Testing and Certification

TEST REPORT

FCC LTE B12(17) Test for TM15FNEUJL1
Certification

APPLICANT
LG Electronics Inc.

REPORT NO.
HCT-RF-2502-FC106-R1

DATE OF ISSUE
April 8, 2025

Tested by
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Technical Manager
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Accredited by KOLAS, Republic of KOREA

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TEST REPORT

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HCT-RF-2502-FC106-R1

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Applicant	**LG Electronics Inc.** 128, Yeoui-daero, Yeongdeungpo-gu, Seoul, Republic of Korea
Product Name Model Name	Telematics TM15FNEUJL1
Date of Test	December 9, 2024 ~ February 24, 2025
Location of Test	■ Permanent Testing Lab ☐ On Site Testing (Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Republic of Korea)
FCC ID	BEJTM15FNEUJL1
FCC Classification:	PCS Licensed Transmitter (PCB)
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	February 24, 2025	Initial Release
1	April 08, 2025	Revised the Product Name.

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 This test report provides test result(s) under the scope accredited by the Korea Laboratory Accreditation Scheme (KOLAS), which signed the ILAC-MRA. (KOLAS (KS Q ISO/IEC 17025) Accreditation No. KT197)

CONTENTS

MEASUREMENT REPORT

1. GENERAL INFORMATION

Applicant Name:	LG Electronics Inc.
Address:	128, Yeoui-daero, Yeongdeungpo-gu, Seoul, Republic of Korea
FCC ID:	BEJTM15FNEUJL1
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter (PCB)
FCC Rule Part(s):	§ 27
EUT Type:	Telematics
Model(s):	TM15FNEUJL1
Tx Frequency:	699.7 MHz – 715.3 MHz (LTE – Band 12 (1.4 MHz)) 700.5 MHz – 714.5 MHz (LTE – Band 12 (3 MHz)) 701.5 MHz – 713.5 MHz (LTE – Band 12(17) (5 MHz)) 704.0 MHz – 711.0 MHz (LTE – Band 12(17) (10 MHz))
Date(s) of Tests:	December 9, 2024 ~ February 24, 2025
EUT Serial number:	Radiated : 410VIXV000304(NAD) Conducted : 410VIXV000305(NAD)
Antenna Information	Please refer to the Antenna Specification document.

1.1 MAXIMUM OUTPUT POWER

Mode (MHz)	Tx Frequency (MHz)	Emission Designator	Modulation	Conducted Output Power	
				Max. Power (W)	Max. Power (dBm)
LTE – Band 12 (1.4)	699.7 – 715.3	1M09G7D	QPSK	0.235	23.71
		1M09W7D	16QAM	0.205	23.12
		1M09W7D	64QAM	0.156	21.92
		1M09W7D	256QAM	0.077	18.88
LTE – Band 12 (3)	700.5 – 714.5	2M70G7D	QPSK	0.233	23.68
		2M69W7D	16QAM	0.204	23.10
		2M69W7D	64QAM	0.160	22.05
		2M70W7D	256QAM	0.077	18.89
LTE – Band 12(17) (5)	701.5 – 713.5	4M50G7D	QPSK	0.237	23.74
		4M48W7D	16QAM	0.206	23.13
		4M50W7D	64QAM	0.157	21.95
		4M50W7D	256QAM	0.078	18.90
LTE – Band 12(17) (10)	704.0 – 711.0	8M95G7D	QPSK	0.230	23.62
		8M97W7D	16QAM	0.213	23.29
		8M97W7D	64QAM	0.157	21.97
		8M97W7D	256QAM	0.079	18.98

2. INTRODUCTION

2.1 DESCRIPTION OF EUT

Please refer to the [2G3G] Test Report.

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, Republic 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
Radiated Power	- ANSI C63.26-2015 – Section 5.2.4.4 - KDB 971168 D01 v03r01 – Section 5.8
Radiated Spurious and Harmonic Emissions	- ANSI C63.26-2015 – Section 5.5.3 - KDB 971168 D01 v03r01 – Section 5.8

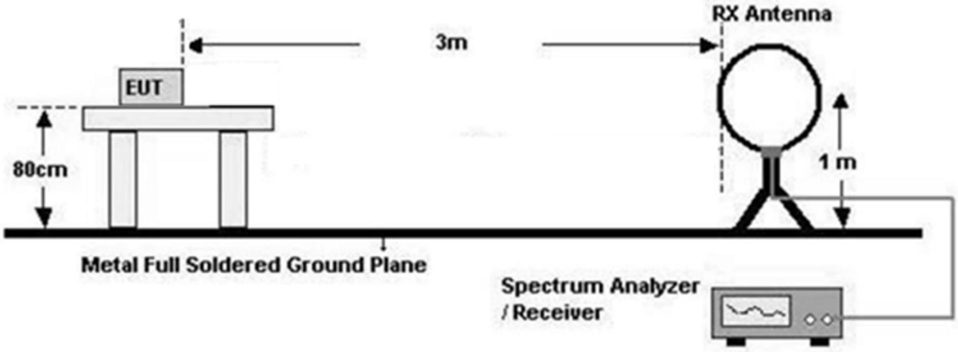
3.2 RADIATED POWER

Test Overview

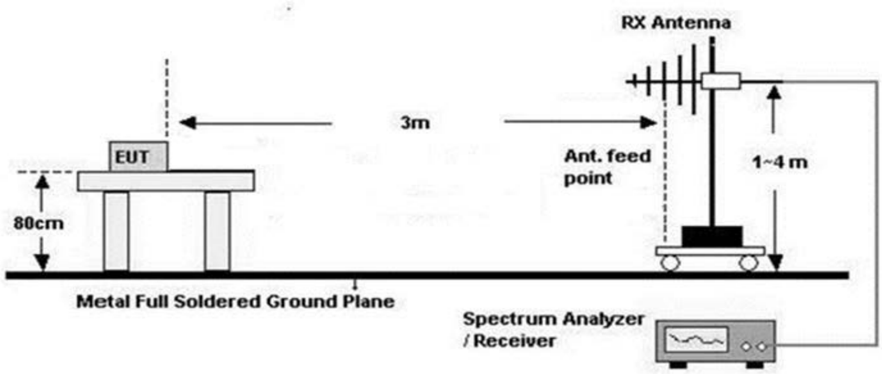
Radiated tests are performed in the semi-anechoic chamber. The equipment under test is placed on a non-conductive table on semi-anechoic chamber.

Test Configuration

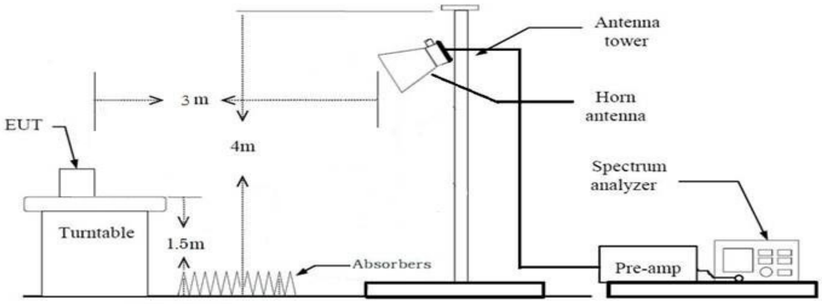
Below 30 MHz



30 MHz - 1 GHz



Above 1 GHz



Test Settings

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

Test Note

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

3.3 RADIATED SPURIOUS EMISSIONS

Test Overview

Radiated tests are performed in the Fully-anechoic chamber.

Radiated Spurious Emission Measurements at 3 meters by Substitution Method.

Test Settings

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

Test Note

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

   The spurious emissions is calculated by the following formula;

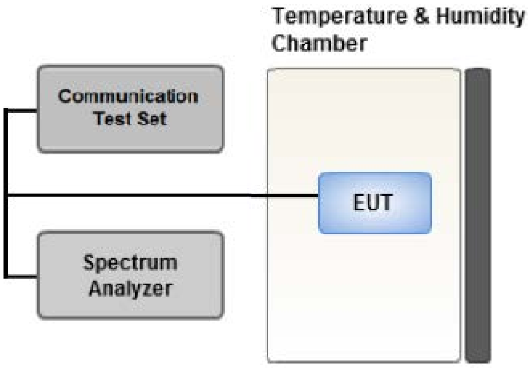
   $$\text{Result}_{(dBm)} = \text{Pg}_{(dBm)} - \text{cable loss}_{(dB)} + \text{antenna gain}_{(dBi)}$$

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

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

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

3.4 OCCUPIED BANDWIDTH.



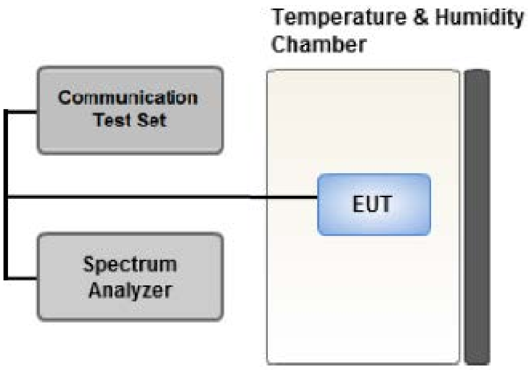
Test setup

The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.
The EUT makes a call to the communication simulator.
The conducted occupied bandwidth used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.
The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

Test Settings

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

3.5 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL



Test setup

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic.

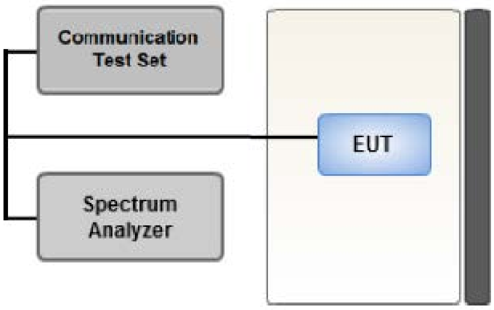
All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.

All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Settings

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

3.6 BAND EDGE



Test setup

Test Overview

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

Test Settings

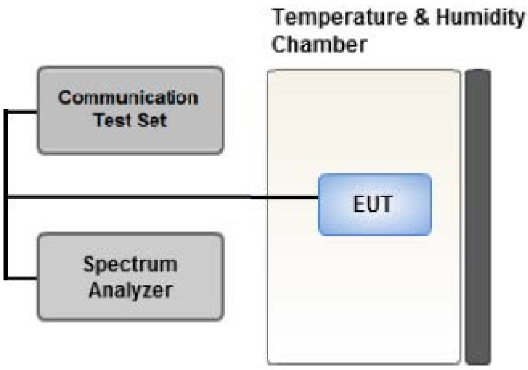
1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW > 1 % of the emission bandwidth
4. VBW > 3 x RBW
5. Detector = RMS
6. Number of sweep points ≥ 2 x Span/RBW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

Test Notes

According to FCC 22.917, 24.238, 27.53 specified that power of any emission outside of The authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.
All measurements were done at 2 channels(low and high operational frequency range.)
The band edge measurement used the power splitter via EUT RF power connector between simulation base station and spectrum analyzer.

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

3.7 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.

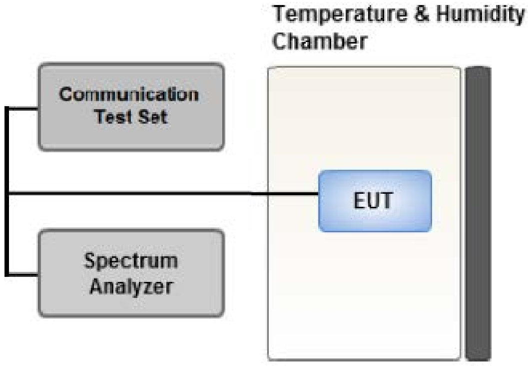
The frequency stability of the transmitter is measured by:

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.

3.8 PEAK- TO- AVERAGE RATIO



Test setup

① CCDF Procedure for PAPR

Test Settings

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

② Alternate Procedure for PAPR

Use one of the procedures presented in 5.2(ANSI C63.26-2015) to measure the total peak power and record as as P_{Pk}.

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

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

Test Settings(Peak Power)

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

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

Test Settings(Average Power)

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

3.9 WORST CASE(RADIATED TEST)

- The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
- All simultaneous transmission scenarios of operation were investigated, and the test results showed no additional significant emissions relative to the least restrictive limit were observed.
  Therefore, only the worst case(stand-alone) results were reported.
- In the case of radiated spurious emissions, all bandwidth of operation were investigated and the worst case bandwidth results are reported. (Worst case : 3 MHz)
- The worst case is reported with the EUT positioning, modulations, and paging service configurations shown in the test data
- LTE Band 12 (699 – 716 MHz, 5/10 MHz bandwidth) overlaps the entire frequency range of LTE Band 17 (704 - 716 MHz) and they have the same Tune-up power.
  Therefore, test data provided in this report covers Band 12 as well as Band 17
- Please refer to the table below.
  - JIG was used to test the EUT. (EUT + JIG)

[Worst case]

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

3.10 WORST CASE(CONDUCTED TEST)

- All modes of operation were investigated and the worst case configuration results are reported.
- LTE Band 12 (699 – 716 MHz, 5/10 MHz bandwidth) overlaps the entire frequency range of LTE Band 17 (704 - 716 MHz) and they have the same Tune-up power.
  Therefore, test data provided in this report covers Band 12 as well as Band 17.
- JIG was used to test the EUT. (EUT + JIG)

[Worst case]

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset
Occupied Bandwidth	QPSK, 16QAM, 64QAM, 256QAM	1.4, 3, 5, 10	Mid	Full RB	0
PEAK- TO- AVERAGE RATIO	QPSK, 16QAM, 64QAM, 256QAM	1.4, 3, 5, 10	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
		1.4, 3, 5, 10	Low, High	Full RB	0
Spurious and Harmonic Emissions at Antenna Terminal	QPSK	1.4, 3, 5, 10	Low, Mid, High	1	0

4. LIST OF TEST EQUIPMENT

[Fully-anechoic chamber]

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
RF Switching System	Switch box(1 G HPF+LNA)	HCT CO., LTD.,	F2L2	12/12/2025	Annual
RF Switching System	Switch box(3 G HPF+LNA)	HCT CO., LTD.,	F2L3	12/12/2025	Annual
RF Switching System	Switch box(LNA)	HCT CO., LTD.,	F2L5	12/12/2025	Annual
RF Switching System	Switch box(6 G HPF+LNA)	HCT CO., LTD.,	F2L14	12/12/2025	Annual
Power Amplifier	CBL18265035	CERNEX	22966	11/07/2025	Annual
Power Amplifier	CBL26405040	CERNEX	25956	02/26/2025	Annual
Power Splitter(DC ~ 26.5 GHz)	11667B	Hewlett Packard	5001	04/17/2025	Annual
DC Power Supply	E3632A	Agilent	MY40010147	08/06/2025	Annual
Dipole Antenna	UHAP	Schwarzbeck	01274	03/10/2026	Biennial
Dipole Antenna	UHAP	Schwarzbeck	01288	08/07/2026	Biennial
Chamber	SU-642	ESPEC	93022487	06/27/2025	Annual
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	03197	11/28/2025	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120D	Schwarzbeck	03201	11/28/2025	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/20/2026	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	ROHDE & SCHWARZ	101733	09/19/2025	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/05/2025	Annual
Loop Antenna(9 kHz ~ 30 MHz)	FMZB1513	Schwarzbeck	1513-333	03/07/2026	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	895	08/28/2026	Biennial
Trilog Broadband Antenna	VULB9168	Schwarzbeck	1135	08/19/2026	Biennial
Radio Communication Test Station	MT8000A	Anritsu Corp.	6272613402	08/28/2025	Annual
SIGNAL GENERATOR (100 kHz ~ 40 GHz)	SMB100A	REOHDE & SCHWARZ	177633	07/26/2025	Annual
Signal Analyzer(5 Hz ~ 40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/17/2025	Annual
Signal & Spectrum Analyzer (2 Hz~67 GHz)	FSW67	REOHDE & SCHWARZ	101736	05/23/2025	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	-

