

FCC SAR Test Report

Report No.: RWAZ202300129-SAA

Applicant: Shenzhen Youmi Intelligent Technology Co., Ltd.

Address: 406-407 Jinqi Zhigu Building, 4/F, 1 Tangling Road, Nanshan District, Shenzhen City, China

Product Name: Smart phone

Product Model: PG2311GBA

Multiple Models: NA

Trade Mark: UMIDIGI

FCC ID: 2ATZ4-G6

Standards: FCC CFR Title 47 CFR Part 2(2.1093)

Test Date: 2024/02/21 ~ 2024/02/26

Test Result: PASS

Report Date: 2024/02/29

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Revision History

Version No.	Issued Date	Description
00	2024/02/29	Original

SAR TEST RESULTS SUMMARY

Operation Frequency Band	Highest Reported 1g SAR(W/kg)		Limit (W/kg)	
	Head SAR	Body SAR (Gap 10mm)		
GSM 850	0.12	0.25	1.6	
PCS 1900	0.57	0.43		
WCDMA Band 2	1.08	0.32		
WCDMA Band 5	0.08	0.12		
LTE Band 2	0.98	0.35		
LTE Band 5	0.15	0.17		
LTE Band 7	0.36	0.91		
LTE Band 12	0.14	0.20		
LTE Band 41	0.11	0.40		
WLAN 2.4G	0.29	0.10		
WLAN 5.2G	0.34	0.31		
WLAN 5.8G	0.22	0.15		
Max. Simultaneous Transmission SAR(W/kg)				
Items	Head SAR	Body SAR (Gap 10mm)	Hotspot (Gap 10mm)	Limit (W/kg)
Sum SAR	1.42	1.22	1.22	1.6
SPLSR	NA	NA	NA	0.04

Contents

1	General Information	6
1.1	Client Information	6
1.2	Product Description of EUT	6
1.3	Laboratory Location	7
1.4	Test Methodology	7
1.5	SAR Limit.....	8
2	SAR Measurement System & Test Equipment.....	9
2.1	SAR Measurement System	9
2.2	SAR Scan Procedures.....	12
2.3	Test Equipment.....	14
3	SAR Measurements Verification.....	15
3.1	Tissue Verification.....	15
3.2	System Accuracy Verification	18
3.3	SAR System Validation Results.....	18
3.4	SAR System Validation Data	19
4	EUT Test Positions and Methodology.....	27
4.1	Test Positions for Device Operating Next to a Person's Ear	27
4.2	Cheek/Touch Position.....	28
4.3	Ear/Tilt Position	28
4.4	Test positions for body-worn and other configurations.....	29
5	Conducted Output Power Measurements.....	30
5.1	Test Procedure.....	30
5.2	Maximum Target Output Power	30
5.3	Maximum Conducted Output Power	32
6	Standalone SAR Test Exclusion Considerations	50
6.1	Antennas Location	50
6.2	Antennas Distance To Edge	50
6.3	Standalone SAR Test Exclusion Considerations.....	50
6.4	Standalone SAR Test Exclusion Considerations	52
6.5	SAR Test Exclusion For The EUT Edge Considerations Result.....	52
7	SAR Measurement Results	54

7.1	SAR Test Conditions.....	54
7.2	Measured and Reported (Scaled) SAR Results.....	55
8	SAR Measurement Variability	70
9	Simultaneous Transmission Description	71
9.1	Simultaneous Transmission.....	71
9.2	Simultaneous SAR test exclusion considerations:	71
10	SAR Plots	72
	Appendix A Measurement Uncertainty.....	73
	Appendix B Test Setup Photos	75
	Appendix C Probe Calibration Certificates	76
	Appendix D Dipole Calibration Certificates.....	77

1 General Information

1.1 Client Information

Applicant:	Shenzhen Youmi Intelligent Technology Co., Ltd.
Address:	406-407 Jinqi Zhigu Building, 4/F, 1 Tangling Road, Nanshan District, Shenzhen City, China
Manufacturer:	Shenzhen Youmi Intelligent Technology Co., Ltd.
Address:	406-407 Jinqi Zhigu Building, 4/F, 1 Tangling Road, Nanshan District, Shenzhen City, China

1.2 Product Description of EUT

Sample Serial Number	2EOA-1(assigned by WATC)
Sample Received Date	2023-12-04
Sample Status	Good Condition
Device Type	Portable
Exposure Category	Population / Uncontrolled
Antenna Type(s)	Internal Antenna
Body-Worn Accessories	None
Proximity Sensor	None
Carrier Aggregation	None
Operation modes	GSM Voice, GPRS/EDGE Data, WCDMA(R99 (Voice+Data), HSDPA/HSUPA), FDD-LTE, TDD-LTE, WLAN, Bluetooth and NFC
Frequency Range	GSM 850: 824-849 MHz(TX); 869-894 MHz(RX) PCS 1900: 1850-1910 MHz(TX); 1930-1990 MHz(RX) WCDMA Band 2: 1850-1910 MHz(TX); 1930-1990 MHz(RX) WCDMA Band 5: 824-849 MHz(TX); 869-894 MHz(RX) LTE Band 2: 1850-1910 MHz(TX); 1930-1990 MHz(RX) LTE Band 5: 824-849 MHz(TX); 869-894 MHz(RX) LTE Band 7: 2500-2570 MHz(TX); 2620-2690 MHz(RX) LTE Band 12: 699-716 MHz(TX); 729-746 MHz(RX) LTE Band 41: 2535-2655 MHz(TX/RX) WLAN 2.4G:2412MHz - 2462MHz/2422MHz - 2452MHz WLAN 5.2G: 5150MHz - 5250MHz WLAN 5.8G: 5745MHz - 5850MHz Bluetooth: 2402MHz - 2480MHz NFC: 13.56MHz
Power Supply	DC 3.87 V from Rechargeable Battery
Dimensions (L*W*H)	164mm (L) *76mm (W) *9mm (H)
Normal Operation	Head and Body Worn

1.3 Laboratory Location

World Alliance Testing and Certification (Shenzhen) Co., Ltd

No. 1002, East Block, Laobing Building, Xingye Road 3012, Xixiang street, Bao'an District, Shenzhen, Guangdong, People's Republic of China

Tel: +86-755-29691511, Email: qa@watc.com.cn

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 463912, the FCC Designation No. : CN5040.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0160.

1.4 Test Methodology

FCC 47 CFR § 2.1093

IEEE 1528:2013

IEC 62209-1

IEC 62209-2

KDB 447498 D01 General RF Exposure Guidance v06

KDB 648474 D04 Handset SAR v01r03

KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04

KDB 865664 D02 RF Exposure Reporting v01r02

KDB 248227 D01 802.11 Wi-Fi SAR v02r02

KDB 941225 D01 3G SAR Procedures v03r01

KDB 941225 D05 SAR for LTE Devices v02r05

KDB941225 D06 Hotspot Mode v02r01

1.5 SAR Limit

FCC Limit

EXPOSURE LIMITS	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / Controlled Exposure Environment)
Spatial Average (averaged over the whole body)	0.08	0.4
Spatial Peak (averaged over any 1 g of tissue)	1.60	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.0	20.0

Population/Uncontrolled Environments are defined as locations where there is the exposure of individual who have no knowledge or control of their exposure.

Occupational/Controlled Environments are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure (i.e. as a result of employment or occupation).

General Population/Uncontrolled environments Spatial Peak limit 1.6W/kg for 1g SAR applied to the EUT.

2 SAR Measurement System & Test Equipment

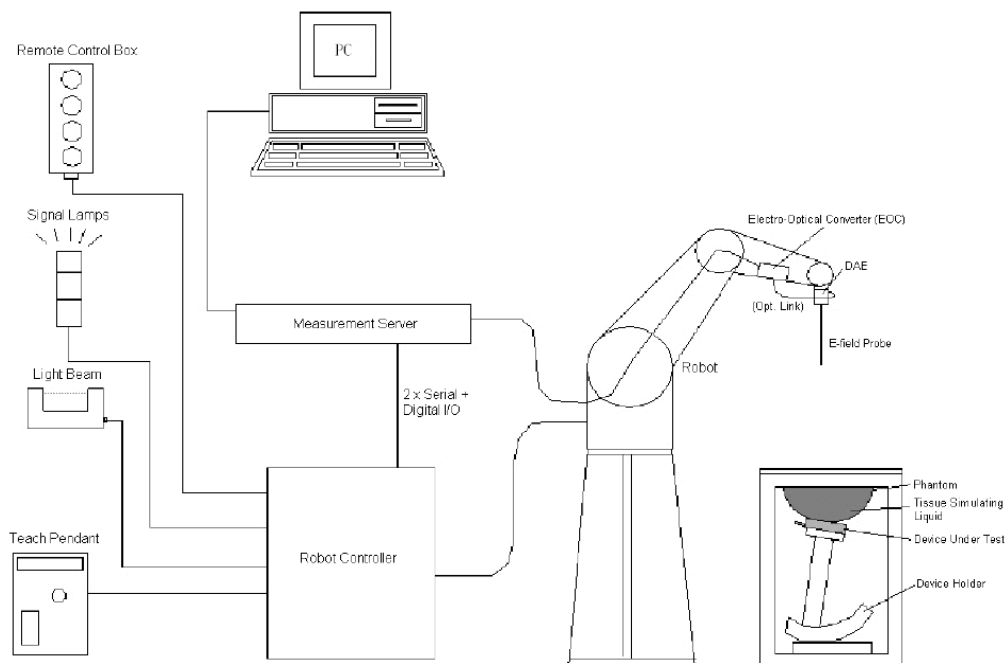
2.1 SAR Measurement System

These measurements were performed with the automated near-field scanning system DASY5 from Schmid & Partner Engineering AG (SPEAG) which is the Fifth generation of the system shown in the figure hereinafter:



DASY5 System Description

The DASY5 system 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 application, 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 Win7 professional operating system and the DASY52 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.

DASY5 Measurement Server

The DASY5 measurement server is based on a PC/104 CPU board with a 400MHz Intel ULV Celeron, 128MB chip-disk and 128MB RAM. The necessary circuits for communication with the DAE4 (or DAE3) electronics box, as well as the 16 bit AD-converter system for optical detection and digital I/O interface are contained on the DASY5 I/O board, which is directly connected to the PC/104 bus of the CPU board.



The measurement server performs all real-time data evaluation of field measurements and surface detection, controls robot movements and handles safety operation. The PC operating system cannot interfere with these time critical processes. All connections are supervised by a watchdog, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements. Furthermore, the measurement server is equipped with an expansion port which is reserved for future applications. Please note that this expansion port does not have a standardized point out, and therefore only devices provided by SPEAG can be connected. Devices from any other supplier could seriously damage the measurement server.

Data Acquisition Electronics

The data acquisition electronics (DAE4) consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock.

The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.

The input impedance of both the DAE4 as well as of the DAE3 box is 200MΩ; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

EX3DV4 E-Field Probes

Frequency	4 MHz - 10 GHz Linearity: ± 0.2 dB (30 MHz to 10 GHz)
Directivity	± 0.1 dB in TSL (rotation around probe axis) ± 0.3 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 μ W/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/g)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%.
Compatibility	DASY3, DASY4, DASY52, DASY6, DASY8 SAR, EASY6, EASY4/MRI

SAM Twin Phantom

The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region, where shell thickness increases to 6 mm). The phantom has three measurement areas:

- _ Left Head
- _ Right Head
- _ Flat phantom

The phantom table for the DASY systems based on the robots have the size of 100 x 50 x 85 cm (L x W x H).

For easy dislocation these tables have fork lift cut outs at the bottom.

The bottom plate contains three pairs of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. Only one device holder is necessary if two phantoms are used (e.g., for different liquids)

A white cover is provided to cover the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. Free space scans of devices on top of this phantom cover are possible.

Three reference marks are provided on the phantom counter. These reference marks are used to teach the absolute phantom position relative to the robot.



Robots

The DASY5 system uses the high precision industrial robot. The robot offers the same features important for our application:

- High precision (repeatability 0.02mm)
- High reliability (industrial design)
- Low maintenance costs (virtually maintenance free due to direct drive gears; no belt drives)
- Jerk-free straight movements (brushless synchrony motors; no stepper motors)
- Low ELF interference (motor control fields shielded via the closed metallic construction shields)

The above mentioned robots are controlled by the Staubli CS8c robot controllers. All information regarding the use and maintenance of the robot arm and the robot controller is contained on the CDs delivered along with the robot. Paper manuals are available upon request direct from Staubli.

2.2 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 1.4 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 Scans

Area scans are defined prior to the measurement process being executed with a user defined variable spacing between each measurement point (integral) allowing low uncertainty measurements to be conducted. Scans defined for FCC applications utilize a 15mm² step integral, with 1.5mm interpolation used to locate the peak SAR area used for zoom scan assessments.

Where the system identifies multiple SAR peaks (which are within 25% of peak value) the system will provide the user with the option of assessing each peak location individually for zoom scan averaging.

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 mm ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2)$ mm ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area} , Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 3: Zoom Scan (Cube Scan Averaging)

The averaging zoom scan volume utilized in the DASY5 software is in the shape of a cube and the side dimension of a 1 g or 10 g mass is dependent on the density of the liquid representing the simulated tissue. A density of 1000 kg/m³ is used to represent the head and body tissue density and not the phantom liquid density, in order to be consistent with the definition of the liquid dielectric properties, i.e. the side length of the 1g cube is 5mm, with the side length of the 10g cube is 21.5mm.

When the cube intersects with the surface of the phantom, it is oriented so that 3 vertices touch the surface of the shell or the center of a face is tangent to the surface. The face of the cube closest to the surface is modified in order to conform to the tangent surface.

The zoom scan integer steps can be user defined so as to reduce uncertainty, but normal practice for typical test applications (including FCC) utilize a physical step of 7 x 7 x 7 (5mmx5mmx5mm) providing a volume of 30 mm in the X & Y & Z axis.

Zoom Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz

			$\leq 3 \text{ GHz}$	$> 3 \text{ GHz}$
Maximum zoom scan spatial resolution: $\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$			$\leq 2 \text{ GHz}: \leq 8 \text{ mm}$ $2 - 3 \text{ GHz}: \leq 5 \text{ mm}^*$	$3 - 4 \text{ GHz}: \leq 5 \text{ mm}^*$ $4 - 6 \text{ GHz}: \leq 4 \text{ mm}^*$
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{\text{Zoom}}(n)$		$\leq 5 \text{ mm}$	$3 - 4 \text{ GHz}: \leq 4 \text{ mm}$ $4 - 5 \text{ GHz}: \leq 3 \text{ mm}$ $5 - 6 \text{ GHz}: \leq 2 \text{ mm}$
	graded grid	$\Delta z_{\text{Zoom}}(1)$: between 1 st two points closest to phantom surface	$\leq 4 \text{ mm}$	$3 - 4 \text{ GHz}: \leq 3 \text{ mm}$ $4 - 5 \text{ GHz}: \leq 2.5 \text{ mm}$ $5 - 6 \text{ GHz}: \leq 2 \text{ mm}$
		$\Delta z_{\text{Zoom}}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{\text{Zoom}}(n-1) \text{ mm}$	
Minimum zoom scan volume	x, y, z		$\geq 30 \text{ mm}$	$3 - 4 \text{ GHz}: \geq 28 \text{ mm}$ $4 - 5 \text{ GHz}: \geq 25 \text{ mm}$ $5 - 6 \text{ GHz}: \geq 22 \text{ mm}$
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details.				
* When zoom scan is required and the <i>reported</i> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB Publication 447498 is $\leq 1.4 \text{ W/kg}$, $\leq 8 \text{ mm}$, $\leq 7 \text{ mm}$ and $\leq 5 \text{ mm}$ 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.

2.3 Test Equipment

Description	Model	SN	Calibration Date	Calibration Due Date
DASY5 Test Software	DASY52.8	N/A	NCR	NCR
DASY5 Measurement Server	DASY5 5.0.28	1123	NCR	NCR
Data Acquisition Electronics	DAE4	1354	2023/11/17	2024/11/16
E-Field Probe	EX3DV4	3801	2023/6/23	2024/6/22
Mounting Device	MD4HHTV5	BJPCTC0152	NCR	NCR
Twin SAM	Twin SAM V5.0	1470	NCR	NCR
Dipole, 750 MHz	D750V3	1109	2021/5/17	2024/5/16
Dipole, 1900 MHz	D1900V2	5d229	2021/5/20	2024/5/19
Dipole, 2450 MHz	D2450V2	1014	2021/5/19	2024/5/18
Dipole, 2600 MHz	D2600V2	1153	2021/5/19	2024/5/18
Dipole,5GHz	D5GHzV2	1280	2021/5/17	2024/5/16
Simulated Tissue Liquid Head(500-9500 MHz)	HBBL600-1000 0V6	230728-1	Each Time	/
Network Analyzer	8753D	3410A08288	2023/12/18	2024/12/17
Dielectric assessment kit	85070B	US33020324	NCR	NCR
Vector Signal Generator	SMBV100A	256300	2023/9/12	2024/9/11
USB Power Sensor	MA24418A	12620	2023/7/12	2024/7/11
SPECTRUM ANALYZER	FSV40	101419	2023/9/12	2024/9/11
Amplifier	ZHL-5W-202S+	416402571	NCR	NCR
Amplifier	ZVE-8G+	558621401	NCR	NCR
Directional Coupler	441498	523Z	NCR	NCR
10dB attenuator	10dB	10-1	NCR	NCR
10dB attenuator	DC-6GHz	10-2	NCR	NCR
Thermometer	0~50°C	N/A	2023/11/16	2024/11/15
Wideband Radio Communication Tester	CMW500	116218	2023/9/12	2024/9/11

Note: All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or International standards.

