

RF Exposure report



The following samples were submitted and identified on behalf of the client as:

Product Name	Digital Camera
Brand Name	FUJIFILM
Model No.	FF240002
Applicant	UNIVERSAL GLOBAL SCIENTIFIC INDUSTRIAL CO., LTD. 141, Lane 351, Sec.1, Taiping Road, Tsao-tuen, Nantou, 542007, Taiwan
Standards	IEEE/ANSI C95.1-1992, IEEE 1528-2013
FCC ID	COF-WMCW26
Date of EUT Receipt	Apr. 10, 2024
Date of Test(s)	Jun. 04, 2024 ~ Jun. 07, 2024
Date of Issue	Jul. 31, 2024

In the configuration tested, the EUT complied with the standards specified above.

Remarks:

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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Signed on behalf of SGS

Clerk / Cindy Chou	PM / Tom Chiang	Approved By / John Yeh

Date: Jul. 31, 2024

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Revision History

Report Number	Revision	Description	Issue Date	Revised By	Remark
TESA2404000199E5	00	Initial creation of document	Jul. 31, 2024	Cindy Chou	

Note:

- The mark " * " is the revised version of the report due to comments submitted by the certification.

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SGS Taiwan Ltd.

No.134,Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan/新北市五股區新北產業園區五工路 134 號

台灣檢驗科技股份有限公司

t (886-2) 2299-3279

f (886-2) 2298-0488

www.sgs.com.tw

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1 GENERAL INFORMATION

1.1 Test Methodology

The SAR testing method and procedure for this device is in accordance with the following standards:

IEEE/ANSI C95.1-1992

IEEE 1528-2013

KDB447498D01v06

KDB865664D01v01r04

KDB865664D02v01r02

KDB248227D01v02r02

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1.2 Description of EUT

Product Name	Digital Camera	
Brand Name	FUJIFILM	
Model No.	FF240002	
FCC ID	COF-WMCW26	
Integrated WLAN Module	Brand Name: USI Model Name: WM-CW-26	
Duty Cycle	WLAN802.11	Please refer to section 6
	Bluetooth	Please refer to section 6
Supported radios (TX Frequency Range, MHz)	802.11 b/g/n	2.4GHz (2400.0 – 2483.5 MHz)
	Bluetooth 5.2	2.4GHz (2400.0 – 2483.5 MHz)

1.3 Maximum value

Summary of Maximum SAR	
Mode	Highest SAR 1g (W/kg)
Bluetooth(GFSK)	0.04
2.4G WLAN	1.11

1.4 Antenna Information

Vendor	YAGEO
Antenna	ANT
Part Number	ANT3216LL11R2400A
Frequency(MHz)	2400~2500
Gain (dBi)	3.68
Note: Antenna information is provided by the applicant.	

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2 MEASUREMENT SYSTEM

2.1 Test Facility

Laboratory	Test Site Address	Test Site Name	FCC Designation number	IC CAB identifier
SGS Taiwan Ltd. Central RF Lab. (TAF code 3702)	1F, No. 8, Alley 15, Lane 120, Sec. 1, NeiHu Road, Neihu District, Taipei City, 11493, Taiwan.	SAR 2	TW0029	TW3702
		SAR 6		
		SAR 8		
	No. 2, Keji 1st Rd., Guishan Township, Taoyuan County, 33383, Taiwan	SAR 1	TW0028	
		SAR 4		
	No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan	SAR 3	TW0027	
SAR 7				

Note: Test site name is remarked on the equipment list in each section of this report as an indication where measurements occurred in specific test site and address.

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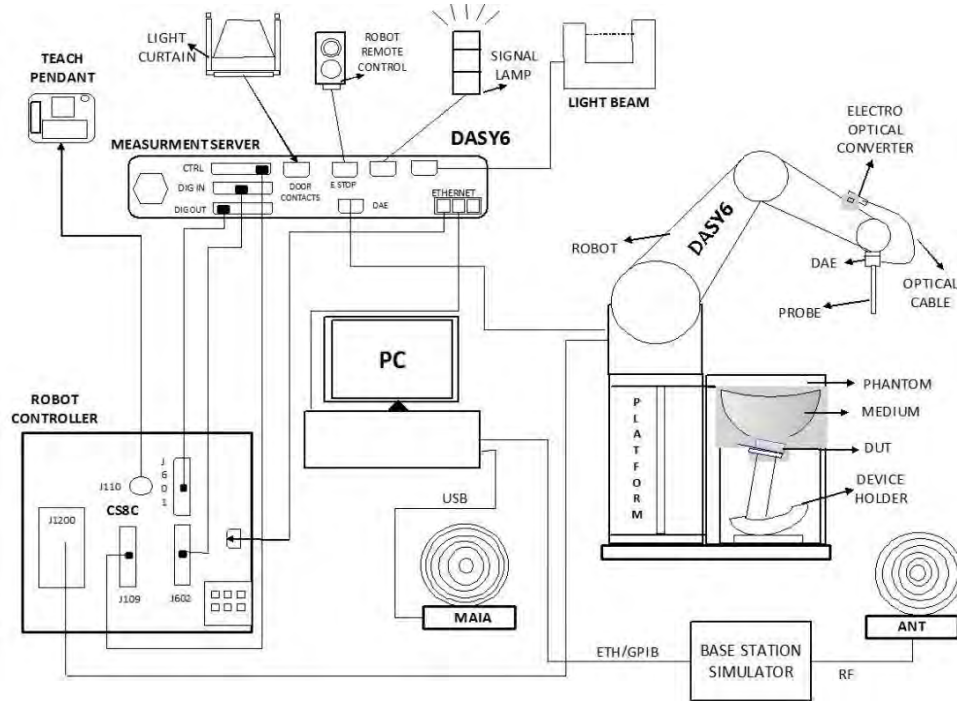
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2.2 SAR System

Block Diagram (DASY6)

The DASY 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 Windows 10 and the DASY6 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.

