 14:02:09

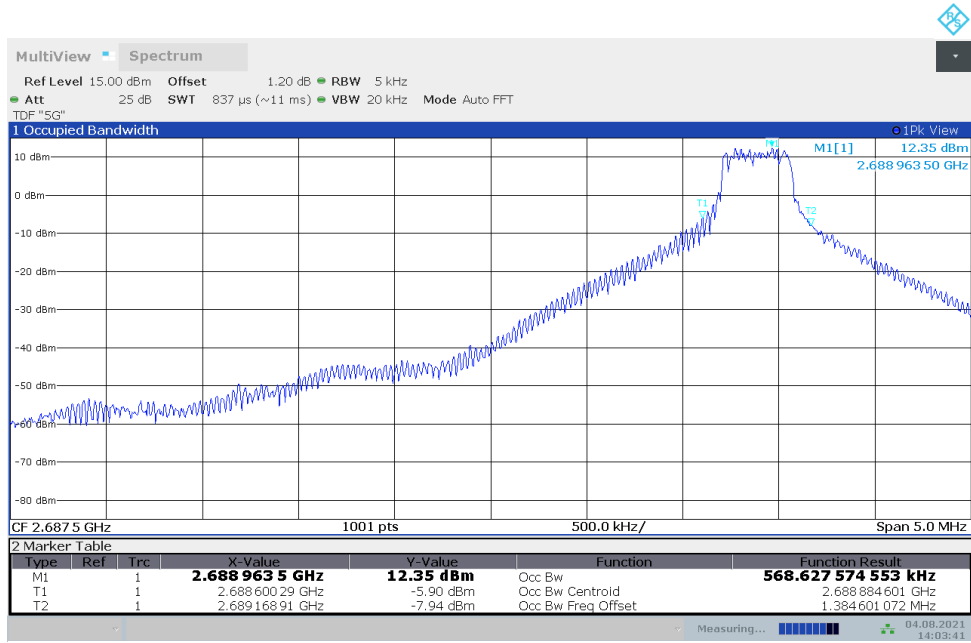
### LOW BAND EDGE BLOCK-1RB-LOW\_offset



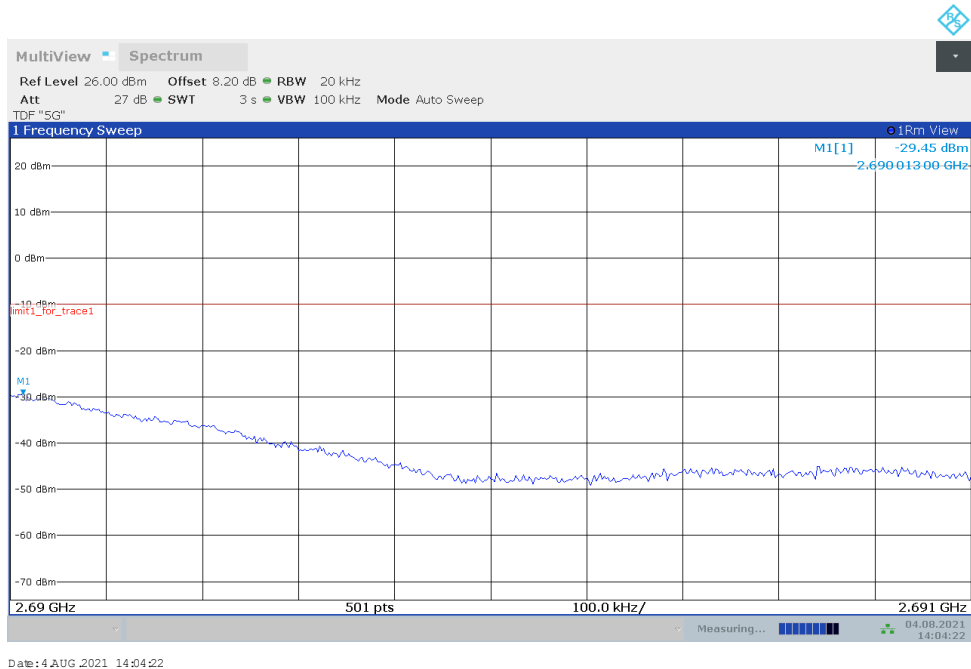
Date: 4 AUG 2021 14:02:49

NR n41

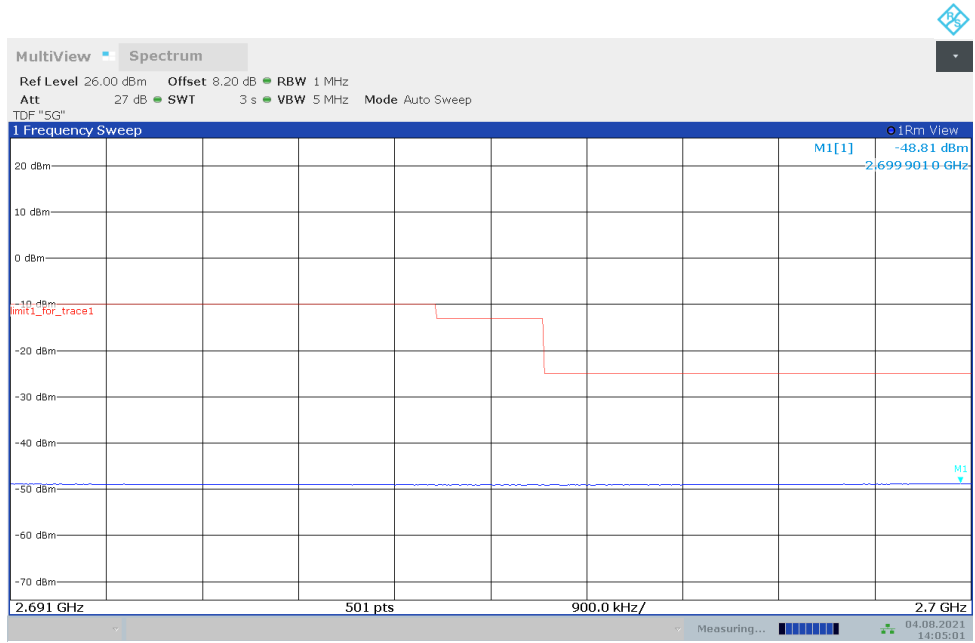
OBW: 1RB-HIGH\_offset



HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



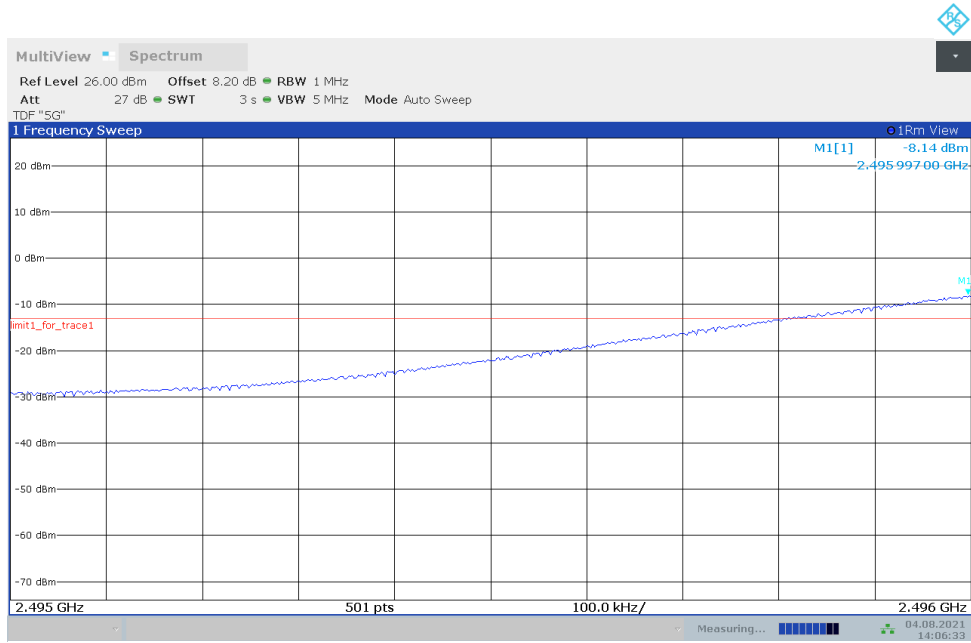
### HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



