SAR TEST REPORT

For

MOBILE PHONE

Model Number: IO Pro

FCC ID: 2AQNZ-IOPRO

IC: 24153-IOPRO

HVIN :IO Pro

Report Number: WT188005125

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Shenzhen Quality Supervision and Inspection Institution for Building Materials
Shenzhen Testing Center for Burning Behavior of Fire Protection Products

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Test report declaration

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Manufacturer	:	ROKIT Corp Limited
Address	:	ROK House, Kingswood Business Park, Holyhead Road, Albrighton, Wolverhampton, WV73AU, Wolverhampton, WV81RL, United Kingdom Of Great Britain And Northern Ireland
EUT Description	:	MOBILE PHONE
Model No	:	IO Pro
Trade mark	:	ROKiT

FCC ID: 2AQNZ-IOPRO ; IC ID: 24153-IOPRO ;HVIN :IO Pro

Test Standards:

IEEE Std 1528-2013, KDB941225 D01, KDB941225 D05, KDB941225 D06, KDB941225 D07,KDB447498 D01,KDB648474 D04,KDB248227 D01,KDB 865664 D01,KDB865664 D02,KDB690783 D01

The EUT described above is tested by Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory to determine the compliance of the applicable standards stated above. Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory is assumed full responsibility for the accuracy of the test results.

The results documented in this report only apply to the tested sample, under the conditions and modes of operation as described herein.

The test report shall not be reproduced in part without written approval of the laboratory.

Project Engineer:	(Zhou Li)	Date:	Sep.13,2018
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1. REPORTED SAR SUMMARY

1.1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing are as follows.

Band	Max Reported SAR(W/kg)
	1-g head
CDMABC0	0.207
CDMA BC1	0.362
CDMA BC10	**0.528**
LTE Band 12	0.155
LTE Band 17	0.121

Band	Max Reported SAR(W/kg)	Max Reported SAR(W/kg)	Max Reported SAR(W/kg)
	1-g Body Worn(10mm)	1-g Body Worn(15mm)	10-g extremity (0mm)
CDMABC0	0.231	0.169	0.392
CDMA BC1	**1.167**	0.396	**1.514**
CDMA BC10	0.679	**0.554**	0.388
LTE Band 12	0.169	0.150	0.470
LTE Band 17	0.171	0.159	0.512

Table 1: Summary of test result

Note:

*For body-worn operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal and that positions the handset a minimum of 15mm from the body. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

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, according to the Industry Canada Radio Standards Specification RSS-102 for General Population/ Uncontrolled exposure, and had been tested in accordance with the measurement methods and procedures specified in IEEE Std 1528-2013& IEEE

Std 1528a-2005.

1.2. RF exposure limits (ICNIRP Guidelines)

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Spatial Peak SAR*(Brain/Body)	**1.60mW/g**	8.00mW/g
Spatial Average SAR** (Whole Body)	0.08mW/g	0.40mW/g
Spatial Peak SAR***(Limbs)	4.00mW/g	20.00mW/g

Table 2: RF exposure limits

The limit applied in this test report is shown in bold letters

Notes:

* The Spatial Peak value of the SAR averaged over any 1 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time

** The Spatial Average value of the SAR averaged over the whole body.

*** The Spatial Peak value of the SAR averaged over any 1 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time. Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result if employment or occupation.)

1.3 Ratings and System Details

Product Name:	MOBILE PHONE
Model No.(EUT):	IO Pro
Trade mark:	ROKiT
EUT Supports Radios application:	BT4.0, 2.1+EDR: 2402MHz to 2480MHz WiFi: IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz GPS: 1559MHz to 1610MHz GSM/GPRS/EDGE 850: Tx:824.20 -848.80MHz; Rx: 869.20 – 893.80MHz GSM/GPRS/EDGE 1900: Tx:1850.20 – 1909.80MHz; Rx:1930.20 – 1989.80MHz CDMA BC0: Tx:815-849MHz; Rx:860-894MHz

	CDMA BC1: Tx:1850-1910MHz; Rx:1930-1990MHz CDMA BC10:TX:817.25-823.975MHz, RX:862.25-868.975MHz 1xEVDO BC0: Tx:815-849MHz; Rx:860-894MHz 1xEVDO BC0: Tx:1850-1910MHz; Rx:1930-1990MHz 1xEVDO BC0: TX:817.25-823.975MHz, RX:862.25-868.975MHz WCDMA/HSDPA/HSUPA/HSPA+(Down Link) Band V: Tx:826.40 -846.60MHz; Rx: 871.40 – 891.60MHz WCDMA/HSDPA/HSUPA/HSPA+(Down Link) Band IV: Tx:1710-1755MHz; Rx: 2110-2155MHz WCDMA/HSDPA/HSUPA/HSPA+(Down Link) Band II: Tx:1852.40 – 1907.60MHz; Rx:1932.40 – 1987.60MHz LTE Band 2:TX:1850MHz to 1910MHz RX:1930MHz to 1990MHz. LTE Band 4:TX:1710MHz to 1755MHz RX:2110MHz to 2155MHz. LTE Band 5:TX:824MHz to 849MHz RX:869MHz to 894MHz. LTE Band 12:TX:698MHz to 716MHz RX:729MHz to 746MHz. LTE Band 17:TX:704MHz to 716MHz RX:734MHz to 746MHz.
Power Supply:	DC 5V by USB port
	Li-ion Battery 3.8V, 3850mAh, 14.82Wh
Firmware version:	MOLY.LR12A.R2.MP.V36.9(manufacturer declare)
Hardware version:	V0(manufacturer declare)
USB cable:	100cm(shielded)

1.4 Product Function and Intended Use

IO Pro is subscriber equipment in the CDMA/LTE system.
The CDMA frequency band is BC0, BC1 and BC10, all can be used in this report. The LTE frequency band is Band 12, Band 17, all can be used in this report. The Mobile Phone implements such functions as RF signal receiving/transmitting, HSUPA/HSDPA/UMTS and GSM/GPRS/EDGE protocol processing, voice, video, MMS service, GPS, AGPS and WIFI etc. Externally it provides micro SD card interface, earphone port (to provide voice service) and Micro USIM card interface.

1.5 Test specification(s)

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 SAR test for 3G devices v03r01	3G SAR MEAUREMENT PROCEDURES
KDB941225 D05 SAR for LTE Devices v02r05	SAR Evaluation Considerations for LTE Devices
941225 D07 UMPC Mini Tablet v01r02	SAR EVALUATION PROCEDURES FOR UMPC MINI-TABLET DEVICES
KDB941225 D06 Hotspot Mode v02r01	SAR Evaluation Procedures for portable Devices with Wireless Router Capabilities
KDB447498 D01 General RF Exposure Guidance v06	Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies
KDB 648474 D04 Handset SAR v01r03	SAR Evaluation Considerations for Wireless Handsets.
KDB 248227 D01 802 11 Wi-Fi SAR v02r02	SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS
KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04	SAR Measurement Requirements for 100 MHz to 6 GHz
KDB 865664 D02 RF Exposure Reporting v01r02	RF Exposure Compliance Reporting and Documentation Considerations
KDB 690783 D01 SAR Listings on Grants v01r03	SAR Listings on Equipment Authorization Grants

1.6 List of Test and Measurement Instruments

No	Equipment	Model No.	Serial No.	Manufacturer	Last Calibration Date	Period
1	SAR test system	TX60L	F08/5AY8A1/A/01 +F08/	SPEAG	NCR	NCR
2	Electronic Data Transmitter	DAE4	876	SPEAG	2018.03.22	1year
3	SAR Probe	EX3DV4	3881	SPEAG	2018.07.14	1year
4	Software	85070	--	Agilent	--	--
5	Software	DASY5	--	SPEAG	--	--
6	System Validation Dipole,835MHz	D835V2	4d141	SPEAG	2015.09.24 2018.09.06	3year
7	System Validation Dipole,1900MHz	D1900V2	5d162	SPEAG	2015.09.16 2018.09.11	3year
8	Dielectric Probe Kit	85070E	MY44300455	Agilent	NCR	NCR
9	Dual-directional coupler,0.10-2.0GHz	778D	MY48220198	Agilent	NCR	NCR
10	Dual-directional coupler,2.00-18GHz	772D	MY46151160	Agilent	NCR	NCR
11	Coaxial attenuator	8491A	MY39266348	Agilent	NCR	NCR
12	Power Amplifier	ZHL42W	81709	MINI-CIRCUITS	NCR	NCR
13	Signal Generator	SMR20	100047	R&S	2018.02.27	1year
14	Power Sensor	NRP-Z21	105057-XP	R&S	2018.06.06	1year
15	Power Sensor	NRP-Z21	105057-XP	R&S	2018.06.06	1year
16	Call Tester	CMU 200	100110	R&S	2017.12.04	1year
17	Network Analyzer	E5071C	MY46109550	Agilent	2018.02.27	1Year
18	Twin Phantom	SAM	TP-1504	SPEAG	NCR	NCR
19	Twin Phantom	SAM	TP-1504	SPEAG	NCR	NCR
20	Wideband Radio Communication Tester	CMW500	125469	R&S	2017.10.31 2018.10.29	1Year
21	Precision Thermometer	--	--	--	2018.08.09	1Year
22	System Validation Dipole,750MHz	D750V3	1103	SPEAG	2017.01.10	3year

Table 3: List of Test and Measurement Equipment

Note: All the test equipments are calibrated once a year, except the dipoles, which are calibrated every three years. Moreover, we have self-calibration every year to the dipoles.

2. GENERAL INFORMATION

2.1. Report information

This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that SMQ approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that SMQ in any way guarantees the later performance of the product/equipment.

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Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through SMQ, unless the applicant has authorized SMQ in writing to do so.

