



PART 0 SAR CHAR REPORT

Applicant Name:

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

Date of Testing:

06/10/2024 - 07/22/2024

Test Site/Location:

Element, Columbia, MD, USA

Document Serial No.:

1M2405140039-22.A3L

FCC ID:

A3LSMX828U

APPLICANT:

SAMSUNG ELECTRONICS CO., LTD

Report Type:

Part 0 SAR Characterization

DUT Type:

Portable Computing Device

Model(s):

SM-X828U

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.

Test results reported herein relate only to the item(s) tested.



RJ Ortanez
Executive Vice President



FCC ID: A3LSMX828U	PART 0 SAR CHAR REPORT	Approved by: Technical Manager
Document S/N: 1M2405140039-22.A3L	DUT Type: Portable Computing Device	Page 1 of 11

REV 1.1
04/08/2022

TABLE OF CONTENTS

1	DEVICE UNDER TEST	3
1.1	Device Overview	3
1.2	Time-Averaging for SAR	4
1.3	Nomenclature for Part 0 Report	4
1.4	Bibliography	4
2	SAR AND POWER DENSITY MEASUREMENTS	5
2.1	SAR Definition	5
2.2	SAR Measurement Procedure	5
3	SAR CHARACTERIZATION	7
3.1	ECI and SAR Determination	7
3.2	SAR Design Target	7
3.3	SAR Char	8
4	EQUIPMENT LIST	10
5	MEASUREMENT UNCERTAINTIES	11

FCC ID: A3LSMX828U	PART 0 SAR CHAR REPORT	Approved by: Technical Manager
Document S/N: 1M2405140039-22.A3L	DUT Type: Portable Computing Device	Page 2 of 11

REV 1.1
04/08/2022

1 DEVICE UNDER TEST

1.1 Device Overview

This device uses time-averaged SAR (TAS) feature to control and manage transmitting power in real time and to ensure at all times the time-averaged RF exposure is in compliance with the FCC requirement for WWAN operations via MediaTek. Additionally, this device supports WLAN/BT technologies, but the output power of these modems is not controlled by the TAS algorithm.

Band & Mode	Operating Modes	Tx Frequency
UMTS 850	Data	826.40 - 846.60 MHz
UMTS 1750	Data	1712.4 - 1752.6 MHz
UMTS 1900	Data	1852.4 - 1907.6 MHz
LTE Band 71	Data	665.5 - 695.5 MHz
LTE Band 12	Data	699.7 - 715.3 MHz
LTE Band 13	Data	779.5 - 784.5 MHz
LTE Band 14	Data	790.5 - 795.5 MHz
LTE Band 26	Data	814.7 - 848.3 MHz
LTE Band 5	Data	824.7 - 848.3 MHz
LTE Band 66	Data	1710.7 - 1779.3 MHz
LTE Band 4	Data	1710.7 - 1754.3 MHz
LTE Band 25	Data	1850.7 - 1914.3 MHz
LTE Band 2	Data	1850.7 - 1909.3 MHz
LTE Band 30	Data	2307.5 - 2312.5 MHz
LTE Band 7	Data	2502.5 - 2567.5 MHz
LTE Band 41	Data	2498.5 - 2687.5 MHz
LTE Band 38	Data	2572.5 - 2617.5 MHz
LTE Band 48	Data	3552.5 - 3697.5 MHz
NR Band n71	Data	665.5 - 695.5 MHz
NR Band n12	Data	701.5 - 713.5 MHz
NR Band n26	Data	816.5 - 846.5 MHz
NR Band n5	Data	826.5 - 846.5 MHz
NR Band n70	Data	1697.5 - 1707.5 MHz
NR Band n66	Data	1712.5 - 1777.5 MHz
NR Band n25	Data	1852.5 - 1912.5 MHz
NR Band n2	Data	1852.5 - 1907.5 MHz
NR Band n30	Data	2307.5 - 2312.5 MHz
NR Band n7	Data	2502.5 - 2567.5 MHz
NR Band n41	Data	2501.01 - 2685 MHz
NR Band n38	Data	2575 - 2615 MHz
NR Band n48	Data	3555 - 3694.98 MHz
NR Band n77	Data	3455.01 - 3544.98 MHz; 3705 - 3975 MHz
NR Band n258	Data	24250 - 24450 MHz; 24750 - 25250 MHz
NR Band n260	Data	37000 - 40000 MHz
NR Band n261	Data	27500 - 28350 MHz
2.4 GHz WIFI	Data	2412 - 2472 MHz
5 GHz WIFI	Data	U-NII-1: 5180 - 5240 MHz U-NII-2A: 5260 - 5320 MHz U-NII-2C: 5500 - 5720 MHz U-NII-3: 5745 - 5825 MHz U-NII-4: 5845 - 5885 MHz
6 GHz WIFI	Data	U-NII-5: 5945 - 6415 MHz U-NII-6: 6435 - 6515 MHz U-NII-7: 6535 - 6875 MHz U-NII-8: 6895 - 7115 MHz
2.4 GHz Bluetooth	Data	2402 - 2480 MHz

