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RF Exposure Part 0 Test Report

Applicant Name:
Microsoft Corporation
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Redmond, WA 98052 USA
Microsoft Corporation

Date of Testing:
05/18/2026 – 07/06/2026
Test Site/Location:
Element, Columbia, MD, USA
Document Serial No.:
1M2604150032-02.C3K

FCC ID: C3K00002101

APPLICANT: MICROSOFT CORPORATION

Report Type: Part 0 SAR Characterization
DUT Type: Wireless Module
Model(s): HWB-Q94
Host Device Model Name: 2145
Permissive Change(s): C2PC Cover Letter

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Test results reported herein relate only to the item(s) tested.

RJ Ortanez
Executive Vice President



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-	Initial Release	07/15/2026	WKR023556

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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
2.4 GHz WIFI	Data	2412 - 2472 MHz
5 GHz WIFI	Data	U-NII-1: 5180 - 5240 MHz U-NII-2A: 5260 - 5320 MHz U-NII-2C: 5500 - 5720 MHz U-NII-3: 5745 - 5825 MHz U-NII-4: 5845 - 5885 MHz
6 GHz WIFI	Data	U-NII-5: 5935 - 6415 MHz U-NII-6: 6435 - 6515 MHz U-NII-7: 6535 - 6875 MHz U-NII-8: 6895 - 7115 MHz
2.4 GHz Bluetooth	Data	2402 - 2480 MHz

FCC ID C3K00002101 (Module Model: HWB-Q94) is a certified transmitter module intended for integration into host devices.

This report documents the RF exposure evaluation for the integration of FCC ID C3K00002101 into the host device evaluated under this filing. While the transmitter characteristics remain unchanged from the authorized module approval, RF exposure compliance is dependent upon the final host implementation and must be demonstrated for the specific host configuration.

1.2 Time-Averaging for SAR and Power Density

This Device is enabled with the Qualcomm® FastConnect TAS feature for WLAN technologies. This feature performs time averaging algorithm in real time to control and manage transmitting power and ensure the time-averaged RF exposure is in compliance with FCC requirements all the time. This Part 0 report shows SAR characterization of WLAN radios. Characterization is achieved by determining P_{Limit} that corresponds to the exposure design targets after accounting for all device design related uncertainties, i.e., SAR_design_target (< FCC SAR limit). The SAR characterization is denoted as SAR Char in this report. Section 1.3 includes a nomenclature of the specific terms used in this report.

The compliance test under the static transmission scenario and simultaneous transmission analysis are reported in Part 1 report. The validation of the time-averaging algorithm and compliance under the dynamic (time-varying) transmission scenario for WLAN technologies are reported in Part 2 report (report SN could be found in Section 1.4 – Bibliography).

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1.3 Nomenclature for Part 0 Report

Technology	Term	Description
WLAN	P_{limit}	Power level that corresponds to the exposure design target (SAR_{design_target}) after accounting for all device design related uncertainties
	P_{max}	Maximum tune up output power
	SAR_{design_target}	Target SAR level < FCC SAR limit after accounting for all device design related uncertainties
	SAR_{Char}	Table containing P_{limit} for all technologies and bands

1.4 Bibliography

Report Type	Report Serial Number
RF Exposure Part 2 Test Report	1M2604150032-03.C3K
RF Exposure Compliance Summary Report	1M2604150032-04.C3K
RF Exposure Part 1 Test Report	1M2604150032-01.C3K

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2 SAR AND POWER DENSITY MEASUREMENTS

2.1 SAR Definition

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Equation 2-1).

