2.4 Probe description

These probes are specially designed and calibrated for use in liquids with high permittivities. They should not be used in air, since the spherical isotropy in air is poor (±2 dB). The dosimetric probes have special calibrations in various liquids at different frequencies.

Isotropic E-Field Probe ES3DV3 for Dosimetric Measurements

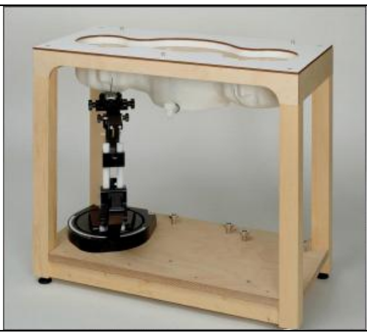
Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	 
Calibration	ISO/IEC 17025 calibration service available.	
Frequency	10 MHz to 4 GHz; Linearity: ± 0.2 dB (30 MHz to 4 GHz)	
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)	
Dynamic range	5 µW/g to > 100 mW/g; Linearity: ± 0.2 dB	
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm	
Application	General dosimetry up to 4 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones	

Isotropic E-Field Probe EX3DV4 for Dosimetric Measurements

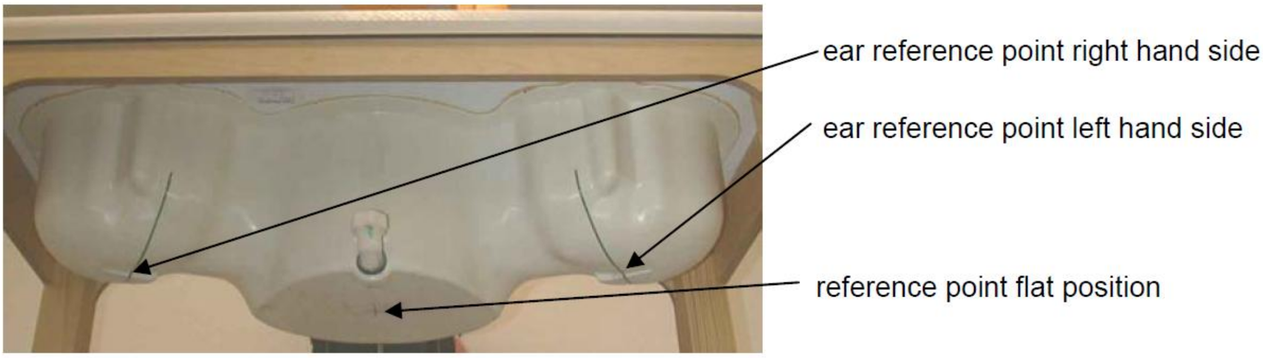
Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	 
Calibration	ISO/IEC 17025 calibration service available.	
Frequency	10 MHz to >6 GHz; Linearity: ± 0.2 dB (30 MHz to 6 GHz)	
Directivity	± 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<1µW/g)	
Dimensions	Overall length: 337 mm (Tip:20 mm) Tip diameter:2.5 mm (Body:12 mm) Typical distance from probe tip to dipole centers: 1mm	
Application	High precision dosimetric measurements in any exposure scenario(e.g.,very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%	

2.5 Phantom description

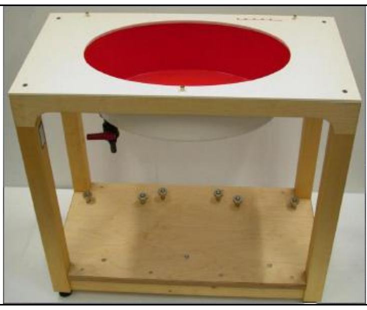
SAM Twin Phantom

Shell Thickness	2mm±0.2mm;The ear region:6.0±0.2mm	
Filling Volume	Approximately 25 liters	
Dimensions	Length:1000mm; Width:500mm; Height: adjustable feet	
Measurement Areas	Left hand Right hand Flat phantom	
The bottom plate contains three pairs of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to cover the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. Free space scans of devices on top of this phantom cover are possible. Three reference marks are provided on the phantom counter. These reference marks are used to teach the absolute phantom position relative to the robot.		

The following figure shows the definition of reference point:



ELI4 Phantom

Shell Thickness	2mm±0.2mm	
Filling Volume	Approximately 30 liters	
Dimensions	Major axis:600mm; Minor axis:400mm;	
Measurement Areas	Flat phantom	
The ELI4 phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30MHz to 6GHz. ELI4 is fully compatible with the latest draft of the standard IEC 62209-2 and all known tissue simulating liquids.		

The phantom shell material is resistant to all ingredients used in the tissue-equivalent liquid recipes. The shell of the phantom including ear spacers is constructed from low permittivity and low loss material, with a relative permittivity $2 \le \varepsilon_r \le 5$ at ≤3 GHz,$3 \le \varepsilon_r \le 4$ at >3 GHz and and a loss tangent ≤0.05.

2.6 Device holder description

The DASY5 device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65°. 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. This device holder is used for standard mobile phones or PDA's only. If necessary an additional support of polystyrene material is used.

The DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity ε =3 and loss tangent σ =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.
The device holder permits the device to be positioned with a tolerance of ±1° in the tilt angle.

Larger DUT's (e.g. notebooks) cannot be tested using this device holder. Instead a support of bigger polystyrene cubes and thin polystyrene plates is used to position the DUT in all relevant positions to find and measure spots with maximum SAR values.
Therefore those devices are normally only tested at the flat part of the SAM.

2.7 Test Equipment List

This table gives a complete overview of the SAR measurement equipment.
Devices used during the test described are marked ☒

	Manufacturer	Device	Type	Serial number	Date of last calibration	Valid period
☒	SPEAG	Dosimetric E-Field Probe	EX3DV4	3744	2014-07-24	One year
☐	SPEAG	750 MHz Dipole	D750V3	1044	2014-09-19	Three years
☒	SPEAG	835 MHz Dipole	D835V2	4d059	2013-05-02	Three years
☒	SPEAG	1750 MHz Dipole	D1750V2	1123	2014-07-08	Three years
☒	SPEAG	1900 MHz Dipole	D1900V2	5d143	2014-09-23	Three years
☒	SPEAG	2450 MHz Dipole	D2450V2	860	2014-01-23	Three years
☐	SPEAG	2600 MHz Dipole	D2600V2	1021	2014-07-16	Three years
☐	SPEAG	5GHz Dipole	D5GHzV2	1155	2014-04-24	Three years
☐	SPEAG	Data acquisition electronics	DAE4	852	2014-04-30	One year
☒	SPEAG	Data acquisition electronics	DAE4	851	2014-07-24	One year
☒	SPEAG	Software	DASY 5	N/A	NCR	NCR
☒	SPEAG	Twin Phantom	SAM1	TP-1475	NCR	NCR
☒	SPEAG	Twin Phantom	SAM2	TP-1474	NCR	NCR
☐	SPEAG	Twin Phantom	SAM3	TP-1597	NCR	NCR
☐	SPEAG	Twin Phantom	SAM4	TP-1620	NCR	NCR
☐	SPEAG	Flat Phantom	ELI 4.0	TP-1038	NCR	NCR
☐	SPEAG	Flat Phantom	ELI 5.0	TP-1111	NCR	NCR
☒	R & S	Universal Radio Communication Tester	CMU 200	111379	2014-07-11	One year
☐	R & S	Universal Radio Communication Tester	CMW 500	126855	2014-07-11	One year
☒	Agilent	Network Analyser	E5071C	MY46213349	2014-02-25	One year
☒	Agilent	Dielectric Probe Kit	85070E	2484	NCR	NCR
☒	Agilent	Signal Generator	N5181A	MY47420989	2014-01-18	One year
☒	MINI-CIRCUITS	Amplifier	ZHL-42W	QA1402001	NCR	NCR
☒	AR	Directional Coupler	DC7144M1	0423264	2014-04-02	One year
☒	R & S	Power Meter	NRP	100740	2014-07-11	One year
☒	R & S	Power Meter Sensor	NRP-Z11	106288	2014-07-11	One year
☒	Agilent	Power Meter	E4417A	MY45101339	2014-01-18	One year
☒	Agilent	Power Meter Sensor	E9321A	MY44420359	2014-01-18	One year

Note:
1) Per KDB865664D01 requirements for dipole calibration, the test laboratory has adopted three-year extended calibration interval. Each measured dipole is expected to evaluate with the following criteria at least on annual interval in Appendix C.
a) There is no physical damage on the dipole;
b) System check with specific dipole is within 10% of calibrated value;
c) The most recent return-loss result, measured at least annually, deviates by no more than 20% from the previous measurement.
d) The most recent measurement of the real or imaginary parts of the impedance, measured at least annually is within 5Ω from the previous measurement.
2) Network analyzer probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.

3 SAR Measurement Procedure

3.1 Scanning procedure

The DASY5 installation includes predefined files with recommended procedures for measurements and system check. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

- The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT’s output power and should vary max. +/- 5 %.

- The “surface check” measurement tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)

- The “area scan” measures the SAR above the DUT or verification dipole on a parallel plane to the surface. It is used to locate the approximate location of the peak SAR with 2D spline interpolation. The robot performs a stepped movement along one grid axis while the local electrical field strength is measured by the probe. The probe is touching the surface of the SAM during acquisition of measurement values. The standard scan uses large grid spacing for faster measurement. Standard grid spacing for head measurements is 15 mm in x- and y- dimension(≤2GHz)，12 mm in x- and y- dimension(2-4 GHz) and 10mm in x- and y- dimension(4-6GHz). If a finer resolution is needed, the grid spacing can be reduced. Grid spacing and orientation have no influence on the SAR result. For special applications where the standard scan method does not find the peak SAR within the grid, e.g. mobile phones with flip cover, the grid can be adapted in orientation.
  Results of this coarse scan are shown in Appendix B.

- A “zoom scan” measures the field in a volume around the 2D peak SAR value acquired in the previous “coarse” scan. This is a fine grid with maximum scan spatial resolution: Δx_{zoom}, Δy_{zoom}≤ 2GHz - ≤8mm, 2-4GHz - ≤5 mm and 4-6 GHz-≤4mm; Δz_{zoom} ≤3GHz - ≤5 mm, 3-4 GHz- ≤4mm and 4-6GHz-≤2mm where the robot additionally moves the probe along the z-axis away from the bottom of the Phantom. DASY is also able to perform repeated zoom scans if more than 1 peak is found during area scan. In this document, the evaluated peak 1g and 10g averaged SAR values are shown in the 2D-graphics in Appendix B. Test results relevant for the specified standard (see chapter 1.4.)are shown in table form form in chapter 7.2.

- A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 2 mm steps. This measurement shows the continuity of the liquid and can - depending in the field strength – also show the liquid depth. A z-axis scan of the measurement with maximum SAR value is shown in Appendix B.

The following table summarizes the area scan and zoom scan resolutions per FCC KDB 865664D01:

Frequency	Maximun Area Scan resolution (Δx_{area}, Δy_{area})	Maximun Zoom Scan spatial resolution (Δx_{Zoom}, Δy_{Zoom})	Maximun Zoom Scan spatial resolution			Minimum zoom scan volume (x,y,z)
			Uniform Grid	Graded Grad		
			$\Delta z_{Zoom}(n)$	$\Delta z_{Zoom}(1)$*	$\Delta z_{Zoom}(n>1)$*	
≤2GHz	≤15mm	≤8mm	≤5mm	≤4mm	≤1.5*$\Delta z_{Zoom}(n-1)$	≥30mm
2-3GHz	≤12mm	≤5mm	≤5mm	≤4mm	≤1.5*$\Delta z_{Zoom}(n-1)$	≥30mm
3-4GHz	≤12mm	≤5mm	≤4mm	≤3mm	≤1.5*$\Delta z_{Zoom}(n-1)$	≥28mm
4-5GHz	≤10mm	≤4mm	≤3mm	≤2.5mm	≤1.5*$\Delta z_{Zoom}(n-1)$	≥25mm
5-6GHz	≤10mm	≤4mm	≤2mm	≤2mm	≤1.5*$\Delta z_{Zoom}(n-1)$	≥22mm

3.2 Spatial Peak SAR Evaluation

The spatial peak SAR - value for 1 and 10 g is evaluated after the Cube measurements have been done. The basis of the evaluation are the SAR values measured at the points of the fine cube grid consisting of 5 x 5 x 7 points(with 8mm horizontal resolution) or 7 x 7 x 7 points(with 5mm horizontal resolution) or 8 x 8 x 7 points(with 4mm horizontal resolution). The algorithm that finds the maximal averaged volume is separated into three different stages.

- The data between the dipole center of the probe and the surface of the phantom are extrapolated. This data cannot be measured since the center of the dipole is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is about 1 mm (see probe calibration sheet). The extrapolated data from a cube measurement can be visualized by selecting 'Graph Evaluated'.

- The maximum interpolated value is searched with a straight-forward algorithm. Around this maximum the SAR - values averaged over the spatial volumes (1g or 10 g) are computed using the 3d-spline interpolation algorithm. If the volume cannot be evaluated (i.e., if a part of the grid was cut off by the boundary of the measurement area) the evaluation will be started on the corners of the bottom plane of the cube.

- All neighboring volumes are evaluated until no neighboring volume with a higher average value is found.

Extrapolation

The extrapolation is based on a least square algorithm [W. Gander, Computermathematik, p.168-180]. Through the points in the first 3 cm along the z-axis, polynomials of order four are calculated. These polynomials are then used to evaluate the points between the surface and the probe tip. The points, calculated from the surface, have a distance of 1 mm from each other.

Interpolation

The interpolation of the points is done with a 3d-Spline. The 3d-Spline is composed of three one-dimensional splines with the "Not a knot"-condition [W. Gander, Computermathematik, p.141-150] (x, y and z -direction) [Numerical Recipes in C, Second Edition, p.123ff].

Volume Averaging

At First the size of the cube is calculated. Then the volume is integrated with the trapezoidal algorithm. 8000 points (20x20x20) are interpolated to calculate the average.

Advanced Extrapolation

DASY5 uses the advanced extrapolation option which is able to compansate boundary effects on E-field probes.

3.3 Data Storage and Evaluation

Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension "DAE4". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

Data Evaluation by SEMCAD

The SEMCAD software 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 factor	$ConvF_i$
	- Diode compression point	Dcpi
Device parameters:	- Frequency	f
	- Crest factor	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 DASY5 components. In the direct measuring mode of the multimeter 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:

$$V_i = U_i + U_i^2 \bullet cf/dcp_i$$

with V_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: $E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$
H-field probes: $H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1}f + a_{i2}f^2)/f$

with V_i = compensated signal of channel i (i = x, y, z)
$Norm_i$ = sensor sensitivity of channel i (i = x, y, z) [mV/(V/m)^2] for E-field Probes
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
H_i = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = (E_x^2 + E_Y^2 + E_z^2)^{1/2}$$

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

$$SAR = (E_{tot}^2 \cdot \sigma) / (\rho \cdot 1000)$$

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 = equivalent tissue density in g/cm^3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid.The power flow density is calculated assuming the excitation field to be a free space field.

$P_{pwe} = E_{tot}^2 / 3770$ or $P_{pwe} = H_{tot}^2 \cdot 37.7$

with P_{pwe} = equivalent power density of a plane wave in mW/cm^2
E_{tot} = total electric field strength in V/m
H_{tot} = total magnetic field strength in A/m

4 System Verification Procedure

4.1 Tissue Verification

The simulating liquids should be checked at the beginning of a series of SAR measurements to determine of the dielectic parameter are within the tolerances of the specified target values. The measured conductivity and relative permittivity should be within ± 5% of the target values.

The following materials are used for producing the tissue-equivalent materials.

