SAR EVALUATION REPORT

IEEE Std 1528-2013

For
SMARTPHONE

FCC ID: BCG-E8948A

Model Name: A3260

Report Number: 15496282-S11V1
Issue Date: 7/29/2025

Prepared for
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Revision History

Rev.	Date	Revisions	Revised By
V1	7/29/2025	Initial Issue	--

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1. Attestation of Test Results

Applicant Name	APPLE INC.
FCC ID	BCG-E8948A
Model Name	A3260
Applicable Standards	Published RF exposure KDB procedures IEEE Std 1528-2013
Date Tested	7/24/2025 to 7/25/2025
Test Results	Pass

This test report is supplemental to UL SAR report 15496282-S1 and UL Smart Tx report 15496282-S6 Part 1. This report contains SAR and PD test results obtained while the DUT was transmitting with a MagSafe compatible battery pack (FCC ID: BCG-A2384) attached to the DUT. Refer to § 7 for a description of the modes tested as well as Standalone SAR and PD test results from UL SAR report 15496282-S1 and UL Smart Tx report 15496282-S6 Part 1

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested can demonstrate compliance with the requirements as documented in this report.

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for the validity of results after the integration of the data provided by the customer.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not considered unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. 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 A2LA, NIST, or any agency of the U.S. Government, or any agency of the U.S. government.

Approved & Released By:	Prepared By:
	
Devin Chang Senior Test Engineer UL Verification Services Inc.	AJ Newcomer Laboratory Test Engineer UL Verification Services Inc.

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, the following FCC Published RF exposure KDB procedures:

SAR

- 248227 D01 802.11 Wi-Fi SAR v02r02
- 447498 D01 General RF Exposure Guidance v06
- 447498 D03 Supplement C Cross-Reference v01
- 648474 D04 Handset SAR v01r03
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- 865664 D02 RF Exposure Reporting v01r02
- 941225 D01 3G SAR Procedures v03r01
- 941225 D05 SAR for LTE Devices v02r05
- 941225 D05A LTE Rel.10 KDB Inquiry Sheet v01r02
- 941225 D06 Hotspot Mode v02r01
- SPEAG DASY 6 System Handbook; part 4 cDASY6 Module mmWave
- IEC TR 63170: 2018

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

- **TCB workshop** October 2014; RF Exposure Procedures (Other LTE Considerations)
- **TCB workshop** April 2015; RF Exposure Procedures (Overlapping LTE Bands)
- **TCB workshop** October 2015; RF Exposure Procedures (KDB 941225 D05A)
- **TCB workshop** April 2016; RF Exposure Procedures (LTE Carrier Aggregation for DL)
- **TCB workshop** October 2016; RF Exposure Procedures (LTE Carrier Aggregation for UL)
- **TCB workshop** October 2016; RF Exposure Procedures (Bluetooth Duty Factor)
- **TCB workshop** October 2016; RF Exposure Procedures (DUT Holder Perturbations)
- **TCB workshop** May 2017; RF Exposure Procedures (Broadband Liquid Above 3 GHz)
- **TCB workshop** May 2017; RF Exposure Procedures (LTE Band 41 Power Class 2)
- **TCB workshop** November 2017; RF Exposure Procedures (LTE UL/DL Carrier Aggregation SAR)
- **TCB workshop** April 2018; RF Exposure Procedures (LTE DL CA SAR Test Exclusion)
- **TCB workshop** October 2018; RF Exposure Procedures (LTE Inter-Band Uplink Carrier Aggregation – Interim Procedures)
- **TCB workshop** April 2019; RF Exposure Procedures (802.11ax SAR Testing)
- **TCB workshop** November 2019; RF Exposure Policy Updates (5G NR FR1 NSA EN-DCUE SAR Evaluations)
- **TCB workshop** October 2020; 5G and RF Exposure Procedures (U-NII 6-7 GHz SAR Testing)
- **TCB workshop** April 2021; RF Exposure Procedures (Remarks on Test Reductions via Data Referencing for Closely Related Products)
- **TCB workshop** April 2022; RF Exposure Procedures (Sum-Peak Location Separation Ratio)
- **TCB workshop** April 2024; RF Exposure Updates (Accessories and Peripherals to RF Devices)

PD

- 447498 D01 General RF Exposure Guidance v06
- 865664 D02 RF Exposure Reporting v01r02
- 388624 D02 Pre-Approval Guidance List v18r05
- 248227 D01 802.11 Wi-Fi SAR v02r02
- SPEAG DASY8 System Handbook; part 4 DASY8 Module mmWave
- SPEAG DASY8 Application Note: SAR, APD & PD at 6 – 10 GHz (Version 5), April 2022
- IEC TR 63170: 2018

