TEST REPORT

Report Number : 4790748041-E6V2

Applicant	:	SAMSUNG ELECTRONICS CO., LTD. 129 SAMSUNG-RO, YEONGTONG-GU, SUWON-SI, GYEONGGI-DO, 16677, KOREA
Model	:	SM-F946U, SM-F946U1
FCC ID	:	A3LSMF946U
EUT Description	:	GSM/WCDMA/LTE 5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC, WPT and UWB
Test Standard(s)	:	FCC 47 CFR PART 96.47

Date Of Issue:
2023-05-15

Prepared by:
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Suwon Test Site: UL KOREA LTD. Suwon Laboratory
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TEL: (031) 337-9902
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IAS ACCREDITED
Testing Laboratory
TL-637

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	2023-05-12	Initial Issue	SunGeun Lee
V2	2023-05-15	Updated to address TCB's question	SunGeun Lee

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SAMSUNG ELECTRONICS CO., LTD.

EUT DESCRIPTION: GSM/WCDMA/LTE 5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC, WPT and UWB

MODEL: SM-F946U, SM-F946U1

SERIAL NUMBER: R3CW20L0JSJ

TEST BAND: LTE Band 48

DATE TESTED: 2023-03-17

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 96.47	Complies

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL LLC based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL KOREA LTD. By:

Seokhwan Hong
Suwon Lab Engineer
UL KOREA LTD.

Tested By:

Sungeun Lee
Suwon Lab Engineer
UL KOREA LTD.

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC Part 96.47, KDB 940660 D01 Part 96 CBRS Eqpt v03 and WINNF-TS-0122-v1.0.2.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea. Line conducted emissions are measured only at the 218 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

218 Maeyeong-ro
☐ Chamber 1(3m semi-anechoic chamber)
☒ Chamber 2(3m semi-anechoic chamber)
☐ Chamber 3(3m semi-anechoic chamber)
☐ Chamber 4(3m Full-anechoic chamber)
☐ Chamber 5(3m Full-anechoic chamber)

UL KOREA LTD. is accredited by IAS, Laboratory Code TL-637. The full scope of accreditation can be viewed at https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.pdf.

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4. DECISION RULES AND MEASUREMENT UNCERTAINTY

4.1. METROLOGICAL TRACEABILITY

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

4.3. DECISION RULE

Decision rule for statement(s) of conformity is based on Procedure 2, Clause 4.4.3 in IEC Guide 115:2021.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a GSM/WCDMA/LTE 5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC, WPT and UWB. This test report addresses the WWAN operational mode.

Representative model	Difference	Derivative model
		SM-F946U1
SM-F946U	Hardware	Same as SM-F946U
	Software	Different UI

Thus, SM-F946U was set for final test.

5.2. SOFTWARE AND FIRMWARE

The test utility software used during testing was WINNF-TS-0122 V1.0.2

5.3. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Charger	SAMSUNG	EP-TA800	R37N9QP4SL9DK3	N/A
Data Cable	SAMSUNG	WBR0062M	R37T53J83Z9SEA	N/A

I/O CABLES

I/O Cable List						
Cable No.	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Power	1	C Type	Shielded	1.0 m	N/A

TEST SETUP

The standalone EUT connected to a certified CBSD and Spectrum Analyzer and an RF cable respectively.

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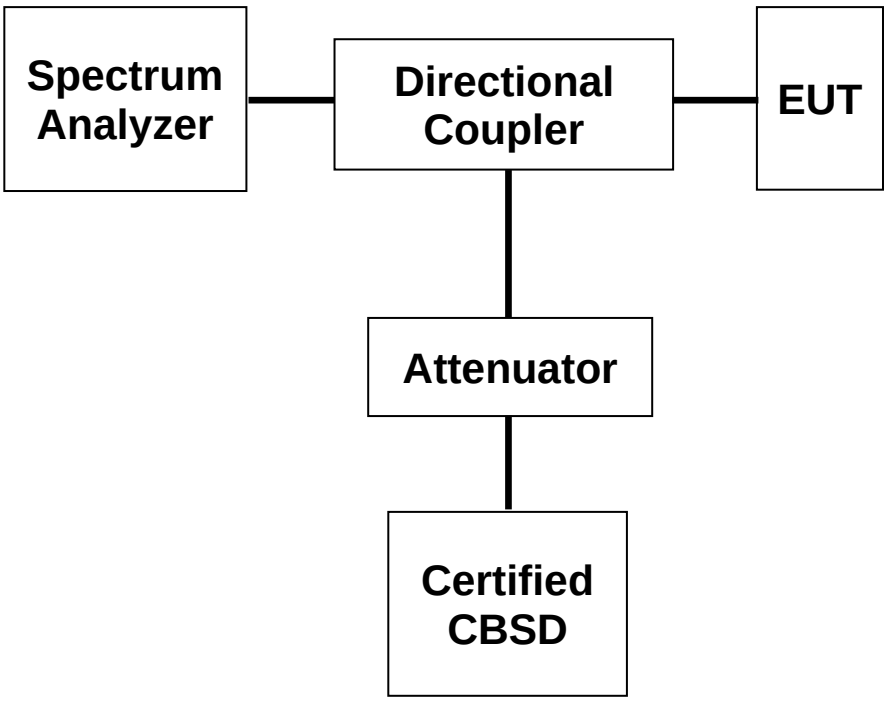
SETUP DIAGRAM OF TEST SYSTEM



