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FCC LTE REPORT

Certification

Applicant Name:
Franklin Technology Inc.

Address:
906 JEI Platz, 186, Gasan digital 1-ro,
Geumcheon-gu, Seoul, Korea, (08502)

Date of Issue:
April 04, 2019

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

Report No.: HCT-RF-1808-FC002-R1

FCC ID: XHG-LT711

APPLICANT: Franklin Technology Inc.

Model(s): LT711
EUT Type: Pet Tracker
FCC Classification: PCS Licensed Transmitter (PCB)
FCC Rule Part(s): §27, §2

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	EIRP	
				Max. Power (W)	Max. Power (dBm)
LTE – Band4 (1.4)	1710.7 – 1754.3	1M10G7D	QPSK	0.244	23.87
		1M10W7D	16QAM	0.181	22.57
LTE – Band4 (3)	1711.5 – 1753.5	2M72G7D	QPSK	0.227	23.56
		2M71W7D	16QAM	0.169	22.29
LTE – Band4 (5)	1712.5 – 1752.5	4M52G7D	QPSK	0.224	23.50
		4M51W7D	16QAM	0.177	22.48
LTE – Band4 (10)	1715.0 – 1750.0	8M96G7D	QPSK	0.234	23.70
		2M48W7D	16QAM	0.181	22.58
LTE – Band4 (15)	1717.5 – 1747.5	13M4G7D	QPSK	0.242	23.83
		3M47W7D	16QAM	0.187	22.73
LTE – Band4 (20)	1720.0 – 1745.0	17M9G7D	QPSK	0.233	23.67
		3M99W7D	16QAM	0.185	22.68

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)

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

Report approved by : Kwon Jeong
Manager of Telecommunication Testing Center

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Version

TEST REPORT NO.	DATE	DESCRIPTION
HCT-RF-1808-FC002	August 08, 2018	- First Approval Report
HCT-RF-1808-FC002-R1	April 04, 2019	- Revised on EUT type

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MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	Franklin Technology Inc.
Address:	906 JEI Platz, 186, Gasan digital 1-ro, Geumcheon-gu, Seoul, Korea, (08502)
FCC ID:	XHG-LT711
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§27, §2
EUT Type:	Pet Tracker
Model(s):	LT711
Tx Frequency:	1710.7 MHz – 1754.3 MHz (LTE – Band 4 (1.4 MHz)) 1711.5 MHz – 1753.5 MHz (LTE – Band 4 (3 MHz)) 1712.5 MHz – 1752.5 MHz (LTE – Band 4 (5 MHz)) 1715.0 MHz – 1750.0 MHz (LTE – Band 4 (10 MHz)) 1717.5 MHz – 1747.5 MHz (LTE – Band 4 (15 MHz)) 1720.0 MHz – 1745.0 MHz (LTE – Band 4 (20 MHz))
Date(s) of Tests:	July 16, 2018 ~ July 31, 2018
UE category:	1
Modulation:	QPSK, 16QAM
Support for RB size:	**QPSK** - 1.4MHz : 1 ~ 6 - 3MHz : 1 ~ 15 - 5MHz : 1 ~ 25 - 10MHz : 1 ~ 50 - 15MHz : 1 ~ 75 - 20MHz : 1 ~ 100 **16QAM** - 1.4MHz : 1 ~ 6 - 3MHz : 1 ~ 15 - 5MHz : 1 ~ 25 - 10MHz : 1 ~ 12 - 15MHz : 1 ~ 16 - 20MHz : 1 ~ 18

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Pet Tracker with LTE.

It also supports IEEE 802.11b/g/n (HT20), BTLE & Bluetooth and GPS.

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

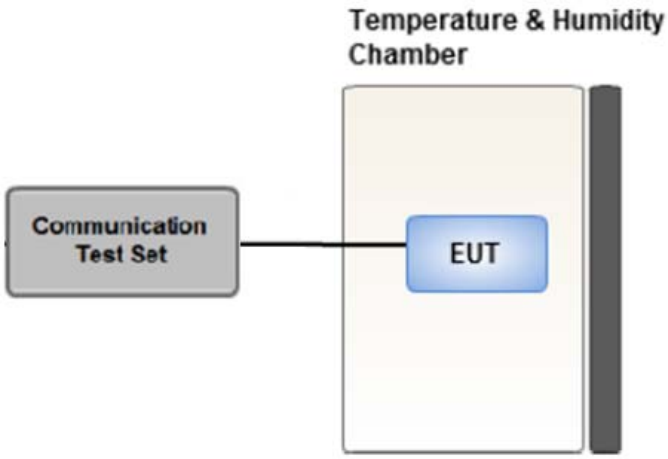
The Fully-anechoic chamber and conducted measurement facility used to collect the radiated data are located at the 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383, Rep. of KOREA.

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 - 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 C63.26-2015 – Section 5.2 - 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 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 1MHz
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 1GHz, 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.

3.4 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.

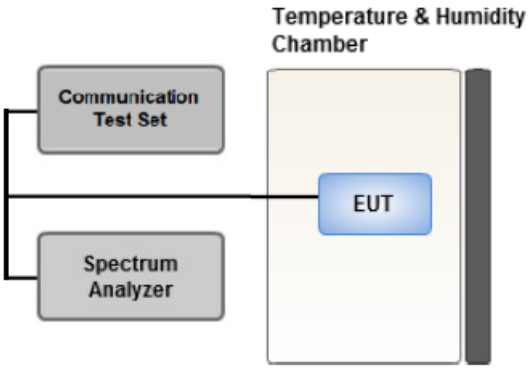
Test Settings

1. RBW = 100kHz for emissions below 1GHz and 1MHz for emissions above 1GHz
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

3.5 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 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)

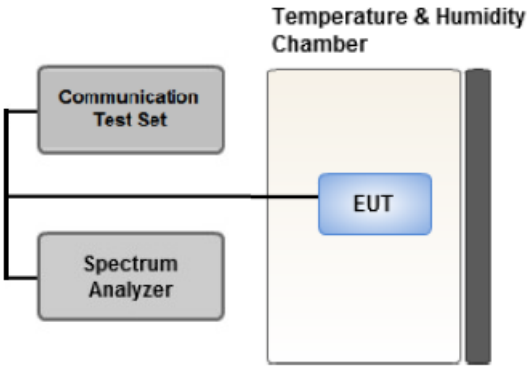
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW ≥ 3 × RBW.

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%.

3.6 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.

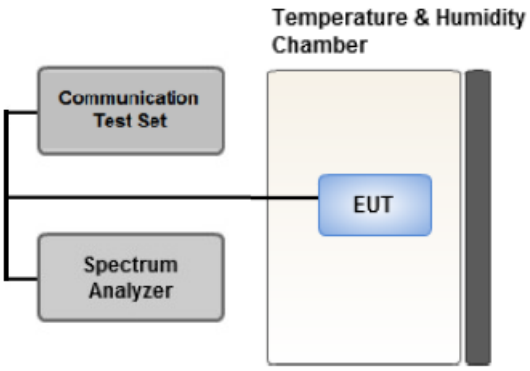
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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 26dB 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

3.7 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

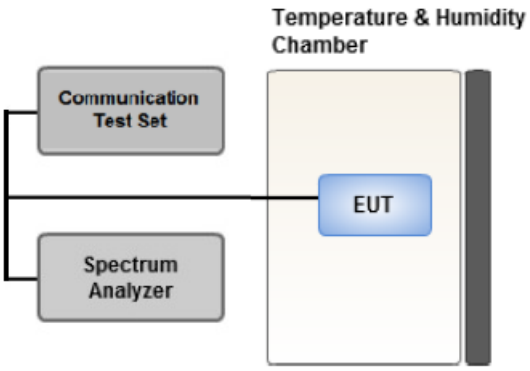
Test Overview

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 = Peak
4. Trace Mode = max hold
5. Sweep time = auto
6. Number of points in sweep ≥ 2 * Span / RBW

3.8 BAND 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 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. 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. RBW > 1% of the emission bandwidth
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

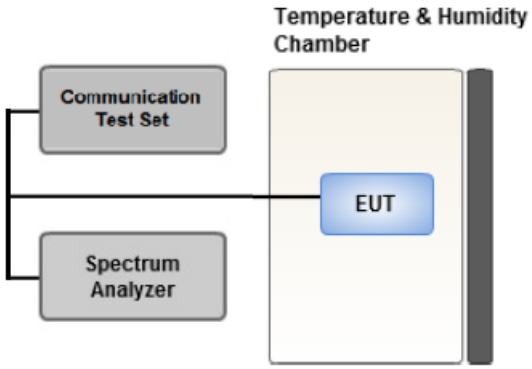
Test Notes

According to FCC 22.917, 24.238, 27.53 specified that power of any emission outside of The authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

All measurements were done at 2 channels(low and high operational frequency range.)

The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

3.9 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.

3.10 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.
- The worst case is reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the test data.
- Please refer to the table below.

[Worst case]

Test Description	Modulation	RB size	RB offset	Axis
Effective Isotropic Radiated Power	QPSK, 16QAM	1	0	X
Radiated Spurious and Harmonic Emissions	QPSK	1	0	Z

3.11 WORST CASE(CONDUCTED TEST)

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
Occupied Bandwidth	QPSK, 16QAM	1.4, 3, 5, 10, 15, 20	Low, Mid, High	Full RB	0
Band Edge	* QPSK	1.4	Low	1	0
			High	1	5
		3	Low	1	0
			High	1	14
		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
		1.4, 3, 5, 10, 15, 20	Low, High	Full RB	0
Channel Edge	* QPSK	1.4, 3, 5, 10, 15, 20	Low, Mid, High	Full RB	0
Spurious and Harmonic Emissions at Antenna Terminal	* QPSK	1	Low, Mid, High	1	0

* Worst case : Of all modulation, We have tested modulation of the high Conducted Output Power.

4. LIST OF TEST EQUIPMENT

Manufacture	Model/ Equipment	Serial Number	Calibration Date	Calibration Interval	Calibration Due
REOHDE & SCHWARZ	SCU 18 / AMPLIFIER	10094	04/17/2018	Annual	04/17/2019
Wainwright	WHK1.2/15G-10EF/H.P.F	4	04/04/2018	Annual	04/04/2019
Wainwright	WHK3.3/18G-10EF/H.P.F	2	04/04/2018	Annual	04/04/2019
Hewlett Packard	11667B / Power Splitter(DC~26.5 GHz)	5001	06/07/2018	Annual	06/07/2019
Agilent	E3632A/DC Power Supply	KR75303243	05/09/2018	Annual	05/09/2019
Schwarzbeck	UHAP/ Dipole Antenna	557	03/31/2017	Biennial	03/31/2019
Schwarzbeck	UHAP/ Dipole Antenna	558	03/31/2017	Biennial	03/31/2019
ESPEC	SU-642 / Chamber	93000718	03/30/2018	Annual	03/30/2019
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	147	09/09/2016	Biennial	09/09/2018
Schwarzbeck	BBHA 9120D/ Horn Antenna(1~18GHz)	9120D-1298	10/14/2016	Biennial	10/14/2018
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170342	04/25/2017	Biennial	04/25/2019
Schwarzbeck	BBHA 9170/ Horn Antenna(15~40GHz)	BBHA9170124	04/25/2017	Biennial	04/25/2019
Agilent	N9020A/Signal Analyzer(10Hz~26.5GHz)	MY52090906	06/08/2018	Annual	06/08/2019
Hewlett Packard	8493C/ATTENUATOR(20dB)	17280	06/21/2018	Annual	06/21/2019
REOHDE & SCHWARZ	FSV40/Spectrum Analyzer(10Hz~40GHz)	100931	10/30/2017	Annual	10/30/2018
Agilent	8960 (E5515C)/ Base Station	MY48360800	09/26/2017	Annual	09/26/2018
Schwarzbeck	FMZB1513/ Loop Antenna(9kHz~30MHz)	1513-175	04/19/2017	Biennial	04/19/2019
Schwarzbeck	VULB9160/ Bilog Antenna	3150	09/30/2016	Biennial	09/30/2018
Schwarzbeck	VULB9160/ Bilog Antenna	9360-3368	10/14/2016	Biennial	10/14/2018
Schwarzbeck	VULB9160/ Hybrid Antenna	760	04/06/2017	Biennial	04/06/2019
Anritsu Corp.	MT8820C/Wideband Radio Communication Tester	6200863156	02/13/2018	Annual	02/13/2019
Anritsu Corp.	MT8820C/Wideband Radio Communication Tester	6201026545	02/08/2018	Annual	02/08/2019
REOHDE & SCHWARZ	SMB100A/ SIGNAL GENERATOR (100kHz~40GHz)	177633	07/19/2018	Annual	07/19/2019
REOHDE & SCHWARZ	FSV40/Spectrum Analyzer	100931	10/30/2017	Annual	10/30/2018
REOHDE & SCHWARZ	ESU40 / EMI TEST RECEIVER	100524	08/16/2017	Annual	08/16/2018
HCT CO., LTD.,	FCC LTE Mobile Conducted RF Automation Test Software	-	-	-	-

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)	1.82
Radiated Disturbance (9 kHz ~ 30 MHz)	3.40
Radiated Disturbance (30 MHz ~ 1 GHz)	4.80
Radiated Disturbance (1 GHz ~ 18 GHz)	5.70
Radiated Disturbance (18 GHz ~ 40 GHz)	5.71

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(h)	< 43 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions	PASS
Conducted Output Power	§2.1046	N/A	PASS
Peak- to- Average Ratio	27.50(d)(5)	< 13 dB	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(d)(4)	< 1 Watts max. EIRP	PASS
Radiated Spurious and Harmonic Emissions	§2.1053, §27.53(h)	< 43 + 10log10 (P[Watts]) for all out-of band emissions	PASS

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

16QAM 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

Band	Band Width (MHz)	Frequency (MHz)	Channel	Resource Block Size	Resource Block Offset	Average Power [dBm]	
						QPSK	16-QAM
Band 4	1.4	1710.7	19957	1	0	22.82	21.74
				1	3	22.91	21.92
				1	5	22.86	21.81
				3	0	22.86	21.71
				3	1	22.89	21.73
				3	3	22.83	21.66
				6	0	21.91	20.92
		1732.5	20175	1	0	22.99	22.06
				1	3	23.12	21.86
				1	5	23.01	21.72
				3	0	22.95	21.79
				3	1	22.92	21.72
				3	3	22.91	21.86
				6	0	21.88	20.75
		1754.3	20393	1	0	22.73	21.64
				1	3	22.82	21.85
				1	5	22.83	21.68
				3	0	22.76	21.76
				3	1	22.91	21.80
				3	3	22.81	21.81
				6	0	21.75	20.86

LTE Conducted Average Output Powers (1.4 MHz Band 4 LTE)

Band	Band Width (MHz)	Frequency (MHz)	Channel	Resource Block Size	Resource Block Offset	Average Power [dBm]	
						QPSK	16-QAM
Band 4	3	1711.5	19965	1	0	23.13	21.89
				1	7	23.17	21.96
				1	14	23.09	21.93
				8	0	21.95	21.04
				8	3	21.94	21.04
				8	7	22.07	20.98
				15	0	22.01	21.15
		1732.5	20175	1	0	23.00	21.90
				1	7	23.04	21.69
				1	14	22.98	21.94
				8	0	21.97	20.66
				8	3	21.96	20.78
				8	7	21.98	20.97
				15	0	21.93	21.00
		1753.5	20385	1	0	22.86	21.58
				1	7	23.00	21.53
				1	14	22.92	21.59
				8	0	21.74	20.92
				8	3	21.95	20.95
				8	7	21.90	20.89
				15	0	21.91	20.87

LTE Conducted Average Output Powers (3 MHz Band 4 LTE)

Band	Band Width (MHz)	Frequency (MHz)	Channel	Resource Block Size	Resource Block Offset	Average Power [dBm]	
						QPSK	16-QAM
Band 4	5	1712.5	19975	1	0	22.94	21.80
				1	12	23.27	21.82
				1	24	22.98	21.81
				12	0	21.98	21.02
				12	6	22.09	21.16
				12	11	22.04	21.10
				25	0	21.99	21.13
		1732.5	20175	1	0	23.05	21.78
				1	12	23.10	21.86
				1	24	22.98	21.85
				12	0	22.01	20.87
				12	6	21.95	20.93
				12	11	22.00	20.87
				25	0	22.00	21.05
		1752.5	20375	1	0	22.83	21.63
				1	12	23.34	21.82
				1	24	23.12	21.92
				12	0	21.94	21.00
				12	6	21.94	21.00
				12	11	21.91	20.98
				25	0	21.90	21.00

LTE Conducted Average Output Powers (5 MHz Band 4 LTE)

Band	Band Width (MHz)	Frequency (MHz)	Channel	Resource Block Size	Resource Block Offset	Average Power [dBm]	
						QPSK	16-QAM
Band 4	10	1715.0	20000	1	0	23.33	21.95
				1	24	23.30	21.94
				1	49	23.12	21.78
				25(12)	0(0)	22.19	22.14
				25(12)	12(19)	22.23	22.06
				25(12)	24(38)	22.09	21.95
				50	0	22.16	-
		1732.5	20175	1	0	23.19	21.83
				1	24	23.49	21.84
				1	49	23.14	21.82
				25(12)	0(0)	22.12	22.02
				25(12)	12(19)	22.15	21.94
				25(12)	24(38)	22.11	21.93
				50	0	22.11	-
		1750.0	20350	1	0	23.31	22.09
				1	24	23.25	21.75
				1	49	23.27	21.80
				25(12)	0(0)	22.11	21.99
				25(12)	12(19)	21.93	21.90
				25(12)	24(38)	22.12	22.05
				50	0	22.10	-

LTE Conducted Average Output Powers (10 MHz Band 4 LTE)

Note:

- ( ) : 16QAM RB Size/ Offset

Band	Band Width (MHz)	Frequency (MHz)	Channel	Resource Block Size	Resource Block Offset	Average Power [dBm]	
						QPSK	16-QAM
Band 4	15	1717.5	20025	1	0	23.26	21.77
				1	36	23.28	21.54
				1	74	23.28	21.57
				36(16)	0(0)	22.26	21.96
				36(16)	18(29)	22.23	21.91
				36(16)	39(59)	22.09	21.60
				75	0	22.13	-
		1732.5	20175	1	0	23.37	21.54
				1	36	23.48	21.74
				1	74	23.19	21.63
				36(16)	0(0)	22.20	21.62
				36(16)	18(29)	22.15	22.00
				36(16)	39(59)	22.18	21.67
				75	0	22.17	-
		1747.5	20325	1	0	23.47	21.76
				1	36	23.39	21.67
				1	74	23.32	21.57
				36(16)	0(0)	22.27	21.69
				36(16)	18(29)	22.01	21.96
				36(16)	39(59)	22.05	21.79
				75	0	22.11	-

LTE Conducted Average Output Powers (15 MHz Band 4 LTE)

Note:

- ( ) : 16QAM RB Size/ Offset

Band	Band Width (MHz)	Frequency (MHz)	Channel	Resource Block Size	Resource Block Offset	Average Power [dBm]	
						QPSK	16-QAM
Band 4	20	1720.0	20050	1	0	22.81	21.71
				1	49	23.42	21.64
				1	99	23.25	21.61
				50(18)	0(0)	22.26	21.75
				50(18)	25(41)	22.27	21.85
				50(18)	49(82)	22.24	21.56
				100	0	22.25	-
		1732.5	20175	1	0	23.28	21.87
				1	49	23.43	21.74
				1	99	23.23	21.61
				50(18)	0(0)	22.24	21.72
				50(18)	25(41)	22.21	21.88
				50(18)	49(82)	22.17	21.56
				100	0	22.19	-
		1745.0	20300	1	0	23.44	21.89
				1	49	23.49	21.91
				1	99	23.28	21.79
				50(18)	0(0)	22.33	22.00
				50(18)	25(41)	22.06	21.98
				50(18)	49(82)	22.12	21.54
				100	0	22.23	-

LTE Conducted Average Output Powers (20 MHz Band 4 LTE)

Note:

- ( ) : 16QAM RB Size/ Offset

Note : Detecting mode is average.

8.2 EQUIVALENT ISOTROPIC RADIATED POWER

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1710.7	LTE B4/ 1.4 MHz	QPSK	-16.16	16.42	9.37	1.92	H	< 1.00	0.244	23.87
		16-QAM	-17.46	15.12	9.37	1.92	H		0.181	22.57
1732.5		QPSK	-16.65	15.97	9.45	1.93	H		0.223	23.49
		16-QAM	-17.92	14.70	9.45	1.93	H		0.167	22.22
1754.3		QPSK	-17.65	14.96	9.52	1.94	H		0.179	22.54
		16-QAM	-18.25	14.36	9.52	1.94	H		0.156	21.94

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1711.5	LTE B4/ 3 MHz	QPSK	-16.47	16.11	9.37	1.92	H	< 1.00	0.227	23.56
		16-QAM	-17.74	14.84	9.37	1.92	H		0.169	22.29
1732.5		QPSK	-16.63	15.99	9.45	1.93	H		0.224	23.51
		16-QAM	-17.85	14.77	9.45	1.93	H		0.169	22.29
1753.5		QPSK	-16.89	15.71	9.52	1.94	H		0.213	23.29
		16-QAM	-18.21	14.39	9.52	1.94	H		0.157	21.97

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1712.5	LTE B4/ 5 MHz	QPSK	-16.55	16.03	9.37	1.92	H	< 1.00	0.223	23.48
		16-QAM	-17.55	15.03	9.37	1.92	H		0.177	22.48
1732.5		QPSK	-16.64	15.98	9.45	1.93	H		0.224	23.50
		16-QAM	-17.91	14.71	9.45	1.93	H		0.167	22.23
1752.5		QPSK	-17.00	15.60	9.52	1.94	H		0.208	23.18
		16-QAM	-18.17	14.43	9.52	1.94	H		0.159	22.01

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1715.0	LTE B4/ 10 MHz	QPSK	-16.35	16.23	9.39	1.92	H	< 1.00	0.234	23.70
		16-QAM	-17.47	15.11	9.39	1.92	H		0.181	22.58
1732.5		QPSK	-16.73	15.89	9.45	1.93	H		0.219	23.41
		16-QAM	-17.64	14.98	9.45	1.93	H		0.178	22.50
1750.0		QPSK	-16.78	15.82	9.51	1.94	H		0.218	23.39
		16-QAM	-17.76	14.84	9.51	1.94	H		0.174	22.41

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1717.5	LTE B4/ 15 MHz	QPSK	-16.23	16.36	9.39	1.92	H	< 1.00	0.242	23.83
		16-QAM	-17.33	15.26	9.39	1.92	H		0.187	22.73
1732.5		QPSK	-16.62	16.00	9.45	1.93	H		0.225	23.52
		16-QAM	-17.63	14.99	9.45	1.93	H		0.178	22.51
1747.5		QPSK	-16.80	15.81	9.50	1.94	H		0.217	23.37
		16-QAM	-17.69	14.92	9.50	1.94	H		0.177	22.48

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain(dBi)	C.L	Pol	Limit	EIRP	
								W	W	dBm
1720.0	LTE B4/ 20 MHz	QPSK	-16.39	16.19	9.40	1.92	H	< 1.00	0.233	23.67
		16-QAM	-17.38	15.20	9.40	1.92	H		0.185	22.68
1732.5		QPSK	-16.83	15.79	9.45	1.93	H		0.214	23.31
		16-QAM	-17.68	14.94	9.45	1.93	H		0.176	22.46
1745.0		QPSK	-17.36	15.26	9.49	1.94	H		0.191	22.81
		16-QAM	-18.16	14.46	9.49	1.94	H		0.159	22.01

8.3 RADIATED SPURIOUS EMISSIONS

▣ OPERATING FREQUENTY: 1710.70 MHz

▣ MEASURED OUTPUT POWER: 23.87 dBm = 0.244 W

▣ MODE: LTE B4

▣ MODULATION SIGNAL: 1.4 MHz QPSK

▣ DISTANCE: 3 meters

▣ LIMIT: 43 + 10 $\log_{10}$ (W) = 36.87 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
19957 (1710.7)	3,421.40	-37.88	12.19	-44.86	2.78	V	-35.45	59.32
	5,132.10	-45.47	12.76	-46.14	3.44	V	-36.82	60.69
	6,842.80	-50.92	12.06	-46.97	3.99	H	-38.90	62.77
20175 (1732.5)	3,465.00	-38.29	12.28	-44.93	2.76	H	-35.41	59.28
	5,197.50	-45.86	12.86	-46.76	3.47	V	-37.37	61.24
	6,930.00	-50.01	11.87	-45.31	4.06	V	-37.50	61.37
20393 (1754.3)	3,508.60	-43.01	12.36	-49.22	2.82	V	-39.68	63.55
	5,262.90	-46.47	12.95	-48.15	3.49	V	-38.69	62.56
	7,017.20	-50.86	11.73	-47.61	3.98	V	-39.86	63.73

▣ OPERATING FREQUENTY: 1711.50 MHz

▣ MEASURED OUTPUT POWER: 23.56 dBm = 0.227 W

▣ MODE: LTE B4

▣ MODULATION SIGNAL: 3 MHz QPSK

▣ DISTANCE: 3 meters

▣ LIMIT: 43 + 10 log_{10} (W) = 36.56 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
19965 (1711.5)	3,423.00	-39.65	12.20	-46.66	2.78	V	-37.24	60.80
	5,134.50	-46.59	12.76	-47.28	3.44	V	-37.96	61.52
	6,846.00	-54.33	12.05	-50.32	3.99	V	-42.26	65.82
20175 (1732.5)	3,465.00	-39.22	12.28	-45.86	2.76	V	-36.34	59.90
	5,197.50	-44.77	12.86	-45.67	3.47	V	-36.28	59.84
	6,930.00	-53.02	11.87	-48.32	4.06	V	-40.51	64.07
20385 (1753.5)	3,507.00	-43.04	12.36	-49.28	2.82	V	-39.74	63.30
	5,260.50	-47.10	12.95	-48.83	3.49	V	-39.37	62.93
	7,014.00	-54.11	11.73	-51.09	3.98	V	-43.34	66.90

▣ OPERATING FREQUENTY: 1732.50 MHz

▣ MEASURED OUTPUT POWER: 23.50 dBm = 0.224 W

▣ MODE: LTE B4

▣ MODULATION SIGNAL: 5 MHz QPSK

▣ DISTANCE: 3 meters

▣ LIMIT: 43 + 10 log_{10} (W) = 36.50 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
19975 (1712.5)	3,425.00	-40.70	12.20	-47.75	2.78	V	-38.33	61.83
	5,137.50	-46.45	12.77	-47.18	3.44	V	-37.85	61.35
	6,850.00	-54.02	12.04	-49.91	4.00	V	-41.87	65.37
20175 (1732.5)	3,465.00	-40.46	12.28	-47.10	2.76	V	-37.58	61.08
	5,197.50	-45.64	12.86	-46.54	3.47	V	-37.15	60.65
	6,930.00	-52.79	11.87	-48.09	4.06	V	-40.28	63.78
20375 (1752.5)	3,505.00	-42.23	12.36	-48.51	2.82	V	-38.97	62.47
	5,257.50	-49.17	12.94	-50.89	3.48	V	-41.43	64.93
	7,010.00	-51.23	11.73	-48.50	3.98	V	-40.75	64.25

▣ OPERATING FREQUENTY: 1715.00 MHz

▣ MEASURED OUTPUT POWER: 23.70 dBm = 0.234 W

▣ MODE: LTE B4

▣ MODULATION SIGNAL: 10 MHz QPSK

▣ DISTANCE: 3 meters

▣ LIMIT: 43 + 10 log_{10} (W) = 36.70 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
20000 (1715.0)	3,430.00	-40.95	12.21	-48.10	2.78	V	-38.67	62.37
	5,145.00	-45.80	12.77	-46.36	3.44	V	-37.03	60.73
	6,860.00	-52.29	12.01	-48.05	4.02	V	-40.06	63.76
20175 (1732.5)	3,465.00	-40.52	12.28	-47.16	2.76	V	-37.64	61.34
	5,197.50	-45.97	12.86	-46.87	3.47	V	-37.48	61.18
	6,930.00	-55.57	11.87	-50.87	4.06	V	-43.06	66.76
20350 (1750.0)	3,500.00	-38.74	12.35	-45.11	2.82	V	-35.58	59.28
	5,250.00	-48.01	12.93	-49.68	3.48	V	-40.23	63.93
	7,000.00	-53.68	11.73	-51.15	4.07	V	-43.49	67.19

▣ OPERATING FREQUENTY: 1717.50 MHz

▣ MEASURED OUTPUT POWER: 23.83 dBm = 0.242 W

▣ MODE: LTE B4

▣ MODULATION SIGNAL: 15 MHz QPSK

▣ DISTANCE: 3 meters

▣ LIMIT: 43 + 10 $\log_{10}$ (W) = 36.83 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
20025 (1717.5)	3,435.00	-41.81	12.21	-48.83	2.78	V	-39.40	63.23
	5,152.50	-45.25	12.79	-45.76	3.45	V	-36.42	60.25
	6,870.00	-53.55	11.99	-49.58	4.03	V	-41.62	65.45
20175 (1732.5)	3,465.00	-40.65	12.28	-47.29	2.76	V	-37.77	61.60
	5,197.50	-44.28	12.86	-45.18	3.47	V	-35.79	59.62
	6,930.00	-55.28	11.87	-50.58	4.06	V	-42.77	66.60
20325 (1747.5)	3,495.00	-37.81	12.34	-44.17	2.81	V	-34.64	58.47
	5,242.50	-46.98	12.92	-48.46	3.48	V	-39.02	62.85
	6,990.00	-53.18	11.75	-47.94	4.05	V	-40.24	64.07

▣ OPERATING FREQUENTY: 1720.00 MHz

▣ MEASURED OUTPUT POWER: 23.67 dBm = 0.233 W

▣ MODE: LTE B4

▣ MODULATION SIGNAL: 20 MHz QPSK

▣ DISTANCE: 3 meters

▣ LIMIT: 43 + 10 log_{10} (W) = 36.67 dBc

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc
20050 (1720.0)	3,440.00	-41.15	12.23	-48.07	2.77	V	-38.61	62.28
	5,160.00	-45.78	12.80	-46.61	3.46	V	-37.27	60.94
	6,880.00	-52.47	11.97	-48.46	4.04	V	-40.53	64.20
20175 (1732.5)	3,465.00	-40.58	12.28	-47.22	2.76	V	-37.70	61.37
	5,197.50	-44.00	12.86	-44.90	3.47	V	-35.51	59.18
	6,930.00	-55.17	11.87	-50.47	4.06	V	-42.66	66.33
20300 (1745.0)	3,490.00	-38.05	12.33	-44.39	2.81	V	-34.87	58.54
	5,235.00	-46.46	12.91	-47.87	3.47	V	-38.43	62.10
	6,980.00	-52.04	11.77	-46.77	4.04	V	-39.04	62.71

8.4 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
4	1.4 MHz	1732.5	QPSK	6	0	4.79
			16-QAM	6		5.61
	3 MHz		QPSK	15		4.83
			16-QAM	15		5.56
	5 MHz		QPSK	25		4.74
			16-QAM	25		5.45
	10 MHz		QPSK	50		4.80
			16-QAM	12		5.14
	15 MHz		QPSK	75		4.82
			16-QAM	16		5.14
	20 MHz		QPSK	100		4.69
			16-QAM	18		5.06

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 72 ~ 83.

8.5 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
4	1.4 MHz	1732.5	QPSK	6	0	1.0977
			16-QAM	6		1.0959
	3 MHz		QPSK	15		2.7166
			16-QAM	15		2.7078
	5 MHz		QPSK	25		4.5223
			16-QAM	25		4.5093
	10 MHz		QPSK	50		8.9648
			16-QAM	12		2.4848
	15 MHz		QPSK	75		13.415
			16-QAM	16		3.4663
	20 MHz		QPSK	100		17.9060
			16-QAM	18		3.9899

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 60 ~ 71.

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)
4	1.4	1710.7	3.4213	27.976	-65.307	-37.331	-13.00
		1732.5	3.4647	27.976	-67.857	-39.881	
		1754.3	3.5100	27.976	-70.192	-42.216	
	3	1711.5	3.4213	27.976	-66.572	-38.596	
		1732.5	3.4632	27.976	-68.390	-40.414	
		1753.5	3.5100	27.976	-70.953	-42.977	
	5	1712.5	3.4213	27.976	-66.786	-38.810	
		1732.5	3.4612	27.976	-69.085	-41.109	
		1752.5	3.5100	27.976	-70.317	-42.341	
	10	1715.0	3.4218	27.976	-67.036	-39.060	
		1732.5	3.4567	27.976	-69.312	-41.336	
		1750.0	3.5095	27.976	-71.250	-43.274	
	15	1717.5	3.4223	27.976	-65.214	-37.238	
		1732.5	3.4522	27.976	-67.620	-39.644	
		1747.5	3.5090	27.976	-70.328	-42.352	
	20	1720.0	3.4228	27.976	-66.117	-38.141	
		1732.5	3.4477	27.976	-68.433	-40.457	
		1745.0	3.5085	27.976	-70.068	-42.092	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 120 ~ 155.
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	30.131

8.7 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 84 ~ 119.