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

- TCB workshop November 2017; RF Exposure Procedures (Power Density Evaluation)
- TCB workshop October 2018; RF Exposure Procedures (Millimeter Wave Assessment)
- TCB workshop April 2019; RF Exposure Procedures (Millimeter Wave RF Exposure Evaluation)
- TCB workshop November 2019; RF Exposure Procedures (Millimeter Wave Scan Requirements)
- TCB workshop October 2020; RF Exposure Procedures (U NII 6-7 GHz RF Exposure)
- TCB workshop October 2022; RF Exposure Policies and Procedures (f-above-6 GHz Portable Devices)

3. Facilities and Accreditation

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

47173 Benicia Street	47266 Benicia Street
SAR Labs A to I	SAR Labs 1 to 19

UL Verification Services Inc. is accredited by A2LA, Certificate Number 0751.05

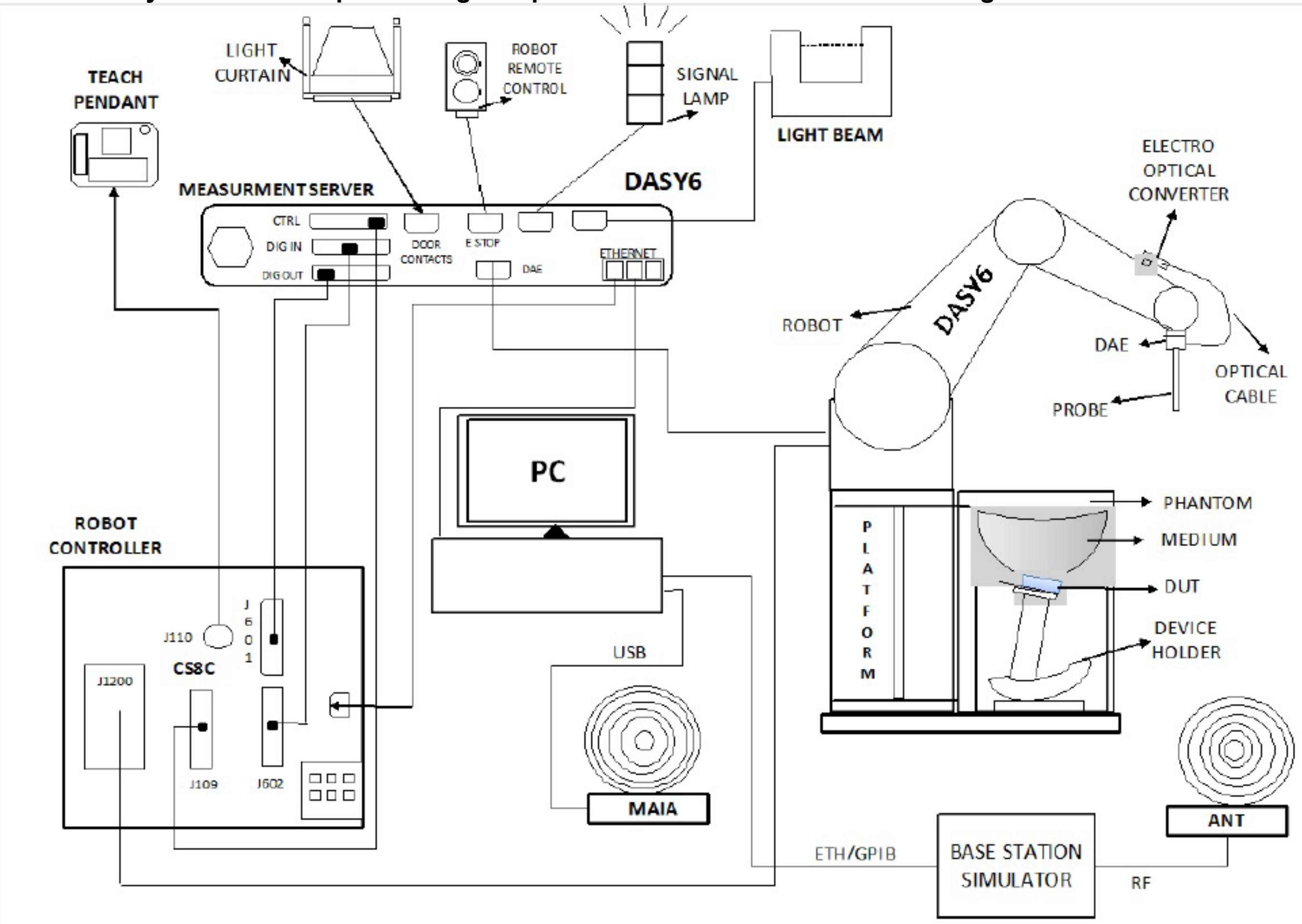
The Test Lab Conformity Assessment Body Identifier (CABID)

Location	CABID	Company Number
47173 Benicia Street, Fremont, CA, 94538 UNITED STATES	US0104	2324A
47266 Benicia Street, Fremont, CA, 94538 UNITED STATES		

4. SAR Measurement System & Test Equipment

4.1. SAR Measurement System

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 Win10 and the DASY6/8[1] 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.

