FCC SAR Test Report

FCC ID: VRQ-GT-200

Project No.	:	1601041
Equipment	:	3G GPS Tracker
Model Name	:	GT-200
Applicant	:	Navisys Technology Corp.
Address	:	2F, No.56, Park Ave.II, Science-Based Industrial Park, Hsinchu 30844, Taiwan

Date of Receipt	:	Mar. 25, 2016
Date of Test	:	Apr. 20, 2016 ~ Jun. 03, 2016
Issued Date	:	Jun. 03, 2016
Tested by	:	BTL Inc.

PREPARED BY : Jerome Chang

(Jerome Chang/ Technical Engineer)

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Testing Laboratory
0659

Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**), or National Institute of Standards and Technology (**NIST**) .

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Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

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REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCC-SAR-1601041	Original Issue.	Jun. 03, 2016

1 GENERAL SUMMARY

Equipment	3G GPS Tracker
Model Name	GT-200
Brand Name	Navisys
Manufacturer	Uong Xing Technology Co., LTD
Address	No.416, Sec.1, Beising Rd., Jhudong Township, Hsinchu Country 310, Taiwan
Standard(s)	**FCC 47CFR §2.1093** Radio frequency Radiation Exposure Evaluation: Portable Devices **ANSI Std C95.1-1992** Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.(IEEE Std C95.1-1991) **IEEE Std 1528-2013** Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques **KDB941225 D01** 3G SAR Procedures v03r01 **KDB447498 D01** General RF Exposure Guidance v06 **KDB865664 D01** SAR measurement 100 MHz to 6 GHz v01r04 **KDB865664 D02** RF Exposure Reporting v01r02 **KDB690783 D01** SAR Listings on Grants v01r03

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCC-SAR-1510CXXX) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).

2. RF EMISSIONS MEASUREMENT

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is **SAR room** at the location of No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan.

2.2 MEASUREMENT UNCERTAINTY

Error Description	Uncertainty Value (± %)	Probability Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g)	Vi V_{eff}
Measurement System							
Probe Calibration	6.0	Normal	1	1	1	± 6.0 %	∞
Axial Isotropy	4.7	Rectangular	√3	0.7	0.7	± 1.9 %	∞
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	0.7	± 3.9 %	∞
Boundary Effects	1.0	Rectangular	√3	1	1	± 0.6 %	∞
Linearity	4.7	Rectangular	√3	1	1	± 2.7 %	∞
Detection Limits	1	Rectangular	√3	1	1	± 0.6 %	∞
Modulation response	2.4	Rectangular	√3	1	1	±1.4 %	∞
Readout Electronics	0.3	Normal	1	1	1	± 0.3 %	∞
Response Time	0.8	Rectangular	√3	1	1	± 0.5%	∞
Integration Time	2.6	Rectangular	√3	1	1	± 1.5 %	∞
RF Ambient – Noise	3.0	Rectangular	√3	1	1	± 1.7 %	∞
RF Ambient– Reflections	3.0	Rectangular	√3	1	1	± 1.7 %	∞
Probe Positioner	0.4	Rectangular	√3	1	1	± 0.2 %	∞
Probe Positioning	2.9	Rectangular	√3	1	1	± 1.7 %	∞
Max.SAR Evaluation	2.0	Rectangular	√3	1	1	± 1.2 %	∞
Test Sample Related							
Device Positioning	1.3 2.2	Normal	1	1	1	± 1.3 %	145
Device Holder	1.5 1.6	Normal	1	1	1	± 1.5 %	5
Power Drift	5.0	Rectangular	√3	1	1	± 2.9 %	∞
Phantom and Setup							
Phantom Production Tolerances	6.1	Rectangular	√3	1	1	± 3.5 %	∞
SAR correction	1.9	Rectangular	√3	1	0.84	± 1.1 %	∞
Liquid Conductivity (mea.)	2.5	Rectangular	√3	0.78	0.71	± 1.1 %	∞
Liquid Permittivity (mea.)	2.5	Rectangular	√3	0.26	0.26	± 0.4 %	∞
Temp. unc. – Conductivity	3.4	Rectangular	√3	0.78	0.71	± 1.5 %	∞
Temp. unc. – Permittivity	0.4	Rectangular	√3	0.23	0.26	± 0.1 %	∞
Combined Standard Uncertainty (K = 1)						± 10.4 %	361
Expanded Uncertainty (K = 2)						**± 20.8 %**	

3. GENERAL INFORMATION

3.1 STATEMENT OF COMPLIANCE

Equipment Class	Mode	Highest Head (5mm) SAR-1g(W/kg)	Highest Body (5mm) SAR-1g(W/kg)
PCB	WCDMA Band II	0.77	0.66
	WCDMA Band V	0.02	0.10

Note:

The device is in compliance with Specific Absorption Rate（SAR）for general population/ uncontrolled exposure limits according to the FCC rule §2.1093, the ANSI/IEEE C95.1:1992, the NCRP Report Number 86 for uncontrolled environment, and had been tested in accordance with the measurement methods and procedures specified in IEEE Std 1528-2013.

