RF SAFETY LAB
A NEXT GENERATION TEST LABORATORY™

Next Generation Test Laboratory Inc. (RF Safety Laboratory, LLC)
5520 Research Park Drive, Suite 140, Catonsville, Maryland 21228 USA
FCC Designation Number: US3274
ANAB 17025 Certificate Number: AT-3274
+1 202 240 9240; info@rfsafetylab.com

PART 1 RF EXPOSURE REPORT

FCC ID:	**A3LSMF976U**
Model (s):	SM-F976U, SM-F976U1
Device Type:	Portable Handset
Report Issue Date:	Aug 06, 2026

Samsung Electronics Co., Ltd.
129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Rep. of Korea

Class II Permissive Change

FCC Equipment Class	Body-worn SAR [W/kg]	Hotspot SAR [W/kg]	Phablet SAR [W/kg]	psPD over $4cm^2$ [W/m^2]
6CD/6VL	0.18	0.18	0.33	7.73
FCC Limit	**1.6**	**1.6**	**4.0**	**10.0**

The measurement evaluations presented in this report are based on the maximum performance of the tested device(s), which has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/ general population exposure federal limits in 47CFR § 1.1310 and has been tested in accordance with the measurement procedures specified within this report.

This document has been revised and replaces all previously issued versions of this document with the same Test Report S/N.

ilac-MRA
ANAB ANSI National Accreditation Board ACCREDITED ISO/IEC 17025 TESTING LABORATORY

Steve Liu
President

Next Generation Test Laboratory Inc. (RF Safety Laboratory, LLC)
5520 Research Park Drive, Suite 140, Catonsville, Maryland 21228 USA
FCC Designation Number: US3274
ANAB 17025 Certificate Number: AT-3274
+1 202 240 9240; info@rfsafetylab.com

Table of Contents

1. DUT Specifics

1.1. Device under Test

The device under test is a wireless device, evaluated for the technologies/exposure conditions listed in Table 1-1 below under Class II permissive change as described in FCC change document. Please refer to the original filing (report SN: 2026.005.01) for RF evaluation of other operations that are not affected by this class II permissive change. The manufacturer has confirmed that the device is within operational tolerances expected for production units and has the same physical, mechanical, and thermal characteristics expected for production units. The serial number of the device used for each test is indicated alongside the results.

1.2. Maximum SAR per Mode

Table 1-1 Maximum SAR Summary

FCC Equipment Class	Band/Mode	Frequency (MHz)	Body-worn SAR [W/kg]	Hotspot SAR [W/kg]	Phablet SAR [W/kg]
6CD/6VL	6 GHz WIFI	5935 - 7115 MHz	0.184	0.184	0.328

1.3. Time-Averaging Algorithm for RF Exposure Compliance

This device is enabled with the Qualcomm® Smart Transmit Gen2 feature. This feature implements a time-averaging algorithm in real time to control and manage transmitting power and ensure the time-averaged RF exposure follows FCC requirements all the time.

Note that NFC/UWB operations are not enabled with Smart Transmit for this device.

The Smart Transmit algorithm maintains the time-averaged transmit power, in turn, time-averaged RF exposure of SAR_design_target or PD_design_target, below the predefined time-averaged power limit (i.e., Plimit for sub-6 radio, and input.power.limit for 5G mmWave NR), for each characterized technology and band. Characterization is achieved by determining Plimit for Smart Transmit supported Radios that corresponds to the exposure design targets after accounting for all device design related uncertainties. The SAR characterization is denoted as SAR Char in this report.

Smart Transmit allows the device to transmit at higher power instantaneously, as high as Pmax, when needed, but enforces power limiting to maintain time-averaged transmit power to Plimit. Below table shows Plimit EFS settings and maximum tune up output power Pmax configured for this EUT for various transmit conditions (Device State Index DSI).

Note that the device uncertainty for Smart Transmit supported Radios is 1.0 dB for this EUT.

Next Generation Test Laboratory Inc. (RF Safety Laboratory, LLC)
5520 Research Park Drive, Suite 140, Catonsville, Maryland 21228 USA
FCC Designation Number: US3274
ANAB 17025 Certificate Number: AT-3274
☎ +1 202 240 9240; 🖂 info@rfsafetylab.com

*Note all Plimit EFS and maximum tune up output power Pmax levels entered in below Table correspond to average power levels after accounting for duty cycle in the case of modulation schemes (e.g. LTE TDD, GPRS, NTN, or WLAN/BT).
The maximum time-averaged output power (dBm) for any Smart Transmit technology, band, and DSI = minimum of the "Plimit EFS" and "Maximum tune up output power Pmax", +1dB device uncertainty. SAR values in this report were scaled to this maximum time-averaged output power to determine compliance per KDB Publication 447498 D04v01.

The device state index (DSI) conditions used in the table below represent different exposure scenarios affected by the Class II Permissive Change.

Table 1-2 DSI Description

Scenario	**Description**	**SAR Test Cases**
Body-worn (DSI = 0)	_ DUT Configuration is Folder Open _ Device being used with a body-worn accessory	*Body-worn SAR per KDB Publication 648474 D04*
Hotspot (DSI = 0)	_ DUT Configuration is Folder Open _ Device transmits in hotspot mode near body _ Hotspot Mode Active	*Hotspot SAR per KDB Publication 941225 D06*
Phablet (DSI = 0)	_ DUT Configuration is Folder Open _ Device is held to hand	*Phablet SAR per KDB Publication 648474 D04 & KDB Publication 616217 D04*

Table 1-3 SAR Char

Band/Mode	Antenna	Antenna Group	Exposure Scenario		Folder Open Body-worn/ Hotspot/ Phablet
			Maximum Tune-Up Output Power		DSI 0
			Pmax Burst (dBm)	Pmax Frame Avg (dBm)	Plimit (dBm)
6 GHz WIFI	E	AG1	16.0	16.0	9.0
6 GHz WIFI	F	AG1	16.0	16.0	9.0
6 GHz WIFI	MIMO (F&E)	AG1	16.0	16.0	9.0

Next Generation Test Laboratory Inc. (RF Safety Laboratory, LLC)
5520 Research Park Drive, Suite 140, Catonsville, Maryland 21228 USA
FCC Designation Number: US3274
ANAB 17025 Certificate Number: AT-3274
☎ +1 202 240 9240; 🖂 info@rfsafetylab.com

1.4. Maximum Time-Averaged Power From Manufacturer

The manufacturer has confirmed that this device follows the below target output power specifications and tolerances. SAR values were scaled to the maximum allowed power (including tolerance) to determine compliance per KDB Publication 447498 D04v01.