8.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

▣ MODE: LTE 4

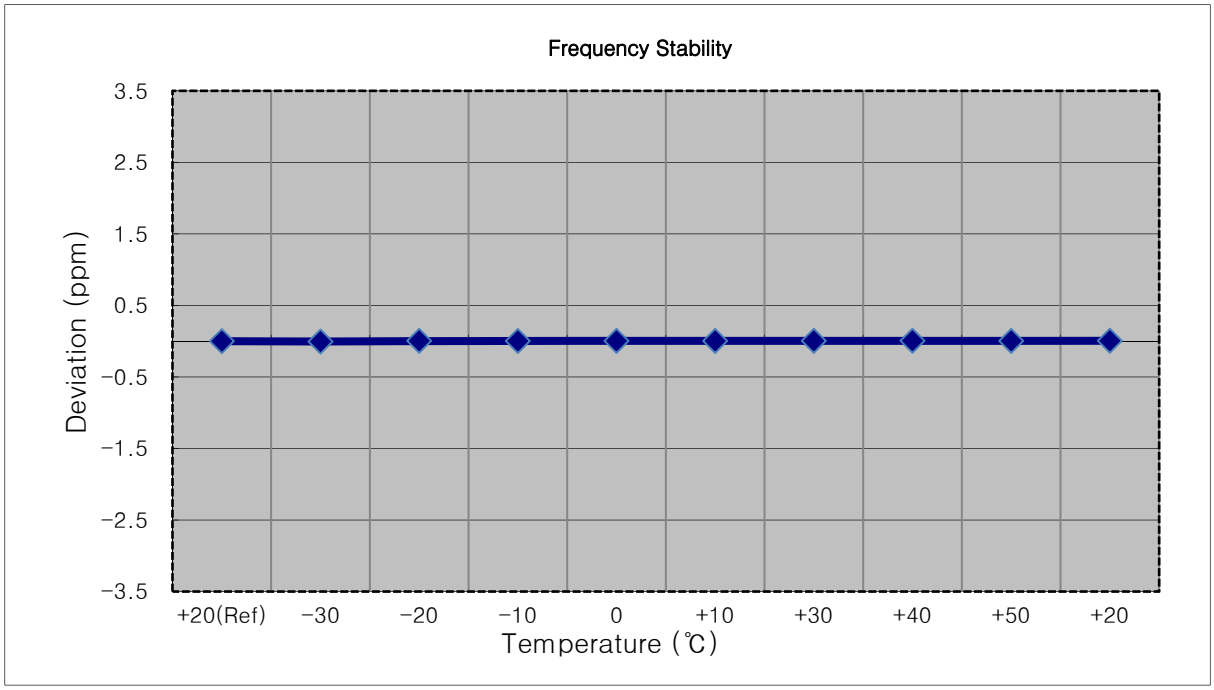
▣ OPERATING FREQUENCY: 1710,700,000 Hz

▣ CHANNEL: 19957 (1.4 MHz)

▣ REFERENCE VOLTAGE: 3.80 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.80	+20(Ref)	1710 700 006	0.0	0.000 000	0.000
100%		-30	1710 699 999	-7.8	0.000 000	-0.005
100%		-20	1710 700 015	8.2	0.000 000	0.005
100%		-10	1710 700 011	4.2	0.000 000	0.002
100%		0	1710 700 013	6.5	0.000 000	0.004
100%		+10	1710 700 014	7.2	0.000 000	0.004
100%		+30	1710 700 015	8.7	0.000 001	0.005
100%		+40	1710 700 016	10.1	0.000 001	0.006
100%		+50	1710 700 014	7.2	0.000 000	0.004
Batt. Endpoint	3.40	+20	1710 700 017	10.3	0.000 001	0.006



▣ MODE: LTE 4

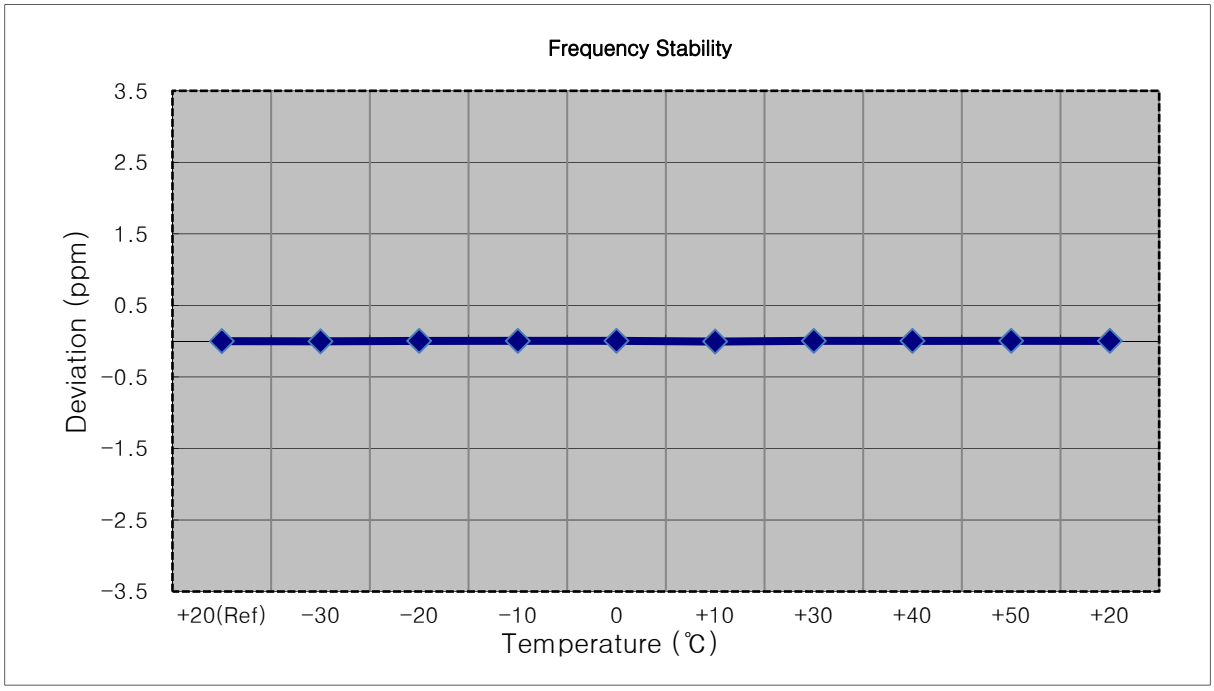
▣ OPERATING FREQUENCY: 1711,500,000 Hz

▣ CHANNEL: 19965 (3 MHz)

▣ REFERENCE VOLTAGE: 3.80 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.80	+20(Ref)	1711 500 010	0.0	0.000 000	0.000
100%		-30	1711 500 005	-4.7	0.000 000	-0.003
100%		-20	1711 500 016	6.3	0.000 000	0.004
100%		-10	1711 500 016	6.8	0.000 000	0.004
100%		0	1711 500 018	8.4	0.000 000	0.005
100%		+10	1711 500 001	-8.8	-0.000 001	-0.005
100%		+30	1711 500 017	7.6	0.000 000	0.004
100%		+40	1711 500 016	6.3	0.000 000	0.004
100%		+50	1711 500 018	8.3	0.000 000	0.005
Batt. Endpoint	3.40	+20	1711 500 016	6.3	0.000 000	0.004



▣ MODE: LTE 4

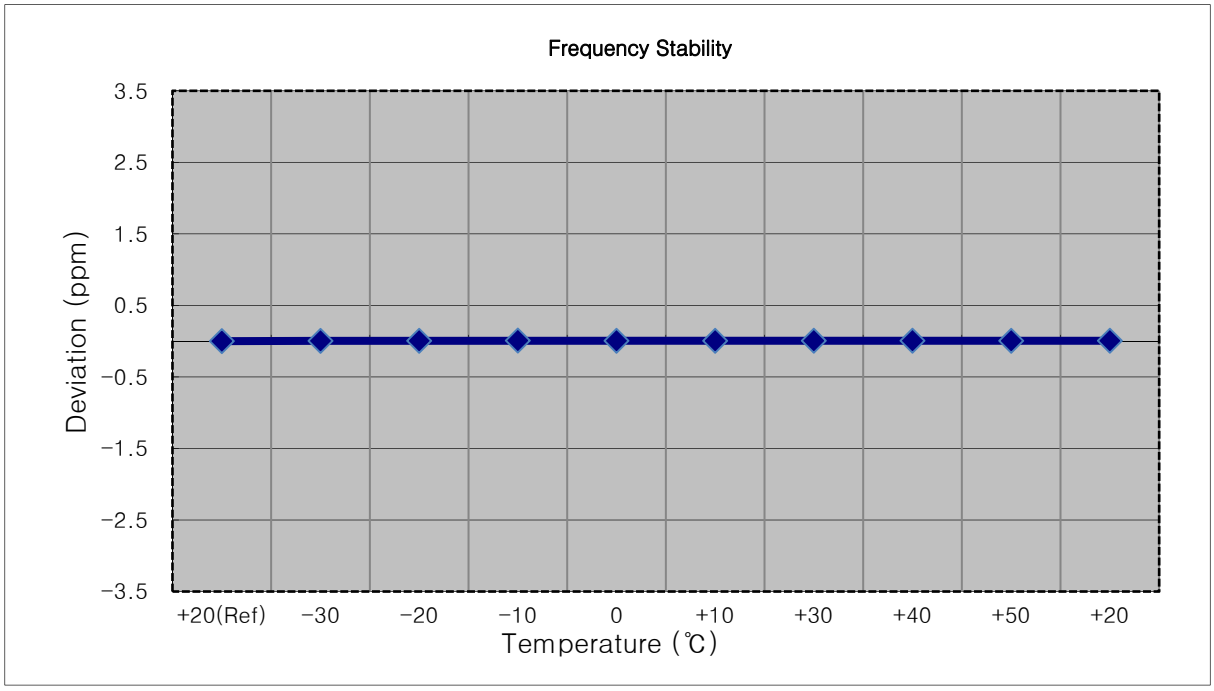
▣ OPERATING FREQUENCY: 1712,500,000 Hz

▣ CHANNEL: 19975 (5 MHz)

▣ REFERENCE VOLTAGE: 3.80 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.80	+20(Ref)	1712 500 010	0.0	0.000 000	0.000
100%		-30	1712 500 017	7.4	0.000 000	0.004
100%		-20	1712 500 018	8.9	0.000 001	0.005
100%		-10	1712 500 024	14.0	0.000 001	0.008
100%		0	1712 500 018	8.1	0.000 000	0.005
100%		+10	1712 500 018	8.1	0.000 000	0.005
100%		+30	1712 500 019	9.7	0.000 001	0.006
100%		+40	1712 500 019	9.6	0.000 001	0.006
100%		+50	1712 500 019	9.0	0.000 001	0.005
Batt. Endpoint	3.40	+20	1712 500 019	9.6	0.000 001	0.006



▣ MODE: LTE 4

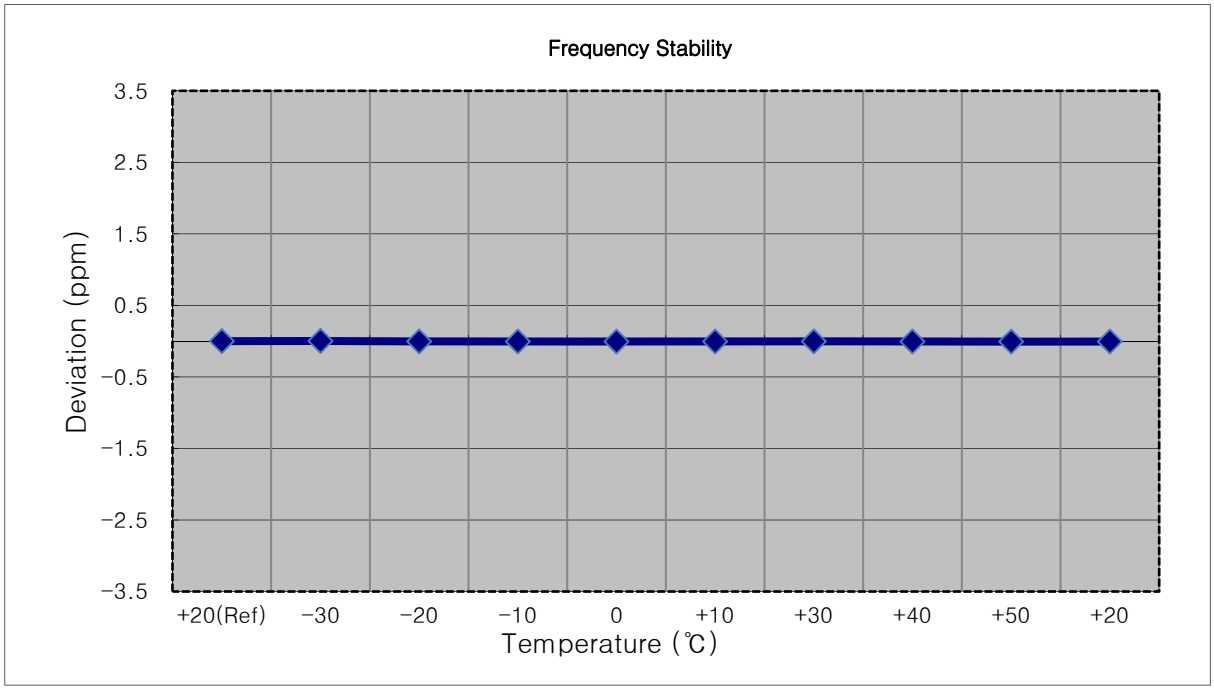
▣ OPERATING FREQUENCY: 1715,000,000 Hz

▣ CHANNEL: 20000 (10 MHz)

▣ REFERENCE VOLTAGE: 3.80 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.80	+20(Ref)	1714 999 991	0.0	0.000 000	0.000
100%		-30	1714 999 996	4.6	0.000 000	0.003
100%		-20	1714 999 985	-6.3	0.000 000	-0.004
100%		-10	1714 999 984	-7.8	0.000 000	-0.005
100%		0	1714 999 983	-8.3	0.000 000	-0.005
100%		+10	1714 999 983	-8.1	0.000 000	-0.005
100%		+30	1714 999 987	-4.3	0.000 000	-0.003
100%		+40	1714 999 983	-8.1	0.000 000	-0.005
100%		+50	1714 999 981	-10.8	-0.000 001	-0.006
Batt. Endpoint	3.40	+20	1714 999 983	-8.8	-0.000 001	-0.005



▣ MODE: LTE 4

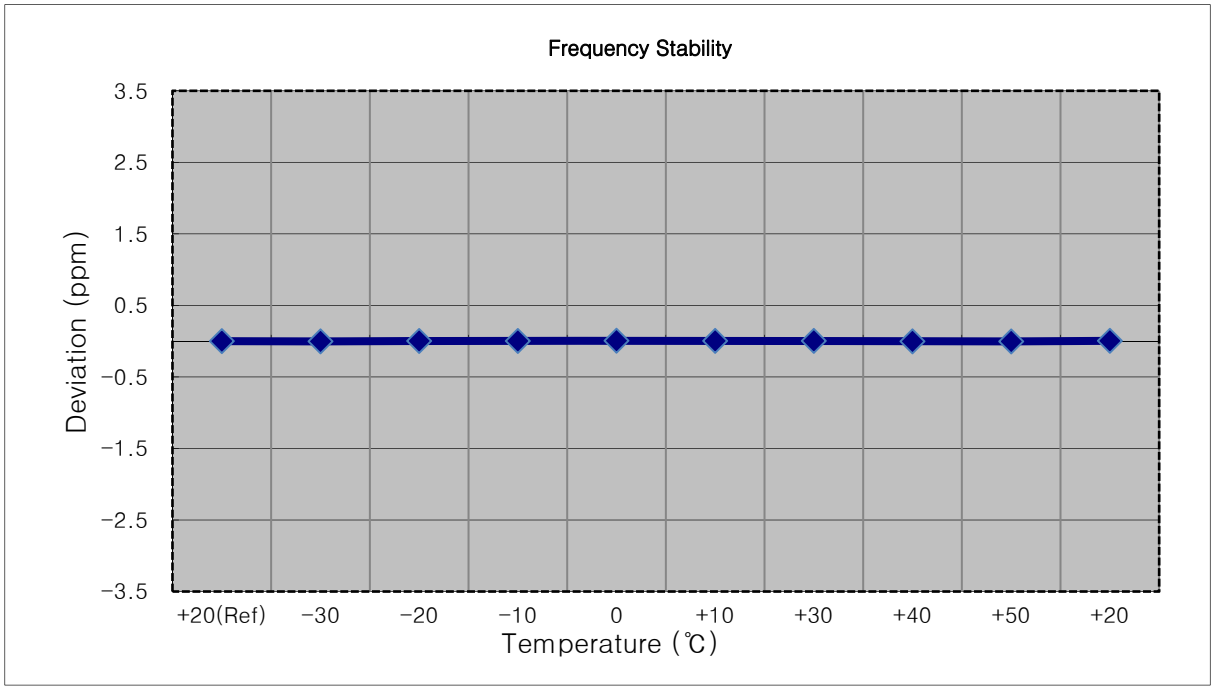
▣ OPERATING FREQUENCY: 1717,500,000 Hz

▣ CHANNEL: 20025 (15 MHz)

▣ REFERENCE VOLTAGE: 3.80 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.80	+20(Ref)	1717 500 008	0.0	0.000 000	0.000
100%		-30	1717 500 003	-5.1	0.000 000	-0.003
100%		-20	1717 500 012	4.6	0.000 000	0.003
100%		-10	1717 500 012	4.6	0.000 000	0.003
100%		0	1717 500 018	10.4	0.000 001	0.006
100%		+10	1717 500 015	7.2	0.000 000	0.004
100%		+30	1717 500 014	6.4	0.000 000	0.004
100%		+40	1717 500 003	-5.2	0.000 000	-0.003
100%		+50	1717 500 001	-6.5	0.000 000	-0.004
Batt. Endpoint	3.40	+20	1717 500 016	8.0	0.000 000	0.005



▣ MODE: LTE 4

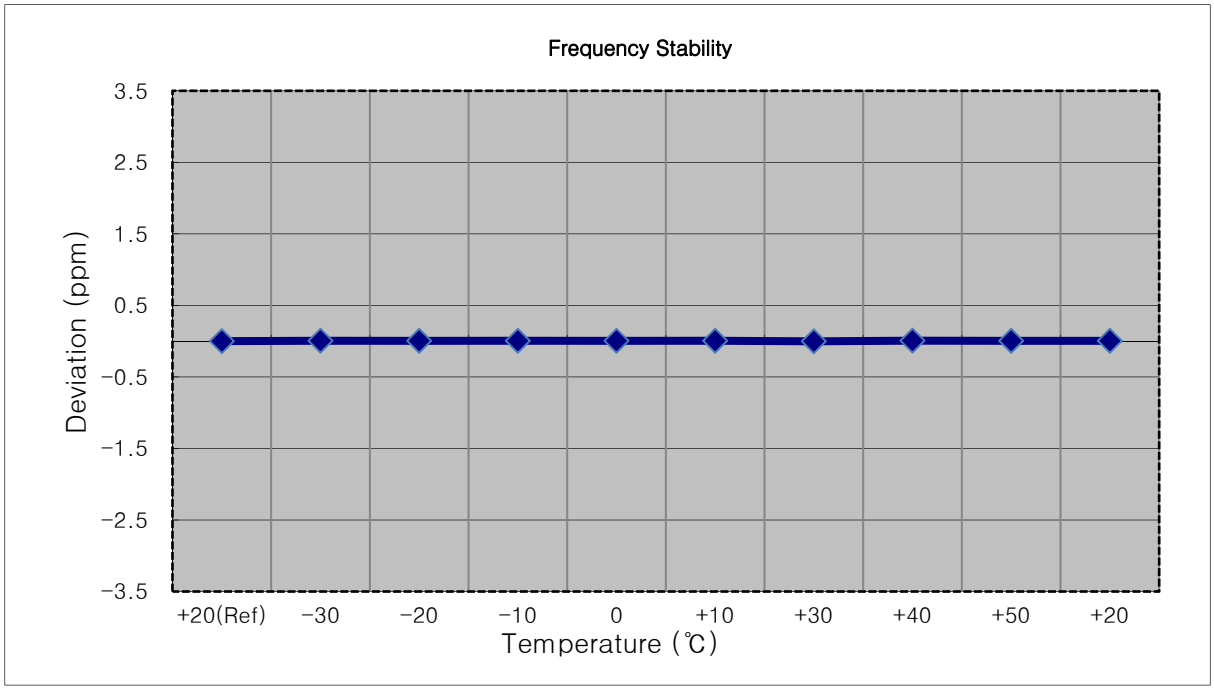
▣ OPERATING FREQUENCY: 1720,000,000 Hz

▣ CHANNEL: 20050 (20 MHz)

▣ REFERENCE VOLTAGE: 3.80 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.80	+20(Ref)	1720 000 008	0.0	0.000 000	0.000
100%		-30	1720 000 018	10.2	0.000 001	0.006
100%		-20	1720 000 016	7.8	0.000 000	0.005
100%		-10	1720 000 017	9.2	0.000 001	0.005
100%		0	1720 000 017	8.5	0.000 000	0.005
100%		+10	1720 000 018	10.0	0.000 001	0.006
100%		+30	1720 000 004	-3.8	0.000 000	-0.002
100%		+40	1720 000 021	12.3	0.000 001	0.007
100%		+50	1720 000 016	8.2	0.000 000	0.005
Batt. Endpoint	3.40	+20	1720 000 016	7.9	0.000 000	0.005



▣ MODE: LTE 4

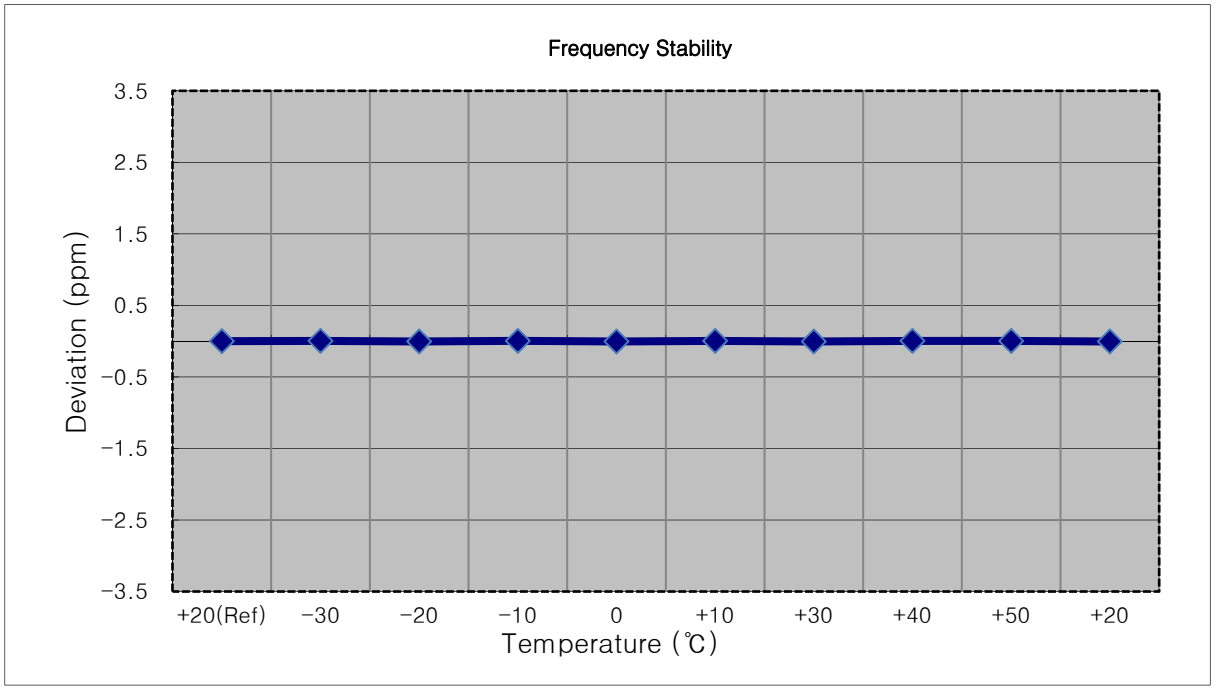
▣ OPERATING FREQUENCY: 1732,500,000 Hz

▣ CHANNEL: 20175 (1.4 MHz)

▣ REFERENCE VOLTAGE: 3.80 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.80	+20(Ref)	1732 500 008	0.0	0.000 000	0.000
100%		-30	1732 500 014	6.2	0.000 000	0.004
100%		-20	1732 500 000	-7.8	0.000 000	-0.005
100%		-10	1732 500 014	6.8	0.000 000	0.004
100%		0	1732 500 000	-7.6	0.000 000	-0.004
100%		+10	1732 500 014	5.9	0.000 000	0.003
100%		+30	1732 499 999	-8.6	0.000 000	-0.005
100%		+40	1732 500 014	5.9	0.000 000	0.003
100%		+50	1732 500 012	4.8	0.000 000	0.003
Batt. Endpoint	3.40	+20	1732 500 000	-7.2	0.000 000	-0.004



▣ MODE: LTE 4

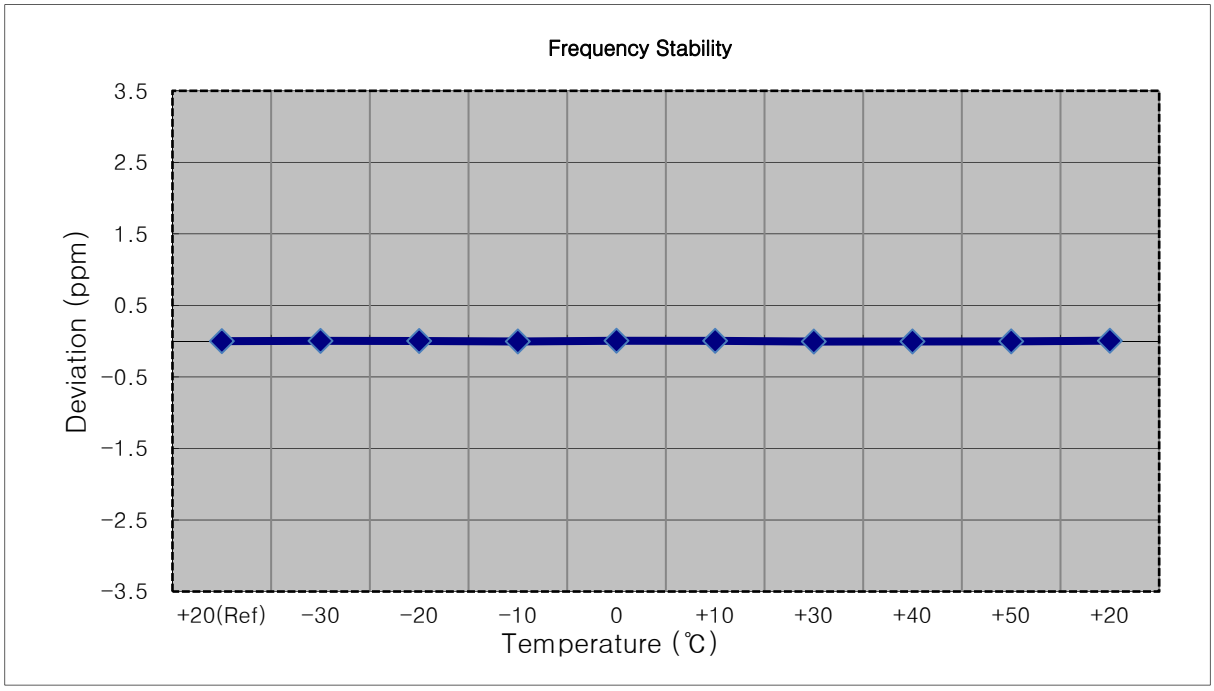
▣ OPERATING FREQUENCY: 1732,500,000 Hz

▣ CHANNEL: 20175 (3 MHz)

▣ REFERENCE VOLTAGE: 3.80 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.80	+20(Ref)	1732 500 006	0.0	0.000 000	0.000
100%		-30	1732 500 014	7.6	0.000 000	0.004
100%		-20	1732 500 011	4.3	0.000 000	0.002
100%		-10	1732 499 999	-7.0	0.000 000	-0.004
100%		0	1732 500 017	10.5	0.000 001	0.006
100%		+10	1732 500 014	7.9	0.000 000	0.005
100%		+30	1732 499 997	-9.0	-0.000 001	-0.005
100%		+40	1732 499 999	-7.4	0.000 000	-0.004
100%		+50	1732 500 001	-5.4	0.000 000	-0.003
Batt. Endpoint	3.40	+20	1732 500 017	11.0	0.000 001	0.006



▣ MODE: LTE 4

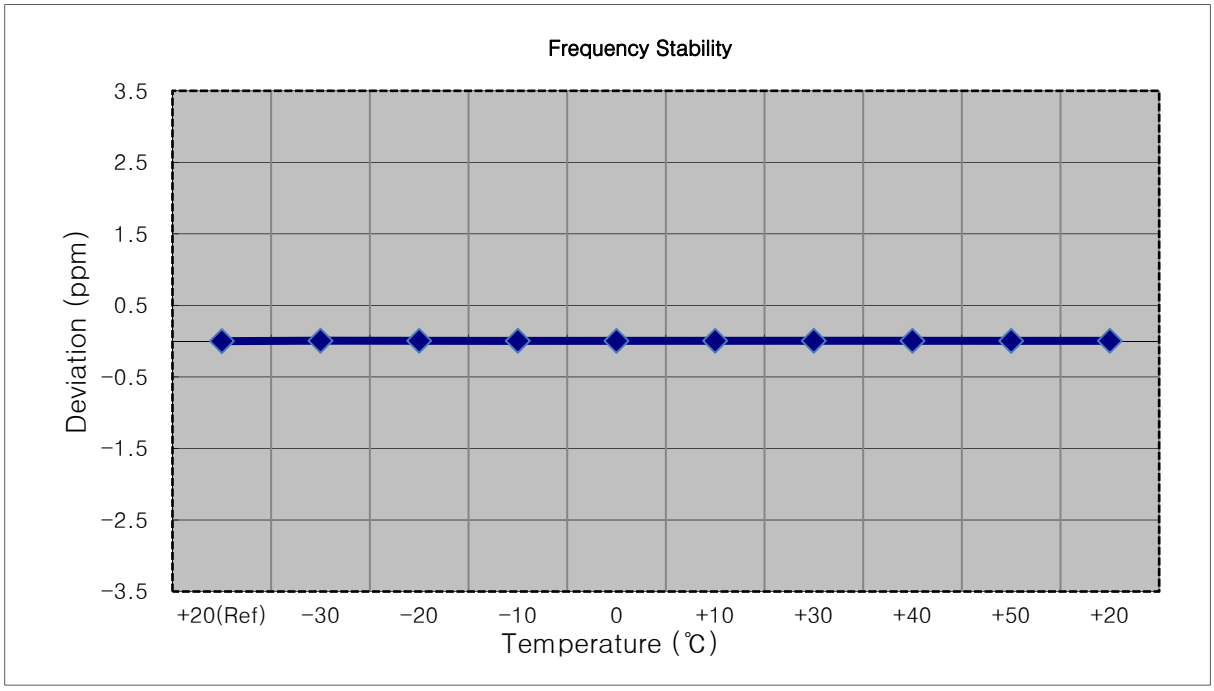
▣ OPERATING FREQUENCY: 1732,500,000 Hz

▣ CHANNEL: 20175 (5 MHz)

▣ REFERENCE VOLTAGE: 3.80 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.80	+20(Ref)	1732 500 007	0.0	0.000 000	0.000
100%		-30	1732 500 018	10.8	0.000 001	0.006
100%		-20	1732 500 015	8.3	0.000 000	0.005
100%		-10	1732 500 016	9.4	0.000 001	0.005
100%		0	1732 500 013	6.6	0.000 000	0.004
100%		+10	1732 500 015	8.3	0.000 000	0.005
100%		+30	1732 500 016	9.3	0.000 001	0.005
100%		+40	1732 500 016	9.0	0.000 001	0.005
100%		+50	1732 500 014	7.0	0.000 000	0.004
Batt. Endpoint	3.40	+20	1732 500 015	8.1	0.000 000	0.005



▣ MODE: LTE 4

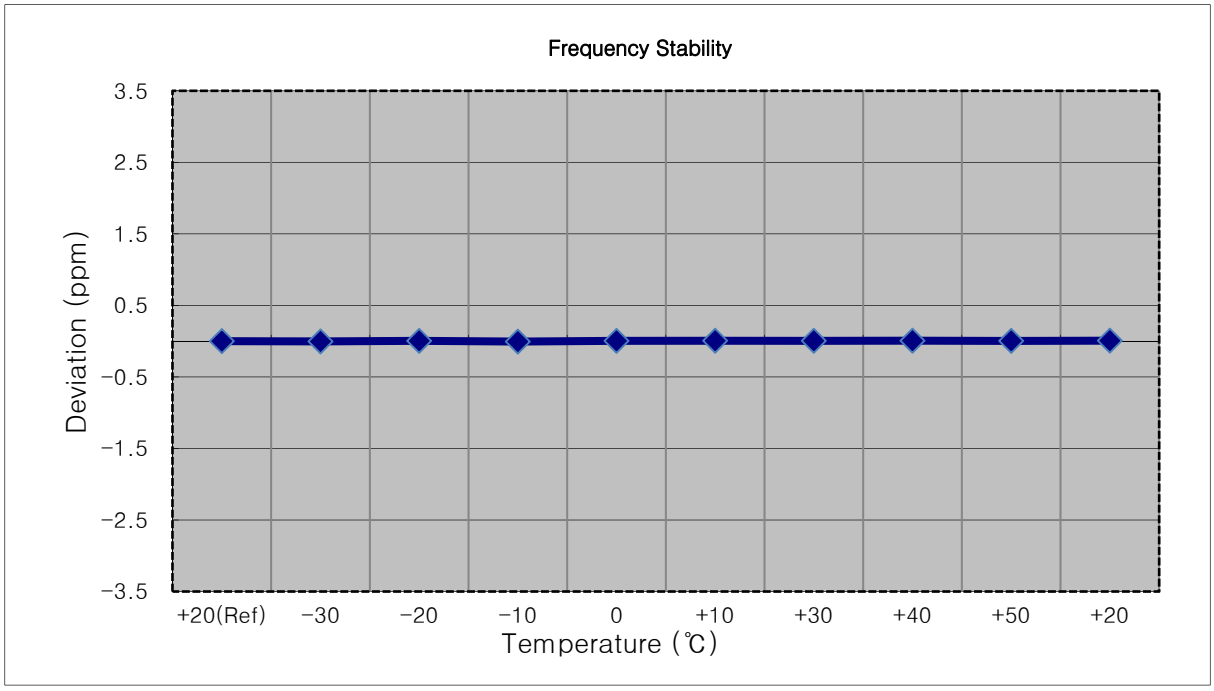
▣ OPERATING FREQUENCY: 1732,500,000 Hz

▣ CHANNEL: 20175 (10 MHz)

▣ REFERENCE VOLTAGE: 3.80 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.80	+20(Ref)	1732 500 010	0.0	0.000 000	0.000
100%		-30	1732 500 003	-6.8	0.000 000	-0.004
100%		-20	1732 500 017	7.2	0.000 000	0.004
100%		-10	1732 500 000	-9.9	-0.000 001	-0.006
100%		0	1732 500 018	7.5	0.000 000	0.004
100%		+10	1732 500 020	9.8	0.000 001	0.006
100%		+30	1732 500 019	8.5	0.000 000	0.005
100%		+40	1732 500 021	11.1	0.000 001	0.006
100%		+50	1732 500 017	6.7	0.000 000	0.004
Batt. Endpoint	3.40	+20	1732 500 022	12.0	0.000 001	0.007



▣ MODE: LTE 4

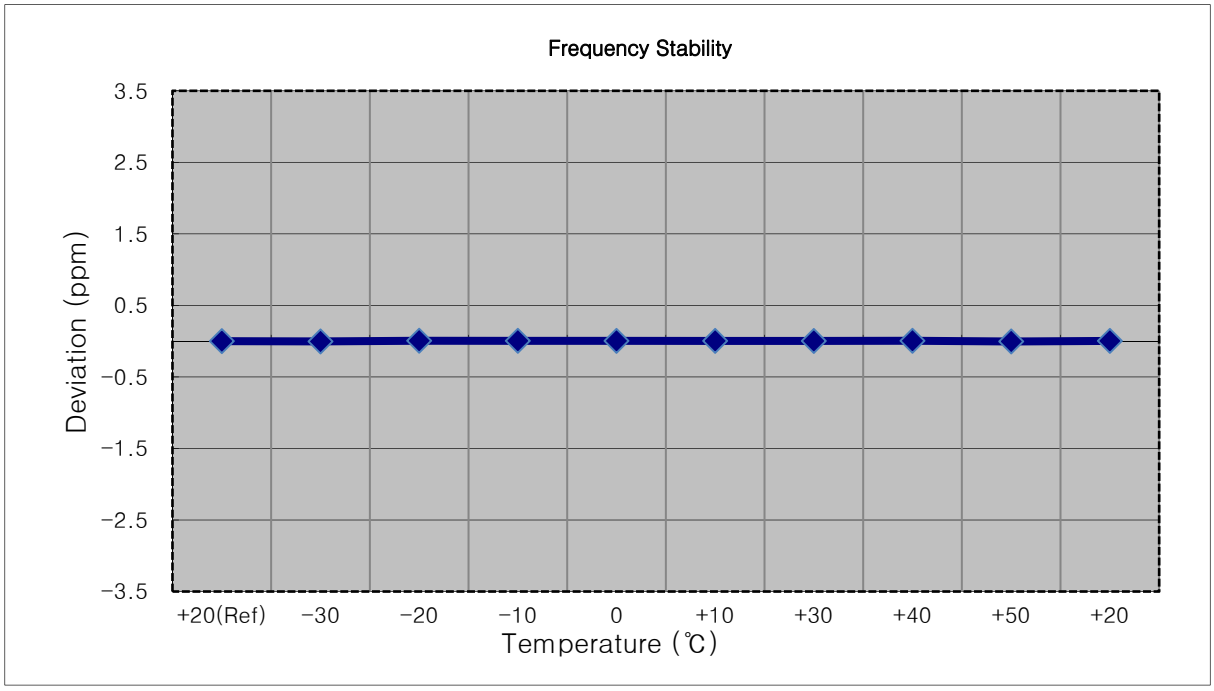
▣ OPERATING FREQUENCY: 1732,500,000 Hz

▣ CHANNEL: 20175 (15 MHz)

▣ REFERENCE VOLTAGE: 3.80 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.80	+20(Ref)	1732 500 010	0.0	0.000 000	0.000
100%		-30	1732 500 003	-6.4	0.000 000	-0.004
100%		-20	1732 500 020	10.3	0.000 001	0.006
100%		-10	1732 500 018	8.4	0.000 000	0.005
100%		0	1732 500 017	6.8	0.000 000	0.004
100%		+10	1732 500 016	5.8	0.000 000	0.003
100%		+30	1732 500 015	5.4	0.000 000	0.003
100%		+40	1732 500 019	8.9	0.000 001	0.005
100%		+50	1732 500 002	-7.4	0.000 000	-0.004
Batt. Endpoint	3.40	+20	1732 500 016	5.9	0.000 000	0.003



▣ MODE: LTE 4

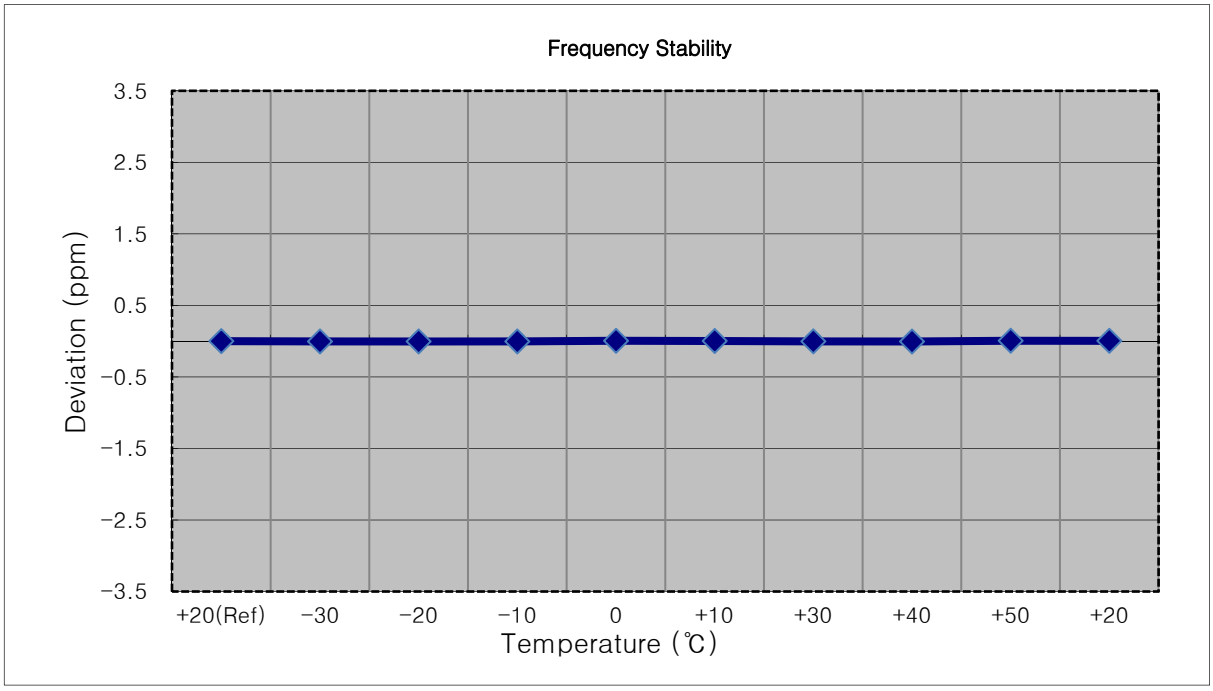
▣ OPERATING FREQUENCY: 1732,500,000 Hz

▣ CHANNEL: 20175 (20 MHz)

▣ REFERENCE VOLTAGE: 3.80 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.80	+20(Ref)	1732 499 992	0.0	0.000 000	0.000
100%		-30	1732 499 986	-6.4	0.000 000	-0.004
100%		-20	1732 499 985	-7.4	0.000 000	-0.004
100%		-10	1732 499 986	-6.2	0.000 000	-0.004
100%		0	1732 500 001	9.1	0.000 001	0.005
100%		+10	1732 499 997	4.6	0.000 000	0.003
100%		+30	1732 499 986	-5.7	0.000 000	-0.003
100%		+40	1732 499 984	-8.1	0.000 000	-0.005
100%		+50	1732 500 002	9.7	0.000 001	0.006
Batt. Endpoint	3.40	+20	1732 500 000	8.5	0.000 000	0.005



▣ MODE: LTE 4

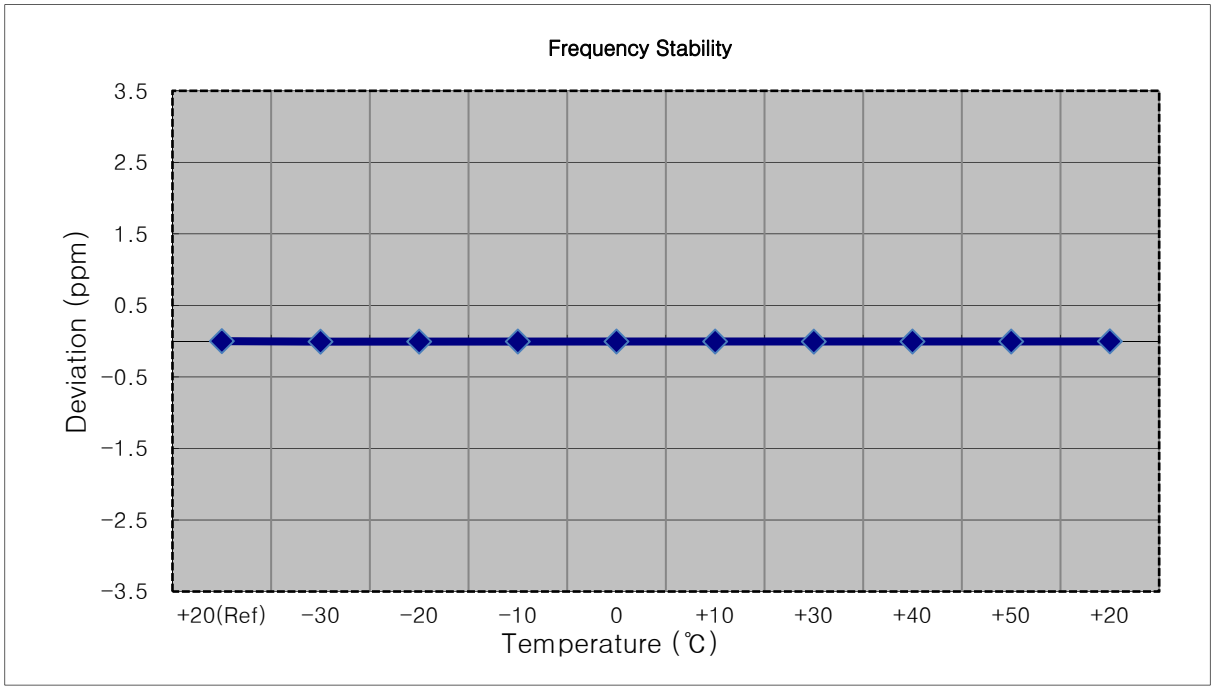
▣ OPERATING FREQUENCY: 1754,300,000 Hz

▣ CHANNEL: 20393 (1.4 MHz)

