

# **TEST REPORT**

FCC Sub6 n5 Test for SM-F741U Certification

APPLICANT SAMSUNG Electronics Co., Ltd.

REPORT NO. HCT-RF-2404-FC024-R1

DATE OF ISSUE May 3, 2024

> **Tested by** Jae Ryang Do

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F-TP22-03(Rev.06)

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T E S T R E P O R T	REPORT NO. HCT-RF-2404-FC024-R1 DATE OF ISSUE May 03, 2024 Additional Model SM-F741U1
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-F741U
Date of Test	February 27, 2024 ~ April 19, 2024
FCC ID	A3LSMF741U
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	April 26, 2024	Initial Release
1	May 03, 2024	Revised the date of test (Page 2.)

## 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).



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## MEASUREMENT REPORT

## **1. GENERAL INFORMATION**

Applicant Name:	SAMSUNG Electronics Co., Ltd.
Address:	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID:	A3LSMF741U
Application Type:	Certification
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part(s):	§ 22
EUT Type:	Mobile phone
Model(s):	SM-F741U
Additional Model(s)	SM-F741U1
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, 256QAM CP-OFDM: QPSK, 16QAM, 64QAM, 256QAM
	826.5 MHz – 846.5 MHz (Sub6 n5(5 MHz))
	829.0 MHz – 844.0 MHz (Sub6 n5(10 MHz))
Tx Frequency:	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
Carial numbers	Radiated : R3CX20KJSJW
Serial number:	Conducted : 7B5599BDA3507ECE



## **1.1. MAXIMUM OUTPUT POWER**

Mode		Tx Frequency Emission		EF	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 - 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, mmWave. 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)

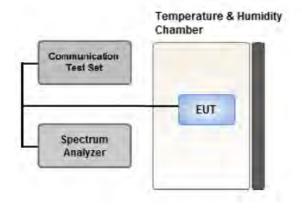
Where:  $\mathsf{P}_{\mathsf{g}}$  is the generator output power into the substitution antenna.

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

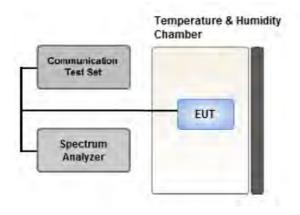
Set  $\geq$  [10 × (number of points in sweep) × (transmission period)] for single sweep

(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 EUT Spectrum Analyzer

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

#### Test setup

#### **Test Overview**

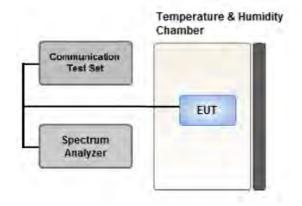
The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured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

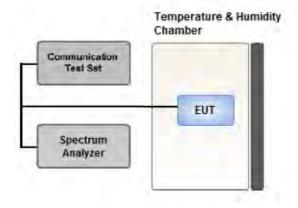
According to FCC 22.917, 24.238, 27.53 specified that power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. In the 1 MHz bands immediately outside and adjacent to the frequency block a 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)
- SM-F741U & additional models were tested and the worst case results are reported.
- (Worst case : SM-F741U)

[ Worst case ]					
Test Description	Modulation	RB size	RB offset	Axis	
	PI/2 BPSK,				
Effective Radiated Power	QPSK,	See Section 8.1		х	
	16QAM,				
	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.
- SM-F741U & additional models were tested and the worst case results are reported.

(Worst case : SM-F741U)

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									
			High	1	24									
	PI/2 BPSK	10	Low	1	0									
		אצסק ל/ום		PI/2 RPSK	PI/2 RPSK						10	High	1	51
Band Edge								15	Low	1	0			
Dana Lage		15	High	1	78									
		20	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				EF	RP
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			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

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### 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		0.063	17.97		
		256-QAM	-34.88	26.80	-10.05	1.41	v		0.034	4 15.34		



Freq	Mod/ Bandwidth	Modulation	Measured Level	Substitute Level	Ant. Gain	C.L	Pol	Limit	Ef	RP		RB
(MHz)	[SCS (kHz)]		(dBm)	(dBm)	(dBd)			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		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	El	RP		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		0.060	19.84       1       77         18.63       1       77         17.33       1       77         14.66       20.22       20.20         18.99       1       77         17.69       1       77         15.05       20.32       20.11		
		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	Pol	Limit	El	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		
834.0		16-QAM	-30.84	30.37	-10.05	1.39	V		0.078	18.93	1	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		0.059	17.73	0.15         0.10         8.93       1         10         7.60         4.97         0.19         0.13         8.97       1         10         7.71         4.99         0.30         0.20         9.08       1         10	
		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:	<u>3 meters</u>
SCS:	<u>15 kHz</u>

