

# **TEST REPORT**

FCC LTE B48 Test for GCM4701NA Certification

APPLICANT CM PARTNER INC.

REPORT NO. HCT-RF-2406-FC007-R1

DATE OF ISSUE June 27, 2024

> **Tested by** Jae Ryang Do

Technical Manager Jong Seok Lee



F-TP22-03(Rev.06)

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T E S T R E P O R T	REPORT NO. HCT-RF-2406-FC007-R1 DATE OF ISSUE June 27, 2024
Applicant	<b>CM PARTNER INC.</b> 479-11, Gyeonggidong-ro, Namsa-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, 17121, South Korea
Product Name Model Name	LTE Module GCM4701NA
Date of Test	May 16, 2024 ~ June 18, 2024
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 ID	2BGOOGCM4701NA
FCC Classification:	Citizens Band End User Devices (CBE)
Test Standard Used	FCC Rule Part(s): §96
Test Results	PASS





## **REVISION HISTORY**

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

Revision No.	Date of Issue	Description
0	June 21, 2024	Initial Release
0	June 27, 2024	Revised the 19&20 page. (Added note)

#### 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).





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# **MEASUREMENT REPORT**

# **1. GENERAL INFORMATION**

Applicant Name:	CM PARTNER INC.
Address:	479-11, Gyeonggidong-ro, Namsa-myeon, Cheoin-gu, Yongin-si, Gyeonggi-
	do, 17121, South Korea
FCC ID:	2BGOOGCM4701NA
Application Type:	Certification
FCC Classification:	Citizens Band End User Devices (CBE)
FCC Rule Part(s):	§ 96
EUT Type:	LTE Module
Model(s):	GCM4701NA
Additional Model(s)	-
	3552.5 – 3697.5 : 5 MHz
	3555.0 – 3695.0 : 10 MHz
Tx Frequency:	3557.5 – 3692.5 : 15 MHz
	3560.0 – 3690.0 : 20 MHz
Date(s) of Tests:	May 13, 2024 ~ June 18, 2024
Antenna gain	-2.7 dBi
Serial number:	351951100001832



#### **1.1. MAXIMUM OUTPUT POWER**

Mode		Emission		Conduct	ed power
(MHz)	Tx Frequency (MHz)	Designator	Modulation	Max. Power (W)	Max. Power (dBm)
		4M50G7D	QPSK	0.170	22.31
LTE – Band 48 (5)	3552.5 - 3697.5	4M48W7D	16QAM	0.142	21.52
		4M50W7D	64QAM	0.109	20.37
LTE – Band 48 (10)		8M99G7D	QPSK	0.169	22.29
	3555.0 – 3695.0	8M92W7D	16QAM	0.146	21.63
		8M95W7D	64QAM	0.110	20.43
		13M5G7D	QPSK	0.161	22.06
LTE – Band 48 (15)	3557.5 - 3692.5	13M5W7D	16QAM	0.141	21.50
	_	13M4W7D	64QAM	0.107	20.30
		17M9G7D	QPSK	0.169	22.27
LTE – Band 48 (20)	3560.0 - 3690.0	17M9W7D	16QAM	0.143	21.55
		18M0W7D	64QAM	0.109	20.37





# 2. INTRODUCTION

## **2.1. DESCRIPTION OF EUT**

The EUT was a LTE Module with LTE

## 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
	- KDB 971168 D01 v03r01 – Section 4.3
Occupied Bandwidth	- ANSI C63.26-2015 – Section 5.4.4
	- KDB 940660 D01 v01
	- KDB 971168 D01 v03r01 – Section 6.0
Channel Edge/ ACLR	- ANSI C63.26-2015 – Section 5.7
	- KDB 940660 D01 v01
Spurious and Harmonic Emissions at	- KDB 971168 D01 v03r01 – Section 6.0
Spurious and Harmonic Emissions at Antenna Terminal	- ANSI C63.26-2015 – Section 5.7
Antenna Terminat	- KDB 940660 D01 v01
	- KDB 971168 D01 v03r01 - Section 5.2.4
Conducted Output Power	- ANSI C63.26-2015 - Section 5.2.1 & 5.2.4.2
	- KDB 971168 D01 v03r01 – Section 5.7
Peak- to- Average Ratio	- ANSI C63.26-2015 – Section 5.2.3.4
	- KDB 940660 D01 v01
	- ANSI C63.26-2015 – Section 5.6
Frequency stability	- KDB 940660 D01 v01
Effective Radiated Power/	- KDB 971168 D01 v03r01 – Section 5.2 & 5.8
	- ANSI/TIA-603-E-2016 – Section 2.2.17
Effective Isotropic Radiated Power	- KDB 940660 D01 v01
Dedicted Cruvieus and Havesonia	- KDB 971168 D01 v03r01 – Section 6.2
Radiated Spurious and Harmonic Emissions	- ANSI/TIA-603-E-2016 – Section 2.2.12
EIIIISSIOIIS	- KDB 940660 D01 v01
End User Device Additional	- KDB 940660 D01 v01
Requirement	- WINNF-TS-0122 V1.0.2
(CBSD Protocol)	



## **3.2 RF OUTPUT POWER**

#### **Test Overview**

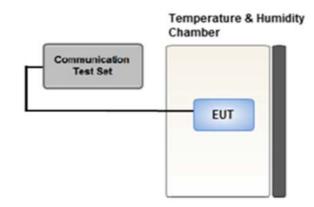
According to ANSI C63.26-2015 Section 5.2.1 when measuring the maximum RF output power from such devices, control over the EUT must be provided either through special test software (provided by manufacturer specifically for compliance testing, but not accessible by an end user) or through use of a base station emulator, communications test set, call box, or similar instrumentation that is capable of establishing a communications link with the EUT to enable control over variable parameters (e.g., output power, OBW, etc.).

In some cases, these instruments also include basic digital spectrum analyzer and/or power meter capabilities that can be utilized to measure the RF output power if the specified detectors and requirements can be realized and the measurement functions have been calibrated.

#### **Test Procedure**

- 1. The RF port of the EUT was connected to the Communication Tester via an RF cable.
- 2. Conducted average power was measured using a calibrated Radio Communication Tester.
- 3. EIRP (dBm) = Conducted Power (dBm) + antenna gain (dBi)

#### Test setup





## **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 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<sup>th</sup> 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;

Result (dBm) = Pg (dBm) - cable loss (dB) + antenna gain (dBi)

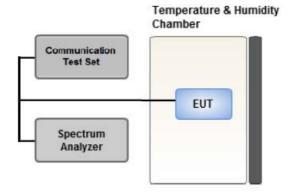
Where:  $\mathsf{P}_{\mathsf{g}}$  is the generator output power into the substitution antenna.

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

EIRP (dBm) = ERP (dBm) + 2.15



#### 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 as P  $_{\rm Pk}$ .

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

P.A.R (dB) = P Pk (dBm) - P Avg (dBm) (P Avg = Average Power + 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 × RBW.

- 1. Set the RBW  $\geq$  OBW.
- 2. Set VBW  $\geq$  3 × RBW.
- 3. Set span  $\geq$  2 × OBW.
- 4. Sweep time  $\geq$  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)**

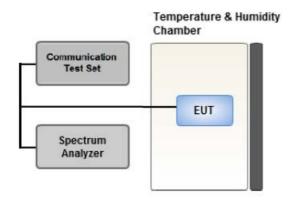
- 1. Set span to 2 × to 3 × the OBW.
- 2. Set RBW  $\geq$  OBW.
- 3. Set VBW  $\geq$  3 × RBW.
- 4. Set number of measurement points in sweep  $\geq$  2 × span / RBW.
- 5. Sweep time:
  - Set  $\geq$  [10 × (number of points in sweep) × (transmission period)] for single sweep

(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.
- Add [10 log (1/duty cycle)] to the measured maximum power level to compute the average power during continuous transmission. For example, add [10 log (1/0.25)] = 6 dB if the duty cycle is a constant 25 %.



## **3.5 OCCUPIED BANDWIDTH.**



#### Test setup

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

The EUT makes a call to the communication simulator.

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

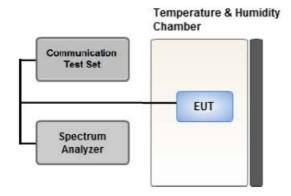
The communication simulator station system controlled a EUT to export maximum output power under transmission mode and specific channel frequency. Use OBW measurement function of Spectrum analyzer to measure 99 % occupied bandwidth

#### **Test Settings**

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



## **3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL**



#### Test setup

#### **Test Overview**

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

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

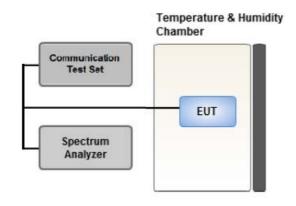
All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

#### **Test Settings**

- 1. RBW = 1 MHz
- 2. VBW  $\geq$  3 MHz
- 3. Detector = RMS
- 4. Trace Mode = trace average
- 5. Sweep time = auto
- 6. Number of points in sweep  $\geq$  2 x Span / RBW



## **3.7 CHANNEL EDGE**



#### Test setup

#### **Test Settings**

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

#### **Test Notes**

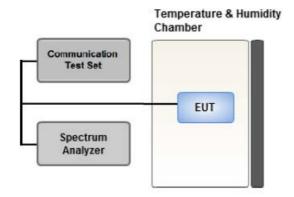
The conducted power of any emission outside the fundamental emission (whether in or outside of the authorized band) shall not exceed -13 dBm/MHz within 0-10 megahertz above the upper SAS-assigned channel edge and within 0-10 megahertz below the lower SAS-assigned channel edge. At all frequencies greater than 10 megahertz above the upper SAS assigned channel edge and less than 10 MHz below the lower SAS assigned channel edge, the conducted power of any emission shall not exceed -25 dBm/MHz.

The conducted power of any emissions below 3530 MHz or above 3720 MHz shall not exceed -40 dBm/Mhz

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



## 3.8 Adjacent Channel Leakage Ratio



## Test setup

#### **Test Settings**

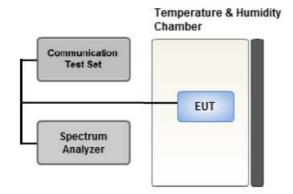
- 1. Use ACP measurement function of Spectrum analyzer to measure adjacent channel leakage ratio
- 2. Integ BW = Assigned channel bandwidth
- 5. Detector = RMS
- 6. Number of sweep points  $\geq$  2 x Span/RBW
- 7. Trace mode = trace average
- 8. Sweep time = 1 s
- 9. The trace was allowed to stabilize

#### **Test Notes**

the Adjacent Channel Leakage Ratio for End User Devices shall be at least 30 dB.



# 3.9 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE



#### Test setup

#### **Test Overview**

Frequency stability testing is performed in accordance with the guidelines of ANSI C63.26-2015. The frequency stability of the transmitter is measured by:

1. Temperature:

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

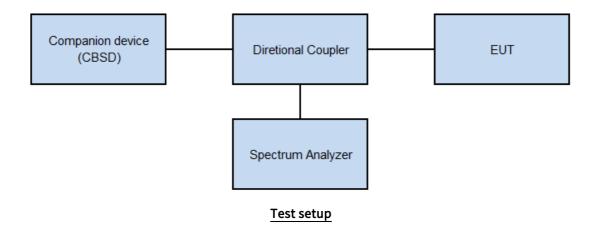
- 2. Primary Supply Voltage:
  - .- Unless otherwise specified, vary primary supply voltage from 85 % to 115 % of the nominal value for other than hand carried battery equipment.
  - .- For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.

## **Test Settings**

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



# 3.10 End User Device Additional Requirement (CBSD Protocol)



#### **Test Overview**

End user device additional requirements (CBSD Protocol) are tested per the test procedures listed below. During testing, the EUT is connected to a certified CBSD (FCC ID: 2AS48SC-220) as a companion device to show compliance with Part 96.47.

End User Devices may operate only if they can positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and power limits for their operation.

#### **Test Settings**

- a. Setup companion device with 3570 MHz & 3610 MHz.
- b. Enable AP service from companion device.
- c. EUT is connected to a companion device.
- c. Check EUT Tx frequency and power.
- d. Disable AP service from companion device and check EUT stop transmission within 10 s.



# 3.11 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.
- JIG was used to test the EUT. (EUT + JIG)
- The R.S.E TEST was tested by combined a term to the antenna port.

- 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.