Ingredients (% of weight)	Head Tissue					
Frequency Band (MHz)	750	**835**	**1750**	**1900**	**2450**	2600
Water	39.2	41.45	52.64	55.242	62.7	55.242
Salt (NaCl)	2.7	1.45	0.36	0.306	0.5	0.306
Sugar	57.0	56.0	0.0	0.0	0.0	0.0
HEC	0.0	1.0	0.0	0.0	0.0	0.0
Bactericide	0.0	0.1	0.0	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0
DGBE	0.0	0.0	47.0	44.542	36.8	44.452
Ingredients (% of weight)	Body Tissue					
Frequency Band (MHz)	750	**835**	**1750**	**1900**	**2450**	2600
Water	50.3	52.4	69.91	69.91	73.2	64.493
Salt (NaCl)	1.60	1.40	0.13	0.13	0.04	0.024
Sugar	47.0	45.0	0.0	0.0	0.0	0.0
HEC	0.0	1.0	0.0	0.0	0.0	0.0
Bactericide	0.0	0.1	0.0	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0
DGBE	0.0	0.0	29.96	29.96	26.7	32.252

Table 4: Tissue Dielectric Properties

Salt: 99+% Pure Sodium Chloride; Sugar: 98+% Pure Sucrose; Water: De-ionized, 16MΩ+ resistivity
HEC: Hydroxyethyl Cellulose; DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]
Triton X-100(ultra pure): Polyethylene glycol mono [4-(1,1,3,3-tetramethylbutyl)phenyl]ether

Tissue Type	Measured Frequency （MHz）	Target Tissue		Measured Tissue		Liquid Temp.	Test Date
		εr (+/-5%)	σ (S/m) (+/-5%)	εr	σ (S/m)		
835H	825	41.60 (39.52~43.68)	0.90 (0.86~0.95)	40.11	0.884	21.4°C	2014-12-23
	835	41.50 (39.43~43.58)	0.90 (0.86~0.95)	40.03	0.894		
	850	41.50 (39.43~43.58)	0.92 (0.87~0.96)	39.75	0.905		
835B	825	55.20 (52.44~57.96)	0.97 (0.92~1.02)	55.37	0.939	21.4°C	2014-12-24
	835	55.20 (52.44~57.96)	0.97 (0.92~1.02)	55.28	0.948		
	850	55.20 (52.44~57.96)	0.99 (0.94~1.04)	55.20	0.965		
1750H	1710	40.1 (38.10~42.11)	1.35 (1.28~1.42)	39.71	1.283	21.4°C	2014-12-26
	1730	40.1 (38.10~42.11)	1.36 (1.29~1.43)	39.64	1.294		
	1750	40.1 (38.10~42.11)	1.37 (1.30~1.44)	39.58	1.304		
	1800	40.0 (38.00~42.00)	1.40 (1.33~1.47)	39.56	1.353		
1750B	1710	53.5 (50.83~56.18)	1.46 (1.39~1.53)	51.56	1.447	21.4°C	2014-12-27
	1730	53.5 (50.83~56.18)	1.48 (1.41~1.55)	51.58	1.470		
	1750	53.4 (50.73~56.07)	1.49 (1.42~1.56)	51.53	1.498		
	1800	53.3 (50.64~55.97)	1.52 (1.44~1.60)	51.26	1.535		
1900H	1850	40.00 (38.00~42.00)	1.40 (1.33~1.47)	39.22	1.351	21.4°C	2014-12-25
	1880	40.00 (38.00~42.00)	1.40 (1.33~1.47)	39.07	1.383		
	1900	40.00 (38.00~42.00)	1.40 (1.33~1.47)	39.01	1.400		
	1910	40.00 (38.00~42.00)	1.40 (1.33~1.47)	38.97	1.412		

1900B	1850	53.30 (50.64~55.97)	1.52 (1.44~1.60)	52.64	1.529	21.4°C	2014-12-25
	1880	53.30 (50.64~55.97)	1.52 (1.44~1.60)	52.52	1.556		
	1900	53.30 (50.64~55.97)	1.52 (1.44~1.60)	52.48	1.572		
	1910	53.30 (50.64~55.97)	1.52 (1.44~1.60)	52.43	1.586		
2450H	2410	39.30 (37.34~41.26)	1.76 (1.67~1.85)	39.56	1.782	21.4°C	2014-12-29
	2435	39.20 (37.24~41.16)	1.79 (1.70~1.88)	39.58	1.827		
	2450	39.20 (37.24~41.16)	1.80 (1.71~1.89)	39.47	1.823		
	2460	39.20 (37.24~41.16)	1.81 (1.72~1.90)	39.39	1.840		
2450B	2410	52.80 (50.16~55.44)	1.91 (1.81~2.00)	52.32	1.925	21.4°C	2014-12-30
	2435	52.70 (50.07~55.34)	1.94 (1.84~2.04)	52.17	1.953		
	2450	52.70 (50.07~55.34)	1.95 (1.85~2.05)	52.18	1.976		
	2460	52.70 (50.07~55.34)	1.96 (1.86~2.06)	52.17	1.990		

Table 5:Measured Tissue Parameter

Note: 1）The dielectric parameters of the tissue-equivalent liquid should be measured under similar ambient conditions and within 2 °C of the conditions expected during the SAR evaluation to satisfy protocol requirements.

2）KDB 865664 was ensured to be applied for probe calibration frequencies greater than or equal to 50MHz of the EUT frequencies.

3）The above measured tissue parameters were used in the DASY software to perform interpolation via the DASY software to determine actual dielectric parameters at the test frequencies. The SAR test plots may slightly differ from the table above since the DASY rounds to three significant digits.

4.2 System Check

The system check is performed for verifying the accuracy of the complete measurement system and performance of the software. The system check is performed with tissue equivalent material according to IEEE P1528 (described above). The following table shows system check results for all frequency bands and tissue liquids used during the tests(Graphic Plot(s) see Appendix A).

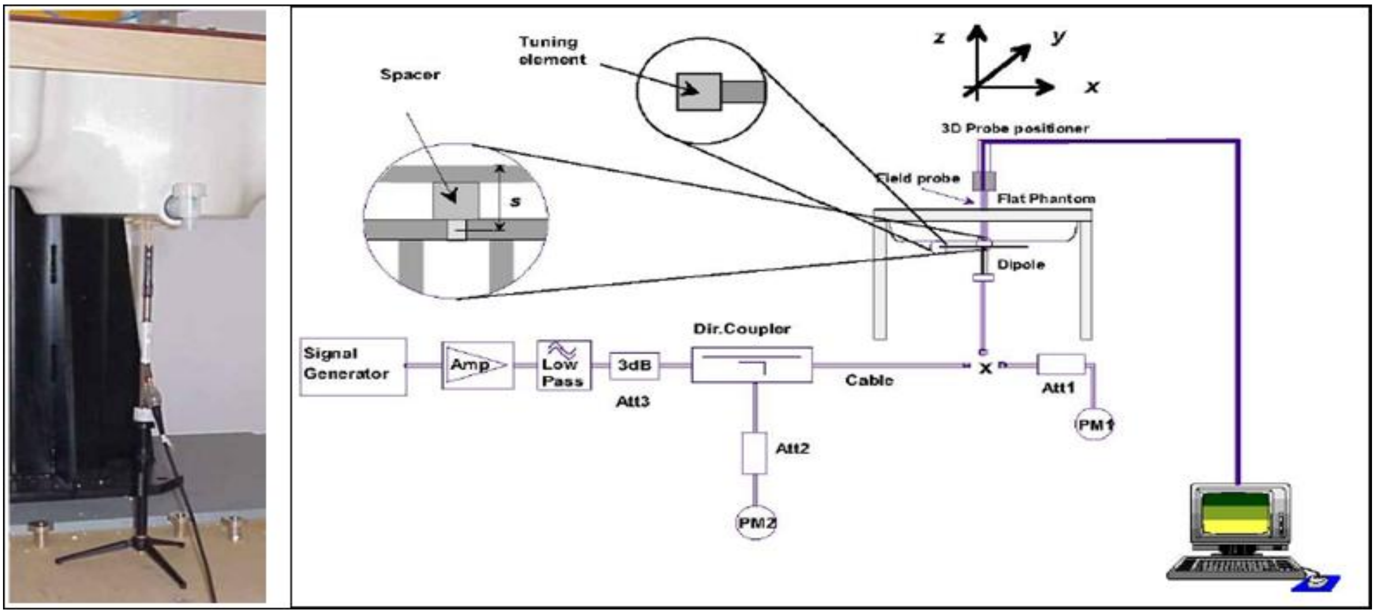
System Check	Target SAR (1W) (+/-10%)		Measured SAR (Normalized to 1W)		Liquid Temp.	Test Date
	1-g (mW/g)	10-g (mW/g)	1-g (mW/g)	10-g (mW/g)		
835MHz Head	9.49 (8.54~10.44)	6.18 (5.56~6.80)	9.72	6.28	21.4°C	2014-12-23
1750MHz Head	35.1 (31.59~38.61)	18.6 (16.74~20.46)	33.92	18.04	21.4°C	2014-12-26
1900MHz Head	40.80 (36.72~44.88)	21.40 (19.26~23.54)	41.60	21.36	21.4°C	2014-12-25
2450MHz Head	52.30 (47.07~57.53)	24.50 (22.05~26.95)	54.40	24.76	21.4°C	2014-12-29
835MHz Body	9.42 (8.48~10.36)	6.19 (5.57~6.80)	9.56	6.32	21.4°C	2014-12-24
1750MHz Body	36.3 (32.67~39.93)	19.5 (17.55~21.45)	39.36	20.60	21.4°C	2014-12-27
1900MHz Body	40.20 (36.18~44.22)	21.30 (19.17~23.43)	43.60	22.60	21.4°C	2014-12-25
2450MHz Body	51.4 (46.26~56.54)	23.9 (21.51~26.29)	53.20	24.16	21.4°C	2014-12-30

Table 6:System Check Results

4.3 System check Procedure

The system check is performed by using a system check dipole which is positioned parallel to the planar part of the SAM phantom at the reference point. The distance of the dipole to the SAM phantom is determined by a plexiglass spacer. The dipole is connected to the signal source consisting of signal generator and amplifier via a directional coupler, N-connector cable and adaption to SMA. It is fed with a power of 250 mW(below 5GHz) or 100mW(above 5GHz). To adjust this power a power meter is used. The power sensor is connected to the cable before the system check to measure the power at this point and do adjustments at the signal generator. At the outputs of the directional coupler both return loss as well as forward power are controlled during the system check to make sure that emitted power at the dipole is kept constant. This can also be checked by the power drift measurement after the test (result on plot).

System check results have to be equal or near the values determined during dipole calibration (target SAR in table above) with the relevant liquids and test system.



5 SAR measurement variability and uncertainty

5.1 SAR measurement variability

Per KDB865664 D01 SAR measurement 100 MHz to 6 GHz v01r03, SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. The additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

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

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

The detailed repeated measurement results are shown in Section 7.2.

5.2 SAR measurement uncertainty

Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz v01r03,when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2003 is not required in SAR reports submitted for equipment approval. The equivalent ratio (1.5/1.6) is applied to extremity and occupational exposure conditions.

6 SAR Test Configuration

6.1 GSM Test Configuration

SAR tests for GSM850 and GSM1900, a communication link is set up with a base station by air link. Using CMU200 the power lever is set to “5”and “0” in SAR of GSM850 and GSM1900. The tests in the band of GSM850 and GSM1900 are performed in the mode of GPRS/EGPRS function. Since the GPRS class is 12 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslot is 5. The EGPRS class is 12 for this EUT, it has at most 4 timeslots in uplink, and at most 4 timeslots in downlink, the maximum total timeslot is 5.

When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.

According to specification 3GPP TS 51.010, the maximum power of the GSM can do the power reduction for the multi-slot.

The allowed power reduction in the multi-slot configuration is as following:

Number of timeslots in uplink assignment		Reduction of maximum output power (dB)		
Band	Time Slots	GPRS (GMSK）	EGPRS (GMSK)	EGPRS (8PSK)
GSM850	1 TX slot	0	0	0
	2 TX slots	2	2	0
	3 TX slots	4	4	2.5
	4 TX slots	6	6	5
GSM1900	1 TX slot	0	0	0
	2 TX slots	2	2	0
	3 TX slots	4	4	2.5
	4 TX slots	6	6	5

Table 7: The allowed power reduction in the multi-slot configuration of GSM

6.2 UMTS Test Configuration

1) Output Power Verification

Maximum output power is verified on the high, middle and low channels according to procedures described in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all “1’s” for WCDMA/HSDPA or by applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HSDPA, HSPA) are requied in the SAR report. All configurations that are not supported by the handset or cannot be measured due to technical or equipment limitations must be clearly identified.

2) WCDMA

a. Head SAR Measurements

SAR for next to the ear head exposure is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”. The 3G SAR test reduction procedure is applied to AMR configurations with 12.2 kbps RMC as the primary mode.

b. Body SAR Measurements

SAR for body-worn accessory configurations is measured using a 12.2 kbps RMC with TPC bits configured to all "1's". The 3G SAR test reduction procedure is applied to other spreading codes and multiple DPDCHn configurations supported by the handset with 12.2 kbps RMC as the primary mode

3) HSDPA

SAR for body exposure configurations is measured according to the "Body SAR Measurements'' procedures of 3G device. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest *reported* SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode. This is referred to as the 3G SAR test reduction procedure in the following SAR test guidance, where the primary mode is identified in the applicable wireless mode test procedures and the secondary mode is wireless mode being considered for SAR test reduction by that procedure. When the 3G SAR test reduction procedure is not satisfied, it is identified as "otherwise" in the applicable procedures; SAR measurement is required for the secondary mode.

Per KDB941225 D01v03, the 3G SAR test reduction procedure is applied to HSDPA body configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for HSDPA using the HSDPA body SAR procedures for the highest reported SAR body exposure configuration in 12.2 kbps RMC.

HSDPA should be configured according to UE category of a test device. The number of HS-DSCH/HS-PDSCHs, HAPRQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission condition, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4ms with a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. The β_c and β_d gain factors for DPCCH and DPDCH were set according to the values in the below table, β_{hs} for HS-DPCCH is set automatically to the correct value when ΔACK, ΔNACK, ΔCQI = 8. The variation of the β_c /β_d ratio causes a power reduction at sub-tests 2 - 4.

Sub-test	β_c	β_d	β_d (SF)	β_c /β_d	β_{hs} (1)	CM(dB)(2)	MPR (dB)
1	2/15	15/15	64	2/15	4/15	0.0	0
2	12/15(3)	15/15(3)	64	12/15(3)	24/15	1.0	0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: ΔACK, ΔNACK and ΔCQI = 8 $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c$

Note 2 : CM=1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH,DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

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 signalled gain factors for the reference TFC (TF1,TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$

Table 8: Sub-tests for UMTS Release 5 HSDPA

The measurements were performed with a Fixed Reference Channel (FRC) and H-Set 1 QPSK.

Parameter	Value
Nominal average inf. bit rate	534 kbit/s
Inter-TTI Distance	3 TTI's
Number of HARQ Processes	2 Processes
Information Bit Payload	3202 Bits
MAC-d PDU size	336 Bits
Number Code Blocks	1 Block
Binary Channel Bits Per TTI	4800 Bits
Total Available SMLs in UE	19200 SMLs

Number of SMLs per HARQ Process	9600 SMLs
Coding Rate	0.67
Number of Physical Channel Codes	5

Table 9:settings of required H-Set 1 QPSK acc. to 3GPP 34.121

HS-DSCH Category	Maximum HS-DSCH Codes Received	Minimum Inter-TTI Interval	Maximum HS-DSCH Transport Block Bits/HS-DSCH TTI	Total Soft Channel Bits
1	5	3	7298	19200
2	5	3	7298	28800
3	5	2	7298	28800
4	5	2	7298	38400
5	5	1	7298	57600
6	5	1	7298	67200
7	10	1	14411	115200
8	10	1	14411	134400
9	15	1	25251	172800
10	15	1	27952	172800
11	5	2	3630	14400
12	5	1	3630	28800
13	15	1	34800	259200
14	15	1	42196	259200
15	15	1	23370	345600
16	15	1	27952	345600

Table 10:HSDPA UE category

4) HSUPA

SAR for body exposure configurations is measured according to the “Body SAR Measurements” procedures of 3G device. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest *reported* SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

Per KDB941225 D01v03, the 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA with RMC) body configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for HSPA using the HSPA body SAR procedures for the highest reported body exposure SAR configuration in 12.2 kbps RMC.

Due to inner loop power control requirements in HSDPA, a commercial communication test set should be used for the output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSDPA should be configured according to the values indicated below as well as other applicable procedures described in the ‘WCDMA Handset’ and ‘Release 5 HSDPA Data Device’ sections of 3G device.

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	β_{ec}	β_{ed}	β_{ec} (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 $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. 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 signalled gain factors for the reference TFC (TF1,TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$

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 signalled gain factors for the reference TFC (TF1,TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$

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} can not be set directly; it is set by Absolute Grant Value.

Table 11:Subtests for UMTS Release 6 HSUPA

UE E-DCH Category	Maximum E-DCH Codes Transmitted	Number of HARQ Processes	E-DCH TTI(ms)	Minimum Speading Factor	Maximum E-DCH Transport Block Bits	Max Rate (Mbps)
1	1	4	10	4	7110	0.7296
2	2	8	2	4	2798	1.4592
	2	4	10	4	14484	
3	2	4	10	4	14484	1.4592
4	2	8	2	2	5772	2.9185
	2	4	10	2	20000	2.00
5	2	4	10	2	20000	2.00
6 (No DPDCH)	4	8	10	2SF2&2SF4	11484	5.76
	4	4	2		20000	2.00
7 (No DPDCH)	4	8	2	2SF2&2SF4	22996	?
	4	4	10		20000	?

