

TEST REPORT

FCC LTE B4 Test for SM-S721B/DS
Certification

APPLICANT
SAMSUNG Electronics Co., Ltd.

REPORT NO.
HCT-RF-2407-FC052

DATE OF ISSUE
July 24, 2024

Tested by
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**TEST
REPORT****REPORT NO.**

HCT-RF-2407-FC052

DATE OF ISSUE

July 24, 2024

Additional Model

SM-S721B

Applicant**SAMSUNG Electronics Co., Ltd.**

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

Product Name

Mobile Phone

Model Name

SM-S721B/DS

Date of Test

May 21, 2024 ~ July 23, 2024

FCC ID

A3LSMS721B

Location of Test☒ Permanent Testing Lab ☐ On Site Testing

(Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 Republic of Korea)

FCC Classification:

PCS Licensed Transmitter Held to Ear (PCE)

Test Standard Used

FCC Rule Part : § 27

Test Results

PASS

REVISION HISTORY

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

Revision No.	Date of Issue	Description
0	July 24, 2024	Initial Release

Notice

Content

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)

The results shown in this test report only apply to the sample(s), as received, provided by the applicant, unless otherwise stated.

The test results have only been applied with the test methods required by the standard(s).

The laboratory is not accredited for the test results marked *.

Information provided by the applicant is marked **.

Test results provided by external providers are marked ***.

When confirmation of authenticity of this test report is required, please contact www.hct.co.kr

The test results in this test report are not associated with the ((KS Q) ISO/IEC 17025) accreditation by KOLAS (Korea Laboratory Accreditation Scheme) / A2LA (American Association for Laboratory Accreditation) that are under the ILAC (International Laboratory Accreditation Cooperation) Mutual Recognition Agreement (MRA).

CONTENTS

1. GENERAL INFORMATION	5
1.1. MAXIMUM OUTPUT POWER.....	6
2. INTRODUCTION	8
2.1. DESCRIPTION OF EUT	8
2.2. MEASURING INSTRUMENT CALIBRATION.....	8
2.3. TEST FACILITY	8
3. DESCRIPTION OF TESTS.....	9
3.1 TEST PROCEDURE.....	9
3.2 RADIATED POWER	10
3.3 RADIATED SPURIOUS EMISSIONS	11
3.4 PEAK- TO- AVERAGE RATIO.....	12
3.5 OCCUPIED BANDWIDTH.	14
3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL	15
3.7 BAND EDGE	16
3.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE.....	18
3.9 WORST CASE(RADIATED TEST).....	19
3.10 WORST CASE(CONDUCTED TEST)	20
4. LIST OF TEST EQUIPMENT	21
5. MEASUREMENT UNCERTAINTY	22
6. SUMMARY OF TEST RESULTS.....	23
7. SAMPLE CALCULATION	24
8. TEST DATA (ANT A)	26
8.1 EQUIVALENT ISOTROPIC RADIATED POWER	26
8.2 RADIATED SPURIOUS EMISSIONS	29
8.3 PEAK-TO-AVERAGE RATIO.....	30
8.4 OCCUPIED BANDWIDTH	31
8.5 CONDUCTED SPURIOUS EMISSIONS.....	32
8.6 BAND EDGE	32
8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE.....	33
9. TEST DATA (ANT F)	51
9.1 EQUIVALENT ISOTROPIC RADIATED POWER	51
9.2 RADIATED SPURIOUS EMISSIONS	54
9.3 PEAK-TO-AVERAGE RATIO.....	55
9.4 OCCUPIED BANDWIDTH	56
9.5 CONDUCTED SPURIOUS EMISSIONS.....	57
9.6 BAND EDGE	57
9.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE.....	58
10. TEST DATA.....	76
10.1. UPLINK CARRIER AGGREGATION.....	76
10.1.1. RADIATED SPURIOUS EMISSIONS	77
11. TEST PLOTS(ANT A).....	78
12. TEST PLOTS(ANT F)	199
13. ANNEX A_ TEST SETUP PHOTO	320

MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	SAMSUNG Electronics Co., Ltd.
Address:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID:	A3LSMS721B
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§ 27
EUT Type:	Mobile phone
Model(s):	SM-S721B/DS
Additional Model(s)	SM-S721B
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:	May 21, 2024 ~ July 23, 2024
Serial number:	Radiated : R3CX40LGBQH Conducted : R3CX503EC1Z

1.1. MAXIMUM OUTPUT POWER

ANT A

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	0.158	22.00
		1M10W7D	16QAM	0.132	21.20
		1M09W7D	64QAM	0.103	20.13
		1M10W7D	256QAM	0.053	17.28
LTE – Band4 (3)	1711.5 – 1753.5	2M71G7D	QPSK	0.168	22.25
		2M71W7D	16QAM	0.136	21.33
		2M71W7D	64QAM	0.107	20.28
		2M72W7D	256QAM	0.054	17.34
LTE – Band4 (5)	1712.5 – 1752.5	4M53G7D	QPSK	0.167	22.22
		4M53W7D	16QAM	0.131	21.18
		4M54W7D	64QAM	0.107	20.28
		4M52W7D	256QAM	0.052	17.18
LTE – Band4 (10)	1715.0 – 1750.0	9M04G7D	QPSK	0.156	21.92
		9M04W7D	16QAM	0.130	21.14
		9M03W7D	64QAM	0.102	20.07
		9M03W7D	256QAM	0.051	17.11
LTE – Band4 (15)	1717.5 – 1747.5	13M5G7D	QPSK	0.160	22.05
		13M5W7D	16QAM	0.130	21.13
		13M5W7D	64QAM	0.103	20.11
		13M5W7D	256QAM	0.051	17.04
LTE – Band4 (20)	1720.0 – 1745.0	17M9G7D	QPSK	0.151	21.79
		17M9W7D	16QAM	0.121	20.82
		18M0W7D	64QAM	0.096	19.83
		17M9W7D	256QAM	0.048	16.83

ANT F

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	0.169	22.28
		1M10W7D	16QAM	0.140	21.47
		1M10W7D	64QAM	0.110	20.43
		1M10W7D	256QAM	0.055	17.42
LTE – Band4 (3)	1711.5 – 1753.5	2M72G7D	QPSK	0.169	22.28
		2M73W7D	16QAM	0.141	21.49
		2M71W7D	64QAM	0.112	20.49
		2M71W7D	256QAM	0.056	17.46
LTE – Band4 (5)	1712.5 – 1752.5	4M52G7D	QPSK	0.169	22.29
		4M53W7D	16QAM	0.140	21.46
		4M54W7D	64QAM	0.111	20.46
		4M52W7D	256QAM	0.055	17.43
LTE – Band4 (10)	1715.0 – 1750.0	9M03G7D	QPSK	0.163	22.12
		9M01W7D	16QAM	0.135	21.31
		9M02W7D	64QAM	0.106	20.24
		9M00W7D	256QAM	0.054	17.34
LTE – Band4 (15)	1717.5 – 1747.5	13M5G7D	QPSK	0.162	22.09
		13M5W7D	16QAM	0.136	21.32
		13M5W7D	64QAM	0.107	20.31
		13M5W7D	256QAM	0.053	17.27
LTE – Band4 (20)	1720.0 – 1745.0	17M9G7D	QPSK	0.158	22.00
		18M0W7D	16QAM	0.133	21.23
		17M9W7D	64QAM	0.105	20.20
		17M9W7D	256QAM	0.053	17.23

2. INTRODUCTION

2.1. DESCRIPTION OF EUT

The EUT was a Mobile Phone with GSM/GPRS/EGPRS/UMTS and LTE, Sub 6. It also supports IEEE 802.11 a/b/g/n/ac/ax (20/40/80/160 MHz), Bluetooth(ePA), BT LE(ePA), NFC, WPT, WIFI 6E.

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	- N/A (See SAR Report)
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Effective Radiated Power/ Effective Isotropic Radiated Power	- KDB 971168 D01 v03r01 – Section 5.2 & 5.8 - ANSI/TIA-603-E-2016 – Section 2.2.17
Radiated Spurious and Harmonic Emissions	- KDB 971168 D01 v03r01 – Section 6.2 - ANSI/TIA-603-E-2016 – Section 2.2.12

3.2 RADIATED POWER

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

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

Test Settings

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

Test Note

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

The power is calculated by the following formula;

$$P_d (\text{dBm}) = P_g (\text{dBm}) - \text{cable loss (dB)} + \text{antenna gain (dB)}$$

Where: P_d is the dipole equivalent power and P_g is the generator output power into the substitution antenna.

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

3.3 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

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

Test Settings

1. RBW = 100 kHz for emissions below 1 GHz and 1 MHz for emissions above 1 GHz
2. VBW $\geq 3 \times$ RBW
3. Span = 1.5 times the OBW
4. No. of sweep points $> 2 \times$ 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. Measurements value show only up to 3 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin > 20 dB from the applicable limit) and considered that's already beyond the background noise floor.
2. The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
The worst case emissions are reported with the EUT positioning, modulations, RB sizes and offsets, and channel bandwidth configurations shown in the test data
3. For spurious emissions above 1 GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator and the previously recorded signal was duplicated.

The spurious emissions is calculated by the following formula;

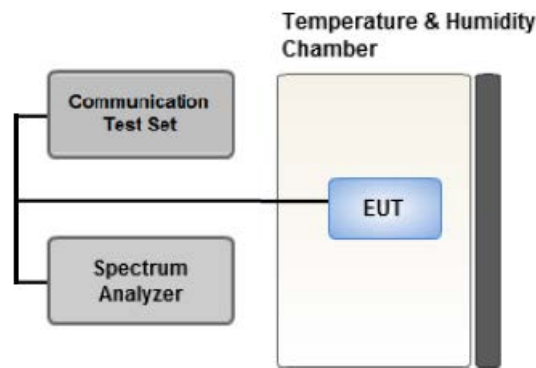
$$\text{Result}_{(\text{dBm})} = P_{g(\text{dBm})} - \text{cable loss}_{(\text{dB})} + \text{antenna gain}_{(\text{dBi})}$$

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

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

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

3.4 PEAK- TO- AVERAGE RATIO



Test setup

① CCDF Procedure for PAPR

Test Settings

1. Set resolution/measurement bandwidth $\geq$ 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:

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

Test Settings(Peak Power)

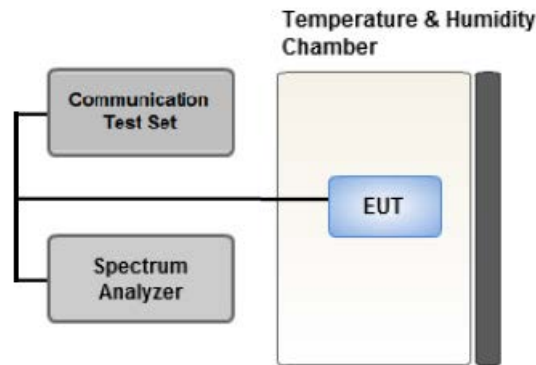
The measurement instrument must have a RBW that is greater than or equal to the OBW of the signal to be measured and a VBW $\geq 3 \times$ RBW.

1. Set the RBW $\geq$ OBW.
2. Set VBW $\geq 3 \times$ RBW.
3. Set span $\geq 2 \times$ OBW.
4. Sweep time $\geq 10 \times$ (number of points in sweep) $\times$ (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 $2 \times$ to $3 \times$ the OBW.
2. Set RBW $\geq$ OBW.
3. Set VBW $\geq 3 \times$ RBW.
4. Set number of measurement points in sweep $\geq 2 \times$ span / RBW.
5. Sweep time:
Set $\geq [10 \times (\text{number of points in sweep}) \times (\text{transmission period})]$ 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 $[10 \log (1/\text{duty cycle})]$ to the measured maximum power level to compute the average power during continuous transmission. For example, add $[10 \log (1/0.25)] = 6 \text{ dB}$ 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.

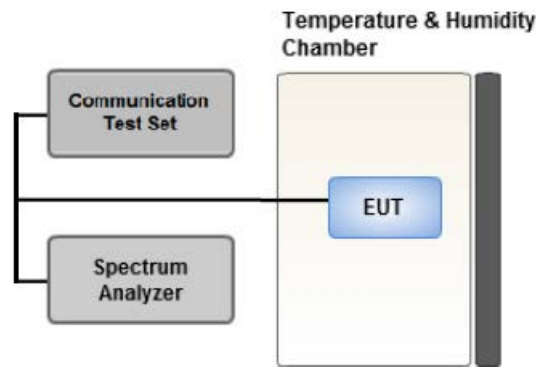
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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. $VBW \geq 3 \times RBW$
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

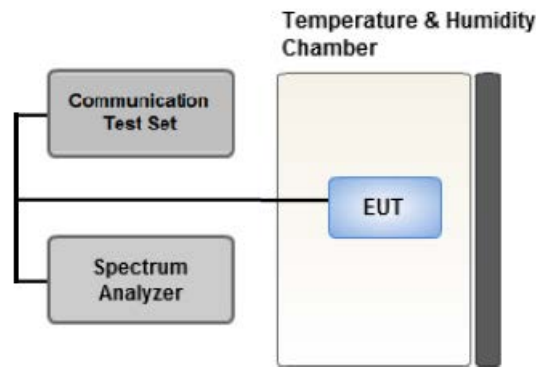
Test Overview

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 $\geq$ 3 MHz
3. Detector = RMS
4. Trace Mode = Average
5. Sweep time = auto
6. Number of points in sweep $\geq 2 * \text{Span} / \text{RBW}$

3.7 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 $\geq 2 \times \text{Span}/\text{RBW}$
7. Trace mode = trace average
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Notes

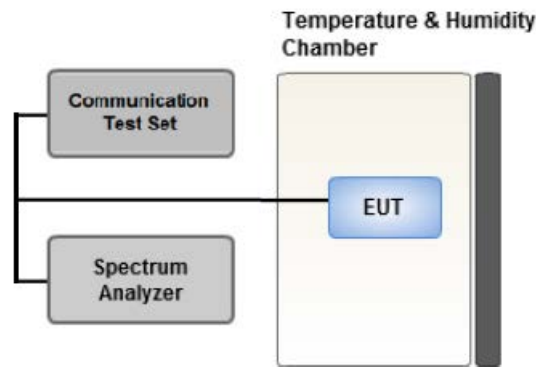
According to FCC 22.917, 24.238, 27.53 specified that power of any emission outside of The authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. In the 1 MHz bands immediately outside and adjacent to the frequency block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

Where Margin < 1 dB the emission level is either corrected by $10 \log(1 \text{ MHz} / \text{RB})$ 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 : Stand alone, Stand alone + External accessories (Earphone, AC adapter, etc.)
Worst case : Stand alone
- We were performed the RSE test in condition of co-location.
Mode : Stand alone, Simultaneous transmission scenarios
Worst case : Stand alone
- In the case of radiated spurious emissions, all bandwidth of operation was investigated and the worst case bandwidth results are reported. (Worst case : 3 MHz(ANT A), 5 MHz(ANT F))
- 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.

[ANT A Worst case]

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

[ANT F Worst case]

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

3.10 WORST CASE(CONDUCTED TEST)

- All modes of operation were investigated and the worst case configuration results are reported.

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
Occupied Bandwidth	QPSK, 16QAM, 64QAM, 256QAM	1.4, 3, 5, 10, 15, 20	Mid	Full RB	0
Peak-To-Average Ratio	QPSK, 16QAM, 64QAM, 256QAM	1.4, 3, 5, 10, 15, 20	Mid	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
Spurious and Harmonic Emissions at Antenna Terminal	QPSK	1.4, 3, 5, 10, 15, 20	Low, Mid, High	1	0

4. LIST OF TEST EQUIPMENT

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
RF Switching System	FBSR-02B(1.2G HPF+LNA)	T&M SYSTEM	F1L1	12/11/2024	Annual
RF Switching System	FBSR-02B(3.3G HPF+LNA)	T&M SYSTEM	F1L2	12/11/2024	Annual
Power Splitter(DC ~ 26.5 GHz)	11667B	Hewlett Packard	5001	04/17/2025	Annual
DC Power Supply	E3632A	Hewlett Packard	MY40004427	08/25/2024	Annual
Dipole Antenna	UHAP	Schwarzbeck	557	03/09/2025	Biennial
Dipole Antenna	UHAP	Schwarzbeck	558	03/09/2025	Biennial
Chamber	SU-642	ESPEC	93008124	02/19/2025	Annual
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	147	08/17/2025	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	9120D-1298	09/11/2025	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	03/28/2025	Biennial
Signal Analyzer(10 Hz ~ 26.5 GHz)	N9020A	Agilent	MY52090906	04/19/2025	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	04/17/2025	Annual
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	REOHDE & SCHWARZ	100931	08/17/2024	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/10/2024	Annual
Loop Antenna(9 kHz ~ 30 MHz)	FMZB1513	Schwarzbeck	1513-333	03/07/2026	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	895	09/16/2024	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	1135	09/16/2024	Biennial
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262094331	11/17/2024	Annual
Wideband Radio Communication Tester	MT8820C	Anritsu Corp.	6201026545	12/11/2024	Annual
Signal Analyzer(5 Hz ~ 40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/17/2025	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	-

Note:

- Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.
- 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 ($\pm$ dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.98 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.36 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.70 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.52 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.66 (Confidence level about 95 %, $k=2$)
Radiated Disturbance (Above 40 GHz)	5.58 (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(h)	$< 43 + 10\log_{10} (P[\text{Watts}])$ at Band Edge and for all out-of-band emissions	PASS
Conducted Output Power	§ 2.1046	N/A	<u>See Note1</u>
Peak- to- Average Ratio	§ 27.50(d)(5)	$< 13 \text{ dB}$	PASS
Frequency stability / variation of ambient temperature	§ 2.1055, § 27.54	Emission must remain in band	PASS

Note:

1. See SAR Report

6.2 Test Condition: Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Equivalent Isotropic Radiated Power	§ 27.50(d)(4)	$< 1 \text{ Watts max. EIRP}$	PASS
Radiated Spurious and Harmonic Emissions	§ 2.1053, § 27.53(h)	$< 43 + 10\log_{10} (P[\text{Watts}])$ 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

$$\text{ERP} = \text{Substitute LEVEL(dBm)} + \text{Ant. Gain} - \text{CL(Cable Loss)}$$

- 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

$$\text{EIRP} = \text{Substitute LEVEL(dBm)} + \text{Ant. Gain} - \text{CL(Cable Loss)}$$

- 1) The EUT mounted on a non-conductive turntable is 2.5 meter above test site ground level.
- 2) During the test, the turn table is rotated until the maximum signal is found.
- 3) Record the field strength meter's level.
- 4) Replace the EUT with dipole/Horn antenna that is connected to a calibrated signal generator.
- 5) Increase the signal generator output till the field strength meter's level is equal to the item (3).
- 6) The signal generator output level with Ant. Gain and cable loss are the rating of equivalent isotropic radiated power.

7.3. Emission Designator

GSM Emission Designator

Emission Designator = 249KGXW
GSM BW = 249 kHz
G = Phase Modulation
X = Cases not otherwise covered
W = Combination (Audio/Data)

EDGE Emission Designator

Emission Designator = 249KG7W
GSM BW = 249 kHz
G = Phase Modulation
7 = Quantized/Digital Info
W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M17F9W
WCDMA BW = 4.17 MHz
F = Frequency Modulation
9 = Composite Digital Info
W = Combination (Audio/Data)

QPSK Modulation

Emission Designator = 4M48G7D
LTE BW = 4.48 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data transmission; telemetry; telecommand

QAM Modulation

Emission Designator = 4M48W7D
LTE BW = 4.48 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data transmission; telemetry; telecommand

8. TEST DATA (ANT A)

8.1 EQUIVALENT ISOTROPIC RADIATED POWER

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured	Substitute	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
			Level (dBm)	Level (dBm)				W	W	dBm	Size	Offset
1710.7	LTE B4 1.4 MHz	QPSK	-19.43	14.30	9.94	2.24	V	< 1.00	0.158	22.00	1	5
		16-QAM	-20.23	13.50	9.94	2.24	V		0.132	21.20		
		64-QAM	-21.30	12.43	9.94	2.24	V		0.103	20.13		
		256-QAM	-24.15	9.58	9.94	2.24	V		0.053	17.28		
1732.5		QPSK	-19.97	13.72	10.07	2.17	V		0.145	21.62	1	0
		16-QAM	-20.74	12.95	10.07	2.17	V		0.122	20.85		
		64-QAM	-21.82	11.87	10.07	2.17	V		0.095	19.77		
		256-QAM	-24.81	8.88	10.07	2.17	V		0.048	16.78		
1754.3		QPSK	-20.26	13.42	10.18	2.17	V		0.139	21.43	1	0
		16-QAM	-20.99	12.69	10.18	2.17	V		0.118	20.70		
		64-QAM	-22.05	11.63	10.18	2.17	V		0.092	19.64		
		256-QAM	-25.04	8.64	10.18	2.17	V		0.046	16.65		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
								W	W	dBm	Size	Offset
1711.5	LTE B4 3 MHz	QPSK	-19.18	14.55	9.94	2.24	V	<1.00	0.168	22.25	1	7
		16-QAM	-20.10	13.63	9.94	2.24	V		0.136	21.33		
		64-QAM	-21.15	12.58	9.94	2.24	V		0.107	20.28		
		256-QAM	-24.09	9.64	9.94	2.24	V		0.054	17.34		
1732.5		QPSK	-19.90	13.79	10.07	2.17	V		0.148	21.69	1	0
		16-QAM	-20.66	13.03	10.07	2.17	V		0.124	20.93		
		64-QAM	-21.72	11.97	10.07	2.17	V		0.097	19.87		
		256-QAM	-24.75	8.94	10.07	2.17	V		0.048	16.84		
1753.5		QPSK	-19.99	13.69	10.18	2.17	V		0.148	21.70	1	7
		16-QAM	-20.89	12.79	10.18	2.17	V		0.120	20.80		
		64-QAM	-21.96	11.72	10.18	2.17	V		0.094	19.73		
		256-QAM	-24.99	8.69	10.18	2.17	V		0.047	16.70		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
								W	W	dBm	Size	Offset
1712.5	LTE B4 5 MHz	QPSK	-19.21	14.52	9.94	2.24	V	< 1.00	0.167	22.22	1	12
		16-QAM	-20.25	13.48	9.94	2.24	V		0.131	21.18		
		64-QAM	-21.15	12.58	9.94	2.24	V		0.107	20.28		
		256-QAM	-24.25	9.48	9.94	2.24	V		0.052	17.18		
1732.5		QPSK	-19.76	13.93	10.07	2.17	V		0.152	21.83	1	0
		16-QAM	-20.75	12.94	10.07	2.17	V		0.121	20.84		
		64-QAM	-21.75	11.94	10.07	2.17	V		0.096	19.84		
		256-QAM	-24.80	8.89	10.07	2.17	V		0.048	16.79		
1752.5		QPSK	-19.93	13.78	10.17	2.15	V		0.151	21.80	1	12
		16-QAM	-20.94	12.77	10.17	2.15	V		0.120	20.79		
		64-QAM	-21.95	11.76	10.17	2.15	V		0.095	19.78		
		256-QAM	-25.02	8.69	10.17	2.15	V		0.047	16.71		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured	Substitute	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
			Level (dBm)	Level (dBm)				W	W	dBm	Size	Offset
1715.0	LTE B4 10 MHz	QPSK	-19.46	14.18	9.98	2.23	V	<1.00	0.156	21.92	1	49
		16-QAM	-20.24	13.40	9.98	2.23	V		0.130	21.14		
		64-QAM	-21.31	12.33	9.98	2.23	V		0.102	20.07		
		256-QAM	-24.27	9.37	9.98	2.23	V		0.051	17.11		
1732.5		QPSK	-20.10	13.59	10.07	2.17	V		0.141	21.49	1	24
		16-QAM	-20.90	12.79	10.07	2.17	V		0.117	20.69		
		64-QAM	-22.20	11.49	10.07	2.17	V		0.087	19.39		
		256-QAM	-24.91	8.78	10.07	2.17	V		0.047	16.68		
1750.0		QPSK	-20.17	13.54	10.17	2.15	V		0.143	21.56	1	0
		16-QAM	-21.05	12.66	10.17	2.15	V		0.117	20.68		
		64-QAM	-22.14	11.57	10.17	2.15	V		0.091	19.59		
		256-QAM	-25.00	8.71	10.17	2.15	V		0.047	16.73		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
								W	W	dBm	Size	Offset
1717.5	LTE B4 15 MHz	QPSK	-19.38	14.26	10.01	2.22	V	< 1.00	0.160	22.05	1	37
		16-QAM	-20.30	13.34	10.01	2.22	V		0.130	21.13		
		64-QAM	-21.32	12.32	10.01	2.22	V		0.103	20.11		
		256-QAM	-24.39	9.25	10.01	2.22	V		0.051	17.04		
1732.5		QPSK	-19.82	13.87	10.07	2.17	V		0.150	21.77	1	37
		16-QAM	-20.77	12.92	10.07	2.17	V		0.121	20.82		
		64-QAM	-21.89	11.80	10.07	2.17	V		0.093	19.70		
		256-QAM	-24.82	8.87	10.07	2.17	V		0.048	16.77		
1747.5		QPSK	-19.97	13.74	10.17	2.15	V		0.150	21.76	1	37
		16-QAM	-20.95	12.76	10.17	2.15	V		0.120	20.78		
		64-QAM	-21.92	11.79	10.17	2.15	V		0.096	19.81		
		256-QAM	-25.06	8.65	10.17	2.15	V		0.046	16.67		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured	Substitute	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
			Level (dBm)	Level (dBm)				W	W	dBm	Size	Offset
1720.0	LTE B4 20 MHz	QPSK	-19.66	13.85	10.01	2.22	V	< 1.00	0.146	21.64	1	0
		16-QAM	-20.55	12.96	10.01	2.22	V		0.119	20.75		
		64-QAM	-21.60	11.91	10.01	2.22	V		0.093	19.70		
		256-QAM	-24.47	9.04	10.01	2.22	V		0.048	16.83		
1732.5		QPSK	-19.80	13.89	10.07	2.17	V		0.151	21.79	1	0
		16-QAM	-20.77	12.92	10.07	2.17	V		0.121	20.82		
		64-QAM	-21.76	11.93	10.07	2.17	V		0.096	19.83		
		256-QAM	-24.79	8.90	10.07	2.17	V		0.048	16.80		
1745.0		QPSK	-20.07	13.61	10.15	2.15	V		0.145	21.61	1	0
		16-QAM	-20.95	12.73	10.15	2.15	V		0.118	20.73		
		64-QAM	-21.98	11.70	10.15	2.15	V		0.093	19.70		
		256-QAM	-24.91	8.77	10.15	2.15	V		0.048	16.77		

8.2 RADIATED SPURIOUS EMISSIONS

▣ OPERATING FREQUENCY:	<u>1711.5 MHz</u>
▣ MEASURED OUTPUT POWER:	<u>22.25 dBm = 0.168 W</u>
▣ MODE:	<u>LTE B4</u>
▣ MODULATION SIGNAL:	<u>3 MHz QPSK</u>
▣ DISTANCE:	<u>3 meters</u>
▣ LIMIT: $43 + 10 \log_{10} (W) =$	<u>35.25 dBc</u>

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc	RB	
									Size	Offset
19965 (1711.5)	3 423.00	-46.43	12.44	-53.35	3.03	H	-43.94	66.18	1	7
	5 134.50	-55.29	12.33	-52.68	3.94	H	-44.29	66.53		
	6 846.00	-57.24	11.91	-50.86	4.49	V	-43.44	65.69		
20175 (1732.5)	3 465.00	-47.93	12.35	-54.57	3.11	H	-45.33	67.58	1	0
	5 197.50	-56.46	12.63	-55.38	3.86	H	-46.61	68.86		
	6 930.00	-57.56	11.65	-50.43	4.52	H	-43.30	65.54		
20385 (1753.5)	3 507.00	-48.88	12.34	-55.19	3.12	V	-45.97	68.21	1	7
	5 260.50	-56.22	12.99	-55.90	3.83	H	-46.74	68.98		
	7 014.00	-55.84	11.24	-47.89	4.57	V	-41.22	63.47		

8.3 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	5.52
			16-QAM			6.00
			64-QAM			6.37
			256-QAM			6.82
	3 MHz		QPSK	15		5.61
			16-QAM			6.05
			64-QAM			6.40
			256-QAM			6.68
	5 MHz		QPSK	25		5.54
			16-QAM			6.11
			64-QAM			6.41
			256-QAM			6.61
	10 MHz		QPSK	50		5.64
			16-QAM			6.06
			64-QAM			6.43
			256-QAM			6.64
	15 MHz		QPSK	75		5.53
			16-QAM			6.01
			64-QAM			6.38
			256-QAM			6.69
	20 MHz		QPSK	100		5.48
			16-QAM			6.03
			64-QAM			6.36
			256-QAM			6.65

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 79 ~ 102.

8.4 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	1.0955
			16-QAM			1.1005
			64-QAM			1.0939
			256-QAM			1.0999
	3 MHz		QPSK	15		2.7125
			16-QAM			2.7143
			64-QAM			2.7142
			256-QAM			2.7213
	5 MHz		QPSK	25		4.5285
			16-QAM			4.5303
			64-QAM			4.5418
			256-QAM			4.5193
	10 MHz		QPSK	50		9.0373
			16-QAM			9.0433
			64-QAM			9.0306
			256-QAM			9.0333
	15 MHz		QPSK	75		13.528
			16-QAM			13.481
			64-QAM			13.482
			256-QAM			13.496
	20 MHz		QPSK	100		17.942
			16-QAM			17.925
			64-QAM			17.946
			256-QAM			17.934

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 103 ~ 126.

8.5 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
4	1.4	1710.7	3.4213	27.976	-75.133	-47.157	-13.00
		1732.5	3.4647	27.976	-75.389	-47.413	
		1754.3	3.5100	27.976	-75.971	-47.995	
	3	1711.5	3.4213	27.976	-74.880	-46.904	
		1732.5	3.4632	27.976	-76.222	-48.246	
		1753.5	3.5100	27.976	-75.718	-47.742	
	5	1712.5	3.4213	27.976	-74.518	-46.542	
		1732.5	3.4612	27.976	-75.530	-47.554	
		1752.5	3.5100	27.976	-76.186	-48.210	
	10	1715.0	3.4218	27.976	-76.109	-48.133	
		1732.5	3.4567	27.976	-75.154	-47.178	
		1750.0	3.5095	27.976	-75.222	-47.246	
	15	1717.5	3.4223	27.976	-74.630	-46.654	
		1732.5	3.4522	27.976	-74.546	-46.570	
		1747.5	3.5090	27.976	-76.146	-48.170	
	20	1720.0	3.4228	27.976	-74.916	-46.940	
		1732.5	3.4477	27.976	-75.889	-47.913	
		1745.0	3.5085	27.976	-74.968	-46.992	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 127 ~ 162.
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

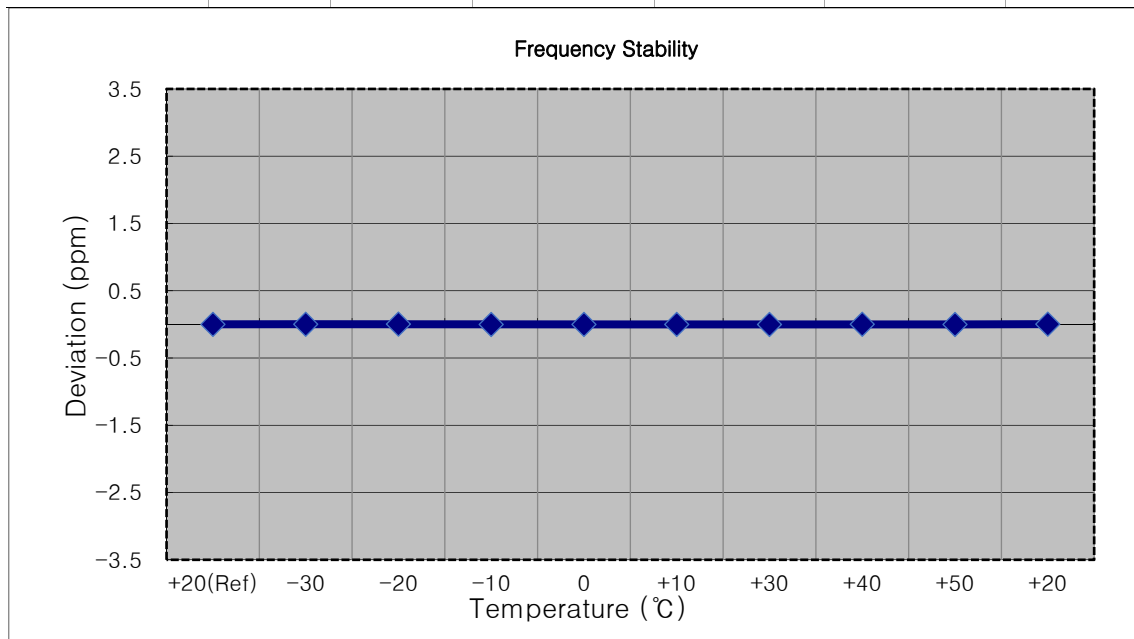
8.6 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 163 ~ 198.

8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

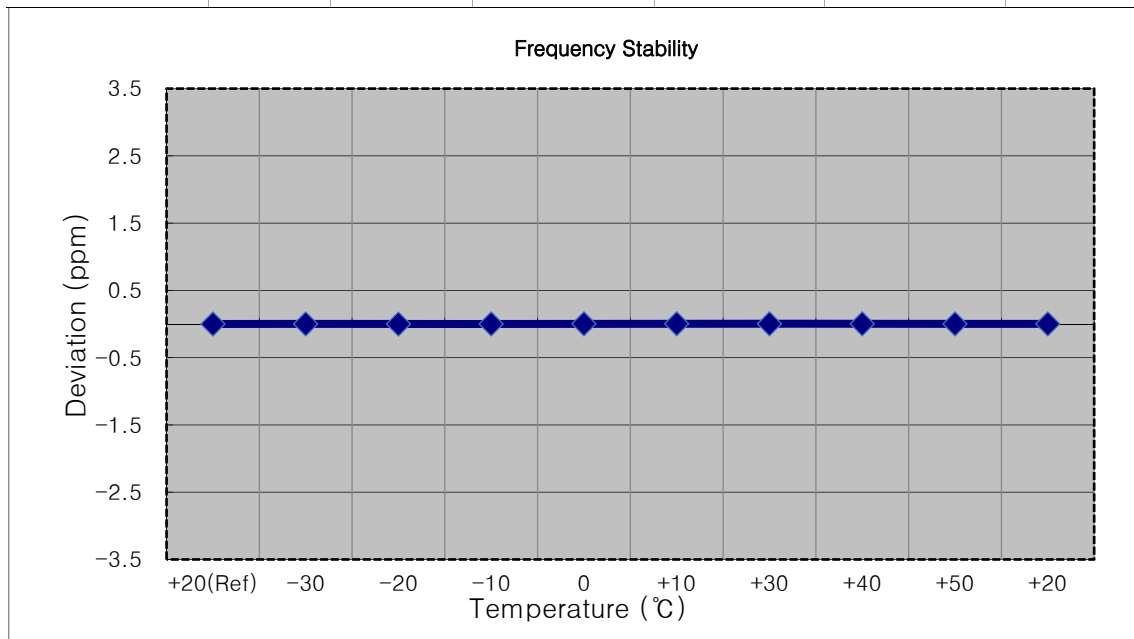
MODE:	<u>LTE 4</u>
OPERATING FREQUENCY:	<u>1710,700,000 Hz</u>
CHANNEL:	<u>19957 (1.4 MHz)</u>
REFERENCE VOLTAGE:	<u>3.880 VDC</u>
DEVIATION LIMIT:	<u>Emission must remain in band</u>

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100 %	3.880	+20(Ref)	1710 700 003	0.0	0.000 000	0.000
100 %		-30	1710 700 005	2.8	0.000 000	0.002
100 %		-20	1710 700 009	6.2	0.000 000	0.004
100 %		-10	1710 700 000	-2.5	0.000 000	-0.001
100 %		0	1710 700 001	-1.9	0.000 000	-0.001
100 %		+10	1710 700 000	-2.2	0.000 000	-0.001
100 %		+30	1710 699 999	-3.5	0.000 000	-0.002
100 %		+40	1710 700 005	2.5	0.000 000	0.001
100 %		+50	1710 700 000	-2.9	0.000 000	-0.002
Batt. Endpoint	3.300	+20	1710 700 007	4.6	0.000 000	0.003



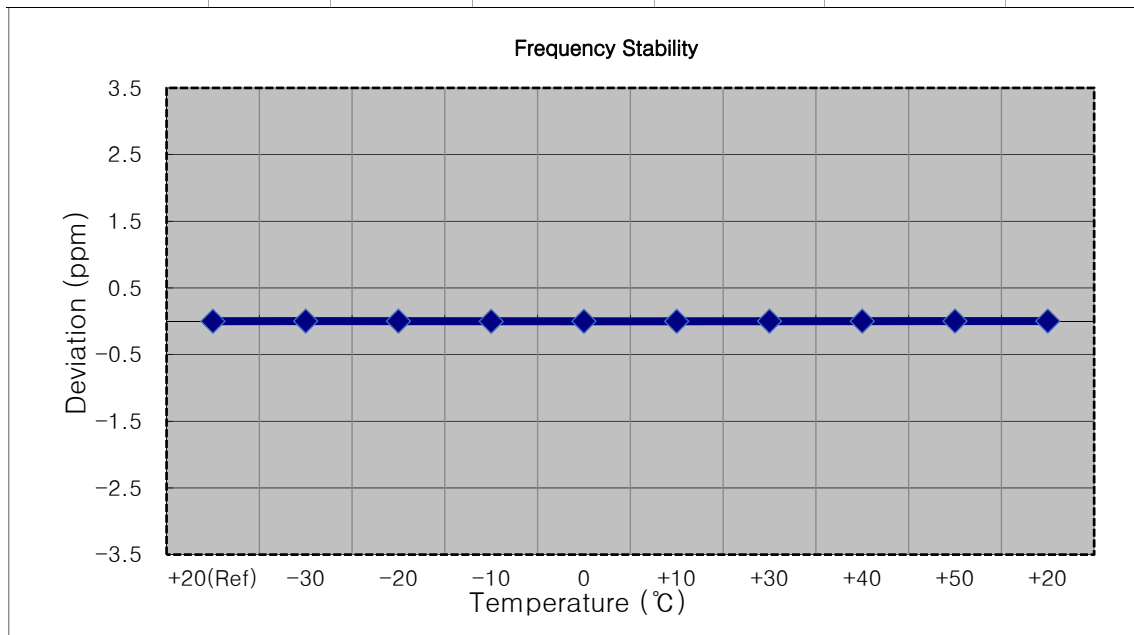
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1711,500,000 Hz
 ■ CHANNEL: 19965 (3 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1711 500 002	0.0	0.000 000	0.000
100 %		-30	1711 500 005	2.9	0.000 000	0.002
100 %		-20	1711 500 000	-2.0	0.000 000	-0.001
100 %		-10	1711 500 004	2.2	0.000 000	0.001
100 %		0	1711 500 007	4.8	0.000 000	0.003
100 %		+10	1711 500 008	6.2	0.000 000	0.004
100 %		+30	1711 500 008	5.4	0.000 000	0.003
100 %		+40	1711 500 007	5.2	0.000 000	0.003
100 %		+50	1711 500 005	3.1	0.000 000	0.002
Batt. Endpoint	3.300	+20	1711 500 005	2.6	0.000 000	0.002



