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FCC Sub6 REPORT

Certification

Applicant Name:
SAMSUNG Electronics Co., Ltd.

Address:
129, Samsung-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Date of Issue:
May 09, 2023

Location:
HCT CO., LTD.,
74, Seoicheon-ro 578beon-gil, Majang-myeon,
Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA

Report No.: HCT-RF-2305-FC020

FCC ID:	**A3LSMX818U**
APPLICANT:	**SAMSUNG Electronics Co., Ltd.**

Model(s):	SM-X818U
EUT Type:	Tablet
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§27, §2

The measurements shown in this report were made in accordance with the procedures specified in CFR47 section §2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.
HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	EIRP	
				Max. Power (W)	Max. Power (dBm)
Sub6 n7 (5)	2502.5 – 2567.5	4M54G7D	PI/2 BPSK	0.330	25.19
		4M55G7D	QPSK	0.328	25.16
		4M51W7D	16QAM	0.258	24.11
		4M51W7D	64QAM	0.192	22.83
		4M51W7D	256QAM	0.155	21.91
Sub6 n7 (10)	2505.0 – 2565.0	9M00G7D	PI/2 BPSK	0.365	25.62
		8M99G7D	QPSK	0.362	25.59
		8M98W7D	16QAM	0.287	24.58
		8M99W7D	64QAM	0.212	23.27
		8M95W7D	256QAM	0.114	20.55
Sub6 n7 (15)	2507.5 – 2562.5	13M5G7D	PI/2 BPSK	0.383	25.83
		13M5G7D	QPSK	0.378	25.78
		13M5W7D	16QAM	0.296	24.72
		13M5W7D	64QAM	0.219	23.41
		13M5W7D	256QAM	0.122	20.85
Sub6 n7 (20)	2510.0 – 2560.0	17M9G7D	PI/2 BPSK	0.384	25.84
		18M0G7D	QPSK	0.381	25.81
		17M9W7D	16QAM	0.316	25.00
		17M9W7D	64QAM	0.205	23.12
		17M9W7D	256QAM	0.122	20.88
Sub6 n7 (25)	2512.5 – 2557.5	22M9G7D	PI/2 BPSK	0.389	25.90
		22M9G7D	QPSK	0.385	25.85
		22M9W7D	16QAM	0.306	24.86
		22M9W7D	64QAM	0.226	23.55
		22M9W7D	256QAM	0.128	21.08
Sub6 n7 (30)	2515.0 – 2555.0	28M7G7D	PI/2 BPSK	0.393	25.94
		28M6G7D	QPSK	0.379	25.79
		28M6W7D	16QAM	0.302	24.80
		28M6W7D	64QAM	0.220	23.43
		28M6W7D	256QAM	0.120	20.79
Sub6 n7 (40)	2520.0 – 2550.0	38M7G7D	PI/2 BPSK	0.368	25.66
		38M7G7D	QPSK	0.361	25.57
		38M6W7D	16QAM	0.286	24.57
		38M6W7D	64QAM	0.212	23.26
		38M6W7D	256QAM	0.113	20.53

REVIEWED BY

Report prepared by : Jae Ryang Do
Engineer of Telecommunication Testing Center

Report approved by : Jong Seok Lee
Manager of Telecommunication Testing Center

This test results were applied only to the test methods required by the standard.

This laboratory is not accredited for the test results marked *.
The above Test Report is the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme), which signed the ILAC-MRA. (HCT Accreditation No.: KT197)

* The report shall not be reproduced except in full(only partly) without approval of the laboratory.

Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-2305-FC020	May 09, 2023	- First Approval Report

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.

Table of Contents

MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	SAMSUNG Electronics Co., Ltd.
Address:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID:	A3LSMX818U
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§27, §2
EUT Type:	Tablet
Model(s):	SM-X818U
SCS(kHz):	15
Bandwidth(MHz):	5, 10, 15, 20, 25, 30, 40
Waveform:	CP-OFDM, DFT-S-OFDM
Modulation:	DFT-S-OFDM: PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM CP-OFDM: QPSK, 16QAM, 64QAM, 256QAM
Tx Frequency:	2502.5 MHz – 2567.5 MHz (Sub6 n7(5 MHz)) 2505.0 MHz – 2565.0 MHz (Sub6 n7(10 MHz)) 2507.5 MHz – 2562.5 MHz (Sub6 n7(15 MHz)) 2510.0 MHz – 2560.0 MHz (Sub6 n7(20 MHz)) 2512.5 MHz – 2557.5 MHz (Sub6 n7(25 MHz)) 2515.0 MHz – 2555.0 MHz (Sub6 n7(30 MHz)) 2520.0 MHz – 2550.0 MHz (Sub6 n7(40 MHz))
Date(s) of Tests:	March 15, 2023 ~ May 07, 2023
Serial number:	Radiated: R32W2003H2Z Conducted: R32W2003GWK

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Tablet with UMTS and LTE, Sub6.

It also supports IEEE 802.11 a/b/g/n/ac/ax (20/40/80/160 MHz),WIFI 6E AIT, Keyboard, S-pen, mmWave.

2.2. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

2.3. TEST FACILITY

The Fully-anechoic chamber and conducted measurement facility used to collect the radiated data are located at the **74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA.**

3. DESCRIPTION OF TESTS

3.1 TEST PROCEDURE

Test Description	Test Procedure Used
Occupied Bandwidth	- KDB 971168 D01 v03r01 – Section 4.3 - ANSI C63.26-2015 – Section 5.4.4
Channel Edge	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Spurious and Harmonic Emissions at Antenna Terminal	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Conducted Output Power	- N/A (See SAR Report)
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4 - ANSI C63.26-2015 – Section 5.2.6(only GSM)
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Effective Radiated Power/ Effective Isotropic Radiated Power	- KDB 971168 D01 v03r01 – Section 5.2 & 5.8 - ANSI/TIA-603-E-2016 – Section 2.2.17
Radiated Spurious and Harmonic Emissions	- KDB 971168 D01 v03r01 – Section 6.2 - ANSI/TIA-603-E-2016 – Section 2.2.12

3.2 RADIATED POWER

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

The equipment under test is placed on a non-conductive table 3-meters away from the receive antenna in accordance with ANSI/TIA-603-E-2016 Clause 2.2.17.

Test Settings

1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
2. RBW = 1 – 5 % of the expected OBW, not to exceed 1 MHz
3. VBW ≥ 3 x RBW
4. Span = 1.5 times the OBW
5. No. of sweep points > 2 x span / RBW
6. Detector = RMS
7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".
8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.
9. Trace mode = trace averaging (RMS) over 100 sweeps
10. The trace was allowed to stabilize

Test Note

1. The turntable is rotated through 360 degrees, and the receiving antenna scans in order to determine the level of the maximized emission.
2. A half wave dipole is then substituted in place of the EUT. For emissions above 1 GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.

   The power is calculated by the following formula;

$$P_{d\ (dBm)} = Pg_{\ (dBm)} - \text{cable loss}_{\ (dB)} + \text{antenna gain}_{\ (dB)}$$

   Where: P_{d} is the dipole equivalent power and P_{g} is the generator output power into the substitution antenna.

3. The maximum value is calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps are repeated with the receiving antenna in both vertical and horizontal polarization. the difference between the gain of the horn and an isotropic antenna are taken into consideration
4. The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
5. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

3.3 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

Radiated Spurious Emission Measurements at 3 meters by Substitution Method according to ANSI/TIA-603-E-2016.

Test Settings

1. RBW = 100 kHz for emissions below 1 GHz and 1 MHz for emissions above 1 GHz
2. VBW ≥ 3 x RBW
3. Span = 1.5 times the OBW
4. No. of sweep points > 2 x span / RBW
5. Detector = Peak
6. Trace mode = Max Hold
7. The trace was allowed to stabilize
8. Test channel : Low/ Middle/ High
9. Frequency range : We are performed all frequency to 10^{th} harmonics from 9 kHz.

Test Note

1. Measurements value show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
2. The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning. The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the test data
3. For spurious emissions above 1 GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.
   The spurious emissions is calculated by the following formula;

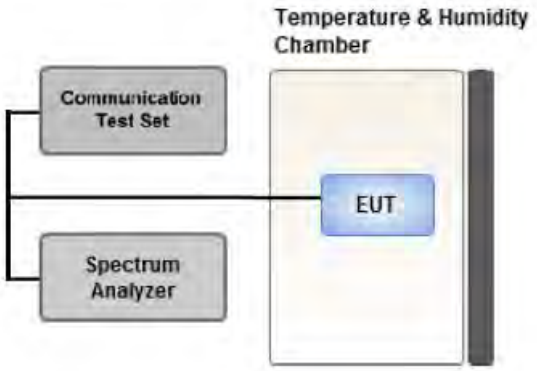
$$\text{Result}_{(dBm)} = \text{Pg}_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

   Where: P_g is the generator output power into the substitution antenna.

   If the fundamental frequency is below 1 GHz, RF output power has been converted to EIRP.

$$\text{EIRP}_{(dBm)} = \text{ERP}_{(dBm)} + 2.15$$

3.4 PEAK- TO- AVERAGE RATIO



Test setup

① CCDF Procedure for PAPR

Test Settings

1. Set resolution/measurement bandwidth ≥ signal's occupied bandwidth;
2. Set the number of counts to a value that stabilizes the measured CCDF curve;
3. Set the measurement interval as follows:
   .- for continuous transmissions, set to 1 ms,
   .- or burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.
4. Record the maximum PAPR level associated with a probability of 0.1 %.

② **Alternate Procedure for PAPR**

Use one of the procedures presented in 5.2(ANSI C63.26-2015) to measure the total peak power and record as as P_{Pk}. Use one of the applicable procedures presented 5.2(ANSI C63.26-2015) to measure the total average power and record as P_{Avg}. Determine the P.A.R. from:

$$P.A.R_{(dB)} = P_{Pk\,(dBm)} - P_{Avg\,(dBm)}\ (P_{Avg} = \text{Average Power} + \text{Duty cycle Factor})$$

Test Settings(Peak Power)

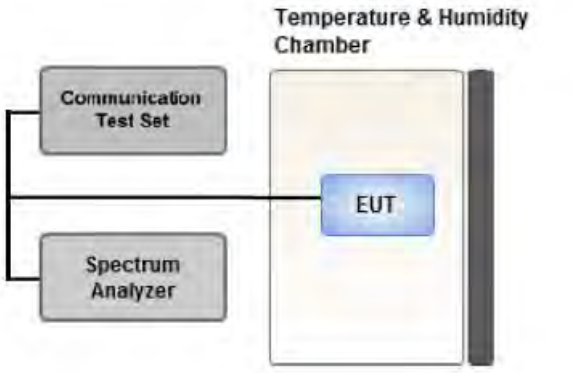
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW ≥ 3 × RBW.

1. Set the RBW ≥ OBW.
2. Set VBW ≥ 3 × RBW.
3. Set span ≥ 2 × OBW.
4. Sweep time ≥ 10 × (number of points in sweep) × (transmission symbol period).
5. Detector = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the peak amplitude level.

Test Settings(Average Power)

1. Set span to 2 × to 3 × the OBW.
2. Set RBW ≥ OBW.
3. Set VBW ≥ 3 × RBW.
4. Set number of measurement points in sweep ≥ 2 × span / RBW.
5. Sweep time:
   Set ≥ [10 × (number of points in sweep) × (transmission period)] for single sweep (automation-compatible) measurement. The transmission period is the (on + off) time.
6. Detector = power averaging (rms).
7. Set sweep trigger to “free run.”
8. Trace average at least 100 traces in power averaging (rms) mode if sweep is set to auto-couple. (To accurately determine the average power over the on and off period of the transmitter, it can be necessary to increase the number of traces to be averaged above 100 or, if using a manually configured sweep time, increase the sweep time.)
9. Use the peak marker function to determine the maximum amplitude level.
10. Add [10 log (1/duty cycle)] to the measured maximum power level to compute the average power during continuous transmission. For example, add [10 log (1/0.25)] = 6 dB if the duty cycle is a constant 25 %.

3.5 OCCUPIED BANDWIDTH.



Test setup

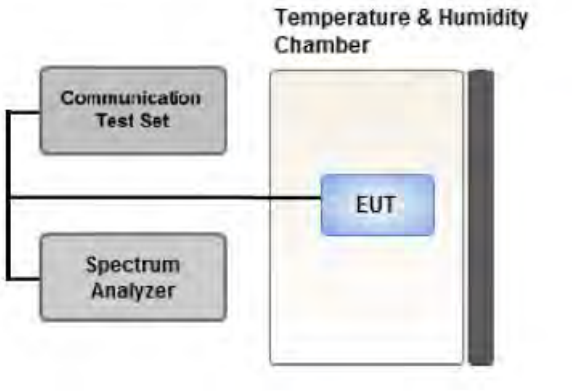
The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

The EUT makes a call to the communication simulator.
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99 % occupied bandwidth and the 26 dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5 % of the expected OBW
3. VBW ≥ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5 % of the 99 % occupied bandwidth observed in Step 7

3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

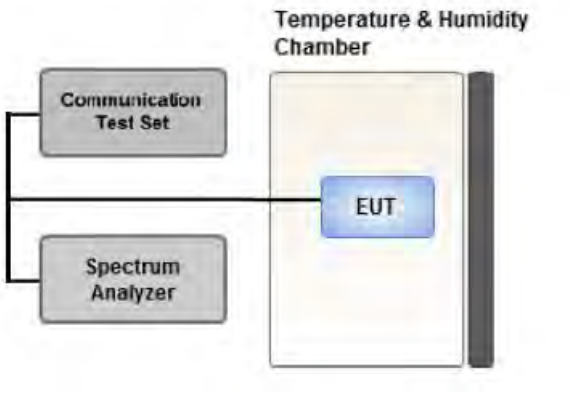
Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Settings

1. RBW = 1 MHz
2. VBW ≥ 3 MHz
3. Detector = RMS
4. Trace Mode = Average
5. Sweep time = auto
6. Number of points in sweep ≥ 2 x Span / RBW

3.7 CHANNEL EDGE



Test setup

Test Overview

All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum power and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Settings

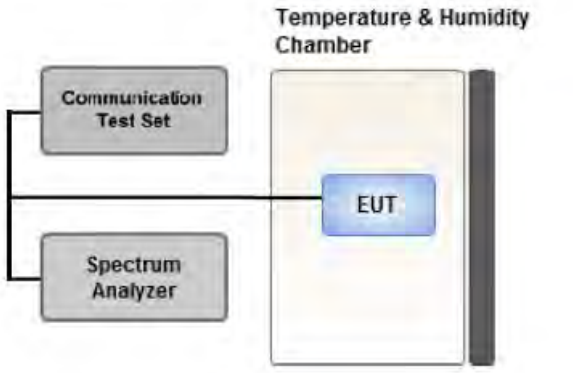
1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. Within 1MHz of the channel edge the RBW should be 2% of EBW, then 1 MHz after that.
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Notes

1. 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,
2. 43 + 10 log (P) dB on all frequencies between 5 megahertz and X megahertz from the channel edge.
3. 55 + 10 log (P) dB on all frequencies more than X megahertz from the channel edge.
4. The attenuation factor shall not be less that 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz.
5. 55 + 10 log (P) dB at or below 2490.5 MHz.
6. X is the greater of 6MHz or the actual emission bandwidth
7. The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer

Where Margin < 1 dB the emission level is either corrected by 10 log(1 MHz/ RB) or the emission is integrated over a 1 MHz bandwidth to determine the final result. When using the integration method the integration window is either centered on the emission or, for emissions at the band edge, centered by an offset of 500 kHz from the block edge so that the integration window is the 1 MHz adjacent to the block edge.

3.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE



Test setup

Test Overview

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015.

The frequency stability of the transmitter is measured by:

1. Temperature:

   The temperature is varied from -30 °C to +50 °C in 10 °C increments using an environmental chamber.

2. Primary Supply Voltage:

   .- Unless otherwise specified, vary primary supply voltage from 85 % to 115 % of the nominal value for other than hand carried battery equipment.

   .- For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.

Test Settings

1. The carrier frequency of the transmitter is measured at room temperature (20 °C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10 °C intervals ranging from -30 °C to +50 °C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

3.9 WORST CASE(RADIATED TEST)

- Waveform : All Waveform of operation were investigated and the worst case configuration results are reported.
  (Worst case: DFT-S-OFDM)
- The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
- All modes of operation were investigated and the worst case configuration results are reported.

Mode : Stand alone, Stand alone + External accessories (Earphone, AC adapter, etc)

Worst case : Stand alone

Mode : NSA, SA

Worst case: SA

We were performed the RSE test in condition of co-location.

Mode : Stand alone, Simultaneous transmission scenarios

Worst case : Stand alone

- Radiated Spurious emissions are measured while operating in EN-DC mode with Sub 6 NR carrier as well as an LTE carrier (anchor).
  All EN-DC mode of operation were investigated and the worst case configuration results are reported.
  (Worst case: 2A-n7A (10 MHz))
- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported.
  Please refer to the table below.

[Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective Isotropic Radiated Power	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	See Section 8.1		X
Radiated Spurious and Harmonic Emissions	PI/2 BPSK	See Section 8.2		Z

3.10 WORST CASE(CONDUCTED TEST)

- Waveform : All Waveform of operation were investigated and the worst case configuration results are reported.
  (Worst case: DFT-S-OFDM)
- Modulation : All Modulation of operation were investigated and the worst case configuration results are reported.
  (Worst case: PI/2 BPSK)
- All modes of operation were investigated and the worst case configuration results are reported.
  Mode : NSA, SA
  Worst case: SA
- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported.
  Please refer to the table below.

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
Occupied Bandwidth Peak- to- Average Ratio	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	5, 10, 15, 20, 25, 30, 40	Mid	Full RB	0
Channel Edge	PI/2 BPSK	5	Low	1	0
			High	1	24
		10	Low	1	0
			High	1	51
		15	Low	1	0
			High	1	78
		20	Low	1	0
			High	1	105
		25	Low	1	0
			High	1	132
		30	Low	1	0
			High	1	159
		40	Low	1	0
			High	1	215
		5, 10, 15, 20, 25, 30, 40	Low, High	Full RB	0
Spurious and Harmonic Emissions at Antenna Terminal	PI/2 BPSK	5, 10, 15, 20, 25, 30, 40	Low, Mid, High	1	1

4. LIST OF TEST EQUIPMENT

Equipment	Model	Manufacture	Serial No.	Due to Calibration	Calibration Interval
Precision Dipole Antenna	UHAP	Schwarzbeck	01273	03/27/2024	Biennial
Precision Dipole Antenna	UHAP	Schwarzbeck	01274	03/27/2024	Biennial
Horn Antenna(1~18 GHz)	BBHA 9120D	Schwarzbeck	02289	03/21/2024	Biennial
Horn Antenna(1~18 GHz)	BBHA 9120D	Schwarzbeck	9120D-1299	04/27/2025	Biennial
Horn Antenna(15~40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Horn Antenna(15~40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	03/28/2025	Biennial
Loop Antenna(9 kHz~30 MHz)	FMZB1513	Rohde & Schwarz	1513-175	06/04/2023	Biennial
Bilog Antenna	VULB9160	Schwarzbeck	3150	03/09/2025	Biennial
Hybrid Antenna	VULB9160	Schwarzbeck	760	02/24/2025	Biennial
High Pass Filter	WHKX10-900-1000-15000-40SS	Wainwright Instruments	15	05/18/2023	Annual
High Pass Filter	WHKX10-2700-3000-18000-40SS	Wainwright Instruments	145	05/18/2023	Annual
High Pass Filter	WHNX6-4740-6000-26500-40CC	Wainwright Instruments	11	05/18/2023	Annual
LOW NOISE AMP (100 MHz ~ 18 GHz)	CBLU1183540B-01	CERNEX	26822	05/18/2023	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/01/2023	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/02/2024	Annual
DC Power Supply	E3632A	Hewlett Packard	MY40004427	09/05/2023	Annual
Power Splitter(DC~26.5 GHz)	11667B	Hewlett Packard	11275	03/02/2024	Annual
Chamber	SU-642	ESPEC	93008124	02/22/2024	Annual
Signal Analyzer(10 Hz~26.5 GHz)	N9020A	Agilent	MY51110063	04/11/2024	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	04/19/2024	Annual
Spectrum Analyzer(10 Hz~40 GHz)	FSV40	REOHDE & SCHWARZ	101436	02/22/2024	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/18/2023	Annual
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262287700	05/19/2023	Annual
Wideband Radio Communication Tester	MT8000A	Anritsu Corp.	6262302511	05/18/2023	Annual
SIGNAL GENERATOR (100 kHz~40 GHz)	SMB100A	REOHDE & SCHWARZ	177633	07/05/2023	Annual
Signal Analyzer(5 Hz~40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/30/2023	Annual
4-Way Divider	ZC4PD-K1844+	Mini-Circuits	942907	09/27/2023	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	-

Note:

1. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
2. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).

5. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4:2014. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Expanded Uncertainty (±dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.90 (Confidence level about 95 %, k=2)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.14 (Confidence level about 95 %, k=2)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.82 (Confidence level about 95 %, k=2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.74 (Confidence level about 95 %, k=2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.76 (Confidence level about 95 %, k=2)
Radiated Disturbance (Above 40 GHz)	5.52 (Confidence level about 95 %, k=2)

6. SUMMARY OF TEST RESULTS

6.1 Test Condition : Conducted Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Occupied Bandwidth	§2.1049	N/A	PASS
Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	§2.1051, §27.53(m)(4)	■ < 40 + 10log10 (P[Watts]) at Channel edges ■ < 43 + 10log10 (P[Watts]) between 5 and X MHz from Channel edges ■ < 55 + 10log10 (P[Watts]) beyond X MHz beyond from Channel edges ■ < 43 + 10 log (P) dB on all frequencies between 2490.5 MHz and 2496 MHz	PASS
Conducted Output Power	§2.1046	N/A	See Note1
Frequency stability / variation of ambient temperature	§2.1055, §27.54	Emission must remain in band	PASS

Note:

1. See SAR Report

2. All conducted tests were tested using 5G Wireless Tester.

6.2 Test Condition : Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Equivalent Isotropic Radiated Power	§27.50(h)(2)	< 2 Watts max. EIRP	PASS
Radiated Spurious and Harmonic Emissions	§2.1053, §27.53(m)(4)	< 55 + 10log10 (P[Watts])	PASS

Note:

1. Radiated tests were tested using 5G Wireless Tester.

7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

Ch./ Freq.		Measured Level(dBm)	Substitute Level(dBm)	Ant. Gain (dBd)	C.L	Pol.	ERP	
channel	Freq.(MHz)						W	dBm
128	824.20	-21.37	38.40	-10.61	0.95	H	0.483	26.84

ERP = Substitute LEVEL(dBm) + Ant. Gain – CL(Cable Loss)

1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.

2) During the test , the turn table is rotated until the maximum signal is found.

3) Record the field strength meter's level.

4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.

5) Increase the signal generator output till the field strength meter's level is equal to the item (3).

6) The signal generator output level with Ant. Gain and cable loss are the rating of effective radiated power.

7.2 EIRP Sample Calculation

Ch./ Freq.		Measured Level(dBm)	Substitute Level(dBm)	Ant. Gain (dBi)	C.L	Pol.	EIRP	
channel	Freq.(MHz)						W	dBm
20175	1,732.50	-15.75	18.45	9.90	1.76	H	0.456	26.59

EIRP = Substitute LEVEL(dBm) + Ant. Gain – CL(Cable Loss)

1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.

2) During the test , the turn table is rotated until the maximum signal is found.

3) Record the field strength meter's level.

4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.

5) Increase the signal generator output till the field strength meter's level is equal to the item (3).

6) The signal generator output level with Ant. Gain and cable loss are the rating of equivalent isotropic radiated power.

