SAR EVALUATION REPORT

FCC 47 CFR § 2.1093
IEEE Std. 1528-2013

For

Osmo Nano

MODEL NUMBER: ON001

REPORT NUMBER: 4791622042-3-SAR-3

ISSUE DATE: February 21, 2025

FCC ID: 2ANDR-ON00125

Prepared for

SZ DJI Osmo Technology Co.,Ltd.
Room S11, Floor 23, Tower 1, DJI Sky City, No. 55 Xianyuan Road, Xili Community, Xili Street, Nanshan District, Shenzhen, 518055,China.

Prepared by

UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch
Building 10, Innovation Technology Park, No. 1, Li Bin Road, Song Shan Lake Hi-Tech Development Zone Dongguan, People's Republic of China

Tel: +86 769 22038881
Fax: +86 769 33244054
Website: www.ul.com

Revision History

Rev.	Issue Date	Revisions	Revised By
V0	February 21, 2025	Initial Issue	\

Note:

1) This test report is only published to and used by the applicant, and it is not for evidence purpose in China.
2) The measurement result for the sample received is <Pass> according to < IEEE Std. 1528>when <Simple Acceptance> decision rule is applied.

Table of Contents

1. Attestation of Test Results

Applicant Name	SZ DJI Osmo Technology Co.,Ltd.	
Address	Room S11, Floor 23, Tower 1, DJI Sky City, No. 55 Xianyuan Road, Xili Community, Xili Street, Nanshan District, Shenzhen, 518055,China.	
Manufacturer	SZ DJI Osmo Technology Co.,Ltd.	
Address	Room S11, Floor 23, Tower 1, DJI Sky City, No. 55 Xianyuan Road, Xili Community, Xili Street, Nanshan District, Shenzhen, 518055,China.	
EUT Name	Osmo Nano	
Brand	/	
Model	ON001	
Sample Received Date	January 1, 2025	
Sample Status	Normal	
Sample ID	/	
Date of Tested	February 20, 2025	
Applicable Standards	FCC 47 CFR § 2.1093 IEEE Std. 1528-2013 KDB publication	
SAR Limits (W/Kg)		
Exposure Category	Peak spatial-average (1g of tissue)	Extremities (hands, wrists, ankles, etc.) (10g of tissue)
General population / Uncontrolled exposure	1.6	4
Occupational / Controlled exposure	8	20

The Highest Reported SAR (W/kg)			
RF Exposure Conditions	**Equipment Class**		
	DTS	**NII**	**DSS**
Body 1-g (5 mm)	0.585	0.300	0.018
Extremity 10-g (0 mm)	1.457	1.840	0.573
Simultaneous Transmission (1-g)-Body	0.603		
Simultaneous Transmission (10-g)-Extremity	2.413		
Test Results	Pass		

Prepared By: Burt Hu Burt Hu Laboratory Engineer	Reviewed By: Kebo Zhang Senior Project Engineer	Approved By: Stephen Guo Laboratory Manager

2. Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with IEEE Std.1528-2013 and the following FCC Published RF exposure KDB procedures:

- 447498 D01 General RF Exposure Guidance v06
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- 865664 D02 RF Exposure Reporting v01r02
- 248227 D01 802.11 Wi-Fi SAR v02r02

