

# **TEST REPORT**

FCC Sub6 n5 Test for SM-F741B Certification

APPLICANT SAMSUNG Electronics Co., Ltd.

REPORT NO. HCT-RF-2405-FC013

DATE OF ISSUE May 3, 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-2405-FC013 DATE OF ISSUE May 03, 2024 Additional Model -
Applicant	<b>SAMSUNG Electronics Co., Ltd.</b> 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
Product Name Model Name	Mobile Phone SM-F741B
Date of Test	February 27, 2024 ~ April 19, 2024
FCC ID	A3LSMF741B
Location of Test	■ Permanent Testing Lab □ On Site Testing (Address: 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi- do, 17383 Republic of Korea)
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§ 22





# **REVISION HISTORY**

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

Revision No.	Date of Issue	Description
0	May 03, 2024	Initial Release

#### Notice

#### Content

The measurements shown in this report were made in accordance with the procedures specified in CFR47 section § 2.947. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

HCT CO., LTD. Certifies that no party to this application has subject to a denial of Federal benefits that includes FCC benefits pursuant to section 5301 of the Anti-Drug Abuse Act of 1998,21 U.S. C.853(a)

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

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

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).

According to the Evaluation report, all of the data contained herein is reused from the reference FCC ID : A3LSMF741U report.



# CONTENTS



# **MEASUREMENT REPORT**

# **1. GENERAL INFORMATION**

129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-d	
Address: of Korea	lo, 16677, Rep.
FCC ID: A3LSMF741B	
Application Type: Certification	
<b>FCC Classification:</b> PCS Licensed Transmitter Held to Ear (PCE)	
FCC Rule Part(s): § 22	
EUT Type: Mobile phone	
Model(s): SM-F741B	
Additional Model(s) -	
SCS(kHz): 15	
Bandwidth(MHz): 5, 10, 15, 20	
Waveform: CP-OFDM, DFT-S-OFDM	
Modulation:DFT-S-OFDM: PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAMCP-OFDM: QPSK, 16QAM, 64QAM, 256QAM	I
826.5 MHz – 846.5 MHz (Sub6 n5(5 MHz))	
829.0 MHz – 844.0 MHz (Sub6 n5(10 MHz))	
<b>Tx Frequency:</b> 831.5 MHz – 841.5 MHz (Sub6 n5(15 MHz))	
834.0 MHz – 839.0 MHz (Sub6 n5(20 MHz))	
Date(s) of Tests:         February 27, 2024 ~ April 19, 2024	
Radiated : R3CX30N96TE	
Serial number: Conducted : 7B5599BDA3507ECE	



## **1.1. MAXIMUM OUTPUT POWER**

Mode		Emission	Emission		RP
(MHz)	Tx Frequency (MHz)	Designator	Modulation	Max. Power (W)	Max. Power (dBm)
		4M50G7D	PI/2 BPSK	0.112	20.49
		4M52G7D	QPSK	0.110	20.43
Sub6 n5 (5)	826.5 - 846.5	4M52W7D	16QAM	0.086	19.33
		4M52W7D	64QAM	0.063	17.97
		4M51W7D	256QAM	0.034	15.34
		8M98G7D	PI/2 BPSK	0.108	20.33
		9M00G7D	QPSK	0.107	20.28
Sub6 n5 (10) 829.0	829.0 - 844.0	8M98W7D	16QAM	0.085	19.28
		8M96W7D	64QAM	0.061	17.83
		8M99W7D	256QAM	0.033	15.16
		13M5G7D	PI/2 BPSK	0.108	20.32
		13M5G7D	QPSK	0.105	20.20
Sub6 n5 (15)	831.5 - 841.5	13M5W7D	16QAM	0.082	19.13
		13M4W7D	64QAM	0.060	17.77
		13M5W7D	256QAM	0.033	15.18
		18M0G7D	PI/2 BPSK	0.107	20.30
		18M0G7D	QPSK	0.105	20.20
Sub6 n5 (20)	834.0 - 839.0	17M9W7D	16QAM	0.081	19.08
		18M0W7D	64QAM	0.059	17.73
		18M0W7D	256QAM	0.033	15.15





# 2. INTRODUCTION

## **2.1. DESCRIPTION OF EUT**

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

# 2.2. MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

# 2.3. TEST FACILITY

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





# **3. DESCRIPTION OF TESTS**

## **3.1 TEST PROCEDURE**

Test Description	Test Procedure Used
Occupied Bandwidth	- KDB 971168 D01 v03r01 – Section 4.3 - ANSI C63.26-2015 – Section 5.4.4
Band Edge	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Spurious and Harmonic Emissions at Antenna Terminal	- KDB 971168 D01 v03r01 – Section 6.0 - ANSI C63.26-2015 – Section 5.7
Conducted Output Power	- N/A (See SAR Report)
Peak- to- Average Ratio	- KDB 971168 D01 v03r01 – Section 5.7 - ANSI C63.26-2015 – Section 5.2.3.4
Frequency stability	- ANSI C63.26-2015 – Section 5.6
Effective Radiated Power/ Effective Isotropic Radiated Power	- KDB 971168 D01 v03r01 – Section 5.2 & 5.8 - ANSI/TIA-603-E-2016 – Section 2.2.17
Radiated Spurious and Harmonic Emissions	- KDB 971168 D01 v03r01 – Section 6.2 - ANSI/TIA-603-E-2016 – Section 2.2.12



## **3.2 RADIATED POWER**

#### **Test Overview**

Radiated tests are performed in the Fully-anechoic chamber.

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

#### **Test Settings**

- 1. Radiated power measurements are performed using the signal analyzer's "channel power" measurement capability for signals with continuous operation.
- 2. RBW = 1 -5% of the expected OBW, not to exceed 1 MHz
- 3. VBW  $\geq$  3 x RBW
- 4. Span = 1.5 times the OBW
- 5. No. of sweep points > 2 x span / RBW
- 6. Detector = RMS

7. Trigger is set to "free run" for signals with continuous operation with the sweep times set to "auto".

8. The integration bandwidth was roughly set equal to the measured OBW of the signal for signals with continuous operation.

- 9. Trace mode = trace averaging (RMS) over 100 sweeps
- 10. The trace was allowed to stabilize

#### Test Note

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

The power is calculated by the following formula;

 $P_{d}$  (dBm) = Pg (dBm) - cable loss (dB) + antenna gain (dB)

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

3. The maximum value is calculated by adding the forward power to the calibrated source plus its appropriate gain value.

These steps are repeated with the receiving antenna in both vertical and horizontal polarization. the difference between the gain of the horn and an isotropic antenna are taken into consideration

- 4. The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
- 5. All measurements are performed as RMS average measurements while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies.





## **3.3 RADIATED SPURIOUS EMISSIONS**

#### **Test Overview**

Radiated tests are performed in the Fully-anechoic chamber.

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

#### **Test Settings**

- 1. RBW = 100 kHz for emissions below 1 GHz and 1 MHz for emissions above 1 GHz
- 2. VBW  $\geq$  3 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

- 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)

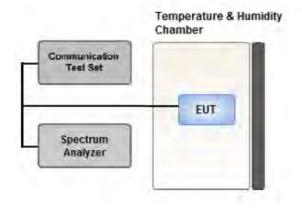
Where:  $\mathsf{P}_{\mathsf{g}}$  is the generator output power into the substitution antenna.

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  $P_{Pk}$ .

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<sub>Pk</sub> (dBm) - P<sub>Avg</sub> (dBm) (P<sub>Avg</sub> = 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  $\geq 3 \times$  RBW.

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

#### Test Settings(Average Power)

- 1. Set span to  $2 \times to 3 \times the OBW$ .
- 2. Set RBW  $\geq$  OBW.
- 3. Set VBW  $\geq$  3 × RBW.
- 4. Set number of measurement points in sweep  $\geq 2 \times \text{span} / \text{RBW}$ .
- 5. Sweep time:

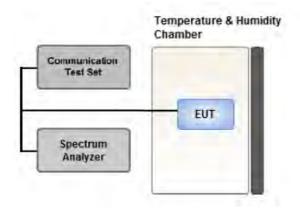
Set  $\geq$  [10 × (number of points in sweep) × (transmission period)] for single sweep

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



## 3.5 OCCUPIED BANDWIDTH.



#### Test setup

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

The EUT makes a call to the communication simulator.

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

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

#### **Test Settings**

- 1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99 % occupied bandwidth and the 26 dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
- 2. RBW = 1 5% of the expected OBW
- 3. VBW  $\geq$  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



# Communication Test Set Spectrum Analyzer

## 3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL

#### Test setup

#### **Test Overview**

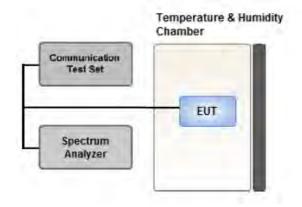
The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured 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  $\geq 2 \times \text{Span} / \text{RBW}$



## 3.7 BAND EDGE



#### Test setup

#### **Test Overview**

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

operation were investigated and the worst case configuration results are reported in this section.

