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TEST REPORT

FCC LTE Test for TFGMEIBBCD4
Certification

APPLICANT
LG Electronics Inc.

REPORT NO.
HCT-RF-2308-FC006-R1

DATE OF ISSUE
October 19, 2023

Tested by
Jung Ki Lim

Technical Manager
Jong Seok Lee

HCT CO., LTD.
BongJai Huh / CEO

HCT CO., LTD.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si,
Gyeonggi-do, 17383 KOREA
Tel. +82 31 634 6300 Fax. +82 31 645 6401

고 객 비 밀
CUSTOMER SECRET

HCT Co., Ltd.
74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA
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Additional Model
TFGMEIBBCD5, TFGMEIBBCD6, TFGMEIBBCD7, TFGMEIBBCD8, TFGMEIBBCD9, TFGMEIBBCDA, TFGMEIBBCDB, TFGMEIBBCDC

Applicant	**LG Electronics Inc.** 10, MagokJungang-ro, Gangseo-gu, Seoul 07796, Republic of Korea
Eut Type Model Name	GM Onstar Gen12 ROW TFGMEIBBCD4
FCC ID	BEJTFGMEIBBCD4
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§ 27

The result shown in this test report refer only to the sample(s) tested unless otherwise stated.
This test results were applied only to the test methods required by the standard.

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	October 05, 2023	Initial Release
1	October 19, 2023	Deleted the Inter Band ULCA results

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)

Test Report Statement:
The above Test Report is not related to the accredited test result by (KS Q) ISO/IEC 17025 and KOLAS(Korea Laboratory Accreditation Scheme) / A2LA(American Association for Laboratory Accreditation), which signed the ILAC-MRA.

If this report is required to confirmation of authenticity, please contact to www.hct.co.kr

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MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	LG Electronics Inc.
Address:	10, Magok Jungang-ro, Gangseo-gu, Seoul 07796, Republic of Korea
FCC ID:	BEJTFGMEIBBCD4
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§ 27
EUT Type:	GM Onstar Gen12 ROW
Model(s):	TFGMEIBBCD4
Additional Model:	TFGMEIBBCD5,TFGMEIBBCD6,TFGMEIBBCD7,TFGMEIBBCD8, TFGMEIBBCD9, TFGMEIBBCDA, TFGMEIBBCDB, TFGMEIBBCDC
Tx Frequency:	2502.5 – 2567.5 : 5 MHz 2505.0 – 2565.0 : 10 MHz 2507.5 – 2562.5 : 15 MHz 2510.0 – 2560.0 : 20 MHz
Date(s) of Tests:	February 27, 2023 ~ October 05, 2023
Serial number:	Radiated - External Antenna : EBR36018942_#30 - Internal Antenna : EBR36018942K_#14 Conducted : EBR36018829_#75
External Antenna Information	ANT5 : 86531607 ANT4 : 86575530 DUT4 : 85608774

1.1. MAXIMUM OUTPUT POWER

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	EIRP External Antenna		EIRP Internal Antenna	
				Max. Power (W)	Max. Power (dBm)	Max. Power (W)	Max. Power (dBm)
LTE – Band 7 (5)	2502.5 – 2567.5	4M50G7D	QPSK	0.304	24.83	0.914	29.61
		4M52W7D	16QAM	0.255	24.06	0.783	28.94
		4M51W7D	64QAM	0.171	22.33	0.555	27.44
		4M50W7D	256QAM	0.116	20.63	0.307	24.87
LTE – Band 7 (10)	2505.0 – 2565.0	8M96G7D	QPSK	0.294	24.69	0.902	29.55
		8M99W7D	16QAM	0.248	23.95	0.800	29.03
		8M96W7D	64QAM	0.155	21.89	0.603	27.80
		8M98W7D	256QAM	0.106	20.24	0.301	24.79
LTE – Band 7 (15)	2507.5 – 2562.5	13M5G7D	QPSK	0.294	24.68	0.979	29.91
		13M5W7D	16QAM	0.245	23.89	0.869	29.39
		13M5W7D	64QAM	0.151	21.78	0.664	28.22
		13M5W7D	256QAM	0.109	20.38	0.328	25.16
LTE – Band 7 (20)	2510.0 – 2560.0	17M9G7D	QPSK	0.290	24.63	0.920	29.64
		17M9W7D	16QAM	0.246	23.91	0.815	29.11
		17M9W7D	64QAM	0.154	21.87	0.619	27.92
		17M9W7D	256QAM	0.114	20.56	0.307	24.87

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a GM Onstar Gen12 ROW with GSM/GPRS/EGPRS/UMTS and LTE, Sub6.

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

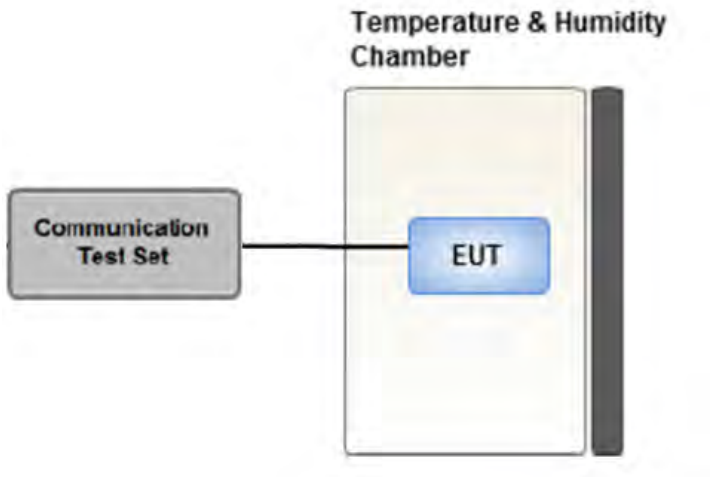
The Fully-anechoic chamber and conducted measurement facility used to collect the radiated data are located at the **74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA.**

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
Band 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	- KDB 971168 D01 v03r01 – Section 5.2
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4
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 CONDUCTED OUTPUT POWER



Test setup

Test Overview

When an average power meter is used to perform RF output power measurements, the fundamental condition that measurements be performed only over durations of active transmissions at maximum output power level applies.

Conducted Output Power was tested in accordance with KDB971168 D01 Power Meas License Digital Systems v03r01, Section 5.2.

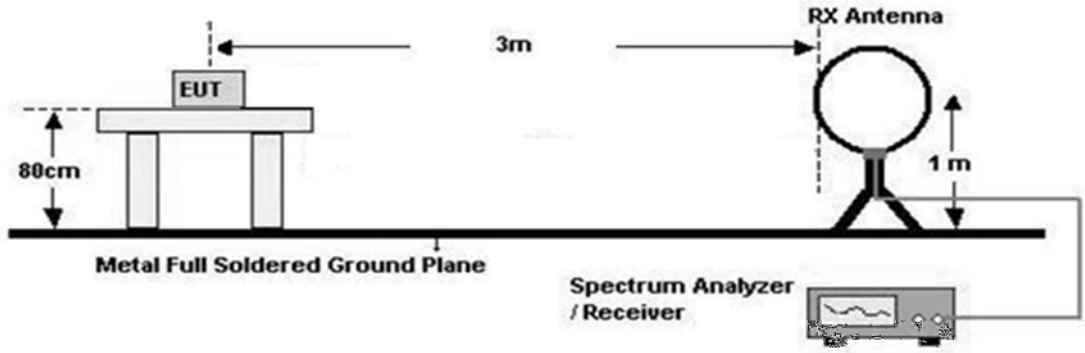
3.3 RADIATED TEST

Test Overview

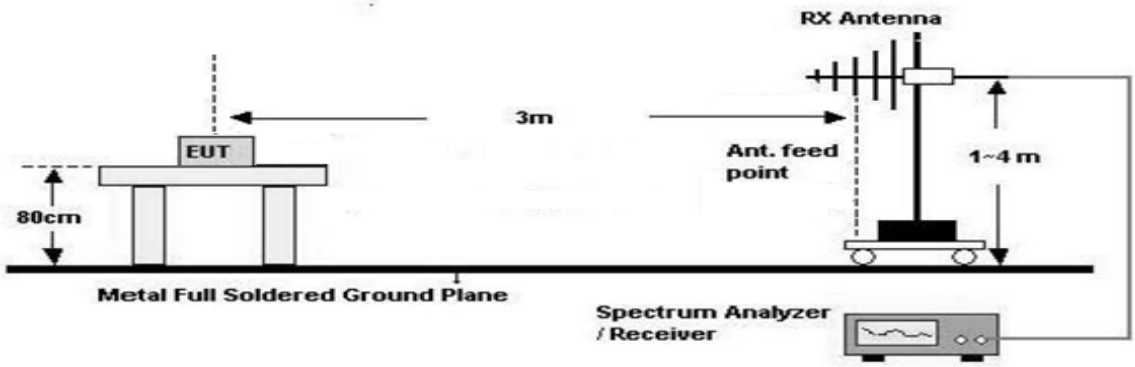
Radiated tests are performed in the semi-anechoic chamber. The equipment under test is placed on a non-conductive table on semi-anechoic chamber.

Test Configuration

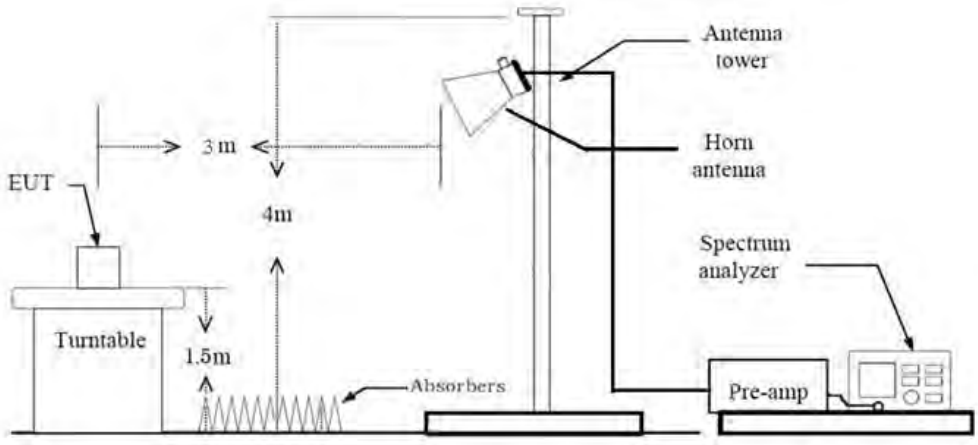
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



3.3.1 RADIATED POWER

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 EUT is placed on a turntable, which is 0.8 m above ground plane. (Below 1 GHz)
2. The EUT is placed on a turntable, which is 1.5 m above ground plane. (Above 1 GHz)
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
6. 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.
7. Total(dBμV/m) = Measured Value(dBμV) + Cable Loss(dB) + Antenna Factor(dB/m) + Distance Factor(D.F)
8. EIRP (dBm)
   = Total (dBμV/m) + 20 log D − 104.8 (where D is the measurement distance in meters. D=3)
   = Total (dBμV/m) - 95.2(dB)
9. ERP(dBm) = EIRP(dBm) - 2.15(dB)

3.3.2 RADIATED SPURIOUS EMISSIONS

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 10th harmonics from 9 kHz.

Test Note

1. 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
2. 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.

Below 30 MHz

1. The loop antenna was placed at a location 3 m from the EUT
2. The EUT is placed on a turntable, which is 0.8 m above ground plane.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization and Parallel to the ground plane in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. Distance Correction Factor(0.009 MHz – 0.490 MHz) = 40log(3 m/300 m) = - 80 dB
   Measurement Distance : 3 m
6. Distance Correction Factor(0.490 MHz – 30 MHz) = 40log(3 m/30 m) = - 40 dB
   Measurement Distance : 3 m
7. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L) + Distance Factor(D.F)
8. EIRP (dBm)
   = Total (dBμV/m) + 20 log D − 104.8 (where D is the measurement distance in meters. D=3)
   = Total (dBμV/m) - 95.2(dB)
9. ERP(dBm) = EIRP(dBm) - 2.15(dB)

KDB 414788 OFS and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

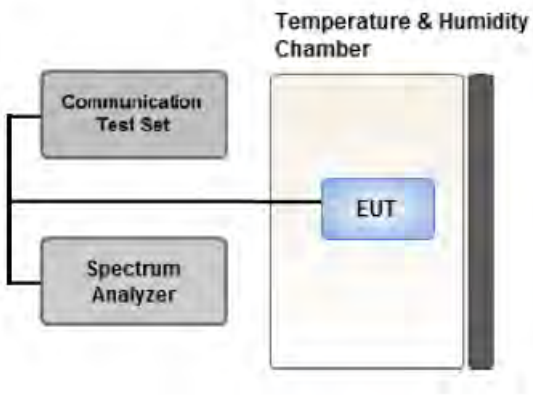
Below 1 GHz

1. The EUT is placed on a turntable, which is 0.8 m above ground plane.
2. The Hybrid antenna was placed at a location 3 m from the EUT, which is varied from 1 m to 4 m to find out the highest emissions.
3. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
4. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
5. Total = Measured Value + Antenna Factor(A.F) + Cable Loss(C.L)
7. Total(dBμV/m) = Measured Value(dBμV) + Cable Loss(dB) + Antenna Factor(dB/m) + Distance Factor(D.F)
8. EIRP (dBm)
   = Total (dBμV/m) + 20 log D − 104.8 (where D is the measurement distance in meters. D=3)
   = Total (dBμV/m) - 95.2(dB)
9. ERP(dBm) = EIRP(dBm) - 2.15(dB)

Above 1 GHz

1. The EUT is placed on a turntable, which is 1.5 m above ground plane.
2. We have done x, y, z planes in EUT and horizontal and vertical polarization in detecting antenna.
3. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
4. EUT is set 3 m away from the receiving antenna, which is varied from 1 m to 4 m to find out the highest emissions.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. Total(dBμV/m) = Measured Value(dBμV) + Cable Loss(dB) + Antenna Factor(dB/m) + Distance Factor(D.F)
   + H.P.F(dB) - Amp Gain(dB)
8. EIRP (dBm)
   = Total (dBμV/m) + 20 log D − 104.8 (where D is the measurement distance in meters. D=3)
   = Total (dBμV/m) - 95.2(dB)

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:

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

Test Settings(Peak Power)

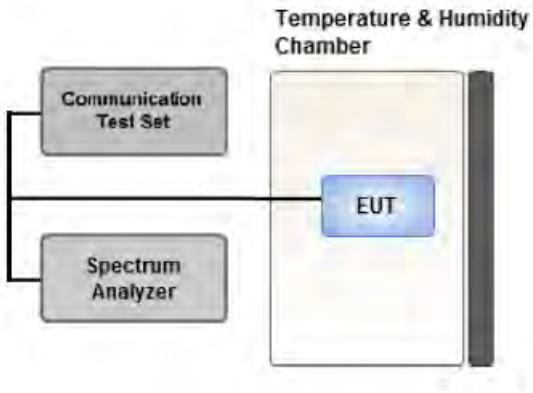
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW ≥ 3 × RBW.

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

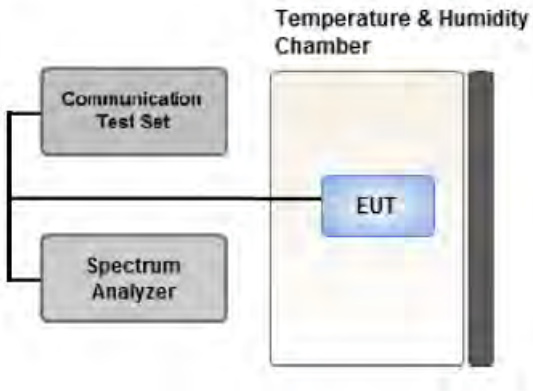
The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

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

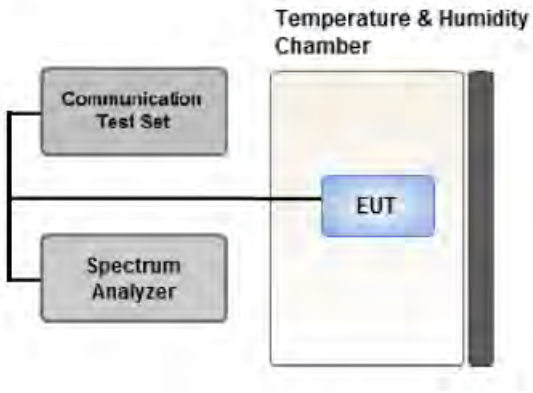
Test Overview

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

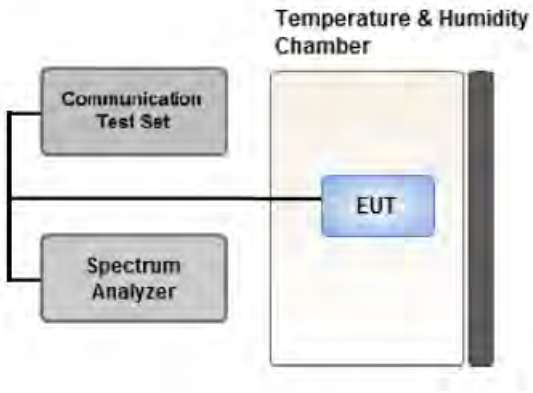
1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. Within 1 MHz of the channel edge the RBW should be 2 % of EBW, then 1 MHz after that.
4. VBW > 3 x RBW
5. 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)

- 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 : Internal Antenna, External Antenna (ANT 5, ANT 4, DUT 4)
  Worst case : Internal Antenna, External Antenna (ANT 5)
- The worst case is reported with the EUT positioning, modulations, and paging service configurations shown in the test data.
- Please refer to the table below.
- TFGMEIBBCD4 & additional models were tested and the worst case results are reported.
  (Worst case : TFGMEIBBCD4)

[External Antenna Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective Radiated Power	QPSK, 16QAM, 64QAM, 256QAM	See Section 8.1		Only X
Radiated Spurious and Harmonic Emissions	QPSK	See Section 8.2		Only X

[Internal Antenna Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective Isotropic Radiated Power	QPSK, 16QAM, 64QAM, 256QAM	See Section 9.1		Z
Radiated Spurious and Harmonic Emissions	QPSK	See Section 9.2		Y

3.10 WORST CASE(CONDUCTED TEST)

- All modes of operation were investigated and the worst case configuration results are reported.
- TFGMEIBBCD4 & additional models were tested and the worst case results are reported.
  (Worst case : TFGMEIBBCD4)

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
Occupied Bandwidth	QPSK, 16QAM, 64QAM, 256QAM	5, 10, 15, 20	Mid	Full RB	0
Peak-To-Average Ratio	QPSK, 16QAM, 64QAM, 256QAM	5, 10, 15, 20	Mid	Full RB	0
Band Edge	QPSK	5	Low	1	0
			High	1	24
		10	Low	1	0
			High	1	49
		15	Low	1	0
			High	1	74
		20	Low	1	0
			High	1	99
		5, 10, 15, 20	Low, High	Full RB	0
Spurious and Harmonic Emissions at Antenna Terminal	QPSK	5, 10, 15, 20	Low, Mid, High	1	0

4. LIST OF TEST EQUIPMENT

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Antenna Position Tower	MA4640/800-XP-ET	Innco systems	N/A	N/A	N/A
Turn Table	DS2000-S	Innco systems	N/A	N/A	N/A
Turn Table	Turn Table	Ets	N/A	N/A	N/A
Controller (Antenna mast & Turn Table)	CO3000	Innco systems	CO3000/1251/489 20320/P	N/A	N/A
Amp & Filter Bank Switch Controller	FBSM-01B	TNM system	TM20090002	N/A	N/A
RF Switch System	TMX0132C	TNM System	TM21100002	N/A	N/A
RF Switch System	FBSR-04C(3G HPF+LNA)	TNM System	S4L1	08/18/2024	Annual
RF Switch System	FBSR-04C(LNA)	TNM System	S4L4	08/18/2024	Annual
RF Switch System	FBSR-04C(Thru)	TNM System	S4L6	08/18/2024	Annual
HIGHPASS FILTER	WHKX10-900-1000-15000-40SS	WAINWRIGHT INSTRUMENTS	16	08/01/2024	Annual
HIGHPASS FILTER	WHNX6.0/26.5G-6SS	WAINWRIGHT INSTRUMENTS	1	01/19/2024	Annual
Power Amplifier	CBL18265035	CERNEX	22966	12/01/2023	Annual
Power Amplifier	CBL26405040	CERNEX	25956	03/02/2024	Annual
Loop Antenna(9 kHz ~ 30 MHz)	FMZB1513	Schwarzbeck	1513-333	03/17/2024	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120	Schwarzbeck	937	02/13/2025	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Bilog Antenna	VULB9160	Schwarzbeck	3150	03/09/2025	Biennial
Hybrid Antenna	VULB9160	Schwarzbeck	760	02/24/2025	Biennial
Trilog Broadband Antenna	VULB 9168	Schwarzbeck	895	08/16/2024	Biennial
Chamber	SU-642	ESPEC	93008124	02/22/2024	Annual
Power Splitter(DC~26.5 GHz)	11667B	Hewlett Packard	11275	03/02/2024	Annual
DC Power Supply	E3632A	Agilent	MY40010147	06/23/2024	Annual
4-Way Divider	ZC4PD-K1844+	Mini-Circuits	942907	09/19/2024	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	08/10/2024	Annual
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262287701	05/22/2024	Annual
Wideband Radio Communication Tester	MT8000A	Anritsu Corp.	6262302511	05/23/2024	Annual
SIGNAL GENERATOR (100 kHz ~ 40 GHz)	SMB100A	REOHDE & SCHWARZ	177633	06/22/2024	Annual

Signal Analyzer(10 Hz ~ 26.5 GHz)	N9020A	Agilent	MY52090906	04/20/2024	Annual
Signal Analyzer(5 Hz ~ 40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/24/2024	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	PASS
Frequency stability / variation of ambient temperature	§ 2.1055, § 27.54	Emission must remain in band	PASS

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

7. 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 Conducted Output Power

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				20775	21100	21425
				2502.5 MHz	2535 MHz	2567.5 MHz
5 MHz	QPSK	1	0	23.24	23.30	23.26
		1	12	23.35	23.26	23.01
		1	24	23.34	23.30	22.90
		12	0	22.47	22.47	22.42
		12	6	22.53	22.52	22.46
		12	11	22.47	22.50	22.41
		25	0	22.52	22.51	22.40
	16QAM	1	0	22.73	22.71	22.61
		1	12	22.63	22.58	22.63
		1	24	22.70	22.75	22.56
		12	0	21.54	21.46	21.47
		12	6	21.51	21.49	21.51
		12	11	21.51	21.50	21.50
		25	0	21.56	21.50	21.48
	64QAM	1	0	22.54	21.57	21.02
		1	12	22.46	21.43	21.04
		1	24	20.65	21.54	21.03
		12	0	20.61	20.53	20.08
		12	6	20.57	20.53	20.12
		12	11	20.54	20.50	20.08
		25	0	20.54	20.49	20.03
	256QAM	1	0	18.70	18.57	18.61
		1	12	18.17	18.73	18.55
		1	24	18.52	18.78	18.63
		12	0	18.56	18.50	18.46
		12	6	18.55	18.53	18.51
		12	11	18.50	18.52	18.49
		25	0	18.53	18.51	18.50

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				20800	21100	21400
				2505 MHz	2535 MHz	2565 MHz
10 MHz	QPSK	1	0	23.22	23.44	23.36
		1	24	23.36	23.20	23.11
		1	49	23.35	23.22	22.87
		25	0	22.49	22.46	22.40
		25	12	22.57	22.55	22.49
		25	24	22.53	22.48	22.46
		50	0	22.53	22.54	22.40
	16QAM	1	0	22.66	22.74	22.48
		1	24	22.66	22.62	22.77
		1	49	22.71	22.62	22.71
		25	0	21.44	21.48	21.41
		25	12	21.58	21.60	21.39
		25	24	21.53	21.47	21.48
		50	0	21.57	21.53	21.45
	64QAM	1	0	21.54	21.58	21.26
		1	24	21.55	21.51	21.12
		1	49	21.76	21.43	20.99
		25	0	20.55	20.56	20.17
		25	12	20.59	20.50	20.12
		25	24	20.62	20.55	19.97
		50	0	20.59	20.58	19.98
	256QAM	1	0	18.61	18.44	19.20
		1	24	18.49	18.45	18.62
		1	49	18.12	18.24	18.68
		25	0	18.48	18.48	18.33
		25	12	18.65	18.57	18.47
		25	24	18.55	18.51	18.48
		50	0	18.58	18.57	18.45

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				20825	21100	21375
				2507.5 MHz	2535 MHz	2562.5 MHz
15 MHz	QPSK	1	0	23.52	23.56	23.26
		1	36	23.35	23.34	22.97
		1	74	23.00	23.34	22.75
		36	0	22.46	22.40	22.45
		36	18	22.55	22.45	22.37
		36	39	22.47	22.34	22.47
		75	0	22.56	22.48	22.39
	16QAM	1	0	22.75	22.66	22.59
		1	36	22.79	22.64	22.81
		1	74	22.74	22.52	22.69
		36	0	21.51	21.44	21.44
		36	18	21.55	21.51	21.45
		36	39	21.48	21.32	21.50
		75	0	21.55	21.46	21.39
	64QAM	1	0	21.90	21.64	21.65
		1	36	21.69	21.57	21.06
		1	74	21.59	21.44	21.01
		36	0	20.50	20.46	20.26
		36	18	20.61	20.52	20.15
		36	39	20.61	20.45	20.07
		75	0	20.54	20.42	20.16
	256QAM	1	0	18.70	18.75	18.55
		1	36	18.53	18.49	18.68
		1	74	18.60	18.47	18.62
		36	0	18.51	18.52	18.43
		36	18	18.64	18.51	18.45
		36	39	18.60	18.48	18.47
		75	0	18.59	18.46	18.36

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				20850	21100	21350
				2510 MHz	2535 MHz	2560 MHz
20 MHz	QPSK	1	0	23.53	23.45	23.34
		1	49	23.54	23.44	23.36
		1	99	23.12	23.19	23.28
		50	0	22.50	22.47	22.51
		50	25	22.62	22.48	22.52
		50	49	22.57	22.48	22.47
		100	0	22.62	22.47	22.41
	16QAM	1	0	22.84	22.71	22.58
		1	49	22.61	22.49	22.60
		1	99	22.84	22.48	22.55
		50	0	21.52	21.44	21.50
		50	25	21.54	21.54	21.54
		50	49	21.67	21.51	21.54
		100	0	21.57	21.58	21.45
	64QAM	1	0	21.80	21.67	21.85
		1	49	21.66	21.68	21.49
		1	99	21.67	21.47	21.10
		50	0	20.56	20.53	20.48
		50	25	20.62	20.54	20.36
		50	49	20.53	20.48	20.16
		100	0	20.56	20.49	20.25
	256QAM	1	0	18.68	18.45	18.46
		1	49	18.77	18.62	18.69
		1	99	18.56	18.49	18.61
		50	0	18.56	18.50	18.49
		50	25	18.62	18.54	18.53
		50	49	18.66	18.53	18.50
		100	0	18.58	18.58	18.46

8.2 EQUIVALENT ISOTROPIC RADIATED POWER

8.2.1 External Antenna

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBμV)	A.F+C.L+D.F (dB/m)	Total (dBμV/m)	Pol	Limit	EIRP		RB	
							W	W	dBm	Size	Offset
2502.5	LTE B7/ 5 MHz	QPSK	83.97	35.81	119.78	V	< 2.00	0.287	24.58	1	24
		16-QAM	83.25	35.81	119.06	V		0.243	23.86		
		64-QAM	81.72	35.81	117.53	V		0.171	22.33		
		256-QAM	79.20	35.81	115.01	V		0.096	19.81		
2535.0		QPSK	84.45	35.58	120.03	V		0.304	24.83	1	24
		16-QAM	83.68	35.58	119.26	V		0.255	24.06		
		64-QAM	81.50	35.58	117.08	V		0.154	21.88		
		256-QAM	80.25	35.58	115.83	V		0.116	20.63		
2567.5		QPSK	83.30	35.57	118.87	V		0.233	23.67	1	24
		16-QAM	82.45	35.57	118.02	V		0.191	22.82		
		64-QAM	80.25	35.57	115.82	V		0.115	20.62		
		256-QAM	79.00	35.57	114.57	V		0.086	19.37		

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBμV)	A.F+C.L+D.F (dB/m)	Total (dBμV/m)	Pol	Limit	EIRP		RB	
							W	W	dBm	Size	Offset
2505.0	LTE B7/ 10 MHz	QPSK	84.05	35.84	119.89	V	< 2.00	0.294	24.69	1	49
		16-QAM	83.31	35.84	119.15	V		0.248	23.95		
		64-QAM	81.25	35.84	117.09	V		0.155	21.89		
		256-QAM	79.60	35.84	115.44	V		0.106	20.24		
2535.0		QPSK	84.25	35.58	119.83	V		0.290	24.63	1	0
		16-QAM	83.35	35.58	118.93	V		0.236	23.73		
		64-QAM	81.11	35.58	116.69	V		0.141	21.49		
		256-QAM	79.71	35.58	115.29	V		0.102	20.09		
2565.0		QPSK	83.00	35.62	118.62	V		0.220	23.42	1	25
		16-QAM	82.30	35.62	117.92	V		0.187	22.72		
		64-QAM	80.05	35.62	115.67	V		0.111	20.47		
		256-QAM	78.92	35.62	114.54	V		0.086	19.34		

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBμV)	A.F+C.L+D.F (dB/m)	Total (dBμV/m)	Pol	Limit	EIRP		RB	
							W	W	dBm	Size	Offset
2507.5	LTE B7/ 15 MHz	QPSK	84.10	35.78	119.88	V	< 2.00	0.294	24.68	1	38
		16-QAM	83.31	35.78	119.09	V		0.245	23.89		
		64-QAM	81.20	35.78	116.98	V		0.151	21.78		
		256-QAM	79.79	35.78	115.57	V		0.109	20.37		
2535.0		QPSK	84.20	35.58	119.78	V		0.287	24.58	1	38
		16-QAM	83.36	35.58	118.94	V		0.237	23.74		
		64-QAM	81.27	35.58	116.85	V		0.146	21.65		
		256-QAM	80.00	35.58	115.58	V		0.109	20.38		
2562.5		QPSK	83.23	35.61	118.84	V		0.231	23.64	1	0
		16-QAM	82.62	35.61	118.23	V		0.201	23.03		
		64-QAM	80.49	35.61	116.10	V		0.123	20.90		
		256-QAM	79.22	35.61	114.83	V		0.092	19.63		

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBμV)	A.F+C.L+D.F (dB/m)	Total (dBμV/m)	Pol	Limit	EIRP		RB	
							W	W	dBm	Size	Offset
2510.0	LTE B7/ 20 MHz	QPSK	84.00	35.71	119.71	V	< 2.00	0.283	24.51	1	50
		16-QAM	83.25	35.71	118.96	V		0.238	23.76		
		64-QAM	81.27	35.71	116.98	V		0.151	21.78		
		256-QAM	79.70	35.71	115.41	V		0.105	20.21		
2535.0		QPSK	84.25	35.58	119.83	V		0.290	24.63	1	50
		16-QAM	83.53	35.58	119.11	V		0.246	23.91		
		64-QAM	81.49	35.58	117.07	V		0.154	21.87		
		256-QAM	80.18	35.58	115.76	V		0.114	20.56		
2560.0		QPSK	83.45	35.58	119.03	V		0.242	23.83	1	0
		16-QAM	82.76	35.58	118.34	V		0.206	23.14		
		64-QAM	80.85	35.58	116.43	V		0.133	21.23		
		256-QAM	79.41	35.58	114.99	V		0.095	19.79		

8.2.2 Internal Antenna

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBμV)	A.F+C.L+D.F (dB/m)	Total (dBμV/m)	Pol	Limit	EIRP		RB	
							W	W	dBm	Size	Offset
2502.5	LTE B7/ 5 MHz	QPSK	87.79	35.81	123.60	V	< 2.00	0.692	28.40	1	24
		16-QAM	87.17	35.81	122.98	V		0.600	27.78		
		64-QAM	86.03	35.81	121.84	V		0.461	26.64		
		256-QAM	83.10	35.81	118.91	V		0.235	23.71		
2535.0		QPSK	88.57	35.58	124.15	V		0.785	28.95	1	24
		16-QAM	87.95	35.58	123.53	V		0.681	28.33		
		64-QAM	86.85	35.58	122.43	V		0.529	27.23		
		256-QAM	83.87	35.58	119.45	V		0.266	24.25		
2567.5		QPSK	89.24	35.57	124.81	V		0.914	29.61	1	0
		16-QAM	88.57	35.57	124.14	V		0.783	28.94		
		64-QAM	87.07	35.57	122.64	V		0.555	27.44		
		256-QAM	84.50	35.57	120.07	V		0.307	24.87		

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBμV)	A.F+C.L+D.F (dB/m)	Total (dBμV/m)	Pol	Limit	EIRP		RB	
							W	W	dBm	Size	Offset
2505.0	LTE B7/ 10 MHz	QPSK	87.95	35.84	123.79	V	< 2.00	0.723	28.59	1	49
		16-QAM	87.49	35.84	123.33	V		0.650	28.13		
		64-QAM	86.29	35.84	122.13	V		0.493	26.93		
		256-QAM	83.25	35.84	119.09	V		0.245	23.89		
2535.0		QPSK	88.72	35.58	124.30	V		0.813	29.10	1	49
		16-QAM	88.15	35.58	123.73	V		0.713	28.53		
		64-QAM	86.94	35.58	122.52	V		0.540	27.32		
		256-QAM	83.98	35.58	119.56	V		0.273	24.36		
2565.0		QPSK	89.13	35.62	124.75	V		0.902	29.55	1	0
		16-QAM	88.61	35.62	124.23	V		0.800	29.03		
		64-QAM	87.38	35.62	123.00	V		0.603	27.80		
		256-QAM	84.37	35.62	119.99	V		0.301	24.79		

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBμV)	A.F+C.L+D.F (dB/m)	Total (dBμV/m)	Pol	Limit	EIRP		RB	
							W	W	dBm	Size	Offset
2507.5	LTE B7/ 15 MHz	QPSK	88.18	35.78	123.96	V	< 2.00	0.752	28.76	1	74
		16-QAM	87.54	35.78	123.32	V		0.649	28.12		
		64-QAM	86.49	35.78	122.27	V		0.509	27.07		
		256-QAM	83.50	35.78	119.28	V		0.256	24.08		
2535.0		QPSK	88.79	35.58	124.37	V		0.826	29.17	1	74
		16-QAM	88.18	35.58	123.76	V		0.718	28.56		
		64-QAM	87.08	35.58	122.66	V		0.557	27.46		
		256-QAM	84.04	35.58	119.62	V		0.277	24.42		
2562.5		QPSK	89.50	35.61	125.11	V		0.979	29.91	1	0
		16-QAM	88.98	35.61	124.59	V		0.869	29.39		
		64-QAM	87.81	35.61	123.42	V		0.664	28.22		
		256-QAM	84.75	35.61	120.36	V		0.328	25.16		

Freq (MHz)	Bandwidth	Modulation	Measured Level (dBμV)	A.F+C.L+D.F (dB/m)	Total (dBμV/m)	Pol	Limit	EIRP		RB	
							W	W	dBm	Size	Offset
2510.0	LTE B7/ 20 MHz	QPSK	88.32	35.71	124.03	V	< 2.00	0.764	28.83	1	99
		16-QAM	87.68	35.71	123.39	V		0.659	28.19		
		64-QAM	86.64	35.71	122.35	V		0.519	27.15		
		256-QAM	83.67	35.71	119.38	V		0.262	24.18		
2535.0		QPSK	88.54	35.58	124.12	V		0.780	28.92	1	99
		16-QAM	88.05	35.58	123.63	V		0.697	28.43		
		64-QAM	86.88	35.58	122.46	V		0.532	27.26		
		256-QAM	83.81	35.58	119.39	V		0.262	24.19		
2560.0		QPSK	89.26	35.58	124.84	V		0.920	29.64	1	0
		16-QAM	88.73	35.58	124.31	V		0.815	29.11		
		64-QAM	87.54	35.58	123.12	V		0.619	27.92		
		256-QAM	84.49	35.58	120.07	V		0.307	24.87		

8.3 RADIATED SPURIOUS EMISSIONS

8.3.1 External Antenna

▣ MODE: LTE B7

▣ MODULATION SIGNAL: 5 MHz QPSK

▣ DISTANCE: 3 meters

▣ LIMIT: -25.00 dBm

Ch	Freq (MHz)	Measured Level (dBμV)	A.F+C.L+D.F+H.P.F -A.G (dB/m)	Total (dBμV/m)	Pol.	Result (dBm)	Limit (dBm)	RB	
								Size	Offset
20775 (2502.5)	5 005.00	64.22	-7.44	56.78	V	-38.42	-25.00	1	24
	7 507.50	56.37	-0.82	55.55	V	-39.65	-25.00		
	10 010.00	48.77	4.79	53.56	V	-41.64	-25.00		
	12 512.50	46.70	5.33	52.03	V	-43.17	-25.00		
	15 015.00	48.06	8.96	57.02	V	-38.18	-25.00		
21100 (2535.0)	5 070.00	70.40	-7.19	63.21	V	-31.99	-25.00	1	24
	7 605.00	58.15	-1.09	57.06	V	-38.14	-25.00		
	10 140.00	49.05	3.99	53.04	V	-42.16	-25.00		
	12 675.00	47.49	5.65	53.14	V	-42.06	-25.00		
	15 210.00	47.95	7.18	55.13	V	-40.07	-25.00		
21425 (2567.5)	5 135.00	71.07	-7.11	63.96	V	-31.24	-25.00	1	24
	7 702.50	55.42	-1.00	54.42	V	-40.78	-25.00		
	10 270.00	48.33	5.29	53.62	V	-41.58	-25.00		
	12 837.50	47.33	6.26	53.59	V	-41.61	-25.00		
	15 405.00	48.12	6.12	54.24	V	-40.96	-25.00		

▣ MODE: LTE B7

▣ MODULATION SIGNAL: 10 MHz QPSK

▣ DISTANCE: 3 meters

▣ LIMIT: -25.00 dBm

Ch	Freq (MHz)	Measured Level (dBµV)	A.F+C.L+D.F+H.P.F -A.G (dB/m)	Total (dBµV/m)	Pol.	Result (dBm)	Limit (dBm)	RB	
								Size	Offset
20800 (2505.0)	5 010.00	68.44	-7.42	61.02	V	-34.18	-25.00	1	49
	7 515.00	57.89	-0.83	57.06	V	-38.14	-25.00		
	10 020.00	48.98	4.67	53.65	V	-41.55	-25.00		
	12 525.00	47.68	5.44	53.12	V	-42.08	-25.00		
	15 030.00	48.55	8.85	57.40	V	-37.80	-25.00		
21100 (2535.0)	5 070.00	69.75	-7.19	62.56	V	-32.64	-25.00	1	0
	7 605.00	58.89	-1.09	57.80	V	-37.40	-25.00		
	10 140.00	49.68	3.99	53.67	V	-41.53	-25.00		
	12 675.00	47.73	5.65	53.38	V	-41.82	-25.00		
	15 210.00	47.96	7.18	55.14	V	-40.06	-25.00		
21400 (2565.0)	5 130.00	71.92	-7.09	64.83	V	-30.37	-25.00	1	25
	7 695.00	57.73	-1.00	56.73	V	-38.47	-25.00		
	10 260.00	49.15	5.06	54.21	V	-40.99	-25.00		
	12 825.00	47.57	6.24	53.81	V	-41.39	-25.00		
	15 390.00	49.49	6.20	55.69	V	-39.51	-25.00		

▣ MODE: LTE B7

▣ MODULATION SIGNAL: 15 MHz QPSK

▣ DISTANCE: 3 meters

▣ LIMIT: -25.00 dBm

Ch	Freq (MHz)	Measured Level (dBμV)	A.F+C.L+D.F+H.P.F -A.G (dB/m)	Total (dBμV/m)	Pol.	Result (dBm)	Limit (dBm)	RB	
								Size	Offset
20825 (2507.5)	5 015.00	67.00	-7.40	59.60	V	-35.60	-25.00	1	38
	7 522.50	56.88	-0.82	56.06	V	-39.14	-25.00		
	10 030.00	48.28	4.66	52.94	V	-42.26	-25.00		
	12 537.50	47.76	5.45	53.21	V	-41.99	-25.00		
	15 045.00	48.45	8.76	57.21	V	-37.99	-25.00		
21100 (2535.0)	5 070.00	69.56	-7.19	62.37	V	-32.83	-25.00	1	38
	7 605.00	57.84	-1.09	56.75	V	-38.45	-25.00		
	10 140.00	48.56	3.99	52.55	V	-42.65	-25.00		
	12 675.00	46.70	5.65	52.35	V	-42.85	-25.00		
	15 210.00	48.37	7.18	55.55	V	-39.65	-25.00		
21375 (2562.5)	5 125.00	72.17	-7.06	65.11	V	-30.09	-25.00	1	0
	7 687.50	57.95	-1.08	56.87	V	-38.33	-25.00		
	10 250.00	49.27	5.04	54.31	V	-40.89	-25.00		
	12 812.50	47.45	6.27	53.72	V	-41.48	-25.00		
	15 375.00	49.15	6.31	55.46	V	-39.74	-25.00		

