

PEAK TO AVERAGE POWER (PAPR) - BAND n25



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFL	27-Feb-20	27-Feb-21
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

Because the conducted Output Power was measured using a RMS Average detector, the Peak to Average Power Ratio (PAPR) was measured to show that the maximum peak-max-hold spectrum to the maximum of the average spectrum does not exceed the rule part defined limit.

The PAPR measurement method is described in ANSI C63.26 section 5.2.3.4.
The PAPR was measured using the CCDF function of the spectrum analyzer.

Per FCC part 24.232(d), the PAPR limit shall not exceed 13 dB for more than the ANSI described 0.1% of the time.

RF conducted emissions testing was performed only on one port. The testing was performed on the same version of hardware (AHFIG) as the original certification test. The AHFIG antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in the original certification testing) and antenna port 4 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraph 5.7.2i.

5G NR carrier bandwidths of 5MHz, 10MHz, 15MHz, and 20MHz with QPSK, 16QAM, 64QAM and 256QAM modulation types were verified under this effort. The 5G NR carriers/modulation types for this testing are set up according to 3GPP TS 38.141-1 Test Models and are NR-FR1-TM 1.1 (QPSK modulation type), NR-FR1-TM 3.1 (16QAM modulation type), NR-FR1-TM 3.1 (64QAM modulation type), and NR-FR1-TM 3.1a (256QAM modulation type).

PEAK TO AVERAGE POWER (PAPR) - BAND n25



TM17x 2020.06.06.0 BETA XM1 2020.03.25.0

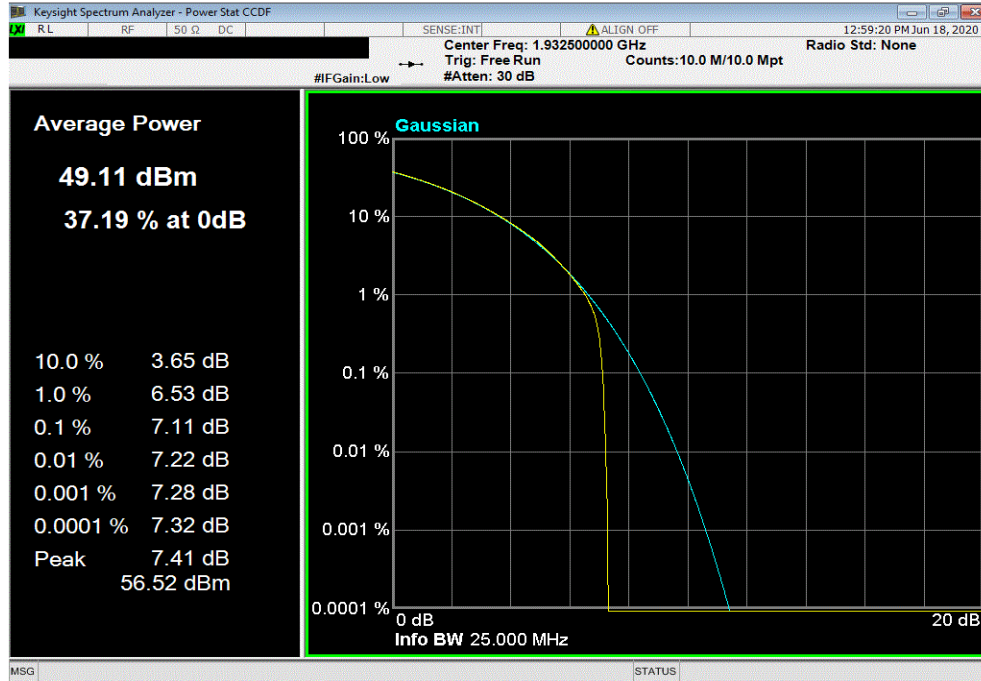
EUT: AHFIG		Work Order: NOKI0016
Serial Number: K9191322351		Date: 19-Jun-20
Customer: Nokia Solutions and Networks		Temperature: 22.1 °C
Attendees: Mitchell Hill, John Rattanaovong		Humidity: 51.9% RH
Project: None		Barometric Pres.: 1015 mbar
Tested by: Brandon Hobbs	Power: 54 VDC	Job Site: TX05
TEST SPECIFICATIONS		Test Method
FCC 24E:2020		ANSI C63.26:2015
COMMENTS		
All measurement path losses were accounted for in the reference level offset including any attenuators, filters and DC blocks. The carrier was set to maximum for all testing.		
DEVIATIONS FROM TEST STANDARD		
None		
Configuration #	2	Signature
		PAPR Value (dB) PAPR Limit (dB) Results
Port 4, Band n25, 1930 MHz - 1995 MHz		
5 MHz Bandwidth		
QPSK Modulation		
Low Channel 1932.5 MHz		7.1 13 Pass
Mid Channel 1962.5 MHz		7.1 13 Pass
High Channel 1992.5 MHz		7.1 13 Pass
16-QAM Modulation		
Low Channel 1932.5 MHz		7.3 13 Pass
Mid Channel 1962.5 MHz		7.3 13 Pass
High Channel 1992.5 MHz		7.3 13 Pass
64-QAM Modulation		
Low Channel 1932.5 MHz		7.1 13 Pass
Mid Channel 1962.5 MHz		7.1 13 Pass
High Channel 1992.5 MHz		7.1 13 Pass
256-QAM Modulation		
Low Channel 1932.5 MHz		7.2 13 Pass
Mid Channel 1962.5 MHz		7.2 13 Pass
High Channel 1992.5 MHz		7.2 13 Pass
10 MHz Bandwidth		
QPSK Modulation		
Low Channel 1935 MHz		7.2 13 Pass
Mid Channel 1962.5 MHz		7.1 13 Pass
High Channel 1990 MHz		7.1 13 Pass
16-QAM Modulation		
Low Channel 1935 MHz		7.3 13 Pass
Mid Channel 1962.5 MHz		7.3 13 Pass
High Channel 1990 MHz		7.3 13 Pass
64-QAM Modulation		
Low Channel 1935 MHz		7.2 13 Pass
Mid Channel 1962.5 MHz		7.1 13 Pass
High Channel 1990 MHz		7.1 13 Pass
256-QAM Modulation		
Low Channel 1935 MHz		7.2 13 Pass
Mid Channel 1962.5 MHz		7.2 13 Pass
High Channel 1990 MHz		7.2 13 Pass
15 MHz Bandwidth		
QPSK Modulation		
Low Channel 1937.5 MHz		7.3 13 Pass
Mid Channel 1962.5 MHz		7.1 13 Pass
High Channel 1987.5 MHz		7.1 13 Pass
16-QAM Modulation		
Low Channel 1937.5 MHz		7.4 13 Pass
Mid Channel 1962.5 MHz		7.2 13 Pass
High Channel 1987.5 MHz		7.2 13 Pass
64-QAM Modulation		
Low Channel 1937.5 MHz		7.2 13 Pass
Mid Channel 1962.5 MHz		7.1 13 Pass
High Channel 1987.5 MHz		7.1 13 Pass
256-QAM Modulation		
Low Channel 1937.5 MHz		7.2 13 Pass
Mid Channel 1962.5 MHz		7.1 13 Pass
High Channel 1987.5 MHz		7.1 13 Pass
20 MHz Bandwidth		
QPSK Modulation		
Low Channel 1940 MHz		7.3 13 Pass
Mid Channel 1962.5 MHz		7.0 13 Pass
High Channel 1985 MHz		7.1 13 Pass
16-QAM Modulation		
Low Channel 1940 MHz		7.4 13 Pass
Mid Channel 1962.5 MHz		7.1 13 Pass
High Channel 1985 MHz		7.1 13 Pass
64-QAM Modulation		
Low Channel 1940 MHz		7.3 13 Pass
Mid Channel 1962.5 MHz		7.0 13 Pass
High Channel 1985 MHz		7.1 13 Pass
256-QAM Modulation		
Low Channel 1940 MHz		7.2 13 Pass
Mid Channel 1962.5 MHz		7.0 13 Pass
High Channel 1985 MHz		7.1 13 Pass

PEAK TO AVERAGE POWER (PAPR) - BAND n25

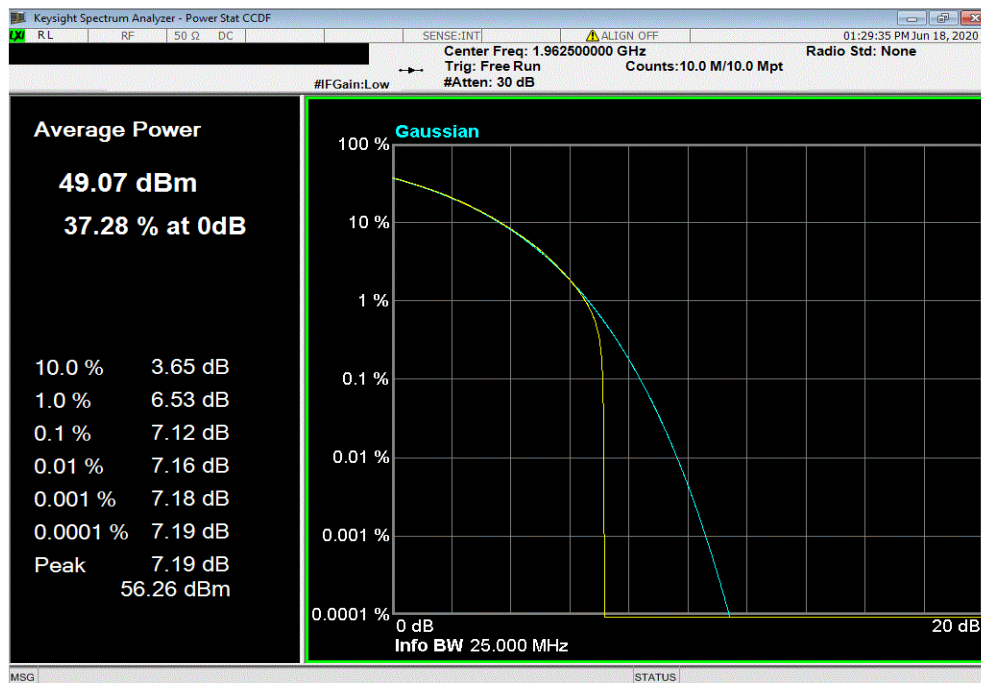


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Port 4, Band n25, 1930 MHz - 1995 MHz, 5 MHz Bandwidth, QPSK Modulation, Low Channel 1932.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.11	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz, 5 MHz Bandwidth, QPSK Modulation, Mid Channel 1962.5 MHz						
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				7.12	13	Pass

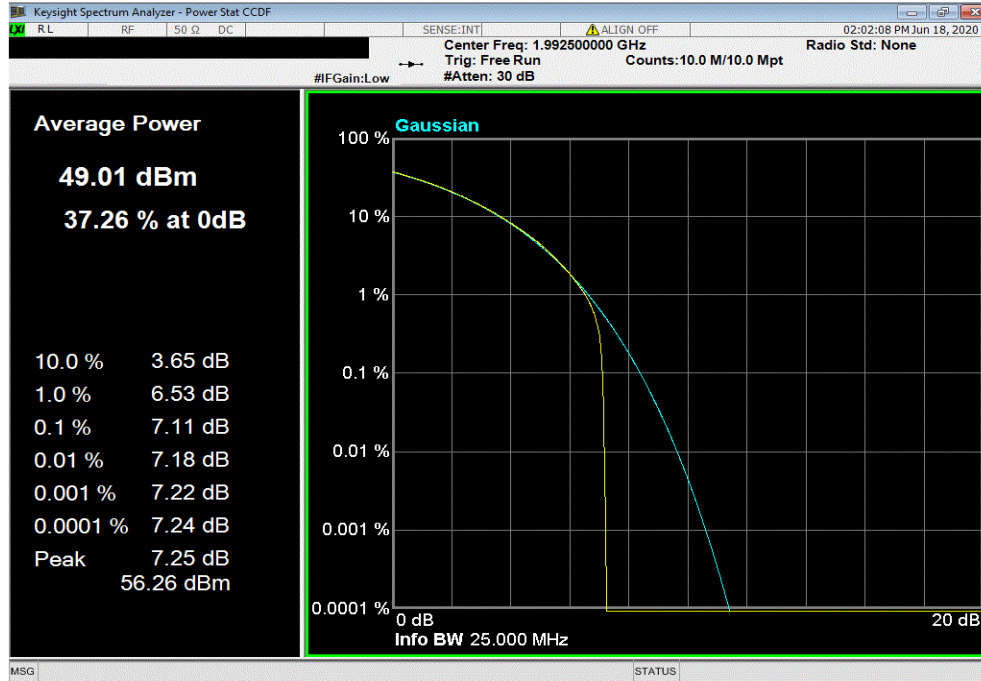


PEAK TO AVERAGE POWER (PAPR) - BAND n25

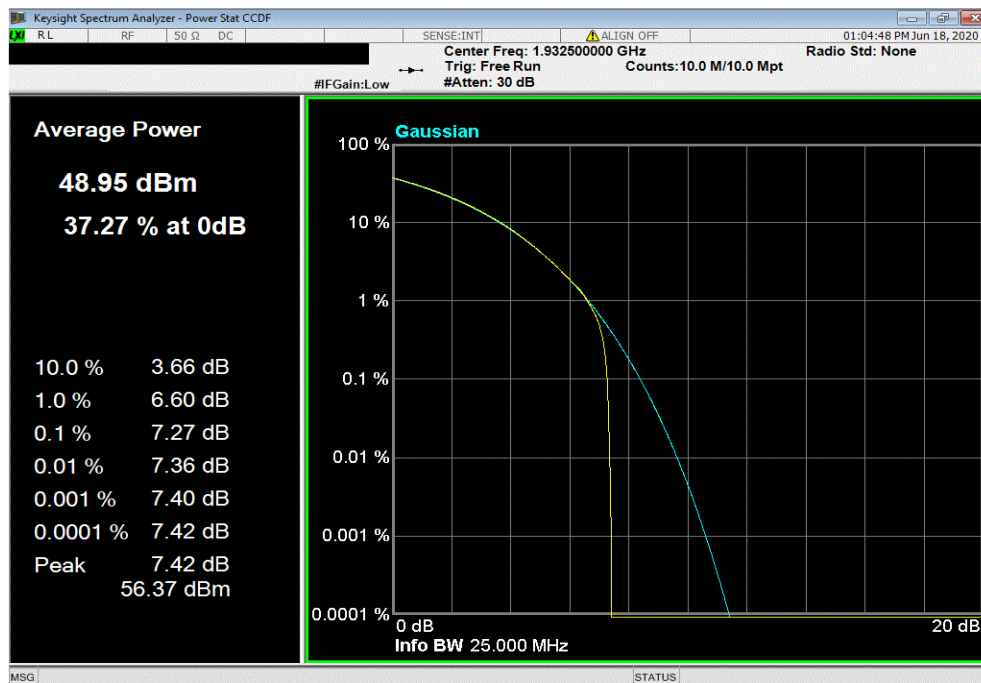


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Port 4, Band n25, 1930 MHz - 1995 MHz, 5 MHz Bandwidth, QPSK Modulation, High Channel 1992.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.11	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel 1932.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.27	13	Pass