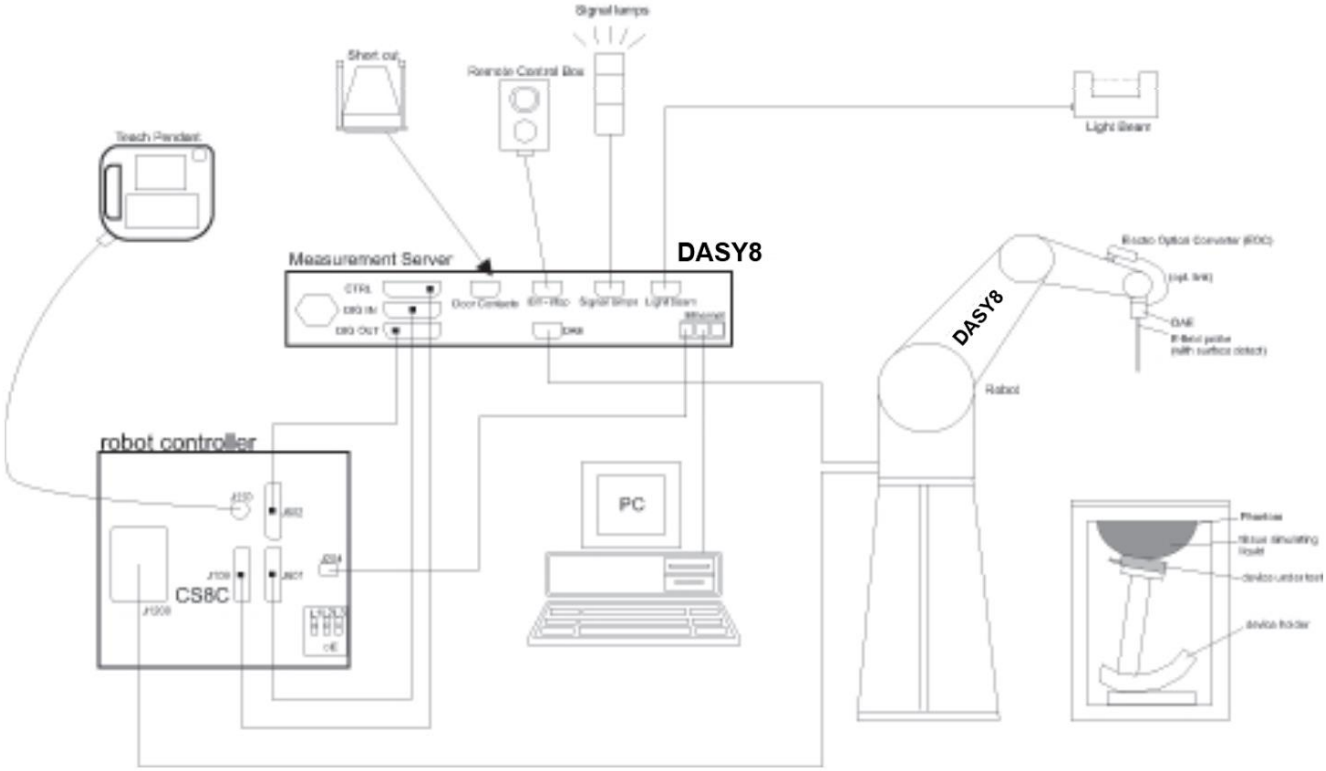
3. Facilities and Accreditation

Test Location	UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch.
Address	Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China
Accreditation Certificate	**A2LA (Certificate No.: 4102.01)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA. **FCC (FCC Designation No.: CN1187)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules. **ISED (Company No.: 21320)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320 and the test lab Conformity Assessment Body Identifier (CABID) is CN0046. **VCCI (Registration No.: G-20192, C-20153, T-20155 and R-20202)** UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793. Facility Name: Chamber D, the VCCI registration No. is G-20192 and R-20202 Shielding Room B, the VCCI registration No. is C-20153 and T-20155
Description	All measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China

4. SAR Measurement System & Test Equipment

4.1. SAR Measurement System

The DASY8 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 Win 10 and the DASY8 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 2.1 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 v01r04 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 mm ± 1 mm	½·δ·ln(2) mm ± 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.	
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*

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 v01r04 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·$\Delta z_{Zoom}(n-1)$ mm	
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 IEEE Std 1528-2013 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB Publication 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.

Step 5: Z-Scan (FCC only)

The Z Scan measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. In order to get a reasonable extrapolation the extrapolated distance should not be greater than the step size in Z-direction.

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.

Name of equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
ENA Network Analyzer	Keysight	E5080A	MY55100583	2025.09.27
Dielectric Probe kit	SPEAG	SM DAK 040 SA	1155	2025.02.27
DC power supply	Keysight	E36103A	MY55350020	2025.09.27
Signal Generator	Rohde & Schwarz	SME06	837633\001	2025.08.05
BI-Directional Coupler	KRYTAR	1850	54733	2025.09.27
Peak and Average Power Sensor	Keysight	E9325A	MY62220002	2025.09.27
Peak and Average Power Sensor	Keysight	E9325A	MY62220003	2025.09.27
Dual Channel PK Power Meter	Keysight	N1912A	MY55416024	2025.09.27
Amplifier	CORAD TECHNOLOGY LTD	AMF-4D-00400600-50-30P	1983561	NCR
Dosimetric E-Field Probe	SPEAG	EX3DV4	7733	2025.02.20
Data Acquisition Electronic	SPEAG	DAE4	1318	2025.10.08
Dipole Kit 2450 MHz	SPEAG	D2450V2	977	2027.12.25
Dipole Kit 5 GHz	SPEAG	D5GHzV2	1231	2027.12.24
Software	SPEAG	DASY8	N/A	NCR
Phantom	SPEAG	SAM V8.0	2100	NCR
Thermometer	/	GX-138	150709653	2025.10.7
Thermometer	VICTOR	ITHX-SD-5	18470005	2025.10.7