#### **Test Settings**

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



## **Test Notes**

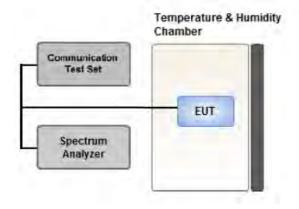
According to FCC 22.917, 24.238, 27.53 specified that power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a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



# 3.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE



#### Test setup

#### **Test Overview**

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

1. Temperature:

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

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

#### **Test Settings**

- 1. The carrier frequency of the transmitter is measured at room temperature (20 °C to provide a reference).
- 2. The equipment is turned on in a "standby" condition for fifteen minutes before applying power to the transmitter.

Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.

3. Frequency measurements are made at 10 °C intervals ranging from -30 °C to +50 °C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.





# 3.9 WORST CASE(RADIATED TEST)

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

(Worst case: DFT-S-OFDM)

- The EUT was tested in three orthogonal planes(X, Y, Z) and in all possible test configurations and positioning.
- The EUT was tested in three modes(Open, Half-open, Closed), the worst case configuration results are reported. (Worst case: Open mode)
- All modes of operation were investigated and the worst case configuration results are reported. Mode: NSA, SA
- Worst case: SA
- Mode : Stand alone, Stand alone + External accessories (Earphone, AC adapter, etc) Worst case : Stand alone
- We were performed the RSE test in condition of co-location.
- Mode : Stand alone, Simultaneous transmission scenarios
- Worst case : Stand alone
- Radiated Spurious emissions are measured while operating in EN-DC mode with Sub 6 NR carrier as well as an LTE carrier (anchor).
- All EN-DC mode of operation (=anchor) were investigated and the test results were measured No Peak Found.
- The test results which are attenuated more than 20 dB below the permissible value, so it was not reported.
- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported.
- Please refer to the table below.
- In the case of radiated spurious emissions, all bandwidth of operation was investigated and the worst case bandwidth results are reported. (Worst case : 5 MHz)

[ Worst case ]					
Test Description	Modulation	RB size	RB offset	Axis	
	PI/2 BPSK,				
Effective Radiated Power	QPSK,				
	16QAM,	See Se	See Section 8.1		
	64QAM,				
	256QAM				
Radiated Spurious and Harmonic Emissions	PI/2 BPSK	See Se	ction 8.1	Х	



## 3.10 WORST CASE(CONDUCTED TEST)

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

(Worst case: DFT-S-OFDM)

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

(Worst case: PI/2 BPSK)

- All modes of operation were investigated and the worst case configuration results are reported. Mode: NSA, SA

Worst case: SA

- All RB sizes, offsets of operation were investigated and the worst case configuration results are reported.

Please refer to the table below.

Test Description	Modulation	Bandwidth (MHz)	Frequency	RB size	RB offset					
Occupied Bandwidth Peak- to- Average Ratio	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	5, 10, 15, 20	Mid	Full RB	0					
		5	Low	1	0					
	PI/2 BPSK	5	High	1	24					
		10	Low	1	0					
		PI/2 BPSK				םו/ז פסכע	10	High	1	51
Band Edge								DI/2 BDCK	15	Low
Dana Luge			15	High	1	78				
				Low	1	0				
		20	High	1	105					
		5, 10, 15, 20	Low, High	Full RB	0					
Spurious and Harmonic Emissions at Antenna Terminal	PI/2 BPSK	5, 10, 15, 20	Low, Mid, High	1	1					

[Worst case]



# 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	05/22/2024	Annual
RF Switching System	FBSR-06B (3G HPF + LNA)	T&M SYSTEM	F3L2	05/22/2024	Annual
RF Switching System	FBSR-06B (6G HPF + LNA)	T&M SYSTEM	F3L3	05/22/2024	Annual
RF Switching System	FBSR-06B (LNA)	T&M SYSTEM	F3L4	05/22/2024	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
Base Station	8960 (E5515C)	Agilent	MY48360800	08/10/2024	Annual
Wideband Radio Communication Tester	MT8821C	Anritsu Corp.	6262287701	05/22/2024	Annual
Wideband Radio Communication Tester	MT8000A	Anritsu Corp.	6262302511	05/23/2024	Annual
SIGNAL GENERATOR (100 kHz~40 GHz)	SMB100A	REOHDE & SCHWARZ	177633	06/22/2024	Annual
Signal Analyzer(5 Hz~40.0 GHz)	N9030B	KEYSIGHT	MY55480167	05/24/2024	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, § 22.917(a)	< 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, § 22.355	< 2.5 ppm	PASS

#### Note:

1. See SAR Report

2. Conducted tests were tested using 5G Wireless Tester.

#### 6.2 Test Condition: Radiated Test

Test Description	FCC Part Section(s)	Test Limit	Test Result	
Effective Radiated Power	§ 22.913(a)(5)	< 7 Watts max. ERP	PASS	
Radiated Spurious and	§ 2.1053,	<43 + 10log10 (P[Watts]) for	DACC	
Harmonic Emissions	§ 22.917(a)	all out-of band emissions	PASS	

Note:

1. Radiated tests were tested using 5G Wireless Tester.



# 7. SAMPLE CALCULATION

#### 7.1 ERP Sample Calculation

Ch.	/ Freq.	Measured	Substitute Ant. Gain				El	RP
channel	Freq.(MHz)	Level (dBm)	Level (dBm)	(dBd)	C.L	Pol.	<b>ER</b> <b>W</b> 0.483	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			EIRP	
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 EFFECTIVE RADIATED POWER**

Freq	Mod/ Bandwidth	Modulation	Measured Level	Substitute Level	Ant. Gain	C.L	Pol	Limit	EI	RP		RB
(MHz)	[SCS (kHz)]		(dBm)	(dBm)	(dBd)			w	W	dBm	Size	Offset
		PI/2 BPSK	-30.06	30.84	-10.05	1.39	V		0.087	19.40		
		QPSK	-30.13	30.77	-10.05	1.39	V		0.086	19.33		
826.5		16-QAM	-31.28	29.62	-10.05	1.39	V	-	0.066	18.18	1	12
		64-QAM	-32.49	28.41	-10.05	1.39	V	-	0.050	16.97		
		256-QAM	-35.25	25.65	-10.05	1.39	V		0.026	14.21		
		PI/2 BPSK	-29.93	31.36	-10.05	1.40	V		0.098	19.91		
	Sub6 n5/	QPSK	-29.97	31.32	-10.05	1.40	V		0.097	19.87		
836.5	5 MHz	16-QAM	-31.02	30.27	-10.05	1.40	V	< 7.00	0.076	18.82	1	23
	[15 kHz]	64-QAM	-32.38	28.91	-10.05	1.40	V		0.056	17.46		
		256-QAM	-35.00	26.29	-10.05	1.40	V		0.031	14.84		
		PI/2 BPSK	-29.73	31.95	-10.05	1.41	V		0.112	20.49		
		QPSK	-29.79	31.89	-10.05	1.41	V	-	0.110	20.43		
846.5		16-QAM	-30.89	30.79	-10.05	1.41	V		0.086	19.33	1	12
		64-QAM	-32.25	29.43	-10.05	1.41	V	V	0.063	17.97		
		256-QAM	-34.88	26.80	-10.05	1.41	v		0.034	15.34	ł	



Freq	Mod/		Measured	Substitute	Ant. Gain		_	Limit	EI	RP	RB	
(MHz)	Bandwidth	Modulation	Level	Level	(dBd)	C.L	Pol			15		
	[SCS (kHz)]		(dBm)	(dBm)				W	W	dBm	Size	Offset
		PI/2 BPSK	-29.89	31.13	-10.05	1.39	V		0.093	19.69		
		QPSK	-30.12	30.90	-10.05	1.39	V		0.088	19.46		
829.0		16-QAM	-31.18	29.84	-10.05	1.39	V		0.069	18.40	1	50
		64-QAM	-32.32	28.70	-10.05	1.39	v		0.053	17.26		
		256-QAM	-35.04	25.98	-10.05	1.39	V		0.029	14.54		
		PI/2 BPSK	-29.76	31.53	-10.05	1.40	V		0.102	20.08		
	Sub6 n5/	QPSK	-29.82	31.47	-10.05	1.40	V		0.101	20.02		
836.5	10 MHz	16-QAM	-31.00	30.29	-10.05	1.40	v	< 7.00	0.077	18.84	1	50
	[15 kHz]	64-QAM	-32.14	29.15	-10.05	1.40	V		0.059	17.70		
		256-QAM	-34.89	26.40	-10.05	1.40	v		0.031	14.95		
		PI/2 BPSK	-29.69	31.79	-10.05	1.41	V		0.108	20.33		
		QPSK	-29.74	31.74	-10.05	1.41	V		0.107	20.28		
844.0		16-QAM	-30.74	30.74	-10.05	1.41	V		0.085	19.28	1	50
		64-QAM	-32.19	29.29	-10.05	1.41	V	V 0.0	0.061	17.83		
		256-QAM	-34.86	26.62	-10.05	1.41	V		0.033	15.16		