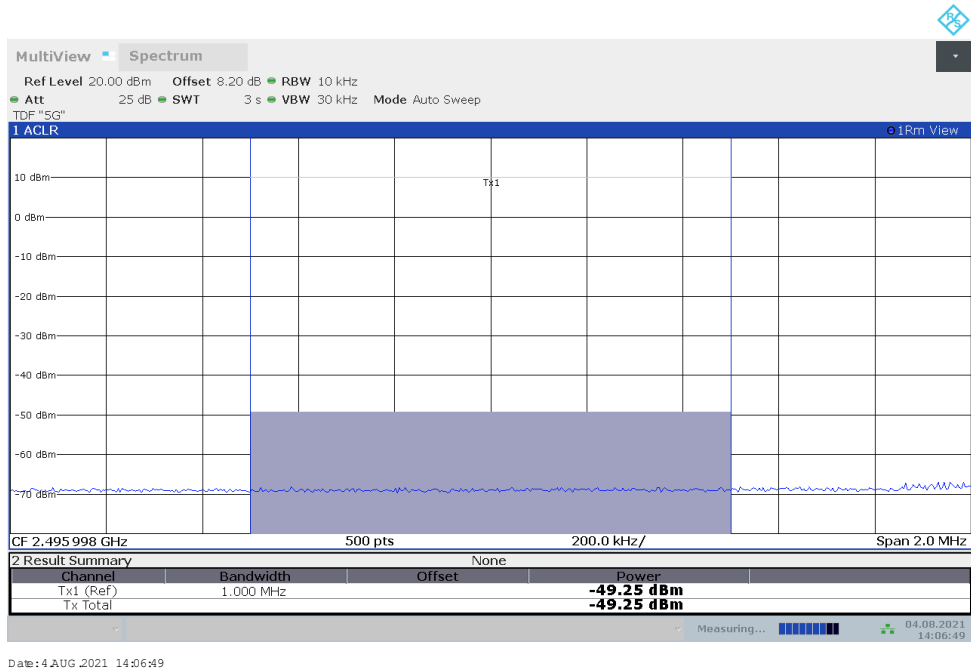
Date: 4 AUG 2021 14:05:02

NR n41

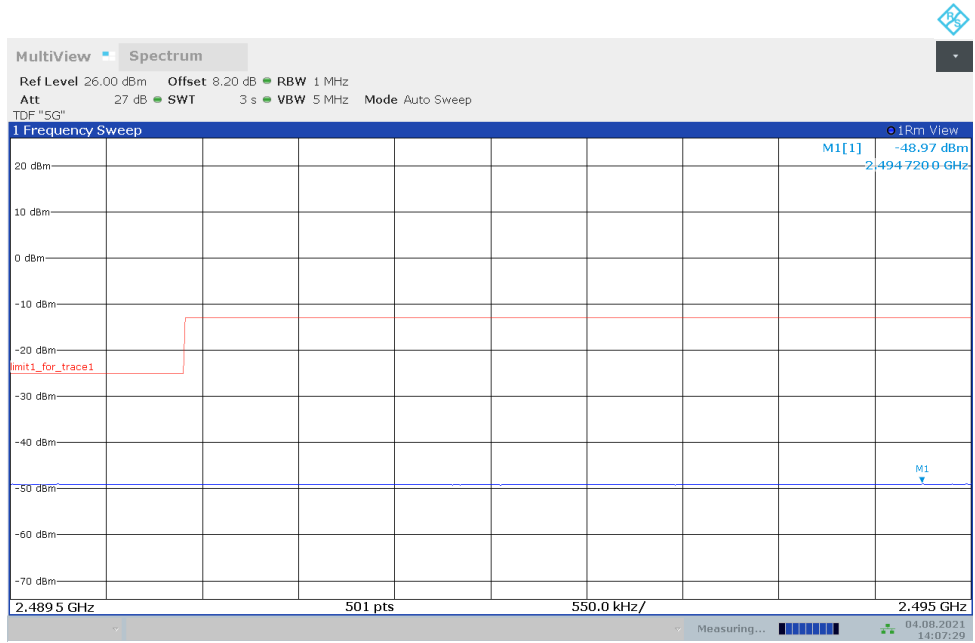
LOW BAND EDGE BLOCK-100M-100%RB



Channal Power

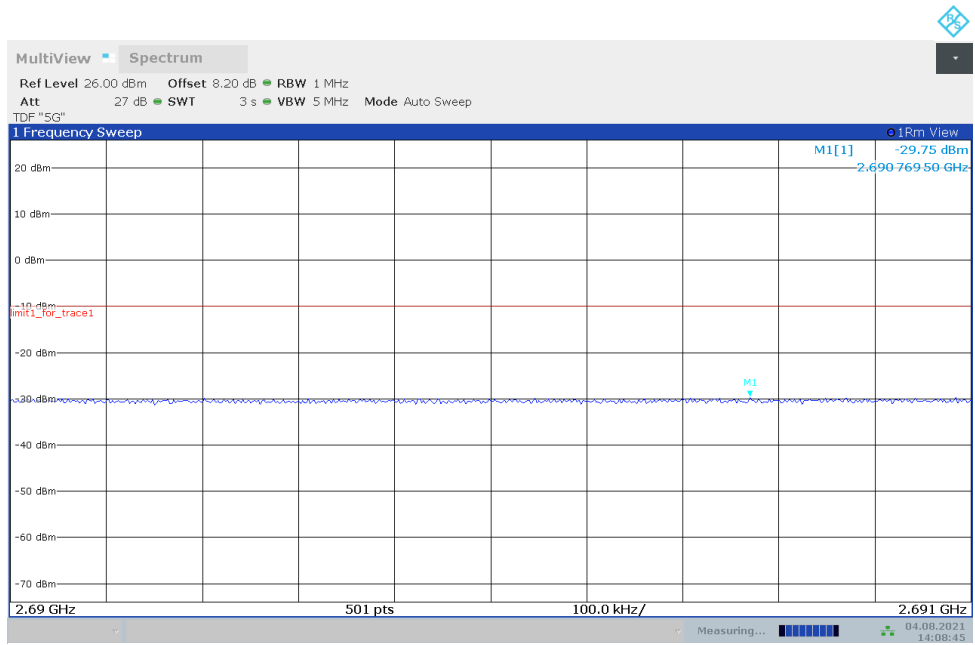


### LOW BAND EDGE BLOCK-100M-100%RB



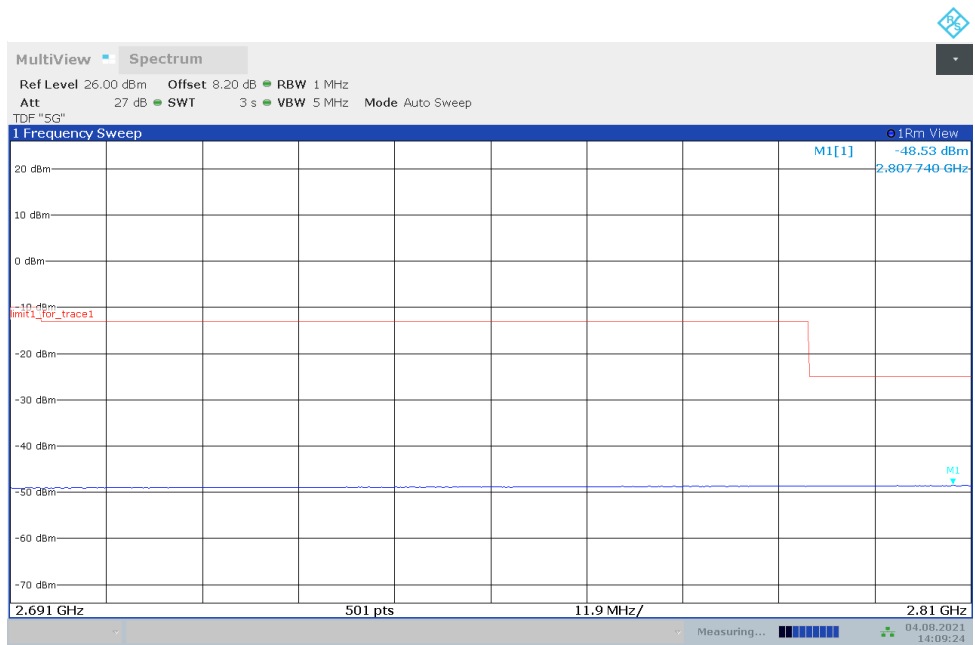
Date: 4 AUG 2021 14:07:29

### HIGH BAND EDGE BLOCK-100M-100%RB



Date: 4 AUG 2021 14:08:45

### HIGH BAND EDGE BLOCK-100M-100%RB

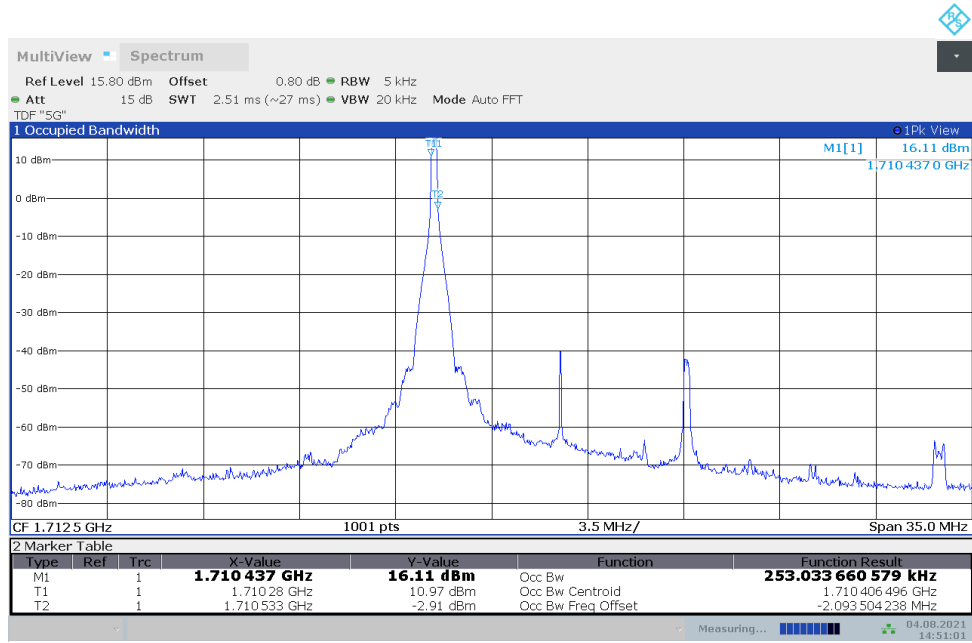


Date: 4 AUG 2021 14:09:25



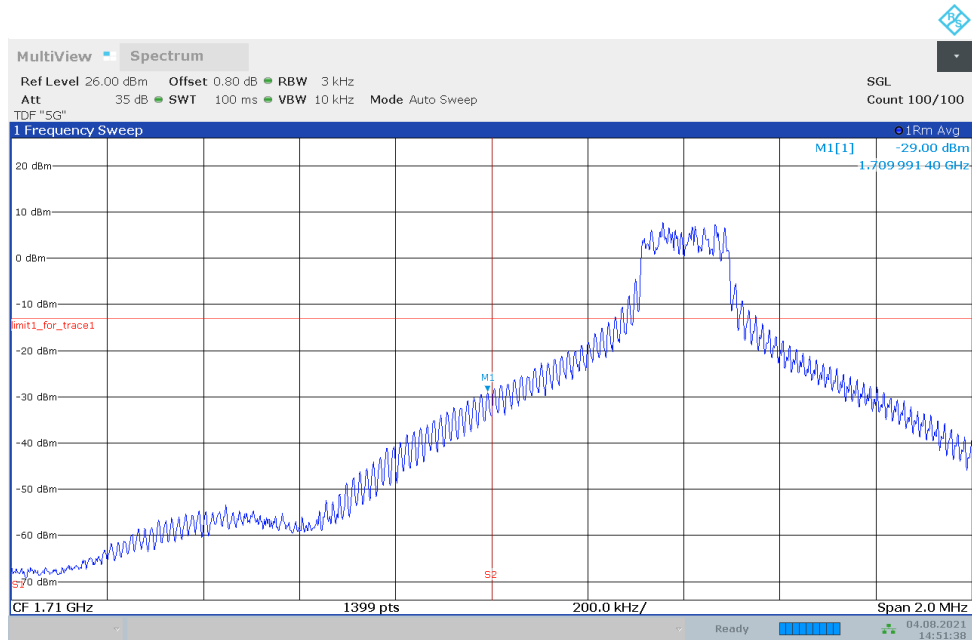