FCC ID: A3LSMX828U	PART 0 SAR CHAR REPORT	Approved by: Technical Manager
Document S/N: 1M2405140039-22.A3L	DUT Type: Portable Computing Device	Page 3 of 11

1.2 Time-Averaging for SAR

This device is enabled with MediaTek TAS algorithm to control and manage transmitting power in real time and to ensure that the time-averaged RF exposure from WWAN is in compliance with FCC requirements. This Part 0 report shows SAR characterization of WWAN radios. Characterization is achieved by determining P_{Limit} for WWAN that corresponds to the exposure design targets after accounting for all device design related uncertainties, i.e., SAR_design_target (< FCC SAR limit) for WWAN radios. The SAR characterization is denoted as SAR Char in this report. Section 1.3 includes a nomenclature of the specific terms used in this report.

The compliance test under the static transmission scenario and simultaneous transmission analysis are reported in Part 1 report. The validation of the time-averaging algorithm and compliance under the dynamic (time-varying) transmission scenario for WWAN technologies are reported in Part 2 report (report SN could be found in Section 1.4 – Bibliography).

1.3 Nomenclature for Part 0 Report

Technology	Term	Description
WWAN	P_{limit}	Power level that corresponds to the exposure design target (SAR_design_target) after accounting for all device design related uncertainties
	P_{max}	Maximum tune up output power
	SAR_design_target	Target SAR level < FCC SAR limit after accounting for all device design related uncertainties
	SAR Char	Table containing P_{limit} for all technologies and bands

1.4 Bibliography

Report Type	Report Serial Number
RF Exposure Part 2 Test Report	TESA2406000425ES
RF Exposure Compliance Summary Report	1M2405140039-21.A3L
RF Exposure Part 1 Test Report	1M2405140039-20.A3L
PD Evaluation Report (Part 0)	
Near Field PD Report (Part 1)	1M2405140039-23.A3L

FCC ID: A3LSMX828U	PART 0 SAR CHAR REPORT	Approved by: Technical Manager
Document S/N: 1M2405140039-22.A3L	DUT Type: Portable Computing Device	Page 4 of 11

2 SAR AND POWER DENSITY MEASUREMENTS

2.1 SAR Definition

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Equation 2-1).

Equation 2-1
SAR Mathematical Equation

$$SAR = \frac{d}{dt} \left(\frac{dU}{dm} \right) = \frac{d}{dt} \left(\frac{dU}{\rho dv} \right)$$

SAR is expressed in units of Watts per Kilogram (W/kg).

$$SAR = \frac{\sigma \cdot E^2}{\rho}$$

where:

σ	=	conductivity of the tissue-simulating material (S/m)
ρ	=	mass density of the tissue-simulating material (kg/m ³)
E	=	Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relation to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.[6]

2.2 SAR Measurement Procedure

The evaluation was 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 (See Table 2-1) 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 (See Table 2-1) and IEEE 1528-2013. On the

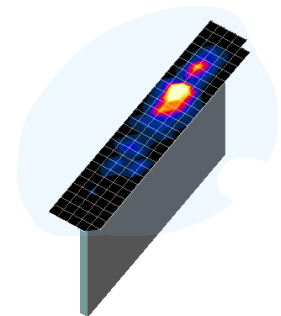


Figure 2-1
Sample SAR Area Scan

FCC ID: A3LSMX828U	PART 0 SAR CHAR REPORT	Approved by: Technical Manager
Document S/N: 1M2405140039-22.A3L	DUT Type: Portable Computing Device	Page 5 of 11

REV 1.1
04/08/2022

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 that in Table 2-1. 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.
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.