▣ REFERENCE VOLTAGE: 3.80 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.80	+20(Ref)	1754 299 988	0.0	0.000 000	0.000
100%		-30	1754 299 975	-12.8	-0.000 001	-0.007
100%		-20	1754 299 977	-10.4	-0.000 001	-0.006
100%		-10	1754 299 978	-9.5	-0.000 001	-0.005
100%		0	1754 299 979	-8.1	0.000 000	-0.005
100%		+10	1754 299 979	-8.6	0.000 000	-0.005
100%		+30	1754 299 978	-10.0	-0.000 001	-0.006
100%		+40	1754 299 979	-8.5	0.000 000	-0.005
100%		+50	1754 299 980	-8.0	0.000 000	-0.005
Batt. Endpoint	3.40	+20	1754 299 982	-5.4	0.000 000	-0.003



▣ MODE: LTE 4

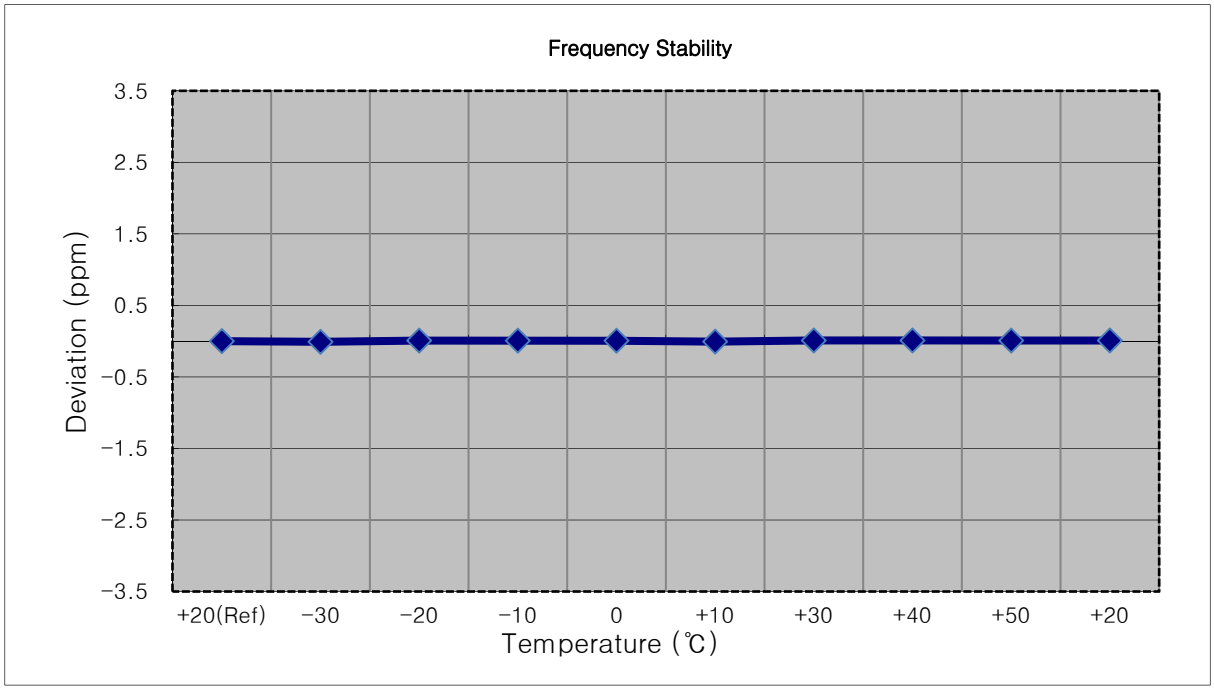
▣ OPERATING FREQUENCY: 1753,500,000 Hz

▣ CHANNEL: 20385 (3 MHz)

▣ REFERENCE VOLTAGE: 3.80 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.80	+20(Ref)	1753 500 012	0.0	0.000 000	0.000
100%		-30	1753 499 996	-16.0	-0.000 001	-0.009
100%		-20	1753 500 026	14.1	0.000 001	0.008
100%		-10	1753 500 025	12.4	0.000 001	0.007
100%		0	1753 500 023	10.3	0.000 001	0.006
100%		+10	1753 500 001	-11.6	-0.000 001	-0.007
100%		+30	1753 500 029	17.1	0.000 001	0.010
100%		+40	1753 500 029	16.9	0.000 001	0.010
100%		+50	1753 500 027	15.0	0.000 001	0.009
Batt. Endpoint	3.40	+20	1753 500 029	16.5	0.000 001	0.009



▣ MODE: LTE 4

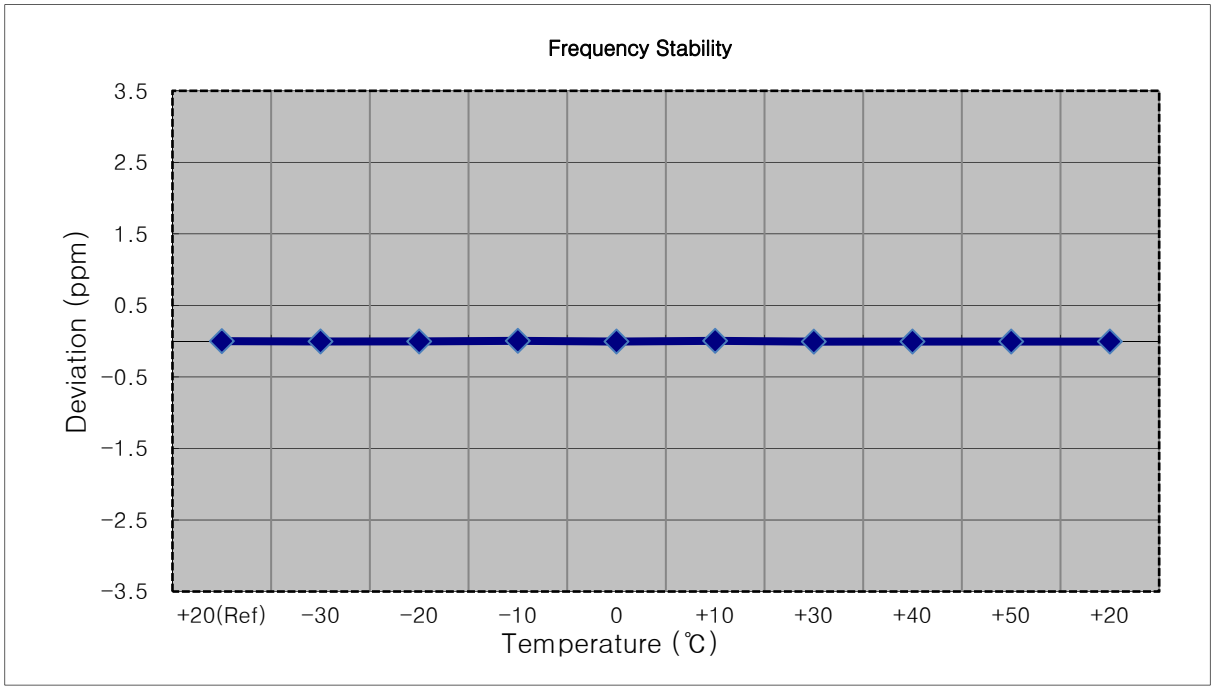
▣ OPERATING FREQUENCY: 1752,500,000 Hz

▣ CHANNEL: 20375 (5 MHz)

▣ REFERENCE VOLTAGE: 3.80 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.80	+20(Ref)	1752 499 992	0.0	0.000 000	0.000
100%		-30	1752 499 985	-7.1	0.000 000	-0.004
100%		-20	1752 499 986	-6.2	0.000 000	-0.004
100%		-10	1752 500 001	8.5	0.000 000	0.005
100%		0	1752 499 982	-9.8	-0.000 001	-0.006
100%		+10	1752 500 001	8.7	0.000 000	0.005
100%		+30	1752 499 981	-11.1	-0.000 001	-0.006
100%		+40	1752 499 983	-9.0	-0.000 001	-0.005
100%		+50	1752 499 983	-9.3	-0.000 001	-0.005
Batt. Endpoint	3.40	+20	1752 499 982	-9.7	-0.000 001	-0.006



▣ MODE: LTE 4

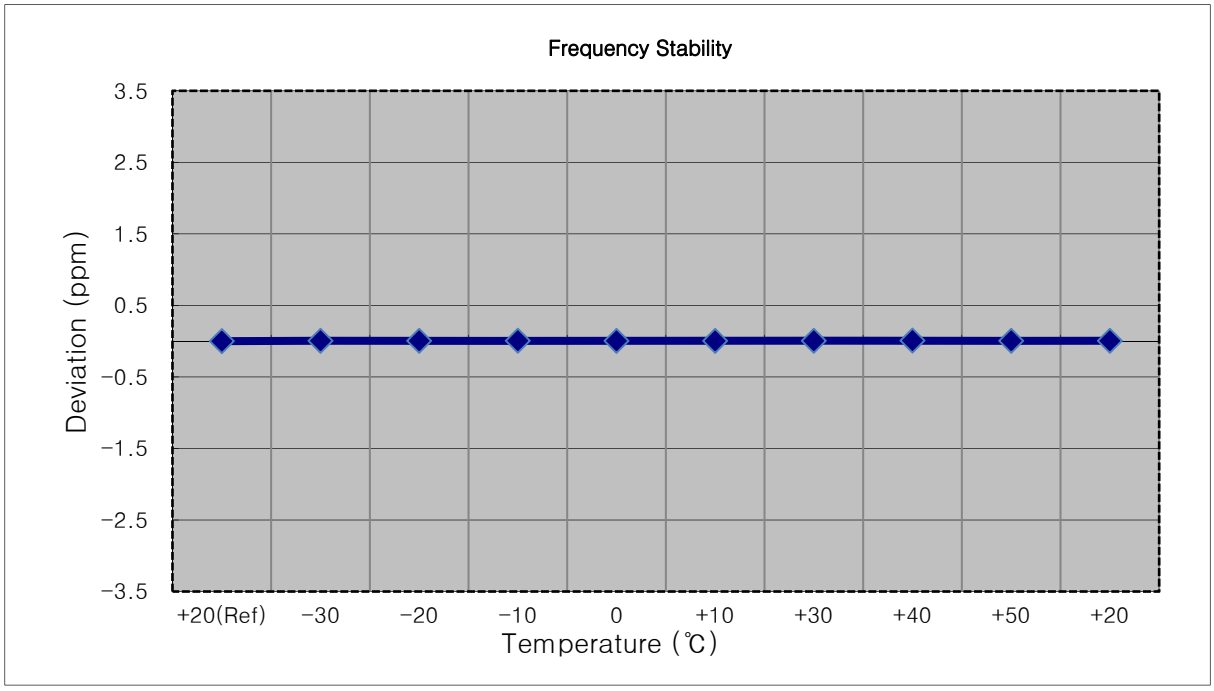
▣ OPERATING FREQUENCY: 1750,000,000 Hz

▣ CHANNEL: 20350 (10 MHz)

▣ REFERENCE VOLTAGE: 3.80 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.80	+20(Ref)	1750 000 010	0.0	0.000 000	0.000
100%		-30	1750 000 019	9.5	0.000 001	0.005
100%		-20	1750 000 019	8.8	0.000 001	0.005
100%		-10	1750 000 021	10.7	0.000 001	0.006
100%		0	1750 000 016	6.2	0.000 000	0.004
100%		+10	1750 000 017	7.2	0.000 000	0.004
100%		+30	1750 000 019	9.6	0.000 001	0.005
100%		+40	1750 000 025	14.7	0.000 001	0.008
100%		+50	1750 000 018	8.2	0.000 000	0.005
Batt. Endpoint	3.40	+20	1750 000 019	9.4	0.000 001	0.005



▣ MODE: LTE 4

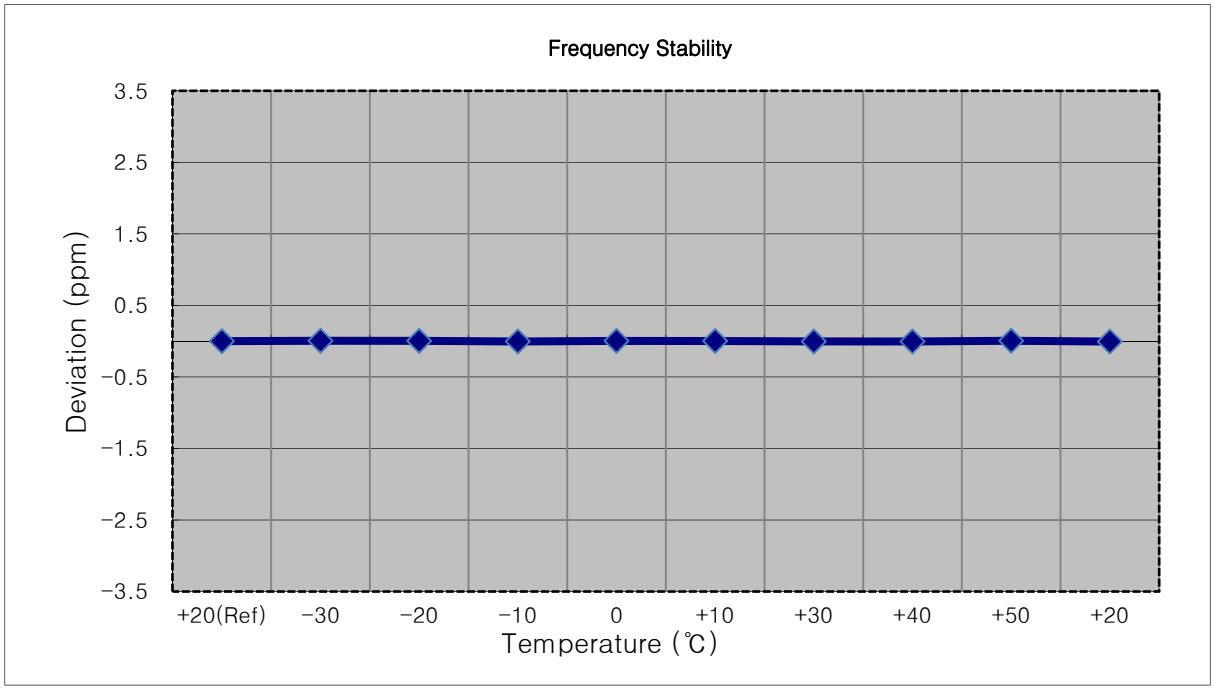
▣ OPERATING FREQUENCY: 1747,500,000 Hz

▣ CHANNEL: 20325 (15 MHz)

▣ REFERENCE VOLTAGE: 3.80 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.80	+20(Ref)	1747 500 012	0.0	0.000 000	0.000
100%		-30	1747 500 021	9.4	0.000 001	0.005
100%		-20	1747 500 019	7.4	0.000 000	0.004
100%		-10	1747 500 004	-7.6	0.000 000	-0.004
100%		0	1747 500 018	6.4	0.000 000	0.004
100%		+10	1747 500 016	4.3	0.000 000	0.002
100%		+30	1747 500 005	-6.2	0.000 000	-0.004
100%		+40	1747 500 004	-7.8	0.000 000	-0.004
100%		+50	1747 500 021	9.0	0.000 001	0.005
Batt. Endpoint	3.40	+20	1747 500 002	-9.6	-0.000 001	-0.005



▣ MODE: LTE 4

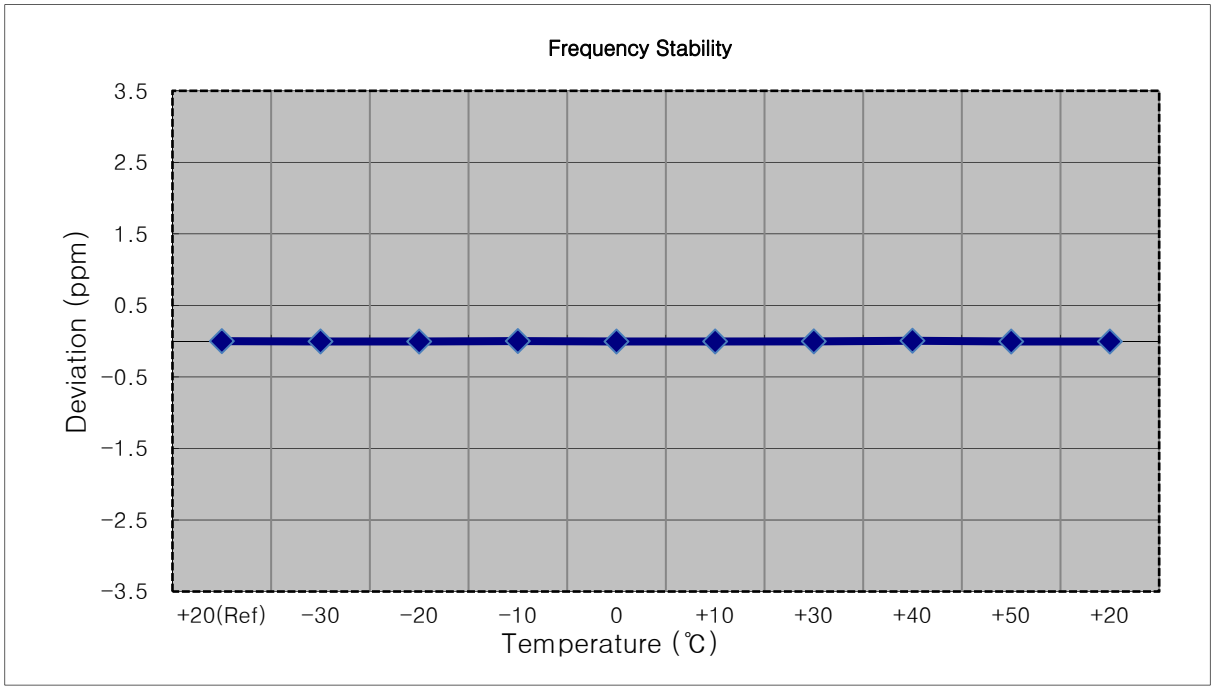
▣ OPERATING FREQUENCY: 1745,000,000 Hz

▣ CHANNEL: 20300 (20 MHz)

▣ REFERENCE VOLTAGE: 3.80 VDC

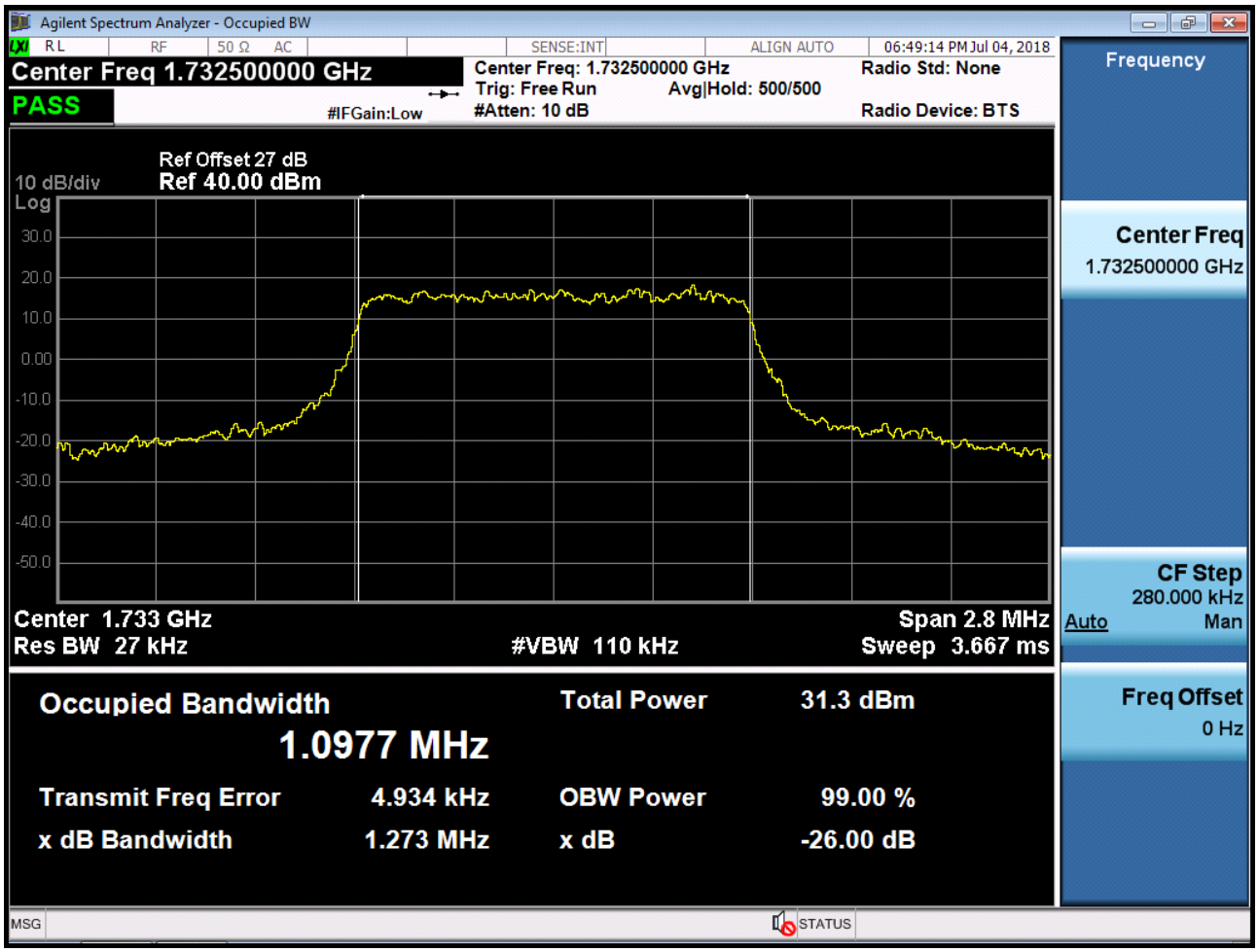
▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100%	3.80	+20(Ref)	1744 999 990	0.0	0.000 000	0.000
100%		-30	1744 999 982	-7.3	0.000 000	-0.004
100%		-20	1744 999 982	-7.9	0.000 000	-0.005
100%		-10	1744 999 992	2.8	0.000 000	0.002
100%		0	1744 999 981	-8.6	0.000 000	-0.005
100%		+10	1744 999 982	-7.2	0.000 000	-0.004
100%		+30	1744 999 984	-5.5	0.000 000	-0.003
100%		+40	1745 000 000	10.1	0.000 001	0.006
100%		+50	1744 999 982	-7.9	0.000 000	-0.005
Batt. Endpoint	3.40	+20	1744 999 981	-8.5	0.000 000	-0.005

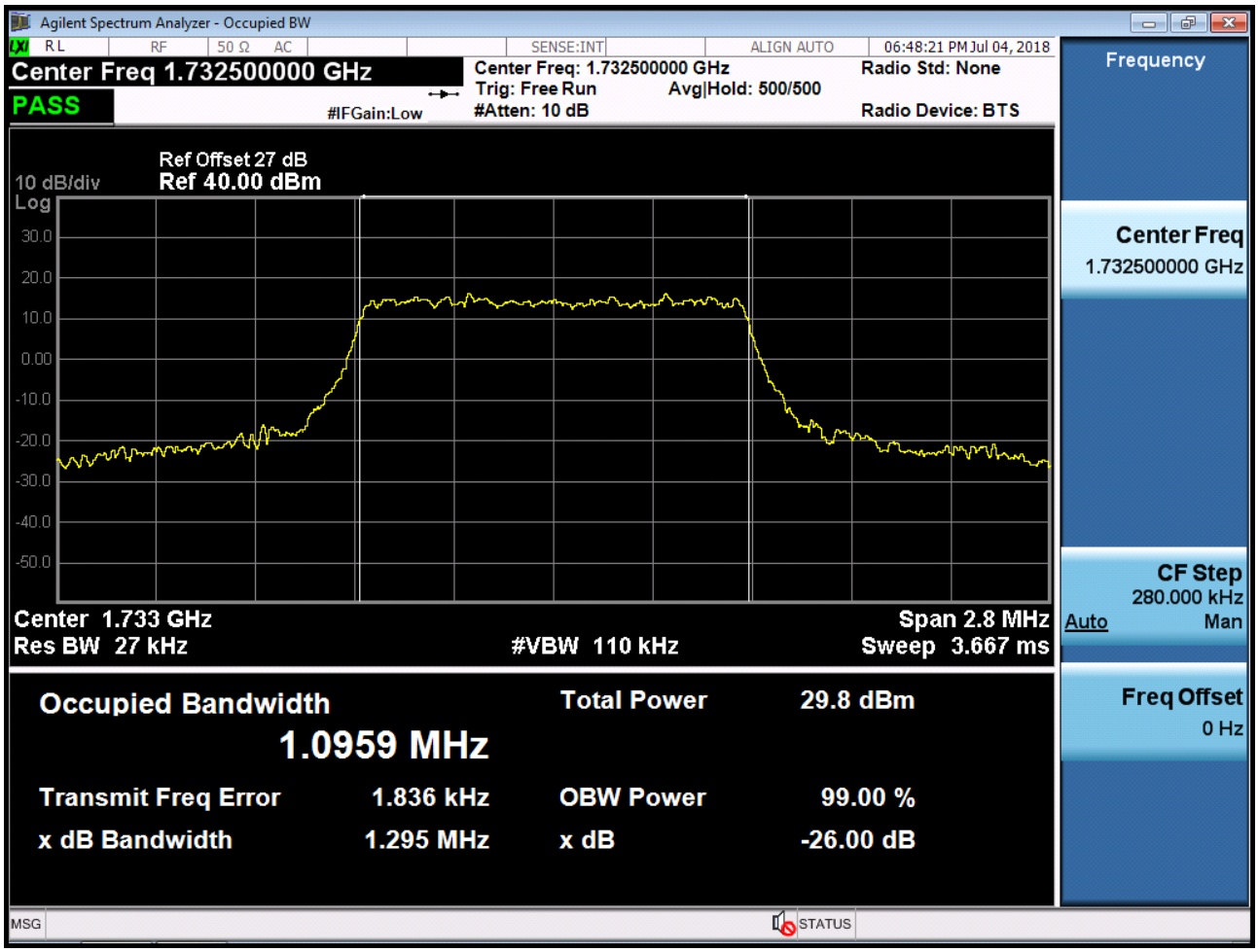


9. TEST PLOTS

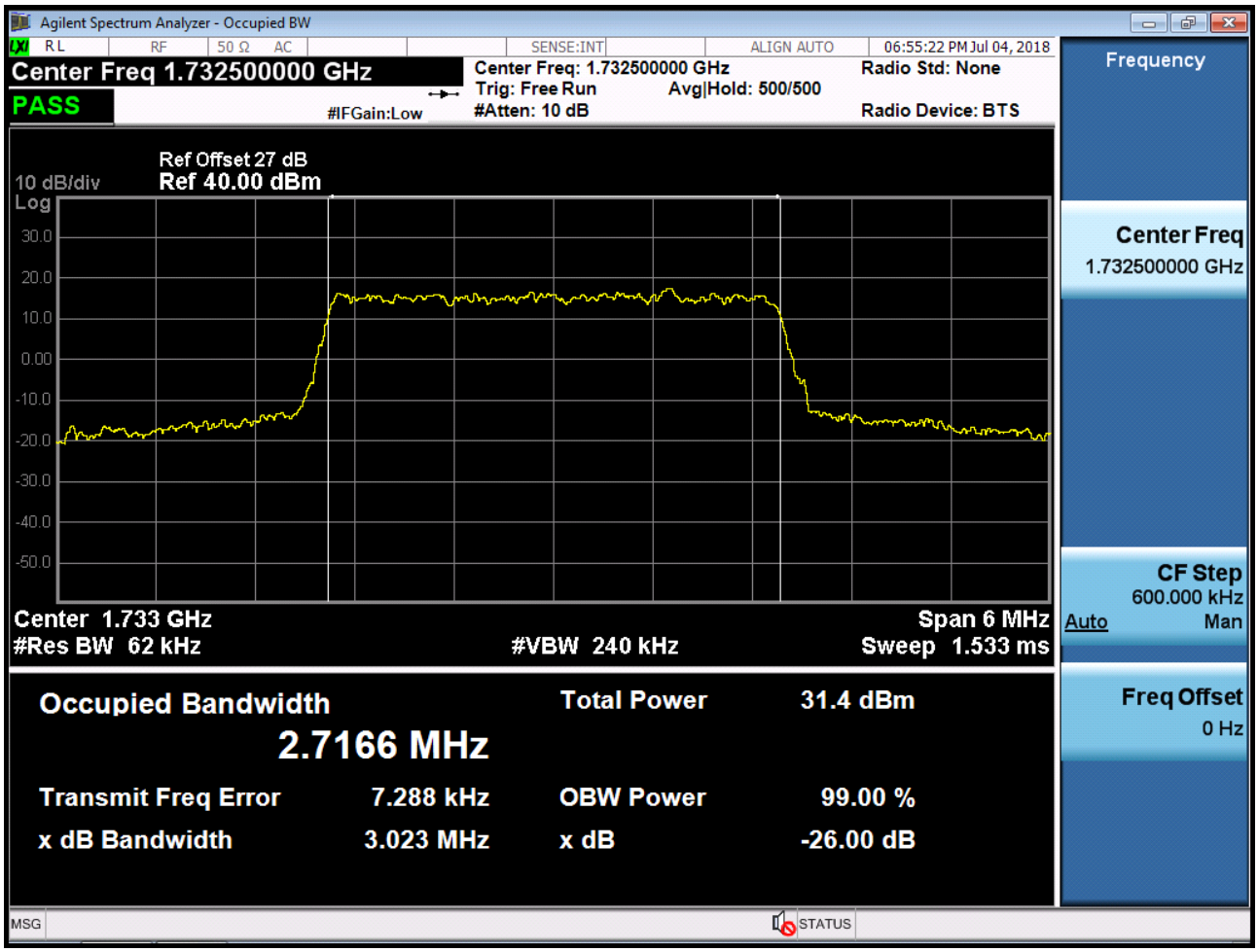
BAND 4. Occupied Bandwidth Plot (1.4M BW Ch.20175 QPSK RB 6)



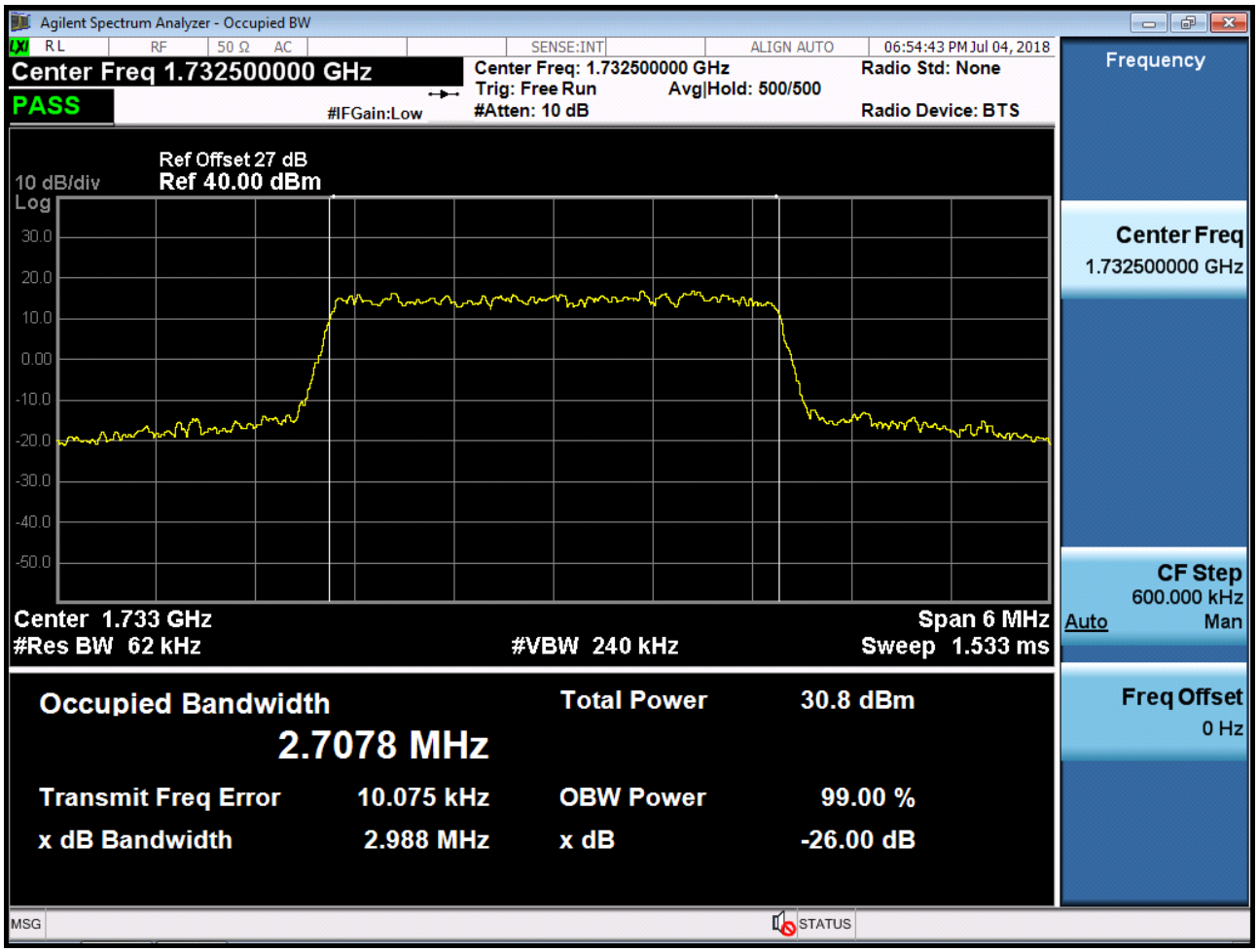
BAND 4. Occupied Bandwidth Plot (1.4M BW Ch.20175 16QAM RB 6)



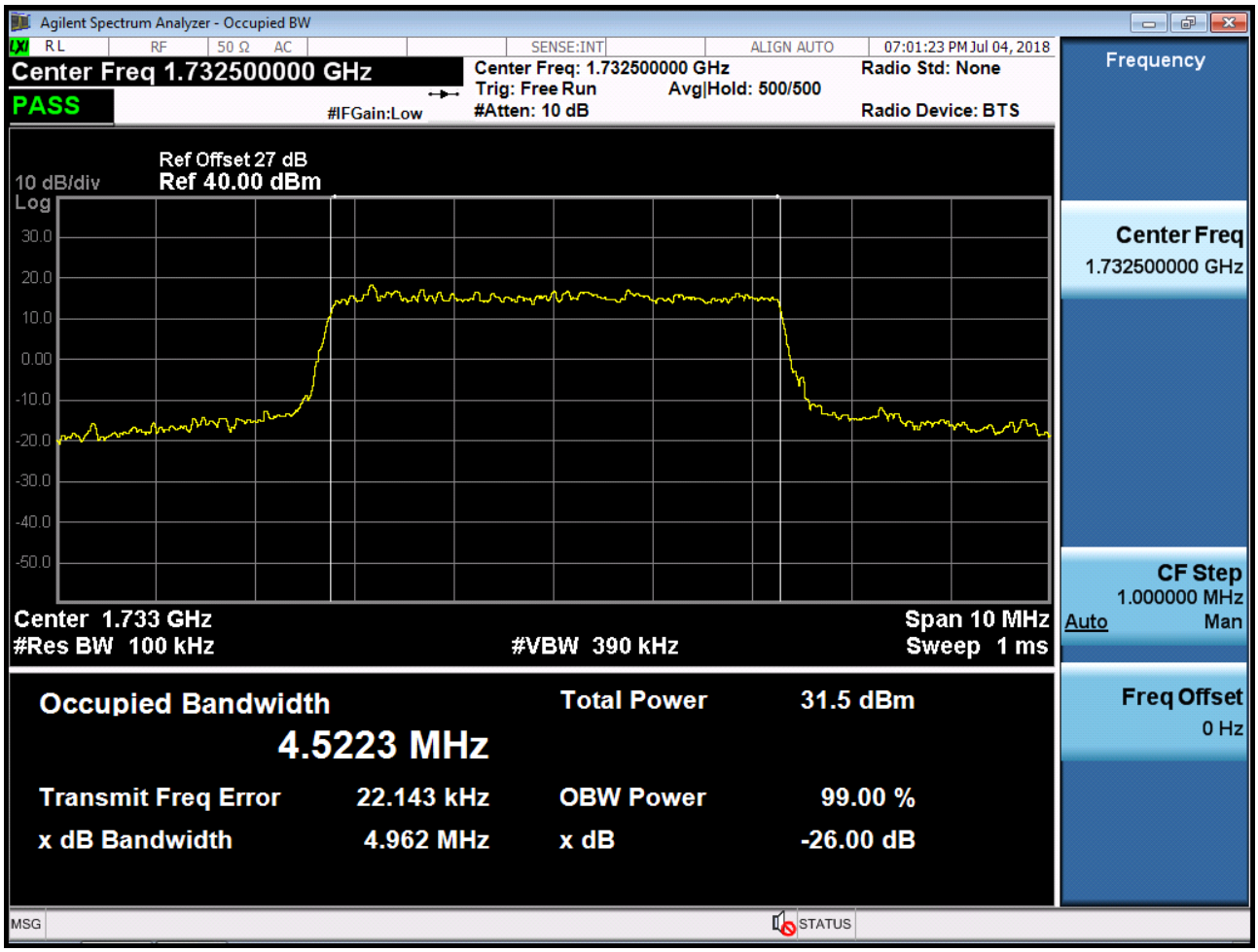
BAND 4. Occupied Bandwidth Plot (3M BW Ch.20175 QPSK RB 15)