NR n66

OBW: 1RB-LOW\_offset



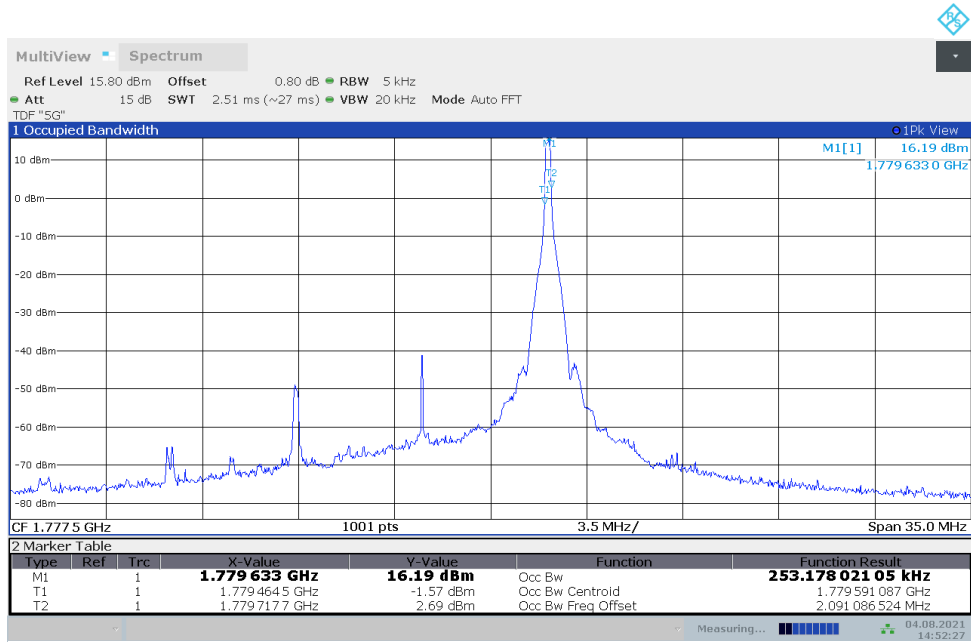
Date: 4 AUG 2021 14:51:01

LOW BAND EDGE BLOCK-1RB-LOW\_offset

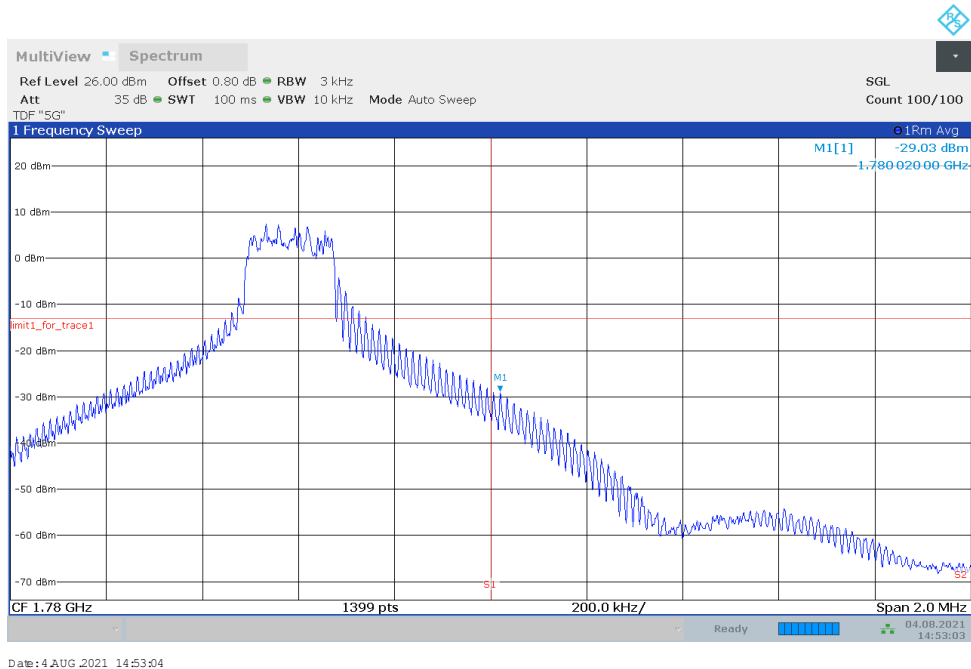


Date: 4 AUG 2021 14:51:38

### OBW: 1RB-HIGH\_offset

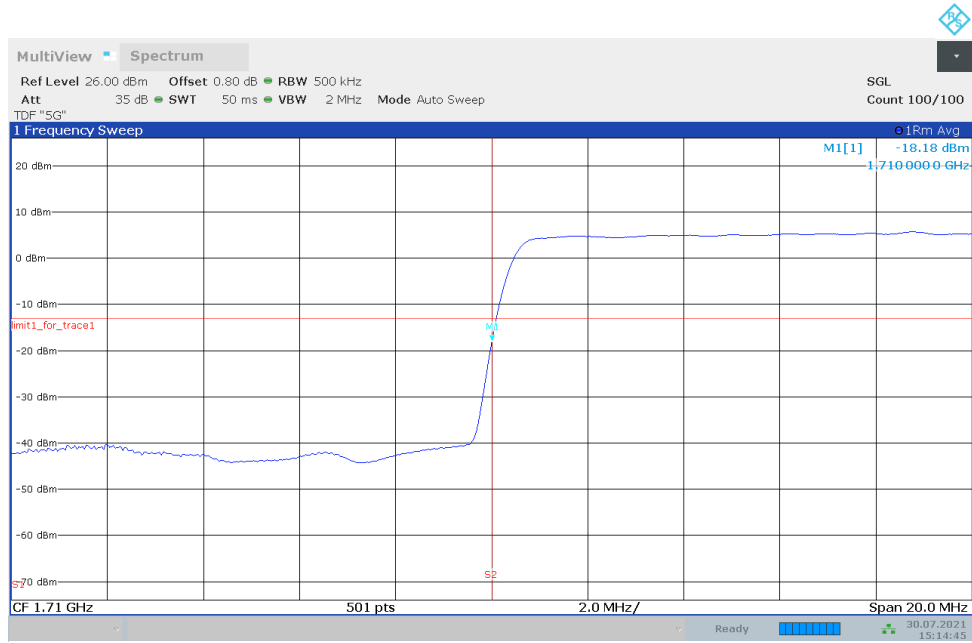


### HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



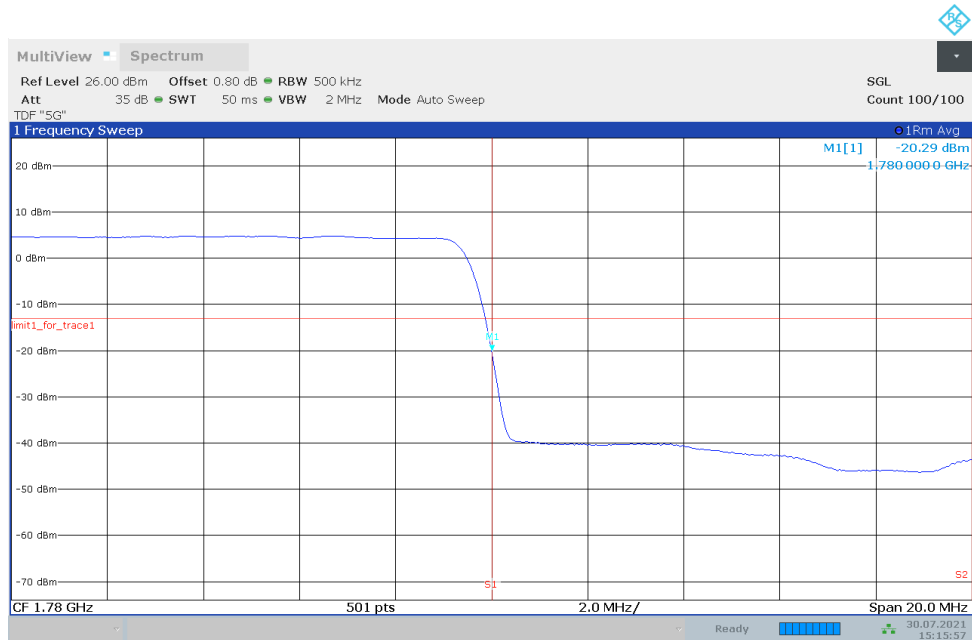
NR n66

LOW BAND EDGE BLOCK-40M-100%RB



Date: 30 JUL 2021 15:14:45

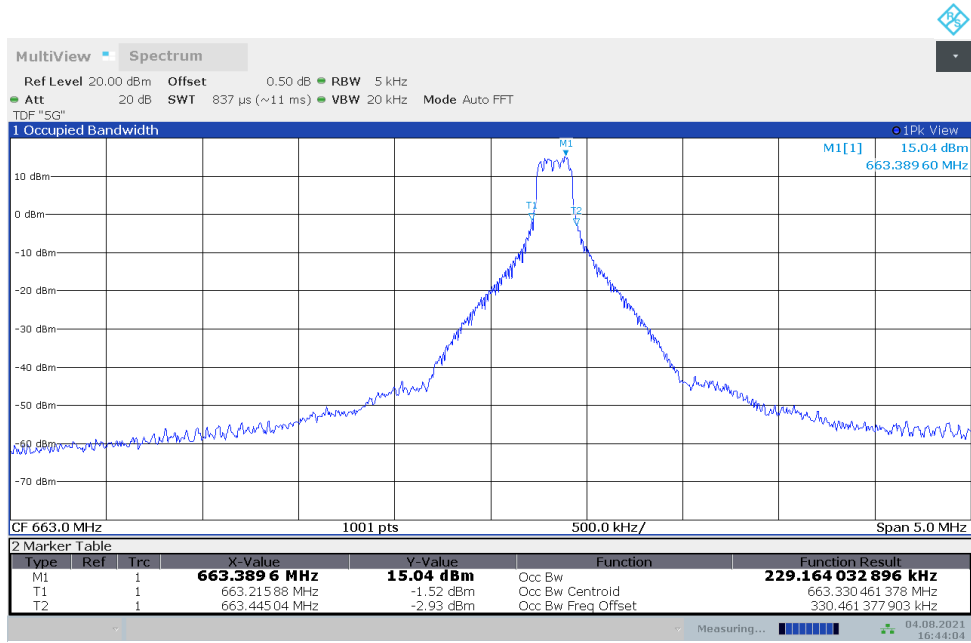