Freq	Mod/ Bandwidth	Modulation	Measured Level	Substitute Level	Ant. Gain	C.L	Pol	Limit	EI	RP	I	RB
(MHz)	[SCS (kHz)]		(dBm)	(dBm)	(dBd)			W	W	dBm	Size	Offset
		PI/2 BPSK	-29.80	31.33	-10.05	1.39	V		0.098	19.89		
		QPSK	-29.85	31.28	-10.05	1.39	V		0.096	19.84		
831.5		16-QAM	-31.06	30.07	-10.05	1.39	V		0.073	18.63	1	77
		64-QAM	-32.36	28.77	-10.05	1.39	V		0.054	17.33		
		256-QAM	-35.03	26.10	-10.05	1.39	V		0.029	14.66		
		PI/2 BPSK	-29.62	31.67	-10.05	1.40	V		0.105	20.22		
	Sub6 n5/	QPSK	-29.64	31.65	-10.05	1.40	V		0.105	20.20		
836.5	15 MHz	16-QAM	-30.85	30.44	-10.05	1.40	V	< 7.00	0.079	18.99	1	77
	[15 kHz]	64-QAM	-32.15	29.14	-10.05	1.40	V		0.059	17.69		
		256-QAM	-34.79	26.50	-10.05	1.40	V		0.032	15.05		
		PI/2 BPSK	-29.64	31.78	-10.05	1.41	V		0.108	20.32		
		QPSK	-29.85	31.57	-10.05	1.41	V		0.103	20.11		
841.5		16-QAM	-30.83	30.59	-10.05	1.41	V		0.082	19.13	1	77
		64-QAM	-32.19	29.23	-10.05	1.41	V	V 0.060	0.060	17.77		
		256-QAM	-34.78	26.64	-10.05	1.41	V		0.033	15.18		



Freq	Mod/ Bandwidth	Modulation	Measured Level	Substitute Level	Ant. Gain	C.L	C.L Pol	Limit	EI	RP		RB	
(MHz)	[SCS (kHz)]		(dBm)	(dBm)	(dBd)			w	W	dBm	Size	Offset	
		PI/2 BPSK	-29.62	31.59	-10.05	1.39	V		0.104	20.15			
		QPSK	-29.67	31.54	-10.05	1.39	V		0.102	20.10	1		
834.0		16-QAM	-30.84	30.37	-10.05	1.39	V		0.078	18.93		104	
		64-QAM	-32.17	29.04	-10.05	1.39	V		0.058	17.60			
		256-QAM	-34.80	26.41	-10.05	1.39	V		0.031	14.97			
		PI/2 BPSK	-29.65	31.64	-10.05	1.40	V		0.105	20.19			
	Sub6 n5/	QPSK	-29.71	31.58	-10.05	1.40	V		0.103	20.13			
836.5	20 MHz	16-QAM	-30.87	30.42	-10.05	1.40	V	< 7.00	0.079	18.97	1	104	
	[15 kHz]	64-QAM	-32.13	29.16	-10.05	1.40	V		0.059	17.71			
_		256-QAM	-34.85	26.44	-10.05	1.40	V		0.032	14.99			
		PI/2 BPSK	-29.70	31.75	-10.05	1.40	V		0.107	20.30			
		QPSK	-29.80	31.65	-10.05	1.40	V		0.105	20.20			
839.0		16-QAM	-30.92	30.53	-10.05	1.40	V		0.081	19.08	1	104	
		64-QAM	-32.27	29.18	-10.05	1.40	V	V 0.059	17.73				
		256-QAM	-34.85	26.60	-10.05	1.40	V		0.033	15.15			



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

NR Band:	N5
Bandwidth:	5 MHz
Modulation:	PI/2 BPSK
Distance:	3 meters
SCS:	<u>15 kHz</u>

		Measured	Ant.	Substitute	~ 1	D.I	Result	Limit	F	RB
Ch	Freq (MHz)	Level (dBm)	Gain (dBi)	Level (dBm)	C.L	Pol	(dBm)	(dBm)	Size	Offset
	1 653.00	-59.06	9.20	-67.97	2.03	V	-60.80	-13.00		
	2 479.50	-59.87	10.20	-63.12	2.45	V	-55.37	-13.00		
165300 (826.5)	3 306.00	-61.26	10.90	-63.30	2.92	V	-55.32	-13.00	1	12
(020.3)	4 132.50	-61.19	11.30	-61.04	3.25	V	-52.99	-13.00		
	4 959.00	-62.25	10.90	-57.96	3.58	V	-50.64	-13.00		
	1 673.00	-58.61	9.20	-67.79	2.03	V	-60.62	-13.00		
	2 509.50	-59.42	10.30	-63.95	2.50	V	-56.15	-13.00		
167300 (836.5)	3 346.00	-61.24	10.95	-64.13	2.89	V	-56.07	-13.00	1	23
(050.5)	4 182.50	-60.96	11.30	-60.81	3.30	V	-52.81	-13.00		
	5 019.00	-61.30	10.70	-56.24	3.55	V	-49.09	-13.00		
	1 693.00	-59.14	9.40	-67.76	2.00	V	-60.36	-13.00		
	2 539.50	-60.58	10.30	-65.41	2.52	V	-57.63	-13.00		
169300 (846.5)	3 386.00	-60.91	11.00	-63.39	2.94	V	-55.33	-13.00	1	12
(0+0.3)	4 232.50	-62.75	11.20	-61.83	3.28	V	-53.91	-13.00		
	5 079.00	-62.98	10.70	-57.82	3.61	V	-50.73	-13.00		

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## 8.3 PEAK-TO-AVERAGE RATIO

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (dB)		
			BPSK	BPSK		4.43		
					QPSK			5.28
	5 MHz		16-QAM	25		5.84		
			64-QAM			6.17		
			256-QAM			6.41		
			BPSK			4.19		
			QPSK			5.09		
	10 MHz		16-QAM	50		5.61		
			64-QAM			5.92		
Sub6		- 836.5	256-QAM		•	6.43		
n5			BPSK		0	4.18		
			QPSK			5.03		
	15 MHz		16-QAM	75		5.73		
			64-QAM		5.89			
			256-QAM			6.28		
			BPSK			4.48		
			QPSK			5.41		
	20 MHz		16-QAM	100		5.90		
			64-QAM			6.22		
			256-QAM			6.53		

# Note:

1. Plots of the EUT's Peak- to- Average Ratio are shown Page 58  $\sim$  77.

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## 8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)	
			BPSK			4.5036	
			QPSK			4.5173	
	5 MHz		16-QAM	25		4.5168	
			64-QAM			4.5152	
			256-QAM			4.5067	
			BPSK			8.9816	
				QPSK	-		9.0012
	10 MHz		16-QAM	50		8.9758	
			64-QAM			8.9558	
Sub6		836.5	256-QAM		0	8.9944	
n5		836.5	BPSK		0	13.468	
			QPSK			13.453	
	15 MHz		16-QAM	75		13.484	
			64-QAM			13.443	
			256-QAM			13.478	
			BPSK			17.977	
	20 MHz		QPSK			17.947	
			16-QAM	100		17.917	
			64-QAM	-		17.946	
			256-QAM			17.975	

# Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 38  $\sim$  57.

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Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
		826.5	8.0429	30.815	-74.793	-43.978	
	5	836.5	9.1595	30.815	-74.151	-43.336	
		846.5	9.6999	30.815	-74.470	-43.655	
		829.0	8.0195	30.815	-74.861	-44.046	
	10	836.5	5.2468	30.815	-75.041	-44.226	
Sub6		844.0	6.0065	30.815	-74.626	-43.811	12.00
n5		831.5	9.0952	30.815	-74.317	-43.502	-13.00
	15	836.5	4.0190	30.200	-74.799	-44.599	
		841.5	3.7807	30.200	-74.674	-44.474	
		834.0	9.0798	30.815	-73.925	-43.110	
	20	836.5	3.7503	30.200	-73.480	-43.280	
		839.0	8.0249	30.815	-74.596	-43.781	

## **8.5 CONDUCTED SPURIOUS EMISSIONS**

## Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 102 ~ 113.

2. Result (dBm) = Measurement Maximum Data (dBm) + Factor (dB)

3. Factor(dB) = Cable Loss + Ext. Attenuator + Power Splitter

Frequency Range (GHz)	Factor [dB]
0.03 - 1	27.494
1 - 5	30.200
5 - 10	30.815
10 - 15	31.340
15 - 20	31.713
Above 20	32.355

## 8.6 BAND EDGE

- Plots of the EUT's Band Edge are shown Page 78 ~ 101.