Table 2-1
Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r04*

Frequency	Maximum Area Scan Resolution (mm) ($\Delta x_{\text{area}}, \Delta y_{\text{area}}$)	Maximum Zoom Scan Resolution (mm) ($\Delta x_{\text{zoom}}, \Delta y_{\text{zoom}}$)	Maximum Zoom Scan Spatial Resolution (mm)			Minimum Zoom Scan Volume (mm) (x,y,z)
			Uniform Grid	Graded Grid		
				$\Delta z_{\text{zoom}}(n)$	$\Delta z_{\text{zoom}}(1)^*$	
≤ 2 GHz	≤ 15	≤ 8	≤ 5	≤ 4	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 30
2-3 GHz	≤ 12	≤ 5	≤ 5	≤ 4	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 30
3-4 GHz	≤ 12	≤ 5	≤ 4	≤ 3	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 28
4-5 GHz	≤ 10	≤ 4	≤ 3	≤ 2.5	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 25
5-6 GHz	≤ 10	≤ 4	≤ 2	≤ 2	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 22

*Also compliant to IEEE 1528-2013 Table 6

FCC ID: A3LSMX828U	PART 0 SAR CHAR REPORT	Approved by: Technical Manager
Document S/N: 1M2405140039-22.A3L	DUT Type: Portable Computing Device	Page 6 of 11

REV 1.1
04/08/2022

3 SAR CHARACTERIZATION

3.1 ECI and SAR Determination

For WWAN operations this device uses different Exposure Condition Index (ECI) via MediaTek TAS to configure different time averaged power levels based on certain exposure scenarios. Depending on the detection scheme implemented in the smartphone, the worst-case SAR was determined by measurements for the relevant exposure conditions for that ECI. Detailed descriptions of the detection mechanisms are included in the operational description.

When 1g SAR exposure comparison is needed, the worst-case was determined from SAR normalized to 1g SAR limit.

The exposure condition index (ECI) conditions used in Table 3-1 represent different exposure scenarios.

Table 3-1
Exposure Scenarios for MTK TAS

Scenario	Description	SAR Test Cases
Free (ECI = 0)	▪ Device transmits in tablet or laptop mode when grip sensors are not triggered	Tablet SAR per KDB Publication 648474 D04v01r03
Grip Sensor Active (ECI = 1)	▪ Device transmits in tablet or laptop mode when grip sensors are triggered	Tablet SAR per KDB Publication 648474 D04v01r03
Grip Sensor #3 Active (ECI = 2)	▪ Device transmits in tablet mode when grip sensor #3 is triggered	Tablet SAR per KDB Publication 648474 D04v01r03

3.2 SAR Design Target

SAR_design_target is determined by ensuring that it is less than FCC SAR limit after accounting for total device designed related uncertainties specified by the manufacturer (see Table 3-2).

Table 3-2
***SAR_design_target* Calculations for WWAN Operations**

<i>SAR_design_target</i>			
$SAR_design_target < SAR_regulatory_limit \times 10^{\frac{-Total\ Uncertainty}{10}}$			
1g SAR (W/kg)		10g SAR (W/kg)	
<i>Total Uncertainty</i>	1.0 dB	<i>Total Uncertainty</i>	1.0 dB
<i>SAR_regulatory_limit</i>	1.6 W/kg	<i>SAR_regulatory_limit</i>	4.0 W/kg
<i>SAR_design_target</i>	0.8 W/kg	<i>SAR_design_target</i>	2.0 W/kg

FCC ID: A3LSMX828U	PART 0 SAR CHAR REPORT	Approved by: Technical Manager
Document S/N: 1M2405140039-22.A3L	DUT Type: Portable Computing Device	Page 7 of 11

3.3 SAR Char

SAR test results corresponding to P_{max} for each antenna/technology/band/ECI can be found in Part 1 Test Report.