	Freq	Measured	Ant.	Substitut			Result	Limit	F	8B
Ch	(MHz)	Level (dBm)	Gain (dBi)	e 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
(0-0.0)	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	Frequenc y (MHz)	Modulatio n	Resource Block Size	Resource Block Offset	Data (dB)
			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		0	6.43
n5		030.5	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 60  $\sim$  79.

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#### 8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequenc y (MHz)	Modulatio n	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		000 5	256-QAM	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 40  $\sim$  59.

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Band	Band Width (MHz)	Frequenc y (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measuremen t 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 104 ~ 115.

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 80 ~ 103.

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## 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
836.5	100 %	0	836 500 011	4.4	0.000 001	0.005
830.5	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:	$\pm$ 0.000 25 % or 2.5 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
026 5	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
026 5	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
02C F	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





# 8.8 UPLINK CARRIER AGGREGATION

### Test Note

1. All tests were evaluated for the two bands using various combinations of RB size, RB offset,

modulation, and channel bandwidth.

2. All modes of operation were investigated and the worst case configuration results are reported in this section.

Please refer to the table below.

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

- N5A(ANT A)-N41A(ANT I)

(PCC - Modulation: BPSK, RB: 1, RB Offset: 23, SCC - Modulation: BPSK, RB: 1, RB Offset: 19)

## Radiated Spurious Emissions

DCC	500	P	SCC		
PCC	SCC	BW(MHz)	Channel	BW(MHz)	Channel
N5A(ANT A)	N41A(ANT I)	5	167300	15	518598

# 8.8.1 RADIATED SPURIOUS EMISSIONS

# N5A(ANT A)(PCC)- N41A(ANT I)(SCC)

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)	Limit (dBm)
1 673.00	-59.60	9.20	-68.78	2.03	V	-61.61	-13.00
2 509.50	-61.19	10.30	-65.72	2.50	V	-57.92	-13.00
3 346.00	-62.26	10.95	-65.15	2.89	V	-57.09	-13.00

Freq.(MHz)	Measured Level [dBm]	Ant. Gain (dBi)	Substitute Level [dBm]	C.L	Pol.	Result (dBm)	Limit (dBm)
5 185.98	-62.72	11.00	-64.22	3.70	V	-56.92	-25.00
7 778.97	-64.67	10.90	-57.29	4.61	V	-51.00	-25.00
10 371.96	-64.99	11.20	-54.29	5.41	V	-48.50	-25.00



Report No. HCT-RF-2404-FC024-R1

# 9. TEST PLOTS

The report shall not be (partly) reproduced except in full without approval of the laboratory.



KEYSIGHT Input RF RL Align Auto	Input Z 50 Q Corr CCorr Freq Ref. Int (S) NFE: Adaptive	Atten 16 dB Preamp Off	Trig: Free Run Gate Ott #IF Gain Low	Center Freq. AvgiHold 50 Radio Std N		Center Frequency 836.500000 MHz	Settings
Graph Grale/Div 10.0 dB		Ref Lvi Offset 27 Ref Value 40.00 (				Span 10.000 MHz	
00 30.0 20.0 10.0				~		CF Step 1.000000 MHz Auto Man	
2 00 10 0 26 0 36 0 46 0 56 0					PE	Freq Offset 0 Hz	
Center 836.500 MHz Res BW 100.00 kHz		#Video BW 390.	00 kHz	Sw	Span 10 Mi eep 16.7 ms (1001 pt		
2 Metrics T							
Occupied Bandwidt 4.5	h 036 MHz		Total Power		31.1 dBm		
Transmit Freq Error x dB Bandwidth	-23.479 k 5.233 M		% of OBW Po x dB	wer	99.00 % -26.00 dB		Loc
1501	? Mar 04, 2024 11:49:13 AM	0				7	