# 8.7 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

BandWidth:	<u>5 MHz</u>
Voltage(100 %):	3.880 VDC
Batt. Endpoint:	3.300 VDC
Deviation Limit:	$\pm~$ 0.000 25 % or 2.5 ppm

Test. Frequncy	Voltage	Temp.	Frequency	Frequency	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	Error (Hz)	(%)	
	100 %	+20(Ref)	836 500 006	0.0	0.000 000	0.000
	100 %	-30	836 500 011	4.5	0.000 001	0.005
	100 %	-20	836 500 012	6.1	0.000 001	0.007
	100 %	-10	836 500 012	5.9	0.000 001	0.007
02C F	100 %	0	836 500 011	4.4	0.000 001	0.005
836.5	100 %	+10	836 500 014	8.2	0.000 001	0.010
	100 %	+30	836 500 013	7.1	0.000 001	0.008
	100 %	+40	836 500 011	5.2	0.000 001	0.006
	100 %	+50	836 500 013	6.6	0.000 001	0.008
	Batt. Endpoint	+20	836 500 011	4.9	0.000 001	0.006



BandWidth:	<u>10 MHz</u>
Voltage(100 %):	3.880 VDC
Batt. Endpoint:	3.300 VDC
Deviation Limit:	$\pm 0.00025\%{ m or}2.5{ m ppm}$

Test. Frequncy	Voltage	Temp.	Frequency	Frequency	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	Error (Hz)	(%)	
	100 %	+20(Ref)	836 500 002	0.0	0.000 000	0.000
	100 %	-30	836 500 010	8.1	0.000 001	0.010
	100 %	-20	836 500 009	6.4	0.000 001	0.008
	100 %	-10	836 500 010	8.0	0.000 001	0.010
02C F	100 %	0	836 500 009	7.2	0.000 001	0.009
836.5	100 %	+10	836 500 009	6.9	0.000 001	0.008
	100 %	+30	836 500 007	4.8	0.000 001	0.006
	100 %	+40	836 500 007	4.5	0.000 001	0.005
	100 %	+50	836 500 010	8.2	0.000 001	0.010
	Batt. Endpoint	+20	836 500 008	6.2	0.000 001	0.007



BandWidth:	<u>15 MHz</u>
Voltage(100 %):	3.880 VDC
Batt. Endpoint:	3.300 VDC
Deviation Limit:	$\pm 0.00025\%{ m or}2.5{ m ppm}$

Test. Frequncy	Voltage	Temp.	Frequency	Frequency	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	Error (Hz)	(%)	
	100 %	+20(Ref)	836 500 005	0.0	0.000 000	0.000
	100 %	-30	836 500 010	5.3	0.000 001	0.006
	100 %	-20	836 500 014	9.2	0.000 001	0.011
	100 %	-10	836 500 014	8.6	0.000 001	0.010
00C F	100 %	0	836 500 012	7.2	0.000 001	0.009
836.5	100 %	+10	836 500 009	3.5	0.000 000	0.004
	100 %	+30	836 500 010	4.8	0.000 001	0.006
	100 %	+40	836 500 010	4.4	0.000 001	0.005
	100 %	+50	836 500 010	5.1	0.000 001	0.006
	Batt. Endpoint	+20	836 500 011	5.9	0.000 001	0.007



BandWidth:	<u>20 MHz</u>
Voltage(100 %):	3.880 VDC
Batt. Endpoint:	3.300 VDC
Deviation Limit:	$\pm$ 0.000 25 % or 2.5 ppm

Test. Frequncy	Voltage	Temp.	Frequency	Frequency	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	Error (Hz)	(%)	
	100 %	+20(Ref)	836 500 003	0.0	0.000 000	0.000
	100 %	-30	836 500 010	7.2	0.000 001	0.009
	100 %	-20	836 500 012	8.4	0.000 001	0.010
	100 %	-10	836 500 010	6.9	0.000 001	0.008
026 5	100 %	0	836 500 009	5.5	0.000 001	0.007
836.5	100 %	+10	836 500 011	7.4	0.000 001	0.009
	100 %	+30	836 500 011	8.1	0.000 001	0.010
	100 %	+40	836 500 013	9.4	0.000 001	0.011
	100 %	+50	836 500 009	6.2	0.000 001	0.007
	Batt. Endpoint	+20	836 500 008	5.1	0.000 001	0.006



Report No. HCT-RF-2405-FC013

# 9. TEST PLOTS

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CEYSIGHT Input. RF Coupling DC Align Auto	Input Z 50 Q Atten 16 dE Corr CCorr Preamp Off Freq Ref. Int (S) NFE Adaptive	Gate Off AvgiHol	Freq: 835.500000 MHz d' 500/500 td: None	Center Frequency 836.500000 MHz	Settings
Graph Graph	Ref Lvi Offse Ref Value 40			Span 10.000 MHz	
00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0				CF Step 1.000000 MHz Auto Man	
0 00 10 0 20 0 30 0 40 0			PEA	Freq Offset 0 Hz	
50 0 Center 836.500 MHz Res BW 100.00 kHz	↓ #Video BW 3	90.00 kHz	Span 10 MH Sweep 16.7 ms (1001 pts		
2 Metrics •				-	
Occupied Bandwidth 4.50	) 936 MHz	Total Power	31.1 dBm		
Transmit Freq Error x dB Bandwidth	-23,479 kHz 5.233 MHz	% of OBW Power x dB	99.00 % -26.00 dB		Loc
	? Mar 04, 2024		.# N - X		

# Sub6 n5. Occupied Bandwidth Plot (5 M BW Ch.167300 BPSK\_Full RB\_0)



Align Auto	Corr CCorr Preamp Off Freq Ref. Int (S) NFE Adaptive		AvgiHold 500/500 Radio Std. None	Center Frequency 836.500000 MHz	Settings
Graph state/Div 10.0 dB	Ref Lvi Offset Ref Value 40.0			Span 10.000 MHz	
<b>50</b> 0.0 0.0				CF Step 1.000000 MHz Auto Man	
				Freq Offset	
enter 836.500 MHz les BW 100.00 kHz	#Video BW 39	90.00 kHz	Span 10 Sweep 16.7 ms (100		
Metrics					
4.5173 Transmit Freq Error x dB Bandwidth	3 MHz -13.869 kHz 5.238 MHz	Total Power % of OBW Power x dB	30.4 dBm r 99.00 % -26.00 dB		Loc

# Sub6 n5. Occupied Bandwidth Plot (5 M BW Ch.167300 QPSK\_ Full RB \_0)





## Sub6 n5. Occupied Bandwidth Plot (5 M BW Ch.167300 16QAM\_ Full RB \_0)





### Sub6 n5. Occupied Bandwidth Plot (5 M BW Ch.167300 64QAM\_ Full RB \_0)





#### Sub6 n5. Occupied Bandwidth Plot (5 M BW Ch.167300 256QAM\_ Full RB \_0)



1 Graph     Ref Lvi Offset 27.11 dB     Span       Scale/Div 10.0 dB     Ref Value 40.00 dBm     CF Step       000     000     000     000       100     000     000       000     000     000       000     000     000       000     000     000       000     000     000       000     000     000       000     000     000       000     000     000       000     000     000       000     000     000       000     000     000       000     000     000       000     000     000       000     000     000       000     000     000       000     000       000     000       000     000       000     000       000     000       000     000       000     000       000     000       000     000       000     000       000     000       000     000       000     000       000     000       000     000       000     000 </th <th>EYSIGHT Input RF Coupling Align Auto</th> <th></th> <th>Atten 16 dB Preamp Off</th> <th>Trig: Free Run Gate: Off #IF Gain: Low</th> <th>Center Free AvgjHold 5 Radio Std</th> <th></th> <th>IZ .</th> <th>Center Fr 836.500</th> <th>and the second se</th> <th>Settings</th>	EYSIGHT Input RF Coupling Align Auto		Atten 16 dB Preamp Off	Trig: Free Run Gate: Off #IF Gain: Low	Center Free AvgjHold 5 Radio Std		IZ .	Center Fr 836.500	and the second se	Settings
OCCUPIEd Bandwidth	Graph •							20.000 N	1Hz	
PEAK PEAK	00 30.0 70.0			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~~~			2.000000 Auto		
Center 836.50 MHz Span 20 MHz Res BW 200.00 kHz Sweep 1.00 ms (1001 pts) 2 Metrics Occupied Bandwidth	10 0 20.0 30:0 40.0						PEAK		et	
2 Metrics	enter 836.50 MHz		#Video BW 820.	00 kHz	S					
		width		Total Power		31 1 dBm				
Transmit Freq Error     -187.83 kHz     % of OBW Power     99.00 %       x dB Bandwidth     9.732 MHz     x dB     -26.00 dB		Error -187.83 k		% of OBW Por	ver	99.00 %				Lo

# Sub6 n5. Occupied Bandwidth Plot (10 M BW Ch.167300 BPSK\_ Full RB \_0)



Graph Ref Lvi Offset 2 cale/Div 10.0 dB Ref Value 40.00	7.11 dB	Span	
	dBm	20.000 MHz	
00 00 00 00 00 00		CF Step 2.000000 M Auto Man	Hz
200 100 200 200 200 200 200 200		PEAK 0 Hz	
enter 836.50 MHz #Video BW 820 Res BW 200.00 kHz		Span 20 MHz 5 1.00 ms (1001 pts)	
Metrics • Occupied Bandwidth 9.0012 MHz	Total Power	30.6 dBm	
Transmit Freq Error -190.99 kHz x dB Bandwidth 9.840 MHz	% of OBW Power x dB	99.00 % -26.00 dB	Lo