2.2. Laboratory Accreditation and Relationship to Customer

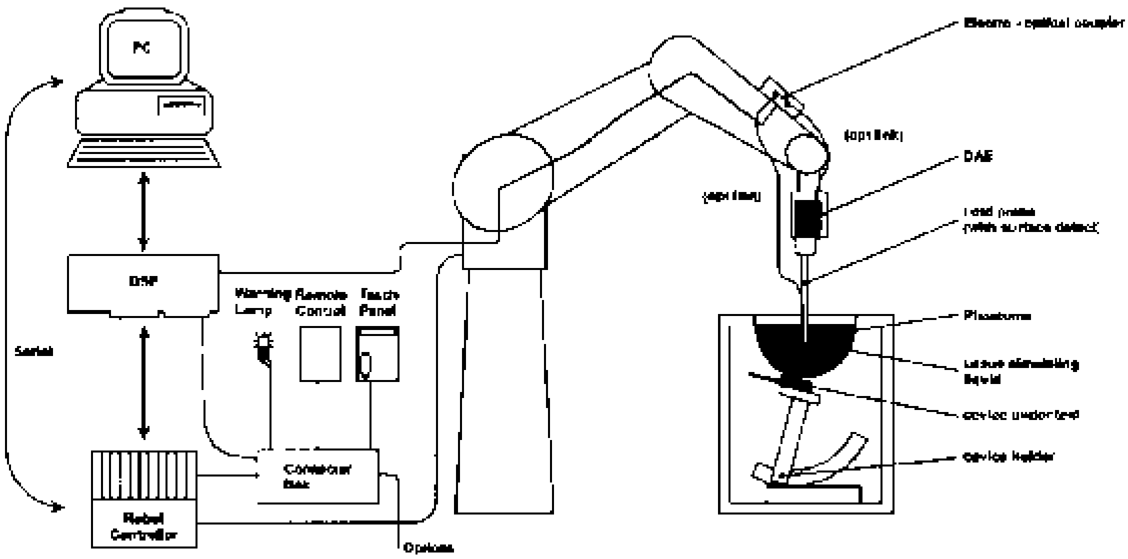
The testing report were performed by the Shenzhen Academy of Metrology and quality Inspection EMC Laboratory (Guangdong EMC compliance testing center), in their facilities located at NETC Building, No.4 Tongfa Rd., Xili, Nanshan, Shenzhen, China. At the time of testing, Laboratory is accredited by the following organizations: China National Accreditation Service for Conformity Assessment (CNAS) accredits the Laboratory for conformance to FCC standards, EMC international standards and EN standards. The Registration Number is CNAS L0579.

The Laboratory is Accredited Testing Laboratory of FCC with Designation number CN1165 and Site registration number 582918.

The Laboratory is registered to perform emission tests with Industry Canada (IC), and the registration number is 11177A.

3. SAR MEASUREMENT SYSTEM CONFIGURATION

3.1. SAR Measurement Set-up



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

● A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).

● 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.

● 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.

● A unit to operate the optical surface detector which is connected to the EOC.

● 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.

● The DASY5 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 XP.

● DASY5 software and SEMCAD data evaluation software.

Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.

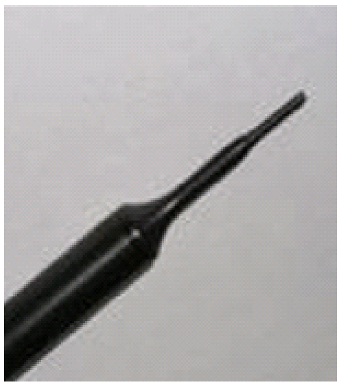
- The generic twin phantom enabling the testing of left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- System checks dipoles allowing validating the proper functioning of the system.
- Test environment
- The DASY5 measurement system is placed at the head end of a room with dimensions:

4.5 x 4 x 3 m³, the SAM phantom is placed in a distance of 1.3 m from the side walls and 1.1m from the rear wall.

Picture 1 of the photo documentation shows a complete view of the test environment.

3.2. Probe description

Isotropic E-Field Probe EX3DV4 for Dosimetric Measurements

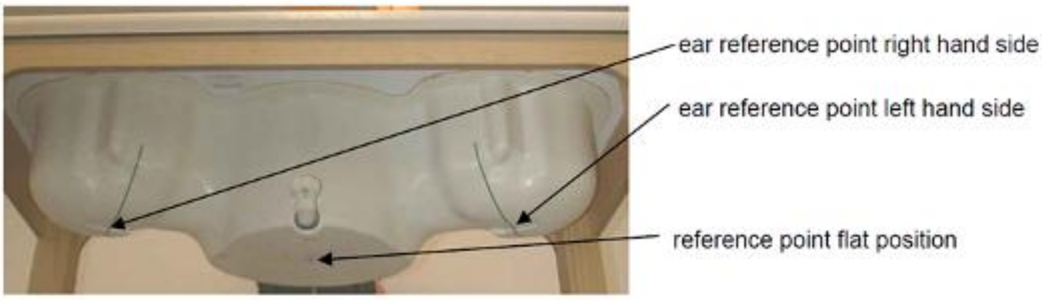
Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Calibration	ISO/IEC 17025 calibration service available.	
Frequency	10 MHz to >6 GHz (dosimetry); Linearity: ± 0.2 dB (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<1 μW/g)	
Dimensions	Overall length: 337 mm (Tip: 20mm) Tip length: 2.5 mm (Body: 12mm) 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%.	

3.3. Phantom description

The used SAM Phantom meets the requirements specified in Edition 01-01 of Supplement C to OET Bulletin 65 for Specific Absorption Rate (SAR) measurements.

The phantom consists of a fibreglass shell integrated in a wooden table. It allows left-hand and right-hand head as well as body-worn measurements with a maximum liquid depth of 18 cm in head position and 22 cm in planar position (body measurements). The thickness of the Phantom shell is 2 mm +/- 0.1 mm.



ELI4 Phantom

Shell Thickness	2mm+/- 0.2mm
Filling Volume	Approximately 30 liters
Measurement Areas	Flat phantom
The ELI4 phantom is in 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	

lastest 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≤5 and a loss tangent ≤0.05.

3.4. 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.

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.

4. SAR MEASUREMENT PROCEDURE

4.1. 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 strenth 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: Δxzoom, Δyzoom ≤2GHZ≤ 8 mm, 2-4GHz - ≤ 5 mm and 4-6 GHz-≤ 4 mm; Δzzoom ≤ 3GHz - ≤ 5 mm, 3-4 GHz- ≤ 4 mm and 4-6GHz-≤2mm where the robot additionally moves the probe along the z-axis away from the bottom of the Phantom. DASY5 is also able to perform repeated zoom scans if more than 1 peak is found during area scan. Test results relevant for the specified standard (see chapter 1.5.) are shown in table form in chapter 3.2.

● 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 2mm 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	Maximum Area Scan resolution (Δxarea, Δyarea)	Maximum Zoom Scan spatial resolution(Δxzoom Δyzoom)	Maximum Zoom Scan spatial resolution			Minimum zoom scan volume (x,y,z)
			Uniform Grid	Graded Grad		
			Δzzoom(n)	Δzzoom(1)	Δzzoom(n>1)	
≤2GHz	≤15mm	≤8mm	≤5mm	≤4mm	≤ 1.5* Δzzoom(n-1)	≥30mm
2-3GHz	≤12mm	≤5mm	≤5mm	≤4mm	≤ 1.5* Δzzoom(n-1)	≥30mm
3-4GHz	≤10mm	≤5mm	≤4mm	≤3mm	≤ 1.5* Δzzoom(n-1)	≥28mm
4-5GHz	≤10mm	≤4mm	≤3mm	≤2.5mm	≤ 1.5* Δzzoom(n-1)	≥25mm
5-6GHz	≤10mm	≤4mm	≤2mm	≤2mm	≤ 1.5* Δzzoom(n-1)	≥22mm

Spatial Peak SAR Evaluation

- The spatial peak SAR - value for 1 and 10 g is evaluated after the Cube measurements have been done. The bases 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).
- 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 neigh boring 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.

4.1.1. 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 Normi, ai0, ai1, ai2

- Conversion factor ConvFi

- Diode compression point Dcpi

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 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:

Vi = Ui + Ui2 ⋅ cf/dcpi

with Vi = compensated signal of channel i (i = x, y, z)

Ui = input signal of channel i (i = x, y, z)

cf = crest factor of exciting field (DASY parameter)

dcpi = diode compression point (DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

E-field probes: Ei = (Vi / Normi · ConvF)1/2

H-field probes: Hi = (Vi)1/2 · (ai0 + ai1f + ai2f2)/f

with Vi = compensated signal of channel i (i = x, y, z)
Normi = 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]
Ei = electric field strength of channel i in V/m
Hi = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):
Etot = (Ex2 + EY2 + Ez2)1/2
The primary field data are used to calculate the derived field units.
SAR = (Etot2 · ▽) / (△ · 1000)
with SAR = local specific absorption rate in mW/g
Etot = total field strength in V/m
▽ = conductivity in [mho/m] or [Siemens/m]
△ = equivalent tissue density in g/cm3

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.

Ppwe = Etot2 / 3770 or Ppwe = Htot2 · 37.7

with Ppwe = equivalent power density of a plane wave in mW/cm2

Etot = total electric field strength in V/m

Htot = 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 dielectric 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)	Body Tissue	
Frequency Band(MHz)	835	1900
Water	52.4	69.91
Salt(NaCl)	1.40	0.13
Sugar	45.0	0.0
HEC	1.0	0.0
Bactericide	0.1	0.0
Triton X-100	0.0	0.0
DGBE	0.0	29.96

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

Head & Body Tissue-equivalent liquid measurements:

Used Target Frequency	Measured Frequency(MHz)	Target Tissue εr (+/-5%)	Target Tissue σ(S/m) (+/-5%)	Measured Tissue εr	Measured Tissue σ (S/m)	Liquid Temp	Test Date
750MHz Head	704	41.9 (37.81~44.00)	0.89 (0.85~0.93)	42.2	0.86	22°C	2018.09.05
	707.5	41.9 (37.81~44.00)	0.89 (0.85~0.93)	42.1	0.86		
	709	41.9 (37.81~44.00)	0.89 (0.85~0.93)	42.1	0.86		
	710	41.9 (37.81~44.00)	0.89 (0.85~0.93)	42.1	0.86		
	711	41.9 (37.81~44.00)	0.89 (0.85~0.93)	42.1	0.86		
	711	41.9 (37.81~44.00)	0.89 (0.85~0.93)	42.1	0.86		
835MHz Head	817.9	41.5 (39.43~43.58)	0.90 (0.86~0.95)	41.7	0.86	22°C	2018.09.06
	820.5	41.5 (39.43~43.58)	0.90 (0.86~0.95)	41.6	0.86		
	823.1	41.5 (39.43~43.58)	0.90 (0.86~0.95)	41.6	0.87		
	824.7	41.5 (39.43~43.58)	0.90 (0.86~0.95)	41.6	0.87		
	836.5	41.5 (39.43~43.58)	0.90 (0.86~0.95)	41.5	0.88		
	848.3	41.5 (39.43~43.58)	0.90 (0.86~0.95)	41.4	0.89		
1900MHz Head	1851.25	40.0 (38.00~42.00)	1.40 (1.33~1.47)	39.45	1.42	22°C	2018.09.07
	1880.0	40.0 (38.00~42.00)	1.40 (1.33~1.47)	39.62	1.44		
	1908.75	40.0 (38.00~42.00)	1.40 (1.33~1.47)	39.71	1.46		
ε_r= Relative permittivity, σ= Conductivity							