Note:

1) Per KDB865664D01 v01r04 requirements for dipole calibration, the test laboratory has adopted three-year extended calibration interval. Each measured dipole is expected to evaluate with the following criteria at least on annual interval in Appendix C.

a) There is no physical damage on the dipole;

b) System check with specific dipole is within 10% of calibrated value;

c) The most recent return-loss result, measured at least annually, deviates by no more than 20% from the previous measurement.

d) The most recent measurement of the real or imaginary parts of the impedance, measured at least annually is within 5Ω from the previous measurement.

2) Network analyzer probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.

5. Measurement Uncertainty

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.
Therefore, the measurement uncertainty is not required.

6. Device Under Test (DUT) Information

6.1. DUT Description

DUT is a sports camera with Wi-Fi and Bluetooth wireless capability	
DUT Dimension	Overall (Length x Width x Height): 51 mm x 41.2 mm x 22 mm

6.2. Wireless Technology

Wireless technology	Frequency band
Wi-Fi	2.4 GHz
Wi-Fi	5.8 GHz
Bluetooth	2.4 GHz

7. Conducted Output Power Measurement and tune-up tolerance

7.1. Test Results of 2.4GHz Wi-Fi

Test Mode	Antenna	Frequency (MHz)	AV Power (dBm)	Tune-up Limit (dBm)
11B-CDD	Ant1	2412	19.28	19.5
	Ant2	2412	17.89	19.5
	MIMO	2412	21.65	22.5
	Ant1	2437	18.70	19.5
	Ant2	2437	18.37	19.5
	MIMO	2437	21.55	22.5
	Ant1	2462	18.26	19.5
	Ant2	2462	19.90	20.0
	MIMO	2462	22.17	23.0
11G-CDD	Ant1	2412	13.61	14.0
	Ant2	2412	12.85	14.0
	MIMO	2412	16.26	17.0
	Ant1	2437	17.14	17.5
	Ant2	2437	17.26	17.5
	MIMO	2437	20.21	20.5
	Ant1	2462	15.08	16.5
	Ant2	2462	16.14	16.5
	MIMO	2462	18.65	19.5
11N20MIMO	Ant1	2412	13.61	14.0
	Ant2	2412	12.73	14.0
	MIMO	2412	16.20	17.0
	Ant1	2437	17.79	18.0
	Ant2	2437	17.96	18.0
	MIMO	2437	20.89	21.0
	Ant1	2462	14.18	15.5
	Ant2	2462	15.29	15.5
	MIMO	2462	17.78	18.5
11AX20MIMO	Ant1	2412	14.22	14.5
	Ant2	2412	13.70	14.5
	MIMO	2412	16.98	17.5
	Ant1	2437	17.11	17.5
	Ant2	2437	17.35	17.5
	MIMO	2437	20.24	20.5
	Ant1	2462	14.54	16.0
	Ant2	2462	15.52	16.0
	MIMO	2462	18.07	19.0

Note:
1) The output power of the device was set to transmit at maximum power for all tests.
2) As per KDB 447498 D01 sec.4.1.d) at the maximum rated output power and within the tune-up tolerance range specified for the product, but not more than 2 dB lower than the maximum tune-up tolerance limit.