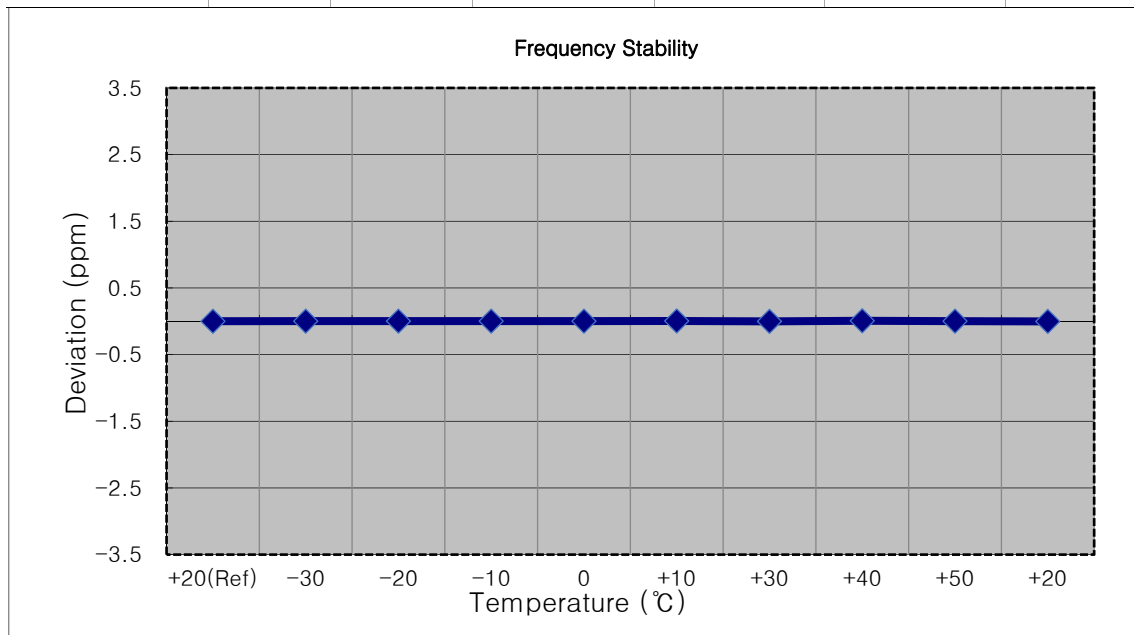
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1712,500,000 Hz
 ■ CHANNEL: 19975 (5 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1712 500 004	0.0	0.000 000	0.000
100 %		-30	1712 500 007	3.6	0.000 000	0.002
100 %		-20	1712 500 007	3.3	0.000 000	0.002
100 %		-10	1712 500 001	-2.5	0.000 000	-0.001
100 %		0	1712 500 002	-1.4	0.000 000	-0.001
100 %		+10	1712 500 002	-2.1	0.000 000	-0.001
100 %		+30	1712 500 006	2.7	0.000 000	0.002
100 %		+40	1712 500 006	2.5	0.000 000	0.001
100 %		+50	1712 500 008	3.9	0.000 000	0.002
Batt. Endpoint	3.300	+20	1712 500 008	4.2	0.000 000	0.002



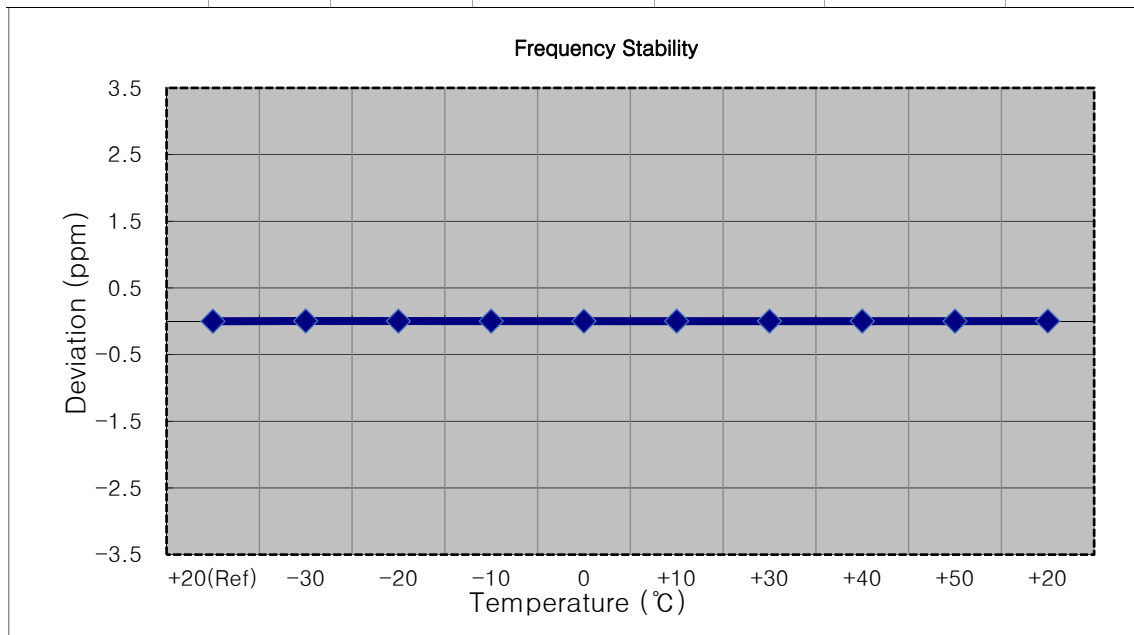
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1715,000,000 Hz
 ■ CHANNEL: 20000 (10 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1715 000 002	0.0	0.000 000	0.000
100 %		-30	1715 000 005	2.7	0.000 000	0.002
100 %		-20	1715 000 005	3.2	0.000 000	0.002
100 %		-10	1715 000 005	2.7	0.000 000	0.002
100 %		0	1715 000 005	2.7	0.000 000	0.002
100 %		+10	1715 000 008	6.2	0.000 000	0.004
100 %		+30	1714 999 999	-2.9	0.000 000	-0.002
100 %		+40	1715 000 014	12.1	0.000 001	0.007
100 %		+50	1715 000 005	2.6	0.000 000	0.002
Batt. Endpoint	3.300	+20	1714 999 998	-4.4	0.000 000	-0.003



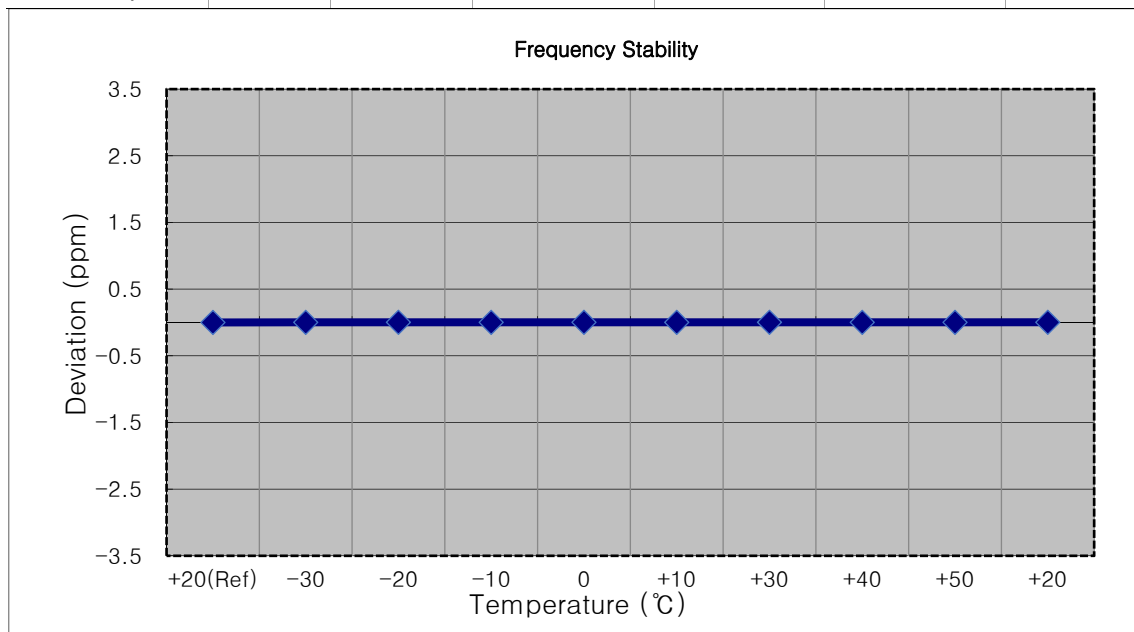
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1717,500,000 Hz
 ■ CHANNEL: 20025 (15 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1717 499 995	0.0	0.000 000	0.000
100 %		-30	1717 500 002	6.8	0.000 000	0.004
100 %		-20	1717 499 999	3.2	0.000 000	0.002
100 %		-10	1717 499 998	2.8	0.000 000	0.002
100 %		0	1717 499 998	2.3	0.000 000	0.001
100 %		+10	1717 499 998	2.2	0.000 000	0.001
100 %		+30	1717 499 998	2.5	0.000 000	0.001
100 %		+40	1717 499 999	3.4	0.000 000	0.002
100 %		+50	1717 499 997	1.3	0.000 000	0.001
Batt. Endpoint	3.300	+20	1717 500 000	4.2	0.000 000	0.002



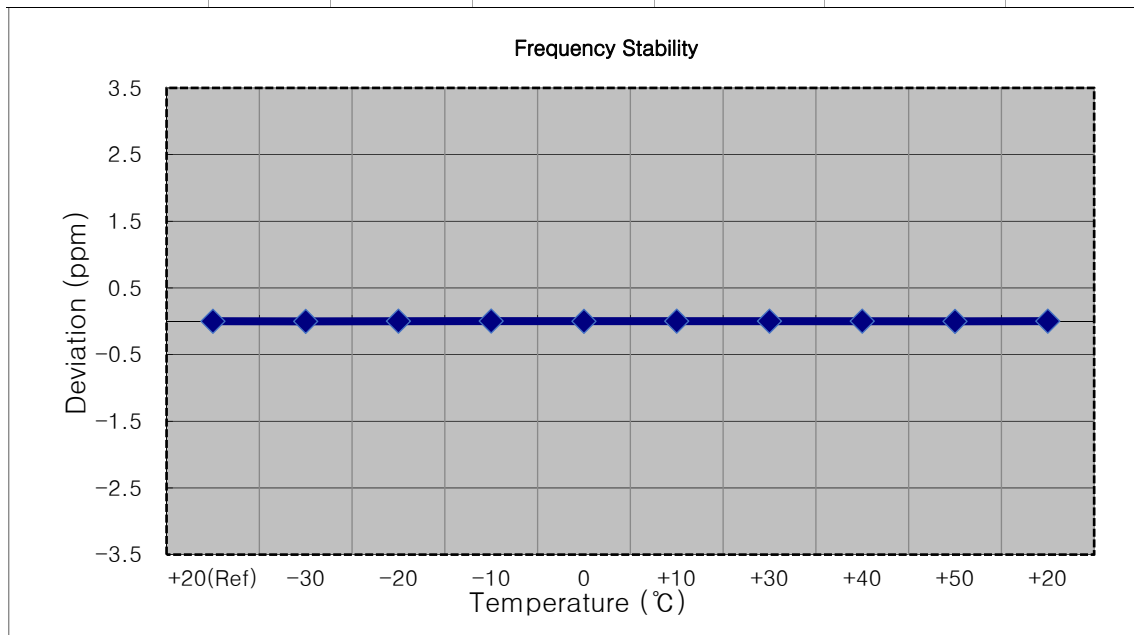
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1720,000,000 Hz
 ■ CHANNEL: 20050 (20 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1720 000 003	0.0	0.000 000	0.000
100 %		-30	1720 000 006	2.7	0.000 000	0.002
100 %		-20	1720 000 007	4.2	0.000 000	0.002
100 %		-10	1720 000 005	2.4	0.000 000	0.001
100 %		0	1720 000 007	3.8	0.000 000	0.002
100 %		+10	1720 000 006	2.8	0.000 000	0.002
100 %		+30	1720 000 007	3.7	0.000 000	0.002
100 %		+40	1720 000 005	1.7	0.000 000	0.001
100 %		+50	1720 000 006	3.0	0.000 000	0.002
Batt. Endpoint	3.300	+20	1720 000 007	3.9	0.000 000	0.002



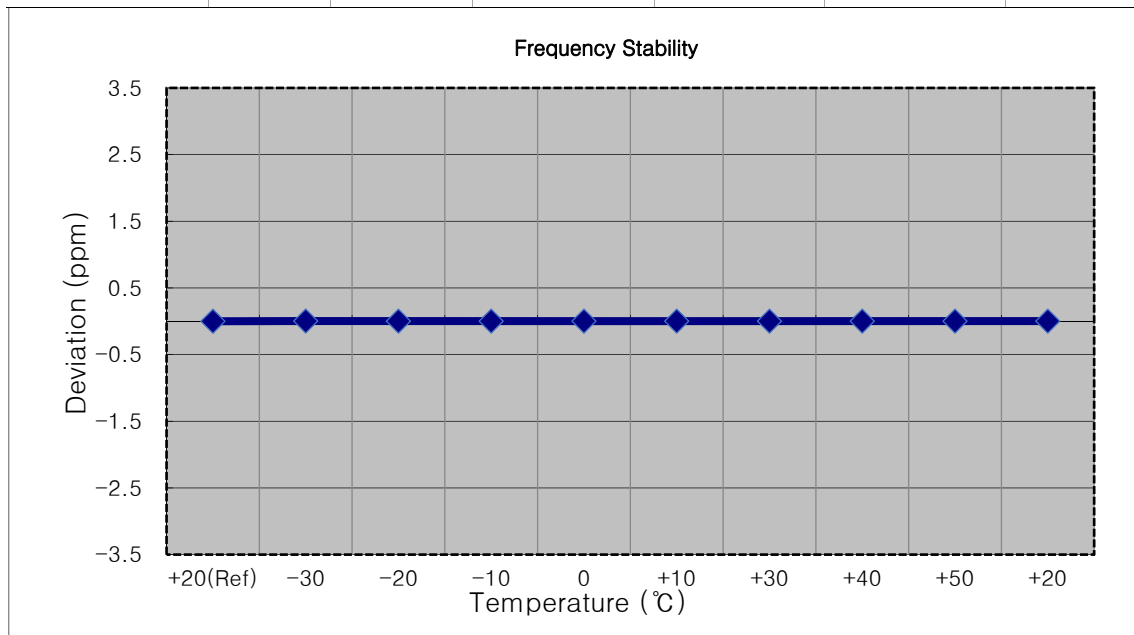
MODE:	LTE 4
OPERATING FREQUENCY:	1732,500,000 Hz
CHANNEL:	20175 (1.4 MHz)
REFERENCE VOLTAGE:	3.880 VDC
DEVIATION LIMIT:	Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1732 500 002	0.0	0.000 000	0.000
100 %		-30	1732 499 999	-2.7	0.000 000	-0.002
100 %		-20	1732 500 005	3.1	0.000 000	0.002
100 %		-10	1732 500 007	5.1	0.000 000	0.003
100 %		0	1732 500 000	-2.0	0.000 000	-0.001
100 %		+10	1732 500 005	2.9	0.000 000	0.002
100 %		+30	1732 500 004	2.2	0.000 000	0.001
100 %		+40	1732 500 004	2.2	0.000 000	0.001
100 %		+50	1732 500 000	-2.2	0.000 000	-0.001
Batt. Endpoint	3.300	+20	1732 500 004	2.2	0.000 000	0.001



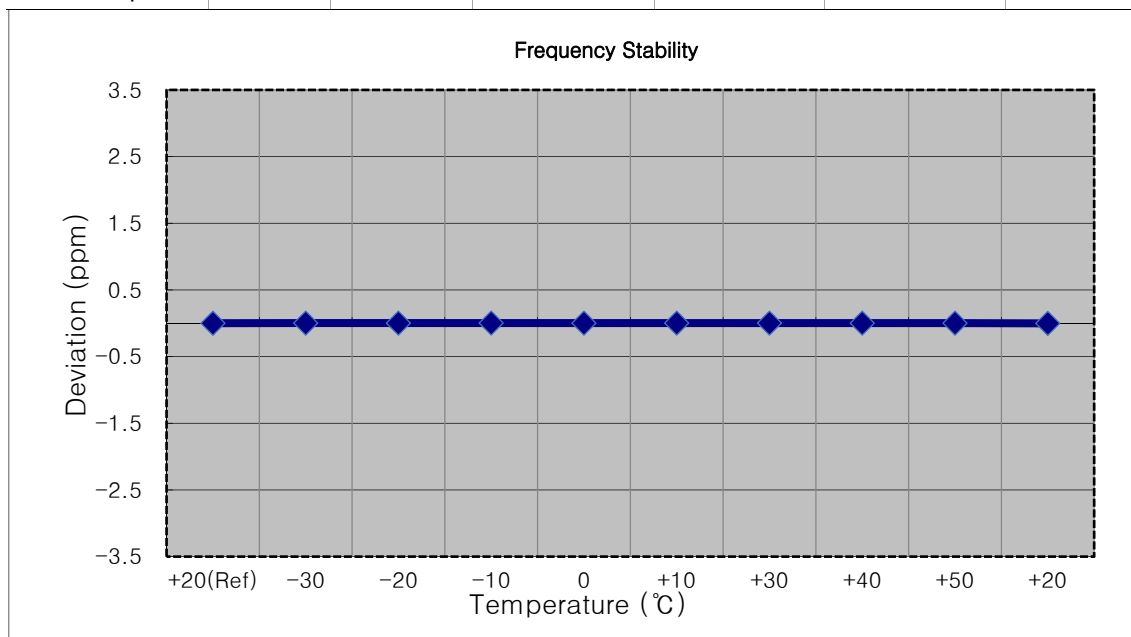
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1732,500,000 Hz
 ■ CHANNEL: 20175 (3 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1732 500 004	0.0	0.000 000	0.000
100 %		-30	1732 500 009	5.3	0.000 000	0.003
100 %		-20	1732 500 007	2.9	0.000 000	0.002
100 %		-10	1732 500 007	3.3	0.000 000	0.002
100 %		0	1732 500 007	3.1	0.000 000	0.002
100 %		+10	1732 500 007	3.0	0.000 000	0.002
100 %		+30	1732 500 006	2.6	0.000 000	0.002
100 %		+40	1732 500 006	2.3	0.000 000	0.001
100 %		+50	1732 500 007	2.9	0.000 000	0.002
Batt. Endpoint	3.300	+20	1732 500 007	3.2	0.000 000	0.002



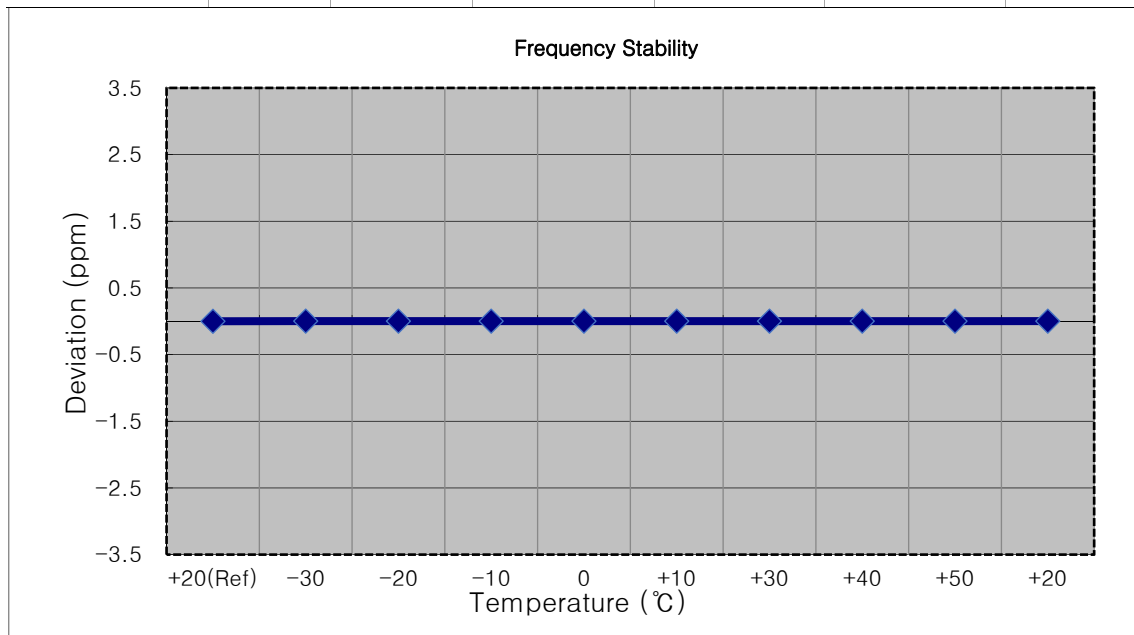
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1732,500,000 Hz
 ■ CHANNEL: 20175 (5 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1732 500 003	0.0	0.000 000	0.000
100 %		-30	1732 500 007	4.2	0.000 000	0.002
100 %		-20	1732 500 007	4.4	0.000 000	0.003
100 %		-10	1732 500 008	5.3	0.000 000	0.003
100 %		0	1732 500 006	2.9	0.000 000	0.002
100 %		+10	1732 500 007	4.0	0.000 000	0.002
100 %		+30	1732 500 007	4.6	0.000 000	0.003
100 %		+40	1732 500 006	3.3	0.000 000	0.002
100 %		+50	1732 500 006	3.0	0.000 000	0.002
Batt. Endpoint	3.300	+20	1732 500 000	-2.9	0.000 000	-0.002



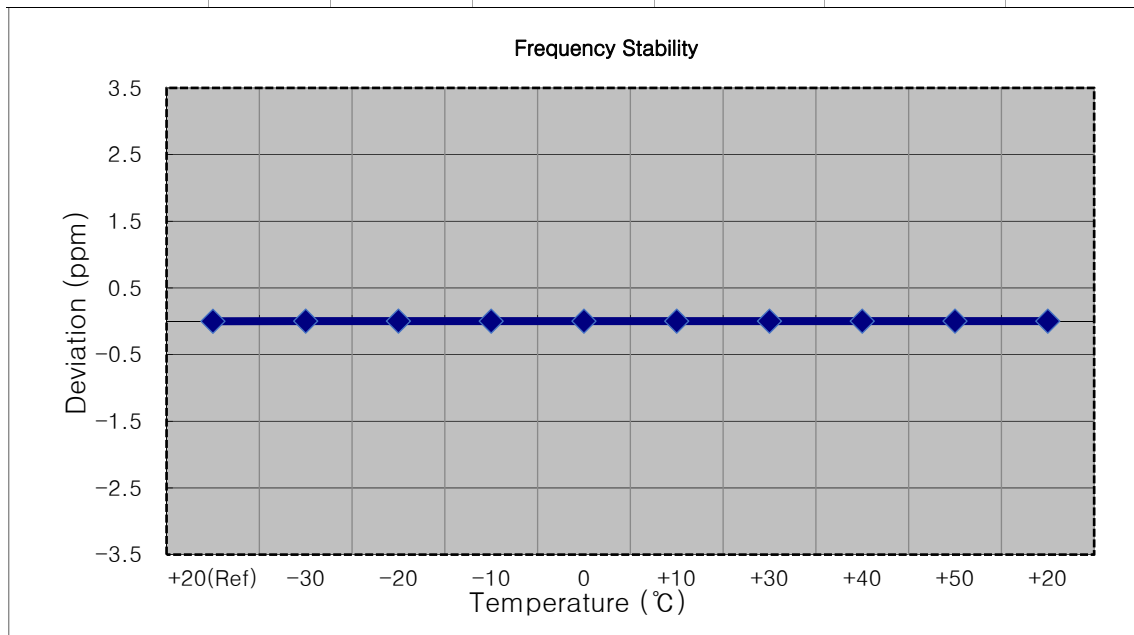
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1732,500,000 Hz
 ■ CHANNEL: 20175 (10 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1732 500 002	0.0	0.000 000	0.000
100 %		-30	1732 500 006	3.8	0.000 000	0.002
100 %		-20	1732 500 005	3.0	0.000 000	0.002
100 %		-10	1732 500 005	3.1	0.000 000	0.002
100 %		0	1732 500 005	2.5	0.000 000	0.001
100 %		+10	1732 500 005	2.8	0.000 000	0.002
100 %		+30	1732 500 005	2.5	0.000 000	0.001
100 %		+40	1732 500 005	2.4	0.000 000	0.001
100 %		+50	1732 500 004	2.2	0.000 000	0.001
Batt. Endpoint	3.300	+20	1732 500 005	3.0	0.000 000	0.002



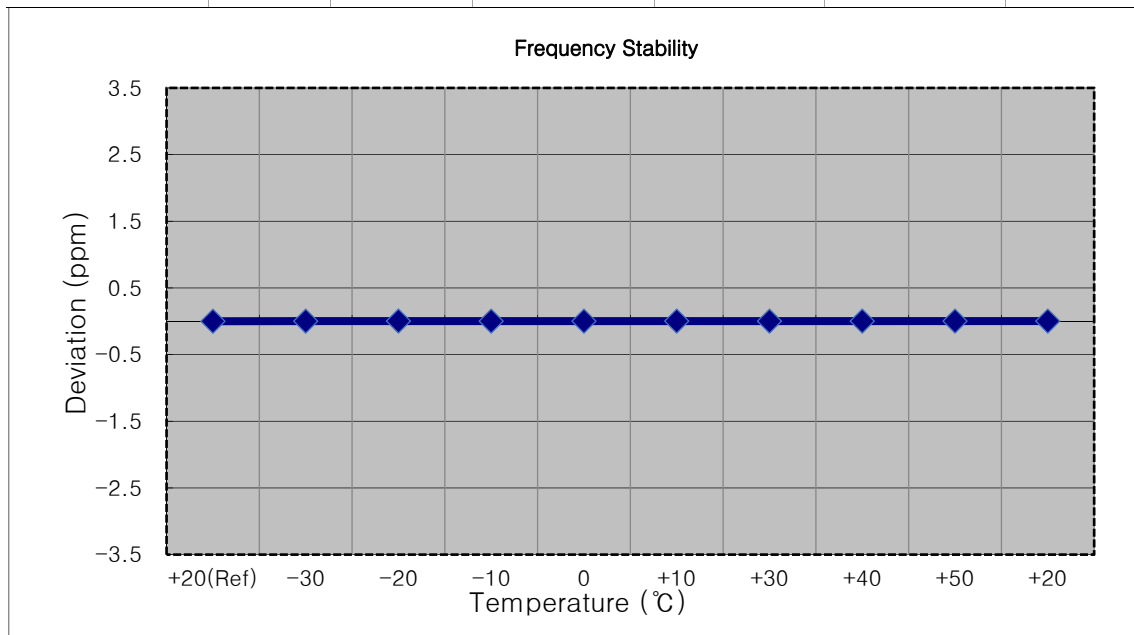
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1732,500,000 Hz
 ■ CHANNEL: 20175 (15 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1732 500 003	0.0	0.000 000	0.000
100 %		-30	1732 500 007	3.8	0.000 000	0.002
100 %		-20	1732 500 006	3.4	0.000 000	0.002
100 %		-10	1732 500 005	2.2	0.000 000	0.001
100 %		0	1732 500 005	2.7	0.000 000	0.002
100 %		+10	1732 500 006	3.0	0.000 000	0.002
100 %		+30	1732 500 006	3.3	0.000 000	0.002
100 %		+40	1732 500 005	2.7	0.000 000	0.002
100 %		+50	1732 500 007	4.3	0.000 000	0.002
Batt. Endpoint	3.300	+20	1732 500 006	3.0	0.000 000	0.002



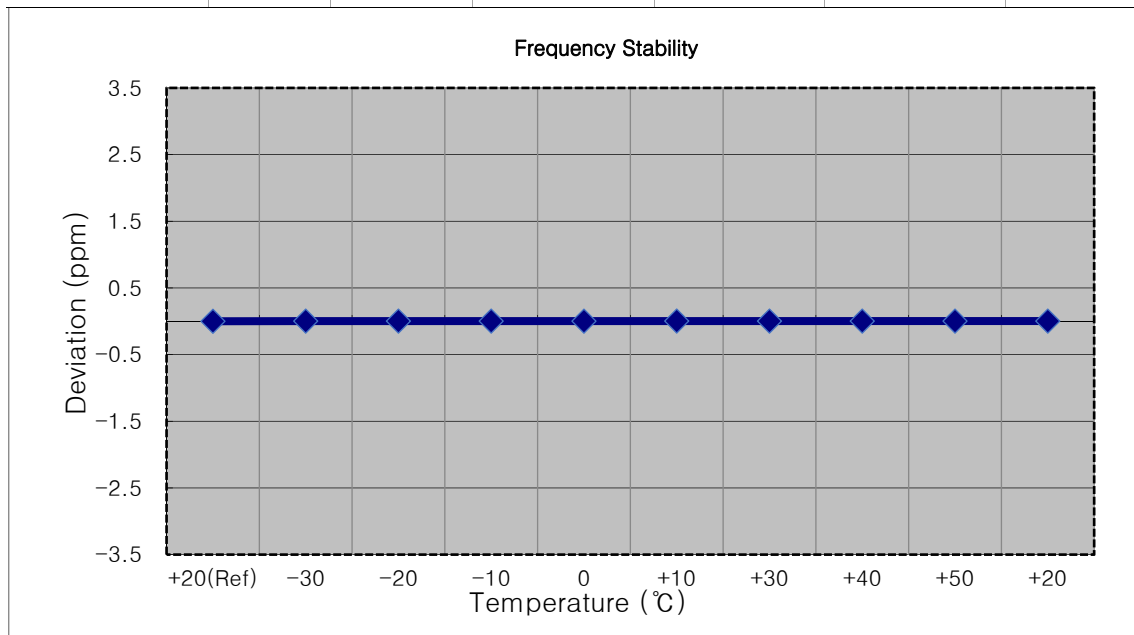
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1732,500,000 Hz
 ■ CHANNEL: 20175 (20 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1732 500 004	0.0	0.000 000	0.000
100 %		-30	1732 500 006	2.7	0.000 000	0.002
100 %		-20	1732 500 009	5.1	0.000 000	0.003
100 %		-10	1732 500 006	2.8	0.000 000	0.002
100 %		0	1732 500 006	2.3	0.000 000	0.001
100 %		+10	1732 500 007	3.6	0.000 000	0.002
100 %		+30	1732 500 006	2.2	0.000 000	0.001
100 %		+40	1732 500 007	3.6	0.000 000	0.002
100 %		+50	1732 500 007	3.5	0.000 000	0.002
Batt. Endpoint	3.300	+20	1732 500 007	3.4	0.000 000	0.002



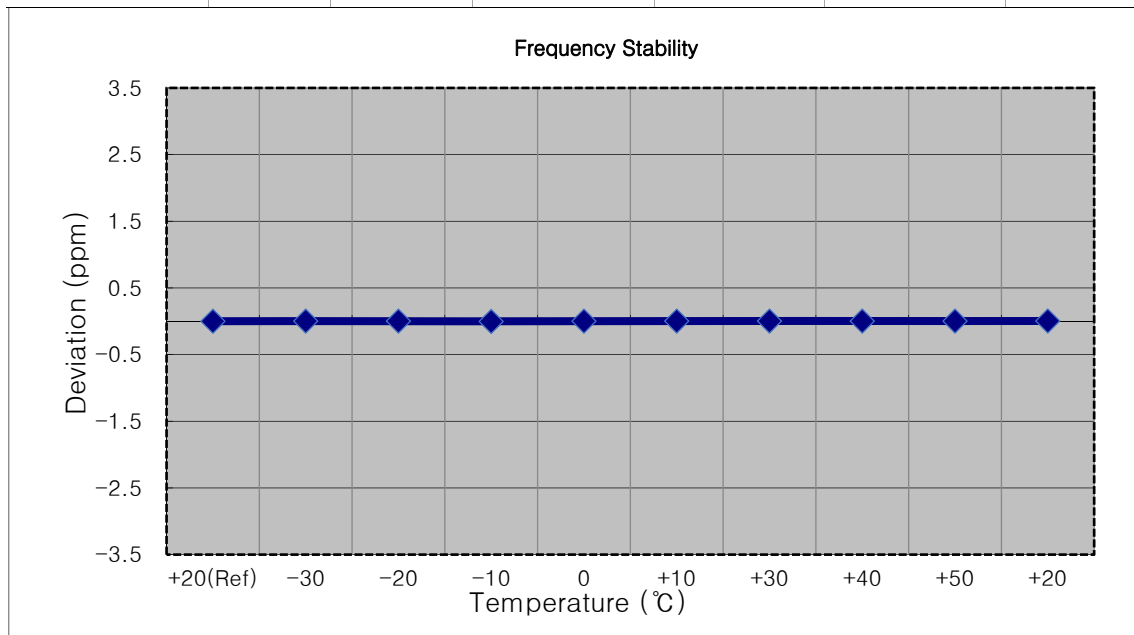
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1754,300,000 Hz
 ■ CHANNEL: 20393 (1.4 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1754 299 998	0.0	0.000 000	0.000
100 %		-30	1754 300 001	3.8	0.000 000	0.002
100 %		-20	1754 300 002	4.3	0.000 000	0.002
100 %		-10	1754 300 001	3.7	0.000 000	0.002
100 %		0	1754 300 001	2.9	0.000 000	0.002
100 %		+10	1754 300 003	5.4	0.000 000	0.003
100 %		+30	1754 300 002	4.1	0.000 000	0.002
100 %		+40	1754 300 001	3.5	0.000 000	0.002
100 %		+50	1754 300 002	4.3	0.000 000	0.002
Batt. Endpoint	3.300	+20	1754 300 002	4.6	0.000 000	0.003



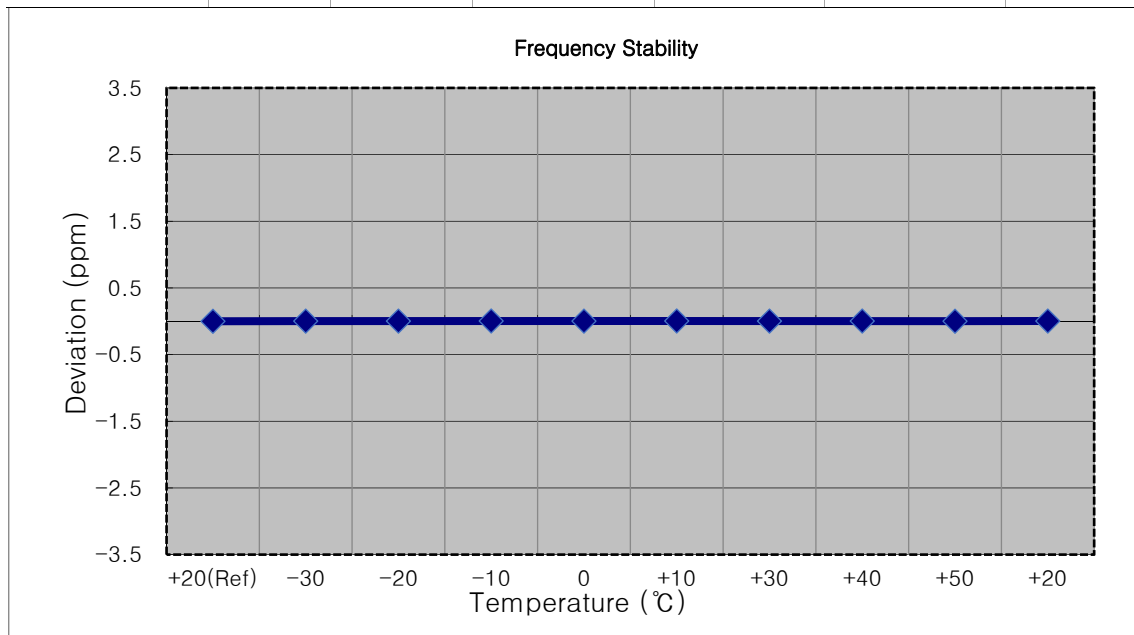
▣ MODE:	<u>LTE 4</u>
▣ OPERATING FREQUENCY:	<u>1753,500,000 Hz</u>
▣ CHANNEL:	<u>20385 (3 MHz)</u>
▣ REFERENCE VOLTAGE:	<u>3.880 VDC</u>
▣ DEVIATION LIMIT:	<u>Emission must remain in band</u>

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1753 500 006	0.0	0.000 000	0.000
100 %		-30	1753 500 009	3.7	0.000 000	0.002
100 %		-20	1753 500 009	3.9	0.000 000	0.002
100 %		-10	1753 500 000	-5.6	0.000 000	-0.003
100 %		0	1753 500 008	2.8	0.000 000	0.002
100 %		+10	1753 500 010	4.3	0.000 000	0.002
100 %		+30	1753 500 011	5.7	0.000 000	0.003
100 %		+40	1753 500 010	4.2	0.000 000	0.002
100 %		+50	1753 500 010	4.7	0.000 000	0.003
Batt. Endpoint	3.300	+20	1753 500 012	6.9	0.000 000	0.004



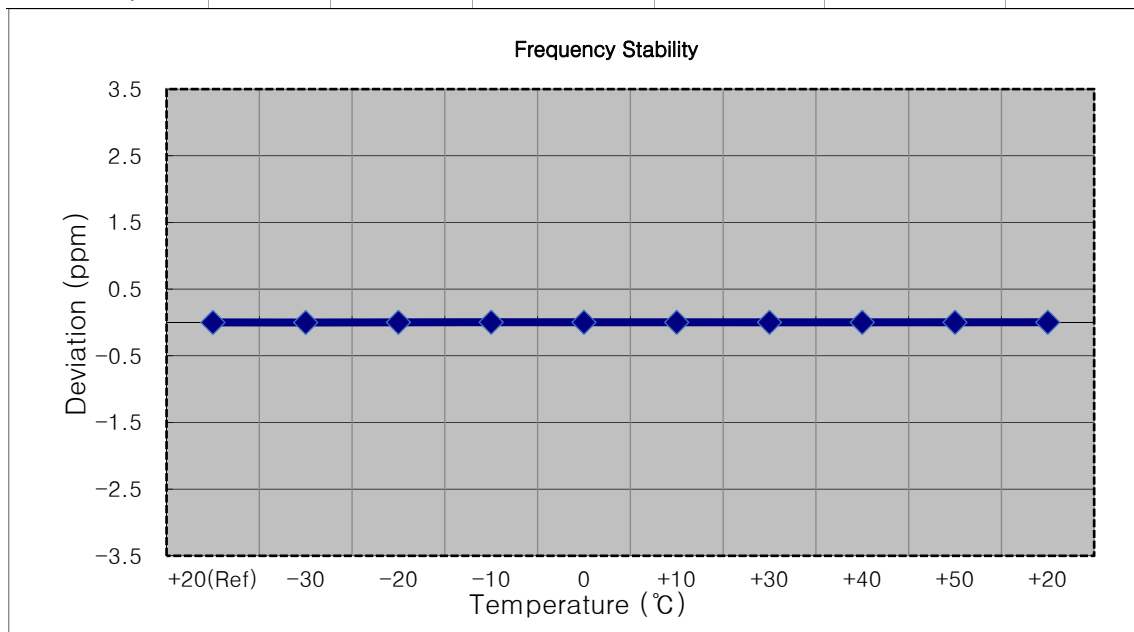
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1752,500,000 Hz
 ■ CHANNEL: 20375 (5 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1752 500 003	0.0	0.000 000	0.000
100 %		-30	1752 500 007	3.8	0.000 000	0.002
100 %		-20	1752 500 007	4.0	0.000 000	0.002
100 %		-10	1752 500 010	6.3	0.000 000	0.004
100 %		0	1752 500 007	3.9	0.000 000	0.002
100 %		+10	1752 500 010	6.3	0.000 000	0.004
100 %		+30	1752 500 008	4.3	0.000 000	0.002
100 %		+40	1752 500 009	5.3	0.000 000	0.003
100 %		+50	1752 500 005	2.0	0.000 000	0.001
Batt. Endpoint	3.300	+20	1752 500 009	6.0	0.000 000	0.003



