

TEST REPORT

FCC Sub6 n26(Part90) Test for SM-F741U Certification

APPLICANT SAMSUNG Electronics Co., Ltd.

REPORT NO. HCT-RF-2404-FC029-R1

DATE OF ISSUE May 3, 2024

> **Tested by** Jae Ryang Do

Technical Manager Jong Seok Lee



F-TP22-03(Rev.06)

The report shall not be (partly) reproduced except in full without approval of the laboratory. **HCT CO., LTD.** 2-6, 73, 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA Tel. +82 31 645 6300 Fax. +82 31 645 6401



HCT CO.,LTD. 2-6, 73, 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, 17383 KOREA Tel. +82 31 645 6300 Fax. +82 31 645 6401

T E S T R E P O R T	REPORT NO. HCT-RF-2404-FC029-R1 DATE OF ISSUE May 03, 2024 Additional Model SM-F741U1
Applicant	SAMSUNG Electronics Co., Ltd. 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):	§90, §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).



CONTENTS

1. GENERAL INFORMATION	5
1.1. MAXIMUM OUTPUT POWER	6
2. INTRODUCTION	7
2.1. DESCRIPTION OF EUT	7
2.2. MEASURING INSTRUMENT CALIBRATION	7
2.3. TEST FACILITY	7
3. DESCRIPTION OF TESTS	8
3.1 TEST PROCEDURE	8
3.2 CONDUCTED OUTPUT POWER	9
3.3 RADIATED POWER	10
3.4 RADIATED SPURIOUS EMISSIONS	11
3.5 OCCUPIED BANDWIDTH	12
3.6 SPURIOUS AND HARMONIC EMISSIONS AT ANTENNA TERMINAL	13
3.7 CHANNEL EDGE	14
3.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE	16
3.9 WORST CASE(RADIATED TEST)	17
3.10 WORST CASE(CONDUCTED TEST)	
4. LIST OF TEST EQUIPMENT	19
5. MEASUREMENT UNCERTAINTY	20
6. SUMMARY OF TEST RESULTS	21
7. SAMPLE CALCULATION	22
8. TEST DATA	24
8.1 CONDUCTED OUTPUT POWER	24
8.2 EFFECTIVE RADIATED POWER	28
8.3 RADIATED SPURIOUS EMISSIONS	32
8.4 OCCUPIED BANDWIDTH	34
8.5 CONDUCTED SPURIOUS EMISSIONS	35
8.6 CHANNEL EDGE (Part90)	35
8.7 BAND EDGE(Part22)	35
8.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE	36
9. TEST PLOTS	40



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):	§90, §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
	816.5 MHz – 824.0 MHz (Sub6 n26 (5 MHz))
Tx Frequency:	819.0 MHz – 824.0 MHz (Sub6 n26 (10 MHz))
TX Frequency:	821.5 MHz – 824.0 MHz (Sub6 n26 (15 MHz))
	824.0 MHz (Sub6 n26 (20 MHz))
Date(s) of Tests:	February 27, 2024 ~ April 19, 2024
	Radiated : R3CX20KJSJW
Serial number:	Conducted : 7B5599BDA3507ECE



1.1. MAXIMUM OUTPUT POWER

Mada		Tx Frequency Emission		Conducted C	output Power
Mode (MHz)	Tx Frequency (MHz)	Designator	Modulation	Max. Power (W)	Max. Power (dBm)
		4M47G7D	PI/2 BPSK	0.256	24.09
		4M53G7D	QPSK	0.264	24.21
Sub6 n26 (5)	816.5 - 824.0	4M50W7D	16QAM	0.200	23.02
		4M51W7D	64QAM	0.137	21.38
		4M50W7D	256QAM	0.098	19.90
		8M95G7D	PI/2 BPSK	0.256	24.09
		9M01G7D	QPSK	0.267	24.27
Sub6 n26 (10)	819.0 - 824.0	8M97W7D	16QAM	0.208	23.18
		8M98W7D	64QAM	0.140	21.46
		8M95W7D	256QAM	0.088	19.45
		13M5G7D	PI/2 BPSK	0.259	24.13
		13M5G7D	QPSK	0.253	24.03
Sub6 n26 (15)	821.5 - 824.0	13M4W7D	16QAM	0.199	22.98
		13M5W7D	64QAM	0.144	21.59
		13M5W7D	256QAM	0.092	19.63
		17M9G7D	PI/2 BPSK	0.245	23.89
		18M0G7D	QPSK	0.251	24.00
Sub6 n26 (20)	824.0	17M9W7D	16QAM	0.204	23.09
		17M9W7D	64QAM	0.146	21.64
		17M9W7D	256QAM	0.085	19.28





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
Channel 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	- KDB 971168 D01 v03r01 - Section 5.2.4 - ANSI C63.26-2015 - Section 5.2.1 & 5.2.4.2
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 CONDUCTED OUTPUT POWER

Test Overview

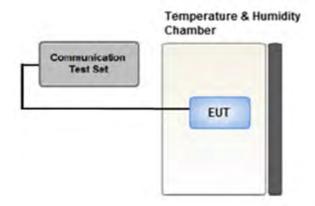
According to ANSI C63.26-2015 Section 5.2.1 when measuring the maximum RF output power from such devices, control over the EUT must be provided either through special test software (provided by manufacturer specifically for compliance testing, but not accessible by an end user) or through use of a base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

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

Test Procedure

- 1. The RF port of the EUT was connected to the Communication Tester via an RF cable.
- 2. Conducted average power was measured using a calibrated Radio Communication Tester.

Test setup





3.3 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.





3.4 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 10th 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)

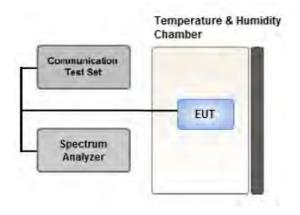
Where: P_{g} is the generator output power into the substitution antenna.

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

EIRP (dBm) = ERP (dBm) + 2.15



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

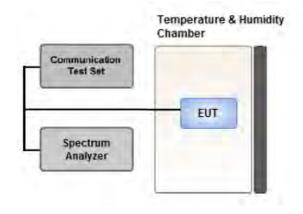
The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured 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 CHANNEL 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 :
 - .- EA licensee's frequency block by up to and including 37.5 kHz : 300 Hz
 - .- EA licensee's frequency block greater than 37.5 kHz : 100 kHz
- 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



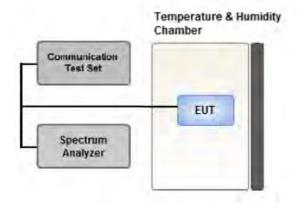
Test Notes

For 90.691(a), RBW=300 Hz for offset less than 37.5 kHz from channel edge and RBW=100 kHz for offsets greater than 37.5 kHz is allowed.

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: SA Only
- 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
- 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	Modulatio	RB size	RB offset	Axis	
rest Description	n	ND SIZE	KD OHSEL	7713	
	PI/2 BPSK,				
	QPSK,	See Section 8.1			
Effective Radiated Power	16QAM,			Х	
	64QAM,				
	256QAM				
Radiated Spurious and Harmonic Emissions	PI/2 BPSK	See See	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 Only
- 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	Modulatio n	Bandwidt h (MHz)	Frequenc y	RB size	RB offset
	PI/2 BPSK QPSK, 16QAM, 64QAM, 256QAM	5	High	Full RB	0
Occupied Bandwidth	PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM	10, 15, 20	Mid	Full RB	0
		5	Low	1	0
			High	1	24
		10	Mid	1	0
				1	51
		15	Mid	1	0
Channel Edge	PI/2 BPSK,			1	78
		20	Mid	1	0
				1	105
		5	Low, High	Full RB	0
		10, 15, 20	Mid	Full RB	0
Spurious and Harmonic Emissions at	PI/2 BPSK,	5	Low, High	1	1
Antenna Terminal	,,	10, 15, 20	Mid	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).

