FCC SAR REPORT

Applicant: Todos Industrial Limited

Address of Applicant: Room 308, building A3, Fuhai information port, Fuhai street, Bao'an District, Shenzhen City, Guangdong Province, 518000

Equipment Under Test (EUT)

Product Name: Tablet PC

Model No.: Tab64, Tab 64, Tab7ii, Tab8ii, Tab10ii, TabX1, TabX2, TabX3,TabX4, TabXX (X can be “0” to "9", "a" to"z"), TabAI1, Tab1066,TabN1, TabN2, TabN3, TabN4

Trade mark: Aprix, Geex, Hiup, None, Quadrant

FCC ID: 2AZQ6-AP64

Applicable standards: FCC 47 CFR Part 2.1093

Date of Test: 05Sep., 2021~12 Sep., 2021

Test Result: Maximum Reported 1-g SAR (W/kg)
Body: 0.748

Authorized Signature:

Bruce Zhang
Laboratory Manager

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

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2 Version

Version No.	Date	Description
00	*24 Sep., 2021*	*Original*

Tested by:	Vieta Zhang	***Date:***	*24 Sep., 2021*
	Test Engineer		
Reviewed by:	Wiby Zhang	***Date:***	*24 Sep., 2021*
	Project Engineer		

3 Contents

4 SAR Results Summary

The maximum results of Specific Absorption Rate (SAR) found during test as bellows:

<Highest Reported standalone SAR Summary>

Exposure Position	Frequency Band	Reported 1-g SAR (W/kg)	Equipment Class	Highest Reported 1-g SAR (W/kg)
Body (0 mm Gap)	GSM 850	0.737	PCB	0.748
	GSM 1900	0.675		
	WCDMA Band V	0.565		
	WCDMA Band II	0.680		
	LTE Band 2	0.748		
	LTE Band 4	0.359		
	LTE Band 7	0.568		
	WLAN 2.4GHz	0.533	DTS	
	WLAN 5.2GHz	0.139	NII	

<Highest Reportedsimultaneous SAR Summary>

Exposure Position	Frequency Band	Reported 1-g SAR (W/kg)	Equipment Class	Highest ReportedSimultaneous Transmission 1-g SAR (W/kg)
Back	LTE Band 2	0.748	PCB	1.281
	WLAN 2.4GHz	0.533	DTS	

Note:

1. The highest simultaneous transmission is scalar summation of Reported standalone SAR per FCCKDB 690783 D01 v01r03, and scalar SAR summation of all possible simultaneous transmission scenarios are< 1.6W/kg.
2. This device is compliance with Specific Absorption Rate (SAR) for general population/uncontrolledexposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-2005, and hadbeen tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013.

5 General Information

5.1 Client Information

Applicant:	Todos Industrial Limited
Address:	Room 308, building A3, Fuhai information port, Fuhai street, Bao'an District, Shenzhen City, Guangdong Province, 518000
Manufacturer:	Todos Industrial Limited
Address:	Room 308, building A3, Fuhai information port, Fuhai street, Bao'an District, Shenzhen City, Guangdong Province, 518000

5.2 General Description of EUT

Product Name:	Tablet PC			
Model No.:	Tab64, Tab 64, Tab7ii, Tab8ii, Tab10ii, TabX1, TabX2, TabX3,TabX4, TabXX (X can be “0” to "9", "a" to"z"), TabAI1, Tab1066,TabN1, TabN2, TabN3, TabN4			
Category of device	Portable device			
Operation Frequency:	2G :	GSM850: 824.2~848.8 MHz	PCS 1900: 1850.2~1909.8 MHz	
	3G :	Band II: 1852.4~1907.6 MHz	Band V: 826.4~846.6 MHz	
	4G :	Band 2 :1850MHz~1910MHz	Band 4 :1710MHz~1755MHz	
		Band 7: 2500MHz~2570MHz		
	Wi-Fi:	2412MHz~2462MHz	5150MHz-5250MHz	
	Bluetooth: 2402 MHz ~ 2480 MHz			
Modulation technology:	2G:	☒Voice(GMSK)	☒GPRS(GMSK)	
	3G:	☒RCM(QPSK)	☒HSUPA(QPSK)	☒HSDPA(QPSK,16QAM)
	4G:	☒QPSK	☒16QAM	☒64QAM
	Wi-Fi:	☒802.11b(DSSS)	☒802.11a/g/n/ac (OFDM)	
	Bluetooth:	☒BDR(GFSK)	☒EDR(π/4-DQPSK, 8DPSK)	☒LE(GFSK)
Antenna Type:	Internal Antenna			
Antenna Gain:	GSM850: 0.16 dBi; PCS1900: 0.35dBi WCDMA Band V: 0.16 dBi ;WCDMA Band II: 0.36 dBi; LTE Band 2: 0.14dBi; LTE Band 4: 0.13 dBi;LTE Band 7: 0.13 dBi Bluetooth: 0.10dBi; 2.4G Wi-Fi: 0.15dBi; ; 5.2G Wi-Fi: 0.15dBi			
(E)GPRS Class:	(E)GPRS Class: 12			
Dimensions (L*W*H):	251mm (L)× 173mm (W)× 11mm (H)			
Accessories information:	Adapter: Model: EE-0502000UZ Input:100-240V AC,50/60Hz 0.5A Output:5.0V DC 2000mA	Battery: Rechargeable Li-ion Battery 3.8V/6000mAh		
		Headset: Support headset		
Remark:	Model No.: Tab64, Tab 64, Tab7ii, Tab8ii, Tab10ii, TabX1, TabX2, TabX3, TabX4, TabXX (X can be “0” to "9", "a" to"z"), TabAI1, Tab1066, TabN1, TabN2, TabN3, TabN4 were identical inside, the electrical circuit design, layout, components used and internal wiring, with only difference being model name.			

5.3 Maximum RF Output Power

Mode	Average Power (dBm)	
	GSM 850	GSM 1900
GSM (Voice)	33.73	30.24
GPRS (1 TX Slot)	33.72	30.22
GPRS (2 TX Slots)	33.11	29.67
GPRS (3 TX Slots)	31.36	27.99
GPRS (4 TX Slots)	30.08	26.79

Mode	Average Power (dBm)	
	WCDMA Band V	WCDMA Band II
AMR 12.2 kbps	22.93	24.15
RMC 12.2 kbps	23.02	24.18
HSDPA Sub-test 1	22.06	23.27
HSDPA Sub-test 2	21.59	22.85
HSDPA Sub-test 3	21.49	22.72
HSDPA Sub-test 4	21.48	22.68
HSUPA Sub-test 1	19.97	21.26
HSUPA Sub-test 2	20.51	21.75
HSUPA Sub-test 3	20.98	22.26
HSUPA Sub-test 4	20.02	21.28
HSUPA Sub-test 5	21.99	23.28

Mode	Average Power (dBm)		
	LTE Band 2	LTE Band 4	LTE Band 7
BW/1.4 MHz	23.73	24.38	/
BW/3.0 MHz	23.66	24.08	/
BW/5.0 MHz	23.73	24.14	23.99
BW/10 MHz	23.72	24.18	23.92
BW/15 MHz	23.72	24.12	24.27
BW/20 MHz	23.95	24.24	23.97

WLAN 2.4 GHz Band Average Power (dBm)				
Mode/Band	b	g	n (HT-20)	n (HT-40)
WLAN 2.4GHz	16.79	14.02	14.12	15.89

WLAN 5.2 GHz Band Average Power (dBm)						
Mode/Band	a	ac20	ac40	ac80	n20	n40
WLAN 5.2GHz	10.81	10.37	12.73	10.71	10.75	12.77

Bluetooth Average Power (dBm)				
Mode/Band	1 Mbps(GFSK)	2 Mbps(π/4DQPSK)	3 Mbps (8DPSK)	LE (BT 4.0)
Bluetooth 2.4 GHz	5.391	5.128	5.502	6.374

5.4 Environment of Test Site

Temperature:	18°C ~25°C
Humidity:	35%~75% RH
Atmospheric Pressure:	1010 mbar

5.5 Test Sample Plan

Sample Number	Used for Test Items
8#	SAR
***Remark**: JianYan Testing Group Shenzhen Co., Ltd. is only responsible for the test project data of the above samples, and will keep the above samples for a month.*	

5.6 Test Location

JianYan Testing Group Shenzhen Co., Ltd.
No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.
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6 Introduction

6.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SARdistribution in a biological body is complicated and is usually carried out by experimental techniques or numericalmodeling. The standard recommends limits for two tiers of groups, occupational/controlled and generalpopulation/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. Ingeneral, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

6.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) anincremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is asbelow:

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

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

SAR measurement can be either related to the temperature elevation in tissue by

$$SAR = C\left(\frac{\delta T}{\delta t}\right)$$

Where: C is the specific heat capacity, δT is the temperature rise and δt is the exposure duration, or related to theelectrical field in the tissue by

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

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

7 RF Exposure Limits

7.1 Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individualswho have no knowledge or control of their exposure. The general population/uncontrolled exposure limitsare applicable to situations in which the general public may be exposed or in which persons who areexposed as a consequence of their employment may not be made fully aware of the potential forexposure or cannot exercise control over their exposure. Members of the general public would comeunder this category when exposure is not employment-related; for example, in the case of a wirelesstransmitter that exposes persons in its vicinity.

7.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurredby persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). Ingeneral, occupational/controlled exposure limits are applicable to situations in which persons are exposedas a consequence of their employment, who have been made fully aware of the potential for exposureand can exercise control over their exposure. This exposure category is also applicable when theexposure is of a transient nature due to incidental passage through a location where the exposure levelsmay be higher than the general population/uncontrolled limits, but the exposed person is fully aware ofthe potential for exposure and can exercise control over his or her exposure by leaving the area or bysome other appropriate means.

7.3 RF Exposure Limits

SAR Human Exposure Specified in ANSI/IEEE C95.1-1992 and Health Canada Safety Code 6

HUMAN EXPOSURE LIMITS		
	UNCONTROLLED ENVIRONMENT *General Population* (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT *Occupational* (W/kg) or (mW/g)
SPATIAL PEAK SAR Brain	1.6	8.0
SPATIAL AVERAGE SAR Whole Body	0.08	0.4
SPATIAL PEAK SAR Hands, Feet, Ankles, Wrists	4.0	20

Note:

1. The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube)and over the appropriate averaging time.
2. The Spatial Average value of the SAR averaged over the whole body.
3. The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of acube) and over the appropriate averaging time.

8 SAR Measurement System

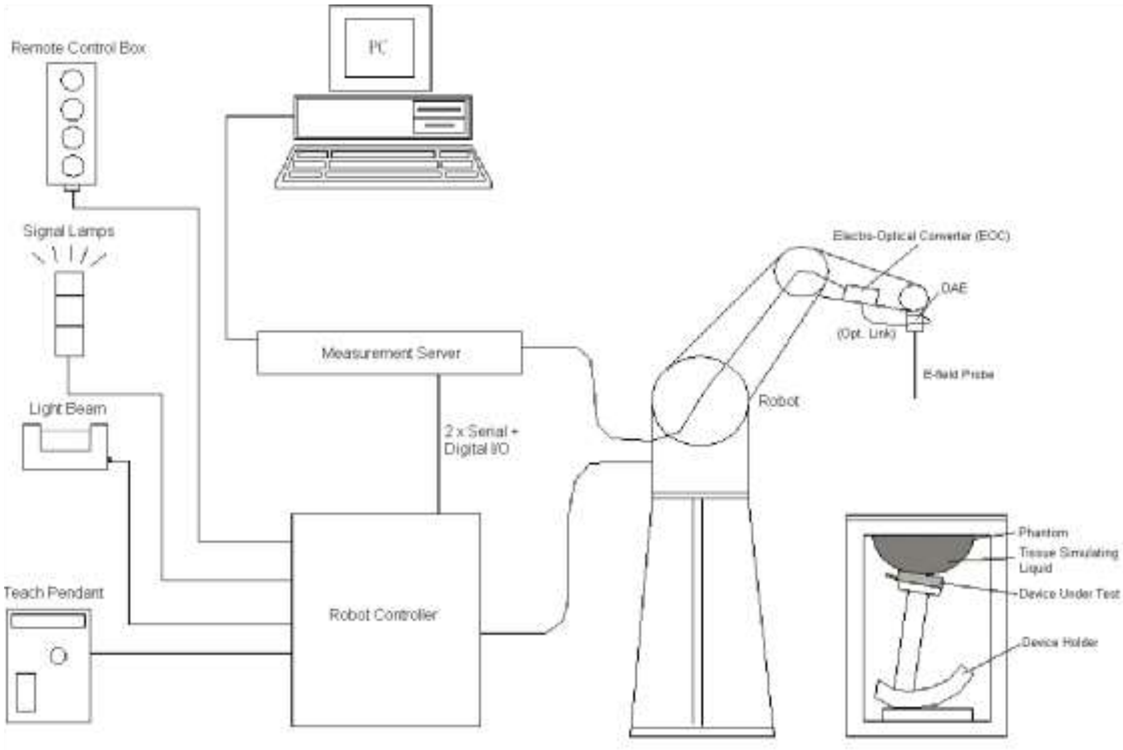


Fig.8.1 SPEAG DASY System Configurations

The DASY system for performance compliance tests is illustrated above graphically. This system consists of thefollowing items:

- A standard high precision 6-axis robot with controller, a teach pendant and software
- A data acquisition electronic (DAE) attached to the robot arm extension
- A dosimetric probe equipped with an optical surface detector system
- The electro-optical converter (EOC) performs the conversion between optical and electrical signals
- A measurement server performs the time critical tasks such as signal filtering, control of the robot operationand fast movement interrupts.
- A probe alignment unit which improves the accuracy of the probe positioning
- A computer operating Windows XP
- DASY software
- Remove control with teach pendant and additional circuitry for robot safety such as warming lamps, etc.
- The SAM twin phantom
- A device holder
- Tissue simulating liquid
- Dipole for evaluating the proper functioning of the system

Component details are described in the following sub-sections.

8.1 E-Field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by SPEAG). The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. This probe has a built in optical surface detection system to prevent from collision with phantom.

- **E-Field Probe Specification**
  <EX3DV4 Probe>

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Frequency **Directivity**	10MHz to 6 GHz; Linearity: ± 0.2 dB ± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 µW/g to 100 mW/g; Linearity: ± 0.2 dB (noise: typically < 1 µW/g)
Dimensions	Overall length: 330 mm (Tip: 20mm) Tip diameter: 2.5 mm (Body: 12mm) Typical distance from probe tip to dipole centers: 1 mm

Fig.8.2 Photo of E-Field Probe

- **E-Field Probe Calibration**
  Each probe needs to be calibrated according to a dosimetric assessment procedure with accuracy better than ±10%. The spherical isotropy shall be evaluated and within ±0.25 dB. The sensitivity parameters (Norm X, Norm Y and Norm Z), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested. The calibration data can be referred to appendix E of this report.

8.2 Data Acquisition Electronics (DAE)

The Data acquisition electronics (DAE) consists 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 and 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 input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Fig. 8.3 Photo of DAE

8.3 Robot

The SPEAG DASY system uses the high precision robots (DASY5: TX60L) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY5: CS8c) from Stäubliis used. The Stäublirobot series have many features that are important for our application:

- High precision (repeatability 0.02 mm)
- High reliability (industrial design)
- Low maintenance costs (virtually maintenance free due to direct drive gears; nobelt drives)
- Jerk-free straight movements
- Low ELF interference (motor control fields shielded via the closed metallic constructionshields)

Fig. 8.4 Photo of Robot

8.4 Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY 5: 400MHz, Intel Celeron), chip-disk (DASY5: 128 MB), RAM (DASY5: 128 MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O board, which is directly connected to the PC/104 bus of the CPU board.
The measurement server performs all the real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operations.

Fig. 8.5 Photo of Server for DASY5

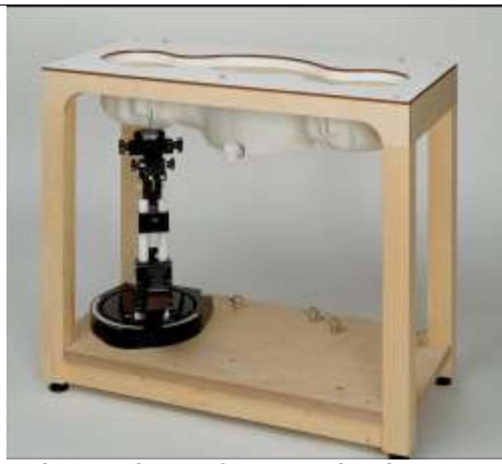
8.5 Light Beam Unit

The light beam switch allows automatic "tooling" of the probe. During the process, the actualposition of the probe tip with respect to the robot arm is measured, as well as the probe lengthand the horizontal probe offset. The software then corrects all movements, such that the robotcoordinates are valid for the probe tip.
The repeatability of this process is better than0.1 mm. If a position has been taught with analigned probe, the same position will be reachedwith another aligned probe within 0.1 mm, even ifthe other probe has different dimensions. Duringprobe rotations, the probe tip will keep its actualposition.

