FCC 47 CFR § 2.1093
IEEE Std 1528-2013

SAR EVALUATION REPORT

FOR

BT/BLE Smart Wearable + DTS/UNII a/b/g/n

MODEL NUMBER: SM-L500

FCC ID: A3LSML500

REPORT NUMBER: S- 4791706680-S1V2

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Prepared for
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IAS ACCREDITED

Testing Laboratory

TL-637

Revision History

Rev.	Date	Revisions	Revised By
V1	2025-04-30	-	-
V2	2025-05-28	Revised Highest UNII Band SAR and Simultaneous transmission SAR results -Sec1 & Sec.1.1 & Sec.12.2	Jaehyeok Lee

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1. Attestation of test results

Applicant Name		SAMSUNG ELECTRONICS CO.,LTD.	
FCC ID		A3LSML500	
Model Number		SM-L500	
Applicable Standards		FCC 47 CFR § 2.1093 IEEE Std 1528-2013 Published RF exposure KDB procedures	
Exposure Category		SAR Limits (W/kg)	
		1g SAR	10g SAR
General population / Uncontrolled exposure		1.6	4.0
RF Exposure Conditions		The Highest Reported SAR (W/kg)	
Next to Mouth 1-g SAR		**0.223**	
Extremity (Wrist) 10-g SAR		**0.797**	
Simultaneous Transmission	1-g SAR	**0.240**	
	10-g SAR	**0.926**	
RF Exposure Conditions		SAR Test Distance (mm)	
Next to Mouth		**10**	
Extremity (Wrist)		**0**	
Date Tested		2025-03-24 to 2025-04-25	
Test Results		Pass	

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

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

Approved & Released By:	Prepared By:
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1.1. The Highest Reported SAR Results

Equipment Class	Band	The Highest Reported SAR (W/kg) of RF exposure conditions	
		1g of tissue	10g of tissue
		Next to Mouth Exposure	Extremity Exposure
DTS	Wi-Fi 2.4 GHz	0.223	0.126
NII	Wi-Fi 5 GHz	0.049	0.797
DSS	Bluetooth	0.191	0.129
Simultaneous Transmission SAR		0.240	0.926

Note(s):

The Highest Reported SAR Results were listed for each RF exposure conditions for each supported bands based on SAR test results of Section.10.

2. Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1093, IEEE STD 1528-2013, ANSI C63.26-2015 the following FCC Published RF exposure KDB procedures:

- 248227 D01 802.11 Wi-Fi SAR v02r02
- 447498 D04 Interim General RF Exposure Guidance v01
- 690783 D01 SAR Listings on Grants v01r03
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- 865664 D02 RF Exposure Reporting v01r02

In addition to the above, the following information was used:

- TCB workshop October, 2016; RF Exposure Procedures (Bluetooth Duty Factor)
- TCB workshop April, 2019; RF Exposure Procedures (Tissue Simulating Liquids (TSL))

3. Facilities and Accreditation

The test sites and measurement facilities used to collect data are located at

Suwon	
SAR 4 Room	

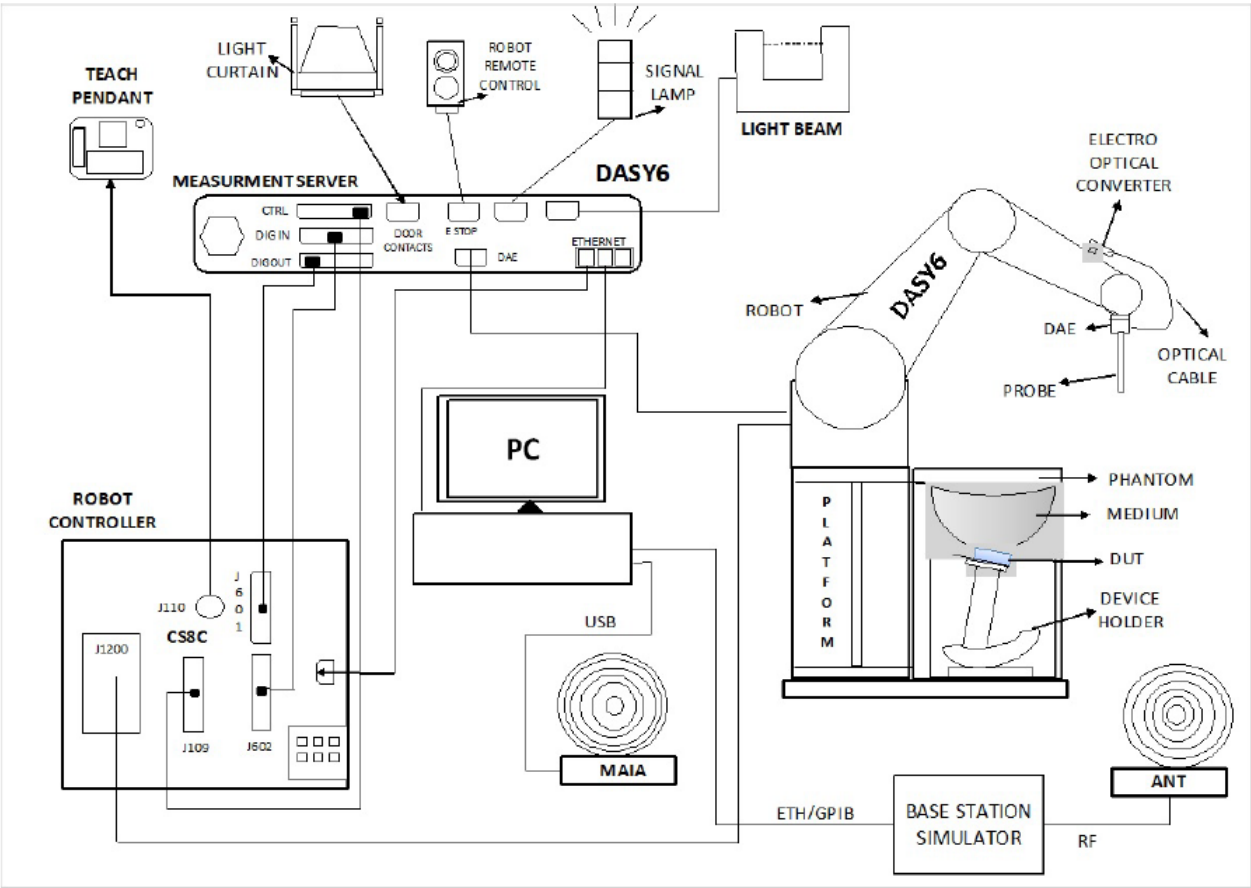
UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637
The full scope of accreditation can be viewed at;