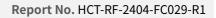


5. MEASUREMENT UNCERTAINTY

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
Channel Edge / Spurious and Harmonic Emissions at Antenna Terminal.	§ 2.1051, § 90.691	< 50 + 10log10 (P[Watts]) at Band Edge and for all out-of-band emissions within 37.5 kHz of Block Edge	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 § 90.635	< 100 Watts	PASS
Frequency stability / variation of ambient temperature	§ 2.1055, § 90.213 § 22.355	< 2.5 ppm	PASS

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 (Only 15,20 MHz B.W & Straddle C.H)	PASS
Radiated Spurious and Harmonic Emissions	§ 2.1053, § 90.691 § 22.917(a)	< 43 + 10log10 (P[Watts]) for all out-of band emissions	PASS



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.	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



8. TEST DATA

8.1 CONDUCTED OUTPUT POWER

Band	M = - -+-		RB		Мах	. output	power(d	lBm)		1
Widt	Modulatio	RB	Offse	816.5	5 MHz	821.5	5 MHz	824.0) MHz	Limit
h	n	Size	t	dBm	W	dBm	W	dBm	W	(W)
		1	1	24.05	0.254	23.84	0.242	23.90	0.245	100
		1	13	24.09	0.256	23.90	0.246	23.93	0.247	100
	BPSK	1	23	24.06	0.255	23.74	0.236	23.82	0.241	100
		12	0	23.46	0.222	23.42	0.220	23.36	0.217	100
		12	7	23.96	0.249	24.03	0.253	23.93	0.247	100
		12	13	23.40	0.219	23.39	0.218	23.39	0.218	100
		25	0	23.42	0.220	23.42	0.220	23.30	0.214	100
		1	1	24.06	0.255	23.95	0.248	23.90	0.245	100
5		1	13	24.17	0.261	24.01	0.252	23.96	0.249	100
		1	23	24.21	0.264	23.93	0.247	23.93	0.247	100
	QPSK	12	0	22.98	0.199	22.93	0.196	22.81	0.191	100
		12	7	24.01	0.252	23.98	0.250	23.92	0.246	100
		12	13	22.86	0.193	22.90	0.195	22.84	0.193	100
		25	0	22.85	0.193	22.90	0.195	22.93	0.196	100
	16QAM	1	1	23.02	0.200	22.93	0.196	22.79	0.190	100
	64QAM	1	1	21.36	0.137	21.31	0.135	21.38	0.137	100
	256QAM	1	1	19.90	0.098	18.74	0.075	18.82	0.076	100



Dand		RB	RB -	М	Limit			
Band	Modulation			819.0) MHz	824.0) MHz	
Width		Size	Offset	dBm	w	dBm	W	(W)
		1	1	23.95	0.248	23.89	0.245	100
		1	26	24.02	0.252	24.07	0.255	100
		1	50	23.94	0.248	24.09	0.256	100
	BPSK	25	0	23.38	0.218	23.42	0.220	100
		25	14	24.07	0.255	23.90	0.246	100
		25	27	23.39	0.218	23.43	0.220	100
		50	0	23.41	0.219	23.33	0.215	100
		1	1	24.15	0.260	24.11	0.258	100
10		1	26	24.27	0.267	24.16	0.260	100
		1	50	24.24	0.265	24.15	0.260	100
	QPSK	25	0	22.85	0.193	22.88	0.194	100
		25	14	23.97	0.250	23.91	0.246	100
		25	27	22.88	0.194	22.88	0.194	100
		50	0	22.90	0.195	22.80	0.191	100
	16QAM	1	1	23.02	0.200	23.18	0.208	100
	64QAM	1	1	21.46	0.140	21.43	0.139	100
	256QAM	1	1	19.36	0.086	19.45	0.088	100



Dand		RB	RB	М	Limit			
Band	Modulation			821.5	5 MHz	824.0) MHz	
Width		Size	Offset	dBm	w	dBm	W	(W)
		1	1	24.02	0.252	23.83	0.242	100
		1	40	24.13	0.259	23.91	0.246	100
		1	77	24.12	0.258	23.93	0.247	100
	BPSK	36	0	23.37	0.217	23.26	0.212	100
		36	22	24.08	0.256	23.91	0.246	100
		36	43	23.26	0.212	23.34	0.216	100
		75	0	23.33	0.215	23.32	0.215	100
		1	1	23.41	0.219	24.01	0.252	100
15		1	40	23.49	0.223	24.03	0.253	100
		1	77	23.47	0.223	23.96	0.249	100
	QPSK	36	0	22.82	0.191	22.82	0.192	100
		36	22	23.99	0.251	23.92	0.246	100
		36	43	22.83	0.192	22.91	0.195	100
		75	0	22.90	0.195	22.80	0.190	100
	16QAM	1	1	22.98	0.199	22.95	0.197	100
	64QAM	1	1	21.11	0.129	21.59	0.144	100
	256QAM	1	1	19.10	0.081	19.63	0.092	100



Band	Modulation	RB	RB		output r(dBm)	Limit
Width	Modulation	Size	Offset	824.	0 MHz	(W)
				dBm	w	
		1	1	23.68	0.233	100
		1	53	23.75	0.237	100
		1	104	23.87	0.244	100
	BPSK	50	0	23.27	0.212	100
		50	28	23.89	0.245	100
		50	56	23.33	0.215	100
		100	0	23.44	0.221	100
		1	1	23.88	0.244	100
20		1	53	23.94	0.248	100
		1	104	24.00	0.251	100
	QPSK	50	0	22.82	0.192	100
		50	28	23.90	0.246	100
		50	56	22.79	0.190	100
		100	0	23.00	0.200	100
	16QAM	1	1	23.09	0.204	100
	64QAM	1	1	21.64	0.146	100
	256QAM	1	1	19.28	0.085	100



8.2 EFFECTIVE RADIATED POWER

Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level	Substitute Level	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
	[SCS (kHz)]		(dBm)	(dBm)	(UBU)			W	W	dBm	Size	Offset
		PI/2 BPSK	-29.63	31.11	-10.05	1.38	Н		0.093	19.68		
		QPSK	-29.77	30.97	-10.05	1.38	Н		0.090	19.54		
816.5		16-QAM	-30.76	29.98	-10.05	1.38	Н		0.072	18.55	1	1
		64-QAM	-32.12	28.62	-10.05	1.38	Н		0.052	17.19		
		256-QAM	-34.58	26.16	-10.05	1.38	Н		0.030	14.73		
		PI/2 BPSK	-29.69	31.23	-10.05	1.38	Н	< 100	0.095	19.80		
	Sub6 n26	QPSK	-29.75	31.17	-10.05	1.38	Н		0.094	19.74	1	1
821.5	5 MHz	16-QAM	-30.76	30.16	-10.05	1.38	Н	0.07	0.075	18.73		
	[15 kHz]	64-QAM	-32.13	28.79	-10.05	1.38	Н		0.054	17.36		
		256-QAM	-34.72	26.20	-10.05	1.38	Н		0.030	14.77		
		PI/2 BPSK	-29.81	31.09	-10.05	1.38	Н		0.093	19.66		
		QPSK	-29.96	30.94	-10.05	1.38	Н		0.089	19.51		
824.0		16-QAM	-30.99	29.91	-10.05	1.38	Н	< 7.00	0.071	18.48	1	1
		64-QAM	-32.31	28.59	-10.05	1.38	Н		0.052	17.16		
		256-QAM	-34.87	26.03	-10.05	1.38	Н		0.029	14.60		



Freq (MHz)	Mod/ Bandwidth	Modulation	Measured Level	Substitute Level	Ant. Gain (dBd)	C.L	Pol	Limit	ERP		RB	
(MITZ)	[SCS (kHz)]		(dBm)	(dBm)	(ubu)			W	W	dBm	Size	Offset
		PI/2 BPSK	-29.69	31.05	-10.05	1.38	Н		0.092	19.62		
		QPSK	-29.76	30.98	-10.05	1.38	Н		0.090	19.55		
819.0		16-QAM	-30.79	29.95	-10.05	1.38	Н	< 100	0.071	18.52	1	1
		64-QAM	-32.07	28.67	-10.05	1.38	Н		0.053	17.24		
	Sub6 n26	256-QAM	-34.72	26.02	-10.05	1.38	Н		0.029	14.59		
	10 MHz [15 kHz]	PI/2 BPSK	-29.69	31.21	-10.05	1.38	Н		0.095	19.78		
		QPSK	-29.70	31.20	-10.05	1.38	н		0.095	19.77		
824.0		16-QAM	-30.88	30.02	-10.05	1.38	н	< 7.00	0.072	18.59	1	1
		64-QAM	-32.18	28.72	-10.05	1.38	н		0.054	17.29		
		256-QAM	-34.78	26.12	-10.05	1.38	Н		0.030	14.69		



(MHZ)		Modulation	Measured Level	Substitute Level	vel Ant. Gain (dBd) C.L Pol	Limit	ERP		RB			
(MHZ)	[SCS (kHz)]		(dBm)	(dBm)	(ава)			w	w	dBm	Size	Offset
		PI/2 BPSK	-29.65	31.27	-10.05	1.38	Н		0.096	19.84		
		QPSK	-29.67	31.25	-10.05	1.38	Н		0.096	19.82		
821.5		16-QAM	-30.74	30.18	-10.05	1.38	Н		0.075	18.75	1	1
		64-QAM	-32.14	28.78	-10.05	1.38	Н		0.054	17.35		
	Sub6 n26	256-QAM	-34.69	26.23	-10.05	1.38	Н	< 7.00	0.030	14.80		
	15 MHz [15 kHz]	PI/2 BPSK	-29.67	31.23	-10.05	1.38	Н	< 7.00	0.096	19.80		
		QPSK	-29.69	31.21	-10.05	1.38	Н		0.095	19.78		
824.0		16-QAM	-30.89	30.01	-10.05	1.38	Н		0.072	18.58	1	1
		64-QAM	-32.15	28.75	-10.05	1.38	Н		0.054	17.32		
		256-QAM	-34.63	26.27	-10.05	1.38	Η		0.031	14.84		