3 SAR Measurements Verification

3.1 Tissue Verification

The temperature of the tissue-equivalent medium used during measurement must also be within 18°C to 25°C and within $\pm 2^\circ\text{C}$ 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 head tissue dielectric parameters recommended by the IEC 62209-1

Table A.3 – Dielectric properties of the head tissue-equivalent liquid

Frequency MHz	Relative permittivity ϵ_r	Conductivity (σ) S/m
300	45,3	0,87
450	43,5	0,87
750	41,9	0,89
835	41,5	0,90
900	41,5	0,97
1 450	40,5	1,20
1 500	40,4	1,23
1 640	40,2	1,31
1 750	40,1	1,37
1 800	40,0	1,40
1 900	40,0	1,40
2 000	40,0	1,40
2 100	39,8	1,49
2 300	39,5	1,67
2 450	39,2	1,80
2 600	39,0	1,96
3 000	38,5	2,40
3 500	37,9	2,91
4 000	37,4	3,43
4 500	36,8	3,94
5 000	36,2	4,45
5 200	36,0	4,66
5 400	35,8	4,86
5 600	35,5	5,07
5 800	35,3	5,27
6 000	35,1	5,48

NOTE For convenience, permittivity and conductivity values at those frequencies which are not part of the original data provided by Drossos et al. [33] or the extension to 5 800 MHz are provided (i.e. the values shown *in italics*). These values were linearly interpolated between the values in this table that are immediately above and below these values, except the values at 6 000 MHz that were linearly extrapolated from the values at 3 000 MHz and 5 800 MHz.

Dielectric Property Measurements Results:

Date	Band (MHz)	Tissue Type	Frequency (MHz)	Conductivity, σ (S/m)			Relative Permittivity, ϵ_r			Tolerance (%)
				Meas.	Target	Delta(%)	Meas.	Target	Delta(%)	
2024/02/24	750	Head	704	0.866	0.89	-2.7	43.022	42.15	2.07	±5
			707.5	0.867	0.89	-2.58	42.825	42.13	1.65	±5
			711	0.867	0.89	-2.58	42.628	42.11	1.23	±5
			750	0.874	0.89	-1.8	42.525	41.9	1.49	±5
			824.2	0.878	0.9	-2.22	40.43	41.55	-2.7	±5
			826.4	0.879	0.9	-2.33	40.417	41.54	-2.7	±5
			829	0.879	0.9	-2.33	40.402	41.53	-2.72	±5
			836.5	0.881	0.9	-2.11	40.357	41.5	-2.75	±5
			836.6	0.881	0.9	-2.11	40.357	41.5	-2.75	±5
			844	0.883	0.91	-2.97	40.313	41.5	-2.86	±5
			846.6	0.886	0.91	-2.64	40.298	41.5	-2.9	±5
			848.8	0.887	0.91	-2.53	40.285	41.5	-2.93	±5
2024/02/25	750	Head	750	0.906	0.89	1.8	42.662	41.9	1.82	±5
			824.2	0.912	0.9	1.33	40.567	41.55	-2.37	±5
			826.4	0.914	0.9	1.56	40.554	41.54	-2.37	±5
			829	0.915	0.9	1.67	40.539	41.53	-2.39	±5
			836.5	0.917	0.9	1.89	40.494	41.5	-2.42	±5
			836.6	0.917	0.9	1.89	40.494	41.5	-2.42	±5
			844	0.920	0.91	1.1	40.450	41.5	-2.53	±5
			846.6	0.921	0.91	1.21	40.435	41.5	-2.57	±5
			848.8	0.922	0.91	1.32	40.422	41.5	-2.6	±5
2024/02/22	1900	Head	1850.2	1.364	1.4	-2.57	39.485	40	-1.29	±5
			1852.4	1.365	1.4	-2.5	39.558	40	-1.11	±5
			1860	1.37	1.4	-2.14	39.81	40	-0.47	±5
			1880	1.381	1.4	-1.36	40.474	40	1.19	±5
			1900	1.393	1.4	-0.5	41.138	40	2.85	±5
			1907.6	1.393	1.4	-0.5	41.138	40	2.85	±5
			1909.8	1.388	1.4	-0.86	40.895	40	2.24	±5
2024/02/23	1900	Head	1850.2	1.387	1.4	-0.93	39.612	40	-0.97	±5

			1852.4	1.388	1.4	-0.86	39.685	40	-0.79	±5
			1860	1.393	1.4	-0.5	39.937	40	-0.16	±5
			1880	1.404	1.4	0.29	40.601	40	1.5	±5
			1900	1.416	1.4	1.14	41.265	40	3.16	±5
			1907.6	1.416	1.4	1.14	41.265	40	3.16	±5
			1909.8	1.411	1.4	0.79	41.022	40	2.56	±5
2024/02/23	2450	Head	2412	1.735	1.77	-1.98	39.175	39.28	-0.27	±5
			2437	1.778	1.79	-0.67	40.116	39.23	2.26	±5
			2450	1.788	1.8	-0.67	40.299	39.2	2.8	±5
			2462	1.802	1.81	-0.44	39.497	39.18	0.81	±5
2024/02/21	2600	Head	2510	1.846	1.86	-0.75	38.335	39.12	-2.01	±5
			2535	1.92	1.89	1.59	38.196	39.09	-2.29	±5
			2545	1.944	1.9	2.32	40.662	39.07	4.07	±5
			2560	1.992	1.92	3.75	38.057	39.05	-2.54	±5
			2595	2	1.95	2.56	39.35	39.01	0.87	±5
			2600	2.002	1.96	2.14	39.358	39	0.92	±5
			2625	2.005	1.99	0.75	39.366	38.97	1.02	±5
			2645	1.932	2.01	-3.88	40.217	38.94	3.28	±5
2024/02/25	5250	Head	5180	4.604	4.64	-0.78	36.772	36.02	2.09	±5
			5200	4.56	4.66	-2.15	36.706	36	1.96	±5
			5240	4.652	4.7	-1.02	36.402	35.96	1.23	±5
			5250	4.675	4.71	-0.74	36.375	35.95	1.18	±5
2024/02/26	5800	Head	5745	5.142	5.22	-1.49	35.695	35.36	0.95	±5
			5785	5.2	5.26	-1.14	36.248	35.32	2.63	±5
			5800	5.219	5.27	-0.97	36.286	35.3	2.79	±5
			5825	5.185	5.3	-2.17	36.654	35.28	3.89	±5

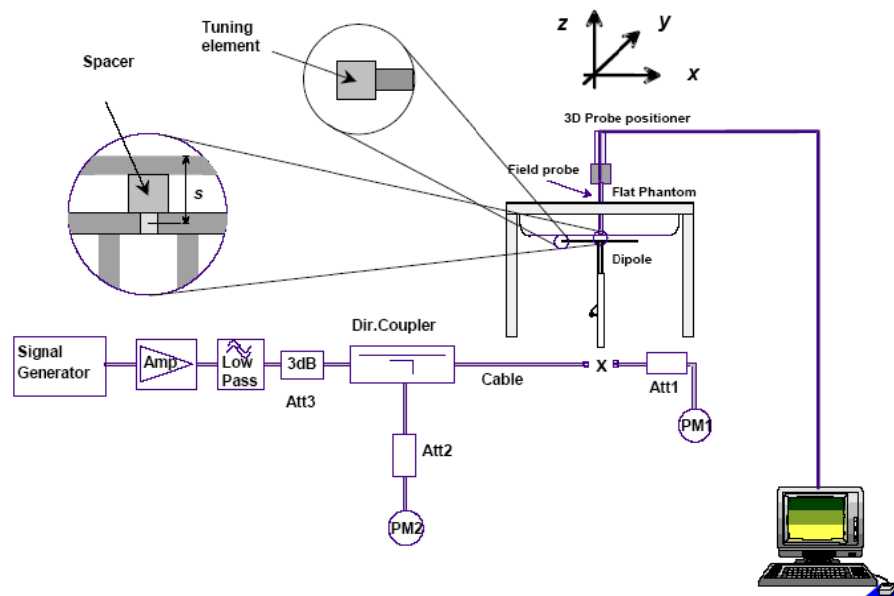
3.2 System Accuracy Verification

Prior to the assessment, the system validation kit was used to test whether the system was operating within its specifications of $\pm 10\%$. The validation results are tabulated below. And also the corresponding SAR plot is attached as well in the SAR plots files.

The spacing distances in the **System Verification Setup Block Diagram** is given by the following:

- $s = 15 \text{ mm} \pm 0,2 \text{ mm}$ for $300 \text{ MHz} \leq f \leq 1\,000 \text{ MHz}$;
- $s = 10 \text{ mm} \pm 0,2 \text{ mm}$ for $1\,000 \text{ MHz} < f \leq 3\,000 \text{ MHz}$;
- $s = 10 \text{ mm} \pm 0,2 \text{ mm}$ for $3\,000 \text{ MHz} < f \leq 6\,000 \text{ MHz}$.

System Verification Setup Block Diagram



3.3 SAR System Validation Results

Date	Frequency Band	Liquid Type	Input Power (mW)	Measured 1g SAR (W/kg)	Normalized to 1W (W/kg)	Target Value (W/kg)	Delta (%)	Tolerance (%)
2024/02/24	750MHz	Head	100	0.842	8.42	8.39	0.36	± 10
2024/02/25	750MHz	Head	100	0.805	8.05	8.39	-4.05	± 10
2024/02/22	1900MHz	Head	100	3.74	37.4	39.9	-6.27	± 10
2024/02/23	1900MHz	Head	100	3.78	37.8	39.9	-5.26	± 10
2024/02/23	2450MHz	Head	100	5.47	54.7	51.8	5.6	± 10
2024/02/21	2600MHz	Head	100	5.72	57.2	54.8	4.38	± 10
2024/02/25	5250MHz	Head	100	7.44	74.4	79.2	-6.06	± 10
2024/02/26	5800MHz	Head	100	7.32	73.2	80.6	-9.18	± 10

3.4 SAR System Validation Data

System Performance 750 MHz Head was performed on 2024/02/24

DUT: D750V3; Type: 750 MHz; Serial: 1109

Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.874 \text{ S/m}$; $\epsilon_r = 42.525$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3801; ConvF(9.49, 9.49, 9.49) @ 750 MHz; Calibrated: 2023/6/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM V5.0; Type: QD000P40CD; Serial: TP:1470
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.972 W/kg

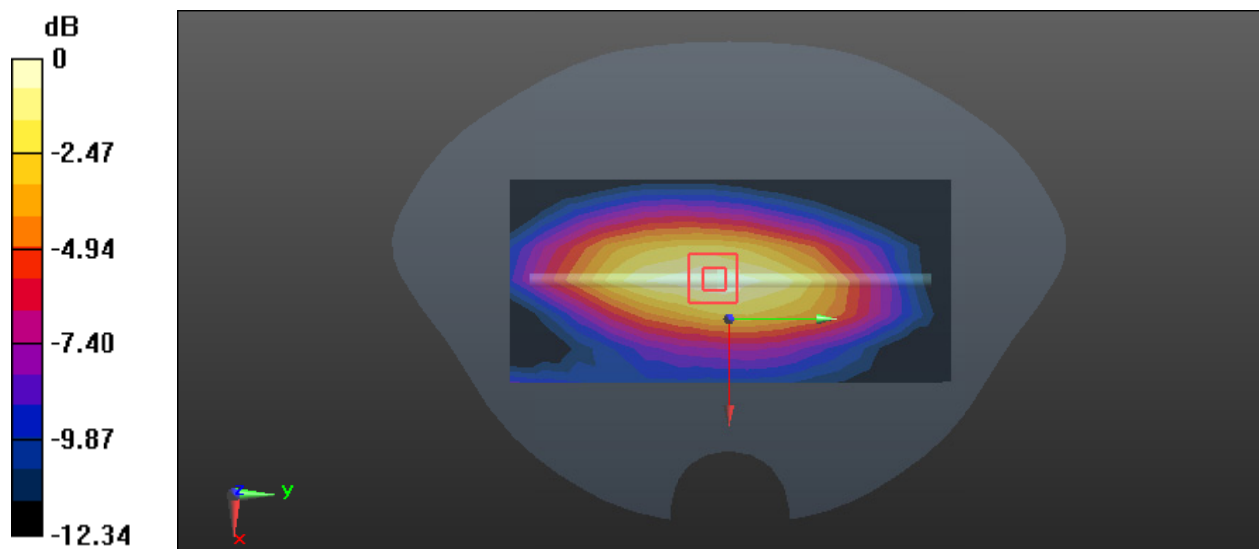
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 31.35 V/m ; Power Drift = -0.15 dB

Peak SAR (extrapolated) = 1.28 W/kg

SAR(1 g) = 0.842 W/kg ; SAR(10 g) = 0.566 W/kg

Maximum value of SAR (measured) = 0.984 W/kg



0 dB = 0.984 W/kg = -0.07 dBW/kg

System Performance 750 MHz Head was performed on 2024/02/25

DUT: D750V3; Type: 750 MHz; Serial: 1109

Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.906 \text{ S/m}$; $\epsilon_r = 42.662$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3801; ConvF(9.49, 9.49, 9.49) @ 750 MHz; Calibrated: 2023/6/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM V5.0; Type: QD000P40CD; Serial: TP:1470
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.923 W/kg

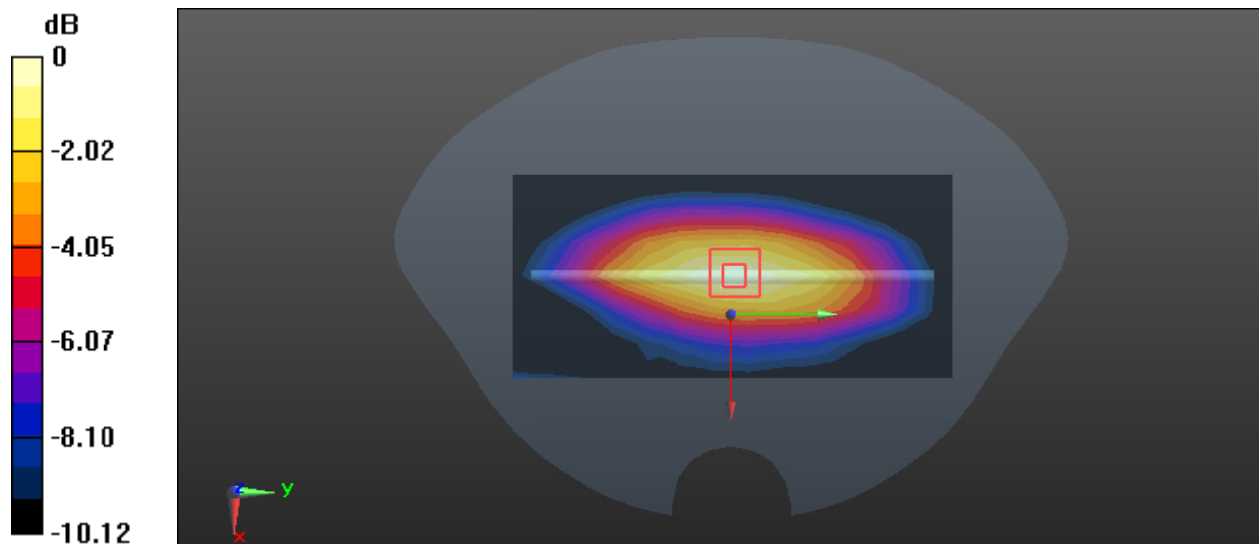
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 29.42 V/m ; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 1.06 W/kg

SAR(1 g) = 0.805 W/kg ; SAR(10 g) = 0.587 W/kg

Maximum value of SAR (measured) = 0.876 W/kg



0 dB = 0.876 W/kg = -0.57 dBW/kg

System Performance 1900MHz Head was performed on 2024/02/22

DUT: D1900V2; Type: 1900 MHz; Serial: 5d229

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.393$ S/m; $\epsilon_r = 41.138$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3801; ConvF(7.93, 7.93, 7.93) @ 1900 MHz; Calibrated: 2023/6/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM V5.0; Type: QD000P40CD; Serial: TP:1470
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (5x6x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 4.86 W/kg