			,	
Test Description	Modulation	RB size	RB offset	Axis
	QPSK,			
Effective Isotropic Radiated Power	16QAM,		-	-
	64QAM,			
Radiated Spurious and Harmonic Emissions	QPSK	See See	ction 8.2	Х

I WOISE CASE I	ſ	Worst o	ase 1
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# 3.12 WORST CASE(CONDUCTED TEST)

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

- JIG was used to test the EUT. (EUT + JIG)

[ Worst case ]							
Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset		
	QPSK,						
Occupied Bandwidth	16QAM,	5, 10, 15, 20	Mid	Full RB	0		
	64QAM,						
Peak-To-Average Radio	QPSK,						
	16QAM,	5, 10, 15, 20	Mid	Full RB	0		
	64QAM,						
	QPSK	5 -	Low	1	0		
			High	1	24		
		10	Low	1	0		
			High	1	49		
		15	Low	1	0		
Channel Edge			High	1	74		
		20	Low	1	0		
		20	High	1	99		
		5, 10, 15, 20	Low,				
			Mid,	Full RB	0		
			High				
Spurious and Harmonis Emissions			Low,				
Spurious and Harmonic Emissions at Antenna Terminal	QPSK	5, 10, 15, 20	Mid,	1	0		
at Antenna Terminat			High				



## 4. LIST OF TEST EQUIPMENT

Equipment	Model	Manufacture	Serial No.	Due to Calibration	Calibration Interval
Precision Dipole Antenna	UHAP	Schwarzbeck	01273	03/10/2026	Biennial
Precision Dipole Antenna	UHAP	Schwarzbeck	01274	03/10/2026	Biennial
Horn Antenna(1~18 GHz)	BBHA 9120D	Schwarzbeck	02289	02/14/2026	Biennial
Horn Antenna(1~18 GHz)	BBHA 9120D	Schwarzbeck	9120D-1299	04/27/2025	Biennial
Horn Antenna(15~40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170342	09/29/2024	Biennial
Horn Antenna(15~40 GHz)	BBHA 9170	Schwarzbeck	BBHA9170124	03/28/2025	Biennial
Loop Antenna(9 kHz~30 MHz)	FMZB1513	Rohde & Schwarz	1513-175	01/16/2025	Biennial
Bilog Antenna	VULB9160	Schwarzbeck	3150	03/09/2025	Biennial
Hybrid Antenna	VULB9160	Schwarzbeck	760	02/24/2025	Biennial
RF Switching System	FBSR-06B (1G HPF + LNA)	T&M SYSTEM	F3L1	05/14/2025	Annual
RF Switching System	FBSR-06B (3G HPF + LNA)	T&M SYSTEM	F3L2	05/14/2025	Annual
RF Switching System	FBSR-06B (6G HPF + LNA)	T&M SYSTEM	F3L3	05/14/2025	Annual
RF Switching System	FBSR-06B (LNA)	T&M SYSTEM	F3L4	05/14/2025	Annual
Power Amplifier	CBL18265035	CERNEX	22966	11/17/2024	Annual
Power Amplifier	CBL26405040	CERNEX	25956	02/26/2025	Annual
DC Power Supply	E3632A	Hewlett Packard	MY40004427	08/25/2024	Annual
Power Splitter(DC~26.5 GHz)	11667B	Hewlett Packard	11275	02/29/2025	Annual
Chamber	SU-642	ESPEC	93008124	02/19/2025	Annual
Signal Analyzer(10 Hz~26.5 GHz)	N9020A	Agilent	MY51110063	04/04/2025	Annual
ATTENUATOR(20 dB)	8493C	Hewlett Packard	17280	04/17/2025	Annual
Spectrum Analyzer(10 Hz~40 GHz)	FSV40	REOHDE & SCHWARZ	101436	02/13/2025	Annual
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262287701	05/16/2025	Annual
SIGNAL GENERATOR (100 kHz~40 GHz)	SMB100A	REOHDE & SCHWARZ	177633	06/22/2024	Annual
Signal Analyzer(5 Hz~40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/17/2025	Annual
4-Way Divider	ZC4PD-K1844+	Mini-Circuits	942907	09/19/2024	Annual
FCC LTE Mobile Conducted RF Automation Test Software	-	HCT CO., LTD.,	-	-	-

Note:

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





## **5. MEASUREMENT UNCERTAINTY**

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

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

Parameter	Expanded Uncertainty (±dB)
Conducted Disturbance (150 kHz ~ 30 MHz)	1.98 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (9 kHz ~ 30 MHz)	4.36 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (30 MHz ~ 1 GHz)	5.70 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (1 GHz ~ 18 GHz)	5.52 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (18 GHz ~ 40 GHz)	5.66 (Confidence level about 95 %, <i>k</i> =2)
Radiated Disturbance (Above 40 GHz)	5.58 (Confidence level about 95 %, <i>k</i> =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, § 96.41(e)	<ul> <li>-13 dBm/MHz at frequencies within</li> <li>0-10 MHz of channel edge</li> <li>-25 dBm/MHz at frequencies greater than 10 MHz above and below channel edge</li> <li>-40 dBm/MHz at frequencies below 3530 MHz and above 3720 MHz</li> </ul>	PASS
Adjacent Channel Leakage Ratio	§ 96.41(e)	At least 30 dB.	PASS
Conducted Output Power	§ 2.1046	N/A	-
Peak- to- Average Ratio	§ 96.41(g)	< 13 dB	PASS
Frequency stability / variation of ambient temperature	§ 2.1055,	Emission must remain in band	PASS
End User Device Additional Requirements (CBSD Protocol)	§ 96.47	End User Devices may operate only if they can positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and power limits for their operation. An End User Device must discontinue operations, change frequencies, or change its operational power level within 10 seconds of receiving instructions from its associated CBSD.	PASS

## Note:

1. The EUT is an End User Device

F-TP22-03 (Rev. 06)





## 6.2 Test Condition: Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result
Equivalent Isotropic Radiated Power	§ 96.41(b)	23 dBm/10 MHz	PASS
Radiated Spurious and	§ 2.1053,		PASS
Harmonic Emissions	§ 96.41(e)	-40 dBm/MHz	LY22



# 7. SAMPLE CALCULATION

#### 7.1 ERP Sample Calculation

Ch.	/ Freq.	Measured	Substitute	Ant. Gain		_	ERP	
channel	Freq.(MHz)	Level (dBm)	Level (dBm)	(dBd)	C.L	Pol.	W	dBm
128	824.20	-21.37	38.40	-10.61	0.95	Н	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	Substitute	Ant. Gain			EI	RP
channel	Freq.(MHz)	Level (dBm)	Level (dBm)	(dBi)	C.L	Pol.	w	dBm
20175	1,732.50	-15.75	18.45	9.90	1.76	Н	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

<u>QAM Modulation</u> 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 RF OUTPUT POWER

			RB	Max.Ave	erage Powe	er (dBm)	<b>Tb</b>	Townsh
Bandwidth	Modulation	RB Size	Offset	55265	55990	56715	- Target	Target
			Unset	3552.5	3625	3697.5	–MPR (dB)	Power
				MHz	MHz	MHz		
		1	0	21.81	21.59	21.45	0	23
		1	12	22.20	22.03	22.31	0	23
		1	24	21.64	21.36	21.60	0	23
	QPSK	12	0	21.65	21.40	21.46	1	22
		12	6	21.33	21.03	21.32	1	22
		12	11	21.25	20.92	21.20	1	22
		25	0	21.19	20.93	21.24	1	22
		1	0	21.03	20.58	20.44	1	22
		1	12	21.52	21.22	21.44	1	22
		1	24	20.91	20.54	20.72	1	22
5 MHz	16QAM	12	0	20.83	20.42	20.37	2	21
		12	6	20.49	20.04	20.23	2	21
		12	11	20.39	19.93	20.10	2	21
		25	0	20.33	19.97	20.14	2	21
		1	0	19.88	19.44	19.38	2	21
		1	12	20.37	20.10	20.32	2	21
		1	24	19.75	19.44	19.50	2	21
	64QAM	12	0	19.81	19.59	19.54	3	20
		12	6	19.48	19.26	19.51	3	20
		12	11	19.39	19.16	19.39	3	20
		25	0	19.43	19.20	19.43	3	20



Bandwidth	Modulation	RB Size	RB Offset		erage Powe	r (dBm)	Target	Target
Danuwiutii	Modulation	KD SIZE	KD Oliset	55290	55990	56690	MPR (dB)	Power
				3555 MHz	3625 MHz	3695 MHz		
		1	0	22.12	21.85	21.64	0	23
		1	24	22.29	22.09	22.13	0	23
		1	49	22.08	21.80	22.09	0	23
	QPSK	25	0	21.35	21.22	20.92	1	22
		25	12	21.58	21.20	21.12	1	22
		25	24	21.46	21.22	21.25	1	22
		50	0	21.38	21.15	21.07	1	22
		1	0	21.41	21.15	20.83	1	22
		1	24	21.63	21.32	21.30	1	22
		1	49	21.33	21.16	21.40	1	22
10 MHz	16QAM	25	0	20.49	20.21	19.88	2	21
		25	12	20.60	20.21	20.13	2	21
		25	24	20.47	20.22	20.23	2	21
		50	0	20.56	20.16	20.06	2	21
		1	0	20.37	19.94	19.52	2	21
		1	24	20.43	20.06	20.10	2	21
		1	49	20.28	19.90	20.15	2	21
	64QAM	25	0	19.58	19.27	19.10	3	20
		25	12	19.68	19.30	19.35	3	20
		25	24	19.56	19.23	19.35	3	20
		50	0	19.55	19.11	19.22	3	20

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				Max.Ave	erage Powe	er (dBm)	Toward	Towest
Bandwidth	Modulation	RB Size	RB Offset	55315	55990	56665	− Target −MPR (dB)	Target Power
				3557.5	3625	3692.5		Power
				MHz	MHz	MHz		
		1	0	21.90	21.73	21.36	0	23
		1	36	22.06	22.06	21.95	0	23
		1	74	21.77	21.80	21.93	0	23
	QPSK	36	0	21.25	21.02	20.32	1	22
		36	18	21.33	20.99	20.80	1	22
		36	39	21.22	20.89	21.04	1	22
		75	0	21.31	21.11	20.89	1	22
		1	0	21.24	21.16	20.31	1	22
		1	36	21.50	21.25	21.08	1	22
		1	74	21.14	20.99	21.27	1	22
15 MHz	16QAM	36	0	20.17	19.95	19.34	2	21
		36	18	20.26	19.95	19.84	2	21
		36	39	20.17	19.85	19.98	2	21
		75	0	20.30	20.11	19.86	2	21
		1	0	20.17	19.82	19.25	2	21
		1	36	20.30	20.00	19.89	2	21
		1	74	19.92	19.61	19.98	2	21
	64QAM	36	0	19.17	18.95	18.39	3	20
		36	18	19.26	19.00	18.78	3	20
		36	39	19.19	18.91	19.04	3	20
		75	0	19.21	19.08	18.93	3	20

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Bandwidth	Modulation	RB Size	RB Offset		erage Powe	r (dBm)	Target	Target
Danuwiuth	Modulation	KD SIZE	KD Oliset	55340	55990	56640	MPR (dB)	Power
				3560 MHz	3625 MHz	3690 MHz		
		1	0	22.27	22.07	21.36	0	23
		1	49	22.21	22.05	21.79	0	23
		1	99	22.02	21.73	22.10	0	23
	QPSK	50	0	21.36	21.24	20.38	1	22
		50	25	21.44	21.07	20.57	1	22
		50	49	21.32	21.09	21.09	1	22
		100	0	21.34	21.19	20.86	1	22
		1	0	21.43	21.27	20.40	1	22
		1	49	21.55	21.26	20.93	1	22
		1	99	21.25	21.02	21.39	1	22
20 MHz	16QAM	50	0	20.52	20.23	19.38	2	21
		50	25	20.45	20.07	19.68	2	21
		50	49	20.35	20.09	20.07	2	21
		100	0	20.49	20.22	19.84	2	21
		1	0	20.37	20.17	19.50	2	21
		1	49	20.35	20.01	19.90	2	21
		1	99	20.16	19.79	20.15	2	21
	64QAM	50	0	19.52	19.24	18.53	3	20
		50	25	19.45	19.24	18.69	3	20
		50	49	19.33	19.17	19.13	3	20
		100	0	19.50	19.20	18.90	3	20

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	Max.Average Power (dBm)		ANT	ANT E.I.R.P (dBm/10 MHz) Gain			Limit		
Bandwidth	Modulation	55265	55990	56715	(dBi)	55265	55990	56715	(dBm/
		3552.5	3625	3697.5	(UDI)	3552.5	3625	3697.5	10 MHz)
		MHz	MHz	MHz		MHz	MHz	MHz	
	QPSK	22.20	22.03	22.31		19.50	19.33	19.61	
5 MHz	16QAM	21.52	21.22	21.44	-2.7	18.82	18.52	18.74	23.00
	64QAM	20.37	20.10	20.32		17.67	17.40	17.62	

	Max.Average Power (dBm)		ANT	E.I.R.F	Limit				
Bandwidth	Modulation	55290	55990	56690	Gain (dBi)	55290	55990	56690	(dBm/
		3555	3625	3695	(UDI)	3555	3625	3695	10 MHz)
		MHz	MHz	MHz		MHz	MHz	MHz	
	QPSK	22.29	22.09	22.13		19.59	19.39	19.43	
10 MHz	16QAM	21.63	21.32	21.40	-2.7	18.93	18.62	18.70	23.00
	64QAM	20.43	20.06	20.15		17.73	17.36	17.45	



		Max.Average Power (dBm)		0		ANT	E.I.R.F	የ (dBm/1	0 MHz)	Limit
Bandwidth	Modulation	55315	55990	56665	Gain (dBi)	55315	55990	56665	(dBm/	
		3557.5	3625	3692.5	(UDI)	3557.5	3625	3692.5	10 MHz)	
		MHz	MHz	MHz		MHz	MHz	MHz		
	QPSK	22.06	22.06	21.95		19.36	19.36	19.25		
15 MHz	16QAM	21.50	21.25	21.27	-2.7	18.80	18.55	18.57	23.00	
	64QAM	20.30	20.00	19.98		17.60	17.30	17.28		

		Max.A	Max.Average Power (dBm)		ANT Gain	E.I.R.F	P (dBm/1	0 MHz)	Limit
Bandwidth	Modulation	55340	55990	56640	(dBi)	55340	55990	56640	(dBm/
		3560	3625	3690	(UDI)	3560	3625	3690	10 MHz)
		MHz	MHz	MHz		MHz	MHz	MHz	
	QPSK	22.27	22.07	22.10		19.57	19.37	19.40	
20 MHz	16QAM	21.55	21.27	21.39	-2.7	18.85	18.57	18.69	23.00
_	64QAM	20.37	20.17	20.15		17.67	17.47	17.45	

Note:

EIRP (dBm) = Conducted Power (dBm) + antenna gain (dBi)



#### **8.2 RADIATED SPURIOUS EMISSIONS**

MODE:	LTE B48
MODULATION SIGNAL:	5 MHz QPSK
DISTANCE:	1 meters

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	Detector	RB	
										Size	Offset
	7 105.00	-56.47	10.50	-49.43	4.36	Н	-43.29	-40.00	Average	1	
55265 (3552.5)	10 657.50	-63.87	11.10	-51.74	5.49	Н	-46.13	-40.00	Peak		0
	14 210.00	-61.81	12.40	-52.64	6.45	Н	-46.69	-40.00	Peak		
	7 250.00	-58.56	10.10	-50.64	4.42	Н	-44.96	-40.00	Peak	1	0
55990 (3625.0)	10 875.00	-64.59	11.20	-53.33	5.53	Н	-47.66	-40.00	Peak		
	14 500.00	-57.77	12.90	-50.96	6.49	Н	-44.55	-40.00	Peak		
56715 (3697.5)	7 395.00	-56.95	10.70	-49.42	4.47	V	-43.18	-40.00	Peak	1	-
	11 092.50	-63.58	11.30	-52.25	5.58	Н	-46.53	-40.00	Peak		0
	14 790.00	-57.25	13.10	-51.26	6.56	Н	-44.72	-40.00	Peak		



LTE B48
10 MHz QPSK
1 meters

DISTANCE:

MODULATION SIGNAL:

MODE:

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	Detector	RB	
										Size	Offset
	7 110.00	-56.25	10.50	-49.18	4.35	Н	-43.03	-40.00	Average	1	0
55290 (3555.0)	10 665.00	-63.54	11.00	-51.94	5.48	Н	-46.42	-40.00	Peak		
(3333.0)	14 220.00	-60.48	12.40	-51.25	6.44	Н	-45.29	-40.00	Peak		
55000	7 250.00	-56.90	10.10	-48.98	4.42	Н	-43.30	-40.00	Peak		
55990 (3625.0)	10 875.00	-64.52	11.20	-53.26	5.53	Н	-47.59	-40.00	Peak	1	0
(3023.0)	14 500.00	-56.91	12.90	-50.10	6.49	Н	-43.69	-40.00	Peak		
56690 (3695.0)	7 390.00	-57.75	10.60	-50.17	4.46	V	-44.03	-40.00	Peak	1	0
	11 085.00	-64.33	11.30	-53.19	5.59	V	-47.48	-40.00	Peak		
	14 780.00	-57.60	13.10	-51.50	6.56	V	-44.96	-40.00	Peak		



MODE:

DISTANCE:

MODULATION SIGNAL:

LTE B48
<u>15 MHz QPSK</u>
1 meters

Ch	Freq (MHz)	Measured Level (dBm)		Substitute Level (dBm)	C.L	Pol	Result (dBm)	Limit (dBm)	Detector	RB	
										Size	Offset
	7 115.00	-56.25	10.50	-49.19	4.37	Н	-43.06	-40.00	Average		
55315 (3557.5)	10 672.50	-62.81	11.10	-51.64	5.47	Н	-46.01	-40.00	Peak	1	0
	14 230.00	-60.06	12.40	-51.26	6.44	Н	-45.30	-40.00	Peak		
	7 250.00	-59.65	10.10	-51.73	4.42	Н	-46.05	-40.00	Average		
55990 (3625.0)	10 875.00	-64.50	11.20	-53.24	5.53	Н	-47.57	-40.00	Peak	1	0
(3023.0)	14 500.00	-57.75	12.90	-50.94	6.49	Н	-44.53	-40.00	Peak		
56665 (3692.5)	7 385.00	-57.73	10.60	-50.07	4.45	V	-43.92	-40.00	Peak		
	11 077.50	-65.54	11.30	-54.22	5.60	Н	-48.52	-40.00	Peak	1	0
	14 770.00	-58.40	13.10	-52.30	6.58	Н	-45.78	-40.00	Peak	1	



MODE:

DISTANCE:

MODULATION SIGNAL:

LTE B48
20 MHz QPSK
1 meters

Ch	Freq (MHz)	Measured Level (dBm)	Ant. Gain (dBi)	Substitute Level (dBm)	~ 1	Pol	Result (dBm)	Limit (dBm)	Detector	RB	
					C.L					Size	Offset
	7,120.00	-56.29	10.50	-49.18	4.39	Н	-43.07	-40.00	Average		
55340 (3560.0)	10,680.00	-63.86	11.10	-52.39	5.46	Н	-46.75	-40.00	Peak	1	0
	14,240.00	-58.76	12.40	-49.90	6.44	Н	-43.94	-40.00	Peak		
	7,250.00	-57.95	10.10	-50.03	4.42	Н	-44.35	-40.00	Peak		
55990 (3625.0)	10,875.00	-63.07	11.20	-51.81	5.53	V	-46.14	-40.00	Peak	1	0
(3023.0)	14,500.00	-56.87	12.90	-50.06	6.49	V	-43.65	-40.00	Peak		
56640 (3690.0)	7,380.00	-57.56	10.60	-49.80	4.45	V	-43.65	-40.00	Peak		
	11,070.00	-64.32	11.30	-52.60	5.61	V	-46.91	-40.00	Peak	1	0
(3030.0)	14,760.00	-58.52	13.10	-52.55	6.58	V	-46.03	-40.00	Peak		



## 8.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB )
			QPSK	25		5.18
	5 MHz		16-QAM		0	5.89
			64-QAM			6.12
	10 MHz		QPSK	50		5.24
		z 3625.0	16-QAM			5.96
40			64-QAM			6.12
48			QPSK			5.06
	15 MHz		16-QAM			5.89
			64-QAM			6.13
	20 MHz		QPSK			4.95
			16-QAM	100		5.78
			64-QAM			6.07

Note:

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



# 8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data ( MHz )
			QPSK			4.5003
	5 MHz		16-QAM	25		4.4781
			64-QAM			4.4962
	10 MHz	_	QPSK	50	0	8.9926
			16-QAM			8.9221
10		2025.0	64-QAM			8.9540
48		- 3625.0	QPSK			13.506
	15 MHz		16-QAM			13.463
			64-QAM			13.433
	20 MHz		QPSK			17.944
			16-QAM	100		17.865
			64-QAM			17.964

Note:

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



Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
		3552.5	35.7525	32.510	-78.554	-46.044	
	5	3625.0	36.3630	32.510	-79.070	-46.560	
		3697.5	35.9225	32.510	-78.652	-46.142	
		3555.0	36.1925	32.510	-78.659	-46.149	
	10	3625.0	36.4080	32.510	-78.701	-46.191	
48		3695.0	36.4080	32.510	-78.567	-46.057	40.00
40		3557.5	36.1240	32.510	-78.847	-46.337	-40.00
	15	3625.0	36.4085	32.510	-78.839	-46.329	
		3692.5	36.4190	32.510	-78.799	-46.289	
	20	3560.0	36.4185	32.510	-77.908	-45.398	
		3625.0	36.2725	32.510	-78.209	-45.699	
		3690.0	36.4795	32.510	-78.072	-45.562	

### **8.5 CONDUCTED SPURIOUS EMISSIONS**

## Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 140 ~ 163.

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	27.600
1 – 5	30.243
5 – 10	30.965
10 – 15	31.571
15 – 20	31.935
Above 20(26.5)	32.510





### 8.6 CHANNEL EDGE

		Freq.	Outside of the authorized band (dBm)							
BW	RB			Lower Side(MHz)				Upper Side(MHz)		
(MHz)	(Size/ Offset)	(MHz)	Below 3530 MHz	-[B]MHz ~ 3530 MHz	-1 MHz ~ -[B]MHz	0 MHz ~ -1 MHz	0 MHz ~ +1 MHz	1 MHz ~ +[B]MHz	+[B]MHz ~ 3720 MHz	Above 3720 MHz
		3552.5	-53.71	-36.22	-17.82	-23.41	-24.30	-17.49	-36.18	-
5	25/0	3625.0	-	-36.72	-20.54	-25.15	-25.40	-20.12	-36.78	-
		3697.5	-	-37.09	-23.11	-25.52	-25.83	-22.29	-37.22	-51.61
		3555.0	-50.12	-41.60	-19.62	-27.47	-27.26	-19.91	-41.47	-
10	50/0	3625.0	-	-42.89	-22.67	-29.77	-29.39	-22.15	-43.17	-
		3695.0	-	-42.36	-24.70	-31.31	-31.31	-24.00	-41.10	-51.40
		3557.5	-46.28	-32.34	-22.28	-28.80	-28.68	-21.66	-44.57	-
15	75/0	3625.0	-	-44.19	-24.13	-30.90	-30.77	-24.26	-44.67	-
		3692.5	-	-43.71	-27.07	-33.67	-33.48	-27.02	-35.54	-49.88
		3560.0	-46.26	-29.45	-21.79	-28.51	-28.93	-22.57	-45.82	-
20	100/0	3625.0	-	-45.80	-24.49	-30.34	-30.50	-24.44	-45.92	-
		3690.0	-	-44.08	-27.26	-33.40	-33.78	-27.68	-32.07	-46.21
	Limit (dBm)		-40.00	-25.00	-13.00	-13.00	-13.00	-13.00	-25.00	-40.00



					Outside	of the auth	norized band (dBm)				
BW	RB	Freq. et) (MHz)	Lower Side(MHz)				Upper Side(MHz)				
(MHz)	(Size/ Offset)		Below 3530 MHz	-[B]MHz ~ 3530 MHz	-1 MHz ~ -[B]MHz	0 MHz ~ -1 MHz	0 MHz ~ +1 MHz	1 MHz ~ +[B]MHz	+[B]MHz ~ 3720 MHz	Above 3720 MHz	
		3552.5	-52.11	-35.71	-24.02	-18.43	-19.21	-24.51	-36.46	_	
5	Lower Side: 1/0	3625.0	-	-36.32	-24.42	-19.13	-19.87	-24.60	-36.74	-	
	Upper Side: 1/24	3697.5	-	-36.41	-24.62	-19.39	-19.81	-24.47	-36.07	-51.15	
		3555.0	-52.22	-41.42	-21.66	-16.32	-16.70	-22.55	-41.39	-	
10	Lower Side: 1/0 Upper Side: 1/49	3625.0	-	-41.70	-22.61	-17.41	-17.41	-23.14	-41.62	-	
	opper side. 1/49	3695.0	-	-41.15	-21.13	-17.79	-17.44	-22.91	-40.48	-50.65	
		3557.5	-51.41	-41.53	-24.75	-21.20	-20.85	-24.90	-41.79	-	
15	Lower Side: 1/0 Upper Side: 1/74	3625.0	-	-41.88	-25.31	-21.91	-22.10	-25.59	-41.22	-	
		3692.5	-	-42.08	-25.94	-22.52	-21.72	-25.03	-40.78	-50.78	
		3560.0	-48.58	-41.22	-25.18	-25.03	-25.90	-26.41	-50.10	-	
20	20 Lower Side: 1/0 Upper Side: 1/99	3625.0	-	-52.00	-25.76	-25.52	-26.77	-26.49	-50.48	-	
	opper Side. 1/33	3690.0	-	-51.88	-26.23	-25.62	-26.06	-25.79	-39.87	-48.87	
	Limit (dBm)		-40.00	-25.00	-13.00	-13.00	-13.00	-13.00	-25.00	-40.00	

Note:

1. C.E = Channel Edge

2. Plots of the EUT's Channel Edge are shown Page 96 ~ 139.



RB Band		Frequency -	Adjacent Channel I	_eakage Ratio(dB)				
Width	(Size/ Offset)	(MHz)	Lower Side	Upper Side				
		3552.5	35.37	34.85				
5 MHz	25/0	3625.0	36.37	35.85				
		3697.5	38.13	37.64				
		3555.0	35.92	35.69				
10 MHz	50/0	3625.0	37.61	37.26				
		3695.0	40.25	40.04				
						3557.5	36.53	36.36
15 MHz	75/0	3625.0	37.91	37.54				
		3692.5	40.50	40.45				
		3560.0	36.07	35.78				
20 MHz 100/0	100/0	3625.0	37.80	37.17				
	3690.0	40.45	40.08					
	Limit (dB	)	ACLR > 30 dB	ACLR > 30 dB				

# 8.7 Adjacent Channel Leakage Ratio(ACLR)

## Note:

1. Duty Cycle factor already applied on the factor.

- Duty Cycle factor(dB) = 3.979

- Factor(dB) = Duty Cycle factor + Cable Loss + Ext. Attenuator + Power Splitter

2. Plots of the EUT's Adjacent Channel Leakage Ratio(ACLR) are shown Page 84 ~ 95.



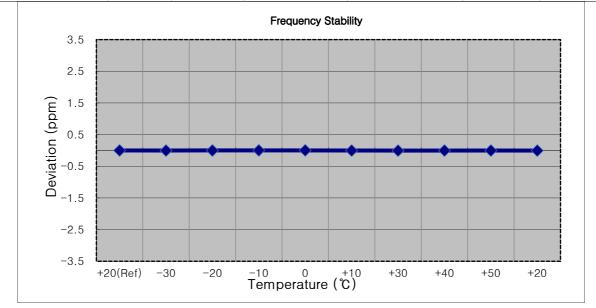
# 8.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

- OPERATING FREQUENCY:
- BANDWIDTH:
- REFERENCE VOLTAGE:
- DEVIATION LIMIT:

3,552,500,000 Hz

- 5 MHz
- 3.300 VDC

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation		
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	ppm	
100 %		+20(Ref)	3552 499 992	0.0	0.000 000	0.000	
100 %		-30	3552 499 982	-10.1	0.000 000	-0.003	
100 %		-20	3552 499 988	-4.2	0.000 000	-0.001	
100 %		-10	3552 500 001	8.7	0.000 000	0.002	
100 %	3.300	0	3552 500 001	8.7	0.000 000	0.002	
100 %		+10	3552 499 980	-12.5	0.000 000	-0.004	
100 %		+30	3552 499 974	-18.4	-0.000 001	-0.005	
100 %		+40	3552 499 983	-9.6	0.000 000	-0.003	
100 %		+50	3552 499 982	-10.8	0.000 000	-0.003	
Batt. Endpoint	2.800	+20	3552 499 976	-16.7	0.000 000	-0.005	





	OPERATING FREQUENCY:
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3,555,000,000 Hz

BANDWIDTH:

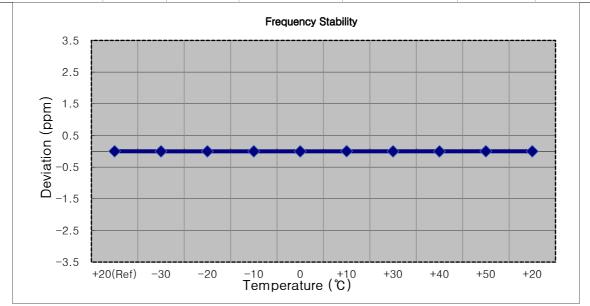
REFERENCE VOLTAGE:

DEVIATION LIMIT:

3.300 VDC

10 MHz

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation		
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	ppm	
100 %		+20(Ref)	3554 999 993	0.0	0.000 000	0.000	
100 %	-	-30	3554 999 982	-11.8	0.000 000	-0.003	
100 %	-	-20	3554 999 984	-9.5	0.000 000	-0.003	
100 %	-	-10	3554 999 987	-6.6	0.000 000	-0.002	
100 %	3.300	0	3554 999 977	-16.1	0.000 000	-0.005	
100 %		+10	3555 000 000	6.3	0.000 000	0.002	
100 %		+30	3554 999 981	-12.6	0.000 000	-0.004	
100 %		+40	3554 999 979	-14.7	0.000 000	-0.004	
100 %		+50	3554 999 989	-4.4	0.000 000	-0.001	
Batt. Endpoint	2.800	+20	3554 999 988	-5.3	0.000 000	-0.001	





OPERATING FREQUENCY:
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3,557,500,000 Hz

REFERENCE VOLTAGE:

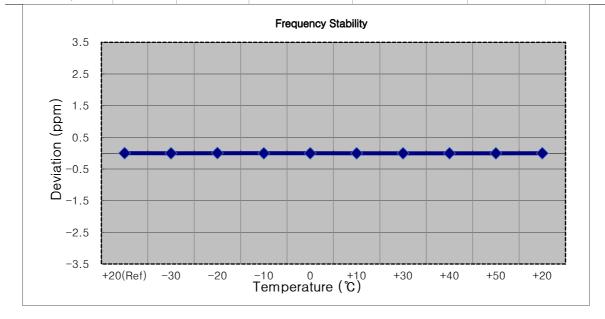
DEVIATION LIMIT:

3.300 VDC

<u>15 MHz</u>

Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation		
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	ppm	
100 %		+20(Ref)	3557 499 985	0.0	0.000 000	0.000	
100 %		-30	3557 499 973	-12.2	0.000 000	-0.003	
100 %	-	-20	3557 499 997	12.0	0.000 000	0.003	
100 %	-	-10	3557 499 974	-11.0	0.000 000	-0.003	
100 %	3.300	0	3557 499 972	-12.9	0.000 000	-0.004	
100 %		+10	3557 499 969	-15.7	0.000 000	-0.004	
100 %		+30	3557 499 970	-14.7	0.000 000	-0.004	
100 %		+40	3557 499 974	-10.9	0.000 000	-0.003	
100 %		+50	3557 499 970	-15.2	0.000 000	-0.004	
Batt. Endpoint	2.800	+20	3557 499 976	-9.1	0.000 000	-0.003	





	OPERATING FREQUENCY:	
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<u>3,560,000,000 Hz</u>

<u>20 MHz</u>

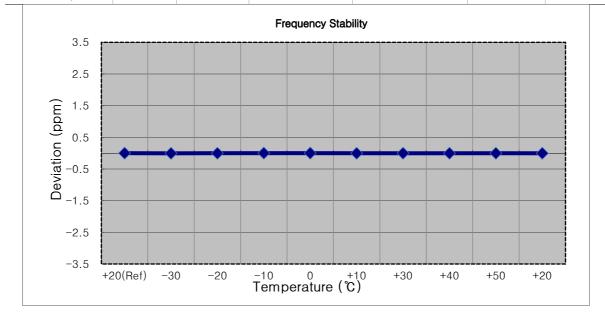
DANDWIDIN:

REFERENCE VOLTAGE:

DEVIATION LIMIT:

3.300 VDC

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	ppm
100 %		+20(Ref)	3559 999 986	0.0	0.000 000	0.000
100 %	-	-30	3559 999 968	-17.7	0.000 000	-0.005
100 %	-	-20	3559 999 975	-11.2	0.000 000	-0.003
100 %	-	-10	3559 999 991	5.1	0.000 000	0.001
100 %	3.300	0	3559 999 992	6.0	0.000 000	0.002
100 %		+10	3559 999 971	-15.2	0.000 000	-0.004
100 %		+30	3559 999 979	-6.3	0.000 000	-0.002
100 %		+40	3559 999 975	-10.8	0.000 000	-0.003
100 %		+50	3559 999 978	-7.5	0.000 000	-0.002
Batt. Endpoint	2.800	+20	3559 999 973	-12.8	0.000 000	-0.004





OPERATING FREQUENCY:
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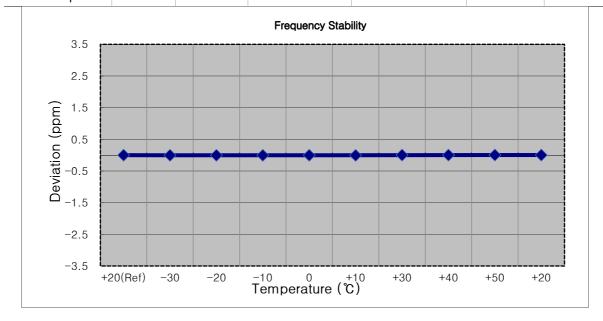
3,625,000,000 Hz

5 MHz 3.300 VDC

DEVIATION LIMIT:

REFERENCE VOLTAGE:

Voltage	Power	Temp.		Frequency Error	Deviation	
(%)	(VDC)	(°C)		(Hz)	(%)	ppm
100 %		+20(Ref)	3624 999 990	0.0	0.000 000	0.000
100 %		-30	3624 999 975	-14.7	0.000 000	-0.004
100 %		-20	3624 999 976	-13.9	0.000 000	-0.004
100 %		-10	3624 999 976	-13.9	0.000 000	-0.004
100 %	3.300	0	3624 999 982	-7.5	0.000 000	-0.00
100 %	-	+10	3624 999 970	-20.3	-0.000 001	-0.00
100 %	-	+30	3624 999 999	8.7	0.000 000	0.002
100 %		+40	3624 999 999	9.1	0.000 000	0.003
100 %		+50	3625 000 005	15.4	0.000 000	0.004
att. Endpoint	2.800	+20	3625 000 003	13.3	0.000 000	0.004





	OPERATING FREQUENCY:
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3,625,000,000 Hz

10 MHz

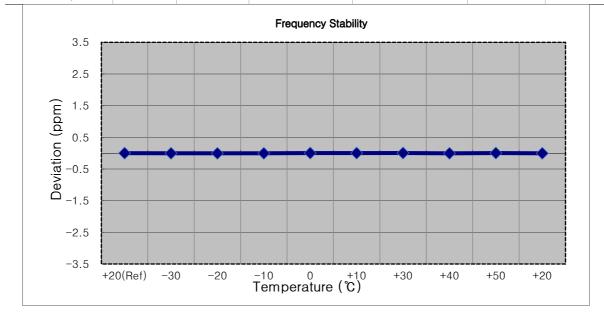
REFERENCE VOLTAGE:

DEVIATION LIMIT:

3.300 VDC

Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	ppm
100 %		+20(Ref)	3624 999 986	0.0	0.000 000	0.000
100 %		-30	3624 999 972	-13.7	0.000 000	-0.004
100 %		-20	3624 999 968	-17.3	0.000 000	-0.005
100 %		-10	3624 999 971	-14.5	0.000 000	-0.004
100 %	3.300	0	3624 999 997	11.8	0.000 000	0.003
100 %		+10	3624 999 993	7.4	0.000 000	0.002
100 %		+30	3625 000 000	14.7	0.000 000	0.004
100 %		+40	3624 999 967	-18.4	-0.000 001	-0.005
100 %		+50	3624 999 998	12.0	0.000 000	0.003
Batt. Endpoint	2.800	+20	3624 999 971	-14.8	0.000 000	-0.004





OPERATING FREQUENCY:
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<u>3,625,000,000 Hz</u>

<u>15 MHz</u>

DANDWIDTH.

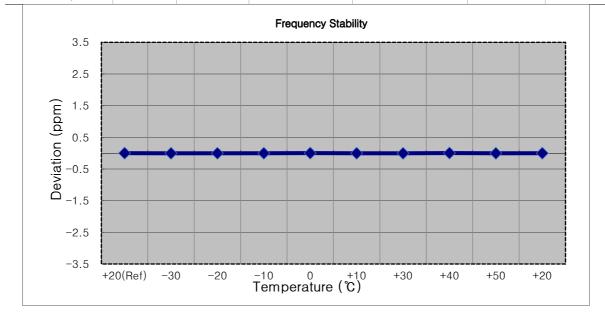
REFERENCE VOLTAGE:

DEVIATION LIMIT:

3.300 VDC

Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	ppm
100 %		+20(Ref)	3624 999 985	0.0	0.000 000	0.000
100 %	-	-30	3624 999 969	-15.9	0.000 000	-0.004
100 %	-	-20	3624 999 972	-13.2	0.000 000	-0.004
100 %		-10	3624 999 975	-9.7	0.000 000	-0.003
100 %	3.300	0	3624 999 993	8.1	0.000 000	0.002
100 %	-	+10	3624 999 972	-12.8	0.000 000	-0.004
100 %	-	+30	3624 999 968	-16.8	0.000 000	-0.005
100 %	-	+40	3624 999 997	12.1	0.000 000	0.003
100 %		+50	3624 999 971	-13.8	0.000 000	-0.004
Batt. Endpoint	2.800	+20	3624 999 979	-5.6	0.000 000	-0.002



F-TP22-03 (Rev. 06)



	OPERATING FREQUENCY:	
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3,625,000,000 Hz

<u>20 MHz</u>

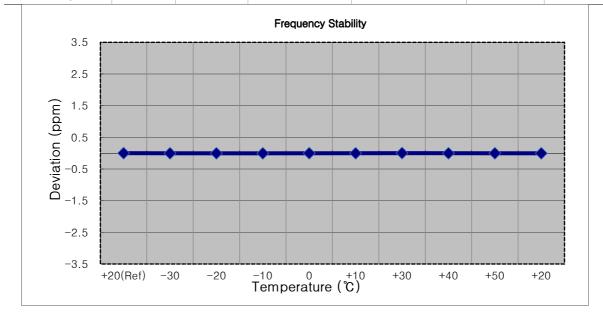
REFERENCE VOLTAGE:

DEVIATION LIMIT:

3.300 VDC

Emission must remain in band

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	ppm
100 %		+20(Ref)	3624 999 991	0.0	0.000 000	0.000
100 %	-	-30	3624 999 977	-13.4	0.000 000	-0.004
100 %	-	-20	3624 999 975	-15.5	0.000 000	-0.004
100 %		-10	3624 999 972	-19.0	-0.000 001	-0.005
100 %	3.300	0	3624 999 985	-6.0	0.000 000	-0.002
100 %	-	+10	3624 999 975	-15.6	0.000 000	-0.004
100 %	-	+30	3625 000 001	10.9	0.000 000	0.003
100 %		+40	3624 999 978	-12.4	0.000 000	-0.003
100 %		+50	3624 999 979	-12.0	0.000 000	-0.003
Batt. Endpoint	2.800	+20	3624 999 975	-15.2	0.000 000	-0.004



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	OPERATING FREQUENCY:
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3,697,500,000 Hz

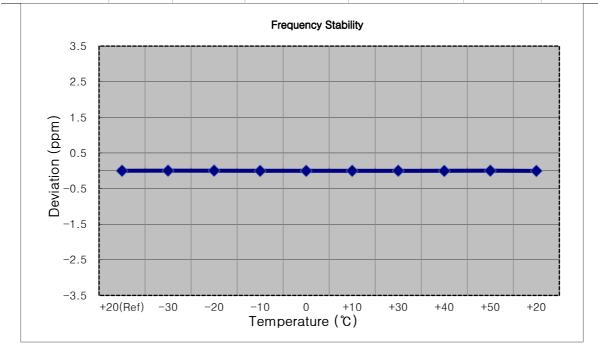
5 MHz

REFERENCE VOLTAGE:

DEVIATION LIMIT:

3.300 VDC

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	ppm
100 %		+20(Ref)	3697 499 991	0.0	0.000 000	0.000
100 %		-30	3697 500 002	11.3	0.000 000	0.003
100 %	-	-20	3697 500 005	14.2	0.000 000	0.004
100 %	-	-10	3697 499 977	-13.2	0.000 000	-0.004
100 %	3.300	0	3697 499 984	-6.8	0.000 000	-0.002
100 %		+10	3697 499 983	-7.9	0.000 000	-0.002
100 %		+30	3697 499 996	5.0	0.000 000	0.001
100 %		+40	3697 499 974	-16.5	0.000 000	-0.004
100 %		+50	3697 499 999	8.0	0.000 000	0.002
Batt. Endpoint	2.800	+20	3697 499 977	-13.2	0.000 000	-0.004