(MHZ)	Mod/ Bandwidth	Modulation	Measured Level	Substitute Level	Ant. Gain (dBd)	C.L	Pol	Limit Pol	ERP		RB	
(10172)	[SCS (kHz)]		(dBm)	(dBm)	(ubu)			W	W	dBm	Size	Offset
		PI/2 BPSK	-29.68	31.22	-10.05	1.38	н		0.095	19.79		
	Sub6 n26	QPSK	-29.71	31.19	-10.05	1.38	Н		0.095	19.76		
824.0	20 MHz	16-QAM	-30.77	30.13	-10.05	1.38	Н	< 7.00	0.074	18.70	1	1
	[15 kHz]	64-QAM	-32.06	28.84	-10.05	1.38	Н		0.055	17.41		
		256-QAM	-34.68	26.22	-10.05	1.38	Н		0.030	14.79		



8.3 RADIATED SPURIOUS EMISSIONS

NR Band:	<u>N26</u>
Bandwidth:	5 MHz
Modulation:	PI/2 BPSK
Distance:	3 meters
SCS:	<u>15 kHz</u>

Ch	Freq (MHz)	Measured Level	Ant. Gain (dBi)	Substitute Level	C.L	Pol	Result (dBm)	Limit (dBm)	F	RB
	()	(dBm)	(42.)	(dBm)			(02)	(02111)	Size	Offset
	1 633.00	-56.32	9.20	-65.23	2.03	V	-58.06	-13.00		
	2 449.50	-59.53	10.20	-62.78	2.45	V	-55.03	-13.00		
163300 (816.5)	3 266.00	-60.91	10.90	-62.95	2.92	V	-54.97	-13.00	1	1
, <i>,</i> ,	4 082.50	-64.08	11.30	-63.93	3.25	V	-55.88	-13.00		
	4 899.00	-60.82	10.90	-56.53	3.58	V	-49.21	-13.00		
	1 643.00	-56.32	9.40	-64.94	2.00	V	-57.54	-13.00		
	2 464.50	-60.02	10.30	-64.85	2.52	V	-57.07	-13.00		
164300 (821.5)	3 286.00	-60.73	11.00	-63.21	2.94	V	-55.15	-13.00	1	1
()	4 107.50	-61.82	11.20	-60.90	3.28	V	-52.98	-13.00		
	4 929.00	-62.59	10.70	-57.43	3.61	V	-50.34	-13.00		



NR Band:	<u>N26</u>
Bandwidth:	15 MHz
Modulation:	PI/2 BPSK
Distance:	3 meters
■ SCS:	<u>15 kHz</u>

Ch	Freq (MHz)	Measured Level	Ant. Gain (dBi)	Substitute Level	C.L	Pol	Result (dBm)	Limit (dBm)	RB			
	((dBm)	()	(dBm)			(4-11)	(42)	Size	Offset		
	1 643.00	-58.19	9.40	-66.81	2.00	V	-59.41	-13.00				
	2 464.50	-59.28	10.30	-64.11	2.52	V	-56.33	-13.00				
164300 (821.5)	3 286.00	-60.08	11.00	-62.56	2.94	V	-54.50	-13.00	1	1		
	4 107.50	-63.21	11.20	-62.29	3.28	V	-54.37	-13.00				
	4 929.00	-61.92	10.70	-56.76	3.61	V	-49.67	-13.00				
	1 648.00	-57.96	9.20	-66.95	2.02	V	-59.77	-13.00				
	2 472.00	-59.75	10.20	-63.89	2.49	V	-56.18	-13.00				
164800 (824.0)	3 296.00	-60.34	10.75	-62.69	2.91	V	-54.85	-13.00	1	1		
	4 120.00	-61.19	11.30	-60.48	3.22	V	-52.40	-13.00				
	4 944.00	-62.28	11.00	-57.80	3.60	V	-50.40	-13.00				



8.4 OCCUPIED BANDWIDTH

Band	Band Width	Frequency (MHz)	Modulation	Resource Block Size	Resource Block Offset	Data (MHz)
			BPSK	25		4.4672
			QPSK			4.5305
	5 MHz	821.5	16QAM			4.4995
			64QAM			4.5126
			256QAM			4.5001
		z 819.0	BPSK	50		8.9508
			QPSK			9.0135
	10 MHz		16QAM			8.9729
			64QAM			8.9835
Band			256QAM		0	8.9514
26		MHz ** 821.5	BPSK	75		13.458
			QPSK			13.500
	15 MHz		16QAM			13.417
			64QAM			13.493
			256QAM			13.500
		20 MHz ** 824.0	BPSK		BPSK	17.924
			QPSK			17.949
	20 MHz		16QAM			17.931
			64QAM			17.893
			256QAM			17.887

Note:

1. Plots of the EUT's Occupied Bandwidth are shown Page 41 ~ 60.

2. **: Straddle Channel

3. Straddle channel does not exceed the Part22 and Part90 limits.



Band	Band Width (MHz)	Frequency (MHz)	Frequency of Maximum Harmonic (GHz)	Factor (dB)	Measurement Maximum Data (dBm)	Result (dBm)	Limit (dBm)
	5	816.5	9.9970	31.315	-75.087	-43.772	
		821.5	8.0070	31.315	-74.712	-43.397	
		** 824.0	9.9586	31.315	-74.557	-43.242	
20	10	819.0	7.7548	31.315	-74.043	-42.728	12.00
26	26 10	** 824.0	4.0574	30.700	-74.873	-44.173	-13.00
15 20	15	** 821.5	9.1182	31.315	-73.714	-42.399	
	12	** 824.0	9.9412	9.9412 31.315 -73.968	-73.968	-42.653	
	20	** 824.0	5.2129	31.315	-74.254	-42.939	

8.5 CONDUCTED SPURIOUS EMISSIONS

Note:

1. Plots of the EUT's Conducted Spurious Emissions are shown Page 87 ~ 94.

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	27.994
1 - 5	30.700
5 - 10	31.315
10 - 15	31.840
15 - 20	32.213
Above 20	32.855

5. **: Straddle Channel

6. Straddle channel does not exceed the Part22 and Part90 limit

8.6 CHANNEL EDGE (Part90)

- Test Channel : 164800(824.0MHz)

- Plots of the EUT's Band Edge are shown Page 61 ~ 76.

8.7 BAND EDGE(Part22)

- Test Channel : 164800(824.0 MHz)

- Plots of the EUT's Band Edge are shown Page 77 ~ 86.



8.8 FREQUENCY STABILITY / VARIATION OF AMBIENT TEMPERATURE

BandWidth:	5 MHz
Voltage(100 %):	3.880 VDC
Batt. Endpoint:	3.300 VDC
LIMIT:	Emission must remain in band

Test. Frequncy	Voltage	Temp.	Frequency	Frequency Error	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	(Hz)	(%)	
	100 %	+20(Ref)	821 499 995	0.0	0.000 000	0.000
	100 %	-30	821 499 991	-4.5	-0.000 001	-0.005
	100 %	-20	821 499 991	-4.5	-0.000 001	-0.005
	100 %	-10	821 499 991	-4.4	-0.000 001	-0.005
021 5	100 %	0	821 499 991	-4.2	-0.000 001	-0.005
821.5	100 %	+10	821 499 991	-4.4	-0.000 001	-0.005
	100 %	+30	821 499 991	-4.4	-0.000 001	-0.005
	100 %	+40	821 499 991	-4.5	-0.000 001	-0.005
	100 %	+50	821 499 991	-4.3	-0.000 001	-0.005
	Batt. Endpoint	+20	821 499 991	-4.4	-0.000 001	-0.005



BandWidth:	<u>10 MHz</u>
Voltage(100 %):	3.880 VDC
Batt. Endpoint:	3.300 VDC
■ LIMIT:	Emission must remain in band

Test. Frequncy	Voltage	Temp.	Frequency	Frequency Error	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	(Hz)	(%)	
	100 %	+20(Ref)	819 000 004	0.0	0.000 000	0.000
	100 %	-30	819 000 007	3.5	0.000 000	0.004
	100 % 100 %	-20	819 000 007	3.5	0.000 000	0.004
		-10	819 000 007	3.6	0.000 000	0.004
010.0	100 %	0	819 000 007	3.8	0.000 000	0.005
819.0	100 %	+10	819 000 007	3.6	0.000 000	0.004
	100 %	+30	819 000 007	3.7	0.000 000	0.005
	100 %	+40	819 000 007	3.9	0.000 000	0.005
	100 %		819 000 008	4.2	0.000 001	0.005
	Batt. Endpoint	+20	819 000 008	4.0	0.000 000	0.005



BandWidth:	<u>15 MHz</u>
Voltage(100 %):	3.880 VDC
Batt. Endpoint:	3.300 VDC
■ LIMIT:	Emission must remain in band