3.1.1 GENERAL DESCRIPTION OF EUT

<table>
<tr><td>Equipment</td><td colspan="3">3G GPS Tracker</td></tr>
<tr><td>Model Name</td><td colspan="3">GT-200</td></tr>
<tr><td>HW Version</td><td colspan="3">V05</td></tr>
<tr><td>SW Version</td><td colspan="3">V20</td></tr>
<tr><td>Modulation</td><td colspan="3">WCDMA(QPSK)</td></tr>
<tr><td>EUT Type</td><td colspan="3">Production Unit</td></tr>
<tr><td rowspan="3">Operation Frequency Range(s)</td><td>Band</td><td>TX (MHz)</td><td>RX (MHz)</td></tr>
<tr><td>WCDMA Band V</td><td>824-849</td><td>869-894</td></tr>
<tr><td>WCDMA Band II</td><td>1850-1910</td><td>1930-1990</td></tr>
<tr><td>HSDPA UE Category</td><td colspan="3">10</td></tr>
<tr><td>HSUPA UE Category</td><td colspan="3">6</td></tr>
<tr><td>3GPP Version</td><td colspan="3">Release 6</td></tr>
<tr><td>Power Class:</td><td colspan="3">3, tested with power control “all 1”(WCDMA Band II/ V)</td></tr>
<tr><td rowspan="2">Test Channels (low-mid-high):</td><td colspan="3">9262-9400-9538(WCDMA Band II)</td></tr>
<tr><td colspan="3">4132-4182-4233 (WCDMA Band V)</td></tr>
<tr><td rowspan="2">Antenna Gain:</td><td colspan="3">WCDMA Band V: -1 dBi</td></tr>
<tr><td colspan="3">WCDMA Band II: -1 dBi</td></tr>
<tr><td colspan="4">Other Information</td></tr>
<tr><td rowspan="5">Battery</td><td>Brand</td><td colspan="2">HPI</td></tr>
<tr><td>Model</td><td colspan="2">GT-200</td></tr>
<tr><td>Capacitance</td><td colspan="2">Li-ion</td></tr>
<tr><td>Rated Voltage</td><td colspan="2">3.7 Vdc, 1430 mAh</td></tr>
<tr><td>Manufacturer</td><td colspan="2">Horizon Power Inc.</td></tr>
</table>

3.2 LABORATORY ENVIRONMENT

<table>
<tr><td>Temperature</td><td>Min. = 18ºC, Max. = 25ºC</td></tr>
<tr><td>Relative humidity</td><td>Min. = 30%, Max. = 70%</td></tr>
<tr><td>Ground system resistance</td><td>< 0.5Ω</td></tr>
<tr><td colspan="2">Ambient noise is checked and found very low and in compliance with requirement of standards.
Reflection of surrounding objects is minimized and in compliance with requirement of standards.</td></tr>
</table>

3.3 MAIN TEST INSTRUMENTS

Item	Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Interval
1	E-field Probe	Speag	EX3DV4	7369	Aug. 18, 2015	1 Year
2	Data Acquisition Electronics	Speag	DAE4	1486	Aug. 27, 2015	1 Year
3	System Validation Dipole	Speag	D835V2	4d199	Aug. 12, 2015	3 Year
4	System Validation Dipole	Speag	D1900V2	5d208	Aug. 13, 2015	3 Year
5	Oval Flat Phantom	Speag	Oval Flat Phantom ELI 5.0	1240	N/A	N/A
6	SAM Twin Phantom	Speag	Twin Sam Phantom V5.0	1897	N/A	N/A
7	8960 Series 10 Wireless Com Test set	Agilent	E5515E	MY52112163	Aug. 03, 2015	1 Years
8	Power Amplifier	Mini-Circuits	ZVE-2W-272+	N650001538	N/A	Note 1
9	ENA Network Analyzer	Keysight	E5071C	MY46524658	Dec. 17, 2015	1 Year
10	EXG Vector Signal Generator	Keysight	N5172B	MY53051229	Dec. 10, 2015	1 Year
11	Power Meter	Anritsu	ML2495A	1128008	Aug. 16, 2015	1 Year
12	Power Sensor	Anritsu	MA2411B	1126001	Aug. 16, 2015	1 Year
13	Power Meter	Anritsu	4232A	10179	Nov. 03, 2015	1 Year
14	Power Sensor	Anritsu	51011	34150	Nov. 03, 2015	1 Year
15	Spectrum Analyzer	Keysight	N9000A	MY54230551	Nov. 09, 2015	1 Year
16	Dielectric Assessment Kit	Speag	DAK-3.5	1226	Dec. 09, 2015	1 Year
17	Low pass filter	Mini-Circuits	SLP-2950+	M108294	N/A	N/A
18	Attenuator	Worken	WFA0602-10	Att-10-01	N/A	Note 1
19	Attenuator	Worken	WFA0602-10	Att-10-02	N/A	Note 1
20	Attenuator	Worken	WFA0602-3	Att-03-01	N/A	Note 1
21	Dual directional coupler	Woken	0110A05601O-10	DOM5CIW3E2	N/A	Note 1