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EX3DV4 E-Field Probe


Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Calibration	Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 2450 MHz Additional CF for other liquids and frequencies upon request	
Frequency	10 MHz to > 6 GHz	
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)	
Dynamic Range	10 µW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/g)	
Dimensions	Tip diameter: 2.5 mm	
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.	

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PHANTOM (SAM)

Model	Twin SAM	
Construction	<p>The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209.</p> <p>It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points with the robot.</p>	
Shell Thickness	2 ± 0.2 mm	
Filling Volume	Approx. 25 liters	
Dimensions	Height: 850 mm; Length: 1000 mm; Width: 500 mm	

DEVICE HOLDER

Construction	<p>In combination with the Twin SAM Phantom V4.0/V4.0C or Twin SAM, the Mounting Device (made from POM) enables the rotation of the mounted transmitter in spherical coordinates, whereby the rotation point is the ear opening.</p> <p>The devices can be easily and accurately positioned according to IEC, IEEE, CENELEC, FCC or other specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).</p>	 <p style="text-align: center;">Device Holder</p>
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3 SAR SYSTEM VERIFICATION

3.1 Tissue Simulating Liquid

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with homogeneous tissue simulating liquid. For head SAR testing, the liquid height from the ear rint (ERP) of the phantom to the liquid top surface is larger than 15cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15cm.

3.2 Tissue Simulant Liquid measurement

The dielectric properties for this Head-simulant fluid were measured by using the SPEAG Dielectric Assessment Kit (DAKS-3.5)

All dielectric parameters of tissue simulates were measured within 24 hours of SAR measurements. The measured conductivity and permittivity are all within $\pm 5\%$ of the target values.

3.3 Measurement results of Tissue Simulant Liquid

Measured Frequency (MHz)	Target Dielectric Constant, ϵ_r	Target Conductivity, σ (S/m)	Measured Dielectric Constant, ϵ_r	Measured Conductivity, σ (S/m)	% dev ϵ_r	% dev σ	Limit	Measurement Date
2402	39.282	1.757	40.145	1.835	2.20%	4.41%	$\pm 5\%$	Jun. 07, 2024
2412	39.265	1.766	40.128	1.844	2.20%	4.40%	$\pm 5\%$	
2440	39.217	1.791	40.078	1.869	2.20%	4.35%	$\pm 5\%$	
2442	39.214	1.793	40.074	1.871	2.19%	4.36%	$\pm 5\%$	
2450	39.200	1.800	40.060	1.878	2.19%	4.33%	$\pm 5\%$	
2472	39.171	1.823	40.032	1.898	2.20%	4.09%	$\pm 5\%$	
2480	39.160	1.832	40.022	1.905	2.20%	3.98%	$\pm 5\%$	

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3.4 The composition of the tissue simulating liquid:

Simulating Liquids for 600 MHz -10 GHz, Manufactured by SPEAG:

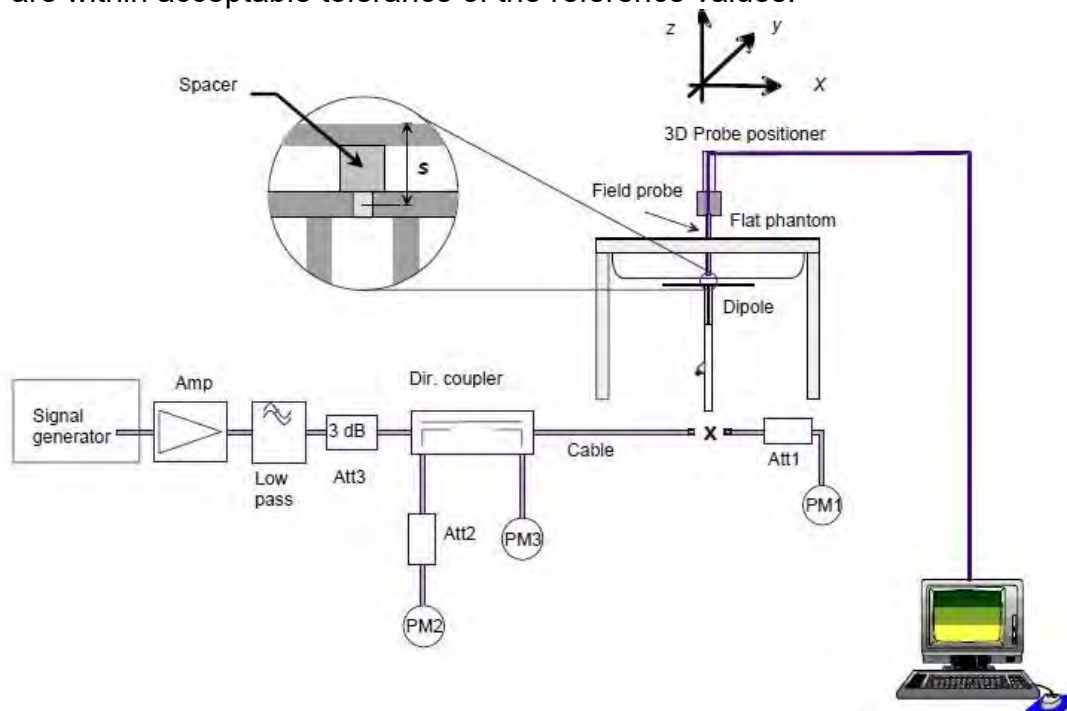
Broad-band head tissue simulating liquids	SPEAG Product	Frequency range (MHz)	Main Ingredients
	HBBL600-10000V6	600 - 10000	Water, Oil