# Sub6 n5. Occupied Bandwidth Plot (10 M BW Ch.167300 QPSK\_ Full RB \_0)





### Sub6 n5. Occupied Bandwidth Plot (10 M BW Ch.167300 16QAM\_ Full RB\_0)





## Sub6 n5. Occupied Bandwidth Plot (10 M BW Ch.167300 64QAM\_ Full RB\_0)





#### Sub6 n5. Occupied Bandwidth Plot (10 M BW Ch.167300 256QAM\_ Full RB \_0)





### Sub6 n5. Occupied Bandwidth Plot (15 M BW Ch.167300 BPSK\_ Full RB \_0)



EYSIGHT Input RF Compling DC Align Auto	Input Z: 50 Q Atten 16 Corr CCorr Preamp Freq Ref. Int (S) NFE Adaptive	Off Gate Off AvgiH	r Freq. 836.500000 MHz old: 500/500 Std: None	Center Frequency 836.500000 MHz	Settings
Graph cale/Div 10.0 dB	Ref Lvi Off Ref Value	set 27.11 dB 40.00 dBm		Span 30.000 MHz	
Og 0.0 0.0 0.0				CF Step 3.000000 MHz Auto Man	
		<u> </u>	PEAK	Freq Offset 0 Hz	
enter 836.50 MHz Res BW 300.00 kHz	#Video BV	/ 1.2000 MHz	Span 30 MHz Sweep 1.00 ms (1001 pts)		
Metrics	53 MHz	Total Power	31.0 dBm		
Transmit Freq Error x dB Bandwidth	-391.90 kHz 14.43 MHz	% of OBW Power x dB	99.00 % -26.00 dB		Lo

# Sub6 n5. Occupied Bandwidth Plot (15 M BW Ch.167300 QPSK\_ Full RB \_0)



EYSIGHT Input RF Coupling DC Align Auto	Input Z: 50 Q Atten 16 dB Corr CCorr Preamp Off Freq Ref. Int (S) NFE Adaptive	Gate Off Avgil	ar Freq: 836.500000 MHz told: 500/500 5 Std: None	Center Frequency 836.500000 MHz	Settings
Graph cale/Div 10.0 dB	Ref Lvi Offset Ref Value 40.0			Span 30.000 MHz	
00 0.0 0.0 0.0				CF Step 3.000000 MHz Auto Man	
			PEA	Freq Offset 0 Hz	
enter 836.50 MHz Res BW 300.00 kHz	#Video BW 1.	2000 MHz	Span 30 MH Sweep 1.00 ms (1001 pt		
Metrics  Occupied Bandwidth 13.4	34 MHz	Total Power	29.8 dBm		
Transmit Freq Error x dB Bandwidth	-382.27 kHz 14,68 MHz	% of OBW Power x dB	99.00 % -26.00 dB		Los

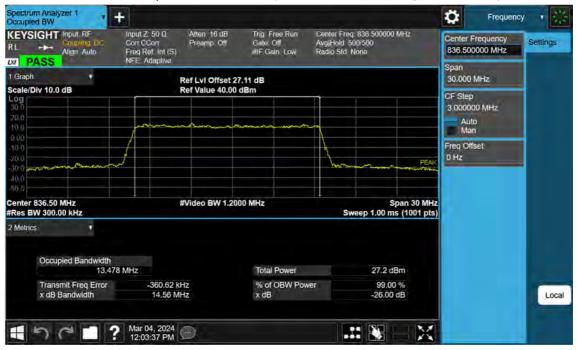
# Sub6 n5. Occupied Bandwidth Plot (15 M BW Ch.167300 16QAM\_ Full RB \_0)





### Sub6 n5. Occupied Bandwidth Plot (15 M BW Ch.167300 64QAM\_ Full RB \_0)





### Sub6 n5. Occupied Bandwidth Plot (15 M BW Ch.167300 256QAM\_ Full RB \_0)



I Graph       Ref Lvi Offset 27.11 dB       Span         Scale/Div 10.0 dB       Ref Value 40.00 dBm       CF Step         300       Auto       Man         300       Auto       Man         300       Freq Offset       Auto         300       Span 40 MHz       Auto         300       Wideo BW 1.6000 MHz       Span 40 MHz         Sweep 1.00 ms (1001 pts)       Netros         Occupied Bandwidth       Total Power       31.5 dBm         Transmit Freg Error       -553.44 kHz       % of OBW Power       99.00 %	CEYSIGHT Input RF Couping DC Align Auto		Atten 16 dB Preamp Off	Trig: Free Run Gate Off #IF Gain Low	Center Freq. 836 AvgjHold' 500/50 Radio Std. None		Center Fr 836.5000	requency 000 MHz	Settings
OG       OCCUPIED Bandwidth         17.977 MHz       Total Power       31.5 dBm         Transmit Freq Error       -553.44 kHz       % of OBW Power       99.00 %	Graph +	Re					40.000 N	ИНz	
Pred Offset December 836.50 MHz #Video BW 1.6000 MHz Span 40 MHz Res BW 390.00 kHz Sweep 1.00 ms (1001 pts) Metrics Occupied Bandwidth 17.977 MHz Total Power 31.5 dBm Transmit Freq Error -553.44 kHz % of OBW Power 99.00 %	00000000000000000000000000000000000000						4.000000 Auto	,	
enter 836.50 MHz Span 40 MHz Res BW 390.00 kHz Sweep 1.00 ms (1001 pts) Metrics Cocupied Bandwidth 17.977 MHz Total Power 31.5 dBm Transmit Freq Error -553.44 kHz % of OBW Power 99.00 %	10 0 20.0 30 0 40 0				how	PEAK		et	
Occupied Bandwidth 17.977 MHz Total Power 31.5 dBm Transmit Freq Error -553.44 kHz % of OBW Power 99.00 %	enter 836.50 MHz	#V	ideo BW 1.6000	MHz	Sweep				
Transmit Freq Error -553.44 kHz % of OBW Power 99.00 %	Occupied Bandwidth	77 MH2		Total Power		31 5 dBm			
	Transmit Freq Error	-553.44 kHz		% of OBW Pov	ver	99.00 %			Loc

# Sub6 n5. Occupied Bandwidth Plot (20 M BW Ch.167300 BPSK\_ Full RB \_0)





## Sub6 n5. Occupied Bandwidth Plot (20 M BW Ch.167300 QPSK\_ Full RB \_0)





### Sub6 n5. Occupied Bandwidth Plot (20 M BW Ch.167300 16QAM\_ Full RB \_0)





#### Sub6 n5. Occupied Bandwidth Plot (20 M BW Ch.167300 64QAM\_ Full RB \_0)





# Sub6 n5. Occupied Bandwidth Plot (20 M BW Ch.167300 256QAM\_ Full RB \_0)





## Sub6 n5. PAR Plot (5 M BW\_Ch.167300\_BPSK\_Full RB\_0)





# Sub6 n5. PAR Plot (5 M BW\_Ch. 167300\_QPSK\_Full RB\_0)





## Sub6 n5. PAR Plot (5 M BW\_Ch. 167300\_16QAM\_ Full RB \_0)





## Sub6 n5. PAR Plot (5 M BW\_Ch. 167300\_64QAM\_ Full RB \_0)





## Sub6 n5. PAR Plot (5 M BW\_Ch. 167300\_256QAM\_ Full RB \_0)





# Sub6 n5. PAR Plot (10 M BW\_Ch. 167300\_ BPSK\_ Full RB \_0)





## Sub6 n5. PAR Plot (10 M BW\_Ch. 167300\_QPSK\_ Full RB \_0)





# Sub6 n5. PAR Plot (10 M BW\_Ch. 167300\_16QAM\_ Full RB \_0)





# Sub6 n5. PAR Plot (10 M BW\_Ch. 167300\_64QAM\_ Full RB \_0)





## Sub6 n5. PAR Plot (10 M BW\_Ch. 167300\_256QAM\_ Full RB \_0)





## Sub6 n5. PAR Plot (15 M BW\_Ch. 167300\_ BPSK\_ Full RB \_0)





### Sub6 n5. PAR Plot (15 M BW\_Ch. 167300\_QPSK\_Full RB\_0)





# Sub6 n5. PAR Plot (15 M BW\_Ch. 167300\_16QAM\_ Full RB \_0)





# Sub6 n5. PAR Plot (15 M BW\_Ch. 167300\_64QAM\_ Full RB \_0)





## Sub6 n5. PAR Plot (15 M BW\_Ch. 167300\_256QAM\_ Full RB \_0)





### Sub6 n5. PAR Plot (20 M BW\_Ch. 167300\_ BPSK\_ Full RB \_0)





### Sub6 n5. PAR Plot (20 M BW\_Ch. 167300\_QPSK\_ Full RB \_0)





### Sub6 n5. PAR Plot (20 M BW\_Ch. 167300\_16QAM\_ Full RB \_0)





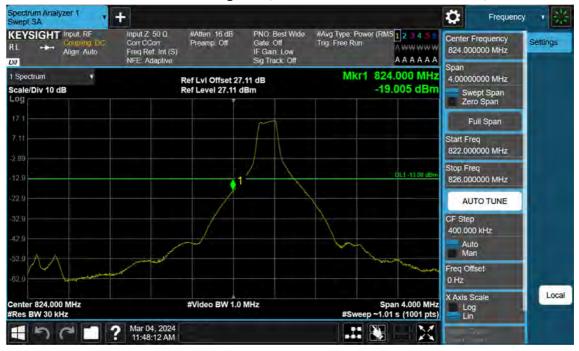
### Sub6 n5. PAR Plot (20 M BW\_Ch. 167300\_64QAM\_ Full RB \_0)