Remark: " N/A" denotes no model name, serial No. or calibration specified.

Note 1: Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. the reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check source.

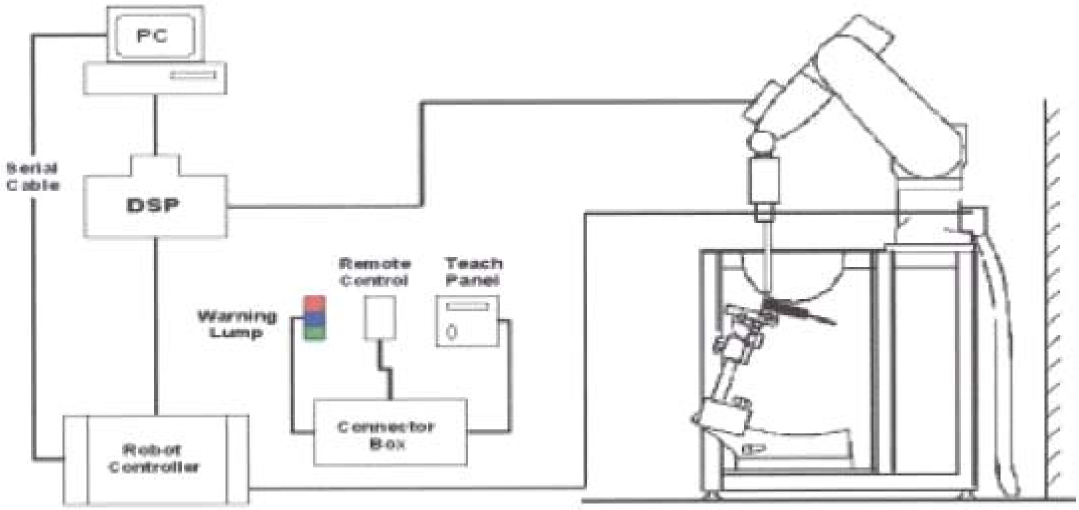
4.SAR MEASUREMENTS SYSTEM CONFIGURATION

4.1SAR MEASUREMENT SET-UP

The DASY5 system for performing compliance tests consists of the following items:

1. A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
2. A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
3. A data acquisition electronic (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
4. A unit to operate the optical surface detector which is connected to the EOC.
5. The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.
6. TheDASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 7
7. DASY5 software and SEMCAD data evaluation software.
8. Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
9. The generic twin phantom enabling the testing of left-hand and right-hand usage.
10. The device holder for handheld mobile phones.
11. Tissue simulating liquid mixed according to the given recipes.
12. System validation dipoles allowing to validate the proper functioning of the system.

4.1.1Test Setup Layout

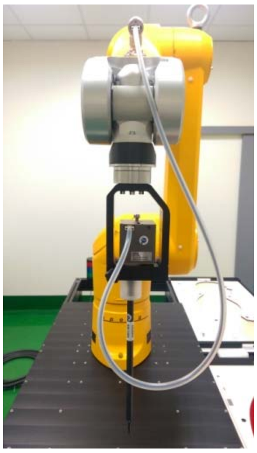


4.2DASY5E-FIELDPROBESYSTEM

The SAR measurements were conducted with the dosimetric probe EX3DV4(manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

4.2.1EX3DV4 PROBE SPECIFICATION

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 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:± 0.2dB
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Distance from probe tip to dipole centers: 1.0 mm



EX3DV4 E-field Probe

4.2.2E-FIELD PROBE CALIBRATION

Each probe is calibrated according to a dosimetric assessment procedure with accuracy better than ±10%. The spherical isotropy was evaluated and found to be better than ± 0.25dB. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested.