Test. Frequncy	Voltage	Temp.	Frequency	Frequency Error	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	(Hz)	(%)	
	100 %	+20(Ref)	821 500 002	0.0	0.000 000	0.000
	100 %	-30	821 500 002	0.2	0.000 000	0.000
100 %	100 %	-20	821 500 002	0.4	0.000 000	0.000
	100 %	-10	821 500 001	-0.5	0.000 000	-0.001
** 021 5	100 %	0	821 500 001	-0.3	0.000 000	0.000
** 821.5	100 %	+10	821 500 001	-0.4	0.000 000	-0.001
	100 %	+30	821 500 003	1.7	0.000 000	0.002
	100 %	+40	821 500 003	1.0	0.000 000	0.001
	100 %	+50	821 500 001	-0.5	0.000 000	-0.001
	Batt. Endpoint	+20	821 500 003	1.5	0.000 000	0.002

Note:

1. **: Straddle Channel

2. Straddle channel does not exceed the Part22 and Part90 limits.



BandWidth:	<u>20 MHz</u>
Voltage(100 %):	3.880 VDC
Batt. Endpoint:	3.300 VDC
■ LIMIT:	Emission must remain in band

Test. Frequncy	Voltage	Temp.	Frequency	Frequency Error	Deviation	ppm
(MHz)	(%)	(°C)	(Hz)	(Hz)	(%)	
	100 %	+20(Ref)	824 000 002	0.0	0.000 000	0.000
	100 %	-30	824 000 003	0.7	0.000 000	0.001
	100 %	-20	824 000 003	1.3	0.000 000	0.002
	100 %	-10	824 000 003	1.3	0.000 000	0.002
** 024 0	100 %	0	824 000 004	1.4	0.000 000	0.002
** 824.0	100 %	+10	824 000 004	1.9	0.000 000	0.002
	100 %	+30	824 000 002	-0.2	0.000 000	0.000
	100 %	+40	824 000 002	0.0	0.000 000	0.000
	100 %	+50	824 000 002	0.1	0.000 000	0.000
	Batt. Endpoint	+20	824 000 002	0.0	0.000 000	0.000

Note:

1. **: Straddle Channel

2. Straddle channel does not exceed the Part22 and Part90 limits.



Report No. HCT-RF-2404-FC029-R1

9. TEST PLOTS





Sub6 n26. Occupied Bandwidth Plot (5 M BW Ch.164300 BPSK RB 25_0)





Sub6 n26. Occupied Bandwidth Plot (5 M BW Ch.164300 QPSK RB 25_0)





Sub6 n26. Occupied Bandwidth Plot (5 M BW Ch.164300 16QAM RB 25_0)



Settings	Center Frequency 821.500000 MHz	Freq 821 500000 MHz d 500/500 td None	Sate Off Avg H	Atten: 16 dB Preamp: Off	Input Z: 50 Ω Corr CCorr Freq Ref. Int (S) NFE Adaptive	linput RF Coupling DG Align Auto	
	Span 10.000 MHz			Ref LvI Offset 27	,		Graph
	CF Step 1.000000 MHz Auto Man			Ref Value 40.00 c	, 	dB	icale/Div 10.0
	Freq Offset 0 Hz	PEAK					0.00 10.0 20.0 30.0 40.0
		Span 10 MHz Sweep 16.7 ms (1001 pts)	Hz	#Video BW 390.0			-50 0 Center 821.50 Res BW 100.
		29.7 dBm	Total Power		26 MHz	vied Bandwidth 4.512	2 Metrics Occu
Lo		99.00 % -26.00 dB	% of OBW Power x dB		5.384 kł 5.124 Mł	mit Freq Error Bandwidth	
				Ð	Mar 04, 2024 1:51:41 PM		5

Sub6 n26. Occupied Bandwidth Plot (5 M BW Ch.164300 64QAM RB 25_0)



CEYSIGHT Input RF Coupling DG Align Auto		Atten: 16 dB Preamp: Oti	Trig: Free Run Gate: Off #IF Gain: Low	Center Freq. 821 50 Avg Hold: 500/500 Radio Std: None	0000 MHz	Center Fr 821.5000		Settings
Graph T	Re	f Lvi Offset 27.				Span 10.000 N	IHz	
cale/Div 10.0 dB	Re	ef Value 40.00 d	Bm			CF Step 1.000000 Auto Man) MHż	
0.00 10.0 20.0 0.0 0 0 0 0 0 0					PEAN	Freq Offse 0 Hz	et	
Center 821.500 MHz Res BW 100.00 kHz	#\	/ideo BW 390.0	0 kHz	Sweep 16	Span 10 MHz 5.7 ms (1001 pts)			
Metrics Occupied Bandwidth 4.500	01 MHz		Total Power	2	7.1 dBm			
Transmit Freq Error x dB Bandwidth	-945 Hz 5.236 MHz		% of OBW Pov x dB		99.00 % 6.00 dB			Lo
501	Mar 04, 2024)						

Sub6 n26. Occupied Bandwidth Plot (5 M BW Ch.164300 256QAM RB 25_0)





Sub6 n26. Occupied Bandwidth Plot (10 M BW Ch.163800 BPSK RB 50_0)



cupled BW	+				🔅 Freque	ency 🔹 🛃
EYSIGHT Input RF Coupling DC Align Auto	Input Z 50 Q Corr CCorr Freq Ref. Inf (S) NFE Adaptive	Atten 16 dB Preamp Off	Trig: Free Run Gate: Off #IF Gain: Low	Center Freq 819 000000 MHz Avg Hold: 500/500 Radio Std: None	Center Frequency 819.000000 MHz	Séttings
Graph Cale/Div 10.0 dB		Ref Lvi Offset 27 Ref Value 40.00			Span 20.000 MHz	
					CF Step 2.000000 MHz Auto	
00 00 0 0 0.0				1 minutes	Man Freq Offset PEAK 0 Hz	
0.0						
enter 819.00 MHz Res BW 200.00 kHz		#Video BW 820.	00 kHz	Span 2 Sweep 1.00 ms (100		
Metrics						
Occupied Bandwidth 9.0	n 135 MHz		Total Power	31.1 dBm		
Transmit Freq Error x dB Bandwidth	-183.57 k 9.863 M		% of OBW Pow x dB	ver 99.00 % -26.00 dB		Loca
	7 Mar 04, 2024	0		.:: 😽	×.	

Sub6 n26. Occupied Bandwidth Plot (10 M BW Ch.163800 QPSK RB 50_0)





Sub6 n26. Occupied Bandwidth Plot (10 M BW Ch.163800 16QAM RB 50_0)





Sub6 n26. Occupied Bandwidth Plot (10 M BW Ch.163800 64QAM RB 50_0)



cy v	Frequenc							+		pectrum Analy occupied BW
Settings	Center Frequency 819.000000 MHz	0000 MHz	ter Freq 819.00000 Hold: 500/500 lio Std: None	e Run If 1 Low	Gale	Atten: 16 dB Preamp: Off	Z 50 Ω CCorr Ref. Int (S) Adaptive	Cor Fre	Input RF Coupling DC Align Auto	EYSIGHT
	Span 20.000 MHz					Ref LvI Offset 2	ļ		*	Graph
	CF Step 2,000000 MHz Auto Man			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	dBm	Ref Value 40.00	****		08	00 30 0 20 0
	Freq Offset 0 Hz	PEAK	L]	and a farmer	40.0
		Span 20 MHz 0 ms (1001 pts)			.00 kHz	#Video BW 820				50 0 Center 819.00 Res BW 200.0
		140					81		ied Bandwidth	2 Metrics Occup
Lor		4 dBm 9.00 % 6.00 dB	99.0	Power DBW Powe			-189.62 kF 9.818 MF	514 MH2	8.9 mit Freq Error Sandwidth	
							r 04, 2024 09:05 PM	? 1	9	5

Sub6 n26. Occupied Bandwidth Plot (10 M BW Ch.163800 256QAM RB 50_0)





Sub6 n26. Occupied Bandwidth Plot (15 M BW Ch.164300 BPSK RB 75_0)



	upling DC gn Auto	Corr CCorr Freq Ref. In NFE Adapt		Trig Free Run Gate Off #IF Gain Low	Center Freq Avg/Hold 5 Radio Std 1	00/500	Center Frequency 821.500000 MHz	Settings
7 PASS Graph cale/Div 10.0 dB		nine nuapi	Ref Lvi Offset 2 Ref Value 40.00				Span 30.000 MHz	
og 0.0 0.0 0.0		Jun		~			CF Step 3.000000 MHz Auto Man	
		1			A.c.	PE	Freq Offset 0 Hz	
enter 821.50 MH Res BW 300.00 k		4	#Video BW 1.20	00 MHz	Sw	Span 30 M veep 1.00 ms (1001 p		
Metrics	•							
Occupied	i Bandwidth 13.50	0 MHz		Total Power		31.2 dBm		
Transmit x dB Ban	Freq Error dwidth		.61 kHz 57 MHz	% of OBW Pov x dB	ver	99.00 % -26.00 dB		Lot

Sub6 n26. Occupied Bandwidth Plot (15 M BW Ch.164300 QPSK RB 75_0)





Sub6 n26. Occupied Bandwidth Plot (15 M BW Ch.164300 16QAM RB 75_0)