### Sub6 n5. PAR Plot (20 M BW\_Ch. 167300\_256QAM\_ Full RB \_0)





### Sub6 n5. Lower Band Edge Plot (5 M BW Ch.165300 BPSK\_RB1\_Offset 0)



Align Auto Fr	iput Z 50 Q #Atten 16 dB orr CCorr Preamp Off reg Ref. Int (S) IFE Adaptive	PNO Best Wide #Av Gate Off Trig IF Gain Low Sig Track Off	ig Type: Power (RMS 1 2 1 4 Free Run Awww A A A A	B24.000000 MHz	Settings
spectrum • ale/Div 10 dB	Ref LvI Offset 2 Ref Level 27.11		Mkr1 824.000 M -23.833 dl		
7.1				Full Span	
89		phillin		Start Freq 822.000000 MHz	
1.9			DL1 -13.00	dBm Stop Freq 826.000000 MHz	
2.0		ļ <i>(</i> "		AUTO TUNE	
29	~~~			CF Step 400.000 kHz	
2.9				Auto Man	
				Freq Offset 0 Hz	-
nter 824.000 MHz es BW 51 kHz	#Video BW 16	0 kHz	Span 4.000   #Sweep ~1.01 s (1001		Loc

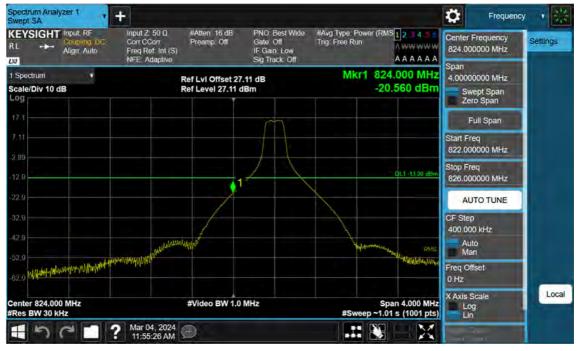
# Sub6 n5. Lower Band Edge Plot (5 M BW Ch.165300 BPSK\_RB25\_Offset 0)



Align Auto Fri	Dut Z: 50 Ω #Atten 16 dB orr CCorr Preamp Off eq Ref. Int (S) E. Adaptive	PNO Best Wide #Avg Gate Off Trig IF Gain Low Sig Track Off		A A A A	
Spectrum sale/Div 10 dB	Ref LvI Offset 2 Ref Level 27.11		Mkr1 822.08 -31.93		Span
7.1				Full S	pan
89				Start Freq 819.000000	MHz
2.9			DE1	-13.00 dBm 823.000000	MHz
2.0			<b>↓</b> 1	AUTO T	UNE
2.9			and the second sec	CF Step 400.000 kH:	z
29				Auto Man	
2.0				Freq Offset 0 Hz	
nter 821.000 MHz es BW 100 kHz	#Video BW 30	00 kHz	Span 4 #Sweep ~1.01 s (*	000 MHz Log 1001 pts) Lin	Loc

# Sub6 n5. Lower Extended Band Edge Plot (5 M BW Ch.165300 BPSK\_RB25\_0)





### Sub6 n5. Lower Band Edge Plot (10 M BW Ch.165800 BPSK\_RB1\_Offset 0)



L +- Couping DC Align Auto F	Input Z 50 Q #Atten 16 dB Corr CCorr Preamp Off Freq Ref. Int (S) NFE Adaptive	PNO Best Wide #Avg T Gate Off Trig F IF Gain Low Sig Track Off	vpe: Power (RMS12145) ree Run A WWWWW A A A A A A	024.000000 Wirtz
Spectrum • sale/Div 10 dB	Ref Lvi Offset 27 Ref Level 27.11 d		Mkr1 824.000 MH: -26.968 dBm	
7.1				Full Span
11			RM3	Start Freq 822.000000 MHz
2.9			D£1 -13.00 dBn	Stop Freq 826.000000 MHz
2.0		2		AUTO TUNE
2.9				CF Step 400.000 kHz Auto Man
2.9				Freq Offset 0 Hz
enter 824.000 MHz tes BW 100 kHz	#Video BW 300	0 kHz	Span 4.000 MH #Sweep ~1.01 s (1001 pts	

# Sub6 n5. Lower Band Edge Plot (10 M BW Ch.165800 BPSK\_RB50\_Offset 0)



EYSIGHT Input. RF Coupling BC Align Auto	Input Z: 50 Q Gorr CCorr Freq Ref. Int (S) NFE: Adaptive	#Atten 16 dB Preamp Off	PNO Best Wide Gate Off IF Gain Low Sig Track Off		821.000000 MHz	Setting
Spectrum • sale/Div 10 dB		Ref LvI Offset 27. Ref Level 27.11 di		Mkr1 819.932 -33.923		
7.1					Full Span	
11					Start Freq 819.000000 MHz	
.9				DE1-13	Stop Freq 823.000000 MHz	
2.0	<u>_1</u>				AUTO TUNE	
2.9	<u><u></u></u>				CF Step 400.000 kHz	
2.9					Auto Man	
2.0					Freq Offset 0 Hz	
nter 821.000 MHz es BW 100 kHz		#Video BW 300	kHz	Span 4.00 #Sweep ~1.01 s (100		Lo

# Sub6 n5. Lower Extended Band Edge Plot (10 M BW Ch.165800 BPSK\_RB50\_0)





### Sub6 n5. Lower Band Edge Plot (15 M BW Ch.166300 BPSK\_RB1\_Offset 0)



Align Auto	Input Z: 50 Q. #Atten: 16 dB Corr CCorr Preamp Off Freq Ref. Int (S) NFE: Adaptive	PNO Best Wide Gate Off IF Gain Low Sig Track Off	#Avg Type: Power (RMS12345 Trig: Free Run Awwww A A A A A	824.000000 MHz	Setting
spectrum • ale/Div 10 dB	Ref LvI Offset 2 Ref Level 27.11		Mkr1 824.000 MH -26.858 dB		
7.1				Full Span	
89			Rt	Start Freq 822,000000 MHz	
1.9			DL1-13.00 at	Stop Freq 826.000000 MHz	
2.0		12		AUTO TUNE	
2.9				CF Step 400.000 kHz	
2.9				Auto Man	
2.0				Freq Offset 0 Hz	-
nter 824.000 MHz es BW 150 kHz	#Video BW 47	0 kHz	Span 4.000 M #Sweep ~1.01 s (1001 p		Lo

# Sub6 n5. Lower Band Edge Plot (15 M BW Ch.166300 BPSK\_RB75\_Offset 0)



Pspectrum       Ref Lvi Offset 27.11 dB       Mkr1       821.264 MHz       4.0000000 MHz         Scale/Div 10 dB       Ref Level 27.11 dBm       -30.925 dBm		Auto	Input Z: 50 Q Gorr CCorr Freq Ref: Int (S) NFE: Adaptive	#Atten 16 dB Preamp Off	PNO Best Wide Gate Off IF Gain Low Sig Track Off	#Avg Type: Po Trig: Free Run	wer (RMS123455 A WWWWW A A A A A A A	Center Frequency 821.000000 MHz	Setting
1     1     Start Freq       28     0       28     0       29     1       29     1       29     1       29     1       29     1       29     1       29     1       29     1       29     1       20     1       21     1       29     1       20     1       20     1       20     1       20     1       21     1       22     1       23     1       24     1       25     1       26     1       27     1       28     1       29     1       20     1       20     1       21     1       22     1       23     1       24     1       25     1       26     1       27     1       28     1       29     1       29     1       20     1       20     1       21     1       22     1 <th>cale/Div 10 dB</th> <th>•</th> <th></th> <th></th> <th></th> <th>Mkr</th> <th></th> <th>Swept Span</th> <th></th>	cale/Div 10 dB	•				Mkr		Swept Span	
enter 821.000 MHz #Video BW 300 kHz Span 4.000 MHz	17.1							Full Span	
12.6     1     1     Stop Freq       12.9     1     1     AUTO TUNE       12.9     1     1     CF Step       42.9     400.000 KHz     Auto       12.9     1     1       1 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>the second se</td><td></td></td<>								the second se	
ACTO TOTAL ACTO T							DL1 -13.00 dBm		
enter 821.000 MHz #Video BW 300 kHz Span 4.000 MHz	22.0				<b>↓</b> 1			1 1 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2	
enter 821.000 MHz #Video BW 300 kHz Span 4.000 MHz							RMS		
enter 821.000 MHz #Video BW 300 kHz Span 4.000 MHz Log									
enter 821.000 MHz #Video BW 300 kHz Span 4.000 MHz Log									
Res BW 100 kHz #Sweep ~1.01 s (1001 pts)				#Video BW 300	kHz	#Swe		Log	La