Equation 2-1
SAR Mathematical Equation

$$SAR = \frac{d}{dt} \left(\frac{dU}{dm} \right) = \frac{d}{dt} \left(\frac{dU}{\rho dv} \right)$$

SAR is expressed in units of Watts per Kilogram (W/kg).

$$SAR = \frac{\sigma \cdot E^2}{\rho}$$

where:

σ	=	conductivity of the tissue-simulating material (S/m)
ρ	=	mass density of the tissue-simulating material (kg/m ³)
E	=	Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relation to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.[6]

2.2 SAR Measurement Procedure

The evaluation was performed using the following procedure compliant to FCC KDB Publication 865664 D01v01r04 and IEEE 1528-2013:

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head and body interface and the horizontal grid resolution was determined per FCC KDB Publication 865664 D01v01r04 (See Table 2-1) and IEEE 1528-2013.
2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1g/10g cube evaluation. SAR at this fixed point was measured and used as a reference value.
3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r04 (See Table 2-1) and IEEE 1528-2013. On the

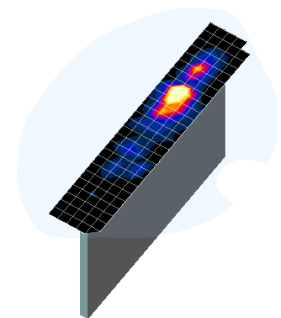


Figure 2-1
Sample SAR Area Scan

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basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual online for more details):

- a. SAR values at the inner surface of the phantom are extrapolated from the measured values along the line away from the surface with spacing no greater than that in Table 2-1. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).
 - b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.
 - c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

Table 2-1
Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r04*

Frequency	Maximum Area Scan Resolution (mm) ($\Delta x_{\text{area}}, \Delta y_{\text{area}}$)	Maximum Zoom Scan Resolution (mm) ($\Delta x_{\text{zoom}}, \Delta y_{\text{zoom}}$)	Maximum Zoom Scan Spatial Resolution (mm)			Minimum Zoom Scan Volume (mm) (x,y,z)
			Uniform Grid	Graded Grid		
				$\Delta z_{\text{zoom}}(n)$	$\Delta z_{\text{zoom}}(1)^*$	
≤ 2 GHz	≤ 15	≤ 8	≤ 5	≤ 4	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 30
2-3 GHz	≤ 12	≤ 5	≤ 5	≤ 4	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 30
3-4 GHz	≤ 12	≤ 5	≤ 4	≤ 3	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 28
4-5 GHz	≤ 10	≤ 4	≤ 3	≤ 2.5	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 25
5-6 GHz	≤ 10	≤ 4	≤ 2	≤ 2	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 22

*Also compliant to IEEE 1528-2013 Table 6

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3 SAR CHARACTERIZATION

3.1 DSI and SAR Determination

This device uses different Device State Index (DSI) to configure different time averaged power levels based on certain exposure scenarios. Depending on the detection scheme implemented in the smartphone, the worst-case SAR was determined by measurements for the relevant exposure conditions for that DSI. Detailed descriptions of the detection mechanisms are included in the operational description.

When 1g SAR and 10g SAR exposure comparison is needed, the worst-case was determined from SAR normalized to 1g or 10g SAR limit.

The device state index (DSI) conditions used in Table 3-1 represent different exposure scenarios.

Table 3-1
DSI and Corresponding Exposure Scenarios

Scenario	Description	SAR Test Cases
Body (DSI = 1)	▪ Device transmits in DSI = 1	KDB Publication 616217 D04v01r02

3.2 SAR Design Target

SAR_design_target is determined by ensuring that it is less than FCC SAR limit after accounting for total device designed related uncertainties specified by the manufacturer (see Table 3-2).

Table 3-2
***SAR_design_target* Calculations**

<i>SAR_design_target</i>			
$SAR_design_target < SAR_regulatory_limit \times 10^{\frac{-Total\ Uncertainty}{10}}$			
1g SAR (W/kg)		10g SAR (W/kg)	
<i>Total Uncertainty</i>	1.0 dB	<i>Total Uncertainty</i>	1.0 dB
<i>SAR_regulatory_limit</i>	1.6 W/kg	<i>SAR_regulatory_limit</i>	4.0 W/kg
<i>SAR_design_target</i>	1.0 W/kg	<i>SAR_design_target</i>	2.5 W/kg

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3.3 SAR Char

SAR test results corresponding to P_{max} for each antenna/technology/band/DSI can be found in the RF Exposure Part 1 Test Report.