https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.pdf.

4. Measurement System & Test Equipment

4.1. SAR Measurement System

The DASY6/8 system used for performing compliance tests consists of the following items:



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running Win11 and the DASY6/8 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

4.2. SAR Scan Procedures

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. The minimum distance of probe sensors to surface is 1.4 mm. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE Standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 3: Zoom Scan

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The Zoom Scan measures points (refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1 g and 10 g and displays these values next to the job's label.

Zoom Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

Step 4: Power drift measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the last Power Reference Measurement. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

4.3. Test Equipment

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

Dielectric Property Measurements

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	Agilent	E5071C	MT46522054	2025-07-24
Dielectric Assessment Kit	SPEAG	DAK-3.5	1196	2025-06-10
Shorting Block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	LKM	DTM3000	3862	2025-07-23

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
MXG Analog Signal Generator	KEYSIGHT	N5173B	MY59101083	2025-07-23
Power Sensor	KEYSIGHT	U2000A	MY54260007	2025-07-25
Power Sensor	KEYSIGHT	U2000A	MY61010006	2025-07-23
Power Amplifier	Sambo	BA00T60W2D	S3010-0001	2026-01-02
Directional Coupler	H.P	778D	16133	2025-07-25
Low Pass Filter	MICROLAB	LA-60N	3942	2025-07-24
Low Pass Filter	FILTRON	L14012FL	1410003S	2025-07-24
Attenuator	MINI-CIRCUITS	BW-N10W5+	N/A	2025-07-23
Attenuator	KEYSIGHT	8491B	MY39272300	2025-07-23
Attenuator	KEYSIGHT	8491B	MY39272275	2025-07-23
E-Field Probe	SPEAG	EX3DV4	7646	2026-01-22
Data Acquisition Electronics	SPEAG	DAE4	1591	2026-02-18
System Validation Dipole	SPEAG	D2450V2	960	2026-03-14
System Validation Dipole	SPEAG	D5GHzV2	1209	2026-02-18
Thermometer	Lutron	MHB-382SD	AJ.45903	2026-01-02

Others

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Base Station Simulator	R & S	CMW500	169800	2025-07-24

Note(s):

1. For System Validation Dipole, Calibration interval applied every 2 years according to referencing KDB 865664 guidance.
2. Refer to Appendix F that mentioned about justification for Extended SAR Dipole Calibrations. (for blue box items)
3. All equipments were used until Cal.Due data.

5. Measurement Uncertainty

Measurement Uncertainty of 100MHz to 6GHz

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be ≤ 30%, for a confidence interval of k = 2. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval.

5.1. Decision Rule

Measurement Uncertainty is not applied when providing statements of conformity in accordance with IEC Guide 115:2023, 4.3.3.

6. Device Under Test (DUT) Information

6.1. DUT Description

Device Dimension	Refer to Appendix A.					
Back Cover	☒ The Back Cover is not removable.					
Battery Options	☒ The rechargeable battery is not user accessible					
Wireless Router (Hotspot)	Wi-Fi Hotspot mode permits the device to share its cellular data connection with other Wi-Fi-enabled devices. ☒ Mobile Hotspot is not supported					
Wi-Fi Direct	Wi-Fi Direct enabled devices transfer data directly between each other ☒ Wi-Fi Direct (Wi-Fi 2.4 GHz) ☒ Wi-Fi Direct (Wi-Fi 5.2 GHz_U-NII 1, Wi-Fi 5.8 GHz_U-NII 3)					
Test Sample Information	**No.**	**S/N**	**Notes**	**No.**	**S/N**	**Notes**
	1	R3AY100COXV	WLAN Conduction	5	R3AY100DCND	WLAN Radiation
	2	R3AY100CF2Z	WLAN Conduction	6	R3AY100DCBV	WLAN Radiation
	3	R3AY100DCZE	WLAN Radiation	7	R3AY100DCCY	WLAN Radiation
	4	R3AY100DCFZ	WLAN Radiation	8	R3AY100DCQT	WLAN Radiation

6.2. Wireless Technologies

Wireless technologies	Frequency bands	Operating mode	Duty Cycle used for SAR testing
Wi-Fi	2.4 GHz	802.11b/802.11g/802.11n (HT20)	98.2% (802.11b)
	5 GHz	802.11a/802.11n (HT20)	95.1% (802.11a)
	Does this device support bands 5.60 ~ 5.65 GHz? ☒ Yes ☐ No		
	Does this device support Band gap channel(s)? ☒ Yes ☐ No		
Bluetooth	2.4 GHz	Version 5.3+LE	76.8%(BDR 1Mbps)

Notes:

Wi-Fi & Bluetooth were tested SAR using highest duty cycle. Measured duty cycle plots are in Section.9.