P_{limit} is calculated by linearly scaling with the measured SAR at the P_{part0} to correspond to the SAR_design_target. When $P_{limit} < P_{max}$, P_{part0} was used as P_{limit} in the TAS. When $P_{limit} > P_{max}$ and $P_{part0} = P_{max}$, calculated P_{limit} was used in the TAS. All reported SAR obtained from the P_{part0} SAR tests was less than SAR_Design_target+ 1 dB Uncertainty. The final P_{limit} determination for each exposure scenario corresponding to SAR_design_target are shown in Table 3-3

Table 3-3
 P_{limit} Determination for MTK TAS

Exposure Condition Index (ECI)	P_{limit} Determination Scenarios
0	P_{limit} is calculated based on: • 1g Body Laptop SAR at 0 mm for bottom edge with keyboard accessory attached. • Tablet with no keyboard accessory and grip sensors inactive at 19, 15, 0 mm for back, top, right and left surfaces.
1	P_{limit} is calculated based on 1g Body Tablet SAR at 0 mm for back, top, bottom, right, and left surfaces with and without keyboard accessory.
2	P_{limit} is calculated based on 1g Body Tablet SAR at 0 mm for right edge with and without keyboard accessory for Ant M1.

FCC ID: A3LSMX828U	PART 0 SAR CHAR REPORT	Approved by: Technical Manager
Document S/N: 1M2405140039-22.A3L	DUT Type: Portable Computing Device	Page 8 of 11

REV 1.1
04/08/2022

Table 3-4
SAR Characterizations for MTK TAS

Exposure Scenario		Maximum Tune-Up Output Power*	Free	Grip Sensor	Grip Sensor #3
			1g	1g	1g
			0, 15, 19 mm	0 mm	0 mm
			0	1	2
Averaging Volume					
Spacing					
ECI					
Technology/Band	Antenna	Pmax			
UMTS 850	M1	24.0	23.0	15.0	23.0
UMTS 1750	M1	24.0	29.4	13.5	22.5
UMTS 1900	M1	24.0	28.4	11.5	17.5
LTE Band 71	M1	24.0	23.5	15.5	23.5
LTE Band 12	M1	24.0	28.1	15.5	28.1
LTE Band 13	M1	24.0	25.4	14.0	25.4
LTE Band 14	M1	24.0	23.5	14.0	23.5
LTE Band 26/5	M1	24.0	25.5	14.0	25.5
LTE Band 66/4	M1	24.0	29.4	14.5	22.5
LTE Band 66	S2	24.0	28.1	12.5	N/A
LTE Band 4	S2	23.0	28.1	12.5	N/A
LTE Band 25/2	M1	24.0	27.8	12.0	17.5
LTE Band 25/2	S2	23.0	29.5	12.5	N/A
LTE Band 30	M1	23.0	27.8	12.0	20.0
LTE Band 30	S2	23.0	29.2	12.0	N/A
LTE Band 7	M1	24.0	25.4	11.0	20.0
LTE Band 7	S2	23.0	27.2	10.5	N/A
LTE Band 41/38 PC3	M1	22.0	26.4	10.0	19.4
LTE Band 41 PC2	M1	22.4	26.4	10.0	19.4
LTE Band 48	S4	21.0	23.2	10.5	N/A
NR Band n71	M1	24.0	27.9	16.0	27.9
NR Band n12	M1	24.0	28.5	16.0	28.5
NR Band n26/n5	M1	24.0	25.6	13.5	25.6
NR Band n70	M1	24.0	22.5	12.5	21.5
NR Band n66	M1	24.0	23.5	13.5	22.5
NR Band n25/n2	M1	24.0	23.0	11.0	17.5
NR Band n30	M1	23.0	28.1	10.5	20.0
NR Band n7	M1	24.0	23.0	9.5	19.0
NR Band n41/38 PC3	M1	24.0	18.0	11.0	18.0
NR Band n41 PC3	S2	21.5	16.0	11.0	N/A
NR Band n41 PC3	S4	23.5	17.5	11.0	N/A
NR Band n41 PC3	S1	20.0	14.0	11.5	N/A
NR Band n41 PC2	M1	27.0	18.0	11.0	18.0
NR Band n41 PC2	S2	21.5	16.0	11.0	N/A
NR Band n41 PC2	S4	23.5	17.5	11.0	N/A
NR Band n41 PC2	S1	20.0	14.0	11.5	N/A
NR Band n48	S4	23.0	17.0	10.0	N/A
NR Band n48	S2	19.0	13.0	9.5	N/A
NR Band n48	M2	20.0	14.0	7.0	N/A
NR Band n48	S3	22.5	16.5	9.5	N/A
NR Band n77 PC3	M2	24.0	18.0	9.0	N/A
NR Band n77 PC3	S2	21.5	15.5	8.0	N/A
NR Band n77 PC3	S4	21.5	15.5	6.5	N/A
NR Band n77 PC3	S3	21.5	15.5	6.5	N/A
NR Band n77 PC2	M2	27.0	18.0	9.0	N/A
NR Band n77 PC2	S2	21.5	15.5	8.0	N/A
NR Band n77 PC2	S4	21.5	15.5	6.5	N/A
NR Band n77 PC2	S3	21.5	15.5	6.5	N/A