Fig. 8.6 Photo of Light Beam

8.6 Phantom

<SAM Twin Phantom>

Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm	
Filling Volume Dimensions	Approx. 25 liters Length: 1000mm; Width: 500mm; Height: adjustable feet	
Measurement Areas	Left Head, Right Head, Flat phantom	**Fig. 8.7Photo of SAM Twin Phantom**

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

<ELI4 Phantom>

The ELI4 phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30MHz to 6 GHz. ELI4 is fully compatible with the latest draft of the standard IEC 62209-2 and all known tissue simulating liquids.
ELI4 has been optimized regarding its performance and can be integrated into a SPEAG standard phantom table. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points
The phantom can be used with the following tissue simulating liquids:

- Water-sugar based liquids can be left permanently in the phantom. Always cover the liquid if the system is not in use; otherwise the parameters will change due to water evaporation.
- DGBE based liquids should be used with care. As DGBE is a softener for most plastics, the liquid should be taken out of the phantom and the phantom should be dried when the system is not in use (desirable at least once a week).
- Do not use other organic solvents without previously testing the phantom resistiveness

Fig.8.8 Photo of ELI4 Phantom

8.7 Device Holder

<Device Holder for SAM Twin Phantom>

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5 mm distance, a positioning uncertainty of ± 0.5 mm would produce a SAR uncertainty of ± 20 %. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.
The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (ERP).
Thus the device needs no repositioning when changing the angles.
The DASY device holder is constructed of low-low POM material having the following dielectric parameters: relative permittivity ε = 3 and loss tangent δ = 0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

Fig. 8.9 Photo of Device Holder

8.8 Data storage and Evaluation

➢ **Data Storage**

The DASY software stores the assessed data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all the necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files. The post-processing software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verifications of the complete software setup even after the measurement and allows correction of erroneous parameter settings. For example, if a measurement has been performed with an incorrect crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be reevaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type (e.g., [V/m], [mW/g]). Some of these units are not available in certain situations or give meaningless results, e.g., a SAR-output in a non-lose media, will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

➢ **Data Evaluation**

The DASY post-processing software (SEMCAD) automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe Parameters:	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion	$ConvF_i$
	- Diode compression point	dcp_i
Device Parameters:	- Frequency	f
	- Crest	cf
Media Parameters:	- Conductivity	σ
	- Density	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multi-meter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power.

The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

WithV_i = compensated signal of channel i, (i = x, y, z)
U_i= input signal of channel i, (i = x, y, z)
cf = crest factor of exciting field (DASY parameter)
dcp^i= diode compression point (DASY parameter)
From the compensated input signals, the primary field data for each channel can be evaluated:

E- Field Probes: $E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$

H-Field Probes: $H_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1} f + a_{i2} f^2}{f}$

WithV_i = compensated signal of channel i, (i = x, y, z)
$Norm_i$= senor sensitivity of channel i, (i = x, y, z), µV/ (V/m)^2
ConvF = sensitivity enhancement in solution
a_{ij}= sensor sensitivity factors for H-field probes
f = carrier frequency (GHz)
E_i = electric field strength of channel i in V/m
Hi = magnetic field strength of channel i in A/m
The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

The primary field data are used to calculate the derived field units.

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1000}$$

With SAR = local specific absorption rate in mW/g
E_{tot}= total field strength in V/m
σ = conductivity in (mho/m) or (Siemens/m)
ρ= equipment tissue density in g/cm^3
Note that the density is set to 1, to account for actual head tissue density rather than the density of the tissue simulating liquid.

8.9 Test Equipment List

Manufacturer	Equipment Description	Model	Management Number	Cal. Information	
				Last Cal.	Due Date
SPEAG	835MHz System Validation Kit	D835V2	WXJ023-1	06.11.2019	06.10.2022
SPEAG	1750MHz System Validation Kit	D1750V2	WXJ023-6	02.10.2021	02.09.2024
SPEAG	1900MHz System Validation Kit	D1900V2	WXJ023-2	06.11.2019	06.10.2022
SPEAG	2450MHz System Validation Kit	D2450V2	WXJ023-3	06.10.2019	06.09.2022
SPEAG	2600MHz System Validation Kit	D2600V2	WXJ023-4	11.05.2018	11.04.2021
SPEAG	5GHz System Validation Kit	D5GHzV2	WXJ023-14	02.05.2021	02.04.2024
SPEAG	Data Acquisition Electronics	DAE4	WXJ021-1	05.26.2021	05.25.2022
SPEAG	Dosimetric E-Field Probe	EX3DV4	WXJ022	09.23.2020	09.22.2021
SPEAG	DASY 52 Measurement Software	DASY 52	Version 52.10.4.1527	N.C.R	N.C.R
SPEAG	DASY 52 File ConversionSoftware	SEMCAD X	Version 14.6.14 (7483)	N.C.R	N.C.R
SPEAG	Phantom	Twin Phantom	WXG008-3	N.C.R	N.C.R
SPEAG	Phantom	ELI V5.0	WXG008-4	N.C.R	N.C.R
SPEAG	Phone Positioner	N/A	WXG008-5	N.C.R	N.C.R
Stäubli	Robot	TX60L	WXG008-2	N.C.R	N.C.R
Anritsu	Universal Radio CommunicationAnalyzer	MT8820C	WXJ008-5	03.03.2021	03.02.2022
R&S	Universal Radio Communication Tester	CMU200	WXJ008-2	06.18.2020	06.17.2022
HP	Network Analyzer	8753D	WXJ024	06.18.2020	06.17.2022
KEYSIGHT	EPM Series Power Meter	N1914A	WXJ075	08.29.2021	08.28.2022
KEYSIGHT	E-Series Power Sensor	E9300H	WXJ075-1	08.29.2021	08.28.2022
KEYSIGHT	E-Series Power Sensor	E9300H	WXJ075-2	08.29.2021	08.28.2022
KEYSIGHT	Signal Generator	N5173B	WXJ006-7	03.25.2021	03.24.2022
Huber Suhner	RF Cable	SUCOFLEX	WXG008-13	See Note 3	
Huber Suhner	RF Cable	SUCOFLEX	WXG008-14	See Note 3	
Huber Suhner	RF Cable	SUCOFLEX	WXG008-15	See Note 3	
Weinschel	Attenuator	23-3-34	WXG008-16	See Note 3	
Anritsu	Directional Coupler	MP654A	WXG008-17	See Note 3	
SPEAG	Dielectric Assessment Kit	3.5 Probe	WXG008-7	See Note 4	
SPEAG	DAK Measurement Software	DAK	Version: DAK 3.5	N.C.R	
TXC	Broadband Amplifier	BBA018000	WXG008-11	See Note 5	

Note:

1. The calibration certificate of DASY can be referred to appendix C of this report.
2. Referring to KDB 865664 D01v01r04, the dipole calibration interval can be extended to 3 years with justification. Thedipoles are also not physically damaged, or repaired during the interval.
3. The Insertion Loss calibration of Dual Directional Coupler and Attenuator were characterized via the networkanalyzer and compensated during system check.
4. The dielectric probe kit was calibrated via the network analyzer, with the specified procedure (calibrated in purewater) and calibration kit (standard) short circuit, before the dielectric measurement. The specific procedure andcalibration kit are provided by Speag.
5. In system check we need to monitor the level on the power meter, and adjust the power amplifier level to haveprecise power level to the dipole; the measured SAR will be normalized to 1W input power according to the ratio of1W to the input power to the dipole. For system check, the calibration of the power amplifier is deemed not criticallyrequired for correct measurement; the power meter is critical and we do have calibration for it
6. Attenuator insertion loss is calibrated by the network Analyzer, which the calibration is valid, before systemcheck.
7. N.C.R means No Calibration Requirement.

9 Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For body SAR testing, the liquid height from the center of the flat phantom to liquid top surface is larger than 15 cm, which is shown in Fig. 9.1.

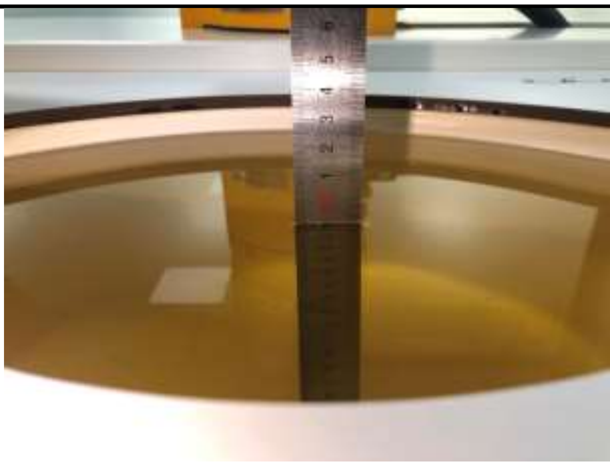


Fig. 9.1 Photo of Liquid Height for Body SAR (700MHz~1000MHz)(depth>15cm)

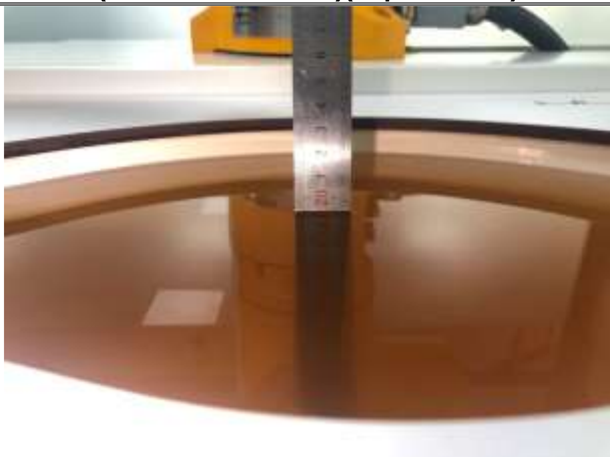


Fig. 9.2 Photo of Liquid Height for Body SAR (1700MHz~2000MHz) (depth>15cm)

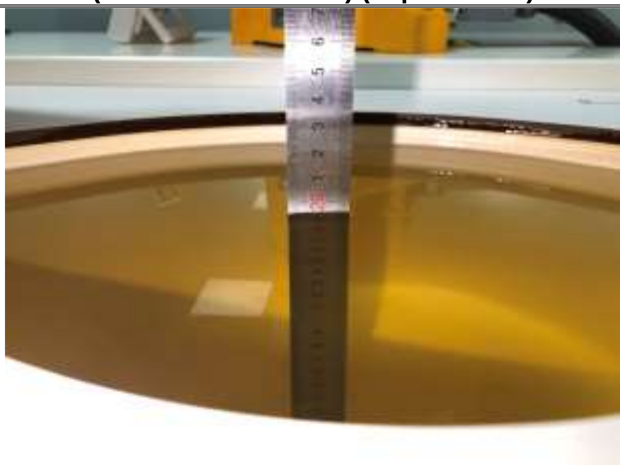


Fig. 9.3 Photo of Liquid Height for Body SAR (2000MHz~2600MHz)(depth>15cm)

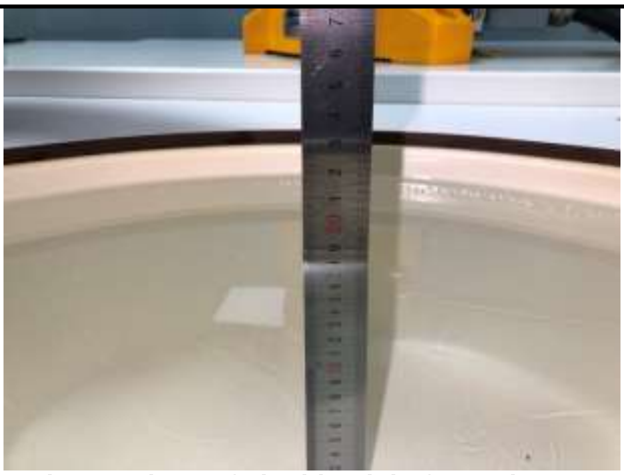


Fig. 9.4 Photo of Liquid Height for Body SAR (5200MHz~5800MHz) (depth>15cm)

The relative permittivity and conductivity of the tissue material should be within±5% of the values given in the table below recommended by the FCC OET 65supplement C and RSS 102 Issue 5.

Target Frequency (MHz)	εr	σ(S/m)
150	52.3	0.76
300	45.3	0.87
450	43.5	0.87
835	41.5	0.90
900	41.5	0.97
915	41.5	0.98
1450	40.5	1.20
1610	40.3	1.29
1800-2000	40.0	1.40
2450	39.2	1.80
3000	38.5	2.40
5800	35.3	5.27

(εr = relative permittivity, σ = conductivity and ρ = 1000 kg/m^3)

The dielectric parameters of liquids were verified prior to the SAR evaluation using a SpeagDielectric Probe Kit and an Agilent Network Analyzer.
The following table shows the measuring results for simulating liquid.

Frequency (MHz)	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (εr)	Conductivity Target(σ)	Permittivity Target(εr)	Delta (σ)%	Delta (εr)%	Limit (%)	Date (mm/dd/yy)
835	22.6	0.92	41.93	0.90	41.5	2.22	1.04	±5	09.07.2021
1750	22.7	1.35	41.07	1.37	40.1	-1.46	2.42	±5	09.05.2021
1900	22.8	1.41	39.14	1.40	40.0	0.71	-2.15	±5	09.05.2021
2450	22.7	1.86	40.04	1.80	39.2	3.33	2.14	±5	09.11.2021
2600	22.3	2.01	39.69	1.96	39.0	2.55	1.77	±5	09.11.2021
5200	23.1	4.77	36.78	4.67	35.96	-2.36	-0.14	±5	09.12.2021

10 SAR System Verification

Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

- **Purpose of System Performance check**

  The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

- **System Setup**

  In the simplified setup for system evaluation, the EUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:

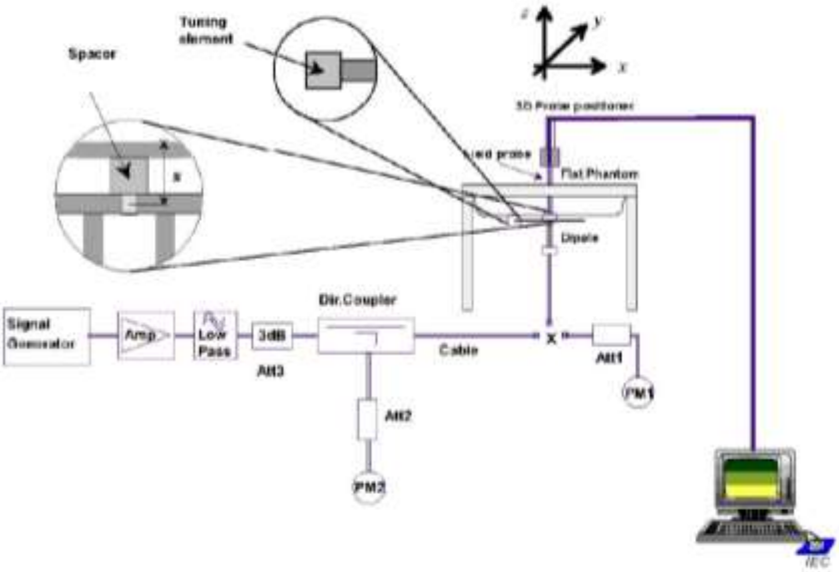


Fig.10.1 System Verification Setup Diagram

Fig.10.2 Photo of Dipole setup

- **System Verification Results**

  Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10%. The table as below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix C of this report.

Date (mm/dd/yy)	Frequency (MHz)	Power fed onto dipole (mW)	Measured 1g SAR (W/kg)	Normalized to1W 1g SAR (W/kg)	1W Target 1g SAR (W/kg)	Deviation (%)
09.07.2021	835	80	0.780	9.75	9.49	2.74
09.05.2021	1750	40	1.390	34.75	36.4	-4.53
09.05.2021	1900	40	1.520	38.00	39.4	-3.55
09.11.2021	2450	40	2.180	54.50	52.6	3.61
09.11.2021	2600	40	2.310	57.75	56.3	2.58
09.12.2021	5200	80	6.220	77.75	79.1	-1.71

11 EUT Testing Position

This EUT was tested in Five different positions. They are Back/Left Side/Right Side/Top Side/Bottom Side of the EUT with phantom 0mm gap, as illustrated below, please refer to Appendix B for the test setup photos.