6.3. Maximum Allowed Output power

WLAN Bands Maximum Allowed Output Power

Maximum allowed output power means that Target power + 1dB device uncertainty.

RF Air interface	Band	Maximum allowed output power (dBm)			
		802.11 mode			
		a	b	g	n
WiFi 2.4 GHz	DTS		19.0 12, 13ch: 9	18.0 12, 13ch: 9	18.0 12, 13ch: 9
WiFi 5 GHz	UNII-1	17.0			17.0
	UNII-2A	17.0			17.0
	UNII-2C	17.0			17.0 140ch: 16
	UNII-3	17.0			17.0
	UNII-4	17.0			17.0

Bluetooth & Bluetooth LE Maximum Allowed Output Power

Maximum allowed output power means that Target power + 1dB device uncertainty.

RF Air interface	DATA RATE	Maximum allowed output power (dBm)
Bluetooth (BDR)	1Mbps	19.0
Bluetooth (EDR)	2Mbps	12.0
	3Mbps	12.0
Bluetooth (LE)	1Mbps	9.0
	2Mbps	9.0
	125kbps	9.0
	500kbps	9.0

7. RF Exposure Conditions (Test Configurations)

Refer to Appendix A for the specific details of the antenna-to-antenna and antenna-to-edge(s) distances.

Wireless technologies	RF Exposure Conditions	Test Positions / distance		
		Test distance	Rear	Front
WLAN/BT	Next to Mouth	10 mm	No	Yes
	Extremity 10-g	0 mm	Yes	No

Notes:

1. For Next to Mouth exposure condition, SAR test is considered for Front test positions only.
2. For Extremity exposure condition, SAR test is considered for Rear test positions only.

8. Dielectric Property Measurements & System Check

8.1. Dielectric Property Measurements

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within ± 2°C of the temperature when the tissue parameters are characterized.
The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The Tissue Dielectric parameters (100MHz to 6GHz) should be re-measured after each 3 – 4 days of use; or earlier if the dielectric parameters can become out of tolerance; for example, when the parameters are marginal at the beginning of the measurement series.
Tissue dielectric parameters were measured at the low, middle and high frequency of each operating frequency range of the test device.

1. Tissue Dielectric Parameters (100MHz to 6GHz)

FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

Target Frequency (MHz)	Head	
	ε_r	σ (S/m)
150	52.3	0.76
300	45.3	0.87
450	43.5	0.87
835	41.5	0.90
900	41.5	0.97
915	41.5	0.98
1450	40.5	1.20
1610	40.3	1.29
1800 – 2000	40.0	1.40
2450	39.2	1.80
3000	38.5	2.40
5000	36.2	4.45
5100	36.1	4.55
5200	36.0	4.66
5300	35.9	4.76
5400	35.8	4.86
5500	35.6	4.96
5600	35.5	5.07
5700	35.4	5.17
5800	35.3	5.27
6000	35.1	5.48

SAR test were performed in All RF exposure conditions using Head tissue according to TCB workshop note of April. 2019.

IEEE Std 1528-2013

Refer to Table 3 within the IEEE Std 1528-2013

Dielectric Property Measurements Results:
SAR 4 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
2025-04-14	Head 2450	e'	38.8900	Relative Permittivity (ε_r):	38.89	39.20	-0.79	5
		e''	12.7400	Conductivity (σ):	1.74	1.80	-3.58	5
	Head 2400	e'	39.8800	Relative Permittivity (ε_r):	39.88	39.30	1.48	5
		e''	12.5800	Conductivity (σ):	1.68	1.75	-4.16	5
	Head 2500	e'	39.8900	Relative Permittivity (ε_r):	39.89	39.14	1.92	5
		e''	12.8600	Conductivity (σ):	1.79	1.85	-3.58	5
2025-04-14	Head 5200	e'	35.2600	Relative Permittivity (ε_r):	35.26	35.99	-2.03	5
		e''	15.5700	Conductivity (σ):	4.50	4.65	-3.21	5
	Head 5250	e'	35.2500	Relative Permittivity (ε_r):	35.25	35.93	-1.90	5
		e''	15.6700	Conductivity (σ):	4.57	4.70	-2.72	5
	Head 5600	e'	35.3800	Relative Permittivity (ε_r):	35.38	35.53	-0.43	5
		e''	16.1800	Conductivity (σ):	5.04	5.06	-0.44	5
	Head 5750	e'	35.3300	Relative Permittivity (ε_r):	35.33	35.36	-0.09	5
		e''	16.1300	Conductivity (σ):	5.16	5.21	-1.09	5
	Head 5800	e'	35.3300	Relative Permittivity (ε_r):	35.33	35.30	0.08	5
		e''	16.0100	Conductivity (σ):	5.16	5.27	-2.03	5
	Head 5925	e'	34.9400	Relative Permittivity (ε_r):	34.94	35.20	-0.74	5
		e''	15.6800	Conductivity (σ):	5.17	5.40	-4.34	5

8.2. System Check

SAR system verification is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device. The same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification of 100MHZ to 6GHz frequency range should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters, typically every three to four days when the liquid parameters are re-measured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

System Performance Check Measurement Conditions (100MHz to 6GHz):

- The measurements were performed in the flat section of the TWIN SAM or ELI phantom, shell thickness: 2.0 ±0.2 mm (bottom plate) filled with Body or Head simulating liquid of the following parameters.
- The depth of tissue-equivalent liquid in a phantom must be ≥ 15.0 cm for SAR measurements ≤ 3 GHz and ≥ 10.0 cm for measurements > 3 GHz.
- The DASY system with an E-Field Probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 10 mm (above 1 GHz) and 15 mm (below 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 15 mm was aligned with the dipole.
  For 5 GHz band - The coarse grid with a grid spacing of 10 mm was aligned with the dipole.
- Special 7x7x7 (below 3 GHz) and/or 8x8x7 (above 3 GHz) fine cube was chosen for the cube.
- Distance between probe sensors and phantom surface was set to 1.4 mm.
- The dipole input power (forward power) was 100 mW.
- The results are normalized to 1 W input power.