NOTE: When 4 codes are transmitted in parallel, two codes shall be transmitted with SF2 and two with SF4.UE categories 1 to 6 support QPSK only. UE category 7 supports QPSK and 16QAM.(TS25.306-7.3.0).

Table 12:HSUPA UE category

5) DC-HSDPA

In DC-HSDPA implementation of this device, the uplink parameters are the same as HSDPA. No additional channels and modulations (16 QAM, and 64 QAM) are supported in uplink. The difference is only in the downlink parameters, where two carriers are supported. HSDPA settings were used on uplink.

For Rel. 8 DC-HSDPA apply the four subtests from HSDPA Release 5 except use fixed reference channel H-Set 12 for DC-HSDPA. And we can apply the same SAR test exclusion criteria used for Rel. 6 HSPA for Rel. 7 HSPA+ and Rel. 8 DC-HSDPA. That is, if the HSPA, HSPA+, or the DC-HSDPA maximum output is not more than 0.25 dB higher than WCDMA, SAR measurement for those modes is not required.
The following tests were completed according to procedures in section 7.3.13 of 3GPP TS 34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.0

Table E.5.0: Levels for HSDPA connection setup

Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH _Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13
The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.
The measurements were performed with a Fixed Reference Channel (FRC) H-Set 12 with QPSK

Parameter	Value
Nominal average inf. bit rate	60 kbit/s
Inter-TTI Distance	1 TTI's
Number of HARQ Processes	6 Processes
Information Bit Payload	120 Bits
Number Code Blocks	1 Block
Binary Channel Bits Per TTI	960 Bits
Total Available SMLs in UE	19200 SMLs
Number of SMLs per HARQ Process	3200 SMLs
Coding Rate	0.15
Number of Physical Channel Codes	1

Table 13:settings of required H-Set 12 QPSK acc. to 3GPP 34.121

Note:

1.The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table above.

2.Maximum number of transmission is limited to 1,i.e.,retransmission is not allowed. The redundancy and constellation version 0 shall be used.

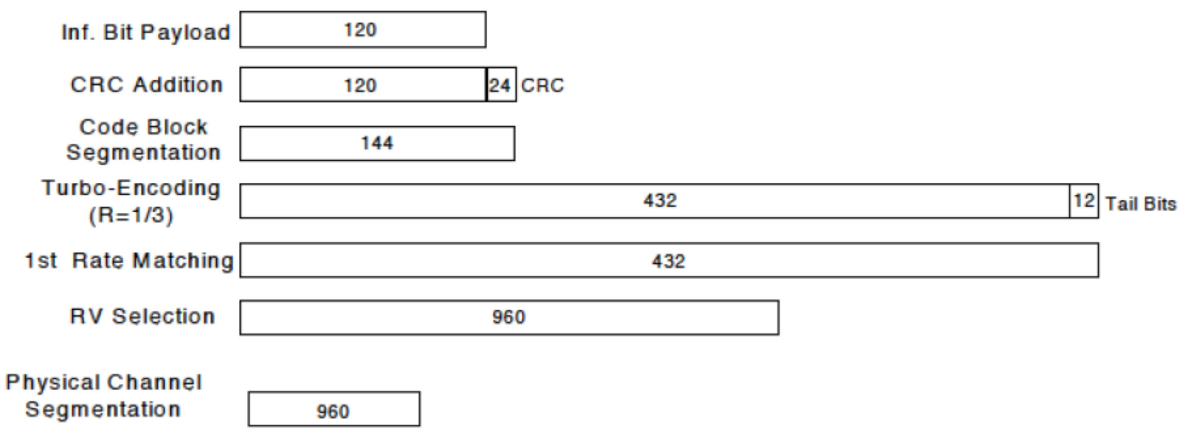


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

The following 4 Sub-tests for HSDPA were completed according to Release 5 procedures. A summary of subtest settings are illustrated below:

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	CM(dB)(2)	MPR (dB)
1	2/15	15/15	64	2/15	4/15	0.0	0
2	12/15(3)	15/15(3)	64	12/15(3)	24/15	1.0	0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5
Note 1: ΔACK, ΔNACK and ΔCQI = 8 $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c$ Note 2: CM=1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases. 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 signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$							

Up commands are set continuously to set the UE to Max power.

Note:

1.The Dual Carriers transmission only applies to HSDPA physical channels

2.The Dual Carriers belong to the same Node and are on adjacent carriers.

3.The Dual Carriers do not support MIMO to serve UEs configured for dual cell operation

4.The Dual Carriers operate in the same frequency band .

5.The device doesn't support the modulation of 16QAM in uplink but 64QAM in downlink for DC-HSDPA mode.

6.The device doesn’t support carrier aggregation for it just can operate in Release 8.

6.3 WiFi 2.4G Test Configuration

For the 802.11b/g SAR tests, a communication link is set up with the test mode software for WiFi mode test. The Absolute Radio Frequency Channel Number(ARFCN) is allocated to 1 ,6 and 11 respectively in the case of 2450 MHz.During the test,at the each test frequency channel, the EUT is operated at the RF continuous emission mode. Each channel should be tested at the lowest data rate.

802.11b/g operating modes are tested independently according to the service requirements in each frquency band. 802.11b/g modes are tested on channel 1, 6, 11; however,if output power reduction is necessary for channels 1 and/or 11 to meet restricted band requirements the highest output channel closest to each of these channels must be tested instead.

SAR is not required for 802.11g/n channels when the maximum average output power is less than 0.25dB higher than that measured on the corresponding 802.11b channels.

Mode	Band	GHz	Channel	“Default Test Channels”	
				802.11b	802.11g
802.11b/g	2.4 GHz	2.412	1#	√	△
		2.437	6	√	△
		2.462	11#	√	△

Notes:
√ = “default test channels”
△= possible 802.11g channels with maximum average output ¼ dB the “default test channels”
= when output power is reduced for channel 1 and /or 11 to meet restricted band requirements the highest output channels closest to each of these channels should be tested.

802.11 Test Channels per FCC KDB 248227

7 SAR Measurement Results

7.1 Conducted power measurements

For the measurements a Rohde & Schwarz Radio Communication Tester CMU 200&CMW500 was used. SAR drift measured at the same position in liquid before and after each SAR test as below 7.2 chapter.

Note: CMU200 measures GSM peak and average output power for active timeslots.For SAR the timebased average power is relevant. The difference in between depends on the duty cycle of the TDMA signal :

No. of timeslots	1	2	3	4
Duty Cycle	1:8.3	1:4.1	1:2.77	1:2.08
timebased avg. power compared to slotted avg. power	-9.19dB	-6.13dB	-4.42dB	-3.18dB

The signalling modes differ as follows:

mode	coding scheme	modulation
GPRS	CS1 to CS4	GMSK
EDGE	MCS1 to MCS4	GMSK
EDGE	MCS5 to MCS9	8PSK

Apart from modulation change (GMSK/8PSK) coding schemes differ in code rate without influence on the RF signal. Therefore one coding scheme per mode was selected for conducted power measurements.

7.1.1 Conducted power measurements of GSM850

GSM850		Burst-Averaged output Power (dBm)				Division Factors	Frame-Averaged output Power (dBm)			
		Tune-up	128CH	190CH	251CH		Tune-up	128CH	190CH	251CH
GSM (CS)		33.50	32.56	32.54	32.51	-9.19	24.31	23.37	23.35	23.32
GPRS (GMSK)	1 Tx Slot	33.50	32.50	32.44	32.42	-9.19	24.31	23.31	23.25	23.23
	2 Tx Slots	31.50	30.56	30.54	30.45	-6.13	**25.37**	**24.43**	**24.41**	**24.32**
	3 Tx Slots	29.50	28.54	28.48	28.47	-4.42	25.08	24.12	24.06	24.05
	4 Tx Slots	27.50	26.48	26.46	26.47	-3.18	24.32	23.30	23.28	23.29
EDGE (8PSK)	1 Tx Slot	26.50	25.64	25.73	25.70	-9.19	17.31	16.45	16.54	16.51
	2 Tx Slots	26.50	25.39	25.41	25.38	-6.13	20.37	19.26	19.28	19.25
	3 Tx Slots	24.00	23.07	23.03	22.99	-4.42	19.58	18.65	18.61	18.57
	4 Tx Slots	21.50	20.73	20.74	20.79	-3.18	18.32	17.55	17.56	17.61
EDGE (GMSK)	1 Tx Slot	33.50	32.34	32.39	32.36	-9.19	24.31	23.15	23.20	23.17
	2 Tx Slots	31.50	30.54	30.52	30.44	-6.13	25.37	24.41	24.39	24.31
	3 Tx Slots	29.50	28.51	28.46	28.46	-4.42	25.08	24.09	24.04	24.04
	4 Tx Slots	27.50	26.46	26.46	26.49	-3.18	24.32	23.28	23.28	23.31

Table 14:Conducted power measurement results of GSM850

Note:

1) The conducted power of GSM850 is measured with RMS detector.

2) Frame-averaged output power was calculated from the measured burst-averaged output power by converting the slot powers into linear units and calculating the energy over 8 timesolts.

3)The device does not support DTM function.Per KDB648474 D04v01r02, body-worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.

4) Per KDB941225 D01v03, SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.

7.1.2 Conducted power measurements of GSM1900

GSM1900		Burst-Averaged output Power (dBm)				Division Factors	Frame-Averaged output Power (dBm)			
		Tune-up	512CH	661CH	810CH		Tune-up	512CH	661CH	810CH
GSM (CS)		30.50	29.51	29.50	29.45	-9.19	21.31	20.32	20.31	20.26
GPRS (GMSK)	1 Tx Slot	30.50	29.47	29.41	29.38	-9.19	21.31	20.28	20.22	20.19
	2 Tx Slots	28.50	27.34	27.44	27.35	-6.13	**22.37**	**21.21**	**21.31**	**21.22**
	3 Tx Slots	26.50	25.44	25.38	25.44	-4.42	22.08	21.02	20.96	21.02
	4 Tx Slots	24.50	23.28	23.34	23.40	-3.18	21.32	20.10	20.16	20.22
EDGE (8PSK)	1 Tx Slot	25.50	24.49	24.43	24.41	-9.19	16.31	15.30	15.24	15.22
	2 Tx Slots	25.50	24.14	24.04	24.12	-6.13	19.37	18.01	17.91	17.99
	3 Tx Slots	23.00	21.91	22.03	21.80	-4.42	18.58	17.49	17.61	17.38
	4 Tx Slots	20.50	19.56	19.36	19.40	-3.18	17.32	16.38	16.18	16.22
EDGE (GMSK)	1 Tx Slot	30.50	29.45	29.39	29.36	-9.19	21.31	20.26	20.20	20.17
	2 Tx Slots	28.50	27.37	27.42	27.35	-6.13	22.37	21.24	21.29	21.22
	3 Tx Slots	26.50	25.44	25.41	25.46	-4.42	22.08	21.02	20.99	21.04
	4 Tx Slots	24.50	23.30	23.33	23.40	-3.18	21.32	20.12	20.15	20.22

Table 15: Conducted power measurement results of GSM1900

Note:

1) The conducted power of GSM1900 is measured with RMS detector.

2) Frame-averaged output power was calculated from the measured burst-averaged output power by converting the slot powers into linear units and calculating the energy over 8 timesolts.

3)The device does not support DTM function.Per KDB648474 D04v01r02, body-worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.

4) Per KDB941225 D01v03, SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.

7.1.3 Conducted power measurements of UMTS Band V

UMTS Band V		Tune-up	Conducted Power (dBm)		
			4132CH	4182CH	4233CH
WCDMA	12.2kbps RMC	24.00	**22.77**	**22.73**	**22.59**
	64kbps RMC	24.00	22.81	22.73	22.56
	144kbps RMC	24.00	22.79	22.69	22.55
	384kbps RMC	24.00	22.78	22.69	22.58
HSDPA	Subtest 1	23.00	22.71	22.59	22.54
	Subtest 2	23.00	22.48	22.37	22.27
	Subtest 3	22.50	21.80	21.73	21.64
	Subtest 4	22.50	21.81	21.73	21.58
HSUPA	Subtest 1	22.50	21.80	21.59	21.30
	Subtest 2	21.50	19.90	19.57	19.82
	Subtest 3	21.50	20.94	20.03	20.94
	Subtest 4	21.50	20.03	20.03	20.14
	Subtest 5	23.50	22.10	22.07	21.88
DC-HSDPA	Subtest 1	23.00	22.71	22.59	22.46
	Subtest 2	23.00	22.39	22.30	22.19
	Subtest 3	22.50	21.73	21.66	21.56
	Subtest 4	22.50	21.72	21.65	21.50

Table 16: Conducted power measurement results of UMTS Band V

Note:

1) The conducted power of UMTS Band V is measured with RMS detector.

2) The bolded 12.2kbps RMC mode was selected for SAR testing(the primary mode).

3) Per KDB941225 D01v03, When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest *reported* SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

7.1.4 Conducted power measurements of UMTS Band IV

UMTS Band IV		Tune-up	Conducted Power (dBm)		
			1312CH	1413CH	1513CH
WCDMA	12.2kbps RMC	24.00	**22.83**	**22.63**	**22.84**
	64kbps RMC	24.00	22.84	22.64	22.80
	144kbps RMC	24.00	22.85	22.63	22.87
	384kbps RMC	24.00	22.82	22.61	22.86
HSDPA	Subtest 1	23.00	22.85	22.66	22.83
	Subtest 2	23.00	22.49	22.40	22.59
	Subtest 3	22.50	21.98	21.80	21.97
	Subtest 4	22.50	21.97	21.78	21.96
HSUPA	Subtest 1	22.50	21.64	21.44	21.84
	Subtest 2	21.50	20.00	19.75	19.96
	Subtest 3	21.50	20.39	20.24	20.42
	Subtest 4	21.50	19.61	20.20	19.59
	Subtest 5	23.50	22.41	22.07	22.31
DC-HSDPA	Subtest 1	23.00	22.77	22.57	22.76
	Subtest 2	23.00	22.48	22.32	22.51
	Subtest 3	22.50	21.93	21.71	21.90
	Subtest 4	22.50	21.91	21.71	21.90

Table 17: Conducted power measurement results of UMTS Band IV

Note:

1) The conducted power of UMTS Band IV is measured with RMS detector.

2) The bolded 12.2kbps RMC mode was selected for SAR testing(the primary mode).

3) Per KDB941225 D01v03, When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest *reported* SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

7.1.5 Conducted power measurements of UMTS Band II

UMTS Band II		Tune-up	Conducted Power (dBm)		
			9262CH	9400CH	9538CH
WCDMA	12.2kbps RMC	24.00	**22.74**	**22.70**	**22.62**
	64kbps RMC	24.00	22.72	22.66	22.57
	144kbps RMC	24.00	22.75	22.67	22.54
	384kbps RMC	24.00	22.72	22.70	22.52
HSDPA	Subtest 1	23.00	22.74	22.69	22.52
	Subtest 2	23.00	22.42	22.32	22.22
	Subtest 3	22.50	21.87	21.85	21.64
	Subtest 4	22.50	21.85	21.81	21.62
HSUPA	Subtest 1	22.50	21.60	21.61	21.36
	Subtest 2	21.50	19.96	19.93	19.79
	Subtest 3	21.50	20.46	20.33	20.07
	Subtest 4	21.50	19.55	19.51	20.05
	Subtest 5	23.50	22.23	22.09	21.82
DC-HSDPA	Subtest 1	23.00	22.73	22.60	22.45
	Subtest 2	23.00	22.38	22.30	22.16
	Subtest 3	22.50	21.79	21.76	21.57
	Subtest 4	22.50	21.76	21.74	21.56

Table 18: Conducted power measurement results of UMTS Band II

Note:

1) The conducted power of UMTS Band II is measured with RMS detector.

2) The bolded 12.2kbps RMC mode was selected for SAR testing(the primary mode).