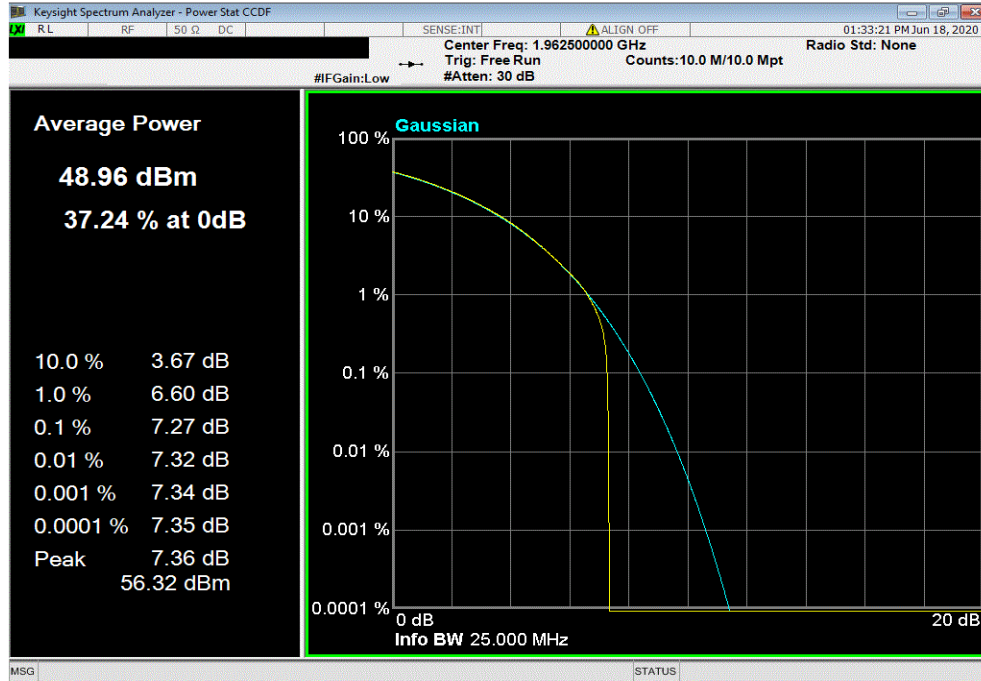


PEAK TO AVERAGE POWER (PAPR) - BAND n25

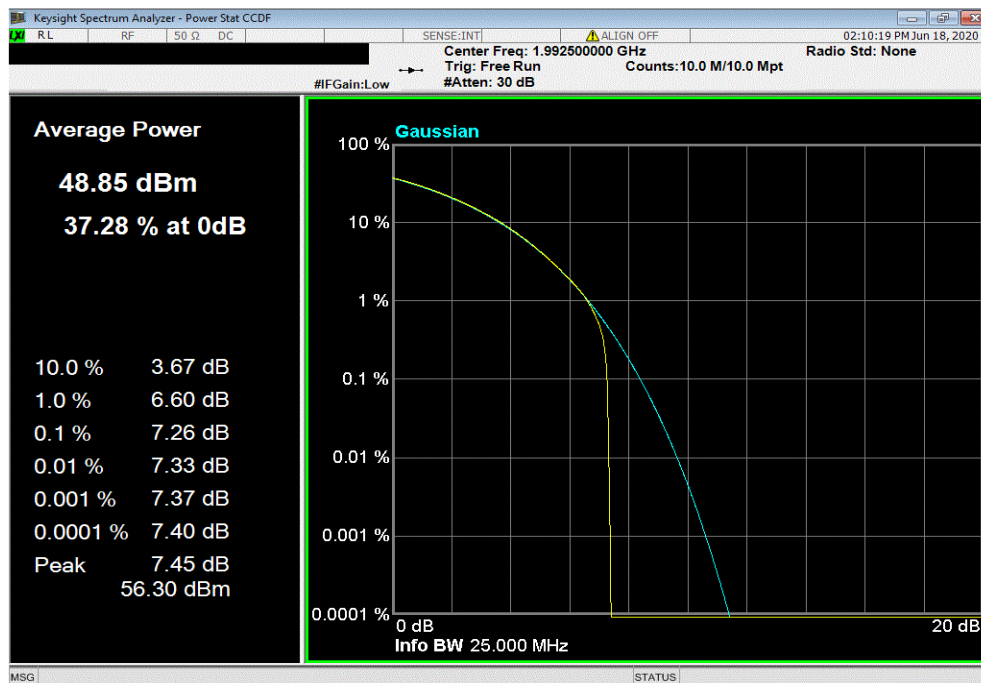


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Port 4, Band n25, 1930 MHz - 1995 MHz, 5 MHz Bandwidth, 16-QAM Modulation, Mid Channel 1962.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.27	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz, 5 MHz Bandwidth, 16-QAM Modulation, High Channel 1992.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.26	13	Pass

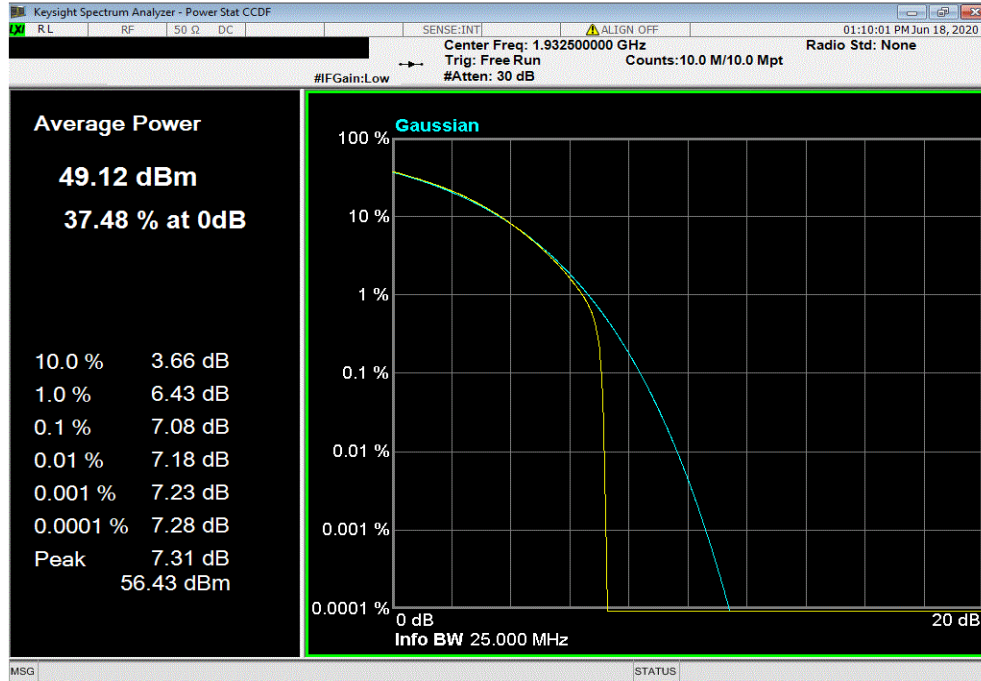


PEAK TO AVERAGE POWER (PAPR) - BAND n25

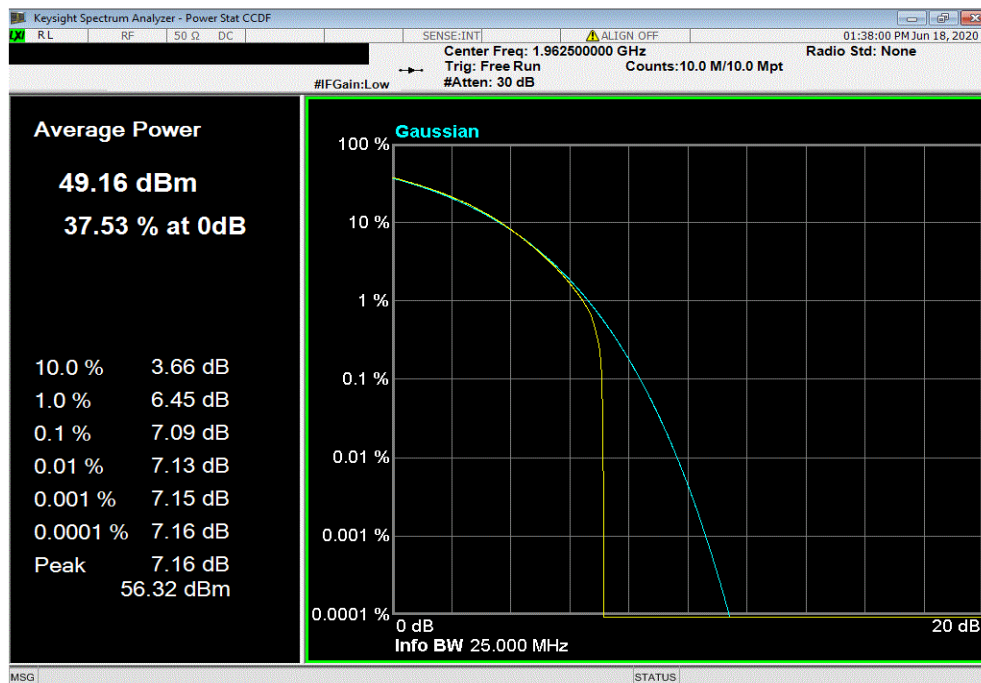


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Port 4, Band n25, 1930 MHz - 1995 MHz, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel 1932.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.08	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz, 5 MHz Bandwidth, 64-QAM Modulation, Mid Channel 1962.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.09	13	Pass

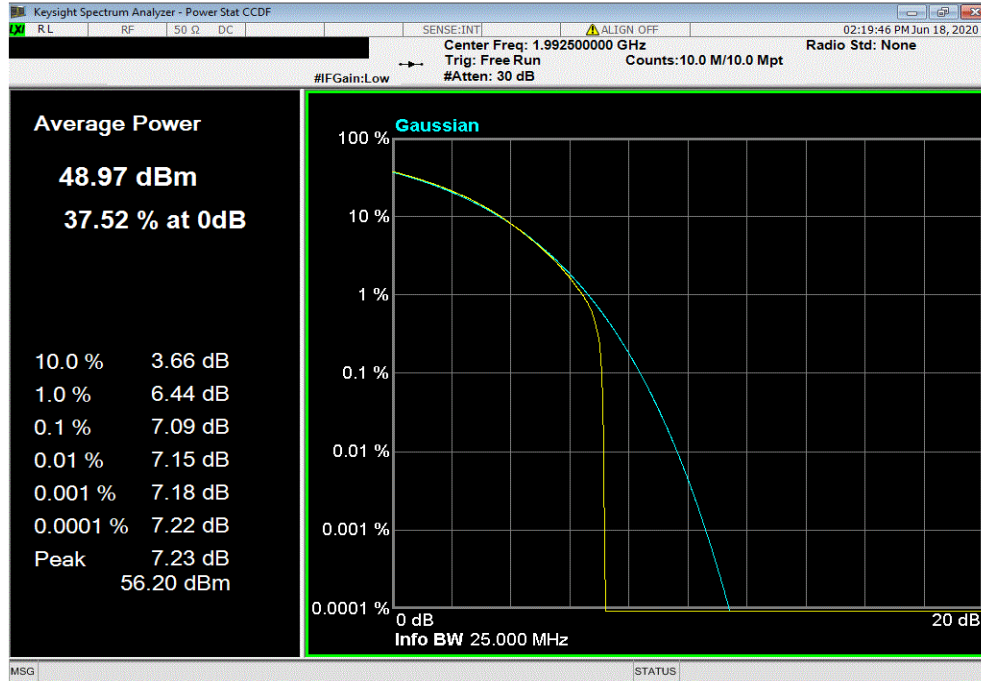


PEAK TO AVERAGE POWER (PAPR) - BAND n25

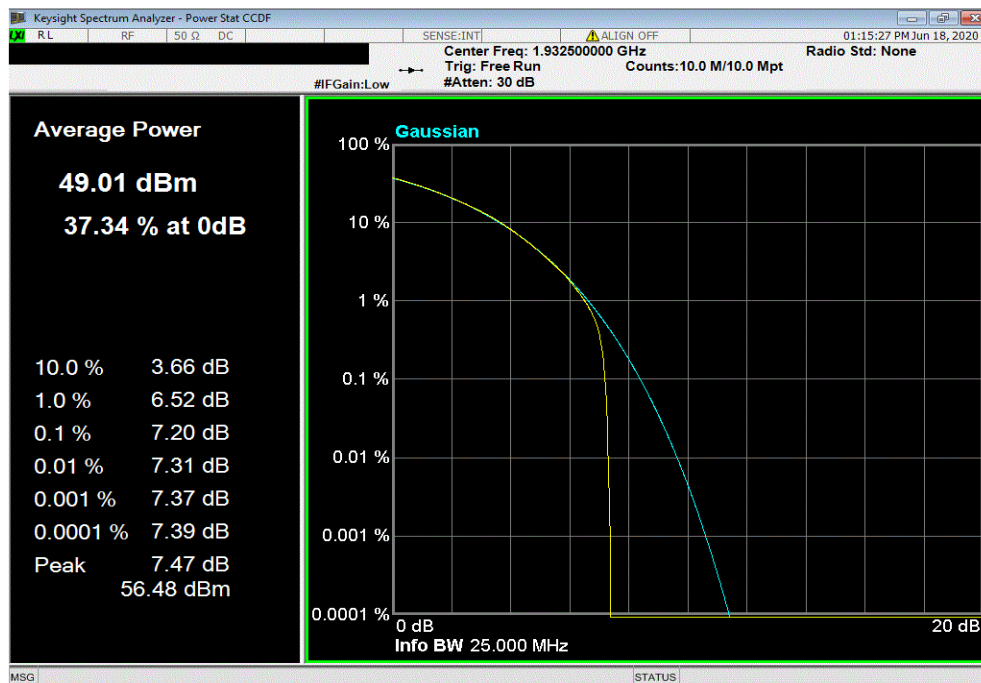


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Port 4, Band n25, 1930 MHz - 1995 MHz, 5 MHz Bandwidth, 64-QAM Modulation, High Channel 1992.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.09	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz, 5 MHz Bandwidth, 256-QAM Modulation, Low Channel 1932.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.2	13	Pass