7.3. Emission Designator

GSM Emission Designator

Emission Designator = 249KGXW

GSM BW = 249 kHz

G = Phase Modulation

X = Cases not otherwise covered

W = Combination (Audio/Data)

EDGE Emission Designator

Emission Designator = 249KG7W

GSM BW = 249 kHz

G = Phase Modulation

7 = Quantized/Digital Info

W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M17F9W

WCDMA BW = 4.17 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

QPSK Modulation

Emission Designator = 4M48G7D

LTE BW = 4.48 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

QAM Modulation

Emission Designator = 4M48W7D

LTE BW = 4.48 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission; telemetry; telecommand

8. TEST DATA

8.1 EQUIVALENT ISOTROPIC RADIATED POWER

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
2502.5	Sub6 n7/ 5 MHz [15 kHz]	PI/2 BPSK	-19.70	16.94	10.30	2.47	H	< 2.00	0.300	24.77	1	23
		QPSK	-19.73	16.91	10.30	2.47	H		0.298	24.74		
		16-QAM	-20.73	15.91	10.30	2.47	H		0.237	23.74		
		64-QAM	-22.07	14.57	10.30	2.47	H		0.174	22.40		
		256-QAM	-22.56	14.08	10.30	2.47	H		0.155	21.91		
2535.0		PI/2 BPSK	-18.84	17.41	10.30	2.52	H		0.330	25.19	1	12
		QPSK	-18.87	17.38	10.30	2.52	H		0.328	25.16		
		16-QAM	-19.92	16.33	10.30	2.52	H		0.258	24.11		
		64-QAM	-21.20	15.05	10.30	2.52	H		0.192	22.83		
		256-QAM	-23.82	12.43	10.30	2.52	H		0.105	20.21		
2567.5		PI/2 BPSK	-20.01	16.53	10.20	2.60	H		0.259	24.13	1	1
		QPSK	-20.10	16.44	10.20	2.60	H		0.254	24.04		
		16-QAM	-21.11	15.43	10.20	2.60	H		0.201	23.03		
		64-QAM	-22.40	14.14	10.20	2.60	H		0.149	21.74		
		256-QAM	-25.25	11.29	10.20	2.60	H		0.077	18.89		

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
2505.0	Sub6 n7/ 10 MHz [15 kHz]	PI/2 BPSK	-18.85	17.79	10.30	2.49	H	< 2.00	0.363	25.60	1	50
		QPSK	-18.99	17.65	10.30	2.49	H		0.352	25.46		
		16-QAM	-20.00	16.64	10.30	2.49	H		0.279	24.45		
		64-QAM	-21.30	15.34	10.30	2.49	H		0.207	23.15		
		256-QAM	-24.06	12.58	10.30	2.49	H		0.109	20.39		
2535.0		PI/2 BPSK	-18.41	17.84	10.30	2.52	H		0.365	25.62	1	26
		QPSK	-18.44	17.81	10.30	2.52	H		0.362	25.59		
		16-QAM	-19.45	16.80	10.30	2.52	H		0.287	24.58		
		64-QAM	-20.76	15.49	10.30	2.52	H		0.212	23.27		
		256-QAM	-23.48	12.77	10.30	2.52	H		0.114	20.55		
2565.0		PI/2 BPSK	-19.87	16.87	10.20	2.60	H		0.280	24.47	1	26
		QPSK	-19.90	16.84	10.20	2.60	H		0.278	24.44		
		16-QAM	-20.85	15.89	10.20	2.60	H		0.223	23.49		
		64-QAM	-22.27	14.47	10.20	2.60	H		0.161	22.07		
		256-QAM	-24.91	11.83	10.20	2.60	H		0.088	19.43		

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
2507.5	Sub6 n7/ 15 MHz [15 kHz]	PI/2 BPSK	-18.59	18.03	10.30	2.50	H	< 2.00	0.383	25.83	1	77
		QPSK	-18.64	17.98	10.30	2.50	H		0.378	25.78		
		16-QAM	-19.70	16.92	10.30	2.50	H		0.296	24.72		
		64-QAM	-21.01	15.61	10.30	2.50	H		0.219	23.41		
		256-QAM	-23.57	13.05	10.30	2.50	H		0.122	20.85		
2535.0		PI/2 BPSK	-18.50	17.75	10.30	2.52	H		0.357	25.53	1	38
		QPSK	-18.55	17.70	10.30	2.52	H		0.353	25.48		
		16-QAM	-19.55	16.70	10.30	2.52	H		0.281	24.48		
		64-QAM	-20.92	15.33	10.30	2.52	H		0.205	23.11		
		256-QAM	-23.58	12.67	10.30	2.52	H		0.111	20.45		
2562.5		PI/2 BPSK	-19.62	17.31	10.20	2.59	H		0.310	24.92	1	1
		QPSK	-19.70	17.23	10.20	2.59	H		0.305	24.84		
		16-QAM	-20.69	16.24	10.20	2.59	H		0.243	23.85		
		64-QAM	-22.09	14.84	10.20	2.59	H		0.176	22.45		
		256-QAM	-24.73	12.20	10.20	2.59	H		0.096	19.81		

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
2510.0	Sub6 n7/ 20 MHz [15 kHz]	PI/2 BPSK	-18.58	18.04	10.30	2.50	H	< 2.00	0.384	25.84	1	104
		QPSK	-18.61	18.01	10.30	2.50	H		0.381	25.81		
		16-QAM	-19.42	17.20	10.30	2.50	H		0.316	25.00		
		64-QAM	-21.49	15.13	10.30	2.50	H		0.196	22.93		
		256-QAM	-23.54	13.08	10.30	2.50	H		0.122	20.88		
2535.0		PI/2 BPSK	-18.52	17.73	10.30	2.52	H		0.356	25.51	1	53
		QPSK	-18.66	17.59	10.30	2.52	H		0.344	25.37		
		16-QAM	-19.63	16.62	10.30	2.52	H		0.275	24.40		
		64-QAM	-20.91	15.34	10.30	2.52	H		0.205	23.12		
		256-QAM	-23.81	12.44	10.30	2.52	H		0.105	20.22		
2560.0		PI/2 BPSK	-19.47	17.46	10.20	2.59	H		0.321	25.07	1	1
		QPSK	-19.50	17.43	10.20	2.59	H		0.319	25.04		
		16-QAM	-20.36	16.57	10.20	2.59	H		0.262	24.18		
		64-QAM	-22.36	14.57	10.20	2.59	H		0.165	22.18		
		256-QAM	-24.51	12.42	10.20	2.59	H		0.101	20.03		

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
2512.5	Sub6 n7/ 25 MHz [15 kHz]	PI/2 BPSK	-18.52	18.10	10.30	2.50	H	< 2.00	0.389	25.90	1	131
		QPSK	-18.57	18.05	10.30	2.50	H		0.385	25.85		
		16-QAM	-19.56	17.06	10.30	2.50	H		0.306	24.86		
		64-QAM	-20.87	15.75	10.30	2.50	H		0.226	23.55		
		256-QAM	-23.34	13.28	10.30	2.50	H		0.128	21.08		
2535.0		PI/2 BPSK	-18.55	17.70	10.30	2.52	H		0.353	25.48	1	66
		QPSK	-18.65	17.60	10.30	2.52	H		0.345	25.38		
		16-QAM	-19.33	16.92	10.30	2.52	H		0.295	24.70		
		64-QAM	-21.40	14.85	10.30	2.52	H		0.183	22.63		
		256-QAM	-23.61	12.64	10.30	2.52	H		0.110	20.42		
2557.5		PI/2 BPSK	-19.62	17.31	10.20	2.59	H		0.310	24.92	1	1
		QPSK	-19.65	17.28	10.20	2.59	H		0.308	24.89		
		16-QAM	-20.63	16.30	10.20	2.59	H		0.246	23.91		
		64-QAM	-21.84	15.09	10.20	2.59	H		0.186	22.70		
		256-QAM	-24.13	12.80	10.20	2.59	H		0.110	20.41		

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
2515.0	Sub6 n7/ 30 MHz [15 kHz]	PI/2 BPSK	-18.34	18.16	10.30	2.52	H	< 2.00	0.393	25.94	1	158
		QPSK	-18.49	18.01	10.30	2.52	H		0.379	25.79		
		16-QAM	-19.48	17.02	10.30	2.52	H		0.302	24.80		
		64-QAM	-20.85	15.65	10.30	2.52	H		0.220	23.43		
		256-QAM	-23.49	13.01	10.30	2.52	H		0.120	20.79		
2535.0		PI/2 BPSK	-18.41	17.84	10.30	2.52	H		0.365	25.62	1	80
		QPSK	-18.44	17.81	10.30	2.52	H		0.362	25.59		
		16-QAM	-19.45	16.80	10.30	2.52	H		0.287	24.58		
		64-QAM	-20.80	15.45	10.30	2.52	H		0.210	23.23		
		256-QAM	-23.52	12.73	10.30	2.52	H		0.112	20.51		
2555.0		PI/2 BPSK	-18.84	17.81	10.20	2.57	H		0.350	25.44	1	1
		QPSK	-18.92	17.73	10.20	2.57	H		0.344	25.36		
		16-QAM	-20.02	16.63	10.20	2.57	H		0.267	24.26		
		64-QAM	-21.30	15.35	10.20	2.57	H		0.199	22.98		
		256-QAM	-23.88	12.77	10.20	2.57	H		0.110	20.40		

Freq (MHz)	Mod/ Bandwidth [SCS (kHz)]	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	ERP		RB	
								W	W	dBm	Size	Offset
2520.0	Sub6 n7/ 40 MHz [15 kHz]	PI/2 BPSK	-18.48	17.89	10.30	2.53	H	< 2.00	0.368	25.66	1	108
		QPSK	-18.60	17.77	10.30	2.53	H		0.358	25.54		
		16-QAM	-19.57	16.80	10.30	2.53	H		0.286	24.57		
		64-QAM	-20.93	15.44	10.30	2.53	H		0.209	23.21		
		256-QAM	-23.63	12.74	10.30	2.53	H		0.112	20.51		
2535.0		PI/2 BPSK	-18.42	17.83	10.30	2.52	H		0.364	25.61	1	108
		QPSK	-18.46	17.79	10.30	2.52	H		0.361	25.57		
		16-QAM	-19.47	16.78	10.30	2.52	H		0.286	24.56		
		64-QAM	-20.77	15.48	10.30	2.52	H		0.212	23.26		
		256-QAM	-23.50	12.75	10.30	2.52	H		0.113	20.53		
2550.0		PI/2 BPSK	-19.03	17.34	10.20	2.55	H		0.316	24.99	1	1
		QPSK	-19.10	17.27	10.20	2.55	H		0.310	24.92		
		16-QAM	-20.02	16.35	10.20	2.55	H		0.251	24.00		
		64-QAM	-21.30	15.07	10.20	2.55	H		0.187	22.72		
		256-QAM	-24.01	12.36	10.20	2.55	H		0.100	20.01		

8.2 RADIATED SPURIOUS EMISSIONS

▣ NR Band: N7

▣ Bandwidth: 5 MHz

▣ Modulation: PI/2 BPSK

▣ Distance: 1 meters

▣ SCS: 15 kHz

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	RB	
									Size	Offset
500500 (2502.5)	5 005.00	-60.57	10.70	-61.85	3.61	V	-54.76	-25.00	1	23
	7 507.50	-54.63	11.10	-47.56	4.50	V	-40.96			
	10 010.00	-60.72	11.20	-52.58	5.27	H	-46.65			
	12 512.50	-59.53	12.10	-50.22	6.04	H	-44.16			
	15 015.00	-56.65	13.80	-50.14	6.65	H	-42.99			
507000 (2535.0)	5 070.00	-59.73	10.70	-61.01	3.62	V	-53.93		1	12
	7 605.00	-52.84	11.20	-45.83	4.53	H	-39.15			
	10 140.00	-59.93	11.10	-50.27	5.31	H	-44.48			
	12 675.00	-60.88	11.90	-51.02	6.06	V	-45.18			
	15 210.00	-57.78	14.40	-53.06	6.67	V	-45.33			
513500 (2567.5)	5 135.00	-57.50	10.80	-59.07	3.62	H	-51.88		1	1
	7 702.50	-52.94	11.00	-45.87	4.57	V	-39.44			
	10 270.00	-61.99	11.00	-51.19	5.35	V	-45.54			
	12 837.50	-61.15	11.80	-51.01	6.06	H	-45.27			
	15 405.00	-58.13	15.30	-52.22	6.75	V	-43.67			

▣ NR Band: N7

▣ Bandwidth: 10 MHz

▣ Modulation: PI/2 BPSK

▣ Distance: 1 meters

▣ SCS: 15 kHz

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	RB	
									Size	Offset
501000 (2505.0)	5 010.00	-61.39	10.70	-62.60	3.59	V	-55.49	-25.00	1	50
	7 515.00	-54.32	11.10	-47.21	4.51	V	-40.62			
	10 020.00	-62.47	11.20	-53.38	5.28	H	-47.46			
	12 525.00	-62.73	12.10	-52.85	6.02	V	-46.77			
	15 030.00	-58.39	13.80	-52.07	6.64	H	-44.91			
507000 (2535.0)	5 070.00	-60.66	10.70	-61.94	3.62	H	-54.86		1	26
	7 605.00	-51.77	11.20	-44.76	4.53	V	-38.08			
	10 140.00	-61.33	11.10	-51.67	5.31	H	-45.88			
	12 675.00	-62.09	11.90	-52.23	6.06	H	-46.39			
	15 210.00	-59.18	14.40	-54.46	6.67	V	-46.73			
513000 (2565.0)	5 130.00	-59.67	10.80	-60.90	3.62	V	-53.72		1	26
	7 695.00	-55.92	11.05	-48.87	4.57	V	-42.39			
	10 260.00	-62.85	11.00	-52.49	5.35	V	-46.84			
	12 825.00	-63.08	11.80	-52.42	6.08	H	-46.70			
	15 390.00	-56.99	15.10	-50.98	6.75	V	-42.63			

▣ NR Band: N7

▣ Bandwidth: 15 MHz

▣ Modulation: PI/2 BPSK

▣ Distance: 1 meters

▣ SCS: 15 kHz

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	RB	
									Size	Offset
501500 (2507.5)	5 015.00	-61.71	10.70	-63.08	3.57	V	-55.95	-25.00	1	77
	7 522.50	-56.09	11.10	-48.95	4.51	V	-42.36			
	10 030.00	-61.33	11.20	-52.77	5.27	H	-46.84			
	12 537.50	-62.89	12.10	-53.04	6.00	H	-46.94			
	15 045.00	-57.79	13.90	-51.68	6.66	V	-44.44			
507000 (2535.0)	5 070.00	-60.63	10.70	-61.91	3.62	H	-54.83		1	38
	7 605.00	-57.81	11.20	-50.80	4.53	V	-44.12			
	10 140.00	-61.47	11.10	-51.81	5.31	V	-46.02			
	12 675.00	-60.41	11.90	-50.55	6.06	H	-44.71			
	15 210.00	-59.34	14.40	-54.62	6.67	H	-46.89			
512500 (2562.5)	5 125.00	-60.01	10.80	-61.15	3.63	H	-53.98		1	1
	7 687.50	-58.97	11.10	-51.94	4.57	V	-45.41			
	10 250.00	-60.49	11.00	-49.75	5.35	V	-44.10			
	12 812.50	-63.53	11.80	-52.38	6.10	V	-46.68			
	15 375.00	-59.22	15.10	-53.41	6.74	H	-45.05			

▣ NR Band: N7

▣ Bandwidth: 20 MHz

▣ Modulation: PI/2 BPSK

▣ Distance: 1 meters

▣ SCS: 15 kHz

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	RB	
									Size	Offset
502000 (2510.0)	5 020.00	-60.44	10.70	-61.97	3.55	H	-54.82	-25.00	1	104
	7 530.00	-58.05	11.10	-50.58	4.50	V	-43.98			
	10 040.00	-61.77	11.20	-52.51	5.26	V	-46.57			
	12 550.00	-62.74	12.10	-53.42	5.99	V	-47.31			
	15 060.00	-58.20	14.00	-52.39	6.65	H	-45.04			
507000 (2535.0)	5 070.00	-53.26	10.70	-54.54	3.62	H	-47.46		1	53
	7 605.00	-59.63	11.20	-52.62	4.53	V	-45.94			
	10 140.00	-62.47	11.10	-52.81	5.31	H	-47.02			
	12 675.00	-62.24	11.90	-52.38	6.06	V	-46.54			
	15 210.00	-59.51	14.40	-54.79	6.67	H	-47.06			
512000 (2560.0)	5 120.00	-59.67	10.80	-60.72	3.64	H	-53.56		1	1
	7 680.00	-62.70	11.10	-55.76	4.55	H	-49.21			
	10 240.00	-62.91	11.00	-53.00	5.33	H	-47.33			
	12 800.00	-63.75	11.80	-52.59	6.10	H	-46.89			
	15 360.00	-58.55	15.10	-53.02	6.72	H	-44.64			

▣ NR Band: N7

▣ Bandwidth: 25 MHz

▣ Modulation: PI/2 BPSK

▣ Distance: 1 meters

▣ SCS: 15 kHz

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	RB	
									Size	Offset
502500 (2512.5)	5 025.00	-60.05	10.70	-61.86	3.56	H	-54.72	-25.00	1	131
	7 537.50	-49.78	11.10	-42.30	4.50	V	-35.70			
	10 050.00	-61.68	11.10	-53.25	5.27	H	-47.42			
	12 562.50	-62.43	12.10	-53.12	6.01	H	-47.03			
	15 075.00	-57.66	14.00	-52.41	6.65	H	-45.06			
507000 (2535.0)	5 070.00	-59.88	10.70	-61.16	3.62	V	-54.08		1	66
	7 605.00	-51.22	11.20	-44.21	4.53	V	-37.53			
	10 140.00	-61.68	11.10	-52.02	5.31	V	-46.23			
	12 675.00	-61.79	11.90	-51.93	6.06	H	-46.09			
	15 210.00	-58.67	14.40	-53.95	6.67	V	-46.22			
511500 (2557.5)	5 115.00	-60.85	10.80	-62.04	3.66	H	-54.89		1	1
	7 672.50	-52.08	11.10	-44.90	4.54	V	-38.34			
	10 230.00	-62.02	11.00	-52.44	5.33	H	-46.77			
	12 787.50	-62.63	11.80	-51.78	6.12	H	-46.10			
	15 345.00	-59.29	15.00	-53.98	6.72	H	-45.70			

▣ NR Band: N7

▣ Bandwidth: 30 MHz

▣ Modulation: PI/2 BPSK

▣ Distance: 1 meters

▣ SCS: 15 kHz

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	RB	
									Size	Offset
503000 (2515.0)	5 030.00	-61.05	10.70	-63.15	3.56	V	-56.01	-25.00	1	158
	7 545.00	-50.22	11.10	-42.87	4.51	V	-36.28			
	10 060.00	-62.30	11.10	-53.51	5.27	V	-47.68			
	12 575.00	-62.01	12.10	-52.49	6.05	V	-46.44			
	15 090.00	-59.02	14.00	-53.88	6.66	V	-46.54			
507000 (2535.0)	5 070.00	-60.73	10.70	-62.01	3.62	H	-54.93		1	80
	7 605.00	-59.96	11.20	-52.95	4.53	H	-46.27			
	10 140.00	-62.74	11.10	-53.08	5.31	V	-47.29			
	12 675.00	-63.23	11.90	-53.37	6.06	H	-47.53			
	15 210.00	-59.17	14.40	-54.45	6.67	H	-46.72			
511000 (2555.0)	5 110.00	-60.51	10.80	-61.84	3.67	H	-54.71		1	1
	7 665.00	-54.23	11.10	-47.17	4.54	V	-40.61			
	10 220.00	-62.09	11.00	-52.11	5.32	H	-46.43			
	12 775.00	-62.50	11.80	-51.64	6.09	V	-45.92			
	15 330.00	-59.94	14.90	-54.77	6.71	H	-46.58			

▣ NR Band: N7

▣ Bandwidth: 40 MHz

▣ Modulation: PI/2 BPSK

▣ Distance: 1 meters

▣ SCS: 15 kHz

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	RB	
									Size	Offset
504000 (2520.0)	5 040.00	-60.51	10.70	-62.48	3.60	V	-55.38	-25.00	1	108
	7 560.00	-45.27	11.10	-38.28	4.51	H	-31.69			
	10 080.00	-60.96	11.10	-51.91	5.29	H	-46.10			
	12 600.00	-63.41	12.00	-53.69	6.06	H	-47.75			
	15 120.00	-60.31	14.10	-54.22	6.68	H	-46.80			
507000 (2535.0)	5 070.00	-59.86	10.70	-61.14	3.62	H	-54.06		1	108
	7 605.00	-58.68	11.20	-51.67	4.53	V	-44.99			
	10 140.00	-61.76	11.10	-52.10	5.31	H	-46.31			
	12 675.00	-62.84	11.90	-52.98	6.06	H	-47.14			
	15 210.00	-58.14	14.40	-53.42	6.67	H	-45.69			
510000 (2550.0)	5 100.00	-60.17	10.80	-62.07	3.66	V	-54.93		1	1
	7 650.00	-44.44	11.10	-37.59	4.53	H	-31.02			
	10 200.00	-62.10	11.00	-51.67	5.33	H	-46.00			
	12 750.00	-63.50	11.80	-52.54	6.04	H	-46.78			
	15 300.00	-60.39	14.90	-54.29	6.72	V	-46.11			

▣ NR Band: N7

▣ LTE Band(Anchor): B2

▣ Bandwidth: 40 MHz

▣ Modulation: PI/2 BPSK

▣ Distance: 3 meters

▣ SCS: 15 kHz

▣ ENDC-Mode : 2A(10 MHz)-n7A(40 MHz)

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)
18900 (1880.0)	3760.00	-60.54	11.64	-60.77	3.16	V	-52.29	-13.00
	5640.00	-61.01	12.00	-54.83	3.93	V	-46.76	-13.00
	7520.00	-61.32	11.54	-46.87	4.51	V	-39.84	-13.00

8.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
Sub6 n7	5 MHz	2535.0	BPSK	25	0	4.38
			QPSK			4.35
			16-QAM			5.61
			64-QAM			6.13
			256-QAM			6.59
	10 MHz		BPSK	50		4.00
			QPSK			4.63
			16-QAM			5.71
			64-QAM			6.19
			256-QAM			6.71
	15 MHz		BPSK	75		4.03
			QPSK			4.90
			16-QAM			5.94
			64-QAM			5.89
			256-QAM			6.64
	20 MHz		BPSK	100		4.41
			QPSK			5.04
			16-QAM			5.46
			64-QAM			5.92
			256-QAM			6.60
	25 MHz		BPSK	128		4.08
			QPSK			4.98
			16-QAM			5.93
			64-QAM			5.99
			256-QAM			6.61
	30 MHz		BPSK	160		4.13
			QPSK			4.74
			16-QAM			5.82
			64-QAM			6.26
			256-QAM			6.68
	40 MHz		BPSK	216		3.96
			QPSK			4.75
			16-QAM			5.81
			64-QAM			5.80
			256-QAM			6.48

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 88 ~ 122.

8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
Sub6 n7	5 MHz	2535.0	BPSK	25	0	4.5410
			QPSK			4.5530
			16-QAM			4.5054
			64-QAM			4.5075
			256-QAM			4.5047
	10 MHz		BPSK	50		9.0006
			QPSK			8.9915
			16-QAM			8.9753
			64-QAM			8.9894
			256-QAM			8.9445
	15 MHz		BPSK	75		13.499
			QPSK			13.469
			16-QAM			13.469
			64-QAM			13.468
			256-QAM			13.471
	20 MHz		BPSK	100		17.908
			QPSK			17.947
			16-QAM			17.924
			64-QAM			17.875
			256-QAM			17.904
	25 MHz		BPSK	128		22.925
			QPSK			22.884
			16-QAM			22.905
			64-QAM			22.884
			256-QAM			22.921
	30 MHz		BPSK	160		28.679
			QPSK			28.612
			16-QAM			28.608
			64-QAM			28.618
			256-QAM			28.570
	40 MHz		BPSK	216		38.670
			QPSK			38.656
			16-QAM			38.639
			64-QAM			38.558
			256-QAM			38.622

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 53 ~ 87.

8.5 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
Sub6 n7	5	2502.5	9.3435	30.415	-71.197	-40.782	-25.00
		2535.0	3.8002	29.800	-70.722	-40.922	
		2567.5	8.2757	30.415	-70.611	-40.196	
	10	2505.0	8.2792	30.415	-71.283	-40.868	
		2535.0	8.6042	30.415	-70.407	-39.992	
		2565.0	8.6182	30.415	-71.394	-40.979	
	15	2507.5	3.8026	29.800	-71.223	-41.423	
		2535.0	9.1351	30.415	-71.044	-40.629	
		2562.5	4.9372	29.800	-71.545	-41.745	
	20	2510.0	3.8126	29.800	-70.748	-40.948	
		2535.0	9.6670	30.415	-70.647	-40.232	
		2560.0	3.8111	29.800	-71.430	-41.630	
	25	2512.5	3.8036	29.800	-70.251	-40.451	
		2535.0	6.0509	30.415	-70.546	-40.131	
		2557.5	6.0095	30.415	-70.660	-40.245	
	30	2515.0	3.7717	29.800	-71.210	-41.410	
		2535.0	9.1271	30.415	-70.470	-40.055	
		2555.0	3.7513	29.800	-69.690	-39.890	
	40	2520.0	4.0539	29.800	-70.688	-40.888	
		2535.0	4.0848	29.800	-70.057	-40.257	
		2550.0	4.1142	29.800	-69.920	-40.120	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 172 ~213.
2. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
3. Factor(dB) = Cable Loss + Ext. Attenuator + Power Splitter

Frequency Range (GHz)	Factor [dB]
0.03 – 1	27.094
1 – 5	29.800
5 – 10	30.415
10 – 15	30.940
15 – 20	31.313
Above 20	31.955

8.6 CHANNEL EDGE

BW (MHz)	Frequency (MHz)	Mod	RB (Size/ Offset)	2 500 MHz ~ 2 496 MHz	C.E ~ (C.E +1 MHz)	2 490.5 MHz ~ 2 496 MHz	(C.E + 1 MHz) ~ (C.E + 5 MHz)	Below 2 490.5 MHz	(C.E + 5 MHz) ~ (C.E + X MHz)	Above (C.E + X MHz)
				Lower	Upper	Lower	Upper	Lower	Upper	Upper
5	2502.5	BPSK	Full RB	-23.61	-21.38	-35.31	-25.56	-53.06	-40.44	-41.12
10	2505.0	BPSK	Full RB	-25.62	-31.58	-31.75	-28.76	-46.11	-30.12	-42.85
15	2507.5	BPSK	Full RB	-24.68	-34.00	-33.24	-31.13	-35.43	-30.53	-45.81
20	2510.0	BPSK	Full RB	-25.27	-33.48	-33.40	-31.13	-33.67	-31.38	-46.95
25	2512.5	BPSK	Full RB	-27.69	-32.51	-35.89	-30.94	-33.51	-31.95	-48.15
30	2515.0	BPSK	Full RB	-27.29	-26.61	-34.52	-28.59	-34.37	-32.60	-49.30
40	2520.0	BPSK	Full RB	-16.22	-16.43	-33.91	-29.42	-36.92	-32.64	-51.05
Limit				-10.0	-10.0	-13.0	-10.0	-25.0	-13.0	-25.0

BW (MHz)	Frequency (MHz)	Mod	RB (Size/ Offset)	C.E ~ (C.E ± 1 MHz)		(C.E ± 1 MHz) ~ (C.E ± 5 MHz)	
				Lower	Upper	Lower	Upper
5	2535.0	BPSK	Full RB	-20.82	-22.97	-25.97	-26.28
	2567.5	BPSK	Full RB	-22.52	-24.32	-29.85	-30.33
10	2535.0	BPSK	Full RB	-22.79	-29.00	-24.62	-25.30
	2565.0	BPSK	Full RB	-24.29	-36.23	-31.57	-33.44
15	2535.0	BPSK	Full RB	-25.35	-33.38	-29.08	-30.52
	2562.5	BPSK	Full RB	-25.32	-36.98	-31.96	-33.60
20	2535.0	BPSK	Full RB	-25.16	-25.45	-23.54	-24.14
	2560.0	BPSK	Full RB	-26.42	-33.76	-30.38	-31.49
25	2535.0	BPSK	Full RB	-26.51	-33.40	-30.76	-32.10
	2557.5	BPSK	Full RB	-27.71	-35.41	-31.58	-32.94
30	2535.0	BPSK	Full RB	-25.64	-25.71	-27.09	-26.39
	2555.0	BPSK	Full RB	-26.18	-28.33	-31.22	-32.44
40	2535.0	BPSK	Full RB	-15.62	-16.69	-31.95	-31.98
	2550.0	BPSK	Full RB	-15.37	-17.47	-31.72	-32.76
Limit				-10.0		-10.0	

BW (MHz)	Frequency (MHz)	Mod	RB (Size/ Offset)	(C.E ± 5 MHz) ~ (C.E ± X MHz)		Above (C.E ± X MHz)	
				Lower	Upper	Lower	Upper
5	2535.0	BPSK	Full RB	-40.08	-40.09	-41.00	-41.16
	2567.5	BPSK	Full RB	-39.63	-43.11	-40.52	-44.00
10	2535.0	BPSK	Full RB	-30.09	-30.76	-41.43	-41.39
	2565.0	BPSK	Full RB	-34.04	-34.78	-43.18	-47.47
15	2535.0	BPSK	Full RB	-30.38	-30.63	-46.48	-46.37
	2562.5	BPSK	Full RB	-35.10	-35.51	-44.04	-52.40
20	2535.0	BPSK	Full RB	-30.63	-32.38	-45.32	-44.56
	2560.0	BPSK	Full RB	-33.76	-36.36	-46.82	-55.48
25	2535.0	BPSK	Full RB	-32.97	-32.14	-50.56	-50.54
	2557.5	BPSK	Full RB	-33.55	-36.59	-44.82	-54.85
30	2535.0	BPSK	Full RB	-29.94	-29.91	-48.23	-47.23
	2555.0	BPSK	Full RB	-36.35	-37.65	-49.29	-54.76
40	2535.0	BPSK	Full RB	-34.07	-34.98	-55.83	-54.68
	2550.0	BPSK	Full RB	-36.32	-37.62	-52.91	-54.69
Limit				-13.0		-25.0	

Note:

1. C.E = Channel Edge
2. X = X is the greater of 6 MHz or the actual emission bandwidth
3. Duty Cycle factor already applied on the factor.
   - Factor(dB) = Cable Loss + Ext. Attenuator + Power Splitter
   - Result(dBm) = Reading + Factor
4. Plots of the EUT's Channel Edge are shown Page 123 ~ 171.