7.1. Test Results of 5.8GHz Wi-Fi

Test Mode	Antenna	Frequency (MHz)	AV Power (dBm)	Tune-up Limit (dBm)
11A-CDD	Ant1	5745	16.43	17.5
	Ant2	5745	16.85	17.5
	MIMO	5745	19.66	20.5
	Ant1	5785	15.75	17.5
	Ant2	5785	16.24	17.5
	MIMO	5785	19.01	20.5
	Ant1	5825	15.88	17.5
	Ant2	5825	16.80	17.5
	MIMO	5825	19.37	20.5
11N20MIMO	Ant1	5745	17.30	17.5
	Ant2	5745	16.38	17.5
	MIMO	5745	19.87	20.5
	Ant1	5785	17.40	17.5
	Ant2	5785	16.35	17.5
	MIMO	5785	19.92	20.5
	Ant1	5825	17.39	17.5
	Ant2	5825	16.57	17.5
	MIMO	5825	20.01	20.5
11AC20MIMO	Cover by 11N20MIMO			
11N40MIMO	Ant1	5755	15.86	16.5
	Ant2	5755	16.08	16.5
	MIMO	5755	18.98	19.5
	Ant1	5795	16.26	16.5
	Ant2	5795	16.39	16.5
	MIMO	5795	19.34	19.5
11AC40MIMO	Cover by 11N40MIMO			
11AC80MIMO	Ant1	5775	15.90	16.5
	Ant2	5775	16.25	16.5
	MIMO	5775	19.09	19.5
11AX20MIMO	Ant1	5745	17.17	17.5
	Ant2	5745	16.54	17.5
	MIMO	5745	19.88	20.5
	Ant1	5785	17.37	17.5
	Ant2	5785	16.47	17.5
	MIMO	5785	19.95	20.5
	Ant1	5825	16.32	17.5
	Ant2	5825	16.29	17.5
	MIMO	5825	19.32	20.5

11AX40MIMO	Ant1	5755	16.21	16.5
	Ant2	5755	16.41	16.5
	MIMO	5755	19.32	19.5
	Ant1	5795	16.42	16.5
	Ant2	5795	16.30	16.5
	MIMO	5795	19.37	19.5
11AX80MIMO	Ant1	5775	16.17	16.5
	Ant2	5775	16.41	16.5
	MIMO	5775	19.30	19.5

Note:
1) The output power of the device was set to transmit at maximum power for all tests.
2) As per KDB 447498 D01 sec.4.1.d) at the maximum rated output power and within the tune-up tolerance range specified for the product, but not more than 2 dB lower than the maximum tune-up tolerance limit.

7.2. Test Results of BT

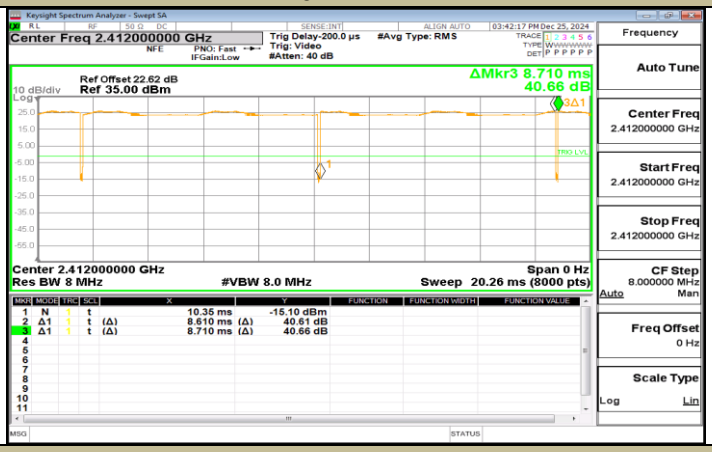
Mode	Frequency (MHz)	AV Power (dBm)	Tune-up Limit (dBm)
DH5	2402	11.45	13.5
	2441	12.15	13.5
	2480	13.00	13.5
3DH5	2402	8.01	9.5
	2441	8.55	9.5
	2480	9.25	9.5
1M	2402	6.17	6.5
	2440	5.56	6.5
	2480	8.65	9.0
2M	2402	6.87	7.0
	2440	5.19	7.0
	2480	8.43	8.5

Note:
1) The output power of the device was set to transmit at maximum power for all tests.
2) As per KDB 447498 D01 sec.4.1.d) at the maximum rated output power and within the tune-up tolerance range specified for the product, but not more than 2 dB lower than the maximum tune-up tolerance limit.