Tolerance +1dB is applicable to all WLAN

Table 1-4 6 GHz WLAN Target RF Output Power

6.5 GHz WIFI Maximum Power [dBm] - SISO, or SISO in MIMO (F&E) mode													
Power Level	Antenna	Channel Bandwidth [MHz]	Band	Mode	802.11a (CDD + STBC)			802.11ax SU (CDD + STBC,SDM)			802.11be SU (CDD +STBC,SDM)		
				Channel	LPI	SP	VLP	LPI	SP	VLP	LPI	SP	VLP
Pmax	F, E	20	UNII-5	All	10	16	5	10	16	5	10	16	5
				2	9	9	5	6	6	5	6	6	5
			UNII-6	All	10	N/A	5	10	N/A	5	10	N/A	5
			UNII-7	All	10	16	5	10	16	5	10	16	5
			UNII-8	All	10	N/A	5	10	N/A	5	10	N/A	5
		40	All	All				12	16	8	12	16	8
		80	All	All				15	16	11	15	16	11
		160	All	All				16	16	11	16	16	11
		320	All	All							16	16	11
DSI 0	F, E	20	UNII-5	All	9	9	9 -> 5	9	9	9 -> 5	9	9	9 -> 5
				2	9	9	9 -> 5	9 -> 6	9 -> 6	9 -> 5	9 -> 6	9 -> 6	9 -> 5
			UNII-6	All	9	N/A	9 -> 5	9	N/A	9 -> 5	9	N/A	9 -> 5
			UNII-7	All	9	9	9 -> 5	9	9	9 -> 5	9	9	9 -> 5
			UNII-8	All	9	N/A	9 -> 5	9	N/A	9 -> 5	9	N/A	9 -> 5
		40	All	All				9	9	9 -> 8	9	9	9 -> 8
		80	All	All				9	9	9	9	9	9
		160	All	All				9	9	9	9	9	9
		320	All	All							9	9	9

Note:

- For 6 GHz WLAN, IEEE 802.11ax/be RU and MRU measurements are addressed in the associated EMC test report. Per April 2019 TCB Workshop Notes, SAR testing was not required for 802.11ax/be when applying the initial test configuration procedures of KDB 248227, with 802.11ax/be considered a higher order 802.11 mode.

- Power is limited to minimum of Pmax and Plimit for all bands/modes in a DSI.

1.5. Surfaces Required for Testing

Table 1-5 Surfaces Required for Testing for Folder Open

Antennas	Back	Front	Top	Bottom	Right	Left
E	Yes	Yes	Yes	No	Yes	No
F	Yes	Yes	Yes	No	No	No
MIMO (F&E)	Yes	Yes	Yes	No	Yes	No

Note: Particular DUT edges were not required to be evaluated if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06v02r01 Section III. The distances between the transmit antennas and the edges of the device are included in the filing.

1.6. Test Guidance Applied

- IEEE 1528-2013
- FCC KDB Publication 941225 D06v02r01 (Hotspot)
- FCC KDB Publication 248227 D01v02r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D04v01 (General SAR Guidance)
- FCC KDB Publication 865664 D01v01r04, D02v01r02 (SAR Measurements up to 6 GHz)
- FCC KDB Publication 648474 D04v01r03 (Phablet Procedures)
- April 2019 TCB Workshop Notes (IEEE 802.11ax)
- IEC/IEEE 63195-1:2022
- IEC 62479:2010
- SPEAG DASY8 Application Note (Interim Procedures for Devices Operating between 6-10 GHz) (April 2023)
- October 2020 TCB Workshop Notes (6-8 GHz Testing)

2. DUT Conducted Powers

2.1. Power Measurement Setup

Figure 2-1 FTM Power Measurement Setup

Table 2-1

6.5 GHz WIFI Conducted Power [dBm] - SISO								
Power Level	Channel Bandwidth [MHz]	Band	Mode		802.11ax		802.11be	
			Channel	Freq. [MHz]	F	E	F	E
DSI 0	80	UNII-5	7	5985	9.10	9.35	9.01	9.11
		UNII-5	55	6225	8.40	8.75	8.50	8.75
		UNII-6	103	6465	9.05	9.11	9.06	8.95
		UNII-7	151	6705	8.74	9.34	8.69	9.74
		UNII-8	215	7025	8.31	9.05	8.26	9.08

Table 2-2

6.5 GHz WIFI Maximum Power [dBm] - SISO in MIMO (F&E) mode										
Power Level	Channel Bandwidth [MHz]	Band	Mode		802.11ax			802.11be		
			Channel	Freq. [MHz]	F	E	MIMO	F	E	MIMO
DSI 0	80	UNII-5	7	5985	8.60	9.11	11.87	8.62	9.00	11.82
		UNII-5	55	6225	8.61	8.75	11.69	8.20	8.72	11.48
		UNII-6	103	6465	9.25	8.95	12.11	9.26	8.91	12.10
		UNII-7	151	6705	8.20	9.66	12.00	8.20	9.70	12.02
		UNII-8	215	7025	8.20	9.50	11.91	8.08	9.51	11.86