[1] DASY6/8 software used: DASY6.16.2 or DASY8.16.2 and older generations.

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 IEC/IEEE 62209-1528, 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	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
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. PD Measurement Procedures

4.3.1. System Verification Scan Procedures

DASY8 Module mmWave supports “5G Scan”, a fine resolution scan performed on two different planes which is used to reconstruct the E- and H-fields as well as the power density; the average power density is derived from this measurement.

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 devise under test.

Step 2: 5G Scan

The steps in the X, Y, and Z directions are specified in terms of fractions of the signal wavelength, lambda. Area Scan Parameters extracted from SPEAG DASY8 System Handbook; part 4 DASY8 Module mmWave.

Recommended settings for measurement of verification sources

Frequency [GHz]	Grid step	Grid extent X/Y [mm]	Measurement points
10	0.125 $\left(\frac{\lambda}{8}\right)$	60/60	18×18
30	0.25 $\left(\frac{\lambda}{4}\right)$	60/60	26×26
45	0.25 $\left(\frac{\lambda}{4}\right)$	42/42	28×28
60	0.25 $\left(\frac{\lambda}{4}\right)$	32.5/32.5	28×28
90	0.25 $\left(\frac{\lambda}{4}\right)$	30/30	38×38

The minimum distance of probe sensors to the verification source surface, horn antenna, is 10 mm for 10 GHz and 5.55mm for 30 GHz and above.

Step 3: 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.

When the drift is larger than ± 5 %, test is repeated from step1.

4.3.2. Scan Procedures

Step 1: Power Reference Measurement

Same as System Verification Scan Procedures step 1.

Step 2: 5G Scan

Same as System Verification Scan Procedures step 2. But measurement area is defined based on TCB workshop April 2019, “A sufficiently large measurement region and proper measurement spatial resolution are required to maintain field reconstruction accuracy”.

–Fields at the measurement region boundary should be ~20-30 dB below the peaks

Step 3: Power drift measurement

Same as System Verification Scan Procedures step 3.

When the drift is smaller than ± 5 %, it is considered in the uncertainty budget if drifts larger than 5%, uncertainty is re-calculated.

4.4. 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
S-Parameter Network Analyzer	Rohde & Schwarz	ZNLE6	171919	2/28/2026
Dielectric Probe kit	SPEAG	DAK-3.5 Probe	1087	9/4/2025
Shorting Block	SPEAG	DAK-3.5 Short	T059	N/A
Thermometer	Fisher Scientific	Traceable	240054866	1/31/2026
Dielectric Probe kit	SPEAG	DAK-12 Probe	167145	1/31/2026
Shorting Block	SPEAG	DAK-12 Short	167145	1/31/2026
Vector Network Analyzer	Copper Mountain Tech	R140N	21130078	1/1/2026
Dielectric Probe kit	SPEAG	DAK-3.5	1103	2/10/2026
Shorting Block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	2/28/2026
Thermometer	Fisher Scientific	Traceable	240029160	1/31/2026
S-Parameter Network Analyzer	Rohde & Schwarz	ZNLE6	23.0012K56-101274-	2/28/2026
Dielectric Probe kit	SPEAG	DAK-3.5	1082	4/14/2026
Shorting Block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	4/14/2026
Thermometer	Fisher Scientific	Traceable	240029257	1/31/2026

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Signal Generator	R & S	SMB100A	168412	1/31/2026
Wideband Power Sensor	Agilent	N1921A	80119	1/31/2026
Power Sensor	R & S	NRP18A	171443	2/28/2026
Power Meter	HP	437B	82600	1/31/2026
Directional coupler	Mini-circuits	ZUDC10-183+	PRE0181620	N/A
Power Meter	Keysight	N1911A	1684412	1/31/2026
DC Power Supply	HP	6296A	T1363	N/A
DC Power Supply	Sorensen	XT 15-4	PRE0178948	N/A
Power Source	SPEAG	POWERSOURCE1	4371	4/1/2025
Power Source	SPEAG	POWERSOURCE1	4378	5/9/2025
Power Source	SPEAG	POWERSOURCE1	4348	12/11/2025
Signal Generator	R & S	SMB100A	06.6000K03-180968-	2/28/2026
DC Power Supply	Sorensen Ametek	XT 15-4	1319A02780	N/A
Power Sensor	Agilent	8481A	2349A36506	9/16/2016
Power Sensor	Agilent	8481A	3318A92374	9/16/2016
Amplifier	MITEQ	AMF-4D-00400600-50-30P	1795092	N/A
Bi-directional coupler	Werlatone	C8060-102	4062	N/A
Bi-directional coupler	Mini-Circuits	ZUDC10-183+	1722	N/A
Bi-directional coupler	Werlatone	C8060-102	2149	N/A

