

RF TEST REPORT FCC Part 96.47

APPLICANT SAMSUNG Electronics Co., Ltd.

MODEL NAME
SM-G991U

FCC ID A3LSMG991U

REPORT NUMBER HA220720-SSE-001-R01





T E S T R E P O R T	Date of Issue July 28, 2022 Test Site Hyundai C-Tech, Inc. dba HCT America, Inc. 1726 Ringwood Ave, San Jose, CA 95131, USA
Applicant	SAMELING Electronics Co. 1td
Applicant	SAMSUNG Electronics Co., Ltd.
Applicant Address	129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea
FCC ID	A3LSMG991U
Model Name	SM-G991U
ЕИТ Туре	Mobile phone
FCC Classification	Citizens Band End User Devices (CBE)
FCC Rule Part(s)	§96.47
Test Procedure	KDB 940660 D01 v01 WINNF-18-IN-00178 v1.0.0.00

The device bearing the trade name and model specified above, has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures required. The results of testing in this report apply only to the product which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Hyundai C-Tech, Inc. dba HCT America, Inc. certifies that no party to application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 862

Tested By

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Test Engineer

Reviewed By

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Technical Manager





REVISION HISTORY

The revision history for this document is shown in table.

TEST REPORT NO.	DATE	DESCRIPTION	
HA220720-SSE-001-R01	07/22/2022	Initial Issue	
HA220720-SSE-001-R01	07/24/2022	Added CBSD device in the list of test equipment	
HA220720-SSE-001-R01	07/28/2022	Revised test condition in summary of test results on page 8.	





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1. GENERAL INFORMATION

RF SPECIFICATION SUBJECT TO THE REPORT

FCC ID:	A3LSMG991U			
RF Specification:	5G Sub6	n48		
Operating Frequency Range	5G Sub6 n48	3550 – 3700 MHz (UL/ DL)		
Frequency:	3555.00 – 3694.98 : (Sub6 n48(10 MHz)) 3560.01 – 3690.00 : (Sub6 n48(20 MHz)) 3570.00 – 3679.98 : (Sub6 n48(40 MHz))			
Equipment Category:	Citizens Band End I	Jser Devices (CBE)		
Applicable Standard(s):	§96.47			
EUT Type:	Mobile Phone			
Model(s):	SM-G991U			
Additional Model(s):	SM-G991U1			
SCS(kHz):	30			
Bandwidth:	10 MHz / 20 MHz / 40 MHz			
Waveform:	CP-OFDM, DFT-S-OFDM			
Modulation Type:	DFT-S-OFDM: PI/2 BPSK, QPSK, 16QAM, 64QAM, 256QAM CP-OFDM: QPSK, 16QAM, 64QAM, 256QAM			
Date(s) of Tests:	July 18, 2022 ~ July 22, 2022			
Serial number:	R3CNC0KHTVV			





2. 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's, which is traceable to recognized national standards. Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5 (Version : 2017).





3. FACILITIES AND ACCREDITATIONS

FACILITIES

The SAC (Semi-Anechoic Chamber) and conducted measurement facility used to collect the radiated data are located at 1726 Ringwood Avenue, San Jose, California 95131, USA.

The site is constructed in conformance with the requirements of ANSI C63.4. (Version :2014) and CISPR Publication 22.



EQUIPMENT

Radiated emissions are measured with one or more of the following types of Linearly polarized antennas: tuned dipole, bi-conical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers. Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

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4. SUMMARY OF TEST RESULTS

Test Description	FCC Part Section(s)	Test Limit	Test Condition	Test Result
End User Device Additional Requirements (CBSD Protocol)	§96.47	End User Devices may operate only if they can positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and power limits for their operation. An End User Device must discontinue operations, change frequencies, or change its operational power level within 10 seconds of receiving instructions from its associated CBSD.	Radiated	PASS





5. DESCRIPTION OF TESTS

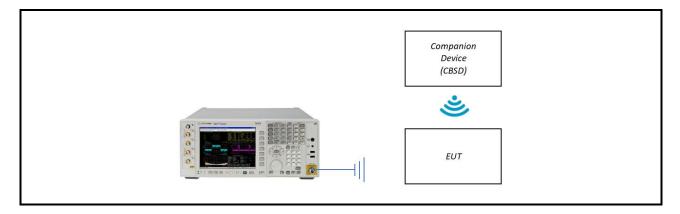
LIMIT

§96.47

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

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

TEST SETUP



TEST OVERVIEW

End user device additional requirements (CBSD Protocol) are tested per the test procedures listed below. During testing, the EUT is connected to a certified CBSD as a companion device to show compliance with Part 96.47. End User Devices may operate only if they can positively receive and decode an authorization signal transmitted by a CBSD, including the frequencies and power limits for their operation.