HIGH BAND EDGE BLOCK-40M-100%RB



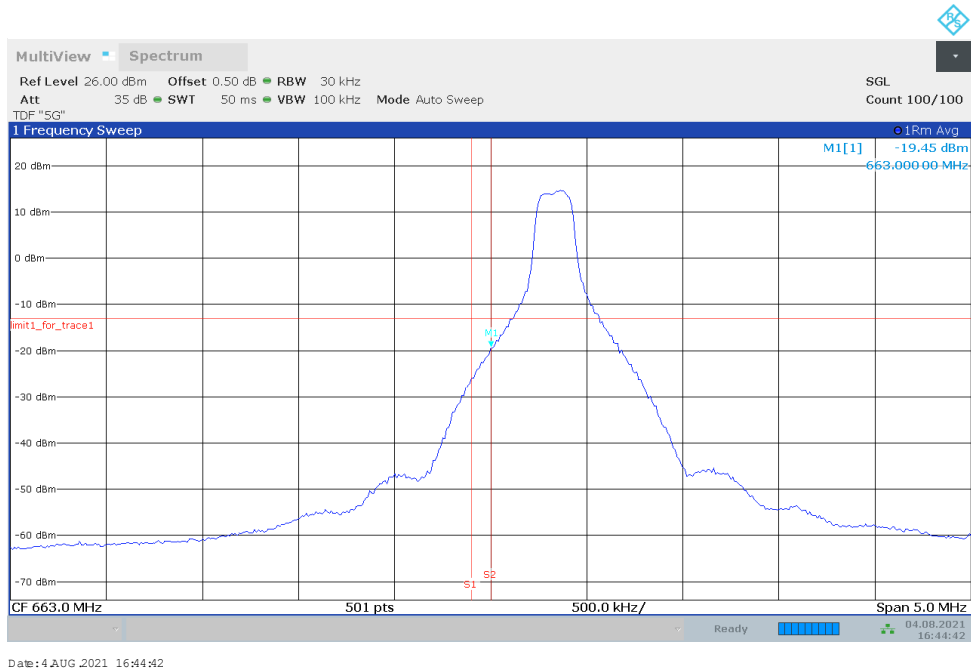
Date: 30 JUL 2021 15:15:57

NR n71

OBW: 1RB-LOW\_offset

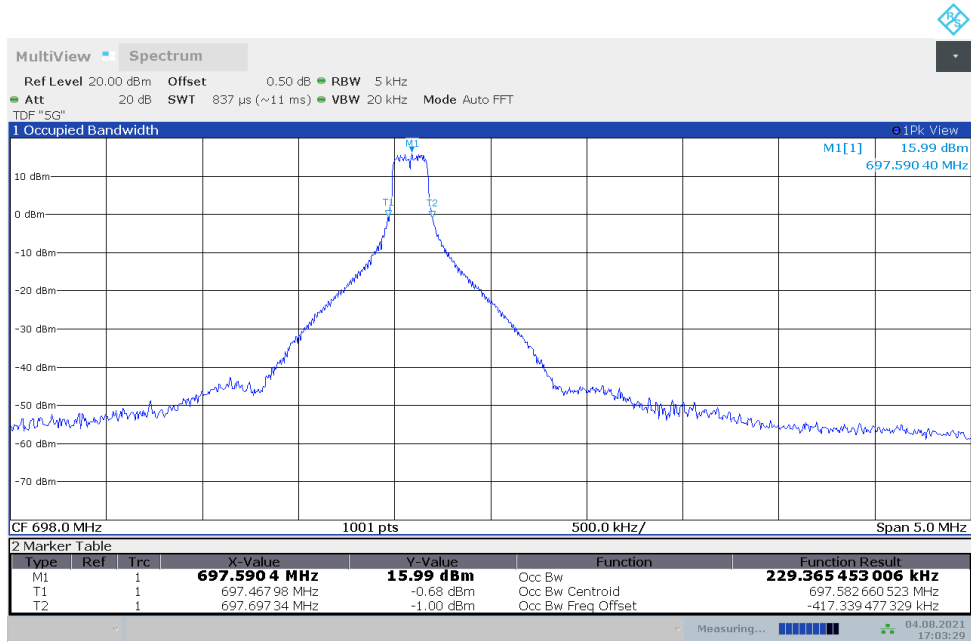


LOW BAND EDGE BLOCK-1RB-LOW\_offset



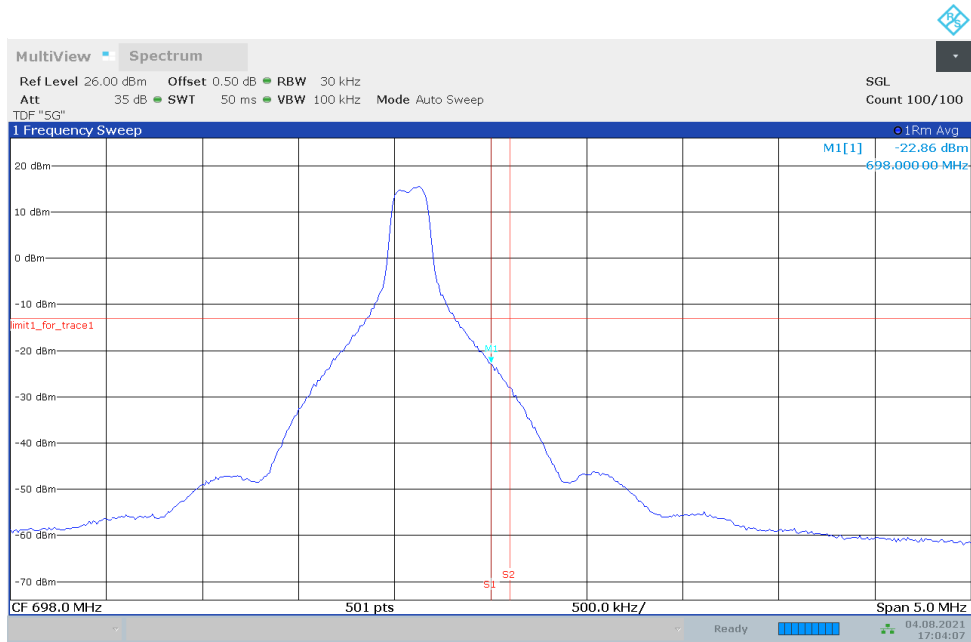
NR n71

OBW: 1RB-HIGH\_offset



Date: 4 AUG. 2021 17:03:30

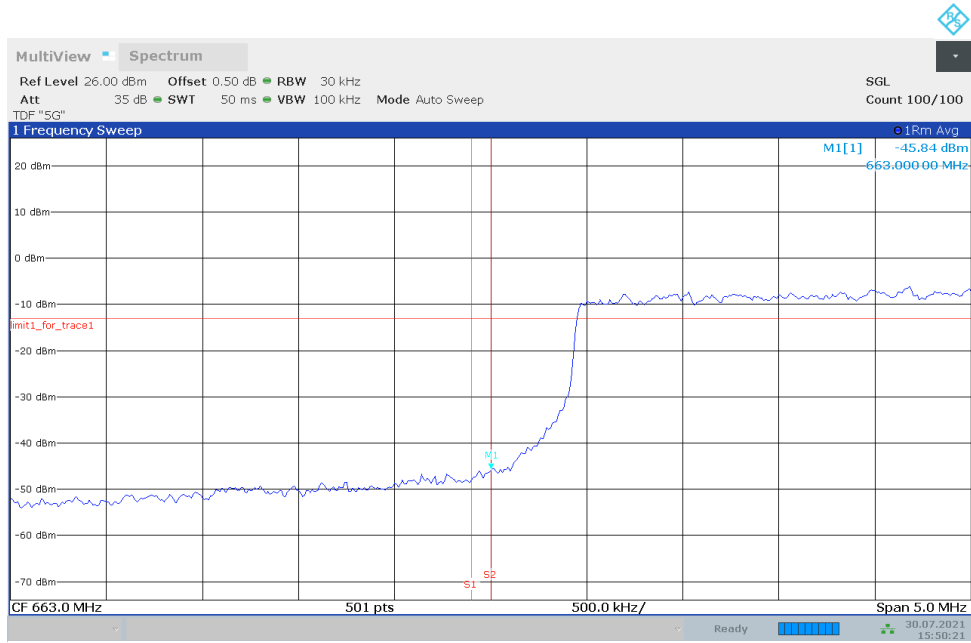
HIGH BAND EDGE BLOCK-1RB-HIGH\_offset



Date: 4 AUG. 2021 17:04:07

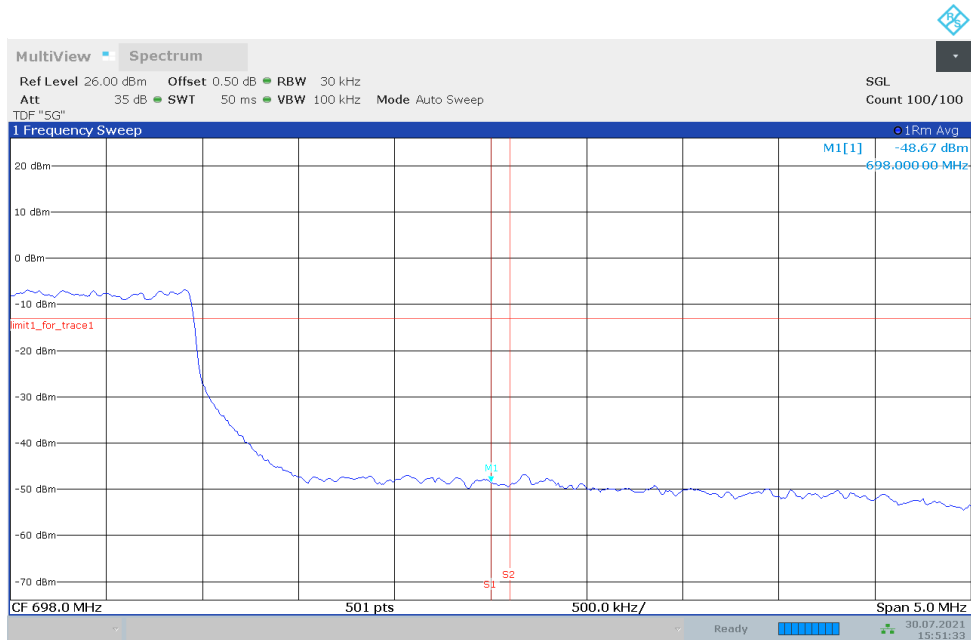
### NR n71

### LOW BAND EDGE BLOCK-20M-100%RB



Date: 30 JUL 2021 15:50:21