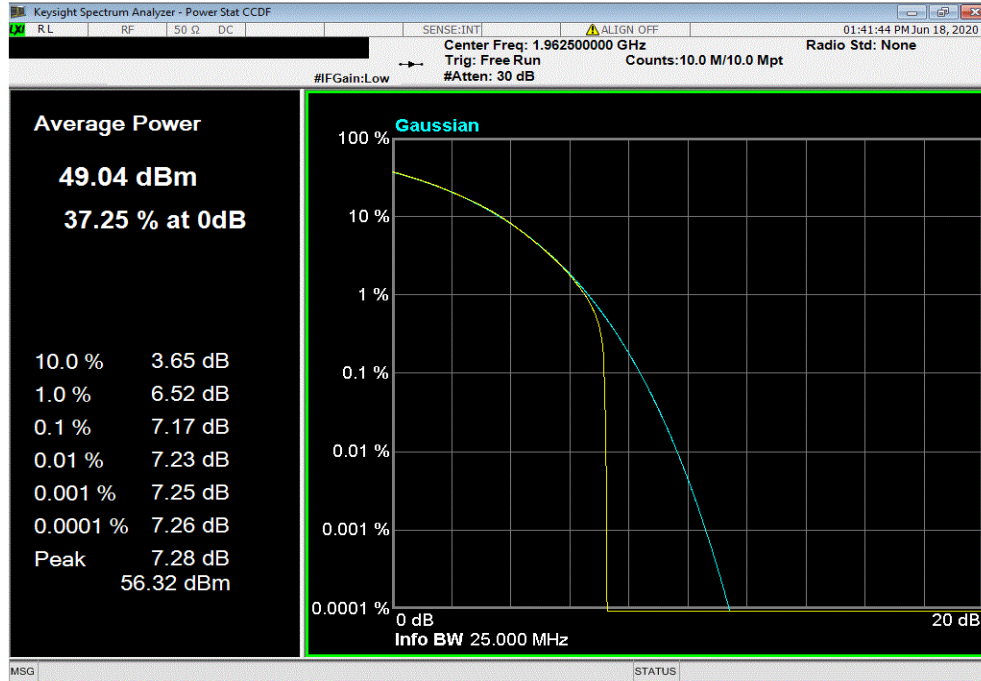


PEAK TO AVERAGE POWER (PAPR) - BAND n25

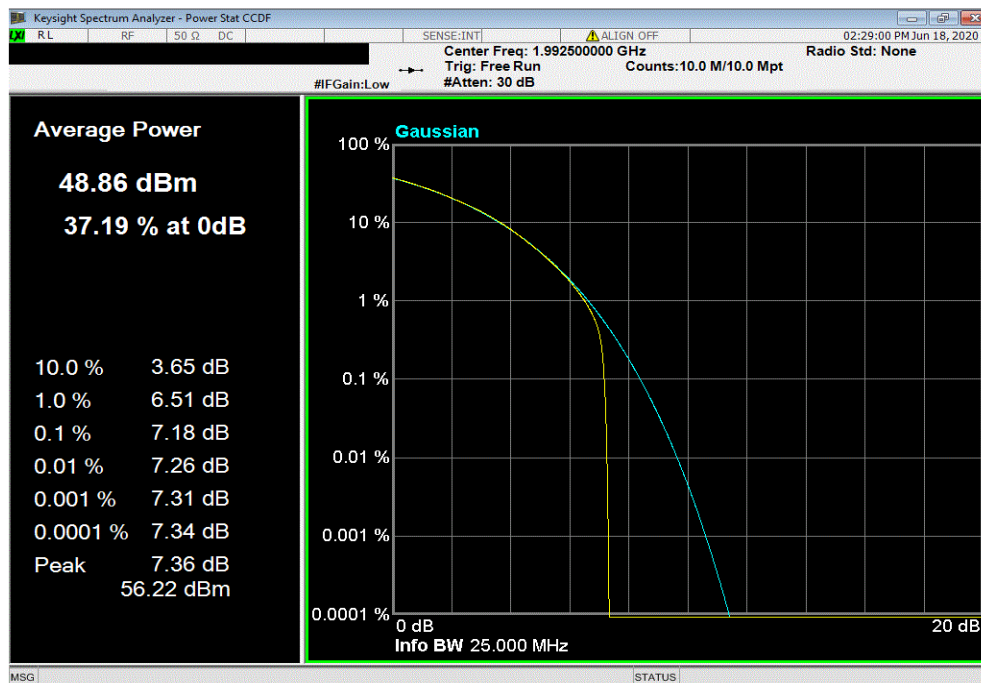


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Port 4, Band n25, 1930 MHz - 1995 MHz, 5 MHz Bandwidth, 256-QAM Modulation, Mid Channel 1962.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.17	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz, 5 MHz Bandwidth, 256-QAM Modulation, High Channel 1992.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
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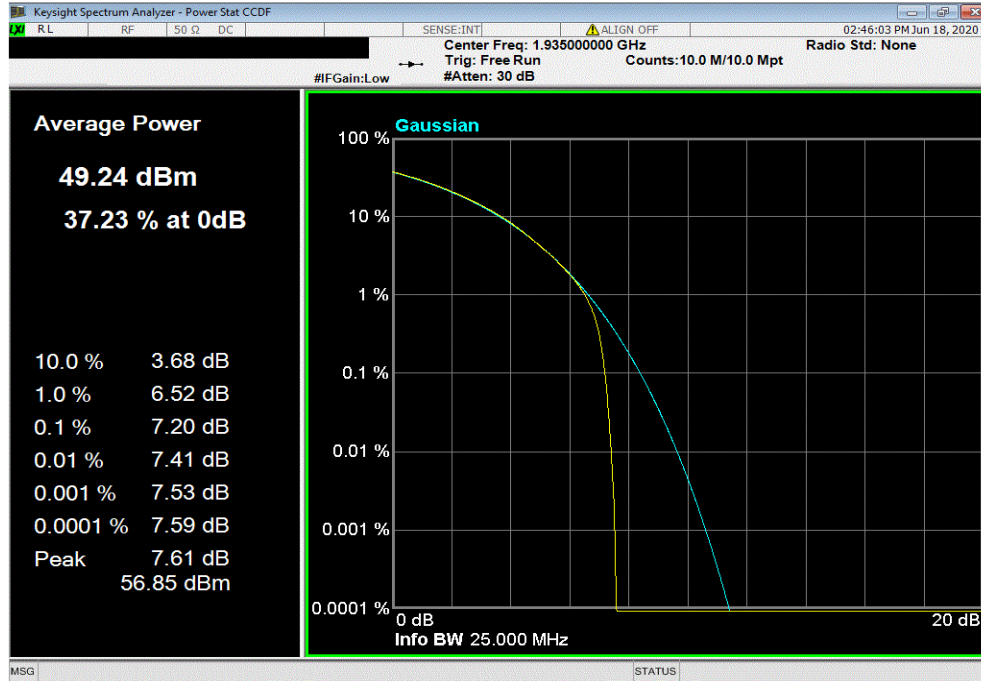


PEAK TO AVERAGE POWER (PAPR) - BAND n25

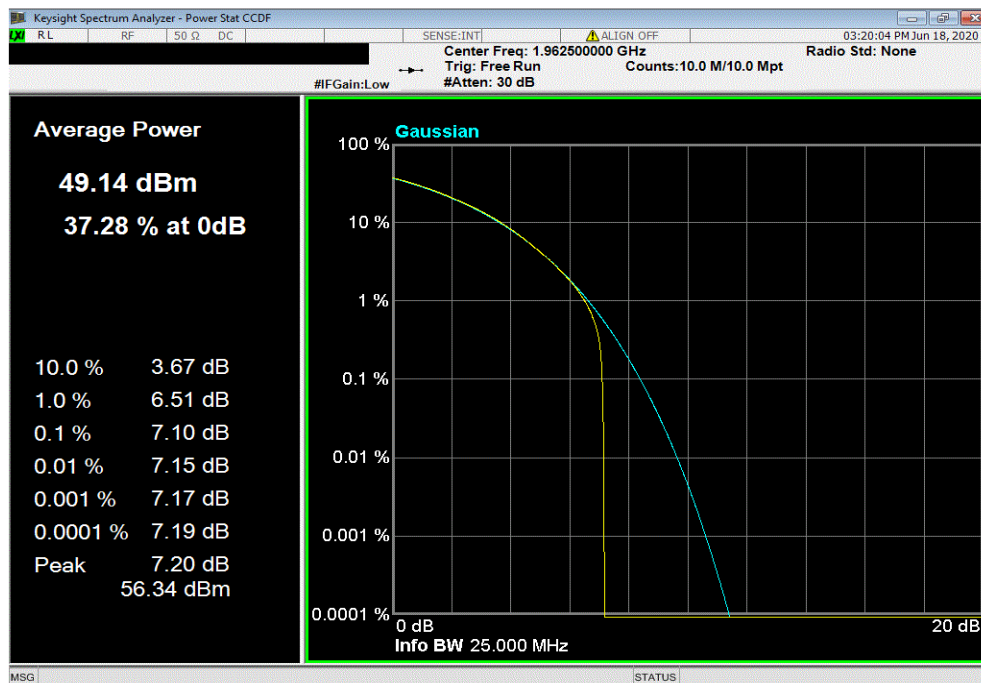


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Port 4, Band n25, 1930 MHz - 1995 MHz , 10 MHz Bandwidth, QPSK Modulation, Low Channel 1935 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.2	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz , 10 MHz Bandwidth, QPSK Modulation, Mid Channel 1962.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.1	13	Pass

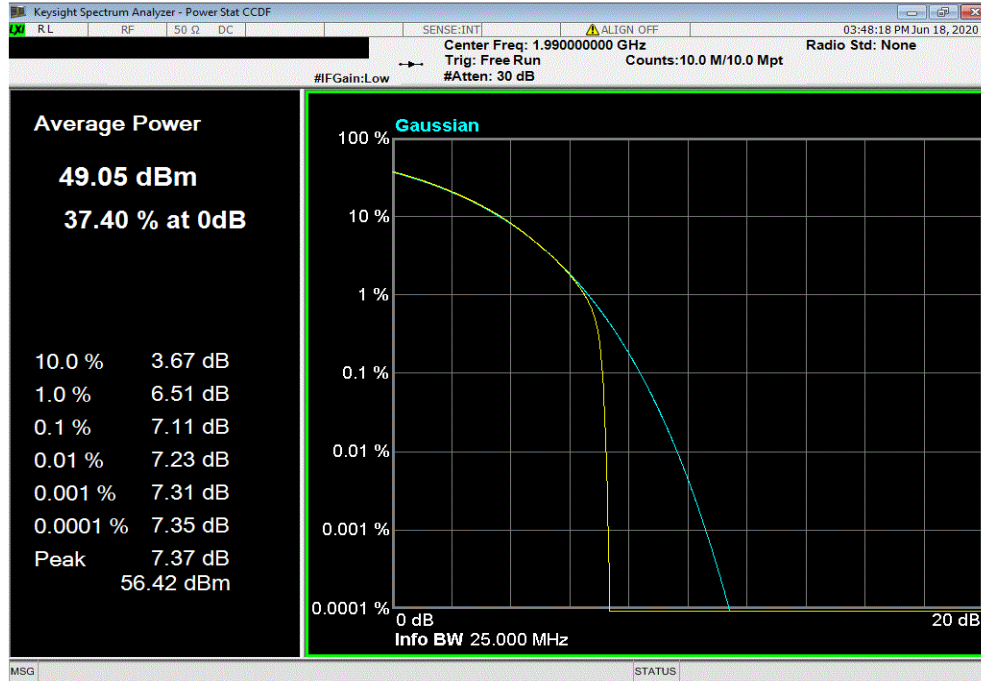


PEAK TO AVERAGE POWER (PAPR) - BAND n25

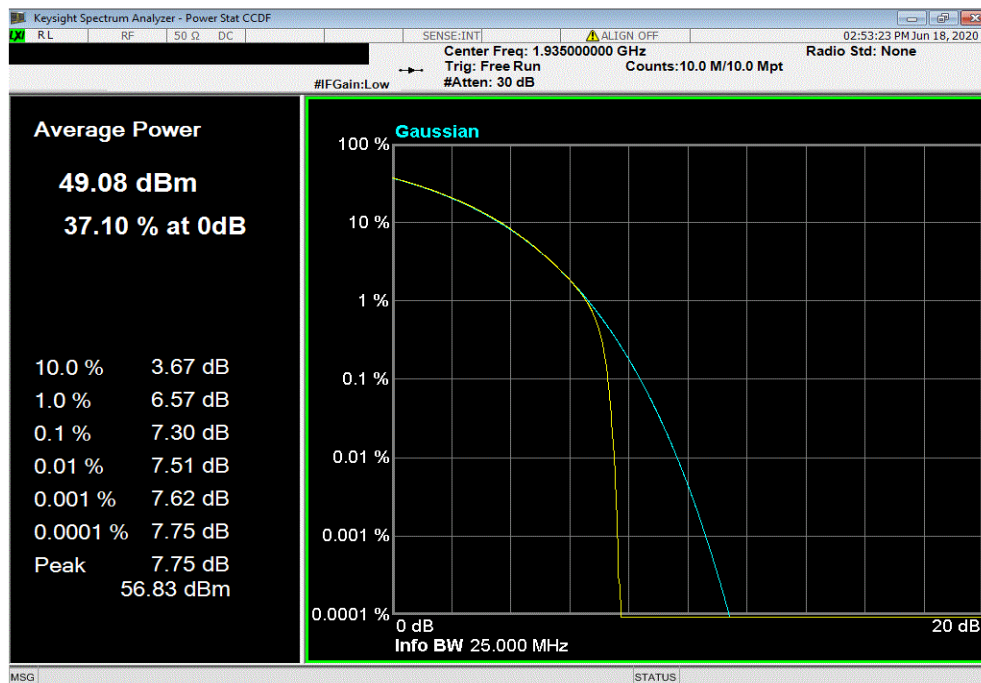


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Port 4, Band n25, 1930 MHz - 1995 MHz, 10 MHz Bandwidth, QPSK Modulation, High Channel 1990 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.11	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz, 10 MHz Bandwidth, 16-QAM Modulation, Low Channel 1935 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.3	13	Pass