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



Align Auto	Corr CCorr Preamp Freq Ref. Int (S) NFE Adaptive	6 dB Trig Free Run o Off Gate Off #IF Gain Low	Center Freq: 836.500000 MH AvgjHold: 500/500 Radio Std: None	Center Frequency 836.500000 MHz	Settings
Graph cale/Div 10.0 dB	Ref Lvi C	0ffset 27.11 dB e 40.00 dBm		Span 10.000 MHz	
<b>00</b> 0.0 0.0 0.0			~	CF Step 1.000000 MHz Auto Man	
				PEAK 0 Hz	
enter 836.500 MHz tes BW 100.00 kHz	#Video E	3W 390.00 kHz	Spar Sweep 16.7 ms (	n 10 MHz 1001 pts)	
Metrics					
4.517 Transmit Freq Error x dB Bandwidth	3 MHz -13.869 kHz 5.238 MHz	Total Power % of OBW Pow x dB	30.4 dBm wer 99.00 % -26.00 dB		Lo

# 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)





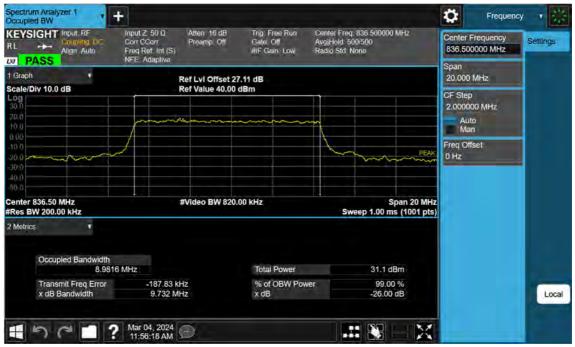
#### Sub6 n5. Occupied Bandwidth Plot (5 M BW Ch.167300 64QAM\_ Full RB \_0)





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





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



GHT Input RF Input Z 50 Q Atten 16 d Compliand BC Con CCon Preamp O Align Auto Freq Ref Inf (S) NFE Adaptive		Center Frequency Settings 836.500000 MHz
Ref Lvi Offs v 10.0 dB Ref Value 40		Span 20.000 MHz
		CF Step 2,000000 MHz Auto Man
		PEAK Freq Offset
36.50 MHz #Video BW / 200.00 kHz	320.00 kHz Span 20 Sweep 1.00 ms (100	
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 99.00 % x dB -26.00 dB	La

# 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)



Settings	r Frequency 00000 MHz	836.50		Center Freq. Avg[Hold: 50 Radio Std: N	Trig: Free Run Gate: Off #IF Gain: Low	Atten 16 dB Preamp Off	Input Z: 50 Q Corr CCorr Freq Ref. Int (S) NFE: Adaptive	out RF upling DC gn Auto	
		Span 30.000				Ref LvI Offset 2 Ref Value 40.00			raph le/Div 10.0
	000 MHz uto	and the second se			namaya				0 0 0
	Difset		PEA	· · · · · · · · · · · · · · · · · · ·					
			Span 30 MH p 1.00 ms (1001 pts	Swi	0 MHz	#Video BW 1.20			ter 836.50 / s BW 300.0
			31.0 dBm		Total Power		MHz	Bandwidth 13.45	etrics Occup
Lo			99.00 % -26.00 dB	er	% of OBW Pov x dB		-391.90 kl	Freq Error	Transr x dB B

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



	Input Z 50 Q Atten 16 dB Corr CCorr Preamp Off Freq Ref. Int (S) NFE Adaptive	Gate Off AvgiHol	Freq: 836.500000 MHz d: 500/500 itd: None	Center Frequency 836.500000 MHz	Settings
Graph Grale/Div 10.0 dB	Ref Lvi Offset 2 Ref Value 40.00			Span 30.000 MHz	
20.0 20.0 10.0	from the second second			CF Slep 3.000000 MHz Auto Man	
0 00 10 0 20 0 20 0 40 0 50 0			PEAK	Freq Offset 0 Hz	
enter 836.50 MHz Res BW 300.00 kHz	#Video BW 1.20	DO MHz	Span 30 MHz Sweep 1.00 ms (1001 pts)		
Metrics • Occupied Bandwidth 13.48	84 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		Lo