	Input Z: 50 Ω Corr CCorr Freq Ref. Int (S) NFE Adaptive	Atten: 16 dB Preamp: Off	Trig: Free Run Gate Off #IF Gain Low	Center Freq. 821 50 Avg Hold: 500/500 Radio Std: None	0000 MHz	Inclusion and the local division of the loca	requency 000 MHz	Settings
Graph •		Ref LvI Offset 27				Span 30,000 /	MHz	
cale/Div 10.0 dB		Ref Value 40.00 (~		CF Step 3.00000 Auto Man	5	
0 00 10 0 20 0 30 0 30 0 30 0					PEAK	Freq Offs 0 Hz	set	
Center 821.50 MHz Res BW 300.00 kHz		#Video BW 1.200	00 MHz	Sweep 1.	Span 30 MHz 00 ms (1001 pts)			
	13 MHz		Total Power		9.7 dBm			
Transmit Freq Error x dB Bandwidth	-381.25 k 14.47 M		% of OBW Pov x dB		99.00 % 6.00 dB			Lo
15011	Mar 04, 2024 2:24:41 PM							

Sub6 n26. Occupied Bandwidth Plot (15 M BW Ch.164300 64QAM RB 75_0)



y T	Frequenc						+	ccupied BW
Settings	Center Frequency 821.500000 MHz	req. 821 500000 MHz 1 500/500 d' None		Trig: Free Run Gate: Off #IF Gain: Low	Atten 16 dB Preamp Off	Input Z: 50 Ω Corr CCorr Freq Ref. Int (S) NFE Adaptive	ning DC. Auto	
	Span 30,000 MHz				Ref LvI Offset 27			Graph
	CF Step 3.000000 MHz Auto Man			dBm	Ref Value 40.00	mm		cale/Div 10.0 (
	Freq Offset 0 Hz	PEAK	1				uma red	0 00 10 0 20 0 30 0 40 0
		Span 30 MHz Sweep 1.00 ms (1001 pts)		0 MHz	Video BW 1.20			enter 821.50 M Res BW 300.0
		27.7 dBm		Total Power		MHz	Bandwidth 13,500 M	Metrics Occupi
Los		99.00 % -26.00 dB	ower	% of OBW Pov x dB		-376.06 kł 14.44 Mł	req Error	Transn x dB B
		# 💥 – 🗙			Ð	Mar 04, 2024 2:25:05 PM	2	5

Sub6 n26. Occupied Bandwidth Plot (15 M BW Ch.164300 256QAM RB 100_0)





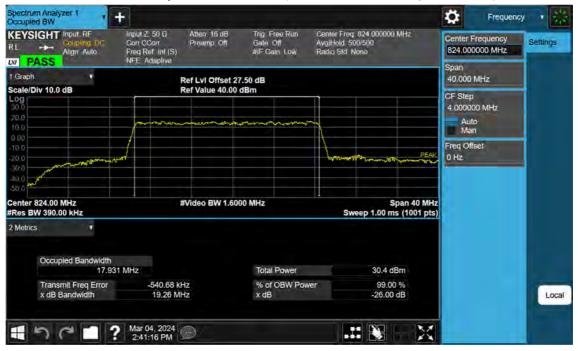
Sub6 n26. Occupied Bandwidth Plot (20 M BW Ch.164800 BPSK RB 100_0)





Sub6 n26. Occupied Bandwidth Plot (20 M BW Ch.164800 QPSK RB 100_0)





Sub6 n26. Occupied Bandwidth Plot (20 M BW Ch.164800 16QAM RB 100_0)



	Input Z: 50 Ω Corr CCorr Freq Ref. Int (S) NFE Adaptive	Atten 16 dB Preamp Off	Trig: Free Run Gate Off #IF Gain Low	Centor Freq. 82/ Avg Hold. 500/51 Radio Std: None	00	and the second s	requency 000 MHz	Settings
Graph •		Ref LvI Offset 27				Span 40.000 /	MHz	
cale/Div 10.0 dB		Ref Value 40.00 (*		CF Step 4.00000 Auto Man		
0 00 10 0 20 0 36 0 36 0				Leven	PEA	Freq Offs 0 Hz	et	
enter 824.00 MHz Res BW 390.00 kHz		#Video BW 1.600	00 MHz	Sweep	Span 40 MH 1.00 ms (1001 pts			
Metrics • Occupied Bandwidth 17.85	13 MHz		Total Power	_	29.8 dBm			
Transmit Freq Error x dB Bandwidth	-546.14 kl 19.12 Ml		% of OBW Pov x dB	ver	99.00 % -26.00 dB			Lo
15011	Mar 04, 2024 2:41:38 PM				N X			

Sub6 n26. Occupied Bandwidth Plot (20 M BW Ch.164800 64QAM RB 100_0)



Settings	Center Frequency 824.000000 MHz	C		Center Freq Avg Hold 50 Radio Std N	Ting: Free Run Gate: Off #IF Gain: Low	Atten: 16 dB Preamp: Off	out Z: 50 Ω or CCorr eq Ref. Int (S) E: Adaptive	C C	Input RF Coupling DC Align Auto	PASS
	Span 40,000 MHz	100				ef Lvi Offset 27			*	Graph
	CF Step 4.000000 MHz Auto Man	100			Bm worderfacture	ef Value 40.00 o	F		dB	ale/Div 10.0
	Freq Offset 0 Hz			h				/		00 00 00 00 00 00 00 00 00 00 00 00 00
		n 40 MHz (1001 pts)	Spar eep 1.00 ms (*	Swi	0 MHz	Video BW 1.600				nter 824.00 es BW 390.0
		n)	27.9 dBm		Total Power		z	dth 7.887 M	vied Bandwid 17	Aetrics Occup
Lo			99.00 % -26.00 dB	er	% of OBW Por x dB		-550.09 kH 19.11 MH	or	mit Freq Erro Bandwidth	
		XX	• 80			2	tar 04, 2024			

Sub6 n26. Occupied Bandwidth Plot (20 M BW Ch.164800 256QAM RB 100_0)





Sub6 n26. Lower Channel Edge Plot (5 M BW Ch.163300 BPSK RB 1, Offset 0)



	Input_RF Coupling_DC Align_Auto	Input Z' 50 Ω Corr CCorr Freq Ref. Int (Pres 5)	amp Off	Trig: Free Run Gate: Off IF Gain: Low	Avgilic	Freq: 816.500 old: 100.00% ol Std: None		product and an end of the	requency 000 MHz	Séttings
PASS Graph cale/Div 10 di	*	NFE Adaptive	Ref L	vi Offset 27. alue 20.0 dE					CF Step 1.00000 Auto		
0.0		4.8						Relative Limit	Mar	1	
00		Minan			un minutes	-		Absolute Limit.	Freq Off 0 Hz	set	
0.0		4					1	Spectrom	-		
0.0 0.0											
0.0											
sp Center 81	6.500 MHz	Chan	Det: Ave	rage, #Offs	Det: Average			oan 10.000 MHz 101 pts			
Table		Power							1		
		23.50 dB	m/5MH	2							
Start Freq	Stop Freq	Integ BW	dBm	Lower ∆Limit(dB)	Freq (Hz)	dBm	Upper ∆Limit(dB)	Freq (Hz)			
2.500 MHz	2.538 MHz	300.0 Hz	-37.01	(-17.01)	-2.512 M	-36.97	(-16.97)	2.519 M			
2.538 MHz 3.515 MHz	5.000 MHz 4.000 MHz	100.0 kHz 30.00 kHz	-21.88	(-8.88)	-2.538 M	-22.56	(-9.56)	2.538 M			
4.000 MHz	4.000 MHz 8.000 MHz	1.000 MHz		()			()				Lo
4.000 MHz	12.50 MHz	1.000 MHz					() ()				
12 50 MHz	15.00 MHz	1.000 MHz		()			()				

Sub6 n26. Lower Channel Edge Plot (5 M BW Ch.163300 BPSK_RB25_Offset 0)





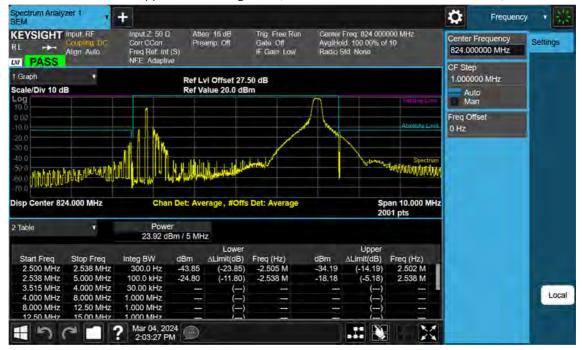
Sub6 n26. Mid Channel Edge Plot (5 M BW Ch.164300 BPSK_RB1_Offset 0)