Used Target Frequency	Measured Frequency(MHz)	Target Tissue εr (+/-5%)	Target Tissue σ(S/m) (+/-5%)	Measured Tissue εr	Measured Tissue σ (S/m)	Liquid Temp	Test Date
750MHz Body	704	55.5 (52.73~58.28)	0.96 (0.91~1.01)	54.7	0.92	22°C	2018.09.05
	707.5	55.5 (52.73~58.28)	0.96 (0.91~1.01)	54.4	0.92		
	709	55.5 (52.73~58.28)	0.96 (0.91~1.01)	54.5	0.92		
	710	55.5 (52.73~58.28)	0.96 (0.91~1.01)	54.5	0.92		
	711	55.5 (52.73~58.28)	0.96 (0.91~1.01)	54.5	0.92		
	711	55.5 (52.73~58.28)	0.96 (0.91~1.01)	54.5	0.92		
835MHz Body	817.9	55.2 (52.44~57.96)	0.97 (0.92~1.02)	55.99	0.94	22°C	2018.09.06
	820.5	55.2 (52.44~57.96)	0.97 (0.92~1.02)	55.94	0.95		
	823.1	55.2 (52.44~57.96)	0.97 (0.92~1.02)	55.93	0.95		
	824.7	55.2 (52.44~57.96)	0.97 (0.92~1.02)	55.92	0.95		
	836.5	55.2 (52.44~57.96)	0.97 (0.92~1.02)	55.87	0.96		
	848.3	55.2 (52.44~57.96)	0.97 (0.92~1.02)	55.84	0.97		
1900MHz Body	1851.25	53.3 (50.64~55.97)	1.52 (1.44~1.60)	54.6	1.50	22°C	2018.09.07
	1880.0	53.3 (50.64~55.97)	1.52 (1.44~1.60)	54.3	1.52		
	1908.75	53.3 (50.64~55.97)	1.52 (1.44~1.60)	54.0	1.54		
ε_r= Relative permittivity, σ= Conductivity							

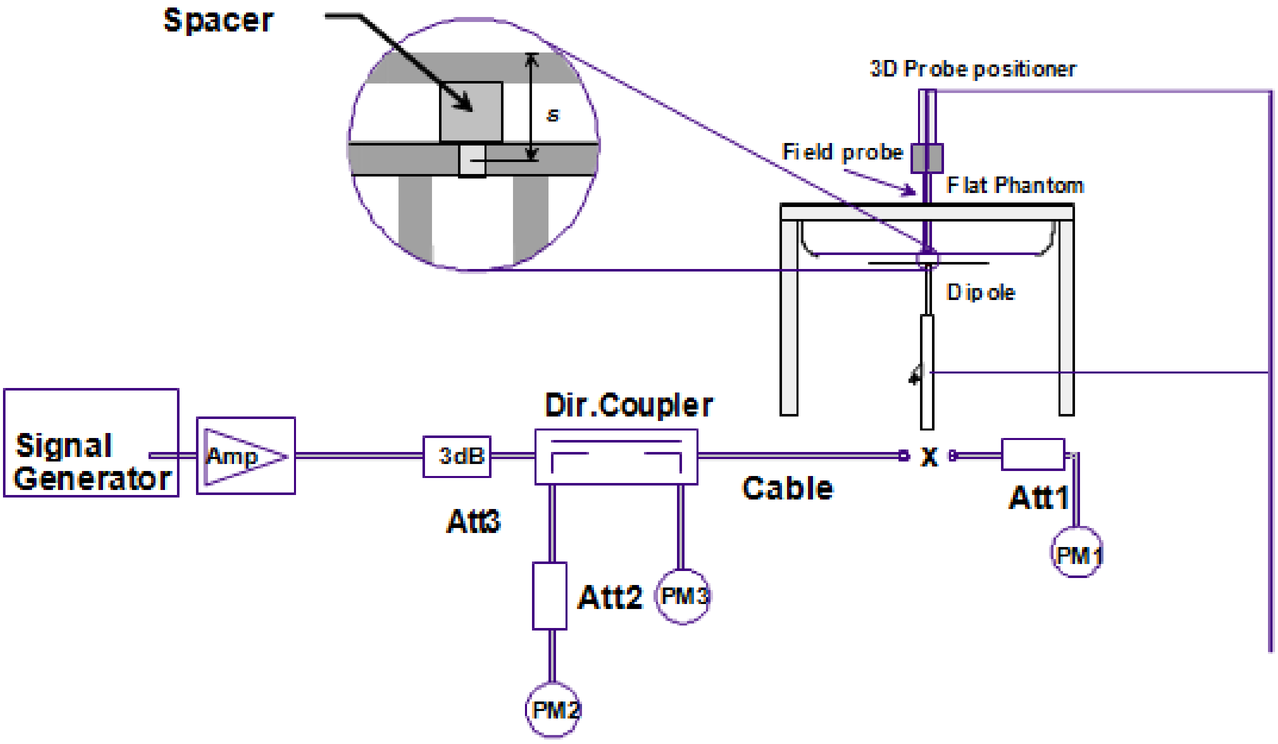
Used Target Frequency	Measured Frequency(MHz)	Target Tissue		Measured Tissue		Liquid Temp	Test Date
		εr (+/-5%)	σ(S/m) (+/-5%)	εr	σ (S/m)		
750MHz extremity	704	55.5 (52.73~58.28)	0.96 (0.91~1.01)	54.6	0.93	22°C	2018.11.01
	707.5	55.5 (52.73~58.28)	0.96 (0.91~1.01)	54.3	0.93		
	709	55.5 (52.73~58.28)	0.96 (0.91~1.01)	54.4	0.93		
	710	55.5 (52.73~58.28)	0.96 (0.91~1.01)	54.4	0.93		
	711	55.5 (52.73~58.28)	0.96 (0.91~1.01)	54.4	0.93		
	711	55.5 (52.73~58.28)	0.96 (0.91~1.01)	54.4	0.92		
835MHz extremity	817.9	55.2 (52.44~57.96)	0.97 (0.92~1.02)	56.09	0.93	22°C	2018.11.01
	820.5	55.2 (52.44~57.96)	0.97 (0.92~1.02)	56.05	0.94		
	823.1	55.2 (52.44~57.96)	0.97 (0.92~1.02)	56.02	0.94		
	824.7	55.2 (52.44~57.96)	0.97 (0.92~1.02)	55.99	0.94		
	836.5	55.2 (52.44~57.96)	0.97 (0.92~1.02)	55.95	0.94		
	848.3	55.2 (52.44~57.96)	0.97 (0.92~1.02)	55.92	0.95		
1900MHz extremity	1851.25	53.3 (50.64~55.97)	1.52 (1.44~1.60)	54.6	1.47	22°C	2018.11.01
	1880.0	53.3 (50.64~55.97)	1.52 (1.44~1.60)	54.3	1.49		
	1908.75	53.3 (50.64~55.97)	1.52 (1.44~1.60)	54.0	1.51		
ε_r= Relative permittivity, σ= Conductivity							

System checking, Body Tissue-equivalent liquid:

System Check	Target SAR (1W) (+/-10%)		Measured SAR (Normalized to 1W)		Liquid Temp.	Test Date
	1-g (W/kg)	10-g (W/kg)	1-g (W/kg)	10-g (W/kg)		
D750V2 Head	8.29 (7.5~9.1)	5.53 (5.0~6.1)	8.16	5.36	22°C	2018.09.05
D835V2 Head	9.45 (8.51~10.40)	6.11 (5.50~6.72)	9.80	6.32	22°C	2018.09.06
D1900V2 Head	40.4 (36.36~44.44)	21.0 (18.90~23.10)	39.56	20.68	22°C	2018.09.07
D750V2 Body	8.89 (8.0~9.8)	5.97 (5.4~6.6)	8.56	6.12	22°C	2018.09.05
D835V2 Body	9.51 (8.6~10.5)	6.25 (5.6~7.2)	8.72	6.36	22°C	2018.09.06
D1900V2 Body	41.2 (37.1~45.3)	21.6 (19.4~23.8)	40.84	21.2	22°C	2018.09.07
D750V2 extremity	8.89 (8.0~9.8)	5.97 (5.4~6.6)	8.64	6.16	22°C	2018.11.01
D835V2 extremity	9.74 (8.8~10.7)	6.54 (5.9~7.2)	8.84	5.96	22°C	2018.11.01
D1900V2 extremity	40.3 (36.3~44.3)	21.7 (19.5~23.9)	41.00	21.68	22°C	2018.11.01

System Checking

The manufacturer calibrates the probes annually. A system check measurement was made following the determination of the dielectric parameters of the tissue-equivalent liquid, using the dipole validation kit. A power level of 250mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom.



The system checking results (dielectric parameters and SAR values) are given in the table below.

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).

6. SAR MEASUREMENT VARIABILITY AND UNCERTAINTY

6.1. SAR measurement variability

Per KDB865664 D01 SAR measurement 100MHz to 6GHz 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 measurement 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; step2) through 4) do not apply.
2) When the original highest measured SAR is ≥0.8 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 ≥1.5W/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.

6.2. SAR measurement uncertainty

Per KDB865664 D01 SAR Measurement 100MHz to 6GHz v01r03, when the highest measured 1-g SAR within a frequency band is <1.5W/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.

7. Test Configuration

The DUT is tested using a CMU 200 or E5515C communications tester as controller unit to set test channels and maximum output power to the DUT, as well as for measuring the conducted peak power.

Test positions as described in the tables above are in accordance with the specified test standard.

CDMA Configuration and Testing

1)CDMA 1xRTT Handsets Head SAR

SAR for next to the ear head exposure is measured in RC3 with the handset configured to transmit at full rate in SO55. The 3G SAR test reduction procedure is applied to RC1 with RC3 as the primary mode. Otherwise, SAR is required for the channel with maximum measured output in RC1 using the head exposure configuration that results in the highest reported SAR in RC3. CDMA 1xRTT Handsets Body-worn SAR Body-worn SAR is measured in RC3 with the handset configured in TDSO/SO32 to transmit at full rate on FCH only with all other code channels disabled. The 3G SAR test reduction procedure is applied to the multiple code channel configuration (FCH + SCHn), with FCH only as the primary mode. Otherwise, SAR is required for multiple code channel configuration (FCH + SCHn), with FCH at full rate and SCH0 enabled at 9600 bps, using the highest reported SAR configuration for FCH only. The 3G SAR test reduction procedure is applied to body-worn SAR in RC1 with RC3 as the primary mode. Otherwise, SAR is required for RC1, with SO55 and full rate, using the highest reported SAR configuration for body-worn exposure in RC3.