	OPERATING FREQUENCY:
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3,695,000,000 Hz

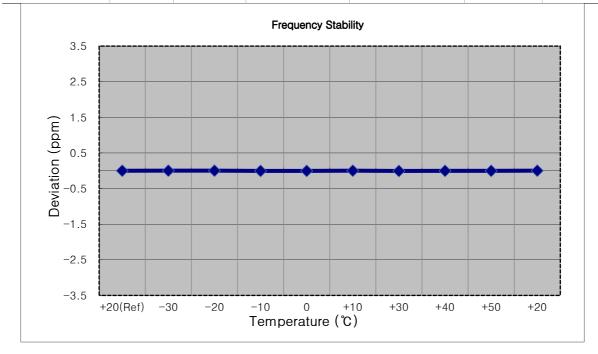
REFERENCE VOLTAGE:

DEVIATION LIMIT:

3.300 VDC

10 MHz

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation		
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	ppm	
100 %		+20(Ref)	3695 000 012	0.0	0.000 000	0.000	
100 %		-30	3695 000 022	10.4	0.000 000	0.003	
100 %	_	-20	3695 000 021	9.7	0.000 000	0.003	
100 %		-10	3694 999 996	-15.5	0.000 000	-0.004	
100 %	3.300	0	3694 999 999	-12.7	0.000 000	-0.003	
100 %		+10	3695 000 020	8.2	0.000 000	0.002	
100 %		+30	3694 999 992	-19.5	-0.000 001	-0.005	
100 %	-	+40	3695 000 004	-7.6	0.000 000	-0.002	
100 %		+50	3695 000 003	-9.1	0.000 000	-0.002	
Batt. Endpoint	2.800	+20	3695 000 023	10.9	0.000 000	0.003	





	OPERATING FREQUENCY:
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3,692,500,000 Hz

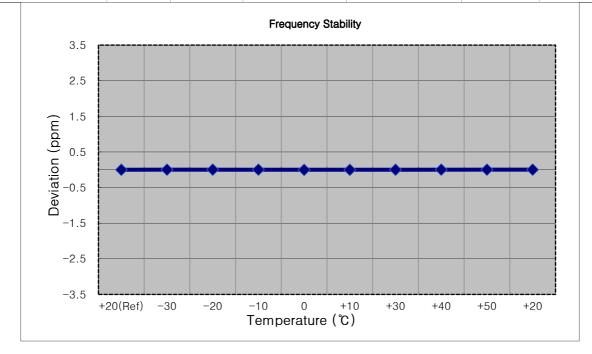
REFERENCE VOLTAGE:

DEVIATION LIMIT:

3.300 VDC

15 MHz

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	ppm
100 %		+20(Ref)	3692 500 014	0.0	0.000 000	0.000
100 %		-30	3692 500 026	11.3	0.000 000	0.003
100 %		-20	3692 500 027	12.4	0.000 000	0.003
100 %		-10	3692 500 026	11.8	0.000 000	0.003
100 %	3.300	0	3692 500 006	-8.0	0.000 000	-0.002
100 %		+10	3692 500 009	-5.3	0.000 000	-0.001
100 %		+30	3692 500 021	6.6	0.000 000	0.002
100 %		+40	3692 500 028	13.2	0.000 000	0.004
100 %		+50	3692 500 026	11.8	0.000 000	0.003
Batt. Endpoint	2.800	+20	3692 500 027	12.4	0.000 000	0.003





	OPERATING FREQUENCY:
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<u>3,690,000,000 Hz</u>

<u>20 MHz</u>

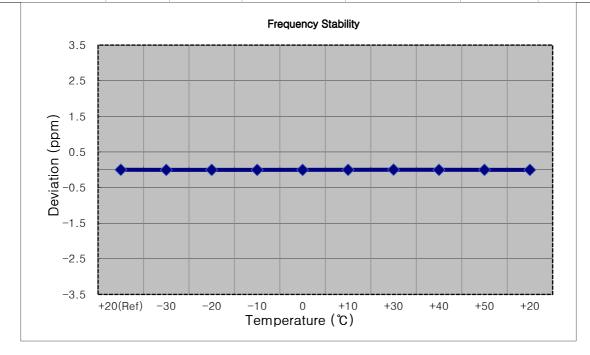
E DANDWIDTH.

REFERENCE VOLTAGE:

DEVIATION LIMIT:

3.300 VDC

Voltage	Power	Temp.	Frequency	Frequency Error	Deviation	
(%)	(VDC)	(°C)	(Hz)	(Hz)	(%)	ppm
100 %		+20(Ref)	3689 999 988	0.0	0.000 000	0.000
100 %		-30	3689 999 976	-12.0	0.000 000	-0.003
100 %		-20	3689 999 978	-9.2	0.000 000	-0.002
100 %		-10	3689 999 978	-9.2	0.000 000	-0.002
100 %	3.300	0	3689 999 976	-11.4	0.000 000	-0.003
100 %		+10	3689 999 980	-7.4	0.000 000	-0.002
100 %	-	+30	3689 999 999	11.1	0.000 000	0.003
100 %		+40	3689 999 978	-9.5	0.000 000	-0.003
100 %		+50	3689 999 980	-7.4	0.000 000	-0.002
Batt. Endpoint	2.800	+20	3689 999 975	-12.5	0.000 000	-0.003





8.9 End User Device Additional Requirements (CBSD Protocol)

RF 50 Q AC Center Freq 3.61000000	0 GHz	SENSE:INT Center Freq: 3.610000000 Trig: Free Run Avg Atten: 10 dB		Radio Std		Frequency	
10 dB/div Ref 10.00 dB	AN OUNLOW	Atten: 10 dB		Radio Dev	Ace: BTS		
-og 0.00 10.0 20.0	the	waryalthmananagagaan	rehantel			Center Fre 3.610000000 GH	
40.0							
50.0 70.0 <mark>%~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~</mark>			- Inter	www.ynardfin	Mahmmillio		
Center 3.61 GHz Res BW 390 kHz		VBW 4 MHz		Spa Swe	n 40 MHz eep 1 ms	CF Ste 4.000000 MH <u>Auto</u> Ma	
Occupied Bandwid 1	<sup>th</sup> 8.018 MH:	Total Powe Z	r 1.49	9 dBm		Freq Offs 0 H	
Transmit Freq Error x dB Bandwidth	-90.895 kH 18.72 MH			9.00 % .00 dB			
SG			STATUS	5			

## Test#1: 3610 MHz(BW: 20 MHz)

**Operation Mode** 





### Stop Operation Within 10 s



#### Note:

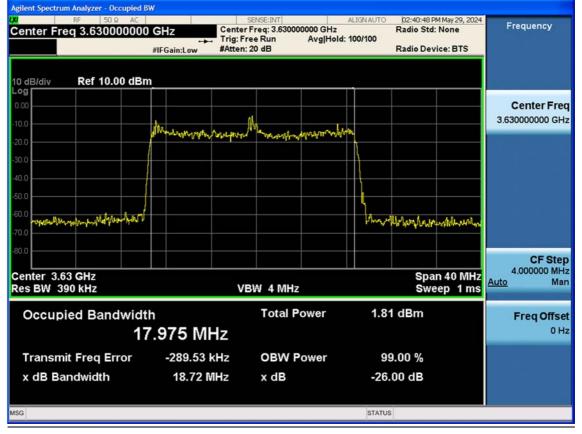
Marker 2: CBSD sends instructions to discontinue LTE operations.

Marker 1 $\triangle$ 2: EUT discontinues operation. (0.07 s)

Marker 3∆4: 10 seconds elapsed time from CBSD sending instructions to EUT.(10.0 s)



### Test#1: 3630 MHz(BW: 20 MHz)



**Operation Mode** 





## Stop Operation Within 10 s

enter F	RF 50 Ω req 3.630000		SENSE:IN	Avg	ALIGN AUTO Type: Log-Pwr Hold: 1/1	02:42:10 PM May 29, 2024 TRACE 1 2 3 4 5 6 TYPE MWWWWW	Frequency
0 dB/div	Ref 20.00 dB	IFGain:Low				ΔMkr3 10.00 s -47.046 dB	Auto Tune
10.0 0.00 10.0		~ <b>`</b>	2				Center Free 3.630000000 GH
20.0 30.0 40.0			142	manutana	3∆4	na la ma de que ne entre	Start Free 3.630000000 GH:
50.0 60.0 70.0							<b>Stop Fre</b> 3.630000000 GH
enter 3.0 tes BW 8	530000000 GH MHz		W 50 MHz		Sweep	Span 0 Hz 30.00 s (1001 pts)	CF Ste 8.000000 MH
MODE         TF           1         Δ2         1           2         F         1           3         Δ4         1           4         F         1           5         6         6	ic scl t (Δ) t t (Δ) t t	× 90.00 ms 10.77 s 10.00 s 10.77 s	8.072 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	Auto Ma Freq Offse 0 H
7 8 9 0 1							
G					STATUS		

## Note:

Marker 2: CBSD sends instructions to discontinue LTE operations.

Marker 1 $\triangle$ 2: EUT discontinues operation. (0.09 s)

Marker 3 $\triangle$ 4: 10 seconds elapsed time from CBSD sending instructions to EUT.(10.0 s)



Report No. HCT-RF-2406-FC007-R1

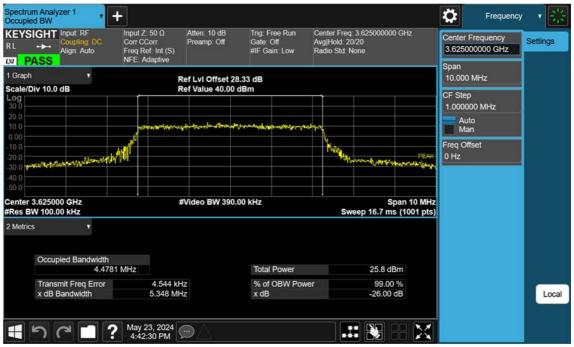
# 9. TEST PLOTS



Graph v scale/Div 10.0 dB				Radio Std: None		3.625000000 GHz	
00		ef LvI Offset 28.3 ef Value 40.00 dE				Span 10.000 MHz CF Step	
og 20.0 10.0	yurayahainya	ymenname fleiden	enraderation for the second	~~		1.000000 MHz Auto Man	
0.00 10.0 20.0 30.0 40.0 0				Murchadu	PEAK Winghon of Mark Radings	Freq Offset 0 Hz	
enter 3.625000 GHz Res BW 100.00 kHz	#	Video BW 390.00	l kHz	Sweep 16	Span 10 MHz .7 ms (1001 pts)		
Metrics   Occupied Bandwidth  4,5003	3 MHz		Total Power	27	7.0 dBm		
Transmit Freq Error x dB Bandwidth	4.942 kH: 5.340 MH:		% of OBW Pow x dB	er	99.00 % 6.00 dB		Loca

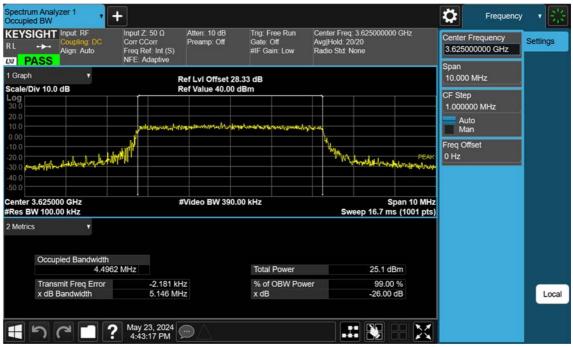
# BAND 48. Occupied Bandwidth Plot (5 MHz Ch.55990 QPSK RB 25)





### BAND 48. Occupied Bandwidth Plot (5 MHz Ch.55990 16-QAM RB 25)





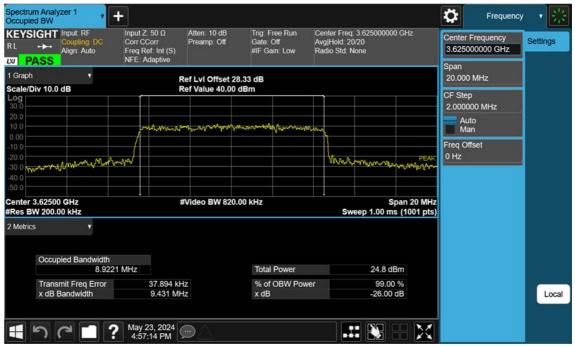
### BAND 48. Occupied Bandwidth Plot (5 MHz Ch.55990 64-QAM RB 25)



Spectrum Analyzer 1 Occupied BW KEYSIGHT Input RF RL Align: Au PASS	DC Corr CCorr		Trig: Free Run Gate: Off #IF Gain: Low	Center Freq: 3 Avg Hold: 20/2 Radio Std: No		Center Frequency 3.62500000 GHz	sy v 🔆 Settings
1 Graph Scale/Div 10.0 dB		Ref Lvl Offset 28 Ref Value 40.00 d				Span 20.000 MHz CF Step 2.000000 MHz	
20.0 10.0 -10.0 -20.0 -30.0 Any han management			adamana ang ang ang ang ang ang ang ang ang	4	PEAK WWY-WMgAgamaga PEAK	Auto Man Freq Offset 0 Hz	
40.0 -50.0 Center 3.62500 GHz #Res BW 200.00 kHz		#Video BW 820.0	00 kHz		Span 20 MHz ep 1.00 ms (1001 pts)		
	dwidth 8.9926 MHz		Total Power		25.6 dBm		
Transmit Freq x dB Bandwidt		2 kHz I MHz	% of OBW Pow x dB	er	99.00 % -26.00 dB		Local
<b>ה</b>	May 23, 20 4:58:34 Pt	24					