[Semi-anechoic chamber]

Equipment	Model	Manufacturer	Serial No.	Due to Calibration	Calibration Interval
Antenna Position Tower	MA4640	Innco systems	S4AM	08/07/2025	Annual
Turn Table	DS2000-S	Innco systems	N/A	N/A	-
Turn Table	Turn Table	Ets	N/A	N/A	-
Controller (Antenna mast & Turn Table)	CO3000	Innco systems	CO3000/1251/48920320/P	N/A	-
Amp & Filter Bank Switch Controller	FBSM-01B	TNM system	TM20090002	N/A	-
RF Switch System	FBSR-04C(3G HPF+LNA)	TNM System	S4L1	04/11/2025	Annual
RF Switch System	FBSR-04C(7G HPF+LNA)	TNM System	S4L5	04/11/2025	Annual
RF Switch System	FBSR-04C(LNA)	TNM System	S4L4	04/11/2025	Annual
RF Switch System	FBSR-04C(Thru)	TNM System	S4L6	04/11/2025	Annual
HIGHPASS FILTER	WHKX10-900-1000-15000-40SS	WAINWRIGHT INSTRUMENTS	16	07/24/2025	Annual
LOW NOISE AMPLIFIER	310N	SONOMA Instrument	186169	02/05/2026	Annual
LOW NOISE AMPLIFIER	TK-PA1840H	TESTEK	170011-L	10/11/2025	Annual
Loop Antenna(9 kHz ~ 30 MHz)	FMZB1513	Schwarzbeck	1513-333	03/07/2026	Biennial
Horn Antenna(1 ~ 18 GHz)	BBHA 9120	Schwarzbeck	937	02/07/2027	Biennial
Horn Antenna(15 ~ 40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/20/2026	Biennial
Trilog Broadband Antenna	VULB 9168	Schwarzbeck	9168-0895	08/28/2026	Biennial
DC Power Supply	E3632A	Agilent	MY40010147	08/06/2025	Annual
Spectrum Analyzer(10 Hz ~ 40 GHz)	FSV40	REOHDE & SCHWARZ	101436	02/04/2026	Annual
Base Station	8960 (E5515C)	Agilent	MY48360800	08/05/2025	Annual
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262287701	05/16/2025	Annual
Wideband Radio Communication Tester	MT8000A	Anritsu Corp.	6272613402	08/28/2025	Annual
Signal Analyzer(3 Hz ~ 50 GHz)	N9030A	Agilent	MY49430478	02/12/2026	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	

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

5. MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4:2014.

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

Parameter	Expanded Uncertainty (±kHz)
Occupied Bandwidth	95 (Confidence level about 95 %, *k*=2)
Frequency stability	28 (Confidence level about 95 %, *k*=2)

Parameter	Expanded Uncertainty (±dB)
Block Edge	0.70 (Confidence level about 95 %, *k*=2)
Conducted Spurious Emissions	1.18 (Confidence level about 95 %, *k*=2)
Peak- to- Average Ratio	0.68 (Confidence level about 95 %, *k*=2)
Radiated Power	4.74 (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

Note. The decision rule applies 'simple acceptance'

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(g)	< 43 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions	PASS
Conducted Output Power	§ 2.1046	N/A	See Note1
Frequency stability / variation of ambient temperature	§ 2.1055, § 27.54	Emission must remain in band	PASS

Note:
1. See SAR Report

6.2. Test Condition: Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Effective Radiated Power	§ 27.50(c)(10)	< 3 Watts max. ERP	PASS
Radiated Spurious and Harmonic Emissions	§ 2.1053, § 27.53(g)	< 43 + 10log10 (P[Watts]) for all out-of band emissions	PASS

6.3. Data Referencing

Rule Part	Test item	Data Referencing	Comments
§ 2.1049	Occupied Bandwidth	Y	-
§ 2.1051, § 27.53(g)	Band Edge / Spurious and Harmonic Emissions at Antenna Terminal.	Y	-
§ 2.1055, § 27.54	Frequency stability / variation of ambient temperature	Y	-
§ 27.50(c)(10)	Effective Radiated Power	Y	Spot-check
§ 2.1053, § 27.53(g)	Radiated Spurious and Harmonic Emissions	Y	Spot-check
§ 2.1046	Conducted Output Power	Y	-

Spot-Check Result
1. Data was leveraged from model TM15FNEUJL0 for the certification of TM15FNEUJL1.
2. Please refer to the [FCC Evaluation] Report.

7. SAMPLE CALCULATION

7.1 ERP Sample Calculation

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

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

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

7.2 EIRP Sample Calculation

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

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

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

7.3. Emission Designator

GSM Emission Designator

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

EDGE Emission Designator

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

WCDMA Emission Designator

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

QPSK Modulation

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

QAM Modulation

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

8. TEST DATA

8.1 EFFECTIVE RADIATED POWER

Freq (MHz)	Bandwidth	Modulation	Measured (dBµV/m)	Ant. Factor	C.L (dB)	Total (dBµV/m)	Pol.	Limit W	ERP W	ERP dBm	RB Size	RB Offset
699.7	LTE B12 (1.4 MHz)	QPSK	93.79	26.80	1.10	121.69	H	< 3.00	0.272	24.34	1	0
		16-QAM	93.22	26.80	1.10	121.12	H		0.238	23.77		
		64-QAM	91.19	26.80	1.10	119.09	H		0.149	21.74		
		256-QAM	88.00	26.80	1.10	115.90	H		0.072	18.55		
707.5		QPSK	93.00	27.00	1.10	121.10	H		0.237	23.75	1	5
		16-QAM	92.33	27.00	1.10	120.43	H		0.203	23.08		
		64-QAM	91.10	27.00	1.10	119.20	H		0.153	21.85		
		256-QAM	88.12	27.00	1.10	116.22	H		0.077	18.87		
715.3		QPSK	92.67	27.00	1.10	120.77	H		0.220	23.42	1	0
		16-QAM	91.99	27.00	1.10	120.09	H		0.188	22.74		
		64-QAM	90.44	27.00	1.10	118.54	H		0.132	21.19		
		256-QAM	87.84	27.00	1.10	115.94	H		0.072	18.59		

Freq (MHz)	Bandwidth	Modulation	Measured (dBµV/m)	Ant. Factor	C.L (dB)	Total (dBµV/m)	Pol.	Limit W	ERP W	ERP dBm	RB Size	RB Offset
700.5	LTE B12 (3 MHz)	QPSK	93.93	26.80	1.10	121.83	H	< 3.00	0.281	24.48	1	0
		16-QAM	93.23	26.80	1.10	121.13	H		0.239	23.78		
		64-QAM	92.08	26.80	1.10	119.98	H		0.183	22.63		
		256-QAM	89.02	26.80	1.10	116.92	H		0.091	19.57		
707.5		QPSK	93.03	27.00	1.10	121.13	H		0.239	23.78	1	0
		16-QAM	92.47	27.00	1.10	120.57	H		0.210	23.22		
		64-QAM	91.37	27.00	1.10	119.47	H		0.163	22.12		
		256-QAM	88.37	27.00	1.10	116.47	H		0.082	19.12		
714.5		QPSK	92.62	27.00	1.10	120.72	H		0.217	23.37	1	14
		16-QAM	91.97	27.00	1.10	120.07	H		0.187	22.72		
		64-QAM	90.22	27.00	1.10	118.32	H		0.125	20.97		
		256-QAM	87.79	27.00	1.10	115.89	H		0.071	18.54		

Freq (MHz)	Bandwidth	Modulation	Measured (dBμV/m)	Ant. Factor	C.L (dB)	Total (dBμV/m)	Pol.	Limit W	ERP W	ERP dBm	RB Size	RB Offset
701.5	LTE B12/17 (5 MHz)	QPSK	93.32	26.80	1.10	121.22	H	< 3.00	0.244	23.87	1	24
		16-QAM	92.74	26.80	1.10	120.64	H		0.213	23.29		
		64-QAM	91.03	26.80	1.10	118.93	H		0.144	21.58		
		256-QAM	88.57	26.80	1.10	116.47	H		0.082	19.12		
707.5		QPSK	92.91	27.00	1.10	121.01	H		0.232	23.66	1	12
		16-QAM	92.30	27.00	1.10	120.40	H		0.202	23.05		
		64-QAM	91.12	27.00	1.10	119.22	H		0.154	21.87		
		256-QAM	88.24	27.00	1.10	116.34	H		0.079	18.99		
713.5		QPSK	92.76	27.00	1.10	120.86	H		0.224	23.51	1	0
		16-QAM	92.01	27.00	1.10	120.11	H		0.189	22.76		
		64-QAM	90.94	27.00	1.10	119.04	H		0.148	21.69		
		256-QAM	87.92	27.00	1.10	116.02	H		0.074	18.67		

Freq (MHz)	Bandwidth	Modulation	Measured (dBμV/m)	Ant. Factor	C.L (dB)	Total (dBμV/m)	Pol.	Limit W	ERP W	ERP dBm	RB Size	RB Offset
704.0	LTE B12/17 (10 MHz)	QPSK	93.80	26.80	1.10	121.70	H	< 3.00	0.272	24.35	1	0
		16-QAM	93.32	26.80	1.10	121.22	H		0.244	23.87		
		64-QAM	91.97	26.80	1.10	119.87	H		0.179	22.52		
		256-QAM	88.94	26.80	1.10	116.84	H		0.089	19.49		
707.5		QPSK	93.47	27.00	1.10	121.57	H		0.264	24.22	1	0
		16-QAM	92.78	27.00	1.10	120.88	H		0.225	23.53		
		64-QAM	91.03	27.00	1.10	119.13	H		0.151	21.78		
		256-QAM	88.47	27.00	1.10	116.57	H		0.084	19.22		
711.0		QPSK	93.04	27.00	1.10	121.14	H		0.239	23.79	1	0
		16-QAM	92.42	27.00	1.10	120.52	H		0.207	23.17		
		64-QAM	91.25	27.00	1.10	119.35	H		0.158	22.00		
		256-QAM	88.25	27.00	1.10	116.35	H		0.079	19.00		

8.2 RADIATED SPURIOUS EMISSIONS

▣ MODE: LTE B12

▣ MODULATION SIGNAL: 3 MHz QPSK

▣ DISTANCE: 3 meters

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	RB	
									Size	Offset
23025 (700.5)	1,401.00	-50.91	7.77	-63.92	1.85	H	-58.00	-13.00	1	0
	2,101.50	-52.15	9.53	-63.39	2.34	H	-56.20	-13.00		
	2,802.00	-52.62	10.62	-63.06	2.66	V	-55.10	-13.00		
	3,502.50	-54.85	11.59	-63.34	3.05	V	-54.80	-13.00		
	4,203.00	-54.24	11.71	-59.82	3.45	V	-51.56	-13.00		
	4,903.50	-54.99	11.34	-56.55	3.63	H	-48.84	-13.00		
23095 (707.5)	1,415.00	-49.94	7.84	-62.97	1.87	H	-57.00	-13.00	1	0
	2,122.50	-51.18	9.36	-62.82	2.28	H	-55.74	-13.00		
	2,830.00	-51.65	10.73	-61.88	2.70	V	-53.85	-13.00		
	3,537.50	-53.88	11.64	-61.71	3.06	V	-53.13	-13.00		
	4,245.00	-53.27	11.68	-59.14	3.35	V	-50.81	-13.00		
	4,952.50	-54.02	11.26	-55.60	3.69	H	-48.03	-13.00		
23165 (714.5)	1,429.00	-50.27	7.90	-63.14	1.87	H	-57.11	-13.00	1	14
	2,143.50	-51.51	9.22	-63.12	2.27	H	-56.17	-13.00		
	2,858.00	-51.98	10.78	-62.31	2.76	V	-54.29	-13.00		
	3,572.50	-53.49	11.72	-61.41	3.08	V	-52.77	-13.00		
	4,287.00	-52.88	11.57	-58.32	3.40	V	-50.15	-13.00		
	5,001.50	-53.63	11.15	-54.84	3.71	H	-47.40	-13.00		

8.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)
12	1.4 MHz	707.5	QPSK	Full RB		5.32
			16-QAM			6.15
			64-QAM			6.67
			256-QAM			6.65
	3 MHz		QPSK			5.20
			16-QAM			6.06
			64-QAM			6.70
			256-QAM			6.56
12/17	5 MHz		QPSK			5.23
			16-QAM			6.05
			64-QAM			6.65
			256-QAM			6.58
	10 MHz		QPSK			5.28
			16-QAM			6.03
			64-QAM			6.64
			256-QAM			6.55

Note:

1. Plots of the EUT's P.A.P.R are shown Page 46 ~ 61.

2. P.A.P.R is not required. These values are reported for information only.

8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
12	1.4 MHz	707.5	QPSK	6	0	1.0936
			16-QAM			1.0873
			64-QAM			1.0901
			256-QAM			1.0852
	3 MHz		QPSK	15		2.7039
			16-QAM			2.6887
			64-QAM			2.6944
			256-QAM			2.6979
12(17)	5 MHz		QPSK	25		4.4976
			16-QAM			4.4818
			64-QAM			4.4992
			256-QAM			4.5024
	10 MHz		QPSK	50		8.9536
			16-QAM			8.9680
			64-QAM			8.9667
			256-QAM			8.9672

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 62 ~ 77.

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)
12	1.4	699.70	3.7787	26.600	-56.658	-30.058	-13.00
		707.50	5.2343	27.520	-55.812	-28.292	
		715.30	5.9921	27.520	-56.632	-29.112	
	3	700.50	3.8286	26.600	-56.443	-29.843	
		707.50	5.9622	27.520	-57.274	-29.754	
		714.50	4.7059	26.600	-55.198	-28.598	
12(17)	5	701.50	9.9601	27.520	-56.713	-29.193	
		707.50	3.7787	26.600	-55.076	-28.476	
		713.50	9.7109	27.520	-56.836	-29.316	
	10	704.00	3.7887	26.600	-56.653	-30.053	
		707.50	4.0778	26.600	-56.613	-30.013	
		711.00	4.0978	26.600	-56.232	-29.632	

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 78 ~ 89.