Test Channel & Power

- 1. Setup companion device with 3560 MHz 3580 MHz and power level 20 dBm
- 2. Setup companion device with 3600 MHz 3620 MHz and power level 10 dBm

TEST PROCEDURE

- 1. Enable AP service from companion device.
- 2. EUT is connected to a companion device.
- 3. Check EUT Tx frequency and power.
- 4. Disable AP service from companion device and check EUT stop transmission within 10 s.





6. TEST RESULTS

20 MHz Bandwidth : 3570 MHz						
Spectrum Analyzer 1				Frequency v		
KEYSIGHT Input: RF Coupling: AC Align: Auto	Input Z: 50 Ω Atten: 10 dB Corrections: Off Preamp: Off Freq Ref. Int (S)		eq: 3.570000000 GHz : 1000/1000 t: None	Center Frequency 3.57000000 GHz		
1 Graph				Span 40.000 MHz		
Scale/Div 10.0 dB Log -20.0	Ref Value -10.00 d	Bm		CF Step 4.000000 MHz		
-30.0	man water and a second and a se	W ULINU WAN WAY		Auto Man		
-50.0				Freq Offset		
-70.0 -80.0		WILLAN-	White Monetor management	⊷ OHz		
-90.0						
Center 3.57000 GHz Res BW 390.00 kHz	Video BW 4.0000 I		Span 40 MH Sweep 1.00 ms (1001 pt			
2 Metrics v						
Occupied Bandwidth						
16.850 Transmit Freq Error	MHz -761.05 kHz	Total Power % of OBW Power	-15.7 dBm 99.00 %			
x dB Bandwidth	18.56 MHz	x dB	-26.00 dB			
	Jul 21, 2022	(
	JUI 21, 2022 12:00:21 PM		# 🖹 🗄 🔀			
	Stop operation	ion with 10 sec : 3	570 MHz			
Spectrum Analyzer 1	-			Frequency v	214	
KEYSIGHT Input: RF	Input Z: 50 Ω #Atten: 10 dB	PNO: Fast Avg Type			<u> </u>	
Coupling: AC Align: Auto	Corrections: Off Preamp: Off Freq Ref: Int (S)	Gate: Off Trig: Free IF Gain: Low Sig Track: Off	PNNNN	3.57000000 GHz	5	
1 Spectrum 🔻			ΔMkr1 360.0 m	0.0000000112		
Scale/Div 10 dB	Ref Level 0.00 dB	Bm	-42.15 dl	Swept Span Zero Span		
Log -10.0 -20.0	Ref Level 0.00 de	3m 	-42.15 dl	Swept Span		
-10.0	Ref Level 0.00 de			Full Span Start Freq		
Log -10.0 -20.0 -30.0 -40.0	harmond and for the second shares of the second sha	3m		Full Span Start Freq 3.57000000 GHz Stop Freq		
Log -10.0 -20.0 -30.0 -40.0 -50.0 -60.0	harmond and for the second shares of the second sha			Start Freq 3.57000000 GHz Stop Freq 3.570000000 GHz		
Log -10.0 -20.0 -40.0 -40.0 -50.0 -60.0 -60.0 -70.0 -80.0 -90.0 Center 3.570000000 GHz	harmond and for the second shares of the second sha		∆4 Span 0 H	Storpt opain Zero Span Full Span Start Freq 3.570000000 GHz Stop Freq 3.570000000 GHz		
Log -10.0 -20.0 -30.0 -40.0 -50.0 -60.0 -70.0 -80.0 -90.0	ληνιγητήνως τροτο _{μα} ιουλική <mark>2</mark> 1Δ2			Storpt opain Zero Span Full Span Start Freq 3.570000000 GHz Stop Freq 3.570000000 GHz AUTO TUNE CF Step 8.000000 MHz		
Log -10.0 -20.	ληπογοληγίας στροπο _{που} ησύλλα μα 1Δ2 μοτοποιο #Video BW 50 M X Y		4 Span 0 H Sweep 30.0 s (1001 pts	Start Freq 3.570000000 GHz Stop Freq 3.570000000 GHz CF Step 8.000000 MHz Auto Man		
Log -10.0 -20.0 -30.0 -40.0 -50.0 -50.0 -60.0 -50.0 -60.0 -50.0 -60.0 -50.0 -60.0 -50.0 -60.0 -50.0 -60.0 -50.0 -60.0 -50.0 -60.0 -70.	× Υ Δ) 360.0 ms (Δ) -42.15 dB 12.18 s -16.35 dBm Δ) 10.00 s (Δ) -41.43 dB	→3L Hz	4 Span 0 H Sweep 30.0 s (1001 pts	Start Freq 3.57000000 GHz Stort Freq 3.570000000 GHz CF Step 8.000000 MHz Auto		
Log -10.0	× γ 360.0 ms (Δ) -42.15 dB 12.18 s -16.35 dBm	→3L Hz	4 Span 0 H Sweep 30.0 s (1001 pts	Storp: opan Zero Span Full Span Start Freq 3.570000000 GHz Stop Freq 3.570000000 GHz AUTO TUNE CF Step 8.000000 MHz Auto Man Freq Offset 0 Hz X Axis Scale		
Log -10.0 -20	× Υ Δ) 360.0 ms (Δ) -42.15 dB 12.18 s -16.35 dBm 12.18 s -16.35 dBm	Hz Function Function Wid	4 Span 0 H Sweep 30.0 s (1001 pts	Storpt Opan Full Span Full Span Start Freq 3.570000000 GHz Stop Freq 3.570000000 GHz AUTO TUNE CF Step 8.000000 MHz Auto Man Freq Offset 0 Hz X Axis Scale Log		