2)Handsets with built-in EV-DO

The 3G SAR test reduction procedure is applied to EV-DO Rev. 0 with 1xRTT RC3 as the primary mode to determine body-worn test requirements. Otherwise, body-worn SAR is required for Rev. 0, at 153.6 kbps, using the highest reported SAR configuration for body-worn exposure in RC3. The 3G SAR test reduction procedure is applied separately to Rev. A and Rev. B, with Rev. 0 as the primary mode to determine body-worn SAR test requirements. When SAR is not required for Rev. 0, the 3G SAR test reduction is applied with 1xRTT RC3 as the primary mode. Otherwise, SAR is required for Rev. A or Rev. B, with a Reverse Data Channel payload size of 4096 bits and a Termination Target of 16 slots defined for Subtype 2 and 3 Physical Layer configurations, using the highest reported SAR configuration for body-worn exposure in Rev. 0 or

RC3, as appropriate. A Forward Traffic Channel data rate corresponding to the 2-slot version of 307.2 kbps with ACK Channel transmitting in all slots is configured in the downlink for Rev. 0, Rev. A and Rev. B.

3)EV-DO Data Devices

SAR is measured using the F/R TAP configurations required for Rev. 0, Rev. A and Rev. B. The AT is tested with a Reverse Data Channel rate of 153.6 kbps in Subtype 0/1 Physical Layer configurations. A Reverse Data Channel payload size of 4096 bits and Termination Target of 16 slots are used for Subtype 2 and 3. FTAP, FETAP and FMCTAP are all configured with a Forward Traffic Channel data rate corresponding to the 2-slot version of 307.2 kbps with ACK Channel transmitting in all slots. AT power control is in “All Bits Up” conditions for the TAP / ETAP / MCTAP. Body-worn and other body SAR are measured using Subtype 0/1 Physical Layer configurations for Rev. 0. The 3G SAR test reduction procedure is applied to Rev. A, Subtype 2 Physical layer configuration, with Rev. 0 as the primary mode. Otherwise, SAR is measured for Rev. A using the highest reported SAR configuration for body-worn exposure in Rev. 0. SAR is required for Rev. B, Subtype 3; it is measured by applying both the “test 2” and “test 3” configurations used for power measurement. EV-DO Data Devices Support 1xRTT

The 3G SAR test reduction procedure is applied to 1xRTT RC3 and RC1 with EV-DO Rev. 0, Rev. A and Rev. B as the respective primary modes. Otherwise, the “CDMA 1xRTT Handsets Body-worn SAR” procedures are applied.

1x-Advanced SAR Guidance

The 3G SAR test reduction procedure is applied to 1x-Advanced with 1xRTT RC3 as the primary mode. When SAR measurement is required, the 1x-Advanced power measurement configurations are used. The 1x Advanced SAR procedures are applied separately to head, body-worn and other exposure conditions.

LTE Test Configuration

SAR for LTE band exposure configurations is measured according to the procedures of KDB 941225 D05 SAR for LTE Devices v02r05. The CMW500 WideBand Radio Communication Tester was used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing.SAR test were performed with the same number of RB and RB offsets transmitting on all TTI frames (Maximum TTI)

1) Spectrum Plots for RB configurations

A properly configured base station simulator was used for LTE output power measurements and SAR testing. Therefore, spectrum plots for RB configurations were not required to be included in this report.

2) MPR

When MPR is implemented permanently within the UE, regardless of network requirements, only those RB configurations allowed by 3GPP for the channel bandwidth and modulation combinations may be tested with MPR active. Configurations with RB allocations less than the RB thresholds required by 3GPP must be tested without MPR.

The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101:

Maximun Power Reduction(MRP) for Power Class 3

<table>
<tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth(N_{RB})</th><th rowspan="2">MPR(dB)</th></tr>
<tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr>
<tr><td>QPSK</td><td>＞5</td><td>＞4</td><td>＞8</td><td>＞12</td><td>＞16</td><td>＞18</td><td>⩽1</td></tr>
<tr><td>16 QAM</td><td>⩽5</td><td>⩽4</td><td>⩽8</td><td>⩽12</td><td>⩽16</td><td>⩽18</td><td>⩽1</td></tr>
<tr><td>16 QAM</td><td>＞5</td><td>＞4</td><td>＞8</td><td>＞12</td><td>＞16</td><td>＞18</td><td>⩽2</td></tr>
</table>

Configuration of special subframe (lengths of DwPTS/GP/UpPTS)

<table>
<tr><th rowspan="3">Special subframe configuration</th><th colspan="3">Normal cyclic prefix in downlink</th><th colspan="3">Extended cyclic prefix in downlink</th></tr>
<tr><th rowspan="2">DwPTS</th><th colspan="2">UpPTS</th><th rowspan="2">DwPTS</th><th colspan="2">UpPTS</th></tr>
<tr><th>Normal cyclic prefix in uplink</th><th>Extended cyclic prefix in uplink</th><th>Normal cyclic prefix in uplink</th><th>Extended cyclic prefix in uplink</th></tr>
<tr><td>0</td><td>6592 T_S</td><td rowspan="5">2192 T_S</td><td rowspan="5">2560 T_S</td><td>7680 T_S</td><td rowspan="4">2192 T_S</td><td rowspan="4">2560 T_S</td></tr>
<tr><td>1</td><td>19760 T_S</td><td>20480 T_S</td></tr>
<tr><td>2</td><td>21952 T_S</td><td>23040 T_S</td></tr>
<tr><td>3</td><td>24144 T_S</td><td>25600 T_S</td></tr>
<tr><td>4</td><td>26336 T_S</td><td>7680 T_S</td><td>4384 T_S</td><td>5120 T_S</td></tr>
</table>

5	6592 T_s	4384 T_s	5120 T_s	20480 T_s		
6	19760 T_s			23040 T_s		
7	21952 T_s			12800 T_s		
8	24144 T_s			-	-	-
9	13168 T_s			-	-	-

Uplink-downlink configurations

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

Calculated Duty Cycle = Extended cyclic prefix in uplink x (Ts) x # of S + # of U

Example for Calculated Duty Cycle for Uplink-Downlink Configuration 0:

Calculated Duty Cycle = 5120 x [1/(15000 x 2048)] x 2 + 6 ms = 63.33%

Where Ts = 1/(15000 x 2048) seconds

3) A-MPR

A-MPR(Additional MPR) has been disabled for all SAR tests by using Network Signalling Value of “NS_01”on the base station simulator.

4) LTE procedures for SAR testing

A) Largest channel bandwidth standalone SAR test requirements

i) QPSK with 1 RB allocation

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

ii) QPSK with 50% RB allocation

The procedures required for 1 RB allocation in i) are applied to measure the SAR for QPSK with 50% RB allocation.

iii) QPSK with 100% RB allocation

For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation in i) and ii) are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

iv) Higher order modulations

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

B) Other channel bandwidth standalone SAR test requirements

For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section A) to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

8. TUNE-UP LIMIT

The LTE Band 12 power adjust procedure

1.4 MHz QPSK/16QAM: 23dBm [-2.0dB~~+0.8dB]

3 MHz QPSK/16QAM: 23dBm [-2.0dB~~+0.8dB]

5 MHz QPSK/16QAM: 23dBm [-2.0dB~~+0.8dB]

10 MHz QPSK/16QAM: 23dBm [-2.0dB~~+0.9dB]

The LTE Band 17 power adjust procedure

5 MHz QPSK/16QAM: 23dBm [-1.0dB~~+0.9dB]

10 MHz QPSK/16QAM: 23dBm [-1.0dB~~+0.9dB]

The CDMA BC0 power adjust procedure

1xRTT: 25dBm [-2.0dB~~+0.5dB]

1XEVDO Rev.0: 25dBm [-2.0dB~~+0.5dB]

1XEVDO Rev.A: 25dBm[-2.0dB~~+0.5dB]

The CDMA BC1 power adjust procedure

1xRTT: 24dBm [-2.0dB~~+0.9dB]

1XEVDO Rev.0: 24dBm [-2.0dB~~+0.9dB]

1XEVDO Rev.A: 24dBm [-1.0dB~~+0.9dB]

The CDMA BC10 power adjust procedure

1xRTT: 24dBm [-2.0dB~~+0.9dB]

1XEVDO Rev.0: 24dBm [-2.0dB~~+0.9dB]

1XEVDO Rev.A: 24dBm [-1.0dB~~+0.9dB]

9. MEASUREMENT RESULTS

Result: Passed

Date of testing	:	2018.09.05~2018.09.07; 2018.11.01
Ambient temperature	:	20℃~22℃
Relative humidity	:	50~68%

9.1. Conducted Power

For the measurements a Rohde & Schwarz Radio Communication Tester CMU 200 was used.

SAR drift measured at the same position in liquid before and after each SAR test.

Note: CMU200 measures GSM peak and average output power for active timeslots. For SAR the time based 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
Time based 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.