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	26.08
1 – 5	26.60
5 – 10	27.52
10 – 15	29.12
15 – 20	31.71
Above 20(26.5)	32.35

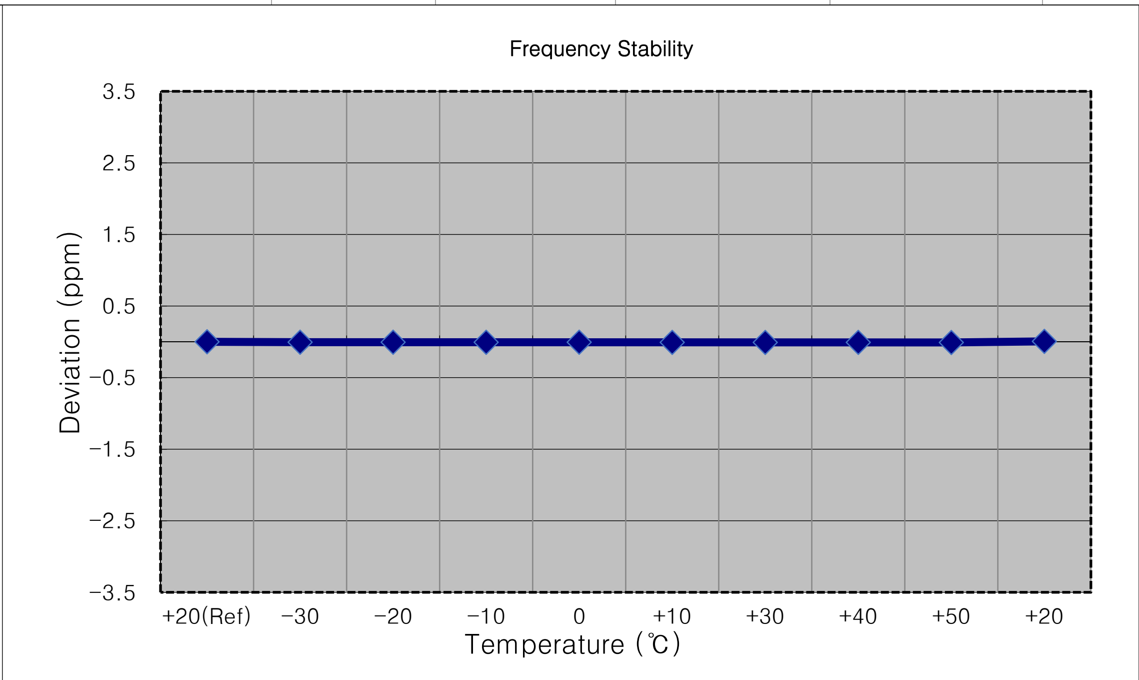
8.6 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 90 ~ 117.

8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

- ▣ MODE: LTE B12
- ▣ OPERATING FREQUENCY: 699,700,000 Hz
- ▣ CHANNEL: 23017 (1.4 MHz)
- ▣ REFERENCE VOLTAGE: 12.000 VDC
- ▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	12.000	+20(Ref)	699 699 997	0.0	0.000 000	0.000
100 %		-30	699 699 993	-4.0	-0.000 001	-0.006
100 %		-20	699 699 992	-4.3	-0.000 001	-0.006
100 %		-10	699 699 992	-4.7	-0.000 001	-0.007
100 %		0	699 699 993	-3.9	-0.000 001	-0.006
100 %		+10	699 699 991	-5.5	-0.000 001	-0.008
100 %		+30	699 699 991	-6.0	-0.000 001	-0.009
100 %		+40	699 699 991	-5.8	-0.000 001	-0.008
100 %		+50	699 699 990	-6.4	-0.000 001	-0.009
115%		+20	699 699 993	-3.3	0.000 000	-0.005
85%		+20	699 700 001	4.2	0.000 001	0.006



▣ MODE: LTE B12

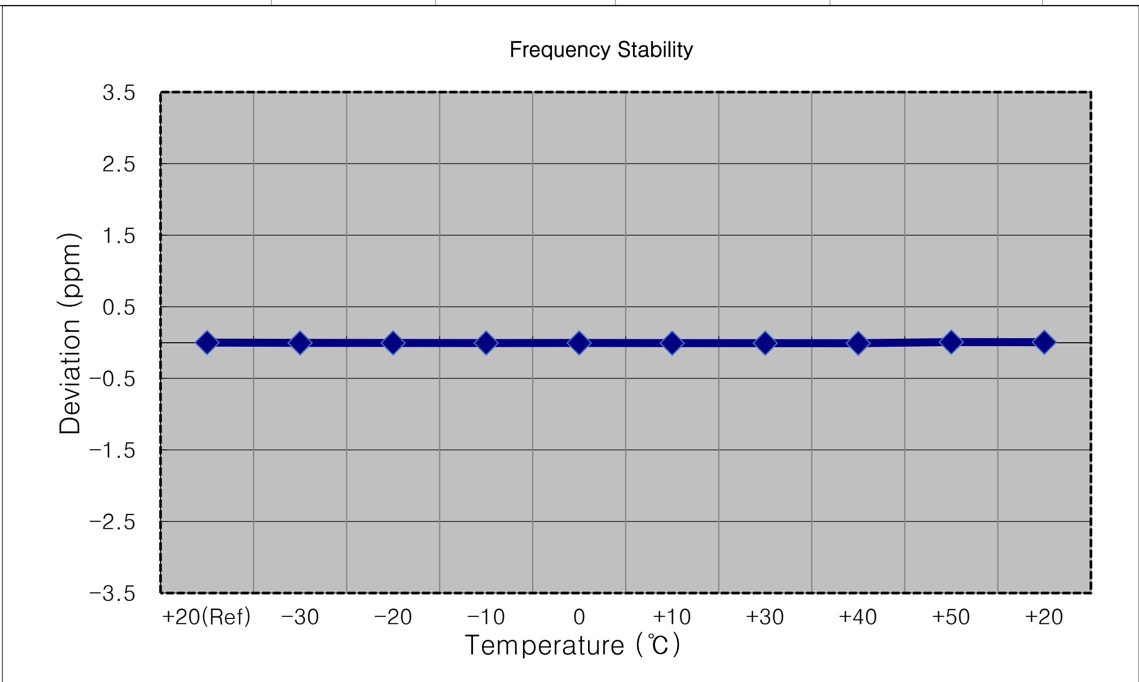
▣ OPERATING FREQUENCY: 700,500,000 Hz

▣ CHANNEL: 23025 (3 MHz)

▣ REFERENCE VOLTAGE: 12.000 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	12.000	+20(Ref)	700 499 998	0.0	0.000 000	0.000
100 %		-30	700 499 994	-3.1	0.000 000	-0.004
100 %		-20	700 499 994	-3.7	-0.000 001	-0.005
100 %		-10	700 499 993	-4.6	-0.000 001	-0.007
100 %		0	700 499 994	-3.9	-0.000 001	-0.006
100 %		+10	700 499 992	-5.6	-0.000 001	-0.008
100 %		+30	700 499 991	-6.1	-0.000 001	-0.009
100 %		+40	700 499 991	-6.4	-0.000 001	-0.009
100 %		+50	700 500 002	4.4	0.000 001	0.006
115%		+20	700 499 995	-2.9	0.000 000	-0.004
85%		+20	700 500 002	4.1	0.000 001	0.006



▣ MODE: LTE B12(17)

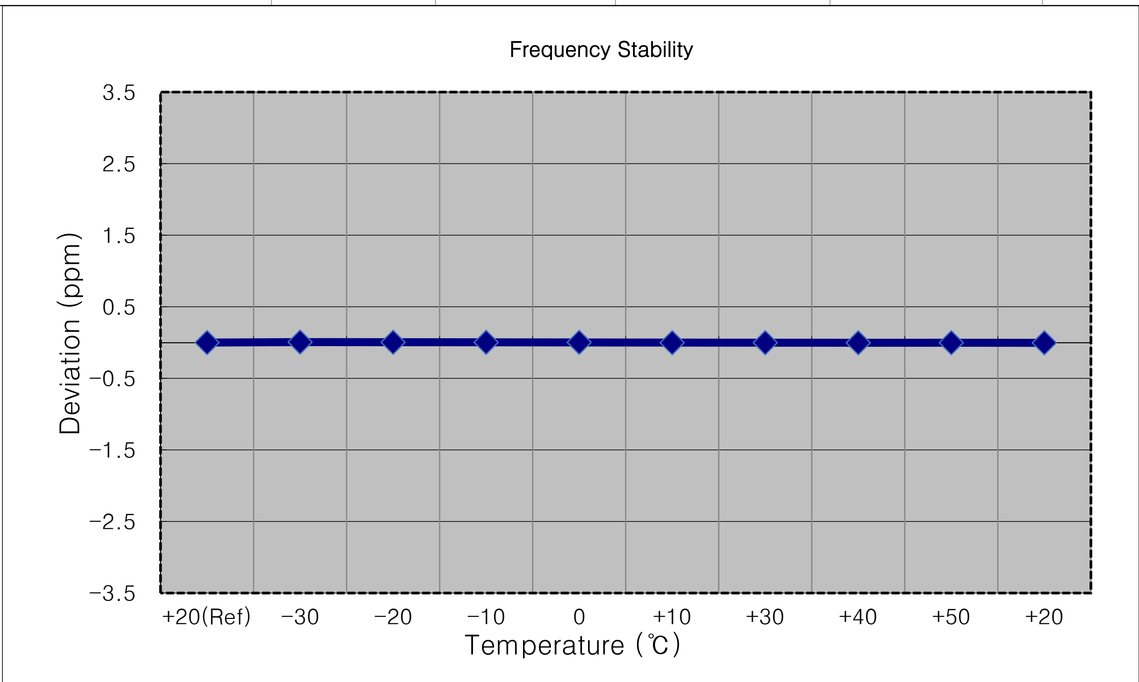
▣ OPERATING FREQUENCY: 701,500,000 Hz

▣ CHANNEL: 23035 (5 MHz)

▣ REFERENCE VOLTAGE: 12.000 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	12.000	+20(Ref)	701 500 005	0.0	0.000 000	0.000
100 %		-30	701 500 009	4.6	0.000 001	0.007
100 %		-20	701 500 008	3.0	0.000 000	0.004
100 %		-10	701 500 007	2.3	0.000 000	0.003
100 %		0	701 500 007	2.2	0.000 000	0.003
100 %		+10	701 500 003	-1.4	0.000 000	-0.002
100 %		+30	701 500 004	-1.2	0.000 000	-0.002
100 %		+40	701 500 003	-2.0	0.000 000	-0.003
100 %		+50	701 500 003	-1.5	0.000 000	-0.002
115%		+20	701 500 003	-1.7	0.000 000	-0.002
85%		+20	701 500 008	3.4	0.000 000	0.005



▣ MODE: LTE B12(17)

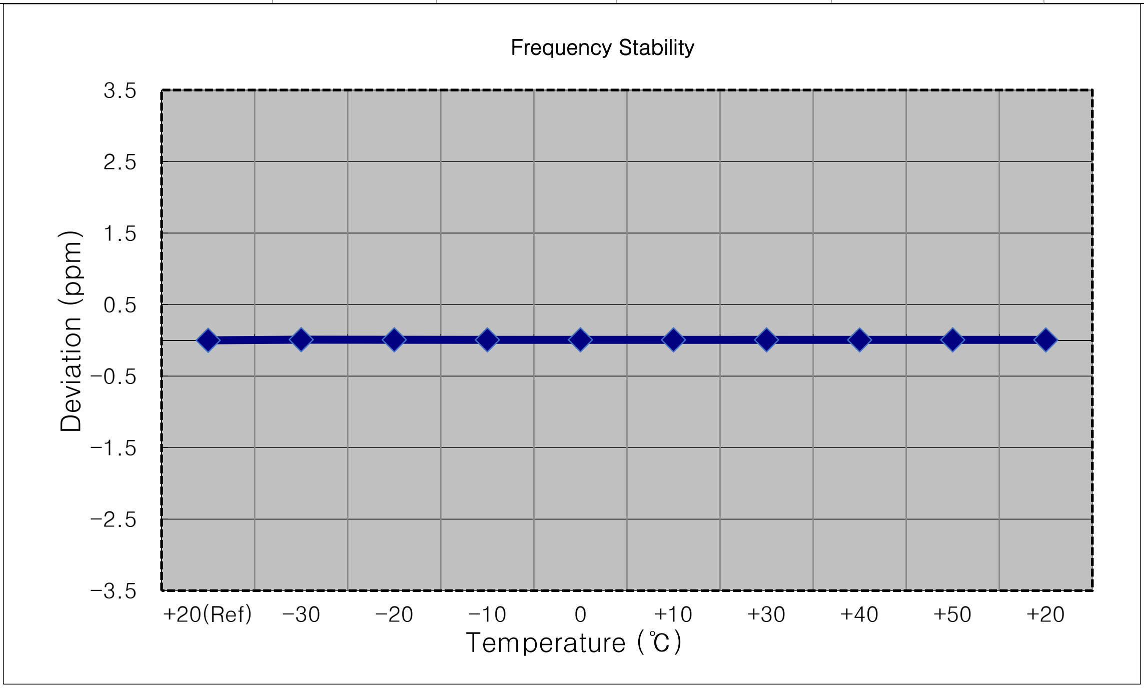
▣ OPERATING FREQUENCY: 704,000,000 Hz

▣ CHANNEL: 23060 (10 MHz)

▣ REFERENCE VOLTAGE: 12.000 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	12.000	+20(Ref)	704 000 007	0.0	0.000 000	0.000
100 %		-30	704 000 013	6.3	0.000 001	0.009
100 %		-20	704 000 011	4.6	0.000 001	0.007
100 %		-10	704 000 011	4.1	0.000 001	0.006
100 %		0	704 000 012	4.9	0.000 001	0.007
100 %		+10	704 000 011	4.2	0.000 001	0.006
100 %		+30	704 000 011	4.1	0.000 001	0.006
100 %		+40	704 000 011	3.7	0.000 001	0.005
100 %		+50	704 000 011	4.2	0.000 001	0.006
115%		+20	704 000 004	-2.4	0.000 000	-0.003
85%		+20	704 000 010	3.6	0.000 001	0.005



▣ MODE: LTE B12

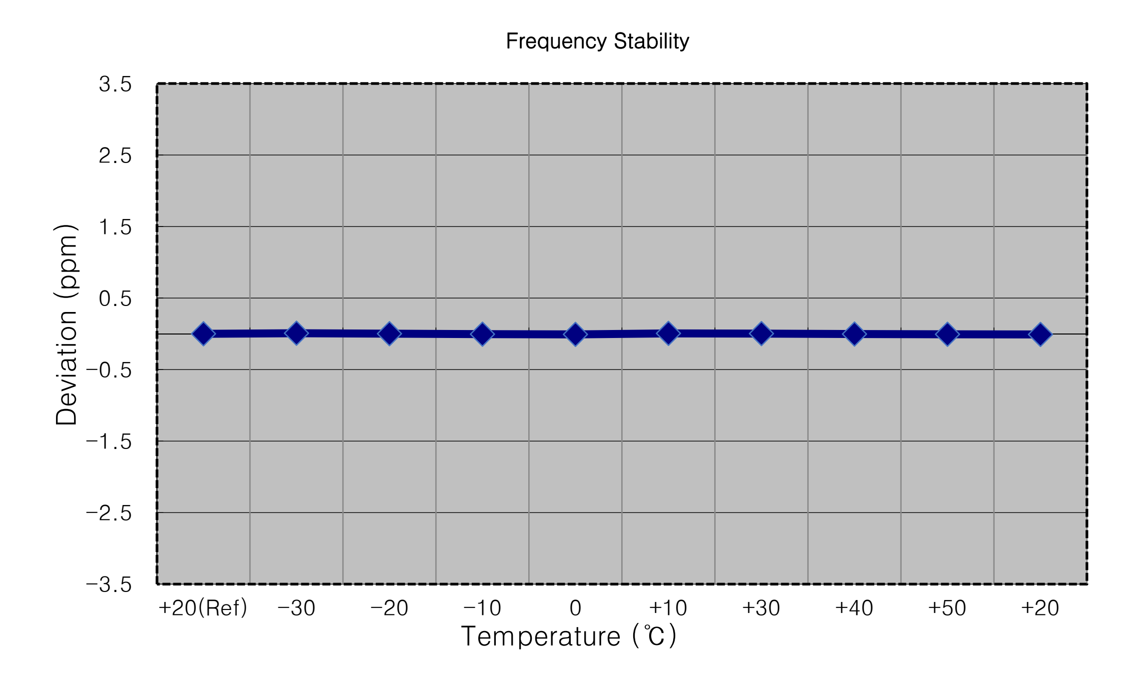
▣ OPERATING FREQUENCY: 707,500,000 Hz

▣ CHANNEL: 23095 (1.4 MHz)