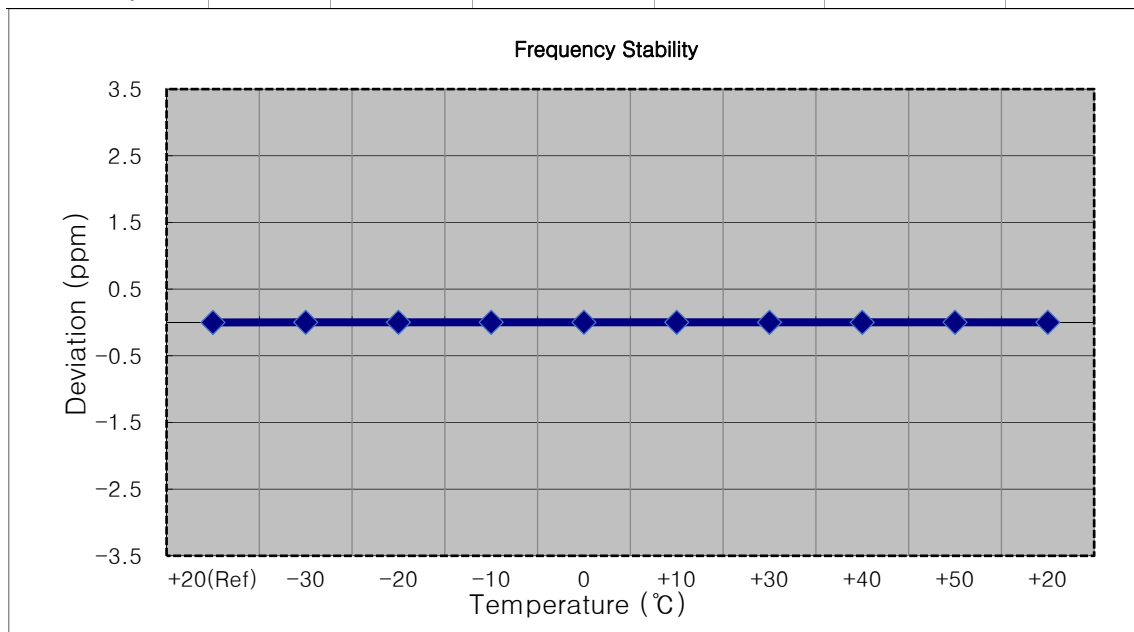
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1750,000,000 Hz
 ■ CHANNEL: 20350 (10 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1750 000 003	0.0	0.000 000	0.000
100 %		-30	1750 000 002	-1.6	0.000 000	-0.001
100 %		-20	1750 000 007	3.8	0.000 000	0.002
100 %		-10	1750 000 008	4.6	0.000 000	0.003
100 %		0	1750 000 007	3.9	0.000 000	0.002
100 %		+10	1750 000 006	3.0	0.000 000	0.002
100 %		+30	1750 000 006	2.6	0.000 000	0.001
100 %		+40	1750 000 006	3.1	0.000 000	0.002
100 %		+50	1750 000 006	2.7	0.000 000	0.002
Batt. Endpoint	3.300	+20	1750 000 007	3.9	0.000 000	0.002



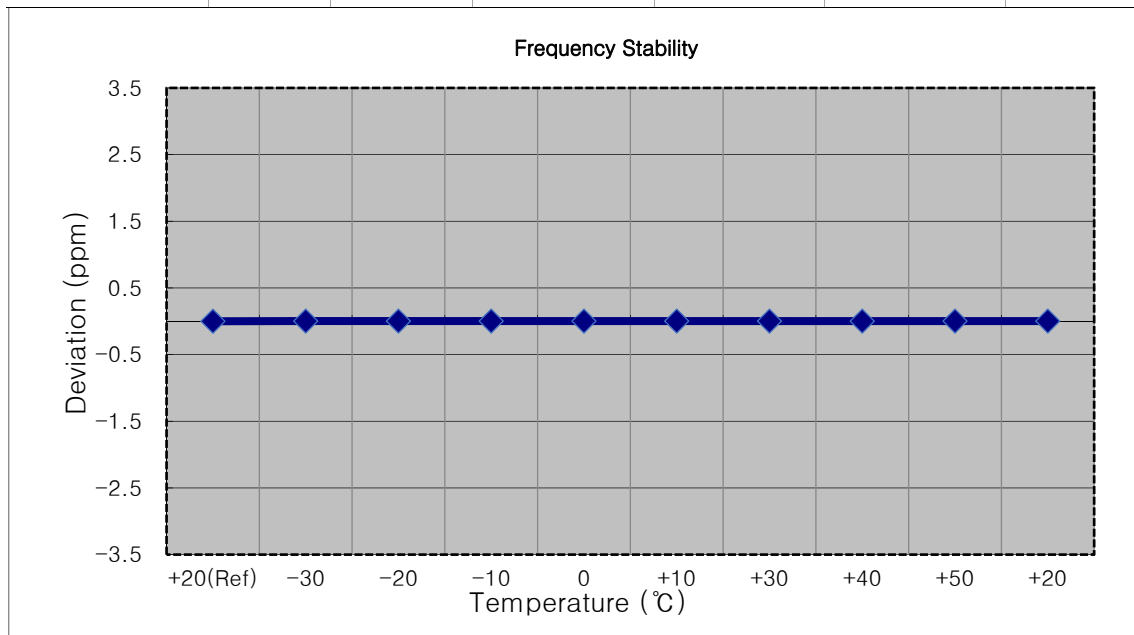
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1747,500,000 Hz
 ■ CHANNEL: 20325 (15 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1747 500 003	0.0	0.000 000	0.000
100 %		-30	1747 500 007	3.3	0.000 000	0.002
100 %		-20	1747 500 007	3.9	0.000 000	0.002
100 %		-10	1747 500 007	3.3	0.000 000	0.002
100 %		0	1747 500 007	4.0	0.000 000	0.002
100 %		+10	1747 500 007	3.2	0.000 000	0.002
100 %		+30	1747 500 006	2.9	0.000 000	0.002
100 %		+40	1747 500 006	2.8	0.000 000	0.002
100 %		+50	1747 500 007	3.5	0.000 000	0.002
Batt. Endpoint	3.300	+20	1747 500 006	2.6	0.000 000	0.001



■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1745,000,000 Hz
 ■ CHANNEL: 20300 (20 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1745 000 006	0.0	0.000 000	0.000
100 %		-30	1745 000 010	4.4	0.000 000	0.003
100 %		-20	1745 000 009	3.6	0.000 000	0.002
100 %		-10	1745 000 010	4.6	0.000 000	0.003
100 %		0	1745 000 010	4.5	0.000 000	0.003
100 %		+10	1745 000 009	3.5	0.000 000	0.002
100 %		+30	1745 000 010	4.1	0.000 000	0.002
100 %		+40	1745 000 009	3.1	0.000 000	0.002
100 %		+50	1745 000 009	3.8	0.000 000	0.002
Batt. Endpoint	3.300	+20	1745 000 009	3.4	0.000 000	0.002



9. TEST DATA (ANT F)

9.1 EQUIVALENT ISOTROPIC RADIATED POWER

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured	Substitute	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
			Level (dBm)	Level (dBm)				W	W	dBm	Size	Offset
1710.7	LTE B4 1.4 MHz	QPSK	-19.15	14.58	9.94	2.24	H	< 1.00	0.169	22.28	1	0
		16-QAM	-19.96	13.77	9.94	2.24	H		0.140	21.47		
		64-QAM	-21.00	12.73	9.94	2.24	H		0.110	20.43		
		256-QAM	-24.01	9.72	9.94	2.24	H		0.055	17.42		
1732.5		QPSK	-19.62	14.07	10.07	2.17	H		0.157	21.97	1	0
		16-QAM	-20.35	13.34	10.07	2.17	H		0.133	21.24		
		64-QAM	-21.37	12.32	10.07	2.17	H		0.105	20.22		
		256-QAM	-24.41	9.28	10.07	2.17	H		0.052	17.18		
1754.3		QPSK	-20.89	12.79	10.18	2.17	H		0.120	20.80	1	0
		16-QAM	-21.56	12.12	10.18	2.17	H		0.103	20.13		
		64-QAM	-22.64	11.04	10.18	2.17	H		0.080	19.05		
		256-QAM	-25.67	8.01	10.18	2.17	H		0.040	16.02		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
								W	W	dBm	Size	Offset
1711.5	LTE B4 3 MHz	QPSK	-19.15	14.58	9.94	2.24	H	<1.00	0.169	22.28	1	0
		16-QAM	-19.94	13.79	9.94	2.24	H		0.141	21.49		
		64-QAM	-20.94	12.79	9.94	2.24	H		0.112	20.49		
		256-QAM	-23.97	9.76	9.94	2.24	H		0.056	17.46		
1732.5		QPSK	-19.40	14.29	10.07	2.17	H		0.166	22.19	1	0
		16-QAM	-20.22	13.47	10.07	2.17	H		0.137	21.37		
		64-QAM	-21.26	12.43	10.07	2.17	H		0.108	20.33		
		256-QAM	-24.38	9.31	10.07	2.17	H		0.053	17.21		
1753.5		QPSK	-20.56	13.12	10.18	2.17	H		0.130	21.13	1	0
		16-QAM	-21.37	12.31	10.18	2.17	H		0.108	20.32		
		64-QAM	-22.40	11.28	10.18	2.17	H		0.085	19.29		
		256-QAM	-25.48	8.20	10.18	2.17	H		0.042	16.21		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
								W	W	dBm	Size	Offset
1712.5	LTE B4 5 MHz	QPSK	-19.14	14.59	9.94	2.24	H	< 1.00	0.169	22.29	1	0
		16-QAM	-19.97	13.76	9.94	2.24	H		0.140	21.46		
		64-QAM	-20.97	12.76	9.94	2.24	H		0.111	20.46		
		256-QAM	-24.00	9.73	9.94	2.24	H		0.055	17.43		
1732.5		QPSK	-19.39	14.30	10.07	2.17	H		0.166	22.20	1	0
		16-QAM	-20.26	13.43	10.07	2.17	H		0.136	21.33		
		64-QAM	-21.31	12.38	10.07	2.17	H		0.107	20.28		
		256-QAM	-24.42	9.27	10.07	2.17	H		0.052	17.17		
1752.5		QPSK	-20.47	13.24	10.17	2.15	H		0.134	21.26	1	0
		16-QAM	-21.30	12.41	10.17	2.15	H		0.110	20.43		
		64-QAM	-22.28	11.43	10.17	2.15	H		0.088	19.45		
		256-QAM	-25.37	8.34	10.17	2.15	H		0.043	16.36		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured	Substitute	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
			Level (dBm)	Level (dBm)				W	W	dBm	Size	Offset
1715.0	LTE B4 10 MHz	QPSK	-19.26	14.38	9.98	2.23	H	<1.00	0.163	22.12	1	0
		16-QAM	-20.07	13.57	9.98	2.23	H		0.135	21.31		
		64-QAM	-21.14	12.50	9.98	2.23	H		0.106	20.24		
		256-QAM	-24.04	9.60	9.98	2.23	H		0.054	17.34		
1732.5		QPSK	-19.50	14.19	10.07	2.17	H		0.162	22.09	1	0
		16-QAM	-20.30	13.39	10.07	2.17	H		0.135	21.29		
		64-QAM	-21.35	12.34	10.07	2.17	H		0.106	20.24		
		256-QAM	-24.29	9.40	10.07	2.17	H		0.054	17.30		
1750.0		QPSK	-20.31	13.40	10.17	2.15	H		0.139	21.42	1	0
		16-QAM	-21.14	12.57	10.17	2.15	H		0.115	20.59		
		64-QAM	-22.18	11.53	10.17	2.15	H		0.090	19.55		
		256-QAM	-25.13	8.58	10.17	2.15	H		0.046	16.60		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level (dBm)	Substitute Level (dBm)	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
								W	W	dBm	Size	Offset
1717.5	LTE B4 15 MHz	QPSK	-19.38	14.26	10.01	2.22	H	< 1.00	0.160	22.05	1	0
		16-QAM	-20.11	13.53	10.01	2.22	H		0.135	21.32		
		64-QAM	-21.20	12.44	10.01	2.22	H		0.105	20.23		
		256-QAM	-24.18	9.46	10.01	2.22	H		0.053	17.25		
1732.5		QPSK	-19.50	14.19	10.07	2.17	H		0.162	22.09	1	0
		16-QAM	-20.27	13.42	10.07	2.17	H		0.136	21.32		
		64-QAM	-21.28	12.41	10.07	2.17	H		0.107	20.31		
		256-QAM	-24.32	9.37	10.07	2.17	H		0.053	17.27		
1747.5		QPSK	-20.10	13.61	10.17	2.15	H		0.145	21.63	1	0
		16-QAM	-20.93	12.78	10.17	2.15	H		0.120	20.80		
		64-QAM	-21.93	11.78	10.17	2.15	H		0.095	19.80		
		256-QAM	-24.96	8.75	10.17	2.15	H		0.048	16.77		

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured	Substitute	Ant. Gain (dBi)	C.L	Pol	Limit	EIRP		RB	
			Level (dBm)	Level (dBm)				W	W	dBm	Size	Offset
1720.0	LTE B4 20 MHz	QPSK	-19.43	14.08	10.01	2.22	H	<1.00	0.154	21.87	1	0
		16-QAM	-20.25	13.26	10.01	2.22	H		0.127	21.05		
		64-QAM	-21.27	12.24	10.01	2.22	H		0.101	20.03		
		256-QAM	-24.25	9.26	10.01	2.22	H		0.051	17.05		
1732.5		QPSK	-19.59	14.10	10.07	2.17	H		0.158	22.00	1	0
		16-QAM	-20.36	13.33	10.07	2.17	H		0.133	21.23		
		64-QAM	-21.39	12.30	10.07	2.17	H		0.105	20.20		
		256-QAM	-24.36	9.33	10.07	2.17	H		0.053	17.23		
1745.0		QPSK	-19.82	13.86	10.15	2.15	H		0.154	21.86	1	0
		16-QAM	-20.63	13.05	10.15	2.15	H		0.127	21.05		
		64-QAM	-21.74	11.94	10.15	2.15	H		0.099	19.94		
		256-QAM	-24.64	9.04	10.15	2.15	H		0.051	17.04		

9.2 RADIATED SPURIOUS EMISSIONS

▣ OPERATING FREQUENCY:	<u>1712.5 MHz</u>
▣ MEASURED OUTPUT POWER:	<u>22.29 dBm = 0.169 W</u>
▣ MODE:	<u>LTE B4</u>
▣ MODULATION SIGNAL:	<u>5 MHz QPSK</u>
▣ DISTANCE:	<u>3 meters</u>
▣ LIMIT: $43 + 10 \log_{10} (W) =$	<u>35.29 dBc</u>

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	dBc	RB	
									Size	Offset
19975 (1712.5)	3 425.00	-55.33	12.43	-62.01	3.06	V	-52.64	74.93	1	0
	5 137.50	-58.46	12.35	-55.71	3.92	V	-47.28	69.57		
	6 850.00	-56.74	11.90	-50.26	4.49	H	-42.85	65.14		
20175 (1732.5)	3 465.00	-55.30	12.35	-61.94	3.11	H	-52.70	74.99	1	0
	5 197.50	-59.06	12.63	-57.98	3.86	V	-49.21	71.50		
	6 930.00	-59.34	11.65	-52.21	4.52	V	-45.08	67.36		
20375 (1752.5)	3 505.00	-55.50	12.34	-61.72	3.11	H	-52.49	74.77	1	0
	5 257.50	-56.11	12.99	-55.79	3.83	V	-46.63	68.91		
	7 010.00	-56.58	11.26	-48.66	4.56	H	-41.96	64.25		

9.3 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	5.04
			16-QAM			5.76
			64-QAM			6.28
			256-QAM			6.62
	3 MHz		QPSK	15		5.47
			16-QAM			6.14
			64-QAM			6.41
			256-QAM			6.64
	5 MHz		QPSK	25		5.48
			16-QAM			6.20
			64-QAM			6.47
			256-QAM			6.60
	10 MHz		QPSK	50		5.58
			16-QAM			6.15
			64-QAM			6.47
			256-QAM			6.64
	15 MHz		QPSK	75		5.46
			16-QAM			6.12
			64-QAM			6.41
			256-QAM			6.63
	20 MHz		QPSK	100		5.40
			16-QAM			6.12
			64-QAM			6.41
			256-QAM			6.65

Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 200 ~ 223.

9.4 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	1.1017
			16-QAM			1.1041
			64-QAM			1.1024
			256-QAM			1.1019
	3 MHz		QPSK	15		2.7181
			16-QAM			2.7273
			64-QAM			2.7049
			256-QAM			2.7088
	5 MHz		QPSK	25		4.5220
			16-QAM			4.5321
			64-QAM			4.5388
			256-QAM			4.5148
	10 MHz		QPSK	50		9.0311
			16-QAM			9.0132
			64-QAM			9.0233
			256-QAM			9.0030
	15 MHz		QPSK	75		13.518
			16-QAM			13.458
			64-QAM			13.491
			256-QAM			13.479
	20 MHz		QPSK	100		17.939
			16-QAM			17.954
			64-QAM			17.908
			256-QAM			17.919

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 224 ~ 247.

9.5 CONDUCTED SPURIOUS EMISSIONS

Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
4	1.4	1710.7	3.4213	27.976	-73.216	-45.240	-13.00
		1732.5	3.4647	27.976	-73.396	-45.420	
		1754.3	3.5100	27.976	-74.316	-46.340	
	3	1711.5	3.4213	27.976	-73.021	-45.045	
		1732.5	3.4632	27.976	-73.347	-45.371	
		1753.5	3.5100	27.976	-73.828	-45.852	
	5	1712.5	3.4213	27.976	-72.857	-44.881	
		1732.5	3.4612	27.976	-73.627	-45.651	
		1752.5	3.5100	27.976	-74.843	-46.867	
	10	1715.0	3.4218	27.976	-72.910	-44.934	
		1732.5	3.4567	27.976	-71.826	-43.850	
		1750.0	3.5095	27.976	-74.142	-46.166	
	15	1717.5	3.4223	27.976	-73.015	-45.039	
		1732.5	3.4522	27.976	-71.937	-43.961	
		1747.5	3.5090	27.976	-73.689	-45.713	
	20	1720.0	3.4228	27.976	-73.083	-45.107	
		1732.5	1.6885	27.976	-69.991	-42.015	
		1745.0	3.5085	27.976	-74.286	-46.310	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 248 ~ 283.
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

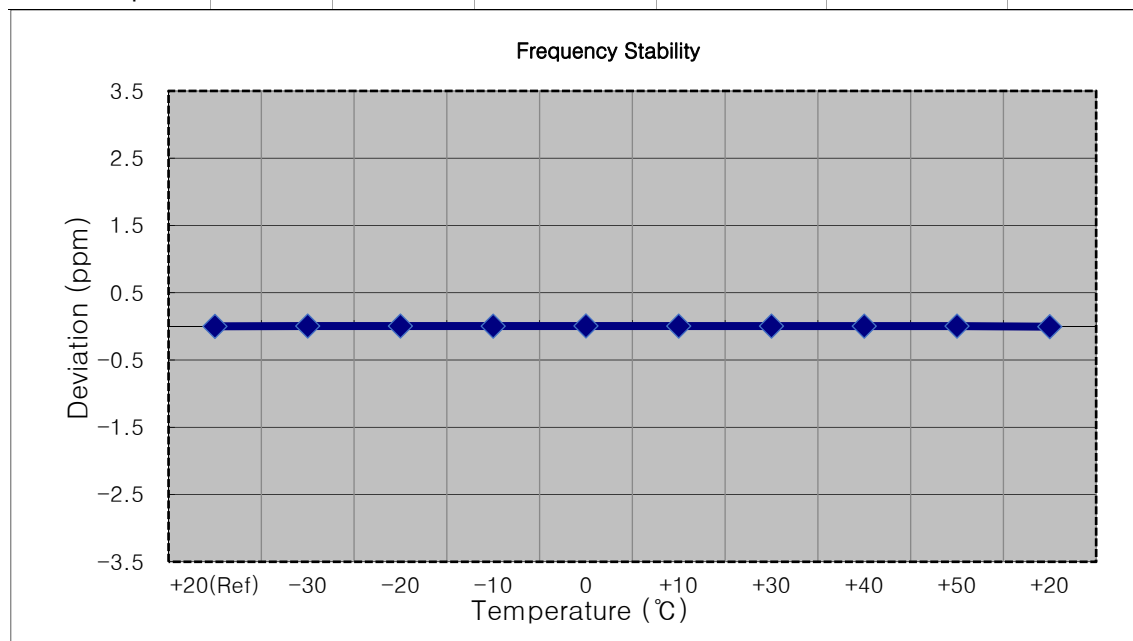
9.6 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 284 ~ 319.

9.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

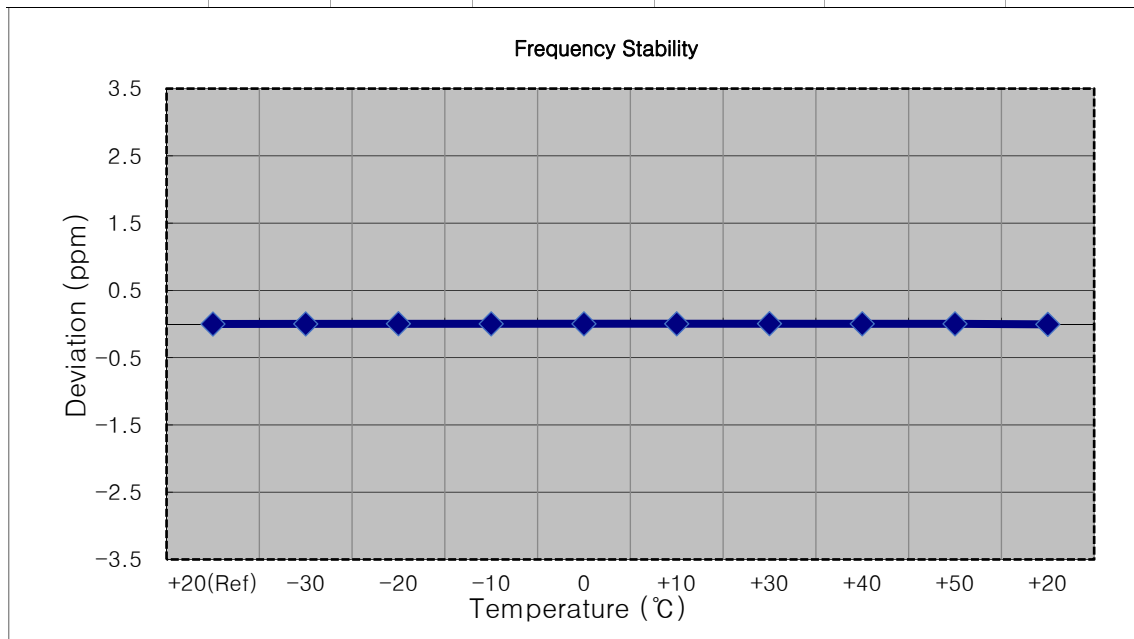
MODE:	<u>LTE 4</u>
OPERATING FREQUENCY:	<u>1710,700,000 Hz</u>
CHANNEL:	<u>19957 (1.4 MHz)</u>
REFERENCE VOLTAGE:	<u>3.880 VDC</u>
DEVIATION LIMIT:	<u>Emission must remain in band</u>

Voltage	Power	Temp.	Frequency	Frequency	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	Error (Hz)	(%)	
100 %	3.880	+20(Ref)	1710 699 996	0.0	0.000 000	0.000
100 %		-30	1710 700 004	7.7	0.000 000	0.005
100 %		-20	1710 700 004	8.0	0.000 000	0.005
100 %		-10	1710 700 001	4.7	0.000 000	0.003
100 %		0	1710 700 006	10.3	0.000 001	0.006
100 %		+10	1710 700 002	6.1	0.000 000	0.004
100 %		+30	1710 700 003	6.7	0.000 000	0.004
100 %		+40	1710 700 002	5.9	0.000 000	0.003
100 %		+50	1710 700 003	6.5	0.000 000	0.004
Batt. Endpoint	3.300	+20	1710 699 988	-8.0	0.000 000	-0.005



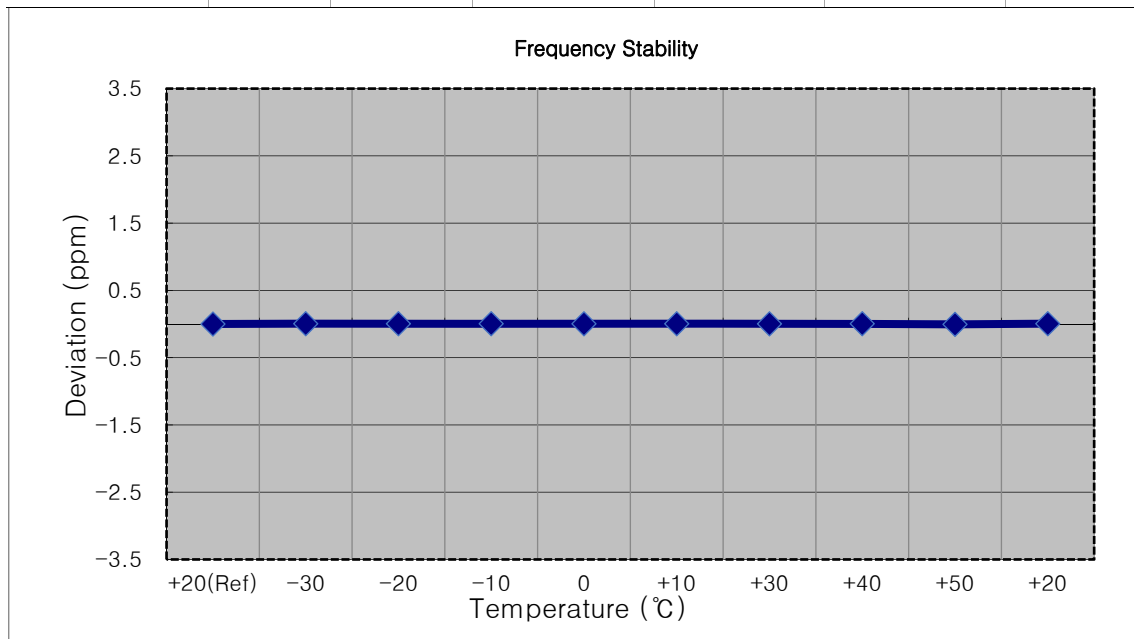
▣ MODE:	<u>LTE 4</u>
▣ OPERATING FREQUENCY:	<u>1711,500,000 Hz</u>
▣ CHANNEL:	<u>19965 (3 MHz)</u>
▣ REFERENCE VOLTAGE:	<u>3.880 VDC</u>
▣ DEVIATION LIMIT:	<u>Emission must remain in band</u>

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1711 500 007	0.0	0.000 000	0.000
100 %		-30	1711 500 010	3.0	0.000 000	0.002
100 %		-20	1711 500 015	8.2	0.000 000	0.005
100 %		-10	1711 500 011	4.2	0.000 000	0.002
100 %		0	1711 500 011	4.2	0.000 000	0.002
100 %		+10	1711 500 013	5.9	0.000 000	0.003
100 %		+30	1711 500 016	8.9	0.000 001	0.005
100 %		+40	1711 500 012	5.1	0.000 000	0.003
100 %		+50	1711 500 012	4.5	0.000 000	0.003
Batt. Endpoint	3.300	+20	1711 499 999	-7.9	0.000 000	-0.005



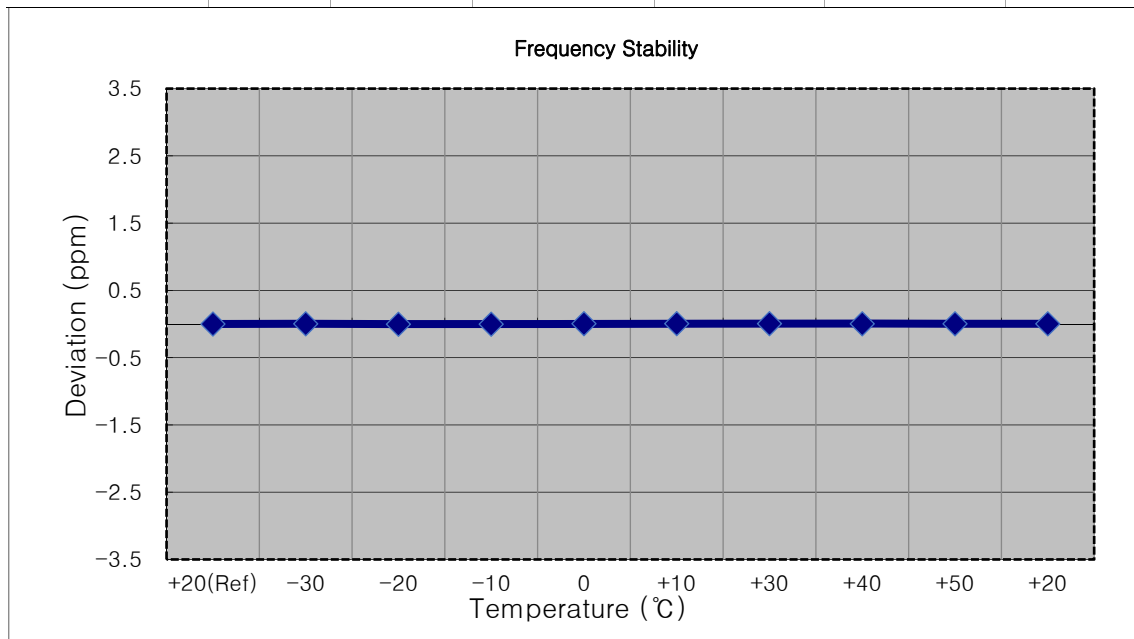
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1712,500,000 Hz
 ■ CHANNEL: 19975 (5 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1712 500 006	0.0	0.000 000	0.000
100 %		-30	1712 500 015	8.4	0.000 000	0.005
100 %		-20	1712 500 014	8.0	0.000 000	0.005
100 %		-10	1712 500 015	8.2	0.000 000	0.005
100 %		0	1712 500 012	5.2	0.000 000	0.003
100 %		+10	1712 500 013	6.1	0.000 000	0.004
100 %		+30	1712 500 011	5.0	0.000 000	0.003
100 %		+40	1712 500 015	8.2	0.000 000	0.005
100 %		+50	1712 499 998	-8.4	0.000 000	-0.005
Batt. Endpoint	3.300	+20	1712 500 015	8.6	0.000 001	0.005



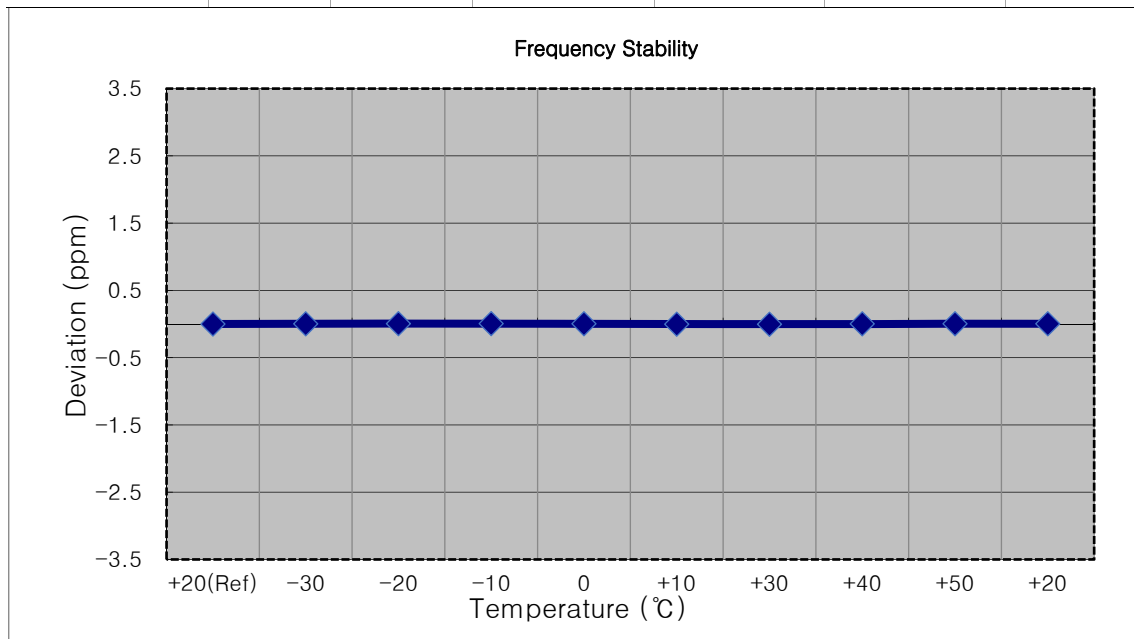
▣ MODE:	<u>LTE 4</u>
▣ OPERATING FREQUENCY:	<u>1715,000,000 Hz</u>
▣ CHANNEL:	<u>20000 (10 MHz)</u>
▣ REFERENCE VOLTAGE:	<u>3.880 VDC</u>
▣ DEVIATION LIMIT:	<u>Emission must remain in band</u>

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1715 000 009	0.0	0.000 000	0.000
100 %		-30	1715 000 015	5.9	0.000 000	0.003
100 %		-20	1715 000 003	-5.9	0.000 000	-0.003
100 %		-10	1715 000 004	-4.7	0.000 000	-0.003
100 %		0	1715 000 017	7.5	0.000 000	0.004
100 %		+10	1715 000 018	9.1	0.000 001	0.005
100 %		+30	1715 000 018	8.8	0.000 001	0.005
100 %		+40	1715 000 015	5.4	0.000 000	0.003
100 %		+50	1715 000 014	5.3	0.000 000	0.003
Batt. Endpoint	3.300	+20	1715 000 015	5.6	0.000 000	0.003



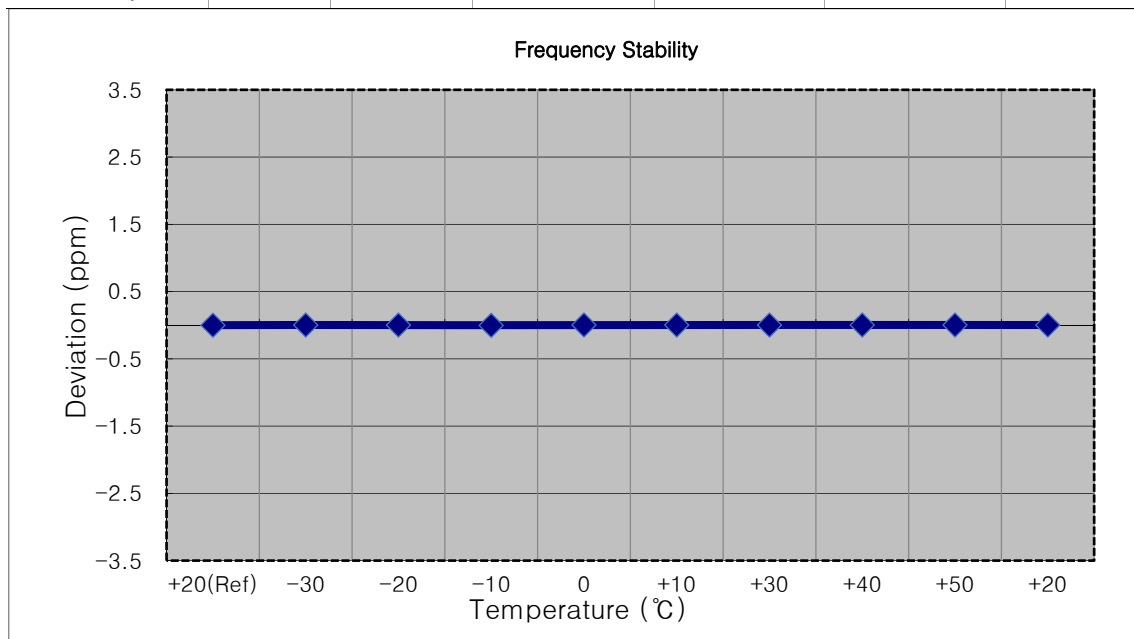
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1717,500,000 Hz
 ■ CHANNEL: 20025 (15 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1717 500 009	0.0	0.000 000	0.000
100 %		-30	1717 500 015	5.3	0.000 000	0.003
100 %		-20	1717 500 019	9.9	0.000 001	0.006
100 %		-10	1717 500 020	10.8	0.000 001	0.006
100 %		0	1717 500 015	6.0	0.000 000	0.003
100 %		+10	1717 500 005	-4.1	0.000 000	-0.002
100 %		+30	1717 500 003	-6.0	0.000 000	-0.003
100 %		+40	1717 500 015	5.1	0.000 000	0.003
100 %		+50	1717 500 017	7.1	0.000 000	0.004
Batt. Endpoint	3.300	+20	1717 500 016	6.5	0.000 000	0.004



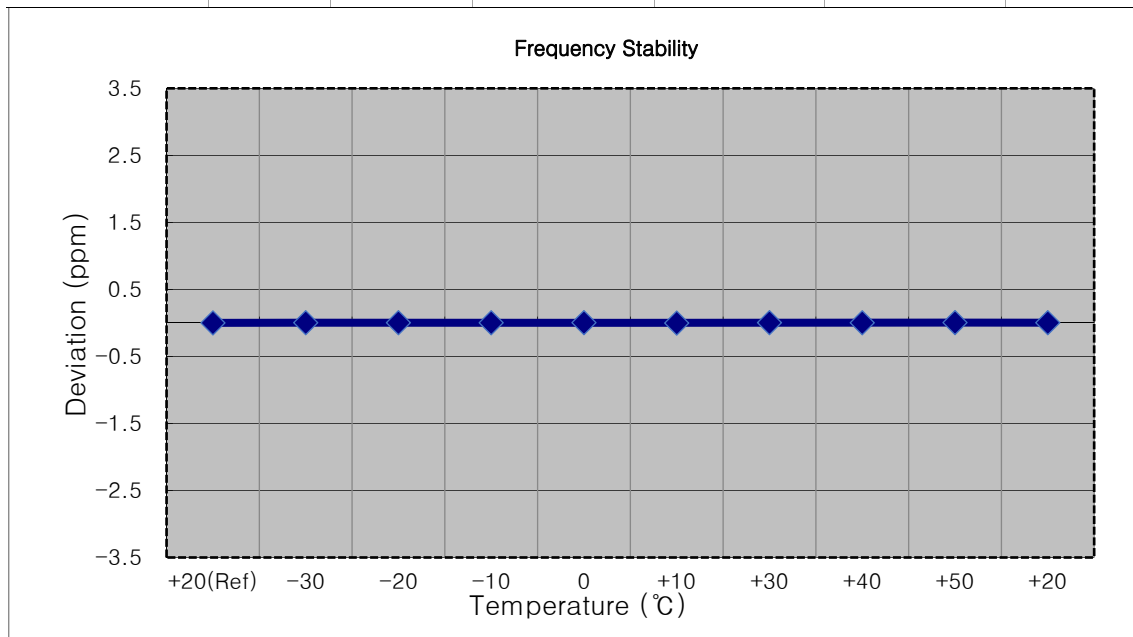
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1720,000,000 Hz
 ■ CHANNEL: 20050 (20 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1720 000 005	0.0	0.000 000	0.000
100 %		-30	1720 000 010	5.1	0.000 000	0.003
100 %		-20	1720 000 009	4.1	0.000 000	0.002
100 %		-10	1720 000 001	-4.0	0.000 000	-0.002
100 %		0	1720 000 011	5.9	0.000 000	0.003
100 %		+10	1720 000 011	5.6	0.000 000	0.003
100 %		+30	1720 000 009	3.5	0.000 000	0.002
100 %		+40	1720 000 010	5.3	0.000 000	0.003
100 %		+50	1720 000 010	5.3	0.000 000	0.003
Batt. Endpoint	3.300	+20	1720 000 009	4.3	0.000 000	0.002