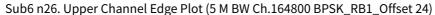


Séttings	Center Frequency 821.500000 MHz		Freq: 821 5000 Id: 100 00% of Std: None	Avgit	Trig: Free Run Gate: Off IF Gain: Low	ni 16.dB ampi Ott	Prez (S)	Input Z: 50 Ω Corr CCorr Freq Ref. Int NFE: Adaptiv	Input_RF Coupling_DC Align_Auto	
	CF Step 1.000000 MHz Auto					/I Offset 27. alue 20.0 dB	Ref Lv	MAR ANADIN	*	Graph cale/Div 10 dl
	Man	Pelsine Limit								og 0.0
	Freq Offset 0 Hz	Absolute Limit		mont	nad bayan di kanan serangan dan dara	and the second second		- for the second		000
		Spectrum)		-				A		20.0
										50-0 30-0
					Det: Average	rage, #Offs	n Det: Ave	Char	1.500 MHz	/0.0 lisp Center 82
		an 10.000 MHz 01 pts	200							- HA
			200			z	er Bm / 5 MH:	Powe 23.50 df		lable
		Freq (Hz)	Upper ∆Limit(dB)	dBm	Freq (Hz)	Lower ∆Limit(dB)	Bm / 5 MH: dBm	23.50 df	Stop Freq	Start Freq
		01 pts	Upper ∆Limit(dB) (-18.01) (-10.93)	-38.01 -23.93	-2.514 M -2.538 M	Lower ∆Limit(dB) (-20.83) (-11.82)	dBm -40.83 -24.82	23.50 dł Integ BW 300.0 Hz 100.0 kHz	Stop Freq 2.538 MHz 5.000 MHz	Start Freq 2.500 MHz 2.538 MHz
Lo		51 pts Freq (Hz) 2.522 M	Upper ∆Limit(dB) (-18.01)	-38.01	-2.514 M	Lower ∆Limit(dB) (-20.83)	dBm / 5 MH; dBm -40.83	23.50 df Integ BW 300.0 Hz	Stop Freq 2.538 MHz	2.500 MHz

Sub6 n26. Mid Channel Edge Plot (5 M BW Ch.164300 BPSK_ RB25_Offset 0)









	Input RF Coupling DC Align Auto	Input Z 50 Q Corr CCorr Freq Ref. Int (NFE Adaptive	Prez S)	n 16.dB 1mp 011	Trig Free Run Gate Off IF Gain Low	AvgiHe	Freq: 824 000 old: 100 00% ol Std: None		Center Frequency 824.000000 MHz	Settings
Graph cale/Div 10 di			Ref Lv	/I Offset 27. alue 20.0 dB					CF Step 1.000000 MHz Auto	
b d								Relating Limit	Man Man	
00 0.0		Mumu	terra terra da anticia da anticia Anticia da anticia da an	in the second	n Hanan in an	molog		Absolute Limit.	Freq Offset 0 Hz	
0.0		-1 ⁴				1		Spectrum		
0.0										
30.0 70.0		-								
isp Center 82	4.000 MHz	Chan	Det: Ave	rage, #Offs	Det: Average			oan 10.000 MHz 01 pts		
Table		Power								
Tubleto		23.46 dB	m / 5 MH	z.						
Start Freq	Stop Freq	Integ BW	dBm	Lower ∆Limit(dB)	Freq (Hz)	dBm	Upper ∆Limit(dB)	Freq (Hz)		
2.500 MHz	2.538 MHz	300.0 Hz	-39.62	(-19.62)	-2.510 M	-39.84	(-19.84)	2.509 M		
2.538 MHz	5.000 MHz	100.0 kHz	-24.10	(-11.10)	-2.599 M	-25.23	(-12.23)	2.538 M		
3.515 MHz	4.000 MHz	30.00 kHz		()			()			Loc
4.000 MHz	8.000 MHz 12.50 MHz	1.000 MHz 1.000 MHz		()	1 1 1 1 1 1 1 1		()		1	LOC
8.000 MHz		1 (JOD MH7		()			()			

Sub6 n26. Upper Channel Edge Plot (5 M BW Ch.164800 BPSK_RB25_Offset 0)





Sub6 n26. Low Channel Edge Plot (10 M BW Ch.163800 BPSK RB 1, Offset 0)



	Input RF Coupling DC Align Auto	Input Z: 50 Q Corr CCorr Freq Ref: Int ()	Prez	n 16.dB 1mp 011	Trig: Free Run Gate Off IF Gain Low	Avgilic	Freq: 819.000 old: 100.00% ol Std: None		and the second s	requency 000 MHz	Settings
Graph Graph cale/Div 10 dl		NFE Adaptive	Ref L	/I Offset 27. lue 20.0 dB	50 dB				CF Step 2.00000 Auto	0 MHz	
og 0.0								Pelane Limit	Mar		
10.0		former	****	4-9-2-9-2-9-2-9-1-9-2-9-4-9-4-9-4-9-4-9-4-9-4-9-4-9-4-9-4	1499,220,200 and and a second s	territy .		Absolute Limit	Freq Off 0 Hz	set	1
	m	1					~~~	Spectrum	-		
50 0											
70 0 Disp Center 81	9.00 MHz	Chan	Det: Ave	rage, #Offs	Det: Average			oan 20.000 MHz 101 pts			
Table		Power 23.45 dBm		z							
Start Freq	Stop Freq	Integ BW	dBm	Lower ∆Limit(dB)	Freq (Hz)	dBm	Upper ∆Limit(dB)	Freq (Hz)			
5.000 MHz 5.038 MHz	5.038 MHz 10.00 MHz	300.0 Hz 100.0 kHz	-41.17	(-21.17)	-5.035 M -5.038 M	-46.63 -30.45	(-26.63)	5.010 M 5.310 M			
3.515 MHz	4.000 MHz	30.00 kHz	-27.70	(-14.70)	-5,036 M	-30.45	(-17.45)	5.310 M	1.0		
4.000 MHz	8.000 MHz	1.000 MHz		()			()				Lo
8.000 MHz	12.50 MHz	1.000 MHz		()							
12 50 MHz	15 00 MHz	1 000 MHz									

Sub6 n26. Low Channel Edge Plot (10 M BW Ch.163800 BPSK_RB50_Offset 0)





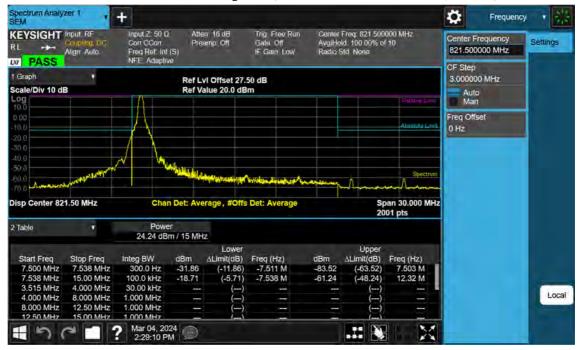
Sub6 n26. Upper Channel Edge Plot (10 M BW Ch.164800 BPSK_RB1_Offset 51)



L	Input_RF Coupling_DC Align_Auto	Input Z 50 Q Corr CCorr Freq Ref. Int NFE: Adaptiv	Prez (S)	n 16.dB xmp 011	Trig Free Run Gate Off IF Gain Low	AvgiHo	Freq 824 000 old 100 00% of Std None		Center Frequency 824.000000 MHz	Settings
Graph Graph cale/Div 10 df	•	WEL Auguin	Ref Lv	/I Offset 27. lue 20.0 dB					CF Step 2.000000 MHz Auto	
.og								Pelating Limit	Man	
10.0								Absolute Limit.	Freq Offset 0 Hz	
30 0								Spectrum		
50-0 60.0 70.0										
isp Center 82	4.00 MHz	Char	Det: Ave	rage, #Offs	Det: Average			oan 20.000 MHz 01 pts		
Table		Powe 23.50 dBr	r m / 10 MH;	z						
Start Freq	Stop Freq	Integ BW		Lower ∆Limit(dB)	Freq (Hz)	dBm	Upper ∆Limit(dB)	Freq (Hz)		
5.000 MHz 5.038 MHz	5.038 MHz 10.00 MHz	300.0 Hz 100.0 kHz	-40.67	(-20.67) (-15.74)	-5.000 M -5.038 M	-46.84	(-26.84) (-22.29)	5.012 M 5.038 M		
3.515 MHz	4.000 MHz	30.00 kHz	-20.74	(-10.14)	-0,000 141	-35.23	(-22.23)	0.000 101	1.1	-
4.000 MHz	8.000 MHz	1.000 MHz		()			()			LO
8.000 MHz	12,50 MHz	1.000 MHz		(—)			()			
12 50 MHz	15.00 MHz	1 000 MHz		()		_	()			

Sub6 n26. Upper Channel Edge Plot (10 M BW Ch.164800 BPSK_RB50_Offset 0)





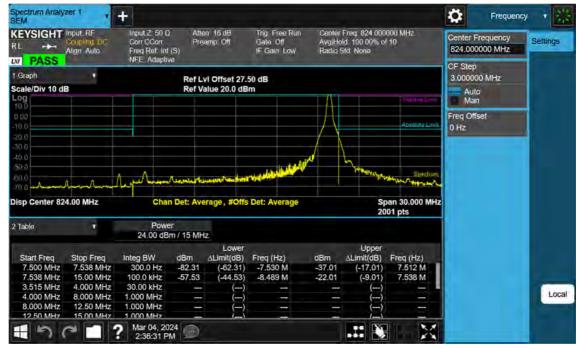
Sub6 n26. Low Channel Edge Plot (15 M BW Ch.164300 BPSK RB 1, Offset 0)