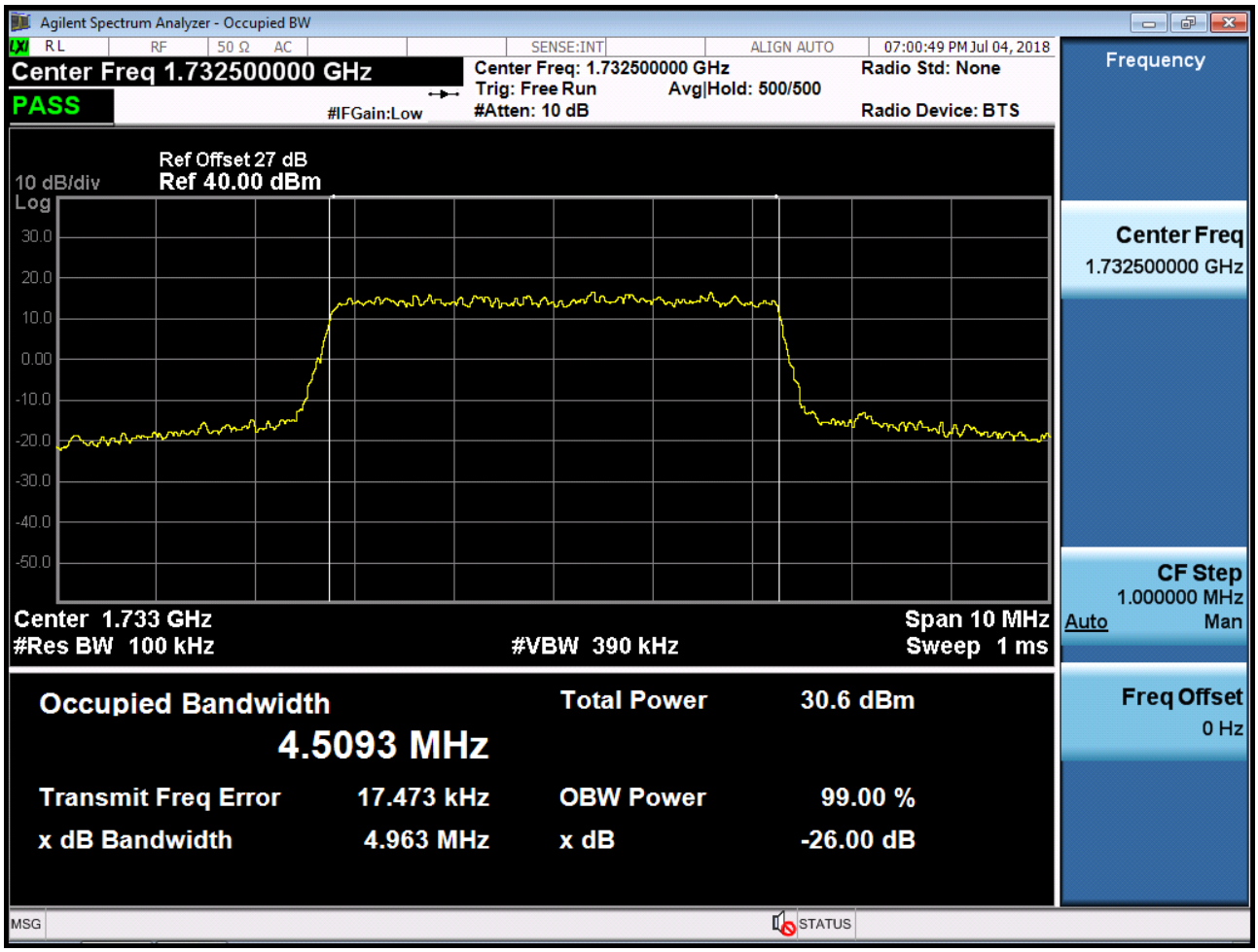
BAND 4. Occupied Bandwidth Plot (3M BW Ch.20175 16QAM RB 15)



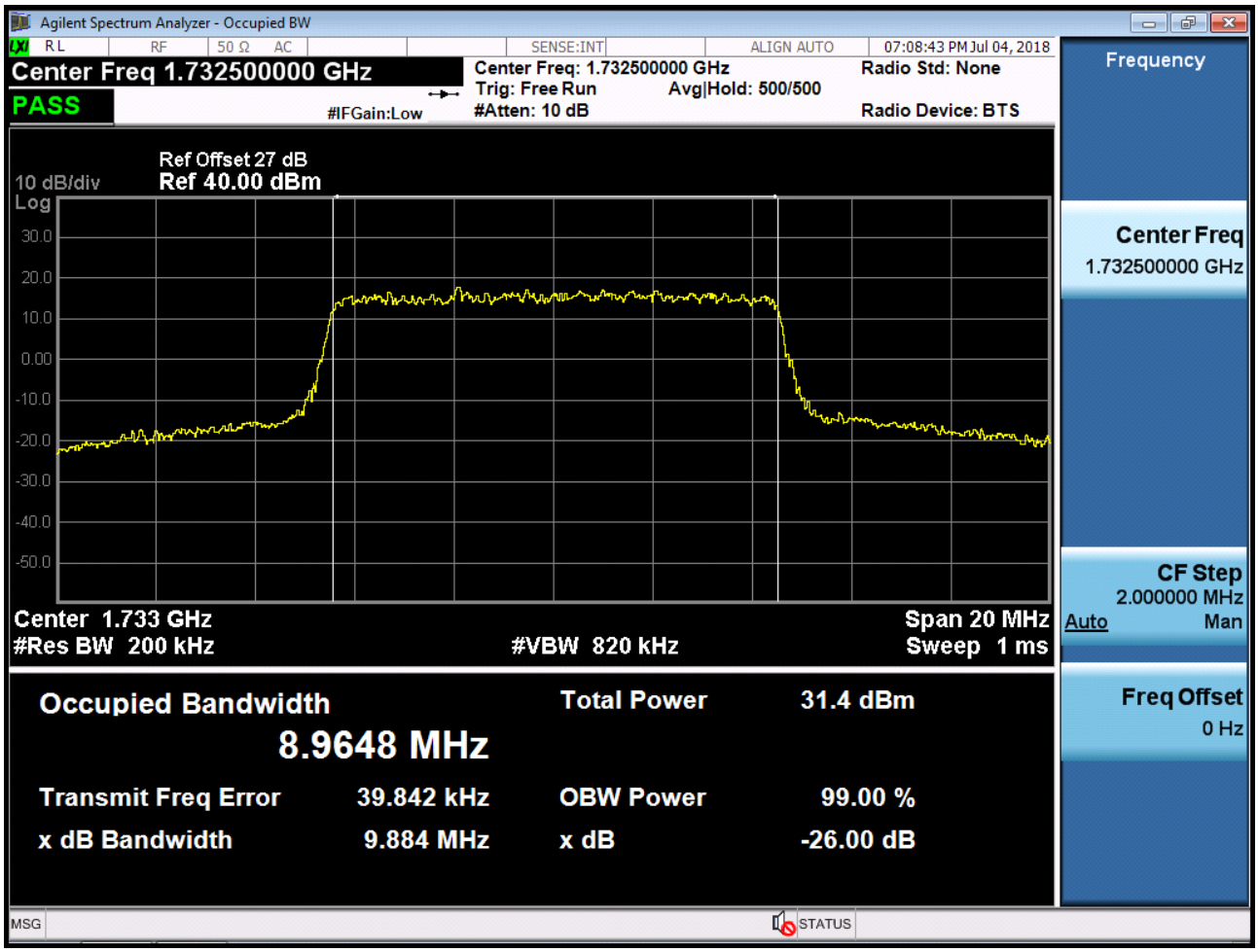
BAND 4. Occupied Bandwidth Plot (5M BW Ch.20175 QPSK RB 25)



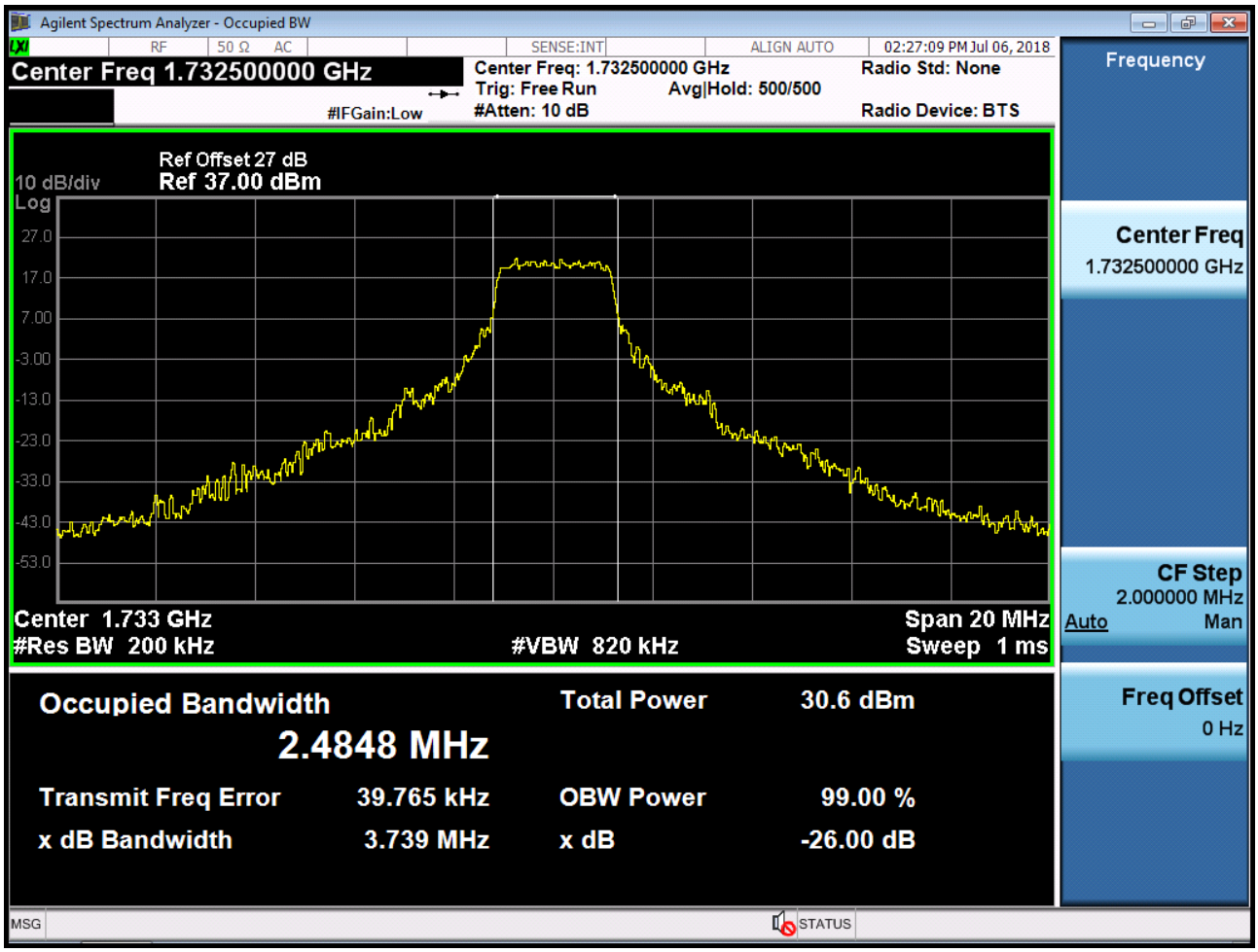
BAND 4. Occupied Bandwidth Plot (5M BW Ch.20175 16QAM RB 25)



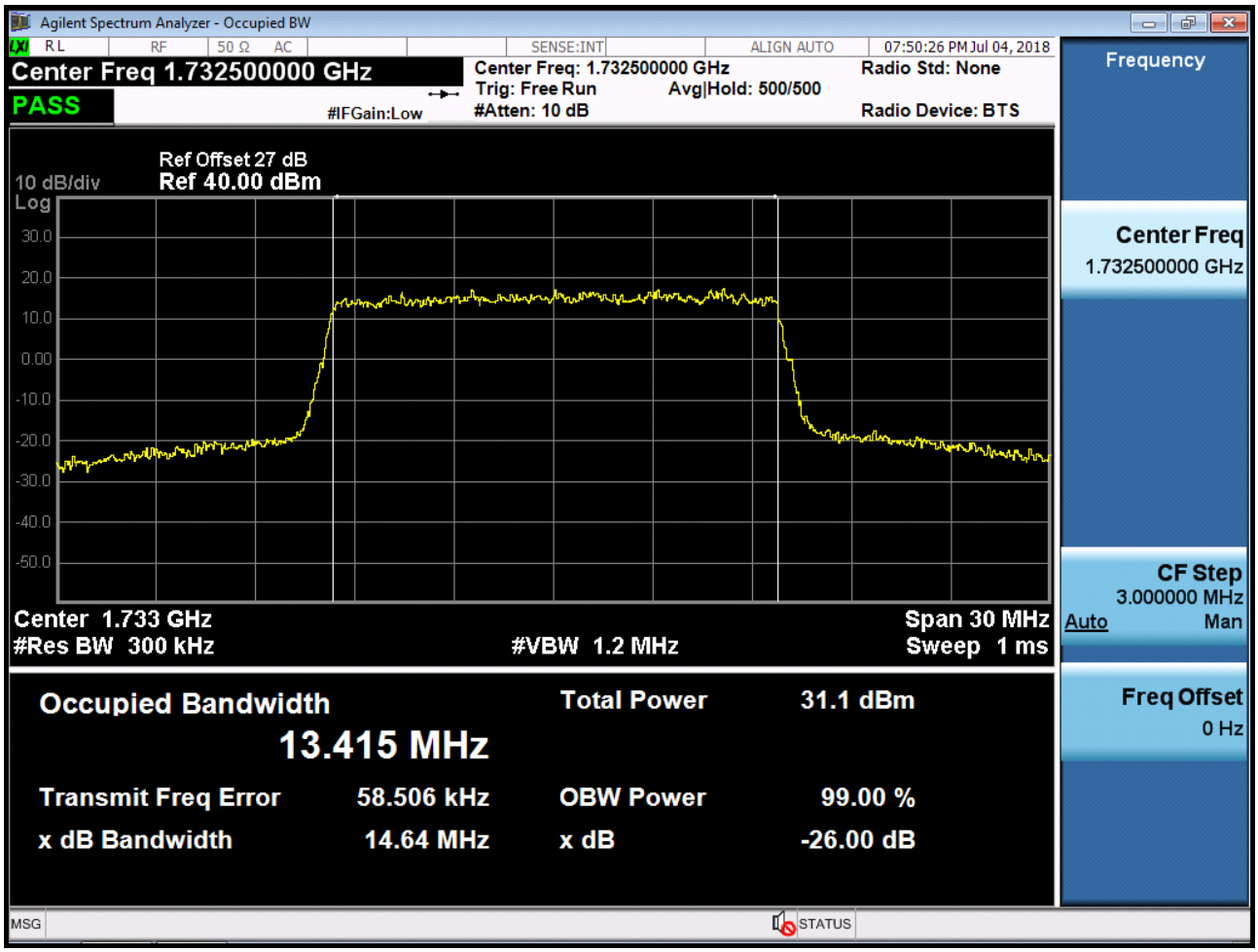
BAND 4. Occupied Bandwidth Plot (10M BW Ch.20175 QPSK RB 50)



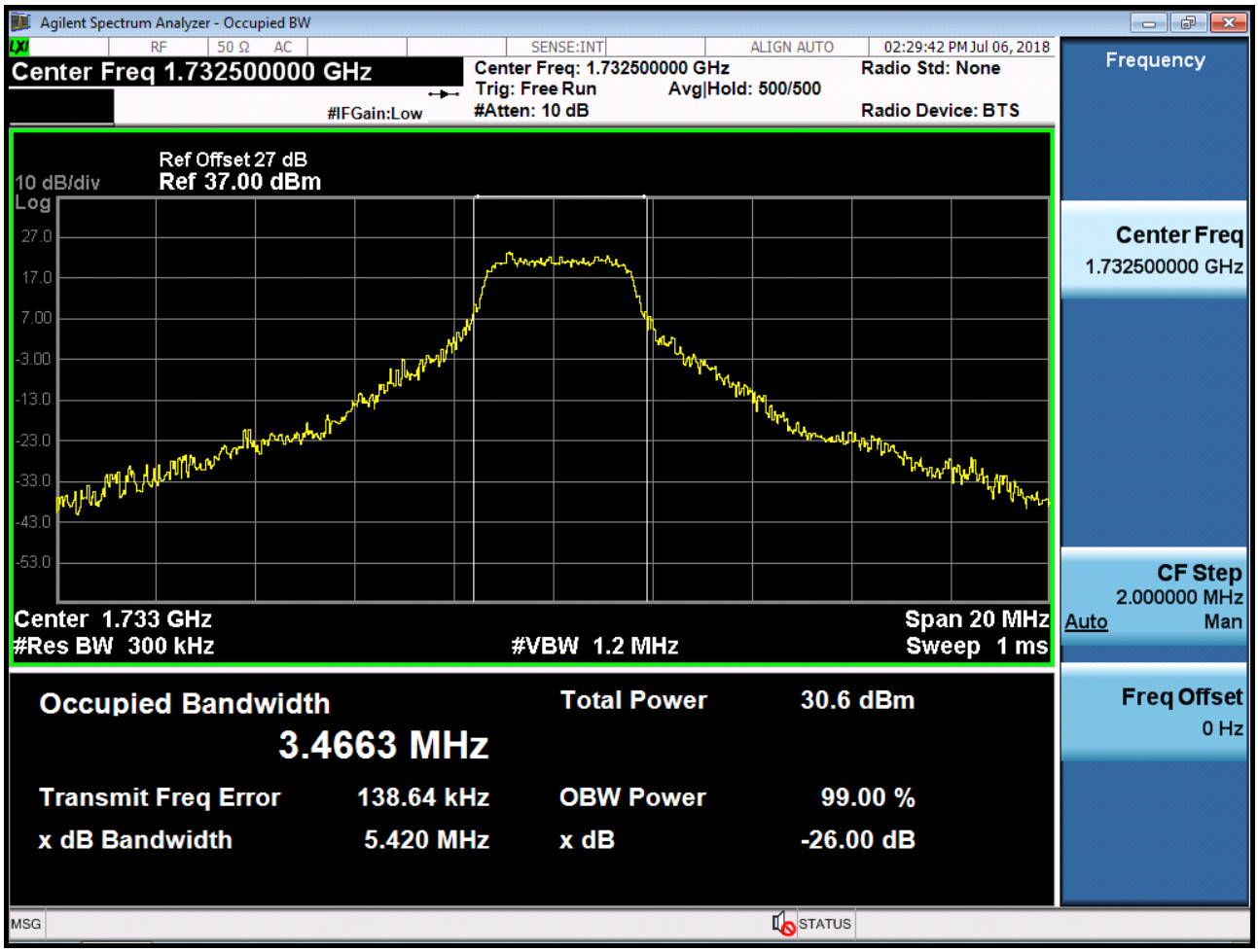
BAND 4. Occupied Bandwidth Plot (10M BW Ch.20175 16QAM RB 12) Partial



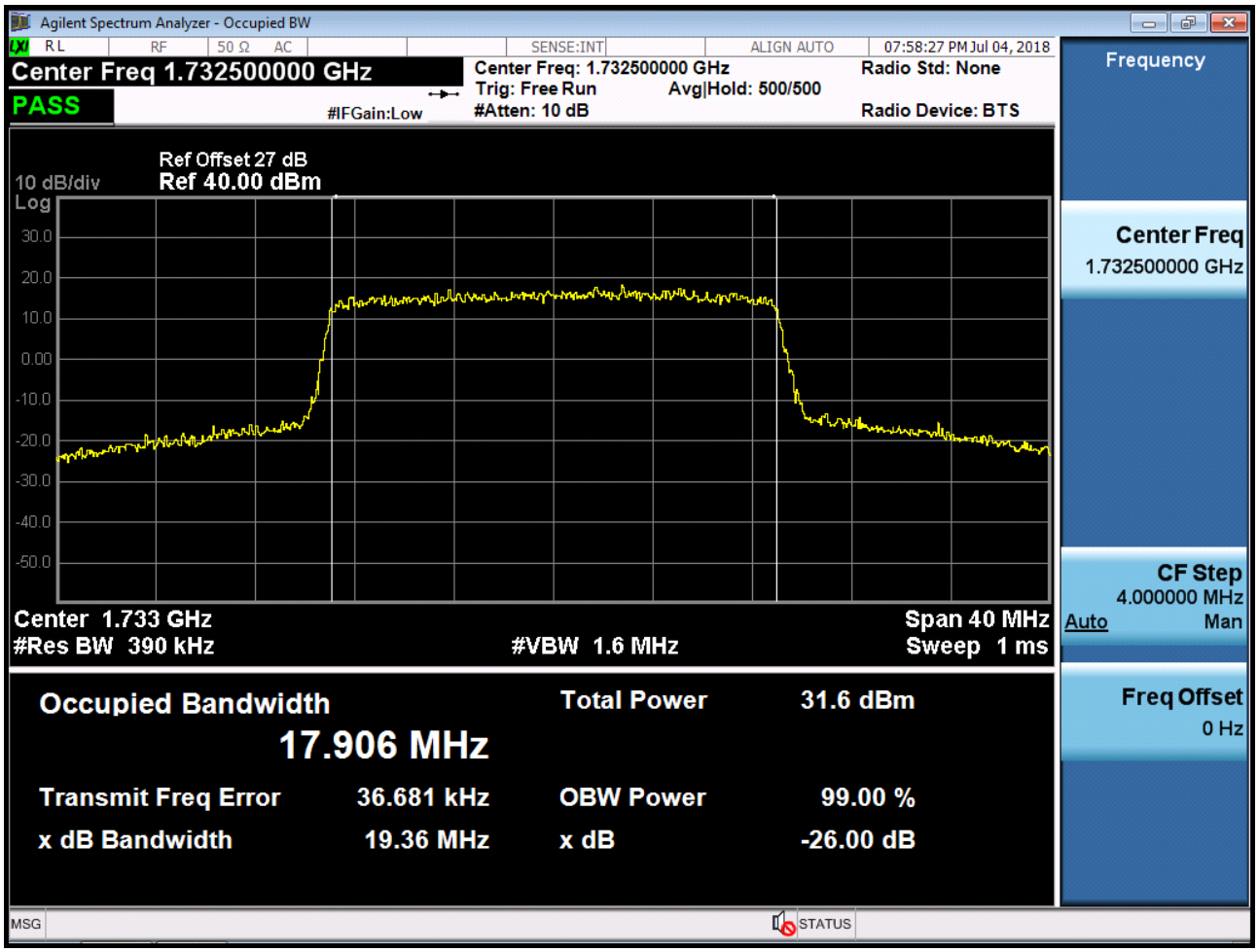
BAND 4. Occupied Bandwidth Plot (15M BW Ch.20175 QPSK RB 75)



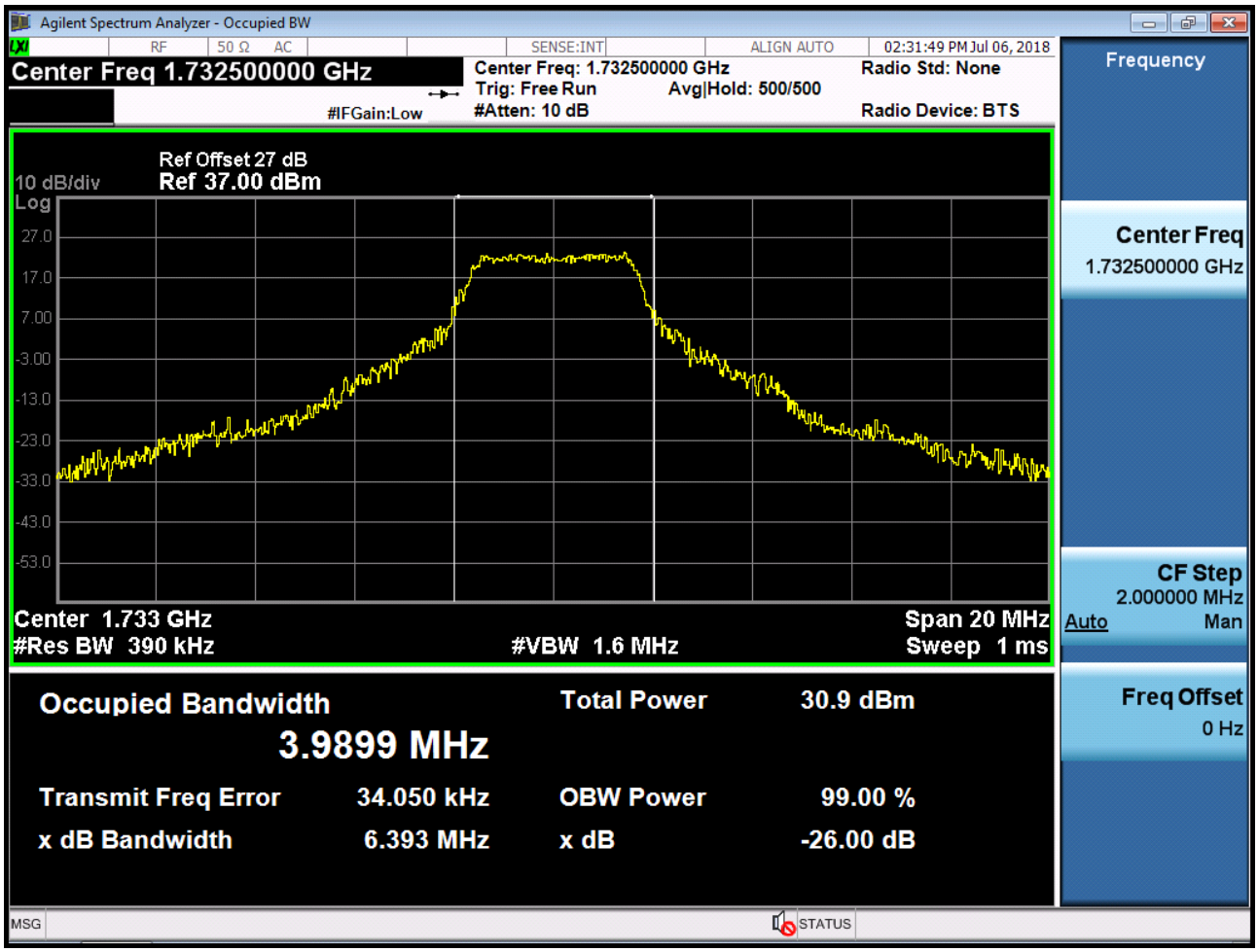
BAND 4. Occupied Bandwidth Plot (15M BW Ch.20175 16QAM RB 16) Partial



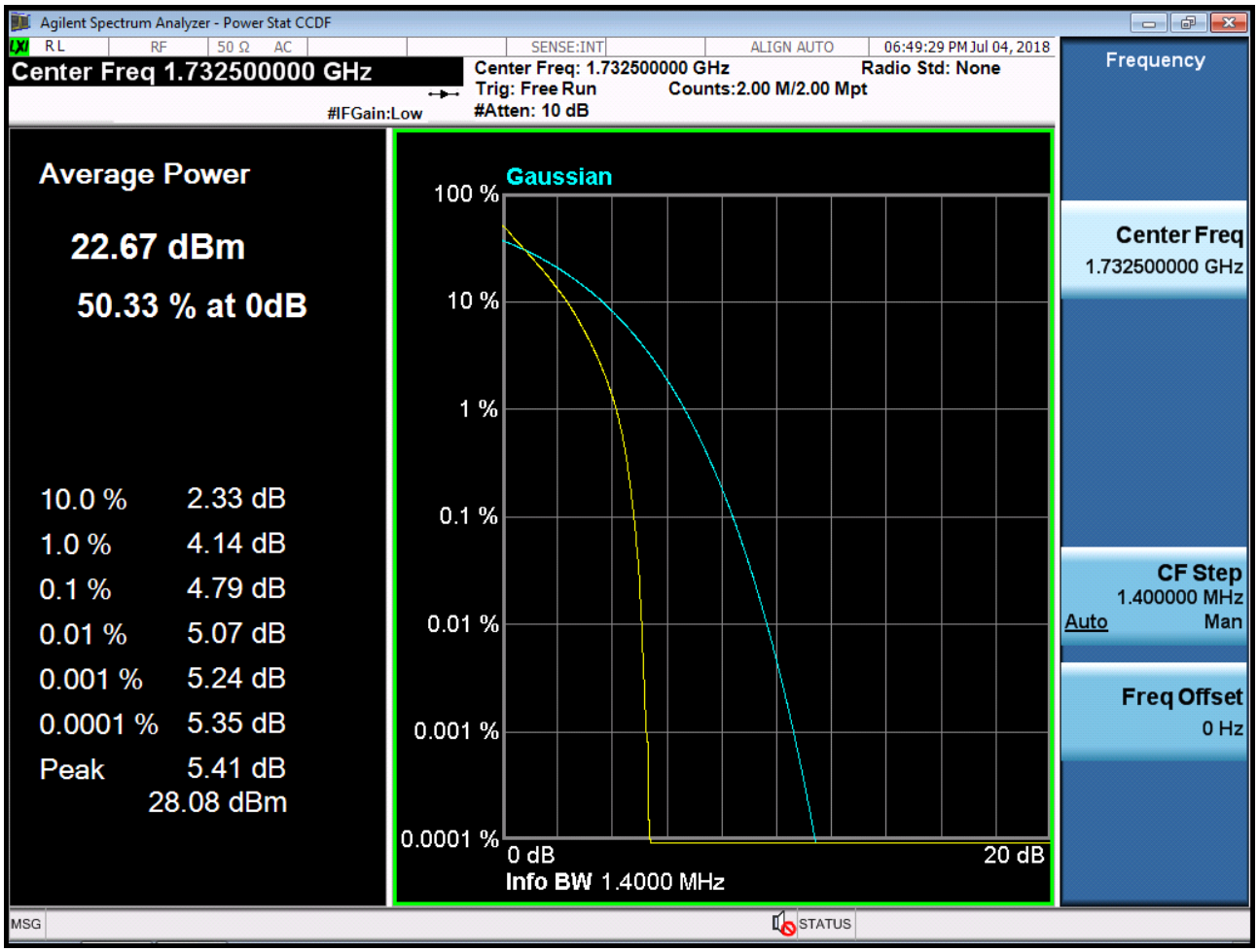
BAND 4. Occupied Bandwidth Plot (20M BW Ch.20175 QPSK RB 100)



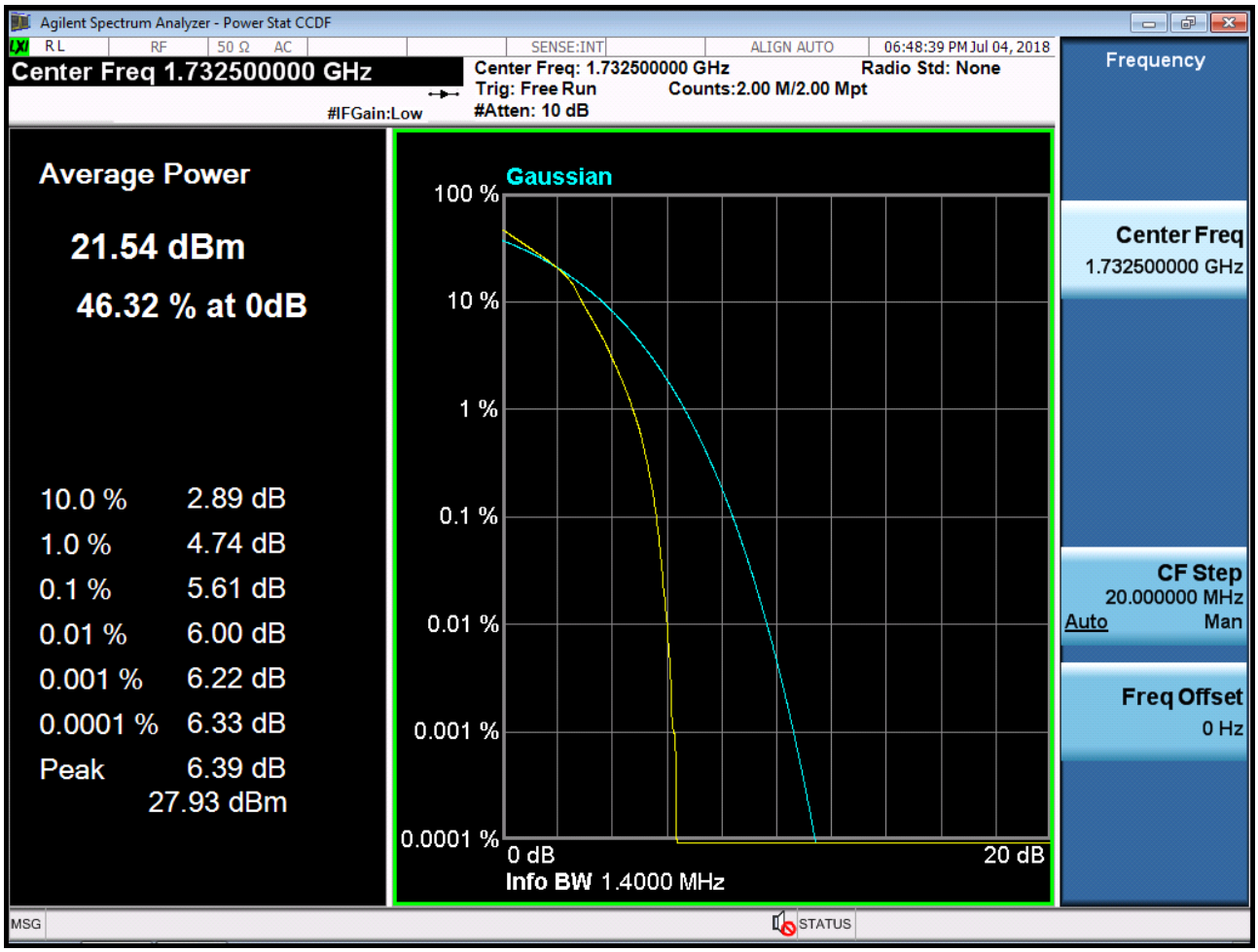
BAND 4. Occupied Bandwidth Plot (20M BW Ch.20175 16QAM RB 18) Partial



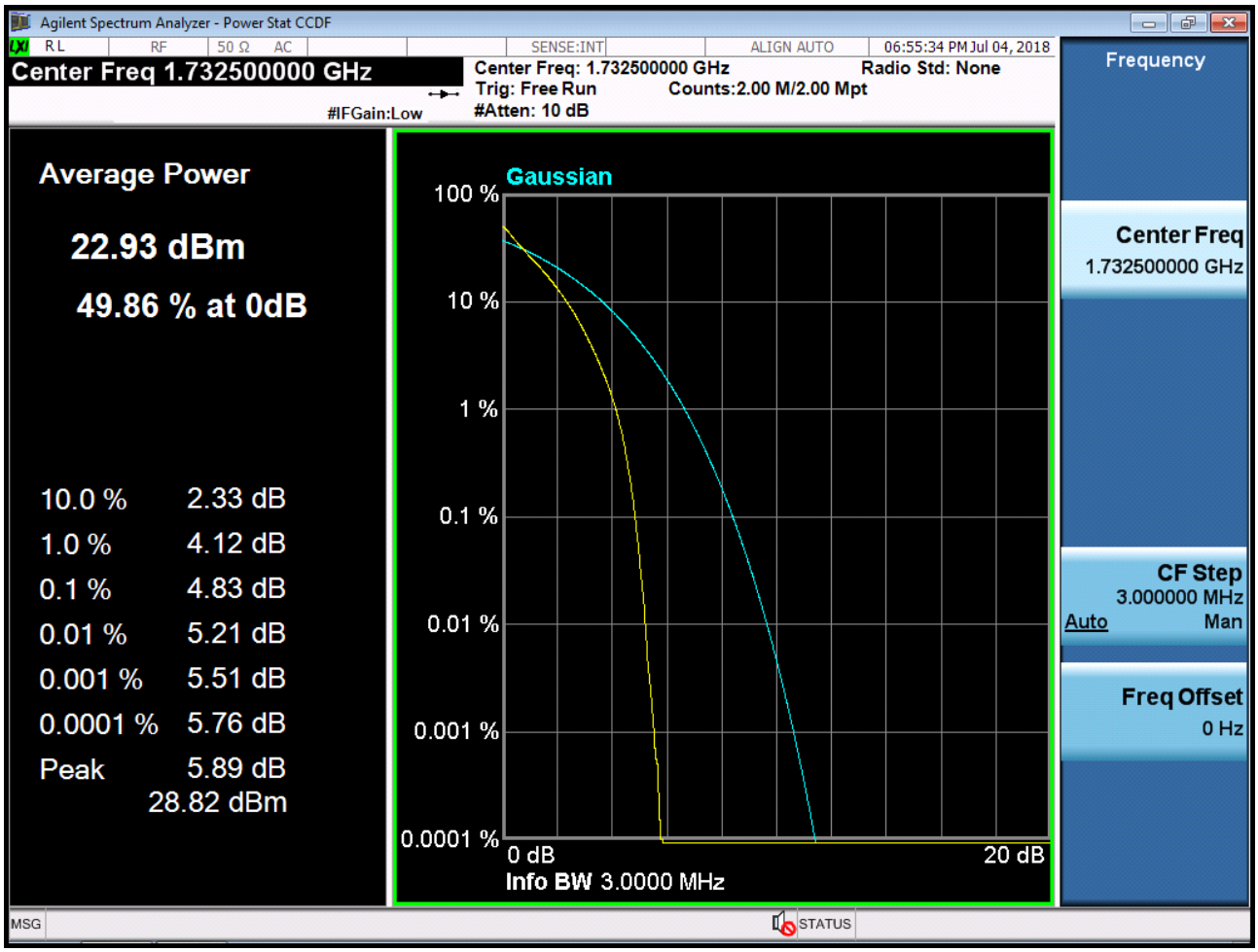
BAND 4. PAR Plot (1.4M BW_Ch.20175_QPSK_RB6_0)