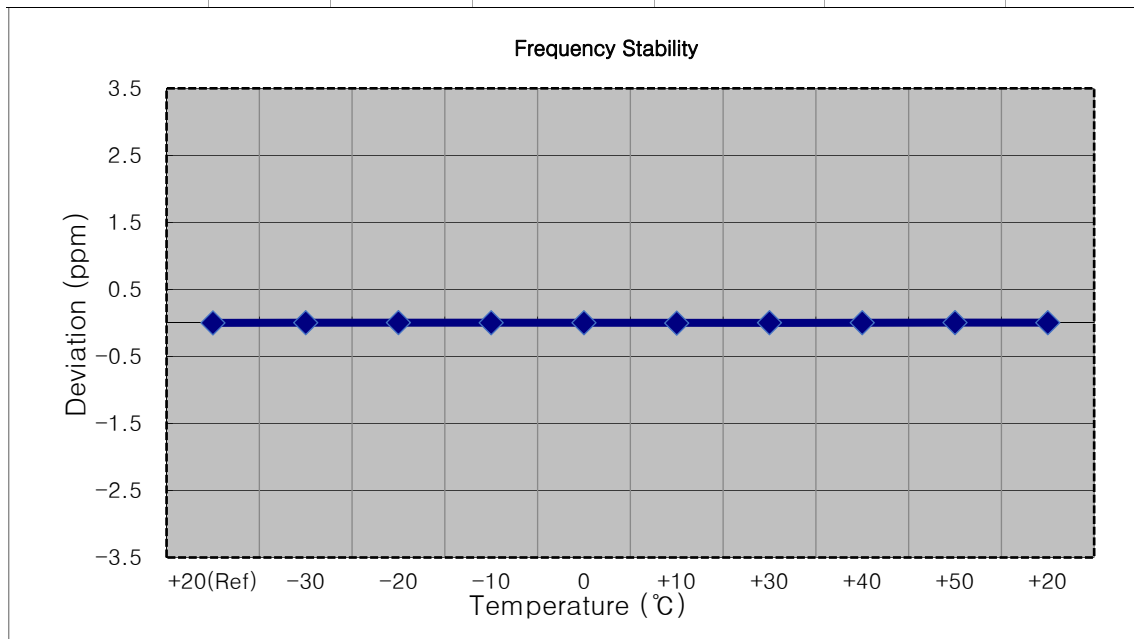
MODE:	<u>LTE 4</u>
OPERATING FREQUENCY:	<u>1732,500,000 Hz</u>
CHANNEL:	<u>20175 (1.4 MHz)</u>
REFERENCE VOLTAGE:	<u>3.880 VDC</u>
DEVIATION LIMIT:	<u>Emission must remain in band</u>

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1732 499 994	0.0	0.000 000	0.000
100 %		-30	1732 499 998	4.8	0.000 000	0.003
100 %		-20	1732 499 998	4.7	0.000 000	0.003
100 %		-10	1732 499 997	3.6	0.000 000	0.002
100 %		0	1732 500 001	7.3	0.000 000	0.004
100 %		+10	1732 499 989	-5.0	0.000 000	-0.003
100 %		+30	1732 500 000	6.1	0.000 000	0.004
100 %		+40	1732 499 998	4.1	0.000 000	0.002
100 %		+50	1732 500 001	7.7	0.000 000	0.004
Batt. Endpoint	3.300	+20	1732 499 998	4.7	0.000 000	0.003



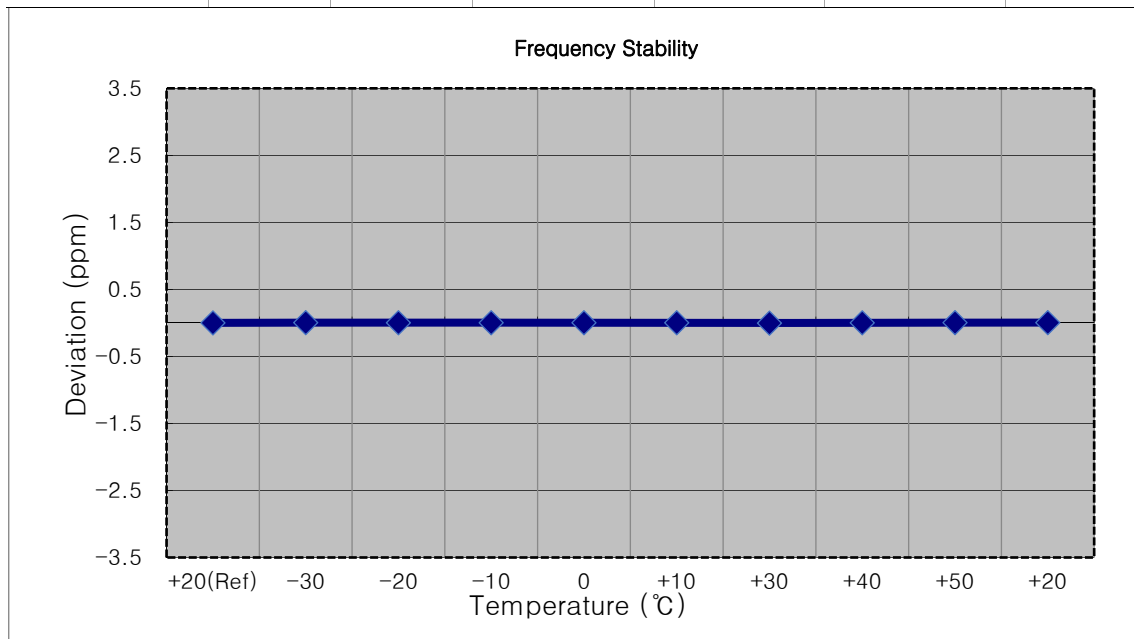
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1732,500,000 Hz
 ■ CHANNEL: 20175 (3 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1732 500 008	0.0	0.000 000	0.000
100 %		-30	1732 500 013	4.7	0.000 000	0.003
100 %		-20	1732 500 016	7.7	0.000 000	0.004
100 %		-10	1732 500 013	4.6	0.000 000	0.003
100 %		0	1732 500 013	4.5	0.000 000	0.003
100 %		+10	1732 500 002	-6.0	0.000 000	-0.003
100 %		+30	1732 500 013	4.8	0.000 000	0.003
100 %		+40	1732 500 013	5.2	0.000 000	0.003
100 %		+50	1732 500 016	7.5	0.000 000	0.004
Batt. Endpoint	3.300	+20	1732 500 014	5.5	0.000 000	0.003



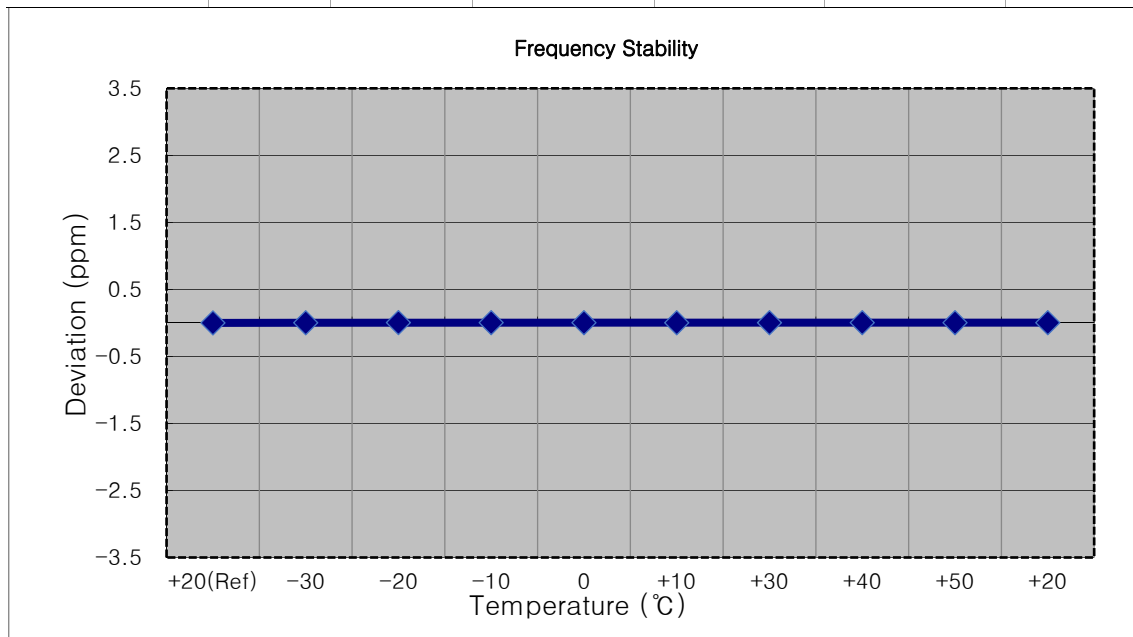
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1732,500,000 Hz
 ■ CHANNEL: 20175 (5 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1732 500 005	0.0	0.000 000	0.000
100 %		-30	1732 500 012	7.0	0.000 000	0.004
100 %		-20	1732 500 009	4.2	0.000 000	0.002
100 %		-10	1732 500 009	4.2	0.000 000	0.002
100 %		0	1732 500 009	4.0	0.000 000	0.002
100 %		+10	1732 500 010	4.6	0.000 000	0.003
100 %		+30	1732 500 000	-5.1	0.000 000	-0.003
100 %		+40	1732 500 008	2.9	0.000 000	0.002
100 %		+50	1732 500 011	6.4	0.000 000	0.004
Batt. Endpoint	3.300	+20	1732 500 012	6.7	0.000 000	0.004



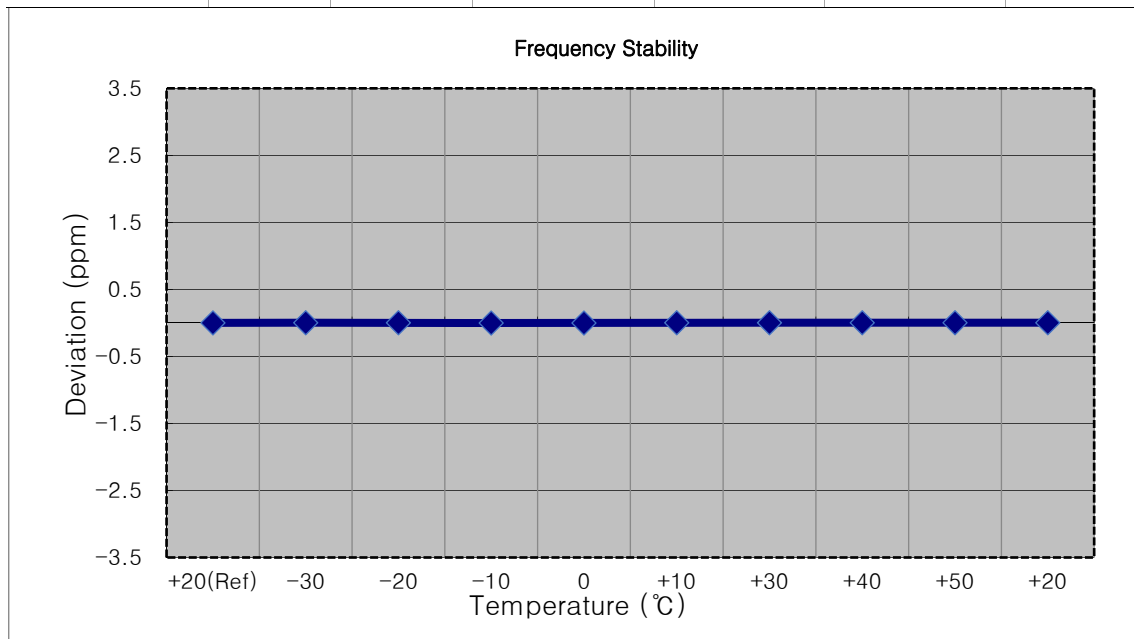
MODE:	LTE 4
OPERATING FREQUENCY:	1732,500,000 Hz
CHANNEL:	20175 (10 MHz)
REFERENCE VOLTAGE:	3.880 VDC
DEVIATION LIMIT:	Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1732 500 004	0.0	0.000 000	0.000
100 %		-30	1732 500 007	3.5	0.000 000	0.002
100 %		-20	1732 500 011	7.7	0.000 000	0.004
100 %		-10	1732 500 010	6.5	0.000 000	0.004
100 %		0	1732 500 009	5.0	0.000 000	0.003
100 %		+10	1732 500 008	4.4	0.000 000	0.003
100 %		+30	1732 500 009	5.4	0.000 000	0.003
100 %		+40	1732 500 010	6.1	0.000 000	0.004
100 %		+50	1732 500 009	5.6	0.000 000	0.003
Batt. Endpoint	3.300	+20	1732 500 009	5.8	0.000 000	0.003



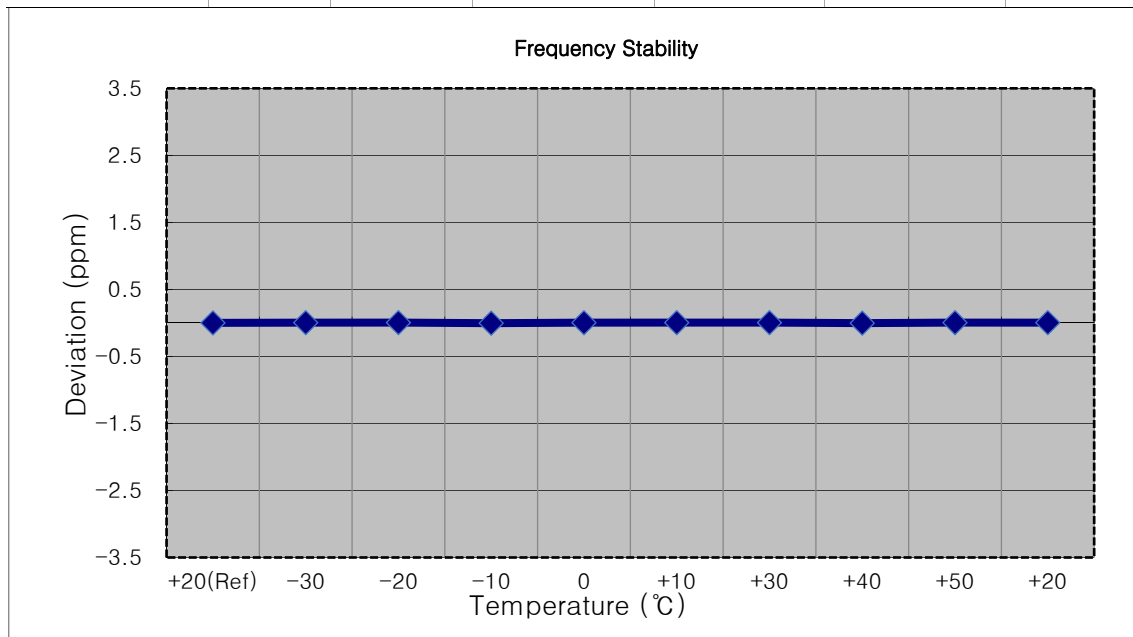
MODE:	LTE 4
OPERATING FREQUENCY:	1732,500,000 Hz
CHANNEL:	20175 (15 MHz)
REFERENCE VOLTAGE:	3.880 VDC
DEVIATION LIMIT:	Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1732 500 004	0.0	0.000 000	0.000
100 %		-30	1732 500 009	4.5	0.000 000	0.003
100 %		-20	1732 500 008	3.6	0.000 000	0.002
100 %		-10	1732 500 001	-3.4	0.000 000	-0.002
100 %		0	1732 500 001	-3.3	0.000 000	-0.002
100 %		+10	1732 500 008	3.7	0.000 000	0.002
100 %		+30	1732 500 008	4.3	0.000 000	0.002
100 %		+40	1732 500 009	4.6	0.000 000	0.003
100 %		+50	1732 500 009	4.6	0.000 000	0.003
Batt. Endpoint	3.300	+20	1732 500 009	4.6	0.000 000	0.003



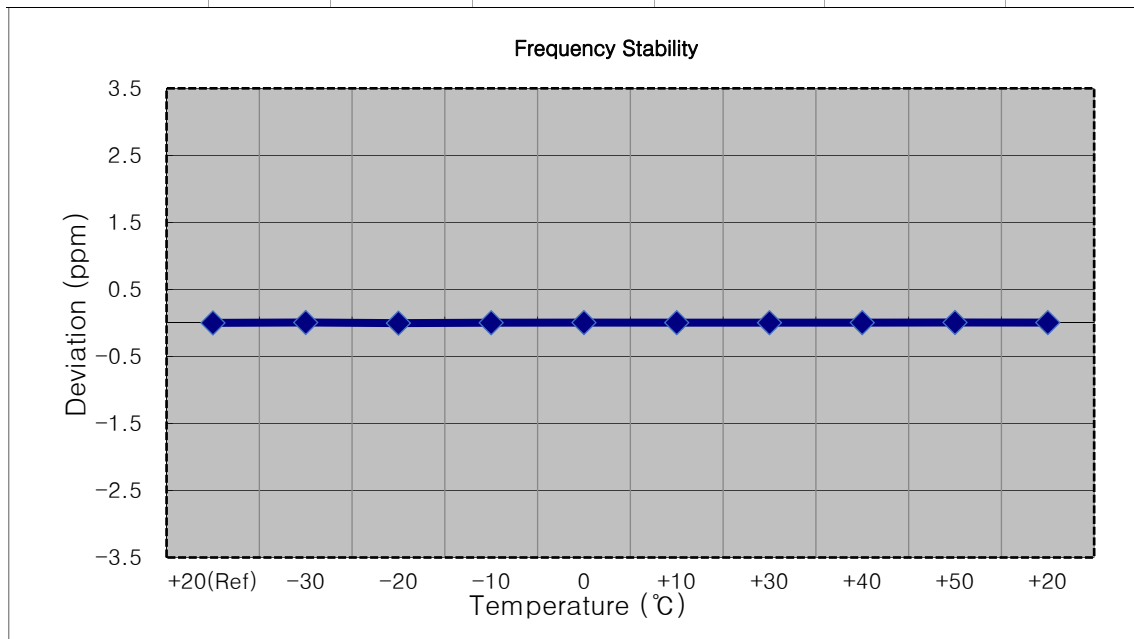
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1732,500,000 Hz
 ■ CHANNEL: 20175 (20 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1732 500 006	0.0	0.000 000	0.000
100 %		-30	1732 500 012	6.1	0.000 000	0.004
100 %		-20	1732 500 013	7.6	0.000 000	0.004
100 %		-10	1732 499 998	-7.3	0.000 000	-0.004
100 %		0	1732 500 012	5.8	0.000 000	0.003
100 %		+10	1732 500 013	6.9	0.000 000	0.004
100 %		+30	1732 500 013	7.1	0.000 000	0.004
100 %		+40	1732 500 000	-6.0	0.000 000	-0.003
100 %		+50	1732 500 013	7.2	0.000 000	0.004
Batt. Endpoint	3.300	+20	1732 500 012	6.5	0.000 000	0.004



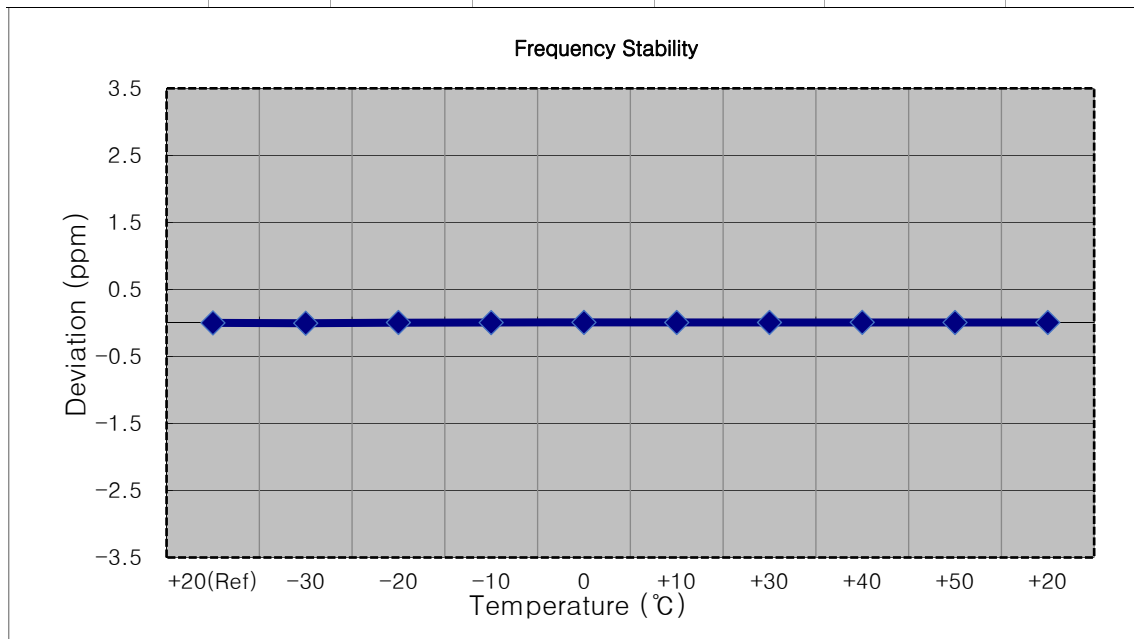
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1754,300,000 Hz
 ■ CHANNEL: 20393 (1.4 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1754 300 008	0.0	0.000 000	0.000
100 %		-30	1754 300 019	10.7	0.000 001	0.006
100 %		-20	1754 300 002	-5.8	0.000 000	-0.003
100 %		-10	1754 300 013	4.5	0.000 000	0.003
100 %		0	1754 300 016	7.6	0.000 000	0.004
100 %		+10	1754 300 015	6.7	0.000 000	0.004
100 %		+30	1754 300 014	5.8	0.000 000	0.003
100 %		+40	1754 300 015	6.6	0.000 000	0.004
100 %		+50	1754 300 019	10.4	0.000 001	0.006
Batt. Endpoint	3.300	+20	1754 300 016	7.9	0.000 000	0.005



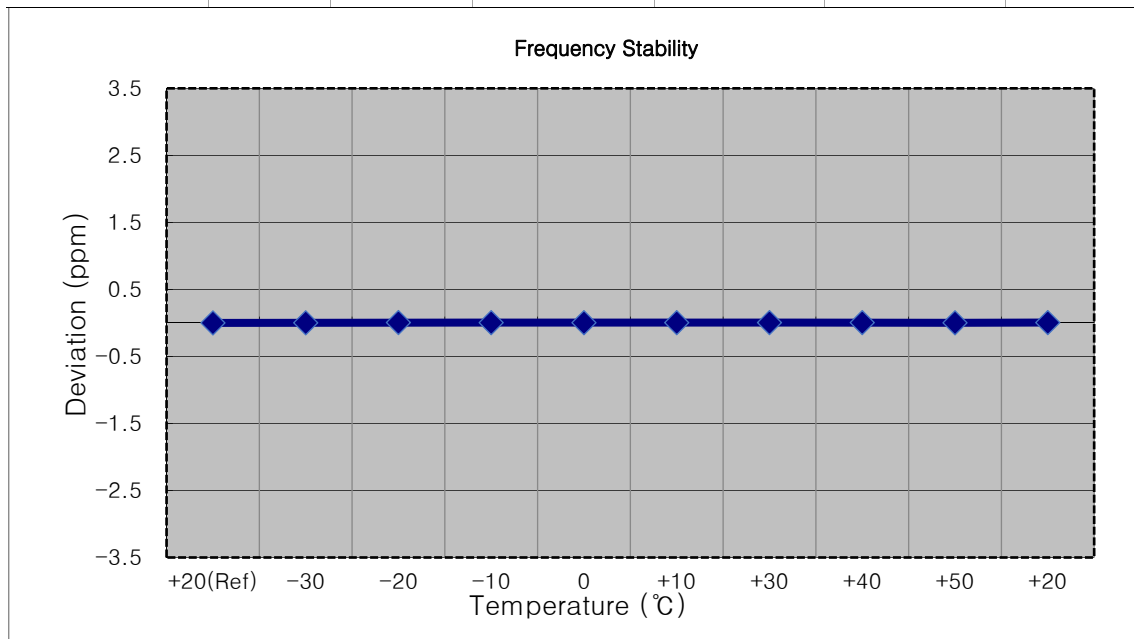
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1753,500,000 Hz
 ■ CHANNEL: 20385 (3 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1753 499 989	0.0	0.000 000	0.000
100 %		-30	1753 499 980	-8.8	-0.000 001	-0.005
100 %		-20	1753 500 000	10.9	0.000 001	0.006
100 %		-10	1753 499 997	7.6	0.000 000	0.004
100 %		0	1753 500 003	14.1	0.000 001	0.008
100 %		+10	1753 500 000	10.7	0.000 001	0.006
100 %		+30	1753 499 999	10.4	0.000 001	0.006
100 %		+40	1753 500 004	15.1	0.000 001	0.009
100 %		+50	1753 499 999	10.5	0.000 001	0.006
Batt. Endpoint	3.300	+20	1753 499 999	10.5	0.000 001	0.006



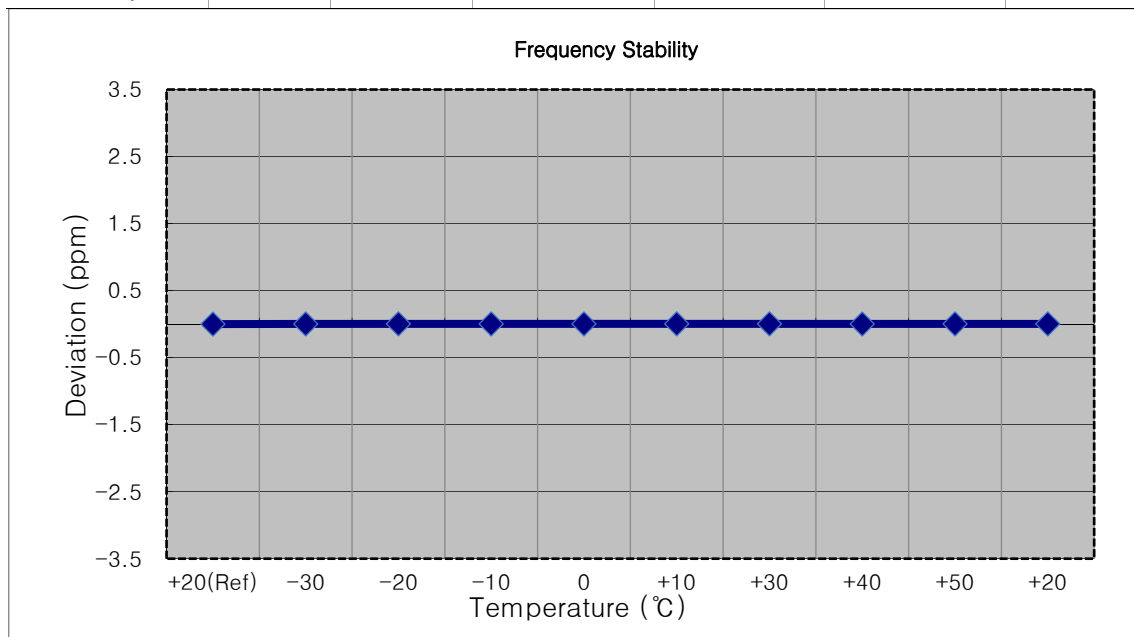
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1752,500,000 Hz
 ■ CHANNEL: 20375 (5 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1752 500 007	0.0	0.000 000	0.000
100 %		-30	1752 500 010	2.5	0.000 000	0.001
100 %		-20	1752 500 016	8.9	0.000 001	0.005
100 %		-10	1752 500 014	7.1	0.000 000	0.004
100 %		0	1752 500 013	5.4	0.000 000	0.003
100 %		+10	1752 500 014	7.2	0.000 000	0.004
100 %		+30	1752 500 016	8.5	0.000 000	0.005
100 %		+40	1752 500 015	7.6	0.000 000	0.004
100 %		+50	1752 500 009	2.0	0.000 000	0.001
Batt. Endpoint	3.300	+20	1752 500 016	8.6	0.000 000	0.005



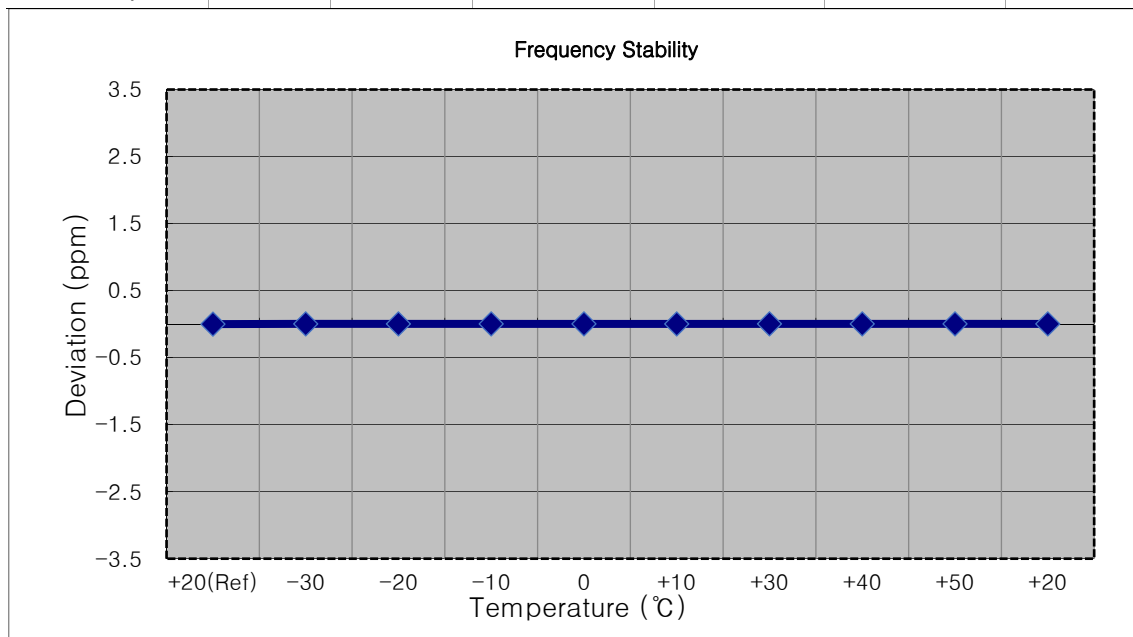
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1750,000,000 Hz
 ■ CHANNEL: 20350 (10 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1750 000 004	0.0	0.000 000	0.000
100 %		-30	1750 000 008	4.1	0.000 000	0.002
100 %		-20	1750 000 010	6.3	0.000 000	0.004
100 %		-10	1750 000 010	5.6	0.000 000	0.003
100 %		0	1750 000 009	5.4	0.000 000	0.003
100 %		+10	1750 000 011	6.8	0.000 000	0.004
100 %		+30	1750 000 011	6.6	0.000 000	0.004
100 %		+40	1750 000 006	2.1	0.000 000	0.001
100 %		+50	1750 000 009	5.0	0.000 000	0.003
Batt. Endpoint	3.300	+20	1750 000 009	4.9	0.000 000	0.003



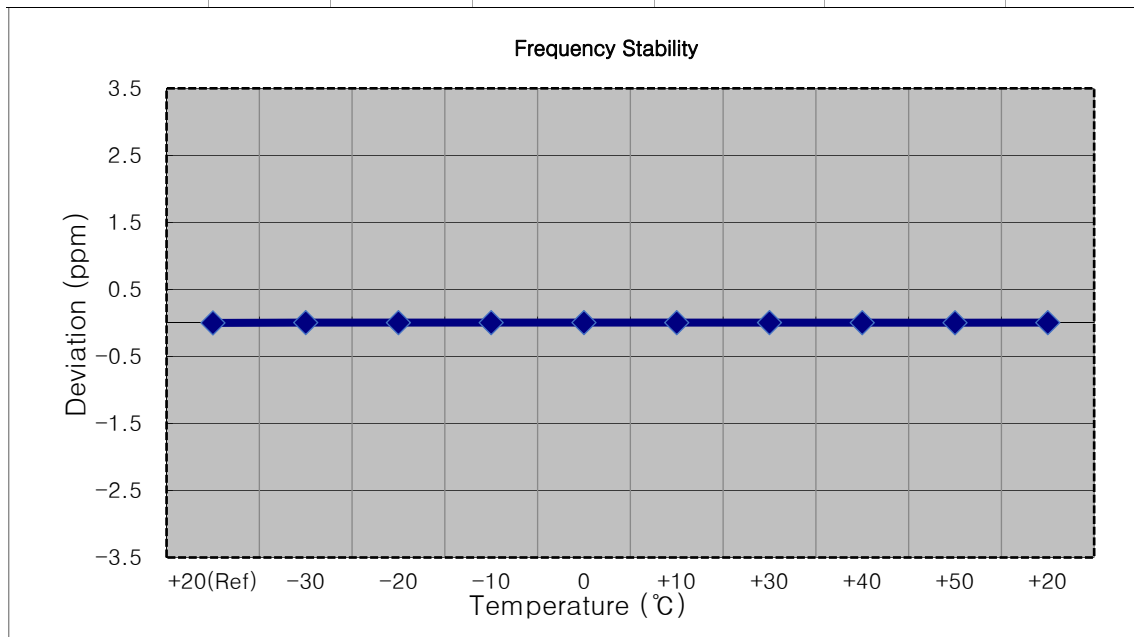
■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1747,500,000 Hz
 ■ CHANNEL: 20325 (15 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1747 500 005	0.0	0.000 000	0.000
100 %		-30	1747 500 011	5.2	0.000 000	0.003
100 %		-20	1747 500 010	4.4	0.000 000	0.003
100 %		-10	1747 500 011	5.3	0.000 000	0.003
100 %		0	1747 500 010	4.6	0.000 000	0.003
100 %		+10	1747 500 009	3.9	0.000 000	0.002
100 %		+30	1747 500 012	6.7	0.000 000	0.004
100 %		+40	1747 500 010	4.5	0.000 000	0.003
100 %		+50	1747 500 011	5.2	0.000 000	0.003
Batt. Endpoint	3.300	+20	1747 500 010	4.9	0.000 000	0.003



■ MODE: LTE 4
 ■ OPERATING FREQUENCY: 1745,000,000 Hz
 ■ CHANNEL: 20300 (20 MHz)
 ■ REFERENCE VOLTAGE: 3.880 VDC
 ■ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	3.880	+20(Ref)	1745 000 007	0.0	0.000 000	0.000
100 %		-30	1745 000 015	7.9	0.000 000	0.005
100 %		-20	1745 000 014	7.0	0.000 000	0.004
100 %		-10	1745 000 014	6.9	0.000 000	0.004
100 %		0	1745 000 016	8.4	0.000 000	0.005
100 %		+10	1745 000 014	6.9	0.000 000	0.004
100 %		+30	1745 000 015	8.1	0.000 000	0.005
100 %		+40	1745 000 013	5.8	0.000 000	0.003
100 %		+50	1745 000 012	4.5	0.000 000	0.003
Batt. Endpoint	3.300	+20	1745 000 014	7.1	0.000 000	0.004



10. TEST DATA

10.1. UPLINK CARRIER AGGREGATION

Test Note

1. All tests were evaluated for the two bands using various combinations of RB size, RB offset, modulation, and channel bandwidth.
2. All modes of operation were investigated and the worst case configuration results are reported in this section.

Please refer to the table below.