P_{limit} is calculated by linearly scaling with the measured SAR at the Ppart0 to correspond to the SAR_{design_target} . When $P_{limit} < P_{max}$, P_{part0} was used as P_{limit} in the TAS BDF. When $P_{limit} > P_{max}$ and $P_{part0}=P_{max}$, calculated P_{limit} was used in the TAS BDF. All reported SAR obtained from the Ppart0 SAR tests was less than $SAR_{Design_target}+ 1$ dB Uncertainty. The final P_{limit} determination for each exposure scenario corresponding to SAR_{design_target} are shown in Table 3-3.

Table 3-3
 P_{Limit} Determination

Device State Index (DSI)	P_{Limit} Determination Scenarios
1	P_{limit} is calculated based on 1g Body SAR

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Table 3-4
SAR Characterizations

		Maximum Tune-Up Output Power*	Body
Exposure Scenario			1g
Averaging Volume			0mm/5mm
Spacing			1
DSI			
Technology/Band	Antenna	P _{max}	P _{limit}
2.4 GHz WIFI	R	19.5	20.00
2.4 GHz WIFI	L	19.5	21.80
2.4 GHz WIFI	MIMO	19.5	22.50
5 GHz WIFI UNII-1	R	15.5	15.50
5 GHz WIFI UNII-1	L	15.5	15.50
5 GHz WIFI UNII-1	MIMO	15.5	15.50
5 GHz WIFI UNII-2A	R	17.0	16.00
5 GHz WIFI UNII-2A	L	17.0	16.00
5 GHz WIFI UNII-2A	MIMO	17.0	16.00
5 GHz WIFI UNII-2C	R	16.0	15.50
5 GHz WIFI UNII-2C	L	16.0	15.50
5 GHz WIFI UNII-2C	MIMO	16.0	15.50
5 GHz WIFI UNII-3	R	20.5	15.50
5 GHz WIFI UNII-3	L	20.5	15.50
5 GHz WIFI UNII-3	MIMO	20.5	15.50
5 GHz WIFI UNII-4	R	17.0	16.25
5 GHz WIFI UNII-4	L	17.0	16.25
5 GHz WIFI UNII-4	MIMO	17.0	16.25
6 GHz WIFI UNII-5	R	17.5	11.00
6 GHz WIFI UNII-5	L	17.5	11.00
6 GHz WIFI UNII-5	MIMO	17.5	11.00
6 GHz WIFI UNII-6	R	10.0	18.70
6 GHz WIFI UNII-6	L	10.0	18.20
6 GHz WIFI UNII-6	MIMO	10.0	17.10
6 GHz WIFI UNII-7	R	18.0	11.75
6 GHz WIFI UNII-7	L	18.0	11.75
6 GHz WIFI UNII-7	MIMO	18.0	11.75
6 GHz WIFI UNII-8	R	7.5	18.00
6 GHz WIFI UNII-8	L	7.5	18.60
6 GHz WIFI UNII-8	MIMO	7.5	15.60

Notes:

- When $P_{max} < P_{limit}$, the DUT will operate at a power level up to P_{max} .