3) Per KDB941225 D01v03, When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest *reported* SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

7.1.6 Conducted power measurements of WiFi 2.4G

The output power of WiFi antenna is as following:

Wi-Fi 2450MHz	Channel	Tune -up	Average Power (dBm) for Data Rates (Mbps)							
			1	2	5.5	11	/	/	/	/
802.11b	1	19.50	**18.45**	18.38	18.42	18.4	/	/	/	/
	6	19.50	**18.95**	18.92	18.91	18.94	/	/	/	/
	11	19.50	**19.49**	19.45	19.42	19.46	/	/	/	/
802.11g	Channel	Tune -up	6	9	12	18	24	36	48	54
	1	18.50	18.46	18.01	17.92	17.68	17.52	17.12	16.88	16.82
	6	18.50	17.82	17.38	17.33	16.98	16.72	16.45	16.22	16.23
	11	18.50	18.29	17.94	17.86	17.52	17.35	16.97	16.77	16.68
802.11n (HT20,800ns)	Channel	Tune -up	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
	1	16.50	15.95	15.56	15.16	14.84	14.56	14.46	13.92	13.42
	6	16.50	15.89	15.38	15.01	14.75	14.41	14.31	13.88	13.35
	11	16.50	15.45	14.83	14.61	14.38	13.89	13.61	12.99	12.62

Table 19: Conducted power measurement results of WiFi 2.4G.

Note:

1) The Average conducted power of WiFi is measured with RMS detector.

2) The bolded mode was selected for SAR testing.

3) Per KDB248227, for WiFi 2.4GHz, highest average RF output power channel for the lowest data rate of 802.11b mode was selected for SAR evalutation. SAR test at higher data rates and higher order modulations (including 802.11g/n) were not required since the maximum average output power for each of these configurations is not more than 1/4dB higher than the tested channel for the lowest data rate of 802.11b mode.

7.1.7 Conducted power measurements of BT

The output power of BT antenna is as following:

BT 2450	Average Conducted Power (dBm)			
	Tune-up	0CH	39CH	78CH
DH5	9.00	7.20	6.80	5.61
2DH5	9.00	5.15	6.23	5.56
3DH5	9.00	5.34	6.25	5.47

BT 2450	Average Conducted Power (dBm)			
	Tune-up	0CH	19CH	39CH
BT(4.0)	9.00	5.36	**7.68**	6.82

Table 20: Conducted power measurement results of BT.

Note: The conducted power of BT is measured with RMS detector.

7.2 SAR measurement Results

General Notes:

1) Per KDB447498 D01v05r02, all measurement SAR results are scaled to the maximum tune-up tolerance limit to demostrate compliant.

2) Per KDB447498 D01v05r02, testing of other required channels within the operating mode of a frequency band is not required when the reported 1-g or 10-g SAR for the mid-band or highest output power channel is: ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz. When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.

3) Per KDB865664 D01v01r03,for each frequency band,repeated SAR measurement is required only when the measured SAR is ≥0.8W/Kg; if the deviation among the repeated measurement is ≤20%,and the measured SAR <1.45W/Kg,only one repeated measurement is required.

4) The device does not support Hotspot function, so Hotspot SAR does not need to be tested.

5) Per KDB648474 D04v01r02, SAR is evaluated without a headset connected to the device.When the standalone reported Body-Worn SAR is ≤1.2 W/kg, no additional SAR evaluations using a headset are required.

6) Per KDB941225 D06v02, the DUT Dimension is bigger than 9 cm x 5 cm, so 10mm is chosen as the test separation distance for Hotspot mode. When the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.

7) Per KDB865664 D02v01r01, SAR plot is only required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination; Plots are also required when the measured SAR is > 1.5 W/kg, or > 7.0 W/kg for occupational exposure. The published RF exposure KDB procedures may require additional plots; for example, to support SAR to peak location separation ratio test exclusion and/or volume scan post-processing(Refer to appendix B for details).

GSM Notes:

1) Per KDB648474 D04v01r02, the device does not support DTM function.Body-worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.

2) Per KDB941225 D01v03, SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.

UMTS Notes:

1) Per KDB941225 D01v03, When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

WLAN Notes:

Per KDB248227D01v01r02 and October 2012/April 2013 FCC/TCB workshop meeting notes:

1) For WiFi 2.4GHz, highest average RF output power channel for the lowest data rate of 802.11b mode was selected for SAR evalutation. SAR test at higher data rates and higher order modulations (including 802.11g/n) were not required since the maximum average output power for each of these configurations is not more than 1/4dB higher than the tested channel for the lowest data rate of 802.11b mode.

7.2.1 SAR measurement Result of GSM850

Test Position of Head	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	Liquid Temp.
			1-g	10-g					
Test data with battery 1#									
Left Hand Touched	190/836.6	GSM	0.197	0.148	0.120	32.54	33.50	0.246	21.4°C
Left Hand Tilted 15°	190/836.6	GSM	0.121	0.093	0.060	32.54	33.50	0.151	21.4°C
Right Hand Touched	190/836.6	GSM	0.201	0.152	0.040	32.54	33.50	0.251	21.4°C
Right Hand Tilted 15°	190/836.6	GSM	0.127	0.096	0.040	32.54	33.50	0.158	21.4°C
Right Hand Touched	128/824.2	GSM	0.183	0.137	0.140	32.56	33.50	0.227	21.4°C
Right Hand Touched	251/848.8	GSM	0.257	0.172	0.000	32.51	33.50	**0.323**	21.4°C
Tested at the worst position with SIM2									
Right Hand Touched	251/848.8	GSM	0.228	0.168	0.070	32.51	33.50	0.286	21.4°C
Tested at the worst position with battery 2#									
Right Hand Touched	251/848.8	GSM	0.222	0.166	0.040	32.51	33.50	0.279	21.4°C

Table 21: Head SAR test results of GSM850

Test Position of Body-Worn with 15mm	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	Liquid Temp.
			1-g	10-g					
Test data with battery 1#									
Front Side	190/836.6	GSM	0.214	0.167	-0.150	32.54	33.50	0.267	21.4°C
Back Side	190/836.6	GSM	0.301	0.225	-0.020	32.54	33.50	0.375	21.4°C
Tested at the worst position with SIM2									
Back Side	190/836.6	GSM	0.297	0.226	0.070	32.54	33.50	0.370	21.4°C
Tested at the worst position with battery 2#									
Back Side	190/836.6	GSM	0.339	0.254	-0.020	32.54	33.50	**0.423**	21.4°C

Table 22: Body-Worn SAR test results of GSM850

Test Position of Hospot with 10mm	**Test channel /Frequency**	**Test Mode**	**SAR Value (W/kg)**		**Power Drift (dB)**	**Conducted Power (dBm)**	**Tune-up Power (dBm)**	**Scaled SAR1-g (W/kg)**	**Liquid Temp.**
			1-g	**10-g**					
Test data with battery 1#									
Front Side	190/836.6	GPRS 2TS	0.451	0.354	0.030	30.54	31.50	0.563	21.4°C
Back Side	190/836.6	GPRS 2TS	0.618	0.353	0.050	30.54	31.50	0.771	21.4°C
Left Side	190/836.6	GPRS 2TS	0.440	0.306	0.080	30.54	31.50	0.549	21.4°C
Right Side	190/836.6	GPRS 2TS	0.358	0.249	0.070	30.54	31.50	0.447	21.4°C
Bottom Side	190/836.6	GPRS 2TS	0.138	0.087	0.190	30.54	31.50	0.172	21.4°C
Tested at the worst position with SIM2									
Back Side	190/836.6	GPRS 2TS	0.637	0.494	0.010	30.54	31.50	**0.795**	21.4°C
Tested at the worst position with battery 2#									
Back Side	190/836.6	GPRS 2TS	0.618	0.479	0.050	30.54	31.50	0.771	21.4°C

Table 23: Hotspot SAR test results of GSM850

7.2.2 SAR measurement Result of GSM1900

Test Position of Head	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	Liquid Temp.
			1-g	10-g					
Test data with battery 1#									
Left Hand Touched	661/1880	GSM	0.124	0.078	0.120	29.50	30.50	0.156	21.4°C
Left Hand Tilted 15°	661/1880	GSM	0.052	0.029	0.090	29.50	30.50	0.065	21.4°C
Right Hand Touched	661/1880	GSM	0.175	0.107	0.180	29.50	30.50	**0.220**	21.4°C
Right Hand Tilted 15°	661/1880	GSM	0.064	0.039	-0.010	29.50	30.50	0.080	21.4°C
Right Hand Touched	512/1850.2	GSM	0.151	0.092	0.080	29.51	30.50	0.190	21.4°C
Right Hand Touched	810/1909.8	GSM	0.162	0.096	0.100	29.45	30.50	0.206	21.4°C
Tested at the worst position with SIM2									
Right Hand Touched	661/1880	GSM	0.154	0.091	0.010	29.50	30.50	0.194	21.4°C
Tested at the worst position with battery 2#									
Right Hand Touched	661/1880	GSM	0.150	0.092	0.080	29.50	30.50	0.189	21.4°C

Table 24: Head SAR test results of GSM1900

Test Position of Body-Worn with 15mm	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	Liquid Temp.
			1-g	10-g					
Test data with battery 1#									
Front Side	661/1880	GSM	0.187	0.109	0.160	29.50	30.50	0.235	21.4°C
Back Side	661/1880	GSM	0.388	0.218	0.080	29.50	30.50	0.488	21.4°C
Tested at the worst position with SIM2									
Back Side	661/1880	GSM	0.374	0.216	0.040	29.50	30.50	0.471	21.4°C
Tested at the worst position with battery 2#									
Back Side	661/1880	GSM	0.397	0.223	0.130	29.50	30.50	**0.500**	21.4°C

Table 25: Body-Worn SAR test results of GSM1900

Test Position of Hotspot with 10mm	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	Liquid Temp.
			1-g	10-g					
Test data with battery 1#									
Front Side	810/1909.8	GPRS 2TS	0.671	0.380	0.080	27.35	28.50	0.874	21.4°C
Front Side	661/1880	GPRS 2TS	0.644	0.369	0.070	27.44	28.50	0.822	21.4°C
Front Side	512/1850.2	GPRS 2TS	0.673	0.390	0.050	27.34	28.50	0.879	21.4°C
Back Side	810/1909.8	GPRS 2TS	0.921	0.495	0.160	27.35	28.50	1.200	21.4°C
Back Side	661/1880	GPRS 2TS	0.884	0.480	0.090	27.44	28.50	1.128	21.4°C
Back Side	512/1850.2	GPRS 2TS	0.906	0.495	-0.050	27.34	28.50	1.183	21.4°C
Left Side	661/1880	GPRS 2TS	0.082	0.048	-0.060	27.44	28.50	0.105	21.4°C
Right Side	661/1880	GPRS 2TS	0.108	0.063	-0.070	27.44	28.50	0.138	21.4°C
Bottom Side	810/1909.8	GPRS 2TS	0.753	0.400	0.050	27.35	28.50	0.981	21.4°C
Bottom Side	661/1880	GPRS 2TS	0.699	0.373	0.080	27.44	28.50	0.892	21.4°C
Bottom Side	512/1850.2	GPRS 2TS	0.751	0.404	-0.190	27.34	28.50	0.981	21.4°C
Tested at the worst position with SIM2									
Back Side	810/1909.8	GPRS 2TS	0.881	0.475	0.130	27.35	28.50	1.148	21.4°C
Tested at the worst position with battery 2#									
Back Side	810/1909.8	GPRS 2TS	0.935	0.494	-0.010	27.35	28.50	**1.218**	21.4°C
Back Side-repeated*	810/1909.8	GPRS 2TS	0.884	0.470	0.030	27.35	28.50	1.152	21.4°C

Table 26: Hotspot SAR test results of GSM1900

Note: * - repeated at the highest SAR measurement according to the FCC KDB 865664.

7.2.3 SAR measurement Result of UMTS Band V

Test Position of Head	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	Liquid Temp.
			1-g	10-g					
Test data with battery 1#									
Left Hand Touched	4182/836.4	RMC	0.164	0.123	-0.150	22.73	24.00	0.220	21.4°C
Left Hand Tilted 15°	4182/836.4	RMC	0.101	0.077	0.060	22.73	24.00	0.135	21.4°C
Right Hand Touched	4182/836.4	RMC	0.162	0.123	0.150	22.73	24.00	0.217	21.4°C
Right Hand Tilted 15°	4182/836.4	RMC	0.098	0.075	-0.010	22.73	24.00	0.131	21.4°C
Left Hand Touched	4132/826.4	RMC	0.141	0.107	-0.020	22.77	24.00	0.187	21.4°C
Left Hand Touched	4233/846.6	RMC	0.203	0.153	-0.130	22.59	24.00	0.281	21.4°C
Tested at the worst position with SIM2									
Left Hand Touched	4233/846.6	RMC	0.204	0.153	-0.100	22.59	24.00	**0.282**	21.4°C
Tested at the worst position with battery 2#									
Left Hand Touched	4233/846.6	RMC	0.202	0.151	0.040	22.59	24.00	0.279	21.4°C

Table 27: Head SAR test results of UMTS Band V

Test Position of Body-Worn with 15mm	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	Liquid Temp.
			1-g	10-g					
Test data with battery 1#									
Front Side	4182/836.4	RMC	0.171	0.133	-0.090	22.73	24.00	0.229	21.4°C
Back Side	4182/836.4	RMC	0.224	0.172	-0.050	22.73	24.00	0.300	21.4°C
Tested at the worst position with SIM2									
Back Side	4182/836.4	RMC	0.221	0.170	-0.040	22.73	24.00	0.296	21.4°C
Tested at the worst position with battery 2#									
Back Side	4182/836.4	RMC	0.260	0.200	-0.030	22.73	24.00	**0.348**	21.4°C

Table 28: Body-Worn SAR test results of UMTS Band V

Test Position of Hotspot with 10mm	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	Liquid Temp.
			1-g	10-g					
Test data with battery 1#									
Front Side	4182/836.4	RMC	0.170	0.134	0.110	22.73	24.00	0.228	21.4°C
Back Side	4182/836.4	RMC	0.267	0.206	0.090	22.73	24.00	0.358	21.4°C
Left Side	4182/836.4	RMC	0.171	0.119	-0.020	22.73	24.00	0.229	21.4°C
Right Side	4182/836.4	RMC	0.148	0.103	0.030	22.73	24.00	0.198	21.4°C
Bottom Side	4182/836.4	RMC	0.059	0.037	0.080	22.73	24.00	0.078	21.4°C
Tested at the worst position with SIM2									
Back Side	4182/836.4	RMC	0.276	0.213	-0.030	22.73	24.00	0.370	21.4°C
Tested at the worst position with battery 2#									
Back Side	4182/836.4	RMC	0.314	0.243	0.020	22.73	24.00	**0.421**	21.4°C

Table 29: Hotspot SAR test results of UMTS Band V

7.2.4 SAR measurement Result of UMTS Band IV

Test Position of Head	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	Liquid Temp.
			1-g	10-g					
Test data with battery 1#									
Left Hand Touched	1413/1732.6	RMC	0.164	0.103	0.000	22.63	24.00	**0.225**	21.4°C
Left Hand Tilted 15°	1413/1732.6	RMC	0.042	0.027	0.110	22.63	24.00	0.058	21.4°C
Right Hand Touched	1413/1732.6	RMC	0.120	0.078	0.080	22.63	24.00	0.165	21.4°C
Right Hand Tilted 15°	1413/1732.6	RMC	0.083	0.051	0.110	22.63	24.00	0.114	21.4°C
Left Hand Touched	1312/1712.4	RMC	0.127	0.082	0.090	22.83	24.00	0.166	21.4°C
Left Hand Touched	1513/1752.6	RMC	0.118	0.075	-0.030	22.84	24.00	0.154	21.4°C
Tested at the worst position with SIM2									
Left Hand Touched	1413/1732.6	RMC	0.152	0.097	0.160	22.63	24.00	0.208	21.4°C
Tested at the worst position with battery 2#									
Left Hand Touched	1413/1732.6	RMC	0.160	0.101	0.030	22.63	24.00	0.219	21.4°C

Table 30: Head SAR test results of UMTS Band IV

Test Position of Body-Worn with 15mm	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	Liquid Temp.
			1-g	10-g					
Test data with battery 1#									
Front Side	1413/1732.6	RMC	0.165	0.099	-0.100	22.63	24.00	0.226	21.4°C
Back Side	1413/1732.6	RMC	0.354	0.204	0.080	22.63	24.00	**0.485**	21.4°C
Tested at the worst position with SIM2									
Back Side	1413/1732.6	RMC	0.322	0.187	0.100	22.63	24.00	0.441	21.4°C
Tested at the worst position with battery 2#									
Back Side	1413/1732.6	RMC	0.334	0.193	-0.020	22.63	24.00	0.458	21.4°C