8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

▣ BandWidth: 5 MHz

▣ Voltage(100 %): 3.880 VDC

▣ Batt. Endpoint: 3.400 VDC

▣ LIMIT: Emission must remain in band

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
2502.500	100 %	+20(Ref)	2502 499 996	0.0	0.000 000	0.000
	100 %	-30	2502 499 991	-4.8	0.000 000	-0.002
	100 %	-20	2502 499 992	-4.5	0.000 000	-0.002
	100 %	-10	2502 499 989	-7.4	0.000 000	-0.003
	100 %	0	2502 499 989	-6.7	0.000 000	-0.003
	100 %	+10	2502 499 988	-7.6	0.000 000	-0.003
	100 %	+30	2502 499 988	-8.2	0.000 000	-0.003
	100 %	+40	2502 499 987	-8.8	0.000 000	-0.004
	100 %	+50	2502 499 989	-7.1	0.000 000	-0.003
	Batt. Endpoint	+20	2502 499 991	-4.8	0.000 000	-0.002
2567.500	100 %	+20(Ref)	2567 499 997	0.0	0.000 000	0.000
	100 %	-30	2567 499 994	-3.4	0.000 000	-0.001
	100 %	-20	2567 499 994	-3.1	0.000 000	-0.001
	100 %	-10	2567 499 994	-3.4	0.000 000	-0.001
	100 %	0	2567 499 999	1.7	0.000 000	0.001
	100 %	+10	2567 499 995	-2.7	0.000 000	-0.001
	100 %	+30	2567 499 997	-0.8	0.000 000	0.000
	100 %	+40	2567 499 996	-1.4	0.000 000	-0.001
	100 %	+50	2567 499 997	-0.5	0.000 000	0.000
	Batt. Endpoint	+20	2567 499 996	-1.0	0.000 000	0.000

▣ BandWidth: 10 MHz

▣ Voltage(100 %): 3.880 VDC

▣ Batt. Endpoint: 3.400 VDC

▣ LIMIT: Emission must remain in band

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
2505.000	100 %	+20(Ref)	2505 000 004	0.0	0.000 000	0.000
	100 %	-30	2505 000 006	1.4	0.000 000	0.001
	100 %	-20	2505 000 006	1.5	0.000 000	0.001
	100 %	-10	2505 000 004	-0.6	0.000 000	0.000
	100 %	0	2505 000 004	0.0	0.000 000	0.000
	100 %	+10	2505 000 007	2.4	0.000 000	0.001
	100 %	+30	2505 000 009	4.6	0.000 000	0.002
	100 %	+40	2505 000 006	1.6	0.000 000	0.001
	100 %	+50	2505 000 007	2.3	0.000 000	0.001
	Batt. Endpoint	+20	2505 000 006	1.5	0.000 000	0.001
2565.000	100 %	+20(Ref)	2564 999 990	0.0	0.000 000	0.000
	100 %	-30	2564 999 980	-10.0	0.000 000	-0.004
	100 %	-20	2564 999 981	-8.4	0.000 000	-0.003
	100 %	-10	2564 999 981	-8.4	0.000 000	-0.003
	100 %	0	2564 999 985	-4.1	0.000 000	-0.002
	100 %	+10	2564 999 977	-12.2	0.000 000	-0.005
	100 %	+30	2564 999 978	-11.1	0.000 000	-0.004
	100 %	+40	2564 999 979	-10.5	0.000 000	-0.004
	100 %	+50	2564 999 980	-9.5	0.000 000	-0.004
	Batt. Endpoint	+20	2564 999 978	-11.8	0.000 000	-0.005

▣ BandWidth: 15 MHz

▣ Voltage(100 %): 3.880 VDC

▣ Batt. Endpoint: 3.400 VDC

▣ LIMIT: Emission must remain in band

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
2507.500	100 %	+20(Ref)	2507 500 000	0.0	0.000 000	0.000
	100 %	-30	2507 500 003	3.5	0.000 000	0.001
	100 %	-20	2507 500 001	1.3	0.000 000	0.001
	100 %	-10	2507 500 002	1.8	0.000 000	0.001
	100 %	0	2507 500 001	1.4	0.000 000	0.001
	100 %	+10	2507 500 003	3.6	0.000 000	0.001
	100 %	+30	2507 499 999	-0.5	0.000 000	0.000
	100 %	+40	2507 500 001	0.8	0.000 000	0.000
	100 %	+50	2507 500 005	5.2	0.000 000	0.002
	Batt. Endpoint	+20	2507 500 001	1.1	0.000 000	0.000
2562.500	100 %	+20(Ref)	2562 499 993	0.0	0.000 000	0.000
	100 %	-30	2562 499 983	-9.5	0.000 000	-0.004
	100 %	-20	2562 499 986	-7.1	0.000 000	-0.003
	100 %	-10	2562 499 984	-9.2	0.000 000	-0.004
	100 %	0	2562 499 984	-8.8	0.000 000	-0.003
	100 %	+10	2562 499 983	-9.5	0.000 000	-0.004
	100 %	+30	2562 499 982	-10.8	0.000 000	-0.004
	100 %	+40	2562 499 981	-12.1	0.000 000	-0.005
	100 %	+50	2562 499 982	-11.2	0.000 000	-0.004
	Batt. Endpoint	+20	2562 499 982	-11.2	0.000 000	-0.004

▣ BandWidth: 20 MHz

▣ Voltage(100 %): 3.880 VDC

▣ Batt. Endpoint: 3.400 VDC

▣ LIMIT: Emission must remain in band

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
2510.000	100 %	+20(Ref)	2510 000 008	0.0	0.000 000	0.000
	100 %	-30	2510 000 014	5.6	0.000 000	0.002
	100 %	-20	2510 000 016	7.2	0.000 000	0.003
	100 %	-10	2510 000 015	6.9	0.000 000	0.003
	100 %	0	2510 000 013	4.2	0.000 000	0.002
	100 %	+10	2510 000 013	4.6	0.000 000	0.002
	100 %	+30	2510 000 015	6.3	0.000 000	0.003
	100 %	+40	2510 000 014	5.2	0.000 000	0.002
	100 %	+50	2510 000 014	5.9	0.000 000	0.002
	Batt. Endpoint	+20	2510 000 015	6.6	0.000 000	0.003
2560.000	100 %	+20(Ref)	2559 999 983	0.0	0.000 000	0.000
	100 %	-30	2559 999 970	-12.6	0.000 000	-0.005
	100 %	-20	2559 999 966	-16.6	-0.000 001	-0.006
	100 %	-10	2559 999 967	-16.1	-0.000 001	-0.006
	100 %	0	2559 999 967	-16.0	-0.000 001	-0.006
	100 %	+10	2559 999 968	-15.0	-0.000 001	-0.006
	100 %	+30	2559 999 969	-14.3	-0.000 001	-0.006
	100 %	+40	2559 999 966	-16.9	-0.000 001	-0.007
	100 %	+50	2559 999 970	-12.5	0.000 000	-0.005
	Batt. Endpoint	+20	2559 999 970	-13.2	-0.000 001	-0.005

▣ BandWidth: 25 MHz

▣ Voltage(100 %): 3.880 VDC

▣ Batt. Endpoint: 3.400 VDC

▣ LIMIT: Emission must remain in band

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
2512.500	100 %	+20(Ref)	2512 500 006	0.0	0.000 000	0.000
	100 %	-30	2512 500 011	5.4	0.000 000	0.002
	100 %	-20	2512 500 011	5.4	0.000 000	0.002
	100 %	-10	2512 500 013	7.5	0.000 000	0.003
	100 %	0	2512 500 009	3.8	0.000 000	0.002
	100 %	+10	2512 500 012	6.6	0.000 000	0.003
	100 %	+30	2512 500 015	9.0	0.000 000	0.004
	100 %	+40	2512 500 012	6.1	0.000 000	0.002
	100 %	+50	2512 500 014	8.5	0.000 000	0.003
	Batt. Endpoint	+20	2512 500 009	3.5	0.000 000	0.001
2557.500	100 %	+20(Ref)	2557 499 988	0.0	0.000 000	0.000
	100 %	-30	2557 499 975	-13.0	-0.000 001	-0.005
	100 %	-20	2557 499 976	-12.1	0.000 000	-0.005
	100 %	-10	2557 499 976	-11.3	0.000 000	-0.004
	100 %	0	2557 499 972	-16.0	-0.000 001	-0.006
	100 %	+10	2557 499 977	-11.2	0.000 000	-0.004
	100 %	+30	2557 499 975	-12.5	0.000 000	-0.005
	100 %	+40	2557 499 975	-12.5	0.000 000	-0.005
	100 %	+50	2557 499 974	-13.7	-0.000 001	-0.005
	Batt. Endpoint	+20	2557 499 973	-14.9	-0.000 001	-0.006

▣ BandWidth: 30 MHz

▣ Voltage(100 %): 3.880 VDC

▣ Batt. Endpoint: 3.400 VDC

▣ LIMIT: Emission must remain in band

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
2515.000	100 %	+20(Ref)	2515 000 013	0.0	0.000 000	0.000
	100 %	-30	2515 000 027	13.9	0.000 001	0.006
	100 %	-20	2515 000 029	16.1	0.000 001	0.006
	100 %	-10	2515 000 026	13.1	0.000 001	0.005
	100 %	0	2515 000 026	13.1	0.000 001	0.005
	100 %	+10	2515 000 027	14.1	0.000 001	0.006
	100 %	+30	2515 000 027	14.2	0.000 001	0.006
	100 %	+40	2515 000 029	16.1	0.000 001	0.006
	100 %	+50	2515 000 029	16.6	0.000 001	0.007
	Batt. Endpoint	+20	2515 000 026	13.3	0.000 001	0.005
2555.000	100 %	+20(Ref)	2554 999 976	0.0	0.000 000	0.000
	100 %	-30	2554 999 953	-23.7	-0.000 001	-0.009
	100 %	-20	2554 999 951	-24.8	-0.000 001	-0.010
	100 %	-10	2554 999 952	-24.3	-0.000 001	-0.010
	100 %	0	2554 999 952	-24.5	-0.000 001	-0.010
	100 %	+10	2554 999 952	-23.9	-0.000 001	-0.009
	100 %	+30	2554 999 951	-25.2	-0.000 001	-0.010
	100 %	+40	2554 999 950	-26.0	-0.000 001	-0.010
	100 %	+50	2554 999 950	-26.0	-0.000 001	-0.010
	Batt. Endpoint	+20	2554 999 951	-25.2	-0.000 001	-0.010

▣ BandWidth: 40 MHz

▣ Voltage(100 %): 3.880 VDC

▣ Batt. Endpoint: 3.400 VDC

▣ LIMIT: Emission must remain in band

Test. Frequncy (MHz)	Voltage (%)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
2520.000	100 %	+20(Ref)	2520 000 024	0.0	0.000 000	0.000
	100 %	-30	2520 000 051	26.8	0.000 001	0.011
	100 %	-20	2520 000 046	21.6	0.000 001	0.009
	100 %	-10	2520 000 049	24.9	0.000 001	0.010
	100 %	0	2520 000 052	27.2	0.000 001	0.011
	100 %	+10	2520 000 052	27.2	0.000 001	0.011
	100 %	+30	2520 000 050	25.3	0.000 001	0.010
	100 %	+40	2520 000 046	21.9	0.000 001	0.009
	100 %	+50	2520 000 048	23.5	0.000 001	0.009
	Batt. Endpoint	+20	2520 000 051	26.3	0.000 001	0.010
2550.000	100 %	+20(Ref)	2549 999 976	0.0	0.000 000	0.000
	100 %	-30	2549 999 954	-22.9	-0.000 001	-0.009
	100 %	-20	2549 999 953	-23.1	-0.000 001	-0.009
	100 %	-10	2549 999 954	-22.1	-0.000 001	-0.009
	100 %	0	2549 999 956	-20.5	-0.000 001	-0.008
	100 %	+10	2549 999 955	-21.3	-0.000 001	-0.008
	100 %	+30	2549 999 955	-21.2	-0.000 001	-0.008
	100 %	+40	2549 999 958	-18.8	-0.000 001	-0.007
	100 %	+50	2549 999 958	-18.8	-0.000 001	-0.007
	Batt. Endpoint	+20	2549 999 952	-24.4	-0.000 001	-0.010

9. TEST PLOTS

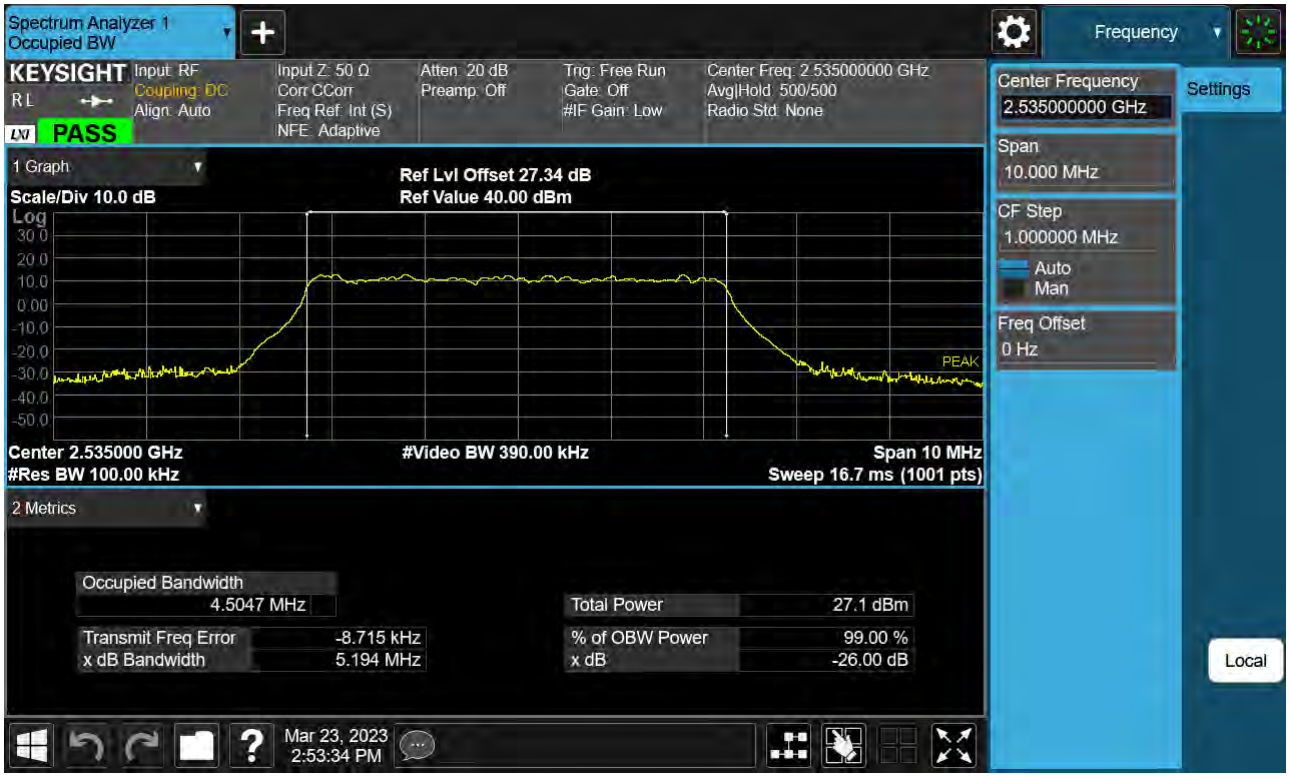
Sub6 n7. Occupied Bandwidth Plot (5 M BW Ch.507000 BPSK)

Sub6 n7. Occupied Bandwidth Plot (5 M BW Ch.507000 QPSK)

Sub6 n7. Occupied Bandwidth Plot (5 M BW Ch.507000 16QAM)

Sub6 n7. Occupied Bandwidth Plot (5 M BW Ch.507000 64QAM)

Sub6 n7. Occupied Bandwidth Plot (5 M BW Ch.507000 256QAM)



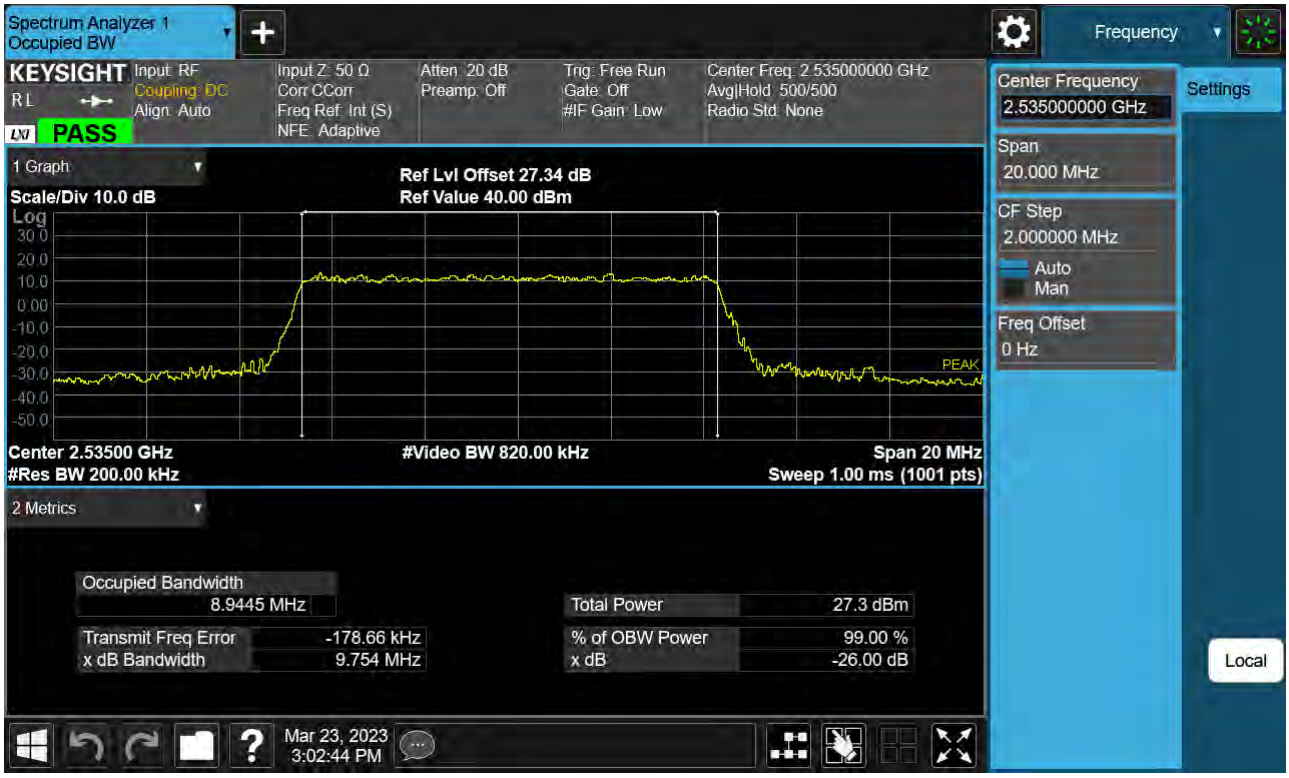
Sub6 n7. Occupied Bandwidth Plot (10 M BW Ch.507000 BPSK)

Sub6 n7. Occupied Bandwidth Plot (10 M BW Ch.507000 QPSK)

Sub6 n7. Occupied Bandwidth Plot (10 M BW Ch.507000 16QAM)

Sub6 n7. Occupied Bandwidth Plot (10 M BW Ch.507000 64QAM)

Sub6 n7. Occupied Bandwidth Plot (10 M BW Ch.507000 256QAM)



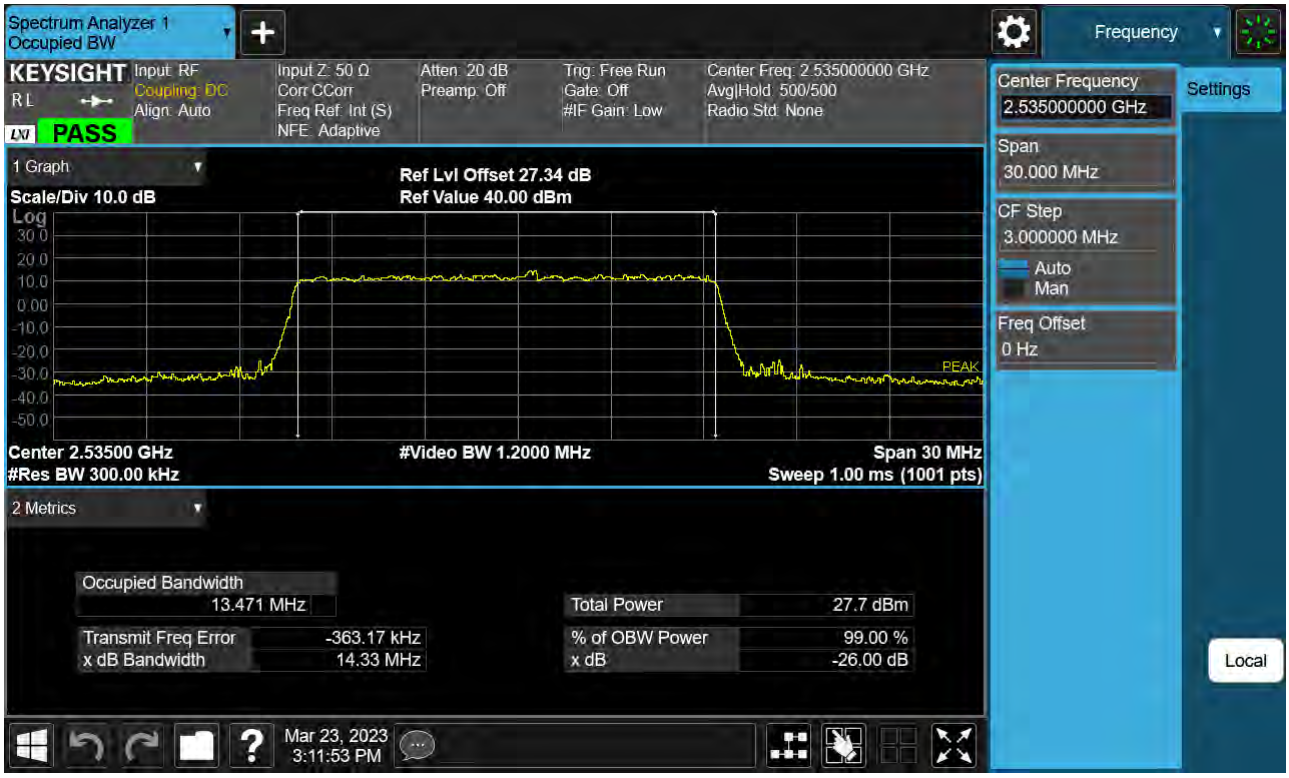
Sub6 n7. Occupied Bandwidth Plot (15 M BW Ch.507000 BPSK)

Sub6 n7. Occupied Bandwidth Plot (15 M BW Ch.507000 QPSK)

Sub6 n7. Occupied Bandwidth Plot (15 M BW Ch.507000 16QAM)

Sub6 n7. Occupied Bandwidth Plot (15 M BW Ch.507000 64QAM)

Sub6 n7. Occupied Bandwidth Plot (15 M BW Ch.507000 256QAM)

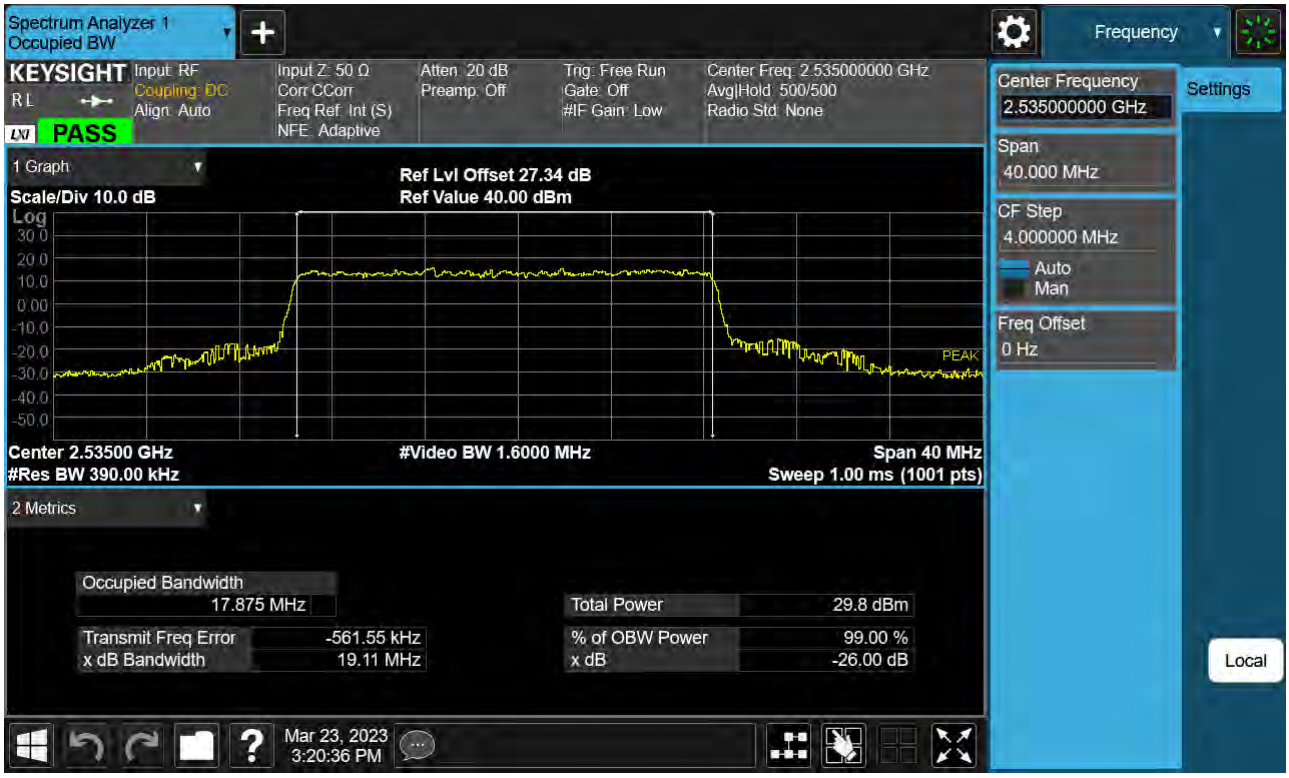


Sub6 n7. Occupied Bandwidth Plot (20 M BW Ch.507000 BPSK)

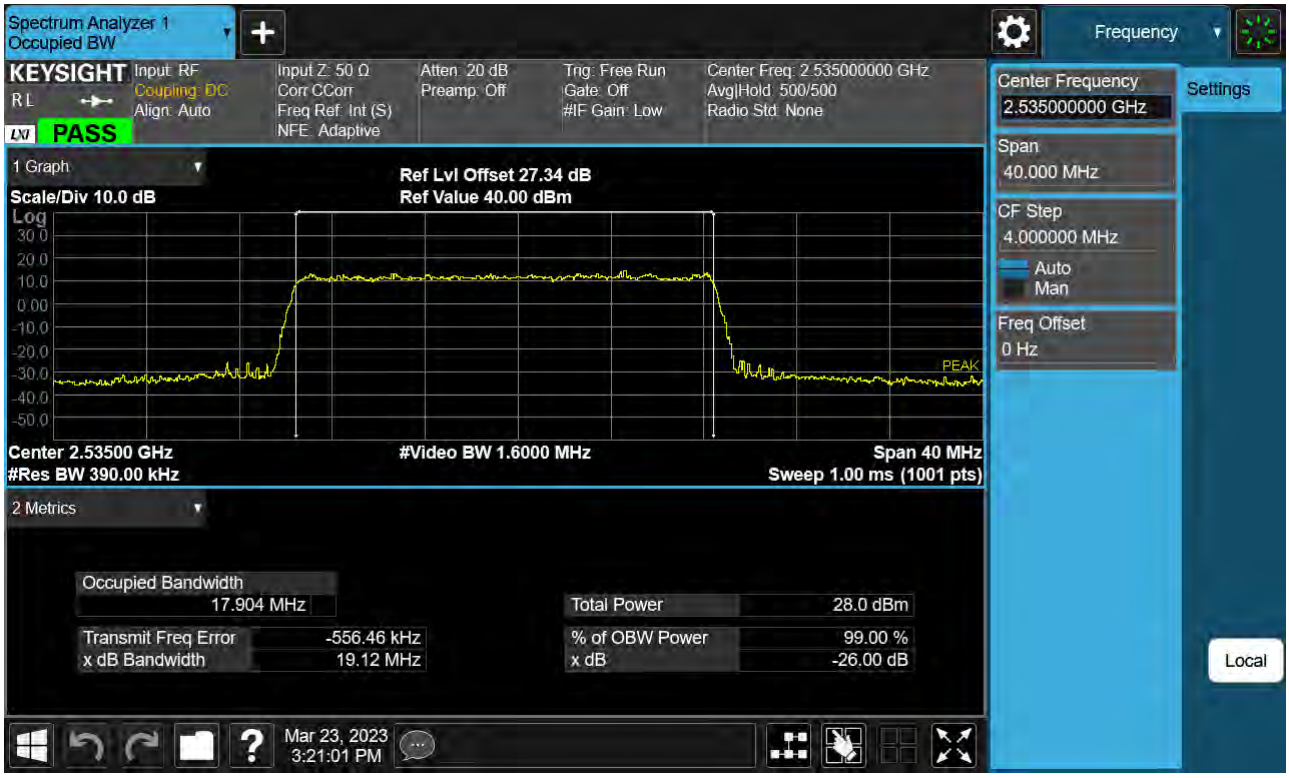
Sub6 n7. Occupied Bandw idth Plot (20 M BW Ch.507000 QPSK)