Lab Equipment

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
E-Field Probe (SAR Lab A)	SPEAG	EX3DV4	7810	5/8/2026
E-Field Probe (SAR Lab H)	SPEAG	EX3DV4	3990	2/7/2026
E-Field Probe (SAR Lab 1)	SPEAG	EX3DV4	7915	3/21/2026
E-Field Probe (SAR Lab 7)	SPEAG	EX3DV4	7808	3/12/2026
E-Field Probe (SAR Lab 11)	SPEAG	EX3DV4	3902	3/10/2026
E-Field Probe (SAR Lab 24)	SPEAG	EX3DV4	7335	1/13/2026
E-Field Probe (SAR Lab 23)	SPEAG	EUmmWV4	9532	2/17/2026
Data Acquisition Electronics (SAR Lab A)	SPEAG	DAE4	1434	5/9/2026
Data Acquisition Electronics (SAR Lab H)	SPEAG	DAE4	1545	2/6/2026
Data Acquisition Electronics (SAR Lab 1)	SPEAG	DAE4ip	1894	3/18/2026
Data Acquisition Electronics (SAR Lab 7)	SPEAG	DAE4	1546	3/6/2026
Data Acquisition Electronics (SAR Lab 11)	SPEAG	DAE4	1259	3/6/2026
Data Acquisition Electronics (SAR Lab 24)	SPEAG	DAE4ip	1892	3/4/2026
Data Acquisition Electronics (SAR Lab 23)	SPEAG	DAE4	1548	2/7/2026

Note(s):

*Equipment not used past calibration due date.

Lab Equipment

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
System Validation Dipole	SPEAG	D1900V2	5d140	4/14/2026
System Validation Dipole	SPEAG	D2450V2	706	1/20/2026
System Validation Dipole	SPEAG	D2600V2	1036	4/11/2026
System Validation Dipole	SPEAG	D3700V2	1039	4/11/2026
System Validation Dipole	SPEAG	D5GHzV2	1168	2/6/2026
System Validation Dipole	SPEAG	D6.5GHzV2	1032	4/14/2026
5G Verification Source	SPEAG	10GHz	1015	9/6/2025

Note(s):

Dipole Calibration Date has been extended past 1 year. Impedance measurements have been performed to validate Dipole performance.

Other

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Base Station Simulator	R & S	CMW500	124593-SS	2/28/2026
Base Station Simulator	R & S	CMW500	135384	2/28/2026
Base Station Simulator	R & S	CMW500	137873	2/28/2026
Base Station Simulator	R & S	CMW500	259688	3/31/2026
Base Station Simulator	R & S	CMW500	86119	2/28/2026
Base Station Simulator	R & S	CMW500	85698	3/31/2026
Base Station Simulator	R & S	CMW500	231727	2/28/2026
Base Station Simulator	R & S	CMW500	81849	2/28/2026
Base Station Simulator	R & S	CMW500	259610	3/31/2026
Base Station Simulator	R & S	CMW500	259607	3/31/2026
Base Station Simulator	R & S	CMW500	259689	3/31/2026
Base Station Simulator	R & S	CMW500	231726	2/28/2026
Base Station Simulator	R & S	CMW500	208880	2/28/2026
Base Station Simulator	R & S	CMW500	171875-WG	9/2/2025
Base Station Simulator	R & S	CMW500	171871-Gd	9/2/2025
Power Meter	Keysight	N1911A	MY55196015	1/31/2026
Power Meter	Keysight	N1921A	MY55296004	1/31/2026
Power Sensor	Aligent	N1921A	MY53260010	1/31/2026
Power Meter	Keysight	N1911A	MY55196015	1/31/2026
Power Meter	Keysight	N1921A	MY55296004	1/31/2026
Power Sensor	Aligent	N1921A	MY53260010	1/31/2026

5. Measurement Uncertainty

SAR

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.