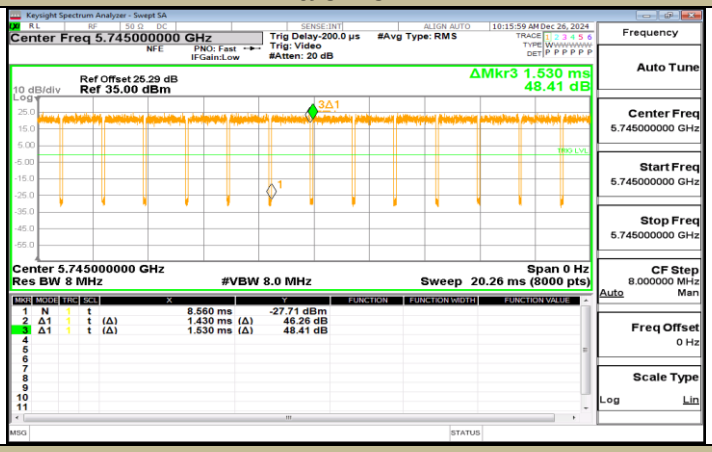
7.3. Duty Cycle

Test Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)
11b	8.61	8.71	0.9885	98.85
11a	1.43	1.53	0.9346	93.46
BT DH5	2.88	3.74	0.7701	77.01

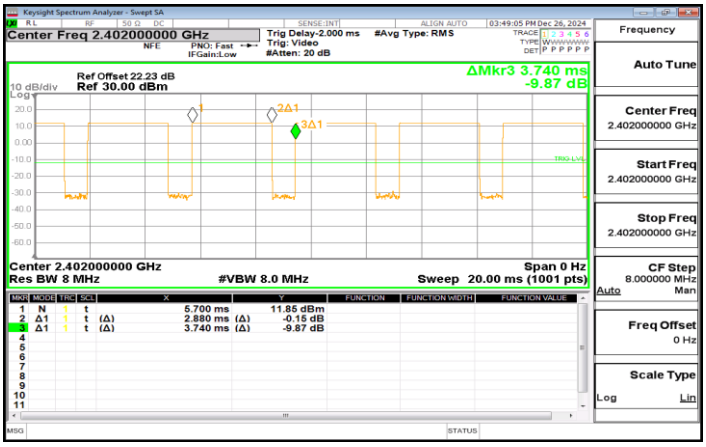
11b 2412MHz



11a 5745MHz



DH5 2402MHz



8. Test Configuration

8.1.Wi-Fi Test Configuration

For Wi-Fi SAR testing, a communication link is set up with the testing software for Wi-Fi mode test. During the test, at each test frequency channel, the EUT is operated at the RF continuous emission mode. The test procedures in KDB 248227D01 are applied.

8.1.1. Initial Test Position Procedure

For exposure condition with multiple test position, such as handsets operating next to the ear, devices with hotspot mode or UMPC mini-tablet, procedures for initial test position can be applied. Using the transmission mode determined by the DSSS procedure or initial test configuration, area scans are measured for all position in an exposure condition. 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 ≤ 0.4W/kg, no additional testing for the remaining test position is required. Otherwise, SAR is evaluated at the subsequent highest peak SAR position until the reported SAR result is ≤ 0.8W/kg or all test position are measured. For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

8.1.2. Initial Test Configuration Procedure

An initial test configuration is determined for OFDM transmission modes according to the channel bandwidth, modulation and data rate combination(s) with the highest maximum output power specified for production units in each standalone and aggregated frequency band. SAR is measured using the highest measured maximum output power channel. For configurations with the same specified or measured maximum output power, additional transmission mode and test channel selection procedures are required (see section 5.3.2 of KDB 248227D01). SAR test reduction of subsequent highest output test channels is based on the reported SAR of the initial test configuration.

For next to the ear, hotspot mode and UMC mini-tablet exposure configurations where multiple test positions are required, the initial test position procedure is applied to minimize the number of test positions required for SAR measurement using the initial test configuration transmission mode. For fixed exposure conditions that do not have multiple SAR test positions, SAR is measured in the transmission mode determined by the initial test configuration.

When the reported SAR of the initial test configuration is > 0.8 W/kg, SAR measurement is required for the subsequent next highest measured output power channel(s) in the initial test configuration until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

8.1.3. Sub Test Configuration Procedure

SAR measurement requirements for the remaining 802.11 transmission mode configurations that have not been tested in the initial test configuration are determined separately for each standalone and aggregated frequency band, in each exposure condition, according to the maximum output power specified for production units.

When the highest reported SAR for the initial test configuration, according to the initial test position or fixed exposure position requirements, is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for that subsequent test configuration.

8.1.4. 2.4GHz Wi-Fi SAR Test Procedures

Separate SAR procedures are applied to DSSS and OFDM configurations in the 2.4 GHz band to simplify DSSS test requirements. For 802.11b DSSS SAR measurements, DSSS SAR procedure applies to fixed exposure test position and initial test position procedure applies to multiple exposure test positions.