Sub6 n7. Occupied Bandwidth Plot (20 M BW Ch.507000 16QAM)

Sub6 n7. Occupied Bandwidth Plot (20 M BW Ch.507000 64QAM)



Sub6 n7. Occupied Bandwidth Plot (20 M BW Ch.507000 256QAM)



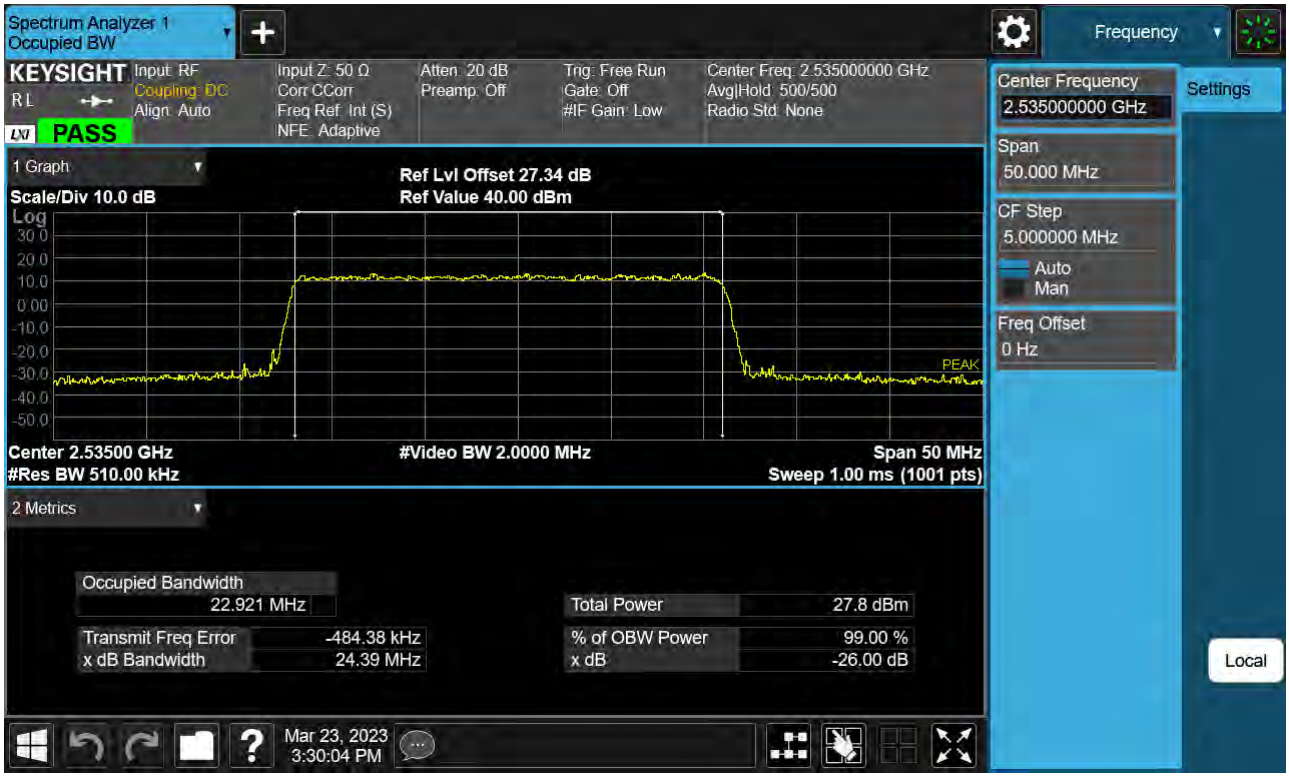
Sub6 n7. Occupied Bandwidth Plot (25 M BW Ch.507000 BPSK)

Sub6 n7. Occupied Bandw idth Plot (25 M BW Ch.507000 QPSK)

Sub6 n7. Occupied Bandwidth Plot (25 M BW Ch.507000 16QAM)

Sub6 n7. Occupied Bandwidth Plot (25 M BW Ch.507000 64QAM)

Sub6 n7. Occupied Bandwidth Plot (25 M BW Ch.507000 256QAM)



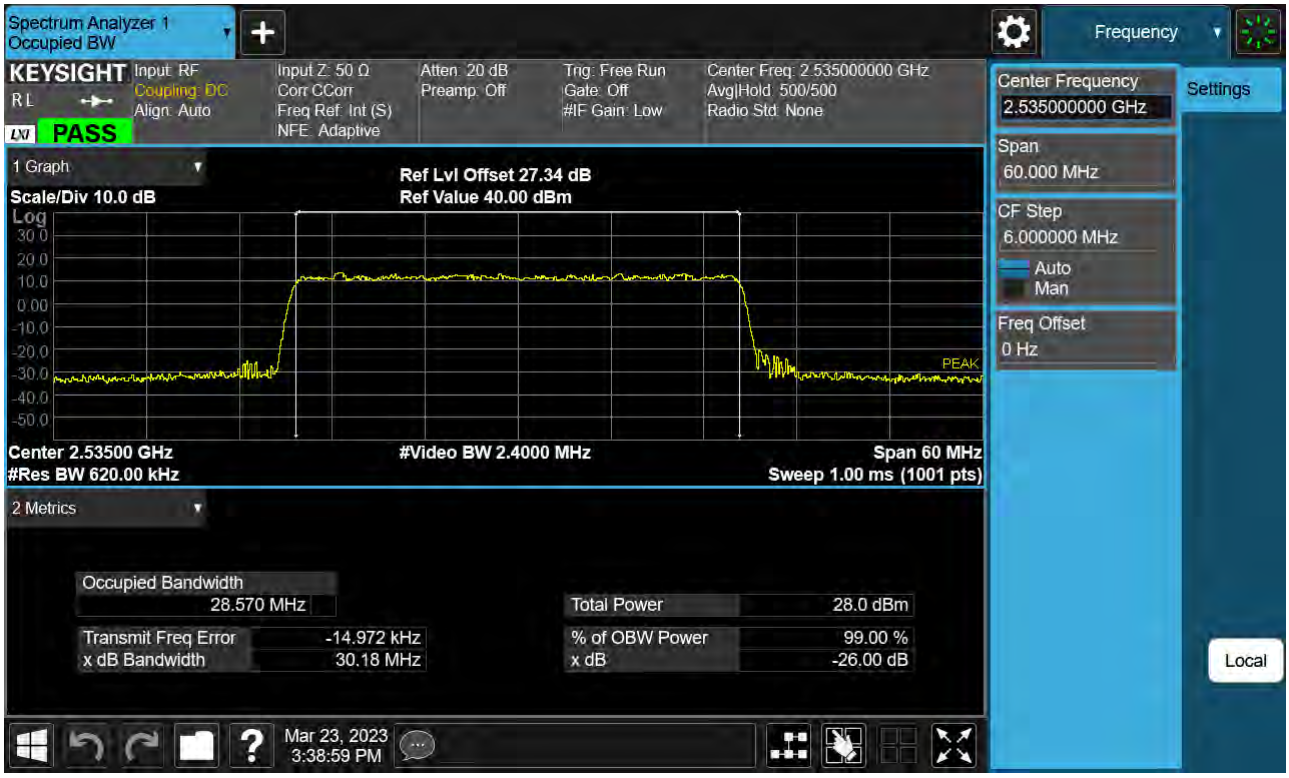
Sub6 n7. Occupied Bandwidth Plot (30 M BW Ch.507000 BPSK)

Sub6 n7. Occupied Bandw idth Plot (30 M BW Ch.507000 QPSK)

Sub6 n7. Occupied Bandwidth Plot (30 M BW Ch.507000 16QAM)

Sub6 n7. Occupied Bandwidth Plot (30 M BW Ch.507000 64QAM)

Sub6 n7. Occupied Bandwidth Plot (30 M BW Ch.507000 256QAM)



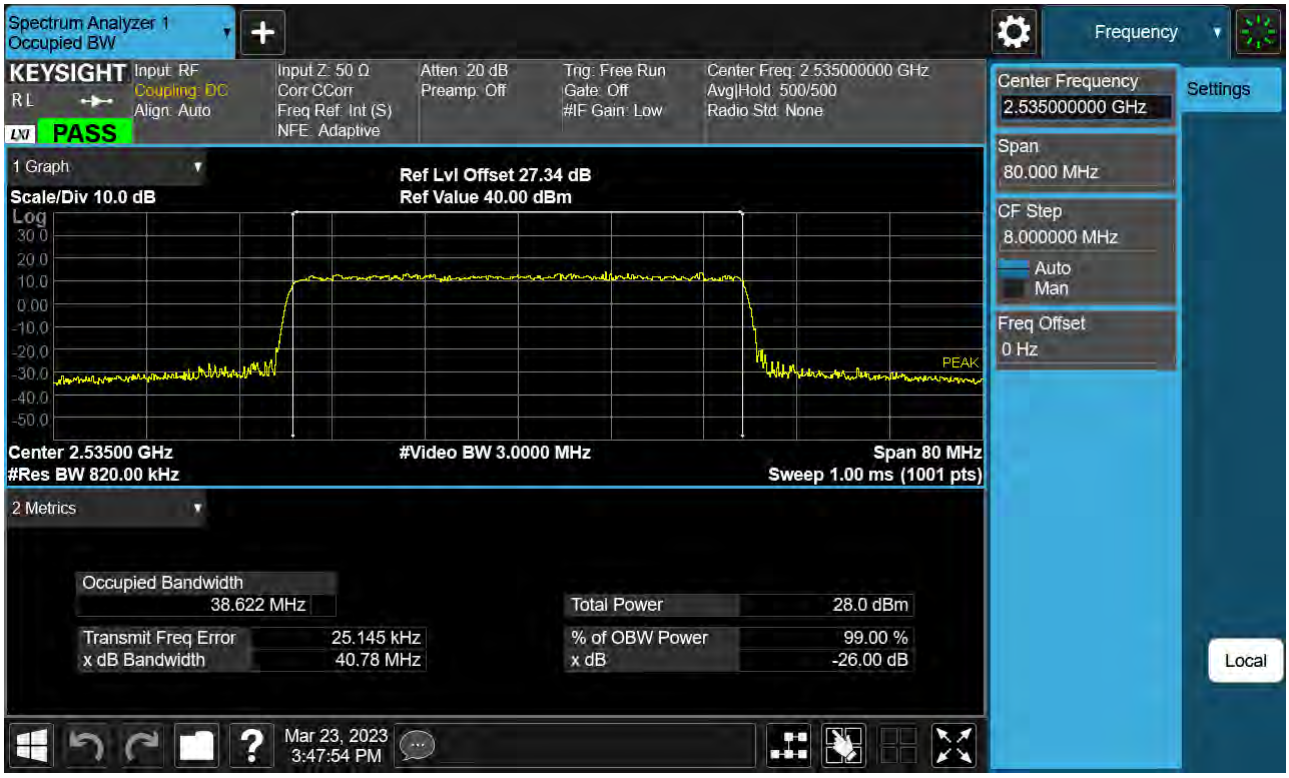
Sub6 n7. Occupied Bandwidth Plot (40 M BW Ch.507000 BPSK)

Sub6 n7. Occupied Bandw idth Plot (40 M BW Ch.507000 QPSK)

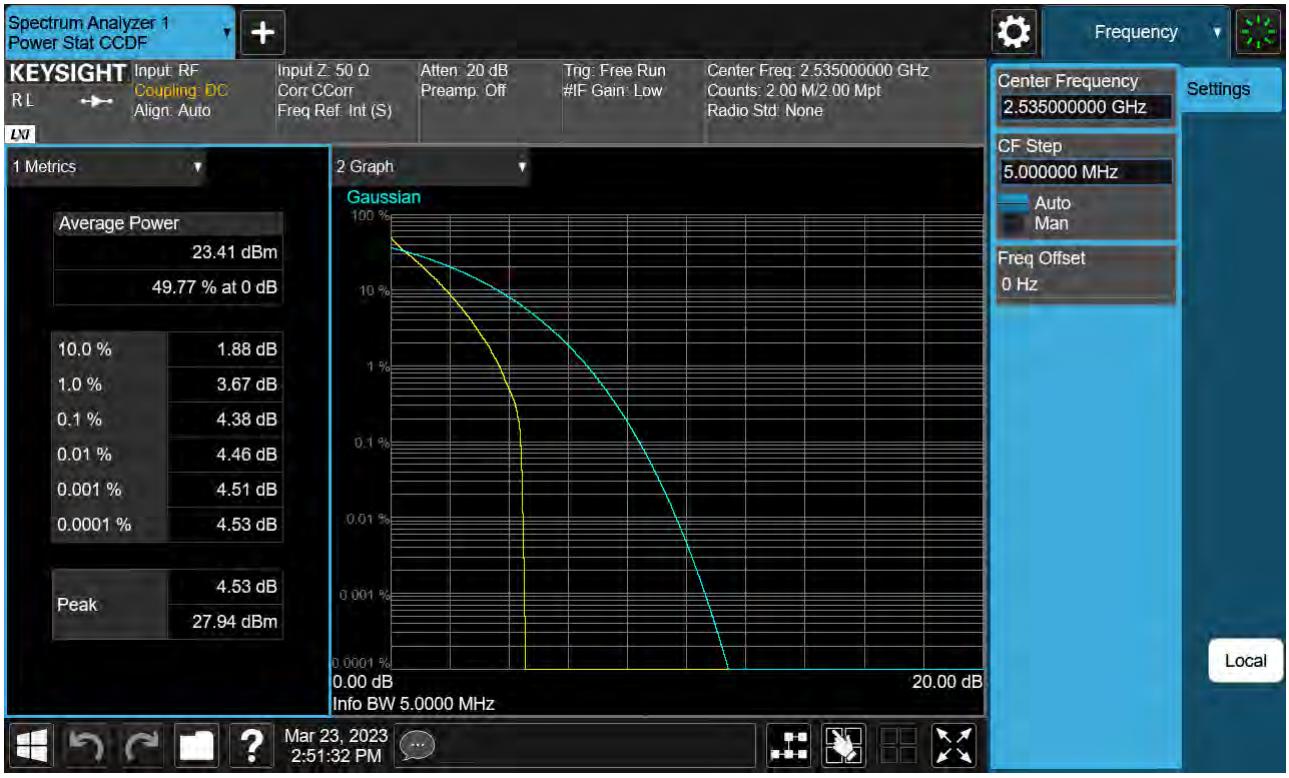
Sub6 n7. Occupied Bandwidth Plot (40 M BW Ch.507000 16QAM)

Sub6 n7. Occupied Bandwidth Plot (40 M BW Ch.507000 64QAM)

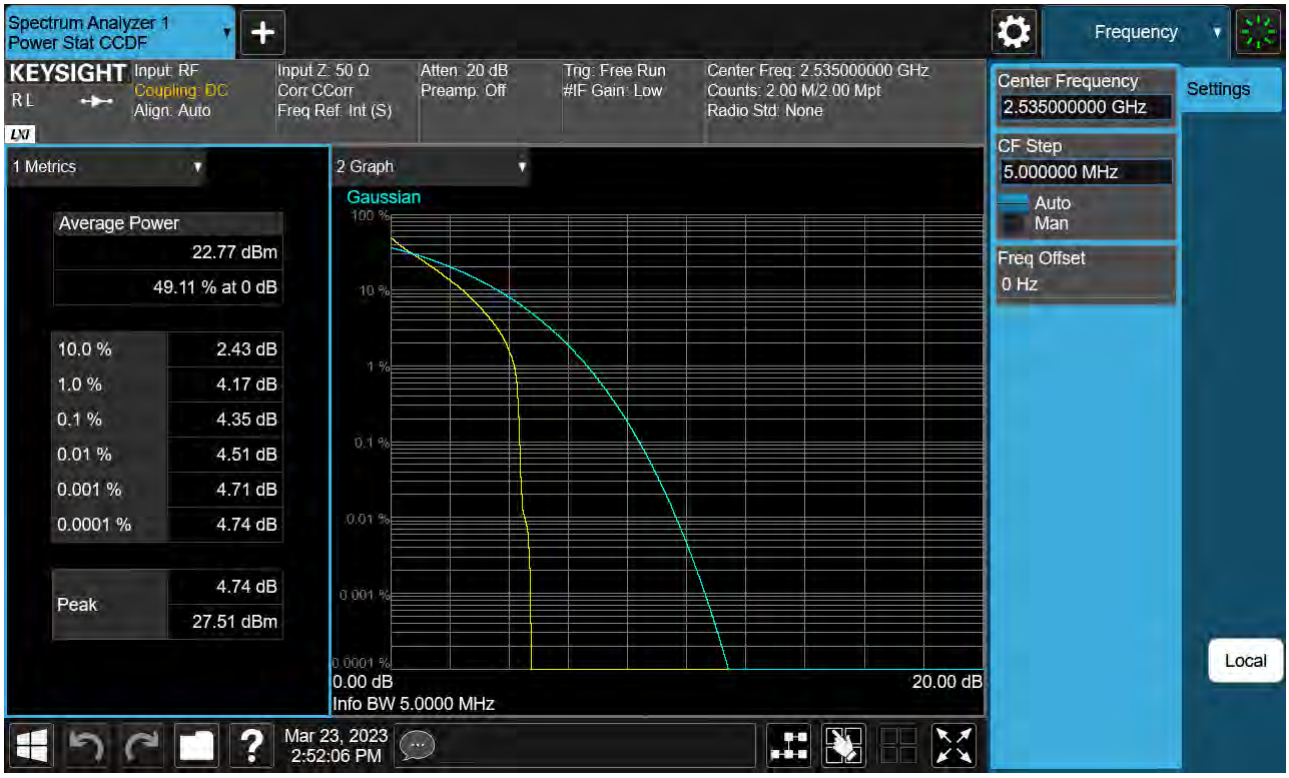
Sub6 n7. Occupied Bandwidth Plot (40 M BW Ch.507000 256QAM)



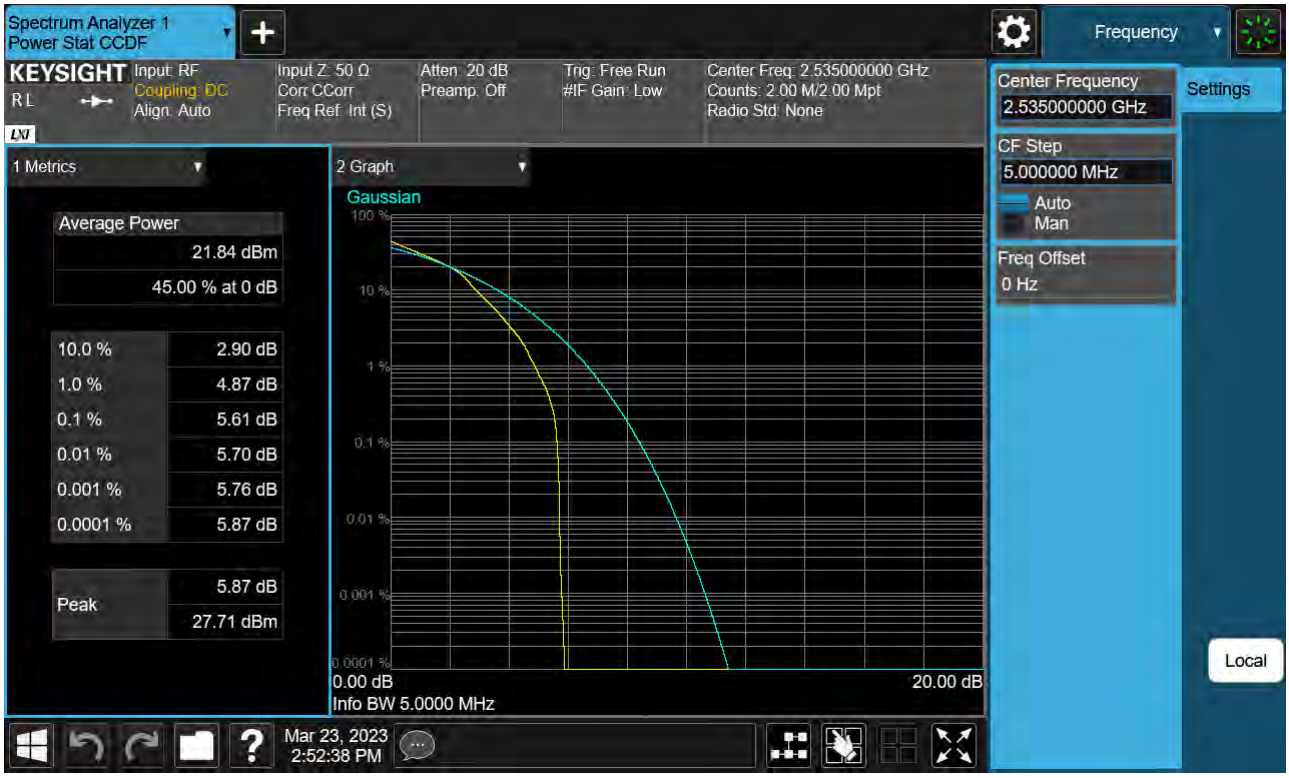
Sub6 n7. PAR Plot (5 M BW_Ch.507000_ BPSK)



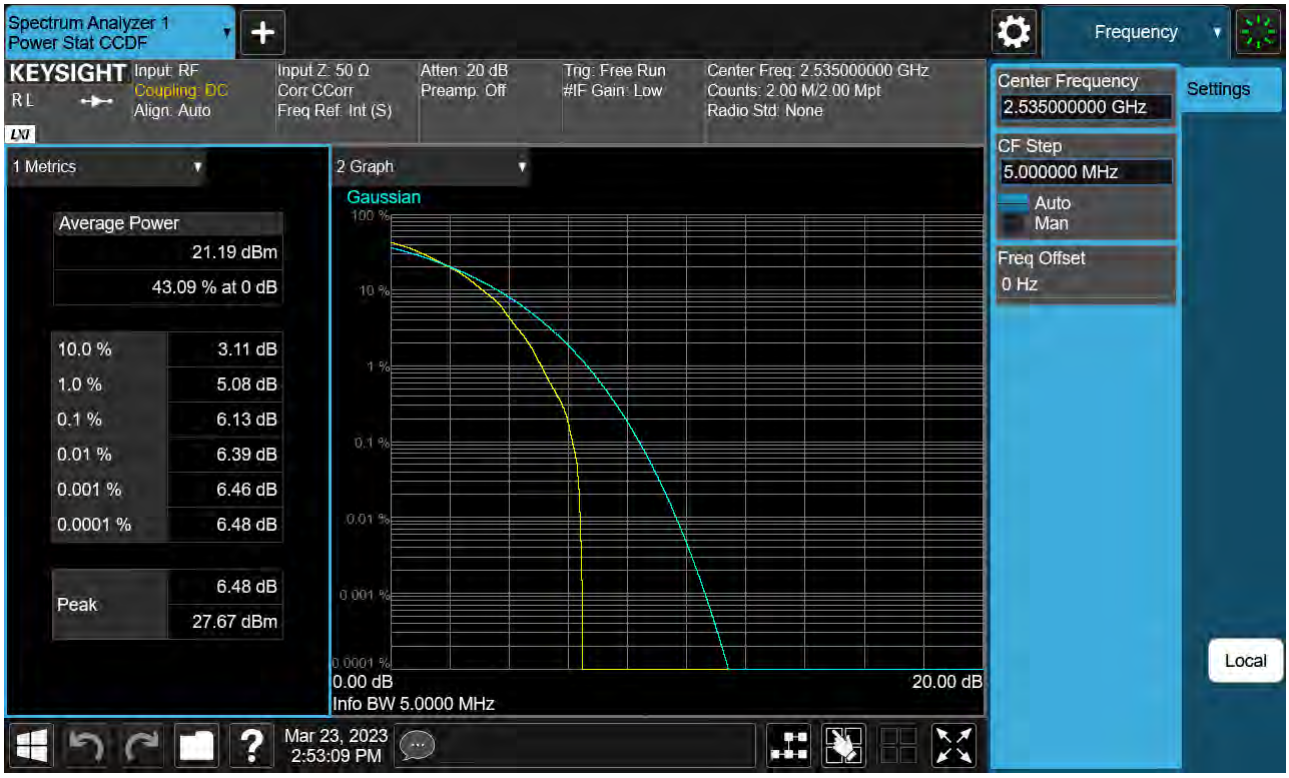
Sub6 n7. PAR Plot (5 M BW_Ch.507000_QPSK)



Sub6 n7. PAR Plot (5 M BW_Ch.507000_16QAM)

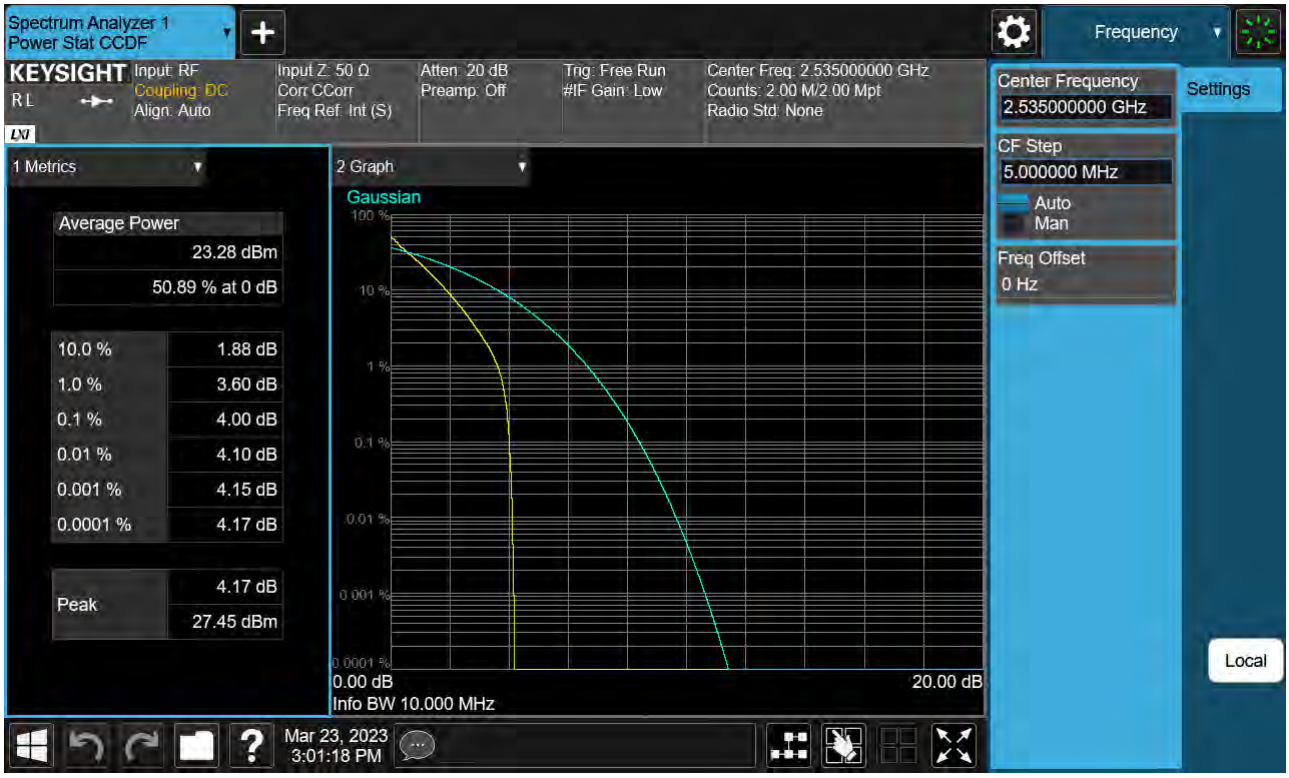


Sub6 n7. PAR Plot (5 M BW_Ch.507000_64QAM)