Reference Target SAR Values

The reference SAR values can be obtained from the calibration certificate of system validation dipoles.

System Dipole	Serial No.	Cal. Date	Cal.due date	Target SAR Values (W/kg)	
				1g/10g	Head
D2450V2	960	2024-03-14	2025-03-14	1g	51.80
				10g	24.10
D5GHzV2 (5.25 GHz)	1209	2025-02-18	2026-02-18	1g	79.20
				10g	22.40
D5GHzV2 (5.6 GHz)	1209	2025-02-18	2026-02-18	1g	80.70
				10g	22.90
D5GHzV2 (5.75 GHz)	1209	2025-02-18	2026-02-18	1g	78.20
				10g	22.00
D5GHzV2 (5.8 GHz)	1209	2025-02-18	2026-02-18	1g	80.10
				10g	22.60

Note(s):

1. For System Validation Dipole, Calibration interval applied every 2 years.
2. Refer to Appendix F that mentioned about justification for Extended SAR Dipole Calibrations. (for blue box items)

System Check Results

The 1-g and 10-g SAR measured with a reference dipole, using the required tissue-equivalent medium at the test frequency, must be within 10% of the manufacturer calibrated dipole SAR target.

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Date Tested	System Dipole		T.S. Liquid		Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.
	Type	Serial #			Zoom Scan to 100 mW	Normalize to 1 W			
2025-04-14	D2450V2	960	Head	1g	5.25	52.5	51.80	1.35	
				10g	2.59	25.9	24.10	7.47	
2025-04-15	D2450V2	960	Head	1g	5.36	53.6	51.80	3.47	1
				10g	2.64	26.4	24.10	9.54	
2025-04-16	D5GHzV2 (5250)	1209	Head	1g	7.71	77.1	79.20	-2.65	
				10g	2.31	23.1	22.40	3.13	
2025-04-16	D5GHzV2 (5600)	1209	Head	1g	7.90	79.0	80.70	-2.11	
				10g	2.35	23.5	22.90	2.62	
2025-04-16	D5GHzV2 (5750)	1209	Head	1g	8.01	80.1	78.20	2.43	
				10g	2.37	23.7	22.00	7.73	
2025-04-16	D5GHzV2 (5800)	1209	Head	1g	7.74	77.4	80.10	-3.37	
				10g	2.27	22.7	22.60	0.44	
2025-04-17	D5GHzV2 (5750)	1209	Head	1g	8.09	80.9	78.20	3.45	2
				10g	2.34	23.4	22.00	6.36	
2025-04-17	D5GHzV2 (5800)	1209	Head	1g	7.90	79.0	80.10	-1.37	
				10g	2.28	22.8	22.60	0.88	

9. Conducted Output Power Measurements

9.1. Wi-Fi 2.4 GHz (DTS Band)

WLAN Measured Output Power Results

Antenna	Mode	Data Rate	Ch #	Freq. (MHz)	Maximum Allowed Average power (dBm)		
					Meas. Avg Pwr (dBm)	Max. Tune-up Limit (dBm)	SAR Test (Yes/No)
Wi-Fi 2.4G	802.11b	1 Mbps	1	2412.0	17.84	19.0	Yes
			6	2437.0	17.81		
			11	2462.0	17.83		
	802.11g	6 Mbps	Not Required			18.0	No
	802.11n	MCS 0				18.0	

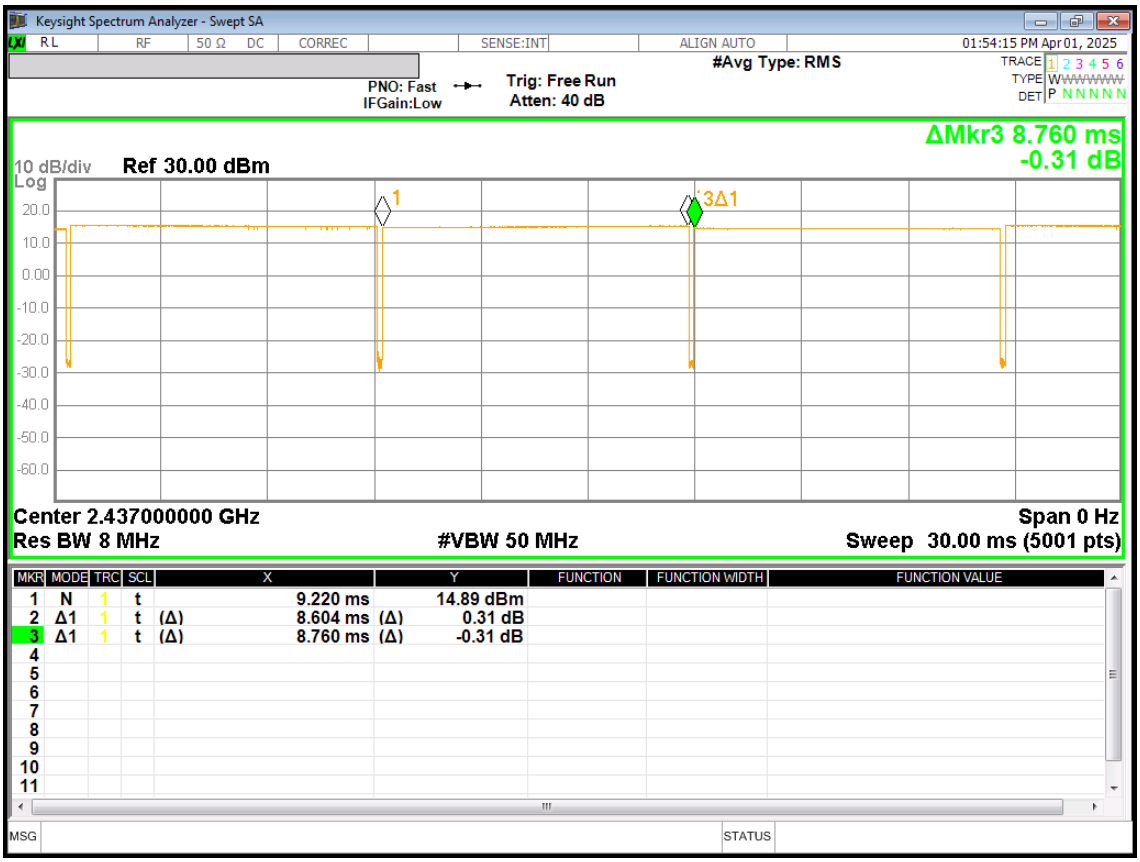
Note(s):

