FCC 47 CFR § 2.1093
IEC/IEEE Std 62209-1528 : 2020
IEC TR 63170 : 2018

RF EVALUATION REPORT (Above 6GHz)

FOR

GSM/WCDMA/LTE/5G NR Phone + BT/BLE, DTS/UNII a/b/g/n/ac/ax, NFC, WPT and UWB

MODEL NUMBER: SM-S916B/DS, SM-S916B

FCC ID: A3LSMS916B

REPORT NUMBER: 4790541040-S2V2

ISSUE DATE: 11/4/2022

Prepared for
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IAS ACCREDITED

Testing Laboratory

TL-637

Revision History

Rev.	Date	Revisions	Revised By
V1	10/27/2022	Initial Issue	--
V2	11/4/2022	Added 6E SAR test at UNII-6 and UNII-8 Sec. 8 & 9.3 & 10.1	Seungyeon Kim
		-	

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1. Attestation of Test Results

Applicant Name	SAMSUNG ELECTRONICS CO.,LTD.					
FCC ID	A3LSMS916B					
Model Number	SM- S916B/DS, SM-S916B					
Applicable Standards	FCC 47 CFR § 2.1093 IEC/IEEE Std 62209-1528 : 2020 IEC TR 63170 : 2018 Published RF exposure KDB procedures					
Exposure Category	SAR Limits (W/Kg)		Power Density Limits (mW/cm^2 over $4cm^2$)			
	Peak spatial-average (1g of tissue)	Product Specific 10g (10g of tissue)	APD (Absorbed Power Density)	IPD (Incident Power Density)		
General population / Uncontrolled exposure	1.6	4.0	N/A	1.0		
RF Exposure Conditions	Equipment Class					
	The Highest Reported SAR (W/kg)		APD (mW/cm^2)		IPD (mW/cm^2)	
	6CD	UWB	6CD	UWB	6CD	UWB
Head	0.194	N/A	0.118	N/A	0.977	0.009
Body-worn	0.127	N/A	0.088	N/A		
Hotspot	N/A	N/A	N/A	N/A		
Product Specific 10g	0.594	0.001	1.320	0.003		
Date Tested	10/5/2021 to 11/4/2022					
Test Results	Pass					

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

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

Approved & Released By:	Prepared By:
	
Justin Park Operations Leader UL Korea, Ltd. Suwon Laboratory	Seungyeon Kim Senior Laboratory Technician UL Korea, Ltd. Suwon Laboratory

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, IEC TR 63170-2018, IEC 62479:2010 the following FCC Published RF exposure KDB procedures:

- 248227 D01 802.11 Wi-Fi SAR v02r02
- 447498 D01 General RF Exposure Guidance v06
- 648474 D04 Handset SAR v01r03
- 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- 941225 D07 UMPC Mini Tablet v01r02

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

- TCB workshop April, 2021; RF Exposure Policies (U-NII 6-7 GHz Interim Procedures)
- PEAG, 5G Module Application Note : 5G Compliance Testing
- SPEAG DASY6 Application Note : Interim Procedures for Devices Operating at 6 – 10 GHz

3. Facilities and Accreditation

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

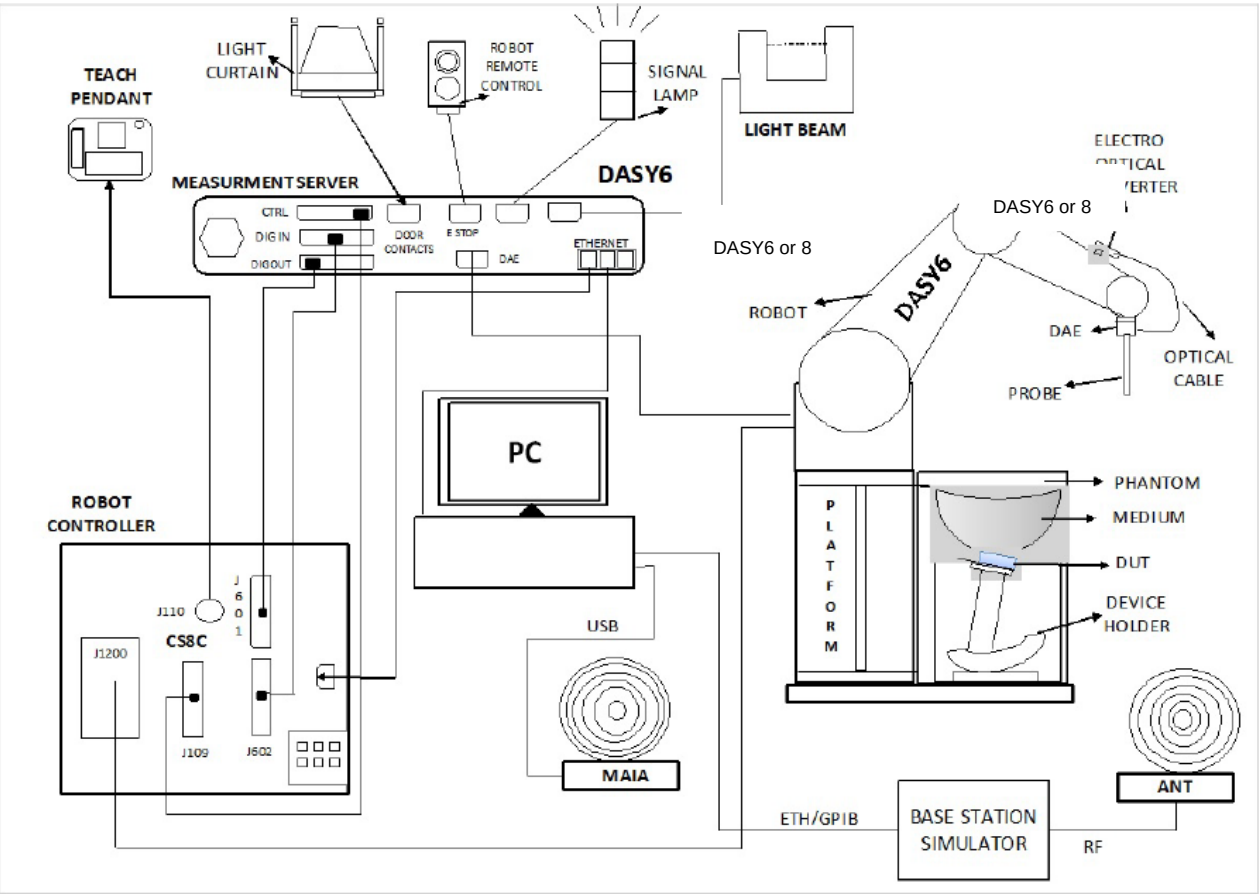
Suwon
SAR 7 Room
SAR 8 Room
SAR 9 Room

UL Korea, Ltd. is accredited by IAS, Laboratory Code TL-637.
The full scope of accreditation can be viewed at https://www.iasonline.org/wp-content/uploads/2017/05/TL-637-cert-New.pdf.

4. SAR and Power Density Measurement System & Test Equipment

4.1. SAR Measurement System

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running Win10 and the DASY6 or 8 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

4.1.1. 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 Standard 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 IEC/IEEE Standard 62209-1528.

Parameter	DUT transmit frequency being tested	
	$f \leq 3$ GHz	3 GHz < $f \leq 10$ GHz
Maximum distance between the measured points (geometric centre of the sensors) and the inner phantom surface (z_{M1} in Figure 20 in mm)	5 ± 1	$\delta \ln(2)/2 \pm 0{,}5$ [a]
Maximum spacing between adjacent measured points in mm (see O.8.3.1)[b]	20, or half of the corresponding zoom scan length, whichever is smaller	$60/f$, or half of the corresponding zoom scan length, whichever is smaller
Maximum angle between the probe axis and the phantom surface normal (α in Figure 20)[c]	5° (flat phantom only) 30° (other phantoms)	5° (flat phantom only) 20° (other phantoms)
Tolerance in the probe angle	1°	1°

[a] δ is the penetration depth for a plane-wave incident normally on a planar half-space.

[b] See Clause O.8 on how Δx and Δy may be selected for individual area scan requirements.

[c] The probe angle relative to the phantom surface normal is restricted due to the degradation in the measurement accuracy in fields with steep spatial gradients. The measurement accuracy decreases with increasing probe angle and increasing frequency. This is the reason for the tighter probe angle restriction at frequencies above 3 GHz.

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 IEC/IEEE Standard 62209-1528.