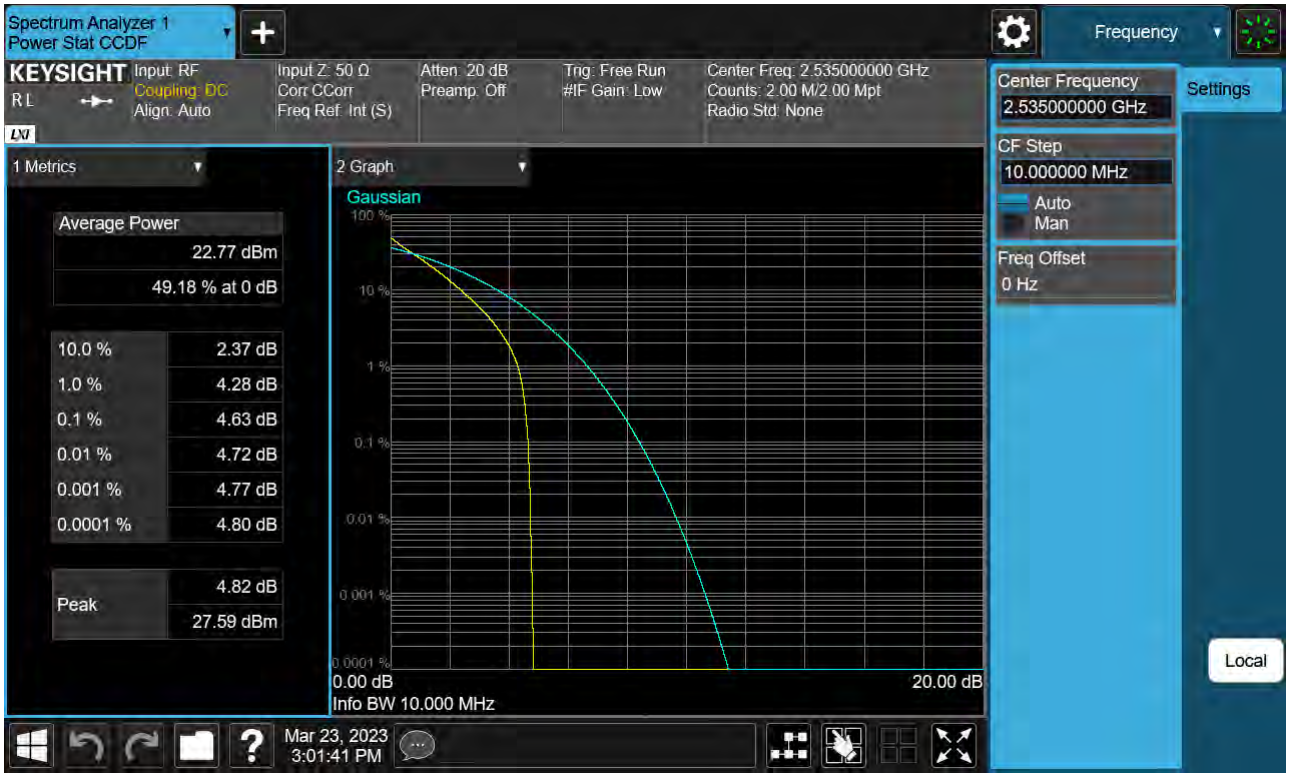


Sub6 n7. PAR Plot (5 M BW_Ch.507000_256QAM)

Sub6 n7. PAR Plot (10 M BW_Ch.507000_ BPSK)

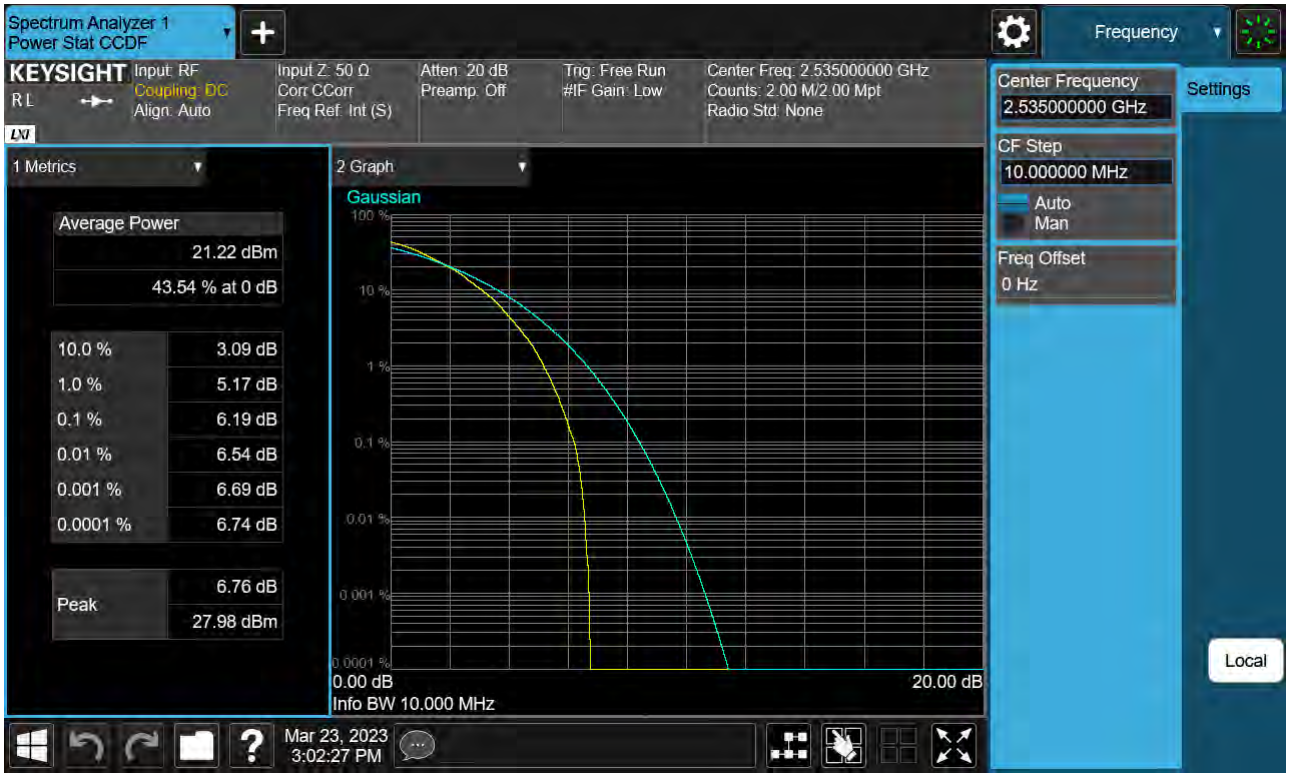


Sub6 n7. PAR Plot (10 M BW_Ch.507000_QPSK)

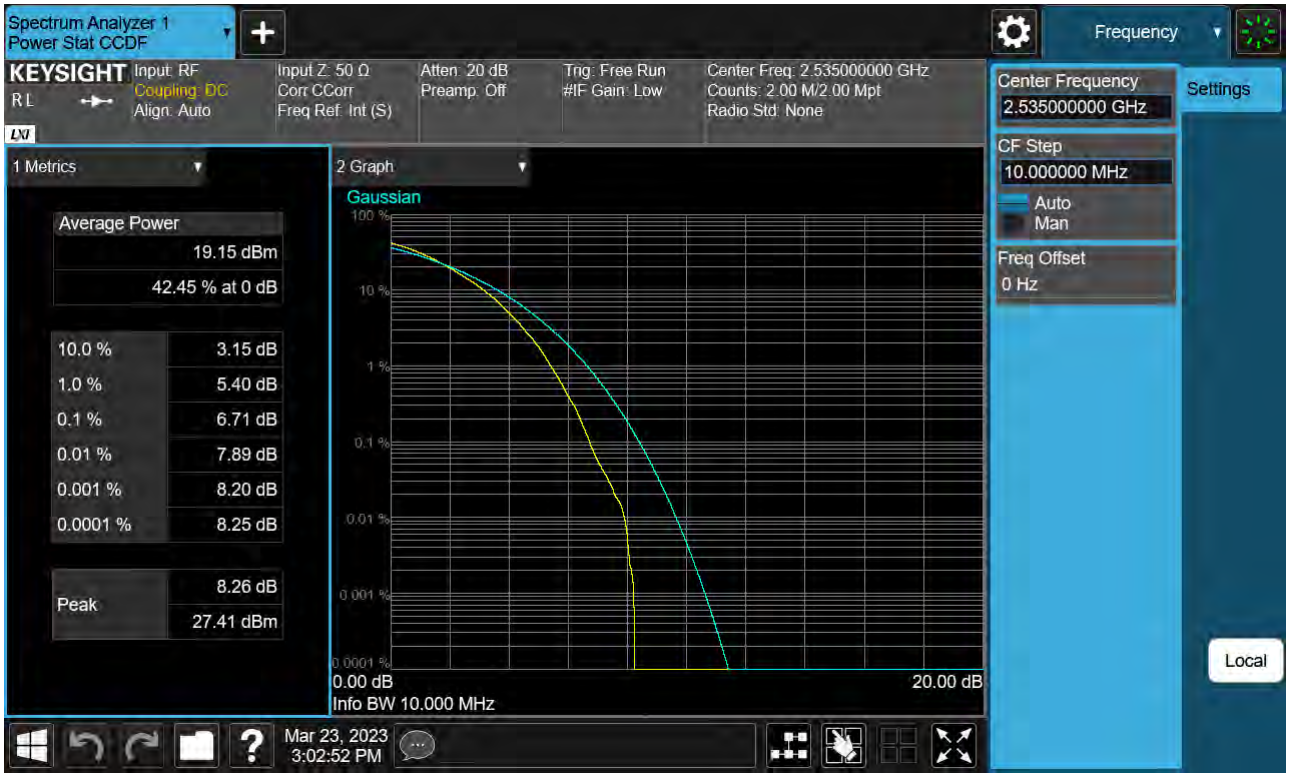


Sub6 n7. PAR Plot (10 M BW_Ch.507000_16QAM)

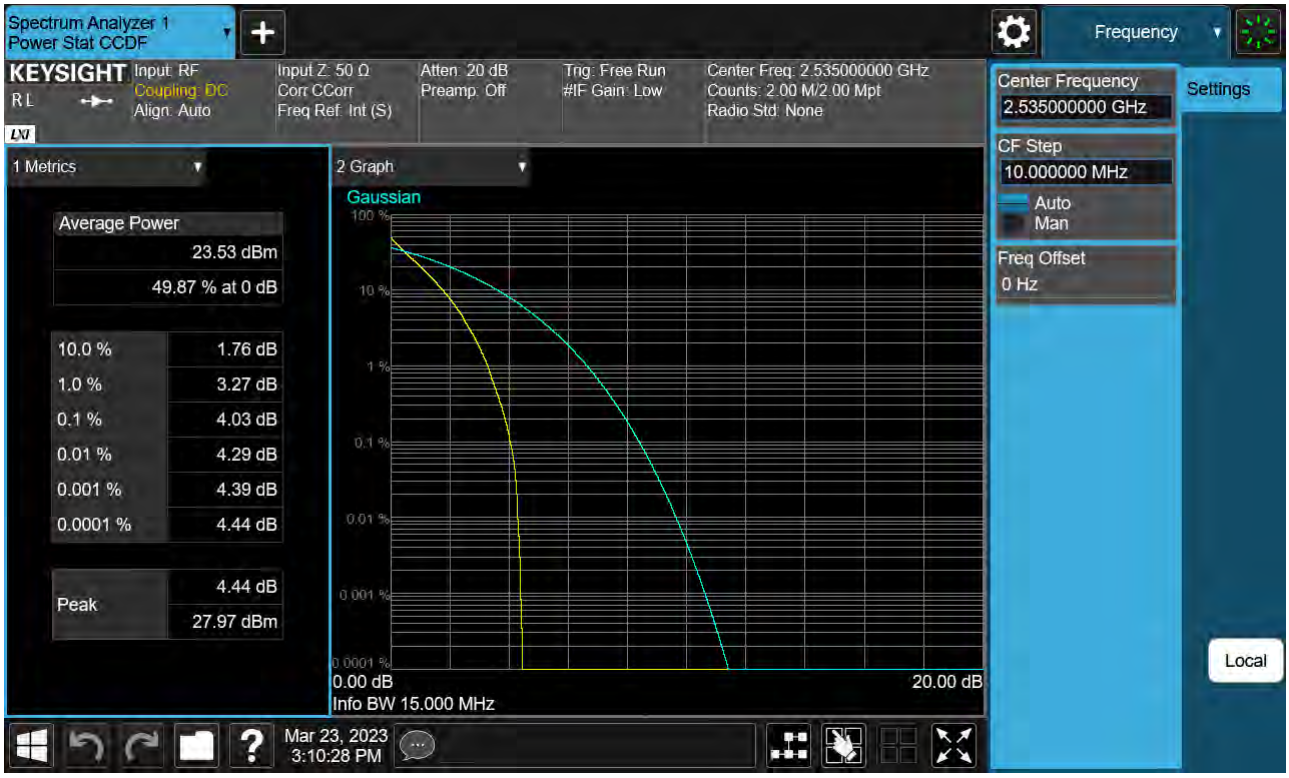
Sub6 n7. PAR Plot (10 M BW_Ch.507000_64QAM)



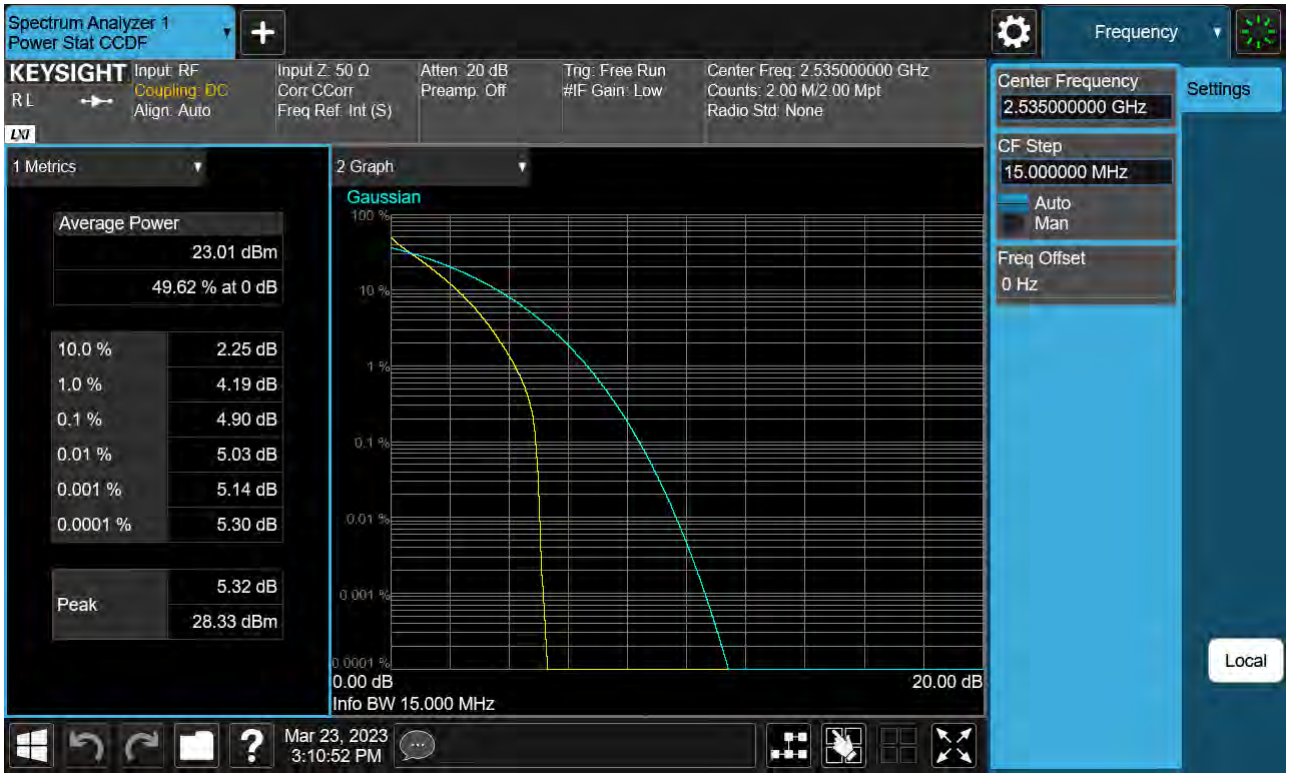
Sub6 n7. PAR Plot (10 M BW_Ch.507000_256QAM)



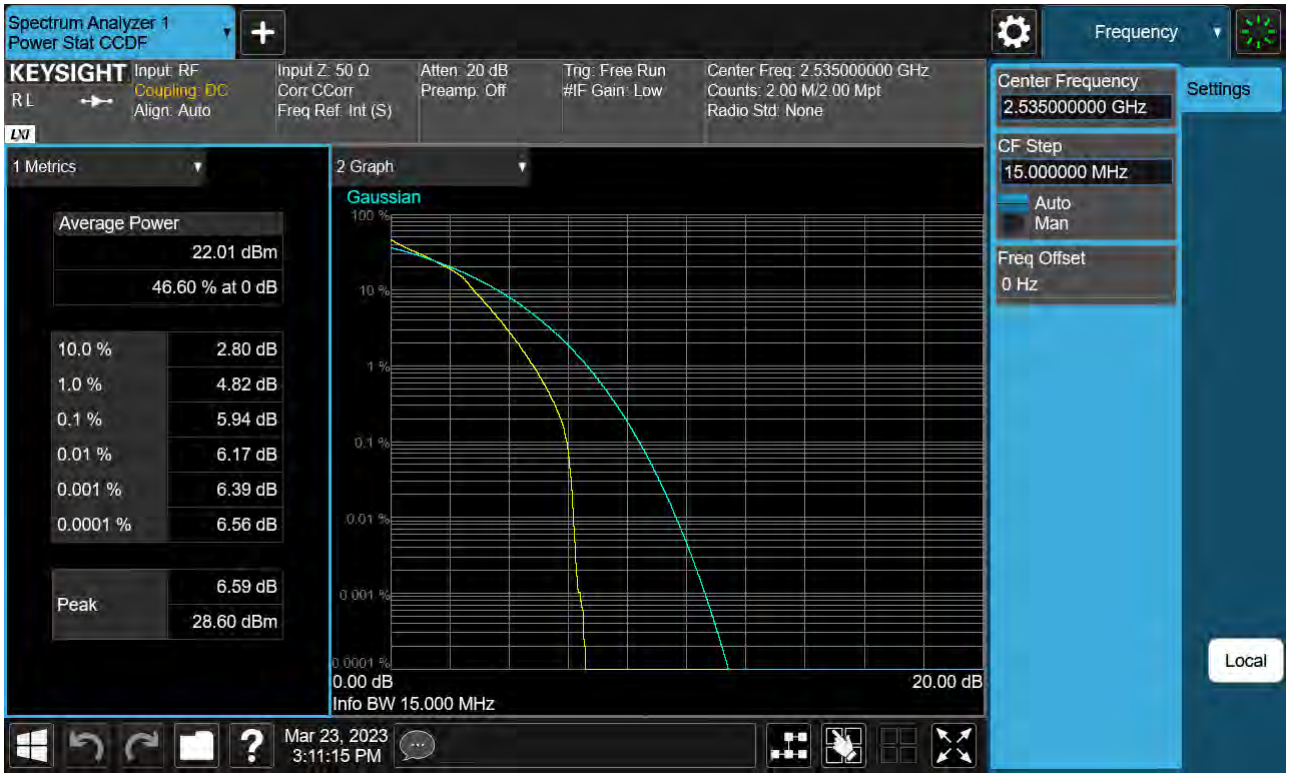
Sub6 n7. PAR Plot (15 M BW_Ch.507000_ BPSK)



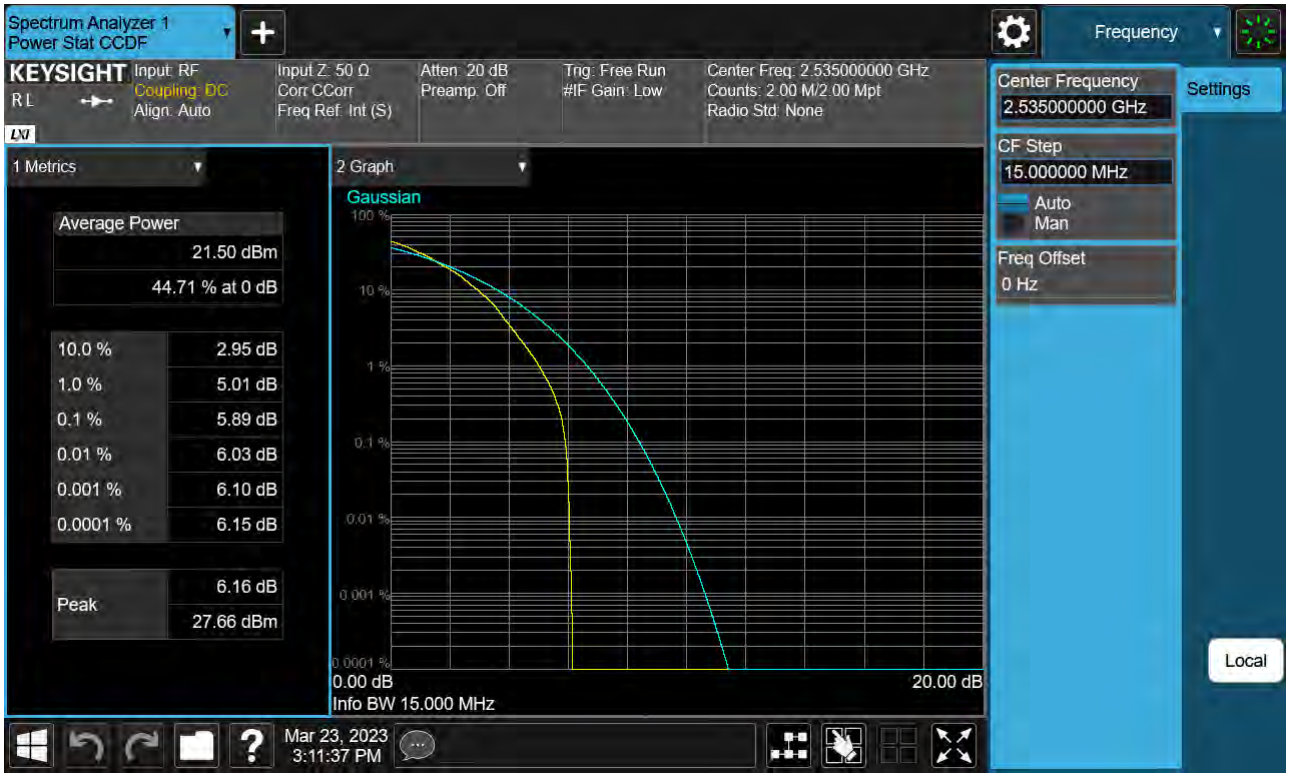
Sub6 n7. PAR Plot (15 M BW_Ch.507000_QPSK)



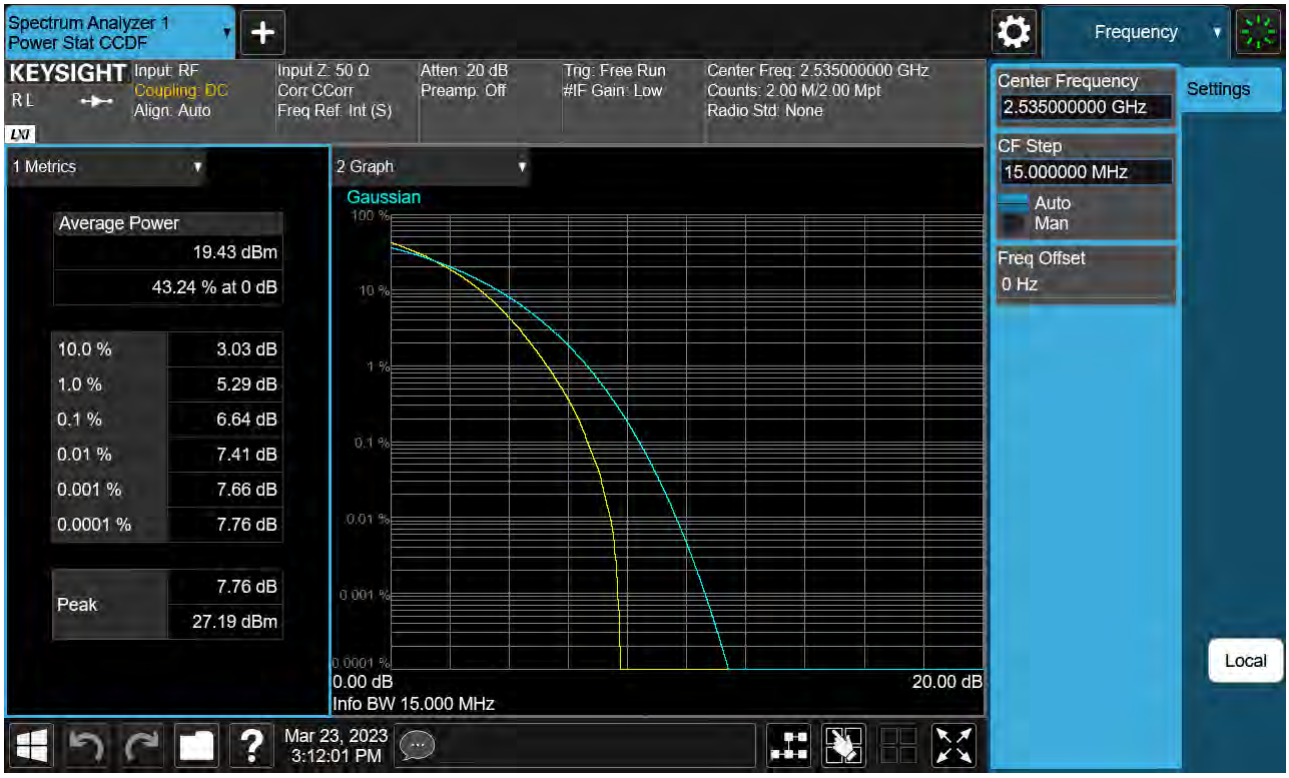
Sub6 n7. PAR Plot (15 M BW_Ch.507000_16QAM)