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EQUIPMENT LIST

For SAR measurements

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E4404B	Spectrum Analyzer	N/A	N/A	N/A	MY45113242
Agilent	E4438C	ESG Vector Signal Generator	11/2/2025	Annual	11/2/2026	MY45093852
Agilent	E4438C	ESG Vector Signal Generator	3/23/2026	Annual	3/23/2027	MY45092078
Agilent	N5182A	MXG Vector Signal Generator	4/13/2026	Annual	4/13/2027	MY48180366
Agilent	8753ES	S-Parameter Vector Network Analyzer	10/28/2025	Annual	10/28/2026	MY40003841
Agilent	8753ES	S-Parameter Vector Network Analyzer	10/27/2025	Annual	10/27/2026	US39170118
Agilent	E5515C	Wireless Communications Test Set	CBT	N/A	CBT	GB46310798
Agilent	E5515C	Wireless Communications Test Set	CBT	N/A	CBT	GB41450275
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB46170464
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433973
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433974
Amplifier Research	150A100C	Amplifier	CBT	N/A	CBT	350132
Anritsu	ML2496A	Power Meter	8/21/2025	Annual	8/21/2026	1138001
Anritsu	ML2496A	Power Meter	6/27/2025	Annual	6/27/2026	1840005
Anritsu	MA2411B	Pulse Power Sensor	10/14/2025	Annual	10/14/2026	1726262
Anritsu	MA2411B	Pulse Power Sensor	10/14/2025	Annual	10/14/2026	1027293
Insize	1108-150	Insize - Digital Caliper	1/7/2026	Annual	1/7/2027	1410255640
Anritsu	MA24106A	USB Power Sensor	8/4/2025	Annual	8/4/2026	1827530
Anritsu	MA24106A	USB Power Sensor	2/20/2026	Annual	2/20/2027	1520501
Control Company	4352	Long Stem Thermometer	12/22/2025	Biennial	12/22/2027	250770121
Control Company	4352	Long Stem Thermometer	12/22/2025	Biennial	12/22/2027	250770096
Control Company	4040	Therm./ Clock/ Humidity Monitor	12/29/2025	Biennial	12/29/2027	250778120
Control Company	4040	Therm./ Clock/ Humidity Monitor	10/24/2025	Biennial	10/24/2027	250652331
Control Company	4040	Therm./ Clock/ Humidity Monitor	10/15/2024	Biennial	10/15/2026	240763503
Keysight Technologies	N9020A	MXA Signal Analyzer	7/7/2025	Annual	7/7/2026	MY48010233
Agilent	N9020A	MXA Signal Analyzer	7/7/2025	Biennial	7/7/2027	MY56470202
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
Mini-Circuits	VLF-6000+	Low Pass Filter DC to 6000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	VLF-6000+	Low Pass Filter DC to 6000 MHz	7/3/2025	Annual	7/3/2026	31634
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mini-Circuits	ZUDC10-83-S+	Directional Coupler	CBT	N/A	CBT	2050
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	BW-S3V2	Attenuator (3dB)	CBT	N/A	CBT	120
Pasternack	NC-100	Torque Wrench	5/29/2025	Biennial	5/29/2027	N/A
SPEAG	DAK-3.5	Dielectric Assessment Kit	11/10/2025	Annual	11/10/2026	1277
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	8/5/2025	Annual	8/5/2026	1041
SPEAG	MAIA	Modulation and Audio Interference Analyzer	N/A	N/A	N/A	1237
SPEAG	MAIA	Modulation and Audio Interference Analyzer	N/A	N/A	N/A	1331
SPEAG	MAIA	Modulation and Audio Interference Analyzer	N/A	N/A	N/A	1390
SPEAG	DAK-12	Dielectric Assessment Kit (4MHz - 3GHz)	3/3/2026	Annual	3/3/2027	1102
SPEAG	D2450V2	2450 MHz SAR Dipole	8/7/2024	Biennial	8/7/2026	719
SPEAG	D5GHZV2	5 GHz SAR Dipole	2/21/2024	Triennial	2/21/2027	1057
SPEAG	D6.5GHZV2	6.5 GHz SAR Dipole	12/5/2025	Annual	12/5/2026	1018
SPEAG	5G Verification Source 10GHz	10GHz System Verification Antenna	8/6/2025	Annual	8/6/2026	1004
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/10/2026	Annual	3/10/2027	1450
SPEAG	DAE4	Dasy Data Acquisition Electronics	11/5/2025	Annual	11/5/2026	1677
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/5/2025	Annual	6/5/2026	1558
SPEAG	DAE4ip	Dasy Data Acquisition Electronics	2/9/2026	Annual	2/9/2027	1638
SPEAG	EX3DV4	SAR Probe	11/7/2025	Annual	11/7/2026	7406
SPEAG	EX3DV4	SAR Probe	6/11/2025	Annual	6/11/2026	7661
SPEAG	EX3DV4	SAR Probe	3/11/2026	Annual	3/11/2027	7539
SPEAG	EUMmWV3	EUMmWV3 Probe	1/14/2026	Annual	1/14/2027	9389

Note:

1. CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.
2. Each equipment item was used solely within its respective calibration period.