▣ REFERENCE VOLTAGE: 12.000 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(℃)	(Hz)	(Hz)	(%)	
100 %	12.000	+20(Ref)	707 500 002	0.0	0.000 000	0.000
100 %		-30	707 500 008	5.8	0.000 001	0.008
100 %		-20	707 500 003	1.4	0.000 000	0.002
100 %		-10	707 499 999	-3.5	0.000 000	-0.005
100 %		0	707 499 996	-5.9	-0.000 001	-0.008
100 %		+10	707 500 006	4.1	0.000 001	0.006
100 %		+30	707 500 004	2.1	0.000 000	0.003
100 %		+40	707 500 000	-2.5	0.000 000	-0.004
100 %		+50	707 499 997	-4.7	-0.000 001	-0.007
115%		+20	707 499 999	-3.1	0.000 000	-0.004
85%		+20	707 500 007	4.5	0.000 001	0.006



▣ MODE: LTE B12

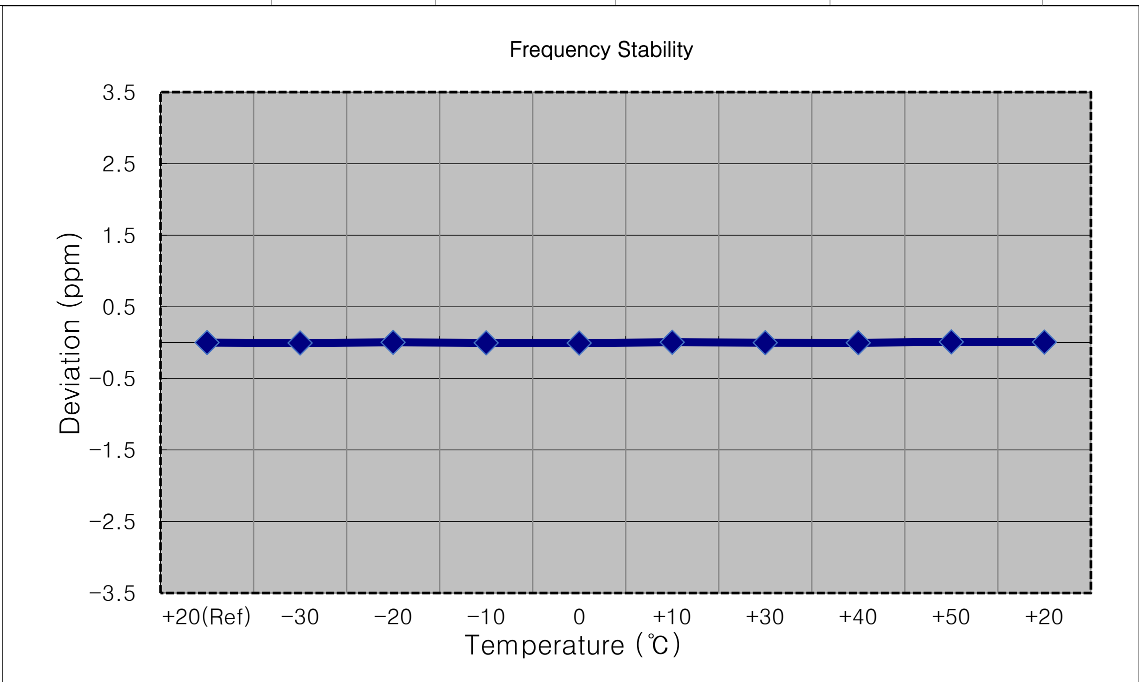
▣ OPERATING FREQUENCY: 707,500,000 Hz

▣ CHANNEL: 23095 (3 MHz)

▣ REFERENCE VOLTAGE: 12.000 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	12.000	+20(Ref)	707 500 004	0.0	0.000 000	0.000
100 %		-30	707 500 000	-4.1	-0.000 001	-0.006
100 %		-20	707 500 006	2.3	0.000 000	0.003
100 %		-10	707 500 001	-2.8	0.000 000	-0.004
100 %		0	707 499 999	-4.8	-0.000 001	-0.007
100 %		+10	707 500 007	3.1	0.000 000	0.004
100 %		+30	707 500 003	-1.2	0.000 000	-0.002
100 %		+40	707 500 002	-2.2	0.000 000	-0.003
100 %		+50	707 500 010	6.5	0.000 001	0.009
115%		+20	707 500 001	-2.8	0.000 000	-0.004
85%		+20	707 500 007	3.5	0.000 001	0.005



▣ MODE: LTE B12(17)

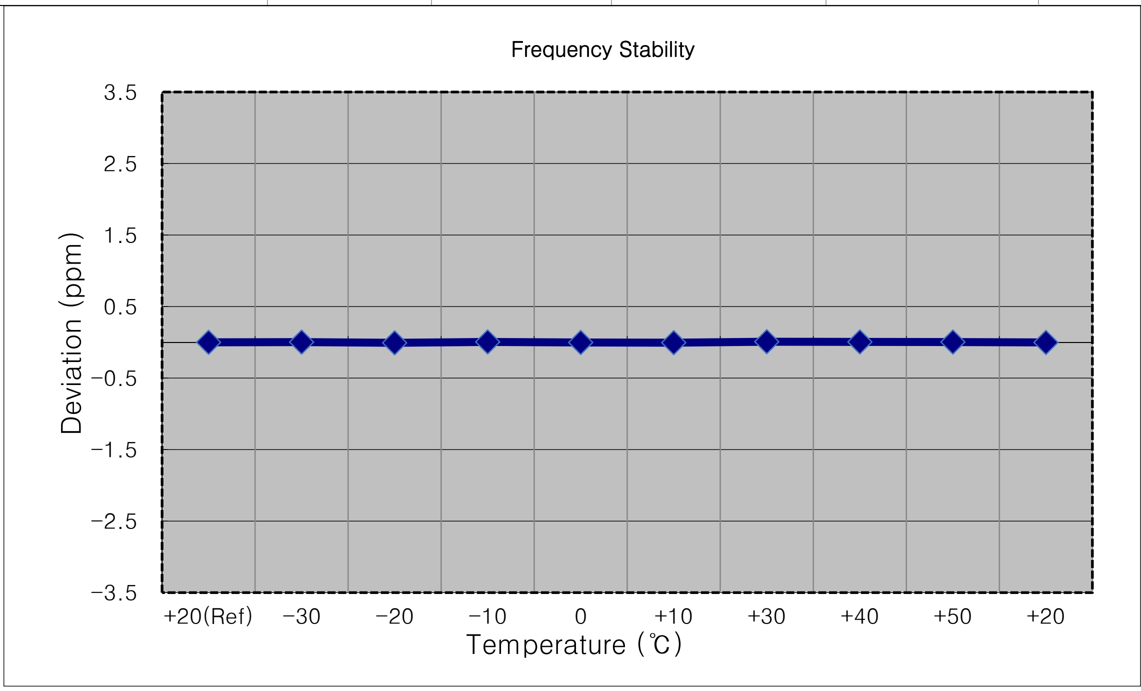
▣ OPERATING FREQUENCY: 707,500,000 Hz

▣ CHANNEL: 23095 (5 MHz)

▣ REFERENCE VOLTAGE: 12.000 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (℃)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	12.000	+20(Ref)	707 500 006	0.0	0.000 000	0.000
100 %		-30	707 500 008	2.0	0.000 000	0.003
100 %		-20	707 500 001	-4.9	-0.000 001	-0.007
100 %		-10	707 500 010	3.7	0.000 001	0.005
100 %		0	707 500 005	-1.5	0.000 000	-0.002
100 %		+10	707 500 002	-3.8	-0.000 001	-0.005
100 %		+30	707 500 012	5.9	0.000 001	0.008
100 %		+40	707 500 010	4.0	0.000 001	0.006
100 %		+50	707 500 009	2.7	0.000 000	0.004
115%		+20	707 500 004	-2.2	0.000 000	-0.003
85%		+20	707 500 010	3.8	0.000 001	0.005



▣ MODE: LTE B12(17)

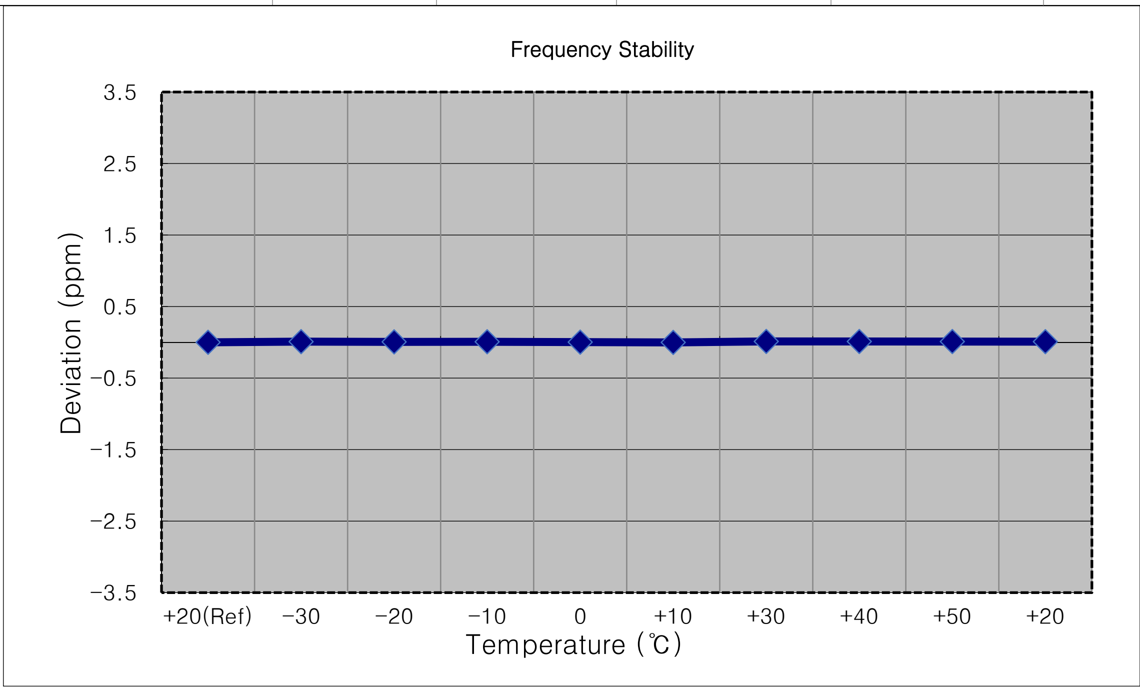
▣ OPERATING FREQUENCY: 707,500,000 Hz

▣ CHANNEL: 23095 (10 MHz)

▣ REFERENCE VOLTAGE: 12.000 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	12.000	+20(Ref)	707 499 998	0.0	0.000 000	0.000
100 %		-30	707 500 004	6.6	0.000 001	0.009
100 %		-20	707 500 002	4.3	0.000 001	0.006
100 %		-10	707 500 003	5.3	0.000 001	0.007
100 %		0	707 500 000	1.9	0.000 000	0.003
100 %		+10	707 499 997	-1.0	0.000 000	-0.001
100 %		+30	707 500 006	8.6	0.000 001	0.012
100 %		+40	707 500 006	8.2	0.000 001	0.012
100 %		+50	707 500 005	7.5	0.000 001	0.011
115%		+20	707 499 996	-2.1	0.000 000	-0.003
85%		+20	707 500 004	6.4	0.000 001	0.009



▣ MODE: LTE B12

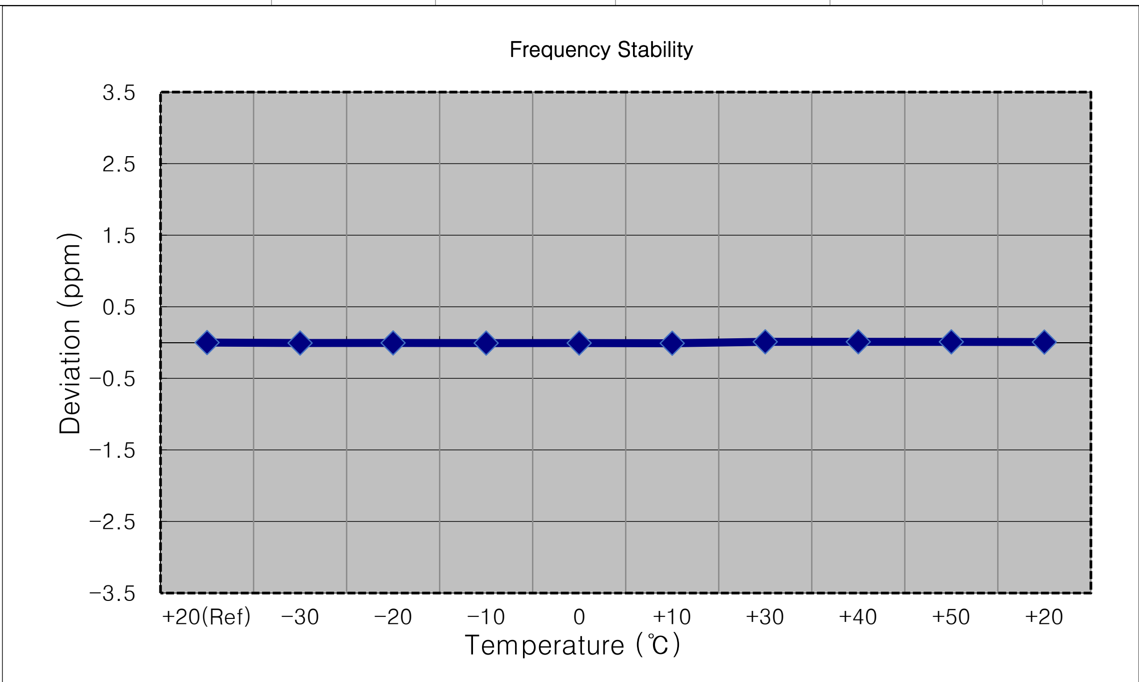
▣ OPERATING FREQUENCY: 715,300,000 Hz

▣ CHANNEL: 23173 (1.4 MHz)

▣ REFERENCE VOLTAGE: 12.000 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	12.000	+20(Ref)	715 300 003	0.0	0.000 000	0.000
100 %		-30	715 299 999	-4.5	-0.000 001	-0.006
100 %		-20	715 300 000	-3.7	-0.000 001	-0.005
100 %		-10	715 299 998	-5.3	-0.000 001	-0.007
100 %		0	715 299 999	-4.7	-0.000 001	-0.007
100 %		+10	715 299 996	-7.0	-0.000 001	-0.010
100 %		+30	715 300 011	7.5	0.000 001	0.010
100 %		+40	715 300 011	7.5	0.000 001	0.010
100 %		+50	715 300 010	7.0	0.000 001	0.010
115%		+20	715 300 000	-3.0	0.000 000	-0.004
85%		+20	715 300 007	3.7	0.000 001	0.005