3. DUT Test Results

3.1. WIFI SAR Data

Table 3-1

DUT Configuration	Exposure Condition	Band/Mode	Antenna	Additional Information	DUT SN	Power Drift [dB]	Maximum Duty Cycle [%]	Measured Duty Cycle [%]	Frequency [MHz]	Channel	Modulation/Configuration	Data Rate (Mbps)	UNII Band	Maximum Allowed Power [dBm]	Measured Conducted Power [dBm]	Maximum Allowed Power 2nd Ant [dBm]	Measured Conducted Power 2nd Ant [dBm]	Separation Distance [mm]	Position	Measured 1g SAR [W/kg]	Reported 1g SAR [W/kg]	Measured 10g SAR [W/kg]	Reported 10g SAR [W/kg]	Measured APD [W/m²]	Reported APD [W/m²]	Adjusted 1g SAR [W/kg]	Adjusted 10g SAR [W/kg]	Test Plot	Part0 Frame Avg Plimit [dBm]	Part0 Overal Frame Avg Plimit [dBm]
Folder Open	Body-worn/Hotspot	6 GHz WIFI	E	Tilted Top	1364M	-0.13	100.0%	99.6%	5985	7	IEEE 802.11ax - 80 MHz	30.6	UNII-5	10.00	9.35	N/A	N/A	5	Back	0.096	0.112	-	-	0.563	0.656	0.142	-	-	19.51	18.32
Folder Open	Body-worn/Hotspot	6 GHz WIFI	E	-	1364M	-0.13	100.0%	99.6%	5985	7	IEEE 802.11ax - 80 MHz	30.6	UNII-5	10.00	9.35	N/A	N/A	5	Front	0.126	0.147	-	-	0.818	0.954	0.187	-	-	18.32	
Folder Open	Body-worn/Hotspot	6 GHz WIFI	E	-	1364M	-0.05	100.0%	99.6%	6225	55	IEEE 802.11ax - 80 MHz	30.6	UNII-5	10.00	8.75	N/A	N/A	5	Front	0.095	0.127	-	-	0.585	0.783	0.161	-	-	18.95	
Folder Open	Body-worn/Hotspot	6 GHz WIFI	E	-	1364M	-0.13	100.0%	99.6%	6465	103	IEEE 802.11ax - 80 MHz	30.6	UNII-6	10.00	9.11	N/A	N/A	5	Front	0.070	0.086	-	-	0.442	0.545	0.109	-	-	20.64	
Folder Open	Body-worn/Hotspot	6 GHz WIFI	E	-	1364M	-0.13	100.0%	99.6%	6705	151	IEEE 802.11ax - 80 MHz	30.6	UNII-7	10.00	9.34	N/A	N/A	5	Front	0.076	0.089	-	-	0.471	0.550	0.113	-	-	20.51	
Folder Open	Body-worn/Hotspot	6 GHz WIFI	E	-	1364M	0.18	100.0%	99.6%	7025	215	IEEE 802.11ax - 80 MHz	30.6	UNII-8	10.00	9.05	N/A	N/A	5	Front	0.086	0.107	-	-	0.514	0.642	0.136	-	-	19.68	
Folder Open	Hotspot	6 GHz WIFI	E	-	1364M	-0.13	100.0%	99.6%	5985	7	IEEE 802.11ax - 80 MHz	30.6	UNII-5	10.00	9.35	N/A	N/A	10	Top	0.017	0.020	-	-	0.104	0.121	0.025	-	-	27.02	
Folder Open	Hotspot	6 GHz WIFI	E	-	1364M	-0.13	100.0%	99.6%	5985	7	IEEE 802.11ax - 80 MHz	30.6	UNII-5	10.00	9.35	N/A	N/A	10	Right	0.010	0.012	-	-	0.014	0.016	0.015	-	-	29.33	
Folder Open	Phablet	6 GHz WIFI	E	Tilted Top	1364M	0.09	100.0%	99.6%	5985	7	IEEE 802.11ax - 80 MHz	30.6	UNII-5	10.00	9.35	N/A	N/A	0	Back	-	-	0.063	0.073	1.520	1.772	-	0.093	-	25.31	
Folder Open	Phablet	6 GHz WIFI	E	-	1364M	0.05	100.0%	99.6%	5985	7	IEEE 802.11ax - 80 MHz	30.6	UNII-5	10.00	9.35	N/A	N/A	0	Front	-	-	0.201	0.234	4.750	5.538	-	0.297	-	20.28	
Folder Open	Phablet	6 GHz WIFI	E	-	1364M	0.05	100.0%	99.6%	6225	55	IEEE 802.11ax - 80 MHz	30.6	UNII-5	10.00	8.75	N/A	N/A	0	Front	-	-	0.166	0.222	3.940	5.275	-	0.282	-	20.51	
Folder Open	Phablet	6 GHz WIFI	E	-	1364M	-0.05	100.0%	99.6%	6465	103	IEEE 802.11ax - 80 MHz	30.6	UNII-6	10.00	9.11	N/A	N/A	0	Front	-	-	0.134	0.165	3.180	3.919	-	0.210	-	21.80	
Folder Open	Phablet	6 GHz WIFI	E	-	1364M	-0.04	100.0%	99.6%	6705	151	IEEE 802.11ax - 80 MHz	30.6	UNII-7	10.00	9.34	N/A	N/A	0	Front	-	-	0.138	0.161	3.280	3.833	-	0.204	-	21.90	
Folder Open	Phablet	6 GHz WIFI	E	-	1364M	-0.13	100.0%	99.6%	7025	215	IEEE 802.11ax - 80 MHz	30.6	UNII-8	10.00	9.05	N/A	N/A	0	Front	-	-	0.129	0.161	3.060	3.823	-	0.204	-	21.90	
Folder Open	Phablet	6 GHz WIFI	E	-	1364M	-0.13	100.0%	99.6%	5985	7	IEEE 802.11ax - 80 MHz	30.6	UNII-5	10.00	9.35	N/A	N/A	0	Top	-	-	0.044	0.051	1.020	1.189	-	0.065	-	26.87	
Folder Open	Phablet	6 GHz WIFI	E	-	1364M	0.00	100.0%	99.6%	5985	7	IEEE 802.11ax - 80 MHz	30.6	UNII-5	10.00	9.35	N/A	N/A	0	Right	-	-	0.021	0.024	0.457	0.533	-	0.030	-	30.09	
Folder Open	Body-worn/Hotspot	6 GHz WIFI	F	Tilted Top	1364M	0.14	100.0%	99.6%	5985	7	IEEE 802.11ax - 80 MHz	30.6	UNII-5	10.00	9.10	N/A	N/A	5	Back	0.079	0.098	-	-	0.615	0.760	0.124	-	-	20.10	17.37
Folder Open	Body-worn/Hotspot	6 GHz WIFI	F	Tilted Top	1364M	0.17	100.0%	99.6%	6225	55	IEEE 802.11ax - 80 MHz	30.6	UNII-5	10.00	8.40	N/A	N/A	5	Back	0.126	0.183	-	-	0.829	1.203	0.232	-	-	17.37	
Folder Open	Body-worn/Hotspot	6 GHz WIFI	F	Tilted Top	1364M	0.14	100.0%	99.6%	6465	103	IEEE 802.11ax - 80 MHz	30.6	UNII-6	10.00	9.05	N/A	N/A	5	Back	0.071	0.089	-	-	0.517	0.646	0.113	-	-	20.52	
Folder Open	Body-worn/Hotspot	6 GHz WIFI	F	Tilted Top	1364M	0.14	100.0%	99.6%	6705	151	IEEE 802.11ax - 80 MHz	30.6	UNII-7	10.00	8.74	N/A	N/A	5	Back	0.083	0.111	-	-	0.581	0.780	0.141	-	-	19.53	
Folder Open	Body-worn/Hotspot	6 GHz WIFI	F	Tilted Top	1364M	0.14	100.0%	99.6%	7025	215	IEEE 802.11ax - 80 MHz	30.6	UNII-8	10.00	8.31	N/A	N/A	5	Back	0.074	0.110	-	-	0.434	0.643	0.140	-	-	19.60	
Folder Open	Body-worn/Hotspot	6 GHz WIFI	F	-	1364M	0.14	100.0%	99.6%	5985	7	IEEE 802.11ax - 80 MHz	30.6	UNII-5	10.00	9.10	N/A	N/A	5	Front	0.024	0.030	-	-	0.143	0.177	0.038	-	-	25.28	
Folder Open	Hotspot	6 GHz WIFI	F	-	1364M	0.14	100.0%	99.6%	5985	7	IEEE 802.11ax - 80 MHz	30.6	UNII-5	10.00	9.10	N/A	N/A	10	Top	0.028	0.035	-	-	0.159	0.196	0.044	-	-	24.61	
Folder Open	Phablet	6 GHz WIFI	F	Tilted Top	1364M	-0.09	100.0%	99.6%	5985	7	IEEE 802.11ax - 80 MHz	30.6	UNII-5	10.00	9.10	N/A	N/A	0	Back	-	-	0.124	0.153	2.890	3.569	-	0.194	-	22.12	
Folder Open	Phablet	6 GHz WIFI	F	-	1364M	0.01	100.0%	99.6%	5985	7	IEEE 802.11ax - 80 MHz	30.6	UNII-5	10.00	9.10	N/A	N/A	0	Front	-	-	0.117	0.145	2.760	3.409	-	0.184	-	22.38	
Folder Open	Phablet	6 GHz WIFI	F	-	1364M	0.20	100.0%	99.6%	5985	7	IEEE 802.11ax - 80 MHz	30.6	UNII-5	10.00	9.10	N/A	N/A	0	Top	-	-	0.129	0.159	3.030	3.742	-	0.202	-	21.95	
Folder Open	Phablet	6 GHz WIFI	F	-	1364M	0.04	100.0%	99.6%	6225	55	IEEE 802.11ax - 80 MHz	30.6	UNII-5	10.00	8.40	N/A	N/A	0	Top	-	-	0.141	0.205	3.290	4.774	-	0.260	-	20.87	
Folder Open	Phablet	6 GHz WIFI	F	-	1364M	0.14	100.0%	99.6%	6465	103	IEEE 802.11ax - 80 MHz	30.6	UNII-6	10.00	9.05	N/A	N/A	0	Top	-	-	0.106	0.132	2.460	3.073	-	0.168	-	22.75	
Folder Open	Phablet	6 GHz WIFI	F	-	1364M	-0.15	100.0%	99.6%	6705	151	IEEE 802.11ax - 80 MHz	30.6	UNII-7	10.00	8.74	N/A	N/A	0	Top	-	-	0.082	0.110	1.890	2.536	-	0.140	-	23.56	
Folder Open	Phablet	6 GHz WIFI	F	-	1364M	0.14	100.0%	99.6%	7025	215	IEEE 802.11ax - 80 MHz	30.6	UNII-8	10.00	8.31	N/A	N/A	0	Top	-	-	0.059	0.087	1.380	2.044	-	0.110	-	24.56	
Folder Open	Body-worn/Hotspot	6 GHz WIFI	MIMO (F&E)	Tilted Top	1364M	-0.15	100.0%	99.6%	5985	7	IEEE 802.11ax - 80 MHz	61.3	UNII-5	10.00	8.60	10.00	9.11	5	Back	0.104	0.144	-	-	0.845	1.171	0.183	-	-	18.41	17.35
Folder Open	Body-worn/Hotspot	6 GHz WIFI	MIMO (F&E)	Tilted Top	1364M	0.16	100.0%	99.6%	6225	55	IEEE 802.11ax - 80 MHz	61.3	UNII-5	10.00	8.61	10.00	8.75	5	Back	0.133	0.184	-	-	0.855	1.182	0.234	-	1	17.35	
Folder Open	Body-worn/Hotspot	6 GHz WIFI	MIMO (F&E)	Tilted Top	1364M	0.16	100.0%	99.6%	6465	103	IEEE 802.11ax - 80 MHz	61.3	UNII-6	10.00	9.25	10.00	8.95	5	Back	0.076	0.097	-	-	0.554	0.708	0.123	-	-	20.12	
Folder Open	Body-worn/Hotspot	6 GHz WIFI	MIMO (F&E)	Tilted Top	1364M	0.16	100.0%	99.6%	6705	151	IEEE 802.11ax - 80 MHz	61.3	UNII-7	10.00	8.20	10.00	9.66	5	Back	0.078	0.119	-	-	0.545	0.828	0.151	-	-	19.26	
Folder Open	Body-worn/Hotspot	6 GHz WIFI	MIMO (F&E)	Tilted Top	1364M	0.16	100.0%	99.6%	7025	215	IEEE 802.11ax - 80 MHz	61.3	UNII-8	10.00	8.20	10.00	9.50	5	Back	0.103	0.157	-	-	0.849	1.290	0.199	-	-	18.05	
Folder Open	Body-worn/Hotspot	6 GHz WIFI	MIMO (F&E)	-	1364M	0.03	100.0%	99.6%	6465	103	IEEE 802.11ax - 80 MHz	61.3	UNII-6	10.00	9.25	10.00	8.95	5	Front	0.065	0.083	-	-	0.545	0.697	0.105	-	-	20.80	
Folder Open	Hotspot	6 GHz WIFI	MIMO (F&E)	-	1364M	0.16	100.0%	99.6%	6465	103	IEEE 802.11ax - 80 MHz	61.3	UNII-6	10.00	9.25	10.00	8.95	10	Top	0.043	0.055	-	-	0.345	0.441	0.070	-	-	22.59	
Folder Open	Hotspot	6 GHz WIFI	MIMO (F&E)	-	1364M	0.16	100.0%	99.6%	6465	103	IEEE 802.11ax - 80 MHz	61.3	UNII-6	10.00	9.25	10.00	8.95	10	Right	0.009	0.012	-	-	0.058	0.074	0.015	-	-	29.39	
Folder Open	Phablet	6 GHz WIFI	MIMO (F&E)	Tilted Top	1364M	0.01	100.0%	99.6%	6465	103	IEEE 802.11ax - 80 MHz	61.3	UNII-6	10.00	9.25	10.00	8.95	0	Back	-	-	0.111	0.142	2.560	3.273	-	0.180	-	22.45	
Folder Open	Phablet	6 GHz WIFI	MIMO (F&E)	-	1364M	0.08	100.0%	99.6%	5985	7	IEEE 802.11ax - 80 MHz	61.3	UNII-5	10.00	8.60	10.00	9.11	0	Front	-	-	0.237	0.328	5.570	7.719	-	0.417	2	18.81	
Folder Open	Phablet	6 GHz WIFI	MIMO (F&E)	-	1364M	-0.16	100.0%	99.6%	6225	55	IEEE 802.11ax - 80 MHz	61.3	UNII-5	10.00	8.61	10.00	8.75	0	Front	-	-	0.184	0.254	4.350	6.014	-	0.323	-	19.92	
Folder Open	Phablet	6 GHz WIFI	MIMO (F&E)	-	1364M	0.19	100.0%	99.6%	6465	103	IEEE 802.11ax - 80 MHz	61.3	UNII-6	10.00	9.25	10.00	8.95	0	Front	-	-	0.149	0.190	3.540	4.526	-	0.241	-	21.18	
Folder Open	Phablet	6 GHz WIFI	MIMO (F&E)	-	1364M	-0.07	100.0%	99.6%	6705	151	IEEE 802.11ax - 80 MHz	61.3	UNII-7	10.00	8.20	10.00	9.66	0	Front	-	-	0.160	0.243	3.770	5.728	-	0.309	-	20.12	
Folder Open	Phablet	6 GHz WIFI	MIMO (F&E)	-	1364M	-0.07	100.0%	99.6%	7025	215	IEEE 802.11ax - 80 MHz	61.3	UNII-8	10.00	8.20	10.00	9.50	0	Front	-	-	0.164	0.249	3.840	5.835	-	0.316	-	20.01	
Folder Open	Phablet	6 GHz WIFI	MIMO (F&E)	-	1364M	0.16	100.0%	99.6%	6465	103	IEEE 802.11ax - 80 MHz	61.3	UNII-6	10.00	9.25	10.00	8.95	0	Top	-	-	0.120	0.153	2.790	3.567	-	0.194	-	22.12	
Folder Open	Phablet	6 GHz WIFI	MIMO (F&E)	-	1364M	0.06	100.0%	99.6%	6465	103	IEEE 802.11ax - 80 MHz	61.3	UNII-6	10.00	9.25	10.00	8.95	0	Right	-	-	0.021	0.027	0.467	0.597	-	0.034	-	29.69	