EYSIGHT	Input RF Coupling DC Align Auto	Input Z: 50 Q Corr CCorr Freq Ref. Inf NFE: Adaptiv	Prei S)	ni 16.dB amp Ott	Trig: Free Run Gate: Off IF Gain: Low	Avgillo	Freq: 821.500 old: 100.00% ol Std: None		Center Frequ 821.500000		Settings
Graph cale/Div 10 df	,		Ref L	/I Offset 27. alue 20.0 dB					CF Step 3.000000 Mi	Hz	
.og								Relative Lund	Man Man		
10.0								Absolute Limit	Freq Offset 0 Hz		
20.0		$\boldsymbol{\lambda}$				1	n.	Spectrum	-		
50 0 80 0											
70 û											
isp Center 82	1.50 MHz	Chan	Det: Ave	rage, #Offs	Det: Average			oan 30.000 MHz 101 pts			
? Table		Powe 23,46 dBr		z							
Start Freq	Stop Freq	Integ BW	dBm	Lower ∆Limit(dB)	Freq (Hz)	dBm	Upper ∆Limit(dB)	Freq (Hz)			
7.500 MHz 7.538 MHz	7.538 MHz 15.00 MHz	300.0 Hz 100.0 kHz	-45.67 -30.29	(-25.67) (-17.29)	-7.515 M -7.538 M	-51.23	(-31.23)	7.532 M 7.538 M			
3.515 MHz	4.000 MHz	30.00 kHz	-30.29	(-17.29)	-7,538 M	-37.55	(-24.55)	7.538 M			-
4.000 MHz	8.000 MHz	1.000 MHz		()			()				LO
8.000 MHz	12.50 MHz	1.000 MHz		(—) (—)		_					
12 50 MHz	15.00 MHz	1 000 MHz		()	(L.C.)		1				

Sub6 n26. Low Channel Edge Plot (15 M BW Ch.164300 BPSK_RB75_Offset 0)





Sub6 n26. Upper Channel Edge Plot (15 M BW Ch.164800 BPSK_RB1_Offset 78)



EYSIGHT	Input.RF Coupling DC Align Auto	Input Z 50 Ω Gorr CCorr Freq Ref. Int (NFE Adaptive	Prei S)	n 16.dB amp Off	Trig: Free Run Gate Off IF Gain Low	AvgiHo	Freq: 824 000 Id: 100 00% of Std: None		and the second s	requency 000 MHz	Settings
Graph cale/Div 10 dl	3		Ref L	/I Offset 27. Ilue 20.0 dB					CF Step 3.00000 Auto		
2g								Relative Limit	Mar	r	
00								Absolute Limit.	Freq Offs 0 Hz	set	
0									-	_	
0	mon	~				- `	manhow	Spectrum			
0											
10											
sp Center 82	4.00 MHz	Chan	Det: Ave	rage, #Offs	Det: Average			oan 30.000 MHz 101 pts			
Table		Power									
		23.54 dBn	1/15 MH	z							
Start Freq	Stop Freq	Integ BW	dBm	Lower ∆Limit(dB)	Freq (Hz)	dBm	Upper ∆Limit(dB)	Freq (Hz)			
7.500 MHz	7.538 MHz	300.0 Hz	-42.97	(-22.97)	-7.513 M	-49.67	(-29.67)	7.528 M			
7.538 MHz 3.515 MHz	15,00 MHz	100.0 kHz	-31.17	(-18.17)	-7,538 M	-36.69	(-23,69)	9.891 M			
4.000 MHz	4.000 MHz 8.000 MHz	30.00 kHz 1.000 MHz		()			()				LO
4.000 MHz	12.50 MHz	1.000 MHz		()			()				
12 50 MHz	15.00 MHz	1.000 MHz	~~	()			()				

Sub6 n26. Upper Channel Edge Plot (15 M BW Ch.164800 BPSK_RB75_Offset 0)



enter Fred ASS	RF 50 Ω D		Tri	sense:INT inter Freq: 82 ig: Free Run itten: 16 dB	4.000000 MHz	ALIGN A	Radio 10	:10 PM Apr 16, 2024 Std: None Device: BTS	Frequency
0 dB/div	Ref Offset 27. Ref 30.0 dB								
og 20.0 10.0						Λ			Center Fre 824.000000 MH
0.0								Abaolute Limit	
i0.0 .0,0									
50.0 50.0		~~~~~		A contract strength	للألمد مسمعه		Hallyonen	Spectrum	
enter 824.0		9 dBm / 20 l	MHz				Spa	n 40.00 MHz	CF Ste 4.000000 MH Auto Ma
Start Freq	Stop Freq	Integ BW	dBm	Lower ΔLim(dB)	Freq (Hz)	Peak -> dBm	Upper ΔLim(dB)	Freq (Hz)	Freq Offse
10.00 MHz	10.04 MHz	300.0 Hz	-84.40	(-64.40)	-10.04 M	-36.89	(-16.89)	10.00 M	0 H
10.04 MHz	20.00 MHz	100.0 kHz	-57.86	(-44.86)	-10.69 M	-24.45	(-11.45)	10.04 M	
10.04 101112	4.000 MHz	30.00 kHz		()			()	F	
3.515 MHz				()			()		
	8.000 MHz	1.000 MHz		()					
3.515 MHz 4.000 MHz 8.000 MHz	12.50 MHz	1.000 MHz 1.000 MHz		()			()		
3.515 MHz 4.000 MHz							() ()	_	

Sub6 n26. Mid Channel Edge Plot (20 M BW Ch.164800 QPSK_ RB1_Offset 105)





Sub6 n26. Mid Channel Edge Plot (20 M BW Ch.164800 BPSK_ RB100_Offset 0)



L Coupling DC Align Auto		n 16 dB PNO Fast mp Off Gate Off IF Gain Lov Sig Track (w	A A A A
Spectrum • cale/Div 10 dB		I Offset 27.50 dB vel 22.50 dBm	Mkr1 862.80 -69.793	30,000000 11112
2.5				Full Span
50				Start Freq 824.000000 MHz
7.5			QL1 -	13.00 (Gim Stop Freq 874.000000 MHz
7.5				AUTO TUNE
75				CF Step 5.000000 MHz Auto Man
7.5 7.5 7.5	McV197-marketylathorphysiaetylathorphysiaety	مداور وسوار معارف والمراجعة والمراجعة		
enter 849.00 MHz Res BW 100 kHz	#Vid	eo BW 300 kHz	Span 50 #Sweep 1.00 s (10	

Sub6 n26. Upper Band Edge Plot (5 M BW Ch.164800 BPSK_RB1_Offset 24)





Sub6 n26. Upper Band Edge Plot (5 M BW Ch.164800 BPSK_RB25_Offset 0)



EYSIGHT Input. RF L Align: Auto Align: Auto	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: Power (RM) Trig: Free Run	5123456 AWWWWW AAAAAA	Center Frequency 849.000000 MHz	Sétting
Spectrum • cale/Div 10 dB		Ref LvI Offset 27 Ref Level 22.50 d			1.25 MHz .266 dBm	Span 50.0000000 MHz Swept Span Zero Span	
2.5						Full Span	
50						Start Freq 824.000000 MHz	
7.5					QL1 -13.00 dBm	Stop Freq 874.000000 MHz	1
7.5						AUTO TUNE	
7.5						CF Step 5.000000 MHz Auto Man	
75 W 19	Myslubarowingedowe	here and a second second second	الاستاب في المراجعة الم	والمتواجع العظر والمعارف والمعارفة والمحافظ	1. 1.15.	Freq Offset 0 Hz	
enter 849.00 MHz Res BW 100 kHz		#Video BW 300	kHz		an 50.00 MHz) s (1001 pts)		Lo

Sub6 n26. Upper Band Edge Plot (10 M BW Ch.164800 BPSK_RB1_Offset 51)





Sub6 n26. Upper Band Edge Plot (10 M BW Ch.164800 BPSK_RB50_Offset 0)



EYSIGHT Input. RF Coupling DC Align: Auto	Input Z: 50 Ω 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: Power Trig: Free Run	(RMS 1 2 3 4 5 6 A WW WW W A A A A A A A	Center Frequency 849.000000 MHz	Setting
Spectrum v cale/Div 10 dB		Ref LvI Offset 27. Ref Level 22.50 d			872.75 MHz -69.309 dBm	Span 50.0000000 MHz Swept Span Zero Span	
2.5						Full Span	
50						Start Freq 824.000000 MHz	
7.5					DL1 -19.00 dBm	Stop Freq 874.000000 MHz	
7.5						AUTO TUNE	
75						CF Step 5.000000 MHz Auto Man	
7.5 mm	man some manim	home wow with a straight the	mar and the free of the same	مى يەر بىرىنى مەر ئەر بىرىنى مەر ئىرىنى بىرىنى ھە	vere professional and	Freq Offset 0 Hz	
enter 849.00 MHz Res BW 100 kHz		#Video BW 300	kHz		Span 50.00 MHz 1.00 s (1001 pts)	X Axis Scale Log Lin	L