1. SAR is not required for 802.11g/n modes when the adjusted SAR for 802.11b is < 1.2 W/kg.
2. For "Not required", SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11n/g/ax mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band. Additional output power measurements were not deemed necessary.

Duty Factor Measured Result

Mode		T on (ms)	Period (ms)	Maximum Duty Cyle	Measured Duty Cycle	Crest Factor (maximum duty/ measured duty cycle)
802.11b	SISO	8.604	8.760	100.00%	98.22%	1.02

Duty Cycle plots (802.11b)



9.2. Wi-Fi 5GHz (U-NII Bands)

WLAN Measured Output Power Results

Antenna	Band	Mode	Data Rate	Ch #	Freq. (MHz)	Maximum Allowed Averag power (dBm)		
						Meas. Avg Pwr (dBm)	Max. Tune-up Limit (dBm)	SAR Test (Yes/No)
Wi-Fi 5GHz	U-NII 2A	802.11a	6 Mbps	52	5260.0	15.71	17.0	Yes
				56	5280.0	15.73		
				60	5300.0	15.68		
				64	5320.0	15.71		
		802.11n (HT20)	MCS 0	Not Required				No
	U-NII 2C	802.11a	6 Mbps	100	5500.0	15.75	17.0	Yes
				120	5600.0	15.71		
				124	5620.0	15.73		
				144	5720.0	15.74		
		802.11n (HT20)	MCS 0	Not Required				No
	U-NII 3	802.11a	6 Mbps	149	5745.0	15.77	17.0	Yes
				157	5785.0	15.82		
				165	5825.0	15.93		
		802.11n (HT20)	MCS 0	Not Required				No
	U-NII 4	802.11a	6 Mbps	169	5845.0	15.75	17.0	Yes
				173	5865.0	15.90		
				177	5885.0	15.76		
		802.11n (HT20)	MCS 0	Not Required				No

Note(s):

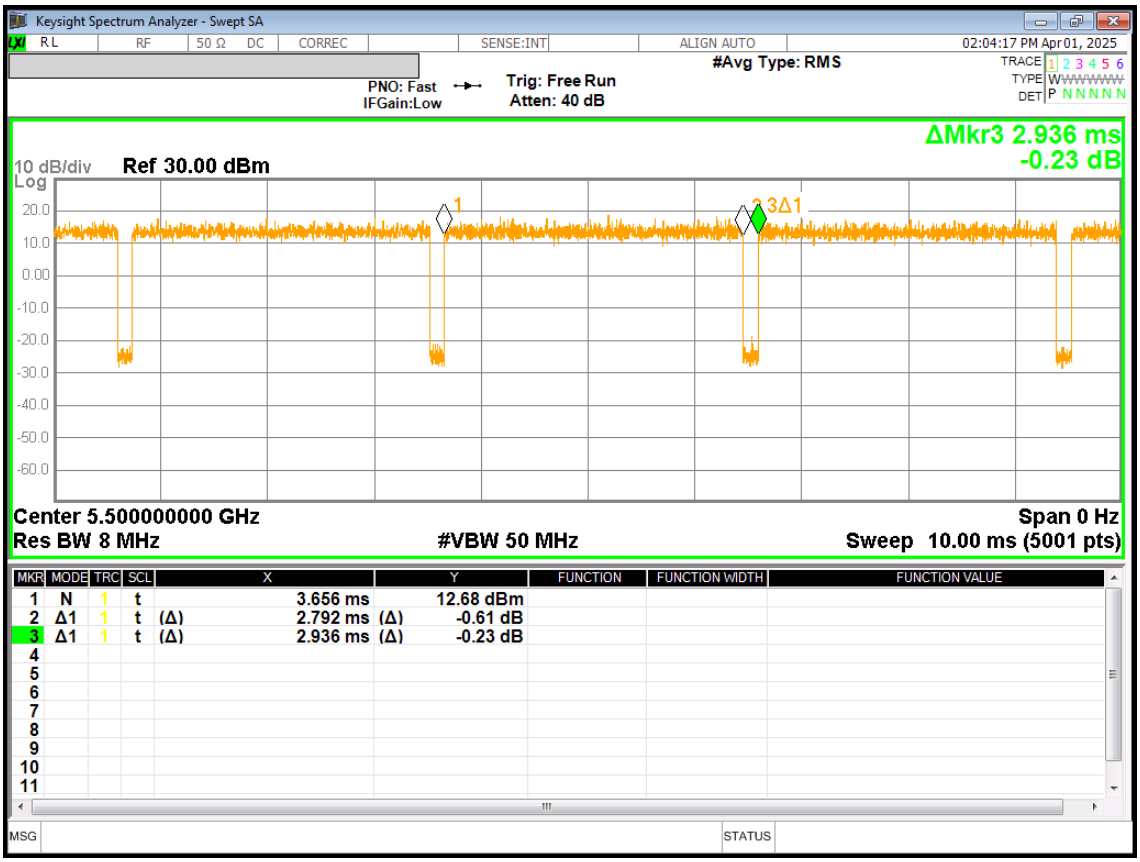
1. For “Not required”, SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) when the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/n mode is used for SAR measurement, on the highest measured output power channel in the initial test configuration, for each frequency band.
2. When the same transmission mode configurations have the same maximum output power on the same channel for the 802.11 a/n modes, the channel in the lower order/sequence 802.11 mode (i.e. a and n) is selected.
3. When the specified maximum output power is the same for both U-NII band 1 and U-NII band 2A, begin SAR measurement in U-NII band 2A; and if the highest *reported* SAR for U-NII band 2A is
   - ≤ 1.2 W/kg, SAR is not required for U-NII band 1
   - > 1.2 W/kg, both bands should be tested independently for SAR.