### HIGH BAND EDGE BLOCK-20M-100%RB



Date: 30 JUL 2021 15:51:34

## **A.7 Conducted Spurious Emission**

### **A.7.1 Measurement Method**

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. In measuring unwanted emissions, the spectrum shall be investigated from 30 MHz or the lowest radio frequency signal generated in the equipment, whichever is lower, without going below 9 kHz, up to at least the frequency given below:
  - (a) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
  - (b) If the equipment operates at or above 10 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.
3. The number of sweep points of spectrum analyzer is set to 30001 which is greater than span/RBW.

### **A. 7.2 Measurement Limit**

Part 22.917, Part 24.238 and Part 27.53(h) specify that 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.

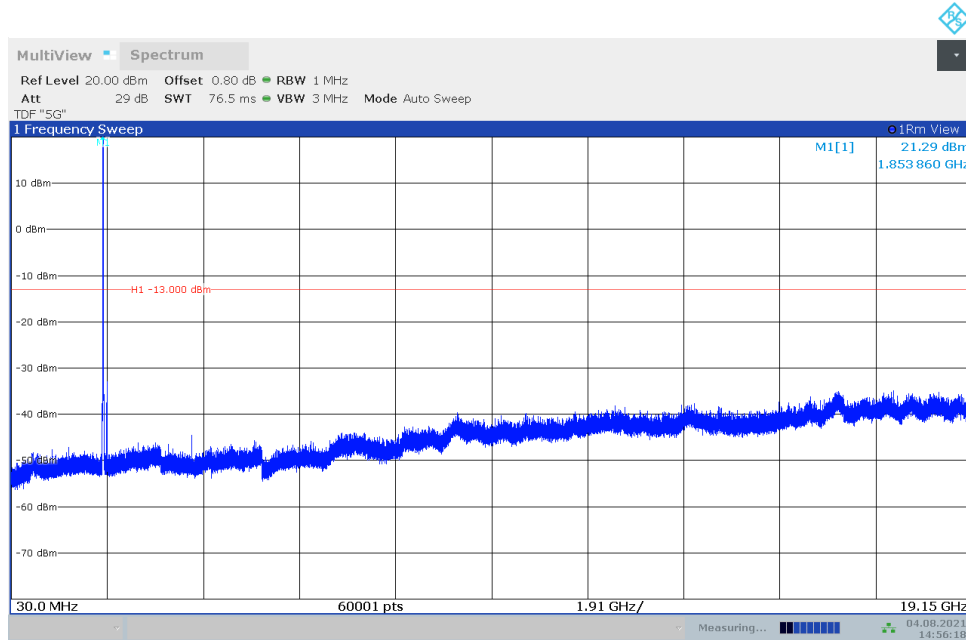
Part 27.53(m) specifies for mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log(P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log(P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log(P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log(P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log(P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Part 27.53(g) states for operations in the 600 MHz band and the 698–746 MHz band, the power of any emission outside a 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, by at least  $43 + 10 \log(P)$  dB. Compliance 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.