▣ MODE: LTE B7

▣ MODULATION SIGNAL: 20 MHz QPSK

▣ DISTANCE: 3 meters

▣ LIMIT: -25.00 dBm

Ch	Freq (MHz)	Measured Level (dBµV)	A.F+C.L+D.F+H.P.F -A.G (dB/m)	Total (dBµV/m)	Pol.	Result (dBm)	Limit (dBm)	RB	
								Size	Offset
20850 (2510.0)	5 020.00	68.79	-7.46	61.33	V	-33.87	-25.00	1	50
	7 530.00	56.93	-0.84	56.09	V	-39.11	-25.00		
	10 040.00	48.35	4.53	52.88	V	-42.32	-25.00		
	12 550.00	46.82	5.76	52.58	V	-42.62	-25.00		
	15 060.00	48.11	8.67	56.78	V	-38.42	-25.00		
21100 (2535.0)	5 070.00	67.69	-7.19	60.50	V	-34.70	-25.00	1	50
	7 605.00	56.71	-1.09	55.62	V	-39.58	-25.00		
	10 140.00	48.97	3.99	52.96	V	-42.24	-25.00		
	12 675.00	46.79	5.65	52.44	V	-42.76	-25.00		
	15 210.00	47.79	7.18	54.97	V	-40.23	-25.00		
21350 (2560.0)	5 120.00	72.84	-7.02	65.82	V	-29.38	-25.00	1	0
	7 680.00	58.75	-1.08	57.67	V	-37.53	-25.00		
	10 240.00	48.75	5.01	53.76	V	-41.44	-25.00		
	12 800.00	47.36	6.25	53.61	V	-41.59	-25.00		
	15 360.00	48.78	6.43	55.21	V	-39.99	-25.00		

8.3.2 Internal Antenna

▣ MODE: LTE B7

▣ MODULATION SIGNAL: 5 MHz QPSK

▣ DISTANCE: 3 meters

▣ LIMIT: -25.00 dBm

Ch	Freq (MHz)	Measured Level (dBμV)	A.F+C.L+D.F+H.P.F -A.G (dB/m)	Total (dBμV/m)	Pol.	Result (dBm)	Limit (dBm)	RB	
								Size	Offset
20775 (2502.5)	5 005.00	53.12	-7.44	45.68	H	-49.52	-25.00	1	0
	7 507.50	50.17	-0.82	49.35	V	-45.85	-25.00		
	10 010.00	43.35	4.79	48.14	H	-47.06	-25.00		
21100 (2535.0)	5 070.00	53.93	-7.19	46.74	V	-48.46	-25.00	1	0
	7 605.00	51.46	-1.09	50.37	H	-44.83	-25.00		
	10 140.00	44.85	3.99	48.84	V	-46.36	-25.00		
21425 (2567.5)	5 135.00	58.63	-7.11	51.52	H	-43.68	-25.00	1	0
	7 702.50	47.24	-1.00	46.24	H	-48.96	-25.00		
	10 270.00	43.96	5.29	49.25	V	-45.95	-25.00		

▣ MODE: LTE B7

▣ MODULATION SIGNAL: 10 MHz QPSK

▣ DISTANCE: 3 meters

▣ LIMIT: -25.00 dBm

Ch	Freq (MHz)	Measured Level (dBμV)	A.F+C.L+D.F+H.P.F -A.G (dB/m)	Total (dBμV/m)	Pol.	Result (dBm)	Limit (dBm	RB	
								Size	Offset
20800 (2505.0)	5 010.00	54.89	-7.42	47.47	H	-47.73	-25.00	1	0
	7 515.00	50.17	-0.83	49.34	V	-45.86	-25.00		
	10 020.00	43.47	4.67	48.14	H	-47.06	-25.00		
21100 (2535.0)	5 070.00	54.22	-7.19	47.03	H	-48.17	-25.00	1	0
	7 605.00	53.38	-1.09	52.29	V	-42.91	-25.00		
	10 140.00	45.03	3.99	49.02	H	-46.18	-25.00		
21400 (2565.0)	5 130.00	58.04	-7.09	50.95	H	-44.25	-25.00	1	0
	7 695.00	49.19	-1.00	48.19	H	-47.01	-25.00		
	10 260.00	46.01	5.06	51.07	H	-44.13	-25.00		

▣ MODE: LTE B7

▣ MODULATION SIGNAL: 15 MHz QPSK

▣ DISTANCE: 3 meters

▣ LIMIT: -25.00 dBm

Ch	Freq (MHz)	Measured Level (dBµV)	A.F+C.L+D.F+H.P.F -A.G (dB/m)	Total (dBµV/m)	Pol.	Result (dBm)	Limit (dBm	RB	
								Size	Offset
20825 (2507.5)	5 015.00	54.32	-7.40	46.92	H	-48.28	-25.00	1	0
	7 522.50	50.47	-0.82	49.65	H	-45.55	-25.00		
	10 030.00	43.19	4.66	47.85	H	-47.35	-25.00		
21100 (2535.0)	5 070.00	51.46	-7.19	44.27	H	-50.93	-25.00	1	0
	7 605.00	53.78	-1.09	52.69	H	-42.51	-25.00		
	10 140.00	44.96	3.99	48.95	V	-46.25	-25.00		
21375 (2562.5)	5 125.00	54.07	-7.06	47.01	V	-48.19	-25.00	1	0
	7 687.50	50.63	-1.08	49.55	V	-45.65	-25.00		
	10 250.00	43.83	5.04	48.87	H	-46.33	-25.00		

▣ MODE: LTE B7

▣ MODULATION SIGNAL: 20 MHz QPSK

▣ DISTANCE: 3 meters

▣ LIMIT: -25.00 dBm

Ch	Freq (MHz)	Measured Level (dBμV)	A.F+C.L+D.F+H.P.F -A.G (dB/m)	Total (dBμV/m)	Pol.	Result (dBm)	Limit (dBm	RB	
								Size	Offset
20850 (2510.0)	5 020.00	56.22	-7.46	48.76	H	-46.44	-25.00	1	0
	7 530.00	48.61	-0.84	47.77	H	-47.43	-25.00		
	10 040.00	44.36	4.53	48.89	V	-46.31	-25.00		
21100 (2535.0)	5 070.00	50.41	-7.19	43.22	H	-51.98	-25.00	1	0
	7 605.00	53.61	-1.09	52.52	H	-42.68	-25.00		
	10 140.00	46.33	3.99	50.32	H	-44.88	-25.00		
21350 (2560.0)	5 120.00	51.68	-7.02	44.66	H	-50.54	-25.00	1	0
	7 680.00	51.83	-1.08	50.75	H	-44.45	-25.00		
	10 240.00	44.47	5.01	49.48	H	-45.72	-25.00		

8.4 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
7	5 MHz	2535.0	QPSK	25	0	5.29
			16-QAM			6.02
			64-QAM			6.62
			256-QAM			6.62
	10 MHz		QPSK	50		5.29
			16-QAM			6.01
			64-QAM			6.56
			256-QAM			6.61
	15 MHz		QPSK	75		5.26
			16-QAM			5.97
			64-QAM			6.56
			256-QAM			6.63
	20 MHz		QPSK	100		5.17
			16-QAM			5.94
			64-QAM			6.52
			256-QAM			6.57

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 101 ~ 116.

8.5 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
7	5 MHz	2535.0	QPSK	25	0	4.5008
			16-QAM			4.5163
			64-QAM			4.5101
			256-QAM			4.5018
	10 MHz		QPSK	50		8.9595
			16-QAM			8.9936
			64-QAM			8.9579
			256-QAM			8.9808
	15 MHz		QPSK	75		13.461
			16-QAM			13.457
			64-QAM			13.471
			256-QAM			13.486
	20 MHz		QPSK	100		17.915
			16-QAM			17.925
			64-QAM			17.940
			256-QAM			17.935

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 85 ~ 100.

8.6 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
7	5	2502.5	26.1823	30.131	-76.816	-46.685	-25.00
		2535.0	26.1632	30.131	-76.432	-46.301	
		2567.5	26.1321	30.131	-76.806	-46.675	
	10	2505.0	26.1695	30.131	-76.807	-46.676	
		2535.0	26.1266	30.131	-76.752	-46.621	
		2565.0	25.7849	30.131	-76.871	-46.740	
	15	2507.5	26.1487	30.131	-76.826	-46.695	
		2535.0	26.1984	30.131	-76.998	-46.867	
		2562.5	3.7114	27.976	-76.590	-48.614	
	20	2510.0	26.1610	30.131	-76.653	-46.522	
		2535.0	26.1462	30.131	-76.817	-46.686	
		2560.0	26.2418	30.131	-76.710	-46.579	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 117 ~ 140.
2. Conducted Spurious Emissions was Tested QPSK Modulation, Resource Block Size 1 and Resource Block Offset 0
3. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)
4. Factor(dB) = Cable Loss + Attenuator + Power Splitter

Frequency Range (GHz)	Factor [dB]
0.03 – 1	25.270
1 – 5	27.976
5 – 10	28.591
10 – 15	29.116
15 – 20	29.489
Above 20(26.5)	30.131

8.7 CHANNEL EDGE

Band Width (Modulation)	Frequency (MHz)	RB Size / Offset	C.E ~ (C.E ± 1 MHz)		2 496 MHz ~ 2 499 MHz	(C.E + 1 MHz) ~ (C.E + 5 MHz)	2 490.5 MHz ~ 2 496 MHz	(C.E + 5 MHz) ~ (C.E + X MHz)	Below 2 490.5 MHz	Above (C.E + X MHz)
			Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
5 MHz	2502.5	25 / 0	-27.00	-26.59	-23.95	-23.84	-31.34	-36.86	-40.62	-38.00
10 MHz	2505.0	50 / 0	-29.03	-28.26	-25.61	-25.34	-27.96	-28.22	-37.10	-38.28
15 MHz	2507.5	75 / 0	-31.38	-28.73	-30.58	-26.79	-30.84	-28.73	-33.67	-38.01
20 MHz	2510.0	100 / 0 0	-30.38	-29.14	-30.26	-28.21	-30.87	-29.46	-32.24	-38.29
Limit			-10.0		-10.0		-13.0		-25.0	

Band Width (Modulation)	Frequency (MHz)	RB Size / Offset	C.E ~ (C.E ± 1 MHz)		(C.E ± 1 MHz) ~ (C.E ± 5 MHz)	
			Lower	Upper	Lower	Upper
5 MHz (QPSK)	2535.0	25 / 0	-28.99	-28.45	-29.80	-30.01
	2567.5	25 / 0	-28.28	-27.65	-27.49	-27.11
10 MHz (QPSK)	2535.0	50 / 0	-30.49	-30.86	-28.25	-31.06
	2565.0	50 / 0	-28.97	-28.68	-27.02	-26.23
15 MHz (QPSK)	2535.0	75 / 0	-31.21	-31.81	-29.70	-32.56
	2562.5	75 / 0	-28.93	-29.16	-28.03	-27.33
20 MHz (QPSK)	2535.0	100 / 0	-29.28	-31.10	-27.91	-31.38
	2560.0	100 / 0	-28.02	-27.12	-27.29	-25.19
Limit			-10.0		-10.0	

Band Width (Modulation)	Frequency (MHz)	Resource Block Size	(C.E ± 5 MHz) ~ (C.E ± X MHz)		Above (C.E ± X MHz)	
			Lower	Upper	Lower	Upper
5 MHz (QPSK)	2535.0	25 / 0	-37.31	-38.79	-38.62	-38.73
	2567.5	25 / 0	-35.41	-36.32	-36.82	-37.83
10 MHz (QPSK)	2535.0	50 / 0	-31.78	-34.91	-39.65	-39.47
	2565.0	50 / 0	-32.95	-29.35	-37.95	-37.78
15 MHz (QPSK)	2535.0	75 / 0	-32.89	-34.20	-42.41	-42.19
	2562.5	75 / 0	-30.99	-29.86	-40.39	-40.22
20 MHz (QPSK)	2535.0	100 / 0	-30.46	-33.33	-43.15	-42.66
	2560.0	100 / 0	-30.44	-28.05	-40.04	-42.87
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. X = 6 MHz(5 MHz Bandwidth), 10 MHz(10 MHz Bandwidth), 15 MHz(15 MHz Bandwidth), 20 MHz(20 MHz Bandwidth)
4. Plots of the EUT's Channel Edge are shown Page 61 ~ 84.

8.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

▣ MODE: LTE 7

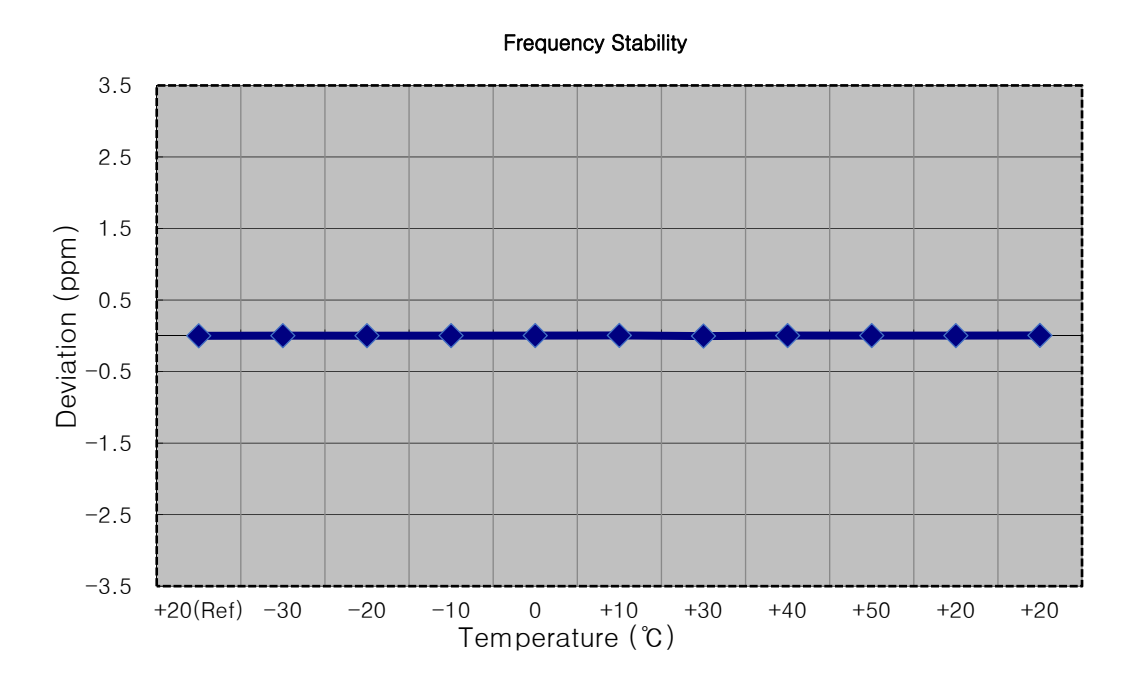
▣ OPERATING FREQUENCY: 2,502,500,000 Hz

▣ CHANNEL: 20775 (5 MHz)

▣ REFERENCE VOLTAGE: 13.500 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	13.500	+20(Ref)	2502 500 006	0.0	0.000 000	0.000
100%		-30	2502 500 011	4.9	0.000 000	0.002
100%		-20	2502 500 010	4.0	0.000 000	0.002
100%		-10	2502 500 012	5.2	0.000 000	0.002
100%		0	2502 500 014	7.8	0.000 000	0.003
100%		+10	2502 500 020	13.6	0.000 001	0.005
100%		+30	2502 499 997	-9.5	0.000 000	-0.004
100%		+40	2502 500 015	8.6	0.000 000	0.003
100%		+50	2502 500 014	7.4	0.000 000	0.003
85%	11.475	+20	2502 500 013	6.5	0.000 000	0.003
115%	15.525	+20	2502 500 020	13.3	0.000 001	0.005



▣ MODE: LTE 7

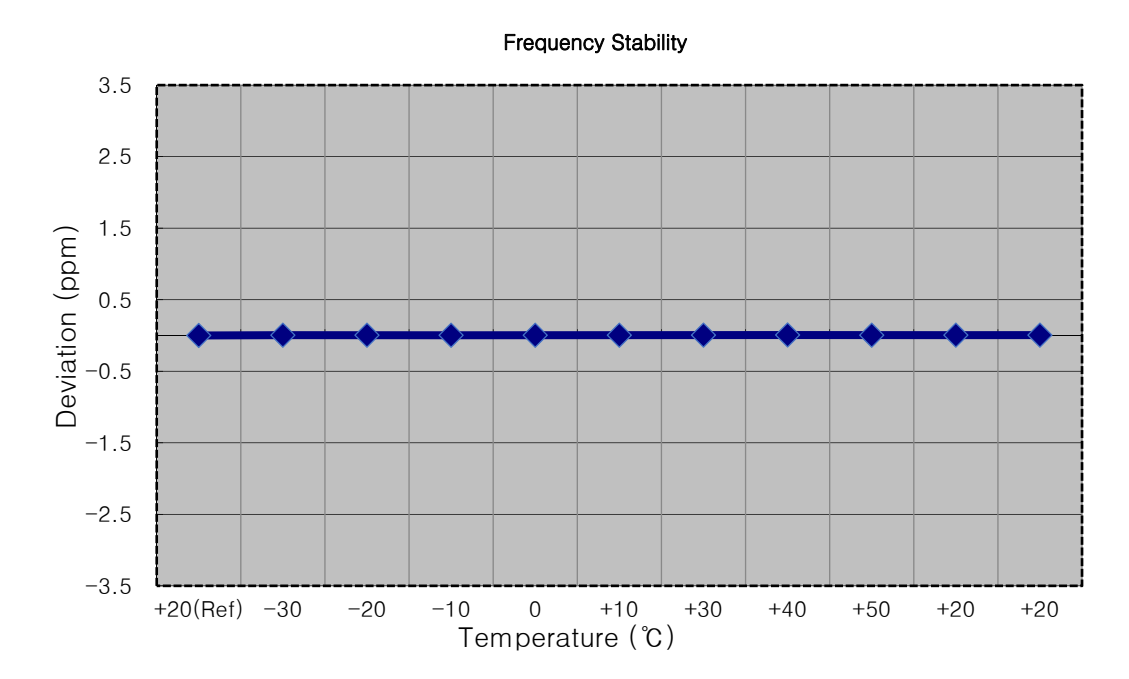
▣ OPERATING FREQUENCY: 2,505,000,000 Hz

▣ CHANNEL: 20800 (10 MHz)

▣ REFERENCE VOLTAGE: 13.500 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	13.500	+20(Ref)	2504 999 994	0.0	0.000 000	0.000
100%		-30	2505 000 004	10.4	0.000 000	0.004
100%		-20	2505 000 004	10.1	0.000 000	0.004
100%		-10	2505 000 001	7.4	0.000 000	0.003
100%		0	2505 000 001	7.9	0.000 000	0.003
100%		+10	2505 000 004	10.0	0.000 000	0.004
100%		+30	2505 000 006	12.3	0.000 000	0.005
100%		+40	2505 000 010	16.4	0.000 001	0.007
100%		+50	2505 000 004	10.5	0.000 000	0.004
85%	11.475	+20	2505 000 005	11.3	0.000 000	0.005
115%	15.525	+20	2505 000 006	12.2	0.000 000	0.005



▣ MODE: LTE 7

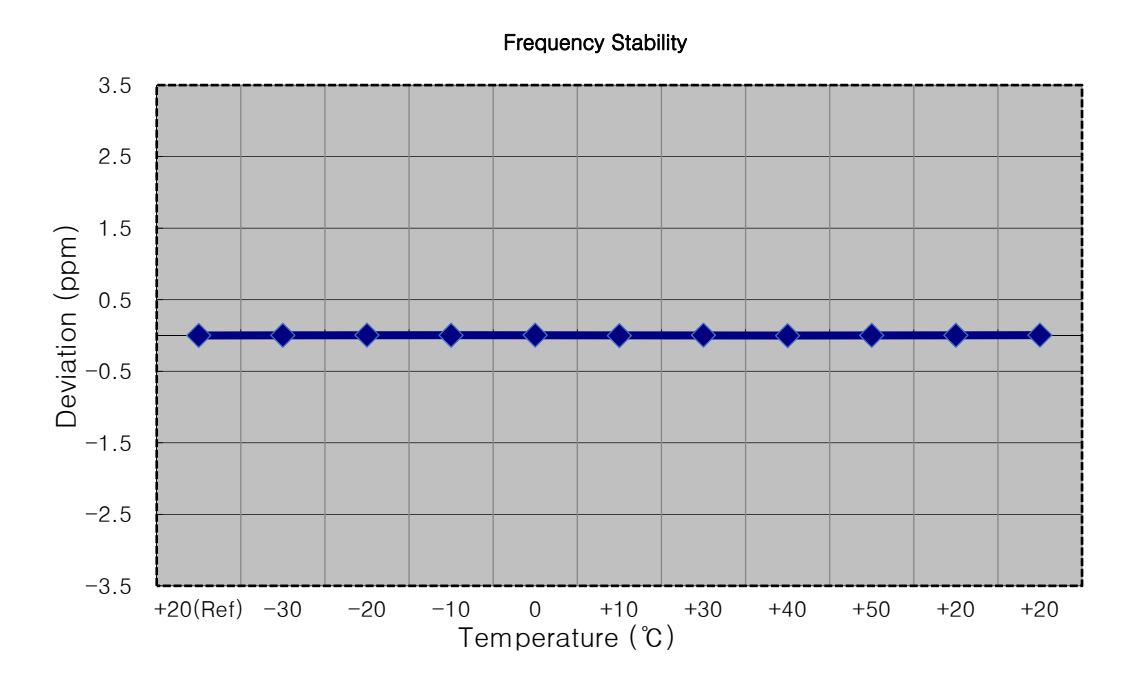
▣ OPERATING FREQUENCY: 2,507,500,000 Hz

▣ CHANNEL: 20825 (15 MHz)

▣ REFERENCE VOLTAGE: 13.500 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	13.500	+20(Ref)	2507 499 995	0.0	0.000 000	0.000
100%		-30	2507 500 000	5.4	0.000 000	0.002
100%		-20	2507 500 006	11.5	0.000 000	0.005
100%		-10	2507 500 001	5.8	0.000 000	0.002
100%		0	2507 500 006	10.9	0.000 000	0.004
100%		+10	2507 499 990	-4.8	0.000 000	-0.002
100%		+30	2507 500 007	11.7	0.000 000	0.005
100%		+40	2507 499 988	-7.3	0.000 000	-0.003
100%		+50	2507 499 998	3.6	0.000 000	0.001
85%	11.475	+20	2507 500 001	5.9	0.000 000	0.002
115%	15.525	+20	2507 500 006	11.6	0.000 000	0.005



▣ MODE: LTE 7

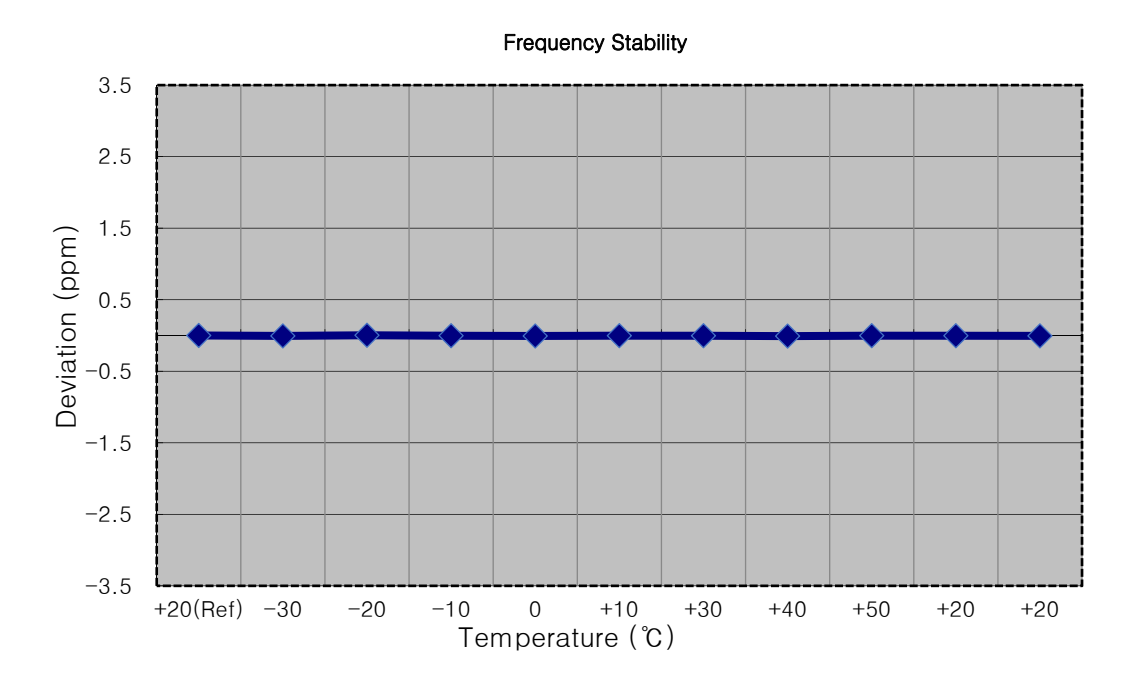
▣ OPERATING FREQUENCY: 2,510,000,000 Hz

▣ CHANNEL: 20850 (20 MHz)

▣ REFERENCE VOLTAGE: 13.500 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	13.500	+20(Ref)	2509 999 991	0.0	0.000 000	0.000
100%		-30	2509 999 975	-15.6	-0.000 001	-0.006
100%		-20	2509 999 998	7.8	0.000 000	0.003
100%		-10	2509 999 981	-9.8	0.000 000	-0.004
100%		0	2509 999 972	-18.1	-0.000 001	-0.007
100%		+10	2509 999 983	-7.2	0.000 000	-0.003
100%		+30	2509 999 981	-9.8	0.000 000	-0.004
100%		+40	2509 999 969	-21.8	-0.000 001	-0.009
100%		+50	2509 999 983	-7.7	0.000 000	-0.003
85%	11.475	+20	2509 999 982	-8.9	0.000 000	-0.004
115%	15.525	+20	2509 999 977	-13.6	-0.000 001	-0.005



▣ MODE: LTE 7

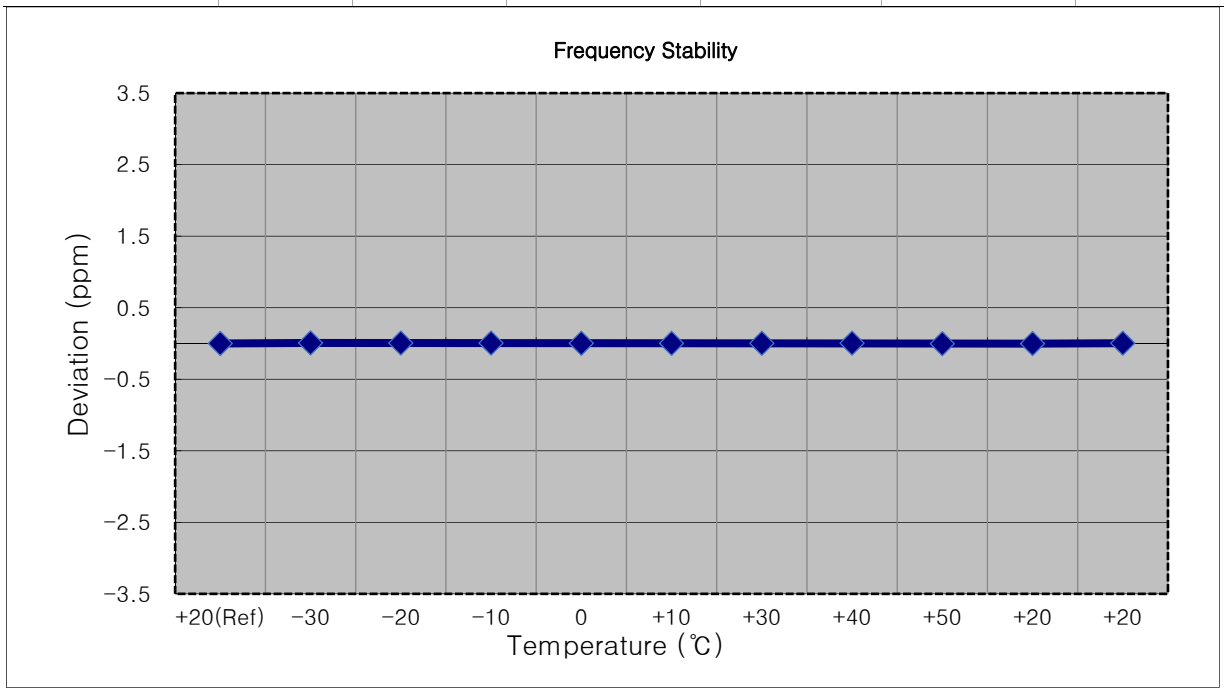
▣ OPERATING FREQUENCY: 2,535,000,000 Hz

▣ CHANNEL: 21100 (5 MHz)

▣ REFERENCE VOLTAGE: 13.500 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	Error (Hz)	(%)	
100%	13.500	+20(Ref)	2535 000 009	0.0	0.000 000	0.000
100%		-30	2535 000 028	19.1	0.000 001	0.008
100%		-20	2535 000 024	15.1	0.000 001	0.006
100%		-10	2535 000 023	14.3	0.000 001	0.006
100%		0	2535 000 016	6.5	0.000 000	0.003
100%		+10	2535 000 013	4.1	0.000 000	0.002
100%		+30	2535 000 016	7.0	0.000 000	0.003
100%		+40	2535 000 021	11.8	0.000 000	0.005
100%		+50	2534 999 999	-9.9	0.000 000	-0.004
85%	11.475	+20	2535 000 003	-5.6	0.000 000	-0.002
115%	15.525	+20	2535 000 019	9.5	0.000 000	0.004



▣ MODE: LTE 7

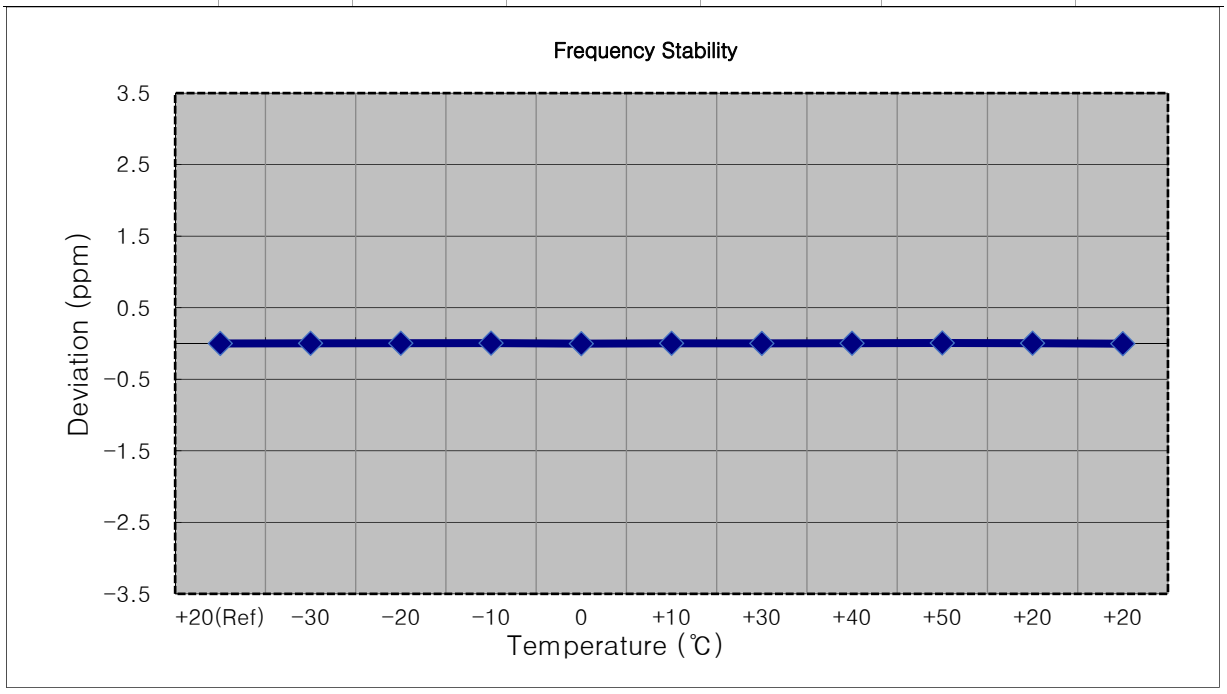
▣ OPERATING FREQUENCY: 2,535,000,000 Hz

▣ CHANNEL: 21100 (10 MHz)

▣ REFERENCE VOLTAGE: 13.500 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	Error (Hz)	(%)	
100%		+20(Ref)	2535 000 003	0.0	0.000 000	0.000
100%		-30	2535 000 009	5.9	0.000 000	0.002
100%		-20	2535 000 012	8.8	0.000 000	0.003
100%		-10	2535 000 015	12.0	0.000 000	0.005
100%	13.500	0	2534 999 997	-6.6	0.000 000	-0.003
100%		+10	2535 000 009	6.0	0.000 000	0.002
100%		+30	2535 000 007	3.1	0.000 000	0.001
100%		+40	2535 000 012	8.1	0.000 000	0.003
100%		+50	2535 000 021	17.2	0.000 001	0.007
85%	11.475	+20	2535 000 013	9.1	0.000 000	0.004
115%	15.525	+20	2534 999 997	-6.7	0.000 000	-0.003



▣ MODE: LTE 7

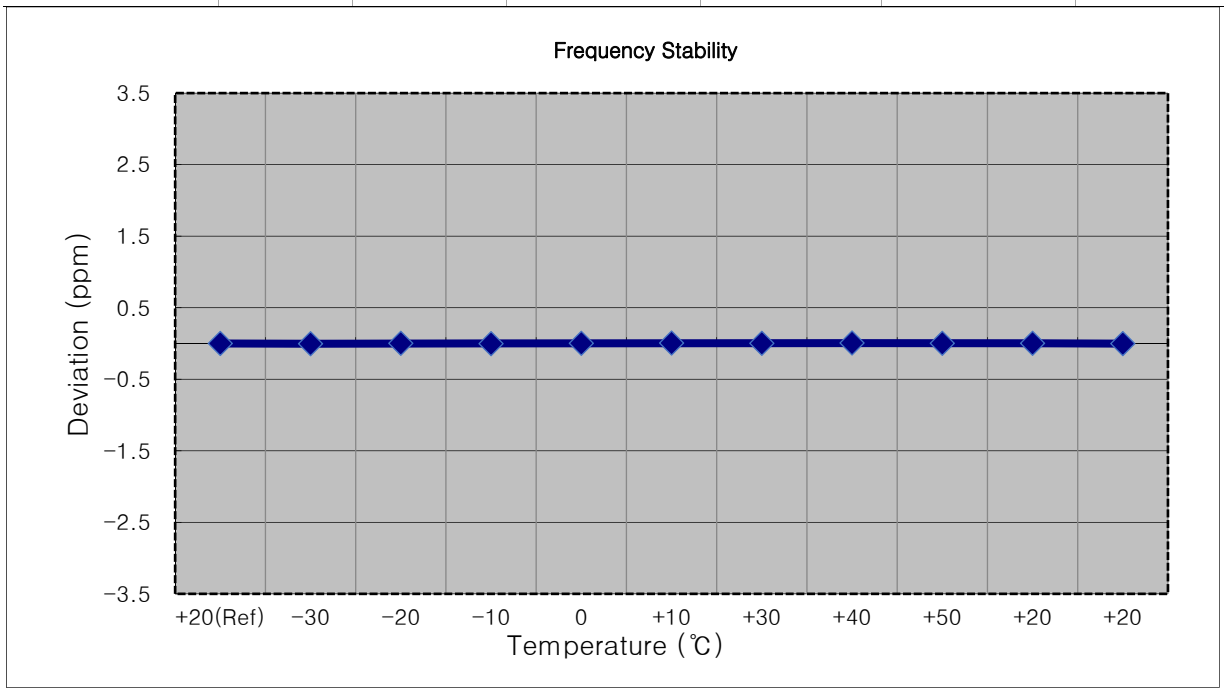
▣ OPERATING FREQUENCY: 2,535,000,000 Hz

▣ CHANNEL: 21100 (15 MHz)

▣ REFERENCE VOLTAGE: 13.500 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	Error (Hz)	(%)	
100%	13.500	+20(Ref)	2535 000 007	0.0	0.000 000	0.000
100%		-30	2534 999 999	-8.3	0.000 000	-0.003
100%		-20	2535 000 012	5.3	0.000 000	0.002
100%		-10	2534 999 999	-7.4	0.000 000	-0.003
100%		0	2535 000 013	5.7	0.000 000	0.002
100%		+10	2535 000 023	16.1	0.000 001	0.006
100%		+30	2535 000 012	5.3	0.000 000	0.002
100%		+40	2535 000 024	16.7	0.000 001	0.007
100%		+50	2535 000 013	5.7	0.000 000	0.002
85%	11.475	+20	2535 000 014	6.7	0.000 000	0.003
115%	15.525	+20	2535 000 001	-5.8	0.000 000	-0.002



▣ MODE: LTE 7

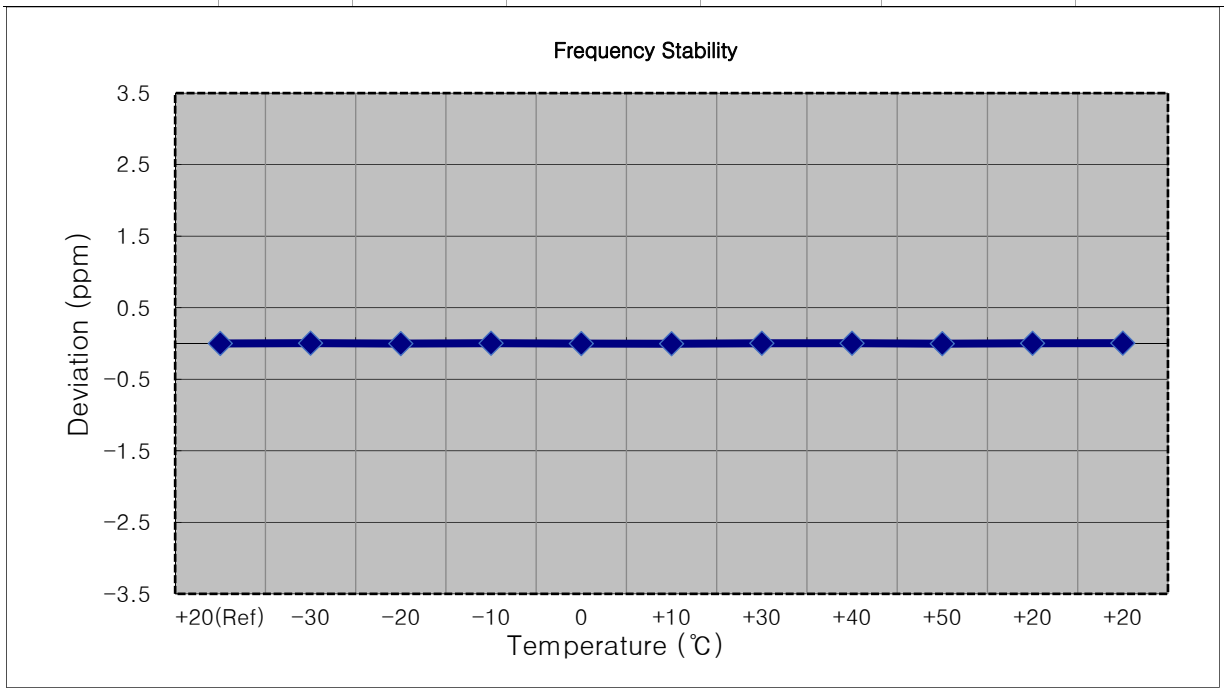
▣ OPERATING FREQUENCY: 2,535,000,000 Hz

▣ CHANNEL: 21100 (20 MHz)