# Sub6 n5. Lower Extended Band Edge Plot (15 M BW Ch.166300 BPSK\_RB75\_0)





#### Sub6 n5. Lower Band Edge Plot (20 M BW Ch.166800 BPSK\_RB1\_Offset 0)



Spectrum       Ref Lvl Offset 27.11 dB       Mkr1 824.000 MHz       Span         Log       -28.731 dBm       -28.731 dBm       -28.731 dBm         10       -28.731 dBm       -28.731 dBm       -28.731 dBm         11       -28.731 dBm       -28.731 dBm       -28.731 dBm         12.9       -0000000 MHz       -28.731 dBm       -28.731 dBm         12.9       -000000 MHz       -28.731 dBm       -28.731 dBm         12.9       -000000 MHz       -28.731 dBm       -28.731 dBm         14.0000 MHz       -0000000 MHz       -28.731 dBm       -28.731 dBm         12.9       -000000 MHz       -0000000 MHz       -28.731 dBm         22.9       -00000 MHz       -0000000 MHz       -0000000 MHz         22.9       -000000 MHz       -0000000 MHz       -0000000 MHz         23.9       -0000000 MHz       -0000000 MHz       -0000000 MHz         24.9       -0000000 MHz       -0000000 MHz       -0000000 MHz         25.9       -00000000 MHz       -00000000 MHz       -00000000 MHz         26.000000 MHz       -00000000 MHz       -00000000 MHz       -0000000 MHz         26.00000 MHz       -0000000 MHz       -0000000 MHz       -0000000 MHz         26.000000 MHz       -000000	EYSIGHT Input. RF	Corr CCorr Freq Ref. Int (S) NFE: Adaptive	#Atten 16 dB Preamp Off	PNO Best Wide Gate Off IF Gain Low Sig Track Off	#Avg Type: Power (RM Trig: Free Run	123455 AWWWWW AAAAAA	Center Frequency 824.000000 MHz	Setting
1     CHI Span       1	Spectrum • cale/Div 10 dB						4.00000000 MHz Swept Span	
1       1	71						Full Span	
12.9     UL 1-13.00 dBm     Stop Freq 826.000000 MHz       1     1     AUTO TUNE       1     CF Step 400.000 kHz     Auto Man       12.9     1     Auto       12.9     1     1       12.9						RHS	Contract of the second s	
ACIO TONE       CF Step       400,000 kHz       Auto       Man       Freq Offset       O Hz       X Axis Scale				1		DL1-13.00 dBm		
42.9 52.9 52.0	22.0						AUTO TUNE	
Freq Offset 0 Hz X Axis Scale	12.9						400.000 kHz	
Res BW 200 kHz #Sweep ~1.01 s (1001 pts)			#Video BW 620	kHz			Log	La

# Sub6 n5. Lower Band Edge Plot (20 M BW Ch.166800 BPSK\_RB100\_Offset 0)



Spectrum Analy Swept SA	/zer 1	+					0	Frequenc	y 🔹 🔛
KEYSIGHT	Input, RF Coupling, DC Align: Auto	Input Z: 50 Q Corr CCorr Freq Ref. Int (S) NFE: Adaptive	#Atten 16 dB Preamp Off	PNO Best Wide Gate Off IF Gain Low Sig Track Off	#Avg Type: Pow Trig: Free Run	er (RMS123455 A WW WW W A A A A A A A	821.00	Frequency 0000 MHz	Settings
Spectrum scale/Div 10 d	B		Ref Lvi Offset 27 Ref Level 27.11 d	.11 dB	Mkr1	822.836 MHz -36.292 dBm	Sw	0000 MHz rept Span ro Span	
17:1							-	ull Span	
2.89							Start Fr 819.00	eq 0000 MHz	
2.9						DL1-13.00 dBm	Stop Fr 823.00	eq 0000 MHz	
2.0							AL	TO TUNE	
2.9							CF Ster 400.00 Au Ma	0 kHz to	
2.9							Freq Of 0 Hz	fset	
enter 821.000 Res BW 100 I			#Video BW 300	kHz	#Sweep	Span 4.000 MHz p ~1.01 s (1001 pts)		a	Loca
15		Mar 04, 2024 12:06:52 PM						-	

# Sub6 n5. Lower Extended Band Edge Plot (20 M BW Ch.166800 BPSK\_RB100\_0)





### Sub6 n5. Upper Band Edge Plot (5 M BW Ch.169300 BPSK\_RB1\_Offset 24)



EYSIGHT Input. RF L Align Auto	Input Z: 50 Q #Atten 10 Corr CCorr Preamp 0 Freq Ref. Int (S) NFE: Adaptive	3 dB PNO: Best Wide # Off Gate Off T IF Gain, Low Sig Track: Off	Avg Type: Power (RMS12345) rig: Free Run A A A A A A	49.00000 WHZ
Spectrum • cale/Div 10 dB	Ref Lvi Off Ref Level 2	set 27.11 dB 27.11 dBm	Mkr1 849.000 MH -26.122 dBn	4.0000000 10112
7.1				Full Span
.11	m			Start Freq 847.000000 MHz
2.9			DL1 -13.00 dB	Stop Freq 851.000000 MHz
2.0		1		AUTO TUNE
2.9		- Jow		CF Step 400.000 kHz
2.9				Auto Man
2.9				Freq Offset 0 Hz
enter 849.000 MHz Res BW 51 kHz	#Video B	W 160 kHz	Span 4.000 MH #Sweep ~1.01 s (1001 pts	

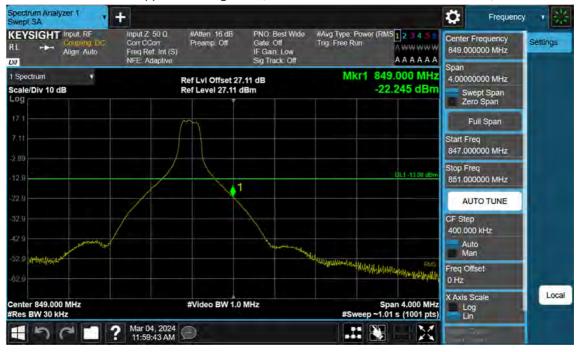
# Sub6 n5. Upper Band Edge Plot (5 M BW Ch.169300 BPSK\_RB25\_Offset 0)





#### Sub6 n5. Upper Extended Band Edge Plot (5 M BW Ch.169300 BPSK\_RB25\_0)





### Sub6 n5. Upper Band Edge Plot (10 M BW Ch.168800 BPSK\_RB1\_Offset 51)



L Align Auto	Input Z: 50 Q Cort CCorr Freq Ref. Int (S) NFE: Adaptive	#Atten 16 dB Preamp Off	PNO Best Wide Gate Off IF Gain Low Sig Track Off	#Avg Type: Powe Trig: Free Run	ar (RMS123455 A WWWWW A A A A A A A	Center Frequency 849.000000 MHz	Setting
Spectrum		Ref LvI Offset 27. Ref Level 27.11 d		Mkr1	850.088 MHz -32.984 dBm	Span 4.00000000 MHz Swept Span Zero Span	
7.1						Full Span	
.11						Start Freq 847.000000 MHz	
2.9					D/L1 -13.00 dBm	Stop Freq 851.000000 MHz	
2.0				¢1	BMS	AUTO TUNE	
12.9					NT/15.	CF Step 400.000 kHz Auto Man	
2.9						Freq Offset 0 Hz	
enter 849.000 MHz Res BW 100 kHz		#Video BW 300	kHz	#Sweep	Span 4.000 MHz >~1.01 s (1001 pts)	X Axis Scale Log Lin	Lo

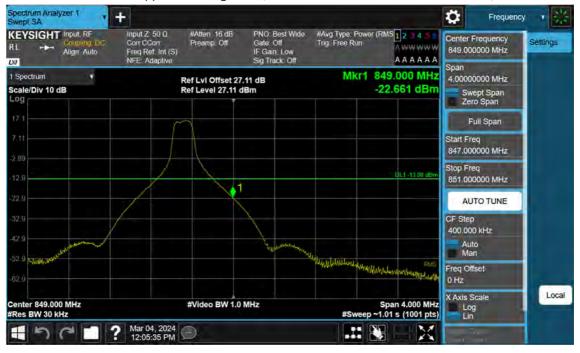
# Sub6 n5. Upper Band Edge Plot (10 M BW Ch.168800 BPSK\_RB50\_Offset 0)