1. When $P_{max} < P_{limit}$, the DUT will operate at a power level up to P_{max} .
2. All P_{limit} and maximum tune up output power P_{max} levels entered in above Table correspond to average power levels after accounting for duty cycle in the case of TDD or GMSK, modulation schemes (e.g. GSM and LTE TDD).
3. Maximum tune up output power P_{max} is used to configure EUT during RF tune up procedure. The maximum allowed output power is equal to maximum Tune up output power + 1dB device design uncertainty.

FCC ID: A3LSMX828U	PART 0 SAR CHAR REPORT	Approved by: Technical Manager
Document S/N: 1M2405140039-22.A3L	DUT Type: Portable Computing Device	Page 9 of 11

4 EQUIPMENT LIST

For SAR measurements

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E4404B	Spectrum Analyzer	N/A	N/A	N/A	MY45113242
Agilent	E4438C	ESG Vector Signal Generator	11/14/2023	Annual	11/14/2024	MY45093852
Agilent	E4438C	ESG Vector Signal Generator	11/15/2023	Annual	11/15/2024	MY45092078
Agilent	N5182A	MWG Vector Signal Generator	10/12/2023	Annual	10/12/2024	MY47400015
Agilent	N5182A	MWG Vector Signal Generator	3/7/2024	Annual	3/7/2025	MY47036629
Agilent	8753ES	S-Parameter Vector Network Analyzer	1/10/2024	Annual	1/10/2025	MY40001472
Agilent	8753ES	S-Parameter Vector Network Analyzer	7/21/2023	Annual	7/21/2024	US59970118
Agilent	E5515C	Wireless Communications Test Set	CBT	N/A	CBT	GB46310798
Agilent	E5515C	Wireless Communications Test Set	CBT	N/A	CBT	US41140256
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB46370464
Amplifier Research	1551G6	Amplifier	CBT	N/A	CBT	433973
Amplifier Research	1551G6	Amplifier	CBT	N/A	CBT	433974
Amplifier Research	150A100C	Amplifier	CBT	N/A	CBT	350132
Anritsu	MNA110B	V/I Adapter	CBT	N/A	CBT	6261747881
Anritsu	ML2496A	Power Meter	6/24/2024	Annual	6/24/2025	1840005
Anritsu	ML2495A	Power Meter	7/8/2024	Annual	7/8/2025	1039008
Anritsu	MA2411B	Pulse Power Sensor	8/22/2023	Annual	8/22/2024	1726262
Anritsu	MA2411B	Pulse Power Sensor	11/8/2023	Annual	11/8/2024	1027293
Anritsu	MT8821C	Radio Communication Analyzer MT8821C	12/15/2023	Annual	12/15/2024	6200901290
Anritsu	MT8821C	Radio Communication Analyzer MT8821C	5/15/2024	Annual	5/15/2025	6262150047
Anritsu	MT8821C	Radio Communication Analyzer MT8821C	5/30/2024	Annual	5/30/2025	6262044725
Anritsu	MT8800A	Radio Communication Test Station	CBT	N/A	CBT	6261967072
Anritsu	MT8800A	Radio Communication Test Station	4/10/2024	Annual	4/10/2025	6261987983
Anritsu	MT8800A	Radio Communication Test Station	5/2/2024	Annual	5/2/2025	6272134346
Anritsu	MA24106A	USB Power Sensor	12/4/2023	Annual	12/4/2024	1520501
Anritsu	MA24106A	USB Power Sensor	4/15/2024	Annual	4/15/2025	1827528
Mini-Circuits	PWR-4GHS	USB Power Sensor	6/13/2024	Annual	6/13/2025	12001070013
Control Company	4052	Long Stem Thermometer	2/27/2024	Biennial	2/27/2026	240124346
Control Company	4052	Long Stem Thermometer	2/27/2024	Biennial	2/27/2026	240171096