Wi-Fi 5GHz (U-NII Bands) (Continued)

Duty Factor Measured Results

Mode	T on (ms)	Period (ms)	Maximum Duty Cyle	Measured Duty Cycle	Crest Factor (maximum duty/ measured duty cycle)
802.11a	2.7920	2.9360	100.00%	95.10%	1.05

Duty Cycle plots (802.11ac VHT80)



9.3. Bluetooth

Bluetooth(Bluetooth Low Energy) Output Power Results

Antenna	Mode	Data Rate	Ch #	Freq. (MHz)	Maximum Allowed Average power (dBm)		
					Meas. Avg Pwr (dBm)	Max. Tune-up Limit (dBm)	SAR Test (Yes/No)
Bluetooth	BDR	1Mbps	0	2402	18.42	19.0	Yes
			39	2441	18.21		
			78	2480	17.04		
	EDR	2Mbps	Not required			12.0	No
		3Mbps				12.0	No
	LE	1Mbps				9.0	No
		2Mbps				9.0	No
		125kbps				9.0	No
		500kbps				9.0	No

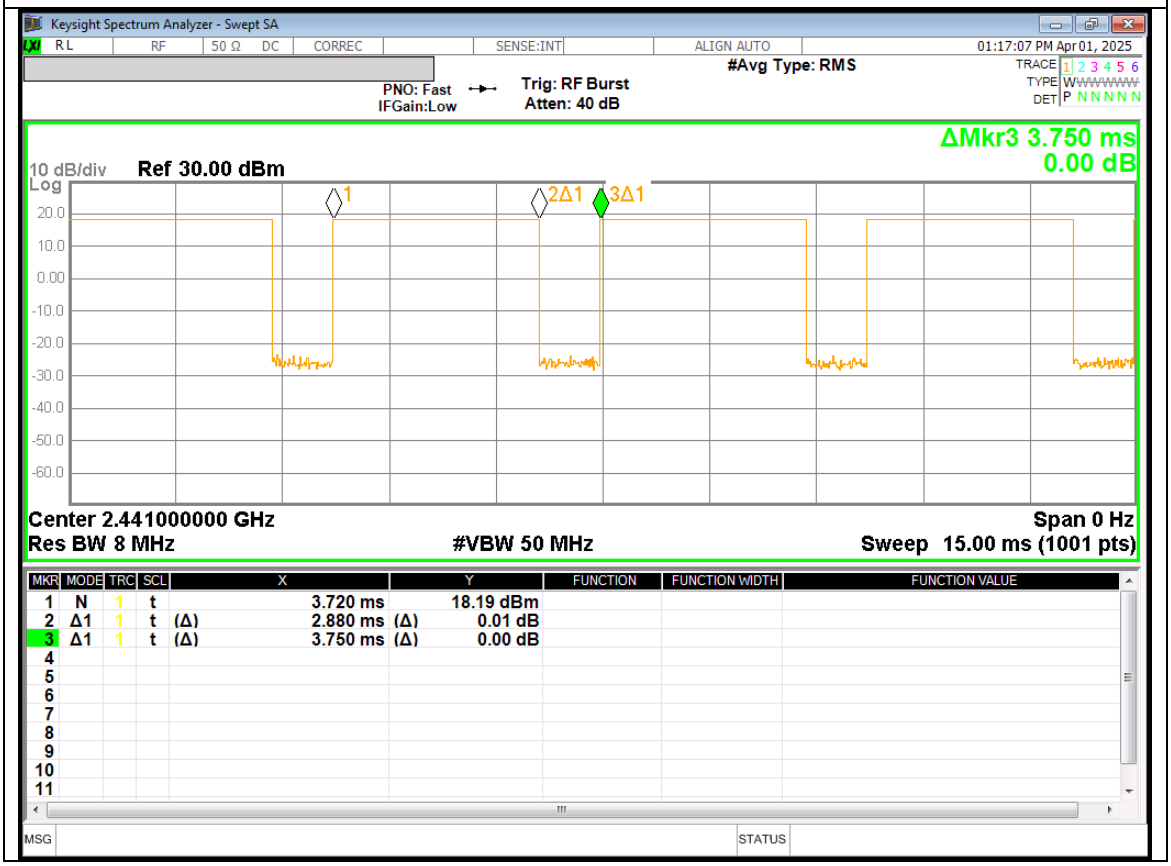
Note(s):