# 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)





#### 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)





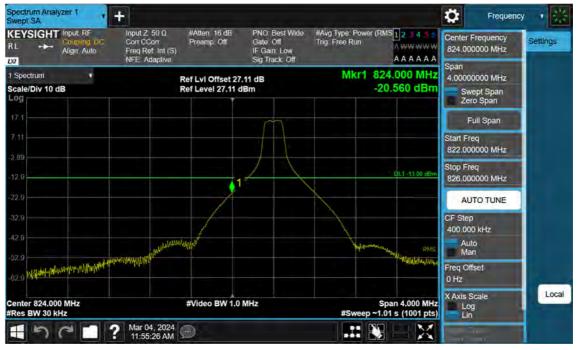
#### Sub6 n5. Lower Band Edge Plot (5 M BW Ch.165300 BPSK\_RB25\_Offset 0)



Align Auto Fre	orr CCorr Preamp Off eq Ref. Int (S) FE: Adaptive	Gate Off Trig IF Gain. Low Sig Track. Off	ig Type: Power (RM) : Free Run		Center Frequency 821.000000 MHz	Settings
spectrum sale/Div 10 dB	Ref LvI Offset 27 Ref Level 27.11 d		Mkr1 822 -31	.088 MHz .934 dBm	Span 4.00000000 MHz Swept Span Zero Span	
7.1					Full Span	
11					Start Freq 819.000000 MHz	
2.9				QL1-13.00 dBm	Stop Freq 823.000000 MHz	
2.10			<b>1</b>		AUTO TUNE	
2.9		and the second s	and the second s	and and an and and and and and and and a	CF Step 400.000 kHz	
29					Auto Man	
2.0					Freq Offset 0 Hz	
enter 821.000 MHz tes BW 100 kHz	#Video BW 300	kHz	Sp #Sweep ~1.0	an 4.000 MHz I s (1001 pts)	X Axis Scale Log Lin	Local

# 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)



Align Auto Fre	put Z 50 Q #Atten 16 dB orr CCorr Preamp Off eq Ref. Int (S) FE Adaptive	PNO Best Wide # Gate Off Ti IF Gain Low Sig Track Off	Avg Type: Power (RMS 1 2 1 4 5 ig: Free Run A A A A A	A
ctrum + /Div 10 dB	Ref Lvi Offset 27 Ref Level 27.11 d		Mkr1 824.000 MH -26.968 dB	
				Full Span
			Sh	Start Freq 822.000000 MHz
			DL1-13.00 dE	Stop Freq 826.000000 MHz
	<b>1</b>	4		AUTO TUNE
				CF Step 400.000 kHz Auto Man
				Freq Offset 0 Hz
er 824.000 MHz BW 100 kHz	#Video BW 300	kHz	Span 4.000 Mi #Sweep ~1.01 s (1001 pt	

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



Spectrum       Ref Lvi Offset 27.11 dB Ref Level 27.11 dBm       Mkr1       819.932 MHz -33.923 dBm       Span 4.0000000 MHz         00       01       10 dB       Ref Level 27.11 dBm       -33.923 dBm       -5000000 MHz         01       01       10 dB       01 dBm       -33.923 dBm       -5000000 MHz         02       01       01 dBm       -33.923 dBm       -5000000 MHz         20       01 dBm       01 dBm       -5000000 MHz         210       01 dBm       01 dBm       -5000 dBm         220       01 dBm       01 dBm       -5000000 MHz         220       0       01 dBm       -500 dBm         220       0       01 dBm       -500 dBm         220       0       01 dBm       -500 dBm         220       0       00 dBm       -500 dBm         220       0       00 dBm       -500 dBm         220       0       0       -500		L RF bling (DC) r 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: Po Trig: Free Run	wer (RMS123455 A ####################################	Center Frequency 821.000000 MHz	Setting
1     Start Freq	Spectrum cale/Div 10 dB	•				Mkr		Swept Span	
1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	71							Full Span	
CLI-13 00 dBm Stop Freq B23.000000 MHz AUTO TUNE CF Step 400.000 KHz Auto Man Freq Offset 0 Hz X Axis Scale								and the second se	
2.9 2.9 2.9 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0							D£1-13.00 dBm		
229 229 229 229 220 220 220 220 220 220	2.0		41					AUTO TUNE	
Freq Offset 0 Hz X Axis Scale	2.9						RMS	400.000 kHz Auto	
Res BW 100 kHz Span 4,000 kHz Log #Sweep ~1.01 s (1001 pts)	enter 821.000 MH Res BW 100 kHz	z		#Video BW 300	kHz	#Swe	Span 4.000 MHz ep ~1.01 s (1001 pts)	loa	La