3.2. 6.5 GHz WIFI PD Data

Table 3-2

DUT Configuration	Band/Mode	Antenna	DUT SN	Power Drift [dB]	Maximum Duty Cycle [%]	Measured Duty Cycle [%]	Frequency [MHz]	Channel	Modulation/Configuration	Data Rate (Mbps)	Maximum Allowed Power [dBm]	Measured Conducted Power [dBm]	Maximum Allowed Power 2nd Ant [dBm]	Measured Conducted Power 2nd Ant [dBm]	IEC 62479 Uncertainty Scaling Factor	Separation Distance [mm]	Position	Measured Normal psPD [W/m²]	Scaled Normal psPD [W/m²]	Measured Total psPD [W/m²]	Scaled Total psPD [W/m²]	Test Plot
Folder Open	6 GHz WIFI	E	1320M	-0.07	100.0%	99.6%	5985	7	IEEE 802.11ax 80 MHz	30.6	10.00	9.35	N/A	N/A	1.129	2	Front	1.770	2.330	3.160	4.160	-
Folder Open	6 GHz WIFI	F	1320M	-0.17	100.0%	99.6%	6225	55	IEEE 802.11ax 80 MHz	30.6	10.00	8.40	N/A	N/A	1.129	2	Top	2.150	3.523	3.910	6.406	-
Folder Open	6 GHz WIFI	MIMO (F&E)	1320M	-0.13	100.0%	99.6%	5985	7	IEEE 802.11ax 80 MHz	61.3	10.00	8.60	10.00	9.11	1.129	2	Front	2.740	4.287	4.940	7.730	3