▣ MODE: LTE B12

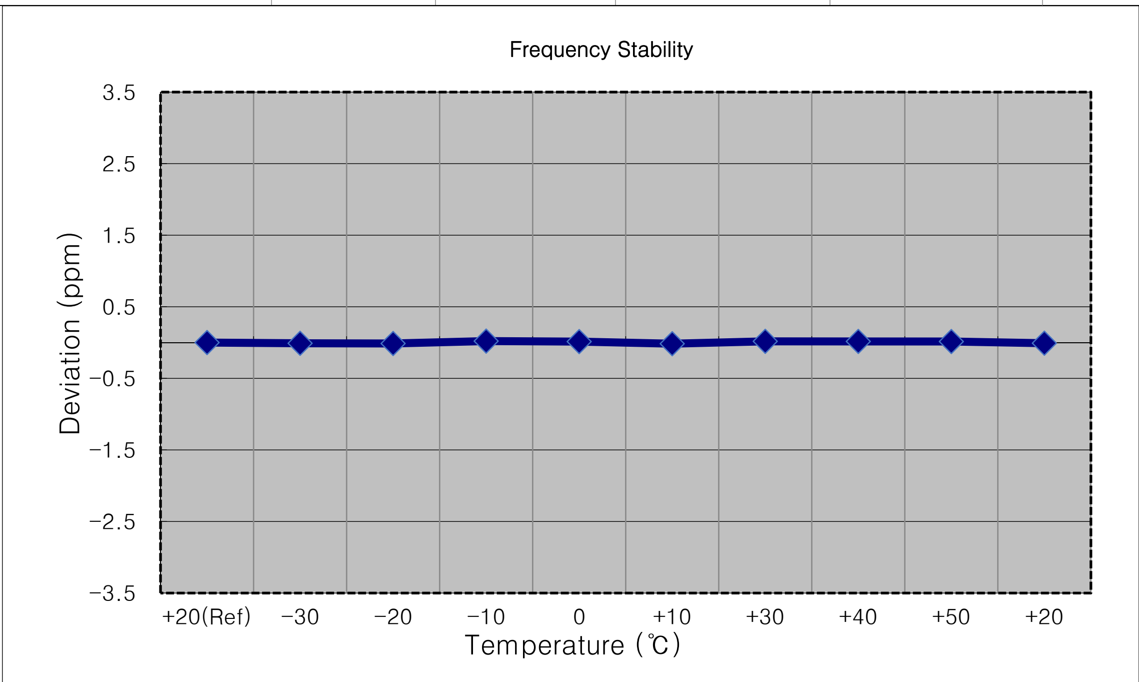
▣ OPERATING FREQUENCY: 714,500,000 Hz

▣ CHANNEL: 23165 (3 MHz)

▣ REFERENCE VOLTAGE: 12.000 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	ppm
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	
100 %	12.000	+20(Ref)	714 500 009	0.0	0.000 000	0.000
100 %		-30	714 500 001	-7.3	-0.000 001	-0.010
100 %		-20	714 499 999	-9.3	-0.000 001	-0.013
100 %		-10	714 500 023	14.7	0.000 002	0.021
100 %		0	714 500 018	9.7	0.000 001	0.014
100 %		+10	714 499 997	-11.4	-0.000 002	-0.016
100 %		+30	714 500 021	12.3	0.000 002	0.017
100 %		+40	714 500 020	11.1	0.000 002	0.016
100 %		+50	714 500 019	10.3	0.000 001	0.014
115%		+20	714 500 006	-2.7	0.000 000	-0.004
85%		+20	714 500 014	4.8	0.000 001	0.007



▣ MODE: LTE B12(17)

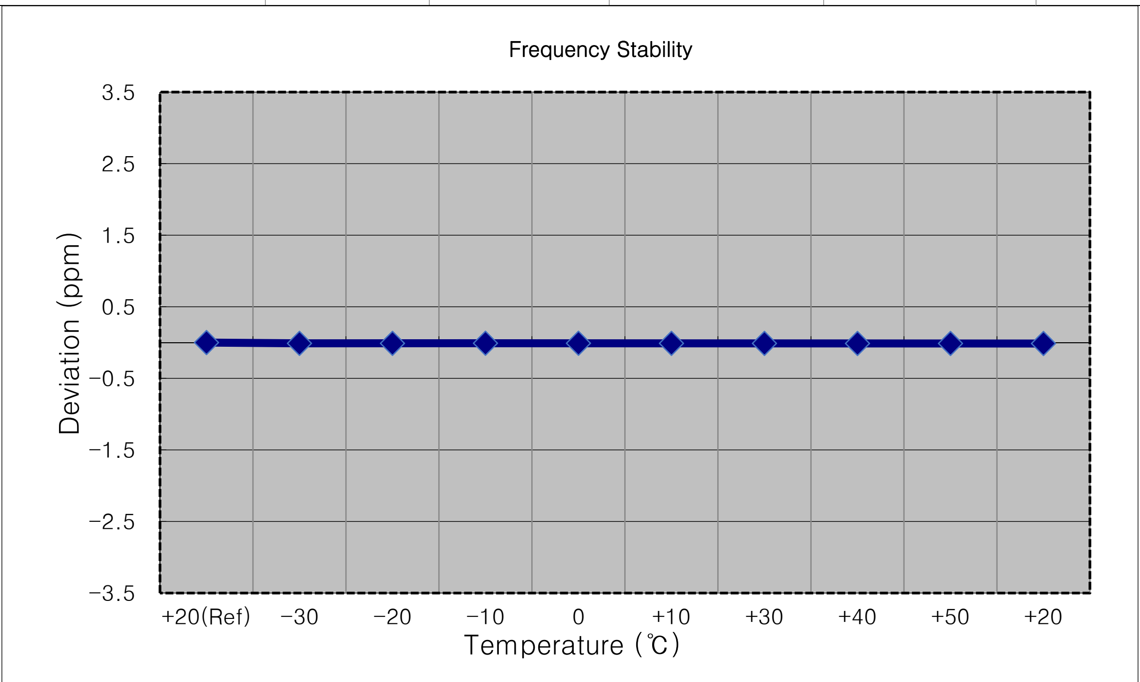
▣ OPERATING FREQUENCY: 713,500,000 Hz

▣ CHANNEL: 23155 (5 MHz)

▣ REFERENCE VOLTAGE: 12.000 VDC

▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	12.000	+20(Ref)	713 499 994	0.0	0.000 000	0.000
100 %		-30	713 499 986	-7.8	-0.000 001	-0.011
100 %		-20	713 499 987	-7.6	-0.000 001	-0.011
100 %		-10	713 499 987	-6.9	-0.000 001	-0.010
100 %		0	713 499 987	-6.7	-0.000 001	-0.009
100 %		+10	713 499 986	-7.7	-0.000 001	-0.011
100 %		+30	713 499 986	-8.4	-0.000 001	-0.012
100 %		+40	713 499 985	-8.8	-0.000 001	-0.012
100 %		+50	713 499 985	-9.0	-0.000 001	-0.013
115%		+20	713 499 990	-4.5	-0.000 001	-0.006
85%		+20	713 499 999	4.6	0.000 001	0.007



▣ MODE: LTE B12(17)

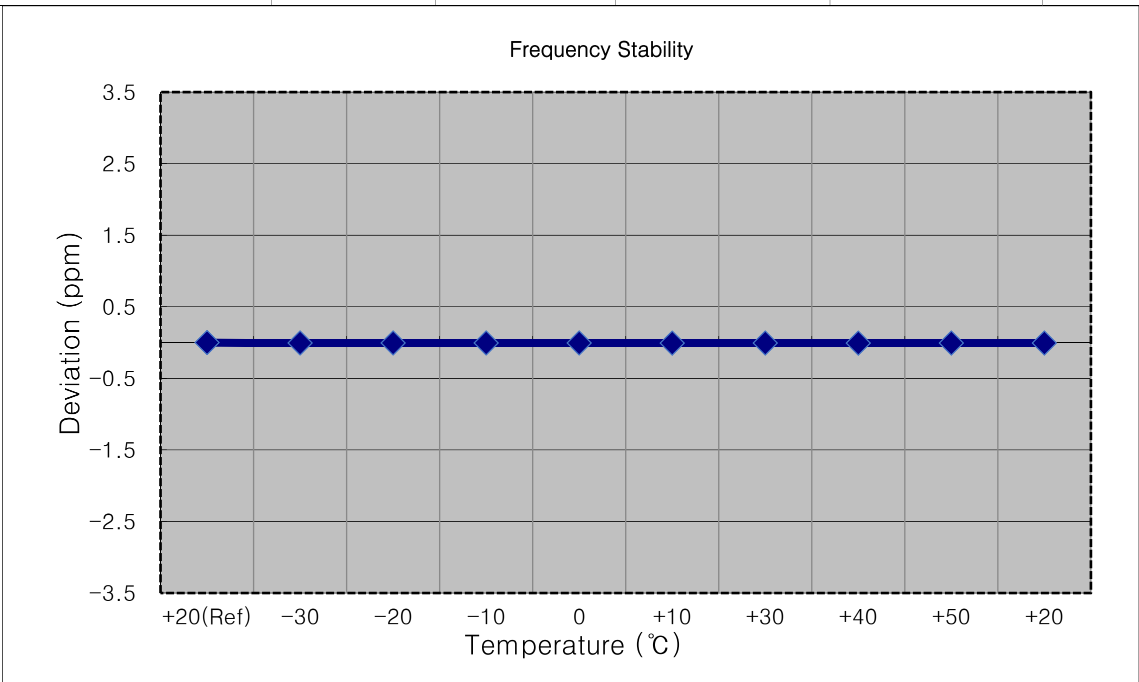
▣ OPERATING FREQUENCY: 711,000,000 Hz

▣ CHANNEL: 23130 (10 MHz)

▣ REFERENCE VOLTAGE: 12.000 VDC

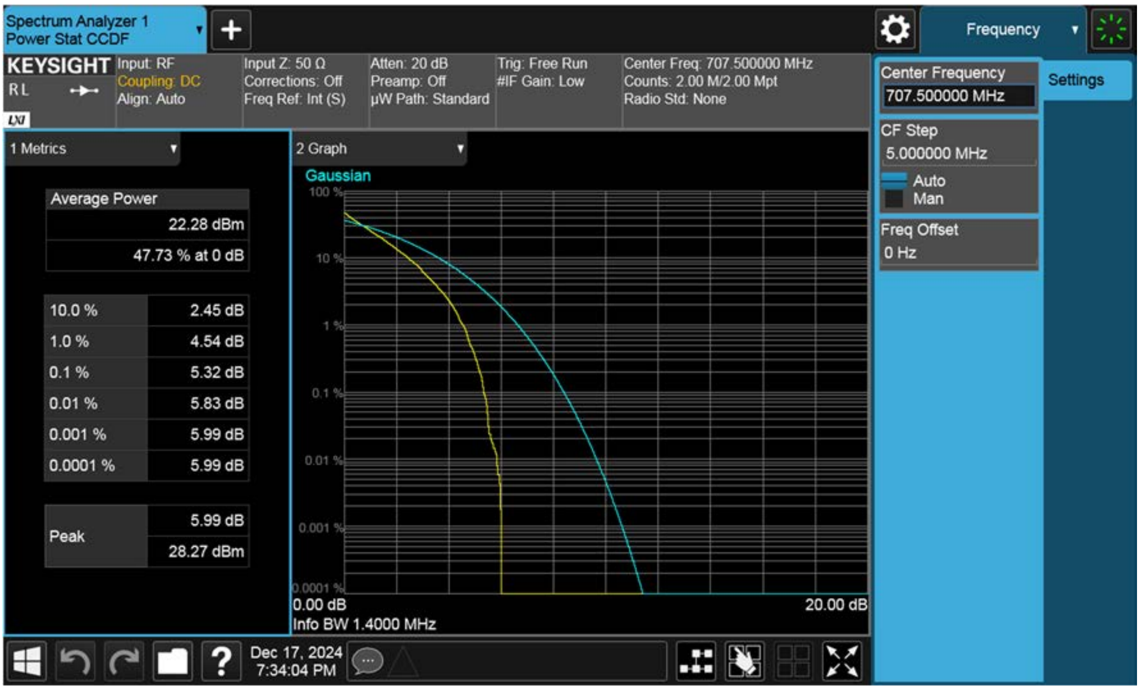
▣ DEVIATION LIMIT: Emission must remain in band

Voltage (%)	Power (VDC)	Temp. (°C)	Frequency (Hz)	Frequency Error (Hz)	Deviation (%)	ppm
100 %	12.000	+20(Ref)	710 999 995	0.0	0.000 000	0.000
100 %		-30	710 999 991	-4.2	-0.000 001	-0.006
100 %		-20	710 999 991	-4.0	-0.000 001	-0.006
100 %		-10	710 999 991	-4.0	-0.000 001	-0.006
100 %		0	710 999 992	-3.9	-0.000 001	-0.005
100 %		+10	710 999 990	-5.1	-0.000 001	-0.007
100 %		+30	710 999 991	-4.5	-0.000 001	-0.006
100 %		+40	710 999 990	-5.0	-0.000 001	-0.007
100 %		+50	710 999 991	-4.8	-0.000 001	-0.007
115%		+20	710 999 994	-1.8	0.000 000	-0.003
85%		+20	710 999 999	3.6	0.000 001	0.005