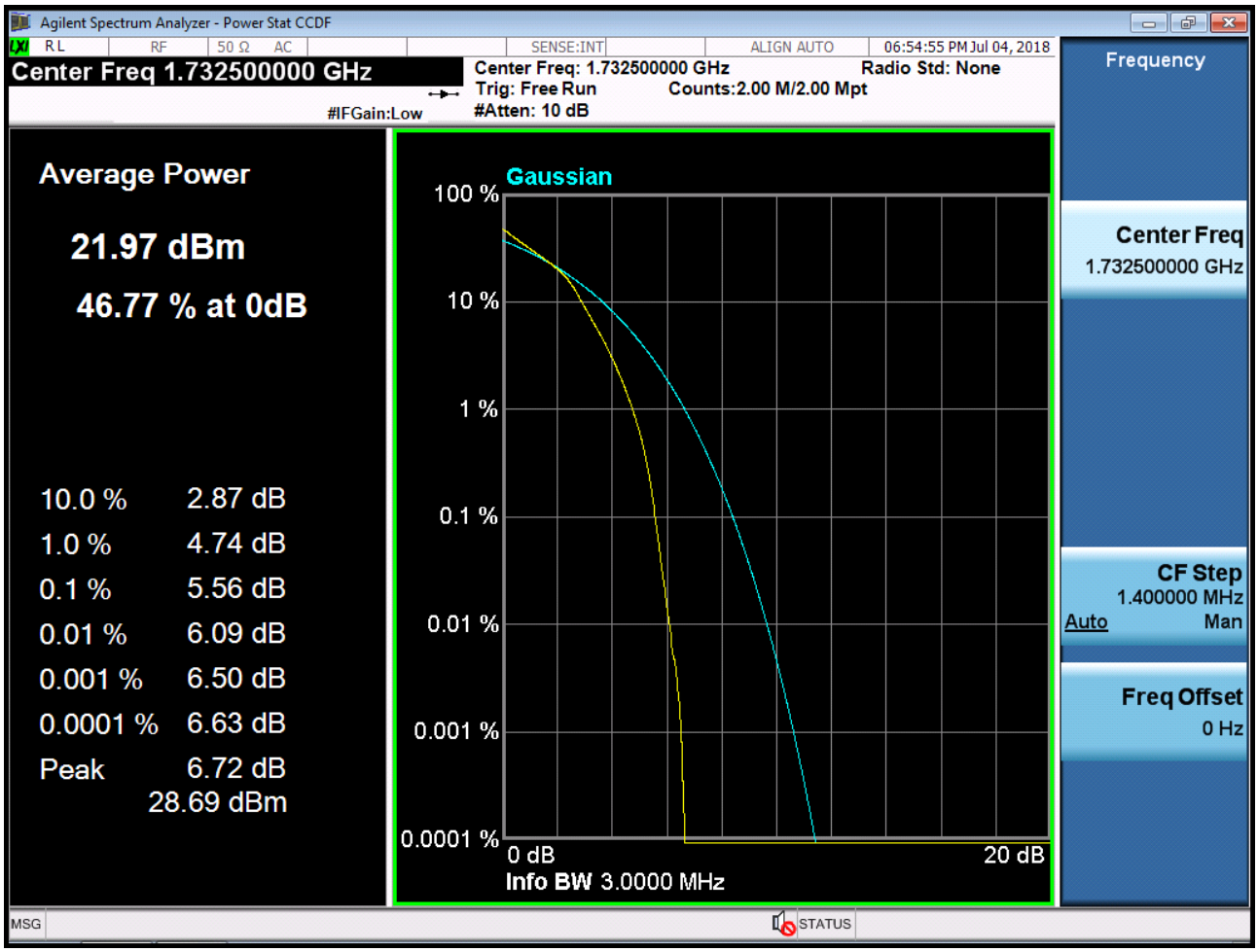
BAND 4. PAR Plot (1.4M BW_Ch.20175_16QAM_RB6_0)



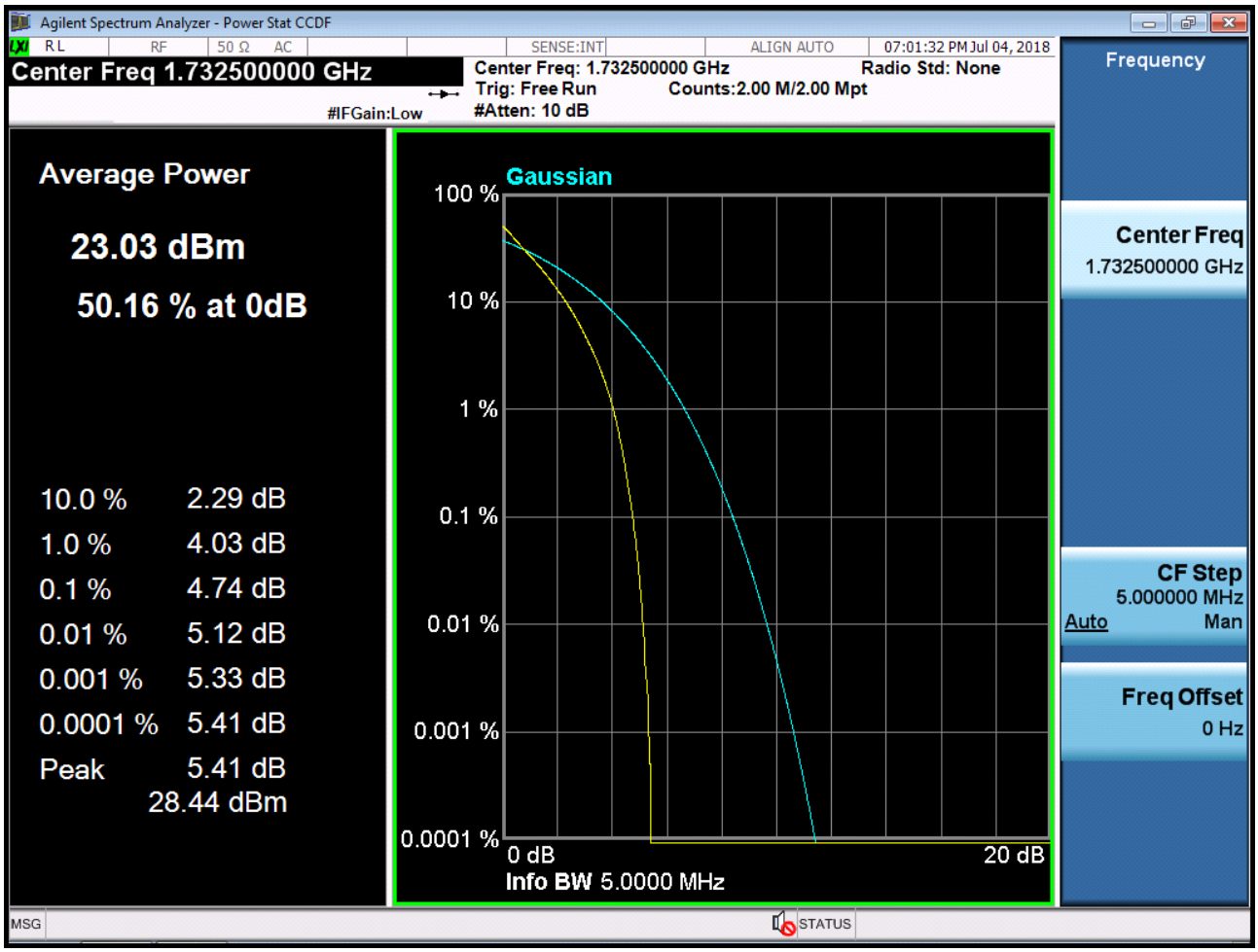
BAND 4. PAR Plot (3M BW_Ch.20175_QPSK_RB15_0)



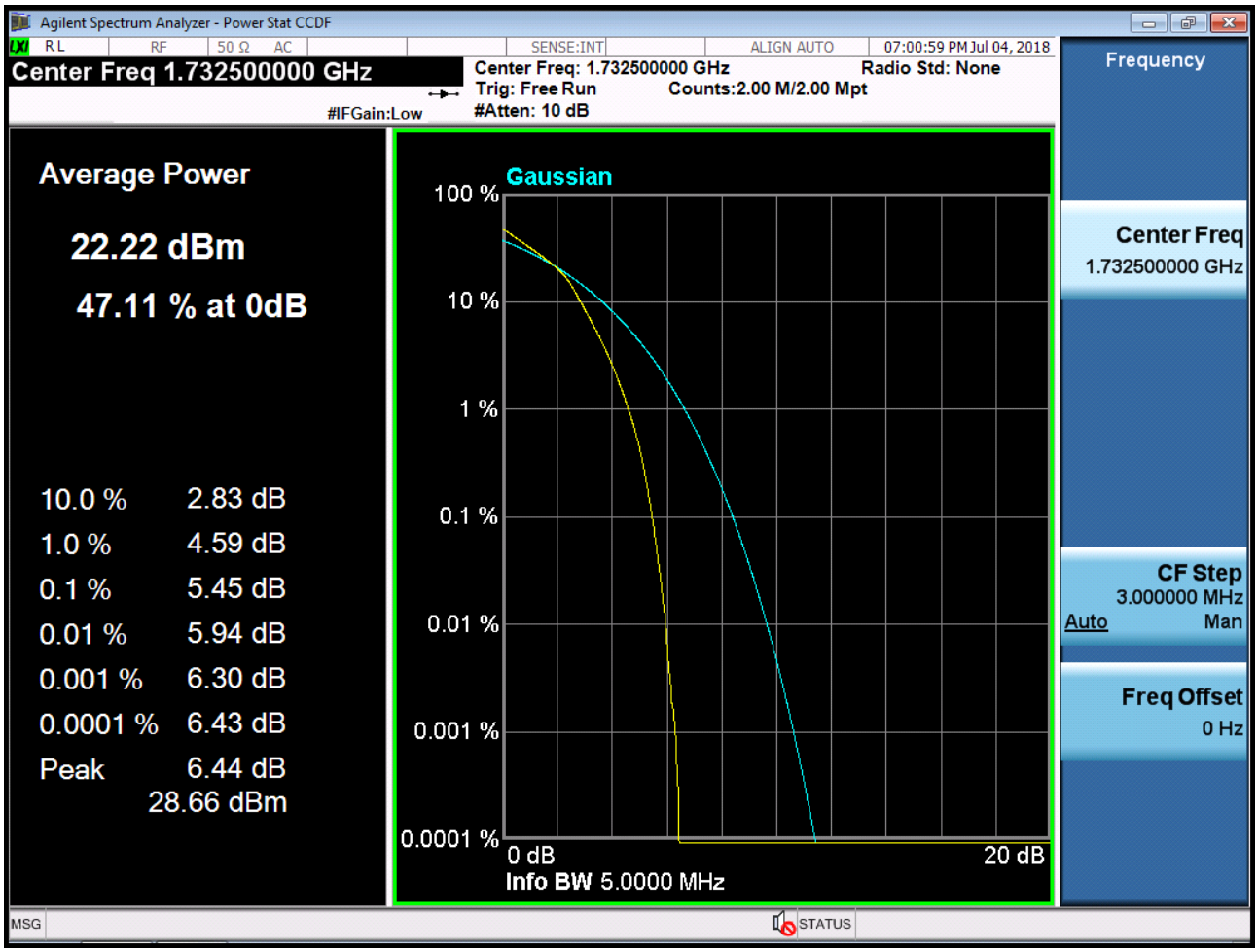
BAND 4. PAR Plot (3M BW_Ch.20175_16QAM_RB15_0)



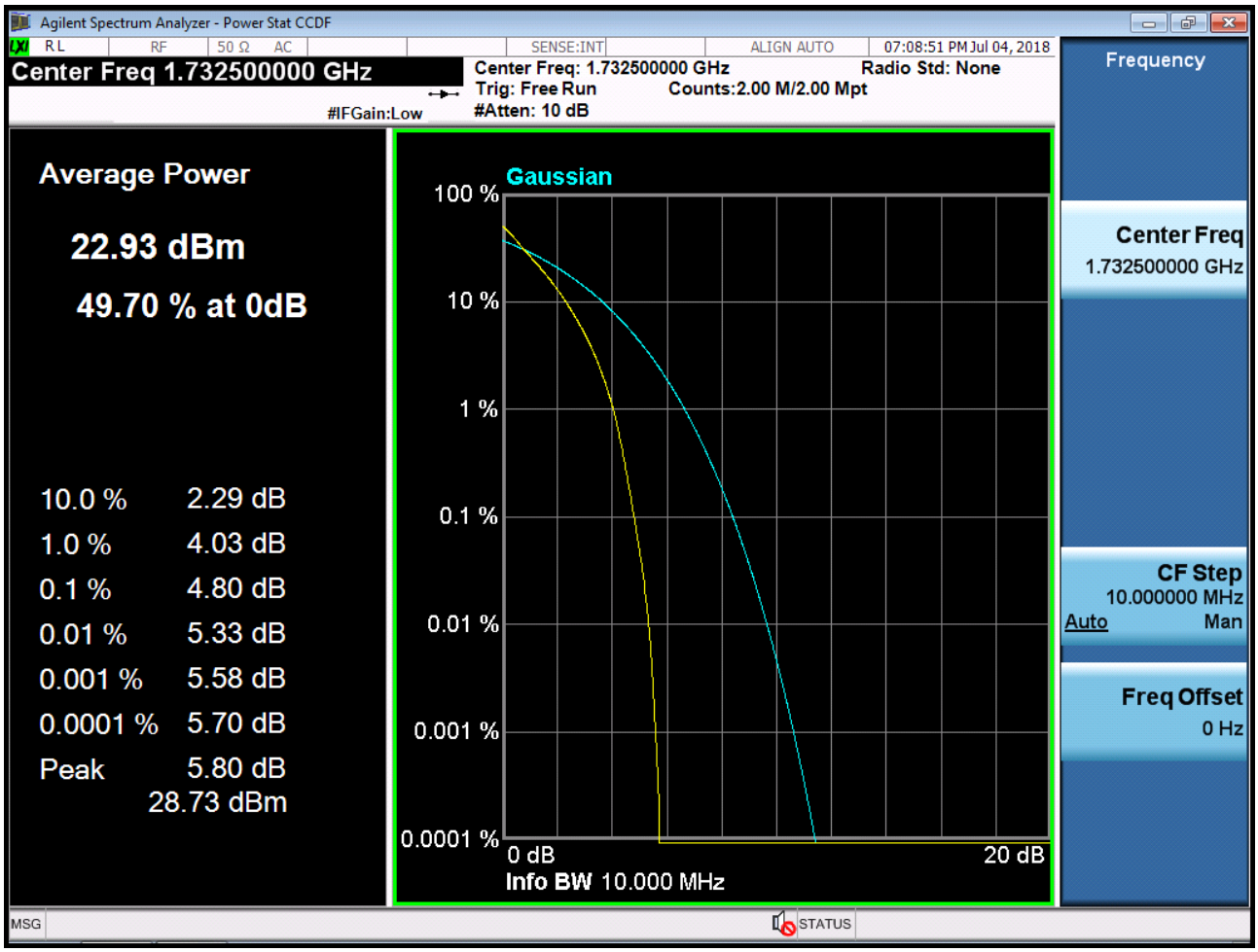
BAND 4. PAR Plot (5M BW_Ch.20175_QPSK_RB25_0)



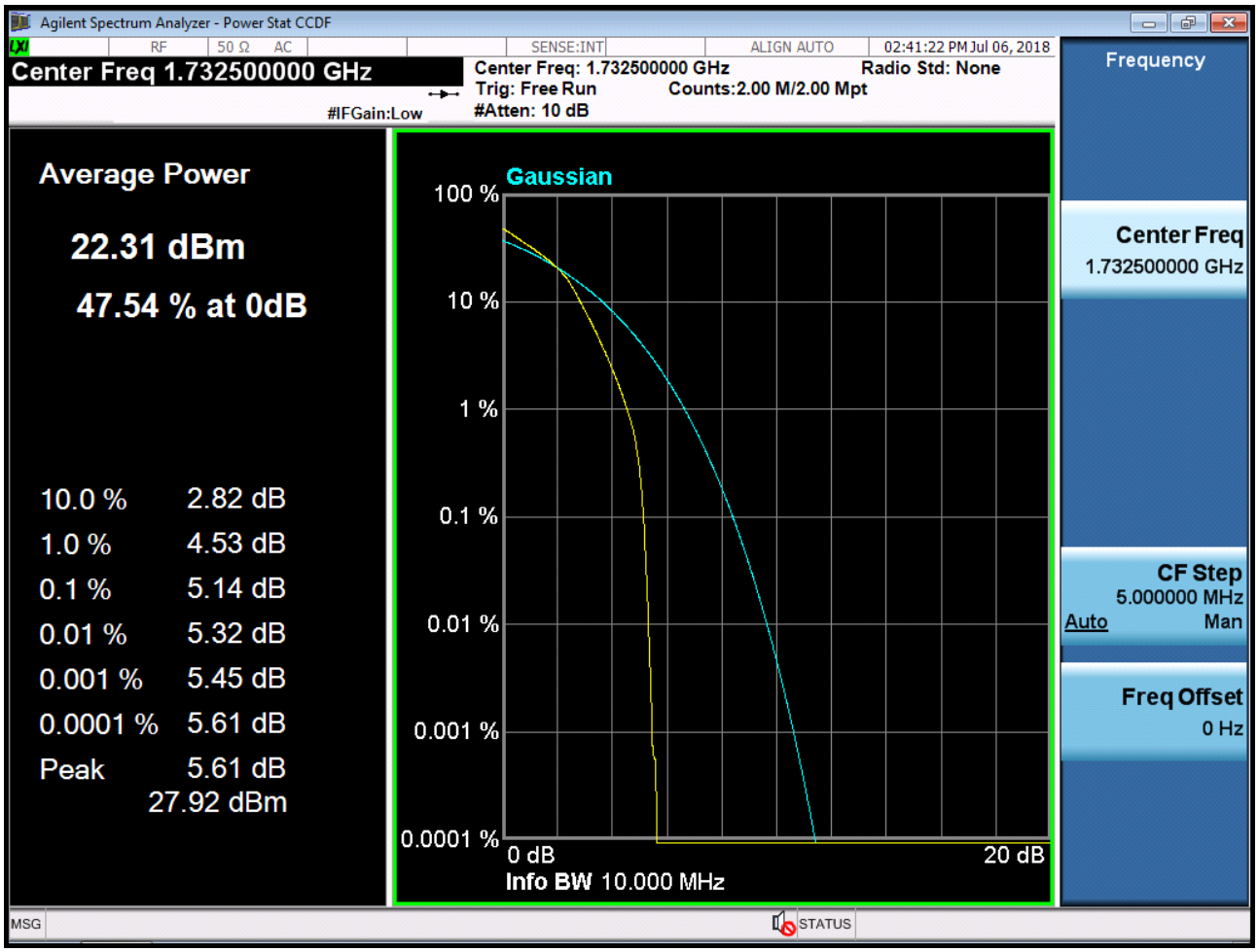
BAND 4. PAR Plot (5M BW_Ch.20175_16QAM_RB25_0)



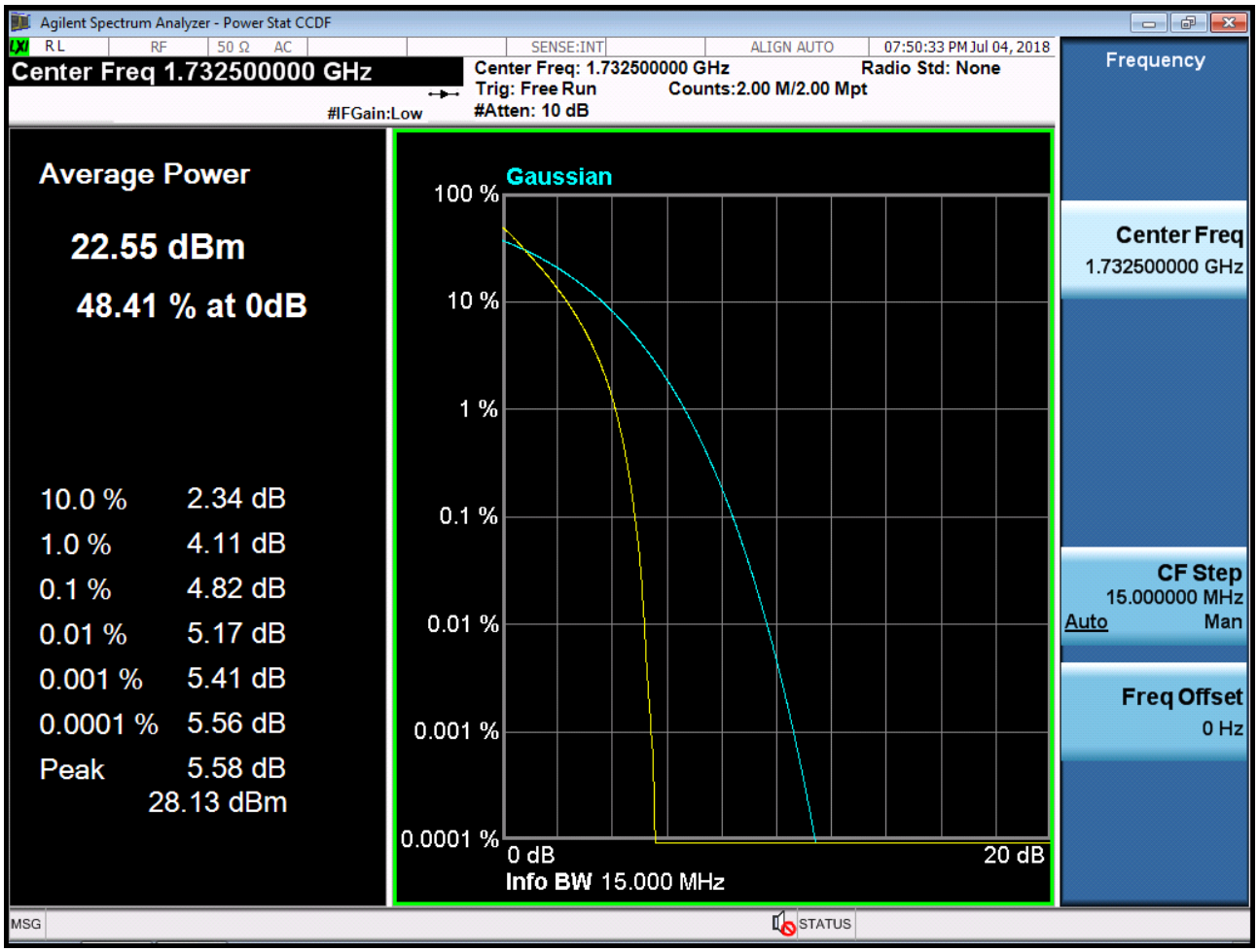
BAND 4. PAR Plot (10M BW_Ch.20175_QPSK_RB50_0)



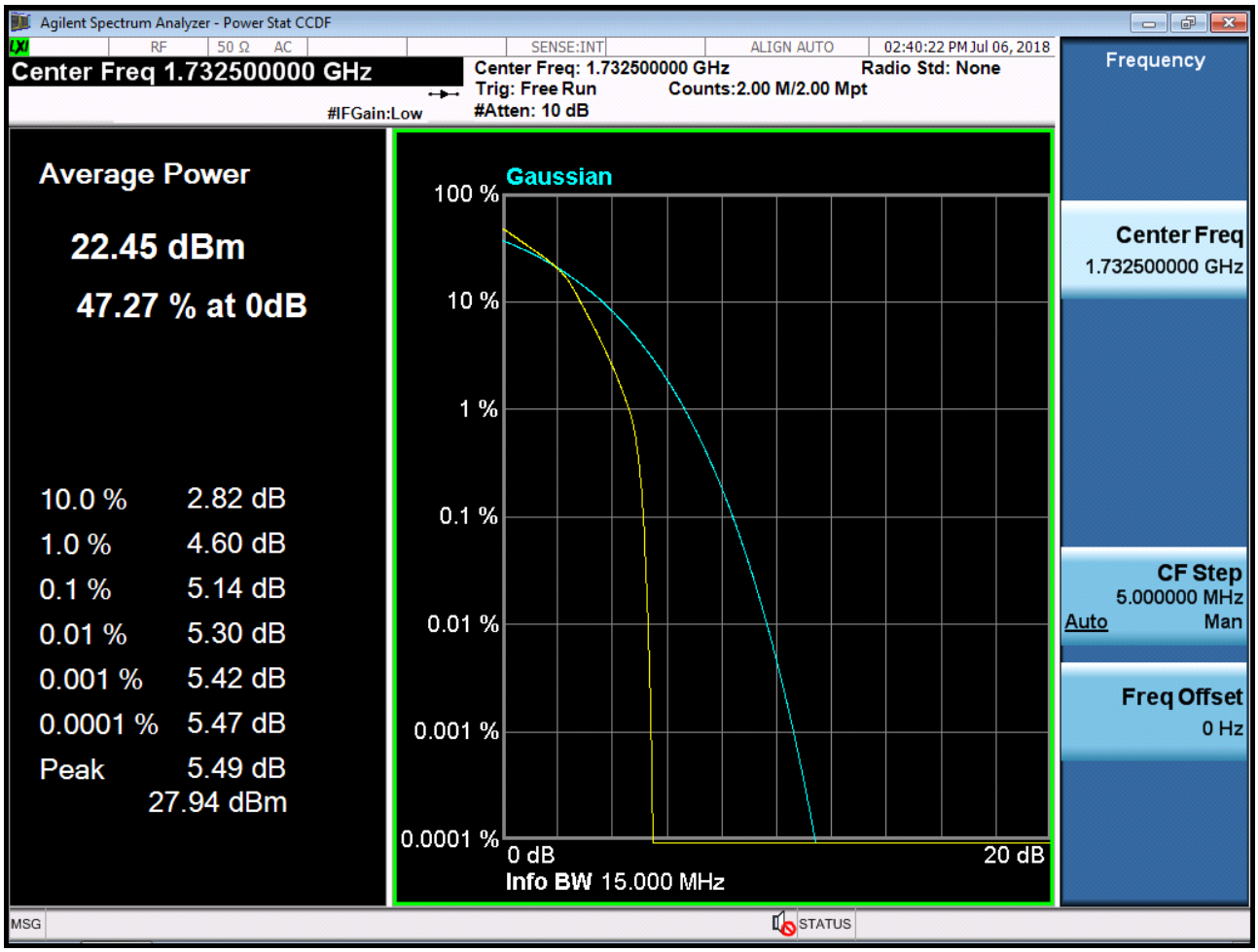
BAND 4. PAR Plot (10M BW_Ch.20175_16QAM_RB12_0) Partial



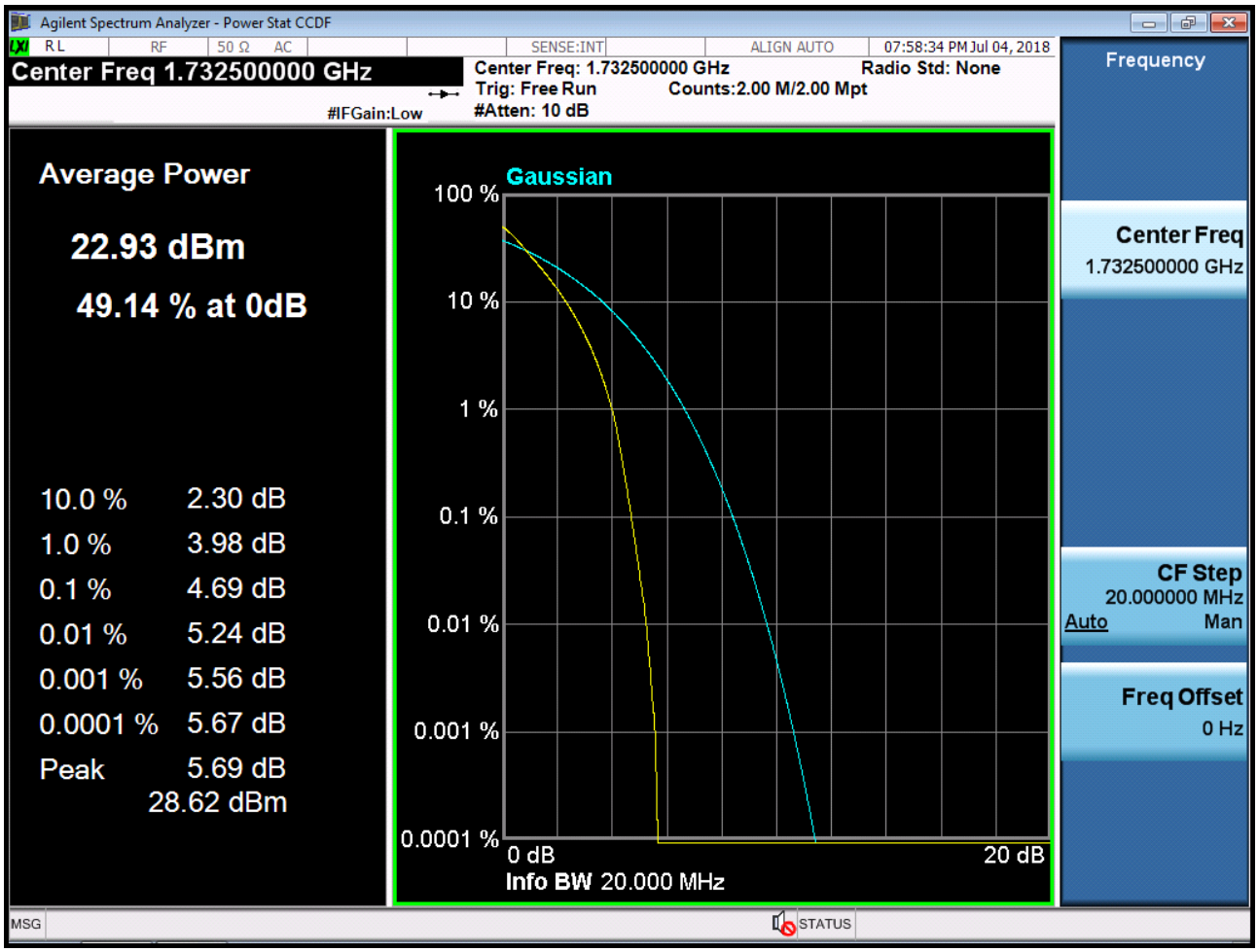
BAND 4. PAR Plot (15M BW_Ch.20175_QPSK_RB75_0)



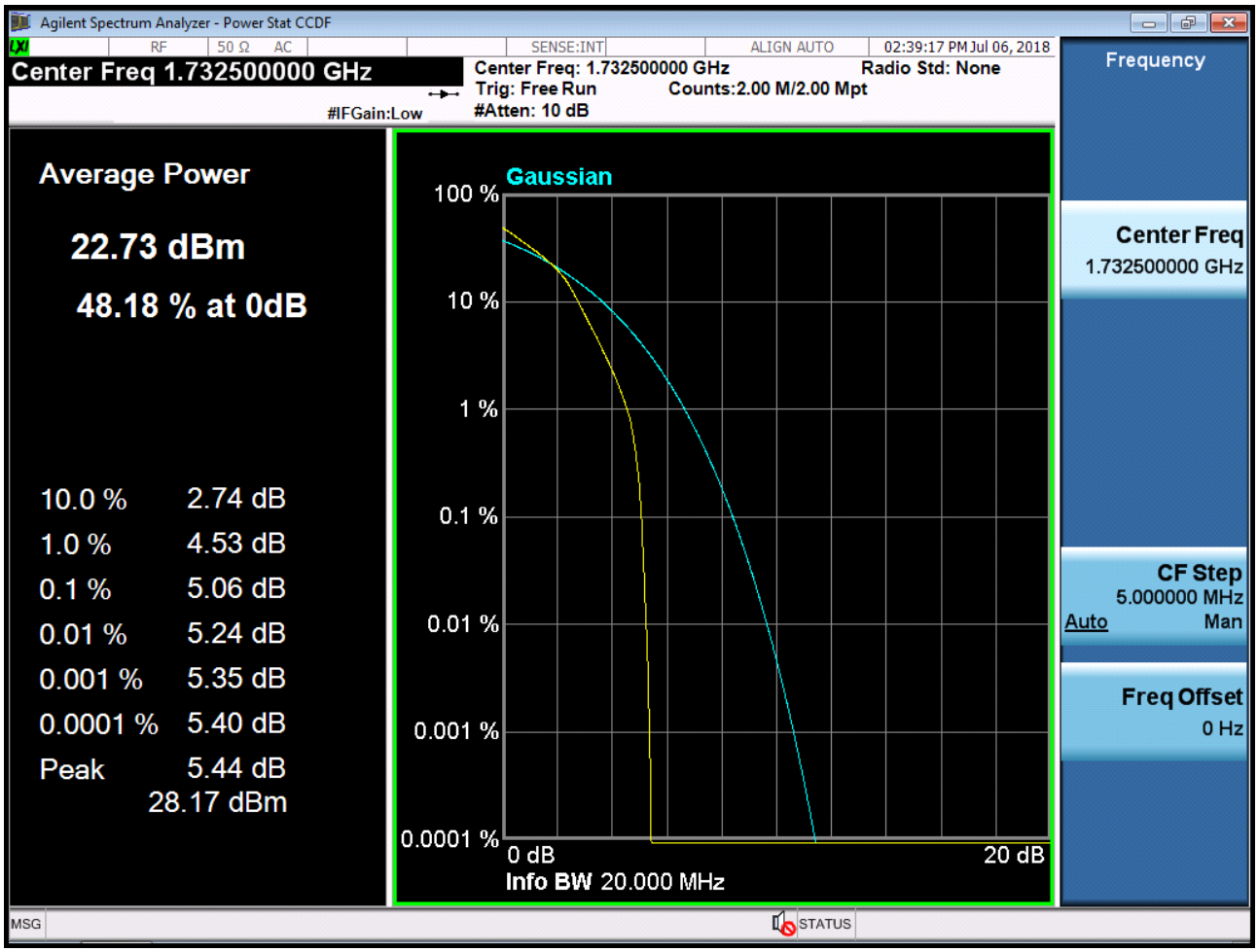
BAND 4. PAR Plot (15M BW_Ch.20175_16QAM_RB16_0) Partial



BAND 4. PAR Plot (20M BW_Ch.20175_QPSK_RB100_0)



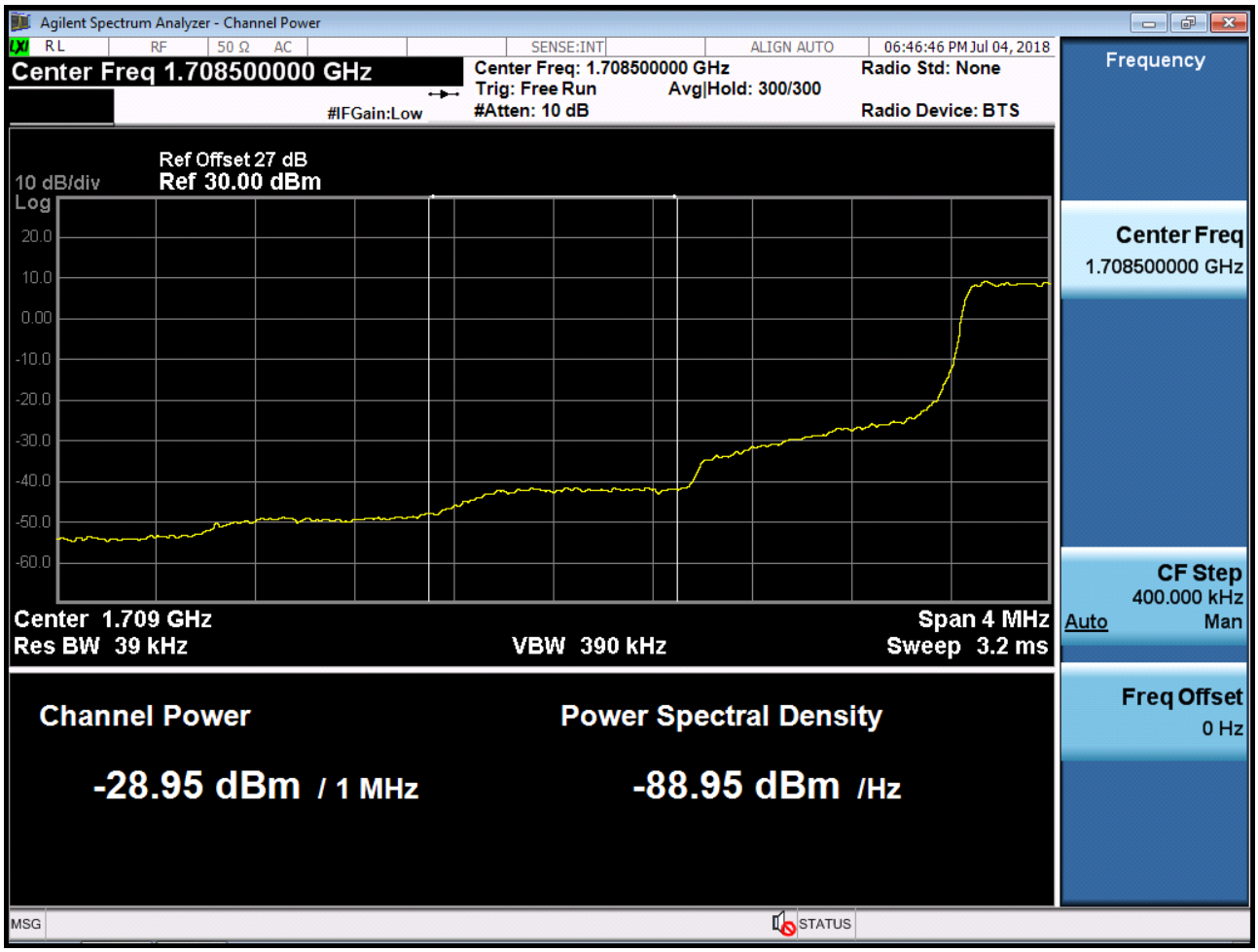
BAND 4. PAR Plot (20M BW_Ch.20175_16QAM_RB18_0) Partial



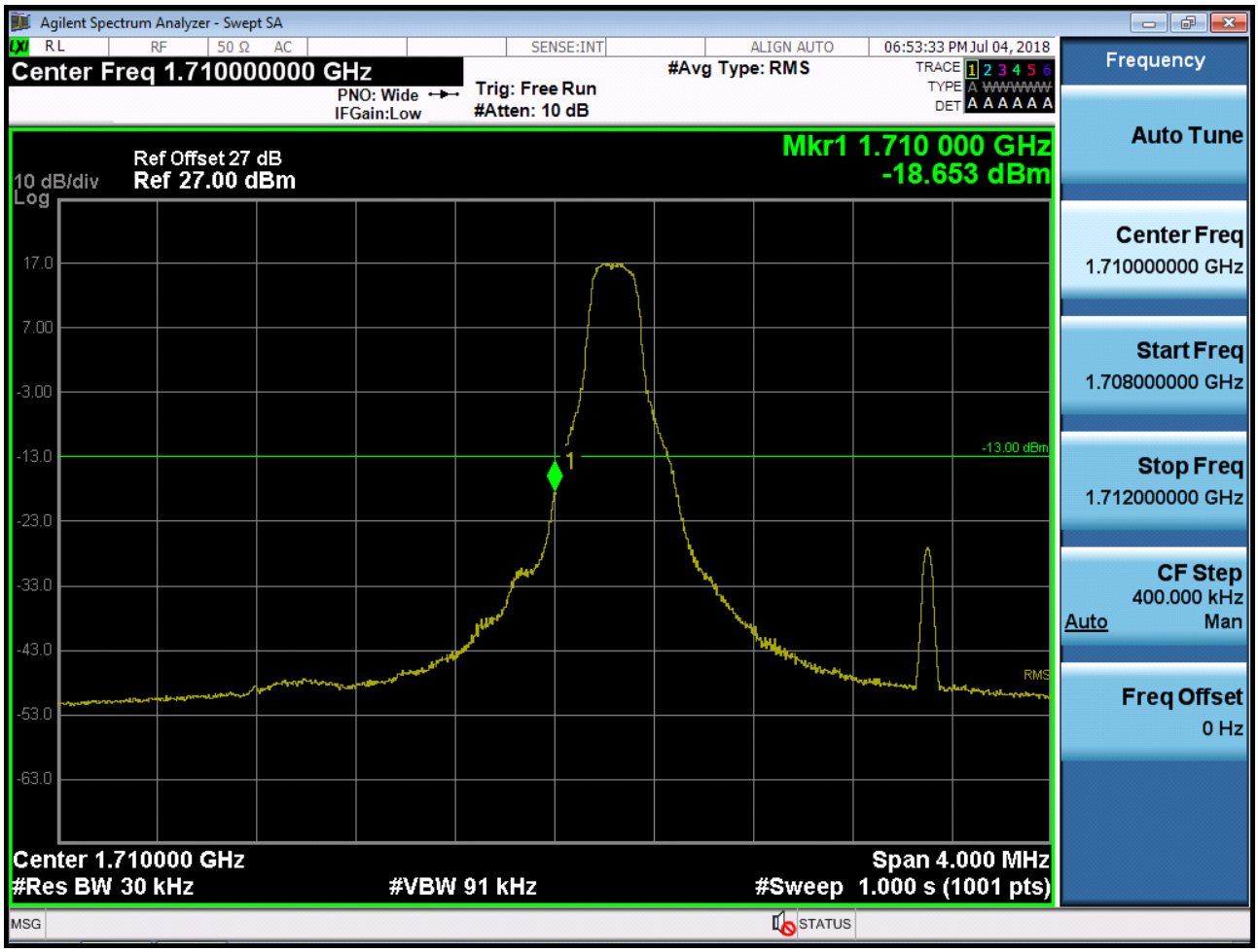
BAND 4. Lower Band Edge Plot (1.4M BW Ch.19957 QPSK RB 1, Offset 0) -1