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies bellow 1 GHz, and in a wave guide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C\frac{\Delta T}{\Delta t}$$

Where: Δt = Exposure time (30 seconds),

C = Heat capacity of tissue (brain or muscle),

ΔT = Temperature increase due to RF exposure.

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

Where: σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m3).

4.2.3OTHER TEST EQUIPMENT

4.2.3.1. Device Holder for Transmitters

Construction: Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices (e.g., laptops, cameras, etc.) It is light weight and fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin SAM, ELI4and SAM v6.0Phantoms.
Material: POM, Acrylic glass, Foam

4.2.3.2 Phantom

Model	ELI4 Phantom	
Construction	Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.	
Shell Thickness	2±0.1 mm	
Filling Volume	Approx. 30 liters	
Dimensions	Length: 600 mm ; Width: 190mm Height: adjustable feet	
Aailable	Special	

Model	Twin SAM	
Construction	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.	
Shell Thickness	2 ± 0.2 mm	
Filling Volume	Approx. 25 liters	
Dimensions	Length:1000mm; Width: 500mm Height: adjustable feet	
Aailable	Special	

4.2.4SCANNING PROCEDURE

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or Body) 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°.)

- Area Scan

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.

- Zoom Scan

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}, $\Delta y_{zoom} \leq$ 2GHz -≤8mm, 2-4GHz -≤5 mm and 4-6 GHz-≤4mm; $\Delta z_{zoom} \leq$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.

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

Frequency	Maximun Area Scan resolution ($\Delta x_{area}, \Delta y_{area}$)	Maximun Zoom Scan spatial resolution ($\Delta x_{Zoom}, \Delta y_{Zoom}$)	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

4.2.5SPATIAL 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.

4.2.6DATA STORAGE AND EVALUATION

4.2.5.1Data 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.

4.4.2 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	Normi, a_{i0}, a_{i1}, a_{i2}
	Conversion factor	$ConvF_i$
	Diode compression point	Dcp_i
Device parameters:	Frequency	f
	Crest factor	cf
Media parameters:	Conductivity	
	Density	

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 multi meter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

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

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

aij = 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

= conductivity in [mho/m] or [Siemens/m]

= 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.

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

With P_{pwe} = equivalent power density of a plane wave in mW/cm^2

E_{tot} = total field strength in V/m

H_{tot} = total magnetic field strength in A/m

5. SYSTEM VERIFICATION PROCEDURE

5.1 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.

Tissue Type	Bactericide	DGBE	HEC	NaCl	Sucrose	Triton X-100	Water	Diethylene Glycol Mono-hexylether
Head 835	0.2	-	0.2	1.5	57.0	-	41.1	-
Head 1900	-	44.5	-	0.2	-	-	55.3	-
Body 835	0.2	-	0.2	0.9	48.5	-	50.2	-
Body 1900	-	29.5	-	0.3	-	-	70.2	-

Salt: 99+% Pure Sodium Chloride; Sugar: 98+% Pure Sucrose; Water: De-ionized, 16M + 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 Verification									
Tissue Type	Frequency (MHz)	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (εr)	Targeted Conductivity (σ)	Targeted Permittivity (εr)	Deviation Conductivity (σ) (%)	Deviation Permittivity (εr) (%)	Date
Head	835	22.2	0.907	41.710	0.90	41.5	-1.11	2.05	Jun. 03, 2016
Head	1900	22.2	1.415	40.328	1.40	40.0	1.07	0.82	Jun. 03, 2016
Body	835	22.3	0.992	55.615	0.97	55.2	2.27	0.75	Apr. 20, 2016
Body	1900	22.3	1.549	51.826	1.52	53.3	1.91	-2.77	Apr. 20, 2016

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.