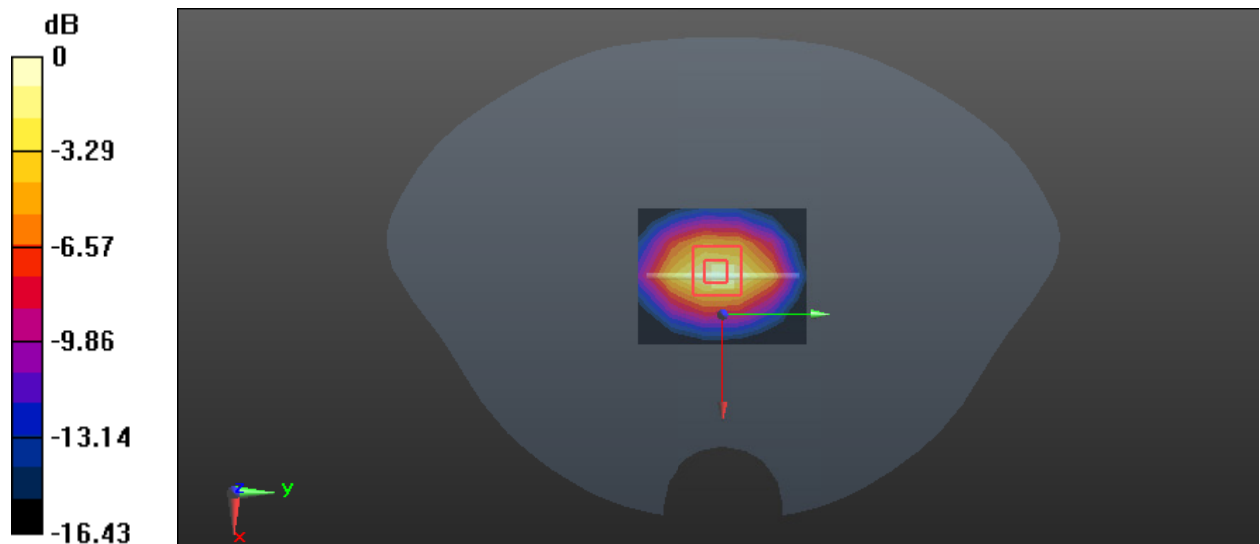
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 53.73 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 6.76 W/kg

SAR(1 g) = 3.74 W/kg; SAR(10 g) = 2.05 W/kg

Maximum value of SAR (measured) = 4.72 W/kg



0 dB = 4.72 W/kg = 6.74 dBW/kg

System Performance 1900MHz Head was performed on 2024/02/23

DUT: D1900V2; Type: 1900 MHz; Serial: 5d229

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.416$ S/m; $\epsilon_r = 41.265$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3801; ConvF(7.93, 7.93, 7.93) @ 1900 MHz; Calibrated: 2023/6/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM V5.0; Type: QD000P40CD; Serial: TP:1470
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (5x6x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 3.42 W/kg

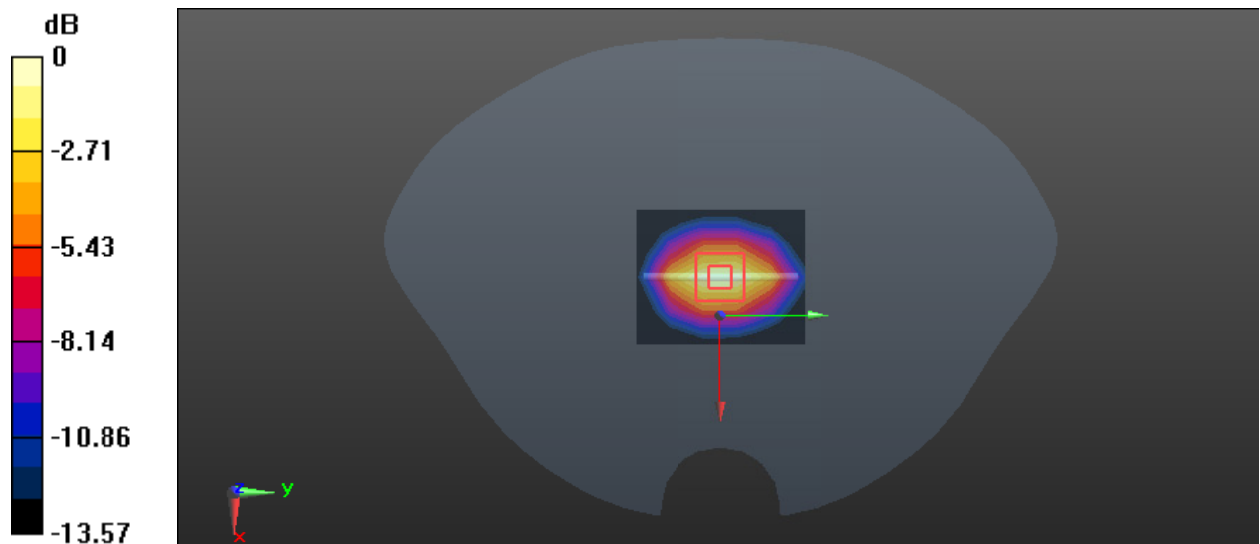
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 51.72 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 5.75 W/kg

SAR(1 g) = 3.78 W/kg; SAR(10 g) = 2.16 W/kg

Maximum value of SAR (measured) = 4.27 W/kg



0 dB = 4.27 W/kg = 6.30 dBW/kg

System Performance 2450MHz Head

DUT: D2450V2; Type: 2450 MHz; Serial: 1014

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.788$ S/m; $\epsilon_r = 40.299$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3801; ConvF(7.38, 7.38, 7.38) @ 2450 MHz; Calibrated: 2023/6/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM V5.0; Type: QD000P40CD; Serial: TP:1470
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (7x10x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 7.33 W/kg

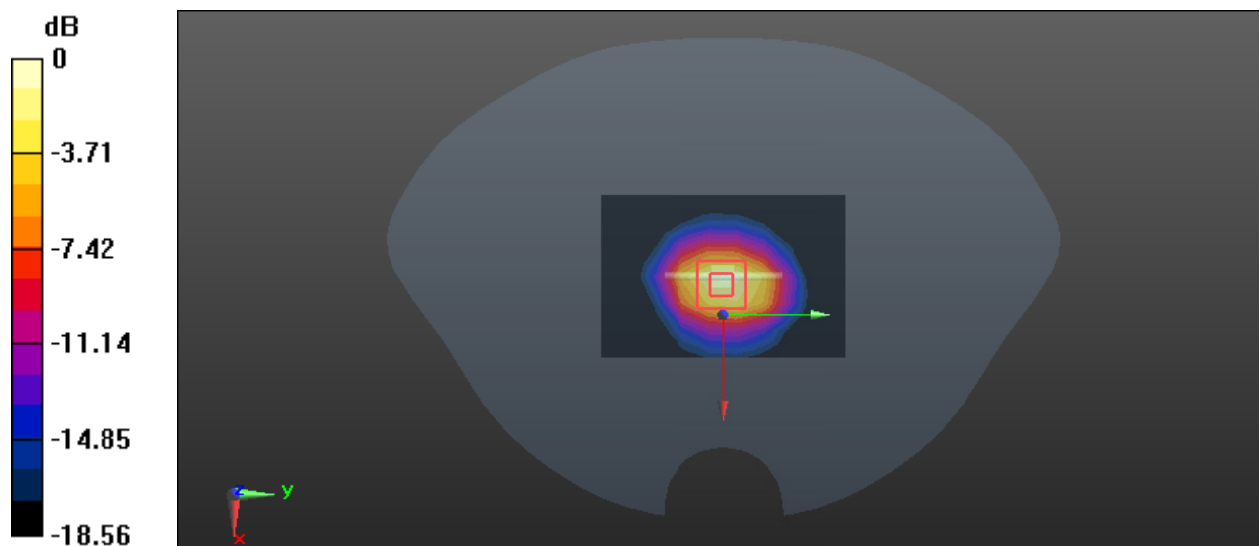
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 61.26 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 10.5 W/kg

SAR(1 g) = 5.47 W/kg; SAR(10 g) = 2.53 W/kg

Maximum value of SAR (measured) = 6.92 W/kg



0 dB = 6.92 W/kg = 8.40 dBW/kg

System Performance 2600MHz Head

DUT: D2600V2; Type: 2600 MHz; Serial: 1153

Communication System: CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 2600$ MHz; $\sigma = 2.002$ S/m; $\epsilon_r = 39.358$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3801; ConvF(7.16, 7.16, 7.16) @ 2600 MHz; Calibrated: 2023/6/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM V5.0; Type: QD000P40CD; Serial: TP:1470
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (6x6x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (measured) = 6.95 W/kg

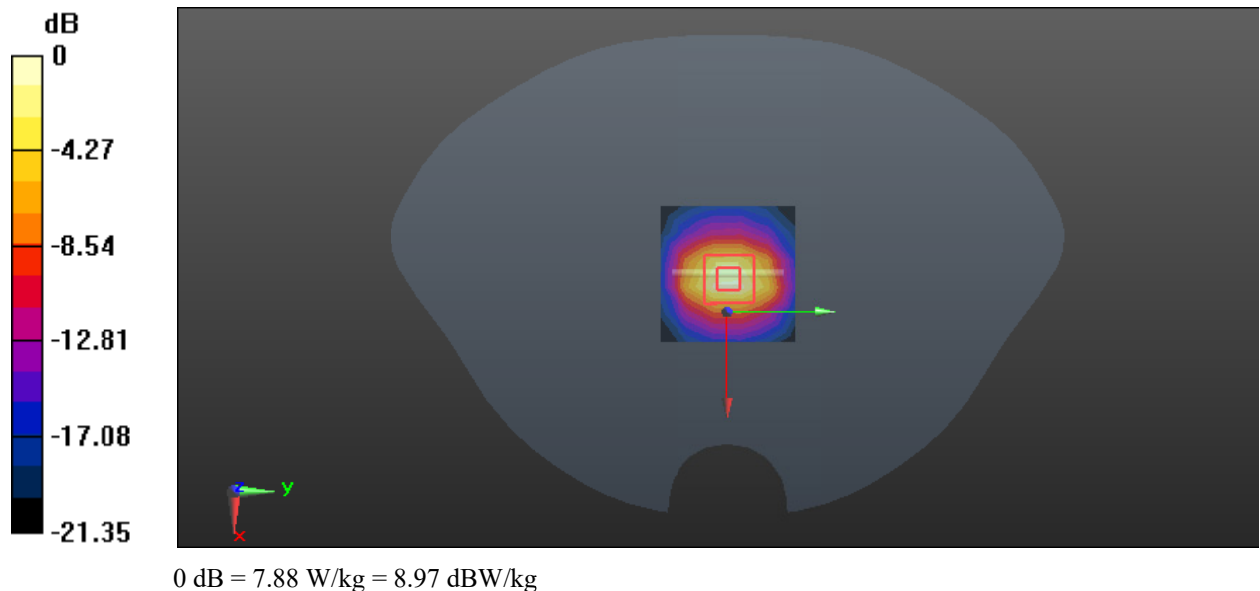
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.32 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 11.5 W/kg

SAR(1 g) = 5.72 W/kg; SAR(10 g) = 2.67 W/kg

Maximum value of SAR (measured) = 7.88 W/kg



System Performance 5250 MHz Head

DUT: Dipole D5GHzV2; Type: 5250 MHz; Serial: SN:1280

Communication System: CW; Frequency: 5250 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5250$ MHz; $\sigma = 4.675$ S/m; $\epsilon_r = 36.375$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3801; ConvF(5.19, 5.19, 5.19) @ 5250 MHz; Calibrated: 2023/6/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM V5.0; Type: QD000P40CD; Serial: TP:1470
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (7x8x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 15.8 W/kg

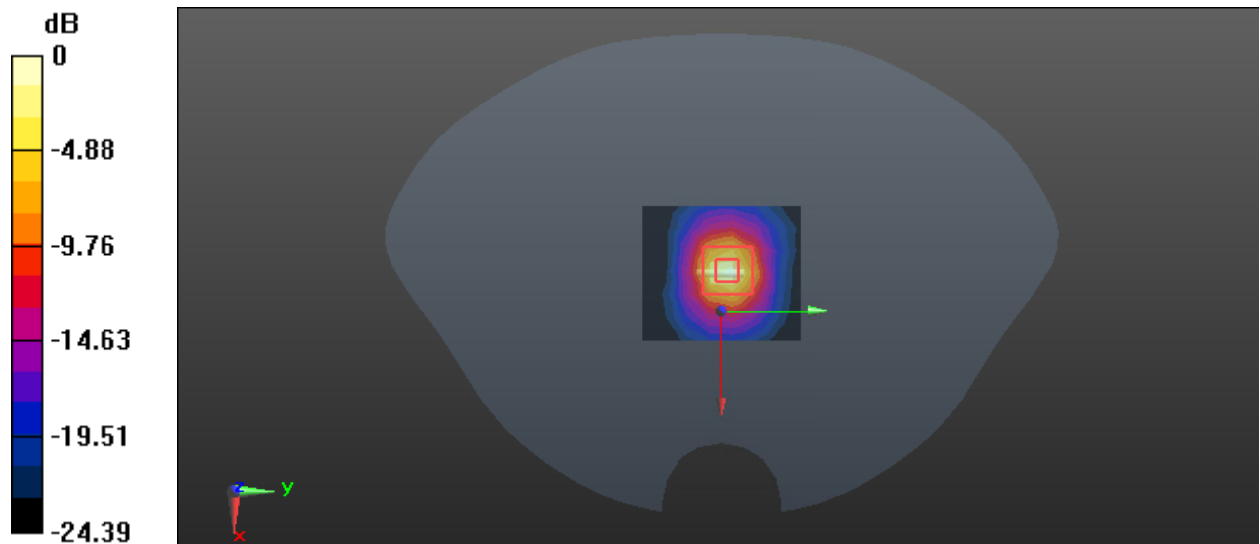
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 39.86 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 22.7 W/kg

SAR(1 g) = 7.44 W/kg; SAR(10 g) = 2.37 W/kg

Maximum value of SAR (measured) = 15.6 W/kg



0 dB = 15.6 W/kg = 11.93 dBW/kg

System Performance 5800 MHz Head

DUT: Dipole D5GHzV2; Type: 5800 MHz; Serial: SN:1280

Communication System: CW; Frequency: 5800 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 5800$ MHz; $\sigma = 5.219$ S/m; $\epsilon_r = 36.286$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3801; ConvF(4.89, 4.89, 4.89) @ 5800 MHz; Calibrated: 2023/6/23
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1354; Calibrated: 2023/11/17
- Phantom: Twin SAM V5.0; Type: QD000P40CD; Serial: TP:1470
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7470)

Area Scan (8x8x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 11.7 W/kg

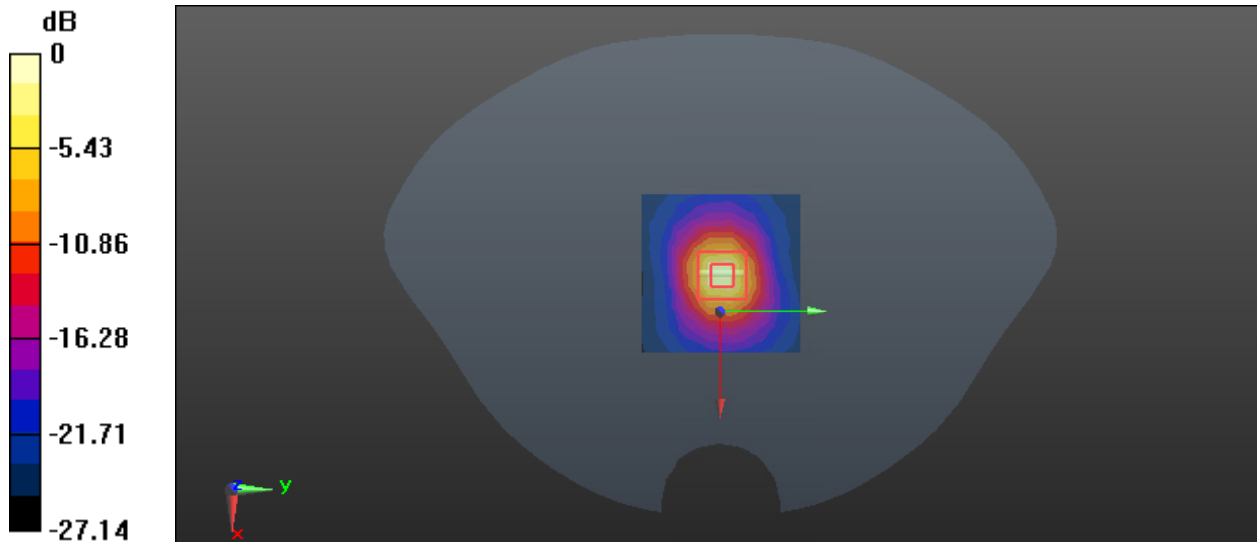
Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 40.84 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 24.9 W/kg