EYSIGHT Input RF Compiled BC Align Auto	Input Z: 50 Q #Atten 16 dB Corr CCorr Preamp Off Freq Ref. Int (S) NFE: Adaptive	PNO Best Wide Gate Off IF Gain Low Sig Track Off	#Avg Type: Power (RMS12145 Trig: Free Run A A A A A	A	Setting
Spectrum • cale/Div 10 dB	Ref Lvi Offset Ref Level 27.1		Mkr1 850.116 MH -32.771 dBr		
7.1				Full Span	
.89				Start Freq 850.000000 MHz	
2.9			DL1-13-00 dB	Stop Freq 854.000000 MHz	
2.0				AUTO TUNE	
2.9			RM	CF Step 400.000 kHz Auto Man	
2.9				Freq Offset 0 Hz	
enter 852.000 MHz Res BW 100 kHz	#Video BW 3	300 kHz	Span 4.000 MH #Sweep ~1.01 s (1001 pt		Lo

# Sub6 n5. Upper Extended Band Edge Plot (10 M BW Ch.168800 BPSK\_RB50\_0)





### Sub6 n5. Upper Band Edge Plot (15 M BW Ch.168300 BPSK\_RB1\_Offset 78)



EYSIGHT Input. RF Coupling BC Align Auto	Input Z: 50 Q Corr CCorr Freq Ref. Int (S NFE: Adaptive	#Atten 16 dB Preamp Off )	PNO: Best Wide Gate Off IF Gain Low Sig Track Off	#Avg Type: Pow Trig: Free Run	xer (RMS123455 A WWWWW A A A A A A A	Center Frequency 849.000000 MHz	Setting
Spectrum + ale/Div 10 dB		Ref Lvi Offset 27. Ref Level 27.11 di		Mkr	850.264 MHz -27.503 dBm	Span 4.00000000 MHz Swept Span Zero Span	
1						Full Span	
89						Start Freq 847.000000 MHz	
1.0					D£1-13.00 dBm	Stop Freq 851.000000 MHz	
2.0					1 BMS	AUTO TUNE	
2.9						CF Step 400.000 kHz Auto Man	
2.0						Freq Offset 0 Hz	
nter 849.000 MHz es BW 150 kHz		#Video BW 470	kHz	#Swee	Span 4.000 MHz p ~1.01 s (1001 pts)	X Axis Scale Log Lin	Lo

# Sub6 n5. Upper Band Edge Plot (15 M BW Ch.168300 BPSK\_RB75\_Offset 0)



Align Auto Fr	put Z: 50 Q: #Atten: 16 dB orr CCorr Preamp Off reg Ref. Int (S) FE: Adaptive	PNO Best Wide #Avg Type Pov Gate Off Trig Free Run IF Gain Low Sig Track Off	ver (RMS123455) A WW WW W A A A A A A	852,000000 MHz	Setting
ectrum • le/Div 10 dB	Ref Lvi Offset 27 Ref Level 27.11 d	ri ub	1 850.252 MHz -29.558 dBm	Span 4.00000000 MHz Swept Span Zero Span	
				Full Span	
)				Start Freq 850.000000 MHz	
]			DL1-13.00 dBm	Stop Freq 854.000000 MHz	
1				AUTO TUNE	
			RMS	CF Step 400,000 kHz Auto Man	
)				Freq Offset 0 Hz	-
ter 852.000 MHz s BW 100 kHz	#Video BW 300		Span 4.000 MHz ep ~1.01 s (1001 pts)	X Axis Scale Log Lin	Lo

# Sub6 n5. Upper Extended Band Edge Plot (15 M BW Ch.168300 BPSK\_RB75\_0)





#### Sub6 n5. Upper Band Edge Plot (20 M BW Ch.167800 BPSK\_RB1\_Offset 105)



KEYSIGHT	Input, RF Coupling, DC Align: Auto	Input Z: 50 Q Corr CCorr Freq Ref. Int (S) NFE: Adaptive	#Atten 16 dB Preamp Off	PNO Best Wide Gate Off IF Gain Low Sig Track Off	#Avg Type: Pow Trig: Free Run	er (RMS123456 AWWWWW AAAAAA	Center Frequency 849.000000 MHz	Setting
Spectrum cale/Div 10 d	B		Ref Lvi Offset 27. Ref Level 27.11 d		Mkr1	849.128 MHz -32.176 dBm	Span 4.00000000 MHz Swept Span Zero Span	
7.1							Full Span	
2.89							Start Freq 847.000000 MHz	
12.9						DL1 -13 D0 dBm	Stop Freq 851.000000 MHz	
2.5				1			AUTO TUNE	
12.9 12.9						RMS	CF Step 400.000 kHz Auto Man	
52.0							Freq Offset 0 Hz	
enter 849.000 Res BW 200 k			#Video BW 620	kHz	#Swee	Span 4.000 MHz p ~1.01 s (1001 pts)	X Axis Scale Log Lin	La
5	2	Mar 04, 2024 12:10:50 PM	©					

# Sub6 n5. Upper Band Edge Plot (20 M BW Ch.167800 BPSK\_RB100\_Offset 0)



EYSIGHT Input. RF Couping BC Align Auto	Input Z 50 Q #Atten 16 dB Corr CCorr Preamp Off Freq Ref. Int (S) NFE Adaptive	PNO Best Wide #Avg Typ Gate Off Trig Free IF Gain Low Sig Track Off	e: Power (RMS <mark>123455</mark> Run A WWWWW A A A A A A	Center Frequency 852.000000 MHz	Setting
Spectrum • sale/Div 10 dB	Ref LvI Offset Ref Level 27.11	chill ub	Mkr1 850.496 MHz -37.371 dBm	Span 4.00000000 MHz Swept Span Zero Span	
7.1				Full Span	
11				Start Freq 850.000000 MHz	
2.9			DL1-13.00 dBm	Stop Freq 854.000000 MHz	
2.0				AUTO TUNE	
2.9			RMS	CF Step 400.000 kHz Auto Man	
2.9				Freq Offset 0 Hz	
enter 852.000 MHz es BW 100 kHz	#Video BW 3		Span 4.000 MHz Sweep ~1.01 s (1001 pts)		La

# Sub6 n5. Upper Extended Band Edge Plot (20 M BW Ch.167800 BPSK\_RB100\_0)





### Sub6 n5. Conducted Spurious Plot (165300ch\_5 MHz\_BPSK\_RB 1\_1)





### Sub6 n5. Conducted Spurious Plot (167300ch\_5 MHz\_BPSK\_RB 1\_1)





### Sub6 n5. Conducted Spurious Plot (169300ch\_5 MHz\_BPSK\_RB 1\_1)



EYSIGHT	Input. I Couple Align	M DC	Input Z: 50 Q Corr CCorr Freq Ref. Int (S) NFE: Adaptive	#Atten 16 dB Preamp Off	PNO Fast Gate Off IF Gain Low Sig Track Off	#Avg Type: Po Trig: Free Rur	wer (RMS123455 Awwwww AAAAAAA	5.01500	requency 00000 GHz	Settings
Spectrum cale/Div 10 d	в 2			Ref Level 6.00 d	IBm	Mk	r1 8.019 5 GHz -74.861 dBm	Sw	0000 GHz ept Span o Span	
4.0								P	ull Span	
4,0								Start Fre 30.0000	eq 000 MHz:	
4.0					the and details		1 RMS	Stop Fre 10.0000	eq 000000 GHz	
4 0 and				#Video BW 3.0 I			Stop 10.000 GHz	AU	TO TUNE	
Res BW 1.0 M Marker Table Mode	IHz Trace	T Scale	x	Y	Function F	Sweep	~18.7 ms (20001 pts) Function Value	CF Step 997.000 Aut Mai	0000 MHz o	
1 N 2 N 3	1	r	8.019 5 GHz 824.6 MHz					Freq Off 0 Hz	set	
4 5 6								X Axis S Log Lin	1	Lo

# Sub6 n5. Conducted Spurious Plot (165800ch\_10 MHz\_BPSK\_RB 1\_1)





#### Sub6 n5. Conducted Spurious Plot (167300ch\_10 MHz\_BPSK\_RB 1\_1)





#### Sub6 n5. Conducted Spurious Plot (168800ch\_10 MHz\_BPSK\_RB 1\_1)





### Sub6 n5. Conducted Spurious Plot (166300ch\_15 MHz\_BPSK\_RB 1\_1)





#### Sub6 n5. Conducted Spurious Plot (167300ch\_15 MHz\_BPSK\_RB 1\_1)





#### Sub6 n5. Conducted Spurious Plot (168300ch\_15 MHz\_BPSK\_RB 1\_1)





### Sub6 n5. Conducted Spurious Plot (166800ch\_20 MHz\_BPSK\_RB 1\_1)





#### Sub6 n5. Conducted Spurious Plot (167300ch\_20 MHz\_BPSK\_RB 1\_1)





### Sub6 n5. Conducted Spurious Plot (167800ch\_20 MHz\_BPSK\_RB 1\_1)



# **10. ANNEX A\_ TEST SETUP PHOTO**

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

No.	Description
1	HCT-RF-2405-FC013-P