Note:

Marker 2: CBSD sends instructions to discontinue NR n48 operations. Marker 1△2: EUT discontinues operation. (360 ms) Marker 3△4: 10 seconds elapsed time from CBSD sending instructions to EUT.(10.0 s)





		20 MHz Bandwid	ith : 3610 MHz			
Spectrum Analyzer 1	+			*	Frequency	· • 22
Occupied BW Input: RF Coupling: AC Align: Auto	Input Z: 50 Ω Atte	en: 10 dB Trig: Free Ru eamp: Off Gate: Off #IF Gain: Lov	Avg Hold: 1000/1000	0000 GHz 3.61	er Frequency 0000000 GHz	Settings
1 Graph v Scale/Div 10.0 dB	Ref \	Value -10.00 dBm		Span 40.0 CF S	00 MHz	
-20.0 -30.0 -40.0 -50.0	- Mar man som mor	where you make the second states and the second	Ruppy	=====	0000 MHz Auto Man Offset	
-60.0 -70.0 -80.0 -90.0 -100				Nikernetenikwere		
Center 3.61000 GHz Res BW 390.00 kHz	Uide	o BW 4.0000 MHz	Sweep 1.00	Span 40 MHz) ms (1001 pts)		
2 Metrics V						
Occupied Bandwidth						
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x dB Bandwidth	17.96 MHz	x dB		.00 dB		
		Λ				
	Jul 22, 2022 3:00:53 AM					
	• 3.00.33 AM	p operation with				
Spectrum Analyzer 1	Sto	p operation with		Hz	Frequency	
Spectrum Analyzer 1 Swept SA KEYSIGHT input: RF Coupling: AC Align: Auto		tten:10.dB PNO:Fast samp:Off Gate:Off IFGain:Low	10 sec : 3610 MI Avg Type: Voltage Trig: Free Run	Hz	Frequency er Frequency 0000000 GHz	settings
Spectrum Analyzer 1 Swept SA KEYSIGHT Input RF Coupling: AC	+ Input Z: 50 Q #AI Corrections: Off Pre	tten: 10 dB PNO: Fast eamp: Off Gate: Off	10 sec : 3610 MI Avg Type: Voltage Trig: Free Run f	Hz 1 2 3 4 5 6 W WWWWW P N N N N 260 0 0 5 pan Span	er Frequency 0000000 GHz	
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Spectrum Analyzer 1 Swept SA KEYSIGHT Input: RF Coupling: AC Align: Auto Scale/Div 10 dB Log -10.0 -30.0	LINPUT Z: 50 Ω #AI Corrections: Off Freq Ref. Int (S)	tten: 10 dB PNO: Fast namp: Off Gate: Off IF Gain: Low Sig Track: Of	10 sec : 3610 MI Avg Type: Voltage Trig: Free Run f	Hz 1 2 3 4 5 6 WWWWWW 9 NN NN N 360.0 ms -32.29 dB 2 2 2 2 2 2 2 2 3 2 3 2 3 2 3 2 3 2 3 2 3 4 5 6 Cente 3.611 Span 0.000 5 2 2 2 3 4 5 6 2 2 3 4 5 6 2 2 3 4 5 6 2 2 3 4 5 6 2 5 6 2 5 6 2 6 1 2 3 6 1 2 2 3 6 1 2 2 3 6 1 2 3 6 1 2 2 3 6 1 2 1 2 3 1 1 2 3 1 1 1 1 1 1 1 1 1 1 1 1 1	er Frequency 0000000 GHz 000000 Hz Swept Span Zero Span	