3. The worst case is reported with the modulations, RB sizes and offsets.

- 4A(ANT A)- 2A(ANT F)

(PCC - Modulation: QPSK, RB: 1, RB Offset: 12, SCC - Modulation: QPSK, RB: 1, RB Offset: 0)

- 4A(ANT A)- 12A

(PCC - Modulation: QPSK, RB: 1, RB Offset: 12, SCC - Modulation: QPSK, RB: 1, RB Offset: 0)

Radiated Spurious Emissions

PCC	SCC	PCC		SCC	
		BW(MHz)	Channel	BW(MHz)	Channel
4A(ANT A)	2A(ANT F)	5	19975	5	18625
4A(ANT A)	12A	5	19975	10	23130

10.1.1. RADIATED SPURIOUS EMISSIONS

4A(ANT A)(PCC)- 2A(ANT F)(SCC)

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)	Limit (dBm)
3 425.00	-47.31	12.43	-60.18	2.18	V	-49.93	-13.00
5 137.50	-56.47	12.35	-61.47	2.63	H	-51.75	-13.00
6 850.00	-56.11	11.90	-56.62	3.05	H	-47.76	-13.00

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)	Limit (dBm)
3 705.00	-58.23	12.29	-63.28	3.14	H	-54.13	-13.00
5 557.50	-56.45	13.04	-54.83	3.92	H	-45.71	-13.00
7 410.00	-59.03	10.79	-49.02	4.68	V	-42.91	-13.00

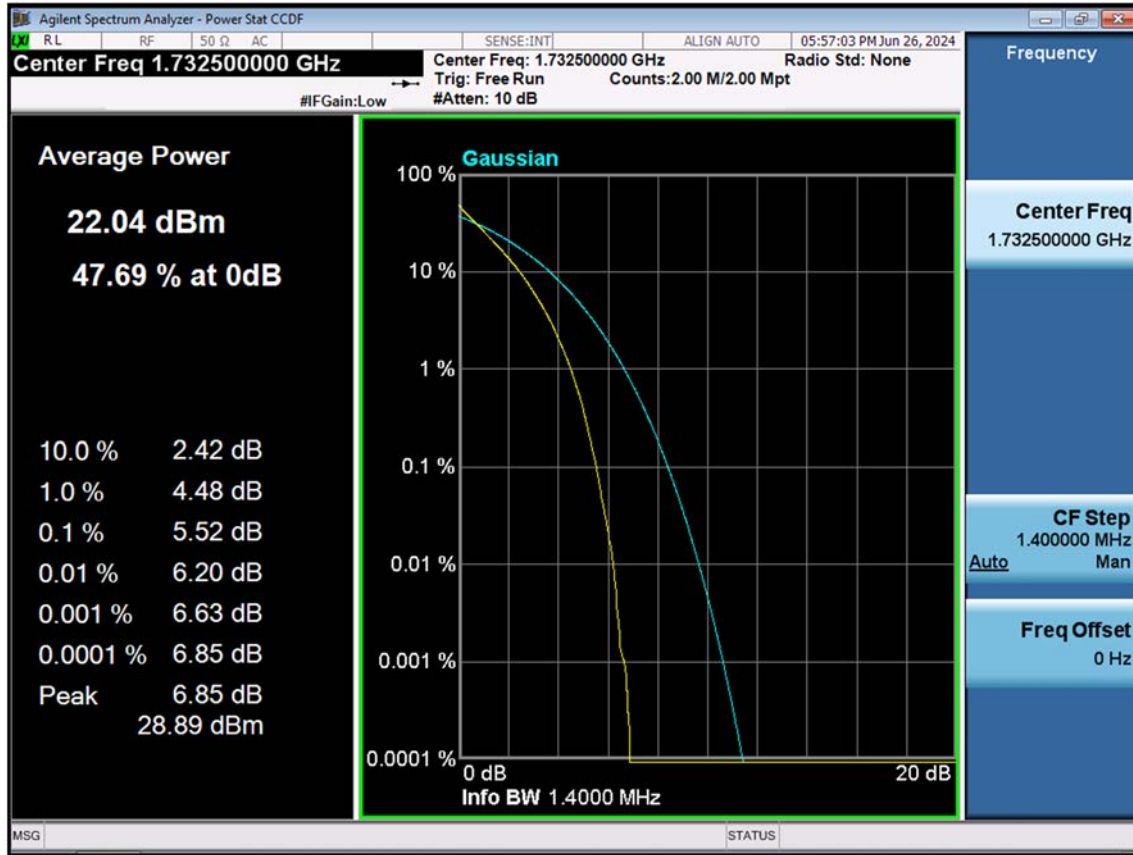
4A(ANT A)(PCC)- 12A(SCC)

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)	Limit (dBm)
3 425.00	-50.67	12.43	-63.54	2.18	H	-53.29	-13.00
5 137.50	-55.04	12.35	-60.04	2.63	V	-50.32	-13.00
6 850.00	-57.98	11.90	-58.49	3.05	V	-49.63	-13.00

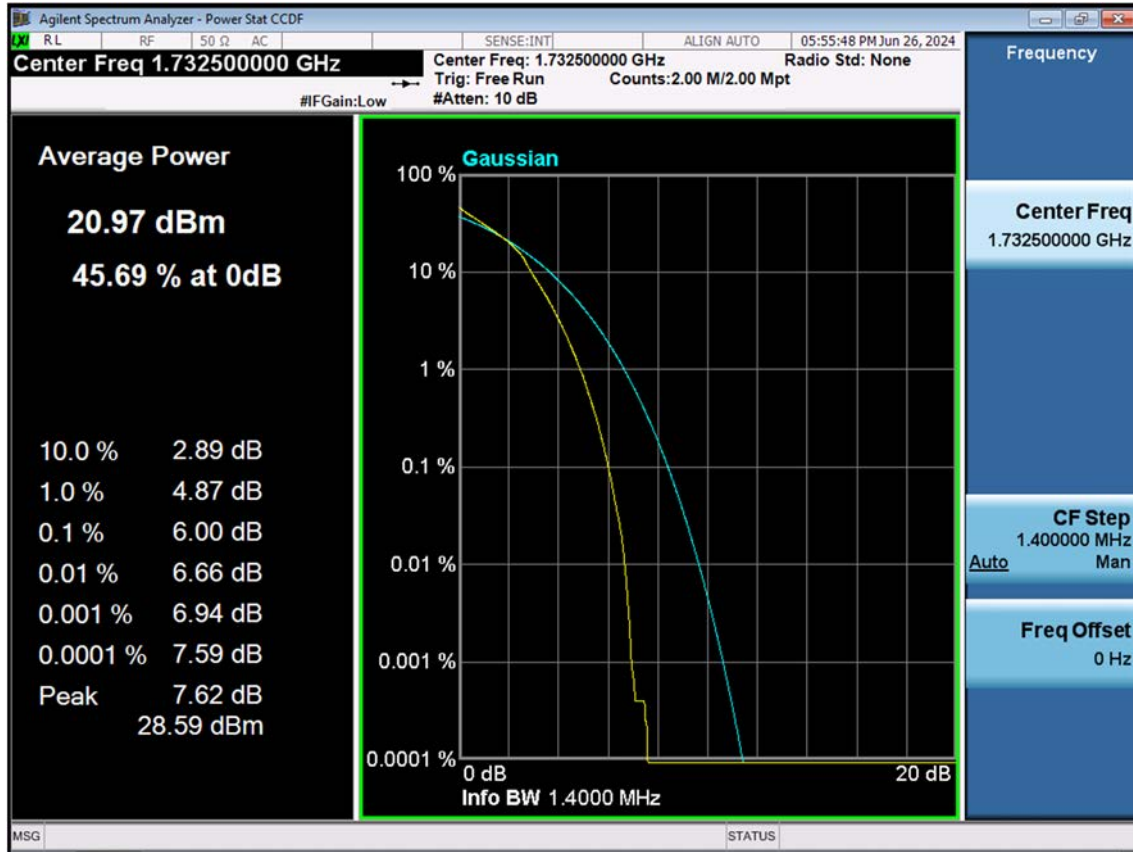
Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)	Limit (dBm)
1 422.00	-52.08	7.74	-60.71	2.00	H	-54.97	-13.00
2 133.00	-36.42	9.36	-40.55	2.42	V	-33.61	-13.00
2 844.00	-57.11	10.78	-58.93	2.80	H	-50.95	-13.00