▣ REFERENCE VOLTAGE: 13.500 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100%	13.500	+20(Ref)	2535 000 017	0.0	0.000 000	0.000
100%		-30	2535 000 028	10.8	0.000 000	0.004
100%		-20	2535 000 012	-5.0	0.000 000	-0.002
100%		-10	2535 000 025	8.4	0.000 000	0.003
100%		0	2535 000 014	-3.4	0.000 000	-0.001
100%		+10	2535 000 009	-8.3	0.000 000	-0.003
100%		+30	2535 000 024	7.2	0.000 000	0.003
100%		+40	2535 000 025	8.4	0.000 000	0.003
100%		+50	2535 000 009	-7.7	0.000 000	-0.003
85%	11.475	+20	2535 000 024	6.9	0.000 000	0.003
115%	15.525	+20	2535 000 028	11.0	0.000 000	0.004



▣ MODE: LTE 7

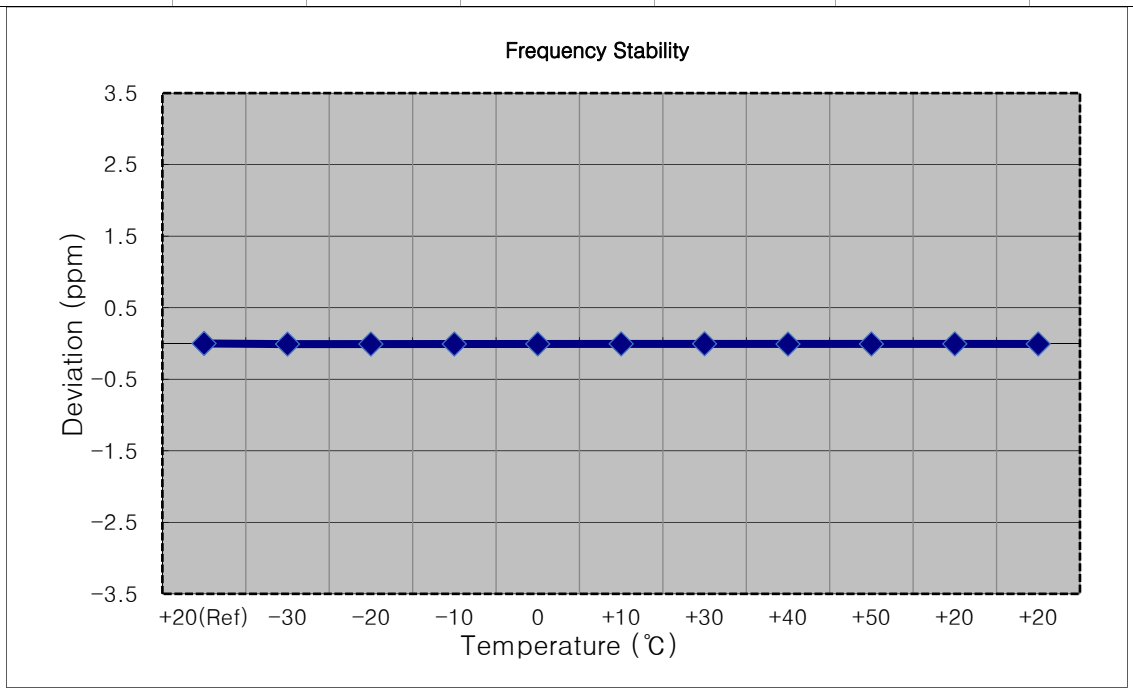
▣ OPERATING FREQUENCY: 2,567,500,000 Hz

▣ CHANNEL: 21425 (5 MHz)

▣ REFERENCE VOLTAGE: 13.500 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	Error (Hz)	(%)	
100%	13.500	+20(Ref)	2567 499 976	0.0	0.000 000	0.000
100%		-30	2567 499 953	-23.0	-0.000 001	-0.009
100%		-20	2567 499 955	-21.4	-0.000 001	-0.008
100%		-10	2567 499 956	-19.7	-0.000 001	-0.008
100%		0	2567 499 958	-17.5	-0.000 001	-0.007
100%		+10	2567 499 961	-15.2	-0.000 001	-0.006
100%		+30	2567 499 965	-10.8	0.000 000	-0.004
100%		+40	2567 499 953	-23.3	-0.000 001	-0.009
100%		+50	2567 499 957	-19.4	-0.000 001	-0.008
85%	11.475	+20	2567 499 961	-15.3	-0.000 001	-0.006
115%	15.525	+20	2567 499 959	-17.2	-0.000 001	-0.007



▣ MODE: LTE 7

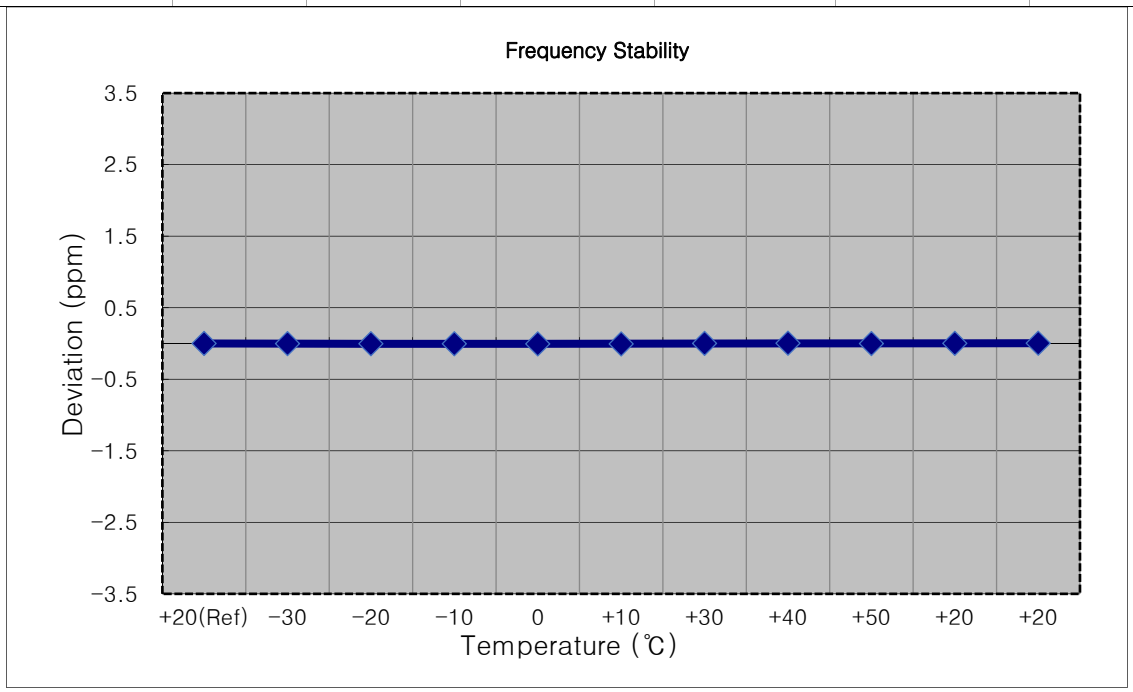
▣ OPERATING FREQUENCY: 2,565,000,000 Hz

▣ CHANNEL: 21400 (10 MHz)

▣ REFERENCE VOLTAGE: 13.500 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	Error (Hz)	(%)	
100%	13.500	+20(Ref)	2565 000 003	0.0	0.000 000	0.000
100%		-30	2564 999 998	-5.7	0.000 000	-0.002
100%		-20	2564 999 994	-9.0	0.000 000	-0.004
100%		-10	2564 999 992	-11.4	0.000 000	-0.004
100%		0	2564 999 989	-14.4	-0.000 001	-0.006
100%		+10	2564 999 986	-17.5	-0.000 001	-0.007
100%		+30	2565 000 005	1.8	0.000 000	0.001
100%		+40	2565 000 013	9.7	0.000 000	0.004
100%		+50	2565 000 001	-2.9	0.000 000	-0.001
85%	11.475	+20	2565 000 008	4.6	0.000 000	0.002
115%	15.525	+20	2565 000 013	9.7	0.000 000	0.004



▣ MODE: LTE 7

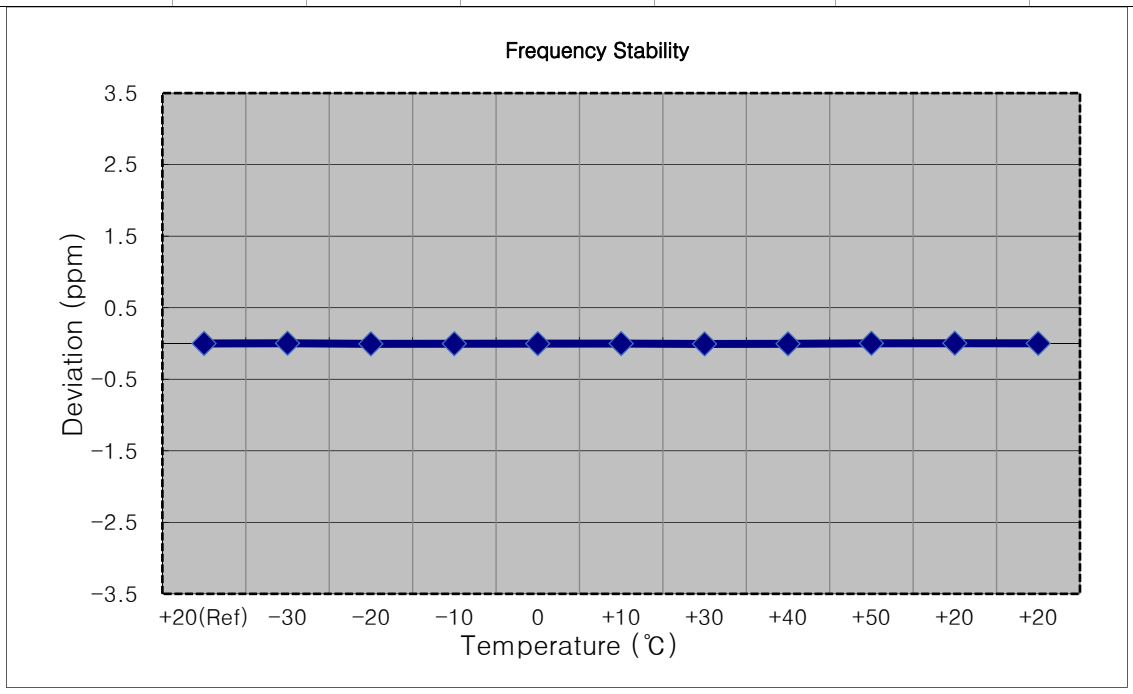
▣ OPERATING FREQUENCY: 2,562,500,000 Hz

▣ CHANNEL: 21375 (15 MHz)

▣ REFERENCE VOLTAGE: 13.500 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	Error (Hz)	(%)	
100%	13.500	+20(Ref)	2562 500 004	0.0	0.000 000	0.000
100%		-30	2562 500 011	7.3	0.000 000	0.003
100%		-20	2562 499 991	-13.1	-0.000 001	-0.005
100%		-10	2562 499 994	-9.9	0.000 000	-0.004
100%		0	2562 499 998	-5.9	0.000 000	-0.002
100%		+10	2562 500 001	-3.5	0.000 000	-0.001
100%		+30	2562 499 988	-16.5	-0.000 001	-0.006
100%		+40	2562 499 992	-11.8	0.000 000	-0.005
100%		+50	2562 500 010	5.9	0.000 000	0.002
85%	11.475	+20	2562 500 012	8.1	0.000 000	0.003
115%	15.525	+20	2562 500 009	5.1	0.000 000	0.002



▣ MODE: LTE 7

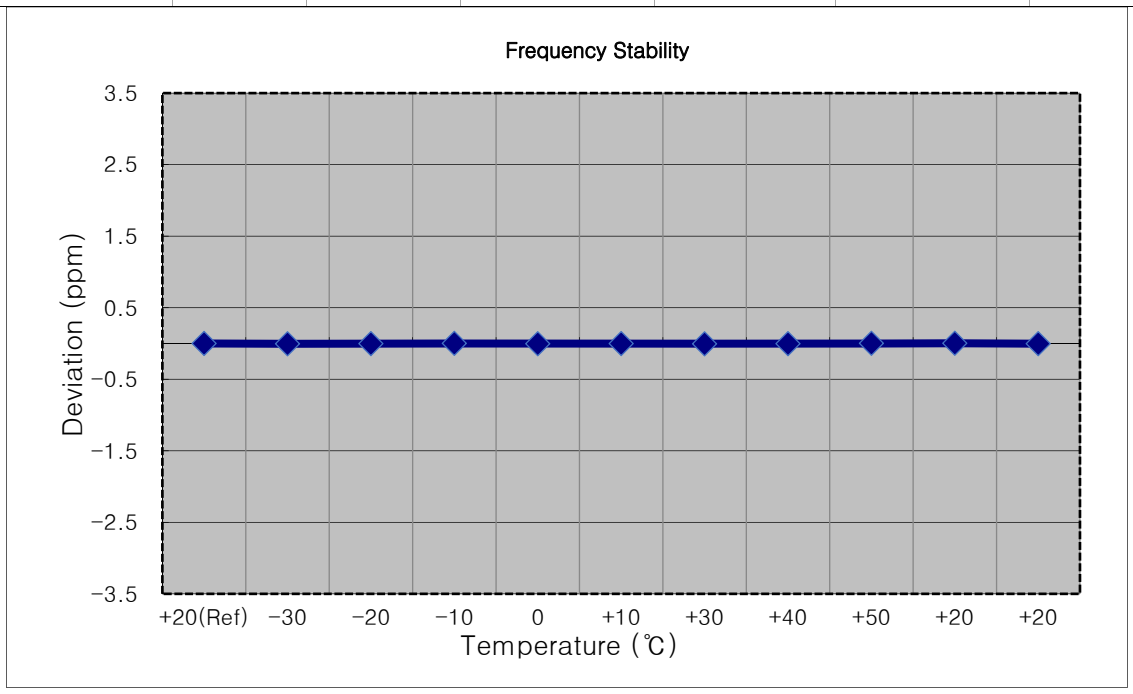
▣ OPERATING FREQUENCY: 2,560,000,000 Hz

▣ CHANNEL: 21350 (20 MHz)

▣ REFERENCE VOLTAGE: 13.500 VDC

▣ DEVIATION LIMIT: Emission must remain in band

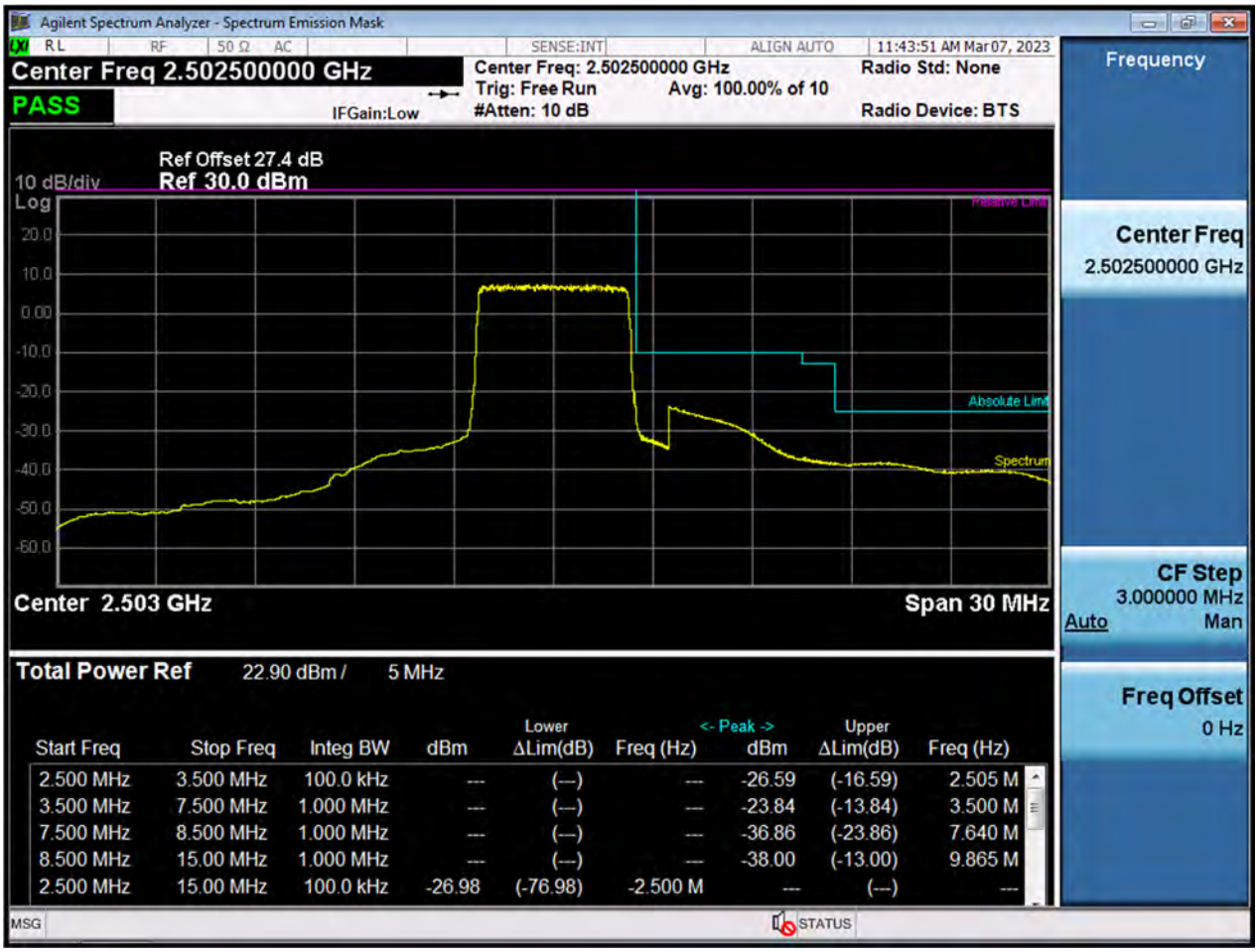
Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	13.500	+20(Ref)	2559 999 983	0.0	0.000 000	0.000
100%		-30	2559 999 971	-11.7	0.000 000	-0.005
100%		-20	2559 999 977	-5.3	0.000 000	-0.002
100%		-10	2559 999 988	4.8	0.000 000	0.002
100%		0	2559 999 973	-9.8	0.000 000	-0.004
100%		+10	2559 999 979	-3.8	0.000 000	-0.001
100%		+30	2559 999 970	-12.8	-0.000 001	-0.005
100%		+40	2559 999 976	-7.1	0.000 000	-0.003
100%		+50	2559 999 990	7.1	0.000 000	0.003
85%	11.475	+20	2559 999 990	7.4	0.000 000	0.003
115%	15.525	+20	2559 999 975	-7.7	0.000 000	-0.003



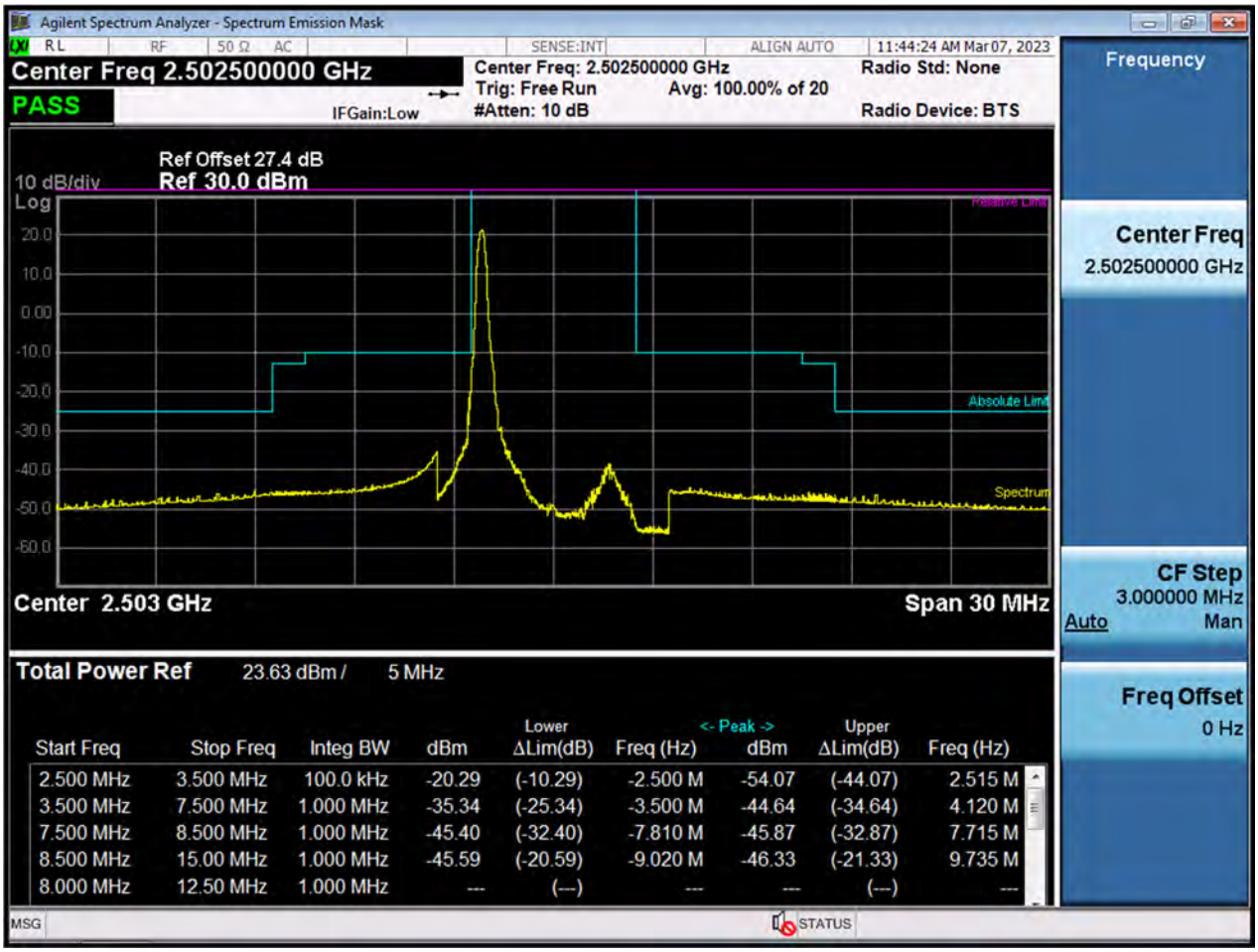
9. TEST PLOTS

LTE7_5 M_BandEdge_Lower_Low_2502.5 MHz_QPSK_FullRB

LTE7_5 M_BandEdge_Upper_Low_2502.5 MHz_QPSK_FullRB

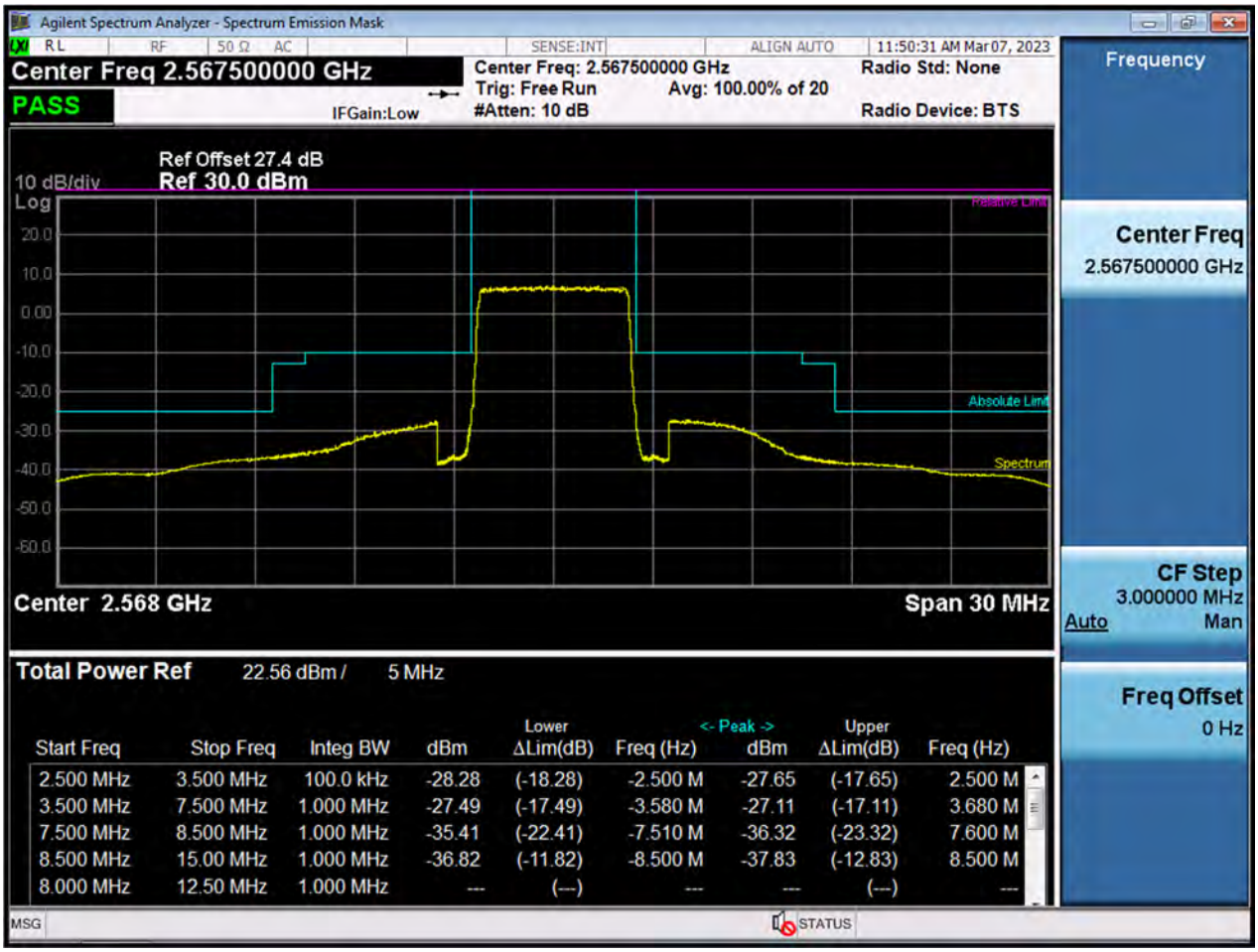


LTE7_5 M_BandEdge_Low_2502.5 MHz_QPSK_1RB

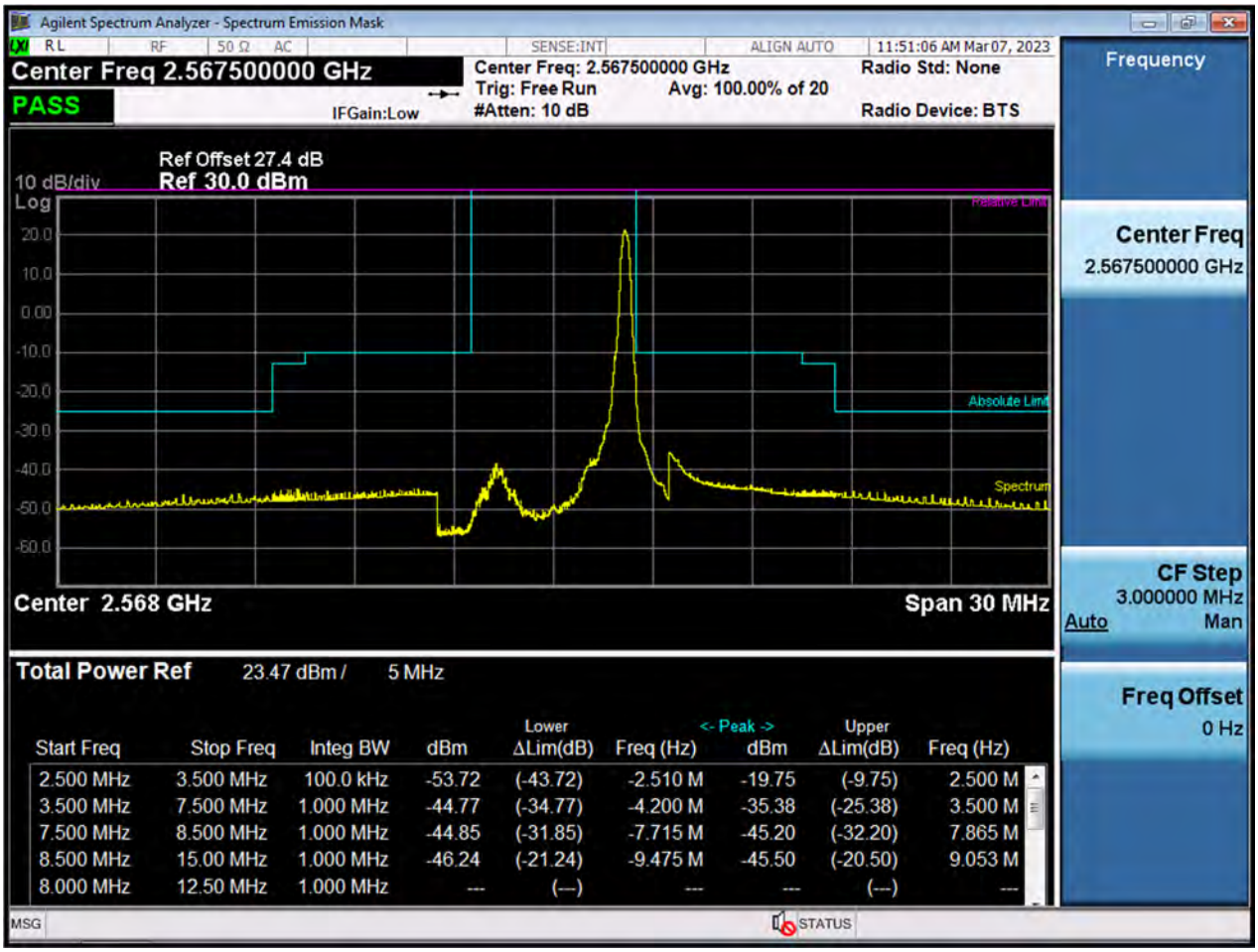


LTE7_5 M_BandEdge_Mid_2535 MHz_QPSK_FullRB

LTE7_5 M_BandEdge_High_2567.5 MHz_QPSK_FullRB



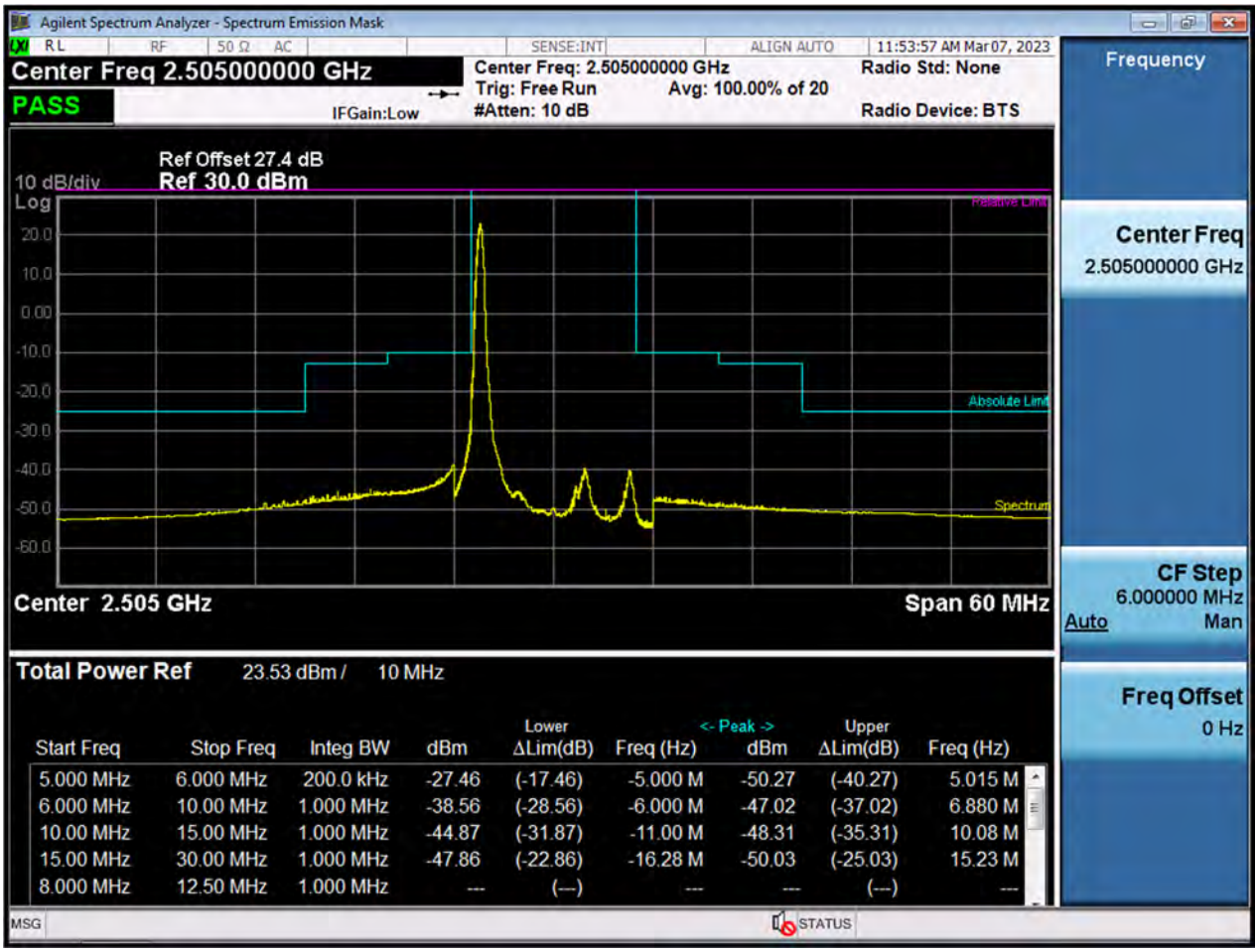
LTE7_5 M_BandEdge_High_2567.5 MHz_QPSK_1RB



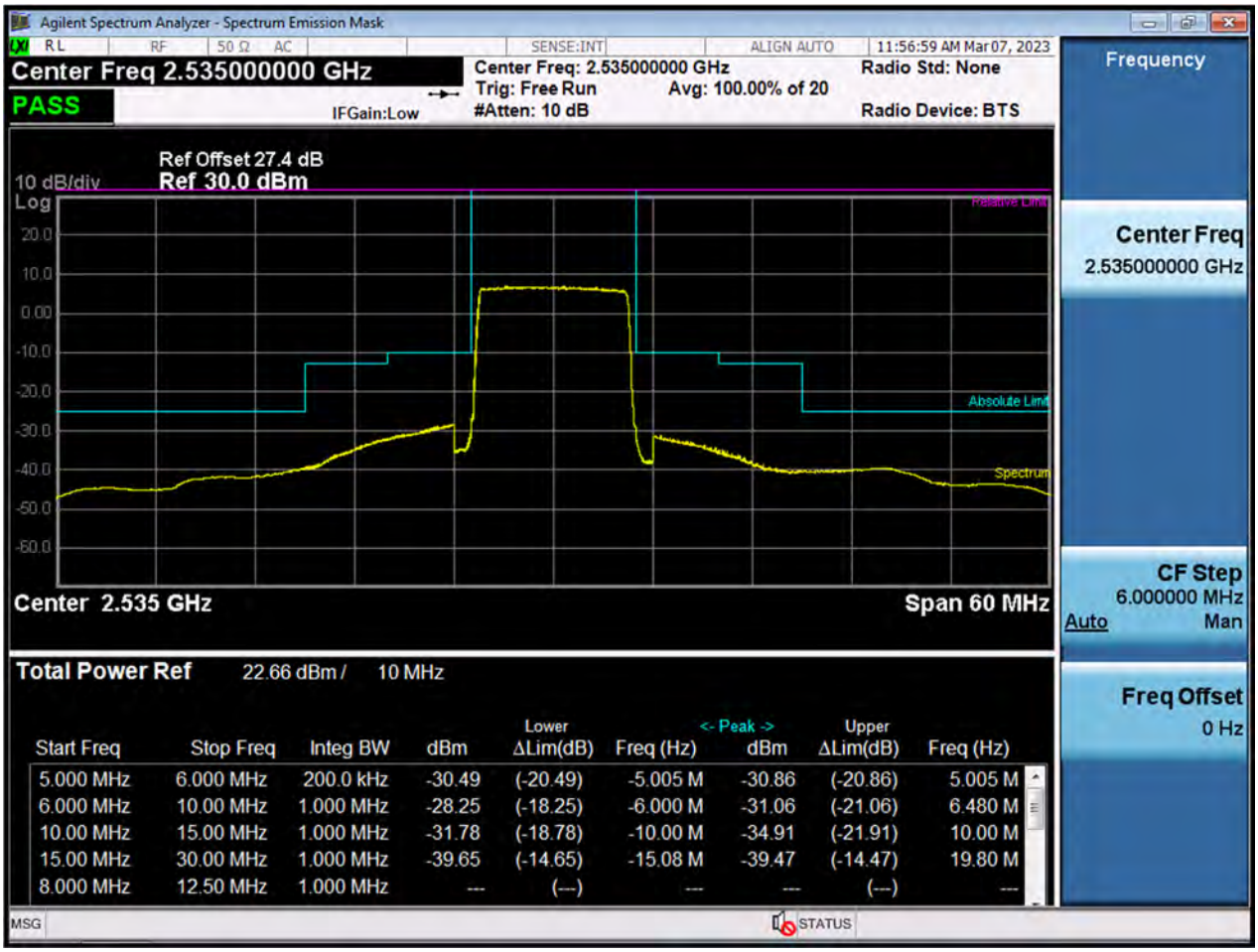
LTE7_10 M_BandEdge_Lower_Low_2505 MHz_QPSK_FullRB

LTE7_10 M_BandEdge_Upper_Low_2505 MHz_QPSK_FullRB

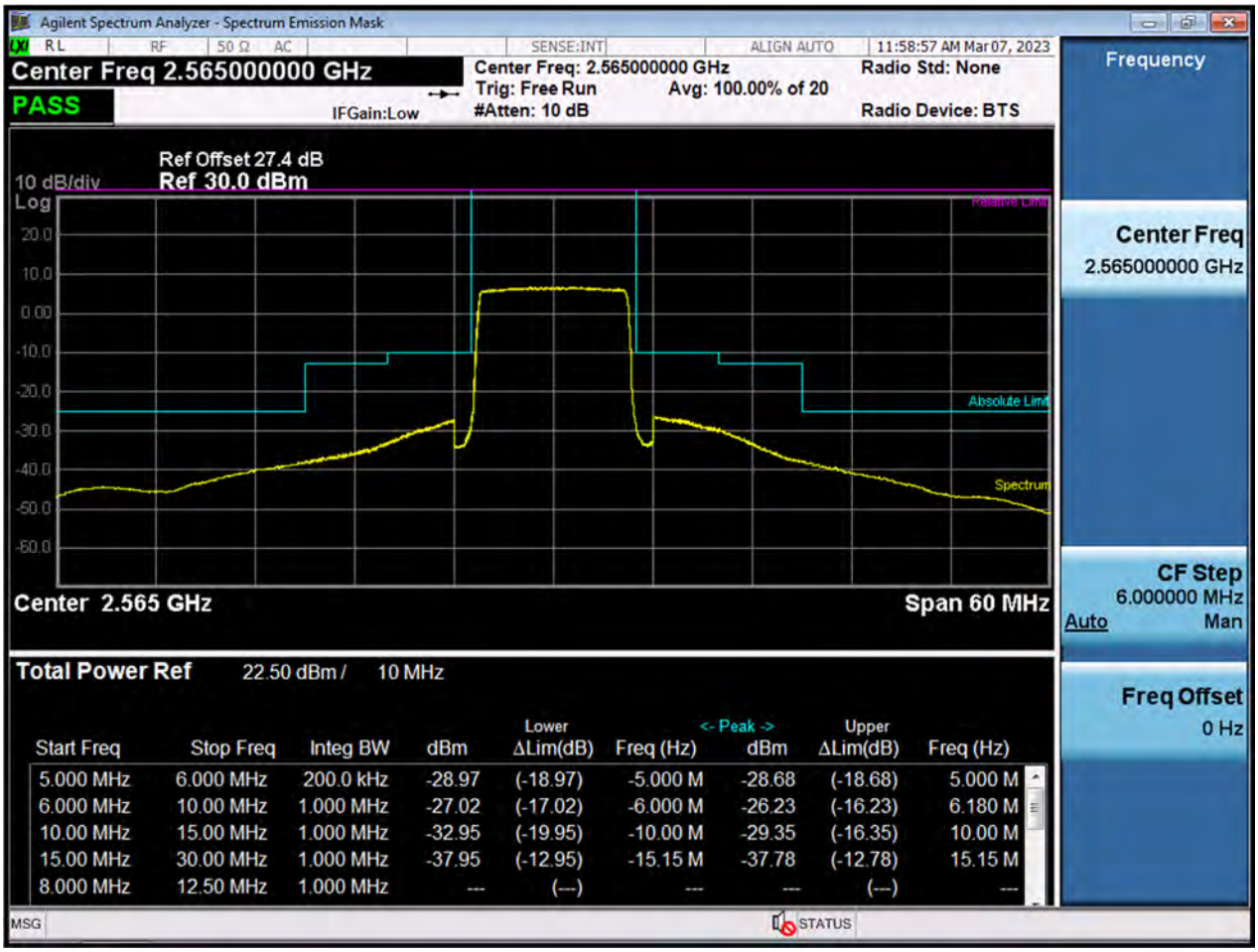
LTE7_10 M_BandEdge_Low_2505 MHz_QPSK_1RB