Parameter	DUT transmit frequency being tested	
	$f \leq 3$ GHz	3 GHz $< f \leq 10$ GHz
Maximum distance between the closest measured points and the phantom surface (z_{M1} in Figure 20 and Table 3, in mm)	5	$\delta \ln(2)/2$ [a]
Maximum angle between the probe axis and the phantom surface normal (α in Figure 20)	5° (flat phantom only) 30° (other phantoms)	5° (flat phantom only) 20° (other phantoms)
Maximum spacing between measured points in the x- and y-directions (Δx and Δy, in mm)	8	$24/f$ [b]
For uniform grids: Maximum spacing between measured points in the direction normal to the phantom shell (Δz_1 in Figure 20, in mm)	5	$10/(f-1)$
For graded grids: Maximum spacing between the two closest measured points in the direction normal to the phantom shell (Δz_1 in Figure 20, in mm)	4	$12/f$
For graded grids: Maximum incremental increase in the spacing between measured points in the direction normal to the phantom shell ($R_z = \Delta z_2/\Delta z_1$ in Figure 20)	1,5	1,5
Minimum edge length of the zoom scan volume in the x- and y-directions (L_z in O.8.3.2, in mm)	30	22
Minimum edge length of the zoom scan volume in the direction normal to the phantom shell (L_h in O.8.3.2 in mm)	30	22
Tolerance in the probe angle	1°	1°

[a] δ is the penetration depth for a plane-wave incident normally on a planar half-space.

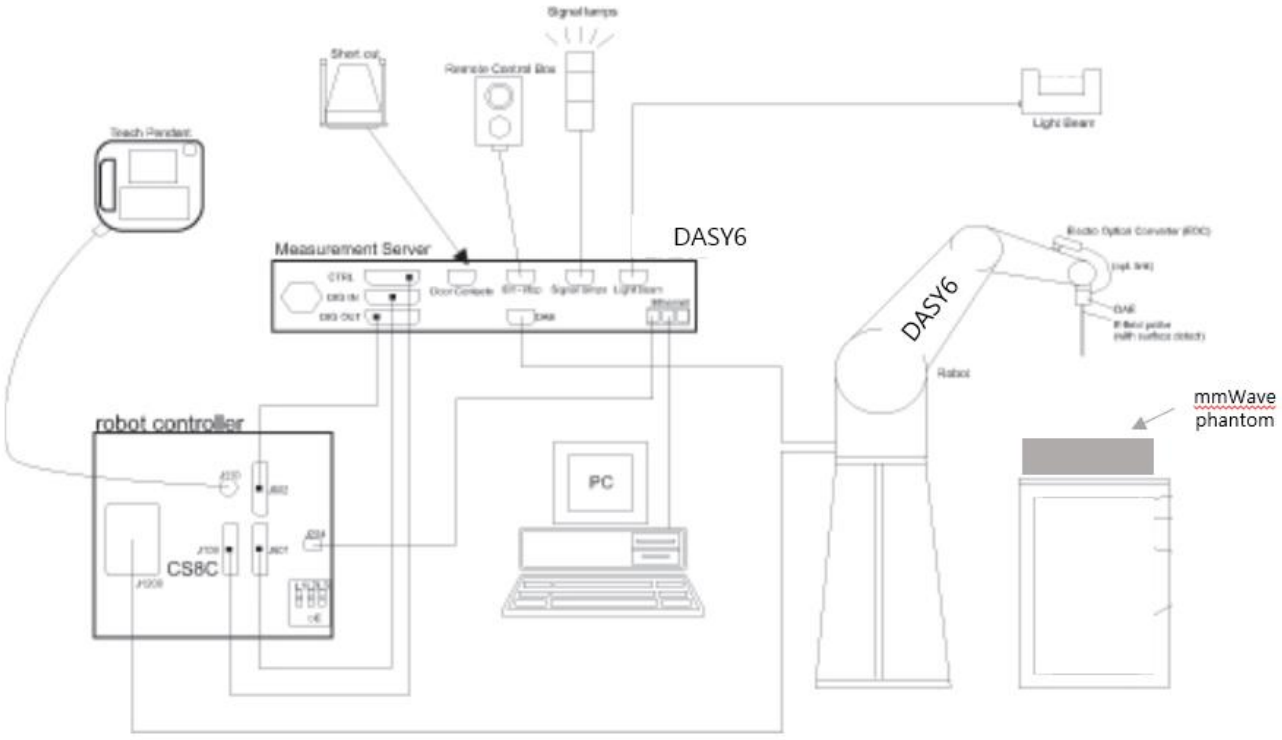
[b] This is the maximum spacing allowed, which might not work for all circumstances.

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.

4.2. Incident Power Density Measurement System

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- The EUmmWVx probe is based on the pseudo-vector probe design, which not only measures the field magnitude but also derives its polarization ellipse.
- 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 or 8 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom which is specialized for 5G other accessories according to the targeted measurement.

4.2.1. Power Density 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 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, 5G Module V1.2 Application Note.

Recommended settings for measurement of verification sources

Frequency [GHz]	Grid step	Grid extent X/Y [mm]	Measurement points
10	0.25 ($\frac{\lambda}{4}$)	120/120	16 × 16
30	0.25 ($\frac{\lambda}{4}$)	60/60	24 × 24
60	0.25 ($\frac{\lambda}{4}$)	31/31	26 × 26
90	0.25 ($\frac{\lambda}{4}$)	29/29	35 × 35

The minimum distance of probe sensors to verification source surface, horn antenna, is 10 mm.

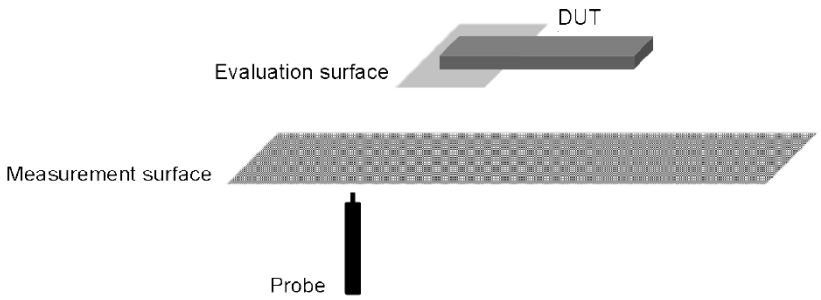
Per equipment manufacturer guidance for 6 – 10GHz, Power density was measured at d=2mm and d=λ/5mm using same grid size and grid step size for some frequencies and surfaces. The integrated power Density (iPD) was calculated based on these measurements. Since iPD ratio between the two distances is < 1dB, the grid step was sufficient for determining compliance at d=2mm.

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.

4.2.2. Total Field and Power Flux Density Reconstruction(measurement distance)

Reconstruction algorithms are used to project or transform the measured fields from the measurement surface to the evaluation surface (below fig) in order to determine power density or to compute spatial-average and/or local power density with known uncertainty.

Manufacture has developed a reconstruction approach based on the Gerchberg-Saxton algorithm, which benefits from the availability of the E-field polarization ellipse information obtained with the EUmmWVx probe. This reconstruction algorithm, together with the ability of the probe to measure extremely close to the source without perturbing the field, permits reconstruction of the E- and H-fields, as well as of the power density, on measurement planes.



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.

4.3.1. SAR Test Equipment

Dielectric Property Measurements

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
Network Analyzer	ROHDE & SCHWARZ	ZNB 20	102256	8/5/2023
Dielectric Assessment Kit	SPEAG	DAK-3.5	1196	7/25/2023
Shorting block	SPEAG	DAK-3.5 Short	SM DAK 200 BA	N/A
Thermometer	LKM	DTM3000	3851	8/3/2023
Thermometer	LKM	DTM3000	3862	8/3/2023

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
MXG Analog Signal Generator	Keysight	N5181B	MY59100587	8/4/2023
MXG Analog Signal Generator	Keysight	N5173B	MY59101083	8/4/2023
Power Sensor	Keysight	U2000A	MY60180020	8/3/2023
Power Sensor	Agilent	U2000A	MY54260007	8/3/2023
Power Sensor	Keysight	U2000A	MY60490008	8/3/2023
Power Sensor	Keysight	U2000A	MY61060004	8/3/2023
Power Sensor	Keysight	U2000A	MY61010006	8/3/2023
Power Amplifier	MINI-CIRCUITS	ZVE-3W-183+	311602009	8/4/2023
Directional Coupler	MINI-CIRCUITS	ZUDC20-183+	N/A	8/3/2023
Directional Coupler	MINI-CIRCUITS	ZUDC20-183+	N/A	8/3/2023
Low Pass Filter	Wainwright Instruments	WLKX10-11000-13640-21000-60TS	1	8/2/2023
Attenuator	KEYSIGHT	8491B/010	MY39271981	8/3/2023
Attenuator	KEYSIGHT	8491B/010	MY39272011	8/2/2023
Attenuator	KEYSIGHT	8491B/020	MY39271973	8/3/2023
Attenuator	MINI-CIRCUITS	BW-S3W10+	N/A	4/7/2023
E-Field Probe	SPEAG	EX3DV4	7376	7/27/2023
E-Field Probe	SPEAG	EX3DV4	7545	8/19/2023
Data Acquisition Electronics	SPEAG	DAE4	1591	3/24/2023
System Validation Dipole	SPEAG	D6.5GHzV2	1010	5/27/2023
System Validation Dipole	SPEAG	D8GHzV2	1008	6/10/2023
Thermometer	Lutron	MHB-382SD	AH.91463	8/4/2023
Thermometer	Lutron	MHB-382SD	AH.50215	8/9/2023
Thermometer	Lutron	MHB-382SD	AH.50213	8/4/2023
Thermometer	Lutron	MHB-382SD	AH.45903	8/9/2023
Thermometer	Lutron	MHB-382SD	AK.18789	8/9/2023

Note(s):

1. For System Validation Dipole, Calibration interval applied every 2 years according to referencing KDB 865664 guidance.
2. Refer to Appendix F that mentioned about justification for Extended SAR Dipole Calibrations.