9. TEST PLOTS

LTE B12_1.4M_PAR_Mid_QPSK_FullRB



LTE B12_1.4M_PAR_Mid_16QAM_FullRB

LTE B12_1.4M_PAR_Mid_64QAM_FullRB

LTE B12_1.4M_PAR_Mid_256QAM_FullRB

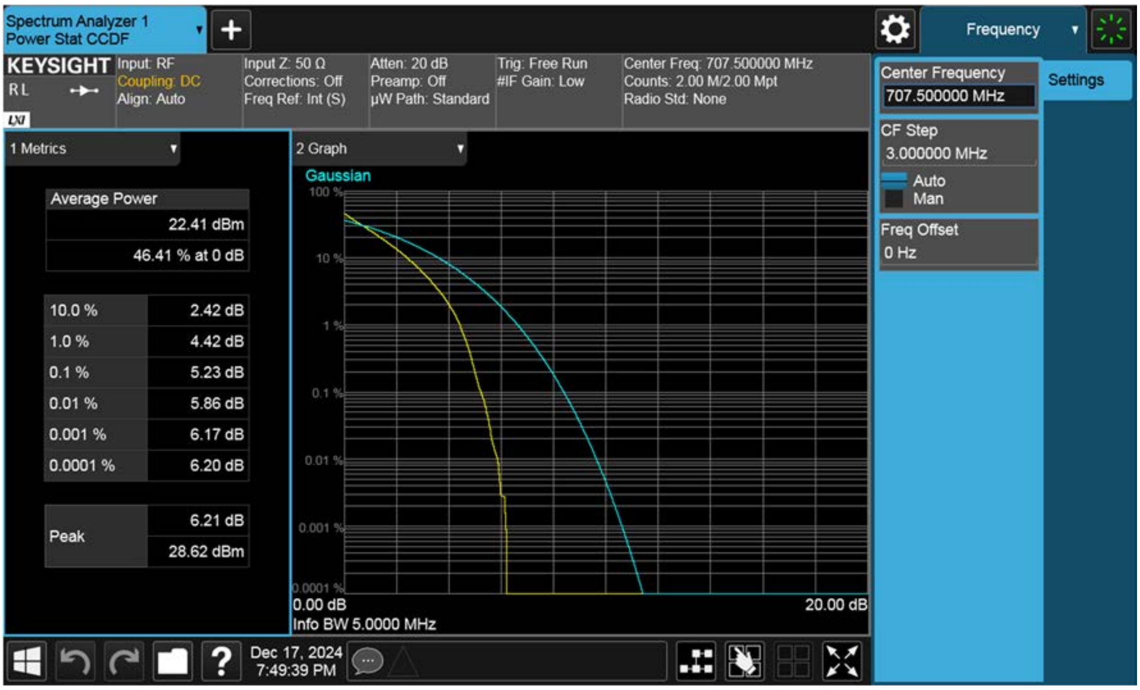
LTE B12_3 M_PAR_Mid_QPSK_FullRB

LTE B12_3 M_PAR_Mid_16QAM_FullRB

LTE B12_3 M_PAR_Mid_64QAM_FullRB

LTE B12_3 M_PAR_Mid_256QAM_FullRB

LTE B12_5 M_PAR_Mid_QPSK_FullRB

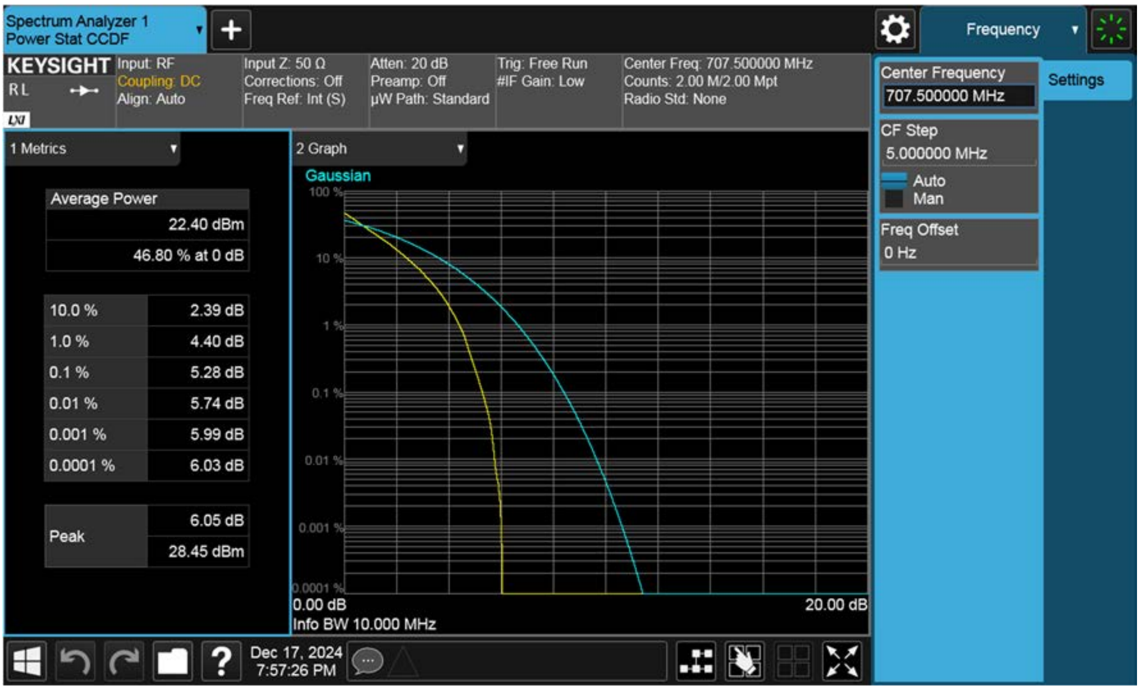


LTE B12_5 M_PAR_Mid_16QAM_FullRB

LTE B12_5 M_PAR_Mid_64QAM_FullRB

LTE B12_5 M_PAR_Mid_256QAM_FullRB

LTE B12_10 M_PAR_Mid_QPSK_FullRB



LTE B12_10 M_PAR_Mid_16QAM_FullRB

LTE B12_10 M_PAR_Mid_64QAM_FullRB

LTE B12_10 M_PAR_Mid_256QAM_FullRB

LTE B12_1.4M_OBW_Mid_QPSK_FullRB

LTE B12_1.4M_OBW_Mid_16QAM_FullRB

LTE B12_1.4M_OBW_Mid_64QAM_FullRB

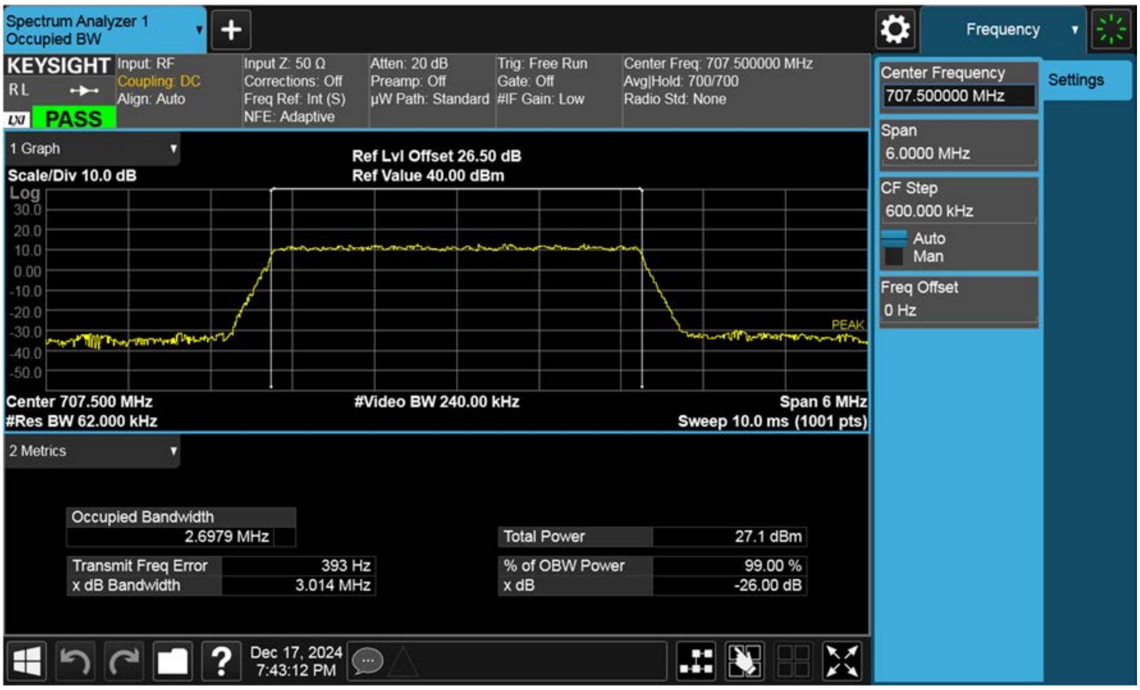
LTE B12_1.4M_OBW_Mid_256QAM_FullRB

LTE B12_3 M_OBW_Mid_QPSK_FullRB

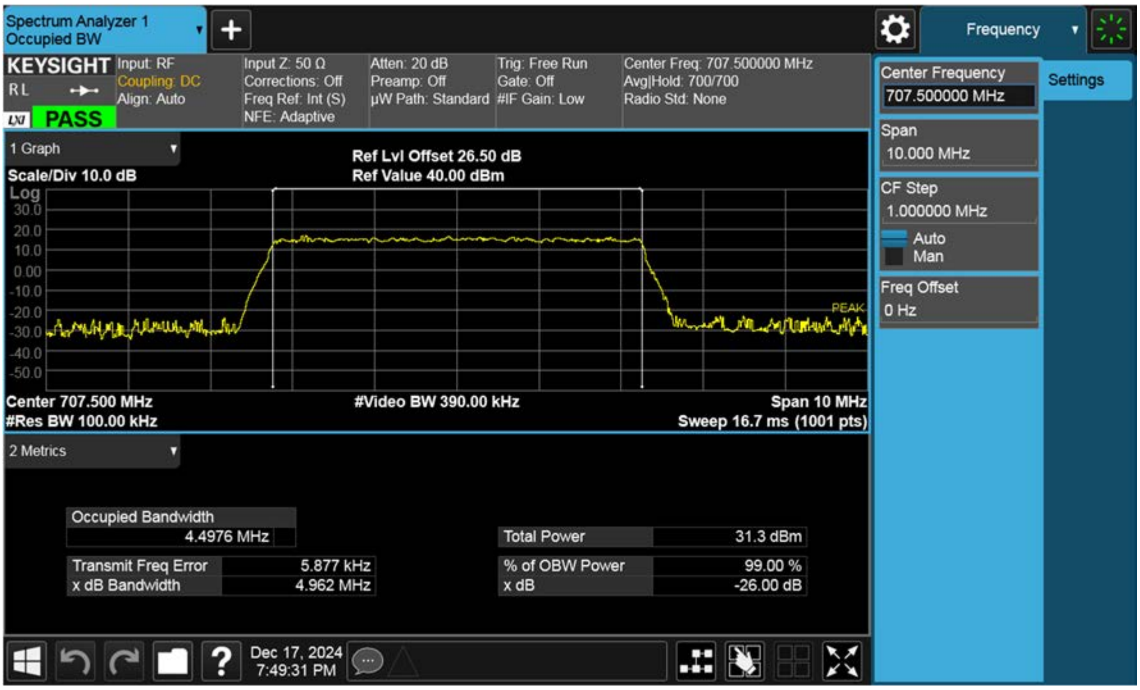
LTE B12_3 M_OBW_Mid_16QAM_FullRB

LTE B12_3 M_OBW_Mid_64QAM_FullRB

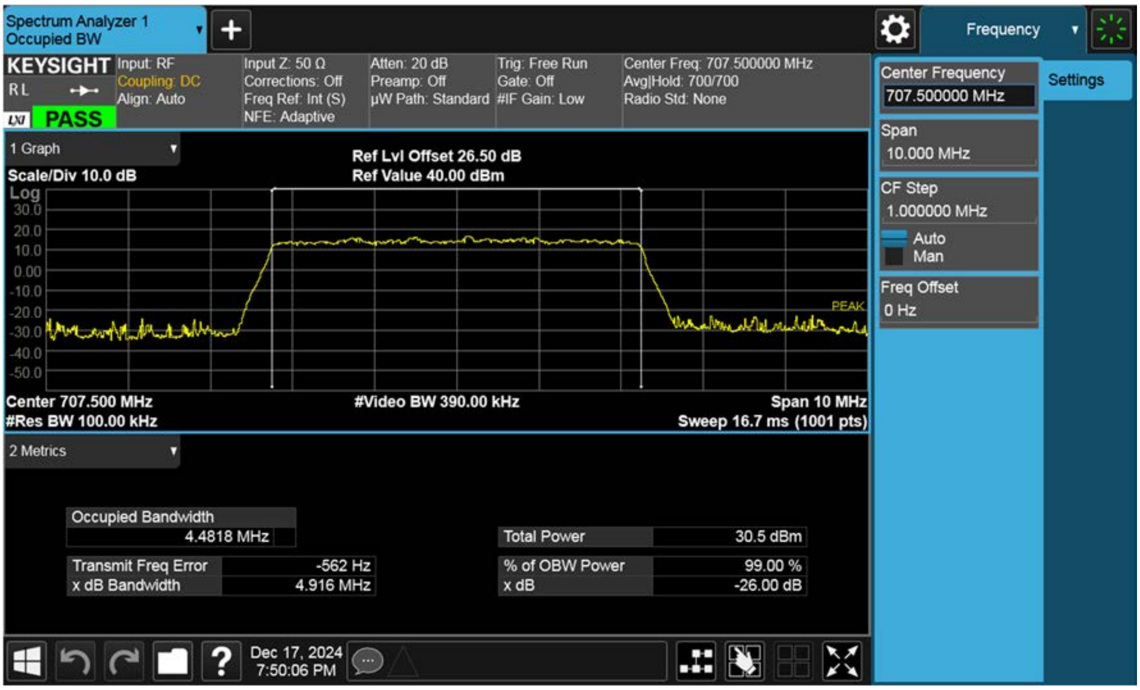
LTE B12_3 M_OBW_Mid_256QAM_FullRB