5.2 SYSTEM CHECK

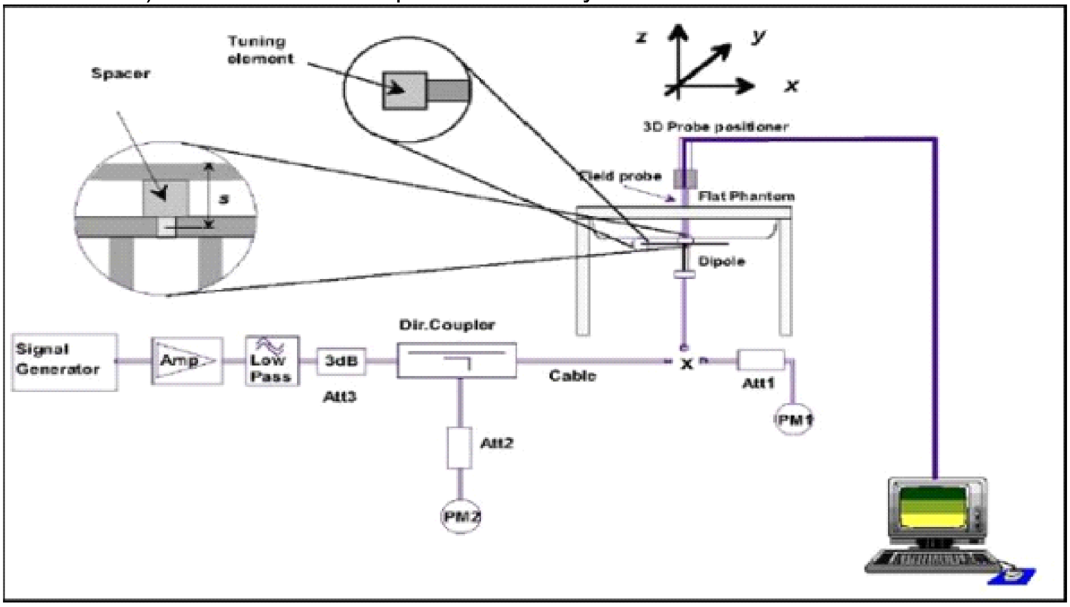
The system check is performed for verifying the accuracy of the complete measurement system and performance of the software. The system check is performed with tissue equivalent material according to IEEE P1528 (described above). The following table shows system check results for all frequency bands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

System Check	Date	Frequency (MHz)	Targeted SAR-1g (W/kg)	Measured SAR-1g (W/kg)	normalized SAR-1g (W/kg)	Deviation (%)	Dipole S/N
Head	Jun. 03, 2016	835	9.15	2.29	9.16	0.11	4d199
Head	Jun. 03, 2016	1900	41.50	9.91	39.64	-4.48	5d208
Body	Apr. 20, 2016	835	9.43	2.48	9.92	5.20	4d199
Body	Apr. 20, 2016	1900	40.40	9.81	39.24	-2.87	5d208

5.3 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.

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.



6.SAR MEASUREMENT VARIABILITY AND UNCERTAINTY

6.1SAR MEASUREMENT VARIABILITY

Per KDB865664 D01 SAR measurement 100 MHz to 6 GHz v01r04, 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 8.2.

6.2SAR MEASUREMENT UNCERTAINTY

Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04,when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis. The SAR measurement uncertainty refer Ch2.2 MEASUREMENT UNCERTAINTY

7. OPERATIONAL CONDITIONS DURING TEST

7.1 SAR TEST CONFIGURATION

7.1.2 UMTS TEST CONFIGURATION

1. Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to the procedures description in section 5.2 of 3GPP TS 34.121,using the appropriate RMC or AMR with TPC(transmit power control) set to all "1s" for WCDMA/HSDPA or applying the required inner loop power control procedure to maintain maximum output power while HSUPA is active. Result for all applicable physical channel configurations(DPCCH,DPDCHn and spreading codes, HSDPA, HSPA)
Should be tabulated in the SAR report .All configuration that are not supported by the DUT or cannot be measured due to technical or equipment limitation should be clearly identified.

2. WCDMA

Body SAR Measurements
SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits configured to all "1s". SAR for other spreading codes and multiple DPDCHn, when supported by the EUT, are not required when the maximum average outputs of each RF channel, for each spreading code and DPDCHn configuration, are less than ¼ dB higher than those measured in 12.2 kbps RMC.

3. HSDPA

SAR for body exposure configurations is measured according to the "Body SAR Measurements"" procedures of 3G device. In addition, body SAR is also measured for HSDPA when the maximum average outputs of each RF channel with HSDPA active is at ¼ dB higher than that measured without HSDPA using 12.2kbps RMC or the maximum SAR 12.2kbps RMC is above 75% of the SAR limit. Body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2 kbps RMC without HSDPA.
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 andβ_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 △ACK, △NACK, △CQI = 8. The variation of theβ_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: △ACK, △NACK and △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 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 $\beta_d = 15/15$

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

Settings of required H-Set 1 QPSK acc. to 3GPP 34.121

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

HSDPA UE category

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

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 primary mode and the adjusted SAR is ≤ 1.2W/kg, SAR measurement is not required for the secondary mode.