Remarks:
Certified CBSD – FCC ID: 2AS48SC-220
Connection between Certified CBSD and EUT is conducted method.
EUT is an End User Device (EUD)

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6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment List				
Description	**Manufacturer**	**Model**	S/N	**Cal Due**
Spectrum Analyzer, EXA	Agilent (Keysight) Technologies	N9010A	MY54200580	2023-08-01
Step Attenuator	Keysight	8494B	MY42155321	2023-08-02
Step Attenuator	Keysight	8496B	MY42149783	2023-08-02
Directional Coupler	KRYTAR	1850	164428	2023-08-01

Test Software			
Description	**Manufacturer**	**Model**	**Version Number**
Laptop (SAS – WINNForum Test Harness)	SAMSUNG	NT550XDA-KC58G	2.0

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7. END USER DEVICE ADDITIONAL REQUIREMENT

7.1. TEST REQUIREMENT

FCC Part 96.47

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

(1) An End User Device must discontinue operations, change frequencies, or change its operational power level within 10 seconds of receiving instructions from its associated CBSD.

8. TEST PROCEDURE AND EUT CONFIGURATION

KDB 940660 D01 Part 96 CBRS v03, WINNF-TS-0122 V1.0.2

Additional requirements are required to End-User Device LTE Band 48 device base on CBSD protocol. During the test, the EUT and its companion certified CBSD (FCC ID: 2AS48SC-220) device communicate with each other.

Configuration	Frequency (MHz)	Power (dBm/MHz)	Bandwidth (MHz)
1	3560 – 3580	8	20
2	3600 – 3620	16	20

Configuration 1

a) Setup WINNF.PT.C.HBT.1 with 3560MHz-3580MHz and power level 8 dBm/MHz
b) Enable AP service from companion device.
c) Check EUT Transmitter Frequency and power
d) Disable AP service from companion device and check EUT stop transmission within 10s.

Configuration 2

a) Setup WINNF.PT.C.HBT.1 with 3600MHz-3620MHz and power level 16 dBm/MHz
b) Enable AP service from companion device.
c) Check EUT Transmitter Frequency and power
d) Disable AP service from companion device and check EUT stop transmission within 10s.

TEST RESULTS

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8.1. END USER DEVICE CONFIGURATION 1 (3560MHz - 3580MHz; MaxEIRP: 8 dBm/MHz)