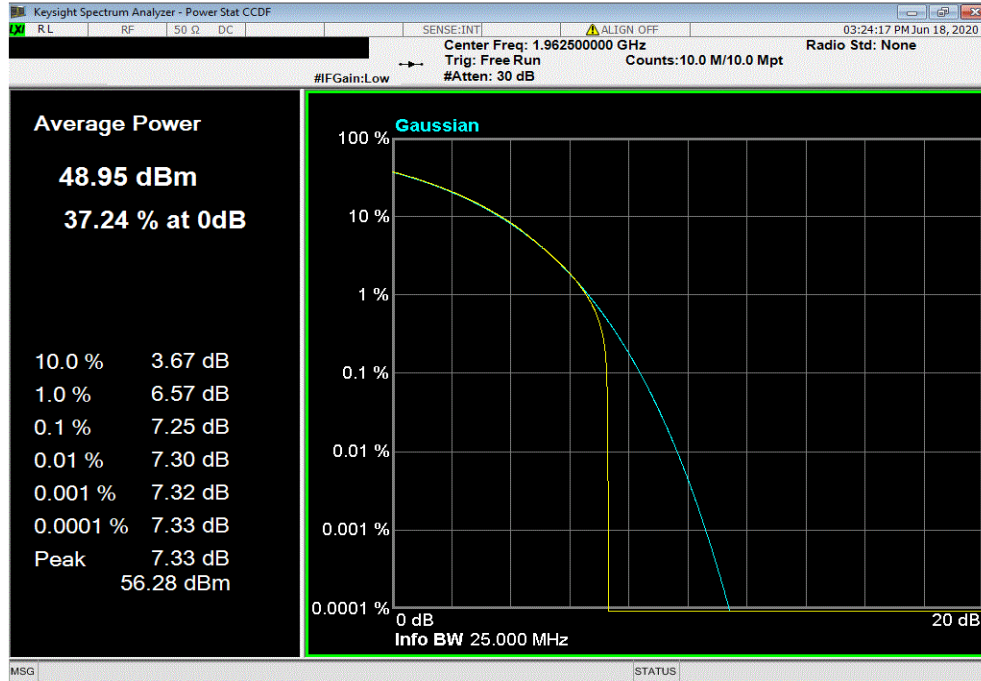


PEAK TO AVERAGE POWER (PAPR) - BAND n25

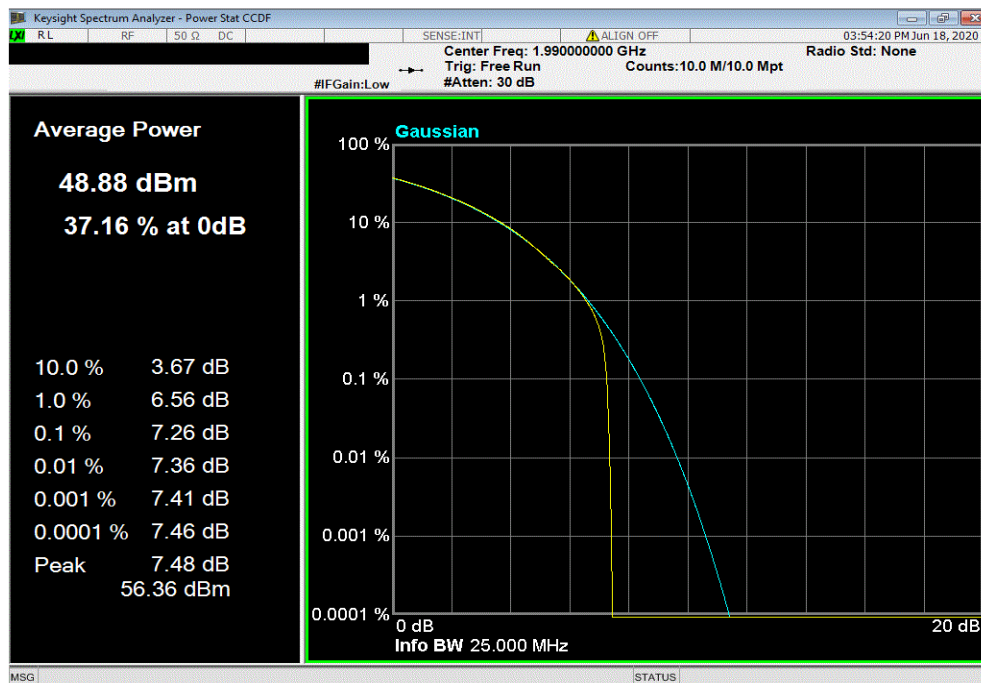


TMTx 2020.06.08.0 BETA XMt 2020.03.25.0

Port 4, Band n25, 1930 MHz - 1995 MHz , 10 MHz Bandwidth, 16-QAM Modulation , Mid Channel 1962.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.25	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz , 10 MHz Bandwidth, 16-QAM Modulation , High Channel 1990 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.26	13	Pass

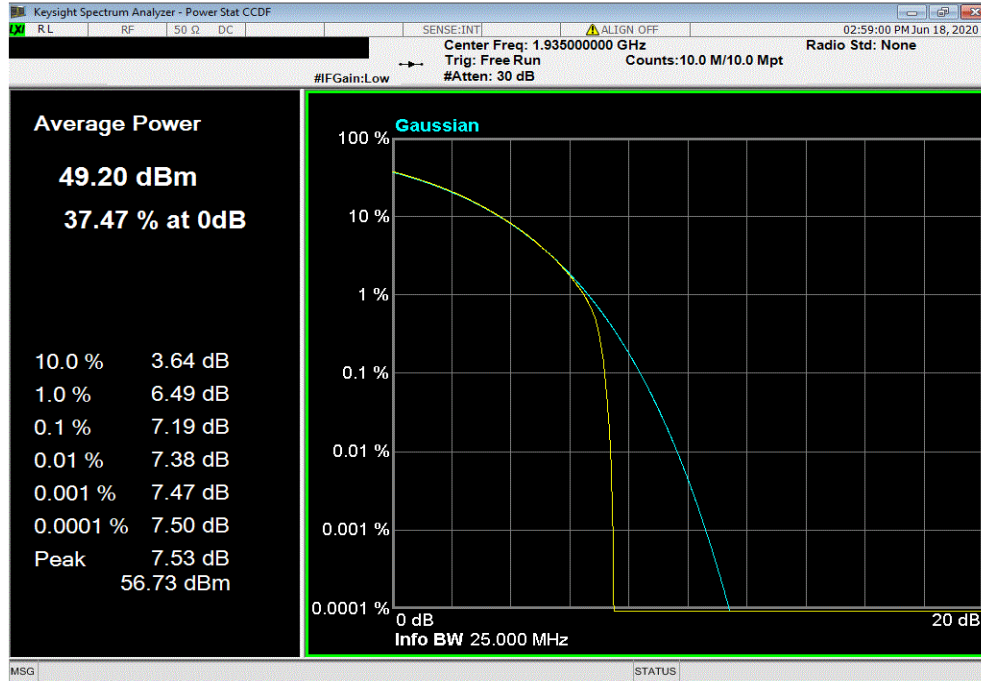


PEAK TO AVERAGE POWER (PAPR) - BAND n25

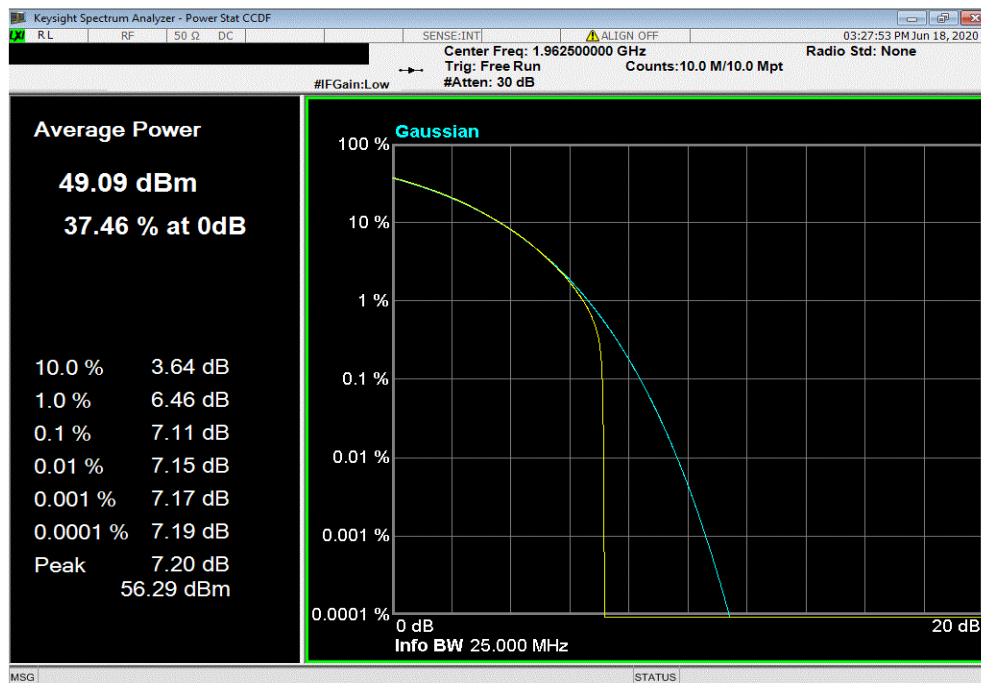


TMTx 2020.06.08.0 BETA XMI 2020.03.25.0

Port 4, Band n25, 1930 MHz - 1995 MHz , 10 MHz Bandwidth, 64-QAM Modulation, Low Channel 1935 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.19	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz , 10 MHz Bandwidth, 64-QAM Modulation, Mid Channel 1962.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.11	13	Pass

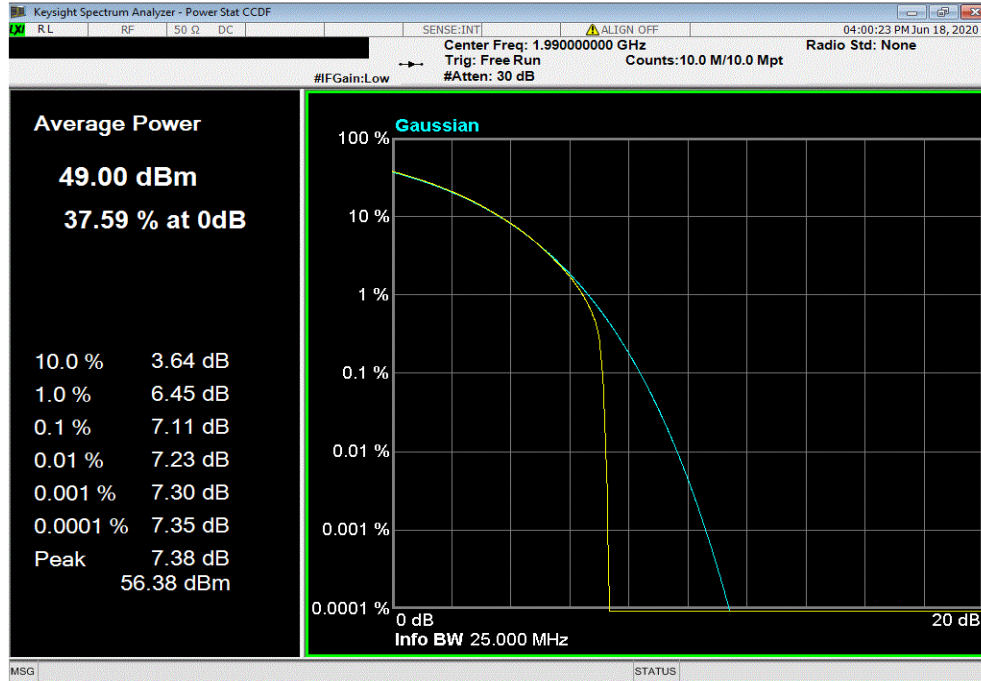


PEAK TO AVERAGE POWER (PAPR) - BAND n25

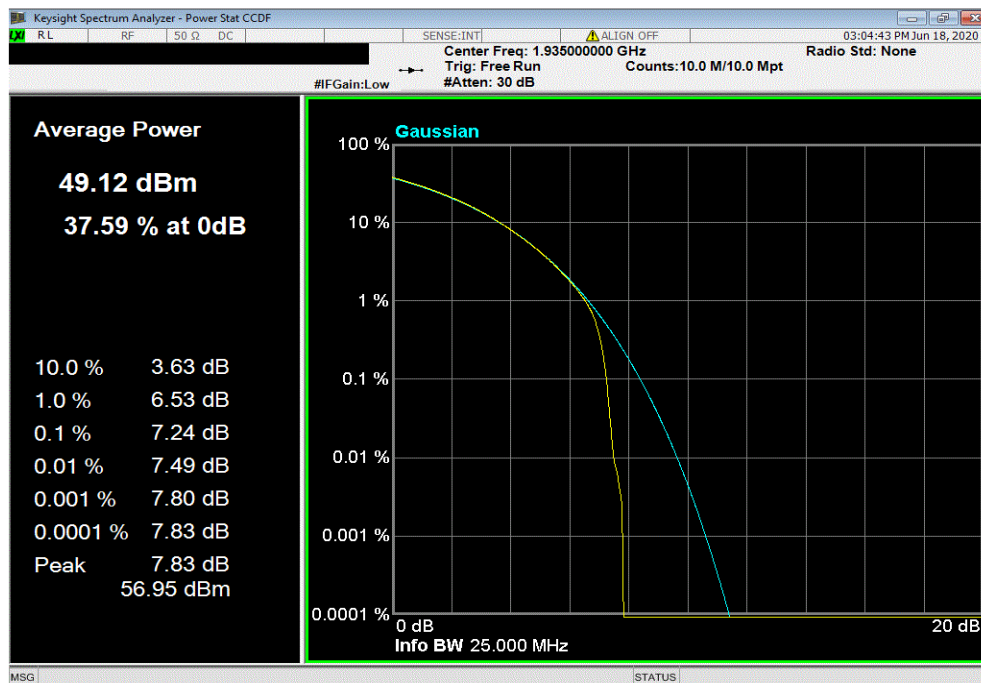


TMTx 2020.06.08.0 BETA XMI 2020.03.25.0

Port 4, Band n25, 1930 MHz - 1995 MHz , 10 MHz Bandwidth, 64-QAM Modulation, High Channel 1990 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.11	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz , 10 MHz Bandwidth, 256-QAM Modulation, Low Channel 1935 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.24	13	Pass