SAR(1 g) = 7.32 W/kg; SAR(10 g) = 2.39 W/kg

Maximum value of SAR (measured) = 16.3 W/kg



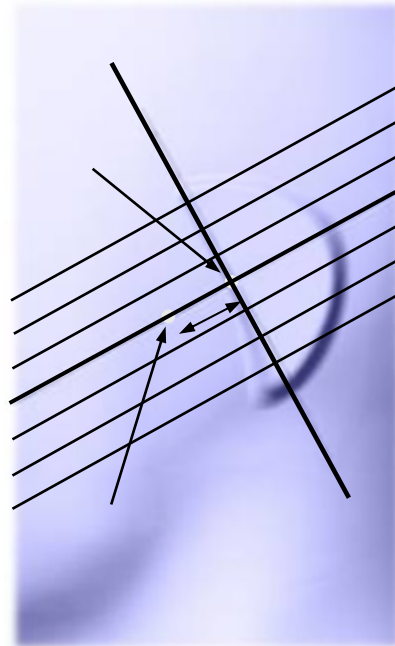
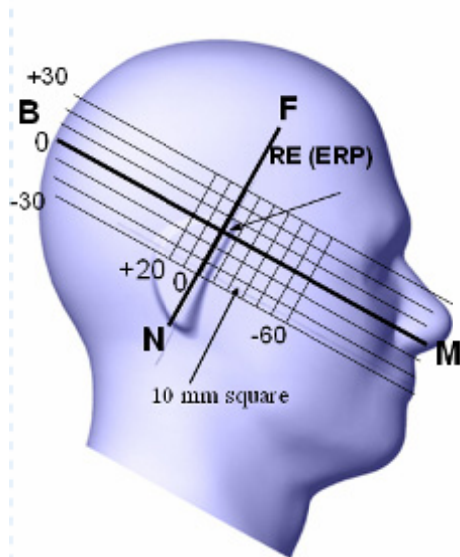
0 dB = 16.3 W/kg = 12.12 dBW/kg

4 EUT Test Positions and Methodology

4.1 Test Positions for Device Operating Next to a Person's Ear

This category includes most wireless handsets with fixed, retractable or internal antennas located toward the top half of the device, with or without a foldout, sliding or similar keypad cover. The handset should have its earpiece located within the upper ¼ of the device, either along the centerline or off-centered, as perceived by its users. This type of handset should be positioned in a normal operating position with the “test device reference point” located along the “vertical centerline” on the front of the device aligned to the “ear reference point”. The “test device reference point” should be located at the same level as the center of the earpiece region. The “vertical centerline” should bisect the front surface of the handset at its top and bottom edges. A “ear reference point” is located on the outer surface of the head phantom on each ear spacer. It is located 1.5 cm above the center of the ear canal entrance in the “phantom reference plane” defined by the three lines joining the center of each “ear reference point” (left and right) and the tip of the mouth.

A handset should be initially positioned with the earpiece region pressed against the ear spacer of a head phantom. For the SCC-34/SC-2 head phantom, the device should be positioned parallel to the “N-F” line defined along the base of the ear spacer that contains the “ear reference point”. For interim head phantoms, the device should be positioned parallel to the cheek for maximum RF energy coupling. The “test device reference point” is aligned to the “ear reference point” on the head phantom and the “vertical centerline” is aligned to the “phantom reference plane”. This is called the “initial ear position”. While maintaining these three alignments, the body of the handset is gradually adjusted to each of the following positions for evaluating SAR:



4.2 Cheek/Touch Position

The device is brought toward the mouth of the head phantom by pivoting against the “ear reference point” or along the “N-F” line for the SCC-34/SC-2 head phantom.

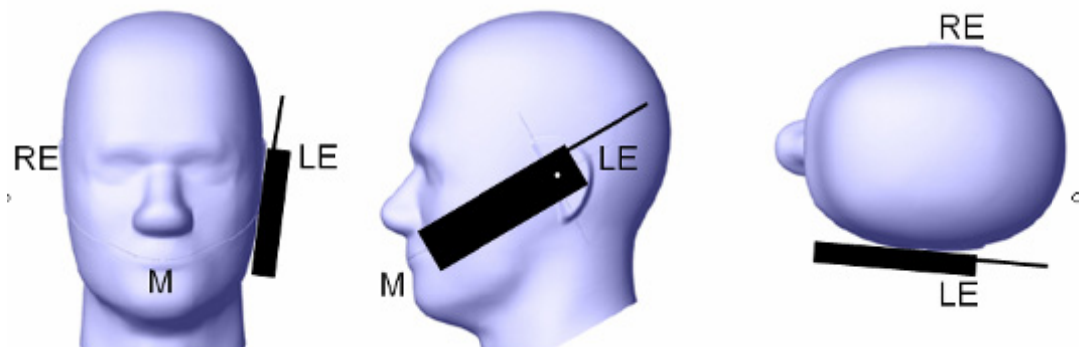
This test position is established:

When any point on the display, keypad or mouthpiece portions of the handset is in contact with the phantom.

(or) When any portion of a foldout, sliding or similar keypad cover opened to its intended self-adjusting normal use position is in contact with the cheek or mouth of the phantom.

For existing head phantoms – when the handset loses contact with the phantom at the pivoting point, rotation should continue until the device touches the cheek of the phantom or breaks its last contact from the ear spacer.

Cheek /Touch Position



4.3 Ear/Tilt Position

With the handset aligned in the “Cheek/Touch Position”:

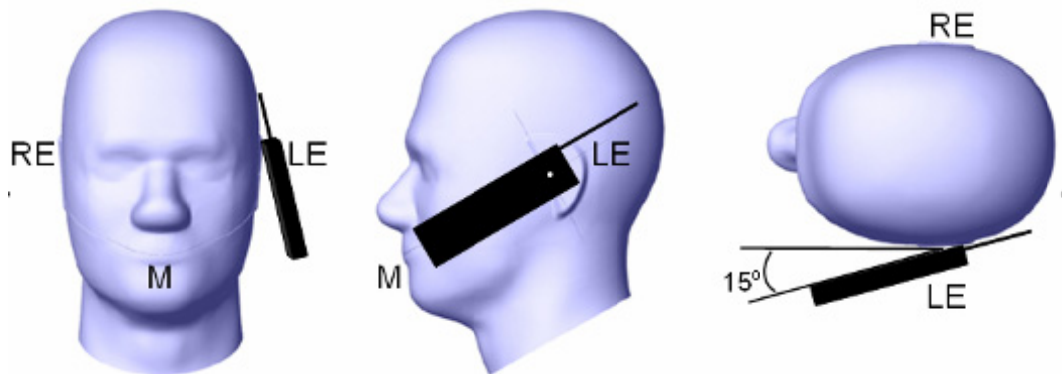
1) If the earpiece of the handset is not in full contact with the phantom’s ear spacer (in the “Cheek/Touch position”) and the peak SAR location for the “Cheek/Touch” position is located at the ear spacer region or corresponds to the earpiece region of the handset, the device should be returned to the “initial ear position” by rotating it away from the mouth until the earpiece is in full contact with the ear spacer.

2) (otherwise) The handset should be moved (translated) away from the cheek perpendicular to the line passes through both “ear reference points” (note: one of these ear reference points may not physically exist on a split head model) for approximate 2-3 cm. While it is in this position, the device handset is tilted away from the mouth with respect to the “test device reference point” until the inside angle between the vertical centerline on the front surface of the phone and the horizontal line passing through the ear reference point is by 15 80°. After the tilt, it is then moved (translated) back toward the head perpendicular to the line passes through both “ear reference points” until the device touches the phantom or the ear spacer. If the antenna touches the head first, the positioning process should be repeated with a tilt angle less than 15° so that the device and its antenna would touch the phantom simultaneously. This test position may require a device holder or positioner to achieve the translation and tilting with acceptable positioning repeatability.

If a device is also designed to transmit with its keypad cover closed for operating in the head position, such positions should also be considered in the SAR evaluation. The device should be tested on the left and right side of the head phantom in the “Cheek/Touch” and “Ear/Tilt” positions. When applicable, each configuration should be tested with the antenna in its fully extended and fully retracted positions. These test configurations should be tested at the high, middle and low frequency channels of each operating mode; for example, AMPS,

CDMA, and TDMA. If the SAR measured at the middle channel for each test configuration (left, right, Cheek/Touch, Tilt/Ear, extended and retracted) is at least 2.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s). If the transmission band of the test device is less than 10 MHz, testing at the high and low frequency channels is optional.

Ear /Tilt 15° Position



4.4 Test positions for body-worn and other configurations

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations. Devices with a headset output should be tested with a headset connected to the device. When multiple accessories that do not contain metallic components are supplied with the device, the device may be tested with only the accessory that dictates the closest spacing to the body. When multiple accessories that contain metallic components are supplied with the device, the device must be tested with each accessory that contains a unique metallic component. If multiple accessories share an identical metallic component (e.g., the same metallic belt-clip used with different holsters with no other metallic components), only the accessory that dictates the closest spacing to the body must be tested.

Body-worn accessories may not always be supplied or available as options for some devices that are intended to be authorized for body-worn use. A separation distance of 1.5 cm between the back of the device and a flat phantom is recommended for testing body-worn SAR compliance under such circumstances. Other separation distances may be used, but they should not exceed 2.5 cm. In these cases, the device may use body-worn accessories that provide a separation distance greater than that tested for the device provided however that the accessory contains no metallic components.

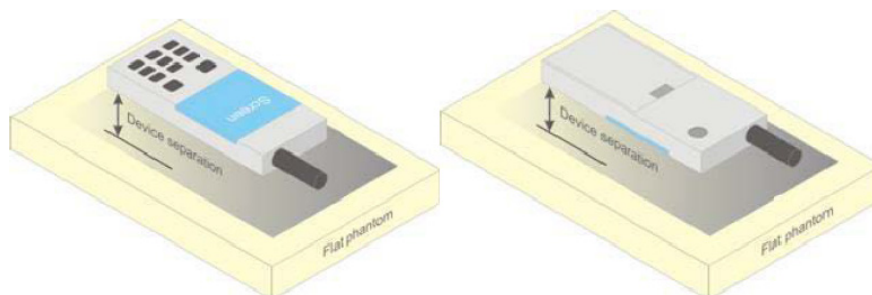
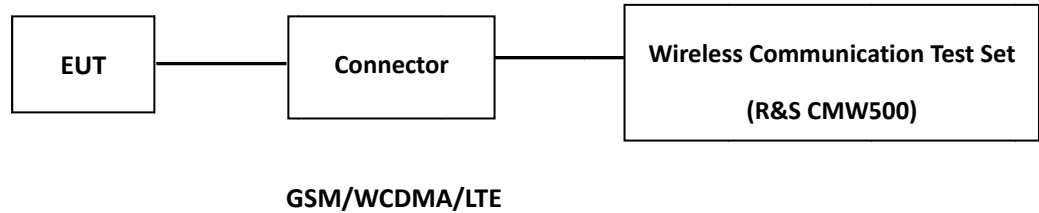


Figure 5 – Test positions for body-worn devices

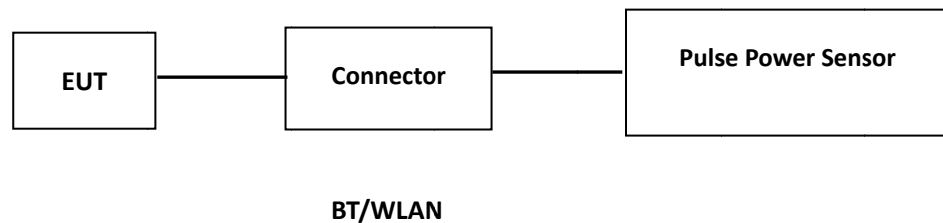
5 Conducted Output Power Measurements

5.1 Test Procedure

The RF output of the transmitter was connected to the input of the Wireless Communication Test Set through Connector.



The RF output of the transmitter was connected to the input port of the Pulse Power Sensor through Connector.



5.2 Maximum Target Output Power

Mode/Band	Max. Target Power(dBm)		
	Low Channel	Middle Channel	High Channel
GSM 850	32.3	32.3	32.3
GPRS 850 1 Slot	32.2	32.2	32.2
GPRS 850 2 Slots	31	31	31
GPRS 850 3 Slots	30	30	30
GPRS 850 4 Slots	28.8	28.8	28.8
EDGE 850 1 Slot	28.2	28.2	28.2
EDGE 850 2 Slots	27.3	27.3	27.3
EDGE 850 3 Slots	26.2	26.2	26.2
EDGE 850 4 Slots	25.2	25.2	25.2
GSM 1900	30	30	30
GPRS 1900 1 Slot	30.1	30.1	30.1
GPRS 1900 2 Slots	29.1	29.1	29.1
GPRS 1900 3 Slots	28.1	28.1	28.1
GPRS 1900 4 Slots	27.3	27.3	27.3
EDGE 1900 1 Slot	28.5	28.5	28.5
EDGE 1900 2 Slots	27.6	27.6	27.6
EDGE 1900 3 Slots	26.6	26.6	26.6
EDGE 1900 4 Slots	25.1	25.1	25.1
WCDMA Band 2	24	24	24

HSDPA	21	21	21
HSUPA	21.1	21.1	21.1
WCDMA Band 5	23.8	23.8	23.8
HSDPA	21	21	21
HSUPA	21	21	21
LTE Band 2(20M)	25.2	25.2	25.2
LTE Band 5(10M)	24.8	24.8	24.8
LTE Band 7(20M)	24	24	24
LTE Band 12(10M)	24.4	24.4	24.4
LTE Band 41(20M)	24.1	24.1	24.1
2.4G WLAN (802.11b)	11.6	11.6	11.6
2.4G WLAN (802.11g)	15.3	15.3	15.3
2.4G WLAN (802.11 n20)	14.5	15	15.7
2.4G WLAN (802.11 n40)	15.6	15.6	15.6
5.2G WLAN (802.11a)	8.7	8.7	8.7
5.2G WLAN (802.11 n20)	7.8	7.8	7.8
5.2G WLAN (802.11 n40)	7.3	/	7.3
5.2G WLAN (802.11 ac80)	/	6.8	/
5.8G WLAN (802.11a)	9	9	9
5.8G WLAN (802.11 n20)	8.6	8.6	8.6
5.8G WLAN (802.11 n40)	7.9	/	7.9
5.8G WLAN (802.11 ac80)	/	7.6	/
Bluetooth(BDR/EDR)	6.4	6.4	6.4
BLE_1M	-4.4	-4.4	-4.4
BLE_2M	-4.2	-4.2	-4.2

5.3 Maximum Conducted Output Power

GSM:

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)
GSM 850	128	824.2	32.04
	190	836.6	32.11
	251	848.8	32.07
PCS 1900	512	1850.2	28.64
	661	1880	29.83
	810	1909.8	29.56

GPRS:

Band	Channel No.	Frequency (MHz)	RF Peak Output Power(dBm)			
			1 Slot	2 Slots	3 Slots	4 Slots
GSM 850	128	824.2	31.94	30.77	29.65	28.53
	190	836.6	31.95	30.86	29.84	28.67
	251	848.8	31.97	30.45	28.97	28.34
PCS 1900	512	1850.2	28.56	27.76	26.80	26.83
	661	1880	29.96	28.95	28.01	27.16
	810	1909.8	29.62	28.38	27.17	26.97

EDGE:

Band	Channel No.	Frequency (MHz)	RF Peak Output Power(dBm)			
			1 Slot	2 Slots	3 Slots	4 Slots
GSM 850	128	824.2	28.13	27.16	25.85	24.65
	190	836.6	28.06	26.95	25.84	24.92
	251	848.8	28.05	27.09	26.03	25.06
PCS 1900	512	1850.2	28.34	27.48	26.45	25.03
	661	1880	28.31	27.42	25.97	24.99
	810	1909.8	28.25	27.09	25.86	24.57

For SAR, the time based average power is relevant, the difference in between depends on the duty cycle of the TDMA signal.

Number of Time Slots	1 Slot	2 Slots	3 Slots	4 Slots
Duty Cycle	1:8	1:4	1:2.66	1:2
Time based Ave. power compared to slotted Ave. power	-9 dB	-6 dB	-4.25 dB	-3 dB
Crest Factor	8	4	2.66	2

GPRS:

Band	Channel No.	Frequency (MHz)	Time Based Average Power(dBm)			
			1 Slot	2 Slots	3 Slots	4 Slots
GSM 850	128	824.2	22.94	24.77	25.40	25.53
	190	836.6	22.95	24.86	25.59	25.67
	251	848.8	22.97	24.45	24.72	25.34
PCS 1900	512	1850.2	19.56	21.76	22.55	23.83
	661	1880	20.96	22.95	23.76	24.16
	810	1909.8	20.62	22.38	22.92	23.97

EDGE:

Band	Channel No.	Frequency (MHz)	Time Based Average Power(dBm)			
			1 Slot	2 Slots	3 Slots	4 Slots
GSM 850	128	824.2	19.13	21.16	21.60	21.65
	190	836.6	19.06	20.95	21.59	21.92
	251	848.8	19.05	21.09	21.78	22.06
PCS 1900	512	1850.2	19.34	21.48	22.20	22.03
	661	1880	19.31	21.42	21.72	21.99
	810	1909.8	19.25	21.09	21.61	21.57

Note:

1. Rohde & Schwarz Radio Communication Tester (CMW500) was used for the measurement of GSM peak and average output power for active timeslots.
2. For GSM voice, 1 timeslot has been activated with power level 5 (850 MHz band) and 0 (1900 MHz band).
3. For GPRS, 1, 2, 3 and 4 timeslots has been activated separately with power level 3(850 MHz band) and 3(1900 MHz band).