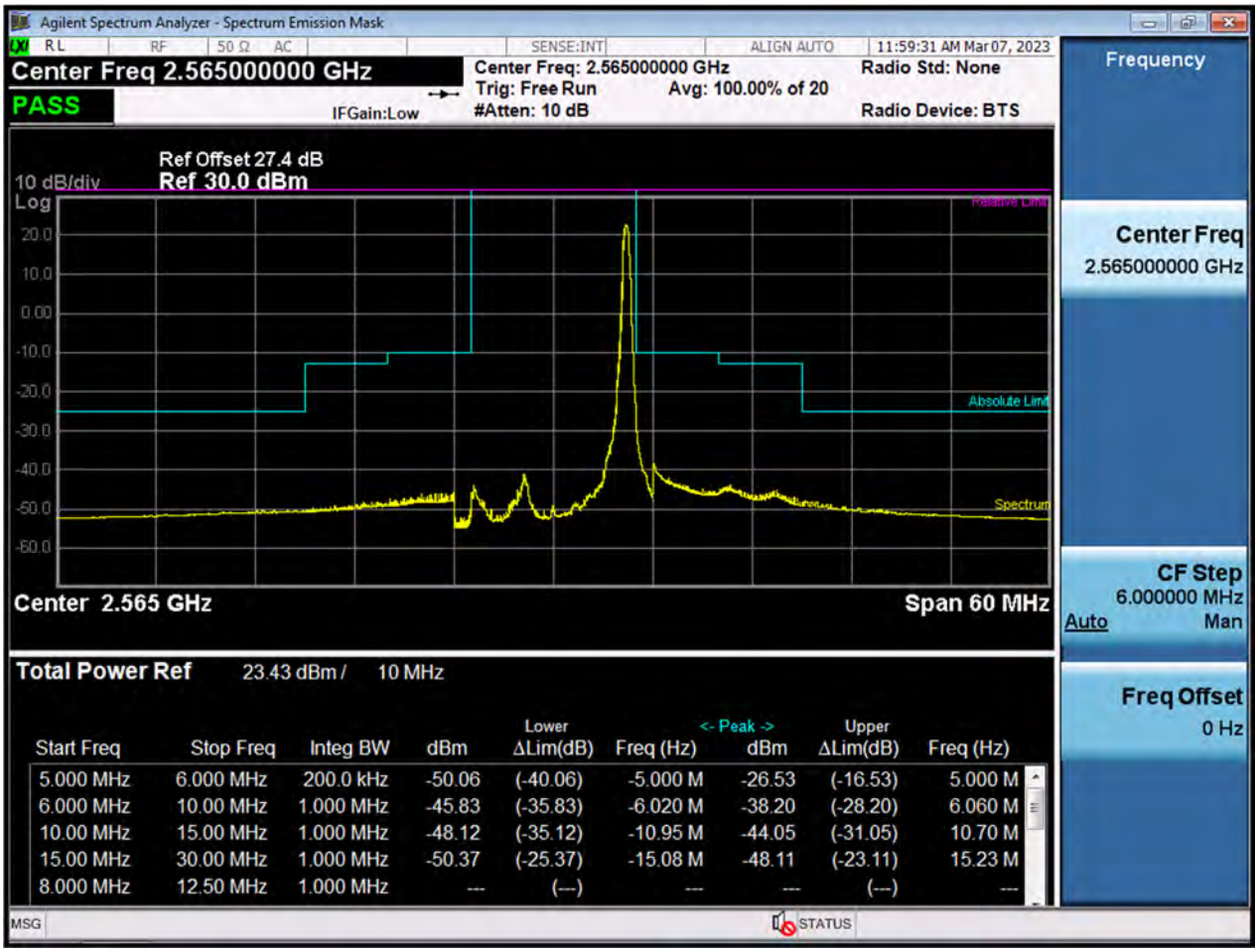
LTE7_10 M_BandEdge_Mid_2535 MHz_QPSK_FullRB



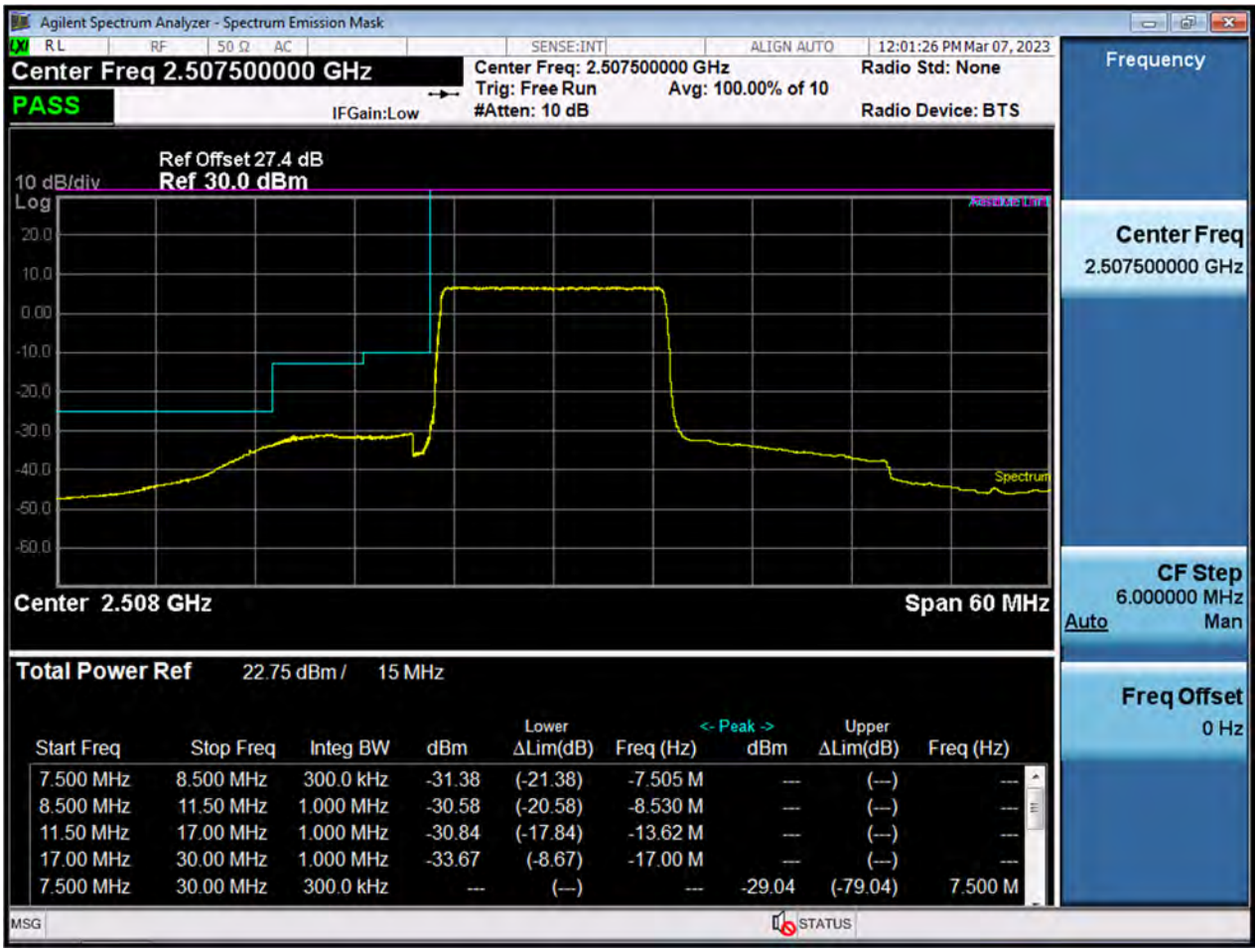
LTE7_10 M_BandEdge_High_2565 MHz_QPSK_FullRB



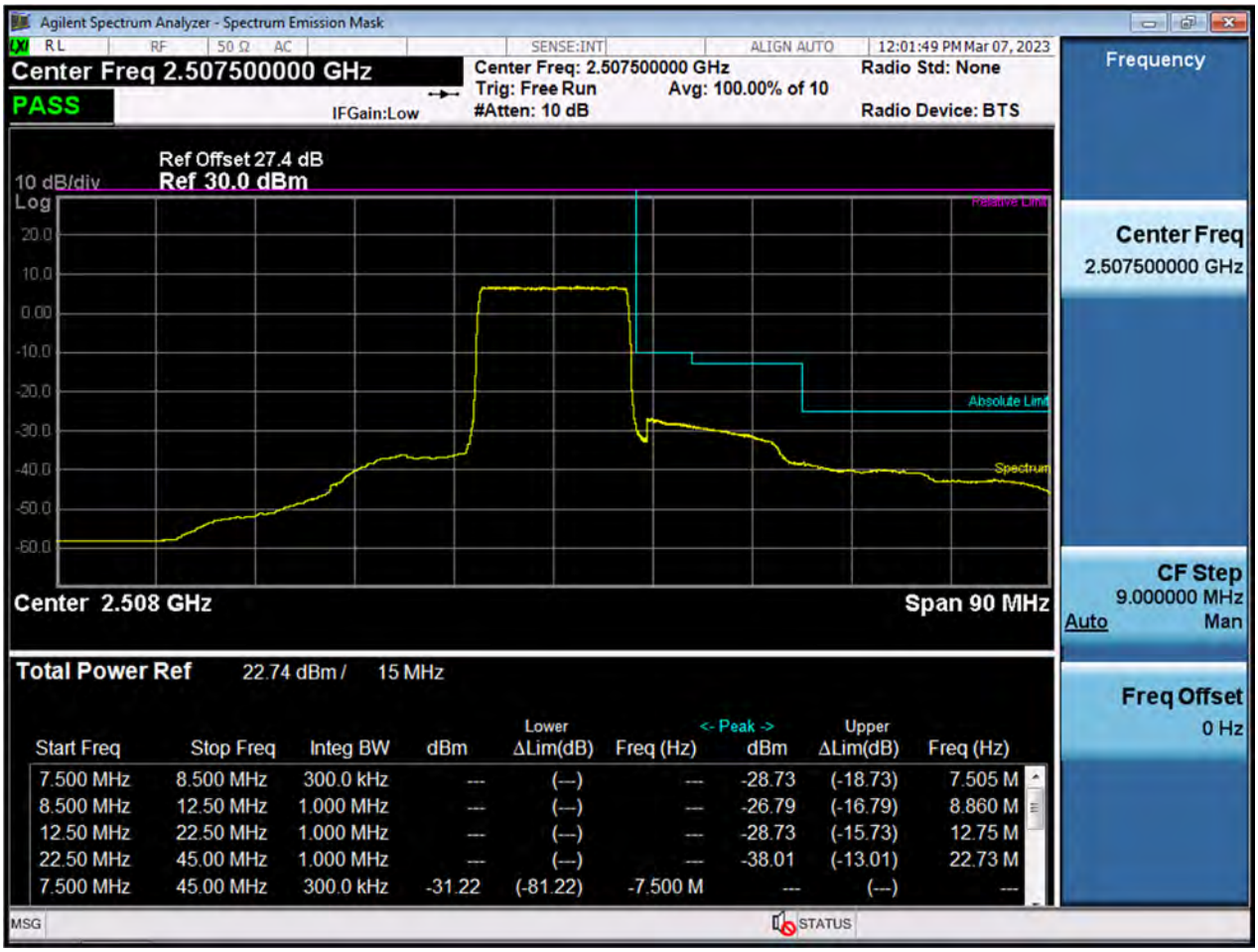
LTE7_10 M_BandEdge_High_2565 MHz_QPSK_1RB



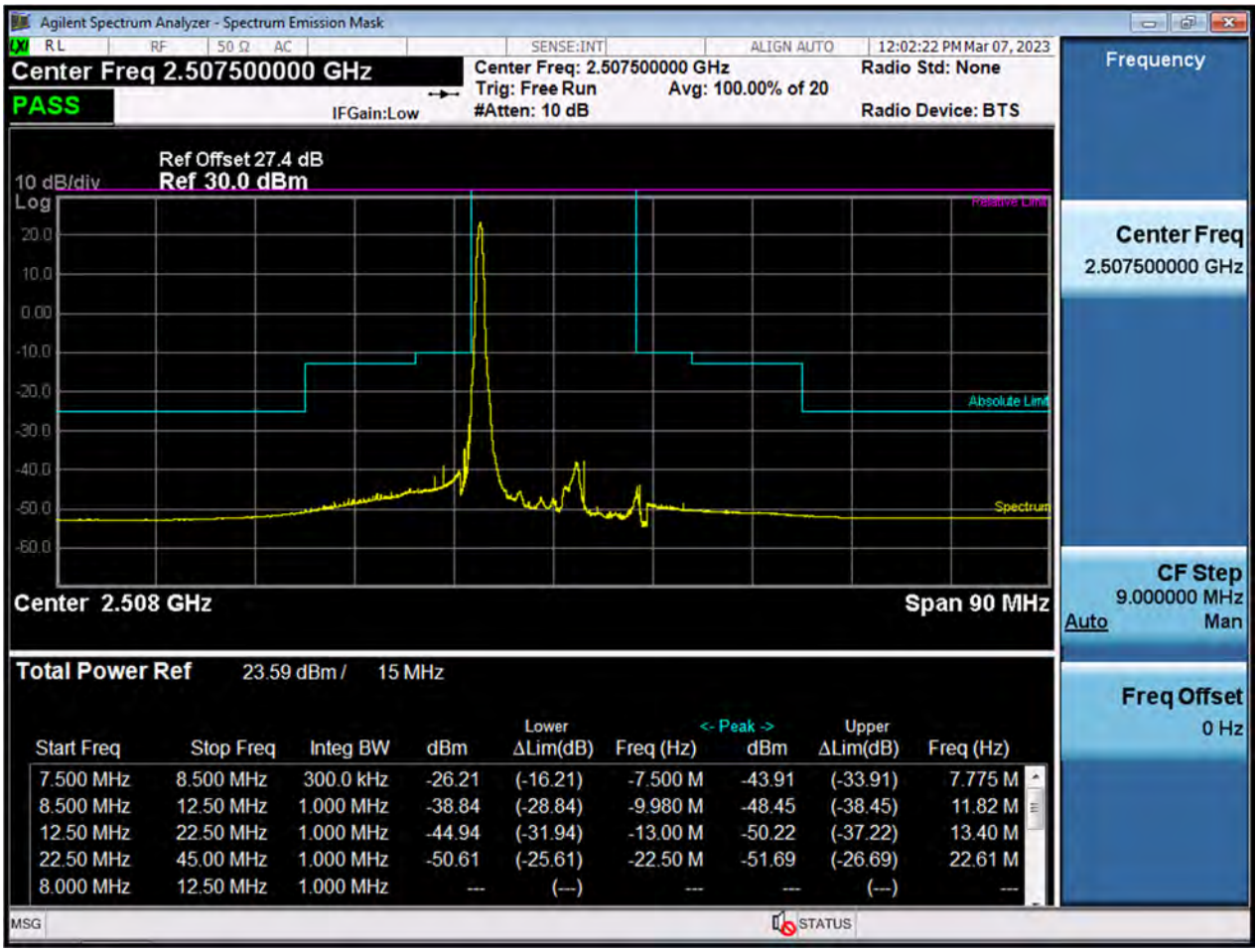
LTE7_15 M_BandEdge_Lower_Low_2507.5 MHz_QPSK_FullRB



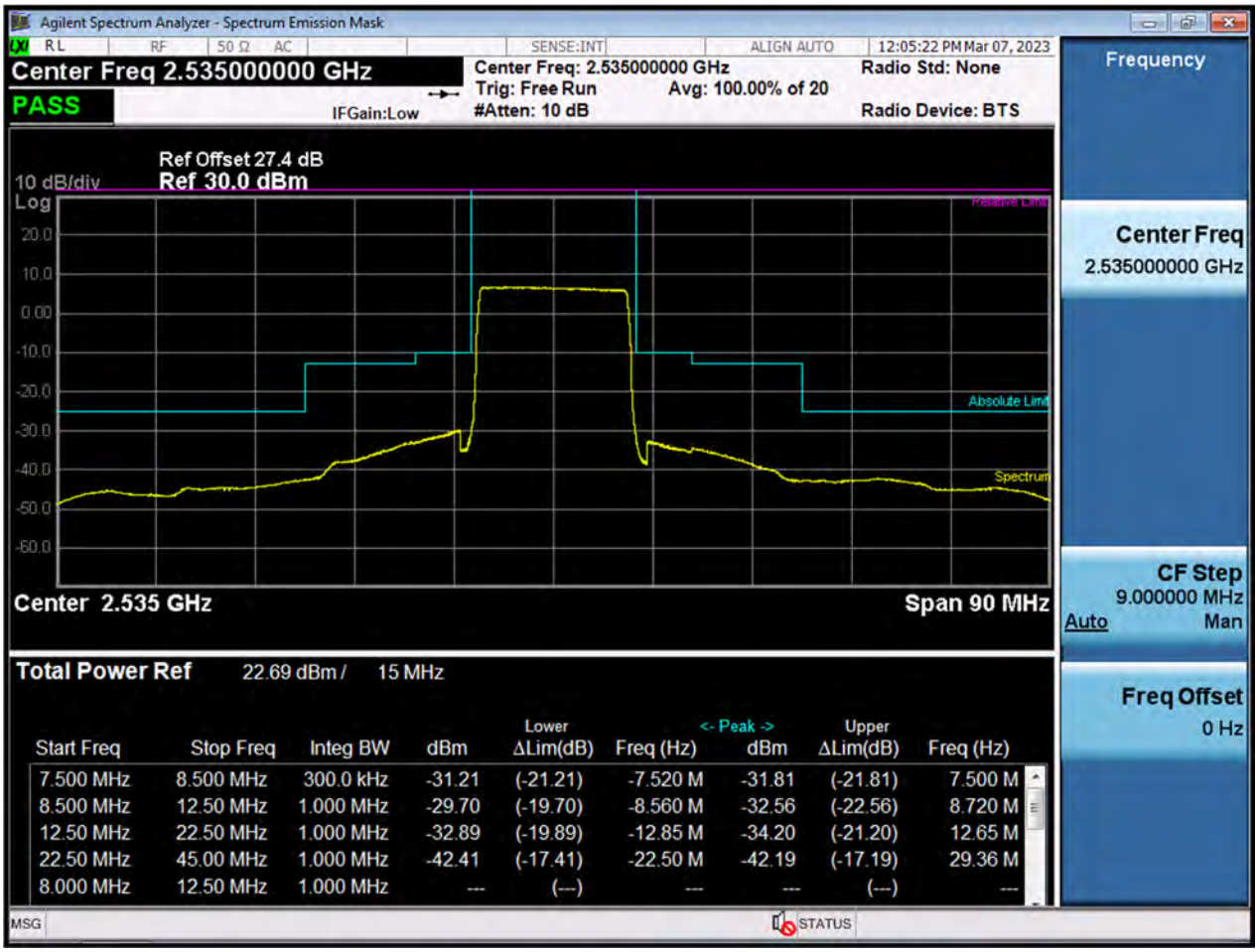
LTE7_15 M_BandEdge_Upper_Low_2507.5 MHz_QPSK_FullRB



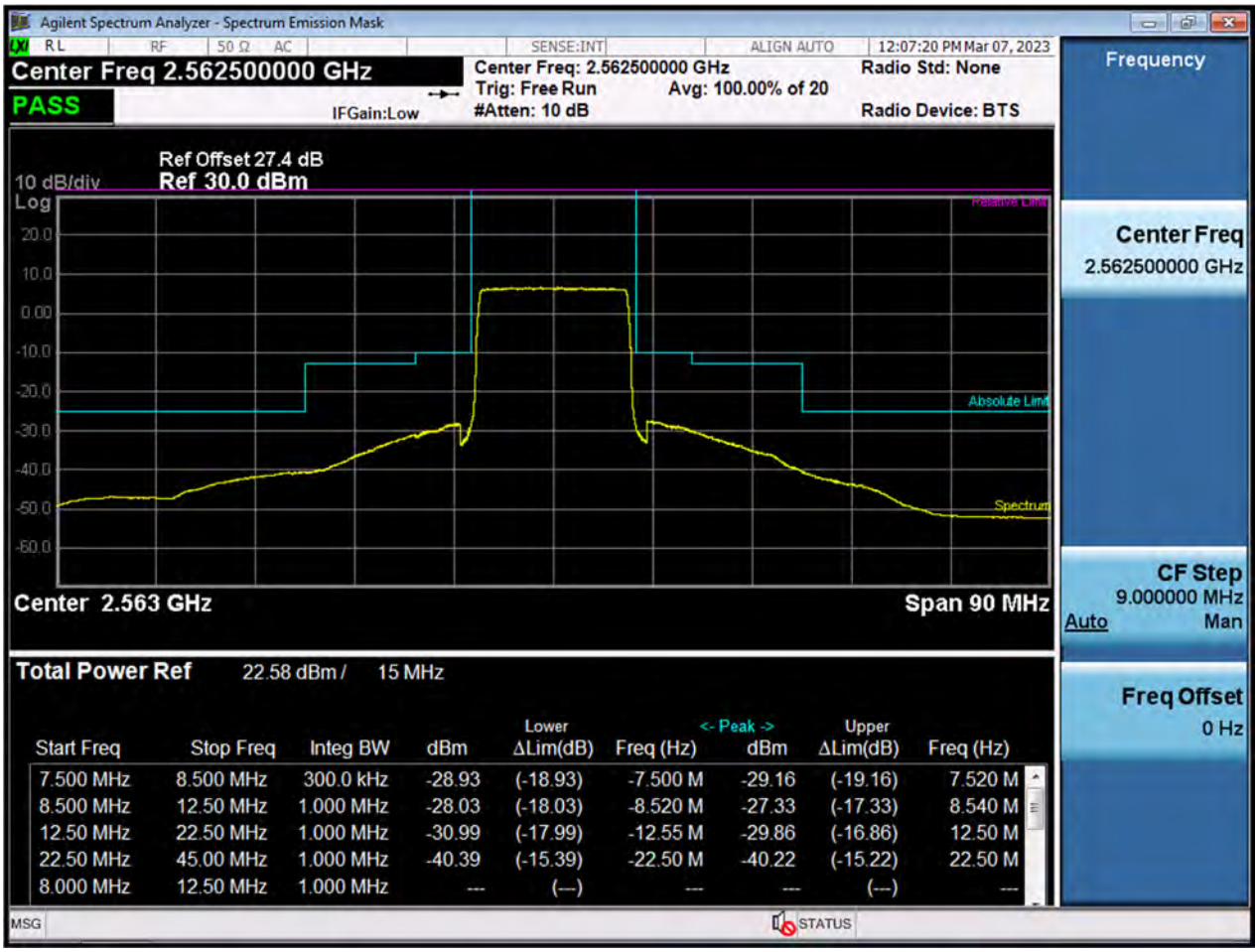
LTE7_15 M_BandEdge_Low_2507.5 MHz_QPSK_1RB



LTE7_15 M_BandEdge_Mid_2535 MHz_QPSK_FullRB

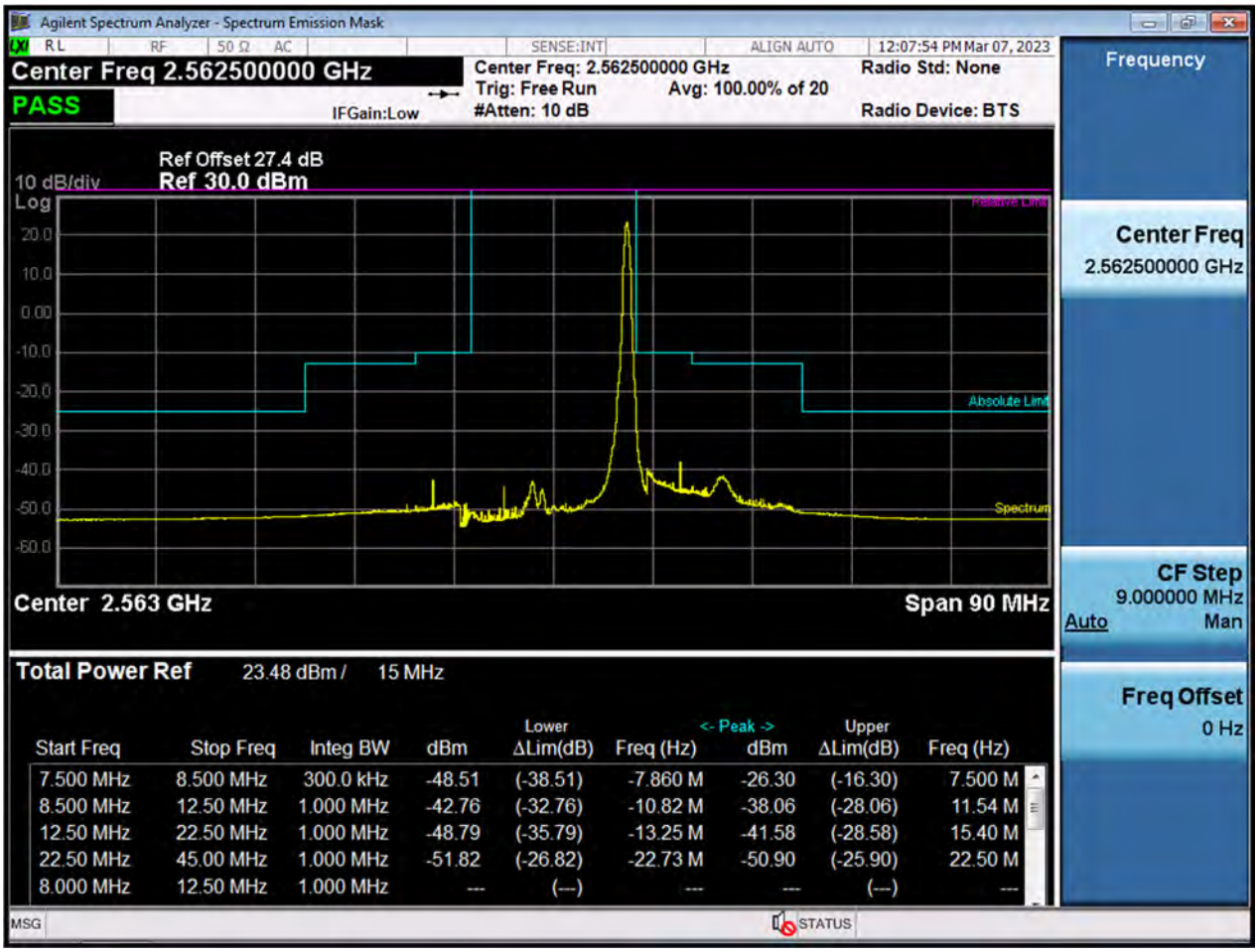


LTE7_15 M_BandEdge_High_2562.5 MHz_QPSK_FullRB



Start Freq	Stop Freq	Integ BW	dBm	Lower ΔLim(dB)	Freq (Hz)	<- Peak -> dBm	Upper ΔLim(dB)	Freq (Hz)
7.500 MHz	8.500 MHz	300.0 kHz	-28.93	(-18.93)	-7.500 M	-29.16	(-19.16)	7.520 M
8.500 MHz	12.50 MHz	1.000 MHz	-28.03	(-18.03)	-8.520 M	-27.33	(-17.33)	8.540 M
12.50 MHz	22.50 MHz	1.000 MHz	-30.99	(-17.99)	-12.55 M	-29.86	(-16.86)	12.50 M
22.50 MHz	45.00 MHz	1.000 MHz	-40.39	(-15.39)	-22.50 M	-40.22	(-15.22)	22.50 M
8.000 MHz	12.50 MHz	1.000 MHz	---	(---)	---	---	(---)	---

LTE7_15 M_BandEdge_High_2562.5 MHz_QPSK_1RB

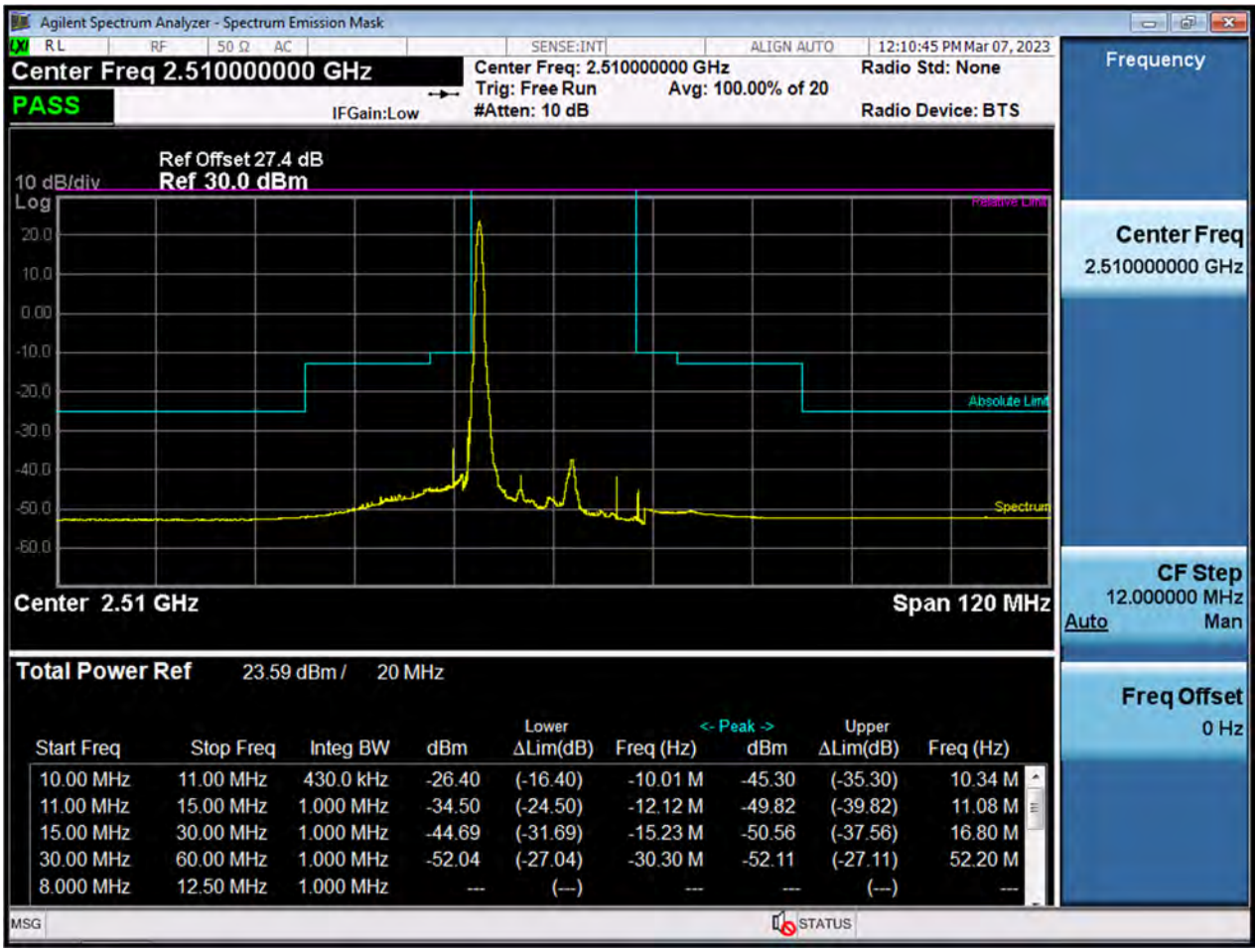


Start Freq	Stop Freq	Integ BW	dBm	Lower ΔLim(dB)	Freq (Hz)	<- Peak -> dBm	Upper ΔLim(dB)	Freq (Hz)
7.500 MHz	8.500 MHz	300.0 kHz	-48.51	(-38.51)	-7.860 M	-26.30	(-16.30)	7.500 M
8.500 MHz	12.50 MHz	1.000 MHz	-42.76	(-32.76)	-10.82 M	-38.06	(-28.06)	11.54 M
12.50 MHz	22.50 MHz	1.000 MHz	-48.79	(-35.79)	-13.25 M	-41.58	(-28.58)	15.40 M
22.50 MHz	45.00 MHz	1.000 MHz	-51.82	(-26.82)	-22.73 M	-50.90	(-25.90)	22.50 M
8.000 MHz	12.50 MHz	1.000 MHz	---	(---)	---	---	(---)	---

LTE7_20 M_BandEdge_Lower_Low_2510 MHz_QPSK_FullRB

LTE7_20 M_BandEdge_Upper_Low_2510 MHz_QPSK_FullRB

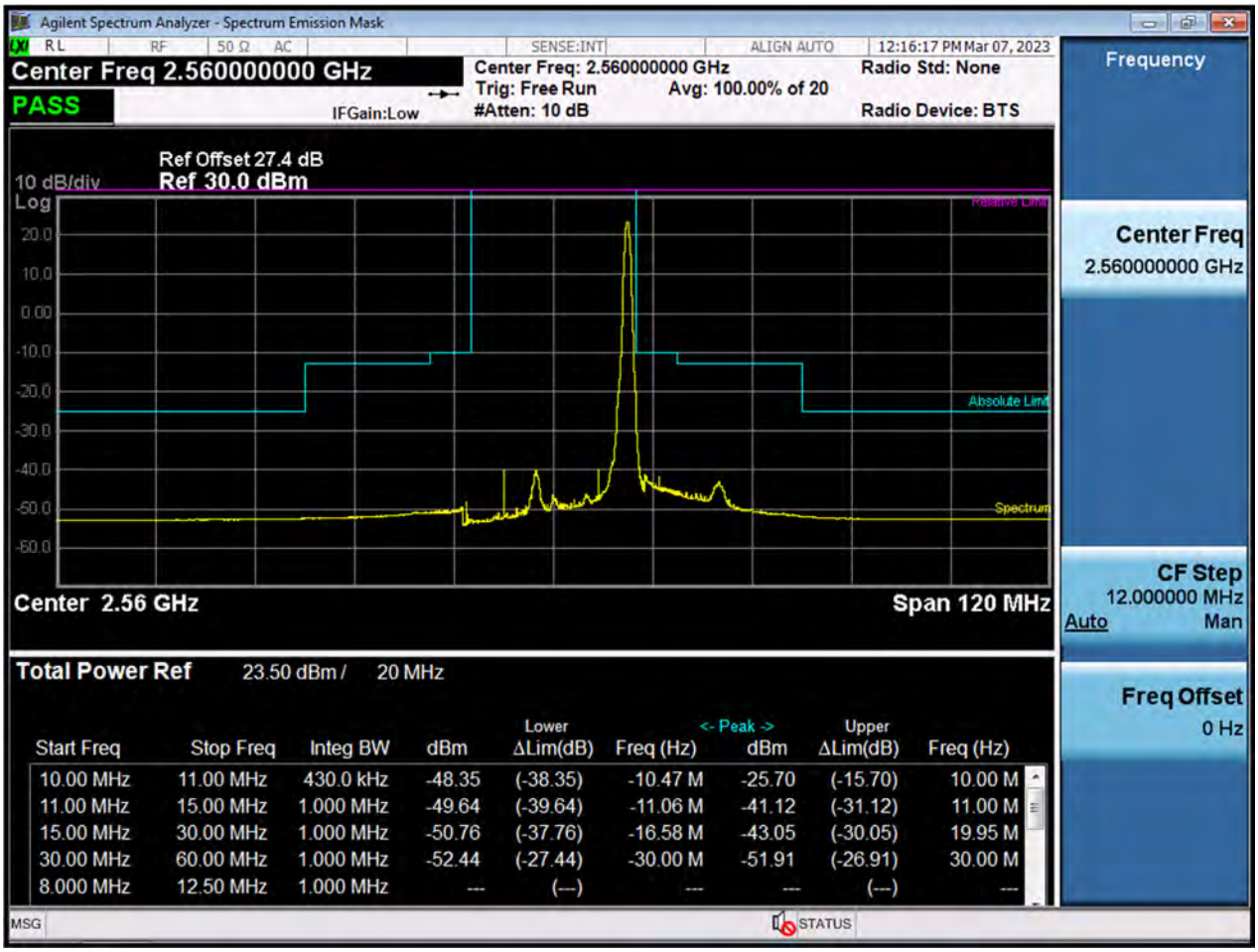
LTE7_20 M_BandEdge_Low_2510 MHz_QPSK_1RB



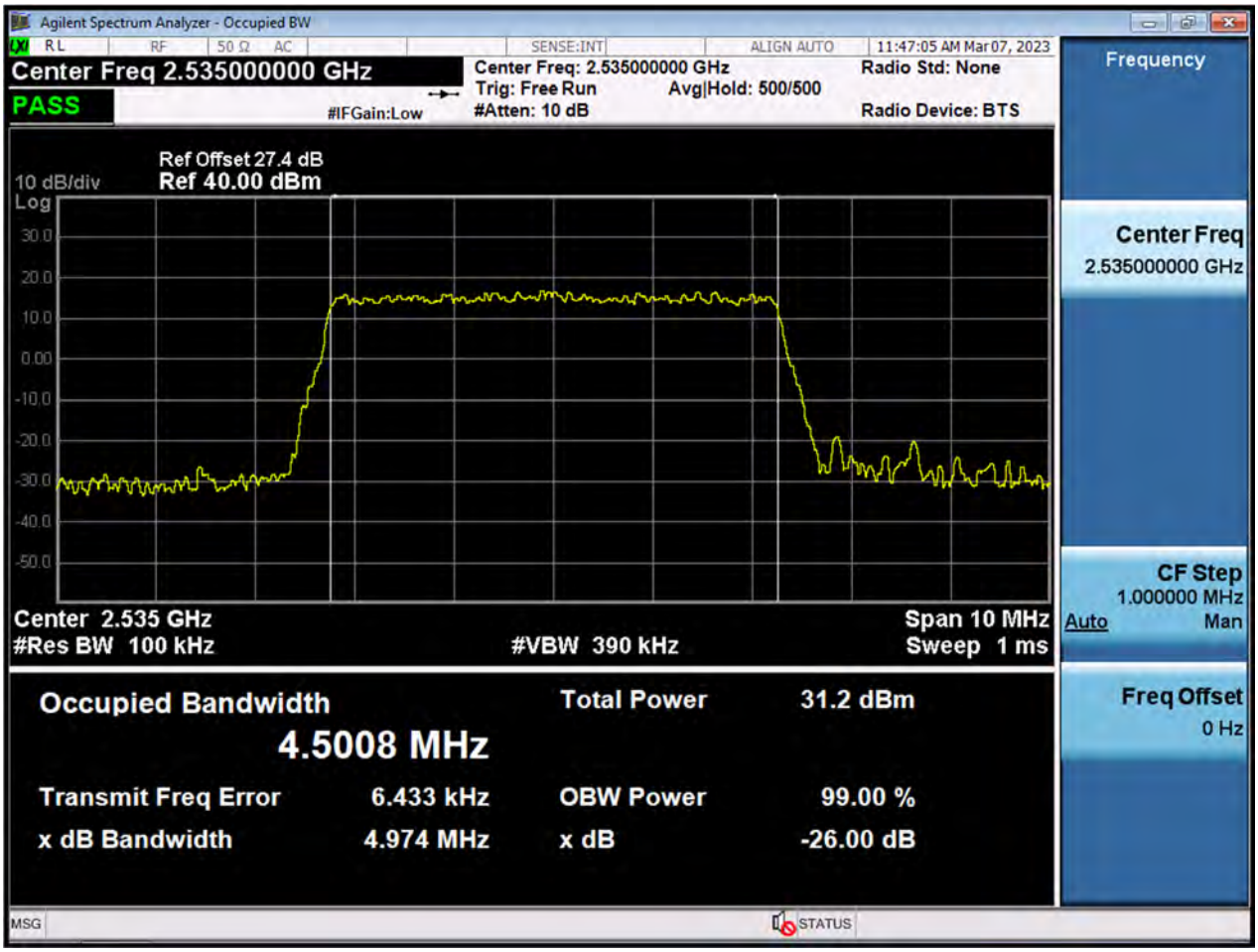
LTE7_20 M_BandEdge_Mid_2535 MHz_QPSK_FullRB