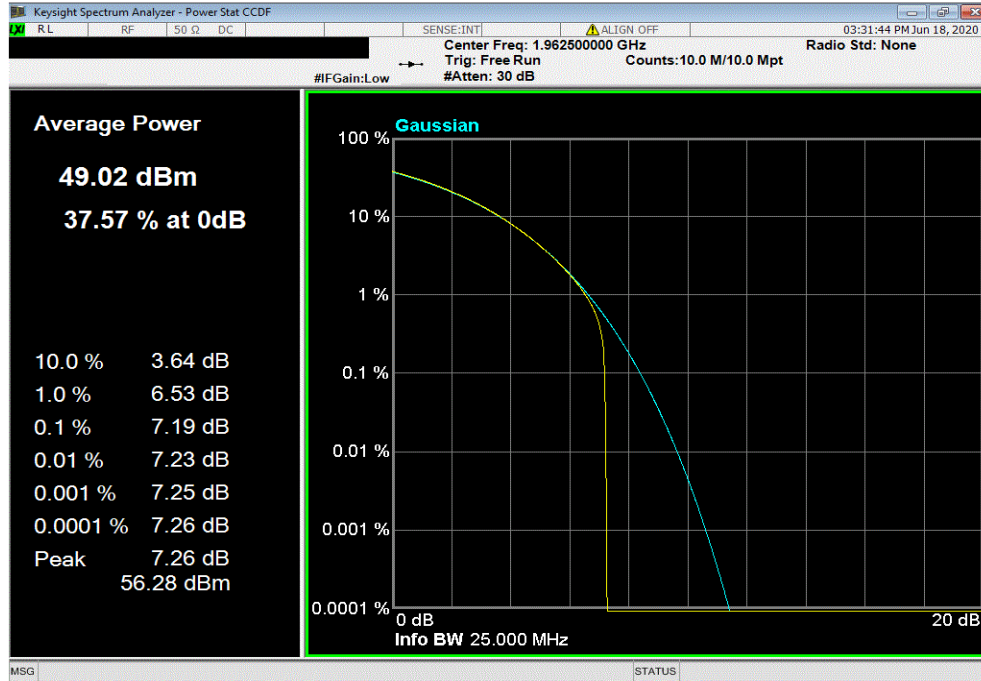


PEAK TO AVERAGE POWER (PAPR) - BAND n25

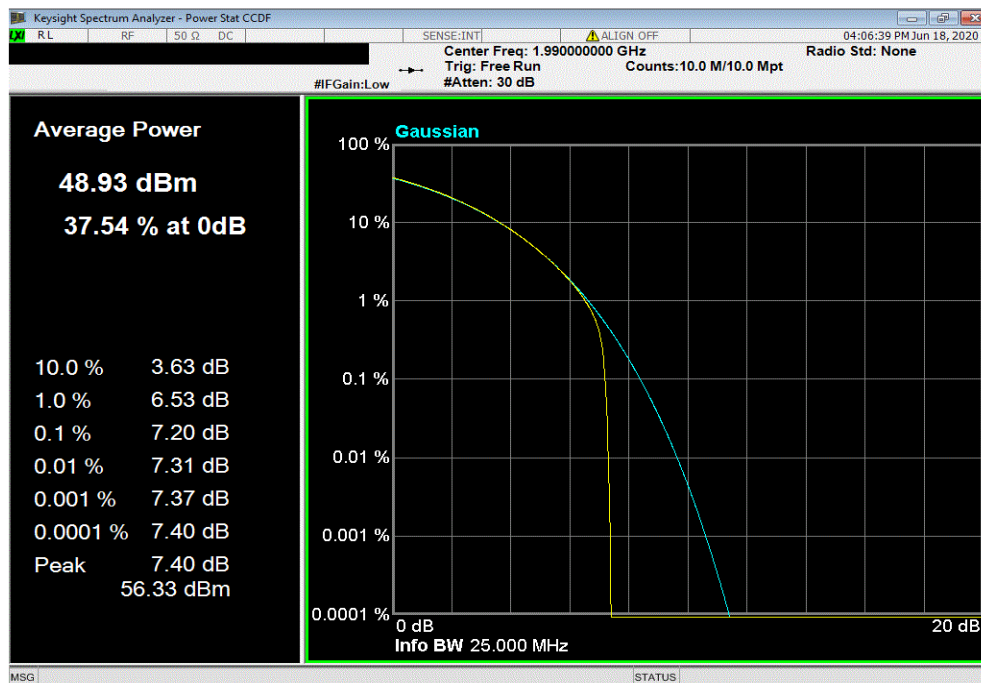


TMTx 2020.06.08.0 BETA XMt 2020.03.25.0

Port 4, Band n25, 1930 MHz - 1995 MHz, 10 MHz Bandwidth, 256-QAM Modulation, Mid Channel 1962.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.19	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz, 10 MHz Bandwidth, 256-QAM Modulation, High Channel 1990 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.2	13	Pass

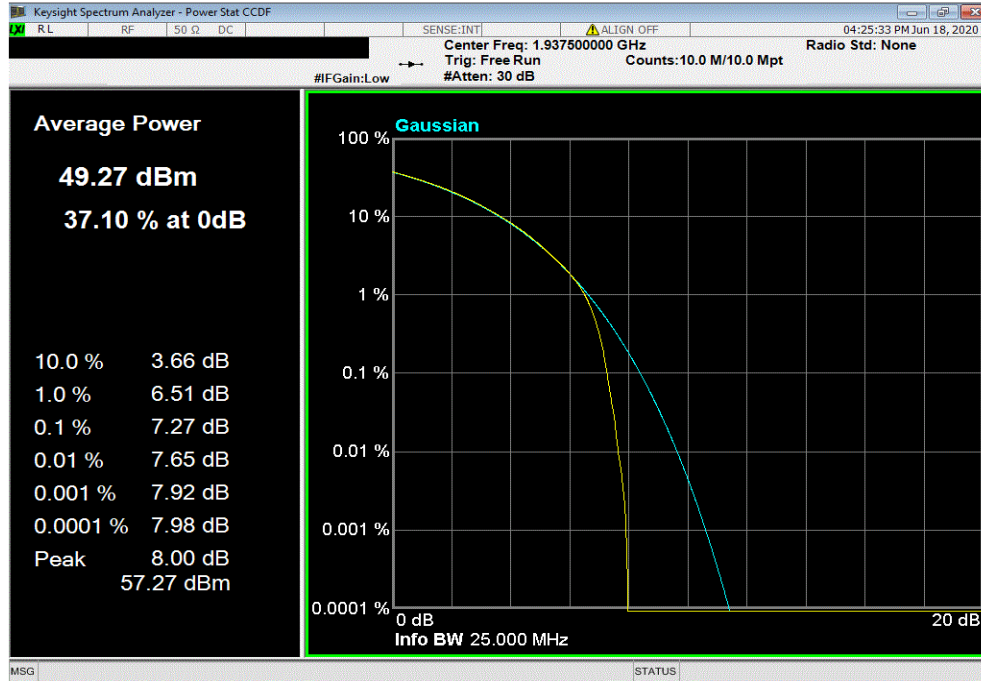


PEAK TO AVERAGE POWER (PAPR) - BAND n25

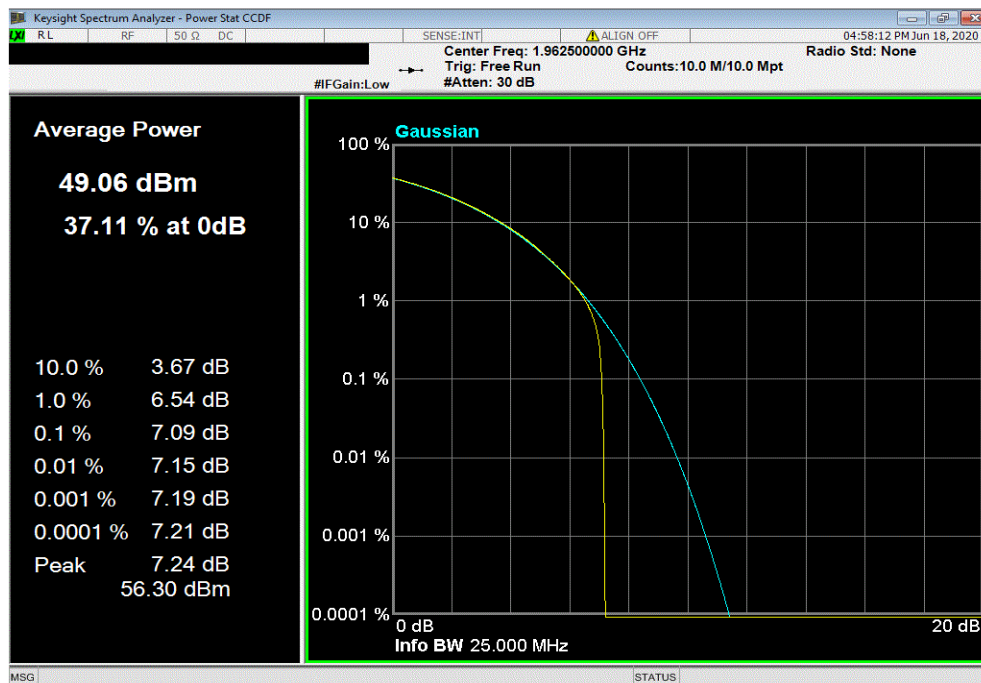


TMTx 2020.06.08.0 BETA XMI 2020.03.25.0

Port 4, Band n25, 1930 MHz - 1995 MHz , 15 MHz Bandwidth, QPSK Modulation, Low Channel 1937.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.27	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz , 15 MHz Bandwidth, QPSK Modulation, Mid Channel 1962.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.09	13	Pass

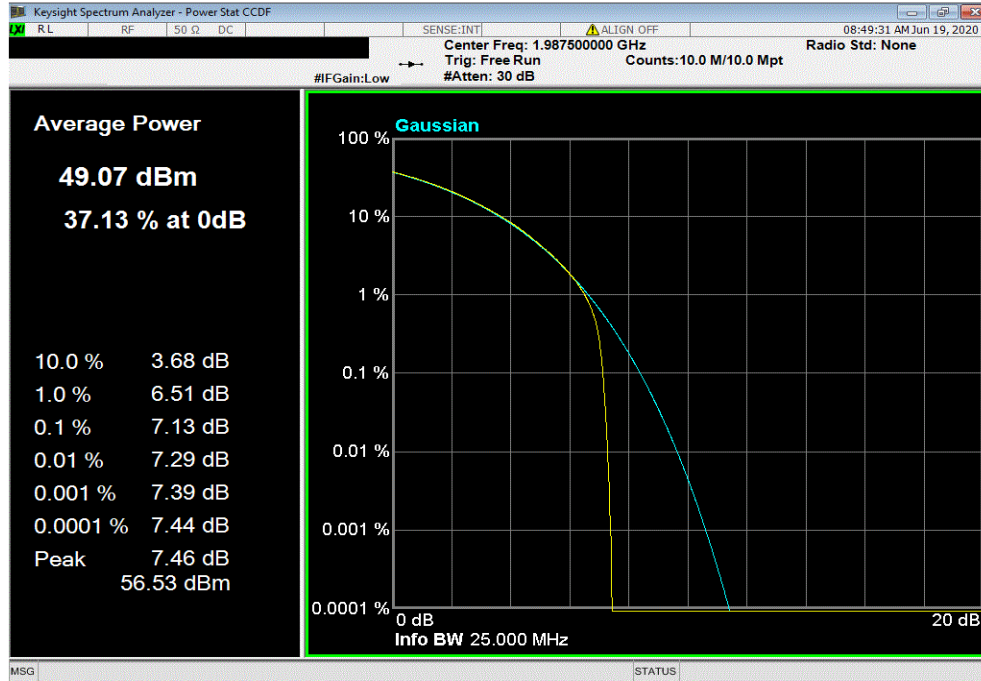


PEAK TO AVERAGE POWER (PAPR) - BAND n25

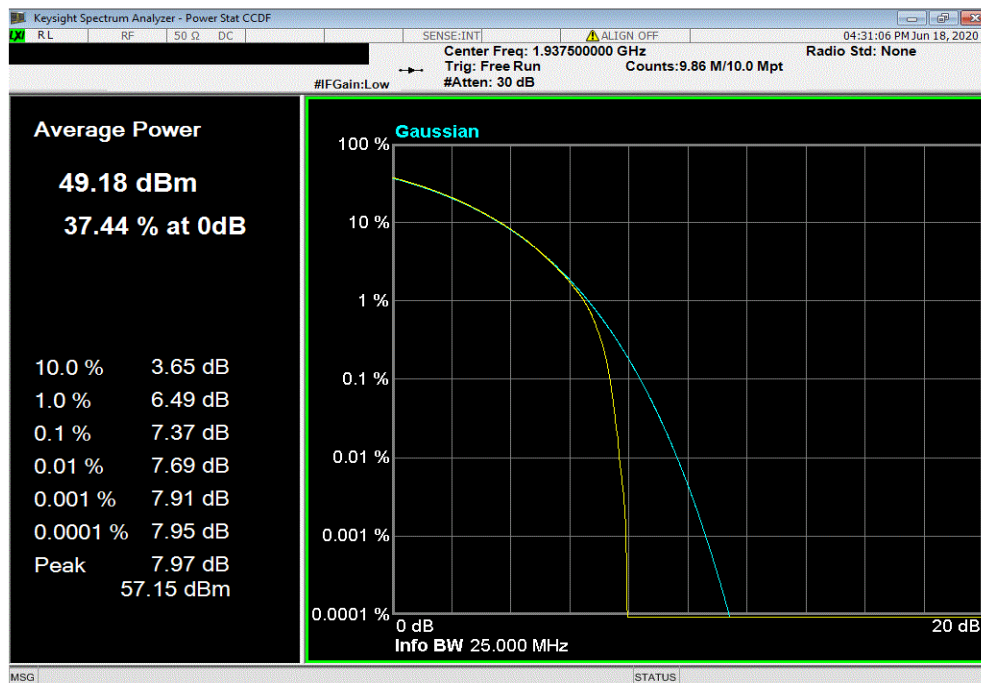


TMTx 2020.06.08.0 BETA XMt 2020.03.25.0

Port 4, Band n25, 1930 MHz - 1995 MHz , 15 MHz Bandwidth, QPSK Modulation, High Channel 1987.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.13	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz , 15 MHz Bandwidth, 16-QAM Modulation , Low Channel 1937.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.37	13	Pass