3.3. General SAR Testing Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2013 and FCC KDB Publication 447498 D04v01.
2. Liquid tissue depth was at least 15.0 cm for all frequencies.
3. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D04v01.
4. Batteries are fully charged at the beginning of the SAR measurements.
5. DUT was tested using a fixed spacing for body-worn accessory testing. A separation distance of 5 mm was considered because the manufacturer has determined that there will be body-worn accessories available for users to support this separation distance When the body-worn SAR is > 1.2 W/kg, additional body-worn SAR evaluations using a headset cable is required on the configuration with the highest reported SAR.
6. Per Qualcomm guidance, when hotspot mode applies, 10-g Phablet SAR is required for surfaces and edges with hotspot mode 1g reported SAR >1.2 W/kg. For surfaces and edges with hotspot mode 1g SAR < 1.2 W/kg, the 10-g Phablet SAR can be excluded when the normalized SAR_design_target for Phablet DSI is less than or equal to that of hotspot

DSI.

7. Per FCC KDB Publication 941225 D07, when 1-g SAR is tested at 5mm for a surface/edge, 10-g SAR is not required.
8. Unless otherwise noted, when 10g SAR measurement is considered, a factor of 2.5 is applied to the 1g thresholds for the equivalent test cases.
9. Lower SAR results for the affected bands/modes/exposures due to the changes do not affect compliance of their Simultaneous Transmission with other radios. Please refer to Simultaneous Transmission analysis in the original filing for full compliance evaluation.

3.4. WLAN Notes:

1. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 6 GHz WIFI operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed powers. Other transmission modes were not investigated since the highest reported SAR for initial test configuration adjusted by the ratio of maximum output powers is less than 1.2 W/kg for 1g evaluations.
2. Per KDB Publication 248227 D01v02r02, SAR for MIMO was evaluated by following the simultaneous SAR provisions from KDB Publication 447498 D04v01 making a measurement with both antennas transmitting simultaneously or by evaluating the summation of the 1g or 10g SAR values of each antenna.
3. When the maximum reported 1g averaged SAR is ≤ 0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg for 1g evaluations or all test channels were measured. When there are multiple untested channels having the same subsequent highest average RF output power, the channel with higher frequency is considered for SAR measurements.
4. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools. Procedures used to measure the duty factor are identical to that in the associated Part 15 test reports.
5. For 6 GHz WIFI Operations:
   - Per FCC Guidance, both SAR and Power Density measurements were performed to demonstrate compliance.
   - Per FCC Guidance, SAR was performed using 6.5 GHz SAR probe calibration factor for WIFI 6E. Per October 2020 TCB workshop notes, 5 channels were tested for WIFI 6E.
   - Per October 2020 TCB Workshop notes, absorbed power density (APD) using a 4cm2 averaging area is reported based on SAR measurements for 6 GHz WIFI.
   - Power density was calculated by repeated E-field measurements on two measurement planes separated by $\lambda/4$.
   - Per FCC guidance and equipment manufacturer guidance, power density results were scaled according to IEC 62479:2010 for the portion of the measurement uncertainty > 30%. Total expanded uncertainty of 1.55 dB (42.9%) was used to determine the psPD measurement scaling factor.

4. DUT SAR Measurement Variability Requirement

Per FCC KDB Publication 865664 D01v01r04, SAR measurement variability was not required since the measured SAR results for a frequency band were less than 0.8 W/kg for 1g SAR and 2.0 W/kg for 10g SAR.

5. General Introduction

Title 47 of the Code of Federal Regulations (CFR) pertains to United States Federal regulation for Telecommunications. The **Federal Communications Commission (FCC)** is the agency responsible for implementing and enforcing these regulations. The rules define a **radiofrequency device** as any device which in its operation is capable of emitting radiofrequency energy by radiation, conduction, or other means.

47CFR §2.1093(b) states, "A **portable device** is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that the RF source's radiating structure(s) **is/are within 20 centimeters of the body of the user**."

Also, 47CFR §2.1093(d)(6) states, that General population/uncontrolled exposure limits defined in §1.1310 "apply to portable devices intended for use by consumers or persons who are exposed as a consequence of their employment and may not be fully aware of the potential for exposure or cannot exercise control over their exposure."

47CFR §2.1093(d)(2) states that evaluation of compliance within FCC's SAR limits can be demonstrated by laboratory measurements. This test report serves this purpose.

6. Background on Radiofrequency (RF) Exposure Limits

6.1. Controlled Environment

Controlled environments are defined as locations where the RF field intensities have been adequately characterized by means of measurement or calculation and exposure is incurred by persons who are: aware of the potential for RF field exposure, cognizant of the intensity of the RF fields in their environment, aware of the potential health risks associated with RF field exposure and able to control their risk using mitigation strategies. In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

6.2. Uncontrolled Environment

Uncontrolled environments are defined as locations where either insufficient assessment of RF fields have been conducted or where persons who are allowed access to these areas have not received proper RF field awareness/safety training and have no means to assess or, if required, to mitigate their exposure to RF fields. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed, or in which persons who may not be made fully aware of the potential for exposure, or cannot exercise control over their exposure. Members of the general public would fall under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

6.3. RF Exposure Limits for 100kHz – 6 GHz

Table 6-1 Human Exposure to RF Radiation Limits in 47 CFR §1.1310 - SAR Basic Restrictions for frequencies 100kHz ~ 6 GHz

Environment	Condition	**SAR**	Averaging volume
Uncontrolled / General Population	Head, Neck Trunk	**1.6 W/kg**	1g cube
	Extremity	**4.0 W/kg**	10g cube
Controlled	Head/Trunk	**8 W/kg**	1g cube
	Extremity / Limbs	**20 W/kg**	10g cube

6.4. RF Exposure Limits for 6 - 100 GHz

Per FCC 47 CFR §1.1310, the power density limits are applied for frequencies between 6 GHz and 100 GHz as shown below. Note that 10 W/m^2 is equivalent to 1 mW/cm^2.