11. TEST PLOTS(ANT A)

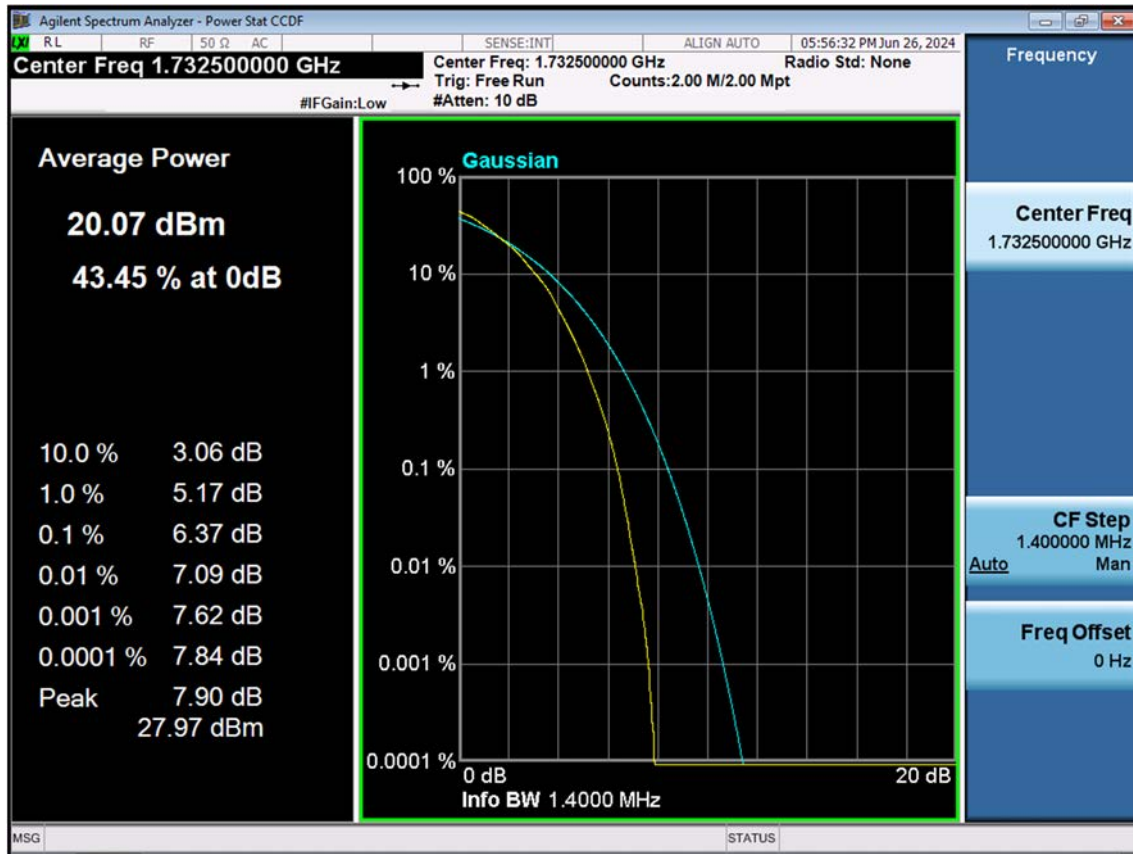
LTE B4_1.4 M_PAR_Mid_QPSK_FullRB



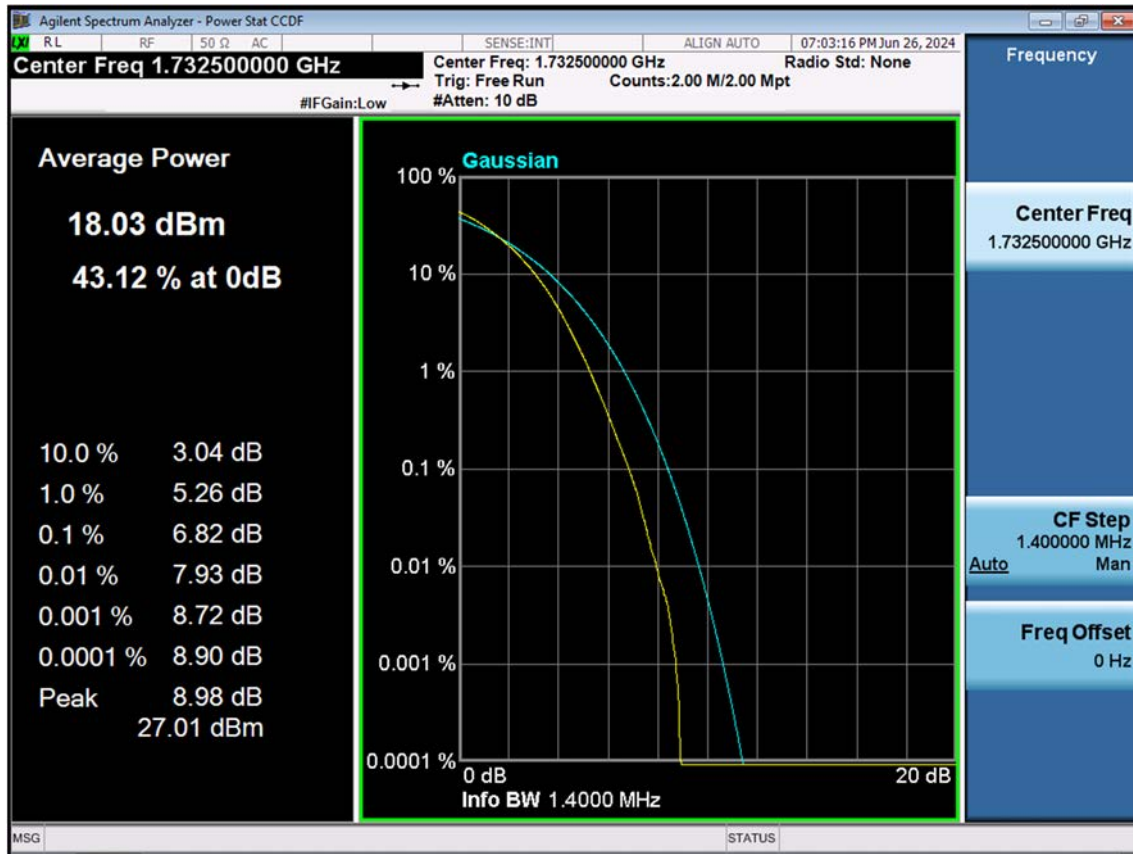
LTE B4_1.4 M_PAR_Mid_16QAM_FullRB



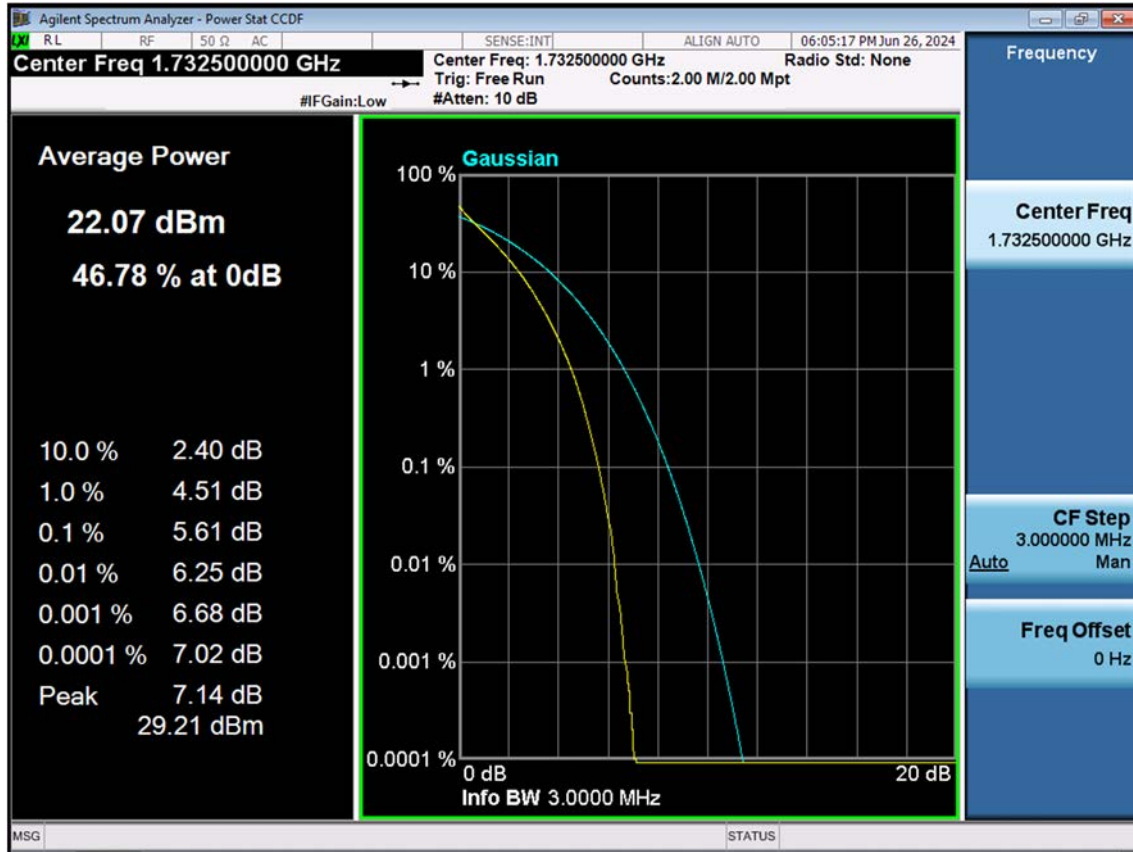
LTE B4_1.4 M_PAR_Mid_64QAM_FullRB



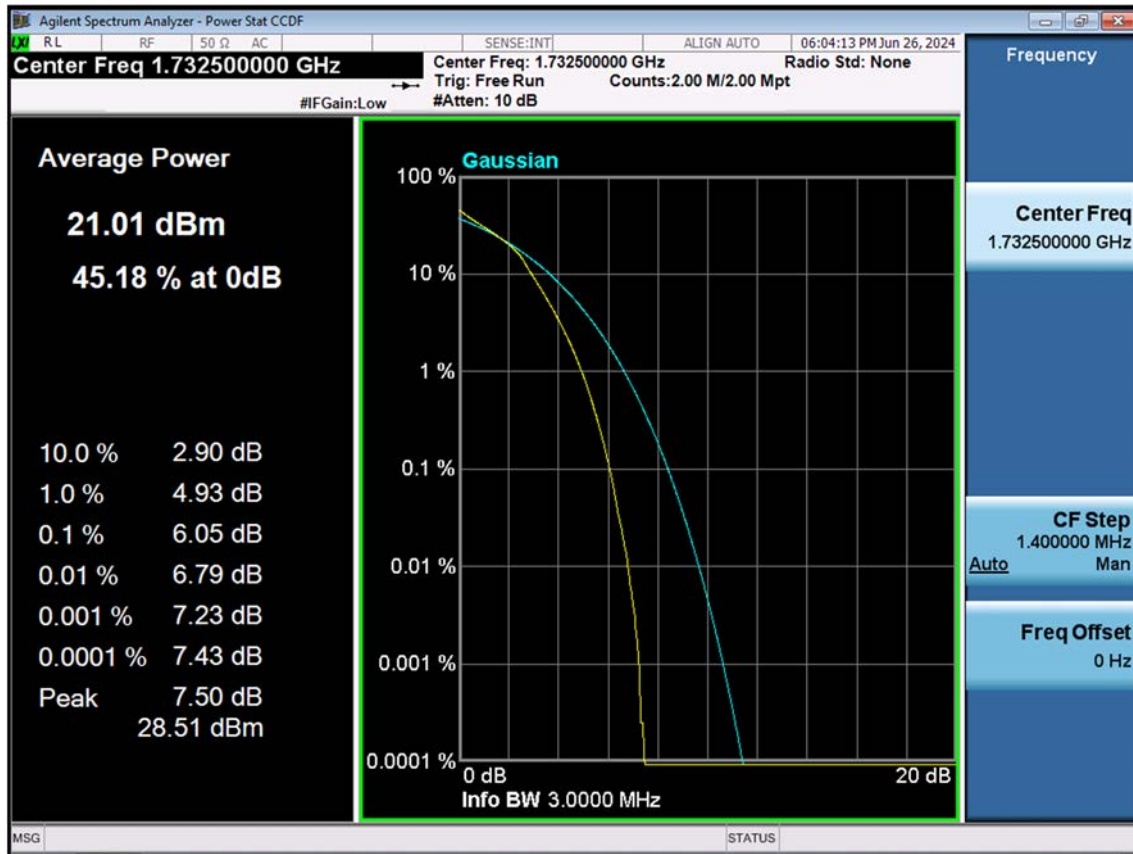
LTE B4_1.4 M_PAR_Mid_256QAM_FullRB



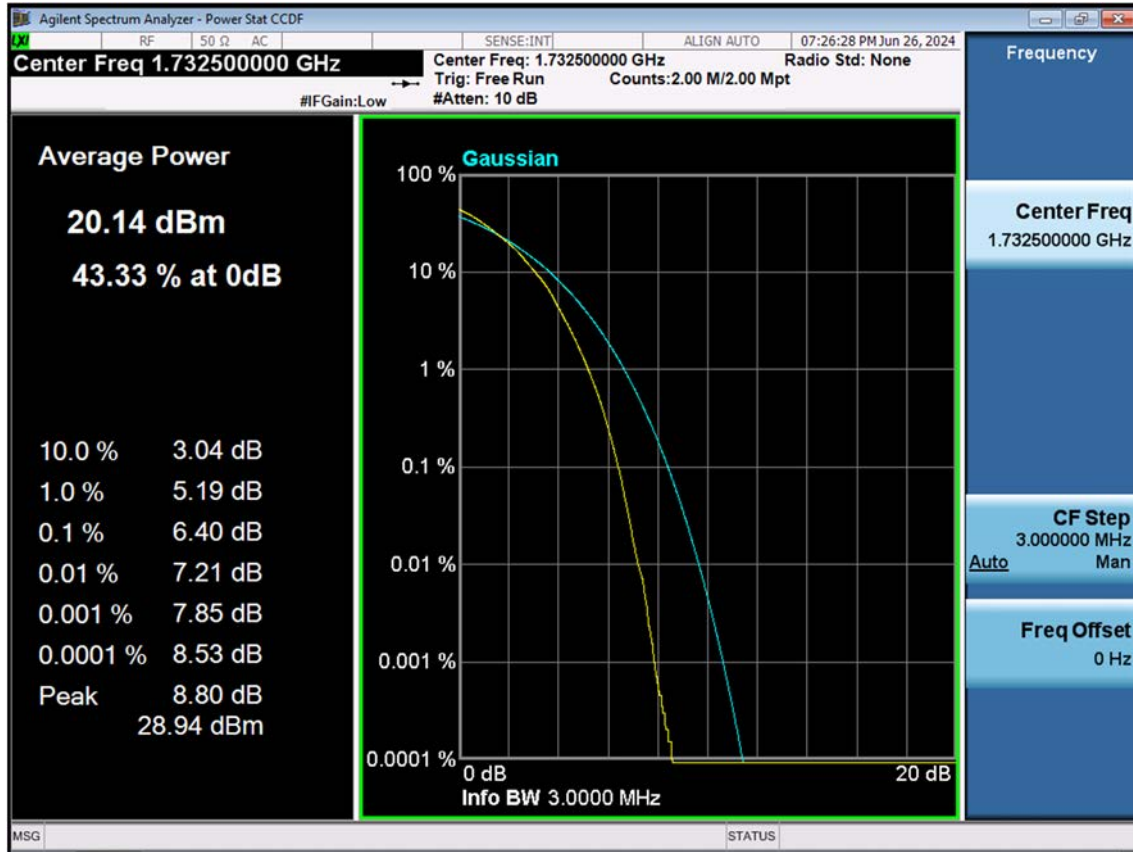
LTE B4_3 M_PAR_Mid_QPSK_FullRB



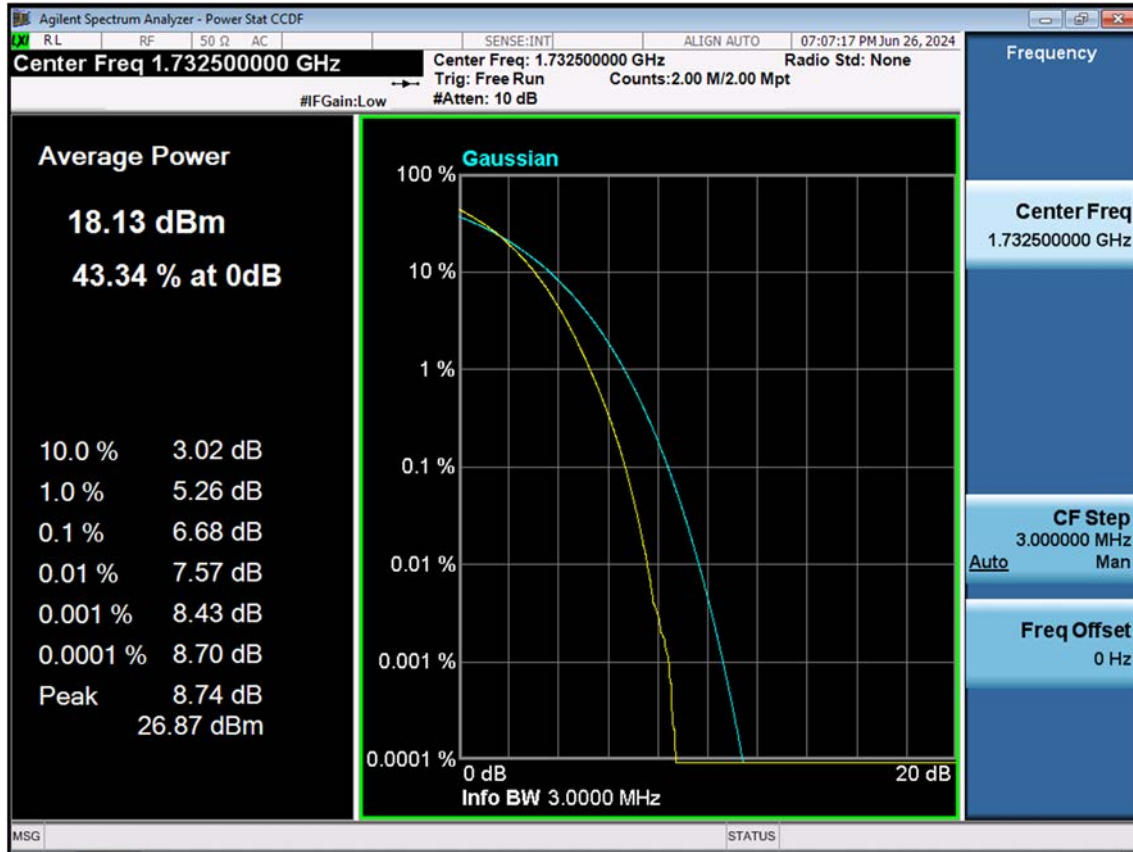
LTE B4_3 M_PAR_Mid_16QAM_FullRB



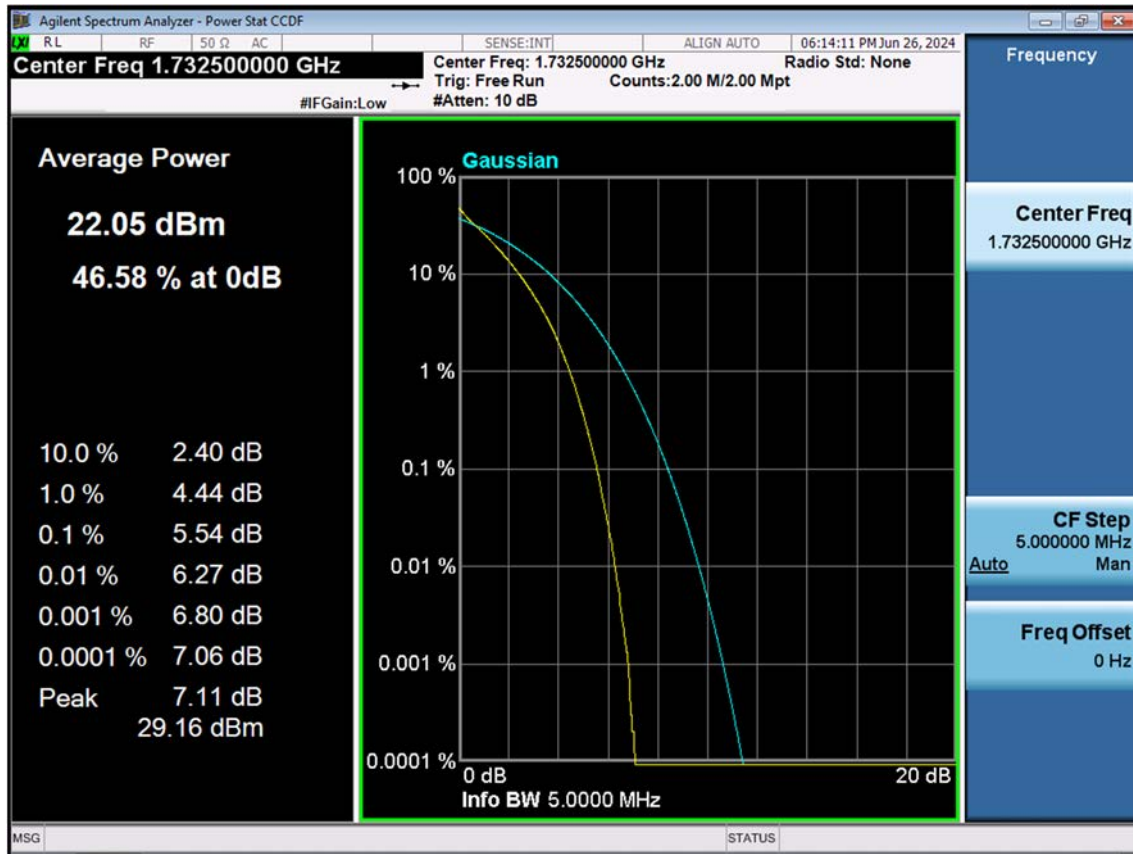
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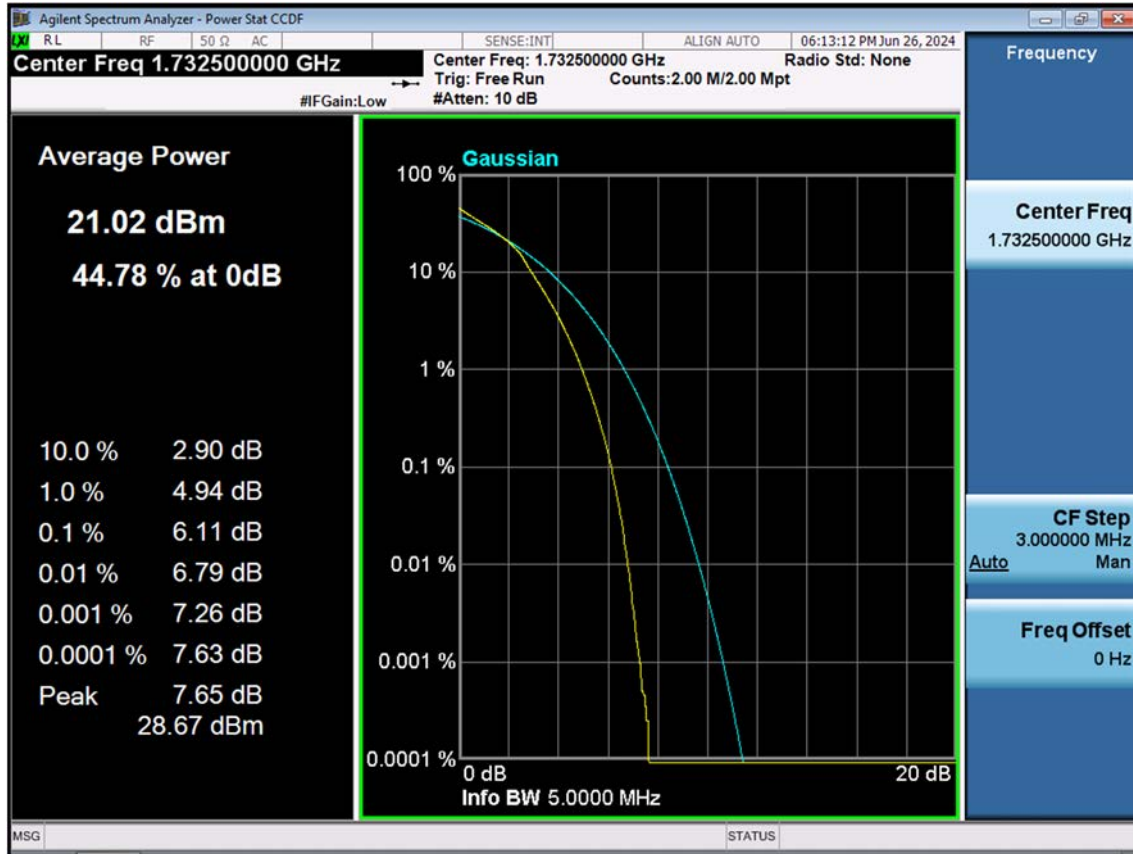
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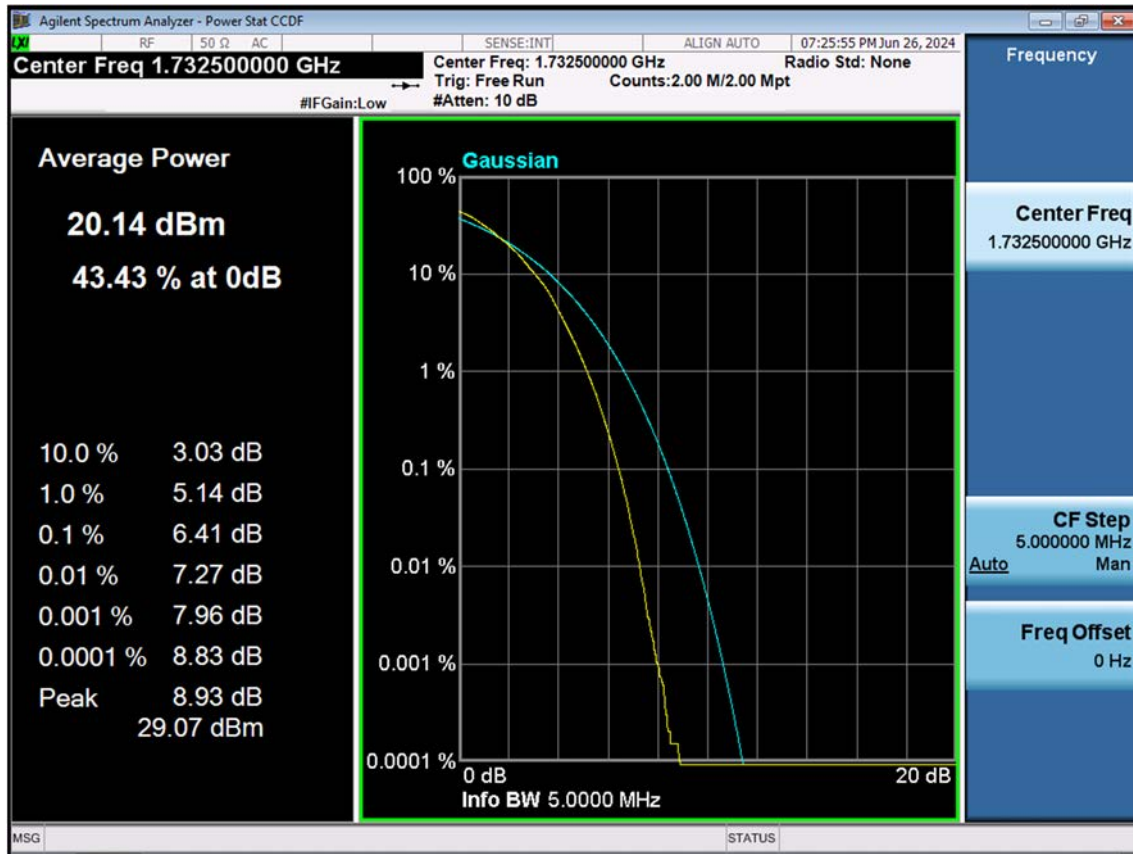
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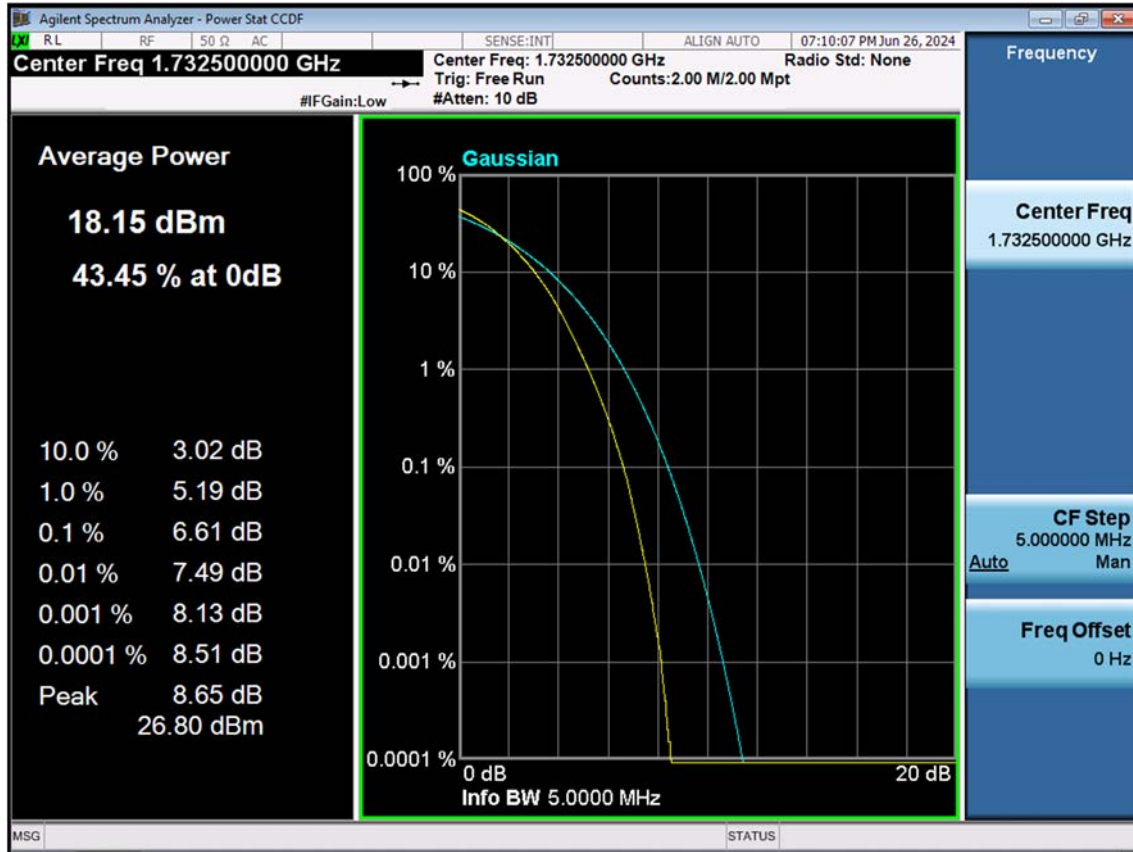
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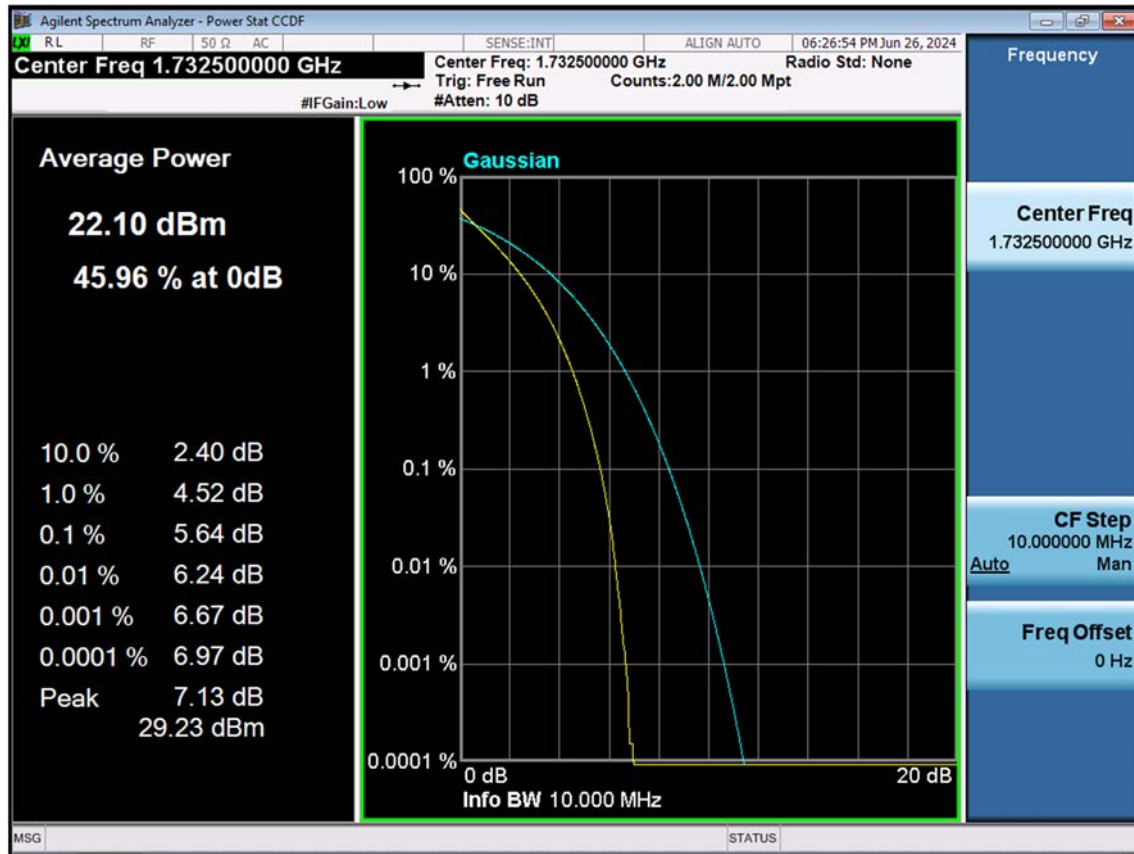
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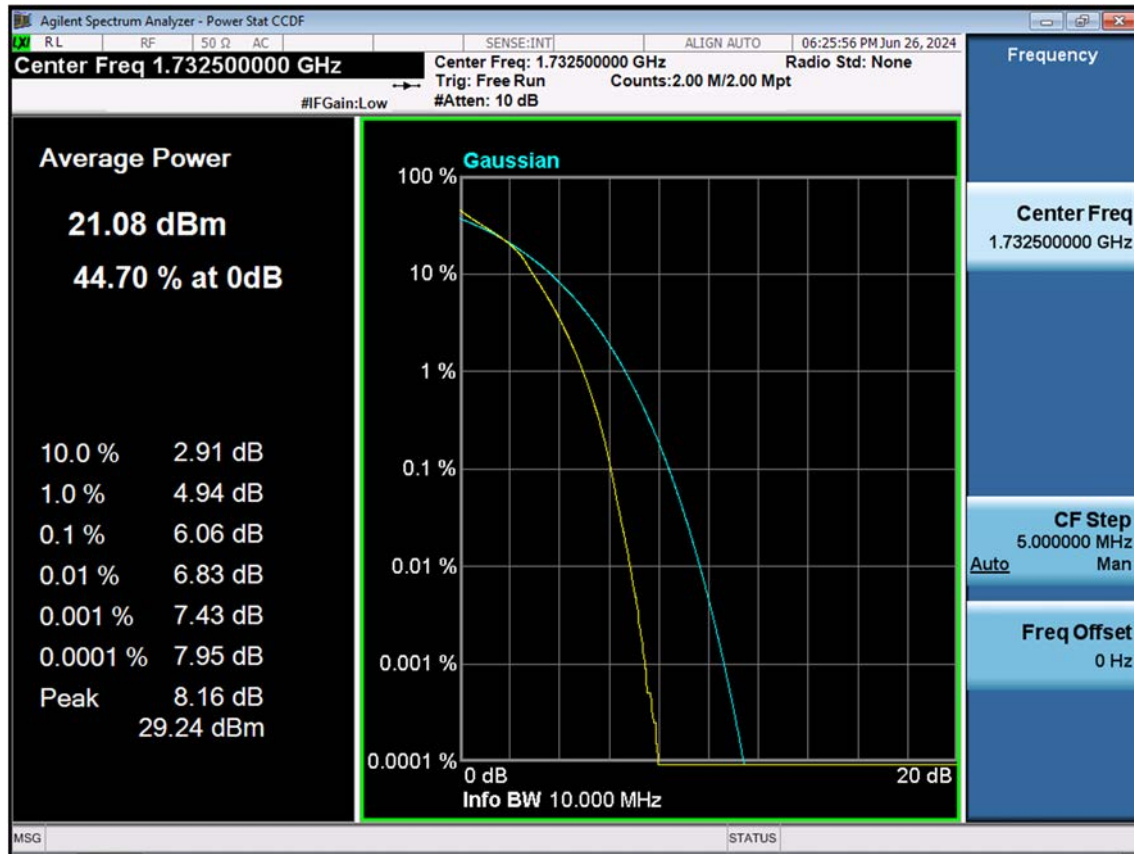
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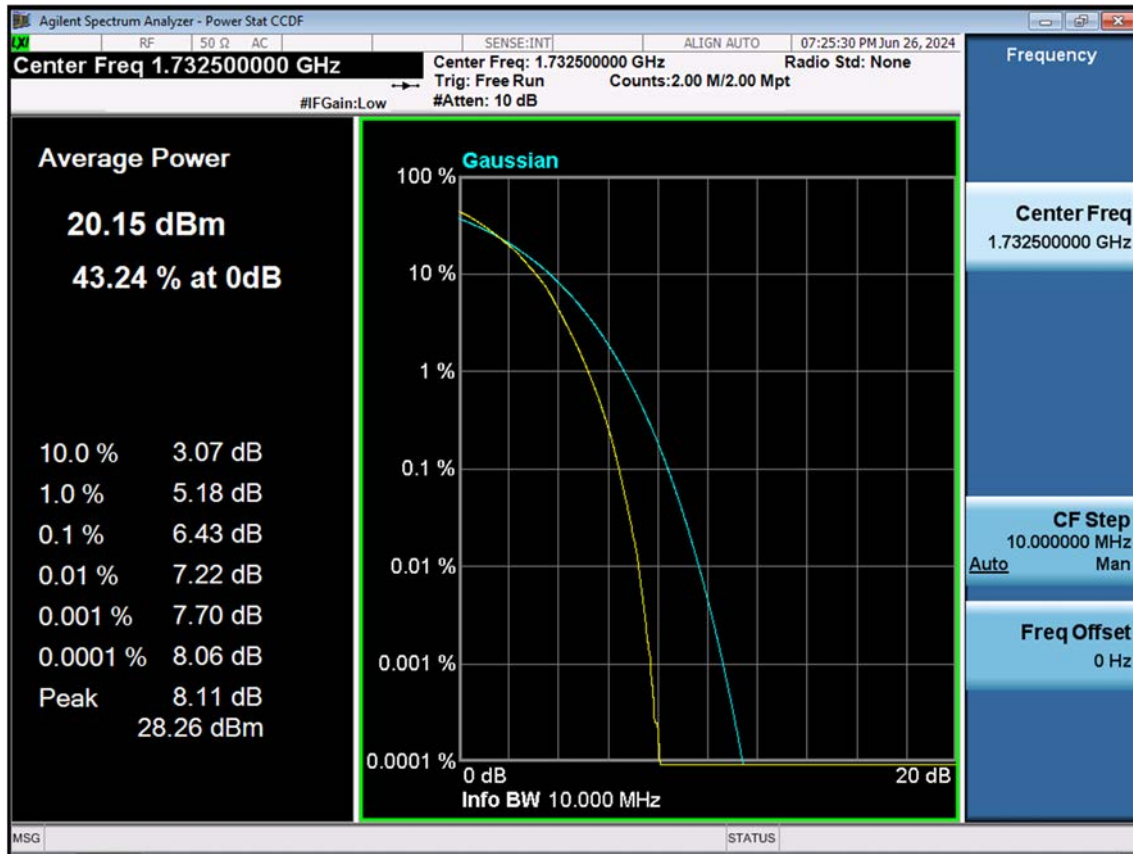
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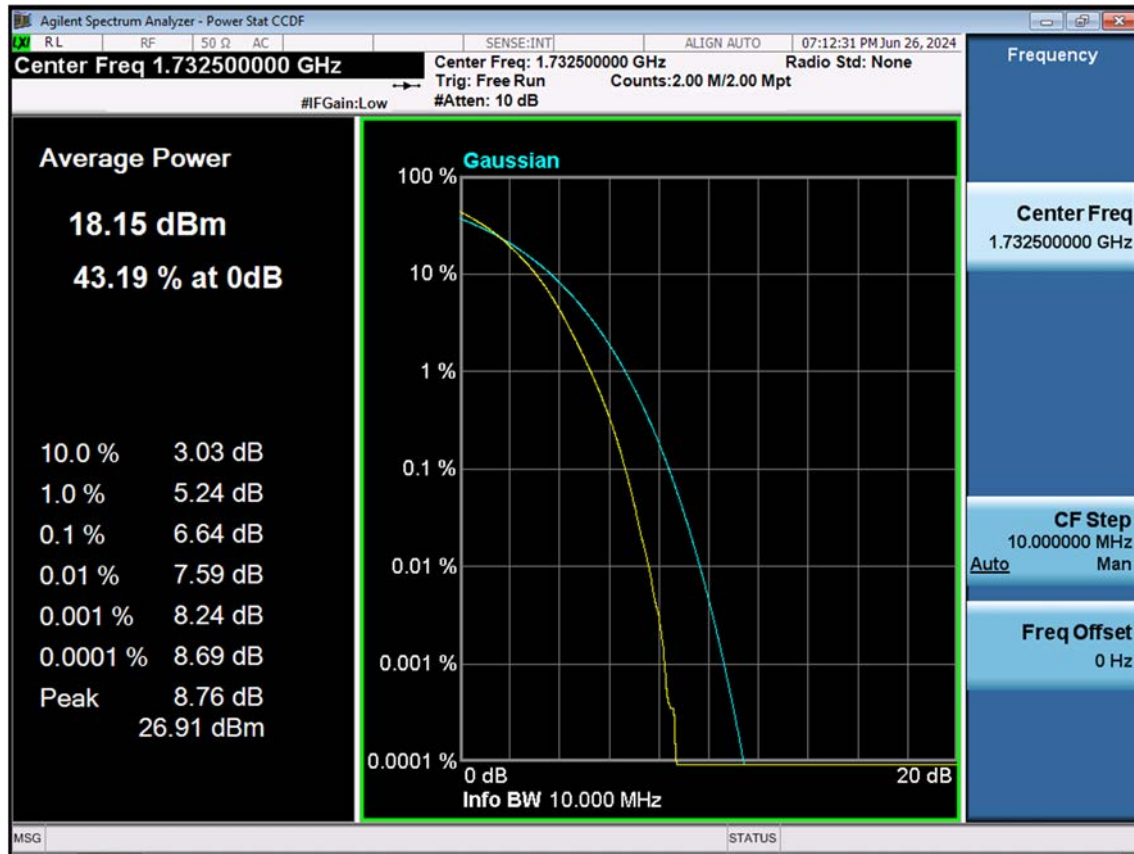
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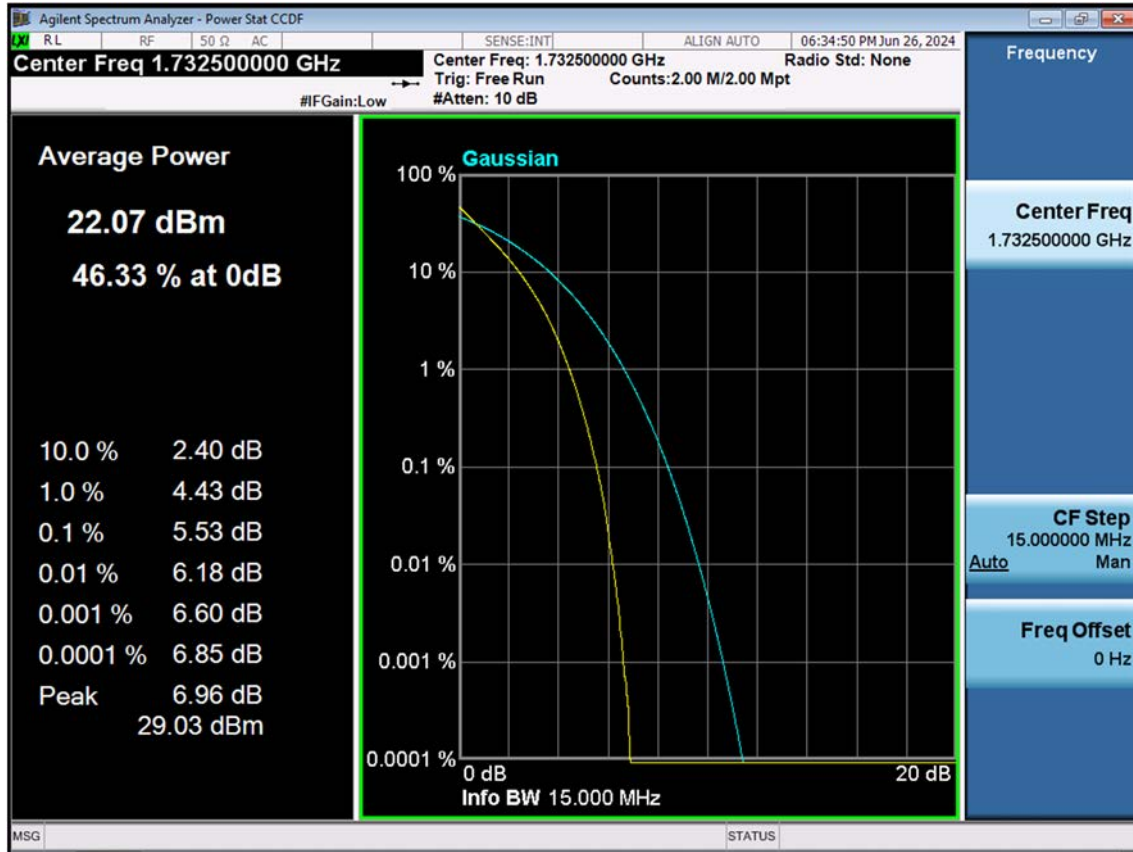
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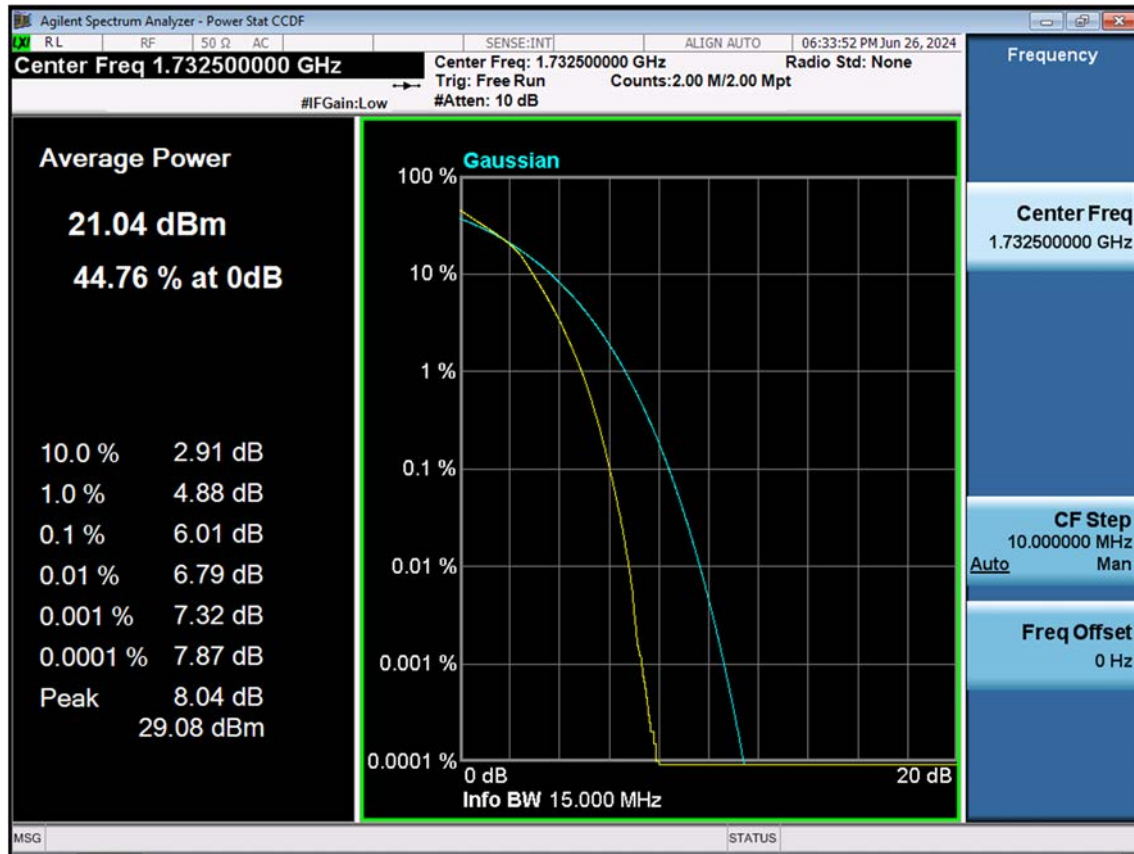
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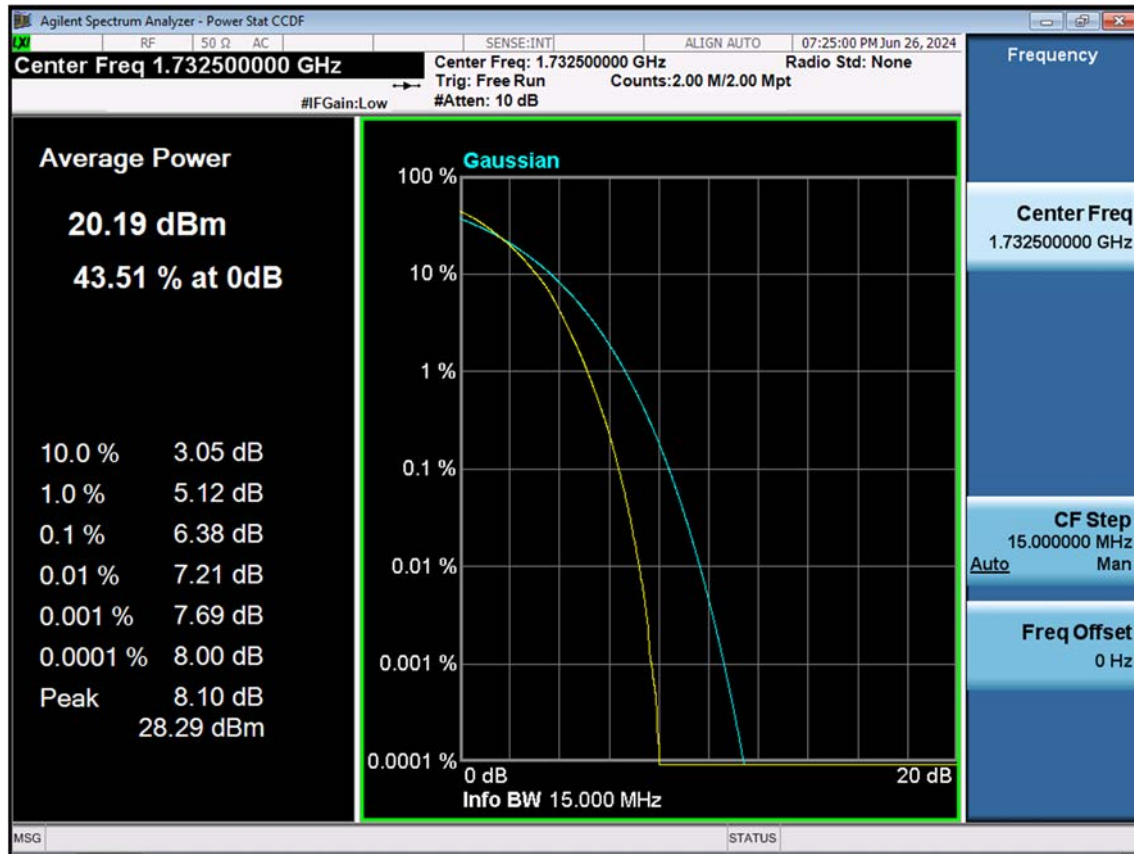
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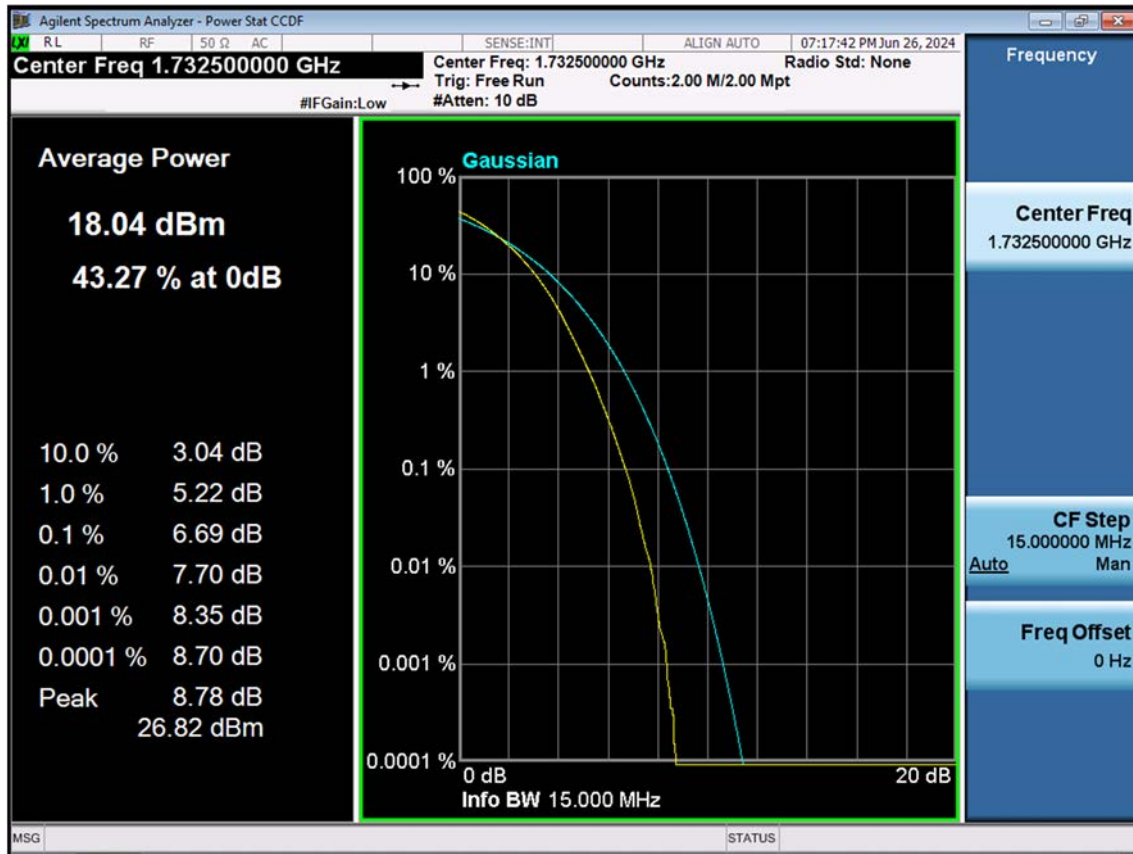