CDMA BC0 Conducted Power Measurement Results

CDMA BC0	Conducted Power (dBm)		
	1013CH	384CH	777CH
·1xRTT RC1+SO55	**25.40**	**25.45**	**25.39**
1xRTT RC3+SO55	25.08	25.21	25.18
1xRTT RC3+SO32 (FCH)	25.07	25.13	25.16
1xRTT RC3+SO32 (SCH)	25.26	25.13	25.18
1xEVDO Rev.0 RTAP 153.6	25.01	25.15	25.19
1xEVDO Rev.A RETAP 4096	25.11	25.12	25.13
RC8+SO75 (1X)	25.08	25.11	25.18

CDMA BC1 Conducted Power Measurement Results

CDMA BC1	Conducted Power (dBm)		
	25CH	600CH	1175CH
·1xRTT RC1+SO55	**24.80**	**24.89**	**24.86**
1xRTT RC3+SO55	24.68	24.82	24.81
1xRTT RC3+SO32 (FCH)	24.67	24.74	24.77
1xRTT RC3+SO32 (SCH)	24.76	24.74	24.73
1xEVDO Rev.0 RTAP 153.6	24.77	24.77	24.75
1xEVDO Rev.A RETAP 4096	24.68	24.72	24.71
RC8+SO75 (1X)	24.70	24.84	24.81

CDMA BC10 Conducted Power Measurement Results

CDMA BC10	Conducted Power (dBm)		
	476CH	580CH	684CH
·1xRTT RC1+SO55	**24.81**	**24.85**	**24.80**
1xRTT RC3+SO55	24.78	24.81	24.88
1xRTT RC3+SO32 (FCH)	24.77	24.79	24.80
1xRTT RC3+SO32 (SCH)	24.66	24.74	24.83
1xEVDO Rev.0 RTAP 153.6	24.60	24.67	24.60
1xEVDO Rev.A RETAP 4096	24.57	24.64	24.68
RC8+SO75 (1X)	24.69	24.66	24.64

Conducted power measurements of LTE Band 12

Bandwidth	Modulation	RB size	RB offset	Channel 23017	Channel 23095	Channel 23173
1.4MHz	QPSK	1	0	23.66	23.62	23.72
		1	3	23.69	23.70	23.72
		1	5	23.71	23.60	23.74
		3	0	23.73	23.73	23.88
		3	2	23.76	23.74	23.86
		3	3	23.77	23.73	23.86
		6	0	22.69	22.69	22.79
	16QAM	1	0	22.93	22.96	23.17
		1	3	23.18	23.14	23.42
		1	5	23.00	22.98	23.20
		3	0	22.88	22.97	22.94
		3	2	22.91	22.98	22.97
		3	3	22.95	22.92	22.95
		6	0	21.82	21.64	21.77

Bandwidth	Modulation	RB size	RB offset	Channel 23025	Channel 23095	Channel 23165
3MHz	QPSK	1	0	23.48	23.62	23.73
		1	7	23.74	23.70	23.70
		1	14	23.56	23.57	23.79
		8	0	22.55	22.62	22.77
		8	4	22.57	22.67	22.82
		8	7	22.58	22.70	22.79
		15	0	22.61	22.60	22.79
	16QAM	1	0	22.81	23.09	23.03
		1	7	23.13	23.35	23.33
		1	14	22.93	23.10	23.12
		8	0	21.63	21.67	21.73
		8	4	21.73	21.69	21.81
		8	7	21.67	21.68	21.77
		15	0	21.55	21.67	21.78

Bandwidth	Modulation	RB size	RB offset	Channel 23035	Channel 23095	Channel 23155
5MHz	QPSK	1	0	23.31	23.53	23.69
		1	12	23.70	23.77	23.79
		1	24	23.11	23.22	23.13
		12	0	22.77	22.63	22.65
		12	6	22.68	22.72	22.75
		12	13	22.87	22.74	22.56
		25	0	22.80	22.69	22.57
	16QAM	1	0	22.78	22.98	22.98
		1	13	23.11	23.25	23.13
		1	24	22.92	23.06	23.12
		12	0	21.80	21.70	21.66
		12	6	21.75	21.77	21.76
		12	13	21.88	21.82	21.57
		25	0	21.82	21.74	21.64

Bandwidth	Modulation	RB size	RB offset	Channel 23060	Channel 23095	Channel 23130
10MHz	QPSK	1	0	23.41	23.50	23.61
		1	24	**23.88**	**23.89**	**23.87**
		1	49	23.59	23.61	23.77
		25	0	22.77	22.63	22.65
		25	12	22.68	22.72	22.75
		25	25	22.87	22.74	22.56
		50	0	22.80	22.69	22.57
	16QAM	1	0	22.78	22.98	22.98
		1	24	23.11	23.25	23.13
		1	49	22.92	23.06	23.12
		25	0	21.80	21.70	21.66
		25	12	21.75	21.77	21.76
		25	25	21.88	21.82	21.57
		50	0	21.82	21.74	21.64

Conducted power measurements of LTE Band 17

Bandwidth	Modulation	RB size	RB offset	Channel 23755	Channel 23790	Channel 23825
5MHz	QPSK	1	0	23.68	23.66	23.67
		1	12	23.77	23.74	23.71
		1	24	23.71	22.78	23.66
		12	0	22.86	22.66	22.99
		12	6	23.28	22.77	23.29
		12	13	21.96	21.80	22.99
		25	0	21.68	21.66	23.67
	16QAM	1	0	22.62	23.69	22.89
		1	13	22.83	24.1	22.81
		1	24	22.64	23.76	22.75
		12	0	21.76	22.95	22.03
		12	6	21.91	23.35	21.98
		12	13	21.73	23.11	21.89
		25	0	22.73	22.89	22.88

Bandwidth	Modulation	RB size	RB offset	Channel 23790	Channel 23790	Channel 23790
10MHz	QPSK	1	0	23.64	23.63	23.69
		1	24	**23.74**	**23.84**	**23.84**
		1	49	23.73	23.78	23.87
		25	0	22.70	22.68	22.74
		25	12	22.78	22.82	22.80
		25	25	22.63	22.64	22.63
		50	0	22.64	22.60	22.68
	16QAM	1	0	22.98	23.13	23.05
		1	24	23.17	23.34	23.13
		1	49	23.04	23.24	23.17
		25	0	21.73	21.74	21.74
		25	12	21.76	21.85	21.80
		25	25	21.68	21.69	21.63
		50	0	21.64	21.66	21.67

9.2. SAR measurement 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 2.0W/kg, for 1-g or 10-g respectively, when the transmission band is ≤100MHz. When the maximum output power variation across the required test channels is >1/2 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 measure 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 KDB 941225 D06 Hotspot Mode SAR v02:r01, the DUT dimension is bigger than 9cm*5cm, 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.
5) Per KDB648474 D04v01r03, SAR is evaluated without a headset connected to the device. When the standalone reported body-worn SAR is ≤1.2W/kg, no additional SAR evaluations using a headset are required.
6) 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 >1.5W/kg, or >7.0W/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 plots-processing (refer to appendix B for details).

WLAN Notes

Per KDB 248227 D01v02r02, for all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

Per KDB 248227 D01v02r02, for 802.11g/n SAR testing is required. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is > 1.2 W/kg.

Per KDB 248227 D01v02r02, for OFDM transmission configurations in the 2.4 GHz bands, When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11g/n mode is used for SAR measurement, on the highest measured output power channel for each frequency band.

9.3. CDMA BC0 SAR results

Head Exposure Condition

Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
CDMA BC0	1xRTT RC1+SO55	Left Cheek	384	836.52	25.45	25.50	1.012	0.149	0.151
CDMA BC0	1xRTT RC1+SO55	Left Tilted	384	836.52	25.45	25.50	1.012	0.046	0.047
CDMA BC0	**1xRTT RC1+SO55**	**Right Cheek**	**384**	**836.52**	**25.45**	**25.50**	**1.012**	**0.205**	**0.207**
CDMA BC0	1xRTT RC1+SO55	Right Tilted	384	836.52	25.45	25.50	1.012	0.057	0.058

Body Hotspot Exposure Condition (Separation Distance is 1.0 cm)

Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
CDMA BC0	**1xRTT RC1+SO55**	**Front Side**	**384**	**836.52**	**25.45**	**25.50**	**1.012**	**0.228**	**0.231**
CDMA BC0	1xRTT RC1+SO55	Back Side	384	836.52	25.45	25.50	1.012	0.219	0.222
CDMA BC0	1xRTT RC1+SO55	Left Side	384	836.52	25.45	25.50	1.012	0.032	0.032
CDMA BC0	1xRTT RC1+SO55	Right Side	384	836.52	25.45	25.50	1.012	0.160	0.162
CDMA BC0	1xRTT RC1+SO55	Bottom Side	384	836.52	25.45	25.50	1.012	0.201	0.203

Extremity Hotspot Exposure Condition (Separation Distance is 0 cm)

Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
CDMA BC0	**1xRTT RC1+SO55**	**Front Side**	**384**	**836.52**	**25.45**	**25.50**	**1.012**	**0.387**	**0.392**
CDMA BC0	1xRTT RC1+SO55	Back Side	384	836.52	25.45	25.50	1.012	0.302	0.306
CDMA BC0	1xRTT RC1+SO55	Left Side	384	836.52	25.45	25.50	1.012	0.034	0.034
CDMA BC0	1xRTT RC1+SO55	Right Side	384	836.52	25.45	25.50	1.012	0.214	0.217
CDMA BC0	1xRTT RC1+SO55	Bottom Side	384	836.52	25.45	25.50	1.012	0.264	0.267

Body-worn Exposure Condition (Separation Distance is 1.5 cm)

Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
CDMA BC0	**1xRTT RC1+SO55**	**Front Side**	**384**	**836.52**	**25.45**	**25.50**	**1.012**	**0.167**	**0.169**
CDMA BC0	1xRTT RC1+SO55	Back Side	384	836.52	25.45	25.50	1.012	0.155	0.157

9.1. CDMA BC1 SAR results

Head Exposure Condition

Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
CDMA BC1	**1xRTT RC1+SO55**	**Left Cheek**	**600**	**1880**	**24.89**	**24.90**	**1.002**	**0.361**	**0.362**
CDMA BC1	1xRTT RC1+SO55	Left Tilted	600	1880	24.89	24.90	1.002	0.048	0.048
CDMA BC1	1xRTT RC1+SO55	Right Cheek	600	1880	24.89	24.90	1.002	0.229	0.230
CDMA BC1	1xRTT RC1+SO55	Right Tilted	600	1880	24.89	24.90	1.002	0.033	0.033

Body Hotspot Exposure Condition (Separation Distance is 1.0 cm)

Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
CDMA BC1	1xRTT RC1+SO55	Front Side	600	1880	24.89	24.90	1.002	0.703	0.705
CDMA BC1	1xRTT RC1+SO55	Back Side	600	1880	24.89	24.90	1.002	0.068	0.068
CDMA BC1	1xRTT RC1+SO55	Left Side	600	1880	24.89	24.90	1.002	0.031	0.031
CDMA BC1	1xRTT RC1+SO55	Right Side	600	1880	24.89	24.90	1.002	1.060	1.062
CDMA BC1	1xRTT RC1+SO55	Bottom Side	600	1880	24.89	24.90	1.002	0.081	0.081
CDMA BC1	**1xRTT RC1+SO55**	**Bottom Side**	**600**	**1880**	**24.80**	**24.90**	**1.023**	**1.140**	**1.167**
CDMA BC1	1xRTT RC1+SO55	Bottom Side	600	1880	24.86	24.90	1.009	1.030	1.040

Extremity Hotspot Exposure Condition (Separation Distance is 0 cm)

Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
CDMA BC1	1xRTT RC1+SO55	Front Side	600	1880	24.89	24.90	1.002	1.045	1.047
CDMA BC1	1xRTT RC1+SO55	Back Side	600	1880	24.89	24.90	1.002	0.351	0.352
CDMA BC1	1xRTT RC1+SO55	Left Side	600	1880	24.89	24.90	1.002	0.168	0.168
CDMA BC1	1xRTT RC1+SO55	Right Side	600	1880	24.89	24.90	1.002	1.355	1.358
CDMA BC1	1xRTT RC1+SO55	Bottom Side	600	1880	24.89	24.90	1.002	0.188	0.188
CDMA BC1	**1xRTT RC1+SO55**	**Bottom Side**	**600**	**1880**	**24.80**	**24.90**	**1.023**	**1.480**	**1.514**
CDMA BC1	1xRTT RC1+SO55	Bottom Side	600	1880	24.86	24.90	1.009	1.245	1.256

Body-worn Exposure Condition (Separation Distance is 1.5 cm)

Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
CDMA BC1	**1xRTT RC1+SO55**	**Front Side**	**600**	**1880**	**24.89**	**24.90**	**1.002**	**0.395**	**0.396**
CDMA BC1	1xRTT RC1+SO55	Back Side	600	1880	24.89	24.90	1.002	0.304	0.305

9.1. CDMA BC10 SAR results

Head Exposure Condition

Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
CDMA BC10	1xRTT RC1+SO55	Left Cheek	580	820.5	24.85	24.90	1.012	0.405	0.410
CDMA BC10	1xRTT RC1+SO55	Left Tilted	580	820.5	24.85	24.90	1.012	0.046	0.047
CDMA BC10	**1xRTT RC1+SO55**	**Right Cheek**	**580**	**820.5**	**24.85**	**24.90**	**1.012**	**0.522**	**0.528**
CDMA BC10	1xRTT RC1+SO55	Right Tilted	580	820.5	24.85	24.90	1.012	0.057	0.058

Body Hotspot Exposure Condition (Separation Distance is 1.0 cm)

Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
CDMA BC10	1xRTT RC1+SO55	Front Side	580	820.5	24.85	24.90	1.012	0.654	0.662
CDMA BC10	1xRTT RC1+SO55	Back Side	580	820.5	24.85	24.90	1.012	0.588	0.595
CDMA BC10	1xRTT RC1+SO55	Left Side	580	820.5	24.85	24.90	1.012	0.025	0.025
CDMA BC10	1xRTT RC1+SO55	Right Side	580	820.5	24.85	24.90	1.012	0.339	0.343
CDMA BC10	**1xRTT RC1+SO55**	**Bottom Side**	**580**	**820.5**	**24.85**	**24.90**	**1.012**	**0.671**	**0.679**

Extremity Hotspot Exposure Condition (Separation Distance is 0 cm)

Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
CDMA BC10	1xRTT RC1+SO55	Front Side	580	820.5	24.85	24.90	1.012	0.308	0.312
CDMA BC10	1xRTT RC1+SO55	Back Side	580	820.5	24.85	24.90	1.012	0.289	0.292
CDMA BC10	1xRTT RC1+SO55	Left Side	580	820.5	24.85	24.90	1.012	0.021	0.021
CDMA BC10	1xRTT RC1+SO55	Right Side	580	820.5	24.85	24.90	1.012	0.117	0.118
CDMA BC10	**1xRTT RC1+SO55**	**Bottom Side**	**580**	**820.5**	**24.85**	**24.90**	**1.012**	**0.383**	**0.388**

Body-worn Exposure Condition (Separation Distance is 1.5 cm)

Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
CDMA BC10	**1xRTT RC1+SO55**	**Front Side**	**580**	**836.52**	**24.85**	**24.90**	**1.012**	**0.548**	**0.554**
CDMA BC10	1xRTT RC1+SO55	Back Side	580	836.52	24.85	24.90	1.012	0.529	0.535

9.1. LTE Band 12 SAR results

Head Exposure Condition

Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
LTE Band12	10M QPSK (1#25)	Left Cheek	23095	707.5	23.89	23.90	1.002	0.120	0.120
LTE Band12	10M QPSK (1#25)	Left Tilted	23095	707.5	23.89	23.90	1.002	0.027	0.027
LTE Band12	**10M QPSK (1#25)**	**Right Cheek**	**23095**	**707.5**	**23.89**	**23.90**	**1.002**	**0.155**	**0.155**
LTE Band12	10M QPSK (1#25)	Right Tilted	23095	707.5	23.89	23.90	1.002	0.033	0.033
50%RB									
LTE Band 12	10M QPSK (1#25)	Right Cheek	23095	707.5	23.89	23.90	1.002	0.146	0.146

Body Hotspot Exposure Condition (Separation Distance is 1.0 cm)

Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
LTE Band12	10M QPSK (1#25)	Front Side	23095	707.5	23.89	23.90	1.002	0.137	0.137
LTE Band12	**10M QPSK (1#25)**	**Back Side**	**23095**	**707.5**	**23.89**	**23.90**	**1.002**	**0.169**	**0.169**
LTE Band12	10M QPSK (1#25)	Left Side	23095	707.5	23.89	23.90	1.002	0.019	0.019
LTE Band12	10M QPSK (1#25)	Right Side	23095	707.5	23.89	23.90	1.002	0.052	0.052
LTE Band12	10M QPSK (1#25)	Bottom Side	23095	707.5	23.89	23.90	1.002	0.159	0.159
50%RB									
LTE Band12	10M QPSK (RB50#0)	Back Side	23095	707.5	23.89	23.90	1.002	0.163	0.163

Extremity Hotspot Exposure Condition (Separation Distance is 0 cm)

Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
LTE Band12	10M QPSK (1#25)	Front Side	23095	707.5	23.89	23.90	1.002	0.437	0.438
LTE Band12	**10M QPSK (1#25)**	**Back Side**	**23095**	**707.5**	**23.89**	**23.90**	**1.002**	**0.469**	**0.470**
LTE Band12	10M QPSK (1#25)	Left Side	23095	707.5	23.89	23.90	1.002	0.119	0.119
LTE Band12	10M QPSK (1#25)	Right Side	23095	707.5	23.89	23.90	1.002	0.152	0.152
LTE	10M	Bottom	23095	707.5	23.89	23.90	1.002	0.259	0.260

Band12	QPSK (1#25)	Side							
50%RB									
LTE Band12	10M QPSK (RB50#0)	Back Side	23095	707.5	23.89	23.90	1.002	0.244	0.244

Body-worn Exposure Condition (Separation Distance is 1.5 cm)

Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
LTE Band12	10M QPSK (RB50#0)	Front Side	23095	707.5	23.89	23.90	1.002	0.116	0.116
LTE Band12	**10M QPSK (RB50#0)**	**Back Side**	**23095**	**707.5**	**23.89**	**23.90**	**1.002**	**0.150**	**0.150**
50%RB									
LTE Band12	10M QPSK (RB50#0)	Back Side	23095	707.5	23.89	23.90	1.002	0.148	0.148

9.1. LTE Band 17SAR results

Head Exposure Condition

Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
LTE Band 17	10M QPSK (1#25)	Left Cheek	23790	710	23.84	23.90	1.014	0.082	0.083
LTE Band 17	10M QPSK (1#25)	Left Tilted	23790	710	23.84	23.90	1.014	0.019	0.019
LTE Band 17	**10M QPSK (1#25)**	**Right Cheek**	**23790**	**710**	**23.84**	**23.90**	**1.014**	**0.119**	**0.121**
LTE Band 17	10M QPSK (1#25)	Right Tilted	23790	710	23.84	23.90	1.014	0.025	0.025
50%RB									
LTE Band 17	10M QPSK (1#25)	Right Cheek	23790	710	23.84	23.90	1.014	0.108	0.110

Body Hotspot Exposure Condition (Separation Distance is 1.0 cm)

Band	**Mode**	**Test Position**	**Ch.**	**Freq. (MHz)**	**Burst Average Power (dBm)**	**Tune-Up Limit (dBm)**	**Scaling Factor**	**Measured SAR (W/kg)**	**Reported SAR (W/kg)**
LTE Band 17	10M QPSK (1#25)	Front Side	23790	710	23.84	23.90	1.014	0.142	0.144
LTE Band 17	**10M QPSK (1#25)**	**Back Side**	**23790**	**710**	**23.84**	**23.90**	**1.014**	**0.169**	**0.171**
LTE	10M QPSK	Left Side	23790	710	23.84	23.90	1.014	0.039	0.040

Band 17	(1#25)								
LTE Band 17	10M QPSK (1#25)	Right Side	23790	710	23.84	23.90	1.014	0.157	0.159
LTE Band 17	10M QPSK (1#25)	Bottom Side	23790	710	23.84	23.90	1.014	0.139	0.141
50%RB									
LTE Band 17	10M QPSK (1#25)	Back Side	23790	710	23.84	23.90	1.014	0.163	0.165

Extremity Hotspot Exposure Condition (Separation Distance is 0 cm)

Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
LTE Band 17	10M QPSK (1#25)	Front Side	23790	710	23.84	23.90	1.014	0.442	0.448
LTE Band 17	**10M QPSK (1#25)**	**Back Side**	**23790**	**710**	**23.84**	**23.90**	**1.014**	**0.505**	**0.512**
LTE Band 17	10M QPSK (1#25)	Left Side	23790	710	23.84	23.90	1.014	0.231	0.234
LTE Band 17	10M QPSK (1#25)	Right Side	23790	710	23.84	23.90	1.014	0.351	0.356
LTE Band 17	10M QPSK (1#25)	Bottom Side	23790	710	23.84	23.90	1.014	0.232	0.235
50%RB									
LTE Band 17	10M QPSK (1#25)	Back Side	23790	710	23.84	23.90	1.014	0.463	0.469

Body-worn Exposure Condition (Separation Distance is 1.5 cm)

Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
LTE Band 17	10M QPSK (1#25)	Front Side	23790	710	23.84	23.90	1.014	0.146	0.148
LTE Band 17	**10M QPSK (1#25)**	**Back Side**	**23790**	**710**	**23.84**	**23.90**	**1.014**	**0.157**	**0.159**
50%RB									
LTE Band 17	10M QPSK (1#25)	Back Side	23790	710	23.84	23.90	1.014	0.151	0.153