11.1 SAR Evaluations near the Mouth/Jaw Regions of the SAM Phantom

Antennas located near the bottom of a phone may require SAR measurements around the mouth and jawregions of the SAM head phantom. This typically applies to clam-shell style phones that are generallylonger in the unfolded normal use positions or to certain older style long rectangular phones.
Under these circumstances, the following procedures apply, adopted from the FCC guidance on SARhandsets document FCC KDB Publication 648474 D04v01r03. The SAR required in these regions of SAMshould be measured using a flat phantom. The phone should be positioned with a separation distance of4 mm between the ear reference point (ERP) and the outer surface of the flat phantom shell. Whilemaintaining this distance at the ERP location, the low (bottom) edge of the phone should be lowered fromthe phantom to establish the same separation distance between the peak SAR locations identified by thetruncated partial SAR distribution measured with the SAM phantom. The distance from the peak SARlocation to the phone is determined by the straight line passing perpendicularly through the phantomsurface. When it is not feasible to maintain 4 mm separation at the ERP while also establishing therequired separation at the peak SAR location, the top edge of the phone will be allowed to touch thephantom with a separation < 4 mm at the ERP. The phone should not be tilted to the left or right whileplaced in this inclined position to the flat phantom.

11.2 Body Worn Accessory Configurations

- To position the device parallel to the phantom surface with either keypad up or down.
- To adjust the device parallel to the flat phantom.
- To adjust the distance between the device surface and the flat phantom to 10 mm or holster surface and the flat phantom to 0 mm.

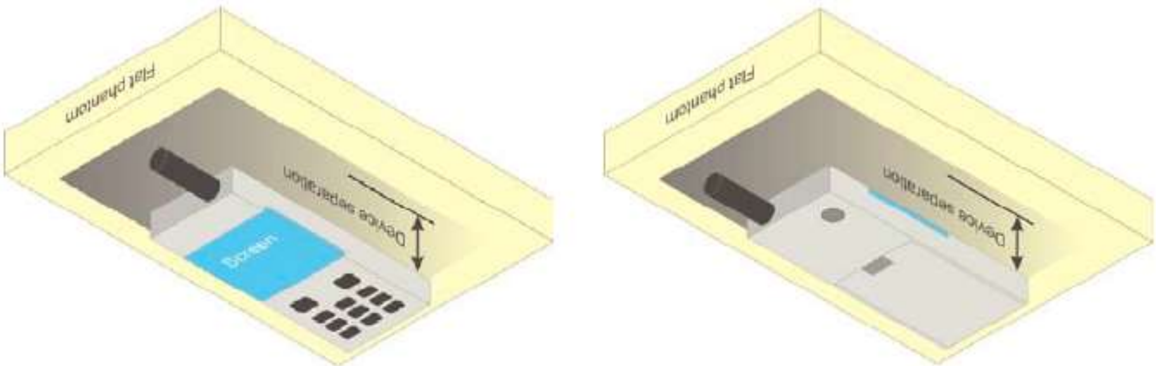


Fig.11.5 Illustration for Body Worn Position

11.3 Wireless Router (Hotspot) Configurations

Some battery-operated handsets have the capability to transmit and receive internet connectivity throughsimultaneous transmission of WIFI in conjunction with a separate licensed transmitter. The FCC hasprovided guidance in KDB Publication 941225 D06 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10 mm from the front, back and edgesof the device with antennas 2.5 cm or closer to the edge of the device, determined from general mixeduse conditions for this type of devices. Since the hotspot SAR results may overlap with the body-wornaccessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

Whenthe user enables the personal wireless router functions for the handset, actual operations includesimultaneous transmission of both the WIFI transmitter and another licensed transmitter. Bothtransmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated forSAR under actual use conditions. Therefore, SAR must be evaluated for each frequency transmissionand mode separately and summed with the WIFI transmitter according to KDB 648474 publicationprocedures. The “Portable Hotspot” feature on the handset was NOT activated, to ensure the SARmeasurements were evaluated for a single transmission frequency RF signal.

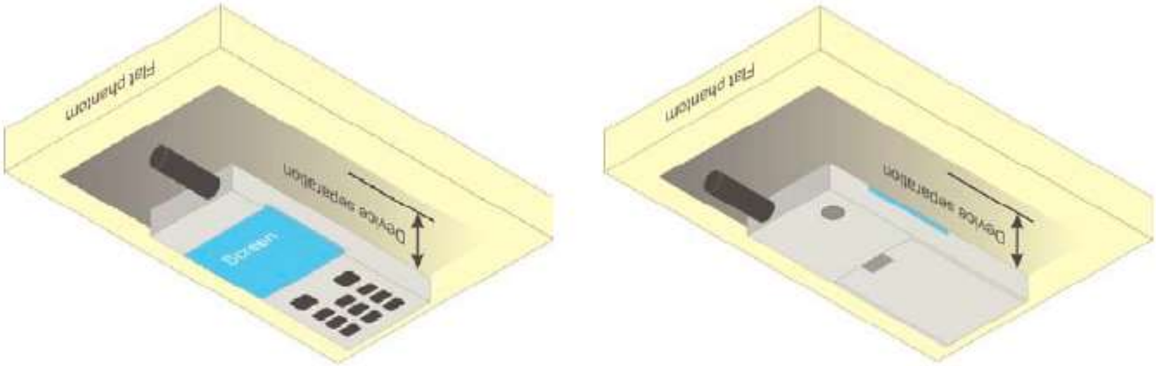


Fig.11.6 Illustration for Hotspot Position

12 Measurement Procedures

The measurement procedures are as bellows:

<Conducted power measurement>

- For WWAN power measurement, use base station simulator to configure EUT WWAN transition in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
- Read the WWAN RF power level from the base station simulator.
- For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band.
- Connect EUT RF port through RF cable to the power meter or spectrum analyzer, and measure WLAN/BT output power.

<Conducted power measurement>

- Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
- Place the EUT in positions as Appendix B demonstrates.
- Set scan area, grid size and other setting on the DASY software.
- Measure SAR results for the highest power channel on each testing position.
- Find out the largest SAR result on these testing positions of each band.
- Measure SAR results for other channels in worst SAR testing position if the Reported SAR or highest power channel is larger than 0.8 W/kg.

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

- Power reference measurement
- Area scan
- Zoom scan
- Power drift measurement

12.1 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a “cube” measurement. The measured volume must include the 1g and 10 g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

- Extraction of the measured data (grid and values) from the Zoom Scan.
- Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters).
- Generation of a high-resolution mesh within the measured volume.
- Interpolation of all measured values form the measurement grid to the high-resolution grid
- Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
- Calculation of the averaged SAR within masses of 1g and 10g.

12.2 Power Reference Measurement

The Power Reference Measurement and Power Drift Measurement 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. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

12.3 Area & Zoom Scan Procedures

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10g. Area scan and zoom scan resolution setting follows KDB 865664 D01v01r04 quoted below.

			$\leq$ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}			$\leq$ 2 GHz: $\leq$ 15 mm 2 – 3 GHz: $\leq$ 12 mm	3 – 4 GHz: $\leq$ 12 mm 4 – 6 GHz: $\leq$ 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 $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			$\leq$ 2 GHz: $\leq$ 8 mm 2 – 3 GHz: $\leq$ 5 mm*	3 – 4 GHz: $\leq$ 5 mm* 4 – 6 GHz: $\leq$ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		$\leq$ 5 mm	3 – 4 GHz: $\leq$ 4 mm 4 – 5 GHz: $\leq$ 3 mm 5 – 6 GHz: $\leq$ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	$\leq$ 4 mm	3 – 4 GHz: $\leq$ 3 mm 4 – 5 GHz: $\leq$ 2.5 mm 5 – 6 GHz: $\leq$ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		$\geq$ 30 mm	3 – 4 GHz: $\geq$ 28 mm 4 – 5 GHz: $\geq$ 25 mm 5 – 6 GHz: $\geq$ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is $\leq$ 1.4 W/kg, $\leq$ 8 mm, $\leq$ 7 mm and $\leq$ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

12.4 Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD post-processor scan combine and subsequently superpose these measurement data to calculating the multiband SAR.

12.5 SAR Averaged Methods

In DASY, the interpolation and extrapolation are both based on the modified Quadratic Shepard's method. The interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1g and 10g cubes, the extrapolation distance should not be larger than 5 mm.

12.6 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.

13 Conducted RF Output Power

13.1 GSM Conducted Power

Band: GSM 850	Burst Average Power (dBm)			Frame-Average Power(dBm)		
Channel	128	190	251	128	190	251
Frequency (MHz)	824.2	836.6	848.8	824.2	836.6	848.8
GSM (GMSK, Voice)	33.56	33.63	**33.73**	24.56	24.63	24.73
GPRS (GMSK, 1 TX slot)	33.56	33.58	33.72	24.56	24.58	24.72
GPRS (GMSK, 2 TX slots)	32.88	32.96	**33.11**	26.88	26.96	**27.11**
GPRS (GMSK, 3 TX slots)	31.03	31.15	31.36	26.77	26.89	27.10
GPRS (GMSK, 4 TX slots)	29.74	29.87	30.08	26.74	26.87	27.08

Remark:

1. The frame-averaged power is linearly reported the maximum burst averaged power over 8 time slots. The calculated method are shown as below:
   The duty cycle "x" of different time slots as below:
   1 TX slot is 1/8, 2 TX slots is 2/8, 3 TX slots is 3/8 and 4 TX slots is 4/8
   Based on the calculation formula:
   Frame-averaged power = Burst averaged power + 10 1og (x)
   So,
   Frame-averaged power (1 TX slot) = Burst averaged power (1 TX slot)– 9.03
   Frame-averaged power (2 TX slots) = Burst averaged power (2 TX slots)– 6.02
   Frame-averaged power (3 TX slots) = Burst averaged power (3 TX slots)– 4.26
   Frame-averaged power (4 TX slots) = Burst averaged power (4 TX slots) – 3.01
2. CS1 coding scheme was used in GPRS conducted power measurements and SAR testing, MCS5 coding scheme was used in EGPRS conducted power measurements and SAR testing (if necessary).

Note:

1. For Head SAR testing, GSM Voice mode should be evaluated, therefore the EUT was set in GSM 850 Voice mode.
2. For Body worn SAR testing, GSM Voice mode should be evaluated, therefore the EUT was set in GSM 850 Voice mode.
3. For Hotspot mode SAR testing, GPRS and EGPRS mode should be evaluated, therefore the EUT was set in GPRS 2 TX slots mode due to the highest frame-averaged power.
4. For GPRS multi time slots SAR measurement, when the measured maximum output power levels are within 0.25 dB of each other, test the configuration with the most number of time slots.
5. Per KDB447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
6. The EUT do not support DTM and VoIP function.

Band: PCS1900	Burst Average Power (dBm)			Frame-Average Power(dBm)		
Channel	512	661	810	512	661	810
Frequency (MHz)	1850.2	1880.0	1909.8	1850.2	1880.0	1909.8
GSM (GMSK, Voice)	29.84	29.85	**30.24**	20.84	20.85	21.24
GPRS (GMSK, 1 TX slot)	29.83	29.84	30.22	20.83	20.84	21.22
GPRS (GMSK, 2 TX slots)	28.97	29.05	29.67	22.97	23.05	23.67
GPRS (GMSK, 3 TX slots)	26.8	26.97	27.99	22.54	22.71	23.73
GPRS (GMSK, 4 TX slots)	25.55	25.73	**26.79**	22.55	22.73	**23.79**

Remark:

3. The frame-averaged power is linearly reported the maximum burst averaged power over 8 time slots. The calculated method are shown as below:
   The duty cycle "x" of different time slots as below:
   1 TX slot is 1/8, 2 TX slots is 2/8, 3 TX slots is 3/8 and 4 TX slots is 4/8
   Based on the calculation formula:
   Frame-averaged power = Burst averaged power + 10 1og (x)
   So,
   Frame-averaged power (1 TX slot) = Burst averaged power (1 TX slot)– 9.03
   Frame-averaged power (2 TX slots) = Burst averaged power (2 TX slots)– 6.02
   Frame-averaged power (3 TX slots) = Burst averaged power (3 TX slots)– 4.26
   Frame-averaged power (4 TX slots) = Burst averaged power (4 TX slots) – 3.01
4. CS1 coding scheme was used in GPRS conducted power measurements and SAR testing, MCS5 coding scheme was used in EGPRS conducted power measurements and SAR testing (if necessary).

Note:

1. For Head SAR testing, GSM Voice mode should be evaluated, therefore the EUT was set in GSM 1900 Voice mode.
2. For Body worn SAR testing, GSM Voice mode should be evaluated, therefore the EUT was set in GSM Voice 1900 mode.
3. For Hotspot mode SAR testing, GPRS and EGPRS mode should be evaluated, therefore the EUT was set in GPRS 4 TX slots mode due to the highest frame-averaged power.
4. Per KDB447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
5. The EUT do not support DTM and VoIP function.

13.2 WCDMA Conducted Power

The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification. A summary of these settings are illustrated below:

HSDPA Setup Configuration:

a. The EUT was connected to Base Station Rohde & Schwarz CMU200 referred to the SetupConfiguration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting:
   i. Set Gain Factors (β_c and β_d) and parameters were set according to each
   ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
   iii. Set RMC 12.2kbps + HSDPA mode.
   iv. Set Cell Power = -86 dBm
   v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
   vi. Select HSDPA Uplink Parameters
   vii. Set Delta ACK, Delta NACK and Delta CQI = 8
   viii. Set Ack-Nack Repetition Factor to 3
   ix. Set CQI Feedback Cycle (k) to 4 ms
   x. Set CQI Repetition Factor to 2
   xi. Power Ctrl Mode = All Up bits
d. The transmitted maximum output power was recorded.

Table 1

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	CM (dB) (2)
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 (3)	15/15 (3)	64	12/15 (3)	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 ⇔ $A_{hs} = \beta_{hs}/\beta_c = 30/15$ ⇔ $\beta_{hs} = 30/15 * \beta_c$

Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15.

Note 3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

HSDPA Sub-test setup configuration

HSUPA Setup Configuration:

a. The EUT was connected to Base Station Rohde & Schwarz CMU200 referred to the SetupConfiguration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting * :
   i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
   ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test inthe following table, C11.1.3, quoted from the TS 34.121
   iii. Set Cell Power = -86 dBm
   iv. Set Channel Type = 12.2k + HSPA
   v. Set UE Target Power
   vi. Power Ctrl Mode= Alternating bits
   vii. Set and observe the E-TFCI
   viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI
d. The transmitted maximum output power was recorded.

Table 2

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM(2) (dB)	MPR (dB)	AG(4) Index	E-TFCI
1	11/15(3)	15/15(3)	64	11/15(3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}: 47/15 β_{ed2}: 47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15(4)	15/15(4)	64	15/15(4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 ⇔ $A_{hs} = \beta_{hs}/\beta_c = 30/15$ ⇔ $\beta_{hs} = 30/15 * \beta_c$.
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.
Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.
Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.
Note 6: β_{ed} cannot be set directly; it is set by Absolute Grant Value.

HSUPA Sub-test setup configuration

WCDMA Conducted Power:

WCDMA Average power (dBm)			
Band	WCDMA Band V		
Channel	4132	4183	4233
Frequency (MHz)	826.4	836.6	846.6
AMR 12.2 kbps	22.71	22.61	22.93
RMC 12.2 kbps	22.76	22.72	**23.02**
HSDPA Sub-test 1	21.81	21.78	22.06
HSDPA Sub-test 2	21.35	21.25	21.59
HSDPA Sub-test 3	21.26	21.15	21.49
HSDPA Sub-test 4	21.24	21.16	21.48
HSUPA Sub-test 1	19.78	19.66	19.97
HSUPA Sub-test 2	20.27	20.19	20.51
HSUPA Sub-test 3	20.79	20.71	20.98
HSUPA Sub-test 4	19.80	19.71	20.02
HSUPA Sub-test 5	21.77	21.71	21.99

WCDMA Average power (dBm)			
Band	WCDMA Band II		
Channel	9262	9400	9538
Frequency (MHz)	1852.4	1880.0	1907.6
AMR 12.2 kbps	24.09	24.15	24.05
RMC 12.2 kbps	24.09	**24.18**	24.11
HSDPA Sub-test 1	23.17	23.27	23.22
HSDPA Sub-test 2	22.79	22.85	22.80
HSDPA Sub-test 3	22.64	22.72	22.65
HSDPA Sub-test 4	22.64	22.67	22.68
HSUPA Sub-test 1	21.17	21.26	21.18
HSUPA Sub-test 2	21.68	21.75	21.69
HSUPA Sub-test 3	22.19	22.26	22.23
HSUPA Sub-test 4	21.20	21.28	21.23
HSUPA Sub-test 5	23.12	23.28	23.13

Note:

1. Applying the subtest setup in Table C.11.1.3 of 3GPP TS 34.121-1
2. Per KDB 941225 D01, RMC 12.2kbps mode is used to evaluate SAR due the highest output power. If AMR 12.2kbps power is < 0.25dB higherthan RMC 12.2kbps, SAR tests with AMR 12.2kbps can be excluded.
3. AMR, HSDPA RF power will not be larger than RMC 12.2kbps, detailed information is included inTune-up Procure exhibit.