# 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 Fre	but Z 50 Q #Atten 16 dB m CCorr Preamp Off eq Ref. Int (S) E Adaptive	PNO Best Wide Gate Off IF Gain Low Sig Track Off	#Avg Type: Power (RMS 1 2 1 4 5 Trig: Free Run A WW WW A A A A A	A A
ctrum + /Div 10 dB	Ref Lvi Offset 2 Ref Level 27.11		Mkr1 824.000 MI -26.858 dB	
				Full Span
			R	Start Freq 822,000000 MHz
			DE1-13.00 d	Stop Freq 826.000000 MHz
		12		AUTO TUNE
				CF Step 400.000 kHz Auto Man
				Freq Offset 0 Hz
er 824.000 MHz BW 150 kHz	#Video BW 47	0 kHz	Span 4.000 M #Sweep ~1.01 s (1001 p	

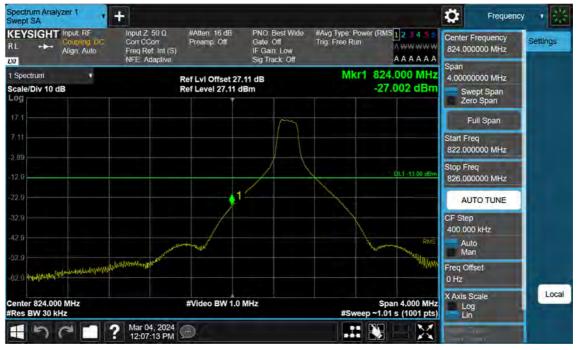
# Sub6 n5. Lower Band Edge Plot (15 M BW Ch.166300 BPSK\_RB75\_Offset 0)



L 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 A A A A A A	821.000000 MHz	Sétüngs
Spectrum • cale/Div 10 dB	Ref Lvi Offset 2 Ref Level 27.11		Mkr1 821.264 MH: -30.925 dBn		
7 1				Full Span	
.89				Start Freq 819.000000 MHz	
2.9			DE1-13.00 dBn	Stop Freq 823.000000 MHz	
2.0		•1		AUTO TUNE	
2.9			RMS	CF Step 400.000 kHz	
2.9				Auto Man	
2.0				Freq Offset 0 Hz	_
enter 821.000 MHz Res BW 100 kHz	#Video BW 3	00 kHz	Span 4.000 MH #Sweep ~1.01 s (1001 pts		Local

# 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)



Align Auto	Input Z: 50 Q #Atten 16 dB Corr CCorr Preamp Off Freq Ref. Int (S) NFE: Adaptive	PNO Best Wide #Avg Gate Off Trig F IF Gain Low Sig Track Off	Type:         Power (RMS12145)           ree Run         A WWWWW           A A A A A A	Center Frequency 824.000000 MHz
spectrum • ale/Div 10 dB	Ref Lvi Offset 2 Ref Level 27.11		Mkr1 824.000 MHz -28.731 dBm	
7.1				Full Span
89			RM3	Start Freq 822.000000 MHz
1.9			DL1 -13.00 dBm	Stop Freq 826.000000 MHz
2.0		1		AUTO TUNE
2.9				CF Step 400.000 kHz Auto Man
2.9				Freq Offset 0 Hz
nter 824.000 MHz es BW 200 kHz	#Video BW 62	0 kHz	Span 4.000 MHz #Sweep ~1.01 s (1001 pts)	

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



	Input, RF Coupling, BC Align: Auto	Input Z: 50 Q Corr CCorr Freq Ref. Int (S)	#Atten 16 dB Preamp Off	PNO Best Wide Gate Off IF Gain Low	#Avg Type: Pow Tng: Free Run	ver (RMS <mark>123455</mark> A WW WW W A A A A A A A		Frequency 0000 MHz	Séttings
2 Spectrum cale/Div 10 dB	*		Ref LvI Offset 27. Ref Level 27.11 d		Mkr	822.836 MHz -36.292 dBm	SW	0000 MHz rept Span ro Span	
7.1							F	ull Span	
.89							Start Fr 819.00	eq 0000 MHz	
2.9						DE1 -13.00 dBm	Stop Fr 823.00	eq 0000 MHz	
2.0							AL	TO TUNE	
2.9						1.3	CF Step 400.00 Au Ma	0 kHz to	
2.9							Freq Of 0 Hz	fset	
enter 821.000 Res BW 100 k			#Video BW 300	kHz	#Swee	Span 4.000 MHz p ~1.01 s (1001 pts)	X Axis S Lo Lir	g	LO
50	9 7 9	Mar 04, 2024 12:06:52 PM	Ð						