4.3.2 Incident Power Density Test Equipment

System Check

Name of Equipment	Manufacturer	Type/Model	Serial No.	Cal. Due Date
MXG Analog Signal Generator	Keysight	N5173B	MY59101083	8/4/2023
Power Sensor	Keysight	U2000A	MY60180020	8/3/2023
Power Sensor	Agilent	U2000A	MY54260007	8/3/2023
Power Amplifier	MINI-CIRCUITS	ZVE-3W-183+	311602009	8/4/2023
Directional Coupler	MINI-CIRCUITS	ZUDC20-183+	N/A	8/3/2023
Directional Coupler	MINI-CIRCUITS	ZUDC20-183+	N/A	8/3/2023
Low Pass Filter	Wainwright Instruments	WLKX10-11000-13640-21000-60TS	1	8/2/2023
Attenuator	KEYSIGHT	8491B/010	MY39271981	8/3/2023
Attenuator	KEYSIGHT	8491B/010	MY39272011	8/2/2023
Attenuator	KEYSIGHT	8491B/020	MY39271973	8/3/2023
Attenuator	MINI-CIRCUITS	BW-S3W10+	N/A	4/7/2023
5G Probe	SPEAG	EUmmWV4	9493	1/27/2023
5G Probe	SPEAG	EUmmWV4	9536	2/28/2023
Data Acquisition Electronics	SPEAG	DAE4	1670	6/7/2023
Data Acquisition Electronics	SPEAG	DAE4	1447	3/25/2023
5G Verification Source (10GHz)	SPEAG	5G Verification Source_10GHz	1022	3/1/2023
Thermometer	Lutron	MHB-382SD	AH.91463	8/4/2023
Thermometer	Lutron	MHB-382SD	AH.50215	8/9/2023
Thermometer	Lutron	MHB-382SD	AH.50213	8/4/2023

5. Measurement Uncertainty

5.1. SAR Measurement Uncertainty

Measurement uncertainty for 6 GHz to 10 GHz

(According to IEEE 62209-1528)

a	b	c		d	e	f	g	h = c×f/e	l = c×g/e	k
Uncertainty component	Reference	Tol. 1 g (±%)	Tol. 10 g (±%)	Prob. Dist.	Div.	*ci* (1 g)	*ci* (10 g)	1 g *ui* (± %)	10 g *ui* (± %)	vi
Measurement System Errors										
Probe Calibration	8.4.1.1	18.6		Normal	2	1	1	9.3	9.3	∞
Probe Calibration Drift	8.4.1.2	1.7		Rectangular	1.732	1	1	1.0	1.0	∞
Probe Linearity	8.4.1.3	4.7		Rectangular	1.732	1	1	2.7	2.7	∞
Broadband Signal	8.4.1.4	2.8		Rectangular	1.732	1	1	1.6	1.6	∞
Probe Isotropy	8.4.1.5	7.6		Rectangular	1.732	1	1	4.4	4.4	∞
Data Acquisition	8.4.1.6	0.3		Normal	1	1	1	0.3	0.3	∞
RF Ambient	8.4.1.7	1.8		Normal	1	1	1	1.8	1.8	∞
Probe Positioning	8.4.1.8	0.005		Normal	1	0.50	0.50	0.25	0.25	∞
Data Processing	8.4.1.9	3.5		Normal	1	1	1	3.5	3.5	∞
Phantom and Device Errors										
Conductivity (meas.)DAK	8.4.2.1	2.5		Normal	1	0.78	0.71	2.0	1.8	∞
Conductivity (temp.)BB	8.4.2.2	2.4		Rectangular	1.732	0.78	0.71	1.1	1.0	∞
Phantom Permittivity	8.4.2.3	14.0		Rectangular	1.732	0	0	0.0	0.0	∞
Distance DUT -TSL	8.4.2.4	2.0		Normal	1	2	2	4.0	4.0	∞
Device Positioning	8.4.2.5	3.8	4.5	Normal	1	1	1	3.8	4.5	50
Device Holder	8.4.2.6	3.6		Normal	1	1	1	3.6	3.6	∞
DUT Modulation	8.4.2.7	2.4		Rectangular	1.732	1	1	1.4	1.4	∞
Time-average SAR	8.4.2.8	1.7		Rectangular	1.732	1	1	1.0	1.0	∞
DUT drift	8.4.2.9	5.0		Normal	1	1	1	5.0	5.0	∞
Correction to the SAR results										
Deviation to Target	8.4.3.1	1.9		Normal	1	1	0.84	1.9	1.6	∞
Combined Standard Uncertainty Uc(y) =				RSS				14.58	14.68	
Expanded Uncertainty U, Coverage Factor = 2, > 95 % Confidence =								**29.15**	**29.37**	

5.1.1. Decision rule

Decision rule for statement(s) of conformity is based on Procedures 1, Clause 4.4.2 in IEC Guide 115:2007.

5.2. Incident Power Density Measurement Uncertainty

Measurement Uncertainty for cDASY6 Module mmWave						
Error Description	Uncertainty value (±dB)	Probe Dist.	Divisor	(Ci)	Std. Unc. (±dB)	(Vi)
Uncertainty terms dependent on the measurement system						
Calibration	**0.49**	Normal	1	1	0.49	Infinity
Probe correction	**0.00**	Rectangular	1.73	1	0.00	Infinity
Frequency response (BW =< 1 GHz)	**0.20**	Rectangular	1.73	1	0.12	Infinity
Sensor cross coupling	**0.00**	Rectangular	1.73	1	0.00	Infinity
Isotropy	**0.50**	Rectangular	1.73	1	0.29	Infinity
Linearity	**0.20**	Rectangular	1.73	1	0.12	Infinity
Probe scattering	**0.00**	Rectangular	1.73	1	0.00	Infinity
Probe positioning offset	**0.30**	Rectangular	1.73	1	0.17	Infinity
Probe positioning repeatability	**0.04**	Rectangular	1.73	1	0.02	Infinity
Sensor mechanical offset	**0.00**	Rectangular	1.73	1	0.00	Infinity
Probe spatial resolution	**0.00**	Rectangular	1.73	1	0.00	Infinity
Field impedance dependance	**0.00**	Rectangular	1.73	1	0.00	Infinity
Amplitude and phase drift	**0.00**	Rectangular	1.73	1	0.00	Infinity
Amplitude and phase noise	**0.04**	Rectangular	1.73	1	0.02	Infinity
Measurement area truncation	**0.10**	Rectangular	1.73	1	0.06	Infinity
Data acquisition	**0.03**	Normal	1.00	1	0.03	Infinity
Sampling	**0.00**	Rectangular	1.73	1	0.00	Infinity
Field reconstruction	**1.97**	Rectangular	1.73	1	1.14	Infinity
Forward transformation	**0.00**	Rectangular	1.73	1	0.00	Infinity
Power density scaling	**-**	Rectangular	1.73	1	-	Infinity
Spatial averaging	**0.10**	Rectangular	1.73	1	0.06	Infinity
System detection limit	**0.04**	Rectangular	1.73	1	0.02	Infinity
Uncertainty terms dependent on the DUT and environmental factors						
Probe coupling with DUT	**0.00**	Rectangular	1.73	1	0.00	Infinity
Modulation response	**0.40**	Rectangular	1.73	1	0.23	Infinity
Integration time	**0.00**	Rectangular	1.73	1	0.00	Infinity
Response time	**0.00**	Rectangular	1.73	1	0.00	Infinity
Device holder influence	**0.10**	Rectangular	1.73	1	0.06	Infinity
DUT alignment	**0.00**	Rectangular	1.73	1	0.00	Infinity
RF ambient conditions	**0.04**	Rectangular	1.73	1	0.02	Infinity
Ambient reflections	**0.04**	Rectangular	1.73	1	0.02	Infinity
Immunity / secondary reception	**0.00**	Rectangular	1.73	1	0.00	Infinity
Drift of the DUT	**0.22**	Rectangular	1.73	1	0.13	Infinity
Combined Std. Uncertainty					1.33	
Expanded Standard Uncertainty (95%)					**2.65**	

5.2.1. Decision rule

Decision rule for statement(s) of conformity is based on Procedures 2, Clause 4.4.3 in IEC Guide 115:2007.