Control Company	4052	Long Stem Thermometer	2/27/2024	Biennial	2/27/2026	240171059
Control Company	4040	Therm./ Clock/ Humidity Monitor	4/15/2024	Biennial	4/15/2026	240310280
Control Company	4040	Therm./ Clock/ Humidity Monitor	4/15/2024	Biennial	4/15/2026	240310282
Control Company	566279	Therm./ Clock/ Humidity Monitor	2/16/2024	Biennial	2/16/2026	240240015
Mitutoyo	500-196-30	CD-6" ASK 6inch Digital Caliper	2/16/2022	Triennial	2/16/2025	A20238413
Keyight Technologies	N9020A	MNA Signal Analyzer	4/11/2024	Annual	4/11/2025	MY54006644
Agilent	N9020A	MNA Signal Analyzer	6/14/2024	Annual	6/14/2025	MY56470202
MCL	BW-N6W5+	5dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	VLF-6000+	Low Pass Filter DC to 6000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	VLF-6000+	Low Pass Filter DC to 6000 MHz	7/5/2023	Annual	7/5/2024	31634
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20-dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mini-Circuits	ZUDC10-83-5+	Directional Coupler	CBT	N/A	CBT	2050
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	BW-53W2	Attenuator (3dB)	CBT	N/A	CBT	120
Seelkonk	NC-100	Torque Wrench	CBT	N/A	CBT	2217
Seelkonk	NC-100	Torque Wrench	4/2/2024	Biennial	4/2/2026	1262
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	1/11/2024	Annual	1/11/2025	150117
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	1/10/2024	Annual	1/10/2025	131454
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	8/10/2023	Annual	8/10/2024	146144
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	8/9/2023	Annual	8/9/2024	162125
SPEAG	DAK-3.5	Dielectric Assessment Kit	11/13/2023	Annual	11/13/2024	1277
SPEAG	DAK3-3.5	Portable Dielectric Assessment Kit	8/14/2023	Annual	8/14/2024	1041
SPEAG	MMA	Modulation and Audio Interference Analyzer	N/A	N/A	N/A	1237
SPEAG	MMA	Modulation and Audio Interference Analyzer	N/A	N/A	N/A	1331
SPEAG	MMA	Modulation and Audio Interference Analyzer	N/A	N/A	N/A	1390
SPEAG	DAK-12	Dielectric Assessment Kit (4MHz - 3GHz)	3/11/2024	Annual	3/11/2025	1102
SPEAG	D750V3	750 MHz SAR Dipole	10/19/2021	Triennial	10/19/2024	1161
SPEAG	D750V3	750 MHz SAR Dipole	3/14/2022	Triennial	3/14/2025	1054
SPEAG	D835V2	835 MHz SAR Dipole	1/18/2024	Annual	1/18/2025	46133
SPEAG	D835V2	835 MHz SAR Dipole	3/11/2024	Annual	3/11/2025	46133
SPEAG	D835V2	835 MHz SAR Dipole	3/14/2022	Triennial	3/14/2025	46047
SPEAG	D1750V2	1750 MHz SAR Dipole	10/22/2023	Triennial	10/22/2024	11550
SPEAG	D1750V2	1750 MHz SAR Dipole	1/18/2022	Triennial	1/18/2025	11448
SPEAG	D1900V2	1900 MHz SAR Dipole	8/8/2022	Biennial	8/8/2024	54580
SPEAG	D1900V2	1900 MHz SAR Dipole	2/21/2022	Triennial	2/21/2025	56148
SPEAG	D2300V2	2300 MHz SAR Dipole	8/25/2022	Biennial	8/25/2024	1073
SPEAG	D2450V2	2450 MHz SAR Dipole	2/8/2024	Annual	2/8/2025	882
SPEAG	D2450V2	2450 MHz SAR Dipole	8/18/2023	Triennial	8/18/2024	981