13.3 LTE Conducted Power

13.3.1 Largest channel bandwidth standalone SAR test requirements

QPSK with 1 RB allocation

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 offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel.8 When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

QPSK with 50% RB allocation

The procedures required for 1 RB allocation in section 4.2.1 are applied to measure the SAR for QPSK with 50% RB allocation.9

QPSK with 100% RB allocation

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 in sections 4.2.1 and 4.2.2 are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

Higher order modulations

For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in sections 4.2.1, 5.2.2 and 4.2.3 to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

13.3.2 Other channel bandwidth standalone SAR test requirements

For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section 4.2 to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ 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 W/kg. The equivalent channel configuration for the RB allocation, RB offset and modulation etc. is determined for the smaller channel bandwidth according to the same number of RB allocated in the largest channel bandwidth. For example, 50 RB in 10 MHz channel bandwidth does not apply to 5 MHz channel bandwidth; therefore, this cannot be tested in the smaller channel bandwidth. However, 50% RB allocation in 10 MHz channel bandwidth is equivalent to 100% RB allocation in 5 MHz channel bandwidth; therefore, these are the equivalent configurations to be compared to determine the specific channel and configuration in the smaller channel bandwidth that need SAR testing.

13.3.3 TDD LTE configuration setup for SAR measurement

According to KDB 941225 D05v02r03 and April 2013 TCB workshop slides, SAR must be tested with a fixed periodic duty factoraccording to the highest transmission duty factor implemented for the device and supported by 3GPP.

- see 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations
- “special subframe S”contains both uplink and downlink transmissions and must be taken into consideration todetermine the transmission duty factor

  ﹣according to the worst case uplink and downlink cyclic prefix requirements for UpPTS to determine the highest SAR test duty factor

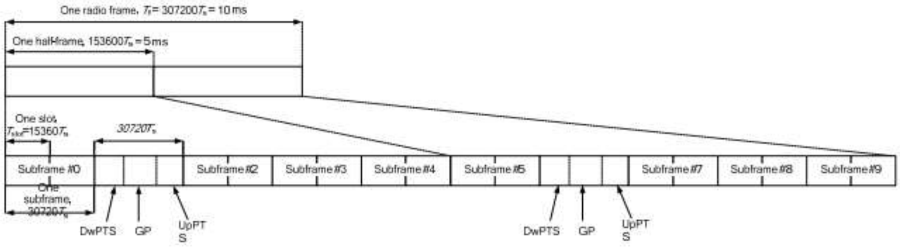


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity)

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS)

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$			$7680 \cdot T_s$		
1	$19760 \cdot T_s$			$20480 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
2	$21952 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$		
5	$6592 \cdot T_s$			$20480 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-	-	-
9	$13168 \cdot T_s$			-	-	-

Per 3GPP 36.211 section 4.2, each radio frame of length T_f=37200·*Ts* = 10 ms consists of two half-frames of length 153600·Ts = 5ms each. Each half-frame consists of five subframes of length30720 ·*Ts* =1ms. So, the uplink duty factor in special subframe as below:

Special Subframe configuration	Normal cyclic prefix in downlink		Extended cyclic prefix in downlink	
	Duty factor of Uplink		Duty factor of Uplink	
	Normal cyclic prefix in uplink	Extended cyclic prefix in uplink	Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	7.14%	8.33%	7.14%	8.33%
1	7.14%	8.33%	7.14%	8.33%
2	7.14%	8.33%	7.14%	8.33%
3	7.14%	8.33%	7.14%	8.33%
4	7.14%	8.33%	14.27%	16.67%
5	14.27%	16.67%	14.27%	16.67%
6	14.27%	16.67%	14.27%	16.67%
7	14.27%	16.67%	14.27%	16.67%
8	14.27%	16.67%	/	/
9	14.27%	16.67%	/	/

Table 4.2-2: Uplink-downlink configurations

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

According to above table:

1. The highest duty factor is configuration 0;
2. The duty factor of uplink in one half-frame with normal cyclic prefix is: (3ms + 0.143ms)/5ms=62.86%;
3. The duty factor of uplink in one half-frame with extended cyclic prefix is: (3ms + 0.167ms)/5ms=63.34%;
4. For purpose to get the worst case SAR test duty factor, the duty factor of normal cyclic prefix in uplink scaled-up to the extended cyclic prefix in uplink, the scaling factor is 63.34%/62.86%=1.008, and the scaling factor will be taken into the final measured SAR.

LTE Band 2 part

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18607	18900	19193
					1850.7MHz	1880.0MHz	1909.3MHz
Band 2	1.4	QPSK	1	0	23.42	23.29	23.58
			1	2	23.51	23.41	23.55
			1	5	23.45	23.31	23.55
			3	0	23.57	23.43	23.70
			3	1	23.51	23.43	23.73
			3	2	23.54	23.40	23.71
			6	0	22.50	22.36	22.65
		16QAM	1	0	22.35	22.30	22.53
			1	2	22.47	22.61	22.66
			1	5	22.31	22.21	22.48
			3	0	22.32	22.25	22.47
			3	1	22.32	22.24	22.51
			3	2	22.31	22.20	22.48
			6	0	21.50	21.39	21.66

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18615	18900	19185
					1851.5MHz	1880.0MHz	1908.5MHz
Band 2	3	QPSK	1	0	23.43	23.43	23.63
			1	7	23.46	23.35	23.66
			1	14	23.46	23.39	23.60
			8	0	22.47	22.34	22.68
			8	4	22.49	22.34	22.71
			8	7	22.48	22.30	22.61
			15	0	22.42	22.31	22.67
		16QAM	1	0	22.43	22.30	22.37
			1	7	22.45	22.27	22.47
			1	14	22.43	22.26	22.39
			8	0	21.53	21.37	21.70
			8	4	21.50	21.31	21.72
			8	7	21.48	21.35	21.69
			15	0	21.50	21.31	21.59

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18625 1852.5MHz	18900 1880.0MHz	19175 1907.5MHz
Band 2	5	QPSK	1	0	23.41	23.25	23.56
			1	12	23.56	23.39	23.73
			1	24	23.46	23.26	23.57
			12	0	22.43	22.44	22.74
			12	6	22.45	22.38	22.69
			12	11	22.43	22.46	22.74
			25	0	22.48	22.43	22.69
		16QAM	1	0	22.39	22.31	22.46
			1	12	22.46	22.50	22.69
			1	24	22.38	22.35	22.45
			12	0	21.38	21.50	21.75
			12	6	21.41	21.52	21.80
			12	11	21.44	21.50	21.72
			25	0	21.48	21.43	21.75

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18650 1855.0MHz	18900 1880.0MHz	19150 1905.0MHz
Band 2	10	QPSK	1	0	23.43	23.39	23.67
			1	24	23.60	23.43	23.72
			1	49	23.54	23.41	23.63
			25	0	22.51	22.51	22.73
			25	12	22.55	22.50	22.72
			25	24	22.53	22.49	22.73
			50	0	22.50	22.46	22.65
		16QAM	1	0	22.46	22.28	22.38
			1	24	22.56	22.28	22.53
			1	49	22.46	22.29	22.40
			25	0	21.48	21.56	21.74
			25	12	21.49	21.55	21.74
			25	24	21.52	21.56	21.73
			50	0	21.51	21.51	21.66

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18675	18900	19125
					1857.5MHz	1880.0MHz	1902.5MHz
Band 2	15	QPSK	1	0	23.37	23.35	23.58
			1	37	23.54	23.36	23.72
			1	74	23.48	23.35	23.55
			36	0	22.57	22.45	22.82
			36	16	22.56	22.50	22.77
			36	35	22.57	22.48	22.80
			75	0	22.67	22.48	22.74
		16QAM	1	0	22.49	22.08	22.48
			1	37	22.61	22.22	22.64
			1	74	22.49	22.10	22.58
			36	0	21.58	21.42	21.61
			36	16	21.54	21.46	21.63
			36	35	21.52	21.42	21.64
			75	0	21.60	21.45	21.66

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					18700	18900	19100
					1860.0MHz	1880.0MHz	1900.0MHz
Band 2	20	QPSK	1	0	23.37	23.43	23.37
			1	49	23.73	23.48	23.95
			1	99	23.45	23.33	23.58
			50	0	22.52	22.46	22.58
			50	24	22.53	22.50	22.58
			50	49	22.55	22.48	22.57
			100	0	22.56	22.41	22.57
		16QAM	1	0	22.32	22.45	22.22
			1	49	22.59	22.60	22.62
			1	99	22.29	22.50	22.41
			50	0	21.52	21.51	21.57
			50	24	21.53	21.46	21.63
			50	49	21.50	21.49	21.59
			100	0	21.54	21.46	21.53

LTE Band 4 part

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					19957	20175	20393
					1710.7MHz	1732.5MHz	1754.3MHz
Band 4	1.4	QPSK	1	0	24.16	23.96	24.05
			1	2	24.38	24.10	24.11
			1	5	24.11	23.93	23.98
			3	0	24.24	24.06	24.11
			3	1	24.20	24.02	24.17
			3	2	24.21	24.02	24.11
			6	0	23.09	22.95	23.07
		16QAM	1	0	22.98	22.85	22.95
			1	2	23.07	23.01	23.15
			1	5	22.99	22.83	22.93
			3	0	23.03	22.78	22.90
			3	1	23.05	22.84	22.90
			3	2	23.03	22.82	22.90
			6	0	22.00	22.06	22.11

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					19965	20175	20385
					1711.5MHz	1732.5MHz	1753.5MHz
Band 4	3	QPSK	1	0	24.05	23.98	24.08
			1	7	24.08	23.99	24.03
			1	14	24.08	24.00	24.02
			8	0	23.07	22.96	23.06
			8	4	23.07	22.93	23.05
			8	7	23.10	22.94	23.10
			15	0	23.05	22.88	23.01
		16QAM	1	0	23.11	22.85	22.80
			1	7	23.05	22.81	22.77
			1	14	23.05	22.76	22.79
			8	0	22.19	21.97	22.14
			8	4	22.16	22.00	22.12
			8	7	22.15	21.96	22.13
			15	0	22.12	21.91	22.03

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					19975	20175	20375
					1712.5MHz	1732.5MHz	1752.5MHz
Band 4	5	QPSK	1	0	24.03	23.88	24.07
			1	12	24.14	23.94	24.14
			1	24	24.04	23.88	23.98
			12	0	23.00	22.91	23.12
			12	6	23.05	22.96	23.08
			12	11	23.11	22.96	23.05
			25	0	23.09	22.98	23.06
		16QAM	1	0	22.94	22.90	22.93
			1	12	23.11	23.02	22.97
			1	24	23.02	22.95	22.85
			12	0	22.09	22.00	22.15
			12	6	22.10	22.04	22.19
			12	11	22.08	22.02	22.10
			25	0	22.16	21.98	22.19

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20000	20175	20350
					1715.0MHz	1732.5MHz	1750.0MHz
Band 4	10	QPSK	1	0	24.03	24.01	24.02
			1	24	24.13	24.10	24.18
			1	49	24.07	23.97	23.99
			25	0	23.13	22.98	23.14
			25	12	23.15	22.98	23.17
			25	24	23.12	23.02	23.16
			50	0	23.09	22.98	23.13
		16QAM	1	0	23.04	22.77	22.78
			1	24	23.23	22.90	23.01
			1	49	23.05	22.77	22.75
			25	0	22.21	22.08	22.25
			25	12	22.19	22.06	22.23
			25	24	22.16	22.07	22.23
			50	0	22.17	22.00	22.17

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20025	20175	20325
					1717.5MHz	1732.5MHz	1747.5MHz
Band 4	15	QPSK	1	0	23.92	23.96	23.90
			1	37	24.09	23.95	24.12
			1	74	23.89	23.89	23.96
			36	0	23.20	23.05	23.13
			36	16	23.14	23.00	23.12
			36	35	23.18	23.00	23.10
			75	0	23.21	22.97	23.16
		16QAM	1	0	23.04	22.71	22.87
			1	37	23.16	22.68	23.08
			1	74	23.02	22.65	22.93
			36	0	22.27	21.98	22.16
			36	16	22.17	22.01	22.09
			36	35	22.22	21.96	22.14
			75	0	22.21	21.99	22.15

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20050	20175	20300
					1720.0MHz	1732.5MHz	1745.0MHz
Band 4	20	QPSK	1	0	23.94	23.93	23.71
			1	49	24.26	24.18	24.11
			1	99	23.90	23.94	23.90
			50	0	23.07	22.94	23.08
			50	24	23.07	22.95	23.08
			50	49	23.05	22.94	23.08
			100	0	23.00	22.93	23.05
		16QAM	1	0	22.83	23.04	22.58
			1	49	23.19	23.14	22.92
			1	99	22.76	23.10	22.74
			50	0	22.18	22.02	22.21
			50	24	22.12	22.03	22.22
			50	49	22.11	22.06	22.21
			100	0	22.09	21.96	22.13

LTE Band 7 part:

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20775	21100	21425
					2502.5MHz	2535.0MHz	2567.5MHz
Band 7	5	QPSK	1	0	23.88	23.20	23.74
			1	12	23.99	23.12	23.59
			1	24	23.80	23.22	23.79
			12	0	22.81	22.38	23.32
			12	6	22.84	22.40	23.33
			12	11	22.84	22.44	23.08
			25	0	22.85	22.43	22.94
		16QAM	1	0	22.75	22.76	22.54
			1	12	22.83	22.46	22.75
			1	24	22.69	22.32	23.18
			12	0	21.75	21.33	22.20
			12	6	21.76	21.36	22.12
			12	11	21.74	21.35	21.86
			25	0	21.80	21.36	21.81

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20800	21100	21400
					2505.0MHz	2535.0MHz	2565.0MHz
Band 7	10	QPSK	1	0	23.90	23.13	23.73
			1	24	23.92	22.99	23.90
			1	49	23.78	23.40	23.51
			25	0	22.80	22.41	22.86
			25	12	22.77	22.40	23.32
			25	24	22.77	22.39	23.36
			50	0	22.80	22.42	23.34
		16QAM	1	0	22.82	22.90	22.43
			1	24	22.84	22.60	22.78
			1	49	22.75	22.41	22.61
			25	0	21.68	21.36	21.85
			25	12	21.72	21.33	22.26
			25	24	21.70	21.34	22.24
			50	0	21.78	21.40	22.14

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20825	21100	21375
					2507.5MHz	2535.0MHz	2562.5MHz
Band 7	15	QPSK	1	0	23.85	23.19	24.07
			1	37	23.84	22.85	24.27
			1	74	23.64	23.48	23.56
			36	0	22.88	23.10	22.91
			36	16	22.86	22.97	22.91
			36	35	22.90	22.59	23.16
			75	0	22.88	22.56	23.11
		16QAM	1	0	22.85	22.06	22.97
			1	37	22.87	22.20	23.22
			1	74	22.73	22.14	22.76
			36	0	21.83	21.87	21.78
			36	16	21.83	21.58	21.78
			36	35	21.80	21.36	21.96
			75	0	21.79	21.47	21.75

LTE Band	Bandwidth (MHz)	Modulation	RB Size	RB Offset	Average Power (dBm)		
					20850	21100	21350
					2510.0MHz	2535.0MHz	2560.0MHz
Band 7	20	QPSK	1	0	23.82	23.43	23.82
			1	49	23.92	23.04	23.97
			1	99	23.73	23.55	23.60
			50	0	22.63	22.39	22.60
			50	24	22.62	22.37	23.07
			50	49	22.64	22.89	23.08
			100	0	22.59	22.95	23.11
		16QAM	1	0	22.65	22.59	22.25
			1	49	22.83	22.35	22.61
			1	99	22.56	22.21	22.64
			50	0	21.60	21.34	21.58
			50	24	21.57	21.32	22.07
			50	49	21.56	21.79	22.07
			100	0	21.56	21.72	22.04

13.4 WLAN 2.4 GHz Band Conducted Power

Average Power (dBm)				
Channel	Frequency (MHz)	802.11 b	802.11 g	802.11n (HT20)
CH 01	2412	16.40	13.52	13.39
CH 06	2437	**16.79**	14.02	14.12
CH 11	2462	16.62	13.28	13.15

Average Power (dBm)		
Channel	Frequency (MHz)	802.11n (HT40)
CH 03	2422	15.51
CH 06	2437	15.85
CH 09	2452	**15.89**

Note:

1. Per KDB 447498 D01v06, the 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤50 mm are determined by:
   [(*max. power of channel, including tune-up tolerance, mW*)/ (*min. test separation distance, mm*)] · [√f(GHz)] ≤ 3.0 for1-g SAR, where
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison

Channel	Frequency (GHz)	Max. Tune-up Power (dBm)	Max. Power (mW)	Test distance (mm)	Result	exclusion thresholds for 1-g SAR
b/CH 06	2.437	17.0	50.12	5	15.6	3.0
n 40/CH 06	2.452	16.5	44.67	5	14.3	3.0

2. Base on the result of note1, RF exposure evaluation of 802.11 b mode is required.
3. Per KDB 248227 D01v02r02, choose the highest output power channel to test SAR and determine further SAR exclusion.
4. Per KDB 248227 D01v02r02, In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements.SAR is not required for the following 2.4 GHz OFDM conditions:
   1) When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
   2) 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.
5. The output power of all data rate were pre-scan, just the worst case (the lowest data rate) of all mode were shown in report.
6. Per KDB 248227 D01V02r02 section 2.2, when the EUT in continuously transmitting mode, the actual duty cycle is 100%, so the duty cycle factor is 1.