For BT/BLE SAR test, BDR (1Mbps) has highest time-based averaged power in all modes. So SAR test performed at BDR (1Mbps)

Duty Factor Measured Results

Mode	T on (ms)	Period (ms)	Maximum Duty Cyle	Measured Duty Cycle	Crest Factor (maximum duty/ measured duty cycle)
BDR 1Mbps	2.880	3.750	78.00%	76.80%	1.02

Duty Cycle plots (BDR – 1M)



Note(s):

Maximum Duty Cycle is mentioned in Operational description. Detail of BT Duty Cycle refer to Operational description.

10. Measured and Reported (Scaled) SAR/APD Results

SAR Test Reduction Criteria are as Follows:

- Reported SAR(W/kg) for WWAN= Measured SAR *Tune-up Scaling Factor
- Reported SAR(W/kg) for Wi-Fi and Bluetooth= Measured SAR * Tune-up scaling factor * Duty Cycle scaling factor
- Wi-Fi Duty Cycle scaling factor = 1 / Duty cycle (%)
- BT Duty Cycle scaling factor = Maximum Duty cycle / Duty cycle (%)

KDB 248227 D01 SAR meas for 802.11:

SAR test reduction for 802.11 Wi-Fi transmission mode configurations are considered separately for DSSS and OFDM. An initial test position is determined to reduce the number of tests required for certain exposure configurations with multiple test positions. An initial test configuration is determined for each frequency band and aggregated band according to maximum output power, channel bandwidth, wireless mode configurations and other operating parameters to streamline the measurement requirements. For 2.4 GHz DSSS, either the initial test position or DSSS procedure is applied to reduce the number of SAR tests; these are mutually exclusive. For OFDM, an initial test position is only applicable to next to the ear, UMPC mini-tablet and hotspot mode configurations, which is tested using the initial test configuration to facilitate test reduction. For other exposure conditions with a fixed test position, SAR test reduction is determined using only the initial test configuration.

The multiple test positions require SAR measurements in head, hotspot mode or UMPC mini-tablet configurations may be reduced according to the highest reported SAR determined using the *initial test position(s)* by applying the DSSS or OFDM SAR measurement procedures in the required wireless mode test configuration(s). The *initial test position(s)* is measured using the highest measured maximum output power channel in the required wireless mode test configuration(s). When the *reported* SAR for the *initial test position* is:

- ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and wireless mode combination within the frequency band or aggregated band. DSSS and OFDM configurations are considered separately according to the required SAR procedures.
- > 0.4 W/kg, SAR is repeated using the same wireless mode test configuration tested in the *initial test position* to measure the subsequent next closet/smallest test separation distance and maximum coupling test position, on the highest maximum output power channel, until the *reported* SAR is ≤ 0.8 W/kg or all required test positions are tested.
  - For subsequent test positions with equivalent test separation distance or when exposure is dominated by coupling conditions, the position for maximum coupling condition should be tested.
  - When it is unclear, all equivalent conditions must be tested.
- For all positions/configurations tested using the *initial test position* and subsequent test positions, when the *reported* SAR is > 0.8 W/kg, measure the SAR for these positions/configurations on the subsequent next highest measured output power channel(s) until the *reported* SAR is ≤ 1.2 W/kg or all required test channels are considered.
  - The additional power measurements required for this step should be limited to those necessary for identifying subsequent highest output power channels to apply the test reduction.
- When the specified maximum output power is the same for both UNII 1 and UNII 2A, begin SAR measurements in UNII 2A with the channel with the highest measured output power. If the reported SAR for UNII 2A is ≤ 1.2 W/kg, SAR is not required for UNII 1; otherwise treat the remaining bands separately and test them independently for SAR.
- When the specified maximum output power is different between UNII 1 and UNII 2A, begin SAR with the band that has the higher specified maximum output. If the highest reported SAR for the band with the highest specified power is ≤ 1.2 W/kg, testing for the band with the lower specified output power is not required; otherwise test the remaining bands independently for SAR.

To determine the *initial test position*, Area Scans were performed to determine the position with the *Maximum Value of SAR (measured)*. The position that produced the highest *Maximum Value of SAR* is considered the worst case position; thus used as the *initial test position*.

10.1. Wi-Fi (DTS Band)

RF Exposure Condition	Mode	Dist (mm)	Test Position	Channel	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Tune-up Limit (dBm)	Meas. (dBm)	Meas. 1g (W/kg)	Reported. 1g (W/kg)	Meas. 10g (W/kg)	Reported. 10g (W/kg)	Plot No.
Next to Mouth	802.11b 1Mbps	10	Front	1	2412.0	0.191	98.2	19.00	17.84	0.168	0.223			1
Extremity	802.11b 1Mbps	0	Rear	1	2412.0	0.337	98.2	19.00	17.84			0.095	0.126	2

10.2. Wi-Fi (U-NII Bands)

U-NII 2A

RF Exposure Condition	Mode	Dist (mm)	Test Position	Channel	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Tune-up Limit (dBm)	Meas. (dBm)	Meas. 1g (W/kg)	Reported. 1g (W/kg)	Meas. 10g (W/kg)	Reported. 10g (W/kg)	Plot No.
Next to Mouth	802.11a 6Mbps	10	Front	56	5280.0	0.062	95.1	17.00	15.73	0.035	0.049			3
Extremity	802.11a 6Mbps	0	Rear	56	5280.0	2.500	95.1	17.00	15.73			0.458	0.645	