Table 31: Body-Worn SAR test results of UMTS Band IV

Test Position of Hotspot with 10mm	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	Liquid Temp.
			1-g	10-g					
Test data with battery 1#									
Front Side	1413/1732.6	RMC	0.339	0.195	0.010	22.63	24.00	0.465	21.4°C
Back Side	1513/1752.6	RMC	0.542	0.292	0.150	22.84	24.00	0.708	21.4°C
Back Side	1413/1732.6	RMC	0.670	0.364	0.070	22.63	24.00	0.918	21.4°C
Back Side	1312/1712.4	RMC	0.528	0.291	0.040	22.83	24.00	0.691	21.4°C
Left Side	1413/1732.6	RMC	0.110	0.066	-0.040	22.63	24.00	0.151	21.4°C
Right Side	1413/1732.6	RMC	0.073	0.042	-0.180	22.63	24.00	0.100	21.4°C
Bottom Side	1413/1732.6	RMC	0.515	0.280	-0.120	22.63	24.00	0.706	21.4°C
Tested at the worst position with SIM2									
Back Side	1413/1732.6	RMC	0.659	0.357	0.010	22.63	24.00	0.903	21.4°C
Tested at the worst position with battery 2#									
Back Side	1413/1732.6	RMC	0.703	0.383	-0.100	22.63	24.00	**0.964**	21.4°C

Table 32: Hotspot SAR test results of UMTS Band IV

7.2.5 SAR measurement Result of UMTS Band II

Test Position of Head	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	Liquid Temp.
			1-g	10-g					
Test data with battery 1#									
Left Hand Touched	9400/1880	RMC	0.131	0.081	0.040	22.70	24.00	0.177	21.4°C
Left Hand Tilted 15°	9400/1880	RMC	0.048	0.027	0.040	22.70	24.00	0.064	21.4°C
Right Hand Touched	9400/1880	RMC	0.132	0.081	0.000	22.70	24.00	0.178	21.4°C
Right Hand Tilted 15°	9400/1880	RMC	0.054	0.034	0.180	22.70	24.00	0.073	21.4°C
Right Hand Touched	9262/1852.4	RMC	0.114	0.071	0.150	22.74	24.00	0.152	21.4°C
Right Hand Touched	9538/1907.6	RMC	0.129	0.079	0.010	22.62	24.00	0.177	21.4°C
Tested at the worst position with SIM2									
Right Hand Touched	9400/1880	RMC	0.139	0.086	0.150	22.70	24.00	0.188	21.4°C
Tested at the worst position with battery 2#									
Right Hand Touched	9400/1880	RMC	0.141	0.086	0.170	22.70	24.00	**0.190**	21.4°C

Table 33: Head SAR test results of UMTS Band II

Test Position of Body-Worn with 15mm	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	Liquid Temp.
			1-g	10-g					
Test data with battery 1#									
Front Side	9400/1880	RMC	0.175	0.105	0.130	22.70	24.00	0.236	21.4°C
Back Side	9400/1880	RMC	0.356	0.206	0.150	22.70	24.00	0.480	21.4°C
Tested at the worst position with SIM2									
Back Side	9400/1880	RMC	0.375	0.217	0.040	22.70	24.00	**0.506**	21.4°C
Tested at the worst position with battery 2#									
Back Side	9400/1880	RMC	0.350	0.202	0.160	22.70	24.00	0.472	21.4°C

Table 34: Body-Worn SAR test results of UMTS Band II

Test Position of Hotspot with 10mm	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR1-g (W/kg)	Liquid Temp.
			1-g	10-g					
Test data with battery 1#									
Front Side	9400/1880	RMC	0.331	0.190	0.170	22.70	24.00	0.447	21.4°C
Back Side	9538/1907.6	RMC	0.784	0.421	0.070	22.62	24.00	1.077	21.4°C
Back Side	9400/1880	RMC	0.734	0.397	-0.120	22.70	24.00	0.990	21.4°C
Back Side	9262/1852.4	RMC	0.633	0.345	0.190	22.74	24.00	0.846	21.4°C
Left Side	9400/1880	RMC	0.073	0.043	0.130	22.70	24.00	0.099	21.4°C
Right Side	9400/1880	RMC	0.081	0.052	0.130	22.70	24.00	0.109	21.4°C
Bottom Side	9400/1880	RMC	0.584	0.316	0.180	22.70	24.00	0.788	21.4°C
Tested at the worst position with SIM2									
Back Side	9538/1907.6	RMC	0.797	0.430	0.100	22.62	24.00	**1.095**	21.4°C
Tested at the worst position with battery 2#									
Back Side	9538/1907.6	RMC	0.715	0.384	0.090	22.62	24.00	0.982	21.4°C

Table 35: Hotspot SAR test results of UMTS Band II

7.2.6 SAR measurement Result of WiFi 2.4G

Test Position of Head	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR_{1-g} (W/kg)	Liquid Temp.
			1-g	10-g					
Test data with battery 1#									
Left Hand Touched	11/2462	802.11 b	0.488	0.223	-0.010	19.49	19.50	0.489	21.4°C
Left Hand Tilted 15°	11/2462	802.11 b	0.374	0.178	0.060	19.49	19.50	0.375	21.4°C
Right Hand Touched	11/2462	802.11 b	0.302	0.157	0.040	19.49	19.50	0.303	21.4°C
Right Hand Tilted 15°	11/2462	802.11 b	0.338	0.167	0.100	19.49	19.50	0.339	21.4°C
Left Hand Touched	1/2412	802.11 b	0.279	0.131	0.070	18.45	19.50	0.355	21.4°C
Left Hand Touched	6/2437	802.11 b	0.391	0.183	-0.010	18.95	19.50	0.444	21.4°C
Tested at the worst position with battery 2#									
Left Hand Touched	11/2462	802.11 b	0.489	0.237	-0.070	19.49	19.50	**0.490**	21.4°C

Table 36: Head SAR test results of WiFi 2450MHz

Test Position of Body-Worn with 15mm	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR_{1-g} (W/kg)	Liquid Temp.
			1-g	10-g					
Test data with battery 1#									
Front Side	11/2462	802.11 b	0.041	0.019	-0.070	19.49	19.50	0.041	21.4°C
Back Side	11/2462	802.11 b	0.050	0.020	0.190	19.49	19.50	0.050	21.4°C
Tested at the worst position with battery 2#									
Back Side	11/2462	802.11 b	0.054	0.021	0.130	19.49	19.50	**0.054**	21.4°C

Table 37: Body-Worn SAR test results of WiFi 2450MHz

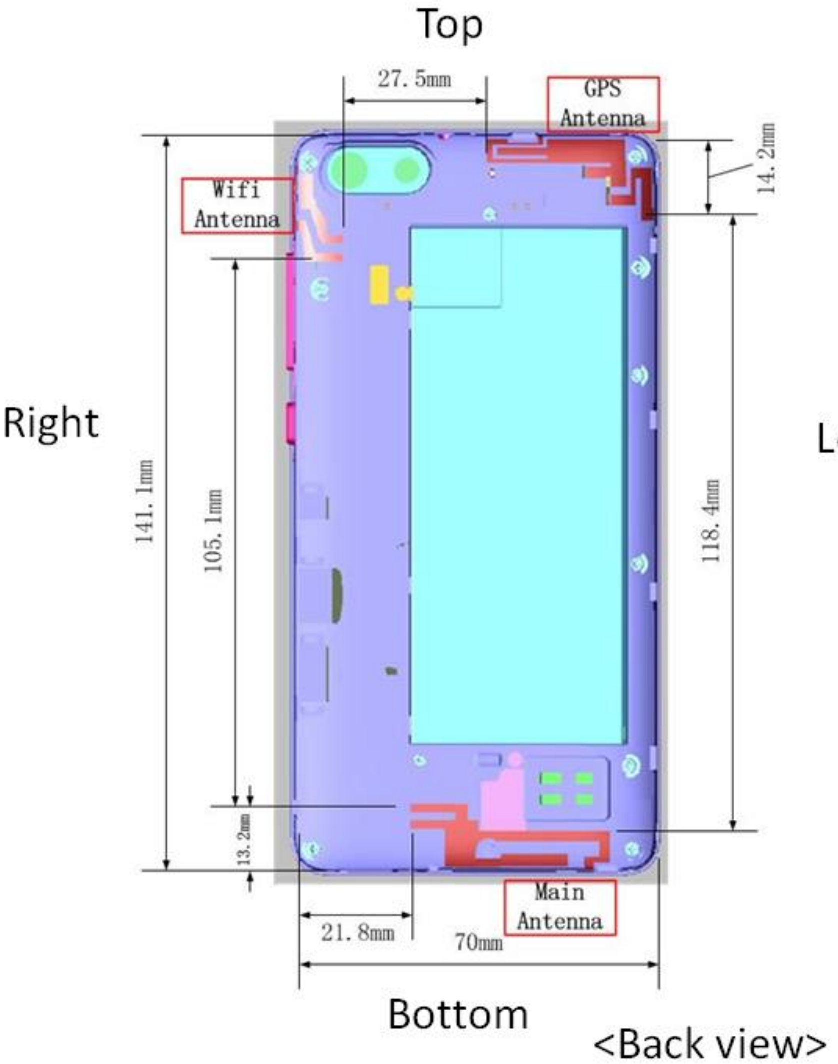
Test Position of Hotspot with 10mm	Test channel /Frequency	Test Mode	SAR Value (W/kg)		Power Drift (dB)	Conducted Power (dBm)	Tune-up Power (dBm)	Scaled SAR_{1-g} (W/kg)	Liquid Temp.
			1-g	10-g					
Test data with battery 1#									
Front Side	11/2462	802.11 b	0.079	0.035	-0.070	19.49	19.50	0.079	21.4°C
Back Side	11/2462	802.11 b	0.130	0.054	-0.040	19.49	19.50	**0.130**	21.4°C
Right Side	11/2462	802.11 b	0.059	0.025	0.160	19.49	19.50	0.059	21.4°C
Top Side	11/2462	802.11 b	0.066	0.025	-0.140	19.49	19.50	0.066	21.4°C
Tested at the worst position with battery 2#									
Back Side	11/2462	802.11 b	0.042	0.016	0.110	19.49	19.50	0.042	21.4°C

Table 38: Hotspot SAR test results of WiFi 2450MHz

7.3 Multiple Transmitter Evaluation

The following tables list information which is relevant for the decision if a simultaneous transmit evaluation is necessary according to FCC KDB 447498D01 General RF Exposure Guidance v05r02.

The location of the antennas inside mobile phone is shown as below picture:



Note:

1) Diversity antenna is used to improve the acceptance of performance of the main antenna. it does not have a transmitter function.

Mode	Exposure Condition	Front Side	Back Side	Left Side	Right Side	Top Side	Bottom Side
Main antenna	Hotspot	Yes	Yes	Yes	Yes	No	Yes
WiFi 2.4G antenna	Hotspot	Yes	Yes	No	Yes	Yes	No

Table 39: Sides for SAR testing

Note:

1) Per KDB 941225 D06, particular DUT edges were not required to be evaluated for Hotspot SAR if the antenna-to-edge distance is greater than 2.5cm.

7.3.1 Stand-alone SAR test exclusion

Per FCC KDB 447498D01v05, the 1-g SAR and 10-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 for 1-g SAR and ≤ 7.5 for 10-g extremity 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

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

Mode	Position	P_{max} (dBm)*	P_{max} (mW)	Distance (mm)	f (GHz)	Calculation Result	SAR Exclusion threshold	SAR test exclusion
BT	Body-Worn	9.00	7.94	15	2.450	0.83	3.00	Yes

Table 40: Standalone SAR test exclusion for BT

Note:

1)* - maximum possible output power declared by manufacturer

2) Held to ear configurations are not applicable to Bluetooth for this device.

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

(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√ f(GHz)/x] W/kg for test separation distances ≤ 50 mm,where x = 7.5 for 1-g SAR and x = 18.75 for 10-g SAR.

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

Mode	Position	P_{max} (dBm)*	P_{max} (mW)	Distance (mm)	f (GHz)	X	Estimated SAR (W/Kg)*
BT	Body-worn	9.00	7.94	15	2.450	7.5	0.111

Table 41: Estimated SAR calculation for BT

Note:

1) * - maximum possible output power declared by manufacturer

2) Held to ear configurations are not applicable to Bluetooth and therefore were not considered for simultaneous transmission.

7.3.2 Simultaneous Transmission Possibilities

The Simultaneous Transmission Possibilities of this device are as below:

No.	Configuration	Head	Body-worn	Hotspot
1	GSM (Voice) + WiFi 2.4G	Yes	Yes	N/A
2	GPRS/EDGE (DATA) + WiFi 2.4G	N/A	N/A	Yes
3	GSM (Voice) +BT	N/A	Yes	N/A
4	GPRS/EDGE (DATA) + BT	N/A	N/A	N/A
5	UMTS (Voice) + WiFi 2.4G	Yes	Yes	N/A
6	UMTS (DATA) + WiFi 2.4G	N/A	Yes	Yes
7	UMTS (Voice)+BT	N/A	Yes	N/A
8	UMTS (DATA) +BT	N/A	Yes	N/A

Table 42: Simultaneous Transmission Possibilities

Note:

1) WiFi 2.4G and Bluetooth share the same Tx antenna and can't transmit simultaneously.

2) The 2G&3G can't transmit simultaneously.

3) The device does not support DTM function.

4) Held to ear configurations are not applicable to Bluetooth and therefore were not considered for simultaneous transmission.

7.3.3 SAR Summation Scenario

Test Position		Scaled SAR$_{Max}$ GSM850	Scaled SAR$_{Max}$ WiFi 2.4G	Σ1-g SAR (W/kg)	SPLSR	Remark
Head	Left Hand Touched	0.246	0.490	0.736	NA	NA
	Left Hand Tilted 15°	0.151	0.375	0.526	NA	NA
	Right Hand Touched	0.323	0.303	0.626	NA	NA
	Right Hand Tilted 15°	0.158	0.339	0.497	NA	NA
Body-Worn	Front Side	0.267	0.041	0.308	NA	NA
	Back Side	0.423	0.054	0.477	NA	NA
Hotspot	Front Side	0.563	0.079	0.642	NA	NA
	Back Side	0.795	0.130	**0.925**	NA	NA
	Left Side	0.549	/	0.549	NA	NA
	Right Side	0.447	0.059	0.506	NA	NA
	Top Side	/	0.066	0.066	NA	NA
	Bottom Side	0.172	/	0.172	NA	NA

Table 43: Simultaneous Tx Combination of GSM850 and WiFi 2.4G.

Test Position		Scaled SAR$_{Max}$ GSM1900	Scaled SAR$_{Max}$ WiFi 2.4G	Σ1-g SAR (W/kg)	SPLSR	Remark
Head	Left Hand Touched	0.156	0.490	0.646	NA	NA
	Left Hand Tilted 15°	0.065	0.375	0.440	NA	NA
	Right Hand Touched	0.220	0.303	0.523	NA	NA
	Right Hand Tilted 15°	0.080	0.339	0.419	NA	NA
Body-Worn	Front Side	0.235	0.041	0.276	NA	NA
	Back Side	0.500	0.054	0.554	NA	NA
Hotspot	Front Side	0.879	0.079	0.958	NA	NA
	Back Side	1.218	0.130	**1.348**	NA	NA
	Left Side	0.105	/	0.105	NA	NA
	Right Side	0.138	0.059	0.197	NA	NA
	Top Side	/	0.066	0.066	NA	NA
	Bottom Side	0.981	/	0.981	NA	NA

Table 44: Simultaneous Tx Combination of GSM1900 and WiFi 2.4G.

Test Position		Scaled SAR$_{Max}$ UMTS Band V	Scaled SAR$_{Max}$ WiFi 2.4G	Σ1-g SAR (W/kg)	SPLSR	Remark
Head	Left Hand Touched	0.282	0.490	**0.772**	NA	NA
	Left Hand Tilted 15°	0.135	0.375	0.510	NA	NA
	Right Hand Touched	0.217	0.303	0.520	NA	NA
	Right Hand Tilted 15°	0.131	0.339	0.470	NA	NA
Body-Worn	Front Side	0.229	0.041	0.270	NA	NA
	Back Side	0.348	0.054	0.402	NA	NA
Hotspot	Front Side	0.228	0.079	0.307	NA	NA
	Back Side	0.421	0.130	0.551	NA	NA
	Left Side	0.229	/	0.229	NA	NA
	Right Side	0.198	0.059	0.257	NA	NA
	Top Side	/	0.066	0.066	NA	NA
	Bottom Side	0.078	/	0.078	NA	NA

Table 45: Simultaneous Tx Combination of UMTS Band V and WiFi 2.4G.