BAND 4. Lower Band Edge Plot (1.4M BW Ch.19957 QPSK RB 6) -2

BAND 4. Lower Extended Band Edge Plot (1.4M BW Ch.19957 QPSK_RB6_0) -3

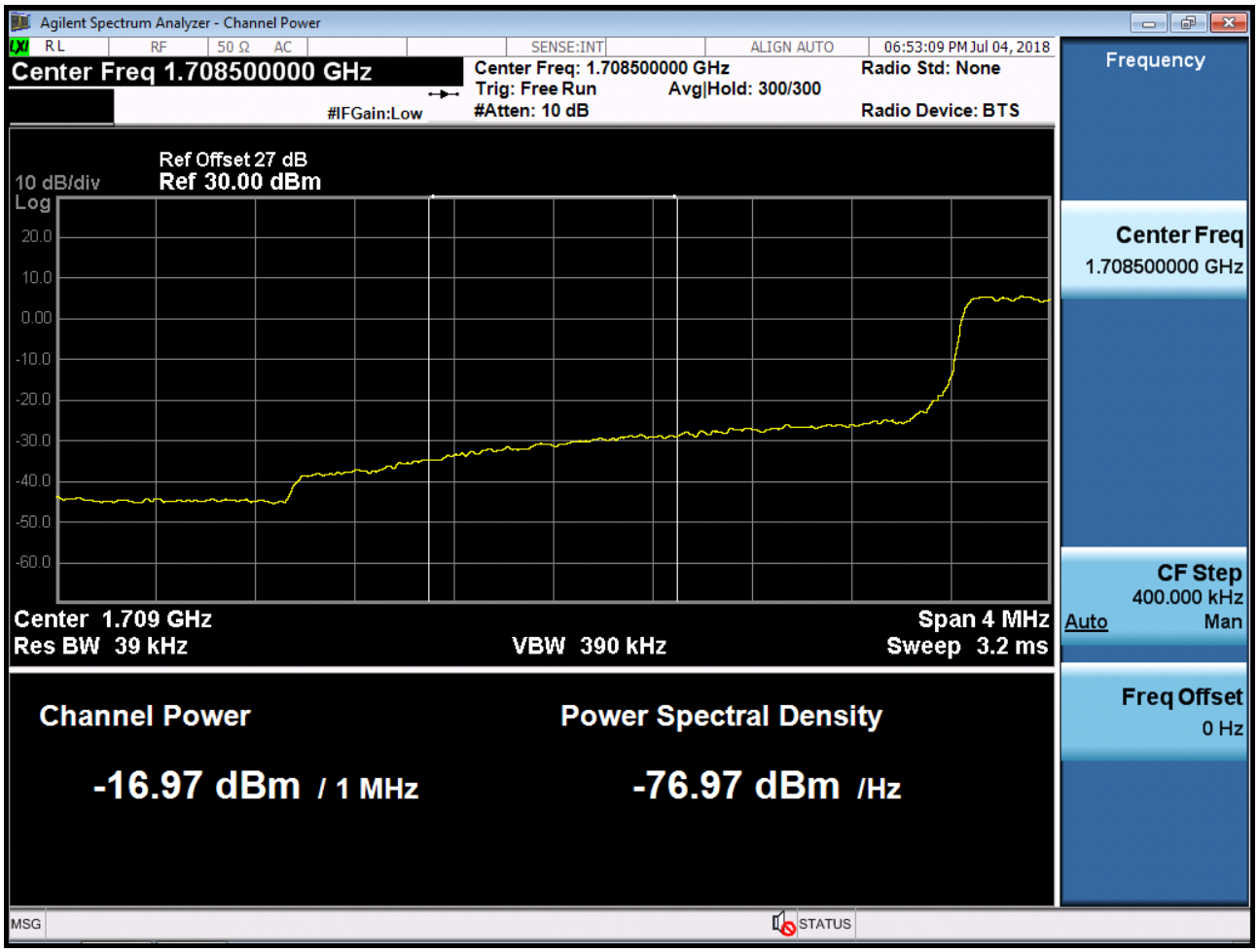


BAND 4. Lower Band Edge Plot (3M BW Ch.19965 QPSK RB 1, Offset 0) -1

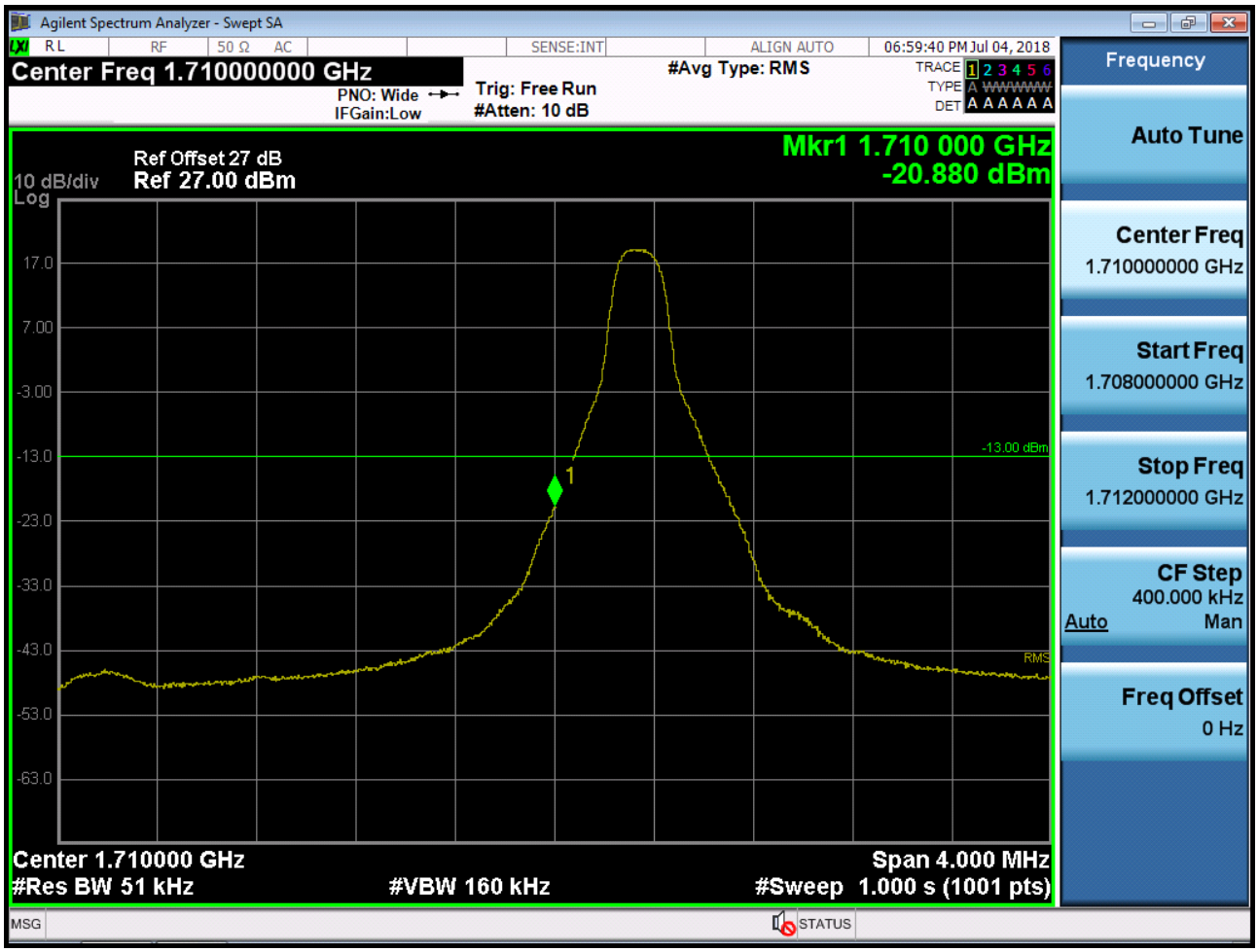


BAND 4. Lower Band Edge Plot (3M BW Ch.19965 QPSK RB 15) -2

BAND 4. Lower Extended Band Edge Plot (3M BW Ch.19965 QPSK_RB15_0) -3

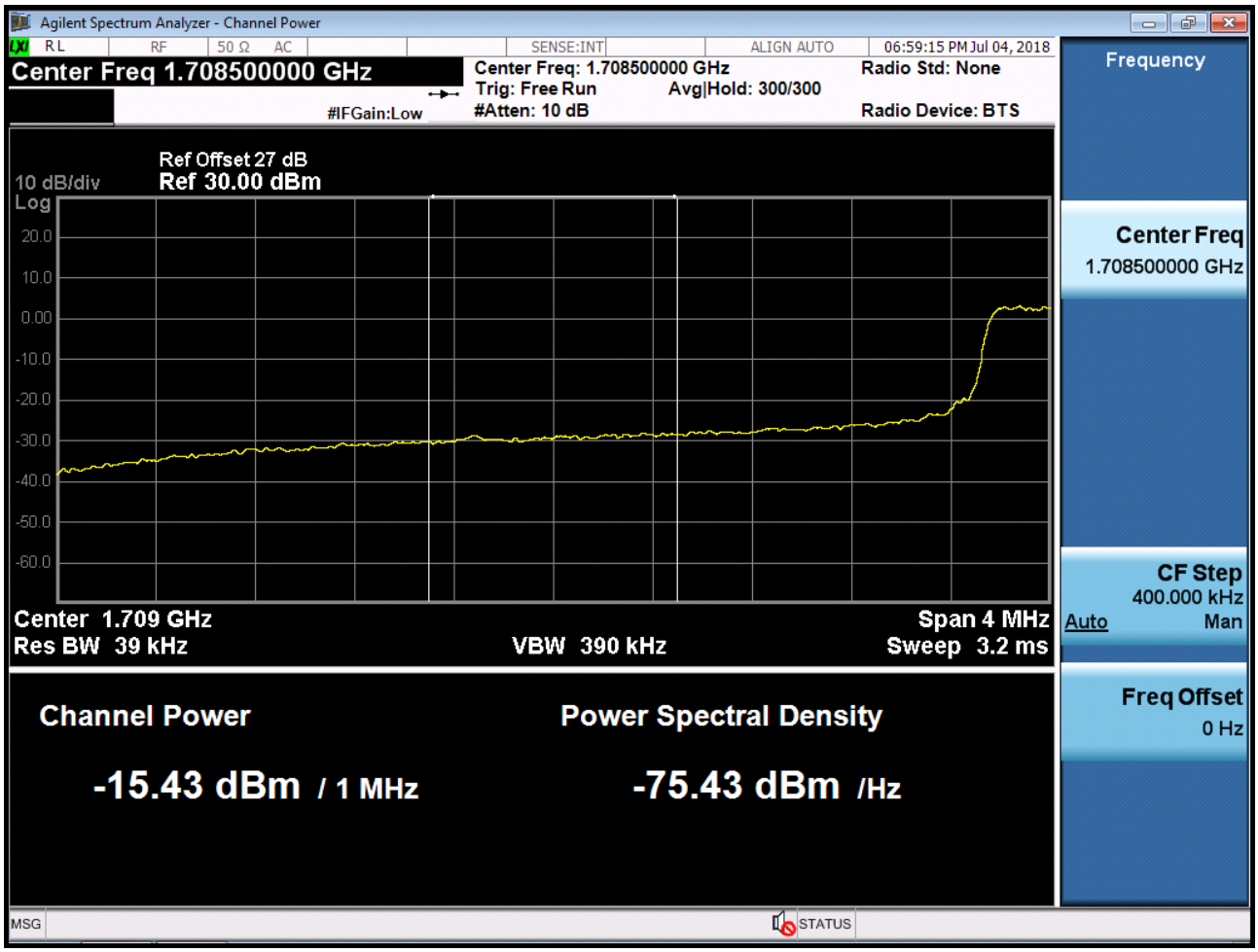


BAND 4. Lower Band Edge Plot (5M BW Ch.19975 QPSK RB 1, Offset 0) -1

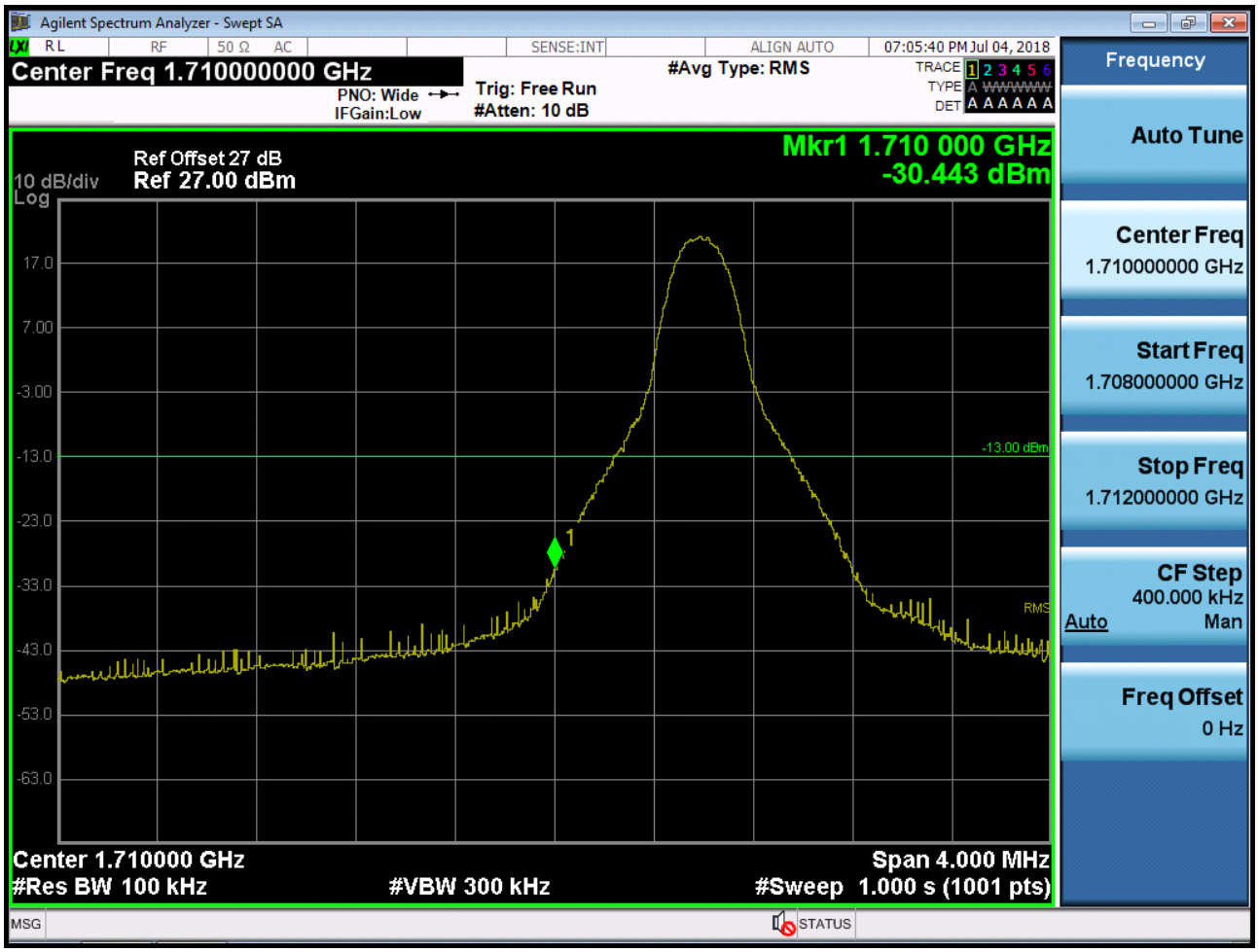


BAND 4. Lower Band Edge Plot (5M BW Ch.19975 QPSK RB 25) -2

BAND 4. Lower Extended Band Edge Plot (5M BW Ch.19975 QPSK_RB25_0) -3

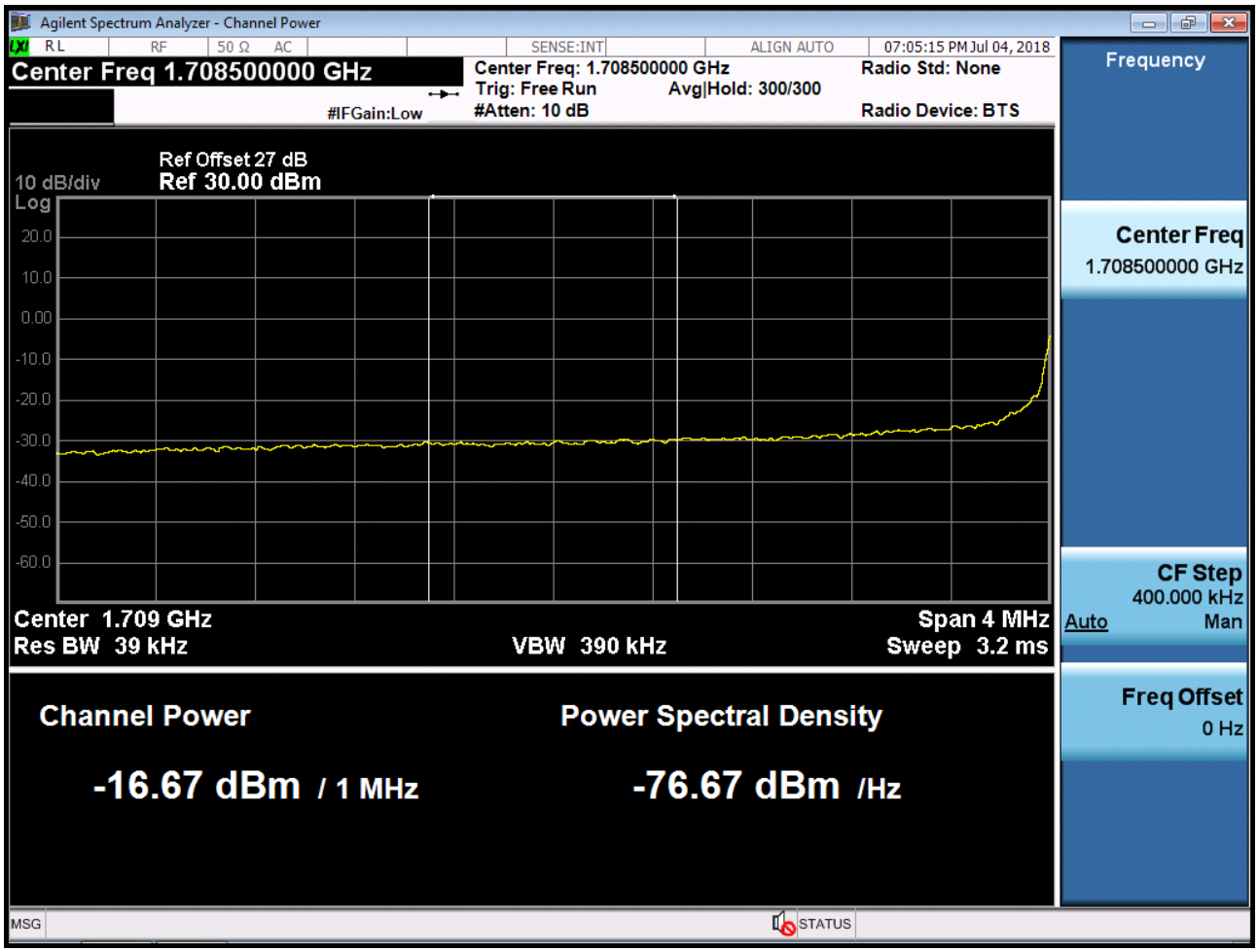


BAND 4. Lower Band Edge Plot (10M BW Ch.20000 QPSK RB 1, Offset 0) -1



BAND 4. Lower Band Edge Plot (10M BW Ch.20000 QPSK RB 50) -2

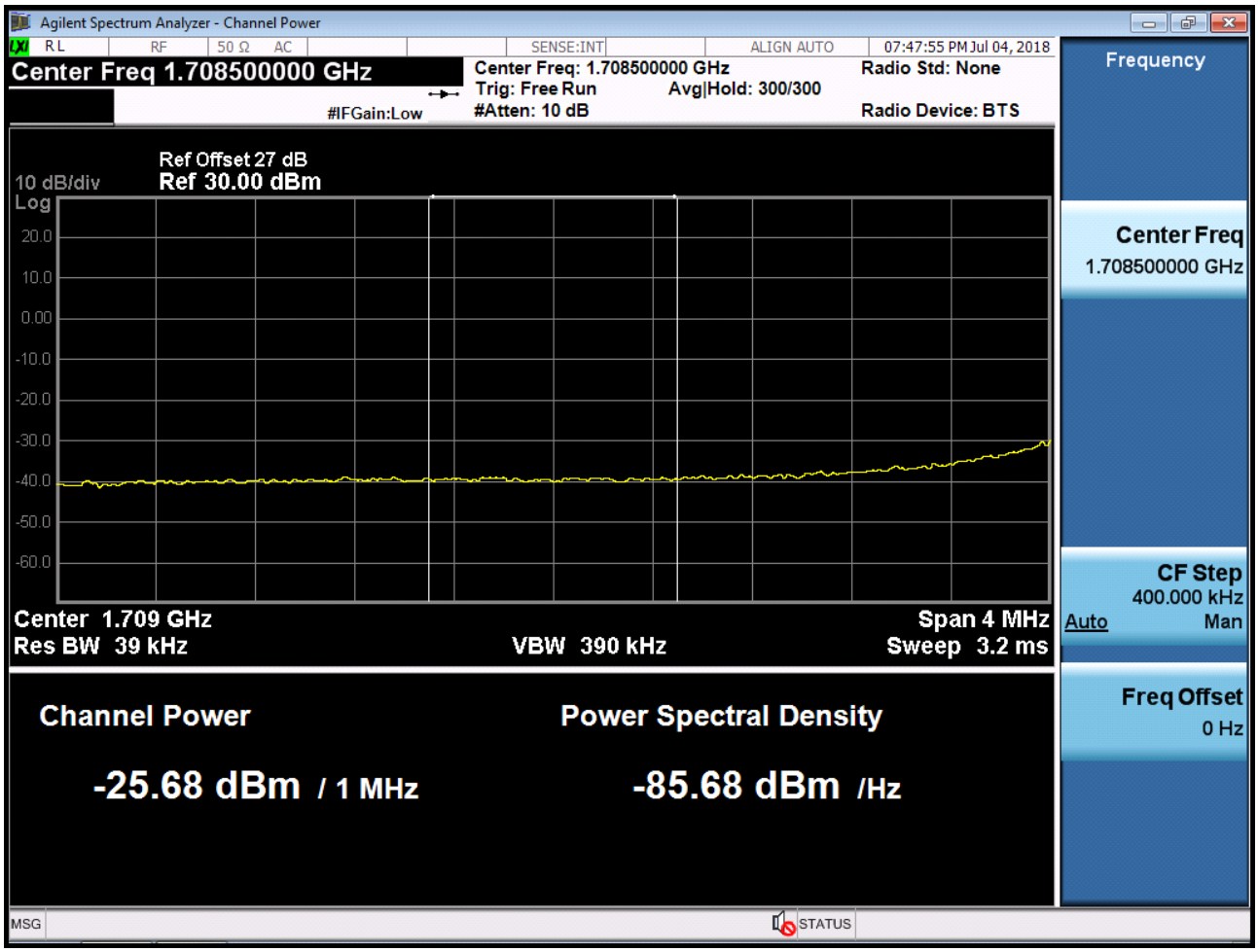
BAND 4. Lower Extended Band Edge Plot (10M BW Ch.20000 QPSK_RB50_0) -3



BAND 4. Lower Band Edge Plot (15M BW Ch.20025 QPSK RB 1, Offset 0) -1

BAND 4. Lower Band Edge Plot (15M BW Ch.20025 QPSK RB 75) -2

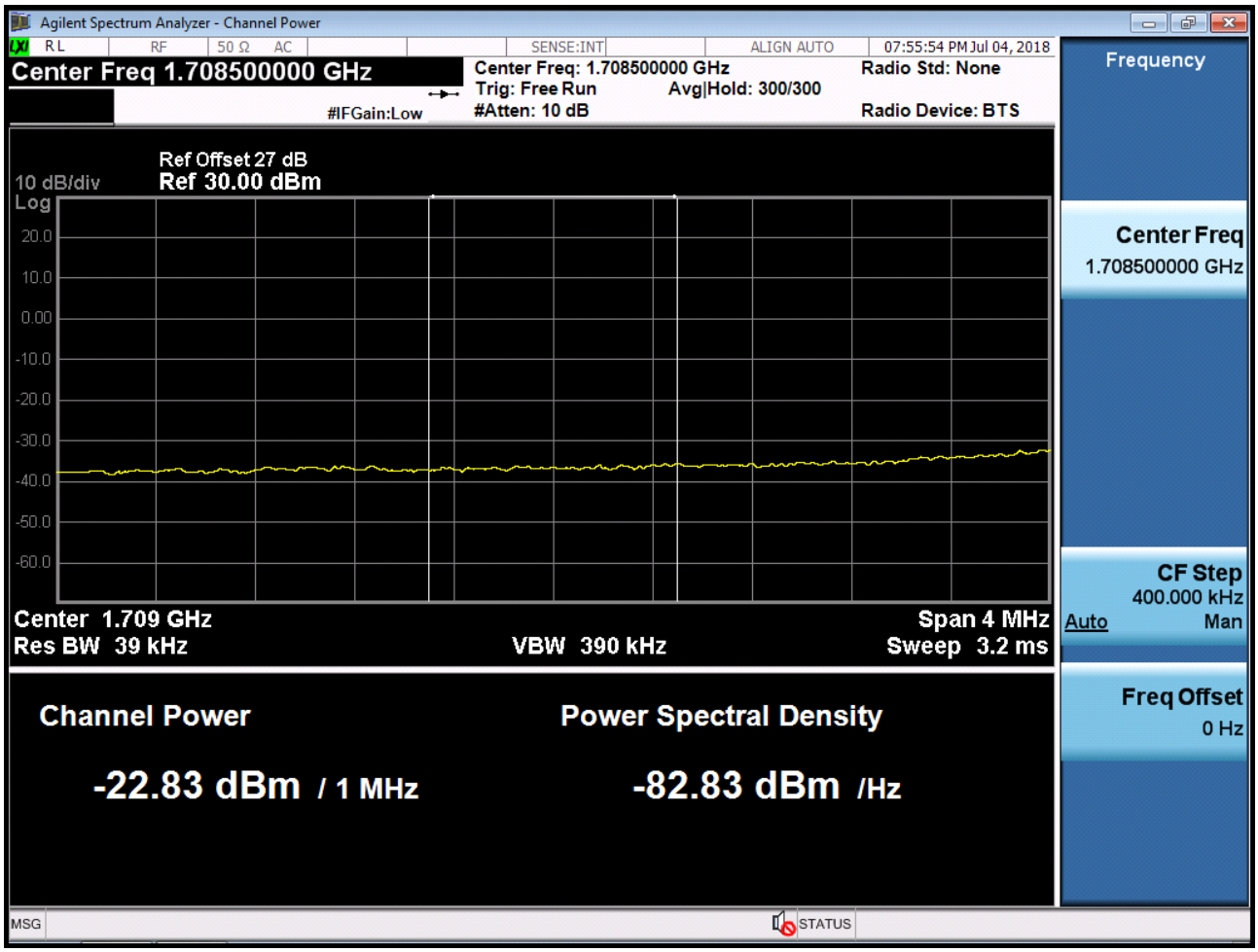
BAND 4. Lower Extended Band Edge Plot (15M BW Ch.20025 QPSK_RB75_0) -3



BAND 4. Lower Band Edge Plot (20M BW Ch.20050 QPSK RB 1, Offset 0) -1

BAND 4. Lower Band Edge Plot (20M BW Ch.20050 QPSK RB 100) -2

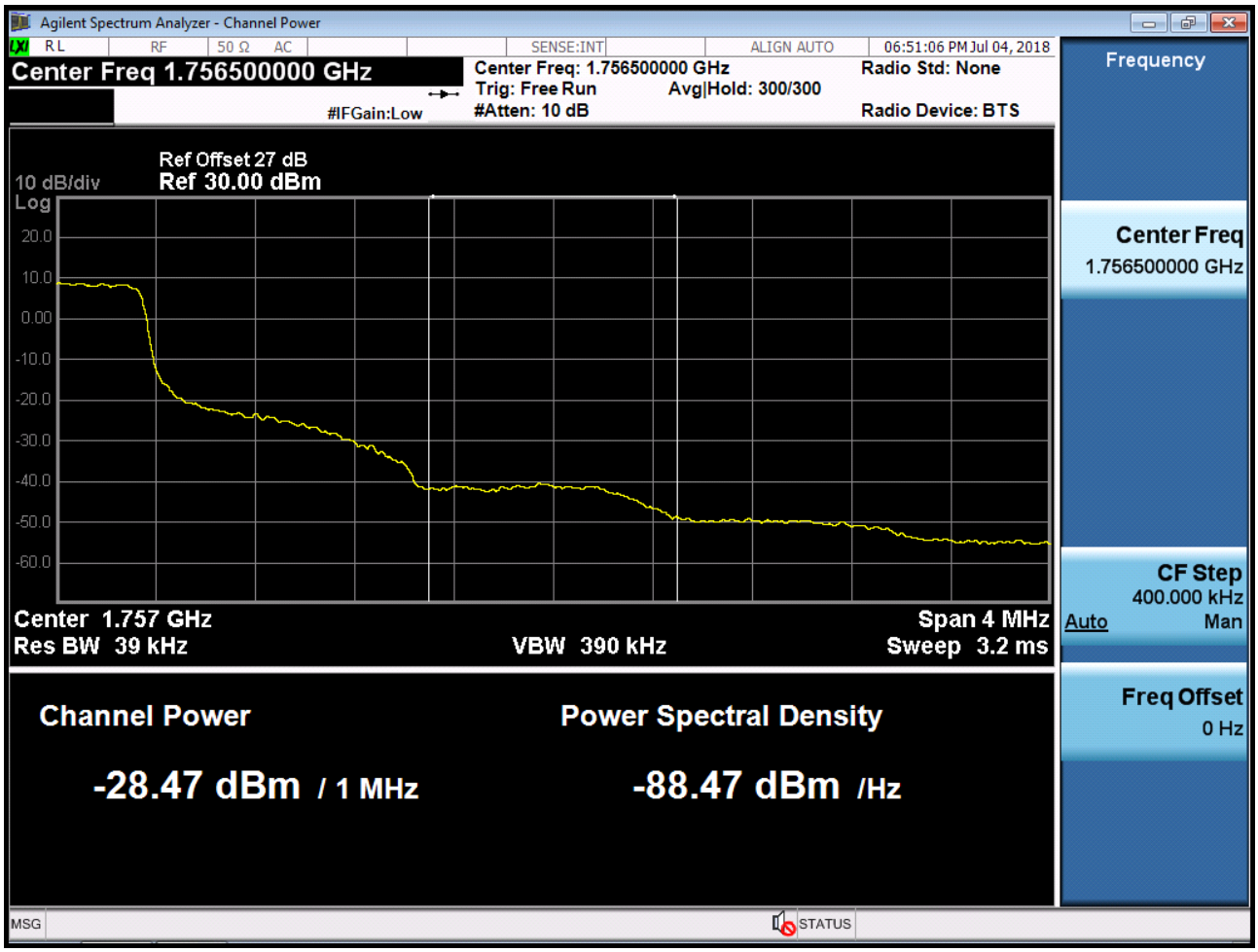
BAND 4. Lower Extended Band Edge Plot (20M BW Ch.20050 QPSK_RB100_0) -3



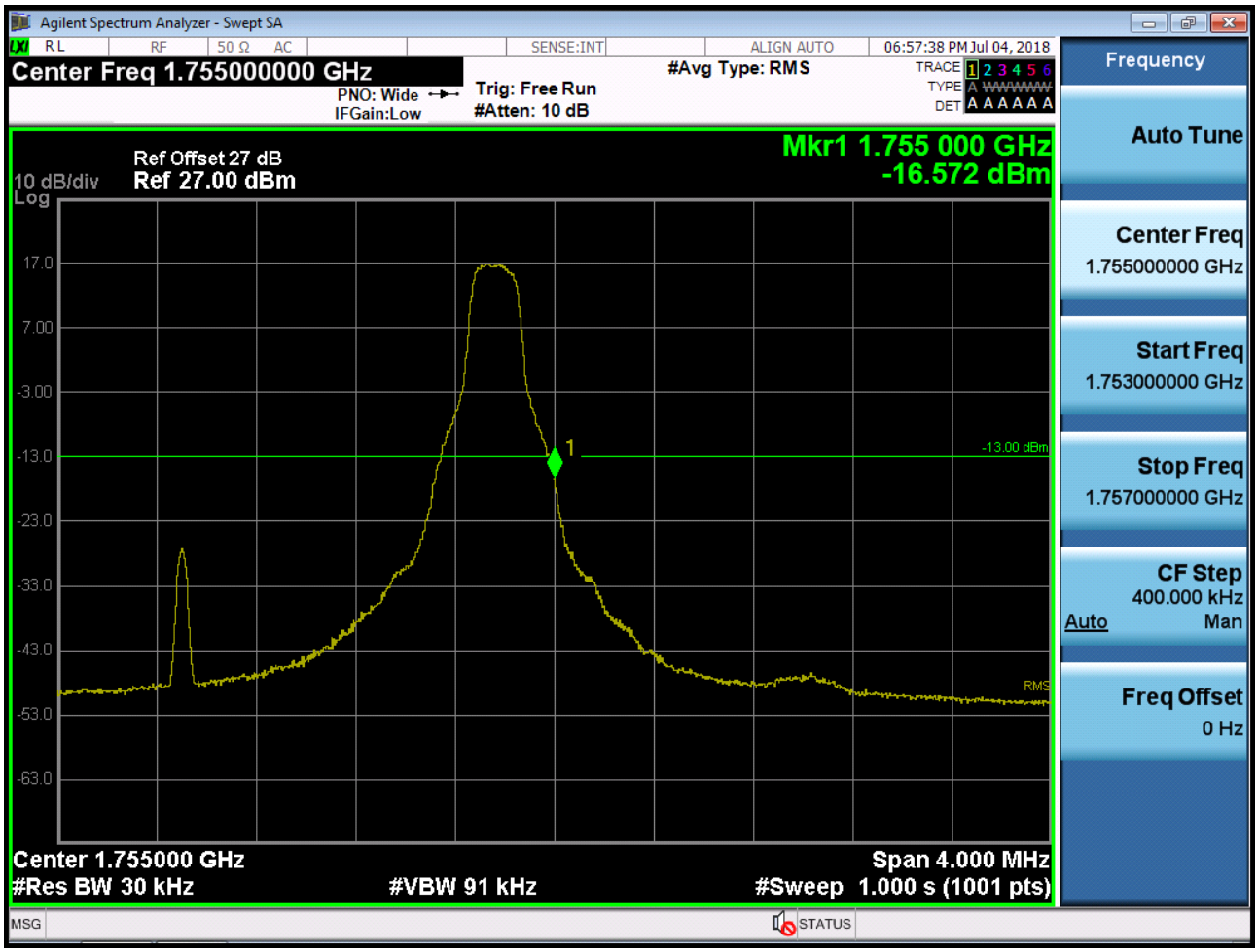
BAND 4. Upper Band Edge Plot (1.4M BW Ch.20393 QPSK_RB1_Offset 5) -1