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MEASUREMENT UNCERTAINTIES

Applicable for SAR Measurements < 6 GHz:

SAR Uncertainty Budget based on IEEE 1528-2013 and SPEAG (0.3 GHz to 6 GHz)

a	b	c	d	e $f(d,k)$	f	g	h $cx/f/e$	i cxg/e	k
Uncertainty component	Reference	Tol. (± %)	Prob. dist.	Dvi.	ci (1g)	ci (10g)	1g ui (± %)	10g ui (± %)	vi
Measurement system									
Probe calibration	E.2.1	6.55	N	1	1	1	6.55	6.55	∞
Axial isotropy	E.2.2	0.25	N	1	0.707	0.707	0.18	0.18	∞
Hemispherical isotropy	E.2.2	1.30	N	1	0.707	0.707	0.92	0.92	∞
Boundary effect	E.2.3	2.00	R	1.73	1	1	1.15	1.15	∞
Linearity	E.2.4	0.30	R	1.73	1	1	0.17	0.17	∞
System detection limits	E.2.4	0.25	R	1.73	1	1	0.14	0.14	∞
Modulation response	E.2.5	4.80	R	1.73	1	1	2.77	2.77	∞
Readout electronics	E.2.6	0.30	N	1	1	1	0.30	0.30	∞
Response time	E.2.7	1.01	R	1.73	1	1	0.58	0.58	∞
Integration time	E.2.8	2.60	R	1.73	1	1	1.50	1.50	∞
RF ambient conditions - noise	E.6.1	3.00	R	1.73	1	1	1.73	1.73	∞
RF ambient conditions - reflections	E.6.1	3.00	R	1.73	1	1	1.73	1.73	∞
Probe positioner mechanical tolerance	E.6.2	0.04	R	1.73	1	1	0.02	0.02	∞
Probe positioning with respect to phantom shell	E.6.3	0.80	R	1.73	1	1	0.46	0.46	∞
Extrapolation, interpolation, and integration algorithms for max. SAR evaluation	E.5	4.00	R	1.73	1	1	2.31	2.31	∞
Test sample related									
Test sample positioning	E.4.2	3.12	N	1	1	1	3.12	3.12	35
Device holder uncertainty	E.4.1	1.67	N	1	1	1	1.67	1.67	5
Output power variation - SAR drift	E.2.9	5.00	R	1.73	1	1	2.89	2.89	∞
SAR scaling	E.6.5	0.00	R	1.73	1	1	0.00	0.00	∞
Phantom and tissue parameters									
Phantom shell uncertainty - shape, thickness and permittivity	E.3.1	7.60	R	1.73	1	1	4.39	4.39	∞
Uncertainty in SAR correction for deviations in permittivity and conductivity	E.3.2	0.00	N	1	1	1	0.00	0.00	∞
Liquid conductivity measurement	E.3.3	2.50	N	1	0.78	0.71	1.95	1.78	∞
Liquid permittivity measurement	E.3.3	2.50	N	1	0.23	0.26	0.58	0.65	∞
Liquid conductivity - temperature uncertainty	E.3.4	3.36	R	1.73	0.78	0.71	1.51	1.38	∞
Liquid permittivity - temperature uncertainty	E.3.4	0.77	R	1.73	0.23	0.26	0.10	0.12	∞
Liquid Conductivity - deviation from target values	E.3.2	5.00	R	1.73	0.64	0.43	1.85	1.24	∞
Liquid Permittivity - deviation from target values	E.3.2	5.00	R	1.73	0.60	0.49	1.73	1.41	∞
Combined standard uncertainty							11.0	10.8	40
Expanded uncertainty (95% confidence interval)							21.9	21.6	