Test Position		Scaled SAR_{Max} UMTS Band IV	Scaled SAR_{Max} WiFi 2.4G	Σ1-g SAR (W/kg)	SPLSR	Remark
Head	Left Hand Touched	0.225	0.490	0.715	NA	NA
	Left Hand Tilted 15°	0.058	0.375	0.433	NA	NA
	Right Hand Touched	0.165	0.303	0.468	NA	NA
	Right Hand Tilted 15°	0.114	0.339	0.453	NA	NA
Body-Worn	Front Side	0.226	0.041	0.267	NA	NA
	Back Side	0.485	0.054	0.539	NA	NA
Hotspot	Front Side	0.465	0.079	0.544	NA	NA
	Back Side	0.964	0.130	**1.094**	NA	NA
	Left Side	0.151	/	0.151	NA	NA
	Right Side	0.100	0.059	0.159	NA	NA
	Top Side	/	0.066	0.066	NA	NA
	Bottom Side	0.706	/	0.706	NA	NA

Table 46: Simultaneous Tx Combination of UMTS Band IV and WiFi 2.4G.

Test Position		Scaled SAR_{Max} UMTS Band II	Scaled SAR_{Max} WiFi 2.4G	Σ1-g SAR (W/kg)	SPLSR	Remark
Head	Left Hand Touched	0.177	0.490	0.667	NA	NA
	Left Hand Tilted 15°	0.064	0.375	0.439	NA	NA
	Right Hand Touched	0.190	0.303	0.493	NA	NA
	Right Hand Tilted 15°	0.073	0.339	0.412	NA	NA
Body-Worn	Front Side	0.236	0.041	0.277	NA	NA
	Back Side	0.506	0.054	0.560	NA	NA
Hotspot	Front Side	0.447	0.079	0.526	NA	NA
	Back Side	1.095	0.130	**1.225**	NA	NA
	Left Side	0.099	/	0.099	NA	NA
	Right Side	0.109	0.059	0.168	NA	NA
	Top Side	/	0.066	0.066	NA	NA
	Bottom Side	0.788	/	0.788	NA	NA

Table 47: Simultaneous Tx Combination of UMTS Band II and WiFi 2.4G.

Test Position		Scaled SAR_{Max} GSM850	Scaled SAR_{Max} BT	Σ1-g SAR (W/kg)	SPLSR	Remark
Body-Worn	Front Side	0.267	0.088	0.355	NA	NA
	Back Side	0.423	0.088	0.511	NA	NA

Table 48: Simultaneous Tx Combination of GSM850 and BT.

Test Position		Scaled SAR_{Max} GSM1900	Scaled SAR_{Max} BT	Σ1-g SAR (W/kg)	SPLSR	Remark
Body-Worn	Front Side	0.235	0.088	0.323	NA	NA
	Back Side	0.500	0.088	0.588	NA	NA

Table 49: Simultaneous Tx Combination of GSM1900 and BT.

Test Position		Scaled SAR_{Max} UMTS Band V	Scaled SAR_{Max} BT	Σ1-g SAR (W/kg)	SPLSR	Remark
Body-Worn	Front Side	0.229	0.088	0.317	NA	NA
	Back Side	0.348	0.088	0.436	NA	NA

Table 50: Simultaneous Tx Combination of UMTS Band V and BT.

Test Position		Scaled SAR_{Max} UMTS Band IV	Scaled SAR_{Max} BT	Σ1-g SAR (W/kg)	SPLSR	Remark
Body-Worn	Front Side	0.226	0.088	0.314	NA	NA
	Back Side	0.485	0.088	0.573	NA	NA

Table 51: Simultaneous Tx Combination of UMTS Band IV and BT.

Test Position		Scaled SAR_{Max} UMTS Band II	Scaled SAR_{Max} BT	Σ1-g SAR (W/kg)	SPLSR	Remark
Body-Worn	Front Side	0.236	0.088	0.324	NA	NA
	Back Side	0.506	0.088	0.594	NA	NA

Table 52: Simultaneous Tx Combination of UMTS Band II and BT.

7.3.4 Simultaneous Transmission Conlcusion

The above numeral summed SAR results and SPLSR analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore simultaneous transmission SAR with Volume Scans is not required per KDB 447498 D01v05r02

Appendix A. System Check Plots
(Pls See Appendix A.)

Appendix B. SAR Measurement Plots
(Pls See Appendix B.)

Appendix C. Calibration Certificate
(Pls See Appendix C.)

Appendix D. Photo documentation
(Pls See Appendix D.)

End

Appendix A. System Check Plots

Table of contents
SystemPerformanceCheck-D835-EX-Head
SystemPerformanceCheck-D835-EX-Body
SystemPerformanceCheck-D1750-EX-Head
SystemPerformanceCheck-D1750-EX-Body
SystemPerformanceCheck-D1900-EX-Head
SystemPerformanceCheck-D1900-EX-Body
SystemPerformanceCheck-D2450-EX-Head
SystemPerformanceCheck-D2450-EX-Body

Date: 2014-12-23

Test Laboratory: HUAWEI SAR/HAC Lab

SystemPerformanceCheck-D835-EX-Head

DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:4d059

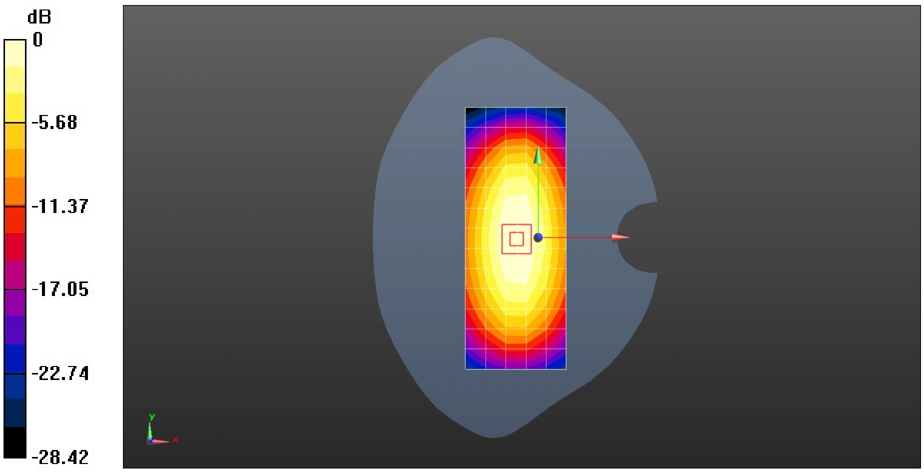
Communication System: UID 0, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.894 S/m; ε_r = 40.025; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3744; ConvF(9.09, 9.09, 9.09); Calibrated: 2014-7-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn851; Calibrated: 2014-7-24
- Phantom: SAM1; Type: SAM; Serial: TP-1475
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/d=15mm, Pin=250mW/Area Scan (6x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.47 W/kg

Configuration/d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 53.93 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 3.71 W/kg
SAR(1 g) = 2.43 W/kg; SAR(10 g) = 1.57 W/kg
Maximum value of SAR (measured) = 2.86 W/kg



0 dB = 2.47 W/kg = 3.93 dBW/kg

Date: 2014-12-24

Test Laboratory: HUAWEI SAR/HAC Lab

SystemPerformanceCheck-D835-EX-Body

DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2 - SN:4d059

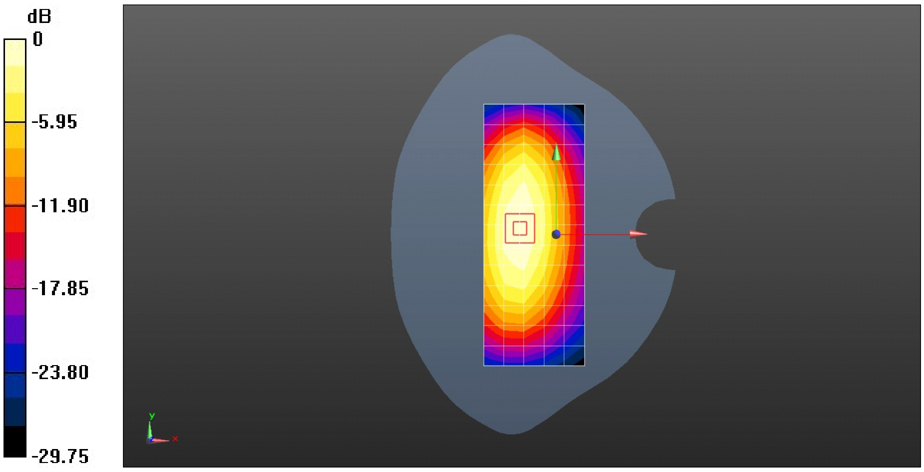
Communication System: UID 0, CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.948 S/m; ε_r = 55.279; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3744; ConvF(9.06, 9.06, 9.06); Calibrated: 2014-7-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn851; Calibrated: 2014-7-24
- Phantom: SAM2; Type: SAM; Serial: TP:1474
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/d=15mm, Pin=250mW/Area Scan (6x14x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.67 W/kg

Configuration/d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 44.95 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 3.51 W/kg
SAR(1 g) = 2.39 W/kg; SAR(10 g) = 1.58 W/kg
Maximum value of SAR (measured) = 2.78 W/kg



0 dB = 2.67 W/kg = 4.27 dBW/kg

Date: 2014-12-26

Test Laboratory: HUAWEI SAR/HAC Lab

SystemPerformanceCheck-D1750-EX-Head

DUT: Dipole 1750 MHz D1750V2; Type: D1750V2; Serial: D1750V2 - SN:1123

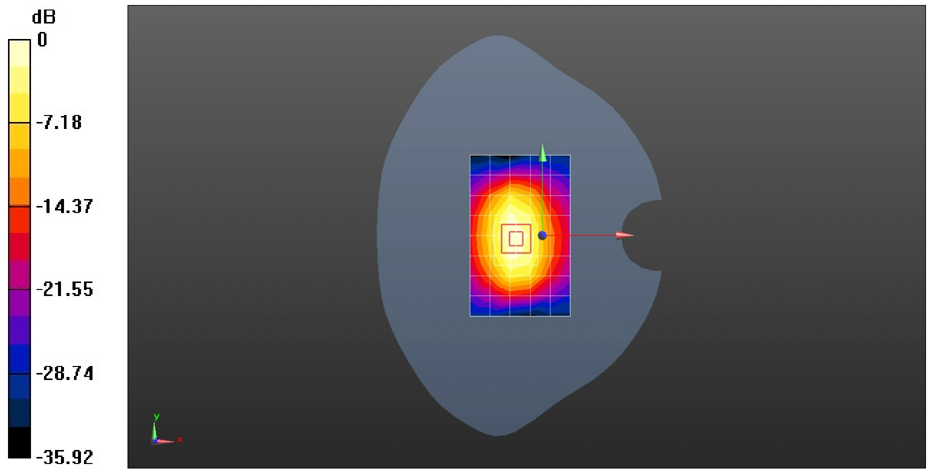
Communication System: UID 0, CW (0); Frequency: 1750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1750 MHz; σ = 1.304 S/m; ε_r = 39.578; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3744; ConvF(8.03, 8.03, 8.03); Calibrated: 2014-7-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn851; Calibrated: 2014-7-24
- Phantom: SAM1; Type: SAM; Serial: TP-1475
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/d=10mm, Pin=250mW/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 9.52 W/kg

Configuration/d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 82.78 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 15.3 W/kg
SAR(1 g) = 8.48 W/kg; SAR(10 g) = 4.51 W/kg
Maximum value of SAR (measured) = 10.5 W/kg



0 dB = 9.52 W/kg = 9.79 dBW/kg

Date: 2014-12-27

Test Laboratory: HUAWEI SAR/HAC Lab

SystemPerformanceCheck-D1750-EX-Body

DUT: Dipole 1750 MHz D1750V2; Type: D1750V2; Serial: D1750V2 - SN:1123

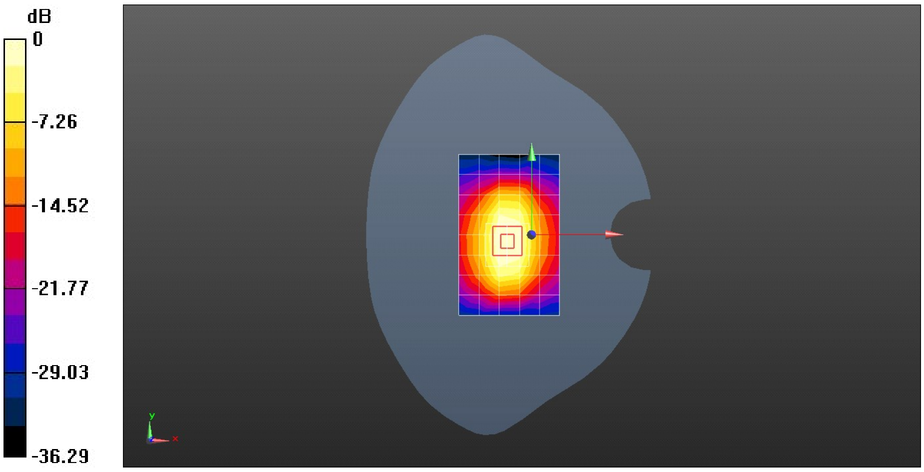
Communication System: UID 0, CW (0); Frequency: 1750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1750 MHz; σ = 1.498 S/m; ε_r = 51.525; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3744; ConvF(7.28, 7.28, 7.28); Calibrated: 2014-7-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn851; Calibrated: 2014-7-24
- Phantom: SAM1; Type: SAM; Serial: TP-1475
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/d=10mm, Pin=250mW/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 9.08 W/kg

Configuration/d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 85.13 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 17.7 W/kg
SAR(1 g) = 9.84 W/kg; SAR(10 g) = 5.15 W/kg
Maximum value of SAR (measured) = 12.4 W/kg



0 dB = 9.08 W/kg = 9.58 dBW/kg

Date: 2014-12-25

Test Laboratory: HUAWEI SAR/HAC Lab

SystemPerformanceCheck-D1900-EX-Head

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN:5d143

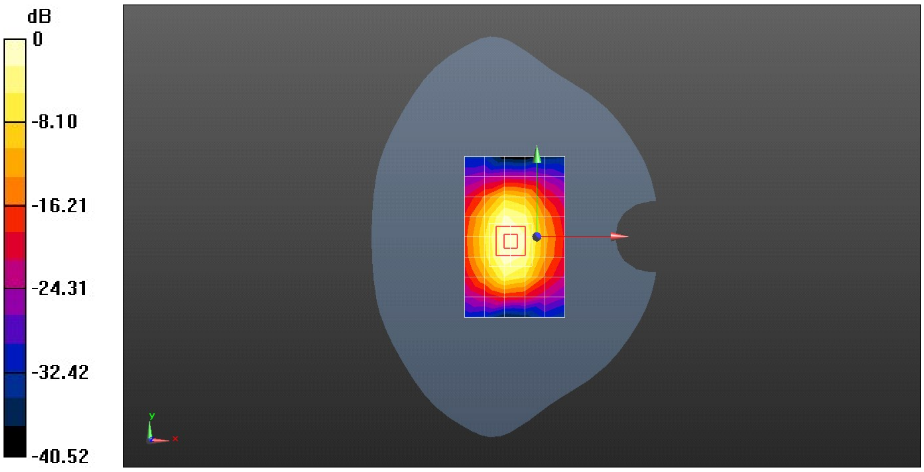
Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.4 S/m; ε_r = 39.012; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3744; ConvF(7.6, 7.6, 7.6); Calibrated: 2014-7-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn851; Calibrated: 2014-7-24
- Phantom: SAM1; Type: SAM; Serial: TP-1475
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/d=10mm, Pin=250mW/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 11.2 W/kg

Configuration/d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 87.85 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 19.4 W/kg
SAR(1 g) = 10.4 W/kg; SAR(10 g) = 5.34 W/kg
Maximum value of SAR (measured) = 13.1 W/kg