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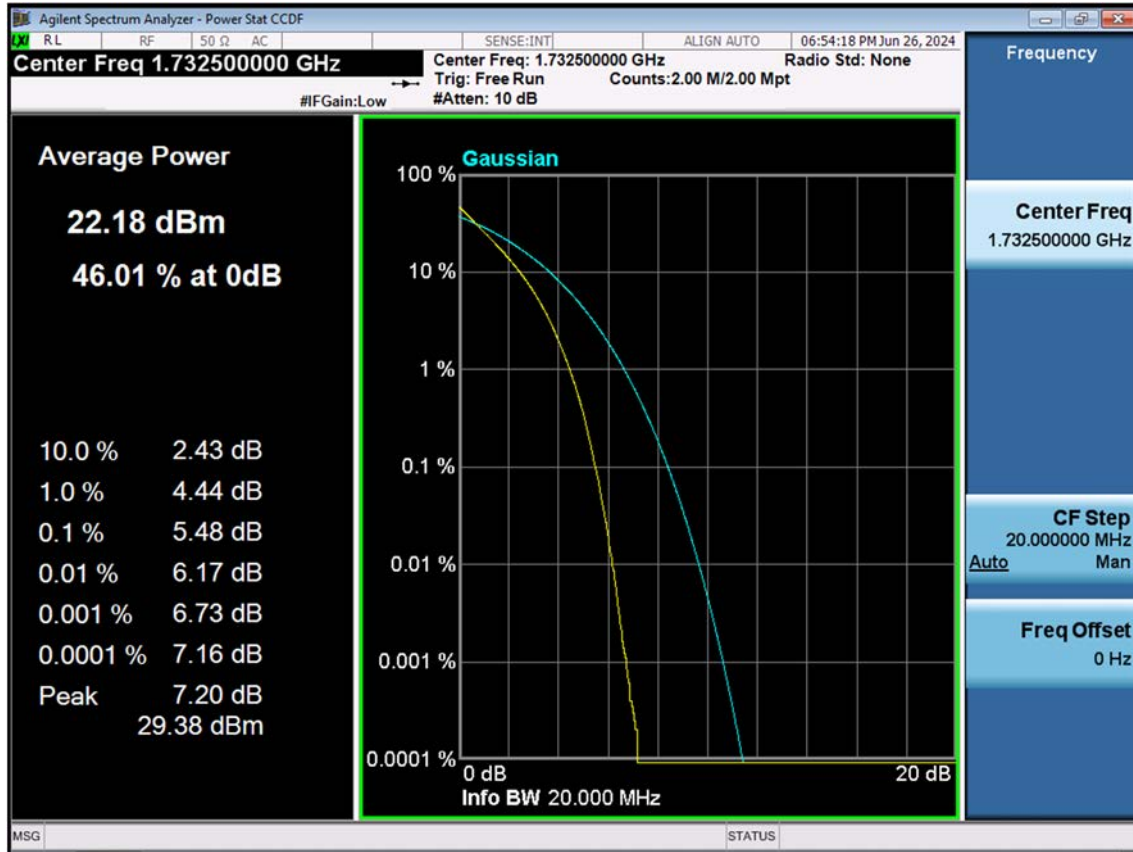
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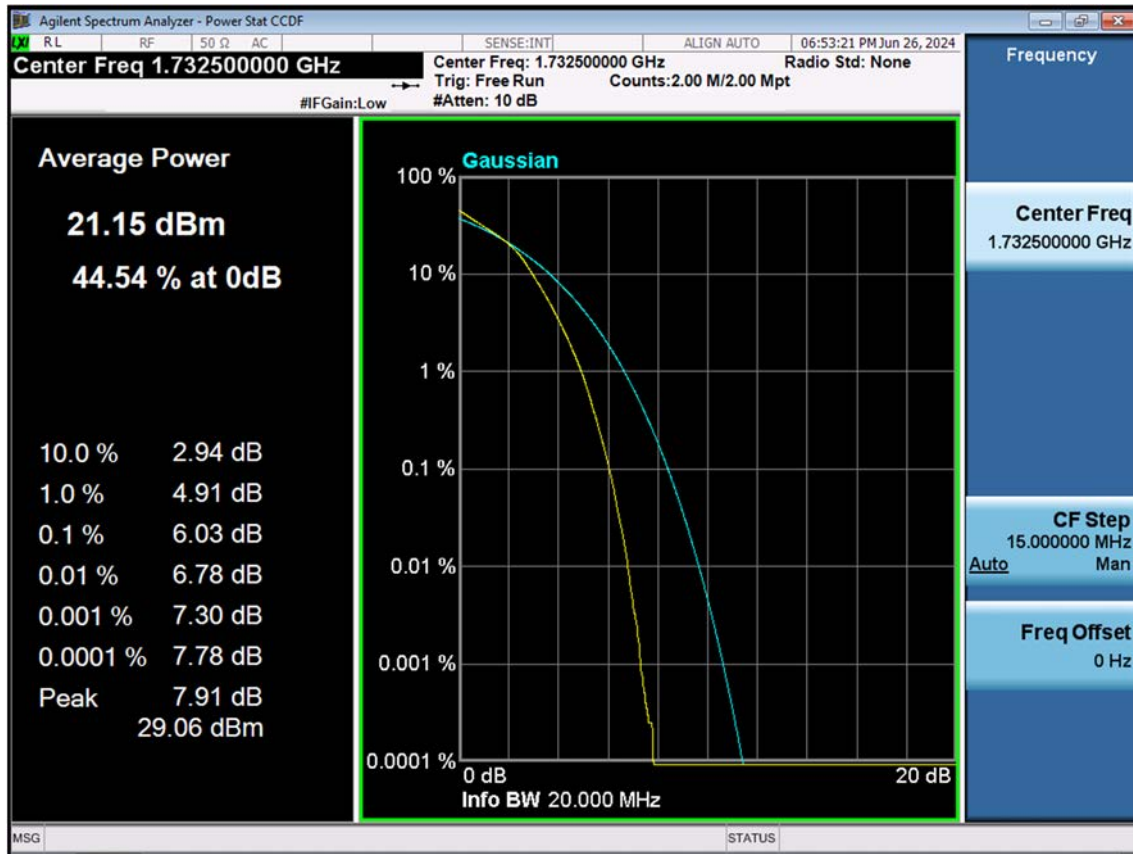
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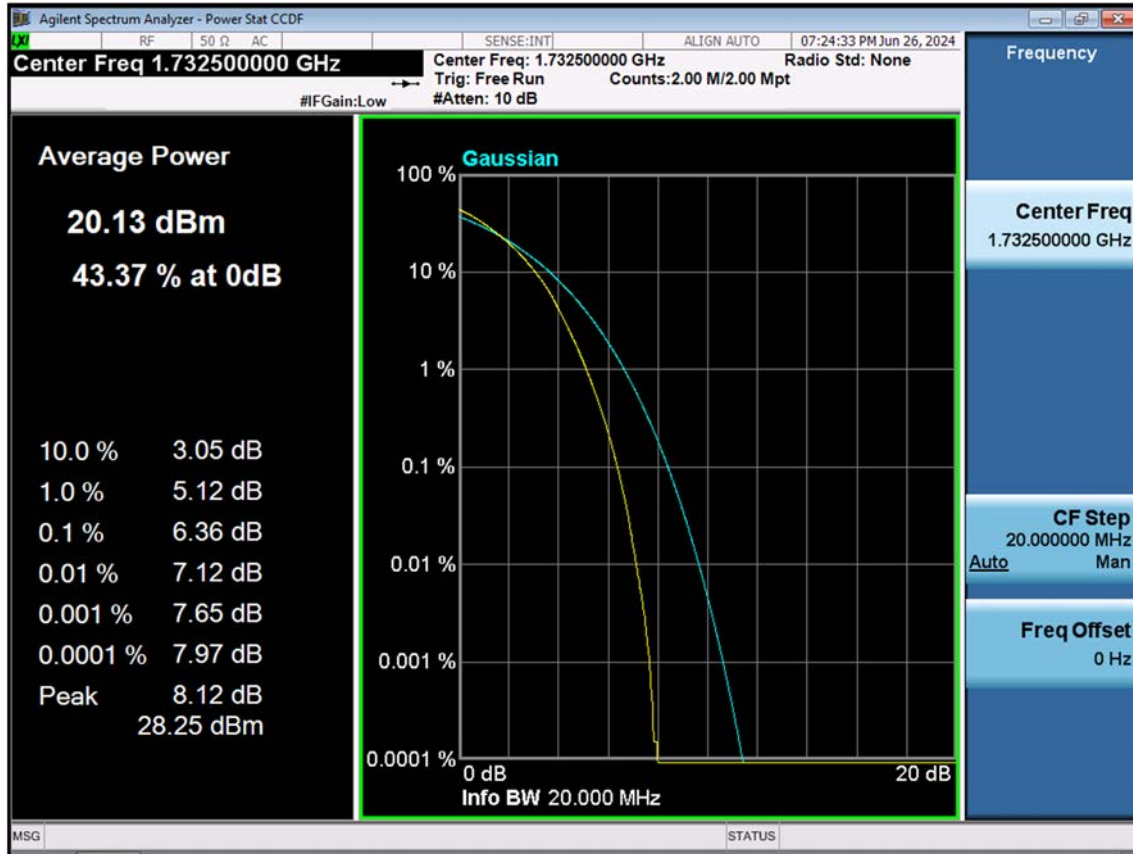
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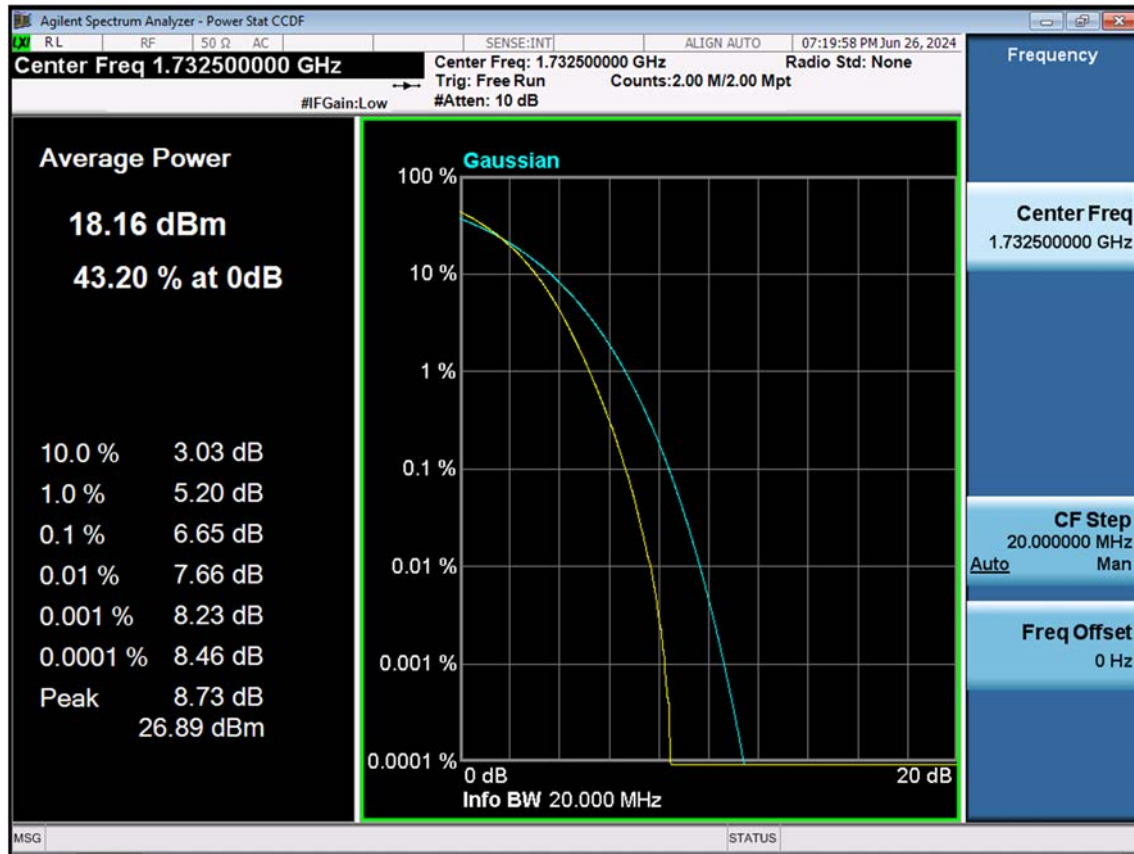
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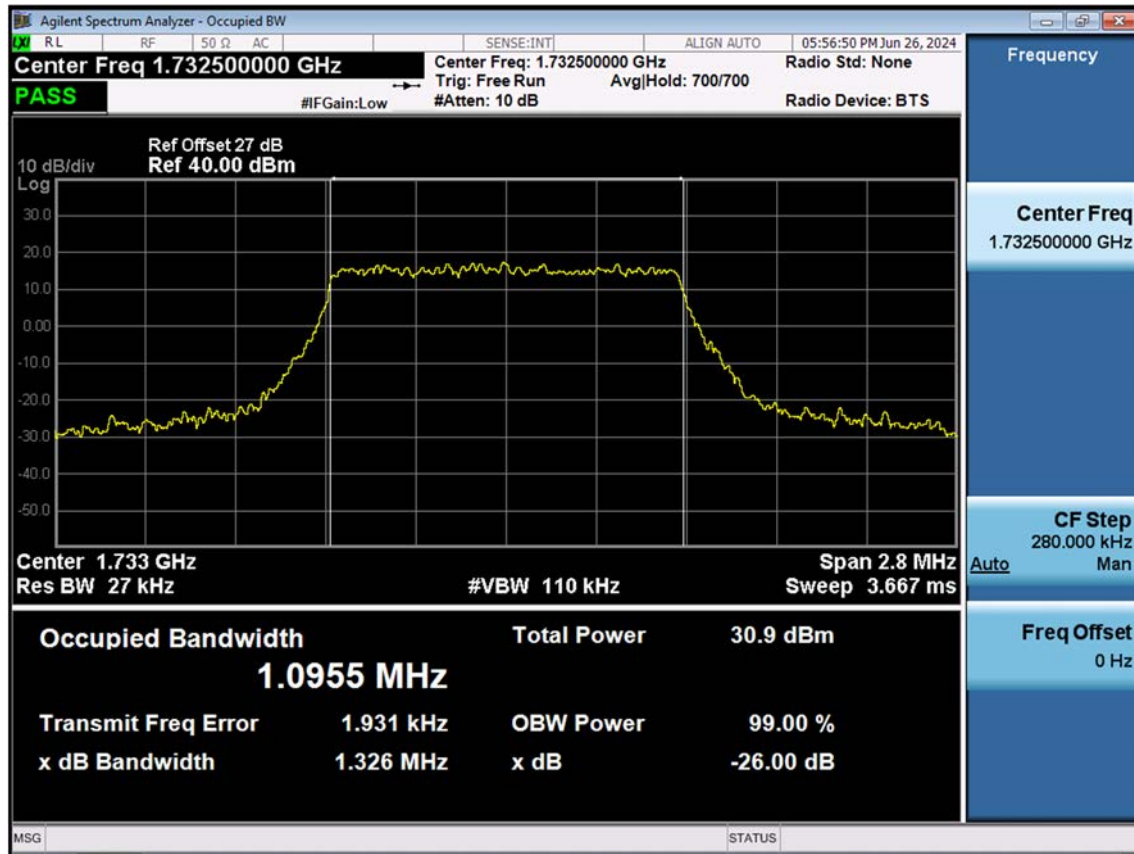
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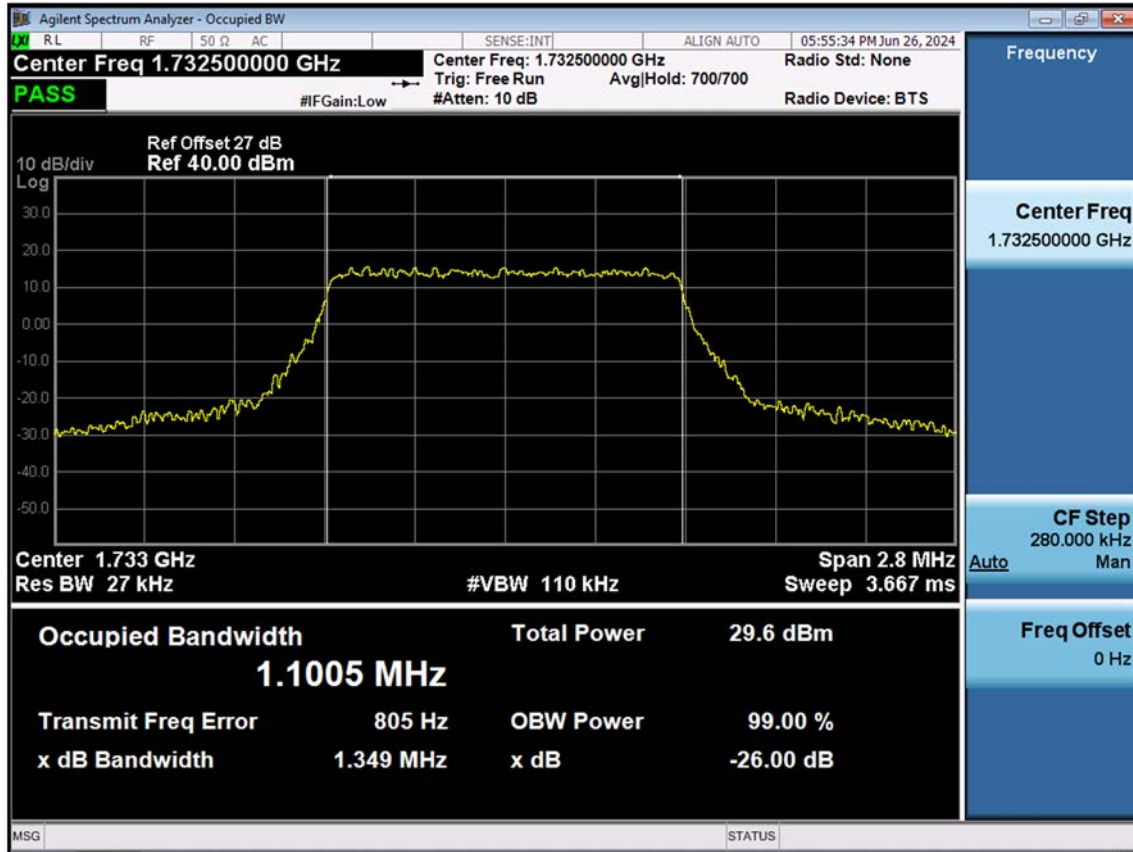
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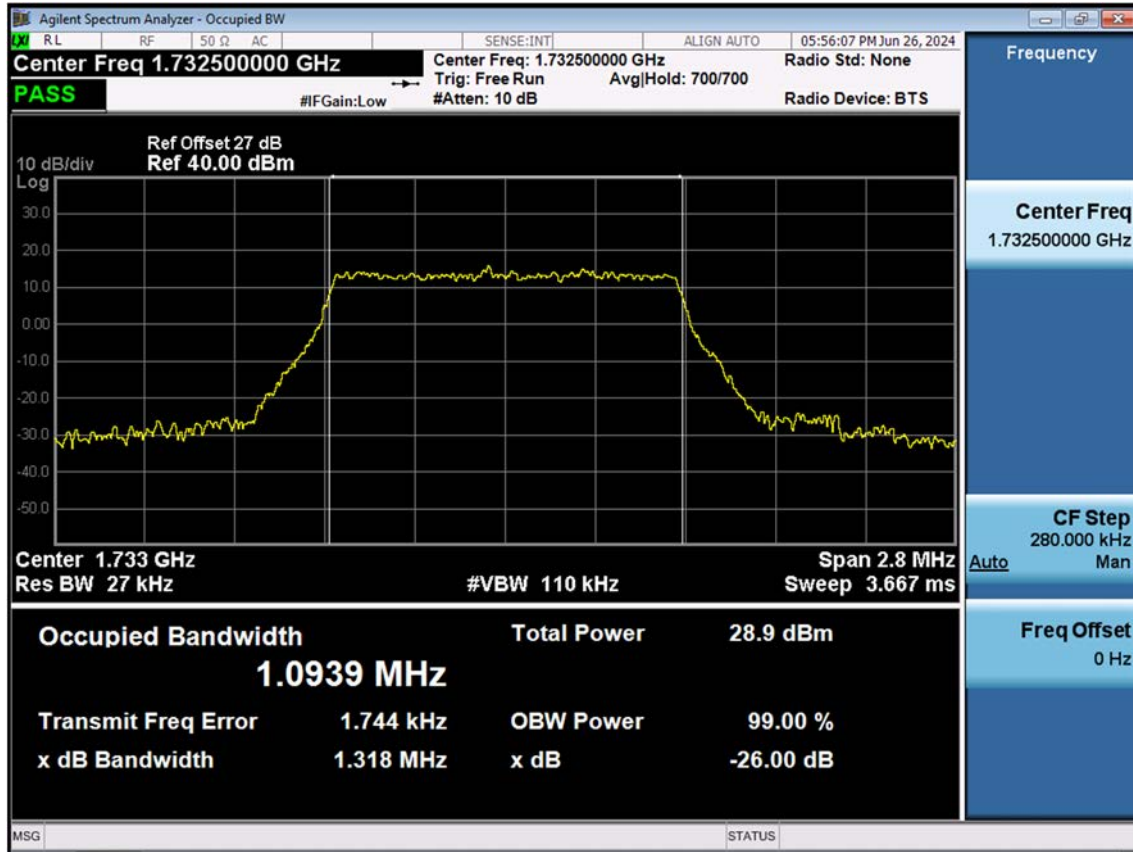
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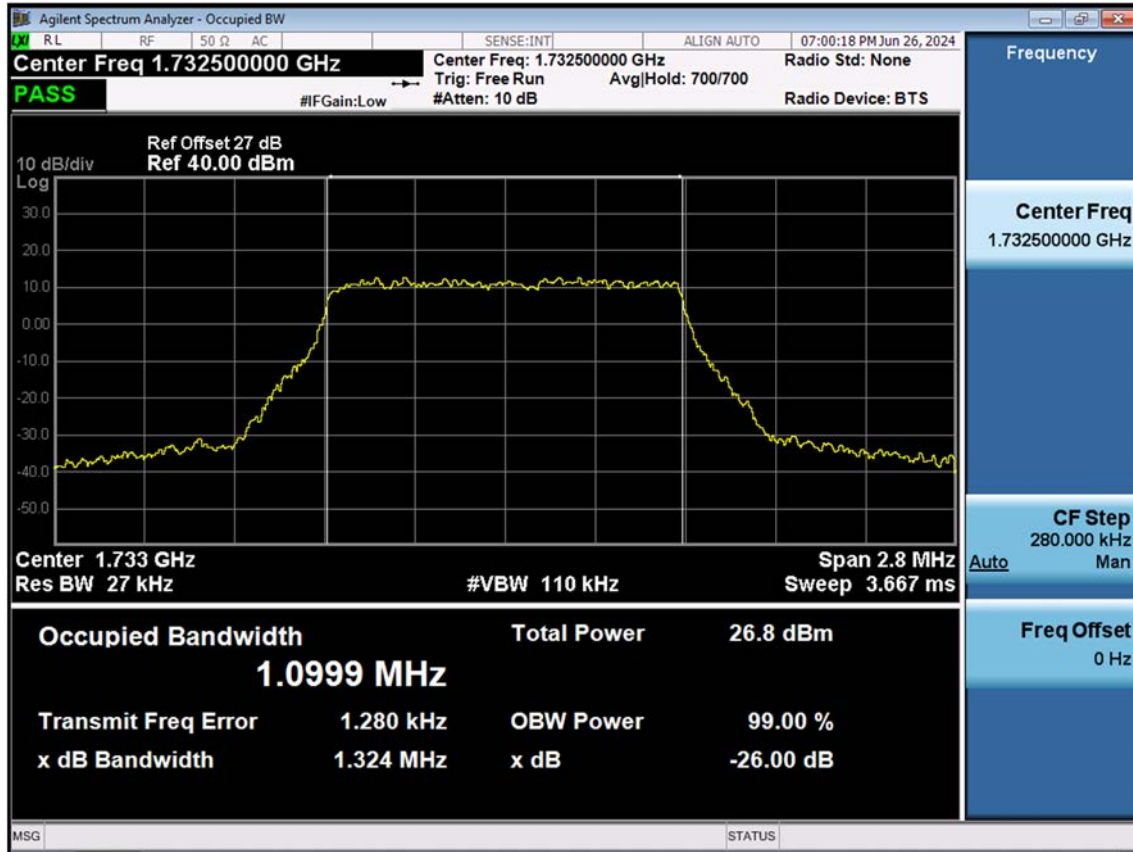
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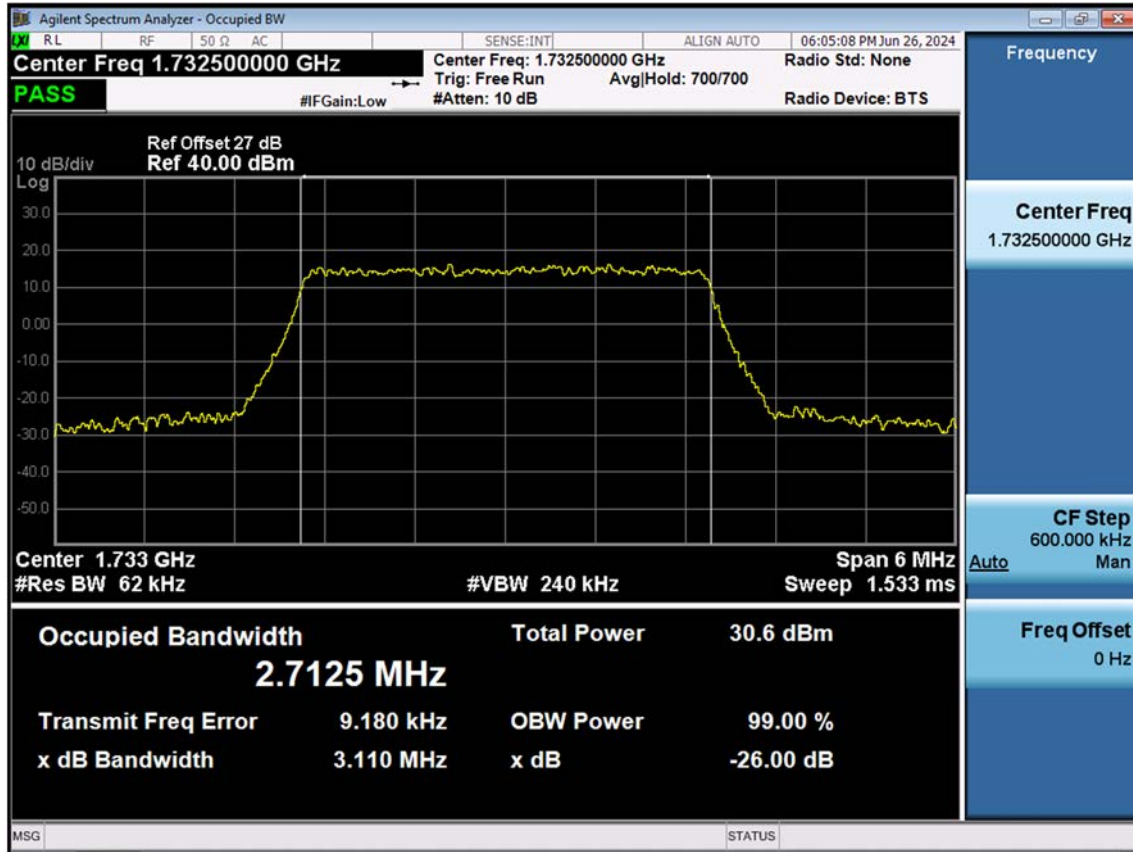
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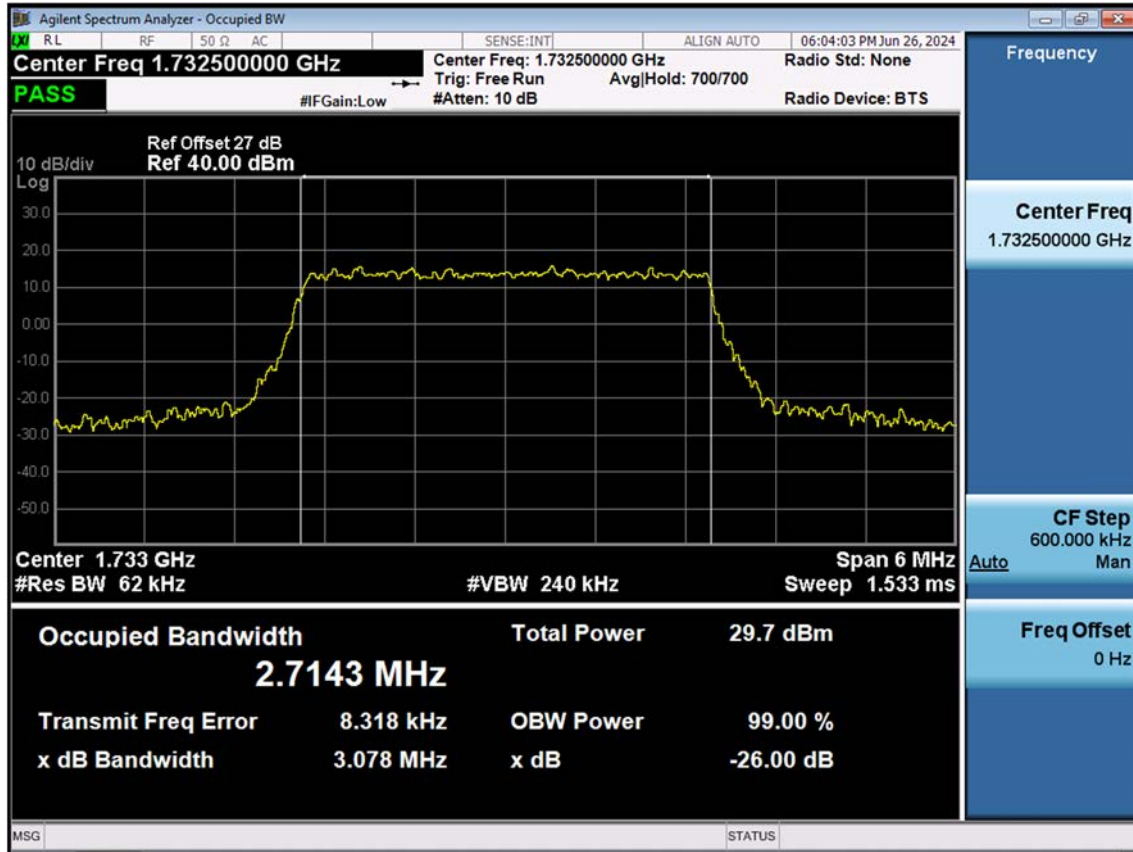
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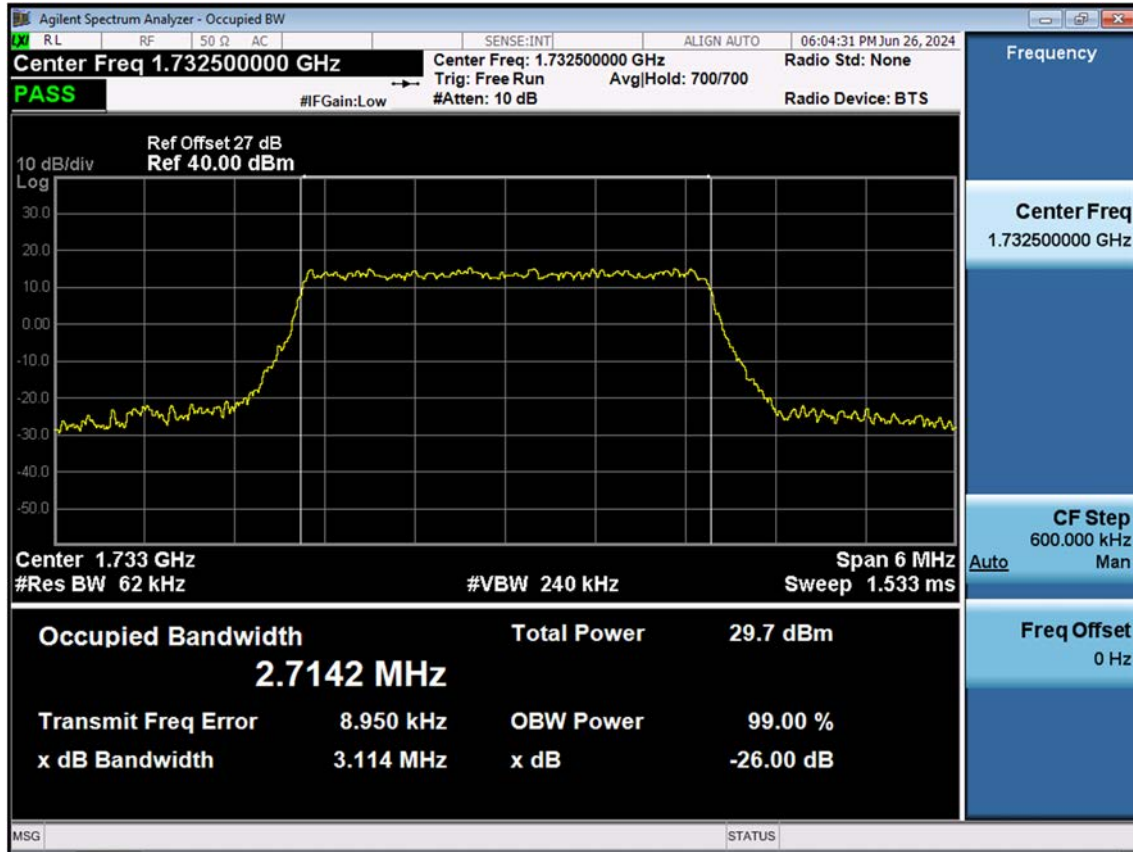
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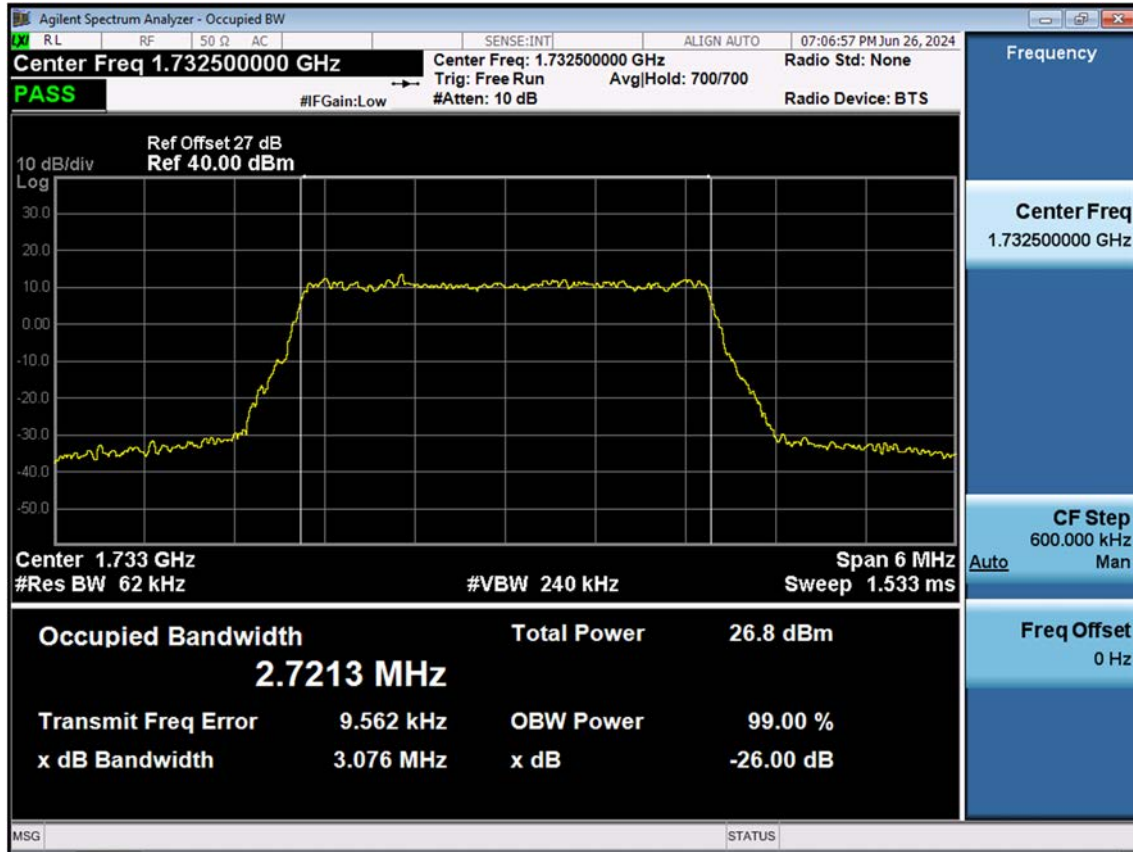
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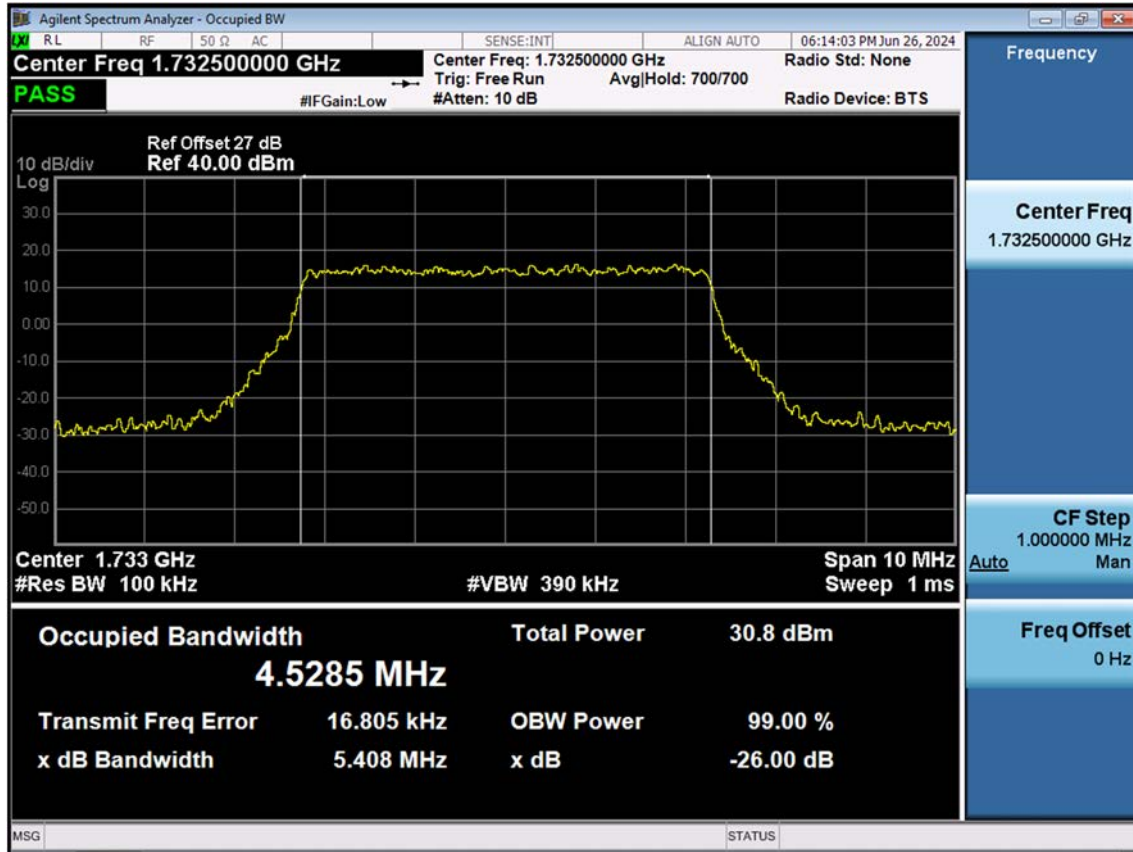
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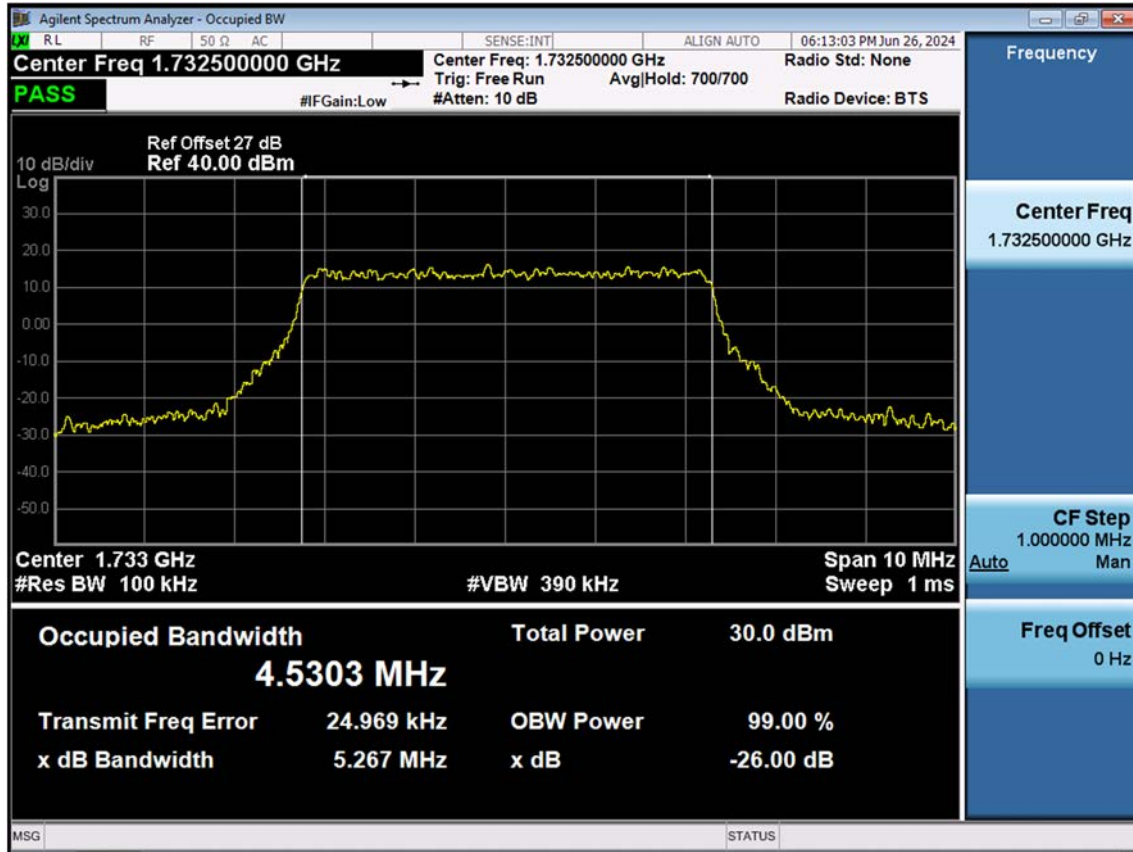
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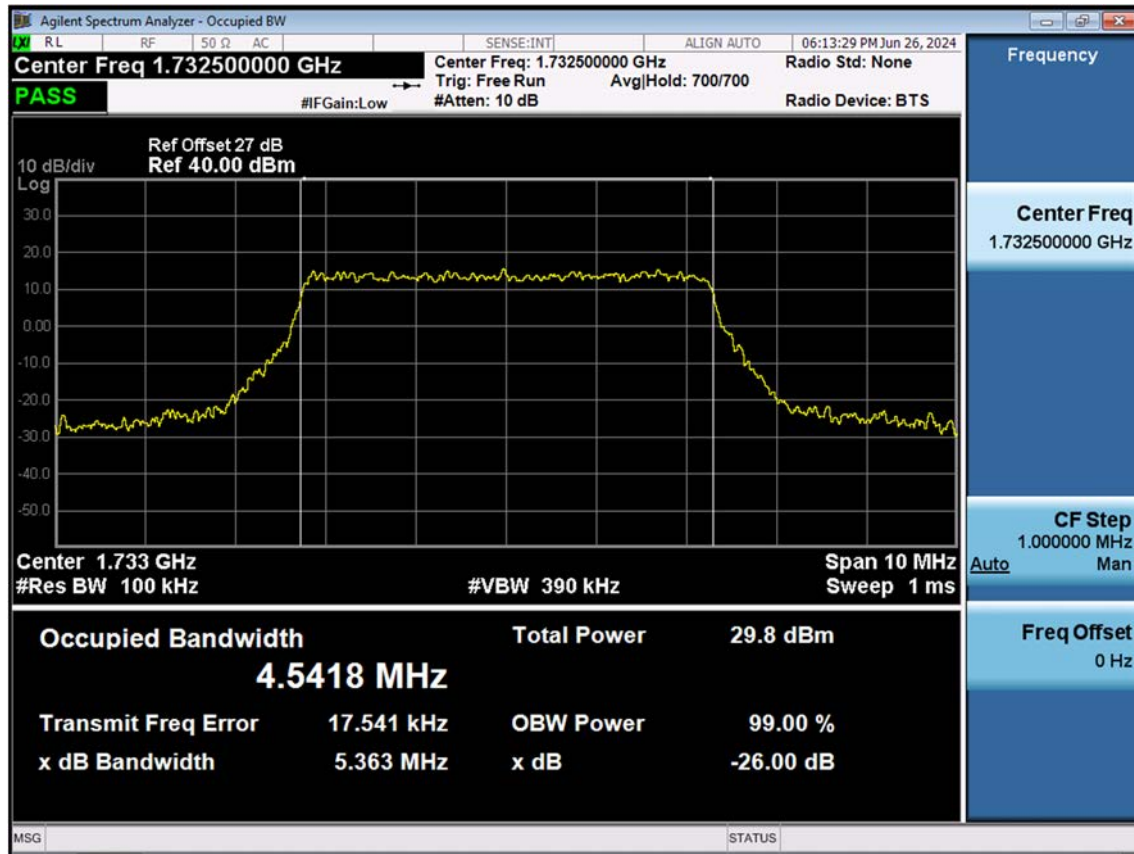
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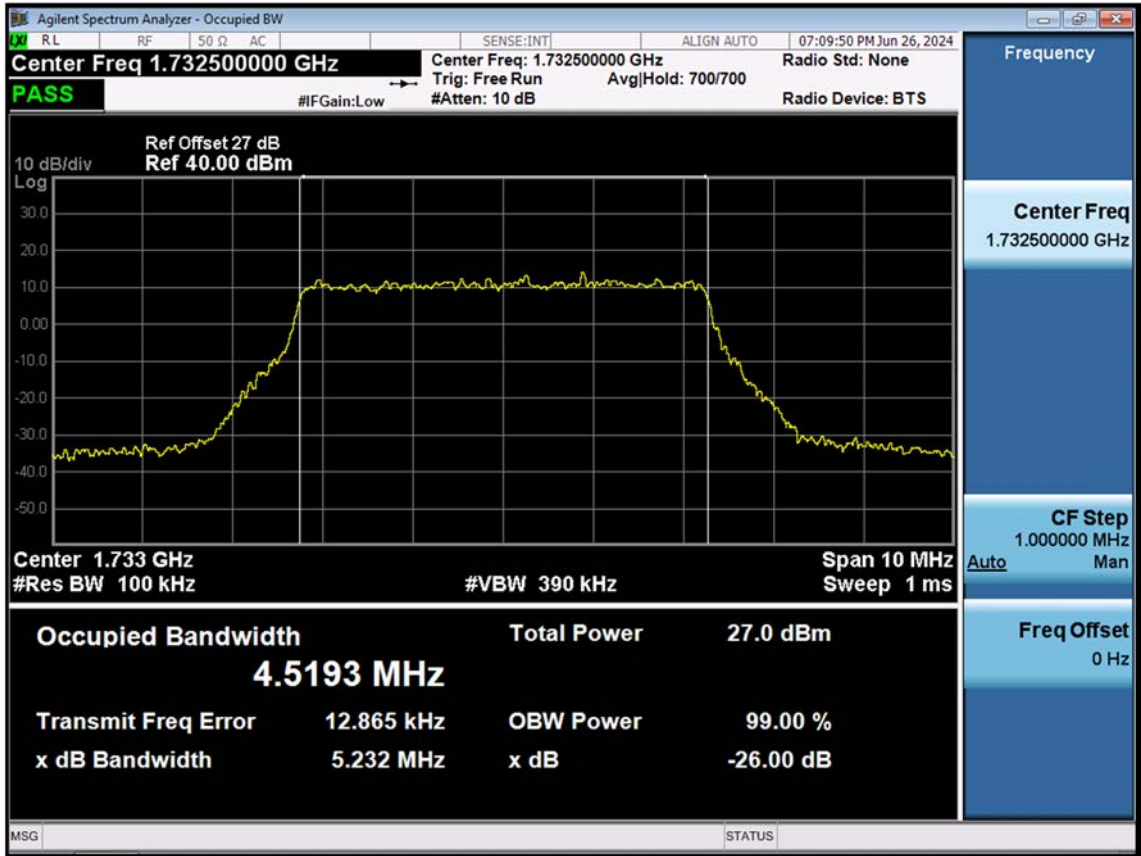
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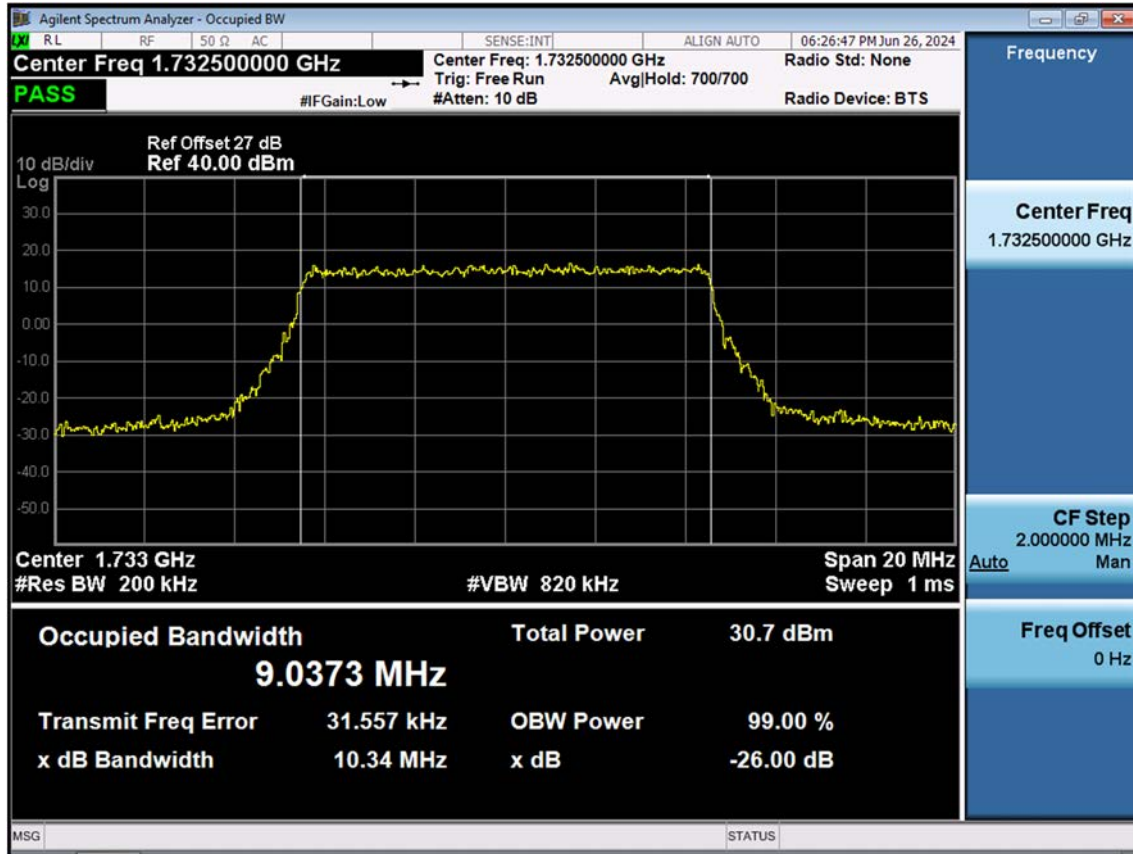