BAND 4. Upper Band Edge Plot (1.4M BW Ch.20393 QPSK_RB6) -2

BAND 4. Upper Extended Band Edge Plot (1.4M BW Ch. 20393 QPSK_RB6_0) -3



BAND 4. Upper Band Edge Plot (3M BW Ch.20385 QPSK_RB1_Offset 14) -1



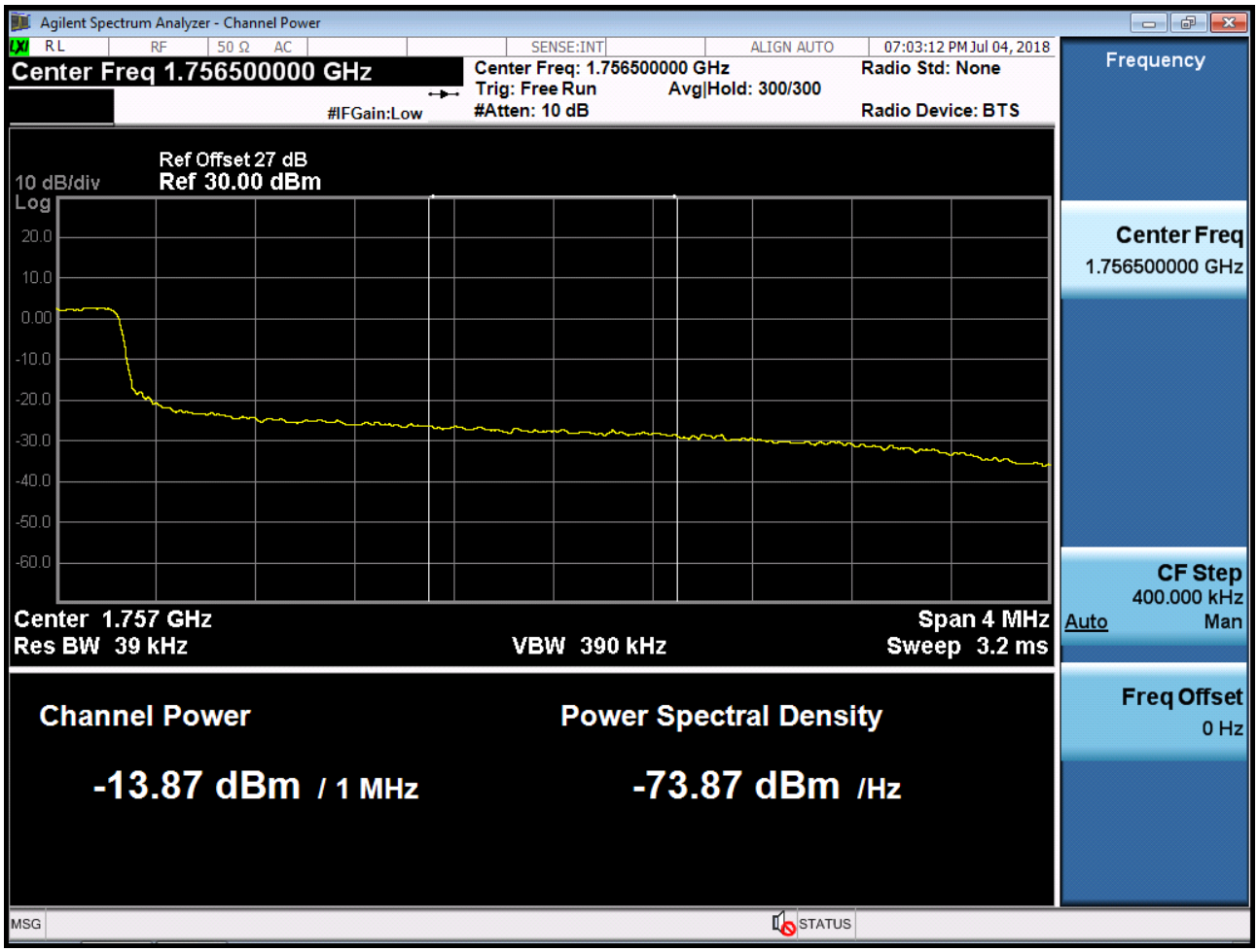
BAND 4. Upper Band Edge Plot (3M BW Ch.20385 QPSK_RB15) -2

BAND 4. Upper Extended Band Edge Plot (3M BW Ch.20385 QPSK_RB15_0) -3

BAND 4. Upper Band Edge Plot (5M BW Ch.20375 QPSK_RB1_Offset 24) -1

BAND 4. Upper Band Edge Plot (5M BW Ch.20375 QPSK_RB25) -2

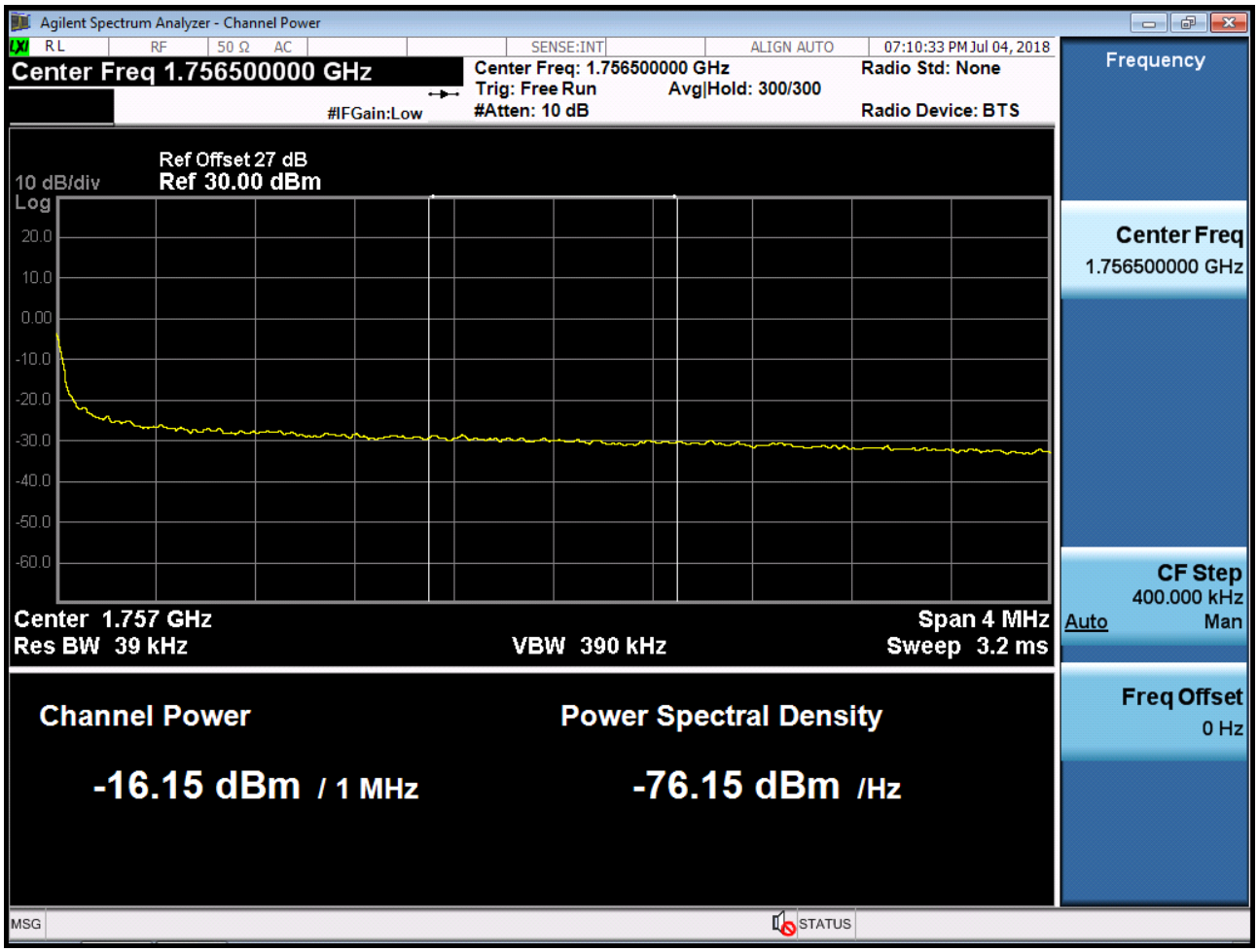
BAND 4. Upper Extended Band Edge Plot (5M BW Ch.20375 QPSK_RB25) -3



BAND 4. Upper Band Edge Plot (10M BW Ch.20350 QPSK_RB1_Offset 49) -1

BAND 4. Upper Band Edge Plot (10M BW Ch.20350 QPSK_RB50) -2

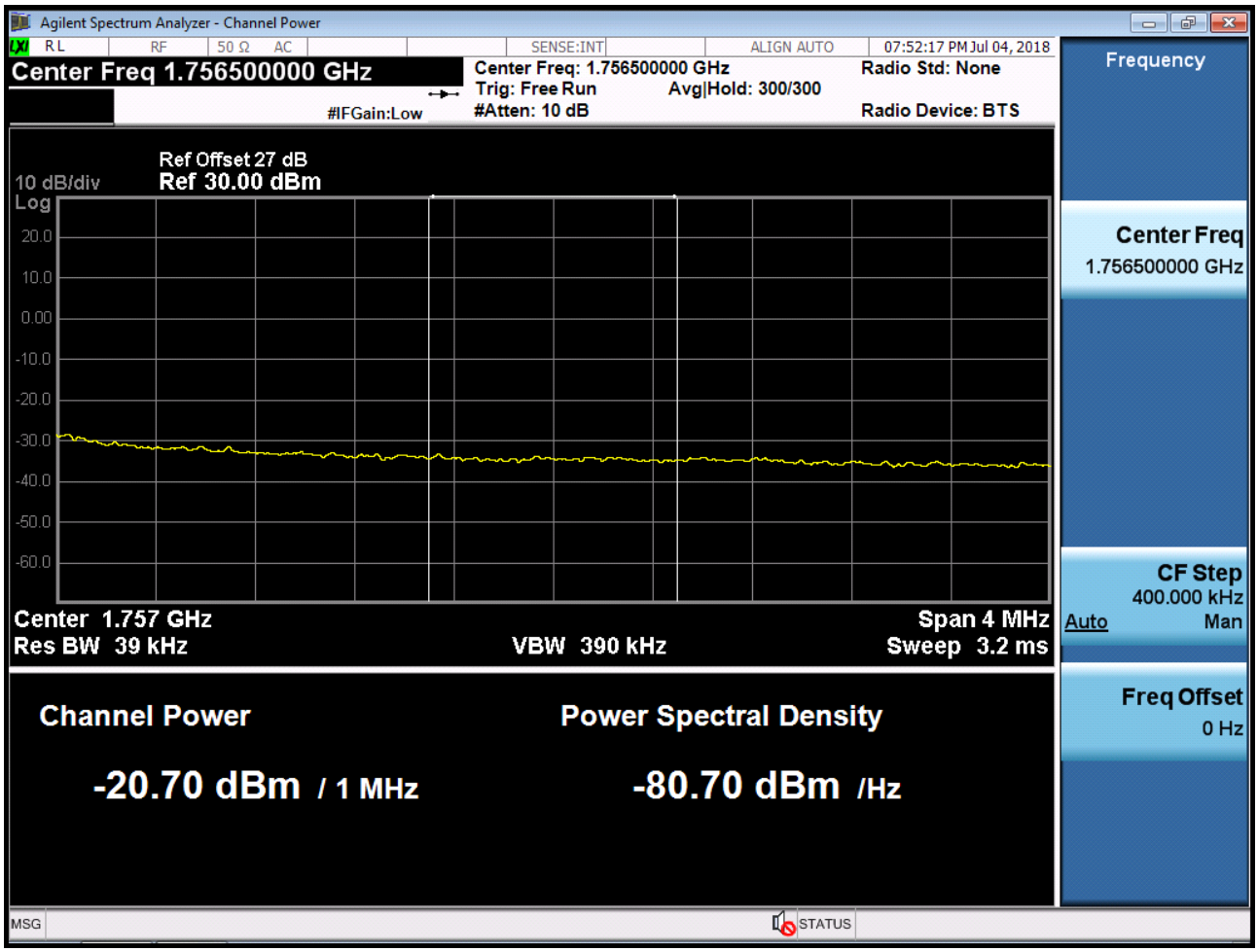
BAND 4. Upper Extended Band Edge Plot (10M BW Ch.20350 QPSK_RB50) -3



BAND 4. Upper Band Edge Plot (15M BW Ch.20325 QPSK_RB1_Offset 74) -1

BAND 4. Upper Band Edge Plot (15M BW Ch.20325 QPSK_RB75) -2

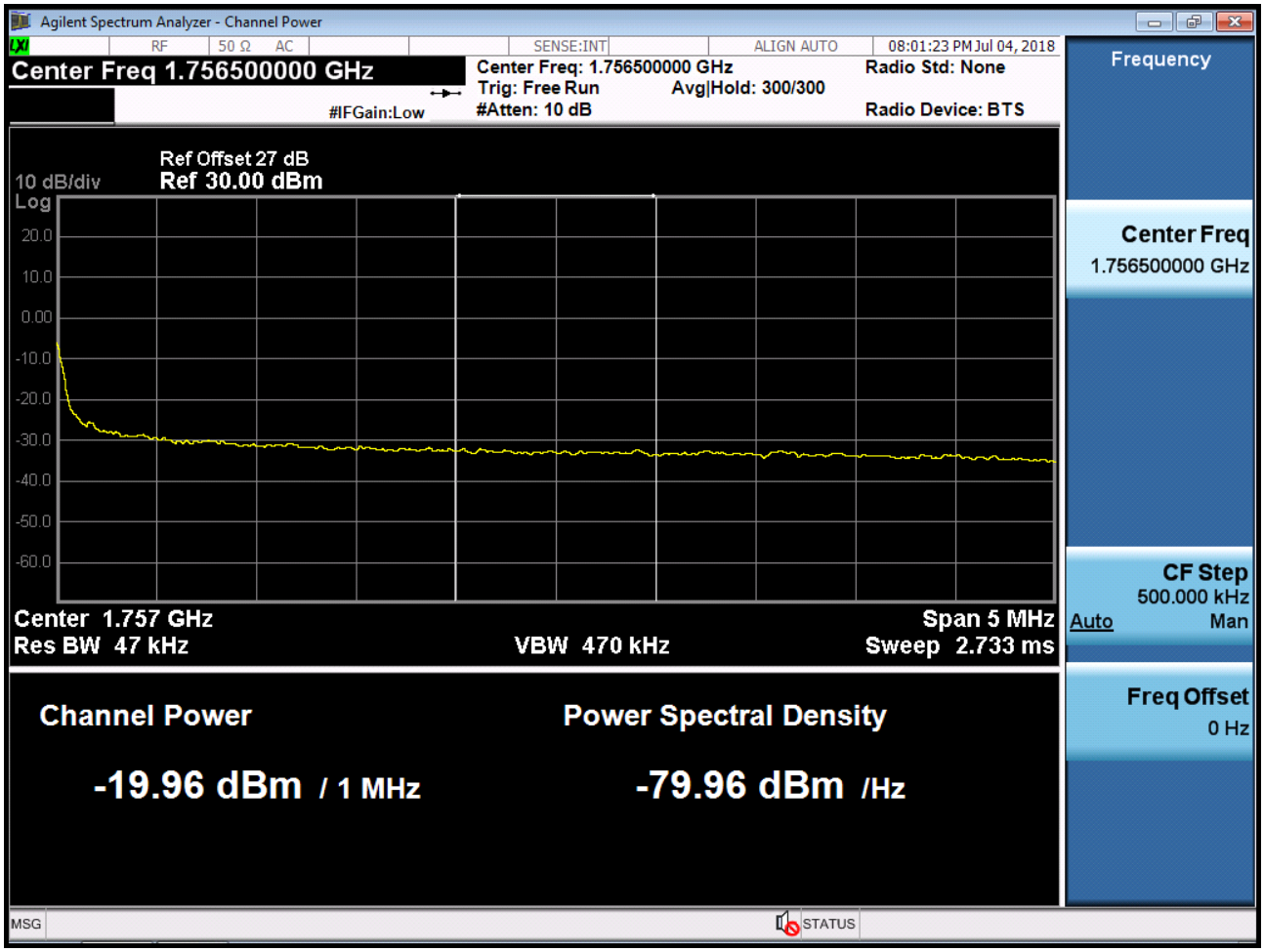
BAND 4. Upper Extended Band Edge Plot (15M BW Ch.20325 QPSK_RB75) -3



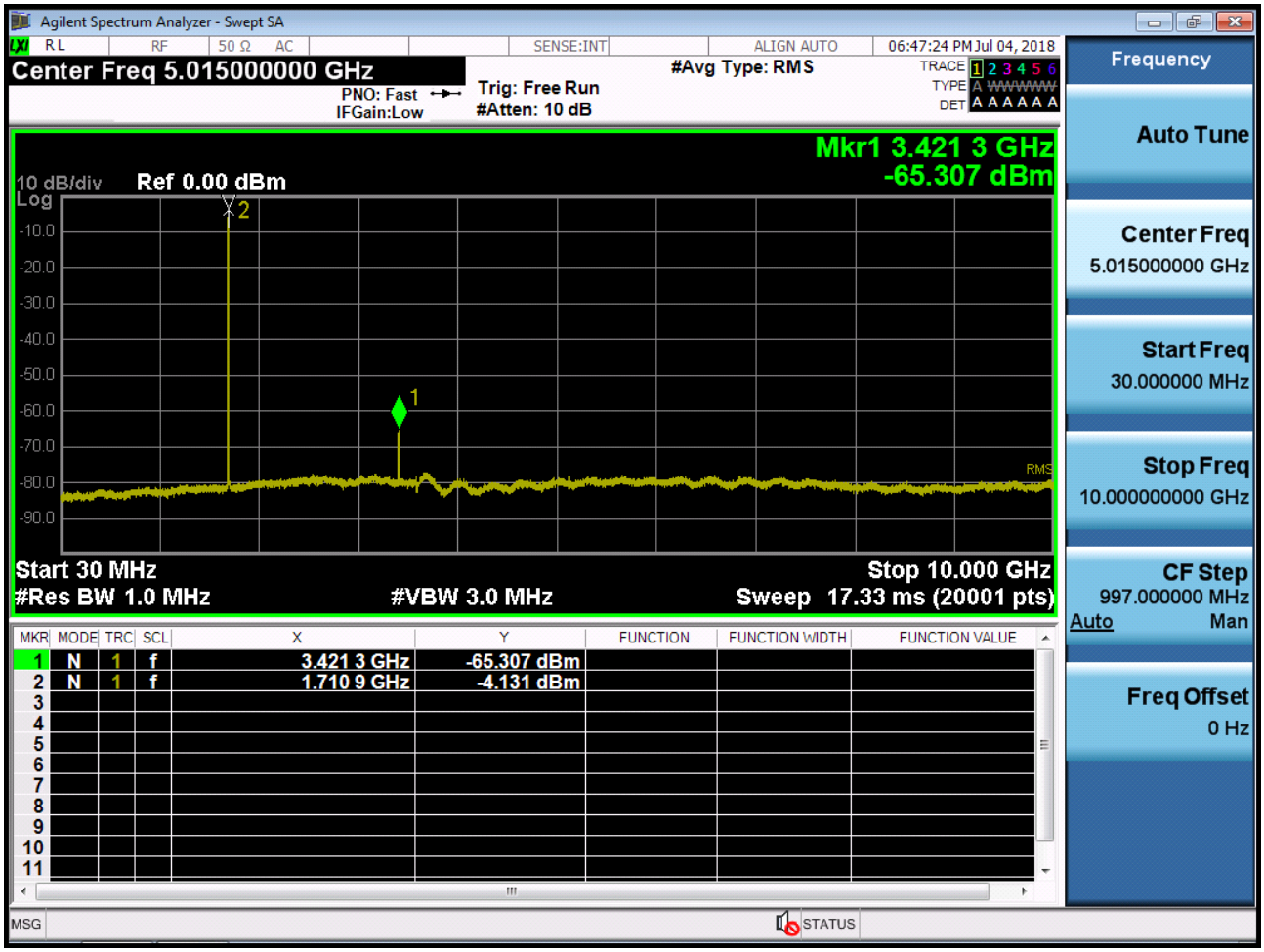
BAND 4. Upper Band Edge Plot (20M BW Ch.20300 QPSK_RB1_Offset 99) -1

BAND 4. Upper Band Edge Plot (20M BW Ch.20300 QPSK_RB100) -2

BAND 4. Upper Extended Band Edge Plot (20M BW Ch.20300 QPSK_RB100) -3

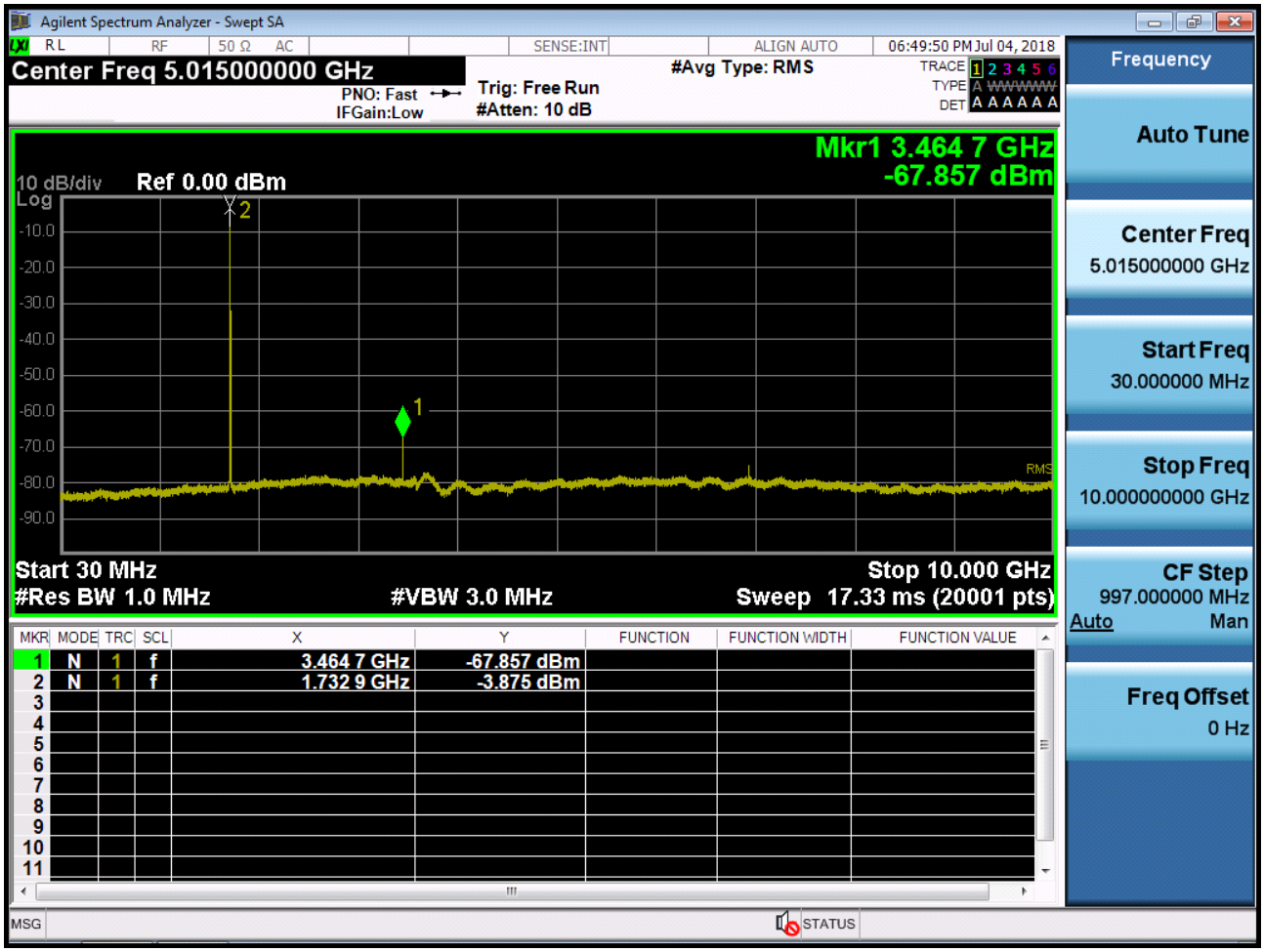


BAND 4. Conducted Spurious Plot_1 (19957ch_1.4MHz_QPSK_RB 1_0)



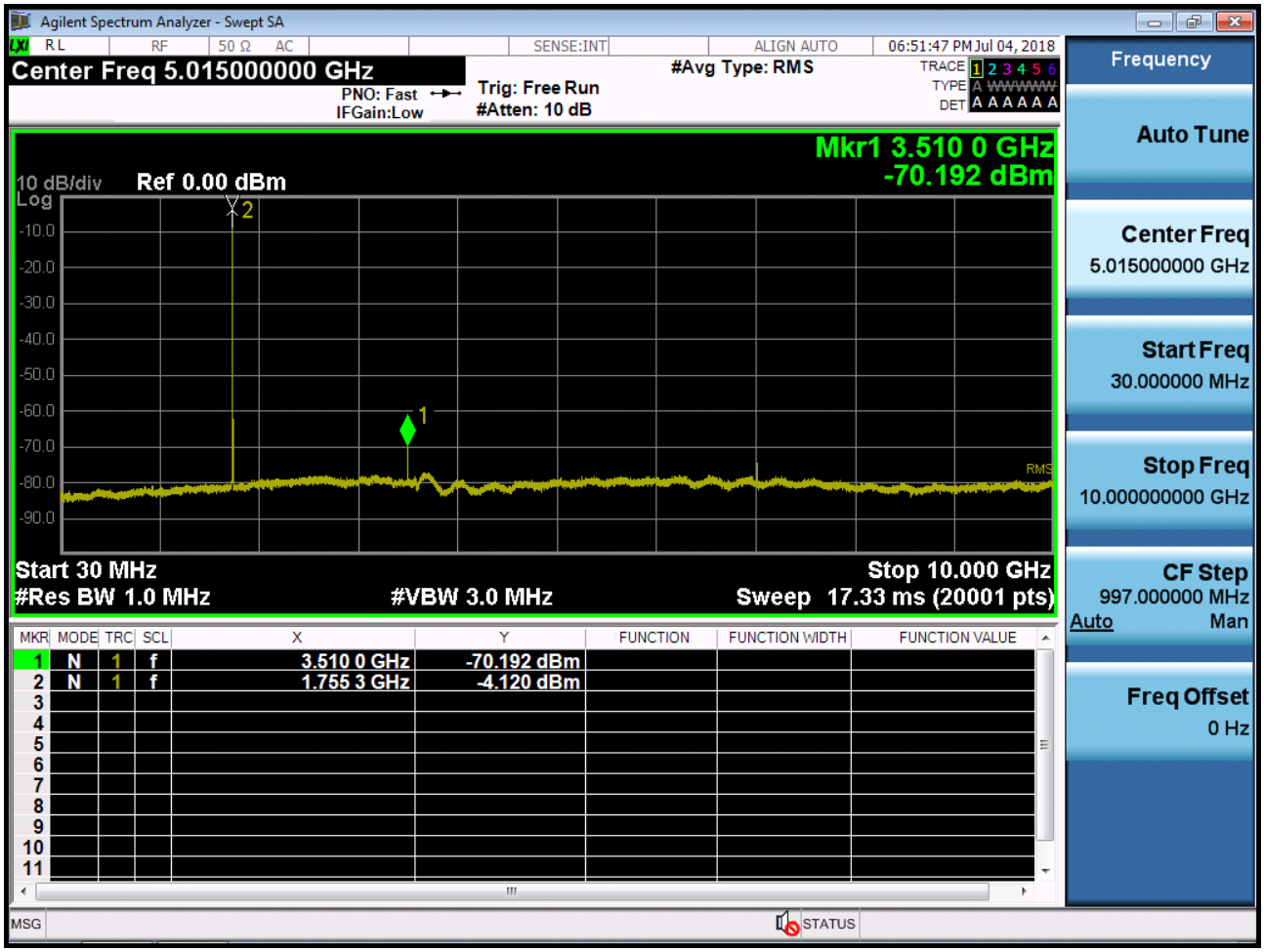
BAND 4. Conducted Spurious Plot_2 (19957ch_1.4MHz_QPSK_ RB 1_0)

BAND 4. Conducted Spurious Plot_1 (20175ch_1.4MHz_QPSK_ RB 1_0)



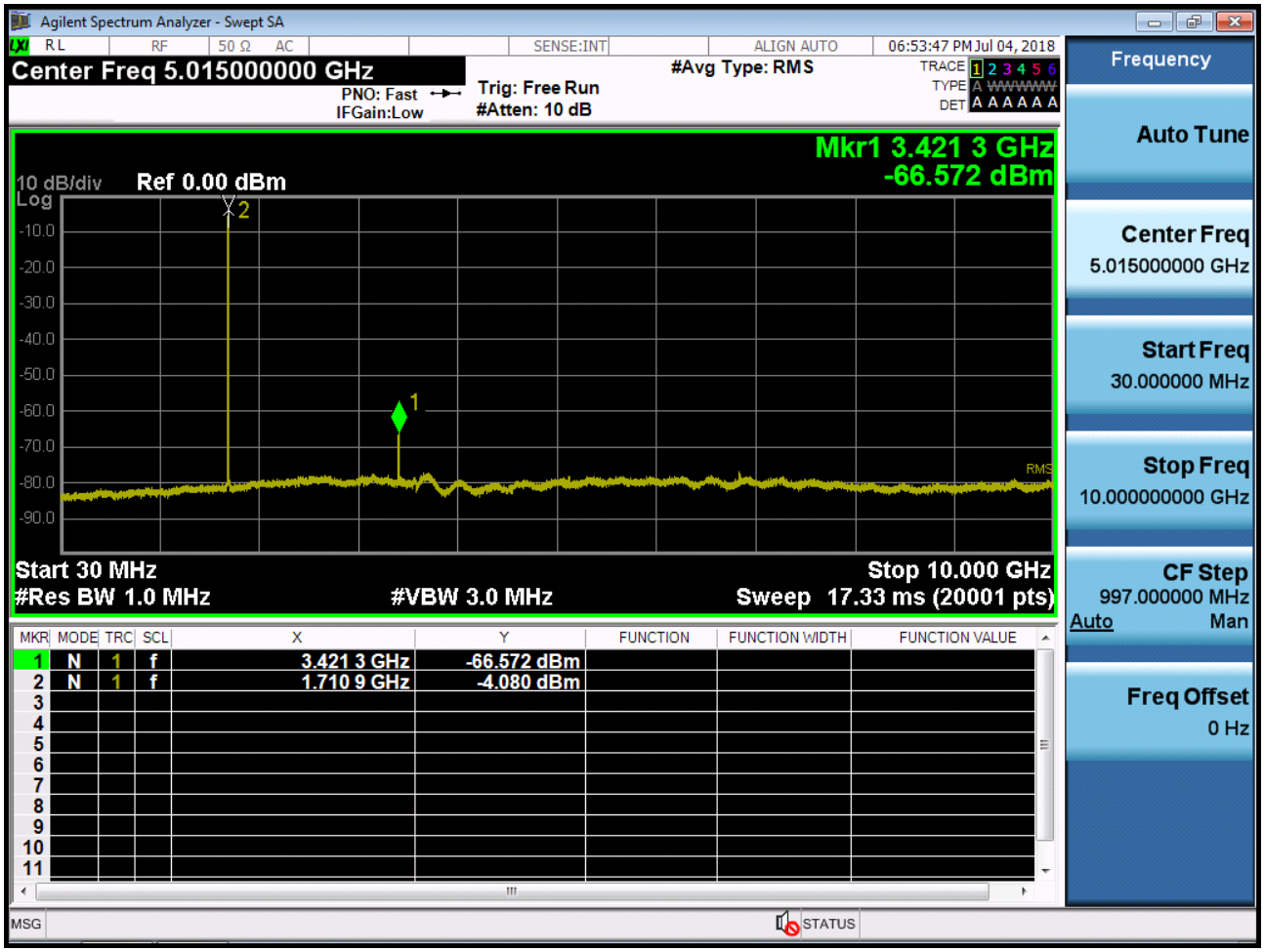
BAND 4. Conducted Spurious Plot_2 (20175ch_1.4MHz_QPSK_ RB 1_0)

BAND 4. Conducted Spurious Plot_1 (20393ch_1.4MHz_QPSK_ RB 1_0)



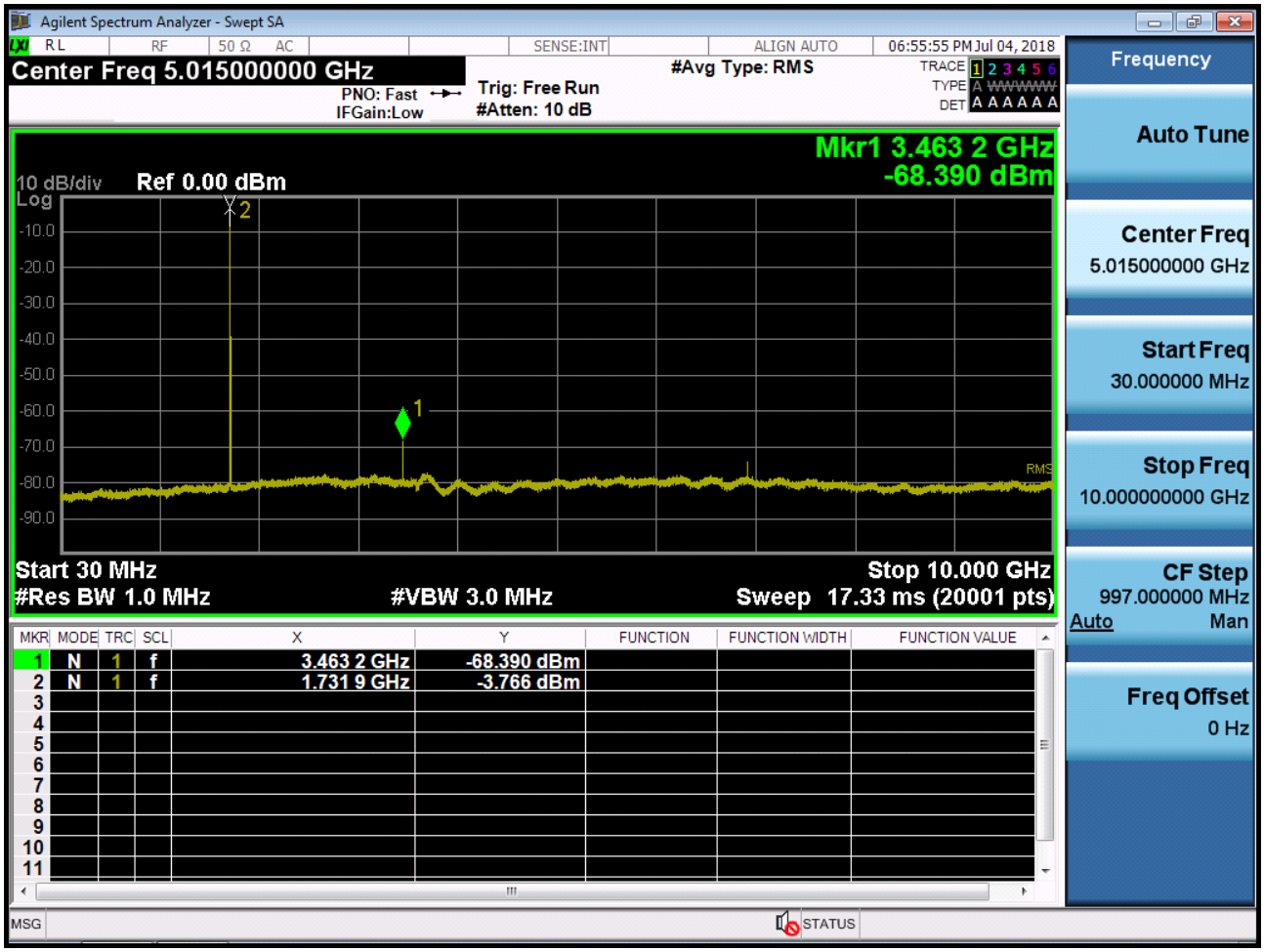
BAND 4. Conducted Spurious Plot_2 (20393ch_1.4MHz_QPSK_ RB 1_0)

BAND 4. Conducted Spurious Plot_1 (19965ch_3MHz_QPSK_ RB 1_0)



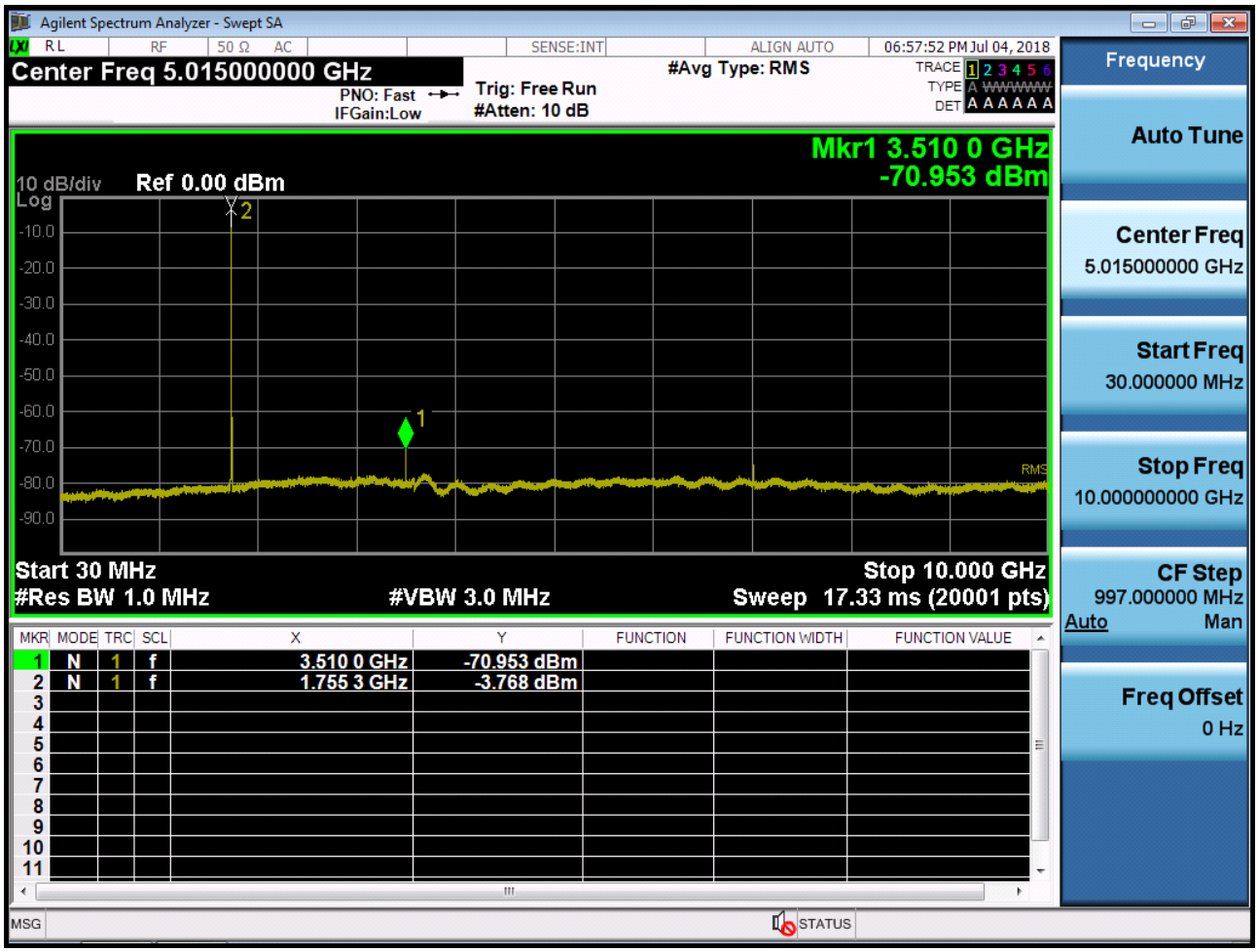
BAND 4. Conducted Spurious Plot_2 (19965ch_3MHz_QPSK_ RB 1_0)

BAND 4. Conducted Spurious Plot_1 (20175ch_3MHz_QPSK_ RB 1_0)