Sub6 n26. Lower Band Edge Plot (15 M BW Ch.164300 BPSK_RB1_Offset 78)





Sub6 n26. Lower Band Edge Plot (15 M BW Ch.164300 BPSK_RB75_Offset 0)





Sub6 n26. Upper Band Edge Plot (15 M BW Ch.164800 BPSK_RB1_Offset 78)





Sub6 n26. Upper Band Edge Plot (15 M BW Ch.164800 BPSK_RB75_Offset 0)



Center F	req 849.000		z	SENSE:INT	#Avg Type: RMS	10:32:52 AM Apr 16, 2024 TRACE 12 3:4 5 6	Frequency
		Р	NO: Fast 🔸 Gain:Low	Trig: Free Run #Atten: 16 dB		DET A N N N N N	
0 dB/div	Ref Offset 27 Ref 23.50 c	5 dB IBm			М	kr1 870.55 MHz -55.609 dBm	Auto Tun
13.5							Center Fre 849.000000 MH
3.50 6.50						-13.00 dBm	Start Fre 824.000000 MH
16.5 36.5							Stop Fre 874.000000 MH
16.5							CF Ste 5.000000 MH Auto Ma
56.5 -		North Marchine				1	Freq Offse
	19.00 MHz					Span 50.00 MHz	
Res BW	100 kHz		#VBW	300 kHz	#Sweep	1.000 s (1001 pts)	-

Sub6 n26. Mid Band Edge Plot (20 M BW Ch.164800 BPSK_RB1_Offset 105)





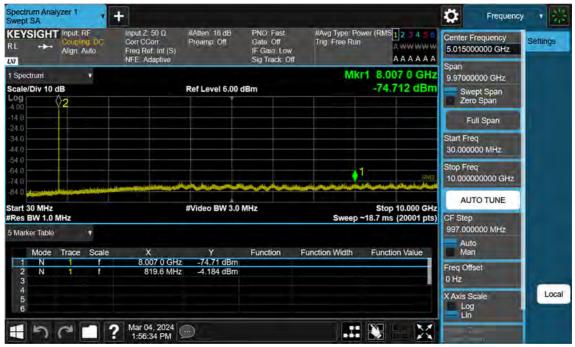
Sub6 n26. Mid Band Edge Plot (20 M BW Ch.164800 BPSK_RB100_Offset 0)





Sub6 n26. Conducted Spurious (163300 ch_5 MHz_ BPSK_RB 1_1)





Sub6 n26. Conducted Spurious (164300 ch_5 MHz_ BPSK_RB 1_1)



Spectrum Ana Swept SA	lyzer 1	-	+					Ö	Frequency	* 2
KEYSIGH RL ++-	T Input F Coupli Align 7	ng DG	Input Z 50 Ω 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: Pr Trig: Free Rui	ower (RMS 1 2 3 4 5 6 A www.www. A A A A A A A	5.0150	requency 00000 GHz	Séttings
1 Spectrum Scale/Div 10	dB	•		Ref Level 6.00	dBm	MI	r1 9.958 6 GHz -74.557 dBm	Sw	0000 GHz ept Span o Span	
4 00 14.0 24.0								F	ull Span	
34.0 44,0								Start Fre 30.000	eq DOO MHz	
54.0 64.0 74.0						مد بند الد الله الله	R. L	Stop Fre 10.000	श्व 000000 GHz	
-84.0 Start 30 MHz				#Video BW 3.0			Stop 10.000 GHz		TO TUNE	
Res BW 1.0				1.1.10 Y		Sweep	~18.7 ms (20001 pts)	CF Step	0000 MHz	
5 Marker Table Mode	Trace	Scale	x	Ŷ	Function	Function Width	Function Value	Aut	0	
1 N 2 N 3	1	f	9.958 6 GHz 822.1 MHz	-74.56 dBm -4.586 dBm				Freq Off 0 Hz	set	
4 5 6								X Axis S Loç Lin	1	Lo
5	3		Mar 04, 2024 2:04:07 PM					÷		

Sub6 n26. Conducted Spurious (164800 ch_5 MHz_ BPSK_RB 1_1)





Sub6 n26. Conducted Spurious (163800 ch_10 MHz_ BPSK_RB 1_1)



Spectrum Anal Swept SA	yzer 1	* +						¢	Frequency	•
KEYSIGHT RL ++-	input RF Coupling Align Auto	DC C	nput Z: 50 Ω Forr CCorr req Ref: Int (S) IFE: Adaptive	#Atten 16 dB Preamp Off	PNO Fast Gate Off IF Gain Low Sig Track Off	#Avg Type: P Trig: Free Ru	ower (RMS <mark>123456</mark> n A www.ww.w A A A A A A		requency 0000 GHz	Sétting
1 Spectrum Scale/Div 10 Log	, dB ∲2			Ref Level 6,00 c	1Bm	MI	r1 4.057 4 GHz -74.873 dBm	Swe	000 GHz pt Span Span	
4 00 14.0 24.0								Fu	ll Span	
34.0 44,0								Start Free 30.0000	And a second	
-54.0 -64.0 -74.0				1			IFMS	Stop Free 10.0000	1 00000 GHz	
-84.0 start 30 MHz	-			#Video BW 3.0	MHz		Stop 10.000 GHz	AUT	O TUNE	
Res BW 1.0	MHz					Sweep	~18.7 ms (20001 pts)	997.000	000 MHz	
Mode	Trace S	cale	x	Ŷ	Function	Function Width	Function Value	Auto Man		
1 N 2 N 3	1	r r	4.057 4 GHz 819.6 MHz	-74.87 dBm -3.895 dBm				Freq Offs 0 Hz	et	-
4 5 6								X Axis So Log Lin	ale	L
5	3	?	Mar 04, 2024 2:20:13 PM				N - X	-		

Sub6 n26. Conducted Spurious (164800 ch_10 MHz_ BPSK_RB 1_1)



Spectrum Analy Swept SA	yzer 1	-	+	-			- 200	0	Frequency	*
KEYSIGHT RL ++-	Input. RE Coupling Align: Au	DG	Input Z: 50 Ω 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. P Trig: Free Ru	ower (RMS 1 2 3 4 5 6 A www.www A A A A A A A		requency 0000 GHz	Séttings
Spectrum cale/Div 10 d	ів 2			Ref Level 6.00 d	1Bm	M	r1 9.118 2 GHz -73.714 dBm	Swe	000 GHz pt Span 9 Span	
4 DQ 14 D 24 O								FL	II Span	
14.0 14.0								Start Fre 30.0000	and the second se	
54.0 54.0 74.0							1 IRMS	Stop Fre 10.0000	9 00000 GHz	
tart 30 MHz				#Video BW 3.0	MHz		Stop 10.000 GHz		O TUNE	
Res BW 1.0 M Marker Table		,				Sweep	~18.7 ms (20001 pts)	CF Step	000 MHz	
Mode	Trace	Scale	X	Y -73.71 dBm	Function	Function Width	Function Value	Man		
1 N 2 N 3	1	I	9.118 2 GHz 814.6 MHz					Freq Off 0 Hz	et	-
4 5 6								X Axis S Log Lin	ale	Loca
5	3		Mar 04, 2024 2:29:32 PM				N - X			

Sub6 n26. Conducted Spurious (164300 ch_15 MHz_ BPSK_RB 1_1)



Spectrum Anal Swept SA	yzer 1	1 🕂					Frequence	cy 🔻
	Coupling I Align: Auto	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 (RMS 1 2 3 4 5 6 A www.ww A A A A A A A	Center Frequency 5.015000000 GHz	Séttings
Spectrum cale/Div 10	нв 02		Ref Level 6.00	dBm	Mk	r1 9.941 2 GHz -73.968 dBm	0.010000000112	
4 00 14 0 24 0							Full Span	
34.0 44,0							Start Freq 30.000000 MHz	
54.0 64.0 74.0						R 1	Stop Freq 10.000000000 GHz	
Start 30 MHz	Automation		#Video BW 3.0	MHz		Stop 10.000 GHz	AUTO TUNE	
Res BW 1.0	MHz				Sweep	~18.7 ms (20001 pts)		
Mode	Trace S	cale X	Ý	Function	Function Width	Function Value	Auto Man	
1 N 2 N 3	1	f 9.941 2 GF f 817.1 MF					Freq Offset 0 Hz	
4 5 6							X Axis Scale Log Lin	Lo
15	3	? Mar 04, 2024 2:37:11 PM	9					

Sub6 n26. Conducted Spurious (164800 ch_15 MHz_ BPSK_RB 1_1)





Sub6 n26. Conducted Spurious (164800 ch_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-FC029-P