13.5 WLAN 5.2GHz Band Conducted Power

Average Power (dBm)				
Channel	Frequency (MHz)	802.11 a	802.11 n20	802.11 ac20
CH 36	5180	10.61	10.36	10.10
CH 40	5200	10.65	9.70	9.85
CH 48	5240	10.81	10.75	10.37

Average Power (dBm)			
Channel	Frequency (MHz)	802.11n 40	802.11 ac40
CH 38	5190	**12.77**	9.67
CH 46	5230	12.72	12.73

Average Power (dBm)		
Channel	Frequency (MHz)	802.11ac 80
CH 42	5210	10.71

Note:

7. Per KDB 447498 D01v06, the 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤50 mm are determined by:
   [(*max. power of channel, including tune-up tolerance, mW*)/ (*min. test separation distance, mm*)] · [√f(GHz)] ≤ 3.0 for1-g SAR, where
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison

Channel	Frequency (GHz)	Max. Tune-up Power (dBm)	Max. Power (mW)	Test distance (mm)	Result	exclusion thresholds for 1-g SAR
n 40/CH 38	5.190	13.0	19.95	5	6.18	3.0

8. Base on the result of note1, RF exposure evaluation of 802.11 a mode is not required.
9. Per KDB 248227 D01v02r02, choose the highest output power channel to test SAR and determine further SAR exclusion.
10. The output power of all data rate were pre-scan, just the worst case (the lowest data rate) of all mode were shown in report.
11. Per KDB 248227 D01V02r02 section 2.2, when the EUT in continuously transmitting mode, the actual duty cycle is 100%, so the duty cycle factor is 1.

13.6 Bluetooth Conducted Power

Average Power (dBm)(Bluetooth)				
Channel	Frequency (MHz)	GFSK	π/4-DQPSK	8DPSK
CH 00	2402	4.073	3.751	4.158
CH 39	2441	5.391	5.128	5.502
CH 78	2480	4.098	3.822	4.176

Average Power (dBm)		
Channel	Frequency (MHz)	BLE
CH 00	2402	5.054
CH 20	2442	**6.374**
CH 39	2480	4.601

Note:

1. Per KDB 447498 D01v06, the 1-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤50 mm are determined by:
   [(*max. power of channel, including tune-up tolerance, mW*)/ (*min. test separation distance, mm*)] · [√f(GHz)] ≤ 3.0 for1-g SAR, where
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison

Channel	Frequency (GHz)	Max. tune-up Power (dBm)	Max. Power (mW)	Test distance (mm)	Result	exclusion thresholds for 1-g SAR
CH 20	2.442	7	5.01	5	1.55	3.0

2. The max. tune-up power wasprovided by manufacturer, base on the result of note 1, RF exposure evaluation is not required.
3. The output power of all data rate were pre-scan, just the worst case of all mode were shown in report.
4. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according is applied to determine SAR test exclusion.

14 Exposure Positions Consideration

14.1 EUT Antenna Locations

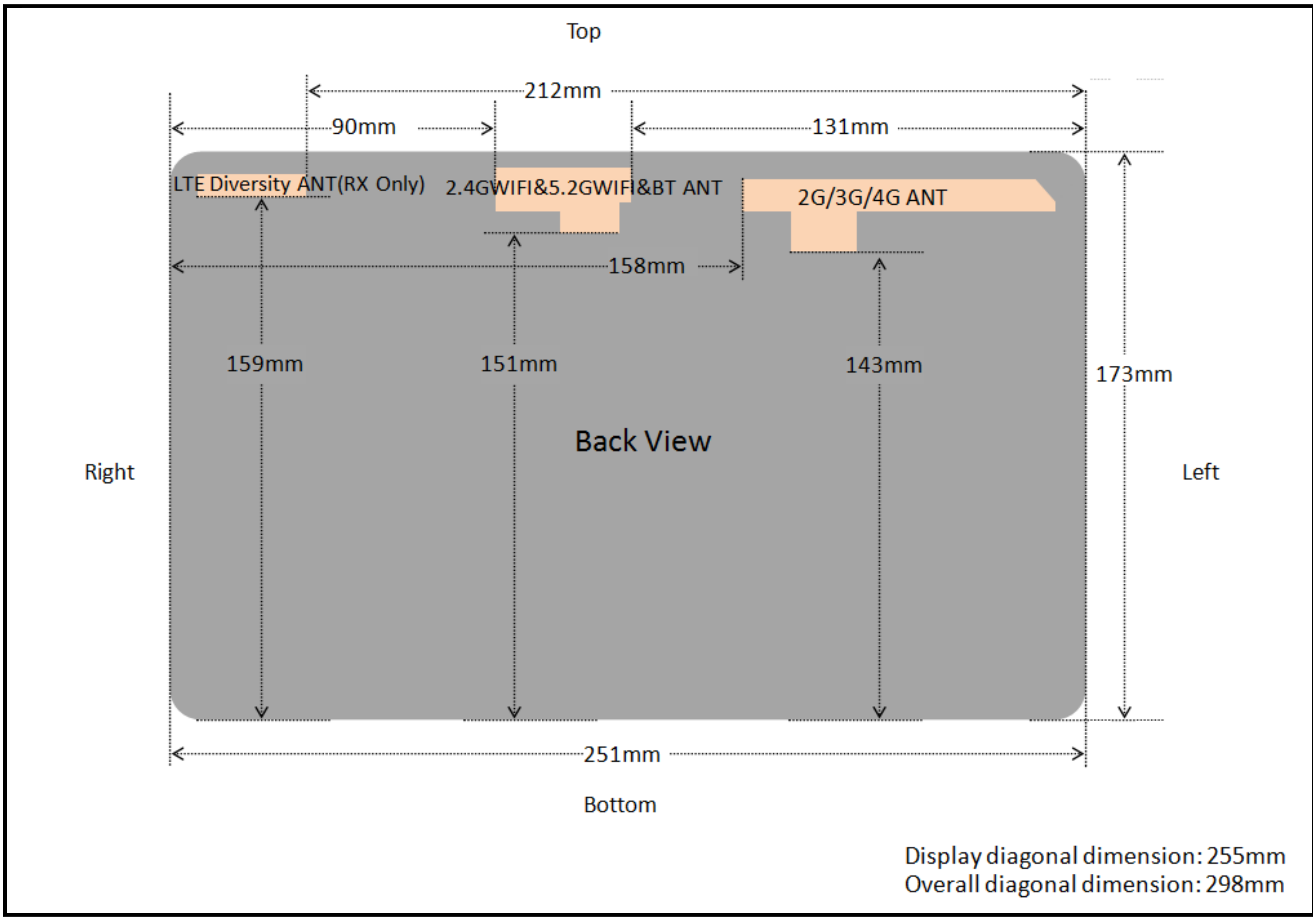


Fig.14.1 EUT Antenna Locations

Note: This antenna diagram is only used as a reference for the distance from the antenna to each edge. For the specific shape of the antenna, please refer to the physical photo.

14.2 Test Positions Consideration

SAR exclusion calculations for antenna < 50mm from the user														
Antennas	Freq. (MHz)	Max. tune-up Power		Distance of Antennas to EUT edge/surface (mm)					Calculated Threshold Value (≦3.0 SAR is not required)					
		dBm	mW	Back	Top	Bott.	Right	Left	Back	Top	Bott.	Right	Left
GPRS 850	848.8	33.5	2238.7	5	5	143	158	8	411.9	411.9	>50mm	>50mm	257.5
GPRS 1900	1909.8	27.0	501.2	5	5	143	158	8	138.3	138.3	>50mm	>50mm	86.5
WCDMA 850	846.6	23.5	223.9	5	5	143	158	8	41.2	41.2	>50mm	>50mm	25.7
WCDMA 1900	1907.6	24.5	281.8	5	5	143	158	8	77.8	77.8	>50mm	>50mm	48.6
LTE Band 2	1900.0	24.5	281.8	5	5	143	158	8	77.8	77.8	>50mm	>50mm	48.6
LTE Band 4	1745.0	24.5	281.8	5	5	143	158	8	74.4	74.4	>50mm	>50mm	46.5
LTE Band 7	2560.0	24.5	281.8	5	5	143	158	8	90.2	90.2	>50mm	>50mm	56.4
802.11b	2462	17.0	50.1	5	5	151	90	131	15.7	15.7	>50mm	>50mm	>50mm
802.11g	2462	14.5	28.2	5	5	151	90	131	8.8	8.8	>50mm	>50mm	>50mm
802.11a	5240	13.0	20.0	5	5	151	90	131	9.1	9.1	>50mm	>50mm	>50mm
Bluetooth	2480	7.0	5.0	5	5	151	90	131	1.6	1.6	>50mm	>50mm	>50mm

SAR exclusion calculations for antenna > 50mm from the user														
Antennas	Freq. (MHz)	Max. tune-up Power		Distance of Antennas to EUT edge/surface (mm)					Calculated Threshold Value (SAR test exclusion power,mW)					
		dBm	mW	Back	Top	Bott.	Right	Left	Back	Top	Bott.	Right	Left
GPRS 850	848.8	33.5	2238.7	5	5	143	158	8	/	/	689.3	774.2	/
GPRS 1900	1909.8	27.0	501.2	5	5	143	158	8	/	/	1038.7	1188.7	/
WCDMA 850	846.6	23.5	223.9	5	5	143	158	8	/	/	687.9	772.6	/
WCDMA 1900	1907.6	24.5	281.8	5	5	143	158	8	/	/	1038.7	1188.7	/
LTE Band 2	1900.0	24.5	281.8	5	5	143	158	8	/	/	1038.7	1188.7	/
LTE Band 4	1745.0	24.5	281.8	5	5	143	158	8	/	/	1043.6	1193.6	/
LTE Band 7	2560.0	24.5	281.8	5	5	143	158	8	/	/	1023.8	1173.8	/
802.11b	2462	17.0	50.1	5	5	151	90	131	/	/	1105.5	495.5	905.5
802.11g	2462	14.5	28.2	5	5	151	90	131	/	/	1105.5	495.5	905.5
802.11a	5240	13.0	20.0	5	5	151	90	131	/	/	1075.8	465.8	875.8
Bluetooth	2480	7.0	5.0	5	5	151	90	131	/	/	1105.5	495.5	905.5

Test Positions					
Antennas	Back	Top Side	Bottom Side	Right Side	LeftSide
GSM 850	Yes	Yes	Yes	Yes	Yes
GSM 1900	Yes	Yes	No	No	Yes
GPRS 850	Yes	Yes	No	No	Yes
GPRS 1900	Yes	Yes	No	No	Yes
WCDMA 850	Yes	Yes	No	No	Yes
WCDMA 1900	Yes	Yes	No	No	Yes
802.11b	Yes	Yes	No	No	No
802.11g	Yes	Yes	No	No	No
802.11a	Yes	Yes	No	No	No
Bluetooth	No	No	No	No	No

Note:

1. Referring to KDB 616217 D04v01r02, when the overall diagonal dimension ofdisplayis > 20 cm, the test distance is 0 mm;the SAR Test Exclusion Threshold in KDB 447498 section 4.3.1 can be applied to determine SAR test exclusion for adjacent edge configurations.
2. The frame-average power was used for the SAR Test Exclusion Threshold calculated for GSM mode.
3. Per KDB 616217 D04v01r02, SAR evaluation for the front surface of tablet display screens isgenerally not necessary.

4. Per KDB 616217 D04v01r02, additional testing for hotspot SAR is not required.
5. Per KDB 616217 D04v01r02, when thereported SAR with the protrusions in place is > 1.2 W/kg, a KDB inquiry is required to determine ifadditional SAR measurements in more conservative test configurations are necessary

15 SAR Test Results Summary

15.1 StandaloneBody SAR

➢ GSM Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
1	GPRS850/2 slots	Back	251	848.8	33.11	0.04	33.5	**0.674**	1.094	0.737
	GPRS850/2 slots	Left	251	848.8	33.11	0.05	33.5	0.083	1.094	0.091
	GPRS850/2 slots	Right	251	848.8	33.11	/	33.5	<0.001	1.094	<0.001
	GPRS850/2 slots	Top	251	848.8	33.11	-0.06	33.5	0.286	1.094	0.313
	GPRS850/2 slots	Bottom	251	848.8	33.11	/	33.5	<0.001	1.094	<0.001
2	GPRS1900/4 slots	Back	810	1909.8	26.79	0.18	27.0	**0.643**	1.050	0.675
	GPRS1900/4 slots	Left	810	1909.8	26.79	-0.11	27.0	0.026	1.050	0.027
	GPRS1900/4 slots	Top	810	1909.8	26.79	0.04	27.0	0.215	1.050	0.226
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ WCDMA Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
3	Band V/RMC	Body Back	4233	846.6	23.02	0.02	23.5	**0.506**	1.117	0.565
	Band V/RMC	Body Left	4233	846.6	23.02	0.12	23.5	0.088	1.117	0.098
	Band V/RMC	Body Top	4233	846.6	23.02	-0.10	23.5	0.246	1.117	0.275
4	Band II/RMC	Body Back	9538	1907.6	24.18	0.03	24.5	**0.632**	1.076	0.680
	Band II/RMC	Body Left	9538	1907.6	24.18	-0.05	24.5	0.031	1.076	0.033
	Band II/RMC	Body Top	9538	1907.6	24.18	-0.02	24.5	0.220	1.076	0.237
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ FDD-LTE Band 2(20MHz) QPSK Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
5	Band2/1RB#49	Body Back	19100	1900	23.95	-0.05	24.5	**0.659**	1.135	0.748
	Band2/1RB#49	Body Left	19100	1900	23.95	0.01	24.5	0.036	1.135	0.041
	Band2/1RB#49	Body Top	19100	1900	23.95	0.04	24.5	0.228	1.135	0.259
	Band2/50%RB#0	Body Back	19100	1900	22.58	0.09	23.0	0.589	1.102	0.649
	Band2/50%RB#0	Body Left	19100	1900	22.58	0.02	23.0	0.018	1.102	0.020
	Band2/50%RB#0	Body Top	19100	1900	22.58	-0.18	23.0	0.186	1.102	0.205
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ FDD-LTE Band 4(20MHz) QPSK Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
6	Band4/1RB#49	Body Back	20050	1720	24.26	0.05	24.5	**0.340**	1.057	0.359
	Band4/1RB#49	Body Left	20050	1720	24.26	0.07	24.5	0.065	1.057	0.069
	Band4/1RB#49	Body Top	20050	1720	24.26	0.06	24.5	0.214	1.057	0.226
	Band4/50%RB#0	Body Back	20050	1720	23.07	-0.01	23.5	0.281	1.104	0.310
	Band4/50%RB#0	Body Left	20050	1720	23.07	-0.02	23.5	0.045	1.104	0.050
	Band4/50%RB#0	Body Top	20050	1720	23.07	-0.09	23.5	0.158	1.104	0.174
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ FDD-LTE Band 7(20MHz) QPSK Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)
7	Band7/1RB#49	Body Back	21350	2560	23.97	0.02	24.5	**0.503**	1.130	0.568
	Band7/1RB#49	Body Left	21350	2560	23.97	0.04	24.5	0.058	1.130	0.066
	Band7/1RB#49	Body Top	21350	2560	23.97	-0.04	24.5	0.103	1.130	0.116
	Band7/50%RB#49	Body Back	21350	2560	23.08	0.04	23.5	0.452	1.102	0.498
	Band7/50%RB#49	Body Left	21350	2560	23.08	-0.03	23.5	0.022	1.102	0.024
	Band7/50%RB#49	Body Top	21350	2560	23.08	-0.09	23.5	0.075	1.102	0.083
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**					

➢ WLAN 2.4GHz Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	D.C Factor	Reported SAR_{1g} (W/kg)
8	2.4GHz/802.11b	Back	6	2437	16.79	0.04	17.0	**0.508**	1.050	1	0.533
	2.4GHz/802.11b	Top	6	2437	16.79	0.05	17.0	0.102	1.050	1	0.107
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**						

➢ WLAN 5.2GHz Body SAR

Plot No.	Band/Mode	Test Position	CH.	Freq. (MHz)	Ave. Power (dBm)	Power Drift (dB)	Tune-Up Limit (dBm)	Meas. SAR_{1g} (W/kg)	Scaling Factor	D.C Factor	Reported SAR_{1g} (W/kg)
9	2.4GHz/802.11n40	Back	38	5190	12.77	0.00	13.0	**0.132**	1.054	1.00	0.139
	2.4GHz/802.11n40	Top	38	5190	12.77	0.05	13.0	0.055	1.054	1.00	0.058
ANSI / IEEE C95.1 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population					**1.6 W/kg (mW/g) Averaged over 1g**						

Note:

1. Per KDB 447498 D01v06, for each exposure position, if the highest output channel Reported SAR ≤0.8W/kg, otherchannels SAR testing is not necessary.
2. Additional WLAN SAR testing was performed for simultaneous transmission analysis.
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required when the measuredSAR is ≥0.8W/kg.
4. Per KDB248227 D01v02r02, OFDM SARis not required 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.Cuz the maximum output powerspecified for OFDM and DSSS are25.23mW(14.02dBm) and 47.75mW(16.79dBm), the scaled SAR would be 0.748×(25.23/47.75)=0.395W/Kg < 1.2 W/kg,therefore, SAR is not required for OFDM.
5. According toKDB 865664 D02v01r02, SAR plot is required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination.
6. Highlight part of test data means repeated test.