### A. 7.3 Measurement result

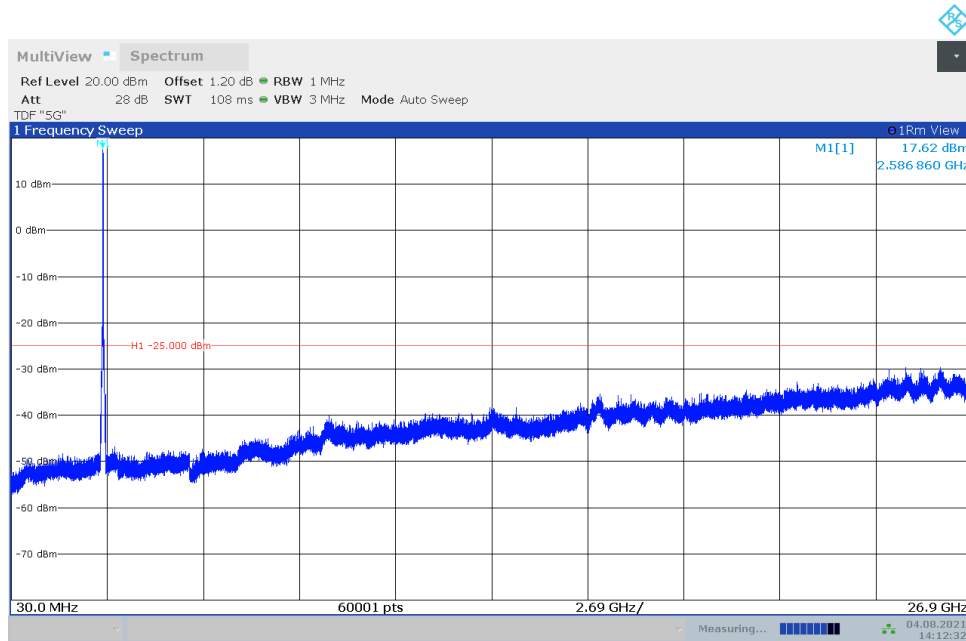
n25

**NOTE: peak above the limit line is the carrier frequency.**



n41

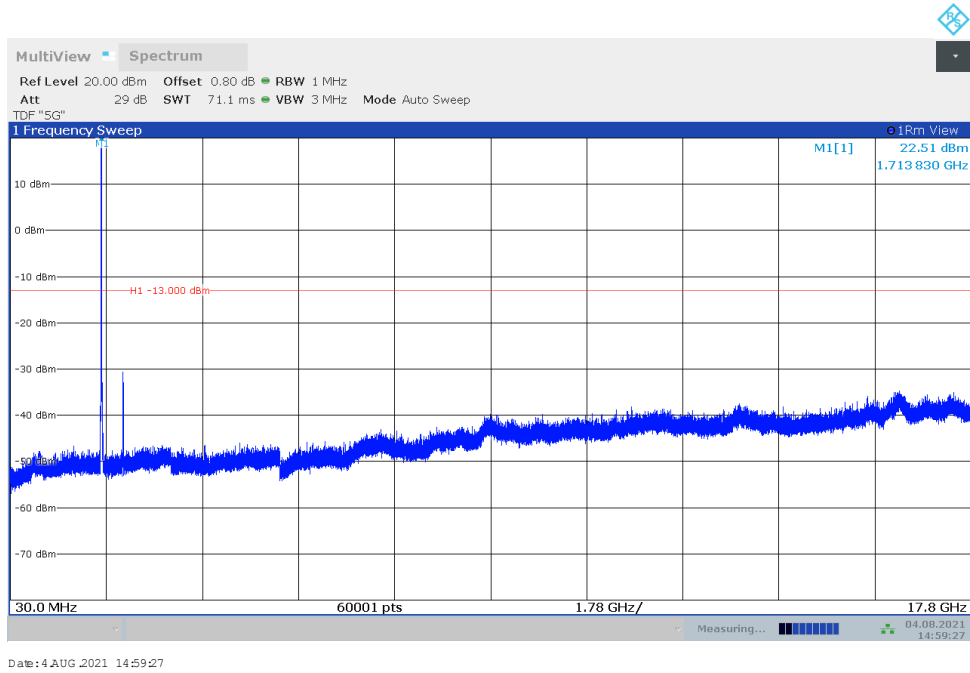
**NOTE: peak above the limit line is the carrier frequency.**





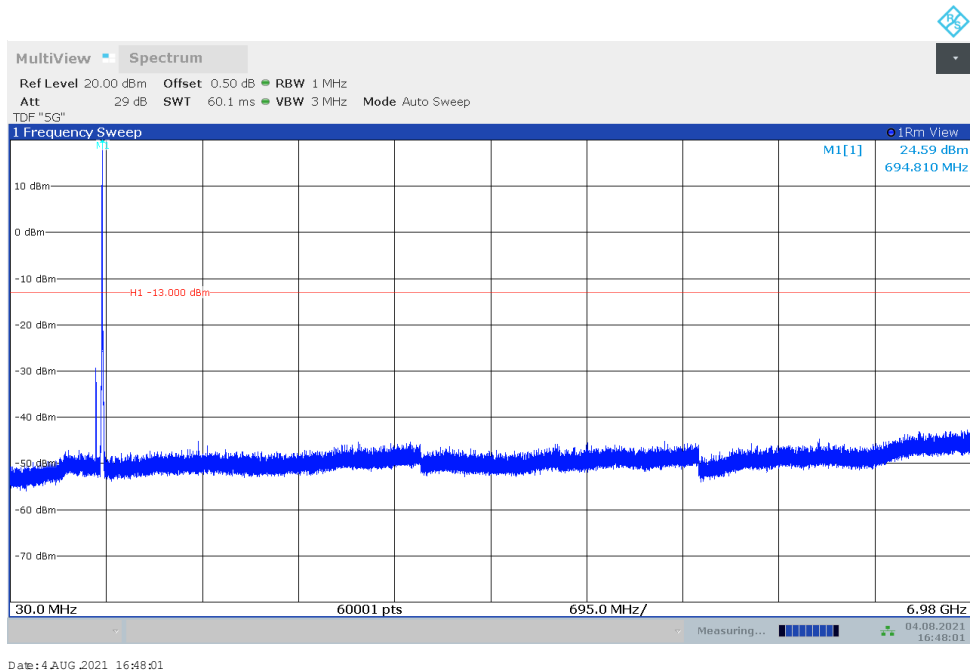
n66

NOTE: peak above the limit line is the carrier frequency.



n71

NOTE: peak above the limit line is the carrier frequency.



## **A.8 Peak-to-Average Power Ratio**

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB

- a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
- b) Set resolution/measurement bandwidth  $\geq$  signal's occupied bandwidth;
- c) Set the number of counts to a value that stabilizes the measured CCDF curve;
- d) Record the maximum PAPR level associated with a probability of 0.1%.

### **Measurement results**

#### **n25,20MHz**

Frequency (MHz)	PAPR (dB)								
	DFT-s-pi/2 BPSK	DFT-s-QPSK	DFT-s-16QAM	DFT-s-64QAM	DFT-s-256QAM	CP-QPSK	CP-16QAM	CP-64QAM	CP-256QAM
1882.5	4.14	5.74	6.60	6.58	6.76	7.38	7.28	7.84	8.66

#### **n41,100MHz**

Frequency (MHz)	PAPR (dB)								
	DFT-s-pi/2 BPSK	DFT-s-QPSK	DFT-s-16QAM	DFT-s-64QAM	DFT-s-256QAM	CP-QPSK	CP-16QAM	CP-64QAM	CP-256QAM
2592.99	4.59	5.66	6.45	6.63	6.72	8.29	8.22	8.35	8.57

#### **n66,40MHz**

Frequency (MHz)	PAPR (dB)								
	DFT-s-pi/2 BPSK	DFT-s-QPSK	DFT-s-16QAM	DFT-s-64QAM	DFT-s-256QAM	CP-QPSK	CP-16QAM	CP-64QAM	CP-256QAM
1745	4.82	5.04	6.12	6.52	6.64	7.76	8.14	8.04	8.74

#### **n71,20MHz**

Frequency (MHz)	PAPR (dB)								
	DFT-s-pi/2 BPSK	DFT-s-QPSK	DFT-s-16QAM	DFT-s-64QAM	DFT-s-256QAM	CP-QPSK	CP-16QAM	CP-64QAM	CP-256QAM
680.5	3.94	5.44	6.46	6.44	6.64	8.04	8.02	7.60	8.68

## Annex B: Accreditation Certificate

<p>United States Department of Commerce National Institute of Standards and Technology</p>  	
<hr/> <b>Certificate of Accreditation to ISO/IEC 17025:2017</b> <hr/>	
NVLAP LAB CODE: 600118-0	
<b>Telecommunication Technology Labs, CAICT</b> Beijing China	
<i>is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:</i>	
<b>Electromagnetic Compatibility &amp; Telecommunications</b>	
<i>This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).</i>	
<hr/> 2020-09-29 through 2021-09-30 Effective Dates	 For the National Voluntary Laboratory Accreditation Program

\*\*\*END OF REPORT\*\*\*