LTE7_20 M_BandEdge_High_2560 MHz_QPSK_FullRB

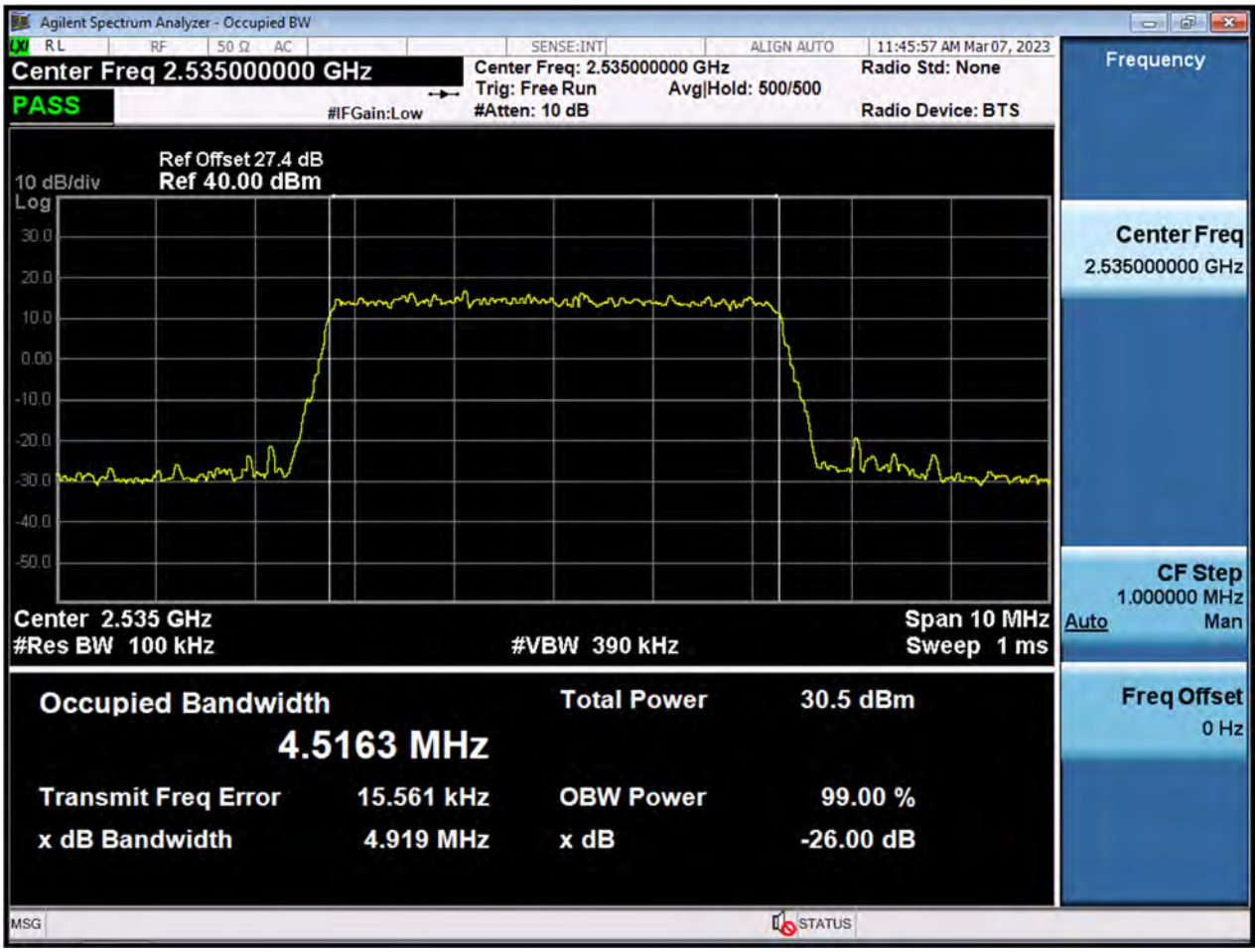
LTE7_20 M_BandEdge_High_2560 MHz_QPSK_1RB