15.2 Multi-Band Simultaneous Transmission Considerations

➢ **Simultaneous Transmission Capabilities**

According to FCC KDB Publication 447498 D01v06, transmitters are considered to be transmittingsimultaneously when there is overlapping transmission, with the exception of transmissions duringnetwork hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths forthe EUT are shown in below Figure and are color-coded to indicate communication modes which share thesame path. Modes which share the same transmission path cannot transmit simultaneously with oneanother.

Fig.15.1 Simultaneous Transmission Paths

➢ **Simultaneous Transmission Procedures**

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmissionanalysis is required. Per FCC KDB 447498 D01v06, simultaneous transmission SAR testexclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas ina specific a physical test configuration is ≤1.6 W/kg. When standalone SAR is not required to bemeasured, per FCC KDB 447498 D01v06 4.3.2), the following equation must be used to estimate thestandalone 1g SAR for simultaneous transmission assessment involving that transmitter.

$$\text{Estimated SAR} = \frac{\sqrt{f(GHz)}}{7.5} \cdot \frac{\text{Max. power of channel, mW}}{\text{Min. Separation Distance, mm}}$$

Mode	Max. tune-up Power (dBm)	Exposure Position	Body
		Test Distance (mm)	0
Bluetooth	7	Estimated SAR (W/kg)	0.208

Note:

1. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm according is applied to determine estimated SAR.

➢ **Multi-Band simultaneous Transmission Consideration**

Simultaneous Transmission Consideration	Position	Applicable Combination
	Body	WWAN + WLAN 2.4 GHz/ WLAN 5.2 GHz
		WWAN + Bluetooth

Note:

1. WLAN 2.4GHz Band ,WLAN 5.2GHz and Bluetooth share the same antenna, and cannot transmit simultaneously.
2. GSM/WCDMA/LTE shares the same antenna, and cannot transmit simultaneously.
3. The Report SAR summation is calculated based on the same configuration and test position.
4. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
   i. Scalar SAR summation < 1.6W/kg.
   ii. SPLSR = $(SAR_1 + SAR_2)^{1.5}$ / (*min. separation distance, mm*), and the peak separation distance is determinedfrom the square root of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$, where (x_1, y_1, z_1) and (x_2, y_2, z_2) are the coordinates of theextrapolated peak SAR locations in the zoom scanIf SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary
   iii. Simultaneously transmission SAR measurement, and the Reported multi-band SAR < 1.6W/kg

15.3 SAR Simultaneous Transmission Analysis

➢ **Body mode Simultaneous Transmission**

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
GSM850	Front	/	/	/
	Back	0.737	0.533	1.270
	Left	0.091	/	0.091
	Right	/	/	/
	Top	0.313	0.107	0.420
	Bottom	/	/	/

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	ΣSAR (W/kg)
GSM850	Front	/	0.208	0.208
	Back	0.737	0.208	0.945
	Left	0.091	0.208	0.299
	Right	/	0.208	0.208
	Top	0.313	0.208	0.521
	Bottom	/	0.208	0.208

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
GSM 1900	Front	/	/	/
	Back	0.675	0.533	1.208
	Left	0.027	/	0.027
	Right	/	/	/
	Top	0.226	0.107	0.333
	Bottom	/	/	/

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	ΣSAR (W/kg)
GSM 1900	Front	/	0.208	0.208
	Back	0.675	0.208	0.883
	Left	0.027	0.208	0.235
	Right	/	0.208	0.208
	Top	0.226	0.208	0.434
	Bottom	/	0.208	0.208

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
WCDMA Band V	Front	/	/	/
	Back	0.565	0.533	1.098
	Left	0.098	/	0.098
	Right	/	/	/
	Top	0.275	0.107	0.382
	Bottom	/	/	/

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	ΣSAR (W/kg)
WCDMA Band V	Front	/	0.208	0.208
	Back	0.565	0.208	0.773
	Left	0.098	0.208	0.306
	Right	/	0.208	0.208
	Top	0.275	0.208	0.483
	Bottom	/	0.208	0.208

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
WCDMA Band II	Front	/	/	/
	Back	0.680	0.533	1.213
	Left	0.033	/	0.033
	Right	/	/	/
	Top	0.237	0.107	0.344
	Bottom	/	/	/

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	ΣSAR (W/kg)
WCDMA Band II	Front	/	0.208	0.208
	Back	0.680	0.208	0.888
	Left	0.033	0.208	0.241
	Right	/	0.208	0.208
	Top	0.237	0.208	0.445
	Bottom	/	0.208	0.208

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
LTE Band 2	Front	/	/	/
	Back	0.748	0.533	1.281
	Left	0.041	/	0.041
	Right	/	/	/
	Top	0.259	0.107	0.366
	Bottom	/	/	/

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	ΣSAR (W/kg)
LTE Band 2	Front	/	0.208	0.208
	Back	0.748	0.208	0.956
	Left	0.041	0.208	0.249
	Right	/	0.208	0.208
	Top	0.259	0.208	0.467
	Bottom	/	0.208	0.208

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
LTE Band 4	Front	/	/	/
	Back	0.359	0.533	0.892
	Left	0.069	/	0.069
	Right	/	/	/
	Top	0.226	0.107	0.333
	Bottom	/	/	/

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	ΣSAR (W/kg)
LTE Band 4	Front	/	0.208	0.208
	Back	0.359	0.208	0.567
	Left	0.069	0.208	0.277
	Right	/	0.208	0.208
	Top	0.226	0.208	0.434
	Bottom	/	0.208	0.208

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
LTE Band 7	Front	/	/	/
	Back	0.568	0.533	1.101
	Left	0.066	/	0.066
	Right	/	/	/
	Top	0.116	0.107	0.223
	Bottom	/	/	/

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	Bluetooth Estimated SAR_{1g} (W/kg)	ΣSAR (W/kg)
LTE Band 7	Front	/	0.208	0.208
	Back	0.568	0.208	0.776
	Left	0.066	0.208	0.274
	Right	/	0.208	0.208
	Top	0.116	0.208	0.324
	Bottom	/	0.208	0.208

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	5.2GHz WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
GSM850	Front	/	/	/
	Back	0.737	0.139	0.876
	Left	0.091	/	0.091
	Right	/	/	/
	Top	0.313	0.058	0.371
	Bottom	/	/	/

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	5.2GHz WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
GSM 1900	Front	/	/	/
	Back	0.675	0.139	0.814
	Left	0.027	/	0.027
	Right	/	/	/
	Top	0.226	0.058	0.284
	Bottom	/	/	/

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	5.2GHz WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
WCDMA Band V	Front	/	/	/
	Back	0.565	0.139	0.704
	Left	0.098	/	0.098
	Right	/	/	/
	Top	0.275	0.058	0.333
	Bottom	/	/	/

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	5.2GHz WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
WCDMA Band II	Front	/	/	/
	Back	0.680	0.139	0.819
	Left	0.033	/	0.033
	Right	/	/	/
	Top	0.237	0.058	0.295
	Bottom	/	/	/

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	5.2GHz WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
LTE Band 2	Front	/	/	/
	Back	0.748	0.139	0.887
	Left	0.041	/	0.041
	Right	/	/	/
	Top	0.259	0.058	0.317
	Bottom	/	/	/

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	5.2GHz WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
LTE Band 4	Front	/	/	/
	Back	0.359	0.139	0.498
	Left	0.069	/	0.069
	Right	/	/	/
	Top	0.226	0.058	0.284
	Bottom	/	/	/

WWAN Mode	Position	WWAN SAR_{1g} (W/kg)	5.2GHz WLAN SAR_{1g} (W/kg)	ΣSAR (W/kg)
LTE Band 7	Front	/	/	/
	Back	0.568	0.139	0.707
	Left	0.066	/	0.066
	Right	/	/	/
	Top	0.116	0.058	0.174
	Bottom	/	/	/

- **Simultaneous Transmission Conclusion**

The above numerical summed SAR results for all the case simultaneous transmission conditionswere below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneoustransmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneousSAR summation is required per FCC KDB Publication 447498 D01v06.

15.4 Measurement Uncertainty

The component of uncertainly may generally be categorized according to the methods used to evaluate them. Theevaluation of uncertainly by the statistical analysis of a series of observations is termed a Type A evaluation ofuncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation istermed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by anestimated standard deviation, termed standard uncertainty, which is determined by the positive square root of theestimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. Thisincludes calculating the standard deviation of the mean of a series of independent observations; using the method ofleast squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; orcarrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A Type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevantinformation available. These may include previous measurement data, experience, and knowledge of the behaviorand properties of relevant materials and instruments, manufacture's specification, data provided in calibration reportsand uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is eitherobtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution,rectangular or triangular distributions indicated in below Table.

UncertaintyDistributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor	1/k(b)	$1/\sqrt{3}$	$1/\sqrt{6}$	$1/\sqrt{2}$

Standard Uncertainty for Assumed Distribution

The combined standard uncertainty of the measurement result represents the estimated standard deviation of theresult. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation usingthe usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root ofthe estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within whichthe measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by acoverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of ameasured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of thisdocument, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASYuncertainty Budget is shown in the following tables.

Uncertainty Component	Section	Uncert. Value	Prob. Dist.	Div.	(C_i) (1 g)	(C_i) (10 g)	Std. Unc. (1 g)	Std. Unc. (10 g)	V_i
Measurement System									
Probe Calibration	E.2.1	±7.4%	N	1	1	1	±7.4%	±7.4%	∞
Axial Isotropy	E.2.2	±1.2%	R	$\sqrt{3}$	0.7	0.7	±0.49%	±0.49%	∞
Hemispherical Isotropy	E.2.2	±3.2%	R	$\sqrt{3}$	0.7	0.7	±1.29%	±1.29%	∞
Boundary Effects	E.2.3	±1.0%	R	$\sqrt{3}$	1	1	±0.58%	±0.58%	∞
Linearity	E.2.4	±0.9%	R	$\sqrt{3}$	1	1	±0.52%	±0.52%	∞
System Detection Limits	E.2.5	±0.25%	R	$\sqrt{3}$	1	1	±0.14%	±0.14%	∞
Readout Electronics	E.2.6	±0.3%	N	1	1	1	±0.3%	±0.3%	∞
Response Time	E.2.7	±0.8%	R	$\sqrt{3}$	1	1	±0.46%	±0.46%	∞
Integration Time	E.2.8	±2.6%	R	$\sqrt{3}$	1	1	±1.5%	±1.5%	∞
RF Ambient Noise	E.6.1	±3.0%	R	$\sqrt{3}$	1	1	±1.73%	±1.73%	∞
RF Ambient Reflections	E.6.1	±3.0%	R	$\sqrt{3}$	1	1	±1.73%	±1.73%	∞
Probe positioner mechanical tolerances	E.6.2	±0.4%	R	$\sqrt{3}$	1	1	±0.23%	±0.23%	∞
Probe positioning tolerance with respect to the phantom shell surface	E.6.3	±2.9%	R	$\sqrt{3}$	1	1	±1.68%	±1.68%	∞
Interpolation, extrapolation, and integration algorithm For max. SAR Evaluation.	E.5	±1.0%	R	$\sqrt{3}$	1	1	±0.58%	±0.58%	∞
Test Sample Related									
Device Positioning	E.4.2	±4.6%	N	1	1	1	±4.6%	±4.6%	M-1
Device Holder	E.4.1	±5.2%	N	1	1	1	±5.2%	±5.2%	M-1
Power Drift	6.6.2	±5.0%	R	$\sqrt{3}$	1	1	±2.89%	±2.89%	∞
Phantom and Setup									
Phantom Uncertainty	E.3.1	±4.0%	R	$\sqrt{3}$	1	1	±2.31%	±2.31%	∞
Liquid conductivity (measured value)	E.3.3	±2.97%	N	1	0.78	0.71	±2.32%	±2.11%	M
Liquid dielectric constant (measured value)	E.3.3	±3.08%	N	1	0.23	0.26	±0.71%	±0.8%	M
Liquid Conductivity - Temperature Uncertainty	E.3.4	±1.3%	R	$\sqrt{3}$	0.78	0.71	±0.59%	±0.53%	∞
Liquid Dielectric Constant - Temperature Uncertainty	E.3.4	±1.1%	R	$\sqrt{3}$	0.23	0.26	±0.15%	±0.17%	∞
Combined Standard Uncertainty (RSS)							±11.55%	±11.51%	
Expanded Uncertainty (95% Confidence Level, k = 2)							±23.11%	±23.01%	

Uncertainty Budget for frequency range 300 MHz to 3 GHz according to IEEE1528-2003

15.5 Measurement Conclusion

The SAR evaluation indicates that the EUT complies with the RF radiation exposure limits of the FCC and Industry Canada, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested. Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

16 Reference

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[2]. ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992

[3]. IEEE Std. 1528-2003, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, December 2003

[4]. SPEAG DASY52 System Handbook

[5]. FCC KDB 248227 D01 v02r02, “SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS”, October 2015

[6]. FCC KDB 447498 D01 v06, “RF EXPOSURE PROCEDURES AND EQUIPMENT AUTHORIZATION POLICIES FOR MOBILE AND PORTABLE DEVICES”, October 2015

[7]. FCC KDB 616217 D04v01r02, “SAR EVALUATION CONSIDERATIONSFOR LAPTOP, NOTEBOOK, NETBOOK AND TABLET COMPUTERS”, October 2015

[8]. FCC KDB 648474 D04 v01r03, “SAR EVALUATION CONSIDERATIONS FOR WIRELESS HANDSETS”, October 2015

[9]. FCC KDB 941225 D01 v03r01, “3G SAR MEAUREMENT PROCEDURES”, October 2015

[10]. FCC KDB 941225 D03 v01, “Recommended SAR Test Reduction Procedures for GSM / GPRS /EDGE”, December 2008

[11]. FCC KDB 941225 D06 v02r01, "SAR EVALUATION PROCEDURES FOR PORTABLE DEVICES WITH WIRELESS ROUTER CAPABILITIES", October 2015