3.5 System check

The microwave circuit arrangement for system check is sketched in below. The daily system accuracy verification occurs within the flat section of the SAM phantom and ELI phantom. A SAR measurement was performed to see if the measured SAR was within +/- 10% from the target SAR values.

The tests were conducted on the same days as the measurement of the DUT. The obtained results from the system accuracy verification are displayed with SAR values normalized to 1W forward power delivered to the dipole.

During the tests, the liquid depth from the center of the flat phantom to the liquid top surface was 15 cm above in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.



The block diagram of system check

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3.6 System check results

Validation Kit	S/N	Frequency (MHz)	1W Target 1g-SAR (W/kg)	pin=250mW Measured 1g-SAR (W/kg)	Normalized to 1W 1g-SAR (W/kg)	Deviation (%)	Limit	Measurement Date
D2450V2	727	2450	52.7	13.2	52.8	0.19	± 10%	Jun.07,2024

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台灣檢驗科技股份有限公司

t (886-2) 2299-3279

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4 TEST CONFIGURATIONS

4.1 Test Environment

Ambient Temperature: 22±2° C

Tissue Simulating Liquid: 22±2° C

4.2 Test Note

- **General:** Measurements are performed respectively on the lowest, middle and highest channels of the operating band(s).
- **General:** The EUT is set to maximum power level during all tests, and at the beginning of each test the battery is fully charged.
- **General:** During the SAR testing, the DASY system checks power drift by comparing the e-field strength of one specific location measured at the beginning with that measured at the end of the SAR testing.
- **General:** According to KDB447498D01v06, testing of other required channels is not required when the reported 1-g SAR for the highest output channel is ≤ 0.8 W/kg, when the transmission band is ≤ 100 MHz.
- **General:** According to KDB865664D01v01r04, SAR measurement variability must be assessed for each frequency band. When the original highest measured SAR is ≥ 0.8 W/kg, repeated that measurement once. 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).
- **WLAN 2.4GHz:** 802.11b DSSS SAR Test Requirements: SAR is measured for 2.4 GHz 802.11b DSSS mode using the highest measured maximum output power channel, when the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration. 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.
- **WLAN 2.4GHz:** 802.11g/n OFDM SAR Test Exclusion Requirements: SAR is not required for 802.11g/n since 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.

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4.3 Test position

SAR is measured for all surfaces with 0mm distance.

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4.4 Test limit

[§ 2.1093\(d\)\(1\)](#)

Applications for equipment authorization of portable RF sources subject to routine environmental evaluation must contain a statement confirming compliance with the limits specified in [§ 1.1310](#) as part of their application. Technical information showing the basis for this statement must be submitted to the Commission upon request. The SAR limits specified in [§ 1.1310\(a\)](#) through [\(c\) of this chapter](#) shall be used for evaluation of portable devices transmitting in the frequency range from 100 kHz to 6 GHz. Portable devices that transmit at frequencies above 6 GHz shall be evaluated in terms of the MPE limits specified in Table 1 to [§ 1.1310\(e\)\(1\)](#). A minimum separation distance applicable to the operating configurations and exposure conditions of the device shall be used for the evaluation. In general, maximum time-averaged power levels must be used for evaluation. All unlicensed personal communications service (PCS) devices and unlicensed NII devices shall be subject to the limits for general population/uncontrolled exposure.

Radiofrequency radiation exposure limits.

[§ 1.1310\(a\)](#)

Specific absorption rate (SAR) shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in § 1.1307(b) within the frequency range of 100 kHz to 6 GHz (inclusive).

[§ 1.1310\(b\)](#)

The SAR limits for occupational/controlled exposure are 0.4 W/kg, as averaged over the whole body, and a peak spatial-average SAR of 8 W/kg, averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the parts of the human body treated as extremities, such as hands, wrists, feet, ankles, and pinnae, where the peak spatial-average SAR limit for occupational/controlled exposure is 20 W/kg, averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). Exposure may be averaged over a time period not to exceed 6 minutes to determine compliance with occupational/controlled SAR limits.

[§ 1.1310\(c\)](#)

The SAR limits for general population/uncontrolled exposure are 0.08 W/kg, as averaged over the whole body, and a peak spatial-average SAR of 1.6 W/kg, averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the parts of the human body treated as extremities, such as hands, wrists, feet, ankles, and pinnae, where the peak spatial-average SAR limit is 4 W/kg, averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). Exposure may be averaged over a time period not to exceed 30 minutes to determine compliance with general population/uncontrolled SAR limits.