# 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 Couping 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: Po Trig: Free Run	ver (RMS <mark>123455</mark> A WWWWW A A A A A A A	Center Frequency 849.000000 MHz	Settings
Spectrum • cale/Div 10 dB		Ref LvI Offset 27. Ref Level 27.11 d		Mkr	1 849.000 MHz -26.122 dBm	Span 4.00000000 MHz Swept Span Zero Span	
7.1						Full Span	
.89	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~				Start Freq 847.000000 MHz	
2.9					Q1.1-13.00 dBm	Stop Freq 851.000000 MHz	
2.0						AUTO TUNE	
2.9				m	And States	CF Step 400.000 kHz	
2.9						Auto Man	
2.0						Freq Offset 0 Hz	
enter 849.000 MHz Res BW 51 kHz		#Video BW 160	kHz	#Swe	Span 4.000 MHz ep ~1.01 s (1001 pts)	X Axis Scale Log Lin	Lo

# 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)



EYSIGHT Input. RF Couping DC Align Auto		eamp Off	PNO Best Wide Gate Off IF Gain Low Sig Track Off	#Avg Type: Power ( Trig: Free Run		Center Frequency 849.000000 MHz	Séttings
Spectrum  Cale/Div 10 dB		vi Offset 27.11 evel 27.11 dBr			150.088 MHz 32.984 dBm	Span 4.00000000 MHz Swept Span Zero Span	
7.1						Full Span	
.11						Start Freq 847.000000 MHz	
2.9					DE1 -13 00 dBm	Stop Freq 851.000000 MHz	
2.0				<u>1</u>		AUTO TUNE	
2.9					FMS	CF Step 400.000 kHz	
2.9						Auto Man	
2.0						Freq Offset 0 Hz	
enter 849.000 MHz Res BW 100 kHz	#Vi	deo BW 300 kH	łz		Span 4.000 MHz 1.01 s (1001 pts)	X Axis Scale Log Lin	Local

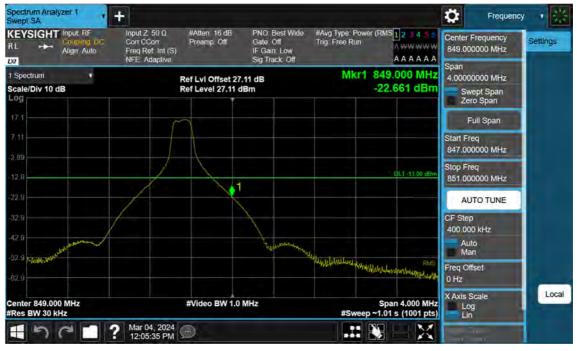
# Sub6 n5. Upper Band Edge Plot (10 M BW Ch.168800 BPSK\_RB50\_Offset 0)



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: Power Trig: Free Run		Center Frequency 852.000000 MHz	Settings
Spectrum • cale/Div 10 dB		Ref LvI Offset 27. Ref Level 27.11 di			850.116 MHz -32.771 dBm	Span 4.00000000 MHz Swept Span Zero Span	
7.1						Full Span	
						Start Freq 850.000000 MHz	
2.9					D)L1 -13 D0 dBm	Stop Freq 854.000000 MHz	
2.0						AUTO TUNE	
12.9					RMS	CF Step 400.000 kHz Auto Man	
2.9						Freq Offset 0 Hz	
enter 852.000 MHz Res BW 100 kHz		#Video BW 300	kHz	#Sweep	Span 4.000 MHz ~1.01 s (1001 pts)	X Axis Scale Log Lin	Local

# 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	Trig: Free Run	rer (RMS123455 A WW WW W A A A A A A A	Center Frequency 849.000000 MHz	Settings
Spectrum + ale/Div 10 dB		Ref LvI Offset 27.1 Ref Level 27.11 dE		Mkr1	850.264 MHz -27.503 dBm	Span 4.00000000 MHz Swept Span Zero Span	
1						Full Span	
89						Start Freq 847.000000 MHz	
1.9					DL1 -13.00 dBm	Stop Freq 851.000000 MHz	
2.0					1 BMS	AUTO TUNE	
29						CF Step 400.000 kHz	
2.9						Auto Man	
						Freq Offset 0 Hz	
nter 849.000 MHz es BW 150 kHz		#Video BW 470 I	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)