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Spectrum Analyzer 1 Swept SA KEYSIGHT Input: RF Coupling: AC Align: Auto I Spectrum Imput: RF Scale/Div 10 dB Log Imput: RF 200 Imput: RF Scale/Div 10 dB Imput: RF Adjoint Imput: RF Coupling: AC Imput: RF Coupling: AC Imput: RF Scale/Div 10 dB Imput: RF Cool Imput: RF Imput: RF Solo Imput: RF Imput: RF Center 3.610000000 GHz Imput: RF Imput: RF Mode Trace Scale Imput: Ac Imput: RF Imput: RF Mode Trace Scale Imput: Ac Imput: RF Imput: RF Mode Trace Scale Imput: RF Imput: RF Imput: RF Imput: RF Imput: RF Imput: RF Imput: RF Imput: RF Imput: RF Imput: RF Imput: RF		tten: 10 dB amp: Off Gate: Off IF Gain: Low Sig Track: Of Comparison of the second F Level 0.00 dBm Comparison of the second Comparison of t	10 sec : 3610 MI	Hz 1 2 3 4 5 6 WWWWWWW PNNNNN 360.0 ms -32.29 dB 3Δ4 3Δ4 Span 0 Hz Span 0 Hz CF St 8.000 CF St 8.000 CF St 8.000 CF St	er Frequency 0000000 GHz Swept Span Zero Span Full Span Full Span Freq 0000000 GHz Freq 0000000 GHz AUTO TUNE	
Spectrum Analyzer 1 Swept SA Input: RF Coupling: AC Align: Auto A I Spectrum Scale/Div 10 dB L00		tten: 10 dB pamp: Off Flevel 0.00 dBm rack: Of Cevel 0.00 dBm compared by 2 compared b	10 sec : 3610 MI	Hz 1 2 3 4 5 6 W WWWWWW P NN NN N 360.0 ms -32.29 dB 344 3611 Span 0 Hz .0 s (1001 pts) Span 0 Hz .0 s (1001 pts) CF St 8.000 M Freq 0 Hz X Axis	er Frequency 0000000 GHz Swept Span Zero Span Full Span Full Span Freq 0000000 GHz Freq 0000000 GHz AUTO TUNE	

Note:

Marker 2: CBSD sends instructions to discontinue NR n48 operations. Marker $1\triangle 2$: EUT discontinues operation. (360 ms)

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





7. LIST OF TEST EQUIPMENT

No.	Instrument	Model No.	Calibration Due (mm/dd/yy)	Manufacture	Serial No.
\boxtimes	Signal Analyzer (10 Hz ~ 26.5 GHz)	N9020B	07/14/2023	Keysight	MY57431494
\boxtimes	Horn Antenna (1 GHz ~ 18 GHz)	DRH-118	01/28/2023	Sunol Sciences	A061616
\square	Companion device (FCC ID: PIDAS2900)	AirSpeed 2900	-	Airspan Networks inc	-

Note:

- 1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
- 2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date





END OF TEST REPORT

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