Note to paragraphs (a) through (c):

SAR is a measure of the rate of energy absorption due to exposure to RF electromagnetic energy. These SAR limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized SAR in [Section 4.2](#) of "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," ANSI/IEEE Std C95.1-1992, copyright 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in "Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," NCRP Report No. 86, [Section 17.4.5](#), copyright 1986 by NCRP, Bethesda, Maryland 20814. Limits for whole body SAR and peak spatial-average SAR are based

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on recommendations made in both of these documents. The MPE limits in Table 1 are based generally on criteria published by the NCRP in "Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," NCRP Report No. 86, Sections 17.4.1, 17.4.1.1, 17.4.2 and 17.4.3, copyright 1986 by NCRP, Bethesda, Maryland 20814. In the frequency range from 100 MHz to 1500 MHz, these MPE exposure limits for field strength and power density are also generally based on criteria recommended by the ANSI in [Section 4.1](#) of "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," ANSI/IEEE Std C95.1-1992, copyright 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017.

Portable devices that transmit at frequencies above 6 GHz shall be evaluated in terms of the MPE limits specified in Table 1 to [§ 1.1310\(e\)\(1\)](#).

According to ANSI/IEEE C95.1-1992, the criteria listed in the following Table shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310.

Peak Spatially Averaged Power Density was evaluated over a circular area of 4cm² per interim FCC Guidance for near-field power density evaluations per October 2018 TCB Workshop notes

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Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(i) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*(900/f ²)	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1,500-100,000			5	<6
(ii) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f ²)	<30
30-300	27.5	0.073	0.2	<30
300-1,500			f/1500	<30
1,500-100,000			1.0	<30

f = frequency in MHz. * = Plane-wave equivalent power density.

Table 1 to [§ 1.1310\(e\)\(1\)](#) - Limits for Maximum Permissible Exposure (MPE)

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5 MAXIMUM OUTPUT POWER

5.1 WLAN

Ant Main						
Band	Mode	Channel	Frequency (MHz)	Data Rate	Max. Rated Avg. Power + Max. Tolerance (dBm)	Average power (dBm)
2.45GHz	802.11b	1	2412	1Mbps	13.50	13.20
		6	2437		14.00	13.85
		11	2462		14.00	13.99
	802.11g	1	2412	6Mbps	13.50	13.15
		6	2437		14.00	13.79
		11	2462		14.00	13.17
	802.11n20-HTO	1	2412	MCS0	13.50	13.14
		6	2437		14.00	13.84
		11	2462		14.00	13.09

5.2 BLE

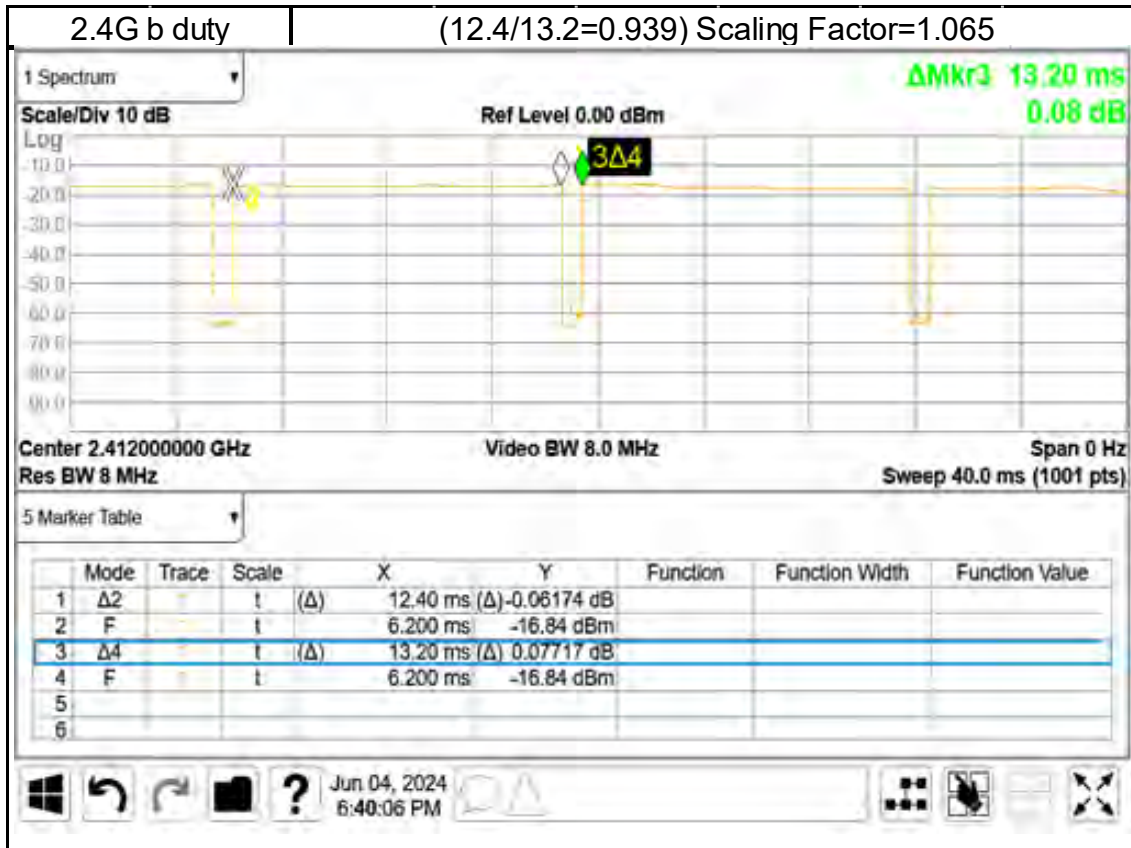
Mode	Channel	Frequency (MHz)	GFSK	
			Max. Rated Avg. Power + Max. Tolerance (dBm)	Average Output Power (dBm)
BLE_1M	CH 00	2402	6	4.49
	CH 19	2440		4.57
	CH 39	2480		4.46