WCDMA Band 2:

Test Mode	Sub Test	Conducted Average Output Power(dBm)		
		Lowest Channel	Middle Channel	Highest Channel
RMC 12.2kbps		23.42	23.85	23.79
HSDPA	1	20.28	20.55	20.86
	2	19.55	19.29	19.07
	3	19.58	19.31	19.05
	4	19.46	19.19	18.89
HSUPA	1	20.34	19.96	20.95
	2	19.47	19.21	19.33
	3	19.41	19.06	19.21
	4	19.36	19.18	19.23
	5	19.46	19.34	19.24

WCDMA Band 5:

Test Mode	Sub Test	Conducted Average Output Power(dBm)		
		Lowest Channel	Middle Channel	Highest Channel
RMC 12.2kbps		23.72	23.55	23.52
HSDPA	1	20.50	20.89	20.54
	2	20.44	20.50	20.53
	3	20.25	20.41	20.26
	4	20.21	20.40	20.35
HSUPA	1	20.62	20.73	20.93
	2	20.64	20.08	20.01
	3	20.43	20.07	19.92
	4	20.43	20.06	19.82
	5	20.55	20.11	19.91

Note:

1. The default test configuration is to measure SAR with an established radio link between the EUT and a communication test set using a 12.2 kbps RMC (reference measurement Channel) Configured in Test Loop Model 1.
2. KDB 941225 D01-Body SAR is not required for HSDPA/HSUPA/HSPA+ when the maximum average output of each RF channel is less than ¼ dB higher than measured 12.2kbps RMC or the maximum SAR for 12.2kbps RMC is < 75% of SAR limit.

LTE Band 2:

Test Bandwidth	Test Modulation	Resource Block & RB offset	Target MPR	Meas. MPR	Lowest Channel (dBm)	Middle Channel (dBm)	Highest Channel (dBm)
1.4M	QPSK	RB1#0	0	0	23.95	24.57	24.86
		RB1#3	0	0	24.23	24.60	25.09
		RB1#5	0	0	24.08	24.55	24.82
		RB3#0	1	1	23.98	24.52	24.62
		RB3#3	1	1	23.97	24.46	24.70
		RB6#0	1	1	23.46	23.51	23.94
	16-QAM	RB1#0	1	1	23.30	23.42	23.81
		RB1#3	1	1	23.29	23.56	24.16
		RB1#5	1	1	23.96	23.32	23.84
		RB3#0	2	2	23.24	23.54	23.63
		RB3#3	2	2	23.28	23.59	23.58
		RB6#0	2	2	23.90	23.53	23.93
3M	QPSK	RB1#0	0	0	24.26	24.57	24.78
		RB1#8	0	0	24.23	24.59	24.84
		RB1#14	0	0	24.23	24.64	24.82
		RB6#0	1	1	23.34	23.53	23.74
		RB6#9	1	1	23.43	23.52	23.95
		RB15#0	1	1	23.39	23.46	23.66
	16-QAM	RB1#0	1	1	23.53	23.93	23.88
		RB1#8	1	1	23.25	23.86	23.82
		RB1#14	1	1	23.49	23.85	23.80
		RB6#0	2	2	23.31	23.51	23.86
		RB6#9	2	2	23.54	23.60	23.77
		RB15#0	2	2	23.44	23.59	23.75
5M	QPSK	RB1#0	0	0	23.96	24.43	24.74
		RB1#13	0	0	24.26	24.57	24.72
		RB1#24	0	0	24.17	24.43	24.32
		RB15#0	1	1	23.24	23.52	23.27
		RB15#10	1	1	23.38	23.58	23.28

		RB25#0	1	1	23.30	23.57	23.26
	16-QAM	RB1#0	1	1	23.97	23.79	23.36
		RB1#13	1	1	23.42	23.33	23.48
		RB1#24	1	1	23.26	23.33	23.39
		RB15#0	2	2	23.42	23.61	23.29
		RB15#10	2	2	23.32	23.56	23.29
		RB25#0	2	2	23.49	23.54	23.37
10M	QPSK	RB1#0	0	0	24.22	24.53	24.81
		RB1#25	0	0	24.45	24.68	24.87
		RB1#49	0	0	24.28	24.57	24.81
		RB25#0	1	1	23.32	23.46	23.60
		RB25#25	1	1	23.26	23.57	23.51
		RB50#0	1	1	23.28	23.48	23.27
	16-QAM	RB1#0	1	1	23.58	23.89	23.34
		RB1#25	1	1	23.28	24.07	23.52
		RB1#49	1	1	23.25	24.03	23.42
		RB25#0	2	2	23.27	23.60	23.42
		RB25#25	2	2	23.34	23.68	23.46
		RB50#0	2	2	23.31	23.58	23.36
15M	QPSK	RB1#0	0	0	24.12	24.37	24.38
		RB1#38	0	0	24.28	24.58	24.18
		RB1#74	0	0	24.37	24.35	24.16
		RB36#0	1	1	23.32	23.45	23.45
		RB36#39	1	1	23.41	23.48	23.36
		RB75#0	1	1	23.31	23.63	23.45
	16-QAM	RB1#0	1	1	23.29	23.34	23.26
		RB1#38	1	1	23.52	23.62	23.31
		RB1#74	1	1	23.43	23.56	23.37
		RB36#0	2	2	23.40	23.24	23.35
		RB36#39	2	2	23.30	23.39	23.32
		RB75#0	2	2	23.27	23.34	23.37
20M	QPSK	RB1#0	0	0	24.35	24.34	24.46
		RB1#50	0	0	25.01	24.94	24.98

		RB1#99	0	0	24.84	24.46	24.59
		RB50#0	1	1	23.63	23.55	23.72
		RB50#50	1	1	24.86	24.87	24.82
		RB100#0	1	1	24.75	24.72	24.71
	16-QAM	RB1#0	1	1	23.47	23.88	23.94
		RB1#50	1	1	23.53	23.38	23.37
		RB1#99	1	1	23.29	23.49	23.30
		RB50#0	2	2	23.66	23.96	23.36
		RB50#50	2	2	23.84	23.42	23.22
		RB100#0	2	2	23.91	23.31	23.25

LTE Band 5:

Test Bandwidth	Test Modulation	Resource Block & RB offset	Target MPR	Meas. MPR	Lowest Channel (dBm)	Middle Channel (dBm)	Highest Channel (dBm)
1.4M	QPSK	RB1#0	0	0	24.52	23.94	23.84
		RB1#3	0	0	24.69	24.10	24.09
		RB1#5	0	0	24.41	23.88	23.82
		RB3#0	1	1	24.53	23.99	23.88
		RB3#3	1	1	24.56	23.97	24.03
		RB6#0	1	1	23.33	23.06	22.84
	16-QAM	RB1#0	1	1	23.14	23.07	22.87
		RB1#3	1	1	23.20	23.31	23.13
		RB1#5	1	1	23.07	23.20	22.99
		RB3#0	2	2	23.32	23.27	23.13
		RB3#3	2	2	23.27	23.19	23.03
		RB6#0	2	2	22.02	22.37	21.78
3M	QPSK	RB1#0	0	0	24.62	23.97	23.86
		RB1#8	0	0	24.49	24.24	23.90
		RB1#14	0	0	24.57	24.02	23.77
		RB6#0	1	1	23.51	23.10	22.83
		RB6#9	1	1	23.22	23.05	22.79
		RB15#0	1	1	23.40	23.25	22.94
	16-QAM	RB1#0	1	1	23.27	23.04	23.44
		RB1#8	1	1	23.65	23.04	23.54
		RB1#14	1	1	23.42	23.08	23.45
		RB6#0	2	2	22.26	22.10	21.87
		RB6#9	2	2	22.15	22.11	21.93
		RB15#0	2	2	22.21	22.40	22.10
5M	QPSK	RB1#0	0	0	24.42	23.94	23.94
		RB1#13	0	0	24.37	23.98	24.04
		RB1#24	0	0	24.39	23.92	23.94
		RB15#0	1	1	23.58	23.02	23.02

		RB15#10	1	1	23.61	23.00	22.99
		RB25#0	1	1	23.27	22.98	22.85
	16-QAM	RB1#0	1	1	23.29	23.02	22.71
		RB1#13	1	1	23.48	23.04	22.93
		RB1#24	1	1	23.26	22.92	22.74
		RB15#0	2	2	21.99	22.03	22.07
		RB15#10	2	2	22.04	21.99	21.90
		RB25#0	2	2	22.16	22.03	22.06
10M	QPSK	RB1#0	0	0	24.54	24.09	23.99
		RB1#25	0	0	24.62	24.54	24.52
		RB1#49	0	0	24.42	24.03	23.98
		RB25#0	1	1	24.29	24.18	24.15
		RB25#25	1	1	24.72	24.67	24.58
		RB50#0	1	1	24.60	24.57	24.49
	16-QAM	RB1#0	1	1	24.05	23.24	22.94
		RB1#25	1	1	24.24	23.24	23.00
		RB1#49	1	1	24.15	23.18	22.89
		RB25#0	2	2	23.63	22.91	23.02
		RB25#25	2	2	23.81	22.92	23.03
		RB50#0	2	2	23.76	22.97	23.01

LTE Band 7:

Test Bandwidth	Test Modulation	Resource Block & RB offset	Target MPR	Meas. MPR	Lowest Channel (dBm)	Middle Channel (dBm)	Highest Channel (dBm)
5M	QPSK	RB1#0	0	0	23.31	23.28	23.62
		RB1#13	0	0	23.38	23.42	23.72
		RB1#24	0	0	22.93	23.34	23.65
		RB15#0	1	1	22.07	22.50	22.70
		RB15#10	1	1	22.18	22.54	22.88
		RB25#0	1	1	22.12	22.46	22.83
	16-QAM	RB1#0	1	1	21.96	22.34	22.75
		RB1#13	1	1	22.11	22.43	23.04
		RB1#24	1	1	22.02	22.21	22.85
		RB15#0	2	2	21.05	21.55	21.63
		RB15#10	2	2	21.11	21.71	21.64
		RB25#0	2	2	21.00	21.55	21.62
10M	QPSK	RB1#0	0	0	23.52	23.41	23.61
		RB1#25	0	0	23.20	23.66	23.82
		RB1#49	0	0	23.15	23.53	23.90
		RB25#0	1	1	21.91	22.52	22.85
		RB25#25	1	1	22.28	22.66	22.77
		RB50#0	1	1	22.21	22.55	22.79
	16-QAM	RB1#0	1	1	22.02	22.86	22.68
		RB1#25	1	1	22.29	23.11	22.99
		RB1#49	1	1	22.01	23.01	22.84
		RB25#0	2	2	21.18	21.55	21.81
		RB25#25	2	2	21.40	21.74	21.82
		RB50#0	2	2	21.24	21.56	21.88
15M	QPSK	RB1#0	0	0	22.91	23.45	23.60
		RB1#38	0	0	23.19	23.49	23.80
		RB1#74	0	0	23.15	23.46	23.74
		RB36#0	1	1	22.00	22.69	22.95
		RB36#39	1	1	22.29	22.71	22.76

	16-QAM	RB75#0	1	1	22.20	22.74	22.94
		RB1#0	1	1	22.32	22.81	22.60
		RB1#38	1	1	22.48	22.97	22.78
		RB1#74	1	1	22.46	22.99	22.98
		RB36#0	2	2	21.03	21.61	21.89
		RB36#39	2	2	21.20	21.65	21.78
		RB75#0	2	2	21.10	21.60	21.82
20M	QPSK	RB1#0	0	0	23.25	23.23	23.38
		RB1#50	0	0	23.75	23.79	23.87
		RB1#99	0	0	23.38	23.45	23.66
		RB50#0	1	1	23.23	23.59	23.78
		RB50#50	1	1	23.86	23.84	23.83
		RB100#0	1	1	23.74	23.73	23.71
	16-QAM	RB1#0	1	1	22.30	22.40	22.44
		RB1#50	1	1	22.75	22.99	22.82
		RB1#99	1	1	22.59	22.61	22.78
		RB50#0	2	2	22.84	22.46	22.61
		RB50#50	2	2	22.26	22.68	22.43
		RB100#0	2	2	22.16	22.73	22.65

LTE Band 12:

Test Bandwidth	Test Modulation	Resource Block & RB offset	Target MPR	Meas. MPR	Lowest Channel (dBm)	Middle Channel (dBm)	Highest Channel (dBm)
1.4M	QPSK	RB1#0	0	0	24.05	23.57	23.44
		RB1#3	0	0	24.20	23.59	23.61
		RB1#5	0	0	24.07	23.50	23.30
		RB3#0	1	1	24.10	23.56	23.57
		RB3#3	1	1	24.08	23.61	23.57
		RB6#0	1	1	23.07	22.69	22.57
	16-QAM	RB1#0	1	1	23.08	22.71	22.55
		RB1#3	1	1	23.20	22.88	22.73
		RB1#5	1	1	22.95	22.60	22.37
		RB3#0	2	2	23.17	22.49	22.56
		RB3#3	2	2	23.13	22.55	22.55
		RB6#0	2	2	21.94	21.60	21.40
3M	QPSK	RB1#0	0	0	24.14	23.64	23.50
		RB1#8	0	0	24.15	23.63	23.43
		RB1#14	0	0	24.03	23.48	23.44
		RB6#0	1	1	22.91	22.52	22.48
		RB6#9	1	1	22.59	22.57	22.60
		RB15#0	1	1	22.69	22.63	22.51
	16-QAM	RB1#0	1	1	23.10	22.60	22.94
		RB1#8	1	1	22.93	22.64	23.04
		RB1#14	1	1	22.85	22.62	22.99
		RB6#0	2	2	21.61	21.48	21.52
		RB6#9	2	2	21.97	21.54	21.49
		RB15#0	2	2	21.76	21.57	21.66
5M	QPSK	RB1#0	0	0	24.08	23.42	23.29
		RB1#13	0	0	24.09	23.58	23.55
		RB1#24	0	0	23.99	23.48	23.36
		RB15#0	1	1	22.92	22.62	22.49
		RB15#10	1	1	23.12	22.60	22.55

	16-QAM	RB25#0	1	1	23.00	22.56	22.53
		RB1#0	1	1	23.29	22.49	22.34
		RB1#13	1	1	23.34	22.68	22.59
		RB1#24	1	1	23.36	22.61	22.35
		RB15#0	2	2	21.91	21.69	21.51
		RB15#10	2	2	21.85	21.60	21.41
		RB25#0	2	2	22.05	21.60	21.57
10M	QPSK	RB1#0	0	0	23.98	23.76	23.84
		RB1#25	0	0	24.27	24.19	24.24
		RB1#49	0	0	24.06	23.70	23.83
		RB25#0	1	1	23.96	23.79	23.88
		RB25#25	1	1	24.18	24.12	24.15
		RB50#0	1	1	24.23	24.25	24.22
	16-QAM	RB1#0	1	1	23.09	23.09	22.77
		RB1#25	1	1	23.21	23.33	22.76
		RB1#49	1	1	23.05	23.16	22.74
		RB25#0	2	2	23.05	22.85	22.62
		RB25#25	2	2	23.14	22.75	22.54
		RB50#0	2	2	23.10	22.76	22.52

LTE Band 41:

Test Bandwidth	Test Modulation	Resource Block & RB offset	Target MPR	Meas. MPR	Lowest Channel (dBm)	Middle Channel (dBm)	2620MHz (dBm)	Highest Channel (dBm)
5M	QPSK	RB1#0	0	0	23.42	23.59	23.20	22.56
		RB1#13	0	0	23.52	23.73	23.37	22.75
		RB1#24	0	0	23.38	23.58	23.01	22.49
		RB15#0	1	1	22.30	22.64	22.11	21.57
		RB15#10	1	1	22.43	22.54	22.02	21.49
		RB25#0	1	1	22.44	22.61	22.22	21.59
	16-QAM	RB1#0	1	1	22.36	22.67	22.47	21.81
		RB1#13	1	1	22.44	22.69	22.50	21.87
		RB1#24	1	1	22.41	22.69	22.39	21.76
		RB15#0	2	2	21.32	21.59	21.42	20.79
		RB15#10	2	2	21.41	21.69	21.25	20.67
		RB25#0	2	2	21.46	21.60	21.27	20.72
10M	QPSK	RB1#0	0	0	23.41	23.85	23.39	22.86
		RB1#25	0	0	23.73	24.01	23.65	23.01
		RB1#49	0	0	23.52	23.70	23.15	22.52
		RB25#0	1	1	22.56	22.78	22.37	21.75
		RB25#25	1	1	22.48	22.76	22.40	21.75
		RB50#0	1	1	22.50	22.72	22.38	21.76
	16-QAM	RB1#0	1	1	22.38	22.72	22.58	21.96
		RB1#25	1	1	22.65	22.96	22.67	22.13
		RB1#49	1	1	22.43	22.71	22.26	21.70
		RB25#0	2	2	21.55	21.80	21.30	20.70
		RB25#25	2	2	21.64	21.68	21.27	20.61
		RB50#0	2	2	21.57	21.67	21.38	20.79
15M	QPSK	RB1#0	0	0	23.34	23.59	23.36	22.73
		RB1#38	0	0	23.55	23.77	23.26	22.65
		RB1#74	0	0	23.59	23.63	23.10	22.51
		RB36#0	1	1	22.47	22.76	22.35	21.79
		RB36#39	1	1	22.62	22.77	22.31	21.69