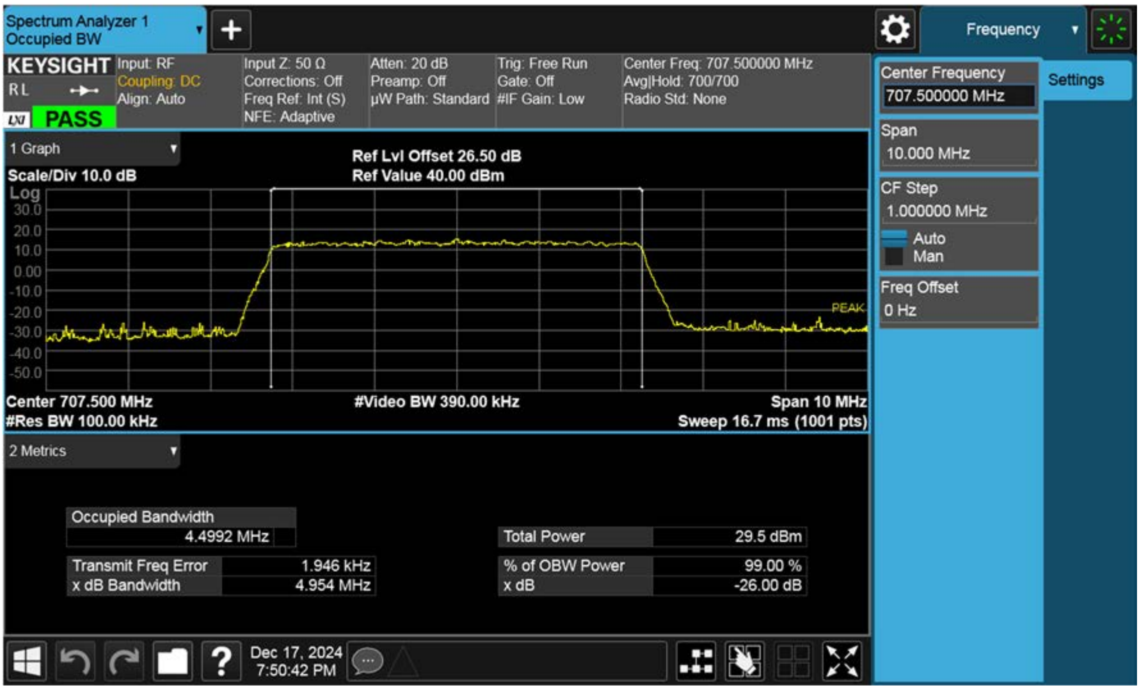
LTE B12_5 M_OBW_Mid_QPSK_FullRB



LTE B12_5 M_OBW_Mid_16QAM_FullRB



LTE B12_5 M_OBW_Mid_64QAM_FullRB



LTE B12_5 M_OBW_Mid_256QAM_FullRB

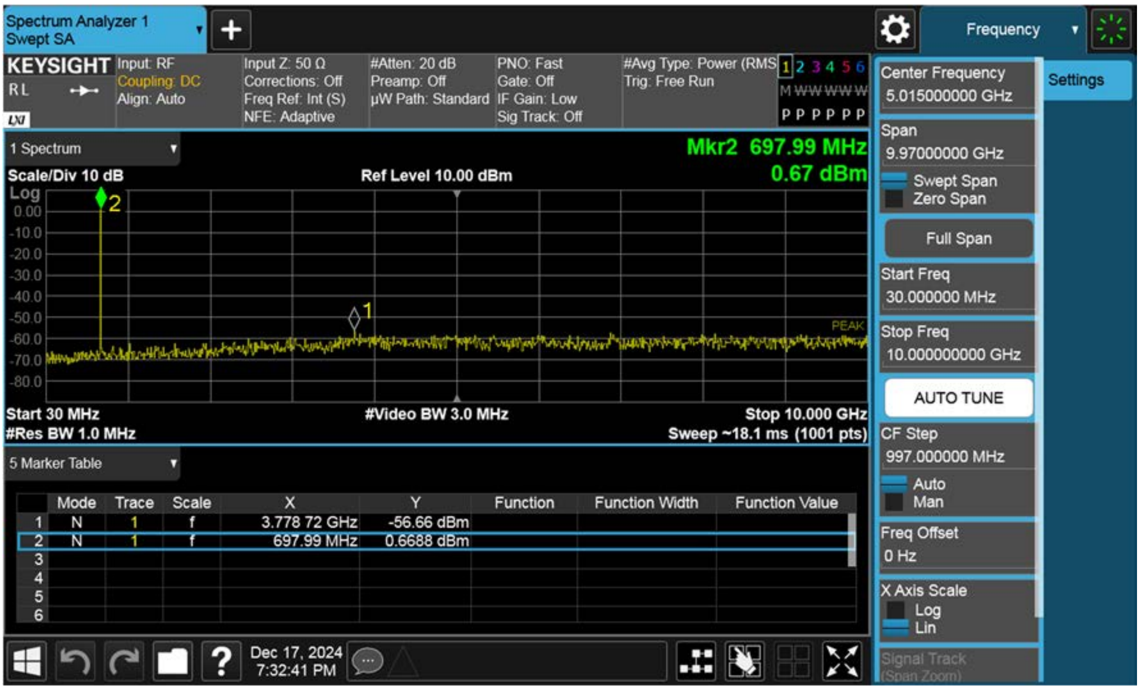
LTE B12_10 M_OBW_Mid_QPSK_FullRB

LTE B12_10 M_OBW_Mid_16QAM_FullRB

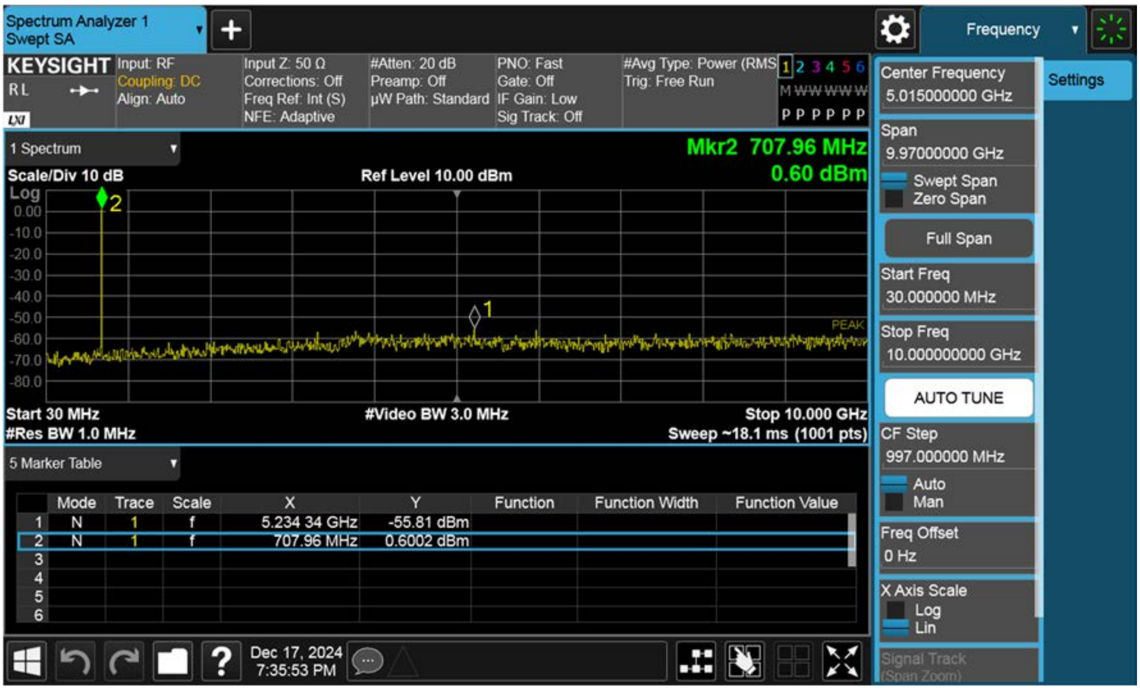
LTE B12_10 M_OBW_Mid_64QAM_FullRB

LTE B12_10 M_OBW_Mid_256QAM_FullRB

LTE B12_1.4M_Conducted Spurious(30 M-10 G)_Low_QPSK_1RB

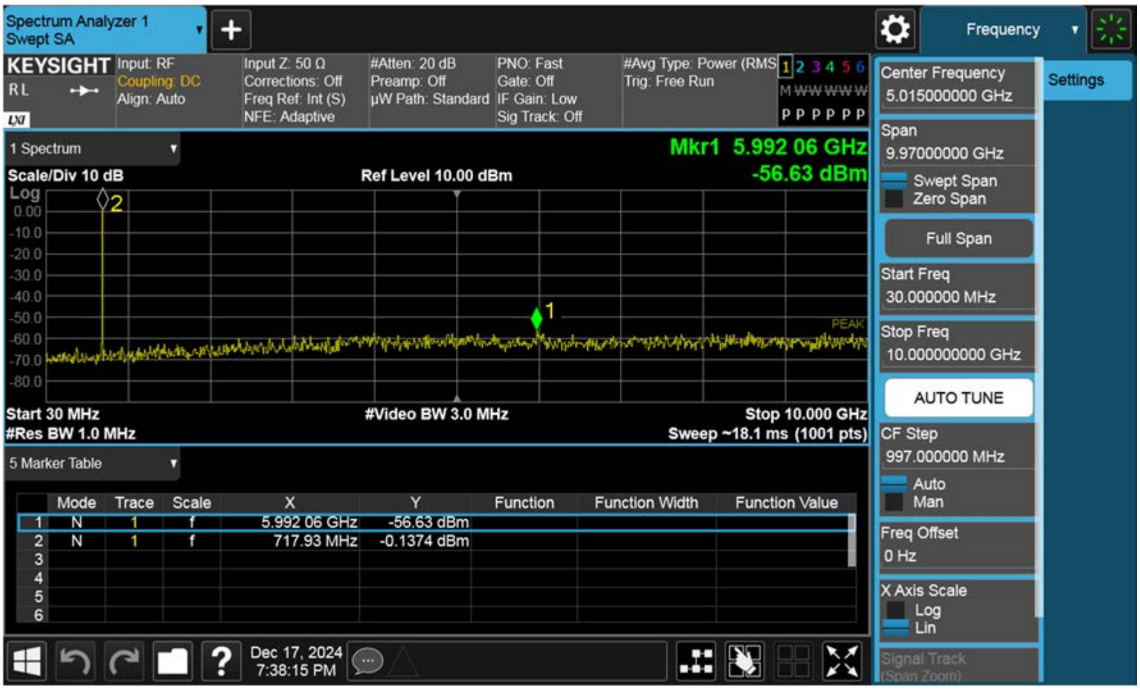


LTE B12_1.4M_Conducted Spurious(30 M-10 G)_Mid_QPSK_1RB

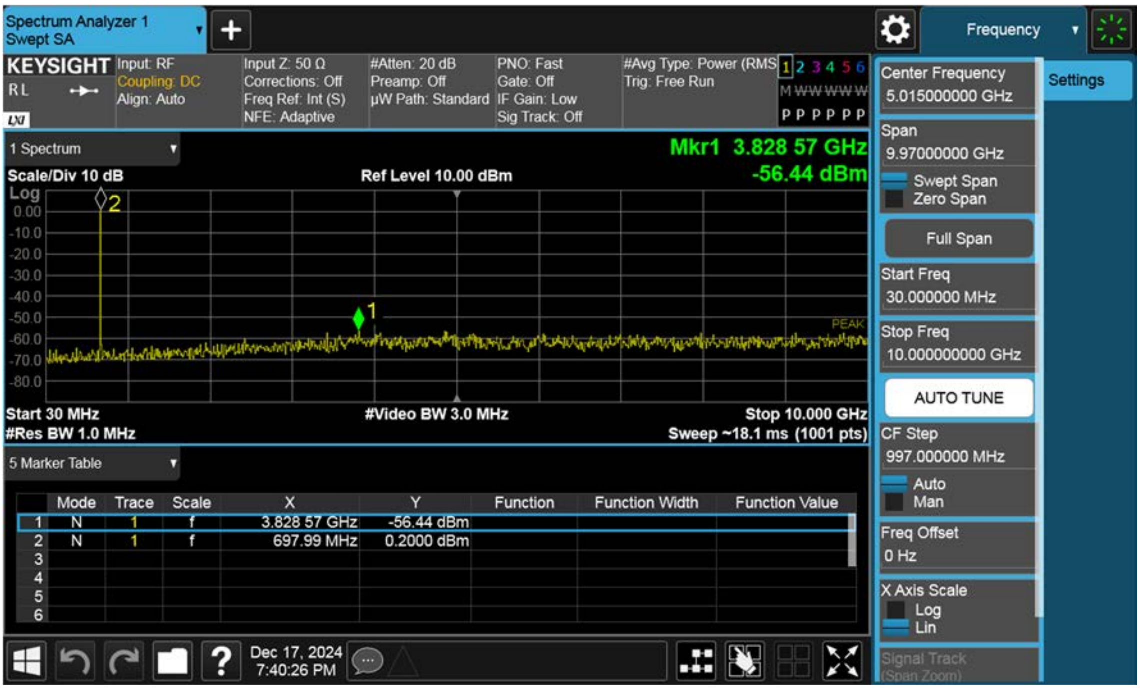


	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	5.234 34 GHz	-55.81 dBm			
2	N	1	f	707.96 MHz	0.6002 dBm			
3								
4								
5								
6								

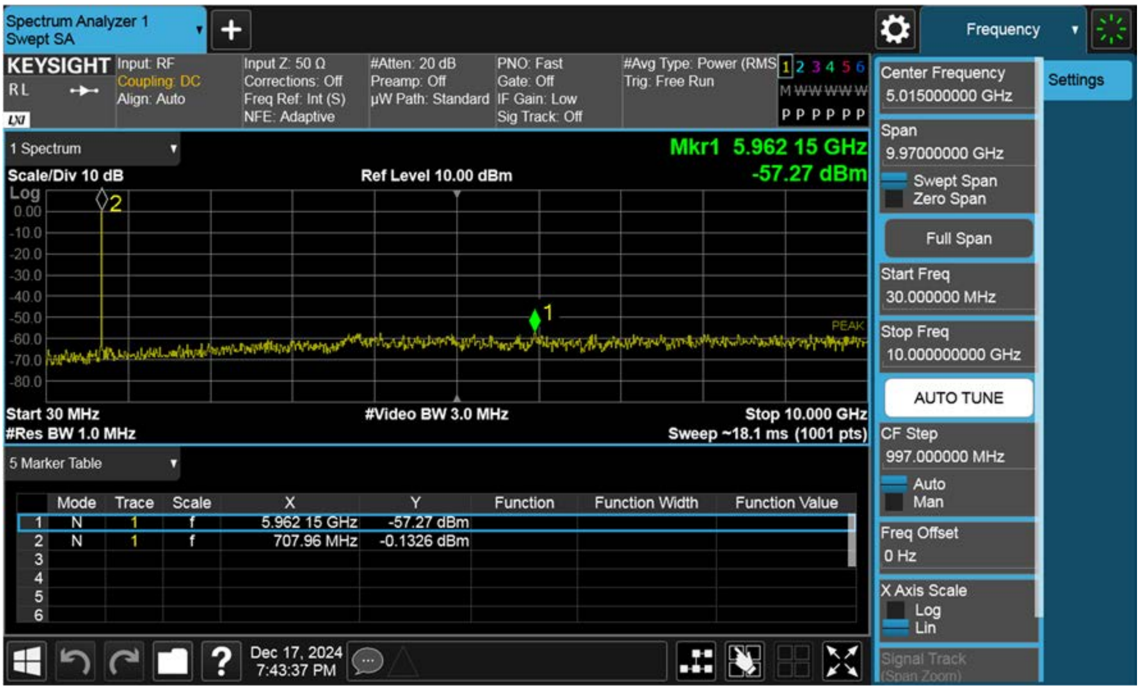
LTE B12_1.4M_Conducted Spurious(30 M-10 G)_High_QPSK_1RB



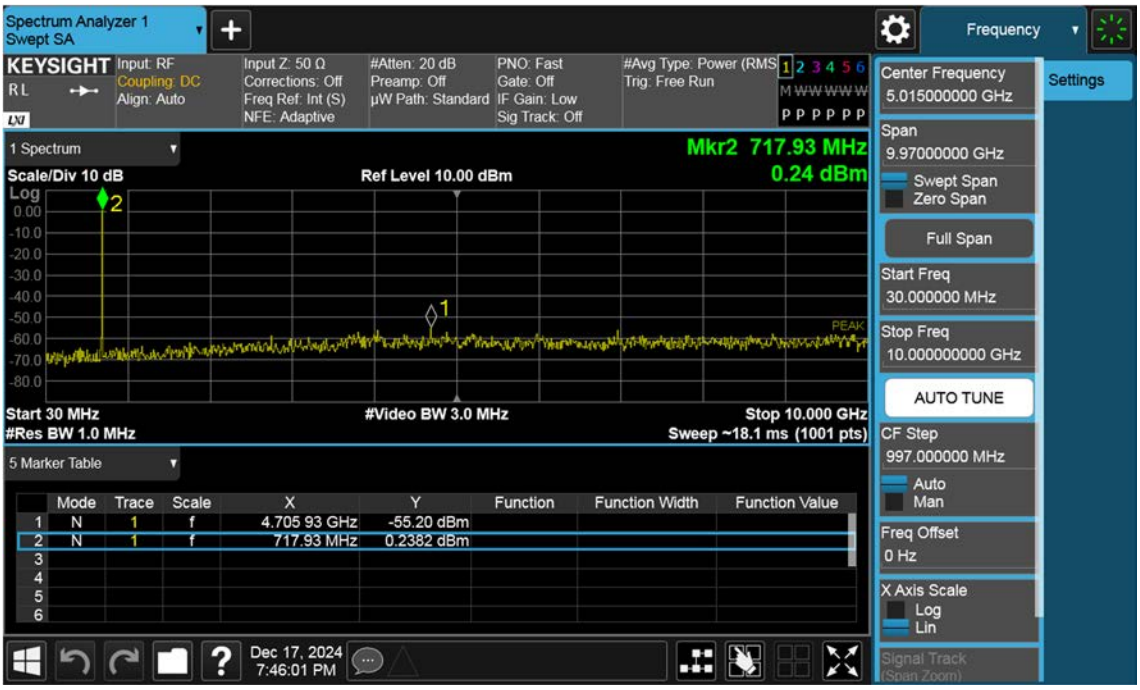
LTE B12_3 M_Conducted Spurious(30 M-10 G)_Low_QPSK_1RB



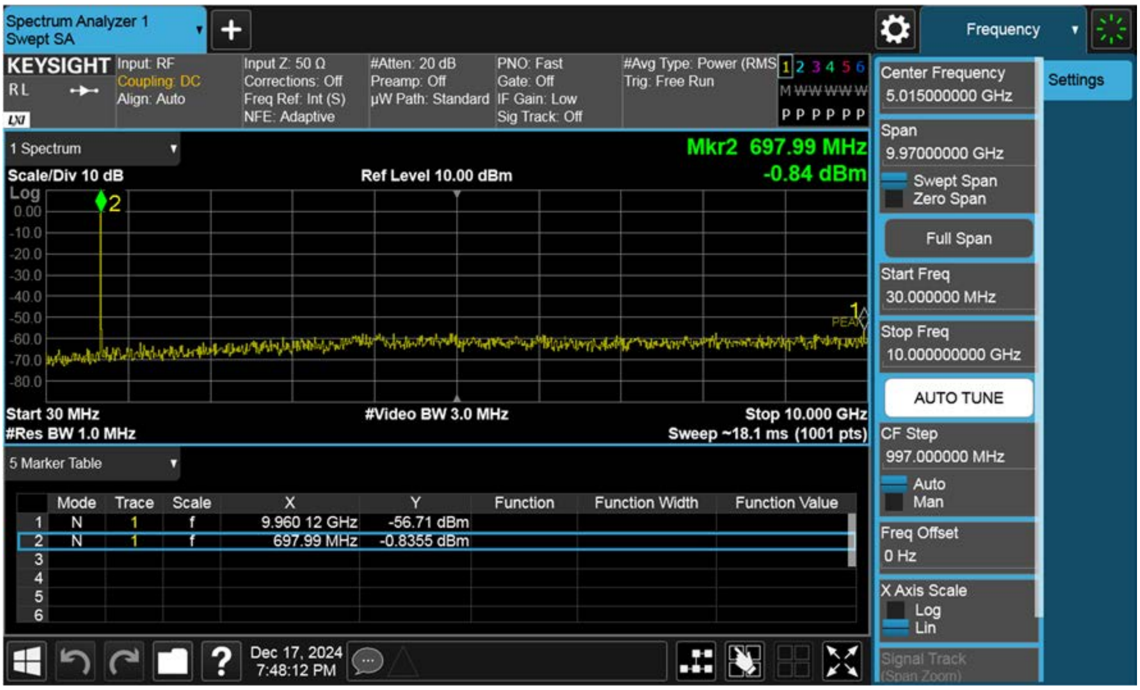
LTE B12_3 M_Conducted Spurious(30 M-10 G)_Mid_QPSK_1RB