A) 802.11b DSSS SAR Test Requirements

SAR is measured for 2.4 GHz 802.11b DSSS using either a fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

1) When the reported SAR of the highest measured maximum output power channel (section 3.1 of KDB 248227D01) for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
2) When the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel i.e., all channels require testing.

B) 2.4GHz 802.11g/n OFDM SAR Test Exclusion Requirements

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied (section 5.3 of KDB 248227D01). SAR is not required for the following 2.4 GHz OFDM conditions.

1) When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
2) When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

C) SAR Test Requirements for OFDM configurations

When SAR measurement is required for 802.11 g/n OFDM configurations, each standalone and frequency aggregated band is considered separately for SAR test reduction. In applying the initial test configuration and subsequent test configuration procedures, the 802.11 transmission configuration with the highest specified maximum output power and the channel within a test configuration with the highest measured maximum output power should be clearly distinguished to apply the procedures.

8.2.2.4GHz BT SAR Test Requirements

2.4GHz BT operating modes are tested independently according to the service requirements in each frequency band for each antenna. DH5/3DH5/1M/2M SISO modes are tested on the maximum average output power mode.

8.3.Repeated measurements

Repeated measurements are required only when the measured SAR is ≥ 0.80 W/kg.18 If the measured SAR value of the initial repeated measurement is < 1.45 W/kg with ≤ 20% variation, only one repeated measurement is required to reaffirm that the results are not expected to have substantial variations, which may introduce significant compliance concerns. A second repeated measurement is required only if the measured result for the initial repeated measurement is within 10% of the SAR limit and vary by more than 20%, which are often related to device and measurement setup difficulties. The following procedures are applied to determine if repeated measurements are required. The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.19 The repeated measurement results must be clearly identified in the SAR report. All measured SAR, including the repeated results, must be considered to determine compliance and for reporting according to KDB Publication 690783.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg, 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 W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

9. Antenna location diagram

Referred to 4791622042-3-SAR-3_App A Photo.

10.RF Exposure Conditions

Wireless technologies	RF Exposure Conditions	DUT-to-User Separation
Wi-Fi/BT	Body	5 mm
Wi-Fi/BT	Extremity	0 mm

Note:
The EUT is a sports camera that is worn on the body during actual used, only its front side facing to the body, so SAR evaluation is performed exclusively for the front side of the EUT.

11.Dielectric Property Measurements & System Check

11.1.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 parameters 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.

Tissue Dielectric Parameters

FCC KDB 865664 D01 v01r04 SAR Measurement 100 MHz to 6 GHz

Target Frequency (MHz)	Head		Body	
	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5000	36.2	4.45	49.3	5.07
5100	36.1	4.55	49.1	5.18
5200	36.0	4.66	49.0	5.30
5300	35.9	4.76	48.9	5.42
5400	35.8	4.86	48.7	5.53
5500	35.6	4.96	48.6	5.65
5600	35.5	5.07	48.5	5.77
5700	35.4	5.17	48.3	5.88
5800	35.3	5.27	48.2	6.00

IEEE Std 1528-2013
Refer to Table 3 within the IEEE Std 1528-2013 Dielectric Property Measurements Results:

Liquid	Freq.	Liquid Parameters				Deviation(%)		Limit (%)	Temp. (℃)	Test Date
		Measured		Target						
		ϵ_r	σ	ϵ_r	σ	ϵ_r	σ			
Head 2450	2400	41.10	1.79	39.29	1.76	4.61	1.70	±5	22.6	February 20, 2025
	2450	41.00	1.83	39.20	1.80	4.59	1.67			
	2500	40.90	1.87	39.13	1.85	4.52	1.08			
Head 5750	5660	34.80	5.05	35.46	5.13	-1.86	-1.56	±5	22.6	February 20, 2025
	5750	34.70	5.12	35.36	5.22	-1.87	-1.92			
	5840	34.60	5.22	35.27	5.30	-1.90	-1.51			

11.2.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 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:

- 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 1GHZ) and 15 mm (below 1GHz) from dipole center to the simulating liquid surface.
- For area scan, standard grid spacing for head measurements is 15 mm in x- and y- dimension (≤2GHz), 12 mm in x- and y-dimension (2-4 GHz) and 10 mm in x- and y- dimension (4-6GHz).
- For zoom scan, Δx_{zoom}, Δy_{zoom} ≤ 2 GHz - ≤ 8 mm, 2-4 GHz - ≤ 5 mm and 4-6 GHz-≤ 4 mm; Δz_{zoom} ≤ 3 GHz - ≤ 5 mm, 3-4 GHz- ≤ 4 mm and 4-6 GHz-≤ 2 mm.
- Distance between probe sensors and phantom surface was set to 3 mm except for 5 GHz band. For 5 GHz band, Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was set to 100 mW or 250 mW depend on the certificate of the dipoles.
- The results are normalized to 1 W input power.