	16-QAM	RB75#0	1	1	22.53	22.75	22.31	21.79
		RB1#0	1	1	22.36	22.77	22.44	21.88
		RB1#38	1	1	22.42	22.96	22.51	21.99
		RB1#74	1	1	22.49	22.73	22.35	21.81
		RB36#0	2	2	21.40	21.78	21.22	20.69
		RB36#39	2	2	21.45	21.65	21.14	20.61
		RB75#0	2	2	21.65	21.62	21.44	20.85
20M	QPSK	RB1#0	0	0	23.15	23.52	23.35	23.70
		RB1#50	0	0	23.79	24.01	23.89	23.94
		RB1#99	0	0	23.42	23.53	23.46	23.54
		RB50#0	1	1	22.48	23.63	23.58	23.76
		RB50#50	1	1	22.47	23.73	23.67	23.86
		RB100#0	1	1	22.46	23.69	23.64	23.74
	16-QAM	RB1#0	1	1	22.20	22.77	22.41	22.85
		RB1#50	1	1	22.67	23.25	22.76	22.12
		RB1#99	1	1	22.31	22.73	22.98	22.40
		RB50#0	2	2	22.51	22.61	22.52	22.87
		RB50#50	2	2	22.65	22.56	22.33	22.76
		RB100#0	2	2	22.45	22.60	22.55	22.91

2.4G WLAN:

Test Mode	Channel [MHz]	Data Rate	Duty Cycle [%]	Max. Conducted Average Output Power [dBm]
802.11b	2412	1Mbps	100	10.45
	2437			10.88
	2462			11.50
802.11g	2412	6Mbps	100	14.45
	2437			14.93
	2462			15.14
802.11 n ht20	2412	MCS0	100	14.43
	2437			14.85
	2462			15.63
802.11 n ht40	2422	MCS0	100	15.41
	2437			15.48
	2452			15.45

5.2G WLAN:

Test Mode	Channel [MHz]	Data Rate	Duty Cycle [%]	Max. Conducted Average Output Power [dBm]
802.11a	5180	6Mbps	100	8.43
	5200			8.61
	5240			8.50
802.11n ht20	5180	MCS0	100	7.68
	5200			7.63
	5240			7.72
802.11n ht40	5190	MCS0	100	6.92
	5230			7.18
802.11 ac80	5210	MCS0	100	6.71

5.8G WLAN:

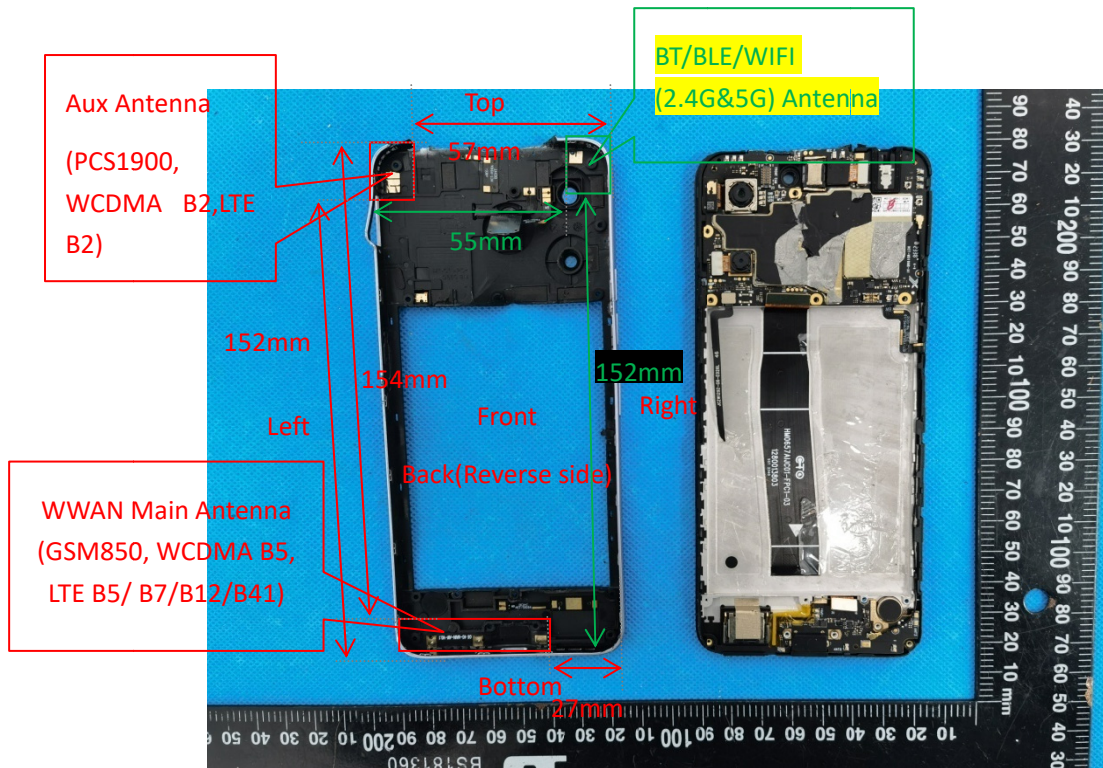
Test Mode	Channel [MHz]	Data Rate	Duty Cycle [%]	Max. Conducted Average Output Power [dBm]
802.11a	5745	6Mbps	100	8.84
	5785			8.67
	5825			8.56
802.11n ht20	5745	MCS0	100	8.51
	5785			8.53
	5825			8.06
802.11n ht40	5755	MCS0	100	7.82
	5795			7.34
802.11 ac80	5775	MCS0	100	7.46

Bluetooth:

Test Mode	Channel [MHz]	Max. Peak Conducted Output Power [dBm]
BDR(GFSK)	2402	5.87
	2441	5.92
	2480	6.25
EDR($\pi/4$ -DQPSK)	2402	4.46
	2441	5.73
	2480	5.62
EDR(8DPSK)	2402	4.47
	2441	5.65
	2480	5.59
BLE_1M	2402	-6.23
	2440	-4.55
	2480	-4.43
BLE_2M	2402	-6.10
	2440	-4.72
	2480	-4.28

6 Standalone SAR Test Exclusion Considerations

6.1 Antennas Location



6.2 Antennas Distance To Edge

Antenna Distance To Edge(mm)						
Antenna	Back	Front	Left	Right	Top	Bottom
WWAN(GSM/WCDMA/LTE) Main Antenna	< 5	< 5	< 5	27	154	< 5
WWAN(GSM/WCDMA/LTE) Aux Antenna	< 5	< 5	< 5	57	< 5	152
WLAN 2.4G/5G & Bluetooth Antenna	< 5	< 5	55	< 5	< 5	152

6.3 Standalone SAR Test Exclusion Considerations

Mode	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Distance (mm)	Calculated value	Threshold (1-g)	SAR Test Exclusion
WLAN 2.4G	2462	15.7	37.2	0	11.7	3	NO
WLAN 5.2G	5240	8.7	7.4	0	3.4	3	NO
WLAN 5.8G	5825	9	7.9	0	3.8	3	NO
Bluetooth	2480	6.4	4.4	0	1.4	3	YES

NOTE:

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot$$

$$[\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR, where}$$

1. $f(\text{GHz})$ is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

According to KDB447498 D01 General RF Exposure Guidance v06: 4.3. General SAR test exclusion guidance

c) For frequencies below 100 MHz, the following may be considered for SAR test exclusion (also illustrated in Appendix C):

- 1) For *test separation distances* > 50 mm and < 200 mm, the power threshold at the corresponding test separation distance at 100 MHz in step b) is multiplied by $[1 + \log(100/f(\text{MHz}))]$
- 2) For *test separation distances* ≤ 50 mm, the power threshold determined by the equation in c) 1) for 50 mm and 100 MHz is multiplied by $\frac{1}{2}$
- 3) SAR measurement procedures are not established below 100 MHz

Measurement Result:

For NFC, the power of EUT: E Field@3m is 66.49dBuV/m = -28.71dBm (0.0013mW)

Note: $E[\text{dB}\mu\text{V/m}] = \text{EIRP}[\text{dBm}] + 95.2$ for $d = 3$ m.

SAR test exclusion threshold for NFC(13.56MHz) separation distance $< 50\text{mm}$

$$= [474 * (1 + \log(100/f(\text{MHz}))) / 2]$$

$$= 443\text{mW}$$

$$> 0.0013\text{mW}$$

Conclusion:

The NFC SAR evaluation can be exempted.

6.4 Standalone SAR Test Exclusion Considerations

Mode	Frequency (MHz)	Output Power (dBm)	Output Power (mW)	Distance (mm)	Estimated 1-g (W/kg)
Bluetooth Head	2480	6.4	4.4	0	0.19
Bluetooth Body	2480	6.4	4.4	10	0.09

NOTE:

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

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot$$

$$[\sqrt{f(\text{GHz})/x}]$$

W/kg for test separation distances ≤ 50 mm;

where $x = 7.5$ for 1-g SAR.

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

6.5 SAR Test Exclusion For The EUT Edge Considerations Result

Mode	Back	Front	Left	Right	Top	Bottom
2.4G Wi-Fi	Required	Required	Exclusion	Required	Required	Exclusion
5G Wi-Fi	Required	Required	Exclusion	Required	Required	Exclusion
Main Antenna	Required	Required	Required	Exclusion	Exclusion	Required
Aux Antenna	Required	Required	Required	Exclusion	Required	Exclusion
BT	Exclusion*	Exclusion*	Exclusion*	Exclusion*	Exclusion*	Exclusion*

Note:

Required: The distance to Edge is less than 25mm, testing is required.

Exclusion*: SAR test exclusion evaluation has been done above.

Exclusion: The distance to Edge is more than 25 mm, testing is not required.

Extremity Exposure Considerations

Per KDB 648474 D04 D04v01r03, this device is considered a "Phablet" since the diagonal dimension is $>160\text{mm}$ and $< 200\text{mm}$, when hotspot mode applies, extremity SAR is required only for the surfaces and edges with hotspot mode scaled to the maximum output power (with tolerance is 1g SAR $> 1.2\text{W/kg}$)

Extremity Exposure Condition		
Worst Mode	Hotspot SAR value	Extremity Condition Test
LTE Band 7	0.91W/kg@1g	Exclusion

7 SAR Measurement Results

7.1 SAR Test Conditions

Temperature:	22.2-23.5℃	22.4-23.6℃	22.1-23.7℃	22.6-23.9℃	22.5-23.6℃	22.4-23.7℃
Relative Humidity:	51%	58%	56%	54%	61%	43%
ATM Pressure:	100.6kPa	100.1kPa	100.8kPa	100.9kPa	99.3kPa	99.9kPa
Test Date:	2024/02/21	2024/02/22	2024/02/23	2024/02/24	2024/02/25	2024/02/26

Testing was performed by Eric Zhang, Mason Xu, Claire Qin.

7.2 Measured and Reported (Scaled) SAR Results

GSM 850:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)			
					Scaled Factor	Meas. SAR	Scaled SAR	Plot
Head Left Cheek	824.2	GSM	/	/	/	/	/	/
	836.6	GSM	32.11	32.3	1.045	0.116	0.12	/
	848.8	GSM	/	/	/	/	/	/
Head Left Tilt	824.2	GSM	/	/	/	/	/	/
	836.6	GSM	32.11	32.3	1.045	0.081	0.08	/
	848.8	GSM	/	/	/	/	/	/
Head Right Cheek	824.2	GSM	/	/	/	/	/	/
	836.6	GSM	32.11	32.3	1.045	0.119	0.12	1#
	848.8	GSM	/	/	/	/	/	/
Head Right Tilt	824.2	GSM	/	/	/	/	/	/
	836.6	GSM	32.11	32.3	1.045	0.072	0.08	/
	848.8	GSM	/	/	/	/	/	/
Body Worn Back (10mm)	824.2	GSM	/	/	/	/	/	/
	836.6	GSM	32.11	32.3	1.045	0.164	0.17	/
	848.8	GSM	/	/	/	/	/	/
Body Front (10mm)	824.2	GPRS	/	/	/	/	/	/
	836.6	GPRS	28.67	28.8	1.03	0.166	0.17	/
	848.8	GPRS	/	/	/	/	/	/
Body Back (10mm)	824.2	GPRS	/	/	/	/	/	/
	836.6	GPRS	28.67	28.8	1.03	0.238	0.25	2#
	848.8	GPRS	/	/	/	/	/	/
Body Left (10mm)	824.2	GPRS	/	/	/	/	/	/
	836.6	GPRS	28.67	28.8	1.03	0.158	0.16	/
	848.8	GPRS	/	/	/	/	/	/
Body Bottom (10mm)	824.2	GPRS	/	/	/	/	/	/
	836.6	GPRS	28.67	28.8	1.03	0.128	0.13	/
	848.8	GPRS	/	/	/	/	/	/

Note: The test data above was performed on 2024/02/25.

Note:

1. When the 1-g SAR is $\leq 0.8\text{W/Kg}$, testing for other channels are optional.
2. The EUT transmit and receive through the same GSM antenna while testing SAR.
3. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
4. When the maximum output power variation across the required test channels is $> 0.5\text{ dB}$, instead of the middle channel, the highest output power channel must be used.
5. The Multi-slot Classes of EUT is Class 12 which has maximum 4 Downlink slots and 4 Uplink slots, the maximum active slots is 5, when perform the multiple slots scan, 1DL+4UL is the worst case.

PCS 1900:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)			
					Scaled Factor	Meas. SAR	Scaled SAR	Plot
Head Left Cheek	1850.2	GSM	/	/	/	/	/	/
	1880	GSM	29.83	30	1.04	0.293	0.3	/
	1909.8	GSM	/	/	/	/	/	/
Head Left Tilt	1850.2	GSM	/	/	/	/	/	/
	1880	GSM	29.83	30	1.04	0.356	0.37	/
	1909.8	GSM	/	/	/	/	/	/
Head Right Cheek	1850.2	GSM	/	/	/	/	/	/
	1880	GSM	29.83	30	1.04	0.409	0.43	/
	1909.8	GSM	/	/	/	/	/	/
Head Right Tilt	1850.2	GSM	/	/	/	/	/	/
	1880	GSM	29.83	30	1.04	0.546	0.57	3#
	1909.8	GSM	/	/	/	/	/	/
Body Worn Back (10mm)	1850.2	GSM	/	/	/	/	/	/
	1880	GSM	29.83	30	1.04	0.065	0.07	/
	1909.8	GSM	/	/	/	/	/	/
Body Front (10mm)	1850.2	GPRS	/	/	/	/	/	/
	1880	GPRS	27.16	27.3	1.033	0.297	0.31	/
	1909.8	GPRS	/	/	/	/	/	/
Body Back (10mm)	1850.2	GPRS	/	/	/	/	/	/
	1880	GPRS	27.16	27.3	1.033	0.415	0.43	4#
	1909.8	GPRS	/	/	/	/	/	/
Body Left (10mm)	1850.2	GPRS	/	/	/	/	/	/
	1880	GPRS	27.16	27.3	1.033	0.211	0.22	/
	1909.8	GPRS	/	/	/	/	/	/
Body Top (10mm)	1850.2	GPRS	/	/	/	/	/	/
	1880	GPRS	27.16	27.3	1.033	0.289	0.3	/
	1909.8	GPRS	/	/	/	/	/	/

Note: The test data above was performed on 2024/02/22.

Note:

1. When the 1-g SAR is $\leq 0.8\text{W/Kg}$, testing for other channels are optional.
2. The EUT transmit and receive through the same GSM antenna while testing SAR.
3. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
4. When the maximum output power variation across the required test channels is $> 0.5\text{ dB}$, instead of the middle channel, the highest output power channel must be used.
5. The Multi-slot Classes of EUT is Class 12 which has maximum 4 Downlink slots and 4 Uplink slots, the maximum active slots is 5, when perform the multiple slots scan, 1DL+4UL is the worst case.