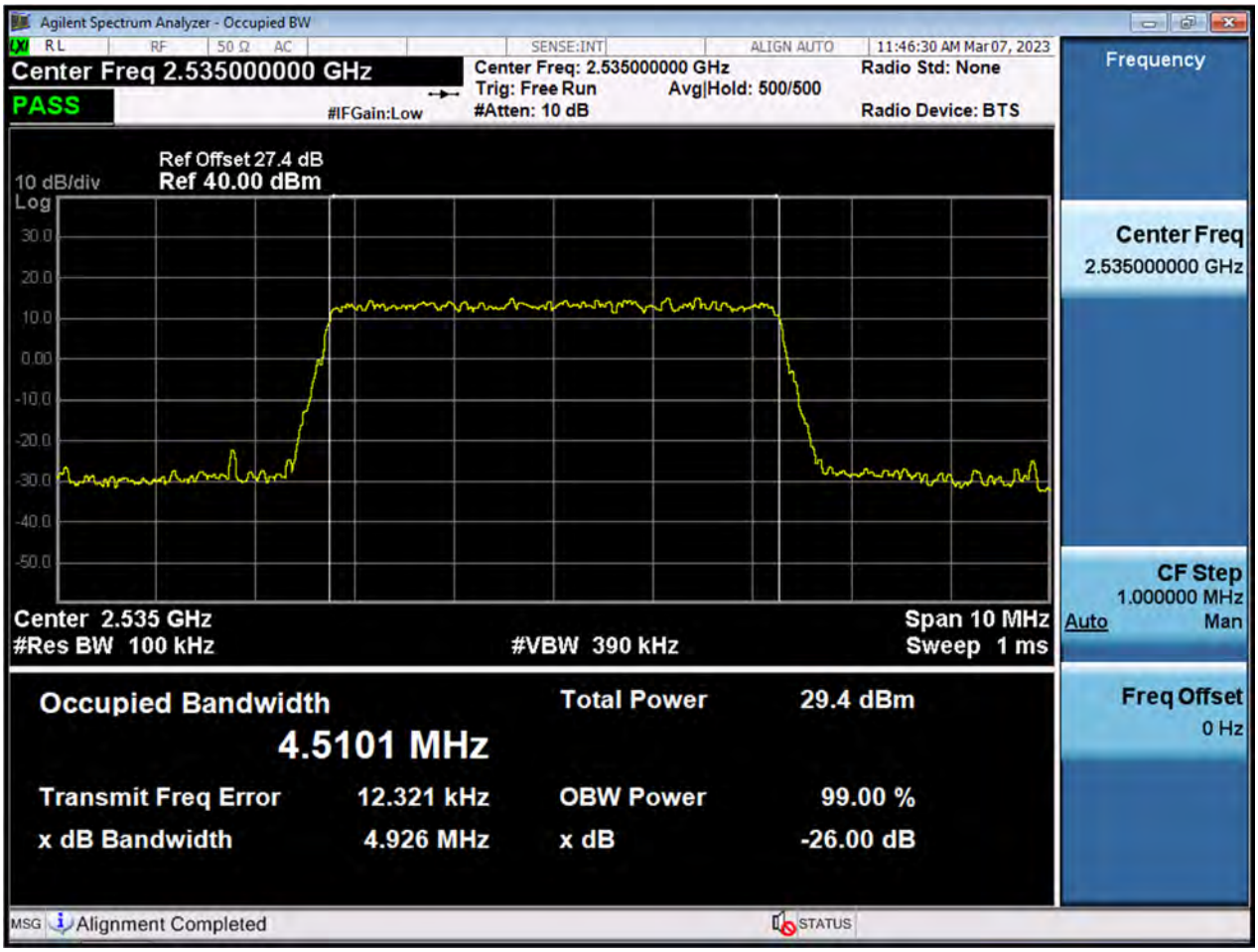
LTE7_5 M_OBW_Mid Channel_QPSK_FullRB



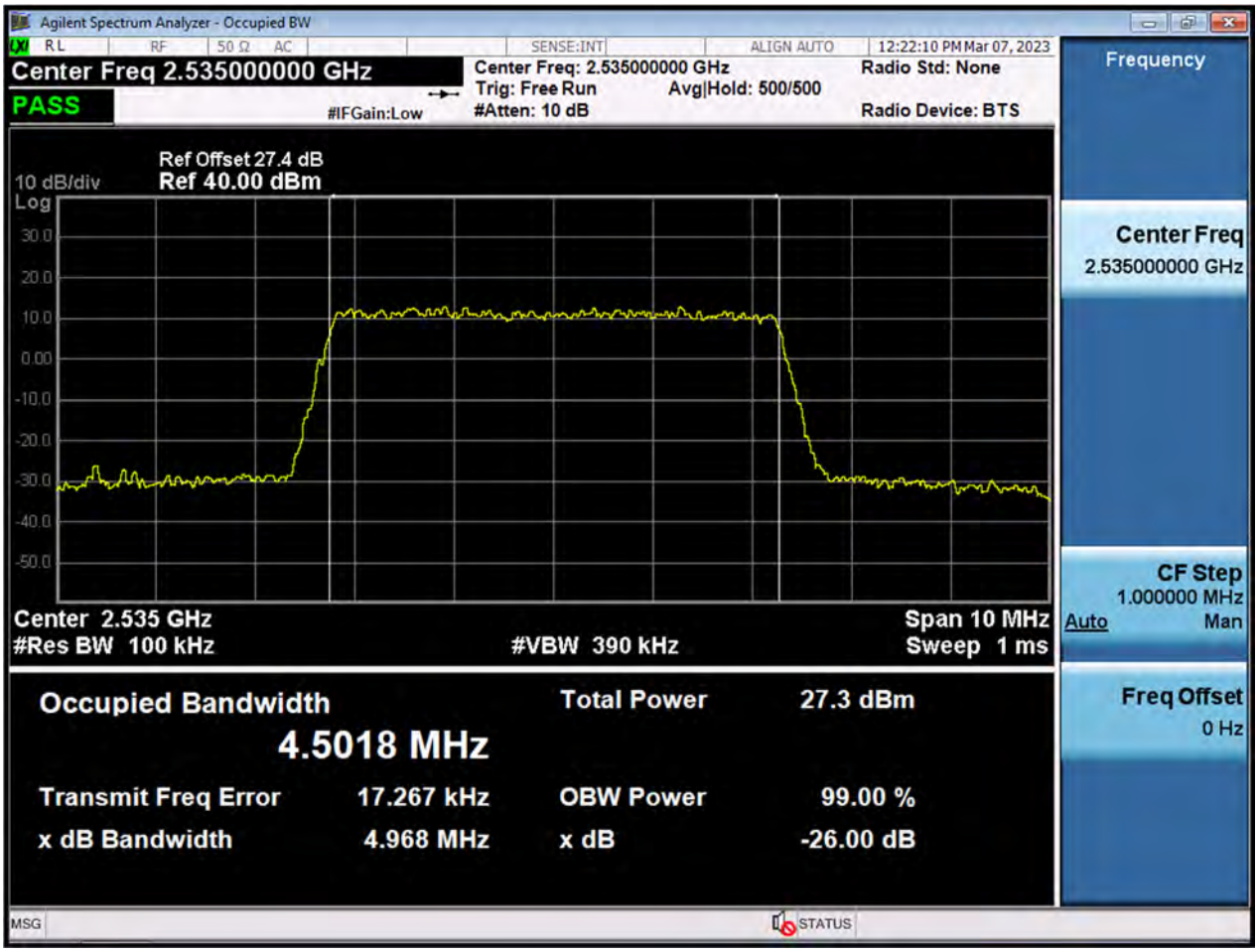
LTE7_5 M_OBW_Mid Channel_16QAM_FullRB



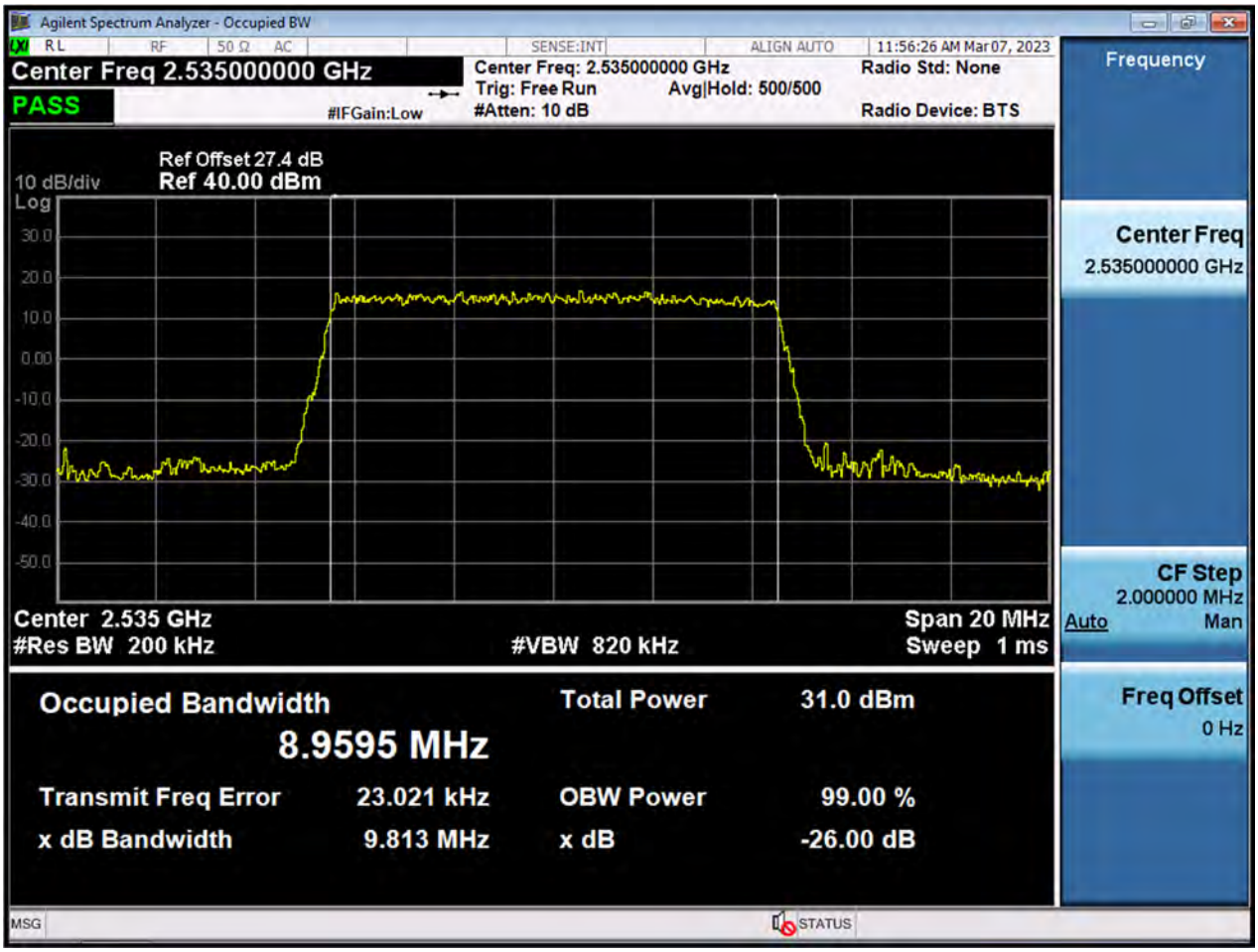
LTE7_5 M_OBW_Mid Channel_64QAM_FullRB



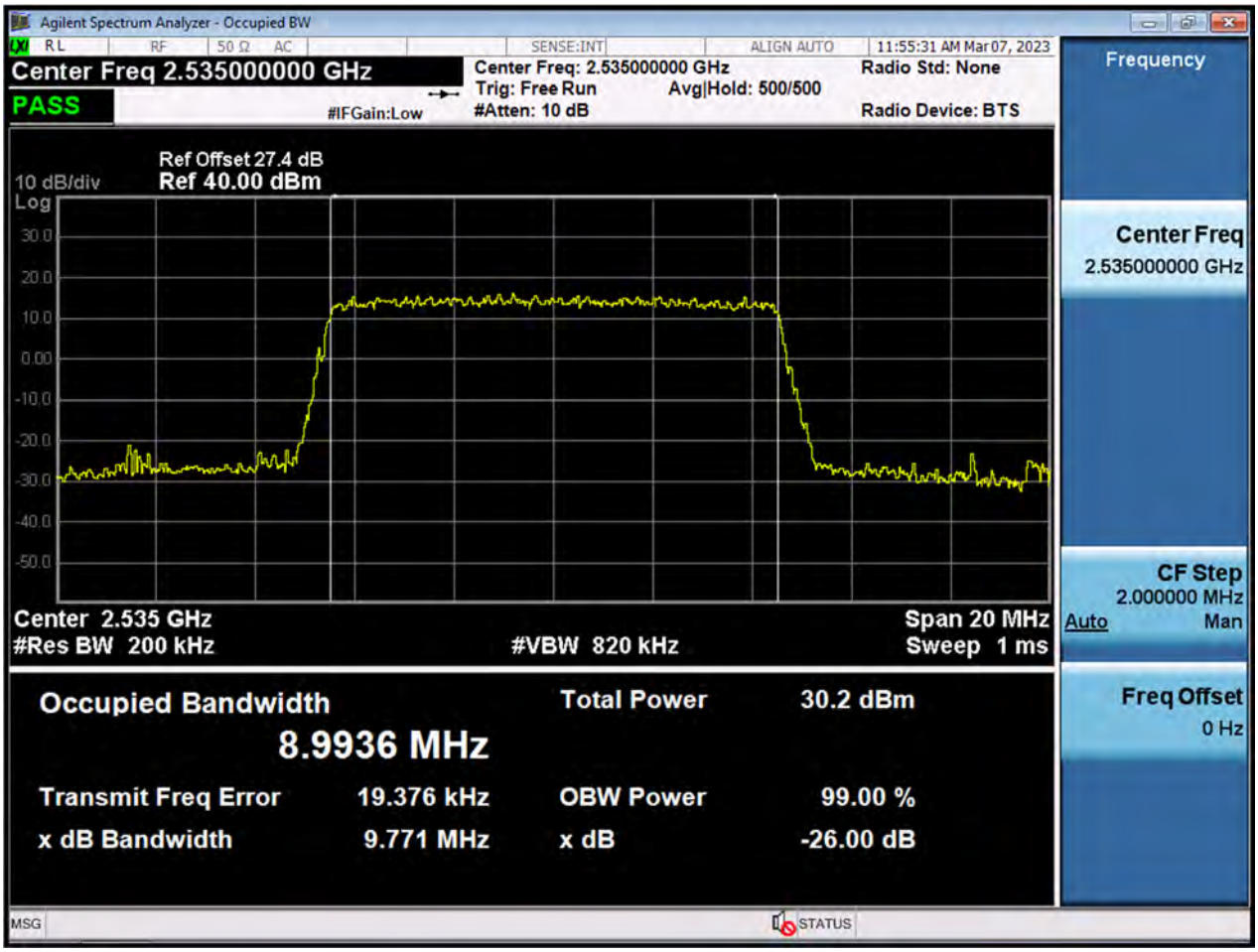
LTE7_5 M_OBW_Mid Channel_256QAM_FullRB



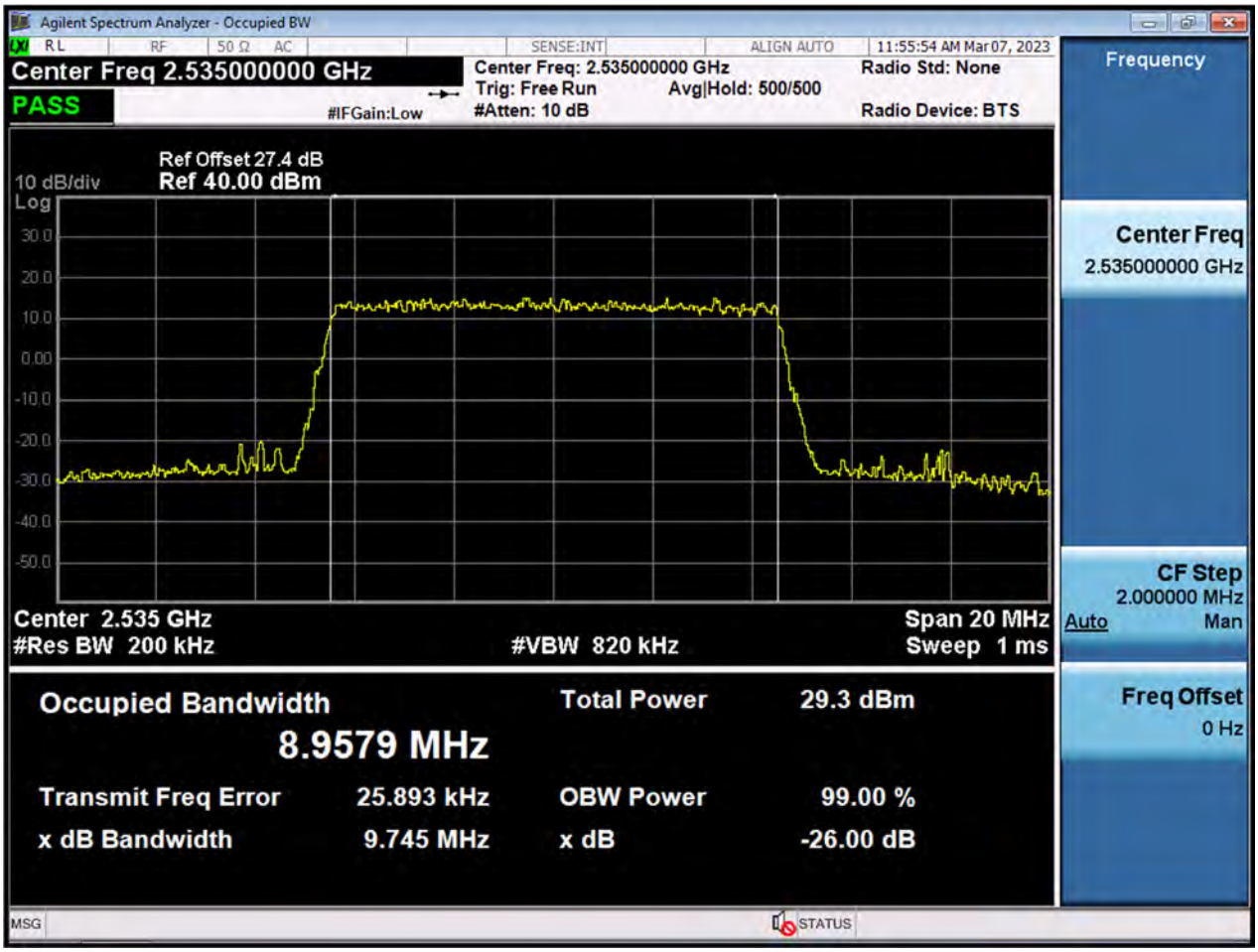
LTE7_10 M_OBW_Mid Channel_QPSK_FullRB



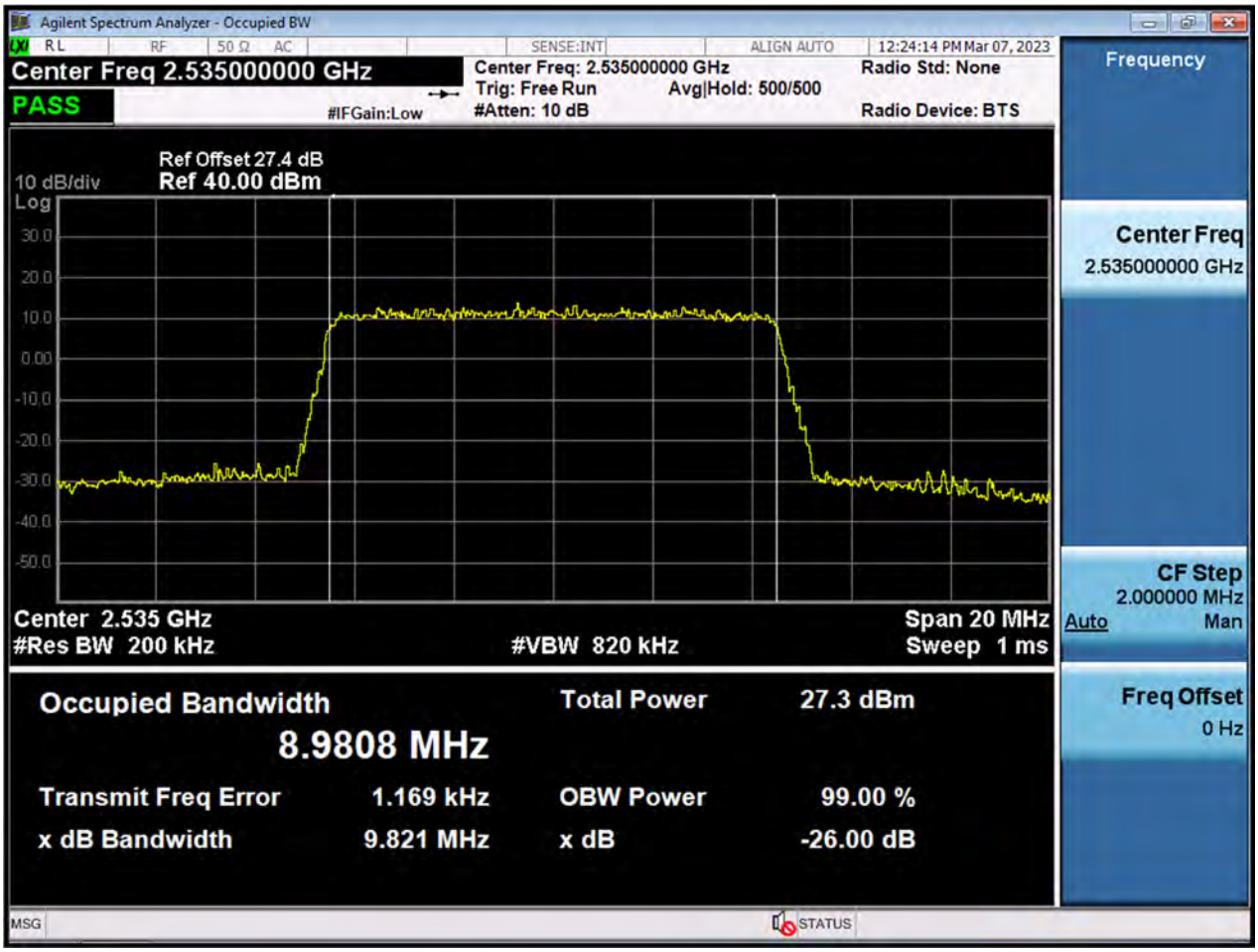
LTE7_10 M_OBW_Mid Channel_16QAM_FullRB



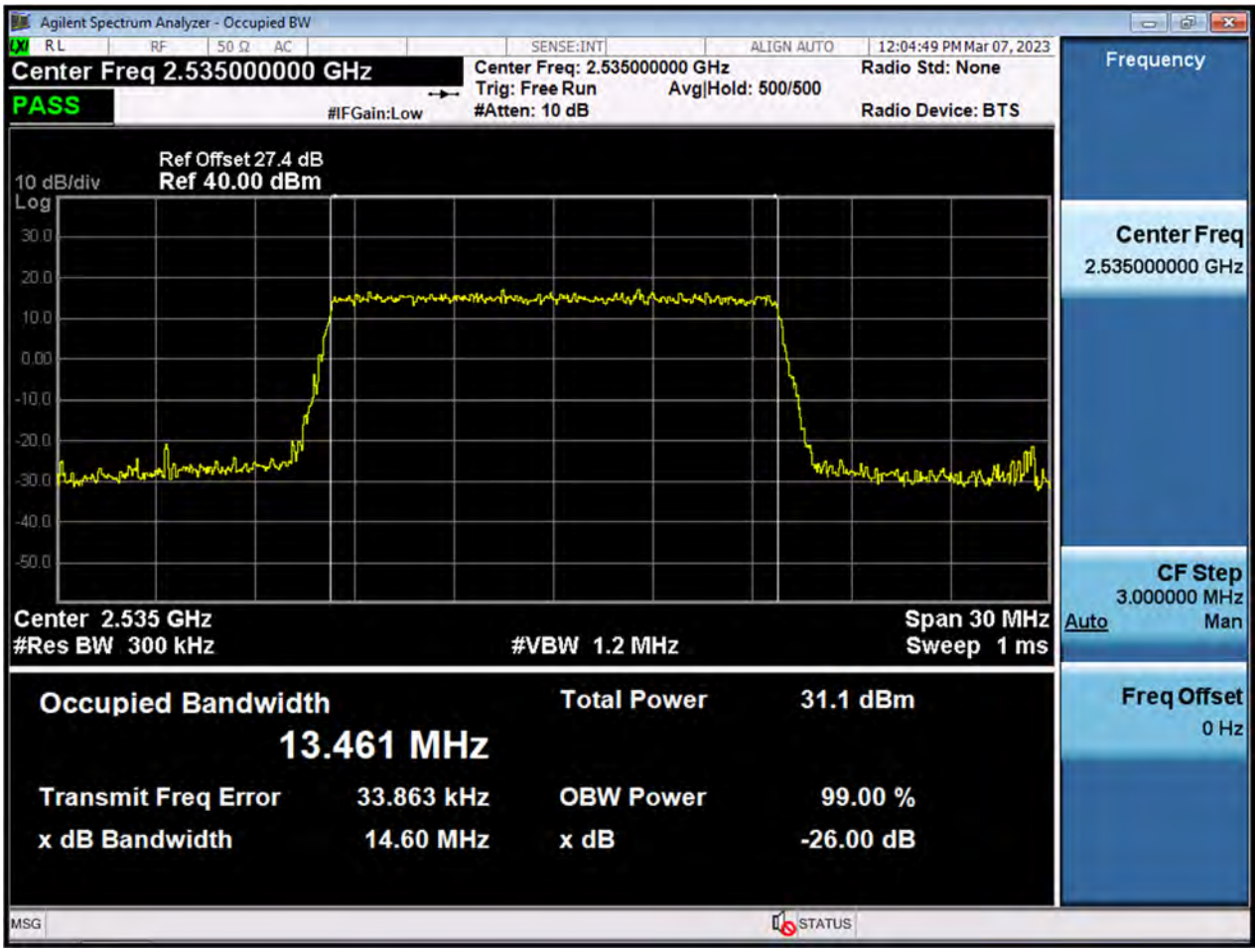
LTE7_10 M_OBW_Mid Channel_64QAM_FullRB



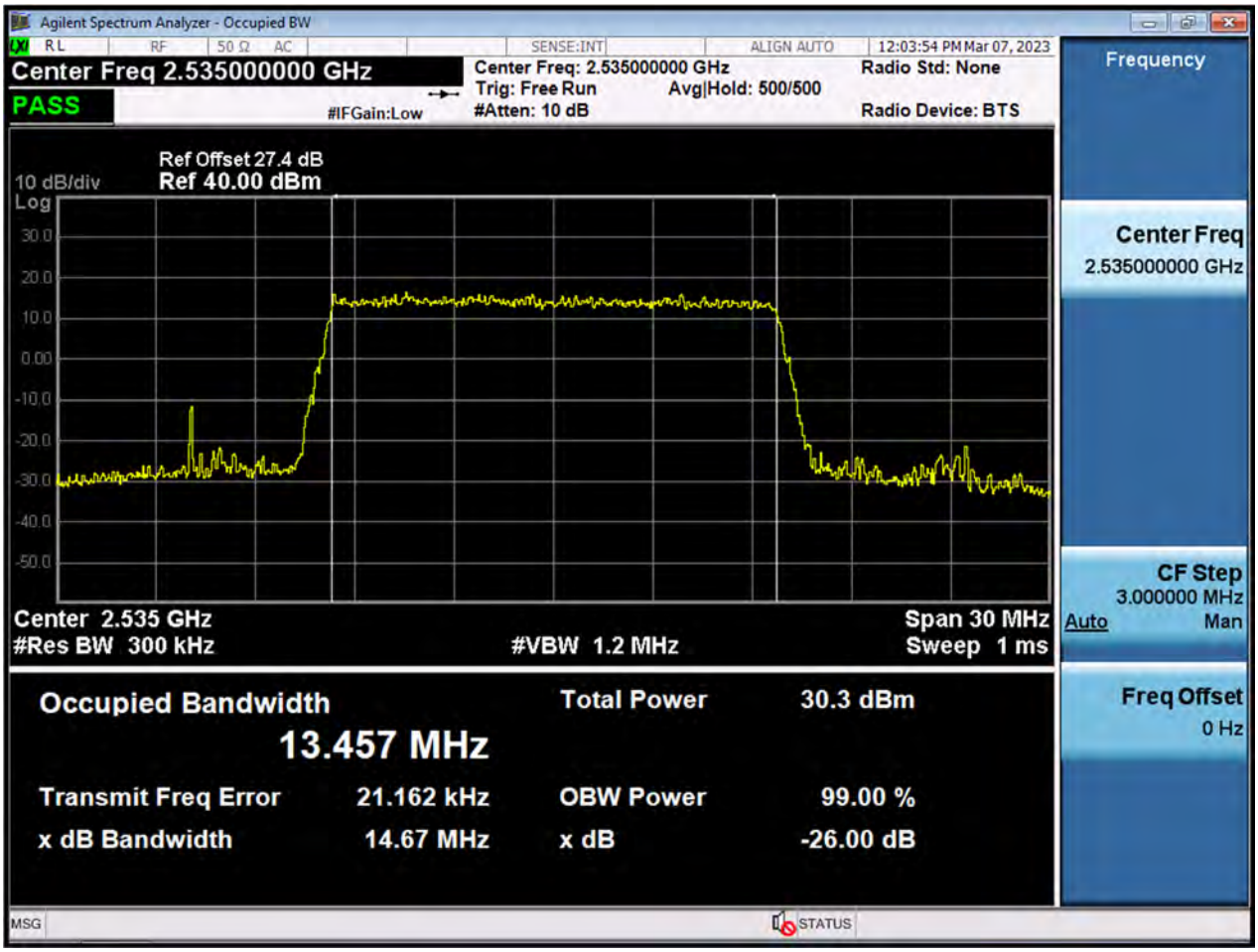
LTE7_10 M_OBW_Mid Channel_256QAM_FullRB



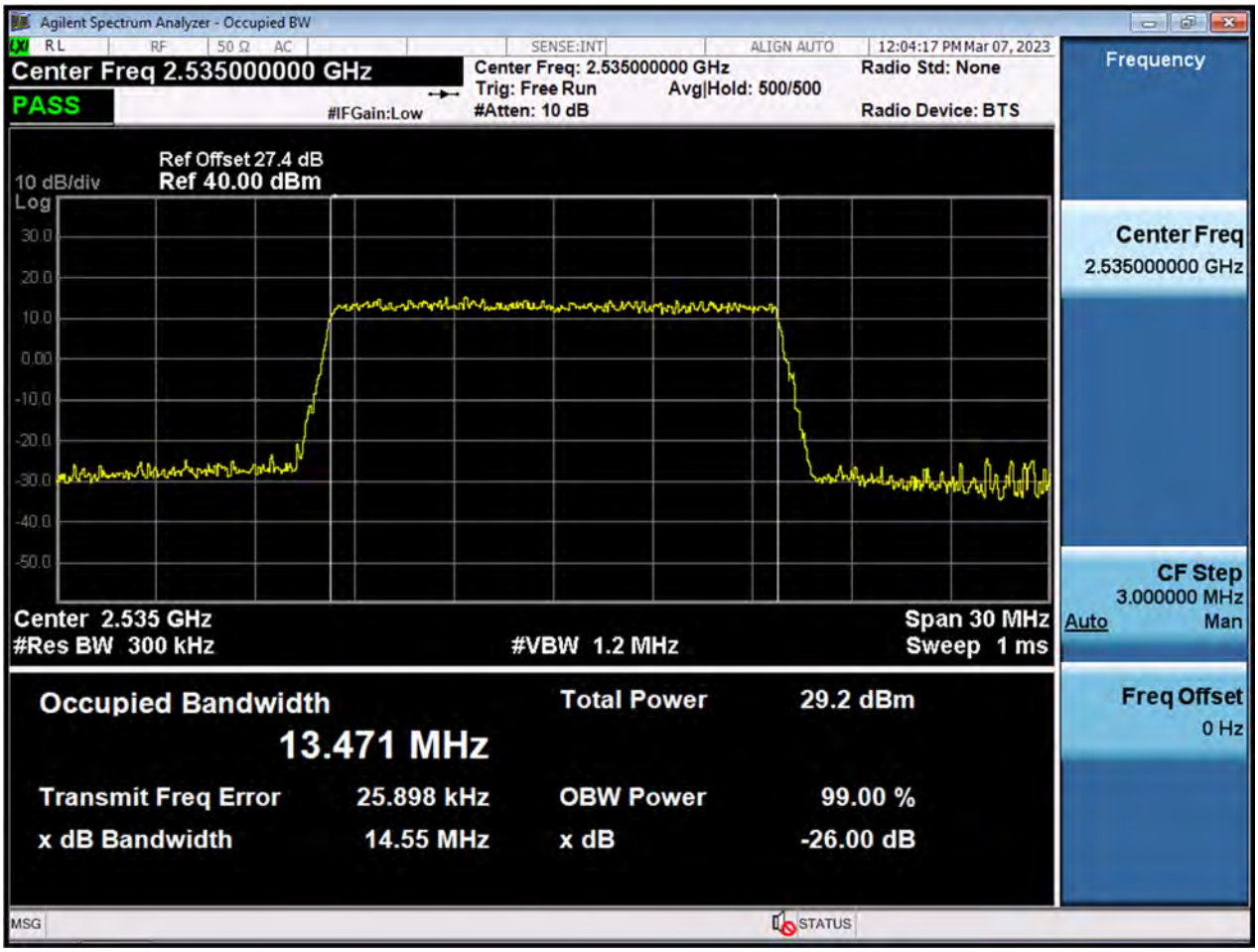
LTE7_15 M_OBW_Mid Channel_QPSK_FullRB



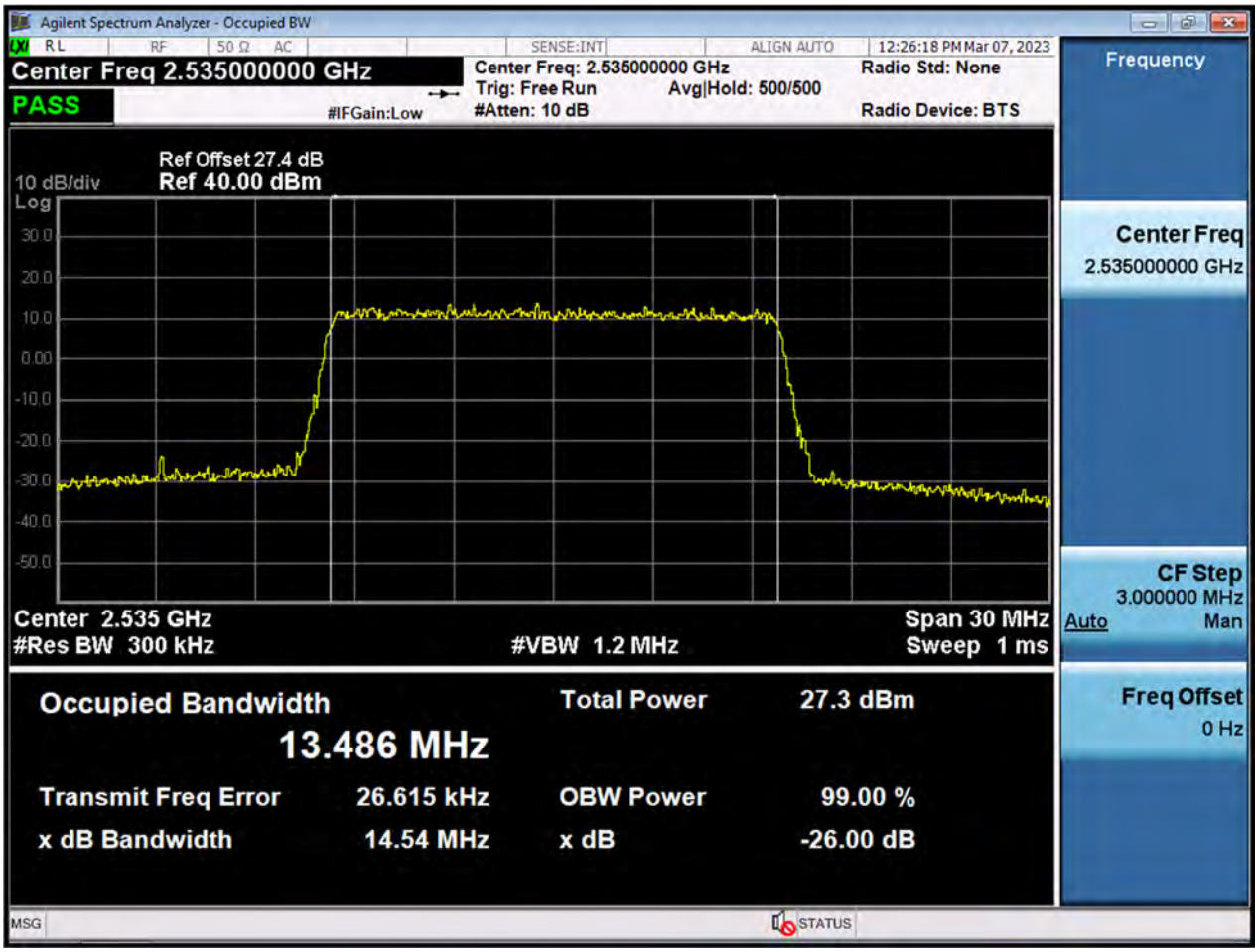
LTE7_15 M_OBW_Mid Channel_16QAM_FullRB



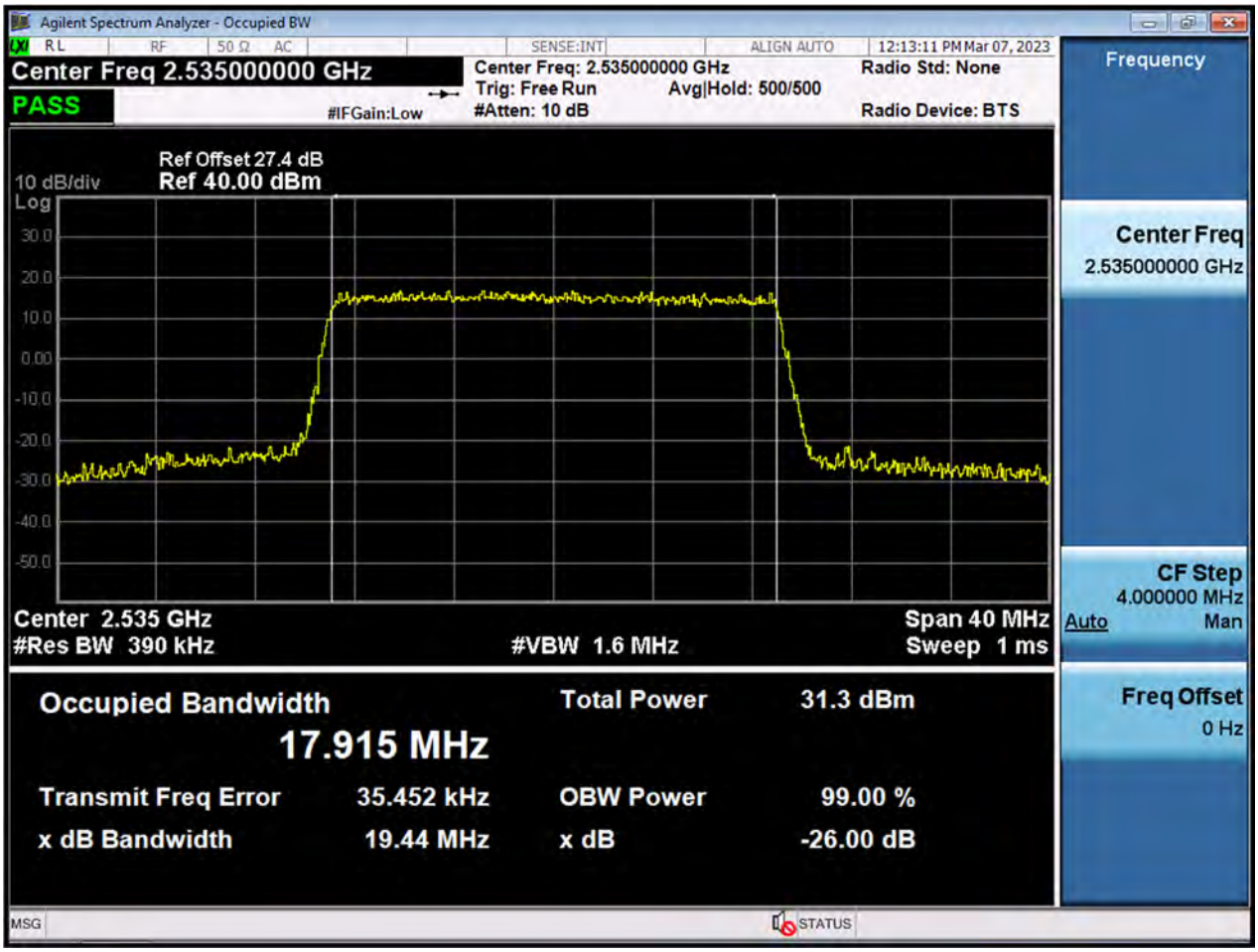
LTE7_15 M_OBW_Mid Channel_64QAM_FullRB



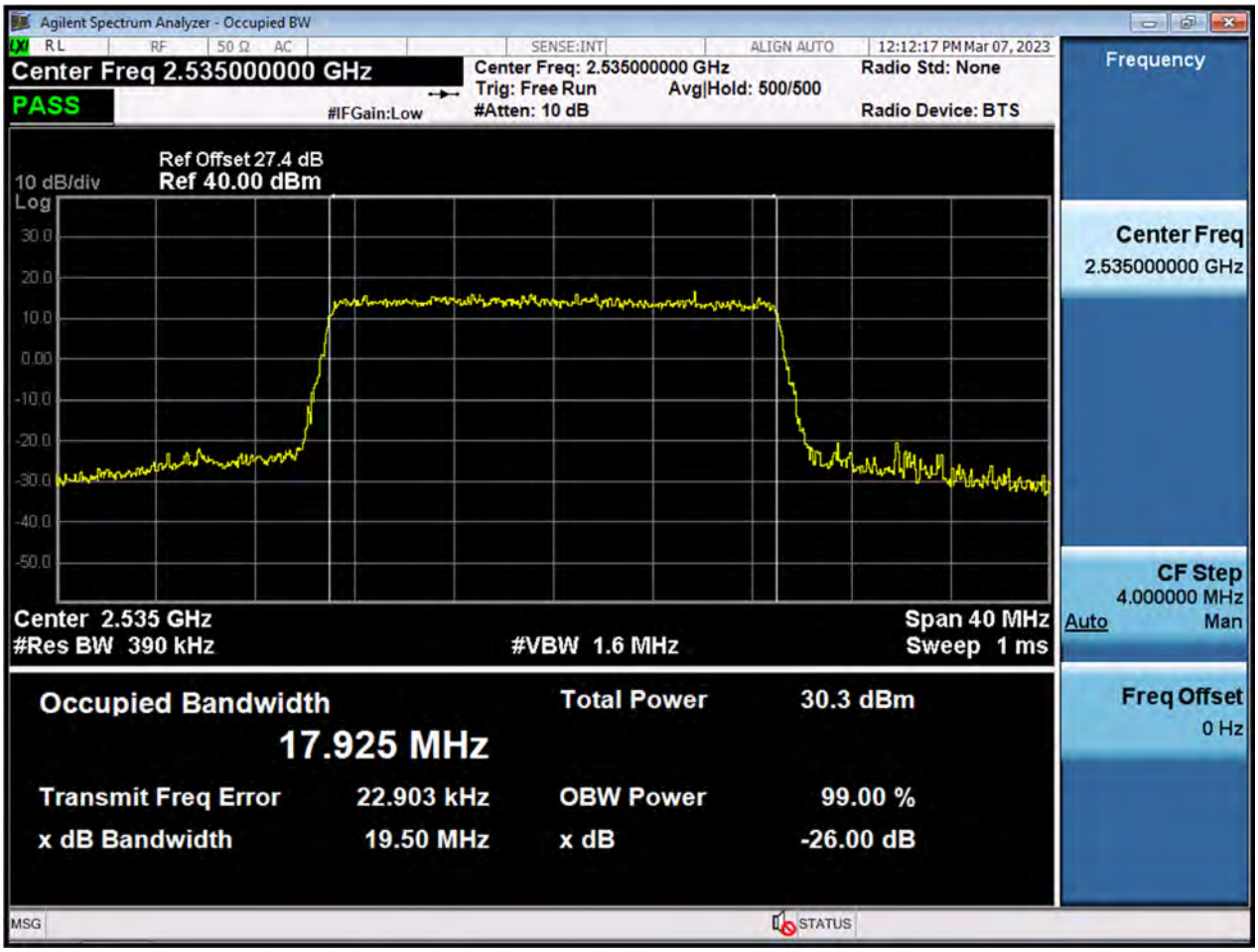
LTE7_15 M_OBW_Mid Channel_256QAM_FullRB



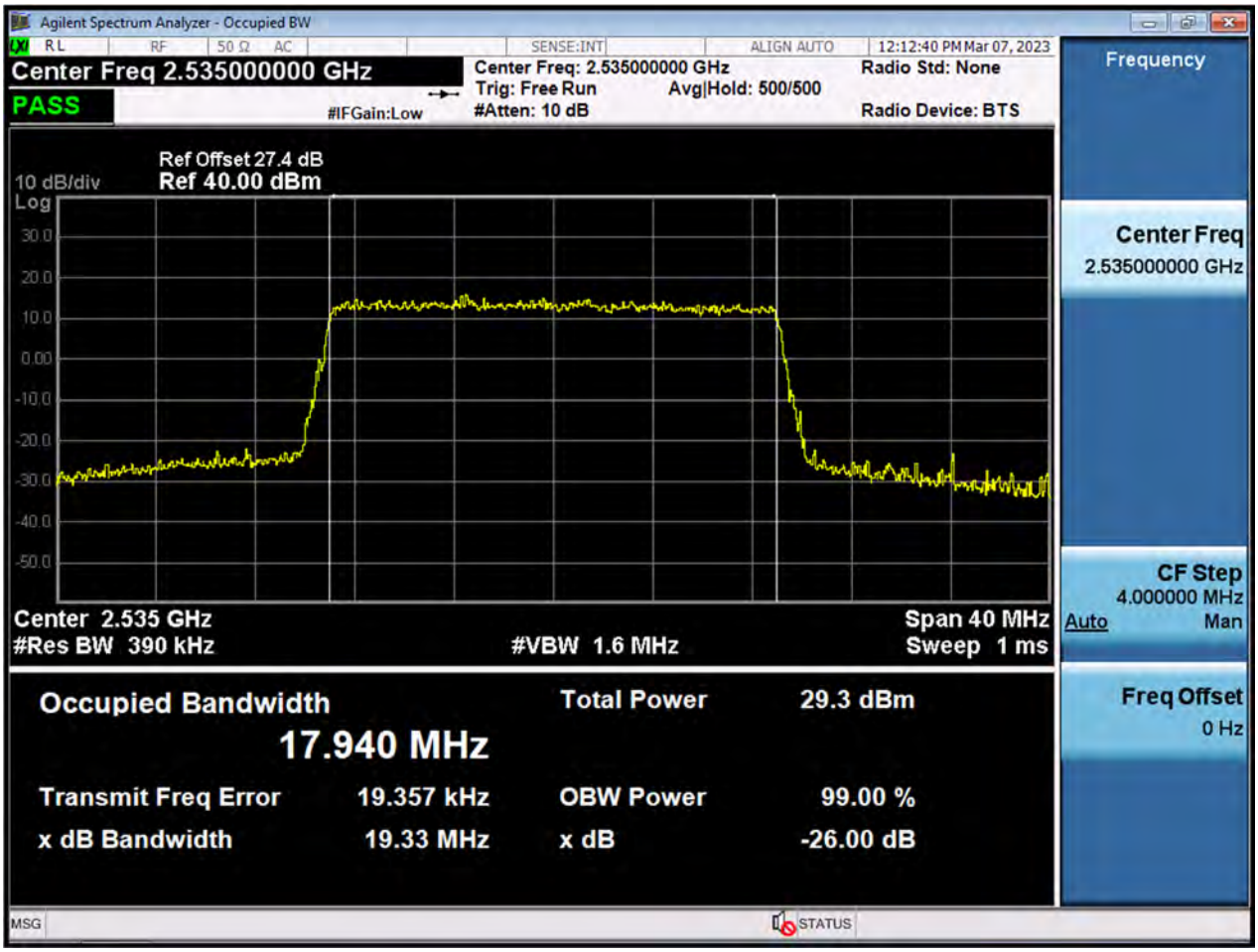
LTE7_20 M_OBW_Mid Channel_QPSK_FullRB



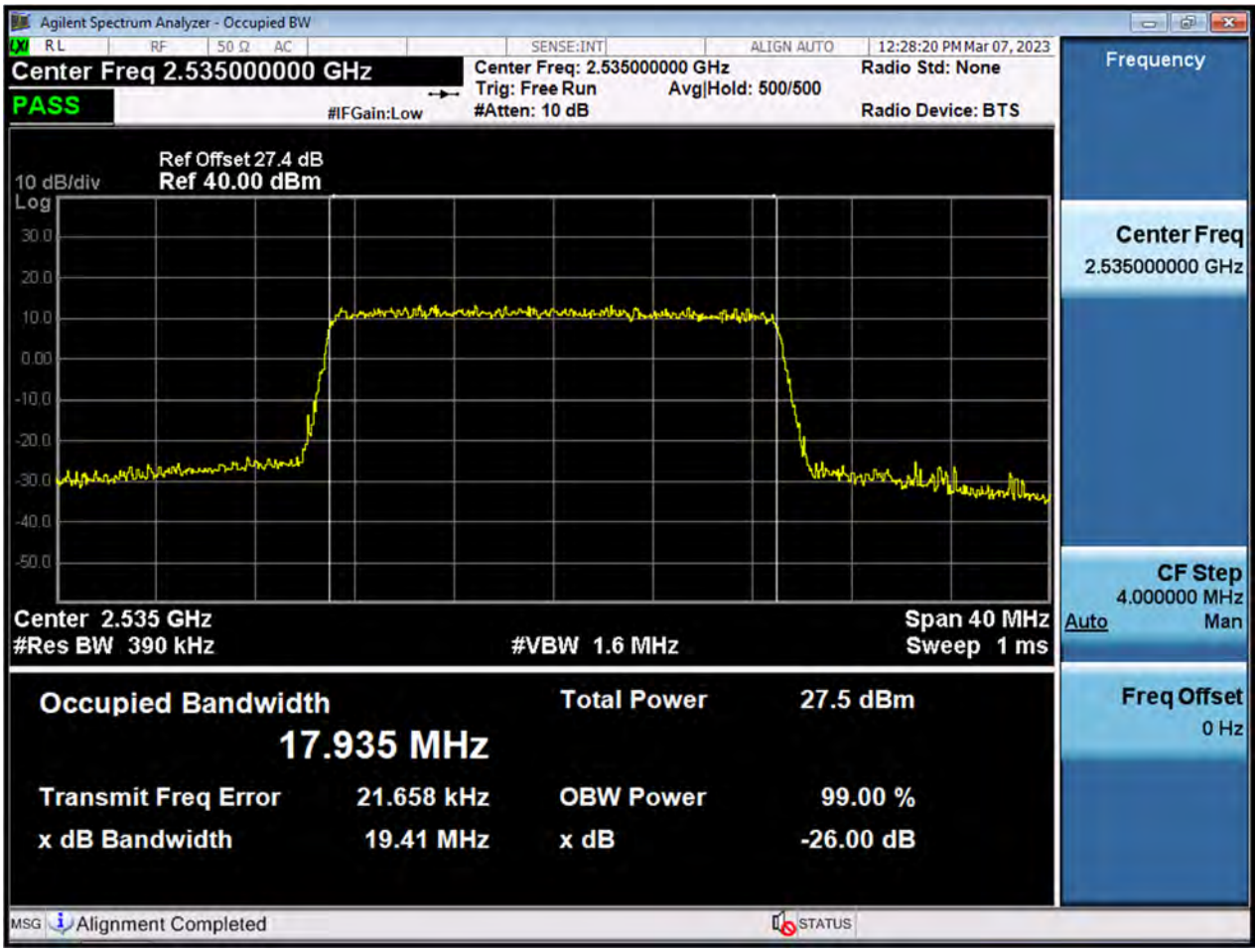
LTE7_20 M_OBW_Mid Channel_16QAM_FullRB



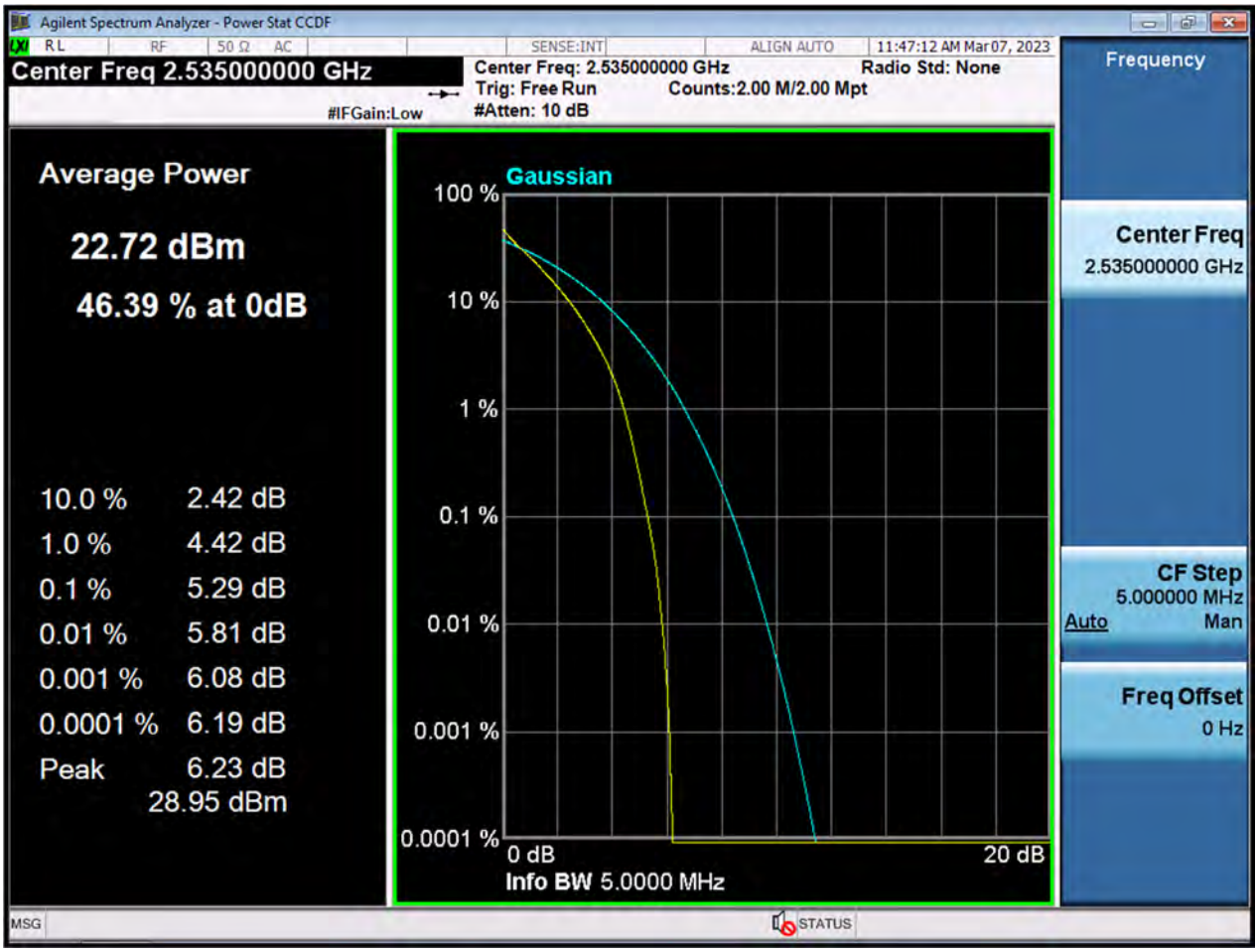
LTE7_20 M_OBW_Mid Channel_64QAM_FullRB



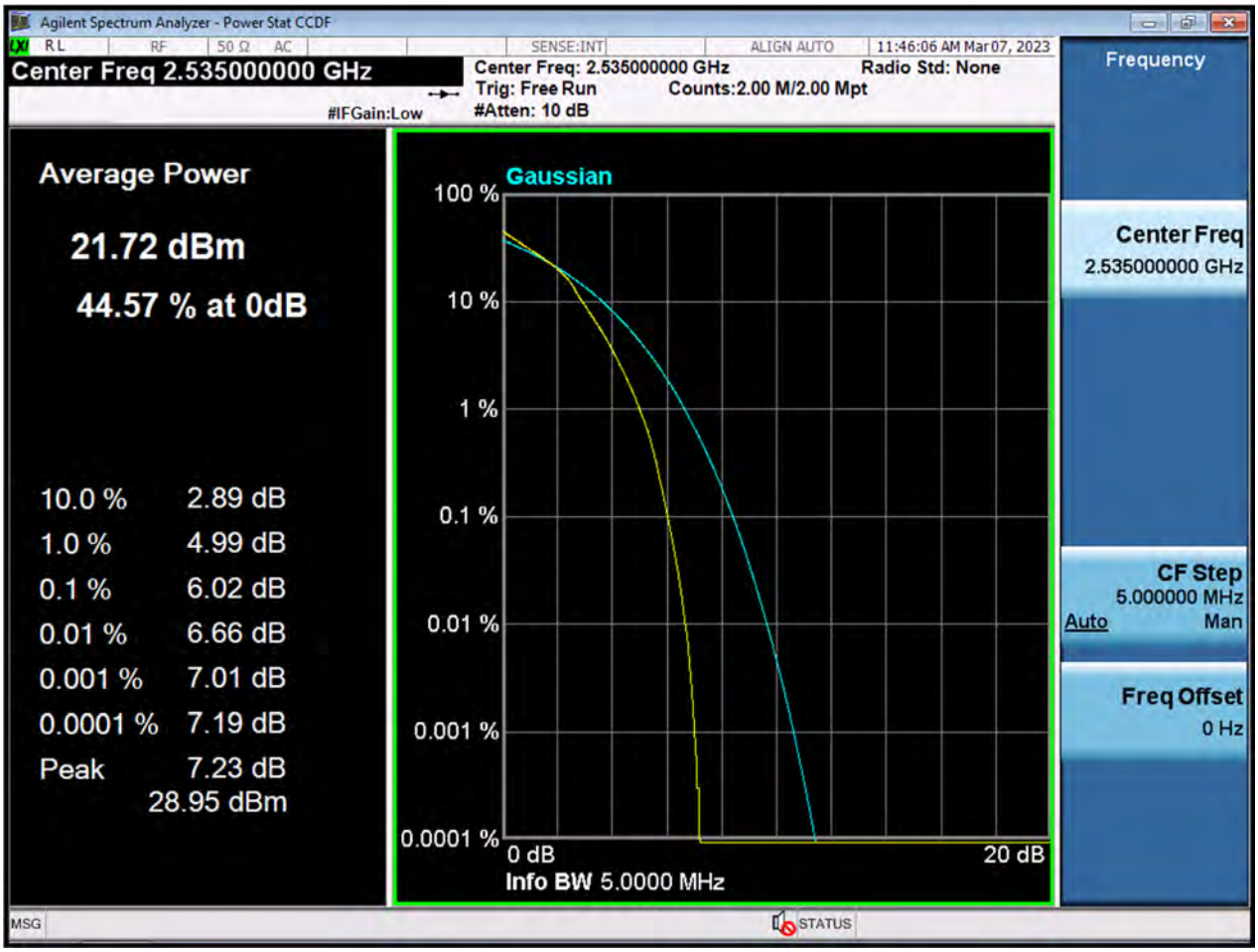
LTE7_20 M_OBW_Mid Channel_256QAM_FullRB



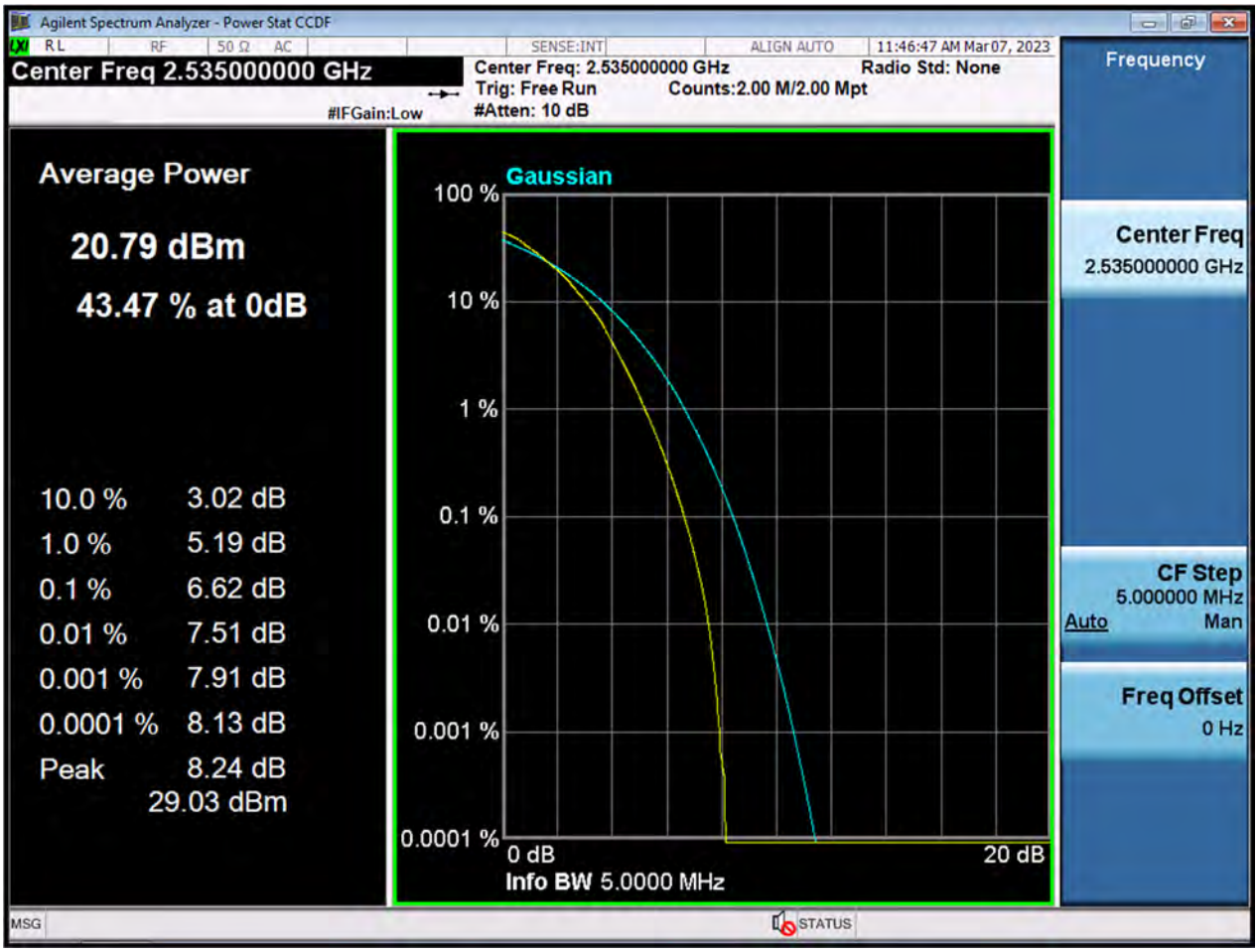
LTE7_5 M_PAR_Mid Channel_QPSK_FullRB