6. Device Under Test (DUT) Information

6.1. DUT Description

Device Dimension	Refer to Appendix A.		
Back Cover	☒ The Back Cover is not removable.		
Battery Options	☒ The rechargeable battery is not user accessible		
Test Sample Information	**No.**	**S/N**	**Notes**
	1	R3CT8056GMW	Conducted
	2	R3CT8056G8T	Conducted
	3	R3CT90EXXCN	Radiated
	4	R3CT90EY0BV	Radiated
	5	R3CT90EXXPJ	Radiated
	6	R3CT90EXV5R	Radiated
	7	R3CT90EXWPA	Radiated

6.2. Wireless Technologies of UNII 6e

Wireless technologies	Frequency bands	Operating mode	Duty Cycle used for SAR & PD testing
Wi-Fi_UNII 6e (Above 6GHz)	UNII Band 5 (5925-6425 MHz) UNII Band 6 (6425-6525 MHz) UNII Band 7 (6525-6885 MHz) UNII Band 8 (6885-7125 MHz)	802.11a 802.11ax (HE20) 802.11ax (HE40) 802.11ax (HE80) 802.11ax (HE160)	99.3% (802.11ax (HE40)) 99.5% (802.11ax (HE160))
UWB	Ch.5 (6489.6 MHz) Ch.9 (7987.2 MHz)	Signal Configurations(0/1/3), PRF modes(BPRF/HPRF)	N/A

Notes:

Duty cycle for Wi-Fi is referenced from the UNII report.

6.3. Nominal Output Power

RF Air interface	Mode	Indoor AP			Standard AP					
		Max. RF Output Power (dBm)			Max. RF Output Power (dBm)			Reduced. RF Output Power (dBm)		
		WLAN Ant.1	WLAN Ant.2	MIMO (Ant.1+Ant.2)	WLAN Ant.1	WLAN Ant.2	MIMO (Ant.1+Ant.2)	WLAN Ant.1	WLAN Ant.2	MIMO (Ant.1+Ant.2)
WiFi 6 GHz (UNII - 5)	802.11a	6.0	6.0	9.0	12.0	12.0	15.0	10.0	10.0	13.0
	802.11ax HE20	6.0	6.0	9.0	12.0	12.0	15.0	10.0	10.0	13.0
	802.11ax HE40	9.0	9.0	12.0	12.0	12.0	15.0	10.0	10.0	13.0
	802.11ax HE80	9.0	9.0	12.0	11.0	11.0	14.0	10.0	10.0	13.0
	802.11ax HE160	9.0	9.0	12.0	11.0	11.0	14.0	10.0	10.0	13.0
WiFi 6 GHz (UNII - 6)	802.11a	8.0	8.0	11.0						
	802.11ax HE20	8.0	8.0	11.0						
	802.11ax HE40	9.0	9.0	12.0						
	802.11ax HE80	9.0	9.0	12.0						
	802.11ax HE160	9.0	9.0	12.0						
WiFi 6 GHz (UNII - 7)	802.11a	8.0	8.0	11.0	12.0	12.0	15.0	10.0	10.0	13.0
	802.11ax HE20	8.0	8.0	11.0	12.0	12.0	15.0	10.0	10.0	13.0
	802.11ax HE40	9.0	9.0	12.0	12.0	12.0	15.0	10.0	10.0	13.0
	802.11ax HE80	9.0	9.0	12.0	11.0	11.0	14.0	10.0	10.0	13.0
	802.11ax HE160	9.0	9.0	12.0	11.0	11.0	14.0	10.0	10.0	13.0
WiFi 6 GHz (UNII - 8)	802.11a	8.0	8.0	11.0						
	802.11ax HE20	8.0	8.0	11.0						
	802.11ax HE40	9.0	9.0	12.0						
	802.11ax HE80	9.0	9.0	12.0						
	802.11ax HE160	9.0	9.0	12.0						

Note(s):.

1. Only MIMO mode supports for UNII 6e Bands.
2. This device has support Dual Client (6CD) in UNII 6-7GHz. So Indoor AP support to UNII 5 – 8, and Standard AP supports to UNII5, 7.

7. RF Exposure Conditions (Test Configurations)

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

Wireless technologies	RF Exposure Conditions	Antena	DUT-to-User Separation	Test Position	Antenna-to-edge/surface	SAR Required	Note
UNII 6e	Head	WiFi 6G MIMO	0 mm	Left Touch	N/A	Yes	
				Left Tilt (15°)	N/A	Yes	
				Right Touch	N/A	Yes	
				Right Tilt (15°)	N/A	Yes	
	Body		15 mm	Rear	N/A	Yes	
				Front	N/A	Yes	
	Product Specific 10-g		0 mm	Rear	< 25 mm	Yes	
				Front	< 25 mm	Yes	
				Edge 1 (Top)	< 25 mm	Yes	
				Edge 2 (Right)	< 25 mm	Yes	
				Edge 3 (Bottom)	> 25 mm	No	1
				Edge 4 (Left)	< 25 mm	Yes	
UWB	Product Specific 10-g	Antenna 1 (Metal Ant.)	0 mm	Rear	< 25 mm	Yes	
				Front	< 25 mm	Yes	
				Edge 1 (Top)	> 25 mm	No	
				Edge 2 (Right)	> 25 mm	No	
				Edge 3 (Bottom)	> 25 mm	No	1
				Edge 4 (Left)	< 25 mm	Yes	
		Antenna 2 (Patch Ant.)	0 mm	Rear	< 25 mm	Yes	
				Front	< 25 mm	Yes	
				Edge 1 (Top)	< 25 mm	Yes	
				Edge 2 (Right)	> 25 mm	No	
				Edge 3 (Bottom)	> 25 mm	No	1
				Edge 4 (Left)	< 25 mm	Yes	

Notes:

1. SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB 941225 D06 Hot Spot SAR.
2. For Phablet devices: When hotspot mode applies, Product specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.
3. For Phablet devices: When hotspot mode is not supported, Product specific 10-g SAR is required for all surfaces and edges with an antenna located at ≤ 25mm from that surface or edge in direct contact with a flat phantom, to address interactive hand use exposure conditions.
4. Per manufacturer guide, UWB SAR was considered about only hand held condition (Product Specific 10-g).

8. SAR System Check with Dielectric Property Measurements

8.1. Dielectric Property Measurements

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within ± 2°C of the temperature when the tissue parameters are characterized.
The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements. The parameters should be re-measured after 1 days of use; 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

Refer to Table 2 within the IEC/IEEE Std 62209-1528 : 2020

Target Frequency (MHz)	Tissue parameters	
	ε_r	σ (S/m)
5800	35.3	5.27
6000	35.1	5.48
6500	34.5	6.07
7000	33.9	6.65
7500	33.3	7.24
8000	32.7	7.84
8500	32.1	8.46

Dielectric Property Measurements Results:

SAR 7 Room

Date	Freq. (MHz)	Liquid Parameters			Measured	Target	Delta (%)	Limit ±(%)
10/11/2022	Head 6000	e'	35.7000	Relative Permittivity (ϵ_r):	35.70	35.10	1.71	5
		e"	15.7600	Conductivity (σ):	5.26	5.48	-4.05	5
	Head 6200	e'	35.3700	Relative Permittivity (ϵ_r):	35.37	34.86	1.46	5
		e"	16.0600	Conductivity (σ):	5.54	5.72	-3.14	5
	Head 6500	e'	34.9500	Relative Permittivity (ϵ_r):	34.95	34.50	1.30	5
		e"	16.3400	Conductivity (σ):	5.91	6.07	-2.71	5
	Head 6600	e'	34.8000	Relative Permittivity (ϵ_r):	34.80	34.38	1.22	5
		e"	16.4600	Conductivity (σ):	6.04	6.19	-2.35	5
	Head 6800	e'	34.5400	Relative Permittivity (ϵ_r):	34.54	34.14	1.17	5
		e"	16.6200	Conductivity (σ):	6.28	6.42	-2.09	5
	Head 7000	e'	34.3700	Relative Permittivity (ϵ_r):	34.37	33.90	1.39	5
		e"	16.3800	Conductivity (σ):	6.38	6.65	-4.13	5
10/11/2022	Head 7000	e'	33.6200	Relative Permittivity (ϵ_r):	33.62	33.90	-0.83	5
		e"	17.2500	Conductivity (σ):	6.71	6.65	0.96	5
	Head 7250	e'	33.1900	Relative Permittivity (ϵ_r):	33.19	33.60	-1.22	5
		e"	17.3800	Conductivity (σ):	7.01	6.95	0.88	5
	Head 7500	e'	32.8500	Relative Permittivity (ϵ_r):	32.85	33.30	-1.35	5
		e"	17.4300	Conductivity (σ):	7.27	7.24	0.40	5
	Head 7800	e'	32.3400	Relative Permittivity (ϵ_r):	32.34	32.94	-1.82	5
		e"	17.5100	Conductivity (σ):	7.59	7.60	-0.08	5
	Head 8000	e'	32.1300	Relative Permittivity (ϵ_r):	32.13	32.70	-1.74	5
		e"	17.5900	Conductivity (σ):	7.82	7.84	-0.20	5
	Head 8100	e'	31.9200	Relative Permittivity (ϵ_r):	31.92	32.58	-2.03	5
		e"	17.6700	Conductivity (σ):	7.96	7.96	-0.07	5
10/12/2022	Head 7000	e'	33.3300	Relative Permittivity (ϵ_r):	33.33	33.90	-1.68	5
		e"	17.4500	Conductivity (σ):	6.79	6.65	2.13	5
	Head 7250	e'	32.8400	Relative Permittivity (ϵ_r):	32.84	33.60	-2.26	5
		e"	17.6300	Conductivity (σ):	7.11	6.95	2.33	5
	Head 7500	e'	32.4000	Relative Permittivity (ϵ_r):	32.40	33.30	-2.70	5
		e"	17.7500	Conductivity (σ):	7.40	7.24	2.24	5
	Head 7800	e'	31.8300	Relative Permittivity (ϵ_r):	31.83	32.94	-3.37	5
		e"	17.9100	Conductivity (σ):	7.77	7.60	2.21	5
	Head 8000	e'	31.5000	Relative Permittivity (ϵ_r):	31.50	32.70	-3.67	5
		e"	17.9800	Conductivity (σ):	8.00	7.84	2.01	5
	Head 8100	e'	31.3000	Relative Permittivity (ϵ_r):	31.30	32.58	-3.93	5
		e"	18.0400	Conductivity (σ):	8.12	7.96	2.02	5