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.

T.S. Liquid		Measured Results		Target (Ref. value)	Delta (%)	Limit (%)	Temp. (℃)	Test Date
		Zoom Scan (W/Kg)	Normalize to 1W (W/Kg)					
Head 2450	1-g	5.160	51.60	52.80	-2.27	±10	22.6	February 20, 2025
	10-g	2.350	23.50	24.40	-3.69			
Head 5750	1-g	7.710	77.10	77.90	-1.03	±10	22.6	February 20, 2025
	10-g	2.170	21.70	21.50	0.93			

12.Measured and Reported (Scaled) SAR Results

• Reported SAR(W/kg) = Measured SAR * Tune-up scaling factor * Duty Cycle scaling factor

SAR Test Reduction criteria are as follows:

KDB 447498 D01 General RF Exposure Guidance:
A）Per KDB447498 D01, all SAR measurement results are scaled to the maximum tune-up tolerance limit to demonstrate SAR compliance.
B）Testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is:

- ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz.
- ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz.
- ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz.

Per KDB865664 D01 v01r04:
For each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/Kg; if the deviation among the repeated measurement is ≤ 20%, and the measured SAR <1.45W/Kg, only one repeated measurement is required.

12.1.SAR Test Results of 2.4GHz Wi-Fi

Test Position (Body 5mm)	Test Mode	Channel/ Frequency	Power (dBm)		Measured SAR Value	Power Drift	Duty Cycle (%)	Scaled (W/Kg)
			Tune-up	Meas.	1-g (W/Kg)			
Front Side	11b	1/2462	23.0	22.17	0.295	-0.07	98.85	0.361
Front Side	11b	1/2412	22.5	21.65	0.412	-0.03	98.85	0.507
Front Side	11b	1/2437	22.5	21.55	0.465	-0.02	98.85	0.585

Note:
1) The SAR testing was set to transmit at maximum power for all tests.

Test Position (Extremity 0mm)	Test Mode	Channel/ Frequency	Power (dBm)		Measured SAR Value	Power Drift	Duty Cycle (%)	Scaled (W/Kg)
			Tune-up	Meas.	10-g (W/Kg)			
Back Side	11b	1/2462	23.0	22.17	0.461	-0.09	98.85	0.565
Left Edge	11b	1/2462	23.0	22.17	0.081	-0.01	98.85	0.099
Right Edge	11b	1/2462	23.0	22.17	0.522	-0.06	98.85	0.639
Top Edge	11b	1/2462	23.0	22.17	1.190	0.01	98.85	1.457
Bottom Edge	11b	1/2462	23.0	22.17	0.120	-0.02	98.85	0.147
Top Edge	11b	1/2412	22.5	21.65	0.530	-0.01	98.85	0.652
Top Edge	11b	1/2437	22.5	21.55	1.100	-0.14	98.85	1.385

Note:
1) The SAR testing was set to transmit at maximum power for all tests.

12.2.SAR Test Results of 5.8GHz Wi-Fi

Test Position (Body 5mm)	Test Mode	Channel/ Frequency	Power (dBm)		Measured SAR Value	Power Drift	Duty Cycle (%)	Scaled (W/Kg)
			Tune-up	Meas.	1-g (W/Kg)			
Front Side	11a	149/5745	20.5	19.66	0.206	-0.02	93.46	0.267
Front Side	11a	157/5785	20.5	19.01	0.199	-0.14	93.46	0.300
Front Side	11a	165/5825	20.5	19.37	0.209	-0.17	93.46	0.290

Note:
1) The SAR testing was set to transmit at maximum power for all tests.