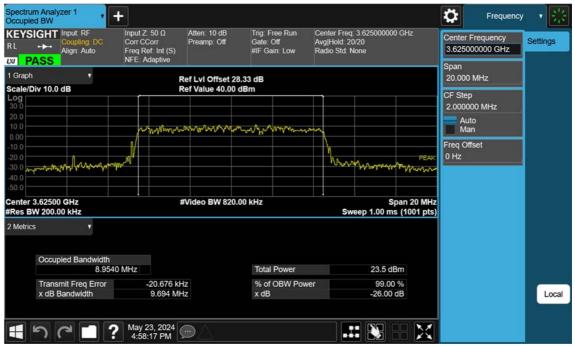
## BAND 48. Occupied Bandwidth Plot (10 MHz Ch.55990 QPSK RB 50)





### BAND 48. Occupied Bandwidth Plot (10 MHz Ch.55990 16-QAM RB 50)





### BAND 48. Occupied Bandwidth Plot (10 MHz Ch.55990 64-QAM RB 50)



		Corr C Freq F	2: 50 Ω Corr Ref: Int (S) Adaptive	Atten: 10 dB Preamp: Off	Gate:	ree Run Off ain: Low	Av	nter Freq g Hold: 20 dio Std: N		) GHz	3.62500	Frequency 00000 GHz	y v 🔀
1 Graph Scale/Div 10.0 dB Log 30.0 20.0	•			Ref LvI Offset 2 Ref Value 40.00							Span 30.000 CF Step 3.00000	00 MHz	
10.0 0.00 -10.0 -20.0 -30.0 -40.0	Joy water		xMichalder/	when hardin	s-New Were North	ndhuma	nch/nc	hora	mp. Marina	PEAK- Murlyhan, in y	Freq Off 0 Hz	n	
-50.0 Center 3.62500 GH #Res BW 300.00 kH 2 Metrics			;	#Video BW 1.2	000 MHz			Sw	Sj eep 1.00 ms	pan 30 MHz s (1001 pts)			
Occupied	13.5	1 506 MHz				Power			26.0 dE				
Transmit F x dB Band			16.556 ki 14.16 Mi		% of x dB	OBW Pow	ver		99.00 -26.00				Local
3		? May 5:17	23, 2024 7:20 PM	$\odot$									

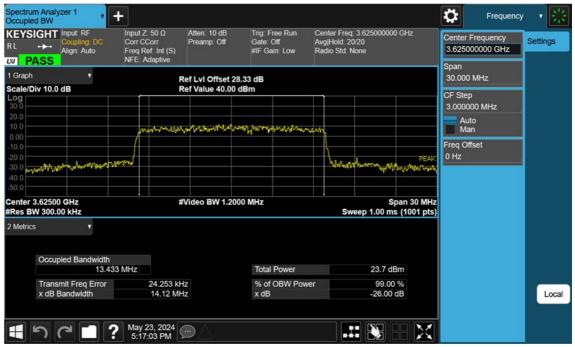
## BAND 48. Occupied Bandwidth Plot (15 MHz Ch.55990 QPSK RB 75)



EYSIGHT Input: RF Coupling: DC Align: Auto	Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive	Atten: 10 dB Preamp: Off	Trig: Free Run Gate: Off #IF Gain: Low	Center Freq: 3.625000000 GH Avg Hold: 20/20 Radio Std: None	Cen	ter Frequency 25000000 GHz	Settings
Graph v cale/Div 10.0 dB		ef LvI Offset 28 ef Value 40.00 c			30.0 CF \$ 3.00	000 MHz Step 00000 MHz	
0.0 0.0 0.0 0.0 0.0 0.0		e de la contraction de la cont	when have been a second se	nor . Mandang markanary ro	Free	Auto Man I Offset Z	
0.0 0.0 enter 3.62500 GHz Res BW 300.00 kHz	#	Video BW 1.200	0 MHz	Span Sweep 1.00 ms (1	30 MHz 001 pts)		
Metrics	3 MHz		Total Power	24.8 dBm			
Transmit Freq Error x dB Bandwidth	-34.022 kH 15.02 MH		% of OBW Pov x dB	ver 99.00 % -26.00 dB			Loca

## BAND 48. Occupied Bandwidth Plot (15 MHz Ch.55990 16-QAM RB 75)





### BAND 48. Occupied Bandwidth Plot (15 MHz Ch.55990 64-QAM RB 75)



		Hoput Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive	Atten: 10 dB Preamp: Off	Trig: Free Run Gate: Off #IF Gain: Low	Center Freq: 3.625000000 GHz Avg Hold: 20/20 Radio Std: None	Center Frequency 3.625000000 GHz Span	ncy v 👬 Settings
1 Graph Scale/Div 10.0 dB Log 30.0 20.0	3		Ref LvI Offset 28 Ref Value 40.00 (	dBm		40.000 MHz CF Step 4.000000 MHz Auto	
10.0 0.00 -10.0 -20.0 -30.0 -40.0 -50.0	manyan			www.inita	when her and a factor	PEAK 0 Hz	
Center 3.62500 G #Res BW 390.00 2 Metrics		#	Video BW 1.600	D0 MHz	Span 4 Sweep 1.00 ms (100		
Transmit	d Bandwidth 17.944 t Freq Error	-40.181 kH		Total Power % of OBW Pow			
x dB Bar		18.88 MH May 23, 2024 5:31:17 PM		x dB	-26.00 dB	X	Local

## BAND 48. Occupied Bandwidth Plot (20 MHz Ch.55990 QPSK RB 100)



Spectrum Analyzer 1 Occupied BW KEYSIGHT Input: RF RL $\leftrightarrow$ Align: Auto	H Input Ζ: 50 Ω Corr CCorr Freq Ref. Int (S) NFE: Adaptive	Atten: 10 dB Preamp: Off	Trig: Free Run Gate: Off #IF Gain: Low	Av	nter Freq: 3.625/ g Hold: 20/20 dio Std: None	000000 GHz		Frequency 0000 GHz	Settings
1 Graph v Scale/Div 10.0 dB Log 30.0		Ref LvI Offset 28 Ref Value 40.00 (					Span 40.000 M CF Step 4.00000		
20.0	howwww.	unantormovagou	Whenthermonus	n¥γ	<u>ــــــــــــــــــــــــــــــــــــ</u>		Auto Man		
-10.0 -20.0 -30.0 styphen a margin and the strip -40.0 -50.0	~~				Languanan	PEAK Alfref abrieve and a second	Freq Offs 0 Hz	et	
Center 3.62500 GHz #Res BW 390.00 kHz	#	Video BW 1.600	00 MHz		Sweep 1.	Span 40 MHz 00 ms (1001 pts)			
2 Metrics • Occupied Bandwidth 17.80	65 MHz		Total Power		2	5.2 dBm			
Transmit Freq Error x dB Bandwidth	1.137 kł 18.80 Mł		% of OBW Pow x dB	er		99.00 % 26.00 dB			Local
4 n C I I	May 23, 2024 5:30:17 PM	$\square$							

## BAND 48. Occupied Bandwidth Plot (20 MHz Ch.55990 16-QAM RB 100)



KEYSIGHT       Input: RF         Coupling: DC       Align: Auto         PASS       Align: Auto	Input Z: 50 Ω Atten: 10 dB Corr CCorr Preamp: Off Freq Ref: Int (S) NFE: Adaptive	Gate: Off Av	nter Freq: 3.625000000 GHz g Hold: 20/20 dio Std: None	Center Frequency 3.625000000 GHz Span	Settings
Graph v cale/Div 10.0 dB	Ref LvI Offset Ref Value 40.0			40.000 MHz	
<b>.09</b>				4.000000 MHz	
10.0	Malangenadation	and and and and and all		Auto Man	
10.0 20.0 30.0	round		PEAK	Freq Offset 0 Hz	
40.0					
enter 3.62500 GHz Res BW 390.00 kHz	#Video BW 1.6	000 MHz	Span 40 MH Sweep 1.00 ms (1001 pts		
Metrics					
17.964	MHz	Total Power	24.3 dBm		
Transmit Freq Error x dB Bandwidth	-29.117 kHz 19.06 MHz	% of OBW Power x dB	99.00 % -26.00 dB		Loca

## BAND 48. Occupied Bandwidth Plot (20 MHz Ch.55990 64-QAM RB 100)





### BAND 48. PAR Plot (5 M BW\_Ch.55990\_QPSK\_RB25\_0)





#### BAND 48. PAR Plot (5 M BW\_Ch.55990\_16QAM\_RB25\_0)





### BAND 48. PAR Plot (5 M BW\_Ch.55990\_64QAM\_RB25\_0)





### BAND 48. PAR Plot (10 M BW\_Ch.55990\_QPSK\_RB50\_0)





### BAND 48. PAR Plot (10 M BW\_Ch.55990\_16QAM\_RB50\_0)





### BAND 48. PAR Plot (10 M BW\_Ch.55990\_64QAM\_RB50\_0)





#### BAND 48. PAR Plot (15 M BW\_Ch.55990\_QPSK\_RB75\_0)





### BAND 48. PAR Plot (15 M BW\_Ch.55990\_16QAM\_RB75\_0)





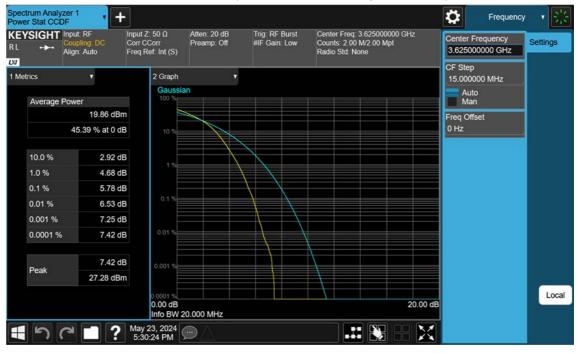
#### BAND 48. PAR Plot (15 M BW\_Ch.55990\_64QAM\_RB75\_0)





#### BAND 48. PAR Plot (20 M BW\_Ch.55990\_QPSK\_RB100\_0)





#### BAND 48. PAR Plot (20 M BW\_Ch.55990\_16QAM\_RB100\_0)





### BAND 48. PAR Plot (20 M BW\_Ch.55990\_64QAM\_RB100\_0)



1 Graph 1 G	
21.7 dBm 34.8 dBc 4.000 MHz Auto Man Freq Offset 0 Hz 1.500000 MHz Auto Man Freq Offset 0 Hz Total Car Pwr 21.690 dBm/5.000 MHz Lower Upper	
enter 3.552500 GHz #Video BW 620.00 kHz* Span 15 MHz tes BW 150 kHz #Sweep 1.00 s (1001 pts) Metrics  Total Car Pwr 21.690 dBm/5.000 MHz Measure Trace Trace 1 Trace Type Trace Average (Active) Lower Upper	
es BW 150 kHz #Sweep 1.00 s (1001 pts) Metrics Total Car Pwr 21.690 dBm/5.000 MHz Measure Trace Trace 1 Total PSD Trace Type Trace Average (Active) Lower Upper	
Trace Type Trace Average (Active)	
Offs Freq         Integ BW         dBc         dBm         Car #         dBc         dBm         Car #         Filter           A         5.000 MHz         5.000 MHz         -35.37         -13.68         21.69         1         -34.85         -13.16         21.69         1         -3 dB	
	Loca

# BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (5 MHz Ch.55265 QPSK RB 25, Offset 0)



4 dBc		Offset 32.3 le 30.00 dB					Span 15.0000000 MHz	
4 dBc							In the second se	
and the second second		20.9 dBm			-35.8 dBc	RMS AVG	CF Step 1.500000 MHz Auto Man	
	#Video E	BW 620.00	kHz*		Spa	n 15 MHz	Freq Offset 0 Hz	
20.924 dBm/5.000 M						Trace 1 (Active)		
			ce					
	dBm		Car# dBc	dBm	dBm Car#	Filter -3 dB		
								Loc
	nteg BW dBc 5.000 MHz -36.3 May 24,	#Video E 20.924 dBm/5.000 MHz  Lower ACP nteg BW dBc dBm	#Video BW 620.00 20.924 dBm/5.000 MHz  hteg BW dBc dBm dBm 0 5.000 MHz -36.37 -15.44 20.92	#Video BW 620.00 kHz*	#Video BW 620.00 kHz* 20.924 dBm/5.000 MHz Trace Type Lower Upper ACP Reference ACP nteg BW dBc dBm dBm Car # dBc dBm 5.000 MHz -36.37 -15.44 20.92 1 -35.85 -14.92	#Video BW 620.00 kHz*       Spa #Sweep 1.00 s (         20.924 dBm/5.000 MHz       Measure Trace Trace Type       Trace Average         Lower       Upper         ACP       Reference       ACP         Reference       ACP       Reference         Measure Trace       Trace Average         Lower       Upper         ACP       Reference         ACP       36.37         -15.44       20.92       1         -35.85       -14.92       20.92       1         May 24, 2024       May 24, 2024       May 24, 2024	#Video BW 620.00 kHz*       Span 15 MHz #Sweep 1.00 s (1001 pts)         20.924 dBm/5.000 MHz       Measure Trace       Trace 1 Trace Type          Trace Type       Trace Average (Active)          Lower       Upper         ACP       Reference       ACP         ACP       Reference       ACP         ACP       Reference       ACP         ACP       Reference       ACP         ACP       36.37       -15.44       20.92       1         5.000 MHz       -36.37       -15.44       20.92       1       -35.85       -14.92       20.92       1       -3 dB	0 Hz         #Video BW 620.00 kHz*       Span 15 MHz #Sweep 1.00 s (1001 pts)         20.924 dBm/5.000 MHz       Trace Trace Trace 1 Trace Type         Trace Type         Lower       Upper         ACP       Reference       ACP         Reference       ACP       Reference         ACP       Reference       ACP         State       dBm       dBm       Car #         5.000 MHz       -36.37       -15.44       20.92       1       -35.85       -14.92       20.92       1       -3 dB

# BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (5 MHz Ch.55990 QPSK RB 25, Offset 0)



	pling DC Co n: Auto Fr	put Z: 50 Ω orr CCorr req Ref: Int (S) FE: Adaptive	Atten: 10 dB Preamp: Off PNO: Best Wide	Trig: Free Gate: Off IF Gain: Lo	e ow F	Center Freq: 3.69750 wg Hold: 10/10 Radio Std: None loise Correction: Off		Hz	Center Frequency 3.697500000 GHz	Settings
Graph cale/Div 10.0 dB			Ref LvI Offset 32.3 Ref Value 30.00 df						Span 15.0000000 MHz	
20.0 0.00 10.0 0.00 0.00 0.0 30.0	-38.1 dBc		21.1 dBr	-		-37.6 dB		RMS AVG	CF Step 1.500000 MHz Auto Man	-
0.0 0.0 50.0 50.0						*********	********	HING AVG	Freq Offset 0 Hz	
enter 3.697500 Gl es BW 150 kHz Metrics	Hz	#	#Video BW 620.00	kHz*		#Sweep 1.		15 MHz 001 pts)		
Fotal Car Pwr	21.111 dBm	/5.000 MHz		Measu Trace 1	re Trace Type	Trace Av		Trace 1 (Active)		
Total PSD			Lower			Upper				
Total PSD		ACP	Referen		ACP	Refere				
Total PSD				Car# dl	Bc dB		Car#			
Offs Freq A 5.000 MHz	Integ BW 5.000 MHz	dBc dB -38.13 -17	8m dBm 7.02 21.11		7.64 -1	6.53 21.11	1	-3 dB		

# BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (5 MHz Ch.56715 QPSK RB 25, Offset 0)



	Coupling: DC Jign: Auto	Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) NFE: Adaptive	Atten: 10 dB Preamp: Off PNO: Best Wide	Trig: Free Run Gate: Off IF Gain: Low	Center Fre Avg Hold Radio Std Noise Con	None	θHz	Center Frequency 3.555000000 GHz Span	Settings
Graph cale/Div 10.0 d	T B		Ref LvI Offset 32.3 Ref Value 30.00 di					30.0000000 MHz	
0.0	-35.9 dBc		21.8 dBr	n		-35.7 dBc	RMS AVG	CF Step 3.000000 MHz Auto Man	
enter 3.55500 C	3Hz		Video BW 1.1000	MHz*		Spa	n 30 MHz	Freq Offset 0 Hz	
s BW 270 kHz					#	Sweep 1.00 s (			
Metrics	-								
otal Car Pwr		3m/10.00 MHz 		Measure Tr Trace Type	ace	Trace Average	Trace 1 (Active)		
Metrics Total Car Pwr Total PSD			Lower	Trace Type	Upper	Č			
Total Car Pwr	21.800 dB	ACP dBc dB	Referen	Trace Type		Reference dBm Car #			
Total Car Pwr Total PSD Offs Freq	21.800 dB	ACP dBc dB	Referei m dBm	Trace Type nce Car # dBc	Upper ACP dBm	Reference dBm Car #	(Active)		Loc

# BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (10 MHz Ch.55290 QPSK RB 50, Offset 0)



	ipling: DC Ci n: Auto Fr	put Ζ: 50 Ω orr CCorr eq Ref: Int (S) FE: Adaptive	Atten: 10 dB Preamp: Off PNO: Best Wide	Trig: Free Run Gate: Off IF Gain: Low	Avg Hold: Radio Std		SHz	Center Frequency 3.625000000 GH Span	Setunds
Graph cale/Div 10.0 dB			Ref LvI Offset 32. Ref Value 30.00 d					30.0000000 MHz	
0.0	-37.6 dBc		21.0 dB	m		-37.3 dBc	RMS AVG	CF Step 3.000000 MHz Auto Man	
0.0 0.0 0.0								Freq Offset 0 Hz	
			HALLA DIALA ADDA	Add -+		0			_
es BW 270 kHz	lz T		#Video BW 1.1000	) MHz*		Spa #Sweep 1.00 s(	n 30 MHz 1001 pts)		
es BW 270 kHz Metrics Total Car Pwr			#Video BW 1.1000	MHz* Measure Tra Trace Type			1001 pts) Trace 1		
enter 3.62500 GH es BW 270 kHz Metrics Total Car Pwr Total PSD		/10.00 MHz 	Lower	Measure Tra Trace Type	ace Upper	#Sweep 1.00 s ( Trace Average	1001 pts) Trace 1		
es BW 270 kHz Metrics Total Car Pwr	20.982 dBm	/10.00 MHz  ACP dBc dl		Measure Tra Trace Type	ace	#Sweep 1.00 s ( Trace Average Reference dBm Car #	1001 pts) Trace 1		
es BW 270 kHz Metrics Total Car Pwr Total PSD Offs Freq	20.982 dBm	/10.00 MHz  ACP dBc dl	Lower Refere Bm dBm	Measure Tra Trace Type nce / Car # dBc	ace Upper ACP dBm	#Sweep 1.00 s ( Trace Average Reference dBm Car #	1001 pts) Trace 1 (Active) Filter		Loca

# BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (10 MHz Ch.55990 QPSK RB 50, Offset 0)



Graph Gr		pling: DC C n: Auto F	nput Ζ: 50 Ω Corr CCorr Treq Ref: Int (S) IFE: Adaptive	Atten: 10 dB Preamp: Off PNO: Best Wide	Gate:	Free Run Off in: Low	Avg Hold: Radio Std			Hz		equency 0000 GHz	Settings
20.9 dBm       40.0 dBc       3.000000 MHz         40.2 dBc       40.0 dBc       Auto         Auto       RMS AVG       Auto         RMS AVG       RMS AVG       RMS AVG         Bes       #Video BW 1.1000 MHz*       Span 30 MHz         ges       BW 270 kHz       #Sweep 1.00 s (1001 pts)         Metrics       Image: Comparison of the second se		•									30.00000	000 MHz	
Freq Offset 0 Hz Freq Offset 0 Hz Freq	20.0 10.0 10.0 10.0 20.0	-40.2 dBc						-40.0 dB	c		3.000000 Auto		
es BW 270 kHz #Sweep 1.00 s (1001 pts) Metrics Total Car Pwr 20.937 dBm/10.00 MHz Measure Trace Trace Trace 1 Total PSD Trace Type Trace Average (Active) Upper ACP Reference ACP Reference Offs Freq Integ BW dBc dBm dBm Car # dBc dBm dBm Car # Filter A 10.00 MHz 10.00 MHz -40.25 -19.31 20.94 1 -40.04 -19.10 20.94 1 -3 dB	10.0	****					************			RMS AVG		et	1
Total Car Pwr 20.937 dBm/10.00 MHz Measure Trace Trace 1 Total PSD	es BW 270 kHz			#Video BW 1.100	00 MHz*			#Sweep 1					
ACP Reference ACP Reference Offs Freq Integ BW dBc dBm dBm Car # dBc dBm dBm Car # Filter A 10.00 MHz 10.00 MHz -40.25 -19.31 20.94 1 -40.04 -19.10 20.94 1 -3 dB	Total Car Pwr	20.937 dBn					e	Trace A					
Offs Freq         Integ BW         dBc         dBm         dBm         Car #         dBc         dBm         Car #         Fliter           A         10.00 MHz         10.00 MHz         -40.25         -19.31         20.94         1         -40.04         -19.10         20.94         1         -3 dB			405										
	0.4		dBc d	iBm dBm	Car #	dBc	dBm	dBm	Car#				
		10.00 MHz	-40.25 -	19.31 20.94	1	-40.04	-19.10	20.94	1	-3 dB			Loca

# BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (10 MHz Ch. 56690 QPSK RB 50, Offset 0)



	oupling: DC C gn: Auto F	nput Z: 50 Ω corr CCorr req Ref: Int (S) IFE: Adaptive	Atten: 10 dB Preamp: Off PNO: Best Wide	Trig: Free F Gate: Off IF Gain: Lo	Avg Hole w Radio S	Freq: 3.557500000 C d: 10/10 td: None orrection: Off	SHz	Center Frequency 3.557500000 GHz	Settings
Graph cale/Div 10.0 dE	•		Ref LvI Offset 32. Ref Value 30.00 d					Span 45.0000000 MHz	
20.0	-36.5 dBc	<b>_</b>	21.5 dB			-36.4 dBc	RMS AVG	CF Step 4.500000 MHz Auto Man	-
30.0 40.0 50.0 60.0							HMS AVG	Freq Offset 0 Hz	
				The local division of			and the second second		
es BW 430 kHz	Hz		#Video BW 1.8000	MHz*		Spa #Sweep 1.00 s	n 45 MHz (1001 pts)		
es BW 430 kHz Metrics Total Car Pwr	-	n∕15.00 MHz 	#Video BW 1.8000	MHz* Measure Trace T			(1001 pts) Trace 1		
es BW 430 kHz Metrics Total Car Pwr	-	n/15.00 MHz 	Lower	Measure Trace Ty	ype Upp	#Sweep 1.00 s ( Trace Average er	(1001 pts) Trace 1		
es BW 430 kHz Metrics Total Car Pwr	21.481 dBn Integ BW	n/15.00 MHz  ACP dBc df		Measure Trace Ty nce Car # dB	ype Upp ACP	#Sweep 1.00 s ( Trace Average er Reference dBm Car #	1001 pts) Trace 1 (Active)		
	21.481 dBn Integ BW	n/15.00 MHz  ACP dBc df	Lower Refere Bm dBm	Measure Trace Ty nce Car # dB	ype Upp ACP c dBm	#Sweep 1.00 s ( Trace Average er Reference dBm Car #	Trace 1 (Active) Filter		Loca

# BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (15 MHz Ch.55315 QPSK RB 75, Offset 0)



	pling: DC C n: Auto F	nput Ζ: 50 Ω Corr CCorr Freq Ref: Int (S NFE: Adaptive	Pream S) PNO:	10 dB np: Off Best Wide	Gate:	ree Run Off n: Low	Avg Hold: Radio Std			Hz	Center Fr 3.62500 Span	requency 0000 GHz	Settings
Graph cale/Div 10.0 dB	•			Offset 32.3 Je 30.00 di							45.0000	000 MHz	
0.0	-37.9 dBc			20.9 dB	m			-37.5 dB	ic		CF Step 4.50000 Auto Man		
000 000 000 enter 3.62500 GH	7		#Video I	3W 1.8000	MHz*				Spar	RMS AVG	Freq Offs 0 Hz	et	
es BW 430 kHz Metrics	•							#Sweep 1					
lotal Car Pwr lotal PSD	20.903 dBr	n/15.00 MHz 				asure Trac Ice Type	e	Trace A		Trace 1 (Active)			
		AC	Lowe	r Refere		AC	Upper	r Refere					
Offs Freq A 15.00 MHz	Integ BW 15.00 MHz	dBc	dBm -17.01		Car #	dBc -37.54	dBm -16.64		Car #	Filter -3 dB			
													Loca

# BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (15 MHz Ch.55990 QPSK RB 75, Offset 0)



	upling: DC C gn: Auto Fi	put Z: 50 Ω orr CCorr req Ref: Int (S) FE: Adaptive	Atten: 10 dB Preamp: Off PNO: Best Wide	Gate:	ree Run Off n: Low	Avg[Hold: Radio Std		000 GI	Hz	A DOUBLE DOUBLE DOUBLE	requency 00000 GHz	Settings
Graph cale/Div 10.0 dB	*		Ref LvI Offset 32 Ref Value 30.00 d							45.000	0000 MHz	
20.0 10.0 10.0 20.0 30.0 30.0	-40.5 dBc		20.9 dE				-40.4 dBc			CF Step 4.50000 Aut Mai	00 MHz o	
50.0 40.0 50.0 50.0	~~~~								RMS AVG	Freq Off 0 Hz	set	
A CONTRACTOR OF A DESCRIPTION OF A DESCRIPANTE A DESCRIPANTE A DESCRIPANTE A DESCRIPTION OF A DESCRIPTION OF										0 112		
enter 3.69250 GI es BW 430 kHz	Hz		#Video BW 1.800	0 MHz*			#Sweep 1.0		145 MHz 1001 pts)	UTIZ		
enter 3.69250 GI es BW 430 kHz Metrics Total Car Pwr			#Video BW 1.800	Ме	asure Trac		#Sweep 1.0 Trace Ave	)0 s (1	1001 pts) Trace 1	UHZ		
enter 3.69250 Gl es BW 430 kHz Metrics Total Car Pwr Total PSD	•	/15.00 MHz 	Lower	Me Tra	ісе Туре	e Uppe	Trace Ave	00 s (1 erage (	1001 pts) Trace 1	UHZ		
enter 3.69250 Gl es BW 430 kHz Metrics Total Car Pwr	▼ 20.859 dBm	V15.00 MHz  ACP dBc dl	Lower	Me Tra	ice Type AC dBc	e Uppe	Trace Ave r Referen	oo s (1 erage ( ce Car #	1001 pts) Trace 1	UTIZ		
enter 3.69250 G es BW 430 kHz Metrics Total Car Pwr Total PSD Offs Freq	▼ 20.859 dBm	V15.00 MHz  ACP dBc dl	Lower P Refere Bm dBm	Me Tra ence Car #	ice Type AC dBc	e Uppe CP dBm	Trace Ave r Referen dBm (	oo s (1 erage ( ce Car #	1001 pts) Trace 1 (Active) Filter	UTIZ		Loc

# BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (15 MHz Ch.56665 QPSK RB 75, Offset 0)



	ipling: DC C in: Auto F	nput Z: 50 Ω Corr CCorr Treq Ref: Int (S) IFE: Adaptive	Atten: 10 dB Preamp: Off PNO: Best Wide	Gate:	Free Run Off in: Low	Avg Hold: Radio Std		)000 GI	Hz	Center Fre 3.560000		Settings
Graph cale/Div 10.0 dB	T		Ref LvI Offset 32 Ref Value 30.00 c							Span 60.00000	00 MHz	
	-36.1 dBc		21.7 dE				-35.8 dBc		BUC AVC	CF Step 6.000000 Auto Man	MHz	
0.0 0.0 0.0 0.0 enter 3.56000 GH			#Video BW 2.200							Freq Offse 0 Hz	t	
es BW 560 kHz Metrics	12 T		#VIGEO BVV 2.200	U WHZ"			#Sweep 1.		n 60 MHz 1001 pts)			
Total Car Pwr Total PSD	21.726 dBn	n/20.00 MHz 			easure Trac ace Type		Trace Av		Trace 1 (Active)			
		ACP	Lower Refere	ence	AC	Uppei	r Referer	ice				
Offs Freq A 20.00 MH;	Integ BW 20.00 MHz	dBc dl	Bm dBm 14.35 21.73	Car # 1	dBc -35.78	dBm -14.06		Car#	Filter -3 dB			
												Loca

# BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (20 MHz Ch.55340 QPSK RB 100, Offset 0)



	i <mark>pling: DC</mark> C n. AutoFr	put Z: 50 Ω orr CCorr eq Ref: Int (S) FE: Adaptive	Atten: 10 dB Preamp: Off ) PNO: Best W	Gate	Free Run : Off ain: Low	Avg Hold: Radio Std		00 GH2	z	A POST OF A POST	requency 0000 GHz	Settings
Graph cale/Div 10.0 dB	T		Ref LvI Offset Ref Value 30.0							60.0000	000 MHz	
20.0	-37.8 dBc			dBm			-37.2 dBc			CF Step 6.00000 Auto Mar	>	
30.0 40.0 50.0 50.0									MS AVG	Freq Offs	set	
The second										0 Hz		
es BW 560 kHz	IZ		#Video BW 2.2	000 MHz*			#Sweep 1.0		60 MHz 101 pts)	0 Hz		
es BW 560 kHz Metrics Total Car Pwr		/20.00 MHz 	#Video BW 2.2	м	easure Trac ace Type			0 s (10 Ti	101 pts) race 1	0 Hz		
es BW 560 kHz Metrics Total Car Pwr	-		Lower	M Tr	асе Туре	ce Uppel	#Sweep 1.0 Trace Ave	D s (10 Tr rage (A	101 pts) race 1	0 Hz		
es BW 560 kHz Metrics Total Car Pwr	21.106 dBm	ACF dBc c	Lower	M Tr ierence n Car #	ace Type AC dBc	ce Uppel	#Sweep 1.0 Trace Ave Reference	Dis (10 Ti rage (A ce ar # F	101 pts) race 1	<u>0 Hz</u>		
	21.106 dBm	ACF dBc c	Lower P Re dBm dBr	M Tr ierence n Car #	ace Type AC dBc	ce Upper CP dBm	#Sweep 1.0 Trace Ave Reference dBm C	Dis (10 Ti rage (A ce ar # F	001 pts) race 1 Active) Filter	<u>0 Hz</u>		Loca

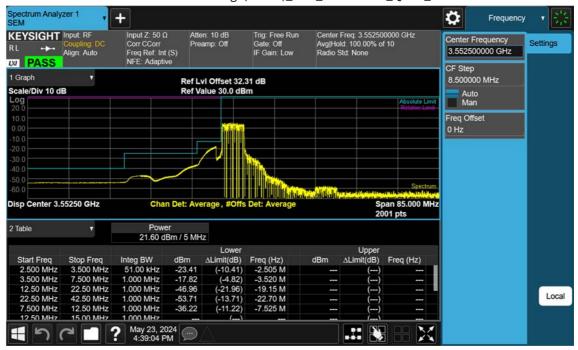
# BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (20 MHz Ch.55990 QPSK RB 100, Offset 0)



	upling: DC In: Auto	Input Ζ: 50 Ω Corr CCorr Freq Ref: Int (\$ NFE: Adaptive	Prean 5) PNO:	10 dB np: Off Best Wide	Gate:	Free Run Off in: Low	Avg Hold Radio Sto			Hz	Center Fre 3.690000		Settings
Graph ale/Div 10.0 dB	•			Offset 32. ue 30.00 d							Span 60.00000	00 MHz	
0.0	-40.5 dBc	/		21.0 dB				-40.1 dE	3c		CF Step 6.000000 Auto Man	MHz	
0.0 0.0 0.0 0.0								*****	*****	RMS AVG	Freq Offse 0 Hz	ət	1
nter 3.69000 GH s BW 560 kHz Metrics	iz T		#Video	BW 2.2000	MHz*			#Sweep 1		n 60 MHz 1001 pts)			
otal Car Pwr otal PSD		m/20.00 MHz				asure Trac ace Type	æ	Trace A		Trace 1 (Active)			
		AC	Lowe	r Refere		A	Uppe	r Refere					
Offs Freq A 20.00 MH	Integ BW 20.00 MH	dBc	dBm -19,44		Car #	dBc -40.08	dBm -19.07	dBm 21.01	Car #	Filter -3 dB			
10100 Will	20.00 Will			21.01		10.00							Loc

# BAND 48. Adjacent Channel Leakage Ratio(ACLR) Plot (20 MHz Ch.56640 QPSK RB 100, Offset 0)





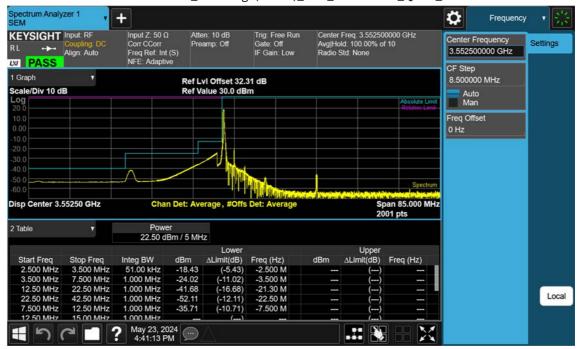
#### BAND 48. 5 M BandEdge(Lower)\_Low\_3552.5 MHz\_QPSK\_Full RB





#### BAND 48. 5 M\_BandEdge(Upper)\_Low\_3552.5 MHz\_QPSK\_Full RB





#### BAND 48. 5 M\_BandEdge(Lower)\_Low\_3552.5 MHz\_QPSK\_1RB





#### BAND 48. 5 M\_BandEdge(Upper)\_Low\_3552.5 MHz\_QPSK\_1RB





### BAND 48. 5 M\_BandEdge(Center)\_Mid\_3625 MHz\_QPSK\_Full RB





### BAND 48. 5 M\_BandEdge(Lower)\_Mid\_3625 MHz\_QPSK\_1RB





### BAND 48. 5 M\_BandEdge(Upper)\_Mid\_3625 MHz\_QPSK\_1RB





#### BAND 48. 5 M\_BandEdge(Lower)\_High\_3697.5 MHz\_QPSK\_Full RB





#### BAND 48. 5 M\_BandEdge(Upper)\_High\_3697.5 MHz\_QPSK\_Full RB



L ++- PASS	Input: RF Coupling: DC Align: Auto			: 10 dB Trig: Free Run mp: Off Gate: Off IF Gain: Low		Center Freq: 3.697500000 GHz Avg Hold: 100.00% of 10 Radio Std: None			Center Frequ 3.69750000 CF Step	Setungs
Graph cale/Div 10 d	Ref Lvl Offset 32.31 dB     Ref Value 30.0 dBm								4.000000 M	Hz
og			and the second second					Absolute Limit	Man	
0.0				A				Holanya Linin	Freq Offset 0 Hz	
0.0				$\Lambda$						
0.0		and the second s		- man and a man	www.marker			Spectrum		
0.0					- and the second of the second	-	finderse to a substitute			
sp Center 3.	69750 GHz	Char	Det: Ave	rage, #Offs	Det: Average		Sp	an 40.000 MHz 01 pts		
Table		Powe	r							
		20.85 dB	3m / 5 MH	z						
				Lower			Upper			
	Stop Freq	Integ BW	dBm	∆Limit(dB)	Freq (Hz)	dBm		Freq (Hz)		
2.500 MHz	3.500 MHz	51.00 kHz	-19.39	(-6.39)	-2.500 M	dBm 	()	Freq (Hz)		
2.500 MHz 3.500 MHz	3.500 MHz 7.500 MHz	51.00 kHz 1.000 MHz	-19.39 -24.62	(-6.39) (-11.62)	-2.500 M -3.500 M	(1977)	() ()			
2.500 MHz 3.500 MHz 7.500 MHz	3.500 MHz 7.500 MHz 20.00 MHz	51.00 kHz 1.000 MHz 1.000 MHz	-19.39 -24.62 -36.41	(-6.39) (-11.62) (-11.41)	-2.500 M -3.500 M -7.563 M		() ()	2		
3.500 MHz	3.500 MHz 7.500 MHz	51.00 kHz 1.000 MHz	-19.39 -24.62	(-6.39) (-11.62)	-2.500 M -3.500 M		() ()			Loo

# BAND 48. 5 M\_BandEdge(Lower)\_High\_3697.5 MHz\_QPSK\_1RB





#### BAND 48. 5 M\_BandEdge(Upper)\_High\_3697.5 MHz\_QPSK\_1RB





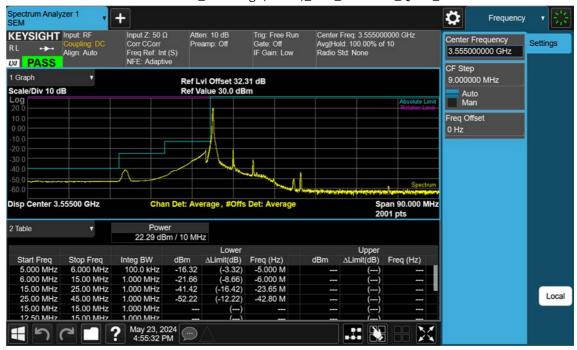
#### BAND 48. 10 M\_BandEdge(Lower)\_Low\_3555 MHz\_QPSK\_Full RB





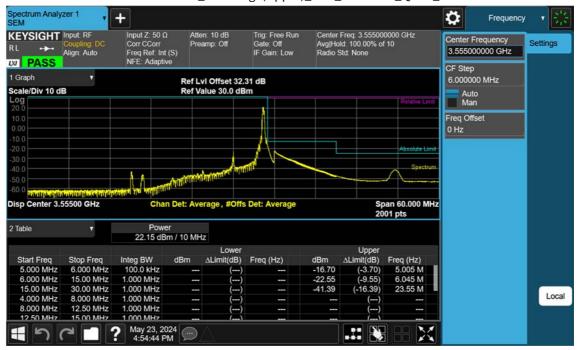
### BAND 48. 10 M\_BandEdge(Upper)\_Low\_3555 MHz\_QPSK\_Full RB





### BAND 48. 10 M\_BandEdge(Lower)\_Low\_3555 MHz\_QPSK\_1RB





### BAND 48. 10 M\_BandEdge(Upper)\_Low\_3555 MHz\_QPSK\_1RB



	Align: Auto Freq Ref: Int						Center Freq: 3.625000000 GHz Avg Hold: 100.00% of 10 Radio Std: None			Center Frequency 3.625000000 GHz CF Step	
Graph			Ref LvI Offset 32.31 dB								
cale/Div 10 dl	3	Ref Value 30.0 dBm								MHz	
.og								Relative Limit	Auto Man		
0.0									Freq Offset 0 Hz		
20.0								Absolute Limit			
30.0						-					
40.0 50.0						~		Spectrum			
50.0											
isp Center 3.6	2500 GHz	Chan	Det: Ave	rage, #Offs	Det: Average			oan 60.000 MHz 01 pts			
! Table			Power								
		20.86 dBm / 10 MHz									
				Lower			Upper				
Start Freq	Stop Freq	Integ BW	dBm	∆Limit(dB)	Freq (Hz)	dBm	∆Limit(dB)	Freq (Hz)			
5.000 MHz	6.000 MHz	100.0 kHz	-29.77	(-16.77)	-5.000 M	-29.39	(-16.39)	5.010 M			_
6.000 MHz	15.00 MHz	1.000 MHz	-22.67	(-9.67)	-6.000 M	-22.15	(-9.15)	6.045 M			
15.00 MHz	30.00 MHz	1.000 MHz	-42.89	(-17.89)	-15.00 M	-43.17	(-18.17)	15.00 M			
4.000 MHz	8.000 MHz	1.000 MHz		()			()				Loc
8.000 MHz	12.50 MHz	1.000 MHz		()			()				
12 50 MHz	15 00 MHz	1 000 MHz		()			()				

# BAND 48. 10 M\_BandEdge(Center)\_Mid\_3625 MHz\_QPSK\_Full RB