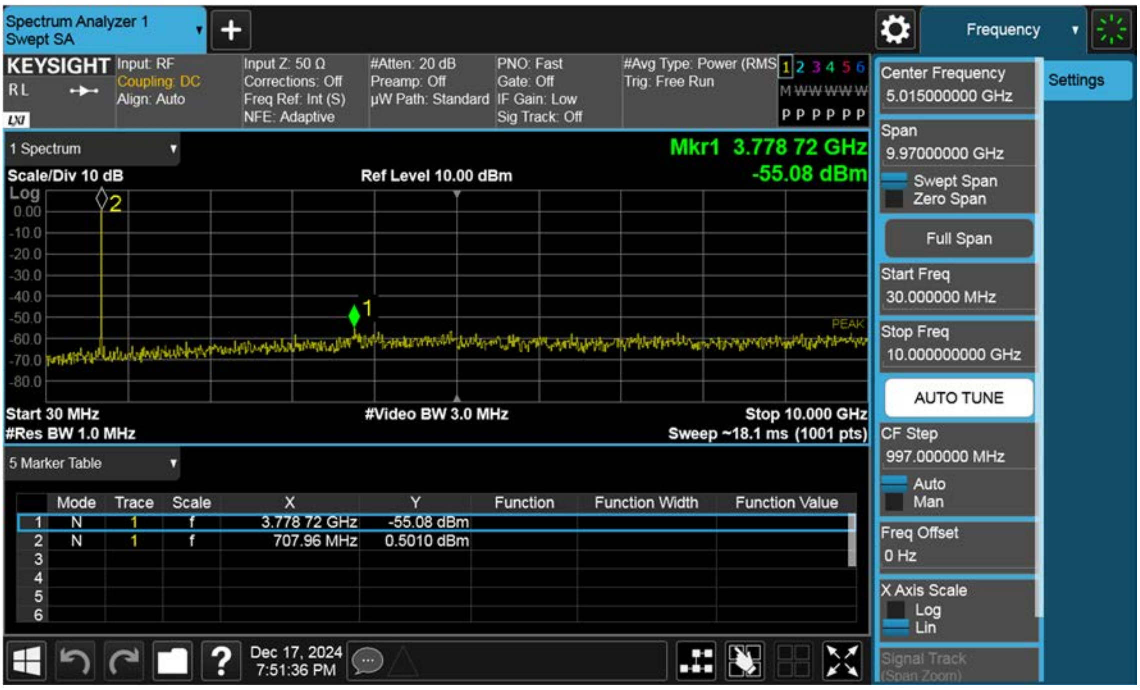
LTE B12_3 M_Conducted Spurious(30 M-10 G)_High_QPSK_1RB



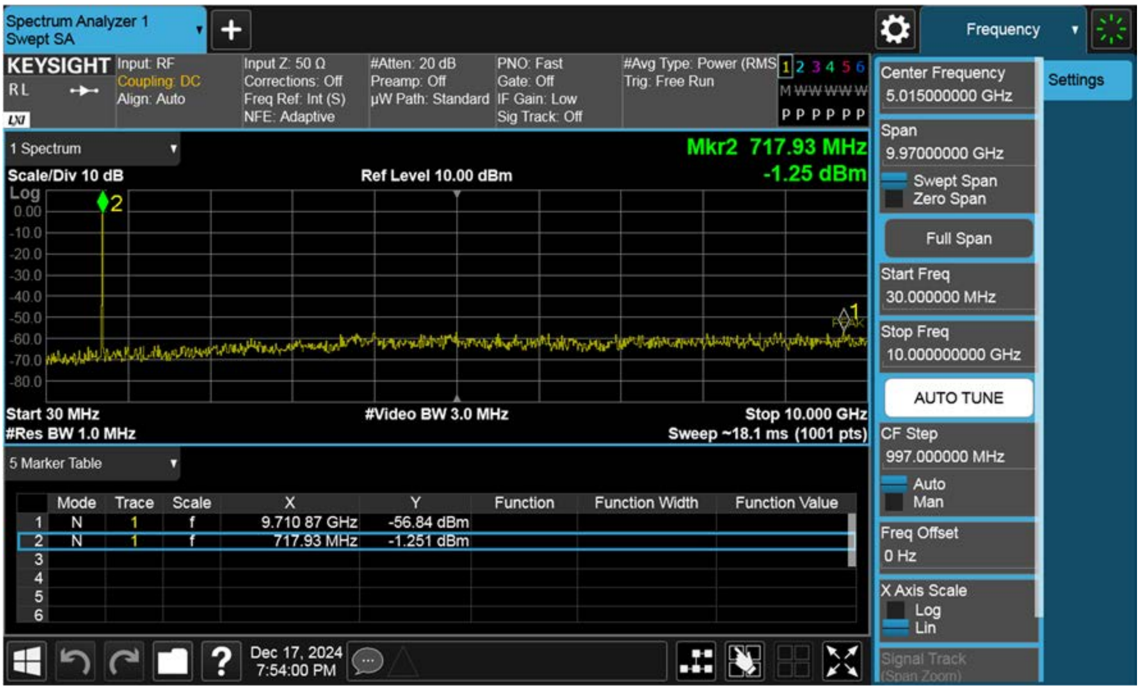
LTE B12_5 M_Conducted Spurious(30 M-10 G)_Low_QPSK_1RB



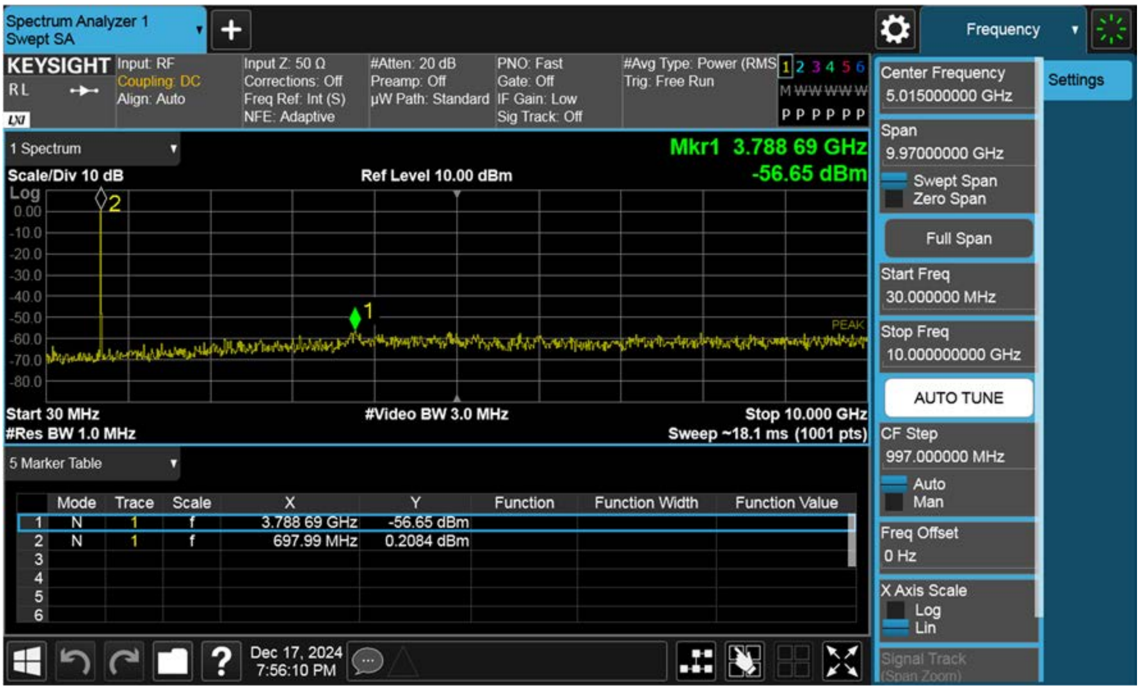
LTE B12_5 M_Conducted Spurious(30 M-10 G)_Mid_QPSK_1RB



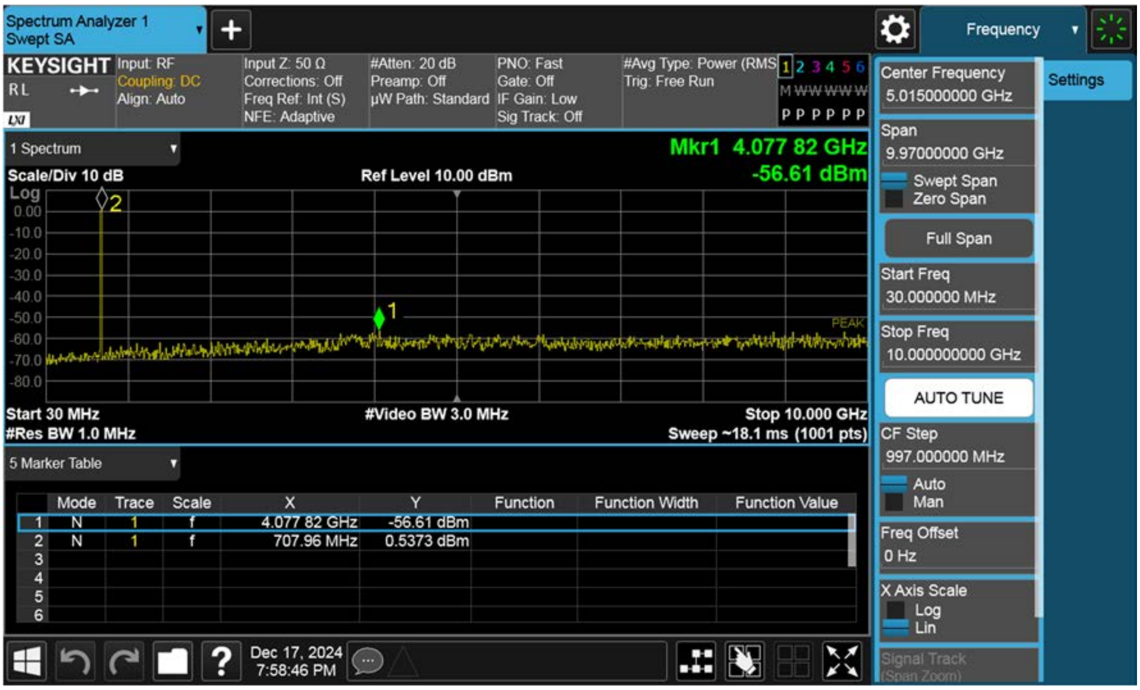
LTE B12_5 M_Conducted Spurious(30 M-10 G)_High_QPSK_1RB



LTE B12_10 M_Conducted Spurious(30 M-10 G)_Low_QPSK_1RB

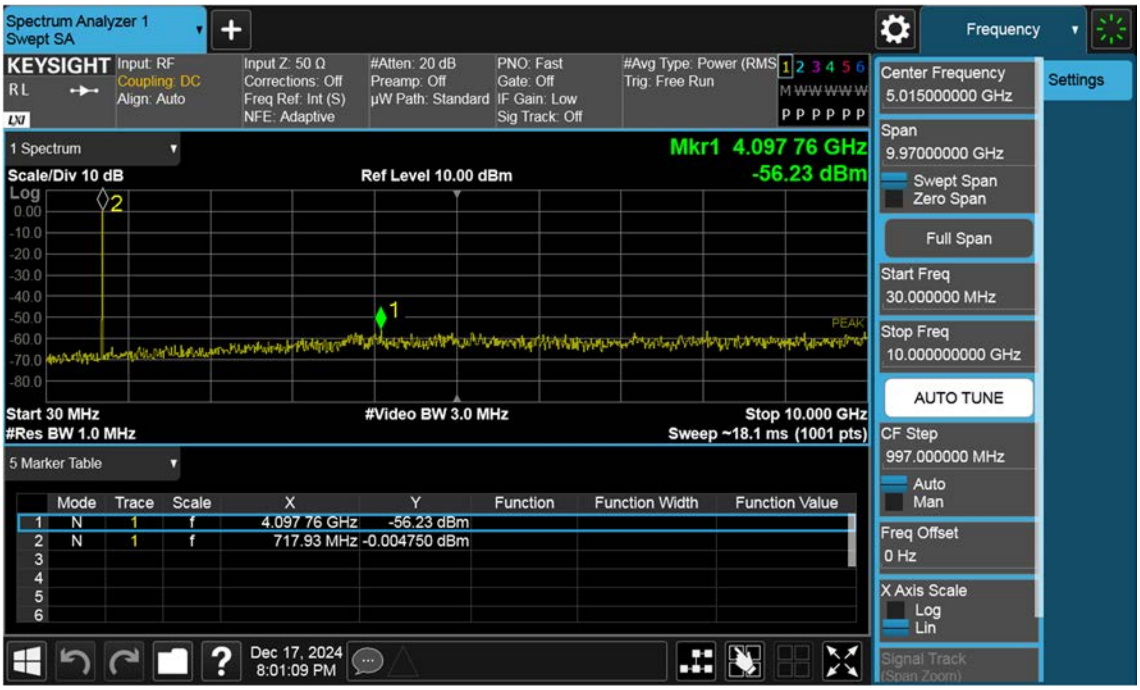


LTE B12_10 M_Conducted Spurious(30 M-10 G)_Mid_QPSK_1RB



	Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
1	N	1	f	4.077 82 GHz	-56.61 dBm			
2	N	1	f	707.96 MHz	0.5373 dBm			
3								
4								
5								
6								

LTE B12_10 M_Conducted Spurious(30 M-10 G)_High_QPSK_1RB



LTE B12_1.4M_Band Edge_Low_QPSK_1RB

LTE B12_1.4M_Band Edge_Low_QPSK_FullRB

LTE B12_1.4M_Extended Band Edge_Low_QPSK_FullRB

LTE B12_1.4M_Band Edge_High_QPSK_1RB(1)

LTE B12_1.4M_Band Edge_High_QPSK_1RB(2)

LTE B12_1.4M_Band Edge_High_QPSK_FullRB

LTE B12_1.4M_Extended Band Edge_High_QPSK_FullRB

LTE B12_3 M_Band Edge_Low_QPSK_1RB

LTE B12_3 M_Band Edge_Low_QPSK_FullRB

LTE B12_3 M_Extended Band Edge_Low_QPSK_FullRB

LTE B12_3 M_Band Edge_High_QPSK_1RB(1)

LTE B12_3 M_Band Edge_High_QPSK_1RB(2)

LTE B12_3 M_Band Edge_High_QPSK_FullRB

LTE B12_3 M_Extended Band Edge_High_QPSK_FullRB

LTE B12_5 M_Band Edge_Low_QPSK_1RB

LTE B12_5 M_Band Edge_Low_QPSK_FullRB

LTE B12_5 M_Extended Band Edge_Low_QPSK_FullRB

LTE B12_5 M_Band Edge_High_QPSK_1RB(1)

LTE B12_5 M_Band Edge_High_QPSK_1RB(2)

LTE B12_5 M_Band Edge_High_QPSK_FullRB