WCDMA Band 2:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)			
					Scaled Factor	Meas. SAR	Scaled SAR	Plot
Head Left Cheek	1852.4	RMC	/	/	/	/	/	/
	1880	RMC	23.85	24	1.035	0.588	0.61	/
	1907.6	RMC	/	/	/	/	/	/
Head Left Tilt	1852.4	RMC	/	/	/	/	/	/
	1880	RMC	23.85	24	1.035	0.718	0.74	/
	1907.6	RMC	/	/	/	/	/	/
Head Right Cheek	1852.4	RMC	23.42	24	1.143	0.804	0.92	/
	1880	RMC	23.85	24	1.035	0.871	0.9	/
	1907.6	RMC	23.79	24	1.05	1.03	1.08	5#
Head Right Tilt	1852.4	RMC	/	/	/	/	/	/
	1880	RMC	23.85	24	1.035	0.68	0.7	/
	1907.6	RMC	/	/	/	/	/	/
Body Front (10mm)	1852.4	RMC	/	/	/	/	/	/
	1880	RMC	23.85	24	1.035	0.293	0.3	/
	1907.6	RMC	/	/	/	/	/	/
Body Back (10mm)	1852.4	RMC	/	/	/	/	/	/
	1880	RMC	23.85	24	1.035	0.301	0.31	/
	1907.6	RMC	/	/	/	/	/	/
Body Left (10mm)	1852.4	RMC	/	/	/	/	/	/
	1880	RMC	23.85	24	1.035	0.213	0.22	/
	1907.6	RMC	/	/	/	/	/	/
Body Top (10mm)	1852.4	RMC	/	/	/	/	/	/
	1880	RMC	23.85	24	1.035	0.306	0.32	6#
	1907.6	RMC	/	/	/	/	/	/

Note: The test data above was performed on 2024/02/23.

WCDMA Band 5:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)			
					Scaled Factor	Meas. SAR	Scaled SAR	Plot
Head Left Cheek	826.4	RMC	/	/	/	/	/	/
	836.6	RMC	23.55	23.8	1.059	0.027	0.03	/
	846.6	RMC	/	/	/	/	/	/
Head Left Tilt	826.4	RMC	/	/	/	/	/	/
	836.6	RMC	23.55	23.8	1.059	0.014	0.01	/
	846.6	RMC	/	/	/	/	/	/
Head Right Cheek	826.4	RMC	/	/	/	/	/	/
	836.6	RMC	23.55	23.8	1.059	0.025	0.03	/
	846.6	RMC	/	/	/	/	/	/
Head Right Tilt	826.4	RMC	/	/	/	/	/	/
	836.6	RMC	23.55	23.8	1.059	0.071	0.08	7#
	846.6	RMC	/	/	/	/	/	/
Body Front (10mm)	826.4	RMC	/	/	/	/	/	/
	836.6	RMC	23.55	23.8	1.059	0.064	0.07	/
	846.6	RMC	/	/	/	/	/	/
Body Back (10mm)	826.4	RMC	/	/	/	/	/	/
	836.6	RMC	23.55	23.8	1.059	0.089	0.09	/
	846.6	RMC	/	/	/	/	/	/
Body Left (10mm)	826.4	RMC	/	/	/	/	/	/
	836.6	RMC	23.55	23.8	1.059	0.114	0.12	8#
	846.6	RMC	/	/	/	/	/	/
Body Bottom (10mm)	826.4	RMC	/	/	/	/	/	/
	836.6	RMC	23.55	23.8	1.059	0.1	0.11	/
	846.6	RMC	/	/	/	/	/	/

Note: The test data above was performed on 2024/02/25.

Note:

1. When the 1-g SAR is $\leq 0.8\text{W/Kg}$, testing for other channels are optional.
2. The EUT transmit and receive through the same antenna while testing SAR.
3. The default test configuration is to measure SAR with an established radio link between the EUT and a communication test set using a 12.2 kbps RMC (reference measurement Channel) Configured in Test Loop Model.
4. KDB 941225 D01-Body SAR is not required for HSDPA/HSUPA when the maximum average output of each RF channel is less than $\frac{1}{4}$ dB higher than measured 12.2kbps RMC or the maximum SAR for 12.2kbps RMC is $< 75\%$ of SAR limit.
5. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.

LTE Band 2:

EUT Position	Frequency (MHz)	Bandwidth (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Head Left Cheek	1860	20	1RB	/	/	/	/	/	/
	1880	20	1RB	24.94	25.2	1.062	0.737	0.78	/
	1900	20	1RB	/	/	/	/	/	/
	1880	20	50%RB	24.87	25.2	1.079	0.607	0.65	/
Head Left Tilt	1860	20	1RB	/	/	/	/	/	/
	1880	20	1RB	24.94	25.2	1.062	0.725	0.77	/
	1900	20	1RB	/	/	/	/	/	/
	1880	20	50%RB	24.87	25.2	1.079	0.602	0.65	/
Head Right Cheek	1860	20	1RB	25.01	25.2	1.045	0.771	0.81	/
	1880	20	1RB	24.94	25.2	1.062	0.873	0.93	/
	1900	20	1RB	24.98	25.2	1.052	0.934	0.98	9#
	1880	20	50%RB	24.87	25.2	1.079	0.737	0.8	/
	1880	20	100%RB	24.72	25.2	1.117	0.692	0.77	/
Head Right Tilt	1860	20	1RB	/	/	/	/	/	/
	1880	20	1RB	24.94	25.2	1.062	0.746	0.79	/
	1900	20	1RB	/	/	/	/	/	/
	1880	20	50%RB	24.87	25.2	1.079	0.59	0.64	/
Body Front (10mm)	1860	20	1RB	/	/	/	/	/	/
	1880	20	1RB	24.94	25.2	1.062	0.319	0.34	/
	1900	20	1RB	/	/	/	/	/	/
	1880	20	50%RB	24.87	25.2	1.079	0.264	0.28	/
Body Back (10mm)	1860	20	1RB	/	/	/	/	/	/
	1880	20	1RB	24.94	25.2	1.062	0.324	0.34	/
	1900	20	1RB	/	/	/	/	/	/
	1880	20	50%RB	24.87	25.2	1.079	0.269	0.29	/
Body Left (10mm)	1860	20	1RB	/	/	/	/	/	/
	1880	20	1RB	24.94	25.2	1.062	0.308	0.33	/
	1900	20	1RB	/	/	/	/	/	/
	1880	20	50%RB	24.87	25.2	1.079	0.25	0.27	/
Body Top (10mm)	1860	20	1RB	/	/	/	/	/	/
	1880	20	1RB	24.94	25.2	1.062	0.334	0.35	10#
	1900	20	1RB	/	/	/	/	/	/
	1880	20	50%RB	24.87	25.2	1.079	0.272	0.29	/

Note: The test data above was performed on 2024/02/22.

LTE Band 5:

EUT Position	Frequency (MHz)	Bandwidth (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Head Left Cheek	829	10	1RB	/	/	/	/	/	/
	836.5	10	1RB	24.54	24.8	1.062	0.127	0.13	/
	844	10	1RB	/	/	/	/	/	/
	836.5	10	50%RB	24.67	24.8	1.03	0.102	0.11	/
Head Left Tilt	829	10	1RB	/	/	/	/	/	/
	836.5	10	1RB	24.54	24.8	1.062	0.077	0.08	/
	844	10	1RB	/	/	/	/	/	/
	836.5	10	50%RB	24.67	24.8	1.03	0.063	0.06	/
Head Right Cheek	829	10	1RB	/	/	/	/	/	/
	836.5	10	1RB	24.54	24.8	1.062	0.141	0.15	11#
	844	10	1RB	/	/	/	/	/	/
	836.5	10	50%RB	24.67	24.8	1.03	0.115	0.12	/
Head Right Tilt	829	10	1RB	/	/	/	/	/	/
	836.5	10	1RB	24.54	24.8	1.062	0.084	0.09	/
	844	10	1RB	/	/	/	/	/	/
	836.5	10	50%RB	24.67	24.8	1.03	0.068	0.07	/
Body Front (10mm)	829	10	1RB	/	/	/	/	/	/
	836.5	10	1RB	24.54	24.8	1.062	0.07	0.07	/
	844	10	1RB	/	/	/	/	/	/
	836.5	10	50%RB	24.67	24.8	1.03	0.058	0.06	/
Body Back (10mm)	829	10	1RB	/	/	/	/	/	/
	836.5	10	1RB	24.54	24.8	1.062	0.114	0.12	/
	844	10	1RB	/	/	/	/	/	/
	836.5	10	50%RB	24.67	24.8	1.03	0.097	0.1	/
Body Left (10mm)	829	10	1RB	/	/	/	/	/	/
	836.5	10	1RB	24.54	24.8	1.062	0.16	0.17	12#
	844	10	1RB	/	/	/	/	/	/
	836.5	10	50%RB	24.67	24.8	1.03	0.132	0.14	/
Body Bottom (10mm)	829	10	1RB	/	/	/	/	/	/
	836.5	10	1RB	24.54	24.8	1.062	0.106	0.11	/
	844	10	1RB	/	/	/	/	/	/
	836.5	10	50%RB	24.67	24.8	1.03	0.088	0.09	/

Note: The test data above was performed on 2024/02/24.

LTE Band 7:

EUT Position	Frequency (MHz)	Bandwidth (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Head Left Cheek	2510	20	1RB	/	/	/	/	/	/
	2535	20	1RB	23.79	24	1.05	0.345	0.36	13#
	2560	20	1RB	/	/	/	/	/	/
	2535	20	50%RB	23.84	24	1.038	0.298	0.31	/
Head Left Tilt	2510	20	1RB	/	/	/	/	/	/
	2535	20	1RB	23.79	24	1.05	0.139	0.15	/
	2560	20	1RB	/	/	/	/	/	/
	2535	20	50%RB	23.84	24	1.038	0.115	0.12	/
Head Right Cheek	2510	20	1RB	/	/	/	/	/	/
	2535	20	1RB	23.79	24	1.05	0.192	0.2	/
	2560	20	1RB	/	/	/	/	/	/
	2535	20	50%RB	23.84	24	1.038	0.168	0.17	/
Head Right Tilt	2510	20	1RB	/	/	/	/	/	/
	2535	20	1RB	23.79	24	1.05	0.14	0.15	/
	2560	20	1RB	/	/	/	/	/	/
	2535	20	50%RB	23.84	24	1.038	0.136	0.14	/
Body Front (10mm)	2510	20	1RB	/	/	/	/	/	/
	2535	20	1RB	23.79	24	1.05	0.702	0.74	/
	2560	20	1RB	/	/	/	/	/	/
	2535	20	50%RB	23.84	24	1.038	0.606	0.63	/
Body Back (10mm)	2510	20	1RB	23.75	24	1.059	0.493	0.52	/
	2535	20	1RB	23.79	24	1.05	0.862	0.91	14#
	2560	20	1RB	23.87	24	1.03	0.555	0.57	/
	2535	20	50%RB	23.84	24	1.038	0.744	0.77	/
	2535	20	100%RB	23.73	24	1.064	0.521	0.55	/
Body Left (10mm)	2510	20	1RB	/	/	/	/	/	/
	2535	20	1RB	23.79	24	1.05	0.327	0.34	/
	2560	20	1RB	/	/	/	/	/	/
	2535	20	50%RB	23.84	24	1.038	0.248	0.26	/
Body Bottom (10mm)	2510	20	1RB	/	/	/	/	/	/
	2535	20	1RB	23.79	24	1.05	0.761	0.8	/
	2560	20	1RB	/	/	/	/	/	/
	2535	20	50%RB	23.84	24	1.038	0.591	0.61	/

LTE Band 12:

EUT Position	Frequency (MHz)	Bandwidth (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Head Left Cheek	704	10	1RB	/	/	/	/	/	/
	707.5	10	1RB	24.19	24.4	1.05	0.125	0.13	/
	711	10	1RB	/	/	/	/	/	/
	707.5	10	50%RB	24.12	24.4	1.067	0.098	0.1	/
Head Left Tilt	704	10	1RB	/	/	/	/	/	/
	707.5	10	1RB	24.19	24.4	1.05	0.069	0.07	/
	711	10	1RB	/	/	/	/	/	/
	707.5	10	50%RB	24.12	24.4	1.067	0.046	0.05	/
Head Right Cheek	704	10	1RB	/	/	/	/	/	/
	707.5	10	1RB	24.19	24.4	1.05	0.134	0.14	15#
	711	10	1RB	/	/	/	/	/	/
	707.5	10	50%RB	24.12	24.4	1.067	0.107	0.11	/
Head Right Tilt	704	10	1RB	/	/	/	/	/	/
	707.5	10	1RB	24.19	24.4	1.05	0.048	0.05	/
	711	10	1RB	/	/	/	/	/	/
	707.5	10	50%RB	24.12	24.4	1.067	0.047	0.05	/
Body Front (10mm)	704	10	1RB	/	/	/	/	/	/
	707.5	10	1RB	24.19	24.4	1.05	0.068	0.07	/
	711	10	1RB	/	/	/	/	/	/
	707.5	10	50%RB	24.12	24.4	1.067	0.06	0.06	/
Body Back (10mm)	704	10	1RB	/	/	/	/	/	/
	707.5	10	1RB	24.19	24.4	1.05	0.073	0.08	/
	711	10	1RB	/	/	/	/	/	/
	707.5	10	50%RB	24.12	24.4	1.067	0.058	0.06	/
Body Left (10mm)	704	10	1RB	/	/	/	/	/	/
	707.5	10	1RB	24.19	24.4	1.05	0.193	0.2	16#
	711	10	1RB	/	/	/	/	/	/
	707.5	10	50%RB	24.12	24.4	1.067	0.153	0.16	/
Body Bottom (10mm)	704	10	1RB	/	/	/	/	/	/
	707.5	10	1RB	24.19	24.4	1.05	0.056	0.06	/
	711	10	1RB	/	/	/	/	/	/
	707.5	10	50%RB	24.12	24.4	1.067	0.045	0.05	/

Note: The test data above was performed on 2024/02/24.

LTE Band 41:

EUT Position	Frequency (MHz)	Bandwidth (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Head Left Cheek	2545	20	1RB	/	/	/	/	/	/
	2595	20	1RB	24.01	24.1	1.021	0.11	0.11	17#
	2620	20	1RB	/	/	/	/	/	/
	2645	20	1RB	/	/	/	/	/	/
	2595	20	50%RB	23.73	24.1	1.089	0.089	0.1	/
Head Left Tilt	2545	20	1RB	/	/	/	/	/	/
	2595	20	1RB	24.01	24.1	1.021	0.092	0.09	/
	2620	20	1RB	/	/	/	/	/	/
	2645	20	1RB	/	/	/	/	/	/
	2595	20	50%RB	23.73	24.1	1.089	0.075	0.08	/
Head Right Cheek	2545	20	1RB	/	/	/	/	/	/
	2595	20	1RB	24.01	24.1	1.021	0.059	0.06	/
	2620	20	1RB	/	/	/	/	/	/
	2645	20	1RB	/	/	/	/	/	/
	2595	20	50%RB	23.73	24.1	1.089	0.058	0.06	/
Head Right Tilt	2545	20	1RB	/	/	/	/	/	/
	2595	20	1RB	24.01	24.1	1.021	0.054	0.06	/
	2620	20	1RB	/	/	/	/	/	/
	2645	20	1RB	/	/	/	/	/	/
	2595	20	50%RB	23.73	24.1	1.089	0.05	0.05	/
Body Front (10mm)	2545	20	1RB	/	/	/	/	/	/
	2595	20	1RB	24.01	24.1	1.021	0.232	0.24	/
	2620	20	1RB	/	/	/	/	/	/
	2645	20	1RB	/	/	/	/	/	/
	2595	20	50%RB	23.73	24.1	1.089	0.185	0.2	/
Body Back (10mm)	2545	20	1RB	/	/	/	/	/	/
	2595	20	1RB	24.01	24.1	1.021	0.361	0.37	/
	2620	20	1RB	/	/	/	/	/	/
	2645	20	1RB	/	/	/	/	/	/
	2595	20	50%RB	23.73	24.1	1.089	0.235	0.26	/
Body Left (10mm)	2545	20	1RB	/	/	/	/	/	/
	2595	20	1RB	24.01	24.1	1.021	0.172	0.18	/
	2620	20	1RB	/	/	/	/	/	/
	2645	20	1RB	/	/	/	/	/	/
	2595	20	50%RB	23.73	24.1	1.089	0.141	0.15	/
Body Bottom (10mm)	2545	20	1RB	/	/	/	/	/	/
	2595	20	1RB	24.01	24.1	1.021	0.39	0.4	18#
	2620	20	1RB	/	/	/	/	/	/
	2645	20	1RB	/	/	/	/	/	/
	2595	20	50%RB	23.73	24.1	1.089	0.315	0.34	/

1. The frequency range of LTE Band 41 is 2535 ~ 2655MHz. Per KDB 447498 D01, according to the following formula Calculate N_c is 4, We chose to test 4 frequency points.