10/16/2022	Head 6000	e'	35.7500	Relative Permittivity (ϵ_r):	35.75	35.10	1.85
		e''	16.6500	Conductivity (σ):	5.55	5.48	1.36
	Head 6200	e'	35.3700	Relative Permittivity (ϵ_r):	35.37	34.86	1.46
		e''	16.8600	Conductivity (σ):	5.81	5.72	1.68
	Head 6500	e'	34.8400	Relative Permittivity (ϵ_r):	34.84	34.50	0.99
		e''	17.0900	Conductivity (σ):	6.18	6.07	1.76
	Head 6600	e'	34.6500	Relative Permittivity (ϵ_r):	34.65	34.38	0.79
		e''	17.1800	Conductivity (σ):	6.30	6.19	1.92
	Head 6800	e'	34.3000	Relative Permittivity (ϵ_r):	34.30	34.14	0.47
		e''	17.3200	Conductivity (σ):	6.55	6.42	2.04
	Head 7000	e'	33.9700	Relative Permittivity (ϵ_r):	33.97	33.90	0.21
		e''	17.4300	Conductivity (σ):	6.78	6.65	2.02
10/21/2022	Head 6000	e'	34.2500	Relative Permittivity (ϵ_r):	34.25	35.10	-2.42
		e''	15.7600	Conductivity (σ):	5.26	5.48	-4.05
	Head 6200	e'	33.8500	Relative Permittivity (ϵ_r):	33.85	34.86	-2.90
		e''	15.9700	Conductivity (σ):	5.51	5.72	-3.68
	Head 6500	e'	33.3800	Relative Permittivity (ϵ_r):	33.38	34.50	-3.25
		e''	16.3600	Conductivity (σ):	5.91	6.07	-2.59
	Head 6600	e'	33.1800	Relative Permittivity (ϵ_r):	33.18	34.38	-3.49
		e''	16.4600	Conductivity (σ):	6.04	6.19	-2.35
	Head 6800	e'	32.8700	Relative Permittivity (ϵ_r):	32.87	34.14	-3.72
		e''	16.6200	Conductivity (σ):	6.28	6.42	-2.09
	Head 7000	e'	32.5400	Relative Permittivity (ϵ_r):	32.54	33.90	-4.01
		e''	16.7200	Conductivity (σ):	6.51	6.65	-2.14
10/24/2022	Head 6000	e'	34.5000	Relative Permittivity (ϵ_r):	34.50	35.10	-1.71
		e''	16.0500	Conductivity (σ):	5.35	5.48	-2.29
	Head 6200	e'	34.2600	Relative Permittivity (ϵ_r):	34.26	34.86	-1.72
		e''	16.3400	Conductivity (σ):	5.63	5.72	-1.45
	Head 6500	e'	33.7100	Relative Permittivity (ϵ_r):	33.71	34.50	-2.29
		e''	16.4500	Conductivity (σ):	5.95	6.07	-2.05
	Head 6600	e'	33.5100	Relative Permittivity (ϵ_r):	33.51	34.38	-2.53
		e''	16.5300	Conductivity (σ):	6.07	6.19	-1.94
	Head 6800	e'	33.2000	Relative Permittivity (ϵ_r):	33.20	34.14	-2.75
		e''	16.6300	Conductivity (σ):	6.29	6.42	-2.03
	Head 7000	e'	32.8500	Relative Permittivity (ϵ_r):	32.85	33.90	-3.10
		e''	16.8700	Conductivity (σ):	6.57	6.65	-1.26
11/4/2022	Head 6000	e'	36.4600	Relative Permittivity (ϵ_r):	36.46	35.10	3.87
		e''	15.9900	Conductivity (σ):	5.33	5.48	-2.65
	Head 6200	e'	36.2200	Relative Permittivity (ϵ_r):	36.22	34.86	3.90
		e''	15.9900	Conductivity (σ):	5.51	5.72	-3.56
	Head 6500	e'	35.8500	Relative Permittivity (ϵ_r):	35.85	34.50	3.91
		e''	16.1100	Conductivity (σ):	5.82	6.07	-4.08
	Head 6600	e'	35.6800	Relative Permittivity (ϵ_r):	35.68	34.38	3.78
		e''	16.1300	Conductivity (σ):	5.92	6.19	-4.31
	Head 6800	e'	35.3500	Relative Permittivity (ϵ_r):	35.35	34.14	3.54
		e''	16.3100	Conductivity (σ):	6.17	6.42	-3.91
	Head 7000	e'	34.9300	Relative Permittivity (ϵ_r):	34.93	33.90	3.04
		e''	16.3900	Conductivity (σ):	6.38	6.65	-4.07

8.2. System Check

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

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 Simulating liquid of the following parameters.
- The depth of tissue-equivalent liquid in a phantom must be ≥ 10.0 cm for measurements > 6 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 5 mm (above 6GHz) from dipole center to the simulating liquid surface.
- The dipole input power (forward power) was 100 mW.
- The results are normalized to 1 W input power.

Reference Target SAR Values

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

System Dipole	Serial No.	Cal. Date	Freq. (MHz)	Target SAR Values (W/kg)	
				1g/10g	Head
D6.5GHzV2	1010	5/27/2023	6500	1g	285.00
				10g	52.90
D8GHzV2	1008	6/10/2023	8000	1g	267.00
				10g	45.00

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.

SAR 7 Room

Date Tested	System Dipole		T.S. Liquid		Measured Results		Target (Ref. Value)	Delta ±10 %	Plot No.
	Type	Serial #			Zoom Scan to 100 mW	Normalize to 1 W			
10/11/2022	D6.5G V2	1010	Head	1g	29.10	291.0	285.00	2.11	
				10g	5.71	57.1	52.90	7.94	
10/11/2022	D8GHzV2	1008	Head	1g	27.10	271.0	267.00	1.50	1
				10g	4.79	47.9	45.00	6.44	
10/12/2022	D8GHzV2	1008	Head	1g	26.30	263.0	267.00	-1.50	
				10g	4.69	46.9	45.00	4.22	
10/16/2022	D6.5G V2	1010	Head	1g	26.90	269.0	285.00	-5.61	
				10g	5.29	52.9	52.90	0.00	
10/21/2022	D6.5G V2	1010	Head	1g	26.70	267.0	285.00	-6.32	2
				10g	5.16	51.6	52.90	-2.46	
10/24/2022	D6.5G V2	1010	Head	1g	27.00	270.0	285.00	-5.26	
				10g	5.16	51.6	52.90	-2.46	
11/4/2022	D6.5G V2	1010	Head	1g	29.40	294.0	285.00	3.16	
				10g	5.76	57.6	52.90	8.88	

9. IPD(Incident Power Density) System with Dielectric Property

9.1. Dielectric Property

Media is air so Relative Permittivity (ϵr) and Conductivity (σ) is 1.

9.2. 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
– 4 cm^2 spatial averaging have been used according to FCC requirement.
– power density distribution should also be verified, both spatially (shape) and numerically (level) through visual inspection for noticeable differences
– The Horn antenna input power (forward power) was 86.1mW.
– The measured results should be within 0.66dB of the calibrated targets

Reference Target PD Values

Per the manufacturer's guide, the target value of the calibration report was converted to a value of 100mW input power.