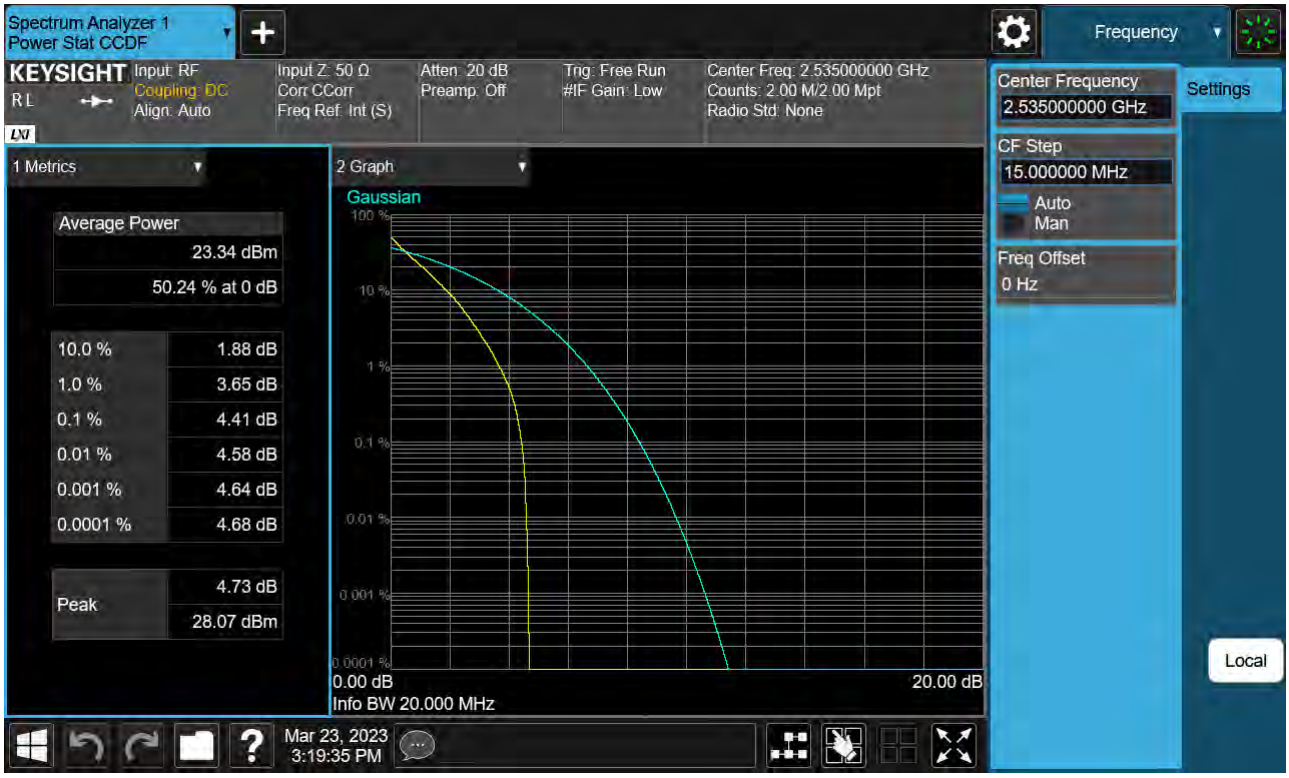
Sub6 n7. PAR Plot (15 M BW_Ch.507000_64QAM)



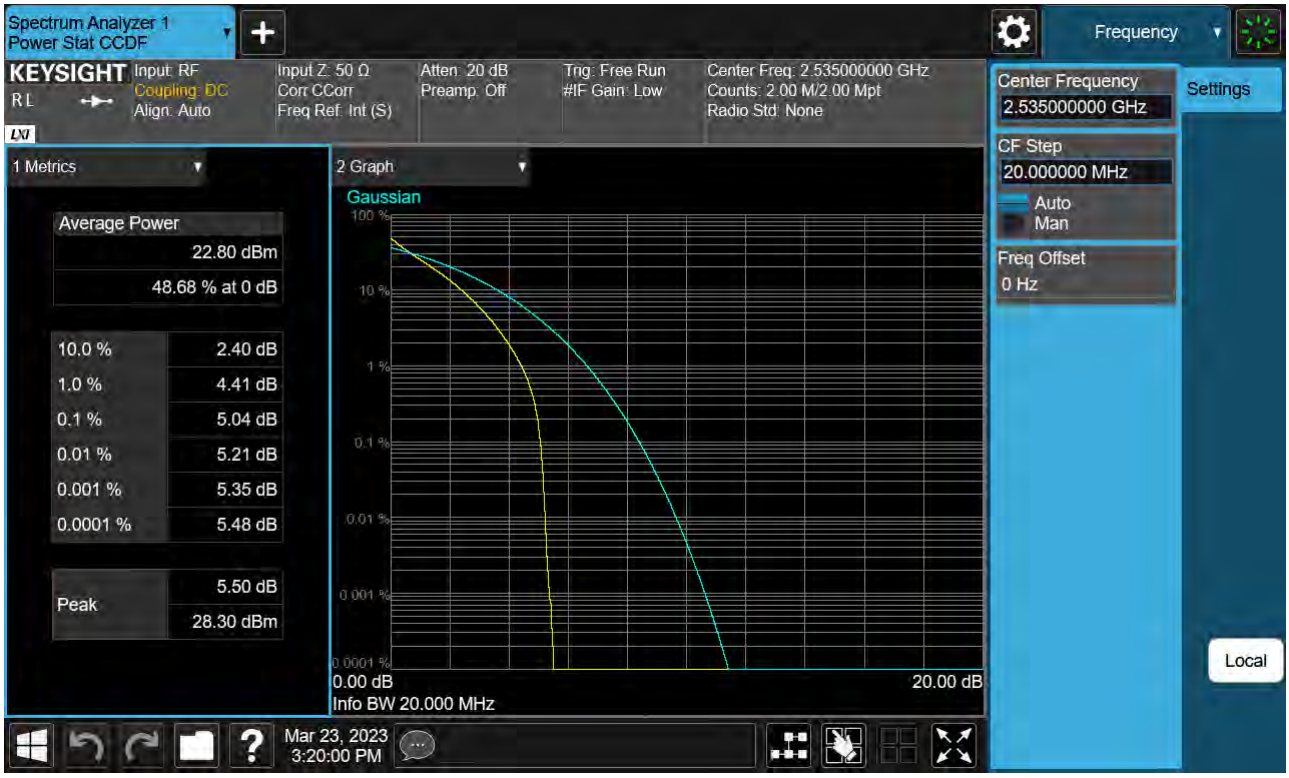
Sub6 n7. PAR Plot (15 M BW_Ch.507000_256QAM)



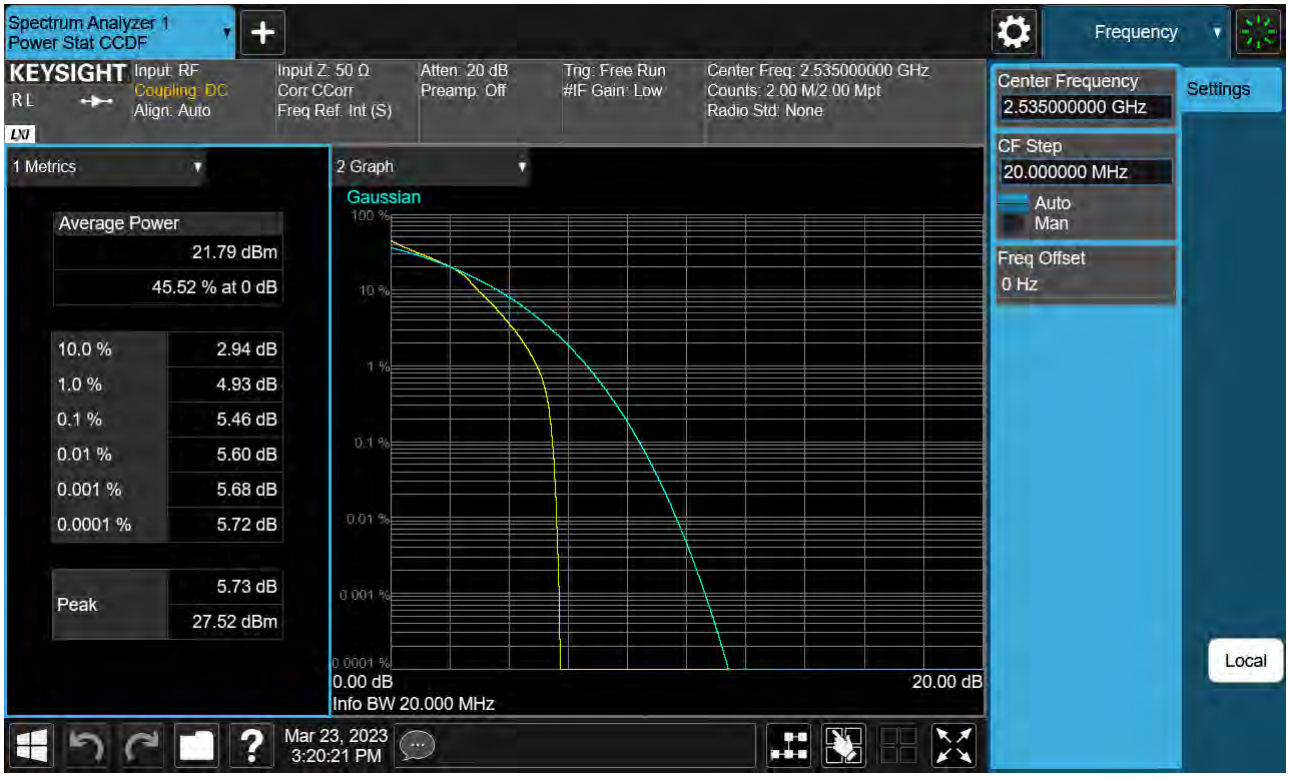
Sub6 n7. PAR Plot (20 M BW_Ch.507000_ BPSK)



Sub6 n7. PAR Plot (20 M BW_Ch.507000_QPSK)



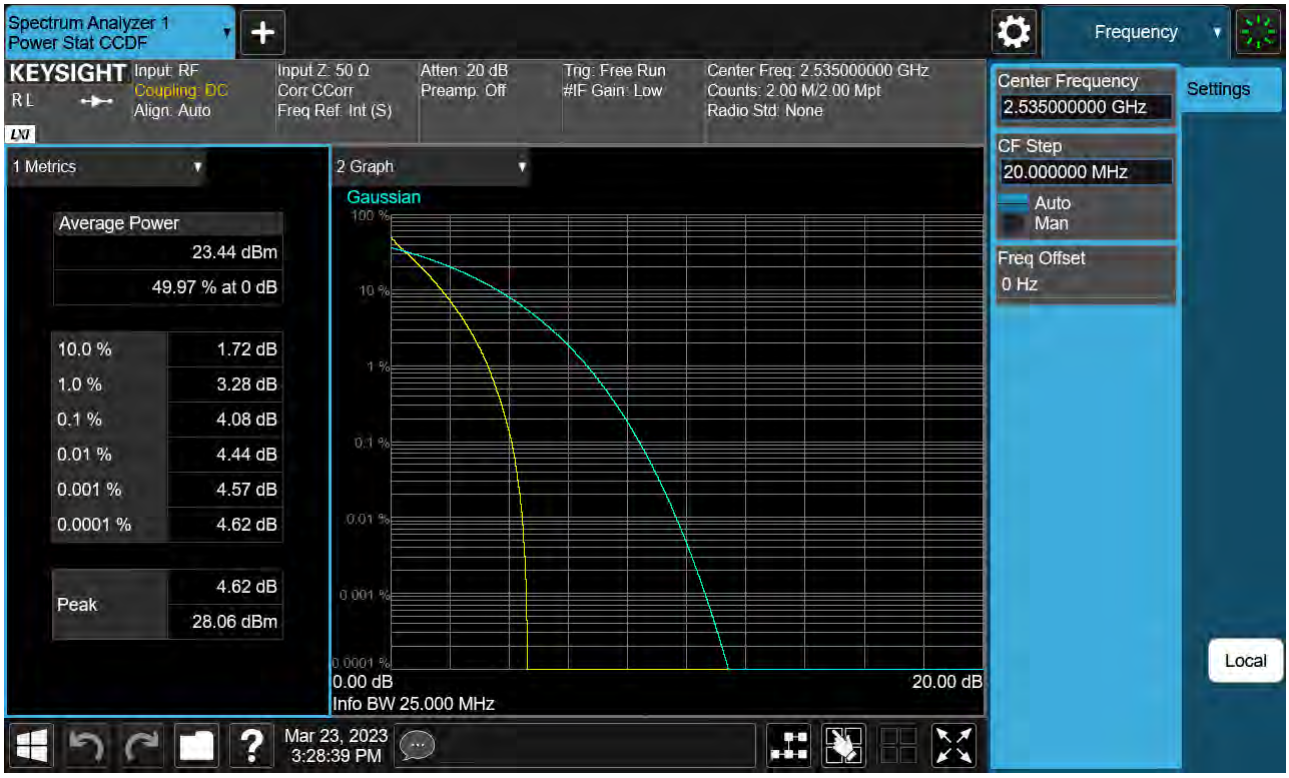
Sub6 n7. PAR Plot (20 M BW_Ch.507000_16QAM)



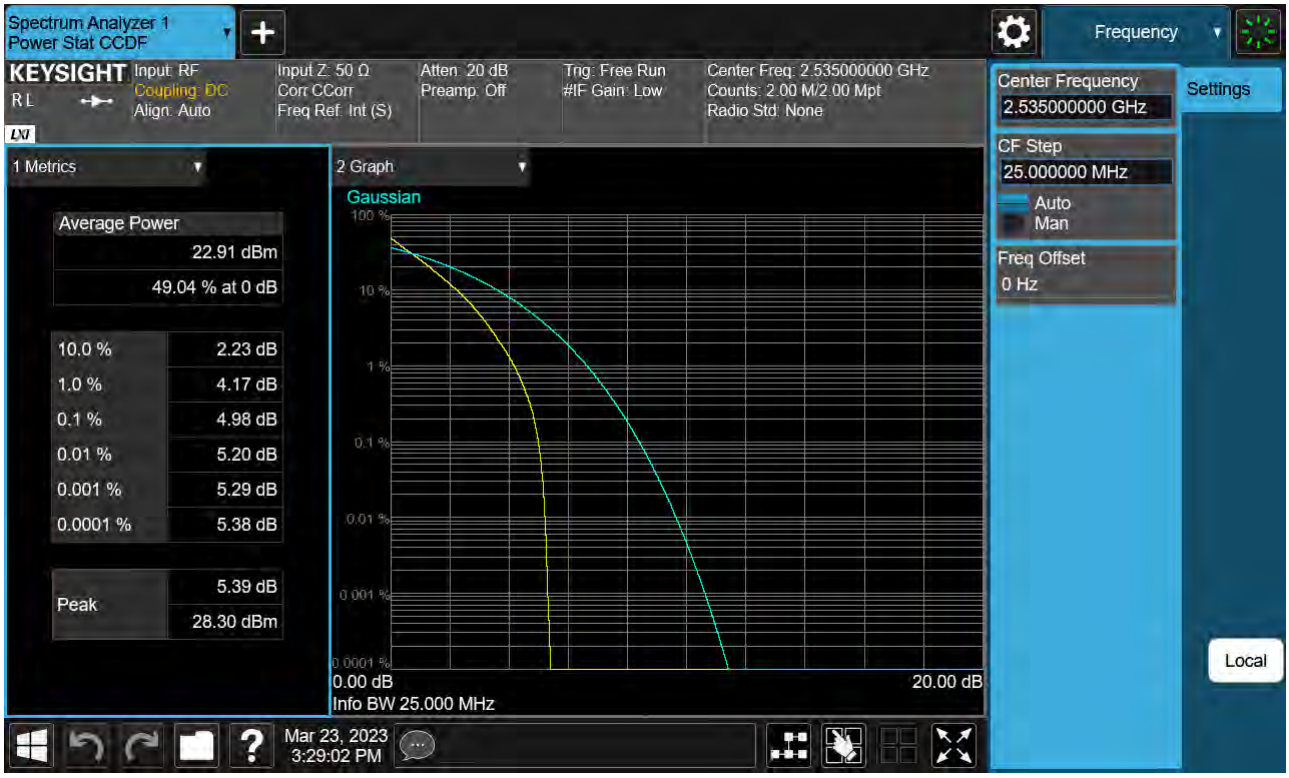
Sub6 n7. PAR Plot (20 M BW_Ch.507000_64QAM)

Sub6 n7. PAR Plot (20 M BW_Ch.507000_256QAM)

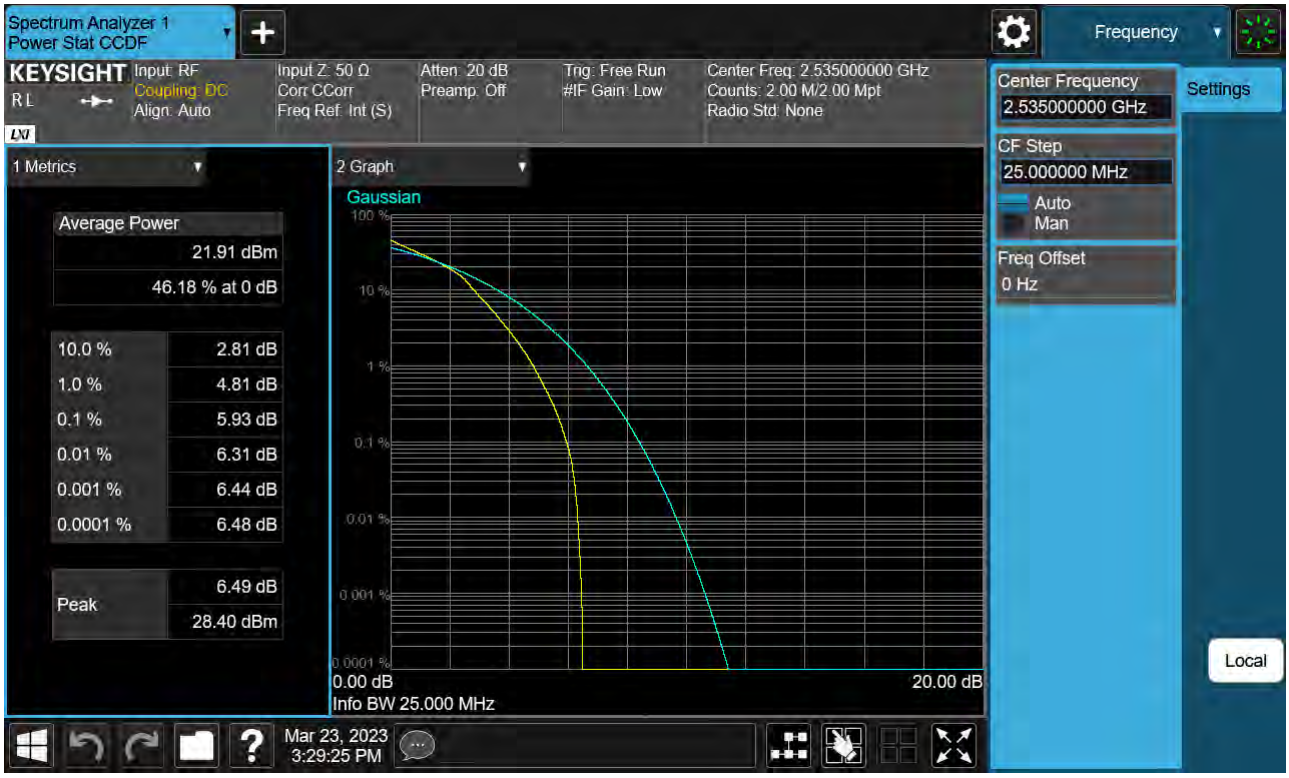
Sub6 n7. PAR Plot (25 M BW_Ch.507000_ BPSK)



Sub6 n7. PAR Plot (25 M BW_Ch.507000_QPSK)



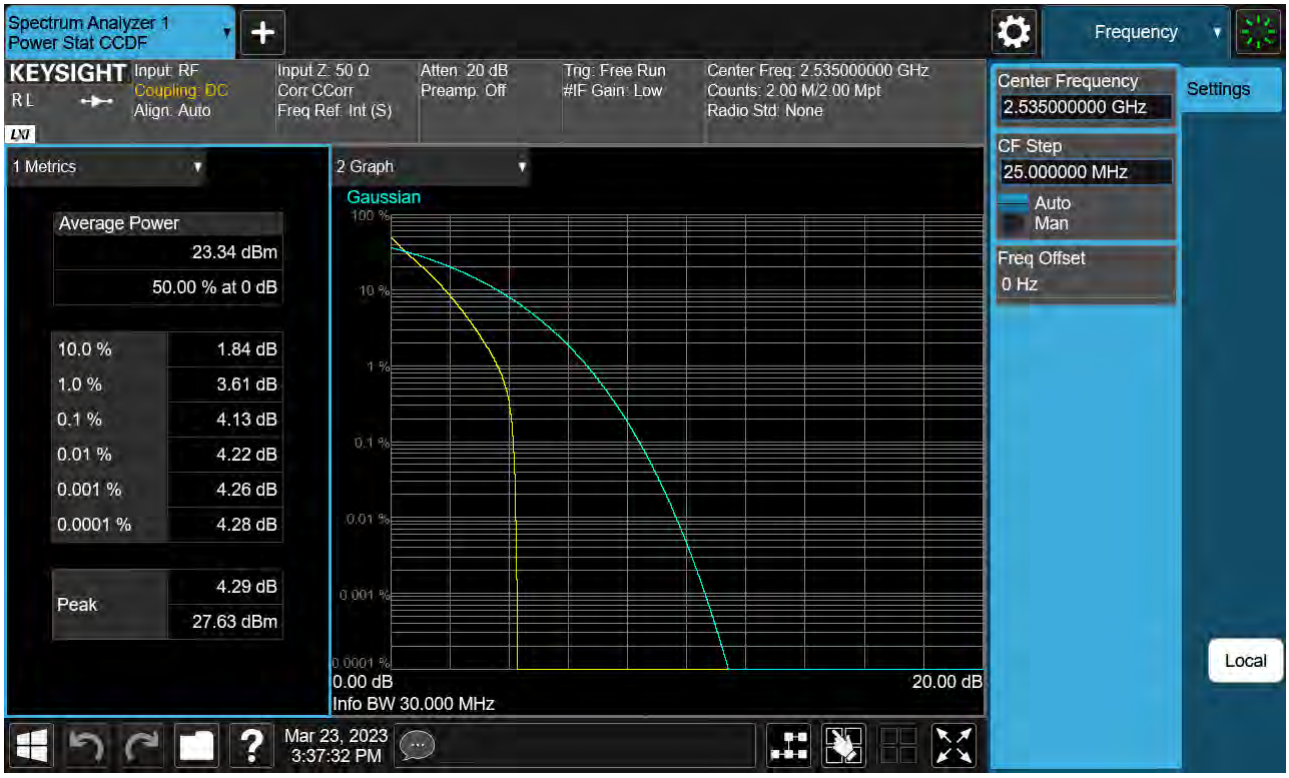
Sub6 n7. PAR Plot (25 M BW_Ch.507000_16QAM)



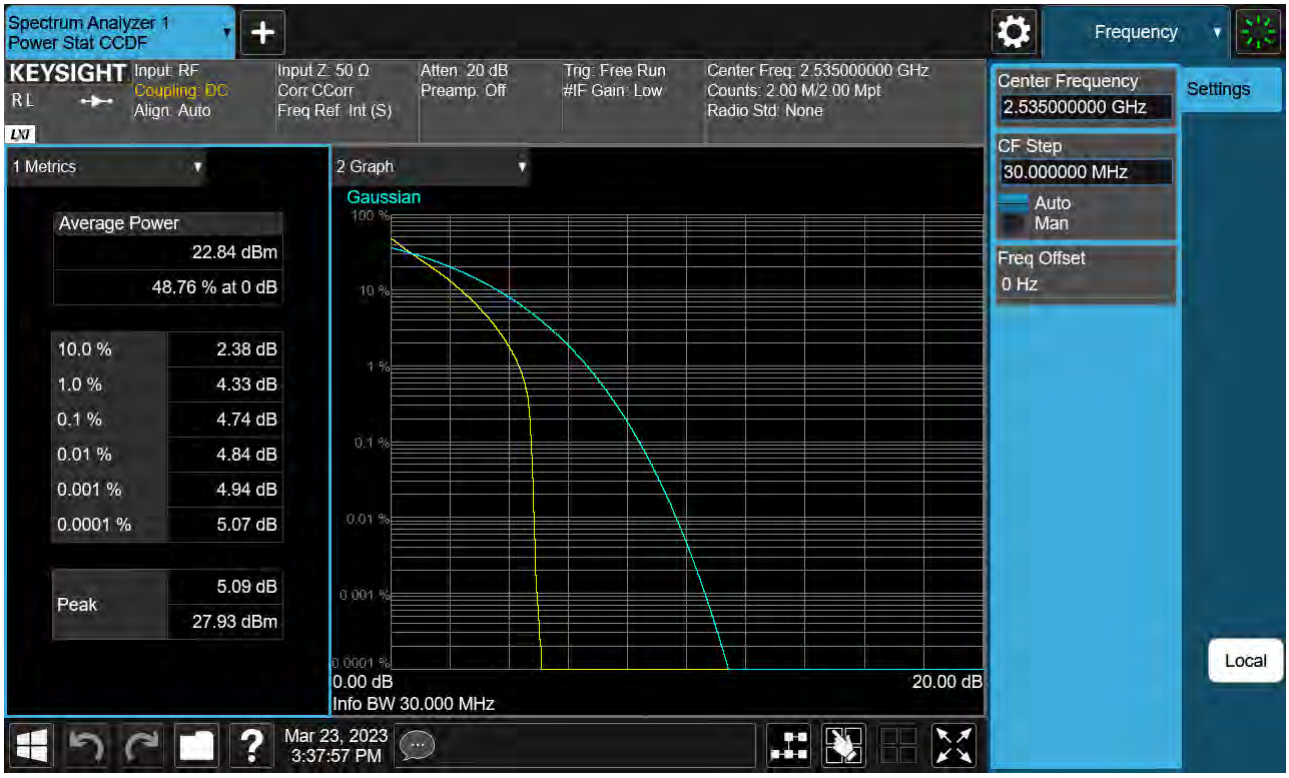
Sub6 n7. PAR Plot (25 M BW_Ch.507000_64QAM)

Sub6 n7. PAR Plot (25 M BW_Ch.507000_256QAM)

Sub6 n7. PAR Plot (30 M BW_Ch.507000_ BPSK)