U-NII 2C

RF Exposure Condition	Mode	Dist (mm)	Test Position	Channel	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Tune-up Limit (dBm)	Meas. (dBm)	Meas. 1g (W/kg)	Reported. 1g (W/kg)	Meas. 10g (W/kg)	Reported. 10g (W/kg)	Plot No.
Next to Mouth	802.11a 6Mbps	10	Front	100	5500.0	0.039	95.1	17.00	15.75	0.017	0.024			
Extremity	802.11a 6Mbps	0	Rear	100	5500.0	2.600	95.1	17.00	15.75			0.568	0.797	4

U-NII 3

RF Exposure Condition	Mode	Dist (mm)	Test Position	Channel	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Tune-up Limit (dBm)	Meas. (dBm)	Meas. 1g (W/kg)	Reported. 1g (W/kg)	Meas. 10g (W/kg)	Reported. 10g (W/kg)	Plot No.
Next to Mouth	802.11a 6Mbps	10	Front	165	5825.0	0.044	95.1	17.00	15.93	0.028	0.038			
Extremity	802.11a 6Mbps	0	Rear	165	5825.0	1.850	95.1	17.00	15.93			0.480	0.646	

U-NII 4

RF Exposure Condition	Mode	Dist (mm)	Test Position	Channel	Freq. (MHz)	Area Scan Max. SAR (W/kg)	Duty Cycle (%)	Tune-up Limit (dBm)	Meas. (dBm)	Meas. 1g (W/kg)	Reported. 1g (W/kg)	Meas. 10g (W/kg)	Reported. 10g (W/kg)	Plot No.
Next to Mouth	802.11a 6Mbps	10	Front	173	5865.0	0.045	95.1	17.00	15.90	0.035	0.047			
Extremity	802.11a 6Mbps	0	Rear	173	5865.0	2.450	95.1	17.00	15.90			0.311	0.421	

10.3. Bluetooth

RF Exposure Condition	Mode	Dist (mm)	Test Position	Channel	Freq. (MHz)	Duty Cycle (%)	Tune-up Limit (dBm)	Meas. (dBm)	Meas. 1g (W/kg)	Reported. 1g (W/kg)	Meas. 10g (W/kg)	Reported. 10g (W/kg)	Plot No.
Next to Mouth	BDR	10	Front	0	2402.0	76.8%	19.00	18.42	0.165	0.191			5
Extremity	BDR	0	Rear	0	2402.0	76.8%	19.00	18.42			0.111	0.129	6

11. SAR Measurement Variability

In accordance with published RF Exposure KDB 865664 D01 SAR measurement 100 MHz to 6 GHz. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

1) Repeated measurement is not required when the original highest measured SAR is <0.8 or 2 W/kg (1-g or 10-g respectively); steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.8 or 2 W/kg (1-g or 10-g respectively), repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 or 3.6 W/kg (~ 10% from the 1-g or 10-g respective SAR limit).
4) Perform a third repeated measurement only if the original, first, or second repeated measurement is ≥ 1.5 or 3.75 W/kg (1-g or 10-g respectively) and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

Note(s):

All bands were not over 0.8 or 2.0 W/kg. thus, Not listed.

12. Simultaneous Transmission SAR Analysis

Simultaneous Transmission Condition

RF Exposure Condition	Item	Capable Transmit Configurations			
Next to mouth & Extremity	1	U-NII	+	BT	Non RSDB

Note(s):
1. DTS, U-NII supports Wi-Fi Direct.
2. U-NII Radio can transmit simultaneously with Bluetooth Radio.
3. BT tethering is considered about each exposure conditions.

Simultaneous Transmission SAR Test Exclusion Considerations

Sum of SAR

To qualify for simultaneous transmission SAR test exclusion based upon Sum of SAR the sum of the reported standalone SARs for all simultaneously transmitting antennas shall be below the applicable standalone SAR limit. If the sum of the SARs is above the applicable limit then simultaneous transmission SAR test exclusion may still apply if the requirements of the SAR to Peak Location Ratio (SPLSR) evaluation are met.

12.1. Next to Mouth Exposure Analysis

Condition#1 (Sum of SAR)

RF Exposure conditions	SAR (W/kg)		Sum of SAR (W/kg)
	U-NII	BT	U-NII+BT
Next to mouth	0.049	0.191	0.240

Note(s):
Additional evaluation is not required due to below SAR Limit

12.2. Extremity 10-g Exposure Analysis

Condition#1 (Sum of SAR)

RF Exposure conditions	SAR (W/kg)		Sum of SAR (W/kg)
	U-NII	BT	U-NII+BT
Extremity	0.797	0.129	0.926

Note(s):
Additional evaluation is not required due to below SAR Limit

Conclusion:
Simultaneous Transmission SAR analysis results is satisfied the FCC Limit requirement according to follow procedures with “Sum of SAR”

Appendixes

Refer to separated files for the following appendixes.

S-4791706680-S1 FCC Report SAR App A Photos

S-4791706680-S1 FCC Report SAR App B Test Plots

S-4791706680-S1 FCC Report SAR App C System Plots

S-4791706680-S1 FCC Report SAR App D Tissue

S-4791706680-S1 FCC Report SAR App E Probe Certi

S-4791706680-S1 FCC Report SAR App F Dipole Certi

END OF REPORT