PD

a		b	c	d f(d,k)	e	f = b×*e/d*	g
Error Description		Unc.Value (±dB)	Probab. Distri.	Div.	*ci*	Std. Unc. (±dB)	vi
Uncertainty terms dependent on the measurement system							
CAL	Calibration Repeatability	0.49	Normal	1	1	0.49	∞
COR	Probe correction	0	Rectangular	1.732	1	0.00	∞
FRS	Frequency response (BW 1 GHz)	0.20	Rectangular	1.732	1	0.12	∞
SCC	Sensor cross coupling	0	Rectangular	1.732	1	0.00	∞
ISO	Isotropy	0.50	Rectangular	1.732	1	0.29	∞
LIN	Linearity	0.20	Rectangular	1.732	1	0.12	∞
PSC	Probe scattering	0	Rectangular	1.732	1	0.00	∞
PPO	Probe positioning o set	0.30	Rectangular	1.732	1	0.17	∞
PPR	Probe positioning repeatability	0.04	Rectangular	1.732	1	0.02	∞
SMO	Sensor mechanical o set	0	Rectangular	1.732	1	0.00	∞
PSR	Probe spatial resolution	0	Rectangular	1.732	1	0.00	∞
FLD	Field impedance dependance	0	Rectangular	1.732	1	0.00	∞
APD	Amplitude and phase drift	0	Rectangular	1.732	1	0.00	∞
APN	Amplitude and phase noise	0.04	Rectangular	1.732	1	0.02	∞
TR	Measurement area truncation	0	Rectangular	1.732	1	0.00	∞
DAQ	Data acquisition	0.03	Normal	1	1	0.03	∞
SMP	Sampling	0	Rectangular	1.732	1	0.00	∞
REC	Field reconstruction	0.60	Rectangular	1.732	1	0.35	∞
TRA	Forward transformation	0	Rectangular	1.732	1	0.00	∞
SCA	Power density scaling	-	Rectangular	1.732	1	-	∞
SAV	Spatial averaging	0.10	Rectangular	1.732	1	0.06	∞
SDL	System detection limit	0.04	Rectangular	1.732	1	0.02	∞
Uncertainty terms dependent on the DUT and environmental factors							
PC	Probe coupling with DUT	0	Rectangular	1.732	1	0	∞
MOD	Modulation response	0.40	Rectangular	1.732	1	0.23	∞
IT	Integration time	0	Rectangular	1.732	1	0	∞
RT	Response time	0	Rectangular	1.732	1	0	∞
DH	Device holder influence	0.10	Rectangular	1.732	1	0.06	∞
DAQ	DUT alignment	0	Rectangular	1.732	1	0	∞
AC	RF ambient conditions	0.04	Rectangular	1.732	1	0.02	∞
AR	Ambient reflections	0.04	Rectangular	1.732	1	0.02	∞
MSI	Immunity / secondary reception	0	Rectangular	1.732	1	0	∞
DRI	Drift of the DUT	0.21	Rectangular	1.732	1	0.12	∞
Combined Standard Uncertainty Uc(f) =			RSS			0.76	∞
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =						1.52	

6. Dielectric Property Measurements & System Check

6.1. SAR Dielectric Property Measurements and System Checks

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.

The dielectric constant (εr) and conductivity (σ) of typical tissue-equivalent media recipes are expected to be within ± 5% of the required target values; but for SAR measurement systems that have implemented the SAR error compensation algorithms documented in IEEE Std 1528-2013, to automatically compensate the measured SAR results for deviations between the measured and required tissue dielectric parameters, the tolerance for εr and σ may be relaxed to ± 10%. This is limited to frequencies ≤ 3 GHz.

Tissue Dielectric Parameters

FCC KDB 865664 D01 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

System Verification

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 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 3 mm.
  For 5 GHz band - Distance between probe sensors and phantom surface was set to 2.5 mm
- The dipole input power (forward power) was 100 mW.
- The results are normalized to 1 W input power.

SAR Liquid and System Check Results

Liquid Check

SAR Lab	Date	Tissue Type	Band (MHz)	Freq. (MHz)	Relative Permittivity (εr)			Conductivity (σ)		
					Measured	Target	Delta	Measured	Target	Delta
SAR A	7/24/2025	Head	2600	2600	39.11	39.01	0.25%	1.87	1.96	-4.49%
				2495	39.26	39.14	0.30%	1.78	1.85	-3.66%
				2690	38.96	38.90	0.16%	1.95	2.06	-5.27%
SAR H	7/24/2025	Head	3700	3700	41.20	37.70	9.28%	2.96	3.12	-5.01%
				3600	41.35	37.82	9.35%	2.86	3.01	-5.11%
				3800	41.06	37.59	9.24%	3.07	3.22	-4.77%
SAR 1	7/23/2025	Head	5750	5750	33.54	35.36	-5.15%	5.02	5.21	-3.72%
				5700	33.67	35.42	-4.94%	4.95	5.16	-4.12%
				5850	33.39	35.30	-5.41%	5.21	5.32	-2.07%
SAR 7	7/23/2025	Head	6500	6500	34.57	34.50	0.20%	5.91	6.07	-2.64%
				5900	35.72	35.20	1.48%	5.20	5.38	-3.35%
				7200	33.36	33.70	-1.01%	6.67	6.89	-3.19%
SAR 11	7/23/2025	Head	2450	2450	39.29	39.20	0.23%	1.71	1.80	-4.83%
				2400	39.35	39.30	0.14%	1.67	1.75	-4.66%
				2500	39.18	39.14	0.11%	1.76	1.85	-5.34%
SAR 24	7/22/2025	Head	1900	1900	42.43	40.00	6.08%	1.45	1.40	3.64%
				1850	42.49	40.00	6.23%	1.42	1.40	1.14%
				1920	42.39	40.00	5.98%	1.47	1.40	4.79%