Table 6-2 Human Exposure to RF Radiation Limits in 47 CFR §1.1310

Environment	Power Density (W/m^2)	Average Time (minutes)
Uncontrolled / General Population	10	30
Controlled	50	6

6.5. General FCC Policy on Human Exposure to RF

Quoted from the FCC OET website:

The FCC is required by the National Environmental Policy Act of 1969, among other things, to evaluate the effect of emissions from FCC-regulated transmitters on the quality of the human environment. Several organizations, such as the American National Standards Institute (ANSI), the Institute of Electrical and Electronics Engineers, Inc. (IEEE) ,and the National Council on Radiation Protection and Measurements (NRCP) have issued recommendations for human exposure to RF electromagnetic fields.

On August 1, 1996, the Commission adopted the NCRP's recommended Maximum Permissible Exposure limits for field strength and power density for the transmitters operating at frequencies of 300 kHz to 100 GHz. In addition, the Commission adopted the specific absorption rate (SAR) limits for devices operating within close proximity to the body as specified within the ANSI/IEEE C95.1-1992 guidelines. (See Report and Order, FCC 96-326)

The Commission's requirements are detailed in Parts 1 and 2 of the FCC's Rules and Regulations [47 C.F.R. 1.1307(b), 1.1310, 2.1091, 2.1093]. The potential hazards associated with RF electromagnetic fields are discussed in the FCC's RF Safety FAQ.

7. RF Safety Laboratory SAR Measurement System

7.1. SAR Measurement Hardware and Software

Peak spatially averaged SAR (psSAR) measurements are performed using a DASY8 robot system with cDASY8 module SAR software. The DASY8 is made by SPEAG in Switzerland and consists of a 6-axis robot, robot controller, computer, dosimetric probe, probe alignment light beam unit, and various SAR phantoms.

7.2. E-Field Probe

Manufacturer	Schmid & Partner Engineering AG
Model	EX3DV4
Description	Smallest isotropic electric (E-) field probe for high precision specific absorption rate (SAR) measurements
Frequency Range	4 MHz - 10.0 GHz
Dynamic Range	10 µW/g – >100 mW/g
Overall Length (mm)	337
Body Diameter (mm)	12
Tip Length (mm)	9
Tip Diameter (mm)	2.5

Probe Tip to Sensor X Calibration Point (mm)	1
Probe Tip to Sensor Y Calibration Point (mm)	1
Applications	High precision dosimetric measurements in any exposure scenario (e.g. very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better than 30%
Compatibility	DASY8 robot + cDASY8 module SAR software

7.3. Peak Spatially Averaged SAR (psSAR) Measurements

SAR Evaluations are performed using the following procedure compliant to FCC KDB Publication 865664 D01v01r04 and IEEE 1528:2013:

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head and body interface, and the horizontal grid resolution was determined per FCC KDB Publication 865664 D01v01r04 and IEEE 1528:2013.
2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1g/10g cube evaluation. SAR at this fixed point was measured and used as a reference value.
3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r04 and IEEE 1528:2013. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual online for more details):
    a. SAR values at the inner surface of the phantom are extrapolated from the measured values along the line away from the surface with spacing no greater than the area scan and zoomscan resolutions specified in FCC KDB Publication 865664 D01v01v04 section 2.7.1 and IEEE 1528:2013 table 6. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).
    b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.
    c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

d. The zoom scan is confirmed to meet both of the following parameters if the result is > 0.1 W/kg. If the result does not meet the below parameters, it is re-measured with a finer resolution scan until the below parameters are met.
    (1) The smallest horizontal distance from the local SAR peaks to all points 3 dB below the SAR peak shall be larger than the horizontal grid steps in both x- and y-directions.
    (2) The ratio of the SAR at the second measured point (M2) to the SAR at the closest measured point (Ml) at the x-y location of the measured maximum SAR value shall be at least 30%

4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

7.4. Test Positions

7.4.1. Device Holder

The device holder is made out of low-loss POM material having the following dielectric parameters: relative permittivity ε = 3 and loss tangent δ = 0.02.

7.4.2. Body-Worn Accessory Configurations

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. Per FCC KDB Publication 648474 D04v01r03, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D04v01 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented.

Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

7.4.3. Extremity Exposure Configurations

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions; i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user's body, SAR compliance for the body is also required. The 1g body and 10g extremity SAR Exclusion Thresholds found in KDB Publication 447498 D04v01 should be applied to determine SAR test requirements.

Per KDB Publication 447498 D04v01, Cell phones (handsets) are not normally designed to be used on extremities or operated in extremity only exposure conditions. The maximum output power levels of handsets generally do not require extremity SAR testing to show compliance. Therefore, extremity SAR was not evaluated for this device.

7.4.4. Wireless Router Configurations

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06v02r01 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10 mm from the front, back and edges of the device containing transmitting antennas within 2.5 cm of their edges, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D04v01 procedures. The "Portable Hotspot" feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

7.4.5. Phablet Configurations

For smart phones with a display diagonal dimension > 150 mm or an overall diagonal dimension > 160 mm that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, the phablets procedures outlined in KDB Publication 648474 D01v06r03 should be applied to evaluate SAR compliance. A device marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance. In addition to the normally required head and body-worn accessory SAR test procedures required for handsets, the UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna <=25 mm from that surface or edge, in direct contact with the phantom, for 10g SAR. The UMPC mini-tablet 1g SAR at 5 mm is not required. When hotspot mode applies, 10g SAR is required only for the surfaces and edges with hotspot mode 1g SAR > 1.2 W/kg.

7.5. RF Safety Laboratory SAR System Measurement Uncertainty

SAR Uncertainty for DUTs According to 62209-1528										
(Frequencies: 4 MHz - 10 GHz)										
Symbol	Input Quantity (Xi) (Source of Uncertainty)	62209-1528 Ref	Unc. (xi)	Prob. Dist. PDFi	Div(qi)	ci (1g)	ci (10g)	Std Unc (1g)	Std. Unc (10g)	vi
Measurement System Errors										
CF	Probe Calibration	8.4.1.1	18.6%	N (k=2)	2	1	1	9.30%	9.3%	∞
CFdrift	Probe Calibration Drift	8.4.1.2	1.7%	R	√3	1	1	1.0%	1.0%	∞
LIN	Probe Linearity and Detection Limit	8.4.1.3	4.7%	R	√3	1	1	2.7%	2.7%	∞
BBS	Broadband Signal	8.4.1.4	2.8%	R	√3	1	1	1.6%	1.6%	∞
ISO	Probe Isotropy	8.4.1.5	7.6%	R	√3	1	1	4.4%	4.4%	∞
DAE	Other probe and data acquisition errors	8.4.1.6	2.4%	N	1	1	1	2.4%	2.4%	∞
AMB	RF Ambient and Noise	8.4.1.7	1.8%	N	1	1	1	1.8%	1.8%	∞
Δxyz	Probe Positioning Errors	8.4.1.8	0.005 mm	N	1	0.5	0.5	0.3%	0.3%	
DAT	Data Processing Errors	8.4.1.9	3.5%	N	1	1	1	3.5%	3.5%	∞
Phantom and Device Errors										
LIQ(σ)	Measurement of Phantom Conductivity	8.4.2.1	2.5%	N	1	0.78	0.71	2.0%	1.8%	∞
LIQ(Tc)	Temperature Effects (Medium)	8.4.2.2	5.4%	R	√3	0.78	0.71	2.4%	2.2%	∞
EPS	Shell Permittivity	8.4.2.3	14.0%	R	√3	0.5	0.5	4.0%	4.0%	∞
DIS	Distance between the radiating element of the DUT and the phantom medium	8.4.2.4	2.0%	N	1	2	2	4.0%	4.0%	∞
Dxyz	Repeatability of Positioning the DUT or source against the phantom	8.4.2.5	1.0%	N	1	1	1	1.0%	1.0%	5
H	Device Holder Effects	8.4.2.6	3.6%	N	1	1	1	3.6%	3.6%	8
MOD	Effect of Operating mode on probe sensitivity	8.4.2.7	2.4%	R	√3	1	1	1.4%	1.4%	∞
RFdrift	Variation in SAR due to Drift in ouptput of DUT	8.4.2.9	2.5%	N	1	1	1	2.5%	2.5%	∞
VAL	Validation Antenna Uncertainty (Validation measurement only)	8.4.2.10	0.0%	N	1	1	1	0.0%	0.0%	∞
Pin	Uncertianty in Accepted Power (Validation Measurement only)	8.4.2.11	0.0%	N	1	1	1	0.0%	0.0%	∞
Correction to the SAR Results										
C(ε',σ)	Phantom Deviation from Target (ε',σ)	8.4.3.1	1.9%	N	1	1	0.84	1.9%	1.6%	∞
C(R)	SAR Scaling	8.4.3.2	0.0%	R	√3	1	1	0.0%	0.0%	∞
u(ΔS AR)	Combined Uncertainty							14.3%	14.3%	∞
U	Expanded Uncertainty and Effective Degrees of Freedom (k=2)							28.7%	28.5%	