5G verification Source	Serial No.	Cal. Date	Freq. (MHz)	Averaging area	Prad (mW)	Input power (mW)	Target PD Values (W/m^2)		Note
							1 cm^2	4 cm^2	
10GHz	1022	3/1/2022	10000	Circular	86.1	19.35	59.60	54.80	Cal.report target / Probe SN:9536
10GHz	1022	3/1/2022	10000	Circular	86.1	19.35	55.10	51.30	Cal.report target Probe SN:9493

SAR 8 Room

Date	Sorce SN	Sorce Cal. Due Data	Input Power (mW)	Measured Results for 1cm^2 (W/m^2)	Target (Ref. Value) (W/m^2)	Delta ±0.66dB	Measured Total psPD for 4cm^2 (W/m^2)	Target (Ref. Value) (W/m^2)	Delta (±66dB)	visual inspection	Plot No.
10/5/2022	1022	3/1/2023	86.1	60.60	59.60	0.07	55.80	54.8	0.08	confirmed	
10/6/2022	1022	3/1/2023	86.1	63.30	59.60	0.26	59.60	54.8	0.36	confirmed	3
10/7/2022	1022	3/1/2023	86.1	60.60	59.60	0.07	55.60	54.8	0.06	confirmed	
10/11/2022	1022	3/1/2023	86.1	58.00	59.60	-0.11	53.10	54.8	-0.13	confirmed	
10/12/2022	1022	3/1/2023	86.1	60.70	59.60	0.08	55.20	54.8	0.03	confirmed	4

SAR 9 Room

Date	Sorce SN	Sorce Cal. Due Data	Input Power (mW)	Measured Results for 1cm^2 (W/m^2)	Target (Ref. Value) (W/m^2)	Delta ±0.66dB	Measured Total psPD for 4cm^2 (W/m^2)	Target (Ref. Value) (W/m^2)	Delta (±0.66dB)	visual inspection	Plot No.
10-6-2022	1022	3-1-2023	86.1	61.70	55.10	0.49	56.70	51.3	0.43	confirmed	
10-7-2022	1022	3-1-2023	86.1	63.10	55.10	0.59	57.90	51.3	0.52	confirmed	5
10-20-2022	1022	3-1-2023	86.1	57.40	55.10	0.18	53.00	51.3	0.14	confirmed	
10-21-2022	1022	3-1-2023	86.1	59.80	55.10	0.36	54.50	51.3	0.26	confirmed	
10-22-2022	1022	3-1-2023	86.1	59.50	55.10	0.33	54.30	51.3	0.26	confirmed	6
10-25-2022	1022	3-1-2023	86.1	55.40	55.10	0.02	51.20	51.3	0.01	confirmed	

Note(s):
psPD value used the ps_{tot} avg value of test result plot.

9.3. Wi-Fi 6 GHz (U-NII Bands)

Indoor AP

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Max. Average Power				SAR Test (Yes/No)
					WLAN MIMO Ant.1		WLAN MIMO Ant.2		
					Avg Pwr (dBm)	Max. Tune-up Limit (dBm)	Avg Pwr (dBm)	Max. Tune-up Limit (dBm)	
UNII 5 (5.925 - 6.425 GHz)	802.11a	6 Mbps	Not Required			6.00	Not Required	6.00	No
	802.11ax (HE20)	7.3 Mbps	Not Required			6.00	Not Required	6.00	No
	802.11ax (HE40)	14.6 Mbps	3	5965	8.58	9.00	7.46	9.00	No
			43	6165	8.64		6.85		
			91	6405	8.50		7.70		
	802.11ax (HE80)	36.0 Mbps	Not Required			9.00	Not Required	9.00	No
	802.11ax (HE160)	72.0 Mbps	15	6025	8.01	9.00	9.12	9.00	No
			47	6185	10.75		7.18		
			79	6345	10.49		7.98		
UNII 6 (6.425 - 6.525 GHz)	802.11a	6 Mbps	Not Required			8.00	Not Required	8.00	No
	802.11ax (HE20)	7.3 Mbps	Not Required			8.00	Not Required	8.00	No
	802.11ax (HE40)	14.6 Mbps	Not Required			9.00	Not Required	9.00	No
	802.11ax (HE80)	36.0 Mbps	Not Required			9.00	Not Required	9.00	No
	802.11ax (HE160)	72.0 Mbps	111	6505	8.55	9.00	7.17	9.00	Yes
UNII 7 (6.525 - 6.885 GHz)	802.11a	6 Mbps	Not Required			8.00	Not Required	8.00	No
	802.11ax (HE20)	7.3 Mbps	Not Required			8.00	Not Required	8.00	No
	802.11ax (HE40)	14.6 Mbps	123	6565	8.42	9.00	8.92	9.00	No
			147	6685	8.41		8.46		
			179	6845	8.61		8.25		
	802.11ax (HE80)	36.0 Mbps	Not Required			9.00	Not Required	9.00	No
	802.11ax (HE160)	72.0 Mbps	143	6665	7.00	9.00	7.78	9.00	No
			175	6825	7.75		7.94		
UNII 8 (6.885 - 7.125 GHz)	802.11a	6 Mbps	Not Required			5.00	Not Required	5.00	No
	802.11ax (HE20)	7.3 Mbps	Not Required			8.00	Not Required	8.00	No
	802.11ax (HE40)	14.6 Mbps	Not Required			9.00	Not Required	9.00	No
	802.11ax (HE80)	36.0 Mbps	Not Required			9.00	Not Required	9.00	No
	802.11ax (HE160)	72.0 Mbps	207	6985	8.94	9.00	7.25	9.00	Yes

Standard AP

Band (GHz)	Mode	Data Rate	Ch #	Freq. (MHz)	Max. Average Power				SAR Test (Yes/No)	Reduced. Average Power				SAR Test (Yes/No)
					WLAN MIMO Ant.1		WLAN MIMO Ant.2			WLAN MIMO Ant.1		WLAN MIMO Ant.2		
					Avg Pwr (dBm)	Max. Tune-up Limit (dBm)	Avg Pwr (dBm)	Max. Tune-up Limit (dBm)		Avg Pwr (dBm)	Max. Tune-up Limit (dBm)	Avg Pwr (dBm)	Max. Tune-up Limit (dBm)	
UNII 5 (5.925 - 6.425 GHz)	802.11a	6 Mbps	1	5955	11.99	12.00	10.34	12.00	No		10.00		10.00	No
			45	6175	11.98		9.45							
			91	6415	11.50		10.70							
	802.11ax (HE20)	7.3 Mbps	1	5935	11.75	12.00	10.21	12.00	No		10.00		10.00	No
			45	6175	11.99		9.52							
			93	6415	11.30		10.60							
	802.11ax (HE40)	14.6 Mbps	3	5965	11.65	12.00	10.45	12.00	Yes		10.00		10.00	No
			43	6165	11.99		10.01							
			91	6405	11.45		11.23							
	802.11ax (HE80)	36.0 Mbps	7	5985	10.51	11.00	9.49	11.00	No		10.00		10.00	No
			39	6145	10.89		8.54							
			87	6385	10.38		9.92							
	802.11ax (HE160)	72.0 Mbps	15	6025	10.72	11.00	9.82	11.00	No	9.68	10.00	8.02	10.00	Yes
			47	6185	10.75		8.90			9.87		8.04		
			79	6345	10.49		10.35			9.48		8.13		
UNII 7 (6.525 - 6.885 GHz)	802.11a	6 Mbps	117	6535	11.28	12.00	11.17	12.00	No		10.00		10.00	No
			149	6695	11.08		10.47							
			185	6875	11.53		10.48							
	802.11ax (HE20)	7.3 Mbps	117	6535	11.15	12.00	11.02	12.00	No		10.00		10.00	No
			149	6695	10.80		10.57							
			185	6875	11.20		10.40							
	802.11ax (HE40)	14.6 Mbps	123	6565	10.70	12.00	11.03	12.00	Yes		10.00		10.00	No
			147	6685	11.25		11.28							
			179	6845	11.40		10.70							
	802.11ax (HE80)	36.0 Mbps	119	6545	7.75	9.00	8.66	9.00	No		10.00		10.00	No
			151	6705	10.55	11.00	10.69	11.00						
			183	6865	7.60	9.00	7.96	9.00						
	802.11ax (HE160)	72.0 Mbps	143	6665	9.92	11.00	10.12	11.00	No	9.58	10.00	8.16	10.00	Yes
			175	6825	7.75	9.00	7.78	9.00		9.24		8.28		

Note(s):

Per TCB workshop April.2021's guide, SAR test should be evaluated at least 5 channels in UNII 6-7GHz.
For each Head, Body-worn and Product Specific 10-g, We evaluated SAR test of each 7 channels in UNII 6-7GHz.