KDB procedures, the following should be applied to determine the number of required test channels. The test channels should be evenly spread across the transmission frequency band of each wireless mode.¹⁴

$$N_c = \text{Round} \left\{ \left[100(f_{\text{high}} - f_{\text{low}}) / f_c \right]^{0.5} \times (f_c / 100)^{0.2} \right\},$$

where

- N_c is the number of test channels, rounded to the nearest integer,
- f_{high} and f_{low} are the highest and lowest channel frequencies within the transmission band,
- f_c is the mid-band channel frequency,
- all frequencies are in MHz.

3. The power class 3 used for LTE Band 41 SAR testing.

Note:

1. When the 1-g SAR is $\leq 0.8 \text{ W/Kg}$, testing for other channels are optional.
2. SAR for LTE band exposure configurations is measured according to the procedures of KDB 941225 D05 SAR for LTE Devices v02.
3. KDB941225D05-SAR for higher order modulation is required only when the highest maximum output power for the configuration in the higher order modulation is $> 0.5 \text{ dB}$ higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is $> 1.45 \text{ W/kg}$
4. KDB941225D05-For QPSK with 100% RB allocation, when the reported SAR measured for the Highest output power channel is $< 1.45 \text{ W/kg}$, tests for the remaining required test channels are optional.
5. KDB941225D05- For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are $\leq 0.8 \text{ W/kg}$.
6. KDB941225D05- Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offset the upper edge, middle and lower edge of each required test channel.
7. KDB941225D05- other channel bandwidths SAR test is required when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is $> 0.5 \text{ dB}$ higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is $> 1.45 \text{ W/kg}$.
8. Worst case SAR for 50% RB allocation is selected to be tested.

WLAN2.4G:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)				
					Scaled Factor	Duty cycle Factor	Meas. SAR	Scaled SAR	Plot
Head Left Cheek	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	10.88	11.6	1.18	1	0.238	0.28	/
	2462	802.11b	/	/	/	/	/	/	/
Head Left Tilt	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	10.88	11.6	1.18	1	0.247	0.29	19#
	2462	802.11b	/	/	/	/	/	/	/
Head Right Cheek	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	10.88	11.6	1.18	1	0.117	0.14	/
	2462	802.11b	/	/	/	/	/	/	/
Head Right Tilt	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	10.88	11.6	1.18	1	0.128	0.15	/
	2462	802.11b	/	/	/	/	/	/	/
Body Front (10mm)	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	10.88	11.6	1.18	1	0.048	0.06	/
	2462	802.11b	/	/	/	/	/	/	/
Body Back (10mm)	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	10.88	11.6	1.18	1	0.081	0.10	20#
	2462	802.11b	/	/	/	/	/	/	/
Body Right (10mm)	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	10.88	11.6	1.18	1	0.04	0.05	/
	2462	802.11b	/	/	/	/	/	/	/
Body Top (10mm)	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	10.88	11.6	1.18	1	0.03	0.04	/
	2462	802.11b	/	/	/	/	/	/	/

Note:

1. When the 1-g SAR is $\leq 0.8\text{W/kg}$, testing for other channels are optional.
2. When SAR or MPE is not measured at the maximum power level allowed for production units, there sults must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
3. KDB 248227 D01-SAR measurement is not required for 2.4 GHz OFDM(802.11g/n) when the highest reported SAR for DSSS(802.11b) is $\leq 1.2\text{ W/kg}$, and the output power for DSSS is not less than that for OFDM.
4. According 2016 Oct. TCB, for SAR testing of 2.4G WIFI 802.11b signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)".

2.4 GHz 802.11g/n OFDM SAR Test Exclusion Requirements

Mode	Output Power(dBm)	Output Power(mW)	Reported SAR(W/kg)	Adjusted SAR(W/kg)	Limit (W/kg)	SAR Test Exclusion
802.11b(DSSS)	11.6	14.5	0.29	/	/	/
802.11g(OFDM)	15.3	33.9	/	0.68	1.2	Yes
802.11n ht20(OFDM)	15.7	37.2	/	0.74	1.2	Yes
802.11n ht40(OFDM)	15.6	36.3	/	0.73	1.2	Yes

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

- When KDB Publication 447498 D01 SAR test exclusion applies to the OFDM configuration.
- When the highest *reported* SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

WLAN5.2G:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)				
					Scaled Factor	Duty cycle	Meas. SAR	Scaled SAR	Plot
Head Left Cheek	5180	802.11a	/	/	/	/	/	/	/
	5200	802.11a	8.61	8.7	1.021	1	0.144	0.15	/
	5240	802.11a	/	/	/	/	/	/	/
Head Left Tilt	5180	802.11a	/	/	/	/	/	/	/
	5200	802.11a	8.61	8.7	1.021	1	0.223	0.23	/
	5240	802.11a	/	/	/	/	/	/	/
Head Right Cheek	5180	802.11a	/	/	/	/	/	/	/
	5200	802.11a	8.61	8.7	1.021	1	0.271	0.28	/
	5240	802.11a	/	/	/	/	/	/	/
Head Right Tilt	5180	802.11a	/	/	/	/	/	/	/
	5200	802.11a	8.61	8.7	1.021	1	0.331	0.34	21#
	5240	802.11a	/	/	/	/	/	/	/
Body Front (10mm)	5180	802.11a	/	/	/	/	/	/	/
	5200	802.11a	8.61	8.7	1.021	1	0.202	0.21	/
	5240	802.11a	/	/	/	/	/	/	/
Body Back (10mm)	5180	802.11a	/	/	/	/	/	/	/
	5200	802.11a	8.61	8.7	1.021	1	0.306	0.31	22#
	5240	802.11a	/	/	/	/	/	/	/
Body Right (10mm)	5180	802.11a	/	/	/	/	/	/	/
	5200	802.11a	8.61	8.7	1.021	1	0.107	0.11	/
	5240	802.11a	/	/	/	/	/	/	/
Body Top (10mm)	5180	802.11a	/	/	/	/	/	/	/
	5200	802.11a	8.61	8.7	1.021	1	0.247	0.25	/
	5240	802.11a	/	/	/	/	/	/	/

Note:

1. When the 1-g SAR is $\leq 0.8\text{W/kg}$, testing for other channels are optional.
2. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
3. For 802.11a mode power is the largest among 802.11a/ac20/ac40/ac80, 802.11 a mode as initial test configuration is selected to test.
4. According 2016 Oct. TCB, for SAR testing of 5G WIFI 802.11a signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)".

WLAN5.8G:

EUT Position	Frequency (MHz)	Test Mode	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/kg)				
					Scaled Factor	Duty cycle	Meas. SAR	Scaled SAR	Plot
Head Left Cheek	5745	802.11a	/	/	/	/	/	/	/
	5785	802.11a	8.67	9	1.079	1	0.16	0.17	/
	5825	802.11a	/	/	/	/	/	/	/
Head Left Tilt	5745	802.11a	/	/	/	/	/	/	/
	5785	802.11a	8.67	9	1.079	1	0.202	0.22	23#
	5825	802.11a	/	/	/	/	/	/	/
Head Right Cheek	5745	802.11a	/	/	/	/	/	/	/
	5785	802.11a	8.67	9	1.079	1	0.134	0.14	/
	5825	802.11a	/	/	/	/	/	/	/
Head Right Tilt	5745	802.11a	/	/	/	/	/	/	/
	5785	802.11a	8.67	9	1.079	1	0.165	0.18	/
	5825	802.11a	/	/	/	/	/	/	/
Body Front (10mm)	5745	802.11a	/	/	/	/	/	/	/
	5785	802.11a	8.67	9	1.079	1	0.059	0.06	/
	5825	802.11a	/	/	/	/	/	/	/
Body Back (10mm)	5745	802.11a	/	/	/	/	/	/	/
	5785	802.11a	8.67	9	1.079	1	0.084	0.09	/
	5825	802.11a	/	/	/	/	/	/	/
Body Right (10mm)	5745	802.11a	/	/	/	/	/	/	/
	5785	802.11a	8.67	9	1.079	1	0.06	0.06	/
	5825	802.11a	/	/	/	/	/	/	/
Body Top (10mm)	5745	802.11a	/	/	/	/	/	/	/
	5785	802.11a	8.67	9	1.079	1	0.138	0.15	24#
	5825	802.11a	/	/	/	/	/	/	/

Note:

1. When the 1-g SAR is $\leq 0.8\text{W/kg}$, testing for other channels are optional.
2. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
3. For 802.11a mode power is the largest among 802.11a/ac20/ac40/ac80, 802.11 a mode as initial test configuration is selected to test.
4. According 2016 Oct. TCB, for SAR testing of 5G WIFI 802.11a signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)".

8 SAR Measurement Variability

In accordance with published RF Exposure KDB procedure 865664 D01 SAR measurement 100 MHz to 6 GHz v01. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results

- 1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg ($\sim 10\%$ from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .

Note: The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.

The Highest Measured SAR Configuration in Each Frequency Band

SAR Probe Calibration Point	Frequency Band	Freq.(MHz)	Test Position	Meas. SAR(W/kg)		Largest to Smallest SAR Ratio
				Original	Repeated	
1900MHz	WCDMA Band 2	1907.6	Head Right Cheek	1.03	0.996	1.03
2600MHz	LTE Band 7	2535	Body Back	0.862	0.857	1.01

Note:

1. Second Repeated Measurement is not required since the ratio of the largest to smallest SAR for the original and first repeated measurement is not > 1.20 .
2. The measured SAR results do not have to be scaled to the maximum tune-up tolerance to determine if repeated measurements are required.
3. SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements.

9 Simultaneous Transmission Description

9.1 Simultaneous Transmission

Description of Simultaneous Transmit Capabilities		
Transmitter Combination	Simultaneous?	Hotspot?
WWAN Main(GSM/WCDMA/LTE) + WLAN 2.4G/5G+NFC	√	√
WWAN AUX(GSM/WCDMA/LTE) + WLAN 2.4G/5G+NFC	√	√
WWAN Main(GSM/WCDMA/LTE) + Bluetooth+ NFC	√	×
WWAN AUX(GSM/WCDMA/LTE) + Bluetooth+ NFC	√	×
WWAN Main(GSM/WCDMA/LTE) + WWAN AUX(GSM/WCDMA/LTE)	×	×
WLAN 2.4G/5G + Bluetooth	×	×

9.2 Simultaneous SAR test exclusion considerations:

Mode(SAR1+SAR2)	Position	Reported SAR(W/kg)		ΣSAR < 1.6w/kg
		SAR1	SAR2	
WWAN(GSM/WCDMA/LTE) + Bluetooth	Head	1.08	0.19	1.27
	Body	0.91	0.09	1.00
WWAN(GSM/WCDMA/LTE) + 2.4G WLAN	Head	1.08	0.29	1.37
	Body	0.91	0.10	1.01
WWAN(GSM/WCDMA/LTE) + 5G WLAN	Head	1.08	0.34	1.42
	Body	0.91	0.31	1.22
WWAN(Hotspot)+ 2.4G WLAN	Body	0.91	0.10	1.01
WWAN(Hotspot)+ 5G WLAN	Body	0.91	0.31	1.22

Note:

For the EIRP of NFC is 0.0013mW, per KDB447498 D01 clause 4.3, the estimated SAR is so lower, so the NFC almost have no influence on the results of simultaneous transmission.

Conclusion:

Sum of SAR: **ΣSAR ≤ 1.6 W/kg**, therefore simultaneous transmission SAR with Volume Scans is **not required**.

10 SAR Plots

Please refer to the attachment (SAR Plots_A).

Appendix A Measurement Uncertainty

The uncertainty budget has been determined for the measurement system and is given in the following Table.

Measurement uncertainty evaluation for IEC62209-1 SAR test

Source of uncertainty	Tolerance/ uncertainty ± %	Probability distribution	Divisor	ci (1 g)	ci (10 g)	Standard uncertainty ± %, (1 g)	Standard uncertainty ± %, (10 g)
Measurement system							
Probe calibration	6.0	N	1	1	1	6.0	6.0
Axial Isotropy	1.5	R	$\sqrt{3}$	1	1	0.9	0.9
Hemispherical Isotropy	9.4	R	$\sqrt{3}$	0	0	0.0	0.0
Boundary effect	1.2	R	$\sqrt{3}$	1	1	0.7	0.7
Linearity	0.9	R	$\sqrt{3}$	1	1	0.5	0.5
Detection limits	1.1	R	$\sqrt{3}$	1	1	0.6	0.6
Readout electronics	0.5	N	1	1	1	0.5	0.5
Response time	0	R	$\sqrt{3}$	1	1	0.0	0.0
Integration time	0	R	$\sqrt{3}$	1	1	0.0	0.0
RF ambient conditions – noise	1.1	R	$\sqrt{3}$	1	1	0.6	0.6
RF ambient conditions–reflections	1.2	R	$\sqrt{3}$	1	1	0.7	0.7
Probe positioner mech. Restrictions	0.9	R	$\sqrt{3}$	1	1	0.5	0.5
Probe positioning with respect to phantom shell	6.9	R	$\sqrt{3}$	1	1	4.0	4.0
Post-processing	2.1	R	$\sqrt{3}$	1	1	1.2	1.2
Test sample related							
Test sample positioning	2.2	N	1	1	1	2.2	2.2
Device holder uncertainty	6.1	N	1	1	1	6.1	6.1
Drift of output power	5.3	R	$\sqrt{3}$	1	1	3.1	3.1
Power scaling	3.98	R	$\sqrt{3}$	1	1	2.3	2.3
Phantom and set-up							
Phantom uncertainty (shape and thickness tolerances)	4.1	R	$\sqrt{3}$	1	1	2.4	2.4
Liquid conductivity target)	4.1	R	$\sqrt{3}$	0.64	0.43	1.5	1.0
Liquid conductivity meas.)	3	N	1	0.64	0.43	1.9	1.3
Liquid permittivity target)	4.3	R	$\sqrt{3}$	0.6	0.49	1.5	1.2
Liquid permittivity meas.)	2.9	N	1	0.6	0.49	1.7	1.4
Combined standard uncertainty		RSS				11.4	11.2
Expanded uncertainty 95 % confidence interval)						22.8	22.4

Measurement uncertainty evaluation for IEC62209-2 SAR test

Source of uncertainty	Tolerance/ uncertainty ± %	Probability distribution	Divisor	ci (1 g)	ci (10 g)	Standard uncertainty ± %, (1 g)	Standard uncertainty ± %, (10 g)
Measurement system							
Probe calibration	6.0	N	1	1	1	6.0	6.0
Axial Isotropy	1.5	R	$\sqrt{3}$	1	1	0.9	0.9
Hemispherical Isotropy	9.4	R	$\sqrt{3}$	0	0	0.0	0.0
Linearity	0.9	R	$\sqrt{3}$	1	1	0.5	0.5
Modulation Response	0	R	$\sqrt{3}$	1	1	0.0	0.0
Detection limits	1.1	R	$\sqrt{3}$	1	1	0.6	0.6
Boundary effect	1.2	R	$\sqrt{3}$	1	1	0.7	0.7
Readout electronics	0.5	N	1	1	1	0.5	0.5
Response time	0	R	$\sqrt{3}$	1	1	0.0	0.0
Integration time	0	R	$\sqrt{3}$	1	1	0.0	0.0
RF ambient conditions – noise	1.1	R	$\sqrt{3}$	1	1	0.6	0.6
RF ambient conditions–reflections	1.2	R	$\sqrt{3}$	1	1	0.7	0.7
Probe positioner mech. Restrictions	0.9	R	$\sqrt{3}$	1	1	0.5	0.5
Probe positioning with respect to phantom shell	6.9	R	$\sqrt{3}$	1	1	4.0	4.0
Post-processing	2.1	R	$\sqrt{3}$	1	1	1.2	1.2
Probe calibration							
Device holder Uncertainty	6.1	N	1	1	1	6.1	6.1
Test sample positioning	2.2	N	1	1	1	2.2	2.2
Power scaling	3.98	R	$\sqrt{3}$	1	1	2.3	2.3
Drift of output power	5.3	R	$\sqrt{3}$	1	1	3.1	3.1
Phantom and set-up							
Phantom uncertainty (shape and thickness tolerances)	4.1	R	$\sqrt{3}$	1	1	2.4	2.4
Algorithm for correcting SAR for deviations in permittivity and conductivity	2.3	N	1	1	0.84	2.3	1.9
Liquid conductivity (meas.)	2.7	N	1	0.64	0.43	1.7	1.2
Liquid permittivity (meas.)	2.9	N	1	0.6	0.49	1.7	1.4
Temp. unc. - Conductivity	1.5	R	$\sqrt{3}$	0.78	0.71	0.7	0.6
Temp. unc. - Permittivity	0.6	R	$\sqrt{3}$	0.23	0.26	0.1	0.1
Combined standard uncertainty		RSS				11.5	11.3
Expanded uncertainty 95 % confidence interval)						23.0	22.6

Appendix B Test Setup Photos

Please refer to the attachment (SAR EUT Test Position Photos_A).

Appendix C Probe Calibration Certificates

Please refer to the attachment (Appendix C Probe Calibration Certificates).

Appendix D Dipole Calibration Certificates

Please refer to the attachment (Appendix D Dipole Calibration Certificates).

---End of Report---