Next Generation Test Laboratory Inc. (RF Safety Laboratory, LLC)
5520 Research Park Drive, Suite 140, Catonsville, Maryland 21228 USA
FCC Designation Number: US3274
ANAB 17025 Certificate Number: AT-3274
+1 202 240 9240; info@rfsafetylab.com

8. RF Safety Laboratory Power Density Measurement System

8.1. Power Density Measurement Hardware and Software

Peak spatially averaged power density (psPD) measurements are performed using a DASY8 robot system with cDASY8 module mmWave software. The DASY8 is made by SPEAG in Switzerland and consists of a 6-axis robot, robot controller, computer, dosimetric probe, and probe alignment light beam unit.

8.2. E-Field Probe

Manufacturer	Schmid & Partner Engineering AG
Model	EUmmWVx
Description	E-field probe for high precision power density (PD) measurements
Frequency Range	750 MHz - 110 GHz
Dynamic Range	< 20 - 10,000 V/m with PRE-10 (min < 50 - 3,000 V/m)
Overall Length (mm)	320
Body Diameter (mm)	8
Tip Length (mm)	23
Tip Diameter (mm)	8
Probe Tip to Sensor X Calibration Point (mm)	1.5
Probe Tip to Sensor Y Calibration Point (mm)	1.5
Applications	High precision dosimetric measurements of devices and transmitters above 6 GHz
Compatibility	DASY8 robot + cDASY8 module mmWave software

8.3. Peak Spatially Averaged Power Density (psPD) Measurements

Electromagnetic field reconstruction is based on Maxwell's equations and uses the Gerchberg-Saxton algorithm to calculate power density. The general measurement procedure is as follows:

1. Measure the local E-field at a point within the measurement region and where the field is higher than the noise level. This reference level will be used to assess output DUT drift during the measurement.
2. Measure the E-field over the measurement region. Measurement techniques are determined by the measurement system manufacturer. In the near-field, a step size of λ/4 or less is required.
3. Check that the peak is captured. Calculate the psPD on the evaluation surface from the measured fields and ensure the psPD is accurately calculated according to the equation below. Averaging area, A, and averaging shape is specified by the applicable exposure limits or regulatory requirements.

$$psPD = \frac{1}{2A_{av}} \iint_{A_{av}} \|Re\{E \times H\}\| dA$$

4. Measure the local E-field at the same location chosen in the first step. The DUT drift is estimated as the difference between the squared amplitude of the field values taken. When measurement drift was greater than 5%, the psPD measurement and drift measurements were repeated.

8.4. RF Safety Laboratory Power Density System Measurement Uncertainty

Power Density Uncertainty for DUTs
According to IEC/IEEE 63195

Symbol	Description	Unc. (+/- dB)	Probab. Distri.	Div.	ci	Std. Unc. (+/- dB)	vi
Measurement System							
CAL	Calibration	0.49	N	1	1	0.49	∞
COR	Probe correction	0.00	R	√3	1	0.00	∞
FRS	Frequency Response	0.20	R	√3	1	0.12	∞
SCC	Sensor cross coupling	0.00	R	√3	1	0.00	∞
ISO	Isotropy	0.50	R	√3	1	0.29	∞
LIN	Linearity	0.20	R	√3	1	0.12	∞
PSC	Probe scattering	0.00	R	√3	1	0.00	∞
PPO	Probe postitioning offset	0.30	R	√3	1	0.17	∞
PPR	Probe positioning repeatability	0.04	R	√3	1	0.02	∞
SMO	Sensor mechanical offset	0.00	R	√3	1	0.00	∞
PSR	Probe spatial resolution	0.00	R	√3	1	0.00	∞
FLD	Field impedance dependance	0.00	R	√3	1	0.00	∞
MED	Measurement drift	0.05	R	√3	1	0.03	∞
APN	Amplitude and phase noise	0.04	R	√3	1	0.02	∞
TR	Measurement area truncation	0.00	R	√3	1	0.00	∞
DAQ	Data acquisition	0.03	N	1	1	0.03	∞
SMP	Sampling	0.00	R	√3	1	0.00	∞
REC	Field reconstruction	0.60	R	√3	1	0.35	∞
SNR	Signal-to-noise raio	0.00	R	√3	1	0.00	∞
TRA	FTE/MEO	0.00	R	√3	1	0.00	∞
SCA	Power density scaling	0.00	R	√3	1	0.00	∞
SAV	Spatial averaging	0.10	R	√3	1	0.06	∞
DUT and Environmental							
PC	Probe coupling with DUT	0.00	R	√3	1	0.00	∞
MOD	Modulation response	0.40	R	√3	1	0.23	∞
IT	Integration time	0.00	R	√3	1	0.00	∞
RT	Response time	0.00	R	√3	1	0.00	∞
DH	Device holder influence	0.10	R	√3	1	0.06	∞
DA	DUT alignment	0.00	R	√3	1	0.00	∞
AC	RF ambient conditions	0.04	R	√3	1	0.02	∞
TEM	Laboratory temperatures	0.05	R	√3	1	0.03	∞
REF	Laboratory reflections	0.04	R	√3	1	0.02	∞
MSI	Immunity / secondary reception	0.00	R	√3	1	0.00	∞
DRI	Drift of the DUT	0.21	R	√3	1	0.12	∞
					Combined Standard Uncertainty	0.76	∞
					Expanded Standard Uncertainty and Effective Degrees of Freedom (k=2)	1.52	

Next Generation Test Laboratory Inc. (RF Safety Laboratory, LLC)
5520 Research Park Drive, Suite 140, Catonsville, Maryland 21228 USA
FCC Designation Number: US3274
ANAB 17025 Certificate Number: AT-3274
+1 202 240 9240; info@rfsafetylab.com

9. Technology Specific Test Setup Requirements

9.1. Measured and Reported SAR

Per FCC KDB Publication 447498 D04v01, when SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as *reported* SAR. The highest *reported* SAR results are identified on the grant of equipment authorization according to procedures in KDB 690783 D01v01r03.