System Check

SAR Lab	Date	Dipole Type & Serial Number	Dipole Cal. Due Date	Input Power (dBm)	Measured results for 1-g SAR				Measured results for 10-g SAR				Measured results for APD 4 cm²				Plot No.
					Meas. Zoom Scan	Normalize to 1 W	Target (Ref. Value)	Delta ±10%	Meas. Zoom Scan	Normalize to 1 W	Target (Ref. Value)	Delta ±10%	Meas. Zoom Scan	Normalize to 1 W	Target (Ref. Value)	Delta ±10%	
SAR A	7/24/2025	D2600V2 SN: 1036	4/11/2026	17.0	2.600	51.877	55.400	-6.36%	1.190	23.744	24.900	-4.64%	[redacted]				1
SAR H	7/24/2025	D3700V2 SN: 1039	4/11/2026	20.0	7.260	72.600	67.800	7.08%	2.750	27.500	25.100	9.56%	[redacted]				2
SAR 1	7/23/2025	D5GHzV2 SN: 1168 (5.75 GHz)	2/6/2026	17.0	3.700	73.825	79.400	-7.02%	1.060	21.150	22.500	-6.00%	[redacted]				3
SAR 7	7/23/2025	D6.5GHzV2 SN: 1032	4/14/2026	17.0	14.600	291.308	291.000	0.11%	2.750	54.870	54.200	1.24%	66.600	1328.845	1320.000	0.67%	4
SAR 11	7/23/2025	D2450V2 SN: 706	1/20/2026	17.0	2.570	51.278	52.300	-1.95%	1.250	24.941	24.500	1.80%	[redacted]				5
SAR 24	7/22/2025	D1900V2 SN: 5d140	4/14/2026	17.0	1.930	38.509	39.400	-2.26%	1.010	20.152	20.600	-2.17%	[redacted]				6

6.2. Power Density Measurement System Validation & System Check

Per Nov 2017, TCB Workshop

System validation is required before a system is deployed for measurement.

System check is also required before each series of continuous measurement and as applicable, repeated at least weekly.

Peak and spatially averaged power density at the peak location(s) must be compared to calibrated results according to the defined test conditions.

- the same spatial resolution and measurement region used in the waveguide calibration should be applied to system validation and system check.
- 1 cm^2 and 4 cm^2 spatial averaging have been recommended in the AHG10 draft TR with reference targets available for specific waveguide.
- power density distribution should also be verified, both spatially (shape) and numerically (level) through visual inspection for noticeable differences.
- the measured results should be within 16% (0.66 dB) of the calibrated targets.

The system components, software settings and other system parameters shall be the same as those used for the compliance tests. The system check shall be performed at closest probe calibration frequency point as in the compliance tests, e.g., if the EUT operates at 35 GHz, it is recommended to perform the validation at 30 GHz.