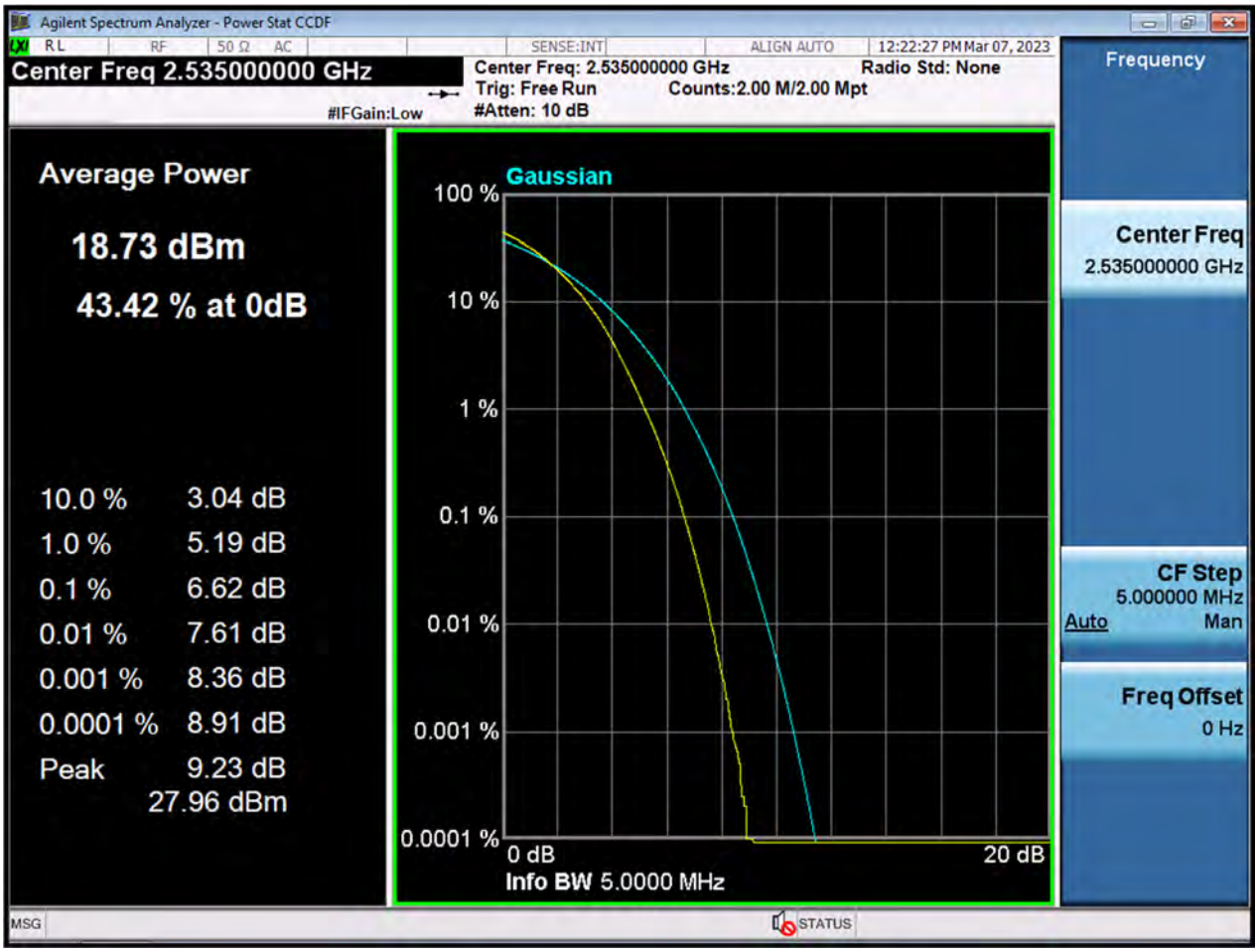
LTE7_5 M_PAR_Mid Channel_16QAM_FullRB



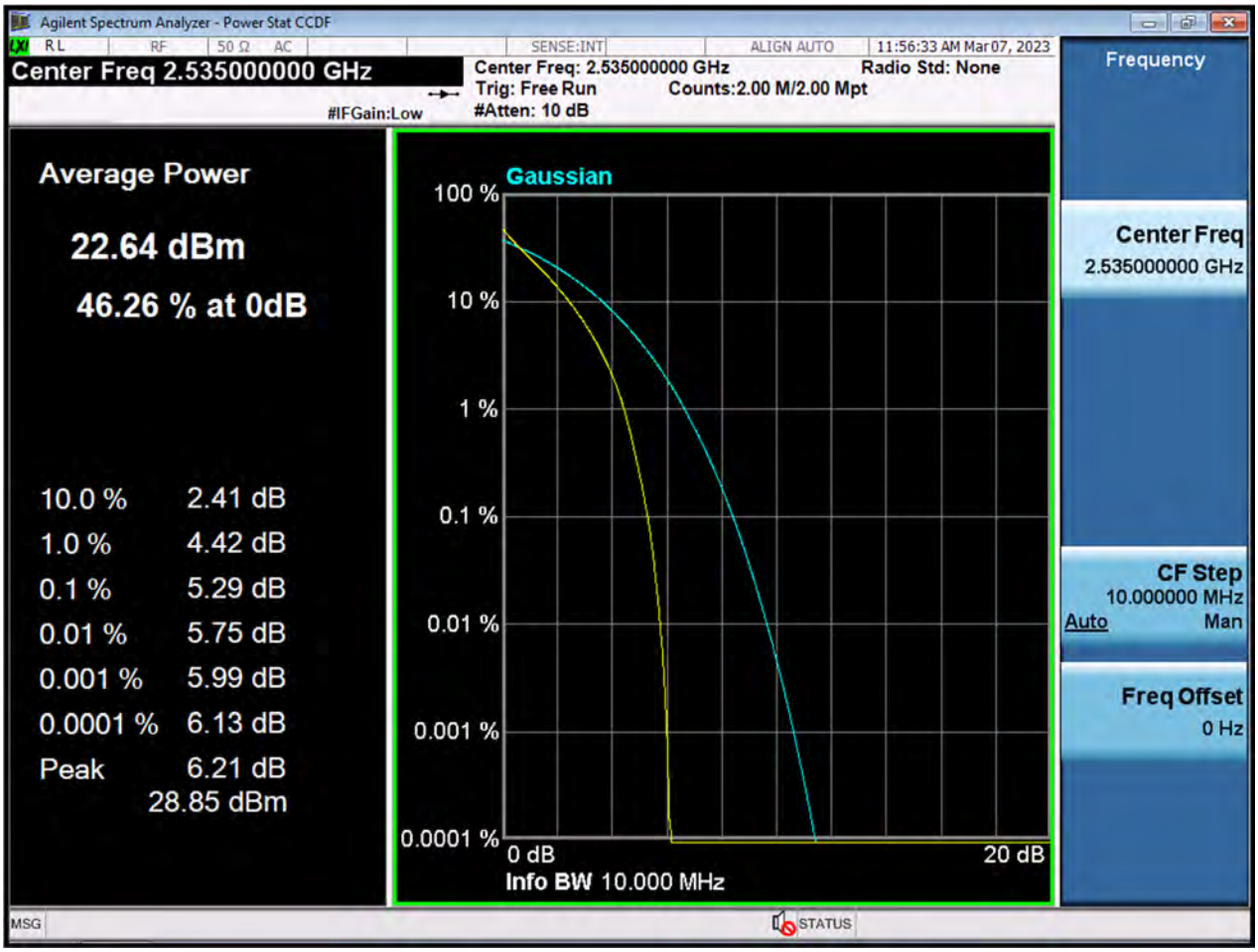
LTE7_5 M_PAR_Mid Channel_64QAM_FullRB



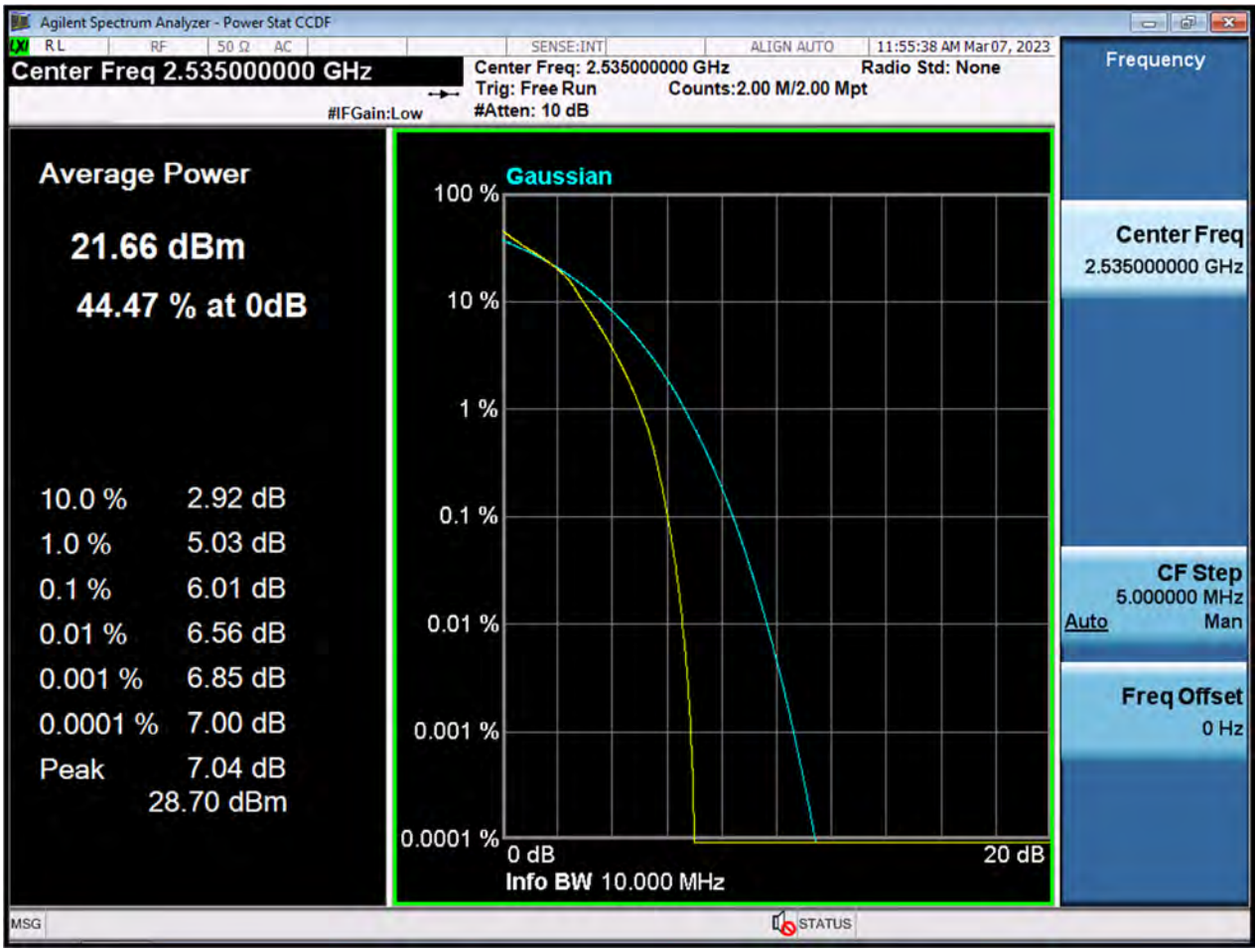
LTE7_5 M_PAR_Mid Channel_256QAM_FullRB



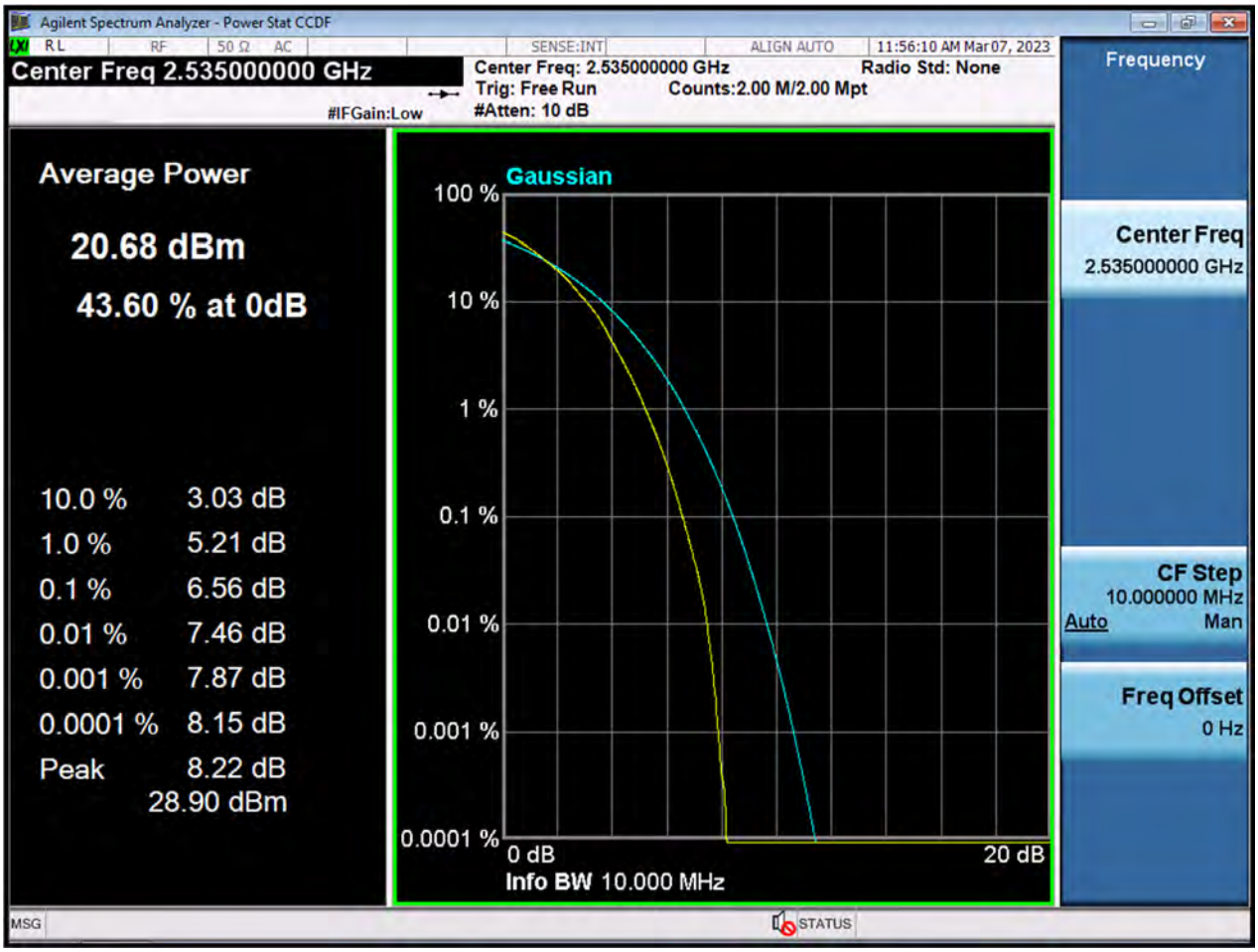
LTE7_10 M_PAR_Mid Channel_QPSK_FullRB



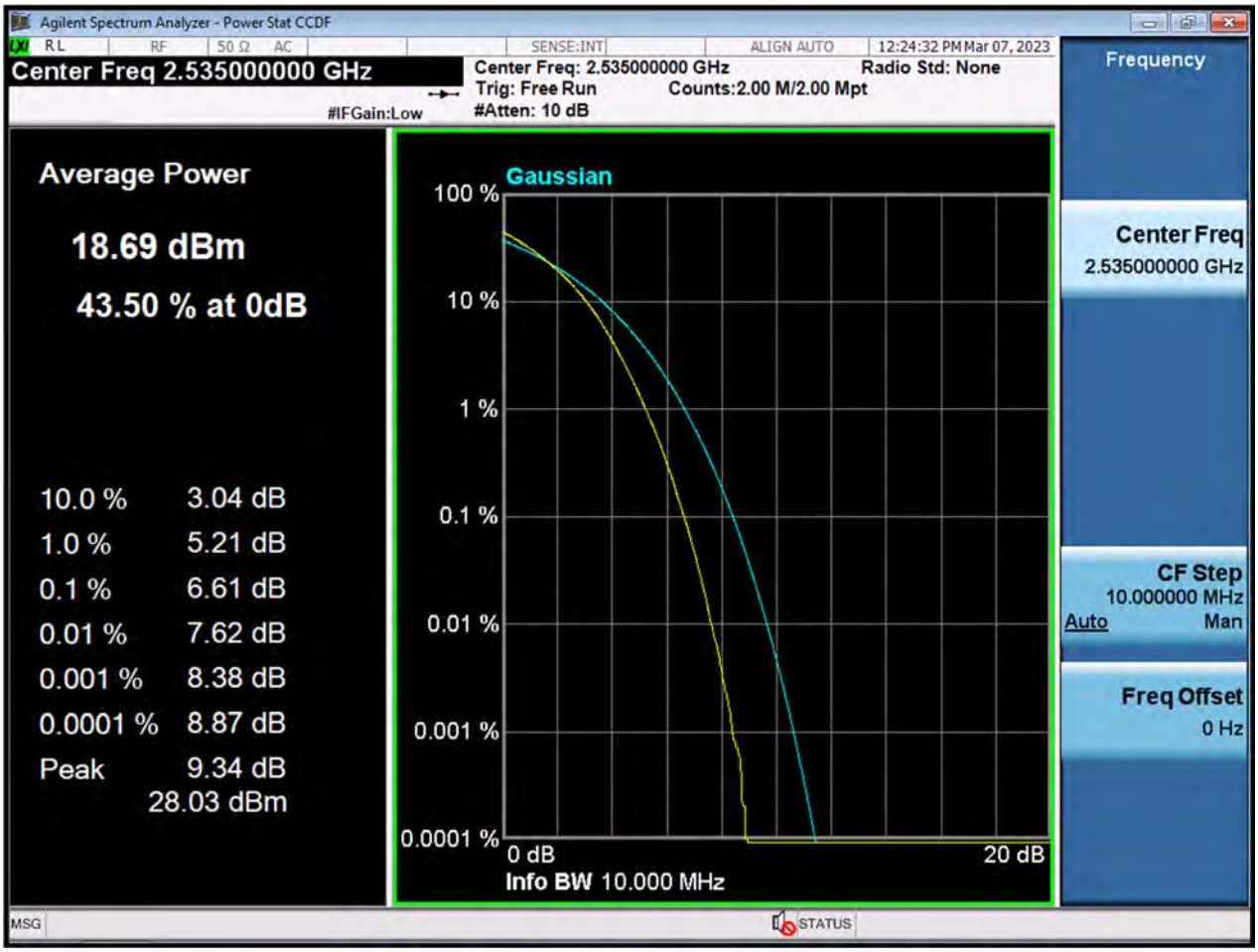
LTE7_10 M_PAR_Mid Channel_16QAM_FullRB



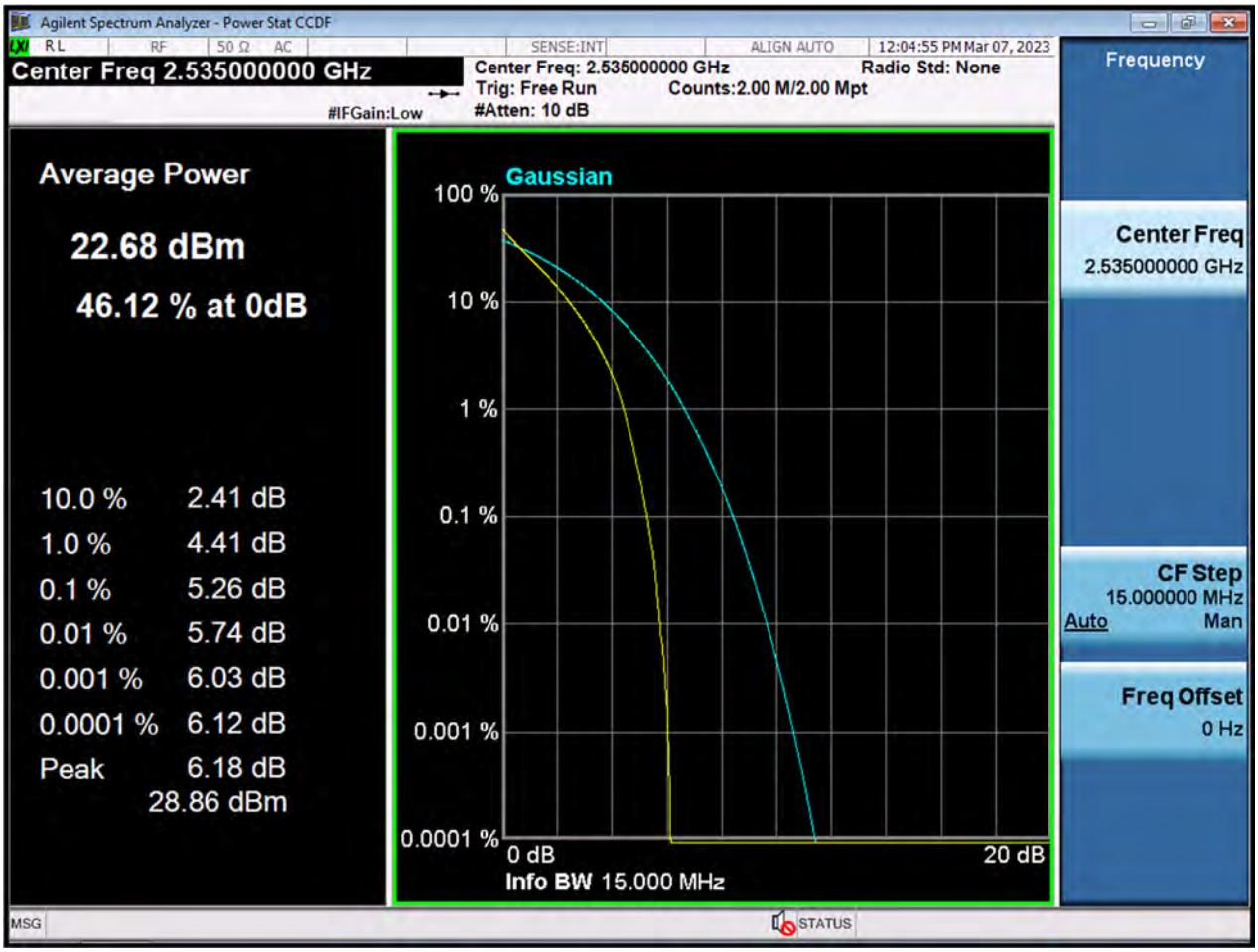
LTE7_10 M_PAR_Mid Channel_64QAM_FullRB



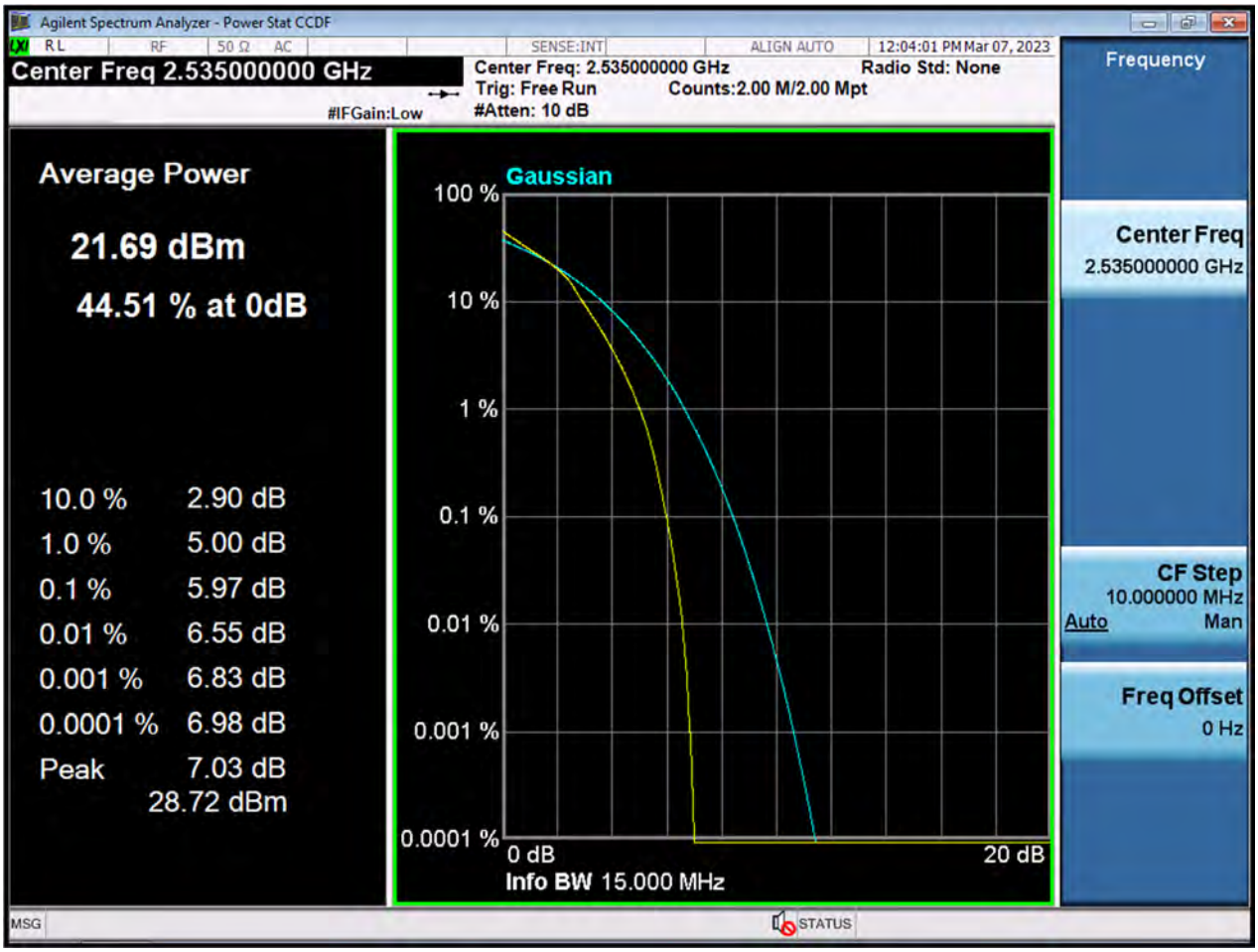
LTE7_10 M_PAR_Mid Channel_256QAM_FullRB



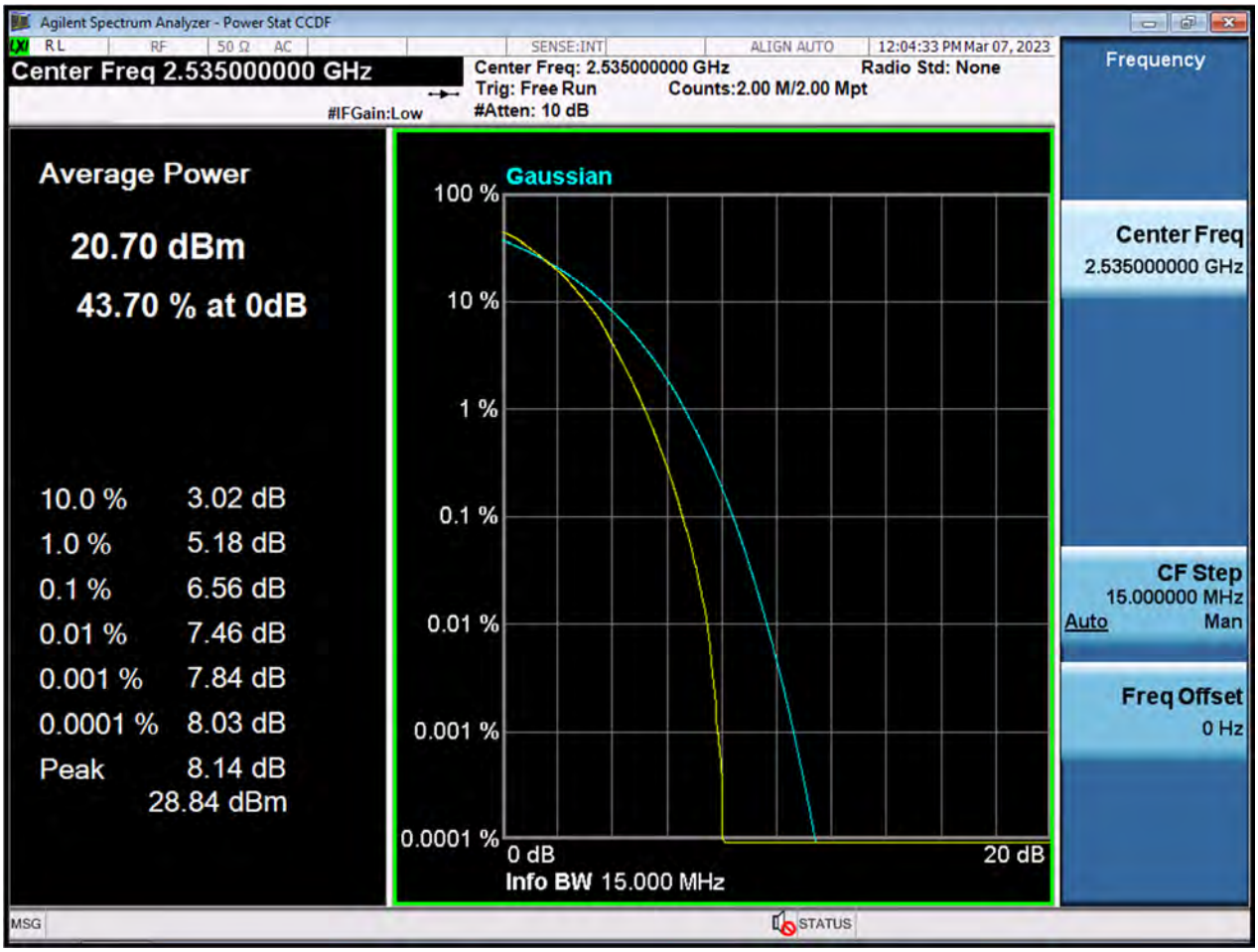
LTE7_15 M_PAR_Mid Channel_QPSK_FullRB



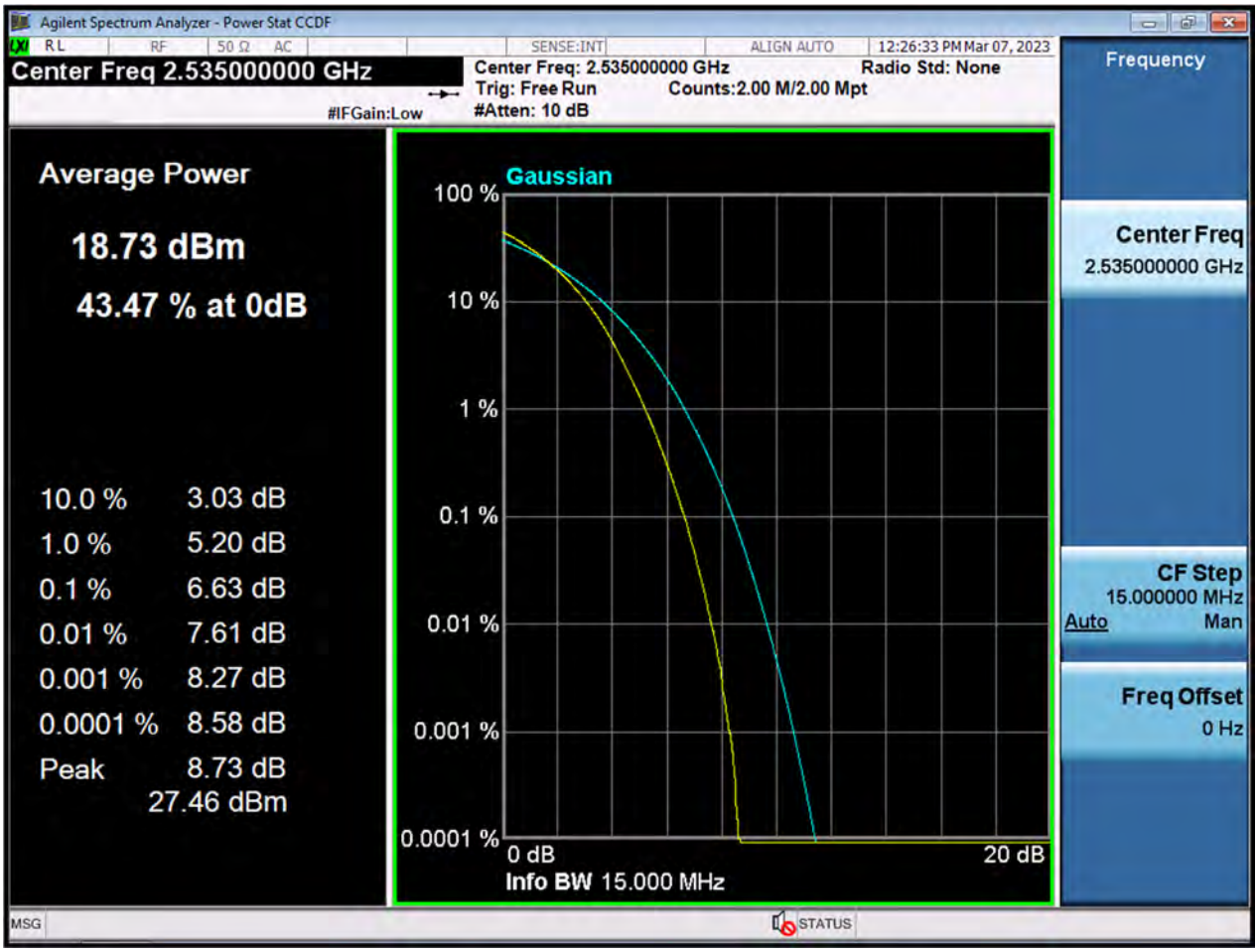
LTE7_15 M_PAR_Mid Channel_16QAM_FullRB



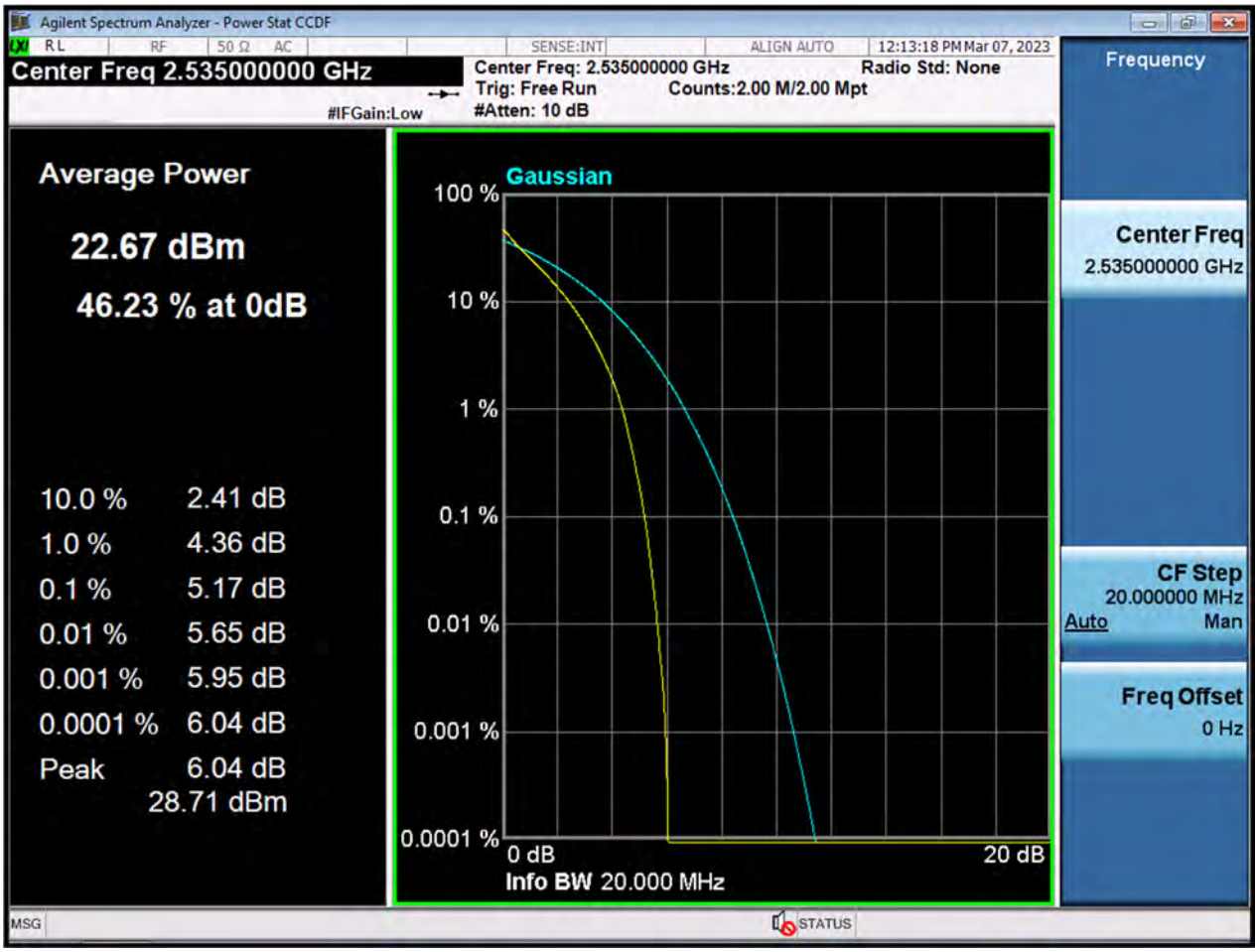
LTE7_15 M_PAR_Mid Channel_64QAM_FullRB



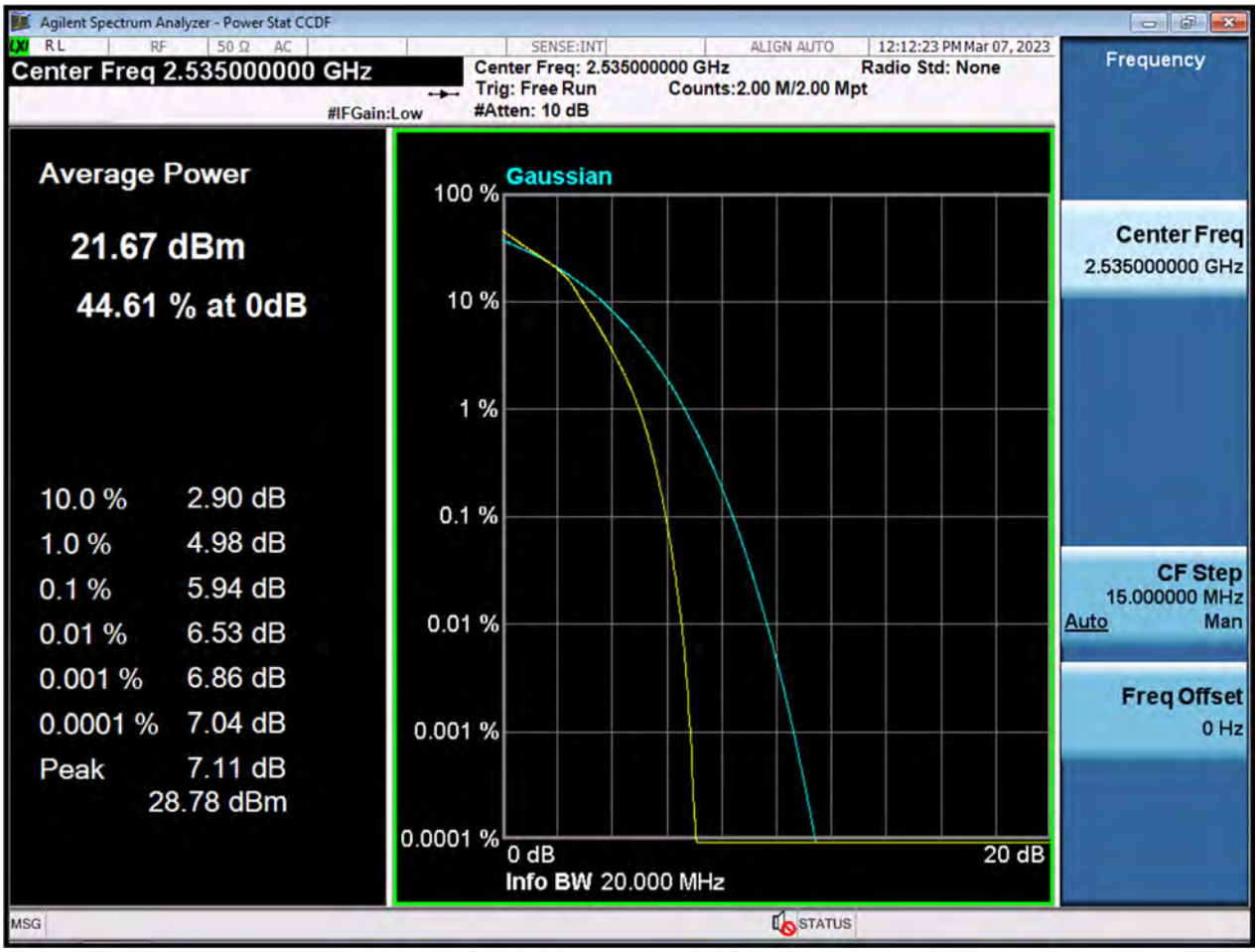
LTE7_15 M_PAR_Mid Channel_256QAM_FullRB



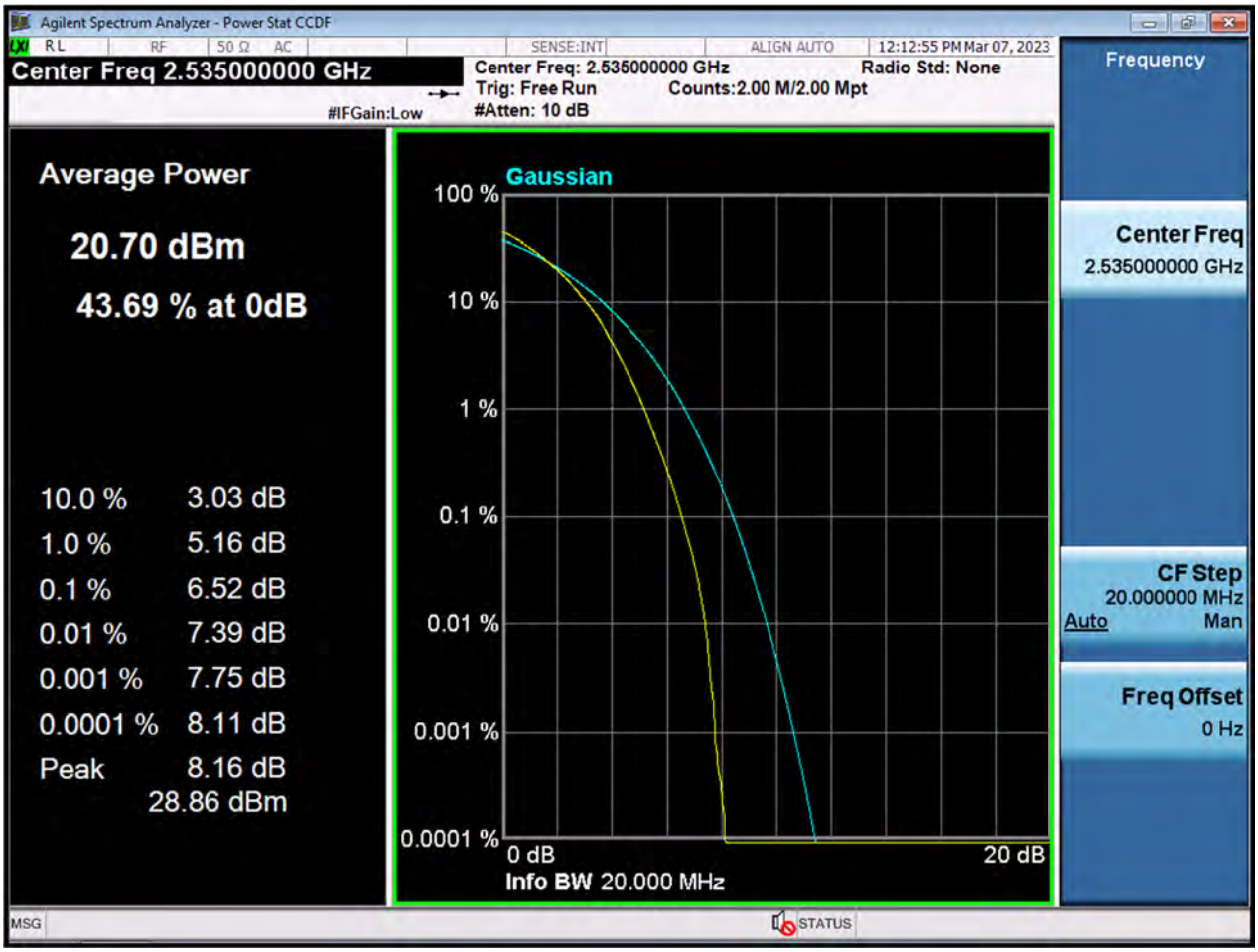
LTE7_20 M_PAR_Mid Channel_QPSK_FullRB



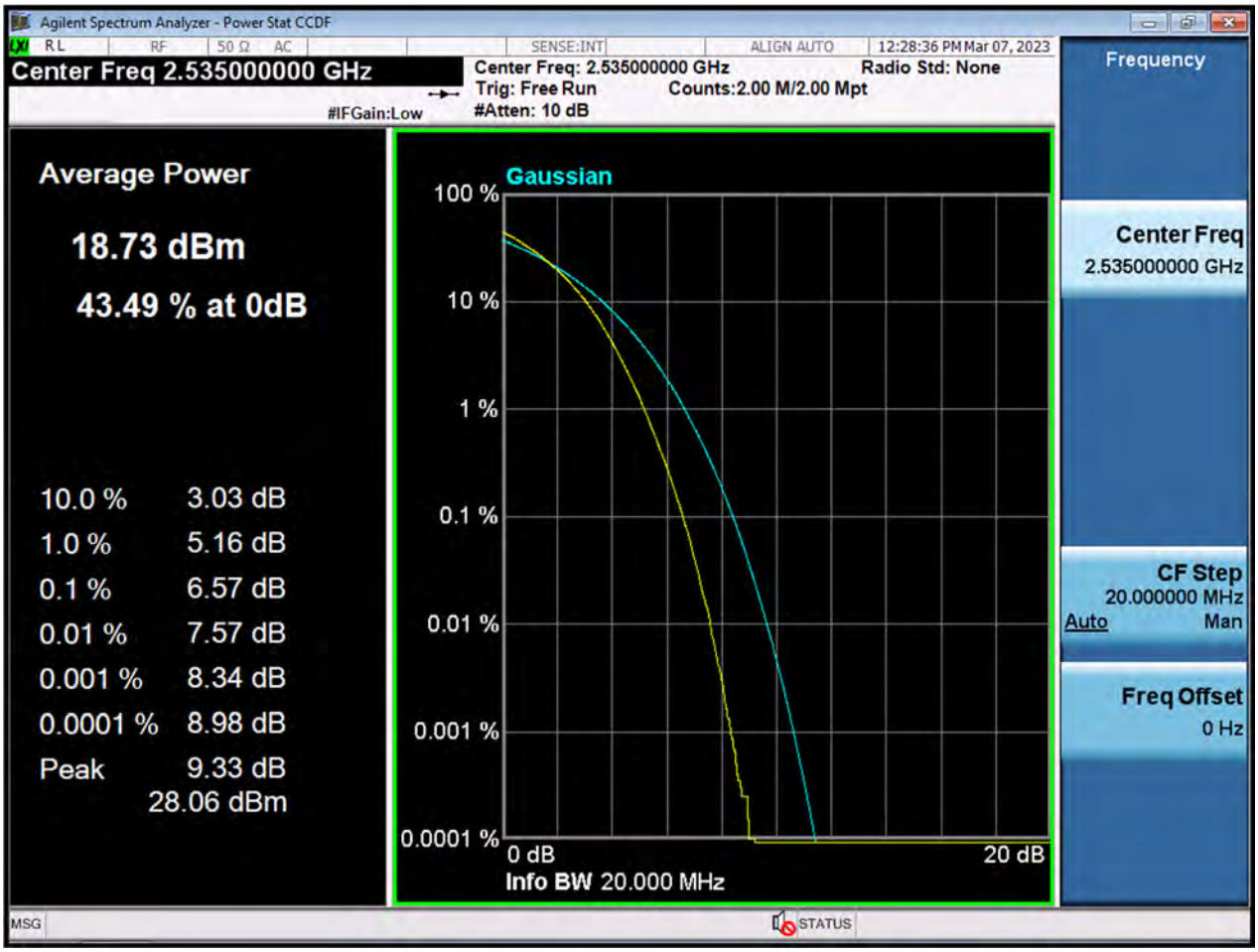
LTE7_20 M_PAR_Mid Channel_16QAM_FullRB



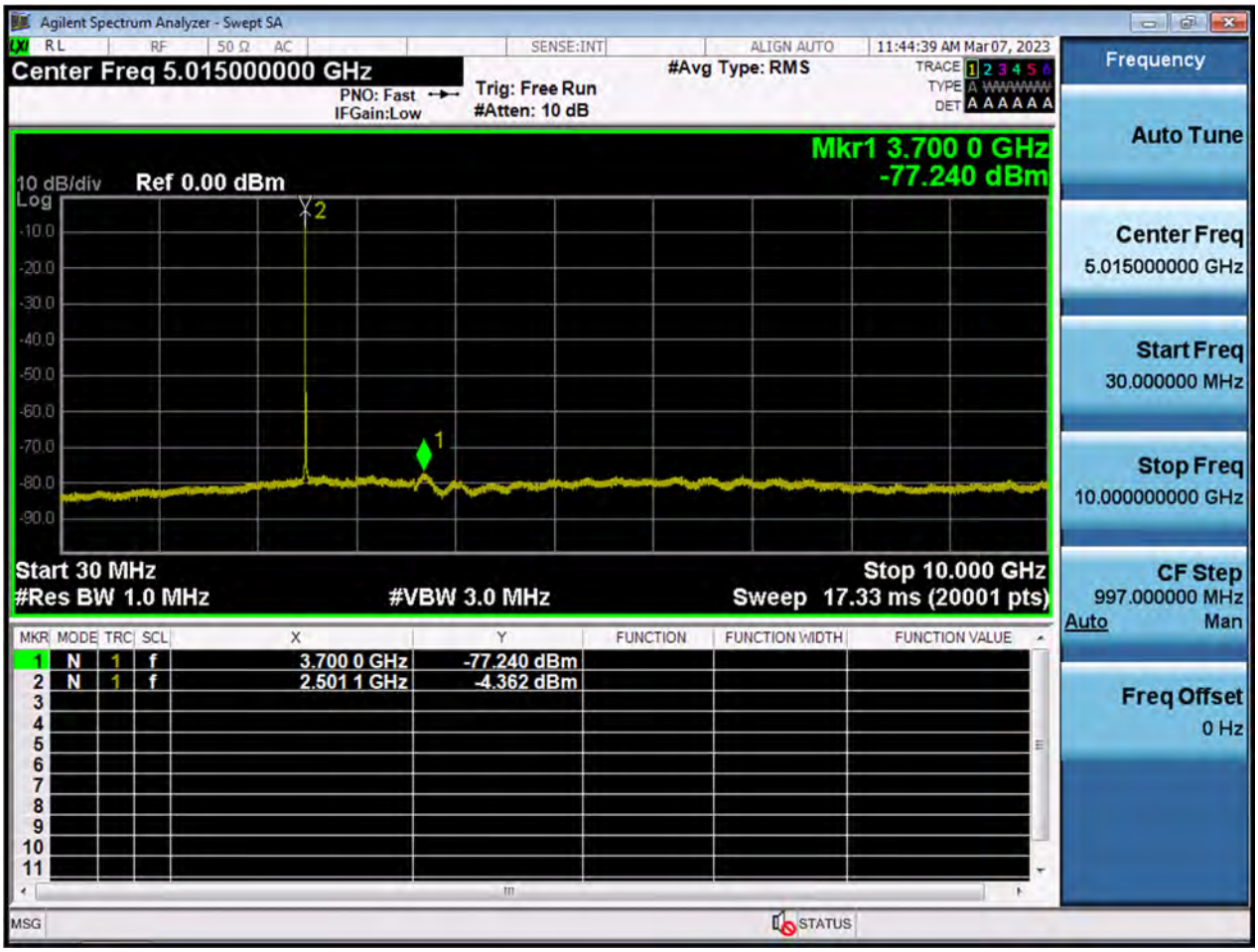
LTE7_20 M_PAR_Mid Channel_64QAM_FullRB



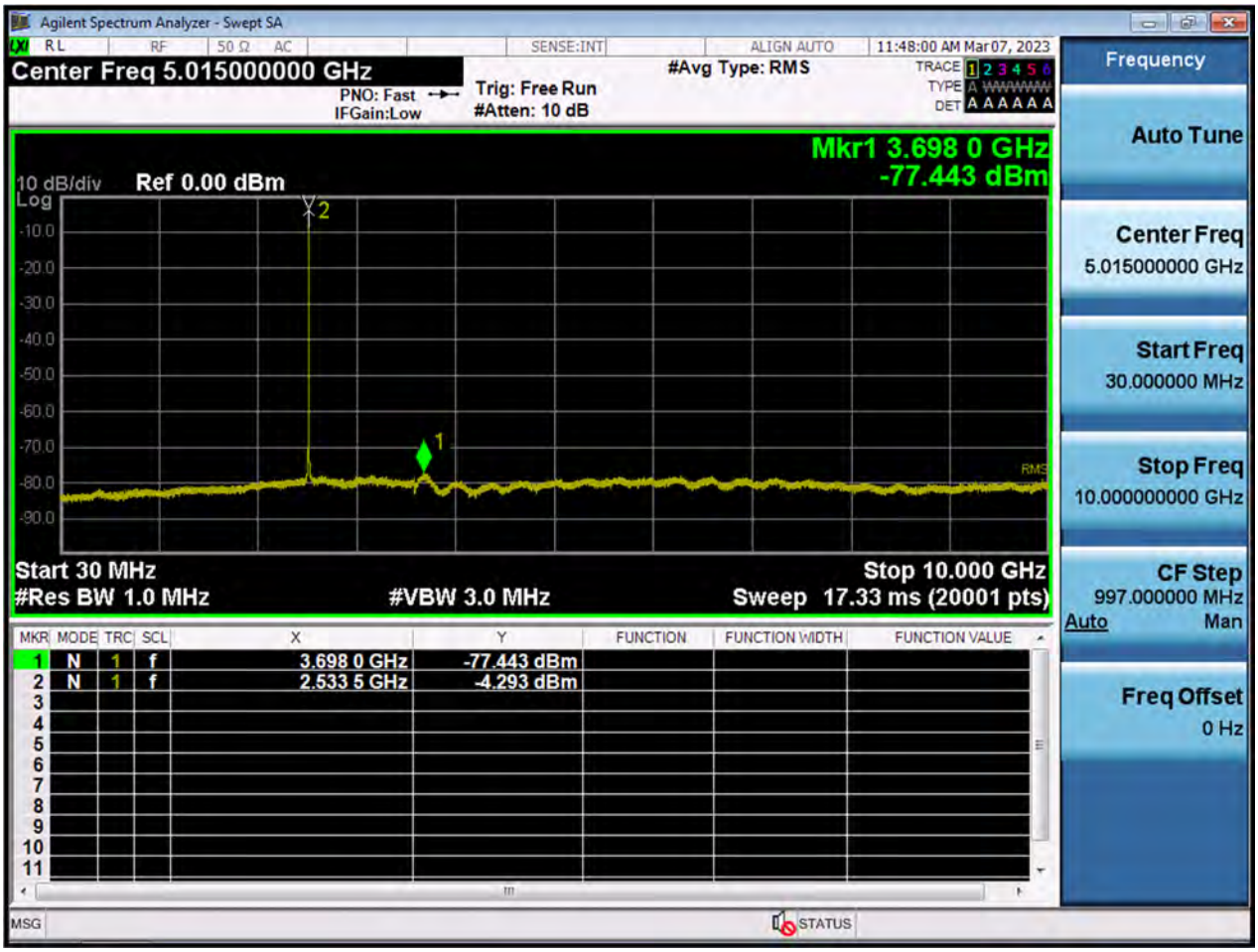
LTE7_20 M_PAR_Mid Channel_256QAM_FullRB



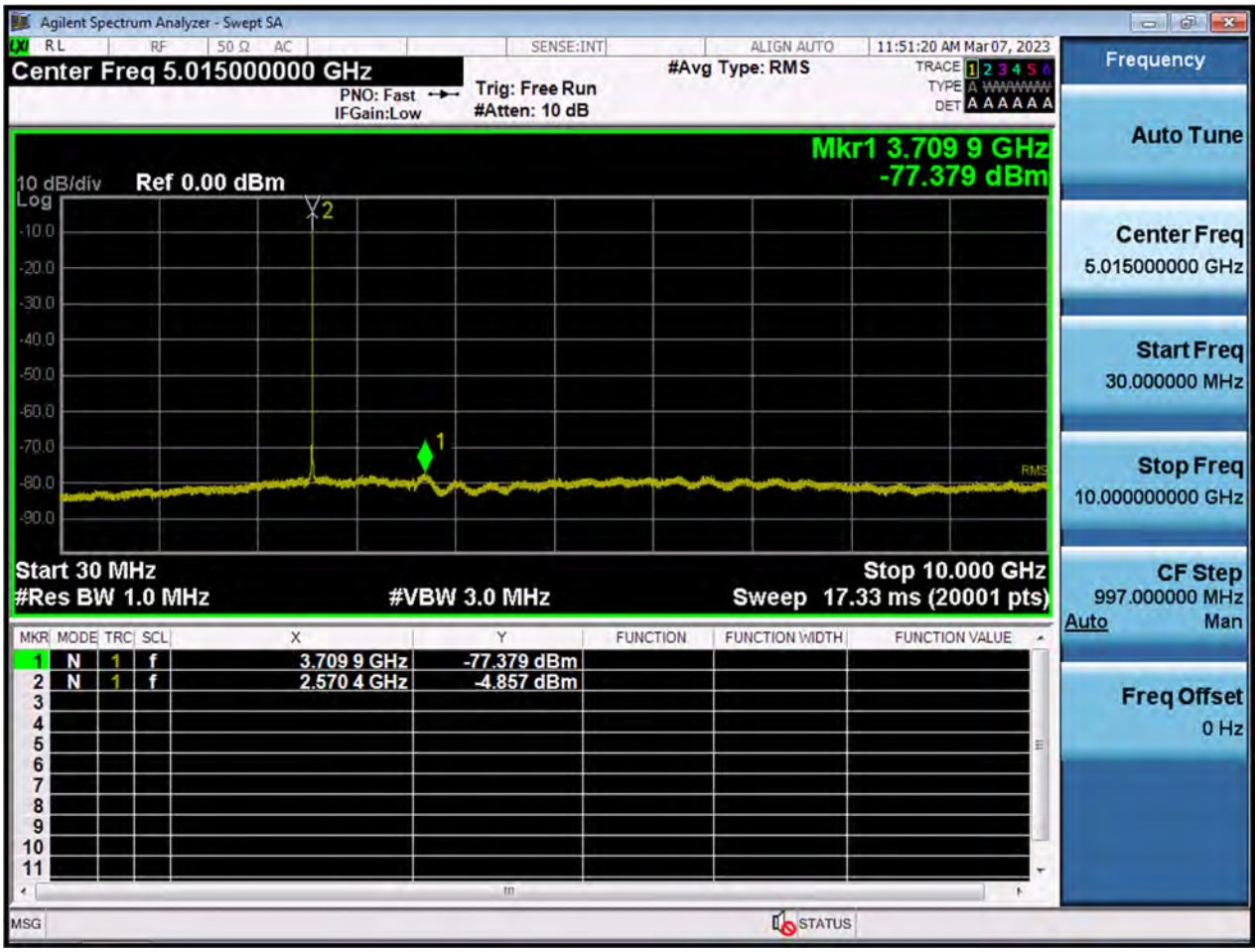
LTE7_5 M_CSE(30 M-10 G)_Lowest Channel



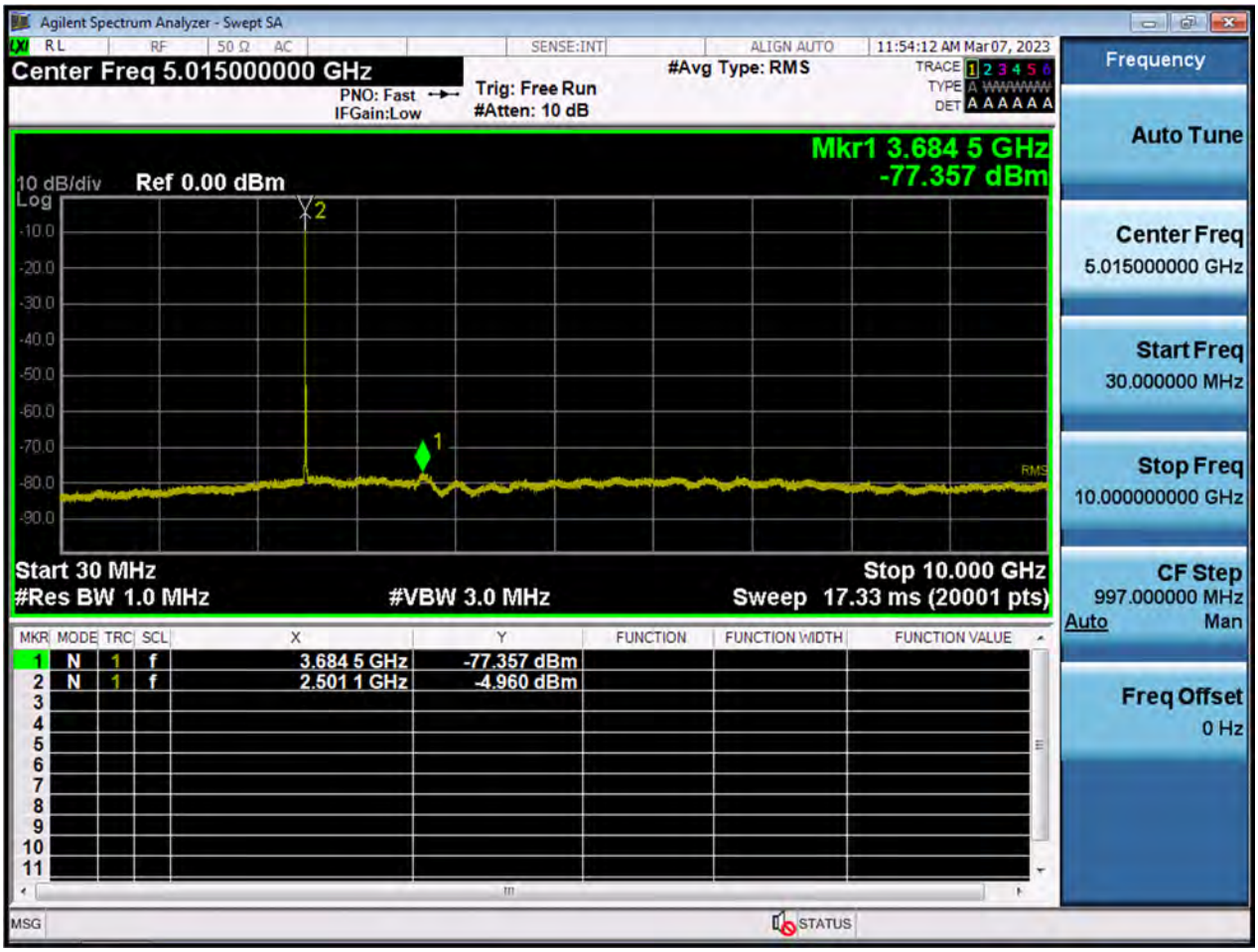