Test Position (Extremity 0mm)	Test Mode	Channel/ Frequency	Power (dBm)		Measured SAR Value	Power Drift	Duty Cycle (%)	Scaled (W/Kg)
			Tune-up	Meas.	10-g (W/Kg)			
Back Side	11a	149/5745	20.5	19.66	0.210	-0.09	93.46	0.273
Left Edge	11a	149/5745	20.5	19.66	0.069	-0.04	93.46	0.090
Right Edge	11a	149/5745	20.5	19.66	1.340	-0.05	93.46	1.740
Top Edge	11a	149/5745	20.5	19.66	0.609	-0.01	93.46	0.791
Bottom Edge	11a	149/5745	20.5	19.66	0.075	-0.02	93.46	0.097
Right Edge	11a	157/5785	20.5	19.01	1.220	-0.07	93.46	1.840
Right Edge	11a	165/5825	20.5	19.37	1.190	-0.17	93.46	1.652

Note:
1) The SAR testing was set to transmit at maximum power for all tests.

12.3.SAR Test Results of BT

Test Position (Body 5mm)	Test Mode	Channel/ Frequency	Power (dBm)		Measured SAR Value	Power Drift	Duty Cycle (%)	Scaled (W/Kg)
			Tune-up	Meas.	1-g (W/Kg)			
Front Side	DH5	78/2480	13.5	13.00	0.011	-0.01	77.01	0.016
Front Side	DH5	0/2402	13.5	11.45	0.008	-0.05	77.01	0.017
Front Side	DH5	39/2441	13.5	12.15	0.010	-0.03	77.01	0.018

Note:
1) The SAR testing was set to transmit at maximum power for all tests.

Test Position (Extremity 0mm)	Test Mode	Channel/ Frequency	Power (dBm)		Measured SAR Value	Power Drift	Duty Cycle (%)	Scaled (W/Kg)
			Tune-up	Meas.	10-g (W/Kg)			
Back Side	DH5	78/2480	13.5	13.00	0.066	-0.03	77.01	0.096
Left Edge	DH5	78/2480	13.5	13.00	0.017	-0.01	77.01	0.025
Right Edge	DH5	78/2480	13.5	13.00	0.281	-0.01	77.01	0.409
Top Edge	DH5	78/2480	13.5	13.00	0.156	-0.05	77.01	0.227
Bottom Edge	DH5	78/2480	13.5	13.00	0.035	-0.11	77.01	0.051
Right Edge	DH5	0/2402	13.5	11.45	0.275	-0.02	77.01	0.573
Right Edge	DH5	39/2441	13.5	12.15	0.276	-0.08	77.01	0.489

Note:
1) The SAR testing was set to transmit at maximum power for all tests.

13.Simultaneous Transmission SAR Analysis

Simultaneous transmission possibilities		
NO	Simultaneous TX Combination	Body
1	2.4GHz Wi Fi+ BT	Y
2	5.8GHz Wi Fi+ BT	Y

Simultaneous Transmission Combination-Body				
Test Position	2.4GHz Wi Fi	BT	∑SAR 1-g (W/kg)	Limit (W/kg)
Front Side	0.585	0.018	0.603	1.6

Simultaneous Transmission Combination-Body				
Test Position	5.8GHz Wi Fi	BT	∑SAR 1-g (W/kg)	Limit (W/kg)
Front Side	0.300	0.018	0.318	1.6

Simultaneous Transmission Combination-Extremity				
Test Position	2.4GHz Wi Fi	BT	∑SAR 10-g (W/kg)	Limit (W/kg)
Back Side	0.565	0.096	0.661	4.0
Left Edge	0.099	0.025	0.124	
Right Edge	0.639	0.573	1.212	
Top Edge	1.457	0.227	1.684	
Bottom Edge	0.147	0.051	0.198	

Simultaneous Transmission Combination-Extremity				
Test Position	5.8GHz Wi Fi	BT	∑SAR 10-g (W/kg)	Limit (W/kg)
Back Side	0.273	0.096	0.369	4.0
Left Edge	0.090	0.025	0.115	
Right Edge	1.840	0.573	2.413	
Top Edge	0.791	0.227	1.018	
Bottom Edge	0.097	0.051	0.148	

Appendixes

Refer to separated files for the following appendixes.

4791622042-3-SAR-3_App A Photo

4791622042-3-SAR-3_App B System Check Plots

4791622042-3-SAR-3_App C Highest Test Plots

4791622042-3-SAR-3_App D Cal. Certificates

---------End of Report---------