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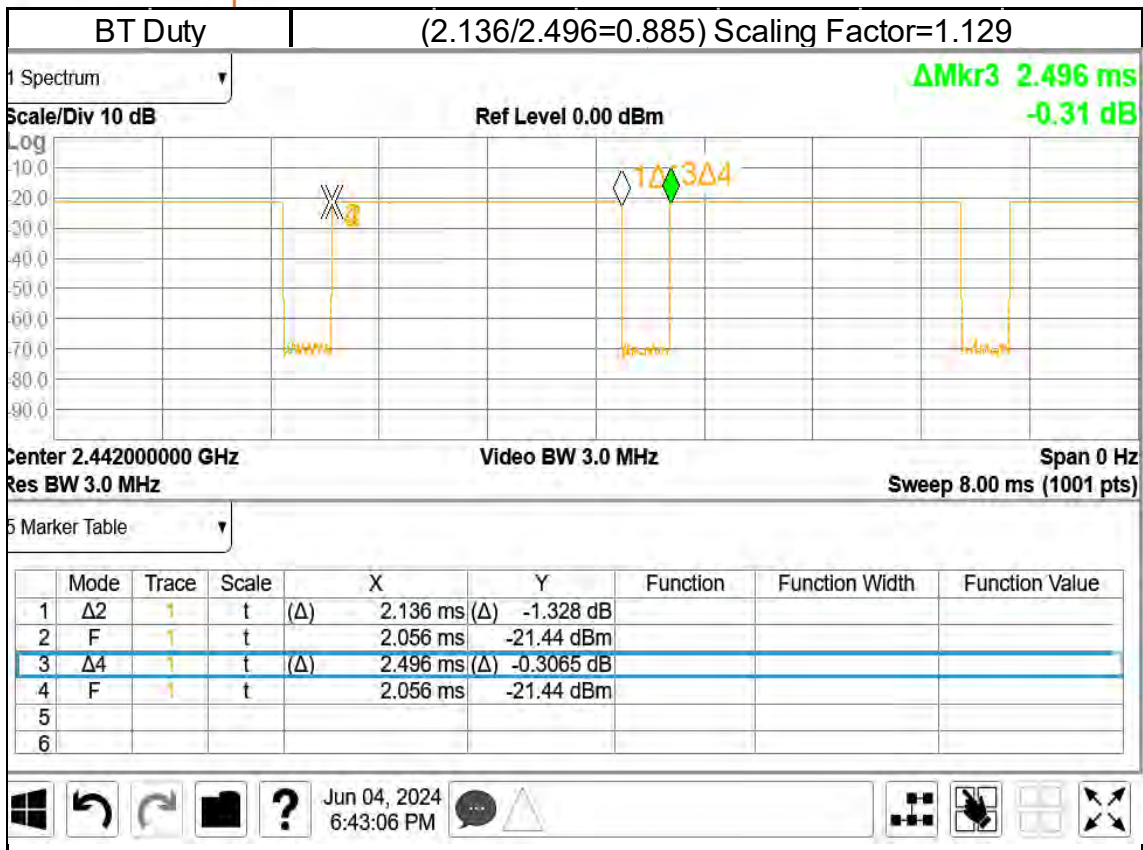
6 DUTY CYCLE



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7 SUMMARY OF RESULTS

7.1 Decision rules

Reported measurement data comply with Test Methodology in section 1.1.

Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

7.2 Summary of SAR Results

WLAN

Band	Antenna	Position	Distance (mm)	Channel	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Duty cycle scaling	Power scaling	Averaged SAR over 1g (W/kg)		ID
										Measured	Reported	
WLAN 802.11b	Ant Main	Front Surface	0	1	2412	13.50	13.20	1.07	107.15%	0.968	1.105	001
WLAN 802.11b	Ant Main	Front Surface	0	6	2437	14.00	13.85	1.07	103.51%	0.863	0.951	-
WLAN 802.11b	Ant Main	Front Surface	0	11	2462	14.00	13.99	1.07	100.23%	0.785	0.838	-
WLAN 802.11b	Ant Main	Back Surface	0	11	2462	14.00	13.99	1.07	100.23%	0.056	0.060	-
WLAN 802.11b	Ant Main	Top Edge	0	11	2462	14.00	13.99	1.07	100.23%	0.089	0.095	-
WLAN 802.11b	Ant Main	Bottom Edge	0	11	2462	14.00	13.99	1.07	100.23%	0.360	0.384	-
WLAN 802.11b	Ant Main	Left Edge	0	11	2462	14.00	13.99	1.07	100.23%	0.018	0.019	-
WLAN 802.11b	Ant Main	Right Edge	0	11	2462	14.00	13.99	1.07	100.23%	0.745	0.795	-
WLAN 802.11b	Ant Main	Front Surface	0	1	2412	13.50	13.20	1.07	107.15%	0.943	1.076	-
Band	Antenna	Position	Distance (mm)	Channel	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Duty cycle scaling	Power scaling	Averaged SAR over 1g (W/kg)		ID
BLE_1M	Ant Main	Front Surface	0	00	2402	6.00	4.49	1.13	141.58%	0.021	0.034	-
BLE_1M	Ant Main	Front Surface	0	19	2440	6.00	4.57	1.13	139.00%	0.025	0.039	-
BLE_1M	Ant Main	Front Surface	0	39	2480	6.00	4.46	1.13	142.56%	0.032	0.052	002
BLE_1M	Ant Main	Back Surface	0	39	2480	6.00	4.46	1.13	142.56%	0.005	0.008	-
BLE_1M	Ant Main	Top Edge	0	39	2480	6.00	4.46	1.13	142.56%	0.008	0.013	-
BLE_1M	Ant Main	Bottom Edge	0	39	2480	6.00	4.46	1.13	142.56%	0.016	0.026	-
BLE_1M	Ant Main	Left Edge	0	39	2480	6.00	4.46	1.13	142.56%	0.003	0.005	-
BLE_1M	Ant Main	Right Edge	0	39	2480	6.00	4.46	1.13	142.56%	0.024	0.039	-

Note:

Reported SAR = measured SAR * Power scaling * Duty cycle scaling

7.3 Reporting statements of conformity

The conformity statement in this report is based solely on the test results, measurement uncertainty is excluded.

7.4 Conclusion

The device is compliant because all the standalone results are less than their corresponding criteria.

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8 SIMULTANEOUS TRANSMISSION ANALYSIS

8.1 Simultaneous Transmission Scenarios:

Simultaneous Transmission configurations	Body
WLAN 2.4GHz Main + BT Main	Yes

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8.2 Estimated SAR calculation

According to KDB447498 D01v06 – When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

$$\text{Estimated SAR} = \frac{\text{Max. tune up power (mW)}}{\text{Min. test separation distance(mm)}} \times \frac{\sqrt{f(\text{GHz})}}{7.5}$$

If the minimum test separation distance is < 5mm, a distance of 5mm is used for estimated SAR calculation. When the test separation distance is >50mm, the 0.4W/kg is used for SAR-1g.

8.3 SPLSR evaluation and analysis

Per KDB447498D01, when the sum of SAR is larger than the limit, SAR test exclusion is determined by the SAR sum to peak location separation ratio(SPLSR).

The simultaneous transmitting antennas in each operating mode and exposure condition combination must be considered one pair at a time to determine the SAR to peak location separation ratio to qualify for test exclusion.

The ratio is determined by $(\text{SAR1} + \text{SAR2})^{1.5}/R_i$, rounded to two decimal digits, and must be ≤ 0.04 for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion.

SAR1 and SAR2 are the highest reported or estimated SAR for each antenna in the pair, and R_i is the separation distance between the peak SAR locations for the antenna pair in mm.

When standalone test exclusion applies, SAR is estimated; the peak location is assumed to be at the feed-point or geometric center of the antenna.

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Simultaneous Transmission Combination

Exposure Position		FCC Reported SAR		Scenario 1
		2	6	2+6
		2.4GHz WLAN Ant Main	Bluetooth Ant Main	Summed
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)
Front Surface	0	1.105	0.052	1.157
Back Surface	0	0.060	0.008	0.068
Top Edge	0	0.095	0.013	0.108
Bottom Edge	0	0.384	0.026	0.410
Left Edge	0	0.019	0.005	0.024
Right Edge	0	0.795	0.039	0.834

8.4 Conclusion

The simultaneous transmission is compliant because both SAR sum and/or SPLSR are less than their corresponding criteria.

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9 INSTRUMENTS LIST

Equipment List					
Manufacturer	Device	Type	Serial number	Date of last calibration	Date of next calibration
SPEAG	Data acquisition Electronics	DAE4	558	Nov/20/2023	Nov/19/2024
SPEAG	Dosimetric E-Field Probe	EX3DV4	7686	Sep/21/2023	Sep/20/2024
SPEAG	System Validation Dipole	D2450V2	727	Apr/22/2024	Apr/21/2025
SPEAG	Dielectric Assessment Kit	DAKS-3.5	1053	Feb/21/2024	Feb/20/2025
Agilent	MXG Analog Signal Generator	N5181A	MY50145142	Dec/12/2023	Dec/11/2024
R&S	MXG Analog Signal Generator	SMB100A03	182012	May/21/2024	May/20/2025
Agilent	Dual-directional coupler	772D	MY52180142	Oct/23/2023	Oct/22/2024
Agilent	Dual-directional coupler	778D	MY52180302	Oct/23/2023	Oct/22/2024
EMCI	Amplifier	ZHL-42	980189	Calibration not required	Calibration not required
EMCI	Amplifier	ZVE-8G	980190	Calibration not required	Calibration not required
R&S	Power Sensor	NRP18S	109065	Oct/23/2023	Oct/22/2024
R&S	Power Meter	NRX	102034	Dec/13/2023	Dec/12/2024
R&S	Power Sensor	NRP18S	101974	Nov/21/2023	Nov/20/2024
SPEAG	Software	DASY 8 V16.0.2.83	N/A	Calibration not required	Calibration not required
SPEAG	Phantom	SAM	N/A	Calibration not required	Calibration not required
LKM	Digital thermometer	DTM3000	EC14010603	Sep/27/2023	Sep/26/2024
TECPEL	Digital thermometer	DTM-303A	TP131515	May/23/2024	May/22/2025