10. SAR and APD(Absorbed Power Density) Results

SAR Test Reduction criteria are as follows:

- Reported SAR(W/kg) for Wi-Fi = Measured SAR * Tune-up scaling factor * Duty Cycle scaling factor
- Duty Cycle scaling factor = 1 / Duty cycle (%)

KDB 447498 D01 General RF Exposure Guidance:

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

KDB 648474 D04 Handset SAR:

With headset attached, when the reported SAR for body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

KDB 648474 D04 Handset SAR (Phablet Only):

For smart phones, with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm.
When hotspot mode does not apply, 10-g extremity SAR is required for all surfaces and edges with an antenna located at ≤ 25mm From that surface or edge in direct contact with a flat phantom, to address interactive hand use exposure conditions. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; However, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, Including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold.

Additional 1-g SAR testing at 5 mm is not required when hotspot mode 10-g extremity SAR is not required for the surfaces and edges; since all 1-g reported SAR < 1.2 W/kg.

10.1. WiFi (UNII Bands-Above 6GHz)

SAR test results

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle (%)	Power (dBm)		1-g SAR (W/kg)		10-g SAR (W/kg)		Plot No.
									Tune-up limit	Meas.	Meas.	Scaled	Meas.	Scaled	
WLAN MIMO Ant.1	Head	802.11ax HE160 72.0 Mbps	On	0	Left Touch	47	6185.0	99.5%	10.00	9.87	0.036	0.037			
					Left Tilt	47	6185.0	99.5%	10.00	9.87	0.036	0.037			
					Right Touch	15	6025.0	99.5%	10.00	9.68	0.140	0.151			
						47	6185.0	99.5%	10.00	9.87	0.187	0.194			1
						79	6345.0	99.5%	10.00	9.48	0.159	0.180			
						111	6505.0	99.5%	9.00	8.55	0.075	0.084			
						143	6665.0	99.5%	10.00	9.58	0.150	0.166			
						175	6825.0	99.5%	10.00	9.24	0.146	0.175			
						207	6985.0	99.5%	9.00	8.94	0.099	0.101			
					Right Tilt	47	6185.0	99.5%	10.00	9.87	0.107	0.111			
	Body-worn	802.11ax HE40	Off	15	Rear	43	6165.0	99.3%	12.00	11.99	0.056	0.057			
						91	6405.0	99.3%	12.00	11.45	0.096	0.110			
						123	6565.0	99.3%	12.00	10.70	0.091	0.124			
						147	6685.0	99.3%	12.00	11.25	0.106	0.127			2
						179	6845.0	99.3%	12.00	11.40	0.080	0.092			
					Front	43	6165.0	99.3%	12.00	11.99	0.021	0.021			
		802.11ax HE160 72.0 Mbps			Rear	111	6505.0	99.5%	9.00	8.55	0.035	0.039			
						207	6985.0	99.5%	9.00	8.94	0.028	0.029			
	Product Specific 10-g	802.11ax HE40	Off	0	Rear	43	6165.0	99.3%	12.00	11.99			0.284	0.287	
					Front	43	6165.0	99.3%	12.00	11.99			0.251	0.253	
					Edge 1	43	6165.0	99.3%	12.00	11.99			0.075	0.076	
					Edge 2	43	6165.0	99.3%	12.00	11.99					
					Edge 4	43	6165.0	99.3%	12.00	11.99			0.555	0.560	
						91	6405.0	99.3%	12.00	11.45			0.518	0.592	
						123	6565.0	99.3%	12.00	10.70			0.437	0.594	3
						147	6685.0	99.3%	12.00	11.25			0.466	0.558	
						179	6845.0	99.3%	12.00	11.40			0.479	0.554	
		802.11ax HE160 72.0 Mbps			Edge 4	111	6505.0	99.5%	9.00	8.55			0.150	0.167	
						207	6985.0	99.5%	9.00	8.94			0.207	0.211	
WLAN MIMO Ant.2	Head	802.11ax HE160 72.0 Mbps	N/A	0	Left Touch	47	6185.0	99.5%	10.00	8.04					
					Left Tilt	47	6185.0	99.5%	10.00	8.04					
					Right Touch	15	6025.0	99.5%	10.00	8.02					
						47	6185.0	99.5%	10.00	8.04					
						79	6345.0	99.5%	10.00	8.13					
						111	6505.0	99.5%	9.00	7.17					
						143	6665.0	99.5%	10.00	8.16					
						175	6825.0	99.5%	10.00	8.28					
						207	6985.0	99.5%	9.00	7.25					
					Right Tilt	47	6185.0	99.5%	10.00	8.04					
	Body-worn	802.11ax HE40	N/A	15	Rear	43	6165.0	99.3%	12.00	10.01					
						91	6405.0	99.3%	12.00	11.23					
						123	6565.0	99.3%	12.00	11.03					
						147	6685.0	99.3%	12.00	11.28					
						179	6845.0	99.3%	12.00	10.70					
					Front	43	6165.0	99.3%	12.00	10.01					
		802.11ax HE160 72.0 Mbps			Rear	111	6505.0	99.5%	9.00	7.17					
						207	6985.0	99.5%	9.00	7.25					
	Product Specific 10-g	802.11ax HE40	N/A	0	Rear	43	6165.0	99.3%	12.00	10.01					
					Front	43	6165.0	99.3%	12.00	10.01					
					Edge 1	43	6165.0	99.3%	12.00	10.01					
					Edge 2	43	6165.0	99.3%	12.00	10.01			0.011	0.018	
					Edge 4	43	6165.0	99.3%	12.00	10.01					
						91	6405.0	99.3%	12.00	11.23					
						123	6565.0	99.3%	12.00	11.03					
						147	6685.0	99.3%	12.00	11.28					
						179	6845.0	99.3%	12.00	10.70					
		802.11ax HE160 72.0 Mbps			Edge 4	111	6505.0	99.5%	9.00	7.17					
						207	6985.0	99.5%	9.00	7.25					

APD (Absorbed Power Density) results

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Duty Cycle (%)	Power (dBm)		Measured APD (mW/cm^2 over 4cm^2)	Plot No.
									Tune-up limit	Meas.		
WLAN MIMO Ant.1	Head	802.11ax HE160 72.0 Mbps	On	0	Left Touch	47	6185.0	99.5%	10.00	9.87	0.0287	
					Left Tilt	47	6185.0	99.5%	10.00	9.87	0.0274	
					Right Touch	15	6025.0	99.5%	10.00	9.68	0.0894	
						47	6185.0	99.5%	10.00	9.87	0.1180	1
						79	6345.0	99.5%	10.00	9.48	0.0992	
						111	6505.0	99.5%	9.00	8.55	0.0440	
						143	6665.0	99.5%	10.00	9.58	0.0823	
						175	6825.0	99.5%	10.00	9.24	0.0834	
						207	6985.0	99.5%	9.00	8.94	0.0547	
					Right Tilt	47	6185.0	99.5%	10.00	9.87	0.0734	
	Body-worn	802.11ax HE40	Off	15	Rear	43	6165.0	99.3%	12.00	11.99	0.0481	
						91	6405.0	99.3%	12.00	11.45	0.0794	
						123	6565.0	99.3%	12.00	10.70	0.0740	
						147	6685.0	99.3%	12.00	11.25	0.0876	2
						179	6845.0	99.3%	12.00	11.40	0.0661	
					Front	43	6165.0	99.3%	12.00	11.99	0.0179	
		802.11ax HE160 72.0 Mbps			Rear	111	6505.0	99.5%	9.00	8.55	0.0307	
						207	6985.0	99.5%	9.00	8.94	0.0243	
	Product Specific 10-g	802.11ax HE40	Off	0	Rear	43	6165.0	99.3%	12.00	11.45	0.6570	
					Front	43	6165.0	99.3%	12.00	11.45	0.5890	
					Edge 1	43	6165.0	99.3%	12.00	11.45	0.1770	
					Edge 2	43	6165.0	99.3%	12.00	11.45		
					Edge 4	43	6165.0	99.3%	12.00	11.99	1.3200	4
						91	6405.0	99.3%	12.00	11.45	1.2300	
						123	6565.0	99.3%	12.00	10.70	1.0400	
						147	6685.0	99.3%	12.00	11.25	1.1500	
						179	6845.0	99.3%	12.00	11.40	1.1100	
		802.11ax HE160 72.0 Mbps			Edge 4	111	6505.0	99.5%	9.00	8.55	0.3570	
						207	6985.0	99.5%	9.00	8.94	0.4960	
WLAN MIMO Ant.2	Head	802.11ax HE160 72.0 Mbps	On	0	Left Touch	47	6185.0	99.5%	10.00	8.04		
					Left Tilt	47	6185.0	99.5%	10.00	8.04		
					Right Touch	15	6025.0	99.5%	10.00	8.02		
						47	6185.0	99.5%	10.00	8.04		
						79	6345.0	99.5%	10.00	8.13		
						111	6505.0	99.5%	9.00	7.17		
						143	6665.0	99.5%	10.00	8.16		
						175	6825.0	99.5%	10.00	8.28		
						207	6985.0	99.5%	9.00	7.25		
					Right Tilt	47	6185.0	99.5%	10.00	8.04		
	Body-worn	802.11ax HE40	Off	15	Rear	43	6165.0	99.3%	12.00	10.01		
						91	6405.0	99.3%	12.00	11.23		
						123	6565.0	99.3%	12.00	11.03		
						147	6685.0	99.3%	12.00	11.28		
						179	6845.0	99.3%	12.00	10.70		
					Front	43	6165.0	99.3%	12.00	10.01		
		802.11ax HE160 72.0 Mbps			Rear	111	6505.0	99.5%	9.00	7.17		
						207	6985.0	99.5%	9.00	7.25		
	Product Specific 10-g	802.11ax HE40	Off	0	Rear	43	6165.0	99.3%	12.00	10.01		
					Front	43	6165.0	99.3%	12.00	10.01		
					Edge 1	43	6165.0	99.3%	12.00	10.01		
					Edge 2	43	6165.0	99.3%	12.00	10.01	0.0256	
					Edge 4	43	6165.0	99.3%	12.00	10.01		
						91	6405.0	99.3%	12.00	11.23		
						123	6565.0	99.3%	12.00	11.03		
						147	6685.0	99.3%	12.00	11.28		
						179	6845.0	99.3%	12.00	10.70		
		802.11ax HE160 72.0 Mbps			Edge 4	111	6505.0	99.5%	9.00	7.17		
						207	6985.0	99.5%	9.00	7.25		