Per KDB941225 D01v03r01, the 3G SAR test reduction procedures 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 HSUPA, 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.

Subtests for UMTS Release 6 HSUPA

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} (code)	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: 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, 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.

HSUPA UE category

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).

7.2 TEST POSITION

7.2.1 Head Mode Exposure conditons

The Head SAR is measured with the front surface of the radio positioned at 5 mm parallel to a flat phantom.

7.2.2 Body Mode Exposure conditons

A test separation of 5 mm is required.SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge, for the data modes, wireless technologies and frequency bands supporting hotspot mode. The standalone SAR results in each device test orientation must be analyzed for the applicable hotspot mode simultaneous transmission configurations to determine SAR test exclusion and volume scan requirements. The simultaneous transmission configurations must be clearly described in the SAR report to support the analyses or test results. When the device form factor is smaller than 9cm x 5cm, unless a test separation distance of 5 mm or less is used a KDB inquiry is required to determine the acceptable test distance.

The location of the antennas is shown as below picture:

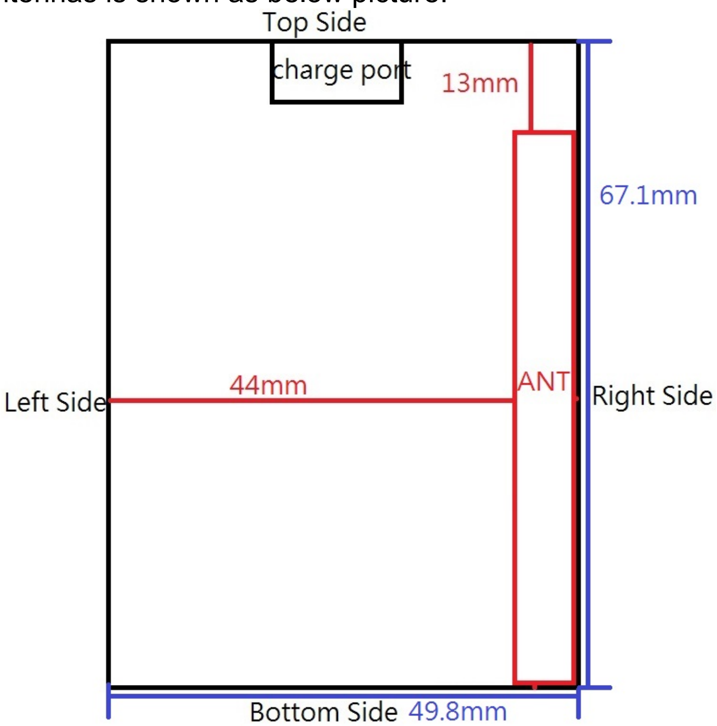


Table 7.2.1 Body Mode For SAR Testing

Mode	Front Side	Rear Side	Left Side	Right Side	Top Side	Bottom Side
WCDMA Band II/ V	YES	YES	No	YES	YES	Yes

8 POWER TEST RESULT

8.1CONDUCTED POWER MEASUREMENTS OF WCDMA1900 Band II

WCDMA1900 (Band II)		Tune-up	**SAR Conducted Power (dBm)**		
			9262CH	9400CH	9538CH
			1852.4	1880	1907.6
WCDMA	AMR	22.50	21.89	22.32	21.92
	12.2kbps RMC	22.50	22.00	**22.39**	22.04
HSDPA	Subtest 1	22.50	21.90	22.20	21.97
	Subtest 2	22.50	21.91	22.21	21.98
	Subtest 3	22.00	21.51	21.81	21.58
	Subtest 4	22.00	21.47	21.77	21.54
HSUPA	Subtest 1	21.50	20.89	21.19	20.96
	Subtest 2	20.50	20.20	20.50	20.27
	Subtest 3	21.00	20.51	20.81	20.58
	Subtest 4	20.50	20.16	20.46	20.23
	Subtest 5	22.50	21.73	22.03	21.80

8.2CONDUCTED POWER MEASUREMENTS OF WCDMA850 Band V

WCDMA 850 (Band V)		Tune-up	**SAR Conducted Power (dBm)**		
			4132CH	4182CH	4233CH
			826.4	836.4	846.6
WCDMA	AMR	24.00	23.49	23.35	23.52
	12.2kbps RMC	24.00	23.56	23.41	**23.60**
HSDPA	Subtest 1	23.50	23.24	23.12	23.27
	Subtest 2	22.50	22.33	22.21	22.36
	Subtest 3	23.00	22.88	22.76	22.91
	Subtest 4	23.00	22.91	22.79	22.94
HSUPA	Subtest 1	22.50	22.42	22.30	22.45
	Subtest 2	22.00	21.95	21.83	21.98
	Subtest 3	22.00	21.97	21.85	22.00
	Subtest 4	22.00	21.79	21.67	21.82
	Subtest 5	23.50	23.39	23.27	23.42

Note:
1) The conducted power of UMTS Band II & V is measured with max power.
2)Note: Per KDB941225 D01v03r01, 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.