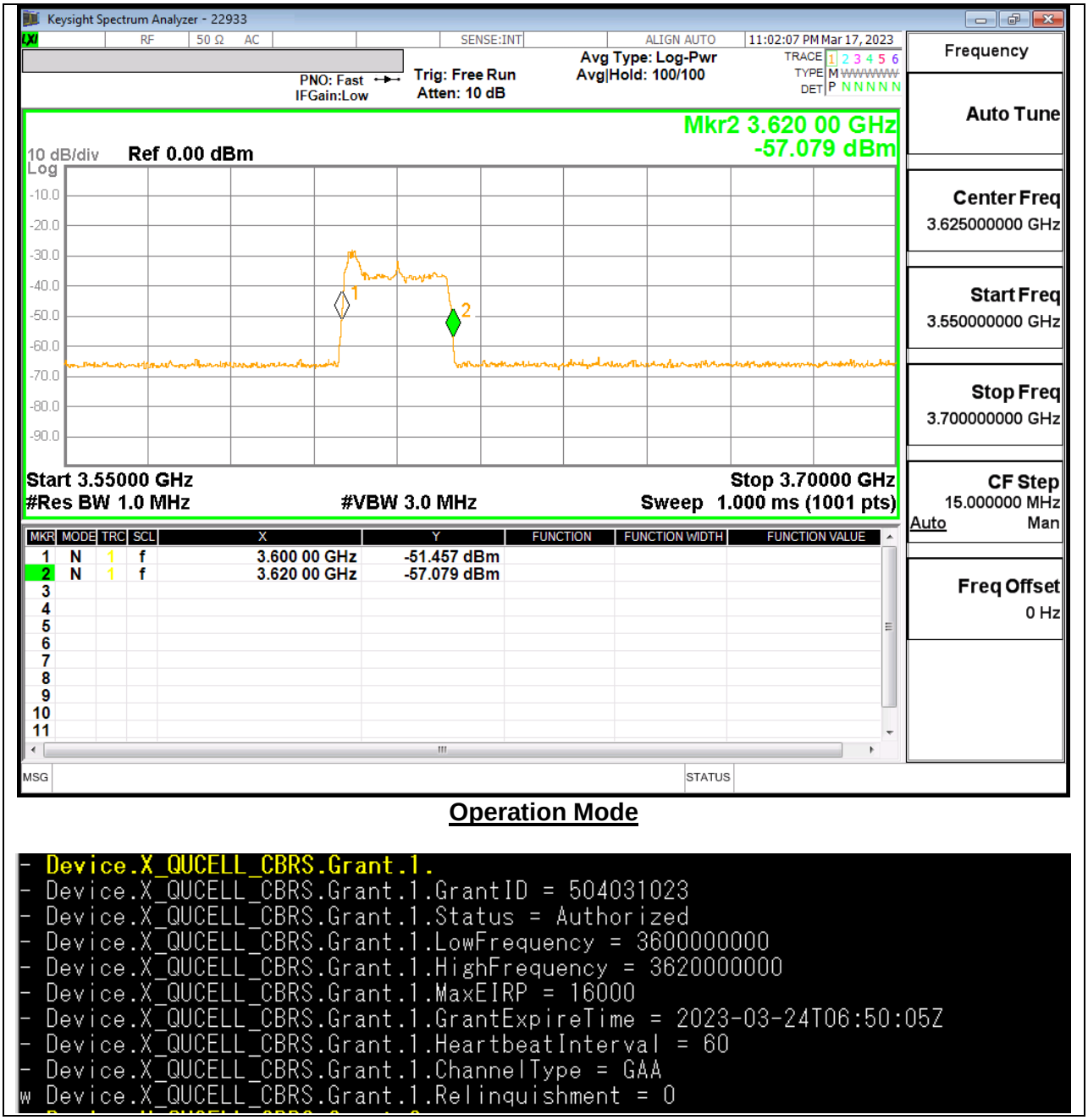
Operation Mode

```
- Device.X_QUCELL_CBRS.Grant.1.
- Device.X_QUCELL_CBRS.Grant.1.GrantID = 623543137
- Device.X_QUCELL_CBRS.Grant.1.Status = Authorized
- Device.X_QUCELL_CBRS.Grant.1.LowFrequency = 3560000000
- Device.X_QUCELL_CBRS.Grant.1.HighFrequency = 3580000000
- Device.X_QUCELL_CBRS.Grant.1.MaxEIRP = 8000
- Device.X_QUCELL_CBRS.Grant.1.GrantExpireTime = 2023-03-24T06:21:25Z
- Device.X_QUCELL_CBRS.Grant.1.HeartbeatInterval = 60
- Device.X_QUCELL_CBRS.Grant.1.ChannelType = GAA
w Device.X_QUCELL_CBRS.Grant.1.Relinquishment = 0
```

Stop Operation Within 10 second Mode

NOTE:
Marker 1: Authorized CBSD sends a signal to stop LTE transmission.
Marker 2-1 Delta: Time elapsed since signal to stop LTE transmission. EUD has stopped transmission.
Marker 3-1 Delta: 10 seconds has elapsed since CBSD has sent a signal to stop LTE transmission to EUT.

8.2. END USER DEVICE CONFIGURATION 2 (3600MHz - 3620MHz; MaxEIRP: 16 dBm/MHz)



Operation Mode

```
- Device.X_QUCELL_CBRS.Grant.1.
- Device.X_QUCELL_CBRS.Grant.1.GrantID = 504031023
- Device.X_QUCELL_CBRS.Grant.1.Status = Authorized
- Device.X_QUCELL_CBRS.Grant.1.LowFrequency = 3600000000
- Device.X_QUCELL_CBRS.Grant.1.HighFrequency = 3620000000
- Device.X_QUCELL_CBRS.Grant.1.MaxEIRP = 16000
- Device.X_QUCELL_CBRS.Grant.1.GrantExpireTime = 2023-03-24T06:50:05Z
- Device.X_QUCELL_CBRS.Grant.1.HeartbeatInterval = 60
- Device.X_QUCELL_CBRS.Grant.1.ChannelType = GAA
w Device.X_QUCELL_CBRS.Grant.1.Relinquishment = 0
```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Stop Operation Within 10 second Mode

NOTE:
Marker 1: Authorized CBSD sends a signal to stop LTE transmission.
Marker 2-1 Delta: Time elapsed since signal to stop LTE transmission. EUD has stopped transmission.
Marker 3-1 Delta: 10 seconds has elapsed since CBSD has sent a signal to stop LTE transmission to EUT.

END OF REPORT

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