Note(s):

1. APD (Absorbed Power Density) over 4cm^2 averaging area is reported based on SAR measurements.
2. 10 W/m^2 = 1.0 mW/cm^2

10.2. UWB

SAR test results

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	10-g SAR (W/kg) Meas.	Plot No.
UWB Ant.1	Product Specific 10-g	CW	N/A	0	Rear	5	6489.6	0.000	
						9	7987.2	0.000	
					Front	5	6489.6	0.000	5
						9	7987.2	0.000	
					Edge 4	5	6489.6	0.000	
						9	7987.2	0.000	
UWB Ant.2	Product Specific 10-g	CW	N/A	0	Rear	9	7987.2	0.001	6
					Front	9	7987.2	0.000	
					Edge 1	9	7987.2	0.000	
					Edge 4	9	7987.2	0.000	

Note(s):

UWB Ant.1 has support to Ch.5 and Ch.9 and UWB Ant.2 has only support to Ch.9.

APD (Absorbed Power Density) results

Antenna	RF Exposure Conditions	Mode	PWR Back-off	Dist. (mm)	Test Position	Ch #.	Freq. (MHz)	Measured APD (mW/cm^2 over 4cm^2)	Plot No.
UWB Ant.1	Product Specific 10-g	CW	N/A	0	Rear	5	6489.6	0.0012	
						9	7987.2	0.0011	
					Front	5	6489.6	0.0022	5
						9	7987.2	0.0008	
					Edge 4	5	6489.6	0.0010	
						9	7987.2	0.0010	
UWB Ant.2	Product Specific 10-g	CW	N/A	0	Rear	9	7987.2	0.0030	6
					Front	9	7987.2	0.0021	
					Edge 1	9	7987.2	0.0007	
					Edge 4	9	7987.2	0.0009	

Note(s):

1. APD (Absorbed Power Density) over 4cm^2 averaging area is reported based on SAR measurements.
2. 10 W/m^2 = 1.0 mW/cm^2

11. IPD(Incident Power density) Results

11.1. WiFi (UNII Bands-Above 6GHz)

Antenna	Mode	Test Position	Dist. (mm)	Ch.	Freq. (MHz)	Duty Cycle	Grid Step (Lamda)	iPD Note.4 (mW/cm^2)	Power (dBm)		Measured. Normal psPD	Measured. Total psPD	Reported. Normal psPD Note.3	Reported. Total psPD Note.3	Scailing factor for Measurement Uncertainty per IEC 62479 Note.2	Scaled Normal psPD	Scaled Total psPD	Note.	Plot No.
									Tune-up limit	Meas.	mW/cm^2	mW/cm^2	mW/cm^2	mW/cm^2		mW/cm^2	mW/cm^2		
WLAN MIMO Ant.1 & Ant.2	802.11ax HE 40	Rear	2.00	43	6165.0	99.3%	0.05	N/A	15.00	14.12	0.2060	0.2470	0.2520	0.3030	1.541	0.3883	0.4669		
		Front		43	6165.0	99.3%	0.05	N/A	15.00	14.12	0.1280	0.1500	0.1570	0.1830	1.541	0.2419	0.2820		
		Edge 1		43	6165.0	99.3%	0.05	N/A	15.00	14.12	0.0582	0.0811	0.0713	0.0993	1.541	0.1099	0.1530		
		Edge 2		43	6165.0	99.3%	0.05	N/A	15.00	14.12	0.0103	0.0157	0.0126	0.0192	1.541	0.0194	0.0296		
		Edge 4		43	6165.0	99.3%	0.05	0.2850	15.00	14.12	0.3550	0.4540	0.4350	0.5550	1.541	0.6703	0.8553		
				91	6405.0	99.3%	0.05	N/A	15.00	14.35	0.4190	0.5460	0.4870	0.6340	1.541	0.7505	0.9770	4	7
				123	6565.0	99.3%	0.05	N/A	15.00	13.88	0.3160	0.3970	0.4090	0.5140	1.541	0.6303	0.7921		
				147	6685.0	99.3%	0.05	N/A	15.00	14.28	0.2990	0.3710	0.3530	0.4370	1.541	0.5440	0.6734		
				179	6845.0	99.3%	0.05	N/A	15.00	14.07	0.3130	0.4330	0.3880	0.5360	1.541	0.5979	0.8260		
		Rear	9.73	43	6165.0	99.3%	0.05	0.2580	15.00	14.12	0.2440	0.2520	0.2990	0.3080	1.541	0.4608	0.4746	4	

Note(s):

1. 10 W/m^2 = 1.0 mW/cm^2
2. Per TCBC workshop guide, Incident power density results were scaled according to IEC 62479:2010 for the portion of the measurement uncertainty > 30%. Total expanded uncertainty of 2.65 dB (84.1%) was used to determine the psPD measurement scailing factor.
3. Power density test data were scaled to tune-up limit using measurement system tool.
4. Per manufacturer guide, Incident power density was measured at d=2mm and d=Lamda/5mm using the same grid size and grid step size for some frequencies and surfaces. iPD(integrated Power Density) was calculated based on these measurements. Since iPD ratio between the two distance is < 1dB, the grid step was sufficient for determining compliance at d=2mm.

11.2. UWB

Antenna	Mode	Test Position	Dist. (mm)	Ch.	Freq. (MHz)	Grid Step (Lamda)	Meas. Normal psPD	Meas. Total psPD	Scailing factor for Measurement Uncertainty per IEC 62479 Note.2	Scaled Normal psPD	Scaled Total psPD	Note.	Plot No.
							mW/cm^2	mW/cm^2		mW/cm^2	mW/cm^2		
UWB Ant. 1	CW	Rear	2.00	5	6489.60	0.05	0.0008	0.0010	1.541	0.0012	0.0015		
				9	7987.20	0.05	0.0029	0.0032	1.541	0.0045	0.0049		
		Front		5	6489.60	0.05	0.0024	0.0027	1.541	0.0037	0.0042		
				9	7987.20	0.05	0.0043	0.0045	1.541	0.0066	0.0069		
		Edge 4		5	6489.60	0.05	0.0034	0.0044	1.541	0.0052	0.0068		
				9	7987.20	0.05	0.0058	0.0060	1.541	0.0089	0.0092		8
UWB Ant. 2		Rear		9	7987.20	0.05	0.0023	0.0025	1.541	0.0035	0.0039		
		Front		9	7987.20	0.05	0.0026	0.0027	1.541	0.0040	0.0042		9
		Edge 1		9	7987.20	0.05	0.0023	0.0024	1.541	0.0035	0.0037		
		Edge 4		9	7987.20	0.05	0.0016	0.0019	1.541	0.0025	0.0029		

Note(s):

1. 10 W/m^2 = 1.0 mW/cm^2
2. Per TCBC workshop guide, Incident power density results were scaled according to IEC 62479:2010 for the portion of the measurement uncertainty > 30%. Total expanded uncertainty of 2.65 dB (84.1%) was used to determine the psPD measurement scailing factor.

12. Simultaneous Transmission Analysis

Please refer to section.12 in FCC SAR report S1.

Appendixes

Refer to separated files for the following appendixes.

4790541040-S2 FCC Report Above 6GHz_App A_PD Photos & Ant. Locations

4790541040-S2 FCC Report Above 6GHz _App B_Highest SAR and PD Test Plots

4790541040-S2 FCC Report Above 6GHz _App C_System Check Plots

4790541040-S2 FCC Report Above 6GHz _App D_SAR Tissue Ingredients

4790541040-S2 FCC Report Above 6GHz _App E_Probe Cal. Certificates

4790541040-S2 FCC Report Above 6GHz _App F_Dipole and Horn antenna Cal. Certificates

END OF REPORT