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10 UNCERTAINTY BUDGET

Measurement Uncertainty evaluation template for DUT SAR test (0.3-3G)

A	c	D	e		f	g	h=c * f / e	i=c * g / e	k
Source of Uncertainty	Tolerance/ Uncertainty	Probability Distributio	Div	Div Value	ci (1g)	ci (10g)	Standard uncertainty	Standard uncertainty	vi, or Veff
Measurement system									
Probe calibration	6.00%	N	1	1	1	1	6.00%	6.00%	∞
<i>Isotropy, Axial</i>	3.50%	R	√3	1.732	1	1	2.02%	2.02%	∞
<i>Isotropy, Hemispherical</i>	9.60%	R	√3	1.732	1	1	5.54%	5.54%	∞
Modulation Response	2.40%	R	√3	1.732	1	1	1.40%	1.40%	∞
Boundary Effect	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Linearity	4.70%	R	√3	1.732	1	1	2.71%	2.71%	∞
Detection Limits	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Readout Electronics	0.30%	N	1	1	1	1	0.30%	0.30%	∞
Response time	0.80%	R	√3	1.732	1	1	0.46%	0.46%	∞
Integration Time	2.60%	R	√3	1.732	1	1	1.50%	1.50%	∞
Measurement drift (class A evaluation)									
RF ambient condition - noise	3.00%	R	√3	1.732	1	1	1.73%	1.73%	∞
RF ambient conditions - reflections	3.00%	R	√3	1.732	1	1	1.73%	1.73%	∞
Probe positioner	0.40%	R	√3	1.732	1	1	0.23%	0.23%	∞
Mechanical restrictions									
Probe Positioning with respect to phantom shell	2.90%	R	√3	1.732	1	1	1.67%	1.67%	∞
Post-processing	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Max SAR Eval	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Test Sample related									
Test sample positioning	2.90%	N	1	1	1	1	2.90%	2.90%	M-1
Device Holder Uncertainty	3.60%	N	1	1	1	1	3.60%	3.60%	M-1
Drift of output power	5.00%	R	√3	1.732	1	1	2.89%	2.89%	∞
Phantom and Setup									
Phantom Uncertainty	4.00%	R	√3	1.732	1	1	2.31%	2.31%	∞
Liquid permittivity (mea.)	2.20%	N	1	1	0.64	0.43	1.41%	0.95%	M
Liquid Conductivity (mea.)	4.41%	N	1	1	0.6	0.49	2.65%	2.16%	M
Combined standard uncertainty		RSS					11.80%	11.65%	
Expant uncertainty (95% confidence interval), K=2							23.61%	23.30%	

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11 SAR MEASUREMENT RESULTS

ID: 001

Report No. : TESA2404000199E5

Measurement Report_WLAN 802.11b_Body_Front Surface_CH 1_0mm_Main

Ambient temperature: 22.2°C; Liquid temperature: 21.3°C

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	Front Surface, 0.00	2412.0,1	8.05	1.844	40.128

Hardware Setup

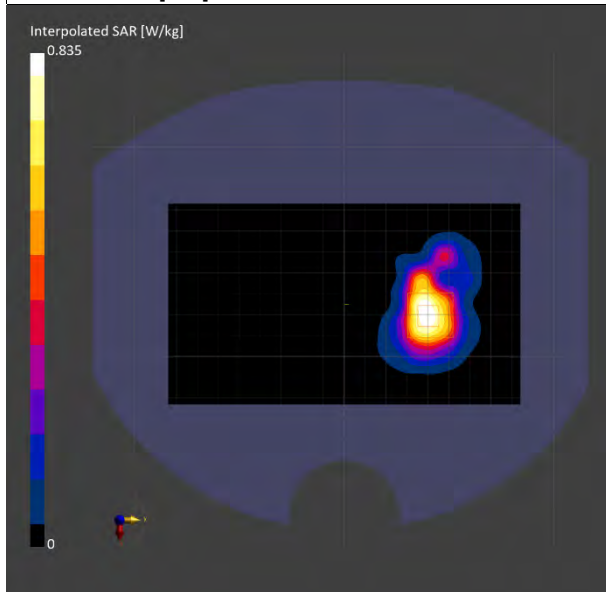
Phantom	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM	EX3DV4 - SN7686, 2023-09-21	DAE4 Sn558, 2023-11-20

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	120.0 x 168.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	12.0 x 12.0	5.0 x 5.0 x 5.0
Sensor Surface [mm]	3.0	1.4