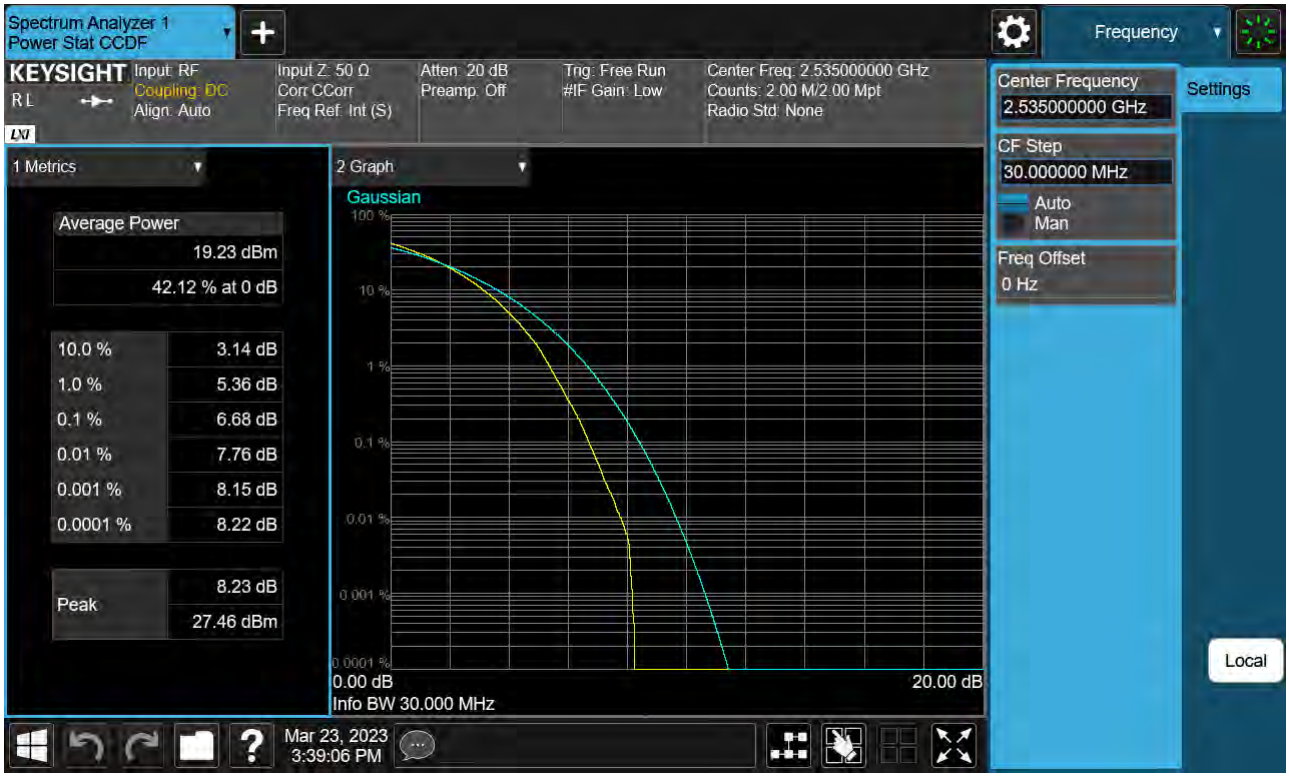
Sub6 n7. PAR Plot (30 M BW_Ch.507000_QPSK)



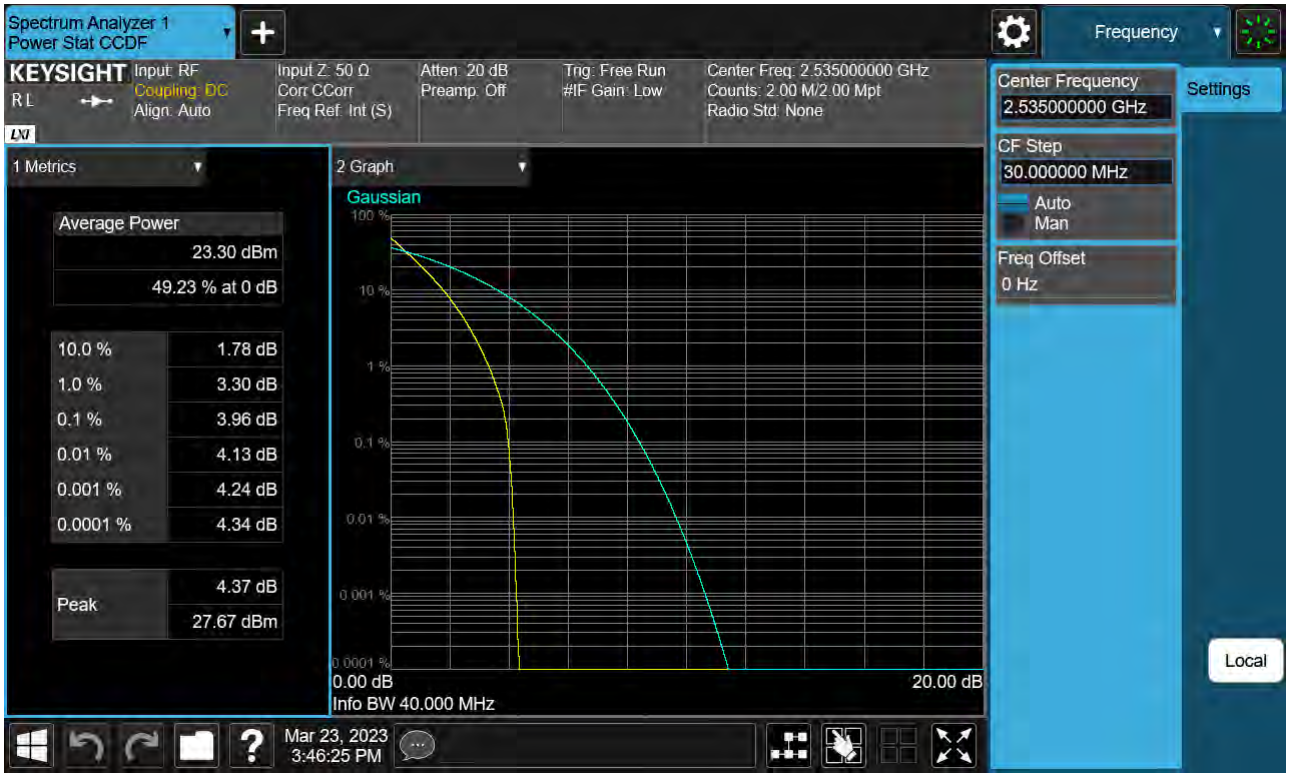
Sub6 n7. PAR Plot (30 M BW_Ch.507000_16QAM)

Sub6 n7. PAR Plot (30 M BW_Ch.507000_64QAM)

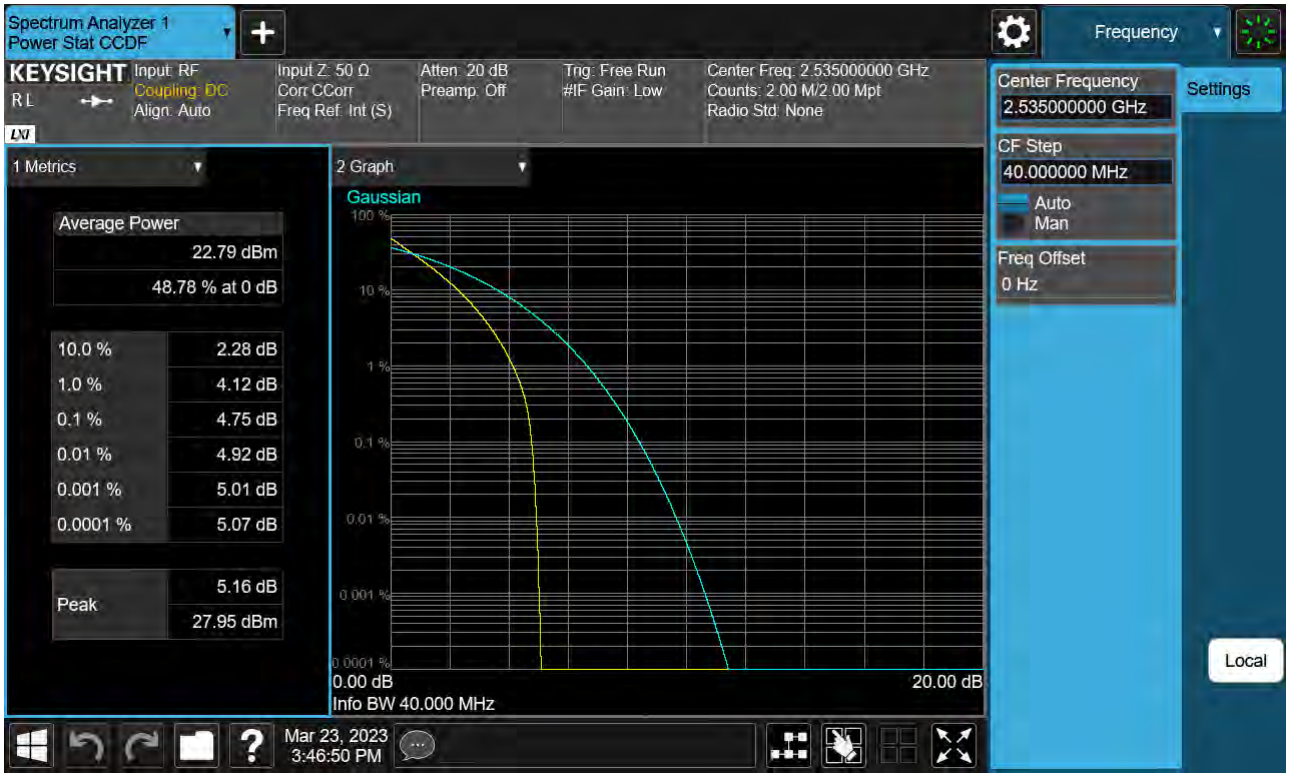
Sub6 n7. PAR Plot (30 M BW_Ch.507000_256QAM)



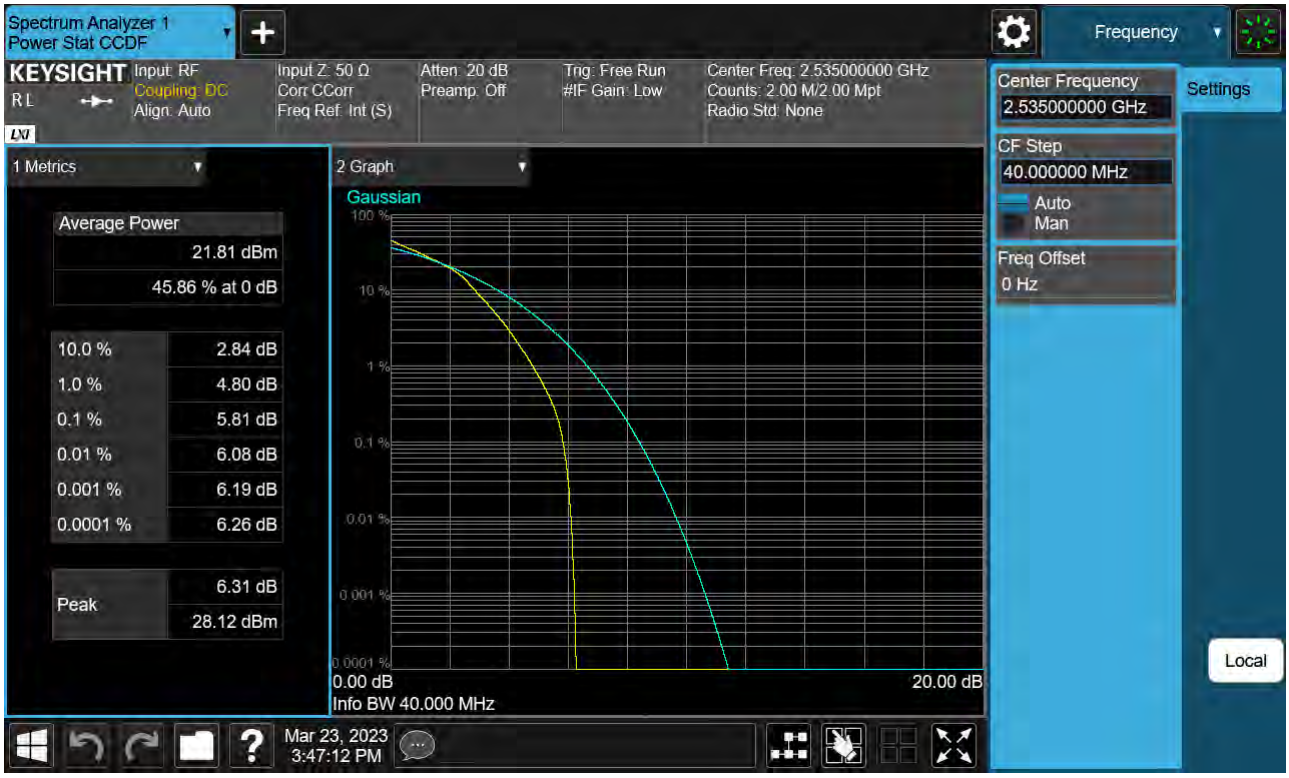
Sub6 n7. PAR Plot (40 M BW_Ch.507000_ BPSK)



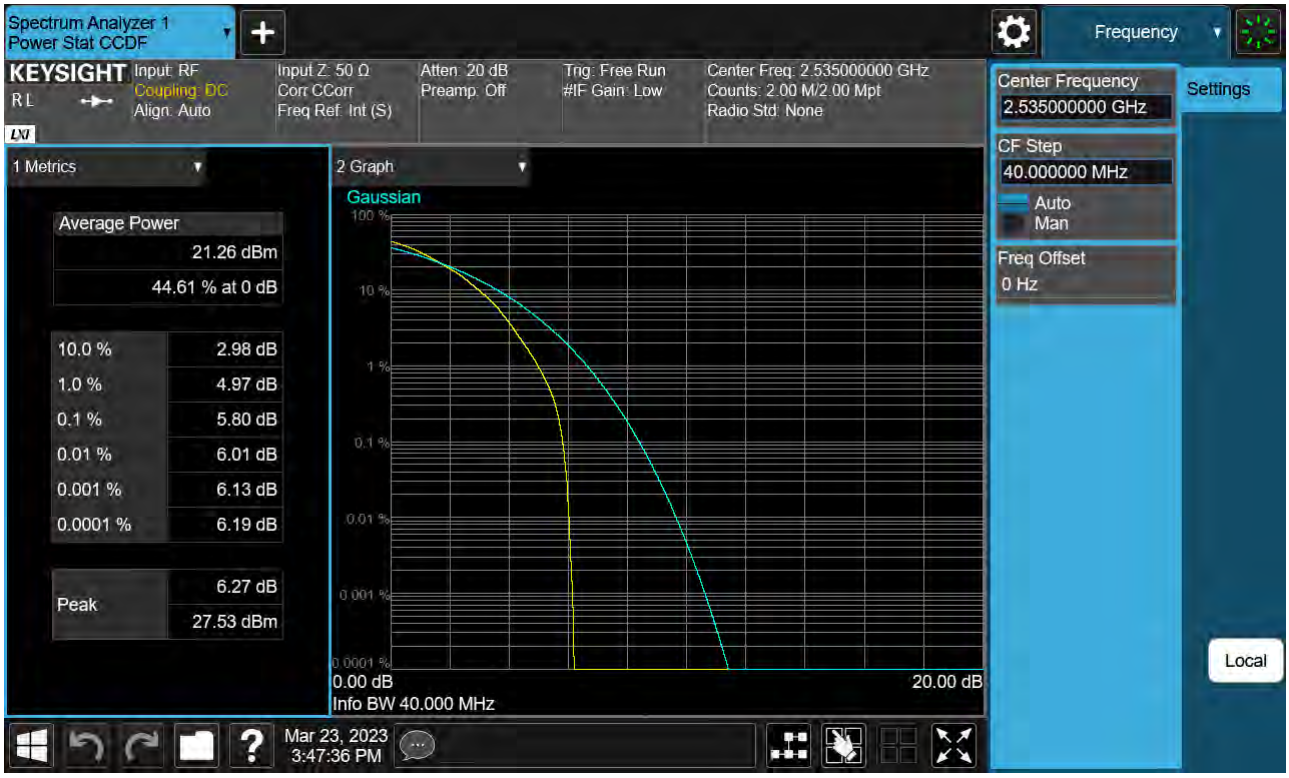
Sub6 n7. PAR Plot (40 M BW_Ch.507000_QPSK)



Sub6 n7. PAR Plot (40 M BW_Ch.507000_16QAM)

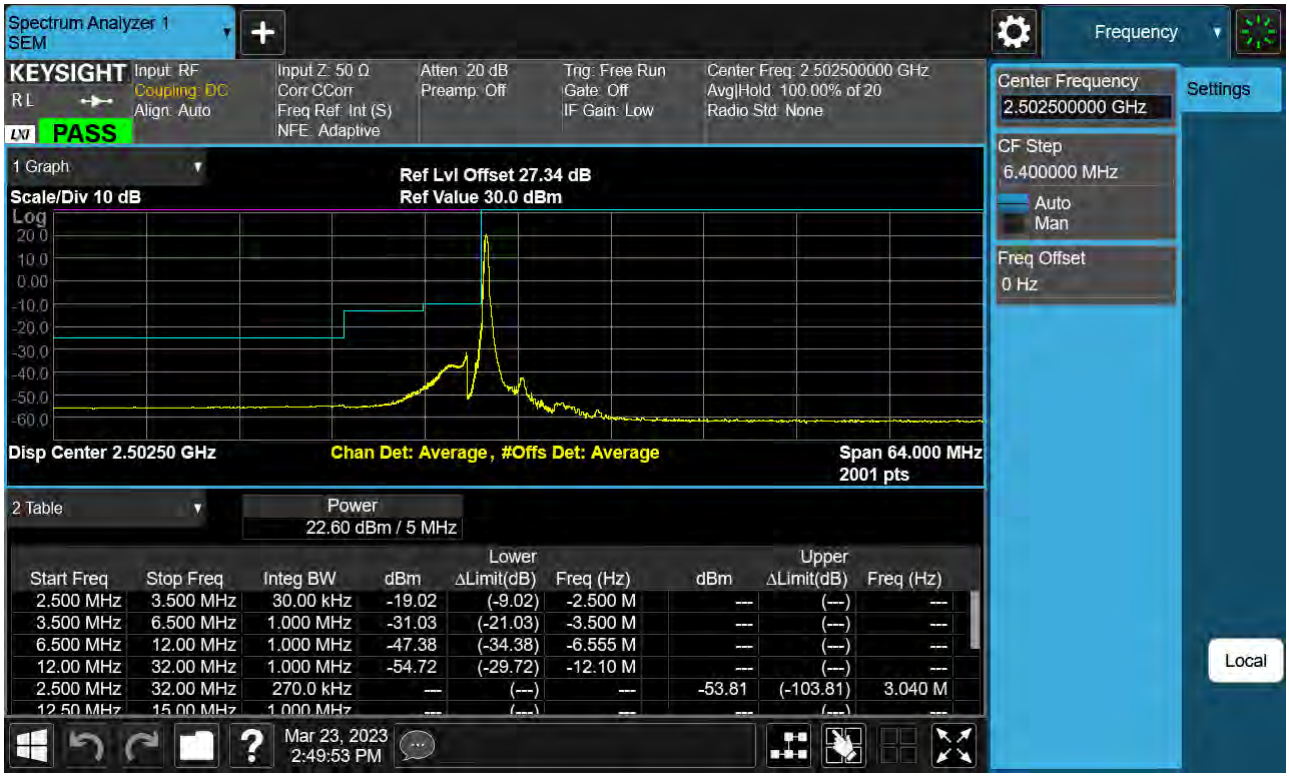


Sub6 n7. PAR Plot (40 M BW_Ch.507000_64QAM)



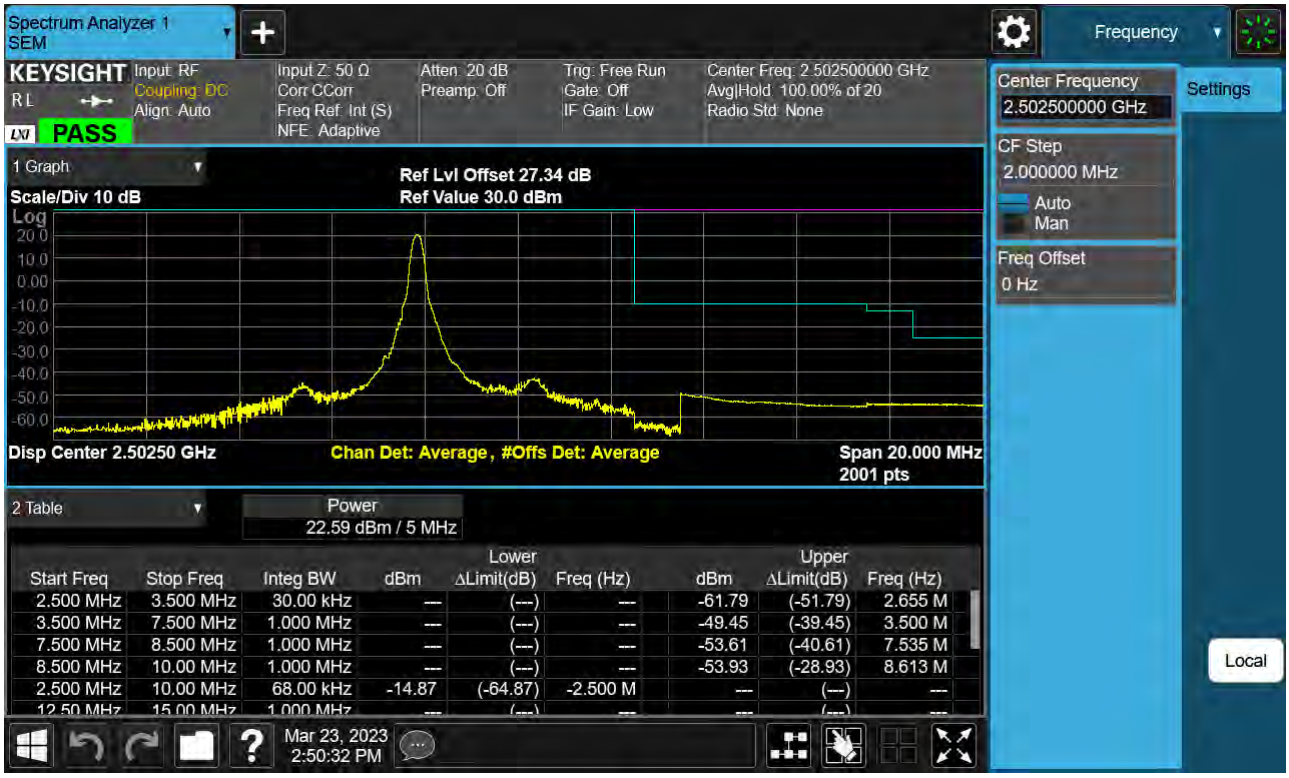
Sub6 n7. PAR Plot (40 M BW_Ch.507000_256QAM)

Sub6 n7. Low Channel Edge Plot (5 MHz Ch.500500 BPSK RB 1)-1



Sub6 n7. Low Channel Edge Plot (5 MHz Ch.500500 BPSK)-1

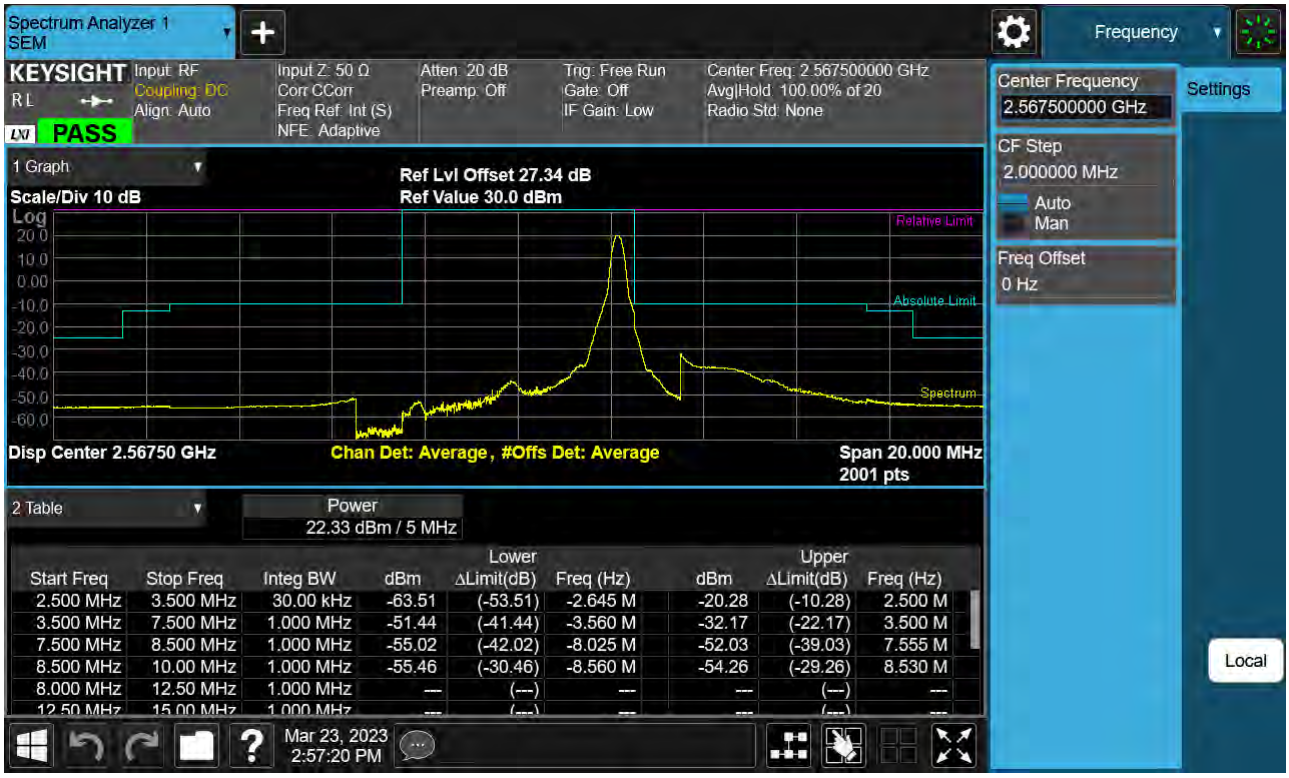
Sub6 n7. Low Channel Edge Plot (5 MHz Ch.500500 BPSK_RB 1)-2



Sub6 n7. Low Channel Edge Plot (5 MHz Ch.500500 BPSK)-2

Sub6 n7. Mid Channel Edge Plot (5 MHz Ch.507000 BPSK)

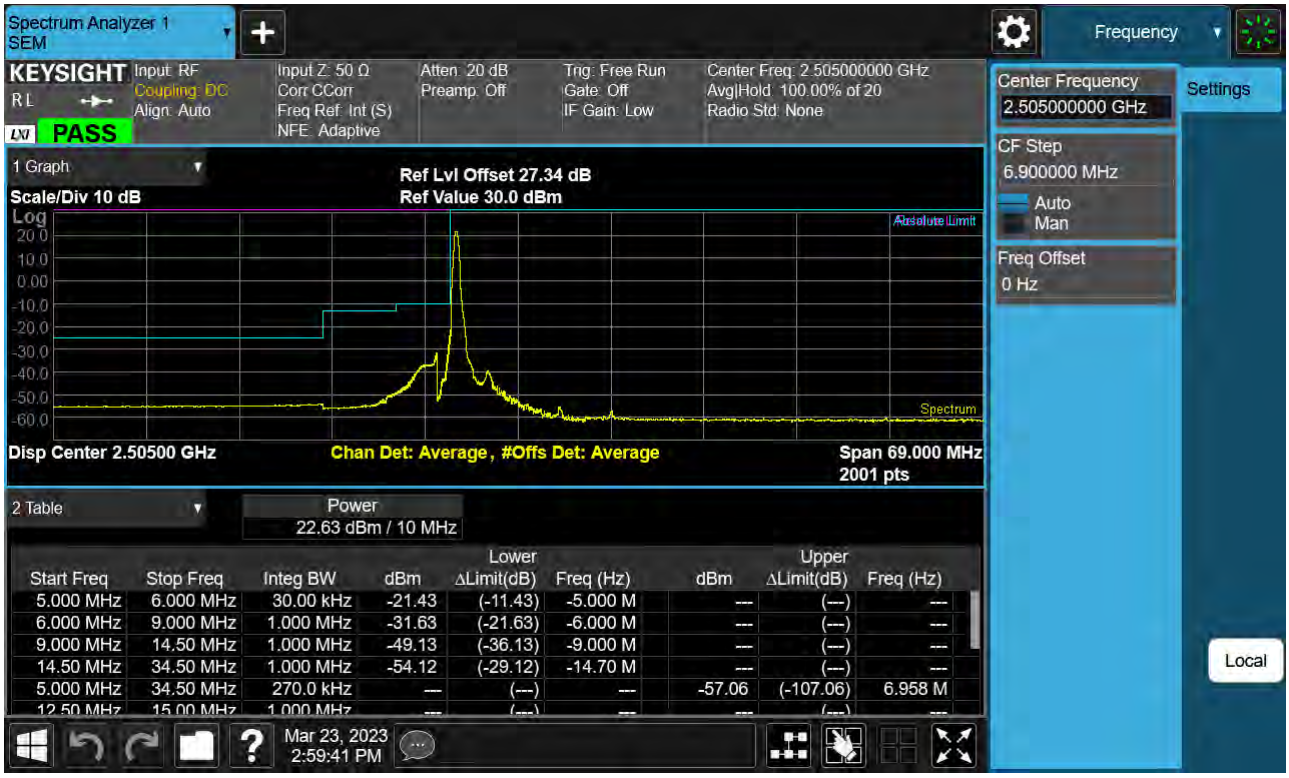
Sub6 n7. High Channel Edge Plot (5 MHz Ch.513500 BPSK RB 1)