LTE7_5 M_CSE(30 M-10 G)_Mid Channel



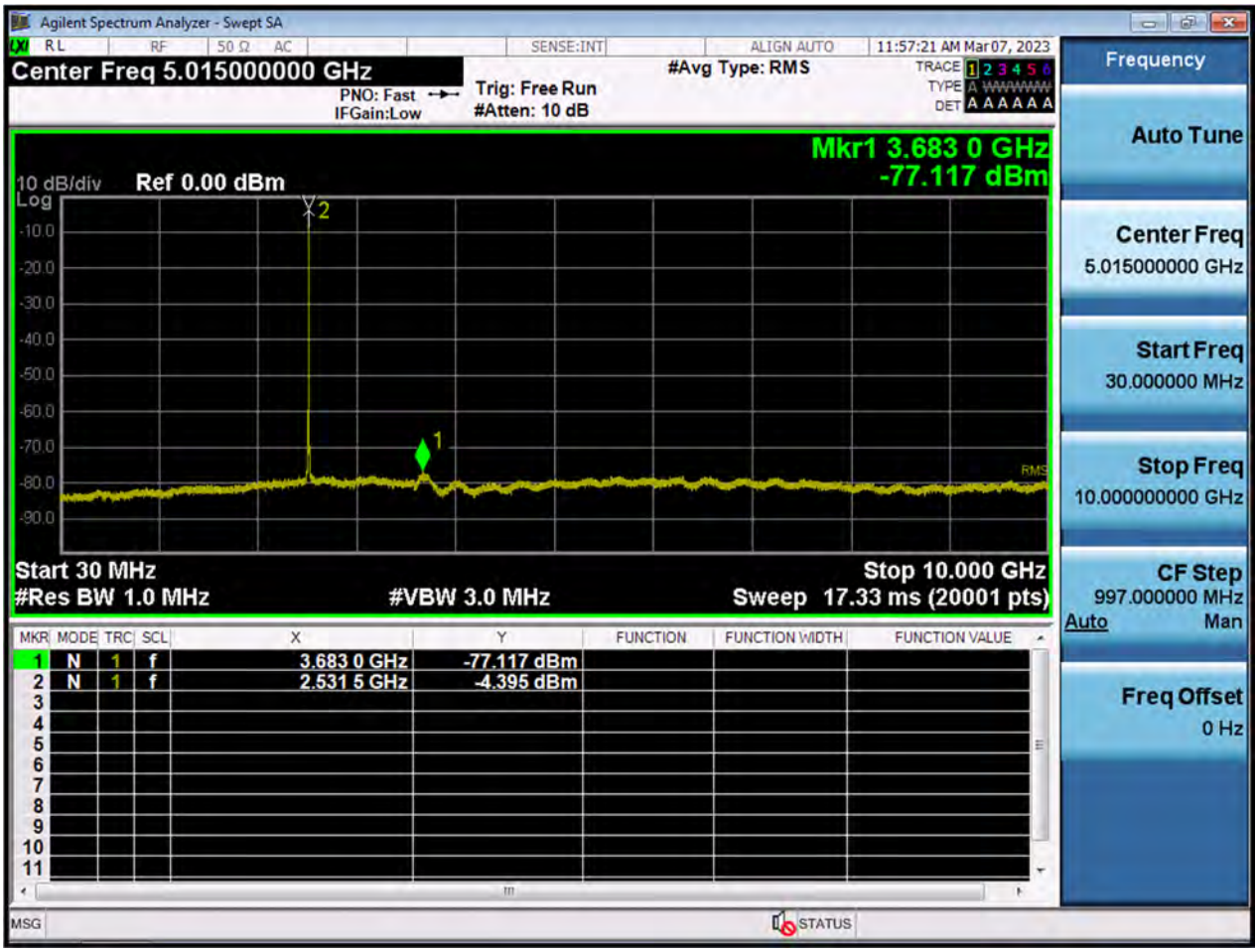
LTE7_5 M_CSE(30 M-10 G)_Highest Channel



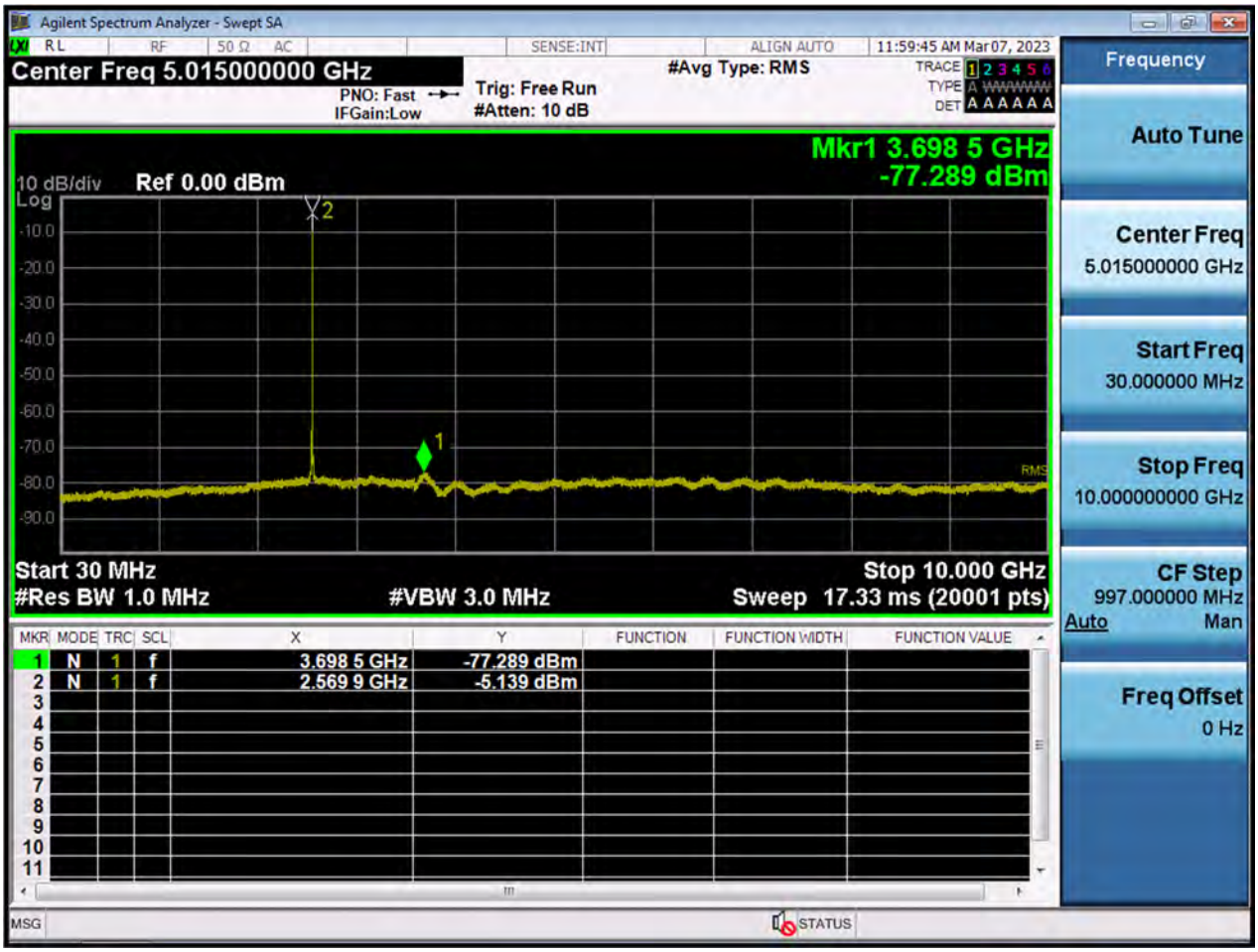
LTE7_10 M_CSE(30 M-10 G)_Lowest Channel



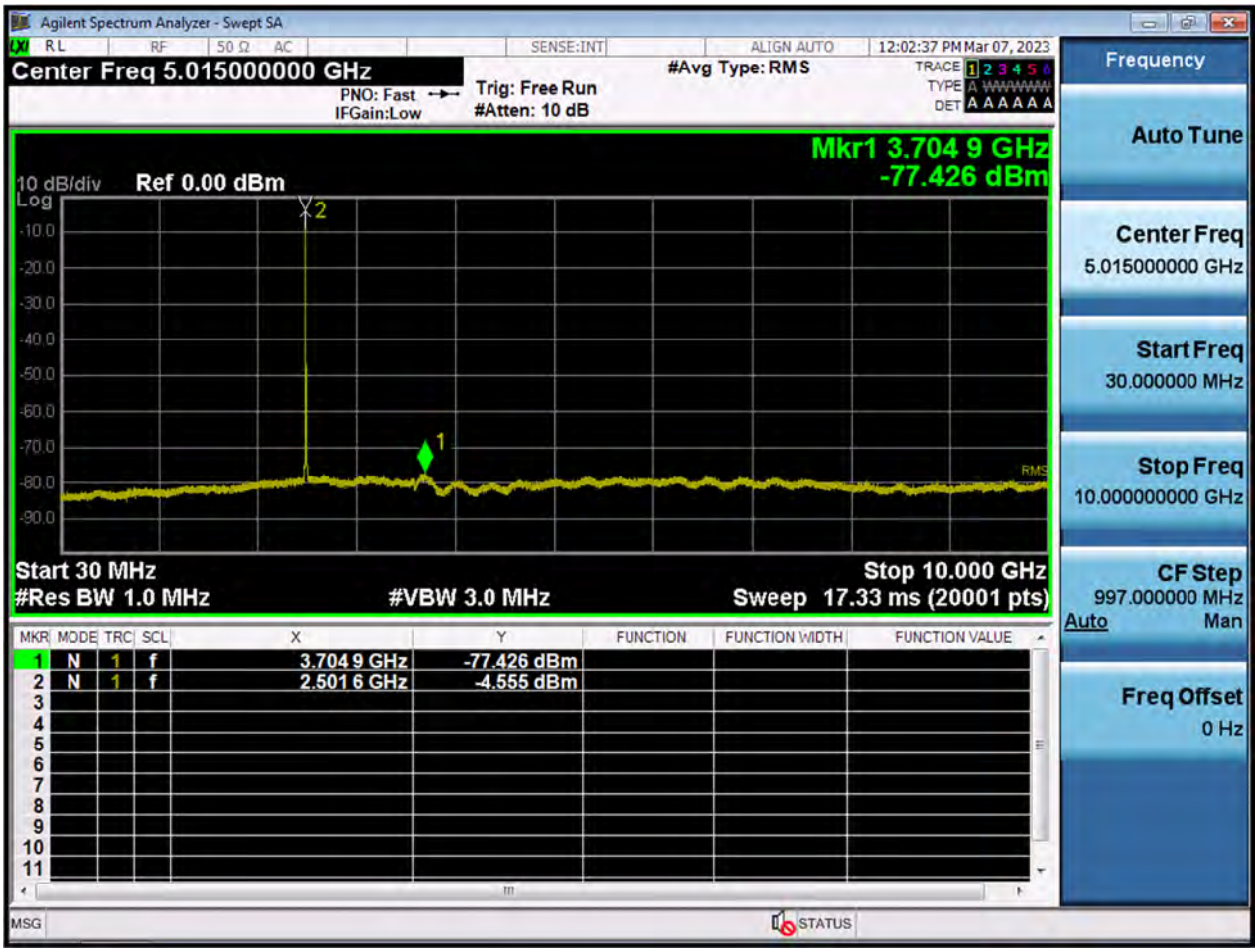
LTE7_10 M_CSE(30 M-10 G)_Mid Channel



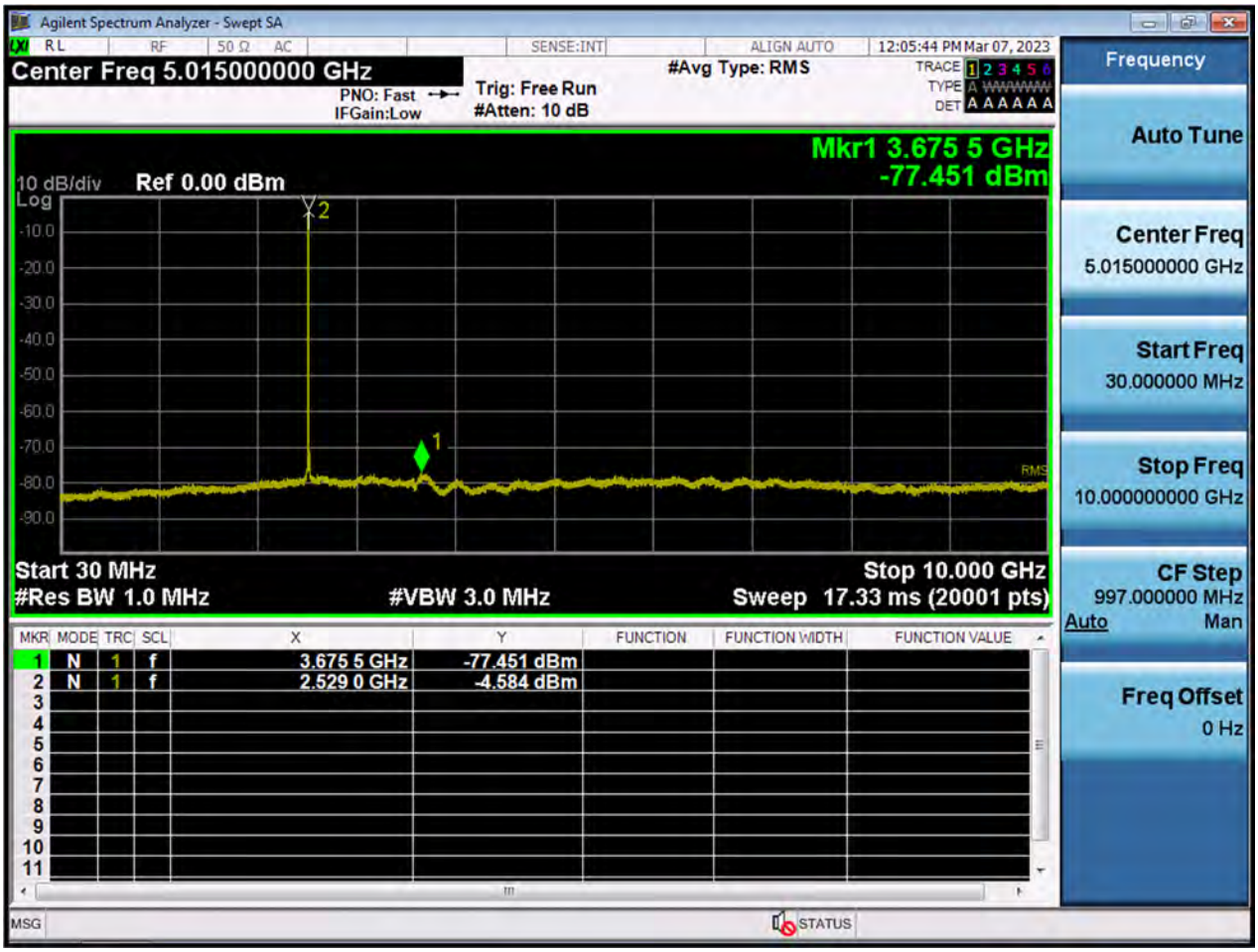
LTE7_10 M_CSE(30 M-10 G)_Highest Channel



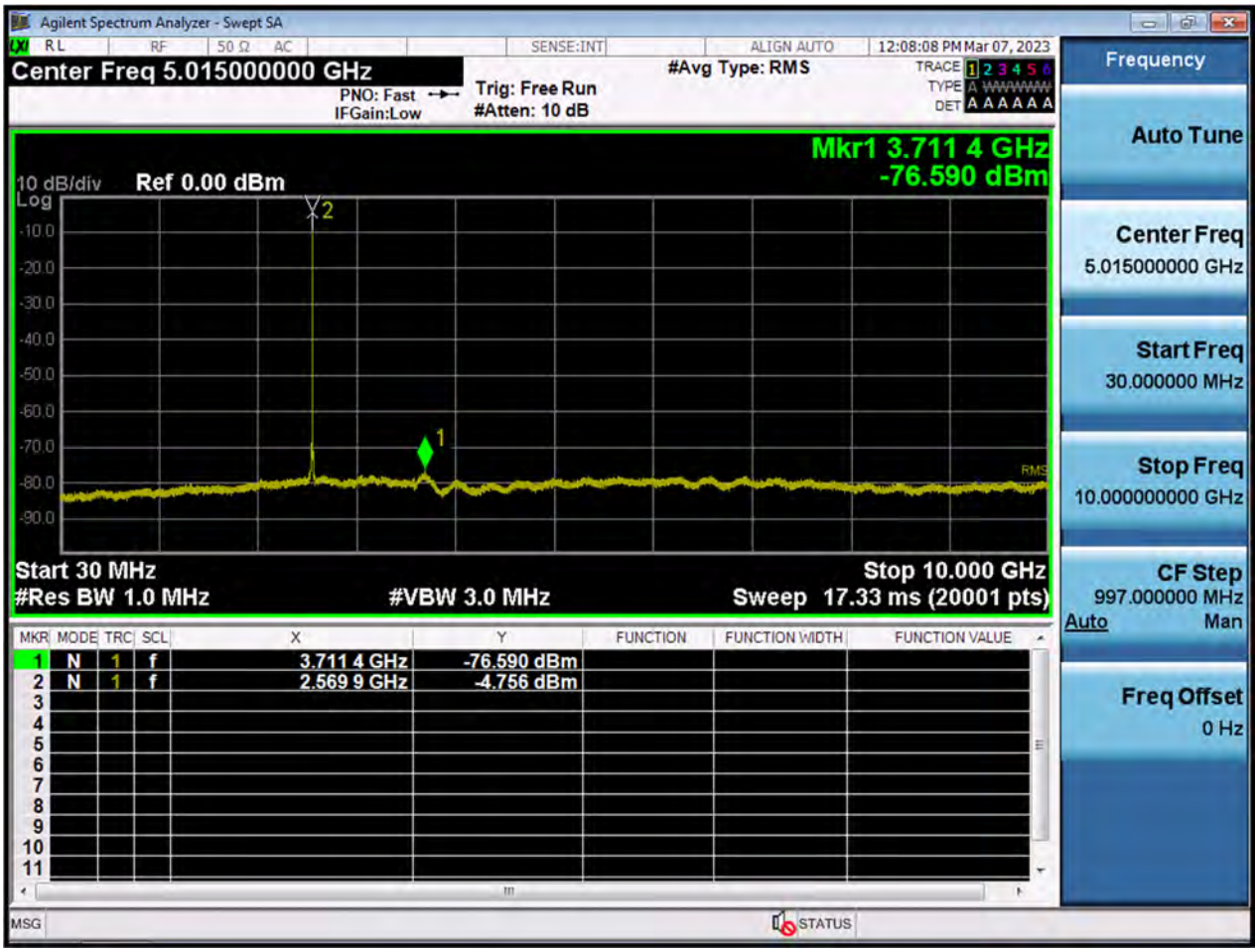
LTE7_15 M_CSE(30 M-10 G)_Lowest Channel



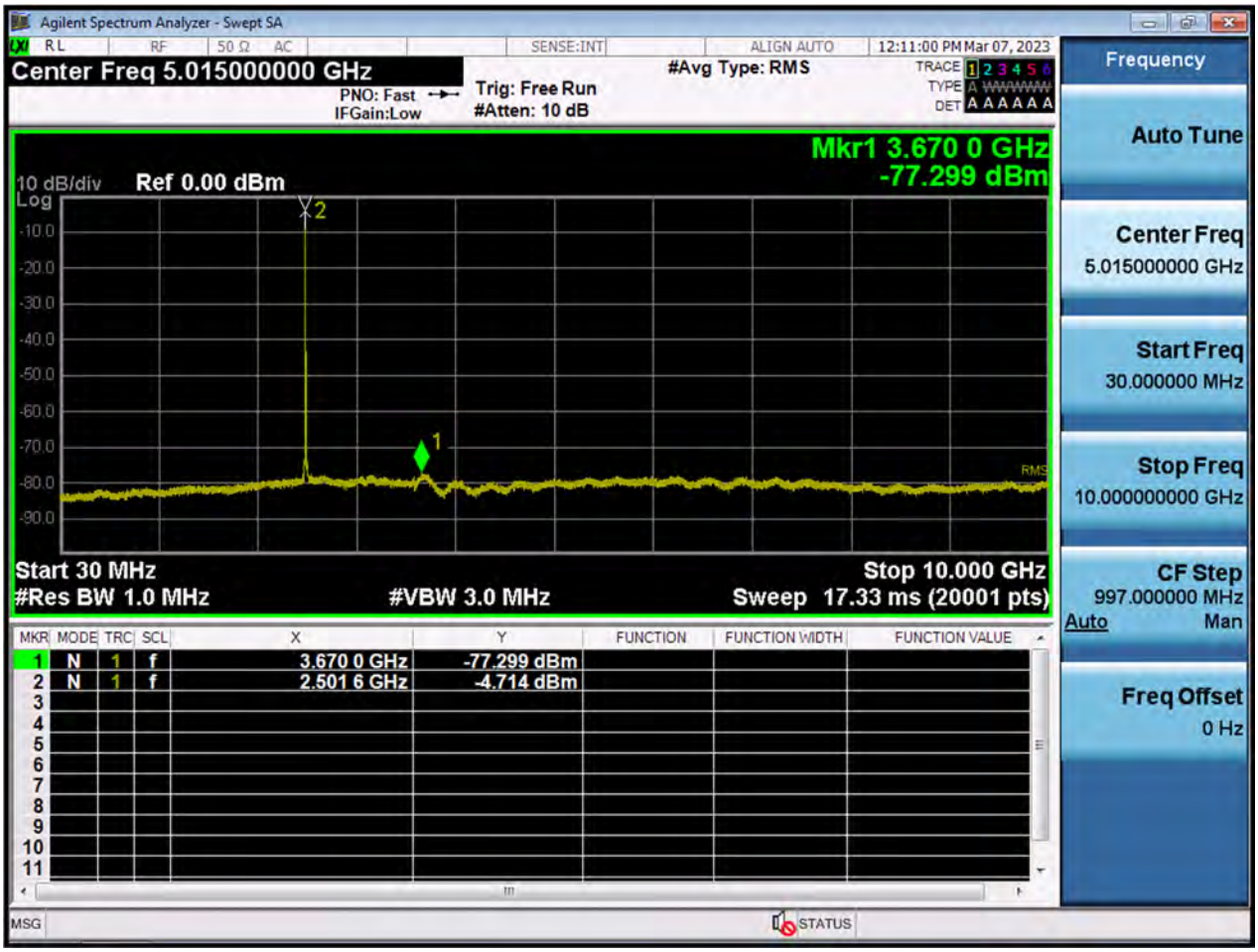
LTE7_15 M_CSE(30 M-10 G)_Mid Channel



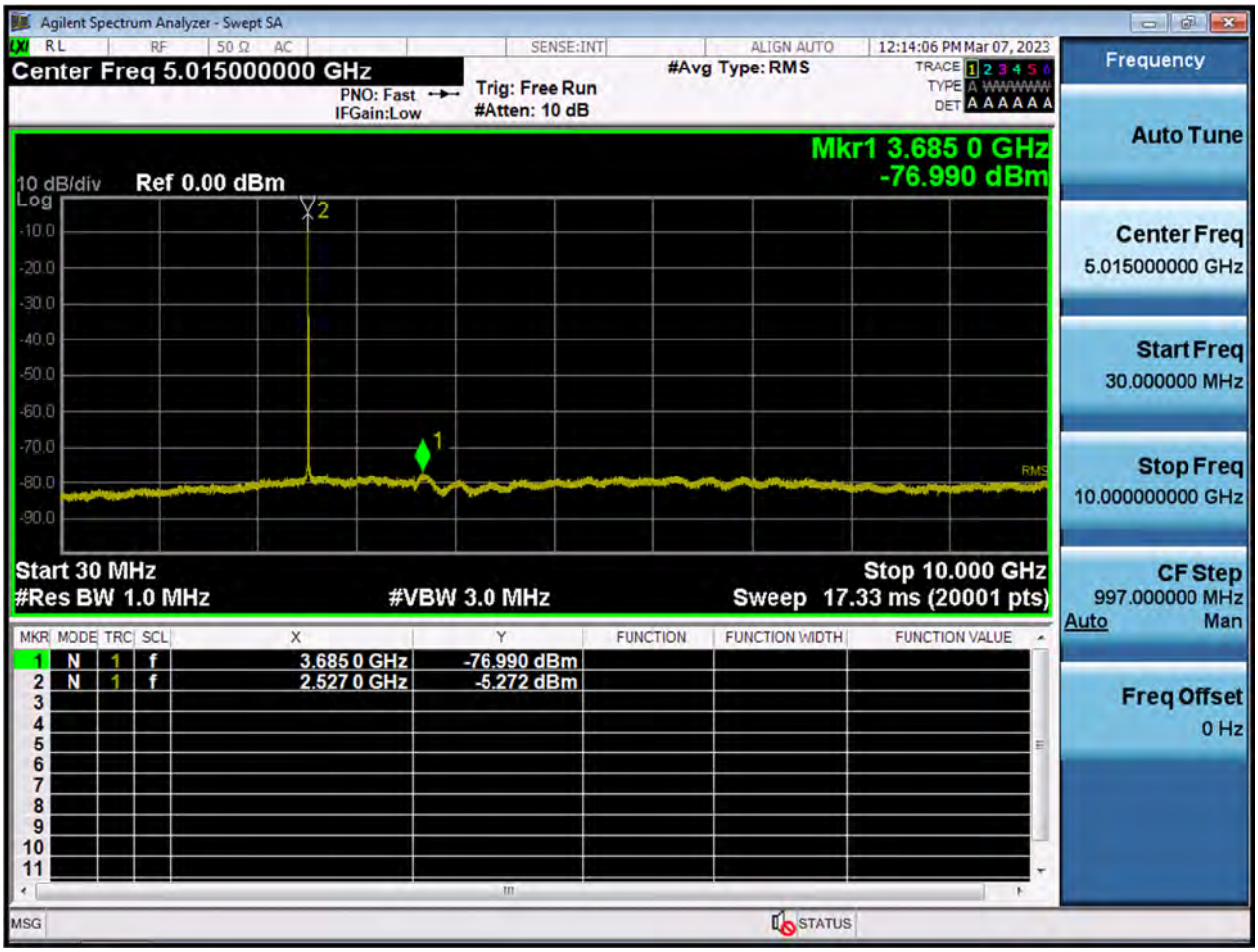
LTE7_15 M_CSE(30 M-10 G)_Highest Channel



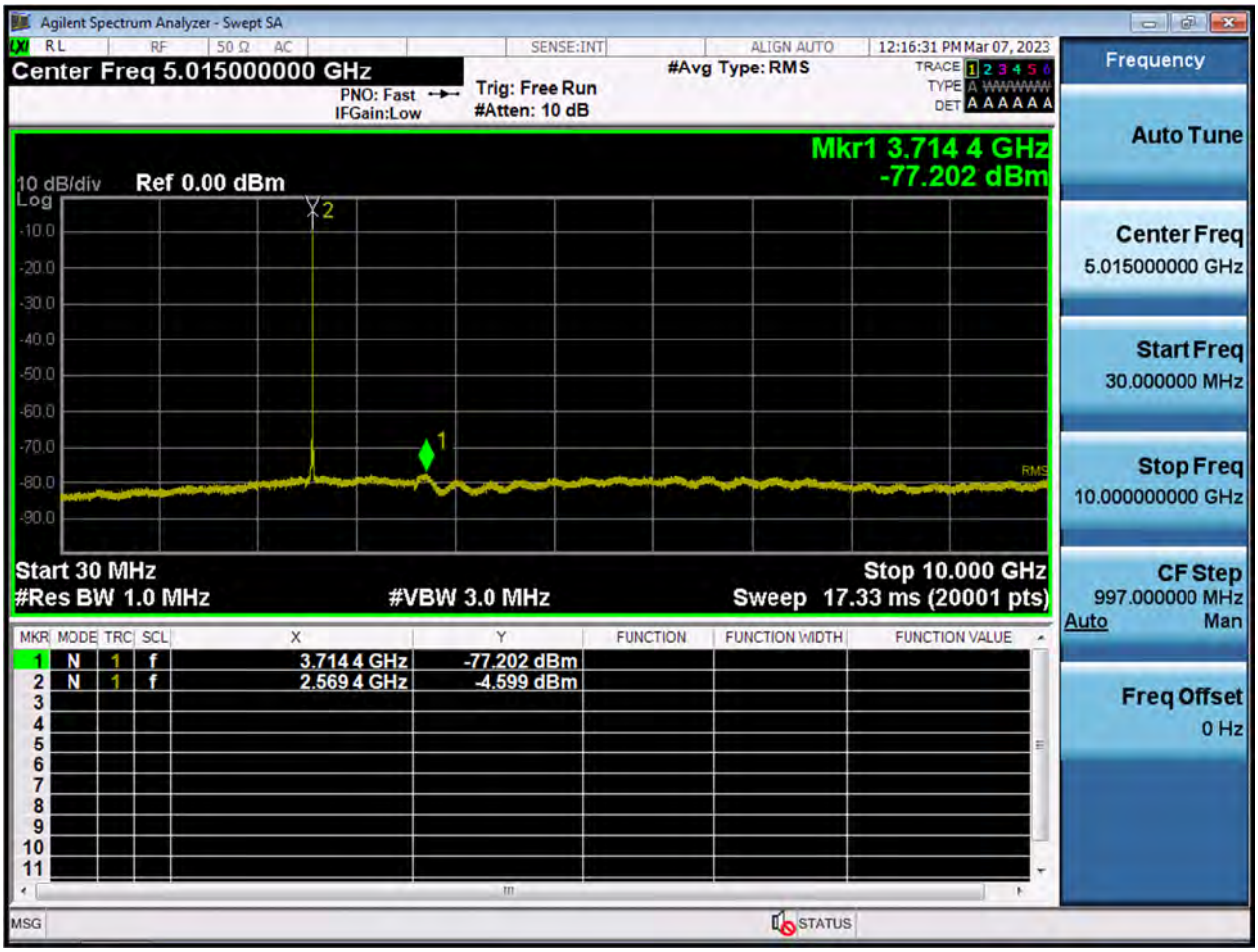
LTE7_20 M_CSE(30 M-10 G)_Lowest Channel



LTE7_20 M_CSE(30 M-10 G)_Mid Channel



LTE7_20 M_CSE(30 M-10 G)_Highest Channel



LTE7_5 M_CSE(10 G-26.5 G)_Lowest Channel

LTE7_5 M_CSE(10 G-26.5 G)_Mid Channel

LTE7_5 M_CSE(10 G-26.5 G)_Highest Channel

LTE7_10 M_CSE(10 G-26.5 G)_Lowest Channel

LTE7_10 M_CSE(10 G-26.5 G)_Mid Channel

LTE7_10 M_CSE(10 G-26.5 G)_Highest Channel

LTE7_15 M_CSE(10 G-26.5 G)_Lowest Channel

LTE7_15 M_CSE(10 G-26.5 G)_Mid Channel

LTE7_15 M_CSE(10 G-26.5 G)_Highest Channel

LTE7_20 M_CSE(10 G-26.5 G)_Lowest Channel

LTE7_20 M_CSE(10 G-26.5 G)_Mid Channel

LTE7_20 M_CSE(10 G-26.5 G)_Highest Channel

10. ANNEX A_ TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

No.	Description
1	HCT-RF-2308-FC006-P