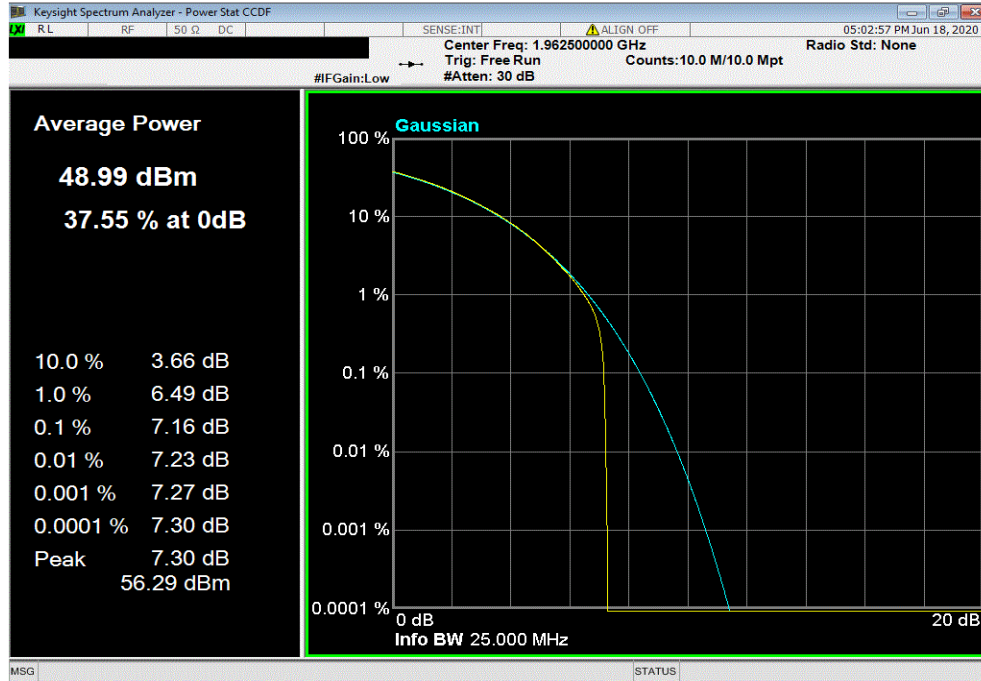


PEAK TO AVERAGE POWER (PAPR) - BAND n25

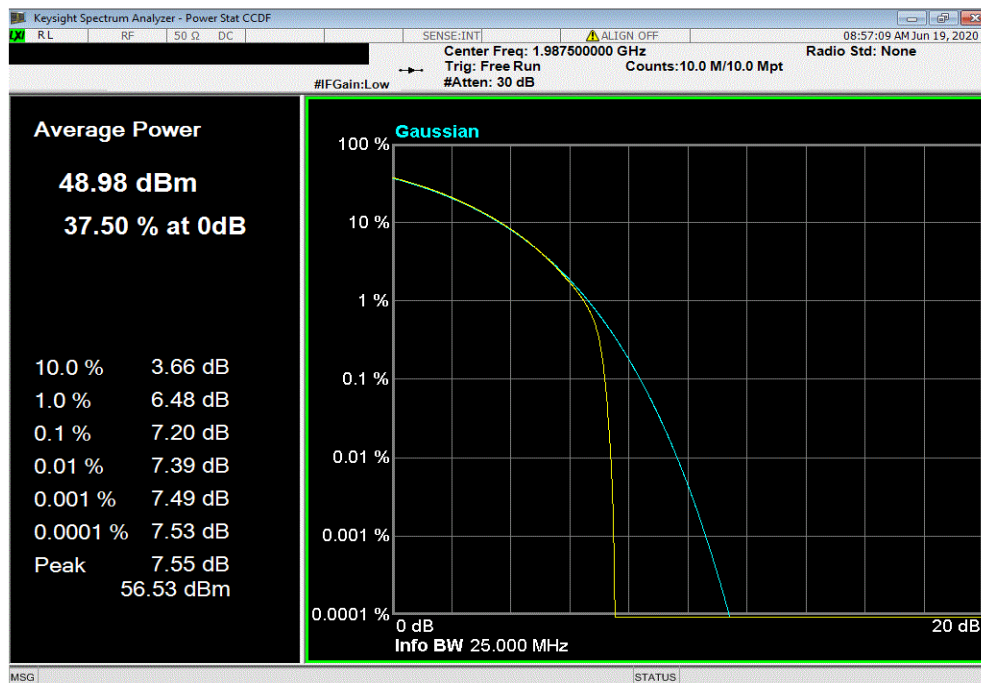


TMTx 2020.06.08.0 BETA XMI 2020.03.25.0

Port 4, Band n25, 1930 MHz - 1995 MHz , 15 MHz Bandwidth, 16-QAM Modulation , Mid Channel 1962.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.16	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz , 15 MHz Bandwidth, 16-QAM Modulation , High Channel 1987.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.2	13	Pass

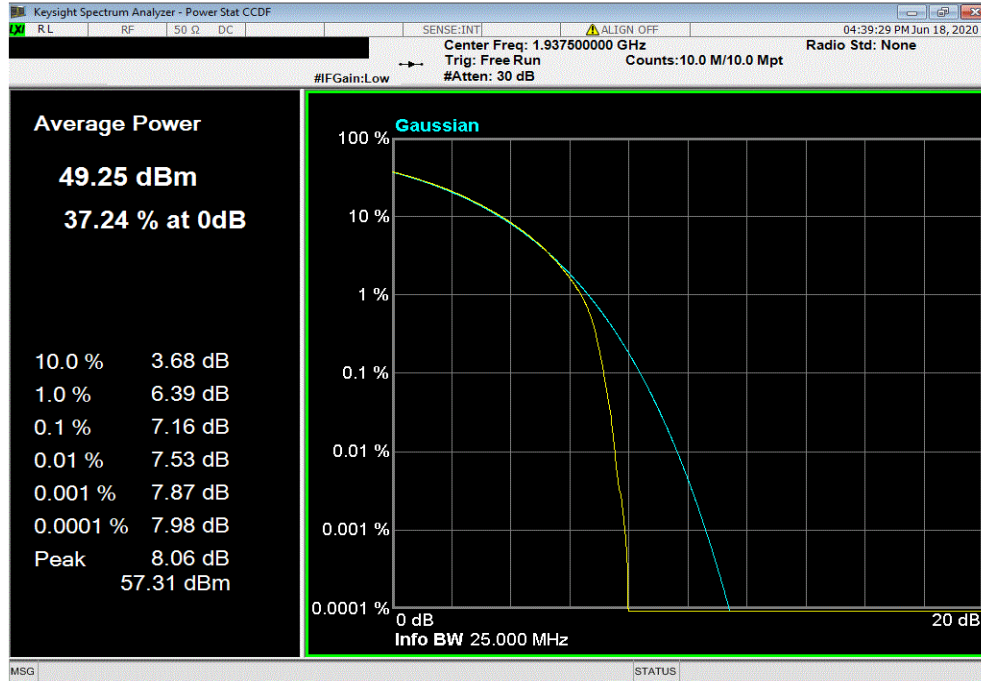


PEAK TO AVERAGE POWER (PAPR) - BAND n25

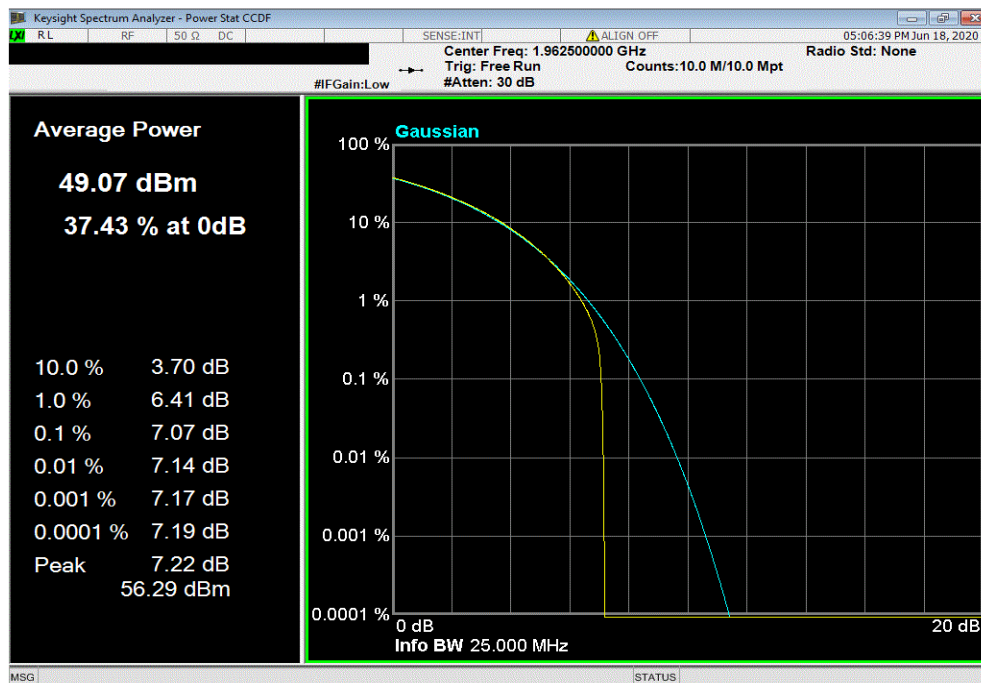


TMTx 2020.06.08.0 BETA XMt 2020.03.25.0

Port 4, Band n25, 1930 MHz - 1995 MHz , 15 MHz Bandwidth, 64-QAM Modulation, Low Channel 1937.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.16	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz , 15 MHz Bandwidth, 64-QAM Modulation, Mid Channel 1962.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.07	13	Pass

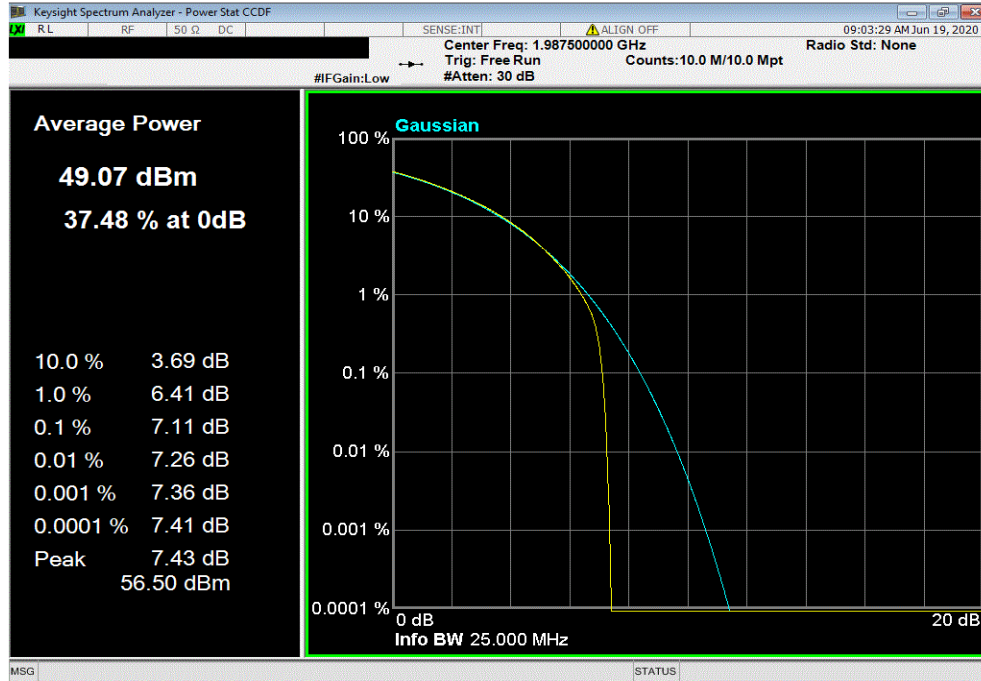


PEAK TO AVERAGE POWER (PAPR) - BAND n25

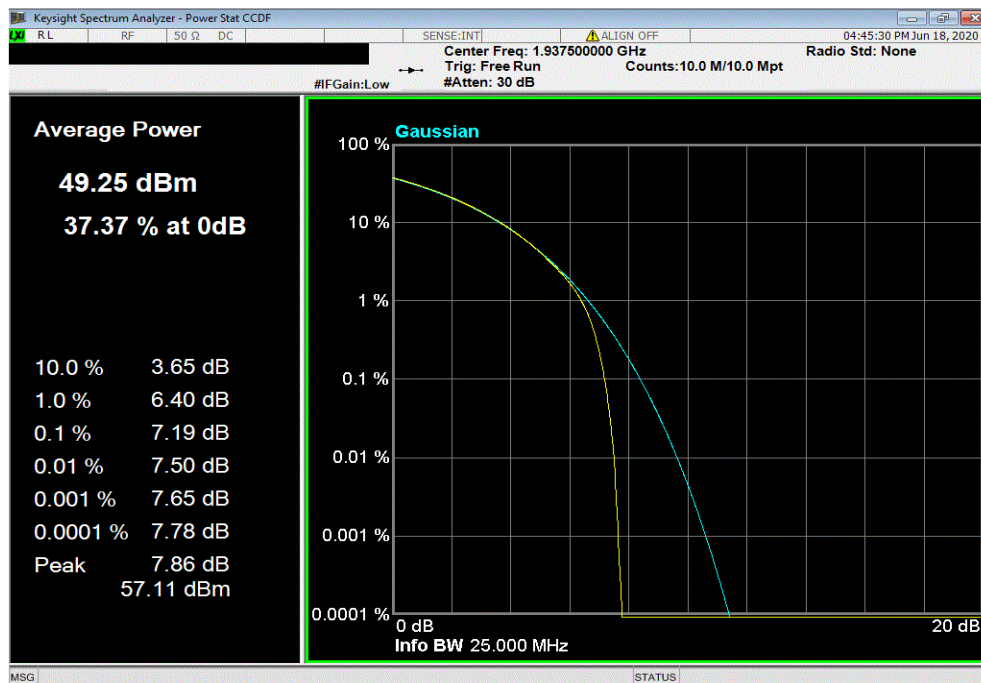


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Port 4, Band n25, 1930 MHz - 1995 MHz, 15 MHz Bandwidth, 64-QAM Modulation, High Channel 1987.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.11	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz, 15 MHz Bandwidth, 256-QAM Modulation, Low Channel 1937.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.19	13	Pass