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Applicable for SAR Measurements > 6 GHz:

SAR Uncertainty Budget based on IEC/IEEE 62209-1528:2020 (4 MHz to 10 GHz)

Symbol	Input quantity X (source of uncertainty)	Ref.	Prob. Dist. PDFi	Unc. a(xi)	Div. qi	$u(x_i) = a(x_i)/q_i$	ci (1g)	ci (10g)	$u(y) = cixu(x_i) 1g (\pm \%)$	$u(y) = cixu(x_i) 10g (\pm \%)$	vi
Measurement system errors											
CF	Probe calibration	8.4.1.1	N (k=2)	9.30	1	9.30	1	1	9.30	9.30	∞
CFdrift	Probe calibration drift	8.4.1.2	R	1.70	1.73	0.98	1	1	0.98	0.98	∞
LIN	Probe linearity and detection limit	8.4.1.3	R	4.70	1.73	2.71	1	1	2.71	2.71	∞
BBS	Broadband signal	8.4.1.4	R	2.80	1.73	1.62	1	1	1.62	1.62	∞
ISO	Probe isotropy	8.4.1.5	R	7.60	1.73	4.39	1	1	4.39	4.39	∞
DAE	Other probe and data acquisition errors	8.4.1.6	N	2.40	1	2.40	1	1	2.40	2.40	∞
AMB	RF ambient and noise	8.4.1.7	N	1.80	1	1.80	1	1	1.80	1.80	∞
Δxyz	Probe positioning errors	8.4.1.8	N	0.30	1	0.30	1	1	0.30	0.30	∞
DAT	Data processing errors	8.4.1.9	N	3.50	1.00	3.50	1	1	3.50	3.50	∞
Phantom and device (DUT or validation antenna) errors											
LIQ(σ)	Measurement of phantom conductivity	8.4.2.1	N	2.50	1	2.50	0.78	0.71	1.95	1.78	∞
LIQ(Tc)	Temperature effects (medium)	8.4.2.2	R	5.40	1.73	3.12	0.78	0.71	2.43	2.21	∞
EPS	Shell permittivity	8.4.2.3	R	14.00	1.73	8.08	0.5	0.5	4.04	4.04	∞
DIS	Distance between the radiating element of the DUT and the phantom medium	8.4.2.4	N	2.00	1	2.00	2	2	4.00	4.00	∞
Dxyz	Repeatability of positioning the DUT or source against the phantom	8.4.2.5	N	3.12	1	3.12	1	1	3.12	3.12	35
H	Device holder effects	8.4.2.6	N	1.67	1	1.67	1	1	1.67	1.67	5
MOD	Effect of operating mode on probe sensitivity	8.4.2.7	R	2.40	1.73	1.39	1	1	1.39	1.39	∞
TAS	Time-average SAR	8.4.2.8	R	1.73	1.73	1.00	1	1	1.00	1.00	∞
RFdrift	Variation in SAR due to drift in output power of DUT	8.4.2.9	N	2.50	1	2.50	1	1	2.50	2.50	∞
VAL	Validation antenna uncertainty (validation measurement only)	8.4.2.10	N	0.00	1	0.00	1	1	0.00	0.00	∞
Pin	Uncertainty in accepted power (validation measurement only)	8.4.2.11	N	0.00	1	0.00	1	1	0.00	0.00	∞
Corrections to the SAR result (if applied)											
C(ϵ' , σ)	Phantom deviation from target	8.4.3.1	R	5.00	1.73	2.89	0.64	0.43	1.85	1.24	∞
C(R)	SAR scaling	8.4.3.2	R	0.00	1.73	0.00	1	1	0.00	0.00	∞
u(ASAR)	Combined uncertainty								14.32	14.20	40
U	Expanded uncertainty and effective degrees of freedom								28.65	28.40	