0 dB = 11.2 W/kg = 10.49 dBW/kg

Date: 2014-12-25

Test Laboratory: HUAWEI SAR/HAC Lab

SystemPerformanceCheck-D1900-EX-Body

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2 - SN:5d143

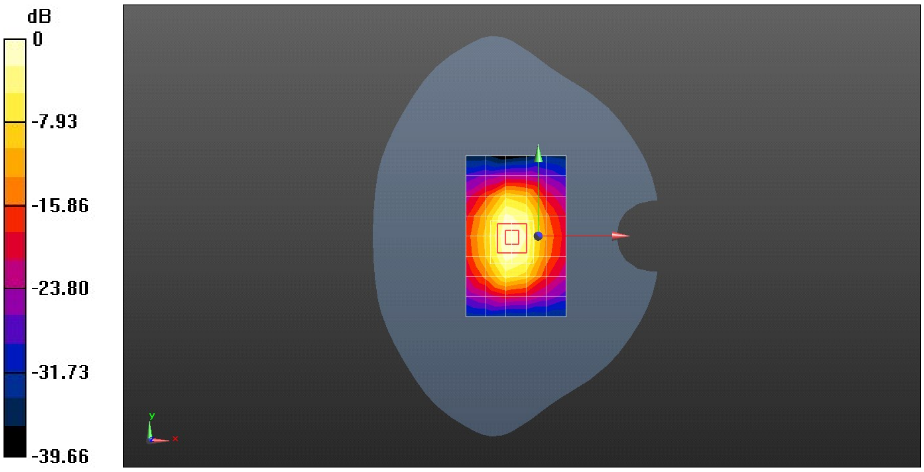
Communication System: UID 0, CW (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.572 S/m; ε_r = 52.482; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3744; ConvF(7.17, 7.17, 7.17); Calibrated: 2014-7-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn851; Calibrated: 2014-7-24
- Phantom: SAM2; Type: SAM; Serial: TP:1474
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/d=10mm, Pin=250mW/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 11.6 W/kg

Configuration/d=10mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 87.44 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 19.8 W/kg
SAR(1 g) = 10.9 W/kg; SAR(10 g) = 5.65 W/kg
Maximum value of SAR (measured) = 13.7 W/kg



0 dB = 11.6 W/kg = 10.64 dBW/kg

Date: 2014-12-29

Test Laboratory: HUAWEI SAR/HAC Lab

SystemPerformanceCheck-D2450-EX-Head

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:860

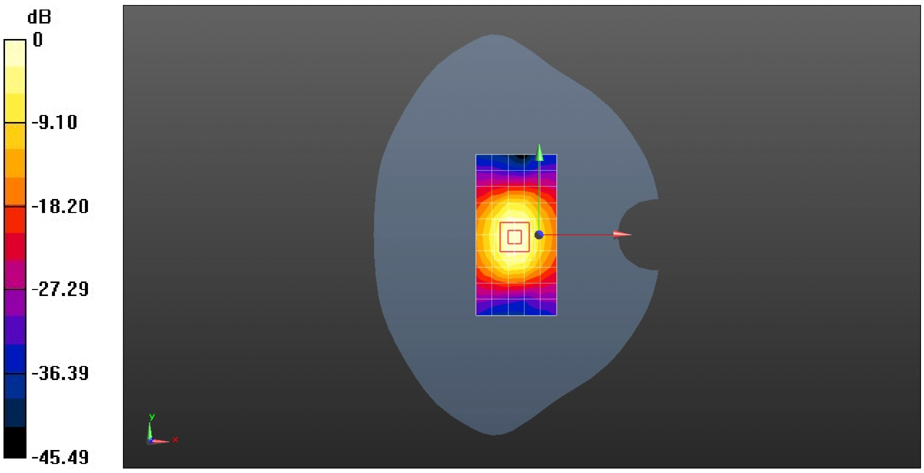
Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.823 S/m; ε_r = 39.467; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3744; ConvF(7.08, 7.08, 7.08); Calibrated: 2014-7-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn851; Calibrated: 2014-7-24
- Phantom: SAM1; Type: SAM; Serial: TP-1475
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/d=10mm, Pin=250mW/Area Scan (6x11x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 14.9 W/kg

Configuration/d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.25 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 28.8 W/kg
SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6.19 W/kg
Maximum value of SAR (measured) = 18.0 W/kg



0 dB = 14.9 W/kg = 11.73 dBW/kg

Date: 2014-12-30

Test Laboratory: HUAWEI SAR/HAC Lab

SystemPerformanceCheck-D2450-EX-Body

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:860

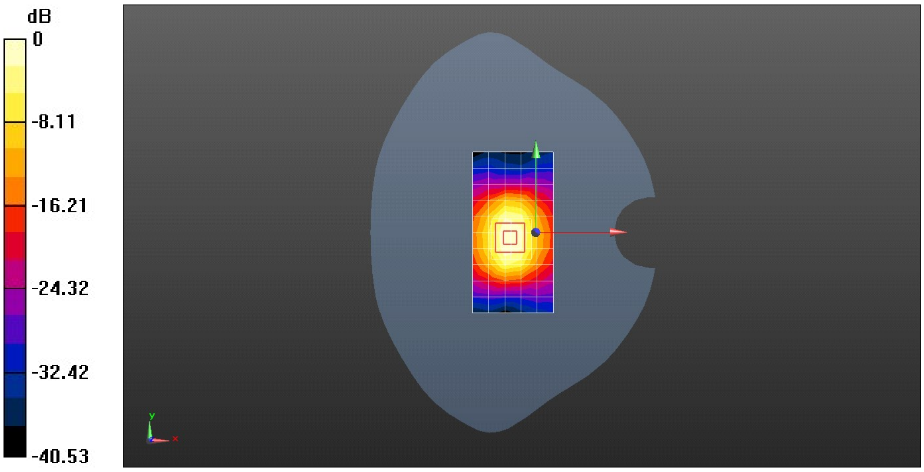
Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.976 S/m; ε_r = 52.178; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3744; ConvF(6.69, 6.69, 6.69); Calibrated: 2014-7-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn851; Calibrated: 2014-7-24
- Phantom: SAM2; Type: SAM; Serial: TP:1474
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/d=10mm, Pin=250mW/Area Scan (6x11x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 14.2 W/kg

Configuration/d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 84.14 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 27.7 W/kg
SAR(1 g) = 13.3 W/kg; SAR(10 g) = 6.04 W/kg
Maximum value of SAR (measured) = 17.7 W/kg



0 dB = 14.2 W/kg = 11.52 dBW/kg

Appendix B. SAR Measurement Plots

Table of contents

Date: 2014-12-23

Test Laboratory: HUAWEI SAR/HAC Lab

CHC-U23 GSM850 251CH Right hand touch cheek

DUT: HUAWEI CHC-U23; Type: Smart Phone; Serial: SAR3

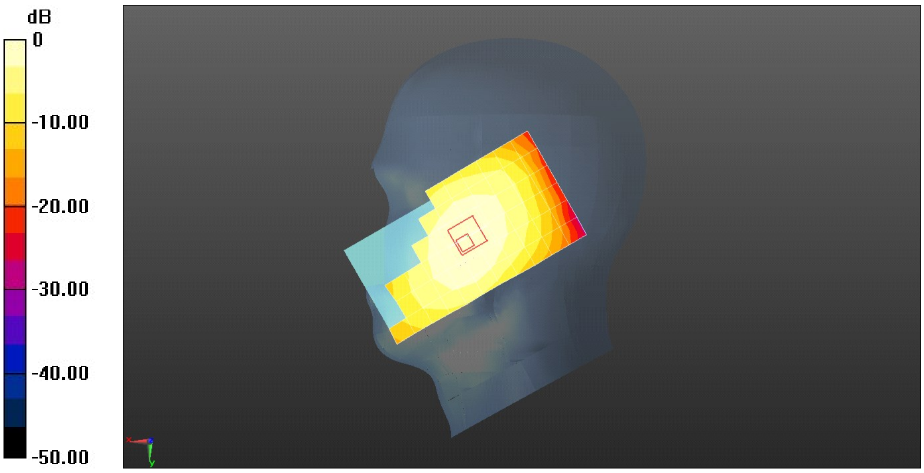
Communication System: UID 0, HW-GSM\GPRS\EGPRS-1TS (0); Frequency: 848.8 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 849 MHz; σ = 0.906 S/m; ε_r = 39.837; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN3744; ConvF(9.09, 9.09, 9.09); Calibrated: 2014-7-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn851; Calibrated: 2014-7-24
- Phantom: SAM1; Type: SAM; Serial: TP-1475
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/Head/Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.243 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.984 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.508 W/kg
SAR(1 g) = 0.257 W/kg; SAR(10 g) = 0.172 W/kg
Maximum value of SAR (measured) = 0.259 W/kg



0 dB = 0.243 W/kg = -6.14 dBW/kg

Date: 2014-12-24

Test Laboratory: HUAWEI SAR/HAC Lab

CHC-U23 GSM850 190CH Back Side 15mm with battery 2#

DUT: HUAWEI CHC-U23; Type: Smart Phone; Serial: SAR4

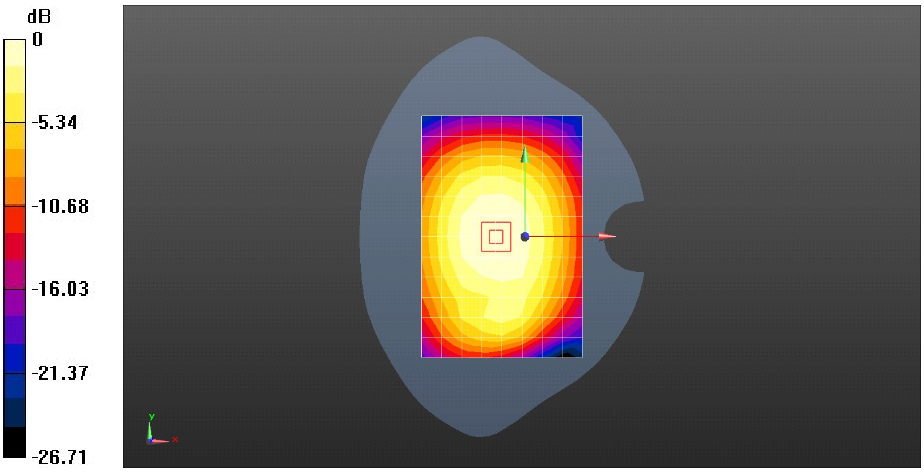
Communication System: UID 0, HW-GSM\GPRS\EGPRS-1TS (0); Frequency: 836.6 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 837 MHz; σ = 0.948 S/m; ε_r = 55.38; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3744; ConvF(9.06, 9.06, 9.06); Calibrated: 2014-7-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn851; Calibrated: 2014-7-24
- Phantom: SAM2; Type: SAM; Serial: TP:1474
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/Body/Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.356 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.07 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.461 W/kg
SAR(1 g) = 0.339 W/kg; SAR(10 g) = 0.254 W/kg
Maximum value of SAR (measured) = 0.374 W/kg



0 dB = 0.356 W/kg = -4.49 dBW/kg

Date: 2014-12-24

Test Laboratory: HUAWEI SAR/HAC Lab

CHC-U23 GSM850 GPRS 2TS 190CH Back Side 10mm-SIM 2

DUT: HUAWEI CHC-U23; Type: Smart Phone; Serial: SAR4

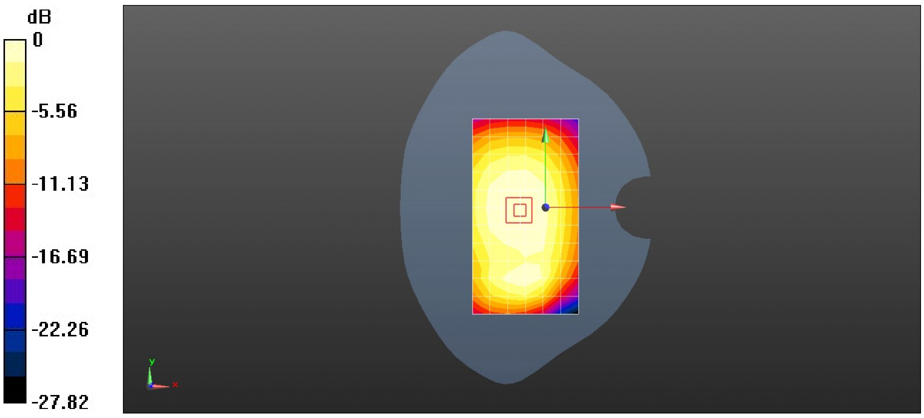
Communication System: UID 0, HW-GSM\GPRS\EGPRS-2TS (0); Frequency: 836.6 MHz;Duty Cycle: 1:4.10015
Medium parameters used: f = 837 MHz; σ = 0.948 S/m; ε_r = 55.38; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3744; ConvF(9.06, 9.06, 9.06); Calibrated: 2014-7-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn851; Calibrated: 2014-7-24
- Phantom: SAM2; Type: SAM; Serial: TP:1474
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/Body/Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.692 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.90 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.789 W/kg
SAR(1 g) = 0.637 W/kg; SAR(10 g) = 0.494 W/kg
Maximum value of SAR (measured) = 0.695 W/kg



0 dB = 0.692 W/kg = -1.60 dBW/kg

Date: 2014-12-25

Test Laboratory: HUAWEI SAR/HAC Lab

CHC-U23 GSM1900 661CH Right hand touch cheek

DUT: HUAWEI CHC-U23; Type: Smart Phone; Serial: SAR3

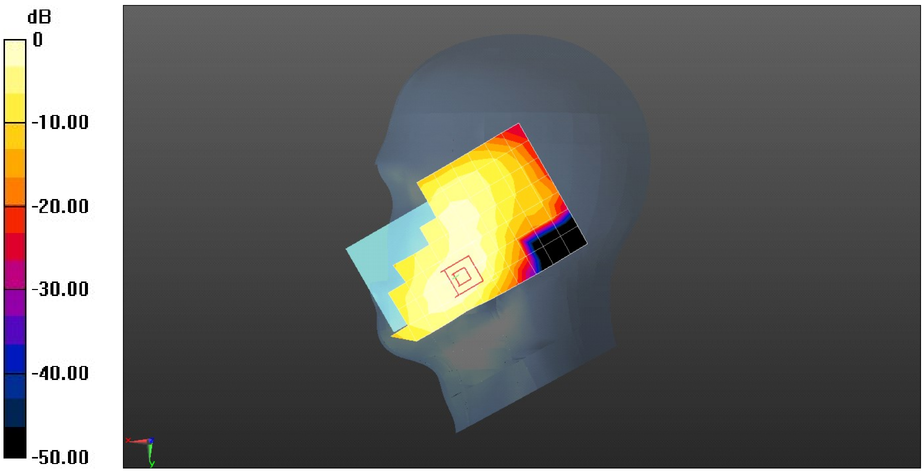
Communication System: UID 0, HW-GSM\GPRS\EGPRS-1TS (0); Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.383 S/m; ε_r = 39.068; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY Configuration:

- Probe: EX3DV4 - SN3744; ConvF(7.6, 7.6, 7.6); Calibrated: 2014-7-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn851; Calibrated: 2014-7-24
- Phantom: SAM1; Type: SAM; Serial: TP-1475
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/Head/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.201 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.497 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.269 W/kg
SAR(1 g) = 0.175 W/kg; SAR(10 g) = 0.107 W/kg
Maximum value of SAR (measured) = 0.204 W/kg



0 dB = 0.201 W/kg = -6.97 dBW/kg

Date: 2014-12-25

Test Laboratory: HUAWEI SAR/HAC Lab

CHC-U23 GSM1900 661CH Back Side 15mm with Battery 2#

DUT: HUAWEI CHC-U23; Type: Smart Phone; Serial: SAR4

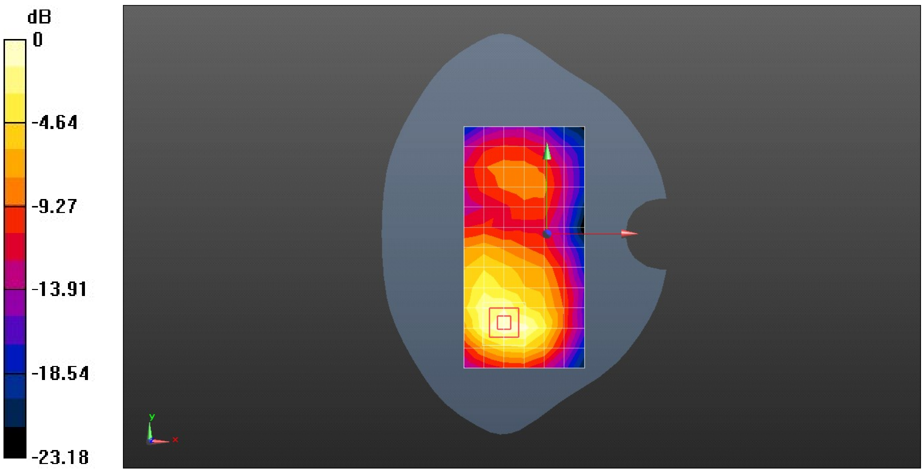
Communication System: UID 0, HW-GSM\GPRS\EGPRS-1TS (0); Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.556 S/m; ε_r = 52.517; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3744; ConvF(7.17, 7.17, 7.17); Calibrated: 2014-7-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn851; Calibrated: 2014-7-24
- Phantom: SAM2; Type: SAM; Serial: TP:1474
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/Body/Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.434 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.587 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.690 W/kg
SAR(1 g) = 0.397 W/kg; SAR(10 g) = 0.223 W/kg
Maximum value of SAR (measured) = 0.488 W/kg