[12]. FCC KDB 865664 D01 v01r04, “SAR MEASUREMENT REQUIREMENTS FOR 100 MHz TO 6 GHz”, August2015

Appendix A: Plots of SAR System Check

Test Laboratory: JYTSZ Date: 09.07.2021

DUT: Dipole 835 MHz; Type: D835V2; Serial: SN:4D154

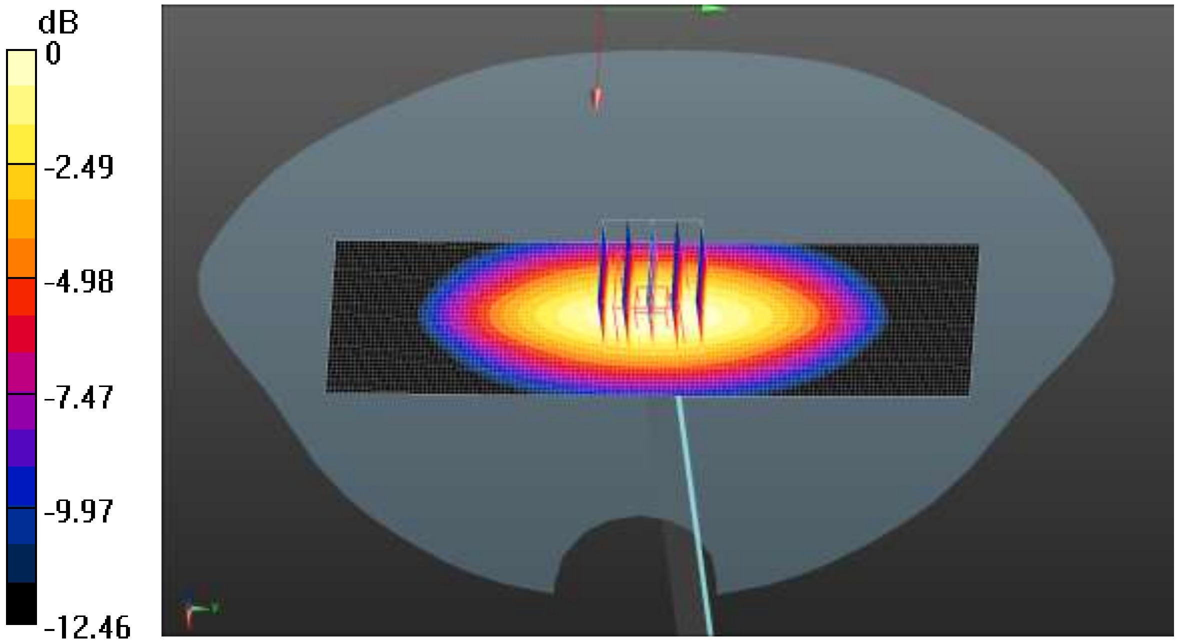
Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.918 S/m; ε_r = 41.926; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(9.71, 9.71, 9.71) @ 835 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

System Performance Check at Frequency 835 MHz Head Tissue/d=15mm, Pin=80 mW, dist=1.4mm (EX-Probe)/Area Scan (41x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.18 W/kg

System Performance Check at Frequency 835 MHz Head Tissue/d=15mm, Pin=80 mW, dist=1.4mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 35.83 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.42 W/kg
SAR(1 g) = 0.780 W/kg; SAR(10 g) = 0.510 W/kg
Smallest distance from peaks to all points 3 dB below = 12.6 mm
Ratio of SAR at M2 to SAR at M1 = 52.6%
Maximum value of SAR (measured) = 1.22 W/kg



0 dB = 1.22 W/kg = 0.86 dBW/kg

Test Laboratory: JYTSZ Date: 09.05.2021

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: SN:1177

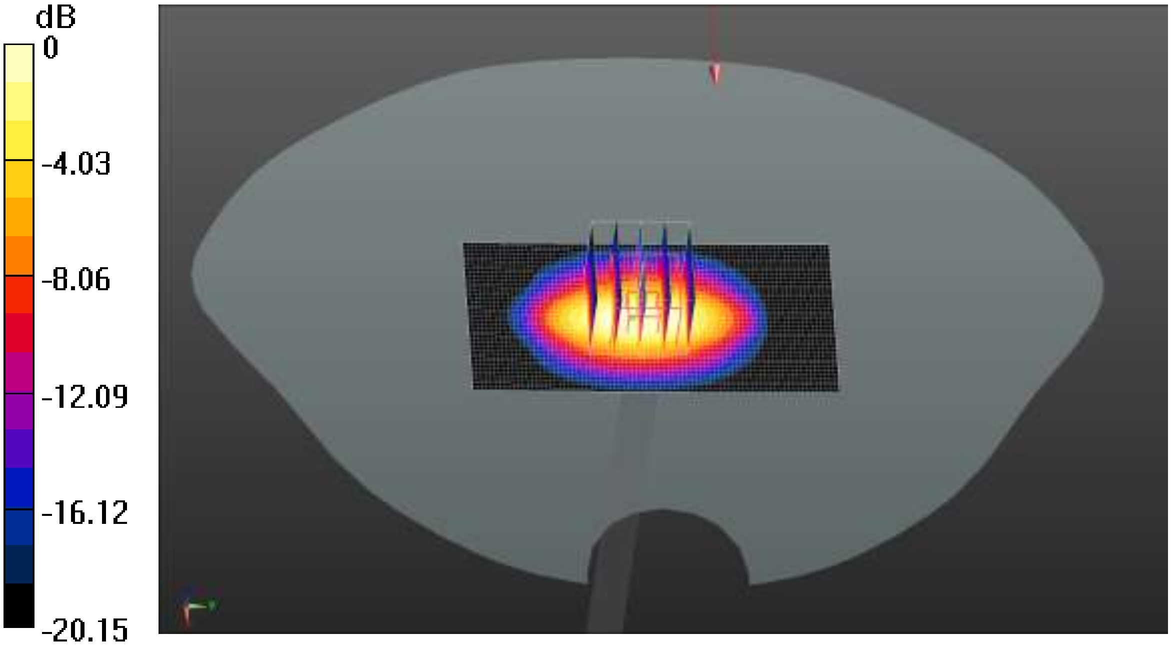
Communication System: UID 0, CW (0); Frequency: 1750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1750 MHz; σ = 1.352 S/m; ε_r = 41.074; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.43, 8.43, 8.43) @ 1750 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

System Performance Check at Frequency 1750 MHz Head Tissue/d=10mm, Pin=40 mW, dist=1.4mm (EX-Probe)/Area Scan (41x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.05 W/kg

System Performance Check at Frequency 1750 MHz Head Tissue/d=10mm, Pin=40 mW, dist=1.4mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 41.44 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 2.71 W/kg
SAR(1 g) = 1.39 W/kg; SAR(10 g) = 0.733 W/kg
Smallest distance from peaks to all points 3 dB below = 8.8 mm
Ratio of SAR at M2 to SAR at M1 = 45.3%
Maximum value of SAR (measured) = 2.16 W/kg



0 dB = 2.16 W/kg = 3.34 dBW/kg

Test Laboratory: JYTSZ Date: 09.05.2021

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: SN:5d175

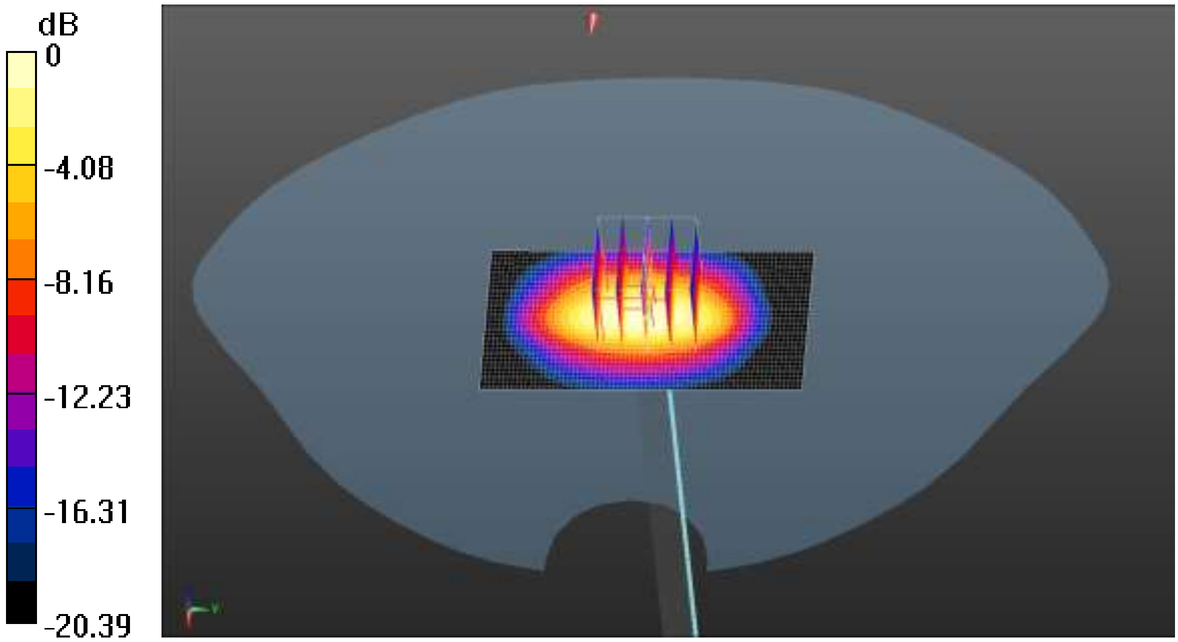
Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.409 S/m; ε_r = 39.143; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.14, 8.14, 8.14) @ 1900 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

System Performance Check at Frequency 1900 MHz Head Tissue/d=10mm, Pin=40 mW, dist=1.4mm (EX-Probe)/Area Scan (41x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 2.25 W/kg

System Performance Check at Frequency 1900 MHz Head Tissue/d=10mm, Pin=40 mW, dist=1.4mm (EX-Probe)/Zoom Scan (7x7x7) (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 39.81 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 3.13 W/kg
SAR(1 g) = 1.52 W/kg; SAR(10 g) = 0.805 W/kg
Smallest distance from peaks to all points 3 dB below = 10.2 mm
Ratio of SAR at M2 to SAR at M1 = 42.8%
Maximum value of SAR (measured) = 2.33 W/kg



0 dB = 2.33 W/kg = 3.67 dBW/kg

Test Laboratory: JYTSZ   Date: 09.11.2021

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: SN:910

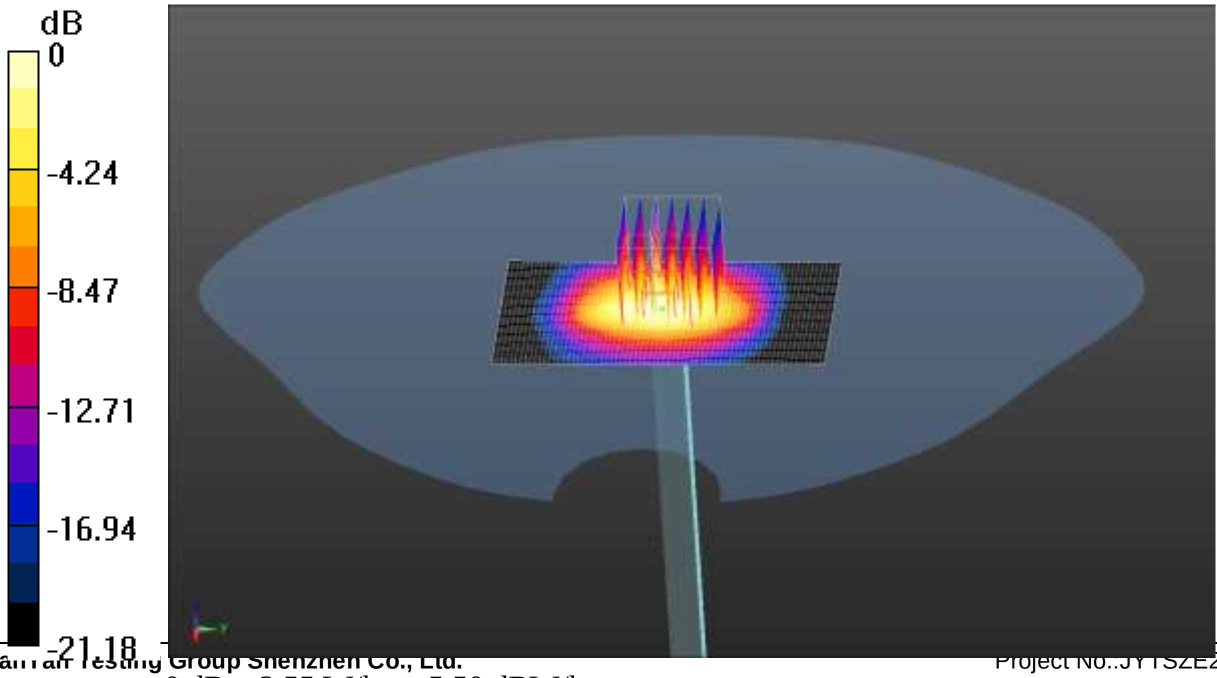
Communication System: UID 0, CW (0); Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.863 S/m; ε_r = 40.044; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(7.58, 7.58, 7.58) @ 2450 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

System Performance Check at Frequency 2450 MHz Head Tissue/d=10mm, Pin=40 mW, dist=1.4mm (EX-Probe)/Area Scan (41x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 3.95 W/kg

System Performance Check at Frequency 2450 MHz Head Tissue/d=10mm, Pin=40 mW, dist=1.4mm (EX-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 45.33 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 4.68 W/kg
SAR(1 g) = 2.18 W/kg; SAR(10 g) = 0.974 W/kg
Smallest distance from peaks to all points 3 dB below = 8.1 mm
Ratio of SAR at M2 to SAR at M1 = 42.2%
Maximum value of SAR (measured) = 3.55 W/kg



0 dB = 3.55 W/kg = 5.50 dBW/kg

Test Laboratory: JYTSZ Date: 09.11.2021

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: SN:1114

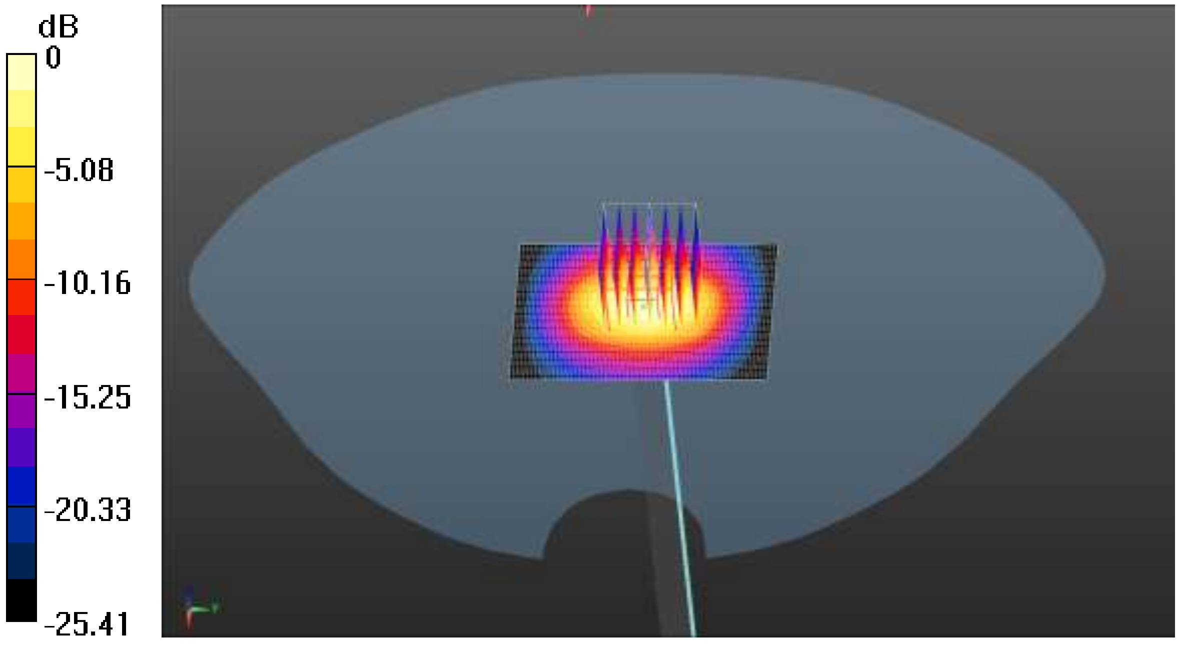
Communication System: UID 0, CW (0); Frequency: 2600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 2.011 S/m; ε_r = 39.691; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(7.35, 7.35, 7.35) @ 2600 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

System Performance Check at Frequency 2600 MHz Head Tissue/d=10mm, Pin=40 mW, dist=1.4mm (EX-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 42.11 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 5.05 W/kg
SAR(1 g) = 2.31 W/kg; SAR(10 g) = 0.997 W/kg
Smallest distance from peaks to all points 3 dB below = 8.2 mm
Ratio of SAR at M2 to SAR at M1 = 45.6%
Maximum value of SAR (measured) = 3.43 W/kg

System Performance Check at Frequency 2600 MHz Head Tissue/d=10mm, Pin=40 mW, dist=1.4mm (EX-Probe)/Area Scan (51x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 4.29 W/kg