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Applicable for Power Density Measurements:

PD Uncertainty Budget based on IEC IEEE 63195-1 for PTP-PR Reconstruction Mode and/or IPD Measurement at $d < \lambda/5$ under 24 GHz

Symbol	Source of uncertainty	Description	Unc. $\pm$ dB	Prob. Dist.	Div. q _i	c _i	Standard uncertainty $\pm$ dB	v _i
Uncertainty terms dependent on the measurement system								
CAL	Calibration	8.4.1	0.49	N	1	1	0.49	∞
COR	Probe correction	8.4.2	0.00	R	1.73	1	0.00	∞
FRS	Frequency response	8.4.3	0.20	R	1.73	1	0.12	∞
SCC	Sensor cross coupling	8.4.4	0.00	R	1.73	1	0.00	∞
ISO	Isotropy	8.4.5	0.50	R	1.73	1	0.29	∞
LIN	System linearity error	8.4.6	0.20	R	1.73	1	0.12	∞
PSC	Probe scattering	8.4.7	0.00	R	1.73	1	0.00	∞
PPO	Probe positioning offset	8.4.8	0.30	R	1.73	1	0.17	∞
PPR	Probe positioning repeatability	8.4.9	0.04	R	1.73	1	0.02	∞
SMO	Sensor mechanical offset	8.4.10	0.02	R	1.73	1	0.01	∞
PSR	Probe spatial resolution	8.4.11	0.00	R	1.73	1	0.00	∞
FLD	Field impedance dependence	8.4.12	0.00	R	1.73	1	0.00	∞
MED	Measurement drift	8.4.13	0.00	R	1.73	1	0.00	∞
APN	Amplitude and phase noise	8.4.14	0.04	R	1.73	1	0.02	∞
TR	Measurement area truncation	8.4.15	0.10	R	1.73	1	0.06	∞
DAQ	Data acquisition	8.4.16	0.03	N	1	1	0.03	∞
SMP	Sampling	8.4.17	0.00	R	1.73	1	0.00	∞
REC	Field reconstruction	8.4.18	2.00	R	1.73	1	1.15	∞
SNR	Signal-to-noise ratio	8.4.19	0.00	N	1	1	0.00	∞
TRA	Forward and backward transformation	8.4.20	0.70	R	1.73	1	0.40	∞
SCA	Power density scaling	8.4.21	0.00	R	1.73	1	0.00	∞
SAV	Spatial averaging	8.4.22	0.10	R	1.73	1	0.06	∞
COM	Exposure combining	8.4.23	0.00	N	1	1	0.00	∞
SDL	System detection limit		0.04	R	1.73	1	0.02	∞
Uncertainty terms dependent on the DUT and environmental factors								
PC	Probe coupling with DUT	8.5.1	0.00	R	1.73	1	0.00	∞
MOD	Modulation response	8.5.2	0.40	R	1.73	1	0.23	∞
IT	Integration time	8.5.3	0.00	R	1.73	1	0.00	∞
RT	Response time	8.5.4	0.00	R	1.73	1	0.00	∞
DH	Device holder influence	8.5.5	0.10	R	1.73	1	0.06	∞
DA	DUT alignment	8.5.6	0.00	R	1.73	1	0.00	∞
AC	RF ambient conditions	8.5.7	0.04	R	1.73	1	0.02	∞
TEM	Laboratory temperature	8.5.8	0.00	R	1.73	1	0.00	∞
REF	Reflections in laboratory	8.5.9	0.04	R	1.73	1	0.02	∞
MSI	Immunity / secondary reception	8.5.10	0.00	R	1.73	1	0.00	∞
DRI	DUT drift	8.5.11	0.22	R	1.73	1	0.13	∞
u(ASAR)	Combined uncertainty						1.40	
U	Expanded uncertainty and effective degrees of freedom (95 % confidence interval)						2.80	

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