Measurement Results

	Area Scan	Zoom Scan
Date	2024-06-07	2024-06-07
psSAR1g [W/kg]	0.790	0.968
psSAR8g [W/kg]	0.425	0.491
psSAR10g [W/kg]	0.385	0.444
Power Drift [dB]	0.05	-0.02
M2/M1 [%]		54.9
Dist 3dB Peak [mm]		6.5



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ID: 002

Report No. : TESA2404000199E5

Measurement Report_BLE 1M_Body_Front Surface_CH 39_0mm_Main

Ambient temperature: 22.2°C; Liquid temperature: 21.3°C

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Frequency [MHz], Channel Number	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	Front Surface, 0.00	2480.0,39	8.05	1.905	40.022

Hardware Setup

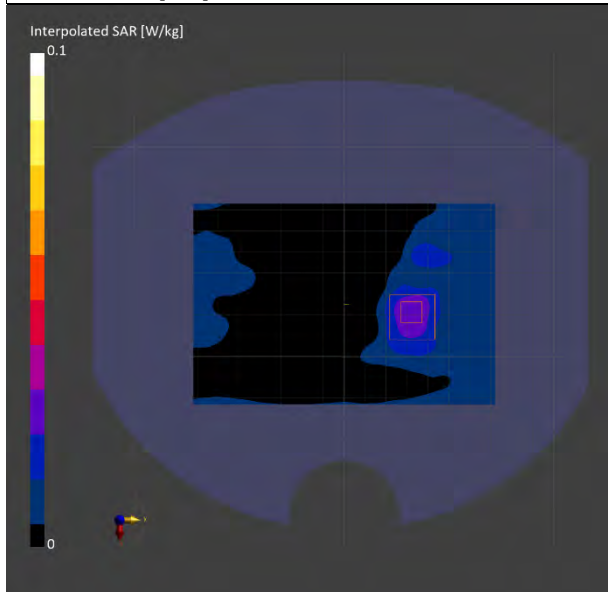
Phantom	Probe, Calibration Date	DAE, Calibration Date
Twin-SAM	EX3DV4 - SN7686, 2023-09-21	DAE4 Sn558, 2023-11-20

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	96.0 x 144.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	12.0 x 12.0	5.0 x 5.0 x 5.0
Sensor Surface [mm]	3.0	1.4

Measurement Results

	Area Scan	Zoom Scan
Date	2024-06-07	2024-06-07
psSAR1g [W/kg]	0.026	0.032
psSAR8g [W/kg]	0.015	0.019
psSAR10g [W/kg]	0.013	0.018
Power Drift [dB]	-0.04	-0.01
M2/M1 [%]		54.5
Dist 3dB Peak [mm]		6.2



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12 SAR SYSTEM CHECK RESULTS

Report No. : TESA2404000199E5

Measurement Report

Dipole_D2450-SN: 727

Ambient temperature: 22.2°C; Liquid temperature: 21.3°C

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Conversion Factor	TSL Conductivity [S/m]	TSL Permittivity
Flat, HSL	FRONT, 10.00	8.05	1.878	40.060

Hardware Setup

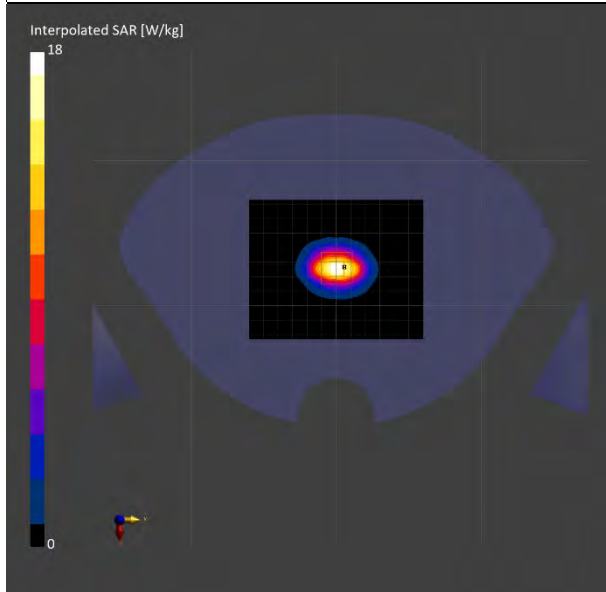
Phantom	Probe, Calibration Date	DAE, Calibration Date
ELI	EX3DV4 - SN7686, 2023-09-21	DAE4 Sn558, 2023-11-20

Scans Setup

	Area Scan	Zoom Scan
Grid Extents [mm]	120.0 x 120.0	30.0 x 30.0 x 30.0
Grid Steps [mm]	12.0 x 12.0	5.0 x 5.0 x 5.0
Sensor Surface [mm]	3.0	1.4

Measurement Results

	Area Scan	Zoom Scan
Date	2024-06-07	2024-06-07
psSAR1g [W/kg]	13.1	13.2
psSAR8g [W/kg]	6.55	6.68
psSAR10g [W/kg]	5.89	6.03
Power Drift [dB]	-0.01	-0.03
M2/M1 [%]		52.2
Dist 3dB Peak [mm]		9.2



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Refer to separated files for the following appendixes.**13.1 SAR_Appendix A Photographs****13.2 SAR_Appendix B DAE & Probe Cal. Certificate****13.3 SAR_Appendix C Phantom Description & Dipole Cal. Certificate****- End of report -**

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