0 dB = 0.434 W/kg = -3.63 dBW/kg

Test Laboratory: HUAWEI SAR/HAC Lab

CHC-U23 GSM1900 GPRS 2TS 810CH Back Side 10mm with Battery 2#

DUT: HUAWEI CHC-U23; Type: Smart Phone; Serial: SAR4

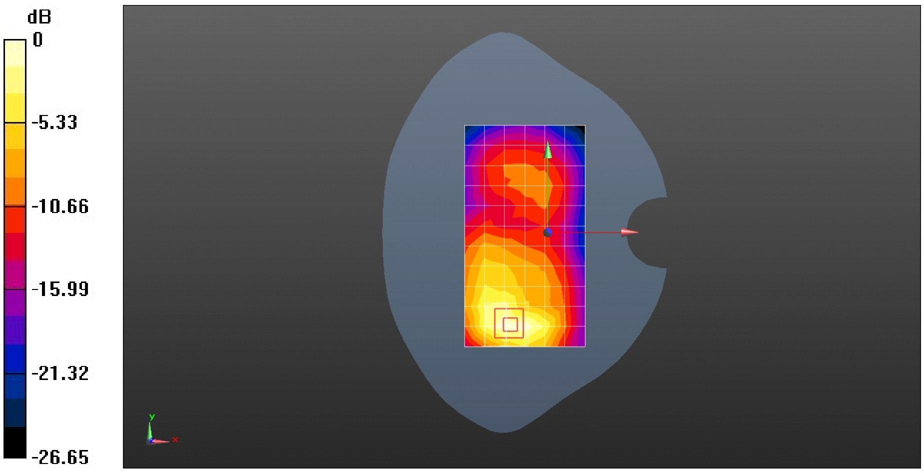
Communication System: UID 0, HW-GSM\GPRS\EGPRS-2TS (0); Frequency: 1909.8 MHz;Duty Cycle: 1:4.10015
Medium parameters used: f = 1910 MHz; σ = 1.586 S/m; ε_r = 52.428; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3744; ConvF(7.17, 7.17, 7.17); Calibrated: 2014-7-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn851; Calibrated: 2014-7-24
- Phantom: SAM2; Type: SAM; Serial: TP:1474
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/Body/Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.09 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.073 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.63 W/kg
SAR(1 g) = 0.935 W/kg; SAR(10 g) = 0.494 W/kg
Maximum value of SAR (measured) = 1.16 W/kg



0 dB = 1.09 W/kg = 0.37 dBW/kg

Date: 2014-12-23

Test Laboratory: HUAWEI SAR/HAC Lab

CHC-U23 UMTS Band V 4233CH Left hand touch cheek-SIM 2

DUT: HUAWEI CHC-U23; Type: Smart Phone; Serial: SAR3

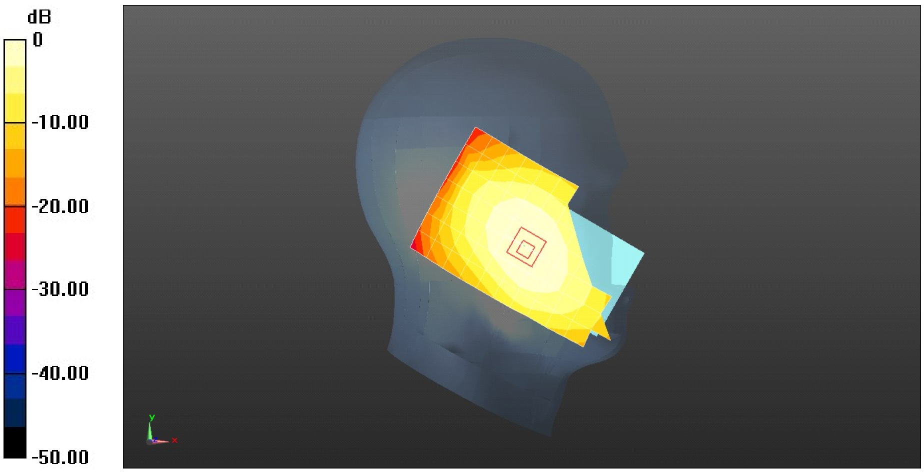
Communication System: UID 0, HW-UMTS-FDD(WCDMA) (0); Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 847 MHz; σ = 0.903 S/m; ε_r = 39.819; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY Configuration:

- Probe: EX3DV4 - SN3744; ConvF(9.09, 9.09, 9.09); Calibrated: 2014-7-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn851; Calibrated: 2014-7-24
- Phantom: SAM1; Type: SAM; Serial: TP-1475
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/Head/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.223 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.453 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.259 W/kg
SAR(1 g) = 0.204 W/kg; SAR(10 g) = 0.153 W/kg
Maximum value of SAR (measured) = 0.227 W/kg



0 dB = 0.223 W/kg = -6.52 dBW/kg

Test Laboratory: HUAWEI SAR/HAC Lab

CHC-U23 UMTS Band V 4182CH Back Side 15mm with battery 2#

DUT: HUAWEI CHC-U23; Type: Smart Phone; Serial: SAR4

Communication System: UID 0, HW-UMTS-FDD(WCDMA) (0); Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.948 S/m; ε_r = 55.362; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

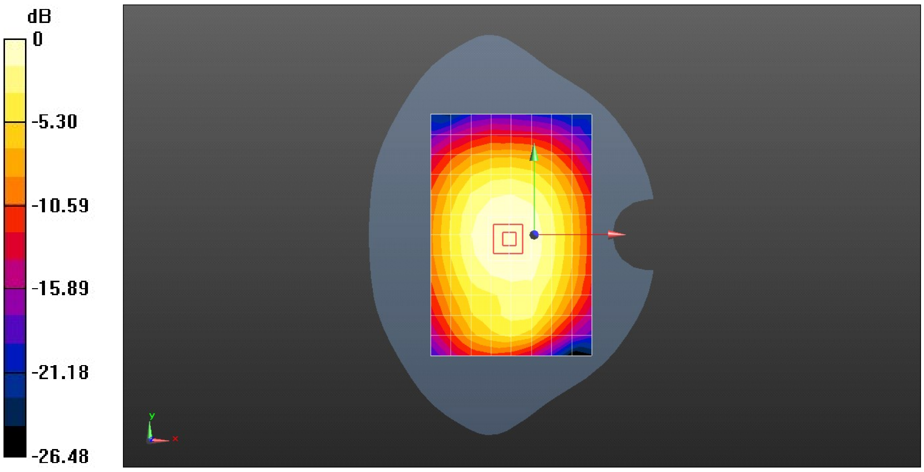
- Probe: EX3DV4 - SN3744; ConvF(9.06, 9.06, 9.06); Calibrated: 2014-7-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn851; Calibrated: 2014-7-24
- Phantom: SAM2; Type: SAM; Serial: TP:1474
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/Body/Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.287 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.01 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.325 W/kg
SAR(1 g) = 0.260 W/kg; SAR(10 g) = 0.200 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.285 W/kg



0 dB = 0.287 W/kg = -5.42 dBW/kg

Date: 2014-12-24

Test Laboratory: HUAWEI SAR/HAC Lab

CHC-U23 UMTS Band V 4182CH Back Side 10mm with battery 2#

DUT: HUAWEI CHC-U23; Type: Smart Phone; Serial: SAR4

Communication System: UID 0, HW-UMTS-FDD(WCDMA) (0); Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.4 MHz; $\sigma = 0.948$ S/m; $\varepsilon_r = 55.362$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3744; ConvF(9.06, 9.06, 9.06); Calibrated: 2014-7-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn851; Calibrated: 2014-7-24
- Phantom: SAM2; Type: SAM; Serial: TP:1474
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/Body/Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm

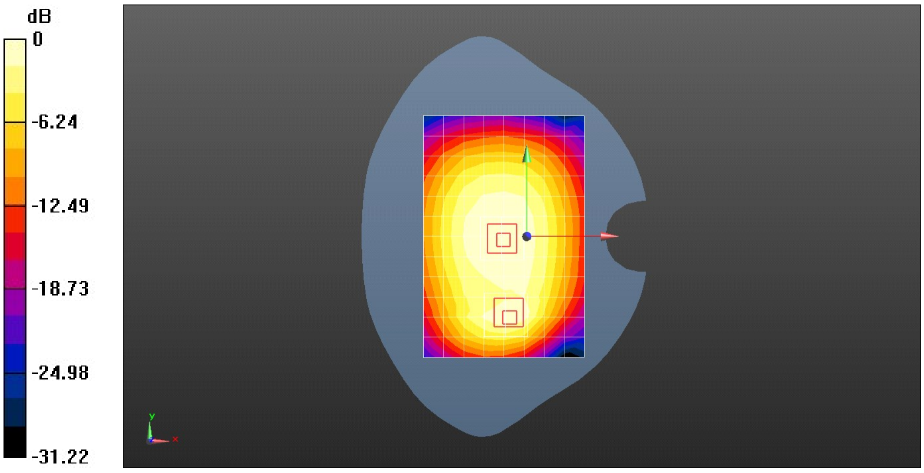
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.349 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.61 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.509 W/kg
SAR(1 g) = 0.286 W/kg; SAR(10 g) = 0.163 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.347 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.61 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.388 W/kg
SAR(1 g) = 0.314 W/kg; SAR(10 g) = 0.243 W/kg

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.342 W/kg



0 dB = 0.349 W/kg = -4.57 dBW/kg

Date: 2014-12-26

Test Laboratory: HUAWEI SAR/HAC Lab

CHC-U23 UMTS Band IV 1413CH Left hand touch cheek

DUT: HUAWEI CHC-U23; Type: Smart Phone; Serial: SAR3

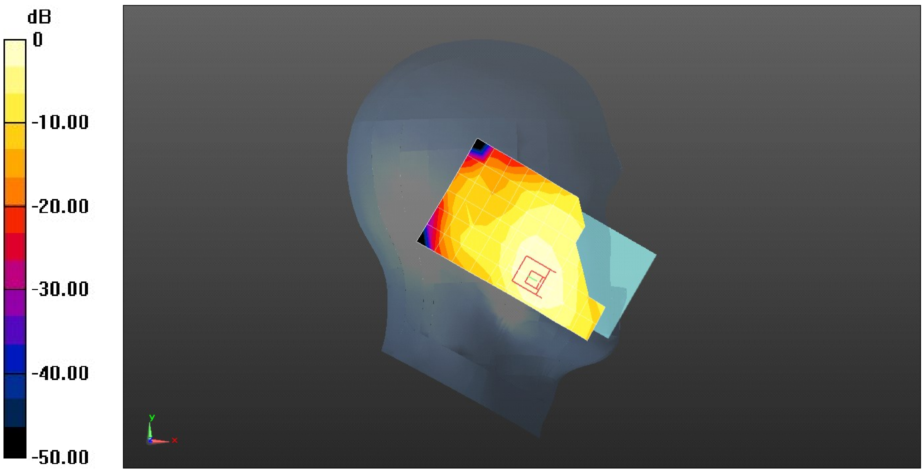
Communication System: UID 0, HW-UMTS-FDD(WCDMA) (0); Frequency: 1732.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1733 MHz; σ = 1.297 S/m; ε_r = 39.63; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY Configuration:

- Probe: EX3DV4 - SN3744; ConvF(8.03, 8.03, 8.03); Calibrated: 2014-7-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn851; Calibrated: 2014-7-24
- Phantom: SAM1; Type: SAM; Serial: TP-1475
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/Head/Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.187 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.435 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.242 W/kg
SAR(1 g) = 0.164 W/kg; SAR(10 g) = 0.103 W/kg
Maximum value of SAR (measured) = 0.190 W/kg



0 dB = 0.187 W/kg = -7.28 dBW/kg

Date: 2014-12-27

Test Laboratory: HUAWEI SAR/HAC Lab

CHC-U23 UMTS Band IV 1413CH Back Side 15mm

DUT: HUAWEI CHC-U23; Type: Smart Phone; Serial: SAR3

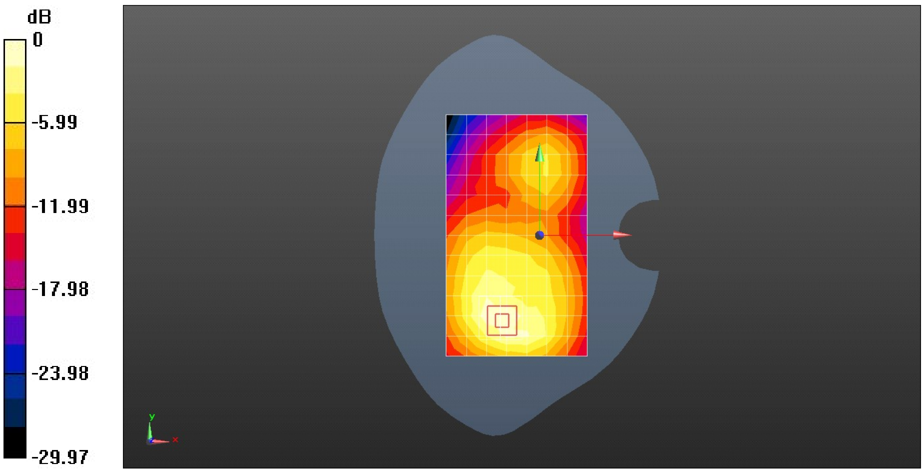
Communication System: UID 0, HW-UMTS-FDD(WCDMA) (0); Frequency: 1732.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1733 MHz; σ = 1.474 S/m; ε_r = 51.576; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3744; ConvF(7.28, 7.28, 7.28); Calibrated: 2014-7-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn851; Calibrated: 2014-7-24
- Phantom: SAM1; Type: SAM; Serial: TP-1475
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/Body/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.397 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.325 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.575 W/kg
SAR(1 g) = 0.354 W/kg; SAR(10 g) = 0.204 W/kg
Maximum value of SAR (measured) = 0.430 W/kg



0 dB = 0.397 W/kg = -4.01 dBW/kg

Date: 2014-12-28

Test Laboratory: HUAWEI SAR/HAC Lab

CHC-U23 UMTS Band IV 1413CH Back Side 10mm with battery 2#

DUT: HUAWEI CHC-U23; Type: Smart Phone; Serial: SAR4

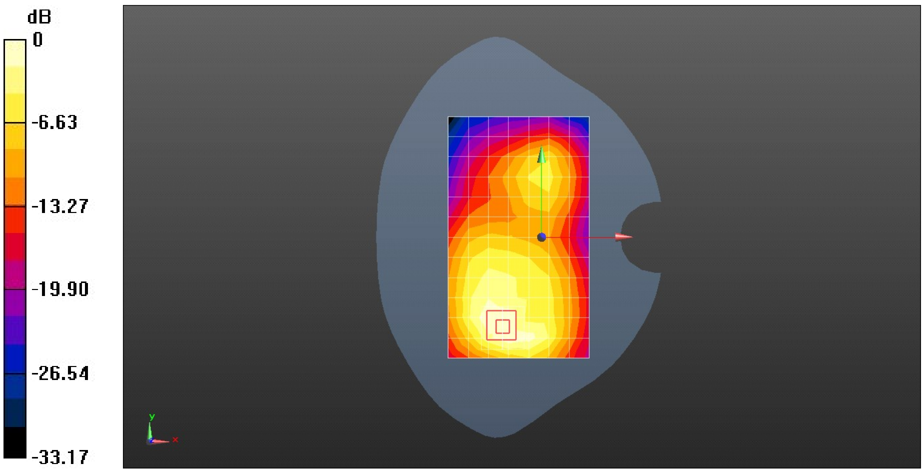
Communication System: UID 0, HW-UMTS-FDD(WCDMA) (0); Frequency: 1732.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1733 MHz; σ = 1.474 S/m; ε_r = 51.576; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY Configuration:

- Probe: EX3DV4 - SN3744; ConvF(7.28, 7.28, 7.28); Calibrated: 2014-7-24;
- Sensor-Surface: 3mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn851; Calibrated: 2014-7-24
- Phantom: SAM1; Type: SAM; Serial: TP-1475
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/Body/Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.670 W/kg

Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.391 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 1.19 W/kg
SAR(1 g) = 0.703 W/kg; SAR(10 g) = 0.383 W/kg
Maximum value of SAR (measured) = 0.876 W/kg



0 dB = 0.670 W/kg = -1.74 dBW/kg