9. SAR TEST RESULTS

General Notes:

1) Per KDB447498 D01v06, all measurement SAR results are scaled to the maximum tune-up tolerance limit to demonstrate compliant.
2) Per KDB447498 D01v06, 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 D01v01r04,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) Per KDB865664 D02v01r02, 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.

WCDMA Notes:

Per KDB941225 D01v03r01, 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.

9.1 SAR MEASUREMENT RESULT

Head SAR test results of WCDMA

Test No.	Band	Mode	CH	Test Position	Separation Distance(cm)	Tune up	Measured	Drift(dB)	SAR Value (W/kg)1-g	Reported SAR
T01	WCDMA V	AMR	4182	Front Face	0.5	24	23.41	0.11	0.021	**0.02**
T07	WCDMA II	AMR	9400	Front Face	0.5	22.5	22.39	0.04	0.746	**0.77**

Note: The value with boldface is the maximum SAR Value of each test band.

Body SAR test results of WCDMA

Test No.	Band	Mode	CH	Test Position	Separation Distance(cm)	Tune up	Measured	Drift(dB)	SAR Value (W/kg)1-g	Reported SAR
T01	WCDMA V	RMC12.2K	4182	Front Face	0.5	24	23.41	0.05	0.051	0.06
T02	WCDMA V	RMC12.2K	4182	Rear Face	0.5	24	23.41	-0.12	0.058	0.07
T04	WCDMA V	RMC12.2K	4182	Right Side	0.5	24	23.41	0.01	0.085	**0.10**
T05	WCDMA V	RMC12.2K	4182	Top Side	0.5	24	23.41	0.07	0.010	0.01
T06	WCDMA V	RMC12.2K	4182	Bottom Side	0.5	24	23.41	-0.02	0.057	0.07
T07	WCDMA II	RMC12.2K	9400	Front Face	0.5	22.5	22.39	0.06	0.629	0.65
T08	WCDMA II	RMC12.2K	9400	Rear Face	0.5	22.5	22.39	0.05	0.640	**0.66**
T10	WCDMA II	RMC12.2K	9400	Right Side	0.5	22.5	22.39	0.03	0.419	0.43
T11	WCDMA II	RMC12.2K	9400	Top Side	0.5	22.5	22.39	-0.01	0.177	0.18
T12	WCDMA II	RMC12.2K	9400	Bottom Side	0.5	22.5	22.39	0.07	0.373	0.38

Note: The value with boldface is the maximum SAR Value of each test band.

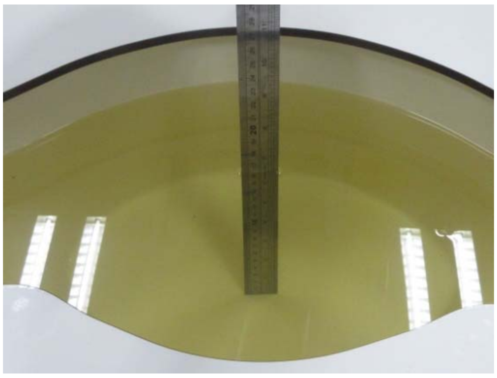
APPENDIX

1. Test Layout

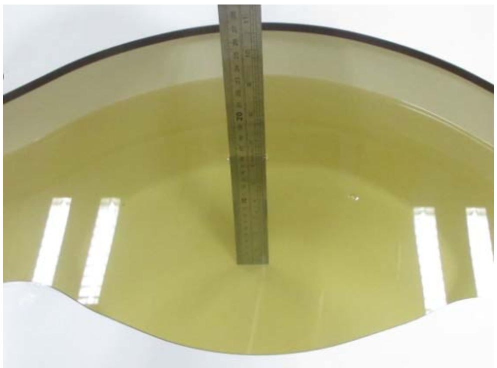
Specific Absorption Rate Test Layout

Liquid depth in the flat Phantom (≥15cm depth)