9.2. Repeated SAR results

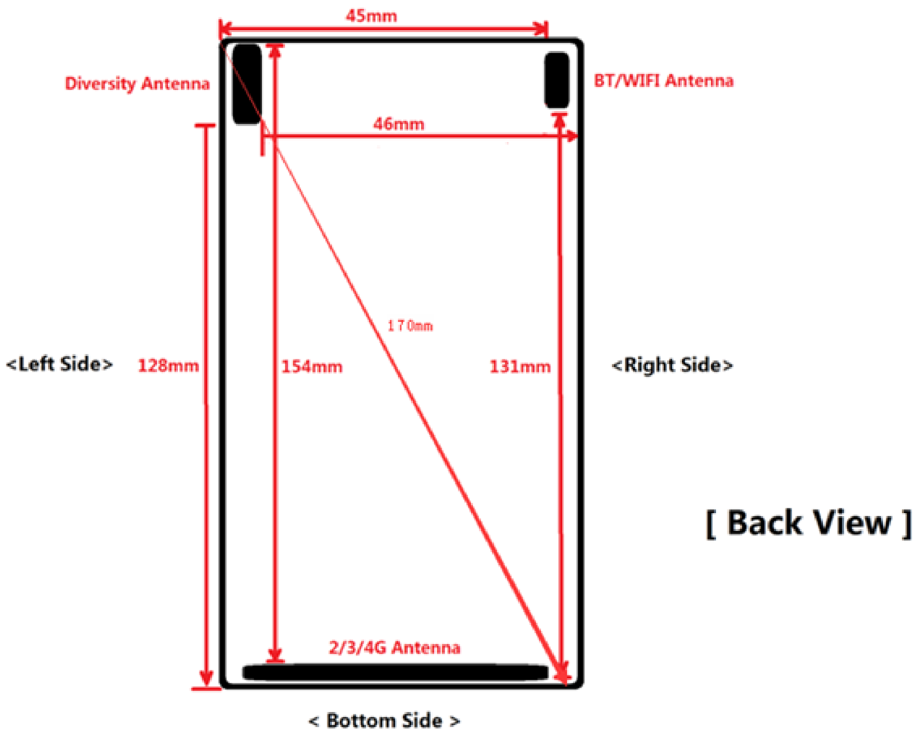
Remark:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR<1.45W/kg, only one repeated measurement is required.
3. The ratio is the difference in percentage between original and repeated measured SAR.
4. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Measured SAR (W/kg)	Reported SAR (W/kg)
CDMA BC1	1xRTT RC1+SO55	Bottom Side	600	1880	24.80	24.90	1.023	1.101	1.126

10. EXPOSURE POSITIONS CONSIDERATION

10.1.Multiple Transmitter Evaluation



Mode	Front Side	Back Side	Left Side	Right Side	Top Side	Bottom Side
Main Antenna	YES	YES	YES	YES	NO	YES

10.2.Stand-alone SAR test exclusion

FCC Stand-alone SAR test can be found on report No.: EED32K00215411

IC Stand-alone SAR test can be found on report No.: EED32K00215511

10.3.Simultaneous Transmission Possibilities

FCC Simultaneous transmission calculation can be found on report No.: EED32K00215411

IC Simultaneous transmission calculation can be found on report No.: EED32K00215511

11. PHOTOGRAPHS OF THE TEST SET-UP

Photo 1: Measurement System DASY5	Photo 2: Left Head Check
	
Photo 3: Left Head Tilted	Photo 4: Right Head Check

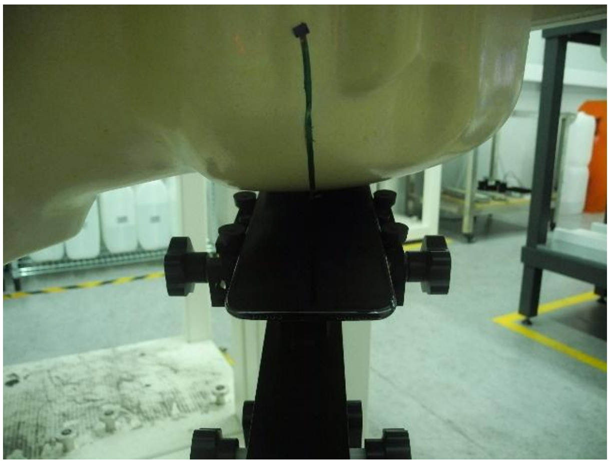
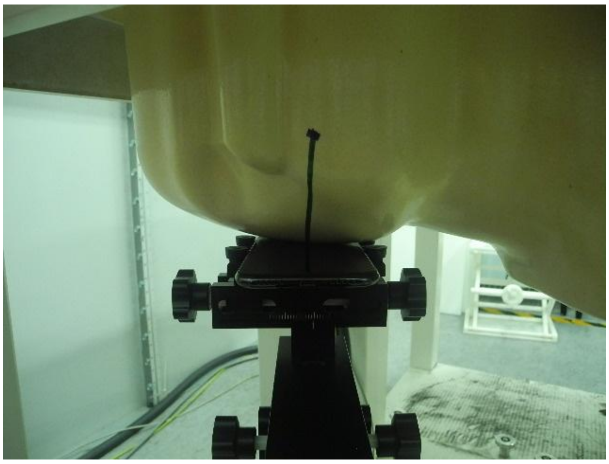

	

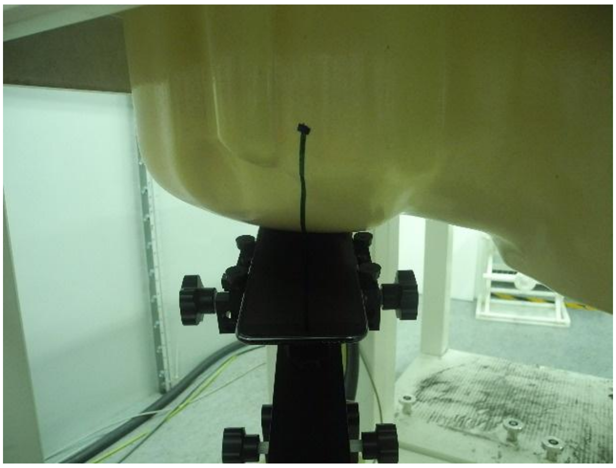
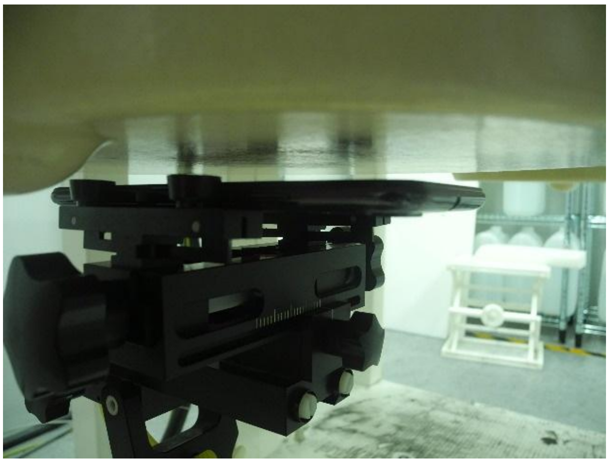
Photo 5: Right Head Tilted	Photo 6: Front Side 10mm
	

Photo 7: Rear View 10mm	Photo 8: Left Side 10mm

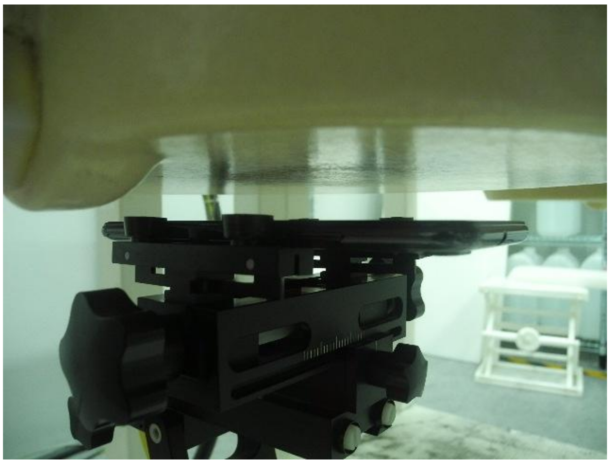
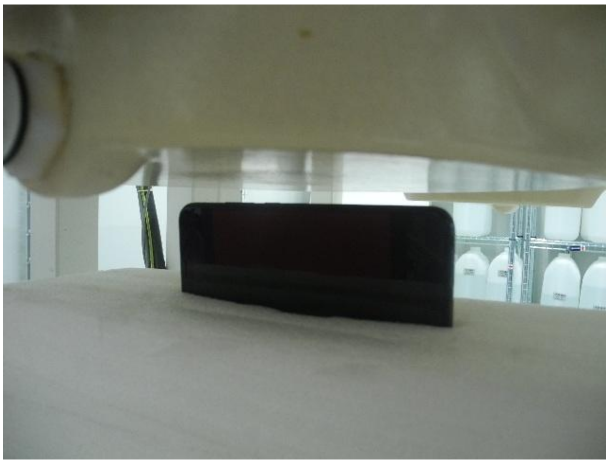

	

Photo 9: Right Side 10mm	Photo 10: Top Side 10mm

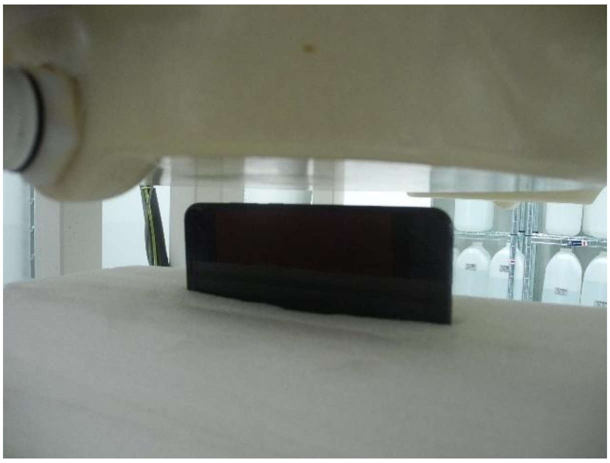
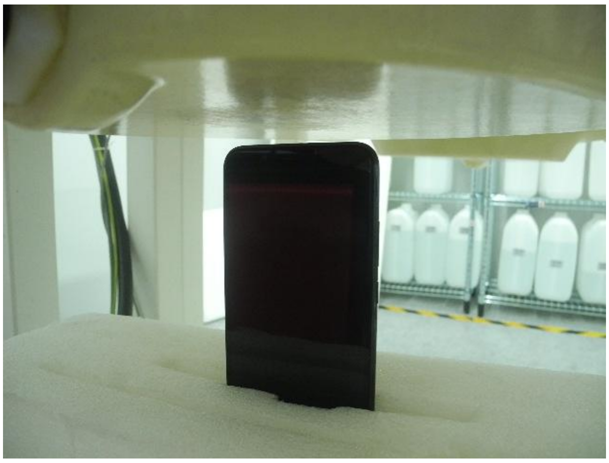

	