9.2. Procedures Used to Establish RF Signal for SAR

Devices under test are evaluated prior to testing, with a fully charged battery and were configured to operate at maximum output power. In order to verify that the device is tested throughout the SAR test at maximum output power, the SAR measurement system measures a “point SAR” at an arbitrary reference point at the start and end of the 1 gram SAR evaluation, to assess for any power drifts during the evaluation.

9.3. SAR Testing with 802.11 Transmitters

The normal network operating configurations of 802.11 transmitters are not suitable for SAR measurements. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable. See KDB Publication 248227 D01v02r02 for more details.

9.3.1. General Device Setup

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters.

A periodic duty factor is required for current generation SAR systems to measure SAR. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. The reported SAR is scaled to 100% duty factor to determine compliance at the maximum tune-up tolerance limit.

9.3.2. Initial Test Position Procedure

The test position with the highest extrapolated (peak) SAR is used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining test positions is required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

9.3.3. OFDM Transmission Mode and SAR Test Channel Selection

When the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate. When the maximum output power of a channel is the same for equivalent OFDM configurations; for example, 802.11a, 802.11n or 802.11g and 802.11n with the same channel bandwidth, modulation and data rate etc., the lower order 802.11 mode i.e., then 802.11n or 802.11g then 802.11n, is used for SAR measurement.

9.3.4. Initial Test Configuration Procedure

For OFDM, an initial test configuration is determined for each frequency band and aggregated band, according to the transmission mode with the highest maximum output power specified for SAR measurements. When the same maximum output power is specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration(s) with the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order IEEE 802.11 mode. The channel of the transmission mode with the highest average RF output conducted power will be the initial test configuration.

When the reported SAR is ≤ 0.8 W/kg, no additional measurements on other test channels are required. Otherwise, SAR is evaluated using the subsequent highest average RF output channel until the reported SAR result is ≤ 1.2 W/kg or all channels are measured. When there are multiple untested channels having the same subsequent highest average RF output power, the channel with higher frequency from the lowest 802.11 mode is considered for SAR measurements. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

9.3.5. Subsequent Test Configuration Procedures

For OFDM configurations in each frequency band and aggregated band, SAR is evaluated for initial test configuration using the fixed test position or the initial test position procedure. When the highest reported SAR (for the initial test configuration), adjusted by the ratio of the specified maximum output power of the subsequent test configuration to initial test configuration, is ≤ 1.2 W/kg, no additional SAR tests for the subsequent test configurations are required. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

10. Equipment List

Manufacturer	Model	Description	Serial Number	Calibration Date	Calibration Due	CBT
Amplifier Research	15S4G8AM1	RF Broadband Amplifier (4 - 8 GHz)	554497	-	-	✓
Rohde & Schwarz	SMCV100B	R&S SMCV100B Vector Signal Generator (VSG)	103882	12/30/25	12/30/27	-
SPEAG	Powersource1	Signal Generator	4341	1/6/26	1/6/27	-
Anritsu	MA24118A	Microwave USB Power Sensor (10MHz - 18 GHz)	2123431	1/22/26	1/22/27	-
Anritsu	MA24118A	Microwave USB Power Sensor (10MHz - 18 GHz)	2123500	1/22/26	1/22/27	-
Rohde & Schwarz	NRP8S	Power Sensor 10 MHz - 8 GHz	114184	3/12/26	3/12/27	-
Rohde & Schwarz	NRP8S	Power Sensor 10 MHz - 8 GHz	114183	3/12/26	3/12/27	-
Rohde & Schwarz	NRP8S	Power Sensor 10 MHz - 8 GHz	114343	4/1/26	4/1/27	-
Anritsu	S820E	Vector Network Analyzer	2348026	1/13/26	1/13/28	-
Control Company	4040	Ambient Thermometer	250440199	7/17/25	7/17/27	-
Control Company	4352	Long Stem Liquid Thermometer	250257665	4/23/25	4/23/27	-
Micro-Coax	UFB205A-0-0240-30x30	SMA M-F RF test Cable (DC - 18 GHz)	-	-	-	✓
Mini-Circuits	BW-N20W20+	20dB RF Fixed Attenuator (DC - 18 GHz)	-	-	-	✓
Mini-Circuits	BW-N20W20+	20dB RF Fixed Attenuator (DC - 18 GHz)	-	-	-	✓
Mini-Circuits	BW-S3W2+	3dB RF Fixed Attenuator (DC - 18 GHz)	-	-	-	✓
Mini-Circuits	BW-S3W2+	3dB RF Fixed Attenuator (DC - 18 GHz)	-	-	-	✓
Mini-Circuits	CBL-6FT-SMNM+	Precision Test Cable SMA/N (DC - 18 GHz)	3318	-	-	✓
Mini-Circuits	CBL-6FT-SMNM+	Precision Test Cable SMA/N (DC - 18 GHz)	3335	-	-	✓
Mini-Circuits	CBL-6FT-SMNM+	Precision Test Cable SMA/N (DC - 18 GHz)	3329	-	-	✓
Mini-Circuits	NF-SF50+	RF Adapter N Male to SMA Female (DC - 18 GHz)	-	-	-	✓
Mini-Circuits	VLF-8400+	Coaxial Low Pass Filter (DC - 8.4 GHz)	-	-	-	✓
Narda	24785-20	20 dB SMA Fixed Attenuator (DC - 4.0 GHz)	-	-	-	✓
Narda	4226-20 (26733)	20 dB SMA Directional Coupler (0.5 - 18 GHz)	201	-	-	✓
Mitutoyo	CD-4"AX	Digital Caliper	B23243217	8/28/25	8/28/27	-
SPEAG	DAK-3.5	DAK-3.5 Dielectric Probe	1349	8/5/25	8/5/26	-
SPEAG	10 GHz System Verification Source	10 GHz System Verification Source	1074	9/15/25	9/15/26	-
SPEAG	EUmmWV4	mmWave Measurement Probe	9690	9/17/25	9/17/26	-
SPEAG	D6.5GHzV2	6.5GHz System Validation Dipole	1104	11/14/24	11/14/26	-
SPEAG	DAE4ip	Data Acquisition Electronics with Integ. Power	1838	7/30/25	7/30/26	-
SPEAG	DAE4ip	Data Acquisition Electronics with Integ. Power	1905	5/8/26	5/8/27	-
SPEAG	EX3DV4	SAR Measurement Probe	7857	12/9/25	12/9/26	-
SPEAG	SE UMS 171 E	MAIA Modulation and Interference Analyzer	1814	-	-	-
SPEAG	SE UMS 176 C	ANT Wideband Communication Antenna	1579	-	-	-

✓Note: Components calibrated before testing. Prior to testing, the measurement paths containing a cable, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator, power sensor, or VNA) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

11. Conclusion

The SAR evaluation indicates that the DUT is capable of compliance with the RF radiation exposure limits of the FCC, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.