SPEAG	D2450V2	2450 MHz SAR Dipole	11/25/2023	Triennial	11/25/2024	981
SPEAG	D2600V2	2600 MHz SAR Dipole	8/10/2023	Annual	8/10/2024	1126
SPEAG	D2600V2	2600 MHz SAR Dipole	4/8/2024	Annual	4/8/2025	1004
SPEAG	D2600V2	2600 MHz SAR Dipole	11/15/2022	Biennial	11/15/2024	1071
SPEAG	D3500V2	3500 MHz SAR Dipole	12/13/2022	Annual	12/13/2024	1058
SPEAG	D3500V2	3500 MHz SAR Dipole	1/10/2023	Biennial	1/10/2025	1097
SPEAG	D3700V2	3700 MHz SAR Dipole	12/13/2023	Annual	12/13/2024	1029
SPEAG	D3700V2	3700 MHz SAR Dipole	1/13/2023	Biennial	1/13/2025	1067
SPEAG	D3900V2	3900 MHz SAR Dipole	10/19/2023	Annual	10/19/2024	1056
SPEAG	D5GHV2	5 GHz SAR Dipole	4/9/2024	Annual	4/9/2025	1237
SPEAG	D5GHV2	5 GHz SAR Dipole	2/21/2024	Annual	2/21/2025	1057
SPEAG	D5GHV2	5 GHz SAR Dipole	1/17/2024	Annual	1/17/2025	1191
SPEAG	D6.5GHV2	6.5 GHz SAR Dipole	2/22/2024	Annual	2/22/2025	1111
SPEAG	D6.5GHV2	6.5 GHz SAR Dipole	1/10/2024	Annual	1/10/2025	1068
SPEAG	5G Verification Source 10GHz	10GHz System Verification Antenna	3/5/2024	Annual	3/5/2025	1002
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/16/2024	Annual	1/16/2025	1530
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/8/2024	Annual	5/8/2025	728
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/27/2024	Annual	3/27/2025	1415
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/12/2024	Annual	3/12/2025	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/8/2024	Annual	5/8/2025	1678
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/12/2023	Annual	9/12/2024	1449
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/6/2023	Annual	9/6/2024	1364
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/16/2024	Annual	1/16/2025	1466
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/12/2024	Annual	3/12/2025	1272
SPEAG	DAE4ip	Dasy Data Acquisition Electronics	11/15/2023	Annual	11/15/2024	1639
SPEAG	DAE4ip	Dasy Data Acquisition Electronics	10/18/2023	Annual	10/18/2024	1638
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/18/2024	Annual	4/18/2025	1407
SPEAG	DAE4	Dasy Data Acquisition Electronics	10/18/2023	Annual	10/18/2024	1332
SPEAG	EX3DV4	SAR Probe	5/10/2024	Annual	5/10/2025	3914
SPEAG	EX3DV4	SAR Probe	3/8/2024	Annual	3/8/2025	7527
SPEAG	EX3DV4	SAR Probe	9/12/2023	Annual	9/12/2024	7558
SPEAG	EX3DV4	SAR Probe	4/17/2024	Annual	4/17/2025	7718
SPEAG	EX3DV4	SAR Probe	1/16/2024	Annual	1/16/2025	7555
SPEAG	EX3DV4	SAR Probe	10/16/2023	Annual	10/16/2024	7539
SPEAG	EX3DV4	SAR Probe	3/8/2024	Annual	3/8/2025	7488
SPEAG	EX3DV4	SAR Probe	9/22/2023	Annual	9/22/2024	7670
SPEAG	EX3DV4	SAR Probe	5/8/2024	Annual	5/8/2025	7940
SPEAG	EX3DV4	SAR Probe	1/17/2024	Annual	1/17/2025	7713
SPEAG	EX3DV4	SAR Probe	10/23/2023	Annual	10/23/2024	7547
SPEAG	EX3DV4	SAR Probe	4/17/2024	Annual	4/17/2025	7659
SPEAG	EX3DV4	SAR Probe	7/7/2023	Annual	7/7/2024	7410
SPEAG	EUmmWV4	EUmmWV4 Probe	2/2/2024	Annual	2/2/2025	9622