PD System Validation Results

SAR Lab	Test Date	5G Verification Source	Source Cal. Due Date	Averaging Type	Input Power System Cart (dBm)	Input Power Source Cal. (dBm)	Meas. 4 cm^2 psPDn+ (W/m^2)	Normalized to 20 dBm (W/m^2)	Target 4 cm^2 psPDn+ (W/m^2)	Deviation (dB)	Meas. 4 cm^2 psPDtot+ (W/m^2)	Normalized to 20 dBm (W/m^2)	Target 4 cm^2 psPDtot+ (W/m^2)	Deviation (dB)	Meas. 4 cm^2 psPDmod+ (W/m^2)	Normalized to 20 dBm (W/m^2)	Target 4 cm^2 psPDmod+ (W/m^2)	Deviation (dB)
23	4/22/2025	5G Verification Source 10 GHz SN: 1015	9/6/2025	Square	18.0	20.0	34.9	55.3	56.4	-0.08	35.2	55.8	56.7	-0.07	35.4	56.1	56.9	-0.06
23	4/22/2025	5G Verification Source 10 GHz SN: 1015	9/6/2025	Square	18.0	20.0	36.1	57.2	56.4	0.06	36.3	57.5	56.7	0.06	36.5	57.8	56.9	0.07
23	4/22/2025	5G Verification Source 10 GHz SN: 1015	9/6/2025	Square	18.0	20.0	34.2	54.2	56.4	-0.17	35.1	55.6	56.7	-0.08	35.3	55.9	56.9	-0.07
23	4/22/2025	5G Verification Source 10 GHz SN: 1015	9/6/2025	Square	18.0	20.0	35.7	56.6	56.4	0.01	36.1	57.2	56.7	0.04	36.2	57.4	56.9	0.04
23	4/22/2025	5G Verification Source 10 GHz SN: 1015	9/6/2025	Square	18.0	20.0	35.7	56.6	56.4	0.01	35.8	56.7	56.7	0.00	36.0	57.1	56.9	0.01
23	4/22/2025	5G Verification Source 10 GHz SN: 1015	9/6/2025	Square	18.0	20.0	35.8	56.7	56.4	0.03	36.4	57.7	56.7	0.08	36.7	58.2	56.9	0.10
23	4/23/2025	5G Verification Source 10 GHz SN: 1015	9/6/2025	Square	18.0	20.0	35.3	55.9	56.4	-0.04	35.7	56.6	56.7	-0.01	35.9	56.9	56.9	0.00
23	4/23/2025	5G Verification Source 10 GHz SN: 1015	9/6/2025	Square	18.0	20.0	37.4	59.3	56.4	0.22	37.5	59.4	56.7	0.20	37.7	59.8	56.9	0.21
23	4/23/2025	5G Verification Source 10 GHz SN: 1015	9/6/2025	Square	18.0	20.0	36.6	58.0	56.4	0.12	36.9	58.5	56.7	0.13	37.1	58.8	56.9	0.14
23	4/23/2025	5G Verification Source 10 GHz SN: 1015	9/6/2025	Square	18.0	20.0	36.8	58.3	56.4	0.15	37.0	58.6	56.7	0.15	37.2	59.0	56.9	0.15
						Average	35.9	**56.8**	56.4	0.03	36.2	**57.4**	56.7	0.05	36.4	**57.7**	56.9	0.06

PD System Check Results

SAR Lab	Date	5G Verification Source	Source Cal. Due Date	Averaging Type	Input Power (dBm)	Prad (mW)	Ohmic & Mismatch Loss (dB)	Meas. 1 cm^2 psPDn+ (W/m^2)	Normalized to 20 dBm (W/m^2)	Meas. 4 cm^2 psPDn+ (W/m^2)	Normalized to 20 dBm (W/m)	Target 4 cm^2 psPDn+ (W/m^2)	Deviation (dB)	Meas. 4 cm^2 psPDtot+ (W/m^2)	Normalized to 20 dBm (W/m)	Target 4 cm^2 psPDtot+ (W/m^2)	Deviation (dB)	Meas. 4 cm^2 psPDmod+ (W/m^2)	Normalized to 20 dBm (W/m)	Target 4 cm^2 psPDmod+ (W/m^2)	Deviation (dB)	Plot
SAR Lab 23	7/23/2025	5G Verification Source 10 GHz SN: 1015	9/6/2025	Square	19.50	93.30	0.30	55.9	62.7	51.3	57.6	56.8	0.06	52.3	58.7	57.4	0.10	52.6	59.0	57.7	0.10	7

7. Test Results

7.1. Measured and Reported (Scaled) SAR Results

The DUT supports an inductive charging system in both Tx and Rx modes. The DUT only supports Tx mode while it is connected to an external power supply via the lightning connector.

SAR testing was performed on the worst-case Head position for each supported technology in accordance with FCC guidance. Body testing was deemed unnecessary as the body-worn scenario would not be supported while the DUT is plugged in to the external power supply. SAR testing was performed while the DUT (FCC ID: BCG-E8948A) was transmitting with the MagSafe compatible battery pack (FCC ID: BCG-A3385) attached to the DUT.