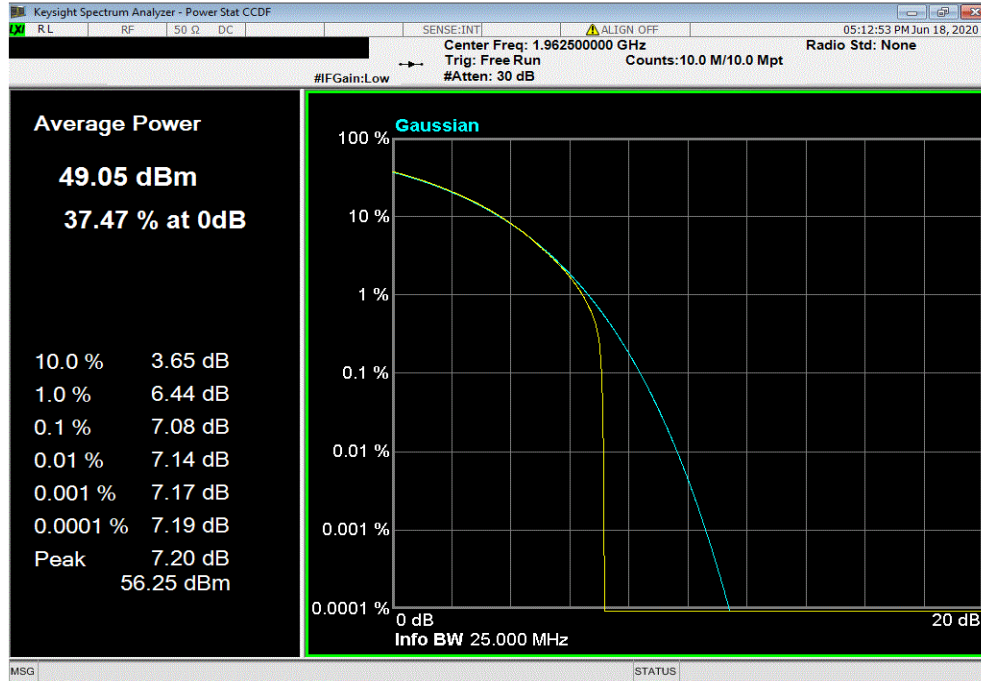


PEAK TO AVERAGE POWER (PAPR) - BAND n25

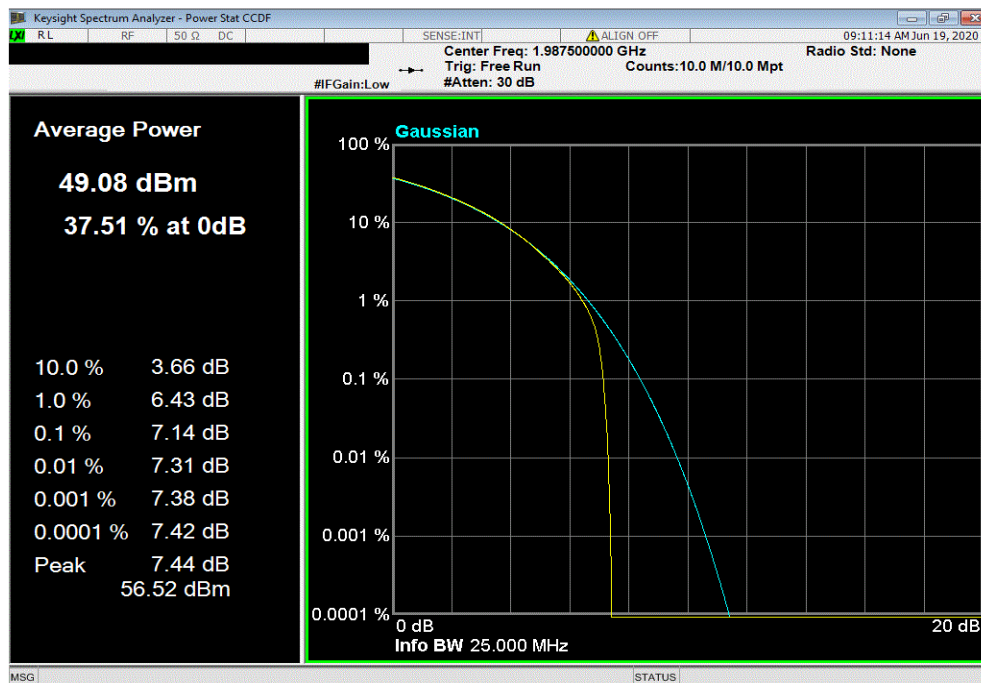


TMTx 2020.06.08.0 BETA XMI 2020.03.25.0

Port 4, Band n25, 1930 MHz - 1995 MHz, 15 MHz Bandwidth, 256-QAM Modulation, Mid Channel 1962.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.08	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz, 15 MHz Bandwidth, 256-QAM Modulation, High Channel 1987.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.14	13	Pass

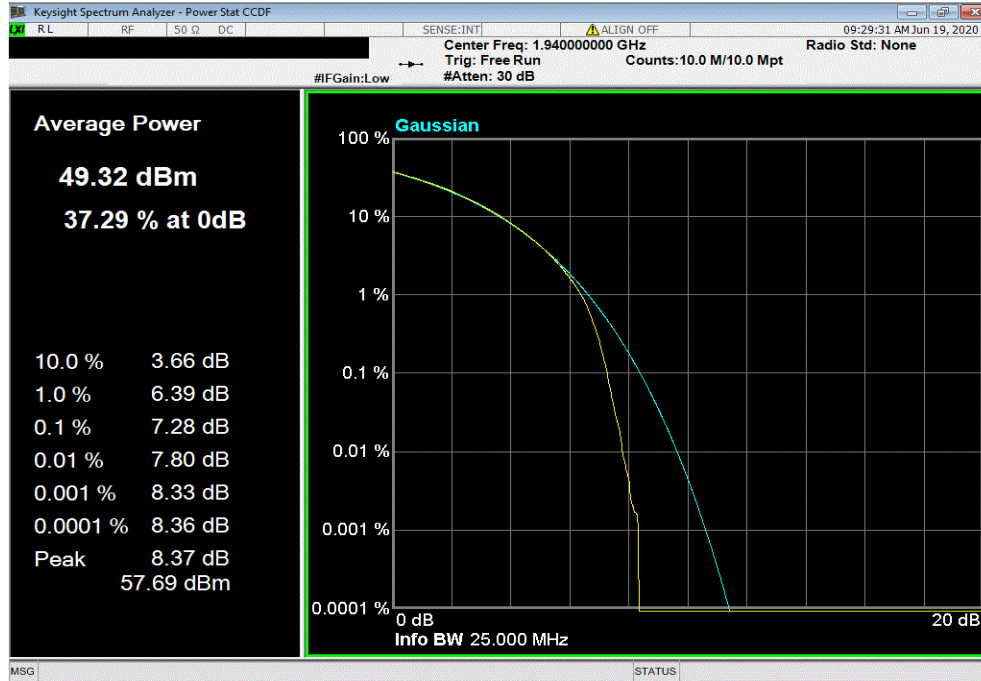


PEAK TO AVERAGE POWER (PAPR) - BAND n25

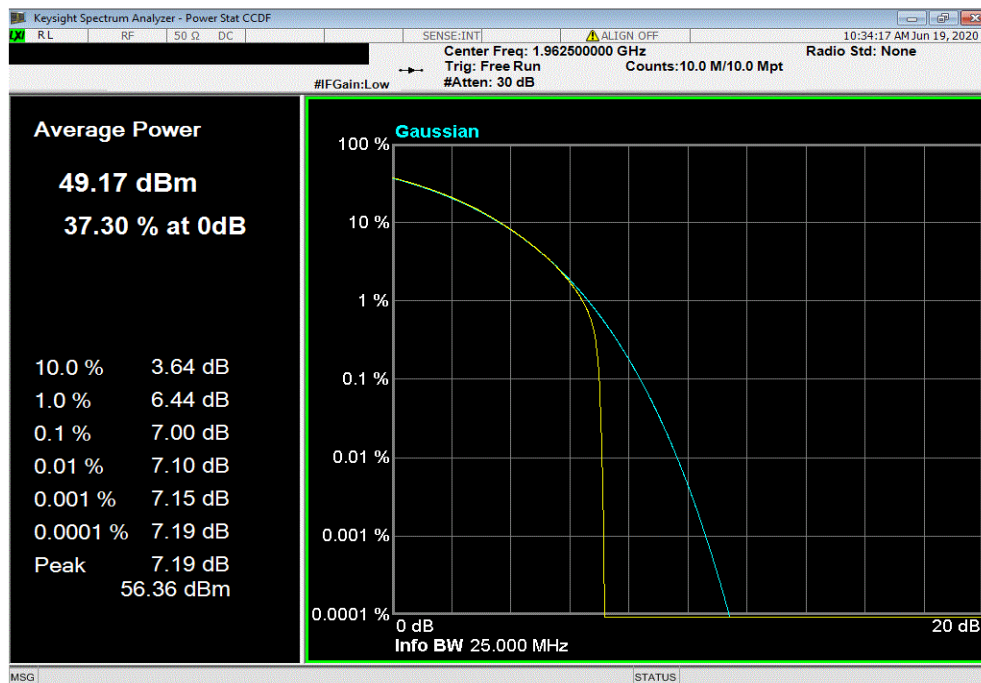


TMTx 2020.06.08.0 BETA XMI 2020.03.25.0

Port 4, Band n25, 1930 MHz - 1995 MHz, 20 MHz Bandwidth, QPSK Modulation, Low Channel 1940 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.28	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz, 20 MHz Bandwidth, QPSK Modulation, Mid Channel 1962.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7	13	Pass

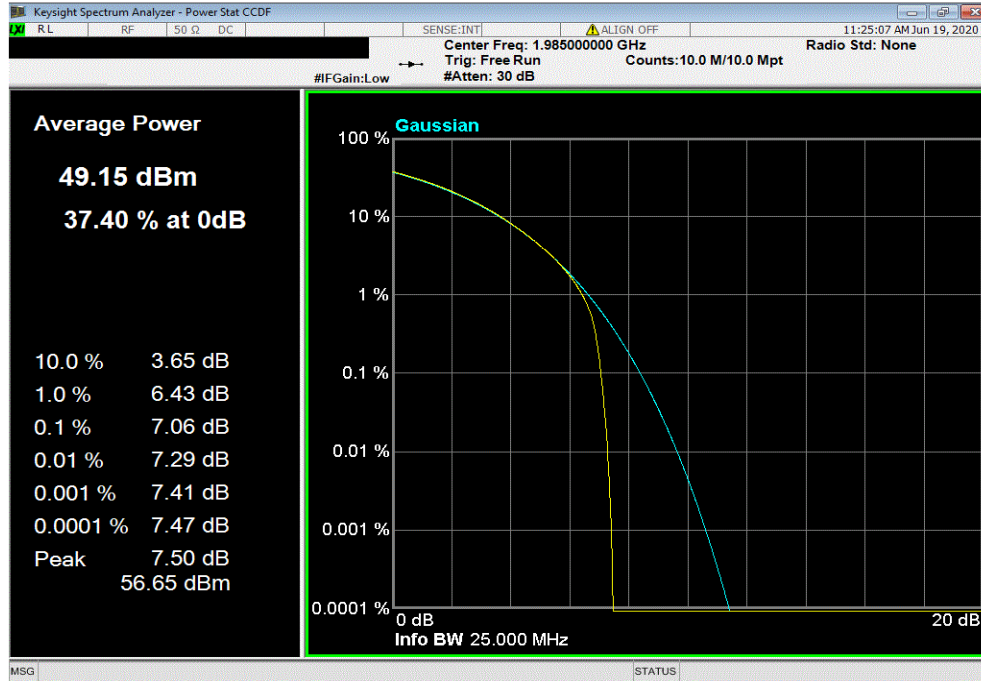


PEAK TO AVERAGE POWER (PAPR) - BAND n25

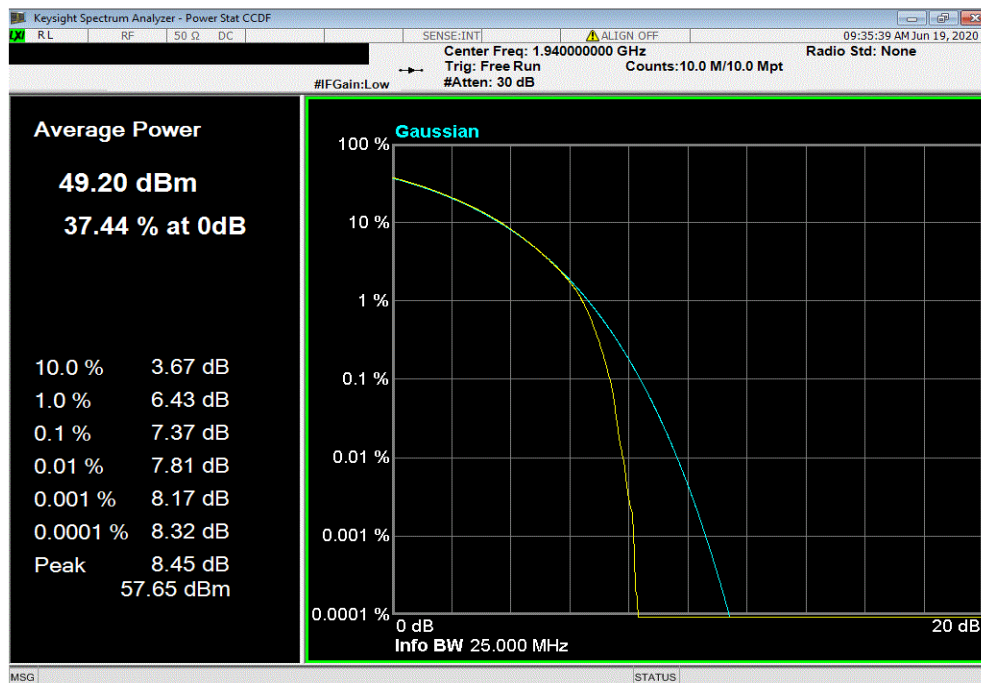


TMTx 2020.06.08.0 BETA XMt 2020.03.25.0

Port 4, Band n25, 1930 MHz - 1995 MHz, 20 MHz Bandwidth, QPSK Modulation, High Channel 1985 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.06	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz, 20 MHz Bandwidth, 16-QAM Modulation, Low Channel 1940 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.37	13	Pass