Note:

1. CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) 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.
2. Each equipment item was used solely within its respective calibration period.

FCC ID: A3LSMX828U	PART 0 SAR CHAR REPORT	Approved by: Technical Manager
Document S/N: 1M2405140039-22.A3L	DUT Type: Portable Computing Device	Page 10 of 11

5 MEASUREMENT UNCERTAINTIES

For SAR Measurements

a	b	c	d	e=	f	g	h =	i =	k
				f(d,k)			c x f/e	c x g/e	
Uncertainty Component	IEEE 1528 Sec.	Tol. (± %)	Prob. Dist.	Div.	c _f 1gm	c _g 10 gms	1gm u _f (± %)	10gms u _g (± %)	v _i
Measurement System									
Probe Calibration	E.2.1	7	N	1	1	1	7.0	7.0	∞
Axial Isotropy	E.2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E.2.2	1.3	N	1	0.7	0.7	0.9	0.9	∞
Boundary Effect	E.2.3	2	R	1.732	1	1	1.2	1.2	∞
Linearity	E.2.4	0.3	N	1	1	1	0.3	0.3	∞
System Detection Limits	E.2.4	0.25	R	1.732	1	1	0.1	0.1	∞
Modulation Response	E.2.5	4.8	R	1.732	1	1	2.8	2.8	∞
Readout Electronics	E.2.6	0.3	N	1	1	1	0.3	0.3	∞
Response Time	E.2.7	0.8	R	1.732	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.732	1	1	1.5	1.5	∞
RF Ambient Conditions - Noise	E.6.1	3	R	1.732	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	3	R	1.732	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.8	R	1.732	1	1	0.5	0.5	∞
Probe Positioning w/ respect to Phantom	E.6.3	6.7	R	1.732	1	1	3.9	3.9	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	4	R	1.732	1	1	2.3	2.3	∞
Test Sample Related									
Test Sample Positioning	E.4.2	3.12	N	1	1	1	3.1	3.1	35
Device Holder Uncertainty	E.4.1	1.67	N	1	1	1	1.7	1.7	5
Output Power Variation - SAR drift measurement	E.2.9	5	R	1.732	1	1	2.9	2.9	∞
SAR Scaling	E.6.5	0	R	1.732	1	1	0.0	0.0	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E.3.1	7.6	R	1.73	1.0	1.0	4.4	4.4	∞
Liquid Conductivity - measurement uncertainty	E.3.3	4.3	N	1	0.78	0.71	3.3	3.0	76
Liquid Permittivity - measurement uncertainty	E.3.3	4.2	N	1	0.23	0.26	1.0	1.1	75
Liquid Conductivity - Temperature Uncertainty	E.3.4	3.4	R	1.732	0.78	0.71	1.5	1.4	∞
Liquid Permittivity - Temperature Uncertainty	E.3.4	0.6	R	1.732	0.23	0.26	0.1	0.1	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Permittivity - deviation from target values	E.3.2	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Combined Standard Uncertainty (k=1)							RSS	12.2	12.0
Expanded Uncertainty							k=2	24.4	24.0
(95% CONFIDENCE LEVEL)									

The above measurement uncertainties are according to IEEE Std. 1528-2013

FCC ID: A3LSMX828U	PART 0 SAR CHAR REPORT	Approved by: Technical Manager
Document S/N: 1M2405140039-22.A3L	DUT Type: Portable Computing Device	Page 11 of 11

REV 1.1
04/08/2022