																BCG-E8666A				BCG-E8666A w/ BCG-A2384					Delta %		
Equipment Class	Technology	Band	Antenna	RF Exposure Condition	Mode	Power Mode(s)	Dist (mm)	Test Position	Channel	Freq. (MHz)	RB Allocation	RB Offset	Duty Cycle (%)	Max Output Pwr (dBm)	Meas. (dBm)	1-g Meas. (W/kg)	1-g Scaled (W/kg)	10-g Meas. (W/kg)	10-g Scaled (W/kg)	1-g Meas. (W/kg)	1-g Scaled (W/kg)	10-g Meas. (W/kg)	10-g Scaled (W/kg)	Peak SAR (x, y, z)	1g	10g	Plot No.
PCE	GSM	1900	ANT 2	Head	GPRS 2 Slots	PS1 Mode A	0	Right Cheek	810	1909.8				28.5	28.1	0.989	1.084	0.497	0.545	1.030	**1.129**	0.515	0.565	1.91, 25.3, -326.4, -169.9	4.1%	3.6%	1
PCE	WCDMA	2	ANT 2	Head	Rel. 99	PS1 Mode A	0	Right Cheek	9538	1907.6				21.4	19.9	0.839	1.185	0.421	0.595	0.828	**1.170**	0.414	0.585	1.54, 25.9, -327.1, -169.9	-1.3%	-1.7%	2
PCE	LTE	41	ANT 4	Head	QPSK	PS1 Mode A	0	Left Cheek	40620	2593.0	1	49		20.7	18.7	0.747	1.184	0.293	0.464	0.738	**1.170**	0.296	0.469	1.81, 46.3, 330.5, -169.2	-1.2%	1.0%	3
PCE	FR1	n77 Block A	ANT 4	Head	DFT-s-OFDM π/2 BPSK	PS1 Mode A	0	Left Cheek	633334	3500.0	135	69		17.8	16.5	0.882	1.190	0.306	0.413	0.530	**0.715**	0.203	0.274	1.49, 49.1, 327.3, -169.3	-39.9%	-33.7%	4
DTS	WiFi 2.4GHz	2.4 GHz	ANT 2	Head	802.11 b	Wi-Fi PS1 Mode A	0	Right Cheek	1	2412.0			97.62%	20.50	18.90	0.793	1.174	0.351	0.520	0.792	**1.145**	0.352	0.521	9.99, 44.7, -327.5, -169.7	-2.5%	0.3%	5
NII	WiFi 5GHz	5.8 GHz	ANT 6	Head	802.11 ac (VHT80)	Wi-Fi PS1 Mode A	0	Left Cheek	155	5775.0			97.81%	20.00	18.30	0.03	0.045	0.009	0.014	0.024	**0.036**	0.006	0.009	0.147, -17.1, 306.2, -163.3	-20.0%	-33.3%	6

																BCG-E8666A						BCG-E8666A w/ BCG-A2384						Delta %			
Equipment Class	Technology	Band	Antenna	RF Exposure Condition	Mode	Power Mode(s)	Dist (mm)	Test Position	Channel	Freq. (MHz)	RB Allocation	RB Offset	Duty Cycle (%)	Max Output Pwr (dBm)	Meas. (dBm)	1-g Meas. (W/kg)	1-g Scaled (W/kg)	10-g Meas. (W/kg)	10-g Scaled (W/kg)	APD Meas. (W/m^2)	APD Scaled (W/m^2)	1-g Meas. (W/kg)	1-g Scaled (W/kg)	10-g Meas. (W/kg)	10-g Scaled (W/kg)	APD Meas. (W/m^2)	APD Scaled (W/m^2)	1g	10g	APD	Plot No.
6CD	WLAN	UNII-5	ANT 5	Head	802.11ax (HE160)	Wi-Fi PS1 Mode A	0	Left Cheek	15	6025.0			94.84%	12.75	11.30	0.030	**0.044**	0.007	0.010	0.173	0.255	0.014	**0.021**	0.005	0.007	0.126	0.186	-53.3%	-28.6%	-27.2%	7

7.2. Measured and Reported (Scaled) PD Results

The DUT supports an inductive charging system in both Tx and Rx modes. The DUT only supports Tx mode while it is connected to an external power supply via the lightning connector.

PD testing was performed on the worst-case Edge position. PD testing was performed while the DUT (FCC ID: BCG-E8948A) was transmitting with the MagSafe compatible battery pack (FCC ID: BCG-A3385) attached to the DUT.

													BCG-E8666A				BCG-E8666A w/ BCG-A2384					
Technology	Band	Antenna	Power Mode	Test Position	Ch No.	Freq. (MHz)	Mode	Conversion Factor	Duty Cycle (%)	TuP Limit (dBm)	Meas. (dBm)	Uncertainty Scaling Factor	Grid Step Size (λ)	Dist. (mm)	Meas. psPDn (W/m^2)	Scaled psPDn (mW/cm^2)	Meas. psPDtot (W/m^2)	Scaled psPDtot (mW/cm^2)	Meas. psPDn (W/m^2)	Scaled psPDn (W/m^2)	Meas. psPDtot (W/m^2)	Scaled psPDtot (W/m^2)	psPDtot Delta (%)	Plot No.
WLAN	UNII-5	ANT 5	Wi-Fi PS1	Edge Right	15	6025.0	802.11ax (160 MHz)	0.1	94.84%	12.75	11.30	1.584	0.0410	2	0.775	0.181	0.911	0.212	0.344	0.080	0.358	0.083	-55.6%	8

Appendixes

Refer to separated files for the following appendixes.

Appendix A: Setup Photos

Appendix B: System Check Plots

Appendix C: Highest Test Plots

Appendix D: SAR Tissue Ingredients

Appendix E: Probe Certificates

Appendix F: Dipole & 5G Source Certificates

END OF REPORT