Séttings	Center Frequency 852,000000 MHz	g Type: Power (RMS121455 Free Run A & W W W W A A A A A A A	Best Wide #A Off Trig ain Low rack Off	#Atten 16 dB Preamp Off	Input Z 50 Ω Corr CCorr Freq Ref. Int (S) NFE: Adaptive	Coupling DC Align Auto	
	Span 4.00000000 MHz Swept Span Zero Span	Mkr1 850.252 MHz -29.558 dBm		Ref Lvi Offset 27.1 Ref Level 27.11 dB		iB	Spectrum cale/Div 10 og
	Full Span						7.1
	Start Freq 850.000000 MHz						2.89
	Stop Freq 854.000000 MHz	D1.1 - 13 00 dBm.					2.9
	AUTO TUNE					1	2.0
	CF Step 400.000 kHz Auto Man	RMS					12.9 12.9
	Freq Offset 0 Hz						02.0
La	X Axis Scale Log Lin	Span 4.000 MHz #Sweep ~1.01 s (1001 pts)		#Video BW 300 k			enter 852.00 Res BW 100

# 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)



Align Auto F	nput Z 50 Q #Atten 16 dB Sort CCorr Preamp Off Freq Ref. Int (S) IFE Adaptive	PNO: Best Wide #Avg Tyj Gate Off Trig: Fre IF Gain Low Sig Track: Off	pe: Power (RMS 1 2 3 4 5 5 e Run A www.www 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 d	IT UB	Mkr1 849.128 MHz -32.176 dBm	Span 4.00000000 MHz Swept Span Zero Span	
1				Full Span	
11				Start Freq 847.000000 MHz	
1.9			D1.1 -13 00 dBm	Stop Freq 851.000000 MHz	
2.0		1		AUTO TUNE	
2.9			RMS	CF Step 400.000 kHz Auto Man	
				Freq Offset 0 Hz	-
nter 849.000 MHz es BW 200 kHz	#Video BW 620		Span 4.000 MHz #Sweep ~1.01 s (1001 pts)	X Axis Scale Log Lin	Lo

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



Align Auto F	nput Z 50 Ω #Atten 16 dB Corr CCorr Preamp Off Freq Ref. Int (S) NFE Adaptive	PNO: Best Wide #Avg Type: Gate Off Trig: Free F IF Gain Low Sig Track Off	Power (RMS123455 Run A WWWWW A A A A A A A	Center Frequency 852,000000 MHz	Setting
ipectrum + ale/Div 10 dB	Ref Lvi Offset 27 Ref Level 27.11 d	IT UB	kr1 850.496 MHz -37.371 dBm	Span 4.00000000 MHz Swept Span Zero Span	
1				Full Span	
11				Start Freq 850.000000 MHz	
9			DL1 -13 00 dBm	Stop Freq 854.000000 MHz	
.0				AUTO TUNE	
19 19			RMS	CF Step 400.000 kHz Auto Man	
0				Freq Offset 0 Hz	
nter 852.000 MHz es BW 100 kHz	#Video BW 300		Span 4.000 MHz weep ~1.01 s (1001 pts)	X Axis Scale Log Lin	Lo

# 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)



EYSIGHT	Couple Align	10 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 AAAAAA	Center Frequent 5.015000000 G	Setunds
Spectrum ale/Div 10 dl	в 2	•		Ref Level 6.00 c	IBm	Mk	r1 9.699 9 GHz -74.470 dBm	0.010000000	
4.0								Full Span	
4,0								Start Freq 30.000000 MH:	z
4.0 4.0 4.0							1	Stop Freq 10.000000000	GHz
art 30 MHz				#Video BW 3.0	MHz		Stop 10.000 GHz		IE .
es BW 1.0 M Marker Table Mode	1Hz Trace	T Scale	x	Y	Function	Sweep Function Width	~18.7 ms (20001 pts) Function Value	CF Step 997.000000 MH Auto Man	tz
1 N 2 N 3	1	r	9.699 9 GHz 844.5 MHz					Freq Offset 0 Hz	
4 5 6								X Axis Scale Log Lin	LO

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





#### 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-2404-FC024-P			