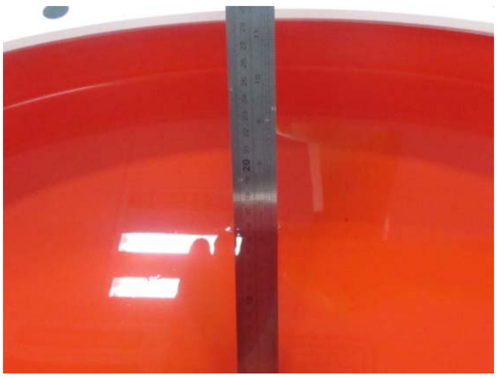
Head(700MHz~920MHz)



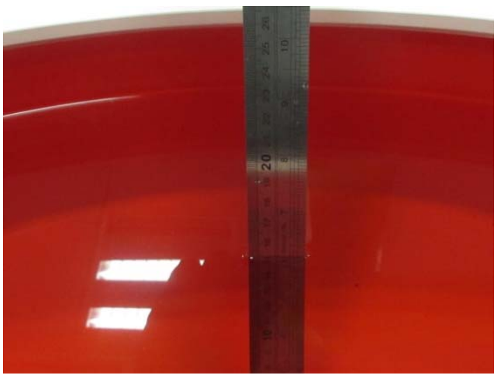
Head(1700MHz~2700MHz)



Body(700MHz~920MHz)



Body(1700MHz~2700MHz)



Appendix A. SAR Plots of System Verification

The plots for system verification with largest deviation for each SAR system combination are shown as follows.

Appendix B. SAR Plots of SAR Measurement

The SAR plots for highest measured SAR in each exposure configuration, wireless mode and frequency band combination are shown as follows.

Appendix C. Calibration Certificate for Probe and Dipole

The SPEAG calibration certificates are shown as follows.

Appendix D. Photographs of the Test Set-Up

Photo 1: Front Face_5mm	Photo 2: Rear Face_5mm

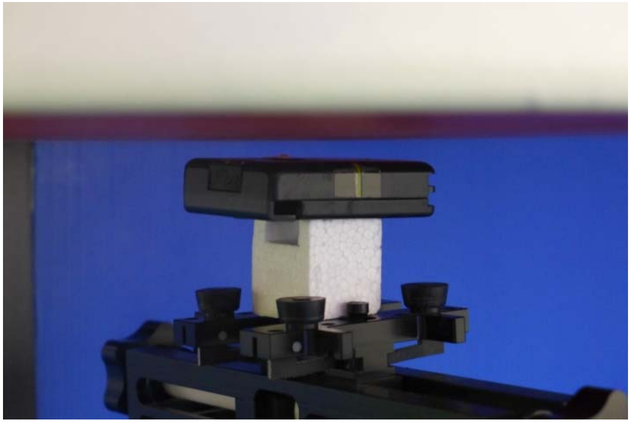
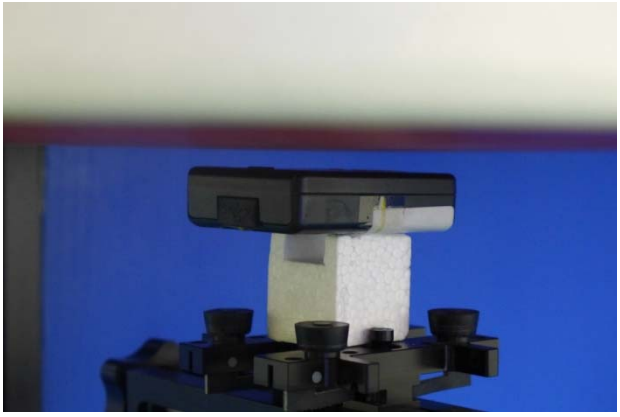

	

Photo 3: Right Side_5mm	Photo 4: Top Side_5mm

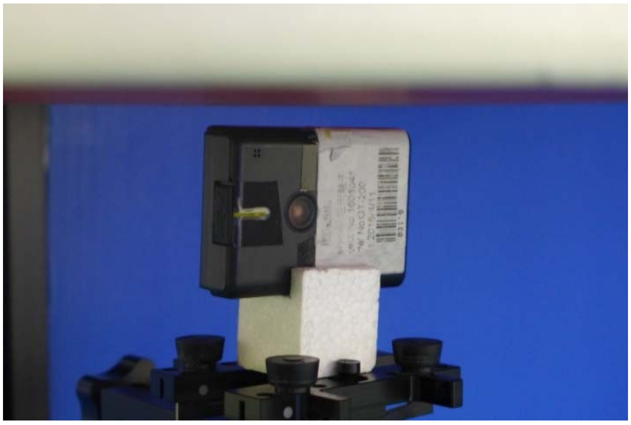



Photo 5: Bottom Side_5mm