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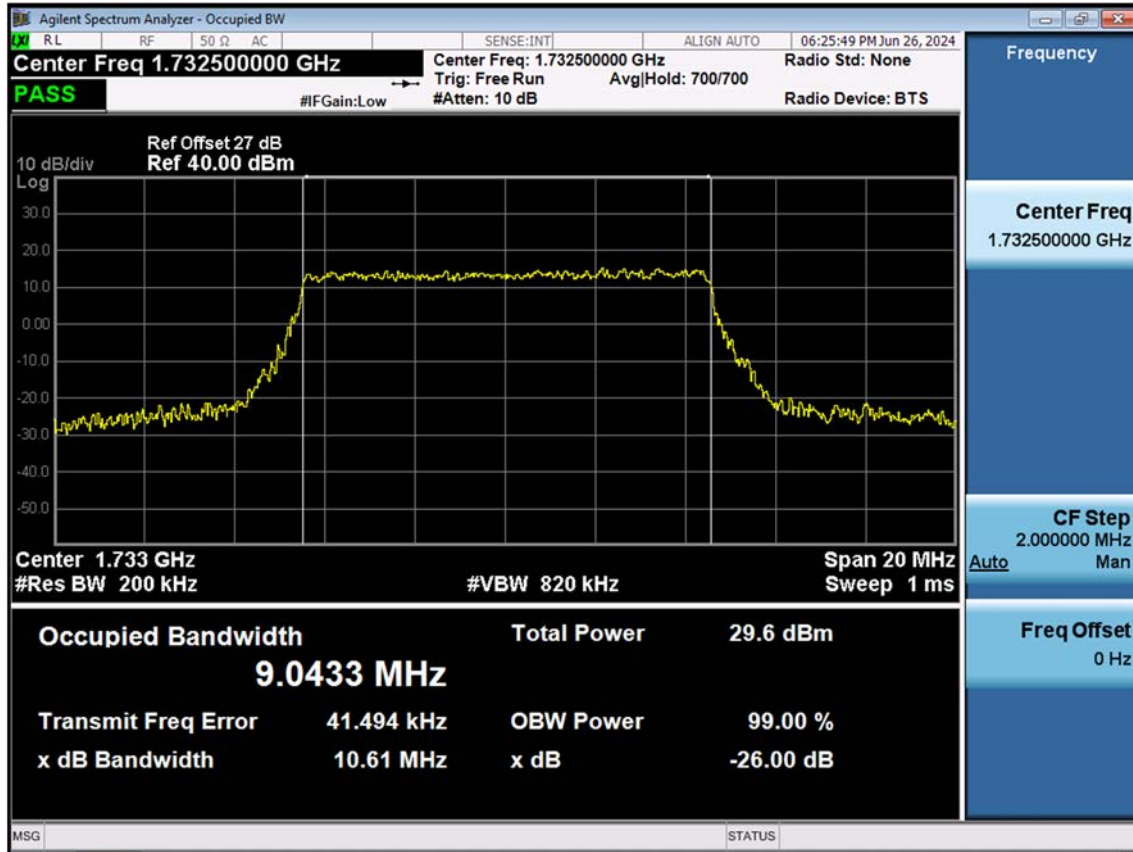
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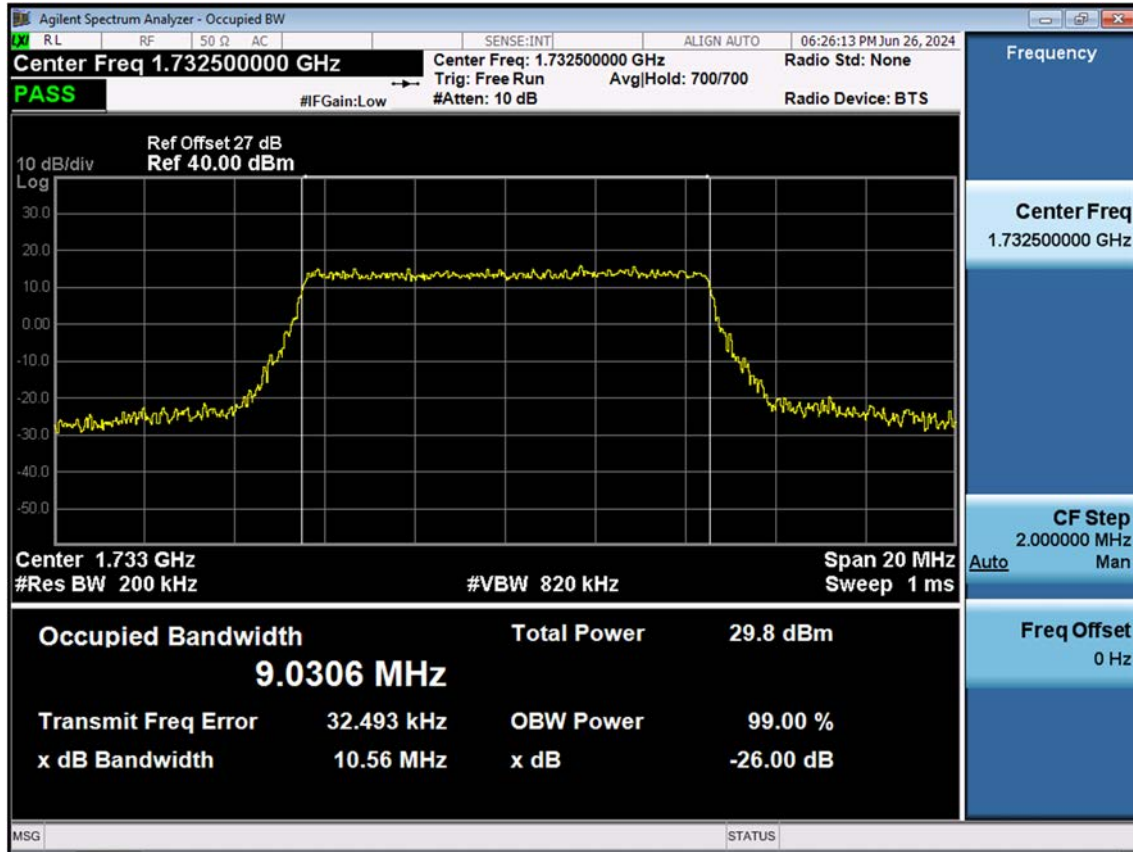
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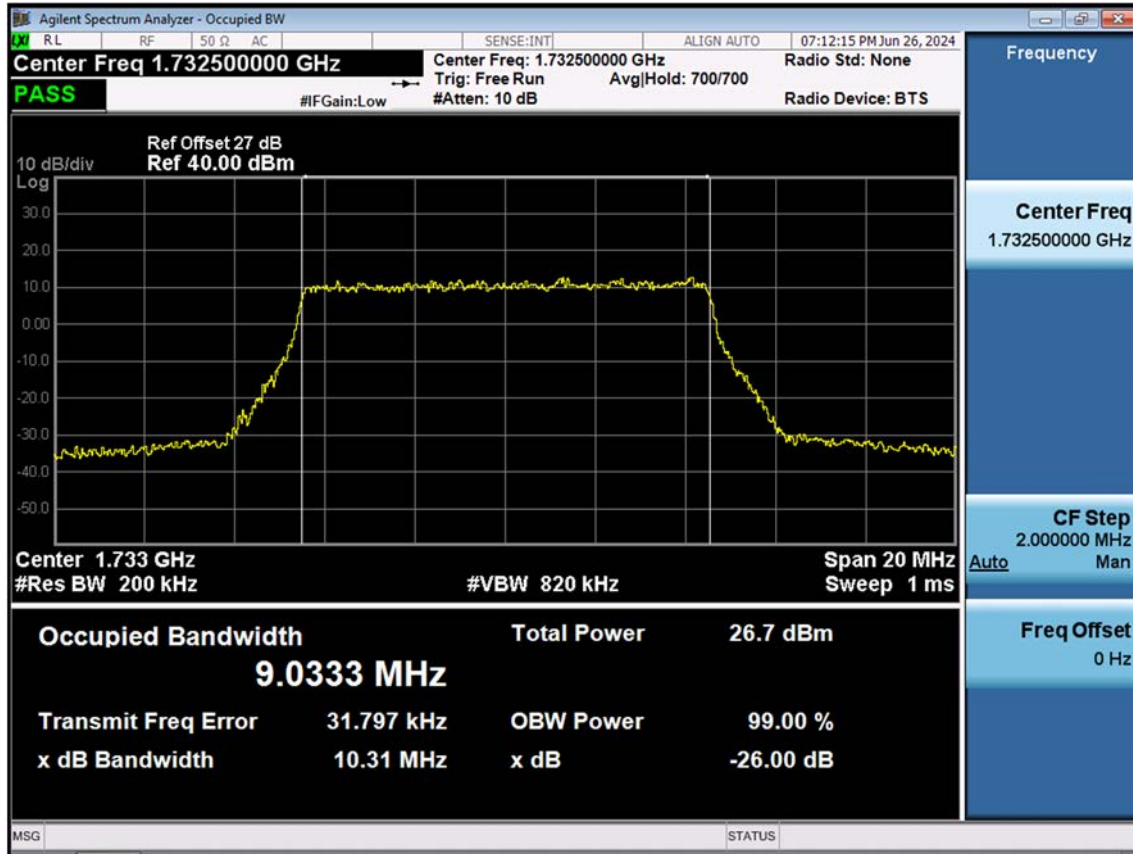
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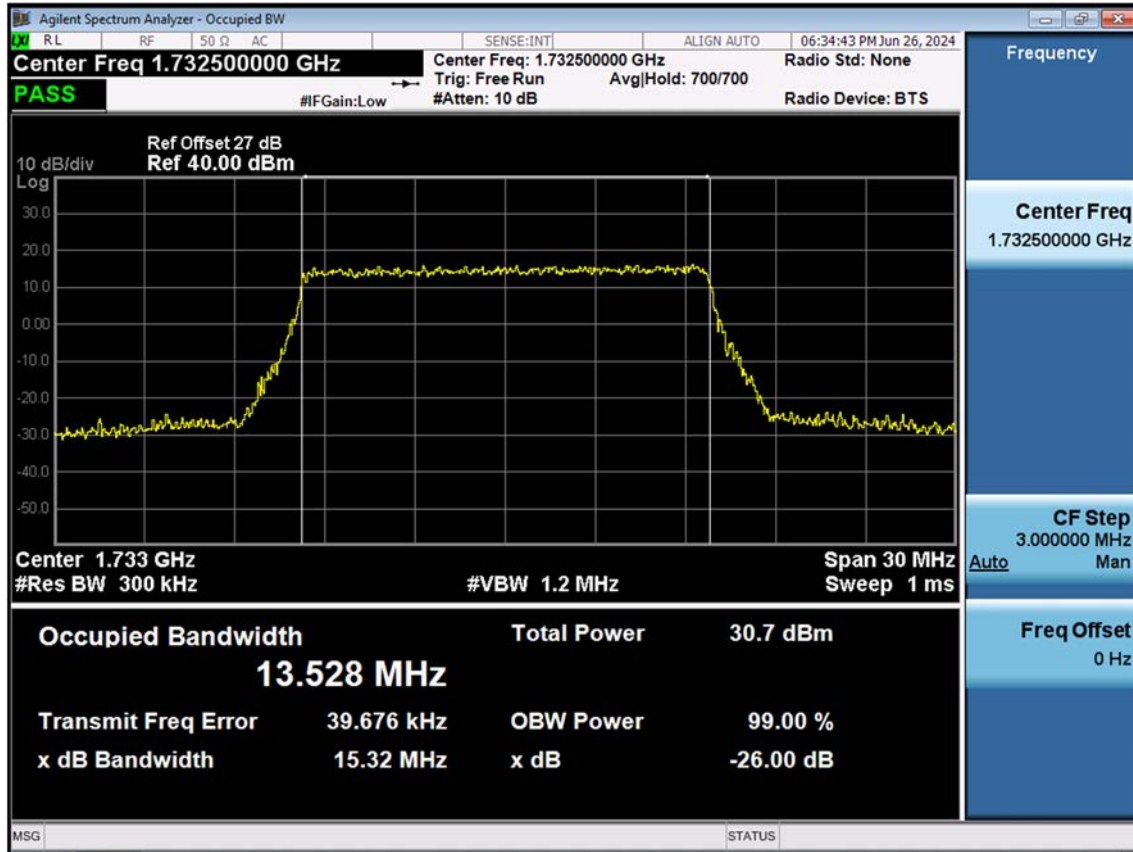
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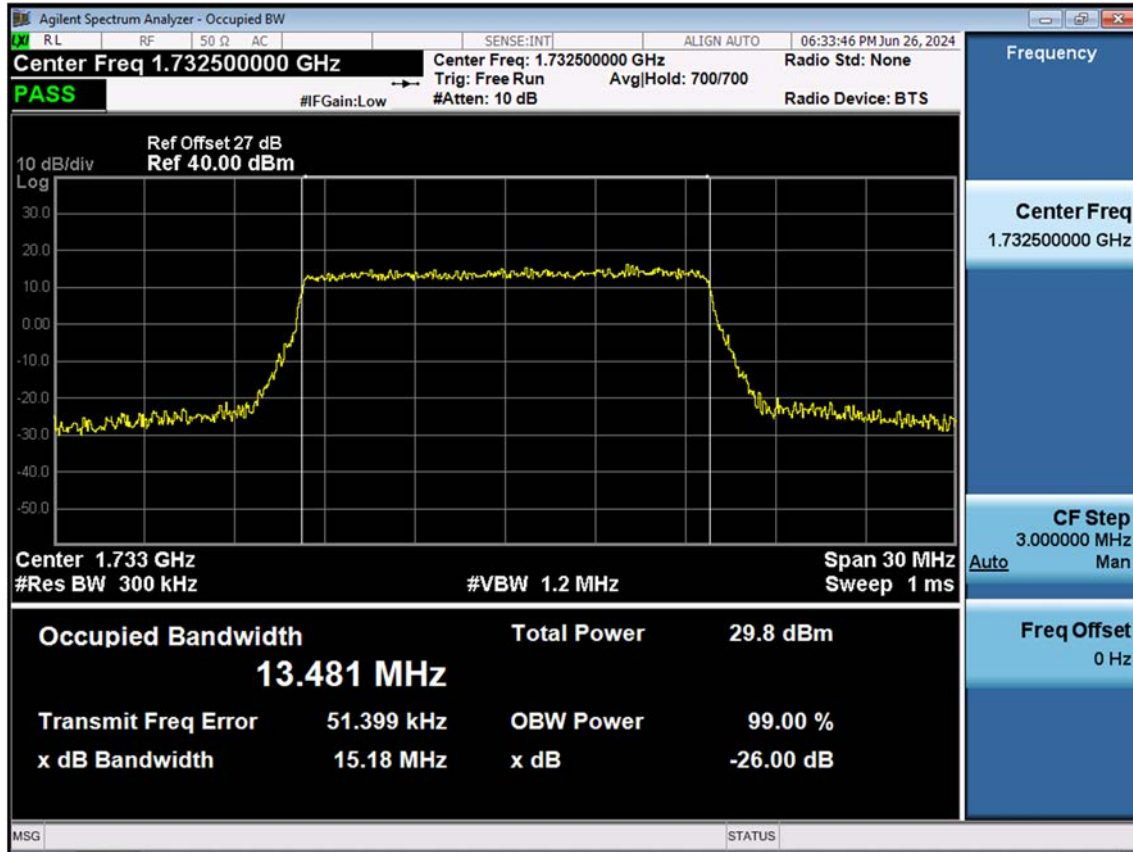
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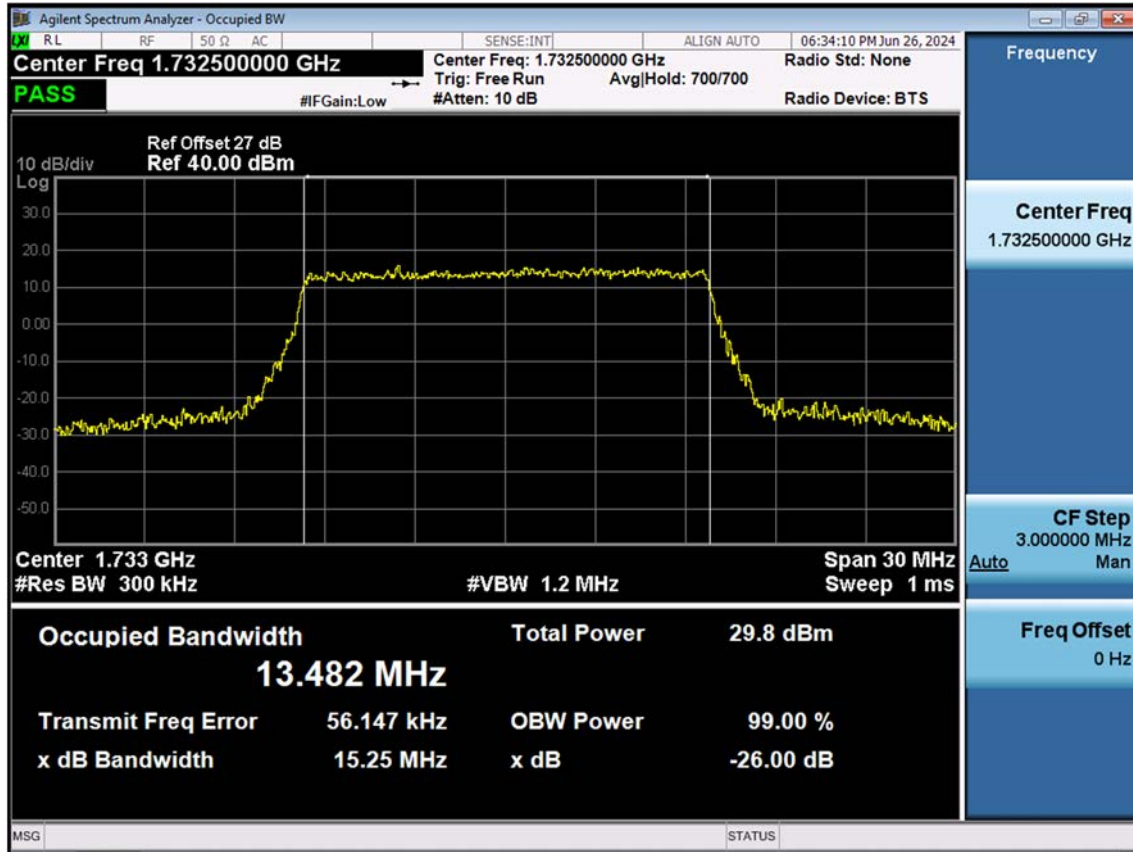
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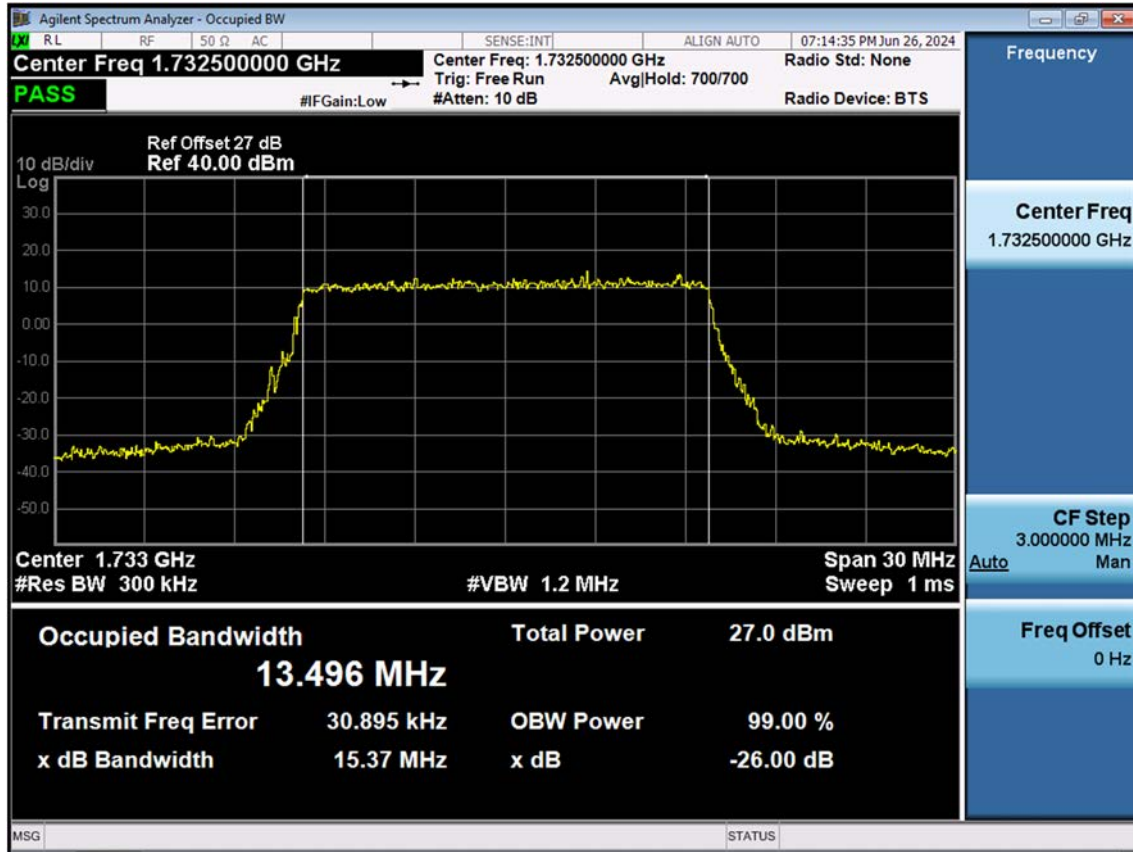
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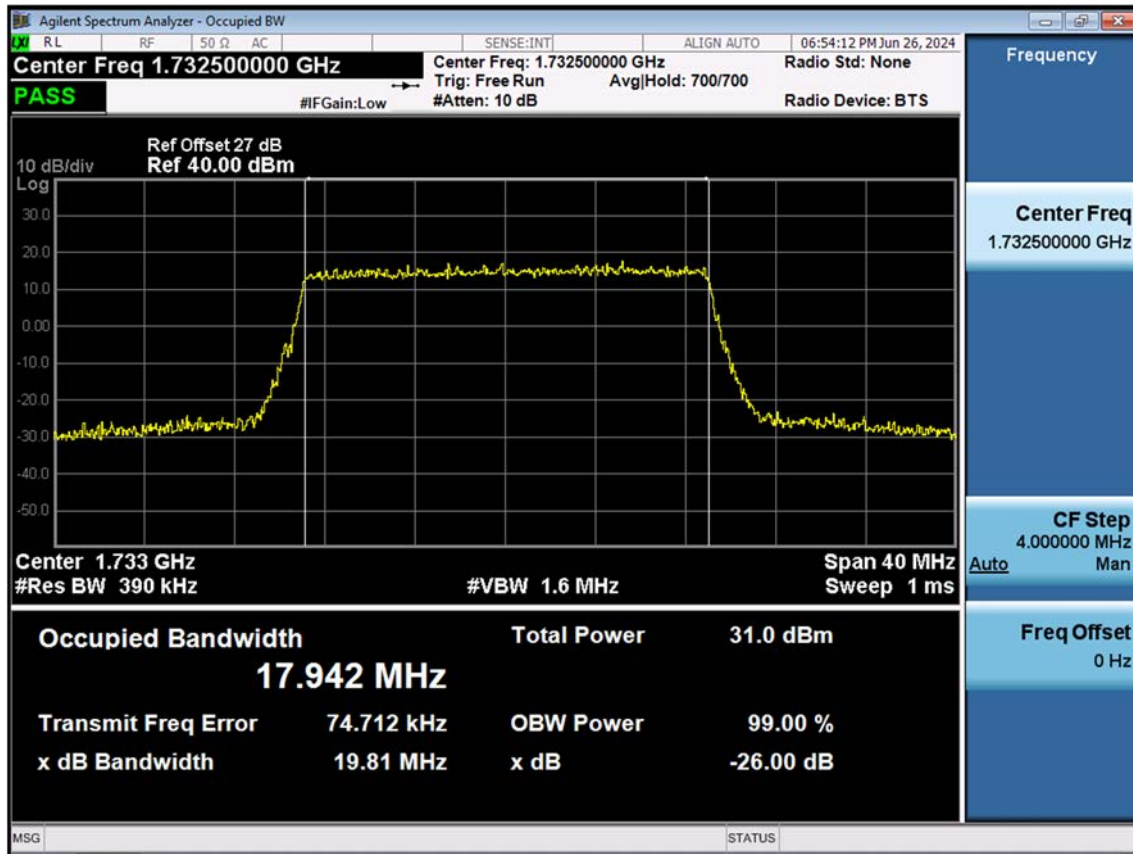
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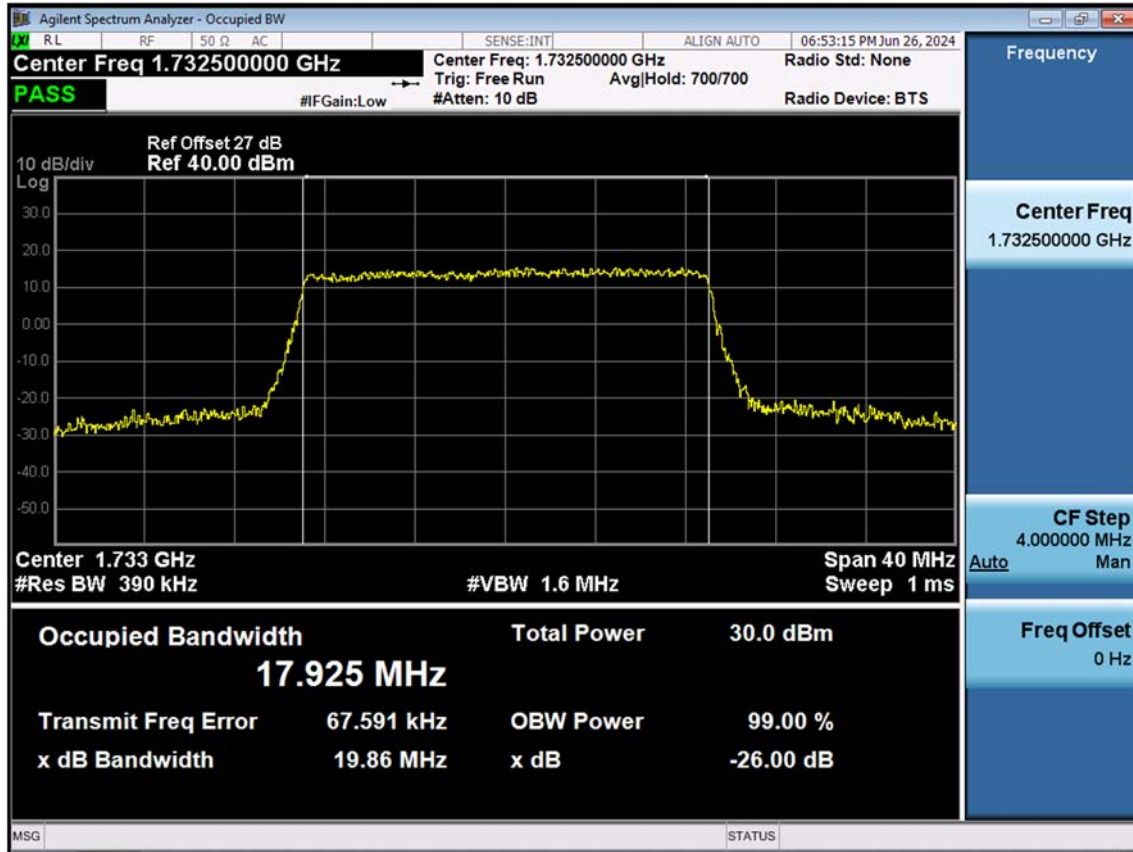
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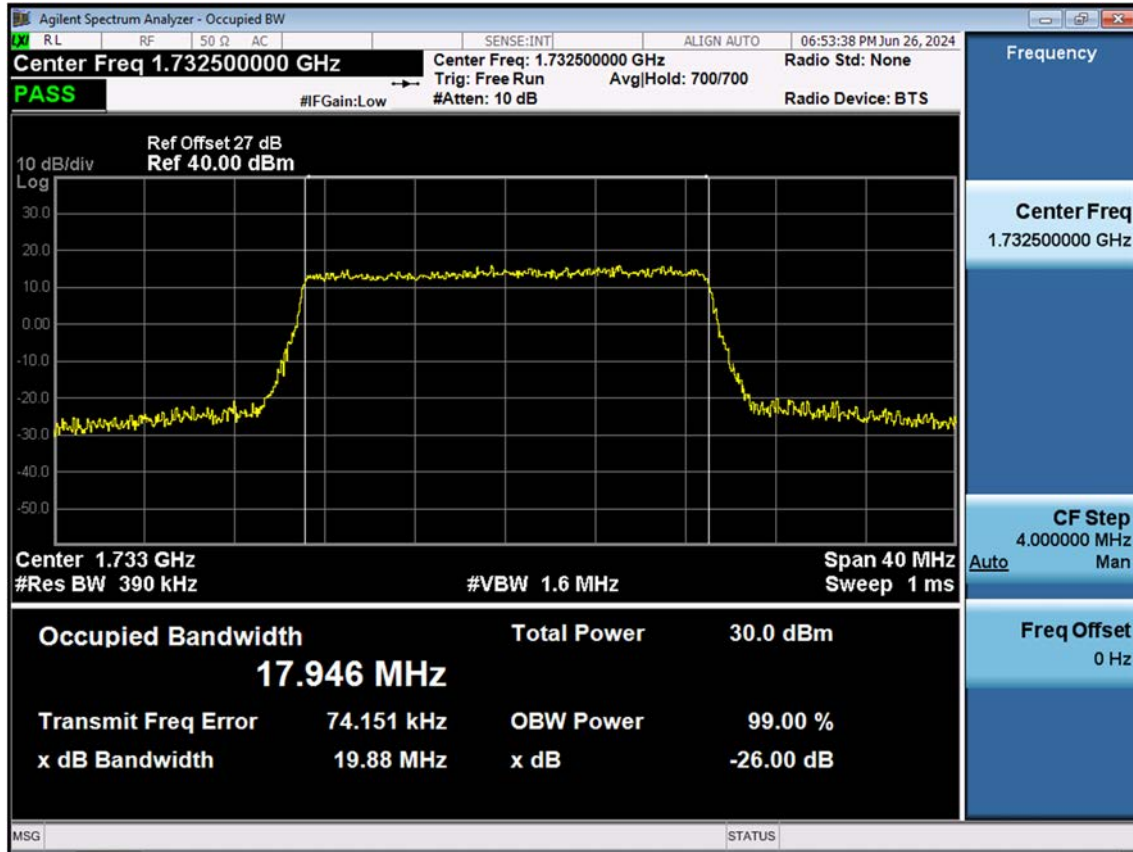
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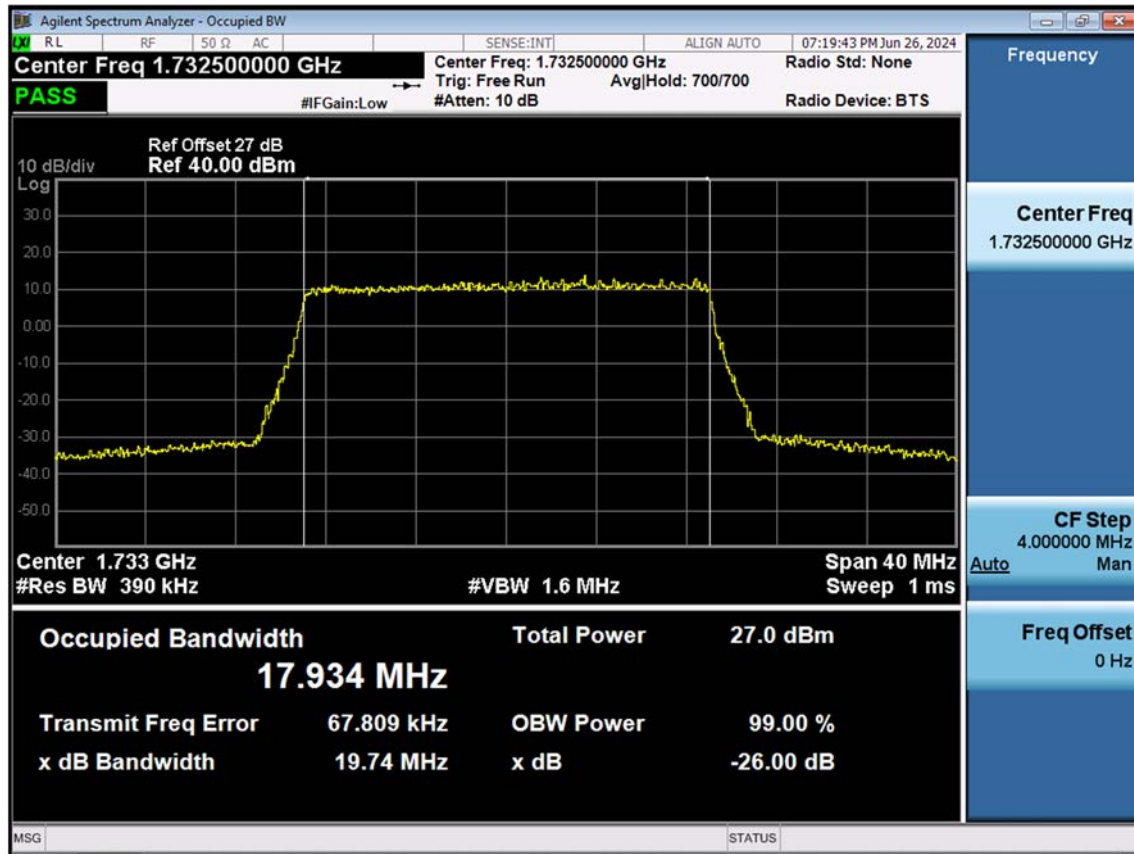
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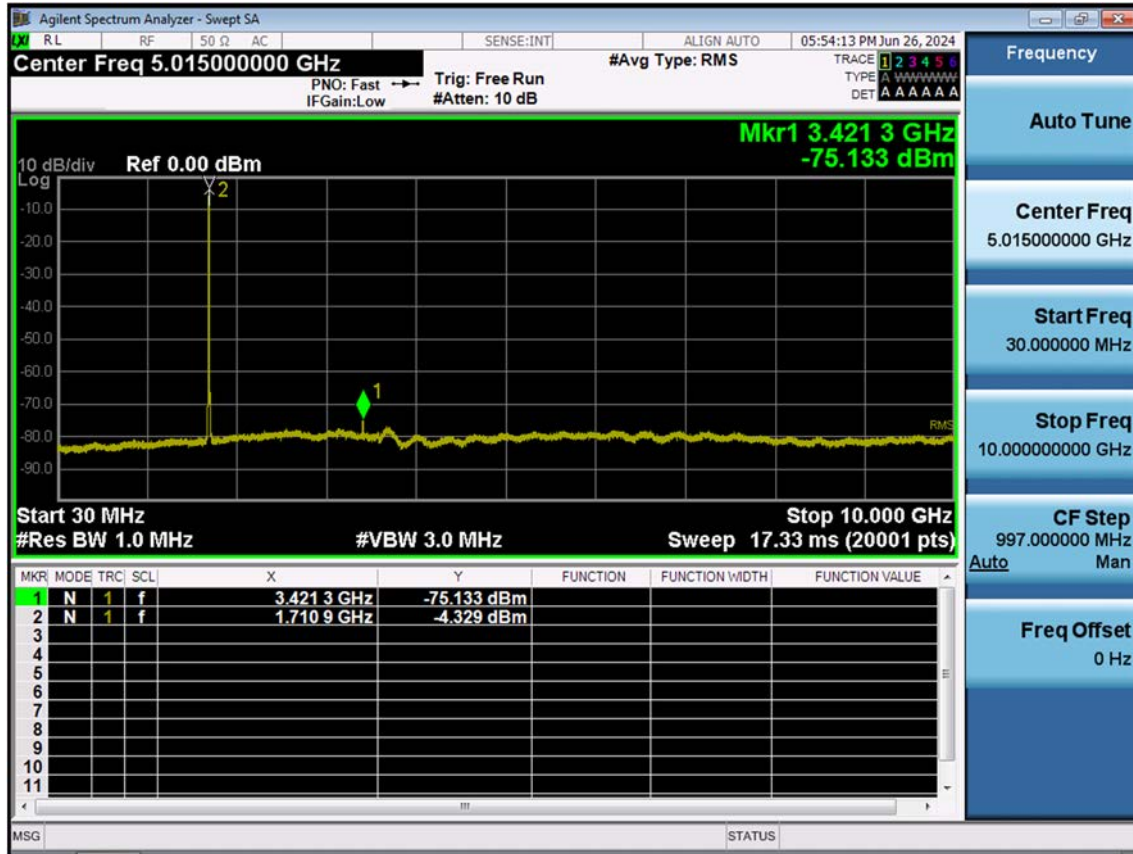
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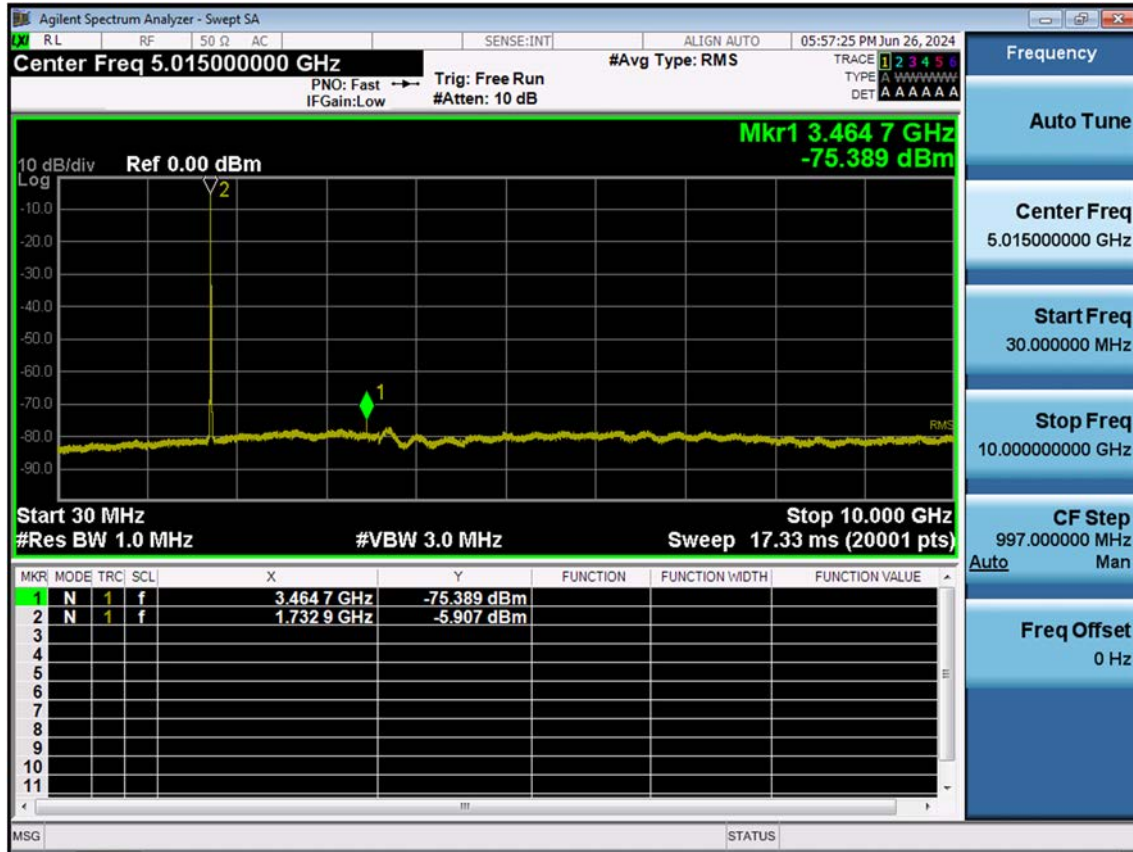
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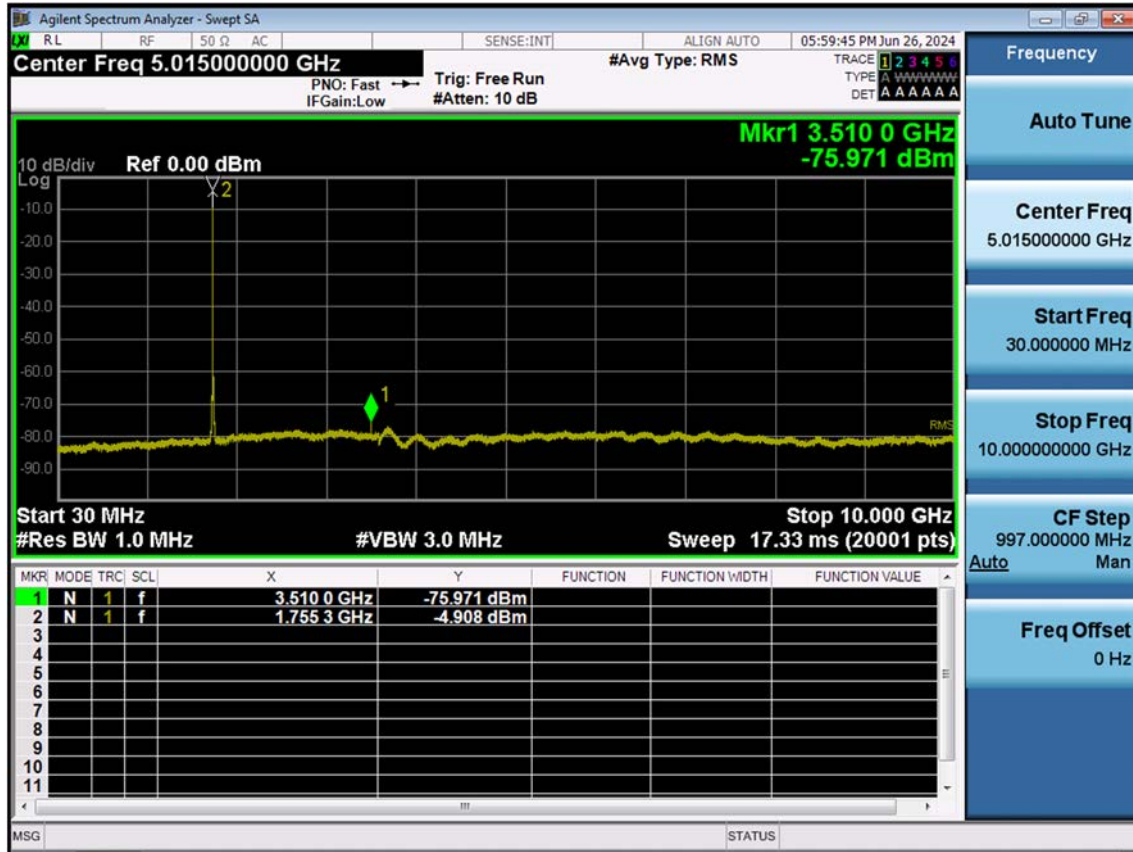
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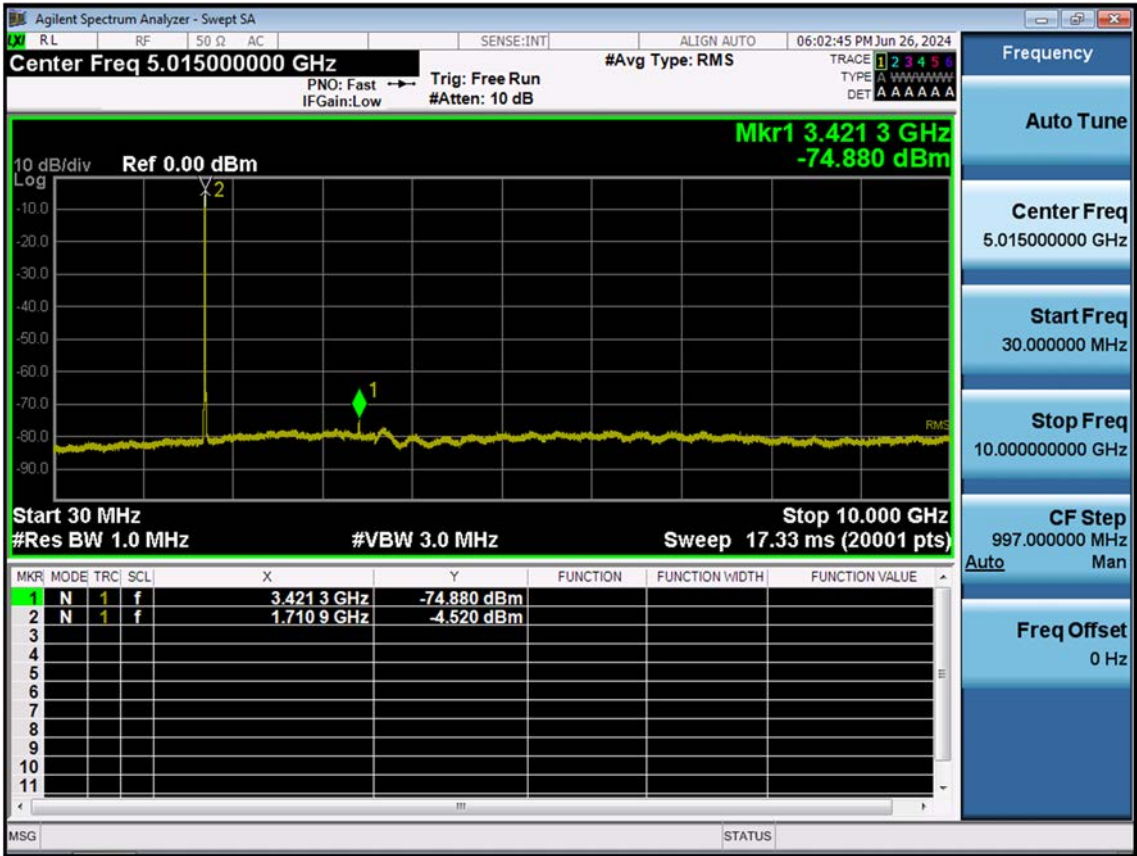
LTE B4_1.4 M_Conducted Spurious(30 M-10 G)_Mid_QPSK_1RB



LTE B4_1.4 M_Conducted Spurious(30 M-10 G)_High_QPSK_1RB



LTE B4_3 M_Conducted Spurious(30 M-10 G)_Low_QPSK_1RB



LTE B4_3 M_Conducted Spurious(30 M-10 G)_Mid_QPSK_1RB