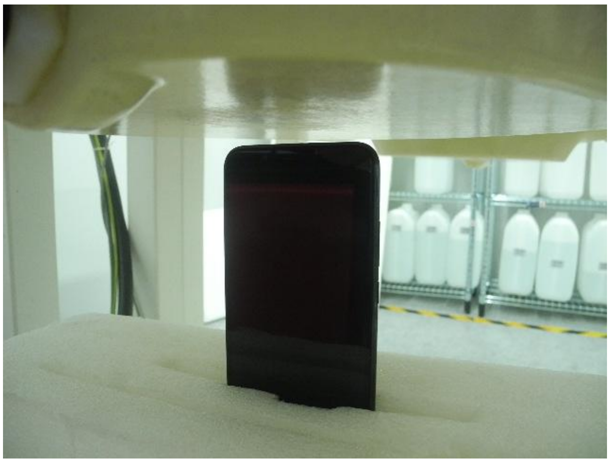
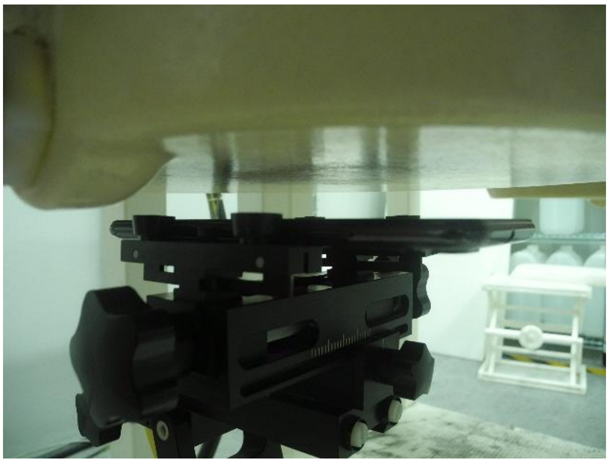
Photo 11: Bottom Side 10mm	Photo 12: Front Side 15mm
	

Photo 13: Rear View 15mm	Photo 14: Front Side 0mm

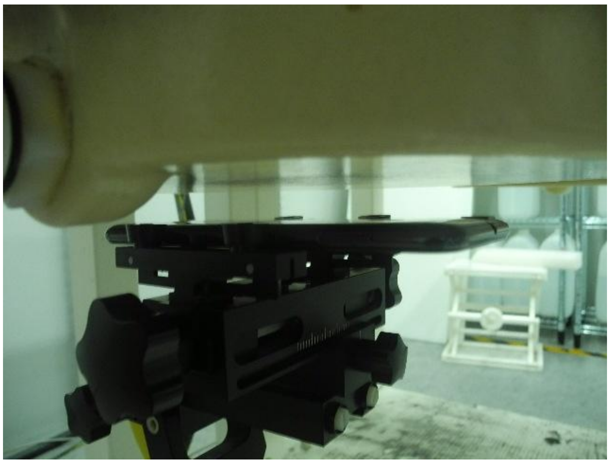
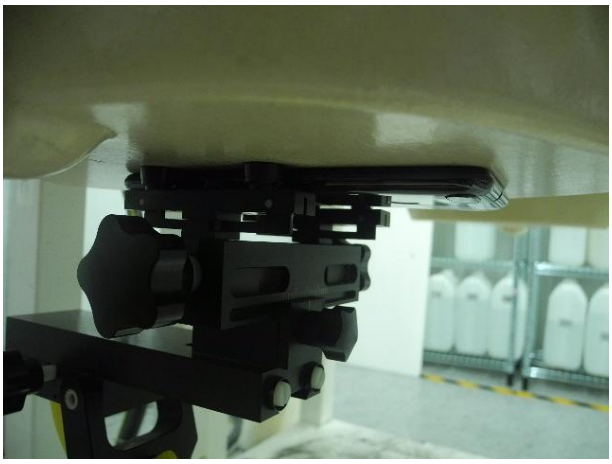
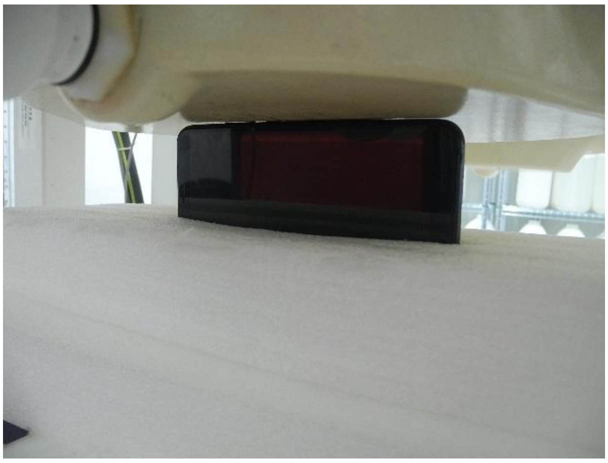

	

Photo 15: Rear View 0mm	Photo 16: Left Side 0mm
	
Photo 17: Right Side 0mm	Photo 18: Top Side 0mm

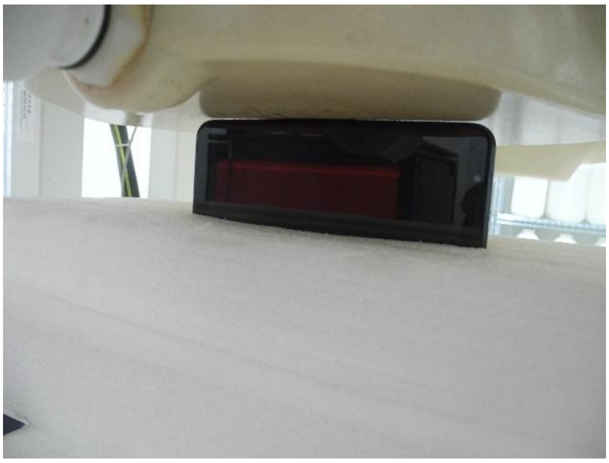
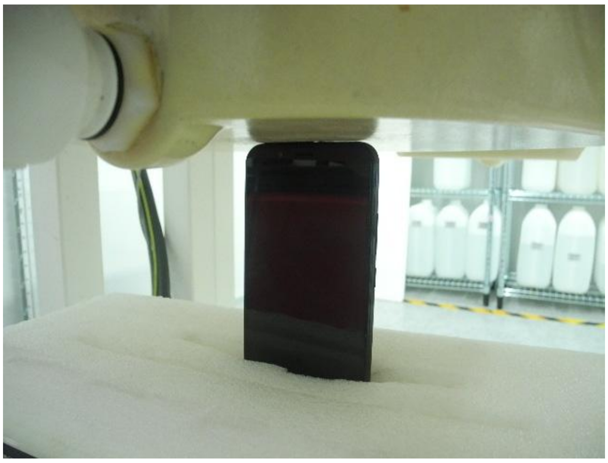
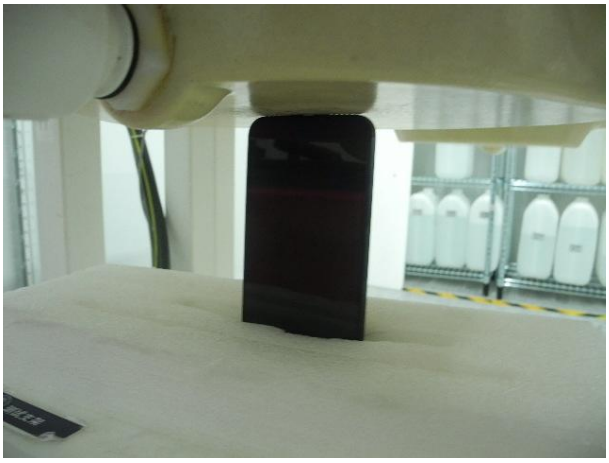

	

Photo 19: Bottom Side 0mm	N/A

	N/A

Photograph: Liquid depth

Photo 20: Body 750 Depth (15.0cm)	Photo 21: Body835 Depth (15.0cm)

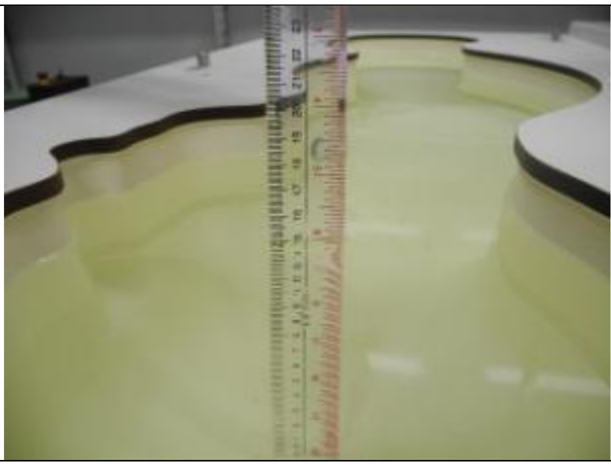
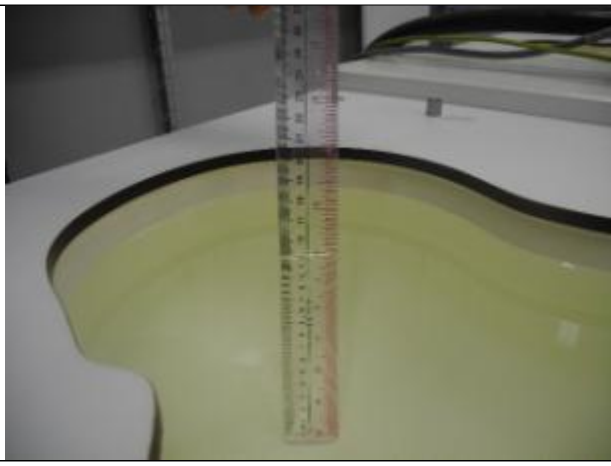
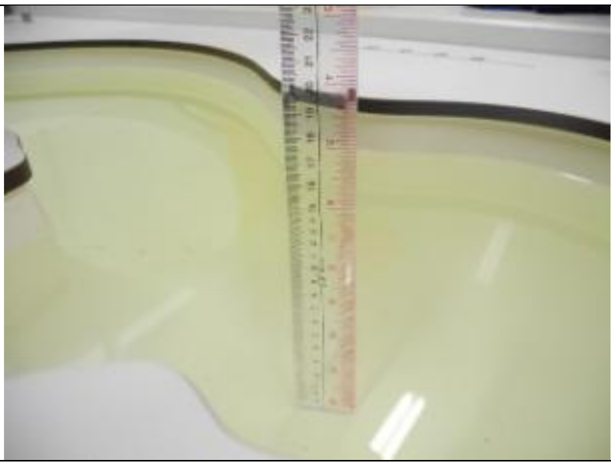

	

Photo 22: Body1900 Depth (15.0cm)	N/A
	N/A