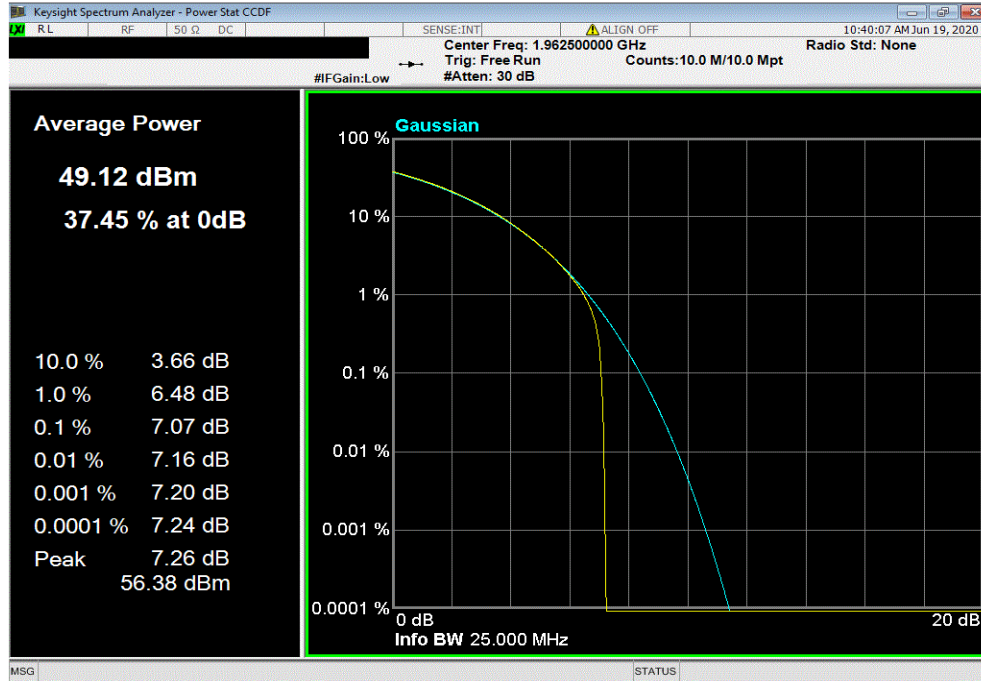


PEAK TO AVERAGE POWER (PAPR) - BAND n25

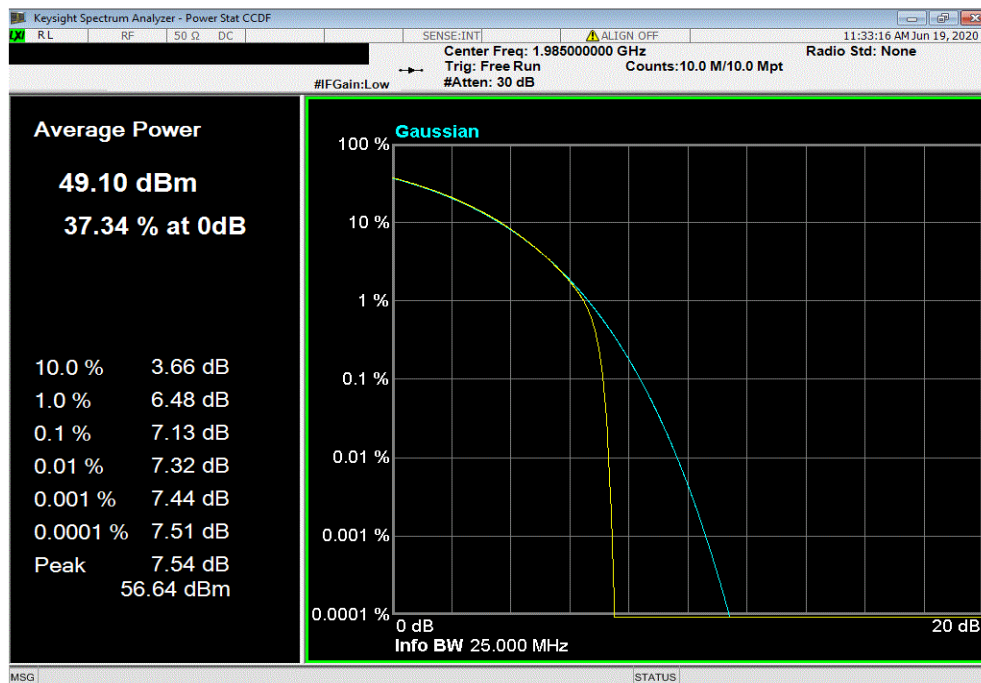


TMTx 2020.06.08.0 BETA XMt 2020.03.25.0

Port 4, Band n25, 1930 MHz - 1995 MHz , 20 MHz Bandwidth, 16-QAM Modulation , Mid Channel 1962.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.07	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz , 20 MHz Bandwidth, 16-QAM Modulation , High Channel 1985 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.13	13	Pass

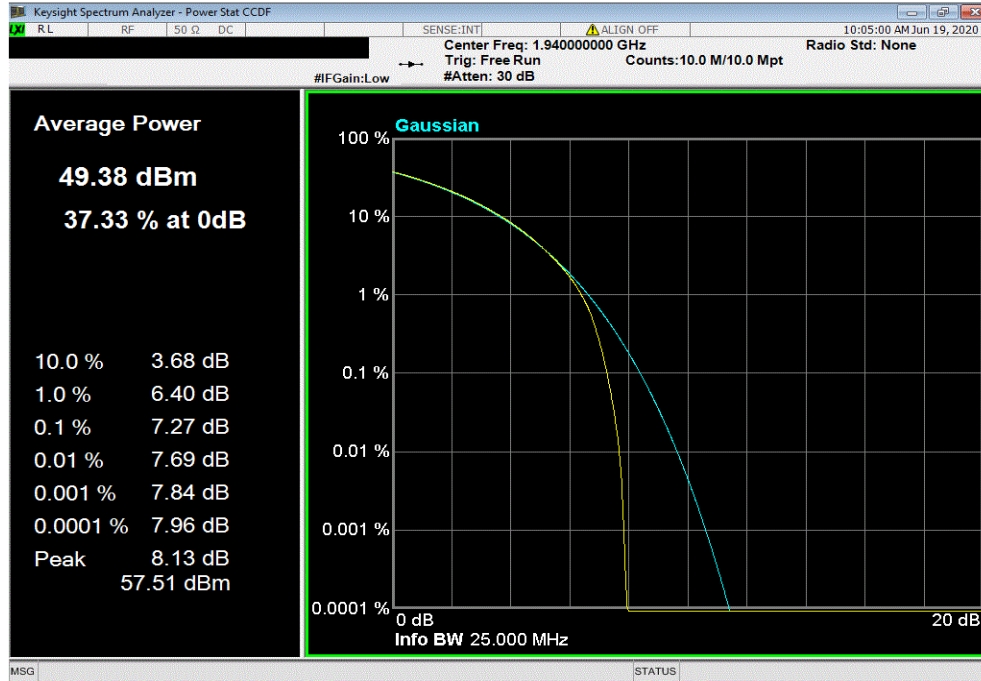


PEAK TO AVERAGE POWER (PAPR) - BAND n25

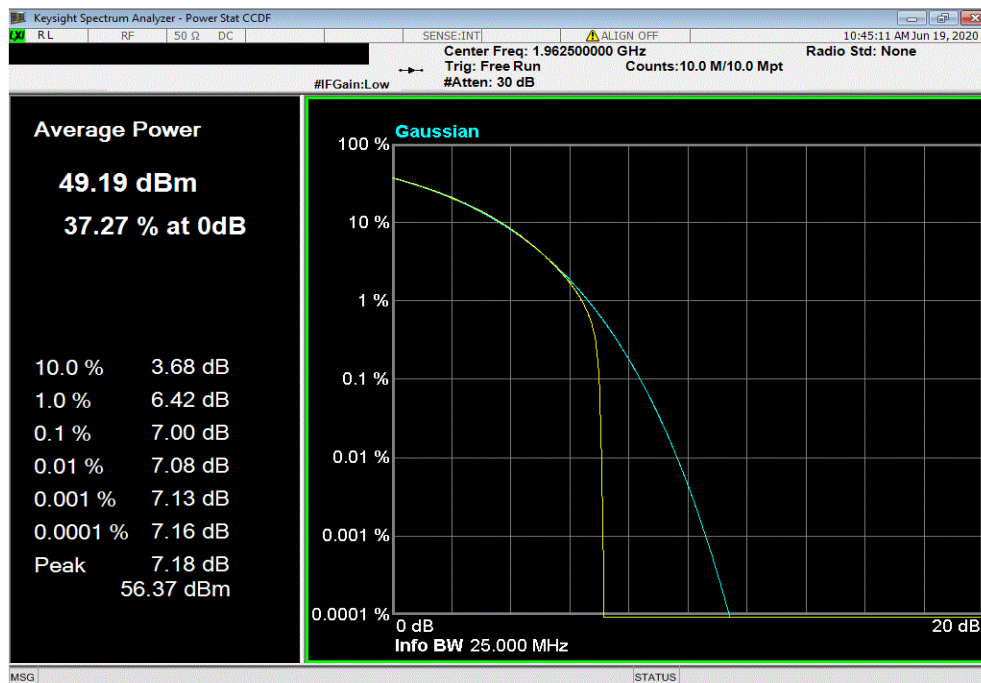


TMTx 2020.06.08.0 BETA XMI 2020.03.25.0

Port 4, Band n25, 1930 MHz - 1995 MHz , 20 MHz Bandwidth, 64-QAM Modulation, Low Channel 1940 MHz						
	PAPR Value (dB)	PAPR Limit (dB)	Results			
	7.27	13	Pass			



Port 4, Band n25, 1930 MHz - 1995 MHz , 20 MHz Bandwidth, 64-QAM Modulation, Mid Channel 1962.5 MHz						
	PAPR Value (dB)	PAPR Limit (dB)	Results			
	7	13	Pass			

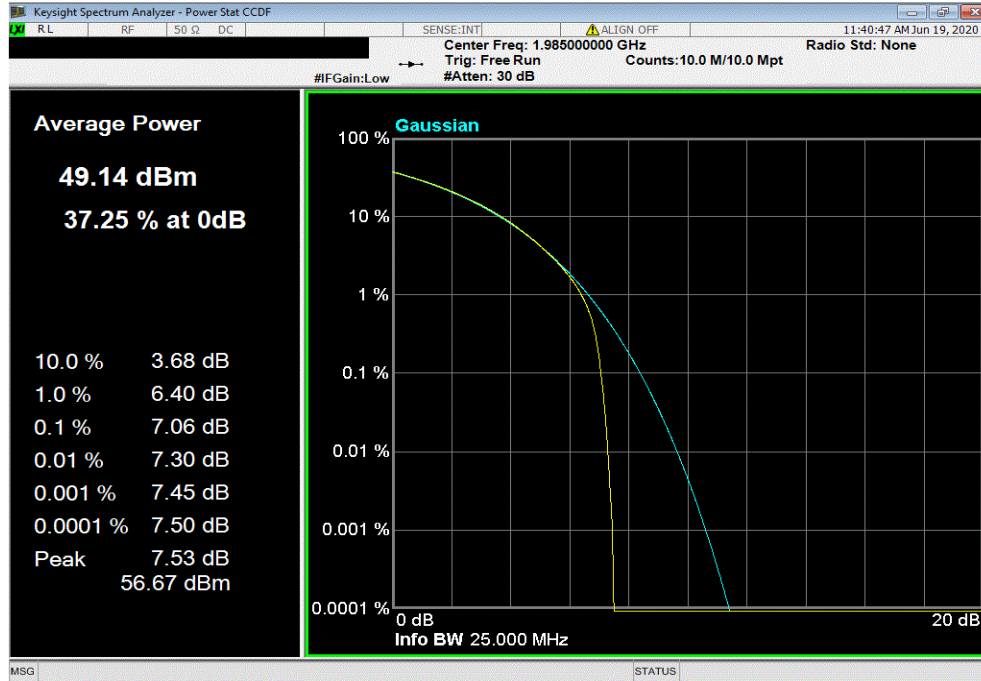


PEAK TO AVERAGE POWER (PAPR) - BAND n25

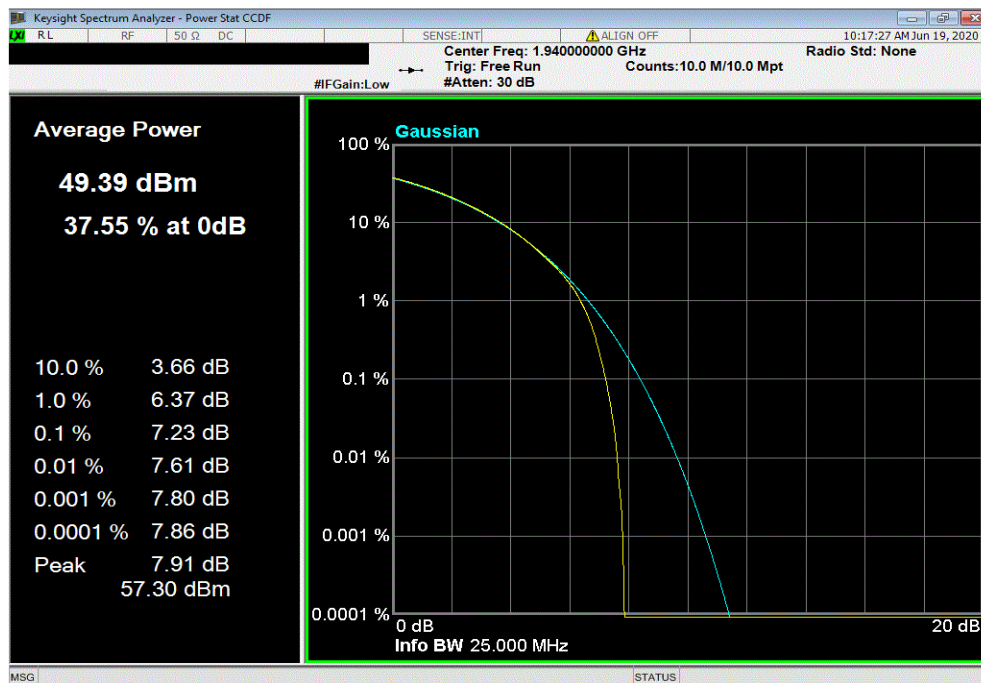


TMTx 2020.06.08.0 BETA XMt 2020.03.25.0

Port 4, Band n25, 1930 MHz - 1995 MHz , 20 MHz Bandwidth, 64-QAM Modulation, High Channel 1985 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.06	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz , 20 MHz Bandwidth, 256-QAM Modulation, Low Channel 1940 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.23	13	Pass

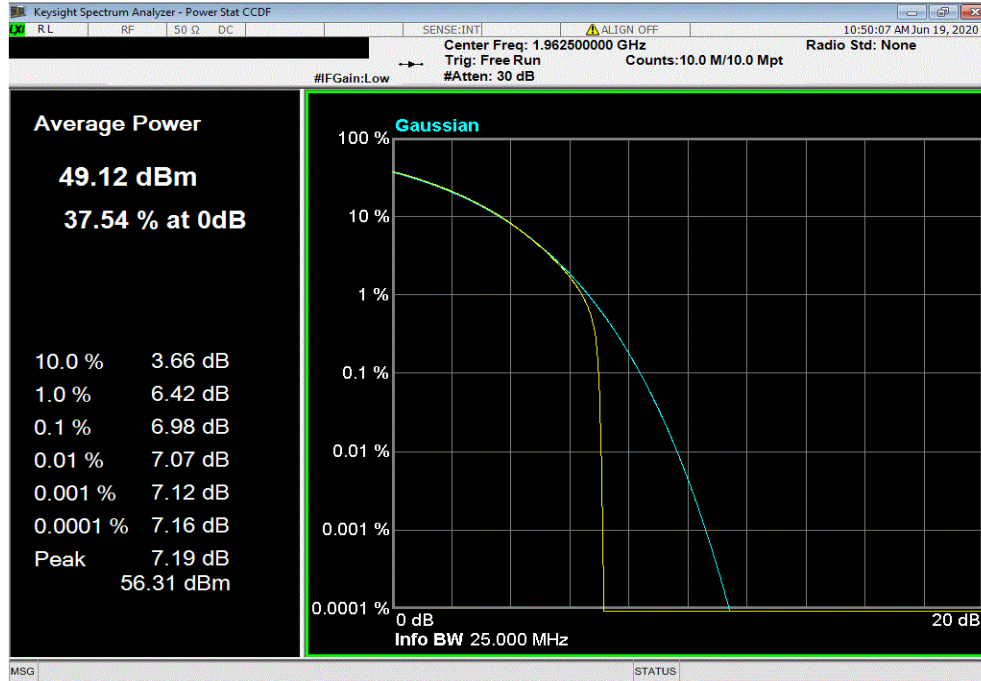


PEAK TO AVERAGE POWER (PAPR) - BAND n25



TMTx 2020.06.08.0 BETA XMt 2020.03.25.0

Port 4, Band n25, 1930 MHz - 1995 MHz, 20 MHz Bandwidth, 256-QAM Modulation, Mid Channel 1962.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				6.98	13	Pass



Port 4, Band n25, 1930 MHz - 1995 MHz, 20 MHz Bandwidth, 256-QAM Modulation, High Channel 1985 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.06	13	Pass