0 dB = 4.29 W/kg = 6.32 dBW/kg

Test Laboratory: CCIS Date: 09.12.2021

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: SN:1182

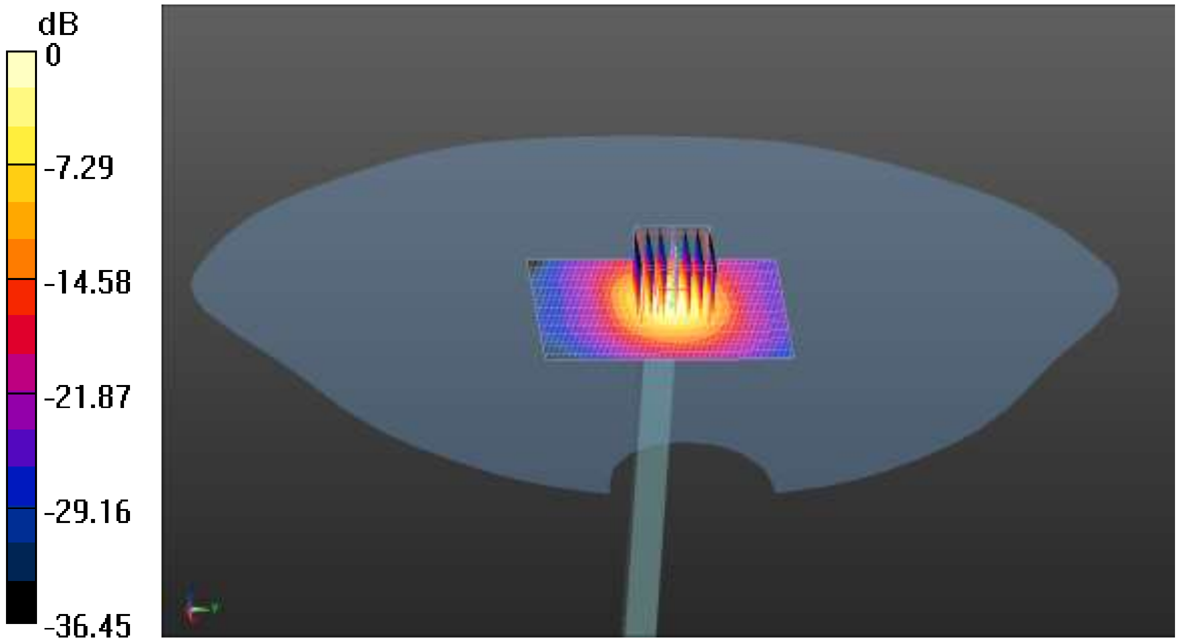
Communication System: UID 0, CW (0); Frequency: 5200 MHz;Duty Cycle: 1:1
Medium parameters used: f = 5200 MHz; σ = 4.768 S/m; ε_r = 36.781; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(5.42, 5.42, 5.42) @ 5200 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

System Performance Check at Frequency 5GHz Head Tissue/d=10mm, Pin=80 mW, dist=2.0mm (EX-Probe)/Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 13.9 W/kg

System Performance Check at Frequency 5GHz Head Tissue/d=10mm, Pin=80 mW, dist=2.0mm (EX-Probe)/Zoom Scan (8x8x7) (7x7x12)/Cube 0:
Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 62.28 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 22.3 W/kg
SAR(1 g) = 6.22 W/kg; SAR(10 g) = 1.85 W/kg
Smallest distance from peaks to all points 3 dB below = 7.2 mm
Ratio of SAR at M2 to SAR at M1 = 51.8%
Maximum value of SAR (measured) = 14.6 W/kg



0 dB = 14.6 W/kg = 11.64 dBW/kg

Appendix B: Plots of SAR Test Data

Test Laboratory: JYTSZ   Date: 09.07.2021

DUT: Tablet PC; Type: Tab64; Serial: 8#

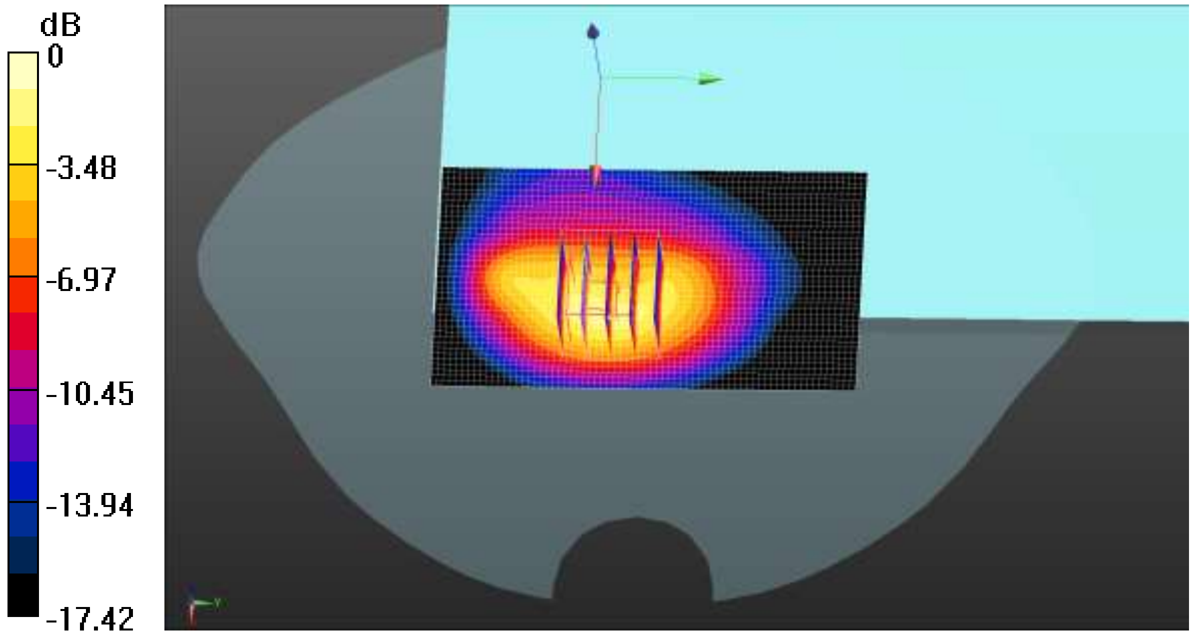
Communication System: UID 0, GPRS(2 Slots) (0); Frequency: 848.8 MHz;Duty Cycle: 1:4.10015
Medium parameters used (interpolated): f = 848.8 MHz; σ = 0.93 S/m; ε_r = 41.946; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(9.71, 9.71, 9.71) @ 848.8 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

GPRS 850 2Slots Body Back/High Channel/Area Scan (41x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.660 W/kg

GPRS 850 2Slots Body Back/High Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.49 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.52 W/kg
SAR(1 g) = 0.674 W/kg; SAR(10 g) = 0.338 W/kg
Smallest distance from peaks to all points 3 dB below = 6.4 mm
Ratio of SAR at M2 to SAR at M1 = 43.8%
Maximum value of SAR (measured) = 0.957 W/kg



0 dB = 0.957 W/kg = -0.19 dBW/kg

Test Laboratory: JYTSZ Date: 09.05.2021

DUT: Tablet PC; Type: Tab64; Serial: 8#

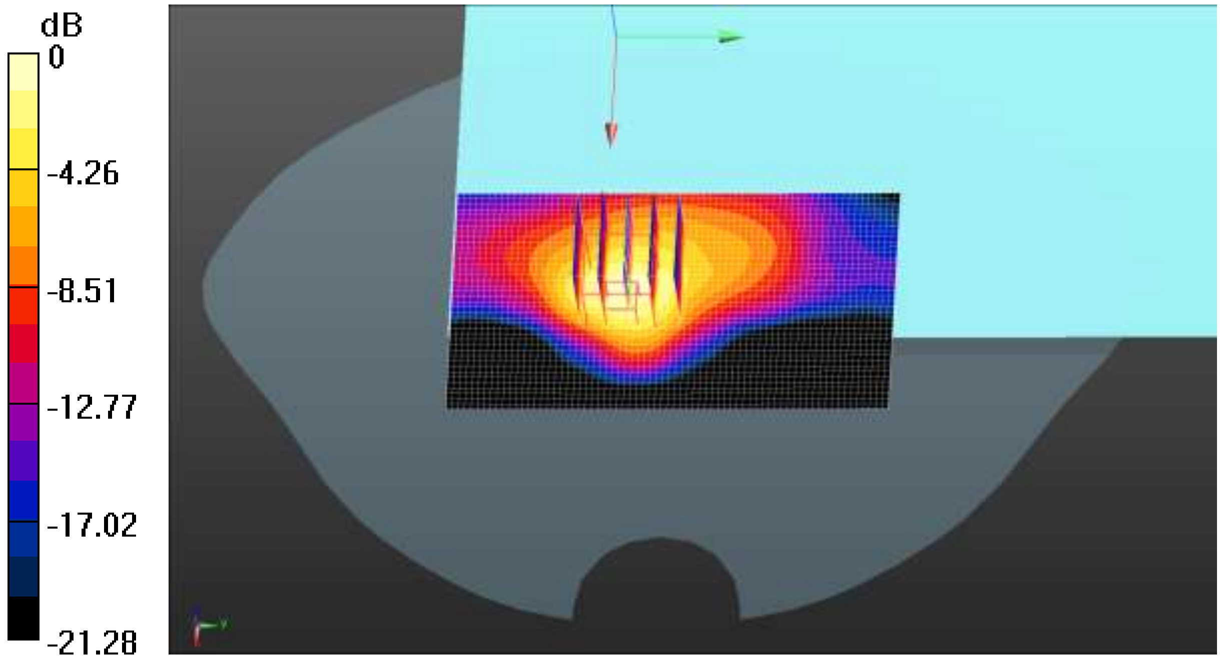
Communication System: UID 0, GPRS(4 Slots) (0); Frequency: 1909.8 MHz;Duty Cycle: 1:1.99986
Medium parameters used: f = 1910 MHz; σ = 1.412 S/m; ε_r = 38.97; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.14, 8.14, 8.14) @ 1909.8 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

GPRS 1900 4Slots Body Back/High Channel/Area Scan (41x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.949 W/kg

GPRS 1900 4Slots Body Back/High Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.73 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 1.45 W/kg
SAR(1 g) = 0.643 W/kg; SAR(10 g) = 0.307 W/kg
Smallest distance from peaks to all points 3 dB below = 8.6 mm
Ratio of SAR at M2 to SAR at M1 = 41.8%
Maximum value of SAR (measured) = 1.07 W/kg



0 dB = 1.07 W/kg = 0.29 dBW/kg

Test Laboratory: JYTSZ Date: 09.07.2021

DUT: Tablet PC; Type: Tab64; Serial: 8#

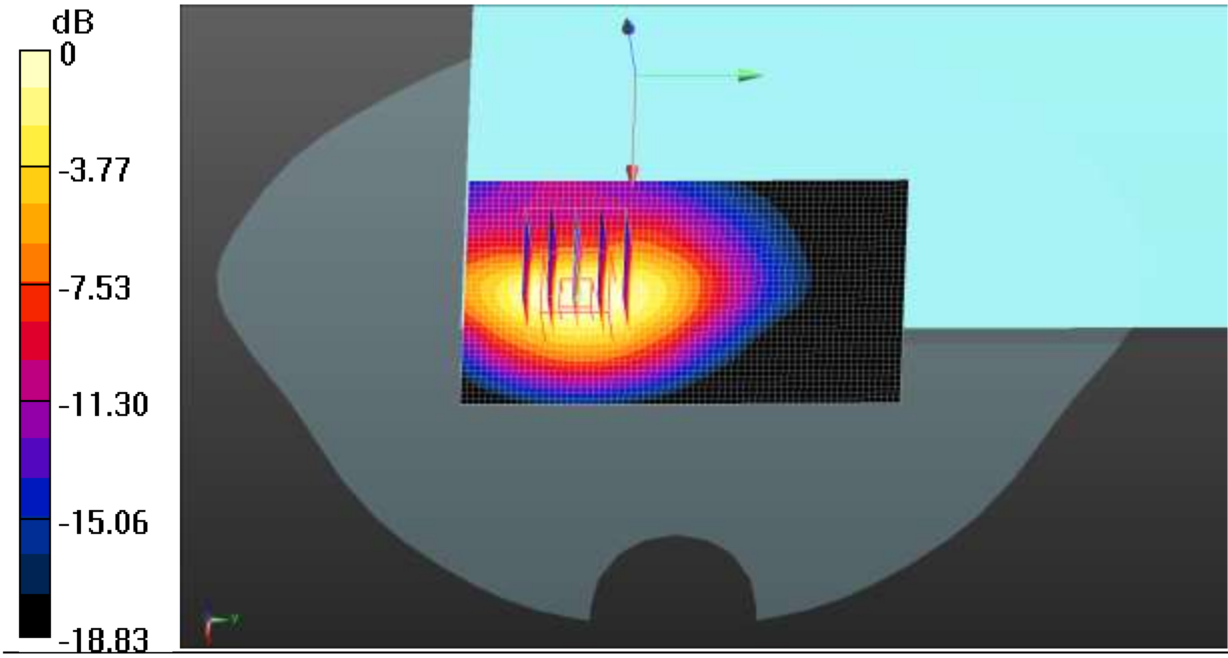
Communication System: UID 0, UMTS-FDD(WCDMA) (0); Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.922 S/m; ε_r = 41.935; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(9.71, 9.71, 9.71) @ 836.6 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

WCDMA 850 Body Back/Middle Channel/Area Scan (41x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.732 W/kg

WCDMA 850 Body Back/Middle Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.92 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.13 W/kg
SAR(1 g) = 0.506 W/kg; SAR(10 g) = 0.254 W/kg
Smallest distance from peaks to all points 3 dB below = 6.4 mm
Ratio of SAR at M2 to SAR at M1 = 44.4%
Maximum value of SAR (measured) = 0.785 W/kg



0 dB = 0.785 W/kg = -1.05 dBW/kg

Test Laboratory: JYTSZ Date: 09.05.2021

DUT: Tablet PC; Type: Tab64; Serial: 8#

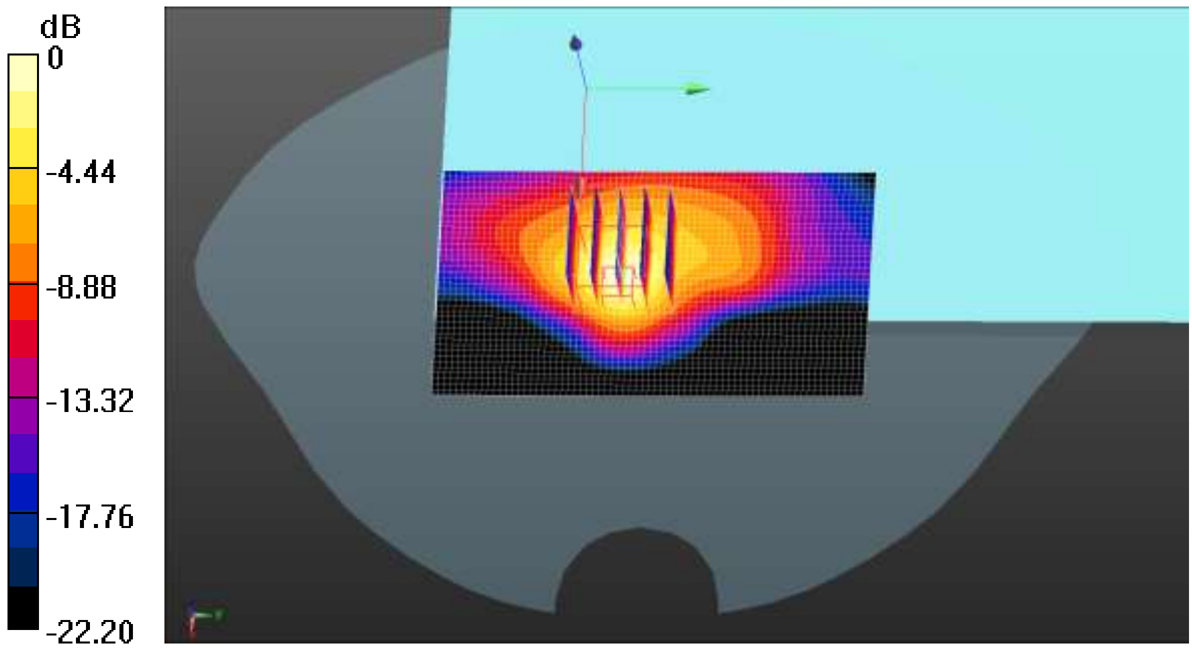
Communication System: UID 0, UMTS-FDD(WCDMA) (0); Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1907.6 MHz; σ = 1.412 S/m; ε_r = 39.012; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3924; ConvF(8.14, 8.14, 8.14) @ 1907.6 MHz; Calibrated: 09.23.2020
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1452; Calibrated: 05.26.2021
- Phantom: SAM 5.0; Type: QD000P40CD; Serial: TP:1765
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

WCDMA 1900 Body Back/High Channel/Area Scan (41x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.13 W/kg

WCDMA 1900 Body Back/High Channel/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.78 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.50 W/kg
SAR(1 g) = 0.632 W/kg; SAR(10 g) = 0.297 W/kg
Smallest distance from peaks to all points 3 dB below = 8 mm
Ratio of SAR at M2 to SAR at M1 = 40.8%
Maximum value of SAR (measured) = 1.17 W/kg



0 dB = 1.17 W/kg = 0.68 dBW/kg