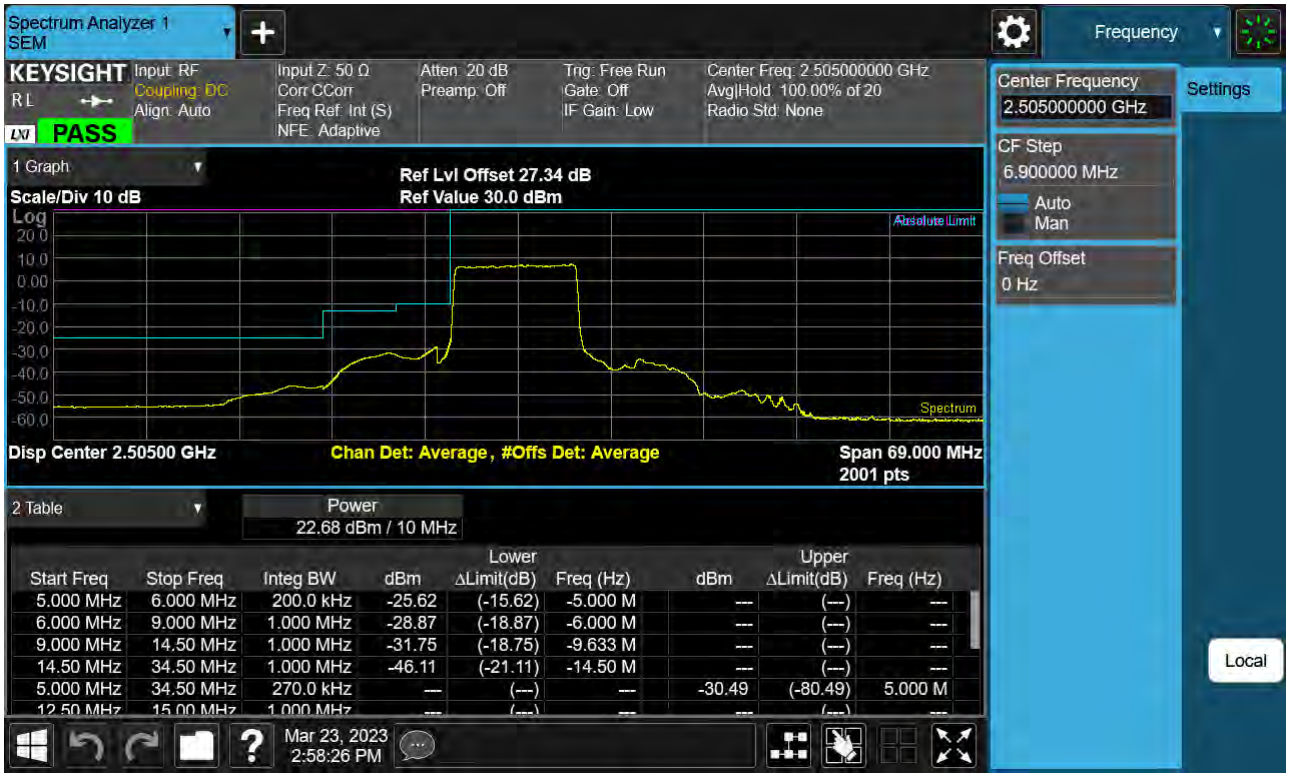
			Lower			Upper		
Start Freq	Stop Freq	Integ BW	dBm	ΔLimit(dB)	Freq (Hz)	dBm	ΔLimit(dB)	Freq (Hz)
2.500 MHz	3.500 MHz	30.00 kHz	-63.51	(-53.51)	-2.645 M	-20.28	(-10.28)	2.500 M
3.500 MHz	7.500 MHz	1.000 MHz	-51.44	(-41.44)	-3.560 M	-32.17	(-22.17)	3.500 M
7.500 MHz	8.500 MHz	1.000 MHz	-55.02	(-42.02)	-8.025 M	-52.03	(-39.03)	7.555 M
8.500 MHz	10.00 MHz	1.000 MHz	-55.46	(-30.46)	-8.560 M	-54.26	(-29.26)	8.530 M
8.000 MHz	12.50 MHz	1.000 MHz	---	(---)	---	---	(---)	---
12.50 MHz	15.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---

Sub6 n7. High Channel Edge Plot (5 MHz Ch.513500 BPSK)

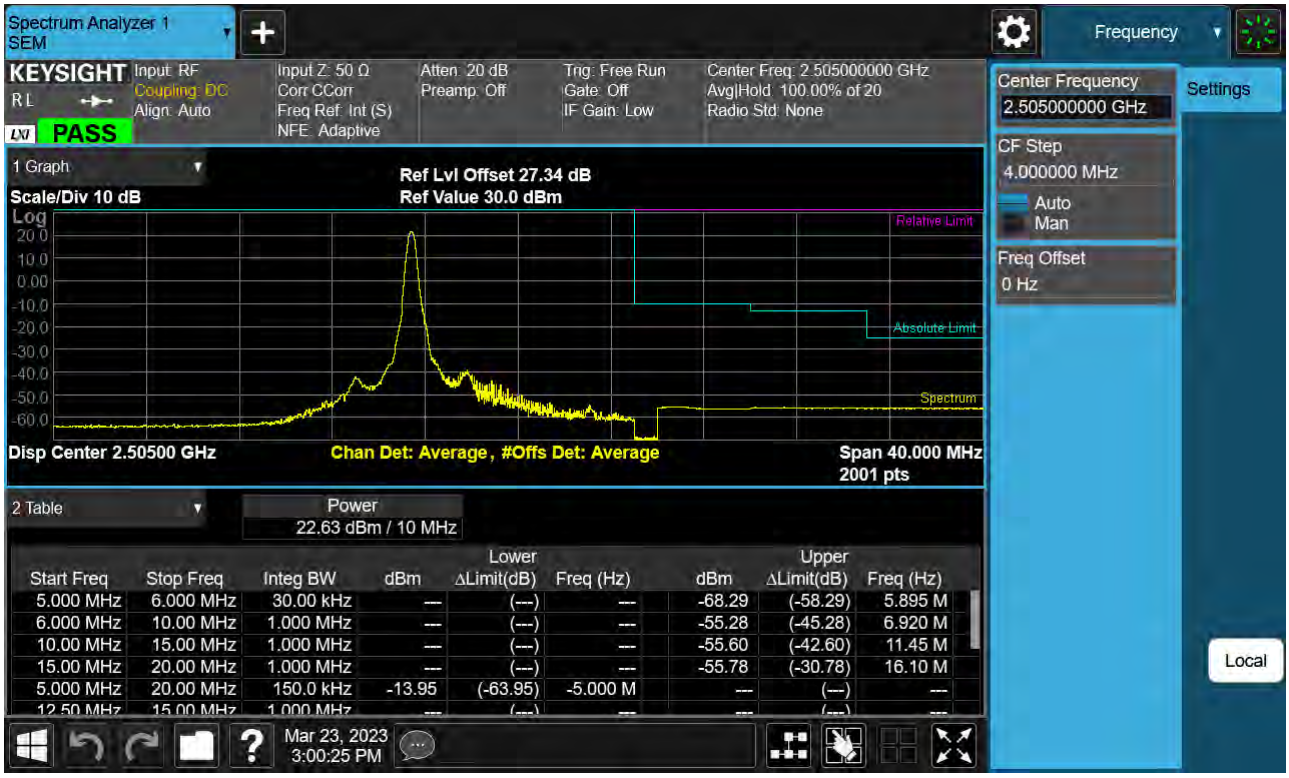
Sub6 n7. Low Channel Edge Plot (10 MHz Ch.501000 BPSK RB 1)-1



Sub6 n7. Low Channel Edge Plot (10 MHz Ch.501000 BPSK)-1



Sub6 n7. Low Channel Edge Plot (10 MHz Ch.501000 BPSK RB 1)-2

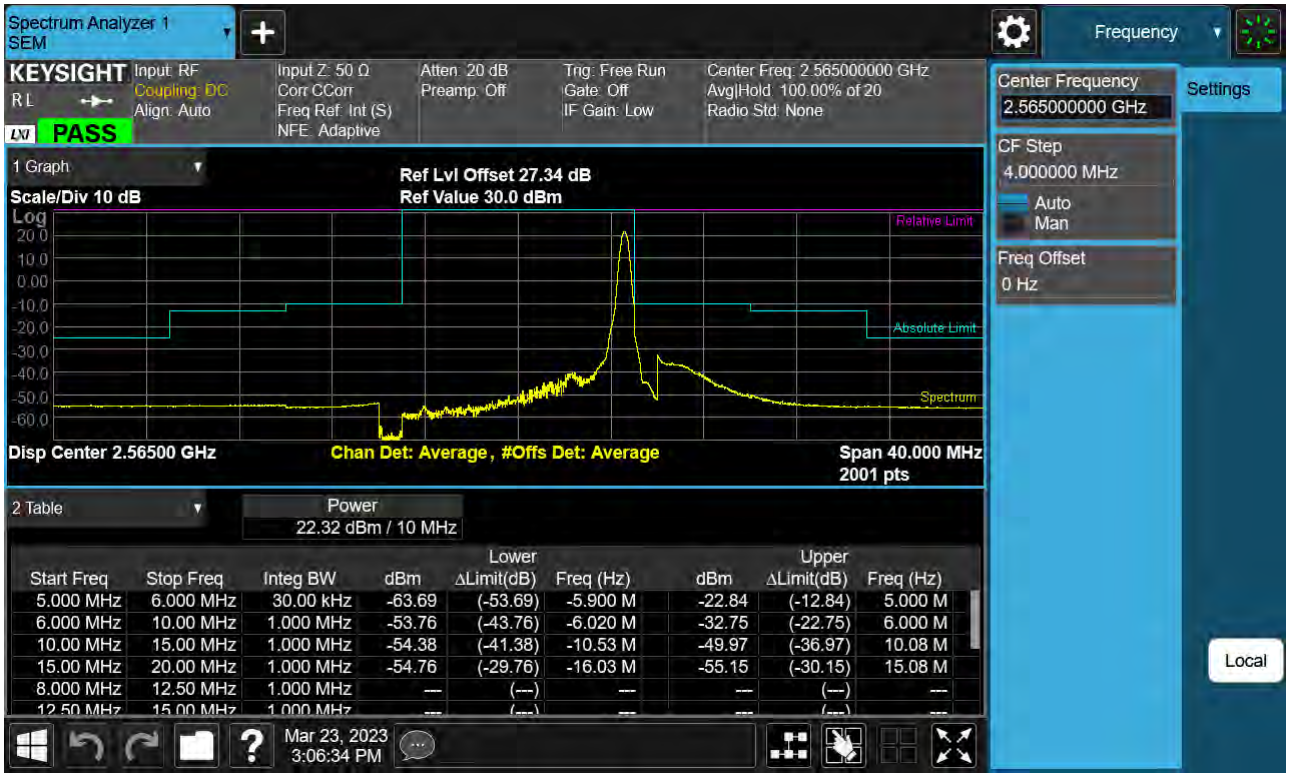


Sub6 n7. Low Channel Edge Plot (10 MHz Ch.501000 BPSK)-2

Sub6 n7. Mid Channel Edge Plot (10 MHz Ch.507000 BPSK)

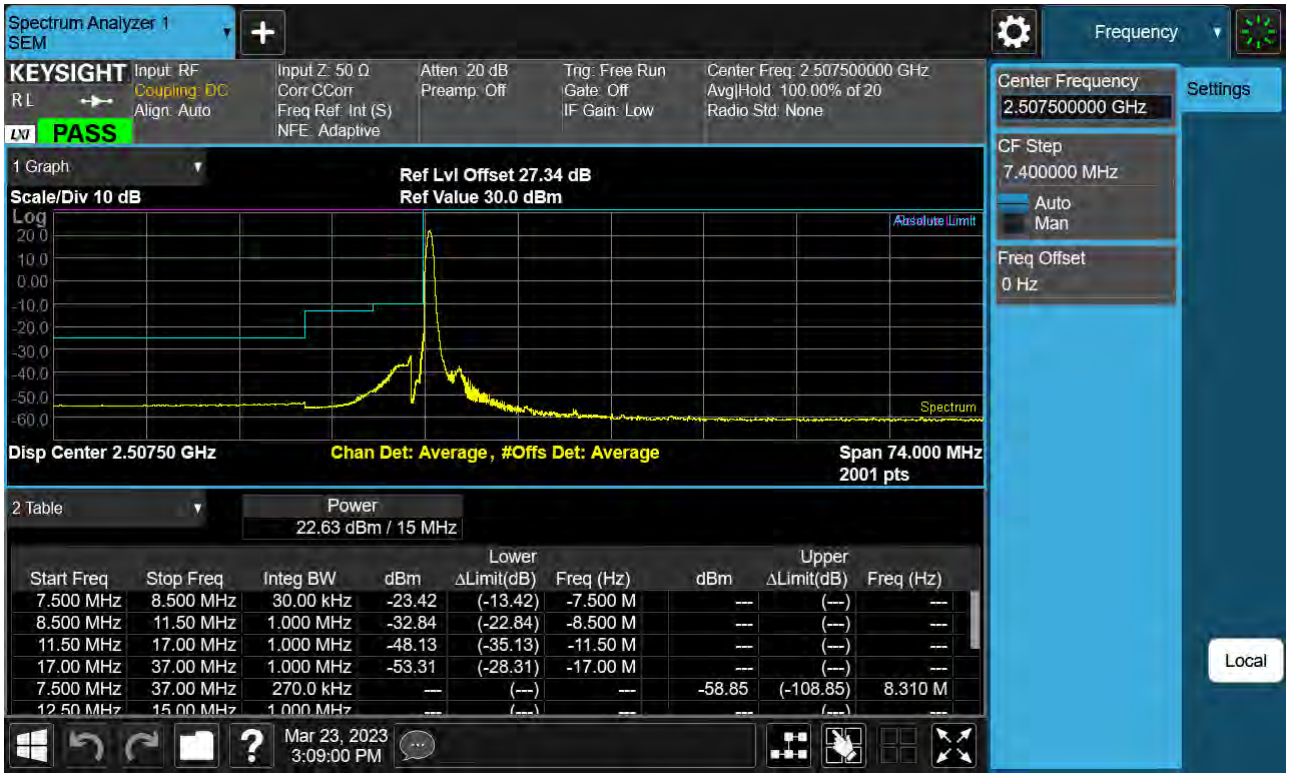
			Lower			Upper		
Start Freq	Stop Freq	Integ BW	dBm	ΔLimit(dB)	Freq (Hz)	dBm	ΔLimit(dB)	Freq (Hz)
5.000 MHz	6.000 MHz	200.0 kHz	-22.79	(-12.79)	-5.000 M	-29.00	(-19.00)	5.000 M
6.000 MHz	10.00 MHz	1.000 MHz	-24.62	(-14.62)	-6.000 M	-25.30	(-15.30)	6.000 M
10.00 MHz	15.00 MHz	1.000 MHz	-30.09	(-17.09)	-10.00 M	-30.76	(-17.76)	10.00 M
15.00 MHz	20.00 MHz	1.000 MHz	-41.43	(-16.43)	-15.23 M	-41.39	(-16.39)	15.00 M
8.000 MHz	12.50 MHz	1.000 MHz	---	(---)	---	---	(---)	---
12.50 MHz	15.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---

Sub6 n7. High Channel Edge Plot (10 MHz Ch.513000 BPSK RB 1)



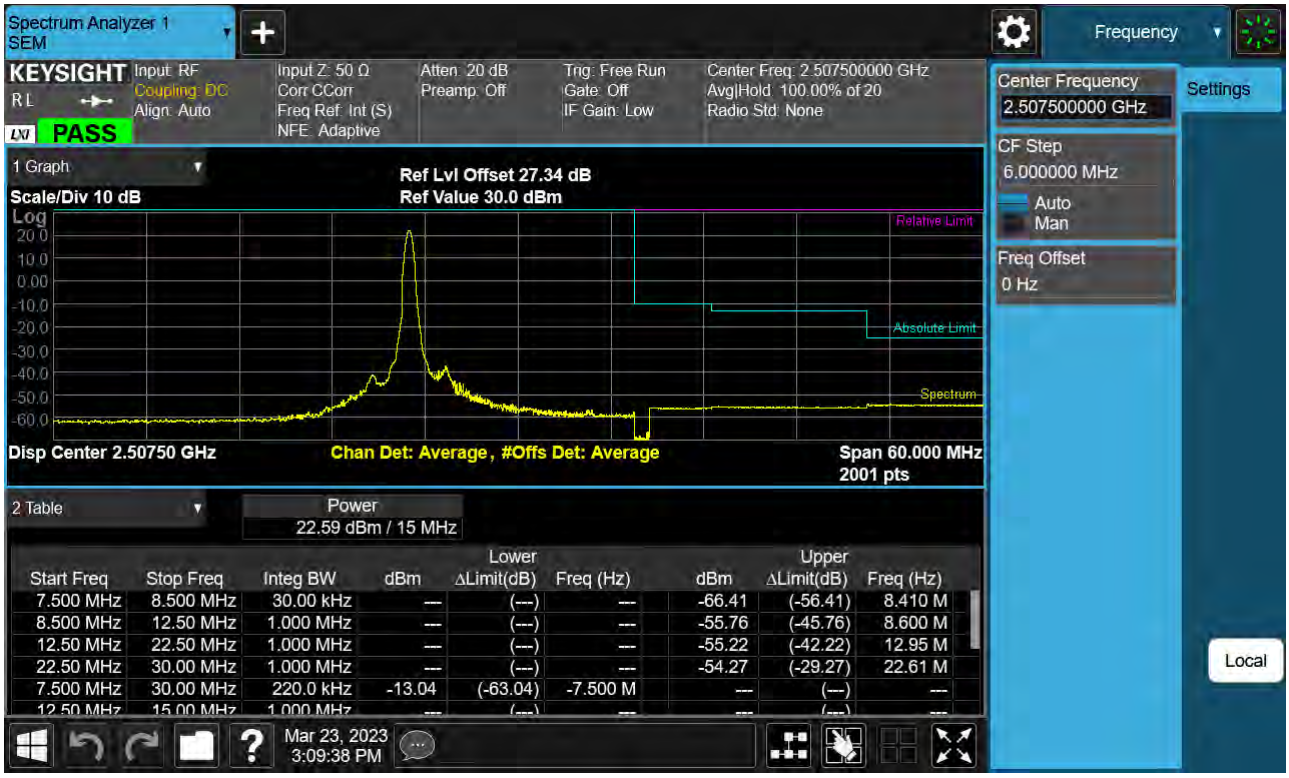
Sub6 n7. High Channel Edge Plot (10 MHz Ch.513000 BPSK)

Sub6 n7. Low Channel Edge Plot (15 MHz Ch.501500 BPSK RB 1)-1



Sub6 n7. Low Channel Edge Plot (15 MHz Ch.501500 BPSK)-1

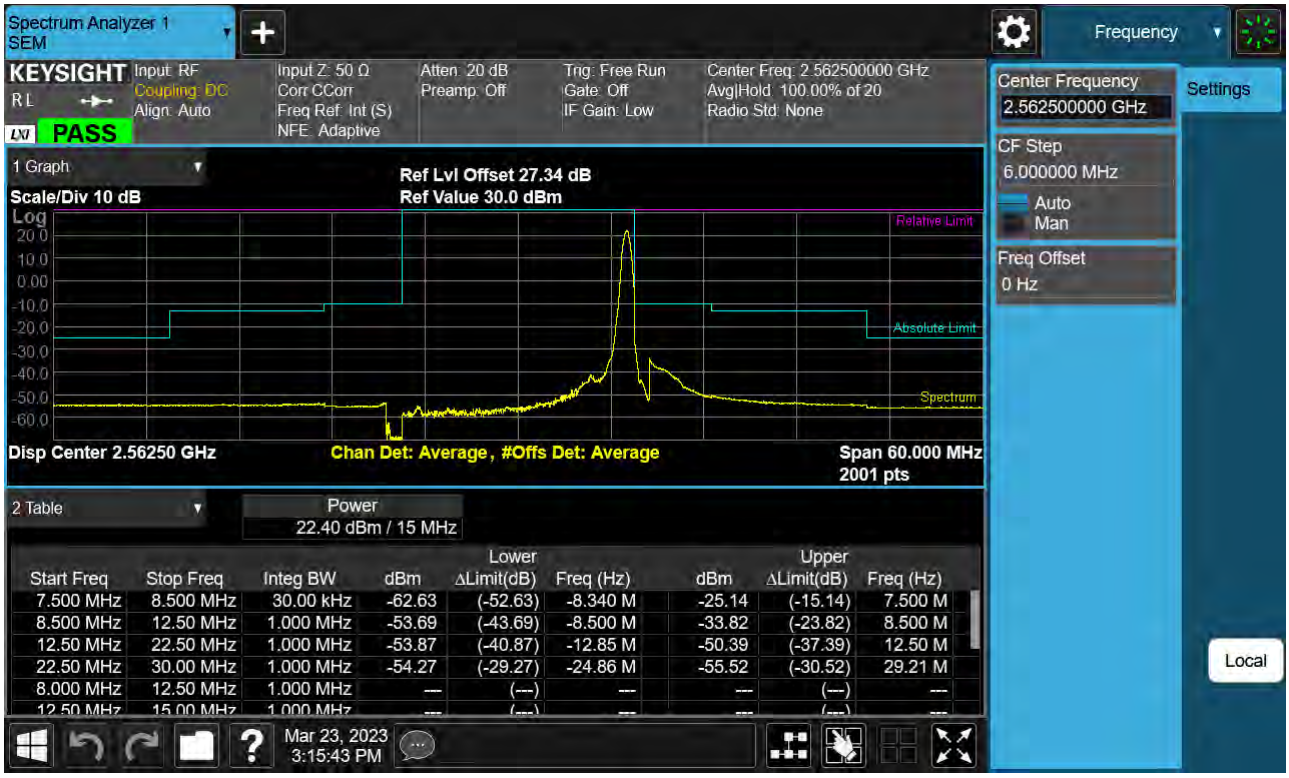
Sub6 n7. Low Channel Edge Plot (15 MHz Ch.501500 BPSK_RB1)-2



Sub6 n7. Low Channel Edge Plot (15 MHz Ch.501500 BPSK)-2

Sub6 n7. Mid Channel Edge Plot (15 MHz Ch.507000 BPSK)

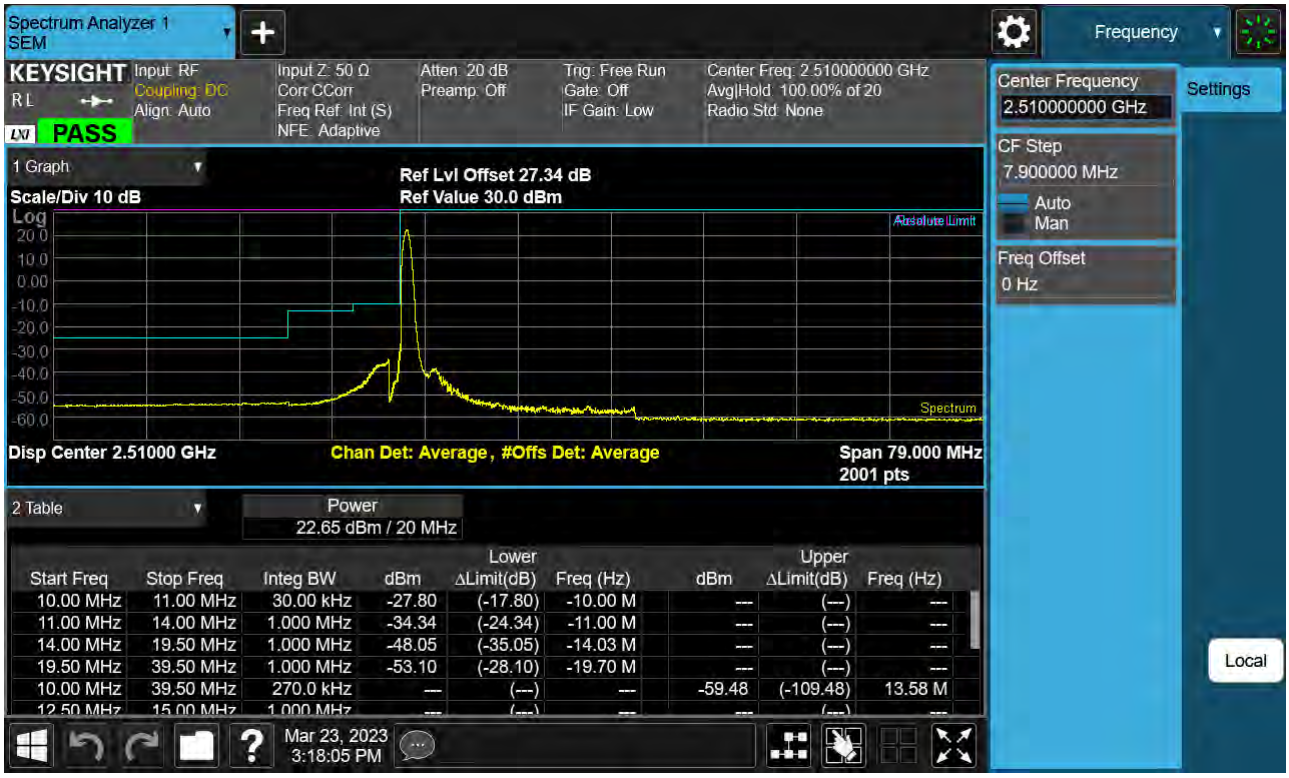
Sub6 n7. High Channel Edge Plot (15 MHz Ch.512500 BPSK RB 1)



			Lower			Upper		
Start Freq	Stop Freq	Integ BW	dBm	ΔLimit(dB)	Freq (Hz)	dBm	ΔLimit(dB)	Freq (Hz)
7.500 MHz	8.500 MHz	30.00 kHz	-62.63	(-52.63)	-8.340 M	-25.14	(-15.14)	7.500 M
8.500 MHz	12.50 MHz	1.000 MHz	-53.69	(-43.69)	-8.500 M	-33.82	(-23.82)	8.500 M
12.50 MHz	22.50 MHz	1.000 MHz	-53.87	(-40.87)	-12.85 M	-50.39	(-37.39)	12.50 M
22.50 MHz	30.00 MHz	1.000 MHz	-54.27	(-29.27)	-24.86 M	-55.52	(-30.52)	29.21 M
8.000 MHz	12.50 MHz	1.000 MHz	---	(---)	---	---	(---)	---
12.50 MHz	15.00 MHz	1.000 MHz	---	(---)	---	---	(---)	---

Sub6 n7. High Channel Edge Plot (15 MHz Ch.512500 BPSK)

Sub6 n7. Low Channel Edge Plot (20 MHz Ch.502000 BPSK RB 1)-1



Sub6 n7. Low Channel Edge Plot (20 MHz Ch.502000 BPSK)-1