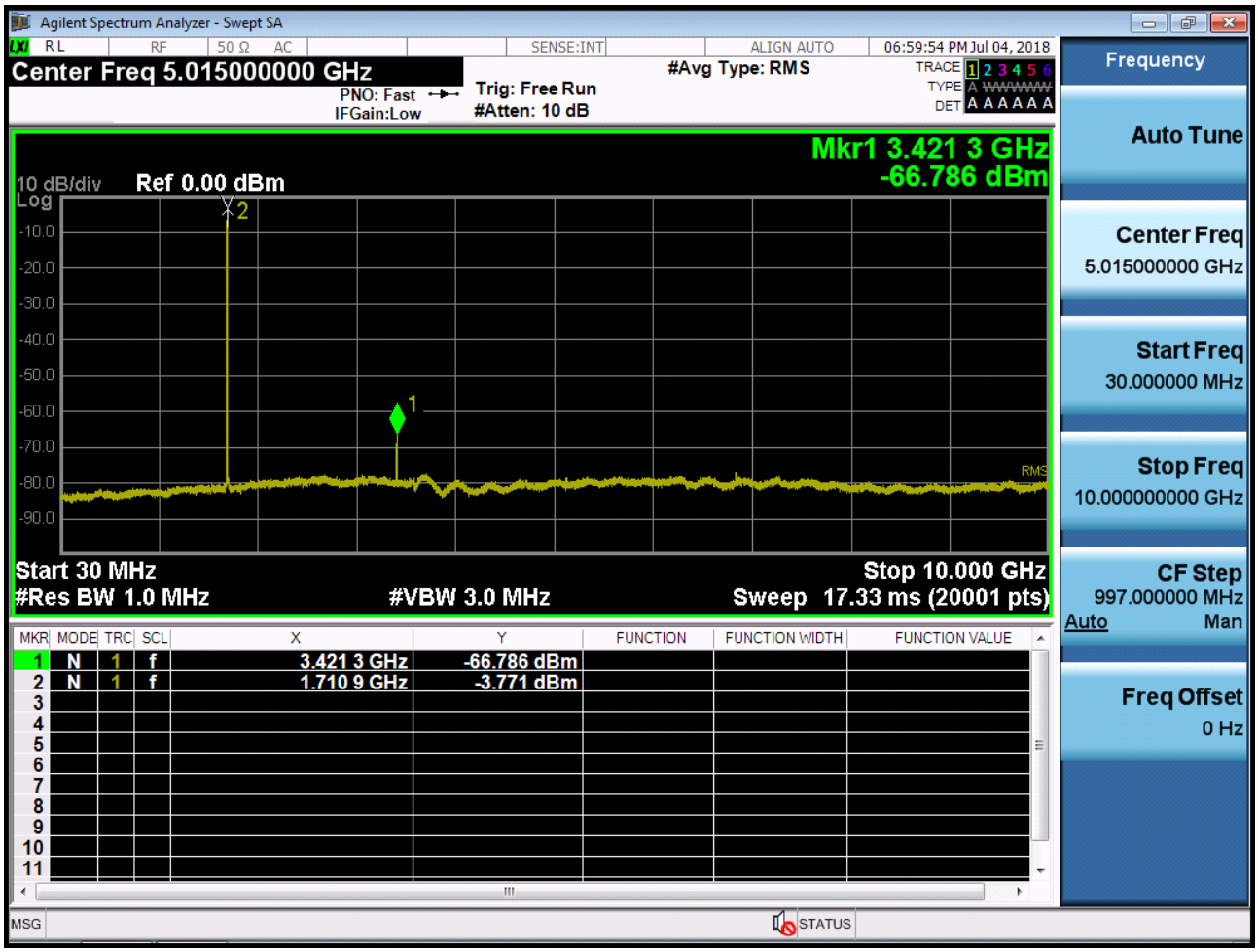
BAND 4. Conducted Spurious Plot_2 (20175ch_3MHz_QPSK_ RB 1_0)

BAND 4. Conducted Spurious Plot_1 (20385ch_3MHz_QPSK_ RB 1_0)



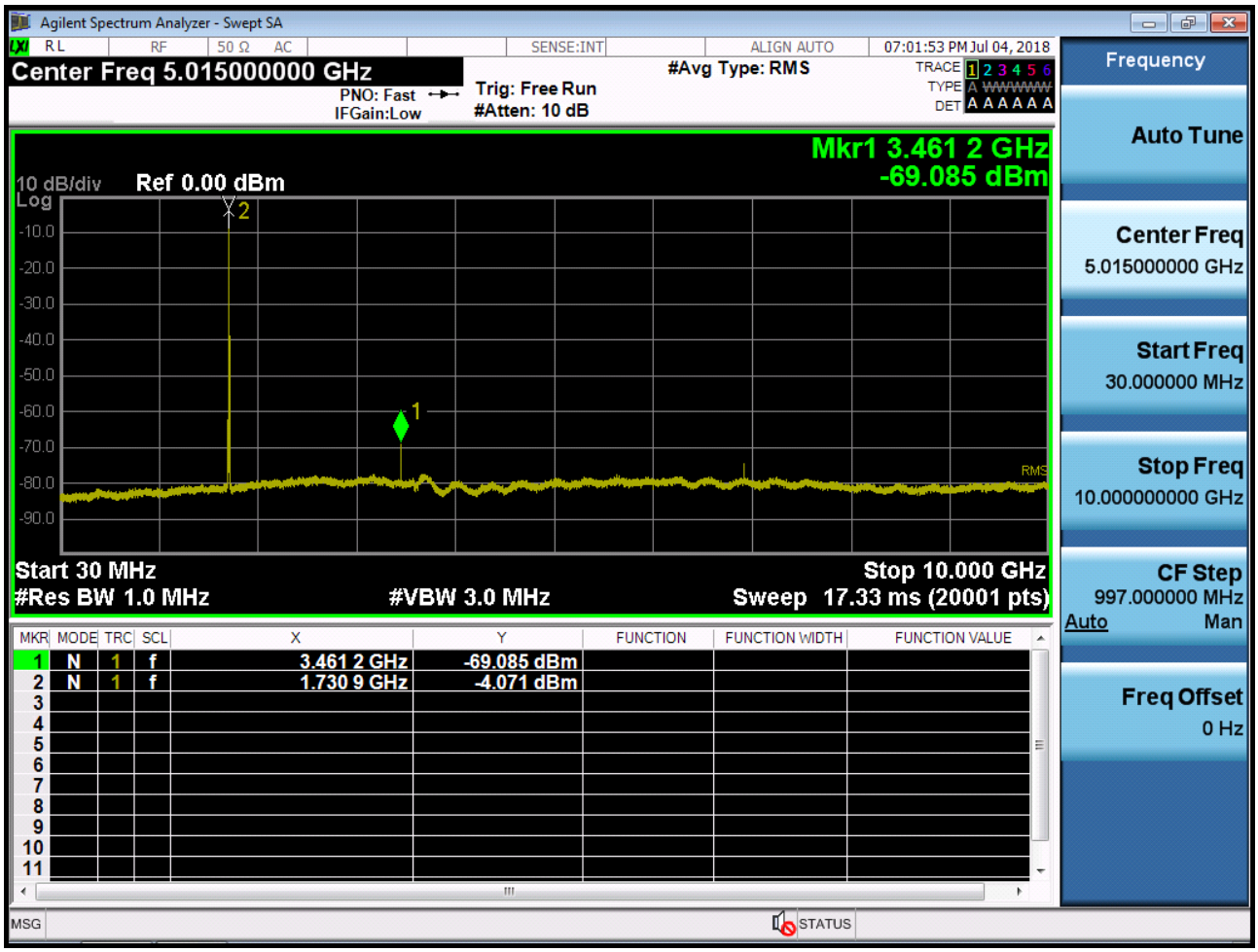
BAND 4. Conducted Spurious Plot_2 (20385ch_3MHz_QPSK_ RB 1_0)

BAND 4. Conducted Spurious Plot_1 (19975ch_5MHz_QPSK_ RB 1_0)



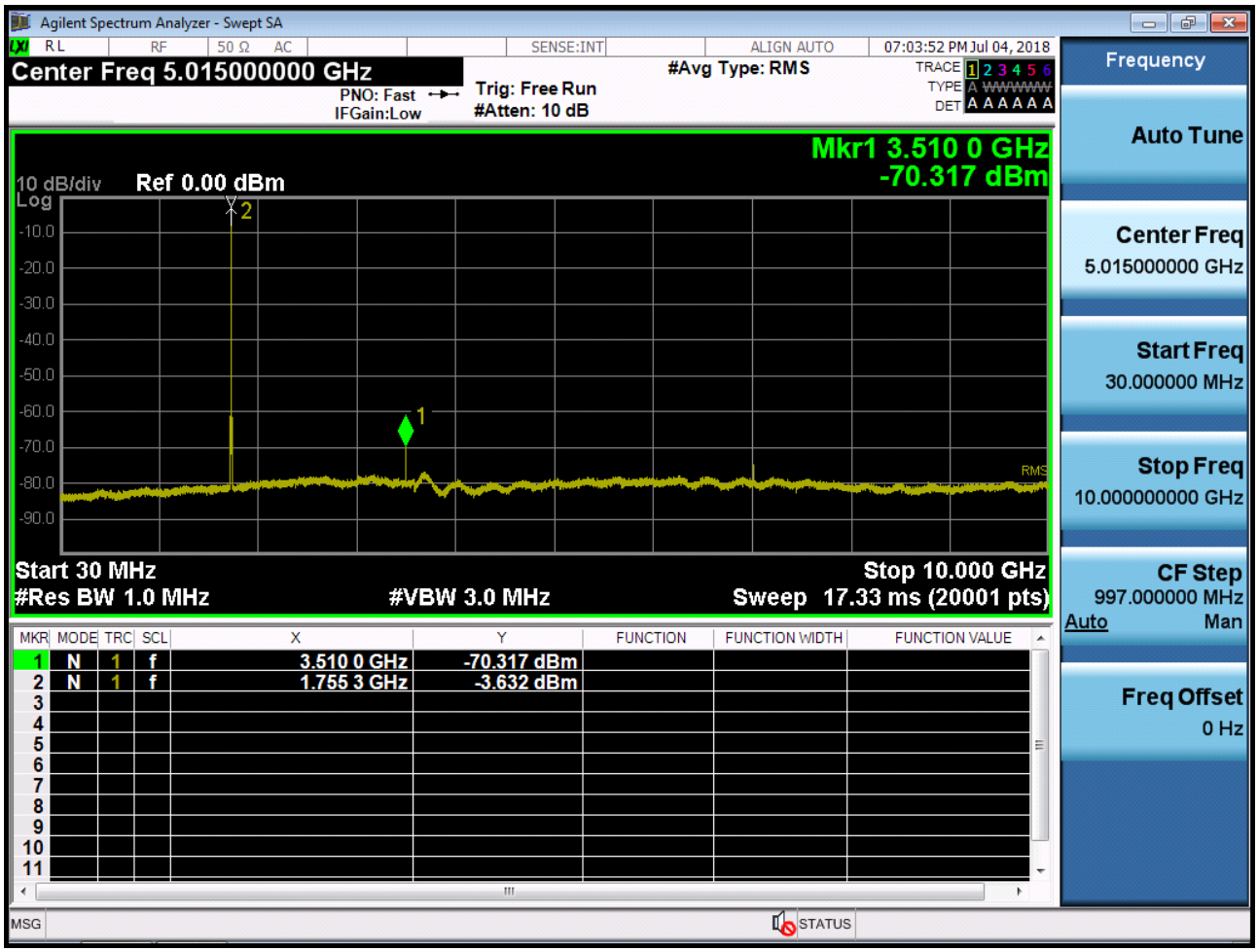
BAND 4. Conducted Spurious Plot_2 (19975ch_5MHz_QPSK_ RB 1_0)

BAND 4. Conducted Spurious Plot_1 (20175ch_5MHz_QPSK_ RB 1_0)



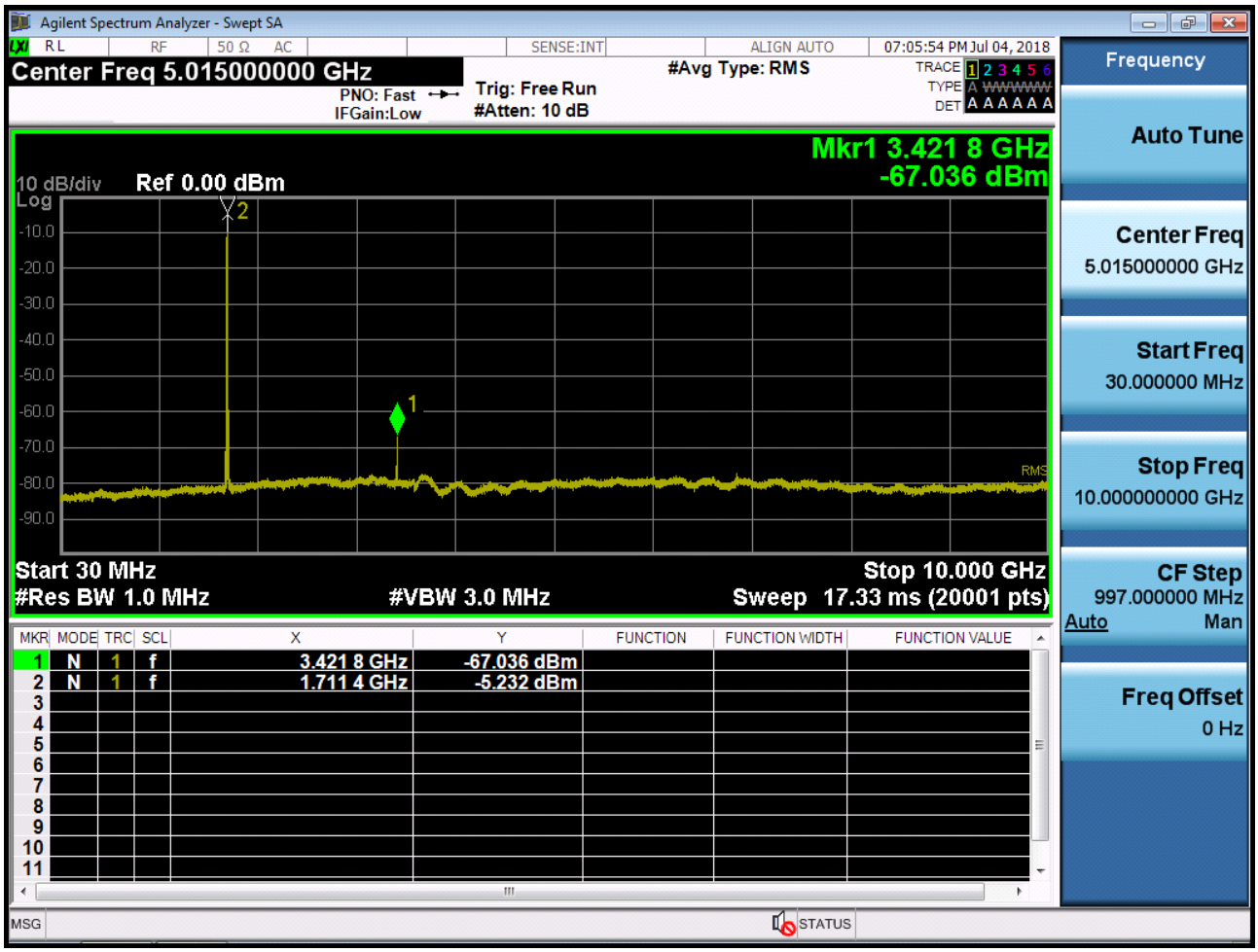
BAND 4. Conducted Spurious Plot_2 (20175ch_5MHz_QPSK_ RB 1_0)

BAND 4. Conducted Spurious Plot_1 (20375ch_5MHz_QPSK_ RB 1_0)



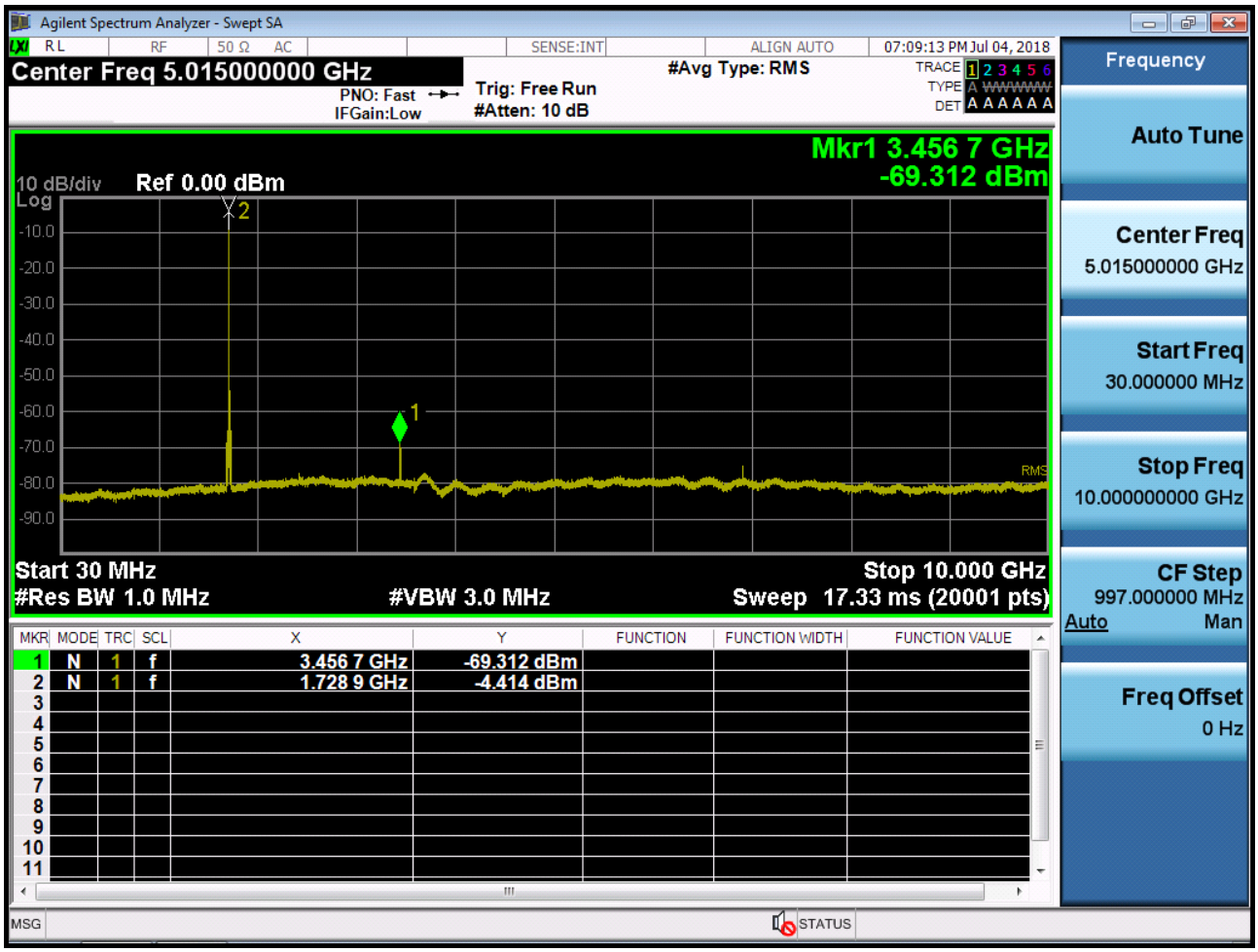
BAND 4. Conducted Spurious Plot_2 (20375ch_5MHz_QPSK_ RB 1_0)

BAND 4. Conducted Spurious Plot_1 (20000ch_10MHz_QPSK_ RB 1_0)



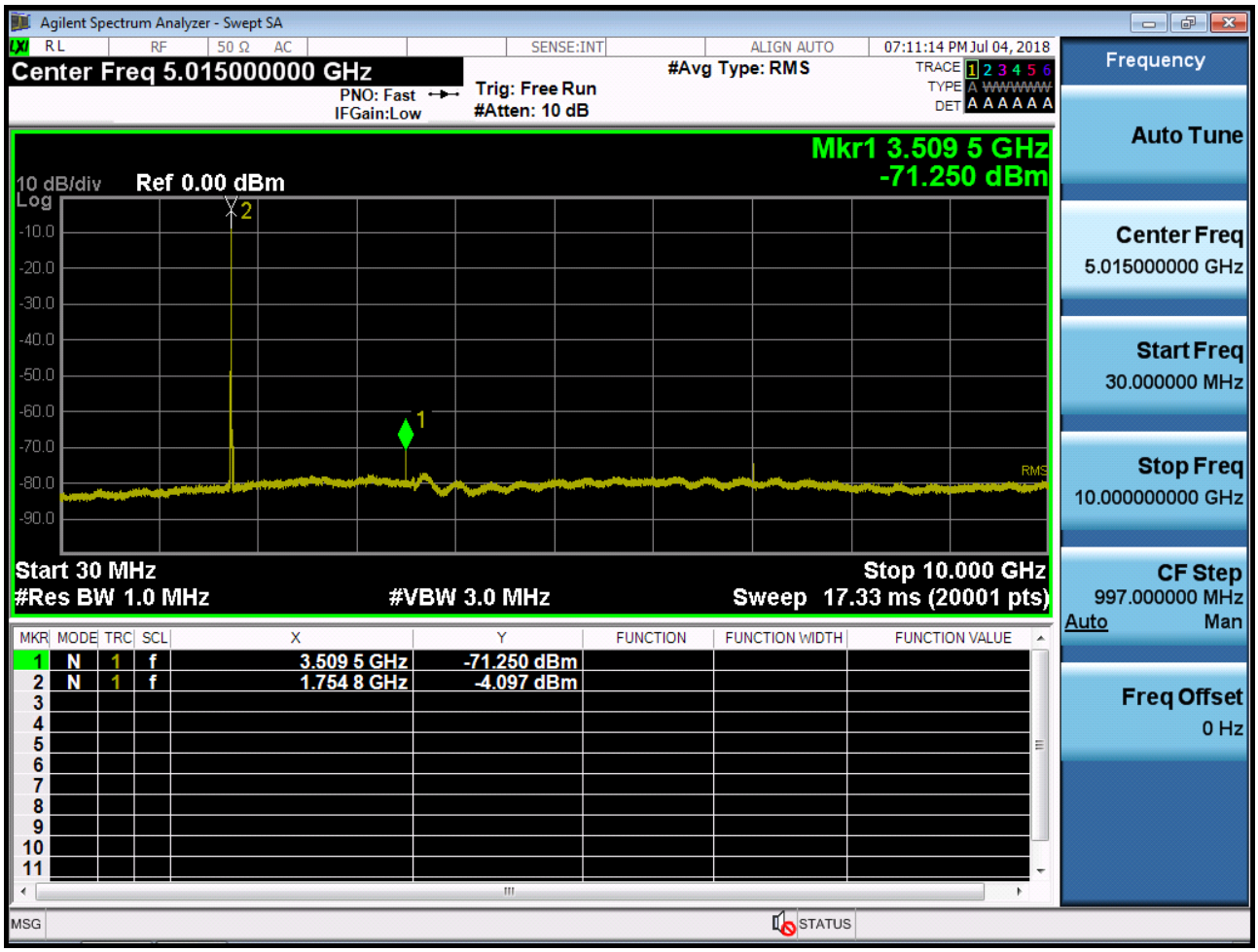
BAND 4. Conducted Spurious Plot_2 (20000ch_10MHz_QPSK_ RB 1_0)

BAND 4. Conducted Spurious Plot_1 (20175ch_10MHz_QPSK_ RB 1_0)



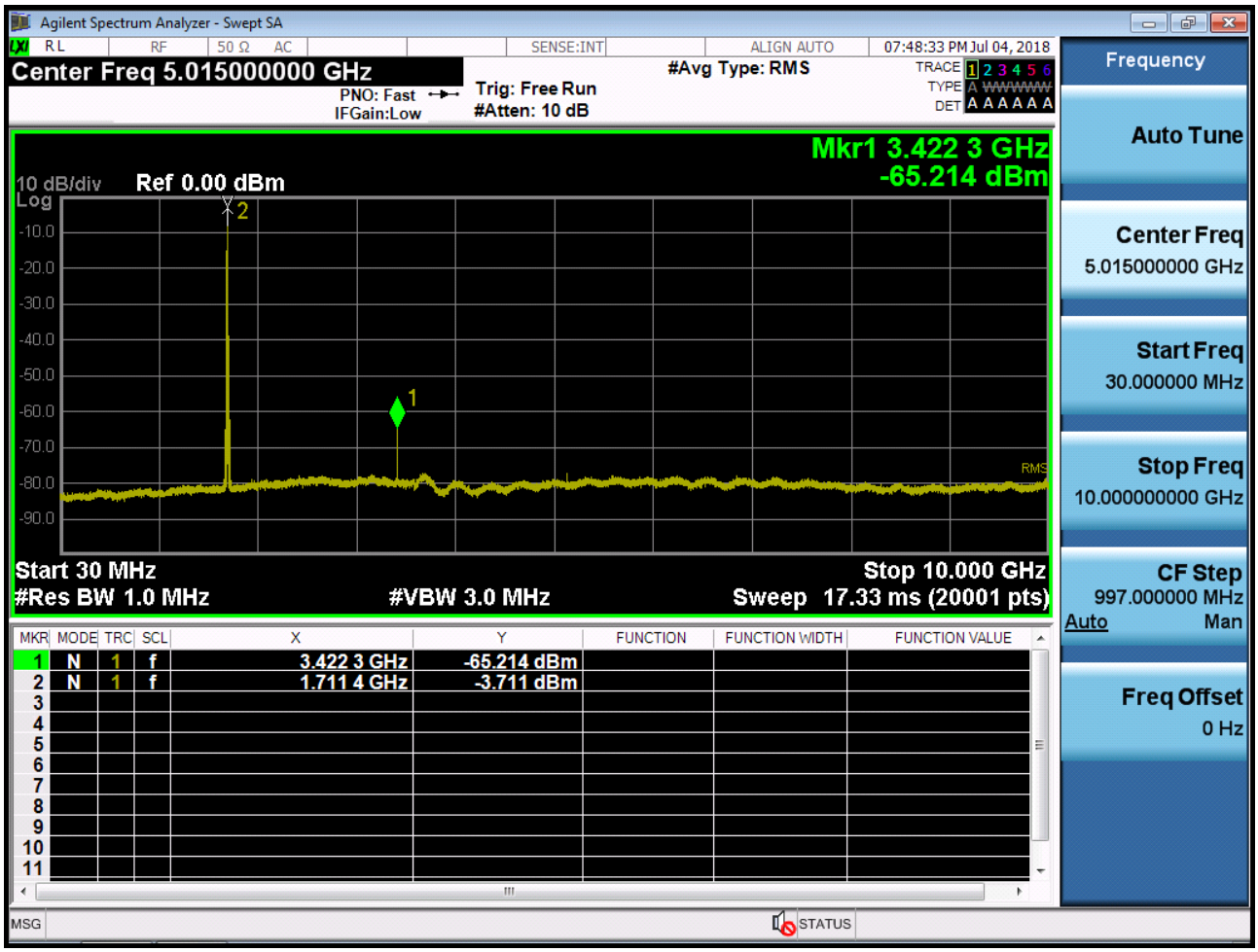
BAND 4. Conducted Spurious Plot_2 (20175ch_10MHz_QPSK_ RB 1_0)

BAND 4. Conducted Spurious Plot_1 (20350ch_10MHz_QPSK_ RB 1_0)



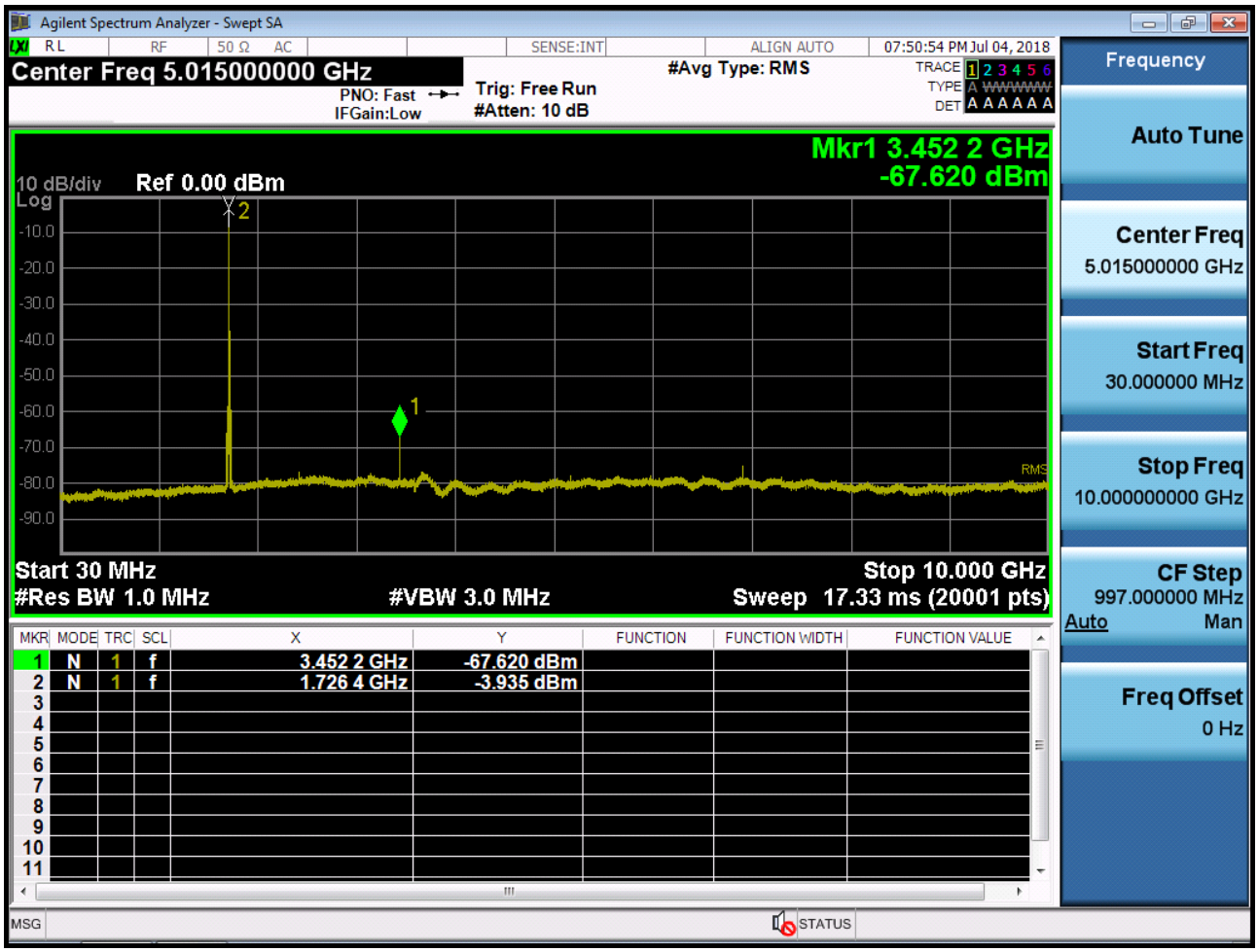
BAND 4. Conducted Spurious Plot_2 (20350ch_10MHz_QPSK_ RB 1_0)

BAND 4. Conducted Spurious Plot_1 (20025ch_15MHz_QPSK_ RB 1_0)



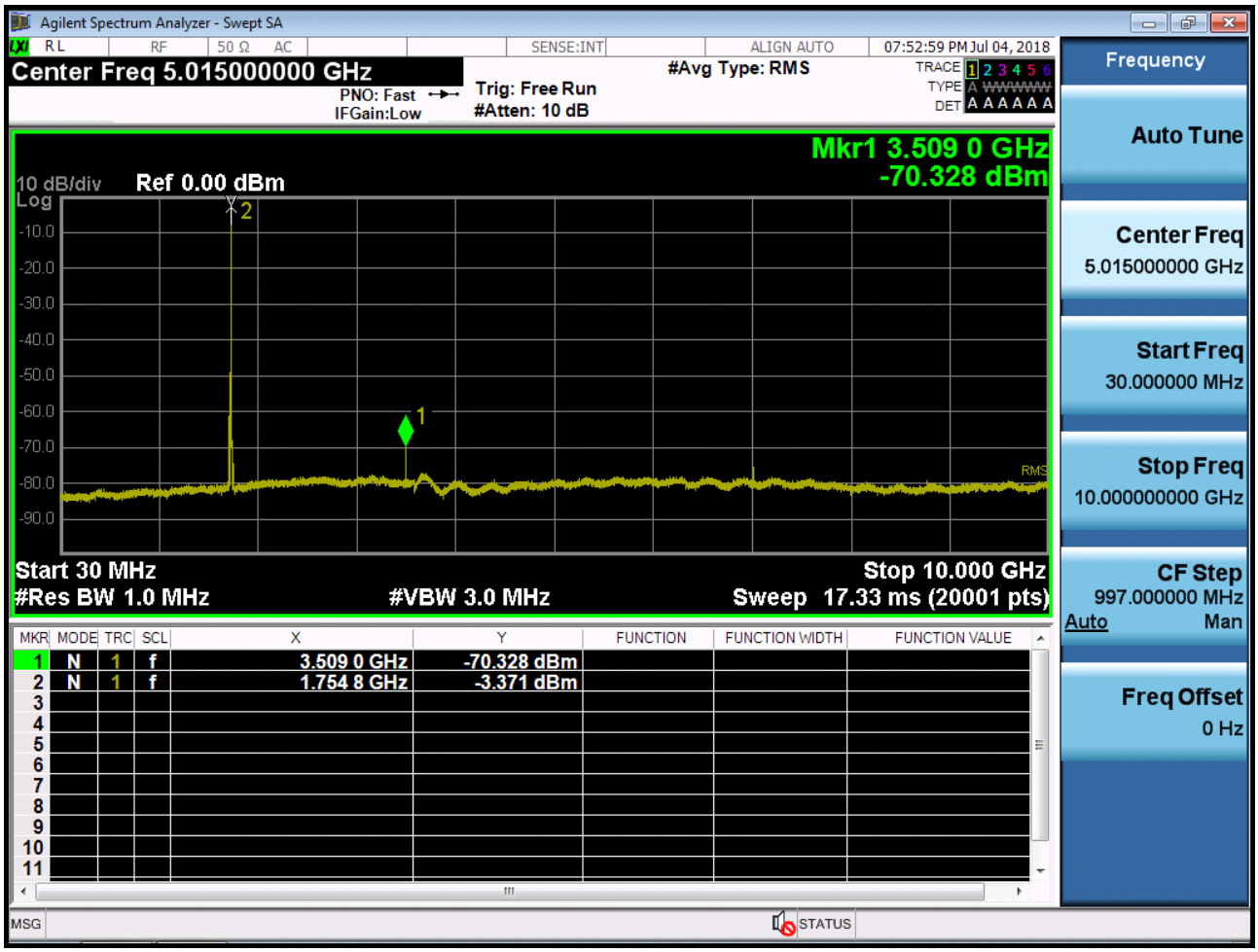
BAND 4. Conducted Spurious Plot_2 (20025ch_15MHz_QPSK_ RB 1_0)

BAND 4. Conducted Spurious Plot_1 (20175ch_15MHz_QPSK_ RB 1_0)



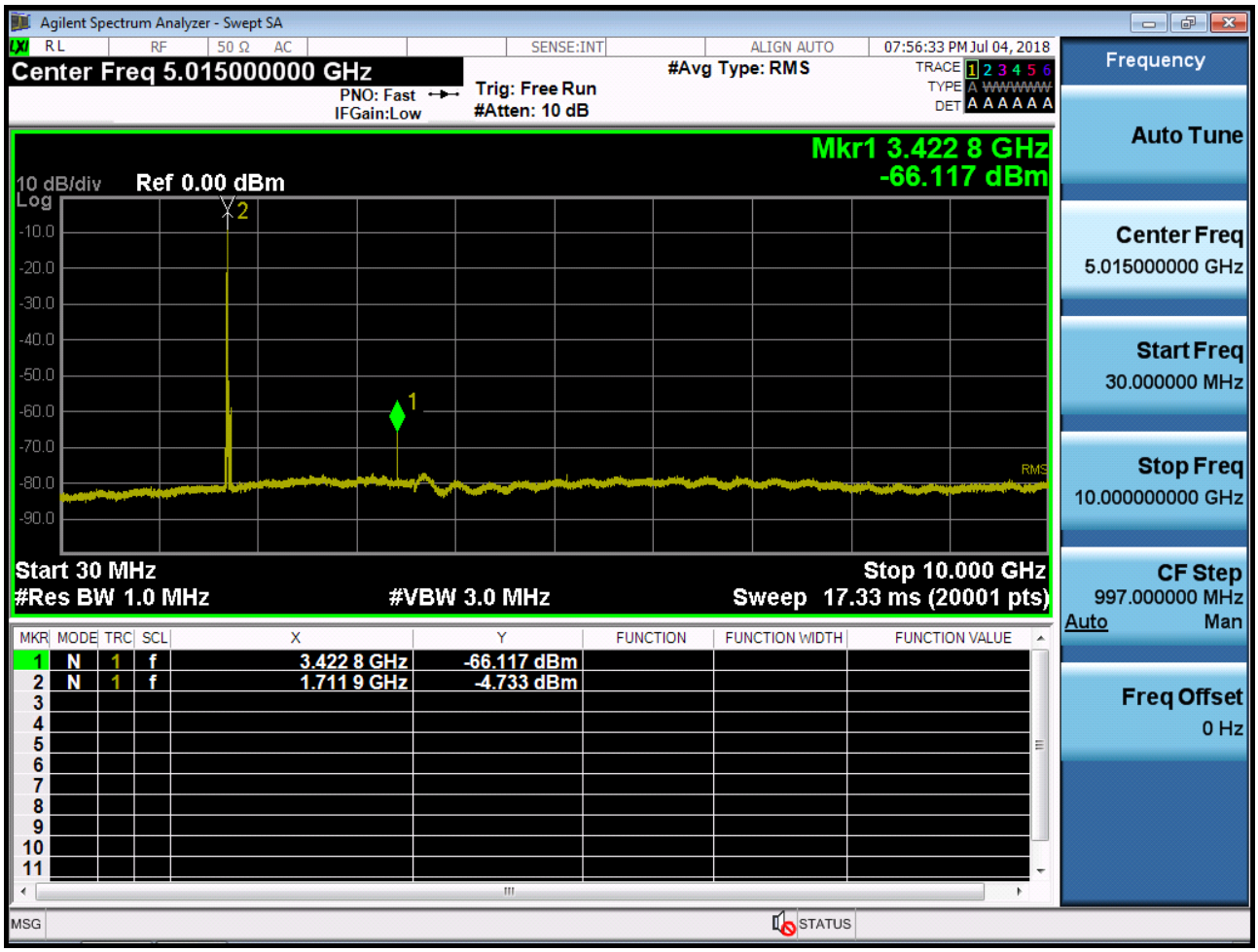
BAND 4. Conducted Spurious Plot_2 (20175ch_15MHz_QPSK_ RB 1_0)

BAND 4. Conducted Spurious Plot_1 (20325ch_15MHz_QPSK_ RB 1_0)



BAND 4. Conducted Spurious Plot_2 (20325ch_15MHz_QPSK_ RB 1_0)

BAND 4. Conducted Spurious Plot_1 (20050ch_20MHz_QPSK_ RB 1_0)



BAND 4. Conducted Spurious Plot_2 (20050ch_20MHz_QPSK_ RB 1_0)